



DC (10-30V) Output Module (Cat. No. 1771-OBN Series B)

Contents

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

To	See page
↓ Important User Information	1
↓ Preinstallation Considerations	4
↓ Calculate Power Requirements	5
↓ Key the Backplane Connector	5
↓ Install the Module and Field Wiring Arm	6
↓ Connect Wiring to the Field Wiring Arm	7

For this reference information	See page
➡ Interpreting the Status Indicators	10
➡ Replacing the Fuses	10
➡ Hazardous Location Approval	11
➡ Specifications	12

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.

Reproduction of the contents of this copyrighted publication, in whole or part, without written permission of Rockwell Automation, is prohibited.

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.

Preinstallation Considerations

The 1771-OBN/B dc output module is a source output and requires a sink input. A sink input provides a path to ground and a source output provides a positive voltage path.

Use this module in all 1771 I/O chassis **except** 1771-A1, -A2 and 1771-A4 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.

Calculate Power Supply Requirements

The controller or I/O chassis power supply, connected through the backplane of the I/O chassis, powers the logic circuitry of the output modules. The maximum current drawn from this supply is 330mA. To calculate the requirements for the backplane power supply, add 330mA 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.

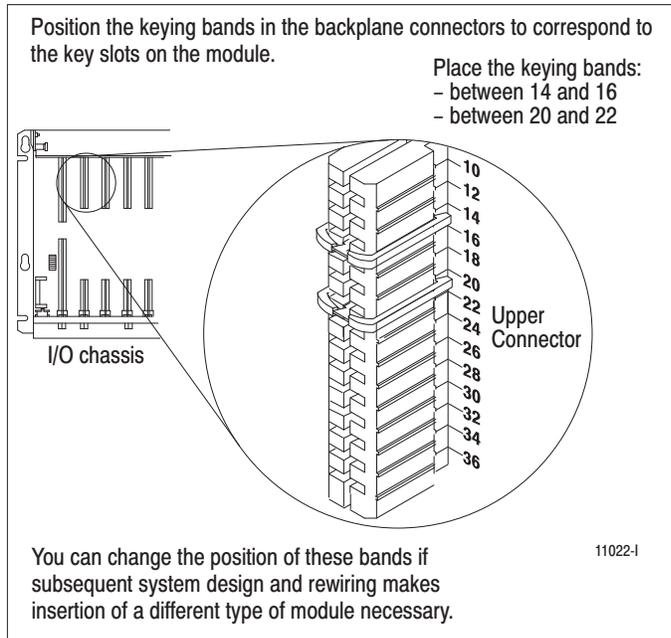
ATTENTION



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.



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



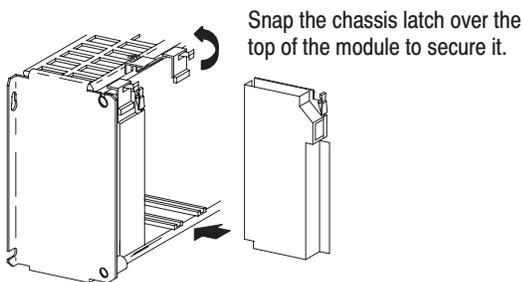
When you insert or remove the module with field power applied, or connect or disconnect the field wiring arm with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before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

1

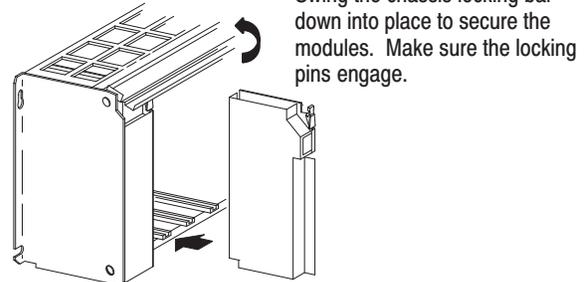
Place the module in the card guides on the top and bottom of the chassis that guide the module into position.

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

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



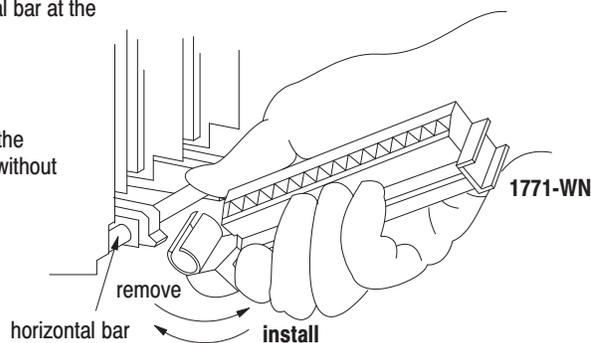
1771-A1B, -A2B, -A4B Series B I/O chassis



2

Attach the wiring arm (1771-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-OBN 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 Module

Make wiring 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 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.

I/O Module Groups

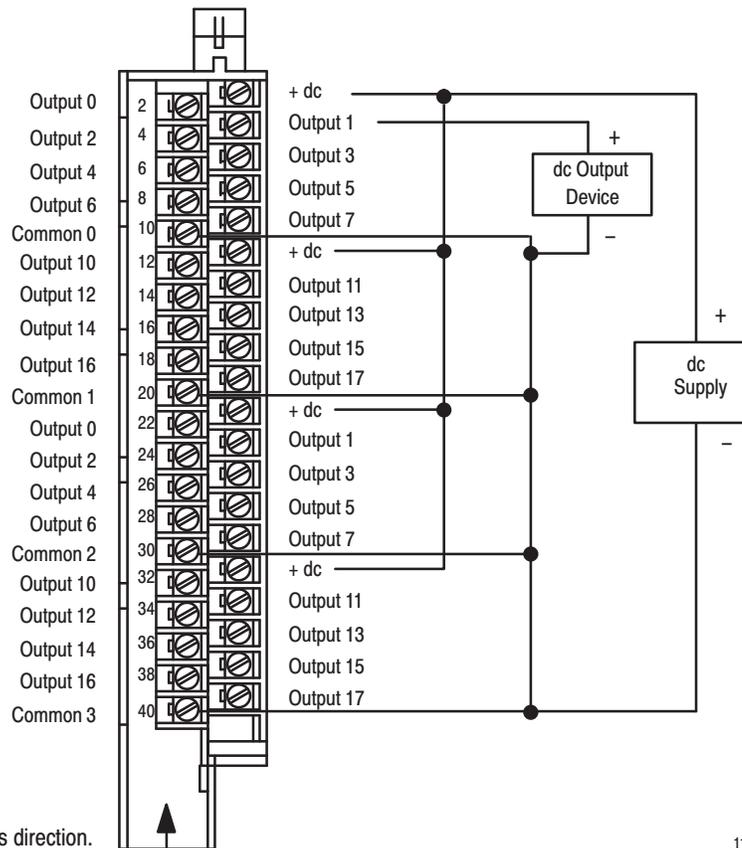
Each module condenses 2 full module groups (32 outputs) into each I/O chassis slot. For example:

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

Terminals 1 through 20 represent module group 1. Terminals 21 through 40 represent module group 2. Terminals 10, 20, 30 and 40 are DC common and terminals 1, 11, 21 and 31 are DC power.

Connection Diagram for the 1771-OBN DC Output Module

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



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

ATTENTION

Miswiring or shorting the output terminals will cause permanent damage to this module.



ATTENTION

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

Table A Module Output Terminal Assignments

Terminal Number	Output Assignment	I/O program address	Terminal Number	Output Assignment	I/O program address
01	¹ 10 to 30V dc	-	21	¹ 10 to 30V dc	-
02	Output 00	ORG00	22	Output 00	ORG00
03	Output 01	ORG01	23	Output 01	ORG01
04	Output 02	ORG02	24	Output 02	ORG02
05	Output 03	ORG03	25	Output 03	ORG03
06	Output 04	ORG04	26	Output 04	ORG04
07	Output 05	ORG05	27	Output 05	ORG05
08	Output 06	ORG06	28	Output 06	ORG06
09	Output 07	ORG07	29	Output 07	ORG07
10	Common 0	-	30	Common 2	-
11	¹ 10 to 30V dc	-	31	¹ 10 to 30V dc	-
12	Output 10	ORG10	32	Output 10	ORG10
13	Output 11	ORG11	33	Output 11	ORG11
14	Output 12	ORG12	34	Output 12	ORG12
15	Output 13	ORG13	35	Output 13	ORG13
16	Output 14	ORG14	36	Output 14	ORG14
17	Output 15	ORG15	37	Output 15	ORG15
18	Output 16	ORG16	38	Output 16	ORG16
19	Output 17	ORG17	39	Output 17	ORG17
20	Common 1	-	40	Common 3	-

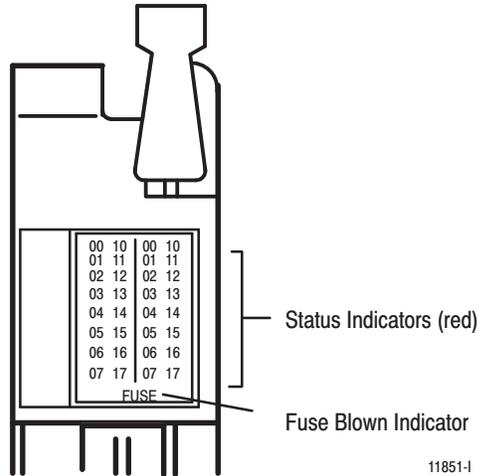
Where: R = rack number (1, 2, 3, etc.)
G = I/O group (0 - 7)

¹ You can connect a different power supply to each 10 to 30V dc terminal. They are not connected internally. Connect each common (0, 1, 2, 3) to the corresponding supply. Commons are not internally connected.

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

Interpreting the Status Indicators

The module has 32 status indicators on the module front plate. These represent the control status of the outputs. Each indicator is lit when its corresponding output is energized. An additional indicator is provided to indicate a blown fuse condition.



Replacing the Fuses

To replace a blown fuse, proceed as follows:

WARNING



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. Turn off power to the chassis.
2. Remove the module from the I/O chassis.
3. Remove the blown fuse from the fuse holder (accessible through the side cover), and replace with a 4A, 250V normal blow fuse.
4. Reinsert the module into chassis I/O chassis.
5. Turn on power to the chassis.

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

Outputs per module	32 (4 groups of 8)
Module Location	1771-A1B thru -A4B or later I/O Chassis
Voltage Rating	10 to 30V dc, 0.5A per output, 2A per group, 8A per module
Maximum Output Current	0.5A per output (not to exceed 8A per module) 2A per output group
Maximum Surge Current	2A per output for 10ms; repeatable every 2s. 5A per output group for 10ms.; repeatable every 2s. 20A per module for 10ms.; repeatable every 2s.
Maximum On-state Voltage Drop	1.5V dc at 0.5A
Maximum Off-state Leakage Current	1.0mA @ 55°C
Output Signal Delay	On to Off Off to On
	2.0ms 0.1ms
Power Dissipation	13.7W (max); 1.7W (min)
Thermal Dissipation	46.7 BTU/hr (max); 5.7 BTU/hr (min)
Backplane Current	330mA @ 5V dc maximum
Isolation Voltage	Tested to withstand 500V dc for 60s
Fuses	Four 4.0A, 250V normal blow fuses (1 per group); SAN-O Corporation ST4-4.0A
Conductors	Wire Size Category
	14–22 AWG (2.5–0.5mm ²) (max) stranded copper rated at 60°C 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 131°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 10V/m with 200Hz 50% pulse 100% AM at 900MHz
EFT/B Immunity	IEC 61000–4–4 +2kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000–4–5 +1kV line–line (DM) and +2kV line–earth (CM) on signal ports

Specifications continued on next page.

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 14 and 16 Between 20 and 22
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 CE² 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-Tick² Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> 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

www.rockwellautomation.com

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