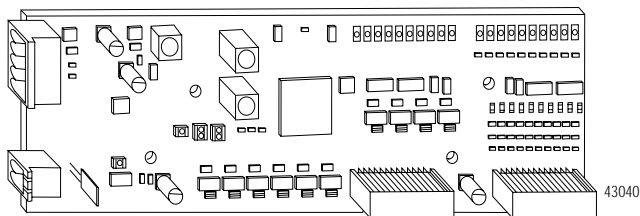




Zone Control I/O Cards

(Cat. No. 1799-ZCIOB and 1799-ZCIOV)



The 1799 Zone Control I/O cards (Cat. No. 1799-ZCIOB and 1799-ZCIOV) are 20-point I/O cards which communicate via the DeviceNet™ network and are intended for material handling and other applications. The cards also have the Zone Interlocking Protocol (ZIP) capability, which enables the cards to communicate directly with each other without hard wiring them together and without using a scanner.

These cards have 10 inputs and 10 outputs. Inputs are 24V dc sourcing (PNP) or sinking (NPN). Outputs are self-protected 24V dc sourcing (1799-ZCIOB) or sinking (1799-ZCIOV).

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Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.ab.com/manuals/gi>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.





In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual we use notes to make you aware of safety considerations.

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: <ul style="list-style-type: none">• identify a hazard• avoid a hazard• recognize the consequence
SHOCK HAZARD 	Labels may be located on or inside the drive to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be located on or inside the drive to alert people that surfaces may be dangerous temperatures.

Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

NOTE: See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

ATTENTION

Package Contents

Your package contains:

- one 1799 ZCIO Card
- DeviceNet connector
- auxiliary power connector
- mounting plate and 4 mounting screws
- these installation instructions

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Optional Hardware

The following mating connectors and mounting hardware must be ordered separately. The following table identifies the different connector and hardware options.

Option	Catalog Number	Third Party Supplier & Part Number
2 DIN rail brackets (4 screws)	1799-BRKD	N/A
2, 12-position, gold-plated I/O mating connectors	1799-12SPCON	Phoenix - FK-MC 0.5/12-ST-2.5AU - 192432

Install Your Card

To install the card you must:

- Set the node address
- Mount the card (brackets, mounting plate)
- Connect the card (DeviceNet, auxiliary power, I/O)
- Communicate with your card
- Configure the parameters

More detailed information about each of these steps is in the following procedures.

ATTENTION

Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
 - Wear an approved grounding wriststrap.
 - Do not touch connectors or pins on component boards.
 - Do not touch circuit components inside the equipment.
 - If available, use a static-safe workstation.
 - When not in use, store the equipment in appropriate static-safe packaging.
-

Set the Node Address

Valid node addresses are **00** to **63**.

Set the node address using the rotary switches or a DeviceNet software configuration tool like **RSNetWorx** for DeviceNet™. Setting the switches between **64** and **99** lets the software have address control.

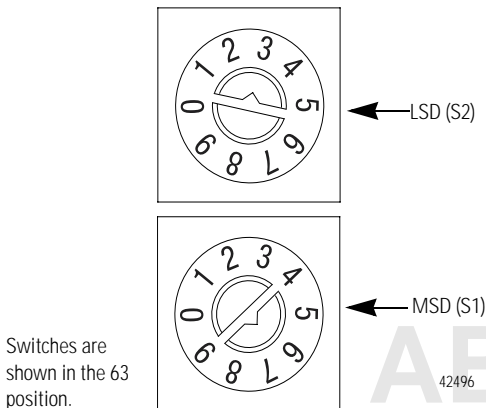
NOTE: You must use RSNetWorx for DeviceNet revision 3.21 or higher with the Zone Control (ZCIOB and ZCIOV) I/O cards.

Each card is shipped with the node address set to **63** in the card's memory. The rotary switches are set for position **99** at shipment. The switches are located near the center of the card. The two switches are:

- MSD (most significant digit)
- LSD (least significant digit)

To reset the node address, use a small blade screwdriver to rotate the switches. Line up the small arrow on the switch with the number setting you wish to use.

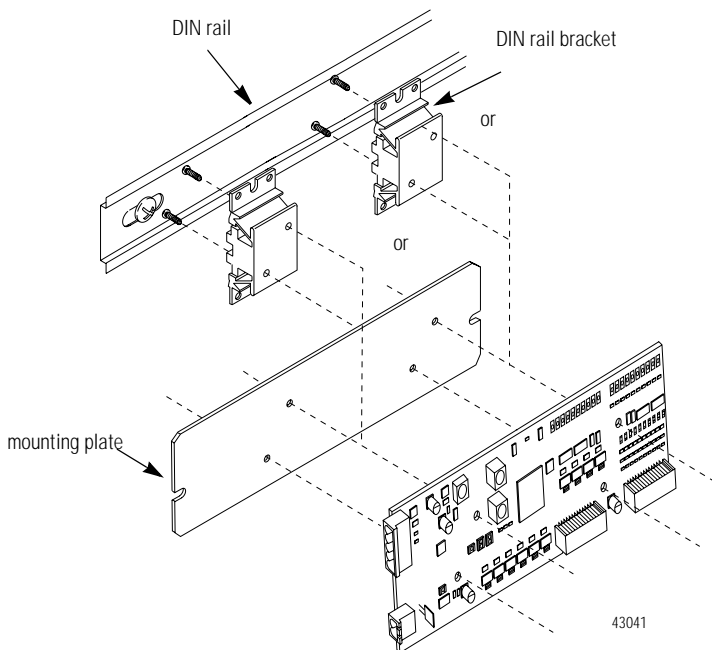
The rotary switches are read at card power up only. Settings between 64 and 99 cause the card to use the last valid node address stored in the card's memory. Example: The last setting was 40. If a change is made to 68, and then you power up, the address will default to 40.



The card is equipped with AutoBaud detect. AutoBaud lets the card detect the baud rate on your DeviceNet network and automatically adjusts to that rate. The card is shipped with AutoBaud enabled.

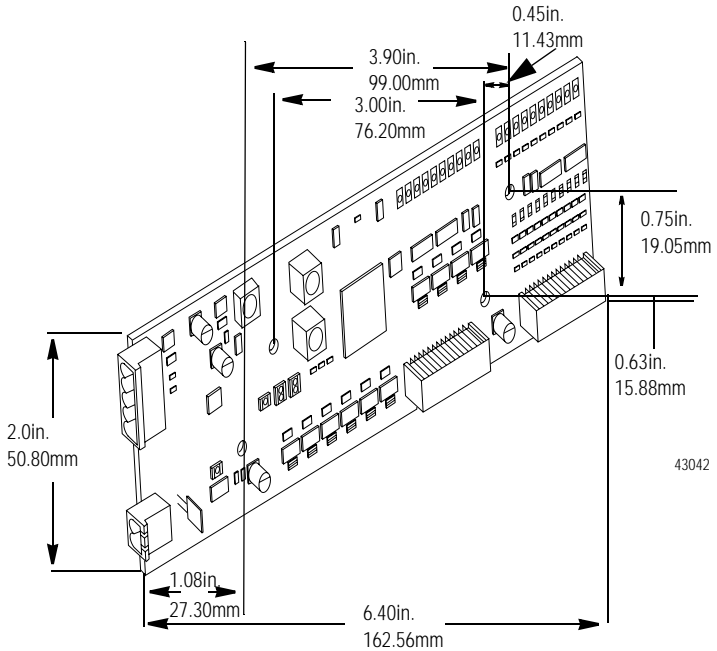
Mount the Card

The ZCIO card comes with a mounting plate. You have the option to order the DIN rail brackets (1799-BRKD) for mounting directly on a DIN rail.



The card can also be mounted in an enclosure with pre-tapped holes, which accommodate M3 x 0.5mm screws.

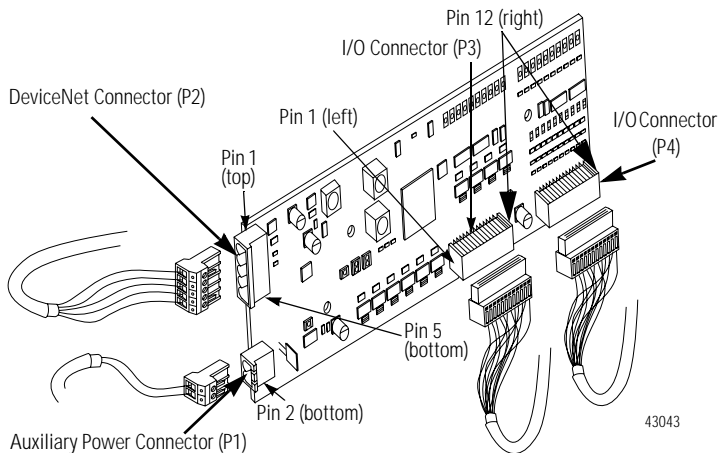
Card Dimensions



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Connect the Card

Use the following picture and tables to help you connect the DeviceNet, auxiliary power, and I/O connectors to the card.



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The following tables identify the pins of each connector.

P1 Auxiliary Power
Connector

Pin	Signal
1	24V dc
2	24V dc Ret

P2 DeviceNet Connector

Pin	Insulation Colors
1	Black
2	Blue
3	Shield
4	White
5	Red

P3 I/O Connector

Pin	Signal
1	Output 0
2	Output 1
3	Output 2
4	24V dc Ret
5	Output 3
6	Output 4
7	Output 5
8	Output 6
9	24V dc
10	Output 7
11	Output 8
12	Output 9

P4 I/O Connector

Pin	Signal
1	Input 0
2	Input 1
3	Input 2
4	In Common
5	Input 3
6	Input 4
7	Input 5
8	Input 6
9	In Common
10	Input 7
11	Input 8
12	Input 9

ATTENTION



- For maximum noise immunity, input cable return wires must be properly terminated.
- When inputs and outputs are connected in loopback, return wires should be connected together.
- I/O cable length should be less than 30 meters (98.43 feet).

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Auxiliary Power Specifications

The power source used to supply the auxiliary power to the outputs must be one of the following:

- a 10-30V dc Class 2 Power Supply

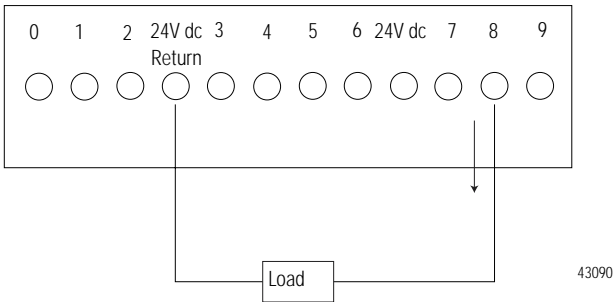
or

- a 10-30V dc UL Listed or Recognized Power Supply with isolated outputs limited to 200 volt-amperes in each ungrounded output line. This condition requires that the card and power source be mounted in a suitable ultimate enclosure with proper spacings maintained.

Connect the Field Output Device to the Output Connector (P3)

The 1799-ZCIOB card has outputs which supply current to your field output device (sourcing outputs). Use the wiring diagram below to connect the outputs on this card.

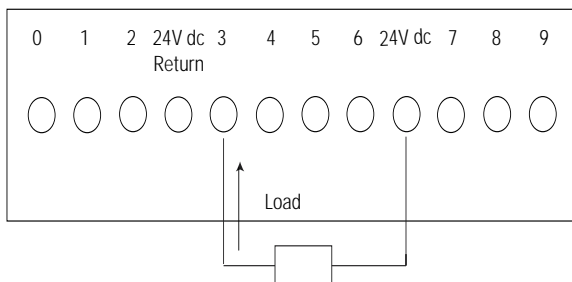
1799-ZCIOB Outputs (Sourcing)



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The 1799-ZCIOV card has outputs which receive current from your field output device (sinking outputs). Use the wiring diagram below to configure the outputs on this card.

1799-ZCIOV Outputs (Sinking)



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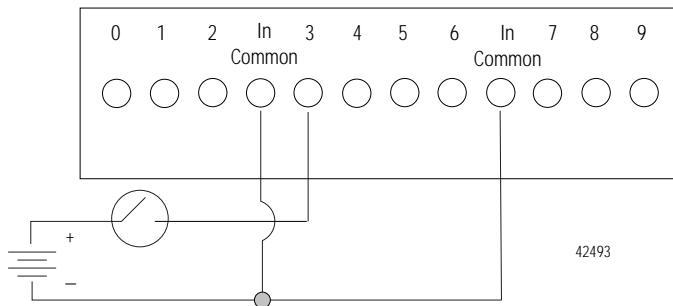
Connect the Field Input Device to the Input Connector (P4)

The 1799-ZCIOB and 1799-ZCIOV cards have universal inputs, which provide operation with either sourcing or sinking input devices. The universal feature lets you configure the inputs as either all sinking or all sourcing. Use the following wiring diagrams to connect the inputs on the cards.

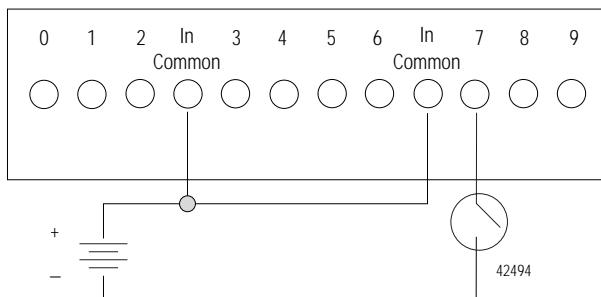
IMPORTANT

All field input devices must be of the same type, either sinking or sourcing. The card will not operate if the types are mixed.

Inputs (Sinking)



Inputs (Sourcing)



Communicate with Your Card

This card's I/O is exchanged with the master on DeviceNet through a cyclic, polled or change-of-state connection.

The card consumes and produces I/O data as follows:

I/O Connection Type	Consumes	Produces
Cyclic	2 Bytes	7 Bytes
Polled	2 Bytes	7 Bytes
Change-of-State	2 Bytes	7 Bytes

Cyclic - the card will produce and consume its I/O cyclically at the rate configured by the master on DeviceNet.

Polled - the master initiates communication by sending its polled I/O message to the card. The card consumes the message, updates any outputs and produces a response containing the input data.

Change-of-State - a production occurs when an input changes. A heartbeat production occurs if no input condition change occurs within the expected packet rate. This heartbeat production tells the master that the card is alive and ready to communicate. Consumption occurs when data changes and the master produces new output data to the card.

Refer to the table below for the word/bit definitions:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Prod 0	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
Prod 1	RSVD	Logic Ena	RSVD				Input 9	Input 8
Prod 2	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0
Prod 3	RSVD						Output 9	Output 8
Prod 4	NetOut 7	NetOut 6	NetOut 5	NetOut 4	NetOut 3	NetOut 2	NetOut 1	NetOut 0
Prod 5	CCV 7	CCV 6	CCV 5	CCV 4	CCV 3	CCV 2	CCV 1	CCV 0
Prod 6	CCV 15	CCV 14	CCV 13	CCV 12	CCV 11	CCV 10	CCV 9	CCV 8
Cons 0	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0
Cons 1	RSVD						Output 9	Output 8

NetOut = Network Output, CCV = Configuration Consistency Value,, RSVD = Reserved

Configure the Parameters

The ZCIO cards have 42 parameters that are configurable through a DeviceNet software configuration tool like **RSNetWorx** for DeviceNet. The DeviceNet configuration tools require an Electronic Data Sheet (EDS) for the ZCIO cards in order to configure the module's parameters. The EDS file can be found at the ODVA Web site (<http://www.odva.org>).

Use the descriptions in the table below to help you configure the non DeviceLogix™ parameters.

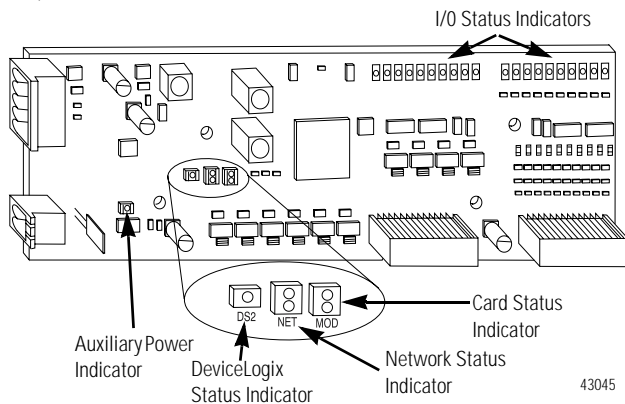
Parameter	Description
Baud Rate	Controls the card's data rate.
Auto-Baud	Enables the card to match the network's data rate. When enabled, Baud Rate parameter is ignored.
Input Off-to-On Filter Time	Controls the amount of time the input must be in the 'on' state before the card reports the input as 'on.'
Input On-to-Off Filter Time	Controls the amount of time the input must be in the 'off' state before the card reports the input as 'off.'
Output Idle State	Controls the state of each output when the DeviceNet master is in an idle state.
Output Fault State	Controls the state of each output when the card loses communication with the DeviceNet master.
Output Idle Value	Controls the value that outputs take on when the output idle state is set to 'use idle value.'
Output Fault Value	Controls the value that outputs take on when the output fault state is set to 'use fault value.'

These DeviceLogix capable cards have additional parameters which are described in the DeviceLogix User Manual, publication number ACIG-UM001 and in the Machine Embedded I/O for DeviceNet Technical Data, publication number 1799-TD001.

Troubleshoot with the Indicators

This card has the following indicators, shown in the picture below:

- Card status indicator
- Network status indicator
- DeviceLogix status
- Auxiliary power indicator
- I/O status indicators



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Card Status Indicator (labeled MOD)

Indication	Status
None	No Power
Green	
Blinking	Needs commissioning
Solid	Device operational
Red	
Blinking	Minor fault
Solid	Critical fault

Network Status Indicator (labeled NET)

Indication	Status
None	Not On-line
Green	
Blinking	On-line/No connections
Solid	On-line/Connected
Red	
Blinking	Connection timed out
Solid	Failed communication: A duplicate node address exists or module is at the wrong baud rate.

DeviceLogix Status Indicator (labeled DS2)

Indication	Status
None	Logic disabled
Green	
Solid	Logic enabled
Blinking	Local forces applied and local logic enabled

Auxiliary Power Indicator (labeled AUX PWR)

Indication	Status
None	No auxiliary power
Green	Auxiliary power present

I/O Status Indicators (labeled Inputs and Outputs)

Indication	Status
None	Input or output point off
Yellow	Input or output point on

Technical Support

For additional troubleshooting information on the 1799 Zone Control I/O Cards, access Rockwell Automation's technical support services at 440.646.5800 or on the Web at <http://www.ab.com>.

Specifications**10 Input/10 Output Card - Cat. No. 1799-ZCIOB & -1799-ZCIOV**

Input Specification	Max	Min
Inputs per block	10 Sinking or Sourcing, Type 1 + compatible	
Off-State: Voltage	5V dc	-
Current	1.5 mA	-
On-State: Voltage	30V dc	10V dc
Current	6 mA	2 mA
Output Specification		
Outputs per block	10 Sinking or Sourcing, 0.5A, Short Circuit Protected, Pilot Duty	
Output Auxiliary Voltage	30V	10V

10 Input/10 Output Card - Cat. No. 1799-ZCIOB & -1799-ZCIOV**Output Specification (continued)**

On-State Voltage Drop	250 mV	-
On-State Current	0.5A	-
Off-State Leakage	20 mA	-
Card Current (all outputs on)	4.0A	-
Surge Current - for 10ms, repeatable every 2s (individual outputs)	1.0A	

General Specifications

DeviceNet Power: Voltage	25V dc	11V dc
Current	125 mA	-
DeviceNet Power Circuit Type	Class 2	
Auxiliary Power: Voltage	30V dc	10V dc
Current	4.0A (all outputs on)	100 mA (all outputs off)
LED Indicators	Card Status - red/green, Network Status - red/green, Auxiliary Power - green, DeviceLogix Status - green, Input Point LED - yellow, Output Point LED -yellow	
Conductors Wire Size	Power: 14 gauge (2mm ²) stranded maximum Auxiliary Power: 14 gauge (2mm ²) stranded maximum DeviceNet: 14 gauge (2mm ²) stranded maximum (See Publication DN-UM072B)	
Category	I/O: 16 gauge (1.6 mm ²) stranded maximum 3/64 inch insulation maximum 2 ^{1,2}	
Dimensions - inches (millimeters)	1.0H x 2.0W x 6.4D (26H x 51W x 163D)	
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -10 to 60° C (14 to 140° F)	

General Specifications (continued)

Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): -40 to 85° C (-40 to 185° F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz
Shock	IEC60068-2-27 (Test Ea, Unpackaged Shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900Mhz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on power ports ±2kV at 5kHz on signal ports ±2kV at 5kHz on communications ports
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports ±2kV line-earth(CM) on shielded and DC power ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz
Enclosure Type Rating	None (open-style)

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General Specifications (continued)

Certifications (When product is marked)	c-UR-us	UL Recognized Component Industrial Control Equipment, certified for US and Canada
	CE ³	European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity
	C-Tick ³	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
	ODVA	ODVA conformance tested to ODVA DeviceNet specifications

1. You use this conductor category information for planning conductor routing as described in the system level installation manual.
 2. See publication 1770-4.1, "Programmable Controller Wiring and Grounding Guidelines."
 3. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.
-

DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).

RSNetWorX for DeviceNet is a trademark of Rockwell Software.

DeviceLogix is a trademark of Rockwell Automation Allen-Bradley, Inc.

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