Honeywell

Process Manager/ Advanced Process Manager Checkout

PM20-511

Total Plant

Honeywell

Implementation
Process Manager - 1

Process Manager/ Advanced Process Manager Checkout

PM20-511
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 publication provides instructions for use by the Process Manager (PM) or Advanced Process Manager (APM) subsystem hardware installation and checkout personnel. It will help you determine if the subsystem hardware is properly installed and ready for on-line operation. Use this manual whenever the Process Manager or Advanced Process Manager subsystem is shut down for major repairs, upgrades (expansions), or major moves (relocation of equipment).

The user of this manual should be familiar with the contents of the *Process Manager/Advanced Process Manager Planning*, *Process Manager/Advanced Process Manager Installation*, and the *Process Manager I/O Installation* manuals.

This publication supports software Release 500.

This publication supports 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."

TECHNICAL ASSISTANCE

If you need assistance	If you need technical assistance, contact your local Honeywell Service Organization, as explained in the following paragraphs.
International customers	Outside of the United States, contact your local Honeywell Service Organization. If you are not sure of the location or telephone number, call your Honeywell representative for information.
Customers inside the United States	Within the United States, call the Technical Assistance Center (TAC) at the toll free number 1-800-822-7673.
Arizona customers	Within Arizona, the local number for TAC is 602-313-5558.
Services provided	Calls to TAC are answered by a dispatcher from 7:00 A.M. to 5:00 P.M., Mountain Standard Time (6:00 A.M. to 4:00 P.M. when daylight saving time is in effect). Outside of these hours, emergency calls—those which affect your ability to control or view a process—will be received by an answering service, and returned within one hour. TAC maintains its own TDC 3000^X system, and frequently can duplicate equipment problems.
Time saving tip	It is a good idea to make specific notes about the problem before making the call. This will help to reduce delays and expedite answers.

Standard Symbols

Scope

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

ATTENTION

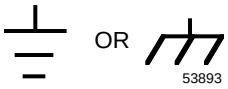
Notes inform the reader about information that is required, but not immediately evident.

CAUTION

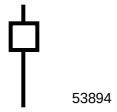
Cautions tell the user that damage may occur to equipment if proper care is not exercised.

WARNING

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

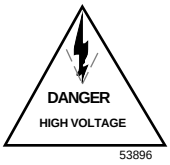


Ground connection to building safety ground.

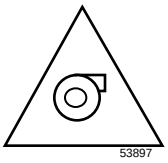


Ground stake for building safety ground.

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

Figures and Tables

References

Publication Title	Publication Number	Binder Title	Binder Number
Process Manager Specification and Technical Data	PM03-500	System Summary - 2	TDC 3010-2
Advanced Process Manager Specification and Technical Data	AP03-500	System Summary - 2	TDC 3010-2
TDC 3000X System Site Planning	SW02-550	System Site Planning - 1	TDC 3020-1
Process Manager/Advanced Process Manager Planning	PM02-501	System Site Planning - 1	TDC 3020-1
Process Manager/Advanced Process Manager Installation	PM20-501	Implementation/PM/APM	TDC 3043
Process Manager I/O Installation	PM20-520	Implementation/Process Manager - 1	TDC 3040-1
Process Manager/Advanced Process Manager Service	PM13-501	PM/APM/HPM Service - 1	TDC 3061-1
Universal Control Network Specification and Technical Data	UN03-500	System Summary - 2	TDC 3010-2
Universal Control Network (UCN) 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 (LCN) 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 – Introduction

1.1 Overview

Section contents

The topics covered in this section are:

Purpose of this manual

This *Process Manager/Advanced Process Manager Checkout* manual provides instructions and references, as needed, for the initial checkout of Process Manager or Advanced Process Manager equipment cabinets, modules, and their interface to the Network Interface Module (NIM). It is intended to be used by trained Honeywell or customer service technicians. The checkout procedures determine if the system components have been properly installed and are ready for system startup. This guide also serves to check out system expansions or significant modifications.

Checklist form

The *PM/APM Post-Installation Checklist* in Appendix A should be used to measure the progress and completeness of the checkout effort.

Please read before starting checkout

Please read this manual completely and scan the documents referenced below before proceeding with the subsystem checkout.

1.2 Tools and Test Equipment

Recommended tools and test equipment

It is recommended that the following tools and test equipment be available for hardware checkout.

- Digital Voltmeter
- Standard tool kit
- ESD ground strap
- Earth Tester—Biddle Megger® models 250200, 250220 or 250241, or equivalent test equipment

  TDC 3000^X system test devices should be available as needed. You can choose equipment equivalent to that specified, but test procedures and results may vary.
- Accessories, such as test leads, grounding rods, etc.

ATTENTION

ATTENTION—The Biddle model 250260 is not acceptable.

Section 2 – Subsystem Hardware Checkout

2.1 Overview

Section contents

The topics covered in this section are:

Introduction

This section references the major hardware items that should be checked and the procedures to follow.

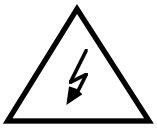
2.2 Site Preparation Checklist

Introduction

Sections 3 and 4 of the *Process Manager/Advanced Process Manager Installation* manual contain detailed site preparation information. At this point in the installation of the Process Manager (PM) or Advanced Process Manager (APM), determine the thoroughness of site preparation by making sure that

- all equipment has been properly located, placed in its operating position, and structural requirements are adequate.
- all equipment has been leveled and, if required, bolted down.
- all protective wrappings, shipping bands, cables, turnbuckles, masking tape, angle iron, and other shipping materials have been removed from the area.
- lighting is adequate in all work areas.
- adequate power, grounding, and cabling is connected.

2.3 Prepower Connection Checks



CAUTION, RISK OF ELECTRIC SHOCK

Introduction

The following prepower checks can be performed after ac wiring has been installed, and either before or after the Process Manager or Advanced Process Manager has been connected to ac power.

2.3.1 Facility Safety Ground Verification

The facility's Safety Ground is a system of metallic water pipes or a metallic building structure chosen for that purpose. See Figure 2-1 or 2-2. Using the 3-terminal method and test leads that are 183 meters (600 feet) or more, verify that the facility's Safety Ground has less than 1 ohm of earth resistance. These measurements can be made with any of the Biddle Megger® Earth Testers listed in subsection 1.3 of this manual or equivalent test equipment. See the tester manuals for measurement details.

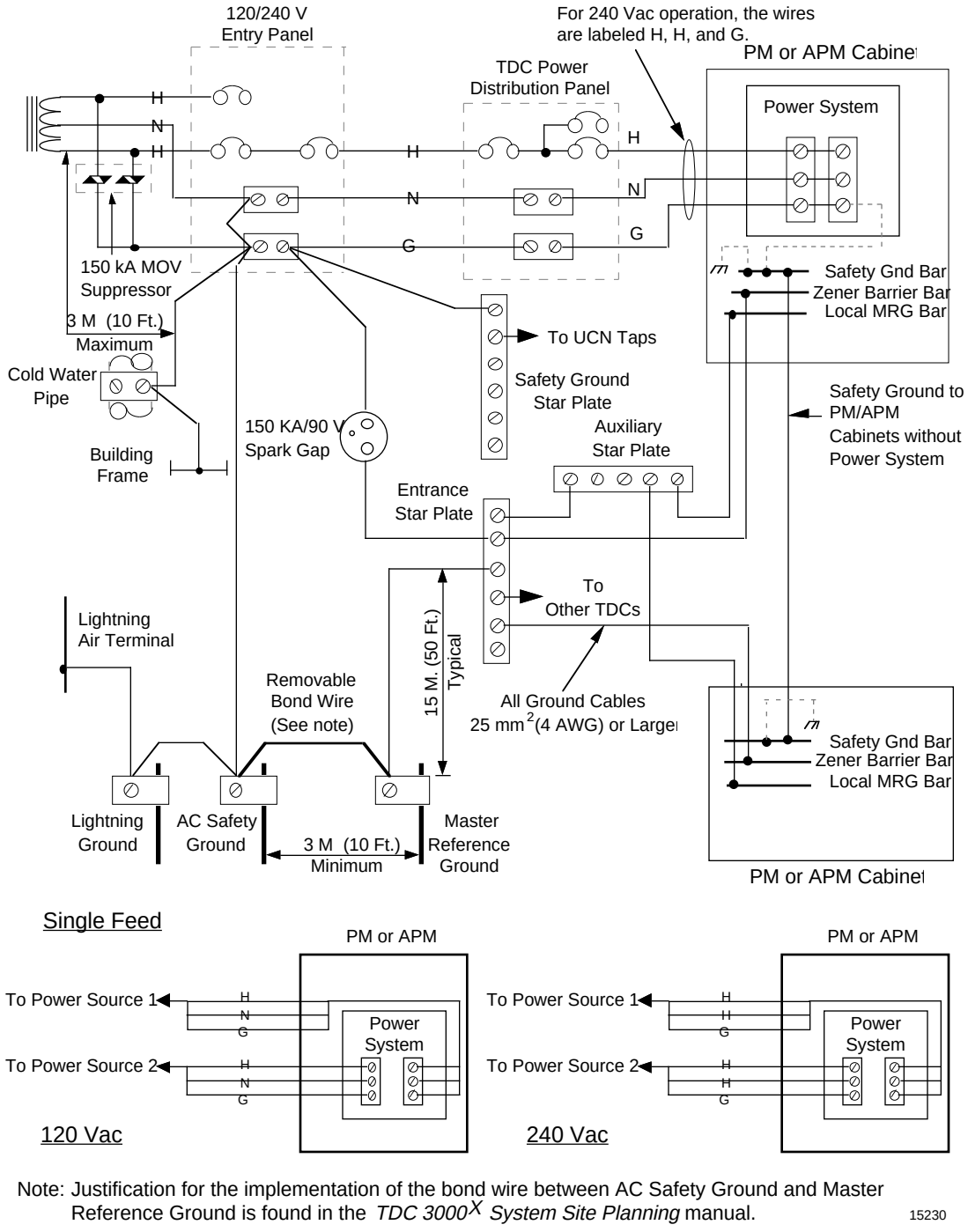
Continued on next page

2.3.1 Facility Safety Ground Verification, Continued

AC power and ground

Figure 2-1 illustrates the ac power and ground connections for a typical multiground PM or APM subsystem installation that includes Master Reference Ground (MRG). The ground system is non-CE Compliant.

Figure 2-1 Subsystem AC Power and Ground Connections—Multiground 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.

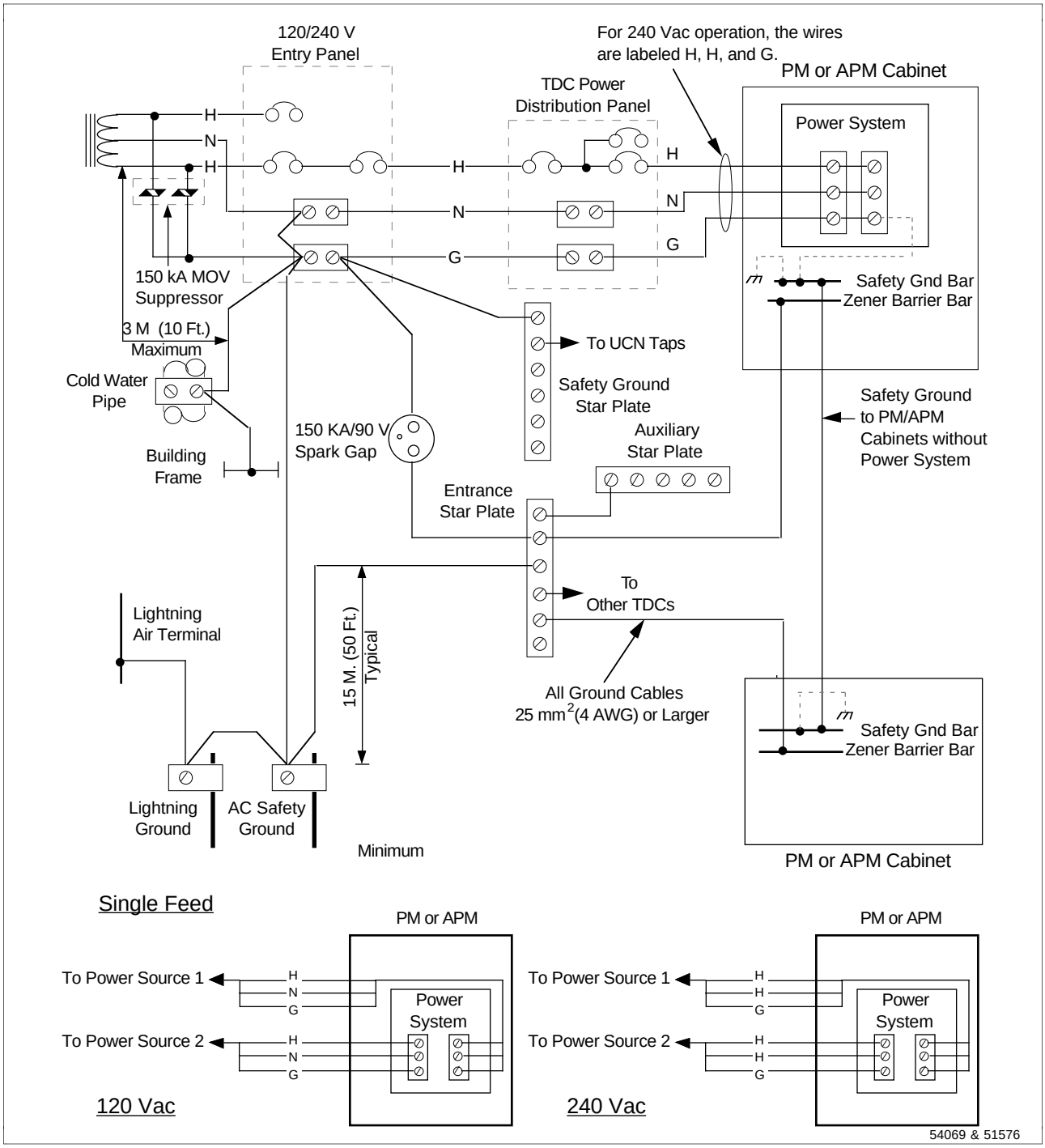
15230

Continued on next page

AC power and ground

Figure 2-2 illustrates the ac power and ground connections for a typical single-ground PM or APM subsystem installation that is designated Safety Ground. The Safety Ground system is CE Compliant.

Figure 2-2 Subsystem AC Power and Ground Connections—Single-Ground System



2.3.2 AC Power Verification

Voltage and frequency checks

Check that the PM or APM ac power is within the voltage range and frequency that is specified in Table 2-1.

Table 2-1 Acceptable Power Source Parameters

Power Source	Voltage Range	Frequency Range
120 Vac, 50 or 60 Hz	100 to 132 Vac	47 to 63 Hz
240 Vac, 50 or 60 Hz	187 to 264 Vac	47 to 63 Hz

Total Harmonic Distortion (THD):	8% maximum
Power Dropouts:	10 milliseconds
Impulse:	8 x 20 µs bursts (8 µs rise to peak, 20 µs decay to 50% amplitude) of 3 kV twice/minute, 2 x line for 10 milliseconds once/hour, maximum
Surge:	IEEE Standard 472-1976 and ANSI C37.90a-1974, full compliance IEC 801-5, severity level 2 kV

2.3.3 AC Line Stability Tests

Monitor ac power during operation

Prior to, or during the first month of operation, connect an ac line analyzer/recorder (Dranetz Universal Disturbance Analyzer Series 626) to the incoming power source as detailed in the procedure that follows. A historical record of power fluctuations is then recorded by the analyzer as plant equipment is turned on and off during normal operation. The stability of the power source must be within all the limits shown in Table 2-1. See Section 6 of the *Process Manager/Advanced Process Manager Installation* manual for full details.

10 milliseconds power dropouts

If you experience serious dropouts (greater than 10 milliseconds), low-line conditions, or if the power line exceeds impulse and surge limits, consider installing an AC Voltage Stabilizer in the ac line to the Process Manager or Advanced Process Manager. This type of stabilizer overcomes short dropouts, as well as correcting low-line conditions. It also removes most impulses and surges. Consult an AC Voltage Stabilizer supplier for details.

50 milliseconds power dropouts

If dropouts are long (50 milliseconds or greater), consider using the battery backup version of the Power System or installing an uninterruptible power system (UPS) instead of the AC Voltage Stabilizer. The UPS overcomes any line problem because it completely regenerates the power sinusoidal wave.

Continued on next page

2.3.3 AC Line Stability Tests, Continued

AC line stability testing procedure

The Dranetz Series 626 Analyzer is designed to accept up to five plug-in monitor modules that can measure various physical disturbances. See subsection 1.2 for a list of plug-in modules recommended to be included with the analyzer. Use the following procedure to time monitor the ac line.

Step	Action
1	Select the proper ac power line monitor module. Use a Series 626-PA-6001-T single-phase ac monitor if measuring a single-phase power source. Use a Series 626-PA-6003-T three-phase ac monitor if measuring a three-phase power source.
2	Connect the Process Manager's or Advanced Process Manager's power lines to the measurement terminal strip at the rear of the ac monitor module as directed in the Dranetz manual. Be sure to measure the same power lines you intend to connect to the cabinet (120 Vac or 240 Vac, single-phase or 3-phase).
3	Plug the line cord of the Dranetz Series 626 Analyzer into a proper source of power. Its power plug can be connected to the same power source as that being measured if the voltages are compatible.
4	Refer to the Dranetz manual and program the monitor for one of the following power source parameters in Table 2-2.
5	Before leaving the analyzer for long term monitoring, be sure the Dranetz real-time clock is properly set and the Dranetz battery backup is operational. See the Dranetz manual.

Power source parameters

Table 2-2 Power Source Parameters

Program Function	Power Source Parameter		
	120 Vac	**200 Vac**	**240 Vac**
RANGE	200 V F.S.	400 V F.S.	400 V F.S.
HI LIMIT	132 V *	264 V *	264 V *
LO LIMIT	100 V *	187 V *	187 V *
SENS	10 V	10 V	10 V
F SENS	0.5 Hz	0.5 Hz	0.5 Hz
IMP SENS	0060 V	0060 V	0060 V
* These are the limits of the PM or APM Power System. However, you may want to "tighten" your test measurements somewhat.			

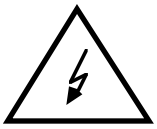
Other Power Analyzers

For Power Analyzers made by other manufacturers, follow the manufacturer's procedure and use the parameters in Table 2-2.

2.3.4 Radio-Frequency Interference Tests

RFI Recording	Use the Dranetz Series 626 Universal Disturbance Analyzer and its Series 626-PA-6020 Radio Frequency Interference Monitor plug-in to record RFI disturbances in the vicinity of the Process Manager or Advanced Process Manager.
Monitor RFI impulses	Set the monitor to record RFI impulses in excess of 10 volts. If interference exceeds this value, consult your Honeywell technical representative.
Set real-time clock	Before leaving the analyzer for long-term monitoring, be sure the Dranetz real-time clock is properly set and the Dranetz battery backup is operational. See the Dranetz manual.

2.4 Power-Off Checks



CAUTION, RISK OF ELECTRIC SHOCK

Introduction

Power-off checks are to be performed after ac wiring has been installed and after the Process Manager's or Advanced Process Manager's power, ground, and field wiring have been connected. The circuit breaker at the PM or APM power distribution panel must be off and tagged. See Figure 2-1.

CAUTION

CAUTION—Do not apply power to the Process Manager or Advanced Process Manager until you have reached subsection 2.6, **Power-On Checks**, in this manual. Failure to do so may permanently damage components in the Process Manager or Advanced Process Manager.

ATTENTION

ATTENTION—The ground tests that follow use one of the Biddle Megger Earth Testers listed in subsection 1.2. See the tester manual for measurement details.

2.4.1 Safety Ground

Inspection

Inspect each PM or APM cabinet to verify the proper connection of the green or green-yellow Safety Ground wire to the PM or APM. This Safety Ground is factory-installed at the input power terminal strips at the left side of the Standard Power System backplane, and is marked **GND**. The Safety Ground is connected to terminal strips on the AC/DC Distribution Assembly in the AC Only Power System. Check any single PM or APM cabinet or bolted together complex of cabinets, without a Power System, for connection of its Safety Ground to a nearby cabinet or the system power distribution panel.

Use an earth tester

Using an earth tester, test for less than 1/2 ohm between the Process Manager or Advanced Process Manager cabinet's Safety Ground connection and the facility's Safety Ground.

2.4.2 Master Reference Ground

Introduction

Installations with a Master Reference Ground (MRG) are not acceptable in countries governed by CE standards. These CE standards generally apply for, but are not exclusive for all European countries. An installation with Master Reference Ground (MRG) is generally acceptable in the United States and many North American and South American countries.

The instructions in this subsection and subsection 2.4.3 apply for those installations that have a Master Reference Ground.

Inspection

Visually inspect each PM or APM cabinet to verify that its local Master Reference Ground (MRG) is connected to the nearest MRG star plate by using a 25 mm^2 (4 AWG) cable as shown in Figure 2-1.

MRG to Safety Ground check

If the PM or APM cabinet does not contain intrinsic safety equipment, use an earth tester to verify that there is less than 5 ohms between the cabinet's MRG and the facility's Safety Ground. If the cabinet contains intrinsic safety devices, use an earth tester to test for less than 1 ohm between its local MRG and the facility's Safety Ground.

ATTENTION

ATTENTION—In the event that there are concerns about the 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 codes. Before the connection is made, the Safety Ground connection point must be prior tested, as detailed in the *TDC 3000X System Site Planning* manual, not to exceed 10 volts peak noise. The *TDC 3000X System Site Planning* manual details the implementation of this bonding connection.

2.4.3 MRG Noise Testing

Introduction

The description in subsection 2.4.2 assumes the existence of a firmly established isolated MRG that is installed according to the *TDC 3000^X System Site Planning* manual. Circumstances, such as on an oil drilling platform, an extremely large indoor facility, or meeting a regulating body's requirements, such as NEC, OSHA, or local codes, may prevent having an isolated MRG. Under these circumstances only, *TDC 3000^X System Site Planning* manual suggests that noise tests be made for the Safety Ground connection point.

Install a Noise-Test Reference Ground

The tests are to be made between the Safety Ground connection point and a Noise-Test Reference Ground that must be installed for the tests. Use the following procedure to install a Noise-Test Reference Ground.

Step	Action
1	Obtain a galvanized steel rod, 2.5 meters (8 feet) long by 16 mm (5/8") in diameter, and a suitable grounding clamp. This is your Noise-Test Reference Ground stake.
2	Drive the stake into the ground 3 meters (10 feet) from any grounded steel structure. The stake can be placed immediately beside a building, providing it does not contact any grounding structure or grounded rebar in the footing. This Noise-Test Reference Ground should be no more than 15 meters (50 feet) from the ground connection point being tested.
3	Check the Noise-Test Reference Ground with an earth tester to determine if it has an earth resistance of less than 100 ohms (it is probably significantly less).

Continued on next page

2.4.3 MRG Noise Testing, Continued

Safety Ground noise test procedure

Testing of noise at the Safety Ground connection point should take place for at least a week with normal plant activity before the ground connection point can be considered suitable for the system. At no time should the measured impulse noise exceed 10 volts peak. Use the Dranetz Series 626 Universal Analyzer to record impulse noise with the following procedure.

Step	Action
1	Using the Dranetz Series 626-PA-6002A-T DC monitor, connect the monitor rear-panel voltage-measuring terminals between the Safety Ground connection point and the Noise-Test Reference Ground with leads no longer than 15 meters (50 feet).
2	Plug the line cord of the Dranetz Series 626 Universal Analyzer into a proper source of ac power.
3	Refer to the Dranetz manual and program the monitor for the following parameters.

Program Function	Parameter
RANGE	20.0
HI LIMIT	10.0
LO LIMIT	00.6
SENS	10.0
IMP SENS	10.0

Step	Action
4	Before leaving the analyzer for long term monitoring, be sure the Dranetz real-time clock is properly set, and the Dranetz battery backup is operational. See the Dranetz manual.

2.4.4 Zener Barrier Ground

Inspection

If zener barriers are installed, visually inspect the local Zener Barrier Grounds (ZBGs) in each PM or APM cabinet to verify that they are connected to the MRG entrance star plate, usually using redundant 25 mm^2 (4 AWG) wires. See Figure 2-1.

Earth Tester

Using an earth tester, test for less than 1 ohm between the cabinet's Zener Barrier Ground and the local Safety Ground.

2.4.5 AC Voltage Source Selection

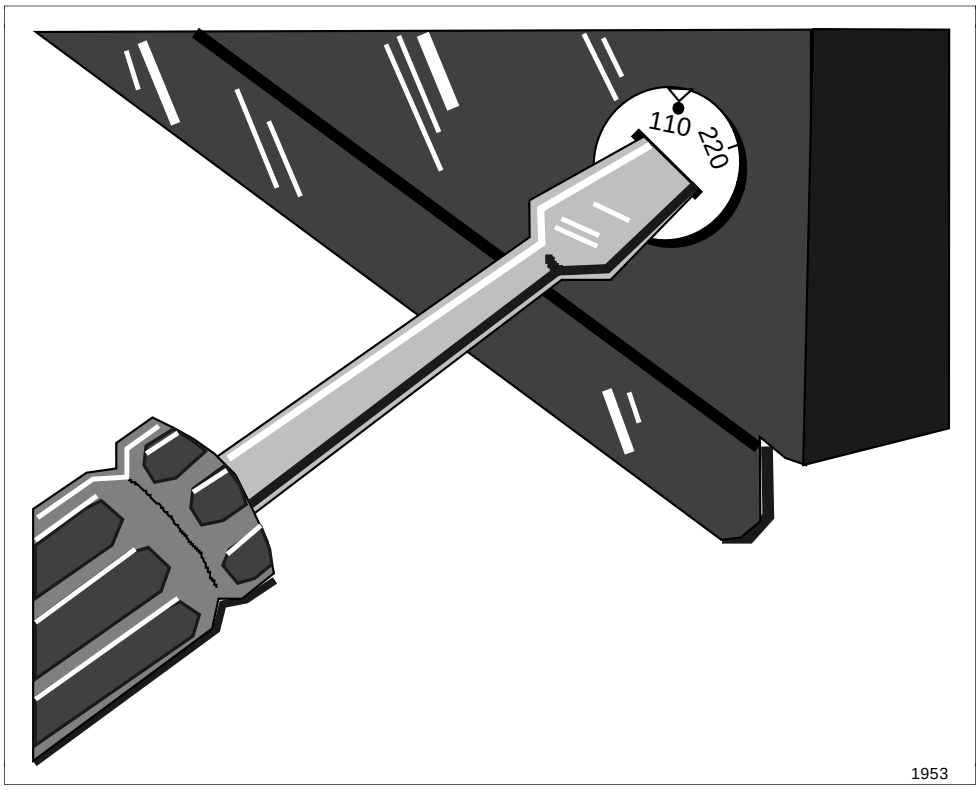
Standard Power System

Locate the Standard Power System in the PM or APM cabinet(s) and remove the plastic cover panel by pulling it towards you, using the hand-holds at the sides of the cover panel. This exposes two Power Supply Modules (one is optional) in the center of the Power System chassis.

Early production Power Supply Module

If the Power System contains early production Power Supply Module(s), use a screwdriver to set the Voltage Selection switch on each Power Supply Module to correspond with the input voltage, 120 or 240 Vac, supplied to the cabinet. The adjustment is illustrated in Figure 2-3.

Figure 2-3 Standard Power Supply Module AC Voltage Selection



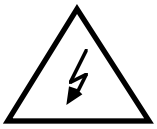
Later production Power Supply Module

If the Power System contains later production Power Supply Module(s), no voltage selection is necessary, because the Power Supply Module automatically adjusts to the input ac voltage.

AC Only Power System

The AC Only Power System has Power Supply Modules that accommodate only a specific voltage. The installed Power Supply Modules must have the proper voltage rating for the voltage application. Be sure the rating is correct for your application.

2.5 Cabling and Wiring Checks



CAUTION, RISK OF ELECTRIC SHOCK

Introduction

Wiring and cabling checks are to be performed after the Process Manager or Advanced Process Manager has been wired and cabled according to instructions in the *Process Manager/Advanced Process Manager Installation* and *Process Manager I/O Installation* manuals. The circuit breaker at the PM or APM power distribution panel must be off. See Figure 2-1 for proper power and ground connections.

2.5.1 Field Wiring

Field wiring verification

Verify that the field wiring to the Field Termination Assemblies (FTAs) meets your requirements and is in accordance with instructions in the *Process Manager I/O Installation* manual.

2.5.2 UCN Cabling

UCN cabling verification

Verify that the UCN cabling to the UCN, PMMs, and APMMs are in accordance with instructions in the *Process Manager/Advanced Process Manager Installation* manual. The drop cables from the UCN trunk cable taps must meet the connection requirements of the manual.

PMM/APMM card file pinning

Verify that the card file(s) is properly pinned for the PMM's or APMM's designated node address on the UCN.

NIM pinning

Verify that the NIM(s) is properly pinned for the NIM's designated node address on the UCN.

2.5.3 Annunciator Wiring

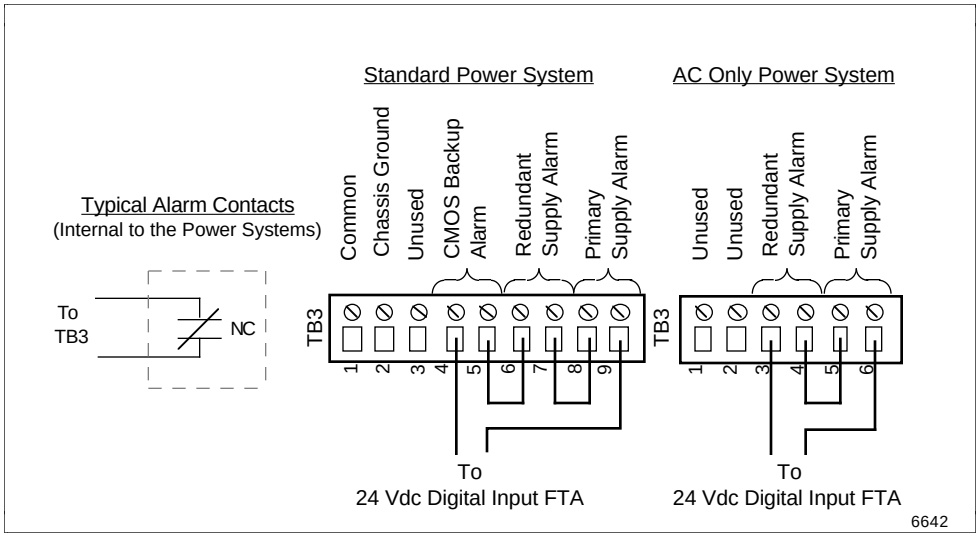
Standard Power System

Terminals for the Power System annunciator contacts are provided on the Standard Power System backplane of the Process Manager or Advanced Process Manager as shown in Figure 2-4. The contacts open when an alarm indicates

- the CMOS Memory Battery Backup system has failed.
- the primary Power Supply Module or the 48 V Backup Battery system has failed.
- the redundant Power Supply Module or the 48 V Backup Battery system has failed.

If the Power Supply Module annunciator contacts open, ac power to one or both of the Power Supply Modules may have failed, or the batteries may have degraded or have been removed.

Figure 2-4 Power System Annunciator Contact Connections



AC Only Power System

The AC Only Power System has two pairs of contacts, a pair for each Power Supply Module, that open when the respective primary or redundant Power Supply Module fails or loses its power source. The terminals for the contacts are located on the AC/DC Distribution Assembly.

CMOS Memory battery and 48 Vdc battery backup

The CMOS Memory Battery Backup feature has charger/monitor circuitry, and each individual Power Supply Module has charger/monitor circuitry for the 48 Vdc Battery Backup system. In addition to charging the batteries, each monitor system periodically checks the batteries to determine if they are capable of handling an operational load.

Your requirements

Be sure that the annunciator wiring that is connected to the alarm contacts terminals meets your requirements.

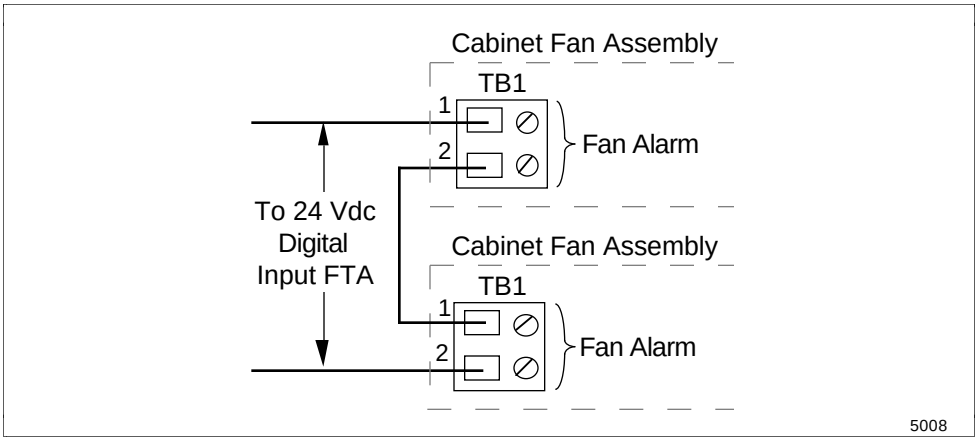
Continued on next page

2.5.3 Annunciator Wiring, Continued

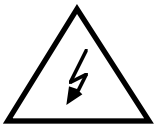
Cabinet Fan Assembly

The Process Manager or Advanced Process Manager cabinet contains one or two dual fan assemblies that are installed at the top of the cabinet. The assembly(ies) has an optional operation indicator (LED) and a normally open set of alarm contacts that can be wired in series to alarm monitoring circuitry. The contacts are closed when the fans are operating properly. Figure 2-5 illustrates the wiring of two cabinet dual fan assemblies. The alarm contacts are shown wired to a 24 Vdc Digital Input Field Termination Assembly (FTA) for subsystem monitoring.

Figure 2-5 Typical Cabinet Fan Alarm Wiring



2.6 Power-On Checks



CAUTION, RISK OF ELECTRIC SHOCK

Introduction

Before power is applied to the Process Manager or Advanced Process Manager, remove the Power System's cover panel and verify that all switches are in the **OFF** position and the batteries are properly installed.

2.6.1 Preparation

Standard Power System

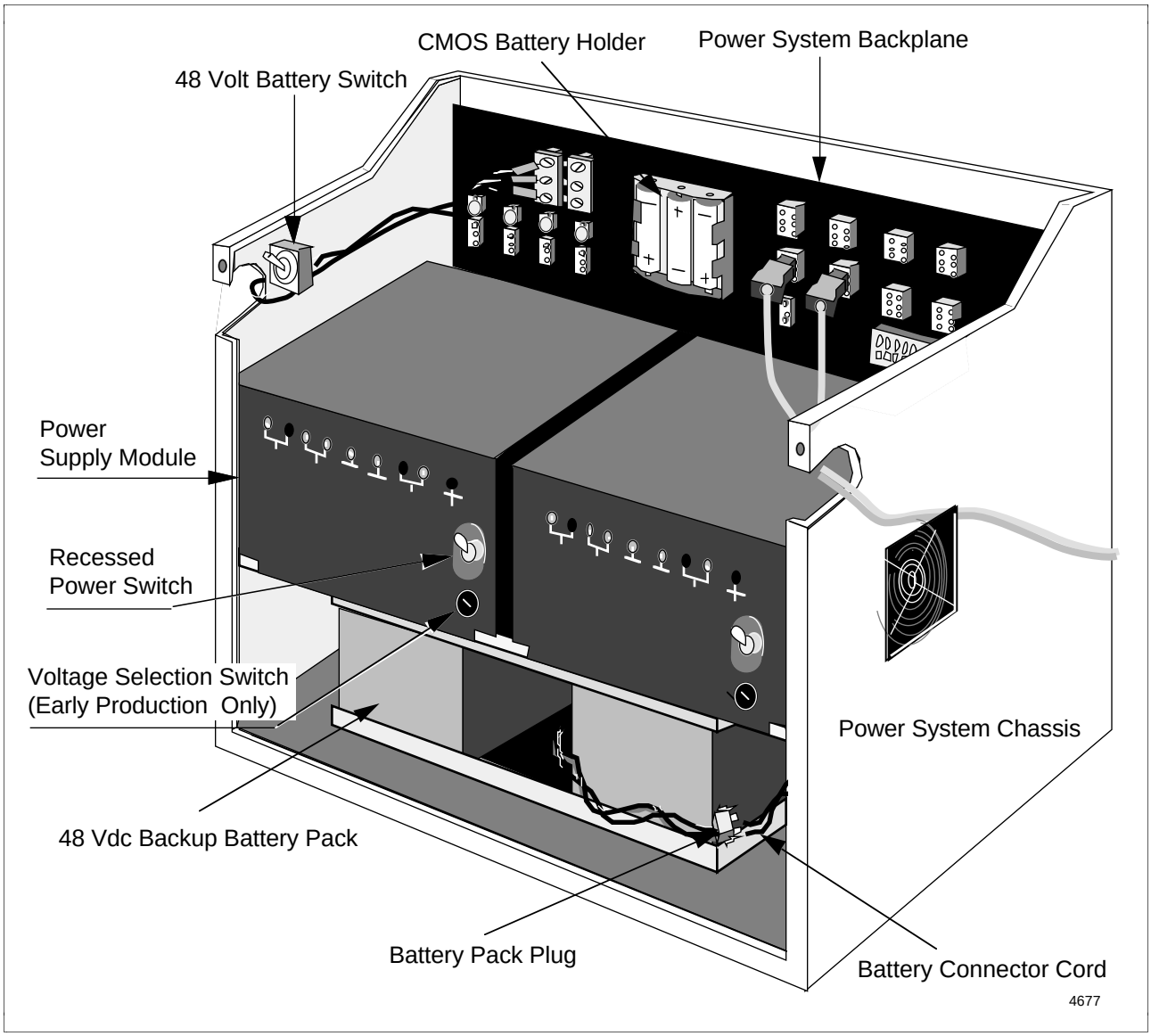
To remove the Standard Power System's cover panel, grasp the hand-holds at the sides of the cover, and pull the cover toward you. This exposes the upper portion of the Standard Power System's backplane and the two Power Supply Modules (one is optional) at the center of the chassis. Fan Assembly fuse holders, power and alarm terminal strips, NiCad battery holders, and card file power connectors are an integral part of the backplane as illustrated in Figure 2-5.

Continued on next page

Standard Power System illustration

Figure 2-6 illustrates the Standard Power System with its battery backup feature.

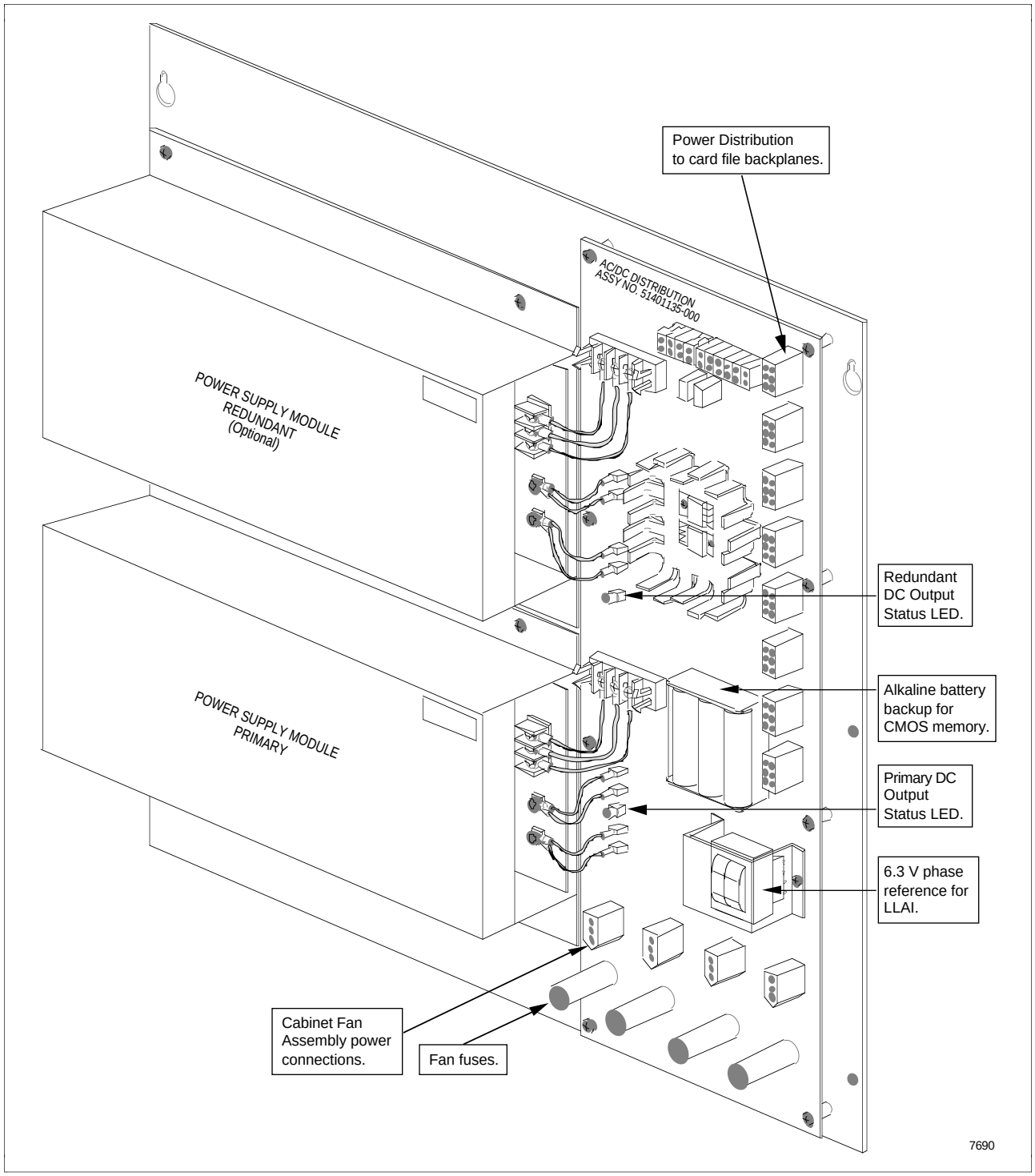
Figure 2-6 Standard Power System with Battery Backup



Continued on next page

AC Only Power System The AC Only Power System can have an optional cover. The AC Only Power System is illustrated in Figure 2-7.

Figure 2-7 AC Only Power System



Continued on next page

Battery Backup system	Two screws that can be turned by a coin or flat blade screwdriver permit removal of the Standard Power System's bottom cover to provide access to the 48 Vdc Backup Battery pack at the bottom of the housing. The AC Only Power System has no 48 Vdc Battery Backup pack.

2.6.2 Battery Installation

CAUTION

CAUTION—Place the **48 V Battery** switch at the upper-left side of the Standard Power System chassis in the **OFF** position. Damage to connectors or batteries could result if this warning is ignored.

Also place the recessed toggle switch on each Power Supply Module in the **OFF** or down position. Damage to electrical circuits could result if this warning is ignored.

Do not install Alkaline batteries in the Standard Power System.

Do not install NiCad batteries in the AC Only Power System.

Standard Power System

Two distinct rechargeable battery backup systems are used in the Process Manager or Advanced Process Manager Power subsystem when a Standard Power System is present.

- A CMOS memory battery backup feature consisting of three AA-size, 1.2 volt NiCad cells (standard feature)
- A 48 V Battery Backup pack consisting of a group of gelled lead-acid batteries contained in a battery pack (optional feature)

NiCad battery installation

Install the three AA-size NiCad batteries in the 3.6 V CMOS battery holder located at the upper center of the backplane in the Standard Power System. Observe the polarities marked on the battery holder and the individual batteries. Do not install Alkaline batteries in the Standard Power System.

48 Vdc Battery Backup pack

If the optional 48 V Battery Backup pack is supplied, install it by carefully sliding it into the lower compartment of the Power System chassis. Use caution not to damage the battery pack connector cord in the compartment. Secure the pack with two screws placed through the front lip of the battery pack into the base of the housing.

Connect the pack to the system by inserting the polarized battery pack plug into the polarized connector cord in the compartment. Carefully dress the cord and connectors to prevent damage, then replace the metal cover.

AC Only Power System

The AC Only Power System has a CMOS Memory battery backup feature, but the alkaline batteries used are not rechargeable. There is no 48 V Battery Backup feature.

Alkaline battery installation

The AC Only Power System's three alkaline batteries are installed in the battery holder located at the center of the AC/DC Distribution Assembly. Observe the polarities marked on the battery holder and the individual batteries. Do not install NiCad batteries in the AC Only Power System.

2.6.3 AC Power Application

Applying ac power

Apply power to the Process Manager or Advanced Process Manager by closing the circuit breaker at the PM or APM power distribution panel. See Figure 2-1 for power distribution. Measure the voltage at the ac input terminals at the Standard Power System backplane and verify that it is in accordance with Table 2-1 in this manual. The power connections are on the AC/DC Distribution Assembly in the AC Only Power System. For 120 volt systems and 240 volt systems with neutral, the measurement from neutral to Safety Ground should be no more than 0.5 Vac.

Power Supply Modules

Apply power to the Power Supply Modules by placing the recessed toggle switch on each module in the **ON** or up position. Check that the Standard Power Supply Module fan moves air through the modules from the right of the Power System and exits to the left.

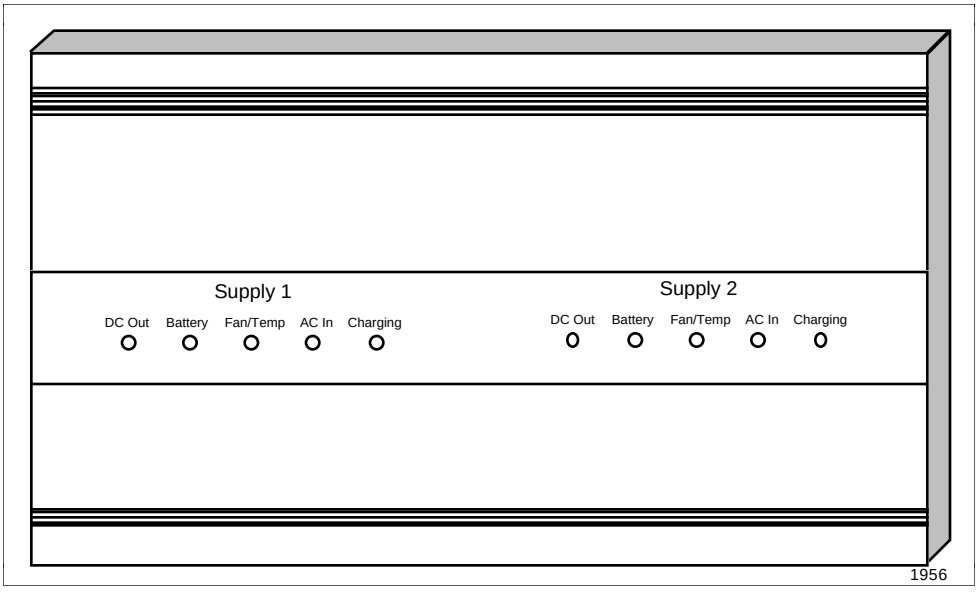
48 Vdc Battery Backup pack

If the 48 Vdc Battery Backup pack is installed, connect the batteries to the charging system by placing the **48 V Battery** switch in the **ON** position.

Standard Power System indicators

For the Standard Power System, note that the **DC Out**, **Battery**, **Fan/Temp**, **AC In**, and **Charging** indicators are all illuminated on both Power Supply Modules (provided both the optional Power Supply Module and optional 48 V Battery Backup pack are installed). The Power System cover that is illustrated in Figure 2-8 identifies the LED indicators.

Figure 2-8 Standard Power System Cover



AC Only Power System indicators

The AC Only Power System has only two LED indicators to indicate proper operation, one for the primary Power Supply Module and the second for the optional redundant Power Supply Module.

2.6.4 Power System Alarm Checks

Introduction

Perform checks of the alarm contact operations as described below. The alarm wiring is connected to three pairs of terminals on the Standard Power System backplane and indicates problems with the primary Power Supply Module, the redundant Power Supply Module, or the CMOS memory backup batteries.

The AC Only Power System has a pair of terminals for each Power Supply Module that are located on the AC/DC Distribution Assembly.

Single Power Supply Module

If only one Power Supply Module is present in the Standard Power System, check that the alarm contacts (measured at the **PRIMARY SUPPLY ALARM** terminals) are closed when the Power Supply Module is turned on, and open when it is turned off.

ATTENTION

ATTENTION—If a Standard Power System is installed without the optional battery backup, it is necessary to defeat the battery alarm and the charger alarm that are provided in the Power Supply Modules; otherwise, the system will receive a constant alarm.

There are two jumpers, identified as **W1** and **W2**, located on the Power System's backplane that are next to the sockets that the Power Supply Modules install in. The jumpers must be removed (cut) to defeat the battery and charger alarms. In most cases, this will have been done at the factory. See the *Process Manager/Advanced Process Manager Service* manual for the location of the jumpers.

The other alarm functions, such as power supply failure, overtemperature or fan failure, ac power failure, and CMOS battery backup failure, will still operate.

Dual Power Supply Modules

For a Standard Power System that has both primary and redundant Power Supply Modules, but no battery backup, check that the alarm contacts (measured at the **PRIMARY SUPPLY ALARM** and **REDUNDANT SUPPLY** terminals) are closed when the Power Supply Module is turned on, and are open when it is turned off. See the above information.

Dual Power Supply Modules with 48 Vdc Battery Backup pack

Perform the same checks as those for Standard Power System with single and dual Power Supply Modules. In addition, check that the contacts for both Power Supply Modules open when the **48 V Battery** switch is placed in the **OFF** position, and closed when the switch is placed in the **ON** position. There may be a delay of 10 seconds before the contacts switch.

Continued on next page

2.6.4 Power System Alarm Checks, Continued

CMOS Memory battery backup alarm	Remove one of the NiCad batteries from the holder on the Standard Power System backplane. Check that the **CMOS BACKUP ALARM** contacts open within 10 seconds. The contacts should close within 10 seconds after the battery is replaced in the holder.

2.6.5 Battery Backup Checks

Introduction	The charging capability of the 48 V Battery Backup system or the CMOS Memory Battery Backup system in the Standard Power System cannot be verified until after an initial 16-hour charging period.
CMOS Memory Battery Backup system	After the initial charging period, remove the three NiCad battery cells and verify that each has a voltage greater than 1.24 volts. Replace any battery that tests with a voltage of less than 1.24 volts.
48 V Battery Backup pack	If a 48 V Battery Backup pack is installed, disconnect the batteries from the system by placing the **48 V Battery** switch in the **OFF** position. Then, measure their combined series voltage at the battery pack plug. See Figure 2-5. If the measurement is less than 48 volts, the batteries should be replaced.

2.6.6 Card File Power Checks

Power System power connectors

Locate the eight 6-pin connectors at the upper-right area of the Standard Power System backplane. The AC Only Power System has eight 6-pin connectors along the right side of the AC/DC Distribution Assembly. Each pair of connectors provides power to an individual card file and is cabled to the card file before the cabinet leaves the factory. Measure voltages at an unused 6-pin connector or temporarily remove a cable if all connectors are in use. The voltages should meet the specifications in Table 2-3.

Table 2-3 Card File Power

Power Source	Power Connector Pins	Limits
6 Vac Rectified	4(+) and 3(-)	Greater than 2 Vac
CMOS Batteries	5(+) and 6(-)	Greater than 3.6 Vdc
24 Vdc Regulated	2(+) and 1(-)	23 to 25 Vdc

WARNING

WARNING—The 48-volt batteries provide input power to the Power Supply Modules when line power is off. They do not provide the 24 volts directly.

In an early production Power System, if ac power is off at one Power Supply Module, it may draw power from the backup batteries even if there is a redundant Power Supply Module installed. This may discharge the batteries within 25 minutes. In a later production Power System, batteries are not discharged when power is removed.

If one Power Supply Module is to be off for a significant period of time, it should be removed from the chassis.

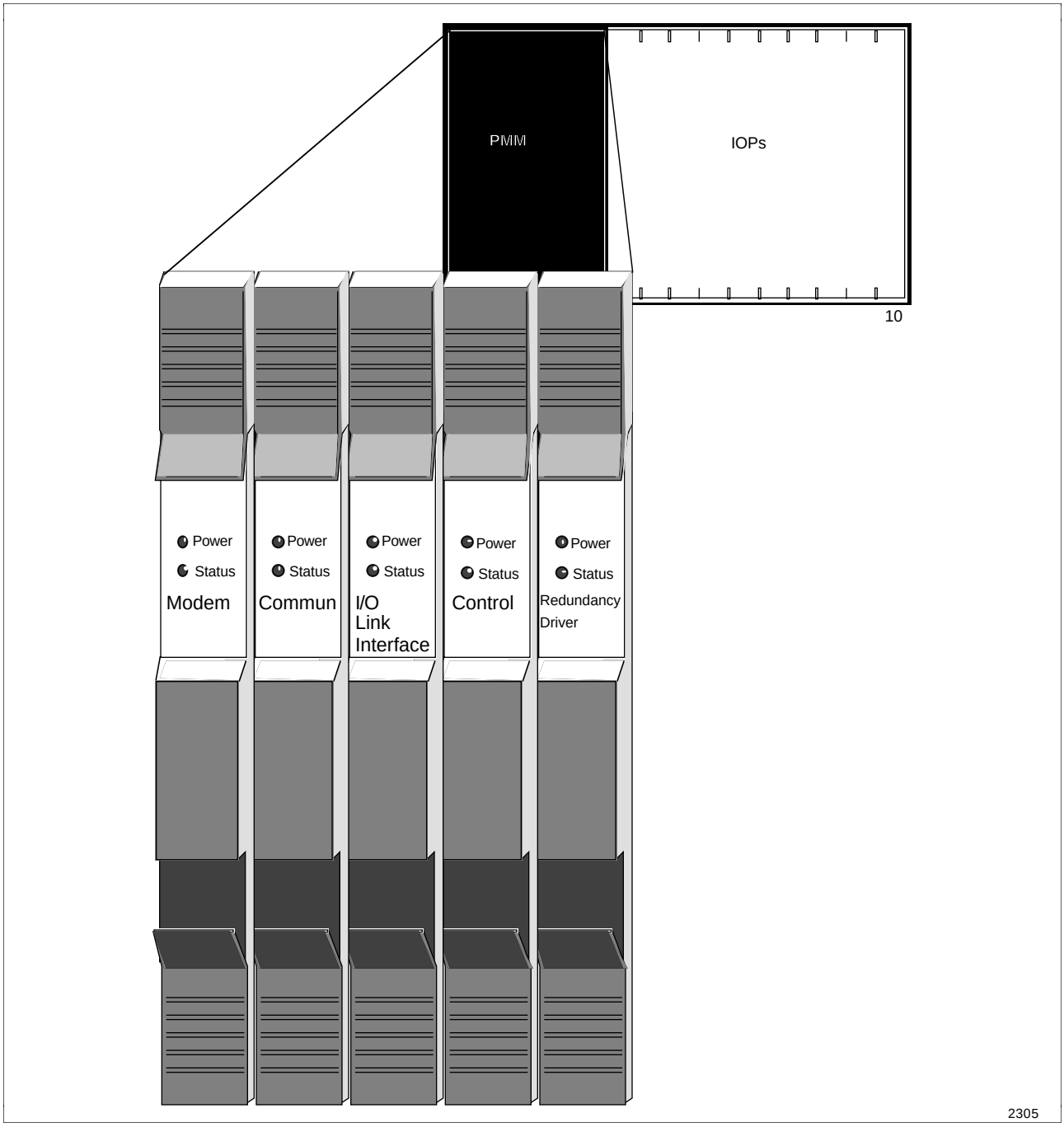
Do not remove both Power Supply Modules at the same time if the system is operational. The batteries will not power the PM or APM unless at least one Power Supply Module is installed.

2.7 PMM/APMM Card Self-Test

PMM Card File

Figure 2-9 is an illustration of a typical Process Manager Module (PMM) card file. The cards in the five card slots starting at the left side of the card file (Modem, Commun, I/O Link Interface, Control, and Redundancy Driver) comprise the PMM. The other 10 card slots accept I/O Processor (IOP) cards, selected by the user for his process application.

Figure 2-9 Typical PMM Card File

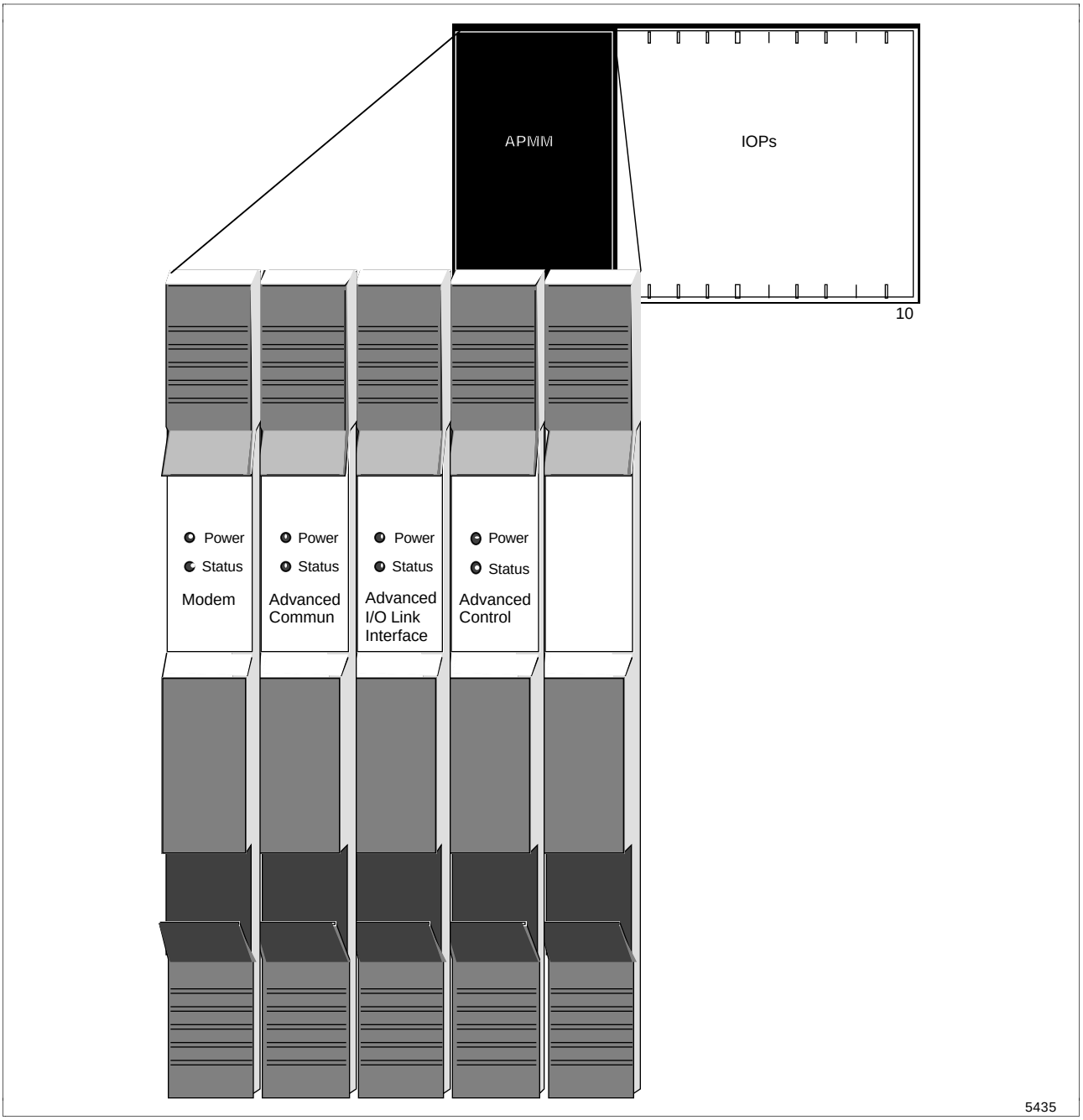


Continued on next page

APMM Card File

Figure 2-10 is an illustration of a typical Advanced Process Manager Module (APMM) card file. The cards in the five card slots starting at the left side of the card file (Modem, Advanced Commun, Advanced I/O Link Interface, Advanced Control, and a blank card) comprise the APMM. The other 10 card slots accept I/O Processor (IOP) cards, selected by the user for his process application.

Figure 2-10 Typical APMM Card File



Continued on next page

2.7 PMM/APMM Card Self-Test, Continued

PMM/APMM or IOP self-test

The five cards constituting the PMM or APMM, and each IOP card, self-test when power is first applied. The Redundancy Driver fifth card in the PMM or blank fifth card in the APMM provides power reset functionality for the other four cards. If the upper card extractor on any PMM or APMM card is lifted slightly, power is removed from all the PMM or APMM cards. The IOP upper card extractor removes power from only that individual IOP card. Power is reapplied when the extractor is released; therefore, an upper card extractor can be used to "power-initialize" any card IOP card or the PMM or APMM.

Power and Status indicators

Visually check the green **Power** and **Status** indicators on each card immediately after power has been applied. The **Power** indicator illuminates whenever power is applied. After approximately one second, the **Status** indicator illuminates on most cards. The Modem card is an exception. On the Modem card, the **Status** indicator illuminates only when the card is transmitting data to the UCN system. After approximately 10 seconds, internal diagnostics are completed and the **Status** indicator remains illuminated if diagnostics were successful. If a card's **Status** indicator extinguishes, a hardware or firmware failure has been detected, and the problem should be analyzed and corrected before operating on-line or running software tests.

2.8 UCN Power-On Test

Introduction

The UCN power-on test checks the operational condition of the Network Interface Module (NIM). All devices on the UCN must be idle (not transmitting) after power is applied to the equipment before testing can begin.

Apply power to all UCN devices

The test is performed only after the Network Interface Module (NIM) and any Process Managers (PMs) or Advanced Process Managers (APMs) that are connected to the primary and redundant UCN trunk cables have power applied, but before software has been downloaded to the NIM through the Local Control Network (LCN).

Network idle test procedure

After power is applied to the devices, use the following procedure to ensure that no UCN device is transmitting on the network.

Step	Action
1	Observe the **Transmit** indicator on the PNI or EPNI board in the NIM continuously for approximately 20 seconds to determine if it is flashing. A flashing indicator indicates that the device is transmitting. If the **Transmit** indicator is flashing, check the **Normal-Test** jumper on the EPNI board. Ensure that the jumper is in the **Normal** position.
2	Observe the **Status** indicator on the Modem card in each PM and APM continuously for approximately 20 seconds to determine if it is flashing. The **Power** indicator should be constantly illuminated. A flashing **Status** indicator indicates the device is transmitting. If the **Status** indicator is flashing, check the **LFAC-LNET-RFAC-RNET** jumper locations on the PMM or APMM card file backplane in the PM or APM. The jumpers are used when performing factory tests. No jumpers should be present.
3	Check again that there is no software being downloaded to the NIM, or none has been downloaded previously. If software was downloaded to the NIM previously, cycle the **Power** switch on the NIM Power Supply to destroy the downloaded program.

Continued on next page

2.8 UCN Power-On Test, Continued

UCN trunk cable test procedure

Use the following procedure to check the operational condition of the Universal Control Network.

Step	Action
1	Go to a UCN trunk cable tap at one end of the network. Disconnect a drop cable or 75-ohm terminator from any drop connection and connect a Relcom CB Tester to the tap.
2	Set the tester switches to **NOISE** and **5 Mb/s**. Move the **RESET/PEAK** switch to **RESET** momentarily and then leave it in the **PEAK** position. Do not use the ac adapter provided with the Relcom tester while making noise measurements. Read the tester after 40 seconds. Verify and record a noise figure less than -10 dBmV (example: -11 dBmV is less than -10 dBmV, -9 dBmV is not). If the measurement is less than -25 dBmV, the tester will flash "-25." This is satisfactory.
3	Disconnect the CB tester, reconnect the cable or terminator to the tap, and move the tester to a tap on the redundant trunk cable. Repeat step 5 for the redundant trunk, then disconnect the tester and reconnect the cable or terminator.
4	Go to the other end of the trunks of the same UCN system and repeat steps 1 and 2.

Appendix A – PM/APM Post-Installation Checklist

Customer_____ **Subsystem ID**_____ **Date (Delivery)**_____ **Date (Start-up)**_____

PRE-POWER CONNECTION TESTS	Check the procedure found in the *Process Manager/Advanced Process Manager Planning* manual and subsection 2.3 in this manual.	
General Site-Preparation Checks	Check the facility's Safety Ground earth resistance with an Earth Tester. Check that the ac power is the proper voltage. Check the ac line stability with Disturbance Analyzer. Do the RFI measurement where the PM or APM is to be installed.	☐
POWER-OFF CHECKS	Check the procedure found in the *Process Manager/Advanced Process Manager Installation* manual and subsections 2.4 and 2.5 in this manual.	
Grounding Checks	Inspect visually and physically for completeness. Check that local Safety Ground is less than 1/2 ohm (also check the cabinets without ac power). Check the local Master Reference Ground (MRG). Do an MRG noise test if a substitute MRG is used. Check the local Zener Barrier Ground bus connection. Check the UCN Safety Ground connections at all taps.	☐
UCN Cable Visual Checks	Ensure that primary cables connect to **A** connectors and redundant cables to **B** fittings at all taps. Verify that the terminators are installed on all unused tap connections.	☐
UCN Power-Off Cable Tests	See the *Universal Control Network Planning* manual. Check the completed UCN recorded Noise, Return Loss, and Signal Strength.	☐
General Pre-Power Checks	Check the AC Voltage Source Selection switch on the early production Power Supply Module(s).	☐
POWER-ON CHECKS	Check the procedure found in subsections 2.6 through 2.8 of this manual.	
AC Power Verification	Verify operation of Power Supply Module fans. If the system is 120 volt ac or 240 volts ac with neutral, check that the voltage is between 100 Vac and 132 Vac — check for a measurement of no more than a 0.5 volts between neutral and the cabinet frame. If the system is 240 volt ac, check that the voltage is between 187 Vac and 264 Vac.	☐
Backup Power Verification	Verify the Power System 48 V Battery Backup system (optional) is operational, and the CMOS battery backup voltage is proper.	☐
Power Supply Output Verification	Check for all green LED display on Power Supply Modules. Check that the 24 volt dc output is between 23 Vdc and 25 Vdc. Check that the 6 volt ac rms output is between 2 Vac and 7.2 Vac.	☐
Card Self-Test Verification	Check each card module for proper green **Power** and **Status** indicator status.	☐
UCN Power-On Cable Tests	Check and record the NOISE figure of UCN with all nodes powered and connected, but silent. Verify the UCN address pinning (See the *Process Manager/Advanced Process Manager Installation* manual).	☐

Appendix B – UCN Cable Measurements

Customer_____________ **Subsystem ID**______ **Date (Delivery)**_______ **Date (Start-up)**_______

Network Name___________________ **Number**_______________ **Cable Segment**____________

Tap Number	Building Location	Drop Name or Usage	Noise Figure	Return Loss		Signal Strength	
				“A” Dir	“B” Dir	Expected	Measured
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______
______	________	1.____________________ 2.____________________	______	______	______	_______	_______

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: **Process Manager/Advanced Process Manager Checkout** Issue Date: **3/96**

Publication Number: **PM20-511**

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

Honeywell

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

Helping You Control Your World