

Wire

Remember the following when wiring the module:

- Do not share communication lines and input/output lines with high-voltage lines.
- Wire correctly after confirming the signal names of all terminals.
- Do not remove the label from a unit before wiring. Always remove label after completing wiring to achieve proper heat dispersion.
- Before connection, process stranded wire with insulation-covered bar terminal (DIN 46228-4 standard compatible type) at its ends.
- Mount screw for communication and I/O connectors correctly at 0.25 Nm...0.3 Nm (2.21 lb-in...2.65 lb-in).



WARNING: Safety state of the module is defined as the off status of safety output and off status of network output.

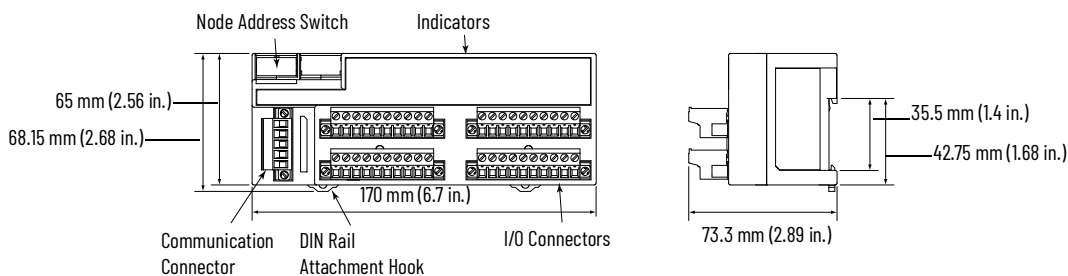
- Use the module only in applications where the safe status for the module produces the safe status.
- Do not connect loads beyond the rated value of the safety outputs. Serious injury can occur due to breakdown of safety outputs.
- Wire the module properly so that supply voltages or voltages for loads do not touch the safety outputs accidentally or unintentionally. Serious injury can occur due to loss of required safety functions.
- Connect a load across the output terminal and the 0V line (PNP output).
- For the 1791DS-IB4XOW4 module, apply only one AC line phase to the relay and insert a fuse at each output terminal whose current rating is less than 3.15 A to protect safety output contacts from welding. Confirm fuse selection with the fuse manufacturer, dependent on the connected load characteristics.
- Use appropriate devices referring to the following Controlling Devices Requirements Table. Serious injury can occur due to loss of safety functions.

Controlling Devices Requirements

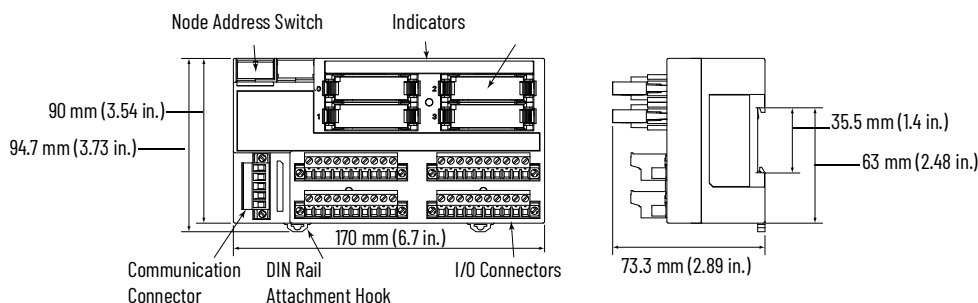
Device	Requirement
Emergency stop switch	Use approved devices with direct opening mechanism that comply with IEC/EN 60947-5-1.
Door interlocking switch limit switch	Use approved devices with direct opening mechanism that comply with IEC/EN 60947-5-1 and capable of switching microloads of 24V DC 5 mA.
Safety sensor	Use approved devices that comply with the relevant product standards, regulations, and rules in the country where used.
Relay with forcibly guided contacts	Use approved devices with forcibly guided contacts that comply with EN 50205. For feedback purposes use devices with contacts capable of switching micro loads of 24V DC 5 mA.
Other devices	Evaluate whether devices used are appropriate to satisfy requirements of safety category levels.

Functions and Dimensions

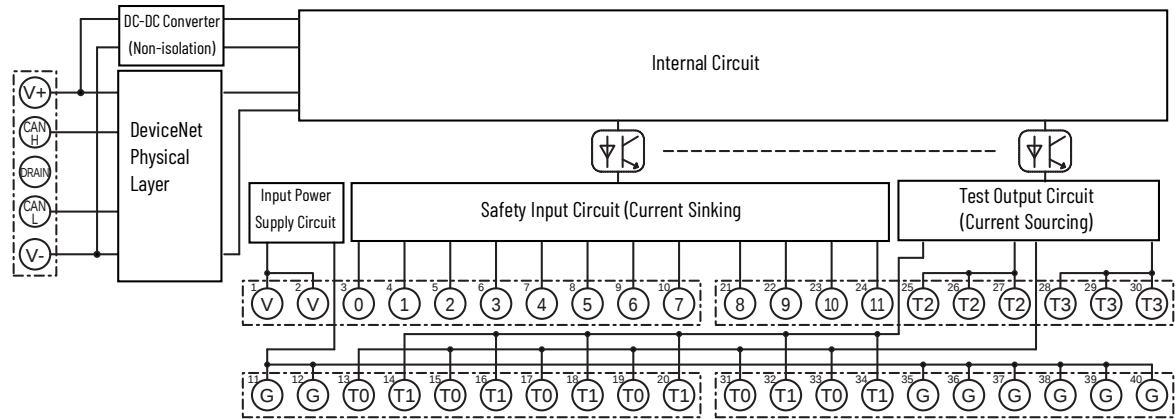
1791DS-IB12 and 1791DS-IB8XOB8



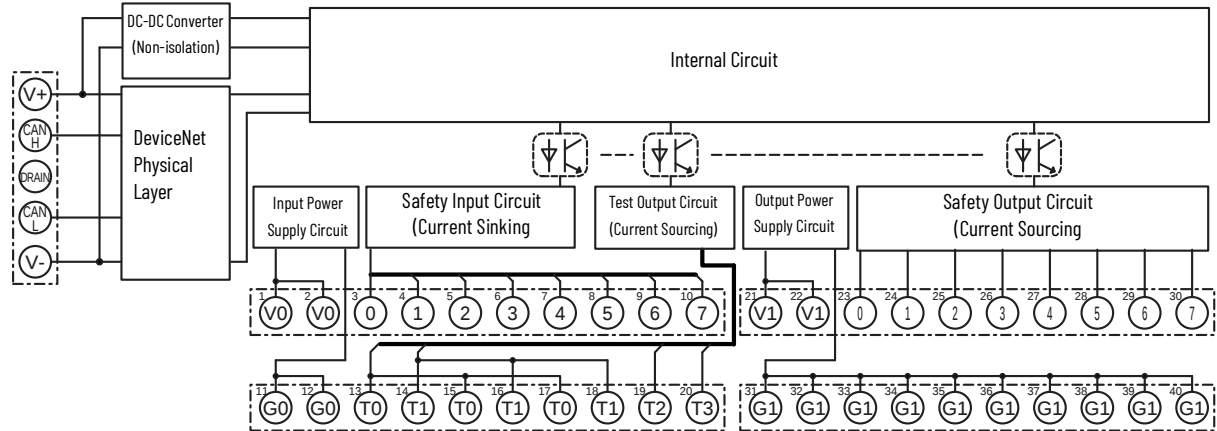
1791DS-IB4XOW4



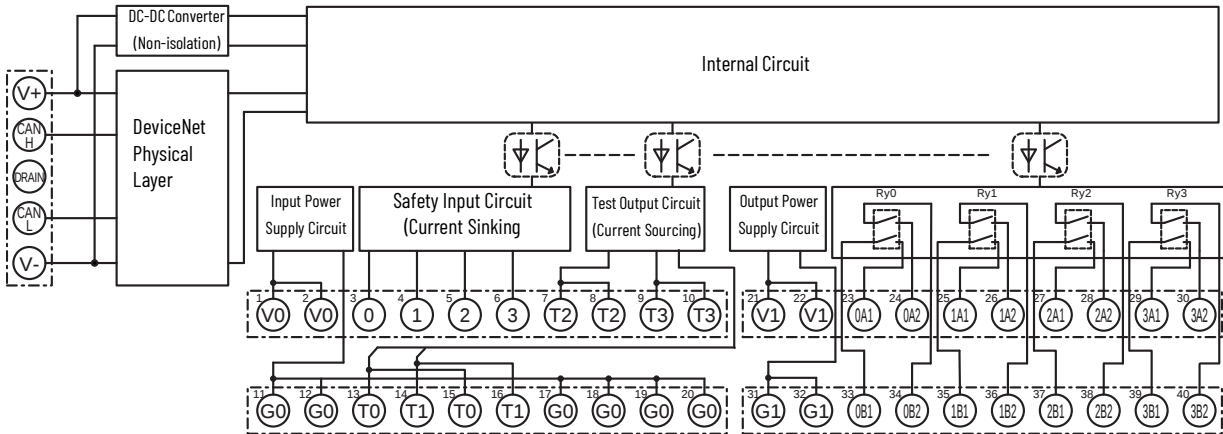
1791DS-IB12



1791DS-IB8X0B8



1791DS-IB4X0W4



Terminal Positions

Function for Model 1791DS-IB8X0B8		
1,2	V0	Power terminal for external input devices Wire Plus side (24V)
11, 12	G0	Power terminal for external input devices Wire Minus side (0V)
3...10	0...7	Terminal for safety input
13...20	T0...T3	Terminal for test output

Terminal Positions (Continued)

21, 22	V1	Power terminal for external output devices	Wire Plus side (24V)
31, 32	G1	Power terminal for external output devices	Wire Minus side (0V)
23...30	0...7	Terminal for safety output	
33...40	G1	Common terminal for external devices Terminal No. 31...40 are connected internally	

Function for Model 1791DS-IB4X0W4

1, 2	V0	Power terminal for external input devices and internal relay feedback monitor. Wire Plus side (24V)	
11, 12	G0	Power terminal for external input devices and internal relay feedback monitor. Wire Minus side (0V)	
17...20	G0	Common terminal for external devices Terminal No. 11, 12 and 17...20 are connected internally	
3...6	0...3	Terminal for safety input	
7...10, 13...16	T0...T3	Terminal for test output	
21, 22	V1	Power terminal for internal relay drive	Wire Plus side (24V)
31, 32	G1	Power terminal for internal relay drive	Wire Minus side (0V)
23...30 33...40	0A1...3A2 0B1...3B2	Terminal for safety output	

Function for Model 1791DS-IB12

1,2	V	Power terminal for external input devices Wire Plus side (24V)	
11, 12	G	Power terminal for external input devices Wire Minus side (0V)	
35...40	G	Common terminal for external devices Terminal 11,12 and 35...40 are connected internally	
3...10, 21...24	0...11	Terminal for safety input	
13...20, 25...30, 31...34	T0...T3	Terminal for test output	

Status Indicators

Indicator	Status	Description
MS	Steady green	Device operational
	Flashing green	Waiting for safety connection
	Steady red	Unrecoverable fault
	Flashing red	Minor fault
	Alternating green and red	Device self-testing or configuring
	Off	No power
NS	Steady green	Online/connected
	Flashing green	Online/not connected
	Steady red	Critical link failure
	Flashing red	Connection timed out
	Off	Not powered/not online
LOCK	Steady yellow	Normal configuration data, locked status
	Flashing yellow	Normal configuration data, but not locked status
	Off	Configuration has not been performed
IN PWR OUTPWR	Steady green	Power supply is on
	Off	No power
IN	Steady yellow	Safety input on
	Off	Safety input off
	Steady red	An error occurs in an input circuit part
	Flashing red	When dual channel is set, an error occurs in the redundant channel
OUT	Steady yellow	Safety output on
	Off	Safety output off
	Steady red	An error occurs in an output circuit part
	Flashing red	When dual channel is set, an error occurs in the redundant channel

Specifications

Technical Specifications

Attribute	Value
Communications power supply voltage	11...25V DC (supplied from communications power supply)
Communications current consumption	110 mA at 24V DC
I/O power supply voltage	20.4...26.4V DC (24V DC, -15...+10%)
Weight	420 g (0.93 lb) - 1791DS-IB12, 1791-IB8X0B8 600 g (1.32 lb) - 1791DS-IB4X0W4
Wire category ⁽¹⁾	2 - on signal ports 2 - on power ports 2 - on communications ports
Wire size	Copper • 0.2...2.5 mm ² (AWG 24...12) solid wire • 0.34...1.5 mm ² (AWG 22...16) standard (flexible) wire with insulation-covered bar terminal
Enclosure type	None (open-style)
North American temperature code	T4 (1791DS-IB12 and 1791DS-IB8X0B8)

(1) Use this Conductor Category information for planning conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

Environmental Specifications

Attribute	Value
Temperature, operating	-10...+55 °C (+14...+131 °F)
Temperature, ambient, max	55 °C (131 °F)
Temperature, surrounding air, max	55 °C (131 °F)
Temperature, nonoperating	-40...+70 °C (-40...+158 °F)
Relative humidity IEC 60068-2-30 (Test dB, Unpackaged Damp Heat)	10...95% noncondensing (1791DS-IB12 and 1791DS-IB8X0B8) 10...85% noncondensing (1791DS-IB4X0W4)
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g (1791DS-IB12 and 1791DS-IB8X0B8) 10 g (1791DS-IB4X0W4)
Operating environment	No corrosive gases
Overvoltage category	II (per IEC 61131-2:4.4.2)

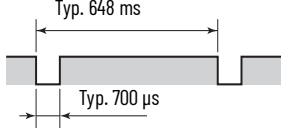
Safety Input Specifications

Attribute	Value
Inputs type	Current sinking
ON voltage	11V DC min
OFF voltage	5V DC max
OFF current	1 mA max
Input current	6 mA

Test Output Specifications

Attribute	Value
Output type	Current sourcing
Rated output current	0.7 A
Residual voltage	1.2V max
Leakage current	0.1 mA max

Safety Output Specifications

Attribute	Value	Signal Sequence
Output type	Current sourcing	 Typ. 648 ms Typ. 700 μs
Rated output current	0.5 A	
Residual voltage	1.2V max	
Leakage current	0.1 mA max	

IMPORTANT: While safety outputs are in an On state, the signal sequence shown in the figure is output continuously for fault diagnosis. Confirm response time of device that is connected to safety outputs so the device does not malfunction due to this Off pulse.

Safety Output (Relay)

Relay type	G7SA-2A2B EN50205 Class A
Minimum permissible load	5V DC, 1 mA
Resistive load	240V AC, 2 A 30V DC, 2 A
Inductive load	240V AC, 2 A ($\cos \Theta = 0.3$); 24V DC, 1 A
Durability (mechanical)	5,000,000 operations min (at approximately 7200 operations/hr)
Durability (electrical)	100,000 operations min (at approximately 1800 operations/hr)

Reaction Time

Attribute	Value
Max input reaction time	16.2 ms + set values of on/off delays
Max output reaction time	6.2 ms + (20 ms) relay response time, 1791DS-1B4X0W4 only

Certifications

Certification (when product is marked) ⁽¹⁾	Description
c-UL-us	UL Listed Information Technology Equipment, certified for US and Canada (all models) UL Listed Industrial Control Equipment, certified for US and Canada (1791DS-1B12 and 1791DS-1B8X0B8 only)
CE	European Union 2014/30/EU EMC Directive, compliant with: EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
UKCA	European Union 2014/30/EU EMC Directive, compliant with: EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
TÜV	TÜV Certified for Functional Safety ⁽²⁾ . Compliant with IEC 61508 (SIL 3) and EN 954-1 (Category 4)
UL	UL Certified for Functional Safety ⁽²⁾
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation
Morocco	Arrêté ministériel n° 6404-15 du 1 ^{er} muharram 1437
DeviceNet®	ODVA conformance tested to DeviceNet specifications

(1) See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

(2) When used with specified firmware revisions.