



# **ControlNet-to-DeviceNet Linking Device**

Catalog Number 1788-CN2DN

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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://literature.rockwellautomation.com>) 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, when necessary, we use notes to make you aware of safety considerations.

<b>WARNING</b> 	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.
<b>IMPORTANT</b>	Identifies information that is critical for successful application and understanding of the product.
<b>ATTENTION</b> 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you to identify a hazard, avoid a hazard and recognize the consequences.
<b>SHOCK HAZARD</b> 	Labels may be located on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
<b>BURN HAZARD</b> 	Labels may be located on or inside the equipment, for example, a drive or motor, to alert people that surfaces may be at dangerous temperatures.

## North American Hazardous Location Approval

<p>The following Information applies when operating this equipment in hazardous locations:</p>	<p>Informations sur l'utilisation de cet équipement en environnements dangereux:</p>
<p>Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>	<p>Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.</p>

<b>WARNING</b>	<b>EXPLOSION HAZARD</b>	<b>AVERTISSEMENT</b>	<b>RISQUE D'EXPLOSION</b>
	<p>Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.</p> <p>Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.</p> <p>Substitution of components may impair suitability for Class I, Division 2.</p> <p>If this product contains batteries, they must only be changed in an area known to be nonhazardous.</p>		<p>Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.</p> <p>Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.</p> <p>La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.</p> <p>S'assurer que l'environnement est classé non dangereux avant de changer les piles.</p>

### European Hazardous Location Approval

European Zone 2 Certification (The following applies when the product bears the EEx Marking)

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15.

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**IMPORTANT**

This equipment is not resistant to sunlight or other sources of UV radiation.

Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.

This equipment shall be used within its specified ratings defined by Allen-Bradley.

Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments.

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## Environment and Enclosure

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**ATTENTION**

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 m (1.24 mi) 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 enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. 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.

Besides this publication, see:

Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

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### Prevent Electrostatic Discharge

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**ATTENTION**

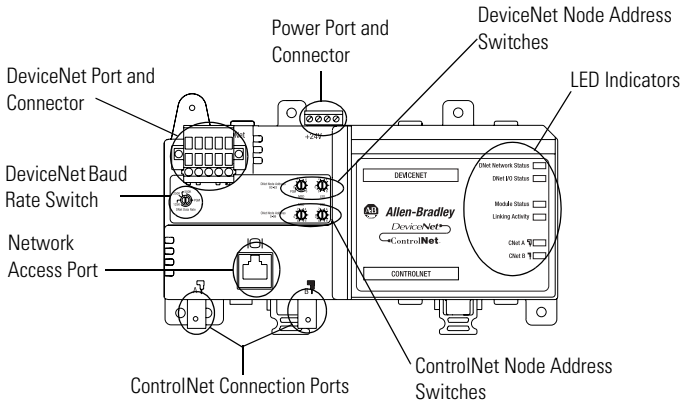
This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- 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.
  - Use a static-safe workstation, if available.
  - Store the equipment in appropriate static-safe packaging when not in use.
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## About the CN2DN Linking Device

Use following graphic to identify the components of your ControlNet-to-DeviceNet linking device.

### CN2DN Linking Device Components



The DeviceNet connection port is located on the top left corner of the device. See the section titled *Connect the CN2DN Device to a DeviceNet Network* for more information.

Rotary switches to set the ControlNet node address, DeviceNet node address, and the DeviceNet communication rate are located just below the power and DeviceNet ports. See the section titled *Uninstall the CN2DN Linking Device* for more information.

#### ATTENTION



The Network Access Port (NAP) is intended for local temporary programming use only. It is not for permanent connection.

Use only specified NAP cable to the network.

Located below the rotary switches, the ControlNet network access port allows for easy access of the ControlNet network using a laptop and 1784-PCC card. Use 1786-CP connection cable to access the ControlNet network using the NAP port.

## 8 ControlNet-to-DeviceNet Linking Device

Two ControlNet connection ports are located on the bottom left side of the device and provide the availability to connect a redundant network. See the section titled Connect the CN2DN Device to a ControlNet Network on page 16 for more information.

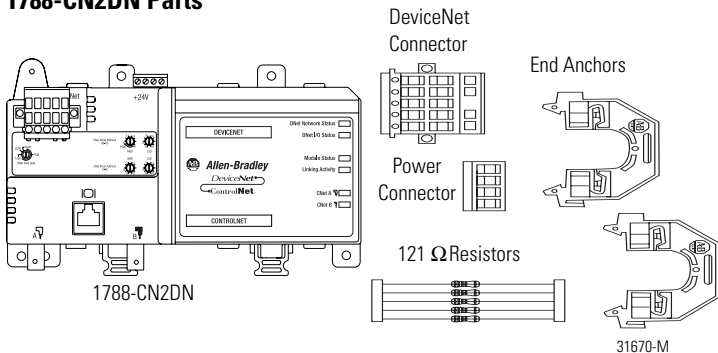
For more information about the power port and connector, see the section titled Wire a Power Supply to the CN2DN Device on page 13.

For more information about the LED indicators, see the section titled Interpret the LED Indicators on page 21.

### Parts List

The following parts are included with the 1788-CN2DN linking device.

#### 1788-CN2DN Parts



- One 1788-CN2CN linking device
- One power input connector
- One DeviceNet 10-pin linear connector
- Five 121  $\Omega$  resistors
- Two end anchors



## Required System Components

In order to install your 1788-CN2DN device, you will need the following system components.

- A 24V dc power supply  
and
- A securely installed zinc-plated, yellow-chrome steel, DIN rail, panel, or other suitable fixture.

## Install the CN2DN Device

Complete the following tasks to install the CN2DN Linking Device.

- Mount the CN2DN Device on a DIN Rail
- Mount the CN2DN Device on a Panel or Other Fixture
- Wire a Power Supply to the CN2DN Device
- Uninstall the CN2DN Linking Device
- Set the Node Addresses and Communication Rate
- Connect the CN2DN Device to a ControlNet Network
- Connect the CN2DN Device to a DeviceNet Network

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## Mount the CN2DN Device on a DIN Rail

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**ATTENTION**



This product is grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum and plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.87 in.) and use end-anchors appropriately.

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**IMPORTANT**

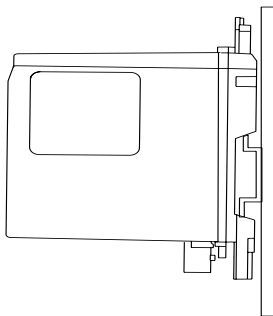
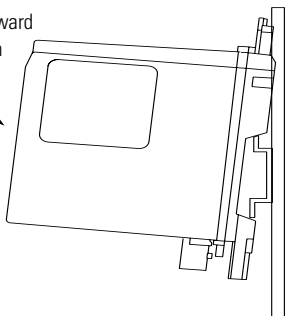
The DIN rail must be properly grounded. See publication Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 for more information about DIN rail grounding.

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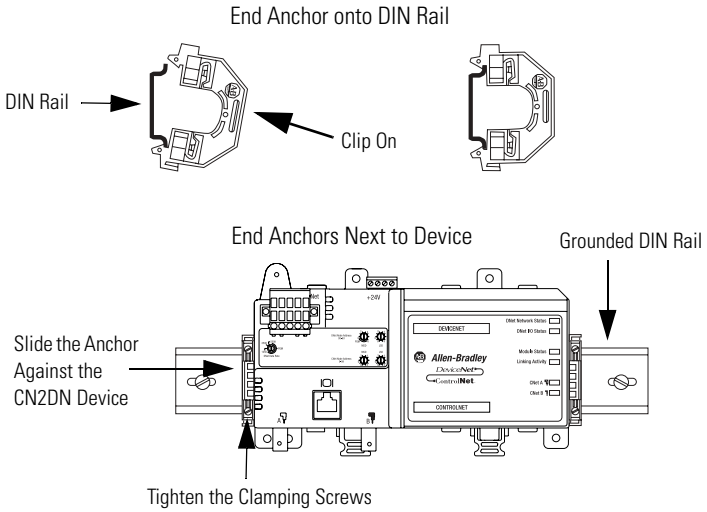
Complete the following steps to mount the CN2DN device on a DIN rail.

1. Align the CN2DN device over the DIN rail.
2. Press the CN2DN device onto the DIN rail until the DIN rail latches lock the linking device in place.

Press Forward  
and Down

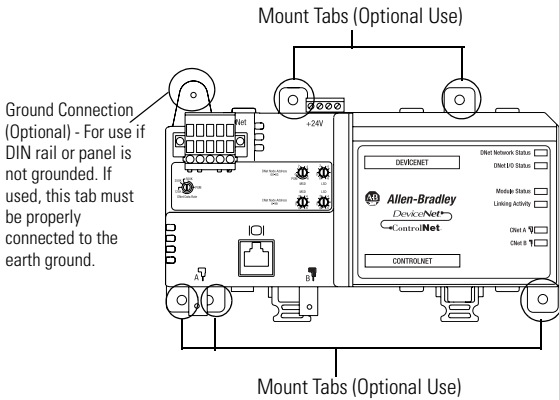


- Clip each of the end anchors onto the DIN rail next to the CN2DN device.



- Slide each anchor against the device and tighten the screws on the front of the end anchor.

5. If you are mounting your CN2DN device in a high-vibration area, insert screws (not included) into the holes of the mounting tabs and tighten so that the screws are firmly anchored into the panel behind the device.



You have completed mounting your CN2DN device on a DIN rail.

### Mount the CN2DN Device on a Panel or Other Fixture

#### IMPORTANT

If mounting the CN2DN device to a panel, ensure that the panel is conductive metal and properly grounded. Paint or other coatings should be sanded from the panel to ensure the CN2DN device makes sufficient conductive contact with the panel.

To mount the CN2DN device on a panel or other suitable fixture, insert five screws (not included) through the module's mounting tabs and into the panel or fixture behind the module. Use screws long enough to penetrate the panel or fixture for a secure mount.

## Wire a Power Supply to the CN2DN Device

**ATTENTION**


To comply with the CE Low Voltage Directive (LVD), power to this equipment and DeviceNet must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

To comply with UL restrictions, DeviceNet must be powered from a source compliant with the following: Class 2 or Limited Voltage/Current.

**ATTENTION**

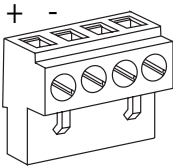

24V dc power connection wiring length must be less than 10 m (32.81 ft).

The CN2DN device requires 18...30V dc input power provided by a power supply that is separate from the DeviceNet network power supply.

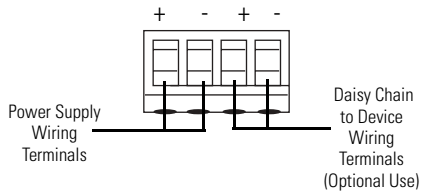
Complete the following steps to wire the power supply to the CN2DN linking device.

1. Disconnect power to the power supply.
2. Locate the orange power connector.

Power Connector



Power Connector, Top



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3. Loosen the two left-most terminal screws of the power connector.

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**IMPORTANT**

Do not connect more than two wires to any terminal.

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4. Insert the bare power supply wire ends into the left-side terminals of the power supply connector using the diagram as a guide.
5. Tighten the two left terminal screws using 0.6 Nm (7 in-lb) torque.

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**IMPORTANT**

The power supply connector must be inserted into the CN2DN device for power to reach any devices daisy chained from the CN2DN power supply connector.

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6. If you choose to connect another device to the power supply connector of the CN2DN device, loosen the two terminal screws on the right side of the connector.
7. Insert the bare device power wire ends into the two right terminals using the diagram as a reference.
8. Tighten the two right terminal screws using 0.6 Nm (7 in-lb) torque.
9. Insert the power supply connector into the power supply connector port.
10. Reapply power to the dc power supply.

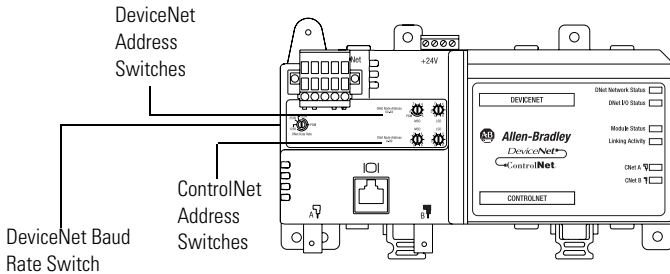
The LED indicators on the right side of the CN2DN device will flash red to indicate power has been connected.

You have completed wiring the power supply to the CN2DN device.

## Set the Node Addresses and Communication Rate

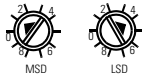
Complete the following steps to set the node addresses using the switches on the front of the CN2DN device.

### CN2DN Device Switches



1. To set the DeviceNet node address, use a small flat-head screwdriver to turn the arrows of the switches towards the desired node numbers.

DeviceNet switches shown set to node 14.



2. To set the DeviceNet communication rate, turn the DeviceNet baud rate switch to the communication rate your DeviceNet network is configured to, for example 125 K, 250 K, or 500 K.
3. To set the ControlNet node address, use a small Phillips-head screwdriver to turn the arrows of the switches towards the desired node numbers.

ControlNet switches shown set to node 26.



You have completed setting the ControlNet and DeviceNet node addresses and communication rate.

## Connect the CN2DN Device to a ControlNet Network

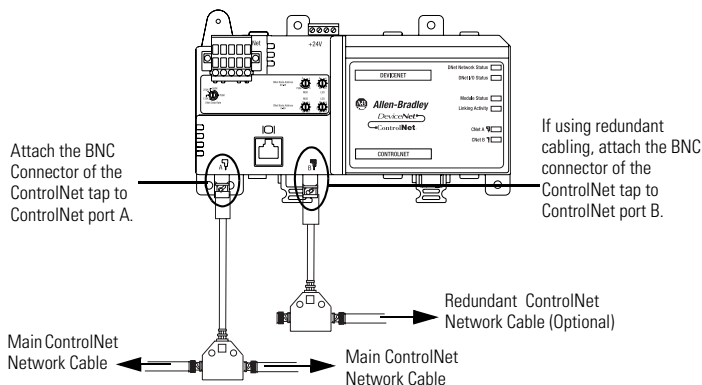
Complete the following steps to connect your CN2DN linking device to the ControlNet network.

### WARNING



If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations.

1. Attach the BNC connector of the ControlNet cable to ControlNet port A.



### IMPORTANT

Do not connect more than one ControlNet network to the CN2DN device at a time. Connecting the CN2DN device to two networks at one time will cause erratic behavior of the CN2DN device.

2. If you are connecting to redundant media, attach the BNC connector of the other ControlNet cable to ControlNet port B.

The CN2DN linking device is now connected to the ControlNet network.



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## Connect the CN2DN Device to a DeviceNet Network

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**WARNING**

If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations.

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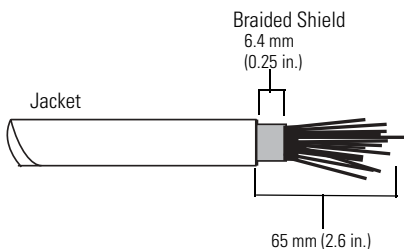
Complete the following steps to connect your CN2DN device to a DeviceNet network using the 10-pin linear connector included with the CN2DN device.

You may also use the following DeviceNet connectors not included with the device.

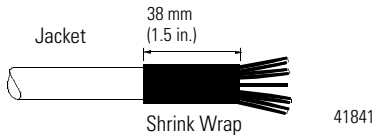
- 5-pin linear connector (1799-DNETSCON or 1799-DNETCON)
- 5-pin linear to micro connector (1799-DNC5MMS)

Consult the DeviceNet Media Design and Installation Guide, publication DNET-UM072, for more information about using the connectors not included with the 1788-CN2DN linking device.

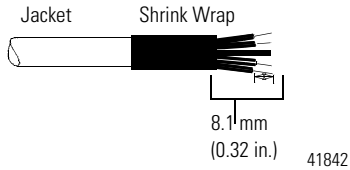
1. Strip 65 mm (2.6 in.) to 75 mm (2.96 in.) of the outer jacket from the end of the DeviceNet cable, leaving no more than 6.4 mm (0.25 in.) of the braided shield exposed.



2. Wrap the end of the cable with 38 mm (1.5 in.) of shrink wrap, covering part of the exposed conductors and part of the trunk line insulation.

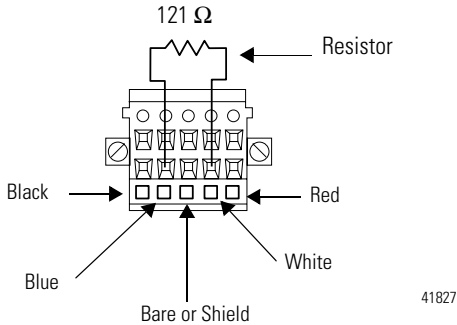


3. Strip 8.1 mm (0.32 in.) of the insulation from the end of each of the colored insulated conductors.



4. Insert each colored conductor into the matching color-coded terminal cavity of the open-style connector.
5. If the CN2DN device is the first or last node on the DeviceNet network, insert an end of a 121  $\Omega$  resistor into the blue and white terminal cavities of the DeviceNet port connector.

The resistor should bridge the blue and white terminal cavities.



6. Tighten all of the terminal screws using 0.6 Nm (7 in-lb) torque.

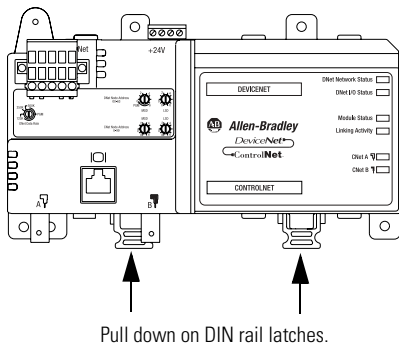
You have completed connecting to the DeviceNet network.

### Uninstall the CN2DN Linking Device

Complete the following steps to uninstall the CN2DN linking device.

1. Remove power from the CN2DN device.
2. Disconnect the power, DeviceNet, and ControlNet connectors.
3. If end anchors are in place, remove by loosening the screws and unclipping the anchor from the DIN rail.

4. To remove the CN2DN linking device from the DIN rail, pull down on the two latches at the bottom of the device while pulling the CN2DN device away from the DIN rail.



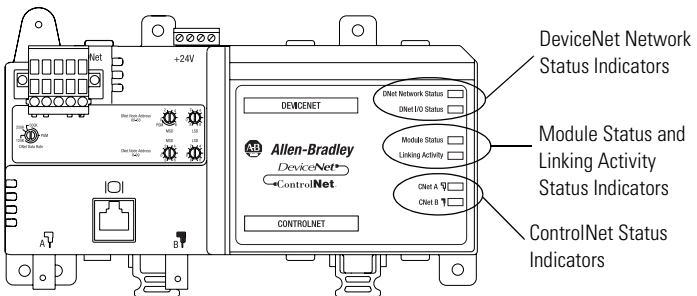
You may need to insert a flat-head screwdriver between the DIN rail latch and the tab that locks the latch into place in order to remove the device.

## Interpret the LED Indicators

Use the LED indicators on the CN2DN linking device to monitor the following:

- Module Status
- Linking Activity Status
- DeviceNet Network Status
- ControlNet Network Status

### CN2DN Device LED Indicators



### Module Status

Use the following table to interpret your Module Status LED indicators and determine if corrective action is necessary.

#### Module Status Indicator

LED Indicator	Device Status	Recommended Action
Off	No power to device.	A. Verify that the power supply is functioning properly. B. Cycle power supply. C. Remove power and check input power wiring. Reapply power. D. Replace the CN2DN linking device.

**Module Status Indicator**

<b>LED Indicator</b>	<b>Device Status</b>	<b>Recommended Action</b>
Green, flashing	The CN2DN device is functioning but not communicating with devices.	Use RSNetworkx software to configure the CN2DN device. See Additional Resources for publications with more information about configuring the CN2DN device.
Green, steady	Fully operational. The CN2DN device is communicating with all configured DeviceNet nodes or there are no configured devices.	None. The device has passed self-tests and is functioning properly if devices have been configured.
Red, flashing	The linking device is not communicating with one or more modules.	<p>A. Verify that DeviceNet switches are not set at PGM.</p> <p>B. Verify that connected devices are functioning properly.</p> <p>C. Verify that devices have been configured properly.</p> <p>See Additional Resources for publications with more information about configuring the CN2DN device.</p>
Red, steady	Unrecoverable communication fault.	<p>A. Verify that the CN2DN device has been assigned a unique node address during configuration.</p> <p>B. Verify that all devices are set at the same baud rate.</p> <p>C. Cycle CN2DN power.</p> <p>D. Replace the CN2DN device.</p>

### Linking Activity Status

The Linking Activity LED indicator displays the status of communication between the DeviceNet and ControlNet networks as well as the amount of traffic.

Use the following table to interpret the Linking Activity LED indicator.

### Linking Activity LED Indicator

LED Indicator	Linking Activity Status
Off	No network traffic is occurring between the ControlNet to DeviceNet networks. I/O traffic may be present.
Green, flashing	ControlNet to DeviceNet (non-I/O) communication traffic present (flash rate indicates amount of traffic).
Red and Green, flashing	Module is running boot code only (used for FLASH upgrades).



## ControlNet Network Status

The CNet A and CNet B LED indicators display the status of the ControlNet network and individual channels.

The ControlNet network may recognize more than one network status a time. If more than one status is present, the CN2DN linking device will display the highest priority status.

Use the following table to interpret the ControlNet LED indicators.

### ControlNet LED Indicators, CNet A and CNet B

LED Indicator State	LED View	Priority Level	ControlNet Network Status
Off	Both CNet A and CNet B	1 (highest priority)	No power.
Red, steady	Both CNet A and CNet B	2	No ControlNet network found.
Red and green, alternating	Both CNet A and CNet B	3	Device self-testing.
Red, alternating	Both CNet A and CNet B	4	Incorrect ControlNet node configuration.
Off	One, CNet A or CNet B	5	ControlNet channel disabled or not supported.
Red and green, flashing	One, CNet A or CNet B	6	Incorrect ControlNet network configuration.
Red, flashing	One, CNet A or CNet B	7	No data received from network.
Green, flashing	One, CNet A or CNet B	8	Temporary channel error or listen-only channel.
Green, steady	One, CNet A or CNet B	9 (lowest)	Normal network operation.

## DeviceNet Network Status

The DeviceNet network indicators, DNet Network Status and DNet I/O Status, indicate the state of the DeviceNet network and the state of DeviceNet I/O modules.

Use the following tables to interpret your DeviceNet LED indicators located at the top right corner of the CN2DN device.

### DNet Network Status Indicator

LED Indicator	DeviceNet Network Status	Recommended Action
Off	No DeviceNet connection.	<p>If a DeviceNet connection has been made:</p> <ul style="list-style-type: none"> <li>A. Verify that the DeviceNet network is powered.</li> <li>B. Check DeviceNet cables and connections.</li> </ul>
Green, flashing	DeviceNet network found, not communicating with devices.	<p>If devices should be communicating:</p> <ul style="list-style-type: none"> <li>A. Check DeviceNet cables and connections.</li> <li>B. Verify that all devices on the DeviceNet network are functioning properly.</li> </ul>

**DNet Network Status Indicator**

<b>LED Indicator</b>	<b>DeviceNet Network Status</b>	<b>Recommended Action</b>
Green, steady	One or more devices connected and communicating.	None needed.
Red, flashing	One or more connections timed-out.	<p>Use programming software to view tags specific to the devices in order to troubleshoot the DeviceNet network.</p> <p>See DeviceNet Modules in Logix5000 Control Systems, publication DNET-UM004, for more information about using controller tags to troubleshoot connection errors.</p>
Red, steady	Communication error (bus off condition).	<p>A. Verify that each device has been assigned a unique node address.</p> <p>B. Verify that specified DeviceNet baud rates are the same.</p> <p>C. Cycle power to the CN2DN device.</p> <p>See DeviceNet Modules in Logix5000 Control Systems, publication DNET-UM004, for more information about using controller tags to troubleshoot connection errors.</p>

**DNet I/O Status Indicator**

<b>LED Indicator</b>	<b>I/O Device Status</b>	<b>Recommended Action</b>
Off	No connection to device.	A. Verify that the DeviceNet network is powered.  B. Verify the connected device is functioning properly.
Green, flashing	Device is in program mode (idle).	To put the device in run mode, use programming software.
Green, steady	Device is in run mode.	To put the device in program mode, use programming software.

## Troubleshoot the DeviceNet Network

If DeviceNet network communications fail, you need to complete one or both of these tasks to troubleshoot the DeviceNet network.

- View and interpret DeviceNet network status codes.
- View and interpret the controller status tags using RSLogix5000 software.

### View and Interpret DeviceNet Status Codes on the DeviceNet Scanner

In order to view the DeviceNet status code, locate the scanner on the DeviceNet network. The status code is viewed on the character display on the front of the scanner module, for example a 1756-DNB, DeviceNet bridge module.

#### IMPORTANT

The DeviceNet status codes display only on the DeviceNet scanner module. Status codes **do not** display on the 1788-CN2DN linking device.

Use the DeviceNet Status Codes table to interpret your status code.

### DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
0-63	Scanner's DeviceNet node address.	None.
65	The AutoScan option is on and the device is in idle mode.	None.
67	Scanner is Secondary scanner.	None.
68	Primary scanner has detected no Secondary scanner.	Configure another scanner to be the Secondary scanner.
69	Primary and Secondary configurations are mismatched.	Check configuration of the Secondary scanner.

### DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
70	The address of the device is already in use by another device on the network. The scanner failed the duplicate node address check.	Change the address of the device to an unused address.
71	Invalid data in scan list.	Use RSNetworkx software to reconfigure the scan list.
72	Slave device stopped communicating. If the slave device does not recover communication during next scan, status code changes to 78.	<ul style="list-style-type: none"> <li>• Verify slave device's:               <ul style="list-style-type: none"> <li>– power.</li> <li>– communication connections.</li> </ul> </li> <li>• If slave device is polled, verify that interscan delay time is adequate for the device to return data.</li> </ul>
73	Slave device's identity information does not match electronic key in scanner.	<ul style="list-style-type: none"> <li>• Make sure that the correct device is connected at this address.</li> <li>• Make sure that the device matches the specified electronic key (vendor, product code, product type).</li> </ul>
74	Scanner detected data overrun on DeviceNet communication port.	<ul style="list-style-type: none"> <li>• Modify your configuration and check for invalid data.</li> <li>• Check network communication traffic.</li> </ul>

**DeviceNet Status Codes**

<b>Status Code</b>	<b>Description of Status</b>	<b>Recommended Action</b>
75	Either or both of the following: <ul style="list-style-type: none"><li>• The device does not have a scan list.</li><li>• The device has not received communication from any other device.</li></ul>	Verify that the device has: <ul style="list-style-type: none"><li>• a configured scan list.</li><li>• a properly-wired connection to the network</li></ul>
76	No direct network traffic for scanner. The scanner hears other network communication but does not hear any directed to it.	None.
77	During initialization, the data size expected by the device does not match the scan list entry.	Use RSNetWorx software to check the slave device and the scan list for the correct input and output sizes for the slave device.

**DeviceNet Status Codes**

<b>Status Code</b>	<b>Description of Status</b>	<b>Recommended Action</b>
78	Device is configured in scan list, but not communicating. It has failed to communicate during the scanner's second scan, which followed the display of status error code 72.	<ul style="list-style-type: none"><li>• Verify device's:<ul style="list-style-type: none"><li>– power.</li><li>– communication connections.</li></ul></li><li>• If the device is polled, make sure the interscan delay is long enough for the device to return its data.</li><li>• If needed, use RSNetWorx software to:<ul style="list-style-type: none"><li>– add the device to the DeviceNet network.</li><li>– delete the device from scanner's scan list.</li><li>– inhibit the device in the scanner's scan list.</li></ul></li></ul>
79	Scanner has failed to transmit a message. The error status usually displays after the duplicate node check completes at power-up.	<ul style="list-style-type: none"><li>• Make sure that your scanner is connected to a valid network.</li><li>• Check for disconnected cables.</li><li>• Verify network baud rate.</li></ul>



**DeviceNet Status Codes**

Status Code	Description of Status	Recommended Action
80	Scanner is in idle mode.	<p>If desired, put network in run mode by completing the following steps.</p> <ol style="list-style-type: none"> <li>1. Put the controller in run or remote run mode using the keyswitch on the controller or through RSLogix5000 software.</li> <li>2. Turn on the bit O.CommandRegister.Run for the scanner.</li> </ol>
81	Controller has set the scanner to the faulted mode. The Command bit also indicates a DeviceNet network fault state.	Bit O.CommandRegister.Fault for the scanner is on. Correct condition that caused controller to set this bit and then turn this bit off.
82	Error detected in sequence of fragmented I/O messages from device.	<p>Use RSNetWorx software to:</p> <ul style="list-style-type: none"> <li>– check scan list of the device to make sure that its input and output data sizes are correct.</li> <li>– check the configuration of the device.</li> </ul>

### DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
83	Device returns error responses when the scanner attempts to communicate with it.	<ul style="list-style-type: none"> <li>• Use RSNetWorx software to:               <ul style="list-style-type: none"> <li>– check the accuracy of the scan list.</li> <li>– check the configuration of the device. The device may be in another scanner's scan list.</li> </ul> </li> <li>• Use the slave device's documentation to verify that the device supports the message type used by the scanner.               <ul style="list-style-type: none"> <li>– If the device's message type does not match the scanner's, then use RSNetWorx to access the scanner's scanlist and change the scanner's message type to one that is compatible with the slave device.</li> </ul> </li> <li>• Cycle power to the device.</li> </ul>
84	Scanner is initializing the DeviceNet network.	None. This code clears itself once the scanner attempts to initialize all the devices on the network.
85	During runtime, the data size sent by the slave device does not match the size in the corresponding scan list entry.	Since variable length poll data is not supported, verify that the slave device is functioning properly.

## DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
86	The device is in idle mode, or not producing data, while the scanner is in run mode.	<ul style="list-style-type: none"> <li>• Check the configuration and status of the device.</li> <li>• If you set up an interlock between 2 scanners (controllers), make sure both scanners are in run mode.</li> </ul>
87	Scanner cannot listen to shared inputs from slave device because the owning scanner has not established communication with that slave device.	<ul style="list-style-type: none"> <li>• Verify primary scanner connection and configuration.</li> <li>• Slave device may not be producing data.</li> </ul>
88	Scanner cannot listen to shared inputs from slave device because I/O parameters (for example, polled or strobed, electronic key, data size) for that slave device are configured differently between this scanner and the owning scanner.	In this scanner, reconfigure the I/O parameters for the shared inputs scan list entry so that they match those same parameters in the owning scanner.
89	Scanner failed to configure a device using the Automatic Device Recovery (ADR) parameters.	<ul style="list-style-type: none"> <li>• Make sure that you installed a compatible device.</li> <li>• If the offline configuration of the device does not match the actual (online) configuration of the device, change the offline configuration to match the online configuration.</li> </ul>
90	Controller has set the scanner to the disabled mode.	If desired, turn enable the scanner by locating the O.CommandRegister.DisableNetwork bit of the command register and turn it off.

## DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
91	Bus-off condition likely due to cable or signal errors.	<ul style="list-style-type: none"> <li>• Cycle power to the device.</li> <li>• Verify that all devices are set to the same baud rate.</li> <li>• Check DeviceNet cabling to make sure no short circuits exist between CAN (blue and white) wires and power or shield (black, red, and shield) wires.</li> <li>• Check the media system for the following noise sources:               <ul style="list-style-type: none"> <li>– Device located near high-volt power cable.</li> <li>– Incorrect or no termination resistor used.</li> <li>– Improper grounding.</li> <li>– Device on network producing noise or incorrect data for the network.</li> </ul> </li> </ul>
92	DeviceNet cable not supplying power to the device's communication port.	<ul style="list-style-type: none"> <li>• Verify the network's 24V dc power supply is operating properly.</li> <li>• Verify good cable condition.</li> <li>• Check cable connections to the device.</li> </ul>
95	A device's firmware is being updated or a configuration is being downloaded.	None. Do not disconnect the device while the update is in process as existing data in device memory will be lost.

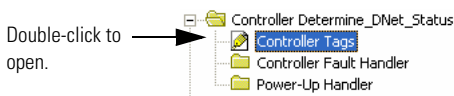
## DeviceNet Status Codes

Status Code	Description of Status	Recommended Action
96	Communication port is in test mode.	None.
97	The controller has placed the scanner in halt mode. February	If the Q.CommandRegister.HaltScanner bit is on, turn it off then cycle scanner power.
98	General firmware error.	Replace device.
99	System Failure.	Replace device.

## View and Interpret Controller Status Tags

Use the following procedure to troubleshoot the DeviceNet network using the controller status tags in RSLogix5000 software.

1. Use RSLogix5000 software to verify that the controller is in run mode and that the program is online with the controller.
2. In the program's organization tree, double-click Controller Tags.



The Controller Tags display.

3. Determine which tags you need to view using the following procedure.
  - a. Determine the first part of the tag title specific to your device using the table below.

<b>If Your DeviceNet Module Is</b>	<b>Then the Tag Title Begins With</b>	<b>Example</b>
Local 1756-DNB module	Local:slot number	Local:3:
Remote 1756-DNB module	Name of the module:slot number in remote chassis	1756-DNB:3
CompactLogix 1769-SDN module	Local:slot number	Local:4
SoftLogix5800 1784-PCIDS module	Local:slot number	Local:0
DriveLogix/FlexLogix 1788-DNBO	Name of module entered in the module Properties dialog.	My_Flex_Bridge
Linking Device, 1788-EN2DN or 1788-CN2DN	Name of the module entered in the module Properties dialog.	As_You_Name_

- b. Decide which tag type you need to view using the following table as a reference.

<b>If You Are Troubleshooting</b>	<b>Then Check Tag Type</b>	<b>Indicated By</b>
A problem specific to the DeviceNet scanner or the DeviceNet network.	Status Register	StatusRegister
The DeviceNet scanner and the DeviceNet network status.	Command Register	CommandRegister
A problem corresponding to a specific device on the DeviceNet network.	Status Tag	S

4. Scroll through the list of tags to locate the specific tag you need.

Use the following examples as references when determining which tags to view.

### 1756-DNB Tag Title Example

Tag Titled Local:3:1:StausRegister used to troubleshoot a problem specific to the DeviceNet module or network.

Name	Value	Force Mask
Local:3:1	{...}	
Local:3:1:StatusRegister	{...}	
Local:3:1:StatusRegister.Run	0	
Local:3:1:StatusRegister.Fault	0	
Local:3:1:StatusRegister.DisableNetwork	0	
Local:3:1:StatusRegister.DeviceFailure	0	
Local:3:1:StatusRegister.Autoverify	0	
Local:3:1:StatusRegister.CommFailure	0	
Local:3:1:StatusRegister.DupNodeFail	0	
Local:3:1:StatusRegister.DnetPowerDet...	0	
Local:3:1:Data	{...}	

Tag Titled Local:3:5 used to troubleshoot a problem specific to a device connected to the DeviceNet network.

Local:3:5	{...}	
Local:3:5:ScanCounter	2#0000_000...	
Local:3:5:DeviceFailureRegister	{...}	
Local:3:5:AutoverifyFailureRegister	{...}	
Local:3:5:DeviceIdleRegister	{...}	
Local:3:5:ActiveNodeRegister	{...}	
Local:3:5:StatusDisplay	{...}	
Local:3:5:ScannerAddress	16#00	
Local:3:5:ScannerStatus	16#00	
Local:3:5:ScrollingDeviceAddress	16#00	
Local:3:5:ScrollingDeviceStatus	16#00	
Local:3:5:DeviceStatus	{...}	

Tag Titled Local:3:0:CommandRegister to determine the command of the DeviceNet scanner and its effect on the DeviceNet network.

Local:3:0	{...}	
Local:3:0:CommandRegister	{...}	
Local:3:0:CommandRegister.Run	0	
Local:3:0:CommandRegister.Fault	0	
Local:3:0:CommandRegister.DisableNet...	0	
Local:3:0:CommandRegister.HaltScanner	0	
Local:3:0:CommandRegister.Reset	0	

## 1788-CN2DN Tag Title Example

Tag Titled

As\_You\_Name:I.StausRegister used to troubleshoot a problem specific to the DeviceNet module or network.

- As_You_Name:I.StausRegister	{...}	{...}	
-As_You_Name:I.StatusRegister.Run		0	Decimal
-As_You_Name:I.StatusRegister.Fault		0	Decimal
-As_You_Name:I.StatusRegister.Disable...		0	Decimal
-As_You_Name:I.StatusRegister.Device...		0	Decimal
-As_You_Name:I.StatusRegister.Autoverify		0	Decimal
-As_You_Name:I.StatusRegister.CommF...		0	Decimal
-As_You_Name:I.StatusRegister.DupNo...		0	Decimal
-As_You_Name:I.StatusRegister.DnetPo...		0	Decimal
+ As_You_Name:I.Data	{...}	{...}	Decimal

Tag Titled As\_You\_Name:S used to troubleshoot a problem specific to a device connected to the DeviceNet network.

- As_You_Name:S	{...}	{...}	
+ As_You_Name:S.ScanCounter	2#0000_000...		Binary
+ As_You_Name:S.DeviceFailureRegister	{...}	{...}	Binary
+ As_You_Name:S.AutoverifyFailureRegister	{...}	{...}	Binary
+ As_You_Name:S.DeviceIdleRegister	{...}	{...}	Binary
+ As_You_Name:S.ActiveNodeRegister	{...}	{...}	Binary
+ As_You_Name:S.StatusDisplay	{...}	{...}	Binary
+ As_You_Name:S.ScannerAddress	16#00		Hex
+ As_You_Name:S.ScannerStatus	16#00		Hex
+ As_You_Name:S.ScrollingDeviceAddress	16#00		Hex
+ As_You_Name:S.ScrollingDeviceStatus	16#00		Hex
+ As_You_Name:S.DeviceStatus	{...}	{...}	Hex

Tag Titled

As\_You\_Name:O.CommandRegister to determine the command of the CN2DN device and its effect on the DeviceNet network

- As_You_Name:O	{...}	{...}	
- As_You_Name:O.CommandRegister	{...}	{...}	
-As_You_Name:O.CommandRegister.Run		0	Decimal
-As_You_Name:O.CommandRegister.Fault		0	Decimal
-As_You_Name:O.CommandRegister.Dis...		0	Decimal
-As_You_Name:O.CommandRegister.Hal...		0	Decimal
-As_You_Name:O.CommandRegister.Re...		0	Decimal



5. If need to troubleshoot Status Register tags, use the following table as a reference to interpret module or network status.

### Status Register Tag Values

If Tag Member	Displays Value	Then Status Is
Run	0	Scanner in idle mode.
Run	1	Scanner in run mode.
Fault	0	Scanner not faulted.
Fault	1	Scanner faulted.
DisableNetwork	0	Scanner not disabled.
DisableNetwork	1	Scanner disabled.
DeviceFailure	0	Scanner communicating with all devices.
DeviceFailure	1	Scanner not communicating with at least 1 device.
AutoVerify	0	Data size of each device matches the amount of memory allocated for the device in the scanner.
AutoVerify	1	Data size of at least 1 device does not match the amount of memory allocated for the device in the scanner.
CommFailure	0	No network-wide communication problem exists
CommFailure	1	Network-wide communication problem exists
DupNodeFail	0	Scanner is on the network at a unique address
DupNodeFail	1	Scanner is trying to get on the network at an address that is already in use.
DnetPowerDetect	0	Network connector of the scanner has power.
DnetPowerDetect	1	Network connector of the scanner does not have power.

6. If you need to troubleshoot Status Tags (:S), use the following table as a reference to interpret device status.

If You Want Information About	Then See	
	Member	Data Type
I/O scans count.	ScanCounter	DINT
<p>Indication that a device is not communicating on the network.</p> <p>Use the following information to interpret status:</p> <ul style="list-style-type: none"> <li>• There is 1 bit for each address on the DeviceNet network (0 -63).</li> <li>• The position of a bit = address of a device.</li> <li>• If a bit = 1, then the device at that address has failed.</li> </ul>	DeviceFailureRegister	SINT[8]
<p>Indication that the data size of a device does not match the amount of memory allocated for the device in the scanner.</p> <p>Use the following information to interpret status:</p> <ul style="list-style-type: none"> <li>• There is 1 bit for each address on the DeviceNet network (0 -63).</li> <li>• The position of a bit = address of a device.</li> <li>• If a bit = 1, then their is a mismatch with that address.</li> </ul>	AutoverifyFailureRegister	SINT[8]

If You Want Information About	Then See	
	Member	Data Type
<p>Indication that a device is idle.</p> <p>Use the following information to interpret status:</p> <ul style="list-style-type: none"> <li>• There is 1 bit for each address on the DeviceNet network (0 -63).</li> <li>• The position of a bit = address of a device.</li> <li>• If a bit = 1, then the device at that address is idle.</li> </ul>	DeviceIdleRegister	SINT[8]
<p>Indication that a device is online.</p> <p>Use the following information to interpret status:</p> <ul style="list-style-type: none"> <li>• There is 1 bit for each address on the DeviceNet network (0 -63).</li> <li>• The position of a bit = address of a device.</li> <li>• If a bit = 1, then the device at that address is online.</li> </ul>	ActiveNodeRegister	SINT[8]
ASCII representation of scanner status/display.	StatusDisplay	SINT[4]
Address of the scanner.	ScannerAddress	SINT
Status code of scanner.	ScannerStatus	SINT

## 44 ControlNet-to-DeviceNet Linking Device

<b>If You Want Information About</b>	<b>Then See</b>	
	<b>Member</b>	<b>Data Type</b>
Address with an error.  Use the following information to interpret status: <ul style="list-style-type: none"><li>• Scrolls through the addresses with errors.</li><li>• ScrollingDeviceStatus member shows the status code.</li></ul>	ScrollingDeviceAddress	SINT
A status code of an address with an error.  Use the following information to interpret status: <ul style="list-style-type: none"><li>• Scrolls through addresses with errors.</li><li>• ScrollingDeviceAddress member shows the address.</li></ul>	ScrollingDeviceStatus	SINT
Status code of all devices – 1 byte per device.	DeviceStatus	SINT[64]

7. If you need to troubleshoot the CommandRegister tags, use the following table to interpret or change the status associated with the data bit.

<b>If Bit</b>	<b>Bit Name</b>	<b>Status Indicates</b>
0	Run	Device and Network: 1 = run mode 0 = idle mode
1	Fault	Network: 1 = fault present 0 = normal
2	Disable Network	Network: 1 = disabled 0 = normal
3	Halt Scanner	Device: 1 = halt device (device stops all functions) 0 = normal operation
4	Reset	Device: 1 = need to reset device (change to 0) 0 = normal

## Troubleshoot the ControlNet Network

If ControlNet network communications fail, you need to complete one or more of the following tasks to troubleshoot the ControlNet network.

- Interpret the LED Indicators of ControlNet devices on the network.
- View and interpret the status indicators displayed on the ControlNet network devices.
- Check ControlNet network for media problems.

For more information about completing each troubleshooting task, consult the following publications.

<b>Task</b>	<b>Publication Title</b>	<b>Publication No.</b>
Interpret LED indicators of a ControlNet module	Installation instructions specific to the module - or - ControlNet Modules in Logix5000 Control Systems User Manual	Varies by module  - or -  CNET-UM001
View and interpret ControlNet network status indicators	ControlNet Modules in Logix5000 Control Systems User Manual	CNET-UM001
Check for ControlNet media problems	ControlNet Fiber Media Planning and Installation Guide	CNET-IN001

## Specifications

### CN2DN Linking Device, 1788-CN2DN

Attribute	Value
Dimensions (H x W x D), Approx.	120 x 200 x 87 mm (4 11/16 x 7 7/8 x 3 7/16 in.)
Enclosure Type	None (Open-style)
IEC Temp Code	T4
Isolation Voltage	30V, Basic Insulation Type Tested at 720V dc for 60 seconds, between all ports
North American Temp Code	T4A
Wiring Category <sup>(1)</sup>	3 - on power ports 2 - on communication ports
Wire Size, Power	2.5 mm <sup>2</sup> (14 AWG)... 0.25 mm <sup>2</sup> (22 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 3/64 inch (1.2 mm) insulation max
Wire Size, DeviceNet	Refer to the DeviceNet Media Design and Planning Guide, publication DNET-UM072, for information specific to your DeviceNet network.
Wire Size, ControlNet	RG6

<sup>(1)</sup> Use this conductor category information for planning conductor routing as described in Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

## Environmental Specifications

Attribute	Value
Conducted RF Immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
EFT/B Immunity	IEC 61000-4-4: ±4 kV at 2.5 kHz on power ports ±2 kV at 5 kHz on communications ports
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1 KHz sine-wave 80% AM from 30...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz
Relative Humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Shock, Non-Operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Shock, Operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Surge Transient Immunity	IEC 61000-4-5: ±2 kV line-earth(CM) on communications ports



**Environmental Specifications**

<b>Attribute</b>	<b>Value</b>
Temperature, Operating	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): 0...60 °C (32...140 °F)
Temperature, Storage	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40...85 °C (-40...185 °F)
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10...500 Hz

## Certifications

The following certifications apply when the product is marked.

Certification <sup>(1)</sup>	Value
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.  UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810
CE	European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
CI	ControlNet Int'l conformance tested to ControlNet specifications.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C.  CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
EEx	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (Zone 2)
ODVA	ODVA conformance tested to DeviceNet specifications.

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

## Additional Resources

Use the following table to determine which publication best suits your information needs.

Topic	Publication Title	Publication No.
Programming, configuring, using, and troubleshooting of ControlNet modules.	ControlNet Modules in Logix5000 Control Systems	CNET-UM001
Planning and installing a ControlNet network.	ControlNet Coax Media Planning and Installation Guide	CNET-IN002
Planning and installing a DeviceNet network.	DeviceNet Media Design and Installation Guide	DNET-UM072
Programming, configuring, using, and troubleshooting of DeviceNet modules.	DeviceNet Modules in Logix5000 Control Systems	DNET-UM004

You can view or download publications at <http://www.literature.rockwellautomation.com>. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

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## Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

## Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running.

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

## New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning, it may need to be returned.

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

[www.rockwellautomation.com](http://www.rockwellautomation.com)

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