



FLEX I/O PROFIBUS Communications Adapter 1794-APBDPV1

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. Attention icons help you: <ul style="list-style-type: none"> • 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 (6562 ft) 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 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, for additional installation requirements, Allen-Bradley publication [1770-4.1](#).
- NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

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



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.
- Store the equipment in appropriate static-safe packaging when not in use.

European Hazardous Location Approval

The following modules are European Zone 2 approved: 1794-APBDPV1

European Zone 2 Certification (The following applies when the product bears the Ex or EEx 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 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.

IMPORTANT

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 Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Allen-Bradley.
- 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.
- 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 modules are North American Hazardous Location approved: 1794-APBDPV1.

| 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. |

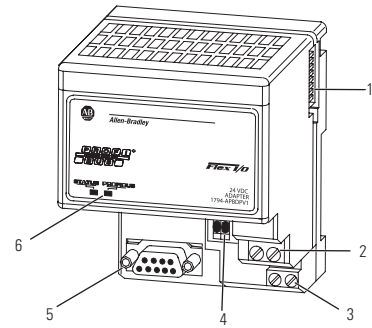
| WARNING | EXPLOSION HAZARD | AVERTISSEMENT | RISQUE D'EXPLOSION |
|---------|--|---------------|--|
| | <ul style="list-style-type: none"> Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. Do not disconnect connections to this equipment unless power 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. | | <ul style="list-style-type: none"> 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. |

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

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.

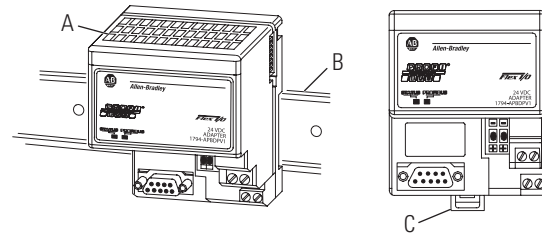
FLEX I/O PROFIBUS Adapter 1794-APBDPV1



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| Description | Description |
|--------------------------|------------------------------------|
| 1 Flexbus connector | 4 Node address thumbwheel switches |
| 2 24V common connections | 5 PROFIBUS connector |
| 3 24V DC connections | 6 Status indicators |

Install Your Adapter Module



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ATTENTION During mounting of all devices, be sure that all debris (such as metal chips and wire stands) 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

- Position the adapter module (A) on a 35 x 7.5 mm (3 x 0.3 in.) DIN rail (B) at a slight angle.
- Hook the lip on the rear of the adapter onto the top of the DIN rail, and rotate the adapter module onto the rail.
- 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.
- 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.
- Connect the adapter wiring as shown under "Connect Wiring for your Module".

Remove the 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."

Mount (or Replace) the Adapter on an Existing System

- Remove the PROFIBUS connector from the front of the adapter.

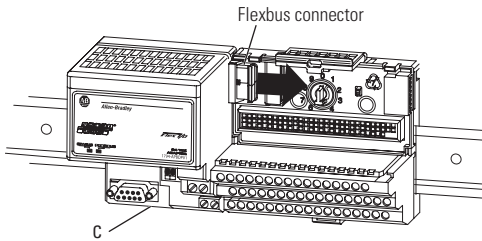
2. Disconnect any wiring jumpered to the adjacent terminal base.

WARNING



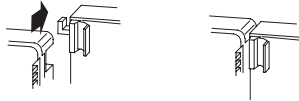
If you connect or disconnect the PROFIBUS cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

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.



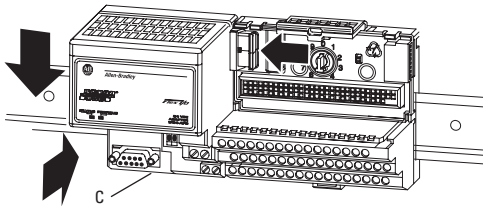
44555

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.



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7. Complete the adapter mounting as follows.
 - a. 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.
 - b. When the adapter is locked onto the DIN rail, gently push the flexbus connector into the adapter to complete the backplane.



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

Connect Wiring for your Module

WARNING

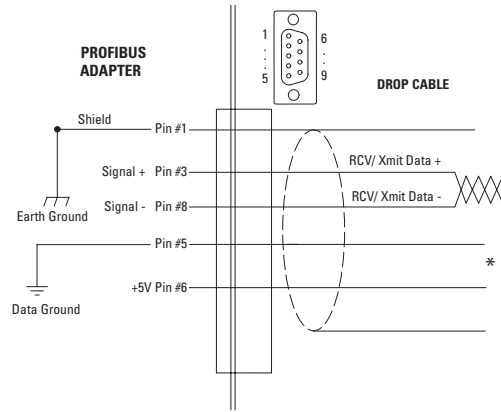


If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

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

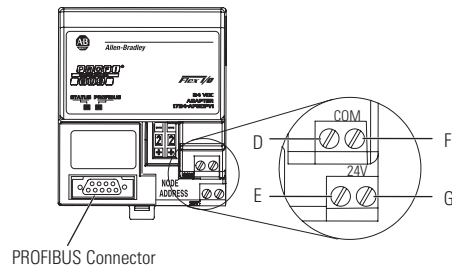
| PIN | RS-485 Reference | Signal | Description |
|-----|------------------|-------------|----------------------------|
| 1 | | Shield | Shield, RC to earth ground |
| 2 | | RP | Not used |
| 3 | B/B' | RXD/TXD-P | Receive/transmit data - P |
| 4 | | CTNR-P | Not used |
| 5 | C/C' | DGND | Data ground |
| 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 + pin 3 and signal - pin 8).



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



PROFIBUS Connector

44559

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

ATTENTION



Total power connection wire length must be less than 10 m (32.8 ft).

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

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- 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 0.8 Nm (7 lb-in).



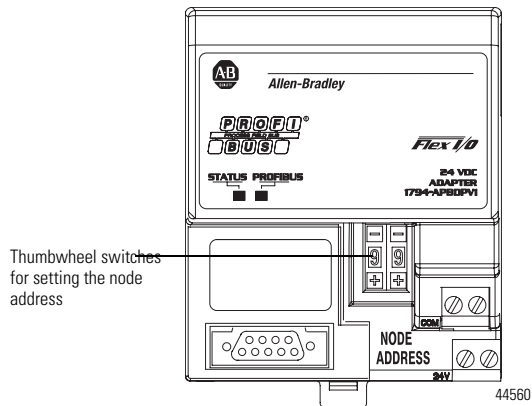
ATTENTION

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

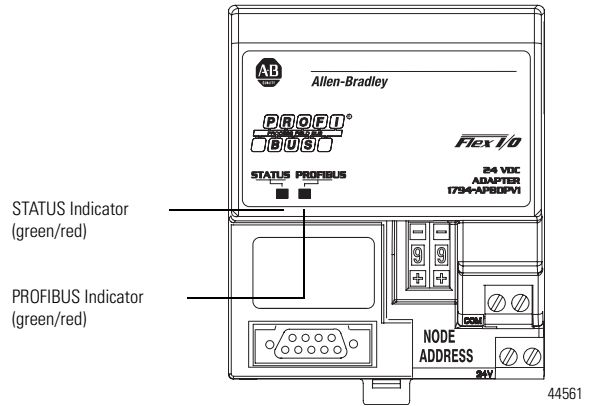


Node Address

Set the node address using the thumbwheel switches on the front of the adapter. Valid settings range from 00...99. Use the + or - buttons to set the node address. Set the thumbwheel switches to 00 to allow node addressing by software configuration tool to set the range from 1 to 125. Address changes take effect only after cycling power.



Indicators



Status Indicators

| Indication | Status |
|------------------|---|
| Off | No power |
| Solid green | Normal operation |
| Flashing red/OFF | Recoverable fault <ul style="list-style-type: none"> - FLEX K/O module defective - Incorrect module installed - Node address changed since powerup |
| Solid red | Unrecoverable fault <ul style="list-style-type: none"> - Major hardware failure |

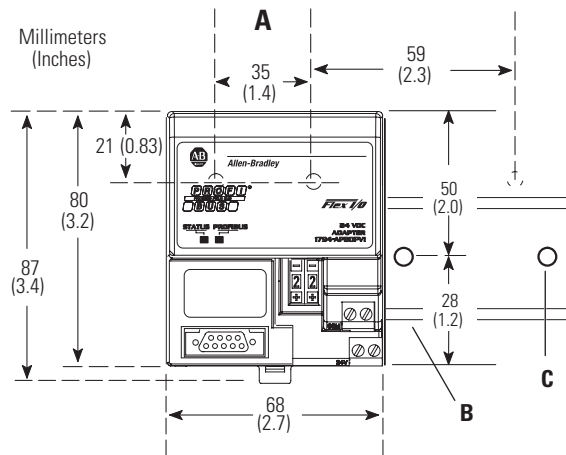
PROFIBUS Indicators

| Indication | Status |
|------------------|---|
| Off | No power or no communication |
| Solid green | Data is being transmitted and received |
| Flashing red/OFF | Recoverable fault <ul style="list-style-type: none"> - Invalid Send parameter data - Invalid Check Configuration data |
| Solid red | Unrecoverable fault <ul style="list-style-type: none"> - Unable to communicate |

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.

Mounting Dimensions



1794-APBDPV1
87H x 68W x 69D
(3.4H x 2.7W x 2.7D)

A = Mounting hole dimensions for optional mounting kit
B = DIN rail
C = Secure DIN rail approximately every 200mm (7.87 in.)

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Specifications - Flex I/O PROFIBUS 1794-APBDPV1

| Specification | Description |
|------------------------------|--|
| I/O capacity | 8 modules |
| Input voltage rating | 24V DC nom 19.2V...31.2 V DC (includes 5% AC ripple) |
| Input current | 450 mA max, 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 max |
| Isolation voltage | 50V (continuous), Basic Insulation Type Profibus to Flex backplane to power Routine tested at 850V DC for 1 s, Profibus to Backplane to Power Type tested at 850V AC for 60 s, Profibus to Backplane to Power |
| Power dissipation | 7.68 W max @ 19.2V dc |
| Thermal dissipation | Max 26 BTU/hr @ 19.2V dc |
| Dimensions (HxWxD) | 87 x 69 x 69mm 3.4 x 2.7 x 2.7 in. |
| Wire size Power | 0.34... 2.5 mm ² (22...12 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max |
| Wire category ⁽¹⁾ | 1 on power ports 2 on communications ports |
| North American temp code | T4 |
| IEC temp code | T4 |
| PROFIBUS CABLE | Standard drop cable |
| PROFIBUS connector plug | 9-pin D-shell |

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

Environmental Specifications

| Module | 1794-APBDPV1 |
|--------------------------|--|
| 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...55 °C (32...131 °F) |
| 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...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 |
| Shock | IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 30 g Nonoperating 50 g |
| Emissions | CISPR 11: Group 1, Class A |
| 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...2500 MHz 3V/m with 1 kHz sine-wave 80% AM from 2500...2700 MHz |
| EFT/B immunity | IEC 61000-4-4: ±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on communication ports |
| Surge transient immunity | IEC 61000-4-5: ±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 10 kHz...80 MHz |
| Enclosure type rating | None (open-style) |

Certifications

| Certifications | (when product is marked) ⁽¹⁾ |
|----------------|--|
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65594 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; 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" (Zone 2) |

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

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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