



ac/dc (120V) Isolated Input Module

Cat. No. 1771-ID16 Series B

Contents

Use this document as a guide when installing the ac Isolated Input module.

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General Information

This module must be used in a series B or later 1771 I/O chassis. The 1771-ID16 is not compatible with the 1771-AL local I/O adapter.

This module contains customer-selectable input filtering to limit the effects of voltage transients caused by contact bounce and/or radiated electrical noise. The delay due to filtering is 9.0 or 18.0ms for turning ac inputs on to off, and 0.57ms for turning ac inputs off to on: 9.0ms for turning dc inputs on to off, and 0.57ms for turning dc inputs off to on. The filter time is factory set to 9.0ms.

The module is designed to operate with limit switches, float switches, selector switches, and pushbutton switches.

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.

Initial Handling

The isolated input module is shipped in a static-shielded packaging to guard against electrostatic discharge damage. Observe the following precautions when handling the module.

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.
-

Calculate Power Requirements

Your module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The module requires 75mA 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 Filter Time

The input module has 2 customer-selectable input filter time jumpers. Jumper JPR 1 sets the input filter time for inputs 00 through 07, and jumper JPR 2 sets the input filter time for inputs 10 through 17. These filter times apply when the input is cycling from ON to OFF. The OFF to ON filter time is fixed at 0.57ms. Refer to Table A for filter times and jumper settings.

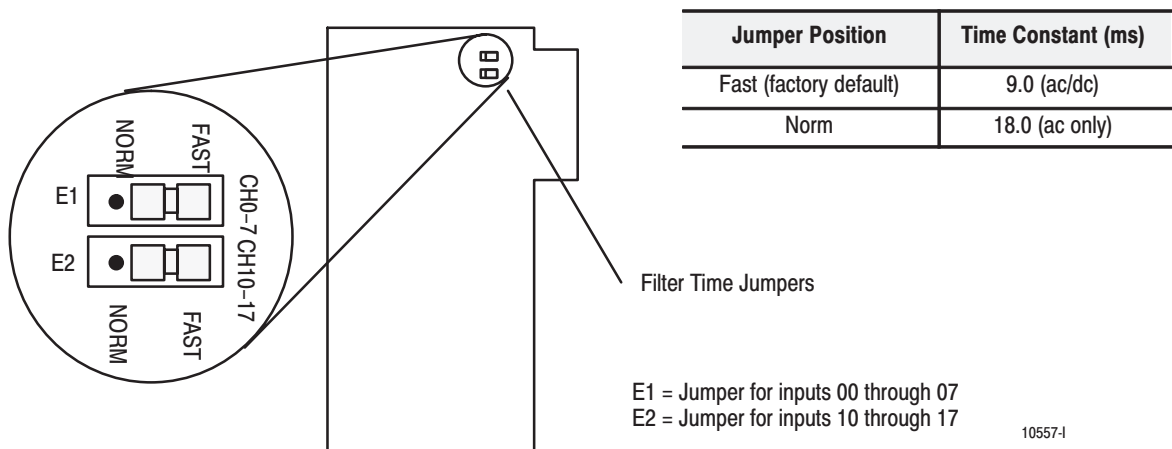
IMPORTANT

Half cycle dropout protection is dependent upon the position of the jumpers. With the jumpers at the 9.0ms position (Fast), half cycle protection may not be guaranteed. If half cycle dropout protection is required, position the jumpers in the 18.0ms position (Norm). Maximum and minimum filter times are shown in Table A.

To set the filtering time, proceed as follows:

1. Remove the side covers from the module circuit board by removing the four screws securing the covers to the module and remove the circuit board.
2. Position the jumpers as required to provide the filter time you require (see below). Use your fingers to pull the jumper up and position over the 2 pins corresponding to your selection (Fast or Norm).

Setting the Filter Time Jumpers



3. Reinstall the covers on the module circuit board and secure with 4 screws.

Table A
Minimum and Maximum Filter Times

Input Voltage	Filter Time (msec)	Off to On (ms)			On to Off (ms)		
		Minimum	Maximum	Typical	Minimum	Maximum	Typical
ac	9.0	0.5	7.0	2.0	7.0	33	20
ac	18.0	0.5	8.1	2.0	14.0	42	29
dc	9.0	0.7	2.2	1.3	8.3	25	13

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:

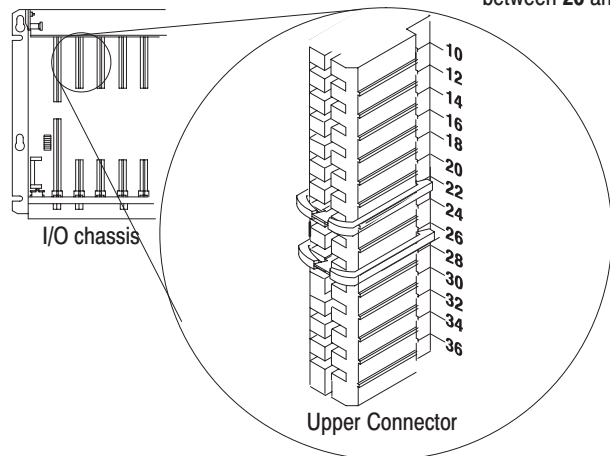


- insert or remove keys with your fingers
- make sure that key placement is correct

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 22 and 24
between 26 and 28



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



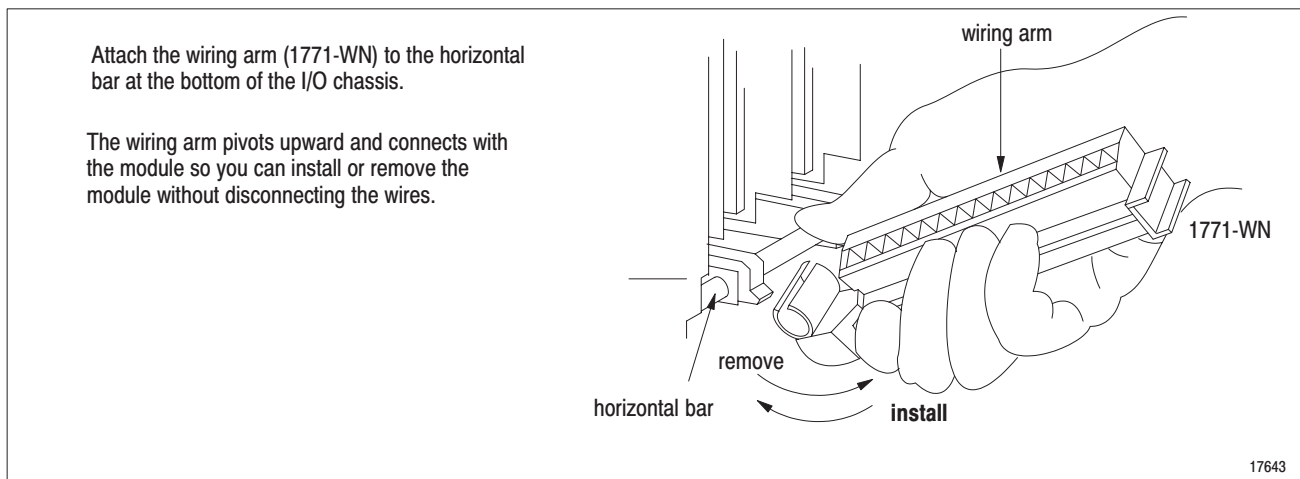
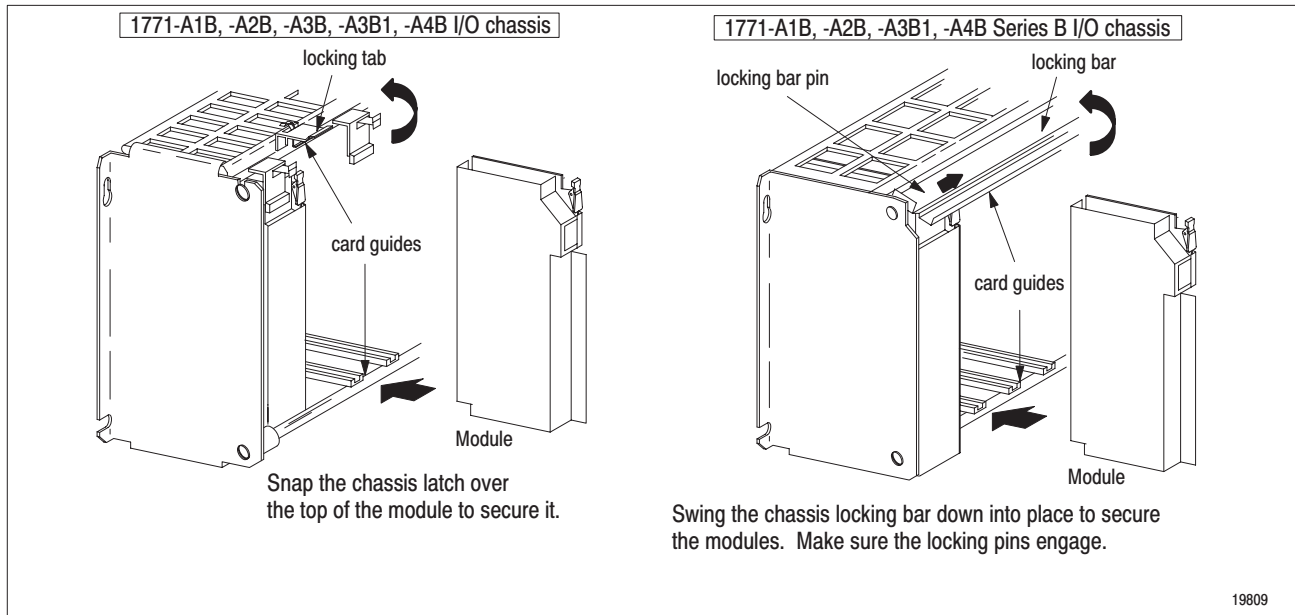
Remove power from the 1771 I/O chassis backplane before you install the module. Failure to remove power from the backplane could cause:

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

WARNING



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



The 1771-ID16/B 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 the Wiring to the Module

Connections to the input module are made to the 40 terminal field wiring arm (cat. no. 1771-WN) 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.

1. Make certain all power is removed from the module before making wiring connections.
2. Swing the wiring arm up into position on the front of the module. The locking tab on the module will secure it into place.

WARNING

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

Be sure that 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.
-

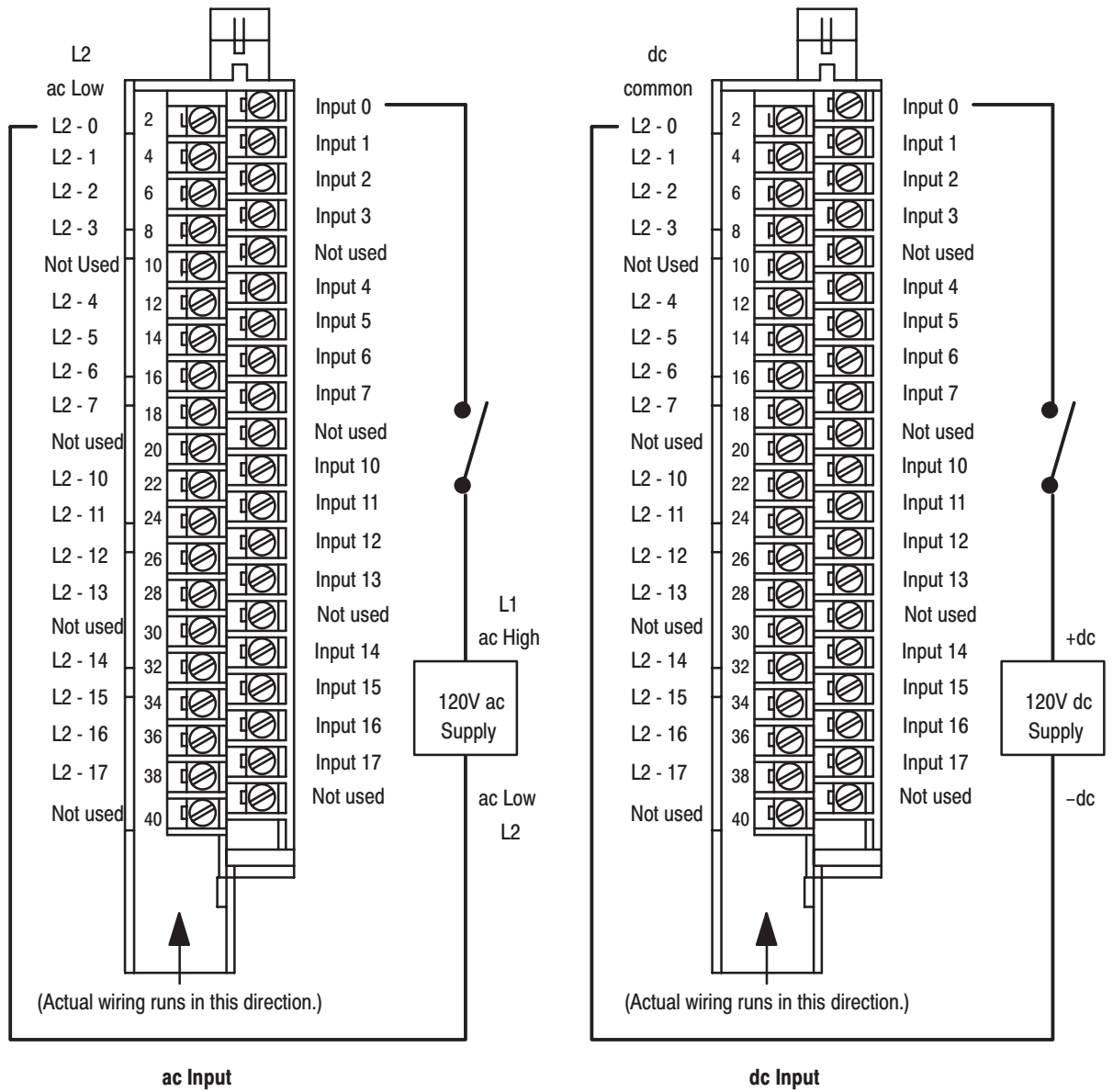
3. Make your connections to the field wiring arm as shown in the following figure. (Use the label on the front of the wiring arm to identify your wiring.)

Note: A shorting bar may be used to connect the commons if channel-to-channel isolation is **not** required.

IMPORTANT

The field wiring arm terminal identification number is not the same as the number of the bit which controls that output.

Figure 1
Connection Diagram for the 1771-ID16 ac/dc (120V) Isolated Input Module



ATTENTION

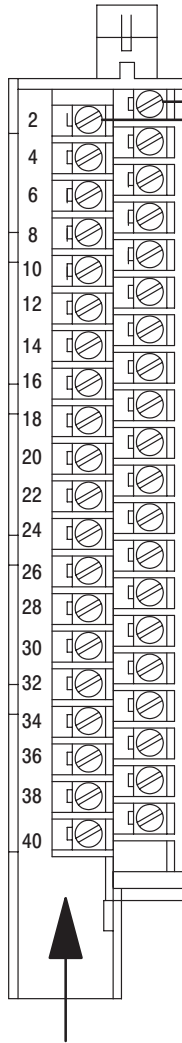
Maintain isolation between phases to prevent module damage.



IMPORTANT

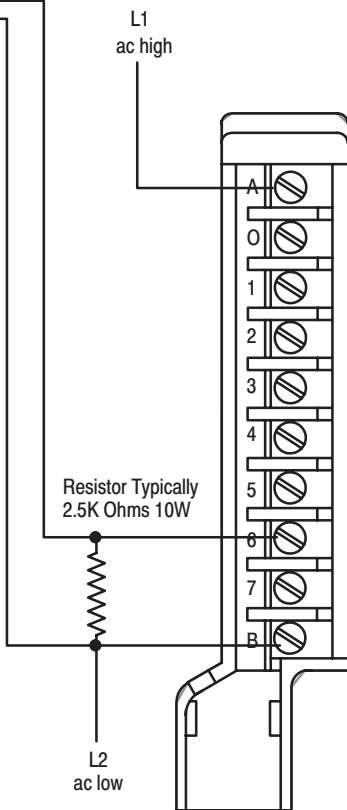
You can use an ac (120V) output module (cat. no. 1771-OA, 1771-OD or 1771-OP) to directly drive terminals on an ac/dc (120V) input module (cat. no. 1771-ID16), but you must use a 2.5K, 10W resistor between the output terminal and L2 (common) as shown in the following figure.

AC/DC (120V)
Isolated Input Module
(Cat. No. 1771-ID16)

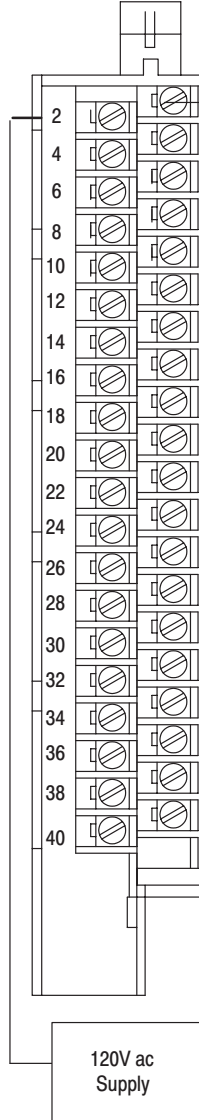


Actual wiring runs in this direction.

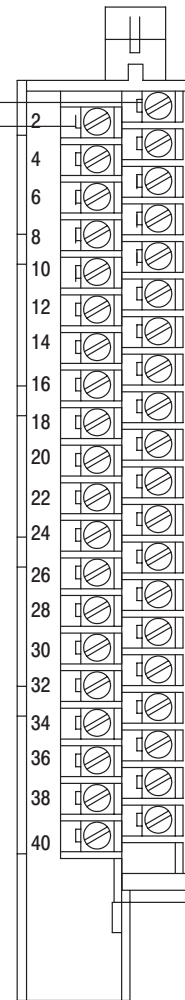
AC (120V) Output Module
(Cat. No. 1771-OA)



AC/DC (120V)
Isolated Input Module
(Cat. No. 1771-ID16)



AC (120V)
Isolated Output Module
(Cat. No. 1771-OD16)



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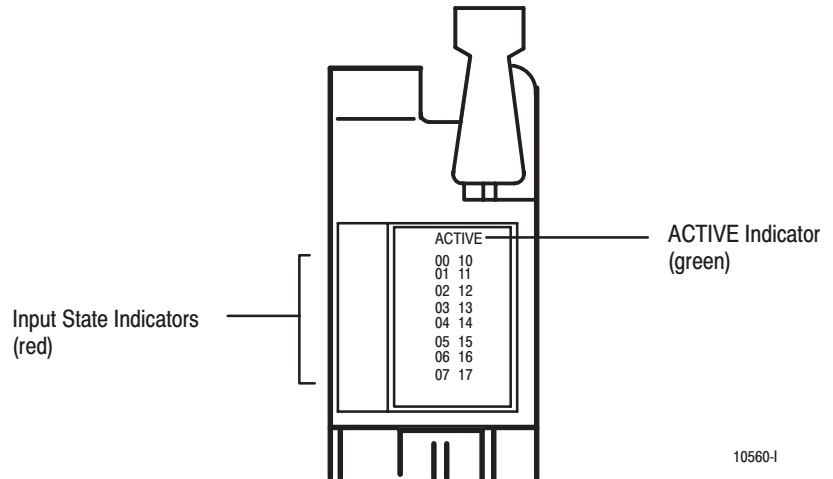
ATTENTION



Maintain isolation between phases to prevent module damage.

Interpreting the Status Indicators

The module has 17 indicators (below), consisting of 16 input status indicators and an active indicator. The 16 status indicators will light when the field load has been applied to the field wiring arm of the module.



The active indicator will light when the module has successfully started up and has initialized.

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.
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Specifications

Inputs per Module ¹	16
Module Location	1771-A1B thru -A4B or later I/O chassis 1771-AM1, -AM2 Chassis
Input Voltage Range	74–138V ac, 47–63Hz; 105–138V dc
Nominal Input Voltage	120V ac/dc
Nominal Input Current	120V ac: 12.4mA @ 50Hz; 14.9mA @ 60Hz 120V dc: 2.5mA
On-state Voltage (minimum)	74V ac; 105V dc
On-state Current (minimum)	6.0mA @ 74V ac, 47–63Hz 1.2mA @ 105V dc
Off-state Voltage (maximum)	45V ac; 66V dc
Off-state Current (minimum)	4.0mA @ 45V ac, 47–63Hz; 0.8mA @ 66V dc
Input Signal Delay	
Off to On	0.57ms for ac; 0.57ms for dc
On to Off	Selectable: 9ms or 18.0ms for ac; Fixed; 9ms for dc
Input Impedance (minimum)	ac: 9.3K ohms @ 47Hz; 6.9K ohms @ 63Hz dc: 75K ohms off; 48K ohms on
Power Dissipation	7.0 Watts (max.), 0.3 Watts (min.)
Thermal Dissipation	23.8 BTU/hr (max.), 1.0 BTU/hr (min.)
Backplane Current	75mA maximum
Isolation Voltage	Tested to 1500V ac channel-to-channel for 1s; 1500V ac channel to backplane for 1s
Maximum Cable Length	1000ft (304.8m)
Conductors	
Wire Size	Only 14 to 22 gauge (2.5mm ² to 0.25mm ²) stranded or solid copper rated at 60° or greater ^{1, 2}
Category	3/64 inch (1.2mm) insulation maximum ^{1 3}
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	
Operating	IEC 60068–2–27 (Test Ea, Unpackaged Shock) 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 10V/m with 200Hz 50% pulse 100% AM at 900MHz

Specifications continued on next page.

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)
Keying	Between 22 and 24 Between 26 and 28
Field Wiring Arm	1771-WN
Wiring Arm Screw Torque	9 pound-inches (1.0Nm)
Certifications (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 CE⁴ European Union 89/336/EEC EMC Directive, compliant with: <ul style="list-style-type: none"> 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-Tick⁴ Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> AS/NZS 2064, Industrial Emissions

¹ One or two 14-22 AWG solid or stranded copper wires per terminal. Must be same size. Do not intermix solid and stranded wires. Use copper wire only

² 14 gauge wire connected to all terminals may not allow the field wiring arm cover to close. A smaller wire size may be required.

³ Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines."

⁴ See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details

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Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846