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AC (120V) Input Module

Catalog Number 1771–IAN

Contents

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

Publication 1771–IN032B–EN–P – July 2002

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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.

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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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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

The 1771–IAN ac input module is a sink input and requires a source output. A sink input provides a path to ground and a source output provides a positive voltage path.

You must use this module in a series B 1771 I/O chassis. Refer to the table below for processor compatibility.

Processor Compatibility Chart

System Type	Use with Processors:
Local	Mini–PLC–2/02 (cat. no. 1772–LZ, –LZP) Mini–PLC–2/16 (cat. no. 1772–LX, –LXP) Mini–PLC–2/17 (cat. no. 1772–LW, –LWP) PLC–5/15, Series B and later (cat. no. 1785–LT)
Remote (with a 1771–ASB remote I/O adapter)	PLC–2/20 (cat. no. 1772–LP2) PLC–2/30 (cat. no. 1772–LP3) PLC–3 (cat. no. 1775–L1, –L2, –L3, –L4) PLC–3/10 (cat. no. 1775–LP4, –LP8) PLC–5/15, Series B and later (cat. no. 1785–LT)

WARNING



When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.

Do not place this module in the same I/O chassis as the 1771–IX thermocouple module. You can use this module in the same chassis as the 1771–IXE thermocouple module.

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This module is not compatible with 2–slot addressing. You must use 1–slot addressing with restrictions or 1/2–slot addressing with no restrictions.

This module has input filtering to limit the effect of voltage transients caused by contact bounce and/or electrical noise. Specifications for input filtering are listed in the specifications at the end of this document.

Calculate Power Supply Requirements

Your module receives its power for internal logic circuitry through the 1771 I/O chassis backplane from the chassis power supply. The module requires 280mA from the output of this supply. To calculate the requirements for the backplane power supply, add 280mA 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.

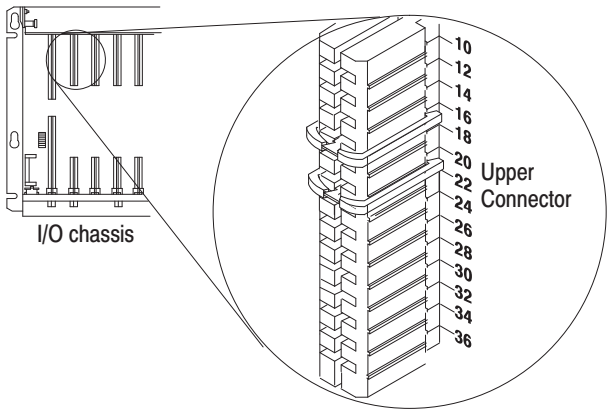
ATTENTION Observe the following precautions when inserting or removing keys:

- 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 16 and 18
between 20 and 22



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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



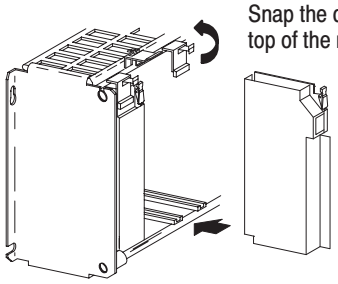
When you insert or remove the module with power applied, or connect or disconnect the field wiring arm with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding.

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

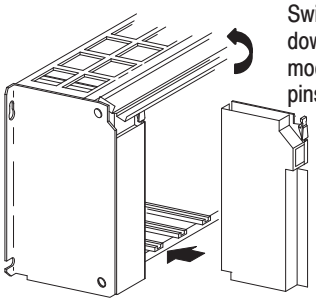
Important: Apply firm even pressure on the module to seat it into its backplane connector.

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



Snap the chassis latch over the top of the module to secure it.

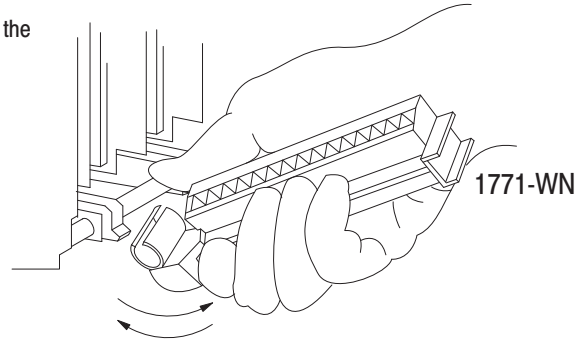
1771-A1B, -A2B, -A4B Series B I/O chassis



Swing the chassis locking bar down into place to secure the modules. Make sure the locking pins engage.

2 Attach the wiring arm (1771-WN) 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–IAN 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.

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Connecting Wiring to the Field Wiring Arm

You make connections to the module through the field wiring arm cat. no. 1771-WN. The arm pivots on the I/O chassis to connect with terminals on the front of the module and acts as a terminal strip. The wiring arm allows the module to be removed from the chassis without disconnecting wiring.

WARNING



When you connect or disconnect the field wiring arm with field power applied, or you insert 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.

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

IMPORTANT

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

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I/O Module Groups

Each module condenses 2 full module groups (32 inputs) into each I/O chassis slot. For example:

- Module group 1 = inputs 00 through 17
- Module group 2 = inputs 00 through 17 (module group 2 represents the second set of inputs).

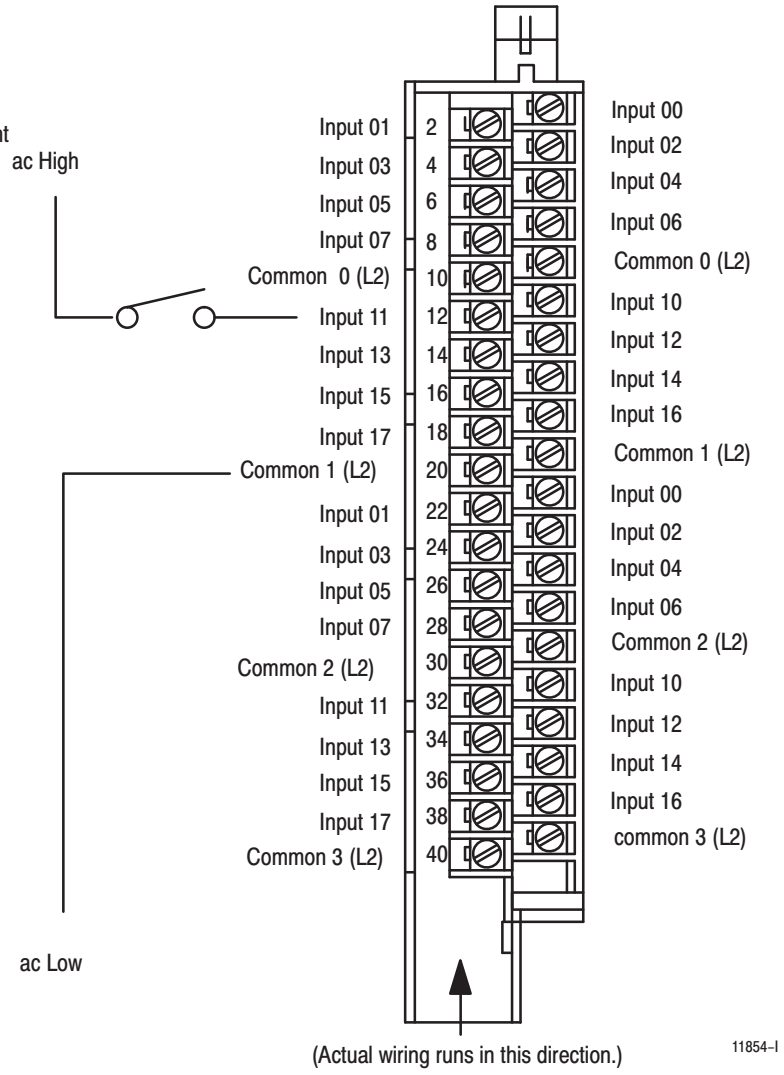
Terminals 1 through 20 represent module group 1, with terminals 9, 10, 19 and 20 ac low (L2). Terminals 21 through 40 represent module group 2, with terminals 29, 30, 39 and 40 ac low (L2).

Connection Diagram for the 1771–IAN ac Input Module

Note: Terminals on the left are even numbered (2 thru 40) , and terminals on the right are odd numbered (1 thru 39).

Module group 1 = inputs 00 through 17
Module group 2 = inputs 00 through 17 (module group 2 represents the second set of inputs.)

Terminals 1 through 20 represent module group 1,with terminals 9, 10, 19 and 20 ac low (L2). Terminals 21 through 40 represent module group 2, with terminals 29, 30, 39 and 40 ac low (L2).



If multiple power supplies are used, do not exceed the specified isolation voltage.

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Table A
Module Input Terminal Assignments

Terminal Number	Input Assignment	I/O program address	Terminal Number	Input Assignment	I/O program address
01	Input 00	1RG00	21	Input 00	1RG00
02	Input 01	1RG01	22	Input 01	1RG01
03	Input 02	1RG02	23	Input 02	1RG02
04	Input 03	1RG03	24	Input 03	1RG03
05	Input 04	1RG04	25	Input 04	1RG04
06	Input 05	1RG05	26	Input 05	1RG05
07	Input 06	1RG06	27	Input 06	1RG06
08	Input 07	1RG07	28	Input 07	1RG07
09	Common 0 (L2)[1]	–	29	Common 3 (L2)[1]	–
10	Common 0 (L2)[1]	–	30	Common 3 (L2)[1]	–
11	Input 10	1RG10	31	Not used	1RG10
12	Input 11	1RG11	32	Input 11	1RG11
13	Input 12	1RG12	33	Input 12	1RG12
14	Input 13	1RG13	34	Input 13	1RG13
15	Input 14	1RG14	35	Input 14	1RG14
16	Input 15	1RG15	36	Input 15	1RG15
17	Input 16	1RG16	37	Input 16	1RG16
18	Input 17	1RG17	38	Input 17	1RG17
19	Common 1 (L2)[1]	–	39	Common 4 (L2)[1]	–
20	Common 1 (L2)[1]	–	40	Common 4 (L2)[1]	–

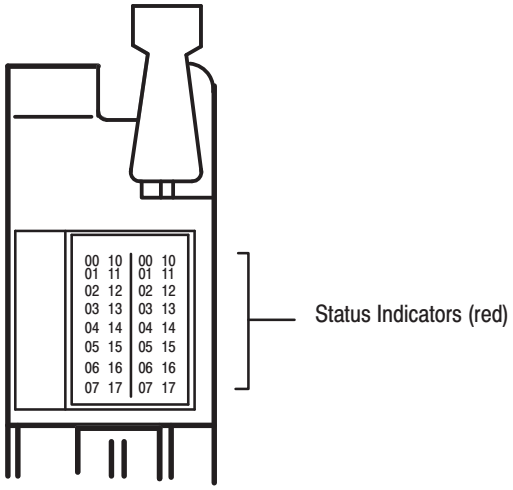
Where: R = rack number (1, 2, 3, etc.)
G = I/O group (0 – 7)

[1] You can connect a different power supply to each common (0,1,2 and 3). Terminals 09/10 are common for terminals 01 thru 08; 19/20 for 11 thru 18; 29/30 for 21 thru 28; 39/40 for 31 thru 38. If multiple power supplies are used, do not exceed the specified isolation voltage.

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Interpreting the Status Indicators

The module has 32 status indicators on the module front plate. These represent the control status of the inputs. Each indicator is lit when voltage is present at the corresponding input.



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 systéme, le code de température le plus défavorable (code de température le plus faible) peut eatre utilisé pour déterminer le code de température global du systéme. Les combinaisons d'equipements dans le systéme 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	32 (4 groups of 8)
Module Location	1771–A1B thru –A4B I/O Chassis
Voltage Range	85 to 135V ac, 50/60Hz
Nominal Input Voltage	120V ac
Nominal Input Current	8.2mA @ 115V ac, 60Hz 6.8mA @ 115V ac, 50Hz
Minimum On–state Current	5.2mA @ 85V ac, 60Hz 4.2mA @ 85V ac, 50Hz
Maximum Off–state Current	2.3mA @ 30V ac, 60Hz 1.9mA @ 30V ac, 50Hz
Maximum Off–state Voltage	30V ac
Input Impedance	0.2uF in parallel with 200K ohms (13.3K ohms @ 60Hz)
Input Signal Delay	Off to On: 10.0ms (+7ms) On to Off: 20.0ms (±15ms)
Isolation Voltage	Tested to withstand 1000V for 60s.
Power Dissipation	4.5W (max); 1.0W (min)
Thermal Dissipation	15.4 BTU/hr (max); 3.4 BTU/hr (min)
Backplane Current	280mA @ 5V dc maximum
Conductors Wire Size Category	14–22 AWG (2.5–0.25mm^2) (max)[1] stranded copper rated at 60° or greater 3/64 inch (1.2mm) insulation (max) 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 Operating Nonoperating	IEC 60068–2–27 (Test Ea, Unpackaged Shock) 30g 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 ±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

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Emissions	CISPR 11 Group 1, Class A (with appropriate enclosure)	
Enclosure Type Rating	None (open–style)	
Keying	Between 16 and 18 Between 20 and 22	
Field Wiring Arm	1771-WN	
Wiring Arm Screw Torque	9 pound–inches (1.0Nm)	
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 Group A, B, C, D Hazardous Locations
	CE[3]	European Union 89/336/EEC EMC Directive, compliant with: EN 61000–6–4, Industrial Emissions EN 50082–2, Industrial Immunity EN 61236, Meas./Control/Lab., Industrial Requirements EN 61000–6–2, Industrial Immunity European Union 73/736/EEC EMC Directive, compliant with: EN 61131–2, Programmable Controllers
	C–Tick[3]	Australian Radiocommunications Act, compliant with: AS/NZS 2064, Industrial Emissions

1 14 gauge wire connected to all terminals may not allow the cover on the field wiring arm to close. A smaller gauge wire may be used.
2 You use this conductor category information for planning conductor routing as described in publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.
3 See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details

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Publication 1771–IN032B–EN–P – July 2002 PN957678–76
Supersedes Publication 1771–5.32 – October 1995
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