



DC (10-40V) Current Limiting Output Module

Cat. No. 1771-OBDS

To The Installer

Use this document as a guide when installing the catalog number 1771-OBDS 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.

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.

ATTENTION

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

IMPORTANT

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

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.

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.

Pre-installation Considerations

This module must be used with a 1771-A1B thru -A4B or later I/O chassis. Make sure no other output module or single card block transfer module is placed in the same module group when using 2-slot addressing.

Calculate Power Requirements

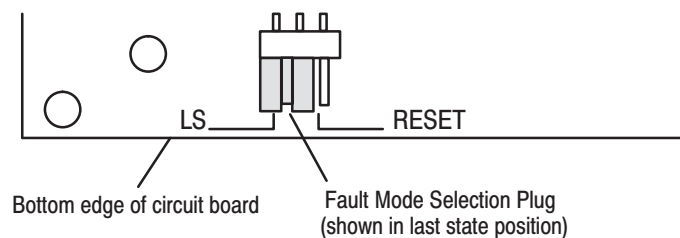
Your module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The module requires 300mA from the output of this supply. Add this to the requirements of all other modules in the I/O chassis to prevent overloading the chassis backplane and/or backplane power supply.

Set the Fault Mode Selection Jumper

You may select one of two input-failure configurations (last state or reset) by positioning a configuration plug on the bottom edge of the printed circuit board. This configuration plug is independent of the last state switch on the I/O chassis backplane.

To set the fault mode selection, proceed as follows:

1. Locate the fault mode selection plug at the bottom edge of the module circuit board.



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2. Using your finger, slide the plug off the two posts.
3. Carefully position the plug on two of the three posts that correspond to your requirement.

Key the Backplane Connector

ATTENTION



A module inserted into a wrong slot could be damaged by improper voltages connected through the wiring arm. Use keying bands to prevent damage to the module.

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

ATTENTION



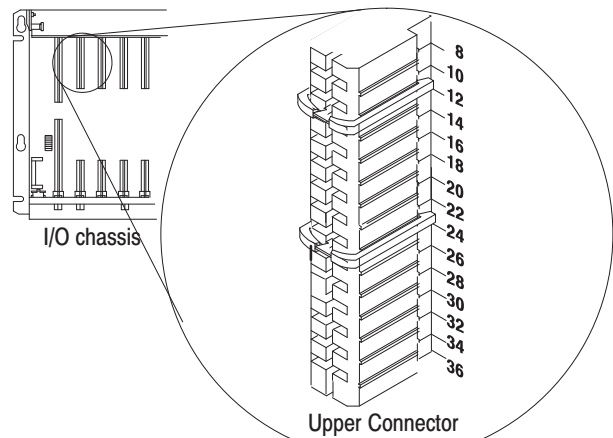
Observe the following precautions when inserting or removing keys:

- 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

WARNING



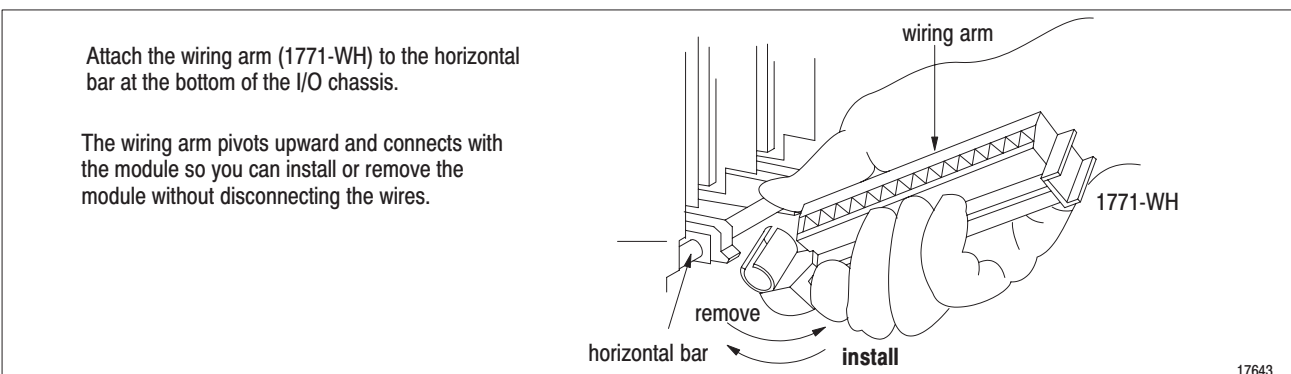
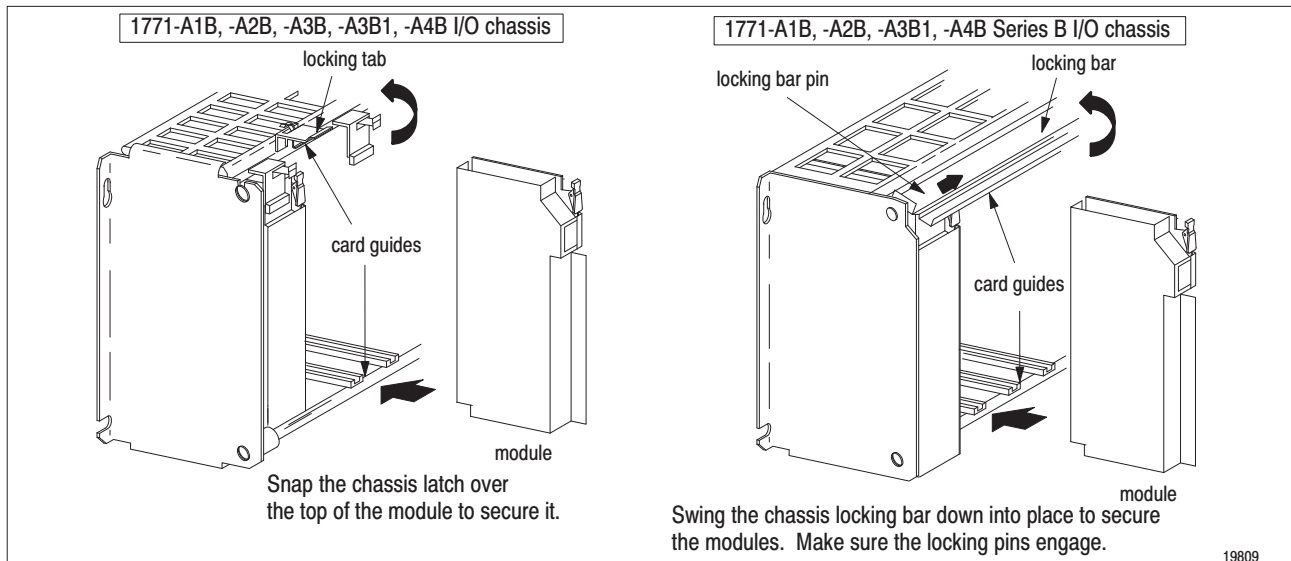
When you insert or remove the module while backplane power is on, or you connect or disconnect the wiring arm with field power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure power is removed or the area is nonhazardous before proceeding.

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.



The 1771-OBDS 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, proper installation and grounding requirements. Limit the maximum adjacent slot power dissipation to 10W maximum.

Connect Wiring to the Output Module

ATTENTION

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

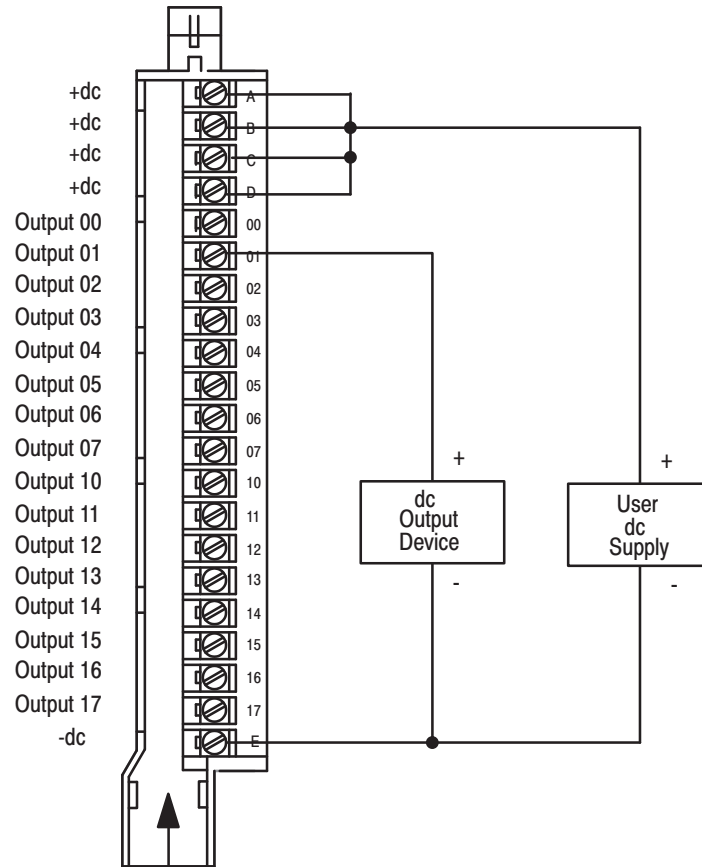
- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
 - Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.
-

Make wiring connections to the 21 terminal field wiring arm (cat. no. 1771-WH) shipped with the module.

Attach the wiring arm to the pivot bar on 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.

WARNING

When you insert or remove the module while backplane power is on, or you connect or disconnect the wiring arm with field power applied, 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.



Actual wiring runs in this direction.

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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.

ATTENTION



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

IMPORTANT

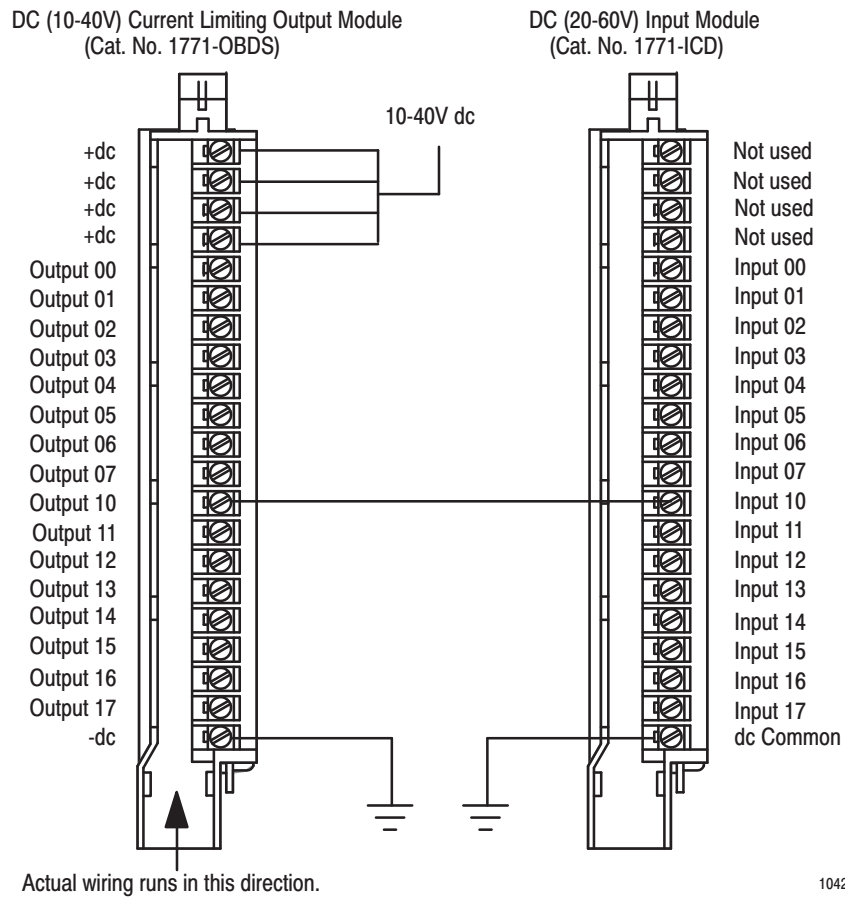
You can use a DC (10-40V) Output Module (cat. no. 1771-OBDS) to directly drive terminals on the following modules:

- DC (10-30V) Input module (cat. no. 1771-IBD)
- DC (20-60V) Input module (cat. no. 1771-ICD)
- DC (12-24V) Input module (cat. no. 1771-IB)

See below for direct connection to a 1771-ICD input module.

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

Driving an Input Module with an Output Module



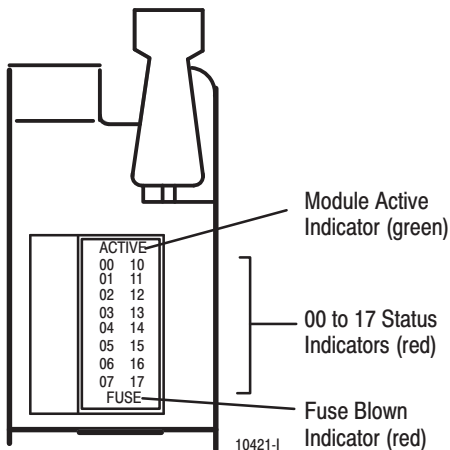
Short Circuit Protection

Each output of the module is capable of withstanding a short circuit condition. When an output is shorted, it will become "latched off," but its corresponding status indicator will remain lighted. Once the short circuit is removed from that output, the output image table bit for that output must be reset by "toggling" the bit off and then back on. This resumes normal operation. This toggling procedure can be done several ways, depending on your system setup:

- modifying the data table
- switching the programmable controller from RUN to PROGRAM mode, and back again
- cycling power to the system.

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, the processor keyswitch is on "run", and the opto-isolators and data paths are functioning properly. It turns off if a fault occurs in the data paths or the opto-isolators. The module then resets its outputs or sets them to last state.



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. However, all output status indicators will turn off if the fuse is blown.

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.

Replacing the Fuse

The individual output transistors are thermally protected against overcurrent or overtemperature conditions. However, a module overload may cause the single, replaceable onboard fuse to blow when the module output exceeds 12A. The onboard fuse is not intended to protect individual output transistors. You can replace the onboard fuse as outlined below.

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 the module.

- Failure to remove power from the backplane or field 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 12A, 250V rectifier fuse (1/4 x 1-1/4 inch), Bussman part number GBB12. The fuse is accessible through the side of the module.
 3. Replace the module in the chassis and attach the field wiring arm.
 4. Turn system power ON.

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.
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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

Outputs per Module	16
Module Location	1771-A1B, thru -A4B or later I/O chassis
Output Voltage Range	10 to 40V dc
Output Current Rating	1A per output - not to exceed 8A per module, Pilot duty. See derating curve below.
On State Voltage Drop (max.)	1.5V at rated current
Off State Leakage Current (max.)	0.5mA per output
Signal Delay	1.0ms
Off to On	1.0ms
On to Off	1.0ms
Power Dissipation	14 Watts (max.), 2 Watts (min.)
Power Dissipation – adjacent slot	10 Watts (max.)
Thermal Dissipation	47.8 BTU/hr (max.), 6.9 BTU/hr (min.)
Backplane Current	300mA @ 5V dc \pm 5%
Isolation Voltage	Tested to withstand 500V for 60s.
Conductors	14 AWG (2.5mm ²) stranded copper rated at 60°C or greater
Wire Size	3/64 inch (1.2mm) insulation (max)
Category	2 ¹
Environmental Conditions	
Operating 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 indirect 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 \pm 1kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5 \pm 1kV line-line (DM) and \pm 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)

Keying	Between 10 and 12 Between 22 and 24
Fuse	12A, 250V rectifier fuse (1/4 x 1-1/4 inch), Bussman GBB12, IEC 127 Type F (black)
Field Wiring Arm	Catalog Number 1771-WH
Wiring Arm Screw Torque	9 pound-inches (1.0Nm)
Agency Certification (when product is marked)	<ul style="list-style-type: none"> UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations CE² European Union 89/336/EEC EMC Directive, compliant with: EN 50082-2, Industrial Immunity EN 61236, Meas./Control/Lab., Industrial Requirements EN 61000-6-2, Industrial Immunity EN 61000-6-4, Industrial Emissions EEx² European Union 94/9/EEC ATEX Directive, compliant with: EN 50021, Potentially Explosive Atmospheres, Protection "n" C-Tick² Australian Radiocommunications Act, compliant with: AS/NZS 2064, Industrial Emissions

¹ You use this conductor category information for planning conductor routing as described in publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

² See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details

European Zone 2 Certification

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

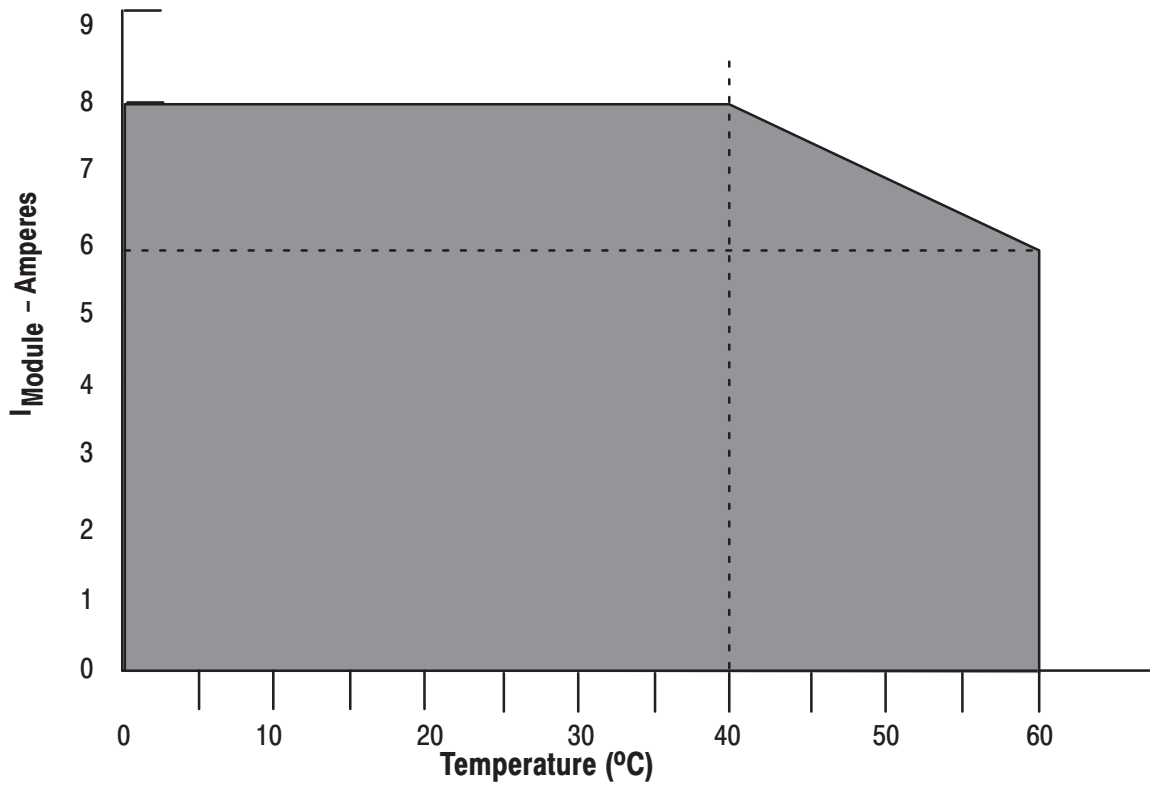
The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive. The examination and test results are recorded in confidential report No. 28 682 010.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021 (1999).

IMPORTANT

Observe the following additional Zone 2 certification requirements:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- The secondary of a current transformer shall not be open-circuited when applied in Class I, Zone 2 environments.
- Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Allen-Bradley.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments.

Derating Curve for the 1771-OBDS

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