

## ControlNet Repeaters

Catalog Numbers 1786-RPA, 1786-RPCD, 1786-RPFS, 1786-RPFM, 1756-RPFRL, 1786-RPFRXL



**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.

**注意:** 在安装、配置、操作和维护本产品前，请阅读本文档以及“其他资源”部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外，用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备，则可能会损害设备提供的保护。

**ATENCIÓN:** Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable.

Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

**ATENÇÃO:** Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

**ВНИМАНИЕ:** Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

**注意:** 本製品を設置、構成、稼動または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。

本機器が製造メーカーにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

**ACHTUNG:** Lesen Sie dieses Dokument und die im Abschnitt „Literaturverweise“ genannten Dokumente zur Installation, Konfiguration und Bedienung dieser Ausrüstung sorgfältig durch, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder instandsetzen. Benutzer müssen sich mit den Anweisungen zur Installation und Verdrahtung vertraut machen und müssen die Anforderungen aller geltenden Vorschriften, Gesetze und Normen kennen.

Aktivitäten wie Installation, Einstellung, Inbetriebnahme, Verwendung, Montage, Demontage und Instandsetzung müssen durch ausreichend geschultes Personal in Übereinstimmung mit den geltenden Durchführungsvorschriften ausgeführt werden.

Wenn diese Ausrüstung in einer Weise verwendet wird, die nicht vom Hersteller angegeben wurde, kann der von der Ausrüstung bereitgestellte Schutz beeinträchtigt sein.

**ATTENTION :** Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

**주의:** 본 제품 설치, 설정, 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치, 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오. 사용자는 모든 관련 규정, 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다.

설치, 조정, 가동, 사용, 조립, 분해, 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다.

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다.

**ATTENZIONE** Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione "Altre risorse", riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

**DİKKAT:** Bu ürünün kurulumu, yapılandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yapılandırılması ve işletimi ile ilgili ilave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlar, hizmete alma, kullanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amacın dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

**注意事項:** 在安装、設定、操作或維護本產品前，請先閱讀此文件以及列於「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示，並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行，以符合適用的實作法規。

如果將設備用於非製造商指定的用途時，可能會造成設備所提供的保護功能受損。

**POZOR:** Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci a elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodné proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovídajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

**UWAGA:** Przed instalacją, konfiguracją, użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiające instalację, konfigurację i procedury użytkowania tego urządzenia. Użytkownicy mają obowiązek zapoznać się z instrukcjami dotyczącymi instalacji oraz oprzewodowania, jak również z obowiązującymi kodeksami, prawem i normami.

Działania obejmujące instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowiązującym kodeksem postępowania.

Jeśli urządzenie jest użytkowane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urządzenie może zostać ograniczone.

**Obs!** Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfigurering och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

**LET OP:** Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bedient of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedradingsinstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

## 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 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 additional 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 additional installation requirements.
- NEMA Standard 250 and EN/IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.



### ATTENTION:

- This product 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.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Before installing, configuring, operating, or maintaining this product, read this document and the documents listed in the additional resources section for installing, configuring, or operating equipment. Users should familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.
- Installation, adjustments, putting into service, use, assembly, disassembly, and maintenance shall be carried out by suitably trained personnel in accordance with applicable code of practice. In case of malfunction or damage, no attempts at repair should be made. The module should be returned to the manufacturer for repair. Do not dismantle the module.
- This equipment is certified for use only within the surrounding air temperature range of 0...60 °C (32...140 °F). The equipment must not be used outside of this range.
- 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.rockwellautomation.com/literature/>, describes some important differences between solid state equipment and hard-wired electromechanical devices.
- Use only a soft dry anti-static cloth to wipe down equipment. Do not use any cleaning agents.

### ATTENTION: For fiber modules

- Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommendations.
- 1786-RPFS, 1786-RPFM: Class 1 LED; optical radiation is present during operation.
- 1786-RPFRLL, 1786-RPFRXL: Class 1 laser; laser radiation is present when the system is open and interlocks bypassed. Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
- Do not discard the end cap. Use this end cap to cover the exposed interconnections on the last mounting base on the DIN rail. Failure to do so could result in equipment damage or injury from electric shock.

## 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 wrist strap.
- 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.

## Electrical Safety Considerations



**ATTENTION:** To comply with the CE Low Voltage Directive (LVD), all connections to this equipment must be powered from a source compliant with the following:

- Safety extra low voltage (SELV) supply
- Protected extra low voltage (PELV) supply

1786-RPA: To comply with UL/CUL requirements, this equipment must be powered from a source compliant with the following:

- IEC 60950-1 Ed. 2.1, Clause 2.2 - SELV Circuits
- IEC 61010-2-201 Ed. 1, Clause 3.109 - PELV Circuits or Clause 3.110 - SELV Circuits

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

Do not exceed 10 A on the power connector.

1786-RPFRLL, 1786-RPFRXL: To comply with UL/CUL requirements, the relay connection must be powered from a source compliant with the following:

- Class 2 supply
- Limited voltage/current supply

## Removal and Insertion Under Power (RIUP)



**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.

**WARNING:** For applicable products, when you connect or disconnect the removable terminal block (RTB) with power applied, 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:** For applicable products, 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.

**WARNING:** For the 1786-RPA in hazardous location applications, use the supplied Phoenix™ MSTB 2.5/2-STF-5.08 power terminal block.

## North American Hazardous Location Approval

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, 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 be changed only 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 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.



### 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.

## European Hazardous Location Approval

The following applies to products marked   II 3 G: Such modules:

- 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 Annex II to Directive 94/9/EC. See the EC Declaration of Conformity at <http://www.rockwellautomation.com/products/certification> for details.
- The type of protection for the 1786-RPA and 1786-RPCD, is "Ex nA IIC T5 Gc" according to EN 60079-15 and comply to Standards: EN 60079-0:2012, EN 60079-15:2010, reference certificate number SIR14ATEX4171X.
- The type of protection for the 1786-RPFM and 1786-RPFS, is "Ex nA op is IIC T5 Gc" according to EN 60079-15 and comply to Standards: EN 60079-0:2012, EN 60079-15:2010, EN60079-28:2007, reference certificate number SIR14ATEX4171X.
- 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 ATEX directive 1999/92/EC.

## IECEx Hazardous Location Approval

The following applies to products marked IECEx:

- Such modules 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 to IECEx 60079-0.
- The type of protection for the 1786-RPA and 1786-RPCD, is "Ex nA IIC T5 Gc" according to IEC 60079-15.
- The type of protection for the 1786-RPFM and 1786-RPFS, is "Ex nA op is IIC T5 Gc" according to IEC 60079-15.
- Such modules comply to Standards IEC 60079-0:2011 Ed. 6, IEC 60079-15:2010 Ed. 4, IEC 60079-28:2007 Ed. 1.0, reference IECEx certificate number IECEx SIR 14.0048X.

### ATEX and IECEx Hazardous Location Conformity

Model	Protection Type	ATEX Certificate	IECEx Certificate
1786-RPA	Ex nA IIC T5 Gc	Sira 14ATEX4171X	IECEx SIR 14.0048X
1786-RPCD	Ex nA IIC T5 Gc	Sira 14ATEX4171X	IECEx SIR 14.0048X
1786-RPFM	Ex nA op is IIC T5 Gc	Sira 14ATEX4171X	IECEx SIR 14.0048X
1786-RPFS	Ex nA op is IIC T5 Gc	Sira 14ATEX4171X	IECEx SIR 14.0048X
1786-RPFRL	—	—	—
1786-RPFRXL	—	—	—

## ATEX and IECEx Special Conditions for Safe Use



### WARNING:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be mounted in an ATEX/IECEx Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (as defined in EN/IEC 60529) 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 must be used within its specified ratings defined by Rockwell Automation.
- Provision must be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the rated voltage when applied in 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.
- When installed in a hazardous or non-hazardous area, the module must be installed in a suitably-certified (for example Ex e or Ex nA) enclosure providing a minimum ingress protection of IP54.
- When installed in a non-hazardous area, the module can alternatively be installed in a controlled environment that provides equivalent protection.
- The installer must verify that the service temperature of the suitably-certified enclosure and the 'maximum ambient' temperature of the module when installed is not exceeded.

## Mount a Module

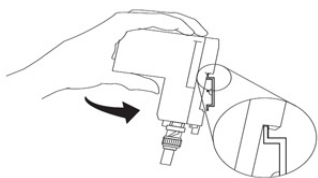
This section explains how to mount 1786-RPA/B, 1786-RPCD, 1786-RPFS, 1786-RPFM, 1786-RPFRL/B, and 1786-RPFRXL/B modules.



**ATTENTION:** This product 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.

**IMPORTANT** Horizontal mounting is preferred. If you do mount the 1786-RPA Repeater Adapter vertically, then we recommend that you mount the 1786-RPA Repeater Adapter at the top.

Follow these steps to mount a module.



1. Position the module on the 35 x 7.5 mm (1.4 x 0.3 in.) DIN rail (Allen-Bradley part number 199-DR1) at a 30° angle.
2. Hook the lip on the rear of the module onto the top of the DIN rail, and rotate the repeater module onto the rail.

3. Press the repeater module down onto the DIN rail until flush.

When the locking tab snaps into position, the repeater module is locked to the DIN rail.

If the repeater module does not snap into position, then use a screwdriver or similar device to move the locking tab down as you press the repeater flush onto the DIN rail.

4. To lock the adapter in place, release the locking tab.

If necessary, push up on the locking tab to lock.

5. Once the repeater adapter is attached to the DIN rail, slide the repeater modules to the left to mate with the repeater adapter.



**WARNING:** Removal and insertion under power (RIUP) is not supported. This module must be powered down while connecting and disconnecting it from any interconnected modules. 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.

6. To lock the repeater adapter and modules in place, attach the DIN rail locks to the left side of the repeater adapter and the right side of the attached modules.



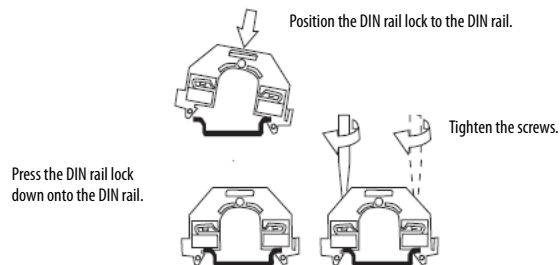
**ATTENTION:** Verify that the repeater adapter and modules are secured together with DIN rail locks on either side. Failure to do so can result in the loss of communication and/or damage the modules.

**IMPORTANT** You can attach as many as four modules maximum to the 1786-RPA/B repeater adapter, or the total power consumption of attached modules cannot exceed 8 W or 1.6 A @ 5V DC, whichever comes first. The 1786-RPFRL/B and 1786-RPFRXL/B modules require 570 mA each; therefore you can attach only two of these modules to a 1786-RPA/B repeater module. The maximum current draw at 5V DC is 400 mA for the 1786-RPFM module, 300 mA for the 1786-RPFS module, and 400 mA for the 1786-RPCD module. If you exceed the module or power limit, you can damage the modules and repeater adapter.

7. Repeat steps 1...6 for each of the two DIN rail locks.

**IMPORTANT** When attaching a 1786-RPFRXL/B module and a 1786-RPCD module to the same 1786-RPA/B repeater module, you must install any 1786-RPCD modules to the left side of any 1786-RPFRL or 1786-RPFRXL/B repeater module.

8. Tighten the two screws on the DIN rail lock to a torque of 1.1 N-m (9...11 lb-in).



9. For the module you installed, continue with:

- Wire the 1786-RPA/B Repeater Adapter on page 3.
- Connect a 1786-RPCD Dual Copper Repeater Module on page 4.
- Connect a 1786-RPFS Fiber Module on page 4.
- Connect a 1786-RPFM, 1786-RPFRL/B, 1786-RPFRXL/B Fiber Module on page 4.

## Wire the 1786-RPA/B Repeater Adapter

This section describes how to wire your module.



**WARNING:** An electrical arc can occur under the following circumstances:

- When you connect or disconnect the Removable Terminal Block (RTB) with field side power applied.
- If you connect or disconnect the communications cable with power applied to this module or any device on the network.

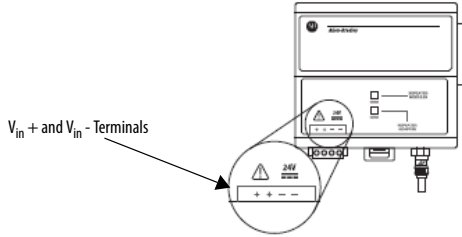
This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

1. Make sure that you have obtained the following items before you begin to wire the module:

- Two lengths of 0.21...3.3 mm<sup>2</sup> (24...12 AWG) wire
- Wire stripping tool
- Small, flathead screwdriver

2. Strip about 7 mm (0.28 in.) of insulation from the end of each wire.

- Attach the  $V_{in+}$  wire to one of the  $V_{in+}$  terminals on the RTB.



- Tighten the screws to 0.6...0.8 N-m (5...7 lb-in).
- Attach the  $V_{in-}$  wire to one of the  $V_{in-}$  terminals on the RTB.
- Tighten the screws to 0.6...0.8 N-m (5...7 lb-in).

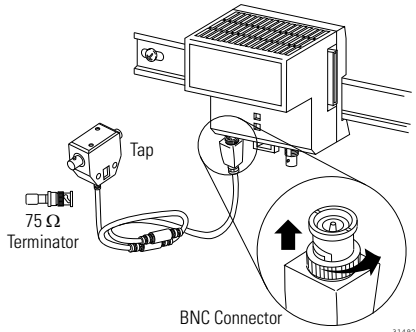
**IMPORTANT** The unused  $V_{in+}$  and  $V_{in-}$  terminals can be used to supply power to other devices. However, the total current draw on daisy-chained power connections through any single 1786-RPA module cannot exceed 10 A.

- Install the RTB onto the repeater adapter module.
  - Tighten the screws to 0.6...0.8 N-m (5...7 lb-in).
  - Connect the repeater adapter module to the ControlNet network by connecting the drop line of the coax tap to the BNC connector.
- If the adapter has dual ports, connect both ports.
- Terminate any unused coax ports by connecting a 75  $\Omega$  terminator to the unused BNC connector.
- One 75  $\Omega$  terminator is shipped with the repeater adapter module.

### Connect a 1786-RPCD Dual Copper Repeater Module

If you connect only one coax channel on the 1786-RPCD module, you can use either channel 1 or channel 2. Both channels 1 and 2 operate identically and can be used interchangeably. Be sure to terminate the unused channel with a 75  $\Omega$  terminating resistor (catalog number 1786-XT).

- Connect the ControlNet tap to port #1.
- Align the knob of the BNC cable connector with the locks of the BNC module connector, and insert the connector into channel 1.



- Twist the BNC connector until the bayonet lug is locked into place.
- To connect channel 2, repeat Steps 1...3 for channel 2. If channel 2 is not used, connect a 75- $\Omega$  terminating resistor (catalog number 1786-XT) to the port labeled channel 2.

### Connect a 1786-RPFS Fiber Module

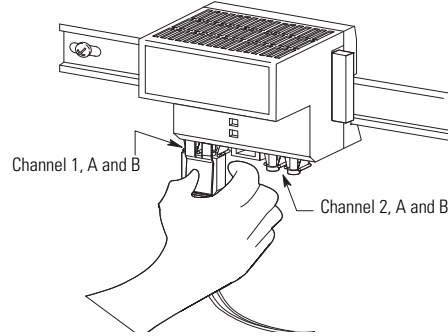
This module requires a pre-terminated zipcord wiring kit. The kits are offered in various lengths. Consult with your local distributor for attenuation specifications before you purchase your fiber media components. The zipcord uses a duplex cable that contains two separate fibers, one for transmit and one for receive. If you are wiring only one channel, you can use either channel 1 or channel 2.

- Remove protective caps from ports that require a connection and save the caps for future storage protection.

**ATTENTION:** Do not discard the end cap. Use this end cap to cover the exposed interconnections on the last module on the DIN rail. Failure to do so could result in equipment damage.

- Hold down the latch and insert the channel 1 zipcord connector into the A and B connectors until the pins and latch lock into place.

Make sure that you insert the blue pin, receive, of the zipcord connector in A and the black pin, transmit, into B.



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- Hold down the latch and insert the other end of the duplex cable into another module by using either channel 1 or channel 2 of the other module.

**IMPORTANT** The duplex cable is manufactured with the fiber reversed on opposite ends. This automatically connects channel A of one unit to channel B of the other. Do not connect multiple duplex fiber or two simplex fibers between the same modular repeaters, even if they are from different modules on the same repeater.



**ATTENTION:** Under certain conditions, viewing the optical port can expose the eye to hazard. When viewed under some conditions, the optical port can expose the eye beyond the maximum permissible exposure recommendations.

### Connect a 1786-RPFM, 1786-RPFRL/B, 1786-RPFRLX/B Fiber Module

If you are wiring only one channel, you can use either channel 1 or channel 2.

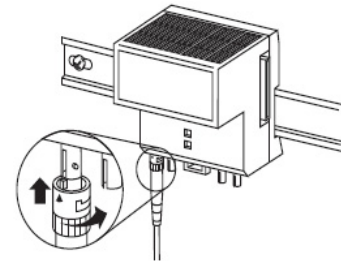
Follow these steps to connect to channel 1, receive (RX).

- Remove protective caps from ports that require a connection, and save for future storage protection.
- Align the knob of the cable connector with the groove of the module connector.



**ATTENTION:** Do not discard the end cap. Use this end cap to cover the exposed interconnections on the last module on the DIN rail. Failure to do so could result in equipment damage.

- Insert the connector into channel 1 RX.



- Twist the receive connector until the bayonet lug locks into place.
- Repeat these steps to connect to channel 1, transmit (TX).



**ATTENTION:** Under certain conditions, viewing the optical port can expose the eye to hazard. When viewed under some conditions, the optical port can expose the eye beyond the maximum permissible exposure recommendations.

**IMPORTANT** Be certain the fiber cable you connect to channel 1 (receive) on one module is set to channel 1 (transmit) on the other module. You can use channel 1 or channel 2 on either module.

### Install the Ferrites (1786-RPFRL/B, 1786-RPFRLX/B only)

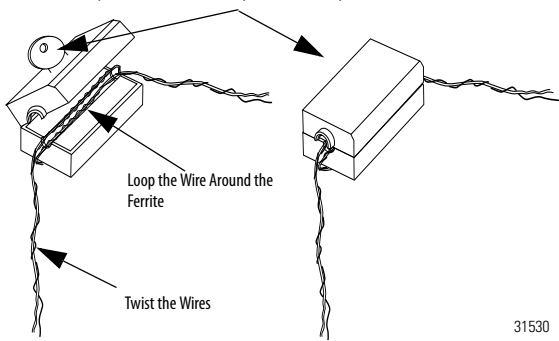
This procedure explains how to install a ferrite to reduce EMI interference. The ferrite connects to the relay contact connector on the module. If you do not plan to use the relay contact connector on the module for system status, you do not need to install the ferrites.

- Obtain 0.25...2.5 mm<sup>2</sup> (22...14 AWG) wire in a length sufficient for your application.

Consider using a smaller wire gauge (for example, 0.25...0.823 mm<sup>2</sup> (22...18 AWG) that is sufficiently sized and rated to handle the amperage requirements of the power supply. A smaller wire gauge can help aid in the installation of the ferrite.

- Twist the wires.

To open the ferrite, use the key. Remove the key and close the ferrite.

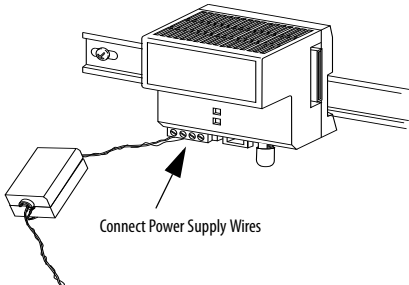


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### Install the Ferrite at the Power Supply

To attach the ferrite to the power supply of the 1786-RPA/B module, do these steps.

- Use the key that is supplied with the ferrite to open it.  
Be careful not to damage the wires.
- Form a loop with both wires (+ and -) approximately 100 mm (4 in.) away from the power supply connector of the 1786-RPA/B module.
- Loop the wires through the ferrite.
- Close the ferrite.  
Be careful not to damage the wires.
- Strip approximately 6 mm (0.24 in.) of wire from the end that connects to the power supply connector on the 1786-RPA/B module.
- Remove the power supply connector from the 1786-RPA/B module.
- Install the stripped ends of the wires in the power supply connector on the 1786-RPA/B module as shown in this graphic.



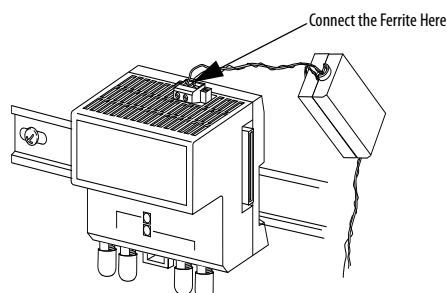
31528

**IMPORTANT** Do not use multiple ferrites per 1786-RPA/B module.

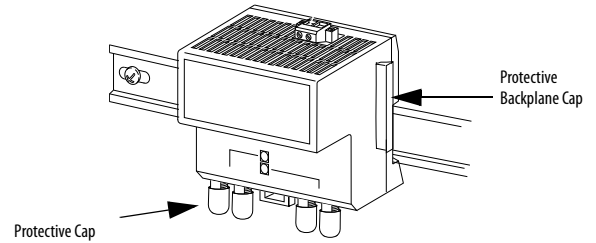
- Reinsert the power supply connector into the 1786-RPA/B module.

### Install the Ferrite at the Relay Contact Connector

- Use the key to open the remaining ferrite.
- Form a loop with both wires (+ and -) approximately 100 mm (4.0 in.) away from the relay contact connector of the 1786-RPFRL/B or 1786-RPFRXL/B module.
- Loop the wires through the ferrite.
- Close the ferrite.  
Be careful not to damage the wires.
- Strip approximately 6 mm (0.24 in.) of wire from the end that connects to the relay contact connector on the 1786-RPFRL/B or 1786-RPFRXL/B module.
- Remove the relay contact connector from the 1786-RPFRL/B or 1786-RPFRXL/B module.
- Install the stripped ends of the wires in the relay contact connector on the fiber repeater module as shown in this graphic.



- Reinsert the relay contact connector into the 1786-RPFRL/B or 1786-RPFRXL/B module.
- Connect the fiber cable as described on [page 4](#).
- If you plan not to use a channel, then create a jumper by attaching a small section of fiber cable (or a Simplex fiber loop) between the Receive port (RX) and the Transmit Port (TX) of any unused fiber port.  
Although not required for module operation, the jumper turns the status indicators green and prevents the relay contact connector from opening and indicating a failure.



## Technical Specifications

Attribute	1786-RPA/B	1786-RPCD	1786-RPFS	1786-RPFM	1786-RPFRL/B, 1786-RPFRXL/B
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)	0...60 °C (32...140 °F)				
Temperature, surrounding air, max	60 °C (140 °F)				
Voltage and current ratings, max	Input: 700 mA @ 24V DC max, SELV <sup>(1)</sup> Output: 1.6 A @ 5V DC	Backplane: 400 mA @ 5V DC max	Backplane: 300 mA @ 5V DC max	Backplane: 400 mA @ 5V DC max	Input: 570 mA @ 5V DC max Relay: 900 mA @ 30V DC, Class 2, resistive only
Power consumption, max	16.8 W	2 W	1.5 W	2 W	2.8 W
Power dissipation, max	8.8 W	2 W	1.5 W	2 W	2.8 W
Isolation voltage	N/A (SELV), functional insulation type, ControlNet to system	N/A (SELV), functional insulation type, ControlNet to system and between ControlNet channels	—	—	50V (continuous), basic insulation type, relay contacts to system
Wire size	0.21...3.3 mm <sup>2</sup> (24...12 AWG) solid or stranded copper wire that is rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max for power connections	NA	—	—	0.25...2.5 mm <sup>2</sup> (22...14 AWG) solid or stranded copper wire that is rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max for power connections
Wiring category	2 - on power ports 2 - on ControlNet ports <sup>(2)</sup>	2 - on ControlNet ports <sup>(2)</sup>	—	—	2 - on relay ports <sup>(2)</sup>
Enclosure type rating	None (open-style)				
North American temp code	T5	T5	T5	T5	T4A
ATEX temp code	T5	T5	T5	T5	—
IECE x temp code	T5	T5	T5	T5	—

(1) For applications within the U.S., use a power supply that is appropriately certified as Class 2 per the definition in the National Electrical Code, ANSI/NFPA 70, Article 725. For applications outside the U.S., use a power supply with safety extra low voltage (SELV) or protected extra low voltage (PELV) output. A power supply with SELV or PELV output is built with appropriate isolation to withstand single fault conditions. The output cannot exceed 30V rms, 42.4V peak, or 60V DC under fault conditions.

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

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
ControlNet Accessory Specifications Technical Data, publication <a href="#">1786-TD008A</a>	Provides ControlNet Repeaters design consideration information and specifications.
ControlNet Fiber Media Planning and Installation Guide, publication <a href="#">CNET-IN001</a>	Information about installing a ControlNet fiber media system.
ControlNet Coax Media Planning and Installation Guide, publication <a href="#">CNET-IN002</a>	Information about installing a ControlNet coaxial media system.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	General guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, <a href="http://www.rockwellautomation.com/products/certification">http://www.rockwellautomation.com/products/certification</a>	Declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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