



## DC (10-60V) Output Module (Cat. No. 1771-OBD Series C)

### Contents

Use this document as a guide when installing the catalog number 1771-OBD series C output module.

To	See page
↓ Prevent Electrostatic Discharge	Below
↓ Understand Compliance to European Union Directives	2
↓ Determine Module Placement	2
↓ Important Pre-installation Considerations	3
↓ Calculate Power Requirements	3
↓ Key the Backplane Connector	3
↓ Install the Module and Field Wiring Arm	4
↓ Connect Wiring to the Field Wiring Arm	5
↓ Ground the Chassis and Module	8

For this reference information	See page
➡ Status Indicators	9
➡ Troubleshooting	9
➡ CSA Hazardous Location Approval	11
➡ Specifications	12

### Prevent Electrostatic Discharge

This output module is sensitive to electrostatic discharge. This module is shipped in static-shielded packaging to guard against electrostatic discharge damage. Observe the following precautions when handling this module.



**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 original static-shielded packaging

## Understand Compliance to European Union Directives

This product has the CE mark and 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
Industrial Automation Wiring and Grounding Guidelines For Noise Immunity	1770-4.1
Guidelines for Handling Lithium Batteries	AG-5.4
Automation Systems Catalog	B111

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

## Determine Module Placement in the I/O Chassis

You can place your module in any I/O module slot of the I/O chassis except for the extreme left slot. This slot is reserved for PC processors or adapter modules.



**ATTENTION:** Do not insert or remove modules from the I/O chassis while system power is ON. Failure to observe this rule could result in damage to module circuitry.

Group your modules to minimize adverse affects from radiated electrical noise and heat. We recommend the following.

- Group analog input and low voltage dc modules away from ac modules or high voltage dc modules to minimize electrical noise interference.
- Do not place this module in the same I/O group with a discrete high-density I/O module when using 2-slot addressing. This module uses a byte in both the input and output image tables for block transfer.

## Important Pre-installation Considerations

The 1771-OBD Series C module is compatible with all chassis **except** 1771-A1, 1771-A2, 1771-A4 chassis. Make sure no other output module or single slot block transfer module is placed in the same module group when using 2-slot addressing.

The 1771-OBD Series C module has 12 amp output capability. If you want to use this option, follow the procedures on page 7.

## Calculate Power Requirements

Your module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The module requires 130mA from the output of this supply. To calculate the requirements for the backplane power supply, add 130mA to the power requirements of all other modules in the I/O chassis. Calculating the requirements will prevent an overload to the chassis backplane and/or backplane power supply.

## Key the Backplane Connector

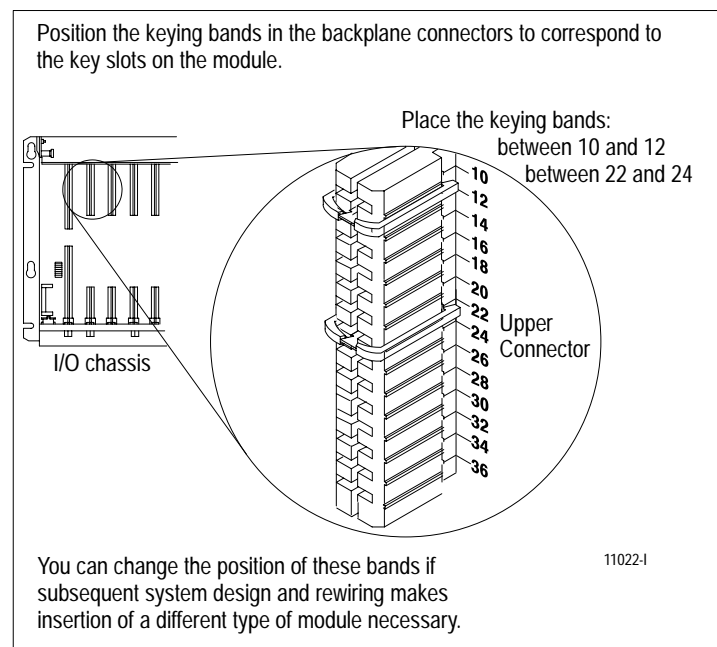
Place your module in any slot in the chassis except the leftmost slot which is reserved for processors or adapters.



**ATTENTION:** Observe the following precautions when inserting or removing keys:

- insert or remove keys with your fingers
- make sure that key placement is correct

Incorrect keying or the use of a tool can result in damage to the backplane connector and possible system faults.



# Allen-Bradley Motors

## Install the Module and Field Wiring Arm



**ATTENTION:** Remove power from the 1771 I/O chassis backplane before you install the module. Failure to remove power from the backplane could cause:

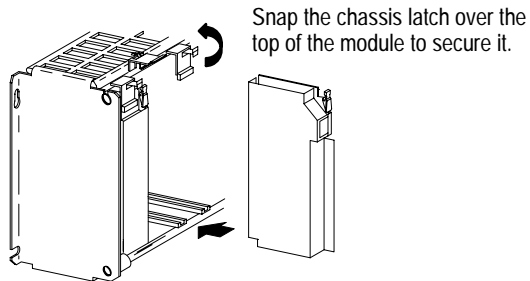
- module damage
- degradation of performance
- injury or equipment damage due to possible unexpected operation

### 1

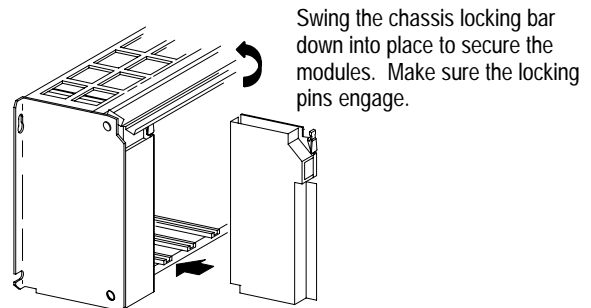
Place the module in the card guides on the top and bottom of the chassis that guide the module into position.

**Important:** Apply firm even pressure on the module to seat it into its backplane connector.

1771-A1B, -A2B, -A3B, -A4B I/O chassis



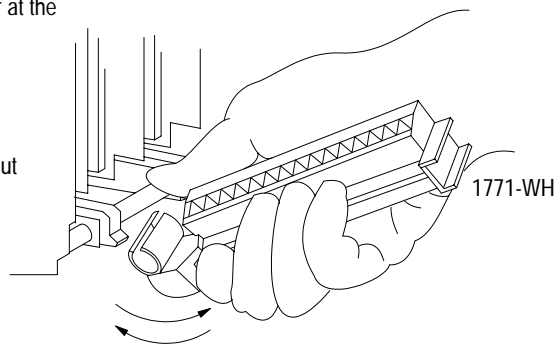
1771-A1B, -A2B, -A4B Series B I/O chassis



### 2

Attach the wiring arm (1771-WH) to the horizontal bar at the bottom of the I/O chassis.

The wiring arm pivots upward and connects with the module so you can install or remove the module without disconnecting the wires.



## Connect Wiring to the Field Wiring Arm

Connect your I/O devices to the field wiring arm (cat. no. 1771-WH) shipped with the module.



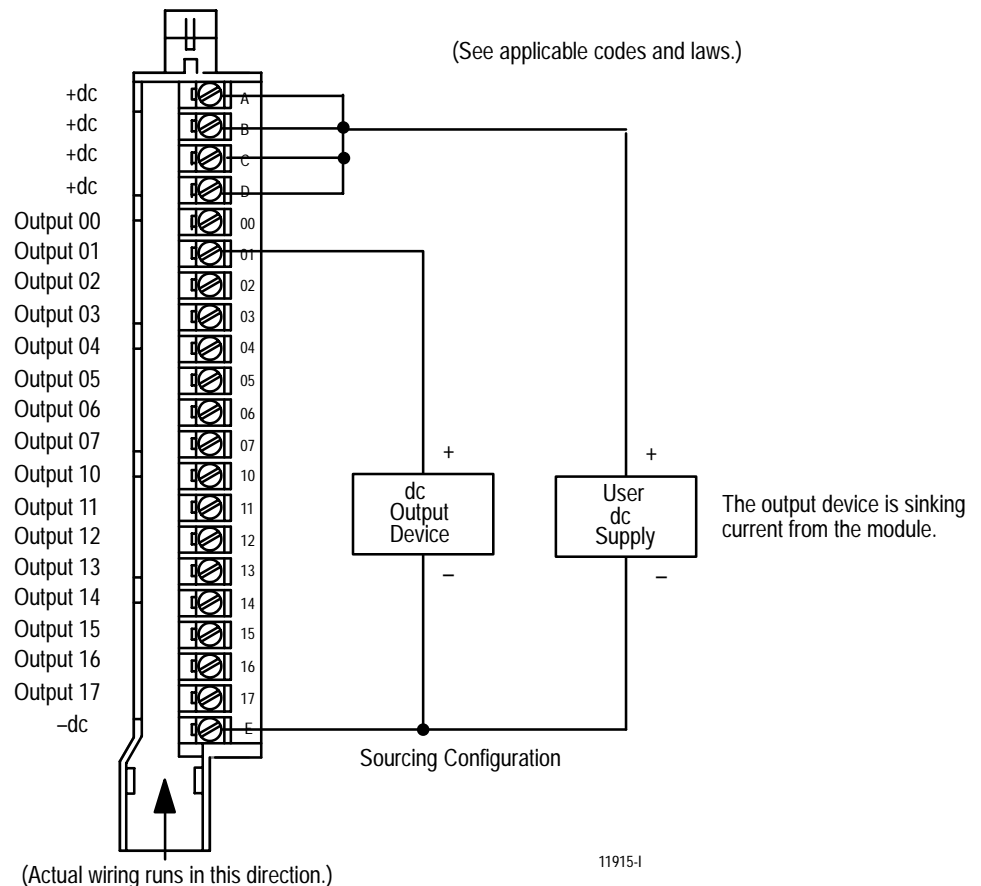
**ATTENTION:** Remove power from the 1771 I/O chassis backplane and field wiring arm before removing or installing an I/O module.

- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.



**ATTENTION:** Permanent damage to the module may occur in applications where frequent overload or short circuit conditions are possible. To prevent module damage where these conditions exist, use the optional 1771-WHF or 1771-WHFB fused field wiring arm instead of the 1771-WH field wiring arm shipped with the module.

### Connection Diagram



# Allen-Bradley Motors

You must supply dc at terminals A through D on the wiring arm. You need four dc connections to accommodate the total required surge rating on the module without overstressing any single connection on the field wiring arm. Jumper all dc connections together to prevent module damage. Connect terminal E to dc common.



**ATTENTION:** Observe proper polarity, as indicated in the connection diagram (above) with dc power connections. Reverse polarity, or application of ac voltage, could damage the module.

---

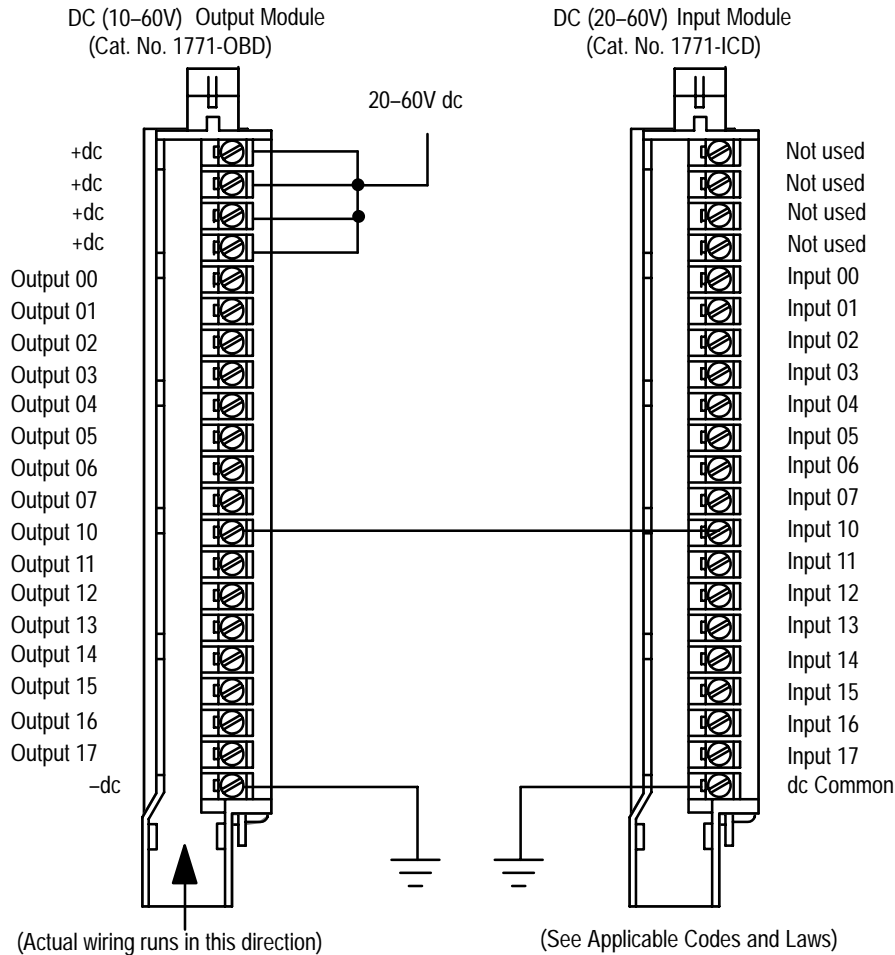
**Important:** You can use a DC (10–60V) Output Module (cat. no. 1771-OBD Series B) to directly drive terminals on the following modules:

- DC (5–30V) Input module (cat. no. 1771-IQ)
- DC (10–30V) Input module (cat. nos. 1771-IBD, -IBN)
- DC (20–60V) Input module (cat. no. 1771-ICD)
- DC (12–24V) Input module (cat. no. 1771-IB)
- DC (24V) Input module (cat. no. 1771-IQ16)
- DC (48V) Input module (cat. no. 1771-IC)

Refer to the illustration below for direct connection to a 1771-ICD input module.

**Important:** Use the same dc supply to power both modules to make sure that ground is at the same potential.

### Driving an Input Module with an Output Module



**Your module can drive a total of 12 amps. To use this capability, do the following:**

1. Provide external fusing which places a 3 amp fuse in series with each output channel. Do this by using the 1771-WHF fused wiring arm or a fused terminal block solution.
2. Replace your module's existing 10 amp, 250 volt rectifier fuse with a Littelfuse 15 amp, 250 volt fast blow fuse, part number 314015.



**ATTENTION:** To configure your module for the 12 amp option, you must use it in an application providing individually fused outputs according to the above procedures. The 15 amp fuse will limit total module current but it will not protect the output transistors.

# Allen-Bradley Motors

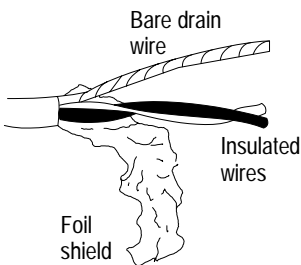
## Ground the Chassis and Module

Use the following diagrams to ground your I/O chassis and isolated analog input module. Follow these steps to prepare the cable:

- 1 Remove a length of cable jacket from the Belden 8761 cable.



- 2 Pull the foil shield and bare drain wire from the insulated wires.



- 3 Twist the foil shield and drain wire together to form a single strand.



- 4 Attach a ground lug.

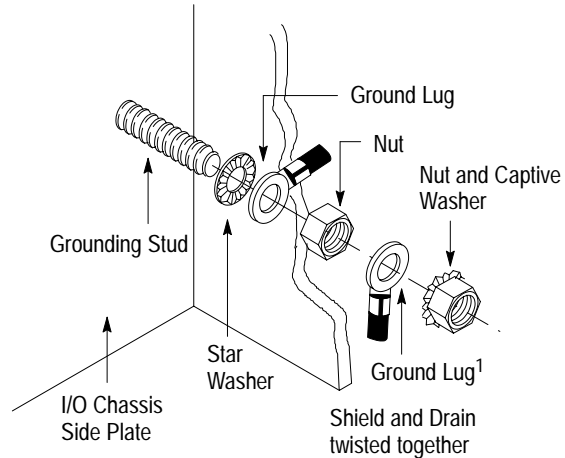


When using shielded cable wire, ground the foil shield and drain wire only at one end of the cable. We recommend that you wrap the foil shield and drain wire together and connect them to a chassis mounting bolt. At the opposite end of the cable, tape exposed shield and drain wire with electrical tape to insulate it from electrical contact.

Refer to Wiring and Grounding Guidelines, publication 1770-4.1 for additional information.

### Chassis Ground

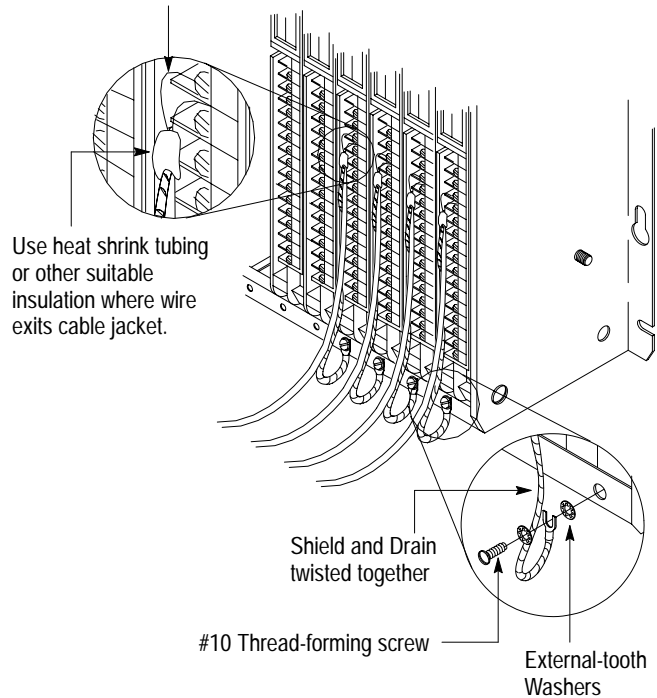
When you connect grounding conductors to the I/O chassis grounding stud, place a star washer under the first lug, then place a nut with captive lock washer on top of each ground lug.



<sup>1</sup>Use the cup washer if crimp-on lugs are not used.

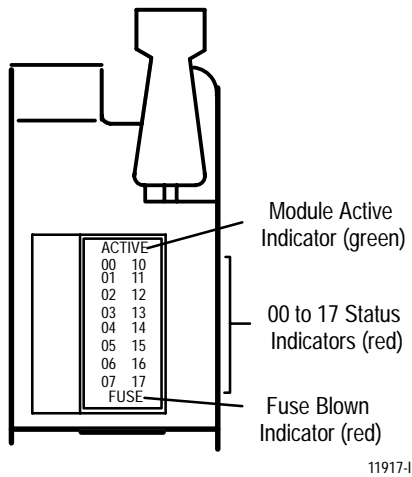
### Single-point Grounding

Extend shield to termination point. Expose just enough cable to adequately terminate inner conductors.





## Interpreting the Status Indicators



The front panel of your module contains one green module active indicator, 16 red status indicators and one red fuse blown indicator. The green module active indicator lights when the module is powered and the processor keyswitch is on “run”. The indicator light turns off when the processor resets the outputs.

The module active indicator must be on to properly interpret the red status indicators. The red status indicators are provided for indication of individual outputs. They indicate the state to which the transistor is commanded by the processor and are powered by circuitry within the module. The indicators will turn on and off as commanded by the processor. They do not indicate the presence or absence of dc power at an output terminal.

The fuse blown indicator turns on when the fuse is blown. When the fuse blown indicator is lit, check the fuse. After checking the fuse, make sure the field wiring arm is firmly in place. Do this before checking the status of the other indicators.

## Troubleshooting

Use this table to help you interpret the 1771-OBD status indicators and to troubleshoot module and system faults.

Indicator Status	Description of Fault or System Status	Action to Take
Module active ON (green)	Normal Indication.	None.
Module active ON (green) and Output status ON (red)	Check voltage at output point on swing arm.	If voltage is present, take no action. If no voltage is present, replace module.
Module active ON (green) and Output status OFF (red)	Output point not ON in data table.	None.
	Module failure.	Replace module.
Module active OFF and Output status ON (red) or OFF	1. Processor is in program mode. 2. Module not functioning properly.	1. None. 2. Check chassis power supply and processor. If they are OK, replace module.

# Allen-Bradley Motors

## Replacing the Fuse

An overload or short will cause the single onboard fuse to blow when the module output exceeds 10A. **The onboard fuse may not always protect individual output transistors.** To replace the onboard fuse, do the following:

1. Turn off all power to the I/O chassis and all output device power to the field wiring arm.



**ATTENTION:** Remove power from the 1771 I/O chassis backplane and wiring arm before removing or installing an I/O module.



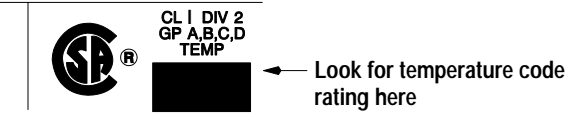
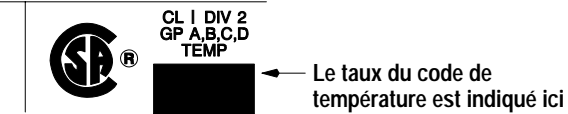


- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.

- 
2. Remove the module from the chassis and replace the blown fuse with a 10A, 250V rectifier fuse (1/4 x 1-1/4 inch), Littelfuse part number 322010. The fuse is accessible through the side of the module.



**ATTENTION:** Failure to use the specified replacement fuse may cause module damage, degradation of performance, or injury.

- 
3. Replace the module in the chassis and attach the field wiring arm.
  4. Turn system power ON.

CSA Hazardous Location Approval	Approbation d'utilisation dans des emplacements dangereux par la CSA
<p>CSA® certifies products for general use as well as for use in hazardous locations. <b>Actual CSA certification is indicated by the product label</b> as shown below, and not by statements in any user documentation.</p>	<p>La CSA® certifie les produits d'utilisation générale aussi bien que ceux qui s'utilisent dans des emplacements dangereux. <b>La certification CSA en vigueur est indiquée par l'étiquette du produit</b> et non par des affirmations dans la documentation à l'usage des utilisateurs.</p>
<p><b>Example of the CSA certification product label</b></p> 	<p><b>Exemple d'étiquette de certification d'un produit par la CSA</b></p> 
<p>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.</p> <ul style="list-style-type: none"> <li>This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only.</li> <li>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.</li> </ul>	<p>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.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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 convenance de combinaison (application ou utilisation) est déterminée par la CSA ou le bureau local d'inspection qualifié.</li> </ul>
<p><b>Important:</b> 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.</p>	<p><b>Important:</b> 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.</p>
<p><b>Temperature code rating</b></p>  <p>← Look for temperature code rating here</p>	<p><b>Taux du code de température</b></p>  <p>← Le taux du code de température est indiqué ici</p>
<p>The following warnings apply to products having CSA certification for use in hazardous locations.</p>	<p>Les avertissements suivants s'appliquent aux produits ayant la certification CSA pour leur utilisation dans des emplacements dangereux.</p>
 <p><b>ATTENTION:</b> Explosion hazard —</p> <ul style="list-style-type: none"> <li>Substitution of components may impair suitability for Class I, Division 2.</li> <li>Do not replace components unless power has been switched off or the area is known to be non-hazardous.</li> <li>Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.</li> <li>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.</li> </ul>	 <p><b>AVERTISSEMENT:</b> Risque d'explosion —</p> <ul style="list-style-type: none"> <li>La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2.</li> <li>Couper le courant ou s'assurer que l'emplacement est désigné non dangereux avant de remplacer les composants.</li> <li>Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.</li> <li>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.</li> </ul>

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.

CSA logo is a registered trademark of the Canadian Standards Association

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

# Allen-Bradley Motors

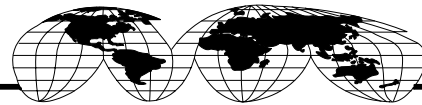
## Specifications

Outputs per Module	16
Module Location	All locations <b>except</b> 1771-A1, -A2, and -A4 I/O chassis
Output Voltage Range	10 to 60V dc
Minimum Load Current	2.5mA per output
Output Current Rating	2A per output - not to exceed 8A per module (except when using 12A option)
Surge Current (maximum)	4A per output for 10ms, repeatable every 2s 25A per module for 10ms, repeatable every 2s
On State Voltage Drop (max.)	0.3V dc at rated current
Off State Leakage Current (max.)	0.5mA per output
Signal Delay	0.1ms on or .2ms off
Power Dissipation	5.6 Watts (max.), 1 Watt (min.)
Thermal Dissipation	19.1 BTU/hr (max.), 3.4 BTU/hr (min.)
Backplane Current	130mA @ 5V dc $\pm$ 5%
Opto-electrical Isolation	1500V ac (rms)
Power Rating	0.6 Watt per output
Environmental Conditions	
Operational Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-40° to 85°C (-40° to 185°F)
Relative Humidity	5 to 95% (without condensation)
Conductors	Wire Size
	14 gauge (2mm <sup>2</sup> ) stranded maximum 3/64 inch (1.2mm) insulation maximum
	Category
	1 <sup>1</sup>
Keying	Between 10 and 12 Between 22 and 24
Fuse	10A, 250V rectifier fuse (1/4 x 1-1/4 inch). (For 12A capability, see page 7 for fuse specifications and additional requirements.)
Field Wiring Arm	Standard
	Optional Fused
	Catalog Number 1771-WH Catalog Number 1771-WHF, -WHFB
Wiring Arm Screw Torque	7-9 inch-pounds
Agency Certification (when product is marked)	<ul style="list-style-type: none"> <li>• CSA certified</li> <li>• CSA Class I, Division 2, Groups A, B, C, D certified</li> <li>• UL listed</li> <li>• CE marked for all applicable directives</li> </ul>

<sup>1</sup> Refer to publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines for Noise Immunity.



Allen-Bradley, a Rockwell Automation Business, has been helping its customers improve productivity and quality for more than 90 years. We design, manufacture and support a broad range of automation products worldwide. They include logic processors, power and motion control devices, operator interfaces, sensors and a variety of software. Rockwell is one of the world's leading technology companies.



## Worldwide representation.

Argentina • Australia • Austria • Bahrain • Belgium • Brazil • Bulgaria • Canada • Chile • China, PRC • Colombia • Costa Rica • Croatia • Cyprus • Czech Republic • Denmark • Ecuador • Egypt • El Salvador • Finland • France • Germany • Greece • Guatemala • Honduras • Hong Kong • Hungary • Iceland • India • Indonesia • Ireland • Israel • Italy • Jamaica • Japan • Jordan • Korea • Kuwait • Lebanon • Malaysia • Mexico • Netherlands • New Zealand • Norway • Pakistan • Peru • Philippines • Poland • Portugal • Puerto Rico • Qatar • Romania • Russia-CIS • Saudi Arabia • Singapore • Slovakia • Slovenia • South Africa, Republic • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • United Arab Emirates • United Kingdom • United States • Uruguay • Venezuela • Yugoslavia

Allen-Bradley Headquarters, 1201 South Second Street, Milwaukee, WI 53204 USA, Tel: (1) 414 382-2000 Fax: (1) 414 382-4444