



## ControlLogix Data Highway Plus-Remote I/O Communication Interface Module

(Catalog Number 1756-DHRIO)

Use this document as a guide to install the ControlLogix™ Data Highway Plus™-Remote I/O communication interface module.

| To   | See page |
|--|----------|
| Prevent Electrostatic Discharge                    | 2        |
| Understand Compliance to European Union Directives | 3        |
| Identify module features                           | 4        |
| Prepare the chassis and system for installation    | 4        |
| Set the module switches                            | 5        |
| Install or remove the module                       | 6        |
| Wire the connectors for the module ports           | 9        |
| Connect the module to the network                  | 9        |
| Apply chassis power                                | 10       |
| Check power supply and module status               | 10       |
| Troubleshoot the module                            | 12       |
| Configure the module                               | 14       |
| Understand CSA Hazardous Location Approval         | 15       |
| Understand module specifications                   | 17       |



This icon is used when additional information is available in the *ControlLogix Data Highway Plus-Remote I/O Communication Interface Module User Manual*, publication 1756-6.5.14.

If you need a copy of this manual, fax the enclosed User Manual Request Card to 1-800-576-6340. If you are outside the U.S., fax the card to 1-330-723-4036.

## Prevent Electrostatic Discharge

The DHRIO module is sensitive to electrostatic discharge.

---



**ATTENTION:** Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential
  - Wear an approved wrist-strap grounding device
  - Do not touch the backplane connector or connector pins
  - Do not touch circuit components inside the module
  - If available, use a static-safe work station
  - When not in use, keep the module in its static-shield bag
-

## Understand Compliance to European Union Directives

If this product bears 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

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

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

This product is intended for use in an industrial environment.

### Low Voltage Directive

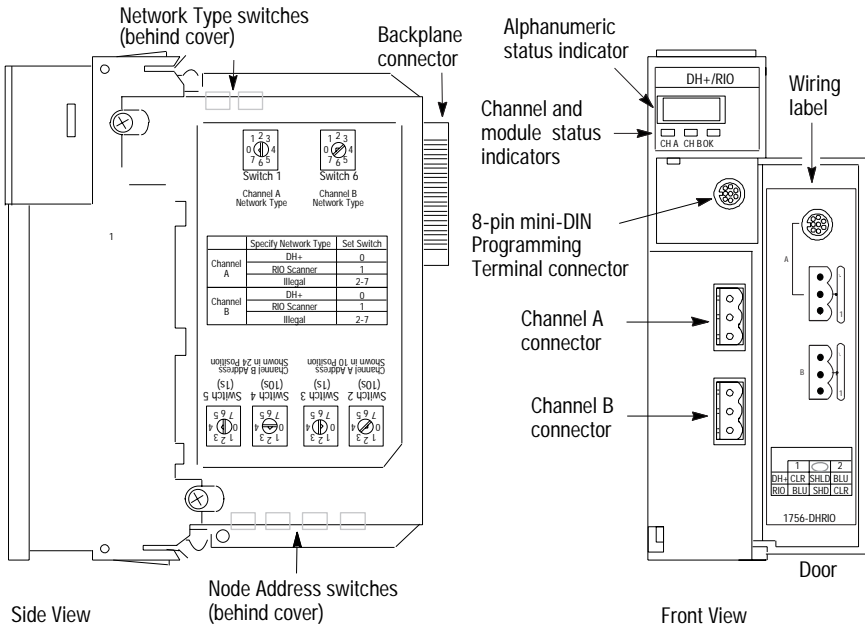
This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 — Equipment Requirements and Tests.

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

| Publication   | Publication number |
|---|--------------------|
| <i>Industrial Automation Wiring and Grounding Guidelines For Noise Immunity</i> | 1770-4.1           |
| <i>Automation Systems Catalog</i>   | B111               |

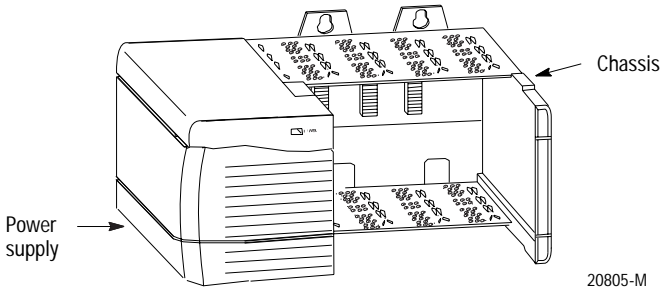
This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

## Identify Module Features



## Prepare the Chassis for Module Installation

Before you install the DHRIO module, you must install and connect a ControlLogix chassis and power supply. To install these products, refer to publications 1756-5.2 and 1756-5.1.

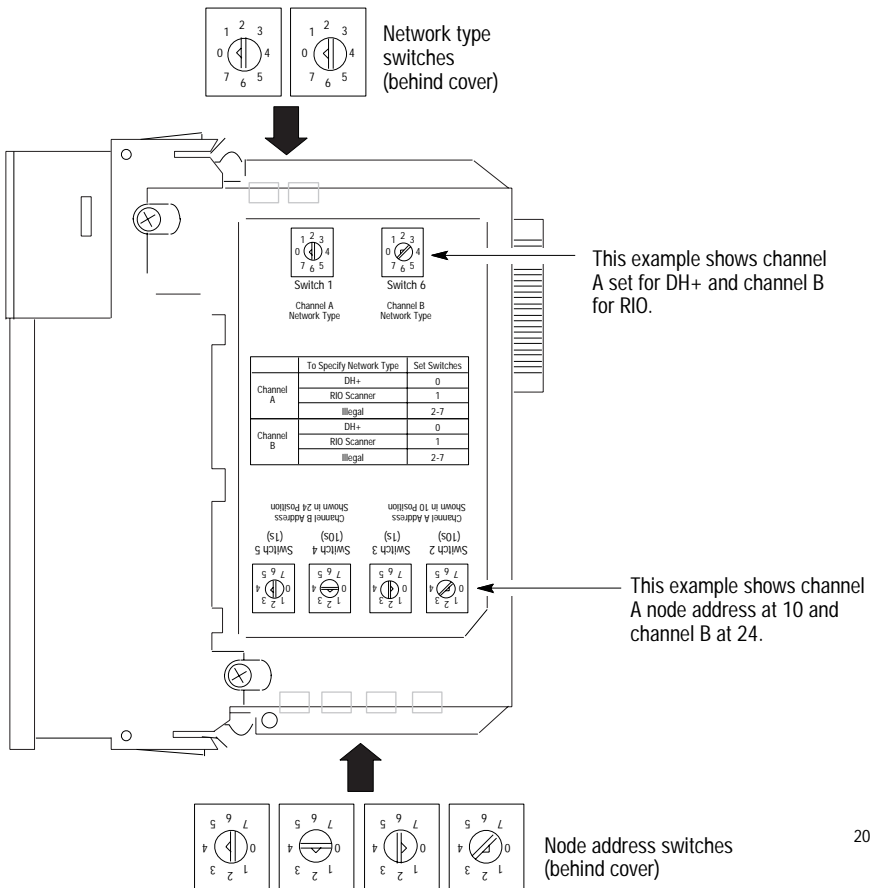


## Set the Network Type and Node Address Switches

Before you install the module, you must set the network type switches for each channel. If you the network type is DH+, you must also set the node address switches for that channel.

**Important:** You do not set node address switches if you are using remote I/O.

For each channel node address, you can select within the range of 00-77.



---

## Install or Remove the Module

You can install or remove the module while chassis power is applied.

---



**ATTENTION:** When you insert or remove a module while backplane power is on, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

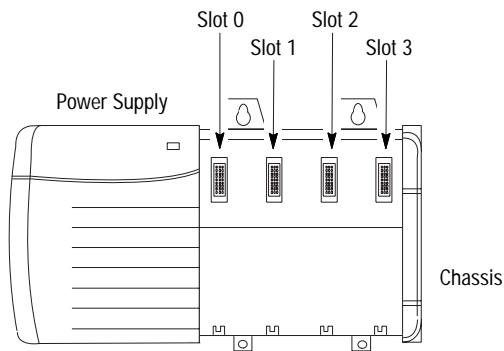
- sending an erroneous signal to your system's actuators causing unintended machine motion or loss of process control.
- causing an explosion in a hazardous environment.

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

---

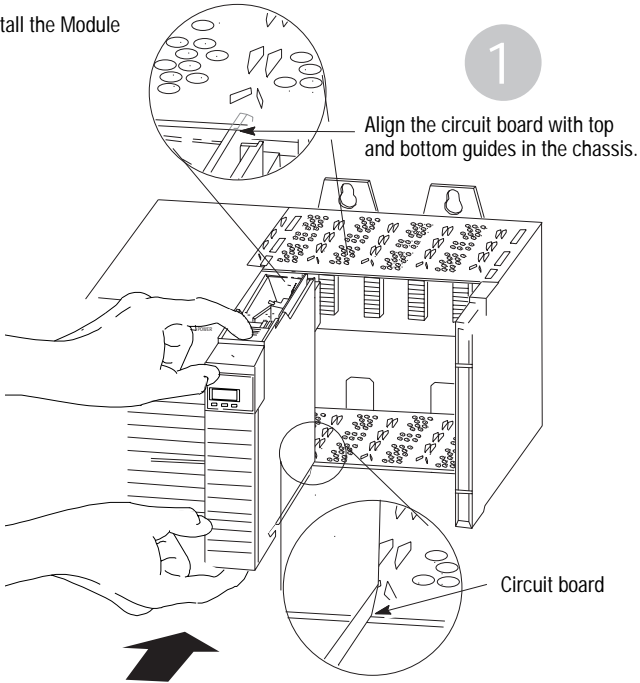
### Determine Module Slot Location

This example shows chassis slot numbering in a 4-slot chassis. Slot 0 is the first slot and is always the leftmost slot in the rack (the first slot to the right of the power supply). You can use any size ControlLogix chassis and install the module in any slot.



You can use multiple DHRIO modules in the same chassis.

Install the Module



2

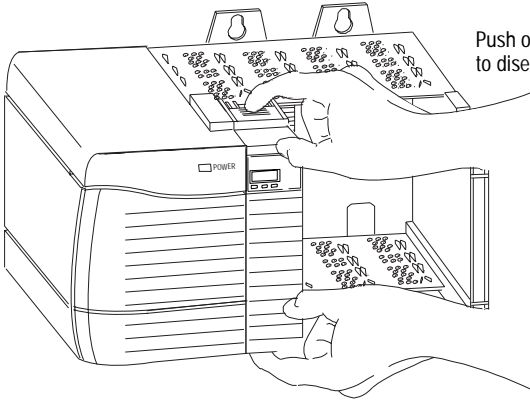
Slide the module into the chassis.  
Make sure the module backplane connector  
properly connects to the chassis backplane.

This diagram shows a hand sliding the module into the chassis. A circular inset shows the module's backplane connector connecting to the chassis backplane. A large black arrow points downwards from the bottom of the diagram.

3

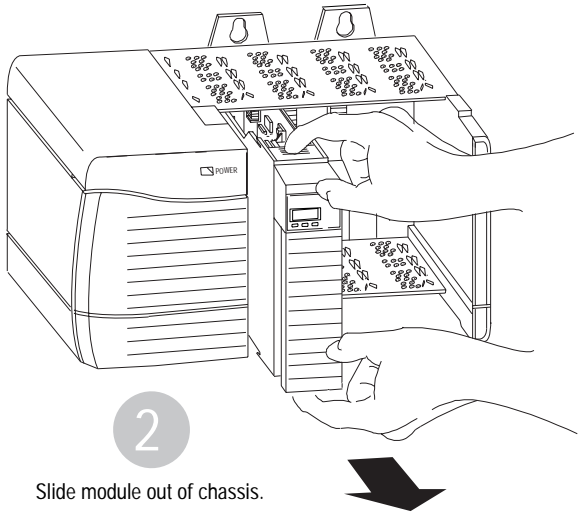
The module is properly installed  
when it is flush with the power  
supply or other installed modules.

This diagram shows the module fully installed in the chassis, flush with the other modules. A large black arrow points downwards from the bottom of the diagram.

**Remove or Replace the Module (when applicable)**

1

Push on upper and lower module tabs to disengage them.



2

Slide module out of chassis.

If you are replacing an existing module with an identical one, and you want to resume identical system operation, you must install the new module in the same slot.

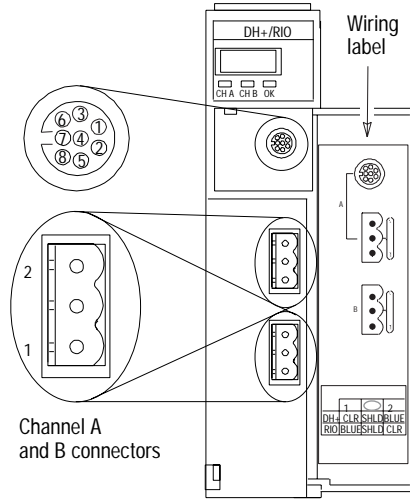


## Wire the Connectors for the Module Channels

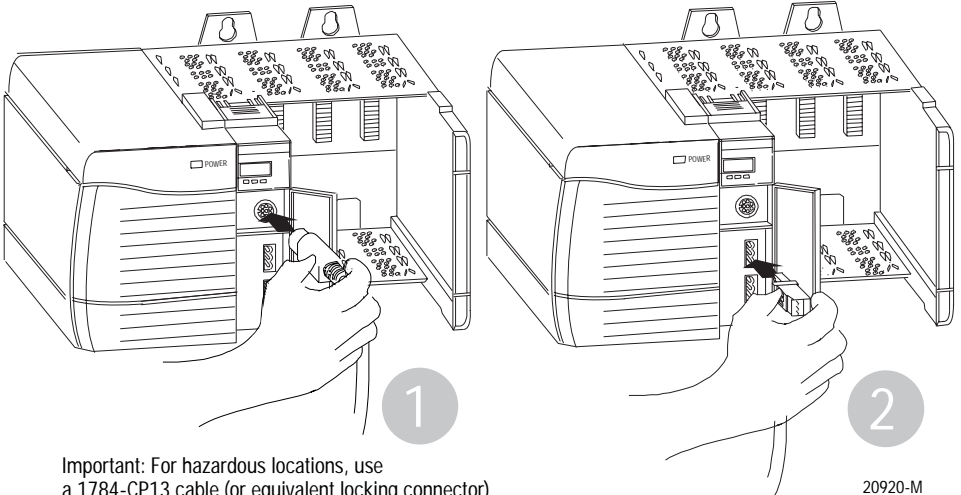
8-pin mini-DIN programming terminal connection parallel to channel A when channel A is configured for DH+ communications.

### Pin Assignments for Channel A and B Connectors

| DH+   |        | Remote I/O  |        |
|---|--------|---|--------|
| Pin no:   | Desc:  | Pin no:   | Desc:  |
| 1   | Clear  | 1   | Blue   |
|  | Shield |  | Shield |
| 2   | Blue   | 2   | Clear  |



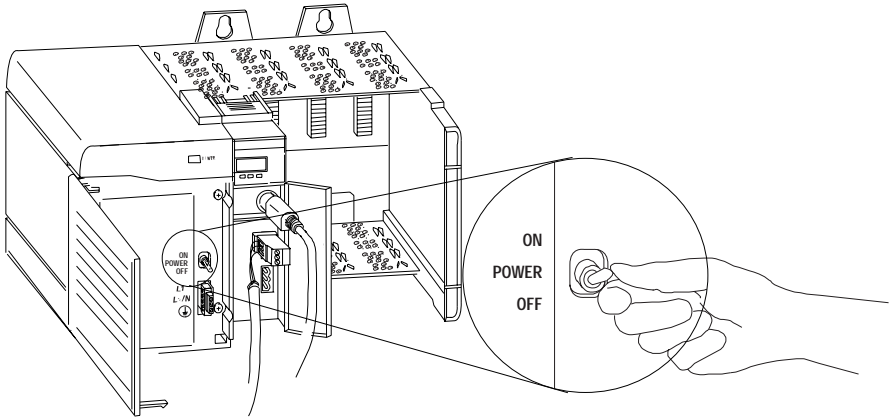
## Connect the Module to the Programming Terminal and Data Highway Plus or Remote I/O Network



Important: For hazardous locations, use a 1784-CP13 cable (or equivalent locking connector) for the programming terminal connection.

20920-M

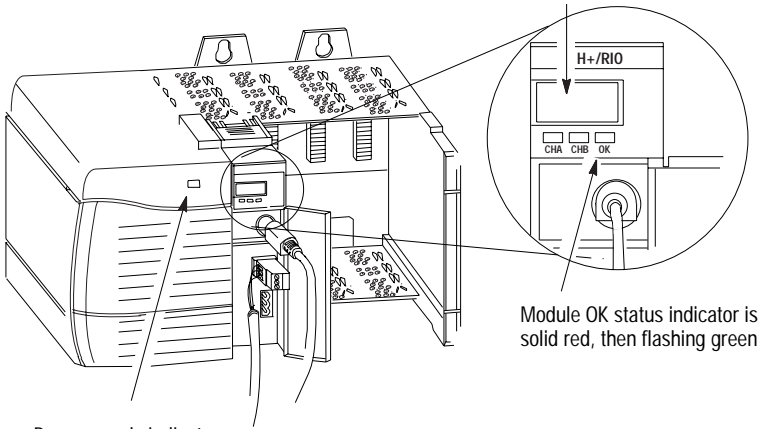
## Apply Chassis Power



20921-M

## Check Power Supply and Module Status

Alphanumeric status indicator illuminates and cycles through a sequence of messages (described in the following table).



Power supply indicator is green

20922-M

## Alphanumeric Indicator Powerup Messages

### Data Highway Plus

| Sequence of display: | Where:   |
|----------------------|--|
| A DH<br>A#xx<br>xxxx | A is the channel (A or B) and DH indicates network type is DH+<br>xx is the channel's node address<br>xxxx is the channel's status message |

### Remote I/O

| Sequence of display:     | Where:  |
|--------------------------|---|
| B IO<br><br>SCAN<br>xxxx | B is the channel (A or B) and IO indicates network type is Remote I/O<br>SCAN indicates scanner<br>xxxx is the channel's status message |

If, after powerup, the alphanumeric indicator does not start cycling (or if it stops cycling) through these messages, refer to the troubleshooting chapter of the *Data Highway Plus-Remote I/O Communication Interface User Manual*, publication 1756-6.5.14.

### Troubleshoot the Power Supply



For detailed troubleshooting information, refer to the troubleshooting chapter of your *Data Highway Plus-Remote I/O Communication Interface Module User Manual*, publication 1756-6.5.14.

**Power Supply Indicator**

| <b>If the POWER indicator is:</b> | <b>then power supply is:</b> | <b>take this action:</b>  |
|-----------------------------------|------------------------------|---|
| Off                               | Not operating.               | Turn power switch ON.<br>Check power wiring connections.<br>Check fuse. |
| On                                | Operating.                   | None, normal operation.   |

**Troubleshoot the Module**

**Alphanumeric Indicator Status Message**

| <b>If the alphanumeric indicator status message shows:</b> | <b>then the network status is:</b>   | <b>take this action:</b>   |
|--|--|--|
| <b>Data Highway Plus</b>                                   |  |  |
| OFF<br>LINE  | Data Highway Plus link is in STOP state.   | Correct configuration.<br>Refer to the configuration chapter of the Data Highway Plus-Remote I/O Communication Interface User Manual, publication 1756-6.5.14.   |
| DUPL<br>NODE   | Data Highway Plus Duplicate node address.  | Choose another node address and reset switches.  |
| ONLY<br>NODE   | Only node on Data Highway Plus link.   | Check cables.  |
| CNFG<br>FALT   | Incorrect Data Highway Plus routing table configuration.<br>Incorrect Data Highway object configuration. | Correct configuration.<br>Refer to the configuration chapter of the Data Highway Plus-Remote I/O Communication Interface User Manual, publication 1756-6.5.14.<br>Verify the module is inserted into the correct slot. |
| OK   | Normal operation for that channel.   | None.  |
| <b>Remote I/O</b>  |  |  |
| MUTE<br>LINK   | No adapters found on remote I/O.   | Add an adapter to the remote I/O network.  |
| RACK<br>OVER   | Rack overlap on remote I/O.  | Reconfigure remote I/O racks.  |
| DUPL<br>SCAN   | Duplicate scanner on remote I/O.   | Check remote I/O adapter settings.   |

| <b>Remote I/O</b> |   |   |
|-------------------|---|---|
| MAX_<br>DEV_      | Maximum devices exceeded on remote I/O. | Remove devices to meet limitations on remote I/O network.   |
| CHAT<br>LINK      | Babble detected on remote I/O.          | Check remote I/O device and network connections.  |
| OFF_<br>LINE      | Not trying to communicate.              | None. Normal state if controller is not controlling remote I/O. For more information, refer to the Data Highway Plus-Remote I/O Communication Interface User Manual, publication 1756-6.5.14. |
| OK                | Normal operation for that channel.      | None.   |

### Module Status - OK Indicator

| <b>If the OK indicator is:</b> | <b>then module status is:</b>  | <b>take this action:</b>   |
|--------------------------------|--|--|
| Off                            | Not operating.   | Apply chassis power.<br>Verify module is completely inserted into chassis and backplane.   |
| Green flashing                 | Operating but not routing messages and no controller transferring I/O. | None, if no messages are actively being routed through the module and no controller transferring I/O.<br>To route messages or transfer I/O, use module default configuration or configure module. Refer to the troubleshooting chapter of Data Highway Plus-Remote I/O Communication Interface User Manual, publication 1756-6.5.14. |
| Red, then Off                  | Performing self-test.  | None, normal operation.  |
| Green                          | Operating and routing messages.  | Verify module configuration.   |
| Red                            | In major fault   | Reboot module. If red reoccurs, then replace module.   |
| Red flashing                   | In major fault or configuration fault.                                 | Check alphanumeric indicator and take action described in alphanumeric indicator status message table on page 9.<br>For more information, refer to the troubleshooting chapter of the Data Highway Plus-Remote I/O Communication Interface User Manual, publication 1756-6.5.14.   |

Channel Status - Channel A and Channel B Indicators

| If the channel A or B indicator is: | in this channel mode: | then the channel status is:                                       | take this action:                                    |
|-------------------------------------|-----------------------|---|--|
| Off                                 | All                   | Not on line.  | Place channel on line.                               |
| Green                               | RIO scanner           | Active RIO link. All adapter modules are present and not faulted. | None, normal operation.                              |
|                                     | DH+                   | Operating.  | None, normal operation.                              |
| Green flashing                      | RIO scanner           | One or more nodes faulted or failed.                              | Check power at other racks.                          |
|                                     | DH+                   | No other node on the network.                                     | Check cables.  |
| Red                                 | All                   | Hardware fault.   | Reboot module. If red reoccurs, then replace module. |
| Red flashing                        | RIO scanner           | Faulted adapters detected.  | Check cables.<br>Check power at other racks.         |
|                                     | DH+                   | Duplicate node detected.  | Check node address.                                  |

**Configure the Data Highway Plus-Remote I/O Module**

Now that you have installed your Data Highway Plus-Remote I/O module, you must configure it. For configuration information, refer to the configuration chapter of your Data Highway Plus-Remote I/O Communication Interface Module User Manual, publication 1756-6.5.14.

## 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** and not by statements in any user documentation.

### Example CSA certification product label



CL I DIV 2  
GP A,B,C,D  
TEMP



12364-1

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 (i.e., Class I Division 2, Groups A, B, C, D), are certified for use in other equipment where the suitability of combination (i.e., 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.

### Temperature Code Rating



CL I DIV 2  
GP A,B,C,D  
TEMP



Look for temperature code rating here.

12365-1

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



### ATTENTION: 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.

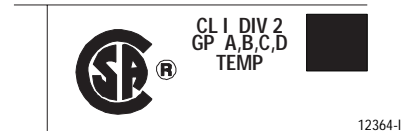
Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on an Allen-Bradley product using screws, sliding latches, threaded connectors, or other means such that any connection can withstand 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.

## 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 I, 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 I, Division 2, Groupes A, B, C, D) sont certifiés à l'utilisation pour d'autres équipements où la convenance 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 I, Division 2. Le taux du code de température est indiqué sur l'étiquette du produit.

### Taux du code de température



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 I, 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.



## Module Specifications

| Description   | Value   |
|---|---|
| Module Location   | ControlLogix chassis  |
| Maximum Backplane Current Load                                | 850mA @ +5.1V dc and 1.7mA @ 24 V dc from I/O chassis backplane   |
| Power Dissipation   | 4.5W maximum  |
| Thermal Dissipation   | 15.4 BTU/hr maximum   |
| Environmental Conditions:                                     |   |
| Operational Temperature                                       | 0-60°C (32-140°F)   |
| Storage Temperature   | -40 to 85°C (-40 to 185°F)  |
| Relative Humidity   | 5-95% without condensation  |
| Shock Unpackaged  | 30g operational<br>50g non-operational  |
| Vibration Unpackaged  | 2g from 10-150Hz  |
| Conductors     Wiring<br>Category                             | Belden 9463 twinaxial<br>2 <sup>1</sup>   |
| Agency Certification<br>(when product or packaging is marked) | <br> Class I Div 2 hazardous <sup>1</sup><br> marked for all applicable directives |
| User Manual   | Publication 1756-6.5.14   |
| 1   | Use this conductor category information for planning conductor routing as described in system level installation manual. Also refer to 1770-4.1, "Programmable Controller Wiring and Grounding Guidelines."   |

ControlLogix and Data Highway Plus are trademarks of the Allen-Bradley Company, Inc.



Rockwell Automation helps its customers receive a superior return on their investment by bringing together leading brands in industrial automation, creating a broad spectrum of easy-to-integrate products. These are supported by local technical resources available worldwide, a global network of system solutions providers, and the advanced technology resources of Rockwell.

**Worldwide representation.**



Argentina • Australia • Austria • Bahrain • Belgium • Bolivia • Brazil • Bulgaria • Canada • Chile • China, People's Republic of • Colombia • Costa Rica • Croatia • Cyprus • Czech Republic • Denmark • Dominican Republic • Ecuador • Egypt • El Salvador • Finland • France • Germany • Ghana • Greece • Guatemala • Honduras • Hong Kong • Hungary • Iceland • India • Indonesia • Iran • Ireland • Israel • Italy • Jamaica • Japan • Jordan • Korea • Kuwait • Lebanon • Macau • Malaysia • Malta • Mexico • Morocco • The Netherlands • New Zealand • Nigeria • Norway • Oman • Pakistan • Panama • Peru • Philippines • Poland • Portugal • Puerto Rico • Qatar • Romania • Russia • Saudi Arabia • Singapore • Slovakia • Slovenia • South Africa, Republic of • Spain • Sweden • Switzerland • Taiwan • Thailand • Trinidad • Tunisia • Turkey • United Arab Emirates • United Kingdom • United States • Uruguay • Venezuela

Rockwell Automation Headquarters, 1201 South Second Street, Milwaukee, WI 53204 USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444  
Rockwell Automation European Headquarters SAMV, avenue Hermann Debrouzsaan, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40  
Rockwell Automation Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication 1756-5.4 - July 1998

PN 955130-52

Supersedes Publication 1756-5.4 – August 1997

© 1998 Rockwell International. All Rights Reserved. Printed in USA