MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

INVENSYS TRICONEX

4353

TRICON COMMUNICATION MODULE

Used with the applicable Tricon v9-v10 system configuration.

REFERENCE PACKAGE

Selected official pages follow this cover with source pagination retained.

OFFICIAL DOCUMENT

Invensys 9700077-012, February 2009

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.

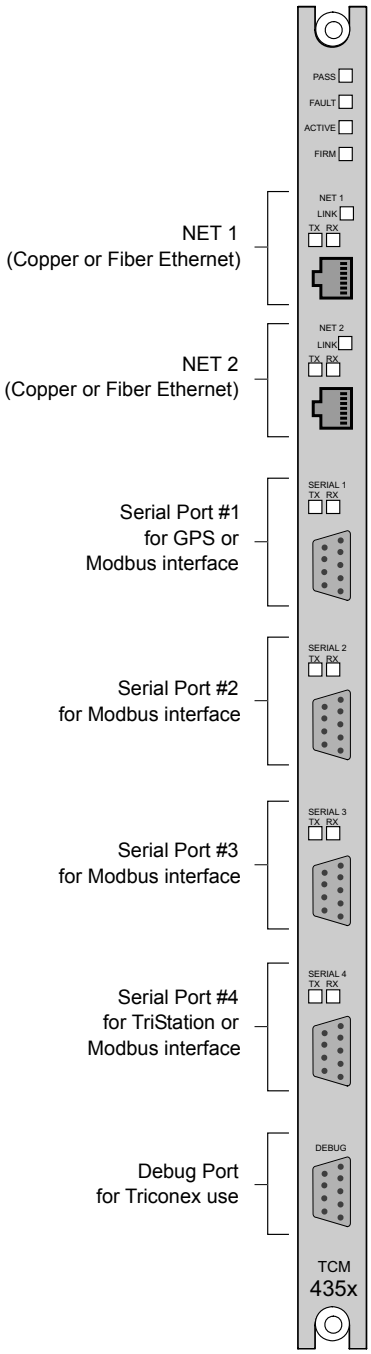

Figure 70 TCM Front Panel

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

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.

Replacing TCMs

This procedure explains how to replace Tricon Communication Modules (TCMs). If the Fault indicator is on or the Pass indicator is off, the module should be replaced, which you can do while the controller is online. Two TCMs can be placed in one logical slot of the Tricon controller chassis, but they function independently, *not* as hot-spare modules.

For indicator information, see TCM Indicators on page 245.

WARNING All communication through a TCM ceases when you remove the module from the system.

Procedure

1. Label all of the communication cables connected to the faulty module, and then disconnect the cables from the module.
2. Undo the retractable fasteners of the module, grasp the fasteners, and slide the module out of the chassis.
3. Insert the replacement module into the chassis slot. Push the module in until it is firmly seated in the chassis.
4. Tighten the retractable fasteners of the replacement module to 10 inch-pounds.

   The Pass indicator should go on within about 1 minute, and the Active indicator should go on within 1 to 2 minutes.
5. Reconnect all the communication cables.
6. On the faulty module, identify the model and serial numbers. Contact the IPS Global Client Support (GCS) center to obtain a Returned Material Authorization (RMA) number. Then return the module to Triconex for repair.