Module Installation

Compact I/O is suitable for use in an industrial environment when installed in accordance with these instructions. Specifically, this equipment is intended for use in clean, dry environments (Pollution degree 2[1]) and to circuits not exceeding Over Voltage Category II[2] (IEC 60664-1).[3]

Prevent Electrostatic Discharge

ATTENTION



Electrostatic discharge can damage integrated circuits or semiconductors if you touch bus 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 bus 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 static-shield box.

Remove Power

ATTENTION



Remove power before removing or inserting this module. When you remove or insert a module with power applied, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field devices, causing unintended machine motion
- causing an explosion in a hazardous environment

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

(1) Pollution Degree 2 is an environment where, normally, only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation shall be expected.

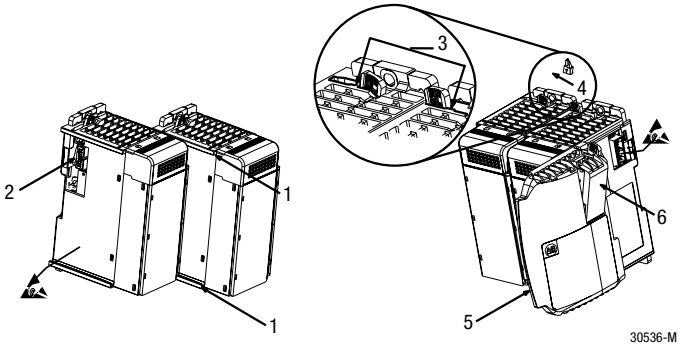
(2) Over Voltage Category II is the load level section of the electrical distribution system. At this level transient voltages are controlled and do not exceed the impulse voltage capability of the product's insulation.

(3) Pollution Degree 2 and Over Voltage Category II are International Electrotechnical Commission (IEC) designations.

System Assembly

The module can be attached to the controller or an adjacent I/O module *before* or *after* mounting. For mounting instructions, see Panel Mounting on page 6, or DIN Rail Mounting on page 8. To work with a system that is already mounted, see Replacing a Single Module within a System on page 8.

The following procedure shows you how to assemble the Compact I/O system.



1. Disconnect power.
2. Check that the bus lever of the module to be installed is in the unlocked (fully right) position.
3. Use the upper and lower tongue-and-groove slots (1) to secure the modules together (or to a controller).
4. Move the module back along the tongue-and-groove slots until the bus connectors (2) line up with each other.
5. Push the bus lever back slightly to clear the positioning tab (3). Use your fingers or a small screw driver.
6. To allow communication between the controller and module, move the bus lever fully to the left (4) until it clicks. Ensure it is locked firmly in place.

ATTENTION



When attaching I/O modules, it is very important that the bus connectors are securely locked together to ensure proper electrical connection.

7. Attach an end cap terminator (5) to the last module in the system by using the tongue-and-groove slots as before.

8. Lock the end cap bus terminator (6).

IMPORTANT A 1769-ECR or 1769-ECL right or left end cap must be used to terminate the end of the serial communication bus.

Mounting Expansion I/O

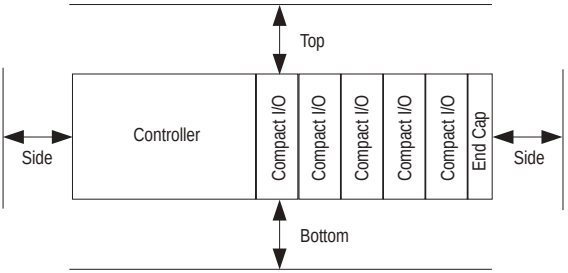
ATTENTION



During panel or DIN rail mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the module. Debris that falls into the module could cause damage on power up.

Minimum Spacing

Maintain spacing from enclosure walls, wireways, adjacent equipment, etc. Allow 50 mm (2 in.) of space on all sides for adequate ventilation, as shown:



Panel Mounting

Mount the module to a panel using two screws per module. Use M4 or #8 panhead screws. Mounting screws are required on every module.

NOTE: If mounting more modules, mount only the last one of this group and put the others aside. This reduces remounting time during drilling and tapping of the next group.

7. Repeat steps 1 to 6 for any remaining modules.

DIN Rail Mounting

The module can be mounted using these DIN rails:
35 x 7.5 mm (EN 50 022 - 35 x 7.5) or 35 x 15 mm (EN 50 022 - 35 x 15).

Before mounting the module on a DIN rail, close the DIN rail latches. Press the DIN rail mounting area of the module against the DIN rail. The latches will momentarily open and lock into place.

Replacing a Single Module within a System

The module can be replaced while the system is mounted to a panel (or DIN rail).

1. Remove power. See important note on page 4.

2. On the module to be removed, remove the upper and lower mounting screws from the module (or open the DIN latches using a flat-blade or phillips style screw driver).

3. Move the bus lever to the right to disconnect (unlock) the bus.

4. On the right-side adjacent module, move its bus lever to the right (unlock) to disconnect it from the module to be removed.

5. Gently slide the disconnected module forward. If you feel excessive resistance, check that the module has been disconnected from the bus, and that both mounting screws have been removed (or DIN latches opened).

   NOTE: It may be necessary to rock the module slightly from front to back to remove it, or, in a panel-mounted system, to loosen the screws of adjacent modules.

6. Before installing the replacement module, be sure that the bus lever on the module to be installed, and on the right-side adjacent module are in the unlocked (fully right) position.

7. Slide the replacement module into the open slot.

8. Connect the modules together by locking (fully left) the bus levers on the replacement module and the right-side adjacent module.

9. Replace the mounting screws (or snap the module onto the DIN rail).

Field Wiring Connections

Grounding the Module

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel. Additional grounding connections from the module's mounting tabs or DIN rail (if used), are not required unless the mounting surface cannot be grounded. Refer to *Industrial Automation Wiring and Grounding Guidelines*, Allen-Bradley publication 1770-4.1, for additional information.

Input Wiring

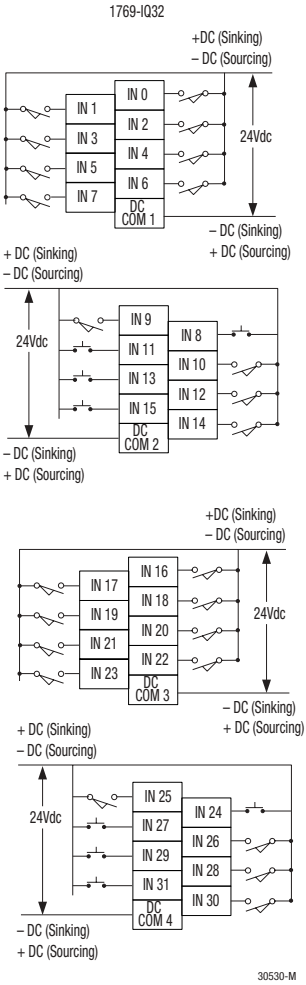
Basic wiring of input devices[1] to the 1769-IQ32 is shown below.

ATTENTION

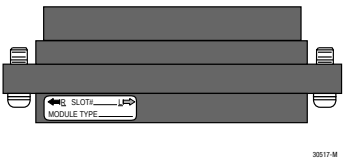


- Miswiring of the module to an AC power source will damage the module.
- Be careful when stripping wires. Wire fragments that fall into a module could cause damage at power up. Once wiring is complete, ensure the module is free of all metal fragments.

[1] **Sinking/Sourcing Inputs** - Sourcing/sinking describes the current flow between the I/O module and the field device. Sourcing I/O circuits supply (source) current to sinking field devices. Sinking I/O circuits are driven by a current sourcing field device. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices. *Europe:* DC sinking input and sourcing output module circuits are the commonly used options.



A removable write-on label is included with the module. Remove the label from the door, mark the identification of each terminal with permanent ink, and slide the label back into the door. Your markings (ID tag) will be visible when the module door is closed.

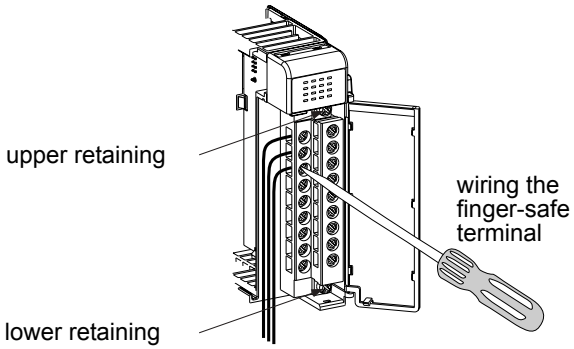


Removing the Finger-safe Terminal Block

When wiring field devices to the module, it is not necessary to remove the terminal block. If you remove the terminal block, use the write-on label on the side of the terminal block to identify the module slot lcation and type. RTB position can be indicated by circling either the 'R' for right side or 'L' for left side.

To remove the terminal block, loosen the upper and lower retaining screws. The terminal block will back away from the module as you remove the screws. When replacing the terminal block, torque the retaining screws to 0.46 Nm (4.1 in-lbs).

Wiring the Finger-safe Terminal Block



When wiring the terminal block, keep the finger-safe cover in place.

1. Loosen the terminal screws to be wired.

2. Route the wire under the terminal pressure plate. You can use the bare wire or a spade lug. The terminals will accept a 6.35 mm (0.25 in.) spade lug.

NOTE: The terminal screws are non-captive. Therefore, it is possible to use a ring lug [max. 1/4" o.d. with a 0.139" minimum i.d. (M3.5)] with the module.

3. Tighten the terminal screw making sure the pressure plate secures the wire. Recommended torque when tightening terminal screws is 0.68 Nm (6 in-lbs).

NOTE: If you need to remove the finger-safe cover, insert a screw driver into one of the square, wiring holes and gently pry the cover off. If you wire the terminal block with the finger-safe cover removed, you will not be able to put it back on the terminal block because the wires will be in the way.

Wire Size and Terminal Screw Torque

Each terminal accepts as many as two wires with these restrictions:

Wire Type		Wire Size	Terminal Screw Torque	Retaining Screw Torque
Solid	Cu-90°C (194°F)	#14 to #22 AWG	0.68 Nm (6 in-lbs)	0.46 Nm (4.1 in-lbs)
Stranded	Cu-90°C (194°F)	#16 to #22 AWG	0.68 Nm (6 in-lbs)	0.46 Nm (4.1 in-lbs)

I/O Memory Mapping

Input Data File

For each input module, slot x, word 0 in the input data file contains the current state of the field input points.

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r
1	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r

r=read

Spare/Replacement Module Parts

- Terminal Block: 1769-RTBN18 (1 per kit)

Input Specifications

Specification	1769-IQ32
Voltage Category	24V dc (sink/source[1])
Operating Voltage Range	10 to 30V dc at 30°C (86°F) 10 to 26.4V dc at 60°C (140°F)
Number of Inputs	32
Bus Current Draw (max.)	170 mA at 5V dc (0.85W)
Heat Dissipation	4.6 Total Watts *(The Watts per point, plus the minimum Watts, with all points energized.)*
Signal Delay (max.)	On Delay: 8.0 ms Off Delay: 8.0 ms
Off-State Voltage (max.)	5V dc
Off-State Current (max.)	1.5 mA
On-State Voltage (min.)	10V dc
On-State Current (min.)	2.0 mA
Inrush Current (max.)	250 mA
Nominal Impedance	5.2kohm at 24V dc, 6.1kohm at 30V dc
IEC Input Compatibility	Type 1+
Power Supply Distance Rating	8 (The module may not be more than 8 modules away from the power supply or controller.)
Input Point to Bus (Compact Bus) Isolation	Verified by one of the following dielectric tests: 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation)
Isolated Groups	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15 Group 3: inputs 16 to 23 Group 4: inputs 24 to 31 Isolated groups operate in either sink or source configurations.
Input Group to Input Group Isolation	Verified by one of the following dielectric tests: 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation)
Vendor I.D. Code	1
Product Type Code	7
Product Code	68

(1) **Sinking/Sourcing Inputs** - Sourcing/sinking describes the current flow between the I/O module and the field device. Sourcing I/O circuits supply (source) current to sinking field devices. Sinking I/O circuits are driven by a current sourcing field device. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices. *Europe:* DC sinking input and sourcing output module circuits are the commonly used options.

Hazardous Location Considerations

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

WARNING



EXPLOSION HAZARD

- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- Do not connect or disconnect components unless power has been switched off or the area is known to be non-hazardous.
- This product must be installed in an enclosure.
- All wiring must comply with N.E.C. article 501-4(b).

Environnements dangereux

Cet équipement est conçu pour être utilisé dans des environnements de Classe 1, Division 2, Groupes A, B, C, D ou non dangereux. La mise en garde suivante s'applique à une utilisation dans des environnements dangereux.

AVERTISSEMENT



DANGER D'EXPLOSION

- La substitution de composants peut rendre cet équipement impropre à une utilisation en environnement de Classe 1, Division 2.
- Ne pas remplacer de composants ou déconnecter l'équipement sans s'être assuré que l'alimentation est coupée et que l'environnement est classé non dangereux.
- Ne pas connecter ou déconnecter des composants sans s'être assuré que l'alimentation est coupée ou que l'environnement est classé non dangereux.
- Ce produit doit être installé dans une armoire.