FLEX I/O PROFIBUS Adapter Module

Cat. No. 1794-APB Series B

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.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 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 enclosure. 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.

WARNING

When you insert or remove the module while backplane 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 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..

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 (e.g. aluminum, plastic, etc.) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding.

ATTENTION

Preventing Electrostatic Discharge

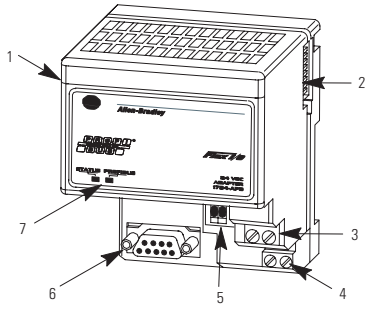
This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- 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.

North American Hazardous Location Approval

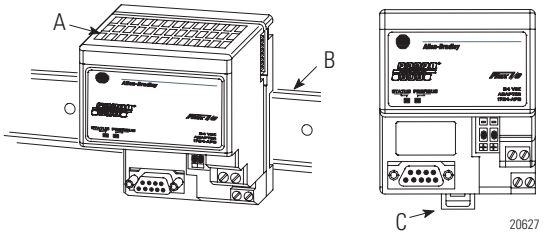
The following information applies when operating this equipment in hazardous locations:		Informations sur l'utilisation de cet équipement en environnements dangereux :	
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous 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.

PROFIBUS Adapter, Cat. No. 1794-APB Series B



Component Identification	
1	PROFIBUS Adapter Module
2	Flexbus Connector
3	24V Common Connections
4	24V dc Connections
5	Node Address Thumbwheel Switches
6	PROFIBUS Connector
7	Status Indicators

Installing Your 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 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 onto the top of the DIN rail, 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 "Connecting Wiring" later in this document.

   Remove debris wrapper before applying power to the module.

Panel/Wall Mounting

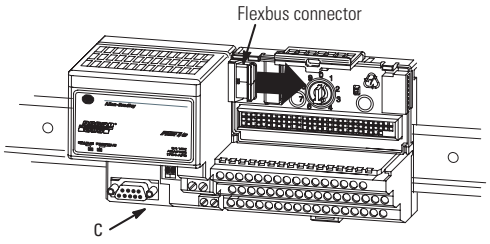
If mounting this adapter to a panel or wall, refer to publication 1794-5.13, "Panel Mounting Kit, Cat. No. 1794-NM1."

Mounting (or Replacing) the Adapter on an Existing System

1. Remove the PROFIBUS connector from the front of the adapter.
2. Disconnect any wiring jumpered to the adjacent terminal base.

WARNING If you connect or disconnect the PROFIBUS 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.

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.

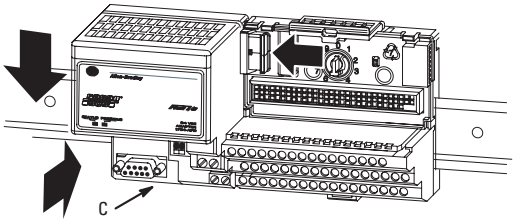


5. Release the locking tab (C) and remove the adapter module.
6. Before installing the new adapter, notice the notch on the right rear of the adapter. This notch accepts the hook on the terminal base unit. The notch is open at the bottom. The hook and adjacent connection point keep the terminal base 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.

Connecting Wiring

1. Connect the PROFIBUS drop cable to the 9-pin D-shell connector according to the following pin assignments.

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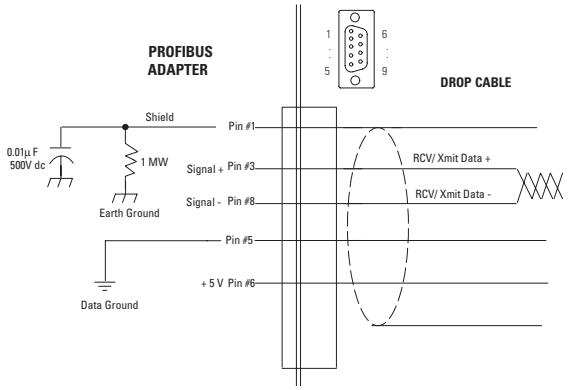
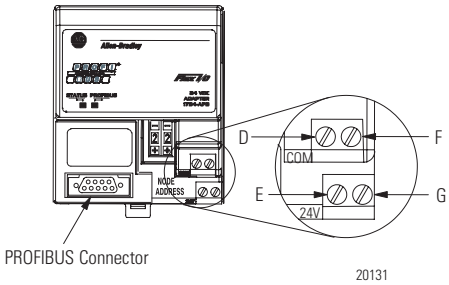
Pin	RS-485 Reference	Signal	Description
1		Shield	Shield, RC to earth ground
2		RP	Not used
3	B/B'	RXD/TXD-P	Receive/transmit data - P
4		CTNR-P	Not used
5	C/C'	DGND	Data Ground
6		VP	Voltage plus (+5V)
7		RP	Not used
8	A/A'	RXD/TXD-N	Receive/transmit data - N
9		CTNR-N	Not used
Metal Shell			Earth Ground

2. Connect the cable shield to Pin 1. The shield is connected to earth ground.
3. Connect the data signal pins on both ends (signal + pin3 and signal - pin 8).



4. Insert the wired connector into the mating connector on the adapter.



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

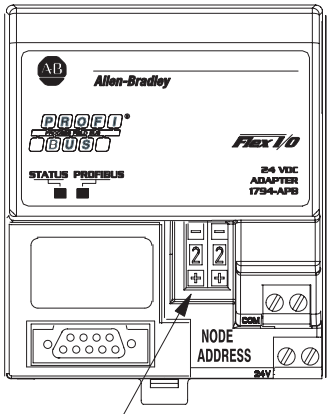
ATTENTION V dc power wiring should be less than 3 m (9.8 ft).

6. Connect -V common to the left side of the upper connector, terminal **D**.
7. 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).

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

Node Address

Set the node address using the thumbwheel switches on the front of the adapter. Valid settings range from 00 to 99. Use the + or - buttons to set the node address.

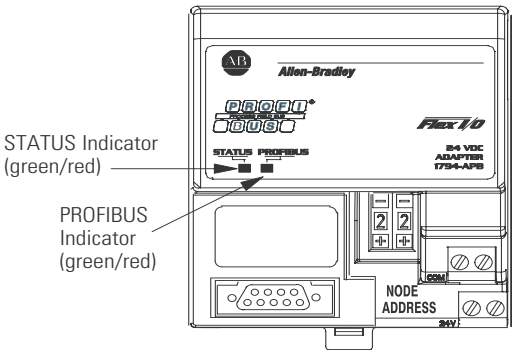


Thumbwheel switches for setting the node address.

GSD Requirements

Current functionality of PROFIBUS adapters requires GSD files. These files are easy to install and are available online at: www.ab.com/networks/gsd.

Indicators



Status Indicator	
Indication	**Status**
OFF	No power
Solid Green	Normal operation
Flashing Red/OFF	Recoverable Fault - FLEX I/O module defective - Incorrect module installed - Node address changed since powerup

PROFIBUS Indicator	
Indication	**Status**
OFF	No power or no communication
Solid Green	Data is being transmitted and received
Flashing Red/OFF	Recoverable Fault - Invalid Send parameter data - Invalid Check Configuration data
Solid Red	Unrecoverable fault - Unable to communicate

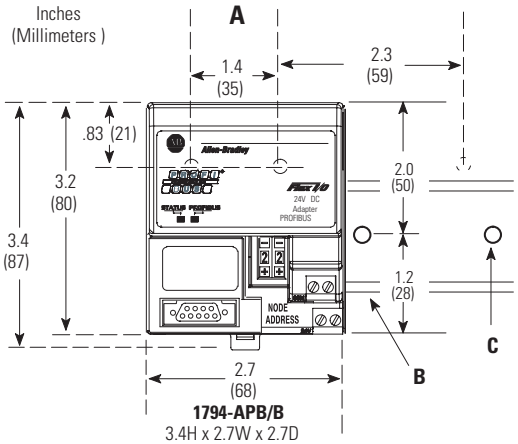
Specifications

Specifications - PROFIBUS Adapter Cat. No. 1794-APB/B

I/O Capacity	8 modules
Input Voltage Rating	24V dc nominal 19.2V to 31.2 V dc (includes 5% ac ripple)
Input Current	450 mA maximum, 330 mA at 24V dc
Inrush Current	23 A for 2 ms
Communication Rate	All rates up to 12.0 Mbits/s
Indicators	Status- red/green PROFIBUS- red/green
Flexbus Output Current	640 mA maximum
Isolation Voltage	Tested at 850V dc for 1s between user power and flexbus
Power Dissipation	7.68 W maximum @ 19.2V dc
Thermal Dissipation	Maximum 26 BTU/hr @ 19.2V dc
Dimensions	3.4H x 2.7W x 2.7D inches 87H x 69W x 69D mm
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): 0 to 55 °C (32 to 131 °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, Un-packaged 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% noncondensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500 Hz
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
ESD Immunity	IEC 61000-4-2: 8 kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10 V/m with 1kHz sine-wave 80%AM from 30 MHz to 1000 MHz
EFT/B Immunity	IEC 61000-4-4: ±2 kV at 5 kHz on communication ports
Surge Transient Immunity	IEC 61000-4-5: ±2 kV line-earth (CM) on shielded ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1 kHz sine-wave 80%AM from 150 kHz to 30 MHz
Enclosure Type Rating	None (open-style)
Power Conductors Wire Size Category[1]	 12 AWG (2.5 mm^2) stranded copper wire rated at 75 °C or higher 3/64 inch (1.2 mm) insulation maximum 2
Terminal Screw Torque	7 pound-inches (0.8 Nm)
PROFIBUS Cable	Standard drop cable
PROFIBUS connector Plug	9-pin D-shell
Certifications (when product is marked)[2]	**c-UL-us** UL Listed for Class I, Division 2, Groups A, B, C and D Hazardous locations, certified for US and Canada **CE** European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity **C-Tick** Australian Radiocommunications Act compliant with AS/NZS CISPR 11, Industrial Emissions
Publications	User Manual 1794-UM059

1 You use this category information for planning conductor routing as described in Allen-Bradley 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.

Mounting Dimensions



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

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