Installation Instructions

ArmorPoint 24V DC 16 Point Input and Output Modules, Series A

Catalog Numbers 1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS, 1738-IB16DM12

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.

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, 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 to identify a hazard, avoid a hazard, and recognize the consequences.
SHOCK HAZARD	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
BURN HAZARD	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

Environment and Enclosure

ATTENTION

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This equipment is intended for use in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters (6562 ft) 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.

In addition to this publication, see:
- Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1, for additional installation requirements.
- NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

## Prevent Electrostatic Discharge

ATTENTION

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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.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

About the Modules

The ArmorPoint I/O family consists of modular I/O modules. The sealed IP67 housing of these modules requires no enclosure when used with IP67 certified cables. (Note that environmental requirements other than IP67 may require an additional appropriate housing.) I/O connectors are sealed DB25, M12 (micro) or M23 styles. The mounting base ships with the module. The 1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS and 1738-IB16DM12 are shown below.

1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS, 1738-IB16DM12 Modules

1738-OB16E19M23/A
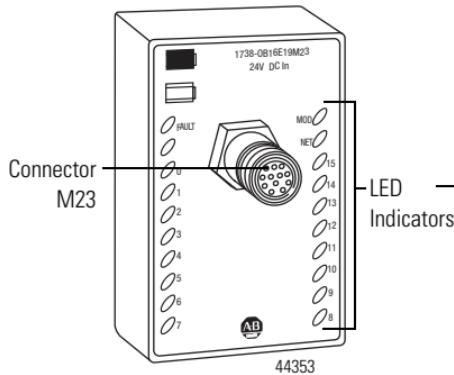
1738-OB16E25DS/A
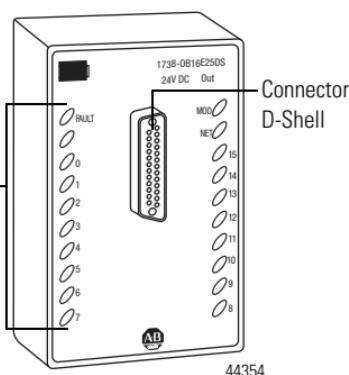
1738-OB16EM12/A and 1738-IB16DM12/A*
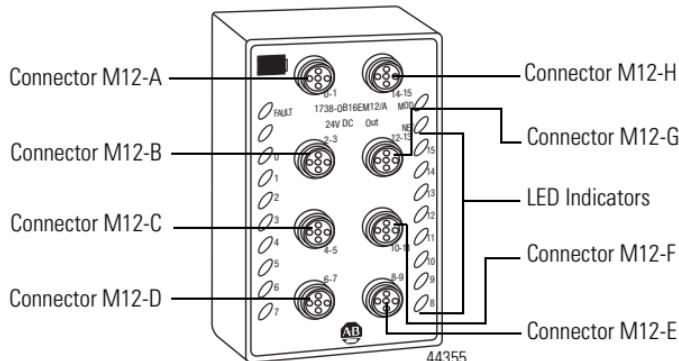
* 1738-IB16DM12/A is represented here by the 1738-OB16EM12/A. They have identical connectors and LED indicators.

Mount the I/O Base

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

IMPORTANT	The module must be mounted on a grounded metal mounting plate or other conductive surface.

Refer to the Drilling Dimensions illustration of the base with an adapter to help you mount the base.

Drilling Dimensions

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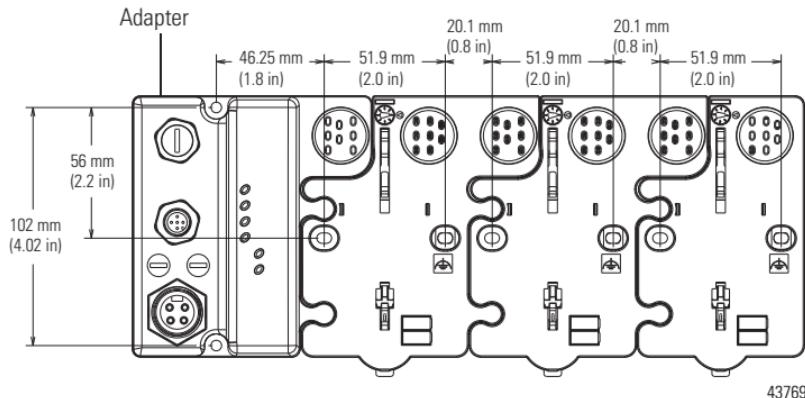
| **ATTENTION**	You can only use the 1738-EP24DC expansion power unit with the 1738 ArmorPoint I/O adapters.

⚠️ ATTENTION	To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

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 M4 (#8) machine or self-tapping screws.

3. Mount the base using M4 (#8) screws.

4. Ground the system using the ground lug connection. The ground lug connection is also a mounting hole.

Mounting Base

Keyswitch
Set to position 1 for the 1738 24V expansion power supply

Ground lug connection

Latching mechanism

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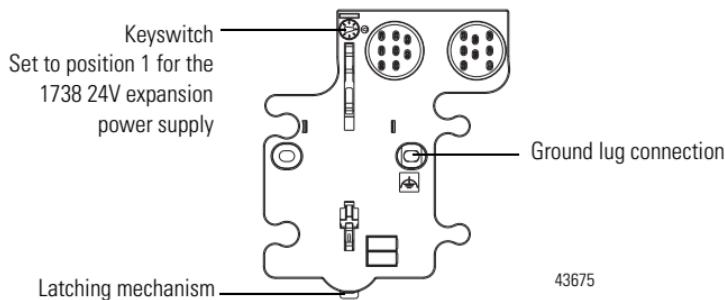
Install the Digital Module

To install the digital module, proceed as follows:

1. Using a bladed screwdriver, rotate the keyswitch on the mounting base clockwise until the number 1 aligns with the notch in the base.

2. Position the module vertically above the mounting base.
   The module bridges two bases.

1738-OB16EM12 shown

Module bridges two bases

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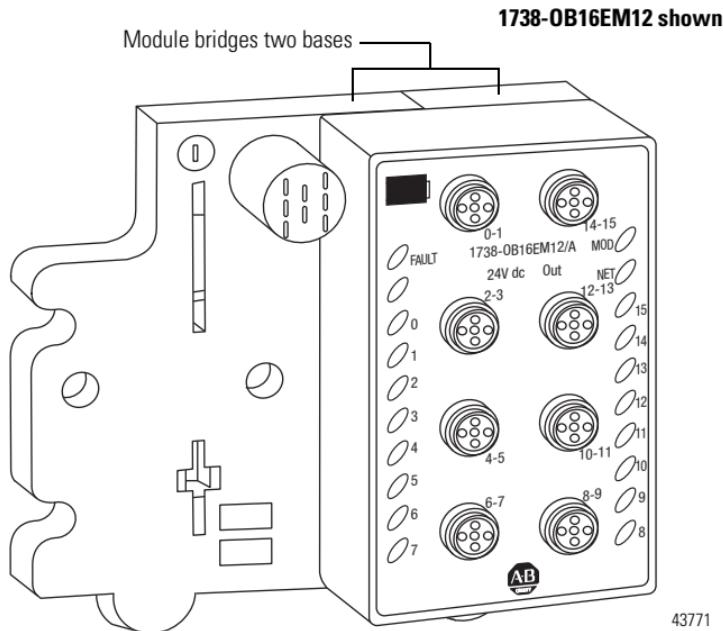
3. Push the module down until it engages the latching mechanism.
   You hear a click sound when the module is properly engaged.
   The locking mechanism locks the module to the base.

Remove the 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 lifts up off the base.

3. Pull the module off of the base.

Wire the Modules

Following are wiring instructions for the modules.

1738-OB16E19M23
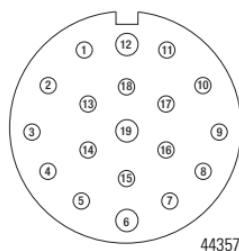
(view into connector)

Pin 1 - 24V DC output 0   Pin 11 - 24V DC output 9
Pin 2 - 24V DC output 1   Pin 12 - Not Used
Pin 3 - 24V DC output 2   Pin 13 - 24V DC output 10
Pin 4 - 24V DC output 3   Pin 14 - 24V DC output 11
Pin 5 -24V DC output 4   Pin 15 - 24V DC output 12
Pin 6 - Common   Pin 16 - 24V DC output 13
Pin 7 -24V DC output 5   Pin 17 - 24V DC output 14
Pin 8 -24V DC output 6   Pin 18 - 24V DC output 15
Pin 9 -24V DC output 7   Pin 19 - Not used
Pin 10 - 24V DC output 8

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1738-OB16EM12
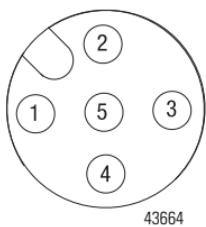
(view into connector)

Pin 1 - Not Used
Pin 2 - 24V DC output 1 (M12-A)
          24V DC output 3 (M12-B)
          24V DC output 5 (M12-C)
          24V DC output 7 (M12-D)
          24V DC output 9 (M12-E)
          24V DC output 11 (M12-F)
          24V DC output 13 (M12-G)
          24V DC output 15 (M12-H)
Pin 3 - Common
Pin 4 - 24V DC output 0 (M12-A)
          24V DC output 2 (M12-B)
          24V DC output 4 (M12-C)
          24V DC output 6 (M12-D)
          24V DC output 8 (M12-E)
          24V DC output 10 (M12-F)
          24V DC output 12 (M12-G)
          24V DC output 14 (M12-H)
Pin 5 - Not Used

1738-OB16E25DS
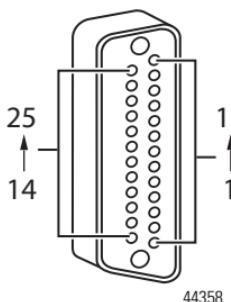
(view into connector)

Pin 1 - 24V DC output 0	Pin 14 - 24V DC output 1
Pin 2 - 24V DC output 2	Pin 15 - 24V DC output 3
Pin 3 - 24V DC output 4	Pin 16 - 24V DC output 5
Pin 4 - 24V DC output 6	Pin 17 - 24V DC output 7
Pin 5 - 24V DC output 8	Pin 18 - 24V DC output 9
Pin 6 - 24V DC output 10	Pin 19 - 24V DC output 11
Pin 7 - 24V DC output 12	Pin 20 - 24V DC output 13
Pin 8 - 24V DC output 14	Pin 21 - 24V DC output 15
Pin 9 - Common	Pin 22 - Common
Pin 10 - Common	Pin 23 - Common
Pin 11 - Common	Pin 24 - Common
Pin 12 - Common	Pin 25 - Common
Pin 13 - Common	

1738-IB16DM12
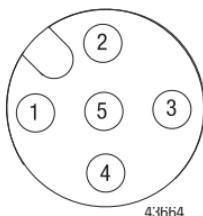
(view into connector)

Pin 1 - SSV 0 (M12-A,B)
      SSV 1 (M12-C,D)
      SSV 2 (M12-E,F)
      SSV 3 (M12-G,H)
Pin 2 - 24V DC input 1 (M12-A)
      24V DC input 3 (M12-B)
      24V DC input 5 (M12-C)
      24V DC input 7 (M12-D)
      24V DC input 9 (M12-E)
      24V DC input 11 (M12-F)
      24V DC input 13 (M12-G)
      24V DC input 15 (M12-H)
Pin 3 -Common
Pin 4 - 24V DC input 0 (M12-A)
      24V DC input 2 (M12-B)
      24V DC input 4 (M12-C)
      24V DC input 6 (M12-D)
      24V DC input 8 (M12-E)
      24V DC input 10 (M12-F)
      24V DC input 12 (M12-G)
   24V DC input 14 (M12-H)
Pin 5 - Not Used

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ATTENTION

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

Communicate with Your Module

I/O messages are sent to (consumed) and received from (produced) the ArmorPoint I/O modules. Messages are mapped into the processor's memory. ArmorPoint I/O output modules produce 1 byte of input data (scanner Rx - status). They consume 2 Bytes of I/O data (scanner Tx). ArmorPoint I/O input modules produce 2 or 3 bytes of input data (scanner Rx - status). They do not consume I/O data (scanner Tx).

Default Data Map for Output Modules

1738-OB16E19M23, 1738-OB16E25DS, and 1738-OB16EM12

	7	6	5	4	3	2	1	0
Produces 0 (scanner Rx)	Not used			Fault LED state	Fault 12-15	Fault 8-11	Fault 4-7	Fault 0-3
Consumes 0 (scanner Tx)	O7	O6	O5	O4	O3	O2	O1	O0
Consumes 1	O15	O14	O13	O12	O11	O10	O9	O8
Where:	O = Output 0 = off, 1 = on							

1738-IB16DM12

	7	6	5	4	3	2	1	0
Produces 0 (scanner Rx)	I7	I6	I5	I4	I3	I2	I1	I0
Produces 1	I15	I14	I13	I12	I11	I10	I9	I8
Produces 2	Not used			Fault LED state	SSV Fault 12-15	SSV Fault 8-11	SSV Fault 4-7	SSV Fault 0-3
Where:	I = Input 0 = off, 1 = on							

Interpret LED Indicators

1738-OB16EM12 shown
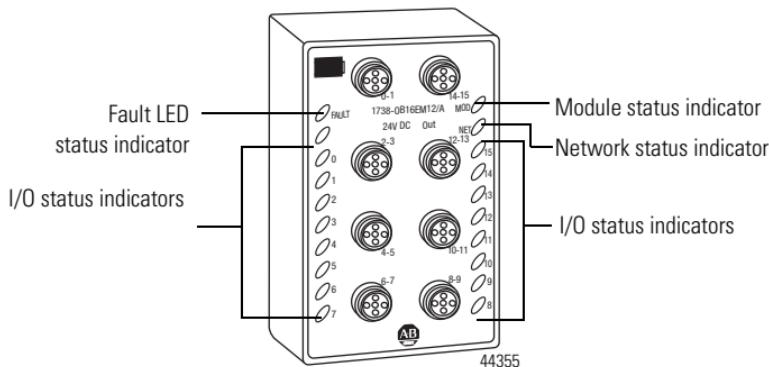
Fault LED status indicator

Module status indicator

Network status indicator

I/O status indicators

I/O status indicators

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1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS, 1738-IB16DM12 Indicator Status

	Status	Description
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.
Fault status	Red	Short circuit detected.

1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS, 1738-IB16DM12 Indicator Status

	Status	Description
Network status	Off	Device is not online: - Device has not completed dup_MAC-id test. - Device not powered — check module status indicator.
	Green	Device is online and has connections in the established state.
	Flashing green	Device is online but has no 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 tdetected a network access error and is in communication faulted state. Device has received and accepted an Identity Communication Faulted Request — long protocol message.
I/O status	Off	Output is not energized or input is not valid.
	Yellow	Output is energized or input is valid.

Specifications

ArmorPoint 24V DC Input Module, Series A - 1738-IB16DM12

Attribute	Value
Inputs per module	1 group of 16, nonisolated
On-state voltage	10V DC minimum 24V DC nominal 28.8V DC maximum
On-state current	2 mA minimum 4 mA @ 24V DC nominal 5 mA maximum
Off-state voltage	5V DC
Off-state current	1.5 mA
Current, sensor source, per input	50 mA maximum
Current, sensor source, per module	800 mA maximum
Field power supply voltage range	10...28.8V DC
Input delay time[1] OFF to ON / ON to OFF	0.5 ms hardware + (0...63 ms selectable)
Input point density	16

[1] Input OFF to ON or ON to OFF delay is time from a valid input signal to recognition by the module.

ArmorPoint 24V DC Output Modules, Series A - 1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS

Attribute	Value
Number of outputs	1 group of 16, nonisolated sourcing outputs
On-state voltage drop	0.2V DC maximum
On-state voltage	10V DC minimum 24.V DC nominal 28.8V DC maximum
On-state current per channel	1.0 mA minimum 0.5 A maximum, electronically protected
Off-state voltage	28.8V DC maximum
External DC supply voltage	10...28.8V DC range 24V DC nominal
Off-state current leakage	0.5 mA
Output current rating	4.0 A per module maximum 0.5 A per channel maximum
Output surge current	1 A maximum, electronically protected
Output delay time[1] OFF to ON / ON to OFF	0.1 ms
Output point density	16
Pilot duty rating	1.3 A Inrush

[1] OFF to ON or ON to OFF delay is time from a valid output on or off signal to output energization or de-energization.

General Specifications

Attribute	Value
Power dissipation	1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS – 3.0W @ 28.8V DC
	1738-IB16DM12 – 2.7W @ 28.8V DC maximum
Thermal dissipation	1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS – 10.3 BTU/hr @ 28.8V DC
	1738-IB16DM12 – 9.2 BTU/hr @ 28.8V DC maximum
Isolation voltage	50V (continuous), Reinforced Insulation Type, field-side to system Type tested at 1000V DC for 60 s, field-side to system No isolation between individual channels
Dimensions (HxWxD), approx.	120 x 72 x 42 mm 4.72 x 2.83 x 4.25 in including I/O and mounting base
Weight	290 g (10.24 oz)
LED indicators	16 yellow input/output status, logic side 1 green/red network status, logic side 1 green/red module status, logic side 1 red fault status, logic side
PointBus current	1738-OB16E19M23, 1738-OB16EM12, 1738-OB16E25DS – 150 mA @ 5V DC maximum
	1738-IB16DM12 – 75 mA @ 5V DC maximum
Wiring category[1]	1 - on signal ports
Keyswitch position	1
Enclosure type rating	Meets IP65/66/67/69K (when marked)
Mounting base screw torque	#8 screw 0.85 Nm (7.5 lb-in) in Aluminum 1.81 Nm (16 lb-in) in Steel

[1] Use this Conductor Category information for planning conductor routing. Refer to Publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

Environmental Specifications

Attribute	Value
Temperature, operating	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…60 °C (-4…140 °F)
Temperature, storage	IEC 60068-2-1 (Test Ab, unpackaged nonoperating cold), IEC 60068-2-2 (Test Bb, unpackaged nonoperating dry heat): -40…85 °C (-40…185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% non-condensing
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30g
Shock, non-operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50g
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5g @ 10...500 Hz
Emissions	CISPR 11: Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80%AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100%AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100%AM at 1890 MHz 3V/m with 1 kHz sine-wave 80%AM from 2000...2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3kV at 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80%AM from 150 kHz...80 MHz

Certifications

Certification (when product is marked)[1]	Value
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

[1] See the Product Certification link at http://www.ab.com for Declaration of Conformity, Certificates, and other certification details.

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 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 product up and running.

United States	1.440.646.3434 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 procedures.

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 the return procedure.

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