DC (10–30V) Input Module

Cat. No. 1771-IBN Series C

Contents

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

Prevent Electrostatic Discharge

The input 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.

Important Pre-installation Considerations

The 1771-IBN Series C dc 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 1771-A1B through -A4B or later 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)

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.

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.

Initial Handling

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

Key the Backplane Connector

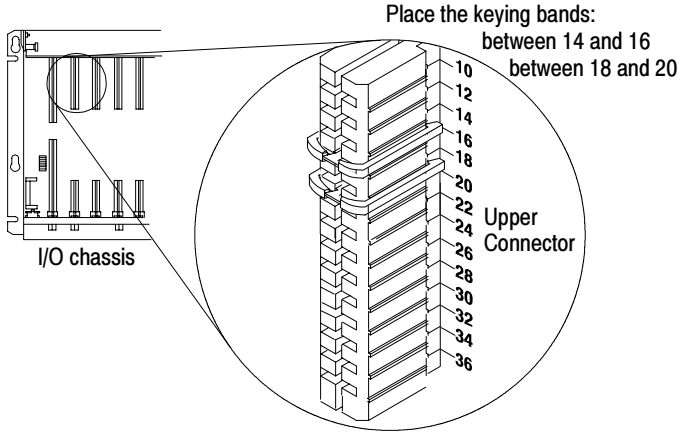
Place your module in any slot in the chassis except the leftmost slot which is reserved for processors or adapters.

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.



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

Install the Module and Field Wiring Arm

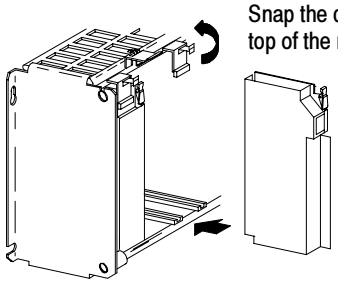
ATTENTION: Remove power from the 1771 I/O chassis backplane before you install the module. Failure to remove power from the backplane could cause:

- 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.

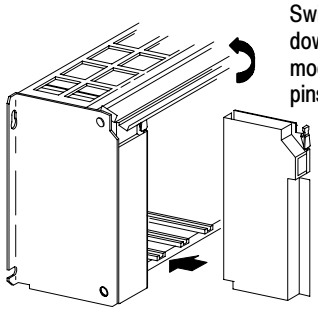
Important: Apply firm even pressure on the module to seat it into its backplane connector.

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



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

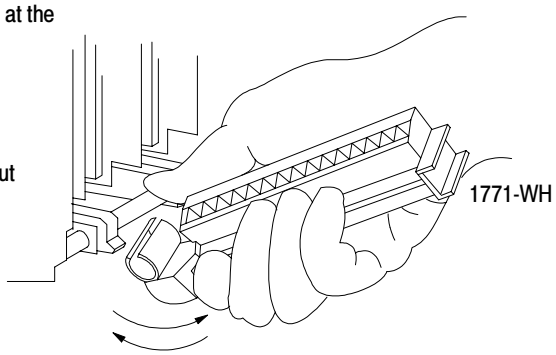
1771-A1B, -A2B, -A4B Series B I/O chassis



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.



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.

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.)

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

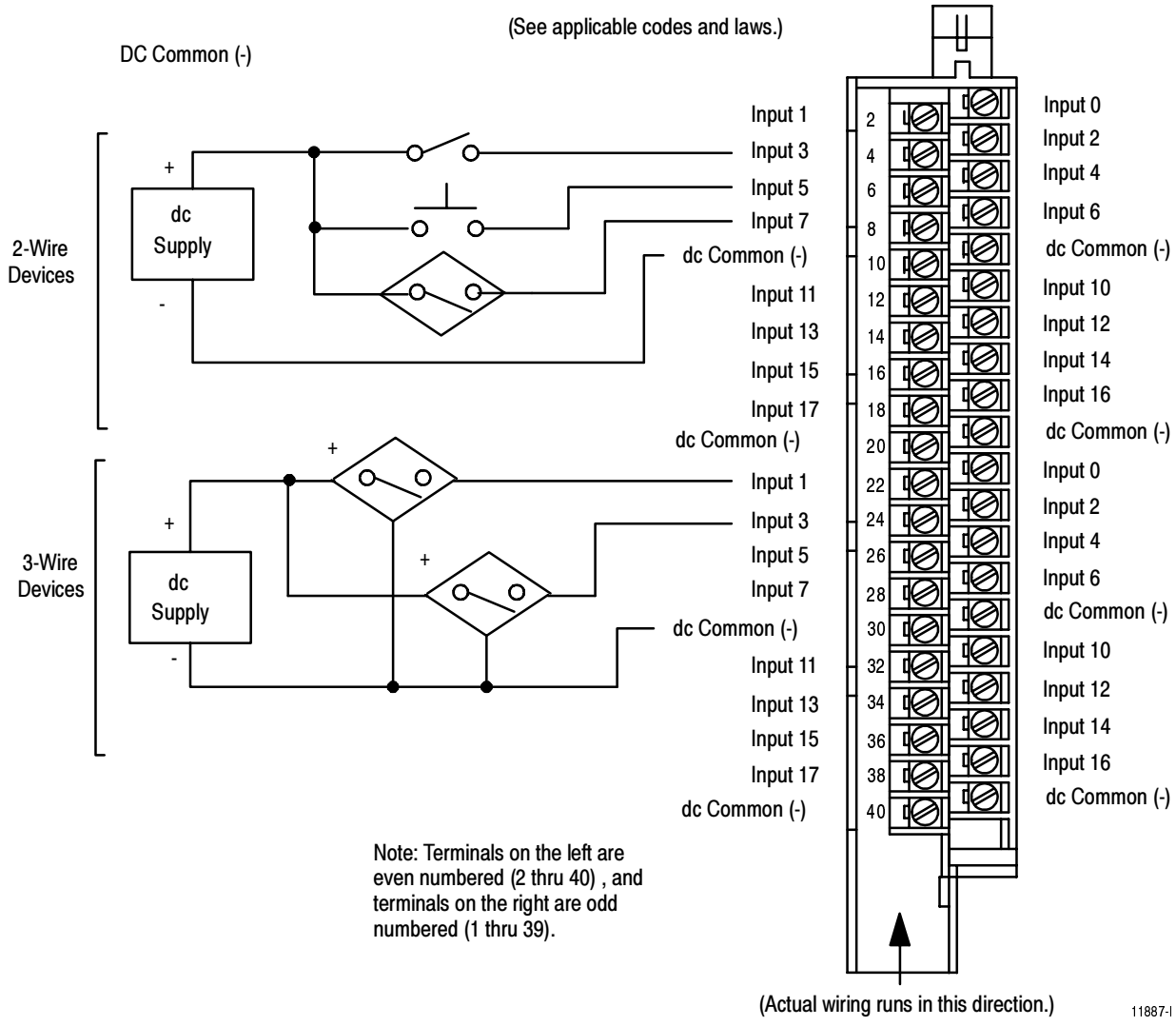
I/O Module Groups

Each module condenses two 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).

In the figure below, terminals 1 through 20 represent module group 1, with terminals 9, 10, 19 and 20 dc common. Terminals 21 through 40 represent module group 2, with terminals 29, 30, 39 and 40 dc common.

Connection Diagram for the 1771-IBN DC Input Module



ATTENTION: Observe proper polarity with dc power connections. Reverse polarity, or application of ac voltage could damage the module.

Table A Table A.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	[1] dc Common 0 (-)	-	29	[1] dc Common 2 (-)	-
10	dc Common 0 (-)	-	30	dc Common 2 (-)	-
11	Input 10	1RG10	31	Input 10	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	[1] dc Common 1 (-)	-	39	[1] dc Common 3 (-)	-
20	dc Common 1 (-)	-	40	dc Common 3 (-)	-

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

1 You can connect a different power supply to each DC 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.

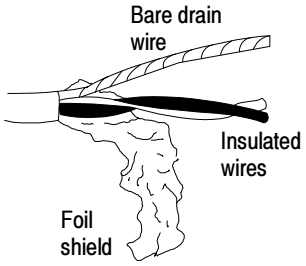
Ground the Chassis and Module

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.

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.

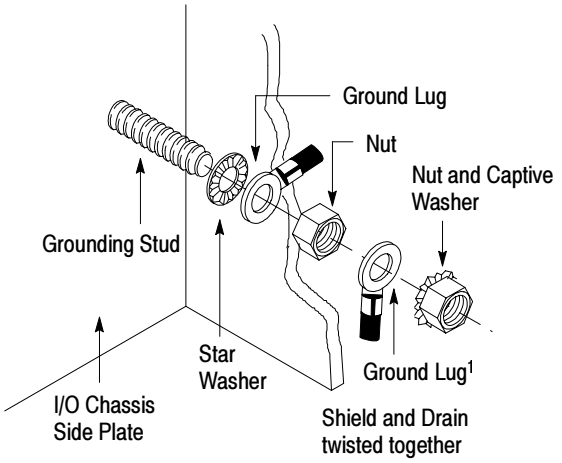
4 Attach a ground lug.

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.

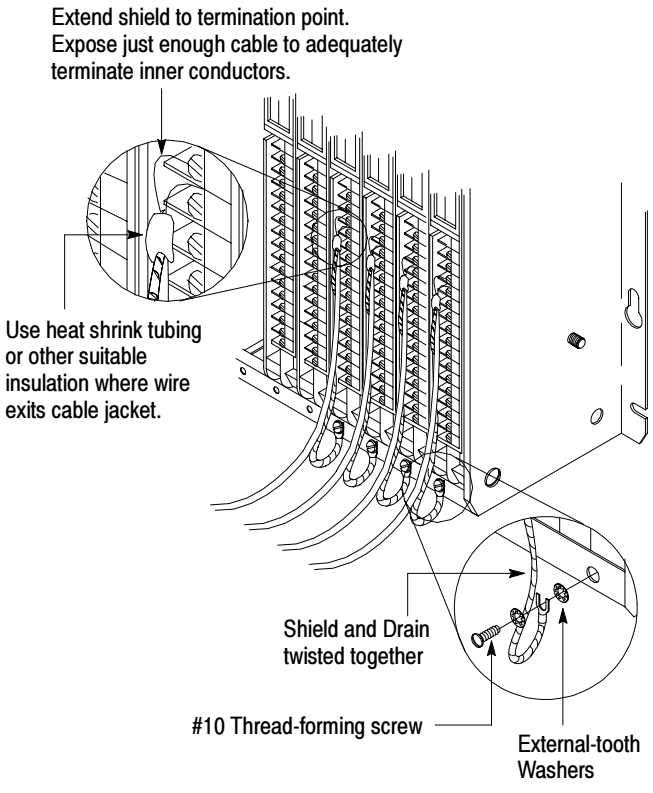
Chassis Ground

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.



[1]Use the cup washer if crimp-on lugs are not used.

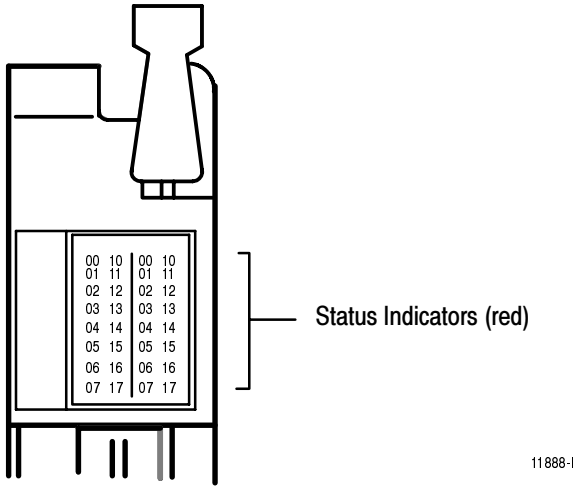
Single-point Grounding



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.

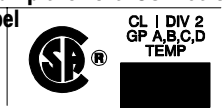
These indicators may flicker (momentarily light up) when the chassis in which the module resides is first powered up. This flicker is normal, and in no way affects the control parameters of the system.



CSA Hazardous Location Approval

CSA® certifies products for general use as well as for use in hazardous locations. **Actual CSA certification is indicated by the product label** as shown below, and not by statements in any user documentation.

Example of the CSA certification product label



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.

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only.
- 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.

Important: 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.

Temperature code rating

Look for temperature code rating here

The following warnings apply to products having CSA certification for use in hazardous locations.

ATTENTION: Explosion hazard —

- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components unless power has been switched off or the area is known to be non-hazardous.
- Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- 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.

Approbation d'utilisation dans des emplacements dangereux par la CSA

La CSA® certifie les produits d'utilisation générale aussi bien que ceux qui s'utilisent dans des emplacements dangereux. **La certification CSA en vigueur est indiquée par l'étiquette du produit** et non par des affirmations dans la documentation à l'usage des utilisateurs.

Exemple d'étiquette de certification d'un produit par la CSA

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.

- 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.
- 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.

Important: 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.

Taux du code de température

Le taux du code de température est indiqué ici

Les avertissements suivants s'appliquent aux produits ayant la certification CSA pour leur utilisation dans des emplacements dangereux.

AVERTISSEMENT: Risque d'explosion —

- La substitution de composants peut rendre ce matériel inacceptable pour lesemplacements de Classe I, Division 2.
- Couper le courant ou s'assurer quel'emplacement est désigné non dangereux avant de remplacer lescomposants.
- Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.
- 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.

Le sigle CSA est la marque déposée de l'Association des Standards pour le Canada.

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Specifications

Inputs per module	32
Module Location	1771-A1B thru -A4B or later I/O Chassis
Input Voltage Range	10 to 30V dc
Nominal Input Current	4.5mA @ 10V
Minimum Off-state Current	1.7mA @ 5V dc
Maximum Off-state Voltage	5V dc
Minimum On-state Voltage	10V dc
Input Impedance	2.2K
Input Signal Delay	Low to high propagation: 6ms(+2ms) High to low propagation: 6ms(+2ms)
Power Dissipation	15.6W (max); 1.5W (min)
Thermal Dissipation	53.3 BTU/hr (max); 5.1 BTU/hr (min)
Backplane Current	280mA @ 5V dc maximum
Isolation Voltage	Isolation meets or exceeds UL Standard 508, and CSA Standard C22.2 No. 142.
Conductors Wire Size	14 gauge ($2mm^2$) stranded (max)[1] 3/64 inch (1.2mm) insulation (max)
Category	1[2]
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)
Keying	Between 14 and 16 Between 18 and 20
Field Wiring Arm	1771-WN
Wiring Arm Screw Torque	7-9 inch-pounds
Agency Certification (when product is marked)	• CSA certified • CSA Class I, Division 2, Groups A, B, C, D certified • UL listed • CE marked for all applicable directives

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 Refer to publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines for Noise Immunity.

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