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Allen-Bradley 1794-ADN Flex I-O DeviceNet Adapter Module

INSTALLATION GUIDE

FLEX I/O DeviceNet Adapter Modules

Catalog Numbers 1794-ADN, 1794-ADNK, Series C

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

FLEX I/O DeviceNet Adapter Modules Installation Instructions

ATTENTION: Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly,

disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Environment and Enclosure

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN/IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.

This equipment is supplied as open-type equipment for indoor use. 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 or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain more information regarding specific enclosure type ratings 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 more installation requirements.
- NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

Prevent Electrostatic Discharge

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.

UK and European Hazardous Location Approval

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

The following applies to products marked II 3 G:

- Are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Schedule 1 of UKEX and Annex II of EU Directive 2014/34/EU. See the UKEx and EU Declaration of Conformity at rok.auto/certifications for details.
- The type of protection is Ex ec IIC T4 Gc according to EN IEC 60079-0:2018, EXPLOSIVE ATMOSPHERES – PART 0: EQUIPMENT – GENERAL REQUIREMENTS, Issue Date 07/2018 and EN IEC 60079-7:2015+A1:2018, Explosive atmospheres. Equipment protection by increased safety "e".
- Comply with Standard EN IEC 60079-0:2018, EXPLOSIVE ATMOSPHERES – PART 0: EQUIPMENT – GENERAL REQUIREMENTS, Issue Date 07/2018, EN IEC 60079-7:2015+A1:2018 Explosive atmospheres. Equipment protection by increased safety "e", reference certificate number DEMKO 14 ATEX 1342501X and UL22UKEX2378X.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to UKEX regulation 2016 No. 1107 and ATEX directive 2014/34/EU.
- May have catalog numbers followed by a "K" to indicate a conformal coating option.

WARNING: Special Conditions for Safe Use:

- This equipment shall be mounted in an UKEX/ATEX/IECEx Zone 2 certified enclosure

with a minimum ingress protection rating of at least IP54 (in accordance with EN/IEC 60079-0) and used in an environment of not more than Pollution Degree 2 (as defined in EN/IEC 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.

- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Transient protection shall be provided that is set at a level not exceeding 140% of the peak-rated voltage value at the supply terminals to the equipment.
- The instructions in the user manual shall be observed.
- This equipment must be used only with UKEX/ATEX/IECEx certified Rockwell Automation® backplanes.
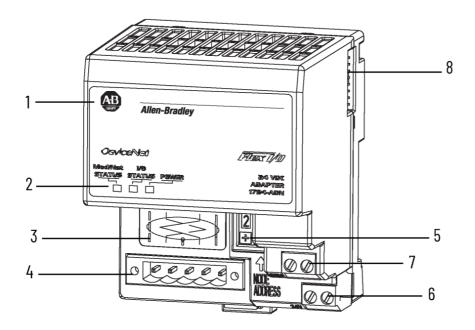- Earthing is accomplished through mounting of modules on rail.

WARNING: 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.

WARNING: When you insert or remove the module while backplane power is on, an electric 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. Repeated electric arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.
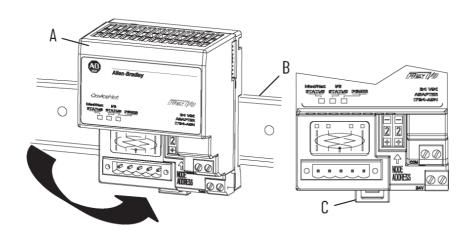
Overview

The FLEX I/O DeviceNet® adapter facilitates transfer of plant-floor data between plant floor devices and a controller.

1. Adapter

2. Indicators

3. Wiring label

4. DeviceNet network cable (plug-in, screw-secured)

5. DeviceNet node selection thumbwheel switches

6. +24V DC connections

7. 24V common connections

8. Flexbus connector

Install Your Adapter

ATTENTION: During mounting of all devices, be sure that all debris (for example, metal chips, wire strands, and so on) is kept from falling into the module. Debris that falls into

the module could cause damage on power-up.

Mount on a DIN rail before you install the terminal base units.

1. Position the DeviceNet adapter (A) on an IEC standard, (35 x 7.5 x 1 mm [1.38 x 0.3 x 0.04 in.]) 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 down the adapter onto the DIN rail until flush. The locking tab (C) snaps into position and locks 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. See Connect Wiring on page 6.
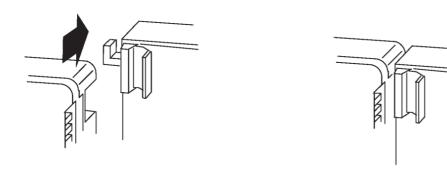
Mount the Adapter on a Panel or Wall

To mount the adapter on a panel or wall, see the Panel Mounting Kit Cat. No. 1794-NM1/B Installation Instructions, publication 1794-IN135.
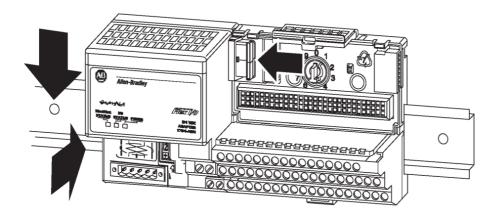
Mount or Replace the Adapter on an Existing System

1. Remove the DeviceNet plug-in connector from the front of the adapter.

2. Disconnect any adapter wiring that is jumpered to the adjacent terminal base.

3. Using a screwdriver or similar tool, open the module latching mechanism and remove the module from the base unit to which the adapter is 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.

Before you install the new adapter, note 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.
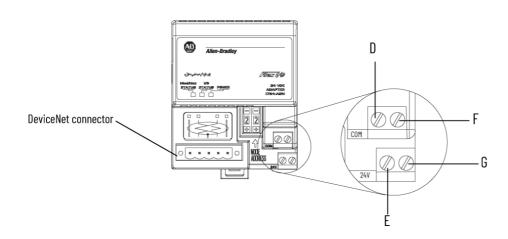
6. Push down and in simultaneously to lock the adapter to the DIN rail.

7. 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.

8. When the adapter is locked onto the DIN rail, gently push the Flexbus connector into the adapter to complete the backplane connection.

9. Reinstall the module in the adjacent terminal base unit.

10. Reconnect adapter wiring. See Connect Wiring on page 6.

Connect Wiring

1. Connect the DeviceNet cable to the removable connector.

Connect	To		
BLK wire	-V	WHT wire	CAN(llhigh
BLU wire	CAN0^{1}1ow	RED wire	+V
Bare wire	Drain		

The cablecolorsare shown on the wiringlabel on the front of the adapter.

(1)   CAN= Controller AreaNetwork

ATTENTION:
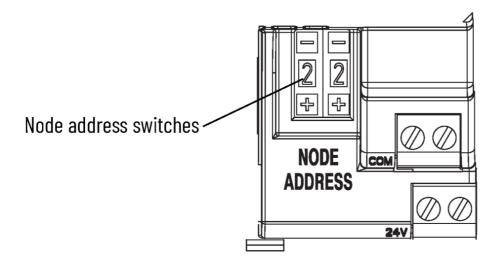
- When connecting wiring, torque the terminal screws on the terminal connections (D, E, F, and G) to 0.8 N•m (7 lb•in).
- Do not wire more than two conductors on any single terminal.

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

3. Connect +V DC power to the terminal connection (E).

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

4. Connect -V common to the terminal connection (D).

5. Terminal connections (G) and (F) are used to pass +V DC power (G) and -V common (F) to the next module in the series (if necessary).
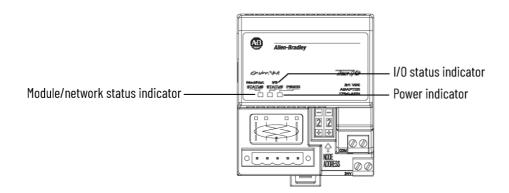
Set the Node Address

Use the 2-position thumbwheel switch to set the node address. Valid settings range from 00…63. Press either the + or – buttons to change the number.

Node address switches

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

Status Indicators

Module/network status indicator

I/O status indicator

Power indicator

Status Indicators

Indicator	Status	Description
Power	On	Thepower isappliedto theadapter.
	Off	Nopower isapplied totheadapter.Check the power wiringto theadapter.
Module/networks	Off	Nopower or nonetwork access
	Flashinggreen/off	Online, but not connected

tatus	Steady green	Online,linkis okay, and connected
	Flashingred	A recoverablefault
	Steadyred	Criticaladapter failure
1/0 status	Off	Nopower or outputsareoff
	Flashingred	A recoverablefault – Theoutputs arein fault
	Flashinggreen/off	IdleProgrammode- Theoutputs areinidle
	Steadygreen	Thedeviceisoperational, running, and outputs arelive.
	Steadyred	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 memory of the adapter), and there is a 32-point input or output module (1794-IB32 or 1794-OB32) on the rail, the adapter detects 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 allocates two input words, and no output words, for the network connection. Similarly for the 1794-OB32, two output words, and no input words, are allocated for the network connection.

Corrected Anomalies

Firmware revision 3.001 corrects the following 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 that is 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 you replace 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 reports an error 77, which indicates the I/O size mismatch between the scanner and adapter.

  To resolve this I/O size mismatch, two changes must be made:

  – The scan list of the scanner must be updated to reflect the new I/O size of the adapter.

  For 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 scan list of the scanner has been updated to reflect the new I/O sizes, the I/O image of the controller will have to be adjusted, along with the ladder program of the controller, 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 configuration of the adapter is the same as the v3.001 out-of-the-box configuration of the adapter.

  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 configuration of the adapter does not match the firmware revision 3.001 out-of-the-box configuration of the adapter.

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

Specifications

General Specifications

Attribute	Value
1/0 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 that is connected to this supply.
Power supply voltage	19.2 31.2V DC, 400 mA
DeviceNet power requirements, max	24V DC (±4%) at 90 mA
DeviceNet power supply voltage	24V DC, 90 mA, Class 2
Flexbus output supply voltage	5V DC, 640 mA
Flexbus output current. max	640 mA@ 5V DC
Input voltage rating	24V DC nom 19.2 31.2V DC (includes 5% AC ripple)
Current draw, max	400 mA, 300 mA@ 24V DC
Communication rate	125 KB, 250 KB, 500 KB

Indicators	Power – On/off Module/Network status – Red/green 1/0 status – Red/green
Isolation voltage	50V (continuous), basic insulation type Type tested at1930V DC for 60 s, power to Flexbus, power to DeviceNet. and DeviceNet to Flexbus
Power dissipation, max	7.6 W @ 19.2V DC
Thermal dissipation, max	26 BTU/hr@ 19.2V DC
Dimensions, approx. (H x W x D)	87 x 68 x 69 mm (3.4 x 2.7 x 2.7 in)
Weight, approx.	195.5 g (6.9 oz)
Wiring categor/11	1 – On power ports 2 – On communications ports
Wire size	Power connections: 0.33…3.3 mm' (22…12 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max
Terminal screw torque	0.8 N•m (7 lb•in)
Enclosure type rating	None (open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

Environmental Specifications

Attribute	Value
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) : -20…+70 °C(-4…+158 OF)
Temperature,surrounding air,max	70 °C(158 OF)
Temperature,nonoperating	IEC 60068-2-1(Test Ab,Unpackaged nonoperating Cold), IEC 60068-2-2 (Test Bb,Unpackaged nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged nonoperating Thermal Shock): -40…+85 °C(-40…+185 °F)
Relative humidity	IEC 60068-2-30 (Test Ob,Unpackaged Damp Heat): 5…95%noncondensing
Vibration	[IEC 60068-2-6 (Test Fe, Operating): 5 g@10…500 Hz](#)
Shock, operating	IEC 60068-2-27(Test Ea,Unpackaged Shock}. 30 g
Shock,nonoperating	IEC 60068-2-27(Test Ea, Unpackaged Shock}. 50 g
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges

Radiated RF immunity	IEC 61000-4-3: IOV/m with 1kHz sine-wave 80% AM from 80…6000 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV at 5 kHz on power ports ±4 kV at 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line (OM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: IOV rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Certifications

Certifications (when product is marked II	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,O Hazardous Locations, certified for U.S. and Canada. See UL File E194810.

UK and CE	UK Statutory Instrument 2016 No.1091 and European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab.,Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers EN 61000-6-4; Industrial Emissions UK Statutory Instrument 2012 No. 3032 and European Union 2011/65/EU RoHS, compliant with: EN 63000; Technical documentation
Ex	UK Statutory Instrument 2016 No. 1107 and European Union 2014/34/EU ATEX Directive, compliant with: EN IEC 60079-0; General Requirements EN IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" 11 3 G Ex ec IIC T4 Ge DEMKO 14 ATEX 1342501X UL22UKEX2378X
IECEx	IECEx System, compliant with: IEC 60079-0; General Requirements IEC 60079-7; Explosive Atmospheres,Protection "e" Exec IIC T4 Ge IECEx UL14.0066X
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act. Clause 3
Morocco	Arrete ministeriel n° 6404-15 du 29 ramadan 1436
CCC	CNCA-C23-01 sHutiF UiiE\;l::lit!iimoou lInti "l: CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products 20201223091118829

(1) See the Product Certification link at rok auto/certjficatjons for Declaration of Conformity,Certificates,and other certification details.

Waste Electrical and Electronic Equipment (WEEE)

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

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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FAQ

Q: What should I do if the status indicators show an error?

A: If you encounter errors indicated by the status lights, refer to the troubleshooting section of the user manual for guidance on resolving common issues.

Q: Can I install the module in a hazardous location?

A: The 1794-ADN and 1794-ADNK modules are UK and European Zone 2 approved for hazardous locations. Follow the installation instructions carefully to ensure safety and compliance.

Documents / Resources

	[Allen-Bradley 1794-ADN Flex I-O DeviceNet Adapter Module](#) [[pdf](#)] Installation Guide 1794-ADN, 1794-ADN Flex I-O DeviceNet Adapter Module, Flex I-O DeviceNet Adapter Module, DeviceNet Adapter Module, Adapter Module, Module

References

- Product Certifications | Rockwell Automation | US
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