32 Input DC Block I/O Module

Cat. No. 1791-32B0 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. 1791–32B0 (PLC version shown)

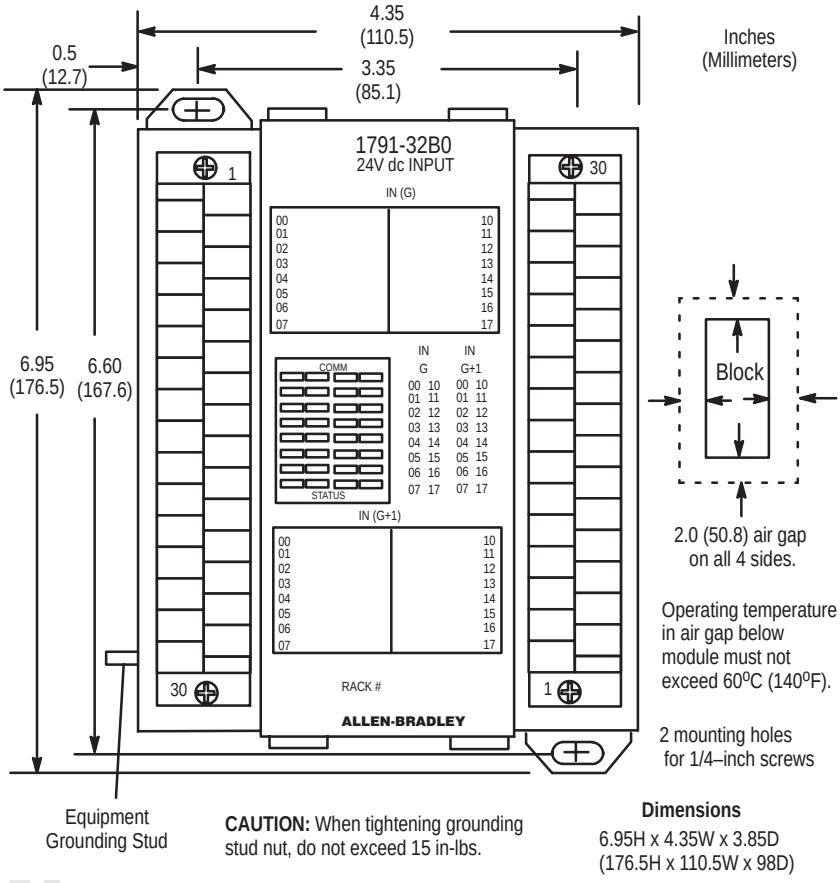
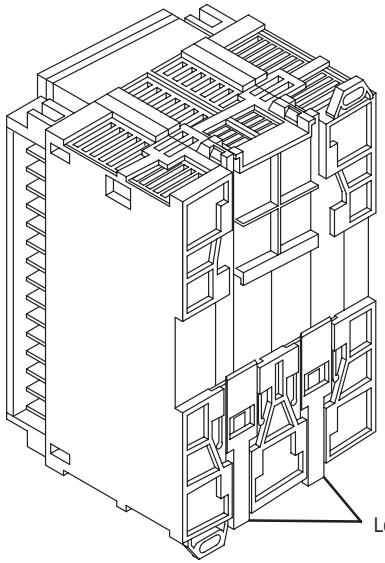
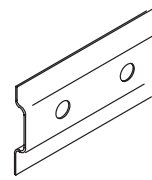


Figure 2
Mounting on a DIN Rail



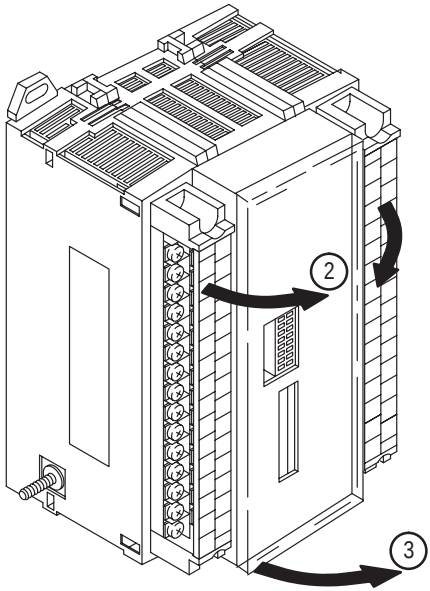


DIN Rail

A-B Pt. No. 199-DR1
46277-3
EN 50022
(35 x 7.5mm)

1. Hook top of slot over DIN rail.
2. While pressing block against rail, pull down on locking levers.
3. When block is flush against rail, push up on locking levers to secure block to rail.

Figure 3
Inserting Labels



A set of labels is supplied with your module. Select the proper module designation labels (PLC or SLC) for the front door and terminal strips.

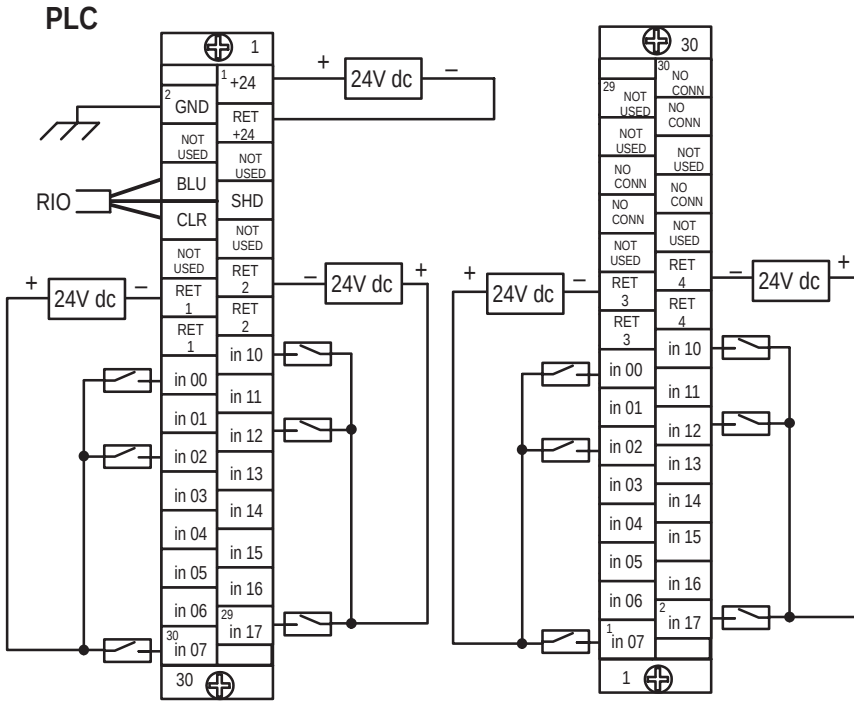
1. Remove die-cut labels from package. Select correct labels for your application. (PLC label is numbered 00–07 and 10–17. SLC is numbered 00–07 and 08–15.)
2. Remove plastic cover on terminal strip by flexing in middle. Slip terminal designation label with power and RIO designations into built-in holders in left terminal strip cover. Flex cover slightly to install. Repeat for the other terminal strip using the remaining label.
3. Open clear front door. Insert module designation label into slots in door.

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^2) stranded with 3/64 inch insulation

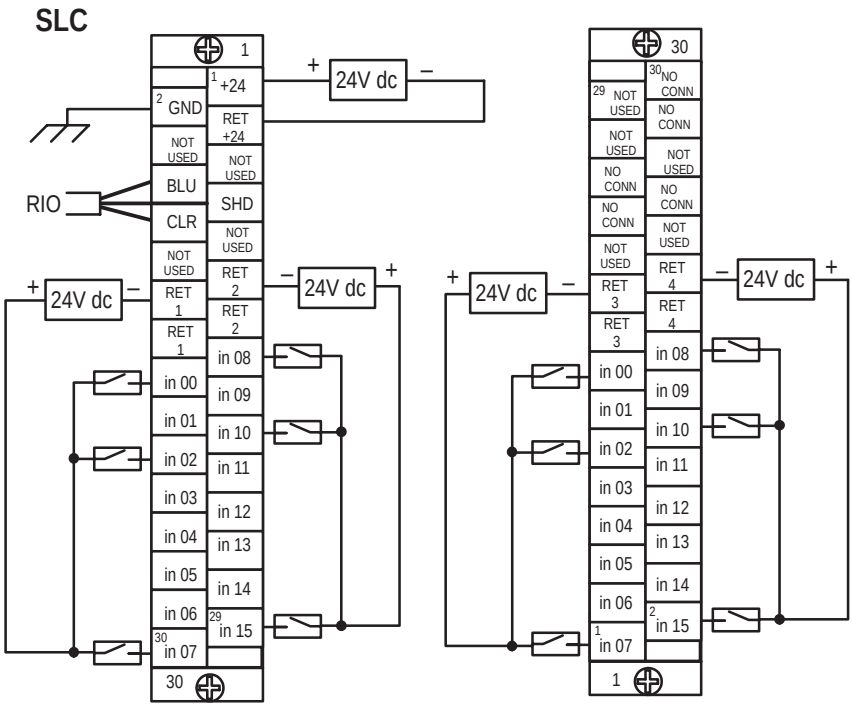
Connect wiring as shown in Figure 4 or Figure 5.

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



NOTE: RET 1 connections are internally connected together.
RET 2 connections are internally connected together.
RET 3 connections are internally connected together.
RET 4 connections are internally connected together.

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



NOTE: RET 1 connections are internally connected together.
RET 2 connections are internally connected together.
RET 3 connections are internally connected together.
RET 4 connections are internally connected together.

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.

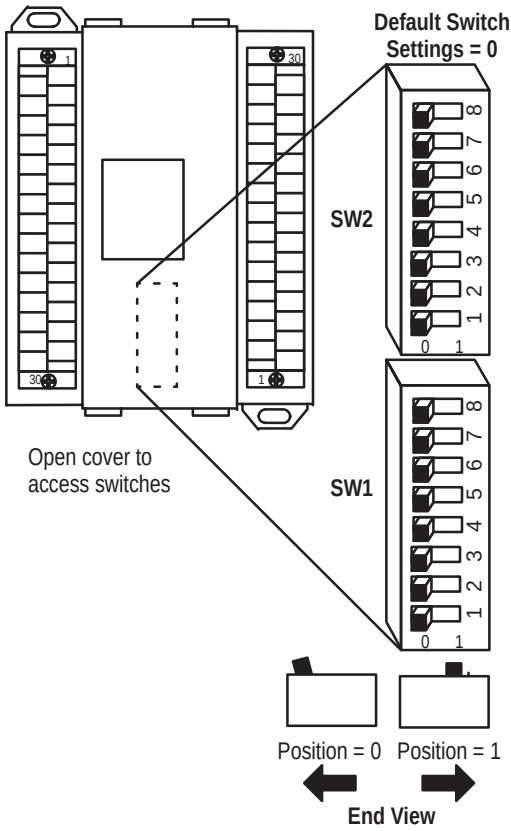
Refer to “Programmable Controller Wiring and Grounding Guidelines” (1770-4.1) for further information.

Table B
Wiring Block Designations

Connections	1791–32B0 Series B		Connector/Terminal	
	Designation	Description	Left	Right
Power Connections	+24	+24V dc Power	1	
	RET +24	dc Return	3	
	GND	Chassis ground	2[1]	
Remote I/O Connections	BLU	Blue wire – RIO	6	
	CLR	Clear wire – RIO	8	
	SHD	Shield – RIO	7	
I/O Connections				
Input (G)[6]	PLC: in 00 thru 07 SLC: in 00 thru 07	PLC: Input 00 thru 07 SLC: Input 00 thru 07	16, 18, 20, 22, 24, 26, 28, 30	
	RET 1	dc input return	12, 14[2]	
	PLC: in 10 thru 17 SLC: in 08 thru 15	PLC: Input 10 thru 17 SLC: Input 08 thru 15	15, 17, 19, 21, 23, 25, 27, 29	
	RET 2	dc input return	11, 13[3]	
Input (G + 1)[7]	PLC: in 00 thru 07 SLC: in 00 thru 07	PLC: Input 00 thru 07 SLC: Input 00 thru 07		15, 13, 11, 9, 7, 5, 3, 1
	RET 3	dc input return		19, 17[4]
	PLC: in 10 thru 17 SLC: in 08 thru 15	PLC: Input 10 thru 17 SLC: Input 08 thru 15		16, 14, 12, 10, 8, 6, 4, 2
	RET 4	dc input return		20, 18[5]
	Not used	For internal test only; not for customer use.	4, 5, 9, 10	29, 27, 26, 22, 21
	No Conn	No internal connection; customer can use.		30, 28, 25, 24, 23

[1] Connect chassis ground to equipment grounding stud. These are not internally connected.
[2] Terminals 12 and 14 are internally connected together.
[3] Terminals 11 and 13 are internally connected together.
[4] Terminals 19 and 17 are internally connected together.
[5] Terminals 20 and 18 are internally connected together.
[6] IN (G) = input module group.
[7] IN (G + 1) = input module group plus 1.

Figure 6
Switch Settings



SW2–8
Not used

SW2–7	Filter Speed Select (Inputs only)
0	Slow
1	Fast

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

SW2–5	Processor Restart/Lockout (PRL)
0	Processor Restart
1	Processor Lockout

SW2–4	Hold Last State
0	Reset Outputs
1	Hold Last State

SW2–3	Complementary I/O[1]
0	Non-Complemented System
0	Complementary Rack[1]
1	Primary Rack[1]

[1] See note.

Communication Rate		
SW2–2	SW2–1	Bits/s
0	0	57.6 K
0	1	115.2 K
1	0	230.4 K
1	1	230.4 K

Starting Quarter		
SW1–2	SW1–1	Module Group
0	0	0 (1st)
0	1	2 (2nd)
1	0	4 (3rd)
1	1	6 (4th)

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

Only block I/O modules with all inputs or all outputs can use complementary I/O.

NOTE: Set switch **SW2–3** to 0 if this rack will have a unique address (not complemented). If this rack address is a duplicate of another I/O block or chassis, set the switch to 1 for primary or 0 for complementary. Refer to Table C for the complementary I/O rack address.

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	0	1	1	0	0	0
				Rack 31	Rack 31	0	1	1	0	0	1
				Rack 32	Rack 32	0	1	1	0	1	0
				Rack 33	Rack 33	0	1	1	0	1	1
				Rack 34	Rack 34	0	1	1	1	0	0
				Rack 35	Rack 35	0	1	1	1	0	1
				Rack 36	Rack 36	0	1	1	1	1	0
				Rack 37	Rack 37	0	1	1	1	1	1
					Rack 40	1	0	0	0	0	0
					Rack 41	1	0	0	0	0	1
					Rack 42	1	0	0	0	1	0
					Rack 43	1	0	0	0	1	1
					Rack 44	1	0	0	1	0	0
					Rack 45	1	0	0	1	0	1
					Rack 46	1	0	0	1	1	0
					Rack 47	1	0	0	1	1	1
					Rack 50	1	0	1	0	0	0

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.

Table C
PLC–2 and PLC–5 With Complementary I/O

PLC–2 Rack Number	PLC–5 Rack Number	SW1 Switch Position					
		8	7	6	5	4	3
Rack 1	Not Valid	0	0	1	0	0	0
Rack 2	Rack 1	0	0	1	0	0	1
Rack 3	Rack 2	0	0	1	0	1	0
Rack 4	Rack 3	0	0	1	0	1	1
Rack 5	Rack 4	0	0	1	1	0	0
Rack 6	Rack 5	0	0	1	1	0	1
Rack 7	Rack 6	0	0	1	1	1	0
	Rack 7	0	0	1	1	1	1

When configured as complementary I/O:
PLC-2 can scan racks 01–07
PLC-5/11 can scan rack 03
PLC-5/20, PLC-5/30, PLC-5/40, PLC-5/60 can scan racks 01–07

NOTE: Remote rack numbers which can have a complementary rack are rack numbers 01 thru 07 only.

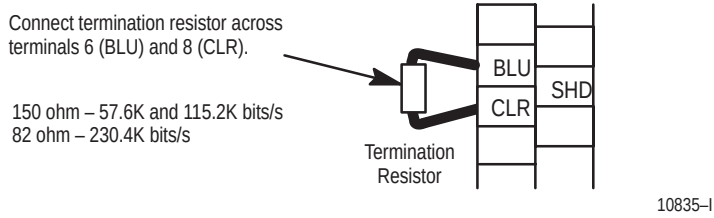
The SLC 500 controllers communicate with the block I/O using an I/O Scanner module (cat. no. 1747-SN series A). Refer to the user manual for the 1747-SN/A Scanner module for more information.

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.

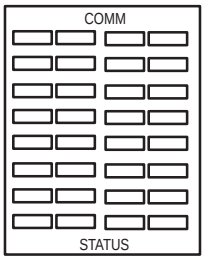
Figure 7
Installing the Termination Resistor



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

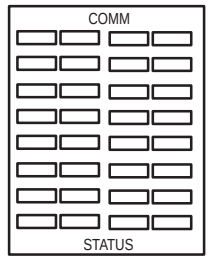
Indicators

PLC



IN G		IN G + 1	
00	10	00	10
01	11	01	11
02	12	02	12
03	13	03	13
04	14	04	14
05	15	05	15
06	16	06	16
07	17	07	17

SLC



IN G		IN G + 1	
00	08	00	08
01	09	01	09
02	10	02	10
03	11	03	11
04	12	04	12
05	13	05	13
06	14	06	14
07	15	07	15

Indicator		Description
COMM	OFF	Communication not established
	ON	Communication established
	Flashing	Processor in Program mode
STATUS	OFF	Normal
	ON	Error (hardware or software), block power low
	Flashing	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.

1791-32B0 Specifications

Input Specifications		
Inputs per Block		32 – 4 groups of 8
On-state Voltage Range		10–30V dc
On-state Current	Maximum Minimum	11.0mA @ 30V 2.5mA @ 10V
Off-state Voltage	Maximum	5V dc
Off-state Current	Minimum	1.5mA
Input Impedance	Maximum	3.4K ohms
Input Signal Delay	Fast Slow	1.0ms on; 5.0ms off (maximum) 1.0ms on; 18.0ms off (maximum)
General Specifications		
External Power (internally protected - no external fuse required)		
	Voltage Current	19.2–30V dc 300mA
Dimensions	Inches Millimeters	6.95H X 4.35W X 3.85D 176.5H X 110.5W X 98D
Isolation Power supply to RIO I/O Group-to-Group I/O Group-to-Logic		500V ac 500V ac 500V ac
Power Dissipation	Maximum	16.3 Watts
Thermal Dissipation	Maximum	55.6 BTU/hr
Environmental Conditions		
Operational Temperature Storage Temperature Relative Humidity		0 to 60°C (32 to 140°F) –40 to 85°C (–40 to 185°F) 5 to 95% noncondensing
Conductors	Wire Size Category	14 gauge ($2mm^2$) stranded maximum 3/64 inch insulation maximum 2[1]

[1] You use this conductor category information for planning conductor routing as described in the system level installation manual.

Installation Instructions
Block I/O
Cat. No. 1791-32B0 Series B

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