



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

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

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### Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, Safety Guidelines for Application, Installation, and Maintenance of Solid-State Control (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard.

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**WARNING**

Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

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**ATTENTION**

Identifies information about practices or circumstances that may lead to personal injury or death, property damage, or economic loss.

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**IMPORTANT**

Identifies information that is critical for successful application and understanding of the product.

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**ATTENTION****Environment and Enclosure**

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664–1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as “open type” equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present, and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures. Also, see the appropriate sections in this publication, as well as the Allen–Bradley publication 1770–4.1, (“Industrial Automation Wiring and Grounding Guidelines”), for additional installation requirements pertaining to this equipment.

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**ATTENTION****Preventing Electrostatic Discharge**

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
  - Wear an approved grounding wriststrap.
  - Do not touch connectors or pins on component boards.
  - Do not touch circuit components inside the equipment.
  - If available, use a static-safe workstation.
  - When not in use, keep modules in appropriate static-safe packaging.
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**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.

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-OB D Series C module is compatible with all 1771 Universal I/O chassis **except** 1771-A1, 1771-A2, and 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.

**Calculate Power Requirements**

Your module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The module requires 400mA from the output of this supply. To calculate the requirements for the backplane power supply, add 400mA 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:

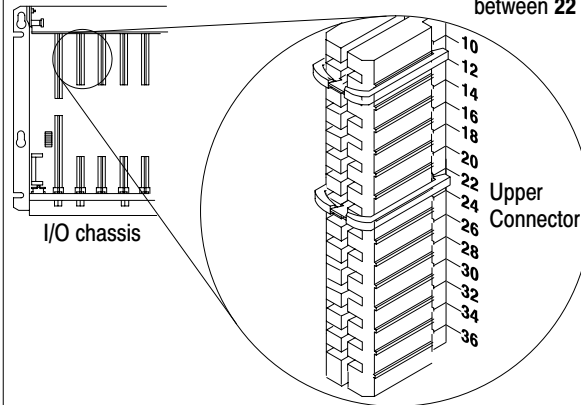


- insert or remove keys with your fingers
- make sure that key placement is correct

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

Position the keying bands in the backplane connectors to correspond to the key slots on the module.

Place the keying bands:  
between 10 and 12  
between 22 and 24



You can change the position of these bands if subsequent system design and rewiring makes insertion of a different type of module necessary.

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## Install the Module and Field Wiring Arm

### 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.

### WARNING



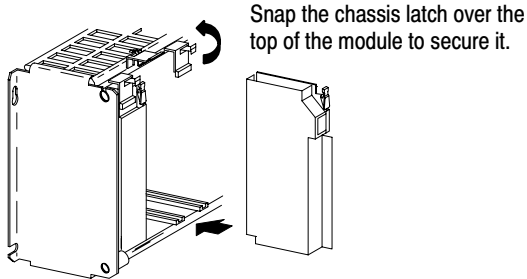
When you connect or disconnect the field wiring arm with field power applied, or remove the module while power is applied to the backplane, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure power is removed or the area is nonhazardous before proceeding.

# 1

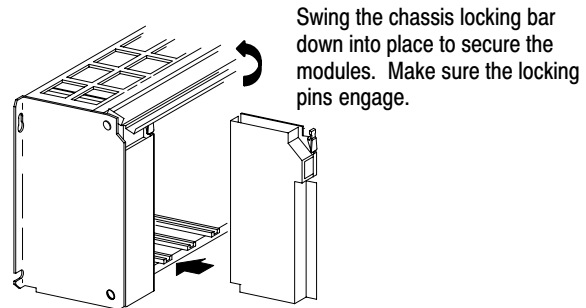
Place the module in the card guides on the top and bottom of the chassis that guide the module into position.

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

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



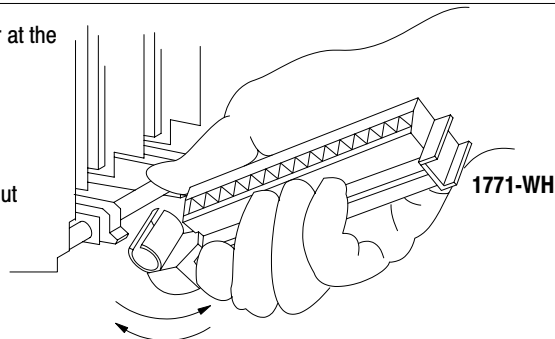
1771-A1B, -A2B, -A4B Series B I/O chassis



# 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.



The 1771–OBD module is a modular component of the 1771 I/O system requiring a properly installed system chassis. Refer to publication 1771–IN075 for detailed information on acceptable chassis and proper installation and grounding requirements. Limit the maximum adjacent slot power dissipation to 10W maximum.

## Connect Wiring to the Field Wiring Arm

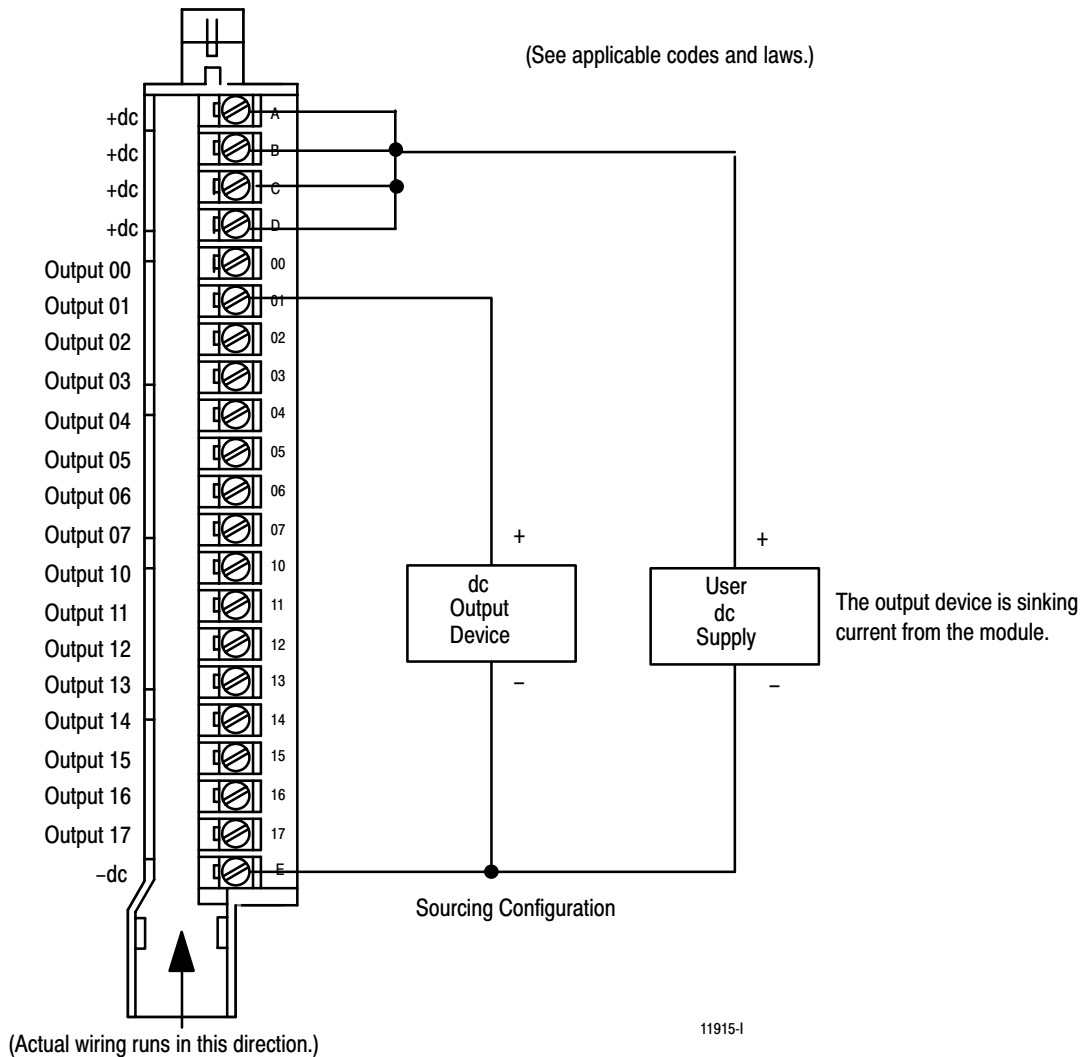
Connect your I/O devices to the field wiring arm (cat. no. 1771-WH) shipped with the module.

### WARNING



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. **Note that the optional 1771-WHF or 1771-WHFB fused field wiring arms are not certified for use in Class I, Division 2, Groups A, B, C and D environments.**

### Connection Diagram



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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.

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**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.

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**IMPORTANT**

You can use a DC (10–60V) Output Module (cat. no. 1771-OBD Series C) 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.

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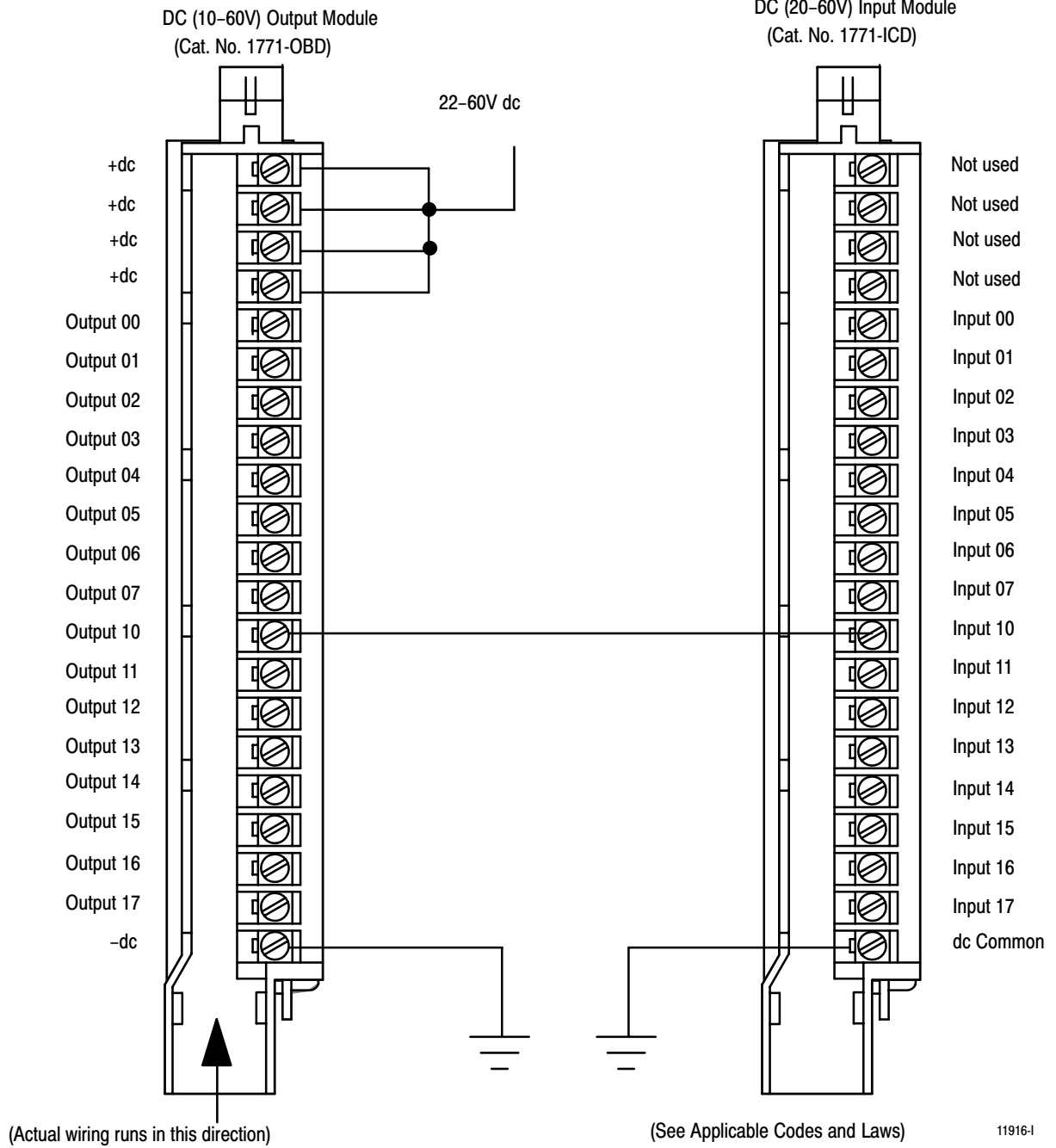
**IMPORTANT**

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

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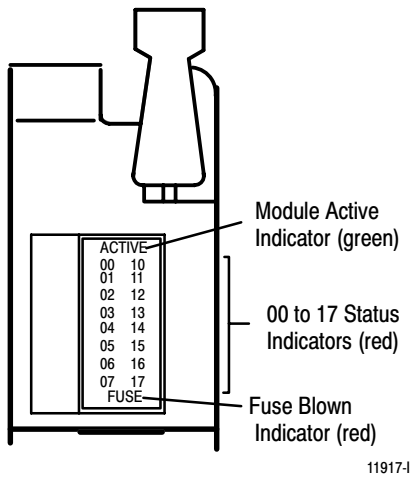


### Driving an Input Module with an Output Module



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## 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-OB 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.

## Replacing the Fuse

An overload or short will cause the single onboard fuse to blow when the module output exceeds 10A. **The onboard fuse does not protect the 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.

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**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.

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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.

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**ATTENTION**

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

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

## Hazardous Locations

### The following information applies when operating this equipment in hazardous locations:

Products marked “CL I, DIV 2, GP A, B, C, D” are suitable for use in Class I Division 2 Groups A, B, C, and D Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest “T” number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

#### WARNING



#### EXPLOSION HAZARD -

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

### Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués CL I, DIV 2, GP A, B, C, D ne conviennent que une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

#### AVERTISSEMENT



#### RISQUE D'EXPLOSION -

- 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 externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe 1, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

**Specifications – dc (10–60V) Output Module, Cat. No. 1771–OBD series C**

Outputs per module	16
Module Location	1771-A1B thru -A4B or later 1771 I/O Chassis (Do not use this module with 1771-A1 thru -A4 chassis.)
User Supply Voltage	10–60V dc
Current Rating (see Derating Curve)	2A per output resistive, not to exceed 8A per module 0.2A per output Pilot Duty
Maximum Surge Current	4A per output for 10ms, repeatable every 2s 25A per output for 10ms, repeatable every 2s
Minimum Load Current	2.5mA
Maximum On-state Voltage Drop (at rated current)	1.5V dc maximum
Maximum Off-state Leakage Current	0.5mA
Maximum Output Signal Delay	Off to On On to Off
	0.1ms 0.2ms
Power Dissipation	15.6W (max)
Thermal Dissipation	53.3 BTU/hr (max)
Isolation Voltage	Tested to withstand 1000V for 60s
Backplane Current	400mA maximum @ 5V DC
Environmental Conditions	
Operational Temperature	IEC 60068–2–1 (Test Ad, Operating Cold) IEC 60068–2–2 (Test Bd, Operating Dry Heat) IEC 60068–2–14 (Test Nb, Operating Thermal Shock) 32 to 140°F (0 to 60°C)
Storage Temperature	IEC 60068–2–1 (Test Ab, Unpackaged, Nonoperating Cold) IEC 60068–2–2 (Test Bb, Unpackaged, Nonoperating Dry Heat) IEC 60068–2–14 (Test Na, Unpackaged, Nonoperating Thermal Shock) –40 to 185°F (–40 to 85°C)
Relative Humidity	IEC 60068–2–30 (Test Db, Unpackaged, Nonoperating Damp Heat) 5 to 95% noncondensing
Shock	IEC 60068–2–27 (Test Ea, Unpackaged Shock)
Operating	30g
Nonoperating	50g
Vibration	IEC 60068–2–6 (Test Fc, Operating) 2g @ 10–500Hz
ESD Immunity	IEC 61000–4–2 4kV contact discharges
Radiated RF Immunity	IEC 61000–4–3 10V/m with 1kHz sine-wave 80% AM from 30MHz to 1000MHz
EFT/B Immunity	IEC 61000–4–4 ±1kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000–4–5 ±1kV line–line (DM) and +2kV line–earth (CM) on signal ports
Conducted RF Immunity	IEC 61000–4–6 10V rms with 1kHz sine wave 80% AM from 150kHz to 30MHz
Emissions	CISPR 11 Group 1, Class A (with appropriate enclosure)
Enclosure Type Rating	None (open style)

**Specifications – dc (10–60V) Output Module, Cat. No. 1771–OBD series C**

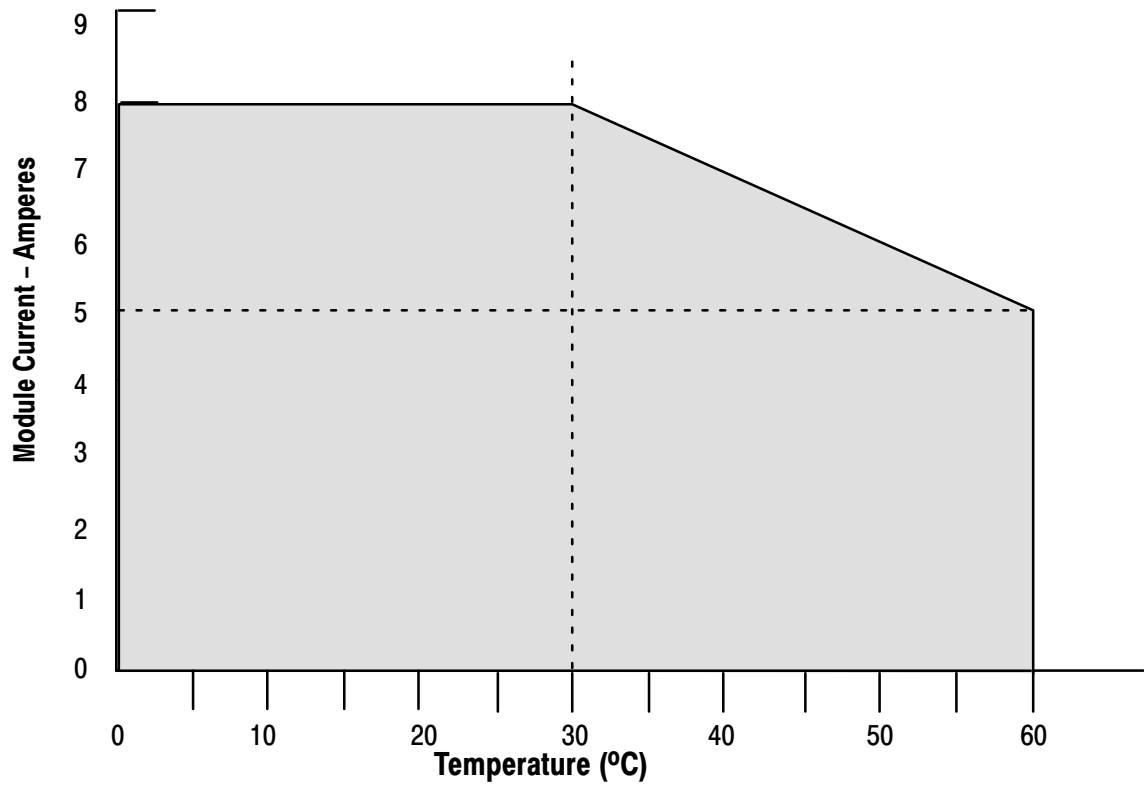
Keying	Between 10 and 12 Between 22 and 24
Fuse	10A, 250V rectifier fuse – Littelfuse pn 322010, IEC 127 Type FF, or black
Field Wiring Arm	Cat. No. 1771–WN (nonfused) Cat. No. 1771–WHF (3A fused) <sup>1</sup> Cat. No. 1771–WHFB (1.5A fused) <sup>1</sup>
Field Wiring Arm Screw Torque	9 pound–inches (1.0Nm)
Conductors	Wire Size 14 AWG (2.5mm <sup>2</sup> ) stranded copper wire rated at 120°C or greater 3/64 inch (1.2mm) insulation (max) Category 1 <sup>2</sup>
Certifications (when product is marked)	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2, Groups A, B, C and D Hazardous Locations CE <sup>3</sup> European Union 89/336/EEC EMC Directive, compliant with: EN 61000–6–4, Industrial Emissions EN 50082–2, Industrial Immunity EN 61326, Meas./Control/Lab., Industrial Requirements EN 61000–6–2, Industrial Immunity C–Tick <sup>3</sup> Australian Radiocommunications Act, compliant with AS/NZS 2064, Industrial Emissions

1 Not suitable for Class I Division 2 Groups A, B, C and D Hazardous Locations.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines."

3 See the Product Certification link at [www.ab.com](http://www.ab.com) for Declarations of Conformity, Certificates, and other certification details.

**Derating Curve for the 1771–OBD Series C**



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