Installation Instructions

Original Instructions

Allen-Bradley
by **ROCKWELL AUTOMATION**

ArmorBlock 2-Port EtherNet/IP Module

Catalog Number 1732E-8X8M12DR

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Removed discontinued catalogs	1
Corrected on anomalies: APBC1732-46, APBC1732-36, APBC1732-41 on I/O connection layout specifying the input and output ports.	4
Corrected on component selection guide and system tools link	11
Module specifications updated, refer to change bars for details	14
Module certification updated	17
Changed to new template	throughout

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 rok.auto/literature) 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.
⚠	**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.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Environment and Enclosure

> ⚠️ **ATTENTION:** This equipment is intended for use in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
> This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.
> This equipment is supplied as enclosed equipment. It should not require additional system enclosure when used in locations consistent with the equipment Enclosure Type Ratings. Subsequent sections of this publication may contain more 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, Rockwell Automation publication 1770-4.1, for additional installation requirements.
> - NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

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

Additional Resources

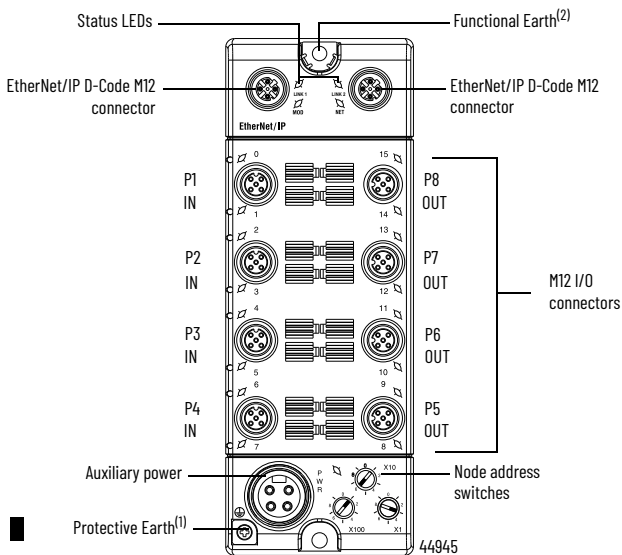| Resource	Description
Pinout Guide for 1732 ArmorBlock 2 Port Ethernet Block, publication 1732E-WD001	Detailed description of how to wire your module.

If you would like a manual, you can:

- download a free electronic version at rok.auto/literature
- purchase a printed manual by contacting your local Allen-Bradley® distributor or Rockwell Automation representative

Overview

The EtherNet/IP™ ArmorBlock® is a 24V DC I/O module that communicates via EtherNet/IP. The sealed IP65, IP67, and IP69K housing of these modules requires no enclosure. I/O connectors are sealed M12 style.

EtherNet/IP networks use advanced network technology, for example, producer/consumer communication, to increase network functionality and throughput.

■ **Module Identification**

Status LEDs

Functional Earth[2]

EtherNet/IP D-Code M12 connector

EtherNet/IP D-Code M12 connector

P1 IN

P8 OUT

P2 IN

P7 OUT

M12 I/O connectors

P3 IN

P6 OUT

P4 IN

P5 OUT

Auxiliary power

Node address switches

Protective Earth[1]

44945

(1) Protective Earth is provided for the grounding of field devices and is internally connected to each Pin 5 of the M12 I/ connectors. See I/O Connectors on page 8.

(2) Functional Earth grounds the I/O block's EtherNet/IP communication circuitry which is designed to mitigate the effect of noise on the network. See EtherNet/IP Connector on page 9.

Catalog Number Explanation

Refer to the table for a description of the module catalog number.

Catalog Number	Description	Network Connector	Auxiliary Power
1732E-8X8M12DR	Diagnostic 8-Input/8-Output 24V DC Digital I/O Dual-Port EtherNet Module	Dual D-code M12	Single 4-pin mini

Install the Module

To install the module:

- Set the network address
- Mount the module
- Connect the I/O, Network and Auxiliary cables to the module.

Set the Network Address

The I/O block ships with the rotary switches set to 999 and DHCP enabled.

To change the network address, you can do one of the following:

- adjust the switch on the front of the module.
- use a Dynamic Host Configuration Protocol (DHCP) server, such as Rockwell Automation® BootP/DHCP.
- retrieve the IP address from nonvolatile memory.

The I/O block reads the switches first to determine if the switches are set to a valid number. To set the network address:
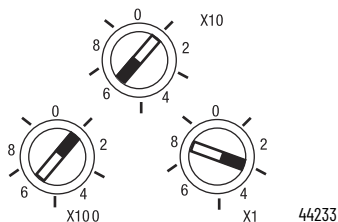
1. Rotate the three (3) switches on the front of the module using a small blade screwdriver.
2. Line up the small notch on the switch with the number setting you wish to use.
   Valid settings range from 001…254.
3. Cycle power.

Set Network Address

Example shows default node address set at 163.

When the switches are set to a valid number, the I/O block's IP address is 192.168.1.xxx (where xxx represents the number set on the switches). The I/O block's subnet mask is 255.255.255.0 and the gateway address is set to 0.0.0.0. When the I/O block uses the network address set on the switches, the I/O block does not have a host name assigned to it or use any Domain Name Server.

If the switches are set to an invalid number (for example, 000 or a value greater than 254 excluding 888), the I/O block checks to see if DHCP is enabled. If DHCP is enabled, the I/O block asks for an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters.

If DHCP is not enabled, the I/O block uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory.
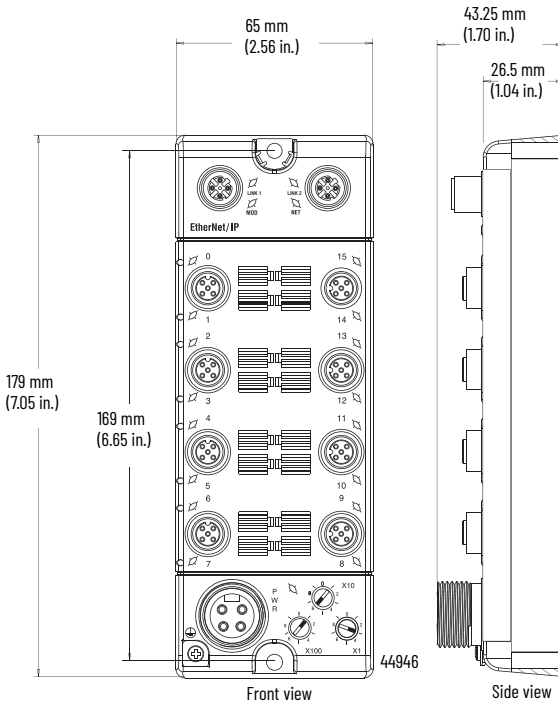
Mount the Module

Two sets of mounting holes are used to mount the module directly to a panel or machine. Mounting holes accommodate #8 (M4) pan head screws. The torque specification is 1.13 N•m (10 in•lb).

Product Dimensions

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

Module Dimensions

Front view

Side view

65 mm
(2.56 in.)

43.25 mm
(1.70 in.)

26.5 mm
(1.04 in.)

179 mm
(7.05 in.)

169 mm
(6.65 in.)

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Mount the Module in High Vibration Areas

If you mount the module in an area that is subject to shock or vibration, we recommend you use a flat and a lock washer to mount the module. Mount the flat and the lock washer as shown in the mounting illustration. Torque the mounting screws to 1.13 N•m (10 in•lb).

**High Vibration Area Mounting**

Lock washer

Flat washer

44766
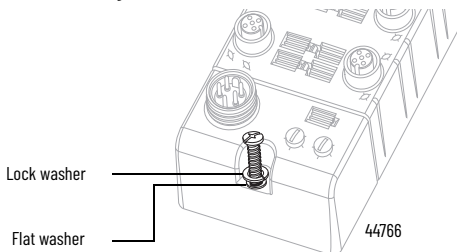
Connect the I/O, Network and Auxiliary Cables to the Module

The ArmorBlock EtherNet/IP 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.

I/O Connectors

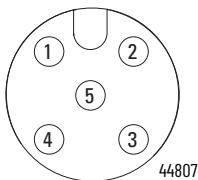Refer to the pinout diagrams for the I/O connectors.

Micro-style 5-Pin Input Female Connector

44807
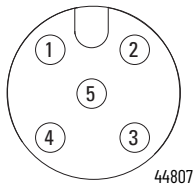
(View into connector)
Pin 1 Sensor source voltage
Pin 2 Input B
Pin 3 Return
Pin 4 Input A
Pin 5 PE

Micro-style 5-Pin Output Female Connector

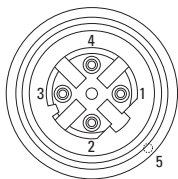

44807

(View into connector)
Pin 1 Not used
Pin 2 Output B
Pin 3 Return
Pin 4 Output A
Pin 5 PE

EtherNet/IP Connector

D-Code Micro Network Female Connector

(View into connector)
Pin 1 M12_Tx+
Pin 2 M12_Rx+
Pin 3 M12_Tx-
Pin 4 M12_Rx-
Pin 5 Connector shell shield FE

44808

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

IMPORTANT Use the 1585D-M4DC-H: Polyamide small body unshielded or the 1585D-M4DC-SH: Zinc die-cast large body shielded mating connectors for the D-Code M12 female network connector.
Use two twisted pair CAT5E UTP or STP cables.

D-Code M12 Pin	Wire color	Signal	8-way modular RJ45 pin
1	White-Orange	TX+	1
2	White-Green	RX+	3
3	Orange	TX-	2
4	Green	RX-	6

Auxiliary Power Connector

Attach the mini-style 4-pin connector to the mini-style 4-pin receptacle as shown below.

Mini-style 4-Pin Input Male Receptacle
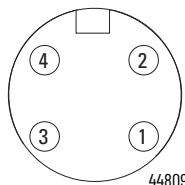
(View into receptacle)
Pin 1 Output power+
Pin 2 Sensor/MDL power+
Pin 3 Sensor/MDL power-
Pin 4 Output power-

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Auxiliary Power is based on a 4-pin connector system and is used to provide 24V DC power to I/O modules and other devices. Running separate power to these devices is most typically used for I/O devices with output connections to prevent power supply interruption due to switching of outputs. However, some devices require separate auxiliary power to power them regardless of the presence of outputs.

Depending on the devices used, it may be possible to provide power through only one pair of the four available pins, and in this case the other available pair may be used for single channel E-stop through the use of special E-stop drop or power T-ports and shorting plugs. Allen-Bradley E-stop T-ports and shorting plugs are red in color for easy identification.

ATTENTION: To comply with the CE Low Voltage Directive (LVD), this equipment and all connected I/O must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).
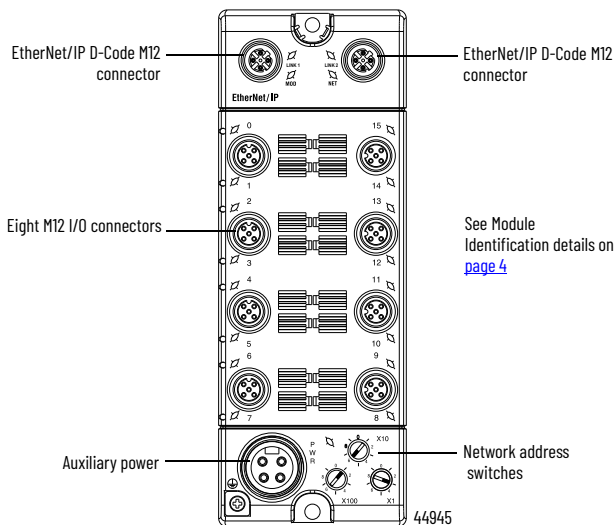
ATTENTION: To comply with UL restrictions, this equipment must be powered from a source compliant with the following: Limited Voltage/Current.

Configure the Module

Refer to the illustration for configuration operations.

Configure Operations

EtherNet/IP D-Code M12 connector

EtherNet/IP D-Code M12 connector

Eight M12 I/O connectors

See Module Identification details on page 4

Auxiliary power

Network address switches

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See Essential Components Selection Guide, publication EC-CA100, for Rockwell Automation cable and cord set offerings or use the configuration tools available at rok.auto/systemtools.

Interpret LED Indicators

This module has the following indicators:

- Network, Module, and Link status indicators for EtherNet/IP
- Auxiliary Power indicator
- Individual I/O status indicators for inputs and outputs
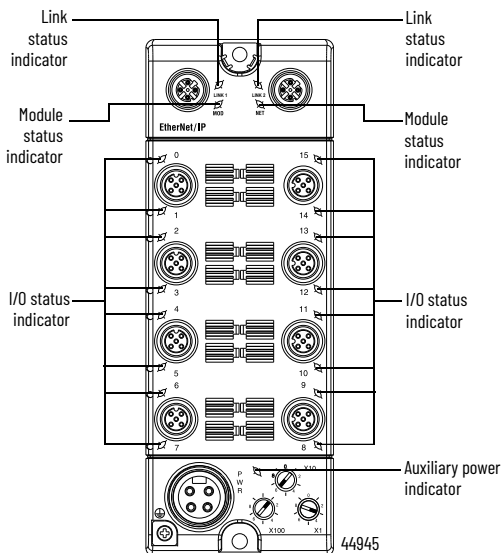
Indicator Status for Modules

Indicator	Status	Description
Module status	Off	No power applied to device.
	Flashing red/green	The module is performing POST (Power-On Self Test), which completes within 30 s.
	Green	Device operating normally.
	Flashing red	Recoverable fault.
	Red	Unrecoverable fault – may require device replacement.

Indicator Status for Modules (Continued)

Indicator	Status	Description
Network status	Off	The device is not initialized or the module does not have an IP address.
	Flashing green	The device has no CIP™ connections. The device has an IP address, but no CIP connections are established.
	Green	The device is online, has an IP address, and CIP connections are established.
	Flashing red	One or more connections have timed out.
	Red	The module has detected that its IP address is already in use.
	Flashing red/green	The module is performing a powerup self-test.
Network link status	Off	No link established.
	Green	Link established on indicated port at 100 Mbps.
	Flashing green	Link activity present on indicated port at 100 Mbps.
	Yellow	Link established on indicated port at 10 Mbps.
	Flashing yellow	Link activity present on indicated port at 10 Mbps.
Auxiliary status	Off	No auxiliary power to device or input not valid.
	Green	Auxiliary power applied to device.
Digital output status	Off	Output not energized.
	Yellow	Output energized.
	Red	Output shorted.
	Flashing red	Output open load.
Digital input status	Off	No valid input.
	Yellow	Valid input.
	Red	Sensor source voltage shorted.
	Flashing red	Sensor source open wire.

Specifications

ArmorBlock 2-Port EtherNet/IP Module Input

Attribute	Value
Number of inputs	8
Input type	Sink, 24V DC
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	12V DC
Current, off-state input, max	1.5 mA @ 5V DC
Current, on-state input, max	5 mA @ 30V DC
Voltage, sensor source, max	30V DC
Voltage, sensor source, min	10V DC
Input delay time ON to OFF OFF to ON	0...16000 µs
Isolation voltage	50V (continuous), Basic Insulation Type, Inputs and Sensor Power to Network. No isolation between individual Inputs or between Network channels. Type tested at 707V DC for 60 s.

ArmorBlock 2-Port EtherNet/IP Module Output

Attribute	Value
Number of outputs	8
Output type	Source, 24V DC
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	12V DC
Voltage, on-state output, nom	24V DC
Current on-state output, max	0.5 A
Current per module, max	4.0 A

ArmorBlock 2-Port EtherNet/IP Module Output (Continued)

Attribute	Value
Leakage current, off-state output, max	500 µA
Surge current per output, min	1.2 A for 10 ms, repeatable every 2 s
Pilot duty rating	DC-14
Isolation voltage	50V (continuous), Basic Insulation Type, Outputs and Output Power to Network. No isolation between individual Outputs or between Outputs and Output power or between Network channels. Type tested at 707V DC for 60 s.

General Specifications

Attribute	Value
Voltage, auxiliary power, max	30V DC
Voltage, auxiliary power, nom	24V DC
Voltage, auxiliary power, min	12V DC
Current, Ethernet system power, max (pins 2, 3 sensor source/module power)	0.8 A
Current, auxiliary power, max per output module (pins 2, 3 sensor source/module power plus pins 1, 4 for output loads)	4 A
Current, sensor source, per input, max	50 mA
Current, sensor source, per connector, max	100 mA
Communication rate	EtherNet/IP 10/100 Mbps Full or half-duplex 100 meter per segment
Isolation voltage	50V (continuous), Basic Insulation Type, Inputs and Sensor Power to Network No isolation between individual Inputs or between Network channels Type tested at 707V DC for 60 s
Status indicators	Module status - red/green Network status - red/green Link status - green/yellow Auxiliary power - green I/O LED - yellow I/O LED - yellow/red
Dimensions (HxWxD), approx.	179 x 65 x 43.25 mm (7.05 x 2.56 x 1.70 in.)

General Specifications (Continued)

Attribute	Value
Weight, approx.	0.34 kg (0.75 lb)
Enclosure type rating	Meets IP65/66/67/69K (when marked), and Type 4X with receptacle dust caps or cable termination.
Wiring category[1]	1 – on signal ports 1 – on power ports 1 – on communications port

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

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, surrounding, max.	60 °C (140 °F)
Temperature, storage	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40...85 °C (-40...185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10...500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, non-operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	CISPR 11 Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges

Environmental Specifications (Continued)

Attribute	Value
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 @ 900 Mhz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 Mhz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity	IEC 61000-4-4: ±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on signal ports ±3 kV @ 5 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...80 MHz

Certifications

Certification (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657.
CE	European Union 2014/30/EU EMC Directive, compliant with: EN 61326-1; 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)
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications.
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
RoHS	European Union 2011/65/EU RoHS, compliant with: EN 50581; Technical documentation

(1) See the Product Certification link at rok.auto/certifications for Declaration of Conformity, Certificates, and other certification details.

Notes:

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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