*Installation Instructions*

# ControlLogix EtherNet/IP Communication Module

Catalog Numbers 1756-EN2TR, 1756-EN3TR

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://www.rockwellautomation.com/literature) 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 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. |

## Environment and Enclosure

**ATTENTION**

This equipment is intended for use in a Pollution Degree 2 industrial environment, 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 open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

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

## North American Hazardous Location Approval

| The following information applies when operating this equipment in hazardous locations. | Informations sur l'utilisation de cet équipement en environnements dangereux. |
|---|---|
| Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation. | Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation. |
| **WARNING** ⚠ **EXPLOSION HAZARD -** <br>• Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.<br>• Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.<br>• Substitution of components may impair suitability for Class I, Division 2.<br>• If this product contains batteries, they must only be changed in an area known to be nonhazardous. | **AVERTISSEMENT** ⚠ **RISQUE D'EXPLOSION –** <br>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.<br>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.<br>• La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.<br>• S'assurer que l'environnement est classé non dangereux avant de changer les piles. |

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

## About the Module

The module provides EtherNet/IP connectivity. Use the tap to support linear, star, and device-level ring (DLR) topologies. The module is configured by default to support linear and star topologies. When setting up a DLR, follow the steps in the Use the Module in a Device-level Ring (DLR) Network section on page 15 to avoid adversely impacting your network.

Refer to the EtherNet/IP Ring Topology Application Guide, publication ENET-AP005, for information on setting up EtherNet/IP network topologies.

Use this figure to identify the external features of the module.
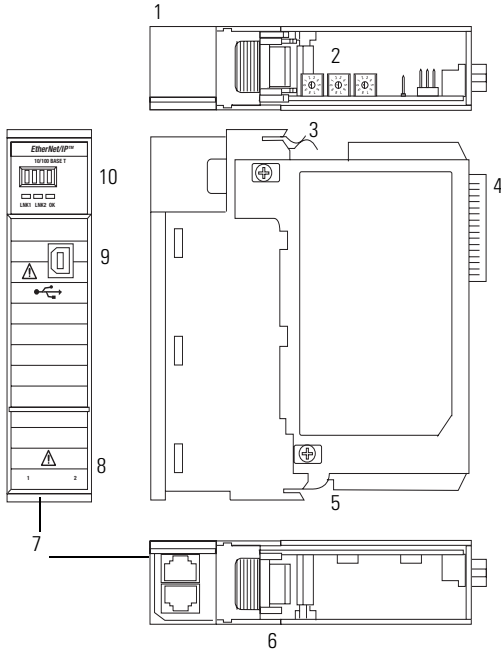


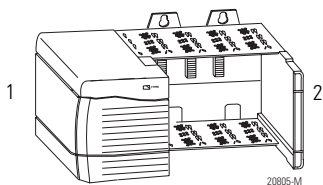| Item | Description | Item | Description |
|------|-------------|------|-------------|
| 1 | Top view | 6 | Bottom view |
| 2 | Rotary switches | 7 | RJ45 (Ethernet) cable connectors (on underside of module) |
| 3 | Side view | 8 | Front view |
| 4 | Backplane connector | 9 | USB port |
| 5 | MAC ID label (on opposite side of circuit board) | 10 | Alphanumeric display and status indicators |

## Software Requirements

You must have the following versions of software.

| Module | Software | Version |
|--------|----------|---------|
| 1756-EN2TR | RSLinx Classic | 2.55 or later |
| | RSLogix 5000 | 17.0x (supports revision 2 of module firmware only) |
| | | If you are using version 17.01 of RSLogix 5000 software, you need to download the add-on-profile. Download it from http://www.rockwellautomation.com/support/controlflash/LogixProfiler.asp |
| | | or<br>18 or later (supports revision 2 and later revisions of module firmware) |
| 1756-EN3TR | RSLinx Classic | 2.56 or later |
| | RSLogix 5000 | 18 or later |

# Before You Begin

Before you install the module, you must install and connect a ControlLogix chassis and power supply.



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| Item | Description |
|------|-------------|
| 1 | Power supply |
| 2 | 1756-A4 chassis |

To install these products, refer to these publications.

| Chassis Type | Chassis Installation Instructions | Power Supply | Power Supply Installation Instructions |
|---|---|---|---|
| 1756-A4/B 1756-A7/B 1756-A10/B 1756-A13/B | Publication 1756-IN080 | 1756-PA72/C, 1756-PB72/B, 1756-PA75/B, 1756-PB75/B | Publication 1756-IN613 |

## Determine Module Slot Location

Install the module in any slot in the ControlLogix chassis. You can install multiple 1756-EN2TR or 1756-EN3TR modules in the same chassis. The following figure shows chassis slot numbering in a 4-slot chassis. Slot 0 is the first slot and is always the leftmost slot in the rack.



20806
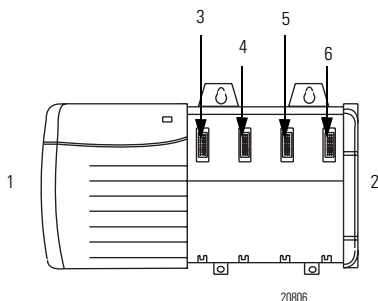
| Item | Description |
|---|---|
| 1 | Power supply |
| 2 | Chassis |
| 3 | Slot 0 |
| 4 | Slot 1 |
| 5 | Slot 2 |
| 6 | Slot 3 |

## Set the Network Address

The module is shipped with the rotary switches set to 999 and BOOTP enabled. You can set the network Internet Protocol (IP) address three ways.

- Use the rotary switches on the top of the module.
- Use a BOOTP server or Dynamic Host Configuration Protocol (DHCP) server.
- Use Rockwell Automation RSLinx Classic or RSLogix 5000 software.

*Use the Rotary Switches*



| Item | Description |
|------|-------------|
| 1 | Front of module |
| 2 | Top of module |
| 3 | Rotary switches |
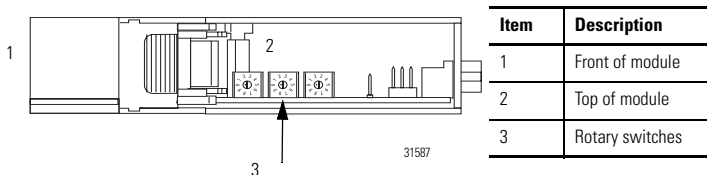
The module reads the rotary switches first to determine if they are set to a valid number for the last portion of the IP address. Valid numbers range from 001…254.

When the switches are set to a valid number, the module's IP address is 192.168.1.*xxx* (where *xxx* represents the number set on the switches). The module's subnet mask is 255.255.255.0 and the gateway address is set to 0.0.0.0.

The module does not have a host name assigned, nor does it use any Domain Name System when using the rotary switch settings.

1. To reset the module to its initial out-of-the-box settings, reset the switches to 888 and cycle power.

**IMPORTANT** Do not use the 888 switch setting during normal module operation.

2. After cycling power with the switches set to 888, remove the module and set the switches to their final value.

    The software configuration determines the IP address when you set the rotary switches to:

    • a value other than 888.
    • the valid IP address values 001…254.

*Use a DHCP/BOOTP Server*

If you do not have a large computer that can act as a boot server, download our DHCP/BOOTP software so you can use a personal computer as a DHCP/BOOTP server.

To set the network address by using the Rockwell Automation DHCP/BOOTP server, follow these steps.

1. Access the DHCP/BOOTP utility at
   http://www.ab.com/networks/ethernet/bootp.html.

2. Download the version 2.3.2 DHCP/BOOTP utility.

3. Extract the zipped files to a temporary directory.

4. In the temporary directory, double-click setup.exe to install the DHCP/BOOTP utility.

5. Run the utility.

6. Refer to the following chart, which describes what happens next, depending on whether DHCP/BOOTP is enabled on the module.

| If DHCP/BOOTP is | The module |
|---|---|
| Enabled | Asks for an address from a DHCP/BOOTP server. The server also assigns other Transport Control Protocol (TCP) parameters. |
| Not enabled | Uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory. |

*Use RSLinx Classic or RSLogix 5000 Software*

Follow the procedures outlined in the online help that accompanies this software to set the network address.
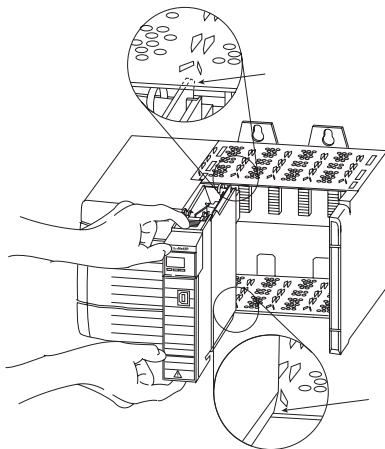
## Install the Module

To install the module, follow this procedure.

> **WARNING**
> When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.
> Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1. Align the circuit board with top and bottom guides in the chassis.



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2. Slide the module into the chassis, making sure the module backplane connector properly connects to the chassis backplane and noting that the module is properly installed when it is flush with the power supply or other installed modules.
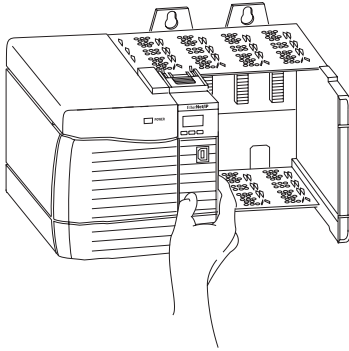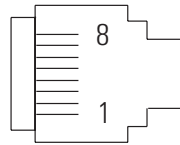


31589-M

## Wire the Ethernet Connector

Use an RJ45 connector to connect to the EtherNet/IP network. Wire the connector as shown.

For detailed EtherNet/IP connection information, see the EtherNet/IP Media Planning and Installation Manual, available from the Open DeviceNet Vendor Association (ODVA) at http://www.odva.org.

8 ------ NC
7 ------ NC
6 ------ RD-
5 ------ NC
4 ------ NC
3 ------ RD+
2 ------ TD-
1 ------ TD+



RJ 45

## Grounding Considerations

The grounding and bonding must be of equal potential between all devices in the communication coverage area.

## Connect the Module to the EtherNet/IP Network

Follow this procedure to connect the module to the network.

| **WARNING** | If you connect or disconnect the communication cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. |
|---|---|

1. Attach the cable with the RJ45 connector to the Ethernet port on the bottom of the module as shown.

2. Attach the other end of the cable to the devices in your network.
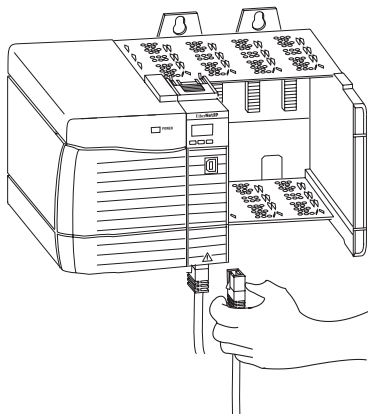
## Download the 1756-EN2TR Module Add-on Profile (AOP) [RSLogix 5000 Software Version 17.01 Only]

If you are using RSLogix 5000 software, version 17.01, you need to download the AOP. Follow these steps to download the AOP.

| **IMPORTANT** | The 1756-EN3TR module requires RSLogix 5000 software version 18. |
|---|---|

1. Locate the module AOP on
   http://www.rockwellautomation.com/support/controlflash/LogixProfiler.as.

| **IMPORTANT** | You need a Rockwell Automation MySupport account to download the AOP. If you do not have one, follow the steps on the MySupport website to obtain an account. |
|---|---|

2. Click on the desired file to download it.

3. Enter your RSLogix 5000 software serial number and click Qualify for Update.

4. Download and extract the zipped files to a temporary directory.

5. Shut down any instances of RSLogix 5000 that are currently running.

6. In the temporary directory, double-click the MPSetup.exe file and follow the onscreen instructions to install the AOP.

## Use the Module in a Device-level Ring (DLR) Network

The module is configured by default to be used in a linear or star topology, or as a ring node in a DLR network. Follow these steps to use the module in a DLR network as a ring supervisor.

1. If you are using the unit as a ring supervisor, follow the procedures outlined in the online help that accompanies RSLinx or RSLogix 5000 software to enable the ring supervisor function with this software.

| IMPORTANT | • Make sure at least one ring supervisor is present before connecting the last link of a device-level ring network and physically closing the ring.<br>• Do not connect nodes that do not support a device-level ring as members of the ring. |
|---|---|

2. Refer to the EtherNet/IP Ring Topology Application Guide, publication ENET-AP005, for information on setting up EtherNet/IP network topologies.

## Connect to the Module via the USB Port

| WARNING | The USB port is intended for temporary local programming purposes only and not intended for permanent connection. If you connect or disconnect the USB cable with power applied to this module or any device on the USB network, an electrical arc can occur. This could cause an explosion in hazardous location installations.<br>Be sure that power is removed or the area is nonhazardous before proceeding.<br>A Samtec Inc. RSP-119350 USB cable is required to maintain hazardous location certifications. |
|---|---|

The module has a USB device port that uses a series B receptacle. To use the USB port, you must have RSLinx Classic software, version 2.55 or later, installed on your computer.

Use a USB cable to connect your computer to the USB port. The connection lets you download programs to controllers and configure Ethernet modules directly from your computer.
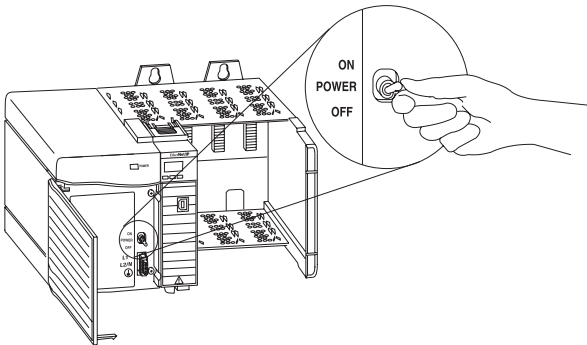
| ATTENTION | The USB cable is not to exceed 3.0 m (9.84 ft) and must not contain hubs. |
|-----------|---------------------------------------------------------------------------|

## Apply Chassis Power and Check Status Indicators

To complete this procedure, follow these steps.

1. Apply chassis power as shown in the figure.



2. Check the power supply and module status indicators and alphanumeric display to determine that the power supply and module are operating properly.

   The alphanumeric display should cycle through the following states: TEST - PASS - OK - REV *x.x,* where *x.x* is the module's firmware revision.

The display then alternates between OK and port link status for both ports.
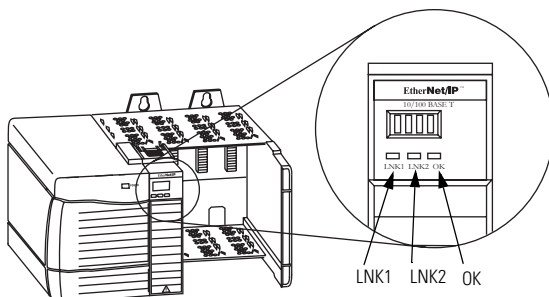


## Install or Remove the Module Under Power

You can install or remove this module while chassis power is applied.

> **WARNING**
>
> When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.
>
> Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.
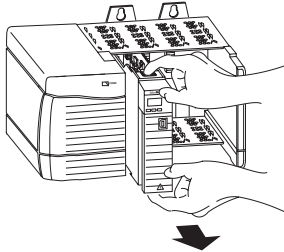
To remove or replace the module, use this procedure.

1.  Push on the upper and lower module tabs to disengage them.
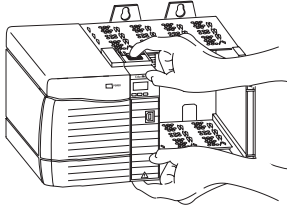


31590-M

2.  Slide the module out of chassis.



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| **IMPORTANT** | If you want to replace an existing module with an identical one, and you want to resume identical system operation, you must install the new module in the same slot. |
|---|---|

## Status Indicators

If the alphanumeric display and status indicators do not sequence through the expected states, refer to the following troubleshooting tables. The three bi-color (red/green) status indicators on the module provide diagnostic information about the module and its connections to the network.

| Indicator | Status | Description |
|-----------|--------|-------------|
| LNK1, LNK2 | Off | No link, or port administratively disabled, or port disabled due to rapid ring faults or partial network fault on active ring supervisor (LNK2). |
| | Green | One of these conditions exists:<br>• A link exists on the port.<br>• The ring network is operating normally on active ring supervisor (LNK2). |
| | Flashing green | Activity exists on the port |

| Indicator | Status | Description |
|---|---|---|
| OK | Off | Module does not have 24V DC power. Verify that there is chassis power and the module is completely inserted into chassis and backplane. |
| | Flashing green | Module is not configured. |
| | Green | Module is operating correctly. |
| | Flashing red | Module detected a recoverable fault. A configuration error may have caused the fault. |
| | Red | Recycle power to the module. If this does not clear the fault, replace the module. Check the module configuration and, if necessary, reconfigure the module. |
| | Red and alpha-numeric display scrolls 'Image Update Needed' | The main firmware image needs to be updated. Update the firmware image. Once the image is updated, recycle power. If this does not clear the fault, replace the module. |
| | Flashing red and green | Module performing power-up self-test. Wait for the module to complete powering up and performing self-test. |

## Specifications

**Technical Specifications - 1756-EN2TR and 1756-EN3TR**

| Attribute | Value |
|---|---|
| Module location | Any slot in the ControlLogix chassis |
| Backplane current (mA) at 5.1V DC | 1 A |
| Backplane current (mA) at 24V DC | 3 mA |
| Isolation voltage | 30 V (continuous), Basic Insulation Type, Ethernet to system<br>No isolation between USB and system<br>Type tested at 853V AC for 60 s |
| Power consumption, max | 5.1 W |
| Power dissipation | 5.1 W |
| Wire size | Ethernet connections:<br>RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702. |
| Wiring category | 1 - on communication ports[(1)] |
| North American temp code | T4A |
| Recommended USB cable for USB port | For hazardous environments, Samtec cable, PN RSP-119350 |
| USB port | USB 1.1<br>USB device,<br>USB series B receptacle |
| Enclosure type rating | None (open-style) |

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

## Environmental Specifications - 1756-EN2TR and 1756-EN3TR

| Attribute | Value |
|---|---|
| Temperature, operating<br>• IEC 60068-2-1 (Test Ad, Operating Cold)<br>• IEC 60068-2-2 (Test Bd, Operating Dry Heat)<br>• IEC 60068-2-14 (Test Nb, Operating Thermal Shock) | 0…60 °C (32…140 °F) |
| Temperature, nonoperating<br>• IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold)<br>• IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat)<br>• IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40…85 °C (-40…185 °F) |
| Relative humidity<br>• IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) | 5…95% noncondensing |
| Vibration<br>• IEC 60068-2-6 (Test Fc, Operating) | 2 g @ 10…500 Hz |
| Shock, operating<br>• EC 60068-2-27 (Test Ea, Unpackaged Shock) | 30 g |
| Shock, nonoperating<br>• IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 50 g |
| Emissions<br>• CISPR 11 | Group 1, Class A |
| Immunity, ESD<br>• IEC 61000-4-2 | 6 kV contact discharges<br>8 kV air discharges |

**Environmental Specifications - 1756-EN2TR and 1756-EN3TR**

| Attribute | Value |
|---|---|
| Immunity, radiated RF<br>• IEC 61000-4-3 | 10V/m with 1 kHz sine-wave 80%AM from 80…2000 MHz<br>10V/m with 200 Hz 50% Pulse 100%AM at 900 MHz<br>10V/m with 200 Hz 50% Pulse 100%AM at 1890 MHz<br>3V/m with 1 kHz sine-wave 80%AM from 2000…2700 MHz |
| Immunity, EFT/B<br>• IEC 61000-4-4 | ±3 kV at 5 kHz on Ethernet port |
| Immunity, surge transient<br>• IEC 61000-4-5 | ±2 kV line-earth(CM) on Ethernet port |
| Immunity, conducted RF<br>• IEC 61000-4-6 | 10V rms with 1 kHz sine-wave 80%AM from 150 kHz…80 MHz |

**Certifications - 1756-EN2TR and 1756-EN3TR**

| Certification | Value |
|---|---|
| When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details | |
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.<br>UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. |
| FM | FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations |

## Certifications - 1756-EN2TR and 1756-EN3TR

| Certification | Value |
|---|---|
| When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details | |
| CE | European Union 2004/108/EC EMC Directive, compliant with: <br>• EN 61326-1; Meas./Control/Lab., Industrial Requirements <br>• EN 61000-6-2; Industrial Immunity <br>• EN 61000-6-4; Industrial Emissions <br>• EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) |
| C-Tick | Australian Radiocommunications Act, compliant with: <br>AS/NZS CISPR 11; Industrial Emissions |
| EtherNet/IP | ODVA conformance tested to EtherNet/IP specifications |

## Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

| Resource | Description |
|---|---|
| EtherNet/IP Modules in Logix5000 Control Systems User Manual, publication ENET-UM001 | Provides details about how to configure your module. |
| EtherNet/IP Embedded Switch Technology Application Guide, publication ENET-AP005 | Provides information about using products with embedded switch technology to construct networks with linear and ring topologies. |
| EtherNet/IP Industrial Protocol White Paper, publication ENET-WP001 | Describes how to implement services and data objects on a TCP/UDP/IP based Ethernet network. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, http://www.ab.com | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

**Notes:**

**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<br>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 (call the 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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