

# VAX 4000

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**digital**

**Site Preparation**

# **VAX 4000 Site Preparation**

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**Digital Equipment Corporation  
Maynard, Massachusetts**

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# Preface

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This manual is a guide to preparing a site for one of the VAX 4000 systems. It describes the physical, environmental, and power requirements of each VAX 4000 model and expander.

To ensure smooth installation and operation of a VAX 4000 system or expander, your site must meet the requirements found in this document *before* the arrival of your system shipment.

## Intended Audience

This manual is intended for Digital service personnel and for Digital customers who wish to install their VAX 4000 systems, and intend to perform self-maintenance.

**NOTE:** *Digital Equipment Corporation recommends that a Digital service representative install your system.*

If you are a customer preparing your site for one of the VAX 4000 systems, please be aware that Digital provides a site preparation service. If you decide you would like a Digital professional to prepare your site, contact your Digital service or sales representative.

## Systems, Enclosures, and Expanders

The systems, expanders and enclosures described in this document are listed in Table 1-1.

Go to Chapter 2 to find the specifications for the different systems and expanders.

# Manual Structure

This manual contains two chapters and one appendix. It is organized as follows:

- Chapter 1 contains general information about the physical, environmental, and power requirements for VAX 4000 systems and expanders.
- Chapter 2 contains specific information about each VAX 4000 system configuration. The following information is provided:
  1. System dimensions (including the shipping carton)
  2. Acceptable temperature and humidity ranges (for both operating and nonoperating)
  3. Electrical requirements
  4. Noise levels
- The appendix lists the power cable order numbers for the different VAX 4000 systems and expanders.

Use this manual to prepare your site for the VAX 4000 system ordered. Refer to Chapter 1 for general environmental requirements. Then refer to Chapter 2 for the specific requirements for your VAX 4000 system.

## Conventions

The following conventions are used in this manual:

<b>Convention</b>	<b>Meaning</b>
<b>NOTE</b>	Provides general information about the current topic.
<b>CAUTION</b>	Provides information to prevent damage to equipment or software.
<b>WARNING</b>	Provides information to prevent personal injury.

The following symbols appear on the system power supply. Please review their definitions below:



This warning symbol indicates risk of electric shock.



**Warning.** To reduce the risk of injury, do not remove modules, Integrated Storage Elements (ISEs), or the power supply. No user-serviceable parts are inside. Refer servicing questions to your Digital Customer Services representative or to your qualified self-maintenance personnel.

This equipment has not been designed for connection to a power system (a power system without a directly grounded neutral conductor).

This equipment should be plugged into a properly grounded receptacle only.

This system contains an automatic voltage select power supply. Voltage selection is not required prior to installation.



# Chapter 1

## Physical Requirements

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Table 1–1 lists the enclosures in which the systems and expanders covered in this document are shipped. For simplicity, enclosure designations will frequently be used throughout the document rather than the system or expander name.

**Table 1–1: Enclosure Designations**

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<b>System or Expander</b>	<b>Enclosure</b>
VAX 4000 Model 200 System (BA430)	BA430
VAX 4000 Model 200 System (BA215)	BA215
VAX 4000 Model 300 System	BA440
B400X Expander	BA430
R400X Expander	R400X
B213F Expander	BA213
R215F Expander	BA215

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The physical requirements for VAX 4000 systems are determined by system dimensions (both before and after the shipping carton has been removed), space for cabinet doors to swing open, and space for peripheral computer equipment such as printers and terminals, and allowances for adequate airflow around the system and the noise emission level of the system.

### 1.1 When Your Shipment Arrives

When the system arrives, you should inspect it with a Digital service representative to ensure that the system and all ordered options have arrived undamaged.

When you are ready to begin installation, find the Customer Hardware Information Kit and begin using the *Installation* manual to install your VAX 4000 system. Also see the *Installation Checklist*.

## 1.2 Space Requirements

When planning cable routing for multiple-terminal equipment, you should consider factors such as safety, convenience, future expansion, and cost. The system installer has other special factors to consider when cabling a multiple-terminal system on more than one floor in the same building, or in more than one building. Digital offers several cable types for these applications, and Digital service personnel are available to help you plan your installation. Your sales representative can provide more information.

Before unpacking any equipment, make sure you have enough space to remove the system from its shipping container. Also make sure you leave enough space around the system so it can be serviced. The dimensions of containers and enclosures are illustrated in Chapter 2.

You must leave at least 1 m (39 in) of clearance at the front of the system for opening and removing the door and to access system controls. You must also leave at least 5 cm (2 in) of clearance at the sides and rear for airflow. Since the base of the enclosure is 5 cm (2 in) wider than the cabinet in front and rear, you can place the rear of the system against a wall or table, and the system will have enough room for adequate airflow.

### Space for Additional Equipment and Cabling

In addition to the space required for the VAX 4000 systems and/or expander(s), you should ensure that you have enough space for terminals, printers, mass storage media, printer paper, and other necessary supplies.

If you plan to connect your system to peripheral devices such as printers, terminals, or modems, you will need additional cabling. Cables that connect the system to peripheral devices must be ordered separately.

**NOTE:** *Cabling from peripheral devices should already be in place and labeled before the system is installed.*

## 1.3 Operating Environment

Computer systems are affected by (or vulnerable to) the discharge of static electricity, temperature changes, and humidity. These conditions can affect the operation and overall dependability of the computer system.

Your system should be installed in a well-ventilated area where the temperature and humidity ranges listed in Chapter 2 for your system are maintained throughout the year. Rapid temperature changes may affect system performance. Therefore, do not operate systems near heating or cooling devices, large windows, or doors that open to the outside. Air should contain a minimum of dust and other abrasive contaminants.

Mass storage media and other computer supplies, including paper, should be kept at the same temperature and humidity as that of the computer area.

### **1.3.1 Static Electricity**

Static electricity is a common problem for computer systems. It can cause system failure and loss of data. The most common source of static buildup is contact between people and carpeting or clothing. Low humidity allows the greatest buildup of static charges.

To minimize static buildup, follow these guidelines:

- Maintain relative humidity of at least 40 percent.
- Locate your system away from busy office corridors.
- Avoid using carpeting in the computer area. If you install carpeting, use antistatic carpeting, if possible. If carpeting is already installed, place a grounded, antistatic mat under the system.
- Maintain the antistatic properties of antistatic floors, carpeting, or mats by following the manufacturer's recommendations for cleaning.

### **1.3.2 Temperature and Humidity Ranges**

To function properly, each system and expander must operate in an environment with acceptable temperature and humidity ranges. To determine the appropriate temperature and humidity ranges for your system, refer to Chapter 2 and the specifications for your particular system.

When calculating the operating temperature in your computer environment, consider the heat that the system, peripherals, and other equipment generate. See Chapter 2 for the amount of heat dissipated by each system and expander.

### **1.3.3 Electrical Requirements**

In determining the electrical requirements of a VAX 4000 system and expander, consider the following:

- What country the system is located in
- Voltage range
- Power-source phase
- Nominal frequency
- Frequency range

- Steady-state current
- Power consumption

When you are ready to use the above information, turn to Chapter 2 and find the electrical requirements for your system.

The power source should be able to handle the original system and allow for system expansion. Digital recommends a dedicated circuit from the power source for each VAX 4000 system enclosure and a separate dedicated power circuit for each expander. A dedicated, isolated ground circuit provides electrical isolation from possible power surges or electrical noise caused by other electrical equipment. You should not connect any other equipment such as air conditioners, office copiers, or coffee pots to the same circuit as your VAX 4000 system or expander.

If you cannot avoid power disturbances, your system will need additional power-conditioning equipment. For more information, contact your Digital sales representative. To operate a VAX 4000 system configuration at 240 Vac, obtain the power cable for use in your country. The appendix lists the power cables used to operate each system at 240 Vac. A power cable must also be ordered separately to enable the operation of your VAX 4000 system configuration. All orders must have selected the proper power cable to accompany your VAX 4000 system.

Each VAX 4000 Model 200 and VAX 4000 Model 300 system shipped within North America includes a 120-Vac power cable.

If your system will be shipped outside North America, or if you require a 240-Vac cable, you must order power cable(s) separately. See Appendix A for a list of the countries and their associated power cables.

### **1.3.4 Acoustics**

Computer systems generate noise. Higher than acceptable noise levels can adversely affect a work environment. Digital recommends placing the VAX 4000 systems and the B400X, R400X, B213F, and R215F expanders in an open office environment.

## Chapter 2

# Site Preparation Specifications

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This chapter lists the acceptable temperature and humidity ranges, electrical requirements, and acoustic levels to consider in preparing the site for your VAX 4000 system.

### 2.1 Dimensions

VAX 4000 systems and B400X, R400X, B213F, and the R215F expanders are shown in this section with their shipping container dimensions and system dimensions.

**CAUTION:** *Use at least two people to handle the system and/or expander, plus terminal boxes.*

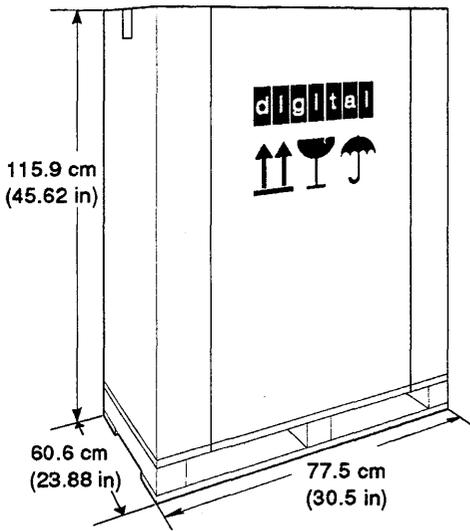
Figure 2-1 shows the dimensions of the container used to ship the VAX 4000 (BA430 or BA440) systems and the R400X, B400X expanders.

Figure 2-2 shows the system dimensions for the VAX 4000 systems and expanders that use the BA430/BA440 enclosure.

Figure 2-3 shows the dimensions of the container used to ship the VAX 4000 Model 200 (BA215) system and the R215F expander, as well as the dimensions of the VAX 4000 Model 200 (BA215) system and the R215F expander.

Figure 2-4 shows the dimensions of the B213F expander and shipping container.

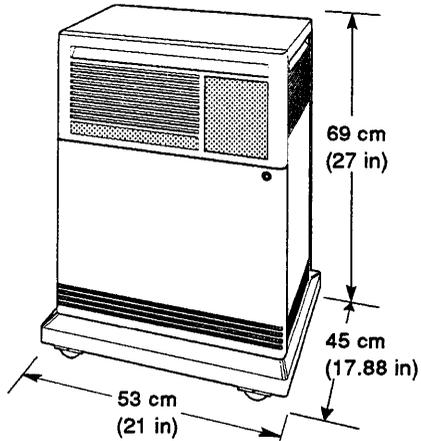
**Figure 2-1: BA430/BA440 Enclosure and the B400X or R400X Expander Shipping Container Dimensions**



**WEIGHT: 63.5 kg to 85.3 kg**  
**(140 lb to 188 lb)**

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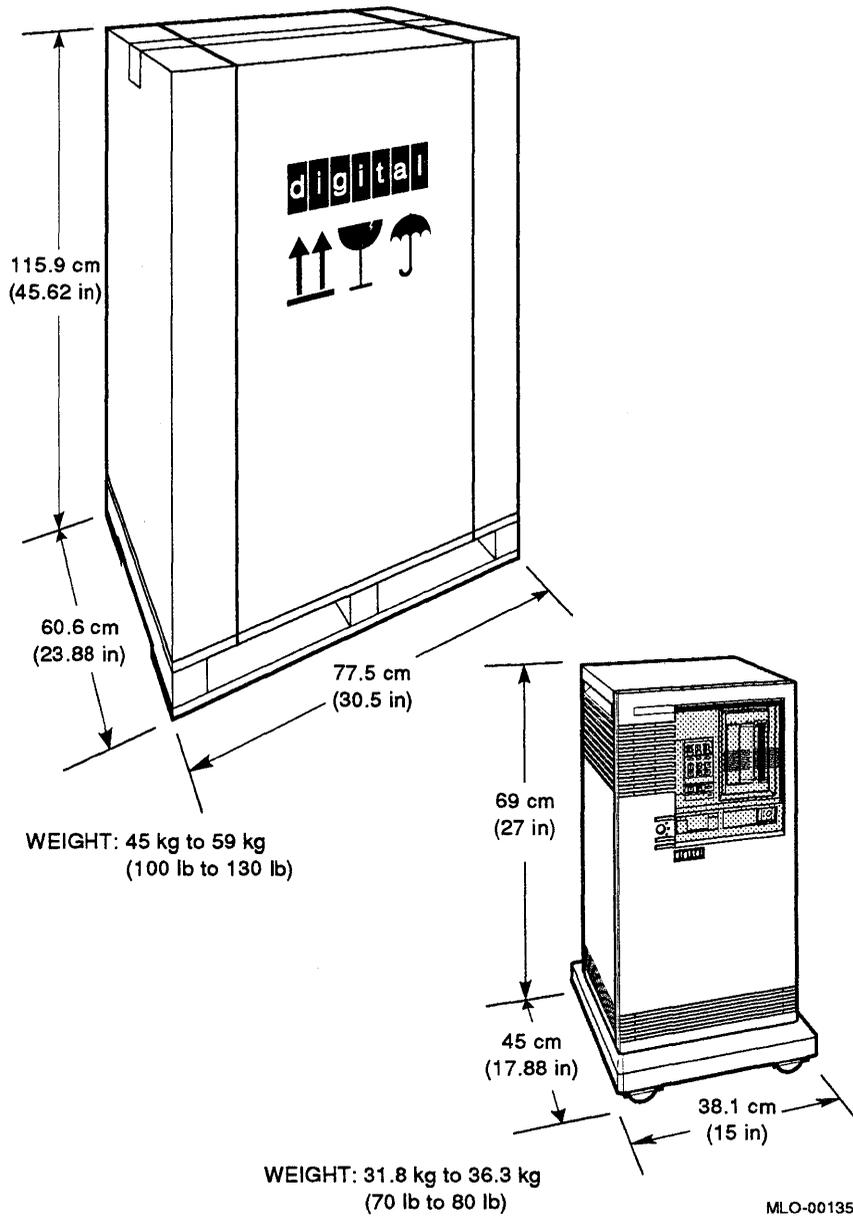
**Figure 2-2: BA430/BA440 Enclosure and the B400X or R400X Expander Dimensions**



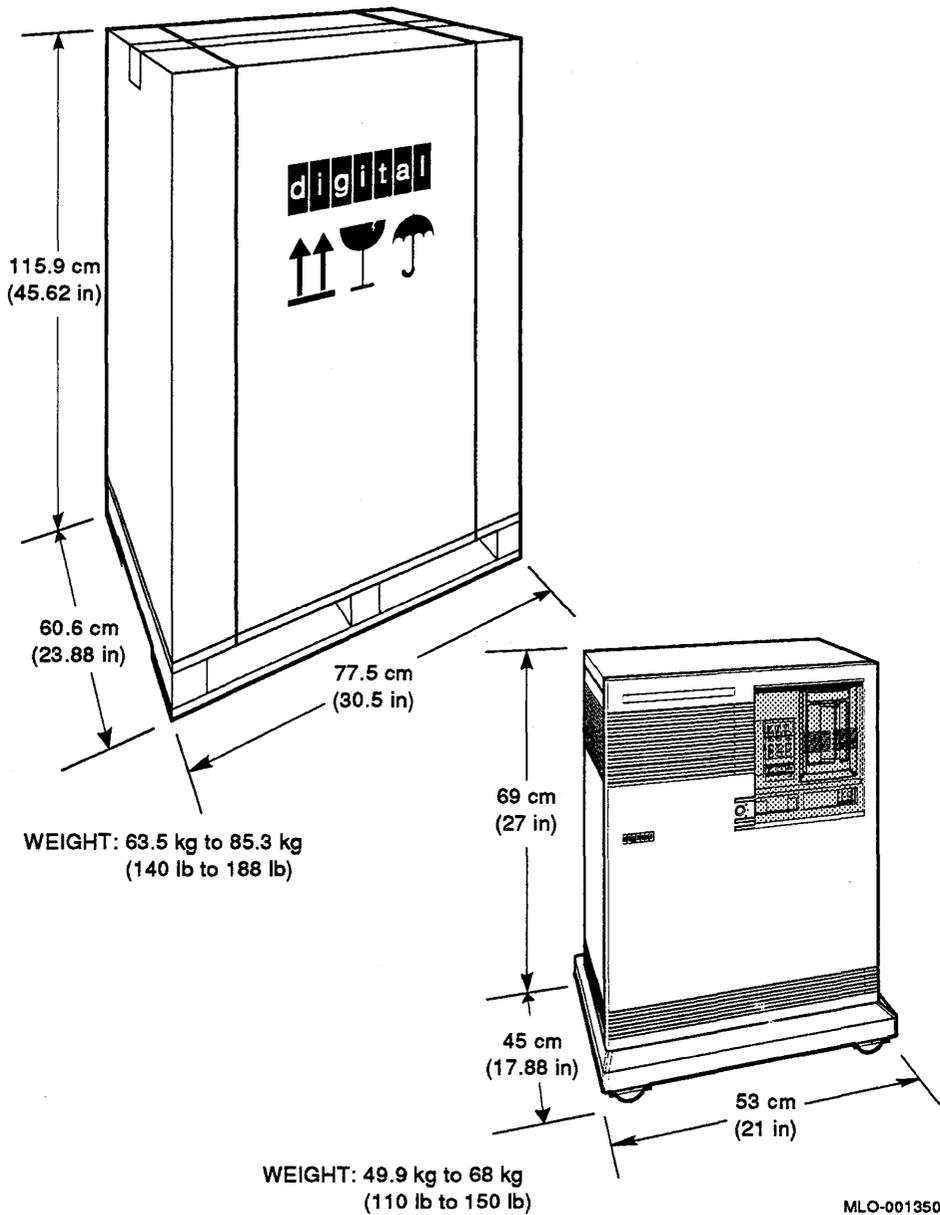
**WEIGHT: 49.9 kg to 68 kg  
(110 lb to 150 lb)**

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**Figure 2-3: BA215 Enclosure and Shipping Container Dimensions**



**Figure 2-4: B213F Expander and Shipping Container Dimensions**



## 2.2 Heat, Humidity, Electrical Requirements, and Acoustics

VAX 4000 systems and expanders operate within or at the values for temperature and humidity, power requirements, and noise levels listed in Table 2-1 through Table 2-3.

**Table 2-1: BA430/BA440 Enclosure and R400X Expander Specifications**

<b>Heat Dissipation, Temperature, and Humidity Ranges</b>		
<b>Condition</b>		<b>Measure</b>
Heat dissipation		2978 BTU/h
Temperature	Operating:	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 20°F per hour maximum
Relative humidity	Operating:	20% to 80% noncondensing
	Nonoperating:	10% to 90%
Maximum altitude	Operating:	2434 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

**NOTE:** For operation above sea level, decrease the operating temperature range values by 1.8°C per 1000 m (or 1°F per 1000 ft).

**Table 2-1 (Cont.): BA430/BA440 Enclosure and R400X Expander Specifications**

**Operating Acoustic Emission Levels**

<b>LNPE (B)</b>	<b>LPA (dB)</b>
5.8	43
Recommended placement	Office environment

LNPE = Noise power emission level (A-weighted sound power level) measured in bels reference 1 pico-watt

LPA = Sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor.

Levels may be lower than those shown, depending on the kind and number of mass storage devices in the system.

All data measured in accordance with ANSI S12.10-1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).

**Electrical Requirements**

<b>Nominal AC Voltage ⇒</b>	<b>100 to 120 Vac</b>	<b>220 to 240 Vac</b>
Voltage range	90 to 128 Vac	176 to 264 Vac
Power-source phase	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz	47 to 63 Hz
Maximum steady-state current at nominal voltage	8.6 A	4.91 A
Maximum steady-state current at minimum voltage	11.91 A	6.82 A
Maximum inrush current	100 A	83 A
Maximum power consumption with 0.65 power factor	1030 W	1030 W

## Table 2-2: BA215 Enclosure Specifications

### Heat Dissipation, Temperature, and Humidity Ranges

Condition		Measure
Heat dissipation		1178 BTU/h
Temperature	Operating:	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 90%
Maximum altitude	Operating:	2438 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

**NOTE:** For operation above sea level, decrease the operating temperature range values by 1.8°C per 1000 m (or 1°F per 1000 ft).

### Operating Acoustic Emission Levels

LNPE (B)	LPA (dB)
----------	----------

6.1

48

Recommended placement

Office environment

LNPE = Noise power emission level (A-weighted sound power level) measured in bels reference 1 pico-watt

LPA = Sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor.

Levels may be lower than those shown, depending on the kind and number of mass storage devices in the system.

All data measured in accordance with ANSI S12.10-1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).

**Table 2-2 (Cont.): BA215 Enclosure Specifications****Electrical Requirements**

<b>Nominal AC Voltage ⇒</b>	<b>101 Vac</b>	<b>120 Vac</b>	<b>220-240 Vac</b>
Voltage range	88 to 110 Vac	93 to 132 Vac	176 to 264 Vac
Power-source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Maximum steady-state current at nominal voltage	5.2 A	4.4 A	2.4 A
Maximum steady-state current at minimum voltage	8.3A	7.2 A	3.9 A
Maximum inrush current	50 A	50 A	50 A
Startup current (30 seconds) at nominal voltage	7.1 A	5.9 A	3.1 A
Maximum power consumption with 0.65 power factor	340 W	340 W	340 W

## Table 2-3: BA213 Enclosure Specifications

### Heat Dissipation, Temperature, and Humidity Ranges

Condition		Measure
Heat dissipation		2304 BTU/h
Temperature	Operating:	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 20°F per hour maximum
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 90%
Maximum altitude	Operating:	2438 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

NOTE: For operation above sea level, decrease the operating temperature range values by 1.8°C per 1000 m (or 1°F per 1000 ft).

### Operating Acoustic Emission Levels

LNPE (B)	LPA (dB)
5.8	43

LNPE = Noise power emission level (A-weighted sound power level) measured in bels reference 1 pico-watt

LPA = Sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor.

Levels may be lower than those shown, depending on the kind and number of mass storage devices in the system.

All data measured in accordance with ANSI S12.10-1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).

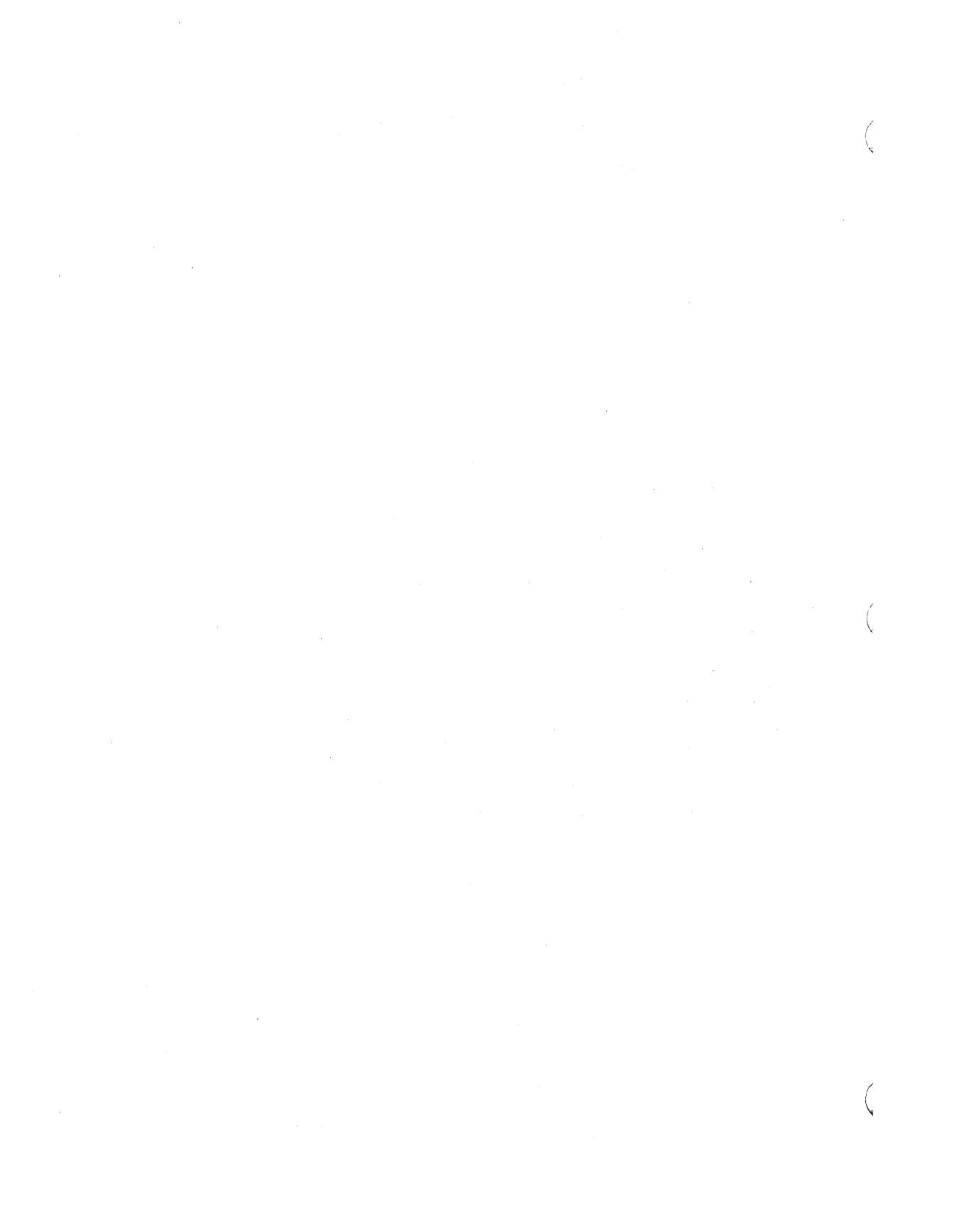
**Table 2–3 (Cont.): BA213 Enclosure Specifications****Electrical Requirements**

<b>Nominal AC Voltage ⇒</b>	<b>101 Vac</b>	<b>120 Vac</b>	<b>220–240 Vac</b>
Voltage range	90 to 110 Vac	104 to 128 Vac	190 to 256 Vac
Power-source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	49 to 61 Hz	49 to 61 Hz	49 to 61 Hz
Maximum steady-state current at nominal voltage	10.2 A	8.6 A	4.7 A
Maximum steady-state current at minimum voltage	11.4 A	9.9 A	5.4 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption with 0.65 power factor	1030 W	1030 W	1030 W

## 2.3 Additional Expander Requirements

The installation of an expander on a VAX 4000 system has the following special requirements.

- All B400X, R400X, B213F, and R215F expanders require dedicated wall outlets for each expander.
- The B400X, R400X, B213F, and R215F expanders must be installed by Digital Customer Services when the system or expander is not part of a factory-configured system.
- When installing a B213F or an R215F expander on a VAX 4000 system, an H4010-AA expander cable kit is required.
- See Appendix A for the required power cables.



## Appendix A

# Power Cable Order Numbers

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Refer to the tables in this appendix and locate the service that is appropriate for your system and your country. Order the power cable listed for your country. For more information on 240-Vac operation, check with your Digital sales representative.

**Table A-1: Power Cables for BA430 and BA440 Enclosure Systems and the B400X and R400X Expanders**

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Part Number	Country
BN20A-2E	United States, Japan, Canada (120 Vac)
BN20B-2E	United States, Japan, Canada (240 Vac)
BN22C-2E	Australia, New Zealand (240 Vac)
BN22D-2E	Central Europe (240 Vac)
BN22E-2E	United Kingdom, Ireland (240 Vac)
BN22F-2E	Switzerland (220 Vac)
BN22H-2E	Denmark (220 Vac)
BN22J-2E	Italy (240 Vac)
BN22K-2E	India (240 Vac)
BN22L-2E	Israel (240 Vac)

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**NOTE:** A 120-Vac power cable (BN20A-2E) is shipped with each 120-Vac system enclosure.

**Table A-2: Power Cables for BA215 Enclosure Systems and the R215F Expander**

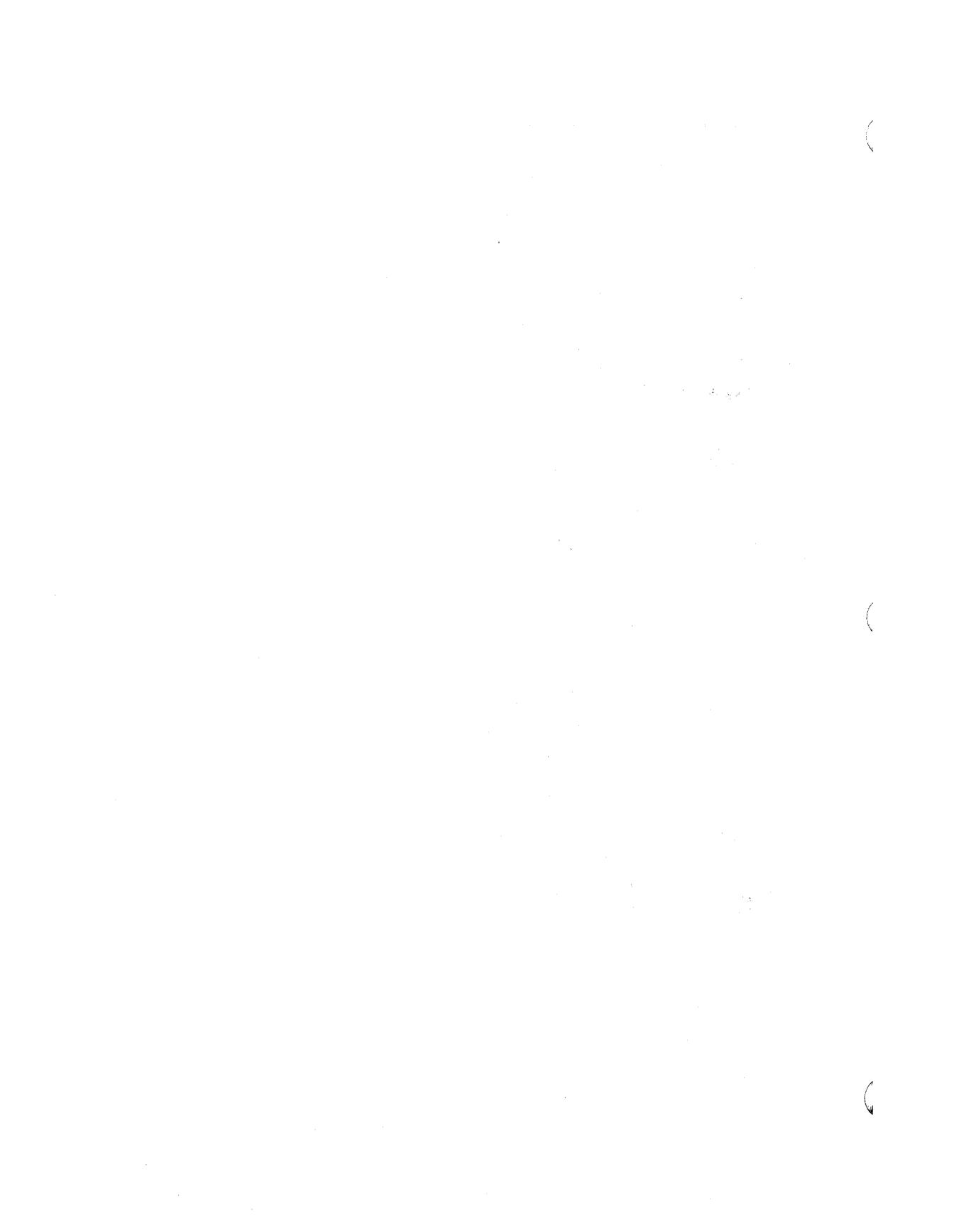
<b>Part Number</b>	<b>Country</b>
BN20M-2E	United States (120 Vac)
BN20N-2E	United States, Japan, Canada (240 Vac)
BN19J-2E	Australia, New Zealand (230/240 Vac)
BN03B-2E	Central Europe (240 Vac)
BN19B-2E	United Kingdom, Ireland (240 Vac)
BN19F-2E	Switzerland (220 Vac)
BN19L-2E	Denmark (220 Vac)
BN19T-2E	India (240 Vac)
BN19Y-2E	Israel (240 Vac)
BN19N-2E	Italy (240 Vac)

**NOTE:** A 120-Vac power cable (BN20M-2E) is shipped with each 120-Vac system enclosure.

**Table A-3: Power Cables for the B213F Expander**

<b>Part Number</b>	<b>Country</b>
BN20A-2E	United States, (included with each 120-Vac system enclosure.)
BN20B-2E	United States, Japan, Canada (240 Vac)
BN20C-2E	Australia, New Zealand (240 Vac)
BN20D-2E	Central Europe (240 Vac)
BN20E-2E	United Kingdom, Ireland (240 Vac)
BN20F-2E	Switzerland (240 Vac)
BN20H-2E	Denmark (240 Vac)
BN20J-2E	Italy (240 Vac)
BN20K-2E	India (240 Vac)
BN20L-2E	Israel (240 Vac)

**NOTE:** *A 120-Vac power cable (BN20A-2E) is shipped with each (120-Vac) system enclosure.*



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---

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VAX 4000 Site Preparation

EK-387AB-SP-002

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