Tricon Communication Module (TCM)

The Tricon Communication Module (TCM), which is compatible with only Tricon v10.0 and later systems, allows the Tricon to communicate with TriStation, other Tricon or Trident controllers, Modbus master and slave devices, and external hosts over Ethernet networks.

Each TCM contains four serial ports, two network ports, and one debug port (for Triconex use).

Each serial port is uniquely addressed and can be configured as a Modbus master or slave. Serial port 1 supports either the Modbus or the Trimble GPS interface. Serial port 4 supports either the Modbus or the TriStation interface. Each TCM supports an aggregate data rate of 460.8 kilobits per second, for all four serial ports.

Programs for the Tricon use variable names as identifiers but Modbus devices use numeric addresses called *aliases*. Therefore an alias must be assigned to each Tricon variable name that will be read by or written to a Modbus device. An alias is a five-digit number which represents the Modbus message type and the address of the variable in the Tricon. An alias number is assigned in TriStation.

Any standard Modbus device can communicate with the Tricon through the TCM, provided that aliases are assigned to the Tricon variables. Alias numbers must also be used when host computers access the Tricon through other communication modules, such as the NCM.

TCM models 4353 and 4354 have an embedded OPC server, which allows up to ten OPC clients to subscribe to data collected by the OPC server. The embedded OPC server supports the Data Access standard and the Alarms and Events standard.

Each TCM contains two network ports—NET 1 and NET 2. Models 4351, 4351A, 4351B, and 4353 have two copper Ethernet ports. Models 4352, 4352A, 4352B, and 4354 have two fiber-optic Ethernet ports. See Table 67 for the list of supported protocols on the TCM network ports.

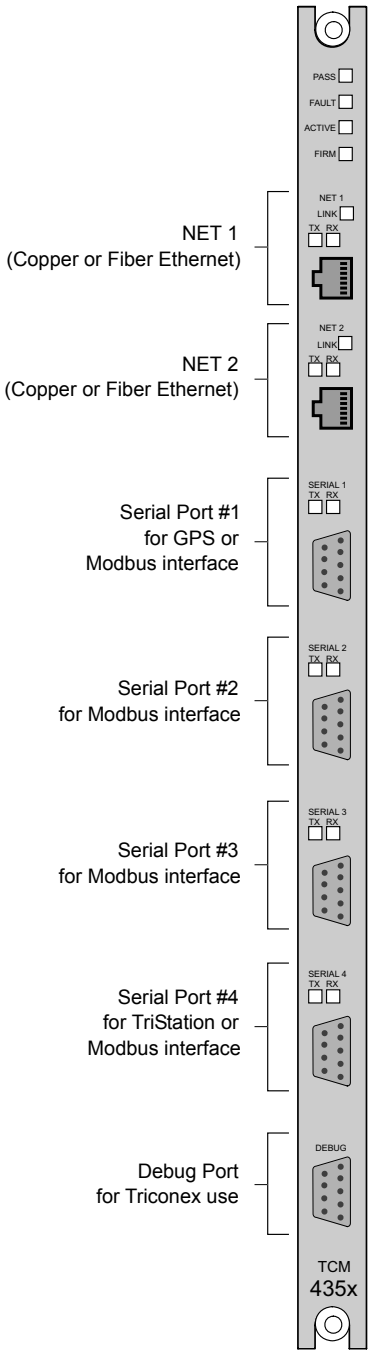

Figure 70 TCM Front Panel

A single Tricon system supports a maximum of four TCMs, which must reside in two logical slots located in chassis 1 or chassis 2 only. Different TCM models cannot be mixed in one logical

slot. Each Tricon system supports a total of sixteen Modbus masters or slaves—this total includes network and serial ports. The hot-spare feature is not available for the TCM, though you can replace a faulty TCM while the controller is online.

This table describes TCM model and Tricon system version compatibility.

Table 65 TCM Model and Tricon System Version Compatibility

Tricon System Version	Compatible TCM Models
10.0	4351, 4352
10.1–10.2	4351A, 4352A
10.3 or later	4351B, 4352B, 4353, 4354

For additional information, see the *Communication Guide for Tricon v9–v10 Systems* and Replacing TCMs on page 230.

TCM Specifications

This table lists specifications for TCM models 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, and 4354.

CAUTION

Different TCM models cannot be mixed in the same logical slot. Additionally, models 4351A, 4351B, 4352A, 4352B, 4353, and 4354 TCMs cannot be installed into a system with 4351 or 4352 TCMs, even if they are installed in different chassis.

Table 66 TCM Specifications

Feature	Description	
Serial ports	4, RS-232/RS-485 ports, DB-9 connectors	
Network ports	2, 10/100BaseT Ethernet ports, RJ-45 connectors (models 4351, 4351A, 4351B, and 4353) 2, fiber-optic mode Ethernet ports, MT-RJ connectors with 62.5/125 um fiber cables (models 4352, 4352A, 4352B, and 4354)	
Port isolation	500 VDC	
Communication protocols	TriStation, Embedded OPC Server (models 4353 and 4354), Modbus, Modbus TCP, TCP/IP, SNTP, TSAA (with support for IP Multicast), Trimble GPS, Peer-to-Peer, Triconex Time Synchronization, Jet Direct (network printing)	
Modbus functions supported	01 — Read Coil Status 02 — Read Input Status 03 — Read Holding Registers 04 — Read Input Registers 05 — Modify Coil Status	06 — Modify Register Content 07 — Read Exception Status 08 — Loopback Diagnostic Test 15 — Force Multiple Coils 16 — Preset Multiple Registers

Table 66 TCM Specifications *(continued)*

Feature	Description
Communication speed	Copper Ethernet ports: 10/100 Mbps (model 4353 only supports 100 Mbps connections) Fiber Ethernet ports: 100 Mbps Serial ports: up to 115.2 Kbps per port, aggregate data rate of 460.8 Kbps for all four ports
Status indicators	PASS, FAULT, ACTIVE, FIRM LINK — 1 per network port TX (Transmit) — 1 per port RX (Receive) — 1 per port
Logic power	< 10 watts

This table lists the protocols and standards supported on TCM ports for models 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, and 4354.

Table 67 TCM Protocols/Standards

Protocol or Standard	Network Ports (Models 4351 and 4352)	Network Ports (Models 4351A, 4351B, 4352A, and 4352B)	Network Ports (Models 4353 and 4354)	Serial Ports (All Models)
TriStation	NET 2	NET 1, NET 2	NET 1, NET 2	Port 4
TSAA (UDP/IP)	NET 2	NET 1, NET 2	NET 1	—
TSAA with IP Multicast (UDP/IP)	—[1]	NET 1, NET 2 (models 4351B and 4352B)	NET 1	—
Peer-to-Peer (UDP/IP)	NET 1	NET 1, NET 2	NET 1	—
Peer-to-Peer (DLC)	NET 1	NET 1	NET 1	—
Embedded OPC Server (OPC Data Access and OPC Alarms and Events)	—	—	NET 2	—
Modbus Slave (ASCII or RTU)	—	—	—	Any port
Modbus Master (RTU)	—	—	—	Any port
Modbus Master or Slave (TCP)	NET 2	NET 1, NET 2	NET 1	—
GPS Time Synchronization	—	—	—	Port 1
Triconex Time Synchronization via DLC	NET 1	NET 1	NET 1	—
Triconex Time Synchronization via UDP/IP	NET 1	NET 1, NET 2	NET 1	—

Table 67 TCM Protocols/Standards *(continued)*

Protocol or Standard	Network Ports (Models 4351 and 4352)	Network Ports (Models 4351A, 4351B, 4352A, and 4352B)	Network Ports (Models 4353 and 4354)	Serial Ports (All Models)
SNTP Triconex Time Synchronization	NET 2	NET 1, NET 2	NET 1, NET 2	—
Network Printing using Jet Direct	NET 2	NET 1, NET 2	NET 1	—

1. — means the protocol or standard is not supported on these ports.

Fiber-Optic Cables

If you are installing a TCM with fiber connectors (model 4352, 4352A, 4352B, or 4354), you will need to provide your own fiber-optic cables. You cannot purchase fiber-optic cables from Triconex.

The fiber cable you purchase should have these qualities:

- be a multimode 62.5/125 um cable
- have a maximum length of 1.24 miles (2 kilometers)
- comply with ANSI/TIA/EIA-568-B.3 standards

3

Installation and Maintenance

System Configuration

This section includes specifications for a Tricon system, which includes a Main Chassis and additional Expansion or Remote Expansion (RXM) Chassis, as required.

Topics include:

Configuration Specifications

This table includes specifications for determining the number and types of components that can be installed in a Tricon high-density and low-density system. A low-density system uses a pre-v9 chassis, which means fewer I/O modules can be included in a system.

Table 68 Configuration Guidelines

Component	High-Density Configuration	Low-Density Configuration
Maximum number of chassis	15	15
Maximum number of I/O and communication modules	118 • Main Chassis = 6 modules with hot-spares and 1 communication module • Expansion Chassis = 8 modules with hot-spares • RXM Chassis = 6 modules with hot-spares	76 • Main Chassis = 4 modules with hot-spares • Expansion Chassis = 5 modules with hot-spares • RXM Chassis = 4 modules with hot-spares
Communication modules	Must be installed in the Main Chassis or Chassis 2. Chassis 2 must be an Expansion or Primary RXM Chassis.	
Maximum I/O Bus length	100 feet (30 meters)	100 feet (30 meters)
Analog Input points (includes Thermocouple Input and Pulse Totalizer Input points)	1024	1024
Analog Output points	512	512
Digital Input points	2048	2048
Digital Output points	2048	2048
Pulse Input points	80	80

Communication Configuration

This table describes rules and guidelines for using communication modules. For more information, including installation and configuration instructions, see the *Communication Guide for Tricon v9–v10 Systems*.

Table 69 Communication Rules

Component	Description
Chassis	At least one communication module (TCM, ACM, EICM, or NCM) must be included in the Main Chassis or in Chassis 2, because these modules enable the TriStation PC to communicate with the Tricon controller. • If communication modules are housed in Chassis 2, this chassis must be an I/O Expansion Chassis or a primary RXM Chassis that is connected directly to the Main Chassis using I/O communication cables (model 9001) rather than standard I/O bus cables. • You cannot install an NCM and a TCM in the same Tricon system. You also cannot install an EICM and a TCM in the same system.
COM Slot	The COM slot can only be used for a TCM, EICM, or NCM.
TCM	Up to two logical slots can be configured for TCMs. Matched pairs of TCMs can be installed in the left and right positions of each logical slot, and they can be located in the main chassis or Chassis 2. Model 4351A, 4351B, 4352A, and 4352B TCMs cannot be installed into a system with model 4351 or 4352 TCMs, even if they are installed in different chassis.
NCM	Up to two logical slots can be configured for NCMs. Matched pairs of NCMs can be installed in the left and right positions of each logical slot. If only one logical slot is used, the slot can be in the Main Chassis or Chassis 2. If two logical slots are used, they must be Slot 6 and 7 in the Main Chassis, and Peer to Peer cannot be used.
EICM and ACM	One logical slot is available for EICMs or ACMs, respectively. Matched pairs of these modules can be installed in both the left and right positions of one logical slot.
HIM	Up to two logical slots can be configured for HIMs. Both slots must be in the Main Chassis.
SMM	Up to three logical slots can be configured for SMMs. A matched pair of SMMs can be installed in the left and right positions of each logical slot. All three slots must be in the Main Chassis or Chassis 2.

Planning Power for a Tricon System

The Tricon Power Modules provide adequate support for most controller configurations, however, limitations may apply to a Main Chassis containing multiple communication modules because these modules consume more power than others. This section explains how to determine the logic power consumption and cooling requirements of a Tricon controller.

Data in this section is based on a fault condition where only one of the redundant Power Modules is operational. Under normal operating conditions, both Power Modules share the load.

WARNING

Do not use the model 8312 Power Module in Tricon systems that are located in hazardous locations and must meet ATEX requirements. If you have 230 V line voltage and your system must meet ATEX requirements, use the model 8311 24 VDC Power Module along with the ATEX-certified 24 VDC power supply from Phoenix Contact—part number QUINT-PS-100-240AC/24DC/10/EX.

Determining Logic Power for Tricon Controller Chassis

Logic power refers to the number and kinds of modules that the Power Modules of a chassis can support without being overloaded. Table 70 (on page 167) identifies the logic power for each module. The total cannot exceed 175 watts, because each Power Module supplies a maximum of 175 watts at the rated maximum temperature of 140° F (60° C).

This calculation is based on the assumption that only one of the redundant Power Modules is operational. Under normal operating conditions, both Power Modules share the load and make more power available at all temperatures. This load-sharing allows the Power Modules to normally run at less than 50 percent of their rated maximum output thereby significantly increasing their service lifetime.

CAUTION

Avoid putting multiple high-power I/O modules into a Main Chassis. Each Main Chassis must house three Main Processors and a communication module which means multiple high-power I/O modules could exceed logic power limitations.

To determine logic power, add:

- logic power for primary modules
- logic power for hot-spare modules

Determining Cooling Requirements

Cooling requirements are determined by calculating the heat load dissipated by all the Tricon modules in the system. Table 70 (on page 167) identifies logic and field power usage for each module. For maximum reliability of the Tricon controller, the ambient temperature must be below 104° F (40° C). Please contact Triconex for further assistance with cooling needs.

To determine cooling requirements, add:

- logic power and field power for all the primary modules
- field power for all hot-spare modules

Table 70 Logic and Field Power of Tricon Modules

Type	Model No.	Maximum Logic Power (Watts)[1]	Maximum Field Power Primary/Spare (Typical)[2]
Main Processor	3008 3006/3007	10 15	
Power Modules	8310, 8311, 8312	—	30 (15)[3]
RXM Modules	420x, 421x	5	
Analog Input	370x/A	10	Negligible
Analog Input (High-Density)	3704E	10	Negligible
Analog Input (Isolated)	3703E	15	Negligible
Analog Input	3720, 3721	10	Negligible
Analog Output	3805E/H	15	22 (6) / 22 (6)
Analog Output	3806E	15	27 (12) / 27 (12)
Analog Output, BiPolar	3807	20	27 (12) / 27 (12)
Digital Input (High-Density)	3504E	10	Negligible
Digital Input (Single)	3564	10	39 (16) / 39 (16)
Digital Input (TMR)	350xE/T	10	96 (48) / 96 (48)
Digital Output (AC)	360xE/T	10	112 (20) / 32 (10)
Digital Output (DC)	360xE/T	10	112 (20) / 32 (10)
Digital Output (Dual)	3664	10	52 (16) / 20 (8)
Digital Output (Supervised, 16 points)	3624	10	32 (16) / Negligible
Digital Output (Supervised, 8 points)	361xE	10	26 (8) / 10 (4)
Digital Output (Supervised or Non-Supervised, 32 points)	3625	13	110
Pulse Input	351x	20	Negligible
Pulse Totalizer Input	3515	10	96 (24) / 96 (24)
Relay Output	3636R/T	15	Negligible
Thermocouple (Isolated)	3708E	15	Negligible
Thermocouple (Non-Isolated)	3706A	10	Negligible
HART Analog Input Interface	2770H	5	Negligible

Table 70 Logic and Field Power of Tricon Modules *(continued)*

Type	Model No.	Maximum Logic Power (Watts)[1]	Maximum Field Power Primary/Spare (Typical)[2]
HART Analog Output Interface	2870H	5	Negligible
Advanced Communication Module	4609	15	
Enhanced Intelligent Communication Module	4119, 4119A	10	
Hiway Interface Module	4509	10	
Network Communication Module	4329, 4329G	20	
Safety Manager Module	4409	20	
Tricon Communication Module	4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, 4354	7	

1. To convert watts to British thermal units, use the formula: BTU = watts x 3.414.
2. Hot-spare Digital Output Modules consume less field power than primary Digital Output Modules.
3. Represents power loss internal to the Power Modules.

Installation Guidelines

This section includes installation guidelines for the Tricon controller.

Topics include:

General Installation Guidelines

Due to the critical applications the Tricon is typically used in, it has been designed to operate under worst-case conditions in the harsh environments typically found in industrial environments.

To ensure adequate operational margins are maintained even under these worst-case conditions, the Tricon should be installed in a controlled environment per the general guidelines contained in:

IEC 61131, Part 4, Programmable controllers, User Guidelines

Section 7 of this standard includes checklists to help control the following environmental conditions:

- Temperature
- Contaminants

- Shock and vibration
- Electromagnetic interference

Typical guidelines include:

- Locate the Tricon away from obvious sources of heat: space heaters, solar radiation, etc.
- Locate or isolate the Tricon from obvious sources of corrosive gases or dust.
- Locate or isolate the Tricon from obvious sources of shocks or periodic vibrations: rotating machinery, engines, compressors, presses, etc.
- Locate or isolate the Tricon from obvious sources of electromagnetic interference: large motors or motor controllers, power converters, radio controlled equipment, welding equipment, etc.

Plant Power and Grounding

All plant and control room power distribution and safety grounding (protective earthing) must be done per the applicable national electric codes, typical examples include:

IEC 60364, Electrical Installations of Buildings

National Fire Protection Association, 2002 Edition of the National Electrical Code Handbook

For new construction, or where simple retrofits are feasible, the plant and/or control room safety grounding system should employ a supplemental Zero Reference Signal Plane or Grid (ZRSG). Installation of such a system for the plant or control room is not required for a successful Tricon application, but does represent modern best industry practice and should be followed wherever possible. Even when not implemented at the plant or control room level, the concepts of a modern ZRSG should be included in the Tricon cabinet and interconnecting cable routing. The ZRSG implementation should be extended to include all equipment racks and interconnecting cable paths: metal conduits, cable trays, wireways, etc. Detailed installation guidelines can be found in:

EPRI TR- 102400, Volume 2, Handbook for Electromagnetic Compatibility of Digital Equipment in Power Plants, Implementation Guide for EMI Control

IEC 61000, Part 5, Section 2, Electromagnetic compatibility (EMC), Installation and mitigation guidelines, Earthing and cabling

IEEE Std 1100-1999, IEEE Recommended Practice for Powering and Grounding Electronic Equipment

Tricon Field, Power, and Ground Wiring

All Tricon power distribution and safety grounding (protective earthing) must be done per the applicable national electric codes, plus the information contained in this manual, typical examples include:

IEC 60364, Electrical Installations of Buildings

National Fire Protection Association, 2002 Edition of the National Electrical Code Handbook

Typically, the Tricon will be installed in an equipment rack or cabinet located in a control room. All wiring internal to that cabinet and leading to from that cabinet should be segregated into different types and bundled accordingly, for example:

- Measurement signals - typically very sensitive, low voltage signals from sensors: RTDs, TCs, speed or flow sensors, etc. These signals will typically require shielded twisted pair cabling.
- Measurement and low power control signals - typically sensitive, low voltage signals to/form intelligent sensors or control devices: 4-20 ma loops, 24 VDC discrete signals, etc. These signals will typically require twisted pair cabling.
- High power control signals and conditioned power distribution - typically not sensitive, higher voltage signals: 48-120 volt discrete signals, 24-120 VDC I/O power distribution, etc. These signals should always use twisted pair cabling.
- Input coming power and misc. circuits - typically noisy, higher power circuits - 115 VAC discrete signals, AC power distribution, cabinet fans or lights, etc. These signals should always use twisted pair cabling, and the Grounding Electrode Conductor (the green wire) should be twisted along with the power leads wherever possible.
- Earth bonding connections.

All cable routing and installation should be done to minimize EMI, detailed guidelines can be found in:

EPRI TR- 102400, Volume 2, Handbook for Electromagnetic Compatibility of Digital Equipment in Power Plants, Implementation Guide for EMI Control

IEC 61000-5-2, Electromagnetic compatibility (EMC), Installation and mitigation guidelines, Earthing and cabling

IEEE Std 1100-1999, IEEE Recommended Practice for Powering and Grounding Electronic Equipment

Typical guidelines include the following:

- Use ferrous metal cabinets, cable trays, and conduits.
- When the RS-485 I/O Bus is used to connect to a remote Expansion Chassis, the I/O Bus cables must be routed in dedicated metallic conduit or equivalently isolated from other noise sources.
- Electrically bond all surfaces of the cabinet and it's contents together with multiple conductive metal strapping, not simple wire. Particular attention should be paid to doors, and removable panels. In turn the cabinet must be bonded to the control room or plant safety ground system or ZRSG.

- Routinely use twisted pair cabling; use shielded twisted pair cabling for all sensitive signals. Allow the minimum amount of un-twisted wire that accommodates connection.
- Signals of different types should never be bundled together.
- Bundles of different types should be separated by a minimum of 10 times the largest lead diameter.
- Bundles of different types of signals should only cross at right angles to each other.
- All wires and/or bundles should be routed along the ZRSG; for example, along the cabinet walls, within a cable tray or conduit, along building steel or the floor ground grid.
- Where an inline filter or power conditioning is used, the input and output leads should never be routed in the same bundle.
- Maintain shield continuity and ensure that shield leads are not broken. Allow the minimum amount of unshielded wire that accommodates connection. Terminate the shield at both ends, use capacitive coupling at one end if potential ground loops are suspected.
- Where ferrites or line filters are to be installed on signals or cables entering or leaving the cabinet, they must be installed as close to the cabinet egress point as possible. Cables must be routed to minimize coupling between the filtered and non-filtered signals. The non-filtered wire lengths in the cabinet must be minimized to the maximum extend possible.

CAUTION

For applications with uninterruptible power supplies (UPS) that use AC inverters, Triconex recommends that you install an AC line filter at the cabinet power entry point for each AC power source. Select the size of the filter based on the worst-case AC load in the cabinet, and install the filter according to the Tricon Field, Power, and Ground Wiring on page 170 guidelines. Suitable filters include the Schaffner FN 350 series, or the Corcom SK series.

WARNING

Always turn field power off before removing ELCO connectors from the backplane of the Tricon chassis. Dangerous voltage may be present when field power is on and can cause damage to the Tricon backplane and termination panel.

Application-Specific Installation Guidelines

The following guidelines apply when installing the Tricon in application-specific locations.

Class 1 Division 2 Hazardous Locations

For North American hazardous location applications, the Tricon and associated equipment must be mounted in an enclosure that provides protection from fire and from personal injury resulting from access to live parts. The enclosure must require access via a tool, and if non-metallic, have the appropriate flammability rating.

The chassis alarm contacts must not be used in hazardous locations.

The replacement of batteries, fuses, I/O Modules, Main Processors, Power Modules, Communications Modules, or I/O Interface cables must not be attempted unless the area is known to be free of ignitable gas concentrations.

All communication cabling connected to the Main Processor and Communications modules must be nonincendive as described in Appendix D, Nonincendive Circuit Parameters. Communication cabling that extends through a hazardous area must be certified as being nonincendive.

Only these components, which are approved for use in Class 1 Division 2 hazardous locations, can be used:

- 2770H, HART Analog Input Interface Module
- 2870H, HART Analog Output Interface Module
- 3006, Main Processor
- 3008, Main Processor
- 3502E, 48V Digital Input Module
- 3503E, 24V Digital Input Module
- 3504E, 24V H.D. Digital Input Module
- 3505E, 24V Low Threshold. Digital Input Module
- 3511, Pulse Input Module
- 3515, Pulse Totalizer Module
- 3564, Single 24V Digital Input Module
- 3604E, 24VDC Digital Output Module
- 3607E, 48VDC Digital Output Module
- 3614E, 24VDC Supervised Digital Output Module
- 3615E, 24VDC Low Power Supervised Digital Output Module
- 3617E, 48VDC Supervised Digital Output Module
- 3624, 24VDC Supervised Digital Output Module
- 3625, 24VDC Supervised/Non-Supervised Digital Output Module

- 3664, 3674; 24V Dual Digital Output Module
- 3700A, 0-5V Analog Input Module
- 3701, 0-10V Analog Input Module
- 3703E, Isolated Analog Input Module
- 3704E, 0-5/0-10VDC Analog Input
- 3706A, TC Input Module
- 3708E, Isolated TC Input Module
- 3720, 3721; Analog Input Module
- 3805E/H, Analog Output Module
- 3806E, H.C. Analog Output Module
- 3807, BiPolar Analog Output Module
- 4119A, Enhanced Intelligent Communications Module
- 4200, 4201; Fiber Optic Remote Extender Module
- 4210, 4211; Single Mode Fiber Optic Remote Extender Module
- 4329, 4329G; Network Communications Module
- 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, 4354; Tricon Communication Module
- 4409, Safety Manager Module
- 4509, Highway Interface Module
- 4609, Advanced Communication Module
- 8110, Main Chassis
- 8112, RXM Chassis
- 8111, Expansion Chassis
- 8121, Enhanced Low Density Expansion Chassis
- 8310, 120 V Power Module
- 8311, 24 VDC Power Module
- 8312, 230 VAC Power Module
- v9 External Termination Panels compatible with the above I/O modules

⚠ WARNING You must take additional explosion protection measures for field circuits when the field apparatus are in a hazardous area.

Zone 2 European Hazardous Locations

For European (ATEX) hazardous location applications, the Tricon and associated equipment must be installed in an enclosure that provides an IP54 minimum degree of protection per the requirements of EN 60529, Specification of protection provided by enclosures (IP Code). Simply stated, the enclosure must provide protection against dust and splashing water.

Additionally, the enclosure must meet the applicable requirements of EN 60079-15 or EN 50021. The following points must be taken into account:

- Mechanical strength
- Non-metallic enclosures and non-metallic parts of enclosures
- Earthing or equipotential bonding connection facilities

The following warning label must be placed on the outside of the enclosure:

DO NOT REMOVE OR REPLACE MODULES OR CABLES WHILE ENERGIZED UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE GAS CONCENTRATIONS.

All connecting screws must be securely tightened, so that loosening and separating are prevented.

The chassis alarm contacts must not be used in hazardous locations.

Male ELCO connectors must have a gasket installed, and it must be replaced before the end of its five-year life span. (Triconex part number 3000793-001 is a kit containing 25 gaskets.)

The replacement of batteries, fuses, I/O Modules, Main Processors, Power Modules, Communications Modules, or I/O Interface cables must not be attempted unless the area is known to be free of ignitable gas concentrations.

All communication cabling connected to the Main Processor and Communications modules must be nonincendive as described in Appendix D, Nonincendive Circuit Parameters. Communication cabling that extends through a hazardous area must be certified as being nonincendive.

Only these components, which are approved for use in Zone 2 hazardous locations, can be used:

- 2770H, HART Analog Input Interface Module
- 2870H, HART Analog Output Interface Module
- 3008, Main Processor
- 3503E, 24V Digital Input Module
- 3504E, 24V H.D. Digital Input Module
- 3505E, 24V Low Threshold Digital Input Module
- 3511 Pulse Input Module
- 3515, Pulse Totalizer Module
- 3564, Single 24V Digital Input Module
- 3604E, 24VDC Digital Output Module
- 3624, 24VDC Supervised Digital Output Module

- 3625, 24VDC Supervised/Non-Supervised Digital Output Module
- 3664, 3674; 24V Dual Digital Output Module
- 3700A, 0-5V Analog Input Module
- 3703E, Isolated Analog Input Module
- 3706A, TC Input Module
- 3708E, Isolated TC Input Module
- 3720, 3721; Analog Input Module
- 3805E/H, Analog Output Module
- 3806E, H.C. Analog Output Module
- 3807, BiPolar Analog Output Module
- 4119A, Enhanced Intelligent Communications Module
- 4200, 4201; Fiber Optic Remote Extender Module
- 4210, 4211; Single Mode Fiber Optic Remote Extender Module
- 4351, 4351A, 4351B, 4352, 4352A, 4352B, 4353, 4354; Tricon Communication Module
- 4329, 4329G; Network Communications Module
- 4409, Safety Manager Module
- 4509, Highway Interface Module
- 4609, Advanced Communication Module
- 8110, Main Chassis
- 8112, RXM Chassis
- 8111, Expansion Chassis
- 8121, Enhanced Low Density Expansion Chassis
- 8310, 120 V Power Module
- 8311, 24 VDC Power Module
- v9 External Termination Panels compatible with the above I/O modules

⚠ WARNING

- You must take additional explosion protection measures for field circuits when the field apparatus are in a hazardous area.
- When the Model 8121 Enhanced Low Density Expansion Chassis is used in Zone 2 hazardous locations, the signal ground and the chassis ground must be bridged together.
- In Zone 2 hazardous locations, an isolator must be used with the Model 2870H HART Analog Output Interface Module.