



Installation Instructions

PROFIBUS 1732 ArmorBlock 16-Point I/O, Series A

Catalog Number(s) 1732P-IB16M12, 1732P-OB16M12,
1732P-16CFGM12

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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.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 identify a hazard, avoid a hazard and recognize the consequences.
	
SHOCK HAZARD	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.
	
BURN HAZARD	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be dangerous temperatures.
	

Environment and Enclosure

ATTENTION

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.

Prevent Electrostatic Discharge

ATTENTION

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

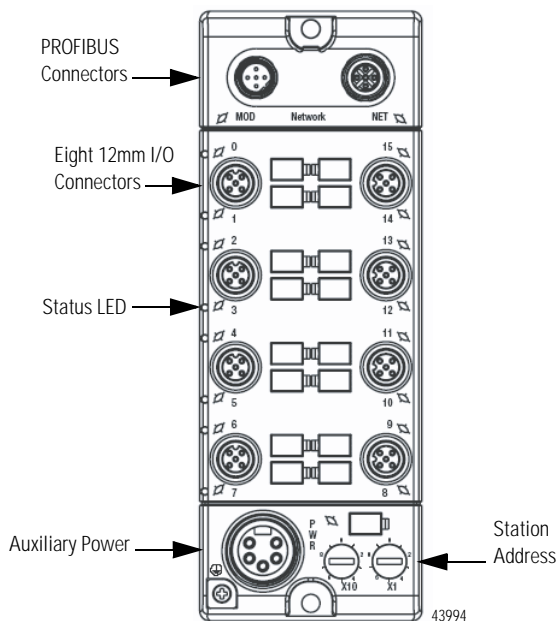
- Touch a grounded object to discharge potential static.
 - Wear an approved grounding wriststrap.
 - Do not touch connectors or pins on component boards.
 - Do not touch circuit components inside the equipment.
 - If available, use a static-safe workstation.
 - When not in use, store the equipment in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

About the PROFIBUS ArmorBlock 16-Point I/O Modules

The PROFIBUS 1732P ArmorBlock I/O family consists of stand-alone 24V dc I/O modules that communicate via the PROFIBUS 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 M12 style.

Refer to the Module Identification illustrations to guide you through the installation process.

Module Identification



Catalog Number Explanation

Refer to the table for a description of the modules' catalog numbers.

Cat. No.	Description	Network Connector
1732P-IB16M12	PROFIBUS 24V dc 16 Input	M12 pass-through
1732P-OB16M12	PROFIBUS 24V dc 16, 2 A Output	
1732P-16CFG12	PROFIBUS 24V dc 16 Selectable points	

Install the Module

To install the module:

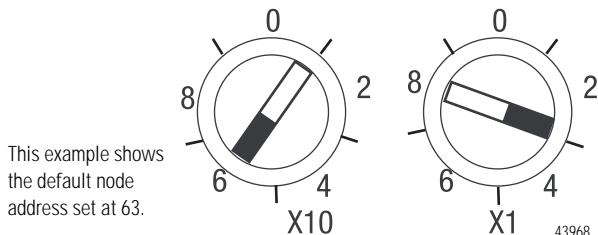
- Set the node address
- Mount the module
- Connect the cord sets

Set the Station Address

To reset the station address:

1. Rotate the switches using a small blade screwdriver.
2. Line up the small black dot on the switch with the number setting you wish to use.
3. Cycle power.

Set Station Address



The switches can be set from 00 through 99. The module reads the switches at power-up only.

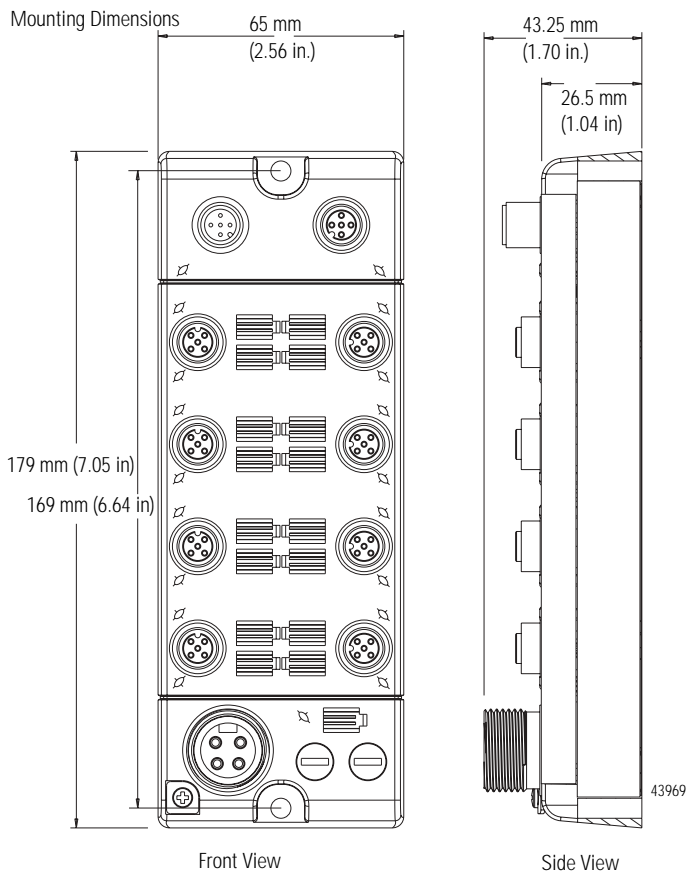
Mount the Module

Two sets of mounting holes are used to mount the module directly to a panel or machine. Mounting holes accommodate #6 (M3) pan head screws. The torque specification is 6 in-lbs.

Product Dimensions

Refer to the mounting dimensions illustration to help you mount the module.

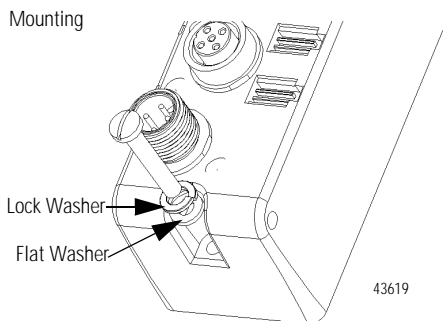
Module Dimensions



Mount the Module in High Vibration Areas

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

Mount in High Vibration Areas



Connect the I/O Cord Sets to the ArmorBlock Module

The ArmorBlock PROFIBUS family has 5-pin micro-style 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.

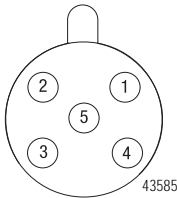
Network Connectors

Refer to the pinout diagrams for the network connectors.

IMPORTANT

Do not use PROFIBUS T-connectors with these modules.

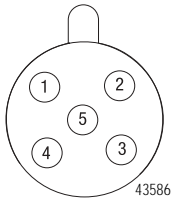
Input Male Connector



(View into Connector)

- Pin 1 +5V dc
- Pin 2 A Signal
- Pin 3 GND
- Pin 4 B Signal
- Pin 5 Shield

Output Female Connector



(View into Connector)

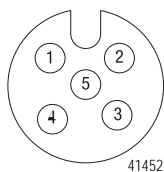
- Pin 1 +5V dc
- Pin 2 A Signal
- Pin 3 GND
- Pin 4 B Signal
- Pin 5 Shield

To terminate the module, use the second PROFIBUS connector and a PROFIBUS termination resistor (such as Brad Harrison B05S06). Be sure that you do not use PROFIBUS-T connectors with these modules.

I/O Connectors

Refer to the pinout diagrams for the I/O connectors.

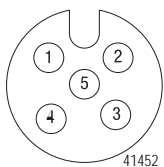
Micro-style Input Connector



(View into Connector)

Pin 1	Sensor Source Voltage
Pin 2	Input B
Pin 3	Return
Pin 4	Input A
Pin 5	PE

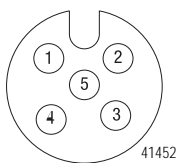
Micro-style 5-Pin Female Output Connector



(View into Connector)

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

Self-configuring Connector



(View into Connector)

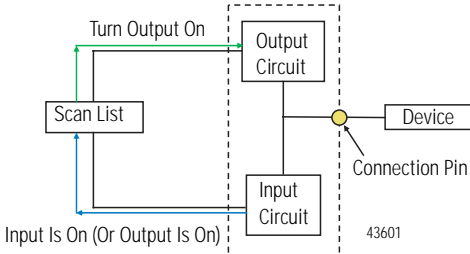
Pin 1	Sensor Source Voltage
Pin 2	Input or Output B
Pin 3	Return
Pin 4	Input or Output A
Pin 5	PE

The self-configuring module (1732P-16CFGM12) contains 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 show an associated active input that can be used as a feedback mechanism to make certain that the output is on.

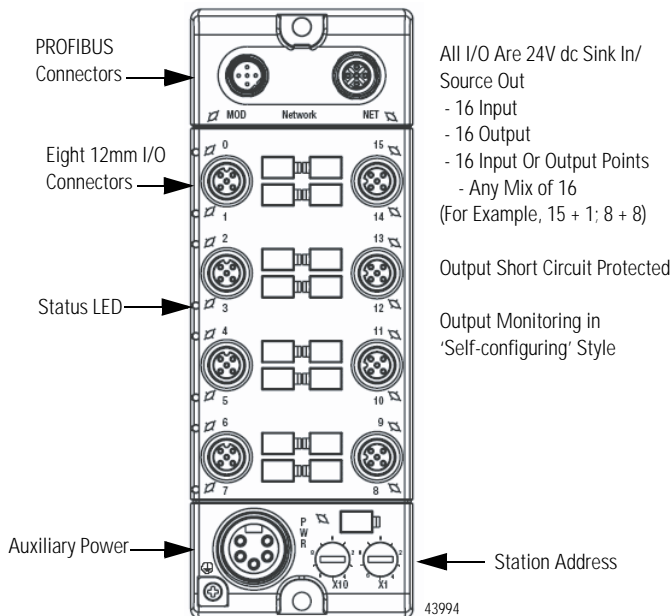
If an I/O point is to be an input, wire the input device as normal and leave the associated output un-energized at all times.

I/O Self-configure Circuitry



Refer to the illustration for configuration operations.

Configure Operations



Refer to publication M115-CA001 for Rockwell Automation cable and cord set offerings or access the Connection Systems website at:
www.ab.com/sensors/products/connection_systems/index.html

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

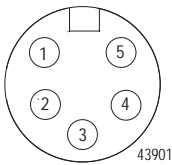


Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP67 requirements.

Auxiliary Power Cable

Attach the mini-style 5-pin connector as shown below.

Mini-style 5-Pin Male Connector



(View into Connector)

- Pin 1 Auxiliary Output Power-
- Pin 2 Sensor/Network Power-
- Pin 3 Earth Ground
- Pin 4 Sensor/Network Power+
- Pin 5 Auxiliary Output Power+

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 make certain that auxiliary power controls the activation and deactivation of sensors and actuators, always wire input sensors and output actuators directly to the I/O connectors.

Communicate with Your ArmorBlock PROFIBUS I/O Module

This ArmorBlock PROFIBUS module has the following baudrates.

Baud Rate	Cable Length
9.6 KBPS	1000 m (3280 ft)
19.2 KBPS	1000 m (3280 ft)
45.45 KBPS	1000 m (3280 ft)
93.75 KBPS	1000 m (3280 ft)
187.5 KBPS	1000 m (3280 ft)
500 KBPS	400 m (1312 ft)
1.5 MBPS	200 m (656 ft)
3 MBPS	100 m (328 ft)
6 MBPS	100 m (328 ft)
12 MBPS	100 m (328 ft)

Refer to the module configuration information to guide you through the installation process.

1732P-IB16M12

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
Produced 1	I15	I14	I13	I12	I11	I10	I9	I8

Where: I=Input

1732P-OB16M12

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Consumed 0	O7	O6	O5	O4	O3	O2	O1	O0
Consumed 1	O15	O14	O13	O12	O11	O10	O9	O8

Where: O=Output

1732P-16CFGM12

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
Produced 1	I15	I14	I13	I12	I11	I10	I9	I8
Consumed 0	O7	O6	O5	O4	O3	O2	O1	O0
Consumed 1	O15	O14	O13	O12	O11	O10	O9	O8

Where: I=Input O=Output

The 1732P-16CFGM12 self-configuring module contains 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.

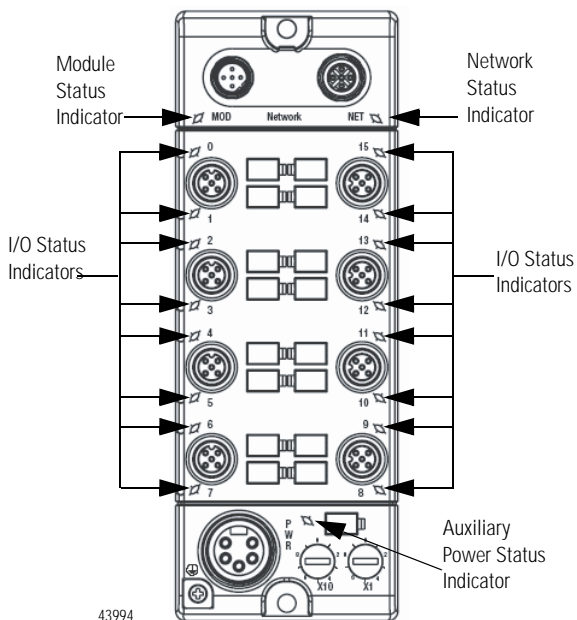
If an I/O point is to be an input, wire the input device as normal and leave the associated output un-energized at all times.

Troubleshoot the Module

This module has the following indicators:

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

Troubleshoot the Module



Network Status Indicator - NET

Refer to the network status indicator table for a description of the status indicator.

State	Status	Description	Recommended Action
Off	Not Powered or Baudrate Search	The module is not powered or the module is in baudrate search mode.	Wait until the module has completed the baudrate search or cycle power to the module.
Green	Module Operational	The module is operating normally in the data exchange mode.	None.
Flashing Green	No Data Exchange	The module knows the baudrate, but no data is being exchanged because of one of the following reasons: <ul style="list-style-type: none">• Parameter fault• Waiting for parameters• Configuration fault• Waiting for configuration.	Check your parameters and configuration and cycle power.

Module Status Indicator - MOD

Refer to the module status indicator table for a description of the module indicator.

State	Status	Description	Recommended Action
Off	Not Powered	There is no power applied to the module.	Apply power to the module.
Green	On line, Connected	The module is operating normally.	None.
Flashing Green	Standby	The EEPROM is initialized or the Ident_Number is not initialized.	Check your configuration and cycle power.
Red	Unrecoverable Fault	The module has an unrecoverable fault.	Contact your Rockwell Automation representative. The module may need to be replaced.
Flashing Red	Minor Fault	The module has an recoverable fault.	Check your configuration and cycle power.

Auxiliary Status Indicator - PWR

Refer to the auxiliary status indicator table for a description of the power indicator.

State	Status	Description	Recommended Action
Off	No Auxiliary Power	There is no auxiliary power applied to the module.	Apply auxiliary power to the module.
Green	Auxiliary Power Present	There is auxiliary power applied to the module.	None.

I/O Status Indicator - Individual Channels As Indicated by Numbers 0-15

Refer to the I/O status indicator table for a description of the I/O indicators.

State	Status	Description	Recommended Action
Off	Output Not Energized or No Valid Input	Output is not energized or input is not valid.	None.
Yellow	Output Energized or Valid Input	Output is energized or input is valid.	None.

Specifications

PROFIBUS 1732 ArmorBlock I/O Series A - 1732P-IB16M12 and 1732P-16CFGM12 Specifications

Specification	Value
Number of Inputs	16
Input Type	61131-2 Type 3 Compatible
Voltage, Off-state Input, Max.	5V dc
Voltage, On-state Input, Max	30V dc
Voltage, On-state Input, Nom.	24V dc
Voltage, On-state Input, Min.	11V dc
Voltage, Sensor Source, Max.	30V
Voltage, Sensor Source, Min.	11V
Current, Off-state Input, Max.	1.5 mA @ 5V dc
Current, On-state Input, Max.	5 mA @ 30V dc

PROFIBUS 1732 ArmorBlock I/O Series A - 1732P-OB16M12 and 1732P-16CFGM12 Specifications

Specification	Value
Number of Outputs	16
Output Type	61131-2 Compatible
Voltage Drop, On-state Output, Max.	0.5V dc
Voltage Off-peak Blocking, Min.	30V dc
Voltage, On-state Output, Max.	30V dc
Voltage, On-state Output, Min.	11V dc
Voltage, On-state Output, Nom.	24V dc
Current On-state Output, Max.	0.5 A (1738-16CFGM12) 2 A (1738-OB16M12)

PROFIBUS 1732 ArmorBlock I/O Series A - 1732P-OB16M12 and 1732P-16CFGM12 Specifications

Specification	Value
Current per Module, Max.	8.0 A (all outputs)
Leakage Current, Off-state Output, Max.	50 μ A
Surge Current per Output, Max.	1.2 A for 10 ms, repeatable every 2 s (1738-16CFGM12) 4.8 A for 10 ms, repeatable every 2 s (1738-OB16M12)

PROFIBUS Specifications

Auto Baud Rate	Supported
Fail Safe Mode	Supported
FMS Support	Not Supported
Freeze Mode	Supported
Implementation Type	DPC31
Network Length/ Communication Rate	1000 m (3280 ft) @ 9.6 KBPS 1000 m (3280 ft) @ 19.2 KBPS 1000 m (3280 ft) @ 45.45 KBPS 1000 m (3280 ft) @ 93.75 KBPS 1000 m (3280 ft) @ 187.5 KBPS 400 m (1312 ft) @ 500 KBPS 200 m (656 ft) @ 1.5 MBPS 100 m (328 ft) @ 3 MBPS 100 m (328 ft) @ 6 MBPS 100 m (328 ft) @ 12 MBPS
Network Protocol	PROFIBUS-DP (EN50170) Communication with a Class 1 master Communication with a Class 2 master
Number of Stations	100 maximum
Redundancy	Not supported
Repeater Control Signal	RS485
Station Type	DP Slave
Sync Mode	Supported

General Specifications

Specification	Value
Voltage, Auxiliary Power, Max.	30V dc
Voltage, Auxiliary Power, Min.	12V dc
Current, Auxiliary Power Input, Max.	1 A
Current, Auxiliary Power Output, Max.	8 A
Current, Sensor Source, per Input, Max.	50 mA
Current, Sensor Source, per Module, Max.	800 mA
LED Indicators	Module Status - red/green Network Status - red/green Auxiliary Power - green I/O LED - yellow
Dimensions (HxWxD), Approx., Metric	179 x 65 x 43.25 mm
Dimensions (HxWxD), Approx., Imperial	7.05 x 2.56 x 1.70 in
Weight, Metric	0.34 kg
Weight, Imperial	0.75 lb

Environmental Specifications

Specification	Value
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...60°C (-4...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...85°C (-49...185°F)

Environmental Specifications

Specification	Value
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5...95% non-condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock, Operating	IEC60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, Non-operating	IEC60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	CSPR 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 30 MHz to 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 line-wave 80% AM from 2.0 GHz to 2.7 GHz
EFT/B Immunity	IEC 61000-4-4: ±3 kV at 5 kHz on power ports ±3 kV at 5 kHz on signal ports ±3 kV at 5.0 kHz on communications ports
Surge Transient Immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports ±2 kV line-earth(CM) on communications ports
Conducted RF Immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz to 80 MHz

Environmental Specifications

Specification	Value
Enclosure Type Rating	Meets IP65, IP66, IP67 (when marked)
Isolation Voltage (Continuous-Voltage Withstand rating)	500V continuous (Network to I/O) Tested to withstand 750V dc for 60 s
Wiring Category ¹	1 - on signal ports 1 - on power ports 1 - on communications ports

1. Use this Conductor Category information for planning conductor routing. Refer to Publication 1770-4.1, 'Industrial Automation Wiring and Grounding Guidelines' and the appropriate system level installation manual.

Certifications

Certification	Value
Certifications ¹ : (When product is marked)	<p>CE 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 EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)</p> <p>C-Tick Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions</p>

1. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

ArmorBlock is a trademark of Rockwell Automation.

All other trademarks are the property of their respective holders, and are hereby acknowledged.

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, 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 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:

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.

www.rockwellautomation.com

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