Foxboro®

by Schneider Electric

Foxboro Evo™
Process Automation System

DCS Fieldbus Modules for Honeywell® TDC 3000 Systems User's Guide

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Preface

This document describes all aspects of the DCS Fieldbus Modules for Honeywell® TDC 3000 systems migration kits, including:

- Installation
- Configuration
- Maintenance.

Who This Book is For

This book is intended for the use of process control engineers and operators, and other qualified and authorized personnel involved in setting up a system to accommodate the Foxboro Evo™ equipment. The I/A Series® system is the legacy version of the Foxboro Evo Process Automation System, which was released with Foxboro Evo Control Core Services (hereinafter referred to as Control Core Services) software v9.0 (formerly known as I/A Series software).

What You Should Know

Prior to using this book, you should be generally familiar with the I/A Series or Foxboro Evo system. Detailed information for the software and the hardware is found in the full documentation set for Foxboro Evo systems.

How to Use This Book

This book is organized in a way that reflects typical sequence of actions in setting up a system. The appendixes consolidate equipment specifications, I/O connections, and control schemes. Product Specification Sheets (PSSs) provide additional information.

Revision Information

For this revision of the document (B0193YW-G), the following changes were made:

Global

- Updated the document to implement new corporate and product branding.

Safety Considerations

Safe use of this product depends largely upon proper installation, use, and maintenance by you, the customer. This manual provides the information needed to properly install, use, and maintain the DCS Fieldbus Module subsystem for the Honeywell TDC3000 system.

Reference Documents

In addition to various Honeywell documents associated with the TDC3000 control system, you should be familiar with the Foxboro Evo documents listed below.

- *Field Control Processor 280 (FCP280) User's Guide* (B0700FW)
- *Field Control Processor 280 (FCP280) Upgrade Guide* (B0700GC)
- *Field Control Processor 270 (FCP270) User's Guide* (B0700AR)
- *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN)
- *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB)
- *Integrated Control Block Descriptions* (B0193AX)
- *I/A Series Configuration Component (IACC) User's Guide* (B0700FE)
- *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG)
- *Integrated Control Configurator* (B0193AV) - For CP60 or earlier control processors
- *Integrated Control Software Concepts* (B0193AW)
- *Network Cable Systems Installation and Maintenance* (B0193UW)
- *System Manager* (B0750AP)
- *Process Operations and Displays* (B0193MM)
- *System Configurator* (B0193JH)
- *System Definition: A Step-by Step-Procedure* (B0193WQ and associated Help screens)
- *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA)
- *System Equipment Installation* (B0193AC)
- *System Management Displays* (B0193JC and associated Help screens).

Most of these documents are available on the Foxboro Evo Electronic Documentation media (K0174MA). The latest revisions of each document are also available through our Global Customer Support at *https://support.ips.invensys.com.*

1. Introduction

This chapter provides general information describing the DCS (Distributed Control System) Fieldbus Module subsystem equipment.

The DCS Fieldbus Modules for Honeywell TDC 3000 systems (or, DCS Fieldbus Module subsystem) provide a means of migrating control of loops from Honeywell TDC 3000 equipment to a Foxboro Evo system. Migration to Foxboro Evo control is effected by replacing the Process Manager Modules (PMMs), Advanced Process Manager modules (APMs) and High Performance Manager (HPMs) and associated I/O processor (IOP) cards in the Honeywell equipment with Foxboro® Fieldbus Isolators and DCS Fieldbus Modules. All existing process I/O terminations and wiring are preserved. The newly installed DCS Fieldbus Modules and Fieldbus Isolators interchange process measurement and output signals, and digital input/output signals, between process field devices and the Foxboro Evo control system.

All process signals are thus fully integrated into the Foxboro Evo system, allowing direct system monitoring and control of the process. Operating in conjunction with the Foxboro Evo control and management software, the DCS Fieldbus Module subsystem provides advanced plant-wide control, display, history, alarming, and information management capabilities.

Connection between the newly installed DCS Fieldbus Modules and the Foxboro control processor (CP) is via the HDLC Fieldbus, which can be implemented in either a single or redundant configuration. The DCS Fieldbus Module subsystem can exist as a single entity on the HDLC Fieldbus, can be combined with other DCS Fieldbus Module subsystems on the Fieldbus, or can be mixed with Fieldbus Modules (FBMs) and/or other Fieldbus-based process interface subsystems.

Figure 1-1 shows implementation of typical DCS Fieldbus Module subsystem.

Major components that are common to all implementations of the DCS Fieldbus Module subsystem are as follows. (See Appendix A “Hardware Specifications” for detailed functional specifications.)

- DCS Fieldbus Modules – Operating in conjunction with the Foxboro control processor, these modules replace the functions performed by the control card and I/O Processor cards in the Process Manager equipment rack.
- Fieldbus Isolators – The Fieldbus Isolator (H3SFBI) provides electrical isolation between the HDLC Fieldbus and the newly-installed DCS Fieldbus Modules. (Two H3SFBIs are used, mounted on a Fieldbus Carrier Board, in a redundant Fieldbus configuration.) Connection between the H3SFBIs and the DCS Fieldbus Modules is via the PMM/APM/HPM or IOP card file backplanes and the original interconnecting cables between card files.
- Fieldbus Isolator Carrier Board – This card frame provides for mounting of the Fieldbus Isolators (up to two).
- Power Jumper card (PWRBD2) – This card contains no active components, and provides a voltage jumper connection to the DCS Fieldbus Modules and Fieldbus Isolators.

— NOTE

Be aware of the following:
1. The PWRBD2 card is not required when migrating an original HPM card file assembly.
2. Original APM card files can be upgraded to HPM's in these cases the card files are to be migrated the same as PMM's with respect to location of PWRBD2 position and Fieldbus carrier board, as well as jumper settings on Fieldbus Carrier board.

In addition to these major components, various supporting hardware items (Fieldbus cables, equipment labels, termination cable assemblies, and so forth) are also included in the equipment migration kit.

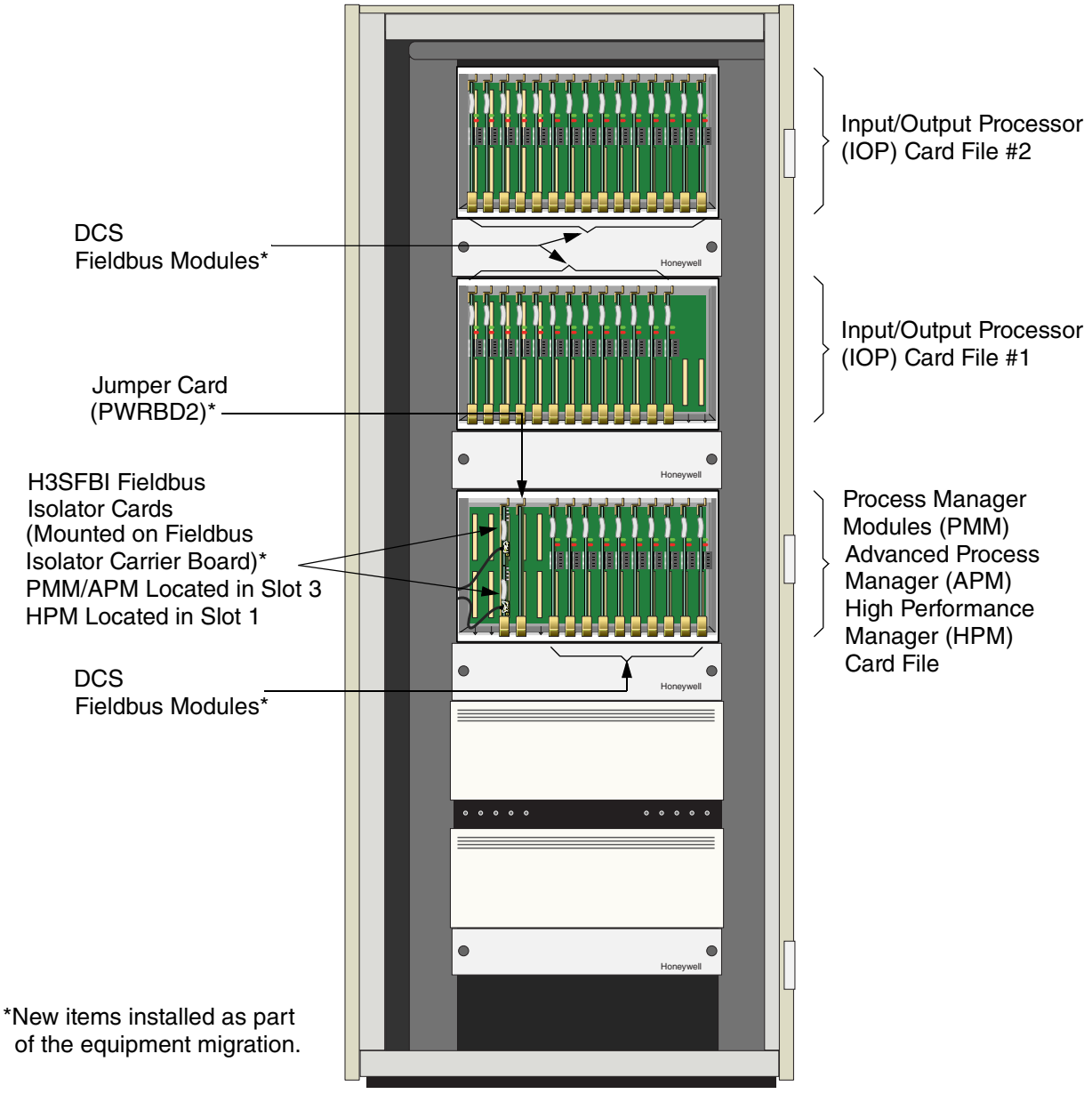


Figure 1-1. DCS Fieldbus Module Subsystem Implementation

— NOTE

For all dual-baud applications in which a FCP280 or FCP270 connect to both 200 Series FBMs, and to Honeywell TDC 3000 equipment via DCS Fieldbus modules (which act similar to 100 Series Fieldbus modules (FBMs)), consider the use of FBI200s or FBI100s to filter the FCP280's or FCP270's 2 Mbps signals out, to ensure only the intended 268 Kbps signals reach the DCS Fieldbus modules. These modules can resolve a variety of potential communication issues.
FBI200s are discussed in *FBI200 Fieldbus Isolator/Filter* (PSS 31H-2Y18).
FBI100s are discussed in *FBI100 Fieldbus Isolator/Filter* (PSS 31H-2Y16).
As the FCP280 does not support dual-baud communications on any of its HDLC fieldbuses, FBI200s/FBI100s are not required for signal filtering. However, FBI200s may be used with the FCP280 optionally to extend the HDLC fieldbus.

Subsystem Implementation – Overview

The following is a brief overview of the actions that implement migration of the TDC 3000 equipment to the Foxboro Evo system. (Detailed descriptions of these actions are covered in the following sections of this document.)

- Removing the Process Manager Modules – modem, communications, I/O link interface, control, and redundancy driver – from the PMM/APM/HPM card file.
- Installing the Fieldbus isolator carrier board, the Fieldbus isolator card(s), and the Power Jumper card.
- Replacing, on a one-for-one basis, all IOP cards with DCS Fieldbus Modules.
- Installing the HDLC Fieldbus, from the Fieldbus connectors on the Fieldbus Isolator card to the Foxboro control processor.
- Performing system definition (defining the hardware and software for the system) and process control configuration (defining compounds and blocks).

— NOTE

After finishing the module replacement procedure in a PMM/APM/HPM card file, be aware that the CMOS batteries located to the rear of the power supply distribution panel can safely be removed as they are no longer required. This is discussed in Chapter 2 "Equipment Installation".

Control Processor/System Software Compatibility

The DCS Fieldbus Modules are modified Foxboro Fieldbus Modules (FBMs) in a Honeywell TDC 3000 equipment rack form factor. Addressing is accomplished by standard letterbugs.

The DCS Fieldbus Module subsystem can be configured to interface with a Foxboro single or fault-tolerant control processor, CP40 or higher. The subsystem connects to the standard HDLC Fieldbus and can coexist on the Fieldbus with other HDLC Fieldbus devices, provided control processor loading constraints are observed.

- Control Core Services software v9.0 (or higher) is required for FCP280.
- I/A Series software v8.1.1-v8.8 or Control Core Services software v9.0 (or higher) is required for FCP270 and ZCP270.
- I/A Series software v6.3.1-v8.8 or Control Core Services software v9.0 (or higher) is required for CP60.
- I/A Series software v4.3-v8.8 or Control Core Services software v9.0 (or higher) is required for CP40.

Migration Kit Contents

Table 1-1 lists the components comprising the DCS Fieldbus Module Subsystem migration kit (P0915WH).

Table 1-1. DCS Fieldbus Module Subsystem Migration Kit Components

Foxboro Part Number	Description	Quantity	Physically Replaces
P0903AN	Migration Kit Label	1	N/A
P0918EU	General Information (“Plugged In”) Label	2	N/A
P0913ZK	Fieldbus Isolator Carrier Board	1	I/O Link Interface board
P0903PN	DIN Rail, 7.175 in	1	N/A
X0127DH	Screw, Pan Head, 0.190-32 x 0.75	2	N/A
X0143AT	Washer, Plain, 0.190	2	N/A
X0143SC	Washer, Lock, 0.190	2	N/A
X0169LF	Nutclip, 0.190	2	N/A
Optional Selections			
P0914DS	Power Jumper Board, PWRBD2 NOTE: Required for migrating the PMM or APM card files. Not required if migrating the original HPM card files. Also, be aware that some HPM card files are upgraded from APM card files; check the model number of the respective card file assembly to confirm its origin type.	1	Control board
P0913XX	H3SFBI Fieldbus Isolator	1 or 2	N/A
P0903VY	Termination Cable Assembly (TCA)	1 or 2	N/A
P0913YA[1]	H3M01 DCS Fieldbus Isolator: 16 AI (0 to 5 V dc, 1 to 5 V dc)	A/R	HLAI (or redundant HLAI) IOP
P0913YK	H3M03 DCS Fieldbus Module: 8 AI (TC/mV/RTD)	A/R	Analog Input Low Level Termination Assembly
P0913ZD	H3FBE1 (Communication card for H3M03 DCS Fieldbus Module)	A/R	LLAI IOP

Table 1-1. DCS Fieldbus Module Subsystem Migration Kit Components (Continued)

Foxboro Part Number	Description	Quantity	Physically Replaces
P0913YR	H3M06 DCS Fieldbus Module: 8 PI (Pulse Input)	A/R	PI IOP
P0913YU	H3M07 DCS Fieldbus Module: 32 DI (Logic Level Input/Sequence of Events Input)	A/R	DI, DISOE IOPs
P0913YX	H3M09 DCS Fieldbus Module: 16 DO (Logic Level Output)	A/R	DO IOP
P0913YN	H3M37 DCS Fieldbus Module: 8 AO (4 to 20 mA)	A/R	AO (or Redundant AO) IOP

1. Where STIM modules are to be replaced, use P0913YA and configure the STIM transmitters for 4-20 mA applications.

Terminology

This document uses certain terms specific to the DCS Fieldbus Module subsystem and the Foxboro Evo system. Understanding these terms is essential to understanding this document:

Control Processor — This is any Foxboro Evo module that effects process control via the HDLC Fieldbus. Examples are the Field Control Processor 280 (FCP280), Field Control Processor 270 (FCP270), Z-Module Control Processor 270 (ZCP270), Control Processor 60 (CP60), and Control Processor 40 (CP40). The control processor controls process variables using algorithms contained in functional control blocks configured by on-site process engineers to implement the desired control strategies.

DAC — Digital-to-Analog Converter.

FBM — Fieldbus Modules provide the interface between process sensors/actuators and the Fieldbus in a standard Foxboro Evo system.

Fieldbus — An optionally redundant serial bus conforming to the EIA standards' general requirements for RS-485. The Fieldbus carries data communications on a twinaxial cable between the Foxboro input/output modules on the Fieldbus (Foxboro Fieldbus Modules and DCS Fieldbus Modules, for example) and their associated control stations.

Letterbug	In the Foxboro Evo system, the letterbug on legacy modules is a plastic character which, when interlocked with similar plastic characters, forms a 6-character module identifier. Letters printed on the front are read visually by the user; pin connectors at the back are read electrically by the computer. In modern Foxboro modules, the letterbug is assigned and retained in modules' software.
TCA	The Termination Cable Assembly provides a means of attaching the HDLC Fieldbus to a Foxboro control processor (at one end) and to the Fieldbus Isolator(s) at the other end.

2. Equipment Installation

This section provides procedures for installing the DCS Fieldbus Module subsystem equipment.

NOTE

To minimize interruption of the process, it may be desirable to perform System Configuration (or System Definition) prior to installing the DCS Fieldbus Module subsystem equipment. If this is the case for your installation, refer to Chapter 3 "Configuration", and proceed with the System Configuration (or Definition) process.

Pre-installation Requirements

Before starting the actual equipment installation (as described in the following subsections) perform the following:

1. If desired (see note above) perform the system configuration for the new (soon to be installed) DCS Fieldbus Module subsystem (refer to "Configuration" on page 47).
2. If desired (see note above) perform the integrated control configuration for the new (soon to be installed) DCS Fieldbus Module subsystem (refer to "Integrated Control Configuration" on page 49).
3. Determine the module ID (letterbug) numbers that the DCS Fieldbus Modules will contain. Refer to the configuration reports for your system, and to "Module Identifier (Letterbug) Installation" on page 43.
4. Perform an orderly shutdown of the process associated with the equipment to be modified, and remove ac power from the equipment rack(s) in question.

Migration Kit Installation

Migration kit installation involves the performance of five basic procedures, presented in the following subsections:

- DCS Fieldbus Module Installation
- Fieldbus Cabling at the CP40
- Fieldbus Cabling at the CP60
- Fieldbus Cabling at the FCP280
- Fieldbus Cabling at the FCP270
- Fieldbus Cabling at the ZCP270
- Fieldbus Cabling at the DCS Fieldbus Module Subsystem.

DCS Fieldbus Module Installation

⚠ CAUTION

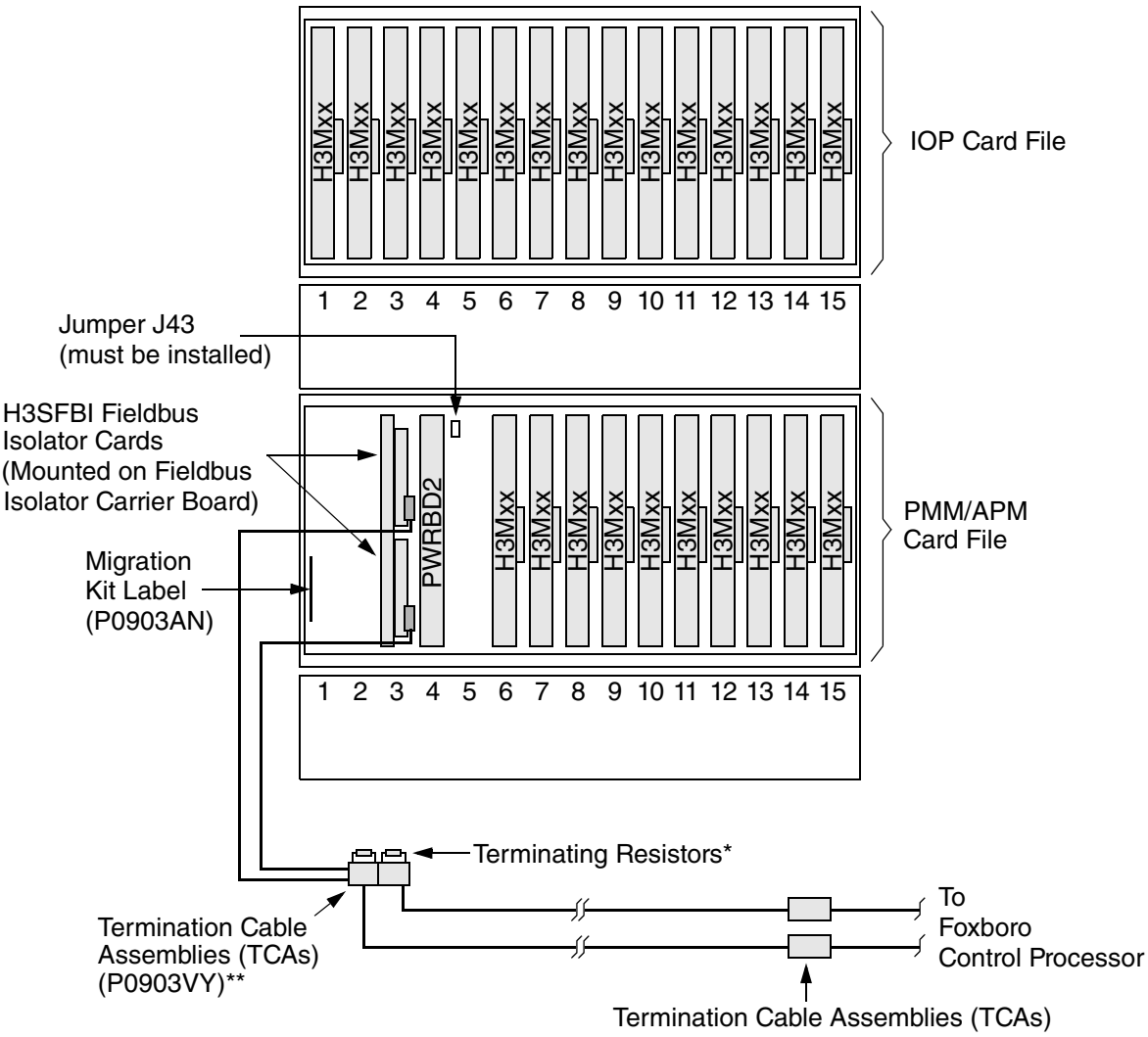
The following procedure assumes that power has been removed from the equipment card rack. Before switching off power to the equipment rack, ensure that such action will not adversely affect the process.

To install the DCS Fieldbus Module subsystem migration kit, refer to Figure 2-1 and proceed as follows.

⚠ CAUTION

It is important to wear a properly connected electrostatic discharge (ESD) wrist strap while removing, handling, and installing the DCS Fieldbus Modules. Connect the ESD strap to the rack ground bar.
It is also good practice to observe the following steps when handling electronic circuitry:
1. Use the static shielding bags supplied with the DCS Fieldbus Modules.
2. Ground the bag before opening.
3. Avoid touching the DCS Fieldbus Module circuitry.

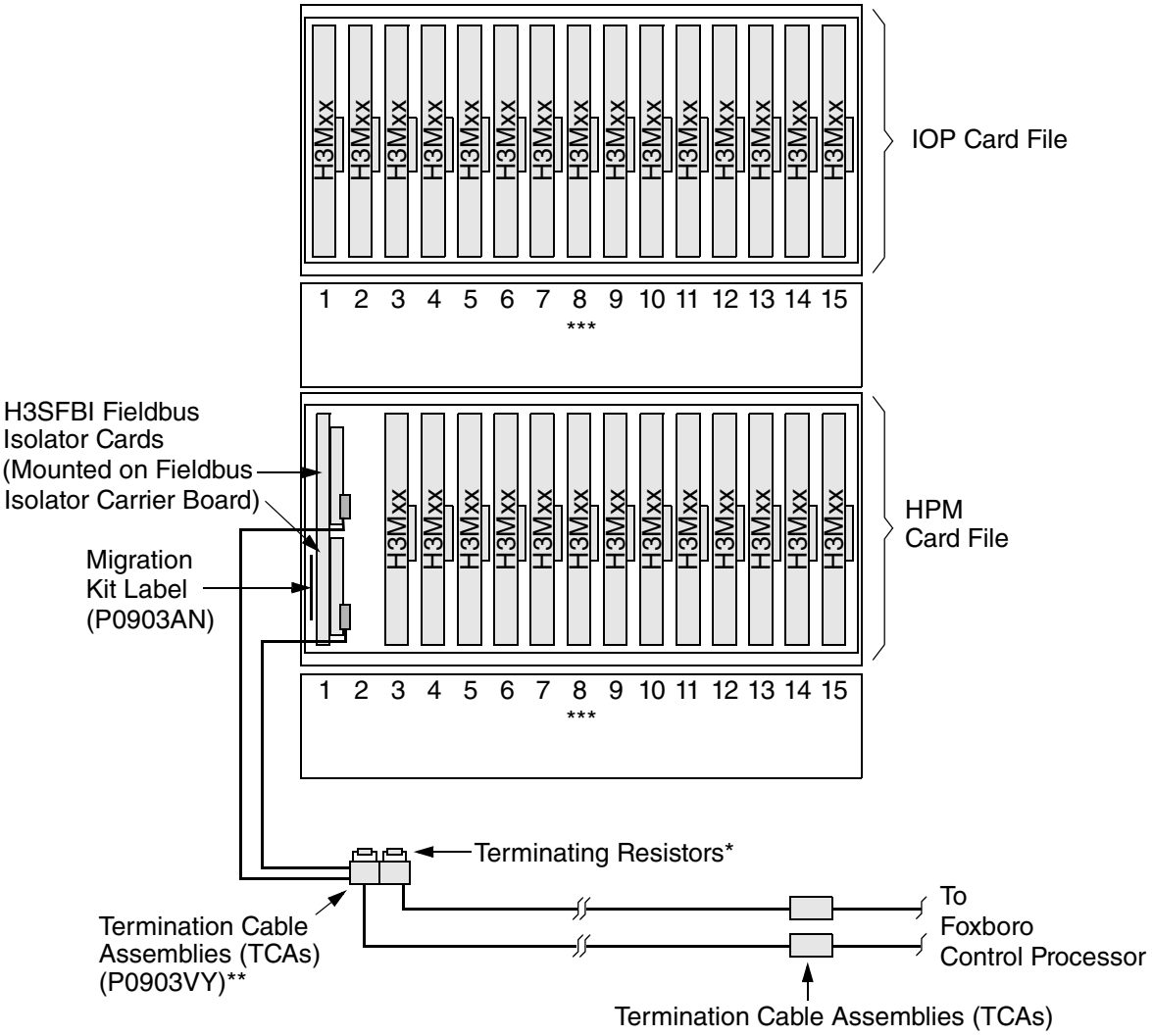
1. Remove all Process Manager Modules from the PMM card file(s), Advanced Process Manager modules from APM card file(s) and High Performance Process Manager modules from HPM card file(s). (If the TDC 3000 rack in question contains two PMM nests, remove all process manager modules from both nests.) The PMM/APM/HPMs may include the following: modem, communications, I/O link interface, control, and redundancy driver.
2. Ensure that jumper J43, located to the right of Slot 4 in the PMM and APM card files (see Figure 2-1), is installed. Note that there is no jumper in the HPM card file.
3. Referring to Figure 2-3, on the Fieldbus Isolator Carrier board, ensure that the jumpers are set for installation of the board in the PMM or APM card file. (All jumpers must be in the horizontal position. For the HPM card file, all jumpers must be in the vertical position.)
4. Install the Fieldbus Isolator Carrier board as follows:
   - PMM/APM card files in slot 3 (see Figure 2-1).
   - HPM card file in slot 1.
   - IOP card files in any available (spare) slot.
5. Install the Power Jumper card (PWRBD2) in slot 4 (see Figure 2-1). This is not required for the HPM card file(s).
6. Referring to Table 2-1, determine which DCS Fieldbus Modules are going to replace specific Honeywell IOP modules in the respective card files.



* Terminating resistors, included with the TCAs, are required only if this is the last device in the Fieldbus run.

** TCAs (up to two) are mounted on a DIN rail supplied with the Migration Kit. Mounting location varies per customer preference and available local space in the rack.

Figure 2-1. PMM/APM w IOP DCS Fieldbus Module Subsystem Implementation



* Terminating resistors, included with the TCAs, are required only if this is the last device in the Fieldbus run.

** TCAs (up to two) are mounted on a DIN rail supplied with the Migration Kit. Mounting location varies per customer preference and available local space in the rack.

*** The H3Mxx I/O cards' power supply (2A bus) fuse is located adjacent to the Field Terminal Assembly (FTA) connector and slot behind each of the numbers (1-15) on the cover plate.
If the red/green LEDs on an H3Mxx I/O card cease flashing (when power seems to be otherwise applied), check the I/O card's power supply fuse at the bottom section of the I/O card slot, above the associated FTA interface cable connector assembly. If this fuse is blown, replace it with the "Little Fuse Bus" fuse micro 2A code 273 (Foxboro p/n N0262CW).

Figure 2-2. HPM w/IOP DCS Fieldbus Module Subsystem Implementation

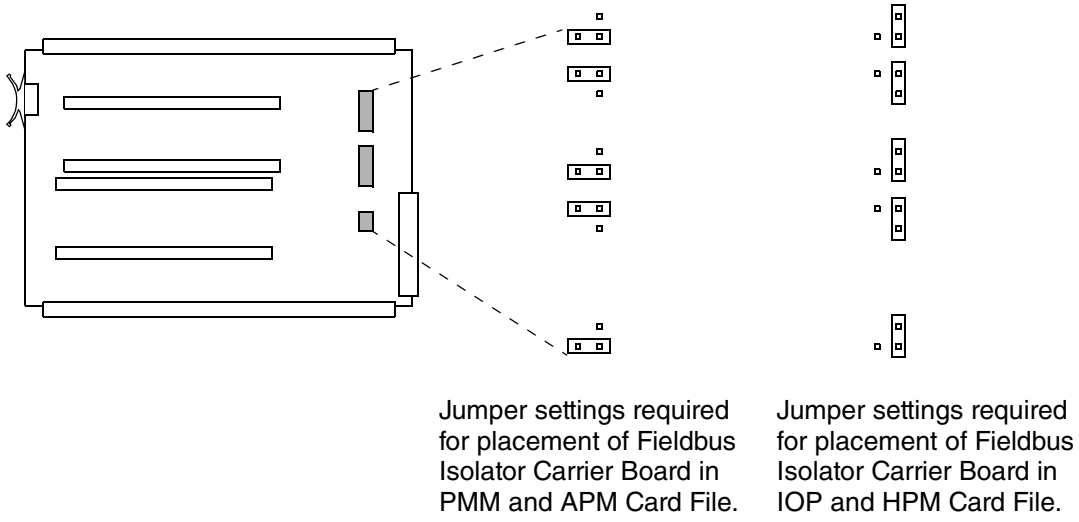


Figure 2-3. Jumper Settings, Fieldbus Isolator Carrier Board

Table 2-1. Honeywell IOP Module Replacement

Foxboro Part Number	Description	Physically Replaces
P0913YA[1]	H3M01 DCS Fieldbus Module: 16 AI (0 to 5 V dc, 1 to 5 V dc)	HLAI, Redundant HLAI
P0913YK	H3M03 DCS Fieldbus Module: 8 AI (TC/mV/RTD)	Analog Input Low Level Termination Assembly
P0913ZD	H3FBE1 (Communication card for H3M03 DCS Fieldbus Module)	LLAI
P0913YR	H3M06 DCS Fieldbus Module: 8 PI (Pulse Input)	PI
P0913YU	H3M07 DCS Fieldbus Module: 32 DI (Logic Level Input/Sequence of Events Input)	DI, DISOE
P0913YX	H3M09 DCS Fieldbus Module: 16 DO (Logic Level Output)	DO
P0913YN	H3M37 DCS Fieldbus Module: 8 AO (4 to 20 mA)	AO, Redundant AOs

1. Where STIM modules are to be replaced, use P0913YA and configure the STIM transmitters for 4-20 mA applications.

7. On a one-for-one basis, replace the Honeywell IOP modules with DCS Fieldbus Modules, taking note of the following:
   a. Refer to Table 2-1 for a list of Honeywell IOP module replacements.
   b. On each DCS Fieldbus Module to be installed, install a module identifier (letterbug set). Refer to "Module Identifier (Letterbug) Installation" on page 43 for specific instructions. Note that, on the H3M06 DCS Fieldbus Module, **two** module identifiers, having two unique (different) sets of characters, must be installed. [The software treats the two sets of four inputs to the H3M06 as two separate DCS Fieldbus Modules, to handle the eight (total) pulse inputs.]
   c. The H3M03 and H3M06 DCS Fieldbus Modules require jumper settings for specific signal input requirements:
      - For H3M03 modules, refer to Figure 2-4 and set the jumpers in accordance with the specific input types.
      - For H3M06 modules, refer to Figure 2-5 and set the jumpers in accordance with the desired frequency range of the pulse inputs. Note that, when control configuration is performed, if the 25 khz input pulse rate is selected, the KSCALE parameter in the associated AIN block(s) must be set to 2 (see Figure C-4).

   d. The H3M01 DCS Fieldbus Module contains jumper pins that are used at the factory for test purposes only. (These pins must remain non-jumpered.)
   e. If an H3M03 DCS Fieldbus Module is to be installed (as a replacement for an Analog Input Low Level Termination Assembly), refer to Figure 2-6 for installation instructions.
   f. If a redundant pair of Honeywell HLAI IOP modules are being replaced, two H3M01 DCS Fieldbus modules are used. At the time of configuration (see Chapter 3 "Configuration"), the letterbugs of the H3M01 will reflect the primary/secondary IOM_IDs (block parameters) of the two modules. Also, redundant input (AINR) control blocks will be used to handle the actual inputs.
   g. If a redundant pair of Honeywell AO IOP modules are being replaced, two H3M37 DCS Fieldbus Modules are used. At the time of configuration (see Chapter 3 "Configuration"), the letterbugs on the H3M37s will reflect the primary/secondary IOM_IDs (block parameters) of the two modules. Also, redundant output (AOUTR)[1] control blocks will be used to handle the actual control (see Figure C-8).
   h. If a redundant pair of Honeywell AI IOP modules is being replaced, two H3M01 DCS Fieldbus Modules are used. As is the case for the redundant AO configuration mentioned above (Step **f**), the H3M01D letterbugs will reflect the primary/secondary IOM_IDs (block parameters) of the two modules. Redundant analog input control block AINR[1] is used to handle the actual control.

[1.] Refer to *Integrated Control Configurator* (B0193AV) for detailed information on using the AOUTR and AINR control blocks.

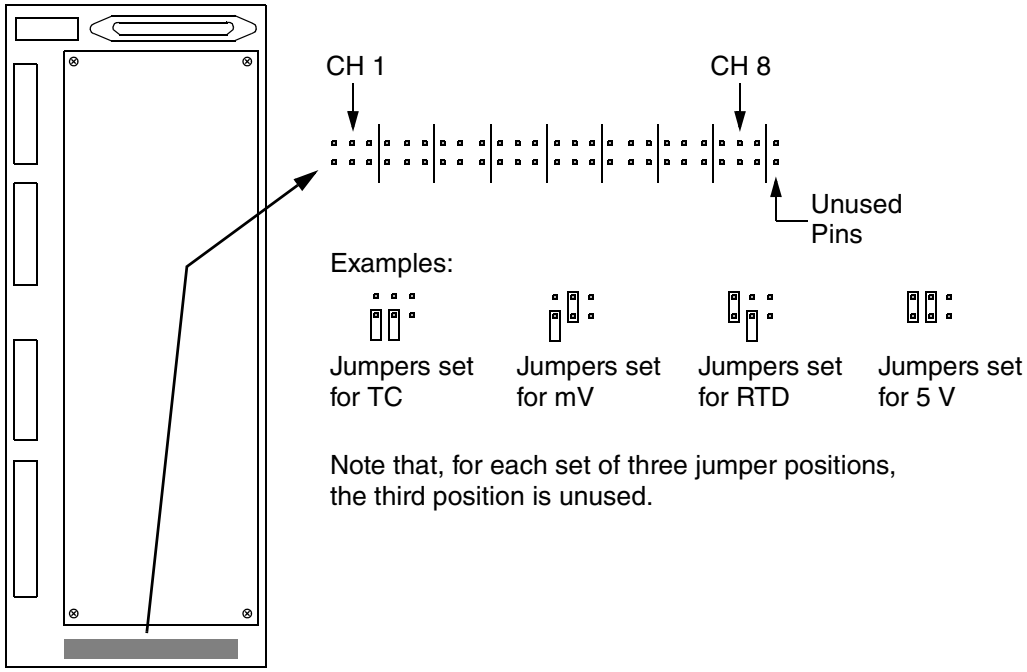


Figure 2-4. H3M03 Jumper Settings

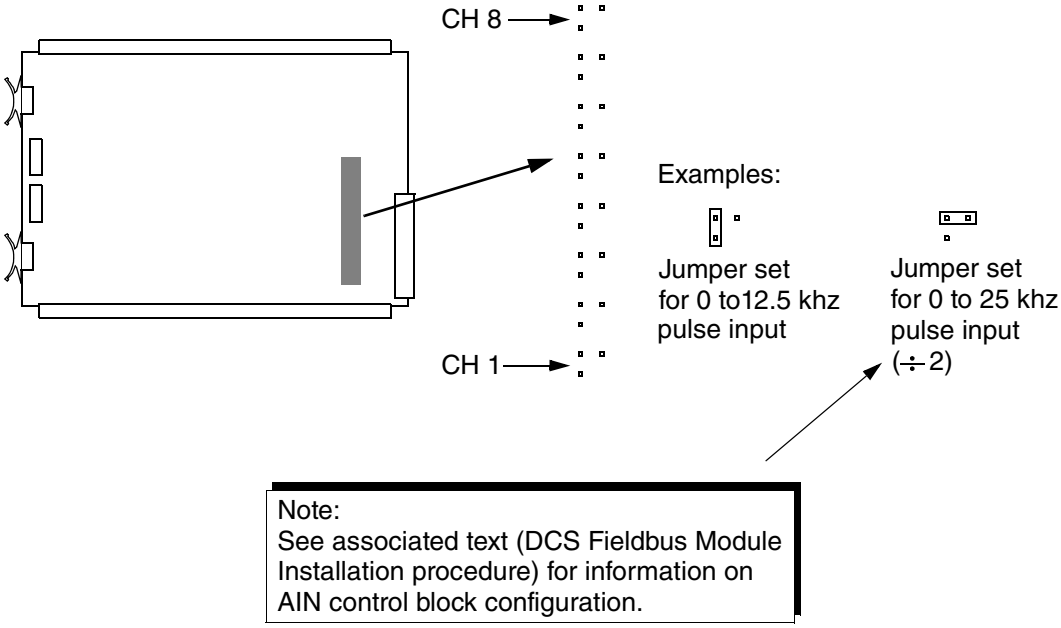
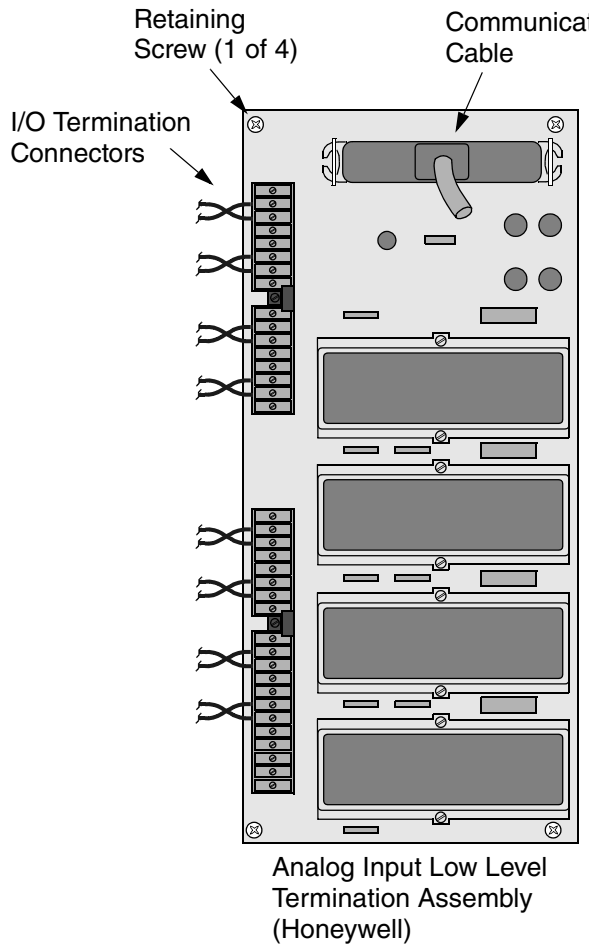


Figure 2-5. H3M06 Jumper Settings



To replace the Analog Input Low Level Termination Assembly with an H3M03 DCS Fieldbus Module:

1. Disconnect the I/O termination connectors and communications cable.
2. Remove the analog input low level termination assembly from its base by unscrewing the four retaining screws.
3. Install the H3M03 by reversing the actions in Steps 1 and 2.

Figure 2-6. H3M03 Installation

8. After finishing the module replacement in the PMM/APM/HPM card file, remove the CMOS batteries located to the rear of the power supply distribution panel (see Figure 2-7), as they are no longer required.

— NOTE

The CMOS batteries may be disposed of safely. They do not need to be replaced, since the card file is now powered by a universal power supply.

If the CMOS battery alarm contacts were previously used, proceed as follows:

a. If the jumpers shown in Figure 2-7 are not already installed, detach the alarm wires and jumper them together as shown in Figure 2-7 to prevent false alarming of the alarm contact terminal located to the right of the CMOS batteries. Remember to remove this logic from the original control scheme if this scheme is being carried over.

b. Remove the alarm configuration for the control scheme.

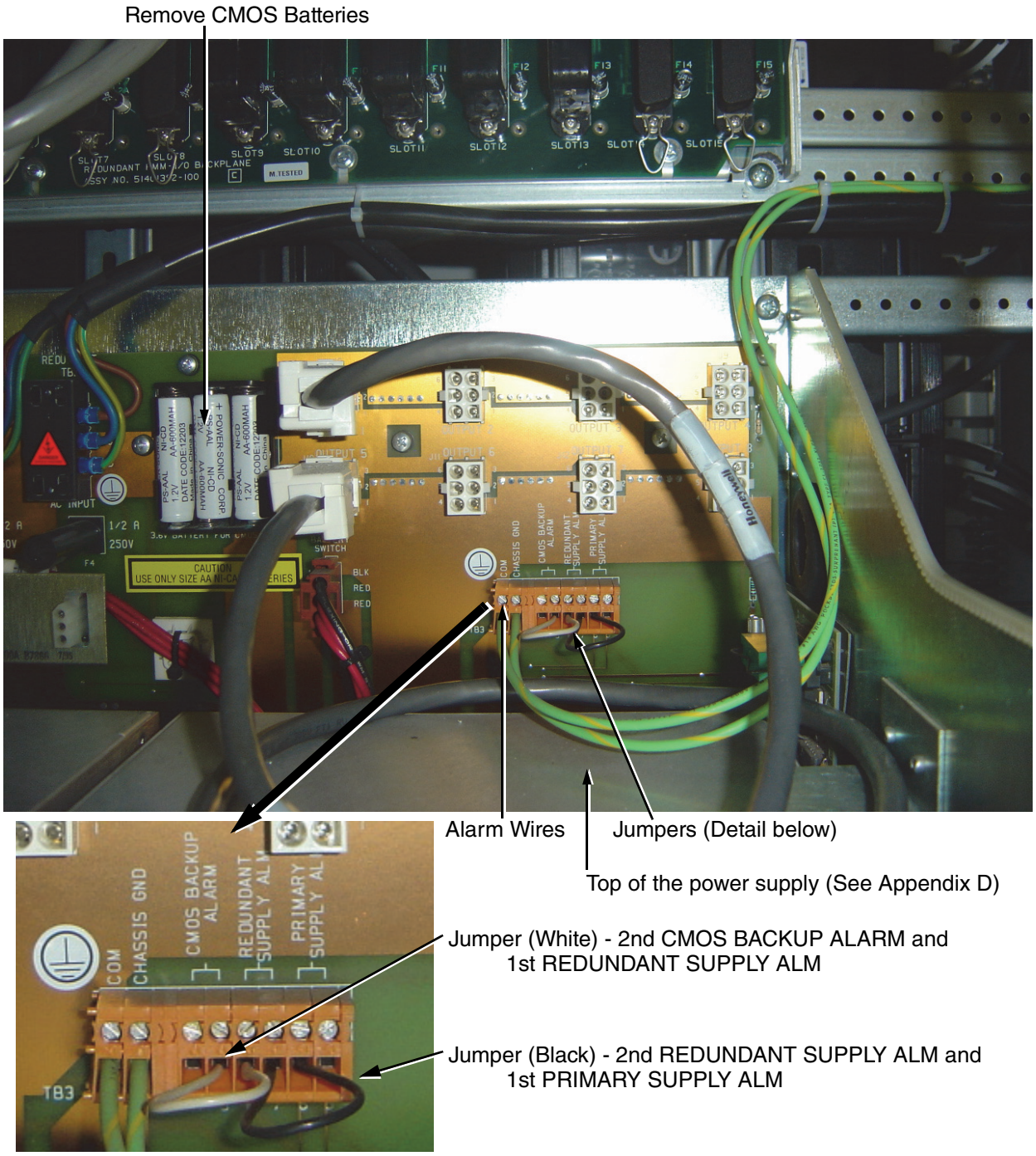


Figure 2-7. CMOS Battery Location in Power Supply Distribution Panel

9. Proceed to one or more of the following sections, depending on the type of Control Processor to which your fieldbus cabling must connect:
   - “Fieldbus Cabling at the CP40” on page 16
   - “Fieldbus Cabling at the CP60” on page 19
   - “Fieldbus Cabling at the FCP270” on page 26
   - “Fieldbus Cabling at the ZCP270” on page 31.

Fieldbus Cabling at the CP40

Fieldbus cable installation involves the use of termination cable assemblies (TCAs) and twin-axial cable to provide connection between the Foxboro Control Processor 40 (CP40) and the Fieldbus Isolator(s). Three remote Fieldbus cabling configurations are possible at the control processor:

- Non-fault-tolerant CP40 and non-redundant Fieldbus (Figure 2-8)
- Non-fault-tolerant CP40 and redundant Fieldbus (Figure 2-9)
- Fault-tolerant CP40 and redundant Fieldbus (Figure 2-10).

To make the Fieldbus cable connections at the CP40, refer to Figure 2-8, Figure 2-9, or Figure 2-10, as appropriate for your configuration, and proceed as follows:

1. Referring to Figure 2-11, assemble the termination block(s) associated with the control processor TCAs, snap them onto a DIN rail in the Foxboro Evo rack, and connect the earth wire(s).
2. Connect the TCA cable(s) to the CP(s) as shown in Figure 2-8, Figure 2-9, or Figure 2-10.
3. Connect the Fieldbus cable(s) to the TCA(s) as shown in Figure 2-8, Figure 2-9, or Figure 2-10.
4. If it is not already in place, add the termination resistor (supplied with each TCA) as shown in Figure 2-8, Figure 2-9, or Figure 2-10.

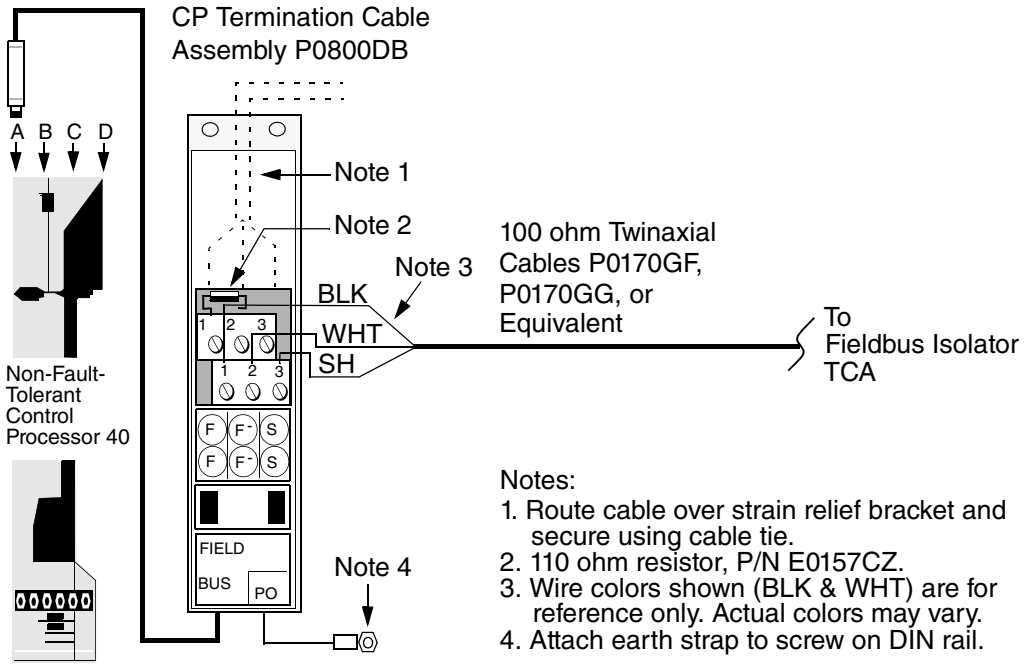


Figure 2-8. Non-Fault-Tolerant CP40 and Non-Redundant Fieldbus, Cable Connections

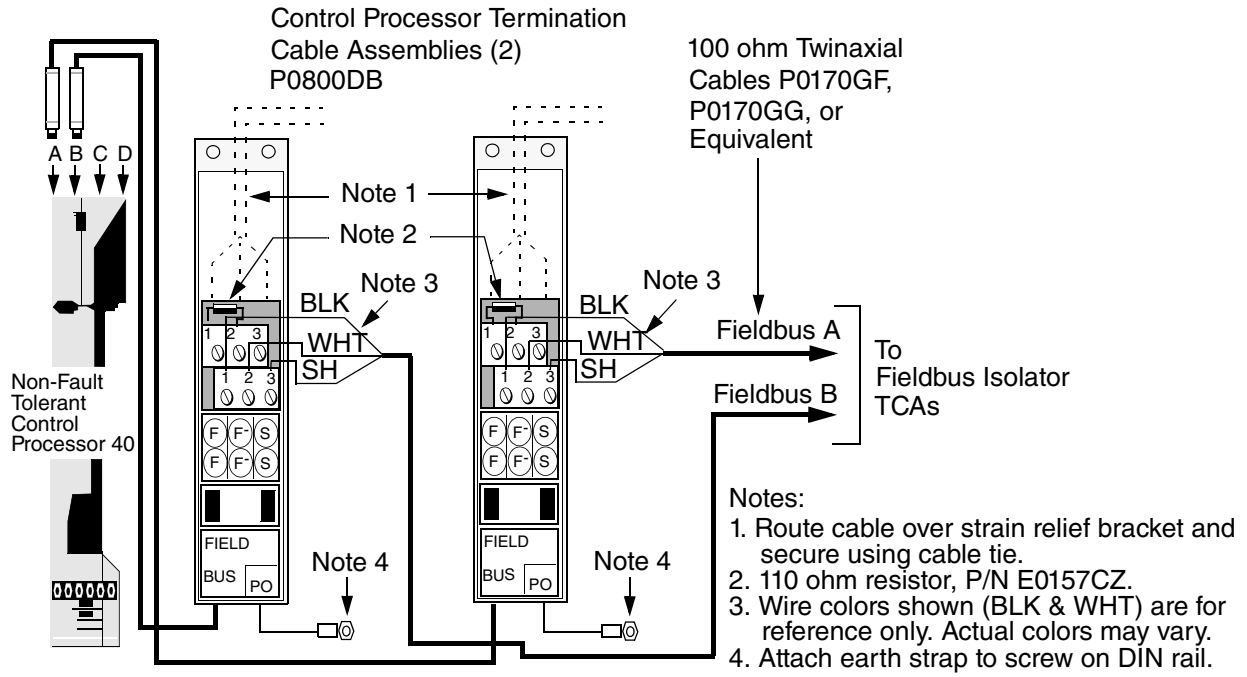


Figure 2-9. Non-Fault-Tolerant CP40 and Redundant Fieldbus, Cable Connections

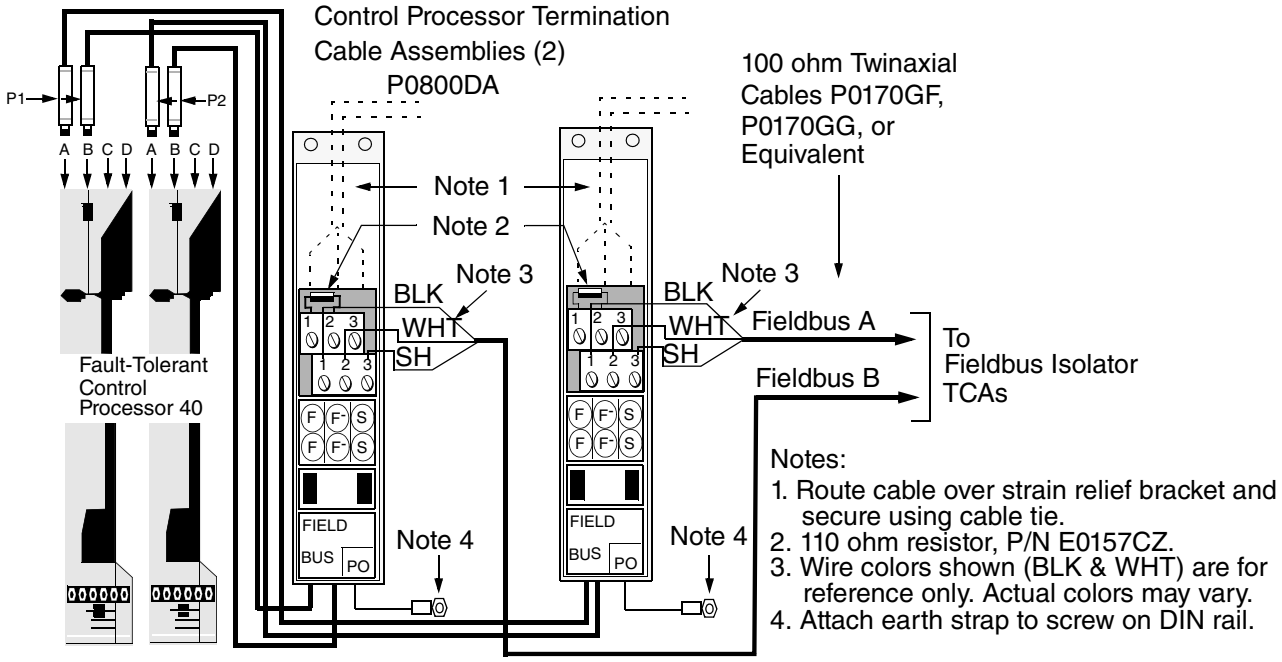


Figure 2-10. Fault-Tolerant CP40 and Redundant Fieldbus, Cable Connections

(1) Slide the strain relief bracket onto the TCA termination block.

(2) Snap the assembled termination block onto the DIN rail, and connect the earth wire to a screw on the DIN rail.

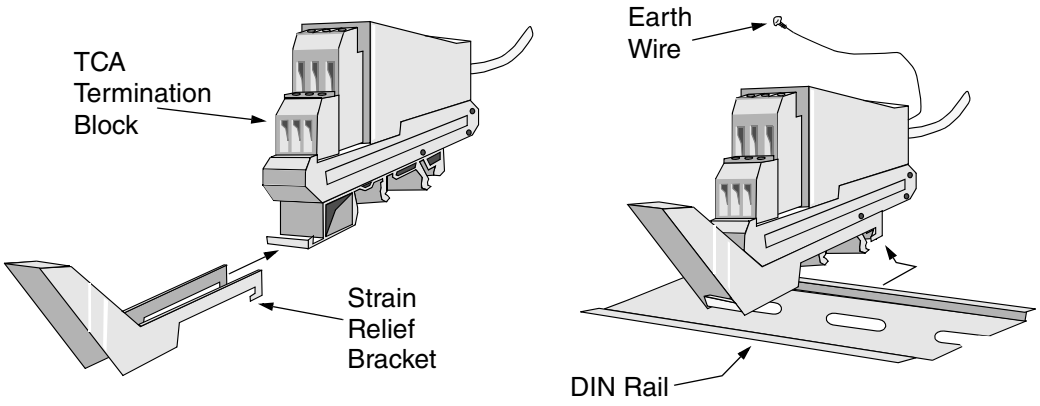
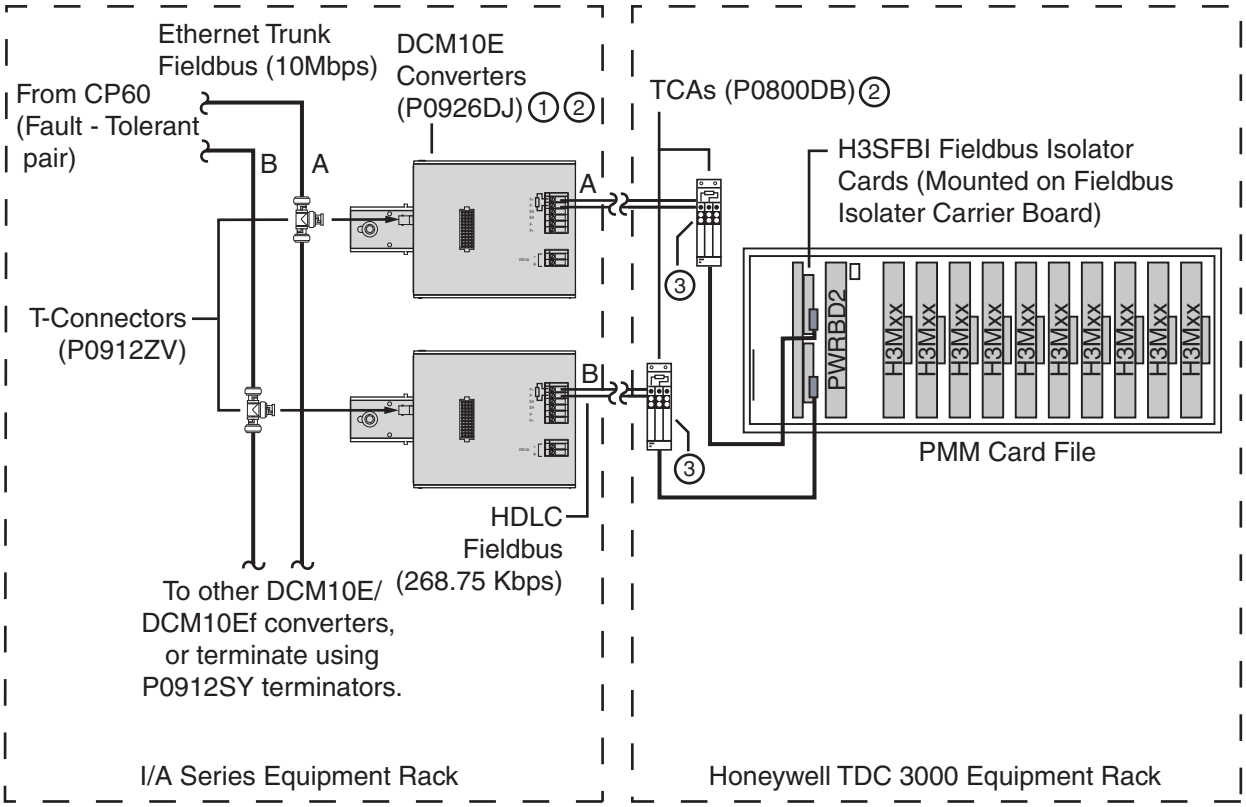


Figure 2-11. TCA Termination Block Assembly and Mounting

Fieldbus Cabling at the CP60

Interfacing of the upgraded TDC 3000 system to the CP60 (via the Fieldbus) is accomplished using DCM10E or DCM10Ef converters, as shown in Figure 2-12. For detailed information on making the cable connections, refer to *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB).



Notes:

① A configuration using DCM10Ef converters (P0926DP) is similar, but with the Ethernet Trunk fiber optic cables connecting to the ST-type connectors on the units.

② Terminating risistors, included with the DCM10E/DCM10Ef converters and the corresponding TCAs, are used only if these devices exist at the ends of the Fieldbus run.

③ If the TCAs are the last TCAs in the Fieldbus run, the Fieldbus shields must be connected to the earth bus bar in the equipment rack (which, in turn, must be connected to solid earth ground). Check to ensure that these connections are in place.

Figure 2-12. Fieldbus Cabling to the CP60 (Typical)

Fieldbus Cabling at the FCP280

Cabling an FCP280 baseplate to the H3SFBI Fieldbus Isolators consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 2-13). This extension, used between enclosures, involves the use of termination cable assemblies (TCAs) and twinaxial cable to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1 Km (3200 ft). If the fieldbus is non-redundant, only one TCA is connected to the FCP280 baseplate.

The Fieldbus splitter (part number RH928CV) consists of a connector for any Fieldbus port on the FCP280 baseplate, and a TCA termination block similar to two of the P0903VY termination assemblies connected together. It has a 3 m (9.8 ft) cable between the connector and the block. The termination blocks on the splitter's TCAs each include a strain relief bracket, nylon cable tie, and labels for bus A and B. You must install the label to the termination block on each TCA. Refer to "Fieldbus Splitter (RH928CV)" in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) and *Field Control Processor 280 (FCP280) User's Guide* (B0700FW) for details.

— NOTE

The Fieldbus splitter (RH928CV) is used instead of the two legacy TCAs (P0903VY) and the Extended Fieldbus Splitter/Terminator (P0926LC), which are used with legacy control processors for their twinaxial cabling.

Before starting this procedure, plan which Fieldbus port on the FCP280 baseplate you will connect the TCA cable to. The FCP280 considers the H3M*xx*s as 100 Series FBMs (see Table 3-1 on page 49), so it must connect to the Fieldbus Isolators from a Fieldbus port on the FCP280 baseplate which is dedicated to 268 Kbps HDLC fieldbus connections. Each fieldbus port on the FCP280 baseplate may connect to either 100 Series or 200 Series modules exclusively - not both.

You can mount the FCP280 module(s) on either the two-position, vertical 200 Series baseplate (RH924YF) or the two-position, horizontal 200 Series baseplate (RH924YL). For FCP280 baseplate mounting procedures, refer to *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For FCP280 installation procedures, refer to *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).

To connect an FCP280 baseplate to the H3SFBI Fieldbus Isolator TCAs:

1. Referring to Figure 2-14 on page 23, assemble the termination blocks on the termination cable assembly end of the RH928CV splitter (RH928CV). Snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 2-15 illustrates how to remove the TCA termination blocks.)
2. Connect the splitter (RH928CV) to the appropriate port on the FCP280 baseplate. The splitter includes both a plug for the Fieldbus port and the TCA termination block which you installed in the previous step (see Figure 2-13). Refer to "Fieldbus Splitter (RH928CV)" in *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA) for instructions on how to make this connection.
   If you are upgrading a legacy control processor with an FCP280 and the site has two P0903VY TCAs on it, be sure to remove the P0903VY TCA termination blocks before installing the splitter, as explained in Figure 2-15.

   Finish making the cable connection(s) to the fieldbus splitter/terminator or fieldbus splitter as shown in Figure 2-13.

3. Make the fieldbus cable connections between termination cable assemblies (see Figure 2-16 on page 24).
4. Terminate the HDLC fieldbus according to the following rules:
   - Terminating resistors are used only at the H3SFBI Fieldbus Isolator TCA end of the bus. Add the terminating resistors (supplied with the termination cable assemblies) to the P0903VY termination cable assemblies as shown in Figure 2-13.
   - To terminate Fieldbus port 1 in the FCP280 baseplate end of the HDLC fieldbus (if needed), set **both** the termination DIP switches on the FCP280 baseplate to "ON", as described in "Setting Termination Switches for FCP280 Baseplates" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).
     Fieldbus ports 2-4 in the FCP280 baseplate are terminated internally and do not require any external hardware for termination. No action is needed to terminate the FCP280 baseplate end of the HDLC fieldbus for Fieldbus ports 2-4.
   - The Fieldbus can be extended in two directions from the FCP280. (Refer to Figure 2-17 on page 25.)
5. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).

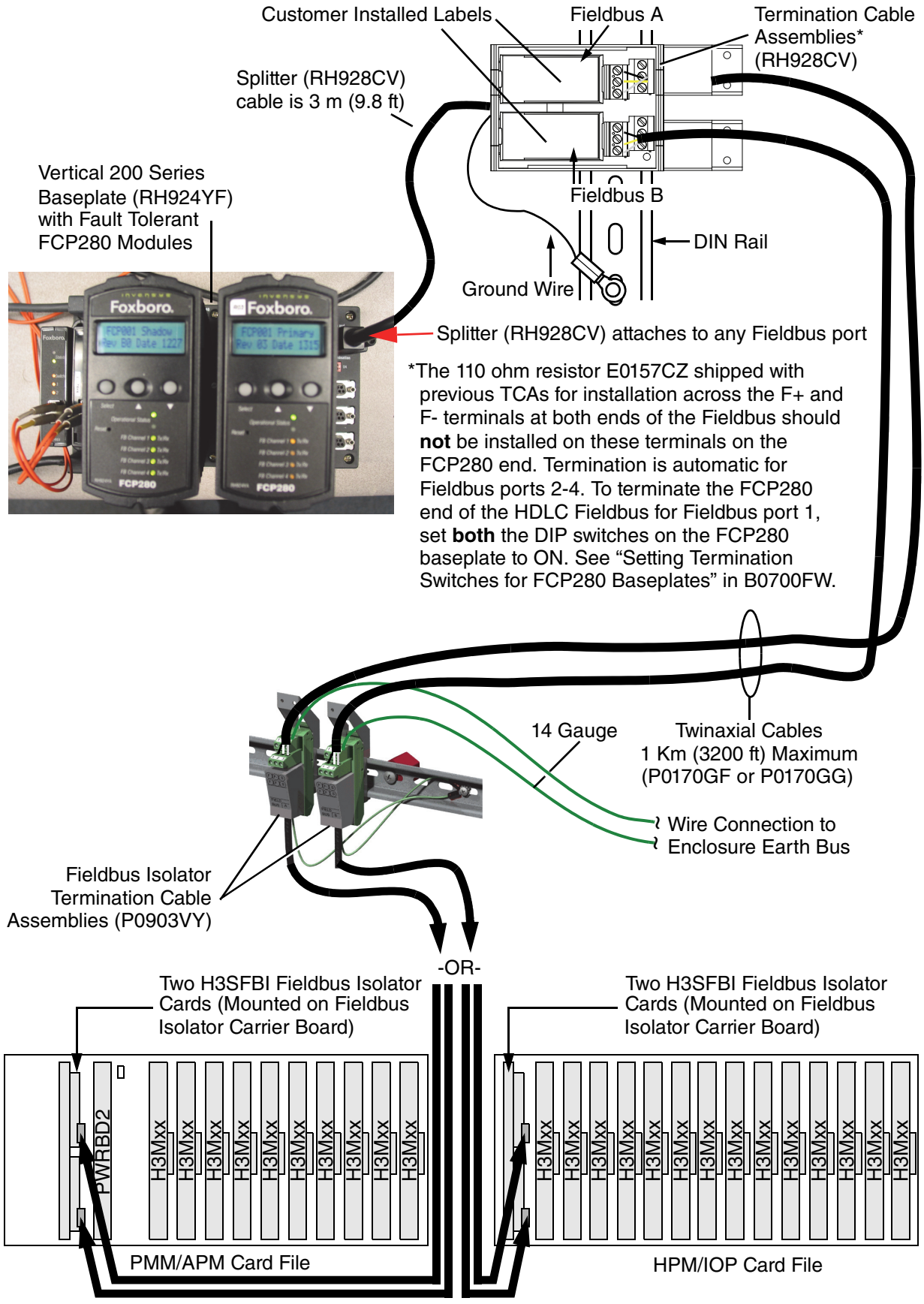


Figure 2-13. Cabling Fieldbus Isolator Cards to an FCP280 Baseplate

1. Slide strain relief bracket(s) onto TCA termination block. (RH928CV has two brackets, not shown.)
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

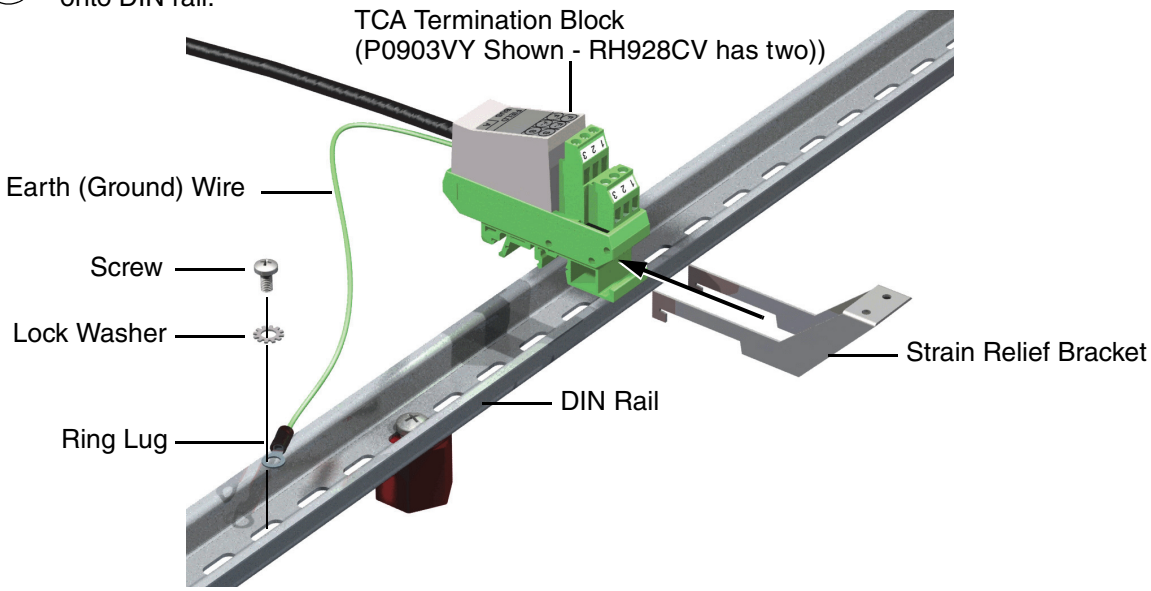


Figure 2-14. TCA Termination Block Assembly Mounting

1. Disconnect the earth wire from from the DIN rail.
2a. For each strain relief bracket, insert a medium-size flat-head screwdriver as shown.
2b. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail. For RH928CV, repeat for the other strain relief bracket.

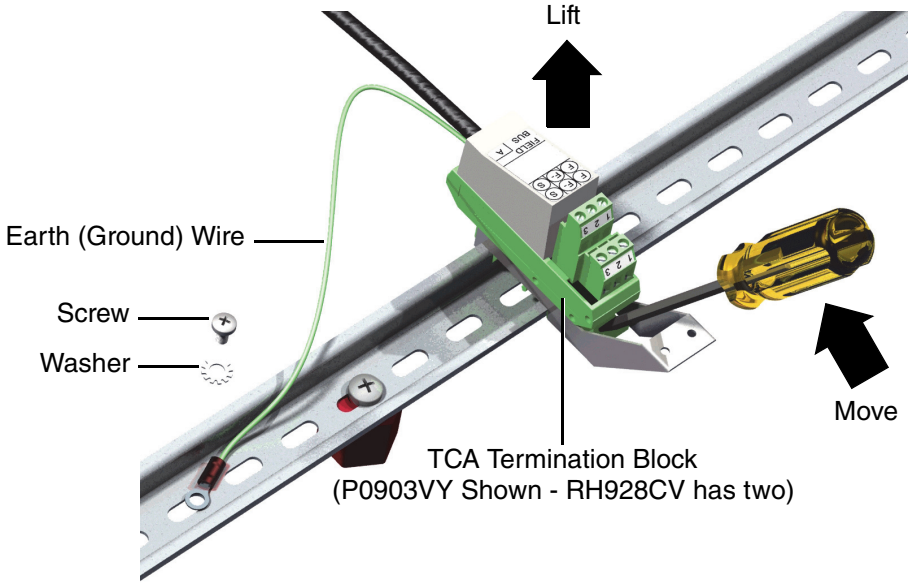
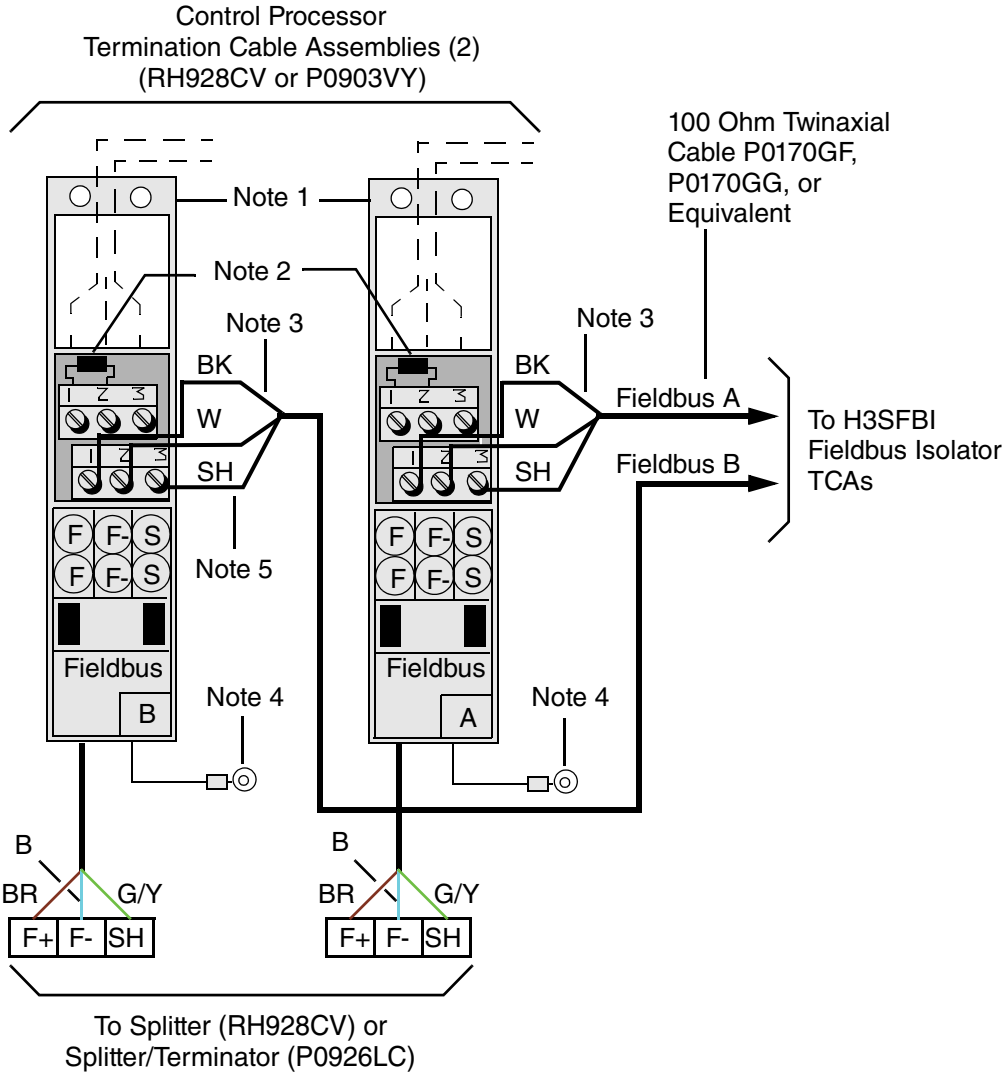


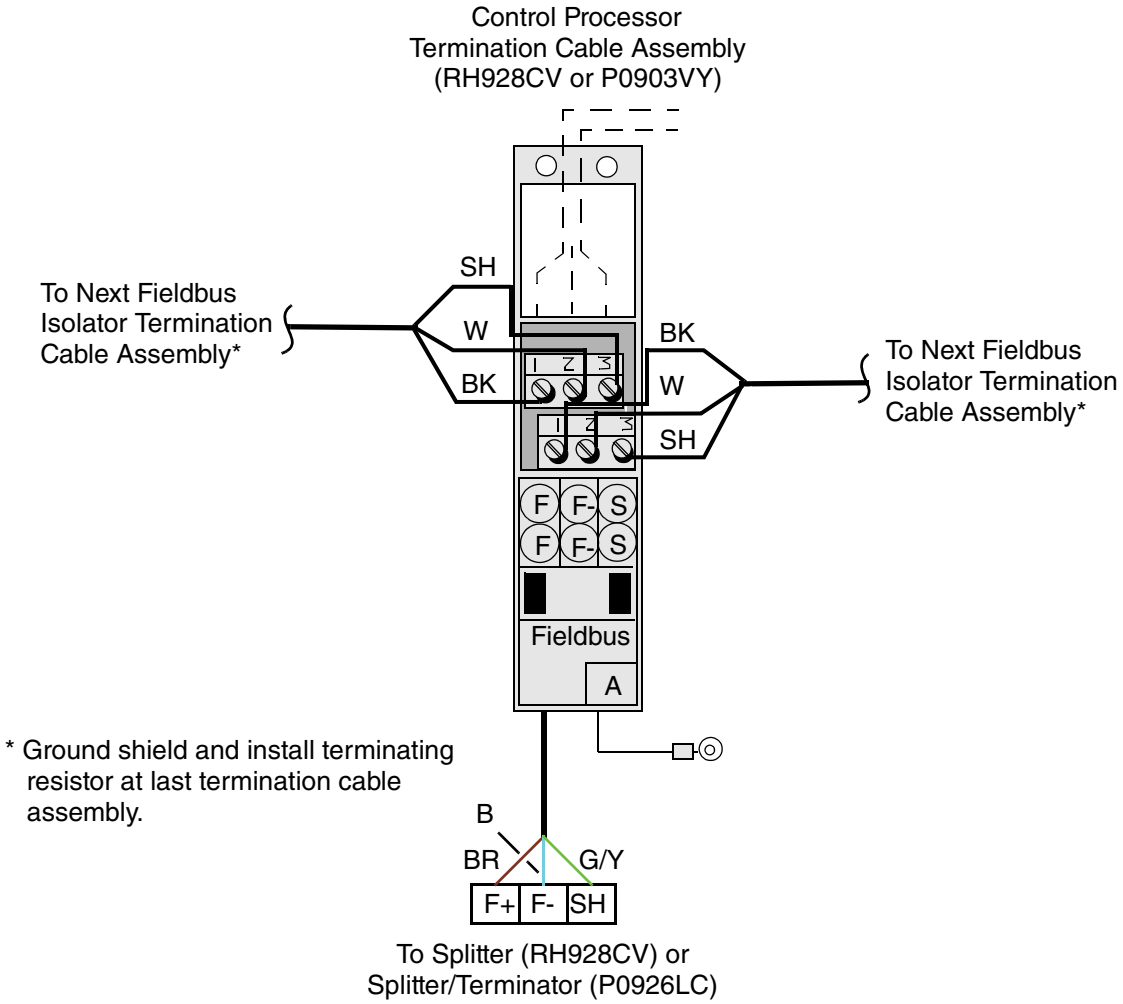
Figure 2-15. TCA Termination Block Removal



Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed on the H3SFBI Fieldbus Isolator TCA end of the fieldbus (not the FCP280 end). For the FCP280 end of the fieldbus, Fieldbus ports 2-4 are auto-terminated internally. Fieldbus port 1 is terminated with the DIP switches on the FCP280's baseplate as described in "Setting Termination Switches for FCP280 Baseplates" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU). Splitter (RH928CV) has only one green earth wire.
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCP280 baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

Figure 2-16. Remote Redundant Fieldbus Cabling (FCP280 End)



NOTE: For the FCP280 in the middle of the fieldbus, if connected to the HDLC Fieldbus on Fieldbus port 1, set both the termination DIP switches on the FCP280's baseplate to "OFF" as described in "Setting Termination Switches for FCP280 Baseplates" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW).

Figure 2-17. Example of Extending Fieldbus in Two Directions from FCP280

Fieldbus Cabling at the FCP270

Cabling an FCP270 baseplate to the H3SFBI Fieldbus Isolators consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 2-18). This extension, used between enclosures, involves the use of termination cable assemblies (TCAs) and twinaxial cable to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1 Km (3200 ft). If the fieldbus is non-redundant, only one TCA is connected to the fieldbus splitter/terminator (P0926LC) which is shown in Figure 2-19. TCA part number P0903VY includes a strain relief bracket, nylon cable tie, labels for bus A and B, and 110 ohm terminating resistor. You must install the label to the TCA.

You can mount the FCP270 module(s) on either the two-position, vertical 200 Series baseplate (P0926HW) or the two-position, horizontal 200 Series baseplate (P0926HC). For FCP270 baseplate mounting procedures, refer to *Standard and Compact 200 Series Subsystem User's Guide* (B0400FA). For FCP270 installation procedures, refer to *Field Control Processor 270 (FCP270) User's Guide* (B0700AR).

To connect an FCP270 baseplate to the H3SFBI Fieldbus Isolator TCAs:

1. Referring to Figure 2-20, assemble the termination blocks associated with the termination cable assemblies (P0903VY) for the FCP270 baseplate, snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 2-21 illustrates how to remove the TCA termination blocks.)
2. Connect the fieldbus splitter/terminator (P0926LC) to the "Fieldbus and Time Strobe" connector on the FCP270 baseplate (see Figure 2-18).
3. Make the cable connection(s) to the fieldbus splitter/terminator as shown in Figure 2-19.
4. Make the fieldbus cable connections between termination cable assemblies (see Figure 2-22).
5. Add the terminating resistors (supplied with the termination cable assemblies) according to the following rules:
   - Terminating resistors are used only at the ends of the bus.
   - The Fieldbus can be extended in two directions from the FCP270. (Refer to Figure 2-23.)
6. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).

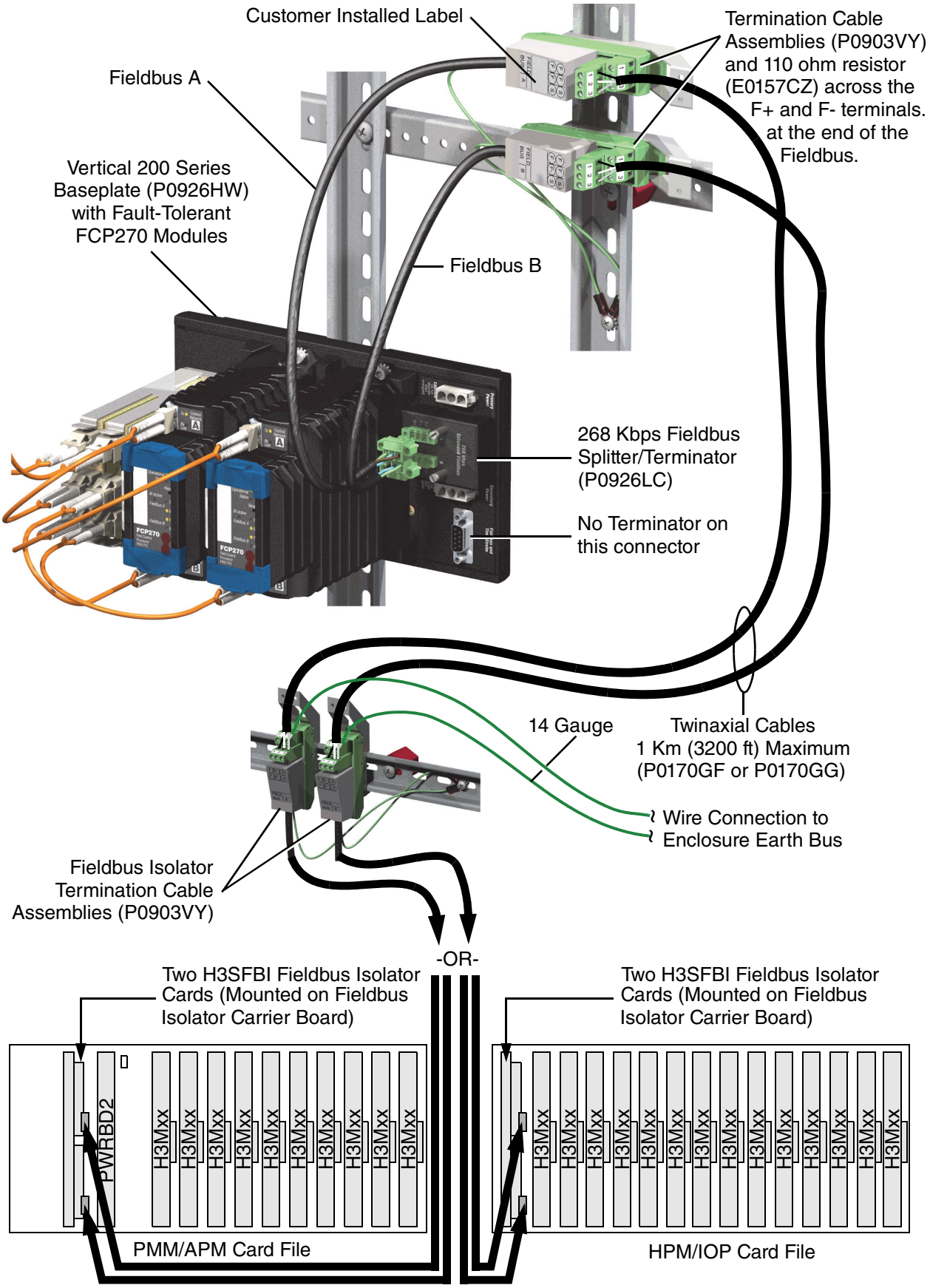


Figure 2-18. Cabling Fieldbus Isolator Cards to an FCP270 Baseplate

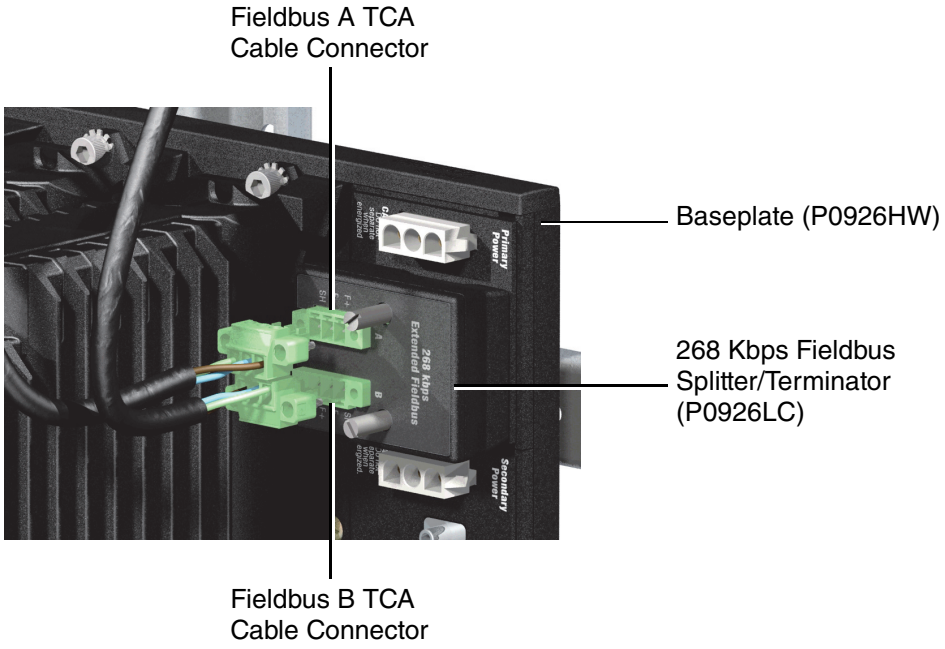


Figure 2-19. TCA Cable Connection to 268 Kbps Fieldbus Splitter/Terminator

1. Slide strain relief bracket onto TCA termination block.
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

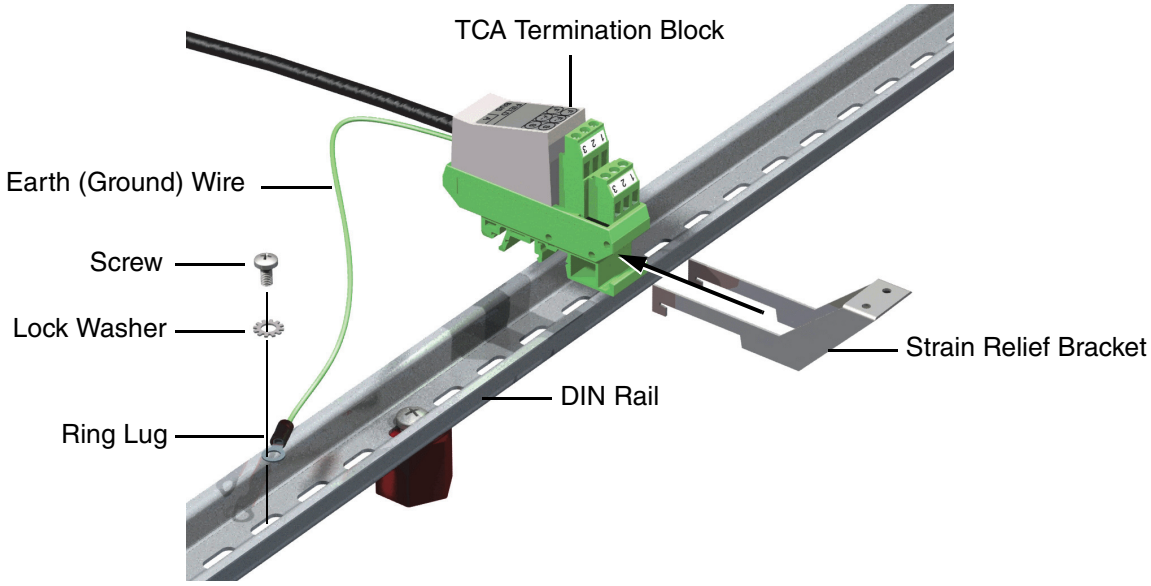


Figure 2-20. TCA Termination Block Assembly Mounting

1. Disconnect the earth wire from from the DIN rail.
2. Insert a medium-size flat-head screw driver as shown.
3. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail.

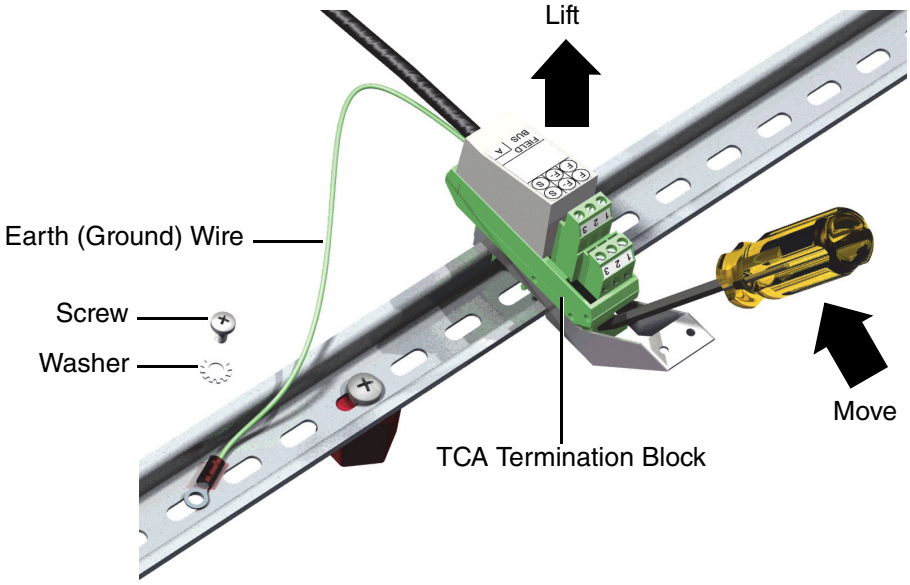
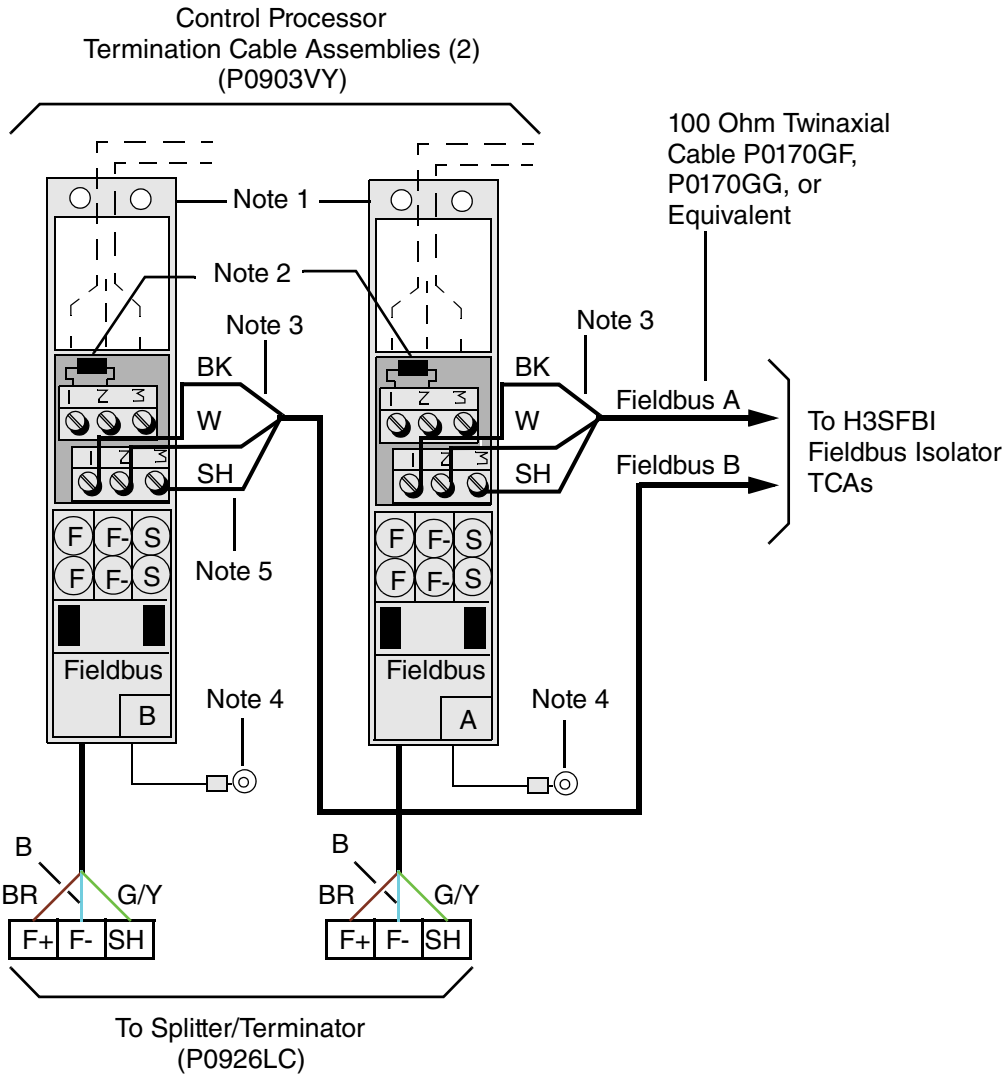


Figure 2-21. TCA Termination Block Removal



Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed at the ends of the fieldbus.
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCP270 baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

Figure 2-22. Remote Redundant Fieldbus Cabling (FCP270 End)

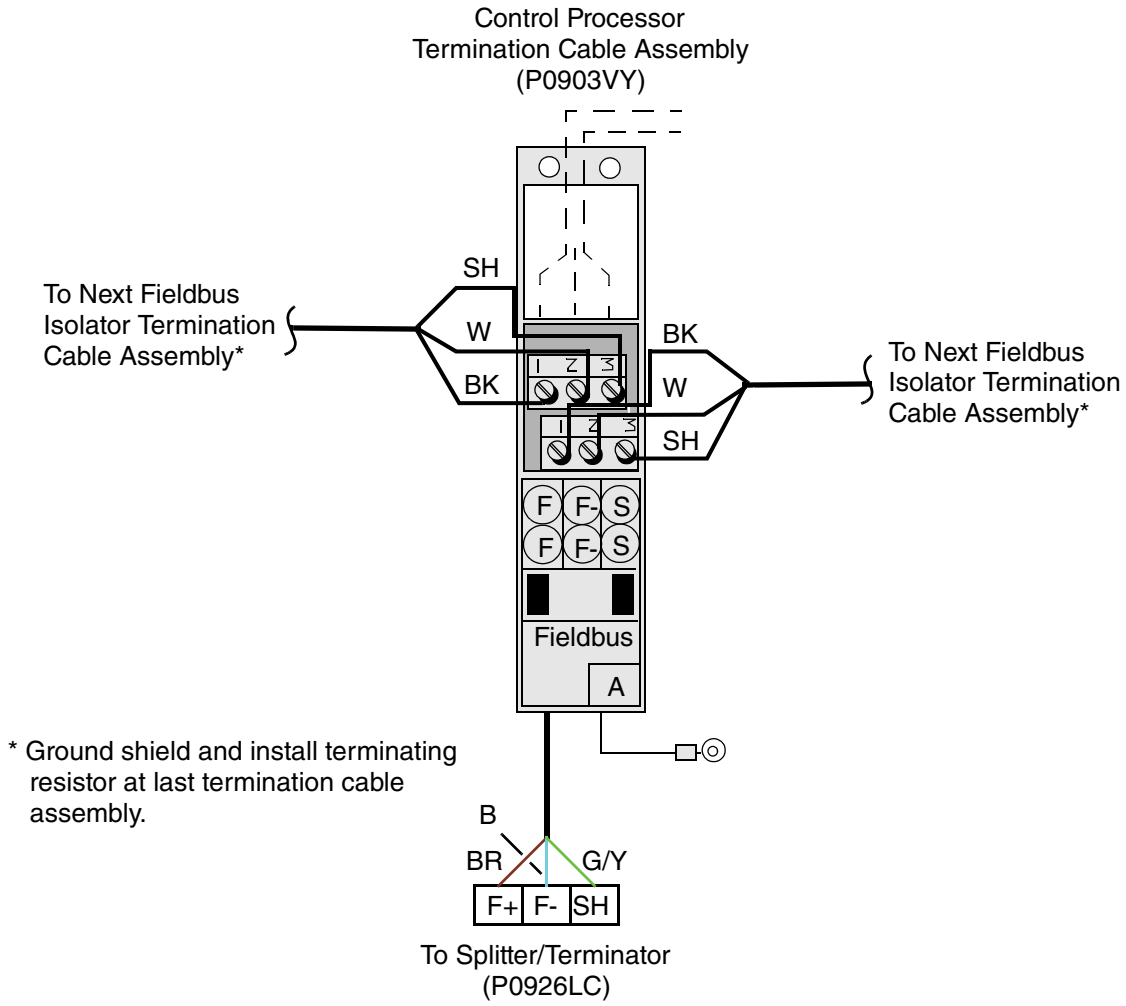


Figure 2-23. Example of Extending Fieldbus in Two Directions from FCP270

Fieldbus Cabling at the ZCP270

— NOTE

Refer to Appendix G "ZCP270 Upgrade" for information regarding control processor upgrades from CP30, CP40, or CP60 to ZCP270. If upgrading from a CP60 to ZCP270, no special procedure is necessary.

Connections between a redundant ZCP270 to the H3SFBI Fieldbus Isolators requires the following to facilitate communications:

- ZCP270 connects to a redundant pair of 200 Series Fieldbus Communications Module 100Es (FCM100Es) via fiber optic cabling, either directly with standard LC to LC cables or indirectly via the Foxboro Evo Control Network (hereinafter referred to as the control network)
- The FCM100Es connect to the H3SFBI Fieldbus Isolators

Cabling a FCM100E baseplate to the H3SFBI Fieldbus Isolators consists of extending the remote 268 Kbps fieldbus from the isolators (see Figure 2-26). This extension, used between enclosures,

involves the use of termination cable assemblies (TCAs) to provide cable connections between primary and extended fieldbus segments, for a maximum fieldbus length of 1830 m (6000 ft). If the fieldbus is non-redundant, only one TCA is connected to the fieldbus splitter/terminator (P0926LC) which is shown in Figure 2-27. TCA part number P0903VY includes a strain relief bracket, labels for bus A and B, and a 110 ohm terminating resistor (E0157CZ) which should be installed across the F+ and F- terminals at the end of the Fieldbus. You must install one of the labels on the TCA (see Figure 2-26 for label orientation)

You can mount the FCM100E module(s) on either the two-position, vertical 200 Series baseplate (P0926KE) or the two-position, horizontal 200 Series baseplate (P0926KH). For FCM100E installation procedures, refer to *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN).

ZCP270 Direct Connection to FCM100E

⚠ WARNING

Prior to connecting the direct connect cables to the FCM100E, install the letterbug into the ZCP270. Refer to the *Letterbug Configurator User's Guide* (B0700AY).

Non-redundant or redundant FCM100Es can be connected directly to a ZCP270 through two splitter/combiners (on each for Bus A and Bus B).

Figure 2-24 shows a redundant FCM100E connection to a redundant ZCP270. Figure 2-25 shows how the connections are made. Use the cables listed in Table 2-2 to make the connections.

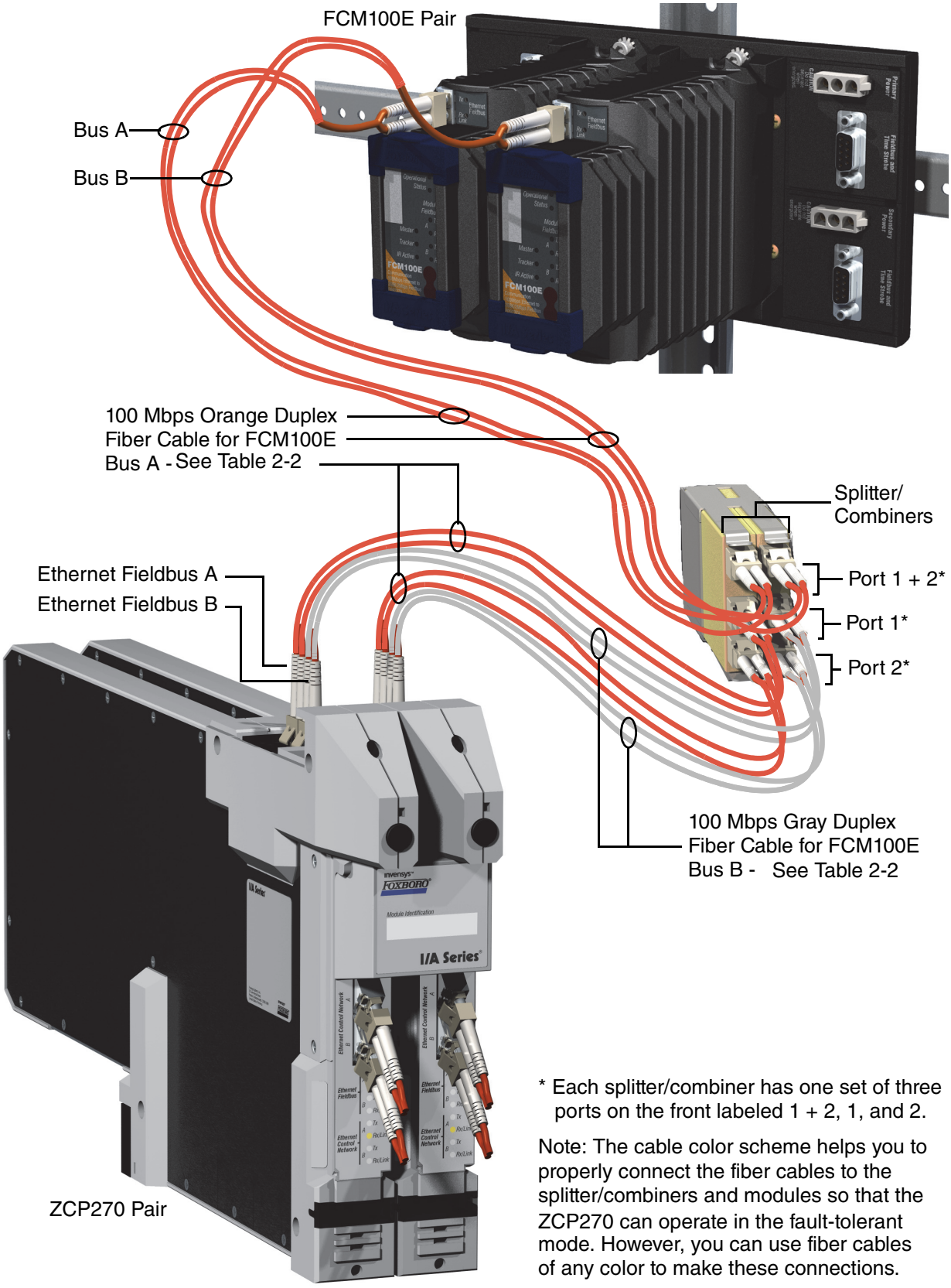


Figure 2-24. FCM100E to Splitter/Combiner to ZCP270 Cabling - Direct Connection - Overview

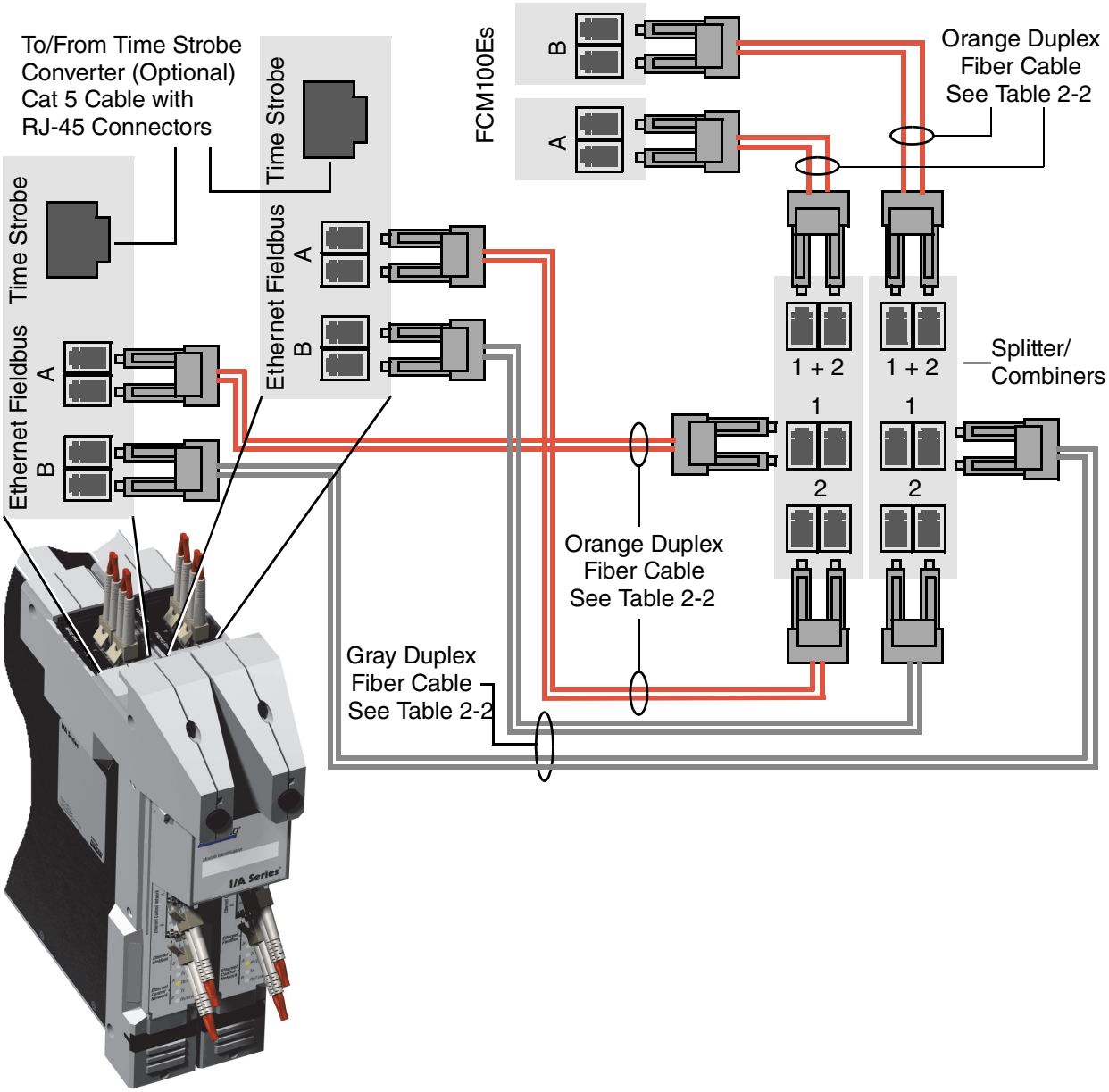


Figure 2-25. FCM100E to Splitter/Combiner to ZCP270 Cabling - Direct Connection - Wiring

Table 2-2. Cables for Connections between the Splitter/Combiners and the FCM100E/ZCP270

Part Number	Length	Material	Use
P0972UN	0.5 m (1.65 ft)	MMF 62.5/125 micron, gray riser. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. Recommended for use on the “B” network.

Table 2-2. Cables for Connections between the Splitter/Combiners and the FCM100E/ZCP270 (Continued)

Part Number	Length	Material	Use
P0972VG	0.5 m (1.65 ft)	MMF 62.5/125 micron, orange riser. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270. Recommended for use on the "A" network.
P0972UJ	1.0 m (3.3ft)	MMF 62.5/125 micron. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270.
P0972TN	3.0 m (9.9 ft)	MMF 62.5/125 micron. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to ZCP270.
P0972TP	15 m (49.5 ft)	MMF 62.5/125 micron. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to FCM100E or ZCP270.
P0972TQ	50 m (164 ft)	MMF 62.5/125 micron. LC connectors on each end.	Fiber Optic Splitter mounted on DIN rail or shelf mounted to FCM100E or ZCP270.

After you have installed and cabled the FCM100E module, you need to assign their letterbugs through the infrared port using the Letterbug Configurator. For information on using this device and procedures for assigning letterbugs, see the *Letterbug Configurator User's Guide* (B0700AY).

ZCP270 Connection to FCM100E via The Foxboro Evo Control Network

Refer to the "Installing a Single or Primary ZCP270 Module", "Cabling a Single (Non-Fault-Tolerant) ZCP270" and/or "Cabling a Fault-Tolerant ZCP270 Module Pair" sections in *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN) for instructions on connecting the ZCP270 to the control network.

Fiber optic connecting cables require a MTRJ connector on the Ethernet 100 Mbps switch and an LC connector on the FCM100E end. The maximum optical insertion loss though each connector must be equal to or less than 0.5 db. For the Ethernet equipment used in the control network, refer to *The MESH Control Network Architecture Guide* (B0700AZ).

After you have installed and cabled the FCM100E module, you need to assign their letterbugs through the infrared port using the Letterbug Configurator. For information on using this device and procedures for assigning letterbugs, see the *Letterbug Configurator User's Guide* (B0700AY).

Cabling FCM100E Baseplate to H3SFBI Fieldbus Isolators

Remote fieldbus extension cable connections are implemented as shown in Figure 2-26 and Figure 2-31.

To connect an FCM100E baseplate to the H3SFBI Fieldbus Isolators:

1. Referring to Figure 2-27, assemble the termination blocks associated with the termination cable assemblies (P0903VY) for the FCM100E Modular Baseplate, snap them onto the mounting rails (DIN rails) in the enclosure, and connect the ground wires. (For future reference, Figure 2-28 illustrates how to remove the TCA termination blocks.)
2. Connect the fieldbus splitter/terminator (P0926LC) to the "Fieldbus and Time Strobe" connector on the FCM100E baseplate (see Figure 2-26).
3. Make the cable connection(s) to the fieldbus splitter/terminator as shown in Figure 2-27.
4. Make the fieldbus cable connections between termination cable assemblies (see Figure 2-29).
5. Add the terminating resistors (supplied with the termination cable assemblies) according to the following rules:
   - Terminating resistors are used only at the ends of the bus.
   - The Fieldbus can be extended in two directions from the FCM100E. (Refer to Figure 2-31.)
6. Connect an insulated 14 AWG green wire between connection point 3 (shield) on the last Fieldbus Isolator termination cable assembly (or assemblies) and the earth bus in the enclosure. For Foxboro Evo system earthing requirements, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).

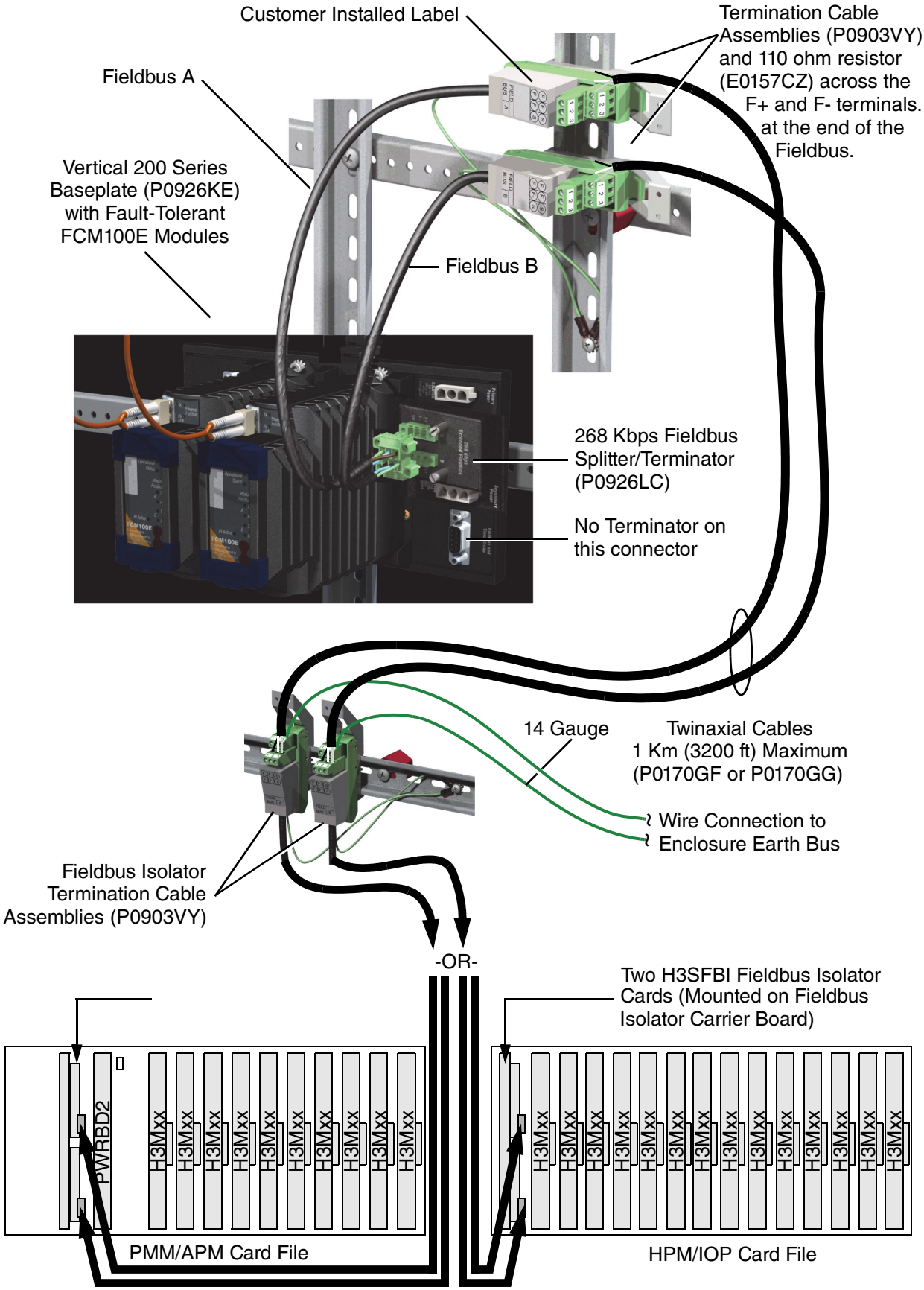


Figure 2-26. Cabling Fieldbus Isolator Cards to an FCM100E Baseplate

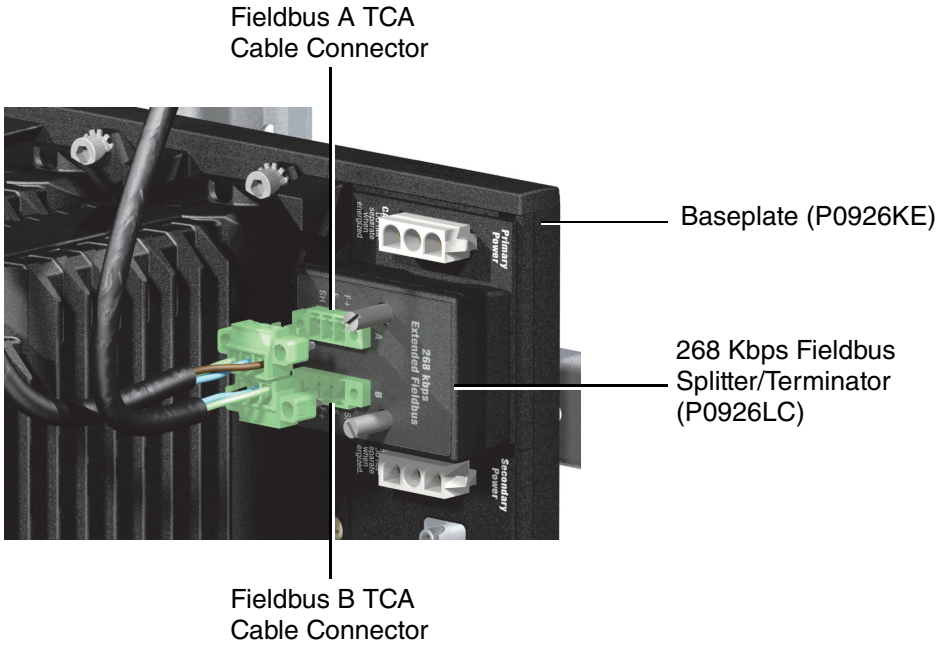


Figure 2-27. TCA Cable Connection to 268 Kbps Fieldbus Splitter/Terminator

1. Slide strain relief bracket onto TCA termination block.
2. Snap assembled termination block onto DIN rail.
3. Connect ground wire to DIN rail using screw, lock washer and nut (customer supplied).

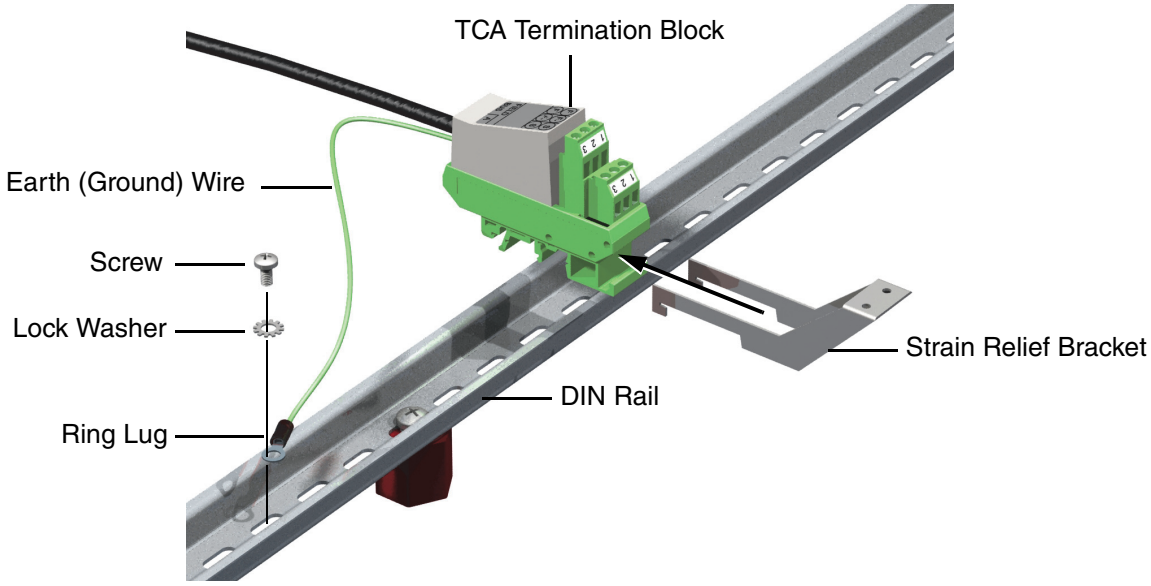


Figure 2-28. TCA Termination Block Assembly Mounting

1. Disconnect the earth wire from from the DIN rail.
2. Insert a medium-size flat-head screw driver as shown.
3. Move the screw drive handle in the direction shown, while lifting the TCA termination block from the DIN rail.

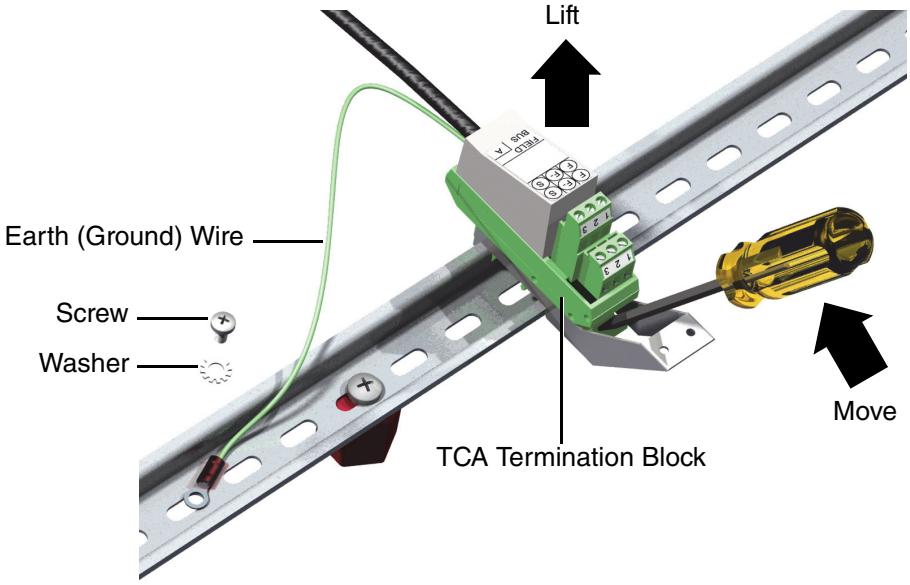
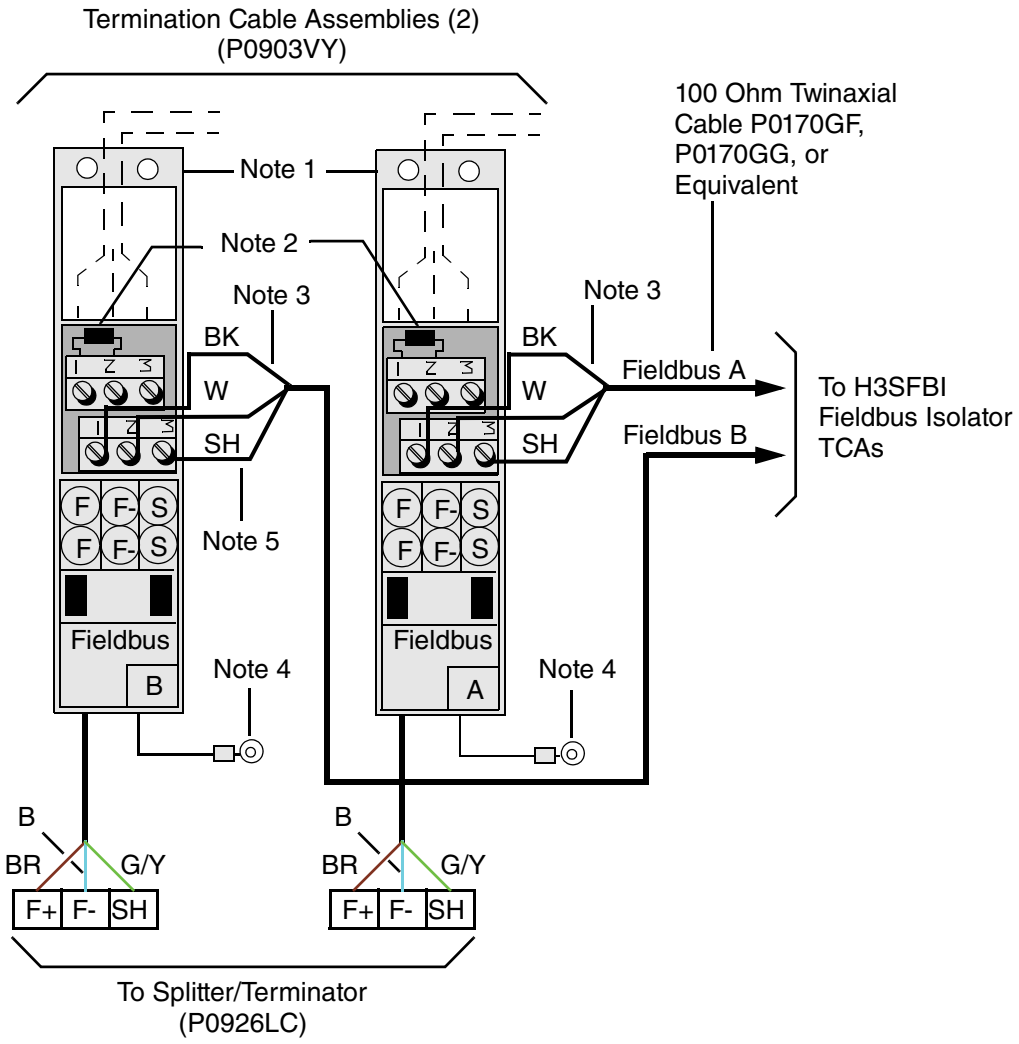


Figure 2-29. TCA Termination Block Removal



Notes:

1. For cable strain relief, it is recommended that the Fieldbus cable(s) be routed over the strain relief bracket and secured using nylon cables ties.
2. TCAs can be daisy chained as indicated by the dashed cable lines, but terminating resistors (110 ohms) must be installed at the ends of the fieldbus.
3. Wire colors shown (BK and W) are for reference purposes only.
4. Earth (ground) the surge protection network contained within the TCAs by attaching the green earth wire to a screw on the DIN rail connected to system earth. For more information on earthing, refer to *Power, Earthing (Grounding), EMC and CE Compliance* (B0700AU).
5. The shield of the twinaxial cable (terminal 3) should be earthed at the farthest end from the FCM100E Modular Baseplate. The fieldbus shield must be earthed at one end only. (See text for earthing instructions.)

Figure 2-30. Remote Redundant Fieldbus Cabling (FCM100E End)

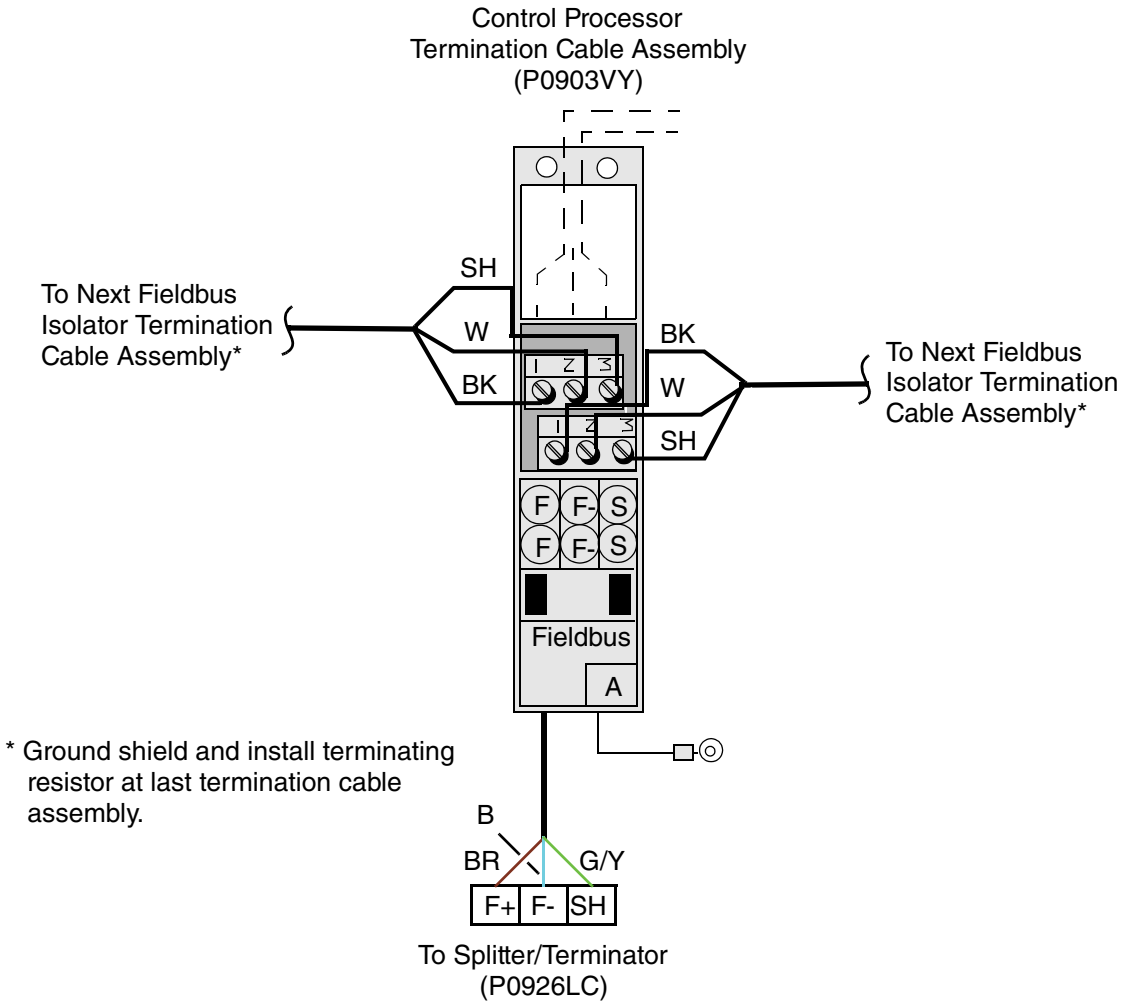


Figure 2-31. Example of Extending Fieldbus in Two Directions from FCM100E

Fieldbus Cabling at the DCS Fieldbus Module Subsystem

Fieldbus cabling at the DCS Fieldbus Module subsystem involves making Fieldbus connections to the TCAs (P0903VY) associated with the Fieldbus Isolators, and connecting the TCA cables to the Fieldbus Isolators.

NOTE

1. Connections at the DCS Fieldbus Module Subsystem are the same regardless of the type of Foxboro control processor is used (CP40 or later).
2. The following procedure assumes that a redundant Fieldbus is being employed. If the installation in question uses a non-redundant Fieldbus, omit the Fieldbus B connections.

1. Using the hardware provided, install the DIN rail (P0903PN) in the equipment rack in question. The DIN rail can be placed anywhere in the rack, its placement limited only by the length of the P0903VY TCA cable, which is 72 in (1829 mm).
2. Referring to Figure 2-11, assemble the termination block(s) associated with the Fieldbus Isolator TCA(s), snap them onto the DIN rail and connect the earth wire(s).

3. Connect the Fieldbus cables (A and B) to the Fieldbus Isolator TCAs, as shown in Figure 2-32. (If the Fieldbus is non-redundant, only one Fieldbus cable (A) connects to a Fieldbus Isolator TCA.) If the Fieldbus is redundant, connect Fieldbus A to the upper Fieldbus Isolator (mounted on the Fieldbus Isolator Carrier board), and connect Fieldbus B to the lower Fieldbus Isolator.
4. If the TCAs in question are the last TCAs on the Fieldbus run:
   a. Add the 110 ohm terminating resistors (E0157EZ) packaged with the TCAs.
   b. Connect an insulated 14 AWG wire between connection point 3 (shield) on each of the last Fieldbus TCAs and the earth bus bar in the equipment rack. (It is assumed that the rack's earth bus bar is connected to a solid earth ground.)

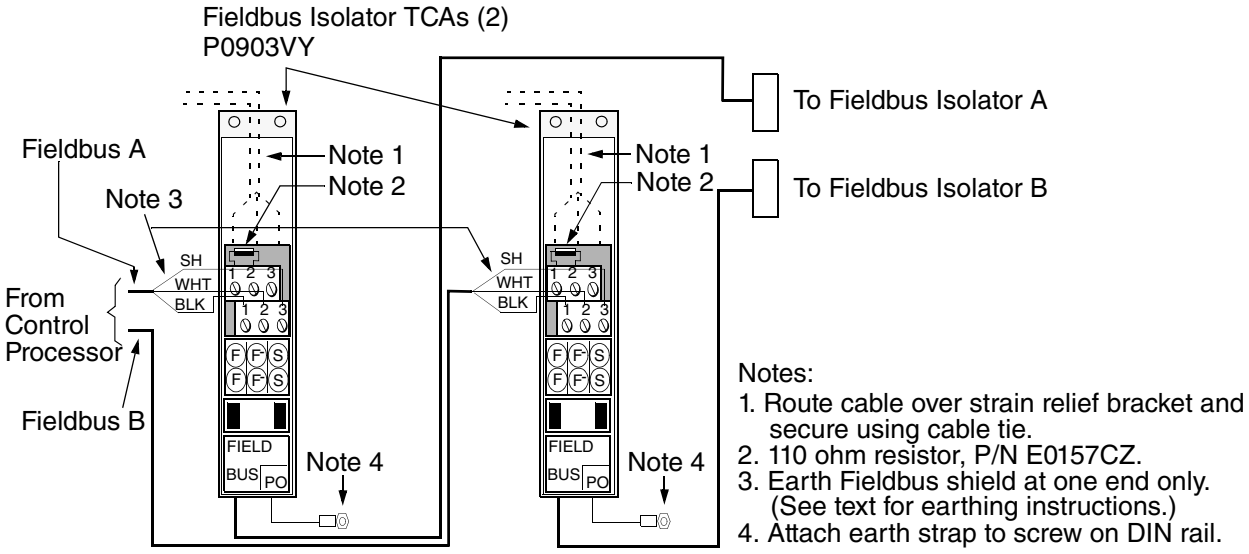


Figure 2-32. Fieldbus Cabling, DCS Fieldbus Module Subsystem

5. Make the cable connections from the TCAs to the Fieldbus Isolators, as shown in Figure 2-33.

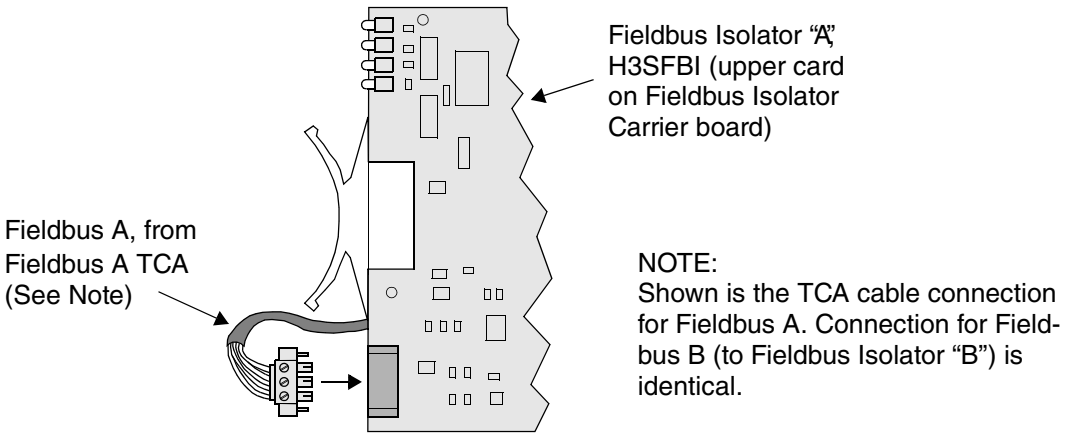


Figure 2-33. Connecting the TCA Cables to the Fieldbus Isolators

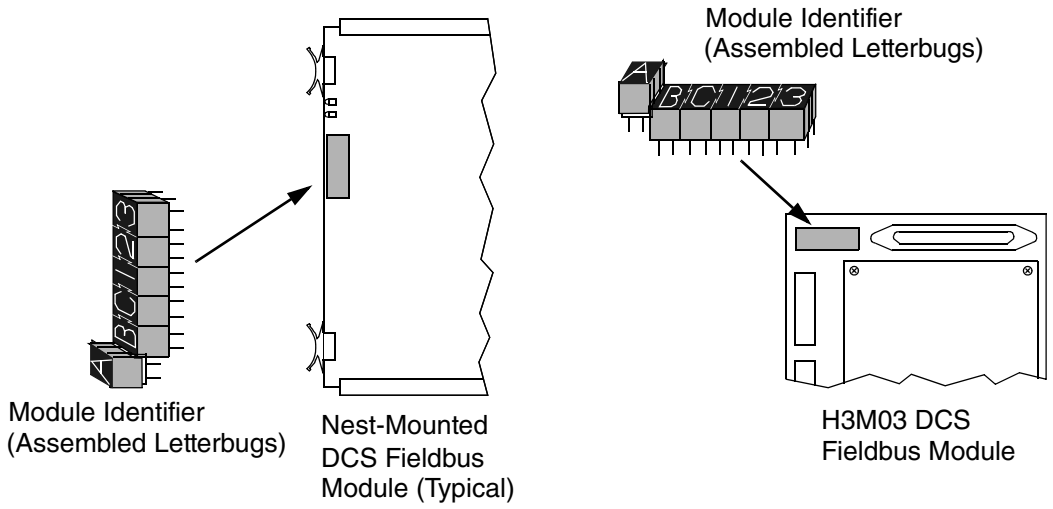
6. Place the migration kit label (P0903AN) on the inside left wall of the PMM/APM/HPM card file (see Figure 2-1).
7. Install the general information ("Plugged In") labels (P0918EU) on the inside of the rack's front and rear doors. Install the labels directly below any existing labels or equipment name plate. The original descriptive name plate(s) should be removed to avoid maintenance confusion. If no name plates exist, place the labels at about eye level.

Module Identifier (Letterbug) Installation

A module identifier, composed of six letterbugs, is used to provide physical, user-assigned labels on the DCS Fieldbus Modules (see Figure 2-34). Each letterbug is a small plastic device with a single character embossed on the front surface. Six interlocking letterbugs form a module identifier, which plugs into a receptacle on the DCS Fieldbus Module. The rear surface of each letterbug contains pins arranged in a unique configuration corresponding to a particular character or symbol. The required sets of letterbugs, as specified per system configurator references, are shipped packaged with the DCS Fieldbus Modules.

Assembly of the letterbugs to form a module identifier and the insertion of the module identifier into the DCS Fieldbus Module are shown in Figure 2-34. To assemble and install the module identifiers, proceed as follows:

1. Referring to "Module Identifier (Letterbug) Assignments" on page 48 and to the Foxboro Evo configuration reports, determine the module identifier (letter/number combination) that pertains to the DCS Fieldbus Module in question.
2. Gather the six letterbugs that form the module identifier and assemble them by inserting the dovetail end of one letterbug into the mating end of the next, until all six letterbugs have been assembled in the proper order.
3. Insert the assembled module identifier into the receptacle on the DCS Fieldbus Module. Exercise care, ensuring that the pins properly align with the holes in the receptacle.
4. Repeat Steps 1 through 4 for all DCS Fieldbus Modules to be installed.



NOTE: For proper operation, the letterbug set must be oriented as shown (with the tops of the letterbug characters aligned with the edge of the circuit board).

For H3M01, ensure all test jumpers are in the storage position (Out).

Figure 2-34. Module Identifier (Letterbug) Assembly and Insertion

Final Installation Operations

Once the DCS Fieldbus Module subsystem equipment is installed and Fieldbus cabling is completed, and system configuration and integrated control configuration (see Chapter 3 “Configuration”) have been performed, the following final installation operations may be performed.

Power Switch On

Power to the TDC 3000 equipment rack may be switched on after all associated equipment has been installed. The DCS Fieldbus Modules and Fieldbus Isolators have status indicators that report operating conditions (see “LED Indicators” on page 70).

When power is first applied, the DCS Fieldbus Module undergoes a power-on self-diagnostic test that checks its operating status. (The Fieldbus Isolators have no self-diagnostics, but LEDs indicate the run/fail status and any local/remote Fieldbus activity.) When power is applied, the LED indicators on the DCS Fieldbus Modules and Fieldbus Isolators should light as described in the Chapter 5 “Maintenance”.

EEPROM Update and Download Operations

Once the DCS Fieldbus Module subsystem equipment has been installed and power is applied to the equipment rack(s), the following EEPROM update and download operations must be performed at the Foxboro workstation to bring the DCS Fieldbus Module subsystem up to operating status.

— NOTE

An exception is the H3M01 DCS Fieldbus Module, which has all the necessary software preloaded by manufacturing prior to shipment. For this module, EEPROM updating is necessary only if specifically required by a Control Core Services software update, or as otherwise instructed by your service representative. Also, to start operation of the software on the H3M01, issuance of the DOWNLOAD command from the System Management Displays is required.

- EEPROM update – This action sends a new EEPROM image to the DCS Fieldbus Module. Prior to EEPROM update and download, the CP sets the DCS Fieldbus Module to off-line (the **GO ON-LINE** option on the **Equipment Change** display turns white), so that all outputs go to **HOLD** while the EEPROM update takes place. You may perform any number of EEPROM updates (for any number of DCS Fieldbus Modules) without waiting for the completion of each EEPROM update request. However, you must be sure that, for each DCS Fieldbus Module, the EEPROM update has completed successfully prior to requesting a download.
- Download (of the DCS Fieldbus Module image and database) – This action restarts the DCS Fieldbus Module software. Prior to the download, you must have performed integrated control configuration and **fix all**, otherwise the System Management Display Handler does not recognize the DCS Fieldbus Module.

The EEPROM update and download operations are performed on each DCS Fieldbus Module using the Equipment Change actions in the System Manager or System Management Displays.

To perform these operations from the System Manager, refer to the "Equipment Change Actions" section of the "Fieldbus Modules" chapter in *System Manager* (B0750AP).

To perform these operations on System Management displays, proceed as follows, referring to *System Management Displays* (B0193JC) for detailed information:

1. Access the **Equipment Change** display for the DCS Fieldbus Module in question:
   a. Select **Sys** from the top menu bar, then select **Sys_Mgmt**.
   b. Select the appropriate System Monitor, and then the letterbug of the CP to which the desired DCS Fieldbus Module is attached.
2. At the **PIO Bus** display, select the desired DCS Fieldbus Module, then select **EQUIP CHG**. Allowable equipment change actions appear in white on the menu.
3. Perform an EEPROM update and download for the DCS Fieldbus Module:
   a. On the DCS Fieldbus Module Equipment Change display, select **EEPROM UPDATE**. An **EEPROM Update Successful** message appears in the message line when the EEPROM update is complete.
   b. Select **DOWNLOAD**. A **Download Successful** message appears in the message line.
4. You must now checkpoint the file in the CP to preserve the on-line state of the DCS Fieldbus Module in the checkpoint file:
   a. Access the CP **Equipment Change** display (part of the System Management displays).
   b. Select **CHECKPOINT COMMAND** on the CP Equipment Change display.
5. Repeat Step 2 through Step 4 for each DCS Fieldbus Module in the subsystem.

Installation Checklist

Check that the following actions are completed:

- ☐ DCS Fieldbus Modules and Fieldbus Isolators are installed.
- ☐ The power jumper card is installed, and jumper J43 is in place.
- ☐ Fieldbus is installed and connected.
- ☐ Fieldbus shields are earthed (at the last the device on Fieldbus).
- ☐ Fieldbus termination resistors are installed (at the Foxboro control processor and at the last device on Fieldbus).
- ☐ Strain relief is provided for Fieldbus cables (at connection to Fieldbus Isolators).
- ☐ Module identifiers (letterbugs) are installed in all DCS Fieldbus Modules.
- ☐ System Configuration (or System Definition) and Integrated Control Configuration are completed.
- ☐ EEPROM update and downloading of the DCS Fieldbus Module image and database have been performed.
- ☐ Power to TDC 3000 equipment rack is switched on, and DCS Fieldbus Module LEDs indicate a GO condition.

3. Configuration

This chapter provides system configuration information (System Definition) and control configuring information (Integrated Control Configuration).

In general, "configuration" means specifying, to the Control Core Services software, the types of hardware and software modules that comprise the newly added DCS Fieldbus Module subsystem, and the control blocks that will be used in conjunction with it. Prior to performing configuration procedures, you must develop loop drawings to determine the control scheme, and a detailed equipment plan that identifies all the equipment required to control the process.

System Configuration

NOTE

1. To minimize interruption of the process, it is advisable to perform System Configuration (or System Definition) prior to installing the DCS Fieldbus Module subsystem equipment, as described in Chapter 2 "Equipment Installation".
2. If the host Foxboro Evo system is on-line (currently controlling the process), it may be desirable to perform Integrated Control Configuration on-line, prior to updating the System Configuration. Using this method, process control using the DCS Fieldbus Module subsystem equipment can commence immediately (following equipment installation), with the System Configuration update being deferred until a more convenient time.

To perform Integrated Control Configuration on-line, refer to "On-line Integrated Control Configuration" on page 54.

System Configuration (or System Definition) is the process of selecting and identifying the hardware and software for a particular Foxboro Evo system. It is initially performed prior to installation of the system equipment, and it is updated with any hardware/software system changes.

- For a step-by-step procedure for defining a Foxboro Evo system configuration using the System Definition (SysDef) software, refer to *System Definition: A Step-By-Step Procedure* (B0193WQ).
- IACC allows you to import system configuration information from a Foxboro Evo system using SysDef Export media created with a previous instance of the System Definition configuration application. For importing procedures, refer to *I/A Series System Configuration Component (IACC) User's Guide* (B0700FE).
- To use the Foxboro Evo Control Editors (hereinafter to be referred as Control Editors) to define the system, refer to the "System Development" and "Security" manuals listed under "Foxboro Evo Documentation" in *Foxboro Evo Control Software Deployment Guide* (B0750BA). Refer to *Hardware Configuration User's Guide* (B0750BB) to define the Foxboro Evo system hardware.

Reports produced by System Configuration (or System Definition) define the network, define the overall packaging of the system, and provide information that may be used in conjunction with equipment installation and system quotation. The System Configuration database can be updated at any time to reflect changes made to the initial hardware layout.

I/A Series Software v4.x vs. v6.0

Execution of System Configuration (or System Definition) is, in part, a function of the software release for your Foxboro Evo system. With I/A Series software v4.x, System Configuration is performed using an System Configurator. With I/A Series software v6-v8.8 or Control Core Services software v9.0 or higher, System Definition (a form of system configuration) is performed using the utilities described in "System Configuration" on page 47. System Configuration software is accessed from a Control Core Services workstation. System Definition software is executed on a PC running the Windows NT® or later Windows operating system.

Module Identifier (Letterbug) Assignments

Before including the DCS Fieldbus Module subsystem in a Foxboro Evo system, module identifiers must be assigned to the DCS Fieldbus Modules. A module identifier can be any combination of six alphanumeric characters. These characters (or letterbugs) are entered by the user during System Configuration and, as part of the equipment installation process (see Chapter 3 "Configuration"), physical letterbugs are attached to the DCS Fieldbus Modules.

NOTE

Control Core Services software treat each DCS Fieldbus Module as an equivalent Foxboro FBM (see Table 3-1, below). As such, the Foxboro Evo Control HMI and System Management Display software portray the DCS Fieldbus Modules as equivalent Foxboro FBMs. In order to distinguish the DCS Fieldbus Modules from other FBMs, it may be desirable to include a specific prefix (such as H3 for Honeywell TDC 3000) in the 6-character letterbug set for each DCS Fieldbus Module.

System Configuration (or System Definition) Procedure

Configure the DCS Fieldbus Modules as you would equivalent Foxboro Fieldbus Modules (FBMs) (see Table 3-1).

- For I/A Series software v4.0, v4.1, or v4.2, refer to *System Configurator* (B0193JH).
- For I/A Series software v6.0-v8.8 or Control Core Services software v9.0 or higher, refer to *System Definition; A Step-by-Step Procedure* (B0193JG).
- For I/A Series software v7.x or Control Core Services software v9.0 or higher, refer to *System Definition: A Step-By-Step Procedure* (B0193WQ).
- To use the Control Editors to define the system, refer to the "System Development" manuals listed under "Foxboro Evo Documentation" in *Foxboro Evo Control Software Deployment Guide* (B0750BA). Refer to *Hardware Configuration User's Guide* (B0750BB) to define the Foxboro Evo system hardware.

Table 3-1. Equivalent FBMs

DCS Fieldbus Module(s)	Equivalent Foxboro FBM
H3M01	One FBP10, and two FBM01s
H3M03	FBM03
H3M06	FBM06 (2)[1]
H3M07	FBM07
H3M09	FBM09
H3M37	FBM37

1. The H3M06 contains two letterbug sets and is used to represent the pulse input channels of two FBM06s (eight channels total)

When System Configuration (or System Definition) is completed, perform one of the following operations:

- If this is a new (as opposed to existing) Foxboro Evo system, install the system software (Refer to the appropriate Control Core Services software installation document - all these documents are available on the Global Customer Support website (*https://support.ips.invensys.com*)).
- If this is an existing (previously configured) Foxboro Evo system, specify to the currently installed system software that hardware items have been added to the system. (Refer to the appropriate Control Core Services software installation document - all these documents are available on the Global Customer Support website (*https://support.ips.invensys.com*)).

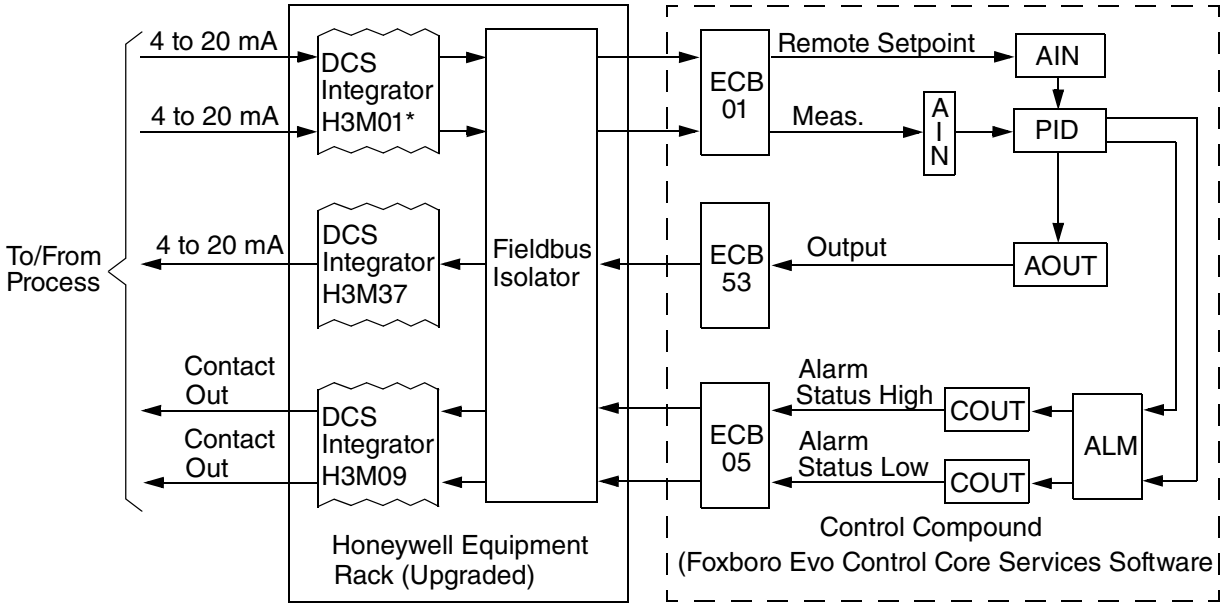
Integrated Control Configuration

The Integrated Control Configurator allows you to integrate Honeywell I/O points into existing Foxboro Evo control schemes, as well as to create entirely new Foxboro Evo based applications. The software interface between the control logic and the process is provided by equipment control blocks (ECBs) specific to the DCS Fieldbus Module subsystem, and control blocks used throughout the Foxboro Evo system.

NOTE

If the migration kit being installed includes an H3M01 DCS Fieldbus Module, the primary ECB of the Foxboro control processor must have its “mpoll” parameter set to zero for DCS Fieldbus Module operation.

Actual control of the process is performed by compounds, consisting of control blocks, which are configured by you. (Figure 3-1 shows a typical application of control blocks.) The Foxboro Evo system offers a wide range of control blocks, providing solutions for a broad spectrum of process control applications. For details on the selection and usage of control blocks, refer to *Integrated Control Block Descriptions* (B0193AX), and to "DCS Fieldbus Module Control Schemes" on page 87.



*In this simplified representation, the ECB47 used with the H3M01 module is omitted for clarity.

Figure 3-1. Typical Control Scheme

NOTE

This section presents integrated control configuration information that is specific to the DCS Fieldbus Module subsystem. For more comprehensive information regarding integrated control configuration, refer to *Integrated Control Configurator* (B0193AV).

The Integrated Control Configurator, which is accessed through the process engineer's environment at a Control Core Services workstation, allows you to configure control blocks relating, in this case, to the DCS Fieldbus Module subsystem equipment. The general procedure is to create a compound name under which the blocks will be created and run, and then create and integrate the desired control blocks.

Using the Control Configurator, you create an equipment control block (ECB) for each DCS Fieldbus Module in the DCS Fieldbus Module subsystem. The ECB serves as a "holding place" for the device's software data. You then go on to configure the necessary control blocks and compounds for the desired control scheme.

The Control Configurator lets you modify configuration data for on-line stations (for example, a CP) or off-line library volumes. (A library volume is a "dummy" configuration which may be loaded into the CP when creation and/or editing are completed.) As a compound/block editor, the Control Configurator provides compound/block-building templates along with a full range of editing functions.

Integrated control configuration for the DCS Fieldbus Module subsystem is divided into two separate procedures:

- "Off-line Integrated Control Configuration" on page 51 is intended for use when a new system is being configured – typically, when the DCS Fieldbus Module subsystem is being included in new (overall) system configuration.
- "Off-line Integrated Control Configuration" on page 51 is intended for use for when a previous Foxboro Evo configuration is being updated to include the DCS Fieldbus Module subsystem.

NOTE

As indicated in a note on page 51, if the host Foxboro Evo system is on-line (currently controlling the process), it may be desirable to perform Integrated Control Configuration on-line, prior to updating the System Configuration. If this is the case, perform the procedure under "On-line Integrated Control Configuration" on page 54.

Off-line Integrated Control Configuration

To perform off-line integrated control configuration:

- For ICC, refer to *Integrated Control Configurator* (B0193AV).
- For IACC, refer to *I/A Series Configuration Component (IACC) User's Guide* (B0700FE).
- For System Manager, refer to *System Manager* (B0750AP).
- For the Control Editors, refer to *Block Configurator User's Guide* (B0750AH).

For the general procedures (provided in these instructions for ICC, but similarly apply to the Control Editors), proceed as follows:

NOTE

1. This procedure assumes that System Configuration has been performed. See "System Configuration" on page 47.
2. If the migration kit being installed includes an H3M01 DCS Fieldbus Module, the primary ECB of the Foxboro control processor must have its "mpoll" parameter set to zero for DCS Fieldbus Module operation.
3. This procedure is intended for use with a system having I/A Series v4.0-v8.8 or Control Core Services software v9.0 or higher software. If your system has software of a previous version, refer to the appropriate version of *Integrated Control Configurator* (B0193AV), and configure the DCS Fieldbus Modules as you would equivalent Foxboro FBMs, as listed in Table 3-1. Use the ECB parameters and block parameter settings shown in "DCS Fieldbus Module Control Schemes" on page 87.

1. Using the System Management displays (accessible at a Control Core Services workstation), boot up the CP to which the DCS Fieldbus Module subsystem equipment will be attached. This creates two compounds:
   - Station compound (CPLBUG_STA)[1] containing the station block (CPLBUG_STA:STATION)[1]
   - ECB compound (cplbug_ECB)[1] containing the primary ECB (CPLBUG_ECB:PRIMARY_ECB)[1].
2. Open the Control Configurator and access the control processor (CP40 or later) to be configured.

NOTE

With regard to control configuration, two of the DCS Fieldbus Module types, H3M01 and H3M037 require special consideration:
As indicated in Table 3-1, H3M01 cannot be configured for one-to-one mapping (DCS Fieldbus Module to FBM), but rather requires configuration as an FBP10 and two to FBMs. For detailed information, refer to "H3M01 Control Configuration" on page 56.
H3M037 may require special consideration if it is configured redundant. For detailed information, refer to "H3M37 Control Configuration" on page 61.

3. Use the Control Configurator's **Fix All** function to create ECB(s) for the DCS Fieldbus Modules previously added to the system configuration via the System Configurator (or System Definition).
4. If required, edit the H3Mxx ECB(s) if the default parameters provided are not satisfactory. (See NOTE immediately following this step.) As an example, Figure 3-2 shows a typical editing display for the H3Mxx ECB. The HWTYPE and SWTYPE ECB parameters for the various types of DCS Fieldbus Modules are shown in "DCS Fieldbus Module Control Schemes" on page 87. For information on other ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

NOTE

For ready reference, ECB parameter information appears in a "show window" along the right side of the ECB editing displays (see Figure 3-2). The show window is accessed by selecting **Show** in the menu bar, and then selecting **Legal FBM/ECB Combos**.

[1] The CP letterbug (cplbug) is filled in by the station being configured.

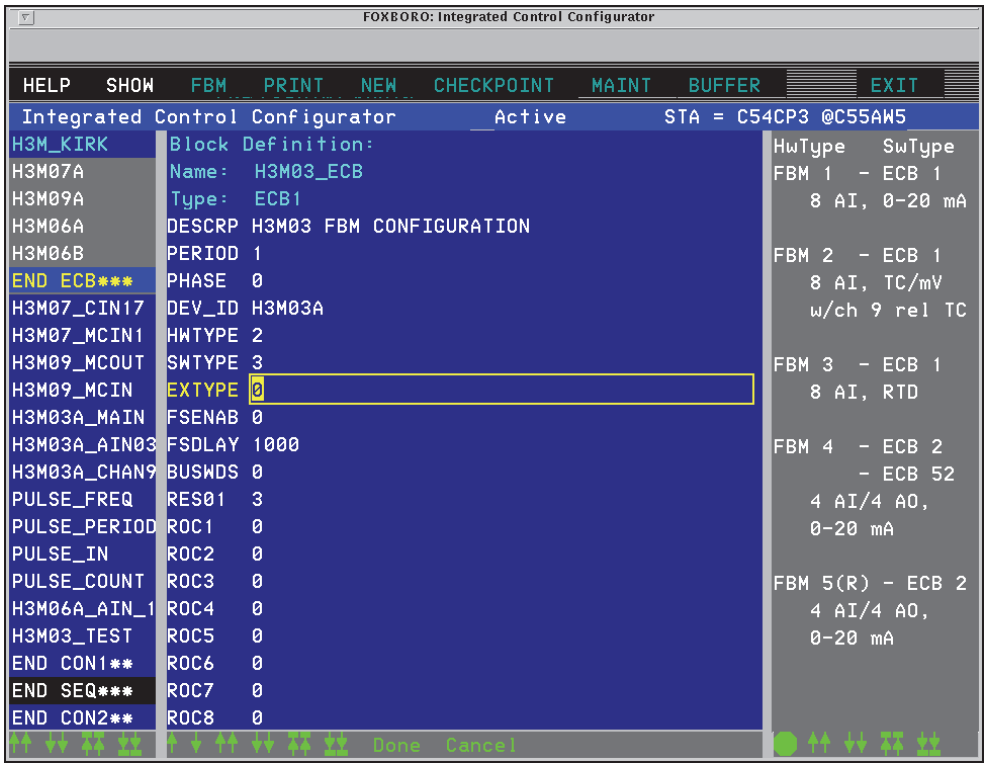


Figure 3-2. Typical Editing Display for H3M03 DCS Fieldbus Module ECB (SMDH)

5. Referring to *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG), *Integrated Control Software Concepts* (B0193AW) (for CP60 and earlier), and *Integrated Control Block Descriptions* (B0193AX), configure the necessary compounds and blocks for the desired control scheme:
   - Typical control schemes using the various types of DCS Fieldbus Modules are shown in "DCS Fieldbus Module Control Schemes" on page 87. Also shown in that appendix are typical block parameter settings that are used with the various types of DCS Fieldbus Modules.
   - Table 3-2 lists the signal conditioning indexes (SCIX) for various types of analog inputs. (The SCIX parameter is used with AIN/MAIN control blocks.)
   - Figure 3-8 shows a typical control block (MAIN) editing display.
   - For information on setting fail-safe parameters, refer to "Fail-Safe Operation" on page 63.

Table 3-2. Signal Conditioning Indexes

Ranges	SCIX
1 to 5 V	3
4 to 20 mA	3
0 to 100 mV	1
Pulse rate	8
Thermocouple	I/A/SeriesFoxboro Evo SCIX[1]
RTD	I/A SeriesFoxboro Evo SCIX[a]

1. See Appendix C “DCS Fieldbus Module Control Schemes”.

On-line Integrated Control Configuration

To perform on-line integrated control configuration:

- For ICC, refer to *Integrated Control Configurator* (B0193AV).
- For IACC, refer to *I/A Series Configuration Component (IACC) User's Guide* (B0700FE).
- For System Manager, refer to *System Manager* (B0750AP).
- For the Control Editors, refer to *Block Configurator User's Guide* (B0750AH).

For the general procedures (provided in these instructions for ICC, but similarly apply to the Control Editors), proceed as follows:

NOTE

1. This procedure assumes that System Configuration has been performed. See “System Configuration” on page 47.
2. If the Migration Kit being installed includes an H3M01 DCS Fieldbus Module, the primary ECB of the Foxboro control processor must have its “mpoll” parameter set to zero for DCS Fieldbus Module operation.
3. This procedure is intended for use with a system having I/A Series software v4.x-v8.8 or Control Core Services software v9.0 or higher. If your system has software of a previous version, refer to the appropriate version of *Integrated Control Configurator* (B0193AV), and configure the DCS Fieldbus Modules as you would equivalent Foxboro FBMs, as listed in Table 3-1. Use the ECB parameters and block parameter settings shown in “DCS Fieldbus Module Control Schemes” on page 87.

1. Using the System Management displays (accessible at a Foxboro workstation), boot up the CP to which the DCS Fieldbus Module subsystem equipment will be attached. This creates two compounds:
   - Station compound (CPLBUG_STA)[2] containing the station block (CPLBUG_STA:STATION)[2]
   - ECB compound (cplbug_ECB)[2] containing the primary ECB (CPLBUG_ECB:PRIMARY_ECB)[2].
2. Open the Control Configurator and access the control processor in question.

— NOTE

With regard to control configuration, two of the DCS Fieldbus Module types, H3M01 and H3M037 require special consideration:
As indicated in Table 3-1, H3M01 cannot be configured for one-to-one mapping (DCS Fieldbus Module to FBM), but rather requires configuration as an FBP10 and two to FBMs. For detailed information, refer to "H3M01 Control Configuration" on page 56.
H3M037 may require special consideration if it is configured redundant. For detailed information, refer to "H3M37 Control Configuration" on page 61.

3. Using the Control Configurator's **Insert New Block/ECB** function, create an ECB for each H2Mxx DCS Fieldbus Module in the subsystem.
4. If required, edit the newly created ECB(s) if the default parameters provided are not satisfactory (see Figure 3-2 for example). The HWTYPE and SWTYPE ECB parameters for the various types of DCS Fieldbus Modules are shown in "DCS Fieldbus Module Control Schemes" on page 87. For information on other ECB parameters, refer to *Integrated Control Block Descriptions* document (B0193AX).

— NOTE

For ready reference, ECB parameter information appears in a "show window" along the right side of the ECB editing displays (see Figure 3-2). The show window is accessed by selecting **Show** in the menu bar, and then selecting **Legal FBM/ECB Combos**.

5. Referring to *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG), *Integrated Control Software Concepts* (B0193AW) (for CP60 and earlier) and *Integrated Control Block Descriptions* (B0193AX), configure the necessary compounds and blocks for the desired control scheme:
   - Typical control schemes using the various types of DCS Fieldbus Modules are shown in "DCS Fieldbus Module Control Schemes" on page 87. Also shown in that appendix are typical block parameter settings that are used with the various types of DCS Fieldbus Modules.

[2] The CP letterbug (cplbug) is filled in by the station being configured.

- Table 3-2 lists the signal conditioning indexes (SCIX) for various types of inputs.
- Figure 3-8 shows a typical control block (MAIN) editing display.
- For information on setting fail-safe parameters, refer to “Fail-Safe Operation” on page 63.

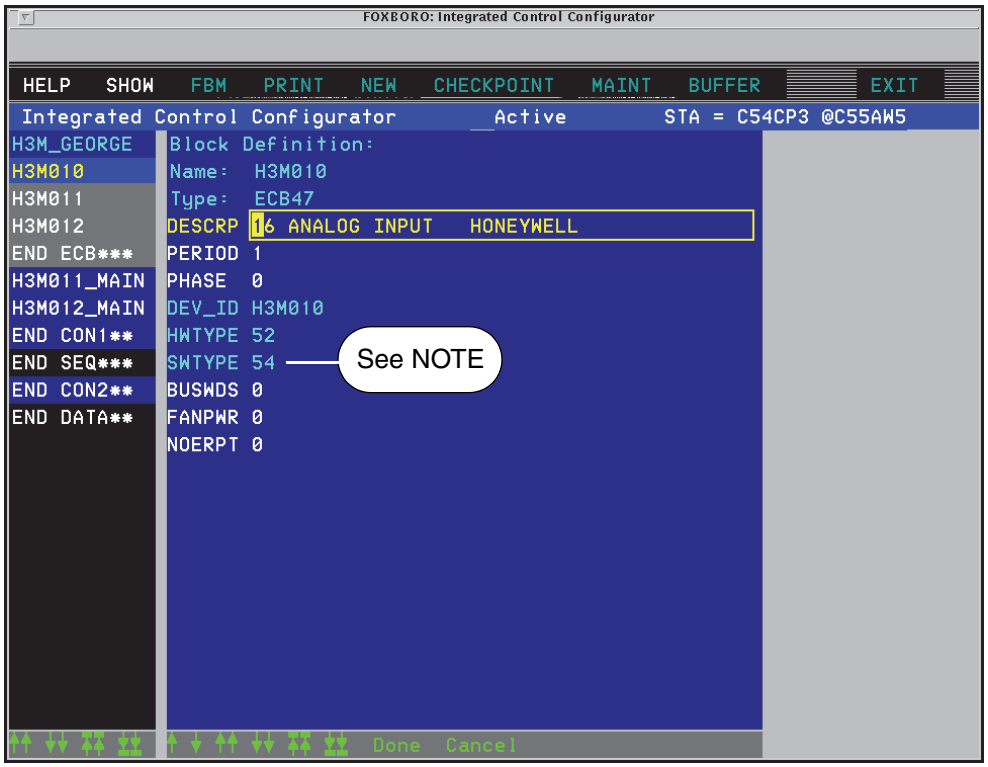
H3M01 Control Configuration

For the H3M01, mapping to three ECBs is required. One ECB is for the operator action and maintenance of the physical card, and the two other ECBs allow mapping of the eight input channels into standard Foxboro control blocks. (Two ECBs are required for the channel mapping, as each ECB can map to only four channels.)

Configuration for the H3M01 is accomplished by first invoking the Integrated Control Configurator (ICC) and selecting the Foxboro control processor that will serve as its host. Then the three ECBs are configured, as shown in the following examples.

FBP10 ECB for H3M01

The physical H3M01 is configured as a Fieldbus Processor 10 (FBP10), as shown in Figure 3-3. As configured, in the System Management (SMDH) displays this ECB appears as a stand-alone FBP10, with no I/O cards. The DEV_ID configured in Figure 3-3 (H3M010) is the letterbug used on the H3M01 module. (It is recommended that the ECB bear the same name as the H3M01 letterbug.) The first five characters in the letterbug are user-determined, and the last character must be “0”.



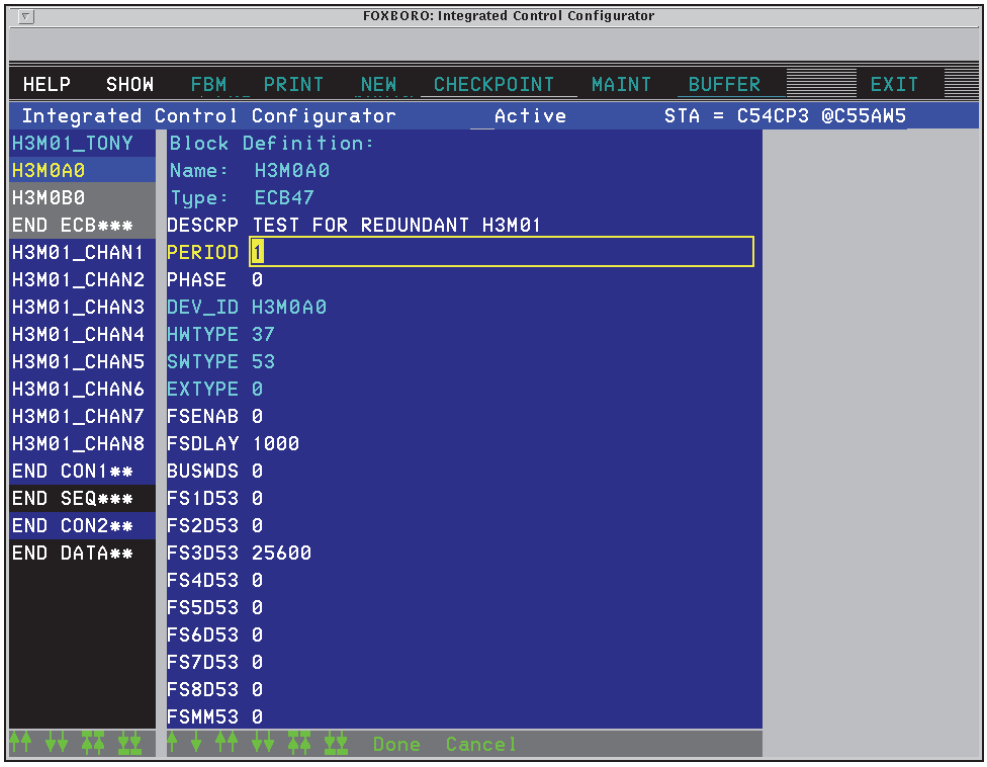
NOTE: If I/A Series software version is v6.1.1-v8.8 or Control Core Services software v9.0 or later, use SWTYPE = 54;
If I/A Series software version is earlier than v6.1.1, use SWTYPE = 42.

Figure 3-3. Typical FBP10 Configuration (ECB47) for an H3M01

H3M01 Non-Redundant and Redundant Configurations

The H3M01 DCS FBM can be configured non-redundant, as illustrated in Figure 3-3 which shows a typical editing display for the primary H3M01 (primary ECB47).

For redundant H3M01 configurations, the Name and the DEV_ID for the primary H3M01 module should have the format **xxxxA0** and the Name and the DEV_ID for the secondary/redundant H3M01 module should have the format **xxxxB0**. See Figure 3-4 and Figure 3-5.



Note: For Device ID, use H3M0B0 for the secondary/redundant module.

Figure 3-4. Typical Editing Display for an ECB47 (Primary H3M01)

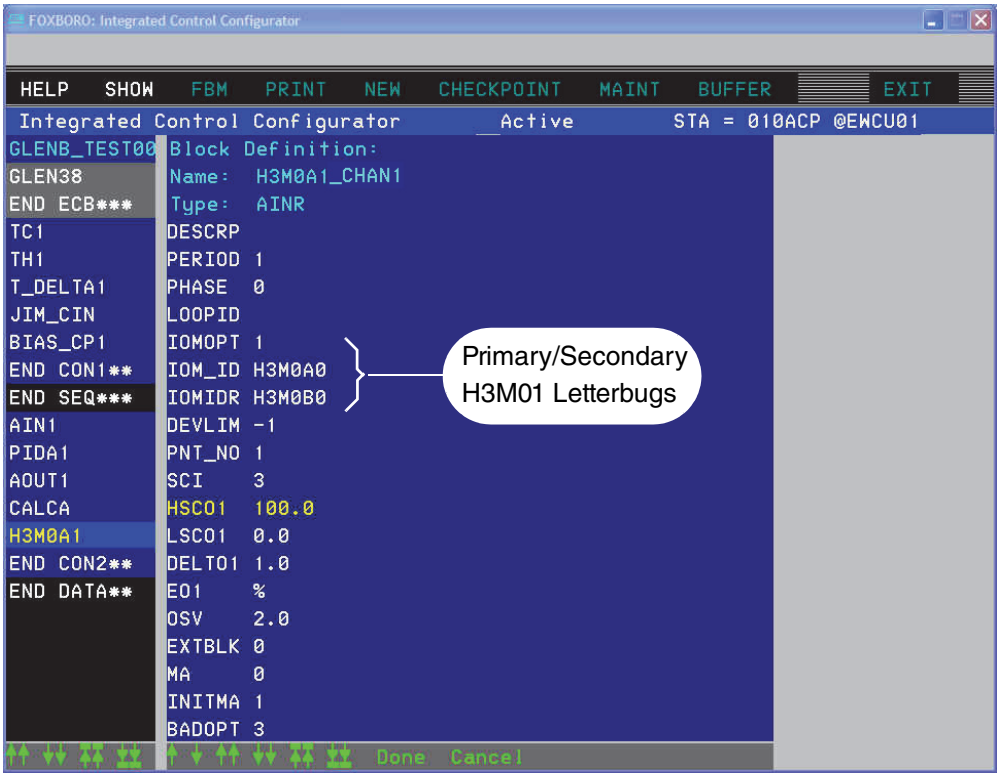


Figure 3-5. Typical Editing Display for an AINR Block (used with Redundant H3M01s)

FBM01 ECBs for H3M01

The two FBM01 ECBs configured for the H3M01 DCS Fieldbus Module are "virtual" FBMs, which means they exist in software only. The physical H3M01 (in the form of the FBP10 ECB) responds to Foxboro control processor requests for data from these two configured virtual FBMs.

The key to the relationship between the CP and the H3M01 is in the letterbug and DEV_ID assignments:

- The virtual FBM's DEV_ID parameters must have the same first five characters as the FBP10 letterbug (or DEV_ID)
- The last character of the first FBM01's ECB DEV_ID parameter must be "1" (as reflected in the following example).
- The last character of the second FBM01's ECB DEV_ID parameter must be "2".

Figure 3-6 shows typical configuration for the first FBM01 ECB (ECB1). The second FBM01 ECB is configured in the same manner as the first, but the last character of its DEV_ID parameter must be "2". For the primary H3M01 module, the first FBM01 ECB is given the letterbug **xxxxA1** and the second FBM01 ECB is given the letterbug **xxxxA2**.

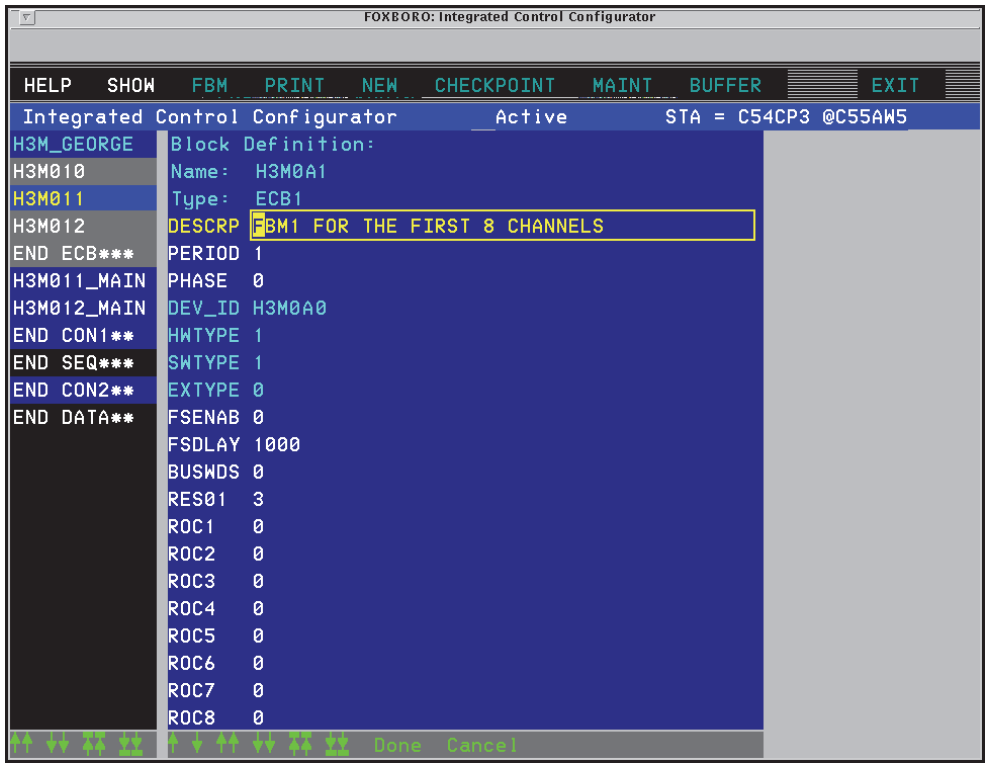


Figure 3-6. Example Configuration, First FBM01 ECB (H3M0A1) for Primary H3M01

When used in a redundant configuration for the secondary H3M01 module, the first FBM01 ECB is given the letterbug **xxxxB1** and the second FBM01 ECB is given the letterbug **xxxxB2**.

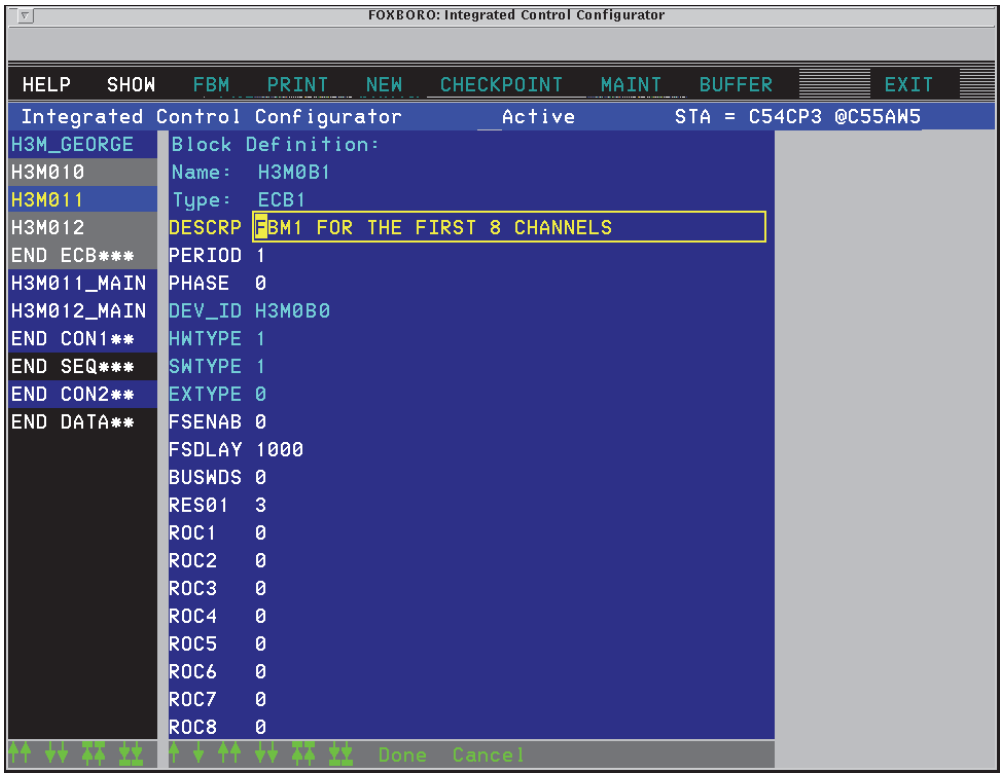


Figure 3-7. Example Configuration, First FBM01 ECB (H3M0B0) for Secondary H3M01

Analog Input Blocks for H3M01 Configuration

Once the equipment control blocks (ECBs) have been configured, the Foxboro control blocks must be configured. Eight input channels must be mapped, four for each of the two FBM01s.

Figure 3-8 shows an example of a MAIN (Multiple Analog Input) control block configured for the first four channels of the first virtual FBM01. (Although the MAIN block is used here, any AIN blocks or standard Foxboro connections can be used.)

— NOTE

Refer to *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG), *Integrated Control Software Concepts* (B0193AW) (for CP60 and earlier), and *Integrated Control Block Descriptions* (B0193AX) for additional information when configuring the necessary compounds and blocks for the desired control scheme. Typical control schemes using the various types of DCS Fieldbus Modules are shown in Appendix C “DCS Fieldbus Module Control Schemes”. Also shown in that appendix are typical block parameter settings that are used with the various types of DCS Fieldbus Modules.

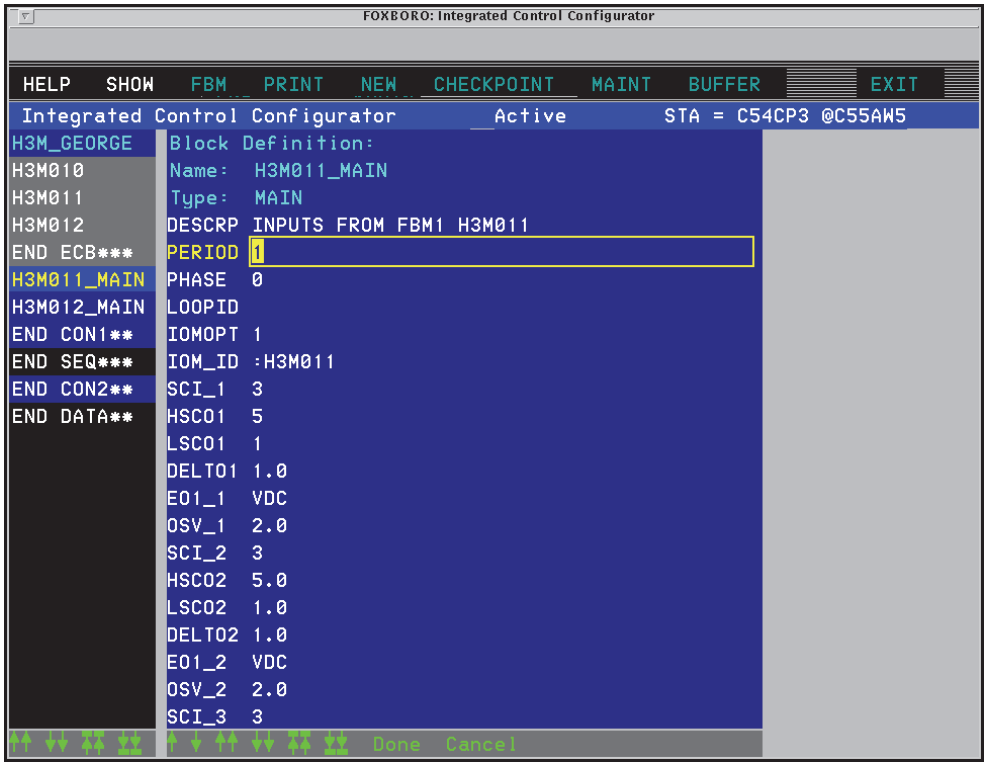


Figure 3-8. Configuring a MAIN Control Block for an H3M01

H3M37 Control Configuration

The H3M37 DCS Fieldbus Module can be configured non-redundant (see Figure 3-6) or redundant (see Figure 3-8). Figure 3-9 shows a typical editing display for the primary H3M37 (primary ECB53). (Configuration for the secondary H3M37 (secondary ECB53) is similar, but the DEV_ID would be H3M37B. Figure 3-10 shows a typical editing display for an AOUTR block used with the redundant H3M37 pair.

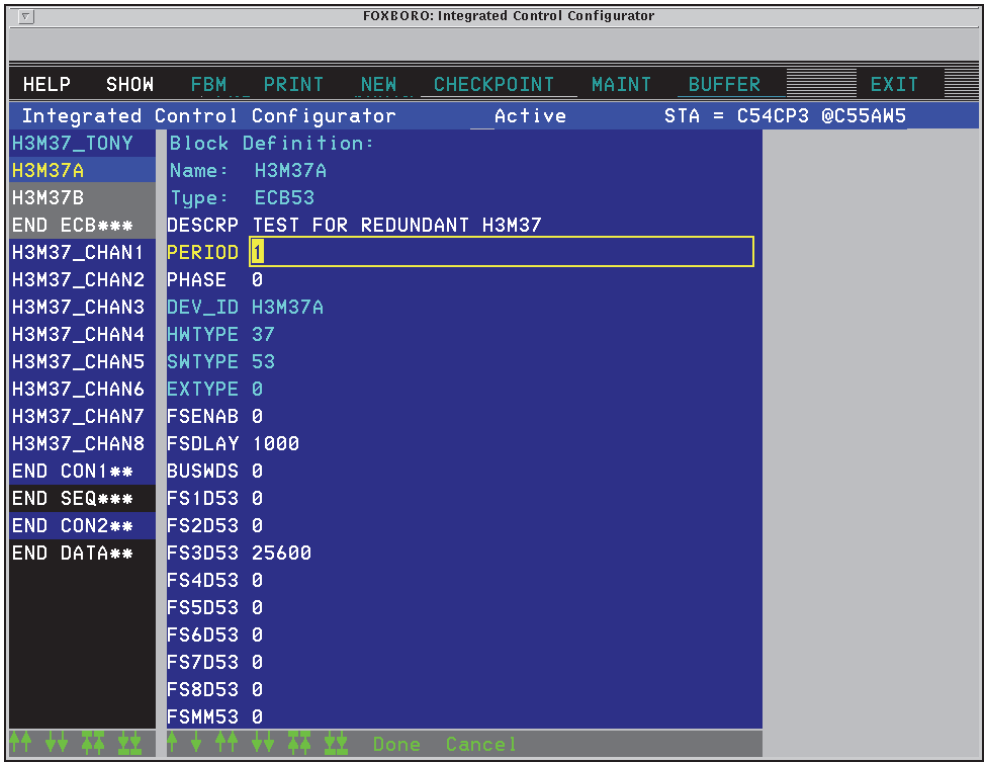


Figure 3-9. Typical Editing Display for an ECB53 (Primary H3M037)

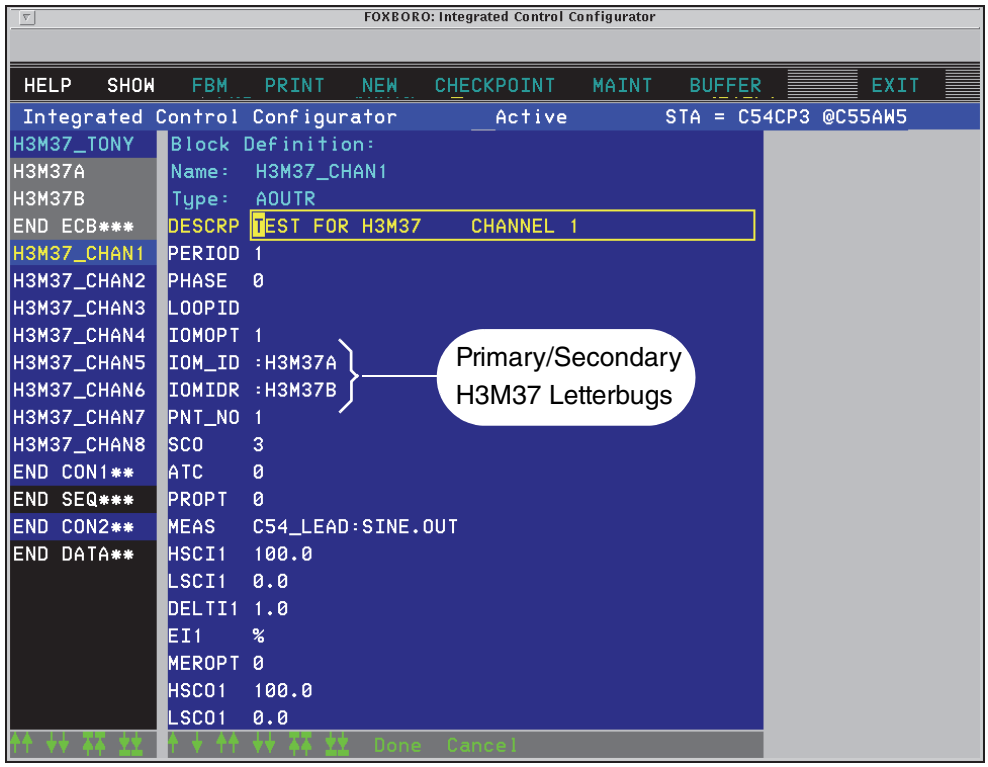


Figure 3-10. Typical Editing Display for an AOUTR Block (used with Redundant H3M37s)

Fail-Safe Operation

Fail-safe parameters in the controlling ECBs specify the outputs in the event of a break in communication with the CP. All fail-safe operations are initiated by the DCS Fieldbus Module.

Each time the DCS Fieldbus Module receives a write request, it resets a fail-safe timer for its ECB. The DCS Fieldbus Module asserts a fail-safe condition for the ECB if it does not receive another output command within a specified time. The fail-safe condition can be either of the following:

- Hold Current Value – Hold the value sent in the most recent output command from the CP.
- Use Fallback Value – Use a value specified for the output (specified in the ECB).

The ECBs for output type DCS Fieldbus Modules include parameters for enabling and disabling the fail-safe function and for setting a fail-safe delay for the outputs. These parameters are downloaded to the DCS Fieldbus Module's database from the CP each time the subsystem is initialized or reconfigured, and each time you execute a download command from the System Management display. If the fail-safe function is enabled for a specific output, the DCS Fieldbus Module asserts fail-safe actions.

When normal operation resumes, the current output values are read by the CP and stored in the ECBs. These values in turn are used by the I/O blocks as the starting point for new output commands.

Fail-Safe Functionality

What the DCS Fieldbus Module does during various failed conditions is dependent upon the configuration of several fail-safe parameters as well as the type of failure. Two basic types of DCS Fieldbus Module failures can occur: those that cause the DCS Fieldbus Module to fail (such as DCS OFFLINE, DCS DOWNLOAD, or DCS EEPROM UPDATE), and those that cause loss of communications (COMM FAIL).

Fail-Safe for Type 1 Failures – DCS Fieldbus Module FAIL

Two variables (parameters), fail-safe mask (FSMMn) and fail-safe data (FSD0n), determine what action the DCS Fieldbus Module takes when a Type 1 failure occurs. FSMMn, configured for a particular output ECB, determines what state is asserted at the output: Fallback Value or Hold Current Value. The default setting of the fail-safe mask parameter is zero to assert the fallback values. The mask can be set so that some outputs hold while others fall back. FSD0n, also configured for a particular output, determines the fallback value. The default value for analog outputs is zero, and the default value for digital values is False.

Fail-Safe for Type 2 Failures – COMM FAIL

In addition to the fail-safe mask and fail-safe data parameters, there are two other parameters, FSENAB and FSDLAY, that affect the DCS Fieldbus Module's response to communications failures. FSENAB determines whether the output simply holds (FSENAB = 0) its output value during the communications failure until the communications failure ceases, or if it delays fail-safe action (FSENAB = 1) for the time specified by FSDLAY and then respond in the same way as Type 1 failures.

Fail-Safe Examples

The following examples are fail-safe operations for an analog type ECB with two outputs. The operation is performed for the first output point, which is Point Number 1. An AOUT block is used, and the output is driven at a value of 75% of full scale. The Fallback Value is configured to be 25% of full scale (FSD01 = 16000). FSDLAY is set to 1000, which is equal to a delay time of 10 seconds.

Example 1: FSENAB = 0 and FSMMn = 0X00

a. Cause: Type 1 failure.
Result: Output immediately goes to 25%.

b. Cause: Type 2 failure.
Result: Output holds at 75%.

Example 2: FSENAB = 0 and FSMMn = 0X10

a. Cause: Type 1 failure.
Result: Output holds at 75%.

b. Cause: Type 2 failure.
Result: Output holds at 75%.

Example 3: FSENAB = 1 and FSMMn = 0X00

a. Cause: Type 1 failure.
Result: Output immediately goes to 25%.

b. Cause: Type 2 failure.
Result: Output holds at 75% for 10 seconds, then goes to 25%.

Example 4: FSENAB = 1 and FSMMn = 0X10

a. Cause: Type 1 failure.
Result: Output holds at 75%.

b. Cause: Type 2 failure
Result: Output holds at 75% for 10 seconds, then continues to hold at 75%.

NOTE

For fail-safe information on digital type ECBs, refer to *Integrated Control Block Descriptions* (B0193AX).

4. Process Displays and System Management Displays

This chapter provides information on the Foxboro Evo process and System Management displays and how they relate to the DCS Fieldbus Module subsystem.

Process Displays

The Foxboro Evo systems provide the following types of displays for performance of process control operations:

- Select Screen Display (compound and block overview display)
- Group Displays
- User-Generated Displays
- Block Detail Displays
- Compound Detail Displays
- Station Displays

For information on how these displays are used, refer to *System Manager* (B0750AP) and *Process Operations and Displays* (B0193JC).

System Management Displays

The Foxboro Evo system management software – System Manager or System Management Display Handler (SMDH) – obtains current and historical information about the system, displays it, and allows you to intervene in system operations and perform diagnostics. With regard to the DCS Fieldbus Module subsystem, System Manager and System Management provides the following displays:

- A Fieldbus-level display (PIO Bus Display), which shows the DCS Fieldbus Module subsystem (portrayed as Foxboro FBMs) along with the host control processor (CP) and any other Fieldbus devices (see Figure 4-1)
- Detailed equipment change (**`EQUIP CHG`**) and equipment information (**`EQUIP INFO`**) displays for each DCS Fieldbus Module (see Figure 4-2 and Figure 4-3).

The DCS Fieldbus Modules are portrayed in the System Manager and System Management displays as equivalent Foxboro FBMs, as listed in the Table 2-1. DCS Fieldbus Modules may be distinguished from other FBMs by means of their user-assigned module identifiers (letterbugs), which can contain a prefix designating the device as a Honeywell DCS Fieldbus Module (for example, H3xxxx).

Once DCS Fieldbus Modules for the I/O cards have been installed and configured, they must be put on-line using the Equipment Change display (not shown). Then you can check their status using the Equipment Information display.

For detailed information on the System Manager, refer to *System Manager* (B0750AP).

For detailed information on the use of the System Management Displays, refer to *System Management Displays* (B0193JC) and the Help screens.

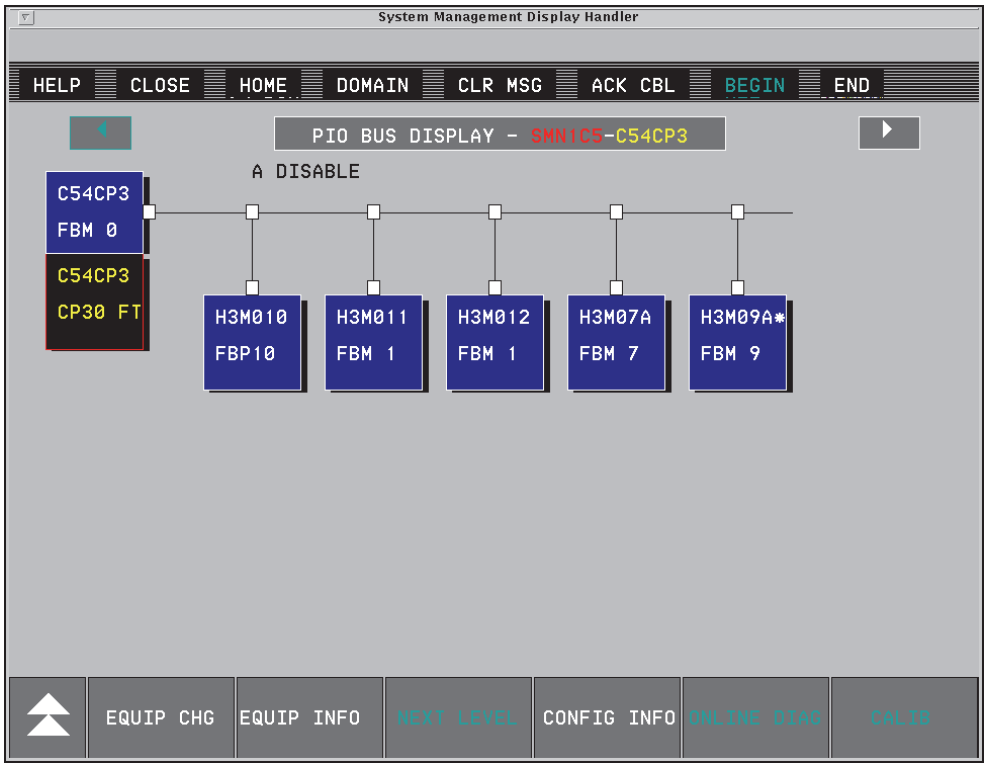


Figure 4-1. PIO Bus Display (Typical SMDH)

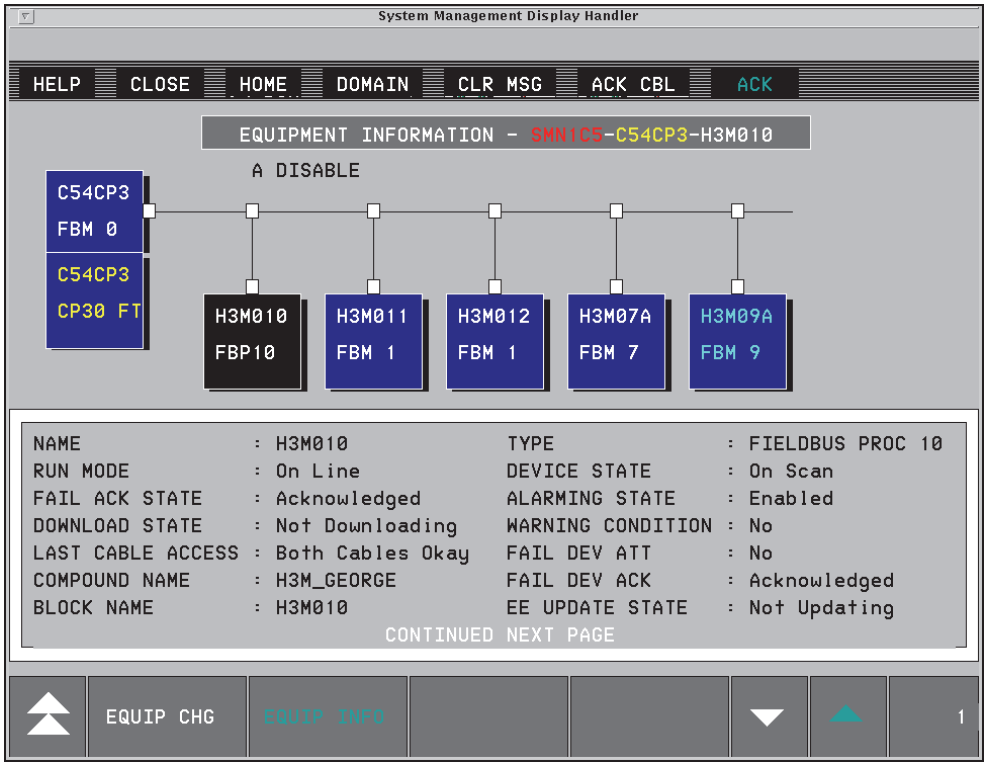


Figure 4-2. Typical SMDH Equipment Information Display (Screen 1 of 2)

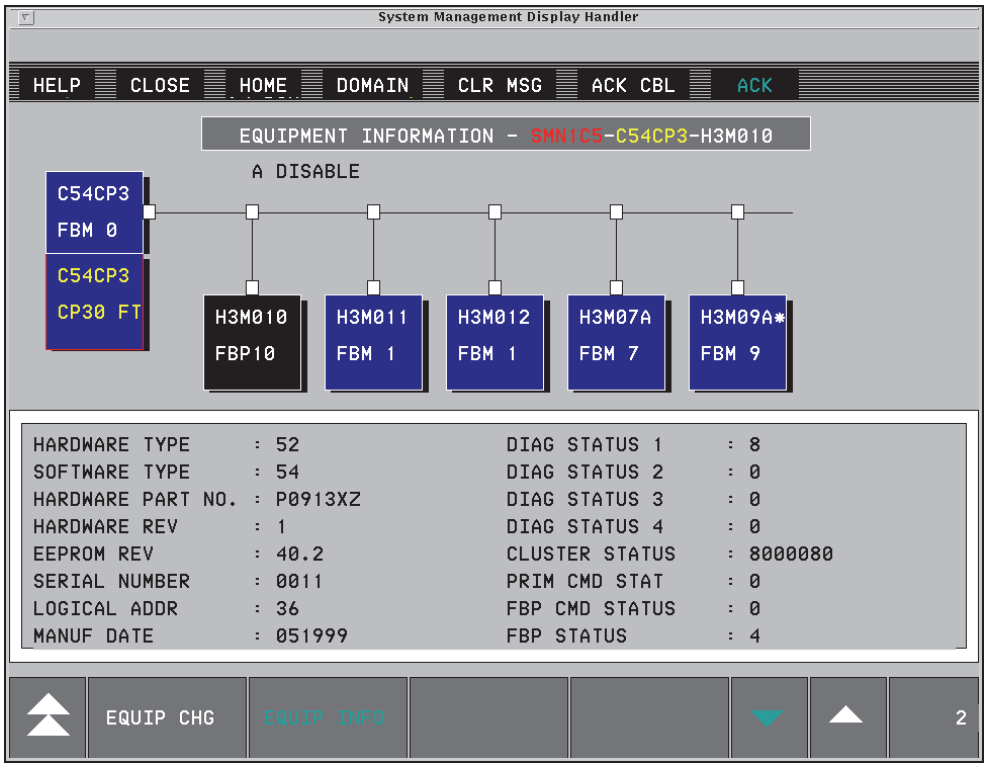


Figure 4-3. Typical SMDH Equipment Information Display (Screen 2 of 2)

5. Maintenance

This chapter provides information on maintaining the DCS Fieldbus Module subsystem.

The original maintenance and preventive maintenance philosophies for the TDC 3000 Process Manager equipment racks are maintained. This includes periodic inspection and cleaning, checking the status of LED indicators, and checking for loose cable connections.

Operating Status

The operating status of the DCS Fieldbus Modules is reported by the Control Core Services software using on-screen messages. [The Control Core Services software regards the DCS Fieldbus Modules as standard 100 Series or 200 Series Fieldbus Modules (FBMs).] Refer to the following Foxboro Evo documents for information on the reporting of equipment operating status and errors:

- *System Maintenance* (B0193AD)
- *System Manager* (B0750AP)
- *System Management Displays* (B0193JC).

H3M37 (Analog Output) DCS Fieldbus Module Behavior

The H3M37 DCS Fieldbus Module (8 AO (4 to 20 mA)) is available with optional redundancy. Each channel of the H3M37 has a feedback loop that is monitored for errors, such as a bad channel, when the AO loop is disconnected and the output is driven above 0 mA, or if the output circuit has failed. Typically, a channel is flagged as bad when the digital-to-analog controller (DAC) feedback loop detects either an excess or not enough current flowing in the output loop.

When one of these errors occurs on one H3M37 in a redundant pair, the H3M37's logic will inhibit communications on both PIO busses, provided the backup H3M37 does not have a similar error, and causes a switchover to use the backup H3M37.

The H3M37's hardware and software do not support individual bad channel detection for analog outputs, so to report bad channel errors, the H3M37 is set to fail (and is subsequently put offline) so that a system alarm is generated.

If communications to the H3M37 are disconnected logically by the system, re-insertion of the H3M37 forces the re-establishment of communications. If successful, communications resume. If the H3M37's communications cannot be established, the H3M37 must be replaced.

During the insertion of a redundant H3M37, should any configured channels become failed or open-circuit, the backup H3M37 will prevent the failed H3M37 from coming on-line until the loop circuit (i.e. bad transmitted, open circuit) is corrected.

— NOTE

Ensure all unused channels are jumpered to prevent stray signals from causing false triggers.

LED Indicators

LED indicators at the front of the H3SFBI Fieldbus Isolator and each DCS Fieldbus Module indicate the operational status of these devices (see Figure 5-1). The functions of the H3SFBI Fieldbus Isolator LEDs are as follows:

- Remote Fieldbus Activity

  When illuminated (amber), indicates the existence of communication activity on the remote Fieldbus (that is, between the Fieldbus Isolator and the Foxboro control processor).

- Local Fieldbus Activity

  When illuminated (amber), indicates the existence of communication activity on the local Fieldbus (that is, internal to the Process Manager rack).

- Run

  When illuminated (green), indicates that the Fieldbus Isolator is operational (running).

- Fail

  When illuminated (red), indicates problem with input power, or an on-card Fieldbus Isolator fault.

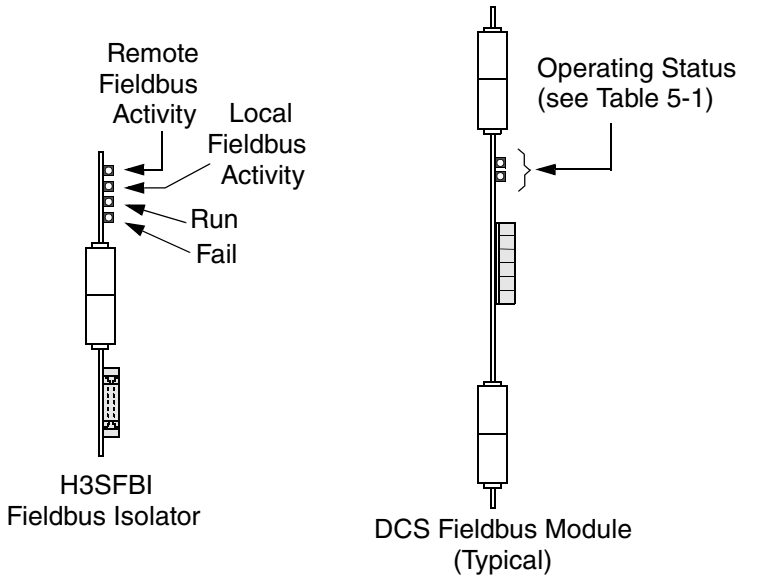


Figure 5-1. LED Indicators

Two status LEDs (red and green) at the front of each DCS Fieldbus Module provide indications of operating status, as listed in Table 5-1

Table 5-1. DCS Fieldbus Module Operating Status LEDs

Red LED	Green LED	Status
Off[1]	Off[1]	Power to card failed.
On	Off[1]	Diagnostic run-time failure occurred.
On	On	Diagnostics passed and DCS Fieldbus Module is ready to be brought on-line by the CP. (This state normally occurs during power-up, or when the DCS Fieldbus Module is off-line.)
Off[1]	On	DCS Fieldbus Module on-line and functional. (This is the normal "run" state.)

1. Either LED, when in the OFF condition, appears clear (colorless).

Technical Support

If technical support is needed, call Global Customer Support (Global CSC) at 1-866-746-6477 or visit the website *https://support.ips.invensys.com.*

Module Return Procedure

Contact Global Customer Support for a Return Authorization Number and shipping address.

Appendix A. Hardware Specifications

H3M01 (Analog Input) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	4 W
Heat Dissipation	4 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

Number of Channels	16
Input Types	Analog input, 0 to 5 V dc, 1 to 5 V dc, or 4 to 20 mA (through a 250 Ω resistor); Designed for compatibility with Honeywell Analog Input Field Terminal Assemblies (FTA)
Rated Mean Accuracy	±0.05% of span
Resolution	12 bits

Isolation

Input to earth (ground), 600 V ac

— NOTE

This does not imply that these channels are intended for connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electrical shock.

H3M03 (Analog Input) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	8 W
Heat Dissipation	8 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

Number of Channels	8
Input Types	-10.5 to 71.4 mV, 0 to 5 V dc, 0 to 100 mV, Thermocouple, and RTD
Thermocouple Types	J, K, E, T, B, S, R, N
RTD Types	Platinum: 100 Ω DIN (4376) Platinum: 100 Ω JIS (C-1604) Nickel 120 Ω Ed #7 Copper 10 Ω
Rated Mean Accuracy	TC: ±0.035% of span RTD channels: ±0.025% of span mV and 0 to 5 V channels: ±0.05% of span
Resolution	12 bits

Isolation

Input to earth (ground), 600 V ac; input to input, 600 V ac

— NOTE

This does not imply that these channels are intended for connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electrical shock.

H3M06 (Pulse Input) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	5 W
Heat Dissipation	5 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

Number of Channels	8
Input Type	Pulse, designed for compatibility with Honeywell Pulse Input FTAs
Rate	Up to 25 kHz, jumper selectable

H3M07 (Digital Input) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	4 W
Heat Dissipation	4 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

Number of Channels	32
Input Types	Digital, designed for compatibility with Honeywell Digital Input FTAs

H3M09 (Digital Output) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	4 W
Heat Dissipation	4 W

Communication

Redundant IEEE P1118 Fieldbus

Output Channels

Number of Channels	16
Output Type	Digital, designed for compatibility with Honeywell Digital Output FTAs
Applied Voltage	21 to 27 V dc
Load Current	0.25 A (maximum)
Off-State Leakage Current	0.1 mA

H3M37 (Analog Output) Functional Specifications

Power Requirements

Input Voltage	22.5 to 30 V dc
Consumption	5 W
Heat Dissipation	5 W

Communication

Redundant IEEE P1118 Fieldbus

Output Channels

Number of Channels	8
Output Type	0 to 20.4 mA dc, designed for compatibility with Honeywell Analog Output FTAs
Rated Mean Accuracy	±0.05% of span
Resolution	12 bits

H3SFBI (Fieldbus Isolator) Functional Specifications

Maximum number of DCS FBMs driven	40
Maximum length of local bus	9 m (30 ft)
Maximum input power voltage (normal operation)	+30 V dc
Maximum operating current	500 mA
Maximum power dissipation	3 W
Minimum isolation voltage	2500 V rms
Holdup time at 24 V dc	250 ms (as provided by the Honeywell power supply)

Appendix B. I/O Connections

The figures in this appendix show input/output connections made at the Field Termination Assemblies (FTAs). The Honeywell Field Termination Assembly types are listed in Table B-1.

Table B-1. Field Termination Assemblies

Description	Terminal Type	
	Compression	Screw
HLAI/STI (16 inputs) Non-Iso	MU-TAIH02	
HLAI/STI Redundant Non-Iso	MU-TAIH12	MU-TAIH52
HLAI/STI Redundant Galvanic Iso	MU-GAIH12	MU-GAIH82
LLAI (8 inputs) Opto-Iso	MU-TAIL01	
LLAI (8 inputs) Opto-Iso	MU-TAIL02	
PI (8 inputs) Non-Iso	MU-TPIX12	
AO (8 outputs) Non-Iso	MU-TAOX01	MU-TPIX52
AO (8 outputs) Non-Iso	MU-TAOX02	
AO (8 outputs) Galvanic Iso	MU-GAOX02	MU-GAOX72
AO Redundancy (8 outputs) Non-Iso	MU-TAOX12	MU-TAOX12
AO Redundancy (8 outputs) Galvanic-Iso	MU-GAOX12	MU-GAOX82
DI 120 V ac (32 inputs/grps of 8) Iso	MU-TDIA11	
DI 120 V ac (32 individual inputs) Iso	MU-TDIA12	MU-TDIA52
DI 240 V ac (32 inputs/grps of 8) Iso	MU-TDIA21	
DI 240 V ac (32 individual inputs) Iso	MU-TDIA22	MU-TDIA62
DI 24 V dc (32 inputs/grps of 8) Iso	MU-TDID11	
DI 24 V dc (32 individual inputs) Iso	MU-TDID12	MU-TDID52
DI 24 V dc (32 individual inputs) Iso	MU-TDID72	
DI 24 Vdc (32 individual inputs) Galvanic		
DO 24-240 V ac		
(16 outputs) Solid State Iso	MU-TDOA11	
(16 outputs) Solid State Iso	MU-TDOA12	
(16 outputs) Solid State Iso	MU-TDOA13	MU-TDOA52
(16 outputs) Solid State Iso	MU-TDOA53	
DO 3-30 V dc		
(16 outputs) Solid State Iso	MU-TDOD13	MU-TDOD53
DO 31-200 V dc		
(16 outputs) Solid State Iso	MU-TDOD21	
	MU-TDOD22	MU-TDOD62
DO 24 V dc, 100 mA		
(16 outputs) Non-Iso	MU-TDON11	
(16 outputs) Non-Iso	MU-TDON12	MU-TDOD52

Table B-1. Field Termination Assemblies (Continued)

Description	Terminal Type	
	Compression	Screw
DO 24 V dc,100 mA (16 outputs) Galvanic Iso	MU-GDOD12	MU-GDOD82
DO 120 V ac/125 V dc (16 outputs) Relay Iso	MU-TDOR11	MU-TDOR52
DO 120 V ac/125 V dc (16 outputs) Relay Iso	MU-TDOR12	
DO (240 V ac/125 V dc Relay (16 outputs)	MU-TDOR22	MU-TDOR 62

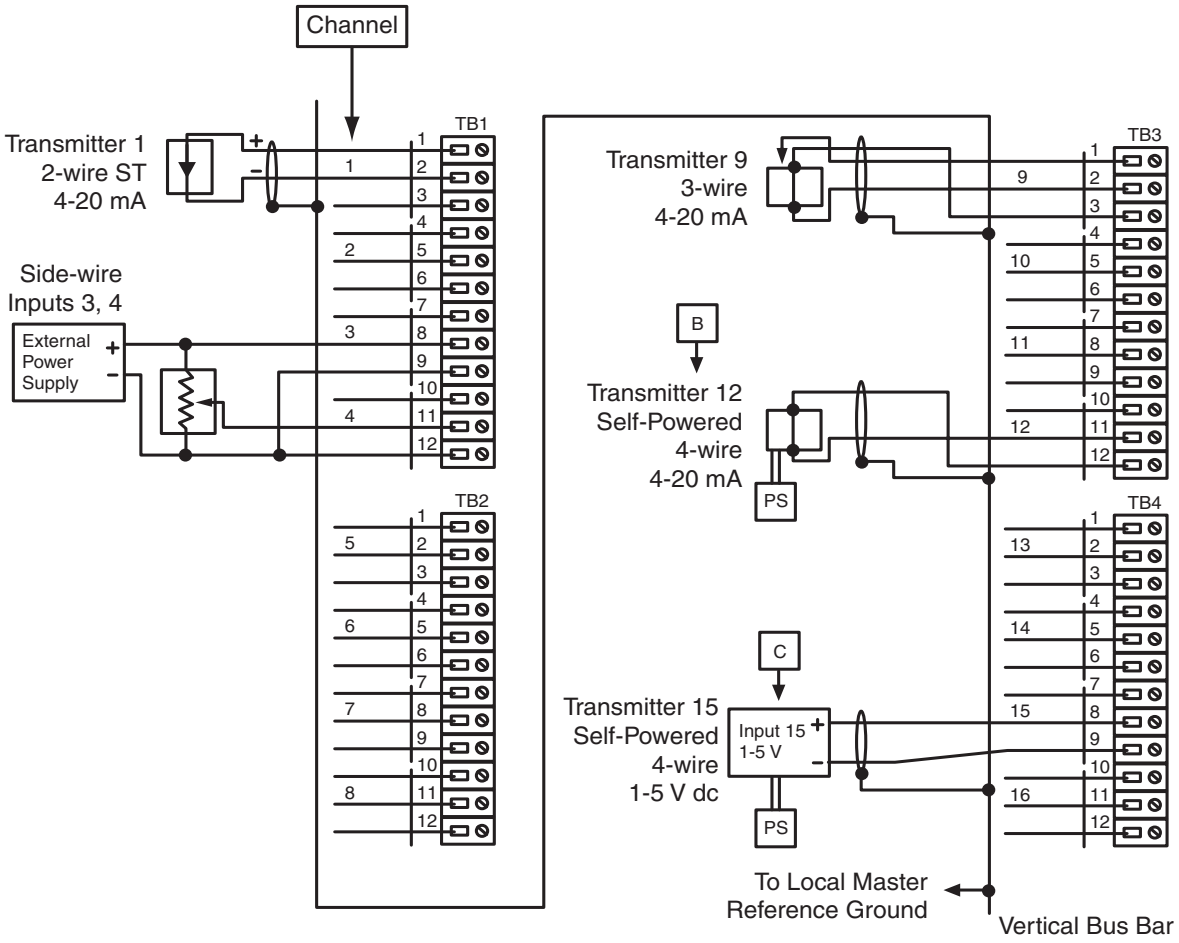
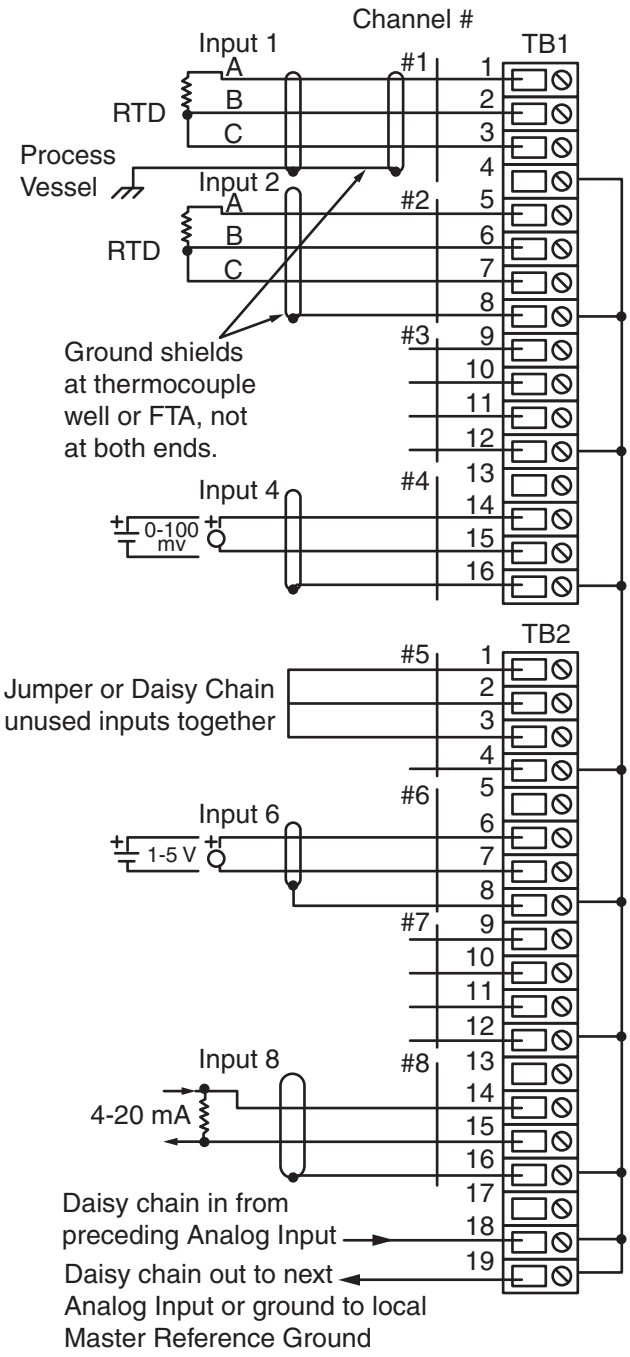


Figure B-1. High Level Analog Input FTA (used with H3M01)



Note:
Remove the connection between TB1-1 and TB2-17, if present.

Figure B-2. Low Level Analog Input FTA (used with H3M03)

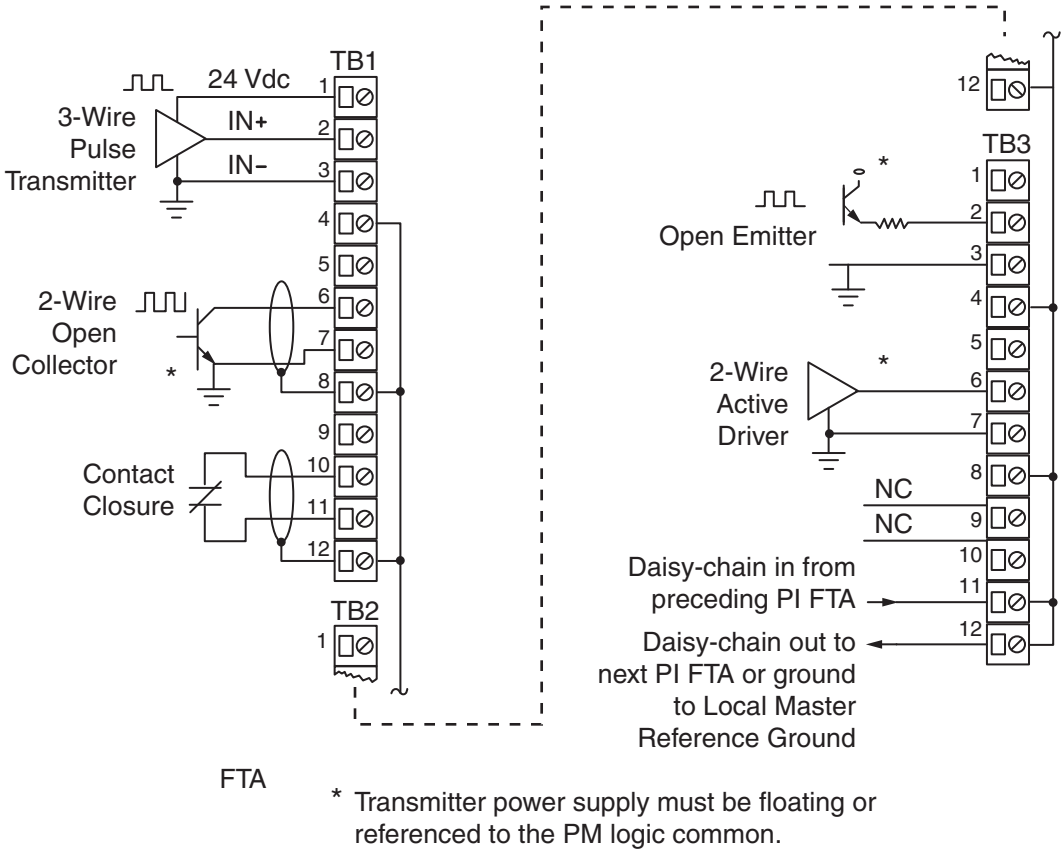


Figure B-3. Pulse Input FTA (used with H3M06)

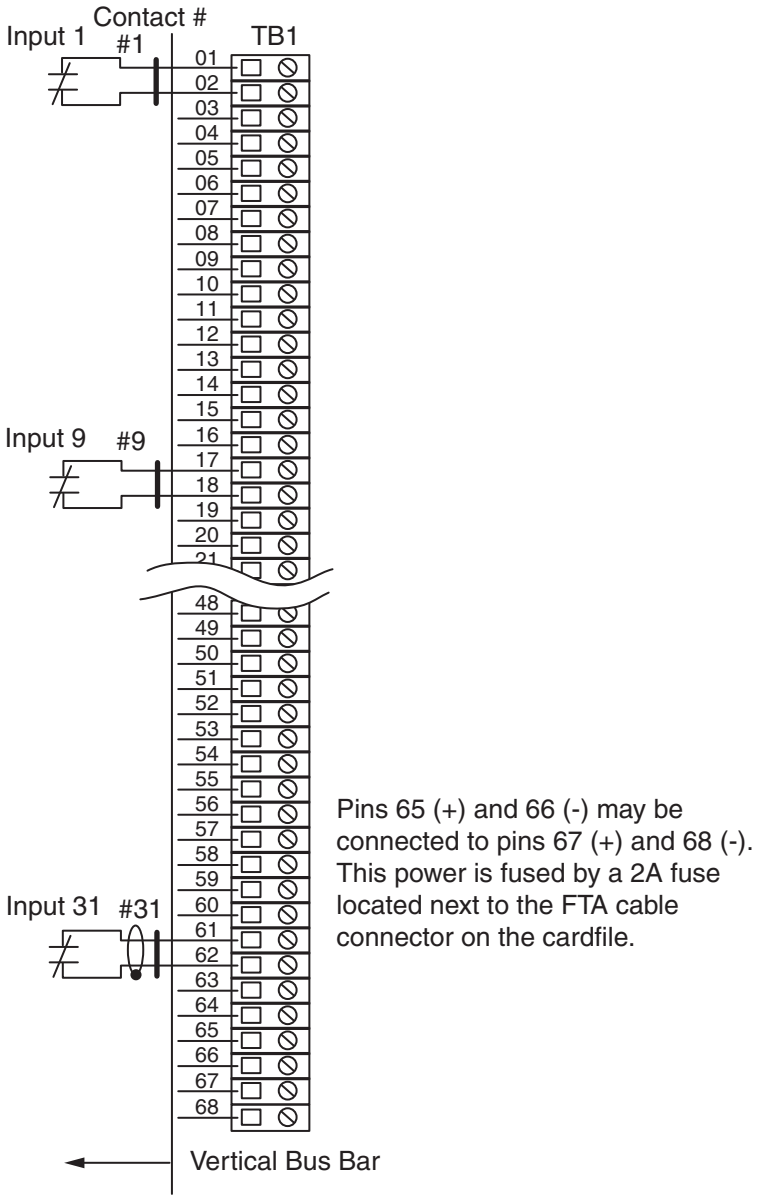


Figure B-4. Digital Input FTA (used with H3M07)

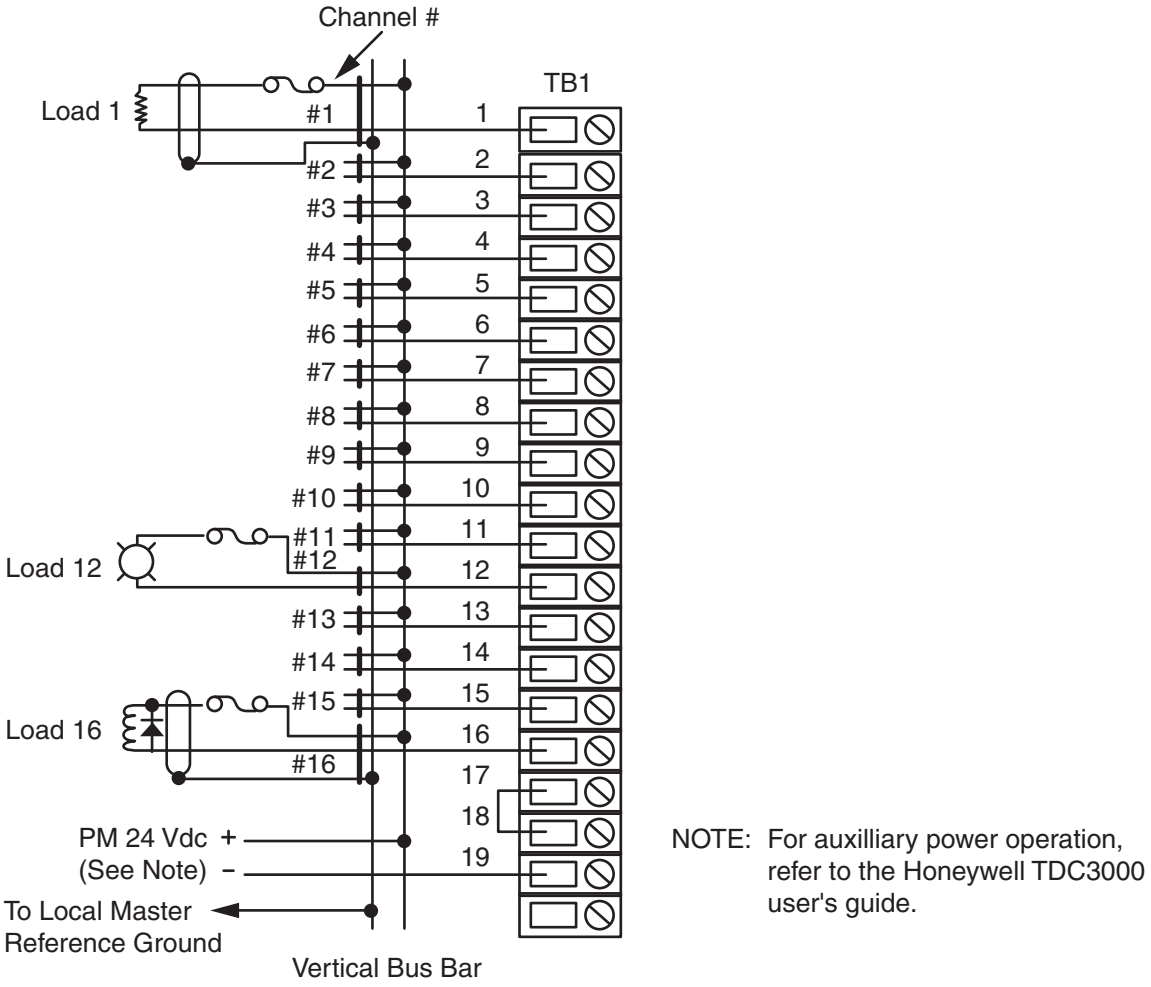


Figure B-5. +24 V dc Nonisolated Digital Output FTA (used with H3M09)

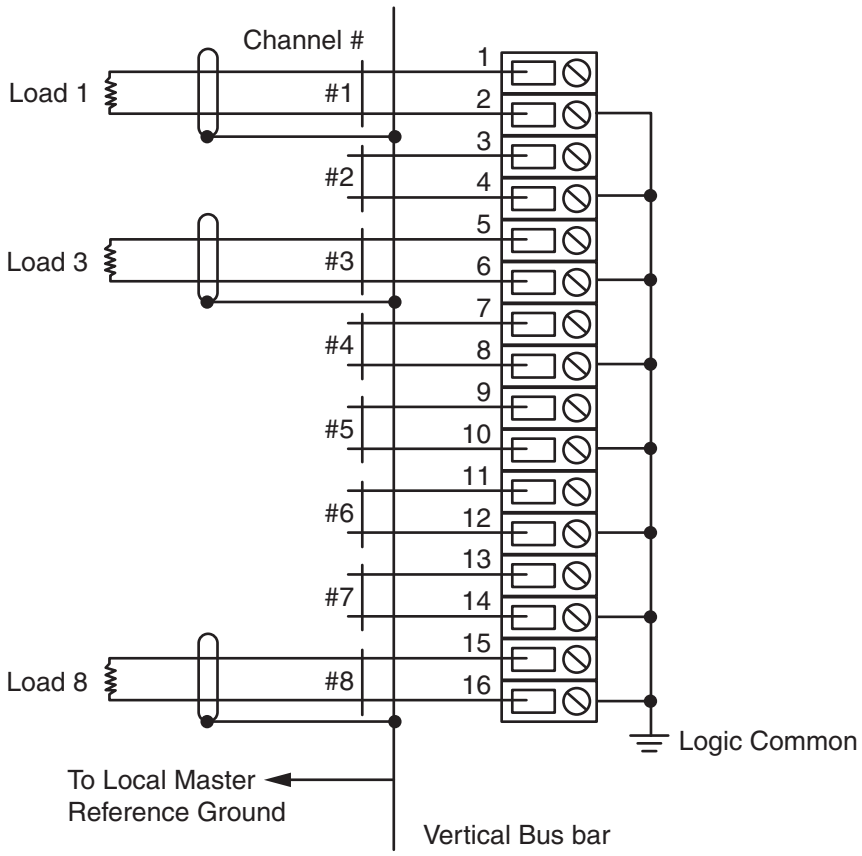
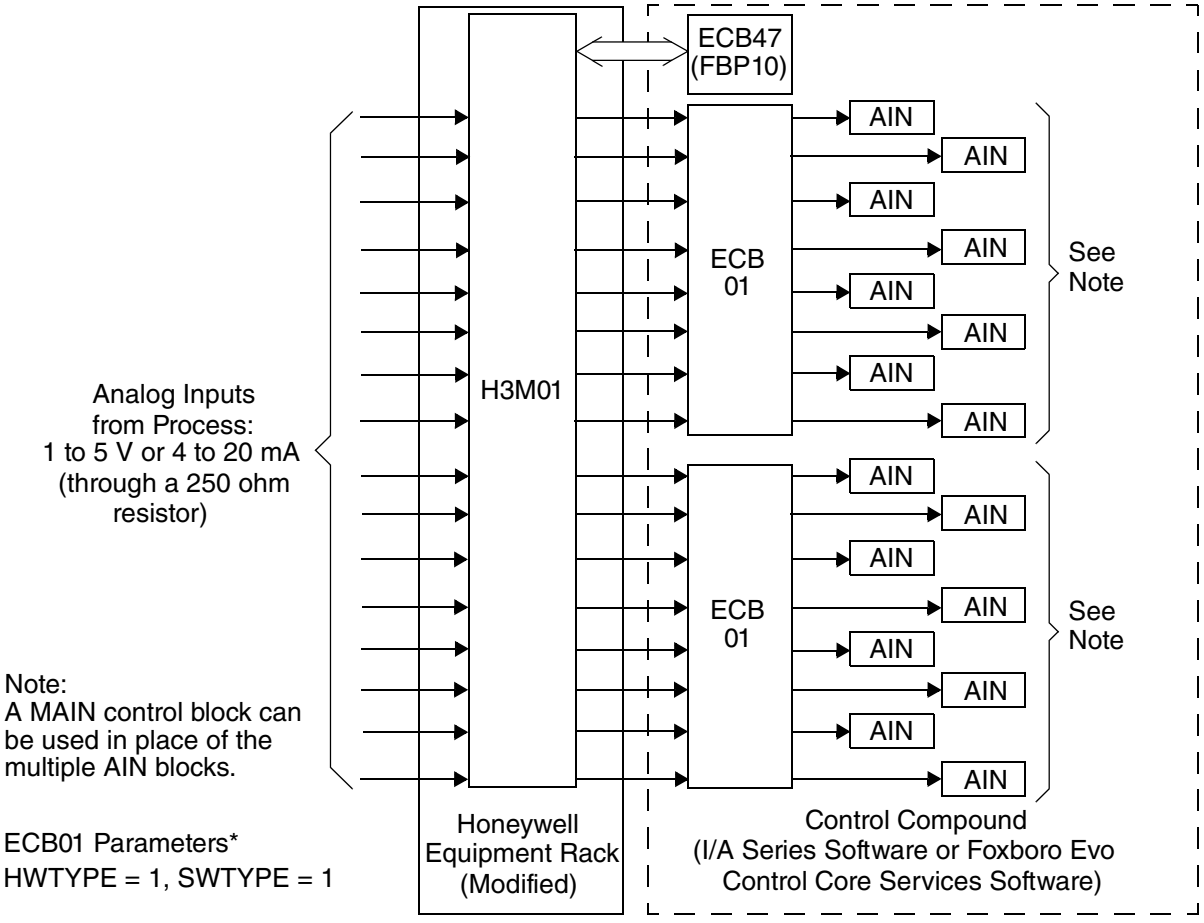


Figure B-6. Analog Output FTA (used with H3M37)

Appendix C. DCS Fieldbus Module Control Schemes

The following figures show typical DCS Fieldbus Module control schemes.



ECB01 Parameters*
HWTYPE = 1, SWTYPE = 1

ECB47 Parameters*
I/A Series software v6.1.1-v8.8 or Foxboro Evo Control Core Services Software v9.0 or later
: HWTYPE = 52, SWTYPE = 54
I/A Series software version earlier than 6.1.1: HWTYPE = 52, SWTYPE = 42
SCIX (Signal Conditioning Index) for AIN Block = 3

PNT_NO (Point Number) for AIN Blocks**

PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK
1	AI1	3	AI3	5	AI5	7	AI7
2	AI2	4	AI4	6	AI6	8	AI8

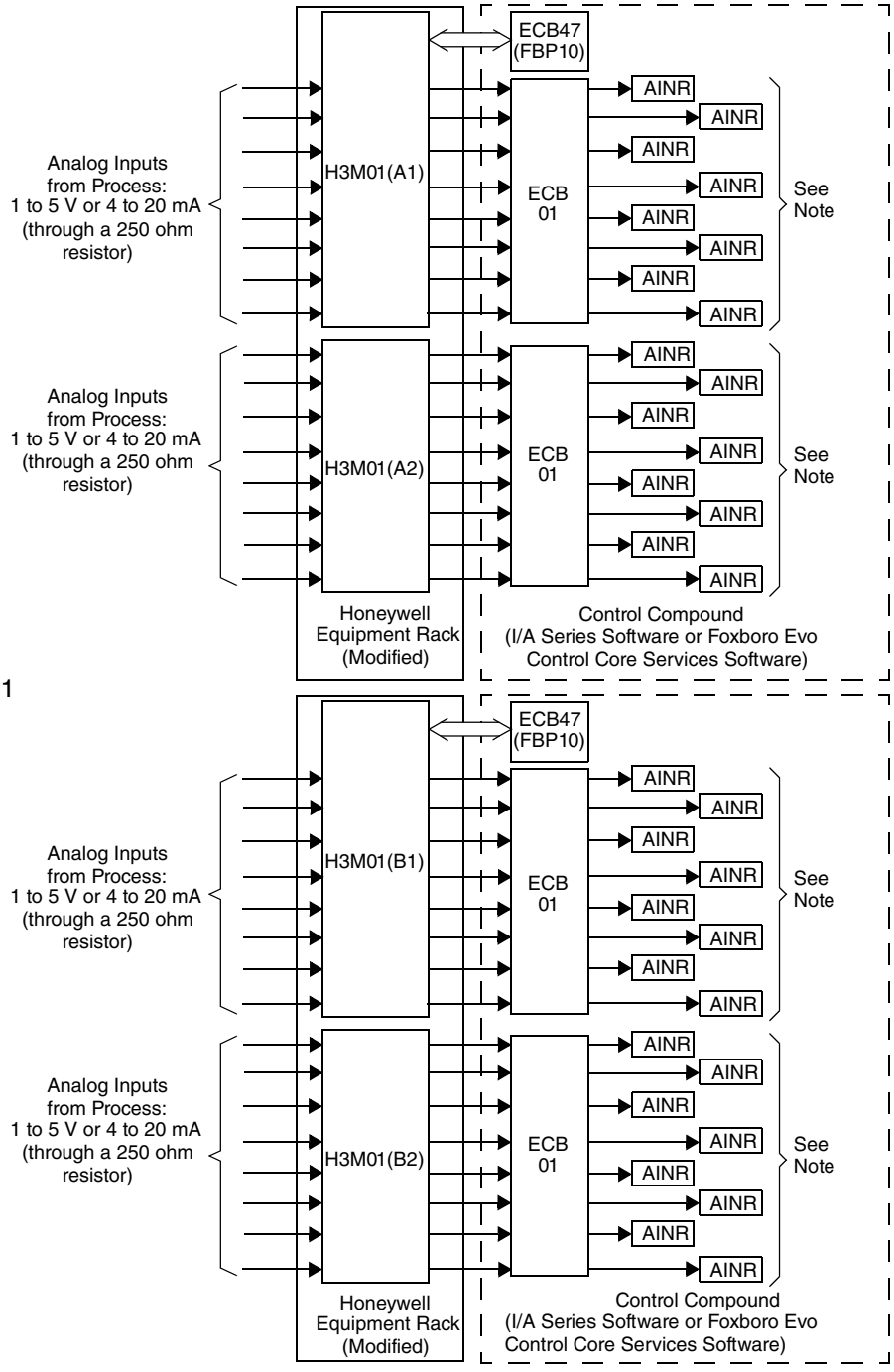
* For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX)

** Point number assignments are the same as for the 100 Series FBM01.

Figure C-1. H3M01

Note:
A MAIN control block can be used in place of the multiple AIN blocks.

The field inputs are common between both primary (A) and secondary (B) H3M01 modules



ECB01 Parameters*
HWTYPE = 1, SWTYPE = 1

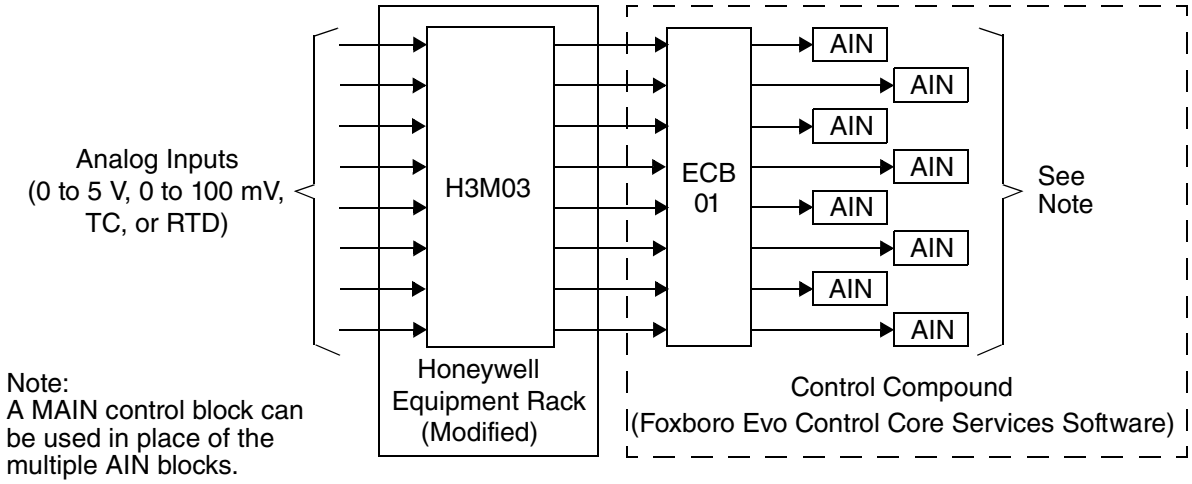
ECB47 Parameters*
I/A Series Software v6.1.1-v8.8 or Foxboro Evo Control Core Services Software v9.0 or later
: HWTYPE = 52, SWTYPE = 54
I/A Series software version earlier than 6.1.1: HWTYPE = 52, SWTYPE = 42
SCIX (Signal Conditioning Index) for AIN Block = 3
PNT_NO (Point Number) for AIN Blocks**

PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK
1	AI1	3	AI3	5	AI5	7	AI7
2	AI2	4	AI4	6	AI6	8	AI8

* For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX)

** Point number assignments are the same as for the100 Series FBM01.

Figure C-2. H3M01, Redundant



SCIX (Signal Conditioning Index) for AIN Block

0 to 100 mV: 1

THERMOCOUPLE TYPE	SCIX
B	20
E	21
J	23
K	24
N	25
R	26
S	27
T	28

RTD TYPE	SCIX
Copper (SAMA)	40
Nickel (SAMA)	41
Platinum (100 ohm DIN 43760-1968)	42
Platinum (100 ohm IEC) DIN 43760-1980)	43
Platinum (100 ohm SAMA)	44

PNT_NO (Point Number) for AIN Blocks**

PNT NO	BLOCK	PNT NO	BLOCK
1	AI1	5	AI5
2	AI2	6	AI6
3	AI3	7	AI7
4	AI4	8	AI8

ECB Parameters**

HWTYPE = 2, SWTYPE = 3

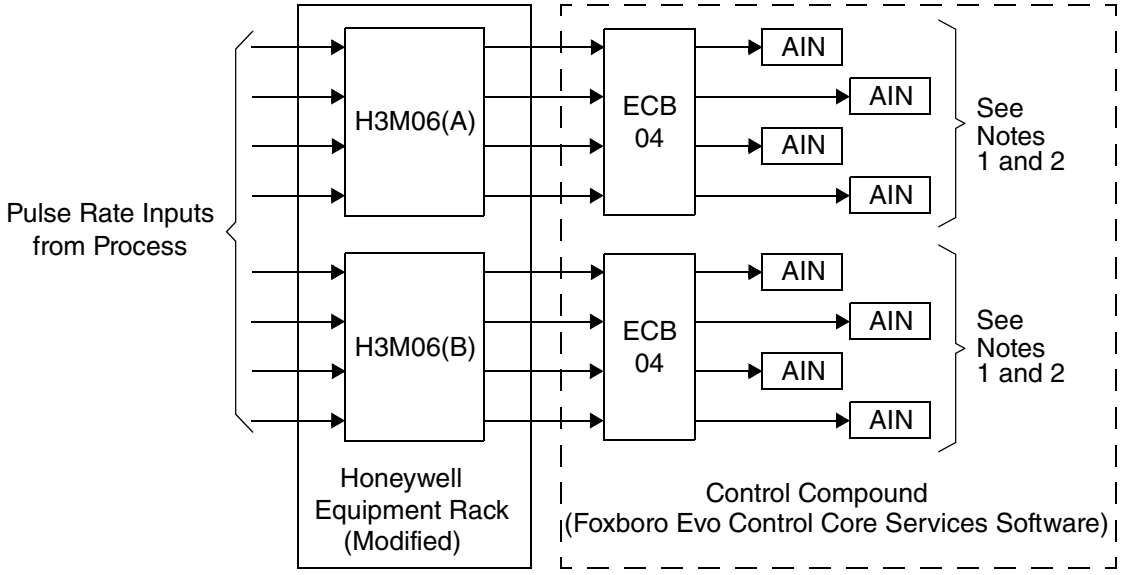
Channel 9 is the temperature compensation channel. Use SCIX 43.

* Point number assignments are the same as for the 100 Series FBM03.

** For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

Note: H3M03 must have the ECB01 BUSWDS set to 1. The H3M03 is connected to the Fieldbus A and B through an H3FBE1 Fieldbus Extender card which automatically switches from bus A to bus B upon a Fieldbus failure.

Figure C-3. H3M03



Notes:
1. A MAIN control block can be used in place of the multiple AIN blocks.
2. When using the 25 kHz pulse input mode, set the AIN block KSCALE factor to 2.

ECB Parameters*
HWTYPE = 6, SWTYPE = 4

SCIX (Signal Conditioning Index) for AOUT Block = 8 (Pulse Rate)

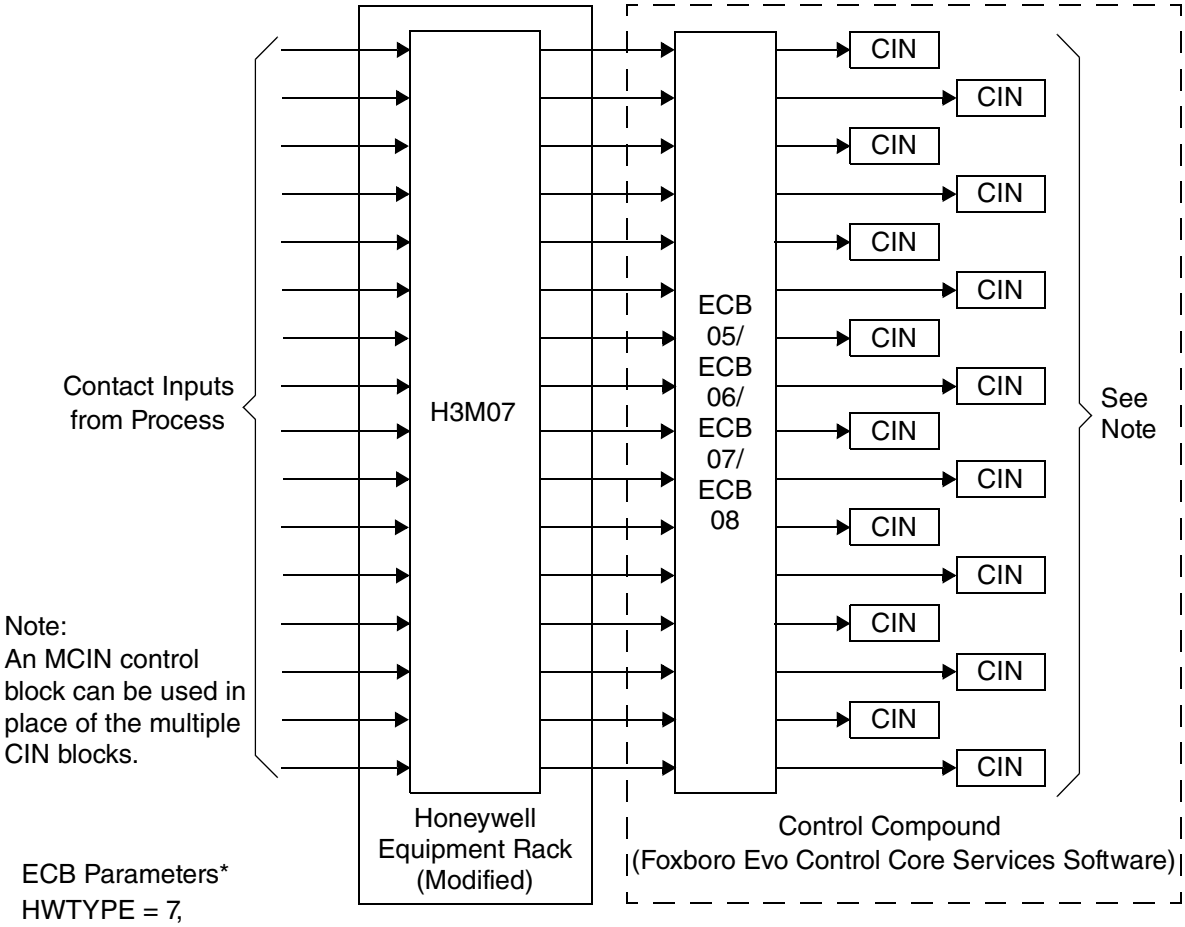
PNT_NO (Point Number) for AIN Blocks**

PNT NO	BLOCK
1	AI1
2	AI2
3	AI3
4	AI4

* For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

** Point number assignments are the same as for the 100 Series FBM06.

Figure C-4. H3M06



ECB Parameters*
HWTYPE = 7,
SWTYPE = 5 for Digital I/O
SWTYPE = 6 for Sequence of Events (SOE)
SWTYPE = 7 for Pulse Count
SWTYPE = 8 for Ladder Logic
EXTYPE = 12

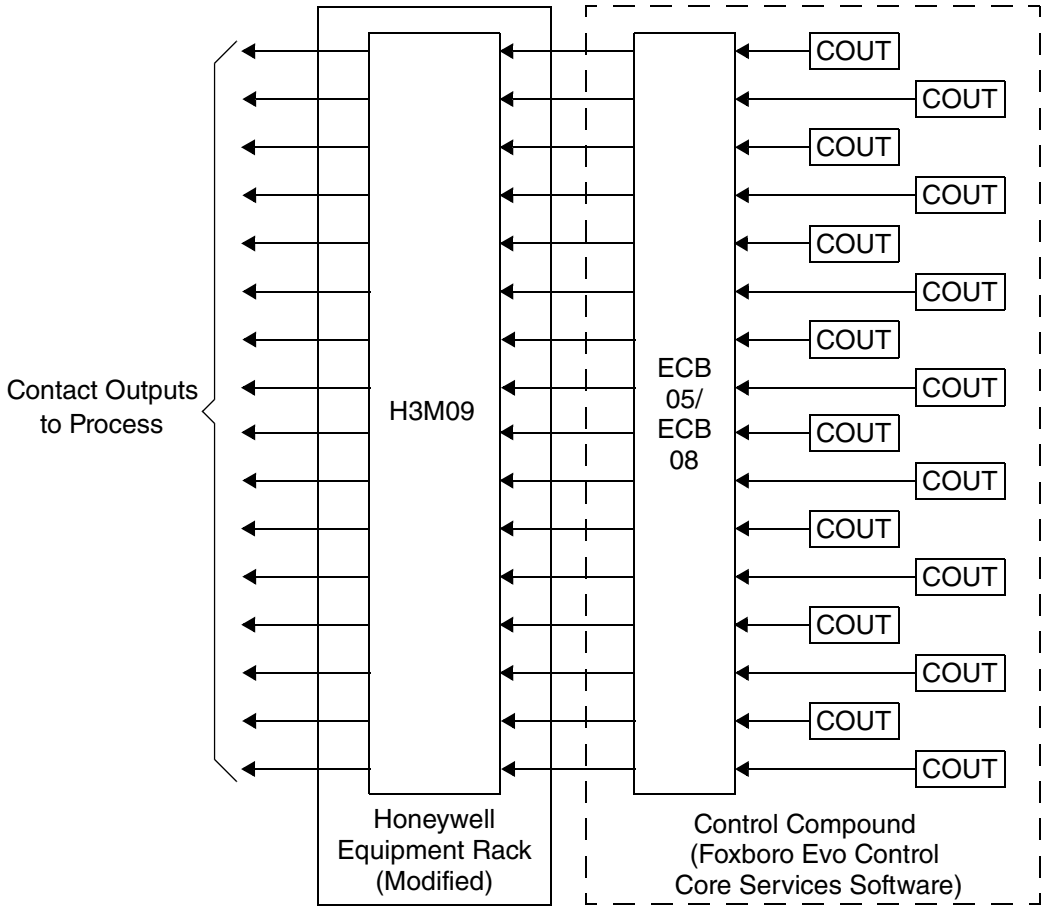
PNT_NO (Point Number) for CIN Blocks**

PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK	PNT NO	BLOCK
1	CI1	9	CI9	17	CI17	25	CI25
2	CI2	10	CI10	18	CI18	26	CI26
3	CI3	11	CI11	19	CI19	27	CI27
4	CI4	12	CI12	20	CI20	28	CI28
5	CI5	13	CI13	21	CI21	29	CI29
6	CI6	14	CI14	22	CI22	30	CI30
7	CI7	15	CI15	23	CI23	31	CI31
8	CI8	16	CI16	24	CI24	32	CI32

* For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).

** Point number assignments are the same as for the 100 Series FBM07.

Figure C-5. H3M07



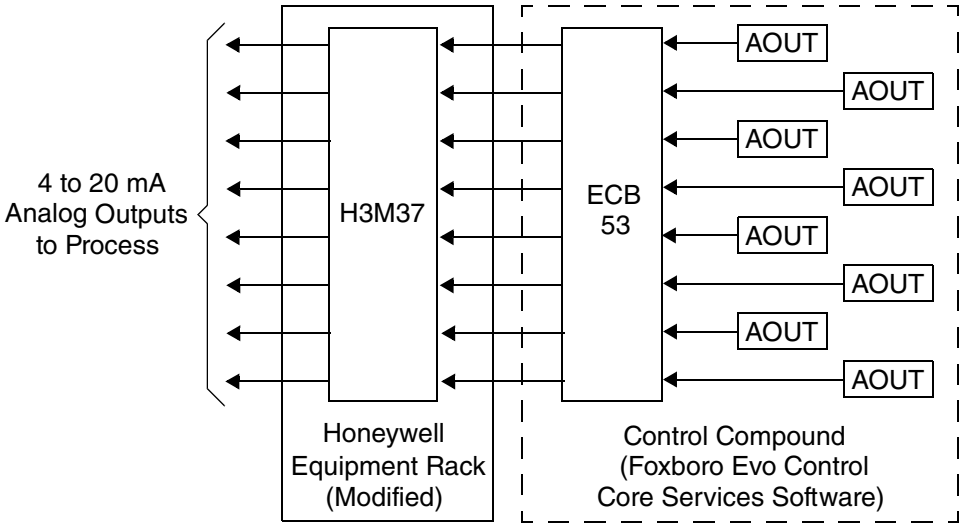
ECB Parameters*
HWTYPE = 9,
SWTYPE = 5 for Digital I/O
SWTYPE = 8 for Ladder Logic
EXTYPE = 14

PNT_NO (Point Number) for COUT Blocks**

PNT NO	BLOCK	PNT NO	BLOCK
9	CO1	25	CO9
10	CO2	26	CO10
11	CO3	27	CO11
12	CO4	28	CO12
13	CO5	29	CO13
14	CO6	30	CO14
15	CO7	31	CO15
16	CO8	32	CO16

*For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).
**Point number assignments are the same as for the 100 Series FBM09 with expander.

Figure C-6. H3M09



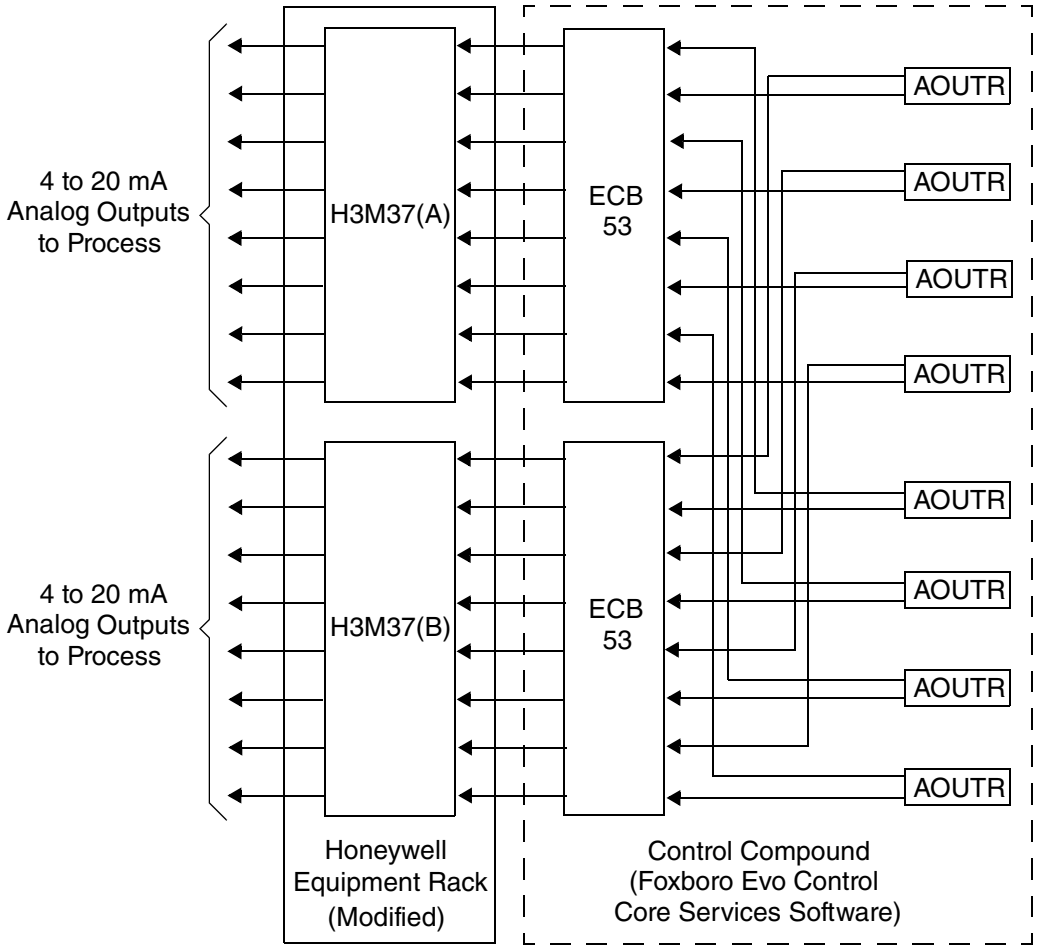
ECB53 Parameters (each ECB)*
HWTYPE = 37, SWTYPE = 53

PNT_NO (Point Number) for AOUT Blocks**

PNT NO	BLOCK	PNT NO	BLOCK
1	AO1	5	AO5
2	AO2	6	AO6
3	AO3	7	AO7
4	AO4	8	AO8

*For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).
**Point number assignments are the same as for the 100 Series FBM37.

Figure C-7. H3M37, Non-Redundant Control Configuration



ECB53 Parameters (each ECB)*
HWTYPE = 37, SWTYPE = 53

PNT_NO (Point Number) for AOUT Blocks**

PNT NO	BLOCK	PNT NO	BLOCK
1	AO1	5	AO5
2	AO2	6	AO6
3	AO3	7	AO7
4	AO4	8	AO8

*For additional ECB parameters, refer to *Integrated Control Block Descriptions* (B0193AX).
**Point number assignments are the same as for the 100 Series FBM37.

Figure C-8. H3M37, Redundant Control Configuration

Appendix D. Power Supply Replacement

The following procedures describe how to replace two different power supplies in the DCS Field-bus Module subsystem:

- The power supply which powers the PMM/APM/HPM is replaced with Foxboro power supply part number P0918HN.
- The power supply which powers the LLPIU or HLPIU is replaced with Foxboro power supply part number P0918ZP.

These power supplies are not included in the Migration Kit, but are ordered separately from Invensys Systems, Inc.

PMM/APM/HPM Power Supply Replacement

⚠ CAUTION

The following procedure assumes that power has been removed from the existing power supply. Before switching off power to the existing power supply, ensure that such action will not adversely affect the process.

The original power supply, and its replacement (P0918HN), are shown in Figure D-1 and Figure D-2. Proceed as follows:

1. Remove the power-in and power-out cables from the power supply, noting (for future reference) which cables are connected to which input/output terminals.
2. Referring to Figure D-1, remove the three screws holding the power supply (and attached mounting bracket) in place, and set the screws aside.
3. Remove the power supply from the rack, and replace it with the new Foxboro power supply (P0918HN).
4. Using the screws that held the original power supply in place, secure the power supply to the rack.
5. Make the power-in and power-out cable connections for the cable assembly (P0918ZL) and its requisite hardware as indicated in Figure D-2, Figure D-3, Figure D-4 and Figure D-5. A label on top of the new (Foxboro) power supply (P0918HN) describes all possible cable connections, as well as jumper and switch settings. If external indication of the power supply status is to be employed, refer to “Power Supply Status Cable Installation” on page 102 for information on installing the power supply status cable.

⚠ CAUTION

When attaching the power cables to the newly installed power supply, use the new screws provided on the terminal blocks. Use of the old screws may cause impaired current conductivity.

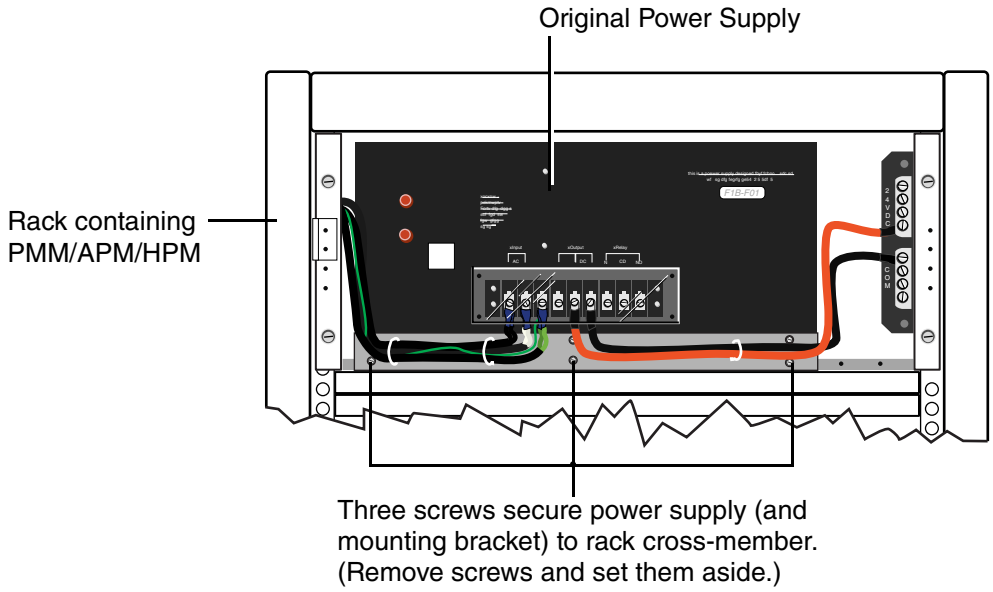


Figure D-1. PMM/APM/HPM Power Supply Replacement

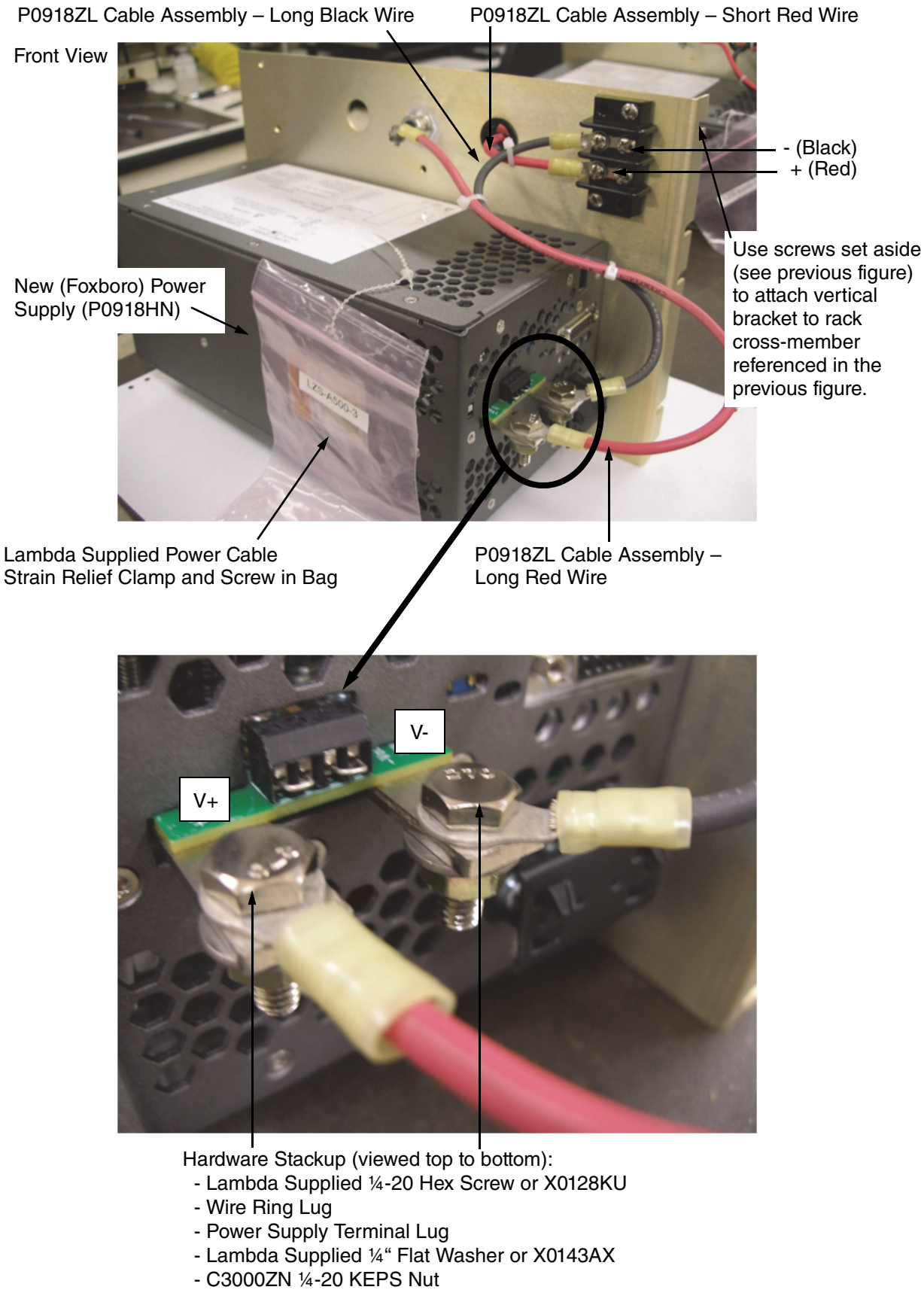


Figure D-2. Connections to Power Supply P0918HN

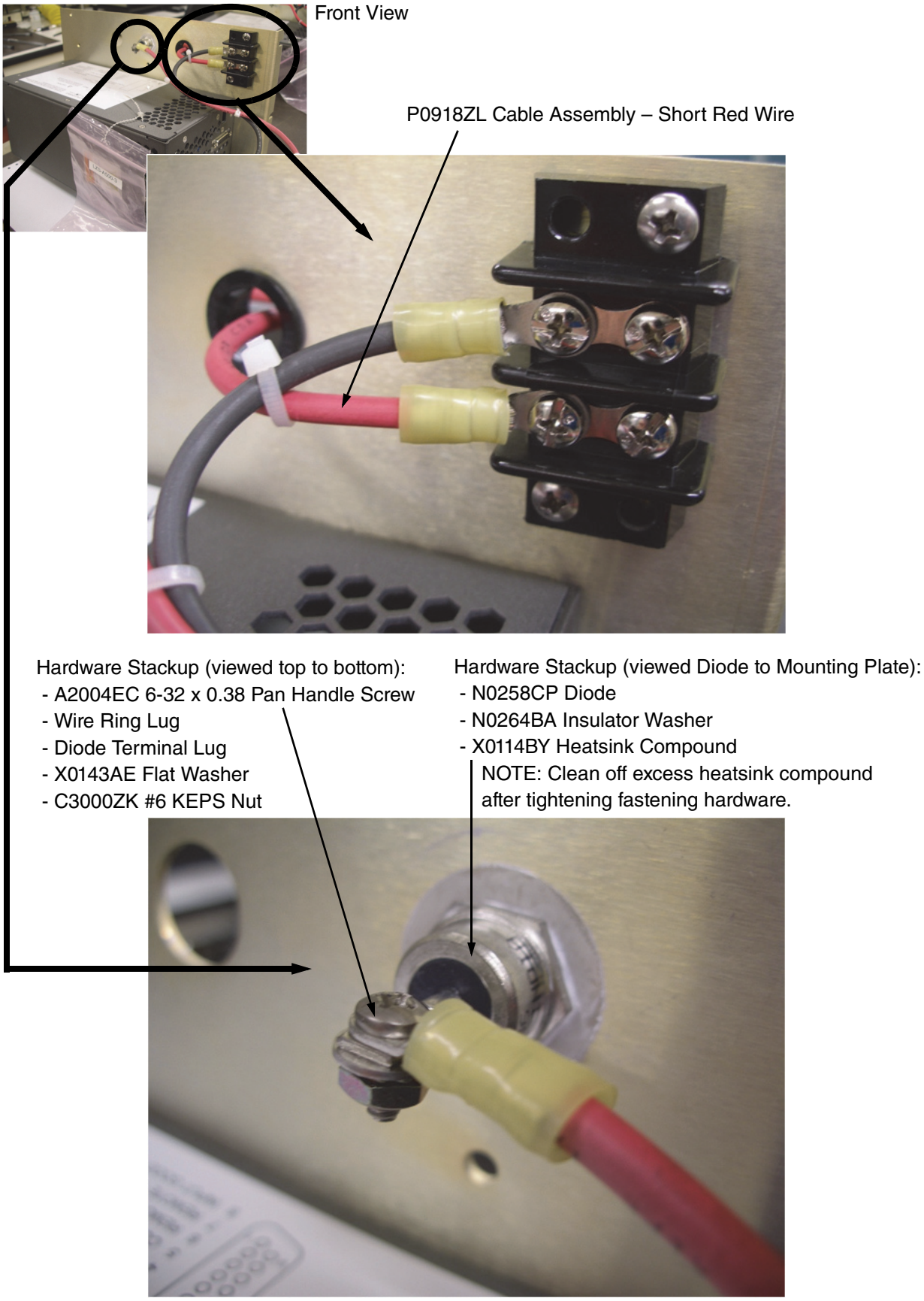
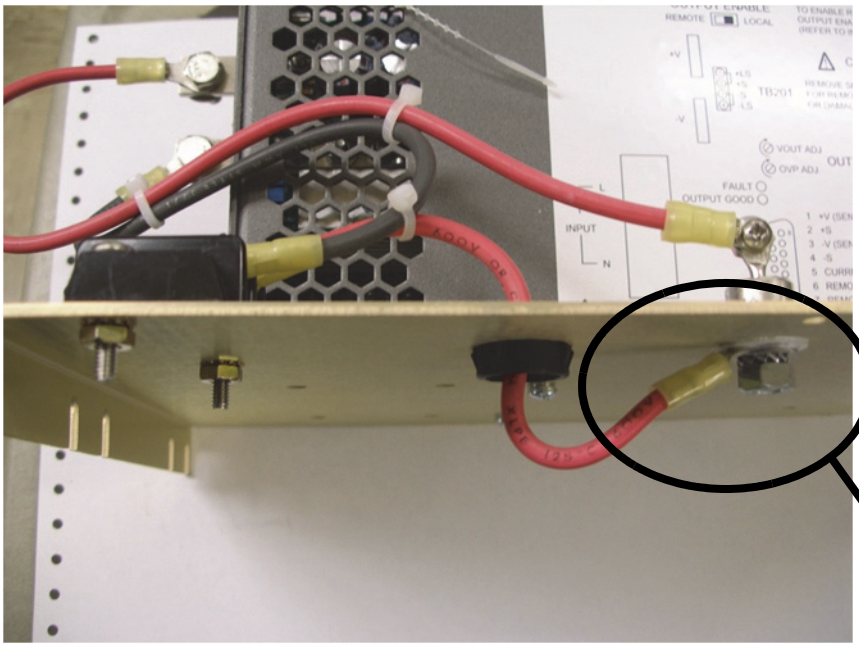


Figure D-3. P0918ZL Cable Assembly Connections to P0904HW Wiring Panel - Part 1

Top View



Hardware Stackup (viewed Mounting Plate to Nut):
- N0258CP Diode Threaded Stud
- X0114BY Heatsink Compound
- N0311JD Shoulder Washer
- M0146ZK Thin ¼" Flat Washer
- Cable Ring Lug
- M0146ZK Thin ¼" Flat Washer

  NOTE: Clean off excess heatsink compound after tightening fastening hardware.
- ¼" Lock Washer (part of Diode Kit)
- ¼-20 Nut (part of Diode Kit)

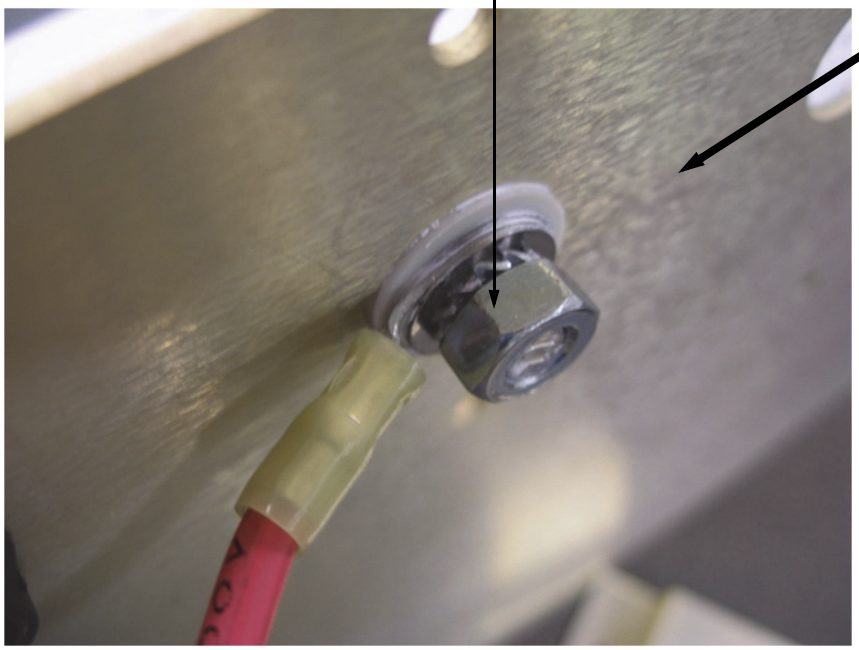
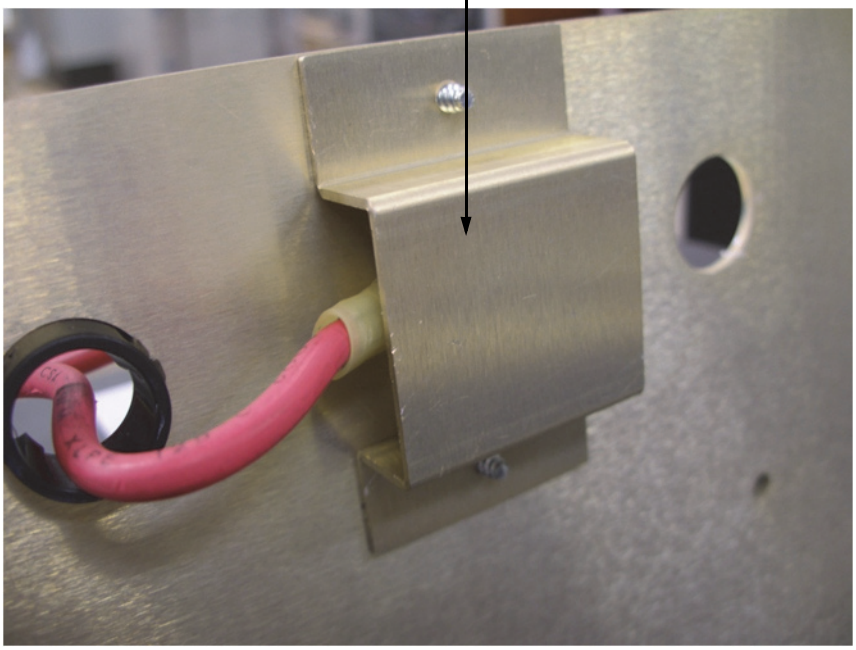


Figure D-4. P0918ZL Cable Assembly Connections to P0904HW Wiring Panel - Part 2

P0918XY Diode Cover Installed on Rear of the P0918BH Mounting Plate



Mount P0918XY Diode Cover using two (2) X0156NJ #6 Self Taping Screws Inserted from the Front of the P0918BH Mounting Plate.

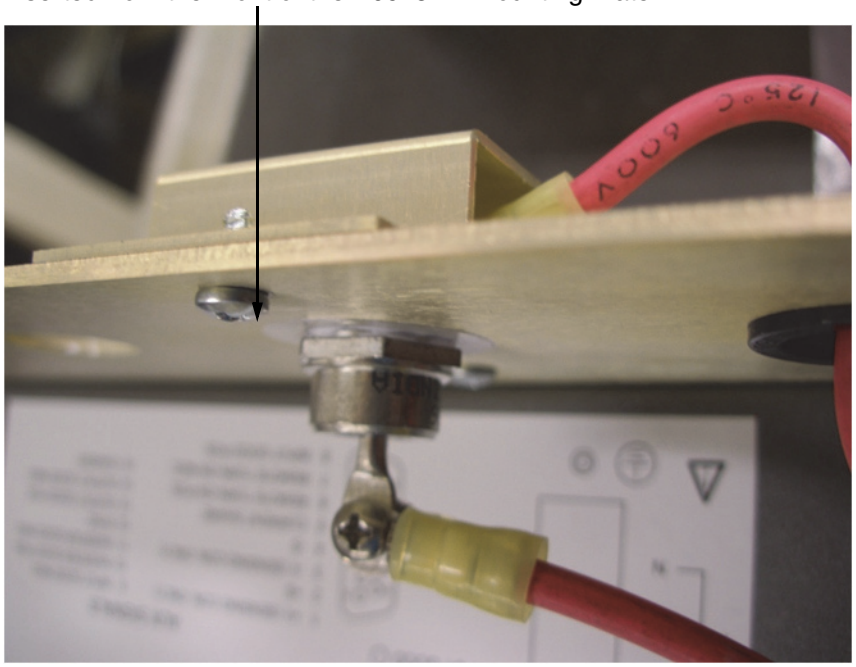


Figure D-5. P0918ZL Cable Assembly Connections to P0904HW Wiring Panel - Part 3

6. Remove the CMOS batteries located to the rear of the power supply distribution panel, as discussed on page 14 and page 15, as they are no longer required.

HLPIU or HLPIU Power Supply Replacement

⚠ CAUTION

The following procedure assumes that power has been removed from the existing power supply. Before switching off power to the existing power supply, ensure that such action will not adversely affect the process.

The original power supply, and its replacement, are shown in Figure D-6. Proceed as follows:

1. Remove the power-in and power-out cables from the power supply, noting (for future reference) which cables are connected to which input/output terminals.
2. Referring to Figure D-6, remove the two screws, at the rear of the rack, holding the power supply in place.
3. Remove the power supply from the rack, and replace it with the new Foxboro power supply (P0918ZP).
4. Using the screws and nut clips provided with the new power supply, secure the power supply to the rack.
5. Make the power-in and power-out cable connections as indicated in Figure D-6. A label on top of the new (Foxboro) power supply describes all possible cable connections, as well as jumper and switch settings. If external indication of the power supply status is to be employed, refer to “Power Supply Status Cable Installation” on page 102 for information on installing the power supply status cable.

⚠ CAUTION

When attaching the power cables to the newly installed power supply, use the new screws provided on the terminal blocks. Use of the old screws may cause impaired current conductivity.

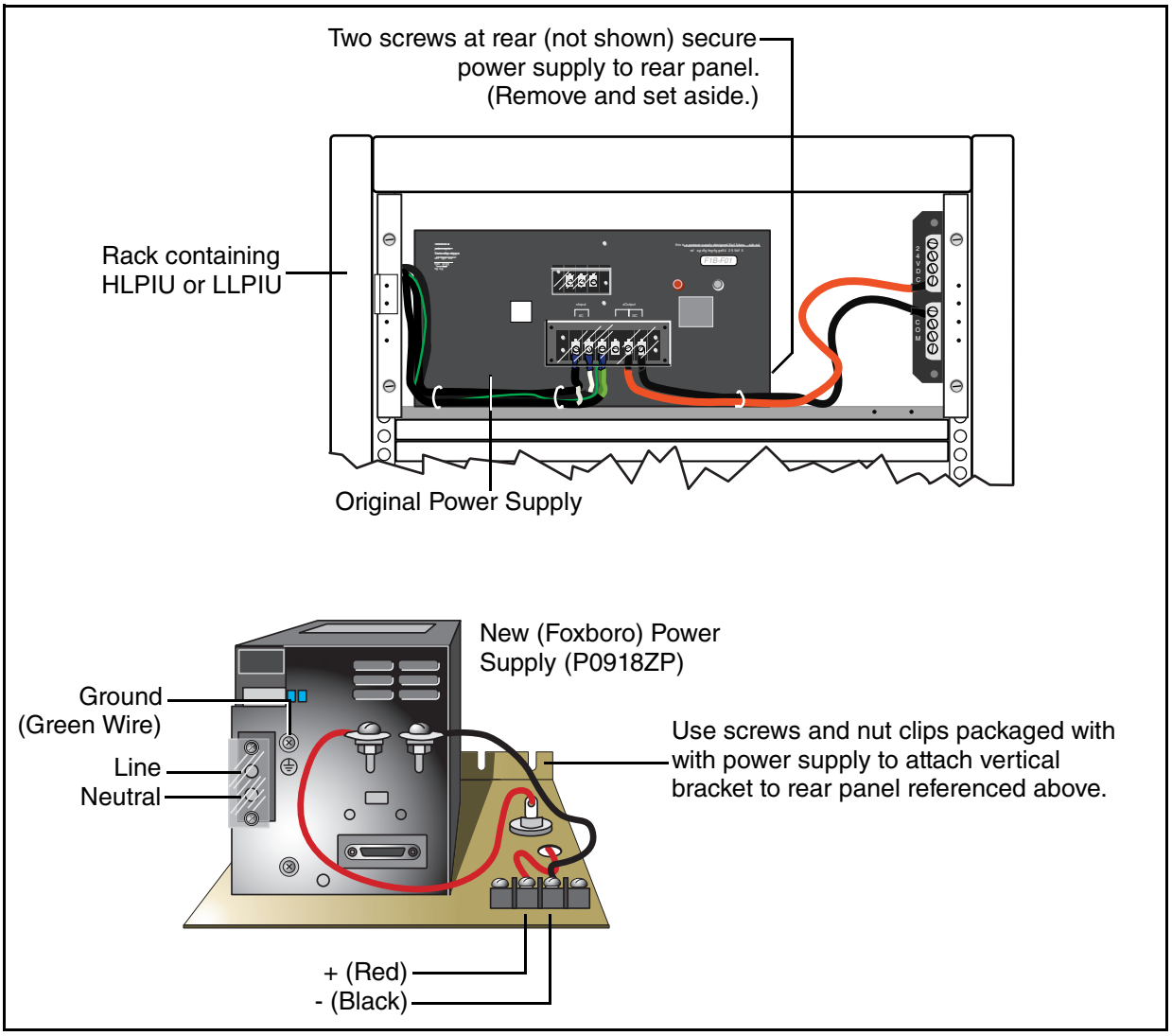
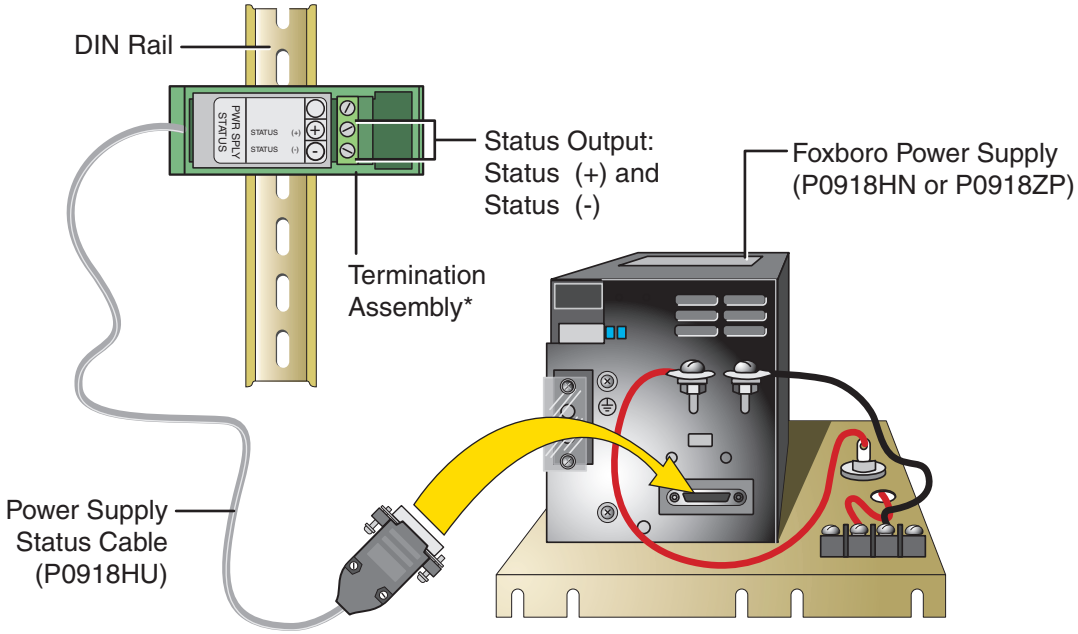


Figure D-6. HLPIU/LLPIU Power Supply Replacement

Power Supply Status Cable Installation

A status cable (Foxboro Part Number P0918HU) can be used in conjunction with appropriate indicator circuitry to provide indication of the power supply's operating status. When the power supply output is good (above its minimum specified value), the power supply produces a switch closure condition at the status cable output points, which are labeled **`Status (+)`** and **`Status (-)`**. If the power supply should fail (or lose input power), the power supply produces and open switch condition. The status output is from an opto transistor (inside the power supply) capable of switching 1 mA dc, with an ON voltage less than 0.4 v at 1 mA. Open circuit voltage at the **`Status (+)`** and **`Status (-)`** output points must not exceed 30 v. Be sure that the connections to the status cable outputs are wired according to the polarity as marked.

Install the power supply status cable as shown in Figure D-7, mounting the termination assembly (part of cable assembly P0918HU) on a DIN rail in the equipment cabinet.



* The Termination Assembly is a part of the Power Supply Status Cable assembly (P0918HU).

Figure D-7. Power Supply Status Cable Installation

Appendix E. CP60 Upgrade

This appendix provides the procedure to upgrade CP30 or CP40 control processors to CP60 control processors on existing Foxboro Evo systems.

To replace CP30 or CP40 control processors with the CP60, perform the following:

1. Install V6.3.1 or later System Software on the existing system and EEPROM all the Honeywell Integrators using the existing CP30 or CP40 based system.

NOTE

Be sure to EEPROM all the Honeywell Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the CP60 replacement is not able to communicate with the older version Honeywell Integrator software.
The following table list the FBP EEPROM REV levels for the old Honeywell Integrators (pre-V6.3.1 systems) and the new ones (V6.3.1 or later system).

DCS Fieldbus Module	FBP EEPROM REV	
	Pre-V6.3.1 Systems	New FBP
H3M01	40.2	6.3.1

2. After the system has been upgraded to V6.3.1 or later and all the Integrators have been upgraded with new IOM software, the CP30s and CP40s can be replaced with CP60 control processors. Follow the instructions in *Control Processor 60 and Control Processor 60S Installation and Maintenance* (B0400FB) for CP60 and DCM10E, DCM10Ef installation.

Appendix F. FCP280 or FCP270 Upgrade

This appendix provides the procedure to upgrade CP30, CP40, or CP60 control processors to FCP280 or FCP270 control processors on existing Foxboro Evo systems.

If upgrading from the CP60 to the FCP280 or FCP270, there is no need to EEPROM update the Honeywell Integrators or other FBMs. No special procedures are required.

NOTE

The FCP280 is supported by Control Core Services software v9.0 or later.
The FCP270 is supported by I/A Series software v8.1.1-v8.8 or Control Core Services software v9.0 or later.

To replace CP30 or CP40 control processors with the FCP280 or FCP270, perform the following:

1. Install the appropriate version of the I/A Series software on the I/A Series system, or Control Core Services software on your Foxboro Evo system, which contains your control processors - see the note above. Refer to the Global Customer Support website (*https://support.ips.invensys.com*) for the latest version of Control Core Services software and its documentation.
   Also, install the EEPROM update for all the Honeywell Integrators using the existing CP30 or CP40 based system.

NOTE

Be sure to EEPROM update all the Honeywell Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the FCP280 or FCP270 replacement is not able to communicate with the older version Honeywell Integrator software.
The following table list the FBP EEPROM REV levels for the old Honeywell Integrators (pre-I/A Series software v6.3.1) and the new ones (I/A Series software v8.1.1-v8.8 or Control Core Services software v9.0 or later).

DCS Fieldbus Module	FBP EEPROM REV	
	Pre-I/A Series v6.3.1	New FBP
H3M01	40.2	6.3.2

2. After the system has been upgraded to I/A Series software v8.1.1-v8.8 or Control Core Services software v9.0 or later and all the Integrators have been upgraded with new IOM software, the CP30s and CP40s can be replaced with FCP280 or FCP270 control processors.
   - To install the FCP280, refer to *Field Control Processor 280 (FCP280) Upgrade Guide* (B0700GC) for instructions on replacing the CP30s, CP40s or CP60s, and refer to the chapter "Installing the Field Control Processor 280" in *Field Control Processor 280 (FCP280) User's Guide* (B0700FW) for instructions on installing the FCP280.
   - To install the FCP270, follow the instructions in *Field Control Processor 270 (FCP270) User's Guide* (B0700AR).
   - To cable the Fieldbus to the FCP280, follow the instructions in "Fieldbus Cabling at the FCP280" on page 20.
   - To cable the Fieldbus to the FCP270, follow the instructions in "Fieldbus Cabling at the FCP270" on page 26.

Appendix G. ZCP270 Upgrade

This appendix provides the procedure to upgrade CP30, CP40, or CP60 control processors to ZCP270 control processors on existing Foxboro Evo systems.

If upgrading from the CP60 to the ZCP270, there is no need to EEPROM update the Honeywell Integrators or other FBMs. No special procedures are required.

To replace CP30 or CP40 control processors with the ZCP270, perform the following:

1. Install V8.3 or later System Software on the existing system and EEPROM update all the Honeywell Integrators using the existing CP30 or CP40 based system.

NOTE

Be sure to EEPROM update all the Honeywell Integrators as well as other FBMs using the existing CP30 or CP40 based system. If this step is not followed, the ZCP270 replacement is not able to communicate with the older version Honeywell Integrator software.
The following table list the FBP EEPROM REV levels for the old Honeywell Integrators (pre-V6.3.1 systems) and the new ones (V8.3 or later system).

DCS Fieldbus Module	FBP EEPROM REV	
	Pre-V6.3.1 Systems	New FBP
H3M01	40.2	6.3.2

2. After the system has been upgraded to V8.3 or later and all the Integrators have been upgraded with new IOM software, the CP30s or CP40s can be replaced with ZCP270 control processors. To install the ZCP270, follow the instructions in *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN). To cable the Fieldbus to the ZCP270, follow the instructions in "Fieldbus Cabling at the ZCP270" on page 31.

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