Installation Instructions

Allen-Bradley

# USB-to-DeviceNet Cable

Catalog Number 1784-U2DN

# 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.rockwellautomation.com/literature/) 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.

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

## Environment and Enclosure

**ATTENTION:** This equipment is intended for use in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be potential difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as enclosed equipment. It should not require additional system enclosure when used in locations consistent with the enclosure type ratings stated in the Specifications section of this publication. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings, beyond what this product provides, that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, , publication 1770-4.1, for additional installation requirements
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures

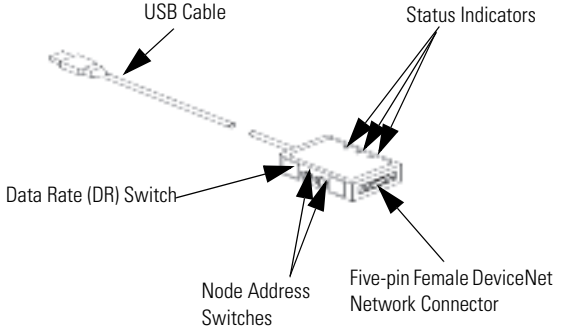
At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

## About the Cable

The 1784-U2DN USB-to-DeviceNet cable lets you connect a computer to a DeviceNet network via an unused USB port on the computer.

**IMPORTANT** To comply with the CE low voltage directive (LVD), this equipment must be powered from a source compliant with safety extra low voltage (SELV) or protected extra low voltage (PELV).

The 1784-U2DN cable replaces the 1784-PCD communication card.




The cable operates at data rates of 125 Kbps, 250 Kbps, and 500 Kbps.

**IMPORTANT** The data rate is read only when power is applied. To change the data rate, you must disconnect the cable from the USB port, use the data rate switch to change the data rate setting, then reconnect the cable to the USB port.

These are the firmware variations:

- Cables with version 1.009 or later contain a fix for an anomaly whereby timeouts could be experienced while monitoring parameters of some devices. The initial installation of a 1784-U2DN USB-to-DeviceNet cable will no longer cause the Windows operating system to report an error code 10.
- Cables with version 1.008 or later have an explicit message size of 500 bytes, which allows uploading from a SmartGuard controller.

## Install the Cable

Follow these procedures to install the cable.

**ATTENTION: Prevent 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.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

**ATTENTION:** USB connection length must be less than 3 m (9.84 ft). Do not attempt to extend the cable.

## Obtain the Device Driver for the Cable

Follow these steps to download and install the device driver for the cable.

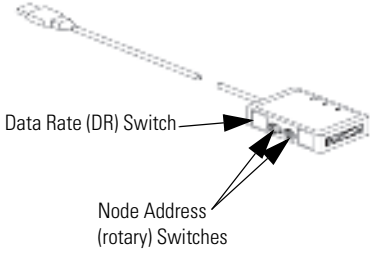
| | |
|---|---|
| **IMPORTANT** | A minimum of RSLinx Classic software, version 2.51, is required for use with the cable. |

| | |
|---|---|
| **IMPORTANT** | If RSLinx Classic software, version 2.54 or later, is installed on the computer, the device driver is already installed on the computer. Skip this section. |

1. Visit http://www.rockwellautomation.com/knowledgebase/.
2. Open tech note ID 53280 and follow the instructions to install the driver.

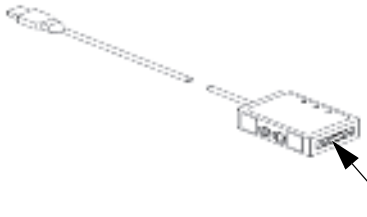
## Configure and Connect the Cable

1. Use the data rate (DR) switch on the side of the connector to set the network data rate to 125 Kbps or Auto.

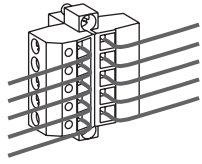



2. Use the rotary switches to set the module node address to a valid number (0...63).
3. Insert the end of the cable with the USB connector into a USB port on a computer.

4. Insert a DeviceNet network cable into the five-pin female DeviceNet network connector.




**TIP** A 10-pin plug-in connector (catalog number 1787-PLUG10R, PN-94220605) is shipped with the 1784-U2DN cable. See the figure and chart for wiring.



| Connect | To |
|---|---|
| Red wire | V+ |
| White wire | CAN High |
| Bare wire | Shield |
| Blue wire | CAN Low |
| Black wire | V- |

## Change the Data Rate

The 1784-U2DN cable can automatically detect the data rate being used on an active DeviceNet network. To use this feature, set the data rate (DR) switch to Auto. If the cable does not detect any network traffic for a period of 12 seconds after it is plugged into the USB port, it will set itself to a fallback data rate. The factory-default fallback data rate is 125 Kbps.

You can change the fallback data rate either manually or with RSNetWorx for DeviceNet software.

**TIP** Manually selecting 125 Kbps and using the fallback data rate lets the cable communicate with devices on a network that does not have active traffic (for example, a network consisting of slaves and no master) for node commissioning.

### *Manually Set the Data Rate*

1. Unplug the cable from the USB port.
2. Set the rotary address switches to 90 for 125 Kbps, 91 for 250 Kbps, or 92 for 500 Kbps.
3. Plug the cable into the USB port and wait for the cable to finish powering up.
4. Unplug the cable from the USB port.
5. Set the rotary address switches to a valid address (0...63).
6. Plug the cable into the USB port.

*Use RSNetWorx for DeviceNet Software to Set the Speed*

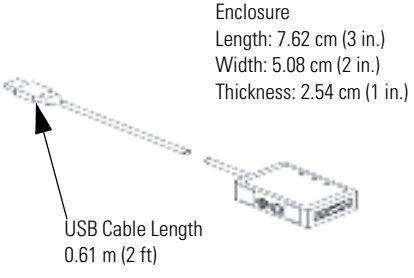
**IMPORTANT** The fallback rate can be set only with the software when the link speed switch is in the Auto position.

**TIP** You cannot change the node address with software. You can set the node address only by using the rotary switches on the module.

1. Start RSNetWorx for DeviceNet software.
2. From the Tools menu, choose Node Commissioning.
3. Click Browse and navigate to the 1784-U2DN cable to be modified.
4. Change the data rate and click Apply.

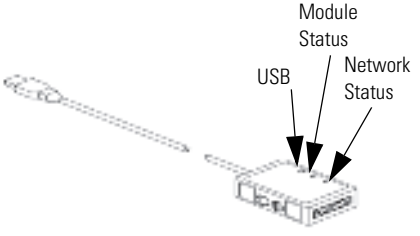
## Product Dimensions

The following illustration shows the product dimensions.



## Status Indicators

The following table describes the cable status indicators.




**Status Indicators**

| Indicator | Status | Description |
|---|---|---|
| USB | Green | The cable is configured, but no network traffic is present. |
| | Flashing green | Network traffic is present. |
| | Off | Unable to transfer data:<br>• Disconnected from host.<br>• In one of the following states:<br>– Default<br>– Powered<br>– Address<br>– Suspend |

### Status Indicators

| Indicator | Status | Description |
|---|---|---|
| Module Status (MS) | Green | The cable is operating normally. |
| | Off | No power to the cable. |
| | Flashing green | The cable is operating in a normal condition and is online with no connections established:<br>• The cable may be in Standby mode.<br>• The cable needs commissioning due to missing, incomplete, or incorrect configuration. |
| | Flashing red | The cable has a recoverable fault. |
| | Red | The cable has an unrecoverable fault and may need to be replaced. |
| | Flashing red/green | The cable is performing a self-test. |
| Network Status (NS) | Off | • The cable has not yet completed the Dup_MAC_ID test.<br>• The cable may not be powered (if the Module Status indicator is off).<br>• No network power present. |
| | Flashing green | The cable is online, and has passed the Dup_MAC_ID test, but has no established connections to the other nodes. |
| | Green | The cable is online and has established connections to the other nodes. |
| | Red | The cable has detected a communication error, such as a duplicate MAC ID or bus-off condition. |

## Traffic Analyzer Software

The 1784-U2DN cable is designed to work with Frontline's NetDecoder traffic analyzer software. For more information on Frontline's product, go to either http://www.rockwellautomation.com/encompass/ or http://www.fte.com.

## Specifications

### Technical Specifications - 1784-U2DN

| Attribute | 1784-U2DN |
|---|---|
| Enclosure type rating | Meets IP30 |
| USB Supply | 75 mA @ 5V DC |
| DeviceNet Supply | 70 mA @ 24V DC |
| Power consumption | 0.5 W |
| Power dissipation | 0.5 W |
| Isolation voltage | 30V (continuous), basic insulation type<br>Type tested at 500V AC for 60 s, DeviceNet network to USB |
| Weight, approx. | 0.11 kg (0.23 lb) |
| Wire size | DeviceNet network:<br>0.05…3.3 $mm^2$ (30…12 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max |
| Wiring category(1) | 2 - on communication ports |
| Terminal block torque | DeviceNet network:<br>0.6…0.8 N•m (5.0…7.0 lb•in) |

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

### Environmental Specifications - 1784-U2DN

| Attribute | 1784-U2DN |
|---|---|
| Temperature, operating<br>• IEC 60068-2-1 (Test Ad, Operating Cold)<br>• IEC 60068-2-2 (Test Bd, Operating Dry Heat)<br>• IEC 60068-2-14 (Test Nb, Operating Thermal Shock) | 0…55 °C (32…131 °F) |
| Temperature, nonoperating<br>• IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>• IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>• IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -10…85 °C (14…185 °F) |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) | 5…95% noncondensing |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 1000 mm (3.28 ft) |
| Emissions<br>CISPR 11 | Group 1, Class A |
| ESD immunity<br>IEC 61000-4-2 | 8 kV air discharges |
| Radiated RF immunity<br>IEC 61000-4-3 | • 10V/m with 1 kHz sine-wave 80%AM from 80…2000 MHz<br>• 10V/m with 200 Hz 50% Pulse 100%AM at 900 MHz<br>• 10V/m with 200 Hz 50% Pulse 100%AM at 1890 MHz<br>• 3V/m with 1 kHz sine-wave 80%AM from 2000…2700 MHz |
| EFT/B immunity<br>IEC 61000-4-4 | ±2 kV at 5 kHz on DeviceNet port |
| Surge transient immunity<br>IEC 61000-4-5 | ±2 kV line-earth (CM) on DeviceNet port |
| Conducted RF immunity<br>IEC 61000-4-6 | 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz on DeviceNet port |

## Certifications - 1784-U2DN

| Certification[1] (when product is marked) | 1784-U2DN |
|---|---|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. |
| CE | European Union 2004/108/EC EMC Directive, compliant with:<br>• EN 61326-1; Meas./Control/Lab., Industrial Requirements<br>• EN6100-6-2; Industrial Immunity<br>• EN 61000-6-4; Industrial Emissions<br>• EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) |
| C-Tick | Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Emissions |
| ODVA | ODVA conformance tested to DeviceNet specifications |

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

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

| Resource | Description |
|---|---|
| DeviceNet Media Design and Installation Guide, publication DNET-UM072 | Provides DeviceNet network planning information. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, http://www.ab.com | Provides declarations of conformity, certificates, and other certification details. |

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

# Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, 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://www.rockwellautomation.com/support/.

## Installation Assistance

If you experience a problem 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 product up and running.

| | |
|---|---|
| United States or Canada | 1.440.646.3434 |
| Outside United States or Canada | Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative. |

## New Product Satisfaction Return

Rockwell Automation 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 and needs to be returned, follow these procedures.

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

## Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.



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