

RS/6000 and @server pSeries



# Site and Hardware Planning Information



RS/6000 and @server pSeries



# Site and Hardware Planning Information

**Twenty-Second Edition (February 2004)**

Before using this information and the product it supports, read the information in “Notices,” on page 387.

A reader's comment form is provided at the back of this publication. If the form has been removed, address comments to Information Development, Department H6DS-905-6C006, 11501 Burnet Road, Austin, Texas 78758-3493. To send comments electronically, use this commercial internet address: [aix6kpub@austin.ibm.com](mailto:aix6kpub@austin.ibm.com). Any information that you supply may be used without incurring any obligation to you.

**©International Business Machines Corporation 1995, 2004. All rights reserved.**

Note to U.S. Government Users - Documentation related to restricted rights - Use, duplication, or disclosure is subject to the restrictions set forth in the GSA ADP Schedule Contract with IBM Corp.

---

# Contents

<b>About This Book</b> . . . . .	xi
ISO 9000 . . . . .	xi
Highlighting . . . . .	xi
Online Publications . . . . .	xi
References to AIX Operating System . . . . .	xi
Related Publications. . . . .	xi
Trademarks . . . . .	xiii
<b>Data Integrity and Verification</b> . . . . .	xv
<b>Chapter 1. Site Planning and Preparation Overview</b> . . . . .	1
Planning Task Checklist . . . . .	2
CSU/SSR Feature Installation . . . . .	3
General Considerations. . . . .	6
Footprint Example. . . . .	7
<b>Chapter 2. Physical Characteristics of Systems</b> . . . . .	9
7006 Graphics Workstation Models 41T, 41W, 42T, and 42W . . . . .	9
7007 POWERportable N40 . . . . .	10
7008 POWERstations M20 and M2A . . . . .	11
7009 Compact Server C10 and C20 . . . . .	12
7010 Xstation 130 . . . . .	13
7010 Xstation 140 and 150 . . . . .	14
7010 Xstation Model 160. . . . .	15
7011 POWERstation and POWERserver 220, and 230. . . . .	16
7011 POWERstation and POWERserver 250 . . . . .	17
7012 POWERstation and POWERserver 34H, 355, 360, 365, 370, and 375 . . . . .	18
7012 POWERserver Models 380, 390, and 39H . . . . .	19
7012 Model 397 . . . . .	20
7012 Models G30, G40, and G02 . . . . .	21
7013 POWERstation and POWERserver 52H . . . . .	22
7013 POWERstation and POWERserver 550L. . . . .	23
7013 POWERstation and POWERserver 570 and 580 . . . . .	24
7013 Models 58H, 590, 59H, 591, and 595 . . . . .	25
7013 Models J30, J40, and J01 . . . . .	26
7013 Model J50 . . . . .	27
7014 Model S00 Rack. . . . .	28
S00 Rack Weight Distribution and Floor Loading . . . . .	29
S00 Rack Service Clearances . . . . .	30
7014 Rack . . . . .	31
Model T00 Rack . . . . .	31
Model T42 Rack . . . . .	32
Service Clearances for S80 or S85 System With T00 Style I/O Rack . . . . .	36
7015 POWERserver 970B and 980B . . . . .	37
7015 POWERserver 990. . . . .	38
7015 SCSI Disk and Device Drawers . . . . .	39
1/2-Inch 9-Track Tape Drive Drawer. . . . .	40
7015 System Rack R00 . . . . .	41
R00 Rack Service Clearances. . . . .	42
7015 Models R10, R20, and R21 CPU Drawers . . . . .	43
7015 Model R24 . . . . .	44
7015 Model R30, R40, and R50 . . . . .	45
Enterprise Server Models S70 and S7A (7017, 7013, 7015) . . . . .	46

System Rack . . . . .	46
Enterprise Server Model S80 (7017) . . . . .	47
System Rack . . . . .	47
S80 Rack Caster Location . . . . .	48
7017 Model S85 . . . . .	49
S85 Rack Caster Location . . . . .	51
S70 SCSI I/O Drawer 7 EIA . . . . .	52
S7A, S80, and S85 SCSI I/O Drawer 10 EIA . . . . .	53
S70, S7A and S80 I/O Rack . . . . .	54
Service Clearances for System in an S70, S7A, or S80 I/O Rack . . . . .	54
7020 Entry Workstation Model 40P . . . . .	57
7024 Entry Deskside PowerPC Server E Series . . . . .	58
7025 Deskside 6F0 Series . . . . .	59
7025 Deskside 6F1 Series . . . . .	61
7025 Deskside F30 Series . . . . .	63
7025 Deskside F40 Series . . . . .	64
7025 Deskside F50 Series . . . . .	65
7025 Deskside F80 Series . . . . .	66
7026 Model 6H0 CEC Drawer . . . . .	67
7026 Model 6H1 CEC Drawer . . . . .	69
7026 Model 6M1 CEC Drawer . . . . .	70
7026 Model B80 . . . . .	72
7026 Model H10 Drawer . . . . .	74
7026 Model H50 (Enterprise Server) . . . . .	75
7026 Model H70 (Enterprise Server) . . . . .	76
7026 Model H80 CEC Drawer . . . . .	77
7026 Model M80 CEC Drawer . . . . .	78
I/O Drawer 5 EIA . . . . .	79
7027 High-Capacity Storage Drawer . . . . .	80
7028 Models 6C1 and 6E1 . . . . .	81
7028 Models 6C4 and 6E4 . . . . .	82
7029 Models 6C3 and 6E3 . . . . .	83
7030 POWERstations 3AT, 3BT, and 3CT . . . . .	85
7038 Model 6M2 (@server pSeries 650). . . . .	86
7039 @server pSeries 655. . . . .	87
@server pSeries 655 Doors and Covers. . . . .	87
Moving the System to the Installation Site . . . . .	87
Power and Electrical Requirements . . . . .	88
@server pSeries 655 Physical Specifications and Loads . . . . .	95
Weight Distribution . . . . .	98
Total System Power Consumption . . . . .	100
Unit Emergency Power Off . . . . .	102
Computer Room Emergency Power Off (EPO) . . . . .	103
Machine-Holdup Times . . . . .	103
Guide for Raised-Floor Preparation . . . . .	104
Considerations for Multiple System Installations . . . . .	115
Service Clearance . . . . .	117
Cooling Requirements . . . . .	118
HMC Connections to the @server pSeries 655 . . . . .	121
7040 @server pSeries 670 . . . . .	126
@server pSeries 670 Doors and Covers . . . . .	126
Moving the System to the Installation Site . . . . .	127
Power and Electrical Requirements . . . . .	127
@server pSeries 670 Physical Specifications and Loads . . . . .	135
Weight Distribution . . . . .	136
Total System Power Consumption . . . . .	140

Unit Emergency Power Off . . . . .	141
Computer Room Emergency Power Off (EPO) . . . . .	142
Battery Holdup Times . . . . .	142
Guide for Raised-Floor Preparation . . . . .	144
Considerations for Multiple System Installations . . . . .	155
Service Clearance. . . . .	157
Cooling Requirements . . . . .	159
7040 @server pSeries 690 . . . . .	162
@server pSeries 690 Doors and Covers . . . . .	162
Moving the System to the Installation Site . . . . .	163
Power and Electrical Requirements . . . . .	163
@server pSeries 690 Physical Specifications and Loads . . . . .	171
Weight Distribution . . . . .	173
Total System Power Consumption . . . . .	177
Unit Emergency Power Off . . . . .	180
Computer Room Emergency Power Off (EPO) . . . . .	181
Battery Holdup Times . . . . .	181
Guide for Raised-Floor Preparation . . . . .	183
Considerations for Multiple System Installations . . . . .	193
Service Clearance. . . . .	195
Cooling Requirements . . . . .	197
7043 43P Series Model 140 . . . . .	201
7043 43P Series Model 150 . . . . .	202
7043 43P Series Model 240 . . . . .	204
7043 43P Series Model 260 . . . . .	205
7044 44P Series Model 170 . . . . .	206
7044 44P Series Model 270 . . . . .	207
7046 Model B50 . . . . .	208
7248 Model 43P . . . . .	209
7311 Model D10 . . . . .	210
7311 Model D20 . . . . .	211
7317 Model D10 . . . . .	212
7317 Model F3L . . . . .	213
9112 Model 265 . . . . .	214
9114 Model 275 . . . . .	215
<b>Chapter 3. Physical Characteristics of Hardware Management Consoles (HMC) . . . . .</b>	<b>217</b>
6578-D5U Hardware Management Console (HMC). . . . .	218
7315-C01 Hardware Management Console (HMC). . . . .	219
7315-C02 Hardware Management Console (HMC). . . . .	220
7315-CR2 Hardware Management Console (HMC). . . . .	221
<b>Chapter 4. Physical Characteristics of Displays . . . . .</b>	<b>223</b>
POWERdisplay 17 and POWERdisplay 20. . . . .	223
6091 Color Display Model 19i . . . . .	224
9516 TFT LCD Color Display. . . . .	225
P50 15" Display, P70 17" Display, P200 and P201 20" Displays . . . . .	226
P72 17" Display, P92 19" Display, and P202 21" Display . . . . .	227
P76 17" Display, and P260 21" Display . . . . .	228
3153 Display Station . . . . .	229
<b>Chapter 5. Physical Characteristics of the 2100 Series . . . . .</b>	<b>231</b>
2101, 2102, and 2103 Fibre Channel RAID Storage Subsystem . . . . .	231
2101 Model 100 Seascape Solution Rack . . . . .	231
2102 Model F10 Fibre Channel RAID Storage Server. . . . .	233
2102 Model D00 Expandable Storage Unit. . . . .	234

2103 Model H07 Fibre Channel Storage Hub . . . . .	235
2104 Model DL1 Expandable Storage Plus . . . . .	236
2104 Model DU3 Expandable Storage Plus . . . . .	237
2104 Model TL1 Expandable Storage Plus . . . . .	238
2104 Model TU3 Expandable Storage Plus . . . . .	239
2105 Model B09 Versatile Storage Server . . . . .	240
2105 Models E10, F10, E20, F20, and 800 Enterprise Storage Servers . . . . .	241
2105 Enterprise Storage Server Clearances and Floor Loading . . . . .	242
2108 Model G07 Storage Area Network Data Gateway . . . . .	243
2109 SAN Fiber Channel Switch . . . . .	244
Model S08 . . . . .	244
Model S16 . . . . .	244
<b>Chapter 6. Physical Characteristics of the 3000 Series . . . . .</b>	<b>245</b>
3490E Enhanced Magnetic Tape Subsystem C11 and C22 . . . . .	245
3490E Enhanced Magnetic Tape Subsystem E01 and E11 . . . . .	246
3514 Models 212 and 213 . . . . .	247
3570 Models B00 and C00 . . . . .	248
3570 Models B01 and C01 . . . . .	249
3570 Model B02 and C02 . . . . .	250
3570 Models B11 and C11 . . . . .	251
3570 Models B12 and C12 . . . . .	252
Magstar MP 3575 Tape Library Dataserver Model L06 . . . . .	253
Magstar MP 3575 Tape Library Dataserver Model L12 . . . . .	254
Magstar MP 3575 Tape Library Dataserver Model L18 . . . . .	255
Magstar MP 3575 Tape Library Dataserver Model L24 . . . . .	256
Magstar MP 3575 Tape Library Dataserver Model L32 . . . . .	257
3590 Magstar Tape System . . . . .	258
3590 Magstar Tape System Models B11 and B1A . . . . .	258
3590 Magstar Tape System Model C12 Frame . . . . .	258
3590 Magstar Tape System Models E11 and E1A . . . . .	259
3995 Model 063 . . . . .	260
3995 Model 163 . . . . .	261
3995 Model A63 . . . . .	262
3995 Model C60 . . . . .	263
3995 Model C62 . . . . .	264
3995 Model C64 . . . . .	265
3995 Model C66 . . . . .	266
3995 Model C68 . . . . .	267
<b>Chapter 7. Physical Characteristics of the 7100 Series . . . . .</b>	<b>269</b>
7131 Model 105 SCSI Multi-Storage Tower . . . . .	269
7131 Model 405 SSA Multi-Storage Tower . . . . .	270
7133 Models 010 and 020 Rack-Mounted SSA Subsystem . . . . .	271
7133 Model D40 Rack-Mounted SSA Subsystem . . . . .	272
7133 Model T40 Deskside SSA Subsystem . . . . .	273
7133 Models 500 and 600 Deskside SSA Subsystem . . . . .	274
7134 Model 010 High-Density SCSI Disk Subsystem . . . . .	275
7135 RAIDiant Array . . . . .	276
7135 RAIDiant Array Deskside Mini-Rack . . . . .	277
7137 Disk Array Subsystem Models 412, 413, 414, and 415 . . . . .	278
7137 Disk Array Subsystem Models 512, 513, 514, and 515 . . . . .	279
<b>Chapter 8. Physical Characteristics of the 7200 Series . . . . .</b>	<b>281</b>
7202 Model 900 Expansion Rack . . . . .	281
7202 Model 900 Service Clearances . . . . .	282



7203 Model 001 External Portable Disk Drive . . . . .	283
7204 Model 010 1GB External Disk Drive . . . . .	284
7204 Models 112, 113, 114, 317, and 325 External Disk Drives . . . . .	285
7204 Models 118 and 418 18.0GB External Disk Drives . . . . .	286
7204 Models 139, and 339 9.1GB External Disk Drives . . . . .	287
7204 Models 215 and 315 External Disk Drives . . . . .	288
7204 Models 402 and 404 External Disk Drives . . . . .	289
7204 Models 409 and 419 External Disk Drives . . . . .	290
7204 Models 518 and 536 External Disk Drives . . . . .	291
7205 Model 311 External DLT Tape Drive . . . . .	292
7205 Model 440 External DLT Tape Drive . . . . .	293
7206 Model 005 External 4-mm Tape Drive . . . . .	294
7206 Model 110 External 4-mm DDS-3 Tape Drive . . . . .	295
7206 Model 220 External 4-mm DDS-4 Tape Drive . . . . .	296
7206 Model VX2 External Tape Drive . . . . .	297
7207 Model 012 1.2GB External 1/4-Inch Cartridge Tape Drive . . . . .	298
7207 Model 122 4GB External SIRS 1/4-Inch Cartridge Tape Drive . . . . .	299
7207 Model 315 13GB External 1/4-Inch Cartridge Tape Drive . . . . .	300
7208 Model 001 2.3GB External 8-mm Tape Drive . . . . .	301
7208 Model 011 5/10GB External 8-mm Tape Drive . . . . .	302
7208 Model 341 20/40GB External 8-mm Tape Drive . . . . .	303
7208 Model 345 External 8-mm Tape Drive . . . . .	304
7209 Model 002 External Re-writable Optical Disk Drive . . . . .	305
7209 Model 003 External 2.6GB Re-writable Optical Disk Drive . . . . .	306
7210 Model 001 External CD-ROM Drive . . . . .	307
7210 Model 005 External CD-ROM Drive . . . . .	308
7210 Model 010 External Quad Speed CD-ROM Drive . . . . .	309
7210 Model 015 External 8X to 20X Speed SCSI-2 CD-ROM Drive . . . . .	310
7210 Model 020 External 32X Speed SCSI-2 CD-ROM Drive . . . . .	311
7210 Model 025 External SCSI-2 DVD-RAM Drive . . . . .	312
7212 Model 102 External Storage Device . . . . .	313
7235 POWER GTO Models 01i and 02i Graphics Subsystem . . . . .	314
7250 POWER GXT1000 Graphics Accelerator . . . . .	315
4869 Model 002 5 1/4-Inch 1.2MB External Diskette Drive . . . . .	316
<b>Chapter 9. Physical Characteristics of the 7300 Series . . . . .</b>	<b>317</b>
7318 Serial Communications Network Server Models P10 and S20 . . . . .	317
7319 Models 100 and 110 Fibre Channel Switches . . . . .	318
7329 Model 308 QIC 1/4 Tape Autoloader . . . . .	319
7331 Model 205 140/280GB or Model 305 400/800GB 8-mm Tape Library . . . . .	320
7332 Model 005 4-mm DDS-2 Autoloading Tape . . . . .	321
7332 Model 110 4-mm DDS-3 Autoloading Tape . . . . .	322
7332 Model 220 4-mm DDS-4 Autoloading Tape . . . . .	323
7334 Model 410 8-mm Tape Library . . . . .	324
7336 Model 205 4-mm Tape Library . . . . .	325
7337 Model 305 DLT Tape Library . . . . .	326
7337 Model 306 DLT Tape Library . . . . .	327
7337 Model 360 DLT Tape Library . . . . .	328
<b>Chapter 10. Physical Characteristics of the 9000 Series . . . . .</b>	<b>329</b>
9291 Models 010, and 020 Single Digital Trunk Processors . . . . .	329
9295 Multiple Digital Trunk Processor With AC Power Supply . . . . .	331
9295 Multiple Digital Trunk Processor With DC Power Supply . . . . .	332
9333 Models 010 and 011 Drawer High-Performance Subsystem . . . . .	333
9333 Models 500 and 501 Deskside High-Performance Subsystem . . . . .	334
9334 Models 010 and 011 Drawer Expansion Units . . . . .	335

9334 Models 500 and 501 Deskside Expansion Units . . . . .	336
9348 Model 012 Magnetic Tape Unit . . . . .	337
Noise Emission Notes . . . . .	338
<b>Chapter 11. Power Cords and Electrical Needs . . . . .</b>	<b>339</b>
Power Cords . . . . .	339
Plugs . . . . .	339
System Input Power . . . . .	340
Electrical Considerations . . . . .	340
Power Plugs for Desktop and Deskside Systems . . . . .	341
Rack-Type System Unit Power . . . . .	342
Rack-Type System Internal Power Distribution Cable . . . . .	347
-48 Volt DC Rack Power Distribution . . . . .	349
<b>Chapter 12. Cable Planning . . . . .</b>	<b>351</b>
General Considerations . . . . .	351
Cable Measuring . . . . .	352
7015 Considerations . . . . .	352
Cable Planning Charts . . . . .	354
Asynchronous Adapter Planning Charts: Example . . . . .	355
Async Adapter Cable Planning Chart . . . . .	356
128-Port Async Controller Cable Planning Chart: Example . . . . .	357
128-Port Async Controller Cable Planning Chart Controller Line Interface . . . . .	358
128-Port Async Device Cable Planning Chart: Example . . . . .	359
128-Port Async Device Cable Planning Chart . . . . .	360
Standard I/O Cable Planning Chart . . . . .	361
4-Port Multiprotocol Communications Controller Cable Planning Chart Example . . . . .	362
4-Port Multiprotocol Communications Controller Cable Planning Chart . . . . .	363
Cable Planning Chart: Other Adapters . . . . .	364
7318 Models P10 and S20 Cable Planning Chart Example . . . . .	365
7318 Serial Communications Network Server Cable Planning Chart . . . . .	366
Cable Labeling Reference Information . . . . .	367
<b>Chapter 13. High Availability Cluster Server Information . . . . .</b>	<b>369</b>
Reference Information . . . . .	369
7133 Serial Disk Systems . . . . .	369
Configuring the HA cluster server System With No Single Points of Failure . . . . .	369
High Availability Cluster Server System Cabling . . . . .	370
Cabling For System Consoles and Cluster Administration Workstations . . . . .	370
High Availability Cluster Server Heartbeat Connections . . . . .	374
SSA Cabling Connections . . . . .	375
HA Cluster Server AC Power Connections . . . . .	376
<b>Chapter 14. Specifications For non-IBM Rack Installation . . . . .</b>	<b>377</b>
Rack Specifications . . . . .	377
General Safety Requirements for IBM Products Installed in a non-IBM Rack/Cabinet . . . . .	380
<b>Chapter 15. Additional Planning Considerations . . . . .</b>	<b>383</b>
Create or Modify Communications Networks . . . . .	383
Perform Building Alterations as Needed . . . . .	384
Prepare Maintenance, Recovery, and Security Plans . . . . .	384
Develop an Education Plan . . . . .	384
Order Any Needed Supplies . . . . .	384
Prepare for System Delivery . . . . .	384
Identify Your Shipment . . . . .	385

**Appendix. Notices . . . . . 387**  
**Index . . . . . 389**



---

## About This Book

This book provides information for technical personnel who are responsible for planning for a system installation.

This book assumes that the service technician has had training on systems and attached SSA disk drive subsystems.

---

## ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

---

## Highlighting

The following highlighting conventions are used in this book:

<b>Bold</b>	Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Also identifies graphical objects such as buttons, labels, and icons that the user selects.
<i>Italics</i>	Identifies parameters whose actual names or values are to be supplied by the user.
Monospace	Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information you should actually type.

---

## Online Publications

RS/6000 and pSeries publications are available online. To access the online books, visit our Web site at: [http://www.rs6000.ibm.com/resource/hardware\\_docs/](http://www.rs6000.ibm.com/resource/hardware_docs/)

---

## References to AIX Operating System

This document may contain references to the AIX operating system. If you are using another operating system, consult the appropriate documentation for that operating system.

This document may describe hardware features and functions. While the hardware supports them, the realization of these features and functions depends upon support from the operating system. AIX provides this support. If you are using another operating system, consult the appropriate documentation for that operating system regarding support for those features and functions.

---

## Related Publications

The following catalogs and publications provide information on systems and related products:

- *Adapters, Devices and Cable Information for Micro Channel Bus Systems*, order number SA23-2764, gives information about adapters and devices as well as detailed information about cables and cabling used with Micro Channel Bus Systems.
- *Adapters, Devices and Cable Information for Multiple Bus Systems*, order number SA23-2778, gives information about adapters and devices as well as detailed information about cables and cabling used with Multiple Bus Systems.
- *AIX Asynchronous Communications Guide* provides information about asynchronous communications.
- *Diagnostics Information for Micro Channel Bus Systems*, order number SA23-2765 contains common diagnostic procedures, error codes, service request numbers, and failing function codes to help diagnose and repair system problems. This manual is intended for trained service technicians.

- *Diagnostics Information for Multiple Bus Systems*, order number SA23-2769 contains common diagnostic procedures, error codes, service request numbers, and failing function codes to help diagnose and repair system problems. This manual is intended for trained service technicians.
- *High Availability Cluster Multi-Processing for AIX, Version 4.3: Enhanced Scalability Installation and Administration Guide*, order number SC23-4284, is needed for HACMP/ES planning information.
- *High Availability Cluster Multi-Processing for AIX, Version 4.3: Planning Guide*, order number SC23-4277, is needed for HACMP/ES planning information.
- *PCI Adapter Placement Reference* order number SA23-2504, contains information regarding PCI adapter placement in your system unit.

---

## Trademarks

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

AIX  
@server  
Enterprise Storage Server  
IBM  
Magstar  
PowerPC  
POWER GTO  
POWERserver  
pSeries  
RS/6000  
Seascape  
Versatile Storage Server

Other company, product, and service names may be trademarks or service marks of others.





---

## **Data Integrity and Verification**

These computer systems contain mechanisms designed to reduce the possibility of undetected data corruption or loss. This risk, however, cannot be eliminated. Users who experience unplanned outages, system failures, power fluctuations or outages, or component failures must verify the accuracy of operations performed and data saved or transmitted by the system at or near the time of the outage or failure. In addition, users must establish procedures to ensure that there is independent data verification before relying on such data in sensitive or critical operations. Users should periodically check our support websites for updated information and fixes applicable to the system and related software.



---

# Chapter 1. Site Planning and Preparation Overview

Successful installation does not happen by accident: It takes planning. You are the most valuable resource in site planning because you know where and how your system, and devices attached to it, will be used.

Site preparation for the complete system is the responsibility of the customer. The primary task of your site planner is to ensure that each system is installed so that it can operate and be serviced efficiently.

This chapter provides the basic information you need to plan for your system installation. It provides an overview of each planning task, as well as valuable reference information useful throughout the performance of these tasks. Depending on the complexity of the system you ordered and your existing computing resource, you may not need to perform all the steps noted here.

First, with the help of your systems engineer, marketing representative, or with the help of those coordinating your installation, list the hardware for which you need to plan. Use the summary of your order to help you when making your list. This list is now your “To Do” list. You can use the “Planning Task Checklist” on page 2 to assist you.

While you are responsible for planning, vendors, contractors, and your sales representative are also available to help with any aspect of the planning. For some system units, a customer service representative will install your system unit and verify correct operation. Other system units such as the 7006, 7025, and 7026 models are customer-installed. If you are not sure, check with your marketing representative.

The physical planning section of this publication provides the physical characteristics of many system units, and associated products. For information on products not included in this publication, contact your marketing representative or your authorized dealer.

Before proceeding with planning, ensure that the hardware and software you have chosen meets your needs. Your marketing representative is available to answer questions.

This book is for hardware planning. However, because the system memory and disk storage needed are a function of the software to be used, some things to consider are listed below. Information on software products is generally in or with the software Licensed Program Product itself.

In assessing the adequacy of hardware and software, consider the following:

- Available disk space and system memory for accommodating software, online documentation, and data (including future growth needs resulting from additional users, more data, and new applications)
- Compatibility of all devices
- Compatibility of software packages with each other and with the hardware configuration
- Adequate redundancy or backup capabilities in hardware and software
- Software portability to the new system, if necessary
- Prerequisites and corequisites of chosen software have been satisfied
- Data to be transferred to the new system

---

## Planning Task Checklist

This checklist provides a convenient way for you to document your planning progress.

Working with your sales representative, establish completion dates for each of the tasks. You may want to review your planning schedule periodically with your marketing representative.

Planning Step	Person Responsible	Target Date	Completion Date
Plan Your Office or Computer Room Layout (Physical Planning)			
Prepare for Power Cords and Electrical Needs			
Prepare for Cables and Cabling			
Create or Modify Communications Networks			
Perform Building Alterations, as Needed			
Prepare Maintenance, Recovery, and Security Plans			
Develop an Education Plan			
Order Supplies			
Prepare for System Delivery			

## CSU/SSR Feature Installation

**Attention:** The following information indicates which features on various systems/models are intended to be installed by the customer and which features are to be installed by a System Service Representative (SSR) as part of a Miscellaneous Equipment Specification (MES). This information is for systems/models available as of the edition date.

**Notes:**

1. CSU = Customer Set-Up.
2. SSR = System Service Representative.
3. For a description of Feature Codes. See the Feature Code Descriptions below the following table.
4. The 7013 Model J30 was announced as CSU. U.S. practice has been for SSR installation.
5. The 7014 rack is SSR install. However, the system units which are installed into the 7014 may be CSU. Check the matrix below to verify which system units should be installed by the SSR or are CSU.

Machine Type	Model	System CSU <sup>1</sup>	Features/Options <sup>2</sup>	
			SSR Install	Customer Install
7006	All	Yes	All Features	None
7007	All	Yes	All Features	None
7008	All	Yes	All Features	None
7009	All	Yes	All Features	None
7010	All	Yes	All Features	None
7011	All	Yes	All Features	None
7012	All	Yes	All Features	None
7013	All	No	All Features	None
7015	All	No	All Features	None
7017	All	No	All Features	None
7024	All	Yes	FC 6309	All Other Features
7025	All	Yes	FC 2856, 5217, 5219, 5221, 6309, 6549	All Other Features
7026	All except B80	No	All Other Features	FC 2901, 2908, 2909, 2911, 2913, 3071, 3072, 3074, 3078, 3079, 3083
7026	B80	Yes	FC 4361, 4362, 4363, 4365, 4366	All Other Features
7028	6C1, 6E1	Yes	FC 4248, 4249, 6567	All Other Features
7028	6C4, 6E4	Yes	FC 5132, 6556, 6575, 6576	All Other Features
7029	6C3, 6E3	Yes	None	All Features
7038	All	No	All Features	None
7039	All	No	All Features	None
7040	All	No	All Features	None
7043	140, 240	Yes	FC 2856, 6309	All Other Features
7043	150	Yes	FC 2842	All Other Features
7043	270	Yes	FC 4362, 4365, 4366	All Other Features
7044	170	Yes	FC 4360, 4364	All Other Features
7044	270	Yes	FC 4362, 4365, 4366	All Other Features
7046	All	Yes	FC 2856, 6309	All Other Features

Machine Type	Model	System CSU <sup>1</sup>	Features/Options <sup>2</sup>	
			SSR Install	Customer Install
7236	All	No	All Features	None
7248	All	Yes	FC 2856	All Other Features
7311	D10 D20	No	None	All Features
7316	All	No	All Features	None
7317	All	No	All Features	None
7318	All	No	All Features	None
7319	All	No	All Features	None
9112	265	Yes	FC 6567	All Other Features

Feature Code	Feature Code Description
2842	POWER GXT4500P Graphics Accelerator
2856	IBM 7250 Attachment Adapter - PCI
2901	4.5GB F/W Ultra SCSI DASD Module
2908	9.1GB Ultra SCSI DASD Module
2909	18.2GB Ultra SCSI DASD Module
2911	9.1GB F/W Ultra SCSI DASD Module
2913	9.1GB F/W Ultra Module, 1" High
3071	4.5GB SSA DASD Module, 1" High
3072	9.1GB SSA DASD Module, 1.6" High
3074	9.1GB SSA DASD Module, Hot Swap
3078	9.1GB SSA DASD Module, 10K
3079	9.1GB SSA DASD Module, 10K
3080	4.5GB F/W SCSI DASD Module
3083	2.2GB F/W SCSI DASD Module
3084	4.5GB F/W SCSI DASD Module
3090	9.1GB F/W SCSI DASD Module
3133	Cable SCSI, 3M, to F/W MC SCSI Adapter (SE OR Diff)
3134	Cable SCSI, 6M, to F/W MC SCSI Adapter (SE OR Diff)
3137	Cable SCSI/DIFF, 12M, to F/W MC SCSI Adapter
3138	Cable SCSI/DIFF, 18M, to F/W MC SCSI Adapter
4248	SCSI Connector Cable and Repeater Card
4249	SCSI 3-Drop Connector Cable
4360	1-Way 400MHz POWER3-II Processor Card w/4MB L2 Cache
4361	1-Way 375MHz POWER3-II Processor Card
4362	2-Way 375MHz POWER3-II Processor Card
4363	2-Way 375MHz POWER3-II Processor Card (8MB L2/Processor)
4364	1-Way 450MHz POWER3-II Processor Card w/8MB L2 Cache
4365	2-Way 375MHz POWER3-II Processor Card (8MB L2/Processor)
4366	2-Way 450MHz POWER3-II Processor Card (8MB L2/Processor)
5132	2-way 1.0 GHz POWER4 Processor Card
5217	RS64 IV, 2-Way SMP, 750MHz, 8MB L2 Cache
5219	RS64 IV, 4-Way SMP, 750MHz, 8MB L2 Cache
5221	RS64 IV, 6-Way SMP, 750MHz, 8MB L2 Cache
6120	80/160 GB Internal Tape Drive with VXA Technology, Bolt-in
6131	60/150 GB 8mm Internal Tape Drive, Autodock
6134	60/150 GB 8mm Internal Tape Drive, Bolt-in
6142	Internal 4mm 4/8GB Tape
6147	8mm 5/10GB VDAT Tape
6153	4mm Tape Drive + Autoloader, Horizontal
6154	20 GB 8-mm Tape Drive, White bolt-in

<b>Feature Code</b>	<b>Feature Code Description</b>
6156	20 GB 8-mm Tape Drive, Black bolt-in
6158	20 GB 4-mm Tape Drive, Bolt-in
6159	12 GB 4-mm Tape Drive, Bolt-in
6169	80/160 GB Internal Tape Drive with VXA Technology, Autodock
6185	20 GB 4-mm Tape Drive, Autodock
6294	Optional AC Power Supply for 7027 SCSI Drawers
6295	Optional bifurcated (Y-cable) Power Cord for 7027 SCSI Drawers
6309	Digital Trunk Quad Adapter, PCI/Long/32Bit/5V
6549	Additional Power Supply for 2nd and 3rd 6-Pks on Model F40
6556	6 Slot PCI Riser (MES order only)
6567	Ultra3 SCSI Backplane for Hot-swap Disks
6575	Enhanced Planar (MES order only)
6576	LPAR Enablement (MES order only)

---

## General Considerations

When determining the placement of your system, consider the following:

- Adequate space for the devices.
- Working environment of personnel who will be using the devices (their comfort, ability to access the devices, supplies, and reference materials).
- Adequate space for maintaining and servicing the devices.
- Physical security requirements necessary for the devices.
- Weight of the devices.
- Heat output of the devices.
- Operating temperature requirements of the devices.
  - When using tape media, the maximum operating temperature is 16 to 32°C (60 to 90°F). The maximum operating wet bulb temperature is 23°C (73°F), unless otherwise specified in the system specifications
- Humidity requirements of the devices.
  - When using tape media, the humidity is 20 to 80%.
- Air flow requirements of the devices.
- Air quality of the location where the devices will be used. (For example, excess dust could damage your system.)

**Note:** The system and devices are designed to operate in normal office environments. Dirty or other poor environments may damage the system or the devices. The customer is responsible for providing the proper operating environment.

- Altitude limitations of the devices.
- Noise emission levels of the devices.
- Any vibration of equipment near where the devices will be placed.
- Paths of power cords.

The following pages contain the information you need to evaluate these considerations.



## Footprint Example

The following table provides footprint dimensions for systems or devices for which they are appropriate. If you want to use full-sized footprints of the system units or devices, use the measurements provided to construct them out of folded newspaper or sheets of construction paper. You can then use them to plan a layout within the actual office space.

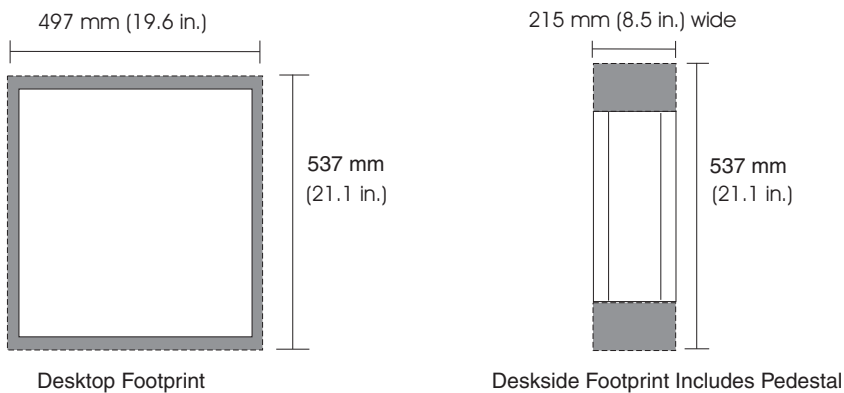
Each footprint represents a top view of the system unit or device. All dimensions given include air flow but not service accessibility.

The following example illustrates the use of a footprint. This illustration uses the 7006 Graphics Workstation Models 41T, 41W, 42T, and 42W for the example.

Footprint <sup>1</sup>	Width	Depth
Desktop	497mm (19.6 in)	537mm (21.1 in)
Deskside	215mm (8.5 in)	537mm (21.1 in)

Note 1. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.

The following figure shows the space for the system, as well as required clearances.





## Chapter 2. Physical Characteristics of Systems

This chapter provides the physical characteristics for systems. This information can help you with physical planning for the products you have ordered.

**Note:** The electrical and thermal information provided for systems does not include displays or a operators terminal (such as an ASCII terminal). Be sure to include display or terminal characteristics when planning the installation of system units.

### 7006 Graphics Workstation Models 41T, 41W, 42T, and 42W

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	119 mm	4.7 in.	447 mm	17.6 in.
Width <sup>1</sup>	447 mm	17.6 in.	215 mm	8.5 in.
Depth	451 mm	17.8 in.	451 mm	17.8 in.
<b>Weight</b>	12.7 kg 28 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.170			
Voltage range (V ac)	100 to 127 or 200 to 240 (switchable)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	290 Btu/hr			
Power requirements (typical)	85 watts			
Power factor	0.5 to 0.7			
Inrush current <sup>6</sup>	75 amps at 120 V ac, 150 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90.5°F)		10 to 43°C (50 to 110.5°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80%		8 to 80%	
	23°C (73.5°F)		27°C (80.5°F)	
<b>Noise Emissions<sup>2</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.2 bels		5.0 bels	
L <sub>pAm</sub>	41 dBA		38 dBA	
<L <sub>pA</sub> > <sub>m</sub>	36 dBA		34 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances<sup>3</sup></b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>4,5</sup></b>	35mm(1.5 in)	51mm(2 in)	25mm(1 in)	25mm(1 in)
<b>Service</b>	466mm(18 in)	N/A	N/A	N/A
<b>Footprint<sup>4</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	497mm (19.6 in)		537mm (21.1 in)	
Deskside	215mm (8.5 in)		537mm (21.1 in)	
<ol style="list-style-type: none"> <li>1. Deskside width measurement includes the optional vertical stand.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Left and right measurements apply only when the system is used in the desktop position.</li> <li>4. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>5. When placed in the vertical position, the system requires 25mm (1 in) at the bottom and top for proper air flow. The necessary bottom clearance is provided by the optional vertical stand.</li> <li>6. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7007 POWERportable N40

<b>Dimensions</b>				
Height	51 mm 2.0 in.			
Width	290 mm 11.8 in.			
Depth	216 mm 8.5 in.			
<b>Weight</b>				
3.13 kg 6.9 lbs				
<b>Electrical</b>				
Voltage range (V ac)	90 to 240 (autosensing)			
Frequency (hertz)	50 or 60			
Power requirements (typical)	55 watts			
<b>Temperature Requirements</b>				
<b>Operating</b> 5 to 35.5°C (41 to 95.5°F)				
<b>Humidity Requirements</b> (Noncondensing)				
<b>Operating</b> 8 to 80%				
<b>Wet Bulb</b> 23°C (73.5F)				
<b>Noise Emissions*</b>				
$L_{WA,d}$	<b>Operating</b> 5.1 bels		<b>Idle</b> 4.8 bels	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	N/A	N/A	N/A	N/A
*See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 7008 POWERstations M20 and M2A

<b>Dimensions</b>				
Height	413 mm 16.1 in.			
Width	410 mm 16.0 in.			
Depth	459 mm 17.9 in.			
<b>Weight</b>				
Minimum	23.5 kg 52 lbs.			
Maximum	23.5 kg 52 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.22			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	550 Btu/hr			
Power requirements (typical)	160 watts			
Power factor	0.5 to 0.7			
Inrush current	20 amps at 120 V ac, 40 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>			<b>Non-Operating</b>
<b>Wet Bulb</b>	8 to 80% 23°C (73.5F)			8 to 80% 27°C (80.5F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.0 bels			5.0 bels
L <sub>pAm</sub>	38 dBA			38 dBA
<L <sub>pA</sub> > <sub>m</sub>	38 dBA			38 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	N/A	152 mm(6 in)	76 mm(3 in)	76 mm(3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	562 mm(22 in)		611 mm(23.9 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7009 Compact Server C10 and C20

<b>Dimensions</b>				
Height	394 mm	15.5 in.		
Width	191 mm	7.5 in.		
Width with pedestal	241 mm	9.5 in.		
Depth	432 mm	17.0 in.		
<b>Weight</b>				
Minimum	16 kg	35.0 lbs.		
Maximum	18 kg	39.5 lbs.		
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.232			
Voltage range (V ac)	100 to 127 or 200 to 240 (switchable)			
Frequency (hertz)	50 or 60			
Thermal output (max)	(C10) 512 Btu/hr (C20) 544 Btu/hr			
Power requirements (max)	(C10) 150 watts (C20 ) 160 watts			
Power factor	0.5 to 0.7			
Inrush current <sup>3</sup>	75 amps at 120 V ac, 150 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.7 bels		5.3 bels	
L <sub>pAm</sub>	NA		NA	
<L <sub>pA</sub> > <sub>m</sub>	41 dBA		38 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76 mm(3 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b> 241 mm(9.5 in)		<b>Depth</b> 660 mm(26 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7010 Xstation 130

<b>Dimensions</b>				
Height		72 mm		2.9 in.
Width		375 mm		14.8 in.
Depth		380 mm		15.0 in.
<b>Weight</b>				
Minimum		7.7 kg		17 lbs.
Maximum		9.5 kg		21 lbs.
<b>Electrical</b>				
Power source loading (maximum in kVA)			0.100	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			222 Btu/hr	
Power requirements (peak)			65 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		8 to 80%		8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.0 bels		4.8 bels
L <sub>pAm</sub>		40 dBA		39 dBA
<L <sub>pA</sub> > <sub>m</sub>		37 dBA		36 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152 mm(6 in)	152 mm(6 in)	N/A
				N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		375 mm(14.8 in)		685 mm(27 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7010 Xstation 140 and 150

<b>Dimensions</b>				
Height		72 mm		2.9 in.
Width		375 mm		14.8 in.
Depth		380 mm		15.0 in.
<b>Weight</b>				
Minimum		7.3 kg		16 lbs.
Maximum		8.6 kg		19 lbs.
<b>Electrical</b>				
Power source loading (maximum in kVA)			0.100	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (max)		222 Btu/hr		
Power requirements (peak)		65 watts		
Power factor		0.5 to 0.7		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		4.7 bels		4.7 bels
L <sub>pAm</sub>		33 dBA		33 dBA
<L <sub>pA</sub> > <sub>m</sub>		31 dBA		31 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 375 mm(14.8 in)		<b>Depth</b> 685 mm(27 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> </ol>				



## 7010 Xstation Model 160

<b>Dimensions</b>				
Height		68 mm		2.75 in.
Width		306 mm		12.00 in.
Depth		306 mm		12.00 in.
<b>Weight</b>				
Minimum		4.1 kg		10 lbs.
Maximum		4.5 kg		9 lbs.
<b>Electrical</b>				
Power source loading (maximum in kVA)				0.121
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)				50 or 60
Thermal output (max)				143 Btu/hr
Power requirements (peak)				50 watts
Power factor				0.715
Maximum altitude				2135 m (7000 ft.)
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		8 to 80%		8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		4.3 bels		4.3 bels
L <sub>pA</sub> m		37 dBA		37 dBA
<L <sub>pA</sub> > <sub>m</sub>		41 dBA		41 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
<b>Install/Air Flow<sup>2</sup></b>		152 mm(6 in)	152 mm(6 in)	152 mm(6 in)
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		612 mm(24 in)		612 mm(24 in)
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> </ol>				

## 7011 POWERstation and POWERserver® 220, and 230

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>		
Height	84 mm	3.3 in.	432 mm	17.0 in.	
Width <sup>1</sup>	406 mm	16.0 in.	216 mm	8.5 in.	
Depth	419 mm	16.5 in.	419 mm	16.5 in.	
<b>Weight</b>					
Minimum	9.0 kg 20 lbs.				
Maximum	11.5 kg 25 lbs.				
<b>Electrical</b>					
Power source loading (typical in kVA)	0.17				
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)				
Frequency (hertz)	50 or 60				
Thermal output (typical)	340 Btu/hr				
Power requirements (typical)	100 watts				
Power factor	0.5 to 0.7				
Inrush current	50 amps at 120 V ac, 100 amps at 240 V ac				
Maximum altitude	2135 m (7000 ft.)				
<b>Temperature Requirements</b>		<b>Operating</b>	<b>Non-Operating</b>		
		16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>	<b>Non-Operating</b>		
		8 to 80%	8 to 80%		
<b>Wet Bulb</b>		23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>2</sup></b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>		5.2 bels	5.0 bels		
L <sub>pAm</sub>		41 dBA	40 dBA		
<L <sub>pA</sub> > <sub>m</sub>		39 dBA	38 dBA		
Impulsive or prominent discrete tones		No	No		
<b>Clearances<sup>3</sup></b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/ Air Flow<sup>4,5</sup></b>	35mm(1.5 in)	51mm(2 in)	25mm(1 in)	25mm(1 in)	
<b>Service</b>	466mm(18 in)	N/A	N/A	N/A	
<b>Footprint<sup>4</sup></b>		<b>Width</b>		<b>Width</b>	
Desktop		456mm(18 in)		508mm(20 in)	
Deskside		216mm(8.5 in)		508mm(20 in)	
<ol style="list-style-type: none"> <li>1. Deskside width measurement includes the optional vertical stand.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Left and right measurements apply only when the system is used in the desktop position.</li> <li>4. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>5. When placed in the vertical position, the Model 220 requires 25 mm (1 in) at the bottom and top for proper air flow. The necessary bottom clearance is provided by the optional vertical stand.</li> </ol>					

## 7011 POWERstation and POWERserver 250

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>		
Height	84 mm	3.3 in.	432 mm	17 in.	
Width <sup>1</sup>	406 mm	16 in.	216 mm	8.5 in.	
Depth	419 mm	16.5 in.	419 mm	16.5 in.	
<b>Weight</b>					
Minimum	9.0 kg 20 lbs.				
Maximum	11.5 kg 25 lbs.				
<b>Electrical</b>					
Power source loading (typical in kVA)	0.185				
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)				
Frequency (hertz)	50 or 60				
Thermal output (typical)	410 Btu/hr				
Power requirements (typical)	120 watts				
Power factor	0.5 to 0.7				
Inrush current	50 amps at 120 V ac, 100 amps at 240 V ac				
Maximum altitude	2135 m (7000 ft.)				
<b>Temperature Requirements</b>		<b>Operating</b>	<b>Non-Operating</b>		
		16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>	<b>Non-Operating</b>		
		8 to 80%	8 to 80%		
<b>Wet Bulb</b>		23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>2</sup></b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d		5.2 bels	5.0 bels		
L <sub>pA</sub> m		41 dBA	40 dBA		
<L <sub>pA</sub> > <sub>m</sub>		39 dBA	38 dBA		
Impulsive or prominent discrete tones		No	No		
<b>Clearances<sup>3</sup></b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>4,5</sup></b>	35 mm(1.5 in)	51 mm(2 in)	25 mm(1 in)	25 mm(1 in)	
<b>Service</b>	466mm (18 in)	N/A	N/A	N/A	
<b>Footprint<sup>4</sup></b>		<b>Width</b>		<b>Depth</b>	
Desktop		456mm(18 in)		508mm(20 in)	
Deskside		216mm(8.5 in)		508mm(20 in)	
<ol style="list-style-type: none"> <li>1. Deskside width measurement includes the optional vertical stand.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Left and right measurements apply only when the Model 250 is used in the desktop position.</li> <li>4. The amount of space needed by the unit during normal operation is indicated by on the footprint dimensions.</li> <li>5. When placed in the vertical position, the Model 250 requires 25 mm (1 in) at the bottom and top for proper air flow. The necessary bottom clearance is provided by the optional vertical stand.</li> </ol>					

## 7012 POWERstation and POWERserver 34H, 355, 360, 365, 370, and 375

<b>Dimensions</b>	<b>Desktop</b>	<b>Deskside</b>		
Height	162 mm 6.4 in.	466 mm 18.3 in.		
Width (at pedestal for deskside)	456 mm 18.0 in.	241 mm 9.5 in.		
Depth	523 mm 20.6 in.	523 mm 20.6 in.		
<b>Weight</b>				
Minimum	12.7 kg 28 lbs.	12.7 kg 28 lbs.		
Maximum	15.4 kg 34 lbs.	15.4 kg 34 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)		0.29		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		585 Btu/hr		
Power requirements (typical)		185 watts		
Power factor		0.5 to 0.7		
Inrush current		49 amps at 120 V ac, 98 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		
	16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		
(Noncondensing)	8 to 80%	8 to 80%		
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	5.7 bels	5.5 bels		
L <sub>pAm</sub>	45 dBA	45 dBA(desktop)		
	N/A	N/A (deskside)		
<L <sub>pA</sub> > <sub>m</sub>	41 dBA	41 dBA (desktop)		
	38 dBA	38 dBA(deskside)		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	760 mm(30 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>	<b>Depth</b>		
Desktop	456 mm(18 in)	830 mm(33 in)		
Deskside	241 mm(9.5 in)	828 mm(32.6 in)		
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</p>				

## 7012 POWERserver Models 380, 390, and 39H

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	162 mm 6.4 in.		452 mm 17.8 in.	
Width (at pedestal for deskside)	442 mm 17.4 in.		241 mm 9.5 in.	
Depth	478 mm 18.8 in.		478 mm 18.8 in.	
<b>Weight</b>				
Minimum	18.1 kg 40 lbs.		18.1 kg 40 lbs.	
Maximum	21.8 kg 48 lbs.		21.8 kg 48 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.35			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	770 Btu/hr			
Power requirements (typical)	225 watts			
Power factor	0.5 to 0.7			
Inrush current <sup>3</sup>	42 amps at 120 V ac, 42 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80% 23°C (73°F)		8 to 80% 27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
$L_{WA_d}$	5.5 bels		5.3 bels	
$L_{pA_m}$	41 dBA (desktop) 38 dBA (deskside)		41 dBA (desktop) 38 dBA (deskside)	
$\langle L_{pA} \rangle_m$	41 dBA (desktop) 38 dBA (deskside)		41 dBA (desktop) 38 dBA (deskside)	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	760 mm(30 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	442mm(17.4 in)		782mm(30.8 in)	
Deskside	241mm(9.5 in)		782mm(30.8 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7012 Model 397

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	162 mm 6.4 in.		452 mm 17.8 in.	
Width (at pedestal for deskside)	442 mm 17.4 in.		241 mm 9.5 in.	
Depth	478 mm 18.8 in.		478 mm 18.8 in.	
<b>Weight</b>				
Minimum	18.1 kg 40 lbs.		18.1 kg 40 lbs.	
Maximum	21.8 kg 48 lbs.		21.8 kg 48 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.5			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	770 Btu/hr			
Power requirements (typical)	250 watts			
Power factor	0.8 to 0.94			
Inrush current <sup>3</sup>	20 amps at 120 V ac, 20 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
(Noncondensing)	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.7 bels		5.5 bels	
L <sub>pAm</sub>	46 dBA (desktop)		46 dBA (desktop)	
<L <sub>pA</sub> > <sub>m</sub>	48 dBA (desktop)		47 dBA (desktop)	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	760 mm(30 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	442mm(17.4 in)		782mm(30.8 in)	
Deskside	241mm(9.5 in)		782mm(30.8 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7012 Models G30, G40, and G02

<b>Dimensions</b>	<b>G30 &amp; G40</b>		<b>G02</b>	
Height	450 mm	17.75 in.	450 mm	17.75 in.
Width	173 mm	6.9 in.	173 mm	6.9 in.
Width (at pedestal)	280 mm	11 in.	280 mm	11 in.
Depth	613 mm	24.1 in.	613 mm	24.1 in.
<b>Weight</b>	<b>G30 &amp; G40</b>		<b>G02</b>	
Minimum	19 kg	43 lbs.	19 kg	43 kg
Maximum	25 kg	55 lbs.	25 lbs.	55 lbs.
<b>Electrical</b>	<b>G30 &amp; G40</b>		<b>G02</b>	
Power source loading (typical in kVA)	0.45		0.2	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)		100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60		50 or 60	
Thermal output (typical)	1380 Btu/hr		615 Btu/hr	
Power requirements (typical)	405 watts		180 watts	
Power factor	0.8 to 1.0		0.8 to 1.0	
Inrush current <sup>3</sup>	35 amps at 120 V ac 70 amps at 240 V ac		35 amps at 120 V ac 70 amps at 240 V ac	
Maximum altitude	2135 m (7000 ft.)		2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
Without tape drive	8 to 80%		8 to 80%	
With tape drive	20 to 80%		20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)		27°C (80°F)	
With tape drive	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.8 bels		5.5 bels	
L <sub>pA</sub> m	39 dBA		37 dBA	
<L <sub>pA</sub> > <sub>m</sub>	39 dBA		37 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	760 mm(30 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 280mm(11 in)		<b>Depth</b> 917mm(36.1 in)	
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</p> <p>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</p>				

## 7013 POWERstation and POWERserver 52H

<b>Dimensions</b>				
Height		610 mm		24.0 in.
Width		360 mm		14.2 in.
Depth		675 mm		26.6 in.
<b>Weight</b>				
Minimum		36.7 kg		81 lbs.
Maximum		53.1 kg		117 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.4	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			975 Btu/hr	
Power requirements (typical)			285 watts	
Power factor			0.8 to 1.0	
Inrush current		22 amps at 120 V ac, 44 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
Without tape drive		8 to 80%		8 to 80%
With tape drive		20 to 80%		20 to 80%
<b>Wet Bulb Requirements</b>				
Without tape drive		27°C (80°F)		27°C (80°F)
With tape drive		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.7 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		39 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	N/A	152mm(6 in)	76mm(3 in)	76mm(3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b> 512mm(20.2 in)		<b>Depth</b> 828mm(32.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 7013 POWERstation and POWERserver 550L

<b>Dimensions</b>				
Height		610 mm		24.0 in.
Width		360 mm		14.2 in.
Depth		675 mm		26.6 in.
<b>Weight</b>				
Minimum		36.7 kg		81 lbs.
Maximum		53.1 kg		117 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.4	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		975 Btu/hr		
Power requirements (typical)		285 watts		
Power factor		0.8 to 1.0		
Inrush current		22 amps at 120 V ac, 44 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity (Noncondensing)</b>		<b>Operating</b>	<b>Non-Operating</b>	
Without tape drive		8 to 80%	8 to 80%	
With tape drive		20 to 80%	20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive		27°C (80°F)	27°C (80°F)	
With tape drive		23°C (73°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d		5.7 bels	5.5 bels	
L <sub>pA</sub> m		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		39 dBA	38 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	N/A	152 mm(6 in)	76 mm(3 in)	76 mm(3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b> 512mm(20.2 in)		<b>Depth</b> 828mm(32.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7013 POWERstation and POWERserver 570 and 580

<b>Dimensions</b>				
Height		610 mm		24.0 in.
Width		360 mm		14.2 in.
Depth		675 mm		26.6 in.
<b>Weight</b>				
Minimum		36.7 kg		81 lbs.
Maximum		53.1 kg		117 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.43	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		1450 Btu/hr		
Power requirements (typical)		425 watts		
Power factor		0.8 to 1.0		
Inrush current		34 amps at 120 V ac, 68 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity (Noncondensing)</b>		<b>Operating</b>		<b>Non-Operating</b>
Without tape drive		8 to 80%		8 to 80%
With tape drive		20 to 80%		20 to 80%
<b>Wet Bulb Requirements</b>				
Without tape drive		27°C (80°F)		27°C (80°F)
With tape drive		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.7 bels		5.5 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		39 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	N/A	152 mm(6 in)	76 mm(3 in)	76 mm(3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (3 in) on each side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b> 512mm(20.2 in)		<b>Depth</b> 828mm(32.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7013 Models 58H, 590, 59H, 591, and 595

<b>Dimensions</b>				
Height		610 mm		24 in.
Width		360 mm		14.2 in.
Depth		675 mm		26.6 in.
<b>Weight</b>				
Minimum		36.7 kg		81 lbs.
Maximum		53.1 kg		117 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.5	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		1620 Btu/hr		
Power requirements (typical)		550 watts		
Power factor		0.8 to 1.0		
Inrush current		34 amps at 120 V ac, 68 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (61 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity (Noncondensing)</b>		<b>Operating</b>	<b>Non-Operating</b>	
Without tape media		8 to 80%	8 to 80%	
With tape media		20 to 80%	20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape media		27°C (80°F)	27°C (80°F)	
With tape media		23°C (73°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d		5.8 bels	5.3 bels	
L <sub>pA</sub> m		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		39 dBA	38 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	N/A	152 mm(6 in)	76 mm(3 in)	76 mm(3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (3 in) on each side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b> 512mm(20.2 in)		<b>Depth</b> 828mm(32.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7013 Models J30, J40, and J01

<b>Dimensions</b>	<b>J30 &amp; J40</b>		<b>J01</b>	
Height	610 mm	24 in.	610 mm	24 in.
Width	360 mm	14.2 in.	360 mm	14.2 in.
Depth	750 mm	29.5 in.	750 mm	29.5 in.
<b>Weight</b>	<b>J30 &amp; J40</b>		<b>J01</b>	
Minimum	67 kg	148 lbs.	67 kg	148 lbs.
Maximum	84 kg	185 lbs.	84 kg	185 lbs.
<b>Electrical</b>	<b>J30 &amp; J40</b>		<b>J01</b>	
Power source loading (typical in kVA)	0.9		0.6	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)		100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60		50 or 60	
Thermal output (typical)	2765 Btu/hr		1843 Btu/hr	
Power requirements (typical)	810 watts		540 watts	
Power factor	0.8 to 1.0		0.8 to 1.0	
Inrush current <sup>3</sup>	35 amps at 120 V ac 70 amps at 240 V ac		35 amps at 120 V ac 70 amps at 240 V ac	
Maximum altitude	2500 m (8202 ft.)		2500 m (8202 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 32°C (50 to 90°F)		<b>Non-Operating</b> 5 to 50°C (41 to 122°F)	
<b>Humidity (Noncondensing)</b>	<b>Operating</b>		<b>Non-Operating</b>	
Without tape drive	8 to 80%		5 to 95%	
With tape drive	20 to 80%		20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive	24°C (75°F)		28°C (82°F)	
With tape drive	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1,4</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.8 bels		5.5 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	NA		NA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	500mm(20 in)	500mm(20 in)	500mm(20 in)	500mm(20 in)
<b>Service</b>	500mm(20 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 1630mm(64 in)		<b>Depth</b> 1750mm(70 in)	
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</p> <p>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</p>				

## 7013 Model J50

<b>Dimensions</b>				
Height	610 mm	24 in.		
Width	360 mm	14.2 in.		
Depth	750 mm	29.5 in.		
<b>Weight</b>				
Minimum	67 kg	148 lbs.		
Maximum	84 kg	185 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.6			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1843 Btu/hr			
Power requirements (typical)	540 watts			
Power factor	0.8 to 1.0			
Inrush current	35 amps at 120 V ac, 70 amps at 240 V ac			
Maximum altitude	2500 m (8202 ft.)			
<b>Temperature Requirements</b>		<b>Operating</b>	<b>Non-Operating (Power Off)</b>	
		10 to 32°C (50 to 90°F)	10 to 43°C 50 to 109°F)	
<b>Humidity Requirements (Noncondensing)</b>		<b>Operating</b>	<b>Non-Operating (Power Off)</b>	
Without tape drive		8 to 80%	8 to 80%	
With tape drive		20 to 80%	8 to 80%	
<b>Wet Bulb Requirements</b>		23°C (73°F)	27°C (80°F)	
<b>Noise Emissions<sup>1,4</sup></b>		<b>Operating</b>	<b>Idle</b>	
$L_{WA_d}$		5.8 bels	5.5 bels	
$L_{pA_m}$		N/A	N/A	
$\langle L_{pA} \rangle_m$				
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	500mm(20 in)	500mm(20 in)	500mm(20 in)	500mm(20 in)
<b>Service</b>	500mm(20 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	1630mm(64 in)		1750mm(70 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The values for <math>\langle L_{pA} \rangle_m</math> not available at the time of publishing.</li> </ol>				

## 7014 Model S00 Rack

<b>Dimensions</b>				
Height		1577 mm		62.0 in.
Width		650 mm		25.5 in.
Depth		1019 mm		40.1 in.
<b>Weight<sup>1</sup></b>				
Base Rack		159 kg		349 lbs.
Full Rack		594 kg		1309 lbs.
<b>Electrical<sup>2</sup></b> (sum specified values for drawers or enclosures in rack)				
DC Rack				
Power source loading maximum in kVA <sup>3</sup>			8.4	
Voltage range (V dc)			-40 to -60	
AC Rack				
Power source loading maximum in kVA (per PDB) <sup>4</sup>			4.8	
Voltage range (V ac)			200 to 240	
Frequency (hertz)			50 or 60	
<b>Humidity Requirements</b> (see specifications for drawers or enclosures)				
<b>Noise Emissions</b> (see specifications for drawers or enclosures)				
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	915mm(36 in)	915mm(36 in)	915mm(36 in)	915mm(36 in)
<b>Notes:</b>				
1. Configuration dependent, base weight plus the weight of the drawers mounted in the rack. The rack can support up to a maximum of 13.6 kg (30) lbs/EIA (Unit)				
2. The total rack power should be derived from the sum of the power used by the drawers in the rack.				

## S00 Rack Weight Distribution and Floor Loading

The S00 rack can be extremely heavy when several drawers are present. The following table shows the necessary weight distribution distances for the S00 rack when it is loaded.

Rack	System Weight (1) lbs(kg)	Width (2) in(mm)	Depth (2) in(mm)	Weight Distribution Distance (3)	
				Front & Back in(mm)	Left & Right in(mm)
7014-S00 (4)	1309 (594)	25.5 (650)	35 (889)	22 (559), 19.2 (487.7)	18 (457.2)
7014-S00 (5)	1309 (594)	25.5 (650)	35 (889)	22 (559), 19.2 (487.7)	0.0 (0.0)
7014-S00 (6)	1309 (594)	25.5 (650)	35 (889)	22 (559), 19.2 (487.7)	13 (330.2)

The following table shows the necessary floor loading for the S00 rack when it is loaded.

Rack	Floor Loading			
	Raised kg/m <sup>2</sup>	Non-Raised kg/m <sup>2</sup>	Raised lb/ft <sup>2</sup>	Non-Raised lb/ft <sup>2</sup>
7014-S00 (4)	304	260.2	62.3	53.3
7014-S00 (5)	561.5	517.5	115	106
7014-S00 (6)	840	296	70	61

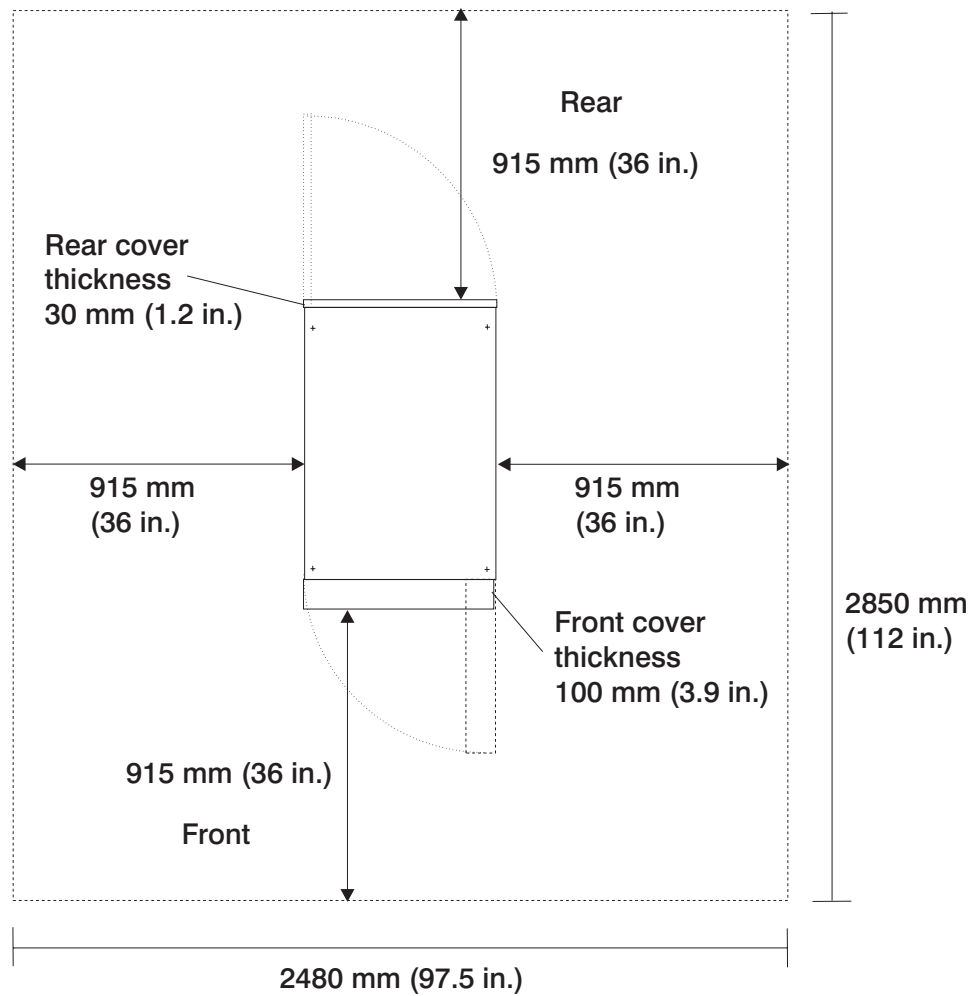
The following notes are for both the weight distribution distance table and the floor loading table.

### Notes:

1. Maximum weight of fully populated rack, units are lbs with kg in parentheses.
2. Dimensions without covers, units are inches with mm in parentheses.
3. The weight distribution distance in all four directions is the area around the rack perimeter (minus covers) necessary to distribute the weight beyond the perimeter of the rack. Weight distribution areas cannot overlap with adjacent computer equipment weight distribution areas. Units are inches with mm in parentheses.
4. Weight distribution distance is 1/2 the service clearance values shown in the figure plus cover thickness.
5. No left and right weight distribution distance.
6. Left and right weight distribution distance required for a 70 lb/ft<sup>2</sup> raised floor loading objective.

## S00 Rack Service Clearances

The lines of the footprint indicate the amount of space needed by the unit during service operation. For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack.



**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging doors on the I/O rack. The illustration shows the minimum space required.



## 7014 Rack

### Model T00 Rack

<b>Dimensions</b>				
Height	1804 mm 71.0 in.			
Capacity	36 EIA Units			
With PDP - DC only	1926 mm 75.8 in.			
Width without side panels	623 mm 24.5 in.			
With side panels	644 mm 25.4 in.			
Depth with rear door only	1042 mm 41.0 in.			
Depth with rear door and RS/6000 style front door	1098 mm 43.3 in.			
pSeries (sculptured) style front door	1147 mm 45.2 in.			
<b>Weight</b>				
Base Rack	244 kg 535 lbs			
Full Rack <sup>1</sup>	816 kg 1795 lbs			
See "T00 and T42 Rack Weight Distribution and Floor Loading" on page 35.				
<b>Electrical<sup>2</sup></b> (sum specified values for drawers or enclosures in rack)				
DC Rack				
Power source loading maximum in kVA <sup>3</sup>	8.4			
Voltage range (V dc)	-40 to -60			
AC Rack				
Power source loading maximum in kVA (per PDB) <sup>4</sup>	4.8			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 or 60			
<b>Temperature Requirements</b>	(see specifications for drawers or enclosures)			
<b>Humidity Requirements</b>	(see specifications for drawers or enclosures)			
<b>Noise Emissions</b>	(see specifications for drawers or enclosures)			
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Rack airflow requirements are a function of the number and type of drawers installed (see 5 on page 32). Refer to the individual drawer specifications.			
<b>Service</b>	915mm(36 in)	915mm(36 in)	915mm(36 in)	915mm(36 in)

1. Configuration dependent, base rack weight plus the weight of the drawers mounted in the rack. The rack can support up to a maximum weight of 35 lbs/EIA (Unit).
2. The total rack power should be derived from the sum of the power used by the drawers in the rack.
3. The Power Distribution Panel (PDP) on the DC powered rack can hold up to eighteen (nine per power source) 48 volt 20 to 50 amp circuit breakers (configuration dependent). Each power source supports up to 8.4 kVA.
4. Each ac Power Distribution Bus (PDB) can supply 4.8 kVA. A rack can have up to four PDBs as required by the drawers mounted in the rack.
5. All rack installations require careful site and facilities planning designed to both address the cumulative drawer heat output and provide the airflow volumes rates necessary to comply with drawer temperature requirements.

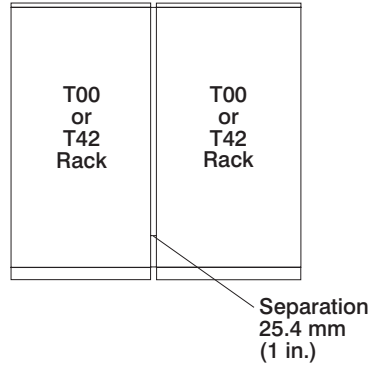
## Model T42 Rack

<b>Dimensions</b>	
Height	2015 mm 79.3 in.
Capacity	42 EIA Units
With PDP - DC only	Not applicable
Width without side panels	623 mm 24.5 in.
With side panels	644 mm 25.4 in.
Depth with rear door only	1042 mm 41.0 in.
Depth with rear door and RS/6000 style front door	1098 mm 43.3 in.
pSeries (sculptured) style front door	1147 mm 45.2 in.
<b>Weight</b>	
Base Rack	261 kg 575 lbs.
Full Rack <sup>1</sup>	930 kg 2045 lbs
See "T00 and T42 Rack Weight Distribution and Floor Loading" on page 35.	
<b>Service Clearance</b>	Recommended minimum vertical service clearance from floor is 2439 mm or 8 feet.
<b>All Other Specifications</b>	For all other technical information, see the table for "Model T00 Rack" on page 31.



**Note:** Rack units are large and heavy and are not easily moved. Because maintenance activities require access at both the front and back, extra room needs to be allowed. The footprint shows the radius of the swinging doors on the I/O rack. The illustration shows the minimum space required.

### T00 and T42 Racks Multiple Attachment



T00 racks or T42 racks can be bolted together in a multiple rack arrangement as shown above. A kit is available including the bolts, spacers, and decorative trim pieces to cover the 25.4mm (1 in.) space. For service clearances, see the service clearances as shown in the table for the “Model T00 Rack” on page 31.

## T00 and T42 Rack Weight Distribution and Floor Loading

The T00 and T42 racks can be extremely heavy when several drawers are present. The following table shows the necessary weight distribution distances for the T00 and T42 racks when it is loaded.

Rack	System Weight (1) lbs(kg)	Width (2) in(mm)	Depth (2) in(mm)	Weight Distribution Distance (3)	
				Front & Back in(mm)	Left & Right in(mm)
7014-T00 (4)	1795 (816)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	18.4 (467.4)
7014-T00 (5)	1795 (816)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	0.0 (0.0)
7014-T00 (6)	1795 (816)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	22 (559)
7014-T42 (4)	2045 (930)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	18.4 (467.4)
7014-T42 (5)	2045 (930)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	0.0 (0.0)
7014-T42 (6)	2045 (930)	24.5 (623)	40.2 (1021)	20.3 (515.6), 18.8 (477.5)	27 (686)

The following table shows the necessary floor loading for the T00 and T42 racks when it is loaded.

Rack	Floor Loading			
	Raised kg/m <sup>2</sup>	Non-Raised kg/m <sup>2</sup>	Raised lb/ft <sup>2</sup>	Non-Raised lb/ft <sup>2</sup>
7014-T00 (4)	366.7	322.7	75	66
7014-T00 (5)	734.5	690.6	150.4	141.4
7014-T00 (6)	341	297	70	61
7014-T42 (4)	403	359	82.5	73.5
7014-T42 (5)	825	781	169	160
7014-T42 (6)	341.4	297.5	70	61

The following notes are for both of the preceding tables.

### Notes:

1. Maximum weight of fully populated rack, units are lbs with kg in parentheses.
2. Dimensions without covers, units are inches with mm in parentheses.
3. The weight distribution distance in all four directions is the area around the rack perimeter (minus covers) necessary to distribute the weight beyond the perimeter of the rack. Weight distribution areas cannot overlap with adjacent computer equipment weight distribution areas. Units are inches with mm in parentheses.
4. Weight distribution distance is 1/2 the service clearance values shown in the figure plus cover thickness.
5. No left and right weight distribution distance.
6. Left and right weight distribution distance required for a 70 lb/ft<sup>2</sup> raised floor loading objective.

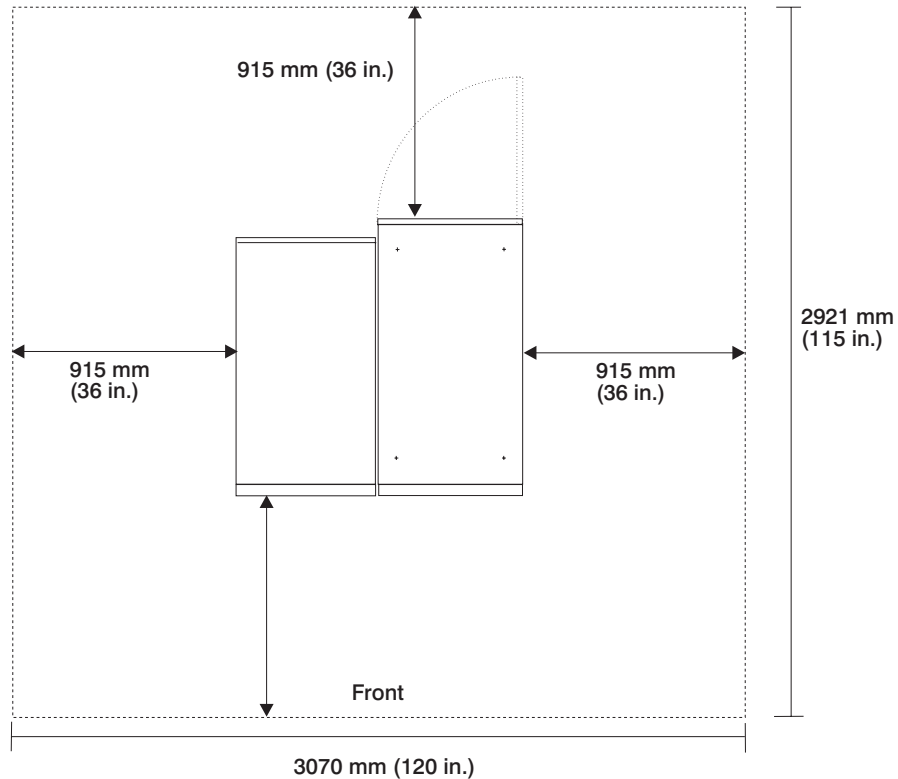
## Service Clearances for S80 or S85 System With T00 Style I/O Rack

The amount of space needed by the units during service is indicated by large box of the footprint.

For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack.

**Note:** If you plan to install an S80 or S85 in an SP System environment, see *RS/6000 SP Planning Volume 1, Hardware and Physical Environment (GA22-7280)* for system planning information.

### Rack Configuration for AC Systems or -48v DC Systems



**Note:** Rack units are large and heavy, they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging doors on the I/O rack. The illustration shows the minimum space required.

## 7015 POWERserver 970B and 980B

<b>Dimensions</b>				
Height	1578 mm	62.0 in.		
Width	650 mm	25.5 in.		
Depth	921 mm	36.0 in.		
<b>Weight</b>				
Minimum	205kg	450 lbs.		
Maximum	441kg	970 lbs.		
<b>Electrical<sup>5</sup></b>	<b>Maximum Entry Configuration</b>	<b>Maximum Configuration</b>		
Power source loading (max)	1.0	2.4		
Voltage range (V ac)	200 to 240 or -48V dc	200 to 240 or -48V dc		
Frequency (hertz)	50 or 60	50 or 60		
Thermal output (max)	2165 Btu/hr	4100 Btu/hr		
Power requirements (max)	634 watts	1200 watts		
Power factor <sup>4</sup>	0.5 to 0.7	0.5 to 0.7		
Inrush current <sup>6</sup>	125 amps	125 amps		
Maximum altitude	2135 m (7000 ft.)	2135 m (7000 ft.)		
<b>Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125°F)		
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating</b>		
Without tape drive	8 to 80%	8 to 80%		
With tape drive	20 to 80%	20 to 80%		
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)	27°C (80°F)		
With tape drive	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	6.4 bels	6.2 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	49 dBA	47 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances<sup>3</sup></b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow			
<b>Service</b>	(See service clearances for the “7015 System Rack R00” on page 41)			
<ol style="list-style-type: none"> <li>See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>Noise emissions data for the 7015 system unit is based on the following configuration: a processor drawer with eight memory cards and eight I/O cards, a SCSI device drawer with four SCSI devices, the second eight I/O slots with eight asynchronous cards, two SCSI disk drawers with four SCSI devices each, and a battery backup unit. Noise emissions data for the SCSI disk drawer is therefore included in the data.</li> <li>For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack. For five to six racks placed side by side, the left and right clearances need to be increased to 1525 mm (60 in). Having more than six racks side by side is not recommended. See “7015 System Rack R00” on page 41 for additional clearance information.</li> <li>Power factor is 0.7 to 0.9 without a battery backup unit.</li> <li>The figures for power source loading, thermal output, and power requirement represent maximums. Work with your sales or service representative to determine the typical figures for your configuration.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal use.</li> </ol>				

## 7015 POWERserver 990

<b>Dimensions</b>				
Height	1578 mm	62.0 in.		
Width	650 mm	25.5 in.		
Depth	921 mm	36.0 in.		
<b>Weight</b>				
Minimum	205 kg	450 lbs.		
Maximum	441 kg	970 lbs.		
<b>Electrical<sup>5</sup></b>	<b>Maximum Entry Configuration</b>	<b>Maximum Configuration</b>		
Power source loading (max)	1.0	2.4		
Voltage range (V ac)	200 to 240 or -48V dc	200 to 240 or -48V dc		
Frequency (hertz)	50 or 60	50 or 60		
Thermal output (max)	2165 Btu/hr	4100 Btu/hr		
Power requirements (max)	634 watts	1200 watts		
Power factor <sup>4</sup>	0.5 to 0.7	0.5 to 0.7		
Inrush current <sup>6</sup>	125 amps	125 amps		
Maximum altitude	2135 m (7000 ft.)	2135 m (7000 ft.)		
<b>Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		
	16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating</b>		
Without tape drive	8 to 80%	8 to 80%		
With tape drive	20 to 80%	20 to 80%		
<b>Wet Bulb Requirements</b>	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	6.4 bels	6.2 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	49 dBA	47 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances<sup>3</sup></b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow			
<b>Service</b>	(See service clearances for the “7015 System Rack R00” on page 41)			
<ol style="list-style-type: none"> <li>See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>Noise emissions data for the 7015 system unit is based on the following configuration: a Processor Drawer with eight memory cards and eight I/O cards, a SCSI Device Drawer with four SCSI devices, the second eight I/O slots with eight asynchronous cards, two SCSI Disk Drawers with four SCSI devices each, and a battery backup unit. Noise emissions data for the SCSI Disk Drawer is therefore included in the data.</li> <li>For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack. For five to six racks placed side by side, the left and right clearances need to be increased to 1525 mm (60 in). Having more than six racks side by side is not recommended. See “7015 System Rack R00” on page 41 for additional clearance information.</li> <li>Power factor is 0.7 to 0.9 without a battery backup unit.</li> <li>The figures for power source loading, thermal output, and power requirement represent maximums. Work with your sales or service representative to determine the typical figures for your configuration.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal use.</li> </ol>				



## 7015 SCSI Disk and Device Drawers

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4 EIA units)
Width	443 mm	17.4 in.
Depth	686 mm	27.0 in.
<b>Weight</b>		
Minimum	25 kg	55 lbs.
Maximum	48 kg	105 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)		0.34
Voltage range (V ac)		200 to 240
Frequency (hertz)		50 or 60
Thermal output (typical)		580 Btu/hr
Power requirements (typical)		170 watts
Power factor		0.5 to 0.7
Inrush current*		39 amps
Maximum altitude		2135 m (7000 ft.)
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating</b>
Without tape drive	8 to 80%	8 to 80%
With tape drive	20 to 80%	20 to 80%
<b>Wet Bulb Requirements</b>		
Without tape drive	27°C (80°F)	27°C (80°F)
With tape drive	23°C (73°F)	27°C (80°F)
<b>Noise Emissions</b>		
Data included with calculations for the 7015 POWERservers.		
* Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.		

## 1/2-Inch 9-Track Tape Drive Drawer

<b>Dimensions</b>		
Height	222 mm	8.75 in. (6 EIA units)
Width	483 mm	19.00 in.
Depth	679 mm	26.75 in.
<b>Weight</b>		
Minimum	48.2 kg	106 lbs.
Maximum	48.2 kg	106 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.2	
Voltage range (V ac)	100 to 125 or 200 to 240 (selectable)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	410 Btu/hr	
Power requirements (typical)	120 watts	
Power factor	0.5 to 0.7	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)

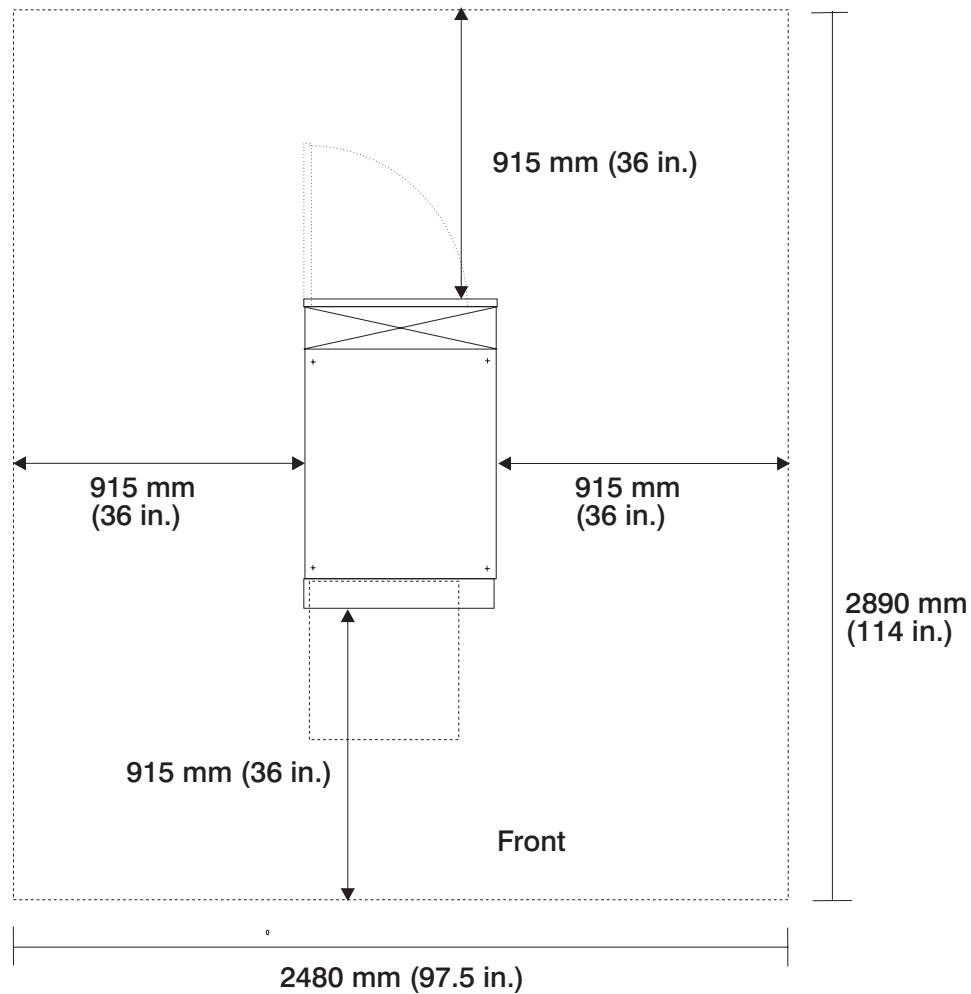
## 7015 System Rack R00

<b>Dimensions</b>				
Height		1578 mm		62.0 in.
Width		650 mm		25.5 in.
Depth with Std. Door		921 mm		36.0 in.
Depth with SMP Door		1060 mm		41.8 in.
<b>Weight <sup>1</sup></b>				
Base Rack		130 kg		286 lbs.
Full rack		594 kg		1309 lbs.
<b>Electrical<sup>2</sup></b> (sum specified values for drawers or enclosures in rack)				
DC Rack				
Power source loading maximum in kVA <sup>3</sup>			8.4	
Voltage range (V dc)			-40 to -60	
AC Rack				
Power source loading maximum in kVA (per PDB) <sup>4</sup>			4.8	
Voltage range (V ac)			200 to 240	
Frequency (hertz)			50 or 60	
<b>Noise Emissions</b> (see specifications for drawers or enclosures)				
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	915mm(36 in)	915mm(36 in)	915mm(36 in)	915mm(36 in)
<b>Notes:</b>				
1. Configuration dependent, base rack weight plus the weight of the drawers mounted in the rack. The rack can support up to a maximum of 13.6 kg (30) lbs/EIA (Unit).				
2. The total rack power should be derived from the sum of the power used by the drawers in the rack.				

## R00 Rack Service Clearances

The broken lines on the footprint indicate the amount of space needed by the unit during normal operation.

For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack. For five to six racks placed side by side, the left and right clearances need to be increased to 1525 mm (60 in). Having more than six racks side by side is not recommended.



**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging door on the rear of the rack and a drawer in the extended position. The illustration shows the minimum space required.

## 7015 Models R10, R20, and R21 CPU Drawers

<b>Dimensions</b>				
Height	266.7 mm	10.5 in.		
Width	445.5 mm	17.5 in.		
Depth	610.0 mm	24.0 in.		
<b>Weight</b>				
Minimum (Configuration dependant)	30.3 kg	65 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.29KVA			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 or 60			
Thermal output (typical)	850 Btu/hr			
Power requirements (typical)	250 watts ( Model R10) 280 watts (Model R20)			
Power factor	0.85 min			
Inrush current <sup>3</sup>	20 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 40°C (50 to 104°F)	
<b>Humidity (Noncondensing)</b>	<b>Operating</b>		<b>Non-Operating</b>	
Without tape drive	8 to 80%		8 to 80%	
With tape drive	20 to 80%		20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)		27°C (80°F)	
With tape drive	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.4 bels		6.2 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49 dBA		47 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See service clearances for the R00 System Rack)			
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for Models R10 and R20 CPU Drawers are based on a processor drawer mounted in a R00 System Rack.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7015 Model R24

<b>Dimensions</b>				
Height	445.5 mm	17.5 in.		
Width	445.5 mm	17.5 in.		
Depth	710.0 mm	28.0 in.		
<b>Weight</b>				
Minimum (Configuration dependent)	51.3 kg	112 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.685			
Voltage range (V ac)	200 to 240 or -48V dc			
Frequency (hertz)	50 or 60			
Thermal output (typical)	2100 Btu/hr			
Power requirements (typical)	615 watts			
Power factor	0.8 to 1.0			
Inrush current <sup>3</sup>	68 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 40°C (50 to 104°F)	
<b>Humidity (Noncondensing)</b>	<b>Operating</b>		<b>Non-Operating</b>	
Without tape drive	8 to 80%		8 to 80%	
With tape drive	20 to 80%		20 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)		27°C (80°F)	
With tape drive	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.4 bels		6.2 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49 dBA		47 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See service clearances for the R00 System Rack)			
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>Noise emissions data for the Model R24 CPU Media Enclosure are based on the following configuration: the enclosure is mounted in a R00 System Rack with three 2.0GB SCSI Disk drives are installed, two SCSI Disk Drawers with three 2.41GB disk drives installed, a power distribution unit is installed in the rack and the system is operating in a nominal environment of 25°C (78 °F)</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7015 Model R30, R40, and R50

<b>Dimensions</b>				
Height	267.0 mm	10.5 in.		
Width	445.5 mm	17.5 in.		
Depth	925.0 mm	36.4 in.		
<b>Weight</b>				
Minimum (Configuration dependent)	59.7 kg	132 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.8			
Voltage range (V ac)	200 to 240 or -48V dc			
Frequency (hertz)	50 or 60			
Thermal output (typical)	2457 Btu/hr			
Power requirements (typical)	720 watts			
Power factor	0.8 to 1.0			
Inrush current <sup>3</sup>	45 amps at 240 V ac 90 amps at 240 V ac with redundant power option			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating (Power Off)</b> 10 to 40°C (50 to 104°F)	
<b>Humidity (Noncondensing)</b>		<b>Operating</b>	<b>Non-Operating (Power Off)</b>	
Without tape drive	8 to 80%		8 to 80%	
With tape drive	20 to 80%		8 to 80%	
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)		27°C (80°F)	
With tape drive	27°C (80°F)		27°C (80°F)	
<b>Noise Emissions</b> <sup>1,2,4</sup>		<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub>	6.4 bels		6.0 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49 dBA		47 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See service clearances for the R00 System Rack)			
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for the Models R30, R40, and R50 CPU Media Enclosure are based on the following configuration: the enclosure is mounted in a R00 System Rack and a power distribution unit is installed in the rack and the system is operating in a nominal environment of 25°C (78 °F)</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

# Enterprise Server Models S70 and S7A (7017, 7013, 7015)

## System Rack

<b>Dimensions</b>				
Height	1577 mm	62.0 in.		
Width	567 mm	22.3 in.		
Depth	1041 mm	40.9 in.		
<b>Weight</b>				
Minimum (Configuration dependant)	400 kg	880 lbs.		
<b>Electrical</b>				
Power source loading (maximum in kVA)	1.887KVA			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 - 60			
Thermal output (Maximum)	5796 Btu/hr			
Power requirements (Maximum)	1698 watts			
Power factor	0.9			
Inrush current <sup>3</sup>	102 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements<sup>4,5</sup></b>	<b>Operating</b> 10 to 37.8°C (50 to 100°F)		<b>Non-Operating</b> 1 to 60°C (34 to 140°F)	
<b>Humidity</b>	<b>Operating</b>		<b>Non-Operating</b>	
Noncondensing	8 to 80%		8 to 80%	
<b>Wet Bulb Requirements<sup>6</sup></b>	23°C (73°F)		23°C (73°F)	
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	7.0 bels		7.0 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	N/A		N/A	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See "Service Clearances for System in an S70, S7A, or S80 I/O Rack" on page 54.			
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for Models S70 and S7A are based on a system with the doors closed.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. The use of the PCI SSA Multi-Initiator/RAID EL in the Model S70 I/O Drawer limits the system usage to a 28°C (82°F) environment maximum.</li> <li>5. The upper limit of the dry bulb temperature must be derated 1 degree C per 137M (450 ft.) above 1295M (4250 ft.)</li> <li>6. The upper limit of the wet bulb temperature must be derated 1 degree C per 274M (882 ft.) elevation above 1370M (4500 ft.)</li> </ol>				



## Enterprise Server Model S80 (7017)

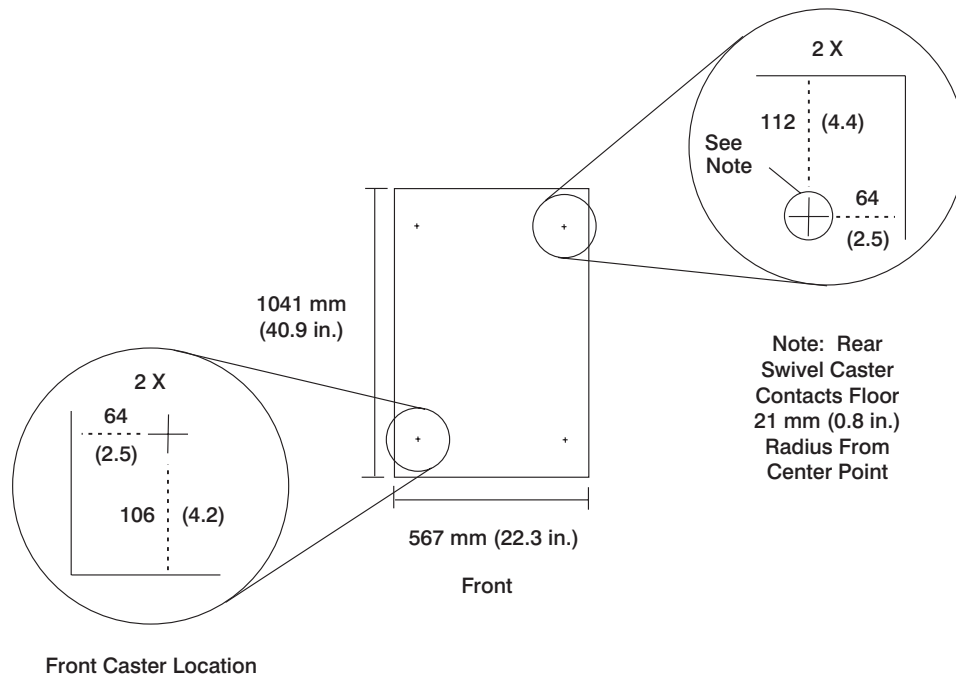
The S80 can be used with a T00 or T42 style I/O rack. See “Model T00 Rack” on page 31. The rack can be ordered by feature code with your system.

### System Rack

<b>Dimensions</b>				
Height	1577 mm	62.0 in.		
Width	567 mm	22.3 in.		
Depth	1041 mm	40.9 in.		
<b>Weight</b>				
Minimum (Configuration dependant)	400 kg	880 lbs.		
<b>Electrical</b>				
Power source loading (maximum in kVA)	2.129KVA			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 - 60			
Thermal output (Maximum)	6904 Btu/hr			
Power requirements (Maximum)	2023 watts			
Power factor	0.92 to 0.98			
Inrush current <sup>3</sup>	43 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements<sup>4,5</sup></b>				
	<b>Operating</b> 10 to 37.8°C (50 to 100°F)		<b>Non-Operating</b> 11 to 60°C (34 to 140°F)	
<b>Humidity</b>				
Noncondensing	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb Requirements<sup>6</sup></b>	23°C (73°F)		23°C (73°F)	
<b>Noise Emissions<sup>1,2</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	6.9 bels		6.8 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49.5 dBA		49.0 dBA	
Impulsive or prominent discrete tones	None		None	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See “Service Clearances for System in an S70, S7A, or S80 I/O Rack” on page 54. Or, see “Service Clearances for S80 or S85 System With T00 Style I/O Rack” on page 36.			
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for Model S80 are based on a system with the doors closed.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. The use of the PCI SSA Multi-Initiator/RAID EL in the Model S7A and S80 I/O Drawer 10 EIA limits the system usage to a 28°C (82°F) environment maximum.</li> <li>5. The upper limit of the dry bulb temperature must be derated 1 degree C per 137M (450 ft.) above 1295M (4250 ft.)</li> <li>6. The upper limit of the wet bulb temperature must be derated 1 degree C per 274M (882 ft.) elevation above 1370M (4500 ft.)</li> </ol>				

## S80 Rack Caster Location

The following figure shows the caster locations for the S80 rack. For complete specifications on the S80 system rack, see "Enterprise Server Model S80 (7017)" on page 47.



## 7017 Model S85

The S85 can be used with a T00 or T42 style I/O rack. See “Model T00 Rack” on page 31. The rack can be ordered by feature code with your system.

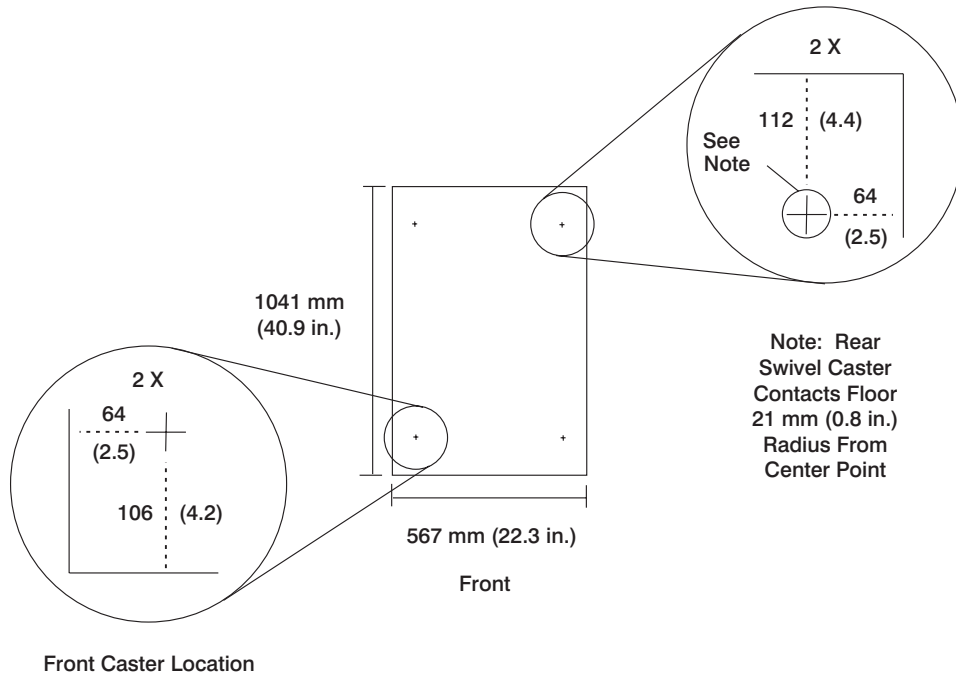
<b>Dimensions</b>				
Height	1577 mm	62.0 in.		
Width	565 mm	22.2 in.		
Depth	1200 mm	47.2 in.		
<b>Weight</b>				
Minimum (Configuration dependant)	400 kg	880 lbs.		
<b>Electrical</b>				
Power source loading (maximum in kVA)	2.129KVA			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 - 60			
Thermal output (Maximum)	6904 Btu/hr			
Power requirements (Maximum)	2023 watts			
Power factor	0.92 to 0.98			
Inrush current <sup>3</sup>	43 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements<sup>4,5</sup></b>	<b>Operating<sup>7</sup></b> 10 to 38°C (50 to 100°F)		<b>Non-Operating</b> 11 to 60°C (34 to 140°F)	
<b>Humidity</b> Noncondensing	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb Requirements<sup>6</sup></b>	23°C (73°F)		23°C (73°F)	
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.9 bels		6.8 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49.5 dBA		49.0 dBA	
Impulsive or prominent discrete tones	None		None	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See “Service Clearances for S80 or S85 System With T00 Style I/O Rack” on page 36.			
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for Model S85 are based on a system with the doors closed.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. The use of the PCI SSA Multi-Initiator/RAID EL in the Model S80 and S85 I/O Drawer 10 EIA limits the system usage to a 28°C (82°F) environment maximum.</li> <li>5. The upper limit of the dry bulb temperature must be derated 1 degree C per 137M (450 ft.) above 1295M (4250 ft.)</li> <li>6. The upper limit of the wet bulb temperature must be derated 1 degree C per 274M (882 ft.) elevation above 1370M (4500 ft.)</li> <li>7. For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>				

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)	2438 m (8000 ft)	2743 m (9000 ft)	3048 m (10000 ft)
FC 6120	33°C (91°F)	33°C (91°F)	33°C (91°F)	32°C (90°F)	32°C (90°F)	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	29°C (84°F)	28°C (82°F)
FC 6134	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	29°C (84°F)	29°C (84°F)	28°C (82°F)	28°C (82°F)	27°C (81°F)	26°C (79°F)	26°C (79°F)

## S85 Rack Caster Location

The following figure shows the caster locations for the S85 rack. For complete specifications on the S85 system rack, see "7017 Model S85" on page 49.



## S70 SCSI I/O Drawer 7 EIA

<b>Dimensions</b>				
Height	306.2 mm 12.1 in.			
Width	442.4 mm 17.4 in.			
Depth	748.2 mm 29.5 in.			
<b>Weight</b>				
Minimum configuration	43 kg 95 lbs.			
Maximum configuration	61 kg 135 lbs.			
<b>Electrical</b>	<b>AC</b>	<b>DC</b>		
Power source loading (typical in kVA)	0.4	0.4		
Power source loading (maximum in kVA)	1.0	1.0		
Voltage range	200 to 240 V ac	40 to 60 VDC		
Frequency (hertz)	50 / 60	N.A		
Thermal output (typical)	1228 Btu/hr	1365 Btu/hr		
Thermal output (maximum)	3071 Btu/hr	3412 Btu/hr		
Power requirements (typical)	360 watts	400 watts		
Power requirements (maximum)	900 watts	1000 watts		
Power factor	0.9	N/A		
Inrush current <sup>3</sup>	120 amps	300 amps		
Maximum altitude	2135 m (7000 ft.)	2135 m (7000 ft.)		
<b>Temperature Requirements<sup>4</sup></b>	<b>Operating</b> 10 to 40°C <sup>4</sup> (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)		
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating</b>		
Without tape drive	8 to 80%	8 to 80%		
With tape drive	20 to 80%	20 to 80%		
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)	27°C (80°F)		
With tape drive	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	5.9 bels	5.8 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	39 dBA	38 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See "Service Clearances for System in an S70, S7A, or S80 I/O Rack" on page 54)			
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data for the Model S70 SCSI I/O Drawer 7 EIA are based on the I/O drawer mounted in a rack. See "S70, S7A and S80 I/O Rack" on page 54.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. Use of the PCI SSA Multi-Initiator/RAID EL in this S70 I/O Drawer limits the system usage to a 28°C (82°F) environment maximum.</li> </ol>				

## S7A, S80, and S85 SCSI I/O Drawer 10 EIA

<b>Dimensions</b>				
Height	440.0 mm 17.3 in.			
Width	443.2 mm 17.5 in.			
Depth	843.2 mm 33.2 in.			
<b>Weight</b>				
Minimum configuration	89 kg 195 lbs.			
Maximum configuration	93 kg 205 lbs.			
<b>Electrical</b>	<b>AC</b>	<b>DC</b>		
Power source loading (typical in kVA)	0.4	0.4		
Power source loading (maximum in kVA)	1.0	1.0		
Voltage range	200 to 240 V ac	40 to 60 VDC		
Frequency (hertz)	50 / 60	NA		
Thermal output (typical)	1228 Btu/hr	1365 Btu/hr		
Thermal output (maximum)	3071 Btu/hr	3412 Btu/hr		
Power requirements (typical)	360 watts	400 watts		
Power requirements (maximum)	900 watts	1000 watts		
Power factor	0.9	N/A		
Inrush current <sup>3</sup>	170 amps	300 amps		
Maximum altitude	2135 m (7000 ft.)	2135 m (7000 ft.)		
<b>Temperature Requirements<sup>4</sup></b>	<b>Operating</b> 16 to 32°C <sup>4</sup> (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)		
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating</b>		
Without tape drive	8 to 80%	8 to 80%		
With tape drive	20 to 80%	20 to 80%		
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)	27°C (80°F)		
With tape drive	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	5.5 bels	5.4 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	37 dBA	36 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See "Service Clearances for System in an S70, S7A, or S80 I/O Rack" on page 54)			
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. Noise emissions data for the Model S7A, SCSI I/O Drawer 7 EIA are based on the I/O drawer mounted in a rack.</p> <p>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</p>				

## S70, S7A and S80 I/O Rack

<b>Dimensions</b>				
Height		1577 mm	62.0 in.	
Width		650 mm	25.5 in.	
Depth		1019 mm	40.1 in.	
<b>Weight<sup>1</sup></b> (Base Rack)		159 kg	349 lbs.	
<b>Electrical</b>	(see specifications for drawers or enclosures)			
<b>Temperature Requirements</b>	(see specifications for drawers or enclosures)			
<b>Humidity Requirements</b>	(see specifications for drawers or enclosures)			
<b>Noise Emissions</b>	(see specifications for drawers or enclosures)			
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See "Service Clearances for System in an S70, S7A, or S80 I/O Rack."			
1. Configuration dependent, base weight plus weight of drawers.				

### Service Clearances for System in an S70, S7A, or S80 I/O Rack

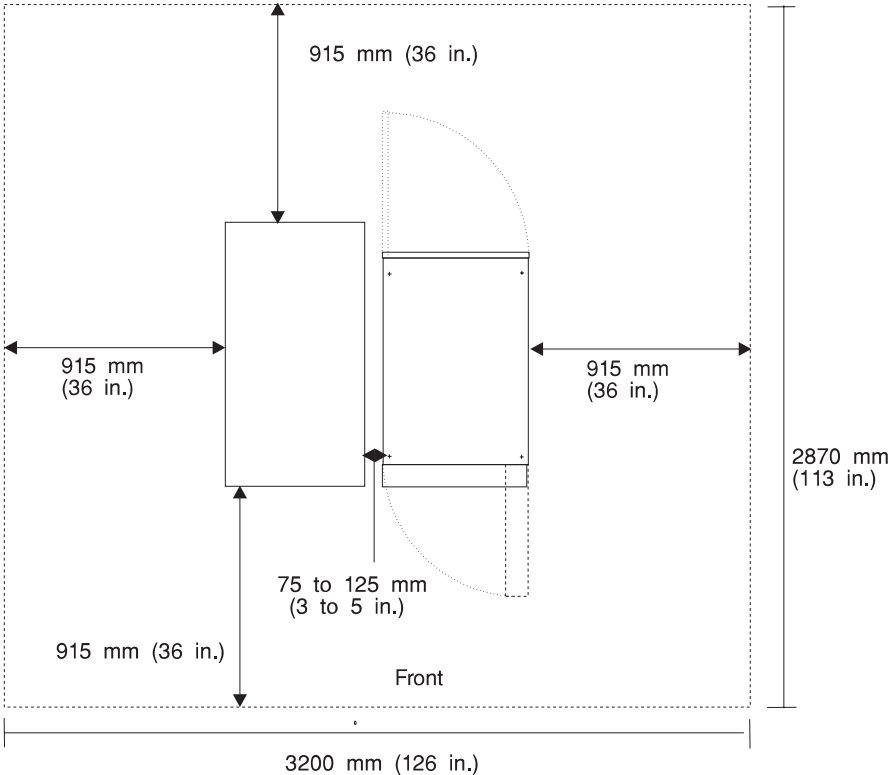
The amount of space needed by the units during service is indicated by large box of the footprint. For complete specifications, see "S70, S7A and S80 I/O Rack."

For multiple racks placed side by side, the left and right service clearances apply only to the leftmost and rightmost rack.

**Note:** If you are planning to install an S70, S7A or S80 in an RS/6000 SP System environment, see *RS/6000 SP Planning Volume 1, Hardware and Physical Environment (GA22-7280)* for system planning information.

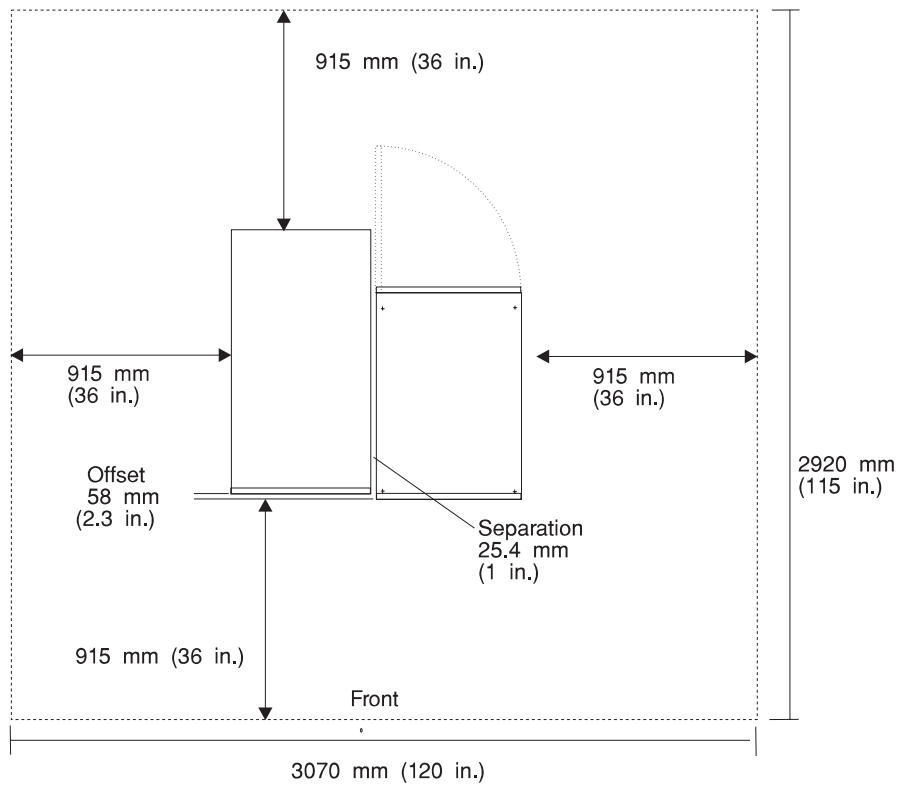


# Rack Configuration (AC Systems)



**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging doors on the I/O rack. The illustration shows the minimum space required.

## Rack Configuration (-48v DC Systems)



**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging doors on the I/O rack. The illustration shows the minimum space required.

## 7020 Entry Workstation Model 40P

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	124 mm	4.9 in.	477 mm	18.8 in.
Width <sup>1</sup>	454 mm	17.9 in.	215 mm	8.5 in.
Depth	447 mm	17.6 in.	447 mm	17.6 in.
<b>Weight</b>				
Minimum configuration			12 kg 26 lbs.	
Maximum configuration			14.5 kg 32 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)			0.52	
Voltage range (V ac)			100 to 127 or 200 to 240 (switchable)	
Frequency (hertz)			50 or 60	
Thermal output (typical)			290 Btu/hr	
Power requirements (typical)			185 watts	
Power factor			0.5 to 0.7	
Inrush current <sup>6</sup>			23 amps at 120 V ac and at 240 V ac	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>				
	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>				
(Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80%		8 to 80%	
	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>2</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.1 bels		4.8 bels	
L <sub>pAm</sub>	43 dBA		43 dBA	
<L <sub>pA</sub> > <sub>m</sub>	40 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances<sup>3</sup></b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>4,5</sup></b>	35mm(1.5 in)	51mm(2 in)	25mm(1 in)	25mm(1 in)
<b>Service</b>	466mm(18 in)	N/A	N/A	N/A
<b>Footprint<sup>4</sup></b>				
	<b>Width</b>		<b>Depth</b>	
Desktop	505mm(19.9 in)		550mm(21.6 in)	
Deskside	215mm(8.5 in)		550mm(21.6 in)	
<ol style="list-style-type: none"> <li>1. Deskside width measurement includes the optional vertical stand.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Left and right measurements apply only when the system is used in the desktop position.</li> <li>4. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>5. When placed in the vertical position, the system requires 25 mm (1 in) at the bottom and top for proper air flow. The necessary bottom clearance is provided by the optional vertical stand.</li> <li>6. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7024 Entry Deskside PowerPC Server E Series

<b>Dimensions</b>				
Height	648 mm 25.5 in.			
Width <sup>1</sup>	315 mm 12.4 in.			
Depth	450 mm 17.7 in.			
<b>Weight</b>				
Maximum	25 kg 55 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.17			
Voltage range (V ac)	100 to 127 or 200 to 240 (switchable)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	375 Btu/hr			
Power requirements (typical)	110 watts			
Power factor	0.5 to 07			
Inrush current <sup>4</sup>	75 amps at 120 V ac, 150 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
(Noncondensing)	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>2</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.2 bels			5.0 bels
L <sub>pAm</sub>	41 dBA			38 dBA
<L <sub>pA</sub> > <sub>m</sub>	36 dBA			34 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>3</sup></b>	76mm(3 in)	76mm(3 in)	25mm(1 in)	25mm(1 in)
<b>Service</b>	466mm(18 in)	N/A	N/A	N/A
<b>Footprint<sup>3</sup></b>	<b>Width</b>		<b>Depth</b>	
	365mm(14.4 in)		602mm(23.7 in)	
<ol style="list-style-type: none"> <li>Width measurement includes the optional vertical stand.</li> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7025 Deskside 6F0 Series

<b>Dimensions</b>				
Height	610 mm 24.0 in.			
Width	483 mm 19.0 in.			
Depth	728 mm 28.7 in.			
<b>Weight</b>				
Minimum configuration	70 kg 155 lbs.			
Maximum configuration	95 kg 209 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.42			
Power source loading maximum in kVA	0.63			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1365 Btu/hr			
Thermal output (maximum)	2048 Btu/hr			
Power requirements (typical)	400 watts			
Power requirements (maximum)	600 watts			
Power factor	0.95			
Inrush current <sup>3</sup>	90 amps			
Maximum altitude <sup>4</sup>	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating<sup>4, 5</sup></b>		<b>Non-Operating</b>	
	10 to 38°C (50 to 100°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating<sup>4</sup></b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.1 bels		5.9 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	43 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	585mm(23 in)		956mm(37.7 in)	
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. A) Dry bulb temperature derating at high altitude: Upper limit temperature must be derated 1.0 deg C per 137 m of elevation beyond 1295 m above sea level. (1 deg F per 250 ft above 4250 feet). B) Wet bulb temperature derating at high altitude: Upper limit temperature must be derated 1 deg C per 274 m of elevation beyond 1372m above sea level (1 deg F per 500 ft above 4500 feet).</li> <li>5. For systems with FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>				

The following table lists maximum operating temperatures for FC 6134 at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)	2438 m (8000 ft)	2743 m (9000 ft)	3048 m (10000 ft)
FC 6134	37°C (99°F)	36°C (97°F)	36°C (97°F)	36°C (97°F)	35°C (95°F)	35°C (95°F)	34°C (93°F)	31°C (88°F)	29°C (84°F)	27°C (81°F)	25°C (77°F)

## 7025 Deskside 6F1 Series

<b>Dimensions</b>				
Height	610 mm 24.0 in.			
Width	483 mm 19.0 in.			
Depth	728 mm 28.7 in.			
<b>Weight</b>				
Minimum configuration	70 kg 155 lbs.			
Maximum configuration	95 kg 209 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.59			
Power source loading maximum in kVA	0.86			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1920 Btu/hr			
Thermal output (maximum)	2867 Btu/hr			
Power requirements (typical)	560 watts			
Power requirements (maximum)	840 watts			
Power factor	0.95			
Inrush current <sup>3</sup>	70 amps			
Maximum altitude <sup>4</sup>	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating<sup>4, 5</sup></b>		<b>Non-Operating</b>	
	10 to 38°C (50 to 100°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating<sup>4</sup></b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.1 bels		5.9 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	43 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	585mm(23 in)		956mm(37.7 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>A) Dry bulb temperature derating at high altitude: Upper limit temperature must be derated 1.0 deg C per 137 m of elevation beyond 1295 m above sea level. (1 deg F per 250 ft above 4250 feet). B) Wet bulb temperature derating at high altitude: Upper limit temperature must be derated 1 deg C per 274 m of elevation beyond 1372m above sea level (1 deg F per 500 ft above 4500 feet).</li> <li>For systems with FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>				

The following table lists maximum operating temperatures for FC 6134 at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)	2438 m (8000 ft)	2743 m (9000 ft)	3048 m (10000 ft)
FC 6134	37°C (99°F)	36°C (97°F)	36°C (97°F)	36°C (97°F)	35°C (95°F)	35°C (95°F)	34°C (93°F)	31°C (88°F)	29°C (84°F)	27°C (81°F)	25°C (77°F)



## 7025 Deskside F30 Series

<b>Dimensions</b>				
Height	620 mm 24.3 in.			
Width	245 mm 9.6 in.			
Width with Pedestal	350 mm 13.7 in.			
Depth	695 mm 27.3 in.			
Depth with Pedestal	745 mm 29.3 in.			
<b>Weight</b>				
Minimum configuration	30 kg 65 lbs.			
Maximum configuration	50 kg 110 lbs.			
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.56			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (maximum)	1535 Btu/hr			
Power requirements (maximum)	450 watts			
Power factor	0.8			
Inrush current <sup>3</sup>	30 amps at 120 V ac, 60 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
(Noncondensing)	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.8 bels			5.5 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	41 dBA			38 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	350mm(13.7 in)		975mm(38.4 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7025 Deskside F40 Series

<b>Dimensions</b>				
Height	620 mm 24.3 in.			
Width	245 mm 9.6 in.			
Width with Pedestal	350 mm 13.7 in.			
Depth	695 mm 27.3 in.			
Depth with Pedestal	745 mm 29.3 in.			
<b>Weight</b>				
Minimum configuration	30 kg 65 lbs.			
Maximum configuration	50 kg 110 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.41			
Power source loading maximum in kVA	0.56			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1125 Btu/hr			
Thermal output (maximum)	1535 Btu/hr			
Power requirements (typical)	330 watts			
Power requirements (maximum)	450 watts			
Power factor	0.8 - 0.96			
Inrush current <sup>3</sup>	30 amps at 120 V ac, 60 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>			<b>Non-Operating</b>
	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.8 bels			5.5 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	41 dBA			38 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	350mm(13.7 in)		975mm(38.4 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7025 Deskside F50 Series

<b>Dimensions</b>				
Height	620 mm 24.3 in.			
Width	245 mm 9.6 in.			
Width with Pedestal	350 mm 13.7 in.			
Depth	695 mm 27.3 in.			
Depth with Pedestal	745 mm 29.3 in.			
<b>Weight</b>				
Minimum configuration	30 kg 65 lbs.			
Maximum configuration	55 kg 120 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.52			
Power source loading maximum in kVA	0.56			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	975 Btu/hr			
Thermal output (maximum)	2050 Btu/hr			
Power requirements (typical)	285 watts			
Power requirements (maximum)	600 watts			
Power factor	0.8 - 0.96			
Inrush current <sup>3</sup>	50 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>			<b>Non-Operating</b>
	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WA</sub> d	5.8 bels			5.5 bels
L <sub>pA</sub> m	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	41 dBA			38 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	350mm(13.7 in)		975mm(38.4 in)	
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7025 Deskside F80 Series

<b>Dimensions</b>				
Height	610 mm 24.0 in.			
Width	483 mm 19.0 in.			
Depth	728 mm 28.7 in.			
<b>Weight</b>				
Minimum configuration	70 kg 155 lbs.			
Maximum configuration	95 kg 209 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.59			
Power source loading maximum in kVA	0.86			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1920 Btu/hr			
Thermal output (maximum)	2867 Btu/hr			
Power requirements (typical)	560 watts			
Power requirements (maximum)	840 watts			
Power factor	0.95			
Inrush current <sup>3</sup>	70 amps			
Maximum altitude <sup>4</sup>	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating<sup>4</sup></b>	<b>Non-Operating</b>		
	10 to 38°C (50 to 100°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating<sup>4</sup></b>	<b>Non-Operating</b>		
	8 to 80%	8 to 80%		
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d	6.1 bels	5.9 bels		
L <sub>pA</sub> m	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	43 dBA	40 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457 mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	585mm(23 in)		956mm(37.7 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>A) Dry bulb temperature derating at high altitude: Upper limit temperature must be derated 1.0 deg C per 137 m of elevation beyond 1295 m above sea level. (1 deg F per 250 ft above 4250 feet). B) Wet bulb temperature derating at high altitude: Upper limit temperature must be derated 1 deg C per 274 m of elevation beyond 1372m above sea level (1 deg F per 500 ft above 4500 feet).</li> </ol>				

## 7026 Model 6H0 CEC Drawer

The Model 6H0 includes the Central Electronics Complex (CEC) Drawer with an I/O Drawer. For technical information on the I/O Drawer, see "I/O Drawer 5 EIA" on page 79.

<b>Dimensions</b>		
Height	218 mm 8.58 in. 5 (EIA Units)	
Width	445 mm 17.5 in.	
Depth	820 mm 32.3 in.	
<b>Weight</b>		
Minimum configuration	41 kg 90 lbs.	
Maximum configuration	52 kg 115 lbs.	
<b>Electrical</b>		
Power source loading typical in kVA	0.24	
Power source loading maximum in kVA	0.37	
Voltage range (V ac)	200 to 240	
Frequency (hertz)	50 or 60	
Thermal output (typical)	768 Btu/hr	
Thermal output (maximum)	1195 Btu/hr	
Power requirements (typical)	225 watts	
Power requirements (maximum)	350 watts	
Power factor	0.95	
Inrush current <sup>1</sup>	40 amps	
Maximum altitude <sup>2</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>2</sup></b>	<b>Operating<sup>4</sup></b>	<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125.6°F)
<b>Humidity Noncondensing</b>	<b>Operating</b>	<b>Non-Operating</b>
Without tape drive	8 to 80%	8 to 80%
With tape drive	20 to 80%	8 to 80%
<b>Wet Bulb Requirements</b>		
Without tape drive	27°C (80.6°F)	27°C (80.6°F)
With tape drive	23°C (73°F)	27°C (80.6°F)
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 CEC Drawer only		
L <sub>WAd</sub>	5.8 bels	5.8 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	45 dBA	45 dBA
Impulsive or prominent discrete tones	No	No
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 and Primary I/O Drawer		
L <sub>WAd</sub>	6.2 bels	6.2 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow Clearance</b>	Maintenance of proper service clearances should allow proper air flow.	
<b>Service Clearance</b>	(See service clearances for the 7014 T00 Rack)	

1. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.
2. For altitudes above 915 meters, the maximum temperature limit is derated by 1 degree C for every 137 meters of elevation above 915 meters.
3. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.
4. For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)
FC 6120	34°C (93°F)	34°C (93°F)	33°C (91°F)	33°C (91°F)	33°C (91°F)	32°C (90°F)	32°C (90°F)	31°C (88°F)
FC 6134	32°C (90°F)	32°C (90°F)	31°C (88°F)	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	30°C (86°F)

## 7026 Model 6H1 CEC Drawer

The Model 6H1 includes the Central Electronics Complex (CEC) Drawer with an I/O Drawer. For technical information on the I/O Drawer, see "I/O Drawer 5 EIA" on page 79.

<b>Dimensions</b>		
Height	218 mm 8.58 in. 5 (EIA Units)	
Width	445 mm 17.5 in.	
Depth	820 mm 32.3 in.	
<b>Weight</b>		
Minimum configuration	41 kg 90 lbs.	
Maximum configuration	52 kg 115 lbs.	
<b>Electrical</b>		
Power source loading typical in kVA	0.32	
Power source loading maximum in kVA	0.48	
Voltage range (V ac)	200 to 240	
Frequency (hertz)	50 or 60	
Thermal output (typical)	1025 Btu/hr	
Thermal output (maximum)	1536 Btu/hr	
Power requirements (typical)	300 watts	
Power requirements (maximum)	450 watts	
Power factor	0.95	
Inrush current <sup>1</sup>	40 amps	
Maximum altitude <sup>2</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>2</sup></b>	<b>Operating<sub>4</sub></b>	<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125.6°F)
<b>Humidity Noncondensing</b>	<b>Operating</b>	<b>Non-Operating</b>
Without tape drive	8 to 80%	8 to 80%
With tape drive	20 to 80%	8 to 80%
<b>Wet Bulb Requirements</b>		
Without tape drive	27°C (80.6°F)	27°C (80.6°F)
With tape drive	23°C (73°F)	27°C (80.6°F)
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 CEC Drawer only		
L <sub>WAd</sub>	5.8 bels	5.8 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	45 dBA	45 dBA
Impulsive or prominent discrete tones	No	No
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 and Primary I/O Drawer		
L <sub>WAd</sub>	6.2 bels	6.2 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow Clearance</b>	Maintenance of proper service clearances should allow proper air flow.	
<b>Service Clearance</b>	(See service clearances for the 7014 T00 Rack)	

1. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.
2. For altitudes above 915 meters, the maximum temperature limit is derated by 1 degree C for every 137 meters of elevation above 915 meters.
3. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.
4. For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)
FC 6120	34°C (93°F)	34°C (93°F)	33°C (91°F)	33°C (91°F)	33°C (91°F)	32°C (90°F)	32°C (90°F)	31°C (88°F)
FC 6134	32°C (90°F)	32°C (90°F)	31°C (88°F)	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	30°C (86°F)

## 7026 Model 6M1 CEC Drawer

The RS/6000 Enterprise Server Model M80 and @server pSeries 660 Model 6M1 systems are multiprocessor, multibus systems packaged in two to five drawers. The processors and memory are packaged in an 8 EIA-unit central electronics complex (CEC) drawer, and the optional DASD and I/O devices are in 5 EIA-unit I/O drawers. The basic system consists of one CEC drawer and one I/O drawer in the same rack. The system is expanded by adding up to three additional I/O drawers in a minimum of two racks. For technical information on the I/O Drawer see "I/O Drawer 5 EIA" on page 79.

<b>Dimensions</b>		
Height	355.6 mm	14.0 in.
Width	445.5 mm	17.5 in.
Depth	825.5 mm	32.5 in.
<b>Weight</b>		
Minimum	69.7 kg	158 lbs.
Maximum	74.6 kg	169 lbs.

<b>Electrical</b>	
Power source loading typical in kVA	0.45
Power source loading maximum in kVA	0.69
Voltage range (V ac)	200 to 240
Frequency (hertz)	50 or 60
Thermal output (typical)	M80: 1265 Btu/hr 6M1: 1450 Btu/hr
Thermal output (maximum)	M80: 1877 Btu/hr 6M1: 2218 Btu/hr
Power requirements (typical)	M80: 370 watts 6M1: 425 watts
Power requirements (maximum)	M80: 550 watts 6M1: 650 watts
Power factor	0.95
Inrush current	34 amps
Maximum altitude	2135 m (7000 ft.)

<b>Temperature Requirements</b>	<b>Operating<sup>4</sup></b>	<b>Non-Operating (Power Off)</b>
	10 to 38°C (50 to 100°F)	10 to 52°C (50 to 125°F)



<b>Humidity (Noncondensing)</b> Without tape drive With tape drive	<b>Operating</b> 8 to 80% 20 to 80%	<b>Non-Operating (Power Off)</b> 8 to 80% 8 to 80%
<b>Wet Bulb Requirements</b> Without tape drive With tape drive	27°C (80°F) 27°C (80°F)	27°C (80°F) 27°C (80°F)
<b>Noise Emissions</b> <sup>1,2</sup> With M80 CEC drawer only	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.4 bels	6.4 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
<b>Noise Emissions</b> <sup>1,2</sup> With M80 and Primary I/O Drawer	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.5 bels	6.5 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	49 dBA	49 dBA
Impulsive or prominent discrete tones	No	No

<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
-------------------	--------------	-------------	-------------	--------------

<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.
<b>Service</b>	(See service clearances for the 7014 Series Model T00 Rack )
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data are based on the following configuration: the drawer is mounted in a 7014 Series Model T00 Rack , a power distribution unit is installed in the rack, and the system is operating in a normal environment of 25 °C (78 °F).</li> <li>3. Inrush currents occur only at initial application of power; no inrush occurs during normal power off-on cycle.</li> <li>4. For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>	

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)
FC 6120	34°C (93°F)	34°C (93°F)	33°C (91°F)	33°C (91°F)	33°C (91°F)	32°C (90°F)	32°C (90°F)	31°C (88°F)
FC 6134	32°C (90°F)	32°C (90°F)	31°C (88°F)	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	30°C (86°F)

## 7026 Model B80

<b>Dimensions</b>				
Height	217 mm 8.6 in. 5 EIA Units			
Width	482.0 mm 19 in.			
Depth	617 mm 24.3 in.			
<b>Weight</b>				
Minimum configuration	36.5 kg 80.3 lbs.			
Maximum configuration	45.0 kg 99.3 lbs.			
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.46			
Power source loading (typical in kVA)	0.29			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 / 60			
Voltage range (V dc)	-48			
Thermal output (maximum)	1536 Btu/hr			
Thermal output (typical)	1024 Btu/hr			
Power requirements (maximum)	450 watts			
Power requirements (typical)	300 watts			
Power factor - US, World Trade, Japan	0.98			
Inrush current <sup>2</sup>	30 amps			
Maximum altitude <sup>3, 4</sup>	2135 m (7000 ft.)			
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating<sup>6</sup></b>	<b>Non-Operating</b>		
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 126°F)		
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>		
<b>Wet Bulb</b>	8 to 80% 27°C (80°F)	8 to 80% 27°C (80°F)		
<b>Noise Emissions<sup>1, 5</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	6.1 bels	5.9 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	44 dBA		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of proper service clearance should allow proper air flow.			
<b>Service</b>	See service clearances for the 7014 T00 Rack			
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The upper limit of the dry bulb temperature must be derated 1 degree C per 137m (450 ft.) above 915m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1 degree C per 274m (900 ft. ) above 305m (1000 ft.).</li> <li>Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> <li>For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>				

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)
FC 6120	39°C (102°F)	39°C (102°F)	39°C (102°F)	39°C (102°F)	36°C (97°F)	35°C (95°F)	33°C (91°F)	31°C (88°F)
FC 6134	37°C (99°F)	37°C (99°F)	37°C (99°F)	37°C (99°F)	36°C (97°F)	35°C (95°F)	33°C (91°F)	31°C (88°F)

## 7026 Model H10 Drawer

<b>Dimensions</b>				
Height	306.2 mm 12.1 in.			
Width	442.4 mm 17.4 in.			
Depth	748.2 mm 29.5 in.			
<b>Weight</b>				
Minimum configuration	42 kg 92 lbs.			
Maximum configuration	57 kg 126 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.41			
Power source loading (maximum in kVA)	0.56			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 or 60			
Thermal output (typical)	683 Btu/hr			
Thermal output (maximum)	1365 Btu/hr			
Power requirements (typical)	200 watts			
Power requirements (maximum)	400 watts			
Power factor	0.8 - 0.96			
Inrush current <sup>3</sup>	60 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)			10 to 52°C (50 to 125.6°F)
<b>Humidity (Noncondensing)</b>	<b>Operating</b>			<b>Non-Operating</b>
Without tape drive	8 to 80%			8 to 80%
With tape drive	20 to 80%			20 to 80%
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)			27°C (80°F)
With tape drive	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.9 bels			5.8 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	39 dBA			38 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See service clearances for the “7015 System Rack R00” on page 41)			
<ol style="list-style-type: none"> <li>See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>Noise emissions data for the Model H10 CPU Drawer is based on the processor drawer mounted in a “7015 System Rack R00” on page 41.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7026 Model H50 (Enterprise Server)

<b>Dimensions</b>				
Height	350 mm 13.8 in.			
Width	443 mm 17.5 in.			
Depth	844 mm 33.2 in.			
<b>Weight</b>				
Minimum configuration	71 kg 157 lbs.			
Maximum configuration	89 kg 195 lbs.			
<b>Electrical</b>				
Power source loading typical in kVA	0.4			
Power source loading maximum in kVA	0.63			
Voltage range (V ac)	200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1296 Btu/hr			
Thermal output (maximum)	2460 Btu/hr			
Power requirements (typical)	380 watts			
Power requirements (maximum)	600 watts			
Power factor	0.8 - 0.96			
Inrush current <sup>2</sup>	50 amps			
Maximum altitude <sup>3</sup>	915 m (3000 ft.)			
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b>			<b>Non-Operating</b>
	10 to 40°C			10 to 43°C
	(50 to 104°F)			(50 to 110°F)
<b>Humidity Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
(Noncondensing)	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	6.2 bels			5.9 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	43 dBA			40 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of proper service clearances should allow proper air flow.			
<b>Service</b>	(See service clearances for the “7015 System Rack R00” on page 41)			
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>3. For altitudes above 915 meters, the maximum temperature limit is derated by 1 degree C for every 137 meters of elevation above 915 meters.</li> </ol>				

## 7026 Model H70 (Enterprise Server)

<b>Dimensions</b>				
Height	350 mm 13.8 in. 8 (EIA Units)			
Width	443 mm 17.4 in.			
Depth	875 mm 34.2 in.			
<b>Weight</b>				
Minimum configuration	71 kg 157 lbs.			
Maximum configuration	89 kg 195 lbs.			
<b>Electrical</b>				
Power source loading typical <sup>1</sup> in kVA	0.46			
Power source loading maximum <sup>1</sup> in kVA	0.691			
Voltage range (V ac)	200 to 240			
Frequency (hertz)	50 or 60			
Thermal output (typical)	1485 Btu/hr			
Thermal output (maximum)	2818 Btu/hr			
Power requirements (typical)	434 watts			
Power requirements (maximum)	650 watts			
Power factor	0.9 - 0.98			
Inrush current <sup>2</sup>	50 amps			
Maximum altitude <sup>3</sup>	915 m (3000 ft.)			
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b>	<b>Non-Operating</b>		
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125.6°F)		
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>		
<b>Wet Bulb</b>	8 to 80% 27°C (80.6°F)	8 to 80% 27°C (80.6°F)		
<b>Noise Emissions<sup>4</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	6.2 bels	5.9 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	43 dBA	40 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of proper service clearances should allow proper air flow.			
<b>Service</b>	(See service clearances for the "7015 System Rack R00" on page 41)			
<ol style="list-style-type: none"> <li>The power source loading is calculated using the power factor = 0.94.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>For altitudes above 915 meters, the maximum temperature limit is derated by 1 degree C for every 137 meters of elevation above 915 meters.</li> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> </ol>				

## 7026 Model H80 CEC Drawer

The Model H80 includes the Central Electronics Complex (CEC) Drawer with an I/O Drawer. For technical information on the I/O Drawer, see "I/O Drawer 5 EIA" on page 79.

<b>Dimensions</b>		
Height	218 mm 8.58 in. 5 (EIA Units)	
Width	445 mm 17.5 in.	
Depth	820 mm 32.3 in.	
<b>Weight</b>		
Minimum configuration	41 kg 90 lbs.	
Maximum configuration	52 kg 115 lbs.	
<b>Electrical</b>		
Power source loading typical in kVA	0.32	
Power source loading maximum in kVA	0.48	
Voltage range (V ac)	200 to 240	
Frequency (hertz)	50 or 60	
Thermal output (typical)	1025 Btu/hr	
Thermal output (maximum)	1536 Btu/hr	
Power requirements (typical)	300 watts	
Power requirements (maximum)	450 watts	
Power factor	0.95	
Inrush current <sup>1</sup>	40 amps	
Maximum altitude <sup>2</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>2</sup></b>	<b>Operating</b>	<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125.6°F)
<b>Humidity Noncondensing</b>	<b>Operating</b>	<b>Non-Operating</b>
Without tape drive	8 to 80%	8 to 80%
With tape drive	20 to 80%	8 to 80%
<b>Wet Bulb Requirements</b>		
Without tape drive	27°C (80.6°F)	27°C (80.6°F)
With tape drive	23°C (73°F)	27°C (80.6°F)
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 CEC Drawer only		
L <sub>WAd</sub>	5.8 bels	5.8 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	45 dBA	45 dBA
Impulsive or prominent discrete tones	No	No
<b>Noise Emissions<sup>3</sup></b>	<b>Operating</b>	<b>Idle</b>
With H80 and Primary I/O Drawer		
L <sub>WAd</sub>	6.2 bels	6.2 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow Clearance</b>	Maintenance of proper service clearances should allow proper air flow.	
<b>Service Clearance</b>	(See service clearances for the 7014 T00 Rack)	
<ol style="list-style-type: none"> <li>1. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>2. For altitudes above 915 meters, the maximum temperature limit is derated by 1 degree C for every 137 meters of elevation above 915 meters.</li> <li>3. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> </ol>		

## 7026 Model M80 CEC Drawer

The Model M80 includes the Central Electronics Complex (CEC) Drawer with an I/O Drawer. For technical information on the I/O Drawer, see "I/O Drawer 5 EIA" on page 79.

<b>Dimensions</b>		
Height	355.6 mm	14.0 in.
Width	445.5 mm	17.5 in.
Depth	825.5 mm	32.5 in.
<b>Weight</b>		
Minimum	69.7 kg	158 lbs.
Maximum	74.6 kg	169 lbs.
<b>Electrical</b>		
Power source loading typical in kVA		0.39
Power source loading maximum in kVA		0.6
Voltage range (V ac)		200 to 240
Frequency (hertz)		50 or 60
Thermal output (typical)		1265 Btu/hr
Thermal output (maximum)		1877 Btu/hr
Power requirements (typical)		370 watts
Power requirements (maximum)		550 watts
Power factor		0.95
Inrush current <sup>3</sup>		34 amps
Maximum altitude		2135 m (7000 ft.)
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating (Power Off)</b> 10 to 52°C (50 to 125°F)
<b>Humidity (Noncondensing)</b>	<b>Operating</b>	<b>Non-Operating (Power Off)</b>
Without tape drive	8 to 80%	8 to 80%
With tape drive	20 to 80%	8 to 80%
<b>Wet Bulb Requirements</b>		
Without tape drive	27°C (80°F)	27°C (80°F)
With tape drive	27°C (80°F)	27°C (80°F)
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>
With M80 CEC Drawer only		
L <sub>WAd</sub>	6.4 bels	6.4 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>
With M80 and Primary I/O Drawer		
L <sub>WAd</sub>	6.5 bels	6.5 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	49 dBA	49 dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow Clearance</b>	Maintenance of a proper service clearance should allow proper air flow.	
<b>Service Clearance</b>	(See service clearances for the 7014 T00 Rack)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data are based on the following configuration: a drawer is in a T00 Rack and a power distribution unit is installed in the rack and the system is operating in a normal environment of 25 °C (78 °F)</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>		



## I/O Drawer 5 EIA

This I/O drawer is used with several of the system CEC drawers. It is used as primary and secondary I/O drawer for those systems.

<b>Dimensions</b>				
Height	218.0 mm 8.6 in.			
Width	445.0 mm 17.5 in.			
Depth	820.0 mm 32.3 in.			
<b>Weight</b>				
Minimum configuration	41 kg 90 lbs.			
Maximum configuration	52 kg 115 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.23			
Power source loading (maximum in kVA)	0.54			
Voltage range	200 to 240 V ac			
Frequency (hertz)	50 / 60			
Thermal output (typical)	750 Btu/hr			
Thermal output (maximum)	1750 Btu/hr			
Power requirements (typical)	220 watts			
Power requirements (maximum)	515 watts			
Power factor	0.95			
Inrush current <sup>3</sup>	41 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)			10 to 52°C (50 to 125.6°F)
<b>Humidity (Noncondensing)</b>	<b>Operating</b>			<b>Non-Operating</b>
Without tape drive	8 to 80%			8 to 80%
With tape drive	20 to 80%			20 to 80%
<b>Wet Bulb Requirements</b>				
Without tape drive	27°C (80°F)			27°C (80°F)
With tape drive	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.8 bels			5.8 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	45 dBA			45 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	(See "Service Clearances for System in an S70, S7A, or S80 I/O Rack" on page 54)			
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. Noise emissions data are based on the following configuration: the drawer is mounted in a T00 Rack and a power distribution unit.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7027 High-Capacity Storage Drawer

<b>Dimensions</b>		
Height	307 mm	12.1 in. 7 (EIA units)
Width	445 mm	17.5 in.
Depth	748 mm	29.5 in.
<b>Weight</b>		
Empty	35 kg	75 lbs.
Maximum Configuration	80 kg	175 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.18 plus 0.027 for each additional disk drive	
Voltage range (V ac)	100 to 127 or 200 to 240	
Frequency (hertz)	50 or 60	
Thermal output (Btus/hr)	580 plus 89 for each additional disk drive	
Power requirements (watts)	170 plus 27 for each additional disk drive	
Power factor	0.95	
Maximum altitude	2135m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 110°F)	<b>Non-Operating</b> 1 to 52°C (34 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	5.8 bels	5.5 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	47.5 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7028 Models 6C1 and 6E1

The Model 6C1 is a rack-mounted server system and the Model 6E1 is a deskside tower system.

<b>Dimensions</b>	<b>Rack (Model 6C1)</b>	<b>Tower (Model 6E1)</b>
Height	215 mm (8.5 in.) 5 EIA Units	426 mm (16.8 in.)
Width	426 mm (16.8 in.)	215 mm (8.5 in.)
Depth	617 mm (24 in.)	617 mm (24 in.)
<b>Weight</b>		
Minimum configuration		35.5 kg 78 lbs.
Maximum configuration		43.1 kg 94.8 lbs.
<b>Electrical</b>		
Power source loading (maximum in kVA)		0.40
Power source loading (typical in kVA)		0.30
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)	50 / 60	
Voltage range (V dc)	Not supported	
Thermal output (maximum)	1306 Btu/hr	
Thermal output (typical)	979 Btu/hr	
Power requirements (maximum)	384 watts	
Power requirements (typical)	288 watts	
Power factor - US, World Trade, Japan	0.96	
Inrush current <sup>2</sup>	70 amps	
Maximum altitude <sup>3, 4</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b> 16 to 32°C (61 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Model 6E1 Noise Emissions<sup>1, 5</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	6.1 bels	6.1 bels
<L <sub>pA</sub> > <sub>m</sub>	42 dBA	41 dBA
<b>Model 6C1 Noise Emissions<sup>1, 5</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	6.2 bels	5.9 bels
<L <sub>pA</sub> > <sub>m</sub>	44 dBA	41 dBA
<b>Install/Air Flow</b>	Maintenance of proper service clearance should allow proper air flow.	
<b>Service</b>	See service clearances for the 7014 T00 Rack	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The upper limit of the dry bulb temperature must be derated 1 degree C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1 degree C per 274 m (900 ft.) above 305 m (1000 ft.).</li> <li>Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> </ol>		

## 7028 Models 6C4 and 6E4

The Model 6C4 is a rack-mounted server system and the Model 6E4 is a deskside tower system.

<b>Dimensions</b>	<b>Rack (Model 6C4)</b>	<b>Tower (Model 6E4)</b>
Height	172.8 mm (6.8 in) 4EIA Units	530 mm (20.9 in.)
Width	444 mm (17.5 in.)	300 mm (11.8 in.)
Depth	609.6 mm (24.0 in.)	725 mm (28.5 in.)
<b>Weight</b>		
Minimum configuration	32 kg (70.4 lbs.)	
Maximum configuration	47.3 kg (104.8 lbs.)	
<b>Electrical</b>		
Power source loading (typical in kVA)	1-way, 2-way processors: 0.348, 4-way processor: 0.522	
Power source loading (max. in kVA)	1-way, 2-way processors: 0.522, 4-way processor: 0.783	
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)	50 / 60	
Voltage range (V dc)	Not supported	
Thermal output (typical)	1-way, 2-way processors: 1129 Btu/hr, 4-way processor: 1693 Btu/hr	
Thermal output (max.)	1-way, 2-way processors: 1693 Btu/hr, 4-way processor: 2540 Btu/hr	
Power requirements (typical)	1-way, 2-way processors: 330 watts, 4-way processor: 500 watts	
Power requirements (max.)	1-way, 2-way processors: 500 watts, 4-way processor: 750 watts	
Power factor - US, World Trade, Japan	0.96	
Inrush current <sup>2</sup>	50 amps	
Maximum altitude <sup>3, 4</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b> 5 to 35°C 41 to 95°F)	<b>Non-Operating</b> 10 to 52°C (50 to 126°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Model 6C4 Noise Emissions<sup>1, 5, 6</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.1 bels	6.0 bels
<L <sub>pA</sub> > <sub>m</sub>	44 dBA	43 dBA
<b>Model 6E4 Noise Emissions<sup>1, 7</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.0 bels	5.9 bels
<L <sub>pA</sub> > <sub>m</sub>	42 dBA	41 dBA
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.	
<b>Service</b>	See service clearances for the 7014 T00 Rack	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The upper limit of the dry bulb temperature must be derated 1°C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft.) above 305 m (1000 ft.).</li> <li>Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> <li>Levels apply to the following hardware configuration: 2 way 1 gigahertz processor, 3 Hard files, 2048 gigabytes of RAM, Redundant system (Two 645 watt power supply, 2 processor fans).</li> <li>Levels apply to the following hardware configuration: 2 way 1 gigahertz processor, 2 Hard files, 2048 gigabytes of RAM, Non-redundant system (One 645 watt power supply, 1 processor fan).</li> <li>All measurements made in accordance with ISO 7779, and declared in conformance with ISO 9296.</li> </ol>		

## 7029 Models 6C3 and 6E3

The Model 6C3 is a rack-mounted server system and the Model 6E3 is a deskside tower system.

<b>Dimensions</b>	<b>Rack (Model 6C3)</b>	<b>Tower (Model 6E3)</b>
Height	178 mm (7.0 in) 4EIA Units	533.0 mm (21.0 in.)
Width	437 mm (17.2 in.)	201 mm (7.9 in.)
Depth	508 mm (20.0 in.)	584 mm (23.0 in.)
<b>Weight</b>		
Minimum configuration	35.5 kg (78.0 lbs.)	35.5 kg (78.0 lbs.)
Maximum configuration	43.1 kg (94.8 lbs.)	43.1 kg (94.8 lbs.)
<b>Electrical</b>		
Power source loading (typical in kVA)		0.30
Power source loading (max. in kVA)		0.50
Voltage range (V ac)	100 to 127 or 200 to 240 (auto-ranging)	
Frequency (hertz)	47 / 63	
Voltage range (V dc)	Not supported	
Thermal output (typical)	1024 Btu/hr	
Thermal output (max.)	1536 Btu/hr	
Power requirements (typical)	300 watts	
Power requirements (max.)	450 watts	
Power factor - US, World Trade, Japan	0.95	
Inrush current <sup>2</sup>	85 amps (max. at <10ms) 25 amps (max at 10 to 150ms)	
Maximum altitude <sup>3, 4</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>3, 6</sup></b>	<b>Operating</b> 10 to 40°C 50 to 104°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Model 6C3 Noise Emissions<sup>1, 5</sup></b>	<b>Operating</b>	<b>Idle</b>
$L_{WA,d}$	6.0 bels	6.0 bels
<b>Model 6E3 Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
$L_{WA,d}$	6.1 bels	6.1 bels
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.	
<b>Service</b>	See service clearances for the 7014 T00 Rack	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>2. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>3. The upper limit of the dry bulb temperature must be derated 1°C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>4. The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft. ) above 305 m (1000 ft.).</li> <li>5. Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> <li>6. For systems with FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>		

The following table lists maximum operating temperatures for FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)	2438 m (8000 ft)	2743 m (9000 ft)	3048 m (10000 ft)
FC 6134	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	29°C (84°F)	29°C (84°F)	28°C (82°F)	28°C (82°F)	27°C (81°F)	26°C (79°F)	26°C (79°F)

## 7030 POWERstations 3AT, 3BT, and 3CT

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	162 mm	6.4 in.	452 mm	17.8 in.
Width	442 mm	17.4 in.	280 mm	11.0 in.
(at pedestal for deskside)				
Depth	478 mm	18.5 in.	478 mm	18.8 in.
<b>Weight</b>				
Minimum	18.1 kg 40 lbs.			
Maximum	21.8 kg 48 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.35			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	770 Btu/hr			
Power requirements (typical)	225 watts			
Power factor	0.5 to 0.7			
Inrush current <sup>3</sup>	42 amps at 120 V ac, 42 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>				
	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>				
	<b>Operating</b>		<b>Non-Operating</b>	
(Noncondensing)	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.5 bels		5.3 bels	
L <sub>pA</sub> m	41 dBA		41 dBA (desktop)	
	38 dBA		38 dBA (deskside)	
<L <sub>pA</sub> > <sub>m</sub>	41 dBA		41 dBA (desktop)	
	38 dBA		38 dBA (deskside)	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm (6 in.)	152 mm (6 in.)	N/A	N/A
<b>Service</b>	760 mm (30 in.)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>				
	<b>Width</b>		<b>Depth</b>	
Desktop	442 mm (17.4 in.)		782 mm (30.8 in.)	
Deskside	280 mm (11 in.)		782 mm (30.8 in.)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7038 Model 6M2 (@server pSeries 650)

<b>Dimensions</b>			
Height	351 mm (13.8 in)		
Width	445 mm (17.5 in.)		
Depth	760 mm (29.9 in.)		
<b>Weight</b>	93 kg (205 lbs)		
<b>Electrical</b>			
Power source loading (typical)	8-way processor: 1.126 kVA		
Power source loading (max.)	8-way processor: 1.684 kVA		
Voltage range	200 to 240 V ac, V dc not supported		
Frequency	50 or 60 Hz		
Thermal output (typical)	8-way processor: 3,652Btu/hr		
Thermal output (max.)	8-way processor: 5,461 Btu/hr		
Power requirements (typical)	8-way processor: 1,070 watts		
Power requirements (max.)	8-way processor: 1,600 watts		
Power factor	0.95		
Inrush current <sup>2</sup>	67 amps at 200 V ac, 60 Hz 87 amps at 230 V ac, 50 Hz		
Maximum altitude <sup>3, 4</sup>	3048 m (10000 ft.)		
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b> 10 to 38°C (50 to 100°F)	<b>Non-Operating</b> 1 to 43°C (34 to 109°F)	<b>Storage</b> 1 to 60°C (34 to 140°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	<b>Storage</b> 5 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (81°F)	29°C (84.2°F)
<b>Noise Emissions<sup>1, 5, 6</sup></b>	<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d	6.1 bels <sup>5</sup>	6.1 bels <sup>5</sup>	
<L <sub>pA</sub> > <sub>m</sub>	44 dBA <sup>6</sup>	44 dBA <sup>6</sup>	
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.		
<b>Service Clearances</b>	See “T00 and T42 Service Clearances and Caster Location” on page 33 for T00 or T42 rack service clearances.		
<p>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions. See noise emissions note 4.</p> <p>2. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</p> <p>3. The upper limit of the dry bulb temperature must be derated 1°C per 137 m (450 ft.) above 915 m (3000 ft.).</p> <p>4. The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft. ) above 305 m (1000 ft.).</p> <p>5. The L<sub>WA</sub>d emission increases to 6.5 bels with a configuration of one 7038-6M2 and four 7311-D10 drawers.</p> <p>6. The L<sub>pA</sub>&gt;<sub>m</sub> emission increases to 48 dBA with a configuration of one 7038-6M2 and four 7311-D10 drawers.</p>			



## 7039 @server pSeries 655

The @server pSeries 655 system consists of multiple components, as summarized in the following table.

Model	Description	Minimum per System	Maximum per System
7040-W42	Base Frame (Redundant power supplies as feature codes)	1	1
FC6076	Slimline Front Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6119	Acoustic Front Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6078	Slimline Rear Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6079	Acoustical Rear Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6200 or FC6201	Optional Integrated Battery Feature (IBF)	0	6
7039-651	Server Node (up to 8 processors, 4 GB to 32 GB memory)	1	16
7315-C01	Hardware Management Console (HMC)	0	2
7040-61D	IO Subsystem (20 PCI cards maximum, 16 DASD maximum)	0	5

**Notes:**

1. Either slimline doors or acoustical doors must be selected by the customer during the order process.
2. Door options determine which doors are included with your @server pSeries 655. See “@server pSeries 655 Doors and Covers.”

## @server pSeries 655 Doors and Covers

Covers are an integral part of the @server pSeries 655 and are *required* for product safety and EMC compliance. The following rear door options are available for the @server pSeries 655:

- “Enhanced Acoustical” Cover Option

This feature provides a low-noise option for customers or sites with stringent acoustical requirements and where a minimal system footprint is not critical. The Acoustical cover option consists of a special front and rear doors which are approximately 250 mm (10 in.) deep and contain acoustical treatment that lowers the noise level of the machine by approximately 7 dB (0.7 B) compared to the Slimline doors. This reduction in noise emission levels means that the noise level of a single @server pSeries 655 system with Slimline covers is about the same as the noise level of five @server pSeries 655 systems with acoustical covers.

- “Slimline” Cover Option

This feature provides a smaller-footprint and lower-cost option for customers or sites where space is more critical than acoustical noise levels. The Slimline cover option consists of a front door, which is approximately 100 mm (4 in) deep, and a rear door, which is approximately 50 mm (2 in) deep. No acoustical treatment is available for this option.

**Note:** For declared levels of acoustical noise emissions, refer to “Declared Acoustical Noise Emissions” on page 97.

## Moving the System to the Installation Site

The customer should determine the path that must be taken to move the system from the delivery location to the installation site. The customer should verify that the height of all doorways, elevators, and so on are sufficient to allow moving the system to the installation site. The customer should also verify that the weight limitations of elevators, ramps, floors, floor tiles, and so on are sufficient to allow moving the

system to the installation site. If the height or weight of the system can cause a problem when the system is moved to the installation site, the customer should contact their local site planning, marketing, or sales representative.

## Power and Electrical Requirements

Dual power and line cords are standard on the @server pSeries 655. For maximum availability, each of the line cords should be fed from independent power grids. Some configurations require drawing current from two power feeds in a non-redundant manner.

The following table illustrates electrical and thermal characteristics for the @server pSeries 655.

<b>Electrical/Thermal Characteristic</b>			
Rated Voltage (V ac, 3 phase)	200 to 240	380 to 415	480
Rated Current, Line Cord with 60-A Plug, FC 8688 or 8689 (amps, per phase)	48	—	—
Rated Current, All Other Line Cords (amps, per phase)	60	32	24
Frequency (Hz)	50 to 60	50 to 60	50 to 60
Power (Maximum in kW)	31.8	31.8	31.8
Typical, Full Load Power Factor (pf)	0.99	0.97	0.95
Inrush Current (Maximum A)	162	162	162
Thermal Output (Maximum kBtu/hr)	102	102	102
<b>Note:</b> Inrush currents occur only at initial application of power (very short duration for charging capacitors). No inrush currents occur during the normal power off-on cycle.			

The following table illustrates the line cord options for the @server pSeries 655 with their geographic, breaker rating, and cord information.

<b>3-Phase Supply Voltage (50/60 Hz)</b>	200-240 V	200-240 V	380-415 V	480 V
<b>Recommended Customer-Circuit-Breaker Rating (see Note below)</b>	60 A (60-A Plug) or 100 A (100-A Plug)	60 A (no plug)	30 A (no plug)	25 A 30A (plug)
<b>Cord Information</b>	6 and 14 foot, 6 AWG line cord (60-A Plug) or 6 and 14 foot, 6 AWG line cord (100-A Plug)	14 foot, 6 AWG line cord, (electrician installed)	14 foot, 8 AWG line cord, (electrician installed)	6 and 14 foot, 10 AWG line cord
<b>Recommended Receptacle</b>	IEC309, 60 A, type 460R9W (not provided) or IEC309, 100A, type 4100R9W (not provided)	Not specified, electrician installed	Not specified, electrician installed	IEC309, 30 A, type 430R7W (not provided)

**Note:** The exact circuit breaker ratings may not be available in all countries. Where the specified circuit breaker ratings are not acceptable, use the nearest available rating. Use of a time delayed circuit breaker is recommended. Use of a GFI circuit breaker is not recommended.

## Line Cord Features

The following three-phase line cord features are available for the @server pSeries 655:

- FC 8686: Line Cord, 200-240V ac, 6AWG, 14ft, IEC309 100A Plug
- FC 8687: Line Cord, 200-240V ac, 6AWG, 6ft, IEC309 100A Plug
- FC 8688: Line Cord, 200-240V ac, 6AWG/Type W, 14ft, IEC309 60A Plug
- FC 8689: Line Cord, 200-240V ac, 6AWG/Type W, 6ft, IEC309 60A Plug
- FC 8677: Line Cord, 380-415V ac, 8AWG, 14ft, No Plug
- FC 8680: Line Cord, 480V ac, 10AWG, 14ft, IEC309 30A Plug
- FC 8682: Line Cord, 480V ac, 10AWG, 6ft, Chicago, IEC309 30A Plug
- FC 8694: Line Cord, 200-240V ac, 6AWG/Type W 14ft, No Plug

## Phase Imbalance and BPR Configuration

Depending on the number of Bulk Power Regulators (BPRs) in your system, phase imbalance can occur in line currents. All systems are provided with 2 bulk power assemblies (BPAs), with separate line cords. Phase currents will be divided between two line cords in normal operation. The following table illustrates phase imbalance as a function of BPR configuration. For information about power consumption, see “Total System Power Consumption” on page 100.

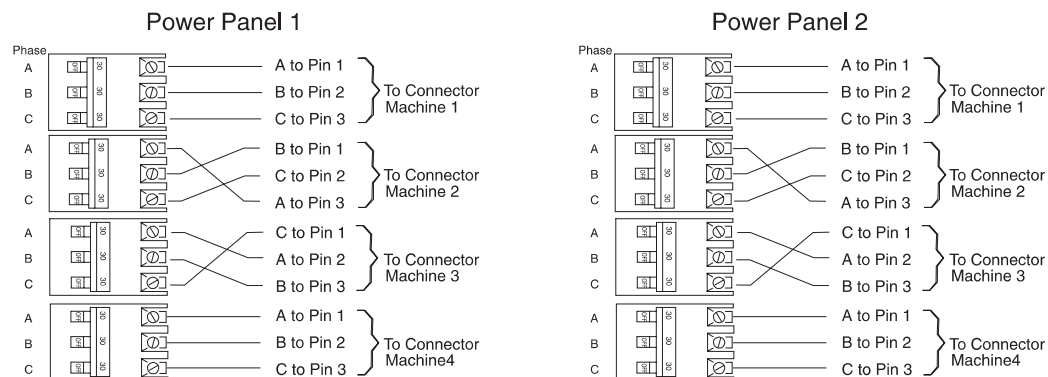
Number of BPRs per BPA	Phase A Line Current	Phase B Line Current	Phase C Line Current
1	Power / Vline	Power / Vline	0
2	0.5 Power / Vline	0.866 Power / Vline	0.5 Power / Vline
3	0.577 Power / Vline	0.577 Power / Vline	0.577 Power / Vline

**Note:** Power is calculated from “Total System Power Consumption” on page 100. Vline is line-to-line nominal input voltage. Since total system power is divided between two line cords, divide the power number by two.

## Balancing Power Panel Loads

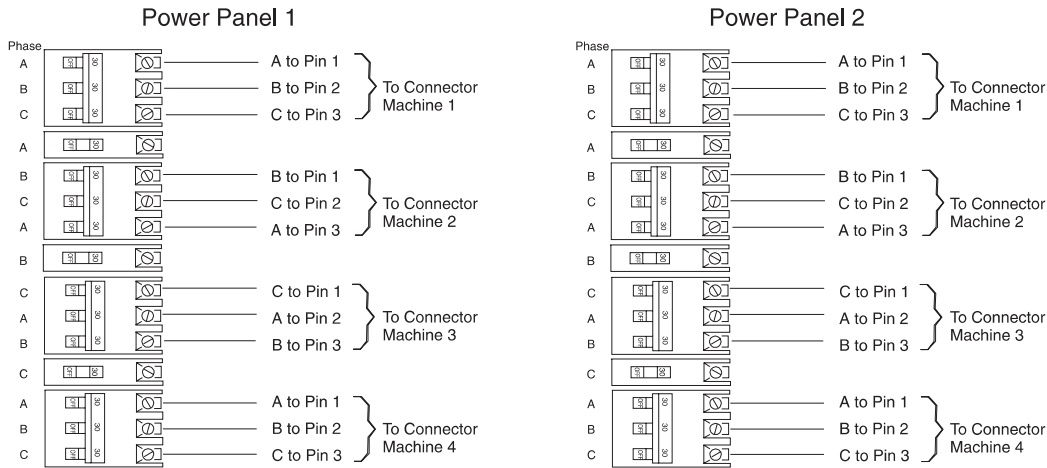
The @server pSeries 655 requires three-phase power. Depending on the system configuration, the phase currents can be fully balanced or unbalanced. System configurations with three BPRs per BPA have balanced power panel loads, while configurations with only one or two have unbalanced loads. With two BPRs per BPA, two of the three phases will draw an equal amount of current, and will be, nominally, 57.8% of the current on the third phase. With one BPR per BPA, two of three phases will carry an equal amount of current, with no current drawn on the third phase. The following figure is an example of feeding several loads of this type from two power panels in a way that balances the load among the three phases.

**Note:** Use of ground-fault-interrupt (GFI) circuit breakers is not recommended for this system because GFI circuit breakers are earth-leakage-current sensing circuit breakers and this system is a high earth-leakage-current product.

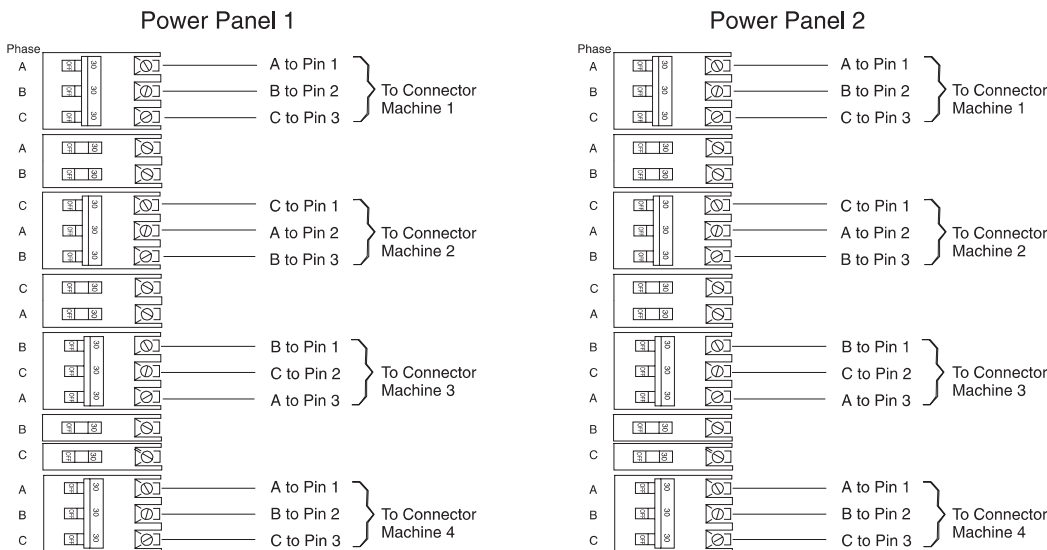


The method illustrated in the preceding figure requires that the connection from the three poles of each breaker to the three phase pins of a connector be varied. Some electricians may prefer to maintain a

consistent wiring sequence from the breakers to the connectors. The following figure shows a way to balance the load without changing the wiring on the output of any breakers. The three-pole breakers are alternated with single-pole breakers, so that the three-pole breakers do not all begin on Phase A.



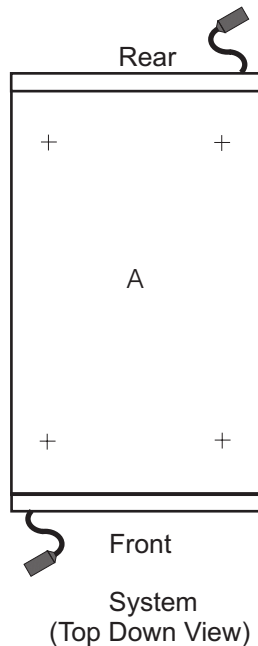
The following figure shows another way of distributing the unbalanced load evenly. In this case, the three-pole breakers are alternated with two-pole breakers.



## Power Cord Configuration

The power cords exit the system from different points of the frame as indicated in the following illustration. For raised-floor applications, we recommend that both cords be routed to the rear of the frame and through the same floor-tile cutout. For more information about raised-floor applications, refer to “Cutting

and Placement of Floor Panels” on page 105 and the raised-floor diagram on page 106.



## Checking the Facility Outlets and Power Source

### CAUTION:

**Do not touch the receptacle or the receptacle faceplate with anything other than your test probes before you have met the requirements in “Checking the Facility Outlets and Power Source” below.**

Performing the following will ensure that appropriate power will be used by the @server pSeries 655. The following checklist is for reference purposes, and will likely be performed by a service engineer prior to installation.

- \_\_\_ 1. The @server pSeries 655 is equipped to use 200-240V / 380-415V / 480V ac, three-phase. Check that the correct power source is available.
- \_\_\_ 2. Before system installation, locate and turn off the branch circuit CB (circuit breaker). Attach tag S229-0237, which reads “Do Not Operate.”

**Note:** All measurements are made with the receptacle faceplate in the normally installed position.

- \_\_\_ 3. Some receptacles are enclosed in metal housings. On receptacles of this type, perform the following steps:
  - a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised-floor metal structure, water pipe, building steel, or similar structure.
  - b. Check for less than 1 volt from receptacle ground pin to a grounded point in the building.

**Note:** If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- \_\_\_ 4. Check the resistance from the ground pin of the receptacle to the receptacle case. Check resistance from the ground pin to building ground. The reading should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
- \_\_\_ 5. If any of the checks made in steps 3 and 4 are not correct, remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

**Note:** Do not use the digital multimeter to measure grounding resistance.

- \_\_\_ 6. Check for infinite resistance between the phase pins. This is a check for a wiring short.

**CAUTION:**

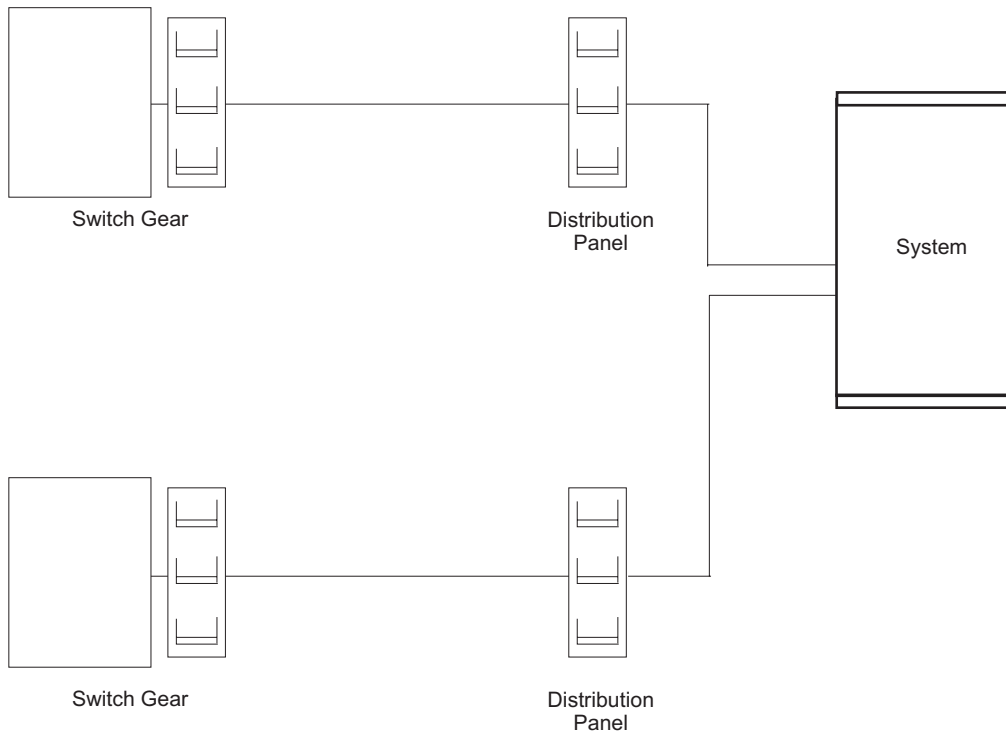
**If the reading is other than infinity, do not proceed! You must make the necessary wiring corrections to satisfy the above criteria before continuing. Do not turn on the branch circuit CB until all the above steps are satisfactorily completed.**

- \_\_\_ 7. Remove tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 8. Turn on the branch circuit CB. Measure for appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
- \_\_\_ 9. With an appropriate meter, verify that the voltage at the outlet is correct.
- \_\_\_ 10. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, or an appropriately approved ground impedance tester.
- \_\_\_ 11. Turn off the branch circuit CB.
- \_\_\_ 12. Attach tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 13. You are now ready to install and connect the power cables to the @server pSeries 655. Refer to Chapter 1 of the @server pSeries 655 Installation Guide for this procedure.

**Dual Power Installation**

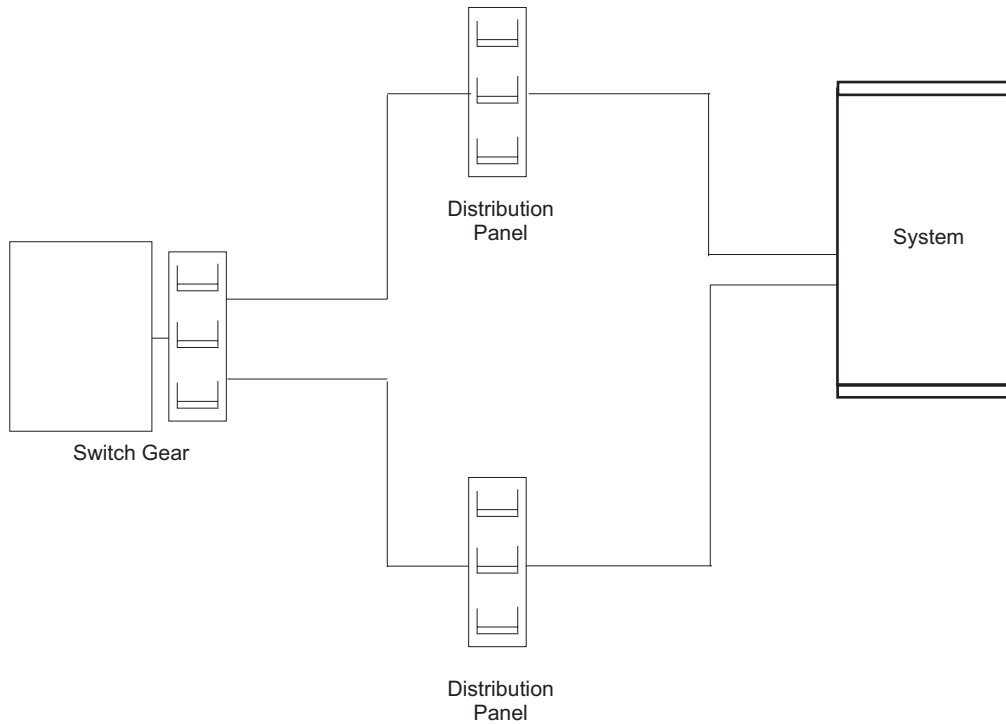
Some @server pSeries 655 configurations are designed with a fully redundant power system. These systems have two line cords attached to two power input ports which, in turn, power a fully redundant power distribution system within the system. To take full advantage of the redundancy/reliability that is built into the computer system, the system must be powered from two distribution panels. Larger @server pSeries 655 configurations require power from two line cords, and they do not have redundant line cords. The possible power installation configurations are described as follows. See “Total System Power Consumption” on page 100 for additional information about power.

**Dual Power Installation - Redundant Distribution Panel and Switch:** This configuration requires that the system receives power from two separate power distribution panels. Each distribution panel receives power from a separate piece of building switch gear. This level of redundancy is not available in most facilities.

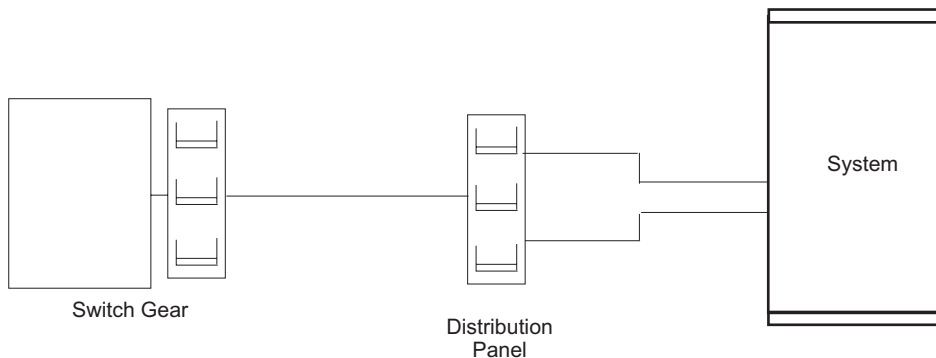


**Dual Power Installation - Redundant Distribution Panel:** This configuration requires that the system receives power from two separate power distribution panels. The two distribution panels receive power

from the same piece of building switch gear. Most facilities should be able to achieve this level of redundancy.



**Single Distribution Panel - Dual Circuit Breakers:** This configuration requires that the system receives power from two separate circuit breakers in a single power panel. This configuration does not make full use of the redundancy provided by the processor. It is, however, acceptable if a second power distribution panel is not available.



### Additional Installation Considerations

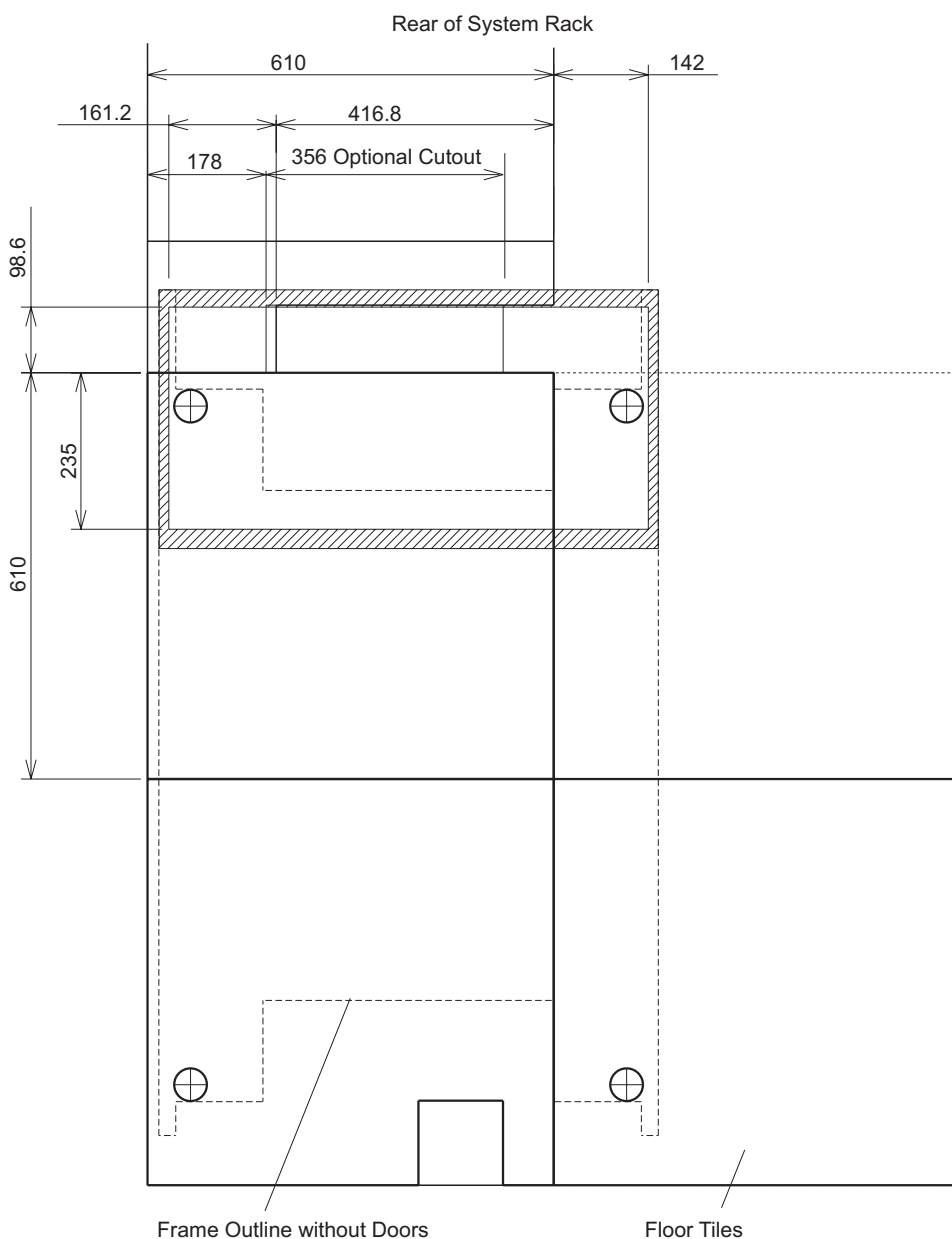
In the United States, installation must be made in accordance with Article 645 of the National Electric Code (NEC). In Canada, installation on a raised floor must be in accordance with Article 12-020 of the Canadian Electrical Code (CEC).

**Signal Integrity:** System reliability can be adversely affected by the presence of transient electrical noise that may be conducted on power, signal, and control cables. To conduct high-frequency-electrical noise away from the system, the ground path must be as short as possible. All systems are provided with a short ground strap that is intended for use with stringer/stanchion-type raised floors (or other grounded types). This ground strap is required if your servers are connected to a 9076 SP Switch2 clustered environment, and it is recommended for all other configurations.

If your installation is not using a grounded-raised floor, and your servers are connected to an 9076 SP Switch2 clustered environment, all attached server frames in your environment must be independently grounded to the switch frame. Use the following information to help you install multiple systems to the 9076 SP Switch2 switch frame in a clustered environment:

- Order grounding straps by calling the IBM Quality Hotline at 1-800-IBM-LINE and requesting Part Number 44P3695, Grounding Kit. Each kit contains one ground strap and the required hardware to make a single connection between a server and a 9076 SP Switch2, so order one kit for each server that is connected to the switch.
- An IBM service representative will install the grounding straps by using instructions that are provided with the grounding kits. Each server frame must be directly connected to a 9076 SP Switch2 frame.

**Additional EMC (Electromagnetic Compatibility) Considerations:** If you are installing a High Performance Switch (7045-SW4) into your rack, you must install, around the base of the rack, the EMC skirt that was shipped with your High Performance Switch. Failure to do so puts the system out of FCC compliance. The following illustration gives the dimensions used and the location for installing the EMC skirt around the rack base.





## @server pSeries 655 Physical Specifications and Loads

The following tables illustrate the physical, electrical and thermal, as well as acoustical and environmental characteristics of various @server pSeries 655 system configurations.

### Dimensions and Weight

Physical Characteristic	Slimline Doors	Acoustical Doors
Height	2028 mm (79.84 in.)	2028 mm (79.84 in.)
Width	785 mm (30.91 in.)	785 mm (30.91 in.)
Depth	1443 mm (56.81 in.)	1799 mm (70.83 in.)
Weight without IBF (max. config.)	1487 kg (3279 lbs.)	1496 kg (3299 lbs.)
Weight with IBF (max. config.)	1629 kg (3592 lbs.)	1638 kg (3612 lbs.)

#### Notes:

- Doors are not installed during product shipment to the customer.
- Refer to the following table for the approximate weight of your system configuration.

### Approximate System Weights by Configuration

If the system that you order weighs more than 1134 kg (2500 lbs) when it is shipped from the factory, a weight-distribution plate will be provided for the system. This plate is used to minimize the point loading from casters and leveling pads.

Number of Nodes, I/O Drawers, or *7045-SW4s	Weight in kg (lbs)					
	Slim Doors with IBF	Slim Doors without IBF	Acoustic Doors with IBF	Acoustic Doors without IBF	No Doors with IBF	No Doors
1, 0	616 (1359)	528 (1165)	625 (1379)	537 (1184)	590 (1301)	502 (1107)
2, 0	665 (1467)	577 (1273)	674 (1487)	586 (1292)	639 (1409)	551 (1215)
3, 0	740 (1631)	652 (1436)	749 (1651)	660 (1456)	714 (1573)	625 (1378)
4, 0	9016 (1986)	724 (1596)	910 (2005)	733 (1616)	875 (1928)	698 (1538)
5, 0	975 (2150)	798 (1760)	984 (2169)	807 (1780)	949 (2092)	772 (1702)
6, 0	1136 (2505)	871 (1920)	1145 (2524)	880 (1940)	1110 (2447)	845 (1862)
7, 0	1211 (2669)	945 (2084)	1219 (2688)	954 (2103)	1184 (2611)	919 (2026)
8, 0	1260 (2777)	994 (2192)	1268 (2796)	1003 (2211)	1233 (2719)	968 (2134)
9, 0	1334 (2941)	1069 (2356)	1343 (2960)	1077 (2375)	1308 (2883)	1042 (2298)
10, 0	1383 (3049)	1118 (2464)	1392 (3068)	1126 (2483)	1357 (2991)	1091 (2406)
11, 0	1457 (3212)	1192 (2628)	1466 (3232)	1201 (2647)	1431 (3154)	1166 (2570)
12, 0	1506 (3320)	1241 (2736)	1515 (3340)	1250 (2755)	1480 (3262)	1215 (2678)
13, 0	1580 (3484)	1315 (2900)	1589 (3504)	1324 (2919)	1554 (3426)	1289 (2842)
14, 0	1629 (3592)	1364 (3008)	1638 (3612)	1373 (3027)	1603 (3534)	1338 (2950)
15, 0	N/A	1438 (3171)	N/A	1447 (3191)	N/A	1412 (3113)
16, 0	N/A	1487 (3279)	N/A	1496 (3299)	N/A	1461 (3221)
1, 1	718 (1583)	630 (1388)	727 (1602)	638 (1407)	692 (1525)	603 (1330)
2, 1	767 (1691)	679 (1496)	776 (1710)	687 (1515)	741 (1633)	652 (1438)
3, 1	841 (1855)	753 (1660)	850 (1874)	762 (1679)	815 (1797)	727 (1602)
4, 1	1002 (2209)	825 (1820)	1011 (2229)	834 (1839)	976 (2151)	799 (1762)

Number of Nodes, I/O Drawers, or *7045-SW4s	Weight in kg (lbs)					
	Slim Doors with IBF	Slim Doors without IBF	Acoustic Doors with IBF	Acoustic Doors without IBF	No Doors with IBF	No Doors
5, 1	1076 (2373)	900 (1984)	1085 (2393)	908 (2003)	1050 (2315)	873 (1926)
6, 1	1237 (2728)	972 (2144)	1246 (2748)	981 (2163)	1211 (2670)	946 (2086)
7, 1	1312 (2892)	1047 (2307)	1321 (2911)	1055 (2327)	1285 (2834)	1020 (2249)
8, 1	1361 (3000)	1096 (2415)	1370 (3019)	1104 (2435)	1334 (2942)	1069 (2357)
9, 1	1435 (3164)	1170 (2579)	1444 (3183)	1179 (2598)	1409 (3106)	1144 (2521)
10, 1	1484 (3272)	1219 (2687)	1493 (3291)	1228 (2707)	1458 (3214)	1193 (2629)
11, 1	1558 (3436)	1293 (2851)	1567 (3455)	1302 (2870)	1532 (3378)	1267 (2793)
12, 1	1607 (3544)	1342 (2959)	1616 (3563)	1351 (2978)	1581 (3486)	1316 (2901)
13, 1	N/A	1417 (3123)	N/A	1425 (3142)	N/A	1390 (3065)
14, 1	N/A	1466 (3231)	N/A	1474 (3250)	N/A	1439 (3173)
2, 2	868 (1914)	780 (1719)	877 (1933)	789 (1738)	842 (1856)	753 (1661)
3, 2	1055 (2325)	878 (1935)	1063 (2344)	886 (1954)	1028 (2267)	851 (1877)
4, 2	1103 (2433)	927 (2043)	1112 (2452)	935 (2062)	1077 (2375)	900 (1985)
5, 2	1290 (2844)	1025 (2259)	1299 (2863)	1033 (2278)	1263 (2786)	998 (2201)
6, 2	1339 (2952)	1074 (2367)	1348 (2971)	1082 (2386)	1312 (2894)	1047 (2309)
7, 2	1413 (3115)	1148 (2531)	1422 (3135)	1157 (2550)	1387 (3057)	1122 (2473)
8, 2	1462 (3223)	1197 (2639)	1471 (3243)	1206 (2658)	1436 (3165)	1171 (2581)
9, 2	1536 (3387)	1271 (2802)	1545 (3406)	1280 (2822)	1510 (3329)	1245 (2744)
10, 2	1585 (3495)	1320 (2911)	1594 (3515)	1329 (2930)	1559 (3437)	1294 (2853)
11, 2	N/A	1394 (3074)	N/A	1403 (3094)	N/A	1368 (3016)
12, 2	N/A	1443 (3182)	N/A	1452 (3202)	N/A	1417 (3124)
3, 3	1156 (2548)	979 (2158)	1165 (2567)	988 (2178)	1129 (2490)	953 (2100)
4, 3	1317 (2903)	1052 (2318)	1326 (2922)	1060 (2338)	1290 (2845)	1025 (2260)
5, 3	1391 (3067)	1126 (2482)	1400 (3086)	1135 (2501)	1365 (3009)	1100 (2424)
6, 3	1440 (3175)	1175 (2590)	1449 (3194)	1184 (2609)	1414 (3117)	1149 (2532)
7, 3	1514 (3339)	1249 (2754)	1523 (3358)	1258 (2773)	1488 (3281)	1223 (2696)
8, 3	1563 (3447)	1298 (2862)	1572 (3466)	1307 (2881)	1537 (3389)	1272 (2804)
9, 3	N/A	1372 (3026)	N/A	1381 (3045)	N/A	1346 (2968)
10, 3	N/A	1422 (3134)	N/A	1430 (3153)	N/A	1395 (3076)
4, 4	1418 (3126)	1153 (2542)	1427 (3146)	1162 (2561)	1392 (3068)	1127 (2484)
5, 4	1492 (3290)	1227 (2705)	1501 (3309)	1236 (2725)	1466 (3232)	1201 (2647)
6, 4	1541 (3398)	1276 (2813)	1550 (3417)	1285 (2833)	1515 (3340)	1250 (2755)
7, 4	N/A	1350 (2977)	N/A	1359 (2997)	N/A	1324 (2919)
8, 4	N/A	1399 (3085)	N/A	1408 (3105)	N/A	1373 (3027)
5, 5	N/A	1329 (2929)	N/A	1337 (2948)	N/A	1302 (2871)
6, 5	N/A	1377 (3037)	N/A	1386 (3056)	N/A	1351 (2979)

\*For configurations with a 7045-SW4 High Performance Switch installed, count the switch as you would an I/O drawer. For example, you have a system with six nodes, three I/O drawers and one 7045-SW4 High Performance Switch, you would use the same weight calibrations that the above table shows for 6 nodes and 4 I/O drawers.

## Declared Acoustical Noise Emissions

@server pSeries 655 Product Configuration	Declared A-Weighted Sound Power Level, $L_{WAd}$ (B)		Declared A-Weighted Sound Pressure Level, $LpAm$ (dB)	
	Operating	Idle	Operating	Idle
One processor node (16 max.), nominal conditions, non-acoustical doors	7.4	7.4	57	57
One processor node (16 max.) nominal conditions, acoustical doors	6.7 <sup>(4)</sup>	6.7 <sup>(4)</sup>	50 <sup>(4)</sup>	50 <sup>(4)</sup>
Typical configuration of (3 processor nodes, bulk power, 1 I/O drawer), nominal conditions, non-acoustical doors	8.2	8.2	64	64
Typical configuration of (3 processor nodes, bulk power, 1 I/O drawer), nominal conditions, acoustical doors	7.5 <sup>(4)</sup>	7.5 <sup>(4)</sup>	57 <sup>(4)</sup>	57 <sup>(4)</sup>
Maximum configuration of (16 processor nodes, bulk power), nominal conditions, non-acoustical doors	8.7 <sup>(3), (4)</sup>	8.7 <sup>(3), (4)</sup>	69 <sup>(3), (4)</sup>	69 <sup>(3), (4)</sup>
Maximum configuration of (16 processor nodes, bulk power), nominal conditions, acoustical doors	8.0 <sup>(3), (4)</sup>	8.0 <sup>(3), (4)</sup>	62 <sup>(3), (4)</sup>	62 <sup>(3), (4)</sup>
<b>Notes:</b>				
1. $L_{WAd}$ is the upper-limit A-weighted sound level; $LpAm$ is the mean A-weighted sound pressure level measured at the 1-meter bystander positions; 1 B = 10 dB.				
2. All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.				
3. <b>Attention:</b> Your server installation may be subject to government regulations (such as those prescribed by OSHA or European Community Directives) that cover noise-level exposure in the workplace. The @server pSeries 7040-W42 rack is available with an optional-acoustical-door feature. This feature can reduce the likelihood of exceeding the noise-level-exposure limits for racks that are "densely populated" with @server pSeries 7039-651 processor nodes. The actual sound-pressure levels in your installation will depend on a variety of factors, including the number of racks that are installed; the size, materials, and configuration of the room where the racks are installed; the noise levels from other equipment; the room ambient temperature; and employees' location in relation to the equipment. It is recommended that a qualified person, such as an industrial hygienist, be consulted to determine if the sound-pressure levels that employees may be exposed to exceed regulatory limits.				
4. These numbers are based on preliminary data and are subject to change.				

## Environmental Specifications

Environmental Specification	Operating	Non-Operating	Storage	Shipping
Temperature	10 to 32°C (50 to 90°F)	10 to 43°C (50 to 109°F)	1 to 60°C (34 to 140°F)	-40 to 60°C (-40 to 140°F)
Relative Humidity (Noncondensing)	8 to 80 %	8 to 80 %	5 to 80 %	5 to 100 %
Maximum Wet Bulb	23°C (73°F)	27°C (73°F)	29°C (84°F)	29°C (84°F)

Environmental Specification	Operating	Non-Operating	Storage	Shipping
<b>Notes:</b>				
1. When an IBM-approved vapor bag and desiccant packets are used to protect the system, storage specifications are valid for 6 months and shipping specifications are valid for 1 month. Otherwise, storage and shipping specifications are valid for two weeks each.				
2. The upper limit of the dry bulb temperature must be derated 1 degree C per 219 m (719 ft.) above 1295 m (4250 ft.). Maximum altitude for is 3048 m (10,000 ft.)				

## Weight Distribution

The following table shows dimensions and weights used to calculate floor loading for the @server pSeries 655. All floor-loading calculations are specified for a raised-floor environment.

	1 Frame with Slimline Covers	1 Frame with Acoustical Covers
Weight without IBF	1501 kg (3303 lbs.)	1521 kg (3345 lbs.)
Weight with IBF	1642 kg (3612 lbs.)	1661 kg (3655 lbs.)
Width	750 mm (29.5 in.)	750 mm (29.5 in.)
Depth	1275 mm (50.2 in.)	1275 mm (50.2 in.)

**Note:** These values may be used to calculate floor loading. Contact your installation planning representative for more information about calculating floor loading for your system.

The following table shows floor-loading specifications for systems with slimline covers.

Floor Loading for Systems with Slimline Covers					
Condition <sup>5</sup> on page 99	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	Without IBF kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )	With IBF kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )
1	25 (1.0)	254(10.0)	254(10.0)	1123.2 (230.0)	1221.8 (250.2)
2	25 (1.0)	508 (20.0)	508 (20.0)	901.2 (184.6)	977.9 (200.3)
3	25 (1.0)	762 (30.0)	762 (30.0)	759.8 (155.6)	822.6 (168.5)
4	254 (10.0)	254 (10.0)	254 (10.0)	759.2 (155.5)	821.9 (168.3)
5	254 (10.0)	508 (20.0)	508 (20.0)	617.9 (126.6)	666.7 (136.5)
6	254 (10.0)	762 (30.0)	762 (30.0)	527.9 (108.1)	567.9 (116.3)
7	508 (20.0)	254 (10.0)	254 (10.0)	575.8 (117.9)	620.5 (127.1)
8	508 (20.0)	508 (20.0)	508 (20.0)	475.2 (97.3)	510.0 (104.4)
9	508 (20.0)	762 (30.0)	762 (30.0)	411.1 (84.2)	439.6 (90.0)
10	762 (30.0)	254 (10.0)	254 (10.0)	474.4 (97.2)	509.1 (104.3)
11	762 (30.0)	508 (20.0)	508 (20.0)	396.3 (81.2)	423.3 (86.7)
12	762 (30.0)	762 (30.0)	762 (30.0)	346.5 (71.0)	368.6 (75.5)

Floor Loading for Systems with Slimline Covers					
Condition <sup>5</sup>	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	Without IBF kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )	With IBF kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )
<b>Notes:</b>					
1. Service clearance is independent from weight distribution distance and must be at least 47 in. for the front of the frame and 36 in. for the rear of the frame (measured from the base frame).					
2. Weight-distribution areas should not be overlapped.					
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.					
4. Consult a professional, such as a structural engineer, if you are unsure of the floor-load rating of your facility.					
5. The "Condition" is the description within the table that indicates the side, front, and rear weight shedding distances.					

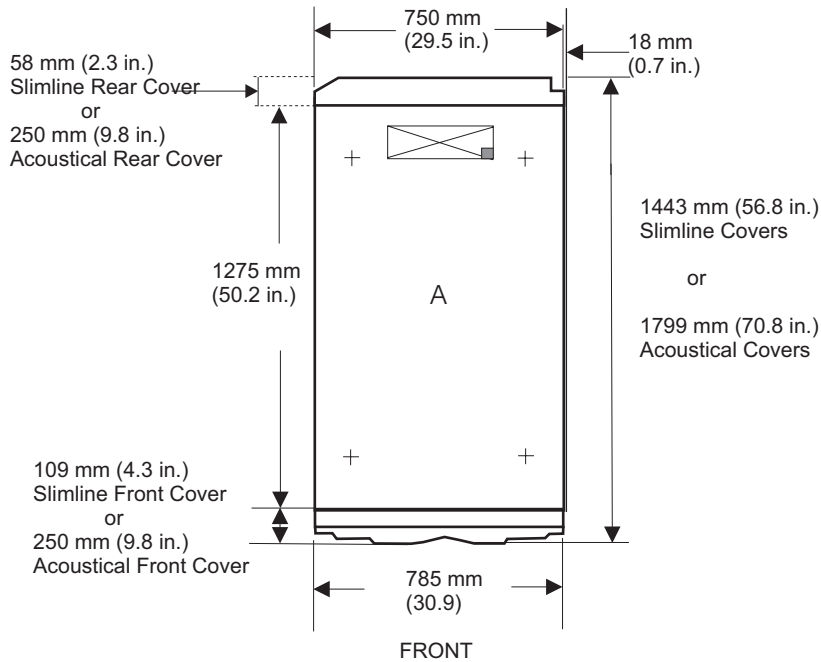
The following table shows floor-loading specifications for systems with acoustical covers.

Floor Loading for Systems with Acoustical Covers					
Condition <sup>5</sup>	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	Without IBF kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )	With IBF kg/m. <sup>2</sup> (lb./ft. <sup>2</sup> )
1	25 (1.0)	254 (10.0)	254 (10.0)	1121.9 (229.8)	1221.3 (250.1)
2	25 (1.0)	508 (20.0)	508 (20.0)	900.2 (184.4)	977.6 (200.2)
3	25 (1.0)	762 (30.0)	762 (30.0)	759.0 (155.4)	822.3 (168.4)
4	254 (10.0)	254 (10.0)	254 (10.0)	758.3 (155.3)	821.6 (168.3)
5	254 (10.0)	508 (20.0)	508 (20.0)	617.2 (126.4)	666.5 (136.5)
6	254 (10.0)	762 (30.0)	762 (30.0)	527.4 (108.0)	567.7 (116.3)
7	508 (20.0)	254 (10.0)	254 (10.0)	575.2 (117.8)	620.3 (127.0)
8	508 (20.0)	508 (20.0)	508 (20.0)	474.7 (97.2)	509.8 (104.4)
9	508 (20.0)	762 (30.0)	762 (30.0)	410.7 (84.1)	439.4 (90.0)
10	762 (30.0)	254 (10.0)	254 (10.0)	473.9 (97.1)	509.0 (104.2)
11	762 (30.0)	508 (20.0)	508 (20.0)	395.9 (81.1)	423.2 (86.7)
12	762 (30.0)	762 (30.0)	762 (30.0)	346.2 (70.9)	368.5 (75.5)
<b>Notes:</b>					
1. Service clearance is independent from weight-distribution distance and must be at least 45 in. at the front of the frame and 36 in. at the rear of the frame (measured from the base frame).					
2. Weight-distribution areas should not be overlapped.					
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.					
4. Consult a professional, such as a structural engineer, if you are unsure of the floor-load rating of your facility.					
5. The "Condition" is the description within the table that indicates the side, front, and rear weight shedding distances.					

Floor loading for the system is illustrated in the Proposed Floor Layout for Multiple Systems in "Considerations for Multiple System Installations" on page 115.

## Plan Views

The following illustration shows dimensional planning information for single-frame systems.



FRAME ENTRY/EXIT	DIMENSION	
	(mm)	(in.)
REAR	117 by 403	4.6 by 15.9

## Total System Power Consumption

The following table contains the maximum power consumption for the @server pSeries 655.

Power consumption values are estimates for nodes and I/O drawer with maximum configurations. Actual values may vary.

Calculate heat load (Btu per hour) by multiplying the power (in watts) for the configuration by a factor of 3.4.

**Note:** System configurations limit the maximum number of I/O drawers that are supported.

Configuration			Max. ac Power (W)	Redundant Power	
Nodes	I/O Drawers, or *7045-SW4s	BPR/BPA		With Line Cord Feature Codes 8688, 8689	With all Other Line Cord Feature Codes
1	0	1	1989	Yes	Yes
2	0	1	3977	Yes	Yes
3	0	1	5966	Yes	Yes
4	0	2	7955	Yes	Yes
5	0	2	9943	Yes	Yes
6	0	3	11932	Yes	Yes
7	0	3	13920	Yes	Yes

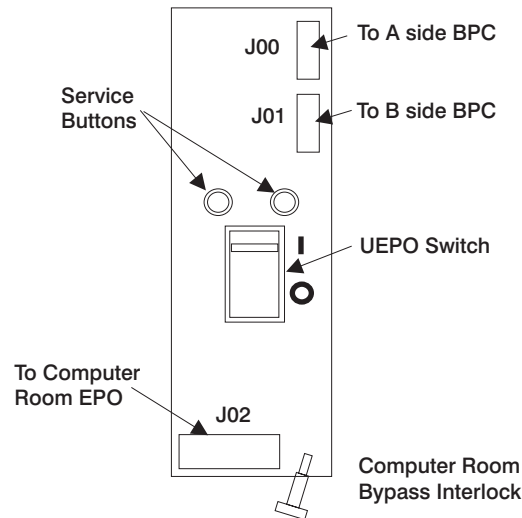
Configuration			Max. ac Power (W)	Redundant Power	
Nodes	I/O Drawers, or *7045-SW4s	BPR/BPA		With Line Cord Feature Codes 8688, 8689	With all Other Line Cord Feature Codes
8	0	3	15909	Yes	Yes
9	0	3	17898	No	Yes
10	0	3	19886	No	Yes
11	0	3	21875	No	No
12	0	3	23864	No	No
13	0	3	25852	No	No
14	0	3	27841	No	No
15	0	3	29830	No	No
16	0	3	31818	No	No
1	1	1	3182	Yes	Yes
2	1	1	5170	Yes	Yes
3	1	2	7159	Yes	Yes
4	1	2	9148	Yes	Yes
5	1	2	11136	Yes	Yes
6	1	3	13125	Yes	Yes
7	1	3	15114	Yes	Yes
8	1	3	17102	Yes	Yes
9	1	3	19091	No	Yes
10	1	3	21080	No	Yes
11	1	3	23068	No	No
12	1	3	25057	No	No
13	1	3	27045	No	No
14	1	3	29034	No	No
2	2	1	6364	Yes	Yes
3	2	2	8352	Yes	Yes
4	2	2	10341	Yes	Yes
5	2	3	12330	Yes	Yes
6	2	3	14318	Yes	Yes
7	2	3	16307	Yes	Yes
8	2	3	18295	No	Yes
9	2	3	20284	No	Yes
10	2	3	22273	No	No
11	2	3	24261	No	No
12	2	3	26250	No	No
3	3	2	9545	Yes	Yes
4	3	2	11534	Yes	Yes
5	3	3	13523	Yes	Yes
6	3	3	15511	Yes	Yes

Configuration			Max. ac Power (W)	Redundant Power	
Nodes	I/O Drawers, or *7045-SW4s	BPR/BPA		With Line Cord Feature Codes 8688, 8689	With all Other Line Cord Feature Codes
7	3	3	17500	No	Yes
8	3	3	19489	No	Yes
9	3	3	21477	No	Yes
10	3	3	23466	No	No
4	4	3	12727	Yes	Yes
5	4	3	14716	Yes	Yes
6	4	3	16705	Yes	Yes
7	4	3	18693	No	Yes
8	4	3	20682	No	Yes
5	5	3	15909	Yes	Yes
6	5	3	17898	No	Yes

\*For configurations with a 7045-SW4 High Performance Switch installed, count the switch as you would an I/O drawer.

## Unit Emergency Power Off

The server has a unit emergency power off (UEPO) switch on the front of the first frame (A Frame). Refer to the following illustration, which shows a simplified UEPO panel.



When the switch is tripped, the utility power is confined to the system power compartment. All volatile data will be lost.

It is possible to attach the computer room emergency power off (EPO) system to the system UEPO. When this is done, tripping the computer room EPO disconnects all power from the line cords and the internal battery backup unit, if it is provided. All volatile data will be lost in this case also.

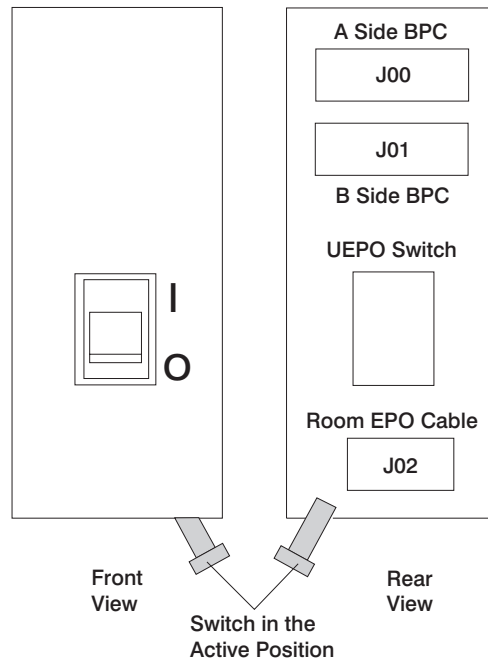
If the room EPO is not connected to the UEPO, tripping the computer room EPO removes ac power from the system. If the interlock bypass feature is used, the system remains powered for a short time based on system configuration.



## Computer Room Emergency Power Off (EPO)

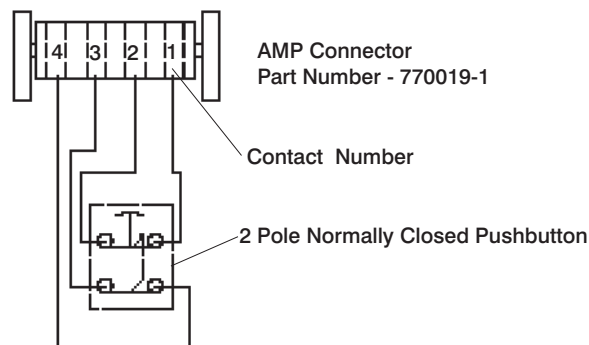
When the integrated battery feature (IBF) is installed and the room EPO is tripped, the batteries will engage and the computer will continue to run. It is possible to attach the computer room EPO system to the machine EPO. When this is done, tripping the room EPO will disconnect all power from the line cords and the internal battery backup unit. In this event all volatile data will be lost.

To incorporate the IBF into the room Emergency Power Off systems (EPO), a cable must be made to connect to the back of the system EPO panel. The following diagrams illustrate how this connection is made.



The preceding figure illustrates the back of the machine UEPO panel with the room EPO cable plugging into the machine. Notice the switch actuator. After it is moved to make the cable connection possible, the room EPO cable must be installed for the machine to power on.

In the following figure, an AMP connector 770019-1 is needed to connect to the system EPO panel. For room EPO cables using wire sizes #20 AWG to #24 AWG, use AMP pins (part number 770010-4). This connection should not exceed 5 Ohms, which is approximately 200 ft.(61 m) of #24 AWG.



## Machine-Holdup Times

The following tables illustrate typical machine-holdup times (time vs. load) for fresh and aged batteries.

- All times are listed in minutes

- Machine load is listed in total ac input power (power for both line cords combined)
- A fresh battery is defined as 2.5 years old or less.
- An aged battery is defined as 6.5 years.

**Note:** Battery capacity decreases gradually as the battery ages (from fresh-battery value to aged-battery value). The system diagnoses a failed-battery condition if the capacity decreases below the aged-battery value.

Typical Machine-Holdup Time vs. Load for Fresh Battery														
Machine Load	3 kW		6 kW		9 kW		12 kW		15 kW		18 kW		19.5 kW	
IBF Configuration	N	R	N	R	N	R	N	R	N	R	N	R	N	R
1 BPR	7.0	21.0	2.1	7.0										
2 BPR	21.0	50.0	7.0	21.0	4.0	11.0	2.1	7.0						
3 BPR	32.0	68.0	12.0	32.0	7.0	21.0	4.9	12.0	3.2	9.5	2.1	7.0	1.7	6.5
N=Non-redundant, R=Redundant														

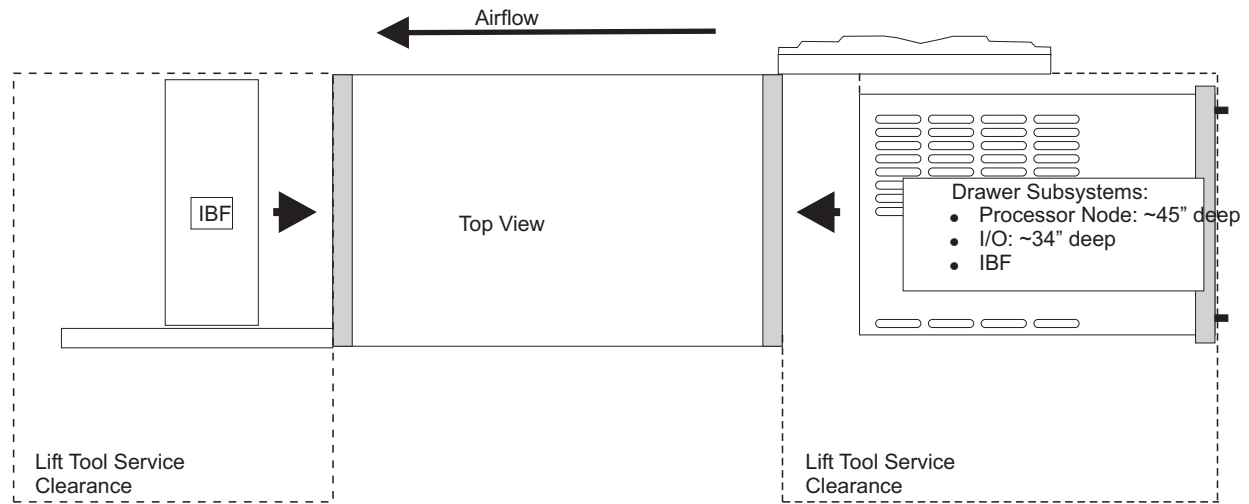
Typical Machine-Holdup Time vs. Load for Aged Battery														
Machine Load	3 kW		6 kW		9 kW		12 kW		15 kW		18 kW		19.5 kW	
IBF Configuration	N	R	N	R	N	R	N	R	N	R	N	R	N	R
1 BPR	4.2	12.6	1.3	4.2										
2 BPR	12.6	30.0	4.2	12.6	2.4	6.6	1.3	4.2						
3 BPR	19.2	41.0	7.2	19.2	4.2	12.6	2.9	7.2	1.9	5.7	1.3	4.2	1.0	3.9
N=Non-redundant, R=Redundant														

## Guide for Raised-Floor Preparation

Although a raised floor is not required for the @server pSeries 655, it is recommended for optimum system cooling and cable management. Raised floor cutouts should be protected by electrically nonconductive molding, appropriately sized, with edges treated to prevent cable damage and to prevent casters from rolling into the floor cutouts.

Front-service access is necessary on the @server pSeries 655 to accommodate a lift tool for the servicing of large drawers (the processor nodes and I/O drawers). Front and rear service access is

necessary to accommodate the lift tool for servicing of the optional integrated battery feature (IBF).



Floor Plan Considerations for Single Units

## Cutting and Placement of Floor Panels

This section provides recommendations for making the necessary openings in the raised floor for installing the @server pSeries 655.

The x-y alphanumeric grid positions are used to identify relative positions of cutout floor panels that may be cut in advance.

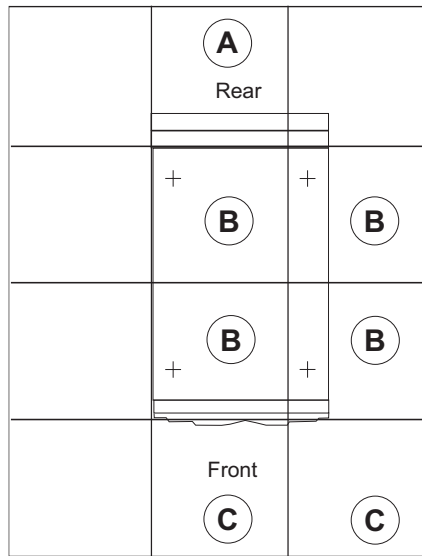
1. Measure the panel size of the raised floor.
2. Verify the floor panel size. The floor panel size illustrated is 600 mm (23.6 in.) and 610 mm (24 in.) panels.
3. Ensure adequate floor space is available to place the frames over the floor panels exactly as shown in the illustration. For front-to-back and side-to-side clearances, refer to "Considerations for Multiple System Installations" on page 115. Use the plan view if necessary. Consider all obstructions above and below the floor.
4. Identify the panels needed, and list the total quantity of each panel required for the installation.
5. Cut the required quantity of panels. When cutting the panels, you must adjust the size of the cut for the thickness of the edge molding you are using. The dimensions shown in the illustrations are finished dimensions. For ease of installation, number each panel as it is cut, as shown in the following illustration.

**Note:** Depending on the panel type, additional panel support (pedestals) may be required to restore structural integrity of the panel. Consult the panel manufacturer to ensure that the panel can sustain a concentrated load of 567 kg (1250 lbs). For multiple frame installation, it is possible that two casters will produce loads as high as 1134 kg (2500 lbs).

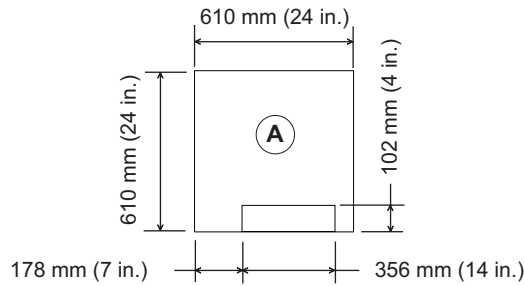
6. Use the raised floor diagram on the next page to install the panels in the proper positions.

### Notes:

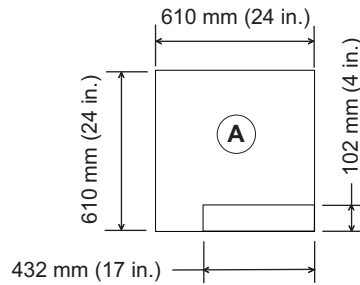
- a. This floor-tile arrangement is recommended so that the castors or leveling pads are placed on separate floor tiles to minimize the weight on a single floor tile. Furthermore, we recommend that tiles bearing the weight (having castors or leveling pads on the tiles) be uncut to retain the strength of the floor tile.
- b. The following illustration is intended only to show relative positions and accurate dimensions of floor cutouts. The illustration is not intended to be a machine template and is not drawn to scale.



Rack Entry/Exit	Dimension	
	(Mm)	(in)
Rear	117 x 403	4.6 x 15.9



Recommended for Non-Reinforced Pedestal Type



Recommended for Reinforced Pedestal or Stringer Types

**(B)** Uncut Panels

**(C)** Perforated Panels

### Raised Floor with 610-mm (24-inch) Floor Panels

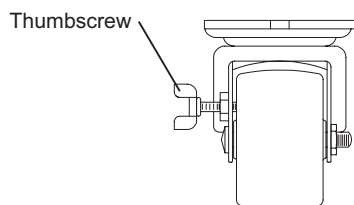
## Securing the Rack

The following can be ordered by the customer as additional rack-securing options for the @server pSeries 655.

- RPQ 8A1183 for attaching the rack-mounting plates to the concrete floor (non-raised floor)
- RPQ 8A1185 to attach the rack to a concrete floor when on a raised floor (9 1/2 inches to 11 3/4 inches high)
- RPQ 8A1186 to attach the rack to a concrete floor when on a raised floor (11 3/4 inches to 16 inches high)

**Positioning the Rack:** To unpack and position the rack, do the following:

1. Remove all packing and tape from the rack.
2. Position the rack according to the customer floor plan.
3. Lock each caster wheel by tightening the thumbscrew on the caster.



**Installing the Frame Kit:** The following tables show the parts required for each of the tie-down kits (a non-raised floor, short-raised floor, and a long-raised floor).

*Rack Tie-Down Kits:*

<b>11P4759 Frame tie-down Kit (Non-Raised Floor) (RPQ 8A1183)</b>			
<b>Item</b>	<b>Part Number</b>	<b>Qty</b>	<b>Description</b>
Item 3 in illustration on page 109.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 109.	11P3529	4	Hinge plate
Item 8 in illustration on page 109.	11P3530	2	Latch plate
Item 6 in illustration on page 109.	11P3531	2	EQ support
Item 2 in illustration on page 109.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 109.	76X4687	2	Latch bolt
Item 1 in illustration on page 109.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 109.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 109.	1622307	8	Washer (M8, hinge)
Item 1 in illustration on page 110.	11P3528	2	Plate lock-down
Item 2 in illustration on page 110.	05N6345	4	Spacer
Item 4 in illustration on page 110.	05N6344	4	Bushing
Item 5 in illustration on page 110.	21L4309	4	Washer
Item 3 in illustration on page 110.	0130985	4	Washer
Item 6 in illustration on page 110.	05N6346	4	Bolt

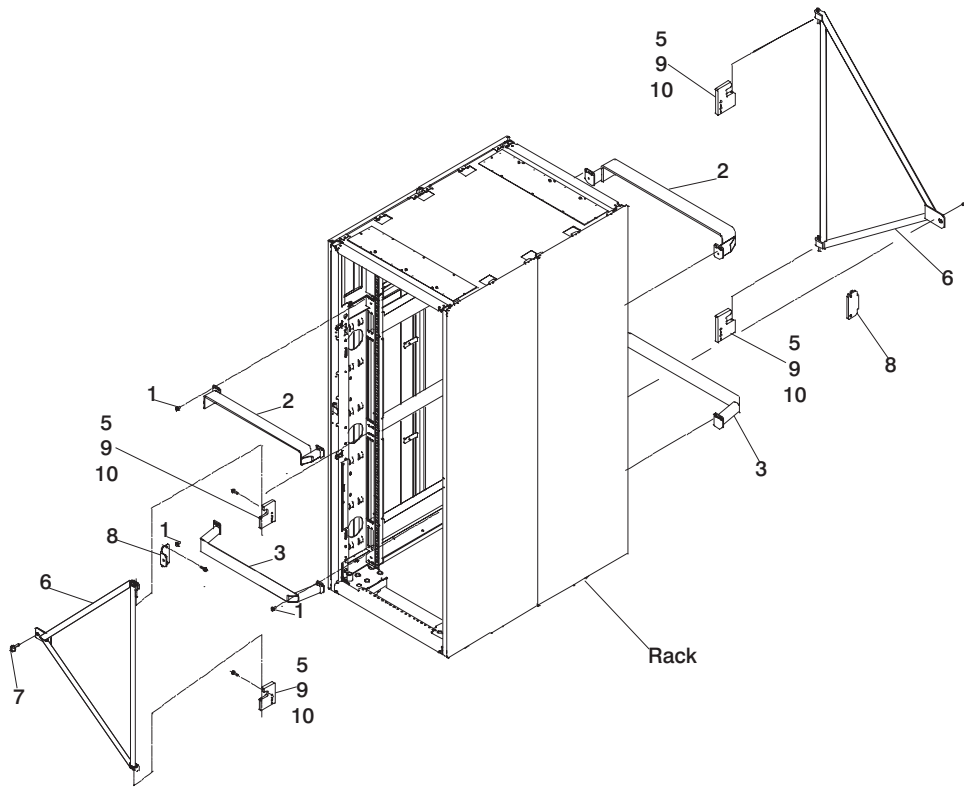
<b>11P4757 Frame tie-down Kit (Short - Raised Floor) (RPQ 8A1185)</b>			
<b>Item</b>	<b>Part Number</b>	<b>Qty</b>	<b>Description</b>
Illustration on page 114.	44P0673	4	Turnbuckle Assembly (short)
Item 3 in illustration on page 109.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 109.	11P3529	4	Hinge plate
Item 8 in illustration on page 109.	11P3530	2	Latch plate
Item 6 in illustration on page 109.	11P3531	2	EQ support
Item 2 in illustration on page 109.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 109.	76X4687	2	Latch bolt
Item 1 in illustration on page 109.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 109.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 109.	1622307	8	Washer (M-8, hinge)

11P4758 Frame tie-down Kit (Long - Raised Floor) (RPQ 8A1186)			
Item	Part Number	Qty	Description
Illustration on page 114.	44P0674	4	Turnbuckle Assembly (long)
Item 3 in illustration on page 109.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 109.	11P3529	4	Hinge plate
Item 8 in illustration on page 109.	11P3530	2	Latch plate
Item 6 in illustration on page 109.	11P3531	2	EQ support
Item 2 in illustration on page 109.	11P3532	2	Shipping bar (upper)
Item 7 in illustration 109.	76X4687	2	Latch bolt
Item 1 in illustration on page 109.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 109.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 109.	1622307	8	Washer (M8, hinge)

*Mounting Internal Rack Components:* To mount the internal rack components, do the following:

**Attention:** This procedure is performed by the service representative.

1. Using four M-8 (20 mm) screws (item 1 in illustration on page 109), install the top shipping bar (item 2 in illustration on page 109) at EIA unit location 32.
2. Using four M-8 screws (item 1 in illustration on page 109), install the bottom shipping bar (item 3 in illustration on page 109) at EIA unit location 18.
3. Repeat steps 1 and 2 to install shipping bars in the rear of the rack.
4. Attach the front top hinge (item 5 in illustration on page 109) on the vertical rail (located approximately at EIA unit 29-30 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 109) and two washers (item 10 in illustration on page 109).
5. Attach the front bottom hinge (item 5 in illustration on page 109) on the vertical rail (located approximately on EIA unit 6-7 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 109) and two washers (item 10 in illustration on page 109).
6. Repeat steps 4 and 5 to install the hinges on the rear rail.
7. Attach the latch plate (item 8 in illustration on page 109) with two M-8 (20 mm) screws (item 1 in illustration on page 109).
8. Repeat step 7 to attach the latch plate in the rear of the rack.
9. Attach the triangular braces (item 6 in illustration on page 109) in both the front and rear of the rack.
10. Install the latch bolts (item 7 in illustration on page 109).



**Determine Your Next Step:** Use the following to determine your next step:

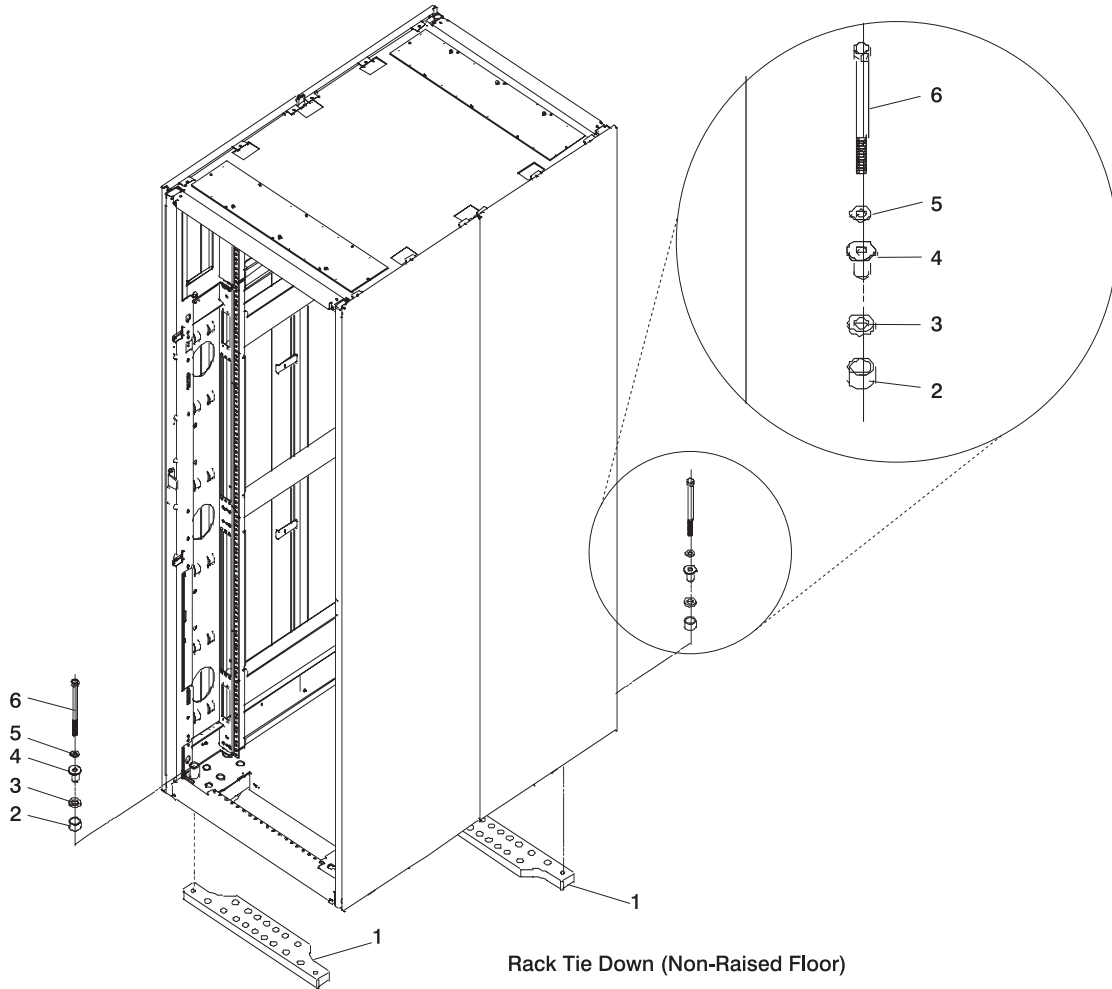
- If the rack is being attached to a concrete (non-raised) floor, proceed to “Attach the Rack to a Concrete (Non-Raised) Floor.”
- If the rack is being attached to a raised floor, proceed to “Attaching the Rack to a Short or Long Raised Floor” on page 111.

**Attach the Rack to a Concrete (Non-Raised) Floor:** Use this procedure to attach the rack to a concrete (non-raised) floor.

**Attention:** It is the customer’s responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

**Note:** The customer should obtain the service of a qualified structural engineer to determine appropriate anchoring of the mounting plates. A minimum of three anchor bolts for each mounting plate must be used to secure the plates to the concrete floor. Because some of the drilled holes may be aligned with concrete reinforcement rods below the surface of the concrete floor, additional holes must be drilled. Each mounting plate must have at least three usable holes, two that are on opposite sides and opposite ends of each other, and one hole at the center. The mounting plates should be able to withstand 2500 pounds pulling force on each end.

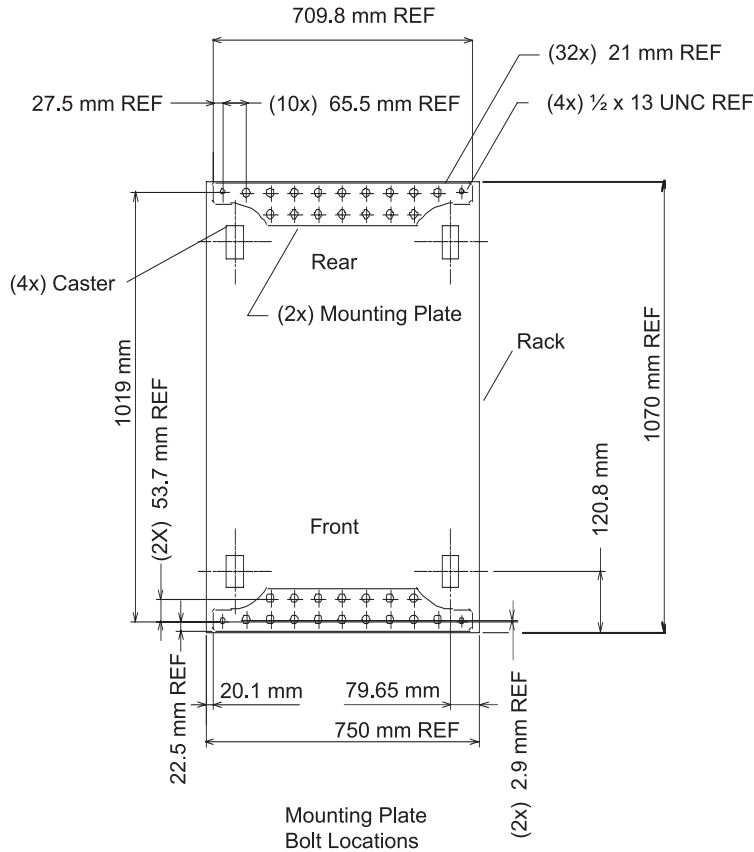
1. Be sure the rack is in the correct location.



2. Place the mounting plates (item 1 in illustration on page 110), front and rear, in the approximate mounting position under the system rack.
3. To align the mounting plates to the system rack, do the following:
  - a. Place the four rack-mounting bolts (item 6 in illustration on page 110) through the plate assembly holes at the bottom of the rack. Install the bushings and washers (item 4 and 5 in illustration on page 110) to ensure bolt positioning.
  - b. Position the mounting plates (item 1 in illustration on page 110) under the four rack-mounting bolts (item 6 in illustration on page 110) so that the mounting bolts are centered directly over the tapped holes.
  - c. Turn the rack-mounting bolts (item 6 in illustration on page 110) three or four rotations into the tapped holes.



4. Mark the floor around the edge of the mounting plates, as shown in the following illustration:



5. Remove the mounting bolts from the threaded holes.
6. Move the rack away from the mounting plates.
7. Mark the floor at the center of each hole in the mounting plate (including tapped holes).
8. Remove the mounting plates from the marked locations.
9. At the marked location of the tapped mounting holes, drill two holes approximately 1 inch to allow clearance for the ends of the two rack-mounting bolts. The ends of the rack-mounting bolts may protrude past the thickness of the mounting plate. Drill one hole in each group of anchor bolt location marks as indicated on the marked floor.
10. Using at least three bolts for each mounting plate, mount the mounting plates to the concrete floor.

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Reposition the system rack over the mounting plates.
2. Place the four rack-mounting bolts through the plate assemblies with the D-washer positioned so that the straight side of the washer is facing inward toward the system rack.
3. Place the isolator bushing (item 4 in illustration on page 110) inside the leveling foot with a washer between the isolator bushing and the floor plate.
4. Turn the rack-mounting bolts three or four rotations into the tapped holes.
5. Turn the leveling foot of the plate assembly down until it contacts the mounting plate, and then level the rack using the four leveling feet.
6. Lock the leveling feet by tightening the lock nut.
7. Tighten the four rack-mounting bolts into the mounting plates.

**Attaching the Rack to a Short or Long Raised Floor:**

**Attention:** It is the customer's responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

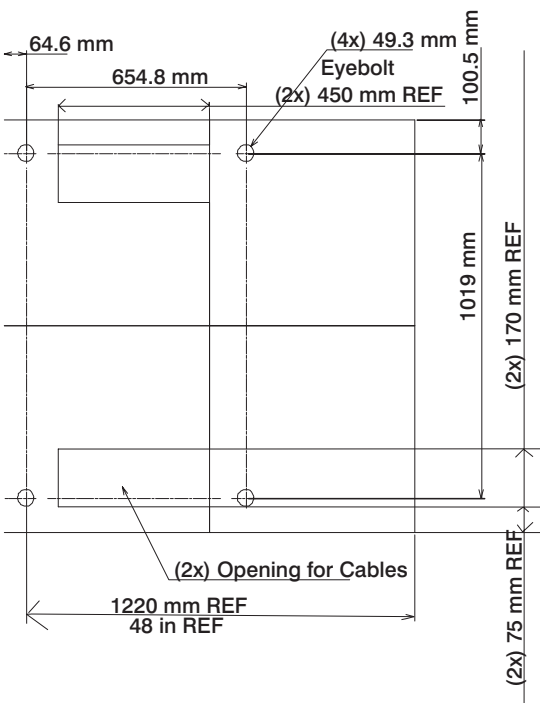
**Note:** To accommodate a floor with a depth of more than 16 inches, a steel beam or a steel channel adapter for mounting the subfloor eyebolts are required. The customer must supply the floor eyebolts.

Consider the following when preparing the floor for tie-down:

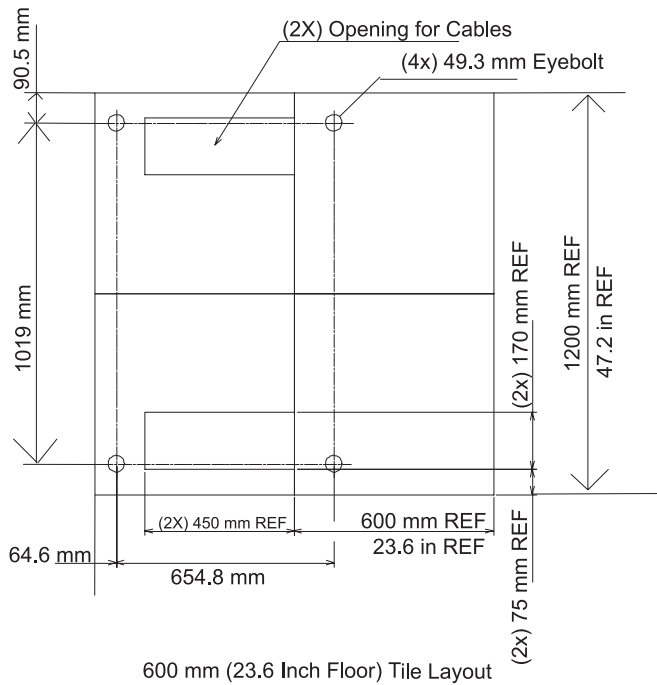
- The hardware is designed to support a frame weighing no more than 2636 pounds.
- The estimated maximum concentrated load on one caster for a 2636 pound-system is 900 pounds. For a multiple system installation, it is possible that one floor tile will bear a total concentrated load of 1800 pounds.

To install the eyebolts, do the following:

1. Obtain the service of a qualified structural engineer to determine appropriate installation of the eyebolts.
2. Consider the following before installing the eyebolts:
  - Floor eyebolts must be securely anchored to the concrete floor.
  - The minimum height of the center of the internal diameter is 1 inch above the concrete floor surface.
  - The maximum is height 2.5 inches above the concrete floor surface. Higher than 2.5 inches can cause excessive lateral deflection to the tie-down hardware.
  - The eyebolt's internal diameter should be 1 3/16 inch, and each eyebolt should be able to withstand 2700 pounds. The customer should obtain the service of a qualified consultant or structural engineer to determine the appropriate anchoring method for these eyebolts and to ensure that the raised floor can support the floor-loading specifications.
3. The plan for installing four eyebolts positioned to match the dimensions is given in the following illustrations.



610 mm (24 Inch) Floor Tile Layout



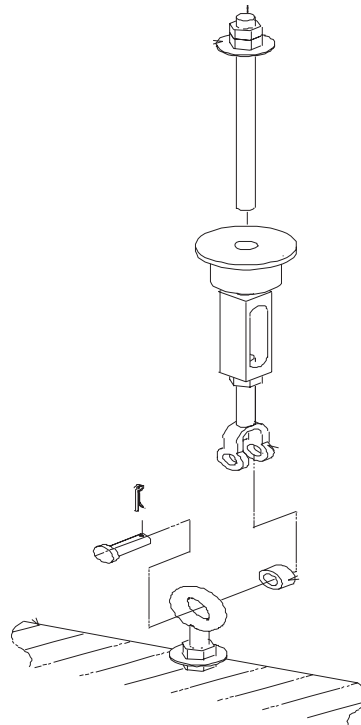
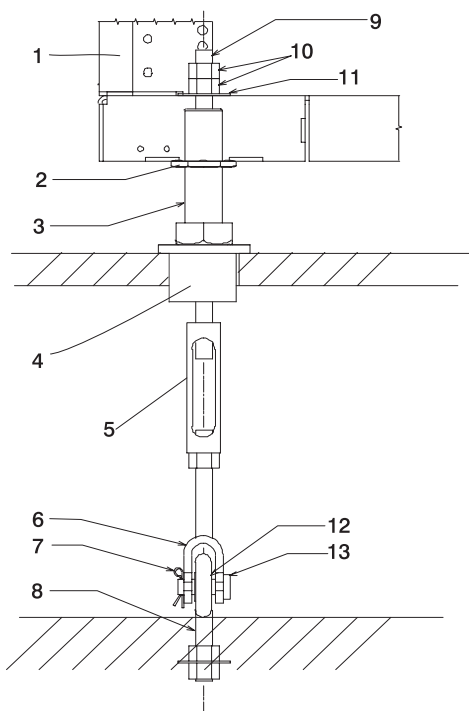
4. Install the eyebolts to the floor.

To install the frame, do the following:

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Before starting the installation, check all cable openings in the floor panel and location of the rubber bushing holes so that they match the dimensions given in the illustrations on 113 and 113.
2. Power off the system and make sure all cables and connectors are disconnected and are not dangling around the frame. The frame should be free to roll.
3. The floor eyebolts should be already secured to the concrete floor. Verify the height of the center of the floor eyebolt to the concrete floor or the steel beam/channel adapter mounted to the concrete floor. Ensure that the turnbuckles can accommodate the total height of the raised floor.
4. Remove the floor tiles around the area where the frame(s) will be installed.

- Remove the pin and the spacer from the lower jaw (see the following illustrations).



1	Frame	8	Floor Eyebolt (customer-supplied)
2	Jam Nut	9	Threaded Rod
3	Rack Leveler	10	Nut
4	Rubber Bushing	11	Washer
5	Turnbuckle (Short or Long)	12	Spacer
6	Lower Jaw	13	Shaft
7	Pin		

**Note:** The difference between the two turnbuckle assemblies is the length of the turnbuckle.

The Short Turnbuckle Assembly (part number 11P4755) is used for a 9 1/2 inches to 11 3/4 inches raised floor.

The Long Turnbuckle Assembly (part number 11P4756) is used for an 11 3/4 inches to 16 inches raised floor.

- Place the spacer inside the floor eyebolt and place the floor eyebolt between the lower jaw. Reinstall the shaft, pin, and spacer.
  - Remove the threaded rod and rubber bushing from the turnbuckle assembly.
  - Install the floor tile that has the rubber bushing holes that are aligned with the eyebolt locations.
  - Install the rubber bushings in the floor tiles.
  - Move the frame so that the frame leveler is located over the rubber bushings.
- Attention:** To avoid a tipping hazard, make sure that the frame casters do not roll into the cable opening.
- Turn the leveling foot of the plate assembly down until it contacts the bushing, and then level the rack using the four leveling feet by tightening the lock nuts.
  - Lock the leveling feet by tightening the lock nut.
  - Insert the threaded rod into the inner hole of the leveler and the rubber bushing.

14. Thread down the threaded rod until the tip of the rod is approximately 1 inch inside the turnbuckle.
15. Insert the nuts and hand-tighten the nuts.
16. Repeat the previous three steps so that all assemblies are completely installed, as shown in the previous illustration.
17. Tighten all the nuts to 40 ft-pounds.

The frame is now secured.

## Considerations for Multiple System Installations

In a multi-frame installation, it is possible that a floor tile with cable cutouts (refer to “Cutting and Placement of Floor Panels” on page 105) will bear two concentrated static loads up to 567 kg (1250 lbs) per caster/leveler. Thus, the total concentrated load can be as high as 1134 kg (2500 lbs). Contact the floor tile manufacturer or consult a structural engineer to ensure that the raised floor assembly can support this load.

When you are integrating an @server pSeries 655 into an existing multiple-system environment, or when adding additional systems to an installed @server pSeries 655, consider the following factors:

- Minimum aisle width

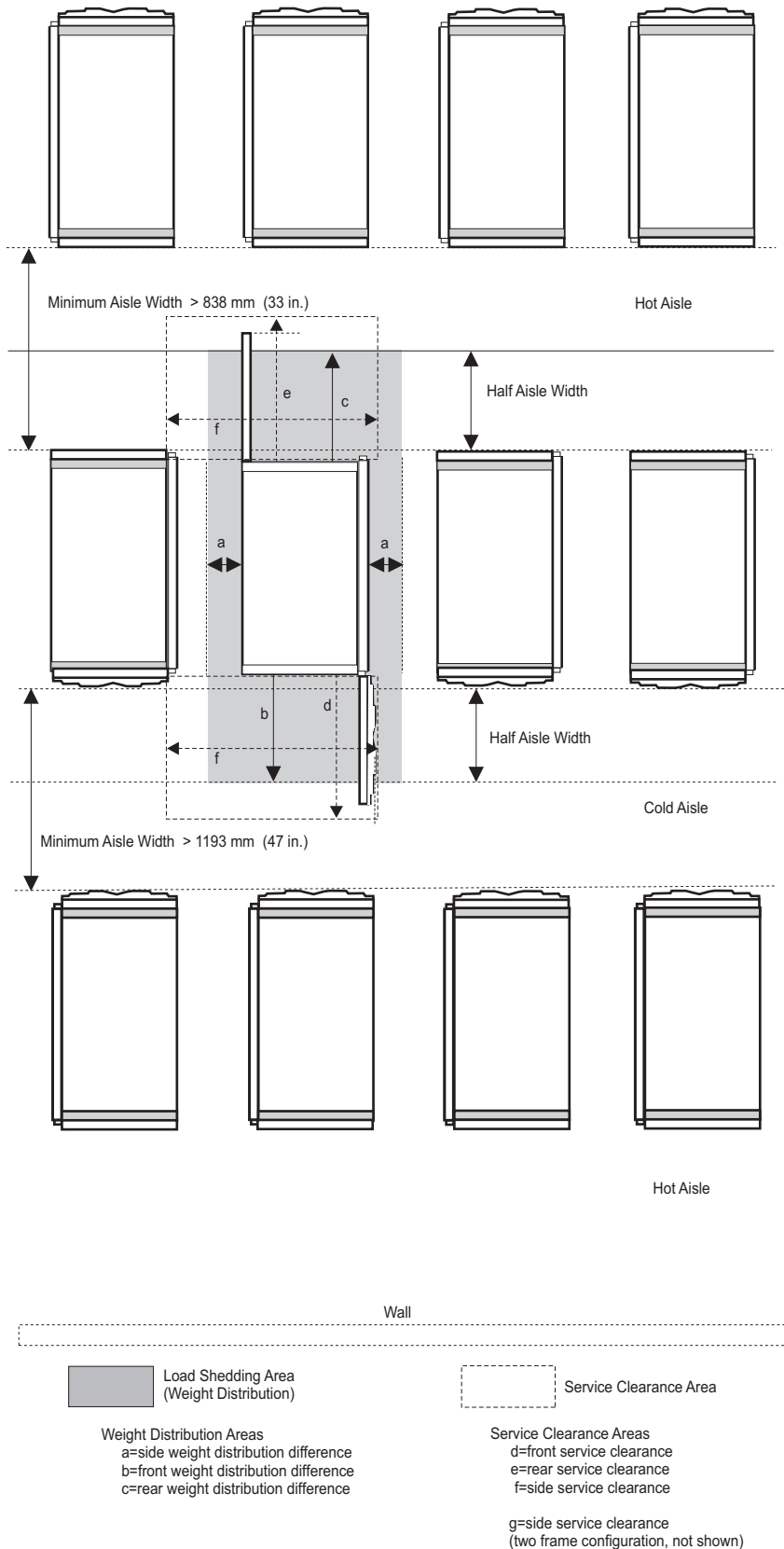
For multiple rows of systems containing one or more @server pSeries 655, the minimum aisle width in the front of the system is 1194 mm (47 in.) and 838 mm (33 in.) in the rear of the system to allow room to perform service operations. The minimum aisle width is in addition to the front and rear service clearances of 1143 mm (45 in.) and 914 mm (36 in.) respectively. Service clearances are measured from the edges of the frame (with doors open) to the nearest obstacle.

- Thermal interactions

Systems should be faced front-to-front and rear-to-rear to create “cool” and “hot” aisles to maintain effective system thermal conditions, as shown in the following illustration.

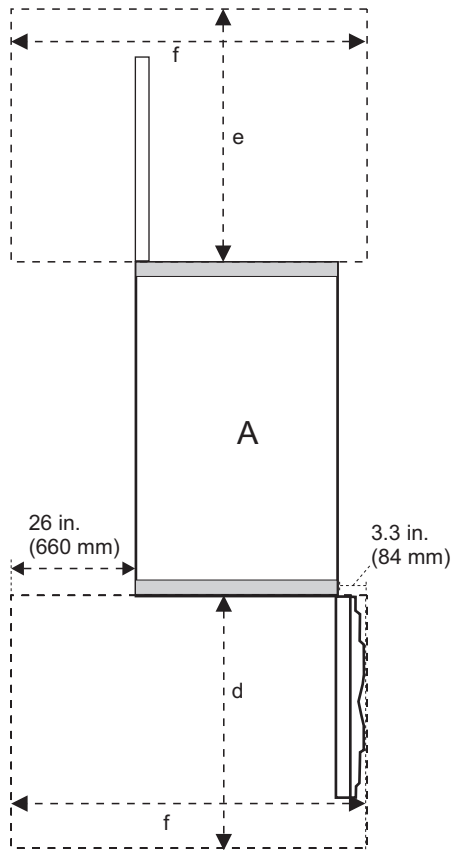
Cool aisles need to be of sufficient width to support the airflow requirements of the installed systems as indicated in Cooling Requirements on Page 90. The airflow per tile will be dependent on the underfloor pressure and perforations in the tile. A typical underfloor pressure of 0.025 in. of water will supply 300-400 cfm through a 25% open 2 ft. by 2 ft. floor tile.

### Proposed Floor Layout for Multiple Systems

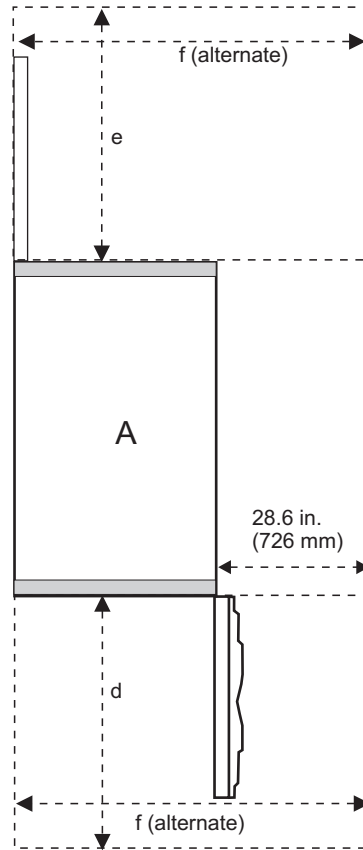


## Service Clearance

The minimum service clearance for systems with thin doors is shown in the following illustration.



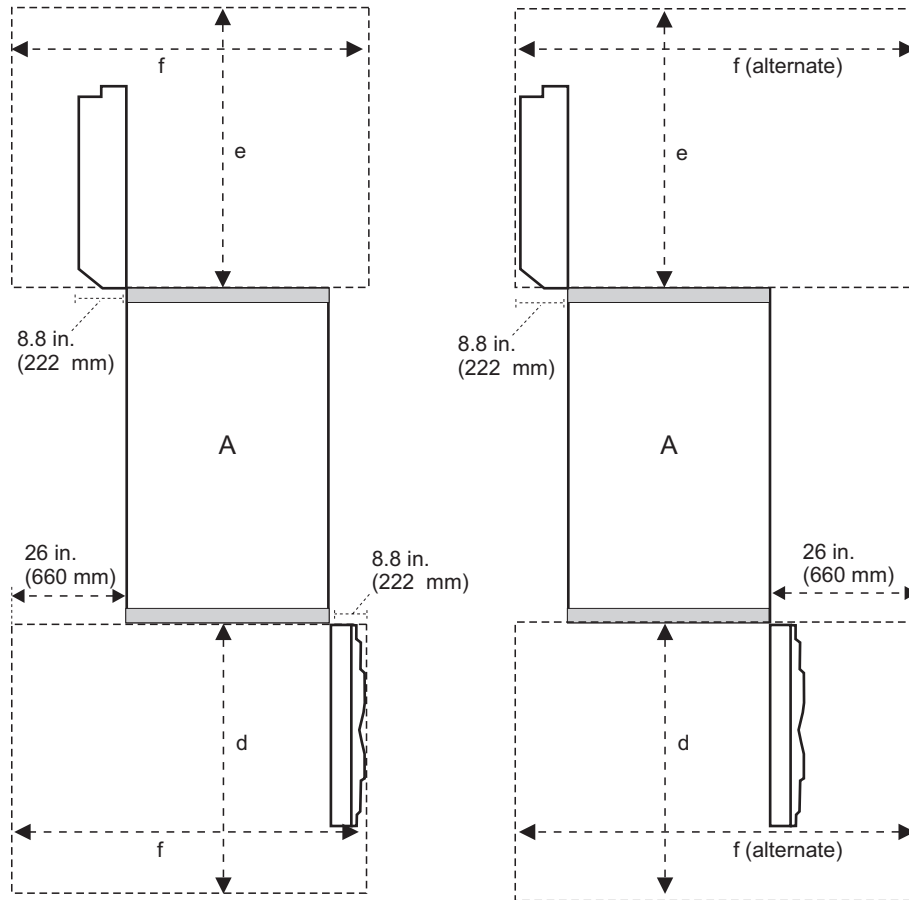
Single-Frame System  
with Slimline Doors



Single-Frame System  
with Slimline Doors  
(with alternative right-side  
service clearance)

d=1295 mm (51.0 in.)  
e=914 mm (36.0 in.)  
f=1511 mm (59.5 in.)  
f (alternate)=1577 mm (62.1 in.)

The minimum service clearance for systems with acoustical doors is shown in the following illustration.



Single-Frame System with Acoustical Doors

Single-Frame System with Acoustical Doors (alternative right-side service clearance)

d=1295 mm (51.0 in.)  
 e=914 mm (36.0 in.)  
 f=1511 mm (59.5 in.)  
 f (alternate)=1765 mm (69.5 in.)  
 G=1808 mm (71.2 in.)

Refer to the illustration in “Guide for Raised-Floor Preparation” on page 104 for service clearances shown in a raised-floor installation.

## Cooling Requirements

The @server pSeries 655 requires air for cooling. As shown in “Proposed Floor Layout for Multiple Systems” on page 116, rows of @server pSeries 655 systems must face front-to-front. The use of a raised floor is recommended to provide air through perforated floor panels placed in rows between the fronts of systems (the cold aisles shown in the figure on page 116).

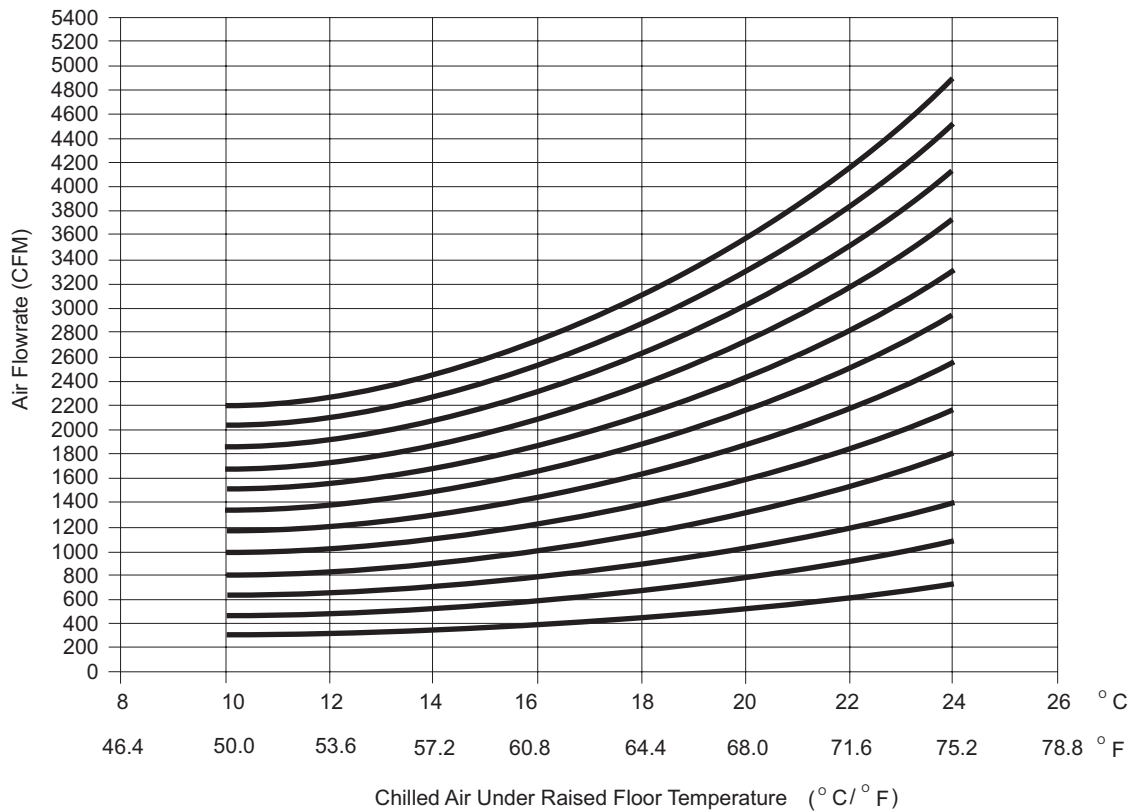
The following table provides system cooling requirements based on system configuration. The letter designations in the table correspond to the letter designations in the graph shown in “Cooling Requirements Graph” on page 119.



Number of Processor Nodes	*Number of I/O Drawers					
	0	1	2	3	4	5
1	A	A				
2	A	B	B			
3	B	C	C	D		
4	C	C	C	D	E	
5	D	D	D	E	F	F
6	E	E	E	F	G	G
7	F	F	F	G	G	
8	F	G	G	H	H	
9	G	G	H	H		
10	H	H	I	I		
11	H	I	J			
12	I	J	J			
13	J	K				
14	K	K				
15	L					
16	L					

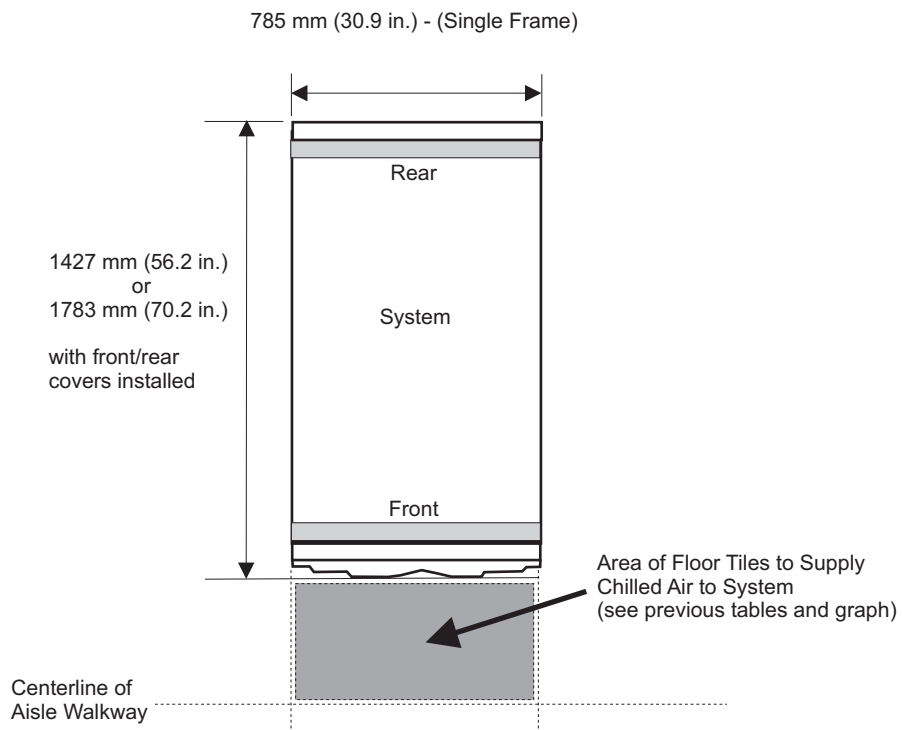
\*For configurations with a 7045-SW4 High Performance Switch installed, count the switch as you would an I/O drawer.

### Cooling Requirements Graph

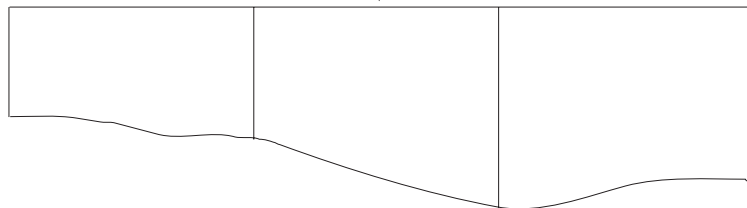


## Requirements for the Chilled Air Flow Area

The following illustration shows the chilled air flow area required for a system. Use the system cooling requirements tables and the preceding graph to determine the area of floor tiles to supply chilled air to the system.



Other Computer Systems



## HMC Connections to the @server pSeries 655

Asynchronous adapters in the HMC are used to connect the HMC to processor nodes in the @server pSeries 655 and bulk power controllers (BPCs) in the racks. This section includes detailed information about how to connect the HMC to processor nodes and BPCs. It also shows how these connections are used in an @server pSeries 655 system.

### Connecting an HMC to @server pSeries 655 Processor Nodes

One HMC can connect up to 16 @server pSeries 655 processor nodes in up to 4 @server pSeries 7040-W42 racks by using RS232 cable connections. These connections can be made from an HMC by using the asynchronous ports on FC 2944 (128-Port Asynchronous Controller) or FC 2943 (8-Port Asynchronous Controller). An integrated port (using RS232) on the HMC is also available to be used to connect to a processor node.

The following table lists the features used to make the RS232 connections from FC 2944 (128-Port Asynchronous Controller) to @server pSeries 655 processor nodes.

Feature Code	Description	Connects From	Connects To
2944	128-Port Asynchronous Controller	HMC	FC 8131
8131	128-Port Asynchronous Cable, 4.5 M (14.8 ft.)	FC 2944	FC 8137
8137	16-Port Remote Asynchronous Node (RAN) with ac transformer See note 1.	FC 8131	FC 8132 and FC 8133
8132	128-Port Asynchronous Cable, 23 cm (9 in.) See note 2.	FC 8137	FC 8137
8133	RJ-45 to DB-25 Converter Cable	FC 8137	FC 8120 or FC 8121
8120	Attachment Cable, HMC to Host, 6 M (19.7 ft.)	FC 8133	p655 node
8121	Attachment Cable, HMC to Host, 15 M (49.2 ft.)	FC 8133	p655 node

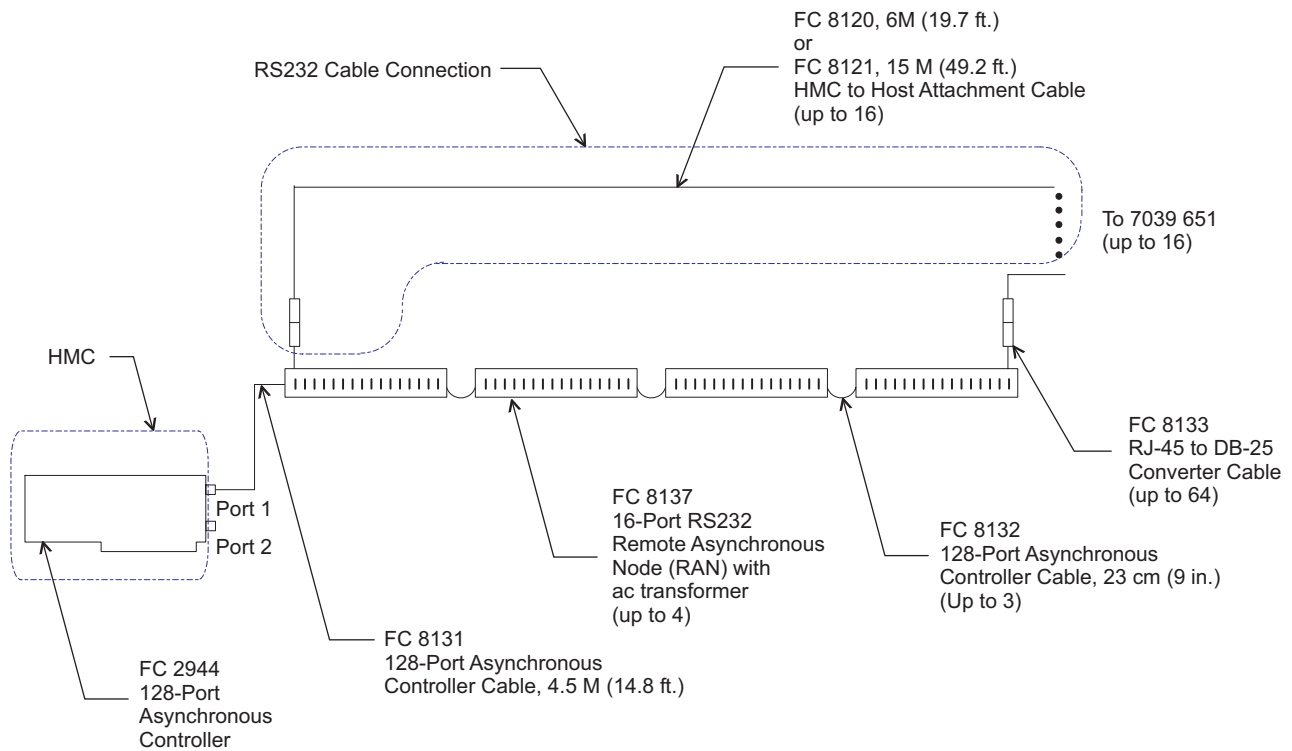
#### Notes:

1. Each FC 8137 requires a 98xx power-cable-specify feature code.
2. FC 8132 is used as a connection between two RANs (FC 8137) when multiple RANs are used.

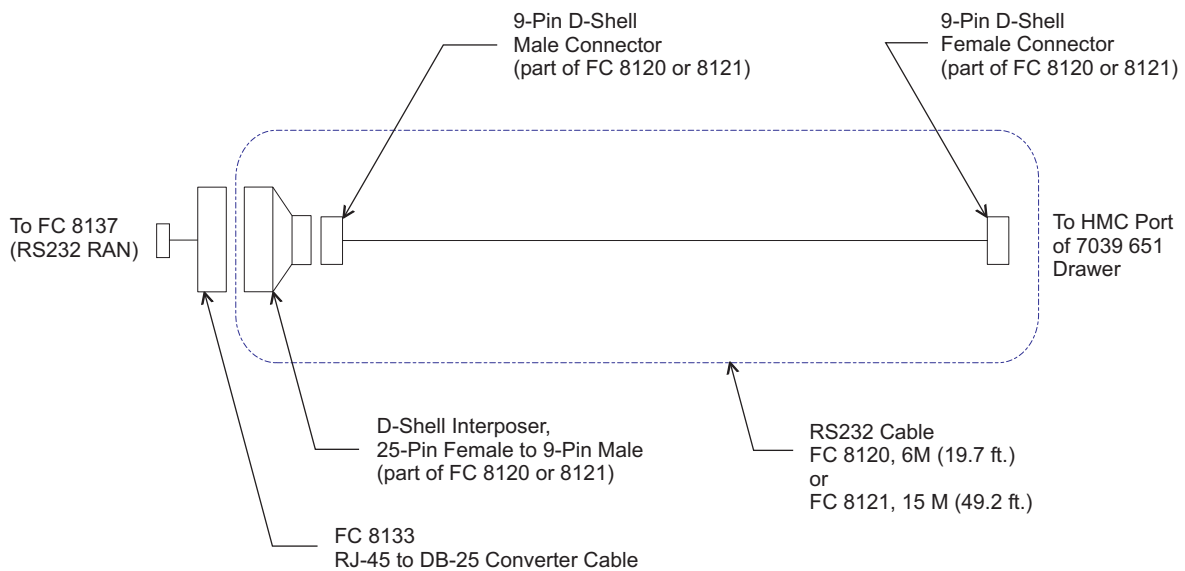
For more information about using FC 2944 to @server pSeries 655 processor nodes, see the illustration “HMC to Host - RS232 Connection with FC 2944” on page 122.

The following illustration shows the RS232 connections between the HMC and the p655 nodes using FC 2944 (128-Port Asynchronous Controller).

### HMC to Host - RS232 Connection



### Detail of RS232 Cable Connection

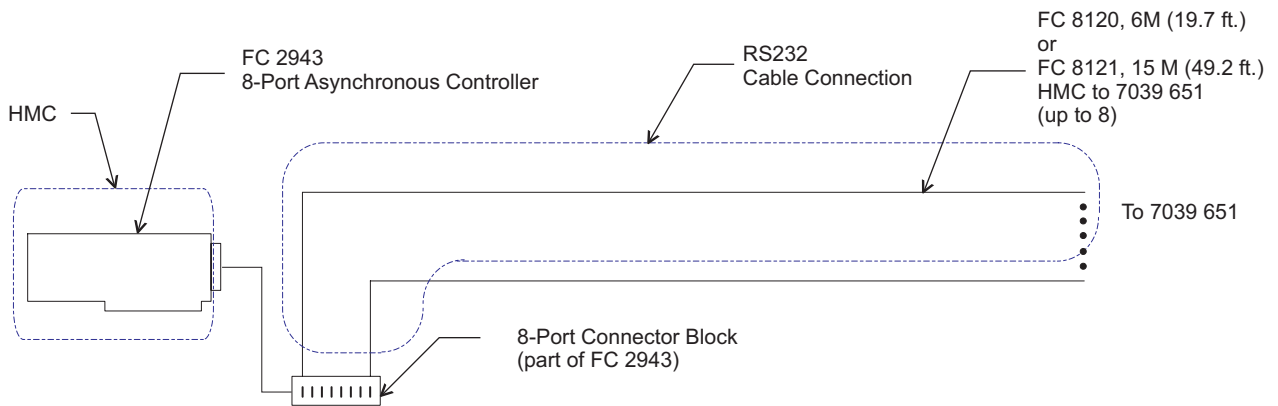


The following table lists the features used to make the RS232 connections from FC 2943 (8-Port Asynchronous Controller) to @server pSeries 655 processor nodes.

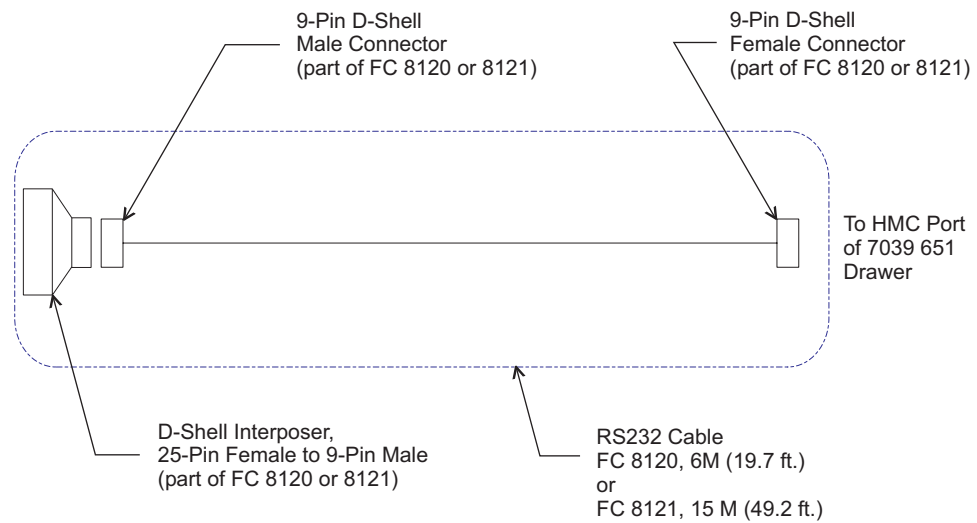
Feature Code	Description	Connects From	Connects To
2943	8-Port Asynchronous Controller and Fan-out box	HMC	FC 8120 or FC 8121
8120	Attachment Cable, HMC to Host, 6 M (19.7 ft.)	FC 2943	p655 node
8121	Attachment Cable, HMC to Host, 15 M (49.2 ft.)	FC 2943	p655 node

The following illustration shows the RS232 connections between the HMC and the p655 nodes using FC 2943 (8-Port Asynchronous Controller).

### HMC to Host - RS232 Connection



### Detail of RS232 Cable Connection



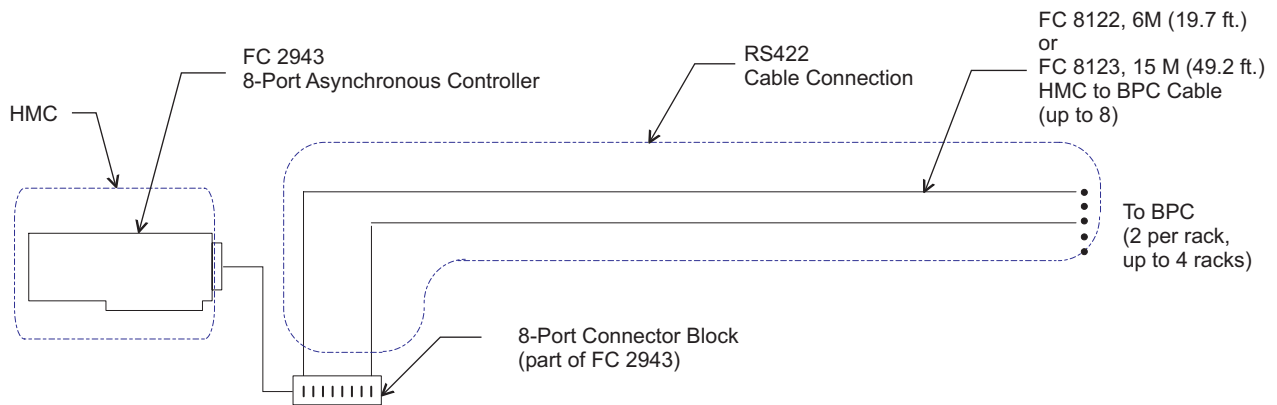
## Connecting an HMC to Bulk Power Controllers

One HMC can connect to 8 BPCs (four racks with two BPCs each). The following features are used to connect an HMC BPCs.

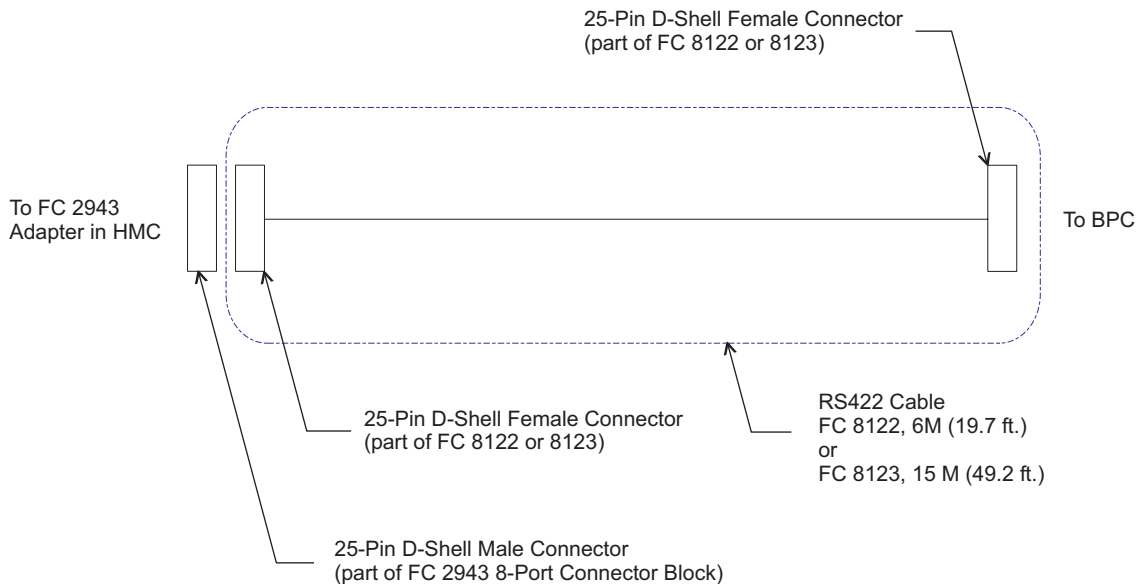
- FC 2943, 8-Port Asynchronous Adapter with 8-port connector box - adapter connects in an HMC, ports in connector box connect to FC 8122 or 8123. Two cables are required per rack for connection to BPC.
- FC 8122, Attachment Cable, HMC to BPC, 6 M (19.7 ft.) - connects from FC FC2943 8-port connector box to BPC
- FC 8123, Attachment Cable, HMC to BPC, 15 M (49.2 ft.) - connects from FC FC2943 8-port connector box to BPC

The following illustrations provide additional information about the connections between the HMC and the BPCs.

### HMC to Bulk Power Controller (BPC) - RS422 Connection

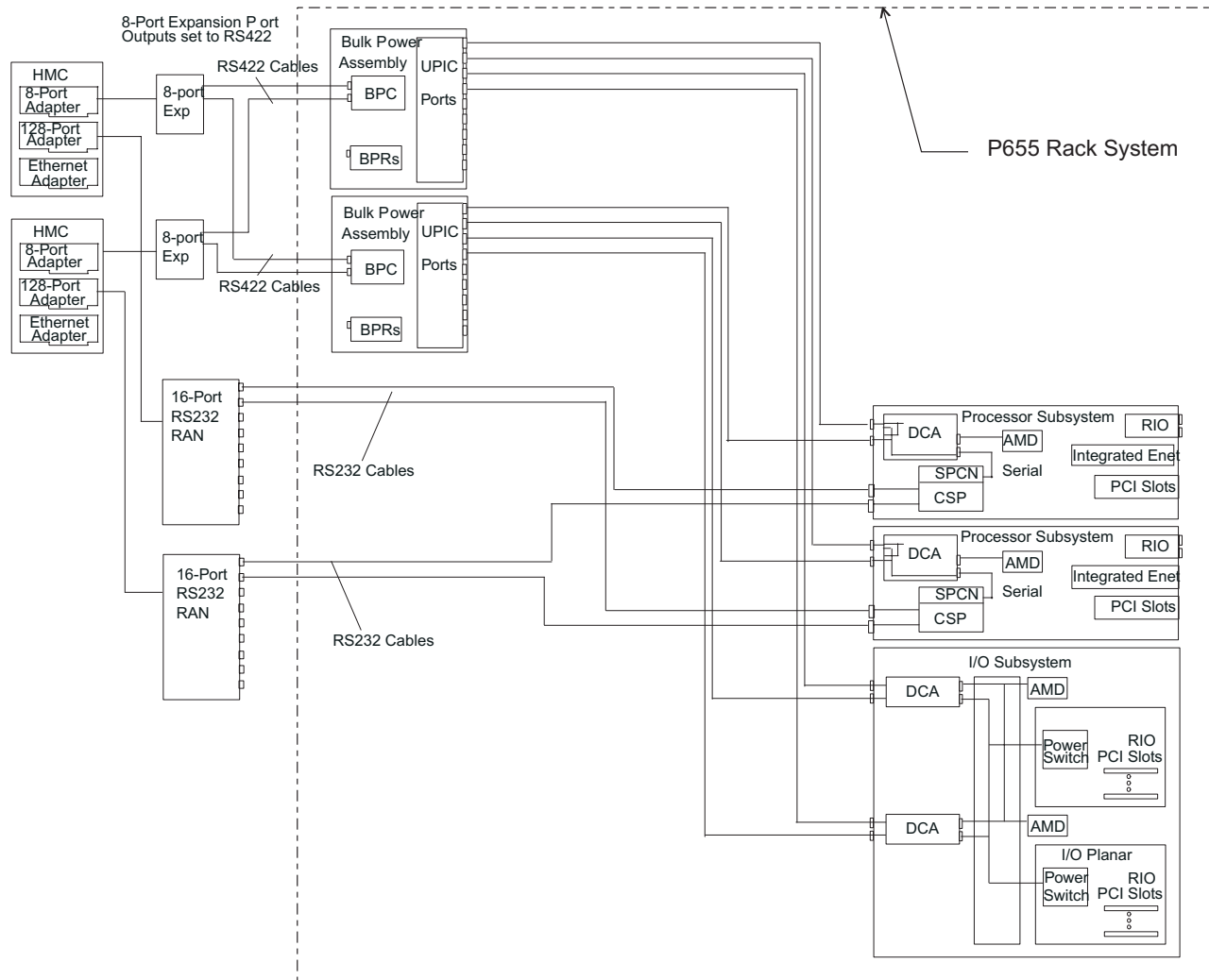


### Detail of RS422 Cable Connection



## Connecting HMCs to the @server pSeries 655

The following illustration shows cable connections from HMCs (using 8-port and 128-port asynchronous adapters) to an @server pSeries 655 configuration.



## 7040 @server pSeries 670

The @server pSeries 670 system consists of multiple components, as summarized in the following table.

Model	Description	Minimum per System	Maximum per System
7040-61R	Base Frame (Redundant power supplies as feature codes)	1	1
FC6070	Base Frame Universal Front Door	1	1
FC6074	Base Frame Slimline Rear Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6075	Base Frame Acoustical Rear Door <sup>2</sup>	1 <sup>1</sup>	1 <sup>1</sup>
FC6200 or FC6201	Optional Integrated Battery Feature (IBF)	0	4
7040-671	Managed Server (up to 16 processors, 4 GB to 256 GB memory)	1	1
FC7315	Hardware Management Console (HMC)	0	2
FC8692	Media Subsystem (Operation panel, 3.5-inch floppy drive, optional media devices)	1	1
7040-61D	IO Subsystem (20 PCI cards maximum, 16 DASD maximum)	1	3

### Notes:

1. Either slimline doors or acoustical doors must be selected by the customer during the order process. Slimline doors will not meet acoustic limits for Category 1A.
2. Door options determine which doors are included with your @server pSeries 670. See “@server pSeries 670 Doors and Covers.”

## @server pSeries 670 Doors and Covers

Covers are an integral part of the @server pSeries 670 and are *required* for product safety and EMC compliance. The following rear door options are available for the @server pSeries 670:

- “Enhanced Acoustical” Cover Option

This feature provides a low-noise option for customers or sites with stringent acoustical requirements and where a minimal system footprint is not critical. The Acoustical cover option consists of a special rear door which is approximately 200-mm (8 in.) in depth and contains acoustical treatment that lowers the noise level of the machine by approximately 6 dB compared to the non-acoustical rear door. With this option, the 7040 meets the acoustical *Specifications for Category 1A for Data Processing Areas*, with a declared A-weighted sound power level,  $L_{WA,d}$  of 7.5 bels (B) for the most common system configuration.

- “Slimline” Cover Option

This feature provides a smaller-footprint and lower-cost option for customers or sites where space is more critical than acoustical noise levels. The Slimline cover option consists of rear door which is about 50-mm (2 in.) in depth with no acoustical treatment. With this option, the 7040 has a declared A-weighted sound power level,  $L_{WA,d}$ , of 7.9 bels (B) for the most common system configuration.

**Note:** For declared levels of acoustical noise emissions, refer to “Acoustical Noise Emissions” on page 136.



## Moving the System to the Installation Site

The customer should determine the path that must be taken to move the system from the delivery location to the installation site. The customer should verify that the height of all doorways, elevators, and so on are sufficient to allow moving the system to the installation site. The customer should also verify that the weight limitations of elevators, ramps, and so on are sufficient to allow moving the system to the installation site. If the height or weight of the system can cause a problem when the system is moved to the installation site, the customer should contact their local site planning, marketing, or sales representative.

## Power and Electrical Requirements

Redundant power and line cords are standard on the @server pSeries 670. The system uses dual A/C power cords. For maximum availability, each of the line cords should be fed from independent power grids.

The following table illustrates electrical and thermal characteristics for the @server pSeries 670 when the input power source is three-phase alternating current.

Electrical/Thermal Characteristics (3-Phase)			
Rated Voltage (V ac, 3 phase)	200 to 240	380 to 415	480
Rated Current (A, per phase)	45	25	20
Frequency (Hertz)	50 to 60	50 to 60	50 to 60
Power (Maximum in kW)	7.9	7.9	7.9
Typical, full load power factor (pf)	0.99	0.97	0.93
Inrush current (Amps)	162 max (see note below)		
Thermal output (Maximum kBtu/hr)	26.9	26.9	26.9
<b>Note:</b> Inrush currents occur only at initial application of power (very short duration for charging capacitors). No inrush currents occur during the normal power off-on cycle.			

The following table illustrates electrical and thermal characteristics for the @server pSeries 670 when the input power source is single-phase alternating current.

Electrical/Thermal Characteristics (1-Phase)		
Rated Voltage (V ac, single phase)	200 to 240	380 to 415
Rated Current (A, per phase)	38	19.5
Frequency (Hertz)	50 to 60	50 to 60
Power (Maximum in kW)	7.9	7.9
Typical, full load power factor (pf)	0.99	0.97
Inrush current (Amps)	162 max (see note below)	
Thermal output (Maximum kBtu/hr)	26.9	26.9
<b>Note:</b> Inrush currents occur only at initial application of power (very short duration for charging capacitors). No inrush currents occur during the normal power off-on cycle.		

The following table illustrates the line cord options for the @server pSeries 670 with their geographic, breaker rating, and cord information when the input power source is three-phase alternating current.

3-Phase Supply Voltage (50/60 Hz)	200-240 V	380-415 V	480 V
Geography	United States, Canada, Japan	Europe, Middle East, Africa, Asia Pacific	United States, Canada

<b>3-Phase Supply Voltage (50/60 Hz)</b>	<b>200-240 V</b>	<b>380-415 V</b>	<b>480 V</b>
<b>Customer Circuit Breaker Rating (see Note 1 below)</b>	60 A	30 A	30 A
<b>Cord Information</b>	6 and 14 foot, 6 AWG line cord	14 foot, 6 or 8 AWG line cord, (electrician installed)	6 and 14 foot, 10 AWG line cord
<b>Recommended Receptacle</b>	IEC309, 60 A, type 460R9W (not provided)	Not specified, electrician installed	IEC309, 30 A, type 430R7W (not provided)

**Notes:**

1. The exact circuit breaker ratings may not be available in all countries. Where the specified circuit breaker ratings are not acceptable, use the nearest available rating. Use of a time delayed circuit breaker is recommended.
2. IBM strongly recommends the use of a metal backbox with line cords using IEC-309 plugs. For additional information about this recommendation, see Chapter 11, "Power Cords and Electrical Needs," on page 339.

The following table illustrates the line cord options for the @server pSeries 670 with their geographic, breaker rating, and cord information when the input power source is single-phase alternating current.

<b>1-Phase Supply Voltage (50/60 Hz)</b>	<b>200-240 V</b>	<b>200-240 V</b>	<b>380-415 V</b>
<b>Geography</b>	United States, Canada, Japan	Europe, Middle East, Africa, Asia Pacific	Europe, Middle East, Africa, Asia Pacific
<b>Customer Circuit Breaker Rating (see Note 1 below)</b>	40 A	40 A	25 A
<b>Cord Information</b>	6 and 14 foot, 8 AWG line cord	14 foot, 8 AWG line cord, (electrician installed)	14 foot, 10 AWG line cord, (electrician installed)
<b>Recommended Receptacle</b>	IEC309, 60 A, type 360R6W (not provided)	Not specified, electrician installed	Not specified, electrician installed

**Notes:**

1. The exact circuit breaker ratings may not be available in all countries. Where the specified circuit breaker ratings are not acceptable, use the nearest available rating. Use of a time delayed circuit breaker is recommended.
2. 380-415V line cord is not an orderable feature. Contact your local marketing representative for ordering information.
3. IBM strongly recommends the use of a metal backbox with line cords using IEC-309 plugs. For additional information about this recommendation, see Chapter 11, "Power Cords and Electrical Needs," on page 339.

## Line Cord Features

The following three-phase line cord features are available for the @server pSeries 670:

- FC 8678: Line Cord, 200-240V ac, 6AWG, 14ft, IEC309 60A Plug
- FC 8681: Line Cord, 200-240V ac, 6AWG, 6ft, Chicago IEC309 60A Plug
- FC 8677: Line Cord, 380-415V ac, 8AWG, 14ft, No Plug
- FC 8680: Line Cord, 480V ac, 10AWG, 14ft, IEC309 30A Plug
- FC 8682: Line Cord, 480V ac, 10AWG, 6ft, Chicago, IEC309 30A Plug
- FC 8694: Line Cord, 200-240V ac, 6AWG/Type W 14ft, No Plug

The following single-phase line cord features are available for the @server pSeries 670:

- FC 8683: Line Cord, 200-240 V ac, 8AWG, 14ft, IEC309 40A Plug, Single Phase
- FC 8684: Line Cord, 200-240V ac, 8AWG, 6ft, Chicago, IEC309 40A Plug, Single Phase
- FC 8685: Line Cord, 200-415V ac, 8AWG, 14ft, No Plug, Single Phase

## Phase Imbalance

All systems are provided with 2 bulk power assemblies (BPAs), with separate line cords. Each BPA uses only 2 phases of a 3-phase power system, causing phase imbalance. Single-phase systems use either two phases of a 3-phase power system, or one phase and neutral. Phase currents will be divided between 2 line cords in normal operation.

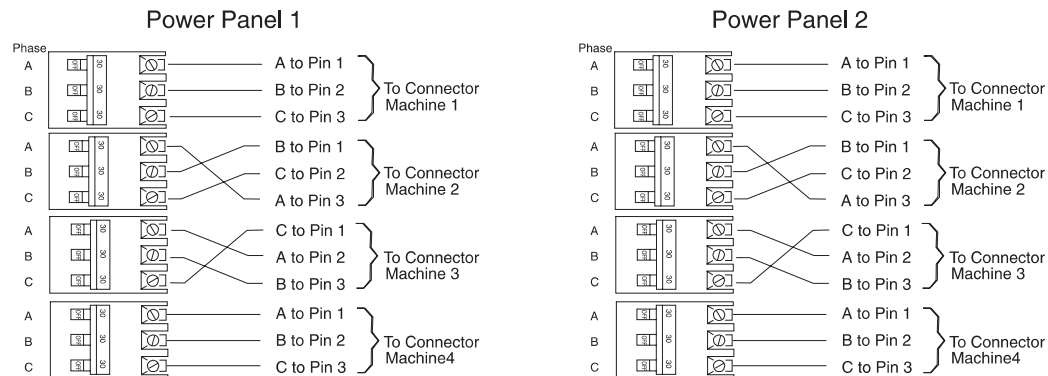
The @server pSeries 670 has one bulk power regulator (BPR) per BPA, with its Phase A and Phase B (or neutral) Line Currents determined by Power/Vline, and a Phase C Line Current of 0.

**Note:** Power is calculated from “Total System Power Consumption” on page 140. Vline is line-to-line nominal input voltage.

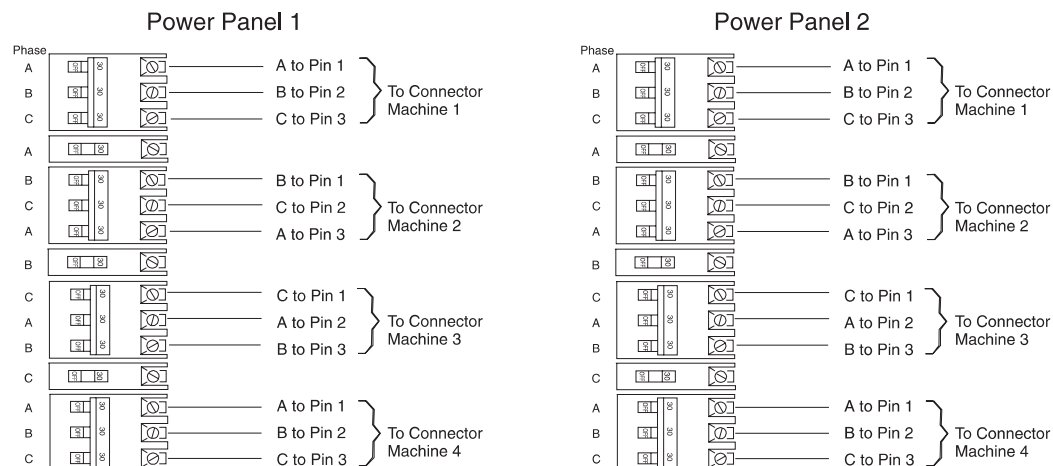
## Balancing Power Panel Loads (3-Phase Systems)

The @server pSeries 670 requires three-phase power. Two of three phases will carry an equal amount of current, with no current drawn on the third phase. The following figure is an example of feeding several loads of this type from two power panels in a way that balances the load among the three phases.

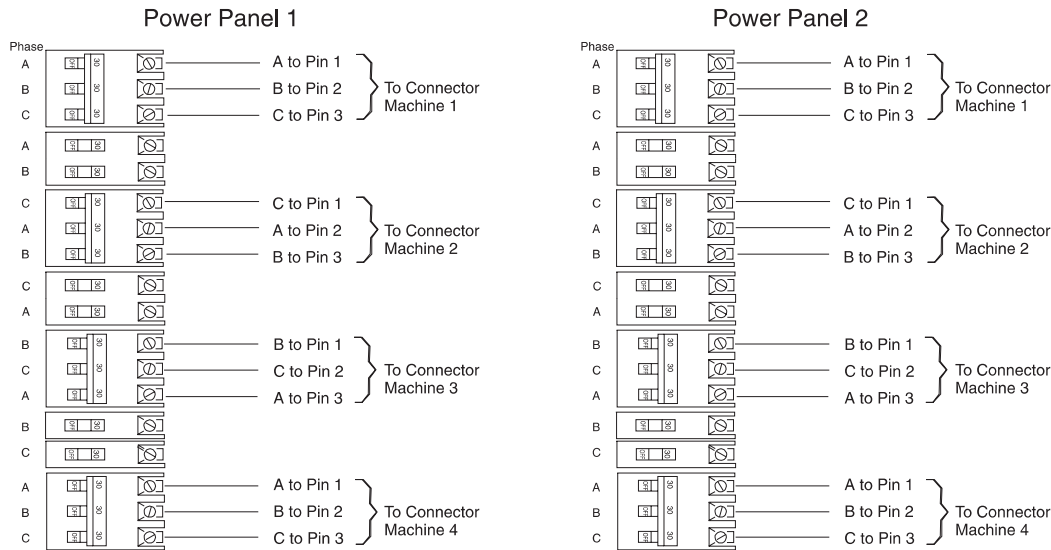
**Note:** Use of ground-fault-interrupt (GFI) circuit breakers is not recommended for this system because GFI circuit breakers are earth-leakage-current sensing circuit breakers and this system is a high earth-leakage-current product.



The method illustrated in the preceding figure requires that the connection from the three poles of each breaker to the three phase pins of a connector be varied. Some electricians may prefer to maintain a consistent wiring sequence from the breakers to the connectors. The following figure shows a way to balance the load without changing the wiring on the output of any breakers. The three-pole breakers are alternated with single-pole breakers, so that the three-pole breakers do not all begin on Phase A.

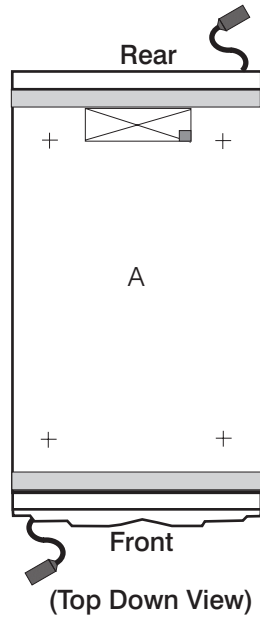


The following figure shows another way of distributing the unbalanced load evenly. In this case, the three-pole breakers are alternated with two-pole breakers.



### Power Cord Configuration

The power cords exit the system from different points of the frame as indicated in the following illustration.



## Checking the Facility Outlets and Power Source

### CAUTION:

**Do not touch the receptacle or the receptacle faceplate with anything other than your test probes before you have met the requirements in “Checking the Facility Outlets and Power Source” below.**

Performing the following will ensure that appropriate power will be used by the @server pSeries 670. The following checklist is for reference purposes, and will likely be performed by a service engineer prior to installation.

- \_\_\_ 1. The @server pSeries 670 is equipped to use one of the two power alternatives listed below:
  - 200-240V / 380-415V / 480V AC, three-phase.
  - 200-240V / 380-415V AC, single-phase.

Check the system to determine which power option was ordered, and then check that the correct power source is available.

- \_\_\_ 2. Before system installation, locate and turn off the branch circuit CB (circuit breaker). Attach tag S229-0237, which reads “Do Not Operate.”

**Note:** All measurements are made with the receptacle faceplate in the normally installed position.

- \_\_\_ 3. Some receptacles are enclosed in metal housings. On receptacles of this type, perform the following steps:
  - a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised-floor metal structure, water pipe, building steel, or similar structure.
  - b. Check for less than 1 volt from receptacle ground pin to a grounded point in the building.

**Note:** If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- \_\_\_ 4. Check the resistance from the ground pin of the receptacle to the receptacle case. Check resistance from the ground pin to building ground. The reading should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
- \_\_\_ 5. If any of the checks made in steps 3 and 4 are not correct, remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

**Note:** Do not use the digital multimeter to measure grounding resistance.

- \_\_\_ 6. Check for infinite resistance between the phase pins. This is a check for a wiring short.

### CAUTION:

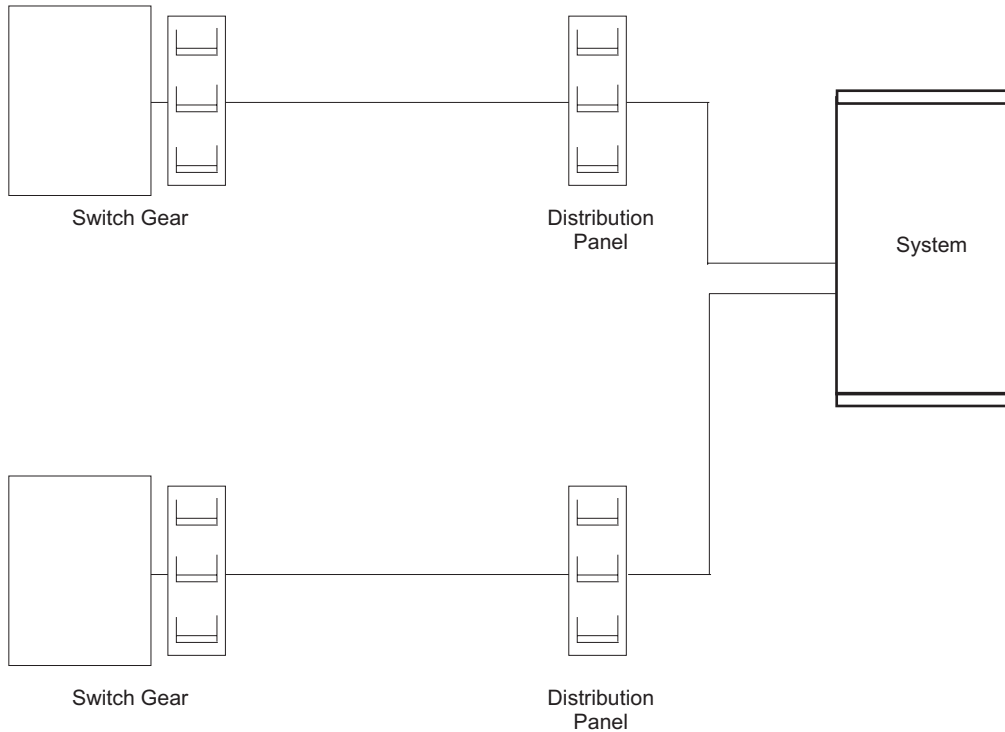
**If the reading is other than infinity, do not proceed! You must make the necessary wiring corrections to satisfy the above criteria before continuing. Do not turn on the branch circuit CB until all the above steps are satisfactorily completed.**

- \_\_\_ 7. Remove tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 8. Turn on the branch circuit CB. Measure for appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
- \_\_\_ 9. With an appropriate meter, verify that the voltage at the outlet is correct.
- \_\_\_ 10. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, or an appropriately approved ground impedance tester.
- \_\_\_ 11. Turn off the branch circuit CB.
- \_\_\_ 12. Attach tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 13. You are now ready to install and connect the power cables to the @server pSeries 670. Refer to Chapter 1 of the @server pSeries 670 Installation Guide for this procedure.

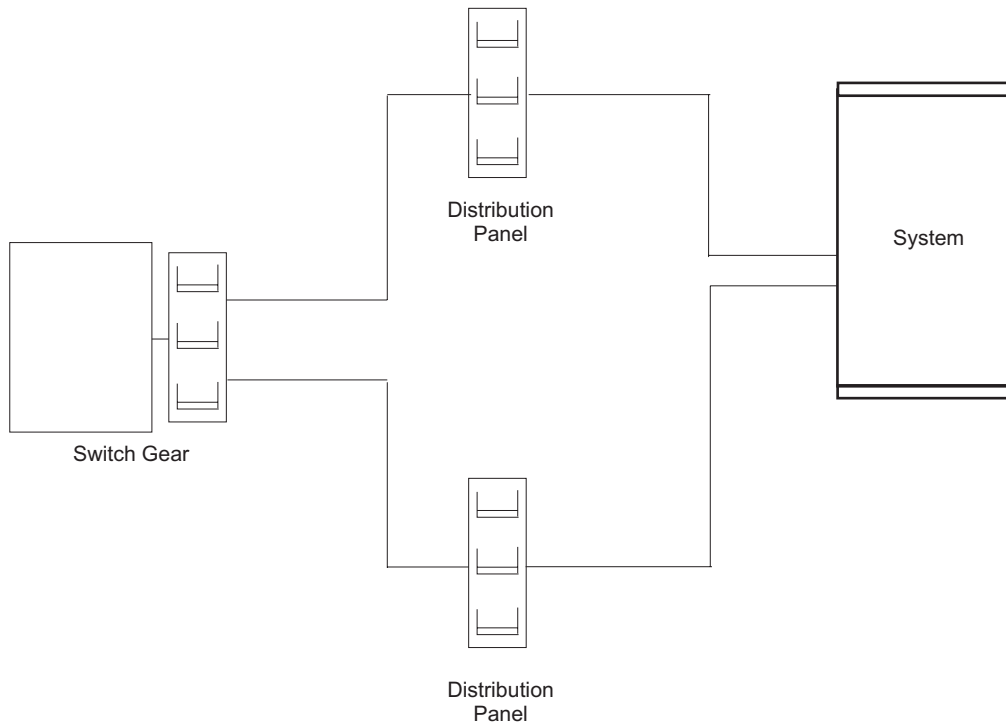
## Dual Power Installation

The @server pSeries 670 is designed with a fully redundant power system. Each system has two line cords attached to two power input ports which, in turn, power a fully redundant power distribution system within the system. To take full advantage of the redundancy/reliability that is built into the computer system, the system must be powered from two distribution panels. The possible power installation configurations are described as follows.

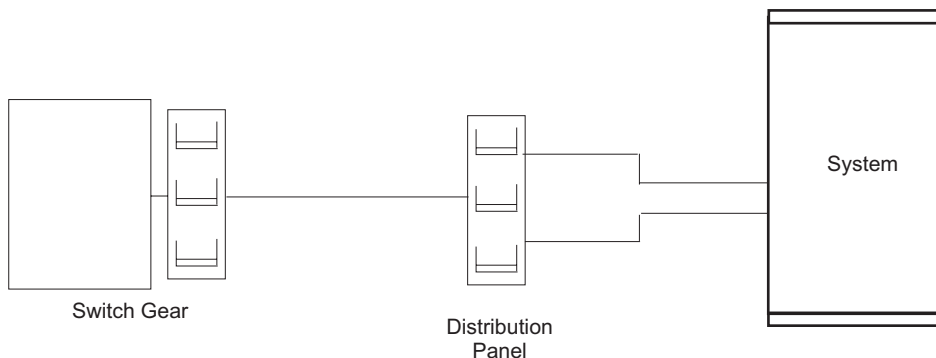
**Dual Power Installation - Redundant Distribution Panel and Switch:** This configuration requires that the system receives power from two separate power distribution panels. Each distribution panel receives power from a separate piece of building switch gear. This level of redundancy is not available in most facilities.



**Dual Power Installation - Redundant Distribution Panel:** This configuration requires that the system receives power from two separate power distribution panels. The two distribution panels receive power from the same piece of building switch gear. Most facilities should be able to achieve this level of redundancy.



**Single Distribution Panel - Dual Circuit Breakers:** This configuration requires that the system receives power from two separate circuit breakers in a single power panel. This configuration does not make full use of the redundancy provided by the processor. It is, however, acceptable if a second power distribution panel is not available.



### Additional Installation Considerations

In the United States, installation must be made in accordance with Article 645 of the National Electric Code (NEC). In Canada, installation must be in accordance with Article 12-020 of the Canadian Electrical Code (CEC).

**Signal Integrity:** System reliability can be adversely affected by the presence of transient electrical noise that may be conducted on power, signal, and control cables. To conduct high-frequency-electrical noise away from the system, the ground path must be as short as possible. All systems are provided with a short ground strap that is intended for use with stringer/stanchion-type raised floors (or other grounded

types). This ground strap is required if your servers are connected to a 9076 SP Switch2 clustered environment, and it is recommended for all other configurations.

If your installation is not using a grounded-raised floor, and your servers are connected to an 9076 SP Switch2 clustered environment, all attached server frames in your environment must be independently grounded to the switch frame. Use the following information to help you install multiple systems to the 9076 SP Switch2 switch frame in a clustered environment:

- Order grounding straps by calling the IBM Quality Hotline at 1-800-IBM-LINE and requesting Part Number 44P3695, Grounding Kit. Each kit contains one ground strap and the required hardware to make a single connection between a server and a 9076 SP Switch2, so order one kit for each server that is connected to the switch.
- An IBM service representative will install the grounding straps by using instructions that are provided with the grounding kits. Each server frame must be directly connected to a 9076 SP Switch2 frame.



## @server pSeries 670 Physical Specifications and Loads

The following tables illustrate the physical, electrical and thermal, as well as acoustical and environmental characteristics of various @server pSeries 670 system configurations.

### Dimensions and Weight

Physical Characteristic	Slimline Doors	Acoustical Doors
Height	2025 mm (79.72 in.)	2025 mm (79.72 in.)
Width	785 mm (30.91 in.)	785 mm (30.91 in.)
Depth	1342 mm (52.83 in.)	1494 mm (58.83 in.)
Weight (maximum configuration)	1085 kg (2392 lbs.)	1099 kg (2422 lbs.)

**Note:** When moving or relocating certain configurations of the system, the Bulk Power Regulators (BPRs) must be removed from the top of the rack (front and rear) to ensure product stability. Specifically, removal of the BPR from the front and rear is required in systems that have a single I/O drawer.

### System Weights by Configuration

	Total System Weight (Pounds)		
	1 I/O Subsystem	2 I/O Subsystems	3 I/O Subsystems
Slimline Doors With IBF	2062	2227	2392
Slimline Doors Without IBF	1865	2030	2195
Acoustical Doors With IBF	2092	2257	2422
Acoustical Doors Without IBF	1923	2088	2253
No Doors With IBF	2004	2169	2334
No Doors Without IBF	1807	1972	2137

	Total System Weight (Kilograms)		
	1 I/O Subsystem	2 I/O Subsystems	3 I/O Subsystems
Slimline Doors With IBF	935	1010	1085
Slimline Doors Without IBF	846	921	996
Acoustical Doors With IBF	949	1024	1099
Acoustical Doors Without IBF	872	947	1022
No Doors With IBF	909	984	1059
No Doors Without IBF	820	894	969

## Acoustical Noise Emissions

Acoustical Characteristic				
Product Configuration	Declared A-Weighted Sound Power Level, $L_{WA_d}$ (B)		Declared A-Weighted Sound Pressure Level, $L_{pAm}$ (dB)	
	Operating	Idle	Operating	Idle
7040 Acoustical Doors	7.5	7.5	57	57
7040 Slimline Doors	7.9	7.9	62	62

**Notes:**

- Noise levels cited are for a typical configuration (Bulk Power, CEC cage, battery option, media drawer, and two I/O drawers).
- The 0.6-B (6-dB) reduction in noise emission levels with the acoustical rear door corresponds to a factor of 4 reduction. That is, the noise level of a single frame with thin covers is about the same as the noise level of four frames with acoustical covers.
- $L_{WA_d}$  is the upper-limit A-weighted sound power level;  $L_{pAm}$  is the mean A-weighted sound pressure level at the 1-meter bystander positions; 1 B = 10 dB.
- All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.

## Environmental Specifications

Environmental Specification	Operating	Non-Operating	Storage	Shipping
Temperature	10 to 32°C (50 to 90°F)	10 to 43°C (50 to 109°F)	1 to 60°C (34 to 140°F)	-40 to 60°C (-40 to 140°F)
	Max. of 24 ° C (75.2 ° F) with 4mm tape or DVD RAM in rear positions of the Media Subsystem			
Relative Humidity (Noncondensing)	8 to 80 %	8 to 80 %	5 to 80 %	5 to 100 %
Maximum Wet Bulb	23°C (73°F)	27°C (73°F)	29°C (84°F)	29°C (84°F)

**Notes:**

- When an IBM-approved vapor bag and desiccant packets are used to protect the system, storage specifications are valid for 6 months and shipping specifications are valid for 1 month. Otherwise, storage and shipping specifications are valid for two weeks each.
- The upper limit of the dry bulb temperature must be derated 1 degree C per 189 m (619 ft.) above 1295 m (4250 ft.). Maximum altitude is 3048 m (10,000 ft.).

## Weight Distribution

The following table shows dimensions and weights used to calculate floor loading for the @server pSeries 690. All floor-loading calculations are intended for a raised-floor environment.

	1 Frame with Slimline Covers	1 Frame with Acoustical Covers
Weight	1085 kg (2392 lbs.)	1099 kg (2422 lbs.)
Width	750 mm (29.5 in.)	750 mm (29.5 in.)
Depth	1173 mm (46.2 in.)	1173 mm (46.2 in.)

**Notes:**

1. The values in the table may be used with the Floor Loading Calculation Program available on the IP Website.
2. All floor-loading calculations are intended for a raised-floor environment.

The following table shows floor-loading specifications for systems with slimline covers. The values contained in the Condition column are described following the table.

Condition	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	1 Frame kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )
1	25 (1.0)	135 (5.3)	135 (5.3)	1006.2 (206.1)
2	25 (1.0)	554 (21.8)	655 (25.8)	657.5 (134.7.)
3	25 (1.0)	762 (30.0)	762 (30.0)	595.0 (121.9)
4	254 (10.0)	554 (21.8)	655 (25.8)	462.8 (94.8)
5	254 (10.0)	762 (30.0)	762 (30.0)	423.0 (86.6)
6	508 (20.0)	554 (21.8)	655 (25.8)	364.7 (74.7)
7	508 (20.0)	762 (30.0)	762 (30.0)	336.4 (68.9)
8	554 (21.8)	762 (30.0)	655 (25.8)	352.8 (72.3)
9	486 (19.1)	554 (21.8)	762 (30.0)	342.0 (70.0)
10	762 (30.0)	434 (17.1)	434 (17.1)	342.0 (70.0)
11	762 (30.0)	762 (30.0)	762 (30.0)	288.5 (59.1)

**Definition of Conditions:**

- Condition 1 indicates maximum floor loading when systems are stored cover-to-cover on all four sides with covers installed.
- Conditions 2 and 3 indicate floor loading when the system has no side clearance (beyond side covers) on both sides while front/back distances varied.
- Conditions 4 through 8 indicate floor loading at various points below the maximum weight-distribution distance of 762 mm (30.0 in.) from each edge of the frame.
- Conditions 9 through 10 indicate floor-loading options when the installation is limited to 342.0 kg/m<sup>2</sup> (70.0 lb/ft<sup>2</sup>).
- Condition 11 is the minimum floor loading required, based on the maximum weight-distribution area (30.0 in. from each side of the base frame).

**Notes:**

1. Service clearance is independent from weight distribution distance and must be at least 45 in. for the front of the frame and 36 in. for the rear of the frame (measured from the base frame).
2. Weight-distribution areas should not be overlapped.
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.

The following table shows floor-loading specifications for systems with acoustical covers. The values contained in the Condition column are described following the table.

Condition	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	1 Frame kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )
1	25 (1.0)	135 (5.3)	135 (5.3)	1019.7 (208.9)
2	25 (1.0)	554 (21.8)	757 (29.8)	643.0 (131.7)
3	25 (1.0)	762 (30.0)	762 (30.0)	601.8 (123.3)
4	254 (10.0)	554 (21.8)	757 (29.8)	453.6 (92.9)
5	254 (10.0)	762 (30.0)	762 (30.0)	427.3 (87.5)
6	508 (20.0)	554 (21.8)	757 (29.8)	358.2 (73.4)
7	508 (20.0)	762 (30.0)	762 (30.0)	339.5 (69.5)
8	498 (19.6)	762 (30.0)	762 (30.0)	342.0 (70.0)
9	762 (30.0)	554 (21.8)	757 (29.8)	305.4 (62.6)
10	762 (30.0)	450 (17.7)	450 (17.7)	341.9 (70)
11	762 (30.0)	762 (30.0)	762 (30.0)	290.9 (59.6)

**Definition of Conditions:**

- Condition 1 indicates maximum floor loading when systems are stored cover-to-cover on all four sides with covers installed.
- Conditions 2 and 3 indicate floor loading when the system has no side clearance (beyond side covers) on both sides while front/back distances varied.
- Conditions 4 through 8 indicate floor loading at various points below the maximum weight-distribution distance of 762 mm (30.0 in.) from each edge of the frame.
- Conditions 9 through 10 indicate floor-loading options when the installation is limited to 342.0 kg/m<sup>2</sup> (70.0 lb/ft<sup>2</sup>).
- Condition 11 is the minimum floor loading required, based on the maximum weight-distribution area (30.0 in. from each side of the base frame).

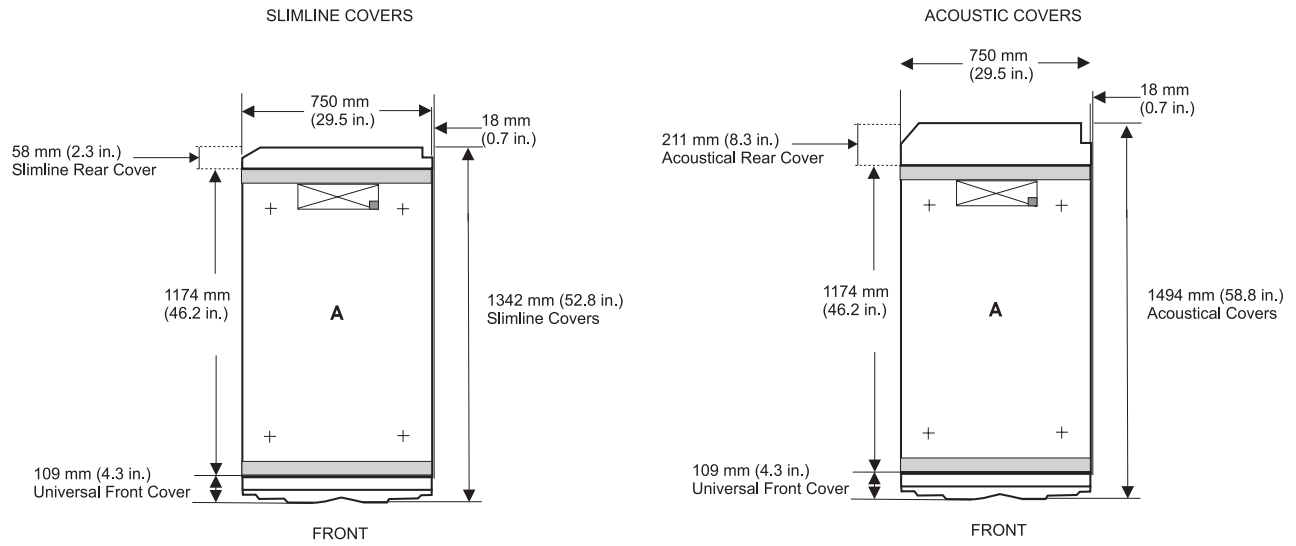
**Notes:**

1. Service clearance is independent from weight-distribution distance and must be at least 45 in. at the front of the frame and 36 in. at the rear of the frame (measured from the base frame).
2. Weight-distribution areas should not be overlapped.
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.

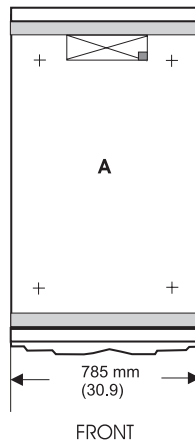
Floor loading for the system is illustrated in the Proposed Floor Layout for Multiple Systems in “Considerations for Multiple System Installations” on page 155.

## Plan Views

The following illustration shows dimensional planning information for single-frame systems and double-frame systems.



FRAME ENTRY/EXIT	DIMENSION	
	(mm)	(in.)
FRONT	117 by 403	4.6 by 15.9
REAR	117 by 403	4.6 by 15.9



## Total System Power Consumption

The following tables contain minimum and maximum power consumption for the 1.1 GHz and 1.5 GHz @server pSeries 670. Minimum power consumption is based on a configuration consisting of a single 4 GB memory card, 1 PCI card per I/O subsystem, and 1 DASD device per I/O subsystem.

Maximum power consumption is based on a configurations consisting of a two 32 GB memory cards per MCM module in 1.1 GHz machines and two 64 GB memory cards per MCM module in 1.5 GHz machines, maximum PCI cards (20 per I/O drawer), and maximum DASD (16 per I/O drawer).

Power consumption calculations are estimates. Actual values may vary.

Calculate heat load (Btu per hour) by multiplying the power (in watts) for the configuration by a factor of 3.4.

**Note:** Certain system configurations only support a maximum number of I/O drawers. If a system does not support a particular count of I/O drawers, it is indicated with "N/A".

Number of I/O Drawers (7040-61D)	1.1 GHz 4-way Modules (minimum power consumption, in watts)	1.1 GHz 4-way Modules (maximum power consumption, in watts)
1	1835	2966
2	2203	4014

Number of I/O Drawers (7040-61D)	1.1 GHz 8-way Modules (minimum power consumption, in watts)		1.1 GHz 8-way Modules (maximum power consumption, in watts)	
	8-way	16-way	8-way	16-way
1	1911	2867	3042	4586
2	2279	3235	4090	5634
3	N/A	3603	N/A	6682

Number of I/O Drawers (7040-61D)	1.5 GHz 4-way Modules (minimum power consumption, in watts)	1.5 GHz 4-way Modules (maximum power consumption, in watts)
1	1714	2931
2	2082	3979

Number of I/O Drawers (7040-61D)	1.5 GHz 8-way Modules (minimum power consumption, in watts)		1.5 GHz 8-way Modules (maximum power consumption, in watts)	
	8-way	16-way	8-way	16-way
1	1839	2723	3056	4614
2	2207	3091	4104	5662
3	N/A	3459	N/A	6710

Number of I/O Drawers (7040-61D)	1.7 GHz 8-way Modules (minimum power consumption, in watts)		1.7 GHz 8-way Modules (maximum power consumption, in watts)	
	8-way	16-way	8-way	16-way
1	2737	3919	3954	5810
2	3105	4287	5002	6858
3	N/A	4655	N/A	7906

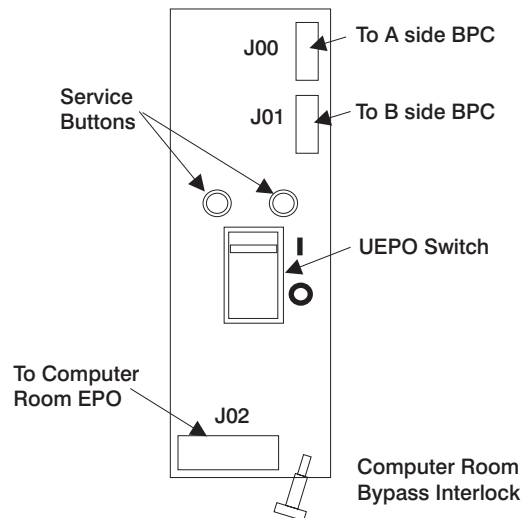
## Wattage Addition/Subtraction for Minimum and Maximum Configurations

To determine the typical power consumption for a specific configuration, use the following typical power values:

- 4GB memory card - 137 Watts
- 8GB memory card - 151 Watts
- 16GB memory card - 235 Watts
- 32GB memory card - 294 Watts
- 64 GB memory card - 337 Watts
- Each PCI card - 20 Watts Each
- DASD - 20 Watts

## Unit Emergency Power Off

The server has a unit emergency power off (UEPO) switch on the front of the frame. Refer to the following illustration, which shows a simplified UEPO panel.



When the switch is tripped, power is removed from all logic elements. All volatile data will be lost.

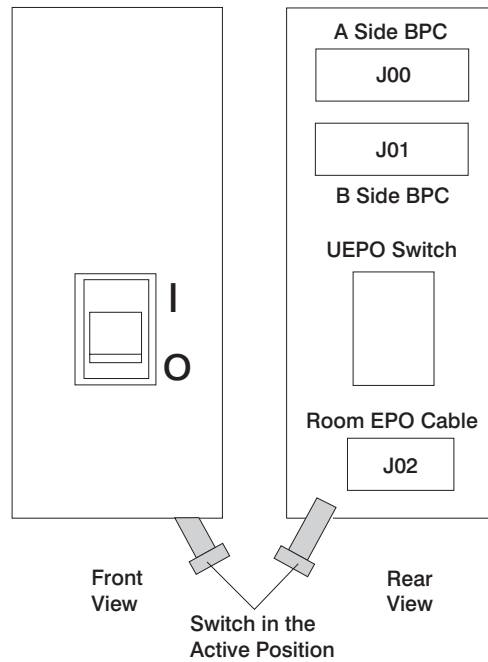
It is possible to attach the computer room emergency power off (EPO) system to the system UEPO. When this is done, tripping the computer room EPO disconnects all power from the line cords and the internal battery backup unit, if it is provided. All volatile data will be lost in this case also.

If the room EPO is not connected to the UEPO, tripping the computer room EPO removes ac power from the system. If the interlock bypass feature is used, the system remains powered for a short time based on system configuration.

## Computer Room Emergency Power Off (EPO)

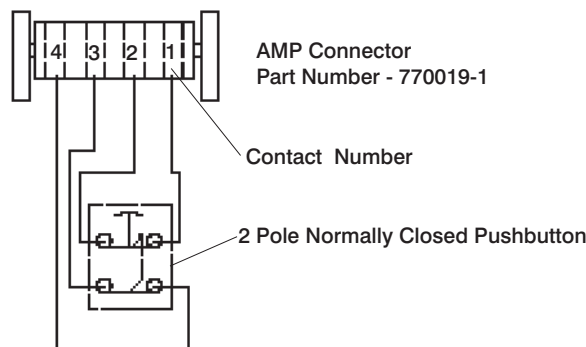
When the integrated battery feature (IBF) is installed and the room EPO is tripped, the batteries will engage and the computer will continue to run. It is possible to attach the computer room EPO system to the machine UEPO. When this is done, tripping the room EPO will disconnect all power from the line cords and the internal battery backup unit. In this event all volatile data will be lost.

To incorporate the IBF into the room Emergency Power Off systems (EPO), a cable must be made to connect to the back of the system UEPO panel. The following diagrams illustrate how this connection is made.



The preceding figure illustrates the back of the machine UEPO panel with the room EPO cable plugging into the machine. Notice the switch actuator. After it is moved to make the cable connection possible, the room EPO cable must be installed for the machine to power on.

In the following figure, an AMP connector 770019-1 is needed to connect to the system UEPO panel. For room EPO cables using wire sizes #20 AWG to #24 AWG use AMP pins part number 770010-4. This connection should not exceed 5 Ohms, which is approximately 200 ft.(61 m) of #24 AWG.



## Battery Holdup Times

The following tables illustrate typical machine holdup time vs load in minutes for fresh and aged batteries. All times listed are in minutes. Machine load is listed in total AC input power (power for both line cords combined). A fresh battery is defined as 2.5 years old or less, while an aged battery as 6.5 years old.



Capacity will gradually decay from fresh battery value to the aged battery value, with the amount of decay shown being worst case. The system will diagnose a "failed battery" if the capacity falls below the aged battery level.

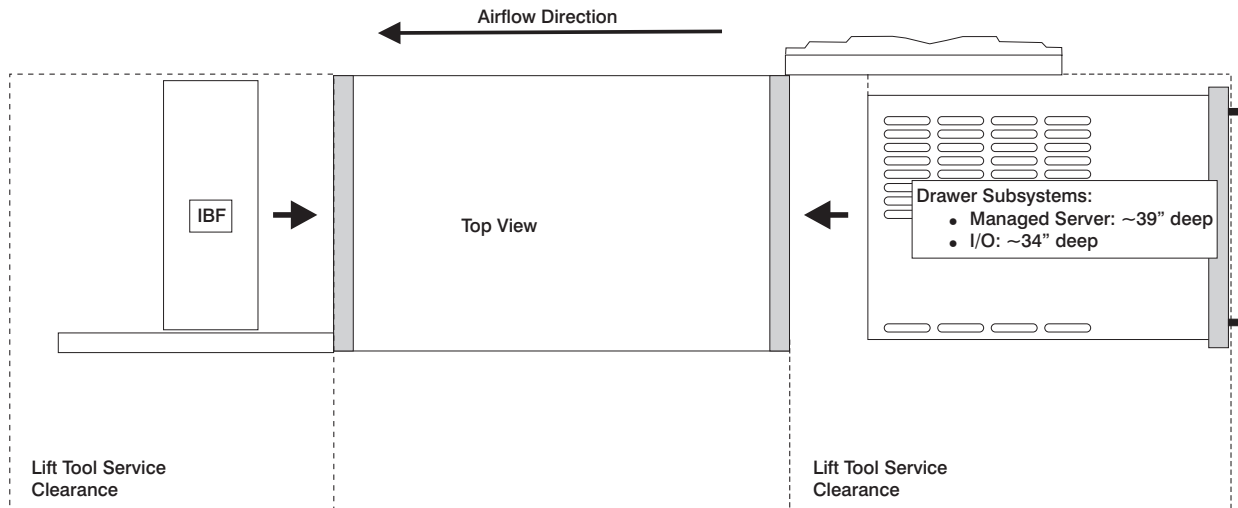
Typical Machine Holdup Time vs. Load in Minutes (Fresh Battery)				
Machine Load	3 kW		6 kW	
IBF Configuration	N	R	N	R
1 BPR	7.0	21	2.1	7.0
N = non-redundant, R = redundant				

Typical Machine Holdup Time vs. Load in Minutes (Aged Battery)				
Machine Load	3 kW		6 kW	
IBF Configuration	N	R	N	R
1 BPR	4.2	12.6	1.3	4.2
N = non-redundant, R = redundant				

## Guide for Raised-Floor Preparation

A raised floor is not required for the @server pSeries 670 (except in Canada). However, it is recommended for optimum system cooling and cable management. Raised floor cutouts should be protected by electrically nonconductive molding, appropriately sized, with edges treated to prevent cable damage and to prevent casters from rolling into the floor cutouts.

Front-service access is necessary on the @server pSeries 670 to accommodate a lift tool for the servicing of large drawers (the managed server, IO drawer, and media subsystems). Front and rear service access is necessary to accommodate the lift tool for servicing of the optional integrated battery feature (IBF).



Floor Plan Considerations for Single Units

## Cutting and Placement of Floor Panels

This section provides recommendations for making the necessary openings in the raised floor for installing the @server pSeries 670.

**Note:** The following illustration is intended only to show relative positions and accurate dimensions of floor cutouts. The illustration is not intended to be a machine template and is not drawn to scale.

The x-y alphanumeric grid positions are used to identify relative positions of cutout floor panels that may be cut in advance.

1. Measure the panel size of the raised floor.
2. Verify the floor panel size. The floor panel size illustrated is 600 mm (23.6 in.) and 610 mm (24 in.) panels.
3. Ensure adequate floor space is available to place the frames over the floor panels exactly as shown in the illustration. Refer to "Considerations for Multiple System Installations" on page 155 for front-to-back and side-to-side clearances. Use the plan view if necessary. Consider all obstructions above and below the floor.
4. Identify the panels needed, and list the total quantity of each panel required for the installation.
5. Cut the required quantity of panels. When cutting the panels, you must adjust the size of the cut for the thickness of the edge molding you are using. The dimensions shown in the illustrations are finished dimensions. For ease of installation, number each panel as it is cut, as shown in the following illustrations.

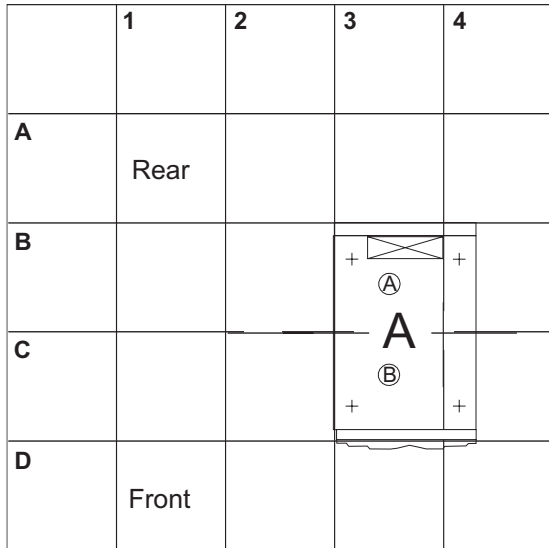
**Note:** Depending on the panel type, additional panel support (pedestals) may be required to restore structural integrity of the panel. Consult the panel manufacturer to insure that the panel can

sustain a concentrated load of 900 lbs. For multiple frame installation it is possible that two casters will produce concentrated loads as high as 1800 lbs.

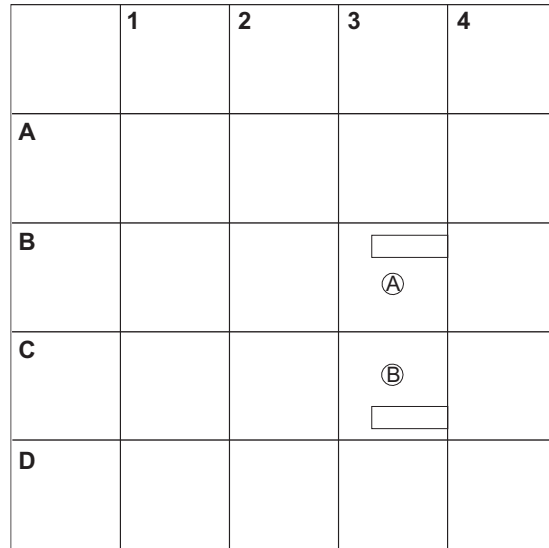
- Use the raised floor diagram on the next page to install the panels in the proper positions.

**Note:** Panel cutout sizes are optimized for parallel-channel external cables.

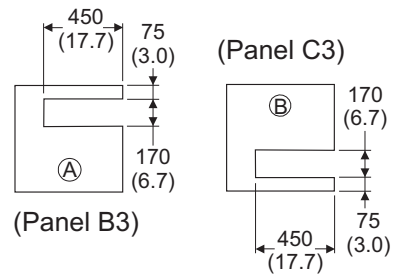
**Rack Placement**



**Panel Cutout Dimensions**



Rack Entry/Exit	Dimension	
	(mm)	(in)
Front	117 x 403	4.6 x 15.9
Rear	117 x 403	4.6 x 15.9



**Raised Floor with 610-mm (24-inch) Floor Panels**

## Securing the Rack

The following can be ordered by the customer as additional rack securing options for the @server pSeries 670.

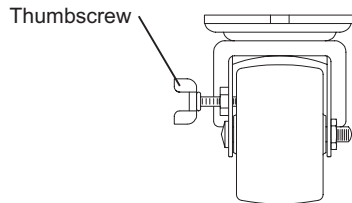
- RPQ 8A1183 for attaching the rack-mounting plates to the concrete floor (non-raised floor)
- RPQ 8A1185 to attach the rack to a concrete floor when on a raised floor (9 1/2 inches to 11 3/4 inches high)
- RPQ 8A1186 to attach the rack to a concrete floor when on a raised floor (11 3/4 inches to 16 inches high)

### Positioning the Rack:

**Note:** The customer should unpack the rack and position it in the room. If this has not been done, consult the customer and the marketing representative as necessary.

To unpack and position the rack, do the following:

1. Remove all packing and tape from the rack.
2. Position the rack according to the customer floor plan.
3. Lock each caster wheel by tightening the thumbscrew on the caster.



**Installing the Frame Kit:** The following tables show the parts required for each of the tie-down kits (a non-raised floor, short-raised floor, and a long-raised floor).

### Rack Tie-Down Kits:

11P4759 Frame tie-down Kit (Non-Raised Floor) (RPQ 8A1183)			
Item	Part Number	Qty	Description
Item 3 in illustration on page 148.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 148.	11P3529	4	Hinge plate
Item 8 in illustration on page 148.	11P3530	2	Latch plate
Item 6 in illustration on page 148.	11P3531	2	EQ support
Item 2 in illustration on page 148.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 148.	76X4687	2	Latch bolt
Item 1 in illustration on page 148.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 148.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 148.	1622307	8	Washer (M8, hinge)
Item 1 in illustration on page 149.	11P3528	2	Plate lock-down
Item 2 in illustration on page 149.	05N6345	4	Spacer
Item 4 in illustration on page 149.	05N6344	4	Bushing
Item 5 in illustration on page 149.	21L4309	4	Washer
Item 3 in illustration on page 149.	0130985	4	Washer
Item 6 in illustration on page 149.	05N6346	4	Bolt

11P4757 Frame tie-down Kit (Short - Raised Floor) (RPQ 8A1185)			
Item	Part Number	Qty	Description
Illustration on page 153.	44P0673	4	Turnbuckle Assembly (short)
Item 3 in illustration on page 148.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 148.	11P3529	4	Hinge plate
Item 8 in illustration on page 148.	11P3530	2	Latch plate
Item 6 in illustration on page 148.	11P3531	2	EQ support
Item 2 in illustration on page 148.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 148.	76X4687	2	Latch bolt
Item 1 in illustration on page 148.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 148.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 148.	1622307	8	Washer (M-8, hinge)

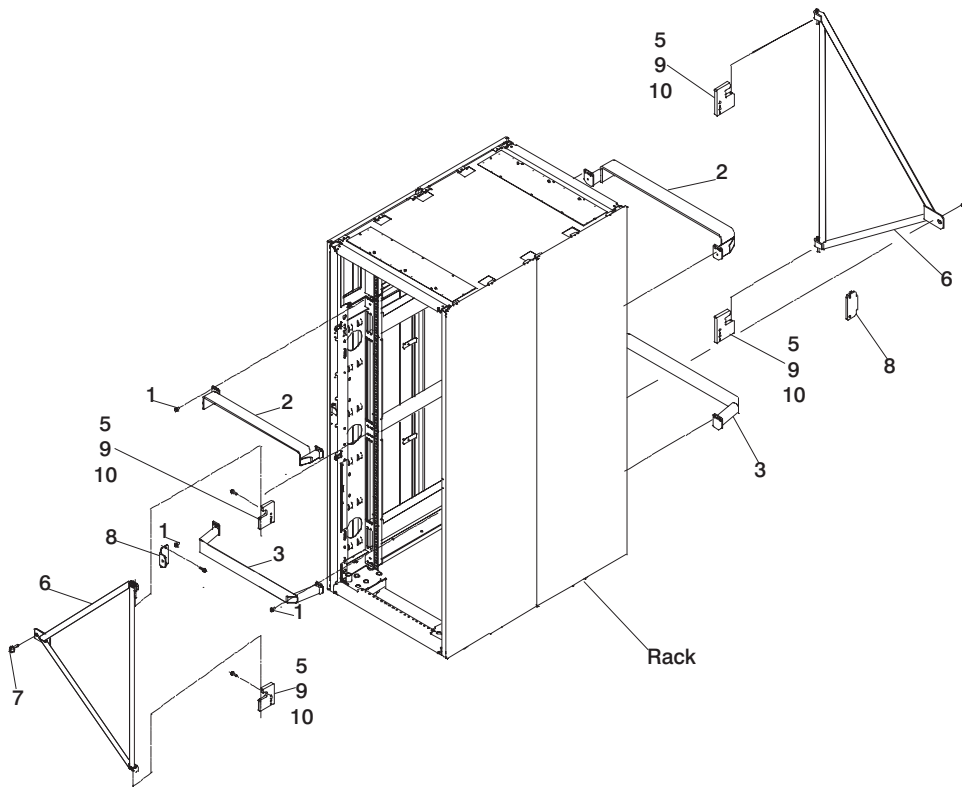
11P4758 Frame tie-down Kit (Long - Raised Floor) (RPQ 8A1186)			
Item	Part Number	Qty	Description
Illustration on page 153.	44P0674	4	Turnbuckle Assembly (long)
Item 3 in illustration on page 148.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 148.	11P3529	4	Hinge plate
Item 8 in illustration on page 148.	11P3530	2	Latch plate
Item 6 in illustration on page 148.	11P3531	2	EQ support
Item 2 in illustration on page 148.	11P3532	2	Shipping bar (upper)
Item 7 in illustration 148.	76X4687	2	Latch bolt
Item 1 in illustration on page 148.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 148.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 148.	1622307	8	Washer (M8, hinge)

*Mounting Internal Rack Components:* To mount the internal rack components, do the following:

**Attention:** This procedure is performed by the service representative.

1. Using four M-8 (20 mm) screws (item 1 in illustration on page 148), install the top shipping bar (item 2 in illustration on page 148) at EIA unit location 32.

2. Using four M-8 screws (item 1 in illustration on page 148), install the bottom shipping bar (item 3 in illustration on page 148) at EIA unit location 18.
3. Repeat steps 1 and 2 to install shipping bars in the rear of the rack.
4. Attach the front top hinge (item 5 in illustration on page 148) on the vertical rail (located approximately at EIA unit 29-30 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 148) and two washers (item 10 in illustration on page 148).
5. Attach the front bottom hinge (item 5 in illustration on page 148) on the vertical rail (located approximately on EIA unit 6-7 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 148) and two washers (item 10 in illustration on page 148).
6. Repeat steps 4 and 5 to install the hinges on the rear rail.
7. Attach the latch plate (item 8 in illustration on page 148) with two M-8 (20 mm) screws (item 1 in illustration on page 148).
8. Repeat step 7 to attach the latch plate in the rear of the rack.
9. Attach the triangular braces (item 6 in illustration on page 148) in both the front and rear of the rack.
10. Install the latch bolts (item 7 in illustration on page 148).



*Determine Your Next Step:* Use the following to determine your next step:

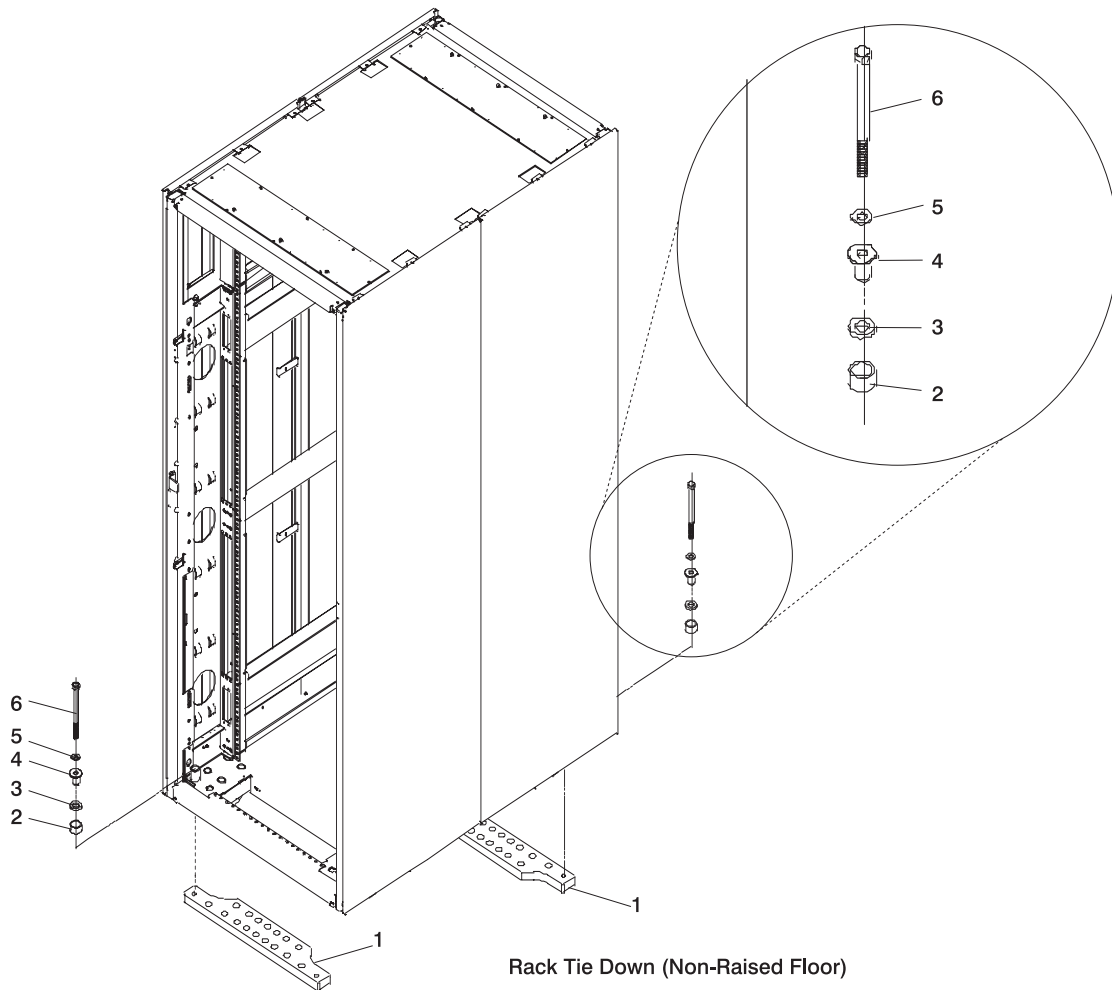
- If the rack is being attached to a concrete (non-raised) floor, proceed to “Attach the Rack to a Concrete (Non-Raised) Floor” on page 149.
- If the rack is being attached to a raised floor, proceed to “Attaching the Rack to a Short or Long Raised Floor” on page 151.

**Attach the Rack to a Concrete (Non-Raised) Floor:** Use this procedure to attach the rack to a concrete (non-raised) floor.

**Attention:** It is the customer's responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

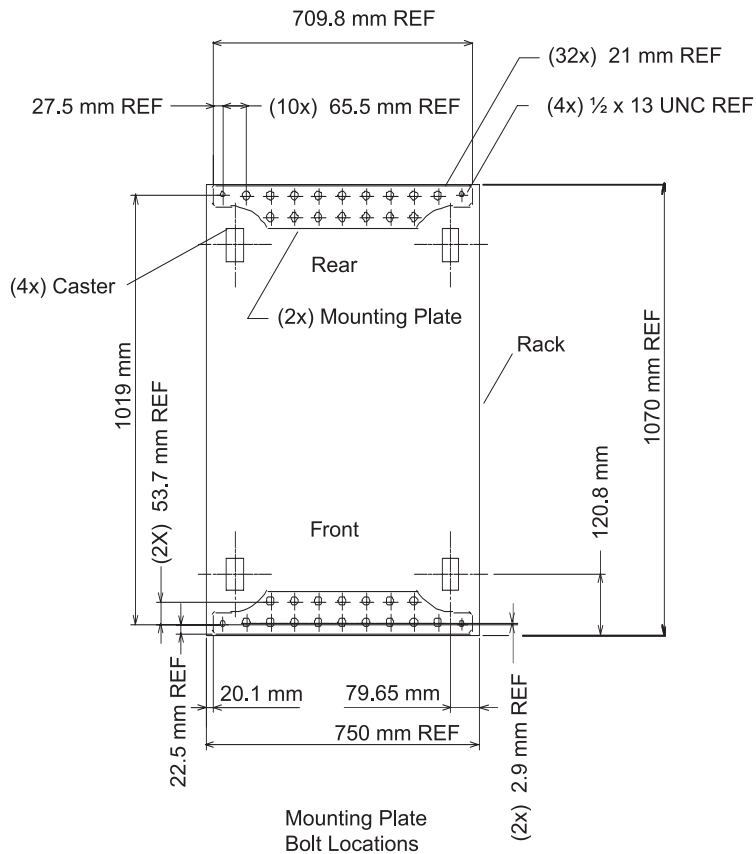
**Note:** The customer should obtain the service of a qualified structural engineer to determine appropriate anchoring of the mounting plates. A minimum of three anchor bolts for each mounting plate must be used to secure the plates to the concrete floor. Because some of the drilled holes may be aligned with concrete reinforcement rods below the surface of the concrete floor, additional holes must be drilled. Each mounting plate must have at least three usable holes, two that are on opposite sides and opposite ends of each other, and one hole at the center. The mounting plates should be able to withstand 2500 pounds pulling force on each end.

1. Be sure the rack is in the correct location.



2. Place the mounting plates (item 1 in illustration on page 149), front and rear, in the approximate mounting position under the system rack.
3. To align the mounting plates to the system rack, do the following:
  - a. Place the four rack-mounting bolts (item 6 in illustration on page 149) through the plate assembly holes at the bottom of the rack. Install the bushings and washers (item 4 and 5 in illustration on page 149) to ensure bolt positioning.
  - b. Position the mounting plates (item 1 in illustration on page 149) under the four rack-mounting bolts (item 6 in illustration on page 149) so that the mounting bolts are centered directly over the tapped holes.

- c. Turn the rack-mounting bolts (item 6 in illustration on page 149) three or four rotations into the tapped holes.
4. Mark the floor around the edge of the mounting plates, as shown in the following illustration:



5. Remove the mounting bolts from the threaded holes.
6. Move the rack away from the mounting plates.
7. Mark the floor at the center of each hole in the mounting plate (including tapped holes).
8. Remove the mounting plates from the marked locations.
9. At the marked location of the tapped mounting holes, drill two holes approximately 1 inch to allow clearance for the ends of the two rack-mounting bolts. The ends of the rack-mounting bolts may protrude past the thickness of the mounting plate. Drill one hole in each group of anchor bolt location marks as indicated on the marked floor.
10. Using at least three bolts for each mounting plate, mount the mounting plates to the concrete floor.

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Reposition the system rack over the mounting plates.
2. Place the four rack-mounting bolts through the plate assemblies with the D-washer positioned so that the straight side of the washer is facing inward toward the system rack.
3. Place the isolator bushing (item 4 in illustration on page 149) inside the leveling foot with a washer between the isolator bushing and the floor plate.
4. Turn the rack-mounting bolts three or four rotations into the tapped holes.
5. Turn the leveling foot of the plate assembly down until it contacts the mounting plate, and then level the rack using the four leveling feet.
6. Lock the leveling feet by tightening the lock nut.
7. Tighten the four rack-mounting bolts into the mounting plates.



### ***Attaching the Rack to a Short or Long Raised Floor:***

**Attention:** It is the customer's responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

**Note:** To accommodate a floor with a depth of more than 16 inches, a steel beam or a steel channel adapter for mounting the subfloor eyebolts are required. The customer must supply the floor eyebolts.

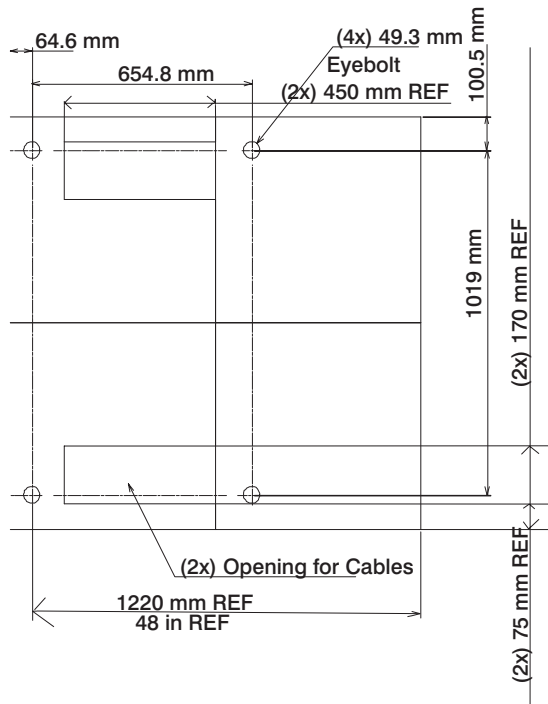
Consider the following when preparing the floor for tie-down:

- The hardware is designed to support a frame weighing no more than 2636 pounds.
- The estimated maximum concentrated load on one caster for a 2636 pound-system is 900 pounds. For a multiple system installation, it is possible that one floor tile will bear a total concentrated load of 1800 pounds.

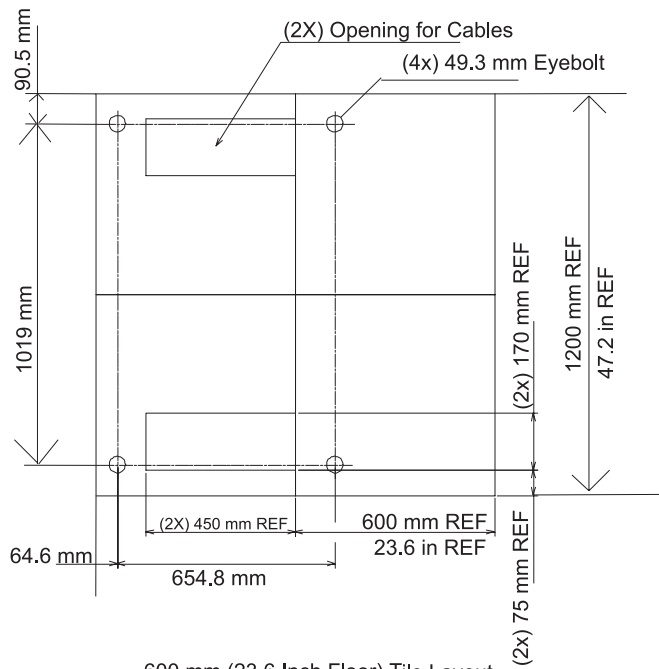
To install the eyebolts do the following:

1. Obtain the service of a qualified structural engineer to determine appropriate installation of the eyebolts.
2. Consider the following before installing the eyebolts:
  - Floor eyebolts must be securely anchored to the concrete floor.
  - The minimum height of the center of the internal diameter is 1 inch above the concrete floor surface.
  - The maximum is height 2.5 inches above the concrete floor surface. Higher than 2.5 inches can cause excessive lateral deflection to the tie-down hardware.
  - The eyebolt's internal diameter should be 1 3/16 inch, and each eyebolt should be able to withstand 2700 pounds. The customer should obtain the service of a qualified consultant or structural engineer to determine the appropriate anchoring method for these eyebolts and to ensure that the raised floor can support the floor-loading specifications.

3. Plan for installing four eyebolts positioned to match the dimensions given in the following illustrations.



610 mm (24 Inch) Floor Tile Layout



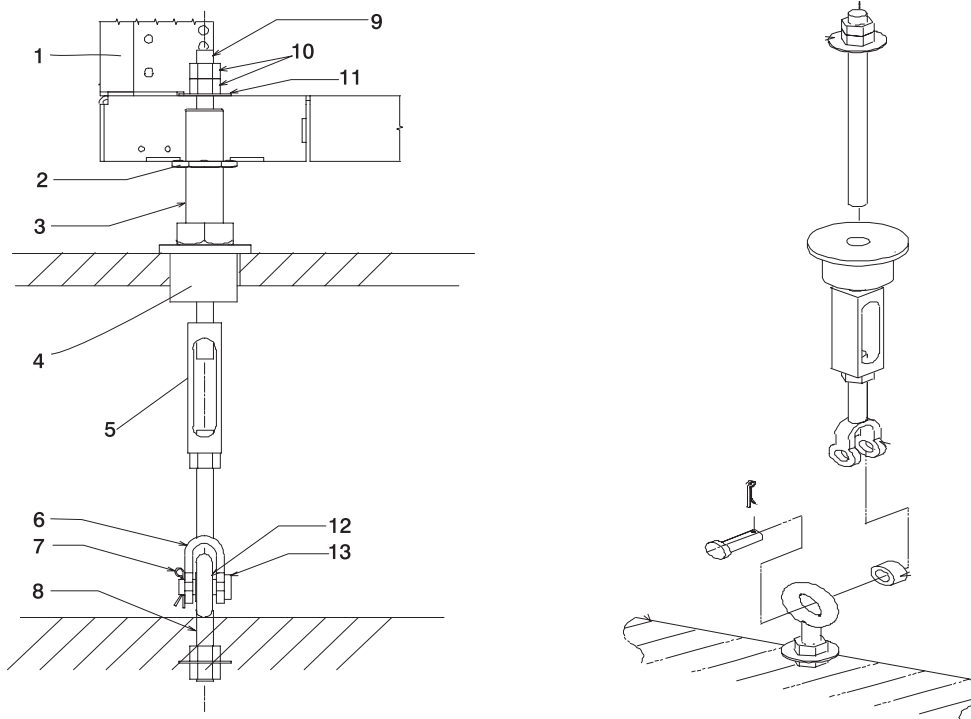
600 mm (23.6 Inch) Floor Tile Layout

4. Install the eyebolts to the floor.

To install the frame, do the following:

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Before starting the installation, check all cable openings in the floor panel and location of the rubber bushing holes so that they match the dimensions given in the illustrations on 152.
2. Power off the system and make sure all cables and connectors are disconnected and are not dangling around the frame. The frame should be free to roll.
3. The floor eyebolts should be already secured to the concrete floor. Verify the height of the center of the floor eyebolt to the concrete floor or the steel beam/channel adapter mounted to the concrete floor. Ensure that the turnbuckles can accommodate the total height of the raised floor.
4. Remove the floor tiles around the area where the frame(s) will be installed.
5. Remove the pin and the spacer from the lower jaw (see the following illustrations).



- |   |   |  |   |
|---|---|--|---|
| <ol style="list-style-type: none"> <li>1</li> <li>2</li> <li>3</li> <li>4</li> <li>5</li> <li>6</li> <li>7</li> </ol> | <p>Frame<br/>Jam Nut<br/>Rack Leveler<br/>Rubber Bushing<br/>Turnbuckle (Short or Long)<br/>Lower Jaw<br/>Pin</p> | <ol style="list-style-type: none"> <li>8</li> <li>9</li> <li>10</li> <li>11</li> <li>12</li> <li>13</li> </ol> | <p>Floor Eyebolt (customer-supplied)<br/>Threaded Rod<br/>Nut<br/>Washer<br/>Spacer<br/>Shaft</p> |
|---|---|--|---|

**Note:** The difference between the two turnbuckle assemblies is the length of the turnbuckle.

The Short Turnbuckle Assembly (part number 11P4755) is used for a 9 1/2 inches to 11 3/4 inches raised floor.

The Long Turnbuckle Assembly (part number 11P4756) is used for an 11 3/4 inches to 16 inches raised floor.

6. Place the spacer inside the floor eyebolt and place the floor eyebolt between the lower jaw. Reinstall the shaft, pin, and spacer.

7. Remove the threaded rod and rubber bushing from the turnbuckle assembly.
8. Install the floor tile that has the rubber bushing holes that are aligned with the eyebolt locations.
9. Install the rubber bushings in the floor tiles.
10. Move the frame so that the frame leveler is located over the rubber bushings.  
**Attention:** To avoid a tipping hazard, make sure that the frame casters do not roll into the cable opening.
11. Turn the leveling foot of the plate assembly down until it contacts the bushing, and then level the rack using the four leveling feet by tightening the lock nuts.
12. Lock the leveling feet by tightening the lock nut.
13. Insert the threaded rod into the inner hole of the leveler and the rubber bushing.
14. Thread down the threaded rod until the tip of the rod is approximately 1 inch inside the turnbuckle.
15. Insert the nuts and hand-tighten the nuts.
16. Repeat the previous three steps so that all assemblies are completely installed, as shown in the previous illustration.
17. Tighten all the nuts to 40 ft-pounds.

The frame is now secured.

## Considerations for Multiple System Installations

In a multi-frame installation, it is possible that a floor tile with cable cutouts (refer to “Cutting and Placement of Floor Panels” on page 144) will bear two concentrated static loads up to 900 lbs (per caster/leveler). Thus, the total concentrated load can be as high as 1800 lbs. Contact the floor tile manufacturer or consult a structural engineer to ensure that the raised floor assembly can support this load.

When you are integrating an @server pSeries 670 into an existing multiple-system environment, or when adding additional systems to an installed @server pSeries 670, consider the following factors:

- Minimum aisle width

For multiple rows of systems containing one or more @server pSeries 670, the minimum aisle width in the front of the system is 1041 mm (41 in.) and 838 mm (33 in.) in the rear of the system to allow room to perform service operations. The minimum aisle width is in addition to the front and rear service clearances of 1143 mm (45 in.) and 914 mm (36 in.) respectively. Service clearances are measured from the edges of the frame (with doors open) to the nearest obstacle.

- Thermal interactions

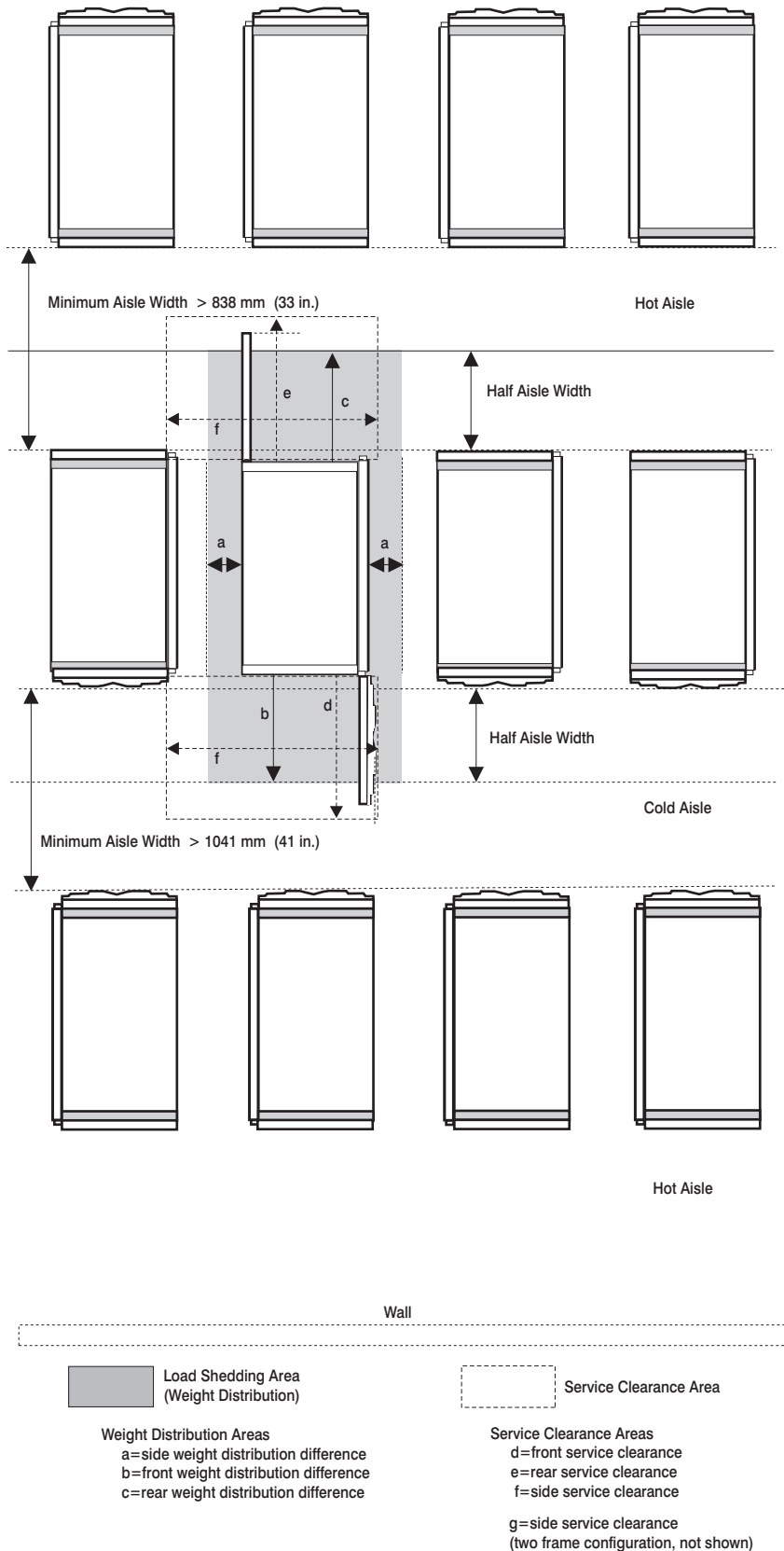
The minimum aisle width between rows on the computer room floor is 33 or 41 inches for optimal cooling. Aisle width is independent of which door or cover set is used. In addition, systems should be faced front-to-front and rear-to-rear to create “cool” and “hot” aisles to maintain effective system thermal conditions, as shown in the following illustration.

Cool aisles need to be of sufficient width to support the airflow requirements of the installed systems as indicated in Cooling Requirements on Page 90. The airflow per tile will be dependent on the underfloor pressure and perforations in the tile. A typical underfloor pressure of 0.025” of water will supply 300-400 cfm through a 25% open 2’x2’ floor tile.

- Floor loading

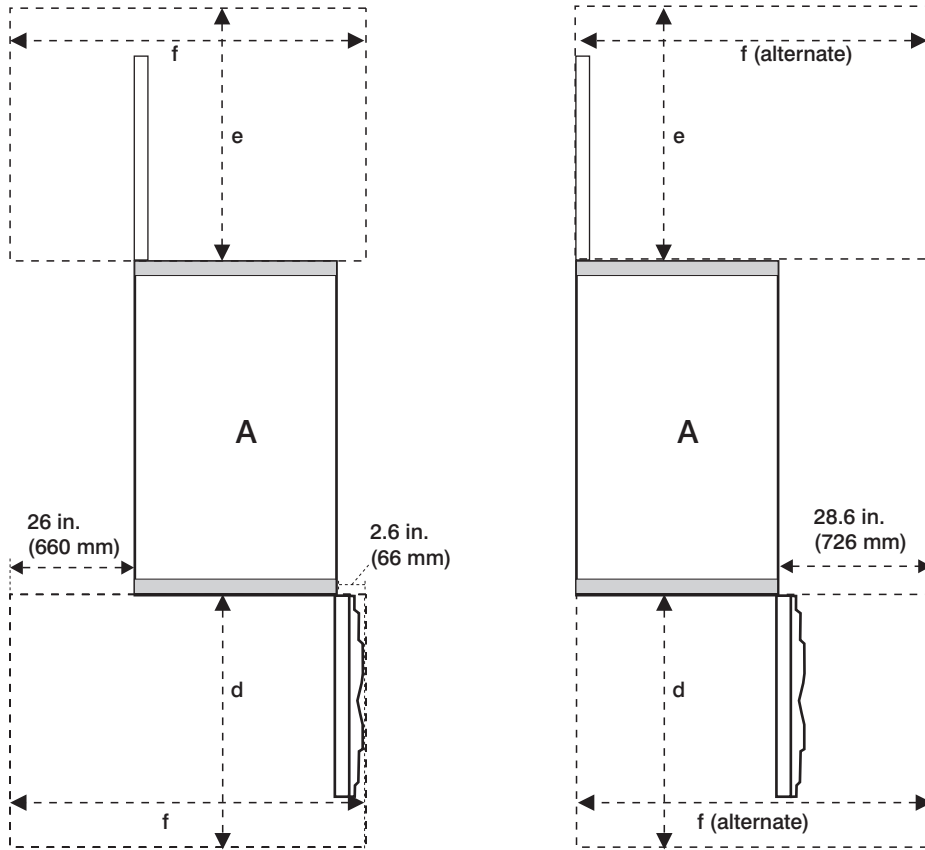
The system can induce a concentrated load of 900 lbs per caster. It is possible that a panel structure has to sustain a total load as high as 1800 lbs. Consult the panel manufacturer and obtain the services of a qualified consultant or structural engineer to insure the concrete floor and the structure panel can support these loads.

## Proposed Floor Layout for Multiple Systems



## Service Clearance

The minimum service clearance for single-frame and double-frame systems with slimline doors is shown in the following illustration.

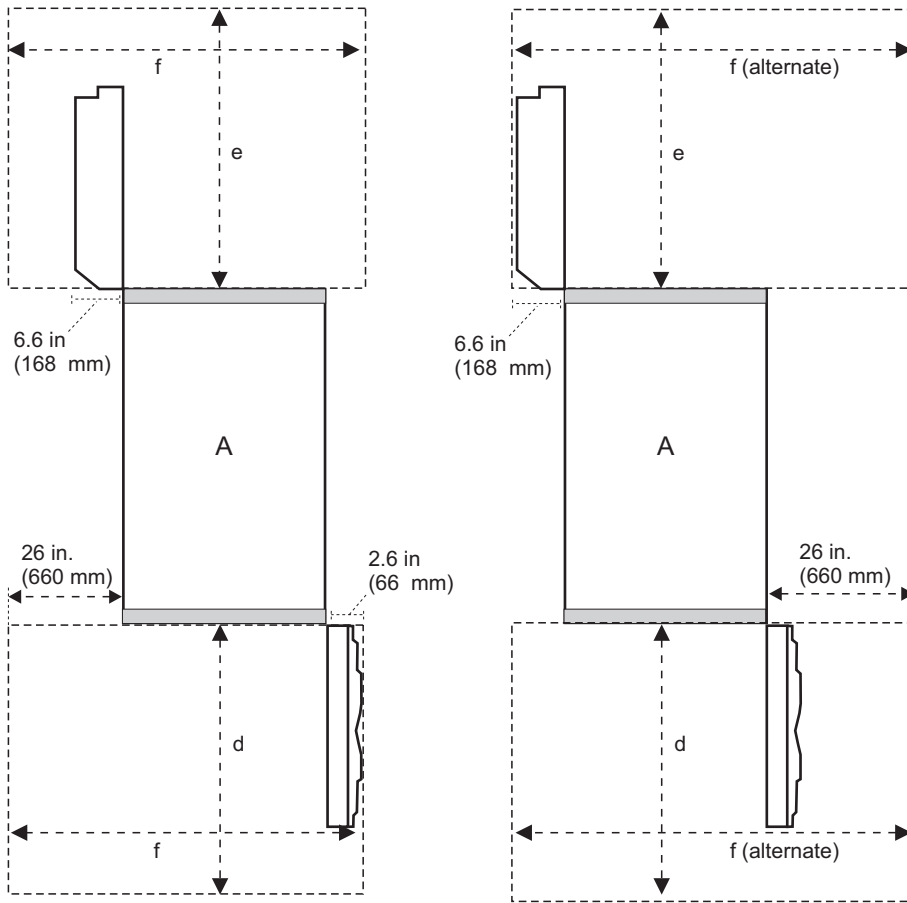


Single-Frame System  
with Slimline Doors

Single-Frame System  
with Slimline Doors  
(with alternative right-side  
service clearance)

d=1143 mm (45.0 in.)  
e=914 mm (36.0 in.)  
f=1511 mm (59.5 in.)  
f (alternate)=1577 mm (62.1 in.)

The minimum service clearance for single-frame and double-frame systems with acoustical doors is shown in the following illustration.



Single-Frame System with Acoustical Doors

Single-Frame System with Acoustical Doors (alternative right-side service clearance)

d=1143 mm (45.0 in.)  
 e=914 mm (36.0 in.)  
 f=1511 mm (59.5 in.)  
 f (alternate)=1765 mm (69.5 in.)

Refer to the illustration in “Guide for Raised-Floor Preparation” on page 144 for service clearances shown in a raised-floor installation.



## Cooling Requirements

The @server pSeries 670 requires air for cooling. As shown in "Proposed Floor Layout for Multiple Systems" on page 156, rows of @server pSeries 670 systems must face front-to-front. The use of a raised floor is recommended to provide air through perforated floor panels placed in rows between the fronts of systems (the cold aisles shown in the figure on page 156).

**Note:** Do not place perforated tiles in the hot aisles. Heated exhaust air must exit the computer room through the ceiling air-return system.

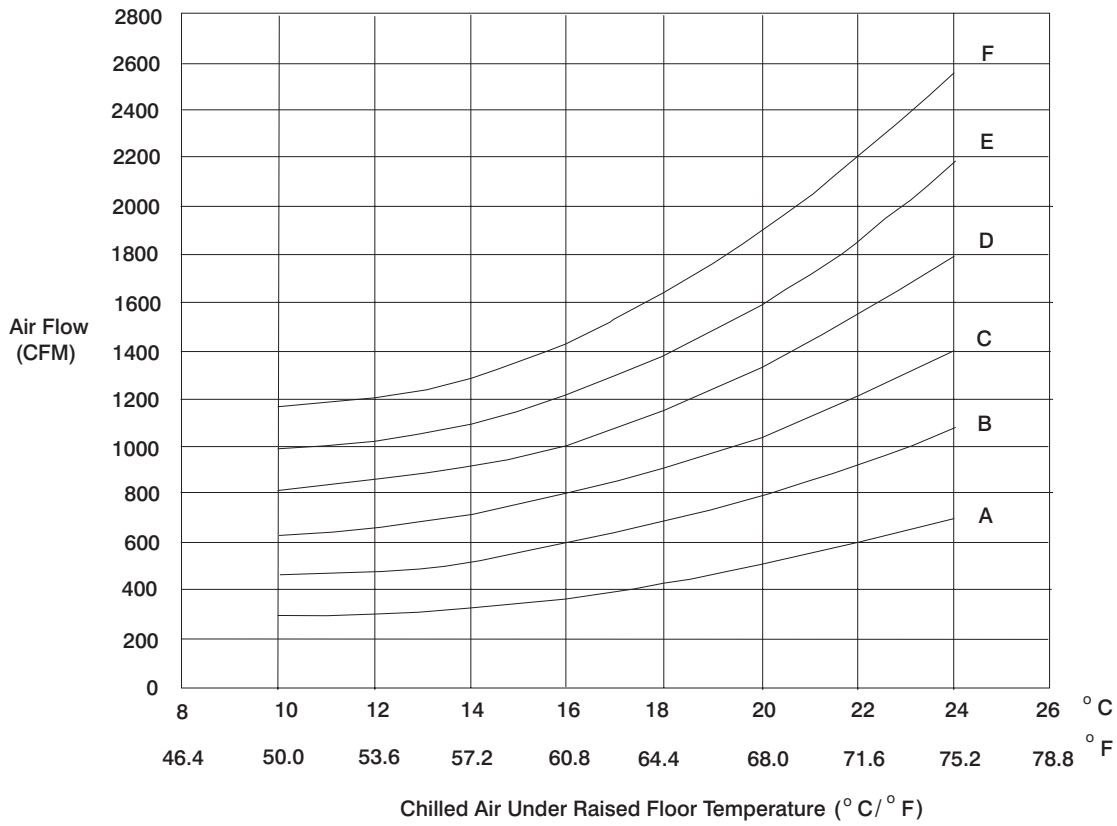
The following table provides system cooling requirements based on system configuration. The letter designations in the table correspond to the letter designations in the graph shown in "Cooling Requirements Graph" on page 160.

Number of I/O Drawers (7040-61D)	1.1 GHz 4-way Module (Cooling Chart Reference)	1.1 GHz 8-way Modules (Cooling Chart Reference)	
		8-way	16-way
1	A	A	A
2	A	A	B
3	N/A	N/A	C

Number of I/O Drawers (7040-61D)	1.5 GHz 4-way Module (Cooling Chart Reference)	1.5 GHz 8-way Modules (Cooling Chart Reference)	
		8-way	16-way
1	A	A	B
2	A	B	B
3	N/A	N/A	C

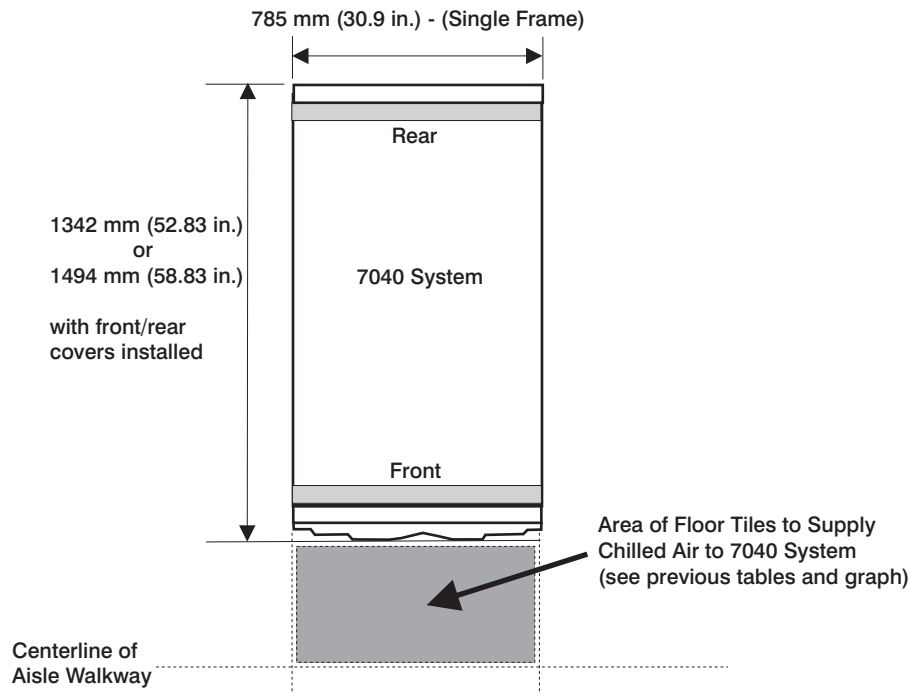
Number of I/O Drawers (7040-61D)	1.7 GHz 8-way Modules (Cooling Chart Reference)	
	8-way	16-way
1	A	B
2	B	B
3	N/A	C

# Cooling Requirements Graph

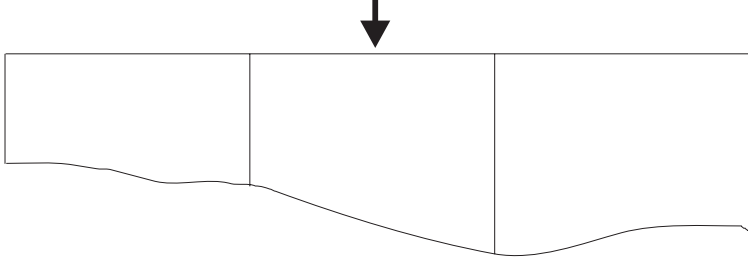


## Requirements for the Chilled Air Flow Area

The following illustration shows the chilled air flow area required for a system. Use the system cooling requirements tables and the preceding graph to determine the area of floor tiles to supply chilled air to the system.



Other Computer Systems



## 7040 @server pSeries 690

The @server pSeries 690 system consists of multiple components, as summarized in the following table.

Model	Description	Minimum per System	Maximum per System
7040-61R	Base Frame (Redundant power supplies as feature codes)	1	1
FC8691	Optional Expansion Frame	0	1
FC6070	Base Frame Universal Front Door	1	1
FC6071	Expansion Frame Universal Front Door	0	1
FC6074	Base/Expansion Frame Slimline Rear Door <sup>2</sup>	1 <sup>1</sup>	2 <sup>1</sup>
FC6075	Base/Expansion Frame Acoustical Rear Door <sup>2</sup>	1 <sup>1</sup>	2 <sup>1</sup>
FC6200 or FC6201	Optional Integrated Battery Feature (IBF)	0	6
7040-681	Managed Server (up to 32 processors, 4 GB to 512 GB memory)	1	1
FC7315	Hardware Management Console (HMC)	0	2
FC8692	Media Subsystem (Operation panel, 3.5-inch floppy drive, optional media devices)	1	1
7040-61D	IO Subsystem (20 PCI cards maximum, 16 DASD maximum)	1	8

### Notes:

1. Either slimline doors or acoustical doors must be selected by the customer during the order process. Slimline doors will not meet acoustic limits for Category 1A.
2. Door options determine which doors are included with your @server pSeries 690. See "@server pSeries 690 Doors and Covers."

## @server pSeries 690 Doors and Covers

Covers are an integral part of the @server pSeries 690 and are *required* for product safety and EMC compliance. The following rear door options are available for the @server pSeries 690:

- "Enhanced Acoustical" Cover Option

This feature provides a low-noise option for customers or sites with stringent acoustical requirements and where a minimal system footprint is not critical. The Acoustical cover option consists of a special rear door which is approximately 200-mm (8 in.) in depth and contains acoustical treatment that lowers the noise level of the machine by approximately 6 dB compared to the non-acoustical rear door. With this option, the 7040 meets the acoustical *Specifications for Category 1A for Data Processing Areas*, with a declared A-weighted sound power level,  $L_{WAd}$  of 7.5 bels (B) for the most common system configuration.

- "Slimline" Cover Option

This feature provides a smaller-footprint and lower-cost option for customers or sites where space is more critical than acoustical noise levels. The Slimline cover option consists of rear door which is about 50-mm (2 in.) in depth with no acoustical treatment. With this option, the 7040 has a declared A-weighted sound power level,  $L_{WAd}$ , of 7.9 bels (B) for the most common system configuration.

**Note:** For declared levels of acoustical noise emissions, refer to "Acoustical Noise Emissions" on page 172.

## Moving the System to the Installation Site

The customer should determine the path that must be taken to move the system from the delivery location to the installation site. The customer should verify that the height of all doorways, elevators, and so on are sufficient to allow moving the system to the installation site. The customer should also verify that the weight limitations of elevators, ramps, and so on are sufficient to allow moving the system to the installation site. If the height or weight of the system can cause a problem when the system is moved to the installation site, the customer should contact their local site planning, marketing, or sales representative.

## Power and Electrical Requirements

Redundant power and line cords are standard on the @server pSeries 690. The system uses dual A/C power cords. For maximum availability, each of the line cords should be fed from independent power grids.

The following table illustrates electrical and thermal characteristics for the @server pSeries 690.

Electrical/Thermal Characteristic			
Rated Voltage (V ac, 3 phase)	200 to 240	380 to 415	480
Rated Current (A, per phase)	45	25	20
Frequency (Hertz)	50 to 60	50 to 60	50 to 60
Power (Maximum in kW)	17.1	17.1	17.1
Typical, full load power factor (pf)	0.99	0.97	0.93
Inrush current (Amps)	162 max (see note below)		
Thermal output (Maximum kBtu/hr)	58.2	58.2	58.2
<b>Note:</b> Inrush currents occur only at initial application of power (very short duration for charging capacitors). No inrush currents occur during the normal power off-on cycle.			

The following table illustrates the line cord options for the @server pSeries 690 with their geographic, breaker rating, and cord information.

3-Phase Supply Voltage (50/60 Hz)	200-240 V	380-415 V	480 V
<b>Geography</b>	United States, Canada, Japan	Europe, Middle East, Africa, Asia Pacific	United States, Canada
<b>Customer Circuit Breaker Rating (see Note 1 below)</b>	60 A	30 A	30 A
<b>Cord Information</b>	6 and 14 foot, 6 AWG line cord	14 foot, 6 or 8 AWG line cord, (electrician installed)	6 and 14 foot, 10 AWG line cord
<b>Recommended Receptacle</b>	IEC309, 60 A, type 460R9W (not provided)	Not specified, electrician installed	IEC309, 30 A, type 430R7W (not provided)
<b>Notes:</b>			
1. The exact circuit breaker ratings may not be available in all countries. Where the specified circuit breaker ratings are not acceptable, use the nearest available rating. Use of a time delayed circuit breaker is recommended.			
2. In two-frame systems, frame B receives its power from frame A. The power to frame B is 350 V DC fed from the BPD through UPIC cables.			
3. IBM strongly recommends the use of a metal backbox with line cords using IEC-309 plugs. For additional information about this recommendation, see Chapter 11, "Power Cords and Electrical Needs," on page 339.			

## Line Cord Features

The following three-phase line cord features are available for the @server pSeries 690:

- FC 8678: Line Cord, 200-240V ac, 6AWG, 14ft, IEC309 60A Plug
- FC 8681: Line Cord, 200-240V ac, 6AWG, 6ft, Chicago IEC309 60A Plug
- FC 8677: Line Cord, 380-415V ac, 8AWG, 14ft, No Plug
- FC 8680: Line Cord, 480V ac, 10AWG, 14ft, IEC309 30A Plug
- FC 8682: Line Cord, 480V ac, 10AWG, 6ft, Chicago, IEC309 30A Plug
- FC 8694: Line Cord, 200-240V ac, 6AWG/Type W 14ft, No Plug

## Phase Imbalance and BPR Configuration

Depending on the number of Bulk Power Regulators (BPRs) in your system, phase imbalance can occur in line currents. All systems are provided with 2 bulk power assemblies (BPAs), with separate line cords. Phase currents will be divided between two line cords in normal operation. The following table illustrates phase imbalance as a function of BPR configuration.

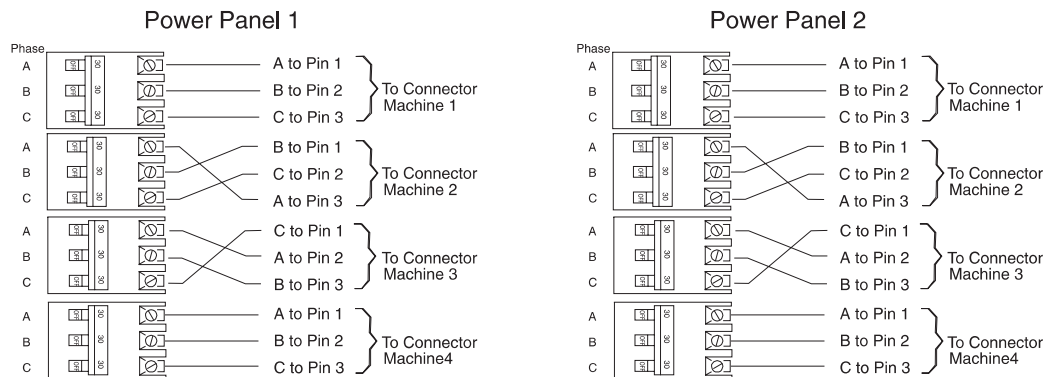
Number of BPRs per BPA	Phase A Line Current	Phase B Line Current	Phase C Line Current
1	Power / Vline	Power / Vline	0
2	0.5 Power / Vline	0.866 Power / Vline	0.5 Power / Vline
3	0.577 Power / Vline	0.577 Power / Vline	0.577 Power / Vline

**Note:** Power is calculated from “Total System Power Consumption” on page 177. Vline is line-to-line nominal input voltage.

## Balancing Power Panel Loads

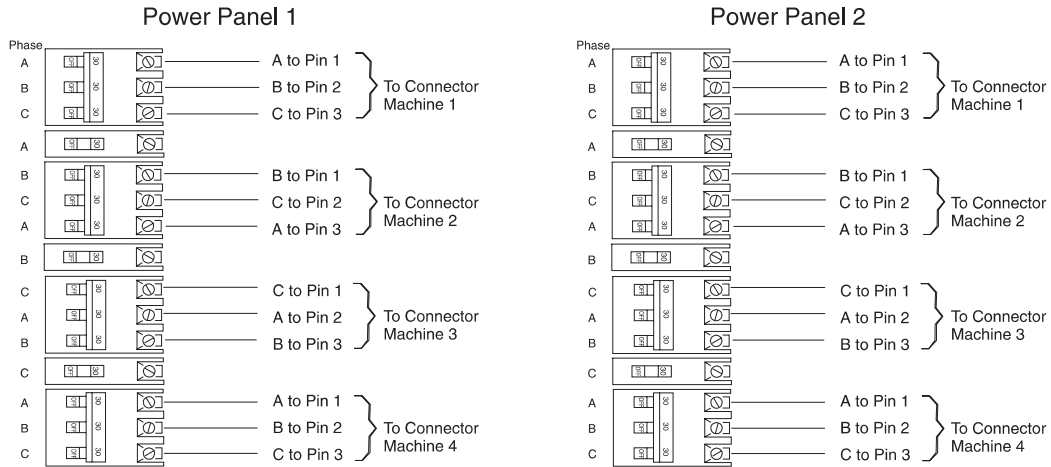
The @server pSeries 690 requires three-phase power. Depending on the system configuration, the phase currents can be fully balanced or unbalanced. System configurations with three BPRs per BPA have balanced power panel loads, while configurations with only one or two have unbalanced loads. With two BPRs per BPA, two of the three phases will draw an equal amount of current, and will be, nominally, 57.8% of the current on the third phase. With one BPR per BPA, two of three phases will carry an equal amount of current, with no current drawn on the third phase. The following figure is an example of feeding several loads of this type from two power panels in a way that balances the load among the three phases.

**Note:** Use of ground-fault-interrupt (GFI) circuit breakers is not recommended for this system because GFI circuit breakers are earth-leakage-current sensing circuit breakers and this system is a high earth-leakage-current product.

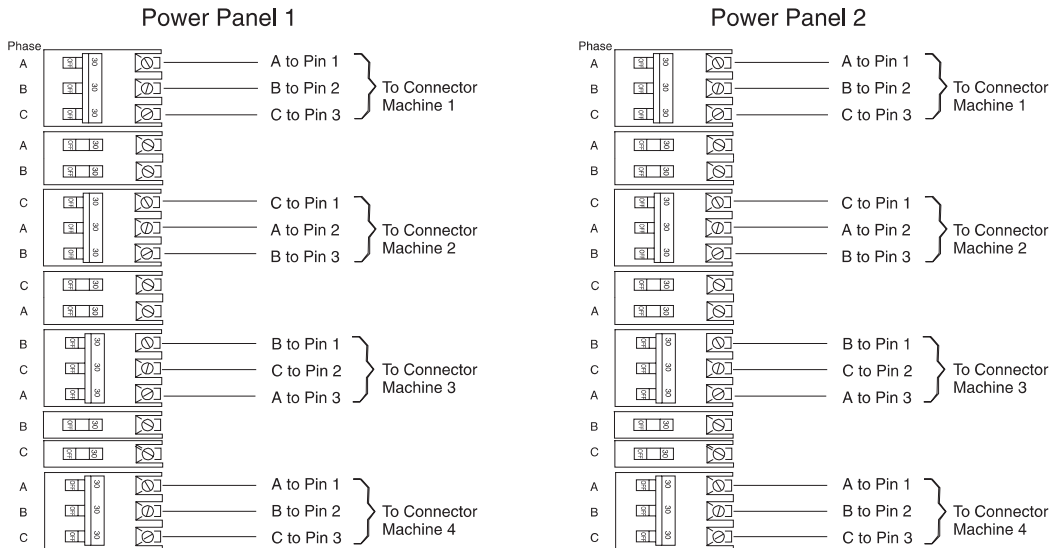


The method illustrated in the preceding figure requires that the connection from the three poles of each breaker to the three phase pins of a connector be varied. Some electricians may prefer to maintain a consistent wiring sequence from the breakers to the connectors. The following figure shows a way to balance the load without changing the wiring on the output of any breakers. The three-pole breakers are

alternated with single-pole breakers, so that the three-pole breakers do not all begin on Phase A.

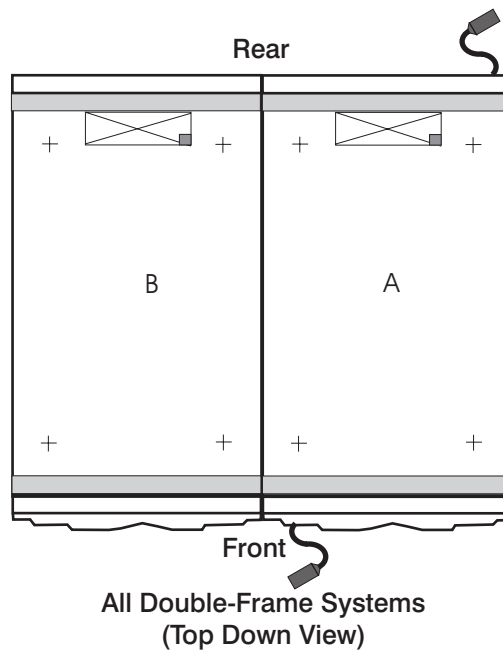
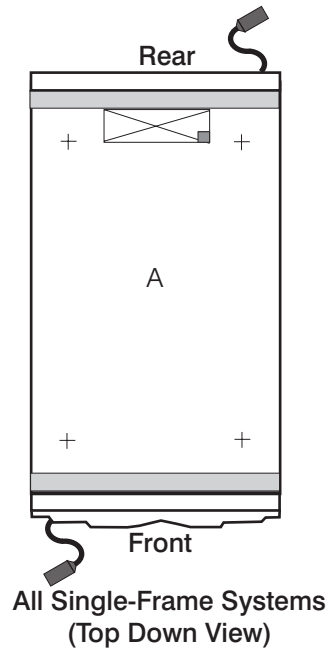


The following figure shows another way of distributing the unbalanced load evenly. In this case, the three-pole breakers are alternated with two-pole breakers.



## Power Cord Configuration

The power cords exit the system from different points of the frame as indicated in the following illustration.





## Checking the Facility Outlets and Power Source

### CAUTION:

**Do not touch the receptacle or the receptacle faceplate with anything other than your test probes before you have met the requirements in “Checking the Facility Outlets and Power Source” below.**

Performing the following will ensure that appropriate power will be used by the @server pSeries 690. The following checklist is for reference purposes, and will likely be performed by a service engineer prior to installation.

- \_\_\_ 1. The @server pSeries 690 is equipped to use 200-240V / 380-415V / 480V AC, three-phase. Check that the correct power source is available.
- \_\_\_ 2. Before system installation, locate and turn off the branch circuit CB (circuit breaker). Attach tag S229-0237, which reads “Do Not Operate.”

**Note:** All measurements are made with the receptacle faceplate in the normally installed position.

- \_\_\_ 3. Some receptacles are enclosed in metal housings. On receptacles of this type, perform the following steps:
  - a. Check for less than 1 volt from the receptacle case to any grounded metal structure in the building, such as a raised-floor metal structure, water pipe, building steel, or similar structure.
  - b. Check for less than 1 volt from receptacle ground pin to a grounded point in the building.

**Note:** If the receptacle case or faceplate is painted, be sure the probe tip penetrates the paint and makes good electrical contact with the metal.

- \_\_\_ 4. Check the resistance from the ground pin of the receptacle to the receptacle case. Check resistance from the ground pin to building ground. The reading should be less than 1.0 ohm, which indicates the presence of a continuous grounding conductor.
- \_\_\_ 5. If any of the checks made in steps 3 and 4 are not correct, remove the power from the branch circuit and make the wiring corrections; then check the receptacle again.

**Note:** Do not use the digital multimeter to measure grounding resistance.

- \_\_\_ 6. Check for infinite resistance between the phase pins. This is a check for a wiring short.

### CAUTION:

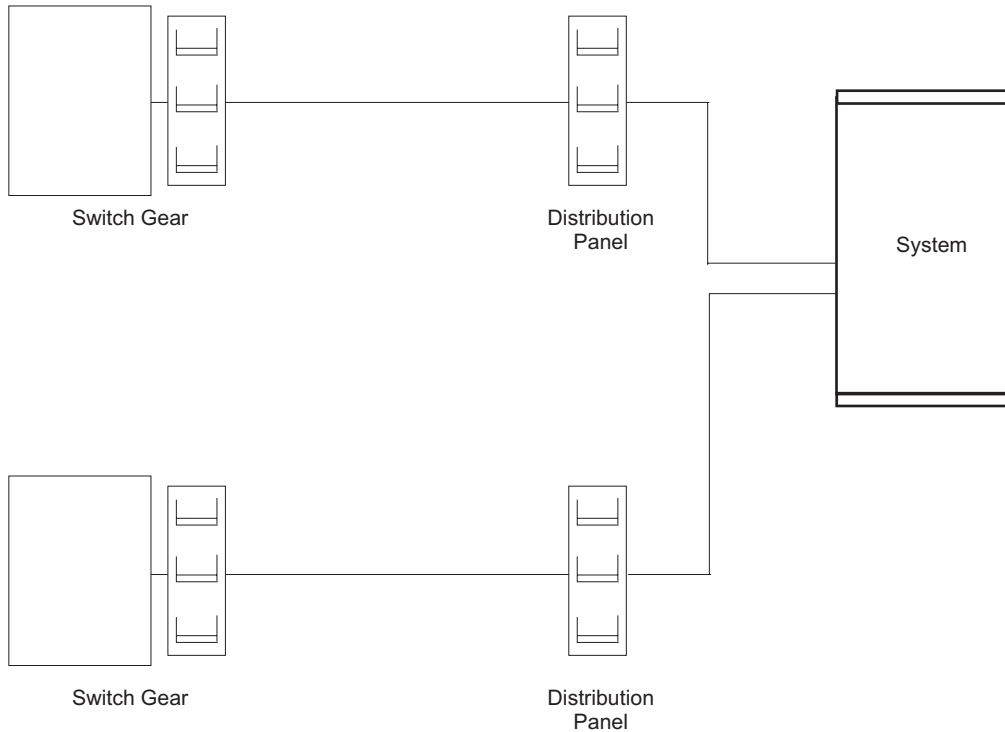
**If the reading is other than infinity, do not proceed! You must make the necessary wiring corrections to satisfy the above criteria before continuing. Do not turn on the branch circuit CB until all the above steps are satisfactorily completed.**

- \_\_\_ 7. Remove tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 8. Turn on the branch circuit CB. Measure for appropriate voltages between phases. If no voltage is present on the receptacle case or grounded pin, the receptacle is safe to touch.
- \_\_\_ 9. With an appropriate meter, verify that the voltage at the outlet is correct.
- \_\_\_ 10. Verify that the grounding impedance is correct by using the ECOS 1020, 1023, B7106, or an appropriately approved ground impedance tester.
- \_\_\_ 11. Turn off the branch circuit CB.
- \_\_\_ 12. Attach tag S229-0237, which reads “Do Not Operate.”
- \_\_\_ 13. You are now ready to install and connect the power cables to the @server pSeries 690. Refer to Chapter 1 of the @server pSeries 690 Installation Guide for this procedure.

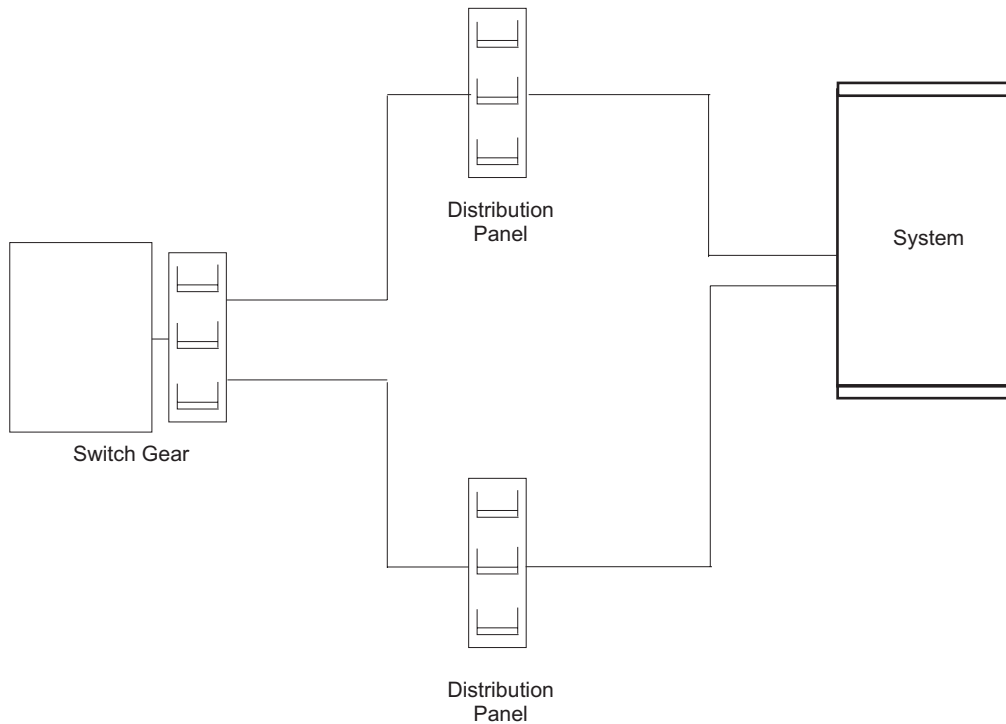
## Dual Power Installation

The @server pSeries 690 is designed with a fully redundant power system. Each system has two line cords attached to two power input ports which, in turn, power a fully redundant power distribution system within the system. To take full advantage of the redundancy/reliability that is built into the computer system, the system must be powered from two distribution panels. The possible power installation configurations are described as follows.

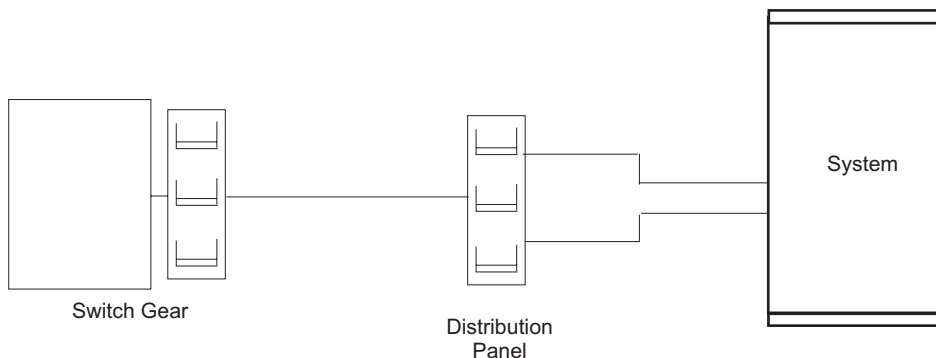
**Dual Power Installation - Redundant Distribution Panel and Switch:** This configuration requires that the system receives power from two separate power distribution panels. Each distribution panel receives power from a separate piece of building switch gear. This level of redundancy is not available in most facilities.



**Dual Power Installation - Redundant Distribution Panel:** This configuration requires that the system receives power from two separate power distribution panels. The two distribution panels receive power from the same piece of building switch gear. Most facilities should be able to achieve this level of redundancy.



**Single Distribution Panel - Dual Circuit Breakers:** This configuration requires that the system receives power from two separate circuit breakers in a single power panel. This configuration does not make full use of the redundancy provided by the processor. It is, however, acceptable if a second power distribution panel is not available.



### Additional Installation Considerations

In the United States, installation must be made in accordance with Article 645 of the National Electric Code (NEC). In Canada, installation must be in accordance with Article 12-020 of the Canadian Electrical Code (CEC).

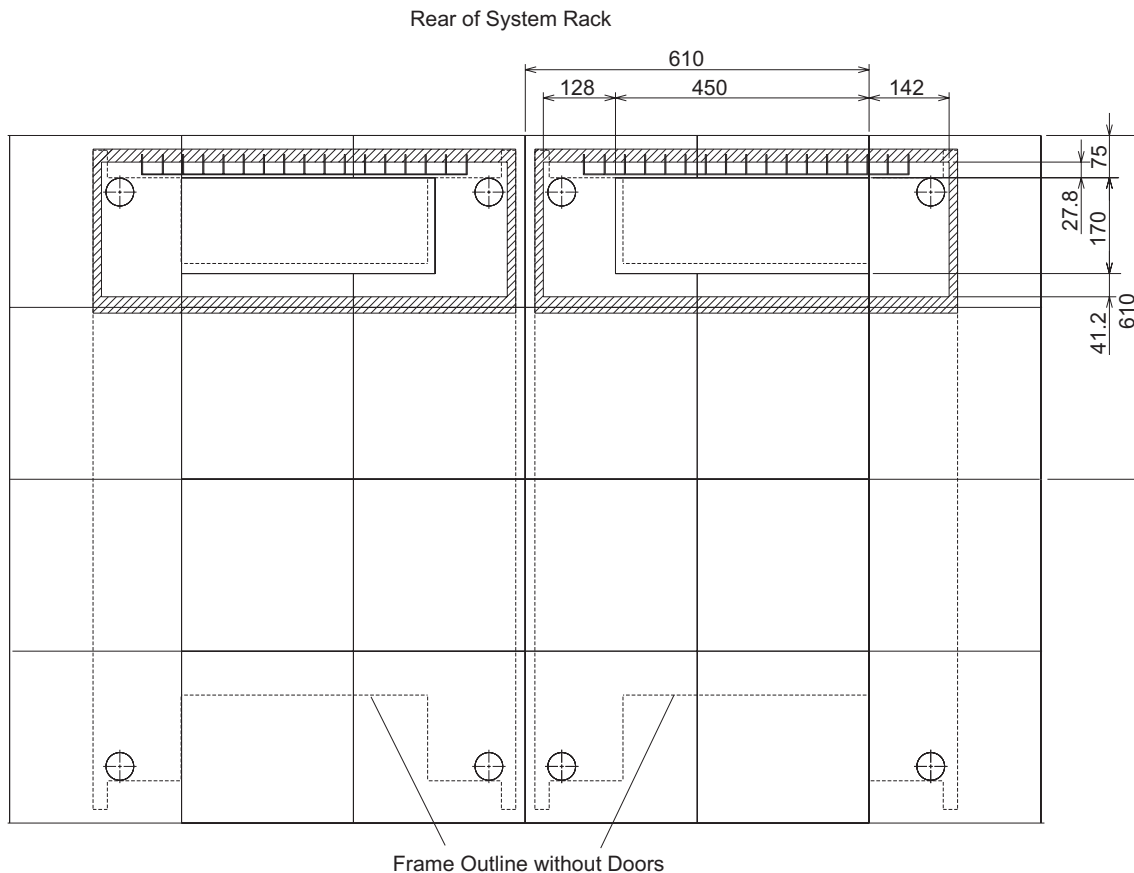
**Signal Integrity:** System reliability can be adversely affected by the presence of transient electrical noise that may be conducted on power, signal, and control cables. To conduct high-frequency-electrical noise away from the system, the ground path must be as short as possible. All systems are provided with a short ground strap that is intended for use with stringer/stanchion-type raised floors (or other grounded

types). This ground strap is required if your servers are connected to a 9076 SP Switch2 clustered environment, and it is recommended for all other configurations.

If your installation is not using a grounded-raised floor, and your servers are connected to an 9076 SP Switch2 clustered environment, all attached server frames in your environment must be independently grounded to the switch frame. Use the following information to help you install multiple systems to the 9076 SP Switch2 switch frame in a clustered environment:

- Order grounding straps by calling the IBM Quality Hotline at 1-800-IBM-LINE and requesting Part Number 44P3695, Grounding Kit. Each kit contains one ground strap and the required hardware to make a single connection between a server and a 9076 SP Switch2, so order one kit for each server that is connected to the switch.
- An IBM service representative will install the grounding straps by using instructions that are provided with the grounding kits. Each server frame must be directly connected to a 9076 SP Switch2 frame.

**Additional EMC (Electromagnetic Compatibility) Considerations:** If you are installing a High Performance Switch (7045-SW4) into your rack, you must install, around the base of the rack, the EMC skirt that was shipped with your High Performance Switch. Failure to do so puts the system out of FCC compliance. The following illustration gives the dimensions used and the location for installing the EMC skirt around the rack base.



## @server pSeries 690 Physical Specifications and Loads

The following tables illustrate the physical, electrical and thermal, as well as acoustical and environmental characteristics of various @server pSeries 690 system configurations.

### Dimensions and Weight

Physical Characteristic	Slimline Doors		Acoustical Doors	
	1 Frame	2 Frames	1 Frame	2 Frames
Height	2025 mm (79.72 in.)	2025 mm (79.72 in.)	2025 mm (79.72 in.)	2025 mm (79.72 in.)
Width	785 mm (30.91 in.)	1575 mm (62.00 in.)	785 mm (30.91 in.)	1575 mm (62.00 in.)
Depth	1342 mm (52.83 in.)	1342 mm (52.83 in.)	1494 mm (58.83 in.)	1494 mm (58.83 in.)
Weight (maximum configuration)	1170 kg (2580 lbs.)	1973 kg (4349 lbs.)	1184 kg (2610 lbs.)	2000 kg (4409 lbs.)

**Notes:**

- Doors are not installed during product shipment to the customer. A maximum configured system with batteries may exceed 1134 kg (2500 lbs.).
- When moving or relocating certain configurations of the system, the Bulk Power Regulators (BPRs) must be removed from the top of the rack (front and rear) to ensure product stability. Specifically, removal of BPR's from frame A and B in the front and rear is required in systems that have a single I/O drawer, and more than 2 BPR's installed per BPA in the primary rack.

### System Weights by Configuration

Number of I/O Subsystems, or *7045-SW4s	Total System Weight (Pounds)							
	1	2	3	4	5	6	7	8
Slimline Doors With IBF	<i>2250</i>	<i>2415</i>	<i>2580</i>	3633	3854	4019	4184	4349
Slimline Doors Without IBF	<i>1865</i>	<i>2030</i>	<i>2195</i>	<i>2418</i>	3266	3431	3596	3761
Acoustical Doors With IBF	<i>2280</i>	<i>2445</i>	<i>2610</i>	3693	3914	4079	4244	4409
Acoustical Doors Without IBF	<i>1923</i>	<i>2088</i>	<i>2253</i>	<i>2506</i>	3326	3491	3656	3821
No Doors With IBF	<i>2192</i>	<i>2357</i>	<i>2522</i>	3517	3738	3903	4068	4233
No Doors Without IBF	<i>1807</i>	<i>1972</i>	<i>2137</i>	<i>2302</i>	3150	3315	3480	3645

\*For configurations with a 7045-SW4 High Performance Switch installed, count the switch as you would an I/O drawer.

**Note:** Italicized numbers in the previous table indicate single-frame systems.

	Total System Weight (Kilograms)							
Number of I/O Subsystems, or *7045-SW4s	1	2	3	4	5	6	7	8
Slimline Doors With IBF	<i>1021</i>	<i>1095</i>	<i>1170</i>	1648	1748	1823	1898	1973
Slimline Doors Without IBF	<i>846</i>	<i>921</i>	<i>996</i>	<i>1097</i>	1481	1556	1631	1706
Acoustical Doors With IBF	<i>1034</i>	<i>1109</i>	<i>1184</i>	1675	1775	1850	1925	2000
Acoustical Doors Without IBF	<i>872</i>	<i>947</i>	<i>1022</i>	<i>1137</i>	1509	1583	1658	1733
No Doors With IBF	<i>994</i>	<i>1069</i>	<i>1144</i>	1595	1696	1770	1845	1920
No Doors Without IBF	<i>820</i>	<i>894</i>	<i>969</i>	<i>1044</i>	1429	1504	1579	1653

\*For configurations with a 7045-SW4 High Performance Switch installed, count the switch as you would an I/O drawer.

**Note:** Italicized numbers indicate single-frame systems.

## Acoustical Noise Emissions

Acoustical Characteristic				
Product Configuration	Declared A-Weighted Sound Power Level, $L_{WA_d}$ (B)		Declared A-Weighted Sound Pressure Level, $L_{pAm}$ (dB)	
	Operating	Idle	Operating	Idle
	7040 Acoustical Doors	7.5	7.5	57
7040 Slimline Doors	7.9	7.9	62	62

**Notes:**

- Noise levels cited are for a typical configuration (A-Frame: Bulk Power, CEC cage, battery option, media drawer, and two I/O drawers).
- The 0.6-B (6-dB) reduction in noise emission levels with the acoustical rear door corresponds to a factor of 4 reduction. That is, the noise level of a single A-Frame with thin covers is about the same as the noise level of four A-Frames with acoustical covers.
- $L_{WA_d}$  is the upper-limit A-weighted sound power level;  $L_{pAm}$  is the mean A-weighted sound pressure level at the 1-meter bystander positions; 1 B = 10 dB.
- All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.

## Environmental Specifications

Environmental Specification	Operating	Non-Operating	Storage	Shipping
Temperature	10 to 32°C (50 to 90°F)	10 to 43°C (50 to 109°F)	1 to 60°C (34 to 140°F)	-40 to 60°C (-40 to 140°F)
	Max. of 24 ° C (75.2 ° F) with 4mm tape or DVD RAM in rear positions of the Media Subsystem			
Relative Humidity (Noncondensing)	8 to 80 %	8 to 80 %	5 to 80 %	5 to 100 %
Maximum Wet Bulb	23°C (73°F)	27°C (73°F)	29°C (84°F)	29°C (84°F)

**Notes:**

1. When an IBM-approved vapor bag and desiccant packets are used to protect the system, storage specifications are valid for 6 months and shipping specifications are valid for 1 month. Otherwise, storage and shipping specifications are valid for two weeks each.
2. The upper limit of the dry bulb temperature must be derated 1 degree C per 189 m (619 ft.) above 1295 m (4250 ft.). Maximum altitude for 1.1 GHz, 1.5 GHz, and 1.7 GHz modules is 3048 m (10,000 ft.) and for 1.3 GHz modules is 2134 m (7000 ft.).

## Weight Distribution

The following table shows dimensions and weights used to calculate floor loading for the @server pSeries 690. All floor-loading calculations are intended for a raised-floor environment.

	1 Frame with Slimming Covers	2 Frames with Slimming Covers	1 Frame with Acoustical Covers	2 Frames with Acoustical Covers
Weight	1170 kg (2580 lbs.)	1973 kg (4349 lbs.)	1184 kg (2610 lbs.)	2000 kg (4409 lbs.)
Width	750 mm (29.5 in.)	1539 mm (60.6 in.)	750 mm (29.5 in.)	1539 mm (60.6 in.)
Depth	1173 mm (46.2 in.)	1173 mm (46.2 in.)	1173 mm (46.2 in.)	1173 mm (46.2 in.)

**Notes:**

1. For 2 frame systems, widths of Frame A and Frame B. were added (the depth remains 1069 mm (42.1 in.), not including frame extenders).
2. For 2 frame systems, weights are based on maximum configuration (less than addition of maximum weights for each frame).
3. The values in the table may be used with the Floor Loading Calculation Program available on the IP Website.
4. All floor-loading calculations are intended for a raised-floor environment.

The following table shows floor-loading specifications for systems with slimline covers. The values contained in the Condition column are described following the table.

Condition	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	1 Frame kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )	2 Frames kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )
1	25 (1.0)	135 (5.3)	135 (5.3)	1080.1 (221.2)	924.4 (189.3)
2	25 (1.0)	554 (21.8)	655 (25.8)	702.2 (143.8)	607.9 (124.5)
3	25 (1.0)	762 (30.0)	762 (30.0)	634.5 (129.9)	551.2 (112.9)
4	254 (10.0)	554 (21.8)	655 (25.8)	491.2 (100.6)	499.4 (102.3)
5	254 (10.0)	762 (30.0)	762 (30.0)	448.1 (91.8)	455.3 (93.3)
6	508 (20.0)	554 (21.8)	655 (25.8)	385.0 (78.9)	424.4 (86.9)
7	508 (20.0)	762 (30.0)	762 (30.0)	354.3 (72.6)	389.1 (79.7)
8	554 (21.8)	554 (21.8)	655 (25.8)	372.1 (76.2)	413.9 (84.8)
9	559 (22)	762 (30.0)	762 (30.0)	341.7 (70.0)	378.9 (77.6)
10	762 (30.0)	521 (20.5)	521 (20.5)	341.7 (70.0)	393.3 (80.6)
11	762 (30.0)	762 (30.0)	762 (30.0)	302.4 (61.9)	344.8 (70.6)

**Definition of Conditions:**

- Condition 1 indicates maximum floor loading when systems are stored cover-to-cover on all four sides with covers installed.
- Conditions 2 and 3 indicate floor loading when the system has no side clearance (beyond side covers) on both sides while front/back distances varied.
- Conditions 4 through 8 indicate floor loading at various points below the maximum weight-distribution distance of 762 mm (30.0 in.) from each edge of the frame.
- Conditions 9 through 10 indicate floor-loading options when the installation is limited to 342.0 kg/m<sup>2</sup> (70.0 lb/ft<sup>2</sup>).
- Condition 11 is the minimum floor loading required, based on the maximum weight-distribution area (30.0 in. from each side of the base frame).

**Notes:**

1. Service clearance is independent from weight distribution distance and must be at least 45 in. for the front of the frame and 36 in. for the rear of the frame (measured from the base frame).
2. Weight-distribution areas should not be overlapped.
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.



The following table shows floor-loading specifications for systems with acoustical covers. The values contained in the Condition column are described following the table.

Condition	a (sides) mm (in.)	b (front) mm (in.)	c (back) mm (in.)	1 Frame kg/m <sup>2</sup> (lb./ft. <sup>2</sup> )	2 Frames kg/m. <sup>2</sup> (lb./ft <sup>2</sup> )
1	25 (1.0)	135 (5.3)	135 (5.3)	1091.9 (223.6)	936.2 (191.7)
2	25 (1.0)	554 (21.8)	757 (29.8)	685.3 (140.4)	594.9 (121.8)
3	25 (1.0)	762 (30.0)	762 (30.0)	640.8 (131.2)	557.5 (114.2)
4	254 (10.0)	554 (21.8)	757 (29.8)	480.5 (98.4)	489.3 (100.2)
5	254 (10.0)	762 (30.0)	762 (30.0)	452.2 (92.6)	460.3 (94.3)
6	508 (20.0)	554 (21.8)	757 (29.8)	377.4 (77.3)	416.3 (85.3)
7	508 (20.0)	762 (30.0)	762 (30.0)	357.2 (73.2)	393.0 (80.5)
8	569 (22.4)	762 (30.0)	762 (30.0)	342.0 (70.0)	380.7 (78.0)
9	762 (30.0)	554 (21.8)	757 (29.8)	320.3 (65.6)	367.5 (75.3)
10	762 (30.0)	533 (21.0)	533 (21.0)	342.0 (70.0)	394.2 (80.7)
11	762 (30.0)	762 (30.0)	762 (30.0)	304.6 (62.4)	348.1 (71.3)

**Definition of Conditions:**

- Condition 1 indicates maximum floor loading when systems are stored cover-to-cover on all four sides with covers installed.
- Conditions 2 and 3 indicate floor loading when the system has no side clearance (beyond side covers) on both sides while front/back distances varied.
- Conditions 4 through 8 indicate floor loading at various points below the maximum weight-distribution distance of 762 mm (30.0 in.) from each edge of the frame.
- Conditions 9 through 10 indicate floor-loading options when the installation is limited to 342.0 kg/m<sup>2</sup> (70.0 lb/ft<sup>2</sup>).
- Condition 11 is the minimum floor loading required, based on the maximum weight-distribution area (30.0 in. from each side of the base frame).

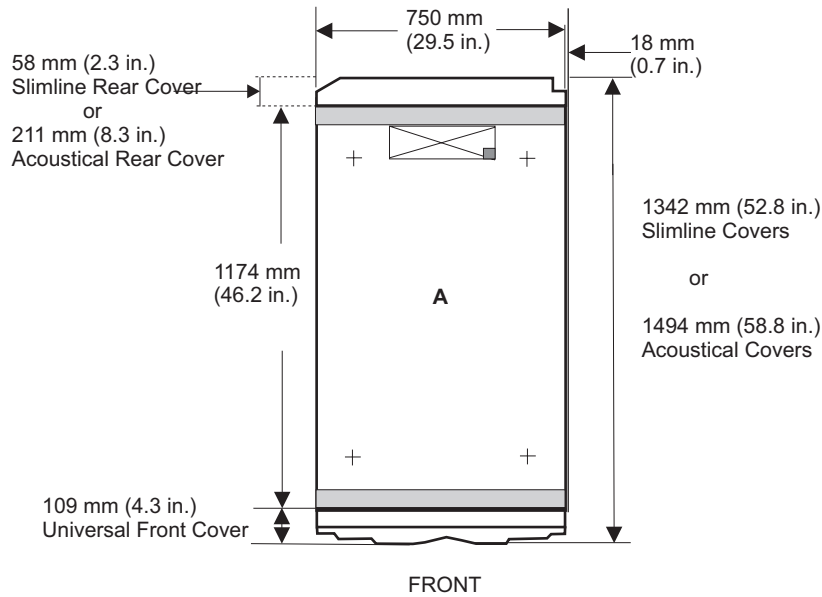
**Notes:**

1. Service clearance is independent from weight-distribution distance and must be at least 45 in. at the front of the frame and 36 in. at the rear of the frame (measured from the base frame).
2. Weight-distribution areas should not be overlapped.
3. Floor-loading weight distribution distances should not exceed 762 mm (30 in.) in any direction when measured from the base frame.

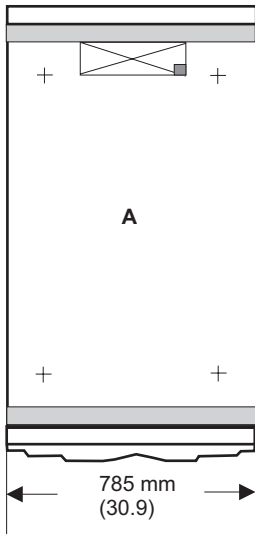
Floor loading for the system is illustrated in the Proposed Floor Layout for Multiple Systems in “Considerations for Multiple System Installations” on page 193.

## Plan Views

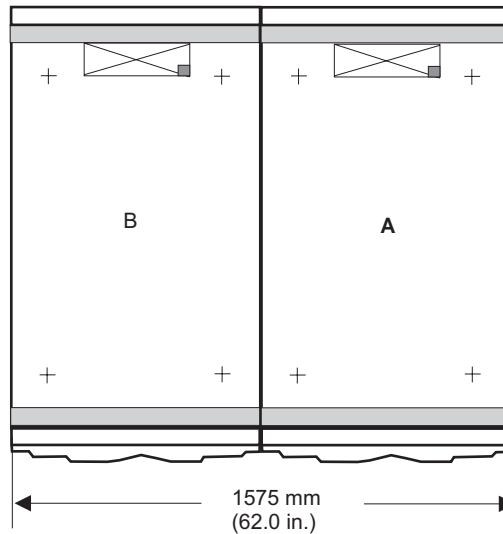
The following illustration shows dimensional planning information for single-frame systems and double-frame systems.



FRAME ENTRY/EXIT	DIMENSION	
	(mm)	(in.)
FRONT	117 by 403	4.6 by 15.9
REAR	117 by 403	4.6 by 15.9



Single-Frame Systems



Double-Frame Systems

## Total System Power Consumption

The following tables contain minimum and maximum power consumption for the 1.1 GHz, 1.3 GHz, 1.5 GHz, 1.7 GHz, and 1.9 GHz @server pSeries 690. Minimum power consumption is based on a configuration consisting of a single 4 GB memory card, 1 PCI card per I/O subsystem, and 1 DASD device per I/O subsystem.

Maximum power consumption is based on a configurations consisting of two 32 GB memory cards per MCM module in 1.1 GHz and 1.3 GHz machines and two 64 GB memory cards per MCM module in 1.5 GHz, 1.7 GHz, and 1.9GHz machines, maximum PCI cards (20 per I/O drawer), and maximum DASD (16 per I/O drawer).

Power consumption calculations are estimates. Actual values may vary.

Calculate heat load (Btu per hour) by multiplying the power (in watts) for the configuration by a factor of 3.4.

**Note:** Certain system configurations only support a maximum number of I/O drawers. If a system does not support a particular count of I/O drawers, it is indicated with "N/A".

Number of I/O Drawers (7040-61D)	1.1 GHz 8-way Modules (minimum power consumption, in watts)				1.1 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
1	1911	2867	3823	4779	3042	4586	6130	7674
2	2279	3235	4191	5147	4090	5634	7178	8722
3	N/A	3603	4559	5515	N/A	6682	8226	9770
4	N/A	3971	4927	5883	N/A	7730	9274	10818
5	N/A	N/A	5295	6251	N/A	N/A	10322	11866
6	N/A	N/A	5663	6619	N/A	N/A	11370	12914
7	N/A	N/A	N/A	6987	N/A	N/A	N/A	13962
8	N/A	N/A	N/A	7355	N/A	N/A	N/A	15010

Number of I/O Drawers (7040-61D)	1.3 GHz 4-way Modules (minimum power consumption, in watts)		1.3 GHz 4-way Modules (maximum power consumption, in watts)	
	8-way	16-way	8-way	16-way
1	3213	5471	4932	8366
2	3581	5839	5980	9414
3	3949	6207	7028	10462
4	4317	6575	8076	11510
5	N/A	6943	N/A	12558
6	N/A	7311	N/A	13606
7	N/A	7679	N/A	14654
8	N/A	8047	N/A	15702

Number of I/O Drawers (7040-61D)	1.3 GHz 8-way Modules (minimum power consumption, in watts)				1.3 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
1	2084	3213	4342	5471	3215	4932	6649	8366
2	2452	3581	4710	5839	4263	5980	7697	9414
3	N/A	3949	5078	6207	N/A	7028	8745	10462
4	N/A	4317	5446	6575	N/A	8076	9793	11510
5	N/A	N/A	5814	6943	N/A	N/A	10841	12558
6	N/A	N/A	6182	7311	N/A	N/A	11889	13606
7	N/A	N/A	N/A	7679	N/A	N/A	N/A	14654
8	N/A	N/A	N/A	8047	N/A	N/A	N/A	15702

Number of I/O Drawers (7040-61D)	1.5 GHz 4-way Modules (minimum power consumption, in watts)				1.5 GHz 4-way Modules (maximum power consumption, in watts)			
	4-way	8-way	12-way	16-way	4-way	8-way	12-way	16-way
1	1714	2473	3232	4946	2931	4364	5797	7230
2	2082	2841	3600	5314	3979	5412	6845	8278
3	N/A	3209	3968	5682	N/A	6460	7893	9326
4	N/A	3577	4336	6050	N/A	7508	8941	10374
5	N/A	N/A	4704	6418	N/A	N/A	9989	11422
6	N/A	N/A	5072	6786	N/A	N/A	11037	12470
7	N/A	N/A	N/A	7154	N/A	N/A	N/A	13518
8	N/A	N/A	N/A	7522	N/A	N/A	N/A	14566

Number of I/O Drawers (7040-61D)	1.5 GHz 8-way Modules (minimum power consumption, in watts)				1.5 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
1	1839	2723	3607	4491	3056	4614	6172	7730
2	2207	3091	3975	4859	4104	5662	7220	8778
3	N/A	3459	4343	5227	N/A	6710	8268	9826
4	N/A	3827	4711	5595	N/A	7758	9316	10874
5	N/A	N/A	5079	5963	N/A	N/A	10364	11922
6	N/A	N/A	5447	6331	N/A	N/A	11412	12970
7	N/A	N/A	N/A	6699	N/A	N/A	N/A	14018
8	N/A	N/A	N/A	7067	N/A	N/A	N/A	15066

Number of I/O Drawers (7040-61D)	1.7 GHz 8-way Modules (minimum power consumption, in watts)				1.7 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
1	2017	3079	4141	5203	3234	4970	6706	8442
2	2385	3447	4509	5571	4282	6018	7754	9490
3	N/A	3815	4877	5939	N/A	7066	8802	10538
4	N/A	4183	5245	6307	N/A	8114	9850	11586

Number of I/O Drawers (7040-61D)	1.7 GHz 8-way Modules (minimum power consumption, in watts)				1.7 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
5	N/A	N/A	5613	6675	N/A	N/A	10898	12634
6	N/A	N/A	5981	7043	N/A	N/A	11946	13682
7	N/A	N/A	N/A	7411	N/A	N/A	N/A	14730
8	N/A	N/A	N/A	7779	N/A	N/A	N/A	15778

Number of I/O Drawers (7040-61D)	1.9 GHz 8-way Modules (minimum power consumption, in watts)				1.9 GHz 8-way Modules (maximum power consumption, in watts)			
	8-way	16-way	24-way	32-way	8-way	16-way	24-way	32-way
1	2805	4055	5305	6555	4022	5946	7870	9794
2	3173	4423	5673	6923	5070	6994	8918	10842
3	N/A	4791	6041	7291	N/A	8042	9966	11890
4	N/A	5159	6409	7659	N/A	9090	11014	12938
5	N/A	N/A	6777	8027	N/A	N/A	12062	13986
6	N/A	N/A	7145	8395	N/A	N/A	13110	15034
7	N/A	N/A	N/A	8763	N/A	N/A	N/A	16082
8	N/A	N/A	N/A	9131	N/A	N/A	N/A	17130

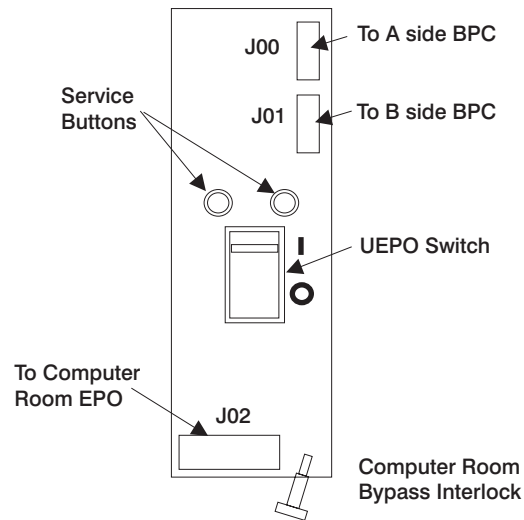
### Wattage Addition/Subtraction for Minimum and Maximum Configurations

To determine the typical power consumption for a specific configuration, use the following typical power values:

- 4GB memory card - 137 Watts
- 8GB memory card - 151 Watts
- 16GB memory card - 235 Watts
- 32GB memory card - 294 Watts
- 64GB memory card - 337 Watts
- Each PCI card - 20 Watts Each
- DASD - 20 Watts

## Unit Emergency Power Off

The server has a unit emergency power off (UEPO) switch on the front of the first frame (A Frame). Refer to the following illustration, which shows a simplified UEPO panel.



When the switch is tripped, the utility power is confined to the system power compartment. All volatile data will be lost.

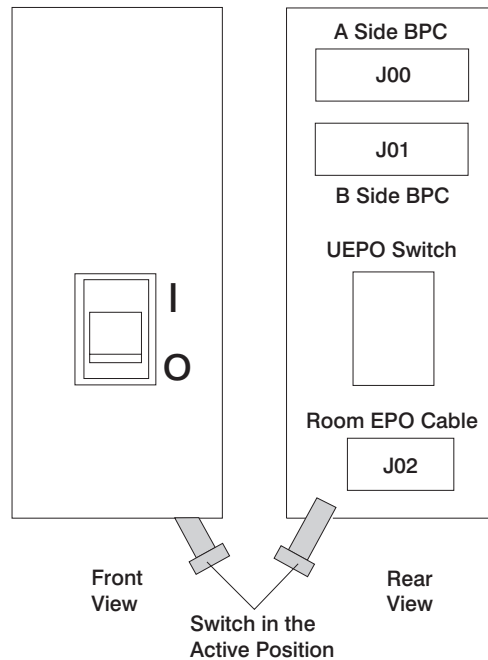
It is possible to attach the computer room emergency power off (EPO) system to the system UEPO. When this is done, tripping the computer room EPO disconnects all power from the line cords and the internal battery backup unit, if it is provided. All volatile data will be lost in this case also.

If the room EPO is not connected to the UEPO, tripping the computer room EPO removes ac power from the system. If the interlock bypass feature is used, the system remains powered for a short time based on system configuration.

## Computer Room Emergency Power Off (EPO)

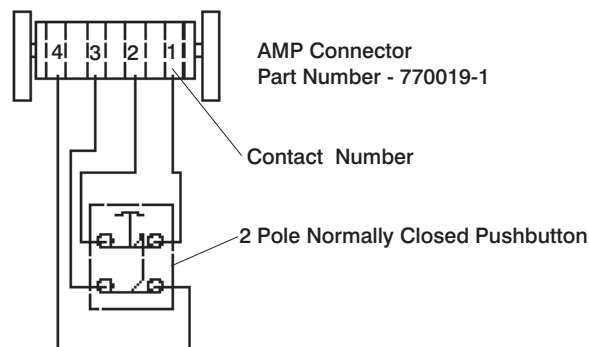
When the integrated battery feature (IBF) is installed and the room EPO is tripped, the batteries will engage and the computer will continue to run. It is possible to attach the computer room EPO system to the machine EPO. When this is done, tripping the room EPO will disconnect all power from the line cords and the internal battery backup unit. In this event all volatile data will be lost.

To incorporate the IBF into the room Emergency Power Off systems (EPO), a cable must be made to connect to the back of the system EPO panel. The following diagrams illustrate how this connection is made.



The preceding figure illustrates the back of the machine UEPO panel with the room EPO cable plugging into the machine. Notice the switch actuator. After it is moved to make the cable connection possible, the room EPO cable must be installed for the machine to power on.

In the following figure, an AMP connector 770019-1 is needed to connect to the system EPO panel. For room EPO cables using wire sizes #20 AWG to #24 AWG use AMP pins part number 770010-4. This connection should not exceed 5 Ohms, which is approximately 200 ft.(61 m) of #24 AWG.



## Battery Holdup Times

The following tables illustrate typical machine holdup time vs load in minutes for fresh and aged batteries. All times listed are in minutes. Machine load is listed in total AC input power (power for both line cords combined). A fresh battery is defined as 2.5 years old or less, while an aged battery as 6.5 years old.

Capacity will gradually decay from fresh battery value to the aged battery value, with the amount of decay shown being worst case. The system will diagnose a "failed battery" if the capacity falls below the aged battery level.

Typical Machine Holdup Time vs. Load in Minutes (Fresh Battery)														
Machine Load	3 kW		6 kW		9 kW		12 kW		15 kW		18 kW		19.5 kW	
IBF Configuration	N	R	N	R	N	R	N	R	N	R	N	R	N	R
1 BPR	7.0	21	2.1	7.0										
2 BPR	21	50	7.0	21	4.0	11	2.1	7.0						
3 BPR	32	68	12	32	7.0	21	4.9	12	3.2	9.5	2.1	7.0	1.7	6.5
N = non-redundant, R = redundant														

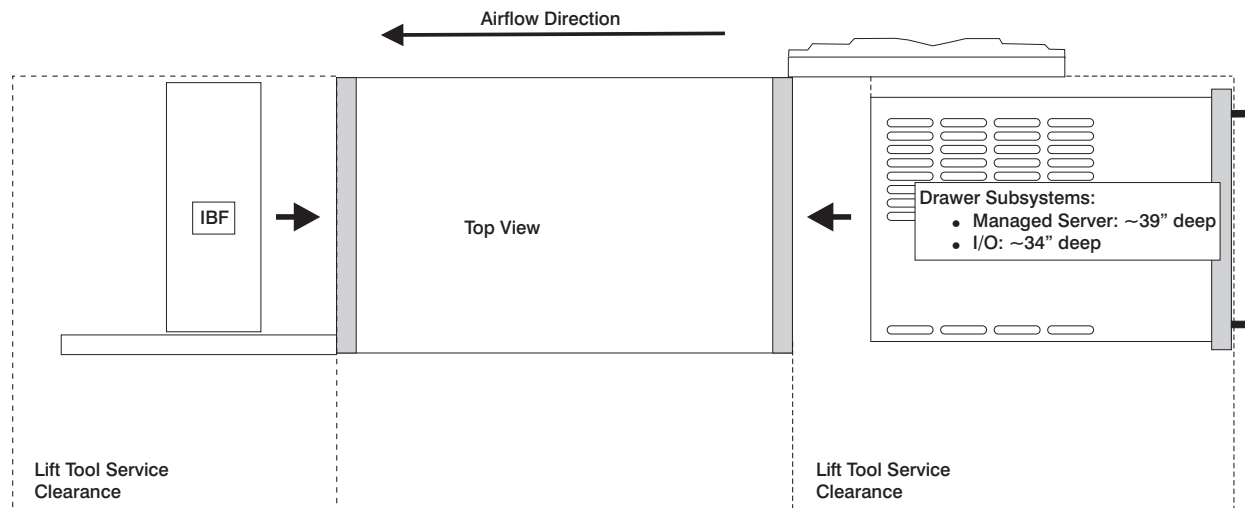
Typical Machine Holdup Time vs. Load in Minutes (Aged Battery)														
Machine Load	3 kW		6 kW		9 kW		12 kW		15 kW		18 kW		19.5 kW	
IBF Configuration	N	R	N	R	N	R	N	R	N	R	N	R	N	R
1 BPR	4.2	12.6	1.3	4.2										
2 BPR	12.6	30	4.2	12.6	2.4	6.6	1.3	4.2						
3 BPR	19.2	41	7.2	19.2	4.2	12.6	2.9	7.2	1.9	5.7	1.3	4.2	1.0	3.9
N = non-redundant, R = redundant														



## Guide for Raised-Floor Preparation

A raised floor is not required for the @server pSeries 690 (except in Canada). However, it is recommended for optimum system cooling and cable management. Raised floor cutouts should be protected by electrically nonconductive molding, appropriately sized, with edges treated to prevent cable damage and to prevent casters from rolling into the floor cutouts.

Front-service access is necessary on the @server pSeries 690 to accommodate a lift tool for the servicing of large drawers (the managed server, IO drawer, and media subsystems). Front and rear service access is necessary to accommodate the lift tool for servicing of the optional integrated battery feature (IBF).



Floor Plan Considerations for Single Units

## Cutting and Placement of Floor Panels

This section provides recommendations for making the necessary openings in the raised floor for installing the @server pSeries 690.

**Note:** The following illustration is intended only to show relative positions and accurate dimensions of floor cutouts. The illustration is not intended to be a machine template and is not drawn to scale.

The x-y alphanumeric grid positions are used to identify relative positions of cutout floor panels that may be cut in advance.

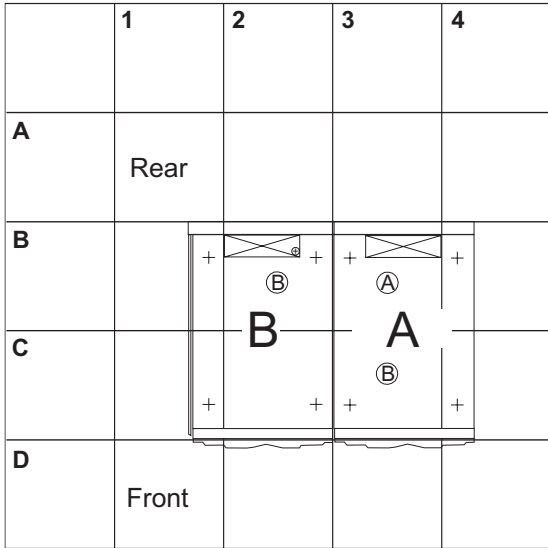
1. Determine whether the system you will be installing has one or two frames.
2. Measure the panel size of the raised floor.
3. Verify the floor panel size. The floor panel size illustrated is 600 mm (23.6 in.) and 610 mm (24 in.) panels.
4. Ensure adequate floor space is available to place the frames over the floor panels exactly as shown in the illustration. Refer to "Considerations for Multiple System Installations" on page 193 for front-to-back and side-to-side clearances. Use the plan view if necessary. Consider all obstructions above and below the floor.
5. Identify the panels needed, and list the total quantity of each panel required for the installation.
6. Cut the required quantity of panels. When cutting the panels, you must adjust the size of the cut for the thickness of the edge molding you are using. The dimensions shown in the illustrations are finished dimensions. For ease of installation, number each panel as it is cut, as shown in the following illustrations.

**Note:** Depending on the panel type, additional panel support (pedestals) may be required to restore structural integrity of the panel. Consult the panel manufacturer to insure that the panel can sustain a concentrated load of 900 lbs. For multiple frame installation it is possible that two casters will produce concentrated loads as high as 1800 lbs.

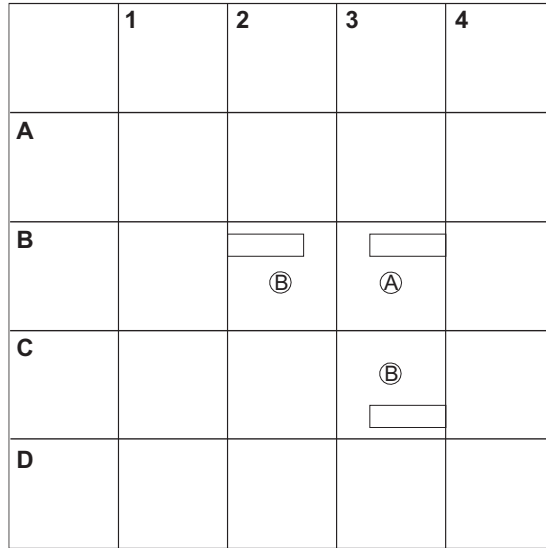
7. Use the raised floor diagram on the next page to install the panels in the proper positions.

**Note:** Panel cutout sizes are optimized for parallel-channel external cables.

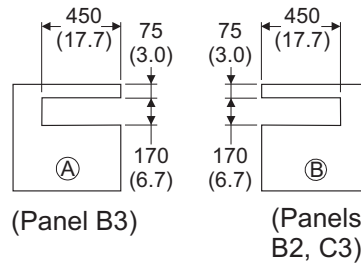
**Rack Placement**



**Panel Cutout Dimensions**



Rack Entry/Exit	Dimension	
	(mm)	(in)
Front	117 x 403	4.6 x 15.9
Rear	117 x 403	4.6 x 15.9



**Raised Floor with 610-mm (24-inch) Floor Panels**

## Securing the Rack

The following can be ordered by the customer as additional rack securing options for the @server pSeries 690.

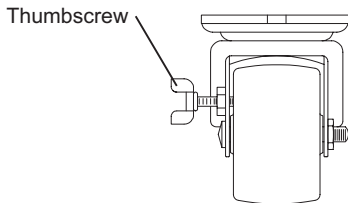
- RPQ 8A1183 for attaching the rack-mounting plates to the concrete floor (non-raised floor)
- RPQ 8A1185 to attach the rack to a concrete floor when on a raised floor (9 1/2 inches to 11 3/4 inches high)
- RPQ 8A1186 to attach the rack to a concrete floor when on a raised floor (11 3/4 inches to 16 inches high)

### Positioning the Rack:

**Note:** The customer should unpack the rack and position it in the room. If this has not been done, consult the customer and the marketing representative as necessary.

To unpack and position the rack, do the following:

1. Remove all packing and tape from the rack.
2. Position the rack according to the customer floor plan.
3. Lock each caster wheel by tightening the thumbscrew on the caster.



**Installing the Frame Kit:** The following tables show the parts required for each of the tie-down kits (a non-raised floor, short-raised floor, and a long-raised floor).

### Rack Tie-Down Kits:

11P4759 Frame tie-down Kit (Non-Raised Floor) (RPQ 8A1183)			
Item	Part Number	Qty	Description
Item 3 in illustration on page 187.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 187.	11P3529	4	Hinge plate
Item 8 in illustration on page 187.	11P3530	2	Latch plate
Item 6 in illustration on page 187.	11P3531	2	EQ support
Item 2 in illustration on page 187.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 187.	76X4687	2	Latch bolt
Item 1 in illustration on page 187.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 187.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 187.	1622307	8	Washer (M8, hinge)
Item 1 in illustration on page 188.	11P3528	2	Plate lock-down
Item 2 in illustration on page 188.	05N6345	4	Spacer
Item 4 in illustration on page 188.	05N6344	4	Bushing
Item 5 in illustration on page 188.	21L4309	4	Washer
Item 3 in illustration on page 188.	0130985	4	Washer
Item 6 in illustration on page 188.	05N6346	4	Bolt

11P4757 Frame tie-down Kit (Short - Raised Floor) (RPQ 8A1185)			
Item	Part Number	Qty	Description
Illustration on page 192.	44P0673	4	Turnbuckle Assembly (short)
Item 3 in illustration on page 187.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 187.	11P3529	4	Hinge plate
Item 8 in illustration on page 187.	11P3530	2	Latch plate
Item 6 in illustration on page 187.	11P3531	2	EQ support
Item 2 in illustration on page 187.	11P3532	2	Shipping bar (upper)
Item 7 in illustration on page 187.	76X4687	2	Latch bolt
Item 1 in illustration on page 187.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 187.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 187.	1622307	8	Washer (M-8, hinge)

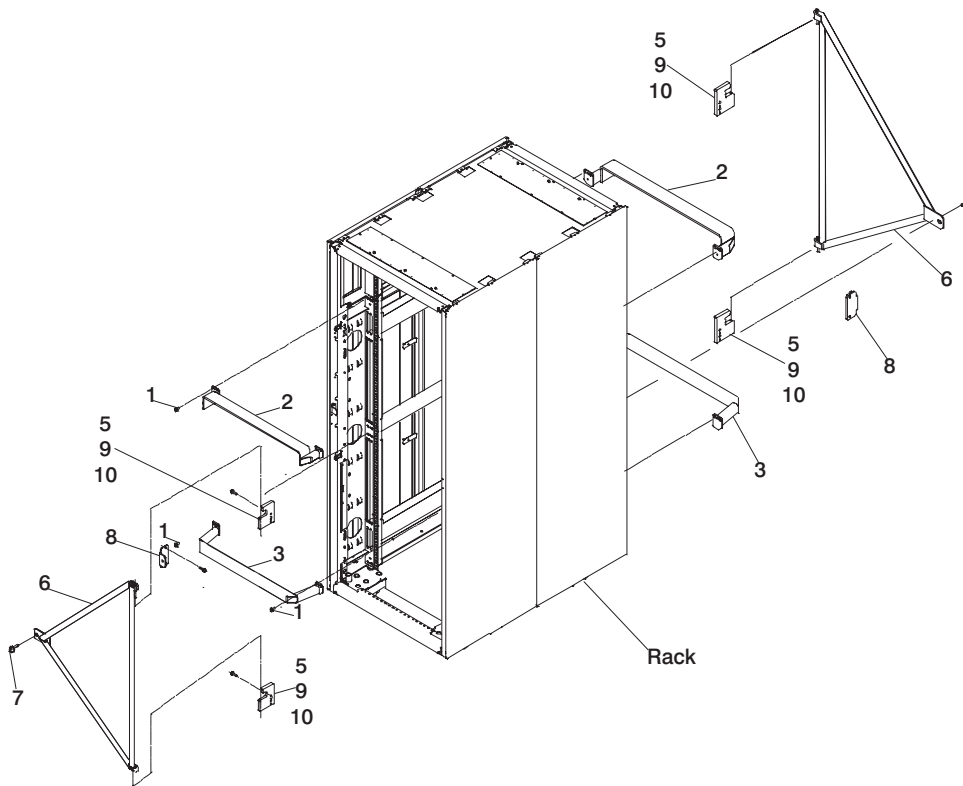
11P4758 Frame tie-down Kit (Long - Raised Floor) (RPQ 8A1186)			
Item	Part Number	Qty	Description
Illustration on page 192.	44P0674	4	Turnbuckle Assembly (long)
Item 3 in illustration on page 187.	11P3527	2	Shipping bar (lower)
Item 5 in illustration on page 187.	11P3529	4	Hinge plate
Item 8 in illustration on page 187.	11P3530	2	Latch plate
Item 6 in illustration on page 187.	11P3531	2	EQ support
Item 2 in illustration on page 187.	11P3532	2	Shipping bar (upper)
Item 7 in illustration 187.	76X4687	2	Latch bolt
Item 1 in illustration on page 187.	1624804	20	Screw (hex flange, 20mm, long)
Item 9 in illustration on page 187.	1621546	8	Screw (hex, 25mm, long, hinge)
Item 10 in illustration on page 187.	1622307	8	Washer (M8, hinge)

*Mounting Internal Rack Components:* To mount the internal rack components, do the following:

**Attention:** This procedure is performed by the service representative.

- Using four M-8 (20 mm) screws (item 1 in illustration on page 187), install the top shipping bar (item 2 in illustration on page 187) at EIA unit location 32.

2. Using four M-8 screws (item 1 in illustration on page 187), install the bottom shipping bar (item 3 in illustration on page 187) at EIA unit location 18.
3. Repeat steps 1 and 2 to install shipping bars in the rear of the rack.
4. Attach the front top hinge (item 5 in illustration on page 187) on the vertical rail (located approximately at EIA unit 29-30 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 187) and two washers (item 10 in illustration on page 187).
5. Attach the front bottom hinge (item 5 in illustration on page 187) on the vertical rail (located approximately on EIA unit 6-7 on the vertical rail) with two 25 mm screws (item 9 in illustration on page 187) and two washers (item 10 in illustration on page 187).
6. Repeat steps 4 and 5 to install the hinges on the rear rail.
7. Attach the latch plate (item 8 in illustration on page 187) with two M-8 (20 mm) screws (item 1 in illustration on page 187).
8. Repeat step 7 to attach the latch plate in the rear of the rack.
9. Attach the triangular braces (item 6 in illustration on page 187) in both the front and rear of the rack.
10. Install the latch bolts (item 7 in illustration on page 187).



*Determine Your Next Step:* Use the following to determine your next step:

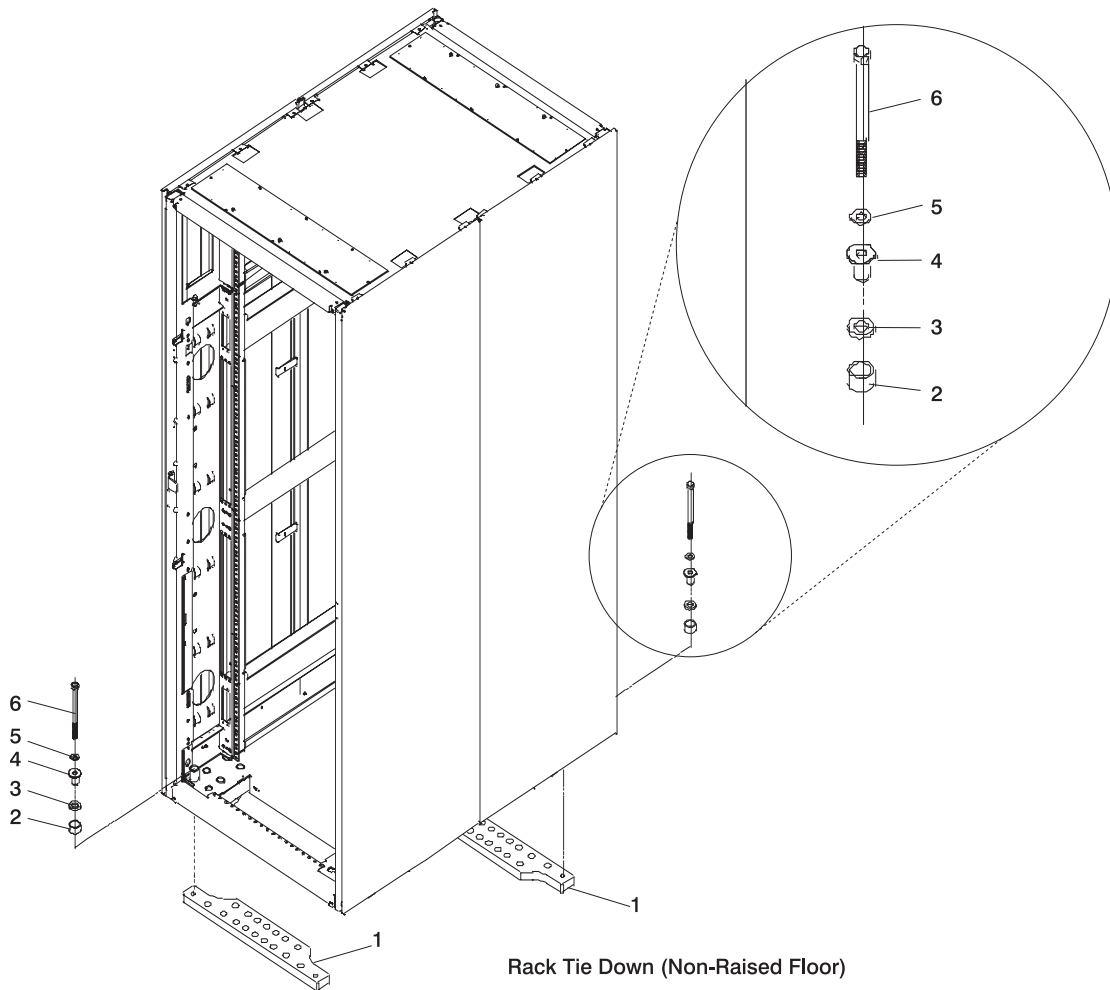
- If the rack is being attached to a concrete (non-raised) floor, proceed to “Attach the Rack to a Concrete (Non-Raised) Floor” on page 188.
- If the rack is being attached to a raised floor, proceed to “Attaching the Rack to a Short or Long Raised Floor” on page 190.

**Attach the Rack to a Concrete (Non-Raised) Floor:** Use this procedure to attach the rack to a concrete (non-raised) floor.

**Attention:** It is the customer's responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

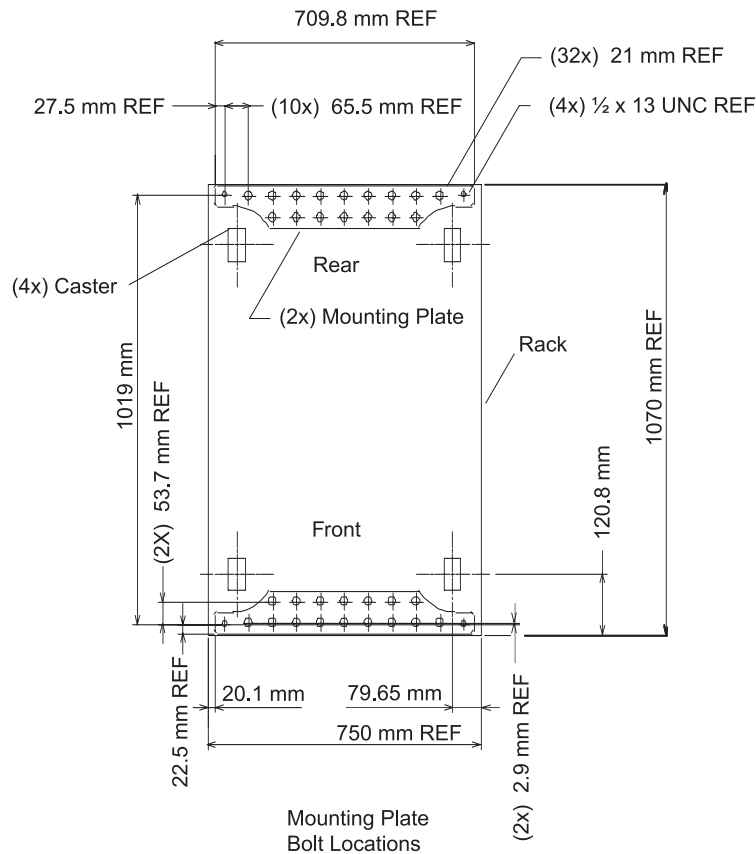
**Note:** The customer should obtain the service of a qualified structural engineer to determine appropriate anchoring of the mounting plates. A minimum of three anchor bolts for each mounting plate must be used to secure the plates to the concrete floor. Because some of the drilled holes may be aligned with concrete reinforcement rods below the surface of the concrete floor, additional holes must be drilled. Each mounting plate must have at least three usable holes, two that are on opposite sides and opposite ends of each other, and one hole at the center. The mounting plates should be able to withstand 2500 pounds pulling force on each end.

1. Be sure the rack is in the correct location.



2. Place the mounting plates (item 1 in illustration on page 188), front and rear, in the approximate mounting position under the system rack.
3. To align the mounting plates to the system rack, do the following:
  - a. Place the four rack-mounting bolts (item 6 in illustration on page 188) through the plate assembly holes at the bottom of the rack. Install the bushings and washers (item 4 and 5 in illustration on page 188) to ensure bolt positioning.
  - b. Position the mounting plates (item 1 in illustration on page 188) under the four rack-mounting bolts (item 6 in illustration on page 188) so that the mounting bolts are centered directly over the tapped holes.

- c. Turn the rack-mounting bolts (item 6 in illustration on page 188) three or four rotations into the tapped holes.
4. Mark the floor around the edge of the mounting plates, as shown in the following illustration:



5. Remove the mounting bolts from the threaded holes.
6. Move the rack away from the mounting plates.
7. Mark the floor at the center of each hole in the mounting plate (including tapped holes).
8. Remove the mounting plates from the marked locations.
9. At the marked location of the tapped mounting holes, drill two holes approximately 1 inch to allow clearance for the ends of the two rack-mounting bolts. The ends of the rack-mounting bolts may protrude past the thickness of the mounting plate. Drill one hole in each group of anchor bolt location marks as indicated on the marked floor.
10. Using at least three bolts for each mounting plate, mount the mounting plates to the concrete floor.

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Reposition the system rack over the mounting plates.
2. Place the four rack-mounting bolts through the plate assemblies with the D-washer positioned so that the straight side of the washer is facing inward toward the system rack.
3. Place the isolator bushing (item 4 in illustration on page 188) inside the leveling foot with a washer between the isolator bushing and the floor plate.
4. Turn the rack-mounting bolts three or four rotations into the tapped holes.
5. Turn the leveling foot of the plate assembly down until it contacts the mounting plate, and then level the rack using the four leveling feet.
6. Lock the leveling feet by tightening the lock nut.
7. Tighten the four rack-mounting bolts into the mounting plates.

### ***Attaching the Rack to a Short or Long Raised Floor:***

**Attention:** It is the customer's responsibility to ensure the following steps are completed before the service representative performs the tie-down procedure.

**Note:** To accommodate a floor with a depth of more than 16 inches, a steel beam or a steel channel adapter for mounting the subfloor eyebolts are required. The customer must supply the floor eyebolts.

Consider the following when preparing the floor for tie-down:

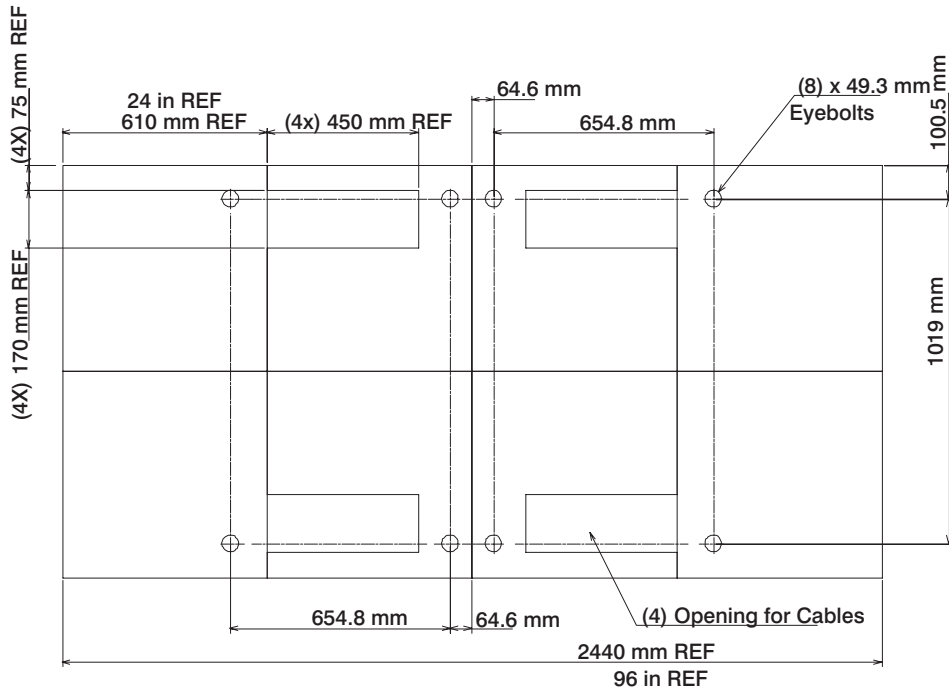
- The hardware is designed to support a frame weighing no more than 2636 pounds.
- The estimated maximum concentrated load on one caster for a 2636 pound-system is 900 pounds. For a multiple system installation, it is possible that one floor tile will bear a total concentrated load of 1800 pounds.

To install the eyebolts do the following:

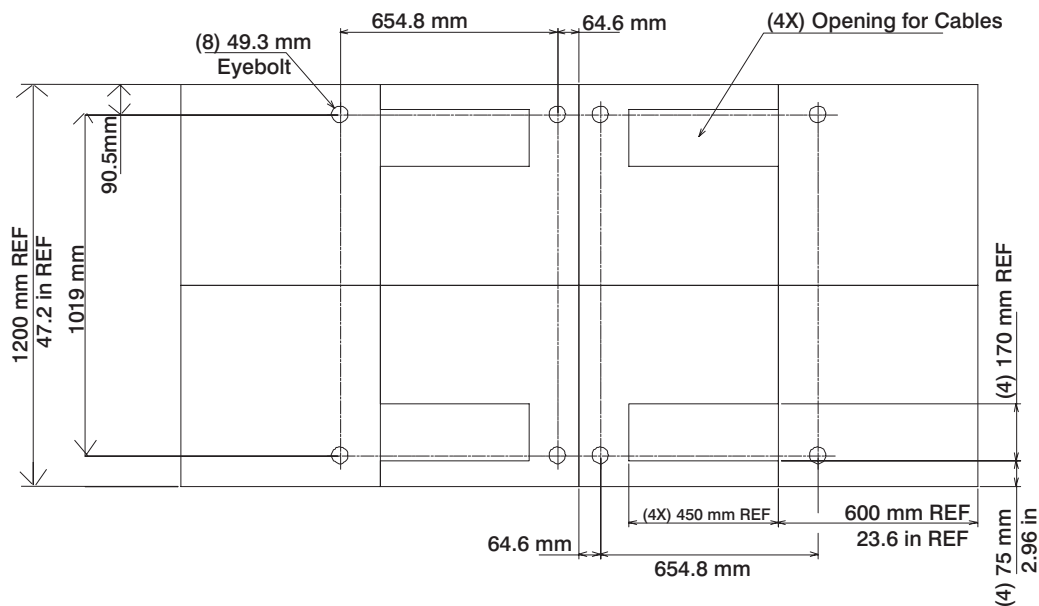
1. Obtain the service of a qualified structural engineer to determine appropriate installation of the eyebolts.
2. Consider the following before installing the eyebolts:
  - Floor eyebolts must be securely anchored to the concrete floor.
  - The minimum height of the center of the internal diameter is 1 inch above the concrete floor surface.
  - The maximum is height 2.5 inches above the concrete floor surface. Higher than 2.5 inches can cause excessive lateral deflection to the tie-down hardware.
  - The eyebolt's internal diameter should be 1 3/16 inch, and each eyebolt should be able to withstand 2700 pounds. The customer should obtain the service of a qualified consultant or structural engineer to determine the appropriate anchoring method for these eyebolts and to ensure that the raised floor can support the floor-loading specifications.



3. Plan for installing four eyebolts positioned to match the dimensions given in the following illustrations.



24 Inch Floor Tile Layout



600 mm (23.6 Inch Floor) Tile Layout

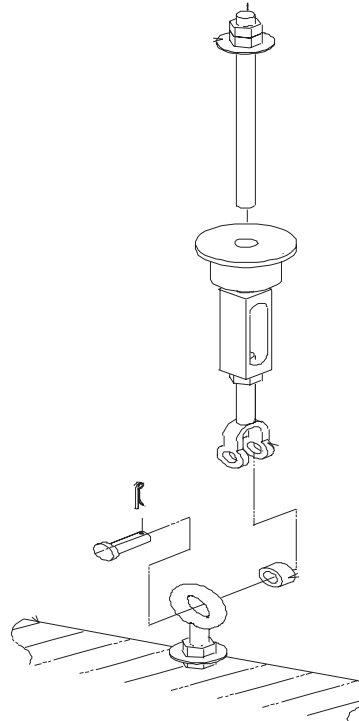
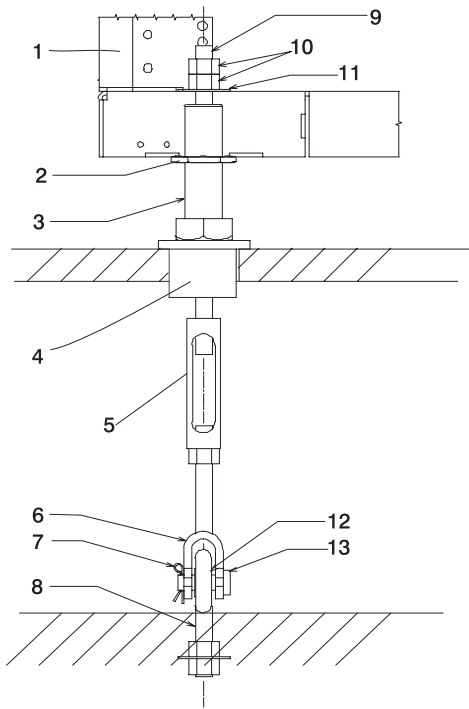
4. Install the eyebolts to the floor.

To install the frame, do the following:

**Attention:** It is the service representative's responsibility to complete the following steps.

1. Before starting the installation, check all cable openings in the floor panel and location of the rubber bushing holes so that they match the dimensions given in the illustrations on 191 and 191.
2. Power off the system and make sure all cables and connectors are disconnected and are not dangling around the frame. The frame should be free to roll.

3. The floor eyebolts should be already secured to the concrete floor. Verify the height of the center of the floor eyebolt to the concrete floor or the steel beam/channel adapter mounted to the concrete floor. Ensure that the turnbuckles can accommodate the total height of the raised floor.
4. Remove the floor tiles around the area where the frame(s) will be installed.
5. Remove the pin and the spacer from the lower jaw (see the following illustrations).



1	Frame	8	Floor Eyebolt (customer-supplied)
2	Jam Nut	9	Threaded Rod
3	Rack Leveler	10	Nut
4	Rubber Bushing	11	Washer
5	Turnbuckle (Short or Long)	12	Spacer
6	Lower Jaw	13	Shaft
7	Pin		

**Note:** The difference between the two turnbuckle assemblies is the length of the turnbuckle.

The Short Turnbuckle Assembly (part number 11P4755) is used for a 9 1/2 inches to 11 3/4 inches raised floor.

The Long Turnbuckle Assembly (part number 11P4756) is used for an 11 3/4 inches to 16 inches raised floor.

6. Place the spacer inside the floor eyebolt and place the floor eyebolt between the lower jaw. Reinstall the shaft, pin, and spacer.
7. Remove the threaded rod and rubber bushing from the turnbuckle assembly.
8. Install the floor tile that has the rubber bushing holes that are aligned with the eyebolt locations.
9. Install the rubber bushings in the floor tiles.
10. Move the frame so that the frame leveler is located over the rubber bushings.

**Attention:** To avoid a tipping hazard, make sure that the frame casters do not roll into the cable opening.

11. Turn the leveling foot of the plate assembly down until it contacts the bushing, and then level the rack using the four leveling feet by tightening the lock nuts.
12. Lock the leveling feet by tightening the lock nut.
13. Insert the threaded rod into the inner hole of the leveler and the rubber bushing.
14. Thread down the threaded rod until the tip of the rod is approximately 1 inch inside the turnbuckle.
15. Insert the nuts and hand-tighten the nuts.
16. Repeat the previous three steps so that all assemblies are completely installed, as shown in the previous illustration.
17. Tighten all the nuts to 40 ft-pounds.

The frame is now secured.

## Considerations for Multiple System Installations

In a multi-frame installation, it is possible that a floor tile with cable cutouts (refer to “Cutting and Placement of Floor Panels” on page 183) will bear two concentrated static loads up to 900 lbs (per caster/leveler). Thus, the total concentrated load can be as high as 1800 lbs. Contact the floor tile manufacturer or consult a structural engineer to ensure that the raised floor assembly can support this load.

When you are integrating an @server pSeries 690 into an existing multiple-system environment, or when adding additional systems to an installed @server pSeries 690, consider the following factors:

- Minimum aisle width

For multiple rows of systems containing one or more @server pSeries 690, the minimum aisle width in the front of the system is 1041 mm (41 in.) and 838 mm (33 in.) in the rear of the system to allow room to perform service operations. The minimum aisle width is in addition to the front and rear service clearances of 1143 mm (45 in.) and 914 mm (36 in.) respectively. Service clearances are measured from the edges of the frame (with doors open) to the nearest obstacle.

- Thermal interactions

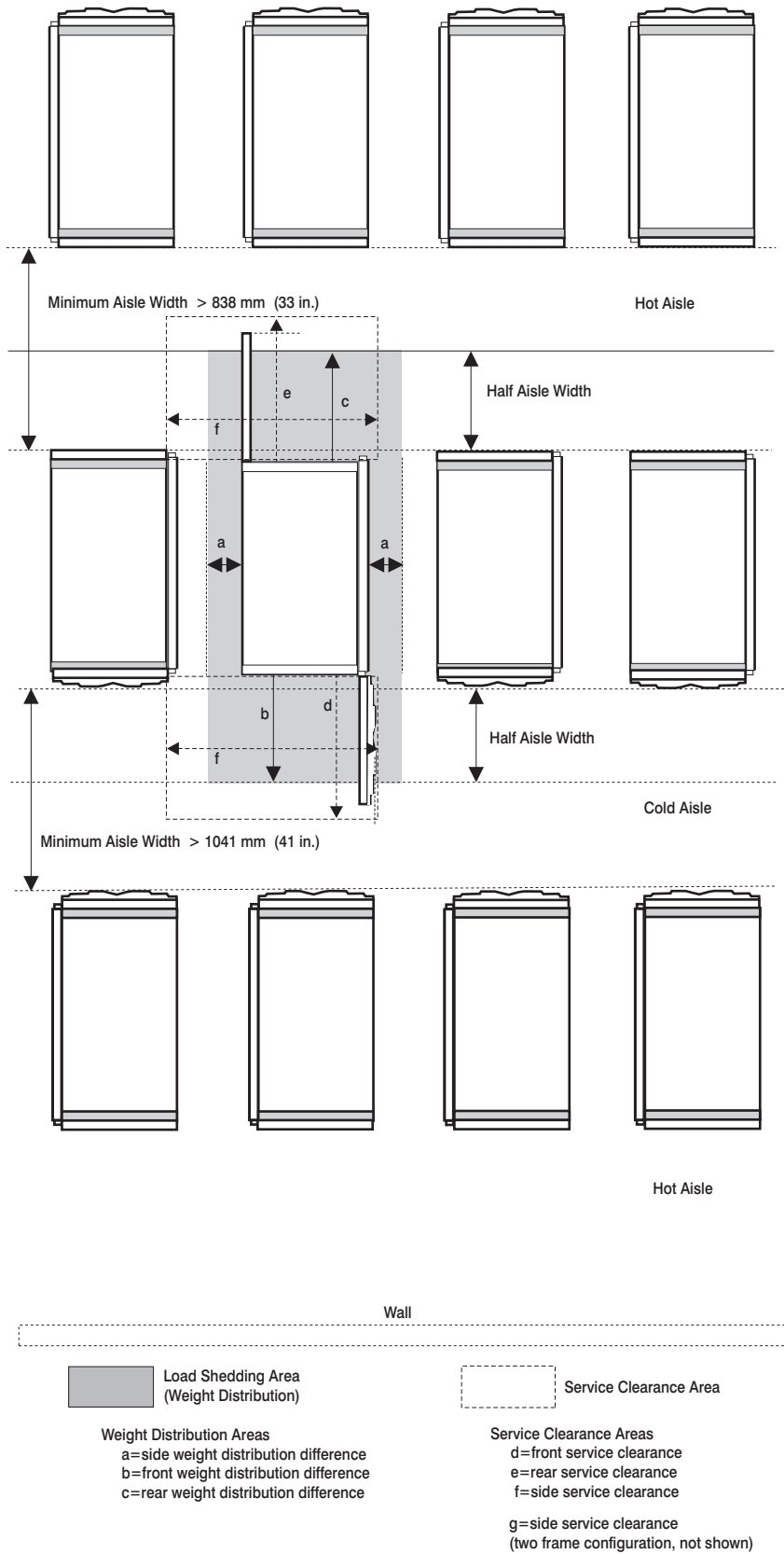
The minimum aisle width between rows on the computer room floor is 33 or 41 inches for optimal cooling. Aisle width is independent of which door or cover set is used. In addition, systems should be faced front-to-front and rear-to-rear to create “cool” and “hot” aisles to maintain effective system thermal conditions, as shown in the following illustration.

Cool aisles need to be of sufficient width to support the airflow requirements of the installed systems as indicated in Cooling Requirements on Page 90. The airflow per tile will be dependent on the underfloor pressure and perforations in the tile. A typical underfloor pressure of 0.025” of water will supply 300-400 cfm through a 25% open 2’x2’ floor tile.

- Floor loading

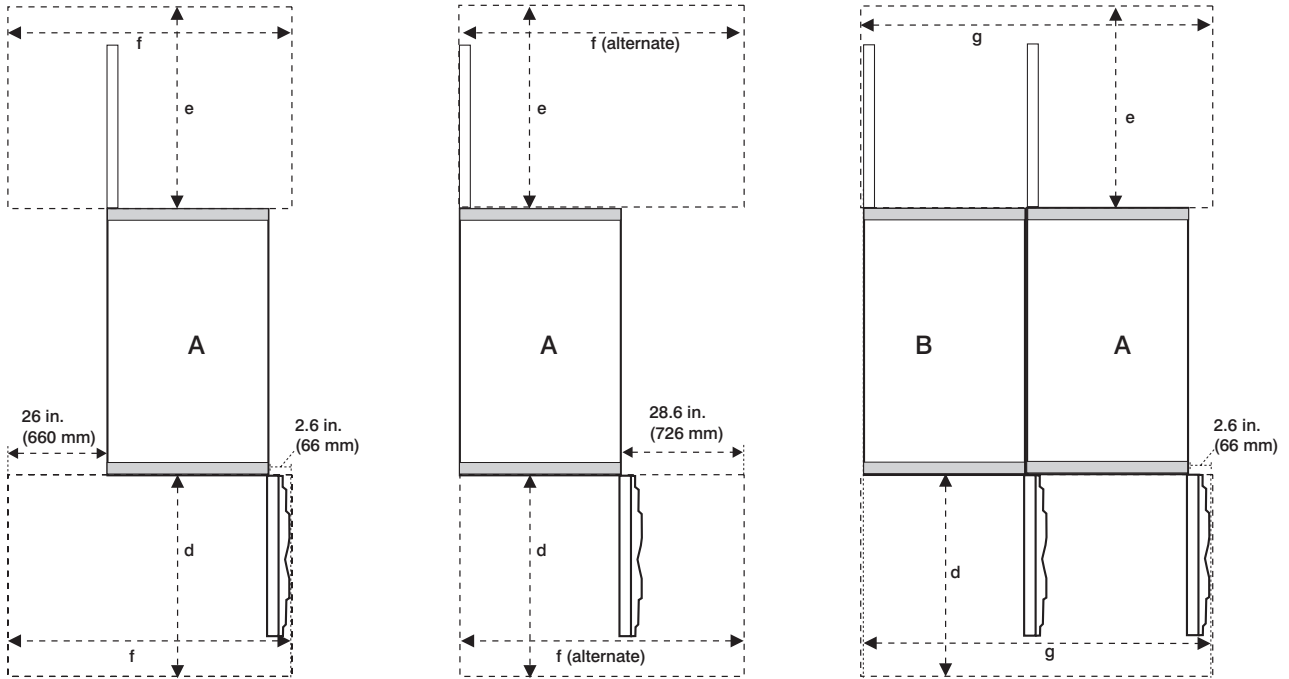
The system can induce a concentrated load of 900 lbs per caster. It is possible that a panel structure has to sustain a total load as high as 1800 lbs. Consult the panel manufacturer and obtain the services of a qualified consultant or structural engineer to insure the concrete floor and the structure panel can support these loads.

## Proposed Floor Layout for Multiple Systems



## Service Clearance

The minimum service clearance for single-frame and double-frame systems with thin doors is shown in the following illustration.



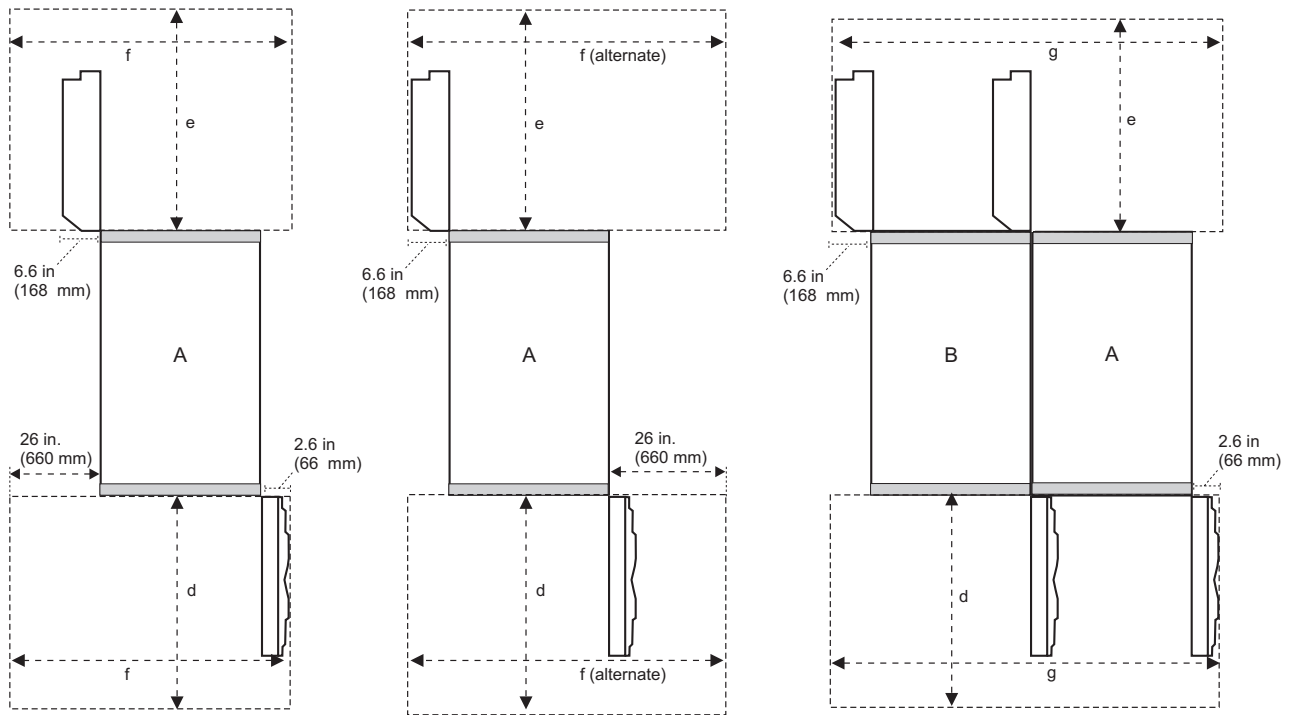
Single-Frame System  
with Slimline Doors

Single-Frame System  
with Slimline Doors  
(with alternative right-side  
service clearance)

Double-Frame System  
with Slimline Doors

d=1143 mm (45.0 in.)  
 e=914 mm (36.0 in.)  
 f=1511 mm (59.5 in.)  
 f (alternate)=1577 mm (62.1 in.)  
 g=1640 mm (64.6 in.)

The minimum service clearance for single-frame and double-frame systems with acoustical doors is shown in the following illustration.



Single-Frame System with Acoustical Doors

Single-Frame System with Acoustical Doors (alternative right-side service clearance)

Double-Frame System with Acoustical Doors

d=1143 mm (45.0 in.)  
 e=914 mm (36.0 in.)  
 f=1511 mm (59.5 in.)  
 f (alternate)=1765 mm (69.5 in.)  
 G=1808 mm (71.2 in.)

Refer to the illustration in “Guide for Raised-Floor Preparation” on page 183 for service clearances shown in a raised-floor installation.

## Cooling Requirements

The @server pSeries 690 requires air for cooling. As shown in "Proposed Floor Layout for Multiple Systems" on page 194, rows of @server pSeries 690 systems must face front-to-front. The use of a raised floor is recommended to provide air through perforated floor panels placed in rows between the fronts of systems (the cold aisles shown in the figure on page 194).

**Note:** Do not place perforated tiles in the hot aisles. Heated exhaust air must exit the computer room through the ceiling air-return system.

The following table provides system cooling requirements based on system configuration. The letter designations in the table correspond to the letter designations in the graph shown in "Cooling Requirements Graph" on page 199.

Number of I/O Drawers (7040-61D)	1.1 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
1	A	B	B	C
2	B	B	C	C
3	N/A	C	C	D
4	N/A	C	D	E
5	N/A	N/A	D	E
6	N/A	N/A	D	E
7	N/A	N/A	N/A	E
8	N/A	N/A	N/A	F

Number of I/O Drawers (7040-61D)	1.3 GHz 4-way Modules (Cooling Chart Reference)	
	8-way	16-way
1	B	C
2	B	D
3	C	D
4	C	D
5	N/A	E
6	N/A	E
7	N/A	F
8	N/A	F

Number of I/O Drawers (7040-61D)	1.3 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
1	A	B	C	C
2	B	B	C	D
3	N/A	C	C	D
4	N/A	C	D	D
5	N/A	N/A	D	E
6	N/A	N/A	D	E
7	N/A	N/A	N/A	F
8	N/A	N/A	N/A	F

Number of I/O Drawers (7040-61D)	1.5 GHz 4-way Modules (Cooling Chart Reference)			
	4-way	8-way	12-way	16-way
1	A	B	B	C
2	A	B	C	C
3	N/A	B	C	D
4	N/A	C	C	D
5	N/A	N/A	D	D
6	N/A	N/A	D	E
7	N/A	N/A	N/A	E
8	N/A	N/A	N/A	F

Number of I/O Drawers (7040-61D)	1.5 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
1	A	B	B	C
2	B	B	C	C
3	N/A	C	C	D
4	N/A	C	D	D
5	N/A	N/A	D	E
6	N/A	N/A	D	E
7	N/A	N/A	N/A	F
8	N/A	N/A	N/A	F

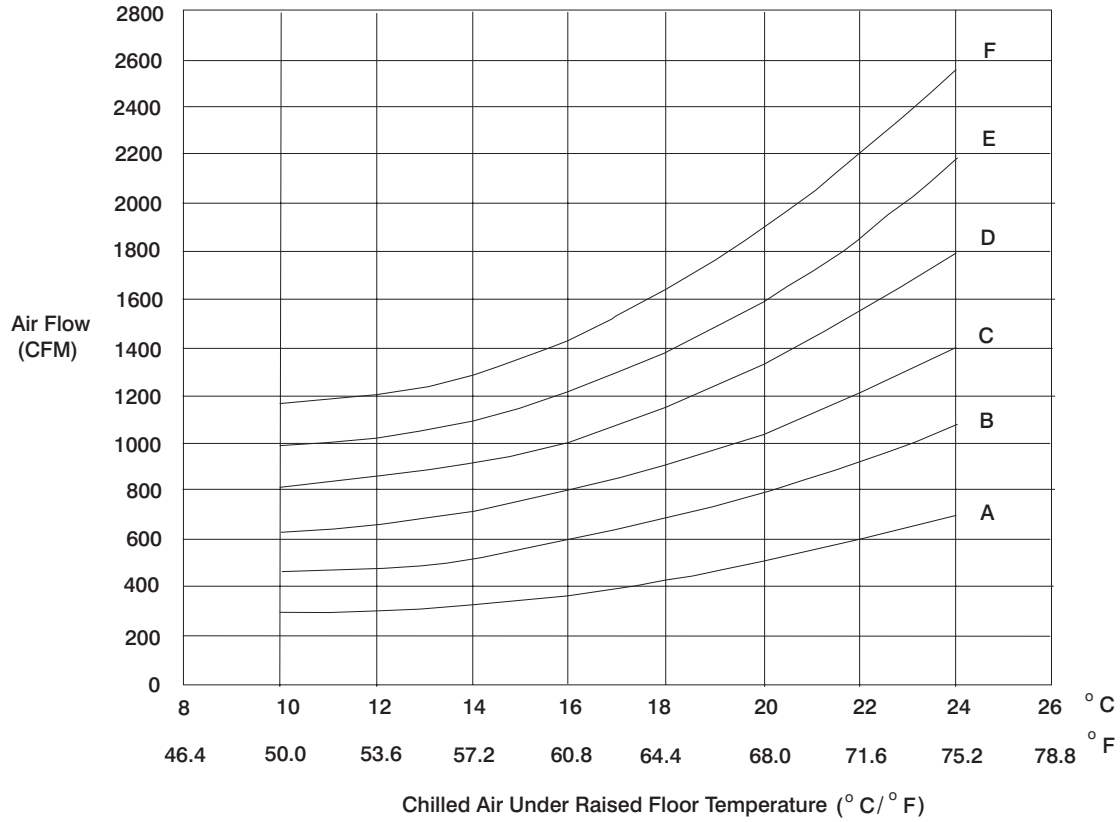
Number of I/O Drawers (7040-61D)	1.7 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
1	A	B	C	C
2	B	B	C	D
3	N/A	C	C	D
4	N/A	C	D	E
5	N/A	N/A	D	E
6	N/A	N/A	E	E
7	N/A	N/A	N/A	F
8	N/A	N/A	N/A	F

Number of I/O Drawers (7040-61D)	1.9 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
1	A	B	C	D
2	B	C	C	D
3	N/A	C	D	E
4	N/A	C	D	E
5	N/A	N/A	E	E
6	N/A	N/A	E	F



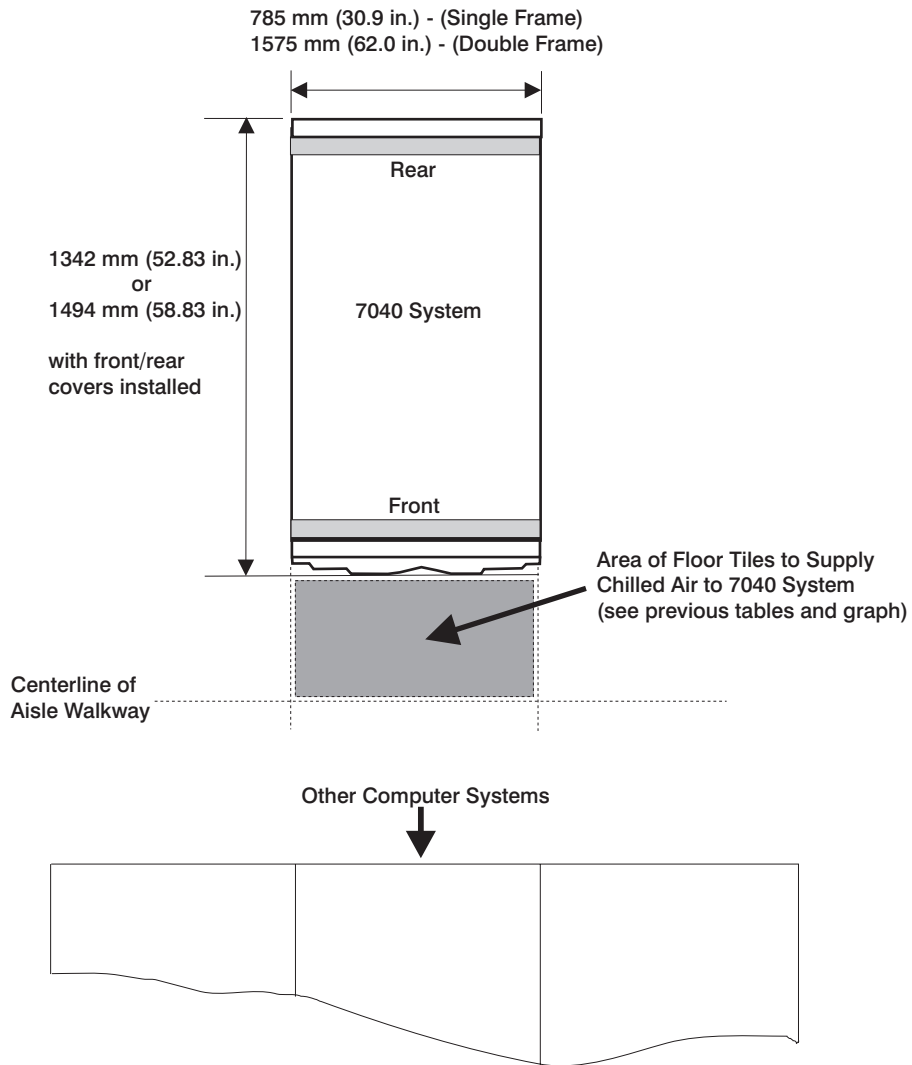
Number of I/O Drawers (7040-61D)	1.9 GHz 8-way Modules (Cooling Chart Reference)			
	8-way	16-way	24-way	32-way
7	N/A	N/A	N/A	F
8	N/A	N/A	N/A	F

### Cooling Requirements Graph



## Requirements for the Chilled Air Flow Area

The following illustration shows the chilled air flow area required for a system. Use the system cooling requirements tables and the preceding graph to determine the area of floor tiles to supply chilled air to the system.



## 7043 43P Series Model 140

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	165 mm	6.5 in.	450 mm	17.7 in.
Width	420 mm	16.5 in.	165 mm	6.5 in.
Width <sup>4</sup>			235 mm	9.25 in.
Depth	460 mm	18.0 in.	460 mm	18.0 in.
<b>Weight</b>				
Minimum configuration			14.5 kg 32 lbs.	
Maximum configuration			18.2 kg 40 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)			0.2	
Power source loading (maximum in kVA)			0.4	
Voltage range (V ac) - US and World Trade			100 to 127 or 200 to 240 (switchable)	
Voltage range (V ac) - Japan			100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)			50 or 60	
Thermal output (typical)			425 Btu/hr	
Thermal output (maximum)			850 Btu/hr	
Power requirements (typical)			125 watts	
Power requirements (maximum)			250 watts	
Power factor - US and World Trade			0.6	
Power factor - Japan			0.98	
Inrush current <sup>3</sup>			less than 70 amps at 120 V ac and at 240 V ac	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>				
	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>				
(Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.3 bels		5.0 bels	
L <sub>pA</sub> m	43 dBA		43 dBA	
<L <sub>pA</sub> > <sub>m</sub>	40 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	76mm(3 in)	76mm(3 in)	50mm(2 in)
<b>Service</b>	Install so that it can be taken to an area providing 457mm(18 in) on the front and 457mm(18 in) on the left side.			
<b>Footprint<sup>2</sup></b>				
	<b>Width</b>		<b>Width</b>	
Desktop	520mm(20.5 in)		610mm(24 in)	
Deskside	318mm(12.5 in)		610mm(24 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. Width measurement includes the optional verticle stand.</li> </ol>				

## 7043 43P Series Model 150

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	165 mm	6.5 in.	450 mm	17.7 in.
Width	420 mm	16.5 in.	165 mm	6.5 in.
Width <sup>4</sup>			235 mm	9.25 in.
Depth	460 mm	18.0 in.	460 mm	18.0 in.
<b>Weight</b>				
Minimum configuration			14.5 kg	32 lbs.
Maximum configuration			18.2 kg	40 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.2	
Power source loading (maximum in kVA)			0.4	
Voltage range (V ac)				
- US, World Trade, and Japan			100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)			50 or 60	
Thermal output (typical)			425 Btu/hr	
Thermal output (maximum)			850 Btu/hr	
Power requirements (typical)			125 watts	
Power requirements (maximum)			250 watts	
Power factor - US, World Trade, Japan			0.98	
Inrush current <sup>3</sup>			less than 70 amps at 120 V ac and at 240 V ac	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>				
	<b>Operating<sup>5</sup></b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>				
(Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.4 bels		5.0 bels	
L <sub>pAm</sub>	43 dBA		43 dBA	
<L <sub>pA</sub> > <sub>m</sub>	40 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	76mm(3 in)	50mm(2 in)	50mm(2 in)
<b>Service</b>				
	Install so that it can be taken to an area providing 457mm(18 in) on the front and 457mm(18 in) on the left side.			
<b>Footprint<sup>2</sup></b>				
	<b>Width</b>		<b>Depth</b>	
Desktop	520mm(20.5 in)		610mm(24.0 in)	
Deskside	318mm(12.5 in)		610mm(24.0 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. Width measurement includes the optional vertical stand.</li> <li>5. For systems with FC 6120: 80/160 GB Internal Tape Drive with VXA Technology or FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>				

The following table lists maximum operating temperatures for system features at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)
FC 6120	28°C (82°F)	27°C (81°F)	27°C (81°F)	26°C (79°F)	26°C (79°F)	25°C (77°F)	24°C (75°F)	24°C (75°F)
FC 6134	26°C (79°F)	25°C (77°F)	25°C (77°F)	24°C (75°F)	24°C (75°F)	23°C (73°F)	22°C (72°F)	22°C (72°F)

## 7043 43P Series Model 240

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	165 mm	6.5 in.	450 mm	17.7 in.
Width	420 mm	16.5 in.	165 mm	6.5 in.
Width <sup>4</sup>			235 mm	9.25 in.
Depth	460 mm	18.0in.	460 mm	18.0 in.
<b>Weight</b>				
Minimum configuration			14.5 kg 32 lbs.	
Maximum configuration			18.2 kg 40 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)			0.2	
Power source loading (maximum in kVA)			0.4	
Voltage range (V ac) - US and World Trade			100 to 127 or 200 to 240 (switchable)	
Voltage range (V ac) - Japan			100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)			50 or 60	
Thermal output (typical)			425 Btu/hr	
Thermal output (maximum)			850 Btu/hr	
Power requirements (typical)			125 watts	
Power requirements (maximum)			250 watts	
Power factor - US and World Trade			0.6	
Power factor - Japan			0.98	
Inrush current <sup>3</sup>			less than 70 amps at 120 V ac and at 240 V ac	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>				
	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b>				
(Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>				
	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.2 bels		5.0 bels	
L <sub>pA</sub> m	Ukn dBA		Unk dBA	
<L <sub>pA</sub> > <sub>m</sub>	39 dBA		38 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	76mm(3 in)	50mm(2 in)	50mm(2 in)
<b>Service</b>				
Install so that it can be taken to an area providing 457mm(18 in) on the front and 457mm(18 in) on the left side.				
<b>Footprint<sup>2</sup></b>				
	<b>Width</b>		<b>Depth</b>	
Desktop	520mm(20.5 in)		610mm(24.0 in)	
Deskside	318mm(12.5 in)		610mm(24.0 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. Width measurement includes the optional verticle stand.</li> </ol>				

## 7043 43P Series Model 260

<b>Dimensions</b>				
Height	610 mm 24.0 in.			
Width	222 mm 8.7 in.			
Width with Pedestal	340 mm 13.4 in.			
Depth	713 mm 28.1 in.			
<b>Weight</b>				
Minimum configuration	37 kg 80 lbs.			
Maximum configuration	45 kg 97 lbs.			
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.41			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 to 60			
Thermal output (typical)	883 Btu/hr			
Thermal output (maximum)	1324 Btu/hr			
Power requirements (typical)	259 watts			
Power requirements (maximum)	388 watts			
Power factor	0.89 to 0.98			
Inrush current <sup>3</sup>	16 amps at 120 V ac, 21 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>			<b>Non-Operating</b>
	16 to 32°C (60 to 90°F)			10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>			<b>Non-Operating</b>
	8 to 80%			8 to 80%
<b>Wet Bulb</b>	23°C (73°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.5 bels			5.4 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	37 dBA			36 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	324mm(12.7 in)		940mm(36.6 in)	
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7044 44P Series Model 170

<b>Dimensions</b>				
Height	490 mm 19.25 in.			
Width	200 mm 7.9 in.			
Width <sup>4</sup>	235 mm 9.25 in.			
Depth	515 mm 20.25 in.			
<b>Weight</b>				
Minimum configuration	17.7 kg 39 lbs.			
Maximum configuration	20.4 kg 45 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.23			
Power source loading (maximum in kVA)	0.40			
Voltage range (V ac)				
- US, World Trade, and Japan	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 to 60			
Thermal output (typical)	752 Btu/hr			
Thermal output (maximum)	1368 Btu/hr			
Power requirements (typical)	220 watts			
Power requirements (maximum)	400 watts			
Power factor - US, World Trade, Japan	0.98			
Inrush current <sup>3</sup>	less than 60 amps at 120 V ac and at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		<b>Power off</b>
	16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>		<b>Power off</b>
<b>Wet Bulb</b>	8 to 80%	8 to 80%		
	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	5.5 bels	5.4 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	38 dBA	37 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	76mm(3 in)	0mm(0 in)	0mm(0 in)
<b>Service</b>	Install so that it can be taken to an area providing 457mm(18 in) on the front and 457mm(18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	235mm(9.25 in)		667mm(26.25 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>4. Width measurement With feet extended.</li> </ol>				



## 7044 44P Series Model 270

<b>Dimensions</b>				
Height	610 mm 24.0 in.			
Width	222 mm 8.7 in.			
Width with Pedestal	340 mm 13.4 in.			
Depth	713 mm 28.1 in.			
<b>Weight</b>				
Minimum configuration	37 kg 80 lbs.			
Maximum configuration	45 kg 97 lbs.			
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.47			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 to 60			
Thermal output (typical)	1012 Btu/hr			
Thermal output (maximum)	1518 Btu/hr			
Power requirements (typical)	297 watts			
Power requirements (maximum)	445 watts			
Power factor	0.92 to 0.99			
Inrush current <sup>3</sup>	30 amps at 120 V ac, 32 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>		
	16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>		
	8 to 80%	8 to 80%		
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)		
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>		
L <sub>WAd</sub>	5.5 bels	5.4 bels		
L <sub>pAm</sub>	N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>	37 dBA	36 dBA		
Impulsive or prominent discrete tones	No	No		
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	76mm(3 in)	152mm(6 in)	51mm(2 in)	51mm(2 in)
<b>Service</b>	Install so that it can be moved to an area providing 457mm (18 in.) on the front and 457 mm (18 in) on the left side.			
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	324mm(12.7 in)		940mm(36.6 in)	
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7046 Model B50

<b>Dimensions</b>				
Height	88 mm 3.5 in. 2 EIA Units			
Width	447.0 mm 17.6 in.			
Depth	751.8 mm 29.6 in.			
<b>Weight</b>				
Minimum configuration	14.5 kg 32 lbs.			
Maximum configuration	15.9 kg 35 lbs.			
<b>Electrical</b>				
Power source loading (maximum in kVA)	0.147			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (maximum)	478 Btu/hr			
Power requirements (maximum)	140 watts			
Power factor - US, World Trade, Japan	0.95			
Inrush current <sup>2</sup>	40 amps			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b>			<b>Non-Operating</b>
	10 to 40°C (50 to 104°F)			10 to 52°C (50 to 126°F)
<b>Humidity Requirements<sup>4</sup></b>	<b>Operating</b>			<b>Non-Operating</b>
(Noncondensing)	8 to 80%			8 to 80%
<b>Wet Bulb</b>	27°C (80°F)			27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>			<b>Idle</b>
L <sub>WAd</sub>	5.2 bels			4.7 bels
L <sub>pAm</sub>	N/A			N/A
<L <sub>pA</sub> > <sub>m</sub>	35 dBA			30 dBA
Impulsive or prominent discrete tones	No			No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	76mm(3 in)	76mm(3 in)	50mm(2 in)	50mm(2 in)
<b>Service</b>	Install so that it can be taken to an area providing 457mm(18 in) on the front and 457mm(18 in) on the left side.			
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The upper limit of the dry bulb temperature must be derated 1 degree C per 137m (450 ft.) above 915m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1 degree C per 274m (900 ft. ) above 305m (1000 ft.).</li> </ol>				

## 7248 Model 43P

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	160 mm	6.3 in.	420 mm	16.5 in.
Width <sup>1</sup>	420 mm	16.5 in.	160 mm	6.3 in.
Depth	454 mm	17.7 in.	454 mm	17.7 in.
<b>Weight</b>				
Minimum	13.2 kg 29 lbs.			
Maximum	15.9 kg 35 lbs.			
<b>Electrical</b>				
Power source loading (typical in kVA)	0.23			
Voltage range (V ac)	100 to 127 or 200 to 240 (switchable)			
Frequency (hertz)	50 or 60			
Thermal output (maximum)	510 Btu/hr			
Thermal output (minimum)	225 Btu/hr			
Power requirements (maximum)	150 watts			
Power factor	0.5 to 0.7			
Inrush current <sup>6</sup>	23 amps at 120 V ac, 23 amps at 240 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
	8 to 80%		8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.2 bels		5.0 bels	
L <sub>pAm</sub>	41 dBA		38 dBA	
<L <sub>pA</sub> > <sub>m</sub>	36 dBA		34 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances<sup>3</sup></b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>4,5</sup></b>	35mm(1.5 in)	51mm(2 in)	25mm(1 in)	25mm(1 in)
<b>Service</b>	466mm(18 in)	N/A	N/A	N/A
<b>Footprint<sup>4</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	470mm(18.5 in)		537mm(21.1 in)	
Deskside	211mm(8.3 in)		537mm(21.1 in)	
<ol style="list-style-type: none"> <li>1. Width measurement includes the optional vertical stand.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Left and right measurements apply only when the system is used in the desktop position.</li> <li>4. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>5. When placed in the vertical position, the system requires 25 mm (1 in) at the bottom and top for proper air flow. The necessary bottom clearance is provided by the optional vertical stand.</li> <li>6. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> </ol>				

## 7311 Model D10

<b>Dimensions</b>	<b>7311-D10</b>	<b>Two 7311-D10s with Enclosure</b>	
Height	170 mm (6.6 in)	178 mm (7.0 in)	
Width	220 mm (8.7 in)	445 mm (17.5 in)	
Depth	711 mm (28.0 in)	711 mm (28.0 in)	
<b>Weight</b>	16.8 kg (37 lbs)	39.1 kg (86 lbs)	
<b>Electrical</b>			
Power source loading per 7311-D10	0.21 kVA		
Voltage range	200 to 240 V ac, V dc not supported		
Frequency	50 or 60 Hz		
Thermal output per 7311-D10 (typical)	461 Btu/hr		
Thermal output per 7311-D10 (max.)	683 Btu/hr		
Power requirements per 7311-D10 (typical)	135 watts		
Power requirements per 7311-D10 (max.)	200 watts		
Power factor	0.91		
Inrush current per 7311-D10 <sup>2</sup>	64 amps		
Maximum altitude <sup>3, 4</sup>	3048 m (10000 ft.)		
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b>	<b>Non-Operating</b>	<b>Storage</b>
	10 to 38°C 50 to 100°F)	1 to 60°C (34 to 140°F)	1 to 60°C (34 to 140°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>	<b>Storage</b>
<b>Wet Bulb</b>	8 to 80% 23°C (73°F)	8 to 80% 27°C (81°F)	8 to 80% 29°C (84°F)
<b>Noise Emissions<sup>1, 4</sup></b>	<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub> , one 7311-D10	5.6 bels	5.6 bels	
L <sub>WAd</sub> , two 7311-D10	5.9 bels	5.9 bels	
L <sub>WAd</sub> , four 7311-D10	6.2 bels	6.2 bels	
<L <sub>pA</sub> > <sub>m</sub> , one 7311-D10	40 dBA	40 dBA	
<L <sub>pA</sub> > <sub>m</sub> , two 7311-D10	43 dBA	43 dBA	
<L <sub>pA</sub> > <sub>m</sub> , four 7311-D10	46 dBA	46 dBA	
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.		
<b>Service Clearances</b>	See "T00 and T42 Service Clearances and Caster Location" on page 33 for T00 or T42 rack service clearances.		
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</p> <p>2. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</p> <p>3. The upper limit of the dry bulb temperature must be derated 1°C per 137 m (450 ft.) above 915 m (3000 ft.).</p> <p>4. The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft. ) above 305 m (1000 ft.).</p>			

## 7311 Model D20

<b>Dimensions</b>			
Height	178 mm (7.0 in)		
Width	445 mm (17.5 in)		
Depth	610 mm (24.0 in)		
<b>Weight</b>	45.9 kg (101 lbs)		
<b>Electrical</b>			
Power source loading (max.)	0.358 kVA		
Voltage range	100 to 240 V ac, V dc not supported		
Frequency	50 or 60 Hz		
Thermal output (typical)	774 Btu/hr		
Thermal output (max.)	1161 Btu/hr		
Power requirements (typical)	227 watts		
Power requirements (max.)	340 watts		
Power factor	0.91		
Inrush current <sup>2</sup>	60 amps		
Maximum altitude <sup>3, 4</sup>	3048 m (10000 ft.)		
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b> 5 to 35°C 41 to 95°F)	<b>Non-Operating</b> 1 to 60°C (34 to 140°F)	<b>Storage</b> 1 to 60°C (34 to 140°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	<b>Storage</b> 5 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (81°F)	29°C (84°F)
<b>Noise Emissions<sup>1, 5</sup></b>	<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub>	6.1 bels	6.0 bels	
<L <sub>pA</sub> > <sub>m</sub>	44 dBA	43 dBA	
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.		
<b>Service Clearances</b>	See “T00 and T42 Service Clearances and Caster Location” on page 33 for T00 or T42 rack service clearances.		
<ol style="list-style-type: none"> <li>1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>2. Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>3. The upper limit of the dry bulb temperature must be derated 1° C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>4. The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft. ) above 305 m (1000 ft.).</li> </ol>			

## 7317 Model D10

<b>Dimensions</b>				
Height	464 mm		18.3 in.	
Width	490 mm		19.3 in.	
Depth with device handles	289 mm		11.4 in.	
<b>Weight</b>				
Minimum	31.8 kg		70 lbs.	
Maximum	45.4 kg		100 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)			N/A	
Voltage range (V dc)			-40 to -65	
Thermal output (typical)			360 Btu/hr	
Thermal output (maximum)			600 Btu/hr	
Power requirements (typical)			106 watts	
Power requirements (maximum)			176 watts	
Maximum altitude (operating) class c			0 to 2133 m (0 to 7000 ft.)	
<b>Temperature Requirements</b> Class C	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%			
<b>Wet Bulb Requirements</b>	27°C (80°F)			
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.0 bels		6.0 bels	
L <sub>pAm</sub>	N/A dBA		N/A dBA	
<L <sub>pA</sub> > <sub>m</sub>	47 dBA		47 dBA	
Impulsive or prominent discrete tones	None		None	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	150mm(6 in)	0	0	0
<b>Service<sup>3</sup></b>	500mm(20 in)	0	0	0
<b>Footprint<sup>2</sup></b>	<b>Width</b> 490mm(19.3 in)		<b>Depth</b> 440mm(17.3 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>All service is performed at the front of the machine.</li> </ol>				

## 7317 Model F3L

<b>Dimensions</b>	<b>w/o Media</b>		<b>with Media</b>	
Height	746 mm	29.4 in.	823 mm	32.4 in.
Width	440 mm	17.3 in.	440 mm	17.3 in.
Depth with device handles	289 mm	11.4 in.	289 mm	11.4 in.
<b>Weight</b>	<b>w/o Media</b>		<b>with Media</b>	
Minimum	45.5 kg	100 lbs.	50 kg	110 lbs.
Maximum	72.6 kg	160 lbs.	72.6 kg	160 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)	N/A			
Voltage range (V dc)	-40 to -65			
Thermal output (typical)	770 Btu/hr			
Thermal output (maximum)	1100 Btu/hr			
Power requirements (typical)	225 watts			
Power requirements (maximum)	322 watts			
Maximum altitude (operating)	0 to 2133 m (0 to 7000 ft.)			
<b>Temperature Requirements</b> Class C	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity (Noncondensing)</b>	<b>Operating</b>		<b>Non-Operating</b>	
with tape	8 to 80%			
without tape	20 to 80%			
<b>Wet Bulb Requirements</b>	28°C (82°F)			
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
$L_{WA,d}$	6.0 bels		6.0 bels	
$L_{pA,m}$	N/A		N/A dBA	
$\langle L_{pA} \rangle_m$	47 dBA		47 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	150mm(6 in)	0	0	0
<b>Service<sup>3</sup></b>	500mm(20 in)	0	0	0
<b>Footprint<sup>2</sup></b>	<b>Width</b> 440mm(17.3 in)		<b>Depth</b> 440mm(17.3 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>All service is performed at the front of the machine.</li> </ol>				

## 9112 Model 265

The Model 265 is either a 1–way or 2–way system. The system can accommodate two processor cards, one memory card with 16 DIMMs, and 5 PCI adapters. It supports six hot-swap DASD bays and one floppy drive.

<b>Dimensions</b>		
Height	426 mm (16.8 in.)	
Width	215 mm (8.5 in.)	
Depth	617 mm (24 in.)	
<b>Weight</b>		
Minimum configuration	35.5 kg 78 lbs.	
Maximum configuration	43.1 kg 94.8 lbs.	
<b>Electrical</b>		
Power source loading (maximum in kVA)	0.40	
Power source loading (typical in kVA)	0.30	
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (maximum)	1306 Btu/hr	
Thermal output (typical)	979 Btu/hr	
Power requirements (maximum)	384 watts	
Power requirements (typical)	288 watts	
Power factor - US, World Trade, Japan	0.96	
Inrush current <sup>2</sup>	70 amps	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>3</sup></b>	<b>Operating</b> 16 to 32°C (61 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.1 bels	6.1 bels
L <sub>pAm</sub>	42 dBA	41 dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow</b>	Maintenance of proper service clearance should allow proper air flow.	
<b>Service</b>	See service clearances for the 7014 T00 Rack	
<ol style="list-style-type: none"> <li>See “Noise Emission Notes” on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle.</li> <li>The upper limit of the dry bulb temperature must be derated 1 degree C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1 degree C per 274 m (900 ft. ) above 305 m (1000 ft.).</li> <li>Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> </ol>		



## 9114 Model 275

<b>Dimensions</b>		
Height	535.0 mm (21.1 in.)	
Width	190 mm (7.5 in.)	
Depth	685 mm (27.0 in.)	
<b>Weight</b>		
Minimum configuration	32.0 kg (70.5 lbs.)	
Maximum configuration	43.1 kg (94.8 lbs.)	
<b>Electrical</b>		
Power source loading (typical in kVA)	0.30	
Power source loading (max. in kVA)	0.50	
Voltage range (V ac)	100 to 127 or 200 to 240 (auto-ranging)	
Frequency (hertz)	47 to 63	
Voltage range (V dc)	Not supported	
Thermal output (typical)	1024 Btu/hr	
Thermal output (max.)	1587 Btu/hr	
Power requirements (typical)	300 watts	
Power requirements (max.)	465 watts	
Power factor - US, World Trade, Japan	0.95	
Inrush current <sup>2</sup>	85 amps (max. at <10ms)	
Maximum altitude <sup>3, 4</sup>	2135 m (7000 ft.)	
<b>Temperature Requirements<sup>3, 6</sup></b>	<b>Operating</b> 10 to 32°C 50 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements<sup>4</sup></b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions<sub>1</sub></b>	<b>Operating</b> 5.5 bels	<b>Idle</b> 5.5 bels
$L_{WA,d}$	Maintenance of service clearance will allow proper air flow.	
<b>Install/Air Flow</b>	Maintenance of service clearance will allow proper air flow.	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions. See noise emissions note 4.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during normal power off-on cycle. The inrush current exponentially decays over 5 ac cycles.</li> <li>The upper limit of the dry bulb temperature must be derated 1°C per 137 m (450 ft.) above 915 m (3000 ft.).</li> <li>The upper limit of the wet bulb temperature must be derated 1°C per 274 m (900 ft.) above 305 m (1000 ft.).</li> <li>Levels are for a single system installed in a T00 32 EIA rack with the center of the unit approximately 1500 mm (59 in.) off the floor.</li> <li>For systems with FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive, the maximum operating temperature is limited. For additional information about this limitation, refer to the following table.</li> </ol>		

The following table lists maximum operating temperatures for FC 6134: 60/150 GB 16-bit 8mm Internal Tape Drive at various altitudes.

	0	305 m (1000 ft)	610 m (2000 ft)	914 m (3000 ft)	1219 m (4000 ft)	1524 m (5000 ft)	1829 m (6000 ft)	2134 m (7000 ft)	2438 m (8000 ft)	2743 m (9000 ft)	3048 m (10000 ft)
FC 6134	31°C (88°F)	31°C (88°F)	30°C (86°F)	30°C (86°F)	29°C (84°F)	29°C (84°F)	28°C (82°F)	28°C (82°F)	27°C (81°F)	26°C (79°F)	26°C (79°F)



---

## **Chapter 3. Physical Characteristics of Hardware Management Consoles (HMC)**

This chapter provides the physical characteristics for systems. This information can help you with physical planning for the products you have ordered.

## 6578-D5U Hardware Management Console (HMC)

The HMC is a user interface that provides the functions needed to create and maintain a multiple-partitioned environment. The interface allows you to directly manipulate HMC-defined objects and learn more about detected changes in hardware conditions. The HMC also provides service technicians with diagnostic information for systems that can operate in a multiple-partitioned environment.

<b>Dimensions</b>		
Height	140 mm	5.5 in.
Width	425 mm	16.7 in.
Depth	425 mm	16.7 in.
<b>Weight</b>		
Minimum	9.4 kg (20 lbs.)	
Maximum	11.3 kg (25 lbs.)	
<b>Electrical</b>		
Power source loading (typical in kVA)	0.08 kVA to 0.30 kVA (as shipped)	
Input Voltage (V ac)	90 V to 265 V ac	
Frequency (hertz)	47 to 63 Hz	
Thermal output (minimum)	240 Btu/hr. (75 watts)	
Thermal output (maximum)	705 Btu/hr. (207 watts)	
Maximum altitude	2134 m (7,000 ft.)	
<b>Air Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	10 to 35°C (50 to 95°F)	10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>
	8% - 80%	8% - 80%
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	5.1 bels	4.8 bels
L <sub>pAm</sub>	4.3 bels	3.8 bels
<L <sub>pA</sub> > <sub>m</sub>	3.7 bels	3.3 bels
Impulsive or prominent discrete tones	No	No
<b>Note:</b> See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7315-C01 Hardware Management Console (HMC)

The HMC is a user interface that provides the functions needed to create and maintain a multiple-partitioned environment. The interface allows you to directly manipulate HMC-defined objects and learn more about detected changes in hardware conditions. The HMC also provides service technicians with diagnostic information for systems that can operate in a multiple-partitioned environment.

<b>Dimensions</b>		
Height	140 mm	5.5 in.
Width	425 mm	16.7 in.
Depth	425 mm	16.7 in.
<b>Weight</b>		
Minimum	10.0 kg (22 lbs.)	
Maximum	11.4 kg (25 lbs.)	
<b>Electrical</b>		
Power source loading (typical in kVA)	0.08 kVA to 0.30 kVA (as shipped)	
Input Voltage (V ac)	90 V to 265 V ac	
Frequency (hertz)	47 to 63 Hz	
Thermal output (minimum)	257 Btu/hr. (75 watts)	
Thermal output (maximum)	889 Btu/hr. (230 watts)	
Maximum altitude	2134 m (7,000 ft.)	
<b>Air Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	10 to 35°C (50 to 95°F)	10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>
	8% - 80%	8% - 80%
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.1 bels	4.8 bels
$L_{pA_m}$	4.3 bels	3.8 bels
$\langle L_{pA} \rangle_m$	3.7 bels	3.3 bels
Impulsive or prominent discrete tones	No	No
<b>Note:</b> See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7315-C02 Hardware Management Console (HMC)

The HMC is a user interface that provides the functions needed to create and maintain a multiple-partitioned environment. The interface allows you to directly manipulate HMC-defined objects and learn more about detected changes in hardware conditions. The HMC also provides service technicians with diagnostic information for systems that can operate in a multiple-partitioned environment.

<b>Dimensions</b>		
Height	140 mm	5.5 in.
Width	425 mm	16.7 in.
Depth	414 mm	16.3 in.
<b>Weight</b>		
Minimum	10.0 kg (22 lbs.)	
Maximum	11.4 kg (25 lbs.)	
<b>Electrical</b>		
Power source loading (typical in kVA)	0.08 kVA to 0.30 kVA (as shipped)	
Input Voltage (V ac)	90 V to 265 V ac	
Frequency (hertz)	47 to 63 Hz	
Thermal output (minimum)	257 Btu/hr. (75 watts)	
Thermal output (maximum)	890 Btu/hr. (260 watts)	
Maximum altitude	2134 m (7,000 ft.)	
<b>Air Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	10 to 35°C (50 to 95°F)	10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>
	8% - 80%	8% - 80%
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	4.7 bels	4.4 bels
L <sub>pAm</sub>	3.6 bels	3.3 bels
<L <sub>pA</sub> > <sub>m</sub>	3.3 bels	3.0 bels
Impulsive or prominent discrete tones	No	No
<b>Note:</b> See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7315-CR2 Hardware Management Console (HMC)

The HMC is a user interface that provides the functions needed to create and maintain a multiple-partitioned environment. The interface allows you to directly manipulate HMC-defined objects and learn more about detected changes in hardware conditions. The HMC also provides service technicians with diagnostic information for systems that can operate in a multiple-partitioned environment.

The 7315-CR2 Hardware Management Console (HMC) mounts in a 19-inch system rack. The IBM 7014-T00 and 7014-T42 racks are recommended. These racks operate with a voltage range of 200 V ac to 240 V ac. For additional information about these racks, refer to “7014 Rack” on page 31.

<b>Dimensions</b>		
Height	44 mm (1.7 in.)	
Width	440 mm (17.3 in.)	
Depth	653 mm (25.7 in.)	
<b>Weight</b>	12.9 kg (28.4 lbs.)	
<b>Electrical</b>		
Power source loading	0.11 kVA to 0.35 kVA	
Input Voltage	100 V ac to 127 V ac 200 V ac to 240 V ac	
Frequency (hertz)	50 Hz to 60 Hz	
Thermal output (minimum)	375 Btu/hr. (110 watts)	
Thermal output (maximum)	1195 Btu/hr. (350 watts)	
Maximum altitude	2134 m (7,000 ft.)	
<b>Air Temperature Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	10 to 35°C (50 to 95°F) at altitude 0 m to 914 m (2999 ft.)	10 to 43°C (50 to 110°F)
	10 to 32°C (50 to 89.6°F) at altitude 914 m (2999 ft.) to 2133 m (6998 ft.)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>	<b>Non-Operating</b>
	8% to 80%	8% to 80%
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA,d</sub>	6.5 bels	6.5 bels
<b>Note:</b> See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.		





## Chapter 4. Physical Characteristics of Displays

This chapter provides the physical characteristics for some of the displays that can be used with the systems. The following information can help you plan for your displays. You need only do physical planning for the displays you have ordered.

### POWERdisplay 17 and POWERdisplay 20

POWERdisplay 17 with a maximum viewable image size of 409 mm (16.1 inches) measured diagonally.

POWERdisplay 20 with a maximum viewable image size of 486 mm (19.1 inches) measured diagonally

<b>Dimensions</b>				
<b>POWERdisplay 17</b>				
Height	414 mm	16.3 in		
Width	404 mm	15.9 in		
Depth	450 mm	17.7 in		
<b>POWERdisplay 20</b>				
Height	474 mm	18.6 in		
Width	480 mm	18.9 in		
Depth	505 mm	19.9 in		
<b>Weight</b>				
<b>POWERdisplay 17</b>	22.5 kg	49.5 lbs		
<b>POWERdisplay 20</b>	30.0 kg	66.3 lbs		
<b>Electrical</b>				
Power source loading (typical in kVA)		.38		
Voltage range (V ac)	100 to 120 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	480 Btu/hr			
Power requirements (typical)	140 watts			
Power factor	0.7			
Maximum altitude	3048 m (10,000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 1 to 60°C (35 to 140°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80 %		<b>Non-Operating</b> 8 to 80 %	
<b>Noise Emissions*</b> L <sub>WAd</sub>	<b>Operating</b> 3.5 bels		<b>Idle</b> 3.5 bels	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Service</b>	Install so that air vents are not blocked.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 6091 Color Display Model 19i

6091 Color Display Model 19i with a maximum viewable image size of 439 mm (17.3 inches) measured diagonally.

<b>Dimensions</b>				
Height	485 mm		19.1 in	
Width	480 mm		18.9 in	
Depth	506 mm		19.9 in	
<b>Weight</b>		34 kg	75 lbs	
<b>Electrical</b>				
Power source loading (typical in kVA)		.38		
Voltage range (V ac)	100 to 120 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	480 Btu/hr			
Power requirements (typical)	185 watts			
Power factor	0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 1 to 60°C (35 to 140°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80 %		<b>Non-Operating</b> 8 to 80 %	
<b>Noise Emissions*</b> L <sub>WAd</sub>	<b>Operating</b> 3.5 bels		<b>Idle</b> 3.5 bels	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Service</b>	Install so that air vents are not blocked.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 9516 TFT LCD Color Display

9516 TFT LCD Color Display with a maximum viewable image size of 408 mm (16.1 inches) measured diagonally.

<b>Dimensions</b>				
Height (Display only)	431 mm		17.0 in	
(Display with Tilt/Swivel)	511 mm		21.1 in	
Width	408 mm		16.1 in	
Depth	250 mm		9.8 in	
<b>Weight</b>		9.9 kg		21.8 lbs
<b>Electrical</b>				
Voltage range (V ac)		100 to 240		
Frequency (hertz)		50 or 60		
Thermal output (maximum)		188 Btu/hr		
Power requirements (in active mode VESA Standby)		18 watts		
(in energy saving mode VESA off)		8 watts		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 5 to 80 %		<b>Non-Operating</b> 5 to 80 %
<b>Noise Emissions*</b> L <sub>WA,d</sub>		<b>Operating</b> 4.5 bels		<b>Idle</b> N/A bels
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b> <b>Right</b>
<b>Service</b>		Install so that air vents are not blocked.		
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## P50 15" Display, P70 17" Display, P200 and P201 20" Displays

P50 15" display with a maximum viewable image size of 345 mm (13.6 inches) measured diagonally.  
 P70 17" display with a maximum viewable image size of 403 mm (15.9 inches) measured diagonally.  
 P200 20" display with a maximum viewable image size of 486 mm (19.1 inches) measured diagonally.  
 P201 20" display with a maximum viewable image size of 486 mm (19.1 inches) measured diagonally.

<b>Dimensions</b>				
<b>P50 display</b>				
Height	374 mm	14.7 in		
Width	368 mm	14.5 in		
Depth	390 mm	15.3 in		
<b>P70 display</b>				
Height	414 mm	16.3 in		
Width	406 mm	15.9 in		
Depth	453 mm	17.8 in		
<b>P200 and P201 display</b>				
Height	474 mm	18.6 in		
Width	474 mm	18.6 in		
Depth	505 mm	19.9 in		
<b>Weight</b>				
<b>P50</b>	14.0 kg	30.8 lbs		
<b>P70</b>	23.0 kg	50.6 lbs		
<b>P200</b>	30.0 kg	66.3 lbs		
<b>P201</b>	31.5 kg	69.4 lbs		
<b>Electrical</b>				
Power source loading (typical in kVA)		.38		
Voltage range (V ac)	100 to 120 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	480 Btu/hr			
Power requirements (typical)	P50=110 watts, P70=140 watts P200=140 watts, P201=150 watts			
Power factor	0.85			
Maximum altitude	3048 m (10000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 0 to 60°C (32 to 140°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80 %		<b>Non-Operating</b> 5 to 90 %	
<b>Noise Emissions*</b> L <sub>WAd</sub>	<b>Operating</b> 3.5 bels		<b>Idle</b> 3.5 bels	
<b>Clearances</b>	<b>Front</b> 152mm (6 in)	<b>Back</b> 152mm (6 in)	<b>Left</b> 152mm (6 in)	<b>Right</b> 152mm (6 in)
<b>Service</b>	Install so that air vents are not blocked.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## P72 17" Display, P92 19" Display, and P202 21" Display

P72 17" display with a maximum viewable image size of 407 mm (16.0 inches) measured diagonally.  
 P92 19" display with a maximum viewable image size of 456 mm (17.9 inches) measured diagonally.  
 P202 21" display with a maximum viewable image size of 503 mm (19.8 inches) measured diagonally.

<b>Dimensions</b>				
<b>P72 display</b>				
Height		441 mm		17.4 in
Width		408 mm		16.1 in
Depth		434 mm		17.1 in
<b>P92 display</b>				
Height		478 mm		18.8 in
Width		462 mm		18.2 in
Depth		476 mm		18.7 in
<b>P202 display</b>				
Height		513 mm		20.2 in
Width		498 mm		19.6 in
Depth		500 mm		19.7 in
<b>Weight</b>				
<b>P72</b>		19.2 kg		43.2 lbs
<b>P92</b>		25.0 kg		56.3 lbs
<b>P202</b>		31.0 kg		70.0 lbs
<b>Electrical</b>				
Voltage range (V ac)		100 to 240		
Frequency (hertz)		50 or 60		
Power requirements (typical)		P72=120 watts, P92=140 watts, P202=160 watts		
Maximum altitude		3048 m (10000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>	<b>Non-Operating</b>	
		10 to 40°C (50 to 104°F)	0 to 60°C (32 to 140°F)	
<b>Humidity Requirements</b>		<b>Operating</b>	<b>Non-Operating</b>	
(Noncondensing)		10 to 80 %	5 to 95 %	
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA,d</sub>		4.5 bels	4.5 bels	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
	152mm (6 in)	152mm (6 in)	152mm (6 in)	152mm (6 in)
<b>Service</b>	Install so that air vents are not blocked.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## P76 17" Display, and P260 21" Display

P76 17" Max. Viewable Image Size 326.7 x 242.5 mm.

P260 21" Max. Viewable Image Size 403.8 x 302.2 mm.

<b>Dimensions</b>				
<b>P76 display</b>				
Height		416 mm		16.3 in
Width		406 mm		15.9 in
Depth		430 mm		16.8 in
<b>P260 Display</b>				
Height		504 mm		19.7 in
Width		498 mm		19.6 in
Depth		509 mm		19.9 in
<b>Weight</b>				
<b>P76</b>		19.2 kg		43.2 lbs
<b>P260</b>		31.0 kg		70.0 lbs
<b>Electrical</b>				
Voltage range (V ac)				100 to 240
Frequency (hertz)				50 or 60
Power requirements (typical)		P76=110 watts, P260=160 watts		
Maximum altitude		3048 m (10000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 0 to 40°C (32 to 104°F)		<b>Non-Operating</b> -40 to 60°C (-40 to 140°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 10 to 80 %		<b>Non-Operating</b> 5 to 95 %
<b>Noise Emissions*</b> L <sub>WA</sub> d		<b>Operating</b> 4.5 bels		<b>Idle</b> 4.5 bels
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
	152mm (6 in)	152mm (6 in)	152mm (6 in)	152mm (6 in)
<b>Service</b>	Install so that air vents are not blocked.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3153 Display Station

The 3153 is an ASCII display station that attaches to a system that supports ASCII displays. It operates on a serial communications port with a choice of RS232C or RS422A communications interface. For additional information, see *3153 Marketing Reference Guide*, order number G520-9415.

<b>Dimensions</b>		
<b>Display with Tilt/Swivel<sup>1</sup></b>		
Height	330 mm	13.0 in
Width	318 mm	12.5 in
Depth	340 mm	13.4 in
<b>Keyboard</b>		
Height	38 mm	1.5 in
Width	451 mm	17.8 in
Depth	158 mm	6.3 in
<b>Weight</b>		
<b>Display with Tilt/Swivel</b>	7.7 kg	16.9 lbs
<b>Keyboard</b>	0.9 kg	2.0 lbs
<b>Electrical</b>		
Voltage range (V ac)	100 to 240	
Frequency (hertz)	50 or 60	
Thermal Output	222 Btu/hr	
Power requirements (typical) <sup>2</sup>	41 watts	
Power requirements (maximum)	65 watts	
Maximum altitude	3048 m (10000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Power Off, Shipping, Storage</b> 0 to 50°C (-32 to 122°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 30 to 80 %	<b>Power Off, Shipping, Storage</b> 10 to 95 %
<b>Noise Emissions<sup>3 4</sup></b>	<b>Operating</b> 4.8 bels or less	<b>Idle</b> -
<b>L<sub>WA</sub>d</b>		
<b>Service</b>	Install so that air vents are not blocked.	
<ol style="list-style-type: none"> <li>1. The display tilt/swivel stand has a +15° to -3° of tilt, +/- 135° of swivel and is not detachable from the display.</li> <li>2. Power consumption is reduced to less than 15 watts when power management feature is enabled.</li> <li>3. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>4. The noise emission level stated is the declared (upper limit) A-weighted sound power level, in Bel, for a random sample of monitors.</li> </ol>		





## Chapter 5. Physical Characteristics of the 2100 Series

This chapter provides the physical characteristics for the 2100 series of external devices. The following information can help you plan for your external devices. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale. Where a footprint is shown, the figure represents a top view of the device.

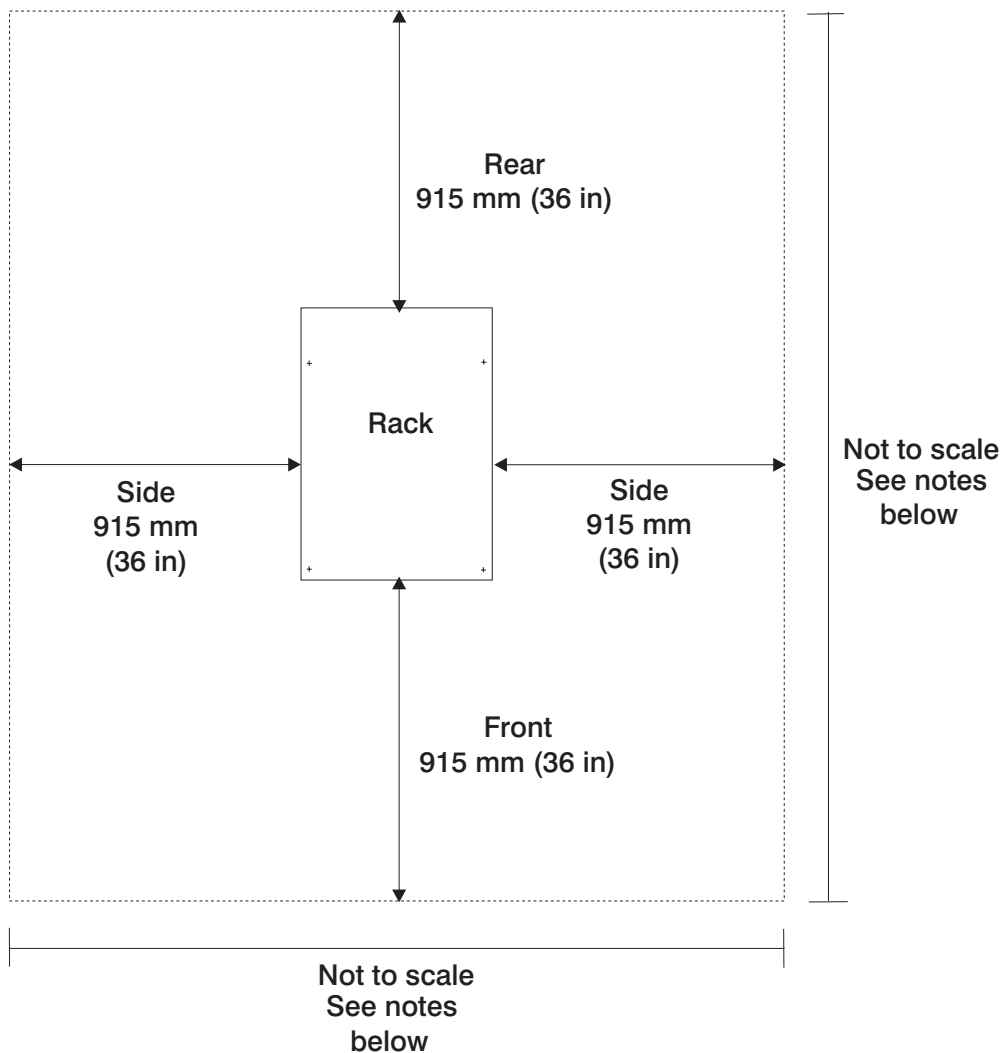
### 2101, 2102, and 2103 Fibre Channel RAID Storage Subsystem

#### 2101 Model 100 Seascope Solution Rack

<b>Dimensions</b>				
Height	1580 mm	62.0 in.		
Width	650 mm	25.5 in.		
Depth	1030 mm	36.0 in.		40.5 in.
<b>Weight (empty)</b>		160 kg	352 lbs.	
<b>Electrical</b>				
Power source loading:				
Maximum operating		2.7 kVA		
Voltage range (V ac)		200 to 240		
Frequency (hertz)		50 or 60		
Thermal output (Maximum)		9250 Btu/hr		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%	
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)	
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>	
$L_{WA,d}$		6.6 bels	NA bels	
$L_{pA,m}$		N/A	N/A	
$\langle L_{pA} \rangle_m$		NA dBA	NA dBA	
Impulsive or prominent discrete tones		N/A	N/A	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	915mm(36 in)	915mm(36 in)	915mm(36 in)	915mm(36 in)
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 2101 Model 100 Service Clearances

**Note:** For more information, see the following Website: <http://www.ibm.com/storage/>.



**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The illustration shows the minimum space required.

For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack. For five to six racks placed side by side, the left and right clearances need to be increased to 1525 mm (60 in). Having more than six racks side by side is not recommended.

## 2102 Model F10 Fibre Channel RAID Storage Server

<b>Dimensions</b>		
Height	175 mm	6.88 in. (4 EIA units)
Width	445 mm	17.5 in.
Depth	635 mm	25.0 in.
<b>Weight</b>	36 kg	79 lbs.
<b>Electrical</b>		
Power source loading:		
Maximum operating		0.329 kVA
Voltage range (V ac)		100 to 125 or 200 to 240
Frequency (hertz)		50 or 60
Thermal output (Maximum)		731 Btu/hr
Power Requirements		214 watts
Inrush current		4 amps. at 120 Vac
Maximum altitude		2135 m (7000 ft.)
<b>Temperature Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Humidity Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Noise Emissions</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Clearances</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	

## 2102 Model D00 Expandable Storage Unit

For more information on the 2102 Model D00 Expandable Storage Unit see page 232.

<b>Dimensions</b>		
Height	132 mm	5.2 in. (3 EIA units)
Width	480 mm	18.9 in.
Depth	575 mm	22.6 in.
<b>Weight</b>		
Minimum	31 kg	69 lbs.
Maximum	42 kg	92 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.39	
Voltage range (V ac)	100 to 125 or 200 to 240	
Frequency (hertz)	50 or 60	
Thermal output (typical)	1315 Btu/hr	
Power requirements (typical)	385 watts	
Inrush current	2.52 amps	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Humidity Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Noise Emissions</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	
<b>Clearances</b>	(see specifications for rack on page 2101 Model 100 Seascope Solution Rack on page 231)	

## 2103 Model H07 Fibre Channel Storage Hub

For more information on the 2103 Model H07 Fiber Channel Storage Hub see page 232.

<b>Dimensions</b>		
Height	44 mm	1.7 in. (1 EIA unit)
Width	219 mm	8.6 in.
Depth	367 mm	14.4 in.
<b>Weight</b>		
	4 kg	8 lbs.
<b>Electrical</b>		
Voltage range (V ac)	100 to 240	
Frequency (hertz)	50 or 60	
Power requirements (typical)	30 watts	
Inrush current	1 amp at 120 Vac	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascape Solution Rack on page 231)	
<b>Humidity Requirements</b>	(see specifications for rack on page 2101 Model 100 Seascape Solution Rack on page 231)	
<b>Noise Emissions</b>	(see specifications for rack on page 2101 Model 100 Seascape Solution Rack on page 231)	
<b>Clearances</b>	(see specifications for rack on page 2101 Model 100 Seascape Solution Rack on page 231)	

## 2104 Model DL1 Expandable Storage Plus

<b>Dimensions</b>					
Height	128 mm	5 in.	(3 EIA units)		
Width	445 mm	17.5 in.			
Depth	552 mm	21.7 in.			
<b>Weight<sup>1</sup></b>					
Minimum	21 kg	47 lbs.			
Maximum	32 kg	71 lbs.			
<b>Electrical</b> (For each drawer)					
Power source loading	N/A				
Power factor	not less than 0.97 at 25% maximum load				
Voltage range (V ac)	100 to 240				
Frequency (hertz)	50 to 60				
Thermal output (Maximum) <sup>1</sup>	921 Btu/hr				
Power Requirements (Maximum)	270 watts				
Inrush current	71 amps				
Maximum altitude	2133 m (7000 ft.)				
<b>Temperature Requirements<sup>2</sup></b>		<b>Operating</b>	<b>Non-Operating</b>		
		10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>	<b>Non-Operating</b>		
		8% to 80%	8% to 80%		
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)		
<b>Noise Emissions<sup>3</sup></b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d		6.15 bels	6.1 bels		
L <sub>pA</sub> m		N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>		N/A	N/A		
Impulsive or prominent discrete tones		N/A	N/A		
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>1</sup></b>		1140 mm(45 in)	810 mm (32 in)	N/A	N/A
<b>Service</b>		1140 mm(45 in)	810 mm (32 in)	When mounted in a rack	
<p>1. Each 2104 rack-mounted unit requires an air flow of 1.1 cubic meters/minute (40 Cubic feet per minute (CFM)). When racks containing many 2104 units are to be installed together, the following requirements must be met to ensure that the 2104 units are adequately cooled:</p> <ul style="list-style-type: none"> <li>• The airflow is in at the front of the rack and out at the back. To avoid moving exhaust air to the intake of another piece of equipment, racks should be positioned in alternate rows, back-to-back and front-to-front.</li> <li>• The front of racks should be positioned on floor-tile seams, with a full line of perforated tiles immediately in front of the racks.</li> <li>• Where racks are in rows front-to-front or back-to-back, there should be a gap of at least 1220 mm (48 in) separating the rows.</li> <li>• To ensure proper air flow within each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 2104 units.</li> </ul> <p>2. The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</p> <p>3. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</p>					

## 2104 Model DU3 Expandable Storage Plus

<b>Dimensions</b>					
Height	128 mm		5 in. (3 EIA units)		
Width	447 mm		17.6 in.		
Depth	563 mm		22.2 in.		
<b>Weight<sup>1</sup></b>					
Minimum	22 kg		49 lbs.		
Maximum	36 kg		80 lbs.		
<b>Electrical</b> (For each drawer)					
Power source loading			N/A		
Voltage range (V ac)			100 to 240		
Frequency (hertz)			50 to 60		
Thermal output (Maximum)			1126 Btu/hr		
Power Requirements (Maximum)			330 watts		
Power factor			not less than 0.95 at 50% maximum load		
Inrush current			40 amps		
Maximum altitude			2133 m (7000 ft.)		
<b>Temperature Requirements<sup>2</sup></b>		<b>Operating</b>	<b>Non-Operating</b>		
		10 to 40°C (50 to 104°F)	10 to 52°C (50 to 125°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>	<b>Non-Operating</b>		
		8% to 80%	8% to 80%		
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)		
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>		
$L_{WA,d}$		6.5 bels	6.1 bels		
$L_{pA,m}$		N/A	N/A		
$\langle L_{pA} \rangle_m$		N/A	N/A		
Impulsive or prominent discrete tones		N/A	N/A		
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		1140 mm(45 in)	810 mm (32 in)	N/A	N/A
<b>Service</b>		1140 mm(45 in)	810 mm (32 in)	When mounted in a rack	
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</p>					

## 2104 Model TL1 Expandable Storage Plus

<b>Dimensions</b>				
Height	529 mm	21.0 in.		
Width (at pedestal)	281 mm	11.0 in.		
Depth	594 mm	23.5 in.		
<b>Weight</b>				
Minimum	43.5 kg	96 lbs.		
Maximum	54.5 kg	120 lbs.		
<b>Electrical</b>				
Power source loading	N/A			
Power factor	not less than 0.97 at 25% of maximum load			
Voltage range (V ac)	88 to 264			
Frequency (hertz)	50 or 60			
Thermal output (Maximum)	921 Btu/hr			
Maximum altitude	2133 m (7000 ft.)			
<b>Temperature Requirements</b> (See note)	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	27°C (80°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b> 6.6 bels		<b>Idle</b> 6.5 bels	
L <sub>WA</sub> d	N/A		N/A	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	N/A		No	
Impulsive or prominent discrete tones				
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	1000 mm(39 in)	1000 mm(39 in)	1000 mm(39 in)	1000 mm(39 in)
<b>Footprint<sup>2</sup></b>	<b>Width</b> 281mm(11 in)		<b>Depth</b> 898mm(35.5 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				
<b>Note:</b> The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.				



## 2104 Model TU3 Expandable Storage Plus

<b>Dimensions</b>				
Height	539 mm	21.2 in.		
Width (at pedestal)	281 mm	11.0 in.		
Depth	585 mm	23.0 in.		
<b>Weight</b>				
Minimum	39 kg	86 lbs.		
Maximum	52 kg	114 lbs.		
<b>Electrical</b>				
Power source loading	N/A			
Voltage range (V ac)	100 to 240			
Frequency (hertz)	50 or 60			
Thermal output (Maximum)	1126 Btu/hr			
Power Requirements (Maximum)	330 watts			
Power factor	not less than 0.95 at 50% of maximum load			
Maximum altitude	2133 m (7000 ft.)			
<b>Temperature Requirements</b> (See note)	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing) <b>Wet Bulb</b>	<b>Operating</b> 8 to 80% 27°C (80°F)		<b>Non-Operating</b> 8 to 80% 27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b> 6.6 bels		<b>Idle</b> 6.5 bels	
L <sub>WAd</sub>	N/A		N/A	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	N/A		No	
Impulsive or prominent discrete tones				
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	1000 mm(39 in)	1000 mm(39 in)	1000 mm(39 in)	1000 mm(39 in)
<b>Footprint<sup>2</sup></b>	<b>Width</b> 281mm(11 in)		<b>Depth</b> 898mm(35.5 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				
<b>Note:</b> The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.				

## 2105 Model B09 Versatile Storage Server™

<b>Dimensions</b>				
Height		1780 mm		70.0 in.
Width		840 mm		33.0 in.
Depth		1305 mm		51.0 in.
<b>Weight</b>		746 kg		1640 lbs.
<b>Electrical</b>				
Power source loading				3.4 kVA
Power factor				0.9
Voltage range (V ac)				200 to 480
Frequency (hertz)				50 or 60
Thermal output (Maximum)				11600 Btu/hr
Maximum altitude				2135 m (7000 ft.)
<b>Temperature Requirements</b> (See note)		<b>Operating</b> 10 to 38°C (50 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b> L <sub>WA</sub> d			<b>Operating</b>	7.6 bels
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Service</b>	1145 mm(45 in)	810 mm (32 in)	N/A	N/A
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
<b>Note:</b> The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.				

## 2105 Models E10, F10, E20, F20, and 800 Enterprise Storage Servers

For more information on the 2105 Models E10, F10, E20, F20, 800 and E20, F20, or 800 with the expansion enclosure, see note 1 below.

<b>Dimensions</b>		
Height		1915 mm (75.3 in.)
Width E10, F10, E20, F20, 800		1383 mm (54.4 in.)
Width E20, F20, 800 with Expansion Enclosure		2938 mm (115.7 in.)
Depth		909 mm (35.8 in.)
<b>Weight</b>		
various configurations	See 2105 Enterprise Storage Server Clearances and Floor Loading on page 242.	
<b>Electrical</b>		
Power source loading for Max. E10, F20		3.5 kVA
Power source loading for Max. E20, F20		5 kVA
Voltage low range (V ac)		200 to 240
high range (V ac)		380 to 480
Frequency (hertz)		50 or 60
Thermal output (Maximum) E10, F10		11000 Btu/hr
Thermal output (Maximum) E20, F20		16000 Btu/hr
Power factor		0.9
Maximum altitude		2135 m (7000 ft.)
<b>Temperature Requirements</b> <sup>2</sup>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions</b> <sup>3</sup>	<b>Operating</b> 7.5 to 7.75 bels	
<b>L<sub>WAd</sub></b> All Models		
<b>Service Clearances</b>	See “2105 Enterprise Storage Server Clearances and Floor Loading” on page 242.	
<b>Floor Loading</b>	See “2105 Enterprise Storage Server Clearances and Floor Loading” on page 242.	
<ol style="list-style-type: none"> <li>For more information see <i>Enterprise Storage Server Introduction and Planning Guide</i>, order number GC26-7294.</li> <li>The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</li> <li>See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.</li> </ol>		

## 2105 Enterprise Storage Server Clearances and Floor Loading

For more information on the 2105 Models E10, F10, E20, F20 see the table “2105 Models E10, F10, E20, F20, and 800 Enterprise Storage Servers” on page 241.

Service clearances are 1145 mm (45 in) front and 1145 mm (45 in) back.

The following table shows service clearances, floor loading, and side clearance requirements.

Configuration and Weight kg (lbs.)	Service Clearance		Floor Loading See notes 1 and 3)	Side Clearances (both Sides) See note 4	
	Front mm (in)	Rear mm (in)	kg/sq m (lbs/sq ft)	mm	inches
Model E10, F10 980 (2160)	1145 (45)	1145 (45)	522 (107) 488 (100) 440 (90) 342 (70)	0 76 178 559	0 3 7 22
Models E20, F20, 800 1175 (2590)	1145 (45)	1145 (45)	610 (125) 488 (100) 440 (90) 342 (70)	0 229 356 762	0 9 14 30
Models E20, F20, 800 with Expansion Enclosure 2495 (5500)	1145 (45)	1145 (45)	586 (120) 488 (100) 440 (90) 342 (70)	0 406 686 See notes 2 and 5	0 16 27 See notes 2 and 5

### Notes:

1. It is recommended that the Enterprise Storage Server (ESS) be installed on a floor with a minimum of 342 kilograms per square meter (kg/sq m) (70 pounds per square foot (lbs/sq ft)) strength.
2. If you install a Model E20 or F20 with an expansion enclosure, the minimum floor strength must be 440 kg/sq m (90 lbs/sq ft). At 342 (kg/sq m) (70 (lbs/sq ft)), the side clearance exceeds the 762 mm (30 in.) maximum allowed. Consult a structural engineer if you are unsure about correct placement and clearances of these machines for floor loading distribution. You need to install a 28 mm (11 in) spacer between a Model E20 or a Model F20 and an expansion enclosure.
3. Floor loadings are calculated for maximum weight of the storage server.
4. Side clearances are for both sides of an ESS expansion enclosure. Clearances on both sides are dedicated to the ESS. Adjoining expansion enclosures must have their own floor loading clearance.
5. Multiple expansion enclosures are bolted together using 28 mm (11 in) spacers. Move the side cover of the E20 or F20 to the side of the expansion enclosure.

## 2108 Model G07 Storage Area Network Data Gateway

<b>Dimensions</b>		
Height	89 mm	3.5 in. 2 EIA
Width	425 mm	16.73 in.
Depth	280 mm	11.0 in.
<b>Weight</b>		
Minimum	4.1 kg	9.0 lbs.
Maximum	4.1 kg	9.0 lbs.
<b>Electrical</b>		
Power source loading in active mode (typical in kVA)	0.2	
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	205 Btu/hr	
Power requirements (typical)	60 watts	
Power factor	0.65 120Vac - 0.53 240 Vac	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b> <sup>1</sup>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions</b> <sup>2</sup>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	6.2 bels	N/A bels
L <sub>pA</sub> m	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	45 dBA	N/A dBA
Impulsive or prominent discrete tones	No	No
<b>Install/Air Flow.</b>	When mounted in an enclosed rack, provision must be made to allow for a minimum of 24 cubic feet per minute of air flow to the exterior of the rack.	
<ol style="list-style-type: none"> <li>1. The recommended operating temperature is 22°C (72°F) or lower.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> </ol>		

## 2109 SAN Fiber Channel Switch

### Model S08

<b>Dimensions</b>		
Height — Rack Mount	43.4 mm	1.71 in.
Height — Table Top	47.2 mm	1.86 in.
Width	428.6 mm	16.88 in.
Depth	450 mm	17.72 in.
<b>Weight</b>		
Single Power Supply	6.36 kg	14.0 lbs.
Dual Power Supply	7.73 kg	17.0 lbs.
<b>Electrical</b>		
Voltage range (V ac)	100 to 240	
Frequency (hertz)	50 or 60	
Maximum altitude	3000 m (9,800 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> –35 to 60°C (–31 to 147°F)
<b>Humidity Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	5 to 80% Noncondensing @ 40°C	

### Model S16

<b>Dimensions</b>		
Height — Rack Mount	87.3 mm	3.44 in.
Height — Table Top	91.2 mm	3.59 in.
Width	428.6 mm	16.88 in.
Depth	450 mm	17.72 in.
<b>Weight</b>		
Single Power Supply	11.59 kg	25.5 lbs.
Dual Power Supply	12.94 kg	28.5 lbs.
<b>Electrical</b>		
Voltage range (V ac)	100 to 240	
Frequency (hertz)	50 or 60	
Maximum altitude	3000 m (9,800 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> –35 to 60°C (–31 to 147°F)
<b>Humidity Requirements</b>	<b>Operating</b>	<b>Non-Operating</b>
	5 to 80% Noncondensing @ 40°C	

## Chapter 6. Physical Characteristics of the 3000 Series

This chapter provides the physical characteristics for the 3000 series of external devices. The following information can help you plan for your external devices. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale.

### 3490E Enhanced Magnetic Tape Subsystem C11 and C22

<b>Dimensions</b>				
Height		622 mm		24.5 in
Width		479 mm		18.6 in
Depth		885 mm		34.9 in
<b>Weight</b>				
C11		90 kg		198 lbs
C22		118 kg		260 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)				
C11			0.57	
C22			0.90	
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80 %		<b>Non-Operating</b> 20 to 80 %
<b>Wet Bulb</b>		25.6°C (78°F)		25.6°C (78°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
$L_{WA,d}$				
C11		6.1 bels		5.8 bels
C22		6.4 bels		6.3 bels
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3490E Enhanced Magnetic Tape Subsystem E01 and E11

<b>Dimensions E01 (Table Top)</b>				
Height		268 mm		10.8 in
Width		220 mm		8.8 in
Depth		801 mm		32.0 in
<b>Dimensions E01 (Rack Mounted)</b>				
Height		336 mm		13.5 in
Width		220 mm		8.8 in
Depth		758 mm		30.3 in
<b>Weight</b>				
E01		25.9 kg		57 lbs
E11		36.0 kg		80 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)				
E01			0.39	
E11			0.39	
Thermal Output (max)			540 Btu/hr	
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 40°C (50 to 104°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80 % 27°C (80.6°F)		<b>Non-Operating</b> 8 to 80 % 27°C (80.6°F)
<b>Wet Bulb</b>				
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
E01		58 dBA		53 dBA
E11		58 dBA		53 dBA
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				



## 3514 Models 212 and 213

<b>Dimensions</b>				
Height		610 mm		24 in
Width				
Enclosure		260 mm		10.3 in
Base		345 mm		13.5 in
Depth		800 mm		31.5 in
<b>Weight</b>				
Minimum		58 kg		128 lbs
Maximum		64 kg		140 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)			.33	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		1024 Btu/hr		
Power requirements (typical)		300 watts		
Power factor		0.91		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements**</b>		<b>Operating</b> 16 to 32°C (50 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.7 bels		5.5 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		38 dBA		36 dBA
Impulsive noise or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	1 mm(40 in)	50 mm(2 in)	25 mm(1 in)	25 mm(1 in)
<b>Service</b>	Must provide reasonable service access to front and rear of unit. Recommended clearance provides enough room to slide unit forward for access to rear.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
**(Below 914 m (3000 ft) altitude, operating range is extended to 35°C(95°F)				

## 3570 Models B00 and C00

<b>Dimensions</b>	<b>Horizontal</b>		<b>Vertical</b>	
Height	112 mm 4.4 in.		320 mm 12.6 in.	
Width	320 mm 12.6 in.		112 mm 4.4 in.	
Depth	338 mm 13.3 in.		338 mm 13.3 in.	
<b>Weight</b>				
Minimum	8.4 kg 18.5 lbs.		8.4 kg 18.5 lbs.	
Maximum (with stand)	8.5 kg 18.7 lbs.		8.5 kg 18.7 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.06			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	205 Btu/hr			
Power requirements (typical)	60 watts			
Power factor	0.99 (100 V ac) or 0.95 (200 V ac)			
Inrush current	30 amps at 100 V ac, 40 amps at 220 V ac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (61 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 109°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	26°C(79°F)		27°C(81°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.5 bels		5.5 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	37dBA		37dBA	
Impulsive noise	None		None	
Prominent discrete tones	None		None	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install Air Flow<sup>2</sup></b>	76 mm (3 in)	76 mm (3 in)	None	None
<b>Service</b>	No additional clearance is needed for service.			
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. Air flow is 25 CFM				

## 3570 Models B01 and C01

<b>Dimensions</b>				
Height		217 mm		8.5 in.
Height (with stand)		242.4 mm		9.5 in.
Width		483 mm		19.0 in.
Depth		771 mm		30.4 in.
<b>Weight</b>				
Maximum		35.0 kg		77.1 lbs
Maximum (with stand)		39.8 kg		87.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		239 Btu/hr		
Power requirements (typical)		70 watts		
Power factor		0.99 (100 V ac) or 0.95 (200 V ac)		
Inrush current		30 amps at 120 V ac, 40 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (61 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		26°C(79°F)		27°C(81°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.7 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		41dBA		36dBA
Impulsive noise		None		None
Prominent discrete tones		None		None
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install Air Flow<sup>2</sup></b>	76 mm (3 in)	76 mm (3 in)	None	None
<b>Service</b>	No additional clearance is needed for service.			
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. Air flow is 25 CFM				

## 3570 Model B02 and C02

<b>Dimensions</b>				
Height		217 mm		8.5 in.
Height (with stand)		242.4 mm		9.5 in.
Width		483 mm		19.0 in.
Depth		771 mm		30.4 in.
<b>Weight</b>				
Maximum		40.0 kg		88.2 lbs
Maximum (with stand)		44.8 kg		98.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)			0.13	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		444 Btu/hr		
Power requirements (typical)		130 watts		
Power factor		0.99 (100 V ac) or 0.95 (200 V ac)		
Inrush current <sup>1</sup>		30 amps at 120 V ac, 40 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (61 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 109°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		26°C(79°F)		27°C(81°F)
<b>Noise Emissions<sup>2</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.8 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		43dBA		38dBA
Impulsive noise		None		None
Prominent discrete tones		None		None
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>3</sup></b>	76 mm (3 in)	76 mm (3 in)	None	None
<b>Service</b>	No additional clearance is needed for service.			
<ol style="list-style-type: none"> <li>Inrush current for each line cord. This model has two line cords.</li> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>Air flow is 50 CFM.</li> </ol>				

## 3570 Models B11 and C11

<b>Dimensions</b>				
Height		217 mm	8.5 in.	(5EIA units)
Width		444 mm	17.5 in.	
Depth		714 mm	28.1 in.	
<b>Weight</b>				
Maximum		24.0 kg	52.8 lbs	
<b>Electrical</b>				
Power source loading (typical in kVA)		0.07		
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		239 Btu/hr		
Power requirements (typical)		70 watts		
Power factor		0.99 (100 V ac) or 0.95 (200 V ac)		
Inrush current		30 amps at 120 V ac, 40 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (61 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		26°C(79°F)	27°C(81°F)	
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>	
$L_{WA_d}$		5.5bels	5.1bels	
$L_{pA_m}$		N/A	N/A	
$\langle L_{pA} \rangle_m$		39 dBA	34 dBA	
Impulsive noise		None	None	
Prominent discrete tones		None	None	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See service clearances for the "7015 System Rack R00" on page 41.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3570 Models B12 and C12

<b>Dimensions</b>				
Height		217 mm	8.5 in.	(5EIA units)
Width		444 mm	17.5 in.	
Depth		714 mm	28.1 in.	
<b>Weight</b>				
Maximum		29.0 kg	63.9 lbs	
<b>Electrical</b>				
Power source loading (typical in kVA)		0.13		
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		444 Btu/hr		
Power requirements (typical)		130 watts		
Power factor		0.99 (100 V ac) or 0.95 (200 V ac)		
Inrush current <sup>1</sup>		30 amps at 120 V ac, 40 amps at 240 V ac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (61 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 109°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		26°C(79°F)	27°C(81°F)	
<b>Noise Emissions<sup>2</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub>		5.6bels	5.3bels	
L <sub>pAm</sub>		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		41 dBA	36 dBA	
Impulsive noise		None	None	
Prominent discrete tones		None	None	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	See service clearances for the “7015 System Rack R00” on page 41.			
1. Inrush current for each line cord. This model has two line cords.				
2. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.				

## Magstar® MP 3575 Tape Library Dataserver Model L06

<b>Dimensions</b>				
Height		991 mm		39 in.
Width		355 mm		14 in.
Depth		836 mm		37.9 in.
<b>Weight</b>				
Maximum		71 kg		157 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)				0.175
Voltage range (V ac)				100 to 127 or 200 to 240
Frequency (hertz)				50 or 60
Thermal output (typical)				600 Btu/hr
Power requirements (typical)				175 watts
Power factor				0.99
Maximum altitude				2135 m (7000 ft.)
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
<b>Wet Bulb</b>		8 to 80% 26°C(79°F)		8 to 80% 27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		6.6 bels		5.6 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		47dBA		34dBA
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
<b>Install/Air Flow</b>	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>		Install so that it can be moved to an area providing 760 mm (30 in) on each side.		
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## Magstar MP 3575 Tape Library Dataserver Model L12

<b>Dimensions</b>					
Height		1029 mm		40.5 in.	
Width		1009 mm		39.7 in.	
Depth		861 mm		33.9 in.	
<b>Weight</b>					
Maximum		127 kg		280 lbs	
<b>Electrical</b>					
Power source loading (typical in kVA)			0.28		
Voltage range (V ac)		100 to 127 or 200 to 240			
Frequency (hertz)		50 or 60			
Thermal output (typical)		850 Btu/hr			
Power requirements (typical)		250 watts			
Power factor		0.89			
Maximum altitude		2135 m (7000 ft.)			
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%		
<b>Wet Bulb</b>		26°C(79°F)	27°C(80°F)		
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d		6.7 bels	5.9 bels		
L <sub>pA</sub> m		N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>		47dBA	34dBA		
Impulsive noise		Yes	Yes		
Prominent discrete tones		No	No		
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>		76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.				
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.					



## Magstar MP 3575 Tape Library Dataserver Model L18

<b>Dimensions</b>				
Height		1029 mm		40.5 in.
Width		1009 mm		39.7 in.
Depth		861 mm		33.9 in.
<b>Weight</b>				
Maximum		132 kg		290 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)				0.45
Voltage range (V ac)				100 to 127 or 200 to 240
Frequency (hertz)				50 or 60
Thermal output (typical)				1200 Btu/hr
Power requirements (typical)				350 watts
Power factor				0.78
Maximum altitude				2135 m (7000 ft.)
<b>Temperature Requirements</b>		<b>Operating</b>	<b>Non-Operating</b>	
		16 to 32°C (60 to 90°F)	10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>	<b>Non-Operating</b>	
<b>Wet Bulb</b>		8 to 80% 26°C(79°F)	8 to 80% 27°C(80°F)	
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>	
$L_{WA_d}$		6.8 bels	6.2 bels	
$L_{pA_m}$		N/A	N/A	
$\langle L_{pA} \rangle_m$		47dBA	34dBA	
Impulsive noise		Yes	Yes	
Prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## Magstar MP 3575 Tape Library Dataserver Model L24

<b>Dimensions</b>				
Height		1480 mm		58.3 in.
Width		1009 mm		39.7 in.
Depth		861 mm		33.9 in.
<b>Weight</b>				
Maximum		195 kg		428 lbs
<b>Electrical</b>				
Power source loading (typical in kVA)				0.45
Voltage range (V ac)				100 to 127 or 200 to 240
Frequency (hertz)				50 or 60
Thermal output (typical)				1200 Btu/hr
Power requirements (typical)				350 watts
Power factor				0.78
Maximum altitude				2135 m (7000 ft.)
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		26°C(79°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		6.8 bels		6.2 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		47dBA		34dBA
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## Magstar MP 3575 Tape Library Dataserver Model L32

<b>Dimensions</b>					
Height		1480 mm		58.3 in.	
Width		1009 mm		39.7 in.	
Depth		861 mm		33.9 in.	
<b>Weight</b>					
Maximum		203 kg		446 lbs	
<b>Electrical</b>					
Power source loading (typical in kVA)				0.45	
Voltage range (V ac)				100 to 127 or 200 to 240	
Frequency (hertz)				50 or 60	
Thermal output (typical)				1200 Btu/hr	
Power requirements (typical)				350 watts	
Power factor				0.78	
Maximum altitude				2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%		
<b>Wet Bulb</b>		26°C(79°F)	27°C(80°F)		
<b>Noise Emissions*</b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d		6.8 bels	6.2 bels		
L <sub>pA</sub> m		N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>		47dBA	34dBA		
Impulsive noise		Yes	Yes		
Prominent discrete tones		No	No		
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>		76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>		Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.					

---

## 3590 Magstar Tape System

### 3590 Magstar Tape System Models B11 and B1A

<b>Dimensions</b>	<b>B11 Rack</b>	<b>B1A Library</b>
Height	522 mm 20.6 in.	262 mm 10.5 in.
Width	230 mm 9.1 in.	221 mm 8.8 in.
Depth	988 mm 39.0 in.	750 mm 29.8 in.
<b>Weight</b>	49.5 kg 109 lbs.	28.6 kg 63 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.3	
Thermal output (typical)	1024 Btu/hr	
<b>Temperature Requirements</b> (media in use)	16 to 32°C (60 to 90°F)	
<b>Humidity Requirements</b> (Noncondensing)	20 to 80%	
<b>Wet Bulb</b>	23°C (73°F)	

### 3590 Magstar Tape System Model C12 Frame

<b>Dimensions</b>		
Height	1803 mm 71.0 in.	
Width	724 mm 28.5 in.	
Depth	775 mm 30.5 in.	
<b>Weight</b>	400 kg 880 lbs.	
<b>Electrical</b>		
Power source loading (typical in kVA)	1.2	
Thermal output (typical)	7830 Btu/hr *	
<b>Temperature Requirements</b> (media in use)	16 to 32°C (60 to 90°F)	
<b>Humidity Requirements</b> (Noncondensing)	20 to 80%	
<b>Wet Bulb</b>	26°C (79°F)	

**Note:** \* Includes four B1A or E1A drives and associated cables

## 3590 Magstar Tape System Models E11 and E1A

<b>Dimensions</b>	<b>E11 Rack</b>	<b>E1A Library</b>
Height	522 mm 20.6 in.	262 mm 10.5 in.
Width	230 mm 9.1 in.	221 mm 8.8 in.
Depth	988 mm 39.0 in.	750 mm 29.8 in.
<b>Weight</b>	46.7 kg 103.0 lbs.	30.0 kg 66.0 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)		0.225
Thermal output (typical)		770 Btu/hr
<b>Temperature Requirements</b> (media in use)		16 to 32°C (60 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)		20 to 80%
<b>Wet Bulb</b>		25°C (78°F)

## 3995 Model 063

<b>Dimensions</b>				
Height		681 mm		26.8 in.
Width		375 mm		14.8 in.
Depth		805 mm		31.7 in.
<b>Weight</b>				
Minimum		93 kg		205 lbs
Maximum		N/A		N/A
<b>Electrical</b>				
Power source loading (typical in kVA)			0.16	
Voltage range (V ac)		100 to 127 or 200 to 240 (selectable)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			350 Btu/hr	
Power requirements (typical)			100 watts	
Power factor			0.63	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
<b>Wet Bulb</b>		8 to 80%		8 to 80%
		23°C(73°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6.0 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		43 dBA		37 dBA
Impulsive noise		Yes		No
Prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
<b>Install/Air Flow</b>		1020mm(40 in)	1020mm(40 in)	559mm(22 in)
				559mm(22 in)
<b>Service</b>		Install so that it can be moved to an area providing 760 mm(30 in) on each side.		
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model 163

<b>Dimensions</b>				
Height		1800 mm		70.9 in.
Width		692 mm		27.3 in.
Depth		943 mm		37.1 in.
<b>Weight</b>				
Minimum		408 kg		900 lbs
Maximum		N/A		N/A
<b>Electrical</b>				
Power source loading (typical in kVA)			0.25	
Voltage range (V ac)			200 to 240	
Frequency (hertz)			50 or 60	
Thermal output (typical)			750 Btu/hr	
Power requirements			220 watts	
Power factor			0.89	
Inrush current			10 amps	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C 10 to 43°C
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
<b>Wet Bulb</b>		8 to 80% 23°C(73°F)		8 to 80% 27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
$L_{WA_d}$		6.5 bels		5.5 bels
$L_{pA_m}$		N/A		N/A
$\langle L_{pA} \rangle_m$		46 dBA		42 dBA
Impulsive noise		Yes		No
Prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
<b>Install/Air Flow</b>		1020mm(40 in)	1020mm(40 in)	559mm(22 in)
				559mm(22 in)
<b>Service</b>		Install so that it can be moved to an area providing 760 mm(30 in) on each side.		
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model A63

<b>Dimensions</b>				
Height		492 mm		19.38 in.
Width		220 mm		8.70 in.
Depth		711 mm		28.00 in.
<b>Weight</b>				
Minimum		32.2 kg		75.5 lbs
Maximum		N/A		N/A
<b>Electrical</b>				
Power source loading (typical in kVA)			0.11	
Voltage range (V ac)		100 to 127 or 200 to 240		
Frequency (hertz)		50 or 60		
Thermal output (typical)		250 Btu/hr		
Power requirements (typical)		60 watts		
Power factor		0.6 (100-127 V ac) or 0.55 (200-240 V ac)		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C(73°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6.4 bels		5.1 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		47dBA		34dBA
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				



## 3995 Model C60

<b>Dimensions</b>				
Height		457 mm		18.0 in.
Width		216 mm		8.5 in.
Depth		737 mm		29.0 in.
<b>Weight</b>				
Minimum (w/o cartridges)		28.0 kg		61 lbs
Maximum (with 20 cartridges)		34.1 kg		75 lbs
Typical weight of cartridge		0.32 kg		0.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA) @ 120 V ac			0.14	
Voltage range (V ac)			100 to 127 or 200 to 240	
Frequency (hertz)			50 or 60	
Thermal output (typical)			275 Btu/hr	
Power requirements (typical)			80 watts	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100.4°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		25.8°C(78.4°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		N/A		N/A
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air flow</b>	leave open for operator panel	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model C62

<b>Dimensions</b>				
Height		991 mm		39.0 in.
Width		355 mm		14.0 in.
Width (with stabilizers)		464 mm		18.3 in.
Depth		737 mm		29.0 in.
<b>Weight</b>				
Minimum (w/o cartridges)		69 kg		152 lbs
Maximum (with 52 cartridges)		85.6 kg		188.4 lbs
Typical weight of cartridge		0.32 kg		0.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA) @ 120 V ac			0.16	
Voltage range (V ac)		100 to 127 or 200 to 240		
Frequency (hertz)		50 or 60		
Thermal output (typical)		310 Btu/hr		
Power requirements (typical)		90 watts		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100.4°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		25.8°C(78.4°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
$L_{WA,d}$		6 bels		5.5 bels
$L_{pA,m}$		N/A		N/A
$<L_{pA}>_m$		N/A		N/A
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air flow</b>	leave open for operator panel	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model C64

<b>Dimensions</b>				
Height		1029 mm		40.5 in.
Width		813 mm		32.0 in.
Depth		762 mm		30.0 in.
<b>Weight</b>				
Minimum (w/o cartridges)		125 kg		275 lbs
Maximum (with 104 cartridges)		158 kg		348 lbs
Typical weight of cartridge		0.32 kg		0.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA) @ 120 V ac			0.17	
Voltage range (V ac)			100 to 127 or 200 to 240	
Frequency (hertz)			50 or 60	
Thermal output (typical)			340 Btu/hr	
Power requirements (typical)			100 watts	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100.4°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		25.8°C(78.4°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
$L_{WA,d}$		6 bels		5.5 bels
$L_{pA,m}$		N/A		N/A
$\langle L_{pA} \rangle_m$		N/A		N/A
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air flow</b>	leave open for operator panel	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model C66

<b>Dimensions</b>				
Height		1029 mm		40.5 in.
Width		813 mm		32.0 in.
Depth		762 mm		30.0 in.
<b>Weight</b>				
Minimum (w/o cartridges)		125 kg		275 lbs
Maximum (with 156 cartridges)		175 kg		384 lbs
Typical weight of cartridge		0.32 kg		0.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA) @ 120 V ac			0.31	
Voltage range (V ac)			100 to 127 or 200 to 240	
Frequency (hertz)			50 or 60	
Thermal output (typical)			475 Btu/hr	
Power requirements (typical)			140 watts	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100.4°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		25.8°C(78.4°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		N/A		N/A
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air flow</b>	leave open for operator panel	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				

## 3995 Model C68

<b>Dimensions</b>				
Height		1480 mm		58.3 in.
Width		813 mm		32.0 in.
Depth		762 mm		30.0 in.
<b>Weight</b>				
Minimum (w/o cartridges)		193 kg		425 lbs
Maximum (with 258 cartridges)		275 kg		606 lbs
Typical weight of cartridge		0.32 kg		0.7 lbs
<b>Electrical</b>				
Power source loading (typical in kVA) @ 120 V ac			0.31	
Voltage range (V ac)			100 to 127 or 200 to 240	
Frequency (hertz)			50 or 60	
Thermal output (typical)			475 Btu/hr	
Power requirements (typical)			140 watts	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 38°C (50 to 100.4°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125.6°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		25.8°C(78.4°F)		27°C(80°F)
<b>Noise Emissions*</b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		N/A		N/A
Impulsive noise		Yes		Yes
Prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air flow</b>	leave open for operator panel	76 mm (3 in)	76 mm (3 in)	76 mm (3 in)
<b>Service</b>	Install so that it can be moved to an area providing 760 mm (30 in) on each side.			
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				



## Chapter 7. Physical Characteristics of the 7100 Series

This chapter provides the physical characteristics for the 7100 series of external devices. The following information can help you plan for your external devices. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale. Where a footprint is shown, the figure represents a top view of the device.

### 7131 Model 105 SCSI Multi-Storage Tower

<b>Dimensions</b>				
Height	407 mm	16.0 in.		
Width (at pedestal)	197 mm	7.8 in.		
Depth	483 mm	19.0 in.		
<b>Weight</b>				
Minimum	15.4 kg	34 lbs.		
Maximum	20.0 kg	44 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.76 to 0.96			
Voltage range (V ac)	100 to 125 or 200 to 240 (selectable)			
Frequency (hertz)	50 or 60			
Thermal output (max)	1638 Btu/hr			
Power requirements (max)	480 watts			
Power factor	0.5			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d (5 devices)	6.0 bels		5.6 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	50 dBA		46 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	25 mm(1 in)	25 mm(1 in)
<b>Service</b>	152 mm(6 in)	N/A	N/A	25 mm(1 in)
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 790mm(31 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7131 Model 405 SSA Multi-Storage Tower

<b>Dimensions</b>				
Height		407 mm		16.0 in.
Width (at pedestal)		197 mm		7.8 in.
Depth		483 mm		19.0 in.
<b>Weight</b>				
Minimum		15.4 kg		34 lbs.
Maximum		18.0 kg		40 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.39	
Voltage range (V ac)			100 to 125 or 200 to 240 (selectable)	
Frequency (hertz)			50 or 60	
Thermal output (max)			785 Btu/hr	
Power requirements (max)			230 watts	
Power factor			0.5	
Maximum altitude			2135 m (7000 ft.)	
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub> (5 devices)		6.0 bels		5.6 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		50 dBA		46 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	25 mm(1 in)	25 mm(1 in)
<b>Service</b>	152 mm(6 in)	N/A	N/A	25mm(1in)
<b>Footprint<sup>2</sup></b>		<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 790mm(31 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 7133 Models 010 and 020 Rack-Mounted SSA Subsystem

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4 EIA units)
Width	444 mm	17.5 in.
Depth	665 mm	26.2 in.
<b>Weight</b>		
Minimum	36 kg	79 lbs.
Maximum	50 kg	110 lbs.
<b>Electrical</b>		
Power source loading:		
Maximum start-up		0.657 kVA
Maximum operating		0.499 kVA
Maximum idling		0.45 kVA
Power factor		greater than 0.95
Voltage range (V ac)		100 to 240
Voltage optional (V dc)		240 to 375
Frequency (hertz)		50 or 60
DC Power Supply -48 V dc (Model 020 only)		-40 to -60
Thermal output (Maximum)	2074 Btu/hr (See note 1)	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b> (See note 2)	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.15 bels	6.1 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	45 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		
<ol style="list-style-type: none"> <li>Each 7133 rack-mounted unit requires an air flow of 2.46 cubic meters/minute (87 CFM). When racks containing many 7133 units are to be installed together, the following requirements must be met to ensure that the 7133 units are adequately cooled: <ul style="list-style-type: none"> <li>The airflow is in at the front of the rack and out at the back. To avoid moving exhaust air to the intake of another piece of equipment, racks should be positioned in alternate rows, back-to-back and front-to-front.</li> <li>The front of racks should be positioned on floor-tile seams, with a full line of perforated tiles immediately in front of the racks. Each perforated tile should have an air flow of at least 11.34 m<sup>3</sup>/min (400 CFM). The underfloor temperature must be at most 15°C (60°F).</li> <li>Where racks are in rows front-to-front or back-to-back, there should be a gap of at least 1220 mm (48 in) separating the rows.</li> <li>To ensure proper air flow within each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 7133 units.</li> </ul> </li> <li>The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</li> </ol>		

## 7133 Model D40 Rack-Mounted SSA Subsystem

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4 EIA units)
Width	444 mm	17.5 in.
Depth	665 mm	26.2 in.
<b>Weight</b>		
Minimum	36 kg	79 lbs.
Maximum	50 kg	110 lbs.
<b>Electrical</b>		
Power source loading:		
Maximum start-up		0.756 kVA
Maximum operating		0.636 kVA
Maximum idling		0.532 kVA
Power factor		greater than 0.95
Voltage range (V ac)		88 to 264
Voltage optional (V dc)		N/A
Frequency (hertz)		50 to 60
Thermal output (Maximum)		1880 Btu/hr (See note 1)
Maximum altitude		2133 m (7000 ft.)
<b>Temperature Requirements</b> (See note 2)	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 40°C (50 to 104°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA,d}$	6.15 bels	6.1 bels
$L_{pA,m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	N/A	N/A
Impulsive or prominent discrete tones	N/A	N/A
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		
<p>1. Each 7133 rack-mounted unit requires an air flow of 2.46 cubic meters/minute (87 CFM). When racks containing many 7133 units are to be installed together, the following requirements must be met to ensure that the 7133 units are adequately cooled:</p> <ul style="list-style-type: none"> <li>• The airflow is in at the front of the rack and out at the back. To avoid moving exhaust air to the intake of another piece of equipment, racks should be positioned in alternate rows, back-to-back and front-to-front.</li> <li>• The front of racks should be positioned on floor-tile seams, with a full line of perforated tiles immediately in front of the racks. Each perforated tile should have an air flow of at least 11.34 m<sup>3</sup>/min (400 CFM). The underfloor temperature must be at most 15°C (60°F).</li> <li>• Where racks are in rows front-to-front or back-to-back, there should be a gap of at least 1220 mm (48 in) separating the rows.</li> <li>• To ensure proper air flow within each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 7133 units.</li> </ul> <p>2. The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</p>		

## 7133 Model T40 Deskside SSA Subsystem

<b>Dimensions</b>				
Height	610 mm	24.0 in.		
Width (at pedestal)	210 mm	8.3 in.		
Depth	820 mm	32.3 in.		
<b>Weight</b>				
Minimum	58.5 kg	129 lbs.		
Maximum	72.5 kg	160 lbs.		
<b>Electrical</b>				
Power source loading:				
Maximum start-up		0.756 kVA		
Maximum operating		0.636 kVA		
Maximum idling		0.532 kVA		
Power factor		greater than 0.95		
Voltage range (V ac)		88 to 264		
Frequency (hertz)		50 or 60		
Thermal output (Maximum)		1880 Btu/hr		
Maximum altitude		2133 m (7000 ft.)		
<b>Temperature Requirements</b> (See note)	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 40°C (50 to 104°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	27°C (80°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.6 bels		6.5 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	N/A		N/A	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow *</b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
<b>Note:</b> * The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.				

## 7133 Models 500 and 600 Deskside SSA Subsystem

<b>Dimensions</b>				
Height	610 mm	24.0 in.		
Width (at pedestal)	210 mm	8.3 in.		
Depth	820 mm	32.3 in.		
<b>Weight</b>				
Minimum	58.5 kg	129 lbs.		
Maximum	72.5 kg	160 lbs.		
<b>Electrical</b>				
Power source loading:				
Maximum start-up		0.657 kVA		
Maximum operating		0.499 kVA		
Maximum idling		0.45 kVA		
Power factor		greater than 0.95		
Voltage range (V ac)		100 to 240		
Frequency (hertz)		50 or 60		
Thermal output (Maximum)		2074 Btu/hr		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b> (See note)	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b> Avg. Max.		<b>Idle</b> Avg. Max.	
$L_{WA,d}$	6.0 bels 6.8 bels		5.5 bels 6.6 bels	
$L_{pA,m}$	N/A		N/A	
$\langle L_{pA} \rangle_m$	50 dBA 59 dBA		45 dBA 56 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The amount of space needed by the unit during normal operation is indicated by broken lines on the footprint.</p>				
<p><b>Note:</b> The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit will be exposed to a greater risk of failure from external causes.</p>				

## 7134 Model 010 High-Density SCSI Disk Subsystem

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4EIA units)
Width	444 mm	17.4 in.
Depth	665 mm	26.2 in.
<b>Weight</b>		
Minimum	69 kg	31.5 lbs.
Maximum	129 kg	58.5 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.021 plus 0.024 for each 2GB Disk Drive, or 0.028 for each 4.5GB Disk Drive	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (max)	68 Btu/hr plus 77 Btu/hr for each 2GB Disk Drive, or 90 Btu/hr for each 4.5 GB Disk Drive	
Power requirements	20 watts plus 22.5 watts for each 2GB Disk Drive, or 26.5 watts for each 4.5GB Disk Drive	
Power factor	0.95 minimum	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 110°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	5.8 bels	5.6 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	46 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7135 RAIDiant Array

<b>Dimensions</b>		
Height (control unit)	82 mm	3.4 in. (2 EIA units)
Height (disk drive units)	171 mm	6.7 in. (4 EIA units)
Width	444 mm	17.4 in.
Depth	665 mm	26.2 in.
<b>Weight</b>		
Empty	50.0 kg	110 lbs.
Maximum Configuration	128.5 kg	283 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.2 plus 0.03 for each disk drive	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	648 Btu/hr plus 92 Btu/hr each disk drive	
Power requirements	190 watts plus 27 watts each disk drive	
Power factor	0.95	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 110°F)	<b>Non-Operating</b> 1 to 52°C (34 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.35 bels	6.05 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	48 dBA	47.5 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7135 RAIDiant Array Deskside Mini-Rack

<b>Dimensions</b>				
Height	610 mm	24.0 in.		
Width	560 mm	23.1 in.		
Depth	750 mm	29.5 in.		
<b>Weight</b>				
<b>Empty</b>	54.5 kg	120 lbs.		
<b>Maximum Configuration</b>	177.0 kg	390 lbs.		
<b>Electrical<sup>1-3</sup></b>				
Power source loading (kVA)	0.2 plus 0.03 for each disk drive			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (max)	648 Btu/hr plus 92 Btu/hr for each disk drive			
Power requirements (max)	190 watts plus 27 watts for each disk drive			
Power factor	0.95			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20% to 80%		<b>Non-Operating</b> 8% to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>2,3</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	N/A		0 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	N/A		0 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	1 m(39.4 in)	1 m(39.4 in)	N/A	1 m(39.4 in)
<ol style="list-style-type: none"> <li>1. The Mini-Rack has a 10A fuse, these values indicate the maximum values for the Mini-Rack with installed devices. The actual values depend on which devices are installed.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>3. Dependant on the devices installed in the 7135 Mini-Rack.</li> </ol>				

## 7137 Disk Array Subsystem Models 412, 413, 414, and 415

<b>Dimensions</b>		
Height	610 mm	24.0 in.
Width		
Enclosure	210 mm	8.3 in.
Base	310 mm	12.2 in.
Depth	820 mm	32.3 in.
<b>Weight</b>		
Empty	49 kg	109 lbs.
Maximum Configuration	54 kg	119 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.33	
Voltage range (V ac)	100 to 125 or 200 to 240	
Frequency (hertz)	50 or 60	
Thermal output	1050 Btu/hr	
Power requirements	308 watts	
Power factor	0.9	
Maximum altitude	2134m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 110°F)	<b>Non-Operating</b> 1 to 52°C (34 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	5.9 bels	5.8 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	37 dBA	37 dBA
(4.5GB)	43 dBA	No
Impulsive or prominent discrete tones	No	
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		



## 7137 Disk Array Subsystem Models 512, 513, 514, and 515

<b>Dimensions</b>		
Height	178 mm	7.0 in.
Width		
Enclosure	483 mm	19.0 in.
Depth	716 mm	28.2 in.
<b>Weight</b>		
Empty	32 kg	70 lbs.
Maximum Configuration	35 kg	76 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.33	
Voltage range (V ac)	100 to 125 or 200 to 240	
Frequency (hertz)	50 or 60	
Thermal output	1050 Btu/hr	
Power requirements	308 watts	
Power factor	0.9	
Maximum altitude	2134m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 110°F)	<b>Non-Operating</b> 1 to 52°C (34 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8% to 80%	<b>Non-Operating</b> 8% to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions<sup>1,2</sup></b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	5.9 bels	5.8 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub> (4.5GB)	39 dBA 44 dBA	38 dBA (See Note 2)
Impulsive or prominent discrete tones	No	No
<p>1. See "Noise Emission Notes" on page 338 for definitions of emissions positions.</p> <p>2. The value for &lt;L<sub>pA</sub>&gt;<sub>m</sub> not available at the time of publishing.</p>		



## Chapter 8. Physical Characteristics of the 7200 Series

This chapter provides the physical characteristics for the 7200 series of external devices. The following information can help you plan for your external devices. This section also gives the physical characteristics for the 4869 Model 002 5 1/4-inch 1.2MB external diskette drive. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale. Where a footprint is shown, the figure represents a top view of the device.

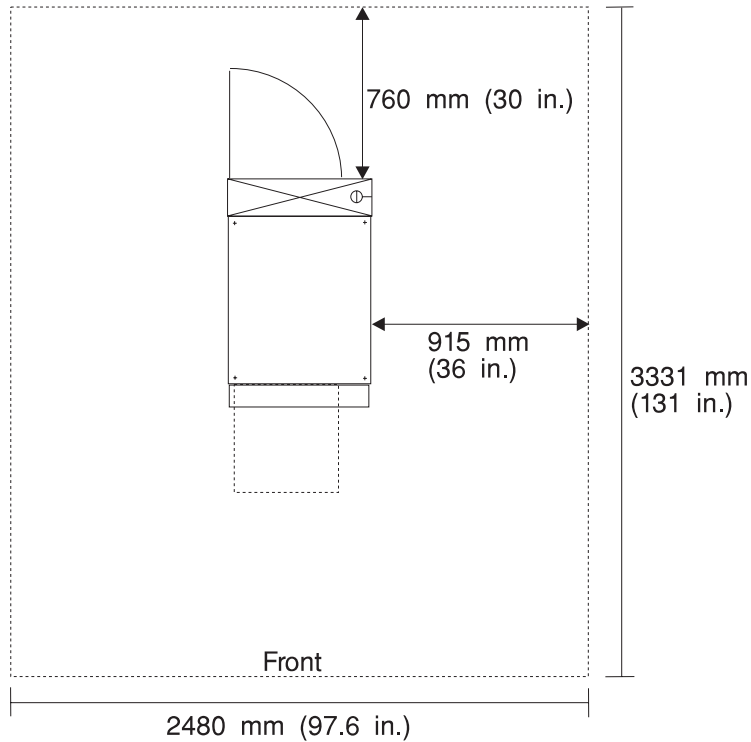
### 7202 Model 900 Expansion Rack

<b>Dimensions</b>				
Height	1578 mm	62.0 in.		
Width	650 mm	25.5 in.		
Depth	921 mm	36.0 in.		
<b>Weight</b>				
Minimum	136 kg	300 lbs.		
Maximum	470 kg	1035 lbs.		
<b>Electrical<sup>1</sup></b>				
Power source loading (typical in kVA)		0 .004		
Voltage range (V ac)		200 to 240 or -48V dc		
Frequency (hertz)		50 or 60		
Thermal output (typical)		15 Btu/hr		
Power requirements (typical)		4 watts		
Power factor		0.5 to 0.7		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)	
<b>Noise Emissions<sup>2 3</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d		6.2 bels	6.0 bels	
L <sub>pA</sub> m		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		48 dBA	46 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	Maintenance of a proper service clearance should allow proper air flow.			
<b>Service</b>	1650 mm(65 in)	760 mm(30 in)	915 mm(36 in)	915 mm(36 in)
<ol style="list-style-type: none"> <li>1. No features installed.</li> <li>2. See "Noise Emission Notes" on page 338 for definitions of emissions positions.</li> <li>3. Noise emissions data for the 7202 Model 900 is based on the following configuration: <ul style="list-style-type: none"> <li>• two 9334 Model 10 Drawers with two disk drives in each and</li> <li>• two 9334 Model 10 Drawers with three disk drives in each.</li> </ul> </li> </ol>				

## 7202 Model 900 Service Clearances

The broken lines of the footprint indicate the amount of space needed by the unit during normal operation.

For multiple racks placed side by side, the left and right clearances apply only to the leftmost and rightmost rack. For five to six racks placed side by side, the left and right clearances need to be increased to 1525 mm (60 in). Having more than six racks side by side is not recommended.



Footprint for the 7202 Model 900

**Note:** Rack units are large and heavy, and they are not easily moved. Because maintenance activities require access at both the front and back, extra room must be allowed. The footprint shows the radius of the swinging door on the rear of the rack and a drawer in the extended position. The illustration shows the minimum space required.

## 7203 Model 001 External Portable Disk Drive

<b>Dimensions</b>				
Height		160 mm		6.3 in.
Width		280 mm		11.0 in.
Depth		345 mm		13.6 in.
<b>Weight</b>				
Minimum		6.12 kg 13.5 lbs.(without module)		
Maximum		10.3 kg 22.6 lbs.(with a 355 or 670MB module)		
<b>Electrical</b>				
Power source loading (typical in kVA)		0.08		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		155 Btu/hr		
Power requirements (typical)		45 watts		
Power factor		0.5 to 0.7		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.8 bels		5.6 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		42 dBA		41 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b> 280mm(11 in)		<b>Depth</b> 649mm(25.6 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7204 Model 010 1GB External Disk Drive

<b>Dimensions</b>				
Height		79 mm		3.13 in.
Width		280 mm		11.0 in.
Depth		287 mm		11.3 in.
<b>Weight</b>				
Minimum		3.9 kg		8.45 lbs.
Maximum		3.9 kg		8.45 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			110 Btu/hr	
Power requirements (typical)			32 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.3 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		45 dBA		44 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm (6 in)	152 mm (6 in)	N/A	N/A
<b>Service</b>	152 mm (6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 280mm(11 in)		<b>Depth</b> 591mm(23.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7204 Models 112, 113, 114, 317, and 325 External Disk Drives

<b>Dimensions</b>				
Height		60 mm		2.36 in.
Width		250 mm		9.84 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.3 kg		7.3 lbs.
Maximum		3.3 kg		7.3 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)		0.02		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		225 Btu/hr		
Power requirements (typical)		46 watts		
Power factor		0.5 to 0.7		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.3 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		45 dBA		44 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm (6 in)	152 mm (6 in)	N/A	N/A
<b>Service</b>	152 mm (6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.84 in)		<b>Depth</b> 580mm(22.8 in)	
<p>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</p> <p>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</p>				

## 7204 Models 118 and 418 18.0GB External Disk Drives

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.8 in.		
<b>Weight</b>				
Minimum	3.5 kg	7.8 lbs.		
Maximum	3.5 kg	7.8 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.05 @ 120 V ac			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	95 Btu/hr			
Power requirements (typical)	28 watts			
Power factor	0.4 to 0.6			
Inrush Current <sup>3</sup>	51 amps at 120 Vac, 99 amps at 208 Vac			
Maximum altitude	3048 m (10000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (81°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.52 bels		5.48 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	39 dBA		38.9 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 575mm(22.6 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during a normal power off-on cycle.</li> </ol>				



## 7204 Models 139, and 339 9.1GB External Disk Drives

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.8 in.		
<b>Weight</b>				
Minimum	3.5 kg	7.8 lbs.		
Maximum	3.5 kg	7.8 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.05 @ 120 V ac			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	95 Btu/hr			
Power requirements (typical)	28 watts			
Power factor	0.4 to 0.6			
Inrush Current <sup>3</sup>	51 amps at 120 Vac, 99 amps at 208 Vac			
Maximum altitude	3048 m (10000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (81°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.52 bels		5.48 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	39 dBA		38.9 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 575mm(22.6 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Inrush currents occur only at initial application of power, no inrush occurs during a normal power off-on cycle.</li> </ol>				

## 7204 Models 215 and 315 External Disk Drives

<b>Dimensions</b>				
Height		79 mm		3.13 in.
Width		280 mm		11.0 in.
Depth		287 mm		11.3 in.
<b>Weight</b>				
Minimum		4.2 kg		9.25 lbs.
Maximum		4.2 kg		9.25 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			110 Btu/hr	
Power requirements (typical)			32 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.3 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		45 dBA		44 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm (6 in)	152 mm (6 in)	N/A	N/A
<b>Service</b>	152 mm (6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 280mm(11 in)		<b>Depth</b> 591mm(23.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7204 Models 402 and 404 External Disk Drives

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.0 kg		6.6 lbs.
Maximum		3.4 kg		7.5 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)		0.06 @ 120 V ac		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		107 Btu/hr		
Power requirements (typical)		31.5 watts		
Power factor		0.5 to 0.6		
Inrush Current <sup>3</sup>		47.6 amps at 120 Vac, 85.7 amps at 208 Vac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.5 bels		5.5 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		38 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during a normal power off-on cycle.</li> </ol>				

## 7204 Models 409 and 419 External Disk Drives

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.0 kg		6.6 lbs.
Maximum		3.4 kg		7.5 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)		0.06 @ 120 V ac		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		107 Btu/hr		
Power requirements (typical)		31.5 watts		
Power factor		0.5 to 0.6		
Inrush Current <sup>3</sup>		47.6 amps at 120 Vac, 85.7 amps at 208 Vac		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.5 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		38 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during a normal power off-on cycle.</li> </ol>				

## 7204 Models 518 and 536 External Disk Drives

<b>Dimensions</b>				
Height	55 mm		2.2 in.	
Width	250 mm		9.8 in.	
Depth	275 mm		10.8 in.	
<b>Weight</b>		3.6 kg		7.8 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)	0.03 @ 120 V ac			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	95 Btu/hr			
Power requirements (typical)	28 watts			
Power factor	0.8 to 0.9			
Inrush Current <sup>3</sup>	47.6 amps at 120 Vac, 85.7 amps at 208 Vac			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80% 23°C (73°F)		8 to 80% 27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.5 bels		5.4 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	50 dBA		49 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	250mm(9.8 in)		579mm(22.8 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>Inrush currents occur only at initial application of power, no inrush occurs during a normal power off-on cycle.</li> </ol>				

## 7205 Model 311 External DLT Tape Drive

<b>Dimensions</b>				
Height		114 mm		4.8 in.
Width		280 mm		11.0 in.
Depth		292 mm		11.5 in.
<b>Weight</b>				
Minimum		6.63 kg		15 lbs.
Maximum		6.63 kg		15 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.135	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			208 Btu/hr	
Power requirements (typical)			61 watts	
Power factor			0.8	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		20 to 80%		20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.8 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		42 dBA		39 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152mm(6 in)	152mm(6 in)	N/A
<b>Service</b>		152 mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		280mm(11 in)		597mm(23.5 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7205 Model 440 External DLT Tape Drive

<b>Dimensions</b>				
Height		122 mm		4.8 in.
Width		250 mm		9.8 in.
Depth		290 mm		11.5 in.
<b>Weight</b>				
Minimum		6.0 kg		13 lbs.
Maximum		6.0 kg		13 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.047	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			150 Btu/hr	
Power requirements (typical)			44 watts	
Power factor			0.9	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.6 bels		5.3 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		41 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b> 255mm(10 in)		<b>Depth</b> 597mm(23.5 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7206 Model 005 External 4-mm Tape Drive

<b>Dimensions</b>				
Height		80 mm		3.3 in.
Width		280 mm		11.0 in.
Depth		285 mm		11.3 in.
<b>Weight</b>				
Minimum		5 kg		11 lbs.
Maximum		5 kg		11 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.08	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			110 Btu/hr	
Power requirements (typical)			32 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		20 to 80%		20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.9 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		46 dBA		40 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152mm(6 in)	152mm(6 in)	N/A
<b>Service</b>		152 mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		432mm(17 in)		589mm(23.3 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 7206 Model 110 External 4-mm DDS-3 Tape Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.7 kg		8 lbs.
Maximum		3.7 kg		8 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (average)			100 Btu/hr	
Power requirements (typical)			30 watts	
Power factor			0.3 to 0.5	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		20 to 80%		20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.9 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		46 dBA		40 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152mm(6 in)	152mm(6 in)	N/A
<b>Service</b>		152 mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		250mm(9.8 in)		579mm(22.8 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7206 Model 220 External 4-mm DDS-4 Tape Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.7 kg		8 lbs.
Maximum		3.7 kg		8 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			120 Btu/hr	
Power requirements (typical)			35 watts	
Power factor			0.6	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		20 to 80%		20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		<5.9 bels		<5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		N/A		N/A
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152mm(6 in)	152mm(6 in)	N/A
<b>Service</b>		152mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		250mm(9.8 in)		579mm(22.8 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7206 Model VX2 External Tape Drive

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.8 in.		
<b>Weight</b>		3.7 kg	8 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.03 @ 120 V ac			
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	77 Btu/hr			
Power requirements (typical)	23 watts			
Power factor	0.8			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	<5.4 bels		<5.4 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	49 dBA		49 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7207 Model 012 1.2GB External 1/4-Inch Cartridge Tape Drive

<b>Dimensions</b>				
Height		80 mm		3.3 in.
Width		280 mm		11.0 in.
Depth		285 mm		11.3 in.
<b>Weight</b>				
Minimum		4.5 kg		10.0 lbs.
Maximum		4.5 kg		10.0 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.07	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			140 Btu/hr	
Power requirements (typical)			40 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		20 to 80%		20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		6.6 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		46 dBA		40 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152 mm(6 in)	152 mm(6 in)	N/A
<b>Service</b>		152 mm(6 in)	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b>		<b>Depth</b>
		280mm(11 in)		589mm(23.3 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7207 Model 122 4GB External SIRS 1/4-Inch Cartridge Tape Drive

<b>Dimensions</b>					
Height	55 mm	2.2 in.			
Width	250 mm	9.8 in.			
Depth	275 mm	10.8 in.			
<b>Weight</b>		3.4kg	7.5 lbs		
<b>Electrical</b>					
Power source loading (typical in kVA)	0.03 @ 120 V ac				
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)				
Frequency (hertz)	50 or 60				
Thermal output (typical)	76 Btu/hr				
Power requirements (typical)	22 watts				
Power Factor	0.3 to 0.6				
Maximum altitude	2135 m (7000 ft.)				
<b>Temperature Requirements</b>		<b>Operating</b> 5 to 45°C (41 to 113°F)	<b>Non-Operating</b> -40 to 60°C (-40 to 140°F)		
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 10 to 90%		
<b>Wet Bulb</b>		26°C (79°F)	29°C (84°F)		
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>		
L <sub>WA</sub> d		6.6 bels	5.3 bels		
L <sub>pA</sub> m		N/A	N/A		
<L <sub>pA</sub> > <sub>m</sub>		46 dBA	40 dBA		
Impulsive or prominent discrete tones		No	No		
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>		152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>		152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.					
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.					

## 7207 Model 315 13GB External 1/4-Inch Cartridge Tape Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.6 kg		7.9 lbs.
Maximum		3.6 kg		7.9 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)		0.029 @ 120 V ac		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		50 Btu/hr		
Power requirements (typical)		16 watts		
Power Factor		0.3 to 0.5		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.48 bels		5.3 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		37.4 dBA		37 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Width</b> 575mm(22.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7208 Model 001 2.3GB External 8-mm Tape Drive

<b>Dimensions</b>				
Height		123 mm		4.8 in.
Width		280 mm		11.0 in.
Depth		285 mm		11.3 in.
<b>Weight</b>				
Minimum		6 kg		13.3 lbs.
Maximum		6 kg		13.3 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)		0.06		
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output (typical)		120 Btu/hr		
Power requirements (typical)		35 watts		
Power factor		0.5 to 0.7		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%	
<b>Wet Bulb</b>		23°C (73°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d		5.9 bels	5.5 bels	
L <sub>pA</sub> m		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		46 dBA	40 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	152 mm(6 in)
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 432mm(17 in)		<b>Depth</b> 589mm(23.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7208 Model 011 5/10GB External 8-mm Tape Drive

<b>Dimensions</b>				
Height		80 mm		3.3 in.
Width		280 mm		11.0 in.
Depth		285 mm		11.3 in.
<b>Weight</b>				
Minimum		4.7 kg		10.3 lbs.
Maximum		4.7 kg		10.3 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.06	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			120 Btu/hr	
Power requirements (typical)			35 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.9 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		46 dBA		40 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 280mm(11 in)		<b>Depth</b> 589mm(23.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 7208 Model 341 20/40GB External 8-mm Tape Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		5 kg		11 lbs.
Maximum		5 kg		11 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.041	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			67 Btu/hr	
Power requirements (typical)			20 watts	
Power factor			0.58	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.6 bels		5.5 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		38 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 575mm(22.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7208 Model 345 External 8-mm Tape Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
Minimum		3.7 kg		8 lbs.
Maximum		3.7 kg		8 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.023	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			44 Btu/hr	
Power requirements (typical)			30 watts	
Power factor			0.58	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 1 to 60°C (34 to 140°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 95%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.9 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		38 dBA		38 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 575mm(22.6 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7209 Model 002 External Re-writable Optical Disk Drive

<b>Dimensions</b>				
Height		123 mm		4.8 in.
Width		280 mm		11.0 in.
Depth		290 mm		11.5 in.
<b>Weight</b>				
Minimum		6.3 kg		14 lbs.
Maximum		6.3 kg		14 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.053	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			110 Btu/hr	
Power requirements (typical)			33 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 1 to 60°C (34 to 140°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 10 to 80%		<b>Non-Operating</b> 10 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		5.5 bels		5.5 bels
L <sub>pAm</sub>		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		45 dBA		45 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b> 280mm(11 in)		<b>Depth</b> 597mm(23.5 in)
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7209 Model 003 External 2.6GB Re-writable Optical Disk Drive

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.5 in.		
<b>Weight</b>				
	4.0 kg	8.8 lbs.		
<b>Electrical</b>				
Power source loading (kVA)	0.045 @ 120 Vac			
Voltage range (V ac)	100 to 125 or 200 to 240 (auto-ranging)			
Frequency (hertz)	50 or 60			
Thermal output (maximum)	100 Btu/hr @ 230 Vac			
Thermal output (typical)	55 Btu/hr			
Power requirements (typical)	16 watts			
Power factor	0.4 to 0.6			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	27°C (80°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.5 bels		5.5 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	45 dBA		45 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7210 Model 001 External CD-ROM Drive

<b>Dimensions</b>				
Height		80 mm		3.3 in.
Width		280 mm		11.0 in.
Depth		285 mm		11.3 in.
<b>Weight</b>				
Minimum		4.9 kg		10.8 lbs.
Maximum		4.9 kg		10.8 lbs.
<b>Electrical</b>				
Power source loading (typical in kVA)			0.05	
Voltage range (V ac)		100 to 125 or 200 to 240 (autoranging)		
Frequency (hertz)			50 or 60	
Thermal output (typical)			85 Btu/hr	
Power requirements (typical)			25 watts	
Power factor			0.5 to 0.7	
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b>		<b>Non-Operating</b>
		16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b>		<b>Non-Operating</b>
		10 to 80%		10 to 80%
<b>Wet Bulb</b>		23°C (73°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.1 bels		5.1 bels
L <sub>pA</sub> m		N/A		N/A
<L <sub>pA</sub> > <sub>m</sub>		36 dBA		36 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>		<b>Front</b>	<b>Back</b>	<b>Left</b>
				<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	52 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
	280mm(11 in)		590mm(23.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7210 Model 005 External CD-ROM Drive

<b>Dimensions</b>				
Height	50 mm		1.94 in.	
Width	183 mm		7.2 in.	
Depth	312 mm		12.3 in.	
<b>Weight</b>				
Minimum	2.0 kg		4.4 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)		0.03		
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (max)	50 Btu/hr			
Power requirements (max)	18 watts			
Power factor (minimum)	0.6			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 10 to 80%		<b>Non-Operating</b> 10 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	4.7 bels		4.7 bels	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow</b>	N/A	N/A	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 183mm(7.2 in)		<b>Depth</b> 464mm(18.3 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7210 Model 010 External Quad Speed CD-ROM Drive

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.8 in.		
<b>Weight</b>				
	3.6 kg	7.9 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.07			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	110 Btu/hr			
Power requirements (max)	18 watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 10 to 80%		<b>Non-Operating</b> 10 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.1 bels		5.1 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	36 dBA		36 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7210 Model 015 External 8X to 20X Speed SCSI-2 CD-ROM Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
		3.2 kg		7.1 lbs.
<b>Electrical</b>				
Power source loading (kVA)		0.023 @ 120 Vac		
Voltage range (V ac)		100 to 125 or 200 to 240 (auto-ranging)		
Frequency (hertz)		50 or 60		
Thermal output (maximum)		42 Btu/hr @240 Vac		
Power requirements (typical idle)		06 watts		
Power requirements (typical seek/read)		18 watts		
Power factor		0.4 to 0.6		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 52°C (50 to 126°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub>		4.8 bels	4.5 bels	
L <sub>pAm</sub>		N/A	N/A	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 7210 Model 020 External 32X Speed SCSI-2 CD-ROM Drive

<b>Dimensions</b>				
Height		55 mm		2.2 in.
Width		250 mm		9.8 in.
Depth		275 mm		10.8 in.
<b>Weight</b>				
		3.2 kg		7.1 lbs.
<b>Electrical</b>				
Power source loading (kVA)		0.023 @ 120 Vac		
Voltage range (V ac)		100 to 125 or 200 to 240 (auto-ranging)		
Frequency (hertz)		50 or 60		
Thermal output (maximum)		42 Btu/hr @240 Vac		
Power requirements (typical idle)		06 watts		
Power requirements (typical seek/read)		18 watts		
Power factor		0.4 to 0.6		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		27°C (80°F)		27°C (80°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WAd</sub>		4.8 bels		4.5 bels
L <sub>pAm</sub>		N/A		N/A
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7210 Model 025 External SCSI-2 DVD-RAM Drive

<b>Dimensions</b>				
Height	55 mm	2.2 in.		
Width	250 mm	9.8 in.		
Depth	275 mm	10.8 in.		
<b>Weight</b>				
	3.6 kg	8 lbs.		
<b>Electrical</b>				
Power source loading (kVA)	0.023 @ 120 Vac			
Voltage range (V ac)	100 to 125 or 200 to 240 (auto-ranging)			
Frequency (hertz)	50 or 60			
Thermal output (maximum)	42 Btu/hr @240 Vac			
Power requirements (typical idle)	06 watts			
Power requirements (typical seek/read)	12.5 watts			
Power factor	0.4 to 0.6			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		23°C (73°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	4.8 bels		4.5 bels	
L <sub>pAm</sub>	46 dBA		41 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 250mm(9.8 in)		<b>Depth</b> 579mm(22.8 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7212 Model 102 External Storage Device

<b>Dimensions</b>				
Height		44 mm		1.7 in.
Width		430 mm		16.8 in.
Depth		485 mm		19.0 in.
<b>Weight<sup>3</sup></b>				
		8.3 kg		18.2 lbs.
<b>Electrical</b>				
Power source loading (kVA)		0.047 @ 120 Vac		
Voltage range (V ac)		100 to 127 or 200 to 240 (auto-ranging)		
Frequency (hertz)		50 or 60		
Thermal output (maximum)		206 Btu/hr @240 Vac		
Power requirements (typical)		60 watts		
Power factor		0.8 to 0.9		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 52°C (50 to 126°F)
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>		23°C (73°F)		23°C (73°F)
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>		<b>Idle</b>
L <sub>WA</sub> d		5.5 bels		5.3 bels
L <sub>pAm</sub>		51 dBA		47 dBA
Impulsive or prominent discrete tones		No		No
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>		<b>Width</b> 430mm(16.8 in)		<b>Depth</b> 789mm(31 in)
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> <li>3. Weight with two DDS-4, 4 mm tape drives installed.</li> </ol>				

## 7235 POWER GTO™ Models 01i and 02i Graphics Subsystem

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	160 mm 6.3 in.		466 mm 18.3 in.	
Width	460 mm 18.0 in.		160 mm 6.3 in.	
Width at pedestal (deskside)			241 mm 9.5 in.	
Depth	525 mm 21.0 in.		525 mm 21.0 in.	
<b>Weight</b>				
Minimum	16 kg 35 lbs.		16 kg 35 lbs.	
Maximum	16 kg 35 lbs.		16 kg 35 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.5			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	850 Btu/hr			
Power requirements (typical)	250 watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80% 23°C (73°F)		8 to 80% 27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	5.8 bels		5.5 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	54 dBA		N/A	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	460mm(18 in)		830mm(33 in)	
Deskside	241mm(9.5 in)		830mm(33 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 7250 POWER GXT1000 Graphics Accelerator

<b>Dimensions</b>	<b>Desktop</b>		<b>Deskside</b>	
Height	160 mm 6.3 in.		466 mm 18.3 in.	
Width	460 mm 18.0 in.		160 mm 6.3 in.	
Width (at pedestal for deskside)			241 mm 9.5 in.	
Depth	525 mm 21.0 in.		525 mm 21.0 in.	
<b>Weight</b>				
Minimum	13.6 kg 30 lbs.		13.6 kg 30 lbs.	
Maximum	13.6 kg 30 lbs.		13.6 kg 30 lbs.	
<b>Electrical</b>				
Power source loading (typical in kVA)	0.5			
Voltage range (Vac) <sup>2</sup>	100 to 125 or 200 to 240 (autoranging)			
Frequency (Hertz)	50 or 60			
Thermal output (typical)	850 Btu/hr			
Power requirements (typical)	250 Watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b>		<b>Non-Operating</b>	
	16 to 32°C (60 to 90°F)		10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>Wet Bulb</b>	8 to 80%		8 to 80%	
	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.2 bels		5.2 bels	
L <sub>pAm</sub>	N/A		N/A	
Impulsive or prominent discrete tones	No		No	
<b>Noise Emissions<sup>1</sup></b>				
<L <sub>pA</sub> > <sub>m</sub>	36.8 dBA			
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>3</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>3</sup></b>	<b>Width</b>		<b>Depth</b>	
Desktop	460mm(18 in)		830mm(33 in)	
Deskside	241mm(9.5 in)		830mm(33 in)	
<ol style="list-style-type: none"> <li>1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>2. The power supply may be autoranging or switchable. The switchable type has a red voltage selection switch near the power cord connector.</li> <li>3. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> </ol>				

## 4869 Model 002 5 1/4-Inch 1.2MB External Diskette Drive

<b>Dimensions</b>				
Height	62.5 mm	2.5 in.		
Width	227.0 mm	8.9 in.		
Depth	408.0 mm	16.0 in.		
<b>Weight</b>				
Minimum	2.1 kg	4.6 lbs.		
Maximum	2.1 kg	4.6 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.02			
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	35 Btu/hr			
Power requirements (typical)	10 watts			
Power factor	N/A			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 52°C (50 to 125°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b>		<b>Non-Operating</b>	
<b>ANSI Media</b>	8 to 80%		5 to 95%	
<b>ISO Media</b>	20 to 80%		5 to 95%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	6.0 bels		N/A	
L <sub>pAm</sub>	54 dBA		N/A	
<L <sub>pA</sub> > <sub>m</sub>	42 dBA		N/A	
Impulsive or prominent discrete tones	Yes		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 227mm(8.9 in)		<b>Depth</b> 712mm(28 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## Chapter 9. Physical Characteristics of the 7300 Series

This chapter provides the physical characteristics for the 7300 series of external devices. The following information can help you plan for your external devices. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale.

### 7318 Serial Communications Network Server Models P10 and S20

<b>Dimensions</b>		
Height	44 mm	1.73 in.
Width	381 mm	15.00 in.
Depth	229 mm	9.00 in.
<b>Weight</b>		
Maximum	2.6 kg	5.7 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.085	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	170 Btu/hr	
Power requirements (max)	50 watts	
Maximum altitude	2135 meters (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 50°C (50 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	4.9 bels	4.9 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	54 dBA	54 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 7319 Models 100 and 110 Fibre Channel Switches

<b>Dimensions</b>		
Height	86 mm	3.39 in.
Width	483 mm	19.00 in.
Depth	495 mm	19.50 in.
<b>Weight</b>		
Maximum	12.2 kg	27 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.18	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	570 Btu/hr	
Power requirements (typical)	170 watts	
Power factor	0.98	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 0 to 40°C (32 to 104°F)	<b>Non-Operating</b> 0 to 50°C (32 to 125°F)
<b>Humidity Requirements</b> (Noncondensing) <b>Wet Bulb</b>	<b>Operating</b> 0 to 90% 27°C (80°F)	<b>Non-Operating</b> 0 to 90% 27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	4.9 bels	4.9 bels
L <sub>pAm</sub>	N/A	N/A
Impulsive or prominent discrete tones	No	No
1. * See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		



## 7329 Model 308 QIC 1/4 Tape Autoloader

<b>Dimensions</b>		
Height	174 mm	6.8 in.
Width	224 mm	8.8 in.
Depth	578 mm	22.8 in.
<b>Weight</b>	15.5 kg	34 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.07	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	208 Btu/hr	
Power requirements (typical)	23.1 watts	
Power factor	0.6	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	<5.8 bels	<5.0 bels
L <sub>pAm</sub>	54 dBA	48 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7331 Model 205 140/280GB or Model 305 400/800GB 8-mm Tape Library

<b>Dimensions</b>		
Height	637.0 mm	25.1 in.
Width	322.5 mm	12.7 in.
Depth	723.0 mm	28.5 in.
<b>Weight</b>		
Minimum	45 kg	92.5 lbs.
Maximum	45 kg	92.5 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.34	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	580 Btu/hr for two drives	
Power requirements	340 watts	
Power factor	0.95	
Maximum altitude	3048 m (10,000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 5 to 40°C (41 to 110°F)	<b>Non-Operating</b> 5 to 32°C (41 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20% to 80%	<b>Non-Operating</b> 20% to 80%
<b>Wet Bulb</b>	26°C (79°F)	26°C (79°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	6.2 bels	5.5 bels
L <sub>pA</sub> m	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions		

## 7332 Model 005 4-mm DDS-2 Autoloading Tape

<b>Dimensions</b>		
Height	122 mm	4.8 in.
Width	280 mm	11.0 in.
Depth	290 mm	11.5 in.
<b>Weight</b>	6.4 kg	14 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.07	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (average)	120 Btu/hr	
Power requirements	35 watts	
Power factor	0.3 to 0.6	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.3 bels	5.3 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	39 dBA	39 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7332 Model 110 4-mm DDS-3 Autoloading Tape

<b>Dimensions</b>		
Height	122 mm	4.8 in.
Width	280 mm	11.0 in.
Depth	290 mm	11.5 in.
<b>Weight</b>	6.4 kg	14 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.07	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (average)	120 Btu/hr	
Power requirements (typical)	35 watts	
Power factor	0.3 to 0.6	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.3 bels	5.3 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	39 dBA	39 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7332 Model 220 4-mm DDS-4 Autoloading Tape

<b>Dimensions</b>		
Height	122 mm	4.8 in.
Width	280 mm	11.0 in.
Depth	290 mm	11.5 in.
<b>Weight</b>	6.4 kg	14 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.07	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output (typical)	208 Btu/hr	
Power requirements (typical)	61 watts	
Power factor	0.6	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	<5.3 bels	<5.3 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	N/A	N/A
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7334 Model 410 8-mm Tape Library

<b>Dimensions</b>		
Height	220.0 mm	8.7 in.
Width	438.0 mm	17.2 in.
Depth	612.0 mm	24.1 in.
<b>Weight</b>		
Minimum	34.5 kg	76 lbs.
Maximum	34.5 kg	76 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.03	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	427 Btu/hr	
Power requirements	125 watts	
Power factor	0.3 to 0.6	
Maximum altitude	3048 m (10,000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 5 to 35°C (41 to 95°F)	<b>Non-Operating</b> -20 to 60°C (-4 to 140°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20% to 80%	<b>Non-Operating</b> 10% to 90%
<b>Wet Bulb</b>	26°C (79°F)	29°C (84°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	6.3 bels	5.8 bels
L <sub>pA</sub> m	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions		

## 7336 Model 205 4-mm Tape Library

<b>Dimensions</b>		
Height	637.0 mm	25.1 in.
Width	322.5 mm	12.7 in.
Depth	723.0 mm	28.5 in.
<b>Weight</b>		
Minimum	45 kg	92.5 lbs.
Maximum	45 kg	92.5 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.34	
Voltage range (V ac)	100 to 125 or 200 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	580 Btu/hr for two drives	
Power requirements	340 watts	
Power factor	0.95	
Maximum altitude	3048 m (10000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 5 to 40°C (41 to 110°F)	<b>Non-Operating</b> 5 to 32°C (41 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	26°C (79°F)	26°C (79°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	6.2 bels	5.5 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7337 Model 305 DLT Tape Library

<b>Dimensions</b>		
Height	23.5 mm	9.25 in.
Width	47.9 mm	18.9 in.
Depth	67.3 mm	26.5 in.
<b>Weight</b>		
Minimum	41.8 kg	92 lbs.
Maximum	41.8 kg	92 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.34	
Voltage range (V ac)	100 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	445 Btu/hr for two drives	
Power requirements	130 watts	
Power factor	TBD	
Maximum altitude	2438 m (6000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 35°C (50 to 95°F)	<b>Non-Operating</b> 5 to 32°C (40 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73.4°F)	46°C (114°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WA</sub> d	5.5 bels	5.14 bels
L <sub>pA</sub> m	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		



## 7337 Model 306 DLT Tape Library

<b>Dimensions</b>		
Height	22.2 mm	8.75 in.
Width	48.0 mm	18.9 in.
Depth	67.3 mm	26.5 in.
<b>Weight</b>		
Maximum	33 kg	72 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.34	
Voltage range (V ac)	100 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	445 Btu/hr for two drives	
Power requirements	130 watts	
Power factor	TBD	
Maximum altitude	1828 m (6000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 35°C (50 to 95°F)	<b>Non-Operating</b> 5 to 32°C (40 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	23°C (73.4°F)	46°C (114°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.3 bels	6.0 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## 7337 Model 360 DLT Tape Library

<b>Dimensions</b>		
Height	68.5 cm	27.0 in. (w/casters)
Width	48.1 cm	18.9 in.
Depth	73.5 cm	28.9 in.
<b>Weight</b>		
Minimum	65.8 kg	145 lbs.
Maximum	116.6 kg	257 lbs.
<b>Electrical</b>		
Power source loading (kVA)	0.72	
Voltage range (V ac)	100 to 240 (autoranging)	
Frequency (hertz)	50 or 60	
Thermal output	1920 Btu/hr	
Power requirements	562 watts	
Power factor	0.55 - 0.8	
Maximum altitude	2135 m (7000 ft)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 38°C (50 to 100°F)	<b>Non-Operating</b> 5 to 32°C (40 to 90°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%	<b>Non-Operating</b> 20 to 80%
<b>Wet Bulb</b>	26°C (79°F)	46°C (114°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
L <sub>WAd</sub>	6.8 bels	6.6 bels
L <sub>pAm</sub>	N/A	N/A
<L <sub>pA</sub> > <sub>m</sub>	46 dBA	43 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of emissions positions.		

## Chapter 10. Physical Characteristics of the 9000 Series

This chapter provides the physical characteristics for the 9000 series of external devices. The following information can help you plan for your external devices. You need only do physical planning for the devices you have ordered.

**Note:** Footprints are not drawn to scale. Where a footprint is shown, the figure represents a top view of the device.

### 9291 Models 010, and 020 Single Digital Trunk Processors

<b>Dimensions</b>				
Height	110 mm	4.33 in.		
Width	220 mm	8.66 in.		
Depth	430 mm	16.9 in.		
<b>Weight</b>				
Minimum	7.5 kg	16.5 lbs.		
Maximum	7.5 kg	16.5 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)		0.06		
Voltage range (V ac)	100 to 127 or 200 to 240 (autoranging)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	170 Btu/hr			
Power requirements (typical)	50 watts			
Power factor	0.5 to 0.8			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	27°C (80°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	4.8 bels		4.8 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	40 dBA		40 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 220mm(8.66 in)		<b>Depth</b> 734mm(28.9 in)	

1. See “Noise Emission Notes” on page 338 for definitions of noise emissions positions.
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.

## 9295 Multiple Digital Trunk Processor With AC Power Supply

<b>Dimensions</b>	<b>Base Unit</b>	<b>Each T1 or CEPT feature</b>	<b>Second Power Supply feature</b>	
Height	266 mm 10.5 in.	264 mm 10.3 in.	264.0 mm 10.3 in.	
Width	449 mm 17.6 in.	50 mm 1.9 in.	69.5 mm 2.7 in.	
Depth	400 mm 15.7 in.	373 mm 14.6 in.	373.0 mm 14.6 in.	
<b>Weight</b>				
Minimum	13.2 kg 29.2 lbs.	2.1 kg 4.6 lbs.	5.0 kg 11.0 lbs.	
Maximum	13.2 kg 29.2 lbs.	2.1 kg 4.6 lbs.	5.0 kg 11.0 lbs.	
<b>Electrical</b>				
Power source loading per power supply (typical in kVA)		0.40		
Voltage range (V ac)		100 to 127 or 200 to 240 (autoranging)		
Frequency (hertz)		50 or 60		
Thermal output per power supply		1030 Btu/hr		
Power requirements per power supply		300 watts		
Power factor		0.5 to 0.8		
Maximum altitude		2135 m (7000 ft.)		
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WA</sub> d		6.0 bels	6.0 bels	
L <sub>pA</sub> m		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		42 dBA	42 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 449mm(17.6 in)		<b>Depth</b> 704mm(27.7 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 9295 Multiple Digital Trunk Processor With DC Power Supply

<b>Dimensions</b>	<b>Base Unit</b>	<b>Each T1 or CEPT feature</b>	<b>Second Power Supply feature</b>	
Height	266 mm 10.5 in.	264 mm 10.3 in.	264.0 mm 10.3 in.	
Width	449 mm 17.6 in.	50 mm 1.9 in.	69.5 mm 2.7 in.	
Depth	400 mm 15.7 in.	373 mm 14.6 in.	373.0 mm 14.6 in.	
<b>Weight</b>				
Minimum	13.2 kg 29.2 lbs.	2.1 kg 4.6 lbs.	5.0 kg 11.0 lbs.	
Maximum	13.2 kg 29.2 lbs.	2.1 kg 4.6 lbs.	5.0 kg 11.0 lbs.	
<b>Electrical</b>				
Voltage range (V dc)	-48 to -60 Vdc			
Thermal output per power supply	1030 Btu/hr			
Power requirements per power supply	300 watts			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>		<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)		<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>		27°C (80°F)	27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>		<b>Operating</b>	<b>Idle</b>	
L <sub>WAd</sub>		6.0 bels	6.0 bels	
L <sub>pAm</sub>		N/A	N/A	
<L <sub>pA</sub> > <sub>m</sub>		42 dBA	42 dBA	
Impulsive or prominent discrete tones		No	No	
<b>Clearances</b>				
	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>				
		<b>Width</b> 449mm(17.6 in)	<b>Depth</b> 704mm(27.7 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 9333 Models 010 and 011 Drawer High-Performance Subsystem

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4 EIA units)
Width	443 mm	17.4 in.
Depth	686 mm	27.0 in.
<b>Weight</b>		
Minimum	25 kg	55 lbs.
Maximum	49 kg	108 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)		0.36
Voltage range for Model 010 (V ac)		200 to 240
Voltage range for Model 011		200 to 240 V ac or -48 V dc
Frequency (hertz)		50 or 60
Thermal output (typical)		680 Btu/hr
Power requirements (typical)		200 watts
Power factor		0.5 to 0.7
Maximum altitude		2135 m (7000 ft.)
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 8 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.5 bels	5.2 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	42 dBA	40 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 9333 Models 500 and 501 Deskside High-Performance Subsystem

<b>Dimensions</b>				
Height	610 mm	24.0 in.		
Width (at pedestal)	270 mm	10.6 in.		
Depth	780 mm	30.7 in.		
<b>Weight</b>				
Minimum	39 kg	85 lbs.		
Maximum	63 kg	138 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.37			
Voltage range (V ac)	100 to 125 or 200 to 240 (selectable)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	680 Btu/hr			
Power requirements (typical)	200 watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.5 bels		5.3 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	44 dBA		42 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 270mm(10.6 in)		<b>Depth</b> 1085mm(42.7 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				



## 9334 Models 010 and 011 Drawer Expansion Units

<b>Dimensions</b>		
Height	171 mm	6.7 in. (4 EIA units)
Width	443 mm	17.4 in.
Depth	686 mm	27.0 in.
<b>Weight</b>		
Minimum	25 kg	55 lbs.
Maximum	43 kg	95 lbs.
<b>Electrical</b>		
Power source loading (typical in kVA)	0.34	
Voltage range for Model 010 (V ac)	200 to 240	
Voltage range for Model 011	200 to 240 V ac or -48 V dc	
Frequency (hertz)	50 or 60	
Thermal output (typical)	580 Btu/hr	
Power requirements (typical)	170 watts	
Power factor	0.5 to 0.7	
Maximum altitude	2135 m (7000 ft.)	
<b>Temperature Requirements</b>	<b>Operating</b> 10 to 40°C (50 to 104°F)	<b>Non-Operating</b> 10 to 52°C (50 to 125°F)
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%	<b>Non-Operating</b> 5 to 80%
<b>Wet Bulb</b>	27°C (80°F)	27°C (80°F)
<b>Noise Emissions*</b>	<b>Operating</b>	<b>Idle</b>
$L_{WA_d}$	5.5 bels	5.2 bels
$L_{pA_m}$	N/A	N/A
$\langle L_{pA} \rangle_m$	42 dBA	40 dBA
Impulsive or prominent discrete tones	No	No
* See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.		

## 9334 Models 500 and 501 Deskside Expansion Units

<b>Dimensions</b>				
Height	610 mm	24.0 in.		
Width (at pedestal)	270 mm	10.6 in.		
Depth	780 mm	30.7 in.		
<b>Weight</b>				
Minimum	39 kg	85 lbs.		
Maximum	65 kg	142 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.4			
Voltage range (V ac)	100 to 125 or 200 to 240 (selectable)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	650 Btu/hr			
Power requirements (typical)	190 watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 8 to 80%		<b>Non-Operating</b> 8 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WAd</sub>	5.5 bels		5.3 bels	
L <sub>pAm</sub>	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	44 dBA		42 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>2</sup></b>	152 mm(6 in)	152 mm(6 in)	N/A	N/A
<b>Service</b>	152 mm(6 in)	N/A	N/A	N/A
<b>Footprint<sup>2</sup></b>	<b>Width</b> 270mm(10.6 in)		<b>Depth</b> 1085mm(42.7 in)	
1. See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.				
2. The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.				

## 9348 Model 012 Magnetic Tape Unit

<b>Dimensions</b>				
Height	222 mm	8.75 in.		
Width	483 mm	19.0 in.		
Depth	673 mm	26.5 in.		
<b>Weight</b>				
Minimum	48.2 kg	105 lbs.		
Maximum	48.2 kg	105 lbs.		
<b>Electrical</b>				
Power source loading (typical in kVA)	0.27			
Voltage range (V ac)	100 to 125 or 200 to 240 (selectable)			
Frequency (hertz)	50 or 60			
Thermal output (typical)	410 Btu/hr			
Power requirements (typical)	120 watts			
Power factor	0.5 to 0.7			
Maximum altitude	2135 m (7000 ft.)			
<b>Temperature Requirements</b>	<b>Operating</b> 16 to 32°C (60 to 90°F)		<b>Non-Operating</b> 10 to 43°C (50 to 110°F)	
<b>Humidity Requirements</b> (Noncondensing)	<b>Operating</b> 20 to 80%		<b>Non-Operating</b> 20 to 80%	
<b>Wet Bulb</b>	23°C (73°F)		27°C (80°F)	
<b>Noise Emissions<sup>1</sup></b>	<b>Operating</b>		<b>Idle</b>	
L <sub>WA</sub> d	7.0 bels <sup>2</sup>		6.8 bels	
L <sub>pA</sub> m	N/A		N/A	
<L <sub>pA</sub> > <sub>m</sub>	51 dBA <sup>2</sup>		50 dBA	
Impulsive or prominent discrete tones	No		No	
<b>Clearances</b>	<b>Front</b>	<b>Back</b>	<b>Left</b>	<b>Right</b>
<b>Install/Air Flow<sup>3</sup></b>	152mm(6 in)	152mm(6 in)	N/A	N/A
<b>Service</b>	152mm(6 in)	N/A	305mm(12 in)	305mm(12 in)
<b>Footprint<sup>3</sup></b>	<b>Width</b> 483mm(19 in)		<b>Depth</b> 977mm(38.5 in)	
<ol style="list-style-type: none"> <li>See "Noise Emission Notes" on page 338 for definitions of noise emissions positions.</li> <li>Data applies when the tape unit is in streaming operating mode.</li> <li>The amount of space needed by the unit during normal operation is indicated by the footprint dimensions.</li> </ol>				

---

## Noise Emission Notes

1.  $L_{WA,d}$  is the declared sound power emission level for a production series of machines.
2.  $L_{pA,m}$  is the mean value of the sound pressure emission levels at the operator position (if any) for a production series of machines.
3.  $\langle L_{pA} \rangle_m$  is the mean value of the space-averaged sound pressure emission levels at the one-meter positions for a production series of machines.
4. N/A = Not Applicable (no operator position).
5. All measurements are made in accordance with ISO DIS 779 and reported in conformance with ISO DIS 7574/4.
6. N/A - not available.

---

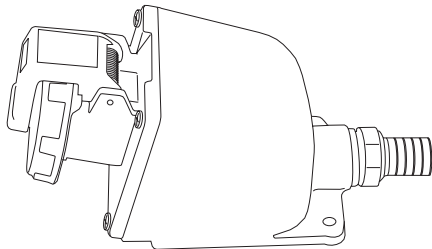
## Chapter 11. Power Cords and Electrical Needs

In planning for your electrical needs, consider the following:

- You must have adequate power to meet the requirements of the devices.
- Electrical receptacles must be near enough to be reached by the power cords supplied with the devices.
- Electrical outlets must be compatible with the electrical plugs supplied with the devices.
- Electrical outlets must be functional and properly grounded.
- Paths of power cords should be arranged to prevent damage to power cords or tripping hazards to personnel.
- Depending on the computing environment, you may need surge-protection devices.
- Radio, radar, or other strong radio frequency transmitters close to your location may cause computer malfunctions. Consult your marketing representative if abnormally high radio frequency noise is anticipated.
- Functionality and capacity of uninterruptible power source (UPS)
- Varying magnetic fields from high current electrical power-distribution systems, elevators, or equipment employing high currents or magnets may cause annoying motion on video displays. Check for acceptable operation of video displays if varying magnetic fields may be encountered.

**Note:** IBM strongly recommends the use of a metal backbox (example shown below) with line cords using IEC-309 plugs. Although in-line connectors and nonmetallic backboxes are available and compatible, they are not recommended. A metal backbox provides an added level of protection against a miswired phase and ground reversal, and in some cases, it may provide better EMI mitigation. If you choose not to use a metal backbox, check your local codes for specific requirements.

### Typical Metal Backbox



---

## Power Cords

Power cords with attached plugs are provided for most ac powered systems. Power cords are 1.8 m (6 ft.) minimum length. Rack-mounted products are normally supplied with 4.3 m (14 ft) power cords. All products shipped to Chicago are provided with 1.8 m (6 ft.) power cords to comply with local electrical standards.

The power cord that is supplied with the system has an attached plug. The plug that is provided corresponds to the power-outlet receptacle most commonly used in the country to which the product is being shipped. A different plug may be selected by specifying its feature code from “Power Plugs for Desktop and Deskside Systems” on page 341 when the product is ordered. The customer must supply the corresponding power outlet receptacles.

---

## Plugs

“Power Plugs for Desktop and Deskside Systems” on page 341 presents information concerning system unit plugs for various countries. The plugs are listed in order of feature code. Consult your marketing representative for information on which type of plug is used in your area or country.

**Notes:**

1. Feature codes 6173, 6174, 9173 , 9174, 7178 and 9178 are for a rack-mounted power distribution and include a power cord and plug that attaches to the power distribution unit (PDU). It is not necessary to order a line cord when one of these feature codes is selected.  
Single phase PDUs 6171, 9171 7176, 9176, 7177, and 9177 must have a power cord specified.
2. In the United States, raised floor installations involving racks may require a Russell and Stoll (R & S) watertight plug/connector/receptacle (feature code 9801 or 9987).
3. A combination of ac PDUs and dc power distribution panels (PDPs) in one rack will only be provided on a special-order basis.

---

## System Input Power

Most of the following input power considerations apply to all system units, except for the "Power Phase Imbalance" and "Power Phase Rotation" sections, which apply only to the rack-mounted or large systems.

## Electrical Considerations

These topics should be considered before you install a system.

### Primary Computer Power Service

While a dedicated power supply is not necessary, for maximum reliability, the computer power panel should connect to feeders that do not serve other loads. Connect electrical noise-producing devices to panels separate from those feeding the system units.

### Grounding

A system unit or device must be properly grounded. It is recommended that an insulated green wire ground, the same size as the phase wire, be installed between the branch circuit panel and the receptacle.

To ensure proper grounding, a licensed electrician should check the grounding and receptacles for conformance with the country electrical codes.

### Computer Room Emergency Power-Off Controls

As a safety precaution, you should provide room emergency power-off controls for disconnecting the main service wiring that supplies the computer equipment. Install these controls at a convenient place for the operator and next to the main exit doors of the room.

### Lightning Protection

You should install lightning protection devices when:

- An overhead power service supplies the primary power.
- The area is subject to electrical storms or equivalent-type power surges.

### Power Phase Imbalance

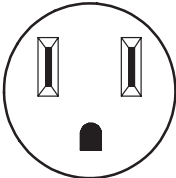
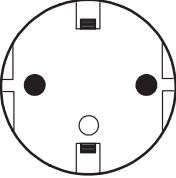
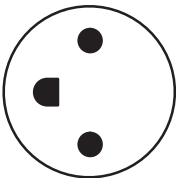
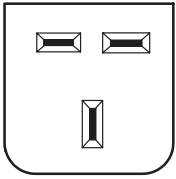
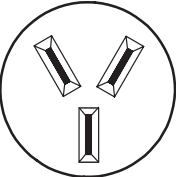

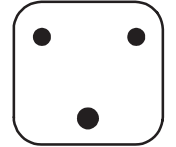

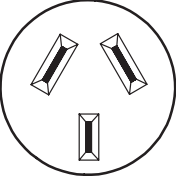
Three versions of rack power distribution units are available. The single-phase PDU, has a detachable line cord and can accept single-phase power or power from one phase of a three-phase source. Multiphase PDUs connect to two and three phases of a three-phase power source.

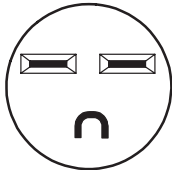
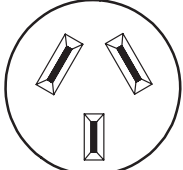
Systems with any of the power distribution units can cause a load imbalance when connected to a three-phase power source. You should consult a licensed electrician to properly balance the loads when new or additional systems are to be connected to a three-phase source.

### Power Phase Rotation

The phase rotation (sequence) is not critical for the rack multiphase power distribution units. The system will operate correctly with a multiphase distribution unit connected to a 200- to 240-volt single-phase power source (all phases connected to one side of the power source, neutral to the other).

## Power Plugs for Desktop and Deskside Systems

Feature Code	Plug	Standard Compliance or Type
<p>9116 9800 9986</p>		<p>NEMA WD-1 5-15P 125 V, 15 A</p>
<p>9820</p>		<p>CEE7 VII 250 V, 16 A</p>
<p>9821</p>		<p>Afsnit 107 250 V, 10 A</p>
<p>9825</p>		<p>BS 1363 250 V, 13 A</p>
<p>9827</p>		<p>SII-32-1971 250 V, 16 A</p>
<p>9828</p>		<p>SEV 1011.1959 250 V, 10 A</p>
<p>9829</p>		<p>SABS 164 BS 546 250 V, 16 A</p>
<p>9830</p>		<p>CEI 23-16/VII 250 V, 10 A</p>
<p>9831</p>		<p>AS 3122-1981 250 V, 10 A</p>

Feature Code	Plug	Standard Compliance or Type
9833		NEMA WD-1 6-15P 250 V, 15 A
9834		IEC 83-A5 1957 250 V, 10 A

## Rack-Type System Unit Power

The racks for rack-type system units are supplied with a PDU and a pluggable power cord. A rack can contain up to four vertically mounted ac PDUs. Two additional PDUs can be mounted horizontally in the bottom rear of a 7014 T00 rack, and three additional PDUs can be mounted horizontally in the bottom rear of a 7014 T42 rack.

**Note:** For information about connecting power cables to PDUs in the rack, refer to the *7014 T00 and T42 Rack Installation and Service Guide*, order number SA23-2544, and *Site and Hardware Planning Information*, this publication.

There are two types of ac PDUs: Type 6 and Type 7.

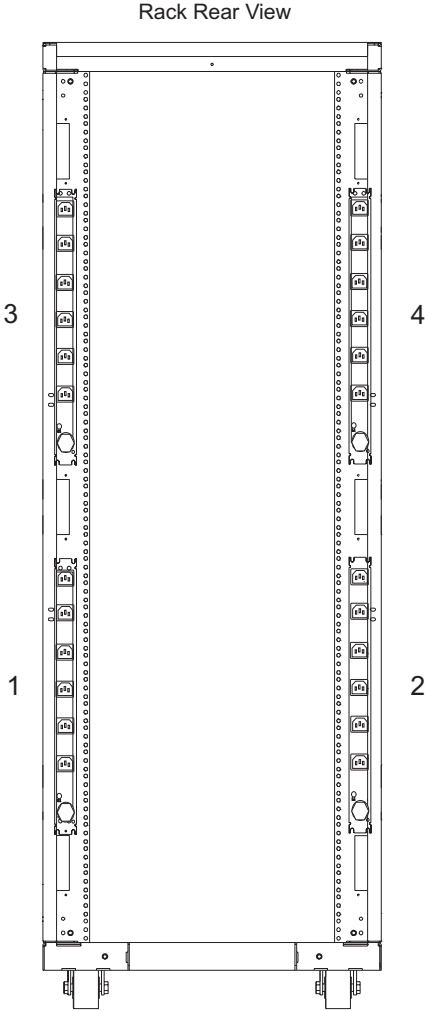
- Type 6 PDUs have six IEC320-C13, 200 V to 240 V ac outlets on the rear of the PDU. There are two additional IEC320-C13, 200 V to 240 V ac outlets (with limited access) on the front of the PDUs. These two additional outlets are intended for IBM service. The input ac power to the bus is not switched, so each outlet has a separate circuit breaker to protect against excessive current. Each outlet on the Type 6 PDU is limited to 8 amps, and the PDU is limited to a total of 24 amps. Type 6 PDU feature codes are 9171, 9173, 9174, and 6xxx. For additional information about Type 6 PDUs, see the illustration “Type 6 Power Distribution Unit” on page 344.
- Type 7 PDUs have nine IEC320-C13, 200 V to 240 V ac outlets and two IEC320-C19, 200 V to 240 V ac outlets. The input ac power to the bus is not switched, so each group of three IEC320-C13, 200 V to 240 V ac outlets has a separate circuit breaker to protect against excessive current. Each IEC320-C19, 200 V to 240 V ac outlet has a separate circuit breaker. Each outlet of Type 7 PDUs is limited to 10 amps. Each group of three outlets in Type 7 PDUs is limited to 15 amps. The three-phase Type 7 PDU is limited to 16 amps per phase, and the PDU is limited to a total of 24 amps. Type 7 PDUs feature codes are 9176, 9177, 9178, 7176, 7177, and 7178. For additional information about Type 7 PDUs, see the illustration “Type 7 Power Distribution Unit” on page 345.



# PDU Location and Configuration Information

The following figure shows the four vertical PDU locations in a rack.

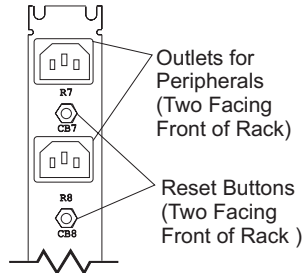
Power Distribution Unit Vertical Locations



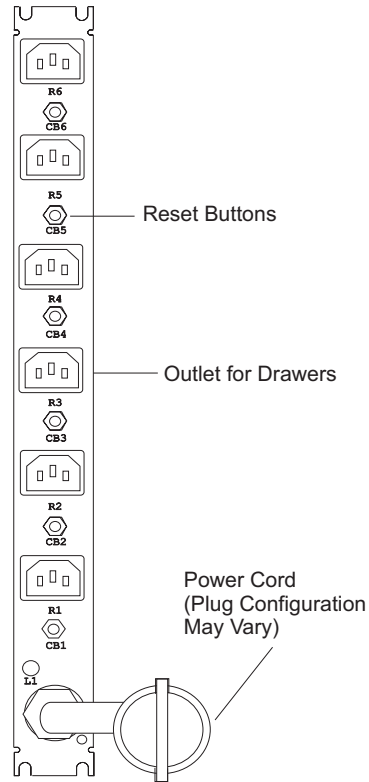
The following figure shows the configuration of Type 6 PDUs.

### Type 6 Power Distribution Unit

View of Power Distribution Unit Facing Front of Rack



View of Power Distribution Unit Facing Rear of Rack

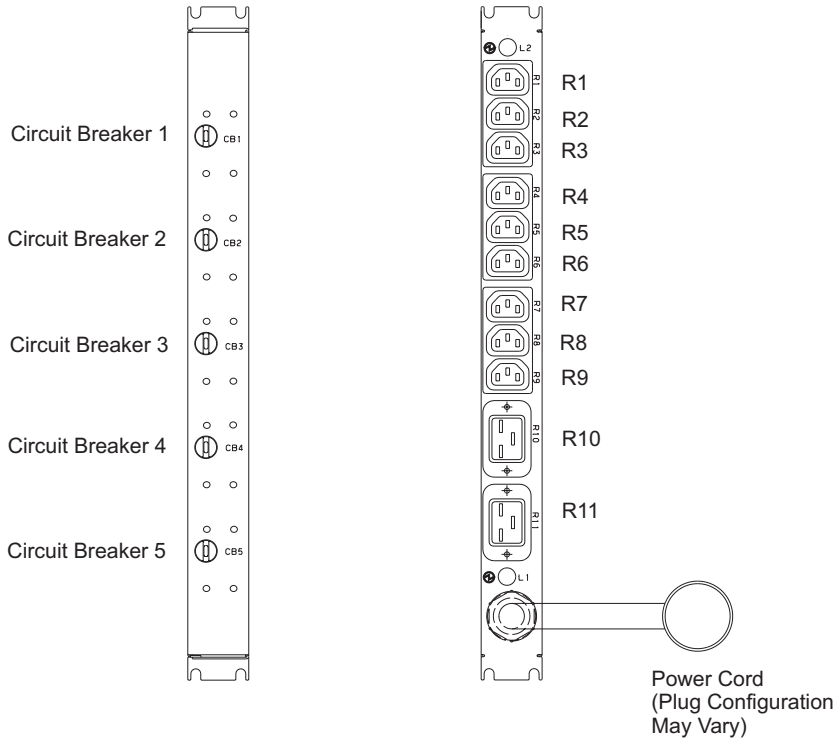


The following figure shows the configuration of Type 7 PDUs.

### Type 7 Primary Power Distribution Unit



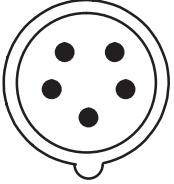

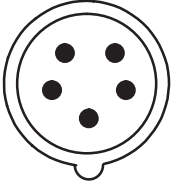
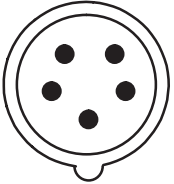
View of Power Distribution Unit Facing Front of Rack

View of Power Distribution Unit Facing Rear of Rack



## Multiphase PDUs With Power Cords

The feature codes in the following table have a PDU and a power cord. The power cord has a receptacle for connection to the PDU plug.

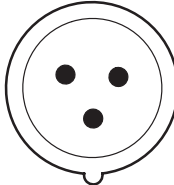
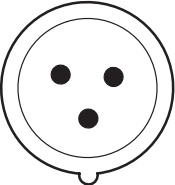
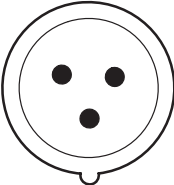
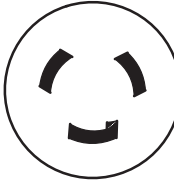




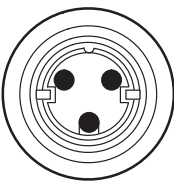
Feature Code for PDU with Power Cord	PDU Plug	Power Cord Receptacle to PDU	Power Cord Plug to Wall	Standard Compliance or Type
6173 9173 Except for S70, S7A, and S80 CEC Racks. See notes.				IEC 309 380-415 V, 32 A
6174 9174 For S70, S7A, and S80 Racks. See Notes. 7178 9178				IEC 309 380-415 V, 16 A

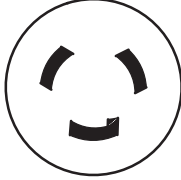

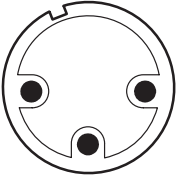


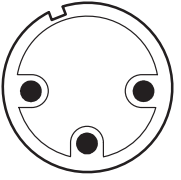
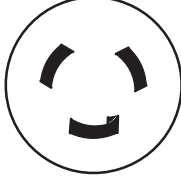

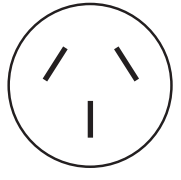
### Notes:

1. When an S70, S7A, S80, or S85 CEC is ordered with feature code (FC) 9173, it is supplied with a 16 amp IEC 309 plug. All other racks ordered with FC 9173 are supplied with a 32 amp IEC 309 plug.
2. For power cord information on the @server pSeries 690, refer to “Power and Electrical Requirements” on page 163.

## Single Phase PDUs and Power Cords

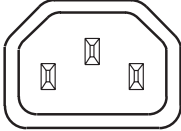
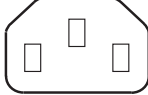
Separate power cords are available for the PDUs listed in the following table.

PDU Feature Code	Power Cord Feature Code	PDU Plug	Power Cord Receptacle to PDU	Power Cord Plug to Wall	Standard Compliance or Type
9171 6171 9177 7177	9823				IEC 309 220 to 240 V, 32 A
9171 6171 9176 7176	9800 9824 9986				NEMA WD-5 L6-30P 250 V, 30 A
9171 6171 9176 7176	9801 9987				R & S 3750 250 V, 30 A

PDU Feature Code	Power Cord Feature Code	PDU Plug	Power Cord Receptacle to PDU	Power Cord Plug to Wall	Standard Compliance or Type
9171 6171 9176 7176	9822				Wilco Weatherproof WIP130 250 V, 30 A
9171 6171 9176 7176	9826				PDL Insulated 56PA330 250 V, 30 A
9171 6171 9176 7176	9835				Korean Standard KS C 8305-1990 250 V, 30 A

## Rack-Type System Internal Power Distribution Cable

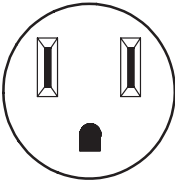
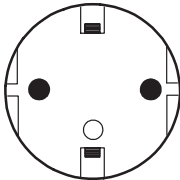

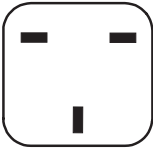
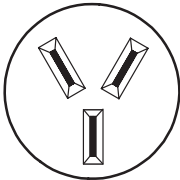



The ac power distribution from PDUs to system components is accomplished with cords using IEC 320/C14 plugs. Additional cords for customer-installed equipment can be provided by feature code 6095. Voltage from the PDU will be 200 to 240 volts as provided by the customer's ac power system. The plug and output connector for power cable feature code 6095 are shown in the following table.

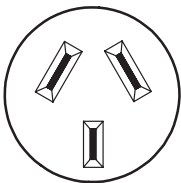
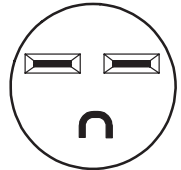
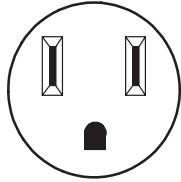
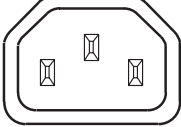
Feature Code	Plug	Standard Compliance or Type
6095		IEC 320/C14 250 V, 10 A This plug is used for all power outlets from a PDU.
		IEC 320/C13 250 V, 10 A For connection to customer installed equipment

## Specify-Feature Codes for Power Cords

The 98xx specify-feature codes are used to provide power from wall-type outlets to external I/O devices like RANs or displays. These power cords do not work with rack PDUs. To provide power from a rack PDU to an external I/O device like the rack-status beacon, order power-cord-feature code 6095.

The following table lists specify-feature codes for power cords that provide power from a rack PDU to the system. All of the power cords listed in the table are 4 M (13.1 ft.) long except feature code 9910, which is 3 M (10.0 ft.) long.

Feature Code	Plug	Standard Compliance or Type	Countries
9900		NEMA WD-1 5-15P 125 V, 15 A	United States, Canada
9901		CEE7 VII 250 V, 16 A	Belgium, Finland, France
9902		NORMBLAD 4 250 V, 10 A	Denmark
9903		BS 13634 250 V, 13 A	United Kingdom, Others
9904		SII-32-1971 250 V, 16 A	Israel
9905		SEV 1011.1959 250 V, 10 A	Switzerland
9906		SABS 164 BS 546 250 V, 16 A	India, Pakistan, South Africa
9907		CEI 23-16/VII 250 V, 10 A	Italy

Feature Code	Plug	Standard Compliance or Type	Countries
9908		AS 3122-1981 250 V, 10 A	Australia, New Zealand, Argentina
9909		NEMA WD-1 6-15P 250 V, 15 A	Thailand
9910		NEMA WD-1 5-15P 125 V, 15 A	Japan, Others
9911		IEC 320/C14 250 V, 10 A	All (See note)

**Note:** The standard pSeries rack-power cord that provides power from a rack PDU to the system is feature code 9911. If customers do not specify a power cord, they will receive feature code 9911.

Specify feature codes 9900 through 9910 are available on some systems for customers who want to plug the system into non-pSeries racks that have PDUs that use regular wall-type outlets. FC 9900 and 9910 are restricted to a few systems with lower power requirements. Consult the system sales manual for the supported power-cord-specify-feature codes.

## -48 Volt DC Rack Power Distribution

System Racks with -48V DC power distribution (feature codes 6115, 6116, or 6117) have provision for ring terminal connection of power to the power distribution panel (PDP) at the top of the rack. The PDP has two independent sections for power input and output. Each section of the PDP has a -48 Volt bus bar and a -48 Volt Return bus bar. Two holes are provided in each bus bar for input power connection. The input power connection holes are sized for 3/8-inch bolts that are approximately 10 mm in diameter. Bolts, ring terminals, and wire for -48 volt input power connection are not provided with the rack.

Properly sized circuit breakers, connectors, and cables to distribute the -48 volts from the PDP to the drawers in the rack are provided with the drawers.





---

## Chapter 12. Cable Planning

Before shipment, the customer is asked to provide specific planning information concerning the physical layout of the installation.

This chapter can help you plan your layout by presenting planning information on some cables used to interconnect the system units and devices. The chapter includes information on cable length and measuring techniques and some sample cable-planning charts. Other cable planning charts can be laid out as necessary. The *Adapters, Devices, and Cable Information for Micro Channel Bus Systems*, order number SA23-2764 or *Adapters, Devices, and Cable Information for Multiple Bus Systems*, order number SA23-2778 has detailed information on cable feature codes, part numbers, and pin-out charts for cables available to be purchased and customer-supplied cables.

You must plan the type of cable, cable path, and cable length. Consider not only your current needs, but also your anticipated growth and the relocation of personnel.

To assist with the installation of your system, you should note cable paths on your office layout.

The customer is responsible for planning for the installation of interconnecting cables, including the proper lightning and surge protection as necessary and should contact the appropriate contractor for guidance and assistance as required. If the cables discussed in the cable publication do not meet your needs, talk to your marketing representative or cabling vendor about custom-cabling alternatives.

---

### General Considerations

In preparing for cabling, consider the following:

- Where applicable, electrical and physical specifications of cables you currently have and plan to use with the new system must be compatible with the standards mentioned in this book. If no standard is specifically mentioned in this book, the standards for the interface on that adapter must be met.
- Lengths and paths of cables. See “Cable Measuring” on page 352.
- Communication signal cables should be installed away from power lines or other sources of electrical interference.
- Toroid and shielding considerations. Shielded cables should be used in applications where a shielded connection is provided. Toroid kits should be applied to cables when provided.
- Labeling of cables and ports you currently have in order to indicate which devices you want attached to them. See “Cable Labeling Reference Information” on page 367.
- Electrostatic discharge (ESD) considerations. In particular, unprotected patch panels, punch blocks, or other intermediate routing or switching devices used in cabling can allow ESD into the network.

**Note:** Lightning protection must be provided on any cable which travels outside of the building in which the system or device, such as a terminal or printer, is installed. Contact a cabling vendor about providing lightning protection for those cables. Fiber-optic cables do not require lightning protection.

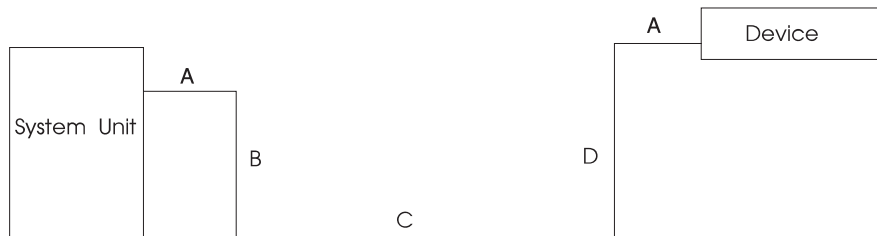
---

## Cable Measuring

Accurate measuring of cables is critical to a successful and efficient installation. Do not guess or estimate your cable lengths.

In determining the cable lengths you need, be sure to consider the following:

- A=length allowed for service access, 51 mm (2 ft.) on both system unit and device ends.
- B=length from system unit to floor.
  - Tabletop to floor for desktop models.
  - 46 mm (1.5 ft.) for deskside units.
  - See "7015 Considerations" for rack-mounted system units.
- C=horizontal and vertical cable runs. Be sure to route cables around furniture to avoid tripping hazards.
- D=distance from floor to device. (This can include distance between floors, between buildings, and so on, depending on complexity of installation.)

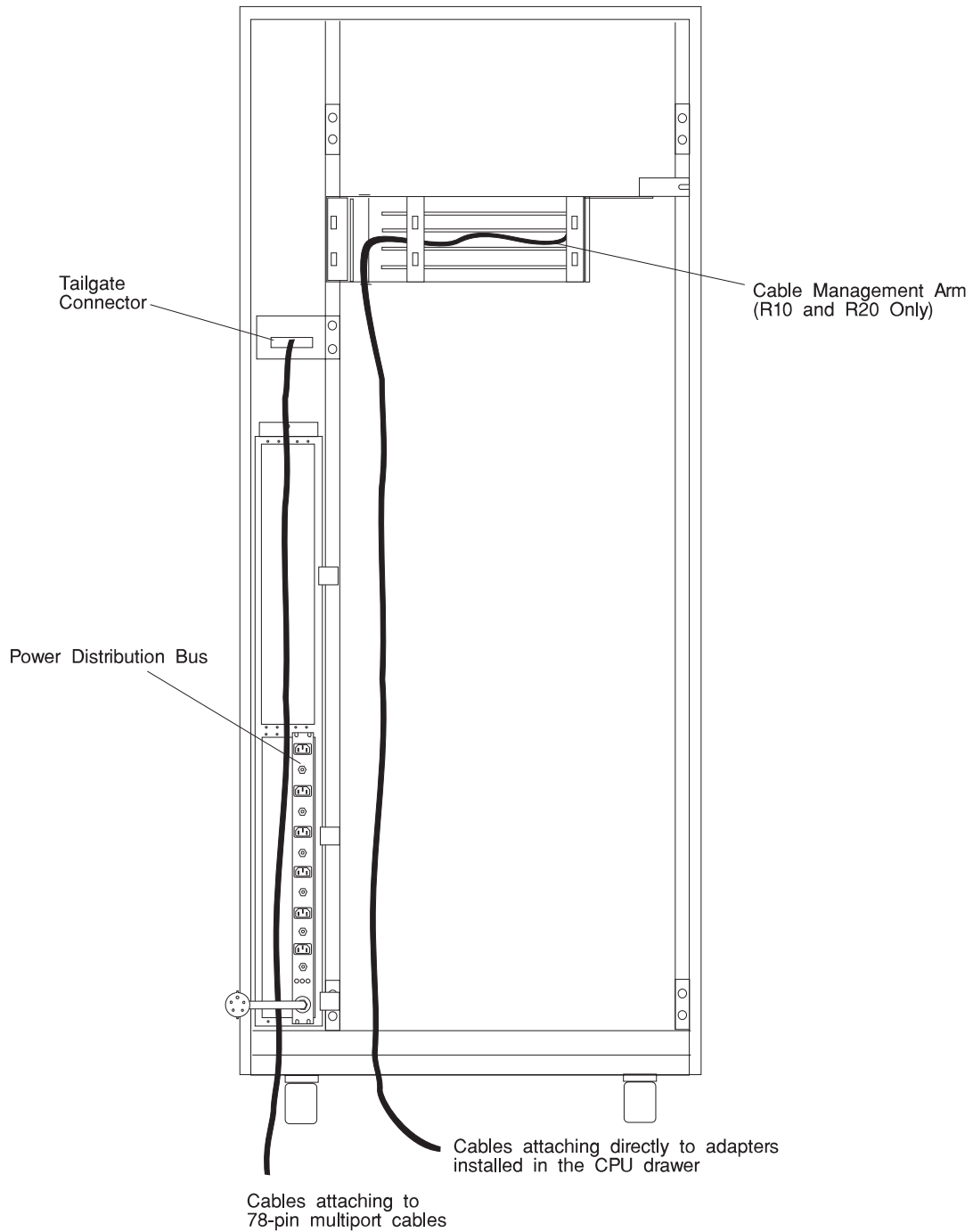


## 7015 Considerations

The 78-pin multiport interface cables for the 8-or 16-port Async Adapters when used with the 7015 Models R10 and R20 attach to the system tailgate connect rather than to the adapter itself. Internal cables not shown in the following cable diagram run from the adapter through the cable management arm to the tailgate connector. You should begin your cable-measurements at the tailgate connector for the 8-or 16-port Async Adapter multiport cables.

Other cables used with the 7015 Models R10 and R20 are routed through a cable management arm. The management arm is designed to ensure that the cables do not kink, stretch, or accidentally disconnect when a drawer is pulled out for service.

When planning the necessary lengths of cables routed through this arm, add 2.3 m (7.5 ft.) to the measured distance from the base of the rack.



**Rear view of a 7015 system unit, showing system tailgate connector and cable management arm (Models R10 and R20). The EIA scale, which provides a standard unit of measure, is located on the inside right of the rack.**

---

## Cable Planning Charts

Cable planning charts help your electrician or cable vendor understand your master plan for cabling. These charts are particularly useful for large, complex installations.

For information about the cables, see the following publications:

- *Adapters, Devices and Cable Information, for Micro Channel Bus Systems* , order number SA23-2764
- *Adapters, Devices and Cable Information, for Multiple Bus Systems* , order number SA23-2778

For more information on asynchronous communications software, hardware, and cabling see the *AIX Asynchronous Communications Guide*.

The planning responsibilities are as follows:

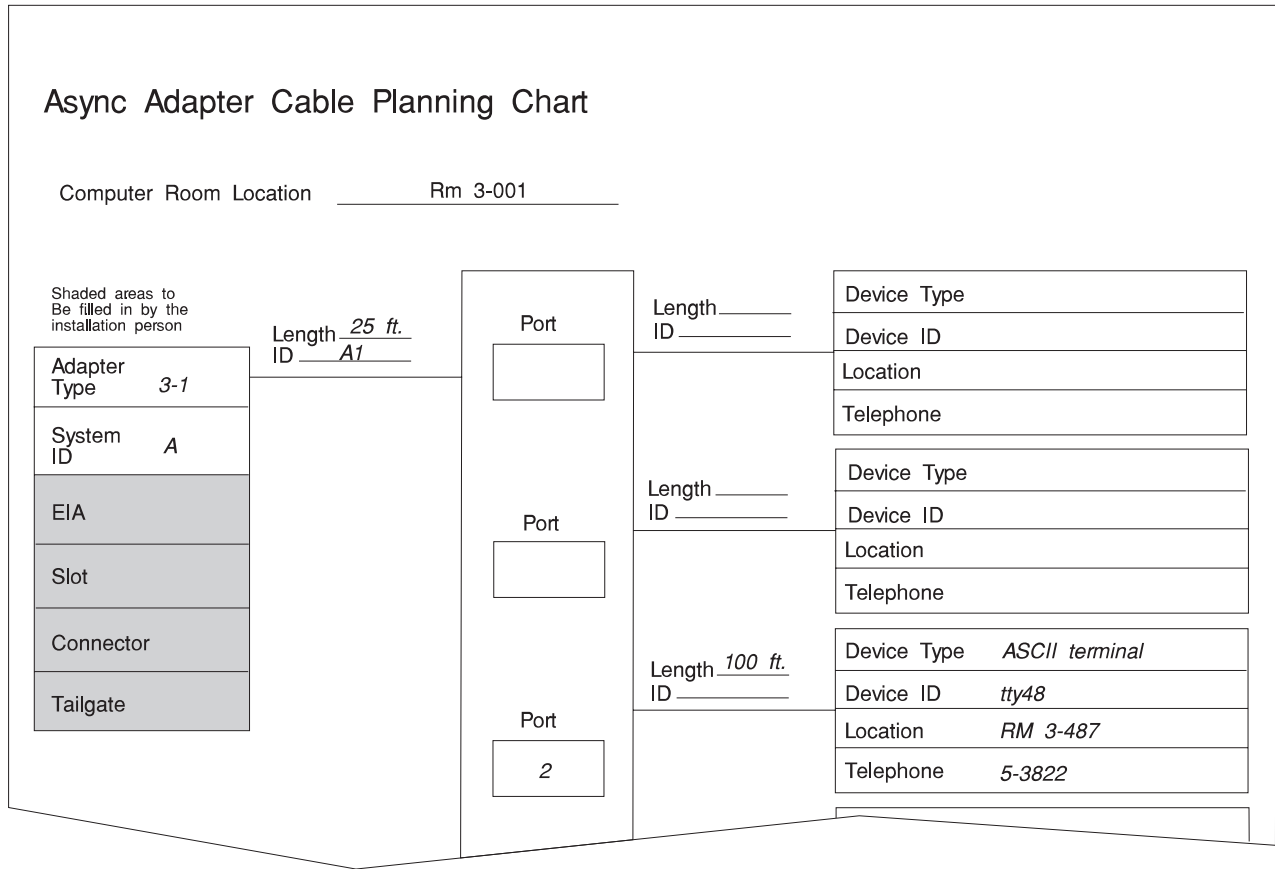
- Fill in each chart, except for the shaded areas, which will be completed by the electrician or cable vendor installing your system. You can make copies of the charts as needed. To help you complete the charts, samples are provided on the following pages.
- Verify that the proper cabling has been ordered and installed.
- Prepare and attach cable labels, using the information from the completed charts.
- After you have completed your sections, give the charts to your electrician or cable vendor who can use them to understand your cabling needs.

**Note:** Following the installation, retain the charts to help you remember the cabling scheme. These charts, in addition to the cable labels that are available (see “Cable Labeling Reference Information” on page 367), will be invaluable in the future if you move system units or devices and need to keep cabling in order.

The following cable planning charts are described in this section, one for each of the following adapters or adapter types:

- Asynchronous adapters
- Standard I/O adapters
- 4-Port Multiprotocol Communications Controller
- Other adapters

# Asynchronous Adapter Planning Charts: Example



An example of an Async Cable Planning Chart for the 8 port async adapter complete for an ASCII terminal. In this example, the terminal is attached to Port 2. Use this chart for 8-port or 16-port asynchronous adapters.

# Async Adapter Cable Planning Chart

Computer Room Location \_\_\_\_\_

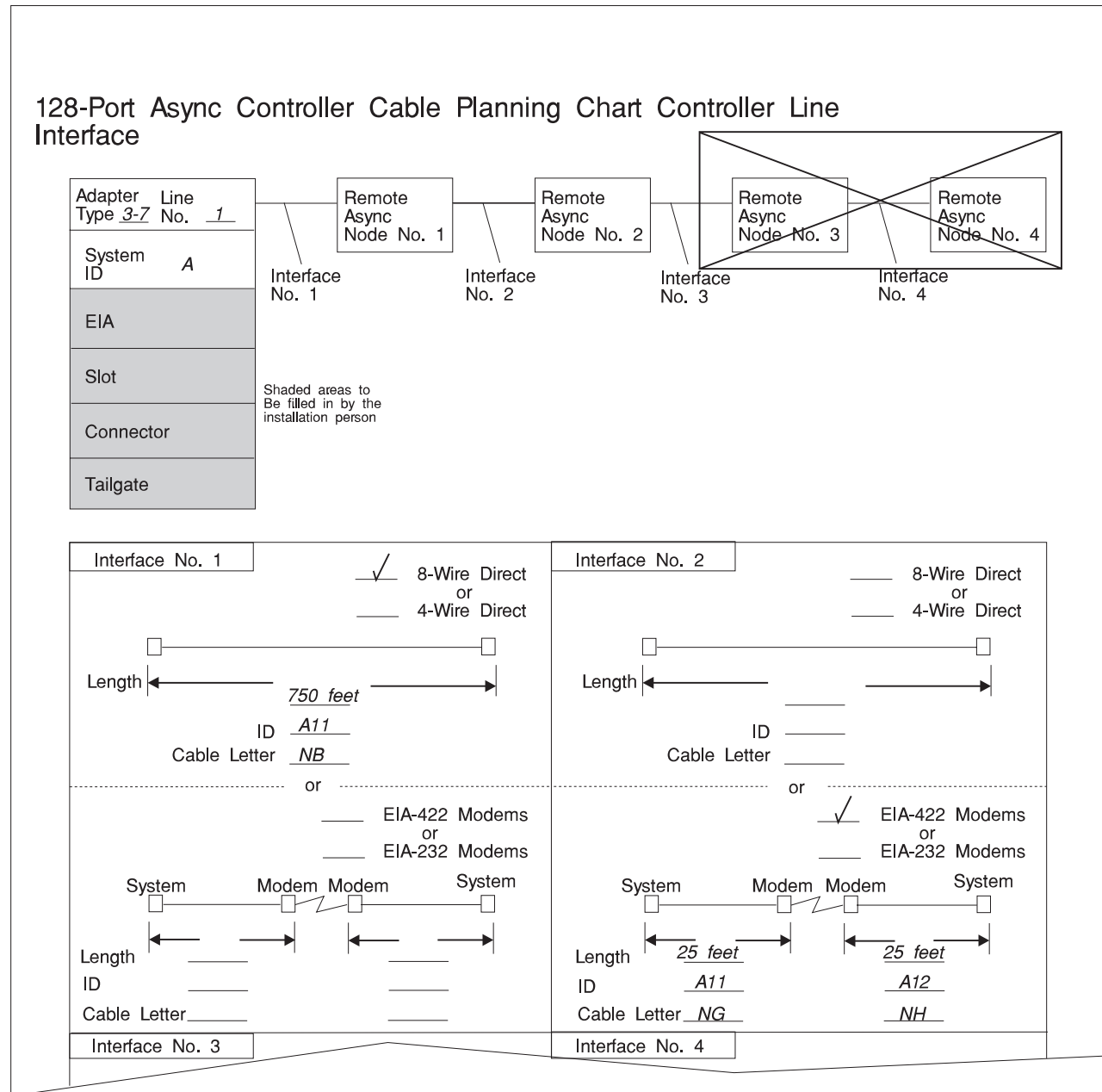
Shaded areas to be filled in by the installation person

Adapter Type	Length _____ ID _____	Port	Length _____ ID _____	Device Type
System ID		Port	Length _____ ID _____	Device ID
EIA		Port	Length _____ ID _____	Location
Slot		Port	Length _____ ID _____	Telephone
Connector		Port	Length _____ ID _____	Device Type
Tailgate		Port	Length _____ ID _____	Device ID
		Port	Length _____ ID _____	Location
		Port	Length _____ ID _____	Telephone
		Port	Length _____ ID _____	Device Type
		Port	Length _____ ID _____	Device ID
		Port	Length _____ ID _____	Location
		Port	Length _____ ID _____	Telephone
		Port	Length _____ ID _____	Device Type
		Port	Length _____ ID _____	Device ID
		Port	Length _____ ID _____	Location
		Port	Length _____ ID _____	Telephone

Fan-Out Box No. \_\_\_\_\_

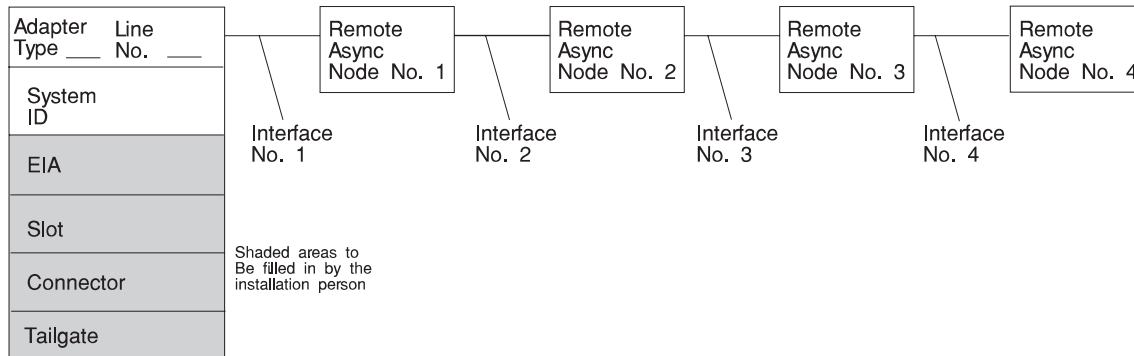
Location \_\_\_\_\_

# 128-Port Async Controller Cable Planning Chart: Example



An example of a 128-Port Async Controller Cable Planning Chart, Controller Line Interface, completed for two interfaces. In this example, interface number 1 uses a 750-foot 8-wire cable, and interface number 2 uses two EIA-422 synchronous modems and associated cables. Cable IDs are assigned by the customer. For information about the cables represented by the cable letters shown in the example above, see "Adapters and Cabling Chapters" for the 128-Port Async Controller in the Adapters, Devices and Cable Information for Micro Channel Bus Systems, order number SA23-2764 or Adapters, Devices and Cable Information for Multiple Bus Systems, order number SA23-2778.

# 128-Port Async Controller Cable Planning Chart Controller Line Interface



<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Interface No. 1</div> <p style="text-align: right;">___ 8-Wire Direct or ___ 4-Wire Direct</p> <p>Length _____ ID _____ Cable Letter _____</p> <p style="text-align: center;">or</p> <p style="text-align: right;">___ EIA-422 Modems or ___ EIA-232 Modems</p> <p>Length _____ ID _____ Cable Letter _____</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Interface No. 2</div> <p style="text-align: right;">___ 8-Wire Direct or ___ 4-Wire Direct</p> <p>Length _____ ID _____ Cable Letter _____</p> <p style="text-align: center;">or</p> <p style="text-align: right;">___ EIA-422 Modems or ___ EIA-232 Modems</p> <p>Length _____ ID _____ Cable Letter _____</p>
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Interface No. 3</div> <p style="text-align: right;">___ 8-Wire Direct or ___ 4-Wire Direct</p> <p>Length _____ ID _____ Cable Letter _____</p> <p style="text-align: center;">or</p> <p style="text-align: right;">___ EIA-422 Modems or ___ EIA-232 Modems</p> <p>Length _____ ID _____ Cable Letter _____</p>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Interface No. 4</div> <p style="text-align: right;">___ 8-Wire Direct or ___ 4-Wire Direct</p> <p>Length _____ ID _____ Cable Letter _____</p> <p style="text-align: center;">or</p> <p style="text-align: right;">___ EIA-422 Modems or ___ EIA-232 Modems</p> <p>Length _____ ID _____ Cable Letter _____</p>



# 128-Port Async Device Cable Planning Chart: Example

**128-Port Async Device Cable Planning Chart**

Remote Async Node No.           1          

Location           Room 231          

Device Type <i>2381 Proprinter</i> Device ID <i>LP44</i> Location <i>Room 522</i> Telephone <i>5-7152</i>	Cable: Length <i>200 ft.</i> ID <i>B</i>	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">0</div>	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div>	Cable: Length _____ ID _____	Device Type Device ID Location Telephone
Device Type <i>3151 ASCII Term.</i> Device ID <i>TTY45</i> Location <i>Room 487</i> Telephone <i>5-8317</i>	Cable: Length <i>100 ft.</i> ID <i>A</i>	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">1</div>	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div>	Cable: Length _____ ID _____	Device Type Device ID Location Telephone
Device Type Device ID Location Telephone	Cable: Length _____ ID _____	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div>	Port <div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div>	Cable: Length _____ ID _____	Device Type Device ID Location Telephone

An example of a 128-Port Async Device Cable Planning Chart, Remote Async Node, completed for a 2381 Proprinter® and a 3151 ASCII terminal. In this example, the terminal is attached to Port 1 on Remote Async Node number 1, and the printer is connected to port 0. Cable IDs are assigned by the customer.

# 128-Port Async Device Cable Planning Chart

Remote Async Node No. \_\_\_\_\_

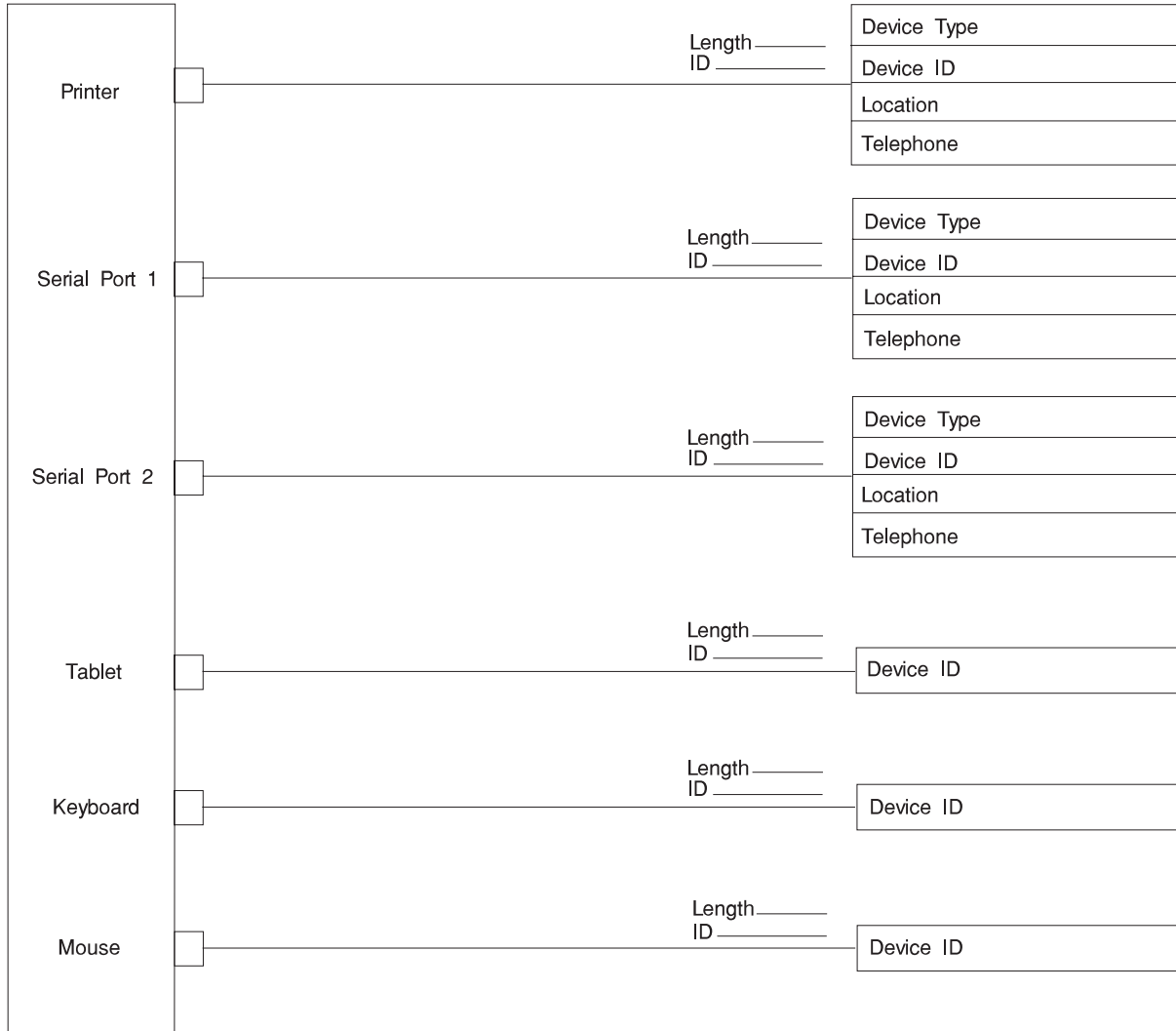
Location \_\_\_\_\_

Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone
Device Type	Cable: Length _____ ID _____	Port	Port	Cable: Length _____ ID _____	Device Type
Device ID		<input type="checkbox"/>	<input type="checkbox"/>		Device ID
Location					Location
Telephone					Telephone

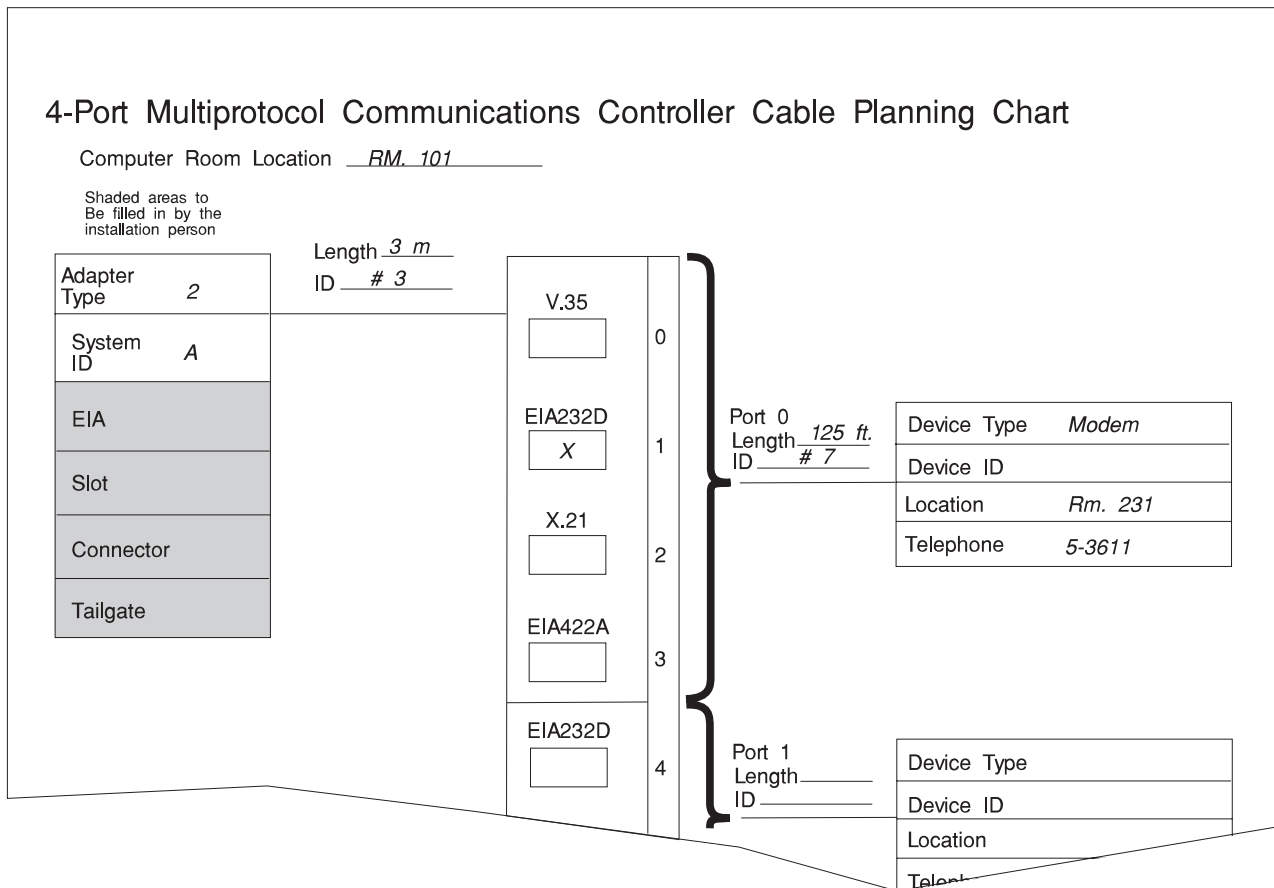
# Standard I/O Cable Planning Chart

Customer Room Location \_\_\_\_\_

SIO Planar  
Connectors



# 4-Port Multiprotocol Communications Controller Cable Planning Chart Example



An example of a 4-Port Multiprotocol Communications Controller Cable Planning Chart completed for a modem. In this example, the terminal is attached to Port 0. The protocol type, in this case EIA-232D, is noted with an X.

# 4-Port Multiprotocol Communications Controller Cable Planning Chart

Computer Room Location \_\_\_\_\_

Shaded areas to  
Be filled in by the  
installation person

Adapter Type	Length _____ ID _____	V.35	Port 0 Length _____ ID _____	Device Type Device ID Location Telephone
System ID		0		
EIA		EIA232D		
Slot		1		
Connector		X.21	Port 1 Length _____ ID _____	Device Type Device ID Location Telephone
Tailgate		2		
		EIA422A	Port 3 Length _____ ID _____	Device Type Device ID Location Telephone
		3		
		EIA232D	Port 2 Length _____ ID _____	Device Type Device ID Location Telephone
		4		
		V.35	Port 3 Length _____ ID _____	Device Type Device ID Location Telephone
		5		
		EIA232D	Port 2 Length _____ ID _____	Device Type Device ID Location Telephone
		6		
		EIA232D	Port 3 Length _____ ID _____	Device Type Device ID Location Telephone
		7		
		EIA422A	Port 2 Length _____ ID _____	Device Type Device ID Location Telephone
		8		

Fan-out Box

**Note:** Select only one interface per port.

# Cable Planning Chart: Other Adapters

Computer Room Location \_\_\_\_\_

Shaded areas to Be filled in by the installation person

Adapter Type	Length _____ ID _____	Device Type
System ID	Interface	Device ID
Drawer	___ X.21	Location
Slot	___ V.24	Telephone
Tailgate	___ V.35	

Adapter Name \_\_\_\_\_

Adapter No. \_\_\_\_\_ of \_\_\_\_\_

Adapter Type	Length _____ ID _____	Device Type
System ID	Interface	Device ID
Drawer	___ X.21	Location
Slot	___ V.24	Telephone
Tailgate	___ V.35	

Adapter Name \_\_\_\_\_

Adapter No. \_\_\_\_\_ of \_\_\_\_\_

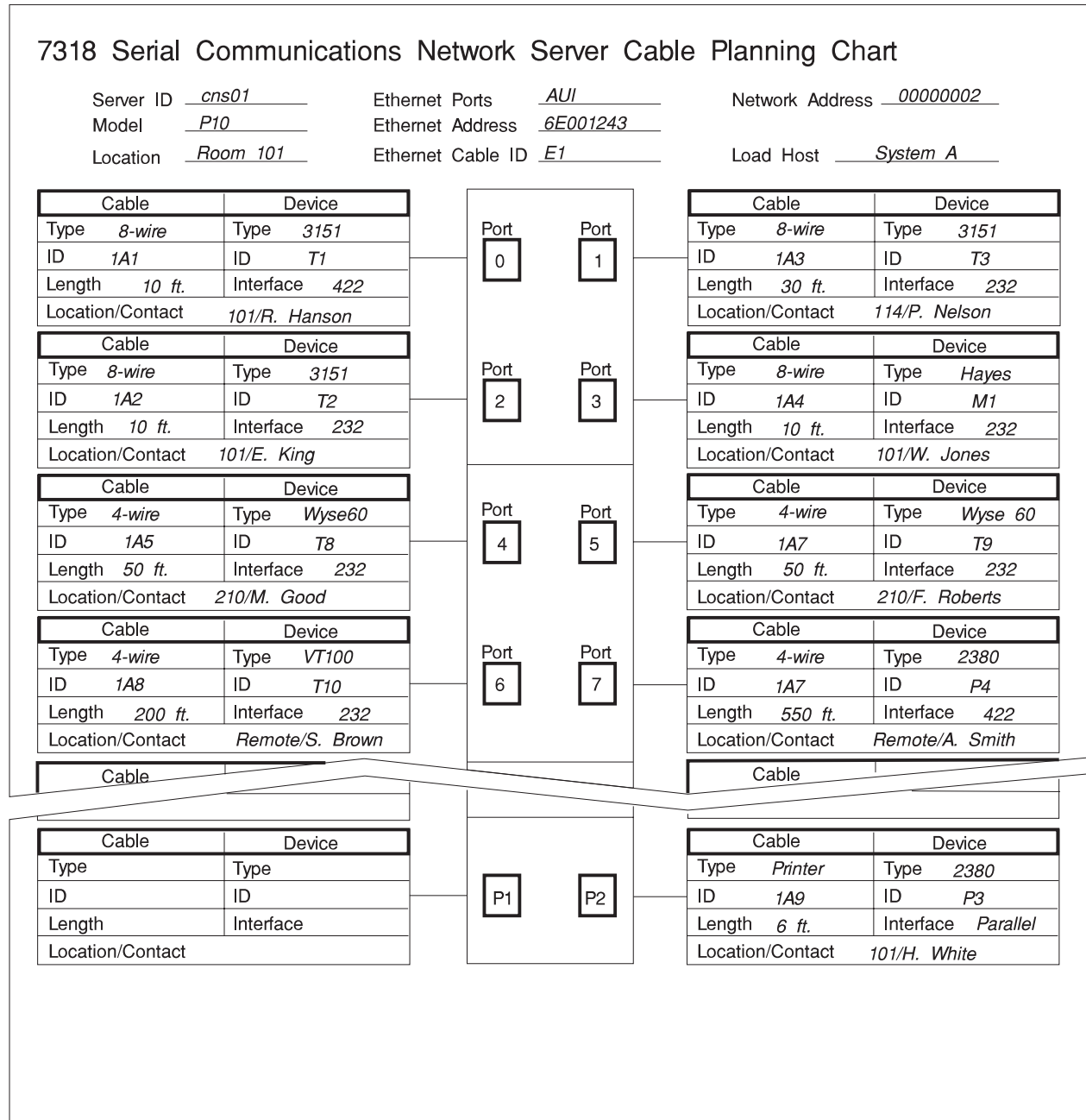
Adapter Type	Length _____ ID _____	Device Type
System ID	Interface	Device ID
Drawer	___ X.21	Location
Slot	___ V.24	Telephone
Tailgate	___ V.35	

Adapter Name \_\_\_\_\_

Adapter No. \_\_\_\_\_ of \_\_\_\_\_

Adapter Type	Length _____ ID _____	Device Type
System ID	Interface	Device ID
Drawer	___ X.21	Location
Slot	___ V.24	Telephone
Tailgate	___ V.35	

# 7318 Models P10 and S20 Cable Planning Chart Example



An example of the 7318 Terminal Server Cable Planning Chart showing connection of six terminals, 1 modem, 1 serial printer, and 1 parallel printer. The IDs assigned in the example above are assigned by the configuration planner.

# 7318 Serial Communications Network Server Cable Planning Chart

Server ID \_\_\_\_\_ Ethernet Ports \_\_\_\_\_ Network Address \_\_\_\_\_  
 Model \_\_\_\_\_ Ethernet Address \_\_\_\_\_  
 Location \_\_\_\_\_ Ethernet Cable ID \_\_\_\_\_ Load Host \_\_\_\_\_





---

## Cable Labeling Reference Information

Use the information in this chapter to assist in cable planning and installation. Because several different interfaces have cable connectors that are identical in appearance, labeling cables can help you keep track of how each cable is being used and provide correct location data. This section provides examples of cable labels that you can develop and use at your installation.

Identify the cables with information describing the type and location of the device it attaches. Use that information to fill out the right hand side of the label.

<b>Room</b>	The room number, or other information about the physical location of the device.
<b>Person</b>	The name of the person who uses the device.
<b>Telephone #</b>	The nearest telephone number to the device.
<b>Device Type</b>	This could be a printer, plotter, TTY, or similar device.
<b>Device ID</b>	The device ID is determined at the time the software is configured on the system.
<b>Software Location Code</b>	The software location code is the link between the hardware and software. This code appears in the software configuration menus and in the hardware diagnostic menus.  <b>Note:</b> For specific location code information, refer to the Diagnostic Information manual for your system.
<b>Adapter Type</b>	The adapter type number is located on a label attached to the end of the adapter. Refer to <i>Adapters, Devices, and Cable Information for Multiple Bus Systems Systems</i> , order number SA23-2778, or <i>Adapters, Devices, and Cable Information for Micro Channel Bus Systems</i> , order number SA23-2764, for a listing of adapter types.  <b>Note:</b> Some of the adapters in the multiple bus systems do not have an adapter type.
<b>Interface</b>	Name of the asynchronous adapters, and some network adapters, generally includes the name of the interface.
<b>EIA</b>	Used in a rack-type system unit to identify the physical location of the drawer within the rack. The label along the right side of the rack (with rear cover open) indicates numbers from 1, at the bottom, to 32, at the top of the rack. The number at the bottom-right corner of the drawer is the EIA location for this drawer.
<b>Slot</b>	Physical position within the system unit or drawer where the adapter is located. Each adapter slot is identified by a single digit number. Usually, the number is embossed in the adapter mounting frame.
<b>Connector</b>	Connector number on the adapter. Most adapters have only one connector, so this number is 1.
<b>Tailgate</b>	For rack-type system unit only. Record the number of the tailgate connector to which this cable is attached.
<b>System ID</b>	If an installation has more than one system unit, each one must be identified to prevent connecting devices to the wrong system unit. The customer determines the System ID.

Software Location Code		Adapter Type		Interface	
This Cable Connects To:					
Service Use Only	EIA	Slot	Connector	Tailgate	System ID:

Fold	This Cable Goes To:		
	Room	Person	Telephone Number
	Device Type:		
Device ID:			

---

## Chapter 13. High Availability Cluster Server Information

This chapter presents information on high availability cluster servers with cluster server cabling information.

---

### Reference Information

This section has general information about systems or subsystems that can be used in high availability cluster configurations.

#### 7133 Serial Disk Systems

High Availability Cluster Servers consist of a minimum of two systems in a cluster with two 7133 Serial Disk Systems. Each system in the cluster comes with AIX operating system software and HACMP high availability cluster software. The systems use and share the external SSA disks in the 7133 SSA Disk Storage Systems.

Each system in the cluster has a minimum of two SSA PCI adapters to allow redundant connection to the 7133 SSA Disk Storage Subsystems.

It is highly recommended that a 3153 ASCII terminal (or equivalent) be purchased even if graphics adapters or remote workstations are used as the control console. This allows a software or service person to work on one of the cluster servers through the serial port without affecting the other server. If a graphics display is preferred to the 3153 display, a low-cost workstation can be connected through an Ethernet connection or a local network.

The 7133 Serial Disk System comes with eight SSA disk drives on two loops and a redundant ac power supply

Each cluster server can have up to four SSA adapters.

The HA cluster server systems offer configuration flexibility. Because cluster servers are comprised of systems that can operate independently, all normally available features are supported.

#### Configuring the HA cluster server System With No Single Points of Failure

Redundant adapters and mirrored disks are the only way to guarantee redundancy in the 7133 serial disk system. In this configuration, no single hardware component failure can cause the serial disk system to be unavailable.

Refer to the *High Availability Cluster Multi-Processing for AIX, Version 4.3: Enhanced Scalability and Administration Guide*, order number SC23-4284, and the *High Availability Cluster Multi-Processing for AIX, Version 4.3: Planning Guide*, order number SC23-4277, for HACMP/ES planning information.

The following table describes outages and their impacts for the minimum cluster-server configuration with mirrored SSA adapters (2 Ethernet adapters, 2 SSA adapters, mirrored disk, HACMP, external SSA, and two power distribution units (PDUs) per I/O rack).

Hardware Failure Description	Failure Behavior If HACMP Is Not Configured	Extra Work Required To Provide Recovery Action (in addition to normal HACMP configuration)	Recovery Action and Behavior If HACMP Is Configured
Node Outage or AIX crash	Node unavailable	None	HACMP fallover. Application(s) unavailable for brief time during fallover.
Ethernet adapter failure	Access to node through Ethernet lost, error log entry.	None	HACMP swap adapter event moves IP address to spare adapter. Node Ethernet IP address unavailable for an extremely brief period as address is swapped.
SSA Drawer Power Supply Failure	None seen, error log entry	None	N/A (no fallover)
SSA adapter failure <sup>1</sup>	None seen, error log entry	None	N/A (no fallover)
CPU power supply or cooling subsystem failure	Node available, N+1 redundancy	None	N/A (no fallover)
CPU power cord or power supply circuit failure	Node unavailable	None	HACMP fallover, application(s) unavailable for a brief time during fallover.
I/O drawer power supply or cooling subsystem failure	Node available, N+1 redundancy	None	N/A (no fallover)
I/O drawer power cord failure	Fallover does not happen if the redundant power supplies are cabled to separate I/O rack power distribution units that are powered by different supply circuits.	None	N/A (no fallover).
I/O power distribution unit power cord failure.	None	None	N/A (no fallover).

<sup>1</sup> Assumes "Quorum off" for volume group.

---

## High Availability Cluster Server System Cabling

This section provides cabling information for the base HA cluster server. Ensure that the two systems are installed before cabling the HA cluster server. Consider the following cable areas to ensure the redundancy required for no single points of failure:

- Cabling for server system consoles and cluster administration workstations
- Heartbeat connections between HA cluster servers
- SSA cable connections between HA cluster servers and 7133 Serial Disk Subsystems
- Power cable connections

### Cabling For System Consoles and Cluster Administration Workstations

The system console for a High Availability Cluster Server can be either of the following:

- an ASCII terminal connection to the S1 serial port

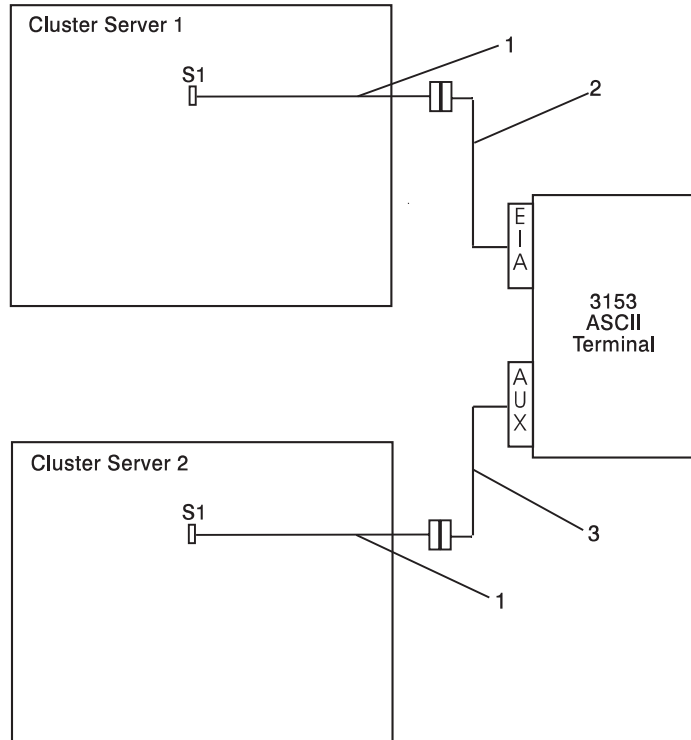
- a graphics terminal connected to a graphics display adapter with keyboard and mouse connections directly to the keyboard and mouse ports on the server

A cluster administration workstation is connected through a LAN connection.

This section illustrates the cabling requirements for these connections.

### HA Cluster Server with ASCII System Console

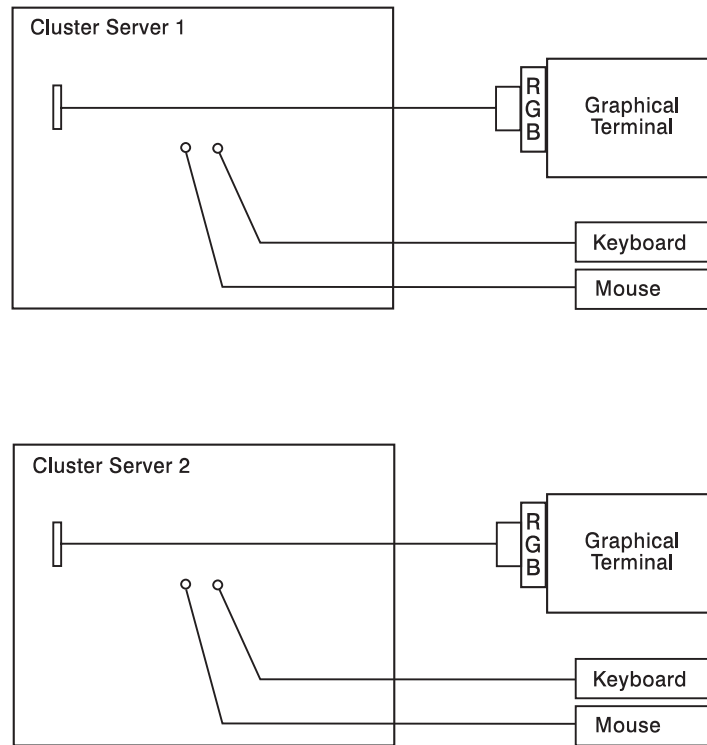
A single ASCII terminal connected to both servers in the cluster allows a system administrator or the service representative to work a single server without disrupting the operation of the cluster.



Index	Description
1	Cable adapter DB9f--DB25M (9 pin to 25 pin) (PN 40H6328)
2	Serial cable with internal null modem (PN 12H1204)
3	Serial cable without internal null modem (PN 88G0093)

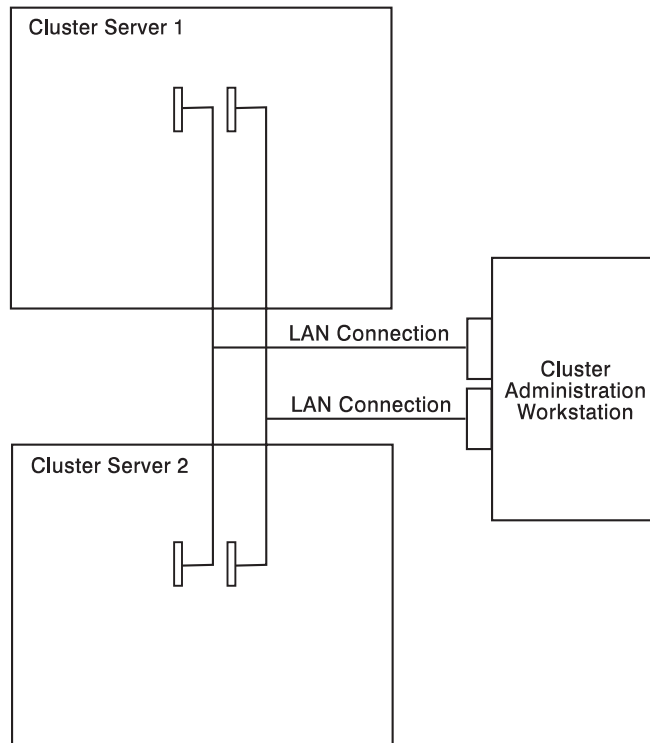
## HA Cluster Server With Graphical System Console

If graphical system console is used for system administration or service representative tasks, each cluster server must have its own console.



## HA Cluster Server Graphical Cluster Administration Workstation

In addition to the system consoles described in the previous sections, a LAN-attached cluster administration workstation is required. Two LANs are required to eliminate a single point of failure.

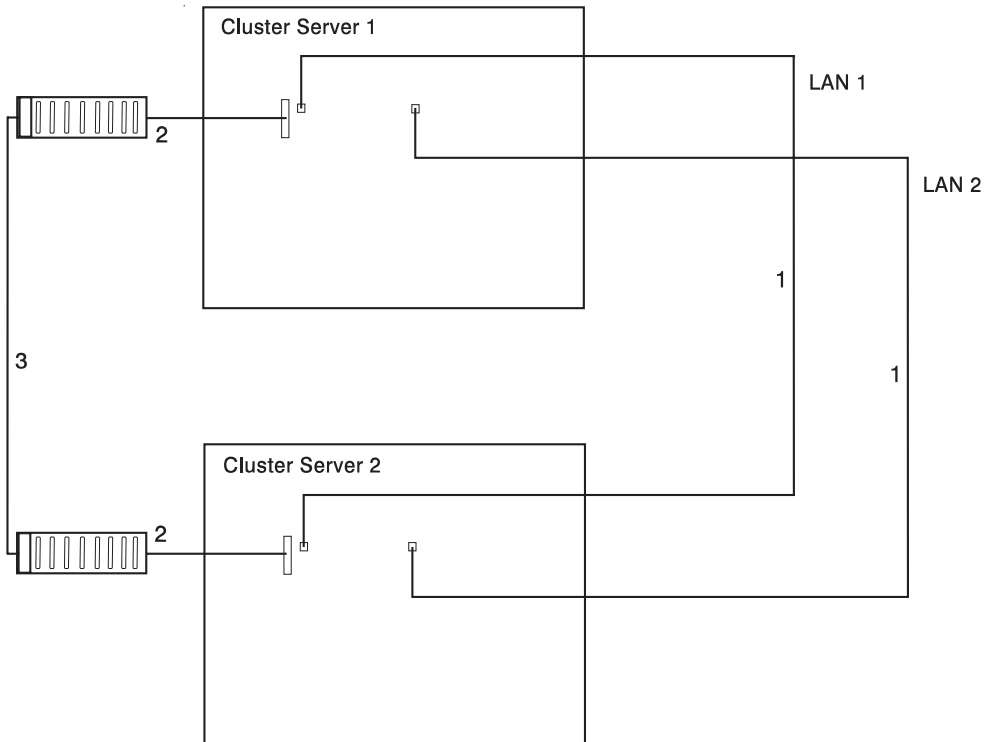


## High Availability Cluster Server Heartbeat Connections

The primary heartbeat connections between two HA cluster servers are made through a serial connection and the LAN connections.

The serial connection is made using an 8-Port Asynchronous PCI Adapter or an optional 128-Port Asynchronous PCI Adapter. The LAN connections are made using a pair of Ethernet, FDDI, token ring, or ATM connections.

The following figure shows an HA cluster server using the 8-Port Asynchronous PCI Adapter and Ethernet connections.



Index	Description
1	Ethernet connections. The customer is responsible for furnishing the cabling to the Ethernet. (T2, T5 and 10baseT are all available.)
2	8-Port DB-25 connector box (PN 11H5967) supplied with 8-Port Asynchronous EIA-232E/RS-422A PCI Adapter
3	Serial Port to Serial Port Cable (Rack to Rack, FC 3125)

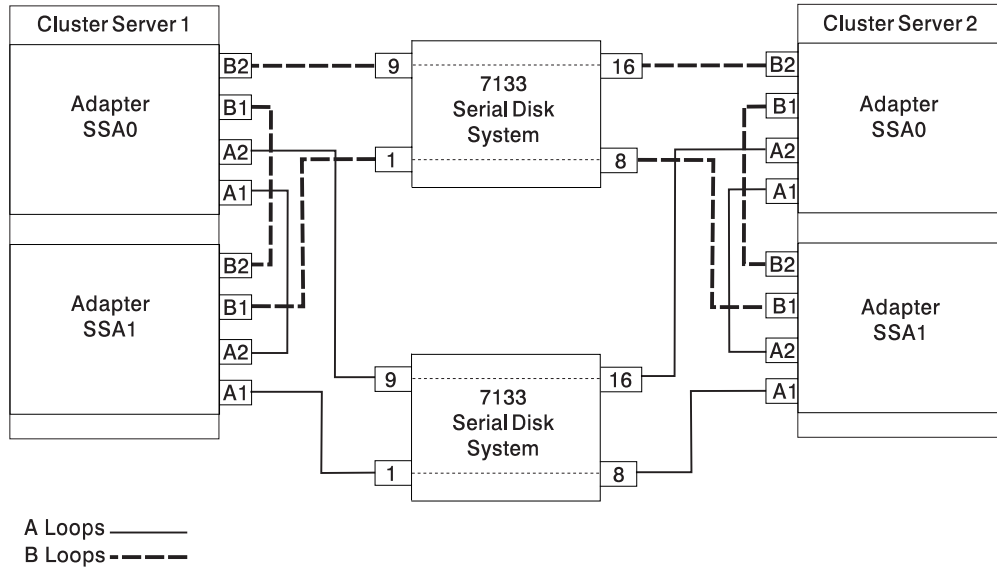


## SSA Cabling Connections

This section shows how to connect the cables from the HA cluster server and the 7133 Serial Disk Systems.

### SSA From Cluster Servers to Double Looped 7133

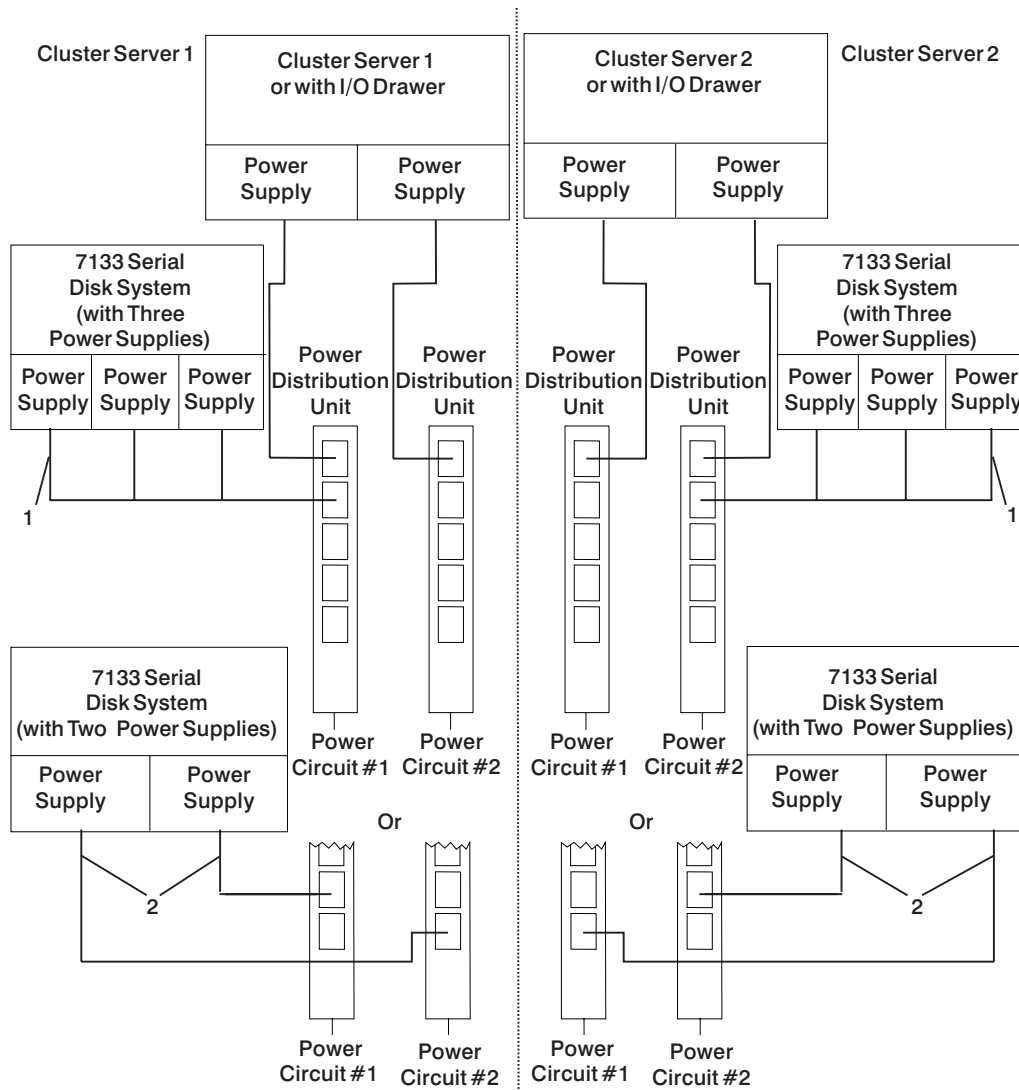
The following figure shows cabling for a fully populated 7133 (16 disk drives installed). Configuration with fewer disk drives may use different port numbers.



Index	Description
1	7133 SSA Cable (FC 5050, PN 88G6404)

## HA Cluster Server AC Power Connections

When installing an HA cluster server, care must be taken to ensure that power is also connected in a redundant manner. The following figure shows an example of how power can be connected to ensure that your cluster has separate power connections.



**Note:** Redundant input power can only be configured on systems with two power cords.

Index	Description
1	Power Cable, PDU to 7133 with three power supplies
2	Power Cable, PDU to 7133 with two power supplies

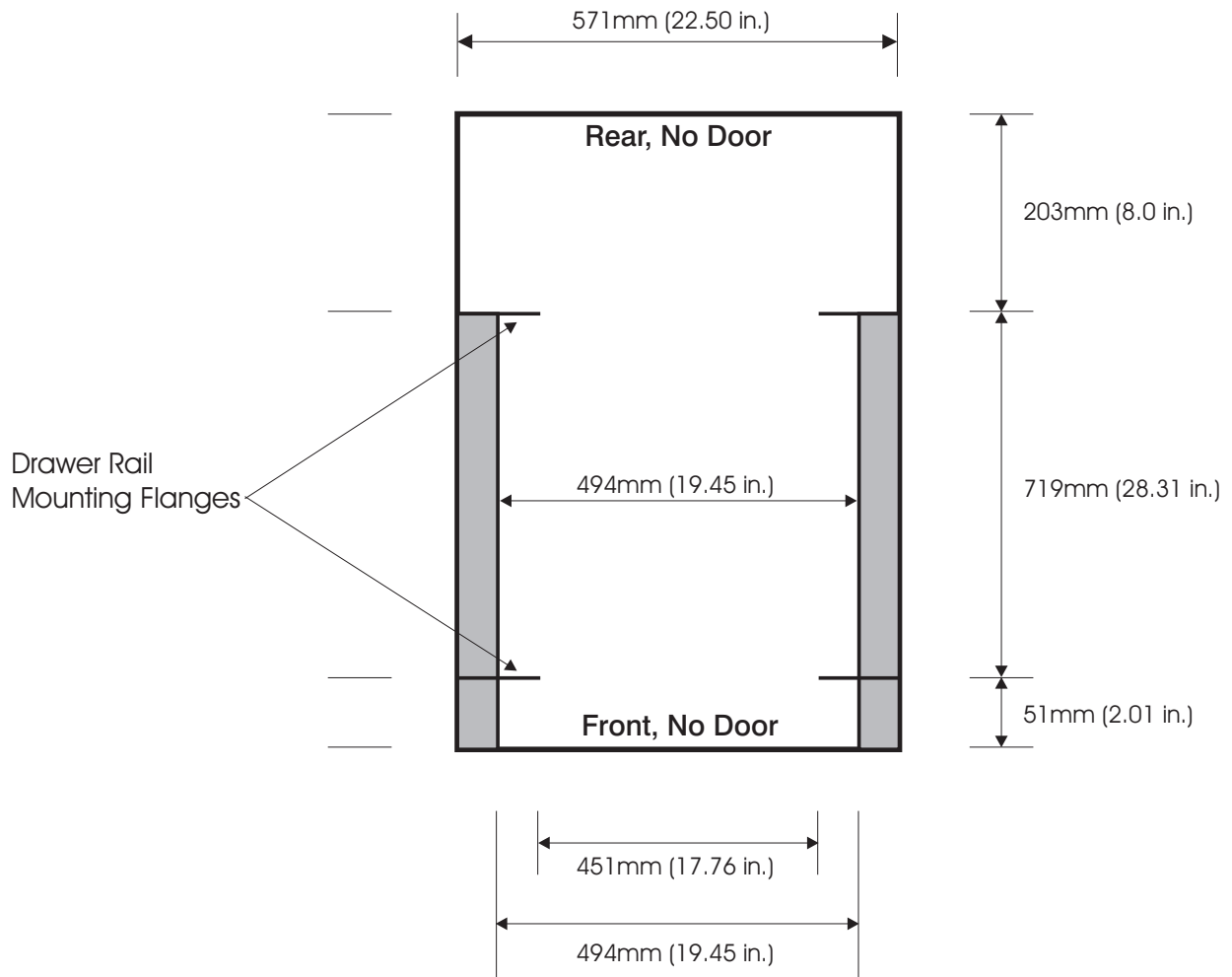
## Chapter 14. Specifications For non-IBM Rack Installation

This chapter provides requirements and specifications for 19" racks used by certain systems.

### Rack Specifications

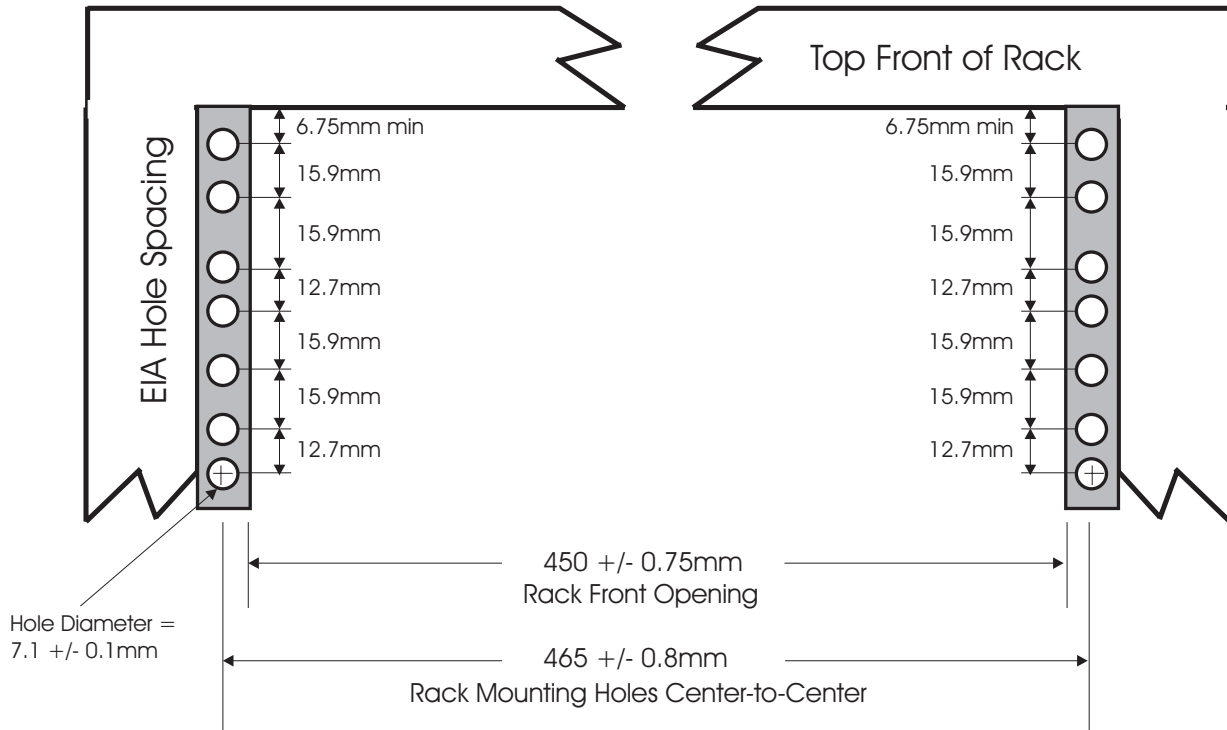
- The rack/cabinet must meet the EIA Standard EIA-310-D for 19 inch racks.

The front rack opening must be 451 mm wide + 0.75 mm (17.75" + 0.03"), and the rail-mounting holes must be 465 mm + 0.8 mm (18.3" + 0.03") apart on center (horizontal width between vertical columns of holes on the two front-mounting flanges and on the two rear-mounting flanges). Rail-mounting holes must be 7.1 mm + 0.1 mm (0.28" + 0.004") in diameter.

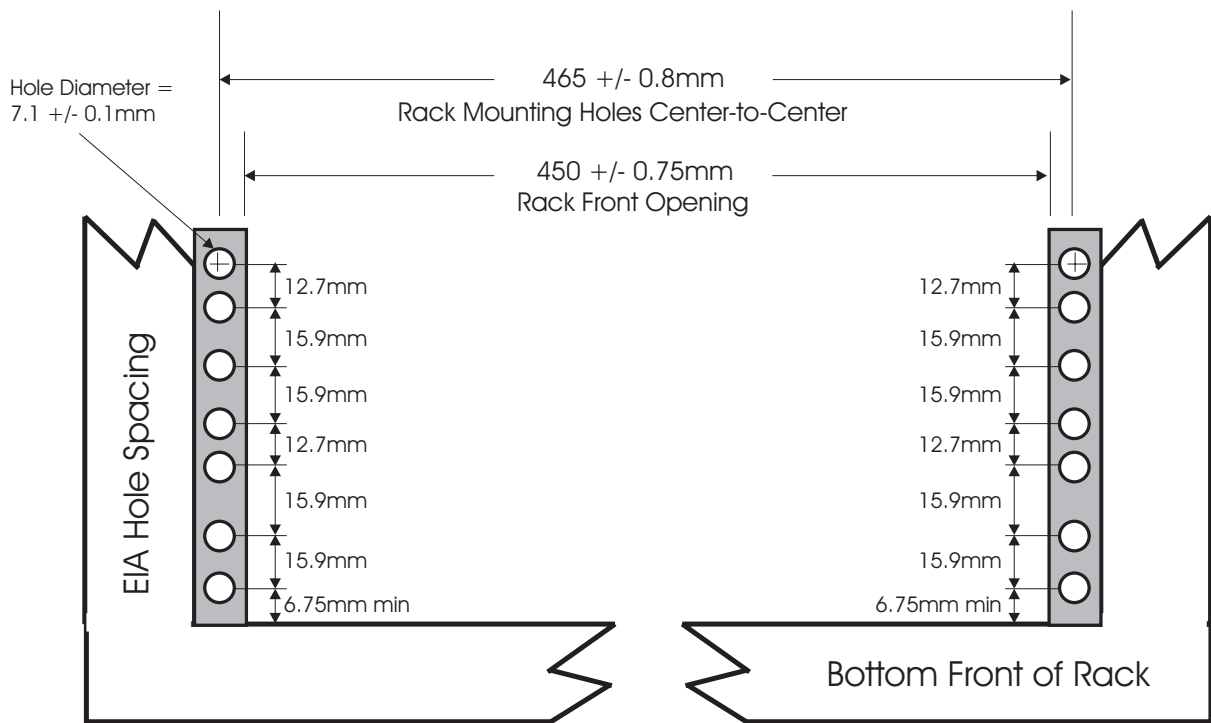


Top View of non-IBM Rack Specifications Dimensions

The vertical distance between mounting holes must consist of sets of 3 holes spaced (from bottom to top) 15.9 mm (0.625"), 15.9 mm (0.625"), and 12.67 mm (0.5") on center (making each 3 hole set of vertical hole spacing 44.45 mm (1.75") apart on center).



**Rack Specifications Dimensions, Top Front View**



**Rack Specifications Dimensions, Bottom Front View**

- The rack/cabinet must be capable of supporting an average load of 15.9 kg (35 lbs.) of product weight per EIA unit.

For example, a 4 EIA drawer will have a maximum drawer weight of 63.6 kg (140 lb.).

- Only ac power drawers are supported in the rack/cabinet. It is strongly recommended to use a power distribution unit (PDU) that meets the same specifications as IBM PDUs to supply rack power. Each Power Distribution Bus installed in a rack requires a dedicated power line of 200 to 240 V ac and 30 A. Rack/cabinet power distribution device(s) must meet the drawer power requirements, as well as that of any additional products that will be connected to the same power distribution device.

The rack/cabinet power receptacle (PDU, UPS or Multi-Outlet Strip) must have a compatible plug type for your drawer or device.

**Note:** Refer to the sales manual for 7014 racks if you want to use power distribution units (PDU) that are designed for 7014 racks. The customer is responsible for ensuring the PDU is compatible with the rack/cabinet and assumes responsibility for any/all agency certifications required.

- The rack/cabinet must be compatible with drawer mounting rails, including a secure and snug fit of the rail-mounting pins and screws into the rack/cabinet rail support hole.

**Note:** If the rack/cabinet has square holes, a plug-in hole adapter may be required.

The rails have been designed and tested to safely support the weight of your drawer or device and to facilitate service access by allowing the drawer to be safely extended forwards, and for some models, also backwards. The rails also provide drawer specific anti-tip brackets, rear lock-down brackets, and cable management guides that require clearance on the rear side of the rails.

The front and rear mounting flanges in the rack/cabinet must be 719 mm (28.3") apart and the internal width bounded by the mounting flanges at least 494 mm (19.45"), for the IBM eServer pSeries rails to fit in your rack/cabinet (see figure, *Top View of non-IBM Rack Specifications Dimensions* on page 377).

- The rack/cabinet must have stabilization feet or brackets installed both in the front and rear of the rack, or have another means of preventing the rack/cabinet from tipping while the drawer or device is pulled into its extreme front or rear service positions.

Examples of some acceptable alternatives: The rack/cabinet may be securely bolted to the floor, ceiling or walls, or to adjacent racks/cabinets in a long and heavy row of racks/cabinets. Refer to 7014 Rack Installation Guides and the individual drawer installation guides for additional information.

- There must be adequate front and rear service clearances (in and around the rack/cabinet).

The rack/cabinet must have sufficient horizontal width clearance in the front and rear to allow the drawer to be fully slid into the front and, if applicable, the rear service access positions (typically this requires 914.4 mm (36") clearance in both the front and rear).

If present, front and rear doors must be able to open far enough to provide unrestrained access for service or be easily removable. If doors must be removed for service, it is the customer's responsibility to remove them prior to service.

- The rack/cabinet must provide adequate clearance around the rack drawer.

There must be adequate clearance around the drawer bezel so that it can be opened and closed, according to the product specifications (refer to the 7014 Rack Installation Guides and the individual drawer installation guides).

Front or rear doors must also maintain a minimum of 51 mm (2") front, 203 mm (8") rear, door to mounting flange clearance, and 494 mm (19.4") front, 571 mm (22.5") rear, side-to-side clearance for drawer bezels and cables (see figure, *Top View of non-IBM Rack Specifications Dimensions* on page 377).

- The rack/cabinet must provide adequate front-to-back ventilation.

For optimum ventilation, it is recommended the rack/cabinet not have a front door. If the rack/cabinet has doors, the doors must be fully perforated so that there is proper front-to-back airflow to maintain the required drawer ambient inlet temperature between 10 °C and 40 °C (50 °F and 104 °F), with an ideal 22 °C (72 °F), inside the rack. The perforations must yield 34% minimum open area per square inch.

---

## General Safety Requirements for IBM Products Installed in a non-IBM Rack/Cabinet

- Any product or component that plugs into either an IBM Power Distribution Unit (PDU) or main power (via a power cord), or uses any voltage over 42 V ac or 60 V dc (considered to be hazardous voltage) must be Safety Certified by a Nationally Recognized Test Laboratory (NRTL) for the country in which it will be installed.

Some of the items that require safety certification may include: the rack/cabinet (if it contains electrical components integral to the rack/cabinet), fan trays, PDU, uninterruptible power supplies (UPS), multi-outlet strips, or any other products installed in the rack/cabinet that connect to hazardous voltage.

Examples of OSHA-approved NRTLs for the USA:

- UL
- ETL
- CSA (with CSA NRTL or CSA US mark)

Examples of approved NRTLs for Canada:

- UL (ULc mark)
- ETL (ETLc mark)
- CSA

The European Union requires a CE mark and a Manufacturer's Declaration of Conformity (DOC).

Certified products should have the NRTL logos or marks somewhere on the product or product label. However, proof of certification must be made available to IBM upon request. Proof consists of such items as copies of the NRTL license or certificate, a CB Certificate, a Letter of Authorization to apply the NRTL mark, the first few pages of the NRTL certification report, Listing in an NRTL publication, or a copy of the UL Yellow Card. Proof should contain the manufacturers name, product type and model, standard to which it was certified, the NRTL name or logo, the NRTL file number or license number, and a list of any Conditions of Acceptance or Deviations. A Manufacturer's Declaration is not proof of certification by an NRTL.

- The rack/cabinet must meet all electrical and mechanical safety legal requirements for the country in which it is installed.

The rack/cabinet must be free of exposed hazards (such as voltages over 60 V dc or 42 V ac, energy over 240 VA, sharp edges, mechanical pinch points, or hot surfaces).

- There must be an accessible and unambiguous disconnect device for each product in the rack, including any PDU.

A disconnect device may consist of either the plug on the power cord (if the power cord is no longer than 6 feet), the appliance inlet receptacle (if the power cord is of a detachable type), or a power on/off switch, or an Emergency Power Off switch on the rack, provided all power is removed from the rack or product by the disconnect device.

If the rack/cabinet has electrical components (such as fan trays or lights), the rack must have an accessible and unambiguous disconnect device.

- The rack/cabinet, PDU and Multi-Outlet Strips, and products installed in the rack/cabinet must all be properly grounded to the customer facility ground.

There must be no more than 0.1 Ohms between the ground pin of the PDU or rack plug and any touchable metal or conductive surface on the rack and on the products installed in the rack. Grounding method must comply with applicable country's electric code (such as NEC or CEC). Ground continuity can be verified by your IBM service personnel, after the installation is completed, and should be verified prior to the first service activity.

- The voltage rating of the PDU and multi-outlet strips must be compatible with the products plugged into them.

The PDU or multi-outlet strips current and power ratings must be at least 1.25 times the sum of the ratings of the products that will plug into it. The current rating of the PDU or Multi-Outlet strip must be less than 0.80 of the rating for the building supply circuit (as required by the NEC and CEC). Example: A PDU rating of 12A for a 15A wall breaker, and sum of product ratings does not exceed 9.6A.

If a UPS is installed, it must meet all the above electrical safety requirements as described for a PDU (including certification by an NRTL).

- The rack/cabinet, PDU, UPS, multi-outlet Strips and all products in the rack/cabinet must be installed according to the manufacturers instructions, and in accordance with all national, state or province, and local codes and laws.

The rack/cabinet, PDU, UPS, multi-outlet strips and all products in the rack/cabinet must be used as intended by the manufacturer (per manufacturers product documentation and marketing literature).

- All documentation for use and installation of the rack/cabinet, PDU, UPS, and all products in the rack/cabinet, including safety information, must be available on-site.
- If there is more than one source of power in the rack/cabinet, there must be clearly visible safety labels for "Multiple Power Source" (in the languages required for the country in which the product is installed).
- If the rack/cabinet or any products installed in the cabinet had safety or weight labels applied by the manufacturer, they must be intact and translated into the languages required for the country in which the product is installed.
- If the rack/cabinet has doors, the rack becomes a fire enclosure by definition and must meet the applicable flammability ratings (V-0 or better). Totally metal enclosures at least 1 mm (0.04") thick are considered to comply.

Nonenclosure (decorative) materials must have a flammability rating of V-1 or better. If glass is used (such as in rack doors) it must be safety glass. If wood shelves are used in the rack/cabinet, they must be treated with a UL Listed flame-retardant coating.

- The rack/cabinet configuration must comply with all IBM requirements for "safe to service" (contact your IBM Installation Planning Representative if in doubt).

There must be no unique maintenance procedures or tools required for service.

Elevated service installations, where the product(s) to be serviced are installed between 1.5 m and 3.7 m (5' and 12') above the floor, require the availability of an OSHA and CSA approved nonconductive step ladder. If a ladder is required for service, the customer must supply the OSHA and CSA approved nonconductive step ladder (unless other arrangements have been made with the local IBM Service Branch Office). Products installed over 2.9 m (12') above the floor require a Special Bid to be completed before they can be serviced by IBM service personnel.

For products not intended for rack-mounting to be serviced by IBM, the products and parts that will be replaced as part of that service must not weigh over 11.4 kg (25 lbs.) (contact your Installation Planning Representative if in doubt).

There must not be any special education or training required for safe servicing of any of the product(s) installed in the racks (contact your Installation Planning Representative if in doubt).

- Any rack/cabinet must have stabilization feet or brackets installed, or have another means of preventing the rack/cabinet from tipping during product operation or service.

Examples of some acceptable alternatives: The rack/cabinet may be securely bolted to the floor, ceiling or walls, or to adjacent racks/cabinets in a long and heavy row of racks/cabinets.

- It is strongly recommended that the mounting rails that are shipped with the product be used to install it in the rack.

The mounting rails that ship with IBM products have been designed and tested to safely support the product during operation and service activities. The mounting rails used on products to be serviced by IBM must be certified for use with the products by an NRTL to all applicable country safety standards.

**Note:** IBM requires that mounting rails must be able to support four times the maximum rated product weight in its worst-case position (fully extended front and rear positions) for 1 full minute without catastrophic failure.



---

## Chapter 15. Additional Planning Considerations

This chapter provides guidance for additional planning steps that may be necessary.

---

### Create or Modify Communications Networks

If you intend to use the system in a network environment, appoint a central site or system administrator to help design and maintain a system that provides maximum availability of all devices in the network. The system administrator may need to consider the following:

- Types of networks with which your network users must communicate (for example, local and wide area networks, asynchronous, coaxial).
- Types of communications functions that your network users need (for example, file transfer, mail, 3278/79 emulation, X-Window server support, data conversion, printing).
- Communications software that is required to communicate between systems within your own network and with systems on external networks.
- International language considerations, if any, between communicating systems.
- Network management functions that you want to use within your network, including error-isolation procedures and performance and monitoring tools.
- Information needed to properly configure your system. The following list provides some of the types of information needed:
  - Transmission speed (in bits per second)
  - Parity checking (whether none, odd, or even)
  - Pacing protocols required or allowed by remote system
  - Dialing or calling protocols, such as autoanswer and autocal, and information such as phone numbers (including back-up phone numbers in case no connection is possible)
  - Times you can call and communicate with the remote systems
  - Naming and addressing requirements within your network and between your systems and remote systems
  - Security relationships within your network and between your systems and remote systems
  - Gateway or bridge requirements
  - Information needed to configure the system software for correct operation in the network.
- Any necessary cables, control units, or other specialized communications hardware.
- Preparation of communications lines:
  - Number of concurrent communications users
  - Amount of data to be transmitted
  - Communications software licensing restrictions.

---

## **Perform Building Alterations as Needed**

Perform any building alterations that you determine are necessary to accommodate your new computing equipment. These may include the following:

- Electrical wiring modifications to accommodate the added computing equipment.
- Network cabling additions to accommodate the replaced or added computing equipment.
- Fire protection measures to protect your data and equipment.
- Antistatic measures to protect your data and equipment.
- Radio or radar shields if you are installing near transmitters.
- Installation of uninterruptible power source (UPS), if required.
- Air conditioning installation.

---

## **Prepare Maintenance, Recovery, and Security Plans**

Maintenance, recovery, and security plans can help protect your investment and maximize productivity. The system administrator may need to formulate the following plans:

- System maintenance program for both hardware and software
- System recovery and availability plan
- Logical security plan
- Physical security plan

---

## **Develop an Education Plan**

Depending on the applications you will be using, your employees may need formal or informal training. Discuss this with your sales representative.

---

## **Order Any Needed Supplies**

You may need to order some of the following items:

- Tapes or diskettes for backing up software and data.
- Printer supplies (paper, printer toner, printer ribbons).
- Plotter supplies (paper, vellum, film, pens).

---

## **Prepare for System Delivery**

After your system unit arrives, you are responsible for moving it to the installation location. For some systems, such as Machine Types 7006, 7009 and 7011, you are also responsible for setting up the system unit. Check your system information or verify with your sales representative to find out who sets up your system. The next section explains how to both identify and inventory your shipment.

---

## Identify Your Shipment

If you have more than one machine being delivered at the same time, make sure that you keep their components separate. Your order, for example, may come from various locations, software from one place and hardware from another.

The shipping label on each box has several numbers that you should retain. No matter where they come from, the parts of the order, from the display to the system unit, have the same system number. The serial number identifies all components that come with a particular system unit's processor. The following figure is an example of a shipping label, with the system number and the serial number indicated.

Customer No.	Sched Date	CL	System Number	Mach Type	Serial No.	Br. Off
			340045		2600512	

If you have any difficulty identifying your order or which products are for a particular system, contact your marketing representative.



---

## Appendix. Notices

This information was developed for products and services offered in the U.S.A.

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

The manufacturer may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the manufacturer.

**The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law:** THIS MANUAL IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions; therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. The manufacturer may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Information concerning products made by other than the manufacturer was obtained from the suppliers of those products, their published announcements or other publicly available sources. The manufacturer has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to products made by other than the manufacturer. Questions on the capabilities of products made by other than the manufacturer should be addressed to the suppliers of those products.



---

# Index

## Special characters

-48 volt DC rack power distribution 349

## Numerics

2101 model 100 seascape solution rack 231  
2102 model D00 expandable storage unit 234  
2102 model F10 fibre channel RAID storage server 233  
2103 model H07 fibre channel storage hub 235  
2104 model DL1 expandable storage plus 236  
2104 model DU3 expandable storage plus 237  
2104 model TL1 expandable storage plus 238  
2104 model TU3 expandable storage plus 239  
2105 model B09 versatile storage server 240  
2105 models E10, E20, 800 enterprise storage servers 241  
2105 models F10, F20, 800 enterprise storage servers 241  
2108 Model G07 SAN data gateway 243  
2109 SAN fiber channel switch 244  
3153 display station 229  
3490E enhanced magnetic tape subsystem C11 and C22 245  
3490E enhanced magnetic tape subsystem E01 and E11 246  
7026 model M80 CEC drawer 78  
7334 model 410 8-mm tape library 324

## A

about this book xi  
related publications xi  
trademarks xiii

## C

cable planning 351  
4-port multiprotocol communications controller 362  
7015 considerations 352  
7318 365  
asynchronous adapters 355  
cable labels 367  
cable measuring 352  
general considerations for cables 351  
miscellaneous adapters 364  
standard I/O adapters 361  
CD-ROM drives 9  
7209 model 002 external re-writable optical disk drive 305  
7209 model 003 external 2.6GB re-writable optical disk drive 306  
7210 model 001 external 307  
7210 model 005 external 308  
7210 model 010 external quad speed 309  
7210 model 015 external 8X to 20X speed SCSI-2 CD-ROM drive 310

CD-ROM drives (*continued*)  
7210 model 020 external 32X speed SCSI-2 311  
7210 Model 025 External SCSI-2 DVD-RAM Drive 312  
7212 Model 102 External Storage Device 313  
checklist, planning 2  
clearances, 2105 ESS 242  
connect  
HMC (hardware management console) to p655 121  
CSU feature installation 3  
CSU/CE feature installation table 2

## D

disk drives 9  
2102 model D00 expandable storage unit 234  
2102 model F10 fibre channel RAID storage server 233  
2103 model H07 fibre channel storage hub 235  
2104 model DL1 expandable storage plus 236  
2104 model DU3 expandable storage plus 237  
2104 model TL1 expandable storage plus 238  
2104 model TU3 expandable storage plus 239  
2105 model B09 versatile storage server 240  
3514 models 212, and 213 247  
7131 model 105 SCSI multi-storage tower 269  
7131 model 405 SSA multi-storage tower 270  
7133 model D40 rack-mounted SSA subsystem 272  
7133 model T40 deskside SSA subsystem 273  
7133 models 010 and 020 rack-mounted SSA subsystem 271  
7133 models 500, and 600 deskside SSA subsystem 274  
7134 model 010 high-density SCSI disk subsystem 275  
7135 RAIDiant array 276  
7135 RAIDiant array deskside mini-rack 277  
7137 disk array subsystem models 412, 413, 414, and 415 278  
7137 disk array subsystem models 512, 513, 514, and 515 279  
7203 model 001 external portable disk drive 283  
7204 model 010 1GB external disk drive 284  
7204 model 118 18.0GB external 286  
7204 model 139 339 9.1GB external 287  
7204 model 212 external 288  
7204 model 315 external 288  
7204 model 339 9.1GB external 287  
7204 model 402 external 289  
7204 model 404 external 289  
7204 model 418 18.0GB external 286  
7204 models 112, 113, 114, 317, and 325 external 285  
9333 models 010, and 011 drawer high-performance subsystem 333  
9333 models 500, and 501 deskside high-performance subsystem 334  
diskette drive, 4869 model 002 5 1/4-inch 1.2MB 316

- display station, 3153 229
- displays 9
  - 3153 display station 229
  - 6091 color display model 19i 224
  - 7235 POWER GTO models 01i and 02i graphics subsystem 314
  - 7250 POWER GXT1000 graphics accelerator 315
  - 9516 TFT LCD color monitor 225
  - P200 20" display 226
  - P201 20" display 226
  - P202 21" display 227
  - P260 21" display 228
  - P50 15" display 226
  - P70 17" display 226
  - P72 17" display 227
  - P76 17" display 228
  - P92 19" display 227
  - POWERdisplay 17 223
  - POWERdisplay 20 223
  - TFT LCD color monitor, 9516 225

## E

- electrical planning
  - cable planning 351
  - general considerations 340
  - plugs 339
  - power cords 339
  - power cords and electrical needs
    - See electrical planning
  - system unit power plug diagrams 341
- enterprise storage server 9
  - 2105 models E10, E20, 800 241
  - 2105 models F10, F20, 800 241
- expandable storage plus 9
  - 2104 model DL1 236
  - 2104 model DU3 237
  - 2104 model TL1 238
  - 2104 model TU3 239
- expandable storage unit 9
  - 2102 model D00 234

## F

- feature installation 3
- feature installation table 2
- fibre channel 9
  - RAID storage server, 2102 model F10 233
  - RAID storage subsystem 231
  - storage hub, 2103 model H07 235
  - switch, 7319 models 100, and 110 318
- floor loading, 2105 ESS 242
- floor loading, S00 rack 29
- floor loading, T00 and T42 rack 35

## H

- hardware management console (HMC) 217
  - 6578-D5U Hardware Management Console (HMC) 218

- hardware management console (HMC) *(continued)*
  - 7315-C01 Hardware Management Console (HMC) 219
  - 7315-C02 Hardware Management Console (HMC) 220
  - 7315-CR2 Hardware Management Console (HMC) 221
- high availability cabling 370
  - ASCII system console 371
  - cluster administration workstations 370
  - system 370
- high availability cluster server
  - 7133 serial disk systems 369
  - AC power connections 376
  - cluster server information 369
  - graphical cluster administration workstations 373
  - graphical system console 372
  - heartbeat connections 374
  - no single points of failure 369
  - reference information 369
  - SSA cabling connections 375
- highlighting xi

## I

- I/O drawer 9
  - I/O drawer 5 EIA (H80 and M80) 79
  - S70 SCSI I/O drawer 7 EIA 52, 53
- internal power distribution cable 347

## M

- machine types 9
  - 2101 model 100 seascape solution rack 231
  - 2101, 2102, and 2103 Fibre Channel RAID Storage Subsystem 231
  - 2102 model D00 expandable storage unit 234
  - 2102 model F10 fibre channel RAID storage server 233
  - 2103 model H07 fibre channel storage hub 235
  - 2104 model DL1 expandable storage plus 236
  - 2104 model Du3 expandable storage plus 237
  - 2104 model TL1 expandable storage plus 238
  - 2104 model TU3 expandable storage plus 239
  - 2105 model B09 versatile storage server 240
  - 2105 models E10, E20, 800 enterprise storage servers 241
  - 2105 models F10, F20, 800 enterprise storage servers 241
  - 2108 Model G07 SAN data gateway 243
  - 2109 SAN fiber channel switch 244
  - 3490E enhanced magnetic tape subsystem C11 and C22 245
  - 3490E enhanced magnetic tape subsystem E01 and E11 246
  - 3514 models 212, and 213 247
  - 3570 model B00 248
  - 3570 model B02 250
  - 3570 model B11 251
  - 3570 model B12 252
  - 3570 model C00 248



machine types (continued)

3570 model C02 250  
 3570 model C11 251  
 3570 model C12 252  
 3570 models B01 249  
 3570 models C01 249  
 3575 model L06 253  
 3575 model L12 254  
 3575 model L18 255  
 3575 model L24 256  
 3575 model L32 257  
 3590 model C12 frame 258  
 3590 models B11 and B1A 258  
 3590 models E11 and E1A 259  
 3995 model 063 260  
 3995 model 163 261  
 3995 model A63 262  
 3995 model C60 263  
 3995 model C62 264  
 3995 model C64 265  
 3995 model C66 266  
 3995 model C68 267  
 4869 model 002 5 1/4-inch 1.2MB external diskette drive 316  
 6091 color display model 19i 224  
 7006 graphics workstation models 41T, 41W, 42T, and 42W 9  
 7007 POWERportable N40 10  
 7008 POWERstations M20, and M2A 11  
 7009 compact server C10, and C20 12  
 7010 Xstation 130 13  
 7010 Xstation 140, and 150 14  
 7010 Xstation model 160 15  
 7011 POWERstation and POWERserver 220, and 230 16  
 7011 POWERstation and POWERserver 250 17  
 7012 model 397 20  
 7012 models G30, G40, and G02 21  
 7012 POWERserver models 380, 390, and 39H 19  
 7012 POWERstation and POWERserver 34H, 355, 360, 365, 370, and, 375 18  
 7013 model J50 27  
 7013 models 58H, 590, 59H, 591, and 595 25  
 7013 models J30, J40, and J01 26  
 7013 models S70 and S7A 46  
 7013 POWERstation and POWERserver 52H 22  
 7013 POWERstation and POWERserver 550L 23  
 7013 POWERstation and POWERserver 570, and 580 24  
 7014 model S00 rack 28  
 7014 model T00 rack 31  
 7014 model T42 rack 32  
 7015 model R24 44  
 7015 model R30, R40, and R50 45  
 7015 models R10, R20, and R21 CPU drawers 43  
 7015 models S70 and S7A 46  
 7015 POWERserver 970B, and 980B 37  
 7015 POWERserver 990 38  
 7015 SCSI disk and device drawers 39  
 7015 system rack R00 41  
 7017 model S80 47

machine types (continued)

7017 model S85 49  
 7017 models S70 and S7A 46  
 7020 entry workstation model 40P 57  
 7024 deskside PowerPC server E series 58  
 7025 deskside 6F0 series 59  
 7025 deskside 6F1 series 61  
 7025 deskside F30 series 63  
 7025 deskside F40 series 64  
 7025 deskside F50 series 65  
 7025 deskside F80 series 66  
 7026 model 6H0 CEC drawer 67  
 7026 model 6H1 CEC drawer 69  
 7026 model B80 72  
 7026 model H10 drawer 74  
 7026 model H50 (enterprise server) 75  
 7026 model H70 (enterprise server) 76  
 7026 model H80 CEC drawer 77  
 7026 model M80 CEC drawer 78  
 7027 model HSC 80  
 7028 Model 6C1 81  
 7028 Model 6C4 82  
 7028 Model 6E1 81  
 7028 Model 6E4 82  
 7029 Model 6C3 83  
 7029 Model 6E3 83  
 7030 POWERstations 3AT, 3BT, and 3CT 85  
 7038 Mode I6M2 86  
 7039 @server pSeries 655 87  
 7040 @server pSeries 670 126  
 7040 @server pSeries 690 162  
 7043 43P series model 140 201  
 7043 43P series model 150 202  
 7043 43P series model 240 204  
 7043 43P series model 260 205  
 7044 44P series model 170 206  
 7044 44P series model 270 207  
 7046 model B50 208  
 7131 model 105 SCSI multi-storage tower 269  
 7131 model 405 SSA multi-storage tower 270  
 7133 model D40 rack-mounted SSA subsystem 272  
 7133 model T40 deskside SSA subsystem 273  
 7133 models 010 and 020 rack-mounted SSA subsystem 271  
 7133s model 500, and 600 deskside SSA subsystem 274  
 7134 model 010 high-density SCSI disk subsystem 275  
 7135 RAIDiant array 276  
 7135 RAIDiant array deskside mini-rack 277  
 7137 disk array subsystem 512, 513, 514, and 515 279  
 7137 disk array subsystem models 412, 413, 414, and 415 278  
 7202 model 900 expansion rack 281  
 7203 model 001 external portable disk drive 283  
 7204 model 010 1GB external disk drive 284  
 7204 model 118 18.0GB external disk drives 286  
 7204 Model 139 9.1GB External Disk Drive 287  
 7204 model 212 external disk drive 288  
 7204 model 315 external disk drive 288

machine types (continued)

7204 Model 339 9.1GB External Disk Drive 287  
7204 Model 402 external disk drive 289  
7204 Model 404 external disk drive 289  
7204 Model 409 external disk drive 290  
7204 model 418 18.0GB external disk drives 286  
7204 Model 419 external disk drive 290  
7204 Model 518 external disk drive 291  
7204 Model 536 external disk drive 291  
7204 models 112, 113, 114, 317, and 325 external disk drives 285  
7205 model 311 external DLT tape drive 292  
7205 model 440 external DLT tape drive 293  
7206 model 005 external 4-mm tape drive 294  
7206 model 110 external 4-mm DDS-3 tape drive 295  
7206 model 220 external 4-mm DDS-4 tape drive 296  
7206 model VX2 external tape drive 297  
7207 model 012 1.2GB external 1/4-inch cartridge tape drive 298  
7207 model 122 4GB external SIRS 1/4-inch cartridge tape drive 299  
7207 model 315 13GB external 1/4-inch cartridge tape drive 300  
7208 model 001 2.3GB external 8-mm tape drive 301  
7208 model 011 5/10GB external 8-mm tape drive 302  
7208 model 341 20/40GB external 8-mm tape drive 303  
7208 model 345 external 8-mm tape drive 304  
7209 model 002 external re-writable optical disk drive 305  
7209 model 003 external 2.6GB re-writable optical disk drive 306  
7210 model 001 external CD-ROM drive 307  
7210 model 005 external CD-ROM drive 308  
7210 model 010 external quad speed CD-ROM drive 309  
7210 model 015 external 8X to 20X speed SCSI-2 CD-ROM drive 310  
7210 model 020 external 32X speed SCSI-2 CD-ROM drive 311  
7210 Model 025 External SCSI-2 DVD-RAM Drive 312  
7212 Model 102 External Storage Device 313  
7235 POWER GTO models 01i and 02i graphics subsystem 314  
7248 Model 43P 209  
7250 POWER GXT1000 graphics accelerator 315  
7311 Model D10 210  
7311 Model D20 211  
7317 model D10 212  
7317 model F3L 213  
7318 serial communications network server models P10, and S20 317  
7319 model 100 fibre channel switch 318  
7319 model 110 fibre channel switch 318  
7329 Model 308 QIC 1/4 Tape Autoloader 319  
7331 model 205 140/280GB 8-mm tape library 320

machine types (continued)

7331 model 305 400/800GB 8-mm tape library 320  
7332 model 005 4-mm DDS-2 autoloading tape 321  
7332 model 110 4-mm DDS-3 autoloading tape 322  
7332 model 220 4-mm DDS-4 autoloading tape 323  
7334 model 410 8-mm tape library 324  
7336 model 205 4-mm tape library 325  
7337 model 305 DLT tape library 326  
7337 model 306 DLT tape library 327  
7337 model 360 DLT tape library 328  
9112 Model 265 214  
9114 Model 275 215  
9291 models 010, and 020 single digital trunk processors 329  
9295 multiple digital trunk processor with AC power supply 331  
9295 multiple digital trunk processor with DC power supply 332  
9333 models 010, and 011 drawer high-performance subsystem 333  
9333 models 500, and 501 deskside high-performance subsystem 334  
9334 models 010, and 011 drawer expansion units 335  
9334 models 500, and 501 deskside expansion units 336  
9348 model 012 magnetic tape unit 337  
9516 TFT LCD color monitor 225  
S70 and S7A I/O rack 54

## N

network cabling 384

## O

online publications xi  
overview, planning 1

## P

P200 20" display 226  
P201 20" display 226  
P202 21" display 227  
P260 21" display 228  
P50 15" display 226  
P70 17" display 226  
P72 17" display 227  
P76 17" display 228  
P92 19" display 227  
physical planning 1  
4-port multiprotocol communications controller 362  
7015 considerations 352  
7318 365  
additional planning considerations 383  
asynchronous adapter 355  
cable labels 367  
cable measuring 352  
cable planning 351  
cable planning charts 354  
general considerations 6

- physical planning (*continued*)
  - general considerations for cables 351
  - miscellaneous adapters 364
  - noise emission notes 338
  - standard I/O adapters 361
  - system unit power plug diagrams 341
  - system unit specifications 9
- planning 1
  - additional considerations 383
  - air conditioning system 384
  - building alterations 384
  - checklist 2
  - create or modify communications networks 383
  - education 384
  - electrical wiring 384
  - identifying your shipment 385
  - maintenance 384
  - needed supplies 384
  - network cabling 384
  - overview 1
  - recovery 384
  - security 384
  - site 1
  - system delivery 384
  - uninterruptible power system 384
- portable, 7007 POWERportable N40 10
- power source 91, 131, 167
- POWERdisplay 17 223
- POWERdisplay 20 223
- PowerPC®s 9
  - 7020 entry workstation model 40P 57
  - 7024 deskside PowerPC server E series 58
  - 7025 deskside 6F0 series 59
  - 7025 deskside 6F1 series 61
  - 7025 deskside F30 series 63
  - 7025 deskside F40 series 64
  - 7025 deskside F50 series 65
  - 7025 deskside F80 series 66
  - 7026 model H10 drawer 74
  - 7027 model HSC 80
  - 7043 43P series model 140 201
  - 7043 43P series model 150 202
  - 7043 43P series model 240 204
  - 7043 43P series model 260 205
  - 7044 44P series model 170 206
  - 7044 44P series model 270 207
  - 7248 Model 43P 209
- POWERservers 9
  - 7011 POWERstation and POWERserver 220, and 230 16
  - 7011 POWERstation and POWERserver 250 17
  - 7012 model 397 20
  - 7012 POWERserver models 380, 390, and 39H 19
  - 7012 POWERstation and POWERserver 34H, 355, 360, 365, 370, and 375 18
  - 7013 POWERstation and POWERserver 52H 22
  - 7013 POWERstation and POWERserver 550L 23
  - 7013 POWERstation and POWERserver 570, and 580 24
  - 7015 POWERserver 970B, and 980B 37
  - 7015 POWERserver 990 38

- POWERstations 9
  - 7008 POWERstations M20, and M2A 11
  - 7011 POWERstation and POWERserver 220, and 230 16
  - 7011 POWERstation and POWERserver 250 17
  - 7012 POWERstation and POWERserver 34H, 355, 360, 365, 370, and 375 18
  - 7013 POWERstation and POWERserver 52H 22
  - 7013 POWERstation and POWERserver 550L 23
  - 7013 POWERstation and POWERserver 570, and 580 24
  - 7030 POWERstations 3AT, 3BT, and 3CT 85
  - 7039 @server pSeries 655 87
  - 7040 @server pSeries 670 126
  - 7040 @server pSeries 690 162
- publications, online xi

## R

- rack-type system unit power 342
  - 48 volt DC rack power distribution 349
  - internal power distribution cable 347
  - multiphase PDUs with power cords 346
  - PDU location and configuration information 343
  - single phase PDUs with separate power cords 346
- Rack/Cabinet Specifications 377
- related publications xi

## S

- S00 rack weight distribution and floor loading 29
- S80 or S85 system with T00 style I/O rack 36
- S80 rack caster location 48
- S85 rack caster location 51
- SAN data gateway, 2108 Model G07 243
- SAN fiber channel switch, 2109 244
- seascape solution rack, 2101 model 100 231
- servers 9
  - 7009 compact server C10, and C20 12
  - 7013 models S70 and S7A 46
  - 7015 model R24 44
  - 7015 models R10, R20, and R21 CPU drawers 43
  - 7015 models S70 and S7A 46
  - 7017 model S80 47
  - 7017 model S85 49
  - 7017 models S70 and S7A 46
  - 7024 deskside PowerPC server E series 58
  - 7025 deskside 6F0 series 59
  - 7025 deskside 6F1 series 61
  - 7025 deskside F30 series 63
  - 7025 deskside F40 series 64
  - 7025 deskside F50 series 65
  - 7025 deskside F80 series 66
  - 7026 model 6H0 CEC drawer 67
  - 7026 model 6H1 CEC drawer 69
  - 7026 model B80 72
  - 7026 model H10 drawer 74
  - 7026 model H50 (enterprise server) 75
  - 7026 model H70 (enterprise server) 76
  - 7026 model H80 CEC drawer 77
  - 7027 model HSC 80

servers *(continued)*

- 7028 Model 6C1 81
- 7028 Model 6C4 82
- 7028 Model 6E1 81
- 7028 Model 6E4 82
- 7029 Model 6C3 83
- 7029 Model 6E3 83
- 7038 Model 6M2 86
- 7043 43P series model 140 201
- 7043 43P series model 150 202
- 7044 44P series model 170 206
- 7046 model B50 208
- 7202 model 900 expansion rack 281
- 7311 Model D10 210
- 7311 Model D20 211
- 7318 serial communications network server models  
P10, and S20 317
- 9112 Model 265 214
- 9114 Model 275 215
- 9334 models 010, and 011 drawer expansion  
units 335
- 9334 models 500, and 501 deskside expansion  
units 336
- site planning and preparation overview 1
- system unit power plugs 341
  - desktop, deskside 341
  - rack-type 342

## T

- T00 and T42 rack 34
- T00 and T42 rack weight distribution and floor  
loading 35
- T00 rack caster location 33
- T00 rack service clearances 33
- T00 style I/O rack, with S80 or S85 system 36
- T42 rack caster location 33
- T42 rack service clearances 33
- tape drives 9
  - 1/2-inch 9-track tape drive drawer 40
  - 3490E enhanced magnetic tape subsystem C11 and  
C22 245
  - 3490E enhanced magnetic tape subsystem E01 and  
E11 246
  - 3575 model L06 253
  - 3575 model L12 254
  - 3575 model L18 255
  - 3575 model L24 256
  - 3575 model L32 257
  - 7205 model 311 external DLT tape drive 292
  - 7205 model 440 external DLT tape drive 293
  - 7206 model 005 external 4-mm 294
  - 7206 model 110 external 4-mm DDS-3 295
  - 7206 model 220 external 4-mm DDS-4 296
  - 7207 model 012 1.2GB external 1/4-inch  
cartridge 298
  - 7207 model 122 4GB external SIRS 1/4-inch  
cartridge 299
  - 7207 model 315 13GB external 1/4-inch  
cartridge 300
  - 7208 model 001 2.3GB external 8-mm 301

tape drives *(continued)*

- 7208 model 001 5/10GB external 8-mm 302
- 7208 model 341 20/40GB external 8-mm 303
- 7208 model 345 external 8-mm 304
- 7329 Model 308 QIC 1/4 Tape Autoloader 319
- 7331 model 205 140/280GB 8-mm tape library 320
- 7331 model 305 400/800GB 8-mm tape library 320
- 7332 model 005 4-mm DDS-2 autoloading 321
- 7332 model 110 4-mm DDS-3 autoloading 322
- 7332 model 220 4-mm DDS-4 autoloading 323
- 7334 model 410 8-mm tape library 324
- 7336 model 205 4-mm tape library 325
- 7337 model 305 DLT tape library 326
- 7337 model 306 DLT tape library 327
- 7337 model 360 DLT tape library 328
- 9348 model 012 magnetic tape unit 337
- trademarks xiii

## V

- versatile storage server, 2105 model B09 240

## W

- weight distribution, S00 rack 29
- weight distribution, T00 and T42 rack 35
- workstations 9
  - 7006 graphics workstation models 41T, 41W, 42T,  
and 42W 9
  - 7010 Xstation 130 13
  - 7010 Xstation 140, and 150 14
  - 7010 Xstation model 160 15
  - 7020 entry workstation model 40P 57

---

# Readers' Comments — We'd Like to Hear from You

RS/6000 and @server pSeries  
Site and Hardware Planning Information

Publication No. SA38-0508-21

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us how we can improve this book:

Thank you for your responses. May we contact you?  Yes  No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

---

Name

---

Address

---

Company or Organization

---

Phone No.



Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE  
NECESSARY  
IF MAILED IN THE  
UNITED STATES

# BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Information Development  
Department H6DS-905-6C006  
11501 Burnet Road  
Austin, TX 78758-3493



Fold and Tape

Please do not staple

Fold and Tape





Printed in USA

SA38-0508-21





Spine information:



RS/6000 and @server pSeries

Site and Hardware Planning Information