*Installation Instructions*

# ControlLogix EtherNet/IP Bridge Module

## Catalog Number 1756-ENBT

Use this document as a guide to install the module. Note that this document describes hardware installation only. For configuration information, refer to the EtherNet/IP Modules User Manual, publication number ENET-UM001, available online at www.rockwellautomation.com/literature.

The following table lists the contents of this document and where to find specific information.



Publication 1756-IN019C-EN-P - November 2004

**Important User Information**

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.ab.com/manuals/gi) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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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:<br>• identify a hazard<br>• avoid a hazard<br>• recognize the consequence |
| **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 a Pollution Degree 2 industrial environment, 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 "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 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.

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.

## Removal and Insertion Under Power

**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.

## European Hazardous Location Approval

If you install the module in a European Zone 2 location, consider:

**European Zone 2 Certification (The following applies when the product bears the EEx Marking)**

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.

The LCIE (Laboratoire Central des Industries Electriques) certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive. The examination and test results are recorded in confidential report No. 28 682 010.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50021.

**IMPORTANT**

When using this product, also consider the following:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- The secondary of a current transformer shall not be open-circuited when applied in Class I, Zone 2 environments.
- Equipment of lesser Enclosure Type Rating must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Allen-Bradley.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments.

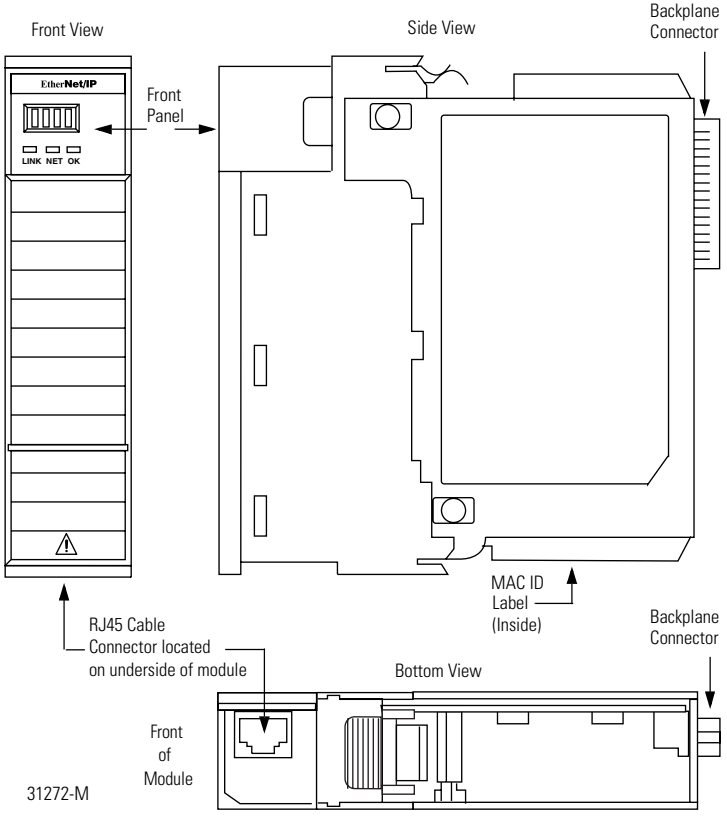
## North American Hazardous Location Approval

| 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. |

| **The following information applies when operating this equipment in hazardous locations:** | | **Informations sur l'utilisation de cet équipement en environnements dangereux:** | |
|---|---|---|---|
| **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. |

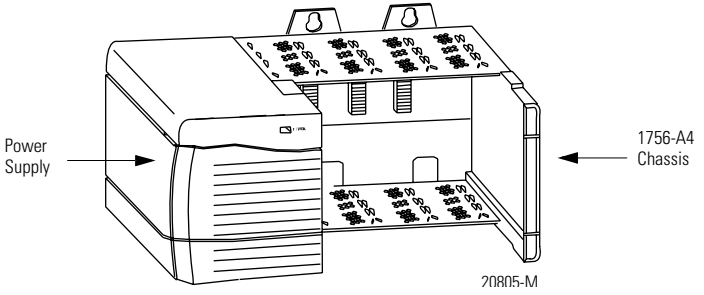
## Identify Module Components

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



## Prepare the Chassis for Module Installation

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

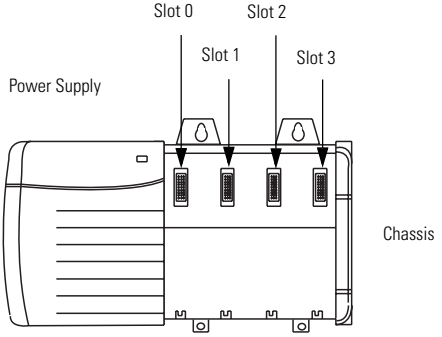



For information on installing these products, refer to the publications listed below.

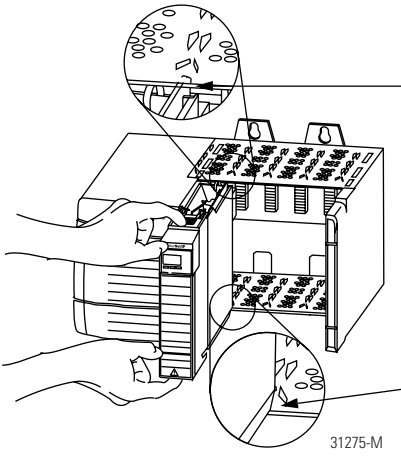
| Chassis Type | Chassis Installation | Power Supply | Power Supply Installation |
|---|---|---|---|
| Series B: 1756-A4, -A7, -A10, -A13 | Pub. No. 1756-IN080 | 1756-PA72/B | Pub. No. 1756-5.67 |
| | | 1756-PB72/B | |
| | | 1756-PA75/A | Pub. No. 1756-5.78 |
| | | 1756-PB75/A | |

## Determine Module Slot Location

You can install the module in any slot in the ControlLogix chassis. You can also install multiple 1756-ENBT modules in the same chassis. The figure below shows chassis slot numbering in a 4-slot chassis. Slot 0 is the first slot and is always the leftmost slot in the rack (the first slot to the right of the power supply).



## Install the Module in the Chassis

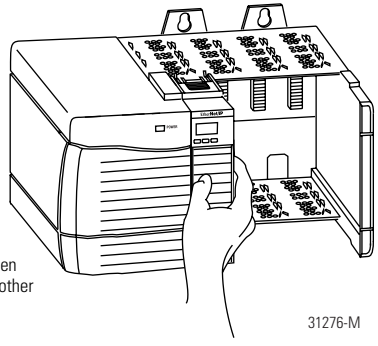



**1**

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

**2**

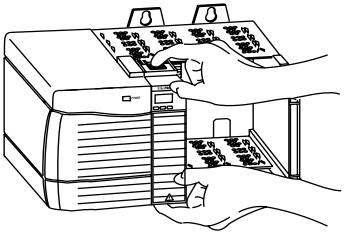
Slide the module into the chassis. Make sure the module backplane connector properly connects to the chassis backplane.




**3**

The module is properly installed when it is flush with the power supply or other installed modules.

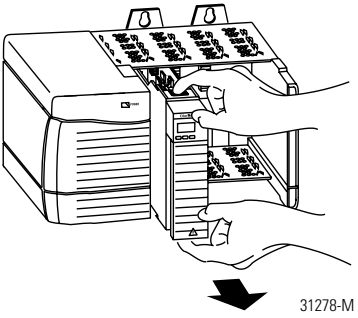
## Remove or Replace the Module (when applicable)



31277-M

1

Push on upper and lower module tabs to disengage them.



31278-M

2

Slide module out of chassis.

**IMPORTANT**

If you are replacing 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.

## Install or Remove the Module Under Power

This module is designed to be installed or removed while chassis power is applied.

**WARNING**

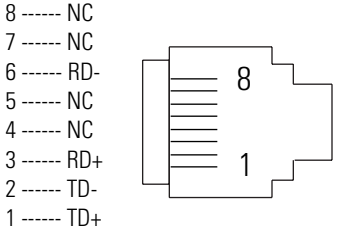
When you insert or remove a module while backplane power is on, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field device causing unintended machine motion or loss of process control
- causing an explosion in a hazardous environment

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.

## Wire the Ethernet Connector

Use an RJ45 connector to connect to the EtherNet/IP network. Wire the connector according to the following illustration:




RJ 45

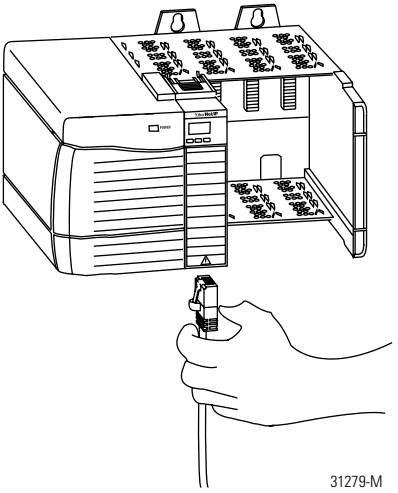
For detailed EtherNet/IP connection information, see the EtherNet/IP Media Planning and Installation Guide, publication number ENET-IN001.

## Connect the Module to the EtherNet/IP Network

**WARNING**

If you connect or disconnect the Ethernet 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.

Attach the RJ45 connector to the Ethernet port on the bottom of the module as shown below:

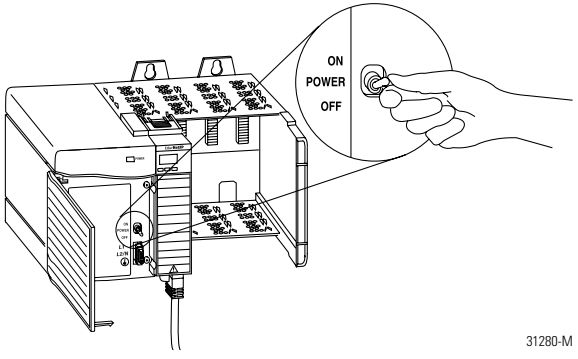



**IMPORTANT**

We recommend connecting the module to the network via a 100MB Ethernet switch, which will reduce collisions and lost packets and increase network bandwidth. For detailed EtherNet/IP connection information, see the following publications:

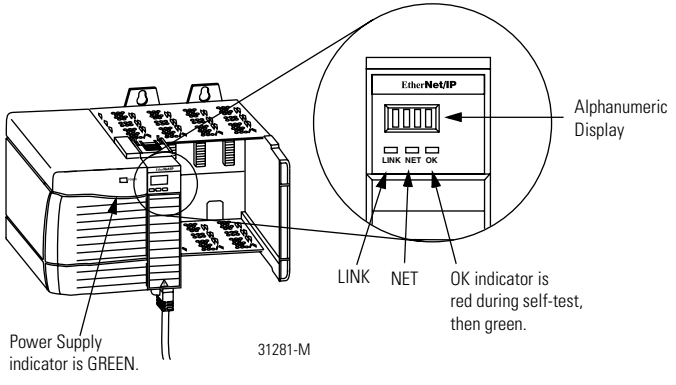
- EtherNet/IP Performance and Application Guide, publication ENET-AP001
- EtherNet/IP Media Planning and Installation Guide, publication ENET-IN001

## Apply Chassis Power




## Check Power Supply and Module Status

Check the LED indicators and alphanumeric display to determine if 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 the module's EtherNet/IP address.

## Troubleshoot the Module

If the alphanumeric display and LED indicators do not sequence through the expected states refer to the following troubleshooting tables. The three bi-color (red/green) LED status indicators on the 1756-ENBT module provide diagnostic information about the module and its connections to the network.

### NET (Network) Status Indicator

The Network Status LED provides the following information:

| State | Status | Description |
|---|---|---|
| Off | Not Powered,<br>No IP Address | Module is not powered, or does not have an IP address.<br>• Verify there is chassis power and the module is completely inserted into the chassis and backplane.<br>• Make sure the module has been configured. |
| Flashing Green | No Connections | Module has obtained an IP address, but has no established connections. |
| Green | CIP Connections | Module has an IP address and at least one established connection. |
| Flashing Red | Connection Timeout | One or more of the connections in which the module is the target has timed out. |
| Red | Duplicate IP Address | Module has detected that its IP address is already in use. Assign a unique IP address to the module. |

### Link Status Indicator

The Link Status LED provides the following information:

| State | Status | Description |
|---|---|---|
| Off | No data transmission | Module is not ready to communicate. |
| Green | Ready | Module is ready to communicate. |
| Flashing Green | Data transmission in progress | Module is communicating over the network. |

### OK Status Indicator

The OK Status LED provides the following module information:

| State | Status | Description |
|---|---|---|
| Off | No Power | Module does not have 24V DC power. Verify there is chassis power and the module is completely inserted into chassis and backplane. |
| Flashing Green | Standby | Module is not configured. |
| Green | Operational | Module is operating correctly. |
| Flashing Red | Minor Fault | A recoverable fault has been detected. This could be caused by an error in the configuration. |
| Red | Major Fault | An unrecoverable fault has been detected. Recycle power to the module. If this does not clear the fault, replace the module. |
| Flashing Red and Green | Self Test | Module performing power-up self-test. |

## Where to Find Information on Configuring the Module

To configure your module, refer to the configuration chapter of your EtherNet/IP Modules User Manual, publication number ENET-UM001, available online at www.rockwellautomation.com/literature.

## Specifications

| | |
|---|---|
| Module Location | Any slot in the ControlLogix chassis |
| Backplane Current (mA) at 5V.1V dc | 700mA |
| Backplane Current (mA) at 24V | 3mA |
| Isolation Voltage, Continuous | 30V<br>Tested to 707V dc for 60 seconds |
| Power Dissipation, Max. | 3.65W |
| Conductors<br>Wire Size<br>Category | <br>802.3 compliant - shielded or unshielded twisted pair<br>2[1] |
| Ethernet Connector | RJ45 Cat. 5 |
| User Manual | ENET-UM001 |
| Environmental Conditions | |
| Operating Temperature | 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):<br>0 to 60°C (32 to 140°F) |
| Storage Temperature | IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold),<br>IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat),<br>IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock):<br>–40 to 85°C (–40 to 185°F) |
| Relative Humidity | IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat):<br>5 to 95% non-condensing |
| Vibration | IEC60068-2-6 (Test Fc, Operating):<br>2g @ 10-500Hz |
| Shock, Operating | IEC60068-2-27 (Test Ea, Unpackaged shock):<br>30g |

| | |
|---|---|
| Shock, Non-operating | IEC60068-2-27 (Test Ea, Unpackaged shock):<br>50g |
| Emissions | CISPR 11:<br>Group 1, Class A |
| ESD Immunity | IEC 61000-4-2:<br>6kV contact discharges<br>8kV air discharges |
| Radiated RF Immunity | IEC 61000-4-3:<br>10V/m with 1kHz sine-wave 80%AM from 30MHz to 2000MHz<br>10V/m with 200Hz 50% Pulse 100%AM at 900Mhz<br>10V/m with 200Hz 50% Pulse 100%AM at 1890Mhz |
| EFT/B Immunity | IEC 61000-4-4:<br>±2kV at 5kHz on communications ports |
| Surge Transient Immunity | IEC 61000-4-5:<br>±2kV line-earth(CM) on communications ports |
| Conducted RF Immunity | IEC 61000-4-6:<br>10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz |
| Enclosure Type Rating | None (open-style) |

| | |
|---|---|
| Certifications[2] (when product is marked) | UL UL Listed Industrial Control Equipment<br>CSA CSA Certified Process Control Equipment<br>CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations<br>FM FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations<br>CE European Union 89/336/EEC EMC Directive, compliant with:<br>EN 50082-2; Industrial Immunity<br>EN 61326; Meas./Control/Lab., Industrial Requirements<br>EN 61000-6-2; Industrial Immunity<br>EN 61000-6-4; Industrial Emissions<br>C-Tick Australian Radiocommunications Act, compliant with:<br>AS/NZS CISPR 11; Industrial Emissions<br>EEx European Union 94/9/EEC ATEX Directive, compliant with:<br>EN 50021; Potentially Explosive Atmospheres, Protection "n" (Zone 2)<br>EtherNet/IP ODVA conformance tested to EtherNet/IP specifications |

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

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



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