



## *Installation Instructions*

# ControlNet Modular Repeater Adapter

(Cat. No. 1786-RPA)

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

- To install the adapter, read these sections:

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- For this information, refer to these sections:

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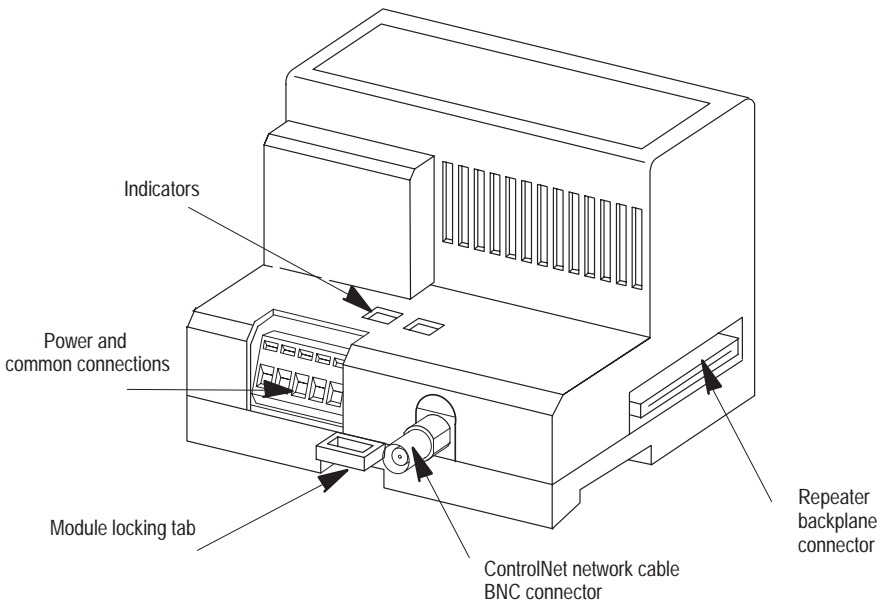
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## About The ControlNet Repeater Adapter

Use the adapter when you need to connect repeater modules to the ControlNet network. The adapter provides:

- backplane power
- coax interface
- LED indicators for the coax port and media modules
- arbitration and data jitter removal of repeated packets

The figure below identifies the components of the adapter:



## European Union Directive Compliance

If this product has the **CE** mark, 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

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

### Low Voltage Directive

The adapter 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:

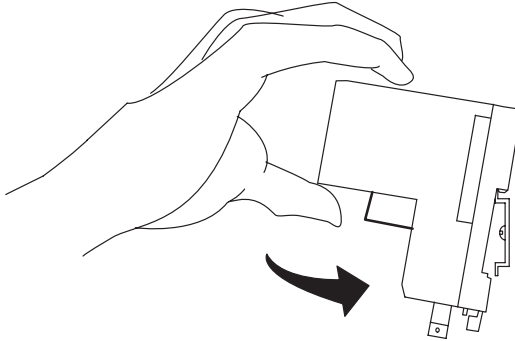
- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1
- Guidelines for Handling Lithium Batteries, publication AG-5.4
- Automation Systems Catalog, publication B111

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## Mounting The ControlNet Repeater Adapter

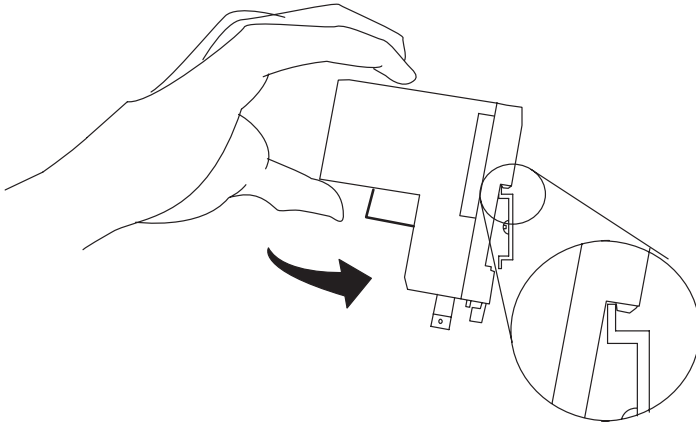
To mount the adapter on the DIN rail:

1. Position the adapter on a 35 x 7.5mm DIN rail (Allen-Bradley part number 199-DR1; 46277-3; EN 50022) at a 30° angle.



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2. Hook the lip on the rear of the adapter onto the top of the DIN rail, and rotate the repeater adapter onto the rail.

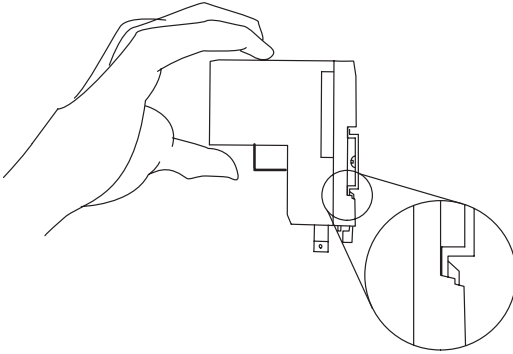


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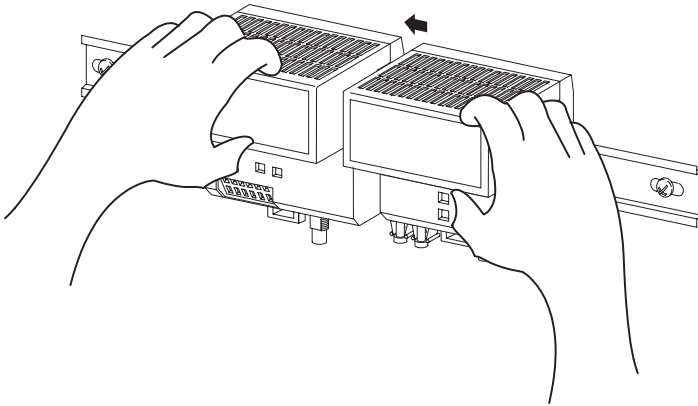
3. Press the repeater adapter down onto the DIN rail until flush.

The locking tab should snap into position and lock the adapter to the DIN rail.

4. If the module does not snap into position, use a screwdriver or similar device to move the locking tab down while pressing the adapter flush onto the DIN rail. Release the locking tab to lock the adapter in place. If necessary, push up on the locking tab to lock.



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



**ATTENTION:** Make certain that the adapter and repeater modules are secured together with DIN rail anchors. Failure to do so may result in the loss of communications and/or cause damage to the modules.

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**Important:** A DIN rail end anchor (Allen-Bradley Part# 1492-EA35) must be used on the left side of the repeater adapter to keep the unit from moving.

6. Connect the adapter wiring as shown in “Wiring The ControlNet Repeater Adapter” on page 6.

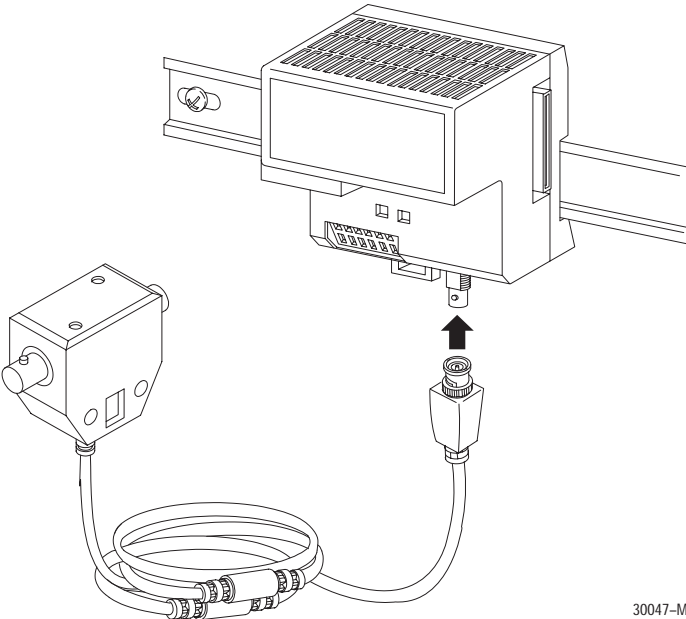
The total number of media modules that can be attached to the repeater adapter can not exceed four or the total power consumption of the modules can not exceed 1.6A @ 5VDC, whichever comes first.

**Important:** If you exceed the module or power limit, you may cause damage to the repeater adapter and modules.

## Wiring The ControlNet Repeater Adapter

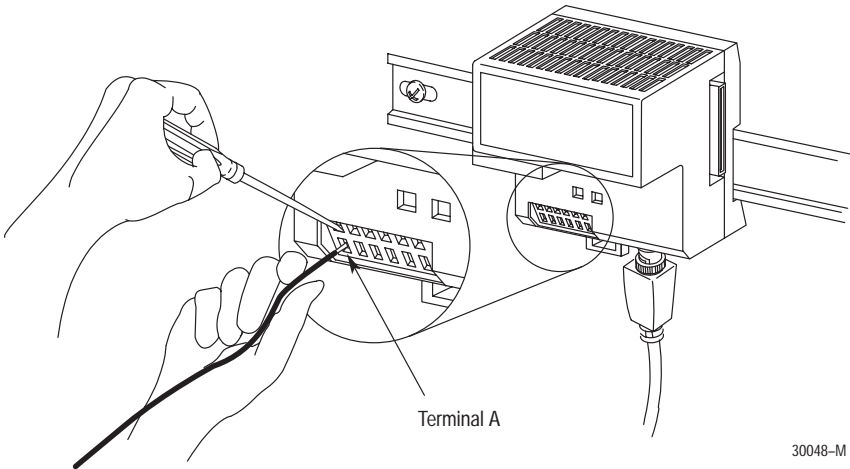
To wire the repeater adapter and connect to power:

1. Connect to the ControlNet coax network by connecting the drop line of the coax tap to the BNC connector.

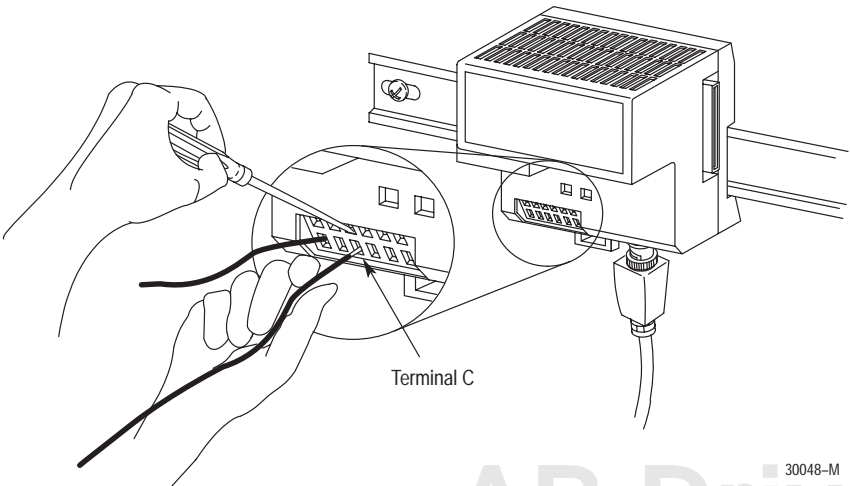


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2. Connect the +24V dc input to the power and common connector by inserting a screwdriver into slot and prying up so the clamp is opened enough to accept the wire.

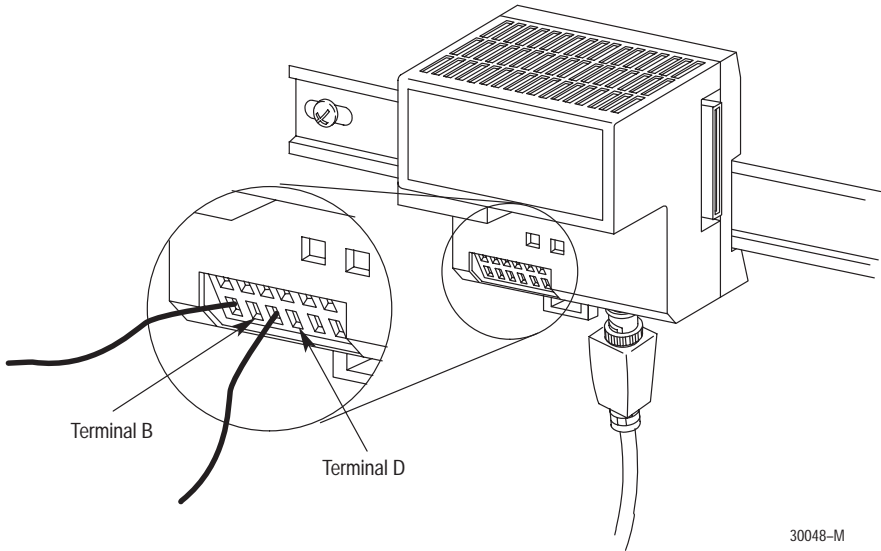


3. After inserting the wire in to terminal **A**, release the prying action on the screwdriver.
4. Repeat Steps 2 and 3 for the common connection by inserting the common wire into terminal **C**.



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5. If there is another module in the series, use terminals **B** and **D** to pass 24V dc power (**B**) and 24V common (**D**) to that module.  
**Important:** Terminals **E** and **F** are reserved for future use.



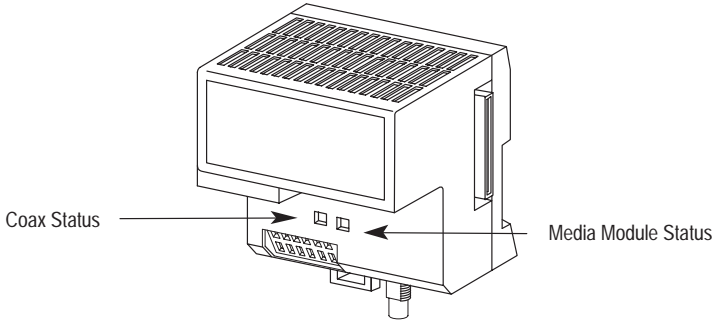
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**Important:** Make sure all repeater modules are attached and secured prior to applying power to the adapter. Failure to do so may cause damage to the adapter and modules.



## Indicators

The figure below identifies indicators on the adapter:



## Status Indicators

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 operation
off	unit is not powered, check the power line for correct voltage.
red	<p>there is a repeater fault</p> <ul style="list-style-type: none"> <li>• If the fault indication is caused by a jabber condition, the fault indication will automatically be cleared when the jabber condition is removed from the coax or fiber port.</li> <li>• If a jabber condition is not causing the fault, replace the repeater adapter.</li> </ul>
If either is:	The respective segment (1 or 2) is:
flashing green/off	<p>experiencing temporary network errors</p> <p>This situation will normally correct itself. If the situation persists, troubleshoot your nodes and cable system. When troubleshooting your cable system, make sure:</p> <ul style="list-style-type: none"> <li>• all BNC connector pins are properly seated</li> <li>• all taps are A-B taps</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	<p>experiencing a high level of network errors. This may indicate a broken cable, broken tap or missing segment terminator.</p> <p><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.</p>

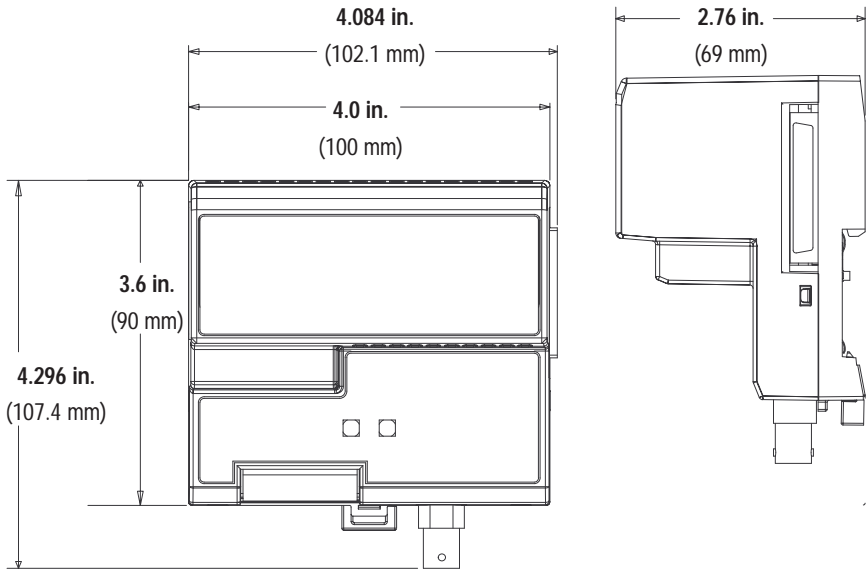
## Related Publications

The table below lists publications that you may want to refer to for additional information:

Publication	Publication Number
Industrial Automation Wiring and Grounding Guidelines	1770-4.1
ControlNet Coax Tap Installation Instructions	1786-5.7
ControlNet Cable System Planning and Installation Manual	1786-6.2.1
ControlNet Cable System Component List	AG-2.2

## Mounting Dimensions

The figure below provides mounting dimensions for the adapter:



## 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 CSA-certified Allen-Bradley industrial control products.

- 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 PLC® control system, the product with the highest temperature rating determines the overall temperature code rating of a PLC control system in a Class I, Division 2 location. The temperature code rating is marked on the product label as shown.

Temperature code rating



← Look for temperature code rating here

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 an Allen-Bradley product 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.

PLC is a registered trademark of Allen-Bradley Company, Inc.

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

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### Approbation d'utilisation dans des emplacements dangereux par la CSA

La CSA certifie les produits d'utilisation générale aussi bien que ceux qui s'utilisent dans des emplacements dangereux. La certification CSA en vigueur est indiquée par l'étiquette du produit et non par des affirmations dans la documentation à l'usage des utilisateurs.

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



Pour satisfaire à la certification de la CSA dans des endroits dangereux, les informations suivantes font partie intégrante de la documentation des produits industriels de contrôle Allen-Bradley certifiés par la CSA.

- Cet équipement convient à l'utilisation dans des emplacements de Classe 1, Division 2, Groupes A, B, C, D, ou ne convient qu'à l'utilisation dans des endroits non dangereux.
- Les produits portant le marquage approprié de la CSA (c'est à dire, Classe 1, Division 2, Groupes A, B, C, D) sont certifiés à l'utilisation pour d'autres équipements où la convenue de combinaison (application ou utilisation) est déterminée par la CSA ou le bureau local d'inspection qualifié.

**Important:** Par suite de la nature modulaire du système de contrôle PLC®, le produit ayant le taux le plus élevé de température détermine le taux d'ensemble du code de température du système de contrôle d'un PLC dans un emplacement de Classe 1, Division 2. Le taux du code de température est indiqué sur l'étiquette du produit.

Taux du code de température



← Le taux du code de température est indiqué ici

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

#### AVERTISSEMENT: Risque d'explosion —







- La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe 1, Division 2.
- Couper le courant ou s'assurer que l'emplacement est désigné non dangereux avant de remplacer les composants.
- Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.
- Avant de débrancher les connecteurs, couper le courant ou s'assurer que l'emplacement est reconnu non dangereux. Attacher tous connecteurs fournis par l'utilisateur et reliés aux circuits externes d'un appareil Allen-Bradley à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens permettant aux connexions de résister à une force de séparation de 15 newtons (3,4 lb. - 1,5 kg) appliquée pendant au moins une minute.

Le sigle CSA est la marque déposée de l'Association des Standards pour le Canada.

PLC est une marque déposée de Allen-Bradley Company, Inc.

## Specifications

The table below provides specifications for the repeater adapter:

<b>Power Supply.1</b>	To comply with CE Low Voltage Directives, you must use a Safety Extra 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.
<b>Input Voltage Rating</b>	24V dc nominal
<b>Input Voltage Range</b>	18.0V to 36.0V dc
<b>Communication Rate</b>	5M bits/s
<b>Indicators</b>	Coax Status – Red/Green Module Status – Red/Green
<b>Repeater Backplane Output Current</b>	1.6A maximum @ 5V dc
<b>Isolation Voltage</b>	100% tested as 850V dc for 1s between user power and repeater backplane connections
<b>Power Consumption</b>	700mA maximum from external 24V supply based on worst case module loading
<b>Environmental Conditions</b>	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 Shock Operating 30 g peak acceleration, 11(± 1)ms pulse width Non-operating 50 g peak acceleration, 11(± 1)ms pulse width Vibration Tested 5 g @ 10-500Hz per IEC 68-2-6
<b>ControlNet Coax Cable</b>	1786 RG6
<b>Power Conductors</b>	
Wire Size	12 gauge maximum, 28 gauge minimum (#12 AWG to 28 AWG)
Category	1 <sup>①</sup> , <sup>②</sup>
<b>Agency Certification</b> (when product is marked)	 <b>Class 1 Div 2 Hazardous</b>  <b>listed</b>  <b>marked for all applicable directives</b>  <b>Class 1 Div 2 Hazardous</b> <small>APPROVED</small>

<sup>①</sup> Use this conductor category information for planning conductor routing as described in system level installation manual.

<sup>②</sup> Refer to publication 1770–4.1, “Programmable Controller Wiring and Grounding Guidelines”.

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