FLEX I/O DeviceNet Adapter Module

1794-ADN Series C and 1794-ADNK Series C

(Modules with a K in the last position of the catalog number are conformally coated to meet noxious gas requirements of ISA/ANSI-71.040 1985 Class G3 Environment.)

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 we use notes to make you aware of safety considerations.

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: • identify a hazard • avoid a hazard • recognize the consequence

ATTENTION 

Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 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 difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

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.

In addition to this publication, see:
- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation 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 different types of enclosure.

WARNING 

When you insert or remove the module while backplane power is on, or connect or disconnect the DeviceNet 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. Be sure that power is removed or the area is nonhazardous before proceeding.

WARNING 

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.

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.
Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION 

FLEX I/O 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 or 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 (7.8 in.) and use end-anchors appropriately.

ATTENTION 

Do not remove or replace an adapter while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

ATTENTION

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

ATTENTION

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

ATTENTION

Preventing Electrostatic Discharge

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

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

European Hazardous Location Approval

The following adapters are European Zone 2 approved:
1794-ADN and -ADNK series C adapters.

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

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and 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 Zone 2 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 and EN 60079-0.

WARNING

Observe the following additional Zone 2 certification requirements.

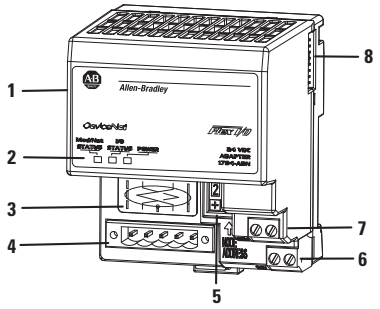
- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Zone 2 environments.
- This equipment must be used only with ATEX certified Rockwell Automation Terminal Bases.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

North American Hazardous Location Approval

The following adapter is North American Hazardous Location approved:
1794-ADN Series C and 1794-ADNK Series C adapters.

The following information applies when operating this equipment in hazardous locations:	**Informations sur l'utilisation de cet équipement en environnements dangereux:**
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.	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.
WARNING **EXPLOSION HAZARD** • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • 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. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT** **RISQUE D'EXPLOSION** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • 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. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

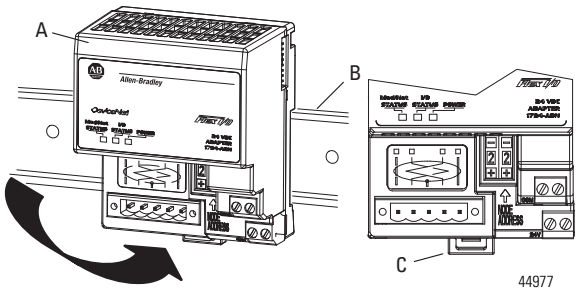
DeviceNet Adapter, Cat. No. 1794-ADN/C and 1794-ADNK/C



44976

Component Identification			
1	DeviceNet Adapter Module	5	DeviceNet Node selection thumbwheel switches
2	Indicators	6	+24V DC connections
3	Wiring label	7	24V common connections
4	DeviceNet network cable (plug-in, screw-secured)	8	Flexbus connector

Installing Your DeviceNet Adapter Module



ATTENTION During mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the module. Debris that falls into the module could cause damage on power up.

Mounting on a DIN rail before installing the Terminal Base Units

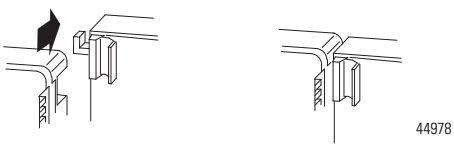
1. Position the DeviceNet adapter module (A) on an IEC standard, (35 x 7.5 x 1 mm) top-hat DIN rail (B), at a slight angle.
2. Hook the lip on the rear of the adapter onto the top of the DIN rail, and rotate the adapter onto the rail.
3. Press the adapter module down onto the DIN rail until flush. Locking tab C will snap into position and lock the adapter to the DIN rail.
4. If the adapter does not lock in place, use a screwdriver or similar device to move the locking tab down while pressing the adapter flush onto the DIN rail, and release the locking tab to lock the adapter in place. If necessary, push up on the locking tab to lock.
5. Connect the adapter wiring as shown under "Connecting Wiring" later in this document.

Panel/Wall Mounting

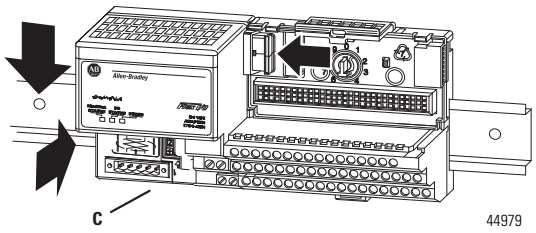
If mounting this adapter to a panel or wall, refer to publication 1794-2.13.

Mounting (or Replacing) the Adapter on an Existing System

1. Remove the DeviceNet plug-in connector from the front of the adapter.
2. Disconnect any wiring jumpered to the adjacent terminal base.
3. Open the module latching mechanism and remove the module from the base unit to which the adapter will be attached.
4. Push the flexbus connector toward the right side of the terminal base to unplug the backplane connection.
5. Release the locking tab and remove the adapter module.
6. Before installing the new adapter, notice the notch on the right rear of the adapter. This notch accepts the hook on the terminal base unit. The notch is open at the bottom. The hook and adjacent connection point keep the terminal base and the adapter tight together, reducing the possibility of a break in communication over the backplane.

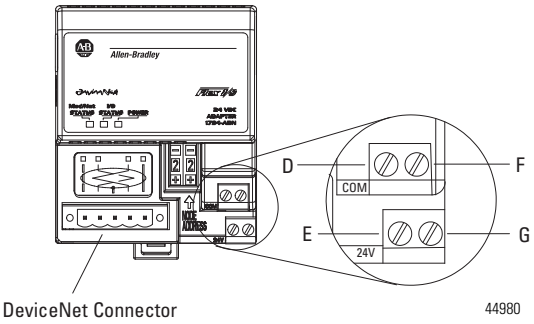


7. Complete the adapter mounting as shown below.
   Push down and in at the same time to lock the adapter to the DIN rail.
   If the adapter does not lock in place, use a screwdriver or similar device to move the locking tab down while pressing the adapter flush onto the DIN rail, and release the locking tab to lock the adapter module in place. If necessary, push up on the locking tab to lock.



   When the adapter is locked onto the DIN rail, gently push the flexbus connector into the adapter to complete the backplane
8. Reinstall the module in the adjacent terminal base unit.
9. Reconnect adapter wiring as described in "Connecting Wiring.)

Connect Wiring



1. Connect the DeviceNet cable to the removable connector as shown.

Connect	To		
BLK wire	-V	WHT wire	CAN high
BLU wire	CAN* low	RED wire	+V
Bare wire	Drain	* CAN = Controller Area Network	

ATTENTION When connecting wiring, torque terminal screws D, E, F and G to 0.8 Nm (7 lb-in).

ATTENTION Do not wire more than 2 conductors on any single terminal.

2. Insert connector into mating connector on the DeviceNet adapter module.

3. Connect +V DC power to the left side of the lower connector, terminal **E**.

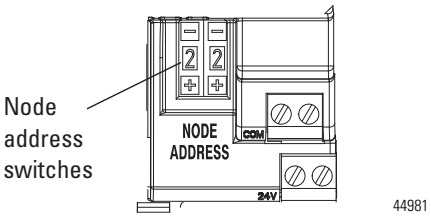
ATTENTION Power wiring must be less than 3 meters (9.8 ft) in length.

4. Connect -V common to the left side of the upper connector, terminal **D**.
5. Connections G and F are used to pass +V DC power (G) and -V common (F) to the next module in the series (if required).

NOTE: Cable colors are shown on the wiring label on the front of the adapter module.

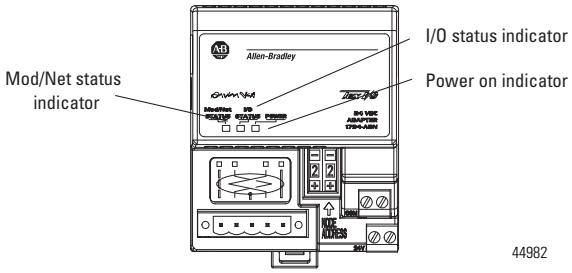
Set the Node Address

Set the node address using the 2-position thumbwheel switch. Valid settings range from 00 to 63. Press either the + or - buttons to change the number.



NOTE: The baud rate for the adapter is set by way of "baud detection" at power-up.

Status Indicators



Status Indicators

Indicator	State	Description
Power	On	Power applied to module
	Off	No power applied to module. Check power wiring to adapter module.
ModNet Status	OFF	No power, or no network access
	Flashing green/off	Online, but not connected
	Solid green	Online, link okay, connected
	Flashing red	Recoverable fault
	Solid red	Critical adapter failure
I/O Status	Off	No power, or outputs off
	Flashing red	Recoverable fault - outputs in fault
	Flashing green/off	Idle program mode - outputs in idle
	Solid green	Device operational - outputs live - run
	Solid red	Critical adapter fault - unrecoverable

Enhancements to Firmware 3.001

Firmware revision 3.001 provides the following functionality to the 1794-ADN DeviceNet adapter.

- When you cycle power to the adapter in out-of-the-box mode (no rack configuration stored in the adapter's memory), and there is a 32-point input or output module (1794-IB32 or 1794-OB32) on the rail, the adapter will detect the 32-point module as a 2-word module and allocate I/O space appropriately for the network connection.
- With firmware revision 3.001, when you cycle power to the adapter in out-of-the-box mode, if a 1794-IB32 module is detected, it will allocate 2 input words, and no output words, for the network connection. Similarly for the 1794-OB32, 2 output words, and no input words, are allocated for the network connection.

Corrected Anomalies

Firmware revision 3.001 corrects these anomalies:

- Input data issue in firmware revision 2.004
- In firmware revision 2.003 or earlier, the 32-point I/O modules would have only one input word and one output word allocated in the default out-of-the-box mode of operation for each 32-point module.

If You Replace Firmware Revision 2.003 or Earlier Adapter With 1794-ADN Series C

Take the following precautions when replacing a firmware revision 2.003 or earlier adapter with a firmware revision 3.001 or later adapter when the FLEX rail contains any 32-point modules.

- If out-of-the-box mode was used with the original adapter, the 32-point modules were configured to act as if they were 16-point modules. After changing to the firmware revision 3.001 adapter, it will not make a connection with the scanner because there will be a mismatch in the I/O sizes. The scanner will report an error 77, indicating the I/O size mismatch between the scanner and adapter.

  To resolve this I/O size mismatch, two changes must be made:
  - The scanner's scan list must be updated to reflect the new adapter's I/O size.
    In the case of each 1794-IB32 module, an extra input word must be added and the output word deleted. Similarly with each 1794-OB32 module, an extra output word must be added and the input word deleted.
  - After the scanner's scan list has been updated to reflect the new I/O sizes, the controller's I/O image will have to be adjusted, along with the controller's ladder program, for any I/O that has shifted due to I/O image changes.
- If out-of-the-box mode was not used, and an RSNetWorx software-based configuration was downloaded to the original adapter, there are two cases to consider:
  - The original adapter's configuration is the same as the v3.001 adapter's out-of-the-box configuration.
    In this case, the scanner will automatically make the I/O connection with the firmware revision 3.001 adapter. Once network setup is complete, downloading and saving the original configuration to the adapter is recommended.
  - The original adapter's configuration does not match the firmware revision 3.001 adapter's out-of-the-box configuration.
    In this case, the scanner will report an error 77, indicating an I/O size mismatch.

    To correct this issue, download the existing configuration to the adapter.

ATTENTION The adapter will not accept any downloads that could change its configuration while there is an active I/O connection between a scanner and the adapter. It will be necessary to either remove the scanner from the network or disable the scanlist entry in the scanner to the adapter, using RSNetWorx software, before configuration downloads can be done successfully to the adapter

Specifications

General

Attribute	Value
I/O capacity	8 modules
Power supply	The 24V DC power supply must be capable of providing a turn-on inrush surge current of 14 A for 5 ms for each adapter connected to this supply.

General

Supply voltage	Power supply: 19.2...31.2V DC, 400 mA DeviceNet power: 24V DC, 90 mA, Class 2 Flexbus output: 5V DC, 640 mA
Input voltage rating	24V DC nom 19.2V to 31.2 V DC (includes 5% AC ripple)
Current draw	400 mA maximum; 300 mA at 24V DC
Communication rate	125 KB 250 KB 500 KB
Indicators	Power - on/off ModNet status - red/green I/O status - red/green
Flexbus output current	640 mA max. @ 5V DC
Isolation voltage	50V (continuous), Basic Insulation Type Type tested at 1930V DC for 60 s, power to Flexbus, power to DeviceNet, and DeviceNet to Flexbus
Power dissipation	7.6W maximum @ 19.2V DC
Thermal dissipation	26 BTU/hr @ 19.2V DC
DeviceNet power requirements	24V DC (±4%) at 90 mA max
Dimensions (HxWxD)	87 x 68 x 69 mm (3.4 x 2.7 x 2.7 in)
Weight	195.5 g (6.9 oz)
Enclosure type rating	None (open-style)
Wire size	Power connections: 0.33... 3.3 mm² (22...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]	1 - on power ports 2 - on communications ports
Terminal screw torque	0.8 Nm (7 lb-in)
North American temp code	T4
IEC temp code	T4

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

Environmental

Attribute	Value
Operating temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20…70 °C (-4…158 °F)
Surrounding air temperature, max	70 °C (158 °F)
Non-operating temperature	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)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz

Environmental

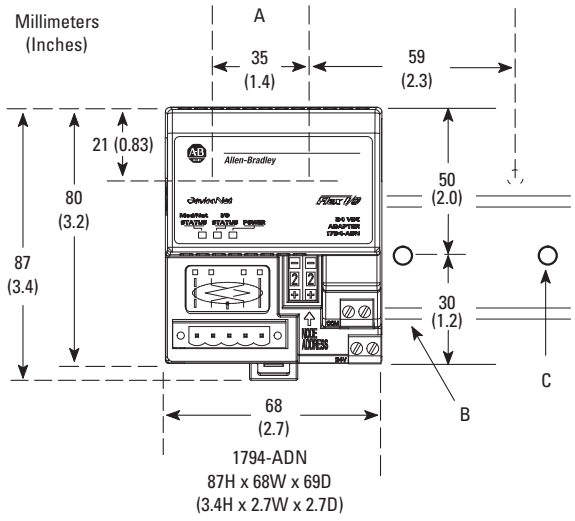
Operating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Non-operating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±4 kV at 5 kHz on power ports ±4 kV at 5 kHz on communications ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±2 kV line-earth(CM) on communications ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Certifications (when product is marked)[1]

Attribute	Value
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 2004/108/EC EMC Directive, compliant with: EN 61326-1; 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)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection "n" EN 60079-0; General Requirements II 3 G Ex nA IIC T4 X
ODVA	ODVA conformance tested to DeviceNet specifications

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

Mounting Dimensions



A = Mounting hole dimensions for optional mounting kit
B = DIN rail
C = Secure DIN rail approximately every 200 mm

44983

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