Installation Instructions

Compact I/O Analog Output Module

Catalog Number 1769-OF4

ALLEN-BRADLEY • ROCKWELL SOFTWARE **Rockwell Automation**

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

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.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION ⚠	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
SHOCK HAZARD ⚡	Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
BURN HAZARD ♨	Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.

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.
- Use a static-safe work station, if available.
- Keep the module in its static-shield box when not in use.

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.

Hazardous Location

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D or non-hazardous locations only. The following 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 is switched off or the area is known to be non-hazardous.
	Do not connect or disconnect components unless power is switched off or the area is known to be non-hazardous.
	This product must be installed in an enclosure.
	All wiring must comply with Class I, Division 2 wiring methods of Article 501 of the National Electrical Code and/or in accordance with Section 18-1J2 of the Canadian Electrical Code, and in accordance with the authority having jurisdiction.

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.

About the 1769-OF4 Module

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 for circuits not exceeding Over Voltage Category II[2] (IEC 60664-1)[3].

Module Description
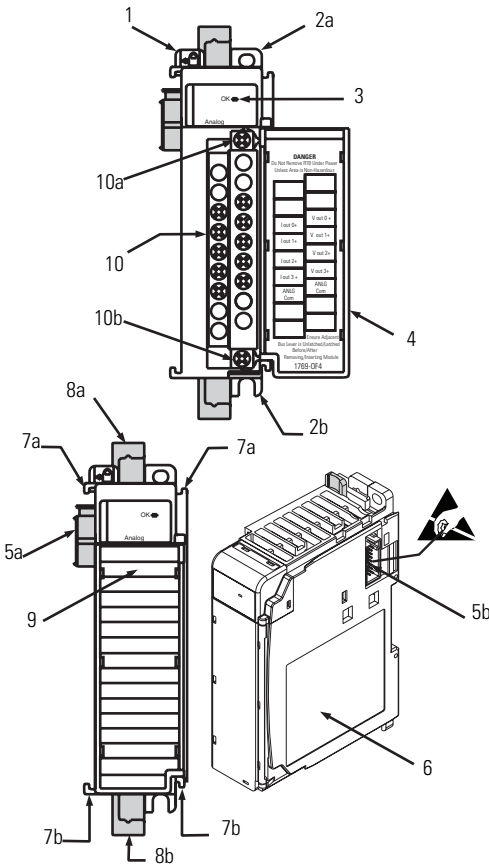
Item	Description
1	Bus lever (with locking function)
2a	Upper panel mounting tab
2b	Lower panel mounting tab
3	Module status indicator
4	Module door with terminal identification label
5a	Movable bus connector with female pins
5b	Stationary bus connector with male pins
6	Nameplate label
7a	Upper tongue-and-groove 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

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

Simplified Block Diagram
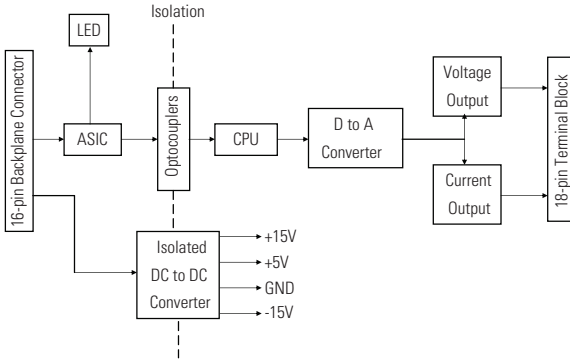
Install the 1769-OF4 Module

Attach the module to the controller or an adjacent I/O module before or after mounting. For mounting instructions, see Mount Module to Panel by Using the Dimensional Template, or Mount Module to a DIN Rail. To work with a system that is already mounted, see .

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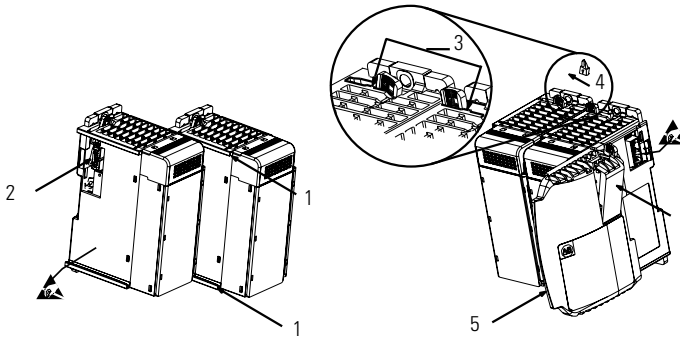
1. Disconnect power.

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, making sure 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 be sure of proper electrical connection. Securely locking together the bus connectors is required for use in hazardous locations.
⚠️	For more information on hazardous locations, see page 4.

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	You must use a 1769-ECR (right) or 1769-ECL (left) end cap to terminate the end of the serial communication bus. An I/O configuration fault will occur if an end cap is not used.

Replace 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 .

2. Remove the upper and lower mounting screws from the module or open the DIN latches by using a flat-blade or Phillips screwdriver.

3. Move the bus lever to the right to disconnect or 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 is disconnected from the bus and that both mounting screws are 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. Be sure that the bus lever on the module and on the right-side adjacent module are in the unlocked (fully right) position before installing the replacement module.

7. Slide the replacement module into the open slot.

8. Connect the modules 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.

Mount Expansion I/O

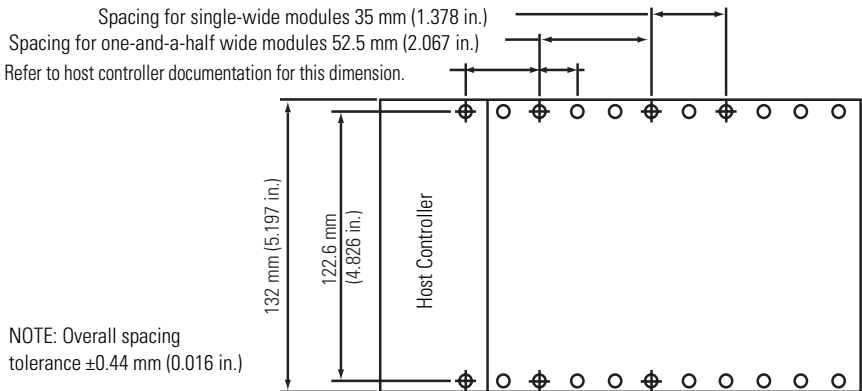| **ATTENTION**	During panel or DIN rail mounting of all devices, be sure that all debris, that is, metal chips or wire strands, is kept from falling into the module. Debris that falls into the module could cause damage when cycling power.

Minimum Spacing

Maintain spacing from enclosure walls, wireways, or adjacent equipment. Allow 50 mm (2 in.) of space on all sides for adequate ventilation, as shown.
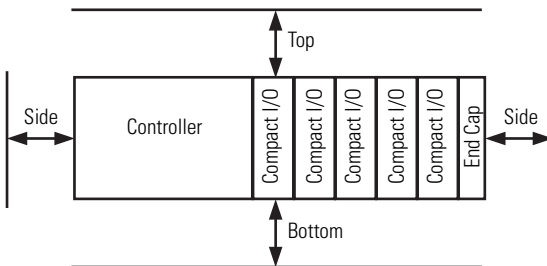
Mount Module to Panel

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

Mount Module to Panel by Using the Dimensional Template

Spacing for single-wide modules 35 mm (1.378 in.)
Spacing for one-and-a-half wide modules 52.5 mm (2.067 in.)
Refer to host controller documentation for this dimension.

132 mm (5.197 in.)
122.6 mm (4.826 in.)
Host Controller

NOTE: Overall spacing tolerance ±0.44 mm (0.016 in.)

Locate holes every 17.5 mm (0.689 in.) to allow for a mix of single-wide and one-and-a-half-wide modules (for example, the 1769-OA16 module).

Mount Module to Panel by Using Modules as a Template

This procedure lets you use the assembled modules as a template for drilling holes in the panel. See Mount Module to Panel by Using the Dimensional Template on page 9 if you have sophisticated panel mounting equipment.

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

Due to module-mounting hole tolerance, it is important to follow this procedure.

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

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

3. Drill and tap the mounting holes for the recommended M4 or #8 screws.

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

5. Attach the modules to the panel by using the mounting screws.

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

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

Mount Module to a DIN Rail

The module can be mounted by using these DIN rails:

- 35 x 7.5 mm (EN 50 022 - 35 x 7.5)
- 35 x 15 mm (EN 50 022 - 35 x 15)

To mount the module on a DIN rail, follow these steps.

1. Close the DIN rail latches.

2. Press the DIN-rail mounting area of the module against the DIN rail.

The latches will momentarily open and lock into place.

Replacement Parts

The 1769-OF4 module has the following replacement parts:

- Terminal block, catalog no. 1769-RTBN10 (1 per kit)
- Door, catalog no. 1769-RD (2 per kit)

Field Wiring Connections

This section includes information on the following topics:

- Module grounding
- System wiring guidelines
- Module wiring
- Analog outputs wiring
- Terminal labeling
- Finger-safe terminal block wiring and removal
- Wire size and terminal screw torque
- Module configuration

Ground 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 <u>1770-4.1</u>, 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]
- For 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]
- Voltage outputs (Vout 0+…Vout 3+) of the 1769-OF4 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+…Iout 3+) of the 1769-OF4 module source current that returns to ANLG COM. Load resistance for a current output channel must remain between 0 and 600 Ω.

ATTENTION

⚠

Be careful when stripping wires. Wire fragments that fall into a module can cause damage at power up. Once wiring is complete, make sure the module is free of all metal fragments.

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(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 0.01μF, 2000V capacitor at the sensor end.

(2) Cable length over 50 meters may impact accuracy. For details, refer to the Compact I/O Analog Output Module User Manual, publication <u>1769-UM020</u>.

Wire Analog Outputs

1769-OF4 Terminal Block
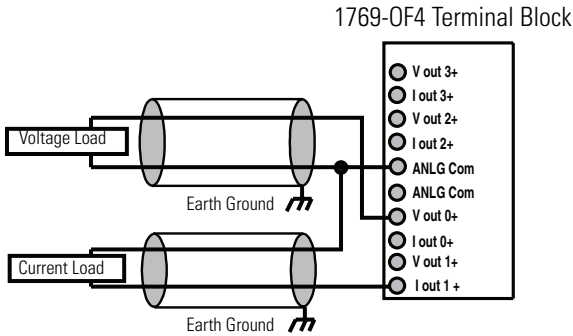
ATTENTION

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 make sure that connected equipment is not affected. Failure to take these preventative measures may result in unexpected load reactions.

Label 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.

Remove 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.
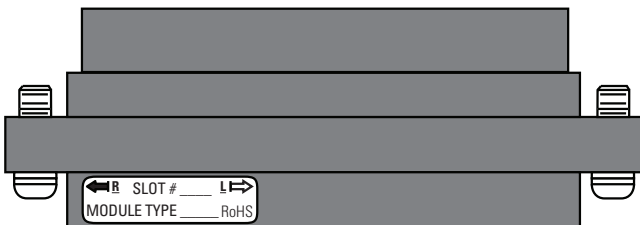
To remove the terminal block, loosen the upper and lower retaining screws. The terminal block will back away from the module as you remove the screws. When replacing the terminal block, torque the retaining screws to 0.46 N•m (4.1 lb•in).

Upper Retaining Screw

Wiring the Finger-safe Terminal Block

Lower Retaining Screw
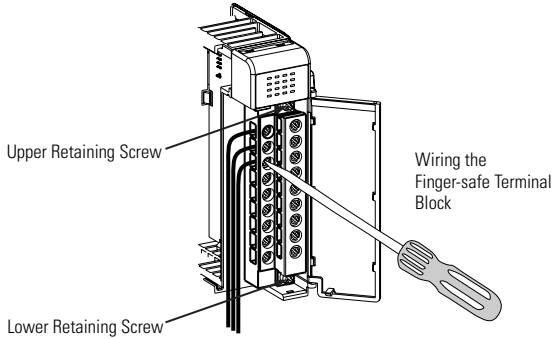
Wire the Finger-safe Terminal Block

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 N•m (6 lb•in).

   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 two wires with the following restrictions.

Wire Type		Wire Size	Terminal Screw Torque	Retaining Screw Torque
Solid	Cu-90 °C (194 °F)	14…22 AWG (2.08…0.33 mm^2)	0.68 N•m (6 lb•in)	0.46 N•m (4.1 lb•in)
Stranded	Cu-90 °C (194 °F)	16…22 AWG (1.31…0.33 mm^2)	0.68 N•m (6 lb•in)	0.46 N•m (4.1 lb•in)

Configure the 1769-OF4 Module

The following I/O memory mapping lets you configure the 1769-OF4 module.

Output Data File

For each module, slot x, words 0…3 in the output data file contain the control program's directed state of the module's analog output channels. Word 4 contains the cancel output-channel-clamp alarm control bits.

Word/Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Word 0	SGN	Analog Output Data Channel 0														
Word 1	SGN	Analog Output Data Channel 1														
Word 2	SGN	Analog Output Data Channel 2														
Word 3	SGN	Analog Output Data Channel 3														
Word 4	NU	NU	NU	NU	NU	NU	NU	NU	CL 03	CH 03	CL 02	CH 02	CL 01	CH 01	CL 00	CH 00

The bits are defined as follows:

- SGN = Sign bit in 2's complement format.
- NU = Not used. Bit must be set to 0.
- CHOx = Cancel High Clamp Alarm Latch for Output x: Allows each output high-clamp-alarm latch to be individually cancelled. NOTE: Cancel = 1.
- CLOx = Cancel Low Clamp Alarm Latch for Output x: Allows each output low-clamp-alarm-latch to be individually cancelled. NOTE: Cancel = 1.

Input Data File

For each module, slot x, word 0 in the input data file contains the status bits for the module's analog output channels. Words 1…4 contain the directed values of the analog output channels (output data echo).

Word/Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Word 0	U3	O3	U2	O2	U1	O1	U0	O0	NU	NU	NU	NU	S3	S2	S1	S0
Word 1	SGN	Output Data Loopback/Echo Channel 0														
Word 2	SGN	Output Data Loopback/Echo Channel 1														
Word 3	SGN	Output Data Loopback/Echo Channel 2														
Word 4	SGN	Output Data Loopback/Echo Channel 3														

The bits are defined as follows:

- SGN = Sign bit in 2's complement format.
- NU = Not Used. Bit must be set to 0.
- Sx = General Status bit for output channels 0…3.
- Ox = Over range flag bits for output channels 0…3.
- Ux = Under range flag bits for output channels 0…3.

Configuration Data File

The manipulation of bits from this file is normally done with programming software (for example, RSLogix 500 software or RSNetWorx for DeviceNet software) during initial configuration of the system. In that case, graphical screens provided by the programming software simplify configuration.

Some systems, like the 1769-ADN DeviceNet adapter system, 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, shown on the following page.

Configuration Data File

Word/Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Word 0	EC	NU							EHI	ELI	LC	ER	FM	PM	NU	PFE
Word 1	NU					Format Ch0			NU				Type/Range Sel Ch0			
Word 2	SGN	Fault Value Channel 0														
Word 3	SGN	Program (Idle) Value Channel 0														
Word 4	SGN	Clamp High Data Value Channel 0														
Word 5	SGN	Clamp Low Data Value Channel 0														
Word 6	SGN	Ramp Rate Channel 0														
Word 7	NU															
Word 8	EC	NU							EHI	ELI	LC	ER	FM	PM	NU	PFE
Word 9	NU					Format Ch1			NU				Type/Range Sel Ch1			
Word 10	SGN	Fault Value Channel 1														
Word 11	SGN	Program (Idle) Value Channel 1														
Word 12	SGN	Clamp High Data Value Channel 1														
Word 13	SGN	Clamp Low Data Value Channel 1														
Word 14	SGN	Ramp Rate Channel 1														
Word 15	NU															
Word 16	EC	NU							EHI	ELI	LC	ER	FM	PM	NU	PFE
Word 17	NU					Format Ch2			NU				Type/Range Sel Ch2			
Word 18	SGN	Fault Value Channel 2														
Word 19	SGN	Program (Idle) Value Channel 2														
Word 20	SGN	Clamp High Data Value Channel 2														
Word 21	SGN	Clamp Low Data Value Channel 2														
Word 22	SGN	Ramp Rate Channel 2														
Word 23	NU															
Word 24	EC	NU							EHI	ELI	LC	ER	FM	PM	NU	PFE
Word 25	NU					Format Ch3			NU				Type/Range Sel Ch3			
Word 26	SGN	Fault Value Channel 3														
Word 27	SGN	Program (Idle) Value Channel 3														
Word 28	SGN	Clamp High Data Value Channel 3														
Word 29	SGN	Clamp Low Data Value Channel 3														
Word 30	SGN	Ramp Rate Channel 3														
Word 31	NU															

The bits are defined as follows:

- SGN = Sign bit in 2's complement format.
- EC = Enable Channel.
- NU = Not used. Bit must be set to 0.
- EHI = Enable Output Channel Interrupt on High Clamp Alarm.[1]
- ELI = Enable Output Channel Interrupt on Low Clamp Alarm.[1]
- LC = Latch Low/High Clamp and Under/Over Range Alarm.
- ER = Enable Ramping.[1]
- FM = Enable Fault Alternate Output State mode.[1]
- PM = Enable Program/Idle Alternate Output State mode.[1]
- PFE = Enable Program/Idle to Fault Alternate Output State mode.[1]
- Format Chx = Output Data Format Select.
- Type/Range Sel Chx = Output Type/Range Select.
- Fault Value Channel x = Provides the ability to configure the Fault mode alternate output value.[1]
- Program (Idle) Value Channel x = Provides the ability to configure the Program (Idle) alternate output value.[1]
- Clamp High Data Value Channel x = Provides the ability to configure the output high clamp value.
- Clamp Low Data Value Channel x = Provides the ability to configure the output low clamp value.
- Ramp Rate Channel x = Provides the ability to configure the Ramp Rate.[1]

[1] Interrupts, ramping, and alternate output states are not supported by all controllers. Refer to your controller's user manual to determine if these functions are available.

Range and Data Format Selections

Define	To Select	Make these bit settings															
		15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Type / Range Select	-10…+10V DC													0	0	0	0
	0…5V DC													0	0	0	1
	0…10V DC													0	0	1	0
	4…20 mA													0	0	1	1
	1…5V DC													0	1	0	0
	0…20 mA													0	1	0	1
Data Format Select	Raw/ Proportional Counts						0	0	0								
	Engineering Units						0	0	1								
	Scaled for PID						0	1	0								
	Percent Range						0	1	1								

Specifications

Compact I/O Analog Output Module - 1769-OF4

Attribute	Value
Dimensions (HxWxD), approx.	118 x 35 x 87 mm Height including mounting tabs is 138 mm (5.43 in.) 4.65 x 1.38 x 3.43 in. Height including mounting tabs is 138 mm (5.43 in.)
Approximate shipping weight (with carton)	280 g (0.61 lb)
Storage temperature	-40…+85 °C (-40…+185 °F)
Operating temperature	0 …+60 °C (32…+140 °F)
Operating humidity	5…95% noncondensing
Operating altitude	2000 m (6561 ft)
Vibration, operating	10…500 Hz, 5 G, 0.030 in. peak-to-peak
Shock, operating	30 G, 11 ms panel mounted (20G, 11 ms DIN rail mounted)
Shock, nonoperating	40G panel mounted (30G DIN rail mounted)
Bus current draw, max	120 mA at 5V DC; 170 mA at 24V DC
Heat dissipation	2.86 Total Watts *(The Watts per point plus the minimum Watts with all points energized.)*
Module OK indicator	On: module has power, has passed internal diagnostics, and is communicating over the bus. Off: Any of the above is not true.
System Power Supply Distance Rating	The module may not be more than 8 modules away from the system power supply.
Recommended Cable	Belden 8761 (shielded)
ESD Immunity (IEC1000-4-2)	4 kV contact, 8 kV air, 4 kV indirect
Radiated Immunity (IEC1000-4-3)	10 V/m, 80…1000 MHz, 80% amplitude modulation
Fast Transient Burst (IEC1000-4-4)	2 kV, 5 kHz
Surge Immunity (IEC1000-4-5)	1 kV galvanic gun
Conducted Immunity (IEC1000-4-6)	10V, 0.15…80 MHz
Vendor I.D. Code	1
Product Type Code	10
Product Code	48
Input Words	5
Output Words	5
Configuration Words	32

Certifications

Certification	Value
Agency Certification	• C-UL certified (under CSA C22.2 No. 142) • UL 508 listed • CE 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	EN50011 Class A

Output Specifications

Attribute	Value
Analog Normal Operating Ranges[1]	0…20 mA, 4…20 mA, +/-10V DC, 0…10V DC, 0…5 V DC, 1…5V DC
Full Scale Analog Ranges[1]	0…21 mA, 3.2…21 mA, +/-10.5V DC, -0.5…10.5V DC, -0.5… 5.25V DC, 0.5… 5.25V DC
Number of Outputs	Four single-ended, voltage or current
Digital Resolution Across Full Range	15 bits plus sign unipolar and bipolar
Conversion Rate (all channels) max.	Interrupts not enabled: 2.5 ms Interrupts enabled: 3.8 ms
Step Response to 63%[2]	2.9 ms
Resistive Load	Current: 0…600 Ω (includes wire resistance) Voltage: 1 KΩ or greater
Max. Inductive Load	0.1 mH (current loads), 1.0 uF (voltage loads)
Field Calibration	None required
Overall Accuracy[3]	0.5% full scale at 25 °C (77 °F)

(1)   The over- or under-range flag will come on when either the High Clamp or the Low Clamp values are exceeded. When either range flag is set, the module clamps the corresponding channel's output to the High Clamp or the Low Clamp value. Unless latched, the flag automatically resets when directed to a value between the High Clamp and the Low Clamp values. The output channel value always returns to normal operation when directed to a value allowed by the High Clamp and Low Clamp values (even if latching of the Clamp status bits is enabled).

(2)   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.

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

Attribute	Value
Accuracy Drift with Temperature	±0.0086% of full scale per °C
Output Ripple[1] range 0…50 kHz (referred to output range)	±0.05%
Non-linearity (in percent full scale)	±0.05%
Repeatability[2] (in percent full scale)	±0.05%
Output Error Over Full Temperature Range (0…60 °C [+32…140 °F])	+/-0.8% of full scale
Open and Short-circuit protection	Yes
Maximum Short-circuit current	40 mA
Output overvoltage protection	Yes
Rated working voltage	30V AC/30V DC
Output group to bus isolation	510V AC or 720V DC for 1 minute (qualification test) 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)
Channel diagnostics	High or Low Clamps Limit Exceeded, by status bit reporting
Output response at system power up and power down	2.5…-1.0V DC spike for less than 15 ms
Output Impedance	Voltage output: < 1 Ω Current output: > 1 MΩ

(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.

Additional Resources

For more information refer to the following publications.

Resource	Description
Compact I/O Analog Output Module User Manual, publication 1769-UM020.	Provides details on installing, configuring, operating, and troubleshooting your 1769-OF4 module
1768 CompactLogix Controllers User Manual, publication number 1768-UM001	Detailed description of how to install and use your 1768 CompactLogix controller
MicroLogix 1200 and MicroLogix 1500 Programmable Controllers User Manual, publication number 1762-RM001	Detailed description of how to install and use your Compact I/O with MicroLogix 1200/1500 programmable controllers
1769-ADN DeviceNet Adapter User Manual, publication number 1769-UM001	Detailed description of how to install and use your Compact I/O system with the 1769-ADN DeviceNet adapter
CompactLogix System User Manual, publication number 1769-UM007	Detailed description of how to install and use your Compact I/O system with the CompactLogix system
Industrial Automation Wiring and Grounding Guidelines, publication number, publication number 1770-4.1	More information on proper wiring and grounding techniques

You can view or download publications at http://literature.rockwellautomation.com. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its 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, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its 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, follow these instructions.

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