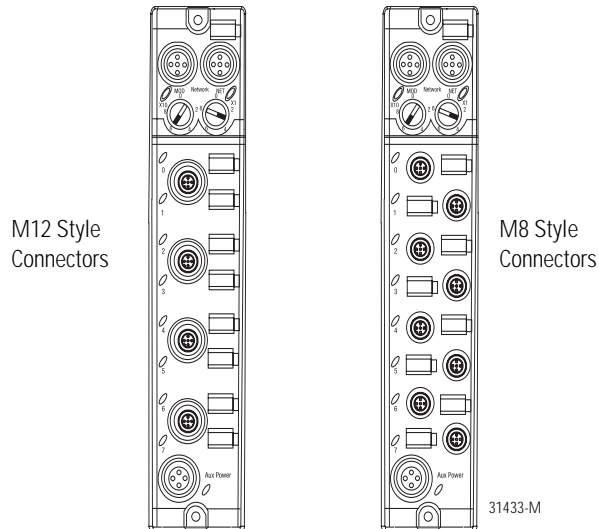




## DeviceNet 1732 ArmorBlock I/O, Series A

(Cat. Nos. 1732D-IB8M12, -IB8M8, -OB8EM12, -OB8EM8, -8CFGM12, -8CFGM8)



The DeviceNet 1732D ArmorBlock™ I/O family consists of stand-alone 24V dc I/O modules that communicate via the DeviceNet™ network. The sealed IP67 housing of these modules requires no enclosure (Note that environmental requirements other than IP67 may require an additional appropriate enclosure.) I/O connectors are sealed M8 (pico) or M12 (micro) styles while the network and auxiliary power connectors are sealed M12 style.

### 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.

**Important User Information**

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc. is prohibited.

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

<p><b>WARNING</b></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><b>ATTENTION</b></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"> <li>• identify a hazard</li> <li>• avoid a hazard</li> <li>• recognize the consequence</li> </ul>
<p><b>IMPORTANT</b></p>	<p>Identifies information that is critical for successful application and understanding of the product.</p>
<p><b>SHOCK HAZARD</b></p> 	<p>Labels may be located on or inside the module to alert people that dangerous voltage may be present.</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.

## Install Your ArmorBlock I/O Module

To install the module:

- Set the node address
- Mount the module
- Connect the cord sets
- Attach the network cables
- Communicate with the module

## Set the Node Address

Valid node addresses are **00** through **63**.

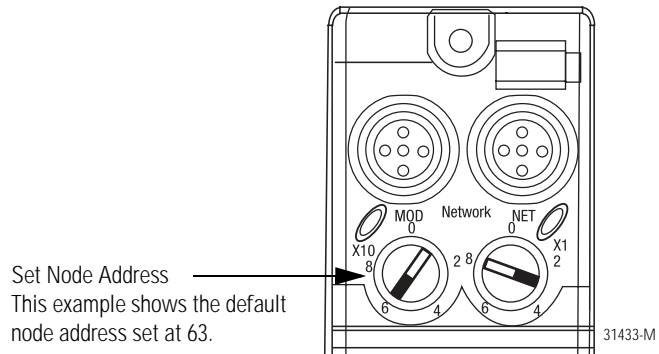
Set the node address using either the rotary switches, RSNetWorx for DeviceNet™, DeviceNetManager™, or another software configuration tool. Setting the switches at any number from **64** to **99** lets the software have address control.

Each module is shipped set for node address **63**. Remove the caps on the front of the module to access the switches. The two switches are:

- X10 (most significant digit) - left side of module
- X1 (least significant digit) - right side of module

To reset the node address, use a small blade screwdriver to rotate the switches. Line up the small black dot on the switch with the number setting you wish to use and then cycle power.

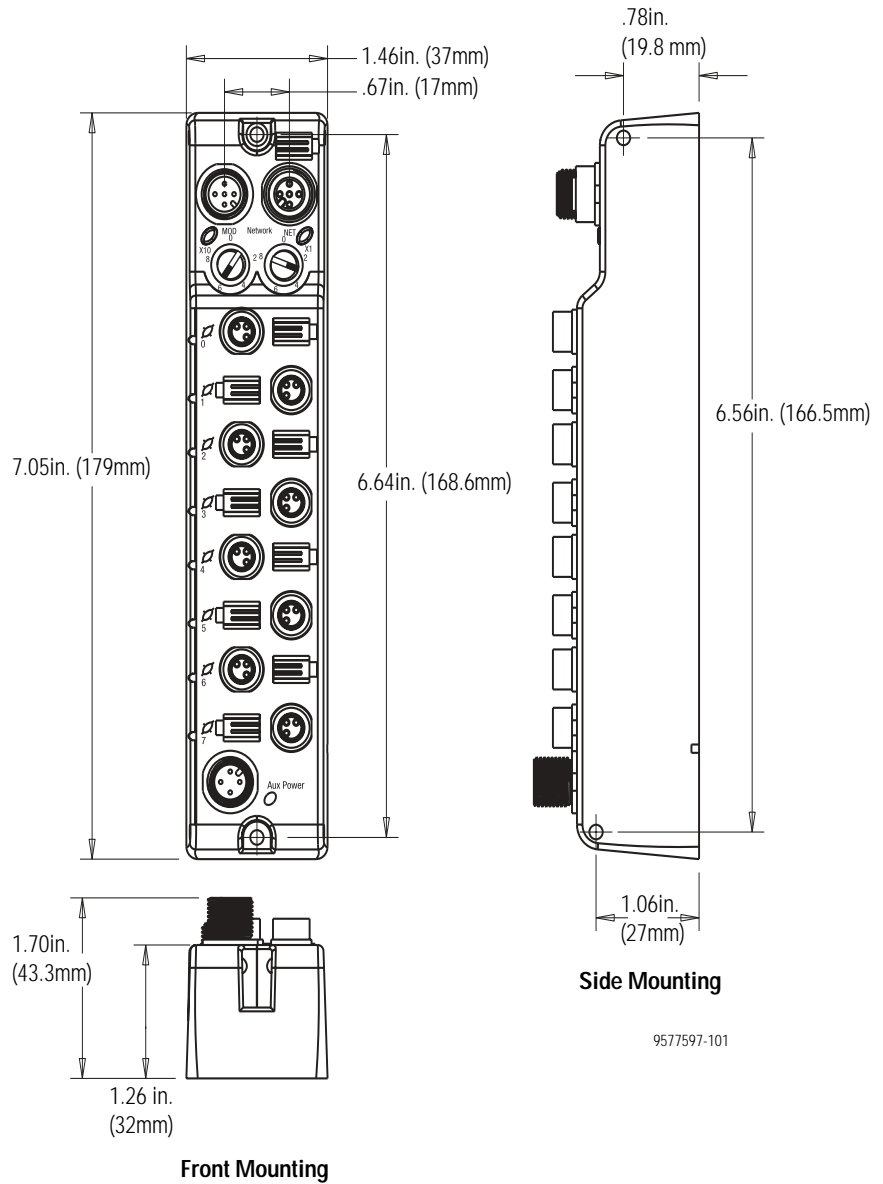
The rotary switches are read periodically. If the switches have been changed since the last time they were read and they no longer match the on line address, a minor fault will occur, which is indicated by a flashing red MOD LED. Settings between 64 and 99 cause the module to use the last valid node address stored internally. Example: The last setting internally was 40. If a change is made to 68, and then you power up, the address will default to 40.



The module is equipped with AutoBaud detect. AutoBaud lets the module read the settings already in use on your DeviceNet network and automatically adjusts to follow those settings.

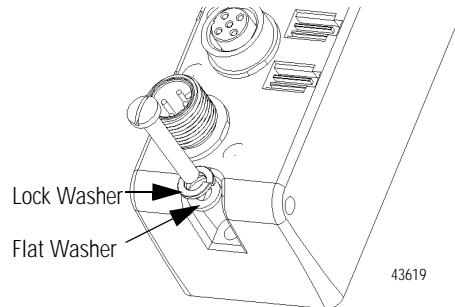
## Mount the Module

Each module has two sets of mounting holes that are used to mount the module directly to a panel or machine. The module can be front or side mounted. Mounting holes accommodate #6 (M3) pan head screws. The torque specification is 6 in-lbs.



## Mount the Module in High Vibration Areas

If you will mount the module in an area that is subject to shock or vibration, we recommend that you use a flat and lock washer to mount the module. Mount the flat and lock washer as shown in the following illustration. Torque the mounting screws to 6 in-lbs.



## Connect the Input/Output Cord Sets to the ArmorBlock Module

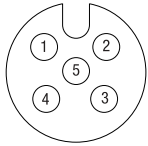
The ArmorBlock family offers 5-pin micro-style PCB mounting connectors or 3-pin pico-style PCB mounting connectors.

We provide caps to cover the unused connectors on your module. Connect the quick-disconnect cord sets you selected for your module to the appropriate ports.

Pinout diagrams for the I/O connectors are shown below.

**5-Pin Micro-Style (12mm) Female Connectors**

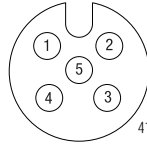
**Input Connector**



Cat. Nos. 1732D-IB8M12  
(view into connector)

- Pin 1 Sensor Source Voltage
- Pin 2 Input B
- Pin 3 Return
- Pin 4 Input A
- Pin 5 Not used

**Output Connector**

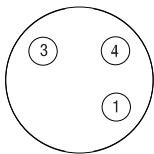


Cat. Nos. 1732D-OB8EM12  
(view into connector)

- Pin 1 Not Used
- Pin 2 Output B
- Pin 3 Return
- Pin 4 Output A
- Pin 5 Not Used

**3-Pin Pico-Style (8mm) Female Connectors**

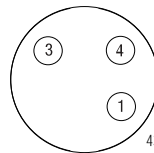
**Input Connector**



Cat. Nos. 1732D-IB8M8  
(view into connector)

- Pin 1 Sensor Source voltage
- Pin 3 Return
- Pin 4 Input

**Output Connector**

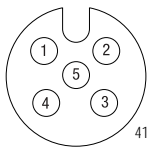


Cat. Nos. 1732D-OB8EM8  
(view into connector)

- Pin 1 Not Used
- Pin 3 Return
- Pin 4 Output

**Self-configuring Female Connectors**

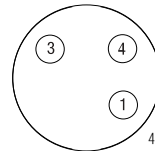
**Self-configuring Connector**



Cat. Nos. 1732D-8CFGM12  
(view into connector)

- Pin 1 Sensor Source Voltage
- Pin 2 Input or Output B
- Pin 3 Return
- Pin 4 Input or Output A
- Pin 5 Not Used

**Self-configuring Connector**



Cat. Nos. 1732D-8CFGM8  
(view into connector)

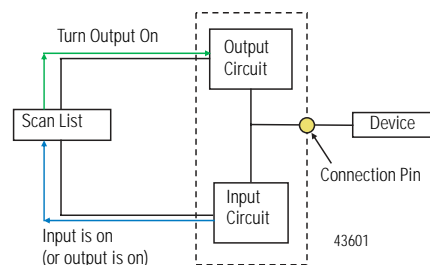
- Pin 1 Sensor Source Voltage
- Pin 3 Return
- Pin 4 Input or Output

The self-configuring modules (1732D-8CFGM8 and 1732D-8CFGM12) contain both input and output functionality.

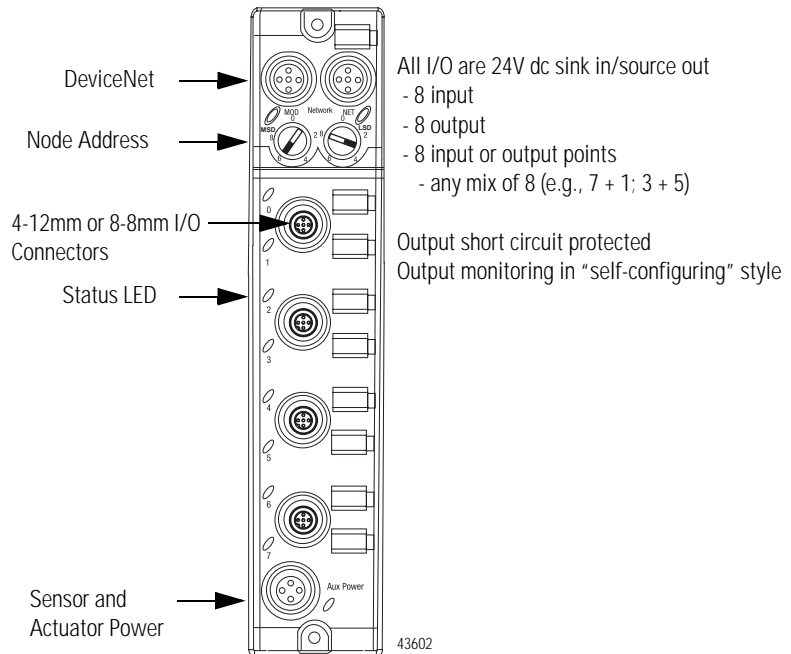
If an I/O point is to be an output, dedicate that point as an output with a wired load and energize it through a control program. Energized outputs will show an associated active input, which can be used as a feedback mechanism to ensure that the output is turned on.

If an I/O point is to be an input, wire the input device as normal and leave the associated output un-energized at all times.

**I/O Self-configuring Circuitry**



Refer to the illustration below for configuration operations.



Please refer to publication 889-CG001 for Rockwell Automation cables and cord sets offerings or access the Connection Systems website at:

[http://www.ab.com/sensors/products/connection\\_systems/index.html](http://www.ab.com/sensors/products/connection_systems/index.html)

For M12 (micro) style connections, please reference the 889D products. For M8 (pico) style connections, please reference the 889P products.

**IMPORTANT**

If the devices (sensors) connected to the input connections require Class 2 power to operate, the auxiliary power connections of this equipment must be powered by a Class 2 source.

**ATTENTION**

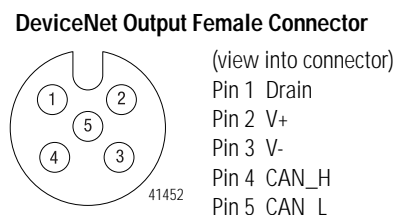
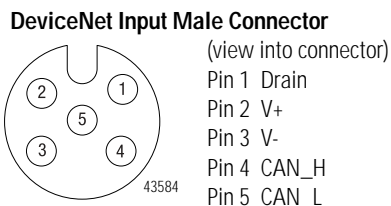


Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP67 requirements.



## Attach DeviceNet Cables

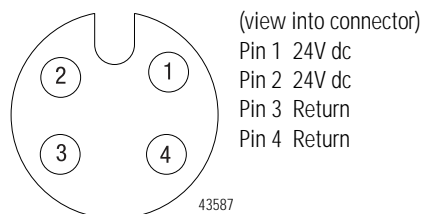
Attach the 5-pin (12mm) DeviceNet style connectors as shown below.



To terminate the module, use the second DeviceNet connector and a Rockwell Automation terminator resistor (Cat. No. 1485A-T1D5).

## Attach Auxiliary Power Cable

Attach the 4-pin (12mm) style connector as shown below.



Input and output devices are powered through the module's I/O connectors. Removing auxiliary power will deactivate all sensors and actuators unless they are powered from a separate source. If a separate source is used, devices may still be active, even if auxiliary power is removed. To ensure that auxiliary power controls the activation/deactivation of sensors and actuators, always wire input sensors and output actuators directly to the I/O connectors.

## Communicate With Your ArmorBlock I/O Module

This ArmorBlock module's I/O is exchanged with the master through a poll, change-of-state, or cyclic connection.

**Cyclic** - allows configuration of the block as an I/O client. The block will produce and consume its I/O cyclically at the rate configured.

**Polled** - a master initiates communication by sending its polled I/O message to the module. The module consumes the message, updates outputs, and produces a response. The response has input data.

**Change-of-State** - productions occur when an input changes or a fault condition occurs. If no input or fault condition change occurs within the expected packet rate, a heartbeat production occurs. This heartbeat production tells the scanner module that the I/O module is alive and ready to communicate. Consumption occurs when data changes and the master produces new output data to the I/O block.

### 1732D-8CFGM8 and 1732D-8CFGM12

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Produced 0	I7	I6	I5	I4	I3	I2	I1	I0
Consumes 0	O7	O6	O5	O4	O3	O2	O1	O0

Where: I=Input O=Output

Note that the 1732D-8CFGM8 and 1732D-8CFGM12 self-assigning modules contain both input and output functionality. These modules do not need to be configured.

If an I/O point is to be an output, dedicate that point as an output with a wired load and energize it through a control program.

If an I/O point is to be an input, wire the input device as normal and leave the associated output un-energized at all times.

### 1732D-IB8M12 and 1732D-IB8M8

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Produced 0	I7	I6	I5	I4	I3	I2	I1	I0

Where: I=Input

### 1732D-OB8EM8 and 1732D-OB8EM12

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Consumes 0	O7	O6	O5	O4	O3	O2	O1	O0

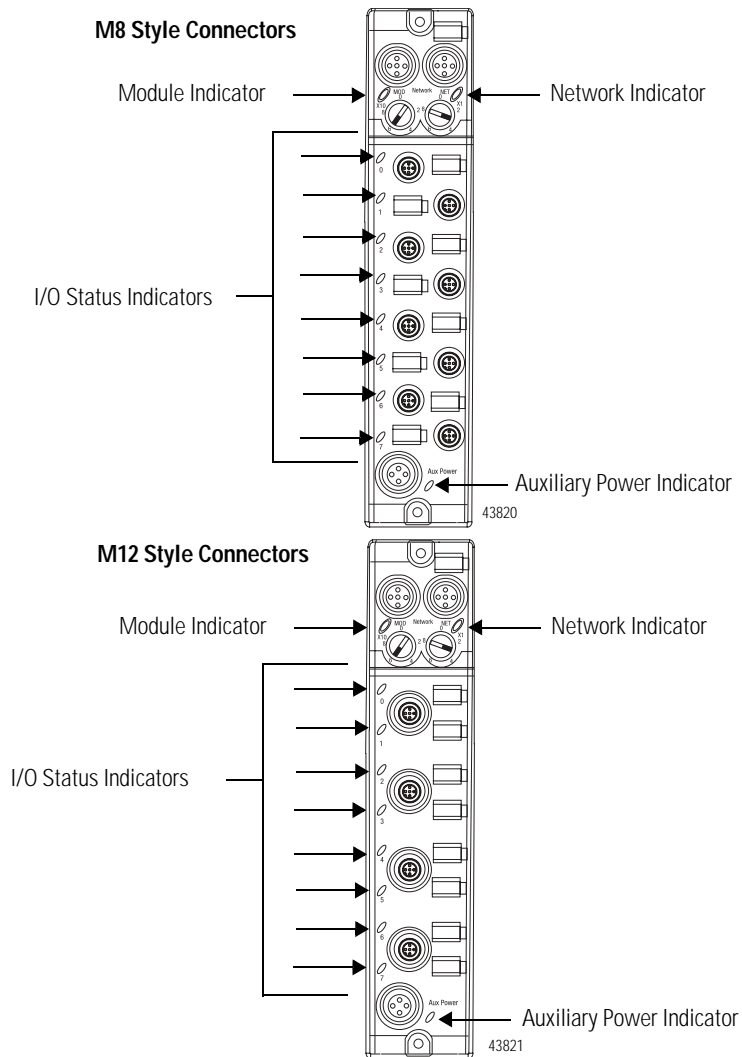
Where: O=Output

The DeviceNet Network uses advanced network technology, producer/consumer communication, to increase network functionality and throughput. Visit our web site at <http://www.ab.com/networks> for producer/consumer technology information and updates.

## Troubleshoot With the Indicators

This module has the following indicators:

- Network and Module status indicator for DeviceNet
- Auxiliary Power indicator
- Individual I/O status indicators for inputs and outputs



The following table describes network status indicators.

<b>Network Status Indicator - NS</b>		
<b>Module's State</b>	<b>Indicator</b>	<b>Status</b>
Not Powered/ Not on line	Off	Device is not on-line: <ul style="list-style-type: none"> <li>• The device has not completed the dup_MAC_id test yet.</li> <li>• The device may not be powered yet.</li> </ul>
On line, connected	Solid Green	The device is operating in a normal condition and the device is on line with connections in the established state. <ul style="list-style-type: none"> <li>• As a Group 2 device, it means that the device is allocated to a master.</li> </ul>
On line, not connected	Flashing Green	The device is on line with no connections in the established state. <ul style="list-style-type: none"> <li>• The device has passed the dup_MAC_id test, is on line, but has no established connections to other nodes.</li> <li>• As a Group 2 device, it means that the device is not allocated to a master.</li> </ul>
Critical link failure	Solid Red	Failed communication device - The device has detected an error that has rendered it incapable of communication on the network (dup_MAC_id failure or bus-off).
Connection time out	Flashing Red	An I/O connection has timed out.

The following table describes module status indicators.

<b>Module Status Indicator - MS</b>		
<b>Module's State</b>	<b>Indicator</b>	<b>Status</b>
No Power	Off	There is no power applied to the module.
Device Operational	Green	The module is operating normally.
Module needs commissioning	Flashing Green	The module needs commissioning due to missing, incomplete or incorrect configuration.
Minor Fault	Flashing Red	Recoverable fault.
Critical Fault	Red	Watchdog timeout or the module has an unrecoverable fault and may need replacing.

The following table describes the auxiliary power indicator.

<b>Auxiliary Power</b>	
<b>Indication</b>	<b>Status</b>
None	No Auxiliary Power
Solid Green	Auxiliary Power Present

The following table describes individual I/O status indicators.

<b>I/O Status Indicators</b>		
<b>Function</b>	<b>Point Indicator</b>	<b>Condition</b>
Outputs	None	Output not energized
	Yellow	Output energized
Inputs	None	No valid input
	Yellow	Valid input

This product has been tested at an Open DeviceNet Vendor Association, Inc. (ODVA) authorized independent test laboratory and found to comply with ODVA Conformance Test. Please contact the ODVA website (<http://www.odva.org>) for listing of products tested by ODVA independent test labs for further details.

## Specifications

Following are specifications for the 1732 ArmorBlock I/O modules.

<b>DeviceNet 1732 ArmorBlock I/O Series A</b>	
<b>Input Specifications</b>	
Inputs	61131-2 Type 3 Compatible
Sensor Source Current, Maximum (per input)	50mA
Sensor Source Current, Maximum (per module)	400mA
Sensor Source Voltage (auxiliary power=12-30V dc)	
Maximum	30V
Minimum	11V
On-state Voltage	
Maximum	30V dc
Minimum	11V dc
On-state Current, Maximum	5mA
Off-state Voltage, Maximum	5V dc
Off-state Current, Maximum	1.5mA
Input Delay Time - ON to OFF and OFF to ON, Maximum	0-16000 $\mu$ s
<b>Output Specifications</b>	
Outputs	61131-2 Compatible
Off-state Peak Blocking Voltage, Minimum	30V
On-state Voltage Drop, Maximum	0.5V
On-state Current, Maximum	0.5A
Off-state Leakage, Maximum	50 $\mu$ A
Module Current, Maximum (all outputs)	4.0A
Surge Current for 10ms, repeatable every 2s, Maximum	1.2A

<b>DeviceNet 1732 ArmorBlock I/O Series A</b>													
<b>General Specifications</b>													
Isolation	Type tested to 500V ac for 60 seconds between auxiliary power and network (I/O to logic)												
Dimensions Inches (Millimeters)	1.9H x 2.7W x 6.9D (48H x 69W x 174D)												
Indicators	Module Status - red/green Network Status - red/green Auxiliary Power - green Point LED - yellow												
Communication Rate	<ul style="list-style-type: none"> <li>• 125Kbps @ 500 meters(1640 feet) for thick cable, flat media length 375 meters (1378 feet)</li> <li>• 250Kbps @ 200 meters(600 feet) for thick cable, flat media length 150 meters (492 feet)</li> <li>• 500Kbps @ 100 meters (330 feet) for thick cable, flat media length 75 meters (246 feet)</li> </ul>												
DeviceNet Power	<table border="0"> <tr> <td>Voltage</td> <td>25V dc</td> </tr> <tr> <td>Maximum</td> <td>11V dc</td> </tr> <tr> <td>Minimum</td> <td></td> </tr> <tr> <td>Current</td> <td>100mA</td> </tr> <tr> <td>Maximum</td> <td>100mA</td> </tr> <tr> <td>Minimum</td> <td></td> </tr> </table>	Voltage	25V dc	Maximum	11V dc	Minimum		Current	100mA	Maximum	100mA	Minimum	
Voltage	25V dc												
Maximum	11V dc												
Minimum													
Current	100mA												
Maximum	100mA												
Minimum													
Auxiliary Power - Voltage for I/O Channel Power	30V dc max												
Maximum	11V dc												
Minimum													
Current for I/O Channel	450mA												
-IB8, Maximum	4A												
-OB8E, Maximum	4A												
-8CFG, Maximum													
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), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): -45 to 85°C (-49 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												
Conductor Category	2 <sup>1,2</sup> See publication no. 889-CG001												
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: ±2kV at 5kHz on signal ports ±2kV at 5kHz on communications ports ±4kV at 5.0kHz on power ports												
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±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												
Emissions	CSPR 11: Group 1, Class A												
Enclosure	Meets IP65/66/67 (when marked)												

<b>General Specifications (continued)</b>	
Weight	0.448 lbs. (0.203 kg)
Certifications: (when product is marked)	c-UL-us UL Listed Industrial Control Equipment, certified for US and Canada CE <sup>3</sup> 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 <sup>3</sup> Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions ODVA ODVA conformance tested to DeviceNet specifications

1. You use this conductor category information for planning conductor routing as described in the system level installation manual.
2. See pub. 1770-4.1, Programmable Controller Wiring and Grounding Guidelines.
3. See the Product Certification link at [www.ab.com](http://www.ab.com) for Declarations of Conformity, Certificates, and other certification details.

# 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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DeviceNet is a trademark of Open DeviceNet Vendor Association.

**[www.rockwellautomation.com](http://www.rockwellautomation.com)**

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