# Compact 1769-OF8C Analog Output Module

**Inside**

# Module Description



| Item | Description |
|------|-------------|
| **1** | bus lever (with locking function) |
| **2a** | upper panel mounting tab |
| **2b** | lower panel mounting tab |
| **3** | module status LED |
| **4** | module door with terminal identification label |
| **5a** | movable bus connector with female pins |
| **5b** | stationary bus connector with male pins |
| **6** | nameplate label |
| **7a** | upper tongue-and-groove slots |
| **7b** | lower tongue-and-groove slots |
| **8a** | upper DIN rail latch |
| **8b** | lower DIN rail latch |
| **9** | write-on label (user ID tag) |
| **10** | removable terminal block (RTB) with finger-safe cover |
| **10a** | RTB upper retaining screw |
| **10b** | RTB lower retaining screw |

# 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 or the terminal block. 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.

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[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 7. To work with a system that is already mounted, see "Replacing a Single Module within a System" on page 7.

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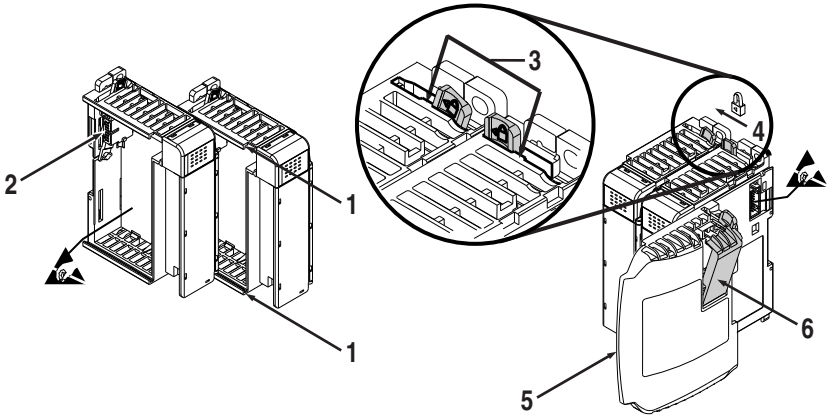


1. Disconnect power.

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 screwdriver.

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

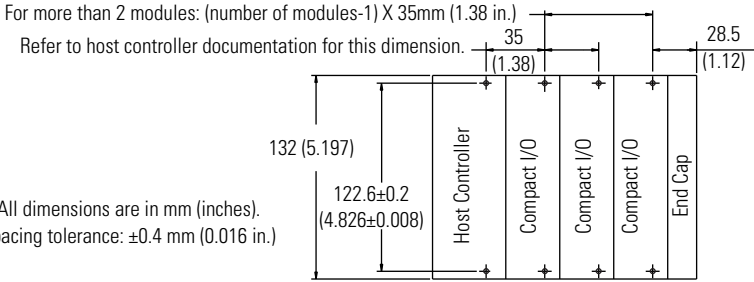| **ATTENTION** | During panel or DIN rail mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the module. Debris that falls into the module could cause damage on power up. |

### 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:
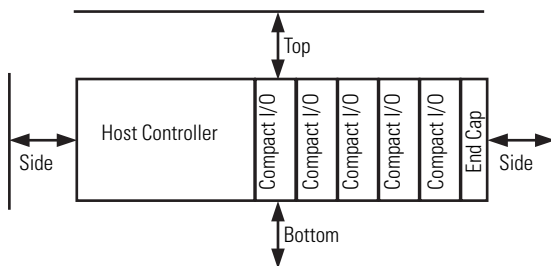
## Panel Mounting

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

*Panel Mounting Using the Dimensional Template*

For more than 2 modules: (number of modules-1) X 35mm (1.38 in.)

Refer to host controller documentation for this dimension.

35 (1.38)

28.5 (1.12)

132 (5.197)

122.6±0.2 (4.826±0.008)

NOTE: All dimensions are in mm (inches).
Hole spacing tolerance: ±0.4 mm (0.016 in.)

Host Controller

Compact I/O

Compact I/O

Compact I/O

End Cap

*Panel Mounting Procedure Using Modules as a Template*

The following procedure allows you to use the assembled modules as a template for drilling holes in the panel. If you have sophisticated panel mounting equipment, you can use the dimensional template provided on page 6. Due to module mounting hole tolerance, it is important to follow these procedures:

1. On a clean work surface, assemble no more than three modules.

2. Using the assembled modules as a template, carefully mark the center of all module-mounting holes on the panel.

3. Return the assembled modules to the clean work surface, including any previously mounted modules.

4. Drill and tap the mounting holes for the recommended M4 or #8 screw.

5. Place the modules back on the panel, and check for proper hole alignment.

6. Attach the modules to the panel using the mounting screws.

| **TIP** | 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 the following 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). Follow the steps below in order:

1. Remove power. See important note on page 3.

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 screwdriver).

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).

| TIP | 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).

# Module Spare/Replacement Parts

- Terminal block, catalog number 1769-RTBN12 (1 per kit)
  (A-B part number A22112-319-01)
- Door, catalog number 1769-RD (2 per kit)

# 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.

## System Wiring Guidelines

Consider the following when wiring your system:

- All module commons (ANLG COM) are connected in the analog module. The analog common (ANLG COM) is not connected to earth ground inside the module.
- Channels are not isolated from each other.
- Use Belden 8761, or equivalent, shielded wire.
- Under normal conditions, the drain wire and shield junction must be connected to earth ground, via a panel or DIN rail mounting screw at the analog I/O module end. Keep the shield connection to ground as short as possible.[1]
- To ensure optimum accuracy, limit overall cable impedance by keeping your cable as short as possible. Locate the I/O system as close to your sensors or actuators as your application will permit.
- Current outputs (Iout 0+ to Iout 7+) of the 1769-OF8C module source current that returns to ANLG COM. Load resistance for a current output channel must remain between 0 and 500 $\Omega$

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[1] In environments where high frequency noise may be present, it may be necessary to ground the shield via a 0.1µF capacitor at the load end and also ground the module end without a capacitor.

## External Power Switch

The 1769-OF8C has an external 24V dc power switch which gives you the option of using an external power supply. The switch is located in on the lower left portion of the module's circuit board, as shown below. With this switch pressed on the top (default), 24V dc power is drawn from the 1769 system power supply via the 1769 I/O bus. Pressed on the bottom, 24V dc power is drawn from the external power supply.

Wire the external power supply to the module via the module's terminal block. The external power supply must be rated Class 2, with a 24V dc range of 20.4 to 26.4V dc and 160 mA minimum.



External Power Switch

Pressed on the Top
Bus Power (default)

Pressed on the Bottom
External Power

BUS

EXT
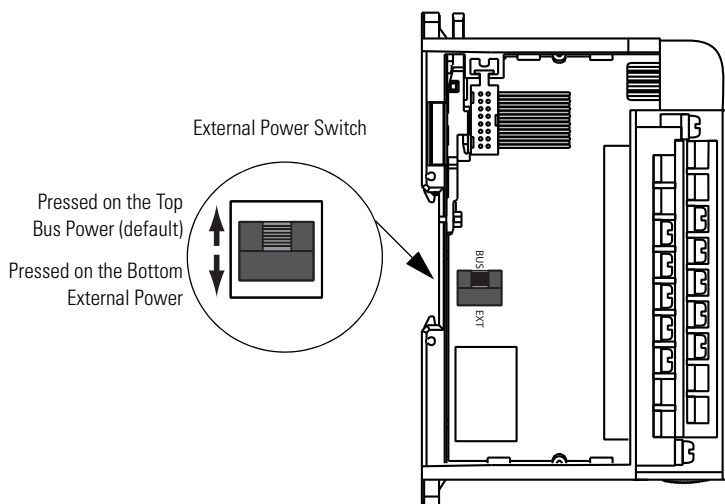
## Wiring Output Devices

Basic wiring of output devices is shown below.

| ATTENTION | • Miswiring of the module to an AC/DC 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. |
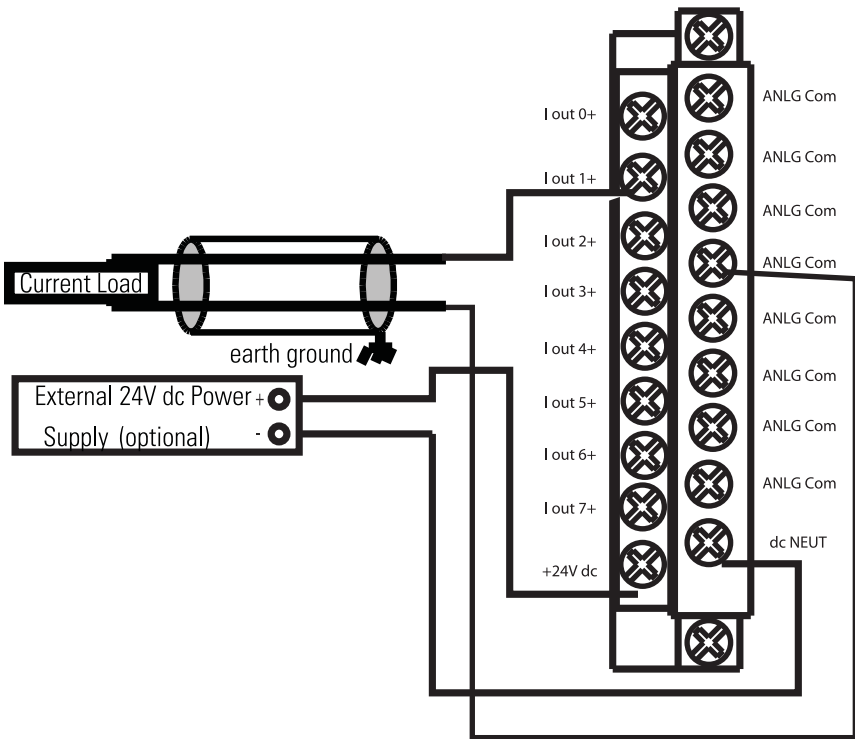


## Labeling the Terminals

A removable, write-on label is provided 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

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).



upper retaining screw

wiring the finger-safe terminal block

lower retaining screw

## Wiring the Finger-Safe Terminal Block

When wiring the terminal block, keep the finger-safe cover in place.
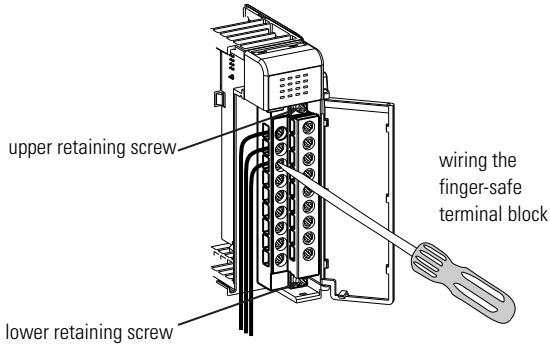
1. Loosen the terminal screws to be wired.

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.

**TIP** The terminal screws are non-captive. Therefore, it is possible to use a ring lug [maximum 1/4 inch o.d. with a 0.139 inch 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).

**TIP** 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 up to two wires with the following 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

> **IMPORTANT**  If you are using RSLogix 5000, version 15, please refer to RSLogix 5000, Version 15, Controller Tags on page 17.

## Output Data File

For each module, slot x, words 0-7 in the output data file contain the channel 0 through 7 output data. Word 8 is used to unlatch any condition that has been latched. Refer to the *Compact™ Analog I/O User Manual*, publication number 1769-UM002 for additional details.

| Word | Bit Position | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | SGN | Analog Output Data Channel 0 | | | | | | | | | | | | | | |
| 1 | SGN | Analog Output Data Channel 1 | | | | | | | | | | | | | | |
| 2 | SGN | Analog Output Data Channel 2 | | | | | | | | | | | | | | |
| 3 | SGN | Analog Output Data Channel 3 | | | | | | | | | | | | | | |
| 4 | SGN | Analog Output Data Channel 4 | | | | | | | | | | | | | | |
| 5 | SGN | Analog Output Data Channel 5 | | | | | | | | | | | | | | |
| 6 | SGN | Analog Output Data Channel 6 | | | | | | | | | | | | | | |
| 7 | SGN | Analog Output Data Channel 7 | | | | | | | | | | | | | | |
| 8 | UU7 | UO7 | UU6 | UO6 | UU5 | UO5 | UU4 | UO4 | UU3 | UO3 | UU2 | UO2 | UU1 | UO1 | UU0 | UO0 |

- SGN = Sign bit in two's complement format.
- UU = Unlatch under-range (or low clamp exceeded) alarm.
- UO = Unlatch over-range (or high clamp exceeded) alarm.

## Input Data File

For each module, slot x, input data file words 3-10 contain the state of the module's output data (output data echo) file words 0-7. During normal operation, these input words represent the analog values that the outputs are directed to by the control program.

| Word | Bit Position | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **15** | **14** | **13** | **12** | **11** | **10** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| 0 | | | | | | | | PF | S7 | S6 | S5 | S4 | S3 | S2 | S1 | S0 |
| 1 | D3 | H3 | U3 | O3 | D2 | H2 | U2 | O2 | D1 | H1 | U1 | O1 | D0 | H0 | U0 | O0 |
| 2 | D7 | H7 | U7 | O7 | D6 | H6 | U6 | O6 | D5 | H5 | U5 | O5 | D4 | H4 | U4 | O4 |
| 3 | Channel 0 Data Value | | | | | | | | | | | | | | | |
| 4 | Channel 1 Data Value | | | | | | | | | | | | | | | |
| 5 | Channel 2 Data Value | | | | | | | | | | | | | | | |
| 6 | Channel 3 Data Value | | | | | | | | | | | | | | | |
| 7 | Channel 4 Data Value | | | | | | | | | | | | | | | |
| 8 | Channel 5 Data Value | | | | | | | | | | | | | | | |
| 9 | Channel 6 Data Value | | | | | | | | | | | | | | | |
| 10 | Channel 7 Data Value | | | | | | | | | | | | | | | |

- PF = Analog power fail.
- S = General status (over-range, under-range, or open-circuit).
- D = Open-circuit diagnostics.
- H = Output held bit.
- U = Under-range (or low-clamp exceeded) alarm.
- O = Over-range (or high-clamp exceeded) alarm.

**IMPORTANT**   The output module's input data file reflects the analog output data echo of the module, not necessarily the electrical state of the output terminals. It does not reflect shorted or open outputs.

## Configuration Data File

The manipulation of the bits from this file is normally done with programming software (e.g. RSLogix 500, RSNetWorx for DeviceNet, etc.) during initial configuration of the system. In that case, graphical screens are provided by the programmer to simplify configuration. However, some systems, like the 1769-ADN DeviceNet Adapter, also allow the bits to be altered as part of the control program, using communication rungs. In that case, it is necessary to understand the bit arrangement. The channel configuration words, the first two words of each eight word group, are described on page 16. Refer to the *Compact™ Analog I/O User Manual*, publication number 1769-UM002 for additional details.

| Word | Description | Word | Description |
|------|-------------|------|-------------|
| 0 | Channel 0 Configuration Word 0 | 24 | Channel 3 Configuration Word 0 |
| 1 | Channel 0 Configuration Word 1 | 25 | Channel 3 Configuration Word 1 |
| 2 | Channel 0 Fault Value Word | 26 | Channel 3 Fault Value Word |
| 3 | Channel 0 Program Idle Mode Word | 27 | Channel 3 Program Idle Mode Word |
| 4 | Channel 0 Low Clamp | 28 | Channel 3 Low Clamp |
| 5 | Channel 0 High Clamp | 29 | Channel 3 High Clamp |
| 6 | Channel 0 Ramp Rate | 30 | Channel 3 Ramp Rate |
| 7 | Channel 0 Spare | 31 | Channel 3 Spare |
| 8 | Channel 1 Configuration Word 0 | 32 | Channel 4 Configuration Word 0 |
| 9 | Channel 1 Configuration Word 1 | 33 | Channel 4 Configuration Word 1 |
| 10 | Channel 1 Fault Value Word | 34 | Channel 4 Fault Value Word |
| 11 | Channel 1 Program Idle Mode Word | 35 | Channel 4 Program Idle Mode Word |
| 12 | Channel 1 Low Clamp | 36 | Channel 4 Low Clamp |
| 13 | Channel 1 High Clamp | 37 | Channel 4 High Clamp |
| 14 | Channel 1 Ramp Rate | 38 | Channel 4 Ramp Rate |
| 15 | Channel 1 Spare | 39 | Channel 4 Spare |
| 16 | Channel 2 Configuration Word 0 | 40 | Channel 5 Configuration Word 0 |
| 17 | Channel 2 Configuration Word 1 | 41 | Channel 5 Configuration Word 1 |
| 18 | Channel 2 Fault Value Word | 42 | Channel 5 Fault Value Word |
| 19 | Channel 2 Program Idle Mode Word | 43 | Channel 5 Program Idle Mode Word |
| 20 | Channel 2 Low Clamp | 44 | Channel 5 Low Clamp |
| 21 | Channel 2 High Clamp | 45 | Channel 5 High Clamp |
| 22 | Channel 2 Ramp Rate | 46 | Channel 5 Ramp Rate |
| 23 | Channel 2 Spare | 47 | Channel 5 Spare |

| Word | Description | Word | Description |
|------|-------------|------|-------------|
| 48 | Channel 6 Configuration Word 0 | 56 | Channel 7 Configuration Word 0 |
| 49 | Channel 6 Configuration Word 1 | 57 | Channel 7 Configuration Word 1 |
| 50 | Channel 6 Fault Value Word | 58 | Channel 7 Fault Value Word |
| 51 | Channel 6 Program Idle Mode Word | 59 | Channel 7 Program Idle Mode Word |
| 52 | Channel 6 Low Clamp | 60 | Channel 7 Low Clamp |
| 53 | Channel 6 High Clamp | 61 | Channel 7 High Clamp |
| 54 | Channel 6 Ramp Rate | 62 | Channel 7 Ramp Rate |
| 55 | Channel 6 Spare | 63 | Channel 7 Spare |

| Word/Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Word 0 | E | Reserved | | | | | | | SIU | SIO | LA | ER | FM | PM | HI | PFE |
| Word 1 | Reserved | | | | | Output Data Format Select | | | Reserved | | | | | Output Type/Range | | |

- E = Channel Enable: (0 = Disabled, 1 = output 0 and hold Enabled, process changes)
- Reserved = Set to zero
- SIU = System interrupt low clamp, under-range alarms: (0 = Disabled, 1 = Enabled)
- SIO = System interrupt high clamp, over-range alarms: (0 = Disabled, 1 = Enabled)
- LA = Latch low/high clamp, under/over-range alarms: (0 = Disabled, 1 = Enabled)
- ER = Enable ramping: (0 = Disabled, 1 = Enabled. Ramp rate limited by fault states.)
- FM = Fault mode: (0 = Hold Last State, 1 = User Defined Value)
- PM = Program mode: (0 = Hold Last State, 1 = User Defined Value)
- HI = Hold for initialization: (0 = Disabled, 1 = Enabled)
- PFE = Program/idle to fault enable: (0 = Disabled, 1 = Enabled)

*Channel Configuration Words*

The first two words of each eight word group in the configuration file allow you to change the parameters of each channel independently. For example, words 8 and 9 correspond to channel 1 while words 56 and 57 correspond to channel 7.

These bit settings:

| Define | Indicate this | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program (Idle) to Fault Enable | Program (Idle) Mode Data Applied[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | 0 |
| | Fault Mode Data Applied[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | 1 |
| Hold for Initialization | Disabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | 0 | |
| | Enabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | 1 | |
| Program (Idle) Mode | Hold Last State[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 0 | | |
| | User-Defined Value[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | 1 | | |
| Fault Mode | Hold Last State[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | | | |
| | User-Defined Fault Value[1] | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | 1 | | | |
| Enable Ramping | Disabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 0 | | | | |
| | Enabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | 1 | | | | |
| System Interrupt High Clamp | Disabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | | | | | |
| | Enabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 1 | | | | | |
| System Interrupt Low Clamp | Disabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| | Enabled | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | | | | |
| Enable Channel | Disabled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | |
| | Enabled | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | |

[1]    These functions are not supported by all controllers (e.g. MicroLogix 1500) using any configuration method. Refer to your controller manual for details.

These bit settings:

| Define | Indicate this | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Range Select | 0 to 20 mA dc | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 4 to 20 mA dc | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Output Data Select | Raw/Proportional Counts | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Engineering Units | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | |
| | Scaled for PID | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| | Percent Range | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | | | |

# RSLogix 5000, Version 15, Controller Tags

Use the following controller tags with RSLogix 5000, version 15 and later.

## Channel 0 and 1 Configuration Data

Channel 0 and 1 configuration data is shown below. The same information applies to all channels.

| - | Local:1:C | | AB:1769_OF8C:C:0 | |
|---|---|---|---|---|
| | Local:1:C.Ch0ProgToFaultEn | BOOL | Decimal |
| | Local:1:C.Ch0HoldForInit | BOOL | Decimal |
| | Local:1:C.Ch0ProgMode | BOOL | Decimal |
| | Local:1:C.Ch0FaultMode | BOOL | Decimal |
| | Local:1:C.Ch0RampEn | BOOL | Decimal |
| | Local:1:C.Ch0AlarmLatchEn | BOOL | Decimal |
| | Local:1:C.Ch0OverRangeInterruptEn | BOOL | Decimal |
| | Local:1:C.Ch0UnderRangeInterruptEn | BOOL | Decimal |
| | Local:1:C.Ch0En | BOOL | Decimal |
| + | Local:1:C.Ch0Range | SINT | Decimal |
| + | Local:1:C.Ch0DataFormat | SINT | Decimal |
| + | Local:1:C.Ch0FaultValue | INT | Decimal |
| + | Local:1:C.Ch0ProgValue | INT | Decimal |
| + | Local:1:C.Ch0LClampValue | INT | Decimal |
| + | Local:1:C.Ch0HClampValue | INT | Decimal |
| + | Local:1:C.Ch0RampRate | INT | Decimal |
| | Local:1:C.Ch1ProgToFaultEn | BOOL | Decimal |
| | Local:1:C.Ch1HoldForInit | BOOL | Decimal |
| | Local:1:C.Ch1ProgMode | BOOL | Decimal |
| | Local:1:C.Ch1FaultMode | BOOL | Decimal |
| | Local:1:C.Ch1RampEn | BOOL | Decimal |
| | Local:1:C.Ch1AlarmLatchEn | BOOL | Decimal |
| | Local:1:C.Ch1OverRangeInterruptEn | BOOL | Decimal |
| | Local:1:C.Ch1UnderRangeInterruptEn | BOOL | Decimal |

| | Local:1:C.Ch1En | BOOL | Decimal |
|---|---|---|---|
| + | Local:1:C.Ch1Range | SINT | Decimal |
| + | Local:1:C.Ch1DataFormat | SINT | Decimal |
| + | Local:1:C.Ch1FaultValue | INT | Decimal |
| + | Local:1:C.Ch1ProgValue | INT | Decimal |
| + | Local:1:C.Ch1LClampValue | INT | Decimal |
| + | Local:1:C.Ch1HClampValue | INT | Decimal |
| + | Local:1:C.Ch1RampRate | INT | Decimal |

| Tag Name | To Select | Make These Bit Settings[1] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 15-8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Ch#ProgToFaultEn | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#HoldForInit | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#ProgMode | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#FaultMode | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#RampEn | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#AlarmLatchEn | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#OverRangeInterruptEn | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#UnderRangeInterruptEn | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#En | Enable | | | | | | | | | 1 |
| | Disable | | | | | | | | | 0 |
| Ch#Range | 0…20 mA dc | | | | | | | | | 0 |
| | 4…20 mA dc | | | | | | | | | 1 |
| Ch#DataFormat | Raw/proportional counts | | | | | | | | 0 | 0 |
| | Engineering units | | | | | | | | 0 | 1 |
| | Scaled for PID | | | | | | | | 1 | 0 |
| | Percent range | | | | | | | | 1 | 1 |

[1] All bit positions left blank in table must be set to 0.

## Input Data

| - | Local:1:I | | AB:1769_OF8C:I:0 | |
|---|-----------|---|------------------|---|
| + | Local:1:I.Fault | DINT | Binary | |
| + | Local:1:I.CombinedStatus | SINT | Binary | |
| | Local:1:I.Ch0Status | BOOL | Decimal | |
| | Local:1:I.Ch1Status | BOOL | Decimal | |
| | Local:1:I.Ch2Status | BOOL | Decimal | |
| | Local:1:I.Ch3Status | BOOL | Decimal | |
| | Local:1:I.Ch4Status | BOOL | Decimal | |
| | Local:1:I.Ch5Status | BOOL | Decimal | |
| | Local:1:I.Ch6Status | BOOL | Decimal | |
| | Local:1:I.Ch7Status | BOOL | Decimal | |
| + | Local:1:I.ModuleStatus | SINT | Binary | |
| | Local:1:I.PowerFail | BOOL | Decimal | |
| + | Local:1:I.Ch0_1Status | SINT | Binary | |
| | Local:1:I.Ch0OverRange | BOOL | Decimal | |
| | Local:1:I.Ch0UnderRange | BOOL | Decimal | |
| | Local:1:I.Ch0InHold | BOOL | Decimal | |
| | Local:1:I.Ch0OpenWire | BOOL | Decimal | |
| | Local:1:I.Ch1OverRange | BOOL | Decimal | |
| | Local:1:I.Ch1UnderRange | BOOL | Decimal | |
| | Local:1:I.Ch1InHold | BOOL | Decimal | |
| | Local:1:I.Ch1OpenWire | BOOL | Decimal | |
| + | Local:1:I.Ch2_3Status | SINT | Binary | |
| | Local:1:I.Ch2OverRange | BOOL | Decimal | |
| | Local:1:I.Ch2UnderRange | BOOL | Decimal | |
| | Local:1:I.Ch2InHold | BOOL | Decimal | |
| | Local:1:I.Ch2OpenWire | BOOL | Decimal | |
| | Local:1:I.Ch3OverRange | BOOL | Decimal | |
| | Local:1:I.Ch3UnderRange | BOOL | Decimal | |

| | | | |
|---|---|---|---|
| | Local:1:I.Ch3InHold | BOOL | Decimal |
| | Local:1:I.Ch3OpenWire | BOOL | Decimal |
| + | Local:1:I.Ch4_5Status | SINT | Binary |
| | Local:1:I.Ch4OverRange | BOOL | Decimal |
| | Local:1:I.Ch4UnderRange | BOOL | Decimal |
| | Local:1:I.Ch4InHold | BOOL | Decimal |
| | Local:1:I.Ch4OpenWire | BOOL | Decimal |
| | Local:1:I.Ch5OverRange | BOOL | Decimal |
| | Local:1:I.Ch5UnderRange | BOOL | Decimal |
| | Local:1:I.Ch5InHold | BOOL | Decimal |
| | Local:1:I.Ch5OpenWire | BOOL | Decimal |
| + | Local:1:I.Ch6_7Status | SINT | Binary |
| | Local:1:I.Ch6OverRange | BOOL | Decimal |
| | Local:1:I.Ch6UnderRange | BOOL | Decimal |
| | Local:1:I.Ch6InHold | BOOL | Decimal |
| | Local:1:I.Ch6OpenWire | BOOL | Decimal |
| | Local:1:I.Ch7OverRange | BOOL | Decimal |
| | Local:1:I.Ch7UnderRange | BOOL | Decimal |
| | Local:1:I.Ch7InHold | BOOL | Decimal |
| | Local:1:I.Ch7OpenWire | BOOL | Decimal |
| + | Local:1:I.Ch0ReadBack | INT | Decimal |
| + | Local:1:I.Ch1ReadBack | INT | Decimal |
| + | Local:1:I.Ch2ReadBack | INT | Decimal |
| + | Local:1:I.Ch3ReadBack | INT | Decimal |
| + | Local:1:I.Ch4ReadBack | INT | Decimal |
| + | Local:1:I.Ch5ReadBack | INT | Decimal |
| + | Local:1:I.Ch6ReadBack | INT | Decimal |
| + | Local:1:I.Ch7ReadBack | INT | Decimal |

| Tag Name | Bit Indicates This[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Combined Status | Ch7 Status | Ch6 Status | Ch5 Status | Ch4 Status | Ch3 Status | Ch2 Status | Ch1 Status | Ch0 Status |
| Module Status | | | | | | | | Power Fail |
| Ch0_1 Status | Ch1 OpenWire | Ch1 InHold | Ch1 Under Range | Ch1 Over Range | Ch0 OpenWire | Ch0 InHold | Ch0 Under Range | Ch0 Over Range |
| Ch2_3 Status | Ch3 OpenWire | Ch3 InHold | Ch3 Under Range | Ch3 Over Range | Ch2 OpenWire | Ch2 InHold | Ch2 Under Range | Ch2 Over Range |
| Ch4_5 Status | Ch5 OpenWire | Ch5 InHold | Ch5 Under Range | Ch5 Over Range | Ch4 OpenWire | Ch4 InHold | Ch4 Under Range | Ch4 Over Range |
| Ch6_7 Status | Ch7 OpenWire | Ch7 InHold | Ch7 Under Range | Ch7 Over Range | Ch6 OpenWire | Ch6 InHold | Ch6 Under Range | Ch6 Over Range |

[1]    Bit positions left blank in table are always set to 0.

## Output Data

| | Local:1:O | | AB:1769_OF8C:O:0 | |
|---|---|---|---|---|
| + | Local:1:O.Ch0Data | | INT | Decimal |
| + | Local:1:O.Ch1Data | | INT | Decimal |
| + | Local:1:O.Ch2Data | | INT | Decimal |
| + | Local:1:O.Ch3Data | | INT | Decimal |
| + | Local:1:O.Ch4Data | | INT | Decimal |
| + | Local:1:O.Ch5Data | | INT | Decimal |
| + | Local:1:O.Ch6Data | | INT | Decimal |
| + | Local:1:O.Ch7Data | | INT | Decimal |
| + | Local:1:O.AlarmUnlatch | | INT | Binary |
| | Local:1:O.Ch0OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch0UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch1OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch1UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch2OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch2UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch3OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch3UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch4OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch4UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch5OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch5UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch6OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch6UnderRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch7OverRangeUnlatch | | BOOL | Decimal |
| | Local:1:O.Ch7UnderRangeUnlatch | | BOOL | Decimal |

# Specifications

## General Specifications

| Specification | Value |
|---|---|
| Dimensions | 118 mm (height) x 87 mm (depth) x 35 mm (width) height including mounting tabs is 138 mm<br><br>4.65 in. (height) x 3.43 in (depth) x 1.38 in (width) height including mounting tabs is 5.43 in. |
| Approximate Shipping Weight (with carton) | 281g (0.62 lbs.) |
| Storage Temperature | -40°C to +85°C (-40°F to +185°F) |
| Operating Temperature | 0°C to +60°C (32°F to +140°F) |
| Operating Humidity | 5% to 95% non-condensing |
| Operating Altitude | 2000 meters (6561 feet) |
| Vibration | Operating: 10 to 500 Hz, 5G, 0.030 in. peak-to-peak Relay Operation: 2G |
| Shock | Operating: 30G, 11 ms panel mounted (20G, 11 ms DIN rail mounted)<br><br>Non-Operating: 40G panel mounted (30G DIN rail mounted) |
| Agency Certification | • C-UL certified (under CSA C22.2 No. 142)<br>• UL 508 listed<br>• CE compliant for all applicable directives |
| Hazardous Environment Class | Class I, Division 2, Hazardous Location, Groups A, B, C, D (ISA 12.12-01, C-UL under CSA C22.2 No. 213) |
| Radiated and Conducted Emissions | EN 6100-6-4 and CISPR 11 Group 1, Class A |
| *Electrical /EMC:* | *The module has passed testing at the following levels:* |
| • ESD Immunity (IEC 61000-4-2) | • 4 kV contact, 8 kV air, 4 kV indirect |
| • Radiated Immunity (IEC 61000-4-3) | • 10 V/m, 80 to 1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier |
| • Fast Transient Burst (IEC 61000-4-4) | • 2 kV, 5 kHz |
| • Surge Immunity (IEC 61000-4-5) | • 1 kV galvanic gun |
| • Conducted Immunity (IEC 61000-4-6) | • 10V rms, 0.15 to 80 MHz[1] |

[1] Conducted Immunity frequency range may be 150 kHz to 30 MHz if the Radiated Immunity frequency range is 30 MHz to 1000 MHz.

## Output Specifications

| Specification | 1769-OF8C |
|---|---|
| Analog Normal Operating Ranges[1] | 0 to 20 mA, 4 to 20 mA |
| Full Scale Analog Ranges[1] | 0 to 21 mA, 3.2 to 21 mA |
| Number of Outputs | 8 single-ended |
| Bus Current Draw (max.) | 145 mA at 5V dc<br>185 mA at 24V dc[2] |
| Heat Dissipation | 2.69 Total Watts *(All points - 21 mA into 250Ω - worst case calculated.)* |
| Digital Resolution Across Full Range | 16 bits (unipolar)<br><br>+4 to +20 mA: 15.59 bits, 0.323 µA/bit<br>0 to +20 mA: 15.91 bits, 0.323 µA/bit |
| Conversion Rate (all channels) max. | 5 ms |
| Step Response to 63%[3] | <2.9 ms |
| Resistive Load on Current Output | 0 to 500 Ω (includes wire resistance) |
| Max. Inductive Load | 0.1 mH |
| Field Calibration | None required |
| Overall Accuracy[4] | ±0.35% full scale at 25°C |

[1] The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range unless configured to latch.

[2] If the optional 24V dc Class 2 power supply is used, the 24V dc current draw from the bus is 0 mA.

[3] Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

[4] Includes offset, gain, drift, non-linearity and repeatability error terms.

| Specification | 1769-OF8C |
|---|---|
| Accuracy Drift with Temperature | ±0.0058% FS per °C |
| Output Ripple[1]<br>range 0 to 50 kHz<br>(referred to output range) | ±0.05% |
| Non-linearity (in percent full scale) | ±0.05% |
| Repeatability[2]<br>(in percent full scale) | ±0.05% |
| Output Error Over Full Temperature Range<br>(0 to 60°C [+32 to +140°F]) | Current: ±0.55% |
| Output Offset Error<br>(0 to 60°C [+32 to +140°F]) | ±0.05% |
| Output Impedance | >1 MΩ |
| Open and Short-Circuit Protection | Yes |
| Maximum Short-Circuit Current | 21 mA |
| Output Overvoltage Protection | Yes |
| Time to Detect Open Wire Condition | 5 ms |
| Output Response at System Power Up and Power Down | ± 0.5V dc spike for < 5 ms |
| Rated Working Voltage[3] | 30V ac/30V dc |
| Output Group to Bus Isolation | 500V ac or 710V dc for 1 minute (qualification test)<br><br>30V ac/30V dc working voltage (IEC Class 2 reinforced insulation) |
| Module OK LED | On: module has power, has passed internal diagnostics, and is communicating over the bus.<br><br>Flashing: external power failure.<br><br>Off: Any of the above is not true. |
| Channel Diagnostics | Over- or under-range by bit reporting<br><br>output wire broken or load resistance high by bit reporting |

[1]    Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

[2]    Repeatability is the ability of the output module to reproduce output readings when the same controller value is applied to it consecutively, under the same conditions and in the same direction.

[3]    Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V dc input signal and 20V dc potential above ground).

| Specification | 1769-OF8C |
|---|---|
| System Power Supply Distance Rating | The module may not be more than 8 modules away from the system power supply. |
| Optional 24V dc Class 2 Power Supply Voltage Range[1] | 20.4 V to 26.4 V dc |
| Recommended Cable | Belden™ 8761 (shielded) |
| Vendor I.D. Code | 1 |
| Product Type Code | 10 |
| Product Code | 40 |
| Input Words | 11 |
| Output Words | 9 |
| Configuration Words | 64 |

[1]   Failure to use a Class 2 power supply without regulation within these limits could result in improper module operation.

# 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.
- When in hazardous locations, turn off power before replacing or wiring modules.
- Do not 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.

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

## For More Information

| For | Refer to this Document | Pub. No. |
|---|---|---|
| A more detailed description of how to install and use your Compact I/O with MicroLogix 1500 programmable controller. | MicroLogix 1500 Programmable Controllers User Manual | 1764-UM001A-US-P |
| Detailed information on installing, programming, and troubleshooting your Compact Analog I/O modules. | Compact I/O Analog Modules User Manual | 1769-UM002A-EN-P |
| A detailed description of how to install and use your Compact I/O with the 1769-ADN DeviceNet Adapter. | 1769-ADN DeviceNet Adapter User Manual | 1769-UM001A-US-P |
| An overview of the MicroLogix 1500 system, including Compact I/O. | MicroLogix 1500 Programmable Controller with Compact I/O for Expansion | 1764-SO001B-EN-P |
| More information on proper wiring and grounding techniques. | Industrial Automation Wiring and Grounding Guidelines | 1770-4.1 |

If you would like a manual, you can:

- download a free electronic version from the internet:
  **www.ab.com/micrologix** or **www.theautomationbookstore.com**
- purchase a printed manual by:
– contacting your local distributor or Rockwell Automation representative
– visiting **www.theautomationbookstore.com** and placing your order
– calling 1.800.963.9548 (USA/Canada)
  or 001.330.725.1574 (Outside USA/Canada)

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**Notes:**

# Notes:

**Notes:**

# Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

## Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

| | |
|---|---|
| United States | 1.440.646.3223 Monday – Friday, 8am – 5pm EST |
| Outside United States | Please contact your local Rockwell Automation representative for any technical support issues. |

## New Product Satisfaction Return

Rockwell tests all of our products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

| | |
|---|---|
| United States | Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for return procedure. |

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