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HP E1421B 6-Slot C-Size High-Power Mainframe User Information
Edition 1
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Documentation History

All Editions and Updates of this manual and their creation date are listed below. The first Edition of the manual is Edition 1. The Edition number increments by 1 whenever the manual is revised. Updates, which are issued between Editions, contain replacement pages to correct or add additional information to the current Edition of the manual. Whenever a new Edition is created, it will contain all of the Update information for the previous Edition. Each new Edition or Update also includes a revised copy of this documentation history page.

Edition 1 (E1421-90000) . . . . . May 1996

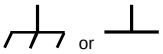
Safety Symbols



Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.



Indicates the field wiring terminal that must be connected to earth ground before operating the equipment—protects against electrical shock in case of fault.



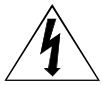
Frame or chassis ground terminal—typically connects to the equipment's metal frame.



Alternating current (AC).



Direct current (DC).



Indicates hazardous voltages.

WARNING Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

CAUTION Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

WARNINGS

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), an uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.

Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

DO NOT service or adjust alone: Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

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according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company
Loveland Manufacturing Center

Manufacturer's Address: 815 14th Street S.W.
Loveland, Colorado 80537

declares, that the product:

Product Name: 6-Slot C-Size Mainframe

Model Number: HP E1421B

Product Options: All

conforms to the following Product Specifications:

Safety: IEC 1010-1 (1990) Incl. Amend 1 (1992)/EN61010-1 (1993)
CSA C22.2 #1010.1 (1992)
UL 3111-1 (1994)

EMC: CISPR 11:1990/EN55011 (1991): Group1 Class A
IEC 801-2:1991/EN50082-1 (1992): 4kVCD, 8kVAD
IEC 801-3:1984/EN50082-1 (1992): 3 V/m
IEC 801-4:1988/EN50082-1 (1992): 1kV Power Line
.5kV Signal Lines

Supplementary Information: The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (inclusive 93/68/EEC) and carries the "CE" mark accordingly.



May, 1996 **Jim White, QA Manager**

European contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen, Germany (FAX +49-7031-14-3143).

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Notes

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Please list the system controller, operating system, programming language, and plug-in modules you are using.

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• Instructions are easy to understand.	O	O	O	O	O
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Chapter 1
Using the Mainframe

Mainframe Description

The HP E1421B mainframe is designed in full compliance with the VXIbus specifications (Rev. 1.4) and VMEbus system specifications (Rev. C.1). The mainframe contains 6 slots for plug-in modules and can be rack mounted in either the forward or reverse position. Features of the HP E1421B mainframe include:

- Improved power supply reliability.
- Solid state automatic bus grant sensing to bypass empty slots.
- Variable speed fan cooling.
- Easy replacement of major components - most can be replaced from the rear of the mainframe, even while the mainframe is rack mounted.
- Seven standard VXIbus power supply voltages - all overvoltage, overcurrent, and temperature protected.
- Maximum usable power (total power supply output power before thermal protection shutdown): 450 W at 55°C.

Options

Options available for the E1421B mainframe include:

- Opt. #W01 - Warranty conversion to 1-year on-site
- Opt. #500 - Module installation using standard address settings
- Opt. #918 - Install backplane connector shields
- Opt. #908, #909, #916 - Rack mounting kits. Refer to *Rack Mounting the HP E1421B* later in this chapter.

Contact your nearest Hewlett-Packard Sales and Support Office for information on ordering these options.

Line Voltage & Input Power

The HP E1421B mainframe includes a power supply which automatically adjusts for standard nominal line voltages of 100/120 VAC and 220/240 VAC, and nominal power line frequencies of 50 Hz and 60 Hz. The power supply has a power factor corrected input section and thus can be powered from any nominal line input over the range of 100 VAC to 240 VAC. The power supply can also be powered from a 400 Hz AC line frequency or DC power line voltages. Refer to *Appendix A - Specifications* for complete input power specifications.

Warning **Refer to *HP E1421B Safety Grounding Information* later in this chapter for complete grounding information when power line frequencies exceed 66 Hz.**

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Air Flow

The Airflow into the plug-in module slots in t E1421B mainframe is significantly more than previous mainframes. The mainframe supplies each of the 6 slots with enough air to cool 60 Watts while maintaining only a 10°C rise across a typically dense module. Up to 75 Watts per slot may be dissipated if a 15°C rise is acceptable across a typically dense module. The graph of Figure 1-1 shows the air flow volume (liters/second) versus change in pressure (mm H_2O) across the module for the mainframe.

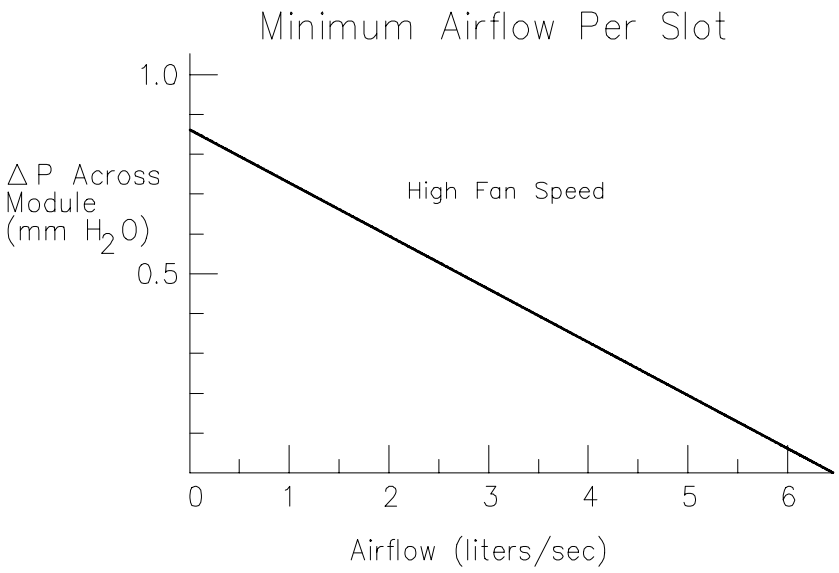


Figure 1-1. Minimum Airflow Available Per Slot

The mainframe has a fan chamber with one circulation fan. The speed of the fans is controlled by the ambient temperature of the air drawn into the mainframe. Air from the fan chamber is forced through the right side of the plug-in modules. The air passes through the installed modules and escapes out the left side of the mainframe.

A second fan provides cooling for the power supply. This fan is mounted on the right side of the mainframe next to the power supply.

Caution **When installing the mainframe in your system, ensure that the air inlets and outlets are not obstructed. Blocked inlets and outlets can cause damage to the mainframe and plug-in modules due to overheating.**

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Variable Speed Fan

Normally, the speed of the two internal circulation fans is determined by the ambient temperature of the air drawn into the mainframe. One fan cools the power supply and the other fan cools the VXI modules inserted into the mainframe. You can override the temperature-controlled speed of the fans by changing the position of the Fan Speed Control Switch on the rear of the mainframe to "HIGH." This forces both fans to remain at full speed all of the time. The two fan modes are:

- Variable Speed Mode (factory default): Quiet operation (≈75% airflow) at <30°C ambient temperature. High speed operation at >40°C ambient temperature.
- High Speed Mode (switch selectable): Full airflow at all times.

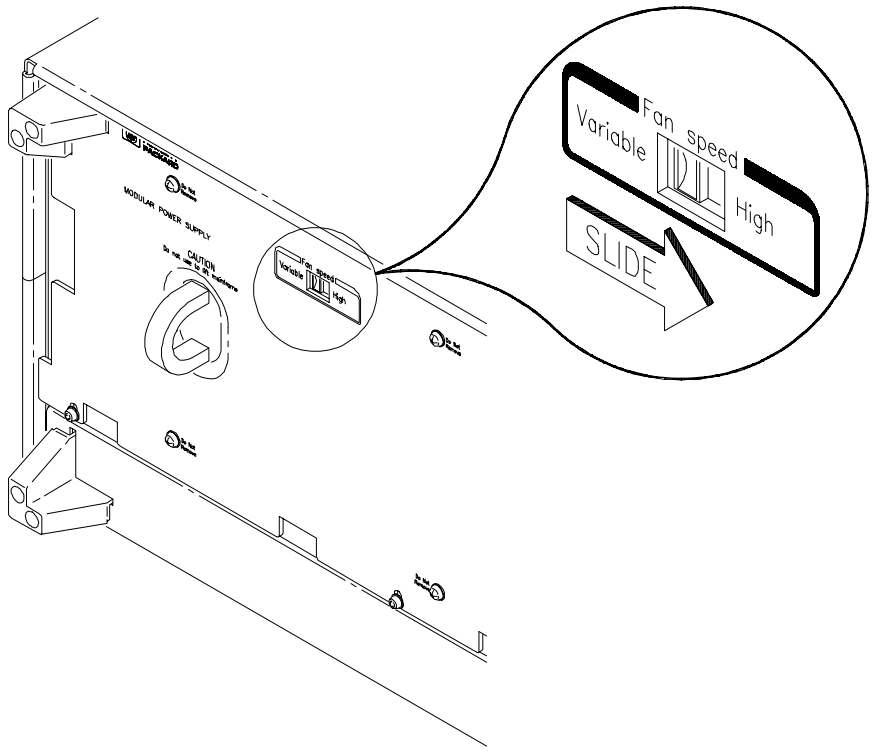


Figure 1-2. Forcing Fan to High Speed

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Power Line Fuse and Power Cord

The mainframe is shipped with a 15A fast blow (15 AF) fuse (HP Part Number 2110-0054) already installed. This fuse is suitable for all line voltages. Figure 1-3 shows how to replace the fuse if necessary.

Power cords and their HP Part Numbers are listed in Table 1-1. Figure 1-3 shows how to install the power cord.

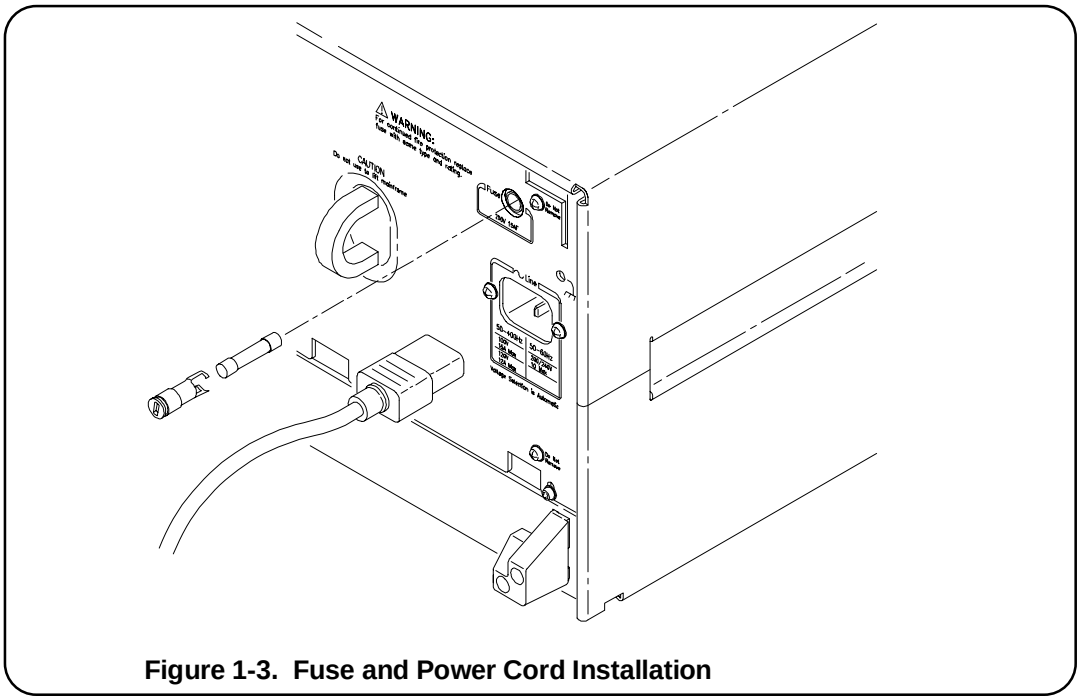


Figure 1-3. Fuse and Power Cord Installation

WARNING **For protection from electric shock hazard, power cord ground must not be defeated. The front power switch on this instrument does not disconnect all power from internal circuits. In case of emergency, the operator may need to disconnect the power to this mainframe. Do not block the operators access to the power cord, or (if installed in a rack) to the circuit breaker which supplies power to the mainframe.**

AVERTISSEMENT **Pour ne pas compromettre la protection contre le choc èlectrique, ne pas couper le circuit de continuitè des masses de la fiche. L'interrupteur avant de cet appariel ne coupe pas la totalitè de l'alimentation des circuits internes. En cas d'urgence, l'utilisateur peut devoir debrancher cet appareil. Ne pas bloquer l'accès au cordon d'alimentation ou (si l'appareil est installè sur un chassis) au disjoncteur alimentant l'appareil.**

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Power cord part numbers

Table 1-1 lists the power cords and their Hewlett-Packard part numbers. The table also lists the specifications of each power cord.

Table 1-1. Power Cords for the HP E1421B

Country	Part Number	Volts	Rated Amps	Type
U.K.	8120-1351	250 VAC	10 A	Straight Connector
Australia	8120-1369	250 VAC	10 A	Straight Connector
Europe	8120-1689	250 VAC	10 A	Straight Connector
U.S./Canada	8120-2371	125 VAC	13 A	Straight Connector
Switzerland	8120-2296	250 VAC	10 A	Right Angle Connector
Denmark	8120-2956	250 VAC	10 A	Straight Connector
Japan	8120-5400	125 VAC	15 A	Right Angle Connector
India/S.A.	8120-4211	250 VAC	10 A	Straight Connector

Power cords supplied by HP have polarities matched to the power input socket on the instrument:

L = Line or Active Conductor (also called "live" or "hot")
N = neutral or identified conductor
E = Earth or safety ground

Note *These are special high power cords. Make certain that any replacement cord is capable of handling the indicated loads.*

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HP E1421B Safety Grounding Information

WARNING **For protection from electrical shock when operating at frequencies greater than 66 Hz, connect the chassis ground terminal to permanent earth ground.**

AVERTISSEMENT **Risque de Choch èlectrique. Si la frèquence du secteur est supèrieure à 66 Hz, relier la borne de masse du chassis à une prise de terre fixe.**

Grounding Procedure

Connect a 16 AWG (1.3 mm or larger) wire to the PEM nut shown in Figure 1-4. The wire must be green with a yellow stripe or bare (no insulation). Use a M4 x 10 screw, grounding lug, and toothed washers (or toothed lug) as shown in Figure 1-5. Securely attach the other end of the wire to a permanent earth ground using toothed washers or a toothed lug.

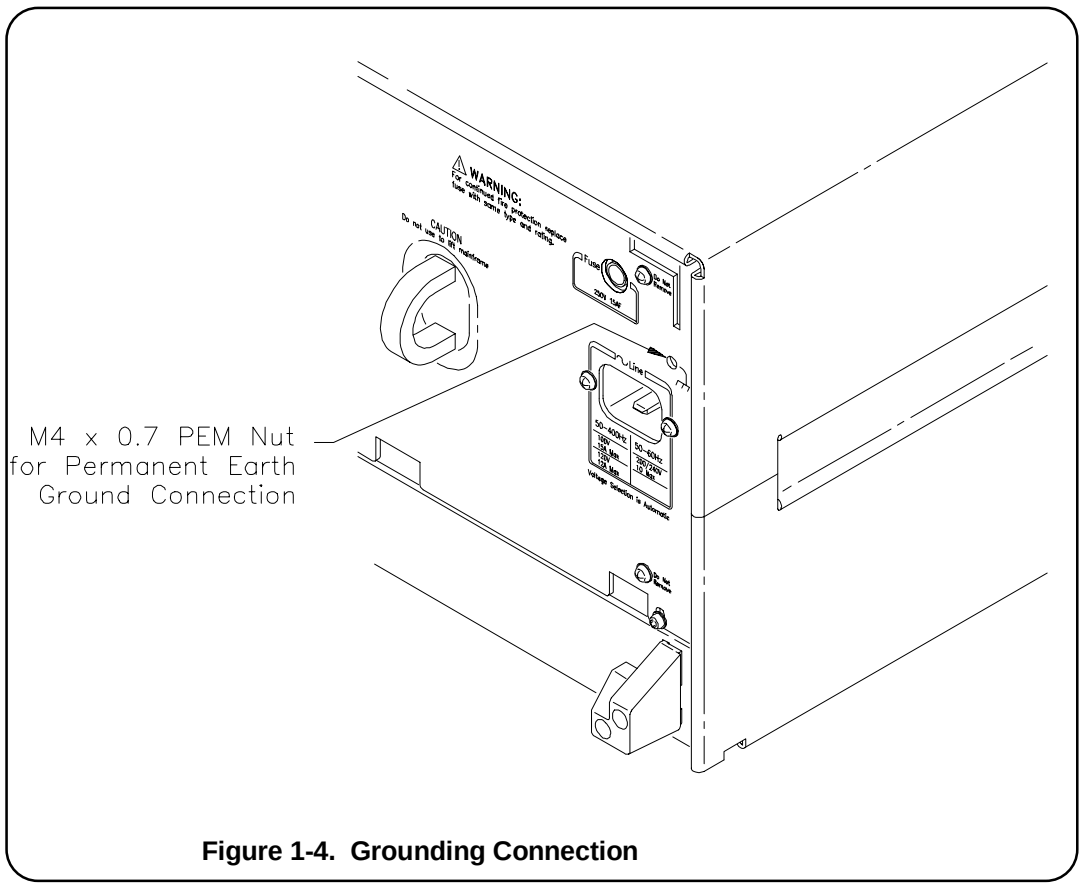


Figure 1-4. Grounding Connection

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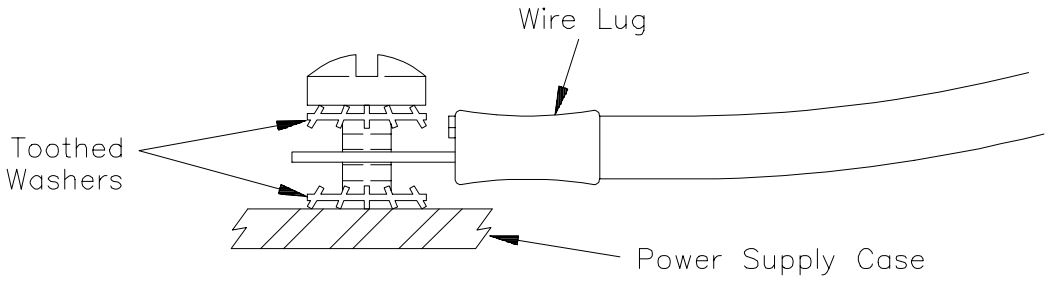


Figure 1-5. Grounding Screw and Toothed Washers

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Rack Mounting the HP E1421B

The HP E1421B mainframe has three rack mount option kits. These kits are shown in Figures 1-6, 1-7, and 1-8. A rack slide or rail kit is also required to rack mount the mainframe. These kits are shown in Figures 1-9 and 1-10. If you are not using a Hewlett-Packard rack, you may also need an adapter bracket. This bracket is shown in Figure 1-11. These kits may be ordered from your nearest Hewlett-Packard Sales and Support Office using the part numbers or option numbers listed with each part description.

Option 908

The Option 908 kit includes flush mount flanges and hardware designed to flush mount the mainframe. This kit is compatible with both the rack slide and rail kits.



Figure 1-6. Option 908 Parts Inventory

Option 916

The Option 916 kit includes the flanges included with Option 908 plus a recess rack mount bracket and supporting hardware. This kit is designed to mount the mainframe at a recess of 10.4 cm (4 1/8 in) or 12.9 cm (4 1/8 in). **The Option 916 kit is not compatible with rack slides shown in Figure 1-10**.

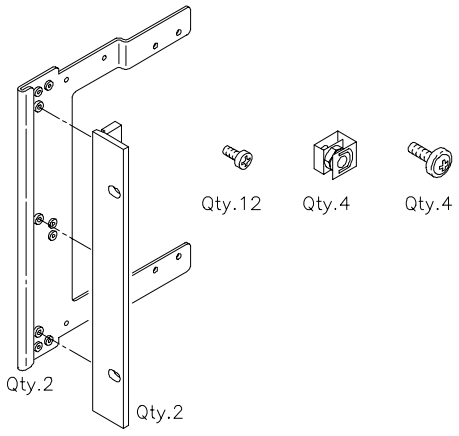


Figure 1-7. Option 916 Parts Inventory

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Option 909

The Option 909 kit includes the flanges and a set of front mount handles. This kit is designed to flush or recess mount the mainframe and provide handles for convenient removal and installation. The Option 909 is compatible with both rack slide and rail kits.

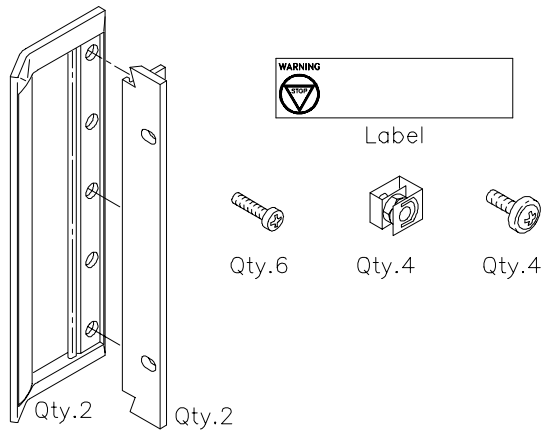


Figure 1-8. Option 909 Parts Inventory

Rail Kit

The rail kit is HP Part Number E3665A. This kit is designed to support the mainframe in a fixed position in the rack. It is compatible with all of the options listed in this section. **The rail kit must be ordered separately from the option kits.**

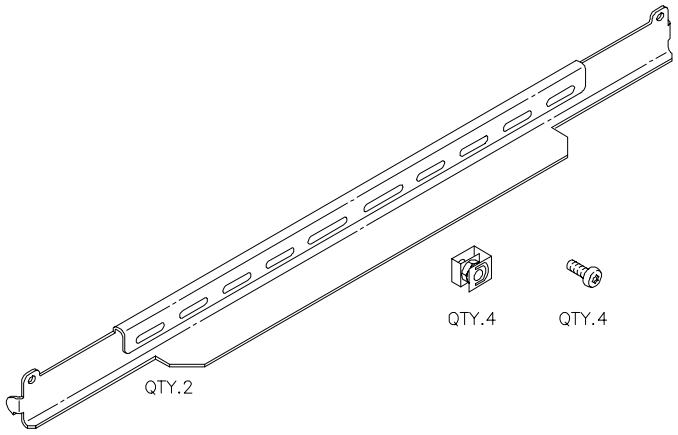


Figure 1-9. Rail Kit

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Rack Slides

The rack slide kit is HP Part Number 1494-0060. This kit is designed to support the E1421B in the rack while allowing it to be slid in and out for greater access. **The Rack Slide Kit is not compatible with Option 916 - Recess Rack Mount Kit. The Rack Slide Kit must be ordered separately from the options kits.**

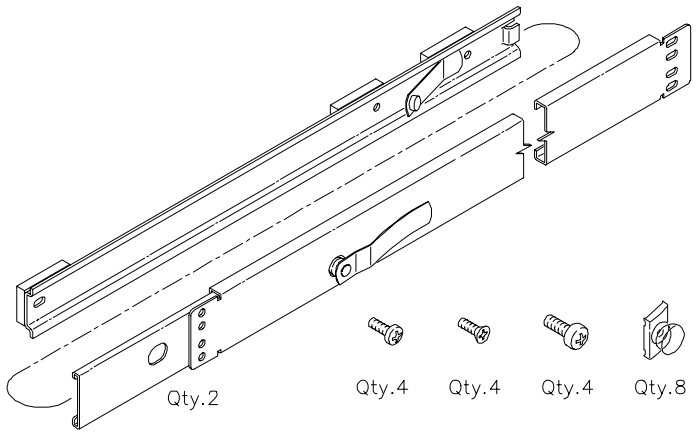


Figure 1-10. Rack Slides

Adapter Bracket

This bracket (HP Part Number 1494-0061) is designed for Rack Slides that are to be used in non-HP Racks.

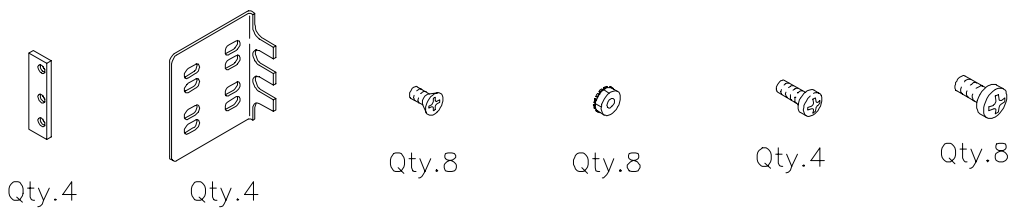


Figure 1-11. Rack Slide Adapter Bracket

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Mounting the Rails or Rack Slides

Figures 1-12 and 1-13 show how to mount the rails or rack slides in the rack.

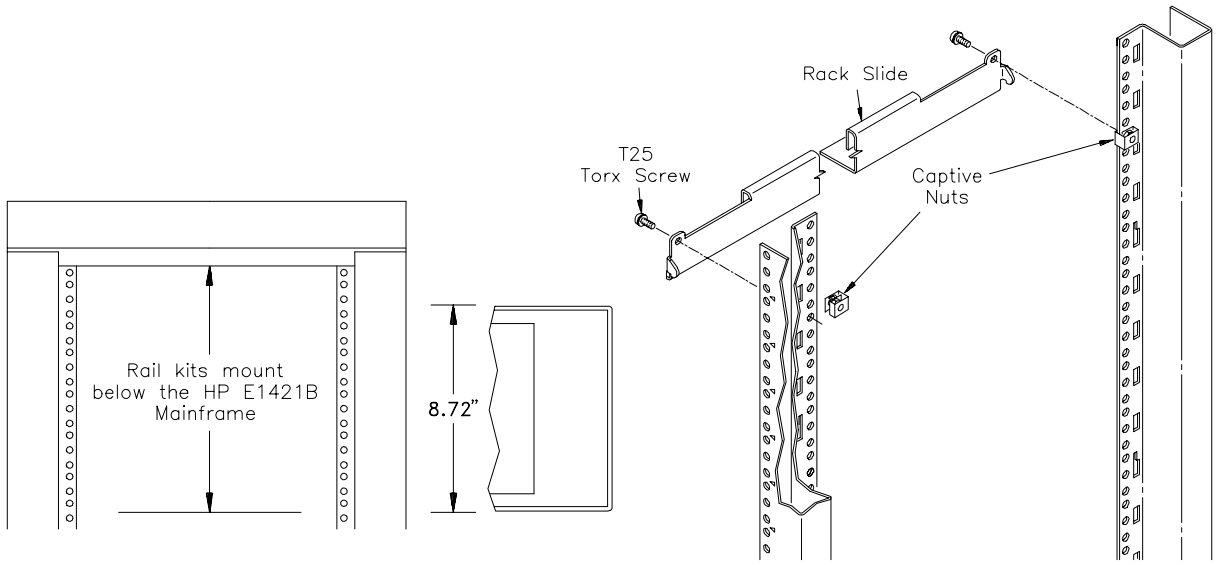


Figure 1-12. Mounting the E3665A Rail Kit

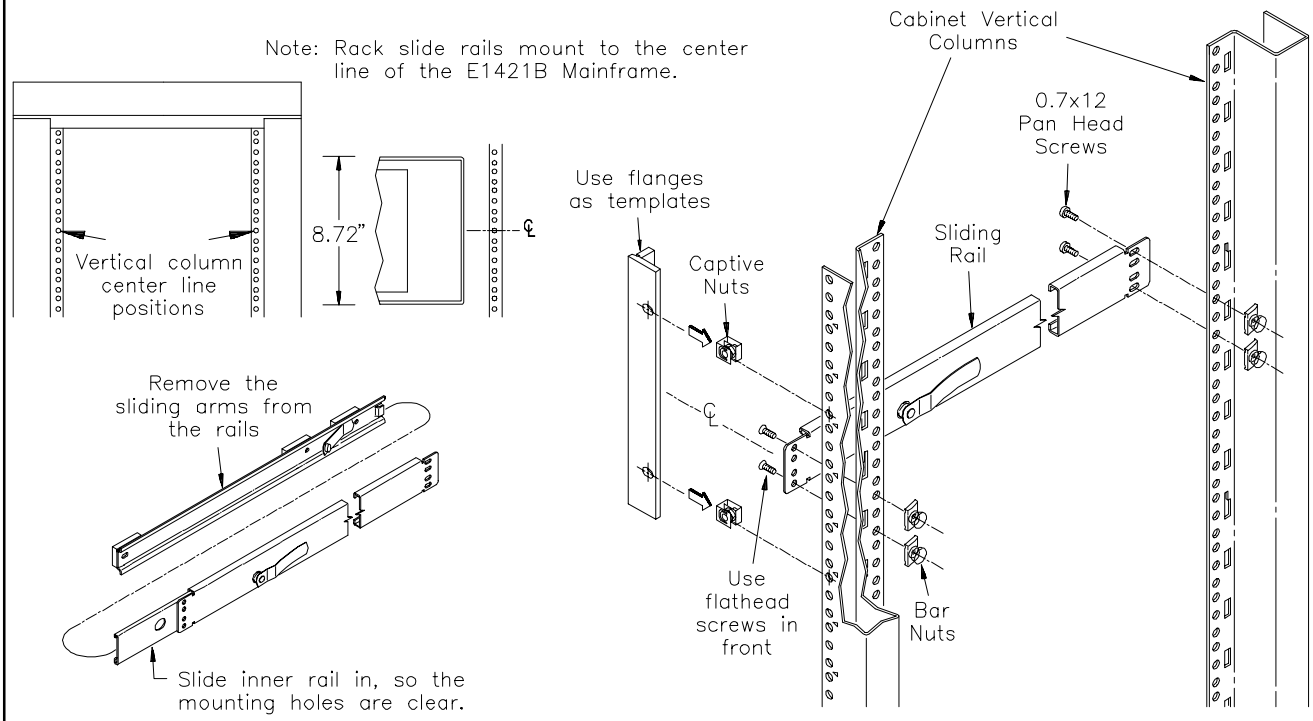
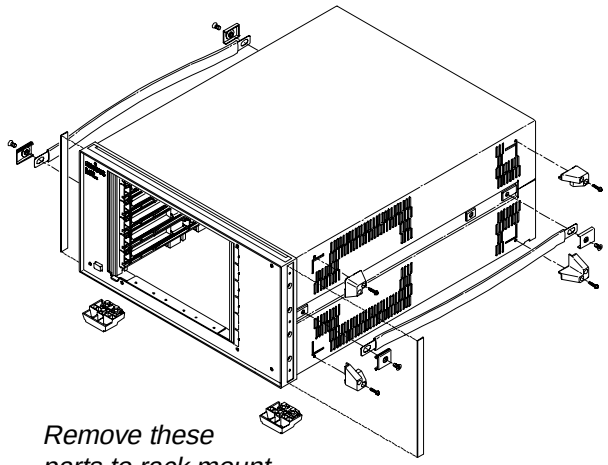


Figure 1-13. Mounting the Rack Slide Kit

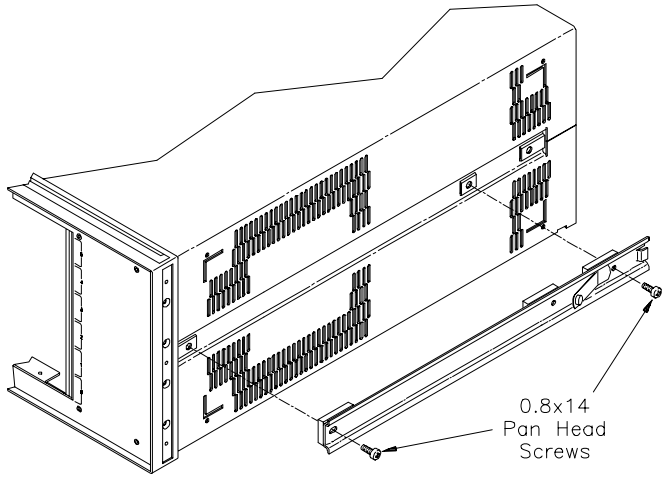
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Preparing the Mainframe

Figure 1-14 shows the steps that are needed to prepare the mainframe for rack mounting. Figure 1-15 shows how to attach the Option Kits to the mainframe.

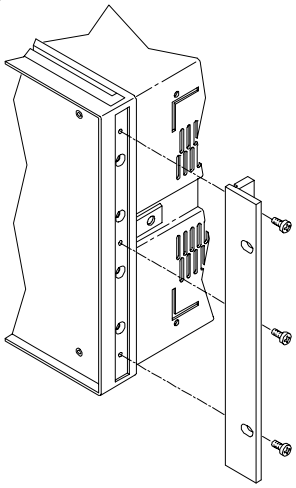


Remove these parts to rack mount the mainframe.

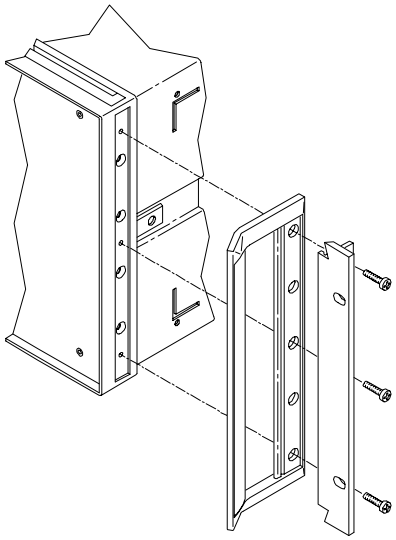


Note: This step is only for the Rack Slide Kit.

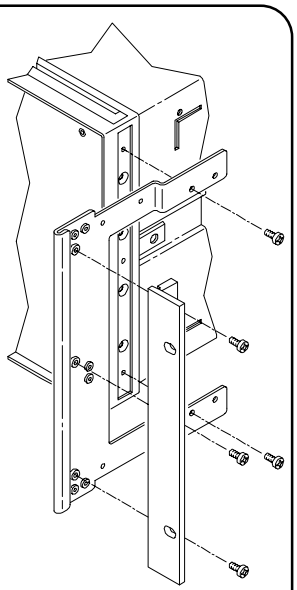
Figure 1-14. Preparing the Mainframe



Option 908 Flush Mount



Option 909 Flush Mount with Handles



Option 916 Recessed Mount

Figure 1-15. Installing the Option Kits.

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Installing the mainframe

Figure 1-16 shows the final step to install the mainframe into the rack. Be sure to connect the mainframe power cord to the rack power supply. Figure 1-16 is shown with Option 908 Flush Mount Kit and the Rack Slide Kit.

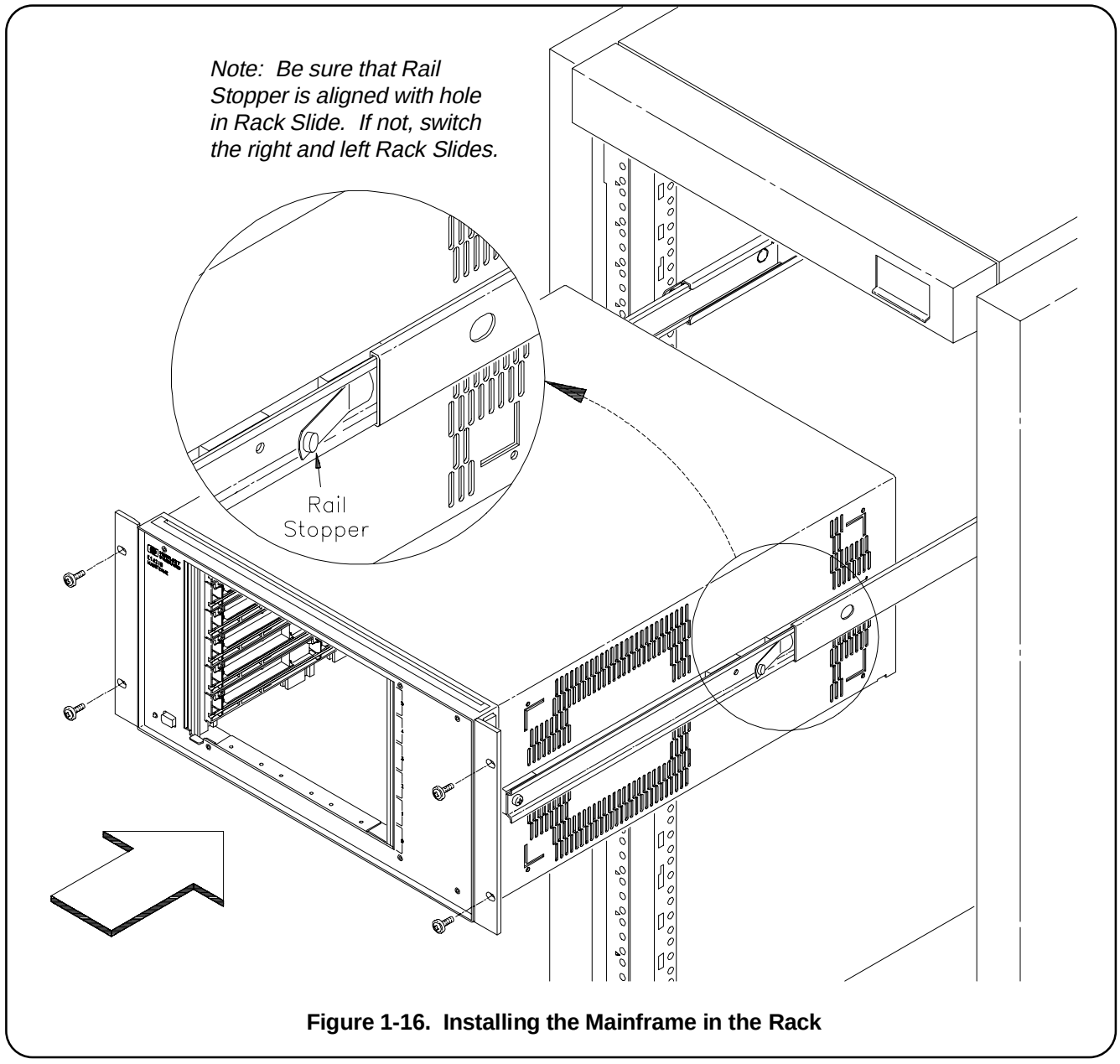


Figure 1-16. Installing the Mainframe in the Rack

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Intermodule Chassis Shield Kit

The Intermodule Chassis Shield Kit (HP Part Number E1409B) is the HP implementation of the VXIbus specification that allows grounded shielding between mainframe slots. Figure 1-17 shows how to install the E1409B in the E1421B mainframe. The E1409B can be ordered from your nearest Hewlett-Packard Sales and Support Office.

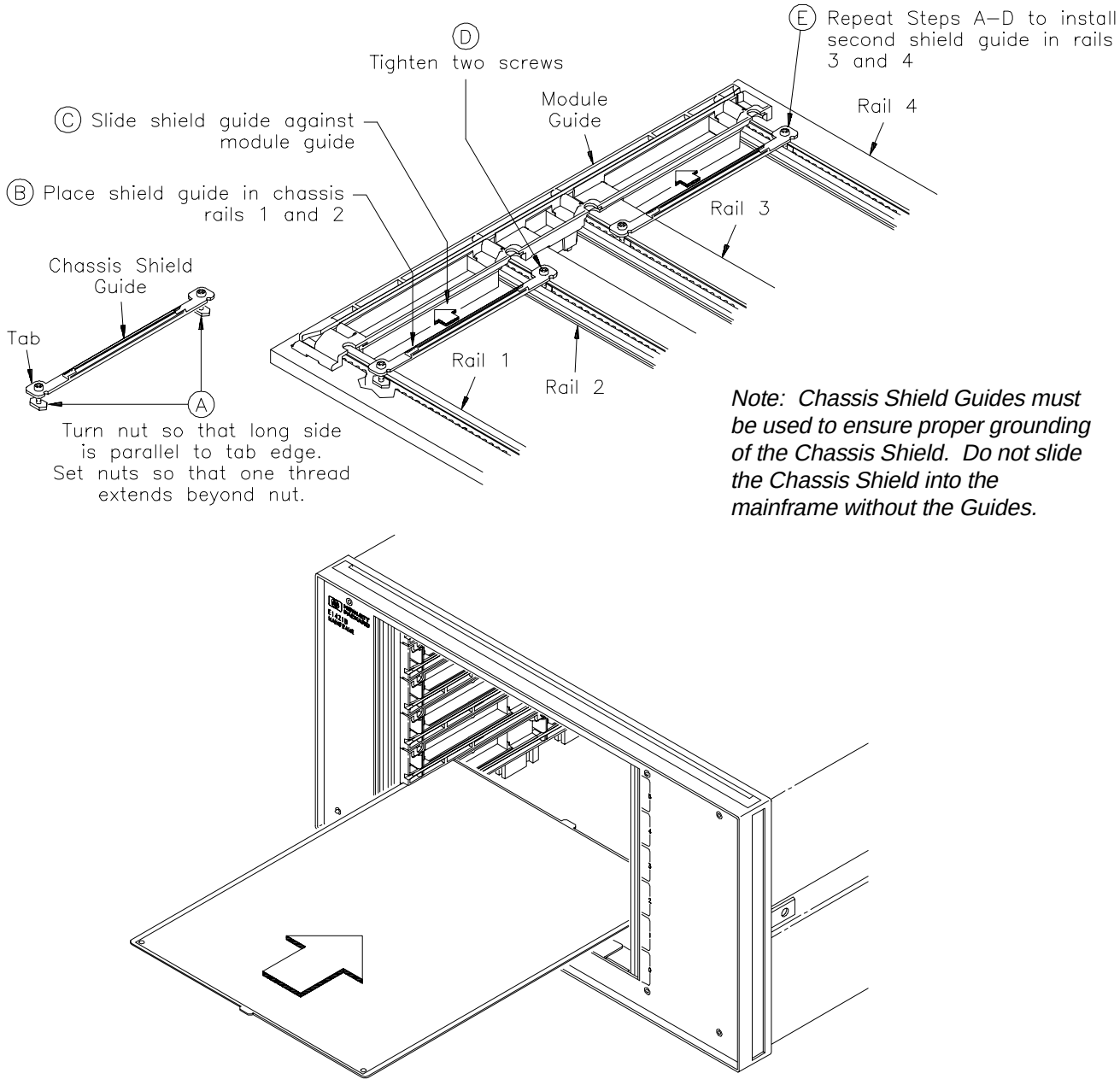


Figure 1-17. Installing Intermodule Chassis Shield Kit

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Chapter 2
Replaceable Parts & Assemblies

There are no user servicable parts in the HP E1421B. Repair is limited to replacing the power supply module, the backplane module, or other mechanical parts only.

Module Replacement

The power supply is available on an exchange basis. The backplane assembly should be replaced and not repaired (no exchange required on the backplane).

Power Supply	E1401-69202
Backplane	E1421-67500

Component Locator

Refer to Figures 2-1 and 2-2 for component locator information.

WARNING **There are no user servicable parts in the HP E1421B. Refer repair and servicing to trained service personnel.**

AVERTISSEMENT **Ne contient pas d'èlèment que l'utilisateur puisse rèparer. Confier les rèparations et la maintenance à un technicien qualifiè.**

Cleaning Fan Filters

The HP E1421B does not have any fan filters. Therefore it is not necessary to remove, clean, or replace the filters.

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HP E1421B Replaceable Parts List

Reference Designator	HP Part Number	Total Qty.	Description	Mfr. Code	Mfr. Part Number
A1	E1421-67500	1	PC ASSY BACKPLANE/INTERFACE	28480	E1421-67500
A2	E1401-69202	1	POWER SUPPLY 650W	28480	E1401-69202
B1-B2	3160-0864	2	FAN - TBAX; 12V DC	28480	3160-0864
PNL1	E1421-04300	1	PANEL FRONT	28480	E1421-04300
CBL2	E1401-61612	1	CABLE - PWR SWITCH LED	28480	E1401-61612
CBL3	E1401-61610	1	CABLE - FAN	28480	E1401-61610
CR1	1990-1027	1	LED - LMP	28480	1990-1027
CVR1	E1421-04110	1	COVER TOP	28480	E1421-04110
F1	2110-0054	1	FUSE 15A, 250V NTD FE UL	75915	314015
MP94	1400-1502	1	CLIP - LED T - 1	28480	1400-1502
	E1421-81206	3	RAILS VERTICAL	28480	E1421-81206
	E1421-81206	3	RAILS VERTICAL	28480	E1421-81206
MP98	E1421-00102	1	CHASSIS MAIN	28480	E1421-00102
	E1421-00103	1	CHASSIS TOP	28480	E1421-00103
	E1421-04602	1	PLENUM AIR	28480	E1421-04602
MP103-114	E1401-41202	12	CARD GUIDE	28480	E1401-41202
MP130	E1401-00203	1	BLANK PANEL (Fan Carrier)	28480	E1401-00203
MP135-MP136	5001-0541	2	TRIM, SIDE	28480	5501-0541
MP137	5021-8407	1	FRAME, FM, FRONT	28480	5021-8407
MP138-MP141	5041-8801	4	FOOT, MOLD	28480	5041-8801
MP142	5041-8802	1	TRIM TOP	28480	5041-8802
MP143-MP146	5041-8821	8	STNDF - REAR PNL	28480	5041-8821
MP149	E1421-81204	1	RAIL FRONT LEFT	28480	E1421-81204
MP150	E1421-81205	1	RAIL FRONT RIGHT	28480	E1421-81205
	E1421-21200	2	NUT BARS FRONT	28480	E1421-21200
	E1421-21201	2	NUT BARS REAR	28480	E1421-21201
MP1	5041-8819	2	CAP - STRP HDL FRT	28480	5041-8819
MP2	5062-3704	2	STRAP HDL 18 IN	28480	5062-3704
MP3	54710-62501	2	CAP STRAP HANDLE	28480	54710-62501
PNL2-PNL3	E1400-00209	2	FILLER PANEL ONE SLOT	28480	E1400-00209
PNL5	E1400-00203	1	FILLER PNL - 3 SLOT	28480	E1400-00203
X1	2110-0565	1	FUSEHOLDER CAP 15A MAX	28480	2110-0565

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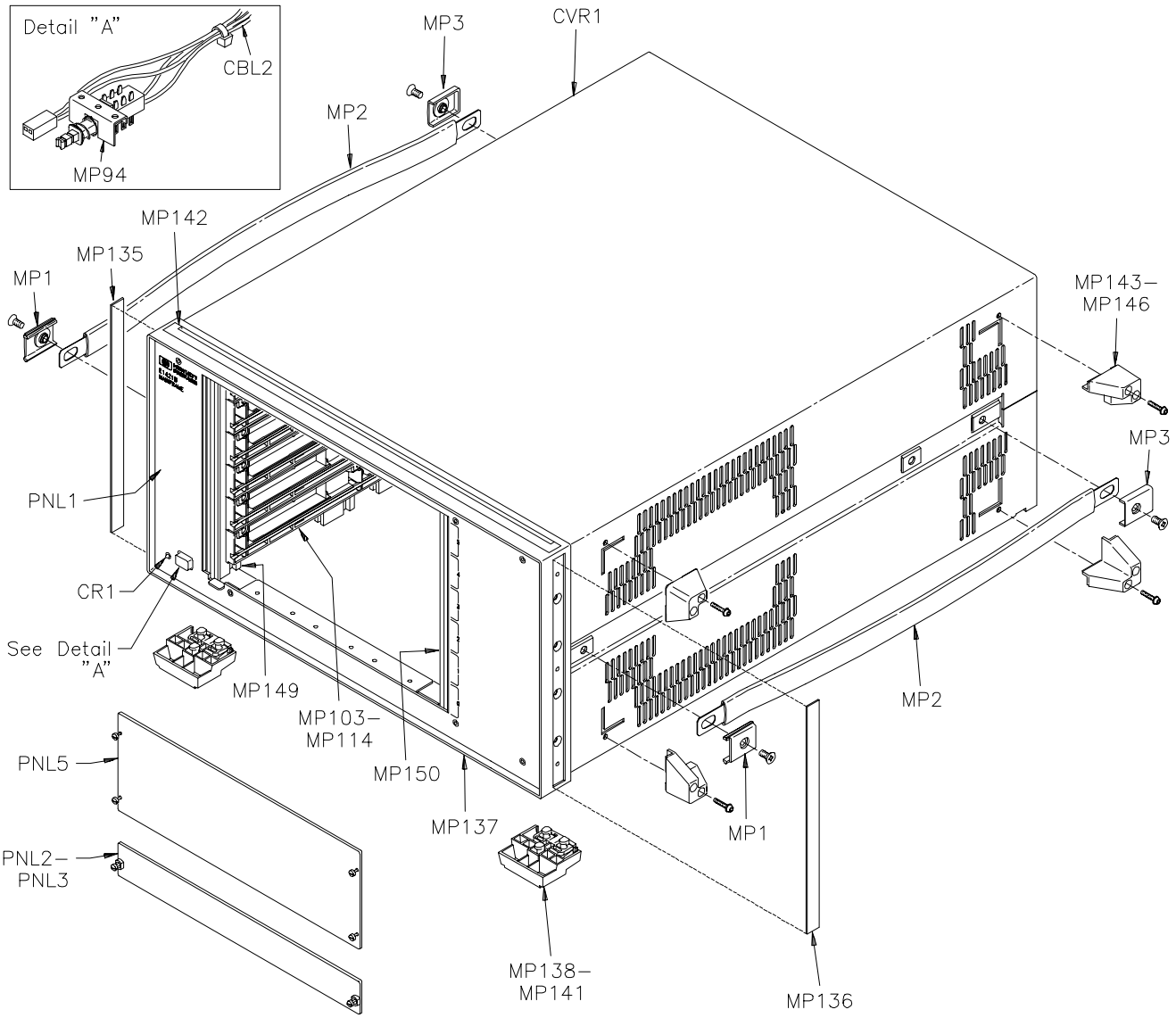


Figure 2-1. Mainframe Replaceable Parts

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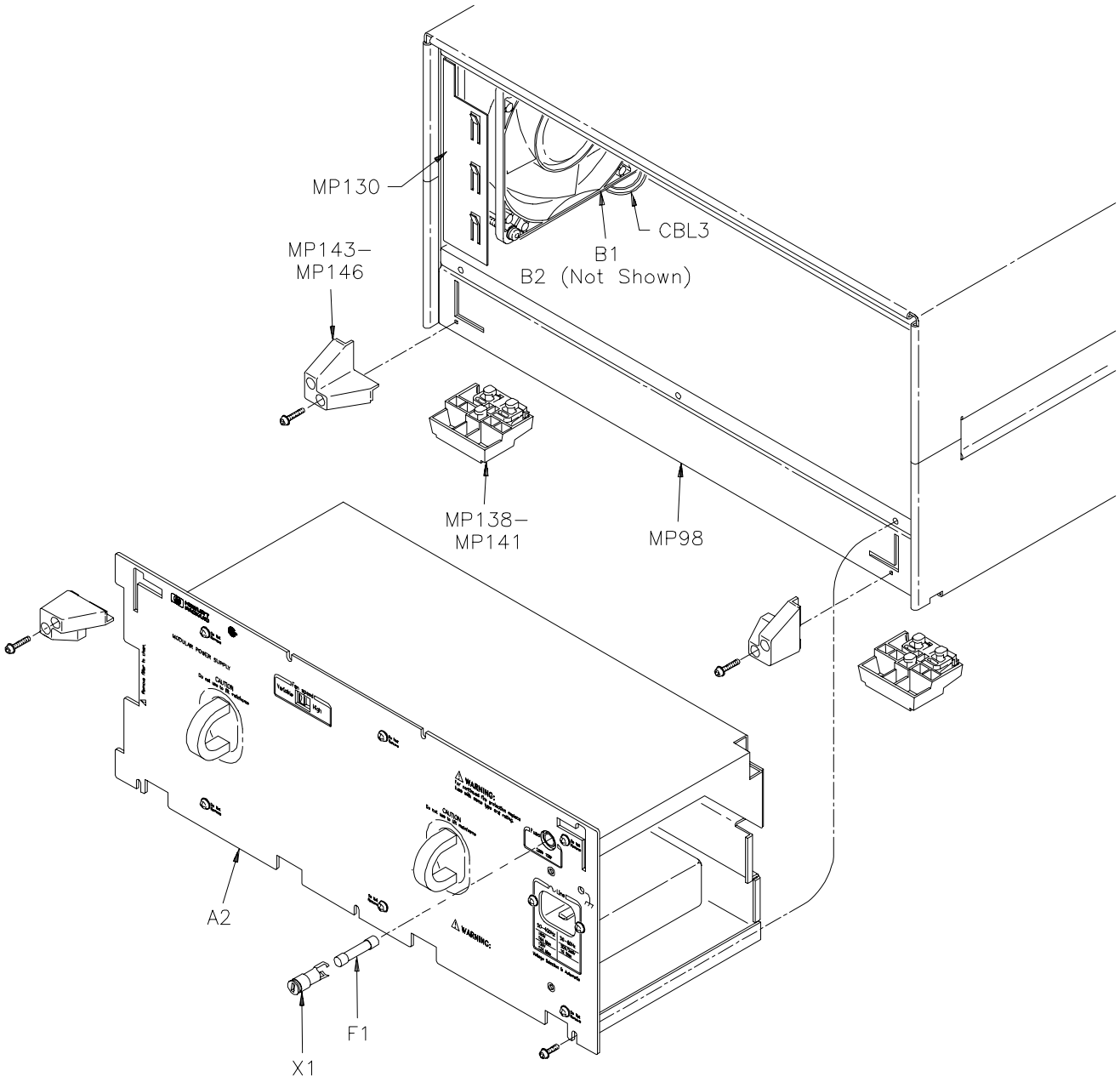


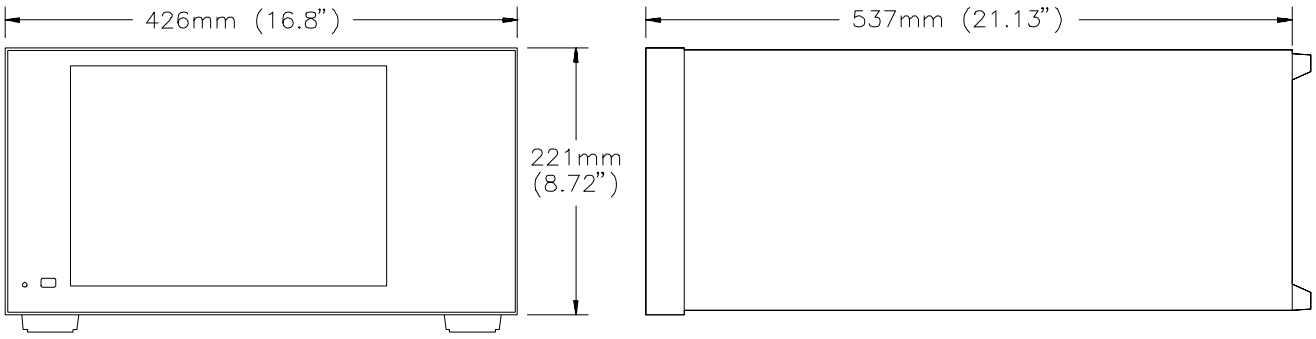
Figure 2-2. Fan & Rear Panel Replaceable Parts

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Appendix A
Specifications

The HP E1421B mainframes are 100% compatible with VXIbus specification revision 1.4.

Overall Mainframe Size



Mainframe Weight

HP E1421B: 15.0 Kg (33.0 lbs) with no modules installed.

Module Size

Six (6) C-Size slots. The mainframes also accept A- or B- Size modules using the optional HP E1403 Module Carrier.

Input Power

50 - 60 Hz Input Power:
Automatic Voltage Ranging, nominal range: 100 - 240 Vac ±10%
Nominal Frequency Range:50 - 60 Hz ±10%
400 Hz Input Power:
Nominal Voltage Range: 100 - 120 VAC ±10%
Nominal Frequency: 400 Hz ±10%
DC Input Power:
Input Voltage Range: 100 VDC minimum - 370 VDC maximum

General Power Supply

Power Factor Corrected
Power Switch: On/Standby with lighted indicator in front.
Inrush Current: 40A max
Designed to meet EN-60555-2
Socket for detachable line cord: IEC 320 "HOT"
Chassis ground tap on rear panel: M4 x 0.7 threaded insert.

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Fuse:

Voltage	Maximum Current	Fuse
100Vac 120Vac 220-240Vac	15A 12A 8A	15AF 15AF 15AF

Power Supply Outputs

DC Output Voltage	Peak DC Output Current (IMP*) 55 °C	P-P Dynamic Current (IMD**)
+5V +12V -12V +24V -24V -5.2V -2V	45A 8A 8A 8A 8A 40A 15A	5.0A 2.5A 2.5A 4.0A 4.0A 5.0A 3.5A

* IMP = Rated mainframe peak DC output current as defined by the VXIbus Specification.
** IMD = Rated mainframe peak-to-peak dynamic current as defined in the VXIbus Specification by a current vs. frequency curve.

VXI Ripple/Noise*

DC Output Voltage	Allowed Variation	Max. DC Load Ripple/Noise	Max. Induced Ripple/Noise
+5V +12V -12V +24V -24V -5.2V -2V	+0.25/-0.125 +0.06/-0.36 -0.60/+0.36 +1.2/-0.72 -1.2/+0.72 -0.26/+0.156 -0.10/+0.10	50 mV 50 mV 50 mV 150 mV 150 mV 50 mV 50 mV	50 mV 50 mV 50 mV 150 mV 150 mV 50 mV 50 mV

* Per VXI Specification rev. 1.4

Humidity

Up to 65% relative humidity from 0 to 40 °C

Temperature Range

Non-operating:-40 ºC to +75 ºC
Operating: 0ºC to 55 ºC

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Shock

Operating, Functional:

Random: 0.0001 g^2/Hz, 5-500 Hz, ~0.21 Grms, 10 min/axis.

Survival:

Swept Sine: 5-500 Hz resonant search, 1 Octave/min sweep rate, 5 min dwell at resonance.

Random: 0.015 g^2/Hz, 5-500 Hz, ~2.09 Grms, 10 min/axis.

Vibration

End use, Handling:

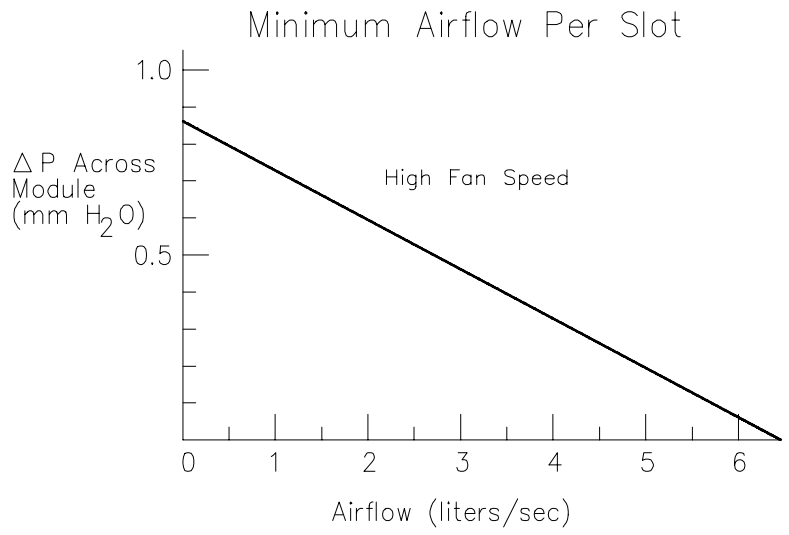
Less than 45.5 kg: Half sine waveform, <3ms duration, velocity change depending on weight.

Greater than 45.5 kg: 10.2 cm free fall tilt drop.

Transportation:

Trapezoidal waveform, velocity change dependent on weight, minimum acceleration 30 g.

Cooling Provided



HP E1421B Minimum Airflow Available per Slot

Fan set to "Variable": Quiet operation (approx. 75% airflow) at <30 ºC ambient temperature and high speed operation at >40 ºC ambient temperature.

Fan set to "HIGH": Full airflow all the time.

For modules with typical density:

10 ºC rise at 60W per slot

15 ºC rise at 75W per slot

Acoustical Noise

Low fan speed: 53 dBA sound pressure at bystander position.

Lpa = 53 dB fiktiver Arbeitsplatz, normalier Betrieb, nach DIN 45635 T.1

High fan speed: 59 dBA sound pressure at bystander position.

Lpa = 59 dB fiktiver Arbeitsplatz, normalier Betrieb, nach DIN 45635 T.1

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EMC Testing Meets requirements of CISPR 11 Level A.

Module Weight Maximum 3.5 Kg (7.7 lbs) per slot to comply with vibration and shock specifications. Heavier modules may be installed if vibration and shock environment is less severe.

Safety IEC 348, UL 1244, and CSA C22.2 #231.

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