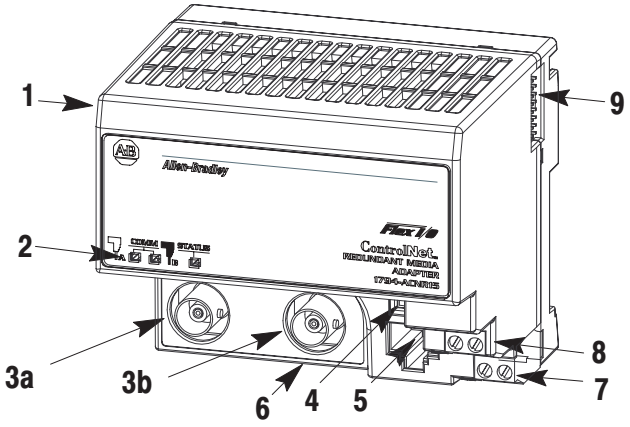
Installation Instructions

FLEX I/O ControlNet Redundant Media Adapter

(Cat. No. 1794-ACNR15)



Component Identification	
1	ControlNet Adapter module
2	Indicators
3a	ControlNet network cable BNC connector A
3b	ControlNet network cable BNC connector B
4	ControlNet Node selection thumbwheel switches
5	ControlNet programming terminal connector port
6	Module locking tab
7	+24V dc connections
8	24V common connections
9	Flexbus connector

Publication 1794-IN048B–EN–P – February 2002

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Allen–Bradley be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen–Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen–Bradley publication SGI–1.1, Safety Guidelines for Application, Installation, and Maintenance of Solid–State Control (available from your local Allen–Bradley office), describes some important differences between solid–state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard. avoid a potential hazard, and recognize the consequences of a potential hazard.

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.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

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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 publication 60664–1), at altitudes up to 2000 meters 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 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.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures. Also, see the appropriate sections in this publication, as well as the Allen–Bradley publication 1770–4.1, (“Industrial Automation Wiring and Grounding Guidelines”), for additional installation requirements pertaining to this equipment.

ATTENTION

FLEX I/O is grounded through the DIN rail to chassis ground. Use zinc plated, yellow chromated steel DIN rail to assure proper grounding. Using other DIN rail materials (e.g. aluminum, plastic, etc.) which can corrode, oxidize or are poor conductors can result in improper or intermittent platform grounding.

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.
- When not in use, keep modules in appropriate static–safe packaging.

WARNING

Remove field-side power before removing or inserting this module. This module is designed so you can **remove and insert it under backplane power**. When you remove or insert a module with field-side power applied, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

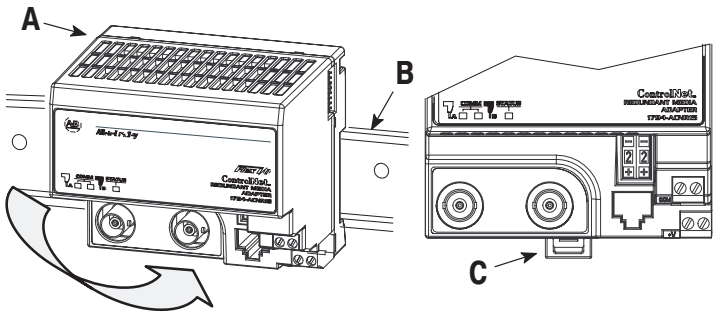
- sending an erroneous signal to your system's field devices causing unintended machine motion
- causing an explosion in a hazardous environment

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

WARNING

If you connect or disconnect wiring while field–side power is on, an electrical arc can occur. This could cause an explosion in hazardous installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Mounting the Adapter on a DIN Rail before Installing Modules



1. Position the ControlNet adapter module **(A)** on a 35 x 7.5mm DIN rail **(B)** at a slight angle.
2. Hook the lip on the rear of the adapter **(A)** onto the top of the DIN rail **(B**), and rotate the adapter module 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 module to the DIN rail.
4. If the adapter module does not lock in place, use a screwdriver or similar device to move the locking tab down while pressing the adapter module 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.
5. Connect the adapter wiring as shown under “Wiring” later in this document.

Mounting (or Replacing) the Adapter on an Existing System

1. Disconnect any wiring jumpered to the adjacent terminal base.

WARNING

If you connect or disconnect wiring while field–side power is on, an electrical arc can occur. This could cause an explosion in hazardous installations. Be sure that power is removed or the area is nonhazardous before proceeding.

2. Disconnect the BNC connectors from the front of the adapter.

WARNING

If you connect or disconnect the ControlNet 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 installations. Be sure that power is removed or the area is nonhazardous before proceeding.

3. Using a screwdriver or similar tool, open the lock and remove the module from the base unit to which the adapter will be attached.

WARNING

If you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous installations. Be sure that power is removed or the area is nonhazardous before proceeding.

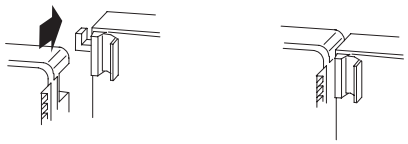
4. Push the flexbus connector toward the right side of the terminal base to unplug the backplane connection.

ATTENTION

Make certain that the flexbus connector is completely clear of the adapter. The slide must be completely to the right and the raised spot on the slide visible.

5. Release the locking tab and remove the adapter.

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 adapter tight together, reducing the possibility of a break in communication over the backplane.



ATTENTION

Make certain that the hook on the terminal base is properly hooked into the adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.

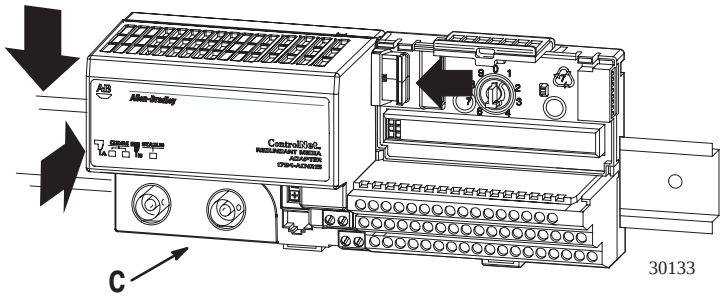
7. Complete the adapter mounting as shown below.

WARNING

If you connect or disconnect wiring while field–side power is on, an electrical arc can occur. This could cause an explosion in hazardous installations. Be sure that power is removed or the area is nonhazardous before proceeding.

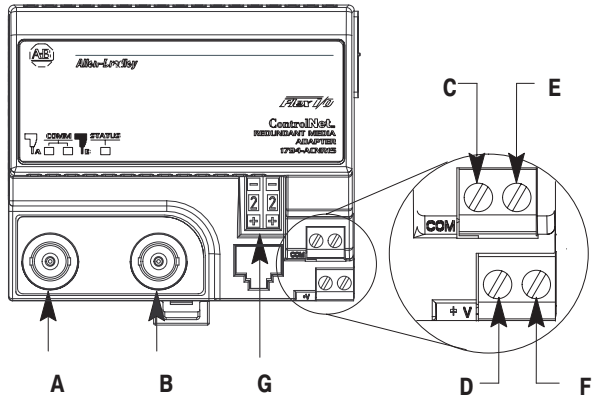
Push down and in at the same time to lock the adapter to the DIN rail.

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



8. If the adapter module does not lock in place, use a screwdriver or similar device to move the locking tab **C** down while pressing the adapter module flush onto the DIN rail. Then release the locking tab to lock the adapter module in place. If necessary, push up on the locking tab to lock.
9. Reinstall the module into the terminal base unit.

Wiring



1. Connect the ControlNet network cable to connector, terminal **A**.
2. Connect the redundant ControlNet network cable to connector **B**.

WARNING

If you connect or disconnect the ControlNet 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 installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION

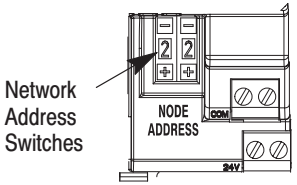
When connecting wiring, torque terminal screws C, D, E and F to 7-9 inch-pounds

ATTENTION 24V dc supply connections must be less than 3m.

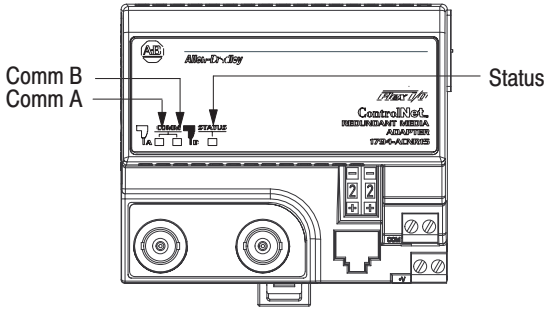
3. Connect +V dc input to the left side of the lower connector, terminal **D**.
4. Connect +V dc input to the left side of the lower connector, terminal **D**.

WARNING If you connect or disconnect wiring while field–side power is on, an electrical arc can occur. This could cause an explosion in hazardous installations. Be sure that power is removed or the area is nonhazardous before proceeding.

5. Connect –V common to the left side of the upper connector, terminal **C**.
6. Connections **E** and **F** are used to pass +V dc power (F) and –V common (E) to the next module in the series (if required).
7. Set the network address using the 2-position thumbwheel switch **G**. Valid settings range from 01 to 99. Press either the + or – buttons to change the number.



Indicators



Status Indicators	Probable Cause
Comm A and Comm B Simultaneously	
Off	No power, or reset
Red	Adapter inoperative
Red/Grn – (flashing alternately)	Adapter self-test
Red/Off – (flashing alternately)	Bad node configuration (duplicate address)
Comm A or Comm B (individually)	
Off	Channel disabled
Green	Channel operational
Flashing Grn/Off	Temporary network errors
Flashing Red/Off	Cable fault, broken cable, redundancy warning
Flashing Red/Grn	Bad network configuration
Status Indicator	
Off	No power
Flashing Grn	On-line but not connected
Green	On-line, link okay, connected
Flashing Red	I/O module removed, wrong I/O module inserted, FLASH program update in progress
Red	Critical – adapter failure

The following information applies when operating this equipment in hazardous locations:

Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, and 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.

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.

Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués CL I, DIV 2, GP A, B, C, D ne conviennent que 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 systéme, le code de température le plus défavorable (code de température le plus faible) peut eatre utilisé pour déterminer le code de température global du systéme. Les combinaisons d'equipements dans le systéme sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

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 1, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

1794-ACNR15 Specifications	
I/O Capacity	8 modules
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	5M Bits/s
Indicators	Comm A – red/grn Comm B – red/grn I/O Status – red/grn
Flexbus Output Current	640mA maximum @ 5V dc
Isolation Voltage	500V ac between user power and flexbus
Power Consumption	400mA maximum from external 24V supply
Power Dissipation	4.6W maximum @ 19.2V dc
Thermal Dissipation	15.7 BTU/hr @ 19.2V dc
Environmental Conditions	
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) 32 to 131°F (0 to 55°C)
Storage Temperature	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 to 185°F (–40 to 85°C)
Relative Humidity	IEC 60068–2–30 (Test Db, Unpackaged, Nonoperating Damp Heat) 5 to 95%, noncondensing

Specifications continued on next page

Shock Operating Nonoperating	IEC 60068–2–27 (Test Ea, Unpackaged Shock) 30g 50g
Vibration	IEC 60068–2–6 (Test Fc, Operating) 5g @ 10–500Hz
ESD Immunity	IEC 61000–4–2 4kV 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
EFT/B Immunity	IEC 61000–4–4 ±2kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000–4–5 ±2kV line–earth (CM) on sheilded ports
Conducted RF Immunity	IEC 61000–4–6 10V rms with 1kHz sine wave 80% AM from 150kHz to 80MHz
Emissions	CISPR 11 Group 1, Class A (with appropriate enclosure)
Enclosure Type Rating	None (open–style)
ControlNet Cable	Belden RG-6/U
Connector Screw Torque	7–9 inch-pounds (0.5–0.6Nm)
Power Conductors Wire Size Category	 12 gauge ($4mm^2$) maximum sokid or stranded copper wire rated at 75^oC or greater 3/64 inch (1.2mm) insulation max. 2[1]

Specifications continued on next page

Agency Certification (when product is marked)	UL	UL Listed Industrial Control Equipment
	UL	UL Listed for Class I, Division 2 Group A, B, C and D Hazardous Locations
	CSA	CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations
	EEx[2]	European Union 94/9/EEC EMC Directive, compliant with: EN 50021; Potentially Explosive Atmospheres, Protection “n”
	CE[2]	European Union 89/336/EEC EMC Directive, compliant with: EN 50081–2, Industrial Emissions EN 50082–2, Industrial Immunity EN 61326, Meas./Control/Lab., Industrial Requirements EN 61000–6–2, Industrial Immunity
	C–Tick[2]	Australian Radiocommunications Act,compliant with: AS/NZS 2064, Industrial Emissions

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, “Industrial Automation Wiring and Grounding Guidelines.”

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

European Zone 2 Certification

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

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. The examination and test results are recorded in confidential report No. 28 682 010.

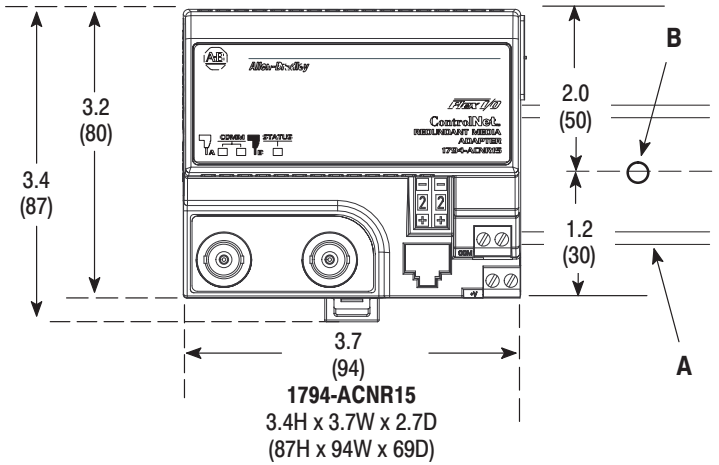
Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021 (1999).

IMPORTANT Observe the following additional Zone 2 certification requirements:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- The secondary of a current transformer shall not be open–circuited.
- The marking “ALCR” is to be considered “as applicable” to individual products.
- 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 must be powered by energy limited associated equipment as defined in EN 50021 when applied in Class I, Zone 2 environments.
- 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.

Mounting Dimensions

Inches
(Millimeters)



1794-ACNR15
3.4H x 3.7W x 2.7D
(87H x 94W x 69D)

A = DIN rail
B = Secure DIN rail approximately every 200mm

Rockwell *Automation*

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1794-IN048B–EN–P – February 2002
Supersedes 1794–5.48 – May 1997
PN957657–62