EtherNet/IP-to-DeviceNet Linking Device

Catalog number 1788-EN2DN

This publication tells you how to install the 1788-EN2DN EtherNet/IP-to-DeviceNet linking device and use RSNetWorx for DeviceNet to configure it.

About the Linking Device

The 1788-EN2DN EtherNet/IP-to-DeviceNet linking device lets you seamlessly connect your information- or control-level networks with your device-level network.

The linking device provides full DeviceNet master functionality, so you can connect up to 63 DeviceNet slave devices to an Ethernet TCP/IP interface that supports EtherNet/IP and a HTTP web server. As examples, you could use the linking device:

- as a gateway to connect information- or control-level networks to device- level networks for programming, configuration, control or data collection
- as a router/bridge to connect the EtherNet/IP network to the DeviceNet network

The linking device provides centralized data storage, or I/O tables, for data shared between the DeviceNet and EtherNet/IP networks. Data is placed into the I/O tables by one network interface, allowing the data to be read through the other network interface.

The linking device appears as a single device on either network using standard protocol mechanisms. No special, or extended, protocol features are required for the devices on either network to read or write the data flowing through the I/O tables; all cross-network activity is transparent to the devices on either network.

All connections, whether power or fieldbus, to the linking device are made on one end of the module. Phoenix connectors are provided for power and DeviceNet connections. A RJ-45 style connector is provided for EtherNet/IP connection.

The linking device can be mounted to a DIN rail.

System Requirements

The following hardware and software components are required to use the linking device.

Required Hardware

- 1788-EN2DN linking device

- DeviceNet cabling, power, and devices forming a DeviceNet network

- Ethernet cabling and power

- PC or other controller with access to the Ethernet network

- PC running DeviceNet Configuration Software. The DeviceNet slave devices with which the linking device communicates are specified using a DeviceNet Configuration Software tool such as RSNetWorx for DeviceNet.

- 24V dc power to the linking device (DeviceNet power may be used; however, using DeviceNet power bypasses DeviceNet network isolation)

Required Software

- DeviceNet configuration software such as RSNetWorx for DeviceNet, version 4.01 or later to configure DeviceNet devices and the linking device's DeviceNet functionality
- RSLinx version 2.31 or later
- DHCP server 2.3.2 or later, which ships with RSLinx 2.42. If you are using an earlier version of RSLinx, you will need to download the standalone server from http://www.software.rockwell.com/rslinx/

Installing and Configuring the Linking Device

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.
	• When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.
	• If you insert or remove the card while host power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.
	• If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Follow these steps to install the linking device (described in the sections that follow):

Connect the Linking Device to the EtherNet/IP Network

Connect the EtherNet/IP network cable to the RJ-45 port on the end of the linking device.

Figure 1 Power and Network Connections
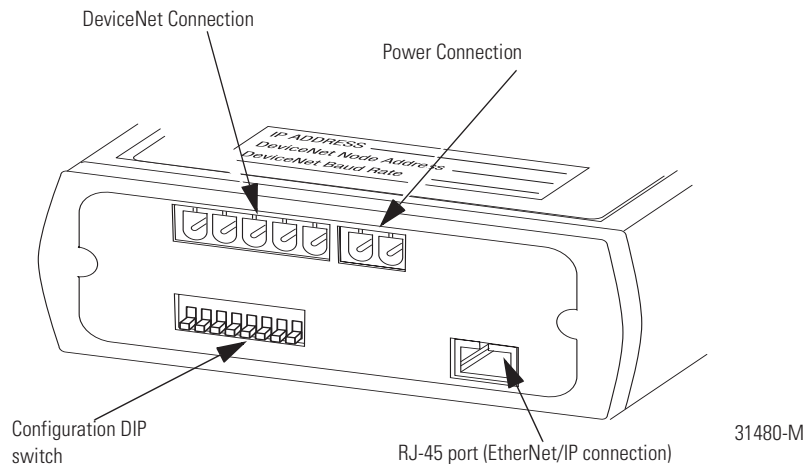
Connect the Linking Device to the DeviceNet Network

1. Make sure a PC running RSNetWorx for DeviceNet is connected to the EtherNet/IP network.

2. With power to the linking device off, connect the DeviceNet network cable to the DeviceNet connector on the linking device. The female terminal block connector is provided with the linking device.

(Red) Net Power 24V dc

(White) CAN High +

CAN Shield

(Blue) CAN Low

(Black) Net Power 24V dc Common   31442-M
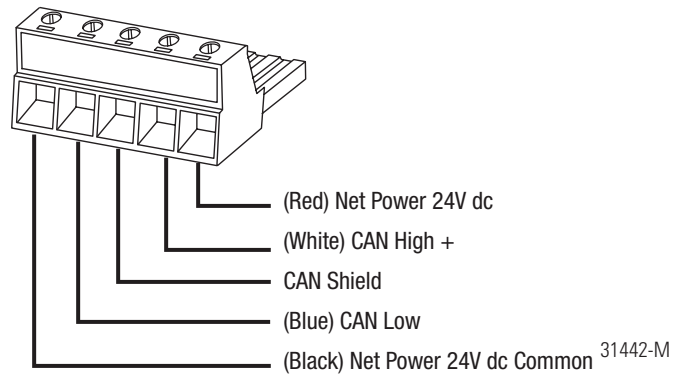
TIP   Two 120 ohm termination resistors (supplied with the linking device) may be required for proper network termination at each end of the trunk line. See the DeviceNet Specification (available from the Open DeviceNet Vendors Association at www.odva.com) for specific rules on DeviceNet connections and termination.

3. Connect the power cable to the linking device. See Figure 1 on page 8. The female terminal block connector is provided with the linking device.

24V dc common

24V dc +
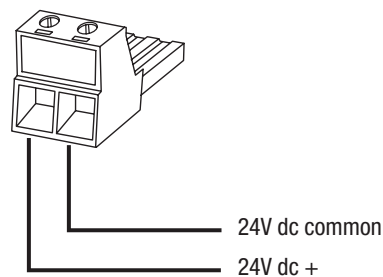
4. Power up the linking device and DeviceNet network.

IMPORTANT   The linking device defaults to Autobaud. This means that the linking
device automatically finds the network baud rate at power-up. You must
specify a master device, such as a DeviceNet Bridge Module (1756-DNB)
so that the linking device can pick up the correct baud rate. If you do not
have another device installed, you must use RSNetWorx for DeviceNet to
set the baud rate, as described in Set the DeviceNet MAC ID and Baud
Rate on page 18. Do not attempt to commission the linking device on a
network configured at a different baud rate.

Configure the Linking Device IP Address

Several methods may be used to set the IP Address. These methods include:

- IP address configuration DIP switch
- DHCP protocol
- web page
- RSLogix 5000 software (v.13 or greater) and 1788-EN2DN Linking Device (revision
  2.X or greater)

Setting the IP Address with the Configuration DIP Switch

A configuration DIP switch on the end of the linking device lets you set the IP address. See
Figure 1 on page 8 to locate the switch. If the configuration DIP switch is set to 1 (in the up
position, as shown in Figure 2), on power-up the value of the switch creates the IP address of
192.168.1.1.

IMPORTANT   The numbers that appear above the switches on the DIP switch do not
correspond to bit locations in the address value. In fact, the numbers on
the switch are opposite the address value bit locations; i.e., bit 0 is set by
switch 8.

Figure 2 IP Address Configuration DIP Switch
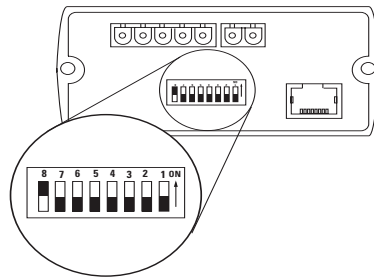
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The switch represents the binary value of the last byte in the 4-byte IP address. In this case it is *n*. If *n* = 0, the linking device obtains its IP address from the software configuration (DHCP or web page).

IP address	192.168.1.*n*
Subnet mask	255.255.255.0
Gateway address	0.0.0.0 (No gateway set)

Setting the IP Address Using DHCP/BootP

TIP	The use of DHCP is the default configuration for the linking device as shipped. The IP address configuration DIP switch ships with *n* = 0.

When DHCP/BootP is enabled and a DHCP or BootP server is found, the IP address, Subnet mask, and Gateway address are automatically configured by the DHCP server, as shown in Figure 3.

Specifications

Table 13 Specifications

| specification	value
DeviceNet Power Requirements DeviceNet Current Draw	Power will be connected to the EN2DN using a 2 position screw terminal (Phoenix) connector. Operating Voltage: 7 to 32 V dc (24 V dc nominal) 100 mA at 24 V Class 2
Linking Device Current Draw	300 mA at 24 V Class 2
Operational 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): 0 to 60 °C (32 to 140 °F)
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, Unpackaged 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
Operating Shock	IEC 60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5g @10-500Hz
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900MHz 10V/m with 200Hz 50% Pulse 100%AM at 1890MHz
EFT/B Immunity	±2kV at 5kHz on power ports ±2kV at 5kHz on signal ports

Table 13 Specifications

specification	value
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line (DM) and ±2kV line-earth (CM) on power ports ±2kV line-earth (CM) on communications ports
Conducted RF Immunity	IEC 61000-4.6: 10vrms with 1kHz sine wave 80%AM from 150kHz to 80mHz
Continuous Isolation Voltage	50V
Enclosure Type Rating	None (open-style)
Power Conductors	12 AWG (3.31 sq. mm) maximum, 24 AWG (0.205 sq. mm) minimum copper wire 75 °C minimum Catergory 2[1]
Torque	5 - 7 in.-lbs. (0.5 - 0.8 Nm)
DeviceNet and EtherNet Conductors	Category 2[1,2]

Certifications (when product is marked)	**c-UL-us:** UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada
	
	CE[3]**:** 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
	
	C-Tick[3]**:** Australian Radiocommunications Act, compliant with:
	
	   AS/NZS CISPR 11; Industrial Emissions
	
	EEx[3]**:** European Union 94/9/EC ATEX Directive, compliant with:
	
	   EN 50021; Potentially Explosive Atmospheres, Protection "n" (Zone 2)
	
	ODVA: ODVA conformance tested to DeviceNet specifications
	
	EtherNet/IP: ODVA conformance tested to EtherNet/IP specifications

[1] Use this conductor information for planning conductor routing. Refer to Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines") or appropriate System Level Installation Manual.
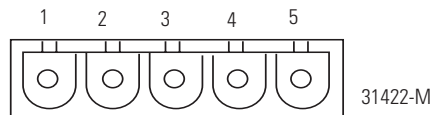
[2] Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual

[3] See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Dimensions

4.3 in.
(100.2 mm)

2 in.
(52.7 mm)

.425 in.
(10 mm)

2.4 in.
(63 mm)

2.69 in.
(68.2 mm)

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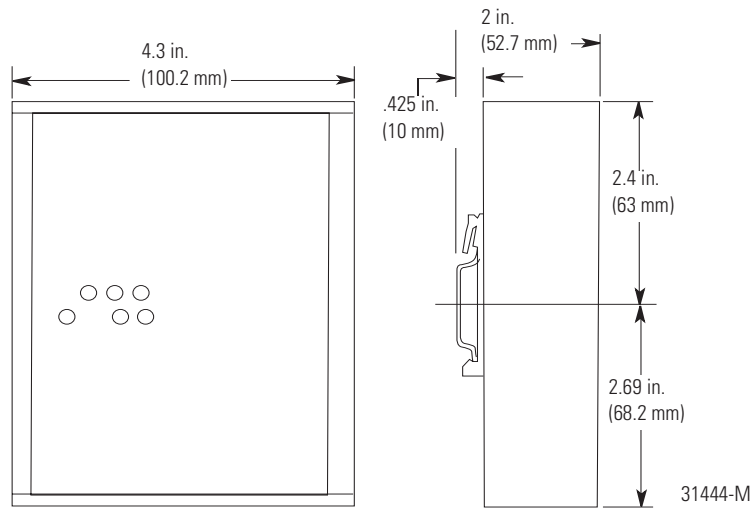
DeviceNet Connector Pinouts

1   2   3   4   5

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Table 14 DeviceNet Pinouts

pin	signal
1	V-
2	CAN_L
3	Shield
4	CAN_H
5	V+