Honeywell

High-Performance Process Manager Installation

HP20-500

Total Plant

Implementation/HPM - 3

High-Performance Process Manager Installation

HP20-500

Release 500
CE Compliant
3/96

Copyright, Notices, and Trademarks

Revision 03 – March 1, 1996

Honeywell
Industrial Automation and Control
Automation College
2820 West Kelton Lane
Phoenix, AZ 85023

(602) 313-5669

About This Publication

This manual provides instructions for the installation of the High-Performance Process Manager (HPM) with the exception of Field Termination Assemblies (FTAs), associated Input/Output Processors (IOPs), and I/O Link Extenders. Installation information for the FTAs, IOPs, and I/O Link Extenders is found in the *Process Manager I/O Installation* manual.

Site planning information is contained in the *TDC 3000^X System Site Planning* and the *High-Performance Process Manager Planning* manual.

After installation of the High-Performance Process Manager, the checkout procedure can be found in the *High-Performance Process Manager Checkout* manual.

This publication supports software Release 500.

This publication supports CE Compliant and non-CE Compliant equipment. Any equipment designated as "CE Compliant" complies with the European Union EMC and its health and safety directives. All equipment entering the European countries after January 1, 1996 require this type of compliance, denoted by the "CE Mark."

Standard Symbols

Scope

The standard symbols used in this publication are defined as follows.

ATTENTION

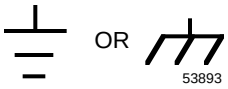
Notes inform the reader about information that is required, but not immediately evident.

CAUTION

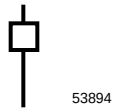
Cautions tell the user that damage may occur to equipment if proper care is not exercised.

WARNING

Warnings tell the reader that potential personal harm or serious economic loss may happen if instructions are not followed.



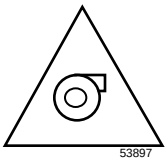
Ground connection to building safety ground.



Ground stake for building safety ground.

Electrical Shock Hazard—can be lethal.

Electrical Shock Hazard—can be lethal.



Rotating Fan—can cause personal injury.

Caution—refer to the appropriate installation document.

Table of Contents

Table of Contents

Figures and Tables

Figures and Tables

Acronyms

AO ..... Analog Output
EPNI ..... Enhanced Process Network Interface
ESD ..... Electrostatic Discharge
FTA ..... Field Termination Assembly
HLAI ..... High Level Analog Input
HPMM ..... High-Performance Process Manager Module
HPM ..... High-Performance Process Manager
I/O ..... Input/Output
IOP ..... Input/Output Processor
LCN ..... Local Control Network
MRG ..... Master Reference Ground
NEC ..... National Electrical Code
NIM ..... Network Interface Module
STI ..... Smart Transmitter Interface
TAC ..... Technical Assistance Center
UCN ..... Universal Control Network

References

Publication Title	Publication Number	Binder Title	Binder Number
High-Performance Process Manager Specification and Technical Data	HP03-500	System Summary – 2	TDC 3010-2
High-Performance Process Manager Planning	HP02-500	System Site Planning – 2	TDC 3020-2
High-Performance Process Manager Service	HP13-500	PM/APM/HPM Service – 1	TDC 3061-1
High-Performance Process Manager Checkout	HP20-510	Implementation/ High-Performance Process Manager - 3	TDC 3066-3
Process Manager I/O Specification and Technical Data	IO03-500	System Summary – 2	TDC 3010-2
Process Manager I/O Installation	PM20-520	Implementation/ High-Performance Process Manager - 3	TDC 3066-3
TDC 3000X System Site Planning	SW02-550	System Site Planning – 1	TDC 3020-1
Universal Control Network Specification and Technical Data	UN03-500	System Summary – 2	TDC 3010-2
Universal Control Network Planning	UN02-501	System Site Planning – 1	TDC 3020-1
Universal Control Network Installation	UN20-500	Installation/Universal Control Network	TDC 3041
Universal Control Network Guidelines	UN12-510	Installation/Universal Control Network	TDC 3041
Local Control Network Planning	SW02-501	System Site Planning – 1	TDC 3020-1
LCN System Installation	SW20-500	LCN Installation	TDC 3025
LCN System Checkout	SW20-510	LCN Installation	TDC 3025
LCN Guidelines - Implementation, Troubleshooting, and Service	LC09-510	LCN Installation	TDC 3025

Section 1 – ESD Caution

1.1 Overview

Section contents

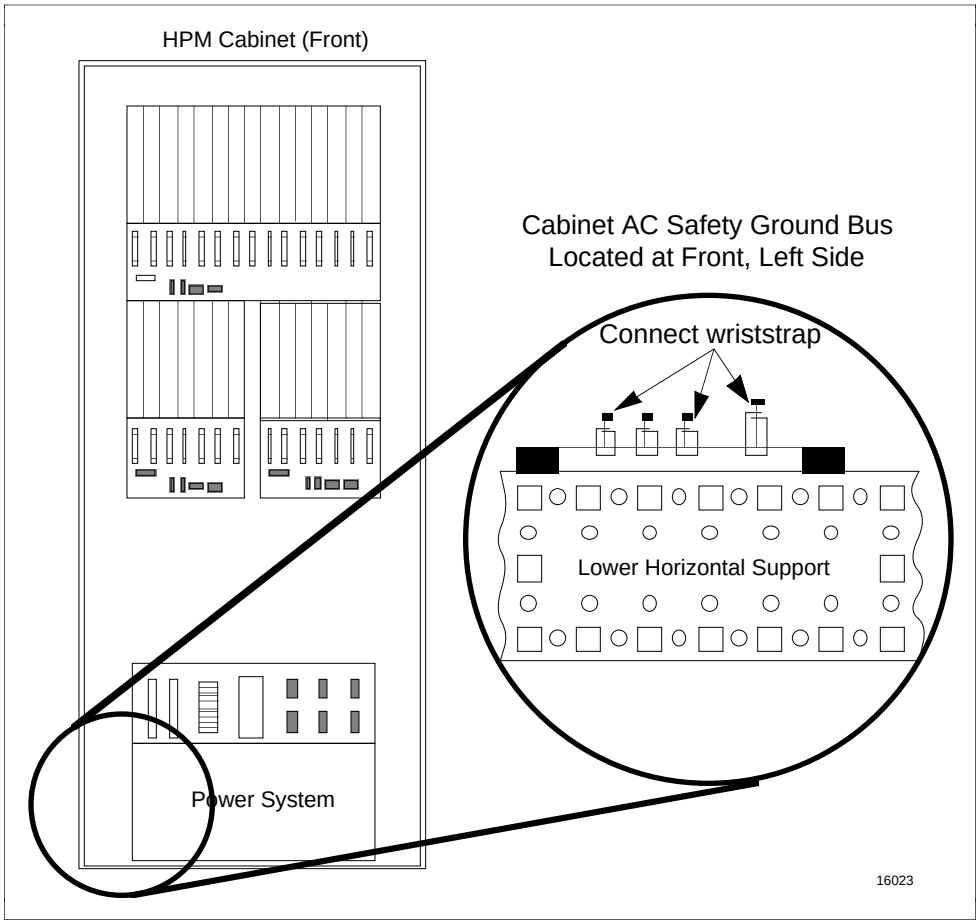
The topics covered in this section are:

CAUTION

CAUTION—This equipment is subject to damage by Electrostatic Discharge (ESD). Wear an ESD wriststrap whenever you handle or make contact with the equipment.

The location of connection points for an ESD wriststrap to the cabinet's Safety Ground is illustrated in Figure 1-1.

Figure 1-1 ESD Wriststrap Cabinet Connection Points



Section 2 – Introduction

2.1 Overview

Section contents

The topics covered in this section are:

Introduction

This publication provides instructions for the installation of the High-Performance Process Manager (HPM). The *High-Performance Process Manager Service* manual provides a description of the High-Performance Process Manager equipment. The following sections provide procedures for the installation of the High-Performance Process Manager equipment.

Installation procedures, including field wiring, for Field Termination Assemblies and associated IOPs, as well as I/O Link Extenders, are found in the *Process Manager I/O Installation* manual.

- Section 3 – Transporting and storing the HPM
- Section 4 – Moving preparations for the HPM
- Section 5 – Unpacking and placement of the HPM
- Section 6 – Installation of redundant HPMMs and IOPs
- Section 7 – Universal Control Network node address pinning
- Section 8 – Wiring to components in the HPM cabinet
- Section 9 – HPM subassembly interconnections

2.2 Tools and Test Equipment

Tools and test equipment list

The following equipment is recommended for the installation of the High-Performance Process Manager.

- Mobile lifter/lift truck – See subsection 5.2 for the requirements.
- Hand tools and a multimeter, as in a typical electrician's tool kit
- A torque wrench, calibrated at 25 inch/pounds for the connection of UCN cables to its connectors. See subsection 7.3.3 for a description.
- A set of SAE (inch) "crow's-foot" wrenches for the above torque wrench.

Section 3 – Equipment Storage

3.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section describes the factory packing and the equipment transit and warehousing specifications requirements.

3.2 Factory Packing

Packaging materials

For shipment, the High-Performance Process Manager are packed with desiccant packages, wrapped in a moisture barrier, placed on skids, and optionally enclosed for shipment as required by the user.

3.3 Transit and Warehousing Specifications

Temperature and humidity parameters

The High-Performance Process Manager can be shipped by a variety of means, but any trucking should be done by enclosed air-ride electronic vans. The equipment is usually trucked on the final segment of the journey to the user warehouse. There, it is stored indoors until needed for installation. During this process, the environment must be monitored and corrected if the following equipment ratings are exceeded.

- Transit/Storage Temperature Range: -55° to 85°C (-67° to 158°F)
- Transit/Storage Humidity Range: 5 to 95% RH noncondensing

Factory wrappers

Keep the factory wrapping intact to minimize humidity.

Resealing the packaging

If it is necessary to unseal the equipment for customs or receiving, add more desiccant and reseal the package.

Section 4 – Move Preparation

4.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section describes the site survey and preparations that should be made before installing the High-Performance Process Manager.

4.2 Survey

Cabinet description

A single cabinet is nominally 0.8 x 0.8 x 2 meters (32 x 32 x 79 inches). Lifting eye-bolts, which are removable, add about five centimeters (2 inches) to the height. The weight varies with options and can go as high as 385 kilograms (850 pounds). A factory assembled complex includes up to four cabinets that are bolted together. See Figures 4-1 and 5-6. Keep this in mind while planning the moving and unpacking of the HPM.

Optional base unit

An optional base unit is available that allows a forklift to be used in moving the cabinets. The option adds 6.35 centimeters (2.5 inches) to the overall height of the cabinet. The option is bolted to the bottom of the cabinet and restricts the wiring access by a small amount.

Planning check items

Items to check for when planning the placement of cabinets :

- Chart the equipment travel route for
  - The loading door's height and location
  - The elevators size, capacity, and availability
  - The number of aisles, their size, and layout
  - The number of doors and their size
  - The hallways' sizes, restrictions, and bends
  - Stairs and ramps that may require some lifting
  - Rigging equipment requirement
- Is there enough floor space to accommodate the equipment?
- Will the flooring in all areas carry the equipment load?
- Are power distribution transformers and panels the proper size, and are there sufficient outlets to support test and maintenance equipment?
- Are proper equipment grounds available?
- Are conduits and cable trays large enough to accommodate the cables?
- Are lighting and other environmental requirements adequate?
- If the installation crew is not composed of regular employees, do they have security clearance?
- To eliminate work delays, have all responsibilities been clearly defined and understood?
- Have at least three conveniently located phones been installed for
  - Honeywell Technical Assistance Center (TAC) data terminal
  - Honeywell TAC voice
  - Operator emergency

4.3 Preparation

Preinstallation preparation list

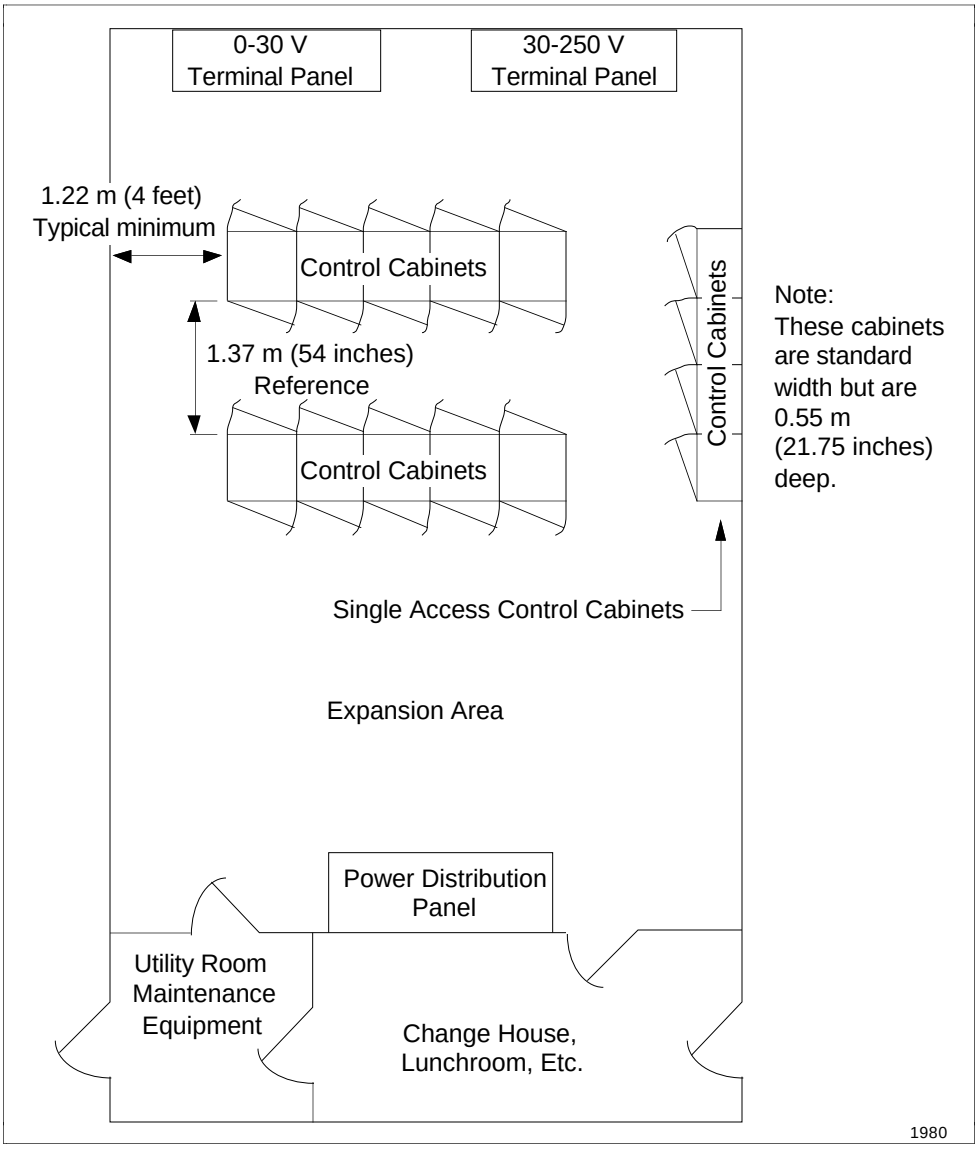
The following preparations will enhance the success in bringing the High-Performance Process Manager to an operational state when power is applied for the first time.

- Static Electricity
  - Strip the floors of any wax to prevent static charge build-up.
  - Use antistatic spray on floors, furniture, and fabric in the work area.
  - Place a sign that states that circuit boards are not to be serviced without wearing an ESD wriststrap.
- Place tack rugs at all entrances to catch dust, grit, and abrasives from other areas.
- Install fire extinguishers suitable for electrical fires.
- Study a typical room layout diagram for cabinet placement as shown in Figure 4-1. If the High-Performance Process Manager cabinet is to be bolted down, Figures 4-2 and 4-3 illustrate the outline dimensions for drilling holes in the floor. In addition, the figures also show the dimensions for cutting out a portion of the floor to accommodate different FTA Mounting Channel configurations when the process wiring is to enter the cabinet from the bottom.

Continued on next page

Typical electronics room layout

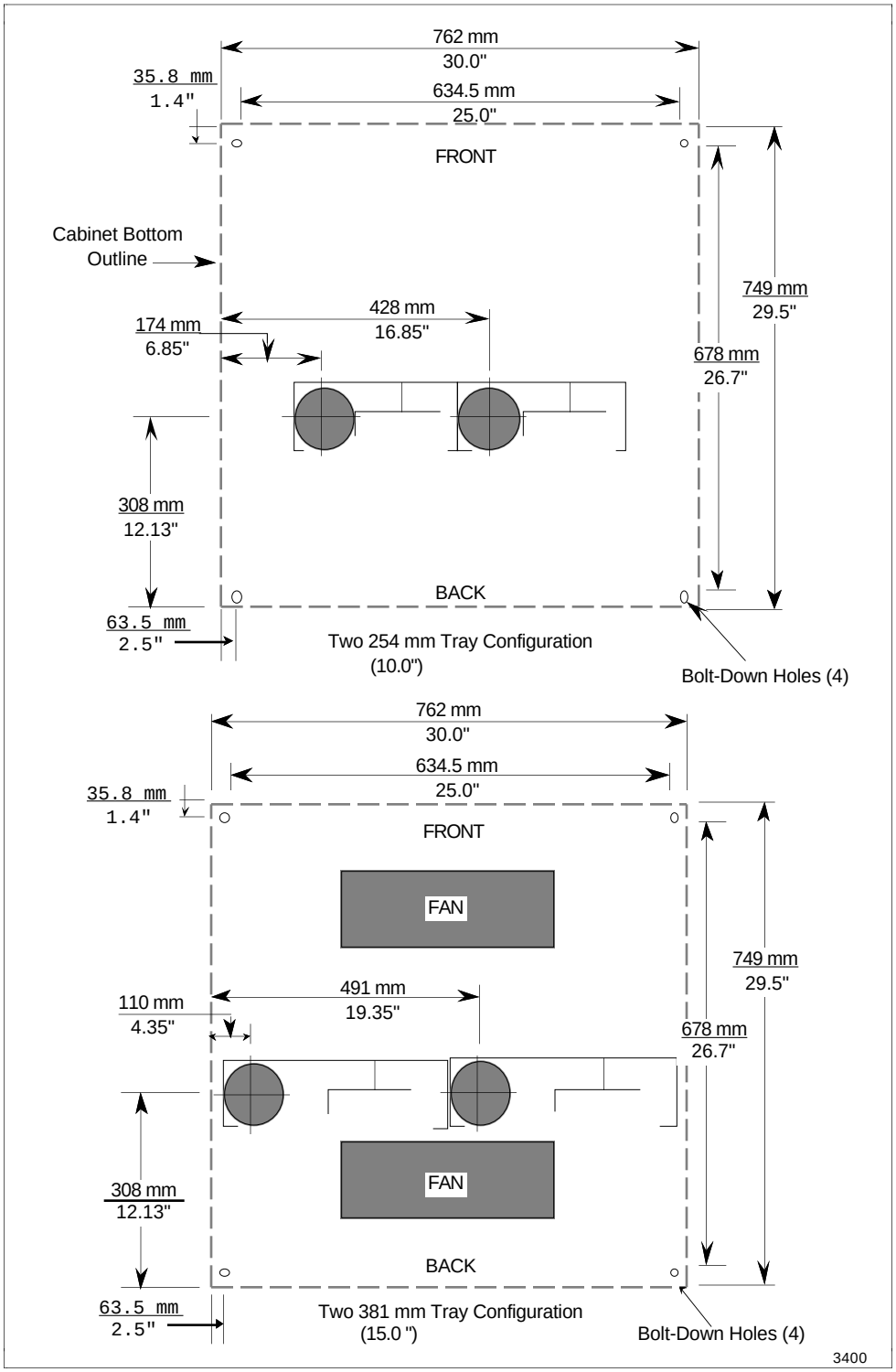
Figure 4-1 Typical Electronics Room Layout



Continued on next page

Two channel cabinet template

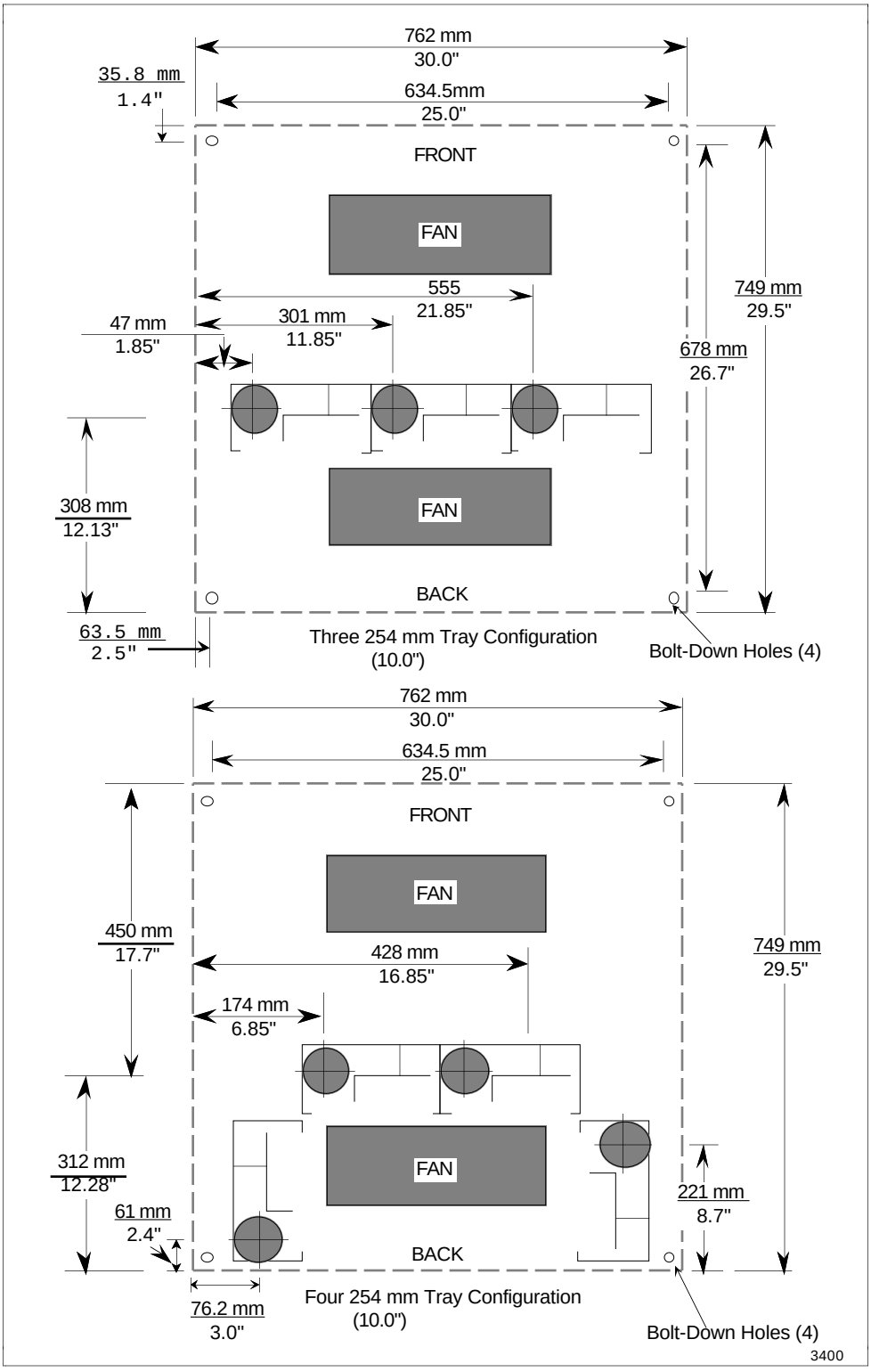
Figure 4-2 Two FTA Mounting Channel Cabinet Template



Continued on next page

Three channel cabinet template

Figure 4-3 Three FTA Mounting Channel Cabinet Template



Section 5 – Equipment Unpacking and Placement

5.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section describes how the High-Performance Process Manager (HPM) is to be moved to its final location, positioned, and then bolted down.

5.2 Unpacking

Unpack the equipment, check the shipment against the invoice, and notify Honeywell of any shortages immediately.

5.3 Moving

CAUTION

CAUTION—Tilting the cabinet more than 45°, front or back, may damage the doors. They are not recessed.

Four methods

The equipment can be moved by using any one of four methods.

- Fork Lift
- Mobile Lifter
- Rollers
- Crane

Use lifters of 1100 kilograms (2500 pounds) or more capacity.

5.3.1 Fork Lift Method

CAUTION

CAUTION—The fork lift method of moving cabinets must not be used when the cabinets have bases attached or they are complexed. Use either the crane or the roller methods described in the following subsections.

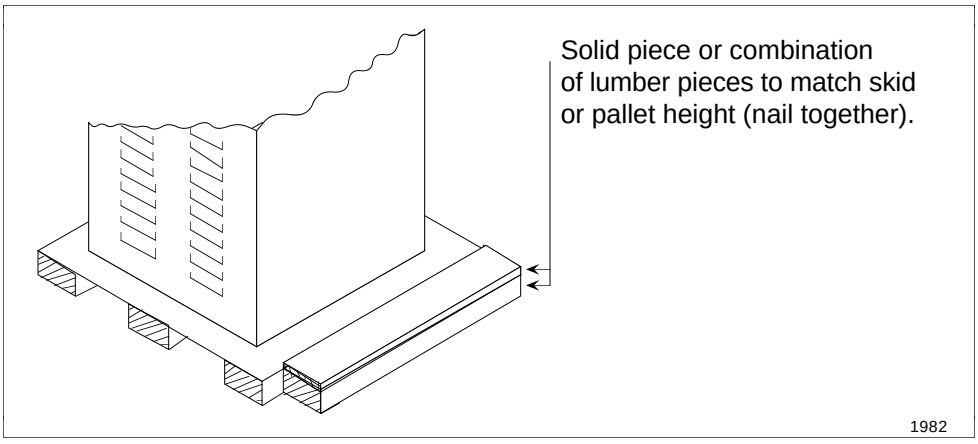
Procedure

When the equipment is attached to its original shipping skid, it can be moved by fork lift to the final location with the procedure in Table 5-1.

Table 5-1 Procedure for Moving Equipment by Fork Lift

Step	Action
1	Move the equipment to the electronics room by fork lift. Remove the fork lift.
2	Open the cabinet doors, locate the skid bolts, and remove them.
3	Stack lumber against the pallet to a matching height as illustrated in Figure 5-1.
4	Manually move the equipment onto the lumber 10 centimeters (4 inches).
5	Tip the cabinet weight onto the lumber and pull out the skid.
6	Tip the cabinet off the lumber and onto the floor. Remove the lumber.
7	Manually move the cabinet to the exact final position.

Figure 5-1 Removal of Equipment from Shipping Skid



5.3.2 Mobile Lifter Method

Procedure

When using mobile lifters, the cabinet is removed from the shipping skid and placed on a transport skid that is made with angle iron. It is then moved with the mobile lifter using the procedure in Table 5-2.

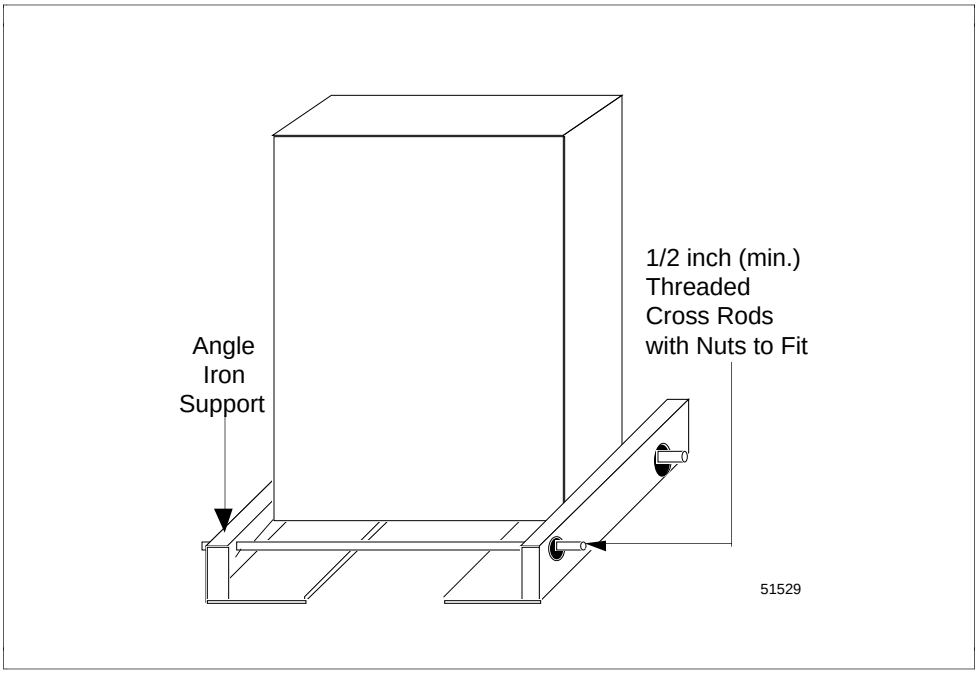
Table 5-2 Procedure for Moving Equipment by Mobile Lifters

Step	Action
1	Remove any steel bands, turnbuckles, and cables securing the equipment to the shipping skid.
2	Open the cabinet doors and locate the bolts holding the cabinets to the shipping skid. Remove them and close the doors.
3	Tilt the equipment slightly and slide one of the angle irons used to make up a transport skid underneath the cabinet as illustrated in Figure 5-2.
4	Repeat the above step for the other angle iron.
5	Insert a strip of heavy cardboard between each angle iron and the equipment finish.
6	Tighten the angle irons against the cabinet by tapping slightly.
7	Insert and tighten two 12 millimeters (1/2-inch) minimum, threaded cross rods as illustrated in Figures 5-2.
8	Spread the lifter forks to 0.8-meter (32-inch) centers and place them under each cross rod. Place the fork dowels, illustrated in Figure 5-3, between the cross rods and the cabinet, just touching the cross rods.
9	Place wooden spacer blocks along the forks that are long enough to press the cross rods against the fork dowels.
10	Position a protective plate using braces as illustrated in Figure 5-2. Be sure that the plate does not press against handles or other cabinet hardware.
11	Raise both lifter forks evenly until the equipment clears the shipping skid. Pull it out of the way.
12	Wheel the equipment to the final position in the electronics room. Lower it to the floor.
13	Pull out the mobile lifters. Remove and dismantle the angle iron transport skid.
14	Manually place the cabinet in the exact final position.

Continued on next page

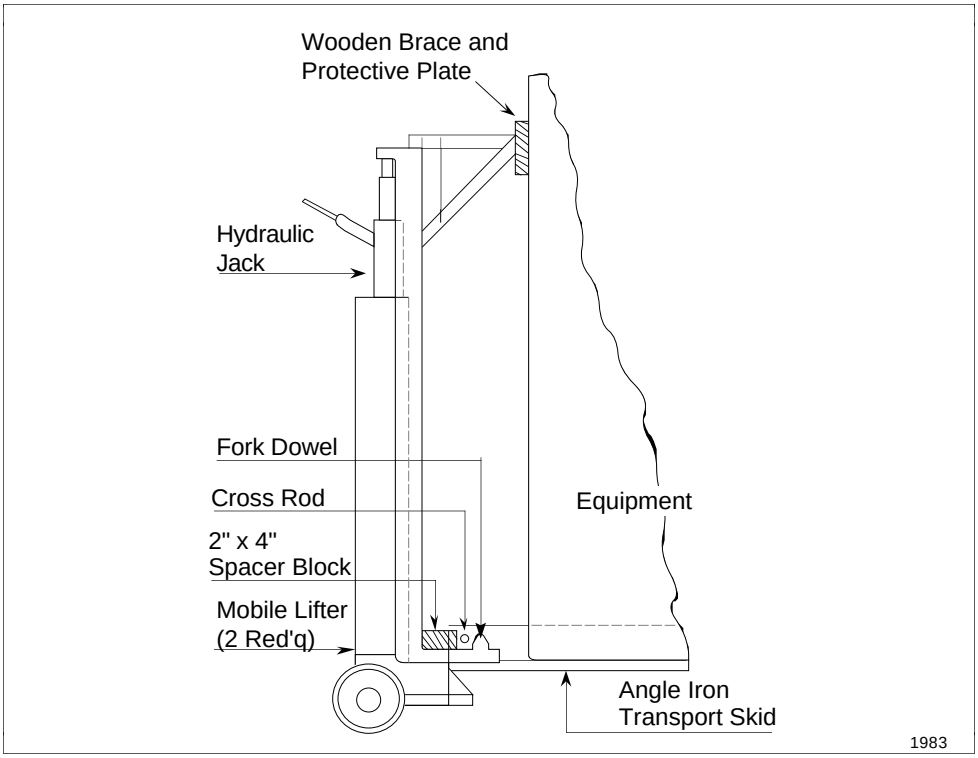
Angle iron transport skid

Figure 5-2 Construction of Angle Iron Transport Skid



Mobile lifter method

Figure 5-3 Mobile Lifter Method of Equipment Transport



5.3.3 Roller Method

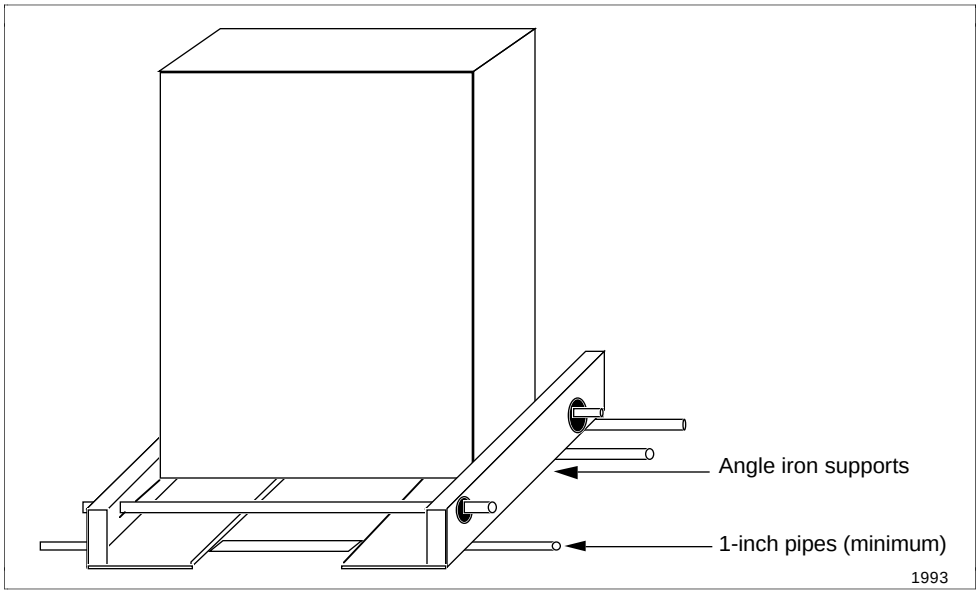
Procedure

The cabinet can be moved to its final destination using pipe rollers under a transport skid made from angle iron using the procedure in Table 5-3.

Table 5-3 Procedure for Moving Equipment by Rollers

Step	Action
1	Use one of the previous methods to move the cabinet to a location where rollers can be used.
2	Install the angle iron transport skid as in the mobile lifter method.
3	Place 25-millimeter (1-inch) pipes under the transport skid as illustrated in Figure 5-4. The load must be on the angle irons, not the cabinet.
4	Roll the cabinet to the final location. At least three pipes must be under the transport skid at all times.
5	When the cabinet is near the final location, tilt it and pull out the pipes, the middle one last.
6	Dismantle the transport skid and position the cabinet manually to the exact final location.

Figure 5-4 Roller Method of Transporting Equipment



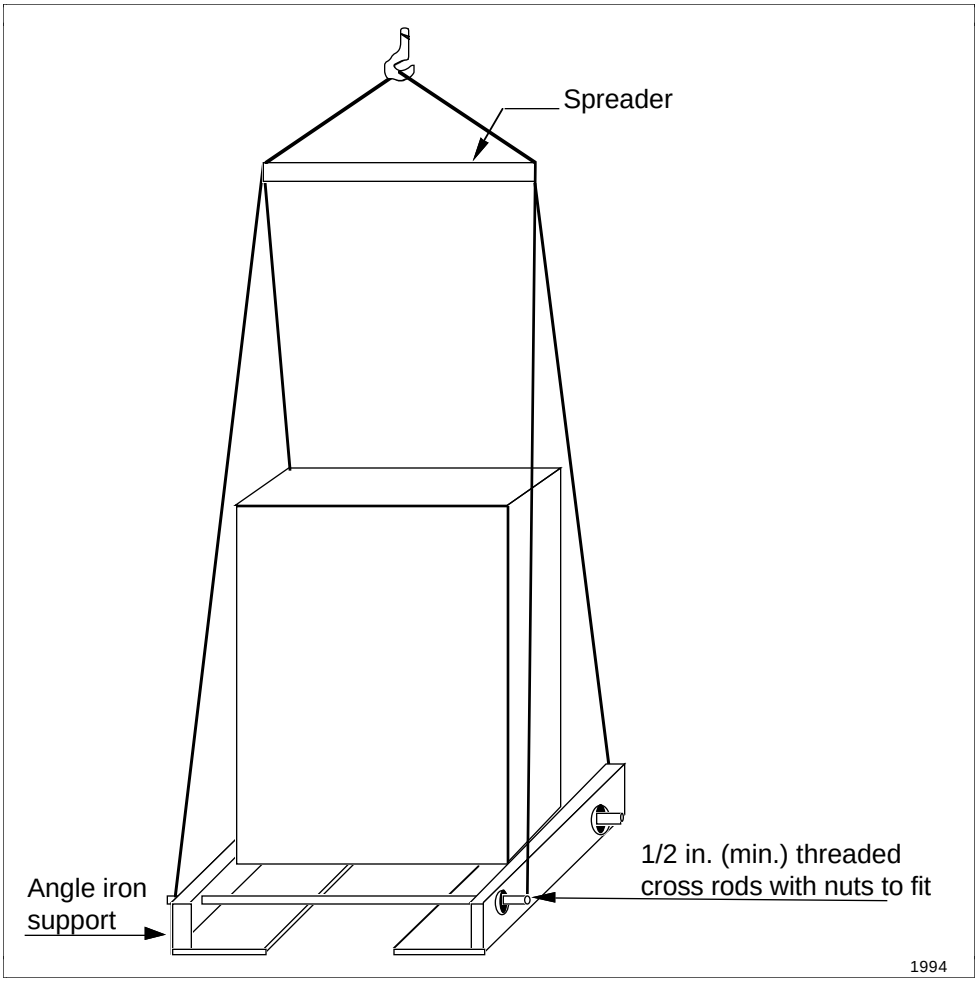
5.3.4 Crane Method

Procedure

The cabinet can be lifted into place with a crane. Use either an angle iron transport skid as illustrated in Figure 5-5 or the lifting eye-bolts installed on each cabinet as illustrated in Figure 5-6.

When a cabinet complex is involved (two or more cabinets), 25-millimeter (1-inch) diameter steel rods of sufficient strength are inserted through both the front and back pairs of eye-bolts of each cabinet, and the complex is lifted at the points shown in Figure 5-6 for the complex size.

Figure 5-5 Transport-Skid Crane Method of Transporting Equipment

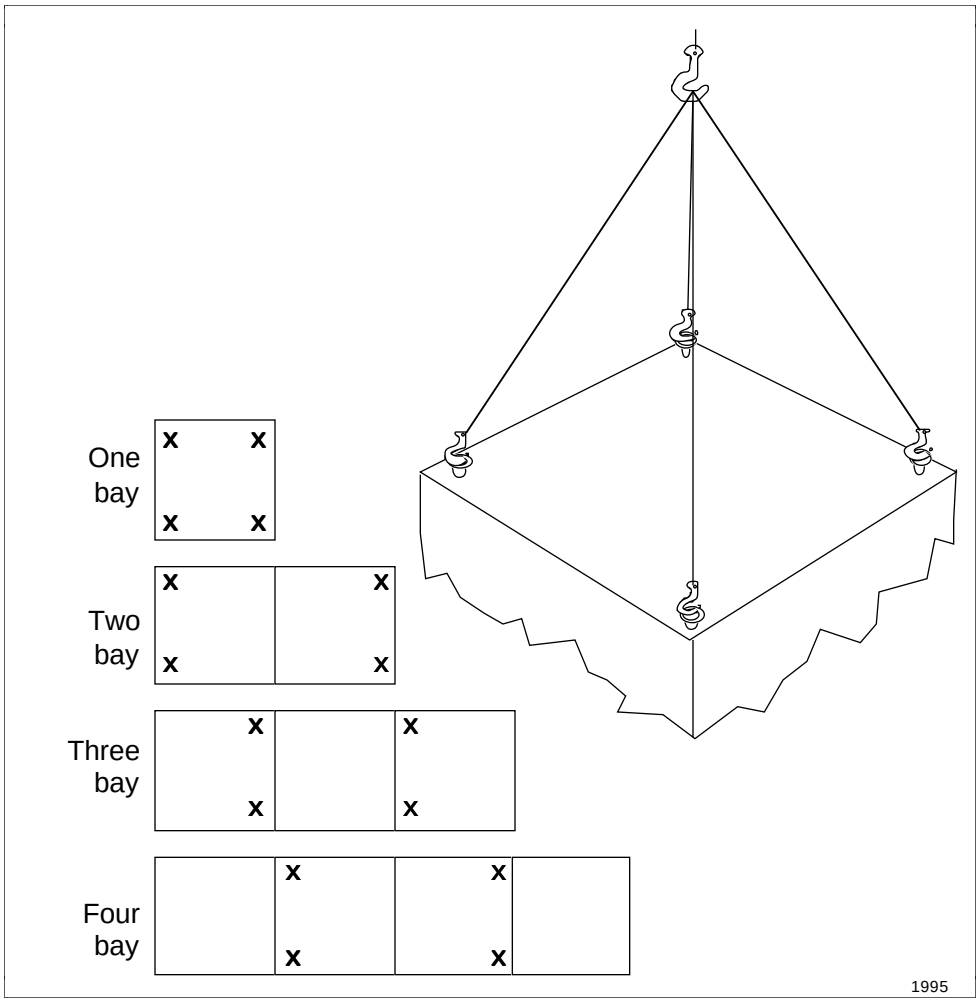


Continued on next page

5.3.4 Crane Method, Continued

Eye-bolt crane method

Figure 5-6 Eye-Bolt Crane Method of Transporting Equipment



5.4 Cabinet Leveling and Bolt-Down

No cabinet levelers

The cabinet does not have levelers. It may be necessary to place shims underneath the cabinet in order to ensure that it is level and rests solidly on the floor.

Bolt-down holes

The cabinet has six holes at the bottom for bolting it to a floor. A partially filled cabinet should be bolted down. Cabinets that are bolted together are not easily moved and do not ordinarily require bolting down. See Figure 4-2 or 4-3 for the location of the bolt-down holes.

Section 6 – Redundancy Installation

6.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section discusses the installation of redundant High-Performance Process Manager Modules (HPMMs) and redundant IOPs.

6.2 Redundant HPMM Card File Installation

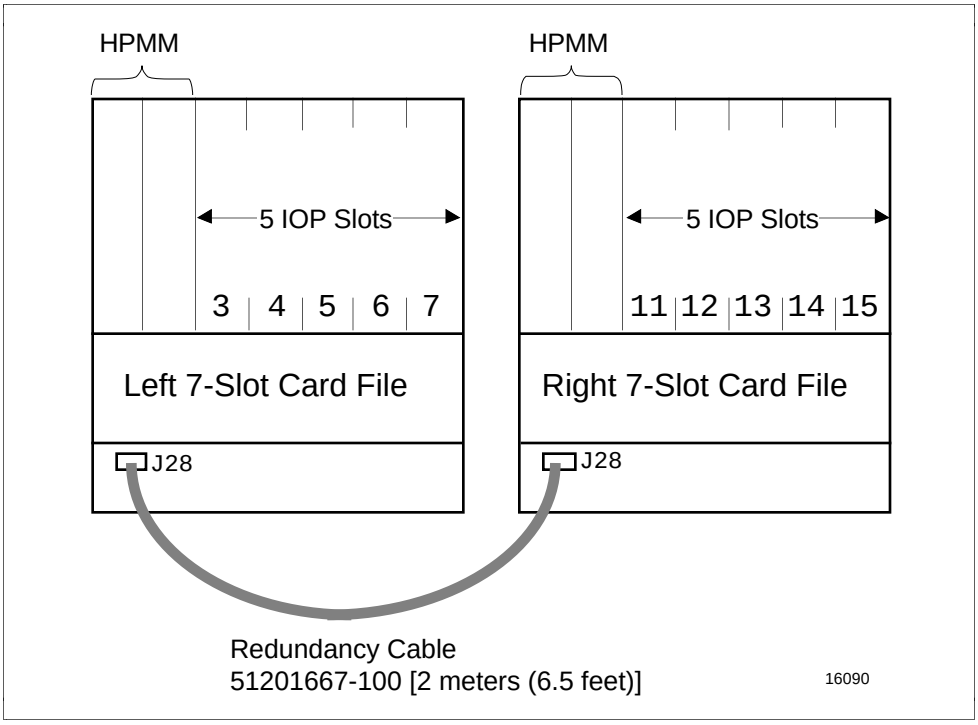
Introduction

Redundancy for an existing High-Performance Process Manager Module (HPMM) can be added to an HPM subsystem by the installation of second card file that contains HPMM cards and a redundancy cable, Honeywell part number 51201667.

Redundant 7-Slot HPMM card files

Figure 6-1 illustrates redundant HPMMs that are installed in two separate 7-Slot card files. The ends of the redundancy cable are connected to J30 on the card file's backplane.

Figure 6-1 Redundant HPMM Card File Configuration



Redundant 15-Slot HPMM card files

The redundant HPMMs can also be resident in 15-Slot card files. The installation procedure is the same. However, the redundancy connectors on the backplane of the 15-Slot card file are labeled J38.

Continued on next page

6.2 Redundant HPMM Card File Installation, Continued

Same or adjacent cabinet	The additional redundant HPMM card file can be installed in the same cabinet or in an adjacent cabinet of a cabinet complex. Installation in an adjacent cabinet is preferred because each HPMM and the accompanying IOPs in the HPMM card file can have the added protection of an independent Power System in the cabinet.
Redundancy cable length	The redundancy cable must not exceed 2 meters (6.5 feet) in length.
Additional Power and I/O Link Interface cables	The added redundant HPMM card file requires the installation of additional Power and I/O Link Interface cables which are discussed in Section 9 in this manual.
Additional UCN cables	Cabling to the Universal Control Network (UCN) must be added as discussed in the *Universal Control Network Planning* and *Universal Control Network Installation* manuals, as well as Section 7 in this manual.
UCN node and I/O Link Interface address configuration	UCN node address selection and I/O Link Interface address selection are other considerations for the added redundant HPMM card file. Section 7 in this manual discusses UCN node address selection. Section 9 discusses I/O Link Interface address selection.

6.3 Redundant IOP Installation

Redundancy rules

Redundant IOPs can be installed in any available slot in a card file and function correctly. However, to take full advantage of redundancy, placement of the redundant IOPs is important. Consider the following.

- For an HPM subsystem that has a nonredundant HPMM, the redundant pair of IOPs should be split between two card files. Also, subsystem maintenance will be much less confusing if the IOPs are installed in the same slot number in each card file.
- For an HPM subsystem that has redundant HPMMs in card files that are located side by side, or in separate cabinets, the pair of redundant IOPs should be installed in separate card files if possible.
- For an HPM subsystem that has redundant HPMMs split between two cabinets, the redundant pair of IOPs should be split between the two cabinets and installed such that each IOP is located in the same card file slot in each cabinet.

FTA IOP redundancy support

Presently, the subsystem supports IOP redundancy for five types of IOPs. They interface with six types of FTAs to provide IOP redundancy.

The IOP types are:

- High Level Analog Input (HLAI)
- Smart Transmitter Interface (STI or STIM)
- Analog Output (AO)
- Digital Input (DI)
- Digital Output (DO)

The FTA types that support IOP redundancy are:

- High Level Analog Input (HLAI)
- High Level Analog Input (HLAI)/Smart Transmitter Interface (STI)
- Smart Transmitter Interface (STI)
- Analog Output (AO)
- Digital Input (DI)
- Digital Output (DO)

Continued on next page

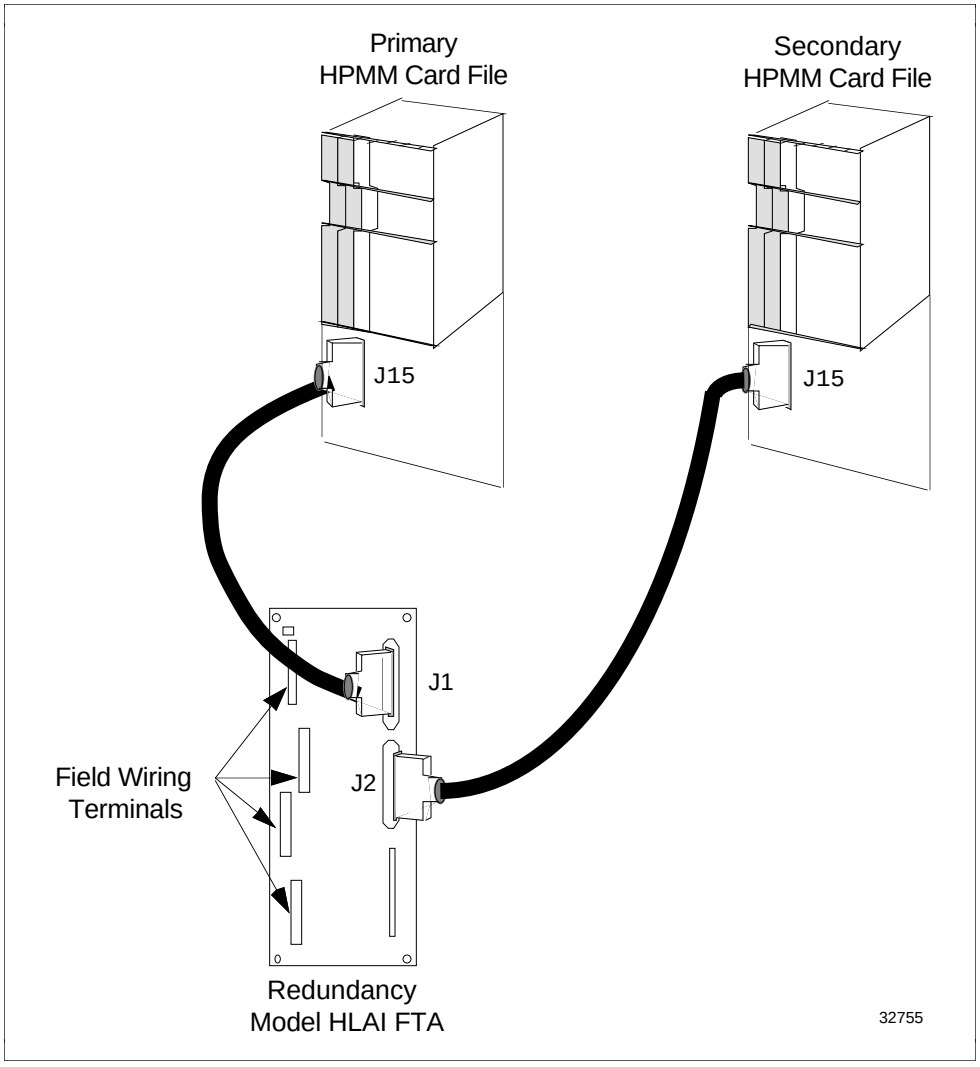
Field control wiring

Redundant FTAs are not supported; however, some FTA models do support redundant IOPs. The field control wiring to these FTAs is never redundant, but the cabling from the FTA to the IOPs that support redundancy is redundant. Installation information and wiring diagrams for the FTAs that support redundant IOPs are found in the *Process Manager I/O Installation* manual.

Redundant HLAI IOPs

Figure 6-2 is an illustration of a High Level Analog Input (HLAI) FTA that supports a pair of redundant High Level Analog Output IOPs in separate card files. The connections between the FTA and the pair of IOPs are shown. Cabling selection is detailed in Section 9 in this manual.

Figure 6-2 Redundant HLAI IOP Cabling

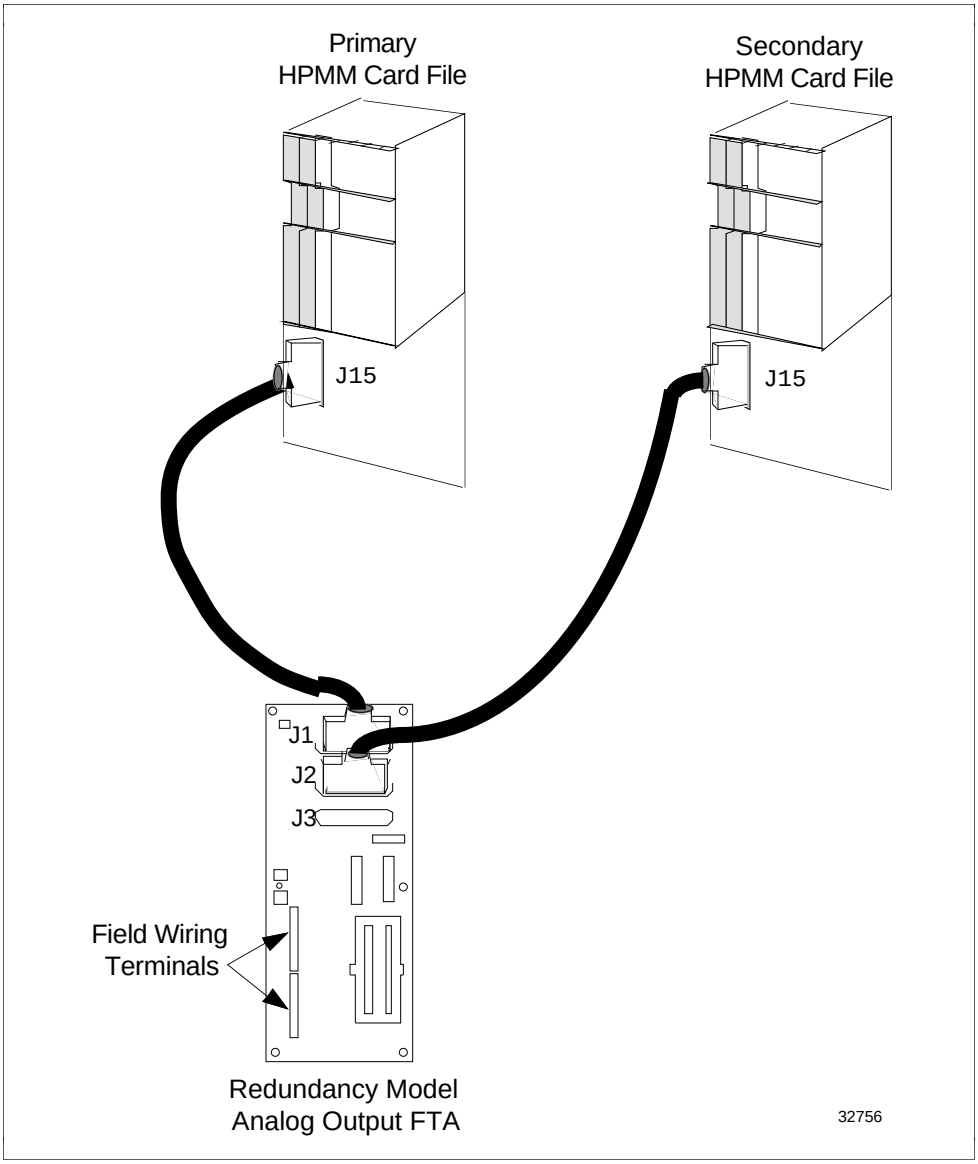


Continued on next page

Redundant Analog Output IOPs

Figure 6-3 is an illustration of a Analog Output (AO) FTA that supports a pair of redundant Analog Output IOPs in separate card files. The connections between the FTA and the pair of IOPs are shown. Cabling selection is detailed in Section 9 in this manual.

Figure 6-3 Redundant Analog Output IOP Cabling



Section 7 – UCN Node Installation

7.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section describes the High-Performance Process Manager (HPM) and Network Interface Module (NIM) UCN node address selection that may be required when installing the High-Performance Process Manager and NIM. It also includes information concerning the installation of Universal Control Network (UCN) trunk taps within the High-Performance Process Manager cabinet.

7.2 UCN Node Address Configuration

Introduction

The selection of the Universal Control Network (UCN) node address for the High-Performance Process Manager (HPM) and Network Interface Module (NIM) is described in the following subsections.

7.2.1 HPM UCN Node Address Selection

Introduction

The UCN node address is configured in the factory for each HPMM, but the address should be verified at the time of installation.

ATTENTION

ATTENTION—Do not confuse the UCN node addressing with the I/O Link Interface addressing. See Section 9 for the I/O Link Interface address selection procedure.

HPMM configuration

The High-Performance Process Manager can have one or two High-Performance Process Manager Module (HPMM) card files, and possibly none or several Input/Output (IOP) card files.

HPMM card file definition

An HPMM card file is defined as a card file that contains a single HPMM and additional card slots that will accommodate IOPs or an I/O Link Extender card and associated Fiber Optic Coupler. A UCN node address must always be selected for an HPMM card file.

IOP card file definition

An IOP card file is a card file that is dedicated to IOPs only. It does not contain an HPMM.

Odd UCN node address

The UCN node address for a High-Performance Process Manager must always be an odd number. The odd UCN node address is the address of both the primary and secondary HPMM in the HPM. The next consecutive address (even) is not used. For example, configuring the HPM for an odd UCN node address of 11 is acceptable. An even UCN node address of 12 is unacceptable.

HPMM card complement

An HPMM card file always contains a single HPMM. The HPMM is composed of 2 cards (HPM Comm/Control and HPM I/O Link) that occupy the two left-most card slots (1 and 2 or 9 and 10) and a module (HPM UCN Interface) that occupies the left-most card slot's 50-pin phone connector.

Redundant HPMMs

Both HPMM card files must be configured for the same odd primary UCN node address.

Primary and secondary HPMM determination

When there are redundant HPMMs, the subsystem logically determines the primary and secondary HPMM, either automatically or by System Console intervention. By convention, the HPMM in a Left 7-Slot card file is the primary HPMM, and an HPMM in a Right 7-Slot card file is the secondary HPMM. When the HPMMs are contained in 15-Slot card files, the HPMM in the card file that is assigned the lower I/O Link Interface address is considered the primary HPMM.

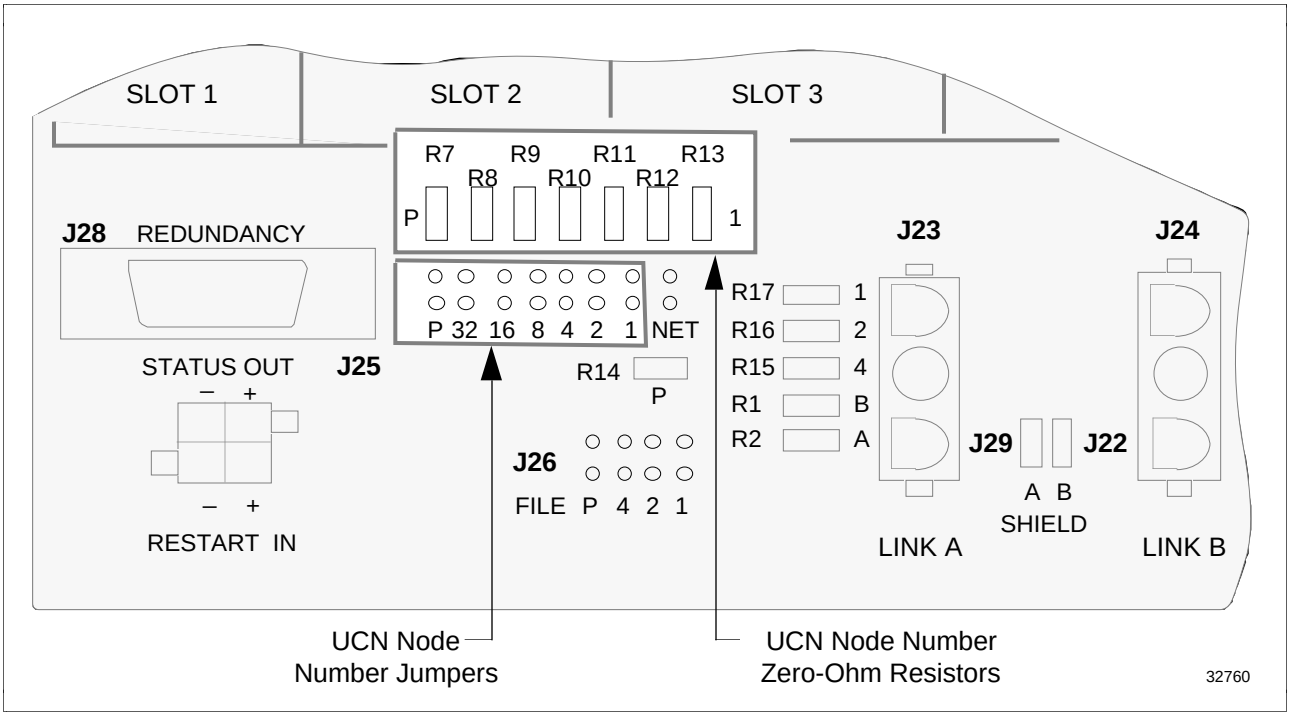
Continued on next page

7.2.1 HPM UCN Node Address Selection, Continued

7-Slot Card file backplane pinning locations

Figure 7-1 illustrates the portion of a Left 7-Slot HPMM card file backplane where the odd UCN node address is selected by one of the two methods described below. The illustration features would be the same for a Right 7-Slot card file. Only the slot numbers are different.

Figure 7-1 7-Slot Card File Backplane Pinning Locations



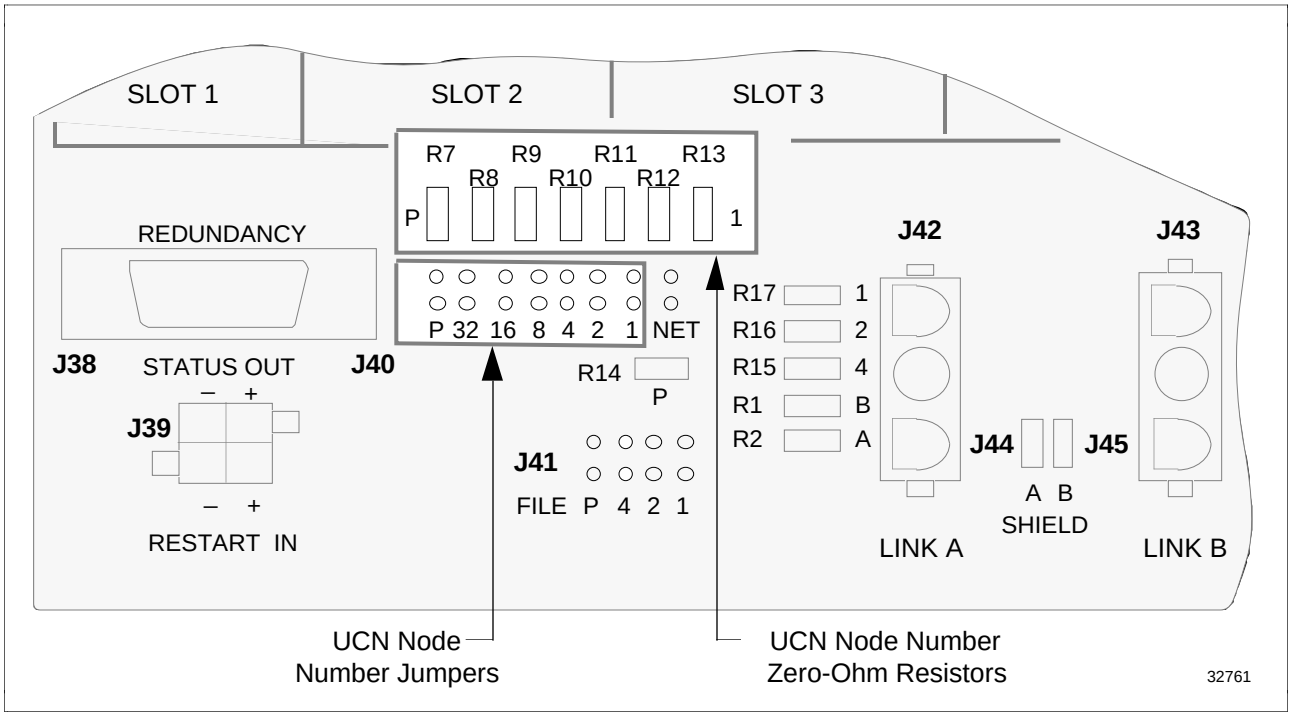
Continued on next page

7.2.1 HPM UCN Node Address Selection, Continued

7-Slot Card file backplane pinning locations

Figure 7-2 illustrates the portion of a 15-Slot HPMM card file backplane where the odd UCN node address is selected. Only the "J" numbers are different for the pinning locations.

Figure 7-2 15-Slot Card File Backplane Pinning Locations



Two UCN node address selection methods

There are two methods of selecting the UCN node address.

- Plug Jumpers – Also known as "padlock" or "cowbell" jumpers.
- Zero-Ohm Resistor Jumpers (Optional) – These are basically a jumper wire soldered to the circuit board.

ATTENTION

ATTENTION—UCN zero-ohm resistor jumpers are a Factory option. They are not normally installed on the card file backplane unless requested when placing a special order for the card file.

Selection method charactistics

UCN plug jumpers are convenient to set up and change. Zero-ohm resistor jumpers are reliable and permanent. Zero-ohm resistor jumpers are selectively removed while initially setting up the UCN node address, so the method can be used only once.

One method or the other must be disabled during installation before the subsystem will function properly.

Continued on next page

7.2.1 HPM UCN Node Address Selection, Continued

Odd number of jumpers

For either address selection method, the system is designed so that an odd number of jumpers or resistors must be used. That is, regardless of the numerical value of the node address, the parity (**P**) plug/resistor jumper must be added or removed to provide an odd number of jumpers.

Plug jumper method

To use the plug jumpers at location J27 (J40 on the 15-Slot card file backplane) to configure the UCN node address, take diagonal cutters and remove all the zero-ohm resistor jumpers, R7 through R13, as shown in Figure 7-1. As an example, to configure a High-Performance Process Manager for a UCN node address of 11, install jumpers at positions **1**, **2**, and **8** (1 + 2 + 8 = 11) by bridging the two circuit pins at each position. Because an odd number of jumpers are used, the **P** (parity) jumper is removed along with those at positions **4**, **16**, and **32**. The unused jumpers can be stored at their regular positions by hanging them on one pin.

Zero-ohm resistor plug method

UCN node address selection, using zero-ohm resistor jumpers, is demonstrated with the following example. This is not the preferred method. Normally, zero-ohm resistor jumpers are not present on the card file backplane.

To use the zero-ohm resistor jumpers to configure the UCN node address, unplug and discard or store all the plug jumpers by the method noted above. As an example, to configure a High-Performance Process Manager for a UCN node address of 33, do not remove the resistors at the **1**, **32** (1 + 32 = 33), and **P** (parity) positions which are resistors R13, R8, and R7. The odd number of jumpers requirement is satisfied with the presence of the parity position jumper. Use diagonal cutters and remove the remaining resistors which are at positions **2**, **4**, **8**, and **16** which are R12, R11, R10, and R9.

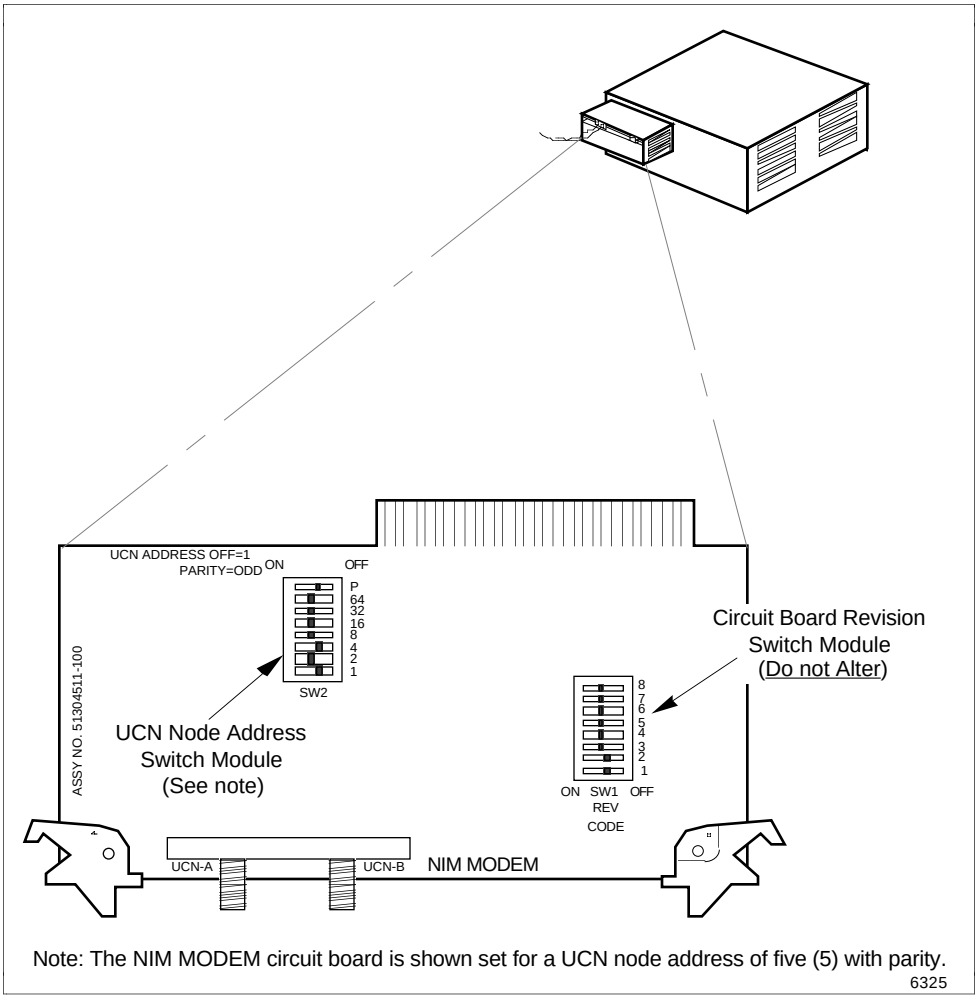
If a mistake is made and a wrong resistor is removed, do not attempt to resolder it. Instead, remove all the resistors and use the plug jumper method for UCN node address selection.

7.2.2 NIM UCN Node Address Selection

NIM Modem board

Configure the Network Interface Module (NIM) UCN node address using the switch module on the NIM Modem board that is located behind the Enhanced Process Network Interface (**EPNI**) circuit board in the Five-Slot or Dual Node Module. Be sure parity is correct as illustrated in Figure 7-3. Parity must be correct or the NIM will not pass startup diagnostics in either the **Test** or **Normal** mode. The *Five/Ten-Slot Module Service* or *Dual Node Module Service* manual provides additional information.

Figure 7-3 Network Interface Module UCN Configuration



Note: The NIM MODEM circuit board is shown set for a UCN node address of five (5) with parity.

6325

Test/Normal mode

The NIM uses the UCN node address selected by the switch module only in the **Test** mode. In the **Normal** mode, the switch module is not active because the UCN node address is configured by the system through the Local Control Network (LCN).

Continued on next page

7.2.2 NIM UCN Node Address Selection, Continued

Node address selection

Configure the primary NIM to an odd number such as 1, 3, 5, or 7. Configure the redundant NIM, if present, to have the next consecutive even address, such as 2, 4, 6, or 8. The redundant NIM can reside in the other node, upper or lower node, of a Dual Node Module or in a Five-Slot Module. When there is not a redundant NIM, the even address must not be assigned to any other module. The even UCN address is reserved for the redundant NIM.

ATTENTION

ATTENTION—The NIM operational node address must be the lowest address in the UCN, typically 1 through 8, to be compatible with software functions.

NIM node address selection example

As an addressing example, to select a primary NIM UCN node address of 5 (odd = primary), move the switch positions **1** and **4** (1 + 4 = 5) to their **OFF** state, to the right. Because it is required that an odd number of switch positions be set to the **OFF** position (equal to one), the parity (**P**) position must also be set to the **OFF** state. All other switch positions must be set to the **ON** state, to the left.

A second address selection example

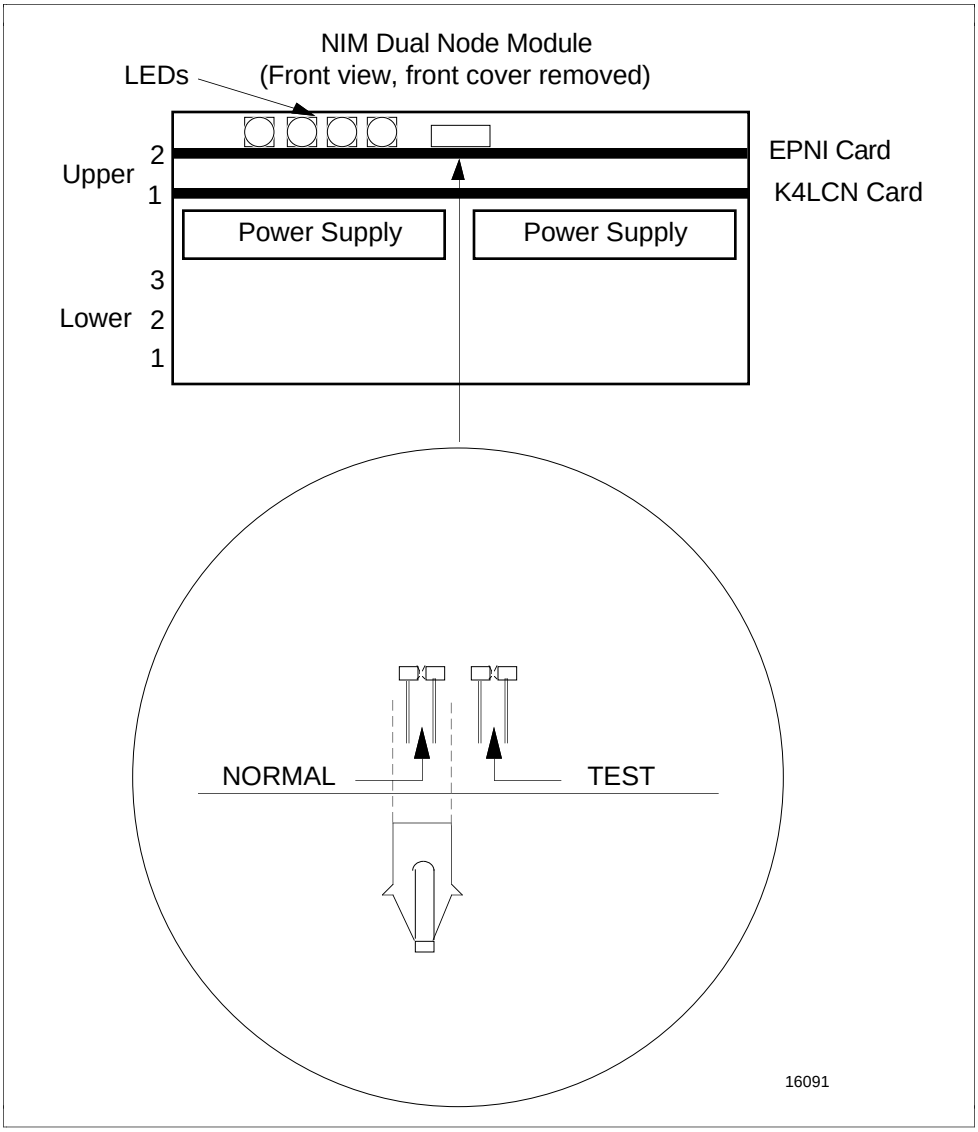
As another addressing example, to configure to a secondary NIM UCN node address of 6 (even = secondary), switch positions **2** and **4** (2 + 4 = 6) must be in the **OFF** state, to the right. Because it is required that an odd number of switch positions are set to the **OFF** state (equal to one), the **P** (parity) position is also set to the **OFF** state. All other positions are set to the **ON** state.

Continued on next page

Test/Normal jumper positioning

Figure 7-4 is an illustration of an **EPNI** board installed in a Dual Node Module. Be sure the **Test/Normal** jumper is in the **Normal** position when the NIM is not in the **Test** mode. Figure 7-4 illustrates an **EPNI** circuit board in a Dual Node Module, but the same rule applies for an **EPNI** circuit board that is installed in a Five-Slot Module.

Figure 7-4 EPNI Board Test/Normal Jumper



7.3 UCN Trunk Tap Cabinet Installation

Introduction

UCN trunk taps can be installed in a High-Performance Process Manager cabinet, or cabinet complex, by mounting them on brackets that are affixed to the cabinet's center side mounting rails.

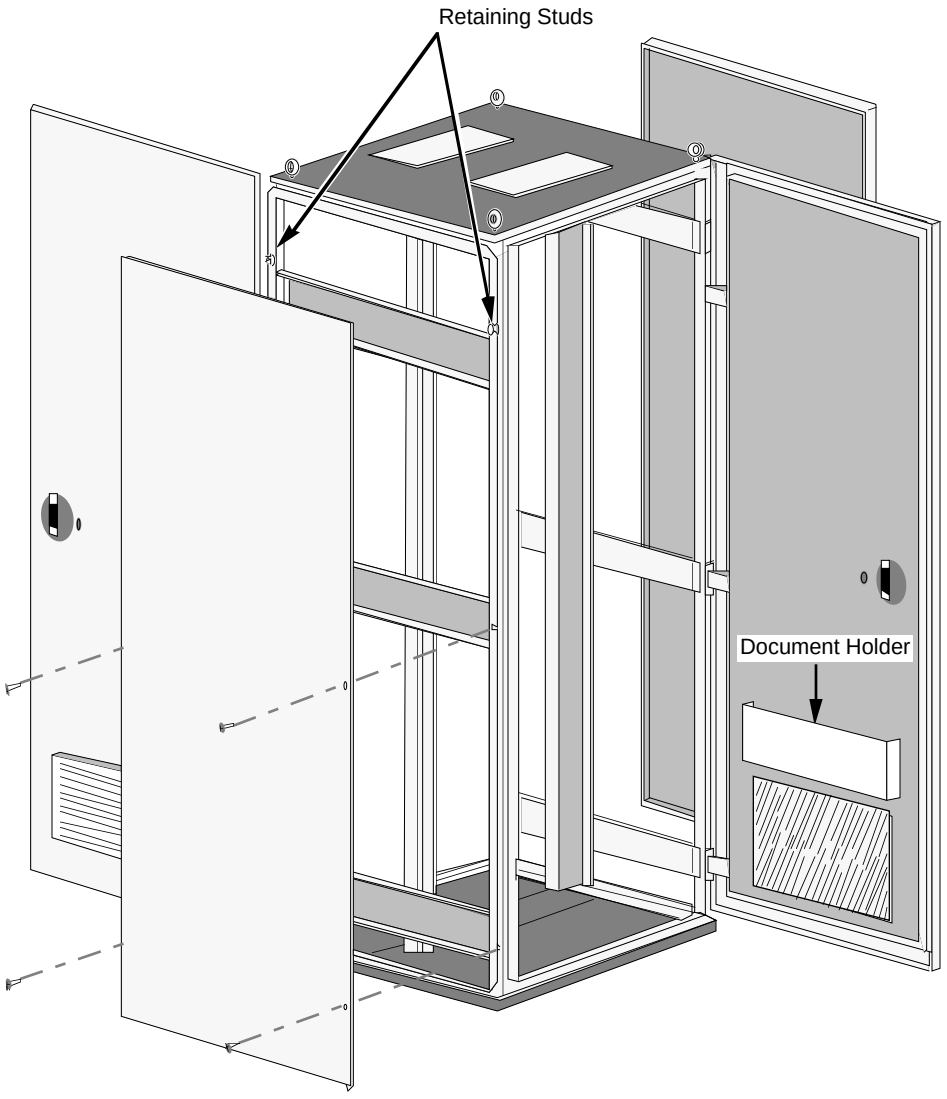
Cabinet model views

See Figures 7-5 and 7-6 for views of the rails in the model MU-CBDM01 and MU-CBSM01 (Markhon) cabinets. See Figures 7-7 and 7-8 for views of the model MU-CBDX01 and MU-CBSX01 (Rittal) cabinets.

Continued on next page

Dual access model MU-CBDM01 cabinet

Figure 7-5 Dual Access Model MU-CBDM01 (Markhon) Cabinet



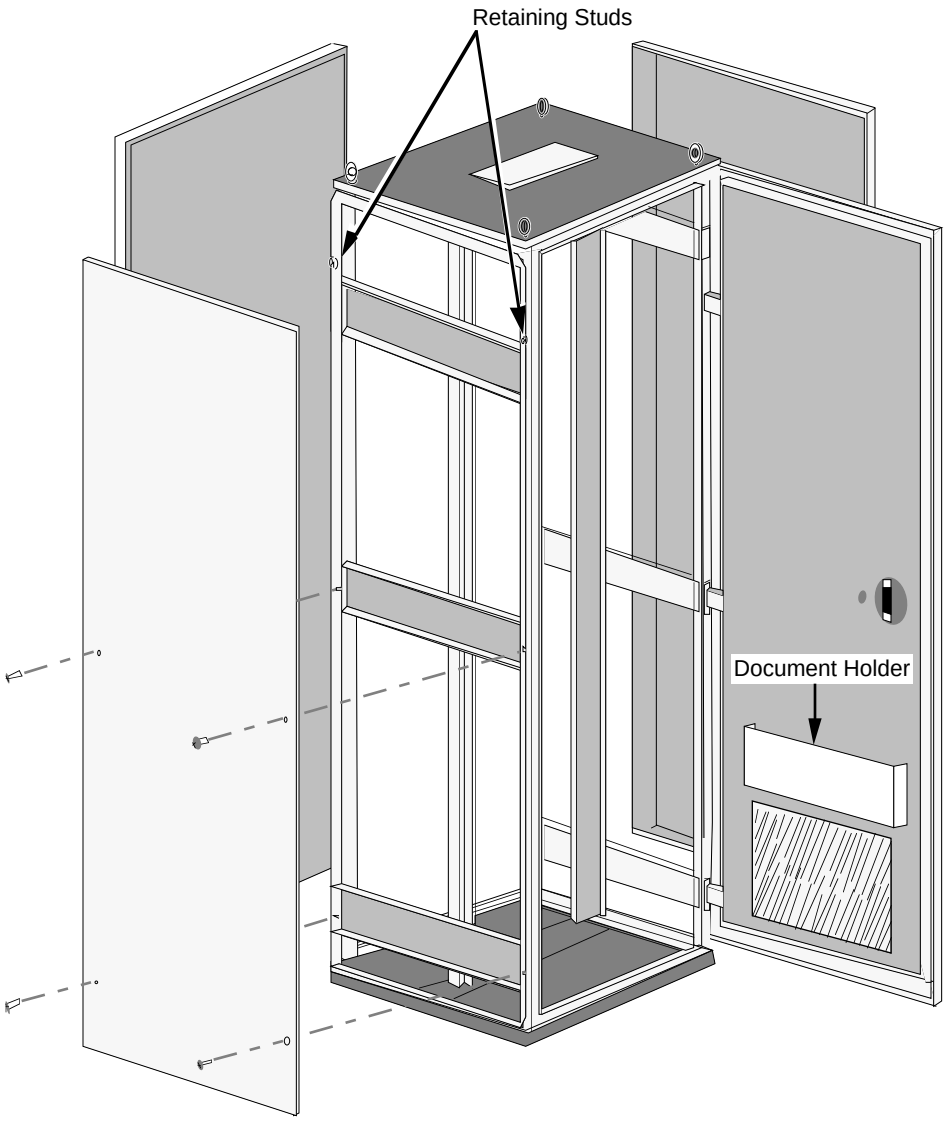
Dimensions	Width	Depth	Height
Dual Access	.8 m/31.5 in.	.8 m/31.5 in.	2.1 m/81.5 in.

3095

Continued on next page

Single access model MU-CBSM01 cabinet

Figure 7-6 Single Access Model MU-CBSM01 (Markhon) Cabinet



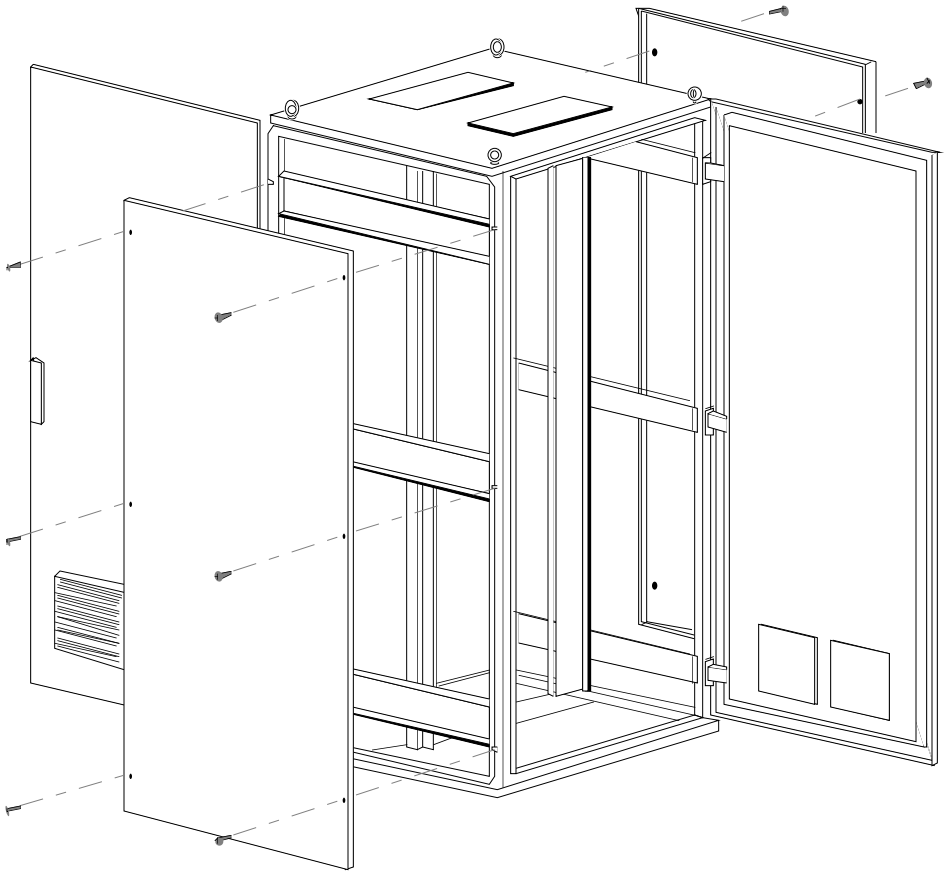
Dimension	Width	Depth	Height
Single Access	.8 m/31.5 in.	.55 m/21.75	2.1 m/81.5 in.

3096

Continued on next page

Dual access model MU-CBDX01 cabinet

Figure 7-7 Dual Access Model MU-CBDX01 (Rittal) Cabinet



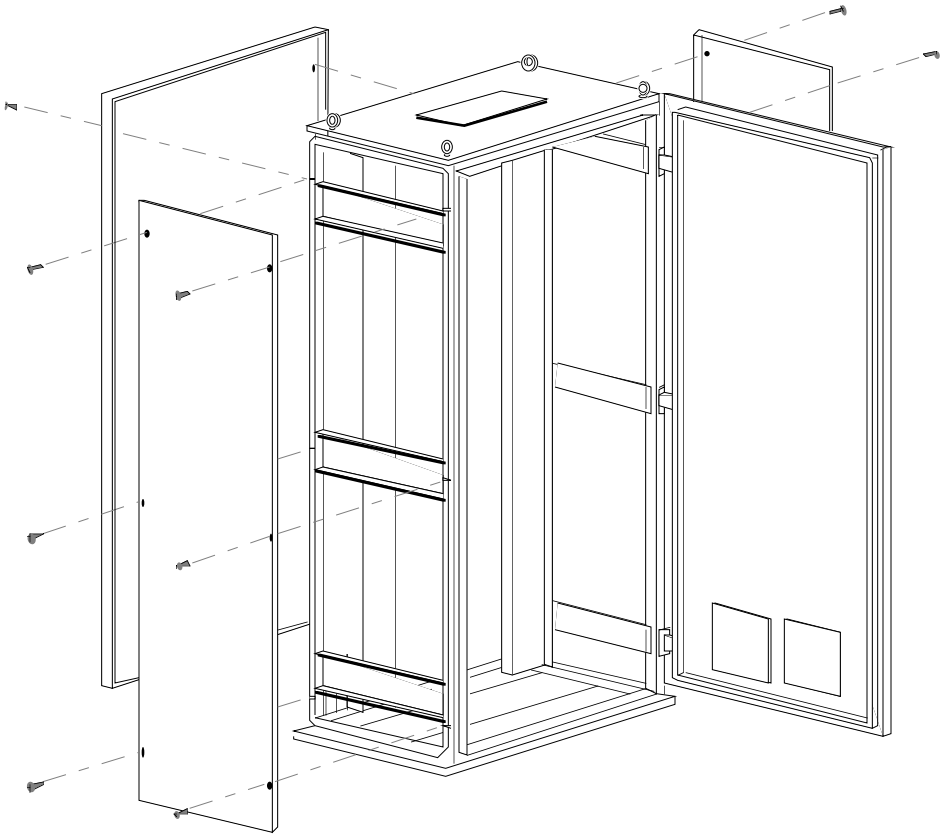
Dimensions	Width	Depth	Height
Dual Access	.8 m/31.49 in.	.8 m/31.49 in.	2 m/78.9 in.

2791

Continued on next page

Single access model MU-CBSX01 cabinet

Figure 7-8 Single Access Model MU-CBSX01 (Rittal) Cabinet



Dimension	Width	Depth	Height
Single Access	.8 m/31.49 in.	.5 m/19.68 in.	2 m/78.9 in.

2808

Continued on next page

Installation kit

Installation consists of installing a kit composed of two brackets with attachment hardware. The brackets accommodate any of the three types of UCN trunk cable taps, 2-port, 4-port, or 8-port. The brackets are attached to both of the cabinet center side rails, left and right, at the front of the cabinet with the hardware included in the kit. The trunk taps are then attached to the brackets with a single bolt included with the bracket.

Tap orientation

Orientation of the tap is dependent upon the type of tap and whether it is attached to the bracket at the left or right side of the cabinet. It is desirable to have the orientation of the tap such that the drop port connectors face the rear of the cabinet. This is obviously not possible for 4-port and 8-port taps that are installed in a cabinet, but it is desirable when 2-port taps are installed.

Top or bottom cable entry

The installer can choose to have the UCN trunk cables, cable A and cable B, enter the cabinet from either the top or bottom. The orientation of the taps is not affected.

7.3.1 Tap Bracket Installation

Tap bracket description

The tap bracket is designed to accommodate the three types of taps and install in all cabinet models. The bracket has two slots for mounting the tap with a 35-millimeter (1-3/8-inch), 1/4-20 thread bolt that is attached to the bracket by threading it into the bracket slot. A flat washer and combination star washer/nut attach the tap to the bracket with the bolt. The bracket has two slots, and the slot chosen to install the tap is dependent upon whether the bracket is attached to the cabinet's left or right center side rail.

2-port tap installation

For the 2-port tap, the slot chosen for the bracket that mounts at the left side of the cabinet will be the slot that orientates the tap's isolation port, identified by a white round spot, in an up position when installed on the bracket. The tap's isolation port is orientated downward at the right side of the cabinet.

4-port or 8-port tap installation

The 4-port or 8-port tap's isolation port can be orientated up or down, because the tap drop ports are symmetrical, but for standardization the isolation port should be orientated up at the left side of the cabinet, and down at the right side of the cabinet.

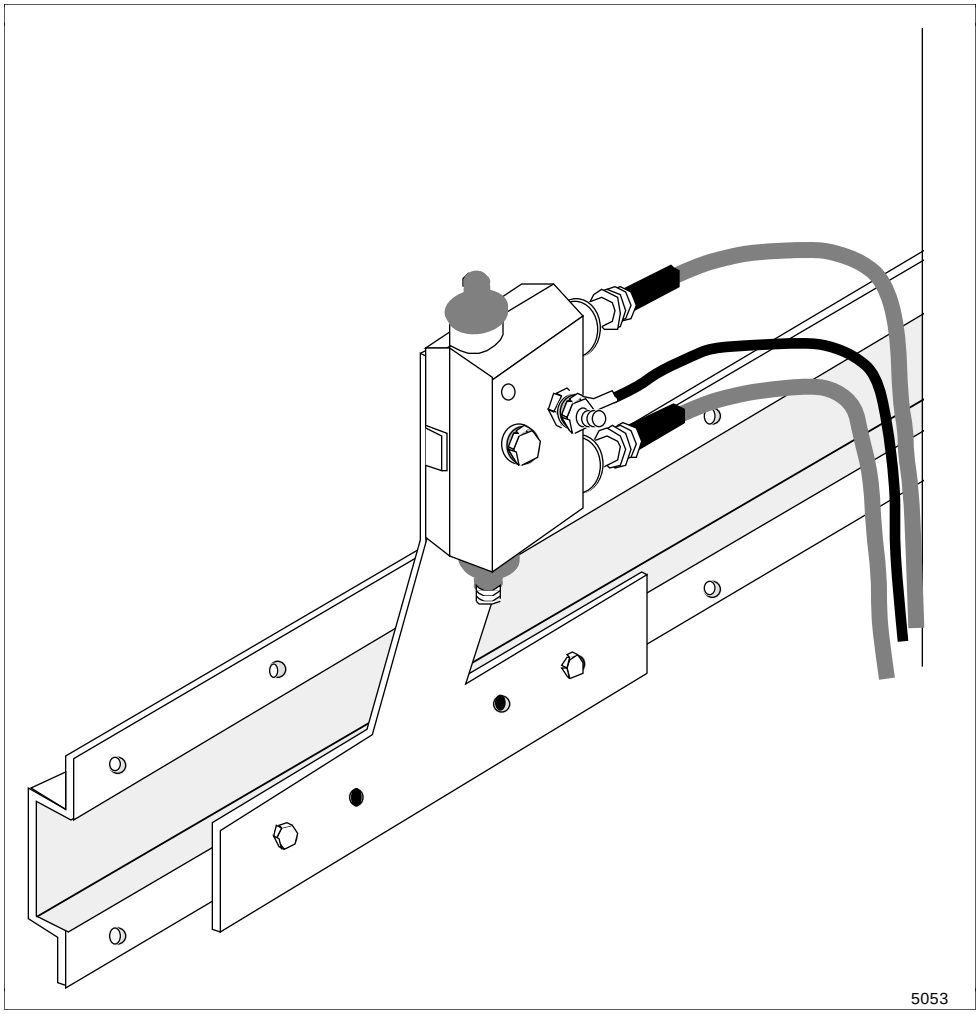
Continued on next page

7.3.1 Tap Bracket Installation, Continued

Model MU-CBDM01 or MU-CBSM01 tap bracket attachment

In the model MU-CBDM01 and MU-CBSM01 (Markhon) cabinets, screws inserted through the two outer holes of the bracket attach the bracket to the cabinet center side rail using the upper two tapped center holes as shown in Figure 7-9.

Figure 7-9 Model MU-CBDM01/MU-CBSM01 Cabinet (Markhon) Tap Bracket Attachment

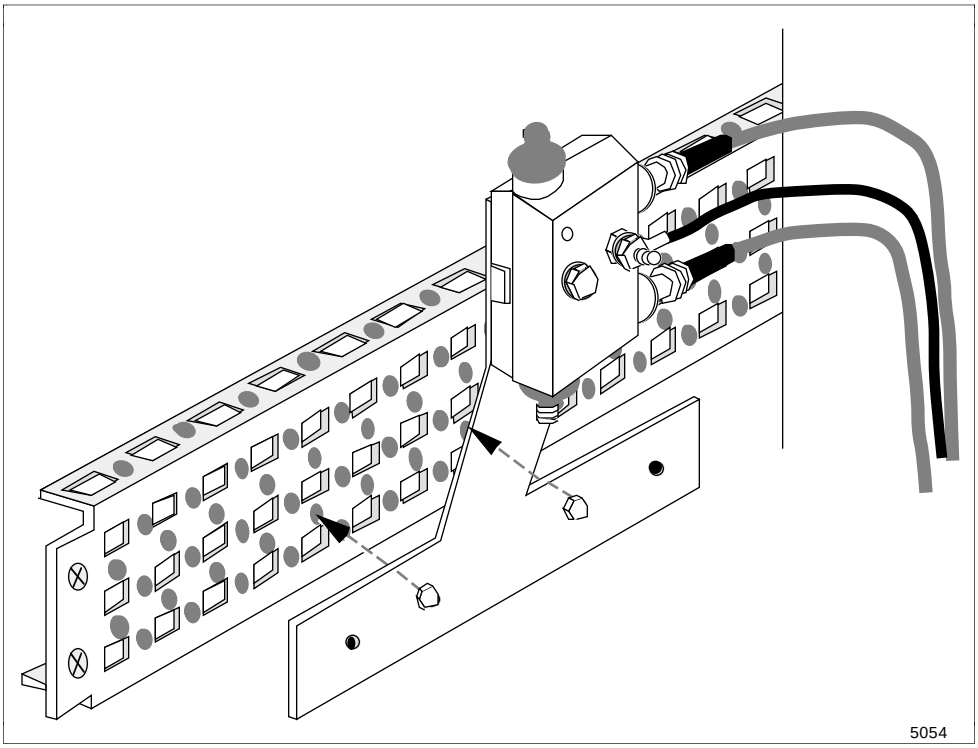


Continued on next page

Model MU-CBDX01 or MU-CBSX01 tap bracket attachment

In the model MU-CBDX01 and MU-CBSX01 (Rittal) cabinets, screws inserted through the two inner holes of the bracket attach the bracket to the cabinet center side rail. The 5th and 8th holes in the second row of holes from the bottom of the rail, starting from the front of the cabinet, are used as shown in Figure 7-10.

Figure 7-10 Model MU-CBDX01/MU-CBSX01 Cabinet (Rittal) Tap Bracket Attachment



Screws and washers included

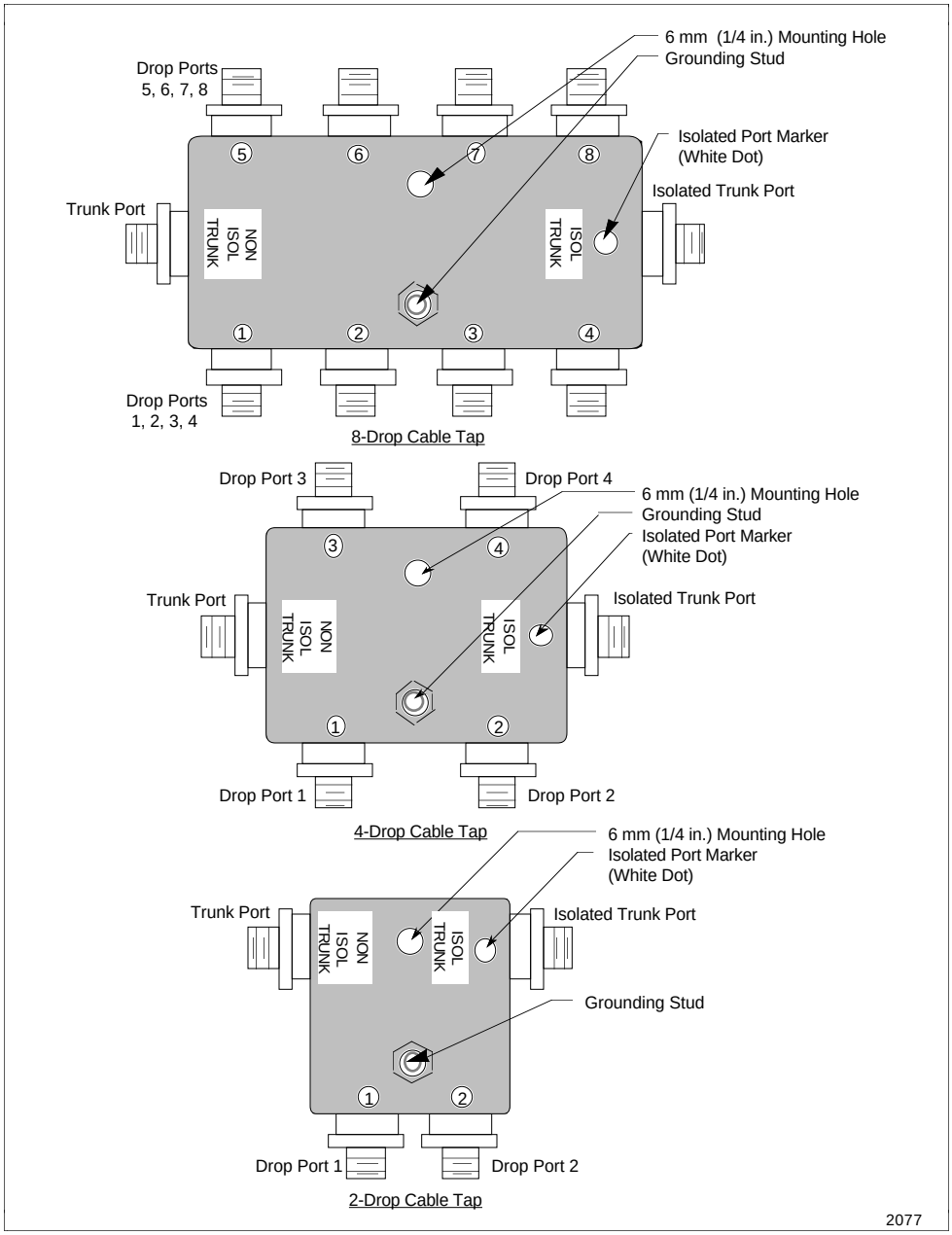
Self-tapping screws, flat washers, and lock washers are provided with the brackets.

7.3.2 Tap Installation

Installation procedure

The UCN trunk cable drop taps are installed on the brackets by inserting the 35-millimeter (1-3/8-inch), 1/4-20 bolt through the properly selected bracket slot, as detailed in the previous subsection. A flat washer, and a combination star washer/nut fasten the tap. If the correct slot is chosen for each bracket, the tap at the left side of the cabinet will have its isolation port orientated up, while the tap at the right side of the cabinet will have its isolation port orientated down. Torque the washer/nut to 20 inch/pounds. Figure 7-11 is an illustration of the three types of UCN trunk drop taps.

Figure 7-11 UCN Trunk Cable Taps



Continued on next page

7.3.2 Tap Installation, Continued

Safety Ground stud

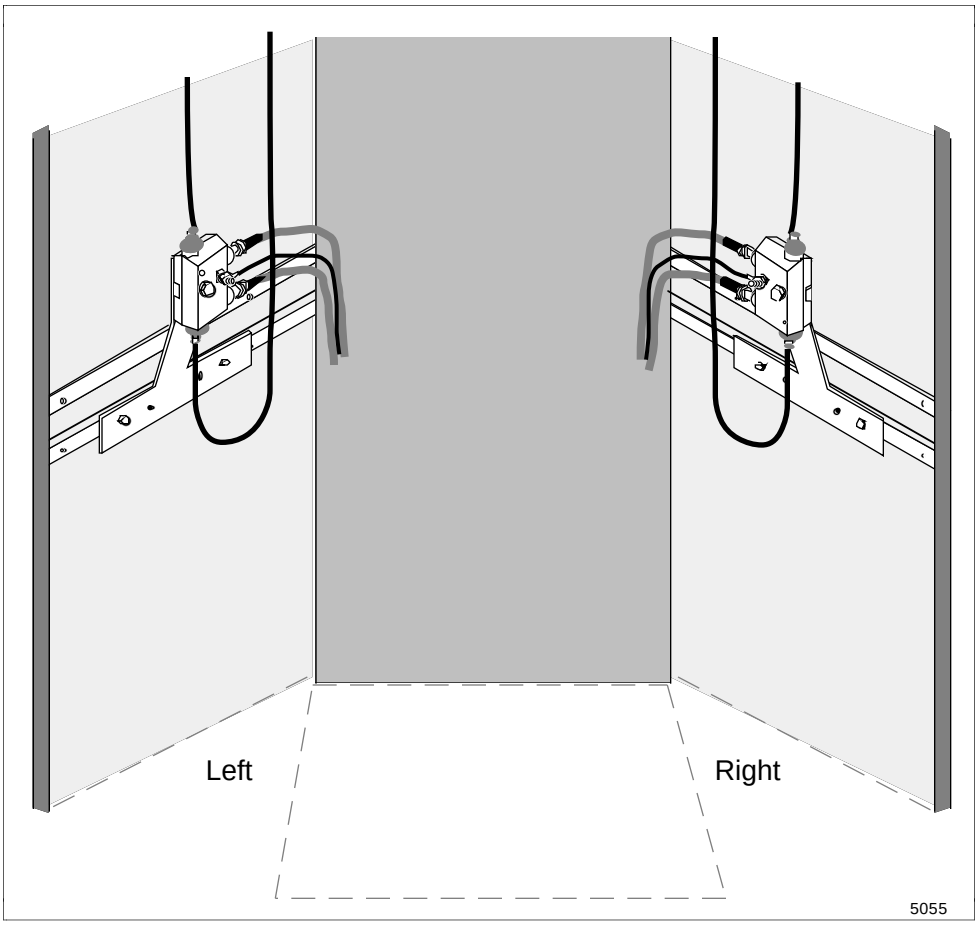
A ground stud on the tap must be connected to the Safety Ground star plate at the bottom of the cabinet with a minimum size 2.5 mm^2 (14 AWG) wire. A separate wire for each tap is required. Fasten the wire between the two 1/4-20 nuts supplied with the tap. See Figure 7-11 for the stud's location. Torque the Safety Ground nuts to 25 inch/pounds.

7.3.3 Tap Cable Installation

Introduction

The UCN trunk and drop cables are connected to the drop taps by observing the cable installation rules detailed in the *Universal Control Network Planning* and *Universal Control Network Installation* manuals. The UCN trunk cables can enter the cabinet from either the top or bottom, whichever is convenient for the cabinet installation. See Figure 7-12 for a view of a typical cabinet cable installation.

Figure 7-12 Typical Cabinet UCN Cable Layout



Continued on next page

7.3.3 Tap Cable Installation, Continued

RG-6 drop cable lengths

Standard RG-6 UCN drop cable is available in various lengths, from 0.5 to 4.5 meters (1.6 to 14.8 feet), for applicable internal cabinet connections between the UCN taps and the HPMM card file(s). The Honeywell cable set (two cables) part number is 51195153-xxx, where "-xxx" is the tab number for the desired length as listed in Table 7-1. Single coax cables have the part number 51304167-xxx.

Table 7-1 UCN Coaxial Drop Cable Sets (51195153-xxx)

Part Number	Length (Meters)
51195153-900	0.5
51195153-001	1.0
51195153-901	1.5
51195153-002	2.0
51195153-902	2.5
51195153-003	3.0
51195153-903	3.5
51195153-004	4.0
51195153-904	4.5

Cable pull strength and bend radius

The coaxial cable pull strength and bend radius parameters must be observed. Table 7-2 details the parameters.

Table 7-2 RG-6/RG-11 Cable Pull and Bend Parameters

Cable Type	Maximum Pull	Minimum Bend Radius
Standard RG-11	68 kg (150 lb)	11 cm (4.5 inches)
Armored RG-11	68 kg (150 lb)	11 cm (4.5 inches)
Standard RG-6	45 kg (150 lb)	8 cm (3.0 inches)

Isolated and nonisolated tap ports

Trunk cables must be connected to the nonisolated trunk port at the tap at one end of the cable, and the isolated end port at the other end of the cable.

Terminate all unused ports

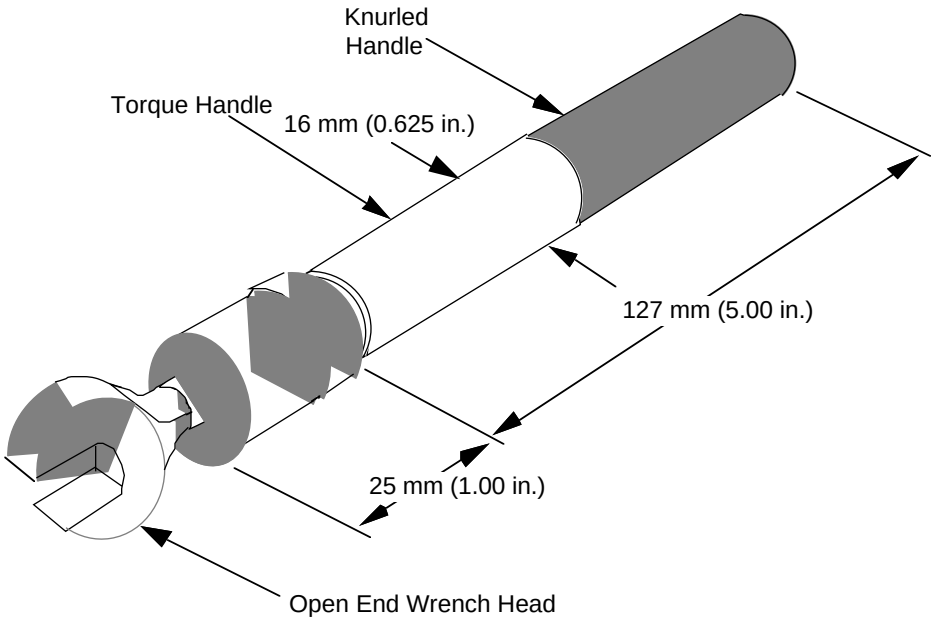
All unused trunk and drop ports must be terminated with the terminators supplied with the tap.

Continued on next page

Cable connector torque wrench

Torque the cable connectors and tap terminators to a nominal 25 inch/pounds with a torque wrench. The suggested tool is found in a Honeywell kit, model number MU-NKTQ01, part number 51109612-100. The torque wrench is illustrated in Figure 7-13.

Figure 7-13 UCN Cable Connector Torque Wrench – 25 Inch/Pounds



Torque wrench description

The torque wrench in the kit is factory set to 25 inch/pounds. It is 6 inches long with a 5/8 inch diameter handle. Included in the kit are three hex wrench heads, sizes 7/16, 1/2, and 5/8 inches, to be used with the torque wrench. The heads incorporate a cutout, allowing the wrench to fit over a cable while it is connected. The 1/2 inch flare head is used for the drop coax cable connectors, the new style trunk coax connectors, and the new style tap terminators. The 7/16 inch head accommodates the old style terminators used on the tap, while the 5/8 inch head accommodates the old style trunk cable connectors.

Torque limit click

A click can be felt or heard when the calibrated 25 inch/pounds torque limit has been reached. Do not over tighten the connector.

CAUTION

CAUTION—It is important that a proper technique be used when gripping the torque wrench, or the “click” may not be felt when the wrench has reached its preset limit. Be sure that all fingers and the thumb are on the handle. Do not place your thumb on the open-end hex head.

Section 8 – Power and Process Control Wiring

8.1 Overview

Section contents

The topics covered in this section are:

Introduction

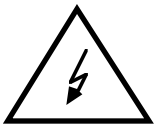
This section discusses the High-Performance Process Manager (HPM) ground, ac power, and process control wiring connections.

Master Reference Ground instructions

References to Master Reference Ground (MRG) are applicable only to site installations that are not required to comply with CE Mark directives. Ignore installation instructions that pertain to Master Reference Ground for those sites. A CE Compliant system must have a single ground system which is designated Safety Ground and include CE Compliant card files, cables, and I/O hardware that accommodates CE Compliant grounding requirements.

See Section 10 for additional information.

8.2 Ground Connections



CAUTION, RISK OF ELECTRIC SHOCK

Introduction

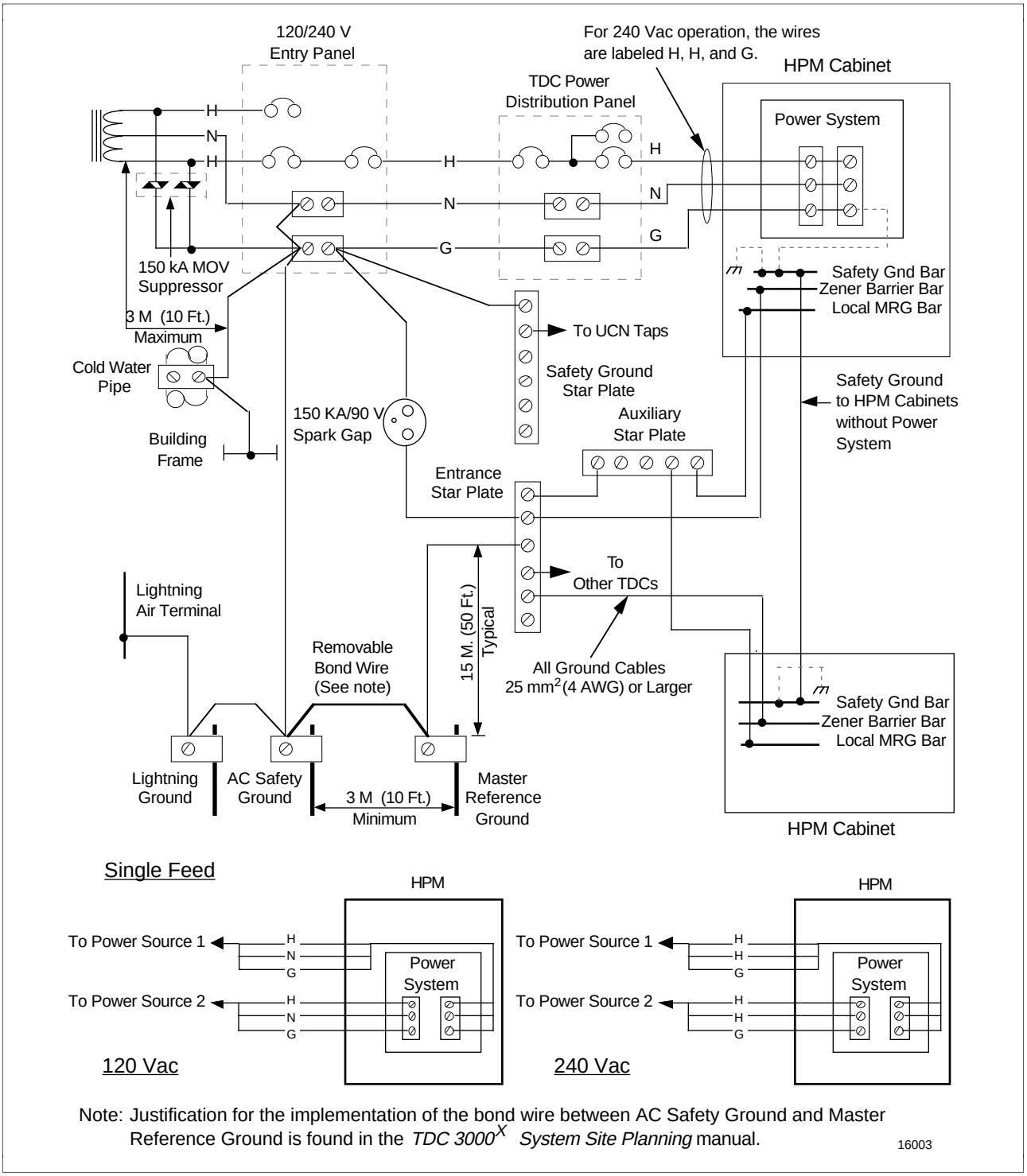
The High-Performance Process Manager (HPM) cabinet provides termination for all ground connections at three bus bars at the floor of the cabinet. The bus bars are local bus bars and connections are made using the hardware included with each cabinet.

Continued on next page

Non-CE Compliant power and ground system

Figure 8-1 is a schematic of typical power and ground entry with internal connections for an HPM cabinet. The multi-ground system is non-CE Compliant.

Figure 8-1 HPM Cabinet Power and Ground Entry Schematic – Multi-Ground System



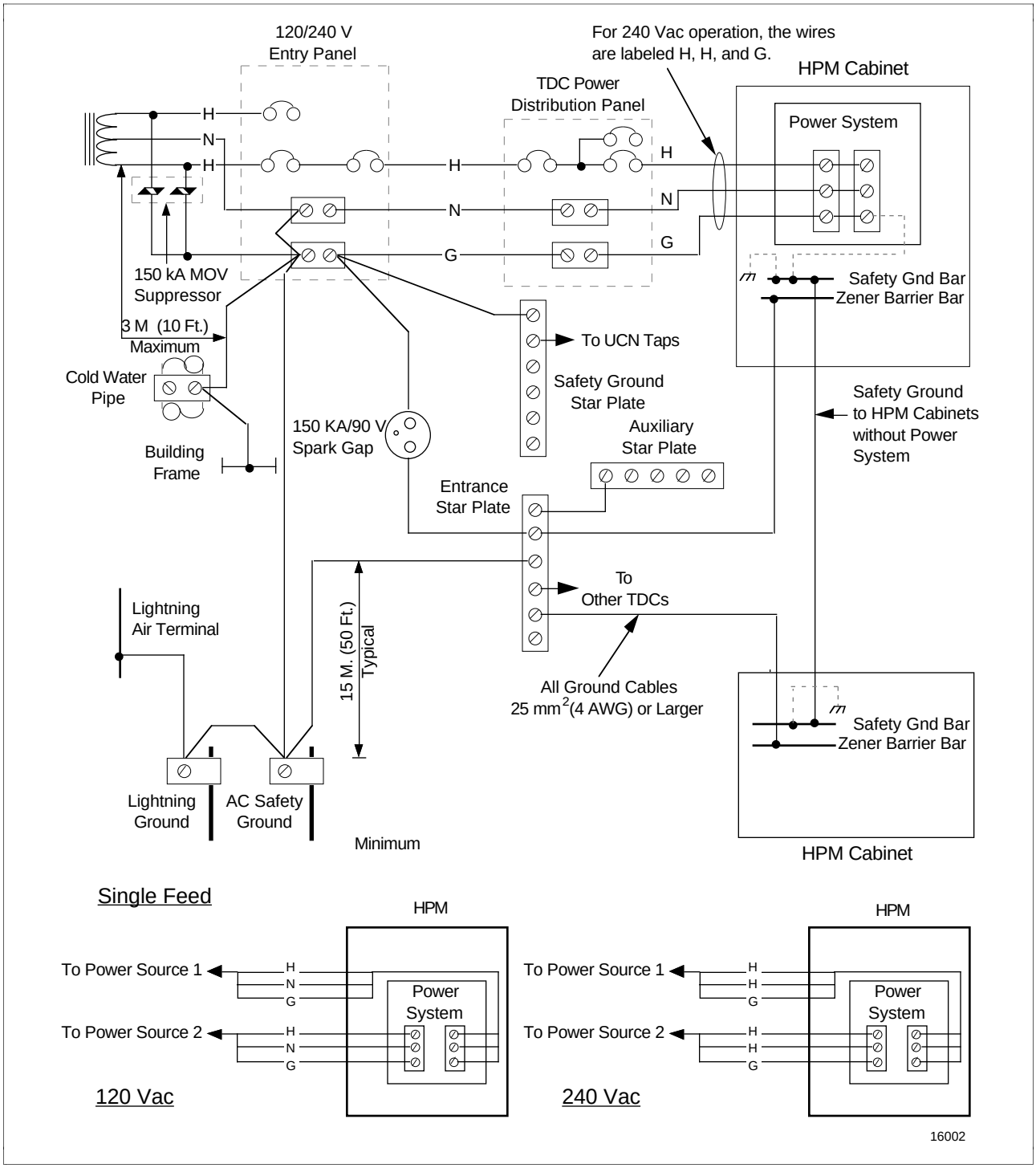
Note: Justification for the implementation of the bond wire between AC Safety Ground and Master Reference Ground is found in the *TDC 3000X System Site Planning* manual.

16003

CE Compliant power and ground system

Figure 8-2 is a schematic of typical power and ground entry with internal connections for an HPM cabinet. The single-ground system is CE Compliant.

Figure 8-2 HPM Cabinet Power and Ground Entry Schematic – Single-Ground System

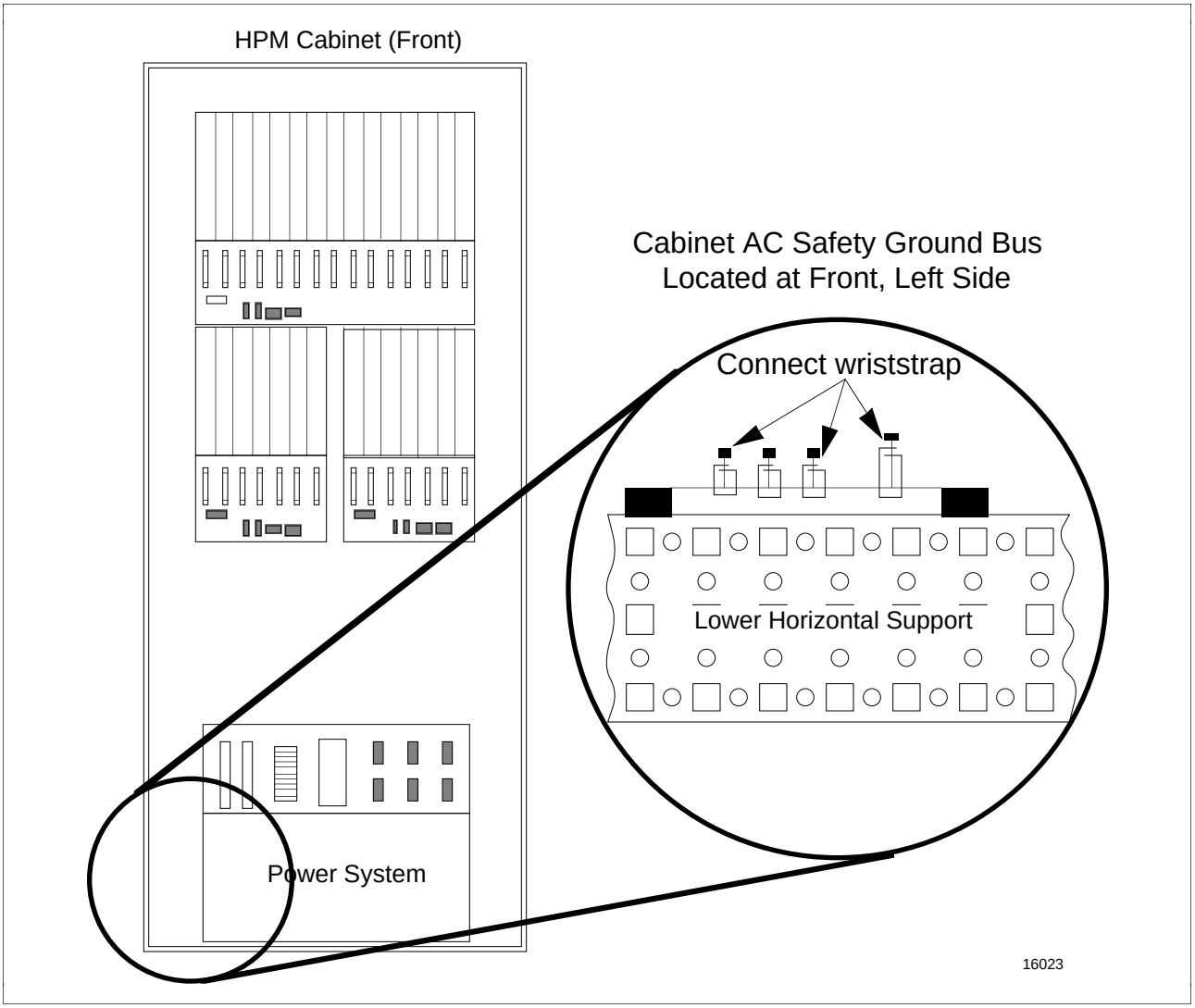


8.2.1 Local Safety Ground Bus Connections

Introduction

All cabinet metal and safety grounds to the cabinet merge at the local Safety Ground bus bar at the floor of the cabinet as illustrated in Figure 8-3. At installation, no Safety Ground connection is required for a cabinet or complex of cabinets with a Power System. The power feed ground provides the cabinet's local Safety Ground. Honeywell's factory connected it to the feeder terminal block's Safety Ground. However, extra Safety Ground connections or metallic conduit installed by the user will not cause a problem.

Figure 8-3 Cabinet Safety Ground Bus Bar Location



Continued on next page

8.2.1 Local Safety Ground Bus Connections, Continued

Cabinets without an ac power feed

A cabinet or complex of cabinets without an ac power feed requires connection to Safety Ground at installation. Connect the local Safety Ground bus bar to the Safety Ground in a nearby breaker panel or to the local Safety Ground in another cabinet that is already grounded. Use a 2.5 mm^2 (14 AWG) wire in a conduit or a 25 mm^2 (4 AWG) wire without a conduit.

Cabinet complex grounding

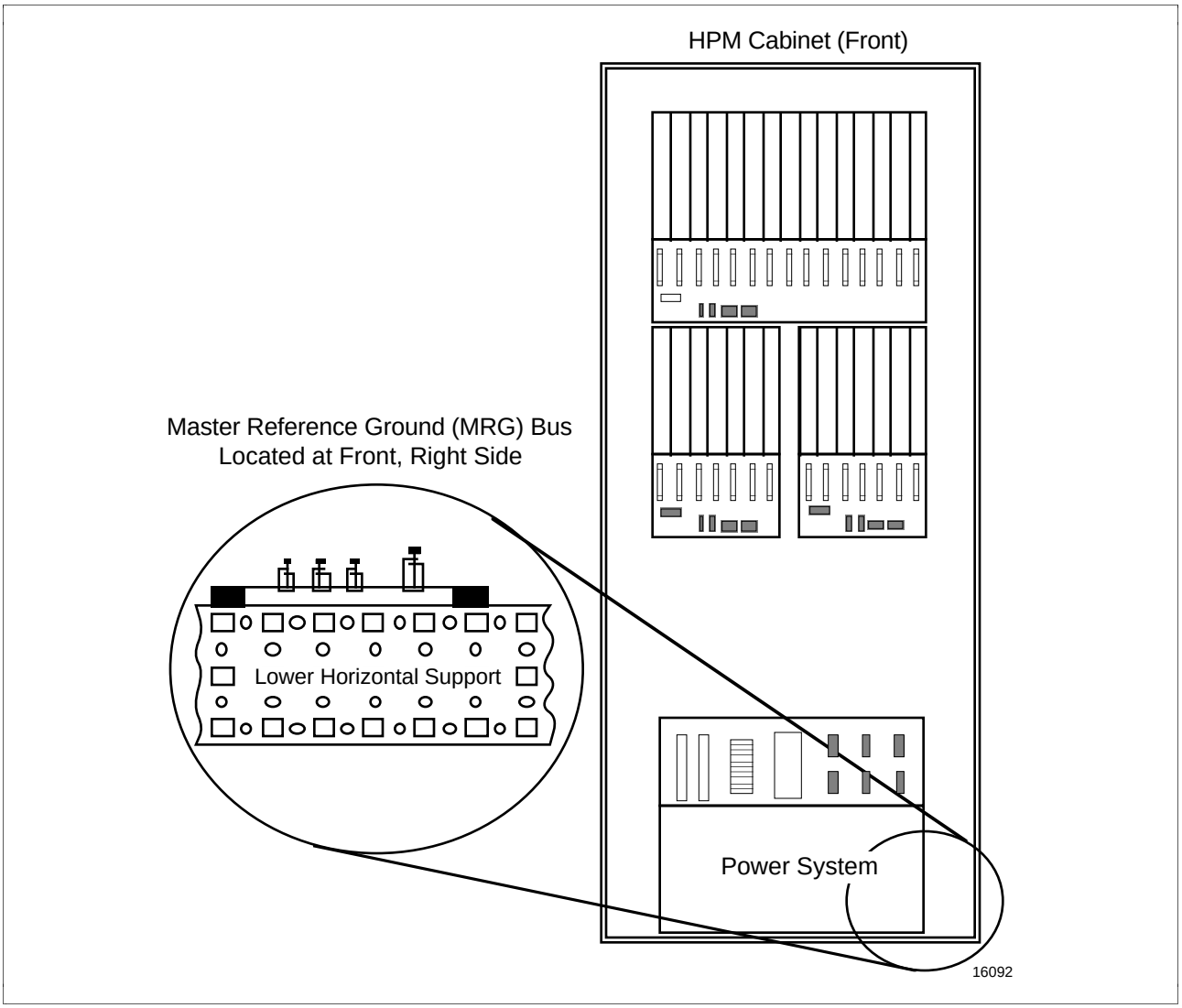
When several cabinets are bolted together in a complex, the local Safety Ground bus bars and local Master Reference Ground (MRG) bars, but not the local Zener Barrier Ground bars in each cabinet, are merged by the factory with a star connection to an end cabinet in the cabinet complex. Only the end unit requires connection to the plant Safety Ground, and that connection is needed only when the complex does not have a power feed connection.

8.2.2 Local Master Reference Ground Bus Connections

Introduction

The Master Reference Ground (MRG) bus provides a reference for the process signals and the card file electronics, and connects indirectly to the Master Reference Ground electrode that is embedded in earth ground. Install a 25 mm^2 (4 AWG) wire to the nearest MRG star or ground plate as illustrated in Figures 8-1. Figure 8-4 illustrates the location of the Master Reference Ground bus bar in the cabinet.

Figure 8-4 Cabinet Master Reference Ground Bus Bar Location



Continued on next page

8.2.2 Local Master Reference Ground Bus Connections, Continued

Cabinet complexing

As stated earlier, when several cabinets are bolted together in a complex, the local Master Reference Ground bus bars in each cabinet are merged by the factory with a star connection to an end cabinet for installation convenience. Only one connection is required for the complex.

ATTENTION

ATTENTION—In the event that there are concerns about this grounding system not meeting a regulating body's requirements, such as NEC, OSHA, or local codes, it is permissible to add a direct wire, 25 mm^2 (4 AWG) or larger, between the Safety Ground and the Master Reference Ground at their grounding electrodes, according to the code. The Safety Ground tie point must be previously tested to not exceed 10 volts peak noise before the connection is made. The *TDC 3000^X System Site Planning* manual details the implementation of this connection.

8.2.3 Local Zener Ground Bus Connections

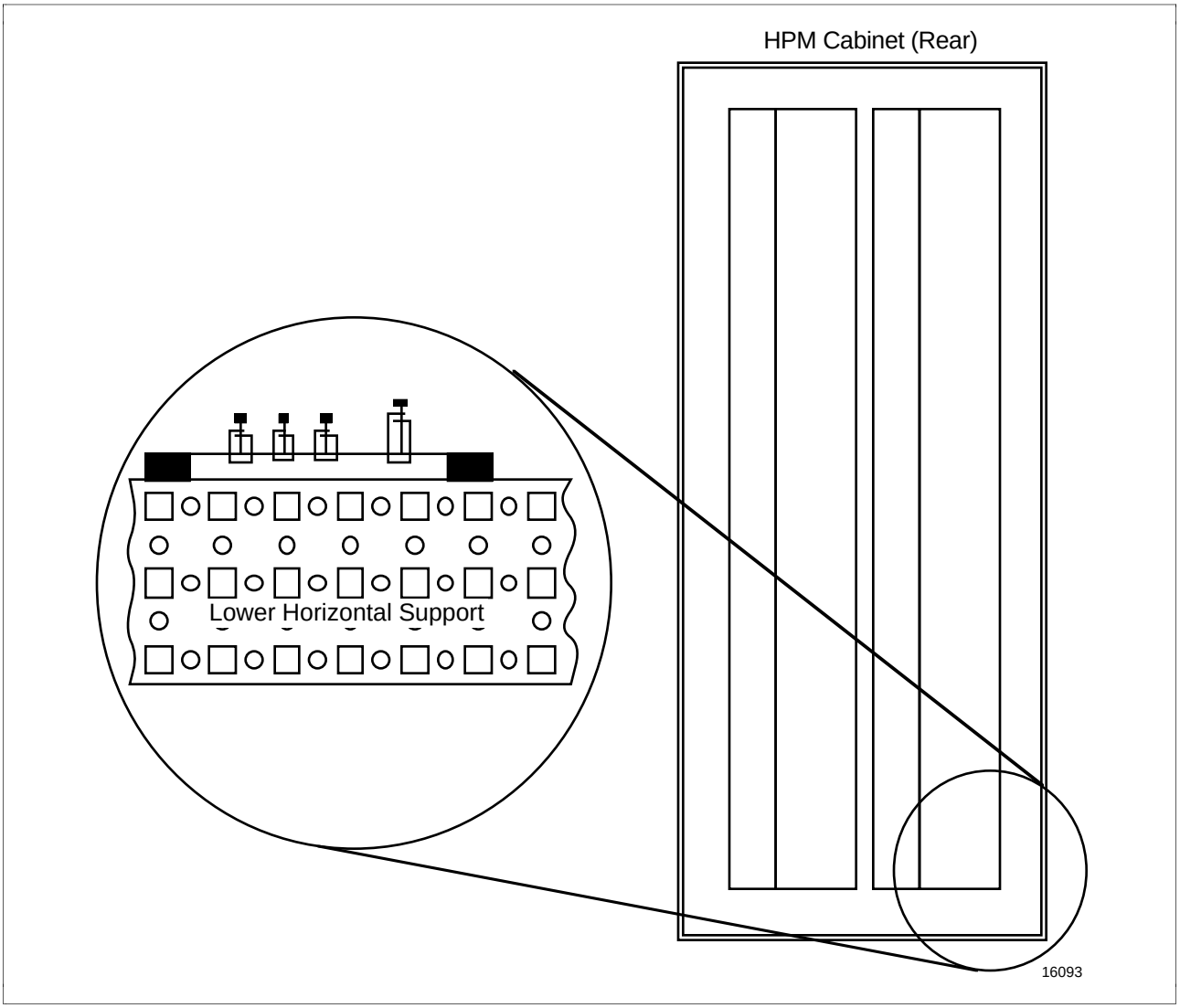
Introduction

This bus collects all Zener Barrier Ground wires that are local to the cabinet. The zener barriers provide intrinsic safety for the controller wiring for processes handling hazardous ignitible materials.

Cabinet connections

Connect the cabinet's local Zener Barrier Ground bus bar to the MRG entry star plate as illustrated in Figure 8-1. Figure 8-5 illustrates the location of the Zener Barrier Ground bus bar in the cabinet.

Figure 8-5 Cabinet Zener Barrier Ground Bus Bar Location



Continued on next page

8.2.3 Local Zener Ground Bus Connections, Continued

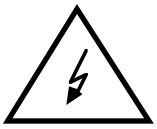
Wire size

Electrical codes usually require two 25 mm^2 (4 AWG) cables for redundancy. Check the site planning drawings for your site.

Cabinet complex

For a complex of several cabinets, the factory does not merge the local Zener Barrier Ground buses to an end unit. This is because some local electrical codes do not accept the merging of Zener Barrier Ground conductors anywhere except at the nearest ground electrode access. Therefore, separately connect the local Zener Barrier Ground in each cabinet with redundant 25 mm^2 (4 AWG) cables to the MRG entry star plate.

8.3 AC Power Connections



CAUTION, RISK OF ELECTRIC SHOCK

Wire and breaker sizes

Conductors and circuit breakers are sized using rules in the *TDC 3000^X System Site Planning* manual. Install power as specified by your site planning drawings. Also, use Figure 8-1 or 8-2 as a reference.

Use a 15 amp breaker

Do not use circuit breakers larger than 15 amperes. The Power Supply Module is not rated to clean larger breakers.

Separate power feed

It may be desirable in some installations that the optional secondary Power Supply Module in the Power System be connected to a separate power feed. Check the installation drawings for your site.

8.3.1 Prepower Cabinet Power and Ground Checks

Procedure

Once the power feed(s) to the HPM cabinet(s) has been installed, use the following procedure before applying power to the cabinet.

Table 8-1 Prepower Cabinet Power and Ground Check Procedure

Step	Action
1	Before applying power at the facility distribution panel, test the cabinet or cabinet complex for proper safety grounding. Use a multimeter and test for a maximum resistance of 1/2 ohm from the frame of the cabinet to any nearby grounded pipe or conduit. A high reading usually means that the cabinet has not been properly connected to Safety Ground. Diagnose and repair the problem.
2	Set the power switches in the cabinet in the off position and the feeder breakers in the facility distribution panel to the on position. With a multimeter, check for the proper voltage at the cabinet's power entry terminal block. For a 120 volt system or a 240 volt system with neutral, check the neutral conductor for a measurement of less than 1/2 Vac to the frame of the cabinet. A higher reading indicates that either the neutral bus in the equipment power distribution panel has not been connected to Safety Ground, or the cabinet has not been connected to Safety Ground. This occurs often when there is a UPS. Diagnose and repair the problem.

8.4 Cabinet Alarm Connections

8.4.1 Power System Alarms

Standard Power System

Each Power Supply Module in the Standard Power System has indicators that display their status, and alarm contacts that are closed during normal operation of the Power Supply Module. The contacts open to provide an alarm when a problem occurs. The isolated alarm contacts are rated for 0-24 Vdc/Vac at 65 mA maximum. The contacts open when any of the following events occur.

- Loss of ac power
- Regulated dc output is out of tolerance
- Backup battery voltage is out of tolerance
- Backup battery charging failure
- Failure of the Power Supply Module cooling fan
- Over-temperature condition in the Power Supply Module

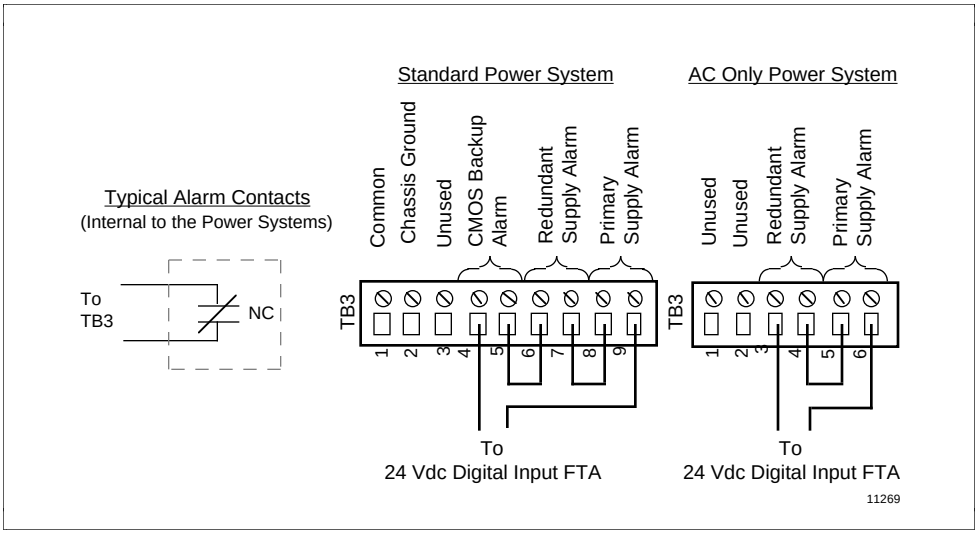
AC Only Power System

The AC Only Power System has only two sets of alarm contacts, a set for each Power Supply Module. The contacts open when the Power Supply Module fails.

Alarm wiring

Figure 8-6 illustrates the wiring to the Power System alarm contact signals that are available at a terminal strip located on the backplane of either the Standard Power System or the AC Only Power System. It is suggested that the alarm contacts be wired to a 24 Vdc Digital Input FTA for system monitoring.

Figure 8-6 Typical Power System Alarm Wiring



Continued on next page

8.4.1 Power System Alarms, Continued

No 48 Vdc battery backup

If a High-Performance Process Manager subsystem is installed without the Standard Power System's optional 48 Vdc battery backup, it is necessary to defeat the battery and charger alarms in the Power Supply Modules. Otherwise, the system will be in a constant alarm state. There are two jumpers located on the printed backplane next to the sockets that accommodate the Power Supply Modules. They are identified as **W1** and **W2** and must be removed (cut). In most cases, this will have been implemented at the factory.

The other alarm functions such as Power Supply Module failure, over-temperature, fan failure, ac power failure, and CMOS backup battery failure will still operate.

8.4.2 Cabinet Fan Assembly Alarm

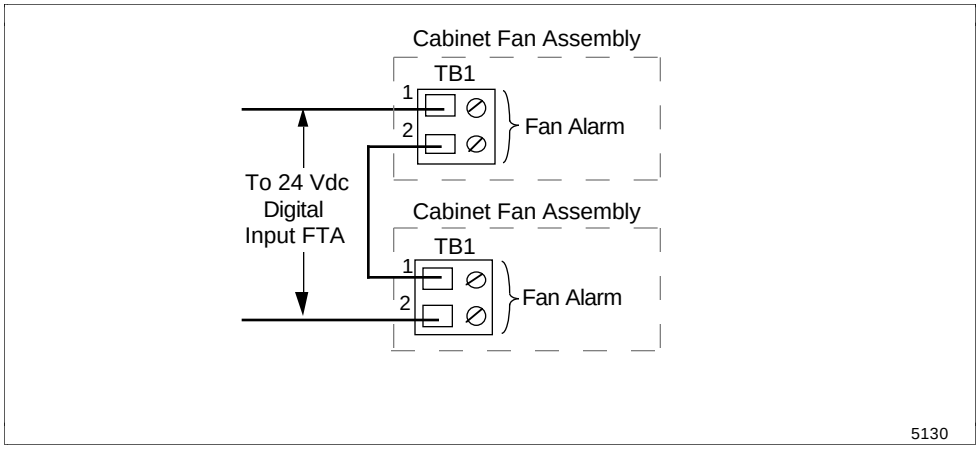
Overview

Cabinet configurations have one or two dual fan assemblies installed at the top of the cabinet. The assembly(ies) can also have an optional operating indicator (LED) and a normally open set of alarm contacts that can be wired in series with other alarm signals. The contacts are closed when the fans are operating properly.

Alarm wiring

Figure 8-7 illustrates the wiring to two cabinet dual fan assemblies. The alarm contacts are shown wired to a 24 Vdc Digital Input FTA for system monitoring.

Figure 8-7 Typical Cabinet Fan Assembly Alarm Wiring

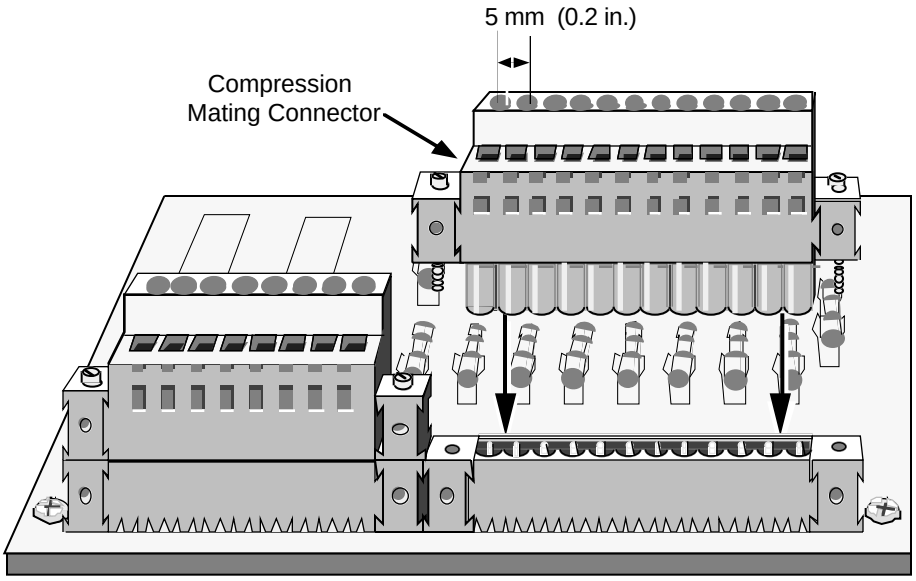


8.5 Process Control Connections

Overview

Process control connections to the High-Performance Process Manager are made at terminal connectors on Field Termination Assemblies (FTAs). See Figure 8-8 for an example. The connections are made using compression terminals or screw terminals (in some cases) depending upon which style of FTA is installed.

Figure 8-8 Typical FTA Compression Terminal Connector



Compression Mating Connector

Number of Connections	Honeywell Part Number
8 11 12	511190694 - 108, - 208, - 408 - 111, - 411 - 112, - 412

4401

ATTENTION

ATTENTION—When a connection is made to a compression terminal, a screwdriver with a shaft diameter no larger than 3 millimeters (1/8 of an inch) is required to tighten the screw that forces the clamping wedge against the wire. The screwdriver blade must be the same width as the shaft.

FTA description

Each FTA has circuits that convert the process signals to voltage and current levels that can be processed by the High-Performance Process Manager electronics. There are various types of FTAs and each is designed for a specific kind of input or output signal, such as a thermocouple input or a relay output.

Continued on next page

8.5 Process Control Connections, Continued

Reference documentation

The *Process Manager I/O Installation, High-Performance Process Manager Planning,*and *High-Performance Process Manager Service* manuals contain FTA planning and installation information.

Terminal referencing

Connections are referred to in the *Process Manager I/O Installation* manual by the terminal connector number and the terminal number. For example, terminal 4 of terminal connector 3 is referred to as TB3-4.

***Process Manager I/O Installation* manual**

The *Process Manager I/O Installation* manual provides detailed information for connecting process control wiring to the standard FTAs. Analog input and output FTAs are discussed in the first sections, followed by discussions of digital input and output FTAs. Latter sections cover miscellaneous FTAs, such as the Serial Device Interface FTA and galvanically isolated FTAs. I/O Link Extenders, though not an FTA, are also included in the manual.

IOP configuration

If configuration of the associated IOP is necessary, such as jumper selection, information is included in the appropriate FTA section in the *Process Manager I/O Installation* manual.

Vertical or horizontal bus bars

Vertical or horizontal bus bars, as described in the *Process Manager I/O Installation* manual, are used to provide a ground connection for cable shields at the FTAs. If a vertical or horizontal bus bar is not available, substitute the local ground bus bars at the floor of the cabinet.

8.5.1 FTA Configurations

Facility terminal panels

Certain installations mount the FTAs in facility terminal panels rather than in factory assembled cabinets. In this case, install the FTA as described in the *Process Manager I/O Installation* manual and connect the FTA to the High-Performance Process Manager as described in Section 9.

ATTENTION

ATTENTION—CE Compliance requires that FTAs are mounted in a High-Performance Process Manager cabinet or cabinet complex.

8.5.2 Cabinet Entry

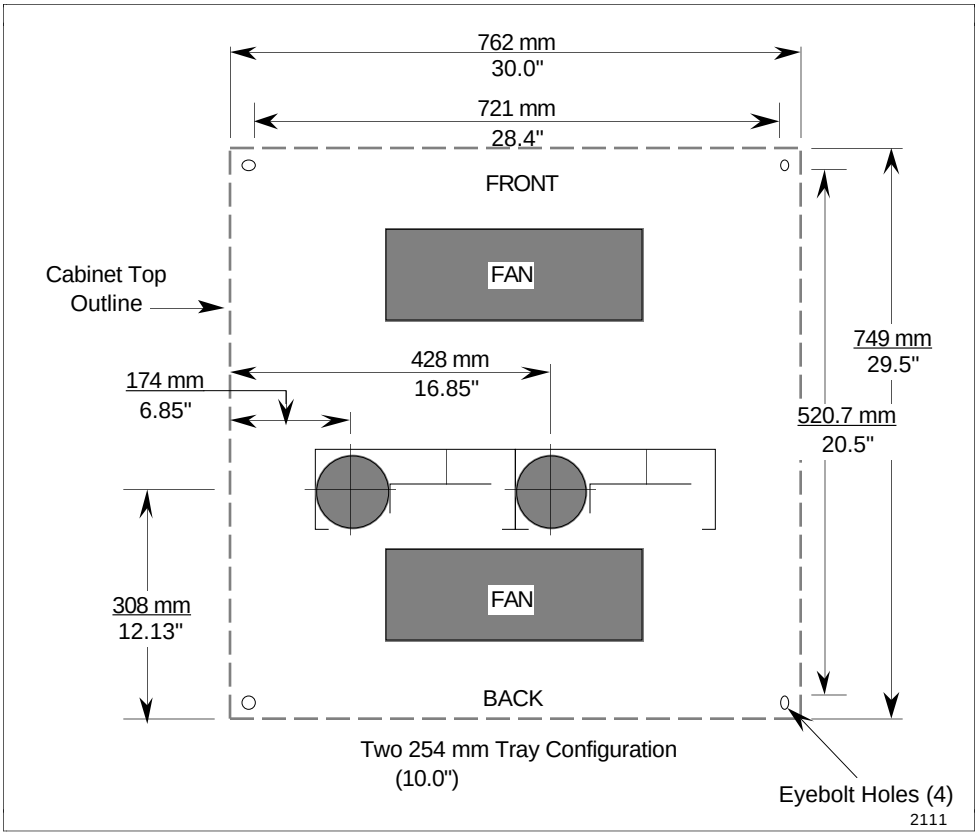
Description

The process control cables enter the cabinet through either the top or bottom of the cabinet. The cabinet is special because for bottom entry, it has sliding or removable floor plates that can be adjusted to provide entry slots. For top entry, use a hydraulic hole punch to provide entry to the FTA Mounting Channels and minimize the generation of metal filings. The outlines for top entry cutouts are illustrated in Figures 8-9 through 8-12.

Cabinet top entry for two 10-inch channels

Figure 8-9 illustrates the recommended top entry cutouts when two 10-inch wide FTA Mounting Channels are installed in a cabinet.

Figure 8-9 Cabinet Top Entry Dimensions – Two 10-Inch Channels

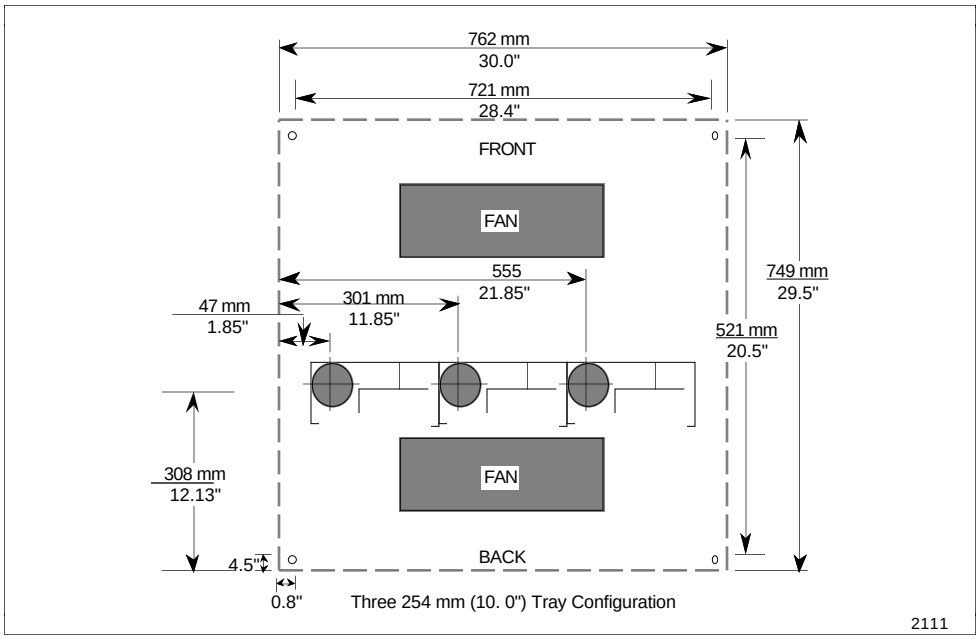


Continued on next page

Cabinet top entry for three 10-inch channels

Figure 8-10 illustrates the recommended top entry cutouts when three 10-inch wide FTA Mounting Channels are installed in a cabinet.

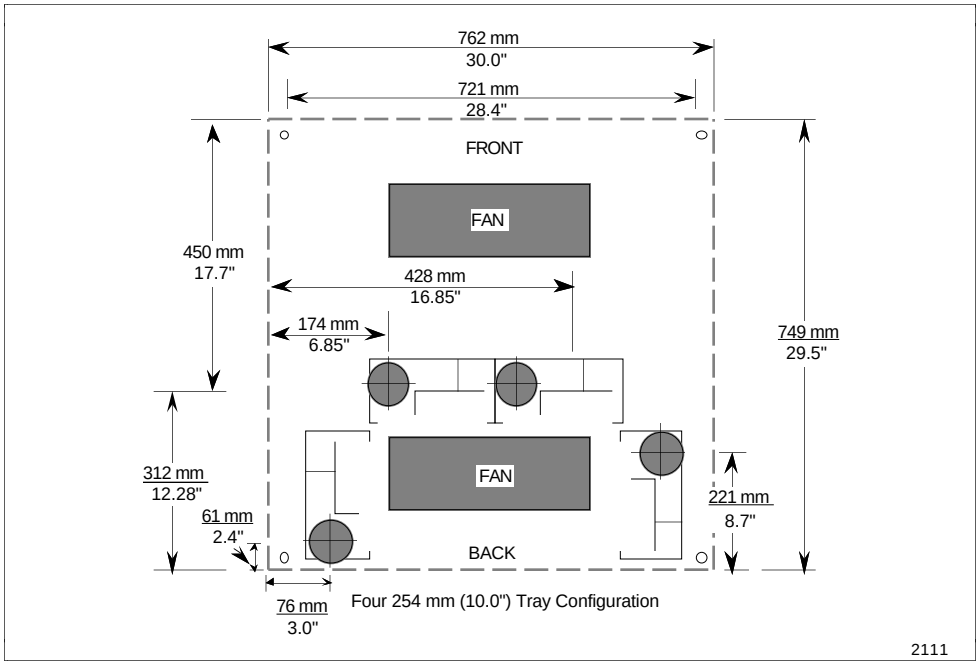
Figure 8-10 Cabinet Top Entry Dimensions – Three 10-Inch Channels



Cabinet top entry for four 10-inch channels

Figure 8-11 illustrates the recommended top entry cutouts when four 10-inch wide FTA Mounting Channels are installed in a cabinet.

Figure 8-11 Cabinet Top Entry Dimensions – Four 10-Inch Channels

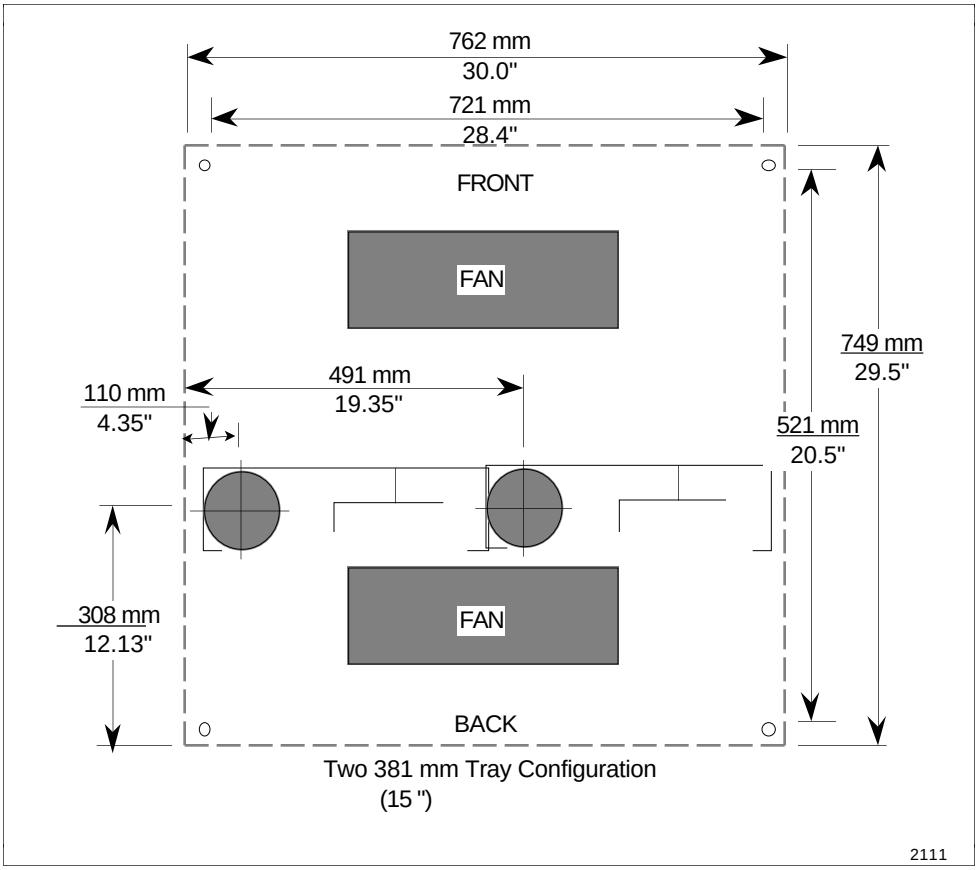


Continued on next page

Cabinet top entry for two 15-inch channels

Figure 8-12 illustrates the recommended top entry cutouts when two 15-inch wide FTA Mounting Channels are installed in a cabinet.

Figure 8-12 Cabinet Top Entry Dimensions – Two 15-Inch Channels



Cable clamping

For top or bottom entry, the cables should be clamped firmly to the cabinet. The clamping should be able to handle about 45 kilograms (100 pounds) of pull. This prevents damage inside the cabinet when pulling on the cables outside the cabinet.

Cable clamp rail

The cabinet includes a cable clamp rail at the bottom. The rail can be remounted to the top if required.

8.5.3 Cable Preparation

Cable shield grounding

The process control cables usually have protective shields surrounding them. To properly ground the cable shield, follow the procedure in Table 8-2.

Table 8-2 Process Control Cable Shield Grounding Procedure

Step	Action
1	Remove the cable jacket and the cable shield/safety wire starting about 25 millimeters (1 inch) past the cable clamp at cabinet entry.
2	Insulate the cable shield with a sleeve or replace it with an insulated conductor.
3	Connect the cable shield/safety wire or insulated wire to the local Safety Ground bus bar at the floor of the cabinet. See Figures 8-1 and 8-2.

Wire shield grounding

The process control cable, besides having a cable shield/safety wire, may also have a shield or ground for each set of wires. It is common practice to run the shielded wire sets intact to the FTA before grounding the cable shield.

8.5.4 Field Wiring Termination

Standard FTA termination methods

Two methods of terminating field wiring are provided on standard FTAs.

- Compression connectors
- Screw terminal strips

The model number of the FTA determines the termination method. Both methods are available for most FTA types.

Field wiring can be connected to the screw terminal strip type FTAs with or without the use of wire lugs, whichever is appropriate.

The number of terminals available depends on the type of standard FTA.

Compression terminal connection method

If the compression termination method is used, strip the wire insulation for 9.5 ± 3 millimeters (0.375 ± 0.125 inch), insert the wire into the compression terminal connector, and then tighten the appropriate compression screw. Figure 8-8 illustrates a typical compression terminal connector and its mate on a standard FTA.

Screw terminal connection method

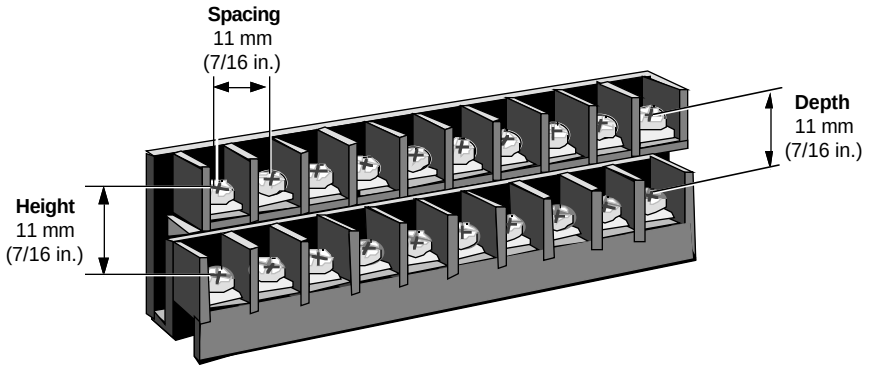
The stripped length will vary according to the specific wire lug used for the screw termination connection method. The terminal can accommodate 0.25 through 2.5 mm^2 (22 through 14 AWG) stranded wire. Two 1 mm^2 (18 AWG) stranded wires or a single 3.5 mm^2 (12 AWG) solid wire are also acceptable.

Continued on next page

Fixed-screw terminal strip

Figure 8-13 illustrates a fixed-screw terminal strip for the standard FTA.

Figure 8-13 Typical FTA Fixed-Screw Terminal Strip



Screw Terminal Strip Sizes

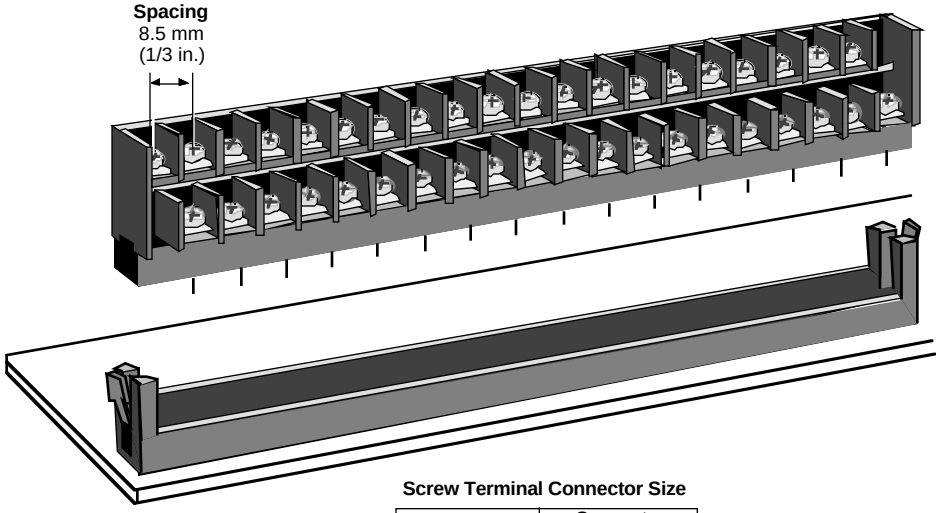
Number of Terminals	Connector Length
8	52 mm (2.0 in.)
12	74 mm (2.9 in.)
24	140 mm (5.5 in.)

4400

Removable-screw terminal connector

Figure 8-14 illustrates a typical removable-screw terminal connector for the standard FTA.

Figure 8-14 Typical FTA Removable-Screw Terminal Connector



Screw Terminal Connector Size

Number of Terminals	Connector Length
40	176 mm (6.9 in.)

6170

Continued on next page

8.5.4 Field Wire Termination, Continued

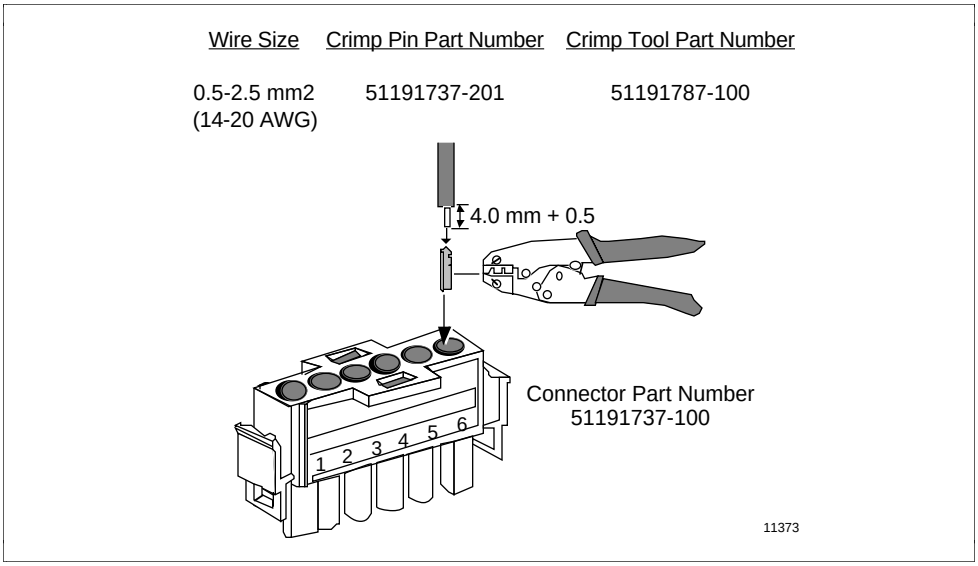
Galvanic Isolation Module connectors

Galvanically isolated FTAs have Galvanic Isolation Modules that accept both pluggable crimp pin-type and pluggable compression-type terminal connectors. Both types of connectors have six terminals. Compression terminals accept size 0.3 to 3.5 mm^2 (12 to 22 AWG) wiring, while crimp terminals accept size 0.5 to 2.5 mm^2 (14 to 20 AWG) wiring.

Crimp pin-type terminal connector

Figure 8-15 illustrates the galvanically isolated FTA's crimp pin-type terminal connector.

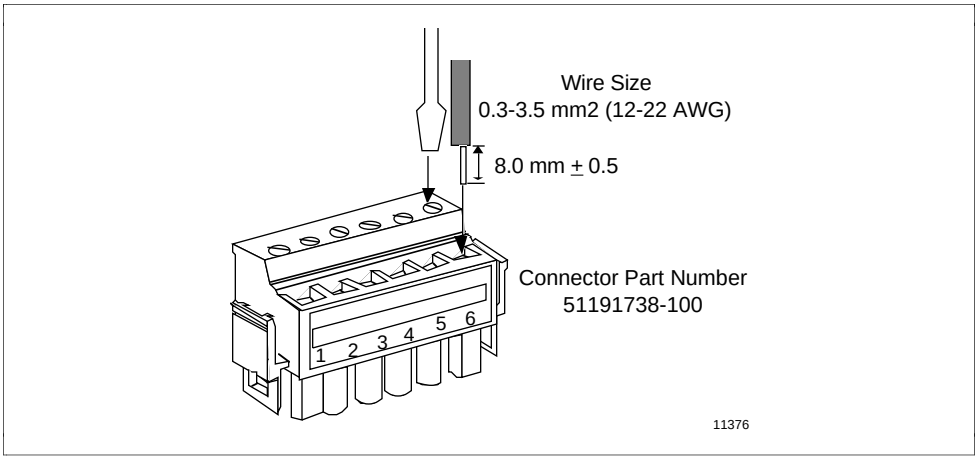
Figure 8-15 Galvanic Isolation Module Crimp Pin-Type Terminal Connector



Compression-type terminal connector

Figure 8-16 illustrates the galvanically isolated FTA's compression-type terminal connector.

Figure 8-16 Galvanic Isolation Module Compression-Type Terminal Connector



Section 9 – Subassembly Interconnections

9.1 Overview

Section contents

The topics covered in this section are:

Introduction

You may become involved with the interconnections of the High-Performance Process Manager (HPM) subassemblies when Field Termination Assemblies (FTAs) and a card file with the associated IOPs are added to the system. Unique cables are used for dc power, the serial Input/Output (I/O) Link, and the FTA assembly connections.

9.2 DC Power Distribution

Subassembly dc power distribution

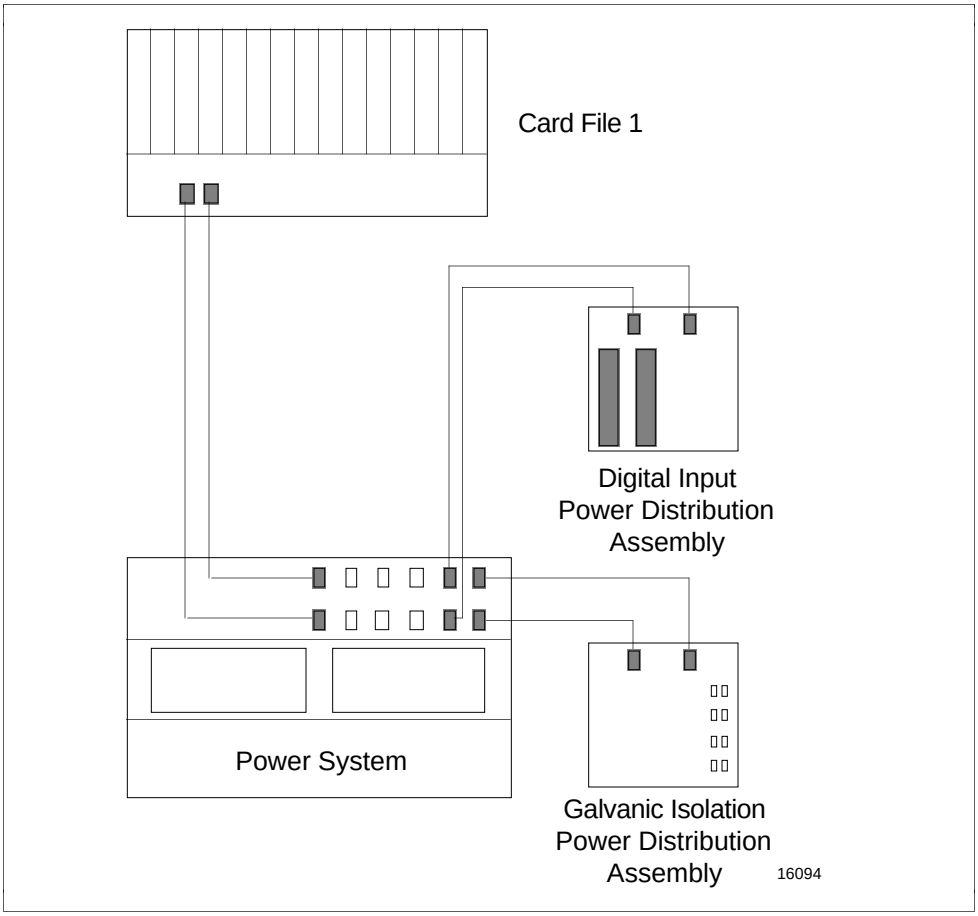
Each card file for the High-Performance Process Manager is installed with redundant power cables that connect the card file and other subassemblies to the Power System. Figures 9-1 through 9-4 illustrate some typical dc distribution for various card file and Standard Power System configurations.

Distribution for an AC Only Power System would be similar.

Single card file and two Power Distribution Assemblies

Figure 9-1 illustrates a typical Standard Power System's power cabling to a single card file and two Power Distribution Assemblies.

Figure 9-1 Typical Standard Power System Single Card File Power Cabling with Power Distribution Assemblies

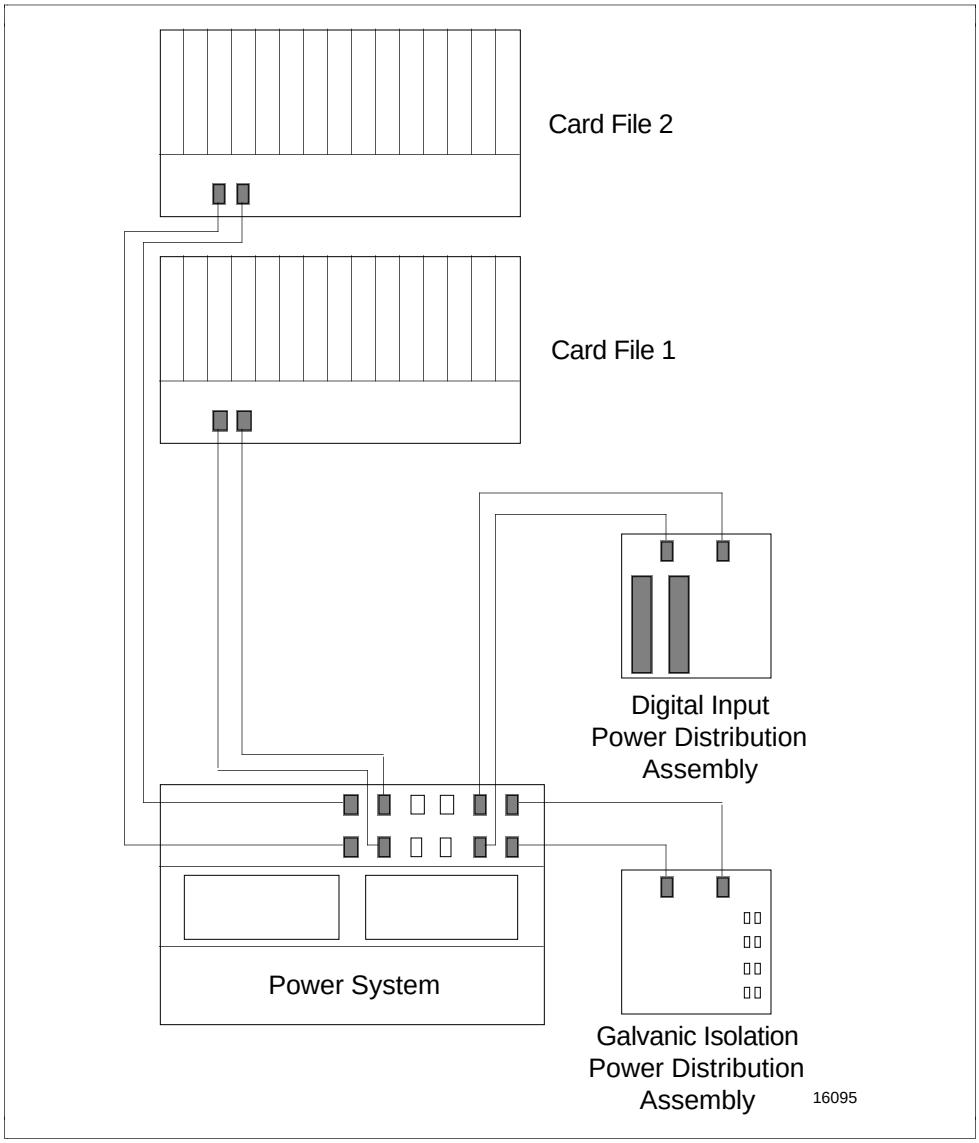


Continued on next page

Two card files and two Power Distribution Assemblies

Figure 9-2 illustrates a typical Standard Power System's power cabling to two card files and two Power Distribution Assemblies.

Figure 9-2 Typical Standard Power System Two Card File Power Cabling with Power Distribution Assemblies

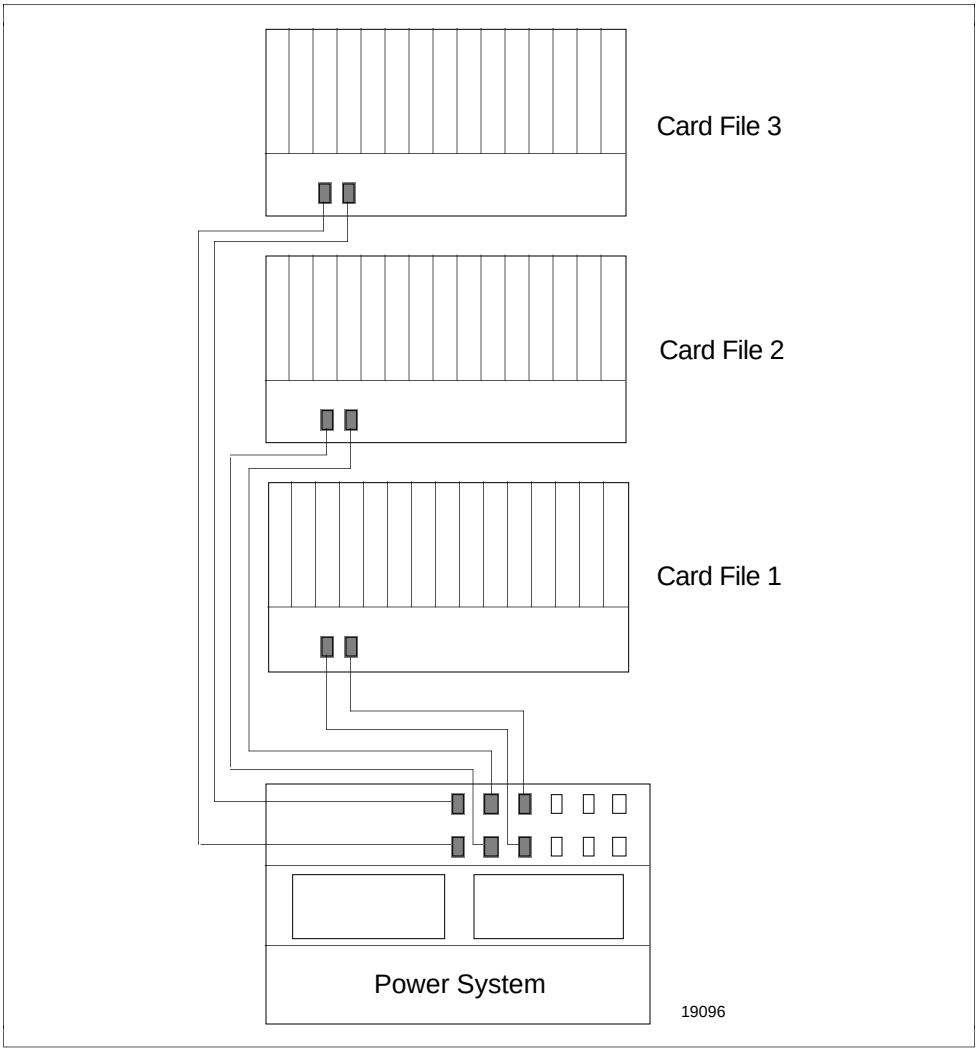


Continued on next page

Three card files

Figure 9-3 illustrates a typical Standard Power System's power cabling to three card files.

Figure 9-3 Standard Power System Three Card File Power Cabling

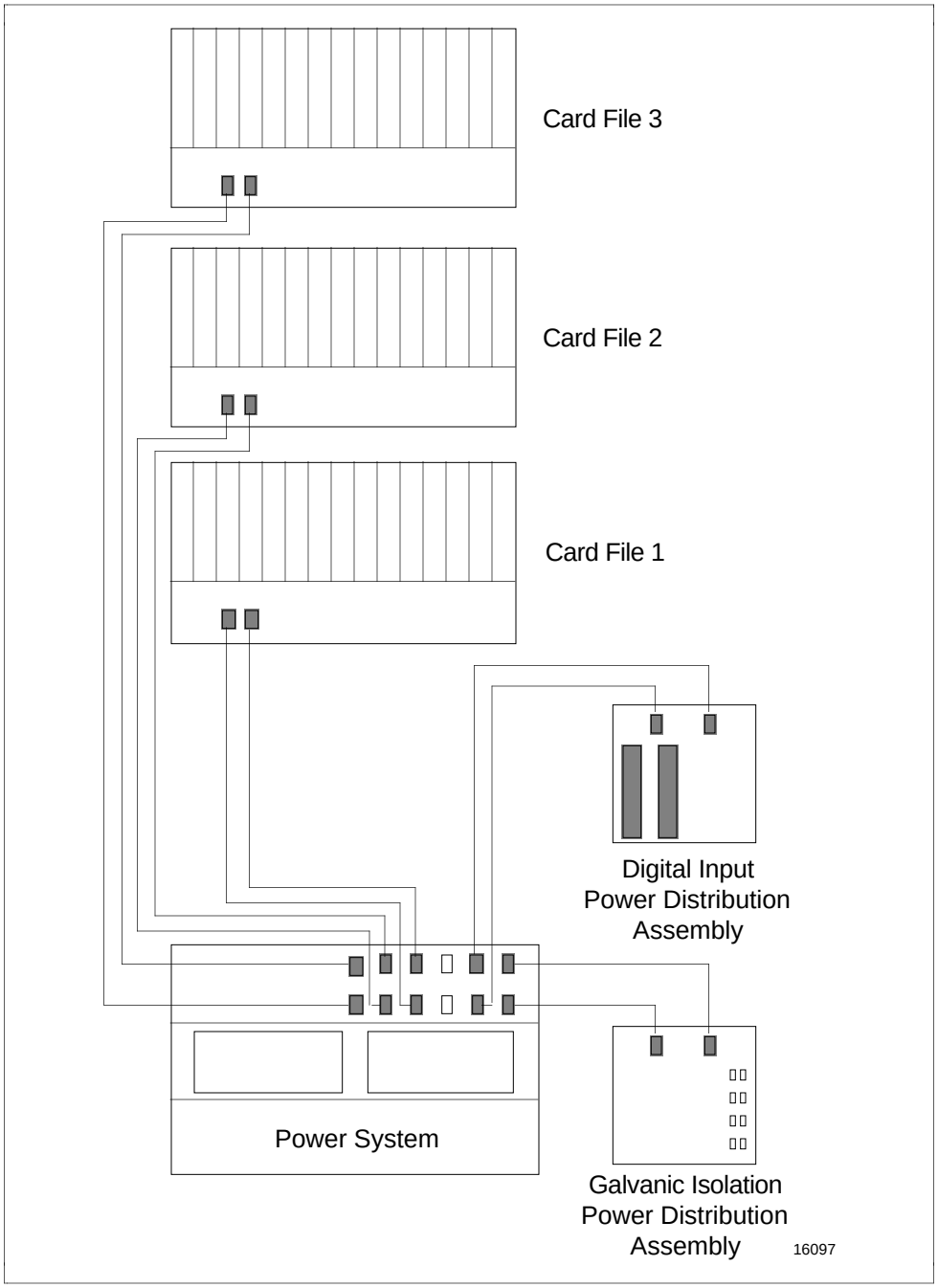


Continued on next page

Three card files and two Power Distribution Assemblies

Figure 9-4 illustrates a typical Standard Power System's power cabling to three card files and two Power Distribution Assemblies.

Figure 9-4 Typical Standard Power System Three Card File Power Cabling with Power Distribution Assemblies



Continued on next page

Power cables

Two types of power cables are available. Each type is specified by a set of model numbers. Although both types use a six-pin connector, one type consists of six conductors while the other type consists of two conductors.

Both sets of models numbers provide of a pair of cables to support power distribution redundancy.

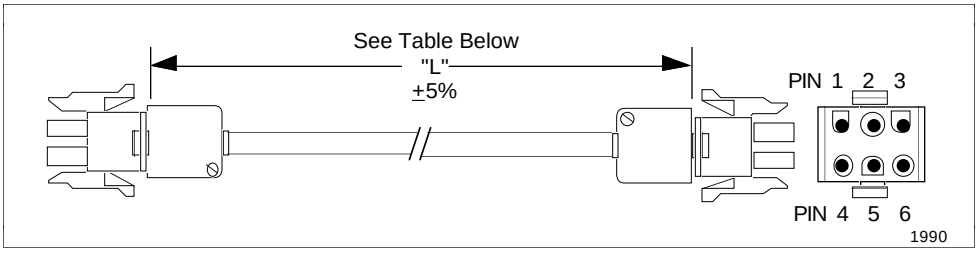
Internal cabinet power cables

When providing power to assemblies internal to the cabinet or cabinet complex, use a model MU-KDPRxx cable, where “xx” represents the length of the cable in meters.

The cable provides 24 Vdc, 3.9 Vdc, and 6 Vac through six conductors.

Figure 9-5 illustrates the model MU-KDPRxx power cable.

Figure 9-5 Model MU-KDPRxx Internal Use Power Cable



External cabinet power cables

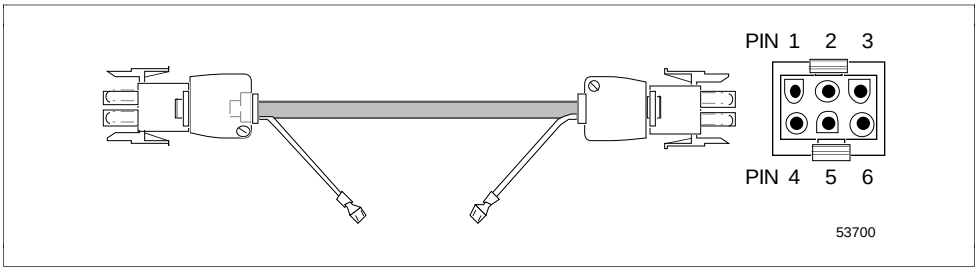
When providing power to the Digital Input Power Distribution Assembly (model MU-TDPR02) or the Galvanic Isolation Power Distribution Assembly (model MU-GPR02), use model MU-KSPRxx cable where “xx” represents the length of the cable in meters. This is a shielded cable and the cable shield must be grounded only at the end that connects to the Power distribution Assembly.

The cable provides only 24 Vdc through two conductors.

The Model MU-KSPRxx cable is used for CE Compliant applications.

Figure 9-6 illustrates the model MU-KSPRxx power cable.

Figure 9-6 Model MU-KSPRxx External Use Power Cable



Continued on next page

Power cable lengths

Table 9-1 is a list of the power cable lengths available. Two cables are supplied when ordered by model number.

Table 9-1 Model MU-KDPRxx/MU-KSPRxx Power Cables

Length (Meters)	Model MU-KDPRxx		Model MU-KSPRxx	
	Model Number	Part Number	Model Number	Part Number
1	N/A	51201397-001	N/A	N/A
1.5	N/A	51201397-915	N/A	N/A
2	MU-KDPR02	51201397-002	N/A	N/A
3	MU-KDPR03	51201397-003	N/A	N/A
4	MU-KDPR04	51201397-004	MU-KSPR04	51204037-004
5	MU-KDPR05	51201397-005	MU-KSPR05	51204037-005
6	MU-KDPR06	51201397-006	N/A	51204037-006
8	MU-KDPR08	51201397-008	N/A	51204037-008
10	MU-KDPR10	51201397-010	MU-KSPR10	51204037-010
15	MU-KDPR15	51201397-015	MU-KSPR15	51204037-015
20	MU-KDPR20	51201397-020	MU-KSPR20	51204037-020
25	MU-KDPR25	51201397-025	N/A	51204037-025
30	MU-KDPR30	51201397-030	MU-KSPR30	51204037-030
35	MU-KDPR35	51201397-035	N/A	51204037-035
40	MU-KDPR40	51201397-040	MU-KSPR40	51204037-040
45	MU-KDPR45	51201397-045	N/A	51204037-045
50	MU-KDPR50	51201397-050	MU-KSPR50	51204037-050

Backplane connectors

Table 9-2 lists the power cable connectors on the card file backplanes.

Table 9-2 Card File Power Connectors

Card File Type	Power Connectors
Left 7-Slot (Slots 1-7)	J20 and J21
Right 7-Slot (Slots 9-15)	J20 and J21
15-Slot (Slots 1-15)	J46 and J47
IOP Only (Slots 1-15)	J33 and J37

Continued on next page

Power cable length selection

The maximum recommended working length of a power cable is 2 meters (6 feet), based on a maximum voltage drop of 0.25 volt for each conductor. The use of longer power cables should be carefully considered and used only in light load applications.

ATTENTION

ATTENTION—Do not install a Digital Input Power Distribution Assembly or a Galvanic Isolation Power Distribution Assembly in the same power loop that contains a card file.

Digital Input Power Distribution Assembly

Certain FTAs may require 24 Vdc from the Power System to provide voltage for process source devices or for cabinet failure alarms. For these applications, the Digital Input Power Distribution Assembly is used and it obtains its power from the Power System through a power cable.

The assembly provides 12 pairs of fused terminals for sense power wiring to alarm contacts.

Galvanic Isolation Power Distribution Assembly

Power for galvanically isolated FTAs is provided by a Galvanic Isolation Power Distribution Assembly (model MU/MC-GPRD02) which is connected to the Power System.

For CE Compliance, the power cabling from the Galvanic Isolation Power Distribution Assembly to the Galvanic Isolation FTAs must not leave the cabinet or cabinet complex unless it is routed in metal conduit that is grounded to Safety Ground.

9.3 I/O Link Interface Cabling

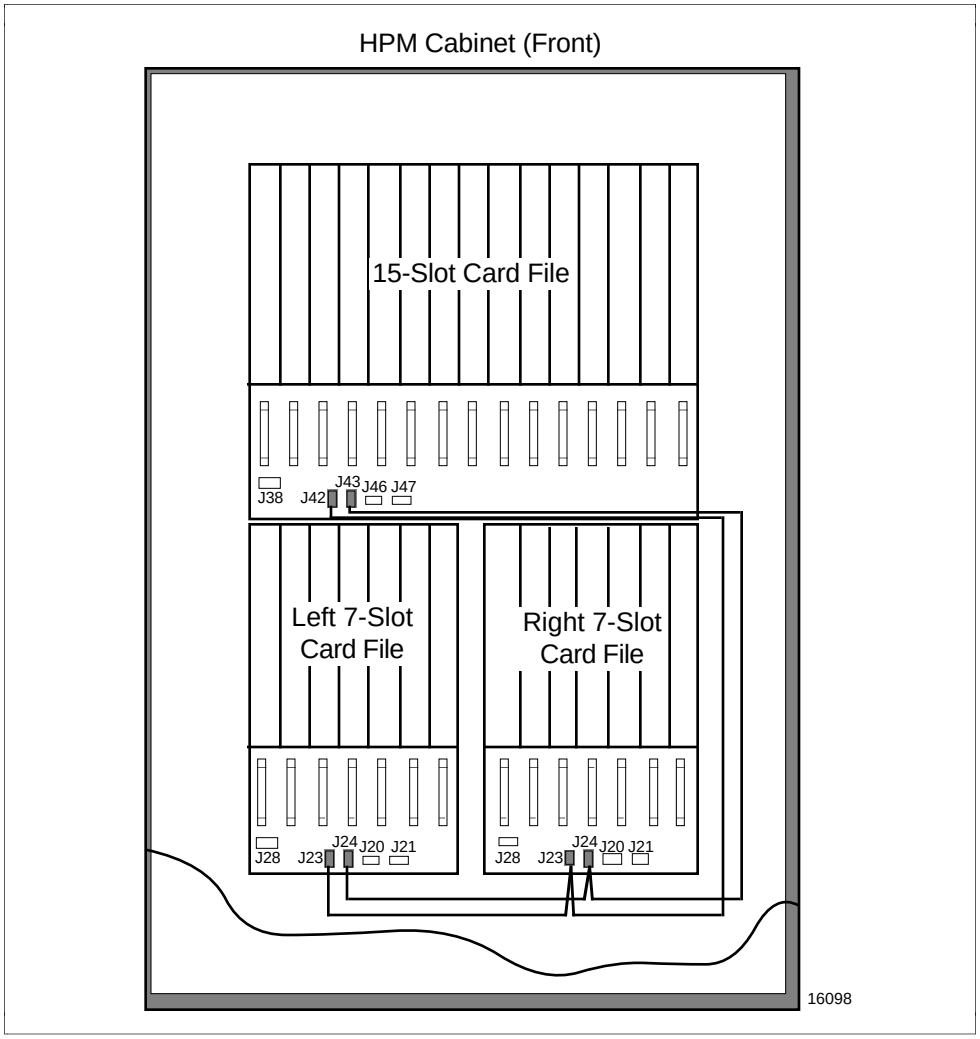
Introduction

When a High-Performance Process Manager (HPM) has more than one card file, the card files communicate through redundant serial I/O Link Interface cables. Correspondingly, an HPM comprised of only one card file, a single HPMM card file, does not require I/O Link Interface cables as the I/O is resident in the card file.

I/O Link Interface cabling for three card files

Figure 9-7 illustrates a typical I/O Link Interface installation for three card files.

Figure 9-7 I/O Link Interface Cabling for Three Card Files



Continued on next page

9.3 I/O Link Interface Cabling, Continued

I/O Link Interface cabling description

I/O Link Interface cables must not be longer than 10 meters (33 feet) total and must not leave the High-Performance Process Manager cabinet or cabinet complex. Two cables are required because the I/O Link Interface provides redundancy for reliability. One cable is designated Link A, and the other Link B.

Two types of cables

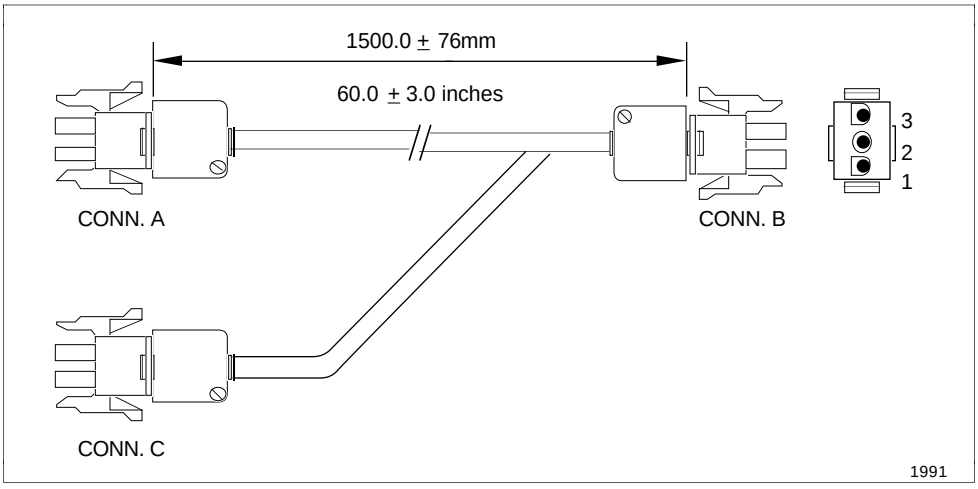
Two types of I/O Link Interface cables are available. Both types of cable are shielded, but they differ in how the cable shield is connected to ground. Both types consist of a pair of cables to support I/O Link Interface redundancy when ordered by the appropriate part number. There are no model numbers for the cables.

Non-CE Compliant I/O Link Interface cables

The number of connectors required depends upon the number of card files that are interconnected. Figure 9-8 illustrates one of a pair of I/O Link Interface cables, part number 51195479-200, which interconnects two card files. Because I/O Link Interface cables are always installed as a redundant pair, part number 51195479-200 specifies a pair of cables.

The cable shield is connected to ground through the cable connector. The cable is for non-CE Compliant applications.

Figure 9-8 Non-CE Compliant I/O Link Interface Cable



Continued on next page

Available non-CE Compliant I/O Link Interface cables

Table 9-3 lists the available I/O Link Interface cables (51195479-xxx).

Table 9-3 I/O Link Interface Cables – 51195479-xxx

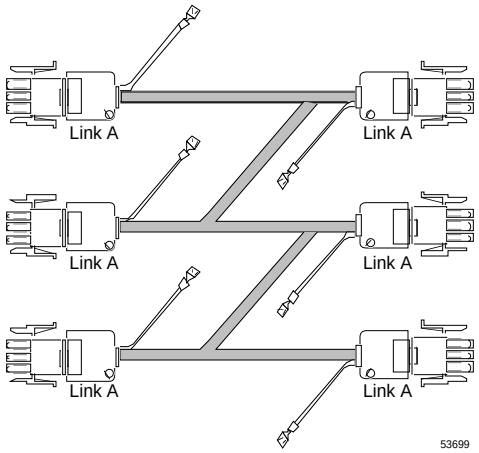
Number of Drop Connectors	Total Cable Length	Part Number
2	1.5 meters (5 feet)	51195479-100
3	3.0 meters (10 feet)	51195479-200
4	4.5 meters (15 feet)	51195479-300
5	6.0 meters (20 feet)	51195479-400
6	7.5 meters (25 feet)	51195479-500

CE Compliant I/O Link Interface cables

The number of connectors required depends upon the number of card files that are interconnected. Figure 9-9 illustrates one of a pair of I/O Link Interface cables, part number 51204042-500, which interconnects six card files. Because I/O Link Interface cables are always installed as a redundant pair, part number 51204042-200 supplies a pair of cables.

The cable has two shields that must be grounded separately at both ends to a FASTON terminal on the ground plate of the card file. It is not grounded through the card file's backplane. The cable is for CE Compliant applications.

Figure 9-9 CE Compliant I/O Link Interface Cable



Continued on next page

Available CE Compliant I/O Link Interface cables

Table 9-4 lists the available shielded I/O Link Interface cables and their part number.

Table 9-4 CE Compliant I/O Link Interface Cables

Number of Drop Connectors	Total Cable Length	Part Number
2	1.5 meters (5 feet)	51204042-100
3	3.0 meters (10 feet)	51204042-200
4	4.5 meters (15 feet)	51204042-300
5	6.0 meters (20 feet)	51204042-400
6	7.5 meters (25 feet)	51204042-500

No card file connector termination necessary

The I/O Link Interface cabling does not use external terminators. However, the connectors at the ends of the I/O Link Interface cable must be connected to a card file. Interior unused connectors are acceptable.

Cabling to more than two card files

When there are more than two card files in a subsystem, a pair of tab 200 (-200) through 500 (-500) cables are used to daisy-chain all the Link A and Link B connections together. Both cables should be laced together to create one harness.

Four types of card files

Four types of card files can be used in the High-Performance Process Manager. The I/O Link Interface connectors are labeled **Link A** and **Link B**. The cables must not be cross-connected.

I/O Link Interface card file connector designations

Table 9-5 lists the A and B I/O Link Interface connectors on the backplane of the various types of card files, and Figures 9-7 and 9-10 illustrate the I/O Link Interface interconnection of two and three card files, respectively. The IOP Only card file is also included.

Table 9-5 I/O Link Interface Card File Connector Designations

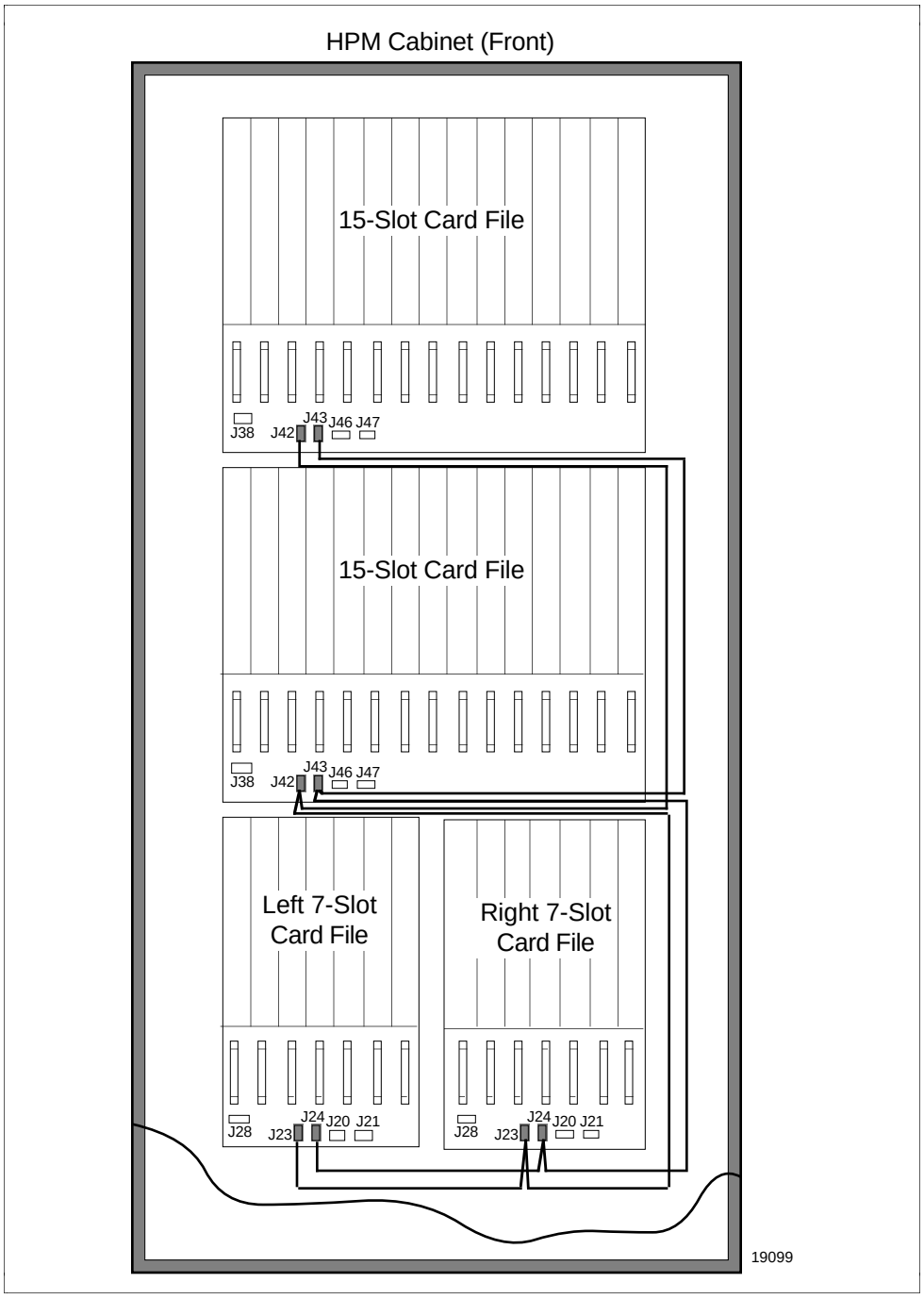
Card File Type	I/O Link A Connector	I/O Link B Connector
Left 7-Slot (Slots 1-7)	J23	J24
Right 7-Slot (Slots 9-15)	J23	J24
15-Slot (Slots 1-15)	J42	J43
IOP Only (Slots 1-15)	J32	J31

Continued on next page

I/O Link Interface cabling for four card files

Figure 9-10 illustrates a typical I/O Link Interface installation for four card files.

Figure 9-10 I/O Link Interface Cabling for Four Card Files



9.4 I/O Link Interface Address Selection

ATTENTION

ATTENTION—The I/O Link Interface address for all card files must be assigned. I/O Link Interface addressing is different than UCN node addressing. See Section 7 for the UCN node address selection procedure.

Introduction

I/O Processor (IOP) cards can be installed in any of the four types of card files that can be configured as a High-Performance Process Manager subsystem. The four types are the Left 7-Slot card file, the Right 7-Slot card file, the 15-Slot card file, and the IOP Only card file.

IOP Only card file

The IOP Only card file can be part of the installation as a result of upgrading an existing Process Manager or Advanced Process Manager subsystem to a High-Performance Process Manager subsystem.

HPMM in 7-Slot and 15-Slot card files

The Left 7-Slot, Right 7-Slot, and 15-Slot types of card files can contain an HPMM (2 slots) with the remaining slots allocated for IOPs, or no HPMM and all the slots allocated for IOPs. When an HPMM is resident in a card file, it occupies the two left-most slots (1 and 2 for the Left 7-Slot or 15-Slot card file, or 9 and 10 for the Right 7-Slot card file).

Only IOP cards in IOP Only card file

The IOP Only card file accommodates only IOP cards.

I/O Link Interface address pinning

The card file must be hardware configured (pinned) for an address on the I/O Link Interface.

Pinning jumpers

I/O Link Interface address selection is implemented with either plug jumpers or zero-ohm resistor jumpers on the card file's backplane.

Continued on next page

I/O Link Interface addressing scheme

The card file I/O Link Interface addresses must be configured consecutively; however, two addressing schemes must be considered, and they are based upon the HPM subsystem's card file configuration.

- In an HPM subsystem with a single HPMM and any supporting card files that contain only IOP cards, the card file containing the HPMM must be configured for an I/O Link Interface binary address of zero (0), and the card files containing only IOP cards must be configured for consecutive addresses starting at one (1).
- In an HPM subsystem with redundant HPMMs, one card file that contains HPMM cards must be configured for I/O Link Interface binary address zero (0), and the second card file that contains HPMM cards must be configured for address one (1). Card files that contain only IOP cards, if present, must be configured for consecutive I/O Link Interface addresses that start at address two (2).

  If the HPMMs are located in Left and Right 7-Slot card files, the Left 7-Slot card file must be assigned address 0, and the Right 7-Slot card file must be assigned address 1.

ATTENTION

ATTENTION—The numerical card file address displayed at the Universal Station is one higher than the actual configured binary address. A binary card file address of zero (0) is displayed as a numerical card file address of one (1).

Two implementation methods

I/O Link Interface address selection can be implemented with either

- Plug jumpers, or
- Zero-ohm resistor jumpers.

One of the two methods must be disabled. Both cannot be active. Figure 7-1 in Section 7 illustrates the locations on the Left 7-Slot and Right 7-Slot card files where the I/O Link Interface address is selected by one of the two methods. Figure 7-2 illustrates the pinning locations on the 15-Slot card file backplane. The IOP Only card file backplane is illustrated in Figure 9-11.

ATTENTION

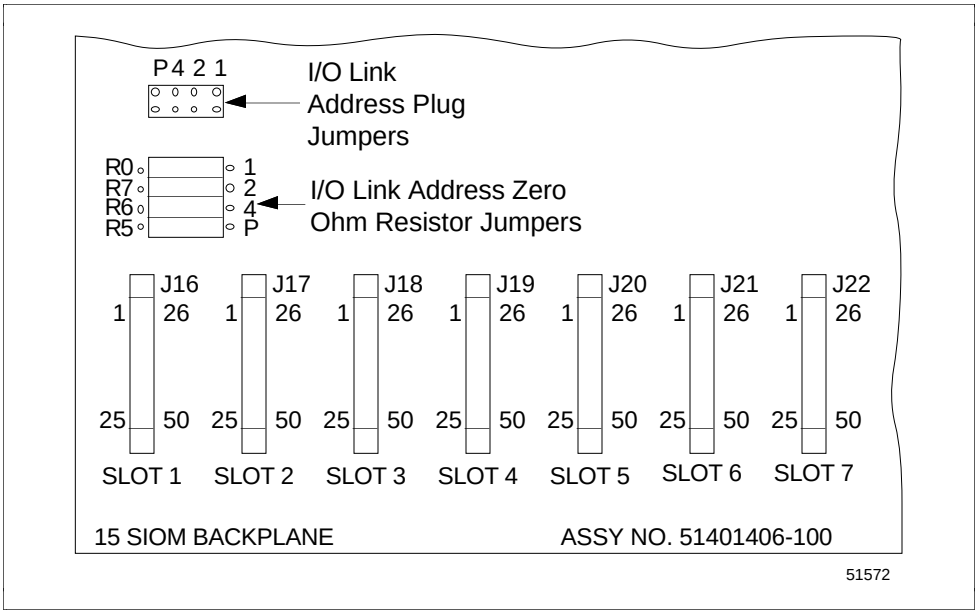
ATTENTION—I/O Link Interface zero-ohm resistor jumpers are available only by special order. They are not installed on the card file backplane unless requested when placing an order for the card file.

Continued on next page

IOP Card file backplane

Figure 9-11 is an illustration of the locations on an IOP backplane where I/O Link Interface address pinning is implemented.

Figure 9-11 IOP Card File Backplane



Plug jumper method

I/O Link Interface address selection using plug jumpers is demonstrated with the following example. This is the preferred method and may be the only method unless zero-ohm resistor jumpers are optionally installed on the card file backplane at the factory.

A card file is to be given an I/O Link Interface binary address of four (4). The Universal Station will display this card file as number five (5). If they exist, take diagonal cutters and remove all the zero-ohm resistor jumpers, R14 through R17, on the backplane. Install a plug jumper to bridge both pins at position **4** at J28. Because this single jumper constitutes an odd number of jumpers, remove the **P** (parity) plug jumper as well as the other jumpers in positions **2** and **1**.

Continued on next page

Zero-ohm resistor jumper method

I/O Link Interface address selection using zero-ohm resistor jumpers is demonstrated with the following example. Normally, zero-ohm resistor jumpers are not present on the card file backplane.

A card file is to be given an I/O Link Interface hardware address of three (3). The Universal Station will display this card file as number four (4). Remove all the plug jumpers and set them aside. A binary one is created by leaving the resistor in place and a binary zero is created by removing the resistor. Do not remove the zero-ohm resistor jumpers at positions **1** and **2** (1 + 2 = 3), and do not remove the **P** (parity) resistor because an odd number of jumpers is required. Remove all other zero-ohm resistor jumpers with the diagonal cutters.

If a zero-ohm resistor jumper is incorrectly removed, do not attempt to replace it by a solder connection. Instead, remove all the zero-ohm resistor jumpers and select the card file's I/O Link Interface address with the plug jumpers.

9.5 I/O Link Interface Cable Shield Grounding

Introduction

The possibility of creating ground loops is reduced by grounding the I/O Link Interface cable shield to ground at only one card file connector.

When using part 51195479-xxx I/O Link Interface cable and installing multiple card files in a High-Performance Process Manager subsystem, both I/O Link Interface cables, A and B, must have their cable shields tied to ground on the backplane of the card file configured as I/O Link Interface address zero (0). The other card files must not have the I/O Link Interface cable shields tied to ground.

This type of I/O Link Interface cable and cable shield grounding method is not for CE Compliant applications.

I/O Link Interface cable shield jumper connections

The grounding option is provided by jumper connections on the backplane of the card file. The connections are designated J29 for cable A and J22 for cable B on the Left and Right 7-Slot card file backplane and J44 and J45, respectively, on the 15-Slot card file backplane. When a jumper plug is inserted in the position, the appropriate cable shield is tied to ground.

I/O Link Interface cable grounding rules

A Left 7-Slot or 15-Slot HPMM card file that is configured as I/O Link Interface address “0” must always have the shield jumpers installed, and the redundant Right 7-Slot or 15-Slot HPMM card file that is configured as I/O Link Interface address “1” must always have the shield jumpers removed.

Remote card files

When card files are located at a remote location, separated from the HPMM card file(s) by a fiber optic I/O Link Extender, select one of the card files and insert plug jumpers in locations J22 and J29 on a 7-Slot card file backplane, or J44 and J45 on a 15-Slot card file backplane to tie one end of the I/O Link Interface cables to ground. All other card files must have the jumpers removed at locations J22 and J29, or J44 and J45.

Remote IOP card files

The I/O Link Interface cable shield cannot be optionally tied to ground on the IOP card file backplane. For that reason, if multiple card files are installed at a remote location and include one or more IOP card files, a 7-Slot or 15-Slot card must be part of the installation so that one end of the I/O Link Interface cables can be tied to ground.

9.6 IOP to FTA Cabling

Introduction

Each FTA interfaces to its associated IOP through a card file backplane connector by using an IOP to FTA cable. FTAs that accommodate IOP redundancy require two FTA cables to connect a single FTA to two associated IOPs.

Two types

Two types of IOP to FTA cables are available. The model MU-KFTAxx cable, where "xx" is the length of the cable in meters, is a nonshielded cable for non-CE Compliant applications. The model MU-KFTSxx cable is a shielded cable CE Compliant applications.

CE Compliance

To provide CE Compliance, the model MU-KFTSxx shielded IOP to FTA cable must be used with card files and FTAs that have filtered mating connectors. In general, these are assemblies with a tab number that ends in a "5" (-xx5). See Section 10 for a list of CE Compliant hardware.

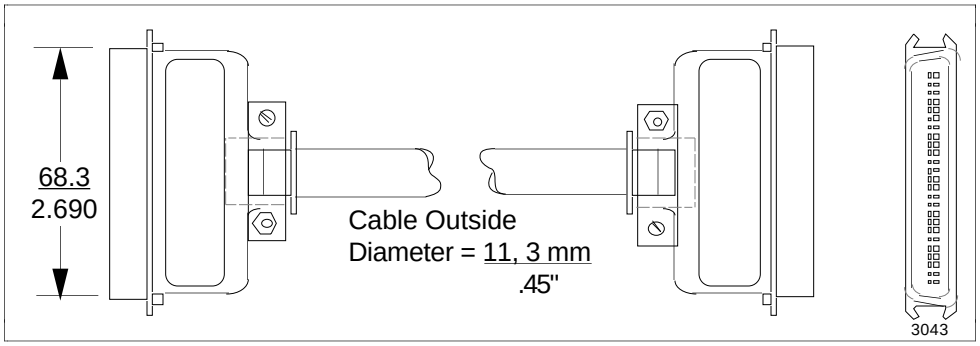
Cable interface description

The IOP to FTA cable has 50 conductors with a phone connector (DB-50) at each end.

Model MU-KFTAxx cables

Figure 9-12 is an illustration of the model MU-KFTAxx and MU-KFTSxx IOP to FTA cables. The model MU-KFTSxx cable has a metallic connector shell.

Figure 9-12 IOP to FTA Cable



Continued on next page

Model MU-KFTAxx cable lengths

The maximum allowed length is 50 meters (164 feet). Table 9-6 is a list of the model MU-KFTAxx IOP to FTA cable lengths available.

Table 9-6 IOP to FTA Cables – Model MU-KFTAxx

Model Number	Cable Length (Meters/Feet)	Part Number
	1.0/3.3	51201420-001
	1.5/4.9	51201420-915
MU-KFTA02	2.0/6.6	51201420-002
MU-KFTA03	3.0/9.8	51201420-003
MU-KFTA04	4.0/13.1	51201420-004
MU-KFTA05	5.0/16.4	51201420-005
MU-KFTA06	6.0/19.7	51201420-006
MU-KFTA08	8.0/26.2	51201420-008
MU-KFTA10	10.0/32.8	51201420-010
MU-KFTA15	15.0/49.2	51201420-015
MU-KFTA20	20.0/65.6	51201420-020
MU-KFTA25	25.0/82.0	51201420-025
MU-KFTA30	30.0/98.4	51201420-030
MU-KFTA35	35.0/114.8	51201420-035
MU-KFTA40	40.0/131.2	51201420-040
MU-KFTA45	45.0/147.6	51201420-045
MU-KFTA50	50.0/164.0	51201420-050

Continued on next page

Model MU-KFTSxx cable lengths

The maximum allowed length is 50 meters (164 feet). Table 9-7 is a list of the model MU-KFTSxx IOP to FTA cable lengths available.

Table 9-7 IOP to FTA Cables – Model MU-KFTSxx

Model Number	Cable Length (Meters/Feet)	Part Number
N/A	1.0/3.3	51204033-001
N/A	1.5/4.9	51204033-915
MU-KFTS02	2.0/6.6	51204033-002
MU-KFTS03	3.0/9.8	51204033-003
MU-KFTS04	4.0/13.1	51204033-004
MU-KFTS05	5.0/16.4	51204033-005
MU-KFTS06	6.0/19.7	51204033-006
MU-KFTS08	8.0/26.2	51204033-008
MU-KFTS10	10.0/32.8	51204033-010
MU-KFTS15	15.0/49.2	51204033-015
MU-KFTS20	20.0/65.6	51204033-020
MU-KFTS25	25.0/82.0	51204033-025
MU-KFTS30	30.0/98.4	51204033-030
MU-KFTS35	35.0/114.8	51204033-035
MU-KFTS40	40.0/131.2	51204033-040
MU-KFTS45	45.0/147.6	51204033-045
MU-KFTS50	50.0/164.0	51204033-050

Cable routing

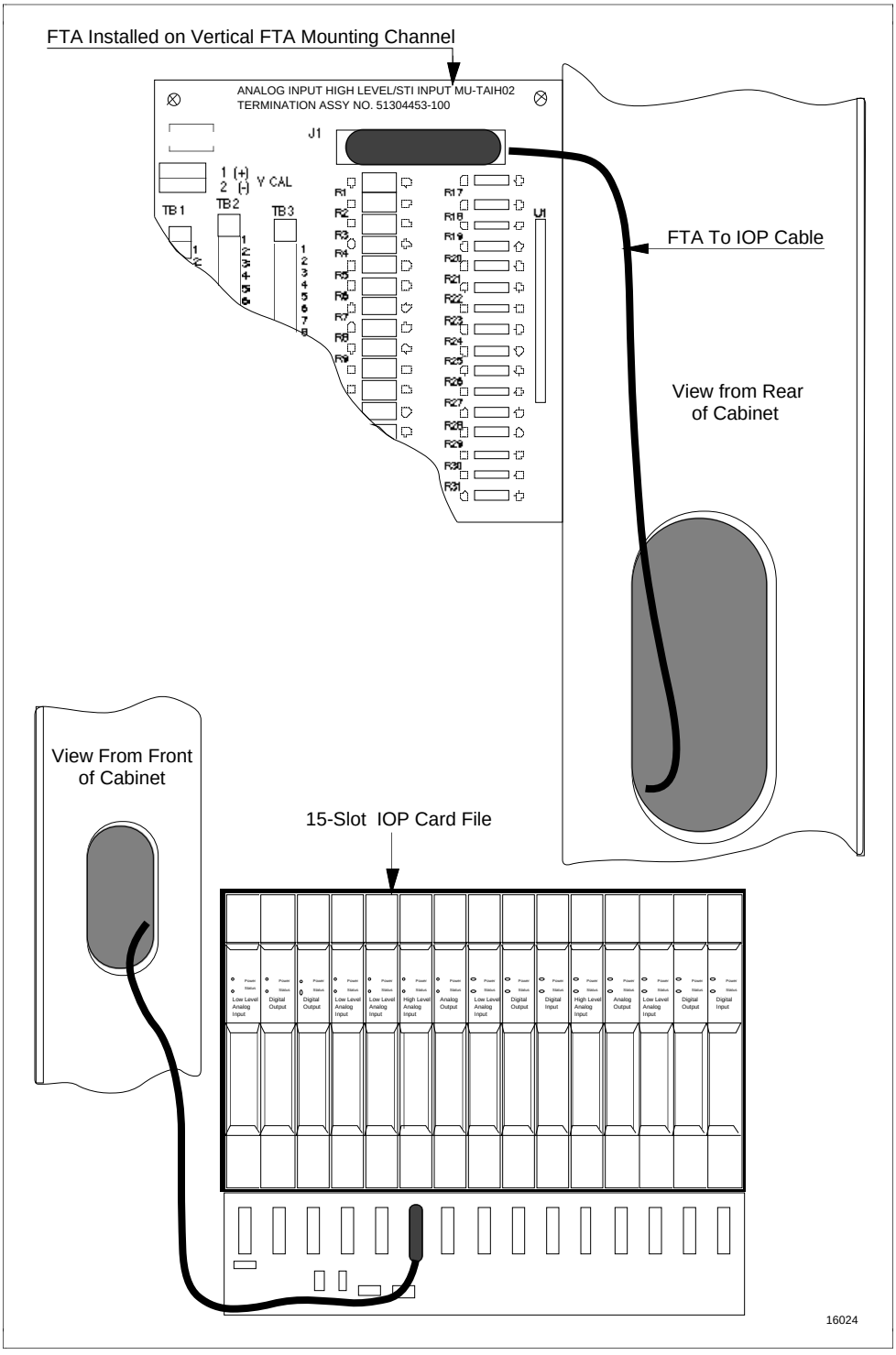
The FTA cables are installed in the right-hand channel of vertical FTA Mounting Channels and in the upper channel of horizontal FTA Mounting Channels. The FTA Mounting Channel has two channels that are shielded from each other by design. Field wiring is routed in the second channel to avoid electrical interference between the field wiring and the IOP to FTA signals.

Continued on next page

FTA to IOP Cabling illustration

Figure 9-13 illustrates a typical FTA to IOP cable connection.

Figure 9-13 Typical FTA to IOP Cable Connection



Section 10 – CE Compliance

10.1 Overview

Section contents

The topics covered in this section are:

Introduction

To meet European Compliance directives, card files, High-Performance Process Manager Module (HPMM) cards, Field Termination Assemblies (FTAs), Power Systems, and cables, namely IOP to FTA cables, power cables, and I/O Link Interface cables, are available and identified either by their model number or by the assembly part number.

Hardware differences

Where applicable, this section describes general differences between the CE Compliant hardware and non-CE Compliant hardware.

Also discussed are the hardware combinations and rules that must be considered for CE Compliance.

CE Compliant hardware identification

Finally, where applicable, each subsection that is devoted to a particular type of hardware identifies the CE Compliant and the non-CE Compliant hardware.

10.2 Card Files

Introduction

All three card file types are available for CE Compliant applications. The CE Compliant models have three unique features. They are:

- Filtered backplane IOP connectors
- IOP connector ground panel(s)
- Rear backplane shield

Unlike the non-CE Compliant 7-Slot and 15-Slot card files which are not dedicated HPMM or IOP card files, the CE-Compliant 7-Slot and 15-Slot card files are mechanically either HPMM or IOP card files. 7-Slot or 15-Slot IOP card files will not accept an HPMM card set.

Backplane ground panel

The backplane ground panel provides a ground plane for the body of the IOP connectors. The body of the connector in turn provides ground for the IOP to FTA cable shield when mated with the IOP connector.

Rear backplane shield panel

Like the UCN connector shield enclosure, the backplane shield panel provides EMI protection at the rear of the backplane.

IOP to FTA cables

Both the model MU-KFTAxx and MU-KFTSxx IOP to FTA cables can be used with both the CE Compliant and non-CE Compliant card files. However, only the CE Compliant card file models and the model MU-KFTSxx IOP to FTA cables together are acceptable for CE Compliant applications.

Continued on next page

10.2 Card Files, Continued

Model list

Table 10-1 lists the model numbers of the CE Compliant card files. All models are available without conformal coating (MU) and with conformal coating (MC). The PM/APM technology IOP Only card file is also included because it may exist when a PM or APM is upgraded to an HPM.

Table 10-1 Card Files

Description	Non-Conformally Coated Model Number	Conformally Coated Model Number
Left 7-Slot HPMM	MU-HPFH03	MC-HPFH03
Right 7-Slot HPMM	MU-HPFH13	MC-HPFH13
15-Slot HPMM	MU-HPFX03	MC-HPFX03
Left 7-Slot IOP	MU-HPFI03	MC-HPFI03
Right 7-Slot IOP	MU-HPFI13	MC-HPFI13
15-Slot IOP	MU-HPFI23	MC-HPFI23
IOP Only (PM/APM)	MU-IOFX03	MC-IOFX03

Conversion kit

A model MU-ZPFI03 upgrade kit will convert a 7-Slot or 15-Slot HPMM card file to an IOP card file.

10.3 HPMM Cards

Introduction

All High-Performance Process Manager Module (HPMM) cards are CE Compliant.

Conformal coating

All HPMM card sets are available with and without conformal coating.

10.4 IOPs

Introduction

Only the model MU-PAOX03 (MC-PAOX03) Analog Output IOP is available in a CE Compliant and non-CE Compliant version. All other IOP models are CE Compliant only.

Conformal coating

All IOP cards are available with and without conformal coating.

Nonconformally coated IOPs

Table 10-2 lists the model numbers of the CE Compliant and non-CE Compliant IOP card that are not conformal coated. Model numbers and part numbers identify the assemblies.

Table 10-2 IOPs – Nonconformally Coated

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
LLAI	MU-PAIL02	N/A	51304481-100
LLMux	MU-PLAM02	N/A	51304362-100
HLAI	MU-PAIH03	N/A	51304754-100
STI	MU-PSTX02	N/A	51304516-100
AO	MU-PAOX03	51304672-100	51309152-125
AO	MU-PAOY22	N/A	80363969-100
DI	MU-PDIX02	N/A	51304485-100
DI	MU-PDIY22	N/A	80363972-100
DISOE	MU-PDIS11	N/A	51304690-100
DO	MU-PDOX02	N/A	51304487-100
DO	MU-PDOY22	N/A	80363975-100
PI	MU-PPIX02	N/A	51304386-100
SDI	MU-PSDX02	N/A	51304362-200
SI	MU-PSIM11	N/A	51304362-300

Continued on next page

Conformally coated IOPs

Table 10-3 lists the model numbers of the CE Compliant and non-CE Compliant IOP card that are conformally coated. Model numbers and part numbers identify the assemblies.

Table 10-3 IOPs – Conformally Coated

IOP Type	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
LLAI	MC-PAIL02	N/A	51304481-150
LLMux	MC-PLAM02	N/A	51304362-150
HLAI	MC-PAIH03	N/A	51304754-150
STI	MC-PSTX02	N/A	51304516-150
STIM	MC-PSTX03	N/A	51304516-250
AO	MC-PAOX03	51304672-150	51309152-175
AO	MC-PAOY22	N/A	80363969-150
DI	MC-PDIX02	N/A	51304485-150
DI	MC-PDIY22	N/A	80363972-150
DISOE	MC-PDIS11	N/A	51304690-150
DO	MC-PDOX02	N/A	51304487-150
DO	MC-PDOY22	N/A	80363975-150
SDI	MC-PSDX02	N/A	51304362-250
SI	MC-PSIM11	N/A	51304362-350

10.5 FTAs

Introduction

Most types of FTAs are available for CE Compliant applications. Some types are identified by a model number that is different than the model number for the non-CE Compliant FTA. Other CE Compliant FTA types have the same model number as the non-CE Compliant FTA, but are generally identified by a part number tab number that ends in “25” or “75.” There are some exceptions.

All CE Compliant FTAs have IOP interface connectors that provide cable shield ground through the metal shell of the connector for the CE Compliant model MU-KFTSxx IOP to FTA cable(s).

Conformal coating

All FTAs are available with and without conformal coating.

Nonconformally coated FTAs

Table 10-4 is a list of FTAs that are CE Compliant and non-CE Compliant and are not conformally coated. Model numbers and part numbers identify the assemblies.

Table 10-4 Field Termination Assemblies – Nonconformally Coated

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
LLAI	MU-TAIL02	51304437-100	N/A
LLAI	MU-TAIL03	N/A	51309202-125
LLMux RTD	MU-TAMR02	51304477-100	N/A
LLMux RTD	MU-TAMR03	N/A	51309218-125
LLMux TC	MU-TAMT02	51401491-100	N/A
LLMux TC	MU-TAMT03	N/A	51309223-125
LLMux TC Remote	MU-TAMT12	51401573-100	N/A
LLMux TC Remote	MU-TAMT13	N/A	51309213-125
HLAI/STI	MU-TAIH02	51304453-100	N/A
HLAI/STI	MU-TAIH12	51304337-100	N/A
HLAI/STI	MU-TAIH22	80366195-100	N/A
HLAI/STI	MU-TAIH52	51304337-200	N/A
HLAI/STI	MU-TAIH62	80366192-100	N/A

Continued on next page

Nonconformally coated FTAs, continued

Table 10-4 Field Termination Assemblies – Nonconformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
HLAI	MU-TAIH03	N/A	51309136-125
HLAI	MU-TAIH13	N/A	51309138-125
HLAI	MU-TAIH23	N/A	80369165-100
HLAI	MU-TAIH53	N/A	51309138-225
STI	MU-TSTX03	N/A	51309136-125
STI	MU-TSTX13	N/A	51309138-125
STI	MU-TSTX53	N/A	51309138-225
AO	MU-TAOX02	51304476-100	51304476-125
AO	MU-TAOX12	51304335-100	51304335-125
AO	MU-TAOX52	51304335-200	51304335-225
AO	MU-TAOY22	80366177-100	80366481-125
AO	MU-TAOY23	80366177-200	N/A
AO	MU-TAOY52	80364007-100	80366484-125
AO	MU-TAOY53	80364007-200	N/A
24 Vdc DI	MU-TDID12	51304441-100	51304441-125
24 Vdc DI	MU-TDID52	51304441-200	51304441-225
24 Vdc DI	MU-TDID72	51303928-100	N/A
24 Vdc DI	MU-TDIY22	80366180-100	80366180-125
24 Vdc DI	MU-TDIY62	80364010-100	80364010-125
120 Vac DI	MU-TDIA12	51304439-100	51304439-125
120 Vac DI	MU-TDIA52	51304439-200	51304439-225
120 Vac DI	MU-TDIA72	51303930-100	N/A
240 Vac DI	MU-TDIA22	51304431-100	51304431-125
240 Vac DI	MU-TDIA62	51304431-200	51304431-225

Continued on next page

Nonconformally coated FTAs, continued

Table 10-4 Field Termination Assemblies – Nonconformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
24 Vdc DO	MU-TDON12	51304446-100	N/A
24 Vdc DO	MU-TDON52	51304446-200	N/A
24 Vdc DO	MU-TDOY22	80366183-100	80366183-125
24 Vdc DO	MU-TDOY62	80364013-100	80364013-125
3-30 Vdc SS DO	MU-TDOD12	51304423-100	N/A
3-30 Vdc SS DO	MU-TDOD13	51304650-100	N/A
3-30 Vdc SS DO	MU-TDOD14	N/A	51309153-125
3-30 Vdc SS DO	MU-TDOD52	51304423-200	N/A
3-30 Vdc SS DO	MU-TDOD53	51304650-200	N/A
3-30 Vdc SS DO	MU-TDOD54	N/A	51309153-225
31-200 Vac SS DO	MU-TDOD22	51304428-100	N/A
31-200 Vac SS DO	MU-TDOD23	N/A	51309154-125
31-200 Vac SS DO	MU-TDOD62	51304428-200	N/A
31-200 Vac SS DO	MU-TDOD63	N/A	51309154-225
120/240 Vac SS DO	MU-TDOA12	51304408-100	N/A
120/240 Vac SS DO	MU-TDOA13	51304648-100	51304648-125
120/240 Vac SS DO	MU-TDOA52	51304408-200	N/A
120/240 Vac SS DO	MU-TDOA53	51304648-200	51304648-225
120 Vac Relay DO	MU-TDOR12	51304443-100	51309148-125
120 Vac Relay DO	MU-TDOR52	51304443-200	51309148-225
240 Vac Relay DO	MU-TDOR22	51304427-100	51309150-125
240 Vac Relay DO	MU-TDOR62	51304427-200	51309150-225
240 Vac Relay DO	MU-TDOY23	80366189-100	80366189-125
240 Vac Relay DO	MU-TDOY63	80366185-100	80366185-125

Continued on next page

Nonconformally coated FTAs, continued

Table 10-4 Field Termination Assemblies – Nonconformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
PI	MU-TPIX12	51304084-100	51304084-125
PI	MU-TPIX52	51304084-200	51304084-225
SDI – Toledo	MU-TSDT02	51303932-201	N/A
SDI – Manual/Auto	MU-TSDM02	51303932-202	N/A
SDI – Toledo	MU-TSDU02	51303932-203	N/A
SI – Modbus	MU-TSIM12	51303932-401	51303932-426
SI – Allen-Bradley	MU-TSIA12	51303932-403	51303932-428
Power Adapter	MU-TLPA02	51304467-100	51309204-125
DI Power Dist Assy	MU-TPRD02	51304425-100	51304425-125
GI Power Dist Assy	MU-GPRD02	51304644-100	51304644-125
GI HLAI/STI	MU-GAIH13	51304718-100	51304718-125
GI HLAI/STI	MU-GAIH14	51304730-100	51304730-125
GI HLAI/STI	MU-GAIH83	51304718-300	51304718-325
GI HLAI/STI	MU-GAIH84	51304730-300	51304730-325
GI HLAI	MU-GAIH12	51304636-100	N/A
GI HLAI	MU-GAIH22	51304748-100	51304748-125
GI HLAI	MU-GAIH82	51304636-300	N/A
GI HLAI	MU-GAIH92	51304748-300	51304748-325
GI AO	MU-GAOX02	51304638-100	51304638-125
GI AO	MU-GAOX12	51304638-500	51304638-525
GI AO	MU-GAOX72	51304638-300	51304638-325
GI AO	MU-GAOX82	51304638-700	51304638-725

Continued on next page

Nonconformally coated FTAs, continued

Table 10-4 Field Termination Assemblies – Nonconformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
GI 24 Vdc DI	MU-GDID12	51304640-100	51304640-125
GI 24 Vdc DI	MU-GDID13	51304728-100	51304728-125
GI 24 Vdc DI	MU-GDID82	51304640-300	51304640-325
GI 24 Vdc DI	MU-GDID83	51304728-300	51304728-325
GI 24 Vdc DO	MU-GDOD12	51304642-100	51304642-125
GI 24 Vdc DO	MU-GDOD82	51304642-300	51304642-325
GI DO with LFD	MU-GDOL12	51304736-100	51304736-125
GI DO with LFD	MU-GDOL82	51304736-300	51304736-325
GI Combiner Panel	MU-GLFD02	51304732-100	51304732-125
GI Marshalling Panel	MU-GMAR52	51304646-100	51309156-125

Continued on next page

Conformally coated FTAs

Table 10-5 is a list of FTAs that are CE Compliant and non-CE Compliant and are conformally coated. Model numbers and part numbers identify the assemblies.

Table 10-5 Field Termination Assemblies – Conformally Coated

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
LLAI	MC-TAIL02	51304437-150	N/A
LLAI	MC-TAIL03	N/A	51309202-175
LLMux RTD	MC-TAMR02	51304477-150	N/A
LLMux RTD	MC-TAMR03	N/A	51309218-175
LLMux TC	MC-TAMT02	51401491-150	N/A
LLMux TC	MC-TAMT03	N/A	51309223-175
LLMux TC Remote	MC-TAMT12	51401573-150	N/A
LLMux TC Remote	MC-TAMT13	N/A	51309213-175
HLAI/STI	MC-TAIH02	51304453-150	N/A
HLAI/STI	MC-TAIH12	51304337-150	N/A
HLAI/STI	MC-TAIH22	80366195-150	N/A
HLAI/STI	MC-TAIH52	51304337-250	N/A
HLAI/STI	MC-TAIH62	80366192-150	N/A
HLAI	MC-TAIH03	N/A	51309136-175
HLAI	MC-TAIH13	N/A	51309138-175
HLAI	MC-TAIH23	N/A	80369165-150
HLAI	MC-TAIH53	N/A	51309138-275
STI	MC-TSTX03	N/A	51309136-175
STI	MC-TSTX13	N/A	51309138-175
STI	MC-TSTX53	N/A	51309138-275

Continued on next page

Conformally coated FTAs, continued

Table 10-5 Field Termination Assemblies – Conformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
AO	MC-TAOX02	51304476-150	51304476-175
AO	MC-TAOX12	51304335-150	51304335-175
AO	MC-TAOX52	51304335-250	51304335-275
AO	MC-TAOY22	80366177-150	80366481-175
AO	MC-TAOY23	80366177-250	N/A
AO	MC-TAOY52	80364007-150	80366484-175
AO	MC-TAOY53	80364007-250	N/A
24 Vdc DI	MC-TDID12	51304441-150	51304441-175
24 Vdc DI	MC-TDID52	51304441-250	51304441-275
24 Vdc DI	MC-TDID72	51303928-150	N/A
24 Vdc DI	MC-TDIY22	80366180-150	80366180-175
24 Vdc DI	MC-TDIY62	80364010-150	80364010-175
120 Vac DI	MC-TDIA12	51304439-150	51304439-175
120 Vac DI	MC-TDIA52	51304439-250	51304439-275
120 Vac DI	MC-TDIA72	51303930-150	N/A
240 Vac DI	MC-TDIA22	51304431-150	51304431-175
240 Vac DI	MC-TDIA62	51304431-250	51304431-275
24 Vdc DO	MC-TDON12	51304446-150	N/A
24 Vdc DO	MC-TDON52	51304446-250	N/A
24 Vdc DO	MC-TDOY22	80366183-150	80366183-175
24 Vdc DO	MC-TDOY62	80364013-150	80364013-175
3-30 Vdc SS DO	MC-TDOD12	51304423-150	N/A
3-30 Vdc SS DO	MC-TDOD13	51304650-150	N/A
3-30 Vdc SS DO	MC-TDOD14	N/A	51309153-175
3-30 Vdc SS DO	MC-TDOD52	51304423-250	N/A

Continued on next page

Conformally coated FTAs, continued

Table 10-5 Field Termination Assemblies – Conformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
3-30 Vdc SS DO	MC-TDOD53	51304650-250	N/A
3-30 Vdc SS DO	MC-TDOD54	N/A	51309153-275
31-200 Vac SS DO	MC-TDOD22	51304428-150	N/A
31-200 Vac SS DO	MC-TDOD23	N/A	51309154-175
31-200 Vac SS DO	MC-TDOD62	51304428-250	N/A
31-200 Vac SS DO	MC-TDOD63	N/A	51309154-275
120/240 Vac SS DO	MC-TDOA12	51304408-150	N/A
120/240 Vac SS DO	MC-TDOA13	51304648-150	51304648-175
120/240 Vac SS DO	MC-TDOA52	51304408-250	N/A
120/240 Vac SS DO	MC-TDOA53	51304648-250	51304648-275
120 Vac Relay DO	MC-TDOR12	51304443-150	51309148-175
120 Vac Relay DO	MC-TDOR52	51304443-250	51309148-275
240 Vac Relay DO	MC-TDOR22	51304427-150	51309150-175
240 Vac Relay DO	MC-TDOR62	51304427-250	51309150-275
240 Vac Relay DO	MC-TDOY23	80366189-150	80366189-175
240 Vac Relay DO	MC-TDOY63	80366185-150	80366185-175
PI	MC-TPIX12	51304084-150	51304084-175
PI	MC-TPIX52	51304084-250	51304084-275
SDI – Toledo	MC-TSDT02	51303932-251	N/A
SDI – Manual/Auto	MC-TSDM02	51303932-252	N/A
SDI – Toledo	MC-TSDU02	51303932-253	N/A
SI – Modbus	MC-TSIM12	51303932-451	51303932-471
SI – Allen-Bradley	MC-TSIA12	51303932-453	51303932-478
Power Adapter	MC-TLPA02	51304467-150	51309204-175

Continued on next page

Conformally coated FTAs, continued

Table 10-5 Field Termination Assemblies – Conformally Coated, Continued

Description	Model Number	Non-CE Compliant Part Number	CE Compliant Part Number
DI Power Dist Assy	MC-TPRD02	51304425-150	51304425-175
GI Power Dist Assy	MC-GPRD02	51304644-150	51304644-175
GI HLAI/STI	MC-GAIH13	51304718-150	51304718-175
GI HLAI/STI	MC-GAIH14	51304730-150	51304730-175
GI HLAI/STI	MC-GAIH83	51304718-350	51304718-375
GI HLAI/STI	MC-GAIH84	51304730-350	51304730-375
GI HLAI	MU-GAIH12	51304636-150	N/A
GI HLAI	MU-GAIH22	51304748-150	51304748-175
GI HLAI	MU-GAIH82	51304636-350	N/A
GI HLAI	MU-GAIH92	51304748-350	51304748-375
GI AO	MC-GAOX02	51304638-150	51304638-175
GI AO	MC-GAOX12	51304638-550	51304638-575
GI AO	MC-GAOX72	51304638-350	51304638-375
GI AO	MC-GAOX82	51304638-750	51304638-775
GI 24 Vdc DI	MC-GDID12	51304640-150	51304640-175
GI 24 Vdc DI	MC-GDID13	51304728-150	51304728-175
GI 24 Vdc DI	MC-GDID82	51304640-350	51304640-375
GI 24 Vdc DI	MC-GDID83	51304728-350	51304728-375
GI 24 Vdc DO	MC-GDOD12	51304642-150	51304642-175
GI 24 Vdc DO	MC-GDOD82	51304642-350	51304642-375
GI DO with LFD	MC-GDOL12	51304736-150	51304736-175
GI DO with LFD	MC-GDOL82	51304736-350	51304736-375
GI Combiner Panel	MC-GLFD02	51304732-150	51304732-175
GI Marshalling Panel	MC-GMAR52	51304646-150	51309156-175

10.6 I/O Link Extender

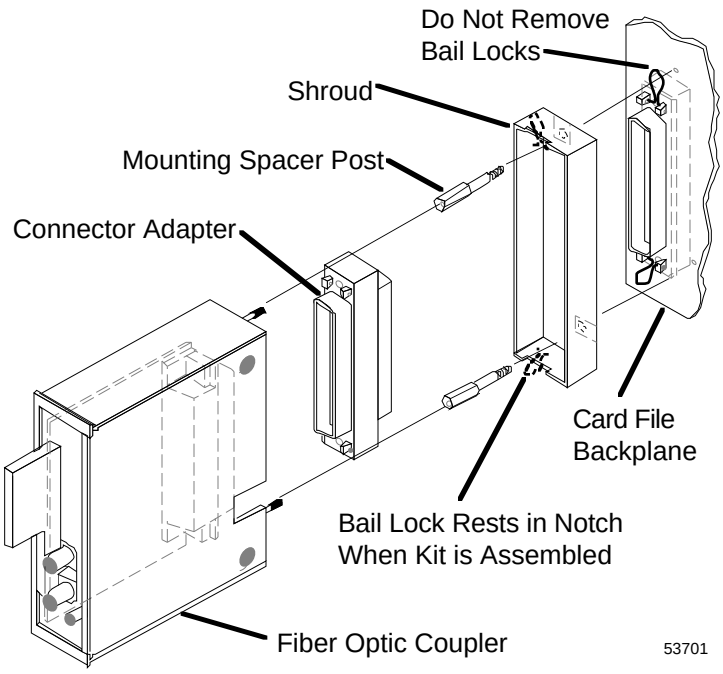
Introduction

The I/O Link Extender cards and Fiber Optic modules are CE Compliant. There are no non-CE Compliant versions.

I/O Link Extender adapter kit

There is a requirement that an adapter kit, model MU-ILES01, must be used to install the Fiber Optic module in the CE Compliant 7-Slot, 15-Slot, and IOP card files. The kit consists of a connector adapter, shroud, and mounting spacers as illustrated in Figure 10-1. See the *Process Manager I/O Installation* manual for installation instructions.

Figure 10-1 I/O Link Extender Adapter Kit



10.7 IOP to FTA Cables

Introduction

Model MU-KFTSxx IOP to FTA cables are shielded cables and are for CE Compliant applications. They are identified by metal connector cases. The non-CE Compliant model MU-KFTAxx IOP to FTA cables are not shielded cables and are identified by the plastic connector case.

CE Compliant

CE Compliance is provided only when the mating connector on the card file backplane is a filtered connector with a metal case and the mating connector on the FTA is a connector with a metal case. The metal connector case grounds the cable shield at both ends of the cable.

Both the card file and the FTA must be CE Compliant assemblies. See subsections 10.2 and 10.5 for a list of CE Compliant assemblies.

Model list

Table 10-6 lists the model numbers of CE Compliant and non-CE Compliant IOP to FTA cables.

Table 10-6 IOP to FTA Cables

Cable Length (Meters/Feet)	Non-CE Compliant Model Number	CE Compliant Model Number
1.0/3.3	Part Number 51201420-001	Part Number 51204033-001
1.5/4.9	Part Number 51201420-915	Part Number 51204033-915
2.0/6.6	MU-KFTA02	MU-KFTS02
3.0/9.8	MU-KFTA03	MU-KFTS03
4.0/13.1	MU-KFTA04	MU-KFTS04
5.0/16.4	MU-KFTA05	MU-KFTS05
6.0/19.7	MU-KFTA06	MU-KFTS06
8.0/26.2	MU-KFTA08	MU-KFTS08
10.0/32.8	MU-KFTA10	MU-KFTS10
15.0/49.2	MU-KFTA15	MU-KFTS15
20.0/65.6	MU-KFTA20	MU-KFTS20
25.0/82.0	MU-KFTA25	MU-KFTS25
30.0/98.4	MU-KFTA30	MU-KFTS30
35.0/114.8	MU-KFTA35	MU-KFTS35
40.0/131.2	MU-KFTA40	MU-KFTS40
45.0/147.6	MU-KFTA45	MU-KFTS45
50.0/164.0	MU-KFTA50	MU-KFTS50

10.8 Power Cables

Introduction

Model MU-KSPRxx power cables are shielded cables. They are identified by shield wires terminated in FASTON terminals at each end of the cable. The model MU-KDPRxx power cables are not shielded cables. They have no shield wires.

CE Compliant

The model MU-KSPRxx power cable is CE Compliant when providing power to the model MU-TDPR02 (MC-TDPR02) Digital Input Power Distribution Assembly or the model MU-GDPR02 (MC-GDPR02) Galvanic Isolation Power Distribution Assembly that are located external to the cabinet or cabinet complex.

The Power Distribution Assembly must be the CE Compliant version of the assembly. It can be identified by a FASTON terminal on the assembly that provides a ground point for the model MU-KSPRxx power cable's shield wire. The Power System end of the cable shield must not be grounded and the shield wire must be either clipped or taped to the body of the cable.

Two-conductor cable

The model MU-KSPRxx power cable is a two-conductor cable. It cannot be used to provide power to card files because 3.9 Vdc and 6 Vac are missing from the cable. The model MU-KDPRxx cable must be used to provide power to card files.

Model list

Table 10-7 lists the model numbers of both CE Compliant and non-CE Compliant power cables.

Table 10-7 Power Cables

Cable Length (Meters/Feet)	Non-CE Compliant Model Number	CE Compliant Model Number
1.0/3.3	Part Number 51201397-001	N/A
1.5/4.9	Part Number 51201397-915	N/A
2.0/6.6	MU-KDPR02	N/A
4.0/13.1	MU-KDPR04	MU-KSPR04
5.0/16.4	MU-KDPR05	MU-KSPR05
10.0/32.8	MU-KDPR10	MU-KSPR10
15.0/49.2	MU-KDPR15	MU-KSPR15
20.0/65.6	MU-KDPR20	MU-KSPR20
30.0/98.4	MU-KDPR30	MU-KSPR30
40.0/131.2	MU-KDPR40	MU-KSPR40
50.0/164.0	MU-KDPR50	MU-KSPR50

10.9 I/O Link Interface Cables

Introduction

There are two types of I/O Link Interface cables.

The I/O Link Interface cables with a part number of 51204042-xxx, where "xxx" represents the length of the cable in meters, are used for CE Compliance application. The cable is identified by shield wires that are terminated with a FASTON terminal at each connector end of the cable. The cable shield is grounded at the card file ground plate.

The I/O Link Interface cables with a part number of 51195479-xxx are not used for a CE Compliance application. They have no shield wires. The cable shield is grounded through the cable connector in the card file backplane.

CE Compliance

The I/O Link Interface cables with a part number of 51204042-xxx are CE Compliant when used with the 7-Slot and 15-Slot card file models that are CE Compliant. The CE Compliant card file models have shield FASTON terminals for the cables on the backplane ground panel.

Model list

Table 10-8 lists the part numbers of I/O Link Interface cables that are CE Compliant and non-CE Compliant.

Table 10-8 I/O Link Interface Cables

Connector Drops	Non-CE Compliant Part Number	CE Compliant Part Number
2	51195479-100	51204042-100
3	51195479-200	51204042-200
4	51195479-300	51204042-300
5	51195479-400	51204042-400
6	51195479-500	51204042-500

10.10 UCN Trunk Cable Taps

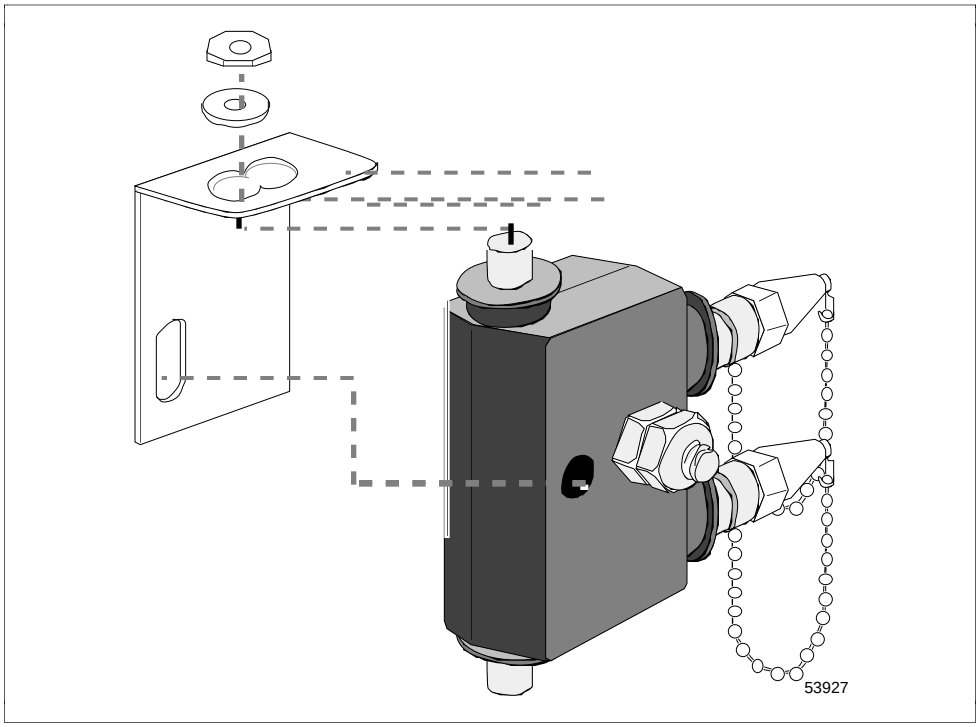
Introduction

A bracket has been added to the UCN cable taps, model numbers MU-NTAO02, MU-NTAP04, and MU-NTAP08, to ensure that the assembly case is properly grounded and CE Compliant. The part numbers for the UCN cable tap models are the same with or without the bracket.

Two-port UCN tap

Figure 10-2 is an illustration of the two-port UCN cable tap with the added grounding bracket for CE Compliance.

Figure 10-2 Two-Port UCN Cable Tap

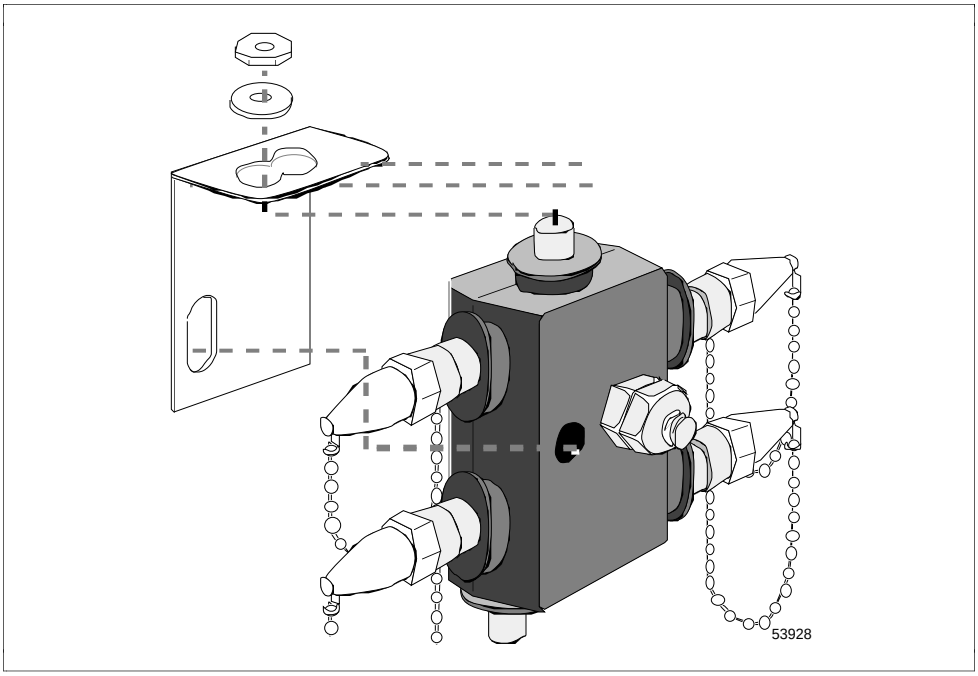


Continued on next page

Four-port UCN tap

Figure 10-3 is an illustration of the four-port UCN cable tap with the added grounding bracket for CE Compliance.

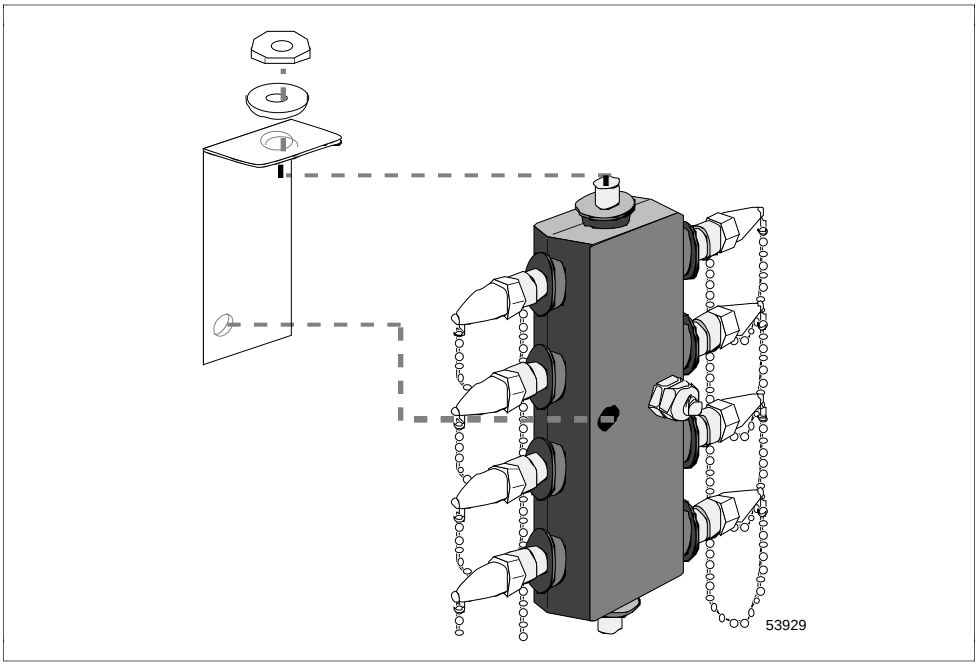
Figure 10-3 Four-Port UCN Cable Tap



Eight-port UCN tap

Figure 10-4 is an illustration of the eight-port UCN cable tap with the added grounding bracket for CE Compliance.

Figure 10-4 Eight-Port UCN Cable Tap



10.11 Cabinets

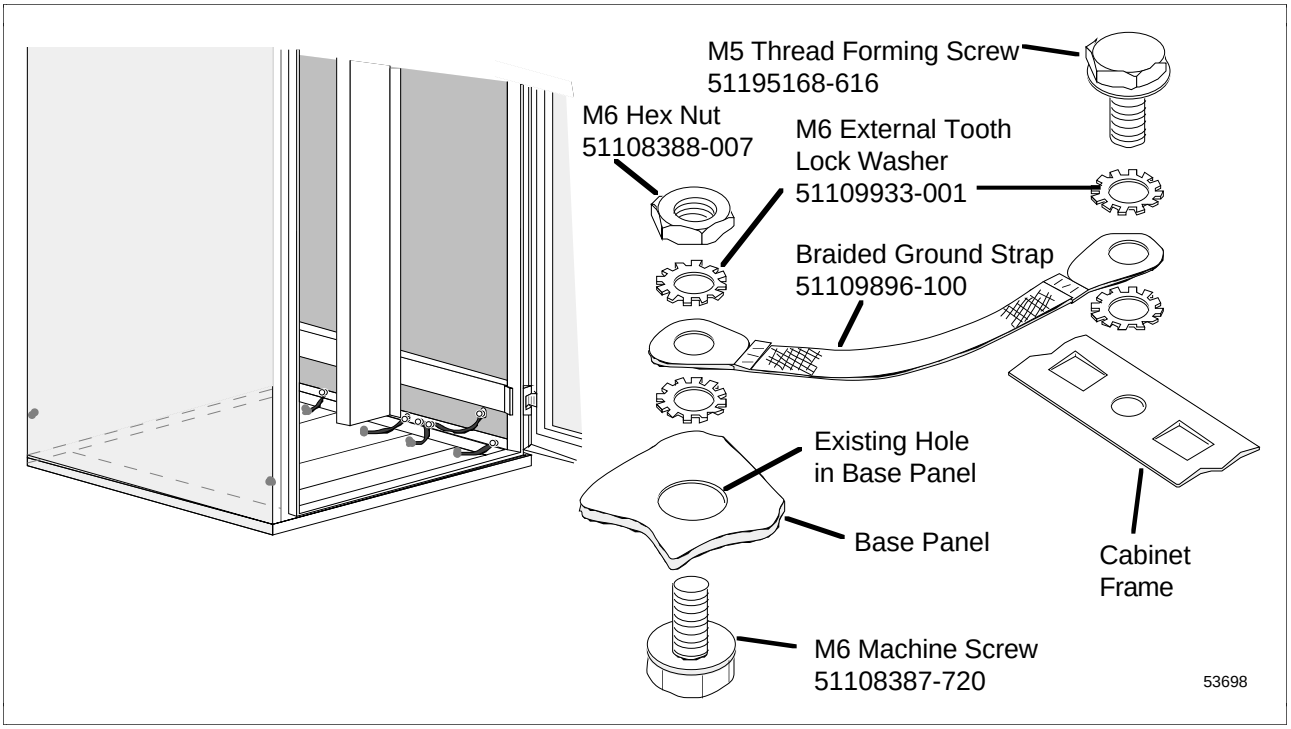
Introduction

Only the Rittal model MU-CBSX01 and MU-CBDX01 cabinets are CE Compliant. However, older versions of the cabinets are not CE Compliant because the cabinet panels and doors are not appropriately grounded to the cabinet frame. The CE Compliant cabinets are identified by abundance of ground straps between the cabinet panels and doors.

Internal cabinet grounding illustration

See Figures 10-5 and 10-6 for illustrations of the CE Compliant cabinets. Note that all cabinet panels and doors are grounded to the cabinet frame. The cabinet frame must be connected to Safety ground as described in the *TDC 3000^X System Site Planning* manual.

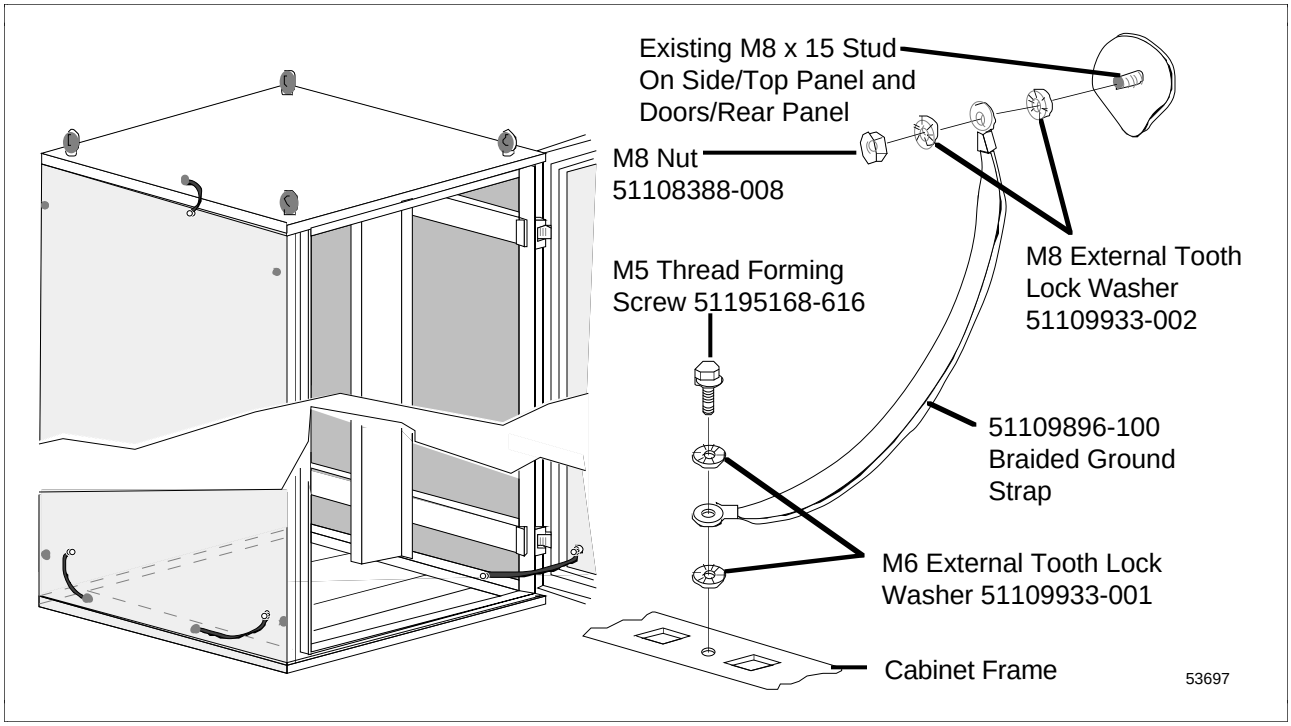
Figure 10-5 Cabinet Base Panel Grounding Procedure



Continued on next page

Internal cabinet grounding illustration, continued

Figure 10-6 Cabinet Panel and Door Grounding Procedure



Index

Index

READER COMMENTS

Honeywell's IAC Automation College welcomes your comments and suggestions to improve future editions of this and other publications.

You can communicate your thoughts to us by fax, mail, or toll-free telephone call. We would like to acknowledge your comments; please include your complete name and address.

BY FAX: Use this form; and fax to us at (602) 313-4108

BY TELEPHONE: In the U.S.A. use our toll-free number 1*800-822-7673 (available in the 48 contiguous states except Arizona; in Arizona dial 1-602-313-5558).

BY MAIL: Use this form; detach, fold, tape closed, and mail to us.

Title of Publication: **High-Performance Process Manager Installation** Issue Date: **3/96**

Publication Number: **HP20-500**

Writer: **Bob Koegel**

COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

RECOMMENDATIONS: _____

_____

_____

_____

_____

_____

_____

_____

NAME _____ DATE _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

(If returning by mail, please tape closed; Postal regulations prohibit use of staples.)

Communications concerning technical publications should be directed to:

Automation College
Industrial Automation and Control
Honeywell Inc.
2820 West Kelton Lane
Phoenix, Arizona 85023

FOLD FOLD

From: _____

_____

_____

NO POSTAGE
NECESSARY
IF MAILED
IN THE USA

BUSINESS REPLY MAIL

FIRST CLASS **PERMIT NO. 4332** PHOENIX, ARIZONA

POSTAGE WILL BE PAID BY ....

Honeywell

Industrial Automation and Control
2820 West Kelton Lane
Phoenix, Arizona 85023

Attention: Manager, Quality

FOLD FOLD

Cut Along Line

Additional Comments:

Honeywell

Industrial Automation and Control
Honeywell Inc.
16404 North Black Canyon Highway
Phoenix, Arizona 85023-3033

Helping You Control Your World