



# ControlNet Coax Repeater Installation Instructions

(Cat. No. 1786-RPT, -RPTD)

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

To install the repeater, read	See page
↓ About the Repeater	2
↓ 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

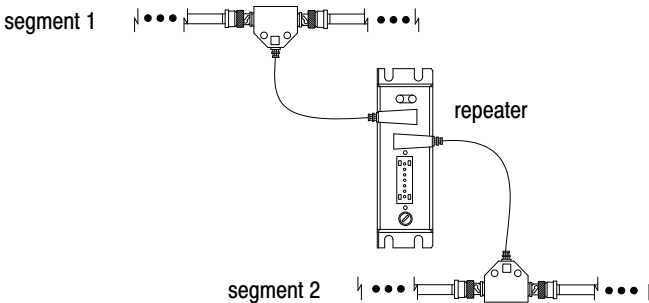
For this reference information	See page
➡ Front Panel Controls	10
➡ Troubleshooting	10
➡ Agency Compliance	11
➡ Related Publications	12
➡ Specifications	12

Allen-Bradley Repla

## 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.

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.

The repeater provides:

- an internal power supply

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

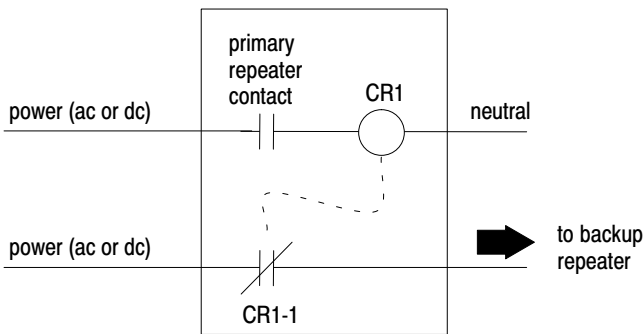
For more specifications, see page 12.

- a fuse (replaceable) for over-current protection
- 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

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.

# Allen-Bradley Repla

## European Union Directive Compliance

The series B version of this product is marked with the  logo, indicating that this version complies with the European Union Directives noted below.

If this product is installed within the European Union or EEA regions and has the CE mark, the following regulations apply.

### EMC Directive

The repeater 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 that the above norm requires, see the appropriate sections in this manual, as well as the following Allen-Bradley publications:

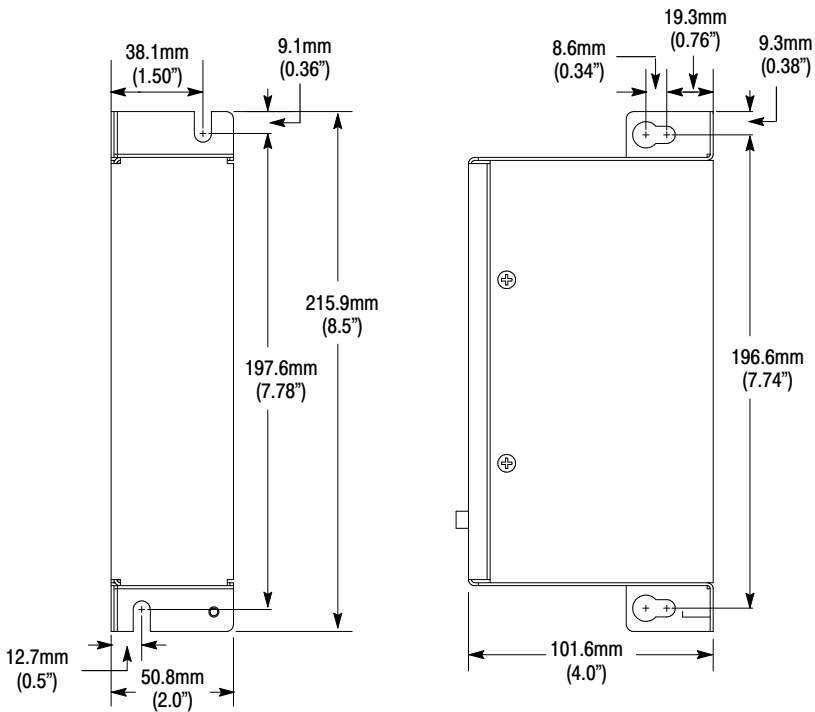
- *Industrial Automation Wiring and Grounding Guidelines*, publication 1770-4.1
- *Guidelines for Handling Lithium Batteries*, publication AG-5.4
- *Automation Systems Catalog*, publication B111

## 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:

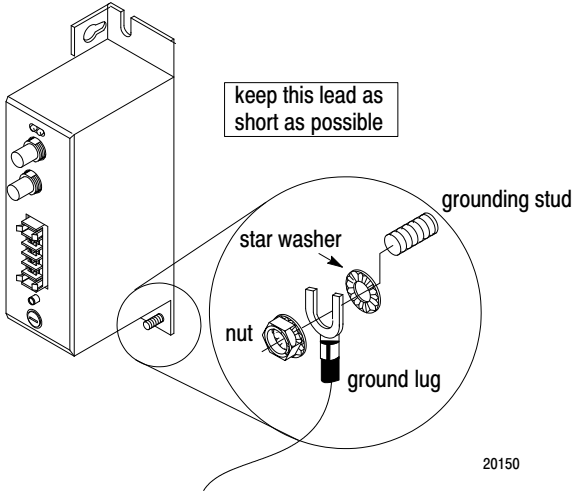
- so that air can flow in/out of the air holes on the top and bottom of the repeater — for proper ventilation, make sure there is a minimum of 5.1cm (2") from surrounding equipment
- in a NEMA enclosure to provide protection from dust, moisture, or corrosive atmospheres
- to a grounded metal plate if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



# Allen-Bradley Repeater

## Ground the Repeater

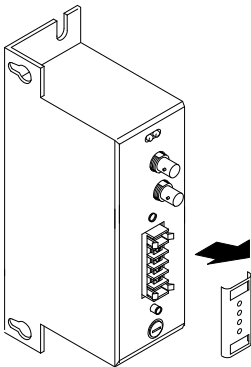
Use a #14 AWG wire to connect the repeater to the ground bus.



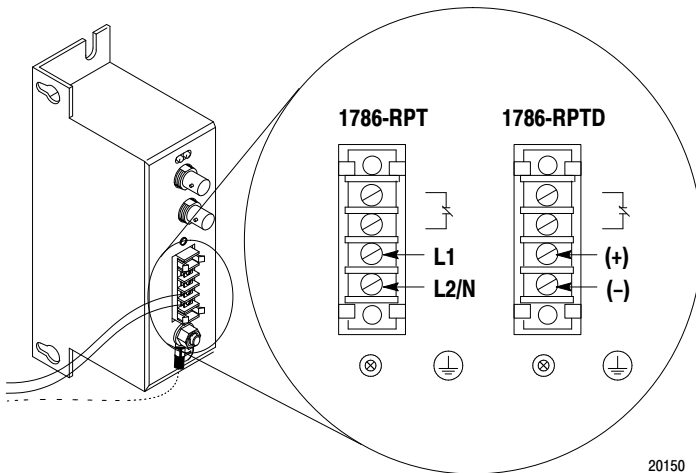
For additional grounding information, see the *Industrial Automation Wiring and Grounding Guidelines*, publication 1770-4.1.

## Connect Power and Relay Circuitry

1. Remove the terminal strip cover.



## 2. Connect power to the repeater.

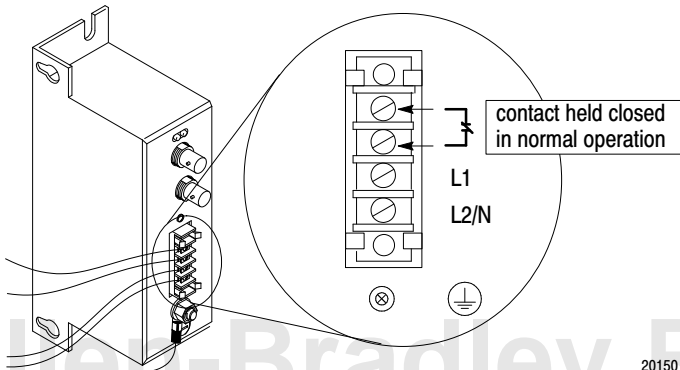


If you are using high voltage dc to power the 1786-RPT, L1 is positive (+) and L2/N is negative (-).

Using the fault relay terminals? <sup>①</sup>	Go to step
yes	3
no	4

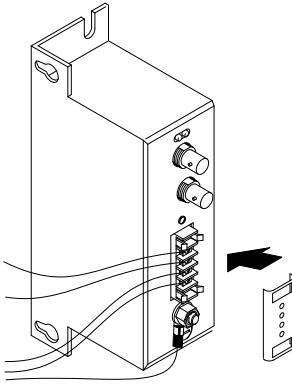
<sup>①</sup> For more information, see page 2.

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



Allen-Bradley Repla

4. Replace the terminal strip cover.



20150

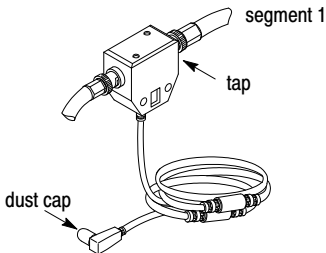
## Connect the Repeater to Your ControlNet Segments

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 metal portions of the tap to contact any conductive material. This contact can cause noise on the network.

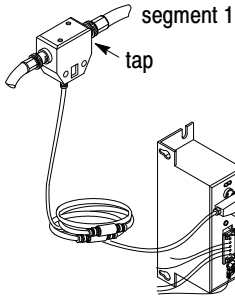
If you disconnect the tap from the repeater, place the dust cap back on the straight or right-angle connector to prevent the connector from accidentally contacting a metallic grounded surface.



20093-1



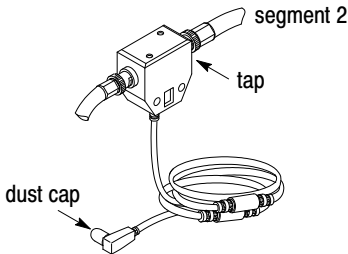
2. Remove and discard the dust caps from the repeater's BNC jacks.
3. Connect this tap's straight or right-angle connector to the the  BNC connector on the repeater.




To prevent inadvertent reversal of the tap connections (resulting in incorrect indicator displays and troubleshooting), check the tap drop cable for a label indicating the attached segment before making your connection.

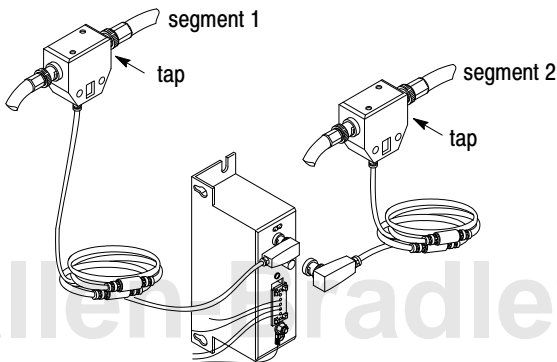
20093-1

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).



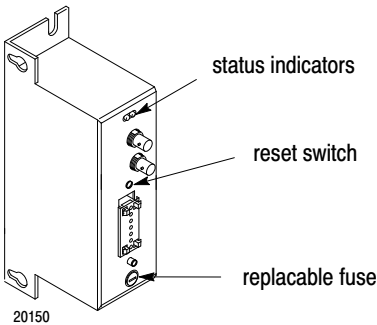
20093-1

5. Connect this tap's straight or right-angle connector to the the  BNC connector on the repeater.



20093-1

## Front-panel Controls



<b>During operation, use the</b>	<b>To</b>
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.

### Status Indicators Under Normal Conditions

<b>If both are</b>	<b>This indicates</b>
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: <ul style="list-style-type: none"> <li>• all BNC connector pins are properly seated</li> <li>• all taps are ControlNet compliant</li> <li>• all terminators are 75Ω and are installed at both ends of all segments</li> <li>• the coax cable has not been inadvertently grounded</li> </ul>
flashing red/off	experiencing a high level of network errors. This may indicate a broken cable, broken tap or missing segment terminator. <b>Important:</b> 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.

## Agency Compliance

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.

## Related Publications

Publication	Publication number
<i>Industrial Automation Wiring and Grounding Guidelines</i>	1770-4.1
<i>ControlNet Coax Tap Installation Instructions</i>	1786-2.3
<i>ControlNet Cable System Planning and Installation Manual</i>	1786-6.2.1
<i>ControlNet Cable System Component List</i>	AG-2.2

## Specifications

### 1786-RPT, -RPTD

Power Requirements	1786-RPT	85-250V ac, 47-63Hz, 60mA maximum
	1786-RPTD	110-250V dc, 25mA maximum 20-72V dc, 100mA maximum
Fault Relay Requirements		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 Conditions	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	0.87kg (1.9lbs)
	1786-RPTD	0.82kg (1.8lbs)
Agency Certification (when product or packaging is marked)		<ul style="list-style-type: none"> <li>•   Class 1 Div 2 Hazardous</li> <li>•  marked for all applicable directives</li> </ul>

ControlNet is a trademark of Allen-Bradley, Inc.

 **Rockwell** Automation  
**Allen-Bradley**

Worldwide representation.

1786-5.8 — October 1996

Supersedes Publication 1786-5.8 — February 1996



PN 955127-69

Copyright 1996 Allen-Bradley Company, Inc. Printed in USA