HP 82000 IC Evaluation System

Site Planning and Preparation Guide

HP 82000 Models D40/50/100/200/400

SERIAL NUMBERS

Affects all systems.

A B C D E

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N o t i c e

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Printing History

New editions of this manual will incorporate all material updates since the previous edition. Update packages may be issued between editions, and contain additional and replacement pages to be merged into the manual by the user. Each updated page will be indicated by a revision date at the bottom of the page. A vertical bar in the margin indicates the changes on each page. Pages which are rearranged due to changes on a previous page are not considered revised.

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated in a reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

October 1990 ..... Revision 2

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The purpose of this guide is to give the site-requirements of the HP 82000 IC Evaluation System. This revision of the manual has been updated to include considerations for HP 82000 Maxiframe systems.

Target Audience

This manual is targeted at users of the system and the installation engineer.

Figures

Tables

Introduction

Using This Guide

This *Site Planning and Preparation Guide* tells you the site requirements of the three different types of HP 82000 IC Evaluation System: Miniframe, Standardframe and Maxiframe.

This guide does not describe how to plan for the installation of the HP 82000 System, but lists the things which must be considered when planning, under the headings:

- **Weights and Dimensions**
- **Power Requirements**
- **Environmental Requirements**

A *Site Preparation Checklist* is supplied with this guide. This checklist lists the most important site preparation considerations. Check-off the boxes on the checklist when each set of requirements is met.

Warning **All plans for the system installation must meet local safety standards.**

Sites to be Prepared

The sites which must be prepared for the HP 82000 installation are:

Unloading Site	Where the system is unloaded and received by the customer.
Unpacking Site	Where the system is unpacked.
Installation Site	Where the system is installed.

One or all of these sites may be the same place. The most important considerations for each site are:

Unloading Site : Considerations

- Weights and Dimensions of Crates
- Means of Moving Crates
- Temperature
- Relative Humidity
- Route to the Unpacking Site

Unpacking Site : Considerations

- Weights and Dimensions of Crates
- Means of Moving Crates
- Moving the Unpacked System
- Temperature
- Relative Humidity
- Electrostatic Discharge Precautions
- Route to the Installation Site

Installation Site : Considerations

- Weight and Dimensions of the System and Peripherals
- Moving the System
- Power Requirements of the System and Peripherals
- Air-Conditioning/Cooling Requirements
- Environmental Requirements
- Electrostatic Discharge Precautions

Note

It is important to carefully consider the routes over which the system must travel. It is possible to choose three perfectly adequate sites and not be able to move the system between any of them.

Responsibilities

The Customer

The customer is responsible for:

- Receiving and checking the completeness of the system shipment. The customer should also check for obvious damage to the shipment crates.
- Moving the system before and after it has been unpacked.
- Supplying a mains power cable (or cables) for the HP 82000 System.
- Ensuring that a qualified electrician is present to connect the mains power cable to the HP 82000 System.
- Ensuring that the requirements set out in this guide are met, so that the system can be installed in a suitable stable working environment.

The Installation Engineer

The Hewlett-Packard installation engineer is responsible for:

- Unpacking the system.
- Installing and configuring the system (except the mains power cable).
- Checking that the system is working correctly.

Note

Trained personnel who can assist with site-assessment and installation-planning are available from the local Hewlett-Packard Customer Service Centre.

In Case of Loss or Damage

If the equipment is damaged or the shipment is incomplete, do not continue with the installation and notify the nearest Hewlett-Packard Customer Service Office. The Hewlett-Packard Office will arrange for the damaged or missing components to be replaced or repaired, without waiting for the settlement of a claim against the carrier.

Weights and Dimensions

Use this chapter to assess the structural suitablity of the proposed unloading- unpacking- and installation-sites.

Weights and Dimensions of Crated Systems

System	Crated Weight	Height	Width	Depth
Miniframe[1]	75 kg	540 mm	730 mm	840 mm
Miniframe Extender[1]	75 kg	540 mm	730 mm	840 mm
Standardframe[1]	300 kg	1260 mm	750 mm	1200 mm
Maxiframe - 2 card-cages[2]	650 kg	1350 mm	940 mm	2250 mm
Maxiframe - 1 card-cage[2]	560 kg	1350 mm	940 mm	2250 mm

1 Shipped with boards and PSMs installed.

2 Shipped with boards installed, but no PSMs.

Moving Crated Systems

Pallet Jack This is the recommended method of moving crates.

Fork Lift Use a fork-lift only if there is no other alternative.

Warning

- **We recommend that pallet-jacks rather than a fork-lift, should be used to to move crated systems. Crated Maxiframes and Standardframes have a high centre of gravity and could fall off the forks unless very securely fastened.**
- **Make sure that the route between the unloading-site and the unpacking-site can accomodate the crated system (weight and dimensions). Remember to include the weight of moving-equipment and personnel.**
- **Move only one crate at a time.**
- **We recommend that you use two pallet-jacks to move a crated Maxiframe, one at each end of the crate.**

Note

To be certain that a crated system can be moved around corners and through doorways, one of the following could be useful:

- Draw a scale plan of the routes the system must be moved over. Cut-out a piece of paper the same width and depth as the crated system (include pallet-jack(s) or other moving equipment in the cut-out) and try to move it over the planned route.
- Cut a piece of plywood the same width and depth as the crated system and move this over the planned route using pallet-jacks, or whatever will be used to move the system.

Unpacking and Placing Systems

Details of how to unpack HP 82000 mainframes are given in the installation manuals. You should, however, consider the following:

- Maxiframes are shipped lying flat in their crates. When unpacking a Maxiframe, the Maxiframe must be lifted into the upright position. To do this, a crane (capable of exerting at least **4000 N** upwards force) is required. Alternatively **four** people can lift the Maxiframe with the lifting-bar supplied with the system. The crane is the recommended method.
- Maxiframe and Standardframe mainframes are equipped with castors and can be pushed SHORT distances. The distance between the unpacking-site and the installation-site should be as short as possible.
- **Two** people are needed to move a Maxiframe on its castors.
- **Two** people are needed to carry a Miniframe. Preferably, put the miniframe on a trolley and push it to its final location.
- Make sure that the route between the unpacking-site and the installation-site can accomodate the unpacked system (weight and dimensions).

Warning

Assess everything which will have to support the system while it is being unpacked and moved to its final location. This includes:

- **Floors**
- **Lifts**
- **Ramps**

- Remove any obstacles (such as cables on the floor) which may cause a system to fall over or become tangled.

Warning

Push Maxiframes SLOWLY, as they tend to fall over if they are stopped suddenly, even at speeds as low as 10 cm/sec.

System Dimensions

System	Height	Width	Depth
Miniframe	245 mm	600 mm	800 mm
Miniframe + Extender	500 mm	600 mm	800 mm
Standardframe - 0° DUT Interface	1000 mm	600 mm	830 mm
Standardframe - 45° DUT Interface	1000 mm	600 mm	1060 mm
Maxiframe	2000 mm	600 mm	1060 mm

Note

- At least **1 m** (**3.28 ft**) unobstructed space is required behind Standardframes and Maxiframes. This is necessary for system cooling, and so that the rear door of Standardframes and Maxiframes can be opened.
- At least **40 cm** (**1.31 ft**) unobstructed space is required on either side of Miniframes. This is necessary for system cooling.
- The measurements for Maxiframes and Standardframes are for single mainframes. For double or triple (Standardframe only) mainframes, double or triple the width measurement as required.
- When calculating the floor-space required, take into account the area needed for peripherals, wafer-probers, handlers, equipment-racks, tables, chairs, etc.

  We recommend that the customer makes a floor-plan which shows the test-area and the relative positions of all HP 82000 System components and peripherals. The drawing should also include the positions of power outlets and furniture.

System Weights

System	Weight[1]
Miniframe	50 kg
Miniframe Extender	50 kg
Standardframe	250 kg
Maxiframe - 2 card-cages	570 kg
Maxiframe - 1 card-cage	520 kg

1 Fully configured with boards and one DPS

Warning

- **Assess everything which will have to support the system at any time. This should include things like:**
  - **Lifts**
  - **Floors**
  - **Stairs**
  - **Ramps**
- **When calculating the total load on the floor in the test-area, take into account the weight of the equipment associated with the system. That is, the controller, printer, wafer-probers, handlers, measurement instruments, tables, chairs and any other peripherals.**

Electrical Requirements

Use the information in this chapter to ensure that the installation site has a suitable source of AC power for the HP 82000 System.

Note

It is the responsibility of the customer to provide an adequate, stable source of AC power for the HP 82000 System up as far as the terminals inside the system Power Control Module.

Warning

A qualified electrician must carry out any electrical installation work required and ensure that the voltage, measured at the input to the system is within the tolerances and limits specified in this chapter.

All local safety standards and regulations must be adhered to.

Mains Power Configurations

The mains power configurations supported by the HP 82000 System are as follows:

Miniframe: Option 110

110 V (phase-to-neutral voltage).

1 phase + Neutral + Protective-Earth.

50/60 Hz.

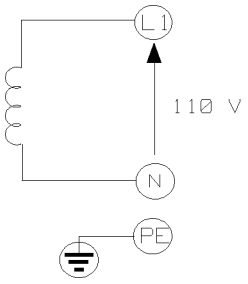

Figure 3-1. Mains for Option 110

Miniframe: Option 230

230 V (phase-to-neutral voltage).

1 phase + Neutral + Protective-Earth.

50/60 Hz.

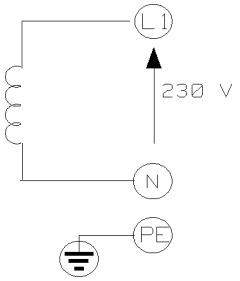

Figure 3-2. Mains for Option 230

Standardframe: Option 208

208 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth.

60 Hz.

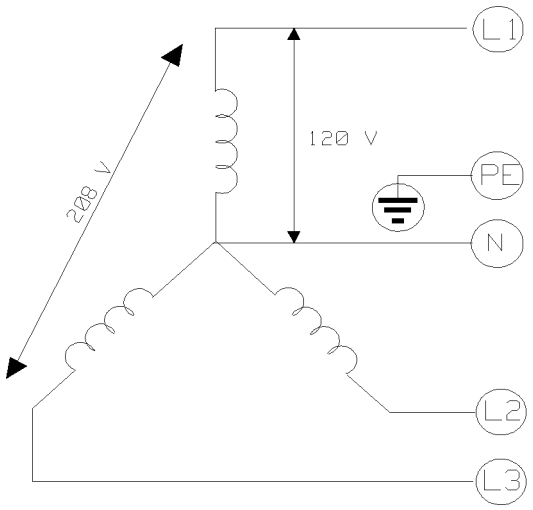

Figure 3-3. Mains for Option 208

Standardframe: Option 400

Europe 400 V (phase-to-phase voltage).

(except UK) 3 phases + neutral + Protective-Earth.

50 Hz.

3 Phase, 4 Wire Connection

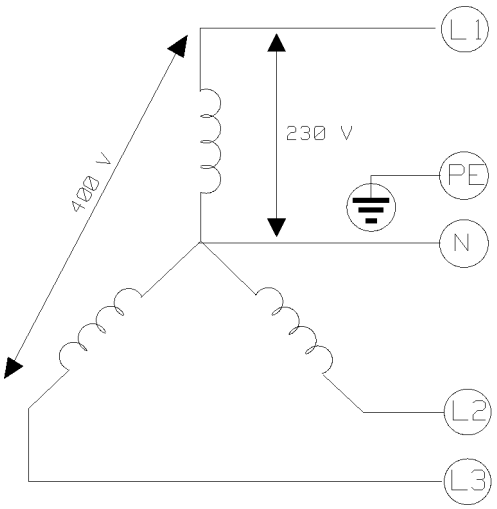

Figure 3-4. Mains for Option 400

Standardframe: Option 415

UK 415 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth.

50 Hz.

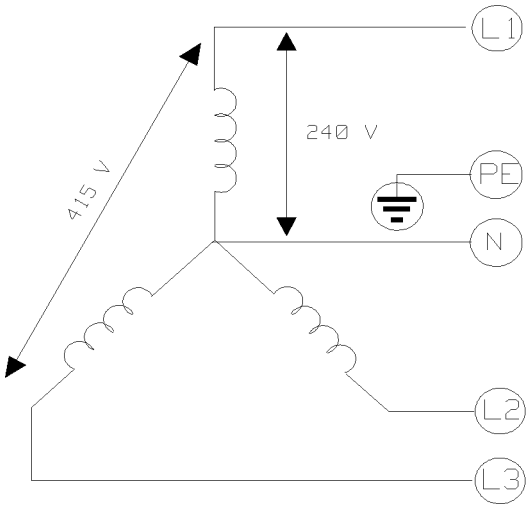

Figure 3-5. Mains for Option 415

Standardframe: Option 200

200 V (phase-to-phase voltage).

1 phase + Protective-Earth.

50/60 Hz.

1 Phase, 2 Wire Connection

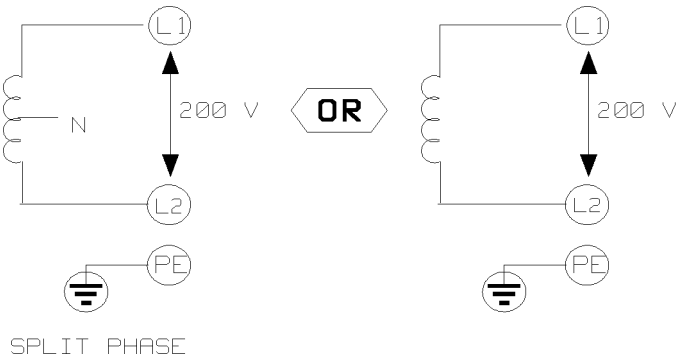

Figure 3-6. Mains for Option 200

Standardframe: Option 240

240 V (phase-to-phase voltage).

1 phase + Protective-Earth.

50/60 Hz.

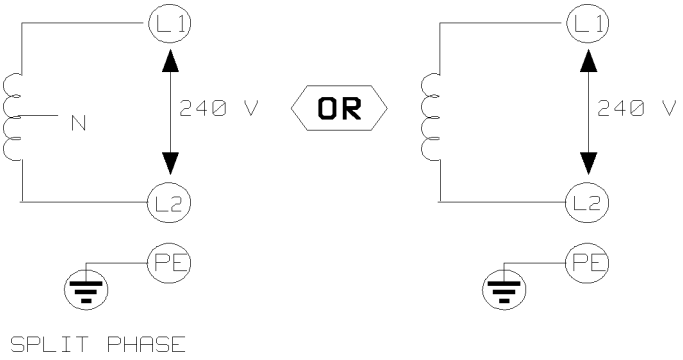

Figure 3-7. Mains for Option 240

Maxiframe: Option 0E5 (Europe)

Two mains voltages can be used by this option:

Europe (except UK)

400 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth

50 Hz.

UK 415 V (phase-to-phase voltage).

3 phases + neutral + Protective-Earth

50 Hz.

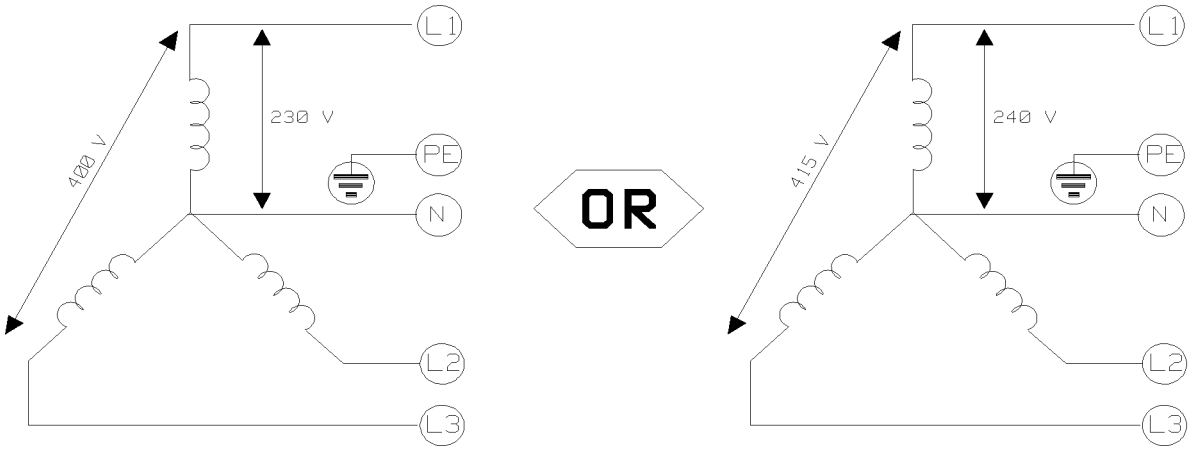

Figure 3-8. Mains for Option 0E5

Maxiframe: Option 0EF (USA)

This option requires:

USA 208 V (phase-to-phase voltage).
3 phases + neutral + Protective-Earth
60 Hz.

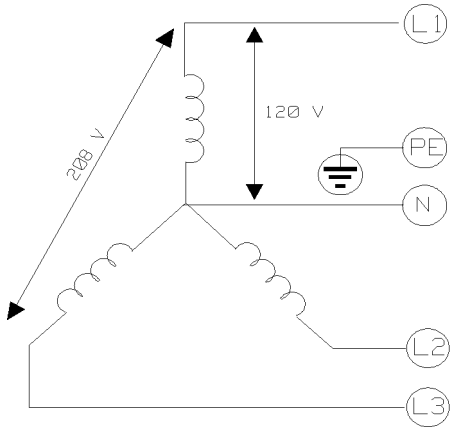

Figure 3-9. Mains for Option 0EF

Maxiframe: Option 0ED (Japan)

This option requires two mains-supplies. A 3-phase supply for the fans and system-boards, and a single-phase supply for instruments.

Mains 1 200 V (phase-to-phase voltage).

3 phases + Protective-Earth.

50/60 Hz.

This supplies the PSMs, the PMU boards and the fans in the mainframe.

Mains 2 100 V (phase-to-neutral voltage).

2 phases + neutral + Protective-Earth.

50/60 Hz.

This supplies instruments in the mainframe via the Test Equipment Outlets.

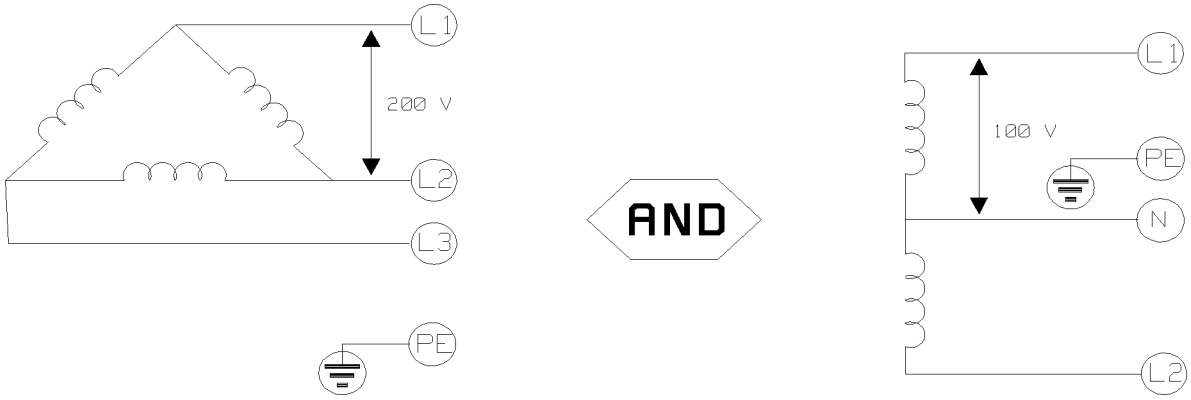

Figure 3-10. Mains for Option 0ED

Power Requirements

The following tables give the power requirements of the HP 82000 System. Use these tables to:

- ensure that the mains supply is suitable and fused correctly.
- choose the power cable(s) for the system.

Note

- Use delayed-action (slow-blow) fuses.
- Remember to take into account the power requirements of the controller and other peripherals.
- All measurements should be made at the input to the HP 82000 System.

Miniframe

Fully configured Miniframe or Extender **2000 VA** maximum.

Option	Voltage	Voltage Tolerance	No of Phases	Rated Current
110	110 V	-13% +6%	1	20 A
230	230 V	-13% +6%	1	10 A

Standardframe

Fully configured Standardframe (with DPS or HSWG) **6000 VA** maximum.

Option	Voltage	Voltage Tolerance	No of Phases	Rated Current
200	200 V	-13% +6%	2	30 A /phase
208	208 V	-13% +6%	3	20 A /phase
240	240 V	-13% +6%	2	25 A /phase
400	400 V	-13% +6%	3	15 A /phase
415	415 V	-13% +6%	3	14 A /phase

Maxiframe

Note

Generally, we recommend to use wire sizes according to the fuse rating of the mains breaker of the HP82000 Maxiframe. The fuse rating **for all power options** on the Maxiframe mains breaker is **40A**. The tables below give the maximum rated currents of a Single-Maxiframe system in two different configurations. This information is given to separate the real Maxiframe current flow from additionally possible current consumption by instruments connected to the internal power outlets. For partly filled Maxiframe card-cages there will be substantial current flow on the Neutral line, as every phase will supply one third of a card-cage!

Caution

Use delayed-action (slow-blow) fuses.

Table Table 3-1 gives the max. current ratings of a single Maxiframe with two card-cages. Max. current load on the internal power outlets is 20A per phases L1 and L2. (Internally fused).

Option 0E5 and Option 0EF only:
With maximum power outlet load on either phases L1 and/or L2,

- a Neutral current of 20A needs to be added to the Maxiframe Neutral current rate.
- a Phase current of 20A needs to be added to the Maxiframe Phase L1 and/or L2 current rate.

Phase L3 is **not** connected to the internal power outlets.

Table 3-1.

Option	Country	Configuration	Phase to Phase Voltage	Frequency	Rated Current
0E5	Europe	3 phase + neutral	400 **or** 415 V -13% +6%	50 Hz	11 A /phase 11 A
0EF	USA	3 phase + neutral	208 V -13% +6%	60 Hz	21 A /phase 21 A
0ED	Japan	3 phase and 2 phase + neutral	200 V -13% +6% 100 V -13% +6%	50/60 Hz 50/60 Hz	23 A /phase 20 A /phase 20 A

Table 3-2 gives the maximum current ratings of a single HP 82000 Maxiframe with 1 card-cage, 2 DPSs and instrumentation equipment in the upper cabinet.

Caution

Every 2 instruments installed and connected to the PCM may use up to 10 A. The total power consumed by instruments connected to the PCM must not exceed 3200 VA.

Up to 4 HSWGs plus one HP 54120A oscilloscope can be installed without additional cooling. For other instruments, additional cooling may be required.

Table 3-2.

Option	Country	Configuration	Phase to Phase Voltage	Frequency	Rated Current
0E5	Europe	3 phase + neutral	400 **or** 415 V -13% +6%	50 Hz	26 A /phase (L1 and L2 only) 26 A
0EF	USA	3 phase + neutral	208 V -13% +6%	60 Hz	31.5 A /phase (L1 and L2 only) 31.5 A
0ED	Japan	3 phase and 2 phase + neutral	200 V -13% +6% 100 V -13% +6%	50/60 Hz 50/60 Hz	11 A /phase 20 A /phase 20 A

Grounding and Protective Earth

All HP 82000 Systems are **Safety Class 1** instruments. This means that they have an exposed metal chassis which is connected to ground via the protective earth conductor in the mains power cable.

All mains power outlets for the HP 82000 System or system peripherals must have a protective-earth terminal.

The protective-earths for the system mainframe and all associated measurement instruments (Oscilloscopes, HSWGs, etc) must be connected together. There must be no flow of current between the individual protective-earths.

Warning

If the correct protective-earth connections described in the installation manual are not made, dangerous charges may be allowed to build up on the system cabinet. This shock-hazard could result in injury or death.

Power Line Conditioning

Frequency Limits	The line-frequency must be between **49** and **61 Hz** (measured at the input to the system) .
Voltage Transients	In the nanosecond range, spikes of up to **1500 V** are allowed. In the microsecond range, spikes of up to **500 V** are allowed.
Waveform Distortion	The Total Harmonic Distortion (THD) must be less than **5 %** of the peak-to-peak voltage.
Line Impedance	The line impedance must be less than **0.2 Ω** in series with **0.5 mH**

If possible, do not connect the HP 82000 System to the same power net as high-inductance equipment (for example, motors, compressors). This kind of equipment usually causes large transients on the power line, which may exceed the specification (Voltage Transients) given above.

If the power line does not meet the given requirements, connect the HP 82000 to a different (separately-wired, cleaner) power net, or, install power line treatment devices. Some of the most commonly used devices are:

- Isolation Transformer
- Line Regulator
- Line Conditioner
- Motor Generator
- Uninterruptable Power Source

Mains Power Cable

The mains power cable for each HP 82000 mainframe is **not** supplied with the system. This must be supplied by the customer.

Note

- **Each** HP 82000 mainframe requires a mains power connection. Thus, **each** Miniframe, Miniframe Extender, Standardframe and Maxiframe requires a mains power connection. This means, for example, that a double Maxiframe with power option OE5 or 0EF needs **two** mains power cables.
- **Two different** mains power cables (one 3-phase and one 2-phase) are required for **each Maxiframe** with **PCM power option 0ED (Japan).**

Warning

Mains power cables must be installed by a qualified electrician, and:

- **have a protective-earth conductor.**
- **must be able to handle the maximum current specified for the HP 82000 System.**
- **must meet local safety standards and regulations.**

The following table gives the maximum and minimum power cable diameters which can be held by the cable-clamp(s) on the HP 82000 system.

Allowed Power Cable Diameters			
System	Power Option	Cable Diameter	
		Minimum	Maximum
Miniframe[1]	all	13 mm (0.5 in)	25 mm (0.9 in)
Standardframe[1]	all	13 mm (0.5 in)	25 mm (0.9 in)
Maxiframe	0E5	13 mm (0.5 in)	18 mm (0.7 in)
Maxiframe	0EF	13 mm (0.5 in)	25 mm (0.9 in)
Maxiframe	0ED	13 mm (0.5 in)	18 mm (0.7 in)

1 Two different cable-clamps are supplied; 13-18 mm (0.5-0.7 in) and 18-25 mm (0.7-0.9 in).

Power for Peripherals

Provide enough power outlets for peripherals which will be located outside the system mainframe and which will not be supplied by the system PCM.

Use the information in this chapter to ensure that the environmental requirements of the HP 82000 System are met during installation and normal operation.

By ensuring that the system is not operated for extended periods above or near the allowed limits, the failure-rate of system components can be reduced.

Caution

Do not subject the system to sudden extremes in environmental conditions.

Temperature

Note

The following specifications are *Ambient Temperature* specifications. That is, they specify the temperature of the system environment and **NOT** the internal temperature of the system.

Operating Temperature	15°C to 35°C (59°F to 95°F)
Non-Operating Temperature[1]	-20°C to +70°C (-4°F to +158°F)
Maximum Variation	±10°C (±40°F)
Maximum Rate of Change	2°C/hr

1 Important for short-term storage and shipping of the system.

Note

If the *internal* temperature of the system changes by more than ±**5°C** (±**9°F**) since the system was last calibrated, the old calibration data will be invalid and the system must be recalibrated.

Cooling Requirements

Cooling equipment may be needed, to keep the operating-temperature of the HP 82000 System stable and within the specified temperature limits. The following table gives the estimated heat-dissipation of the different HP 82000 Systems.

System	Input Power	Heat Dissipation
Miniframe	1200 W Max	4092 Btu/hr[1]
Standardframe	3500 W Max	11935 Btu/hr
Maxiframe	7500 W Max	25575 Btu/hr

1 3410 Btu = 1 kWh

Note

When calculating cooling requirements, remember to include the heat dissipated by:

- Peripherals.
- Lighting.
- Personnel.

Relative Humidity (RH)

Operating Humidity must be less than **80% at +30°C.**

Note

If this level is exceeded, the system must be allowed to stand for 24 hours, at 25°C (77°F) and 50% RH before you can switch it on.

If the system is moved from a cold environment (for example, a loading-dock) to a warmer (and damper) environment, condensation could form on the system components. If this happens, the 24 hour recovery time will be necessary.

Airborne Contaminants

Good air-quality is important for the reliability of the HP 82000 System. Do not use HP 82000 Systems in areas with high levels of airborne contaminants. Airborne contaminants can be classified as:

Particulate Contaminants (hard particles) These consist of a mixture of smokes, mists, fumes, granular particles and miscellaneous organic and inorganic materials. The presence of these particles in the air can cause degradation of system performance, especially where disk-drives and low-impedance interfaces are concerned.

Particulate contaminants can be filtered from the air, and appropriate filters should be included with any air-conditioning equipment.
Consider installing *No Smoking* signs in the test-area, as tobacco smoke can cause contacts to become contaminated on (for example) the DUT board.

Corrosive Contaminants Corrosion is a form of material deterioration or destruction by chemical or electrochemical reaction. The presence of corrosive contaminants is very common in industrial environments and, if ignored, corrosion can eventually degrade system performance by its effects on high-impedance circuits and low-impedance interfaces. The effects of most corrosive contaminants are usually accelerated by high humidity or temperature.

Corrosives generally can not be filtered out of air by normal filtration methods, and the techniques that must be used are complicated and expensive. If the source of corrosive contaminants can not be removed, the system should be installed in an enclosed environment with a supply of clean air.

Viscid Contaminants These are oily or sticky airborne substances that can become deposited on electronic or mechanical parts. Besides contributing directly to the degradation of system performance, viscid contaminants collect and hold particulate contaminants, and make cleaning very difficult.

Viscid contaminants can be removed by filtration, but it is preferable to eliminate them at their source.

Note

Change the air-filters regularly on the HP 82000 System (Standardframe and Maxiframe only) and any associated air-conditioning equipment.

Altitude

Operating	Sea-Level to 3000 m (9842 ft)
Non-Operating[1]	Sea-Level to 12000 m (39370 ft)

1 Important for short-term storage and shipping the system.

Radiated Interference

The HP 82000 System is designed to withstand levels of **radiated interference** of up to **1.0 V/m**, over the frequency-range **10 kHz to 1 GHz.**

Note

The HP 82000 System exceeds the **VDE 0871 class B** limit for **radiated interference.** The amount by which it exceeds this limit depends on:

- Cabinet type (Miniframe, Standardframe, Maxiframe).
- I/O board type (D50, D100, D100X, D200, D400).
- Number of pins.

A single Standardframe filled completely with D200 I/O boards exceeds VDE 0871 class B by **20 dB.**

A single Maxiframe with two card-cages filled completely with D400 I/O boards, exceeds VDE 0871 class B by **24 dB.**

For sites planned in the Federal Republic of Germany, the customer must ensure that under operating conditions the radio interference limits are still met at the border of the premises. The local Hewlett-Packard Customer Service Centre will be able to provide advice to help ensure compliance with these requirements.

Conducted Interference

The HP 82000 System meets the **VDE 0871 Class B** limit for **conducted interference.**

Susceptibility to Electromagnetic Interference (EMI)

The system can withstand **EMI** of up to **1 Gauss (0.1 mTesla)**, over the frequency-range **47.5 to 198 Hz.** Measurement failures can be caused by very strong magnetic fields in the test area.

Note

To minimise the magnetic field effects of mains power lines, route the cables through metal conduit.

Electrostatic Discharge (ESD) Damage Prevention

Caution

Always wear an earthed ESD strap (supplied with the system) when working with the HP 82000 System.

- Electrostatic discharges of as little as **2 kV** can *disrupt* the operation of the HP 82000 system.
- Electrostatic discharges of greater than **7.5 kV** can *damage* components of the HP 82000 system.

Because the ICs being tested, and some of the HP 82000 System components, are susceptible to damage by electrostatic discharge, take precautions to reduce the build-up of electrostatic charge and to protect components against damage. Some such precautions are:

- Store devices in conductive-foam.
- Do not store devices in plastic trays.
- Remove and ban offending insulating-materials from the test-area. For example:
  - Plastic and foam cups.
  - Plastic containers and wrappers.
  - Rubber-soled shoes and man-made fabrics.
- Use anti-static grounded floor-mats, work-mats and wrist-straps. Provide enough of these for all personnel using the system.
- Ground the tips of soldering-irons.
- Discharge tools before using them on the system.
- We strongly discourage carpeting within **6 m** (**20 ft**) of the system. At least place anti-static mats between the system and the carpet.

Acoustic Noise Emission

Note

The following statement is required by German law, therefore it is given in English *and* German.

LpA < 70 dB: Typical operator position, normal operation. This value is a result of tests as per ISO 6081.

LpA < 70 dB: Am Arbeitsplatz, normaler Betrieb. Angabe ist das Ergebnis einer Typpruefung nach DIN 45635 Teil 19.