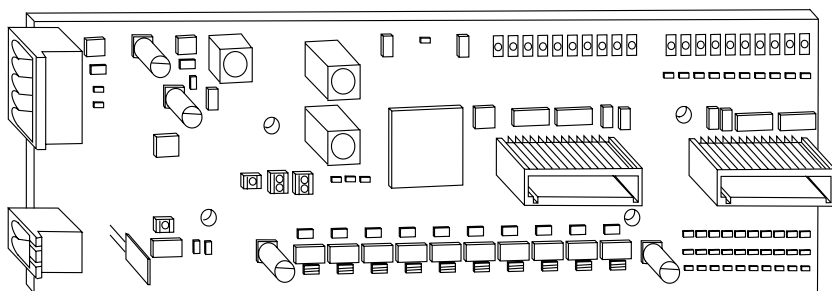# 10 Input/10 Output Discrete Embedded I/O Boards

(Cat. No. 1799-D10U10V, -D10U10VL, -D10U10B & -D10U10BL)

42495

The 1799 I/O board (Cat. No. 1799-D10U10V, -D10U10VL, -D10U10B & -D10U10BL) is a 20-point I/O board which communicates via a DeviceNet™ network.

This board has 10 inputs and 10 outputs. Inputs are 24V dc sourcing (PNP) or sinking (NPN). Outputs are self-protected 24V dc sourcing (1799-D10U10B, -D10U10BL) or sinking (1799-D10U10V, -D10U10VL).

European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1.

This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

ATTENTION	
⚠	Before handling this board, be certain you are grounded to prevent any electrostatic discharge.

Package Contents

Your package contains:

- one 1799 I/O Board
- installation instructions

Optional Hardware

All mating connectors and mounting hardware must be ordered separately. The table below 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
clear plastic cover (4 stand-offs, 4 screws)	1799-COV20	N/A
mounting plate (4 screws)	1799-MP20	N/A
2, 12-position, gold-plated I/O mating connectors	1799-12SPCON	Phoenix - FK-MC 0.5/12-ST-2.5AU - 192432
5-position, open-style plug for DeviceNet	1799-DNETCON	DeviceNet Buyer's Guide at http://www.odva.org
2-position plug for auxiliary power	1799-AUXCON	Weidmuller - 171385 PCD - ELFP02211

Install Your Board

To install the board you must:

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

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

## 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 **RS**NetWorx for DeviceNet™. Setting the switches between **64** and **99** allows the software to have address control.

Each board is shipped with the node address set to **63** in the board's memory. The rotary switches are set for position **99** at shipment. The switches are located near the center of the board. 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 board power up only. Settings between 64 and 99 cause the board to use the last valid node address stored in the board'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.

LSD (S2)

MSD (S1)

Switches are shown in the 99 position.
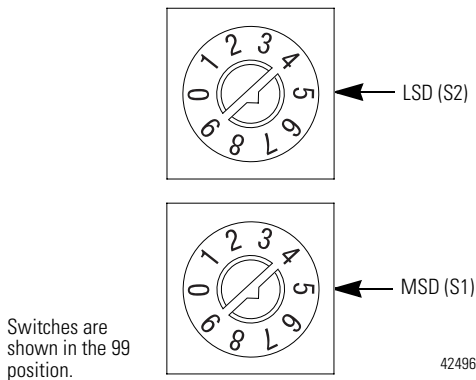
42496

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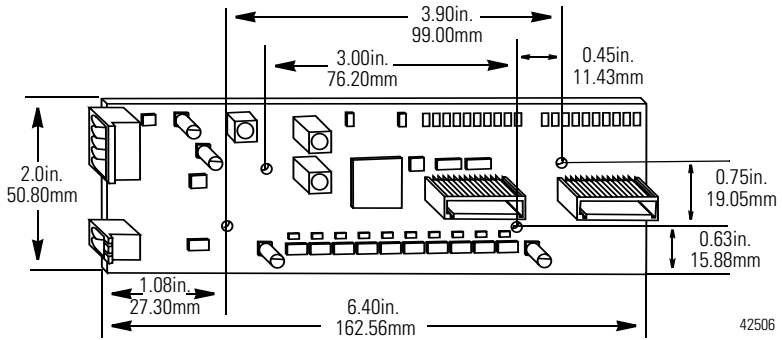
Mount the Board

Use the following picture to help you mount the board to a DIN rail using DIN rail brackets (1799-BRKD) or to a mounting plate (1799-MP20).

DIN rail

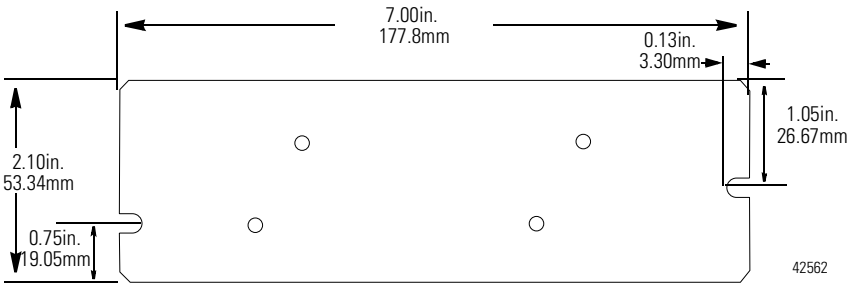DIN rail bracket

or

or
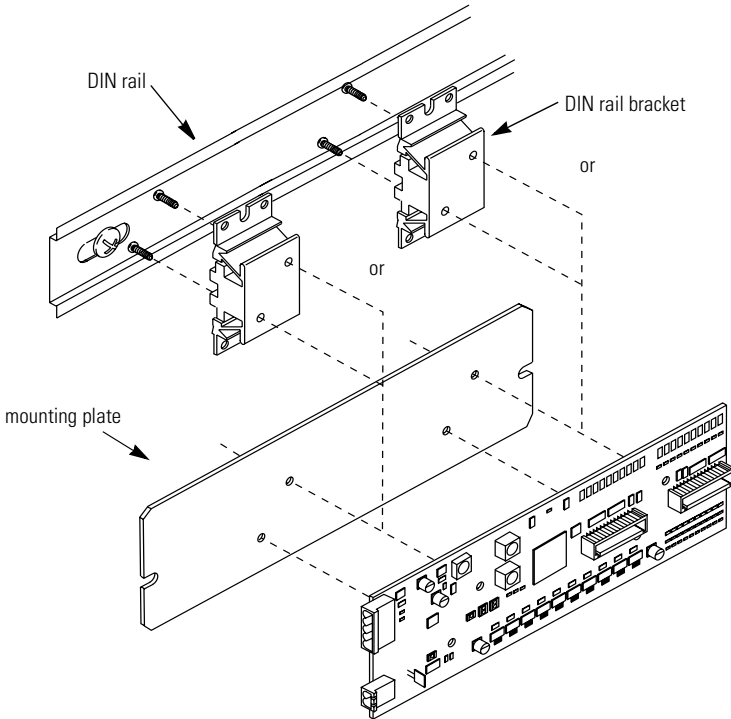
mounting plate

42507

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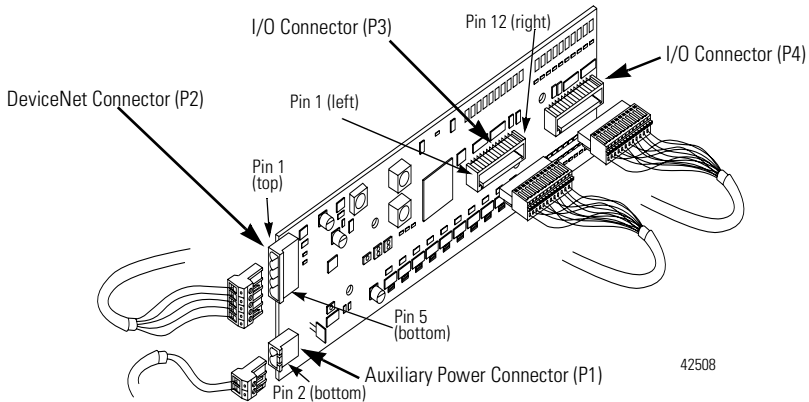
Board Dimensions

Mounting Plate Dimensions (front view)

Connect the Board

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

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 are connected in loopback, return wires should be connected together.
- I/O cable length should be less than 30 meters (98.43 feet).

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 board 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-D10U10B and -D10U10BL boards have outputs which supply current to your field output device (sourcing outputs). Use the wiring diagram below to connect the outputs on these boards.
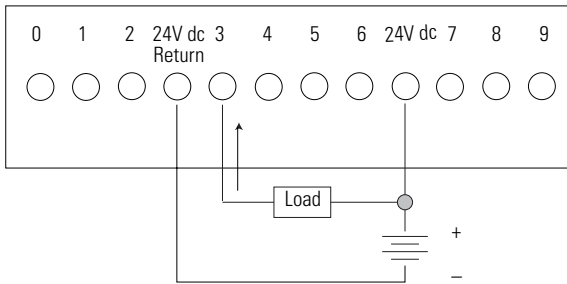
1799-D10U10B & - D10U10BL Outputs (Sourcing)
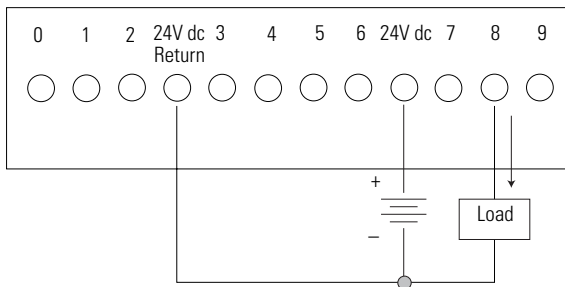
The 1799-D10U10V and -D10U10VL boards have outputs which receive current from your field output device (sinking outputs). Use the wiring diagram below to configure the outputs on these boards.

1799-D10U10V & D10U10VL Outputs (Sinking)

42492

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

The 1799-D10U10B, -D10U10BL, -D10U10V, and -D10U10VL boards have universal inputs which allow operation with either sourcing or sinking input devices. The universal feature lets you configure the inputs as either sinking or sourcing. Use the following wiring diagrams to connect the inputs on the boards.
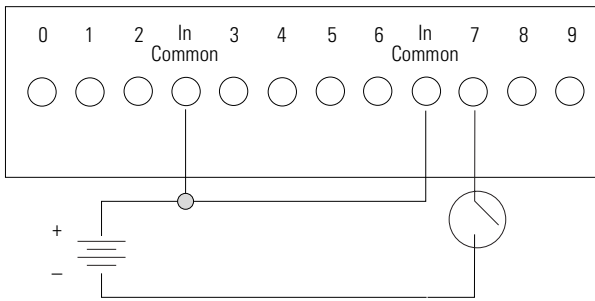
IMPORTANT	All field input devices must be of the same type, either sinking or sourcing. The board will not operate if the types are mixed.

Inputs (Sourcing)
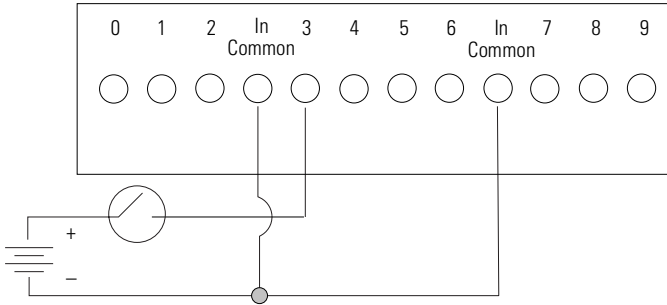


42493

Inputs (Sinking)

42494

Mount the Optional Plastic Cover

After all wires are connected to the board, the optional plastic cover can be mounted onto the board.

1. Place the four stand-offs onto the mounting screws and tighten.

2. Align the holes on the cover with the stand-offs.

3. Place the screws into the stand-offs and tighten.

Use the following picture to help you mount the cover.
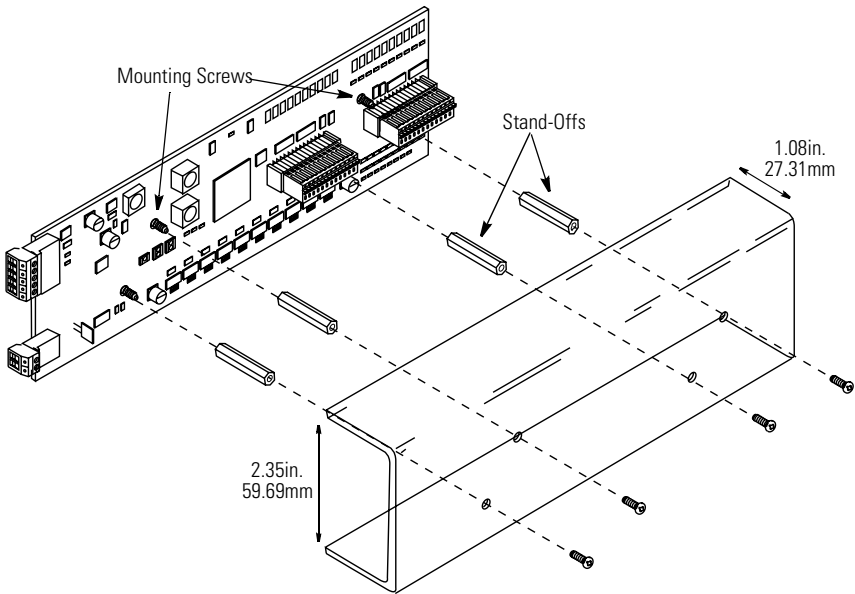
42505

Communicate with Your Board

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

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

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

Cyclic - the board 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 board. The board 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 board is alive and ready to communicate. Consumption occurs when data changes and the master produces new output data to the board.

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
Produced 0	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 1	Input 0
Produced 1	Reserved						Input 9	Input 8
Consumed 0	Output 7	Output 6	Output 5	Output 4	Output 3	Output 2	Output 1	Output 0
Consumed 1	Reserved						Output 9	Output 8

Configure the Parameters

The 1799 I/O boards have eight parameters that are configurable through a DeviceNet software configuration tool like **RS**NetWorx for DeviceNet. The DeviceNet configuration tools require an Electronic Data Sheet (EDS) for the 1799 I/O boards 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 parameters.

| Parameter	Description
Baud Rate	Controls the board's data rate.
Auto-Baud	Enables the board 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 board 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 board reports the input as 'off.'
Output Idle State	Controls the state of each output when the DeviceNet master is in an idle state.

Parameter	Description
Output Fault State	Controls the state of each output when the board 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.'

The DeviceLogix™ capable boards, 1799-D10U10BL and -D10U10VL, have additional parameters which are described in the DeviceLogix configuration tool documentation.

Troubleshoot with the Indicators

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

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

I/O Status Indicators

Auxiliary Power Indicator

DeviceLogix Status Indicator

Network Status Indicator

Board Status Indicator
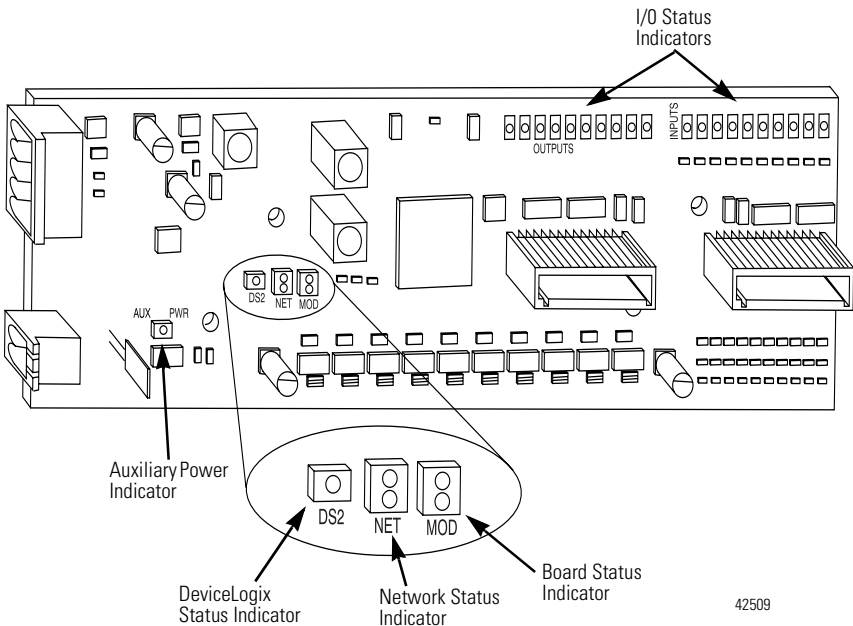
42509

Board Status Indicator (labeled MOD)

Indication	Status
None	No Power

Green
    Blinking
    Solid
	
	Needs commissioning
	Device operational

Red
    Blinking
    Solid
	
	Minor fault
	Critical fault

Network Status Indicator (labeled NET)

Indication	Status
None	Not On-line

Green
    Blinking
    Solid
	
	On-line/No connections
	On-line/Connected

Red
    Blinking
    Solid
	
	Connection timed out
	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
    Blinking
	
	Logic enabled
	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 Embedded I/O Boards, 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 Board - Cat. No. 1799-D10U10B, -D10U10BL, -D10U10V & -D10U10VL		
Input Specification	**Max**	**Min**
Inputs per block	10 Sinking or Sourcing, Type 1 + compatible	
Off-State 　　Voltage 　　Current	5V dc 1.5 mA	- -
On-State 　　Voltage 　　Current	30V dc 6 mA	10V dc 2 mA
Output Specification		
Outputs per block	10 Sinking or Sourcing, 0.5A, Short Circuit Protected, Pilot Duty	
Output Auxiliary Voltage	30V	10V
On-State Voltage Drop	250 mV	-
On-State Current	0.5A	-
Off-State Leakage	20 μA	-
Board Current (all outputs on)	4.0A	-
Surge Current - for 10ms, repeatable every 2s (individual outputs)	1.0A	
General Specifications		
DeviceNet Power 　　Voltage 　　Current	25V dc 125 mA	11V dc -
DeviceNet Power 　　Circuit Type	Class 2	
Auxiliary Power 　　Voltage 　　Current	30V dc 4.0A (all outputs on)	10V dc 100 mA (all outputs off)
LED Indicators	Board Status - red/green Network Status - red/green Auxiliary Power - green Logic Status - green Input Point LED - yellow Output Point LED -yellow	

10 Input/10 Output Board - Cat. No. 1799-D10U10B, -D10U10BL, -D10U10V & -D10U10VL

General Specifications cont.

Wire Gauge		
I/O	20 AWG	28 AWG
Auxiliary	12 AWG	28 AWG
Dimensions inches (millimeters)	1.0H x2.0W x 6.4D (26H x51W x 163D)	
Environmental Conditions		
Operational Temperature	-10 to 80^0 C (14 to 176^0 F)	
Storage Temperature	-40 to 85^0 C (-40 to 185^0 F)	
Relative Humidity	5 to 95% non-condensing	
Shock Operating	30g	
Non-Operating	50g	
Vibration	5g @ 10-50 H$_z$	
Agency Certifications (When product or packaging is marked)	c **UL** US	
	CE marked for all applicable directives	
	C marked for all applicable acts	
	DeviceNet conformance tested	

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Allen-Bradley is a trademark of Rockwell Automation
RSNetWorx for DeviceNet is a trademark of Rockwell Software.
DeviceLogix is a trademark of Rockwell Automation Allen-Bradley, Inc.