Installation Instructions

Compact™ Combination Analog I/O Module

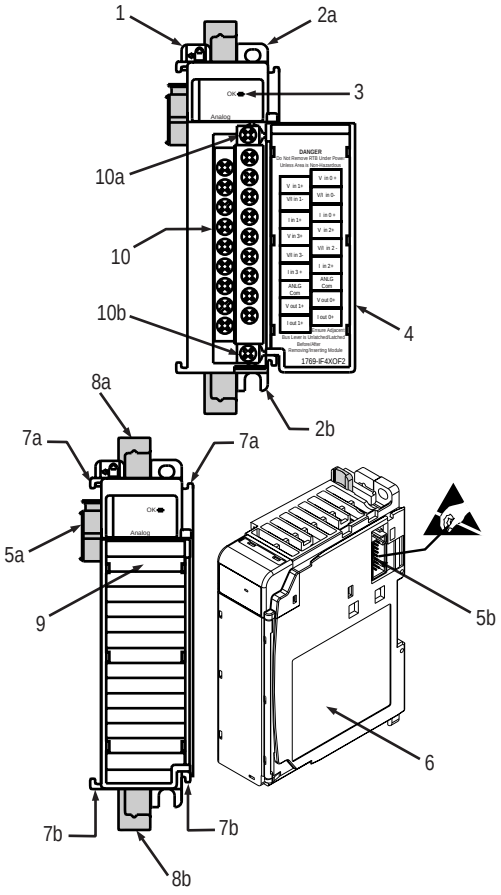
(Catalog Number 1769-IF4XOF2)

Inside

Publication 1769-IN057A-EN-P - July 2001

Module Description

The 1769-IF4XOF2 module features 4 analog input points and 2 analog output points, with input and output ranges of 0 to 10V dc and 0 to 20 mA, with 8-bit resolution.



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.

(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.

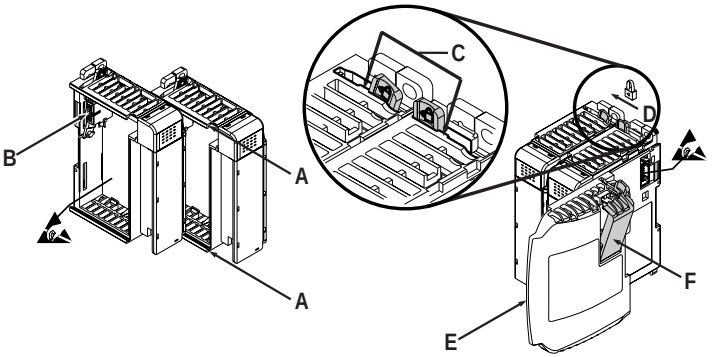
(2) Over Voltage Category II is the load level section of the electrical distribution system. At this level transient voltages are controlled and do not exceed the impulse voltage capability of the product's insulation.

(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 (A) to secure the modules together (or to a controller).
4. Move the module back along the tongue-and-groove slots until the bus connectors (B) line up with each other.
5. Push the bus lever back slightly to clear the positioning tab (C). Use your fingers or a small screwdriver.
6. To allow communication between the controller and module, move the bus lever fully to the left (D) 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 (E) to the last module in the system by using the tongue-and-groove slots as before.

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

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

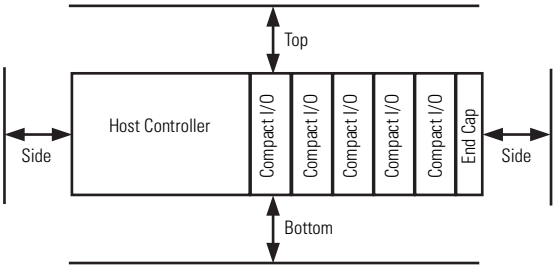
Mounting Expansion I/O

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

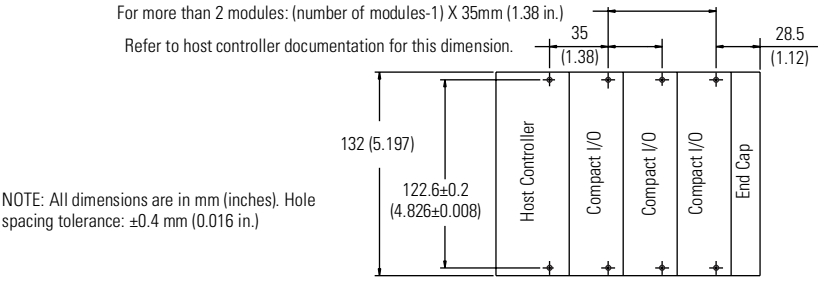
Maintain spacing from enclosure walls, wireways, adjacent equipment, etc. Allow 50 mm (2 in.) of space on all sides for adequate ventilation, as shown:



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



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

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

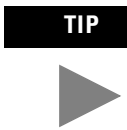
The module can be mounted using the following DIN rails: 35 x 7.5 mm (EN 50 022 - 35 x 7.5) or 35 x 15 mm (EN 50 022 - 35 x 15).

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 these steps 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).



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-RTBN18 (1 per kit)
- 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. (2)
- If multiple power supplies are used with analog inputs, the power supply commons must be connected.
- The 1769-IF4XOF2 module does not provide loop power for analog inputs. Use a power supply that matches the input transmitter specifications.
- Differential analog inputs are more immune to noise than single-ended analog inputs.

(1) In environments where high-frequency noise may be present, it may be necessary to directly ground cable shields to earth at the module end and via a 0.1µF capacitor at the sensor end.

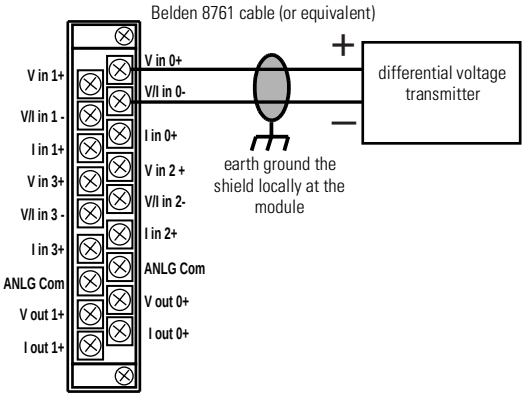
(2) Cable length over 50 meters may impact accuracy., For details, refer to the*Compact Combination Analog I/O Module,* publication 1769-UM008A-EN-P.

- Voltage outputs (Vout 0+ and Vout 1+) of the 1769-IF4XOF2 module are referenced to ANLG COM. Load resistance for a voltage output channel must be equal to or greater than 1K Ω.
- Current outputs (Iout 0+ and Iout 1+) of the 1769-IF4XOF2 module source current that returns to ANLG COM. Load resistance for a current output channel must remain between 0 and 300 Ω.
- Voltages on Vin+, V/Iin-, and Iin+ of the 1769-IF4XOF2 module must be within 0 to +10V dc of analog common.

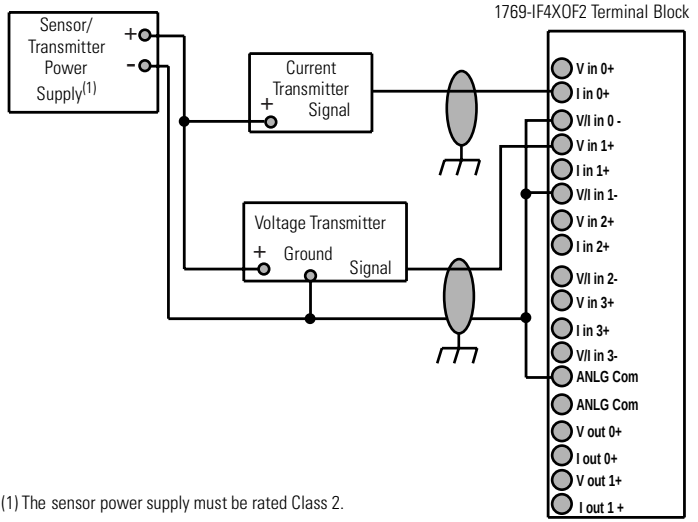
ATTENTION

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.

Wiring Differential Inputs

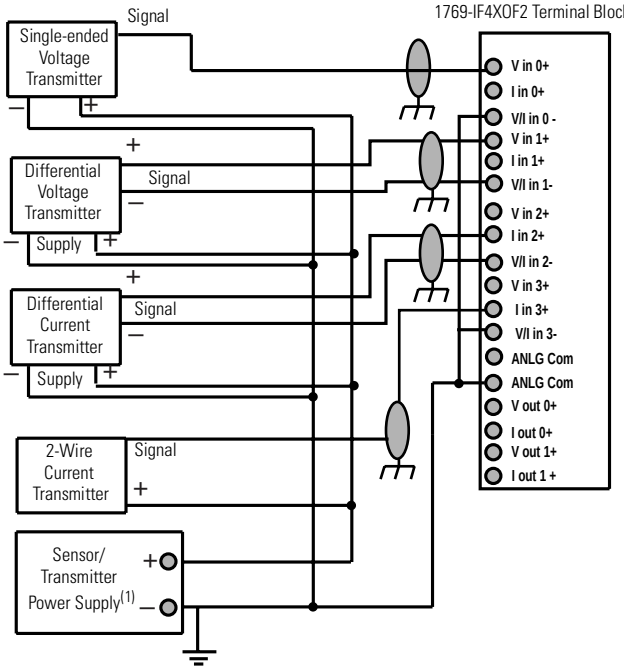


Wiring Single-Ended Sensor/Transmitter Types



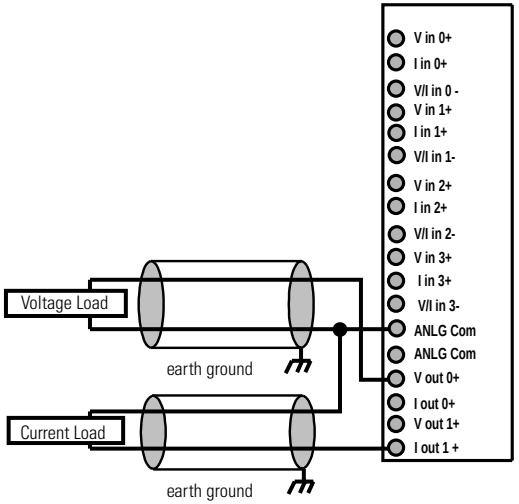
(1) The sensor power supply must be rated Class 2.

Wiring Mixed Transmitter Types



(1) The sensor power supply must be rated Class 2.

Wiring Analog Outputs



ATTENTION

Analog outputs may fluctuate for less than a second when power is applied or removed. This characteristic is common to most analog outputs. While the majority of loads will not recognize this short signal, take preventive measures to ensure that connected equipment is not affected.

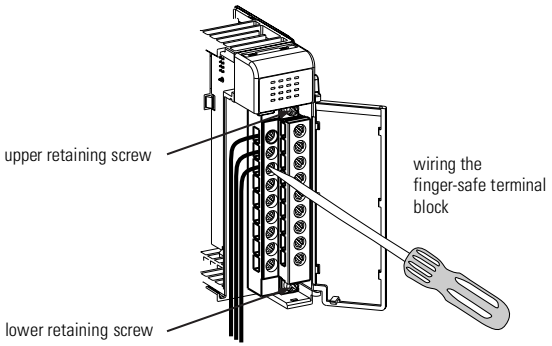
Labeling the Terminals

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

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 location and type.

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).

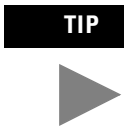


Wiring the Finger-Safe Terminal Block

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.



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).

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

Input Data File

The input data file provides access to input data for use in the control program, over-range indication for the input and output channels, and output data feedback as described below.

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	SGN	Analog Input Data Channel 0								0	0	0	0	0	0	0
1	SGN	Analog Input Data Channel 1								0	0	0	0	0	0	0
2	SGN	Analog Input Data Channel 2								0	0	0	0	0	0	0
3	SGN	Analog Input Data Channel 3								0	0	0	0	0	0	0
4	Not Used(1)												I3	I2	I1	I0
5	Not Used	H0	Not Used	H1	Not Used(1)								E1	E0	O1	O0
6	SGN	Output Data Echo/Loopback for Output Channel 0								0	0	0	0	0	0	0
7	SGN	Output Data Echo/Loopback for Output Channel 1								0	0	0	0	0	0	0

(1) All unused bits are set to 0 by the module.

IMPORTANT Input words 6 and 7 contain the Output Data Echo/Loopback information for output channels 0 and 1 respectively. Bits 0 through 6 and Bit 15 of words 6 and 7 should always be set to zero in your control program. If they are not set to 0, the invalid data flag (Ex) will be set for that channel by the module. However the channel will continue to operate with the previously converted value.

The bits are defined as follows:

- **SGN** = Sign bit in two's complement format. Always positive (equal to zero) for the 1769-IF4XOF2 module.
- **Ix** = Over-range flag bits for input channels 0 through 3. These bits can be used in the control program for error detection. When set to 1, the bits signal that the input signal is outside the normal operating range. However, the module continues to convert analog data to the maximum full-range value. When the over-range condition is cleared, the bits automatically reset (0).
- **Ox** = Word 5, bits 0 and 1 provide over-range indication for output channels 0 and 1. These bits can be used in the control program for error detection. When set to 1, the bits signal that the output signal is outside the normal operating range. However, the module continues to convert analog data to the maximum full-range value. When the over-range condition is cleared, the bits automatically reset (0).

Under-range indication is not provided because zero is a valid number.

- **Ex** = When set (1), this bit indicates that invalid data (e.g. the value sent by the controller is outside the standard output range or increment; e.g. 128, 256, etc.) has been set in the output data bits 0 through 6, or the sign bit (15).
- **Hx** = Hold Last State bits. When set (1), these bits indicate that the channel is in a Hold Last State condition.
- **Words 6 and 7** = These words reflect the analog output data echo of the analog value being converted by the digital/analog converter, not necessarily the electrical state of the output terminals. They do not reflect shorted or open outputs.

IMPORTANT It is only important to use the loopback function of input words 6 and 7 if the controller supports the Program Mode or Fault Mode functions, and if it is configured to use them.

Output Data File

The output data file applies only to output data from the module as shown in the table below.

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								0	0	0	0	0	0	0
1	SGN	Analog Output Data Channel 1								0	0	0	0	0	0	0

IMPORTANT Bits 0 through 6 and Bit 15 of output data words 0 and 1 should always be set to zero in your control program. If they are not set to 0, the invalid data flag (Ex) will be set for that channel. However the channel will continue to operate with the previously converted value. If a MVM (Move with Mask) instruction is used with a mask of 7F80 (hexidecimal) to move data to the output words, writing to bits 0 through 6 and bit 15 can be avoided.

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 typically 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. Refer to the *Compact™ Combination Analog I/O Module User Manual*, publication number 1769-UM008A-EN-P for additional details.

Word	Bit Position															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Not Used(1)	Not Used(1)			Not Used(1)				EI3	EI2	EI1	EI0	FM0(2)	PM0(2)	Not Used(1)	PFE0(2)
1	Not Used(1)	Not Used(1)			Not Used(1)				Not Used(1)	Not Used(1)	EO1	EO0	FM1(2)	PM1(2)	Not Used(1)	PFE1(2)
2	SGN	Channel 0 Fault Value(2)								0	0	0	0	0	0	0
3	SGN	Channel 0 Program (Idle) Value(2)								0	0	0	0	0	0	0
4	SGN	Channel 1 Fault Value(2)								0	0	0	0	0	0	0
5	SGN	Channel 1 Program (Idle) Value(2)								0	0	0	0	0	0	0

(1) Any attempt to write a non-valid (1's) bit configurations into any not used selection field results in a module configuration error.

(2) Not all controllers support these functions. Refer to your controller's user manual for details.

The bits are defined as follows:

- **SGN** = Sign bit in two's complement format. The sign of the data for the 1769-IF4XOF2 must be positive (Bit 15 = 0) or a configuration error occurs.
- **EIx** = Individually enable or disable input channels 0 through 3 using these bits. When a channel is not enabled, the module provides no current or voltage input to the host controller.
- **EOx** = Individually enable or disable output channels 0 and 1 using these bits. When a channel is not enabled, the module does not produce current or voltage.

The enable bit remains set even when a channel is configured incorrectly. However, a configuration error for that channel is set. When this occurs, disable the channel, reconfigure the channel correctly, and then enable the channel.

- **PMx** = These bits provide Program (Idle) Mode selection for analog output channels 0 and 1.

Hold Last State (0) – When reset, this bit directs the module to hold the analog output at the last converted value when the module transitions to Program Mode. This is the default condition.

User-Defined Safe State (1) – When this bit is set and the module transitions to Program mode, the module converts the user-specified integer value from the Channel x Program Value Word (3 or 5) to the appropriate analog output for the configured range as wired.

- **FMx** = These bits provide Fault Mode selection for analog output channels 0 and 1.

  Hold Last State (0) – When reset, this bit directs the module to hold the analog output at the last converted value when the module transitions to Fault Mode. This is the default condition.

  User-Defined Safe State (1) – When this bit is set and the module transitions to Fault mode, the module converts the user-specified integer value from the Channel x Fault Value Word (2 or 4) to the appropriate analog output for the configured range as wired.

- **PFEx** = The Program to Fault Enable bit determines which data value, Program (PFEx = 0) or Fault (PFEx = 1), is applied to the output if the module undergoes a fault condition while in the Program Mode, resulting in a change to Fault Mode.

- **Channel x Program (Idle) Value**

  Words 3 and 5 allow you to enter the integer values that output Channel 0 (Word 3) and output Channel 1 (Word 5) should assume when the system transitions to the Program mode. The value must be in increments of 128 (0, 128, 256, etc.) for proper operation. If the value entered is outside the acceptable increment or range, the module generates a configuration error for that channel. The module default is zero.

- **Channel x Fault Value**

  Words 2 and 4 allow you to enter the integer values that output Channel 0 (Word 2) and output Channel 1 (Word 4) should assume when the system transitions to the Fault mode. The value must be in increments of 128 (0, 128, 256, etc.) for proper operation. If the value entered is outside the acceptable increment or range, the module generates a configuration error for that channel. The module default is zero.

IMPORTANT PMx, FMx, PFEx, Channel x Program (Idle) Value, and Channel x Fault Value functions are not supported by all controllers. Refer to your controller's user manual for details.

Specifications

General Specifications

Specification	1769-IF4XOF2
Dimensions	118 mm (height) x 87 mm (depth) x 35 mm (width) height including mounting tabs is 138 mm 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)	290g (0.64 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 (when a relay module is used in the system)
Shock	Operating: 30G, 11 ms panel mounted (20G, 11 ms DIN rail mounted) Relay Operation: 7.5G panel mounted (5G DIN rail mounted) Non-Operating: 40G panel mounted (30G DIN rail mounted)
Bus Current Draw (max.)	120 mA at 5V dc 160 mA at 24V dc
Heat Dissipation	3.03 Total Watts (The Watts per point, plus the minimum Watts, with all points energized.)
System Power Supply Distance Rating	8 (The module may not be more than 8 modules away from the system power supply.)
Recommended Input/Output Cable	Belden™ 8761 (shielded)
Max. Input/Output Cable Length	200m (656 feet) Exceeding cable length reduces accuracy. For more information, see the Compact Combination Analog Module User Manual, publication number 1769-UM008A-EN-P.
Module OK LED	On: module has power, has passed internal diagnostics, and is communicating over the bus. Off: Any of the above is not true.
Field Calibration	None required
Vendor I.D. Code	1
Product Type Code	10
Product Code	33
Agency Certification	• C-UL certified (under CSA C22.2 No. 142) • UL 508 listed • CE and C-Tick compliant for all applicable directives
Hazardous Environment Class	Class I, Division 2, Hazardous Location, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 No. 213)
Radiated and Conducted Emissions	EN50081-2 Class A

Specification	1769-IF4XOF2
Electrical /EMC:	*The module has passed testing at the following levels:*
ESD Immunity (IEC61000-4-2)	• 4 kV contact, 8 kV air, 4 kV indirect
Radiated Immunity (IEC61000-4-3)	• 10 V/m , 80 to 1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier
Fast Transient Burst (IEC61000-4-4)	• 2 kV, 5kHz
Surge Immunity (IEC61000-4-5)	• 1 kV galvanic gun
Conducted Immunity (IEC61000-4-6)	• 10 V, 0.15 to 80MHz(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.

Input Specifications

Input Specification	1769-IF4XOF2
Number of Inputs	4 differential or single-ended
Analog Normal Operating Ranges(1)	Voltage: 0 to 10V dc Current: 0 to 20 mA
Full Scale Analog Ranges(1)	Voltage:0 to 10.5V dc Current: 0 to 21 mA
Converter Type	Successive Approximation
Resolution (max.)	8 bits plus sign (Sign is always positive.)
Response Speed per Channel	5 ms
Rated Working Voltage(2)	30V ac/30V dc
Common Mode Voltage(3)	10V dc maximum per channel
Common Mode Rejection	greater than 60 dB at 60 Hz at 10V between inputs and analog common
Normal Mode Rejection Ratio	none
Input Impedance	Voltage Terminal: 150K Ω (nominal) Current Terminal: 150 Ω (nominal)
Overall Accuracy(4) at 25°C	Voltage Terminal: ±0.7% full scale Current Terminal: ±0.6% full scale
Overall Accuracy at 0 to 60°C	Voltage Terminal: ±0.9% full scale Current Terminal: ±0.8% full scale
Accuracy Drift with Temperature	Voltage Terminal: ±0.006% per °C Current Terminal: ±0.006% per °C
Calibration	Not required. Accuracy is guaranteed by components.
Non-linearity (in percent full scale)	±0.4%
Repeatability(5)	±0.4%
Input Channel Configuration	via wiring of devices, configuration software screen, or the user program (by writing a unique bit pattern into the module's configuration file). Refer to your controller's user manual to determine if user program configuration is supported.

Input Specification	1769-IF4XOF2
Maximum Overload at Input Terminals(6)	Voltage Terminal: 20V continuous, 0.1 mA Current Terminal: 32 mA continuous, +5V dc
Input Group to Bus Isolation	500V ac or 710V dc for 1 minute (qualification test) 30V ac/30V dc working voltage (IEC Class 2 reinforced insulation)
Channel Diagnostics	Over-range by bit reporting

(1) The over-range flag will come on when the normal operating range 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.

(2) 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).

(3) For proper operation, both the plus and minus input terminals must be within 0 to +10V dc of analog common.

(4) Includes offset, gain, non-linearity and repeatability error terms.

(5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(6) Damage may occur to the input circuit if this value is exceeded.

Output Specifications

Output Specification	1769-IF4XOF2
Number of Outputs	2 single-ended
Analog Normal Operating Ranges(1)	Voltage: 0 to 10V dc Current: 0 to 20 mA
Full Scale Analog Ranges(1)	Voltage:0 to 10.5V dc Current: 0 to 21 mA
Converter Type	Resistor String
Resolution (max.)	8 bits plus sign (Sign is always positive, Bit 15 = 0.)
Response Speed per Channel	0.3 ms for rated resistance and rated inductance 3.0 ms for rated capacitance
Current Load on Voltage Output	10 mA max.
Resistive Load on Current Output	0 to 300 Ω (includes wire resistance)
Load Range on Voltage Output	> 1 kΩ at 10V dc
Max. Inductive Load (Current Outputs)	0.1 mH
Max. Capacitive Load (Voltage Outputs)	1 µF
Overall Accuracy at 25°C(2)	Voltage Terminal: ±0.5% full scale Current Terminal: ±0.5% full scale
Overall Accuracy at 0 to 60°C	Voltage Terminal: ±0.6% full scale Current Terminal: ±1.0% full scale
Accuracy Drift with Temperature	Voltage Terminal: ±0.01% full scale per °C Current Terminal: ±0.01% full scale per °C

Output Specification	**1769-IF4XOF2**
Output Ripple(3) range 0 to 50 kHz (referred to output range)	±0.05%
Non-linearity (in percent full scale)	±0.4%
Repeatability(4) (in percent full scale)	±0.05%
Output Impedance	10 Ω (nominal)
Open and Short-Circuit Protection	Yes
Maximum Short-Circuit	Current: 40 mA
Maximum Open Circuit	Voltage: 15V
Output Response at System Power Up and Power Down	+2.0V dc to -1.0V dc spike for less than 6 ms
Output Group to Bus Isolation	500V ac or 710V dc for 1 minute (qualification test) 30V ac/30V dc working voltage (IEC Class 2 reinforced insulation)
Channel Diagnostics	Over-range by bit reporting

(1) The over-range flag will come on when the normal operating range is exceeded. The module will continue to convert the analog output up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Includes offset, gain, drift, non-linearity and repeatability error terms.

(3) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

(4) 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.

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.

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 how to install and use your Compact I/O with the CompactLogix™ System.	CompactLogix System User Manual	1769-UM007C-EN-P
Detailed information on installing, programming, and troubleshooting your Compact Combination Analog I/O module.	Compact Combination Analog Module User Manual	1769-UM008A-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)
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Rockwell Automation

Publication 1769-IN057A-EN-P - July 2001

PN 40071-140-01(A)