



ControlNet Coax Repeater Installation Instructions

(Cat. No. 1786–RPT, –RPTD)

Use this document as a guide when you install a ControlNet™ coax repeater.

To install the repeater, read	See page
About the Repeater	1
Prepare for Installation	3
European Union Directive Compliance	4
Mount the Repeater	5
Ground the Repeater	6
Connect Power and Relay Circuitry (optional)	6
Connect the Repeater to ControlNet	8

For this reference information	See page
Front Panel Controls	10
Troubleshooting	10
Agency Compliance	13
Specifications	15

About the Repeater

The repeater is a device used to increase the number of nodes, extend the total length of your segment, or create a star or tree configuration (go off in multiple directions from one point). The number of repeaters you can use depends on your network topology.



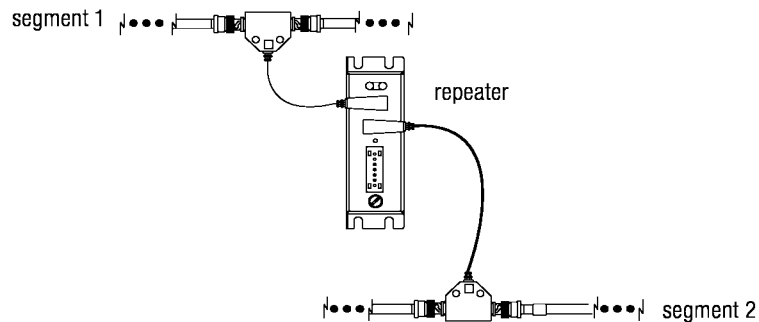
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Use a repeater in your ControlNet cable system to connect segments together to form links.



For more information (including redundant cable systems), refer to the *ControlNet Cable System Planning and Installation Manual*, publication 1786-6.2.1.1786

The repeater provides:

- an internal power supply
- a fuse (replaceable) for over-current protection

For this input power	Use this repeater
85 to 250V ac or 110 to 250V dc	1786-RPT
20 to 72V dc	1786-RPTD

For more specifications, see page 14.

- two indicators for status and troubleshooting
- a fault-relay contact for status indication or switching to a backup repeater. When wired to external circuitry, this contact could be used to turn off a light or activate a backup repeater.

When the repeater is	This contact
working properly	will be held closed
not working properly (or a loss of power occurs)	will open

Specifications

1786-RPT, -RPTD

Power Supply	To comply with CE Low Voltage Directives, you must use a Safety Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this repeater adapter.	
	Use a NEC/CEC Class 2 power supply in order to comply with UL and CSA requirements.	
Power Requirements	1786-RPT	85–250V ac, 47–63Hz, 60mA maximum
	1786-RPTD	110–250V dc, 25mA maximum
Fault Relay Requirements	1786-RPT	20–72V dc, 100mA maximum
	1786-RPTD	132V ac, 150mA maximum or 186V dc, 150mA maximum
Barrier Strip Conductors	#14 AWG to #22 AWG	
Replacement Fuse	1786-RPT	1/4A, 250V 3AG
	1786-RPTD	2A, 250V (slow-blow)
Environmental	Operating Temperature	0 to 60°C (32 to 140°F)
	Storage Temperature	–40 to 85°C (–40 to 185°F)
	Relative Humidity	5 to 95%, noncondensing
	Dimensions	see page 5
Weight 1786-RPT	1786-RPT	0.87kg (1.9lbs)
	1786-RPTD	0.82kg (1.8lbs)
Agency Certification (when product or packaging is marked)		 Class I Div 2 Hazardous marked for all applicable directives

ControlNet is a trademark of ControlNet International, Inc.

Compliance to European Union Directives

If this product bears the **CE** marking, it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336 Electromagnetic Compatibility (EMC) using a technical construction file and the following standards, in whole or in part:

- EN 50081-2 EMC - Generic Emission Standard, Part 2 - Industrial Environment
- EN 50082-2 EMC - Generic Immunity Standard, Part 2 - Industrial Environment

The repeater described in this manual is intended for use in an industrial environment.

Low Voltage Directive

The repeater is also designed to meet Council Directive 73/23 Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests.

For specific information required by EN 61131-2, see the appropriate sections in this manual, as well as the following Allen-Bradley publications:

- *Industrial Automation Wiring and Grounding Guidelines*, publication 1770-4.1.
- *Automation Systems Catalog*, publication B111.

This equipment is classified as open equipment and must be installed (mounted) in an enclosure during operation as a means of providing safety protection.

Approbation d'utilisation dans des environnements dangereux par la CSA

La CSA certifie des produits pour une utilisation générale aussi bien que pour une utilisation en environnements dangereux. La certification CSA en vigueur est indiquée par l'étiquette produit et non par des indications dans la documentation utilisateur.

Exemple d'étiquette de certification d'un produit par la CSA :

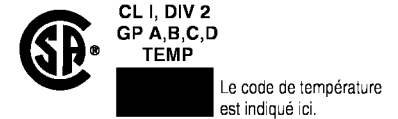


Pour satisfaire à la certification CSA en environnements dangereux, les informations suivantes font partie intégrante de la documentation des produits de commande industrielle certifiés.

- Cet équipement ne convient qu'à une utilisation dans des environnements de Classe 1, Division 2, Groupes A, B, C, D ou non dangereux.
- Les produits portant le marquage CSA approprié (c'est-à-dire Classe 1, Division 2, Groupes A, B, C, D) sont certifiés pour une utilisation avec d'autres équipements, les combinaisons d'applications et d'utilisation étant déterminées par la CSA ou le bureau local d'inspection.

Important: De par la nature modulaire des systèmes de commande programmables, le produit ayant le code de température le plus élevé détermine le code de température global du système dans un environnement de Classe 1, Division 2. Le code de température est indiqué sur l'étiquette produit.

Code de température :



Les avertissements suivants s'appliquent aux produits ayant la certification CSA pour une utilisation dans des environnements dangereux.

AVERTISSEMENT : Risque d'explosion --



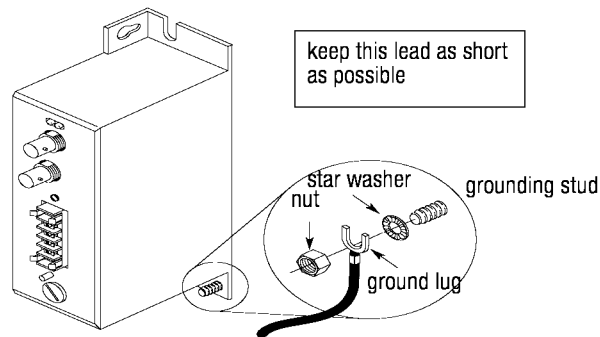
- La substitution de composants peut rendre ce matériel inadapté à une utilisation en environnement de Classe 1, Division 2.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de remplacer des composants.
- Couper le courant ou s'assurer que l'environnement est classé 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 fournis par l'utilisateur pour se brancher aux circuits externes de cet appareil à l'aide de vis, loquets coulissants, connecteurs filetés ou autres, de sorte que les connexions résistent à une force de séparation de 15 Newtons (1,5 kg - 3,4 lb.) appliquée pendant au moins une minute.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Le sigle CSA est une marque déposée de la Canadian Standards Association.

Agency Compliance

Ground the Repeater

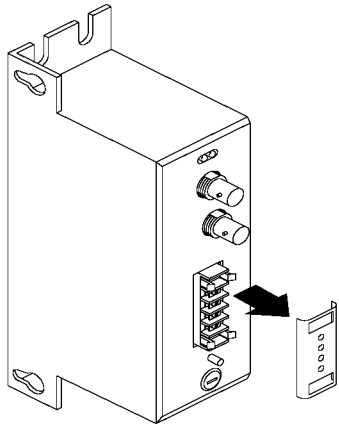
Use a #14 AWG wire to connect the repeater to the ground bus.



For additional grounding information, see the *Industrial Automation Wiring and Grounding Guidelines*, publication 1770-4.1.

Connect Power and Relay Circuitry

1. Remove the terminal strip cover.



Status Indicators Under Normal Conditions

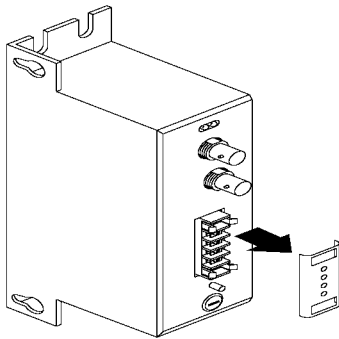
If both are	This indicates
alternately red/green	the repeater is being powered-up or reset. The LEDs alternately flash red and green for about 5 seconds.
steady green	normal operating mode.

Status Indicators Under Fault Conditions

If both are	This indicates that
off	unit is not powered. Check the power line for correct voltage. Check the fuse and replace if blown.
red	there is a repeater fault. To clear this state, press the reset switch. If this does not clear the fault, replace the repeater or troubleshoot the network.

If either is	The respective segment (1 or 2) is
flashing green/off	experiencing temporary network errors. This situation will normally correct itself. If the situation persists, troubleshoot your nodes and cable system. When troubleshooting your cable system, make sure: •all BNC connector pins are properly seated •all taps are ControlNet compliant •all terminators are 75Ω and are installed at both ends of all segments •the coax cable has not been inadvertently grounded
flashing red/off	experiencing a high level of network errors. This may indicate a broken cable, broken tap or missing segment terminator. Important: The indicators will flash red-off on a system that has no network activity. This would be normal for a system that has no ControlNet nodes installed or enabled.

4. Replace the terminal strip cover.



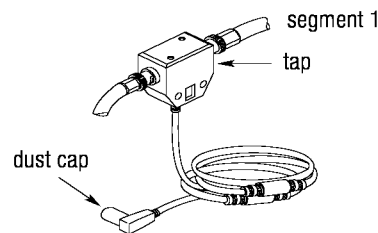
Connect the Repeater to Your ControlNet Segments

1. Remove (and save) the dust cap located on the straight or right-angle connector of the designated tap on the first segment (segment 1).



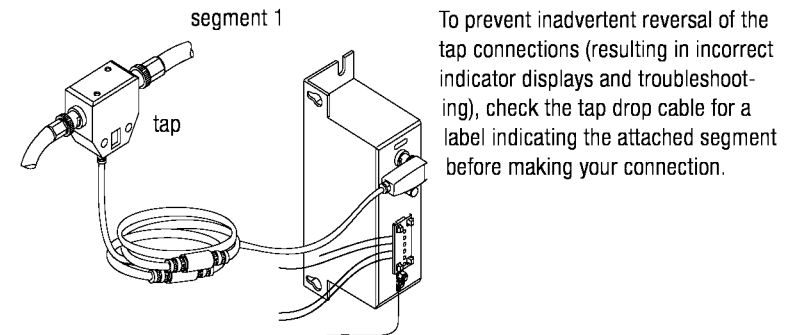
ATTENTION: Do not allow any portions of the tap to contact any conductive material. This contact can cause noise on the network.

If you disconnect the tap from the repeater, place the dust cap back on the straight or right-angle connector to prevent the connector from accidentally contacting a metallic grounded surface.

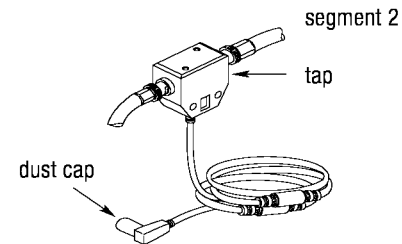


2. Remove and discard the dust caps from the repeater's BNC jacks.

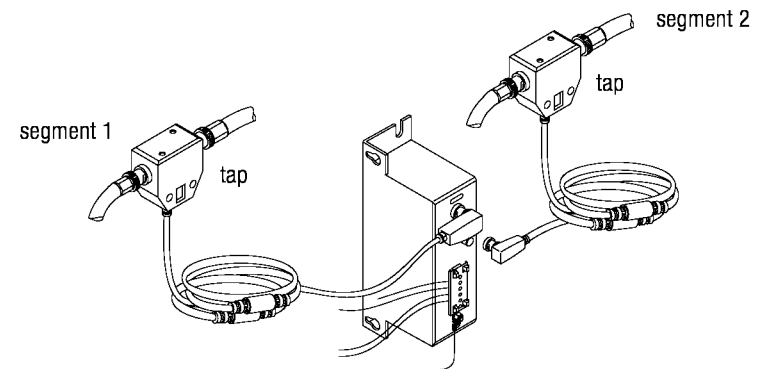
3. Connect this tap's straight or right-angle connector to the $\overline{V}^1$ BNC connector on the repeater.



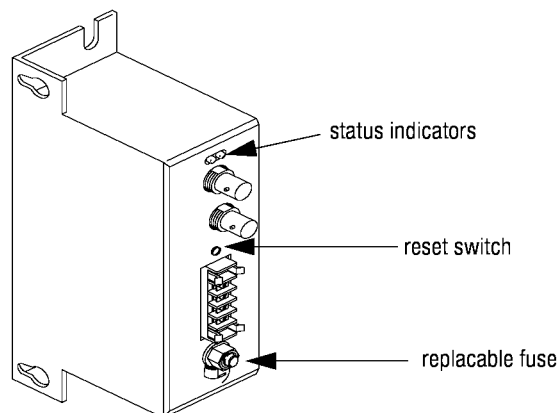
4. Remove (and save) the dust cap located on the straight or right-angle connector of the designated tap on the second segment (segment 2).



5. Connect this tap's straight or right-angle connector to the the $\overline{V}^2$ BNC connector on the repeater.



Front-panel Controls



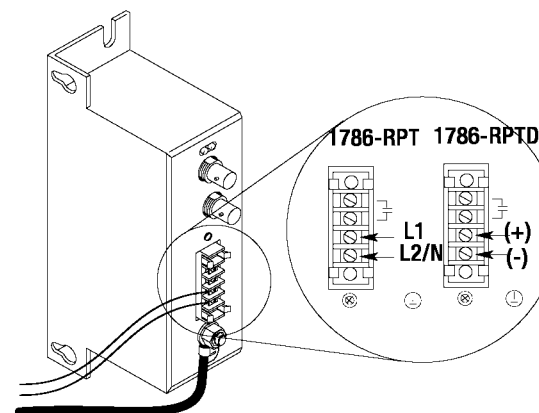
During operation, use the	To
status indicators	determine status of the repeater.
reset switch	to reset the repeater after a fault condition.
replaceable fuse	protect the repeater from over-current conditions.

Troubleshooting

Use the following tables to troubleshoot your repeater. The tables use these terms:

- steady - indicator is on continuously in the defined state.
- alternating - the two indicators alternate between the two defined states at the same time (applies to both indicators viewed together). The two indicators are always in opposite states, out of phase.
- flashing - the indicator alternates between the two defined states (applies to each indicator viewed independent of the other). If both indicators are flashing, they must flash together, in phase.

2. Connect power to the repeater.

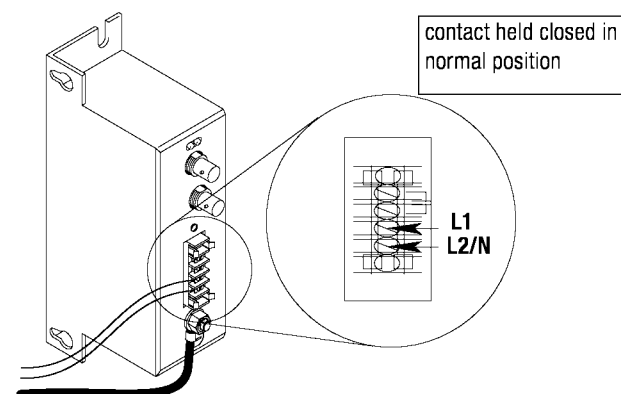


If you are using high voltage dc to power the 1786-RPT, L1 is positive (+) and L2/N is negative (-).

Using the fault relay terminals? ^②	Go to step
yes	3
no	4

^② For more information, see page 2.

3. Connect your relay circuitry to the fault relay terminals.



Understand CSA Hazardous Location Approval

CSA certifies products for general use as well as for use in hazardous locations. Actual CSA certification is indicated by the product label as shown below, and not by statements in any user documentation.

Example of the CSA certification product label:

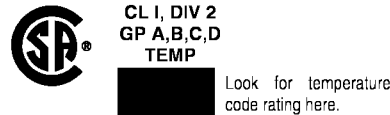


To comply with CSA certification for use in hazardous locations, the following information becomes a part of the product literature for this CSA-certified industrial control product.

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only.
- The products having the appropriate CSA markings (that is, Class I, Division 2, Groups A, B, C, D) are certified for use in other equipment where the suitability of combination (that is, application or use) is determined by the CSA or the local inspection office having jurisdiction.

Important: Due to the modular nature of a programmable control system, the product with the highest temperature rating determines the overall temperature code rating of a programmable control system in a Class I, Division 2, location. The temperature code rating is marked on the product label as shown.

Temperature code rating:



The following warnings apply to products having CSA certification for use in hazardous locations.

WARNING: Explosion hazard--



- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components unless power has been switched off or the area is known to be non-hazardous.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on this equipment by using screws, sliding latches, threaded connectors, or other means such that any connection can withstand a 15 Newton (3.4 lb.) separating force applied for a minimum of one minute.
- Batteries must only be changed in an area known to be non-hazardous.

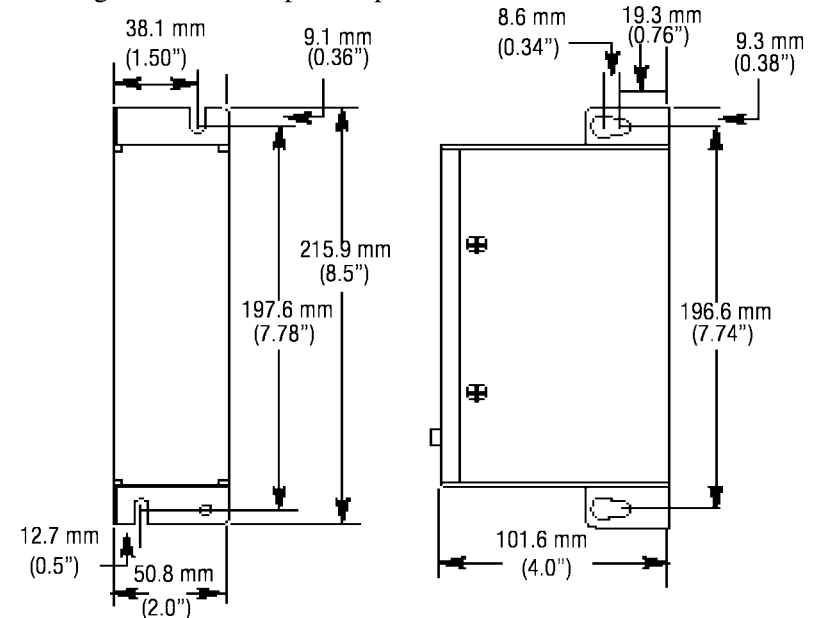
CSA logo is a registered trademark of the Canadian Standards Association.

Mount the Repeater

Use the mounting dimensions provided to mount the repeater horizontally or vertically in the area you selected.

Important: The repeater should be mounted:

- so that air can flow in/out of the air holes on the top and bottom of the repeater — for proper ventilation, make sure there is a minimum of 5.1cm (2") from surrounding equipment
- in a NEMA enclosure to provide protection from dust, moisture, or corrosive atmospheres
- to a grounded metal plate if possible

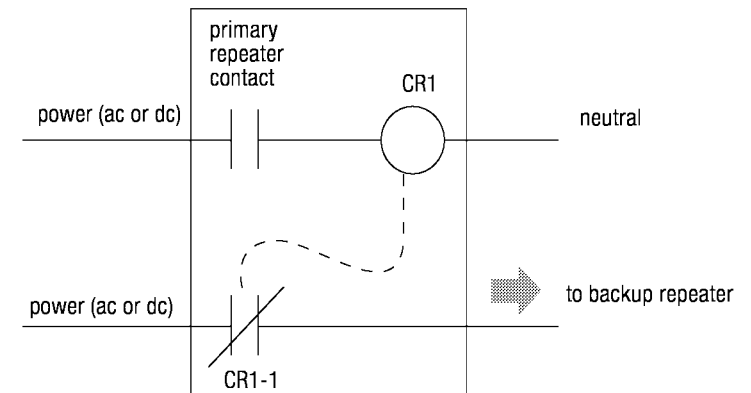


The repeater has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment.

The repeater generates, uses, and can radiate radio frequency energy. To avoid harmful interference to radio communications, observe all installation instructions provided in this document. Operation of the repeater in a residential area is likely to cause harmful interference; if interference occurs, you correct the interference at your own expense.

Important: Changes or modifications not expressly approved by Allen-Bradley could void your authority to use the repeater.

This diagram shows a possible configuration for powering a backup repeater in your ControlNet network. In this diagram, the backup repeater will be activated when the primary repeater is faulted.



ATTENTION: Do not power both repeaters at the same time. Powering both repeaters at the same time disrupts communication on the network. Use the fault-relay contact of the primary repeater to control power to the backup repeater.

Prepare for Installation

Before installing a repeater, you should have determined where the repeater will be installed. See the *ControlNet Cable System Planning and Installation Manual*, publication 1786-6.2.1, if you have not determined repeater placement.