



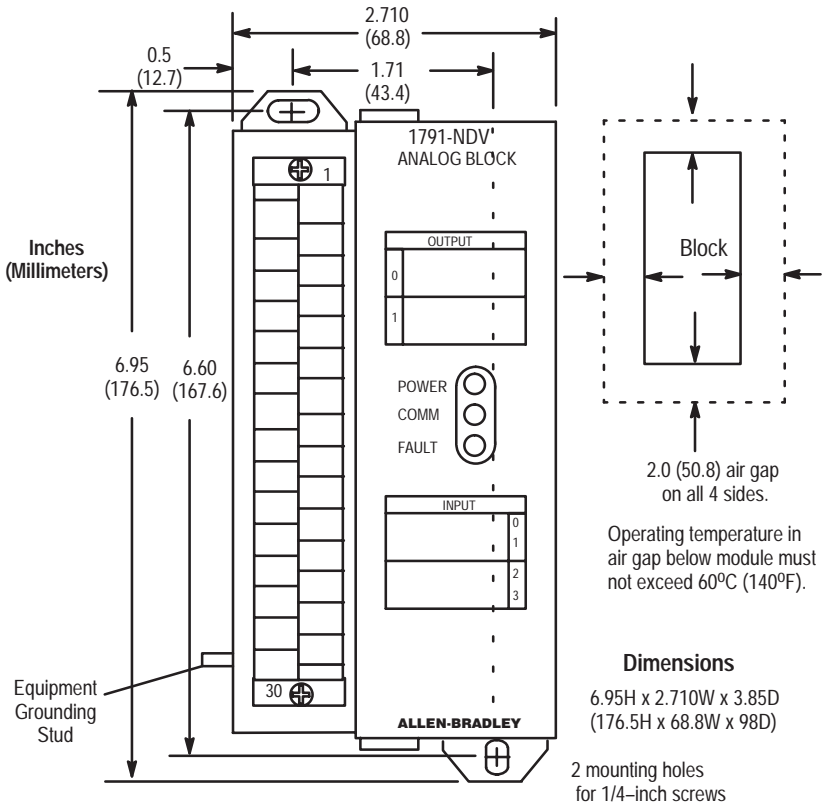
24V dc Analog Block I/O Module

Cat. No. 1791-NDV

Installation

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

Figure 1
Mounting Dimensions for the Analog Block I/O Module
Cat. No. 1791-NDV



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

Installation Instructions

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Figure 2
Mounting on a DIN Rail

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

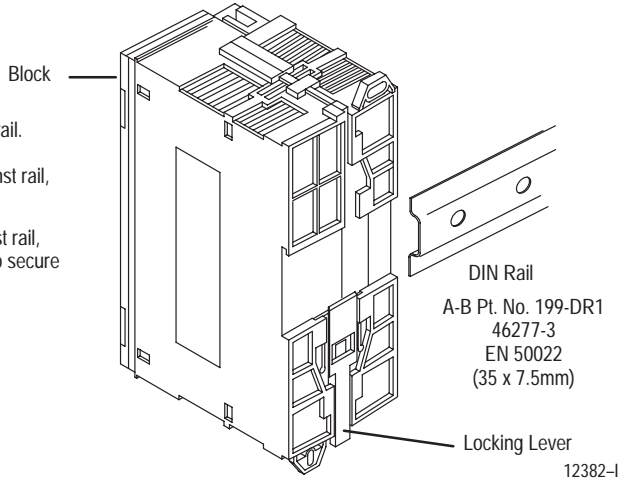
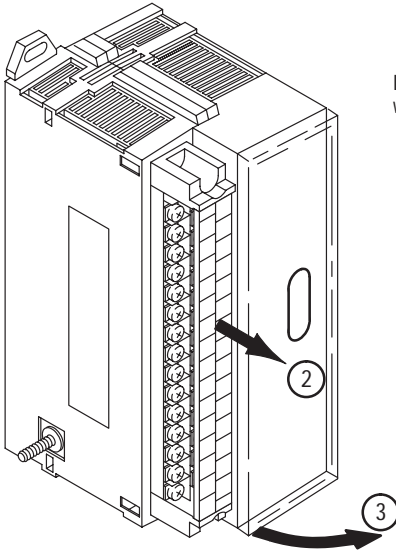


Figure 3
Inserting Labels



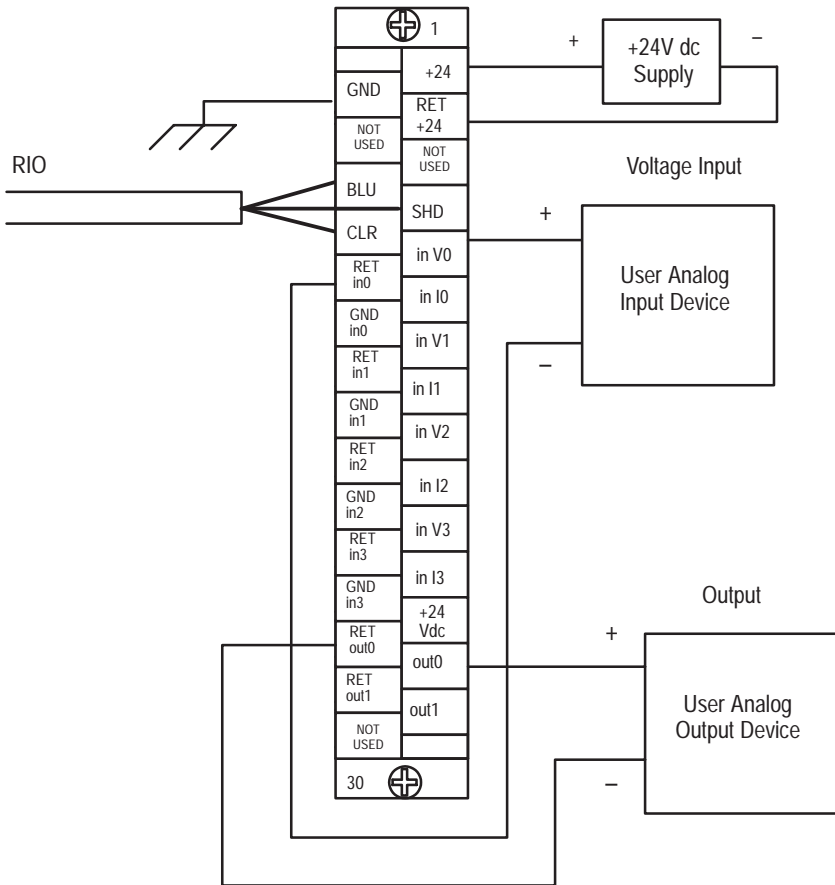
Labels for the front door and terminal strip are supplied with your module.

1. Remove die-cut labels from package.
2. Remove plastic cover on terminal strip by flexing in middle. Slip terminal designation label into built-in holders in terminal strip cover. Flex cover to install.
3. Open clear front door. Insert module designation label into slots that secure it to the door.

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Connect wiring as shown in Figure 4, Figure 5 or Figure 6.

Figure 4
Wiring Connections for the Analog Block Module with Voltage Input
(refer to Table A)



Analog signals must be within the +10V common mode voltage range which is referenced to the analog system common (GND). If an input channel floats outside of this range, invalid input readings will result.

Figure 5
Wiring Connections for the Analog Block Module with Current Input
 and Customer-Supplied Loop Power (refer to Table A)

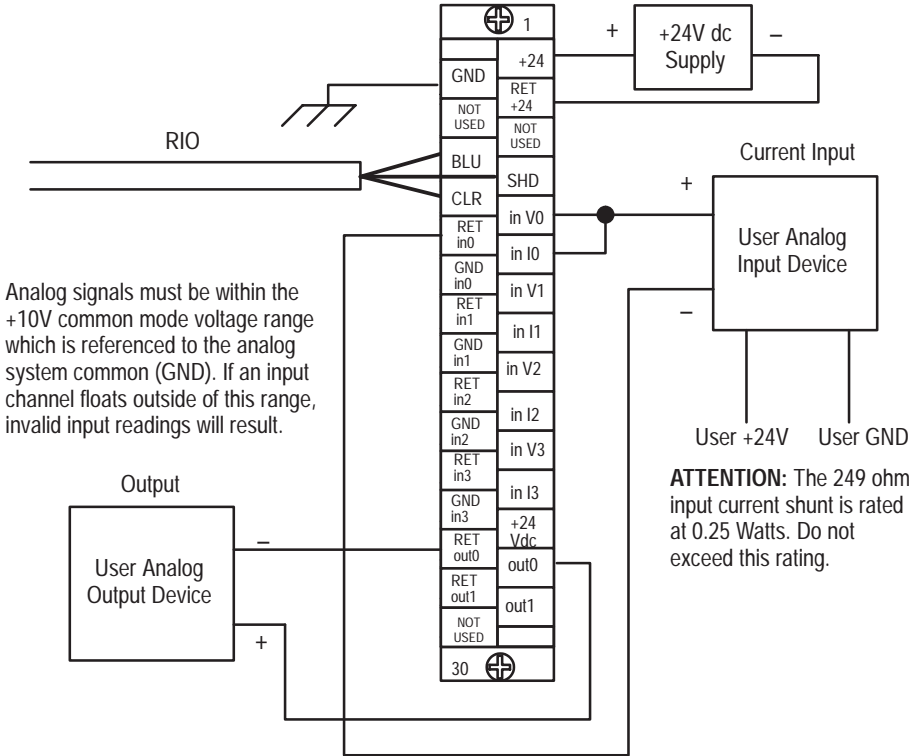
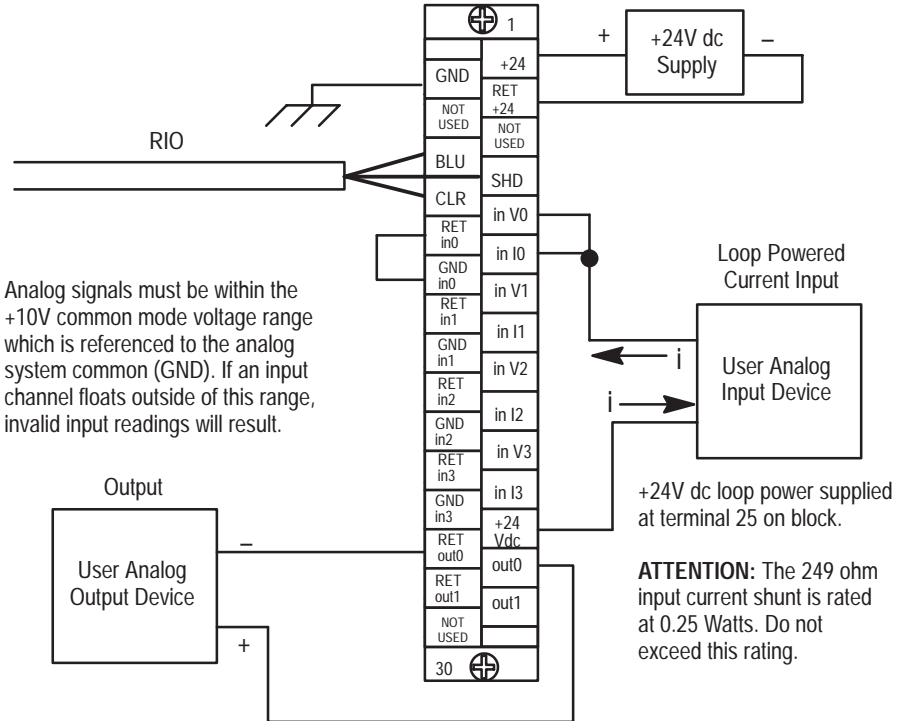


Figure 6
Wiring Connections for the Analog Block Module with Current Input
and Block-Supplied Loop Power (refer to Table A)



Analog signals must be within the +10V common mode voltage range which is referenced to the analog system common (GND). If an input channel floats outside of this range, invalid input readings will result.

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.

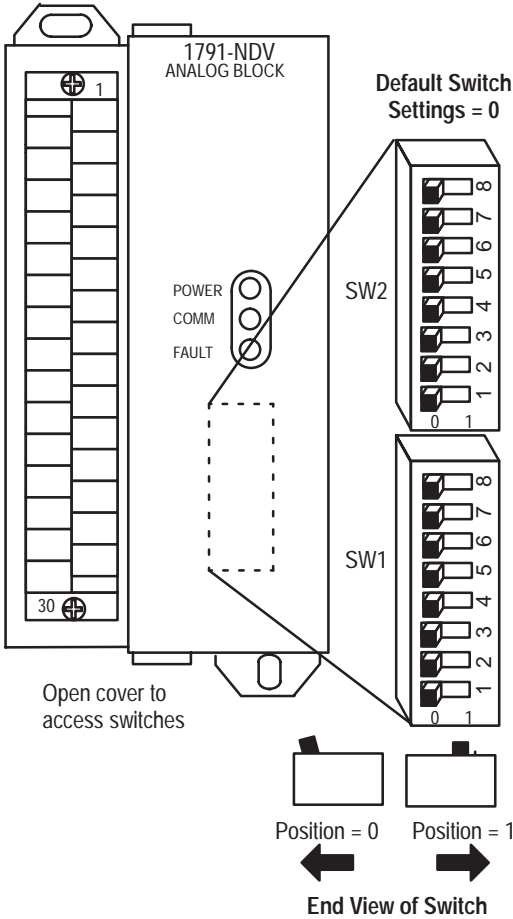
Installation InstructionsBlock I/O
Cat. No. 1791-NDV**Table A**
Wiring Block Designations

Connections	1791-NDV		
	Designation	Description	Terminal No.
Power Connections	+24	+24V dc Power	1
	RET +24	dc Return	3
	GND	Chassis ground	2 ¹
Transducer Power ²	+24V	For current input only	25
Remote I/O Connections	BLU	Blue wire – RIO	6
	CLR	Clear wire – RIO	8
	SHD	Shield – RIO	7
I/O Connections			
Voltage Input	inV0 thru inV3	Voltage Input 0 through 3	9, 13, 17, 21
	RET in0 thru RET in3	Input Return 0 through 3	10, 14, 18, 22
Current Input	inI0 thru inI3	Current Input 0 through 3	11, 15, 19, 23
	RET in0 thru RET in3	Input Return 0 through 3	10, 14, 18, 22
Input Ground	GNDin0–GNDin3	Channels 0–3 ground	12, 16, 20, 24 ³
Output	out 0 – RET out 0	Output 0 (+) Return output 0 (-)	27 26 ⁴
	out 1 – RET out 1	Output 1 (+) Return output 1 (-)	29 28 ⁴
	Not used	For internal test only; not for customer use.	4, 5, 30

¹ Connect chassis ground to equipment grounding stud. These are not internally connected.² 20–28V dc (nominal 24V, 100mA) voltage source for accommodating loop-powered current transducer.³ Terminals 12, 16, 20, and 24 are internally connected.⁴ Terminals 26 and 28 are internally connected together.**Table B**
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

Figure 7
Switch Settings



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

SW2-8

Not used

SW2-7

Not Used

SW2-6

Last I/O Group

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

Transfer Type

0 Block Transfer

1 Discrete Transfer

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)

Installation Instructions
Block I/O
Cat. No. 1791-NDV

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

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.

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

Installation Instructions

Block I/O
Cat. No. 1791-NDV

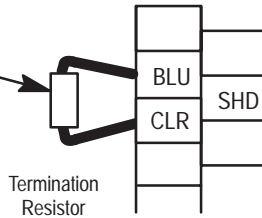
Termination Resistor

A termination resistor must be installed on the last block in a series. Connect the resistor as shown in Figure 8.

Figure 8
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

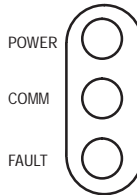


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ATTENTION: Devices that are operating at 230.4K baud must have 82 ohm terminators in place for proper operation.

Indicators



Indication	Description
POWER OFF ON	No power Power okay
COMM OFF ON Flashing	Communication not established Communication established Reset commands being received in Program mode
FAULT OFF ON Flashing	Normal Error (hardware or software), block power low COMM FAIL – remote I/O cable disconnected, 100ms between valid frames, no more than 255 valid frames between valid frames addressed to block, 20ms idle time exceeded.

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

1791-NDV Specifications

Input Specifications	
Inputs per Block	4 Selectable
Type of Input	±10V (14 bit) ±5V (14 bit) 0–10V (14 bit) 0–5V (14 bit) 0–20mA (14 bit) ±20mA (14 bit)
Update Rate per Channel	108ms
Input Impedance	Voltage: 10 megohm Current: 249 ohm
Absolute Accuracy	0.1% @ 25°C
Linearity	0.05% @ 25°C
Common Mode Rejection	–75db
Normal Mode Rejection	–18db @ 50Hz –20db @ 60Hz
Output Specifications	
Outputs per Block	2
Output Voltage Range	±10V (14 bits)
Output Impedance	Less than 1 ohm
Update Rate per Channel	10ms
Output Voltage Compliance	±10.00V into loads of 1K ohms or larger
Short Circuit Protection	Indefinite
Absolute Accuracy	0.1% @ 25°C
Linearity	0.05% @ 25°C
Overall Accuracy Drift	75 ppm/°C
+24V Loop Power	Voltage Current
	20-28V dc unregulated 100mA
Specifications continued on next page	

Installation Instructions

Block I/O
Cat. No. 1791-NDV

1791-NDV Specifications

General Specifications

Number of Channels	Input	4
	Output	2
Resolution		14 bits full scale
Input Band Width		5Hz
Overvoltage Protection	Input	140V ac
	Output	140V ac
ATTENTION: The 249 ohm input current shunt is rated at 0.25 Watts. Do not exceed this rating.		
External Power	Voltage	19.2-30V dc
	Current	600mA
Dimensions	Inches	6.95H X 2.7W X 3.85D
	Millimeters	176.5H X 68.8W X 98D
Isolation	Inputs to Outputs	500V ac
	Power and Chassis to I/O	500V ac
	RIO and Chassis to Power and I/O	500V ac
Power Dissipation	Maximum	11.52 Watts
Thermal Dissipation	Maximum	39.28 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 (2mm ²) stranded maximum 3/64 inch insulation maximum
	Category	2 ¹

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



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