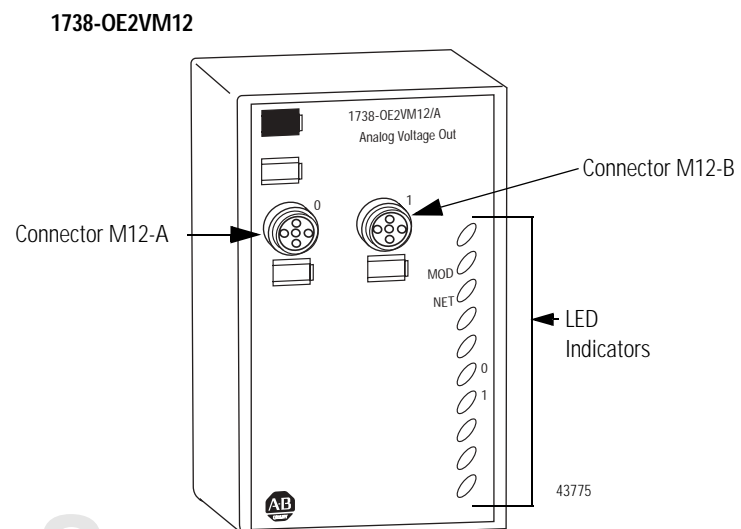
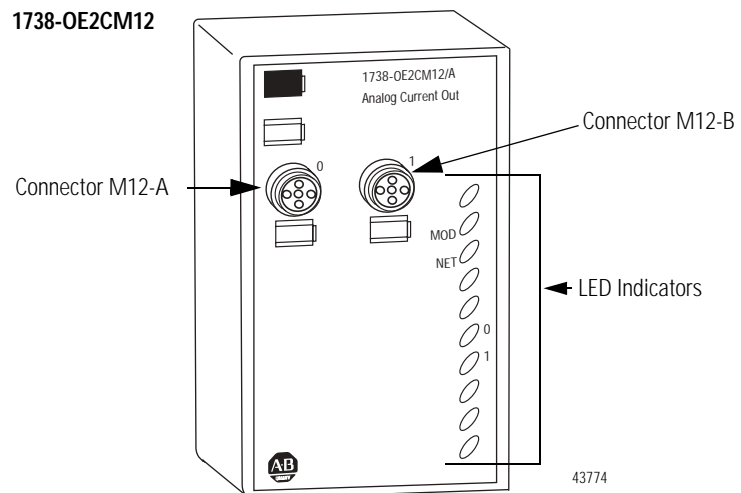




ArmorPoint 24V dc Analog Output Modules, Series A

(Cat. No. 1738-OE2CM12, -OE2VM12)

The ArmorPoint™ I/O family (Cat. no. 1738) consists of modular I/O modules. The sealed IP67 housing of these modules requires no enclosure. (Note that environmental requirements other than IP67 may require an additional appropriate housing.) I/O connectors are sealed M12 style. The mounting base ships with the module. The 1738-OE2CM12 and -OE2VM12 modules are shown below.



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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://www.ab.com/manuals/gi>) 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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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

<p>WARNING</p> 	<p>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.</p>
<p>IMPORTANT</p>	<p>Identifies information that is critical for successful application and understanding of the product.</p>
<p>ATTENTION</p> 	<p>Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you:</p> <ul style="list-style-type: none"> • identify a hazard • avoid a hazard • recognize the consequence
<p>SHOCK HAZARD</p> 	<p>Labels may be located on or inside the equipment to alert people that dangerous voltage may be present.</p>
<p>BURN HAZARD</p> 	<p>Labels may be located on or inside the equipment to alert people that surfaces may be dangerous temperatures.</p>

ATTENTION**Environment and Enclosure**

This equipment is intended for use in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "enclosed" equipment. It should not require additional system enclosure when used in locations consistent with the enclosure type ratings stated in the Specifications section of this publication. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings, beyond what this product provides, that are required to comply with certain product safety certifications.

NOTE: See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

ATTENTION



Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Mount the I/O Base

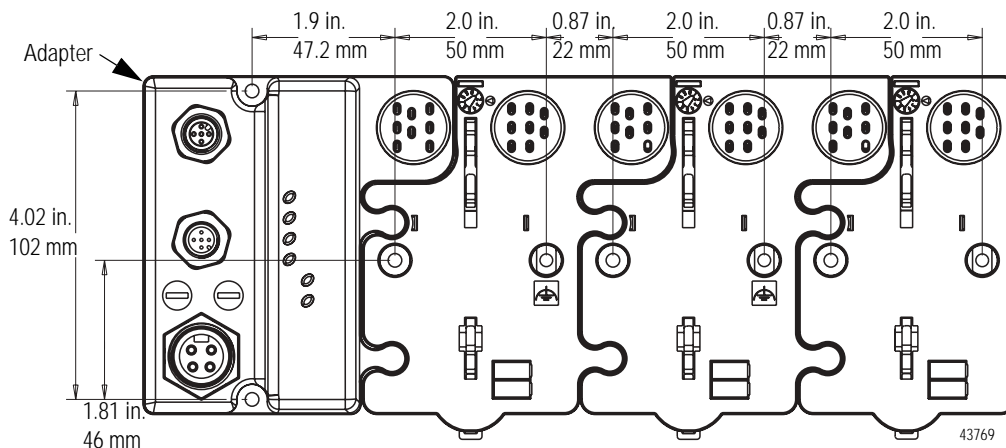
To mount the ArmorPoint I/O base on a wall or panel, use the screw holes provided in the ArmorPoint base.

ATTENTION



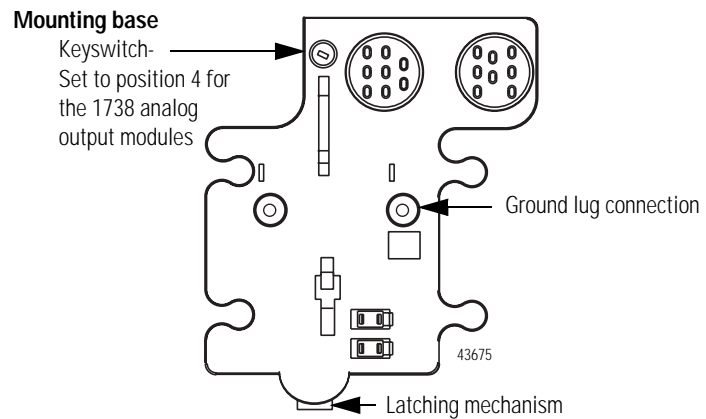
The ArmorPoint I/O module must be mounted on a grounded metal mounting plate or other conductive surface.

A mounting illustration for the ArmorPoint base with an adapter is shown below.



Install the mounting base as follows:

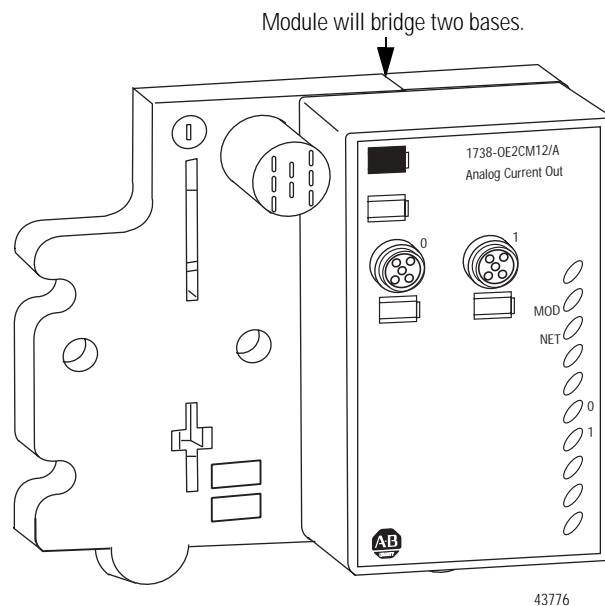
1. Lay out the required points as shown above in the drilling dimension drawing.
2. Drill the necessary holes for #8 (M4) machine or self-tapping screws.
3. Mount the base using #8 (M4) screws.
4. Ground the system using the ground lug connection. (The ground lug connection is also a mounting hole.)



Install the Analog Output Module

To install the analog output module, proceed as follows.

1. Using a bladed screwdriver, rotate the keyswitch on the mounting base clockwise until the number 4 aligns with the notch in the base.
2. Position the module vertically above the mounting base. The module will bridge two bases.



3. Push the module down until it engages the latching mechanism. You will hear a clicking sound when the module is properly engaged.

The locking mechanism will lock the module to the base.

Remove the Analog Output Module From the Mounting Base

To remove the module from the mounting base:

1. Put a flat blade screwdriver into the slot of the orange latching mechanism.
2. Push the screwdriver toward the I/O module to disengage the latch.

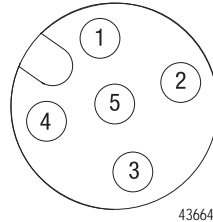
The module will lift up off the base.

3. Pull the module off of the base.

Wire the Analog Output Modules

Following are wiring instructions for the ArmorPoint analog output modules.

1738-OE2CM12 and 1738-OE2VM12



(view into connector)

Pin 1 - Output 0 (M12-A)

Output 1 (M12-B)

Pin 2 - 24V dc

Pin 3 - Common

Pin 4 - Common

Pin 5 - No Connect

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IMPORTANT

Analog modules have earth grounded metal rings. This should be considered when choosing shielded cables and grounding techniques.

ATTENTION



Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP67 requirements.

Communicate With Your Module

I/O messages are sent to (consumed) and received from (produced) the ArmorPoint I/O modules. These messages are mapped into the processor's memory. These ArmorPoint I/O analog output modules produce 2 bytes of input data (scanner Rx - fault status). They consume 4 bytes of output data (scanner Tx).

Default Data Map for the Analog Output Modules

1738-OE2CM12 and -OE2VM12

Message size: 2 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Produces (Scanner Rx)	High Byte - Channel 1 Status								Low Byte - Channel 0 Status							
	Not used				H C A	L C A	C M	C F	Not used				H C A	L C A	C M	C F

Where: CF = Channel Fault Status; 0 = no error, 1 = fault
 CM = Calibration Mode; 0 = normal, 1 = calibration mode
 LCA = Low Clamp Alarm; 0 = no error, 1 = fault
 HCA = High Clamp Alarm; 0 = no error, 1 = fault

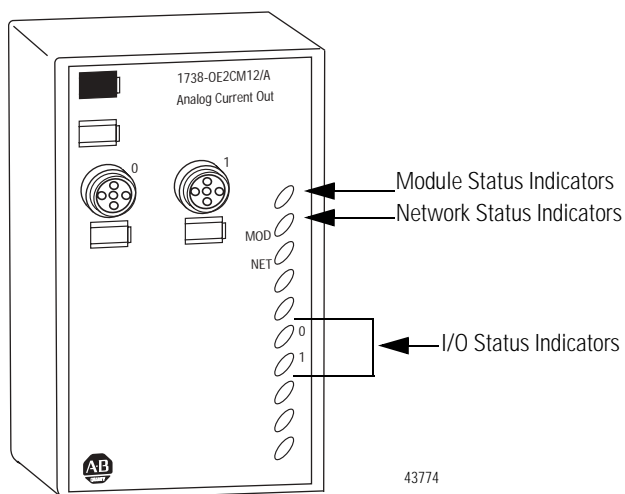
1738-OE2CM12 and -OE2VM12

Message size: 4 Bytes

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Consumes (Scanner Tx)	Output Channel 0 High Byte								Output Channel 0 Low Byte							
	Output Channel 1 High Byte								Output Channel 1 Low Byte							

Troubleshoot with the Indicators

1738-OE2CM12



Indication	Probable Cause
Module Status	
Off	No power applied to device
Green	Device operating normally
Flashing Green	Device needs commissioning due to missing, incomplete, or incorrect configuration
Flashing Red	Recoverable fault
Red	Unrecoverable fault - may require device replacement
Flashing Red/Green	Device is in self-test
Network Status	
Off	Device is not on line: - Device has not completed dup_MAC-id test. - Device not powered - check module status indicator.
Flashing Green	Device is on line but has no connections in the established state.
Green	Device is on line and has connections in the established state.
Flashing Red	One or more I/O connections in timed-out state.
Red	Critical link failure - failed communication device. Device detected error that prevents it from communicating on the network.
Flashing Red/Green	Communication faulted device - the device has detected a network access error and is in communication faulted state. Device has received and accepted an Identity Communication Faulted Request - long protocol message.

Indication	Probable Cause	
	1738-OE2VM12	1738-OE2CM12
I/O Status		
Off	Module in CAL mode	Module in CAL mode
Solid Green	Device operating normally	Device operating normally
Flashing Green	Channel being calibrated	Channel being calibrated
Flashing Red	Low or high clamp	Open wire or no power
Solid Red	No power	Not used by the 1738-OE2CM12 module

Specifications

Following are specifications for the 1738 ArmorPoint analog output modules.

ArmorPoint Analog Output Modules	
Outputs per Module	2 single ended, nonisolated
Output Voltage	1738-OE2V 0V output until communication established 0-10V (user configurable) (0.0V under, +5V over) $\pm 10V$ (user configurable) (-0.5V under, +5V over)
Output Current	0mA output until communication established 4-20mA user configurable 0-20mA user configurable
Resolution	1738-OE2C 13 bits - over 0-21mA 2.5 μ A/cnt (average value - typical range: 2.3-2.7 μ A/cnt) 1738-OE2V 14 bits (13 plus sign) 1.28 μ V/cnt in unipolar or bipolar mode
Absolute Accuracy ¹	0.1% Full Scale @ 25°C
Accuracy Drift w/Temp.	1738-OE2C - 30ppm/°C 1738-OE2V - 5ppm/°C
Resistive Load on mA Output	1738-OE2C - 0-750 Ω
Current Load on Output, Maximum	1738-OE2V - 3 mA
Conversion Type	Digital to analog converter
Conversion Rate	1738-OE2C - 16 μ s 1738-OE2V - 20 μ s
Data Format	Signed integer
General Specifications	
Calibration	Factory calibrated
Step Response to 63% of FS	24 μ s
Indicators	1 green/red module status indicator, logic side 1 green/red network status indicator, logic side 2 green/red output status indicators, logic side
Keyswitch Position	4
PointBus Current	75mA @ 5V dc

General Specifications (continued)	
Power Dissipation - Maximum at 28.8V dc	1738-OE2C 750 Ω load on each output - 1.23W 0 Ω load on each output - 1.83W 1738-OE2V 1.0 W
Thermal Dissipation - Maximum at 28.8V dc	1738-OE2C 750 Ω load on each output - 4.19 BTU/hr. 0 Ω load on each output - 6.24 BTU/hr. 1738-OE2V 3.4 BTU/hr.
Isolation Voltage (continuous-voltage withstand rating)	50V rms Tested at 1250V ac rms for 60s
External dc Power Supply Voltage Voltage Range Supply Current	24V dc nominal 10-28.8V dc 1738-OE2C 70mA @ 24V dc (including outputs @ 20mA) 1738-OE2V 35mA @ 24V dc (including outputs @ 3mA)
Dimensions Imperial (Metric)	1.25H x 2.63W x 4.25D (31.75H x 66.80W x 107.95D)
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20 to 60°C (-4 to 140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), -40 to 85°C (-40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5-95% non-condensing
Shock	IEC60068-2-27 (Test Ea, Unpackaged Shock): Operating 30g Non-operating 50g
Vibration	IEC60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz
ESD Immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz 10V/m with 200Hz 50% Pulse 100%AM at 900Mhz 10V/m with 200Hz 50% Pulse 100%AM at 1890Mhz
EFT/B Immunity	IEC 61000-4-4: \pm 3kV at 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5: \pm 2kV line-earth(CM) on shielded ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz

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General Specifications (continued)

Emissions	CISPR 11: Group 1, Class A
Enclosure Type Rating	Meets IP65/66/67 (when marked)
Mounting Base Screw Torque	#8 screw, 7.5 in. lbs. in Aluminum, 16 in. lbs. in Steel
Wiring Category ²	1 - on signal ports
Weight Imperial (Metric)	0.637 lb. (0.289 kg)
Certifications: (when product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada CE ³ European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick ³ Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

1. Includes offset, gain, non-linearity and repeatability error terms.
2. Use this Conductor Category information for planning conductor routing. Refer to Publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines".
3. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Notes:

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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.

ArmorPoint is a trademark of Rockwell Automation.

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