



Precision Racks

For

Density Series
Systems

Reference Manual

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Precision Racks
Reference Manual**

Table of Contents

Chapter 1 - Introduction	1
Overview of Precision Racks	1
Features and Options	1
Precision Rack Models	2
Chapter 2 - Installation	3-9
Preinstallation Inspection	3
Site Preparation for the Precision Racks	3-4
Cabinet Installation for the Precision Racks	5
Electrical Installation for the Precision Racks	6-7
AC Power Input for Precision Rack 2000 / Precision Rack 1100	6
AC Power Input for Precision Rack 1000	7
Cabling Connections	7-9
Multiplexing for Density Systems	7
V/K/M Interface Module	8
Monitor Power	9
Density System Receptacles	9
Chapter 3 - Replaceable/Removable Units	10-12
Back Door	10
Fan Assembly Replacement Instructions	11
Relocating the V/K/M Interface Module	12
Chapter 4 - Specifications	13-16
Mechanical Specifications	13
For the Precision Rack 2000	13
For the Precision Rack 1100 / Precision Rack 1000	13
Electrical Specifications	14-16
AC Power Input for Precision Rack 2000 / Precision Rack 1100	14
AC Power Input for Precision Rack 1000	14
Internal Power Cords for all Precision Racks	14
Load Balancing via Terminal Blocks	15-16

List of Figures

Figure 1	Precision Rack 2000 .....	.2
Figure 2	Precision Rack 1100 .....	.2
Figure 3	Precision Rack 1000 .....	.2
Figure 4	Dimensions for Precision Rack 2000 .....	.3
Figure 5	Dimensions for Precision Rack 1100 and Precision Rack 1000 .....	.4
Figure 6	Rear Access Area for Electrical Connections .....	.4
Figure 7	Top and Bottom Access Areas for Electrical Connections .....	.4
Figure 8	Leveler Location and Holes for Bolt Placement .....	.5
Figure 9	Configuration for 3 Independent Single-Phase, 3-Wire Circuits .....	.6
Figure 10	Configuration for 3-Phase, Y-Connect, 5-Wire Circuits .....	.6
Figure 11	Tightening Torque Guidelines .....	.6
Figure 12	Daisy-Chaining the V/K/M Module and Density Systems .....	.7
Figure 13	Cable Exit Areas .....	.7
Figure 14	Location of V/K/M Interface Module .....	.8
Figure 15	V/K/M Interface Module Side 1 .....	.8
Figure 16	V/K/M Interface Module Side 2 .....	.8
Figure 17	AC Power Receptacles for Monitor and Density Systems .....	.9
Figure 18	Back Door Reversal .....	.10
Figure 19	Location of Screws Securing Top Panel .....	.11
Figure 20	Fan Assembly .....	.11
Figure 21	Ground Screw and Wire Connection .....	.12
Figure 22	Load Balancing for Precision Rack 2000 .....	.15
Figure 23	Load Balancing for Precision Rack 1100 .....	.15
Figure 24	Load Balancing for Precision Rack 1000 .....	.16
Figure 25	Terminal Block Location for Precision Racks .....	.16
Figure 26	Precision Rack 1000 / AC Power Input Connector Locations .....	.16

Chapter 1—Introduction

Overview of Precision Racks

Cubix's Precision Racks are designed to function as a centralized network support platform for the Cubix Density Series systems. Cubix's goal is to provide a solution for space-constrained high-tech computer environments. The Precision Racks provide a secure, attractive enclosure for the Density systems. The Density Series systems provide cost effective consolidation and fault tolerant features for maximum reliability and minimal down time. The various Precision Rack models displayed in this manual allow for versatility and adaptability as well as attractive esthetics for all types of environments.

Features and Options

This manual explains the concept, operation, installation and specifications of the Cubix Precision Rack models. These models were designed by Cubix for the purpose of accommodating the customer's various needs for supporting different applications and uniquely designed environments with limited space.

Various features of the Precision Racks include the following:

- Conforms to 19" (48.26cm) standard RETMA specifications
- Two high capacity fans supplying more than 1000 CFM airflow for maximum cooling capacity
- Security features of the cabinet include a locking back door and the option for locking the Density Systems in place
- The base of the Precision Rack models are supported on four adjustable levelers and they are designed so they can be easily secured to the floor
- Integrated cable tie assemblies reduce cable clutter
- There are multiple AC receptacles provided for each subsystem
- Optional keyboard mounted in a convenient pull-out tray
- Optional heavy-duty casters for easy cabinet mobility
- Optional patch panel for connection of Ethernet to external Ethernet connections
- The Precision Racks feature attractive esthetics for any type of environment

Precision Rack Models

Figures 1, 2 and 3 demonstrate the different Precision Racks.

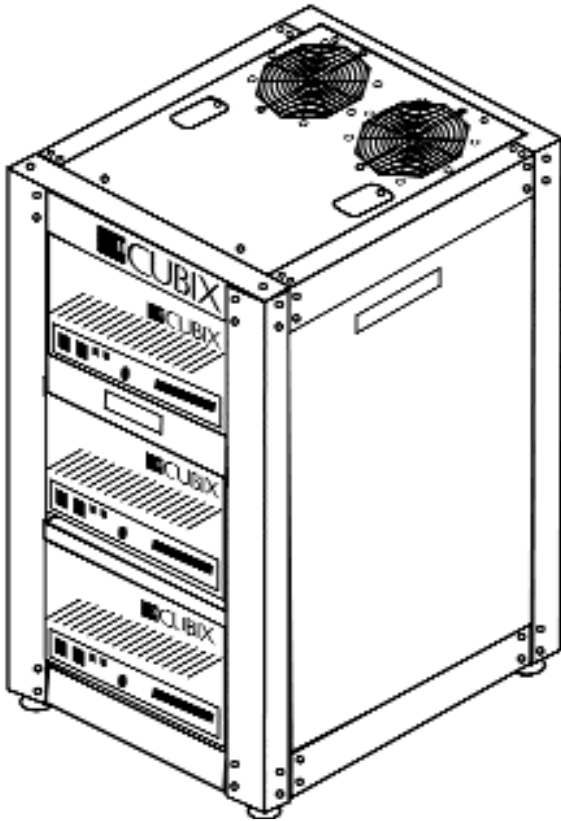


Figure 2
Precision Rack 1100
Accommodates
3 Density systems

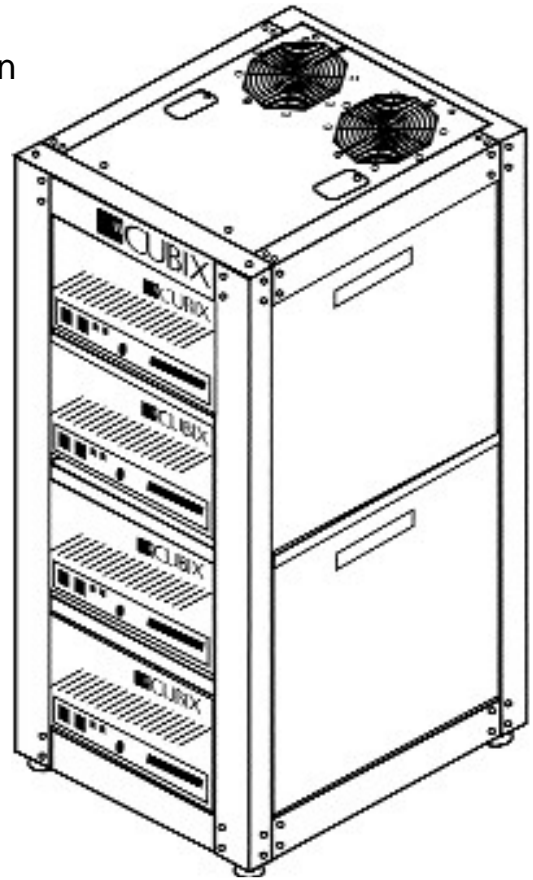


Figure 1
Precision Rack 2000
Accommodates
4 Density systems

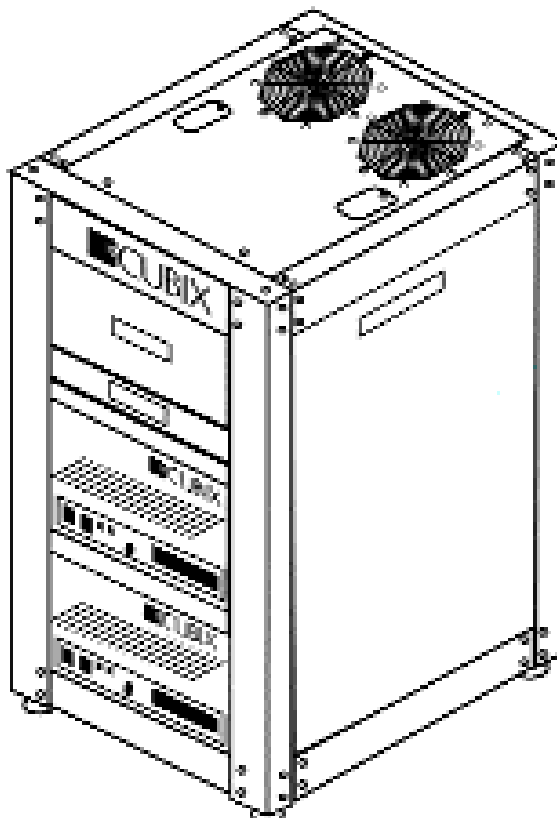


Figure 3
Precision Rack 1000
Accommodates
2 Density systems
and has space for
Modems, RAID Drive
Array, Network
Switches or Hubs

Chapter 2—Installation

Pre-Installation Inspection

When the Precision Rack has been received, perform the following inspection:

1. Conduct visual inspection of shipping container for damage. If damaged, do not throw the container away until further assessment can be made.
2. If you have ordered casters, installation instructions are included with unpacking instructions and will be attached to the shipping container for your convenience. Remove the Precision Rack from its shipping container
3. Examine the cabinet:
 - Verify order contents
 - Perform a visual inspection of the cabinet checking for physical damage which may have occurred during shipping. If there is damage to the cabinet which appears to have resulted from shipping, consult your carrier immediately.
4. Conduct Density System inspection before installation in the rack.

Site Preparation for the Precision Racks

Before installing any of the Precision Racks, prepare the site:

1. Measure site for adequate space. The dimensions for the Precision Rack 2000 are displayed in figure 4, the dimensions for the Precision Rack 1100 are displayed in figure 5, and the dimensions for the Precision Rack 1000 will be the same as the Precision Rack 1100 (see figure 5).

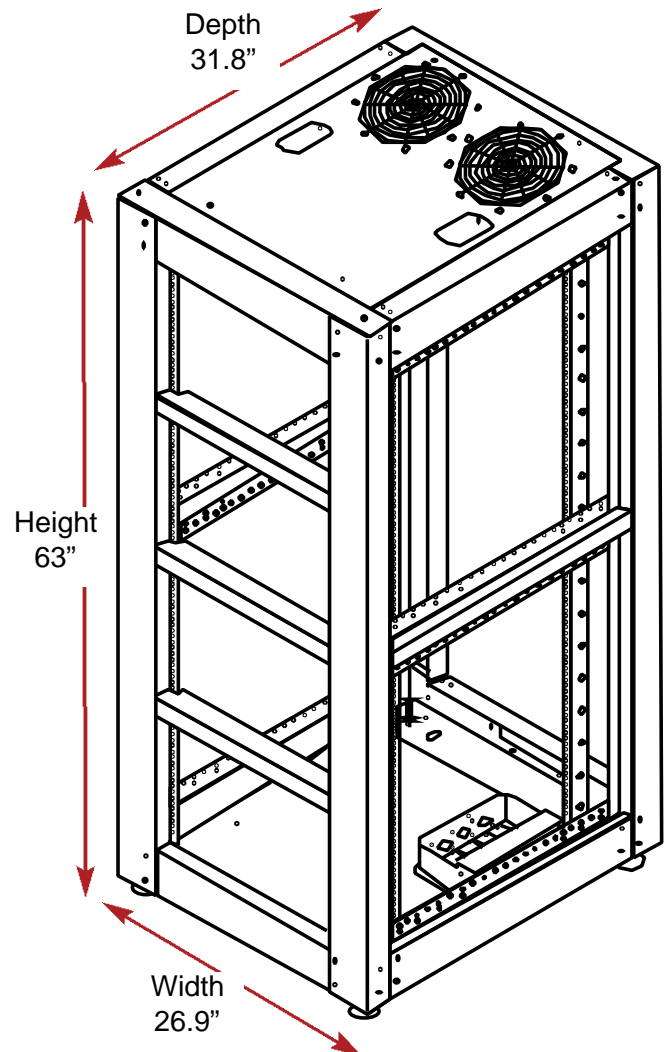


Figure 4 Dimensions for Precision Rack 2000

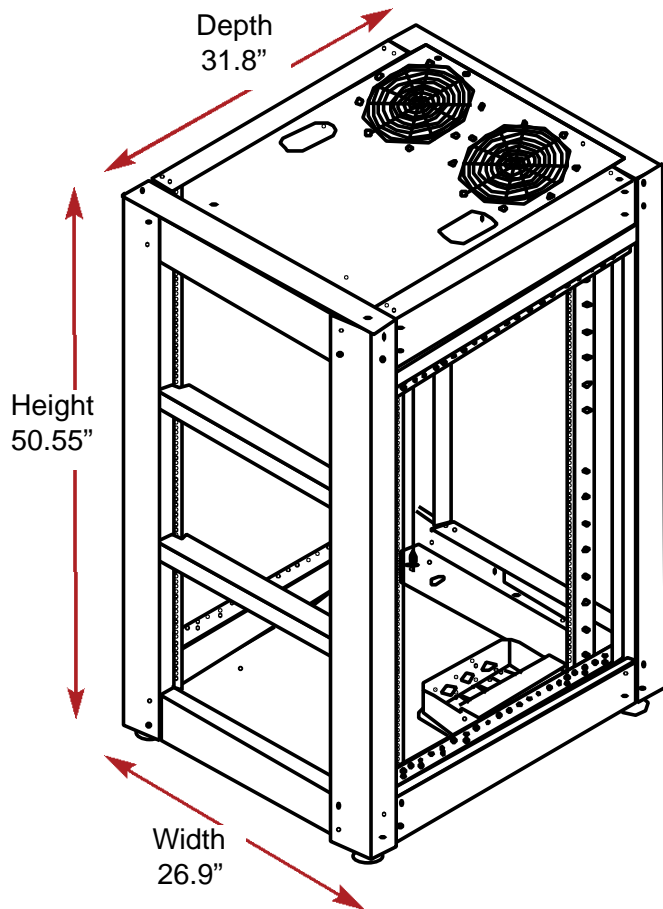


Figure 5 Dimensions for Precision Rack 1100 and Precision Rack 1000

2. Because Cubix recommends the cabinets be bolted to the floor, you may want to allow for extra spacing on both sides and in the back for alternate access.
3. Allow a minimum of 6 inches of space at the top of the Precision Rack for adequate cooling. The fan area should **never** be blocked or covered.
4. Access to the terminal blocks within Precision Rack 2000 and Precision Rack 1100 can be made through the rear, top and bottom (refer to figures 6 & 7). Power to the terminal blocks must follow the appropriate electrical codes for your area.
5. The Precision Rack 1000 needs 2 separate 12A electrical circuits (~120V or ~240V). For further information on power requirements see Chapter 4, Electrical Specifications.

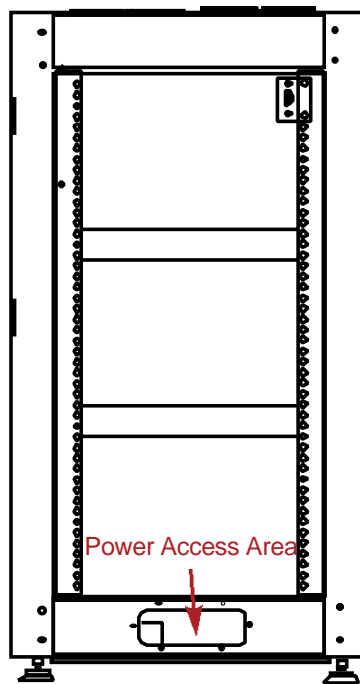


Figure 6 Rear Access Area for Electrical Connections (View from the rear)

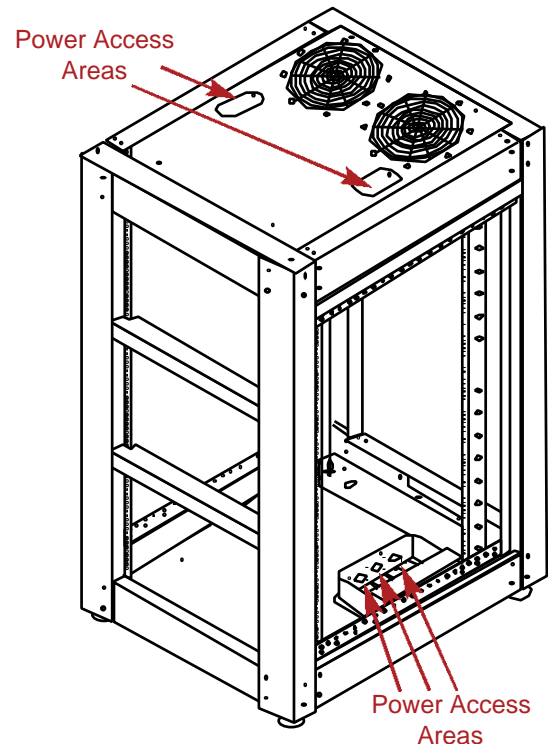


Figure 7 Top and Bottom Access Areas for Electrical Connections

Cabinet Installation for the Precision Racks

After performing the pre-installation inspection and preparing the site, the Precision Rack is ready to be installed. Simply follow these instructions for easy installation:

WARNING!

The weight of a fully loaded Density system (approx. 130 lbs.) placed on fully extended rails may cause the rack to tip forward. For your safety, Cubix Corporation recommends the Precision Rack be secured to the floor!

1. Prepare bolt holes in floor. For precise location of holes for bolting Precision Rack to the floor, a template is supplied with the manual. If the rack has been ordered with casters, disregard the following instructions and follow unpacking and caster installation instructions which will be attached to the shipping container.
2. Position the Precision Rack in the desired location, aligning the bolt holes in the bottom of the cabinet with the bolt holes in the floor.
3. Lower the levelers to the desired position. (A 1/2" open-ended wrench can be used.) Refer to figure 8 for leveler location.
4. Bolt the cabinet to the floor. Four 1/2" lag bolts will be needed. Figure 8 shows proper bolt hole placement.
5. To install the Density System, simply line up and insert the inner slides that are already attached to the sides of the system, with the middle slide rails that are installed in the cabinet. Slide the system into the cabinet.

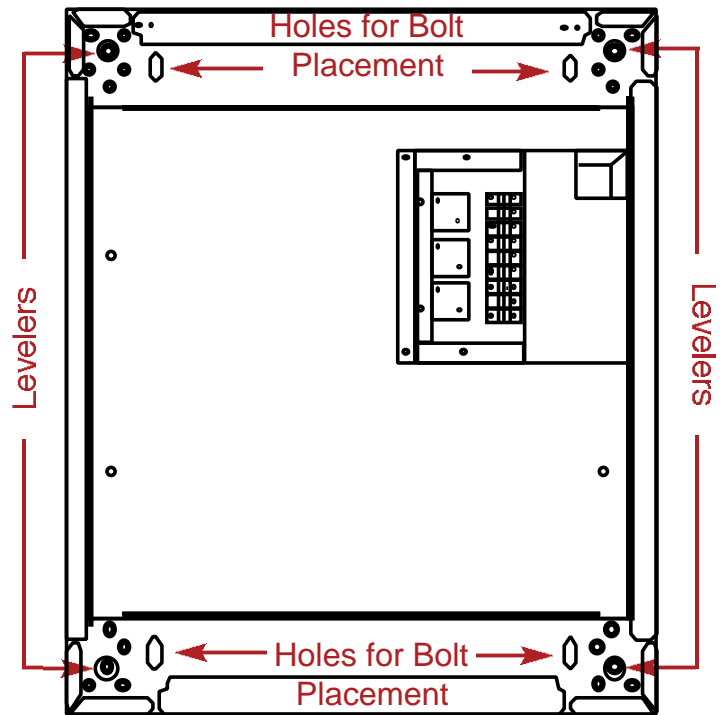


Figure 8 Leveler Location and Holes for Bolt Placement

CAUTION!

If the Precision Rack is not bolted to the floor, install the systems starting from the bottom of the cabinet to help prevent personal injury and damage to the rack and systems.

Electrical Installation for the Precision Racks

AC Power Input for the Precision Rack 2000 and the Precision Rack 1100

The Precision Rack 2000 and the Precision Rack 1100 come equipped with three AC distribution circuits. Each circuit will support either ~120V-30A or ~240V-15A (50/60Hz). AC power is connected to the three terminal blocks located in the base of the cabinet.

Three fully loaded Density Systems are the equivalent of 24 standard PCs and can draw up to 36A of current. A normal wall outlet is in parallel with other outlets and in total normally supplies a maximum of 15A. For this reason, dedicated power must be supplied to this rack in one of the two following configurations:

- 1. The configuration for 3 independent single phase 3-wire circuits consists of Line, Neutral, Earth (Ground). The “Earth” on each of the three terminal blocks is connected together with a jumper wire. Refer to figure 9.
- 2. The configuration for 3-phase, y-connect, 5-wire circuit consists of Phase 1, Phase 2, Phase 3, Neutral, Earth. The “Neutral” and “Earth” on each of the three terminal blocks are connected together via a jumper wire. Refer to figure 10.
- 3. Be sure to follow the tightening torque guidelines displayed in figure 11.

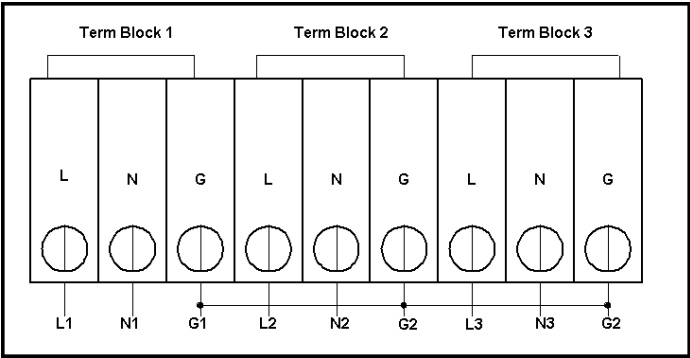


Figure 9 Configuration for 3 Independent Single-Phase, 3-Wire Circuits

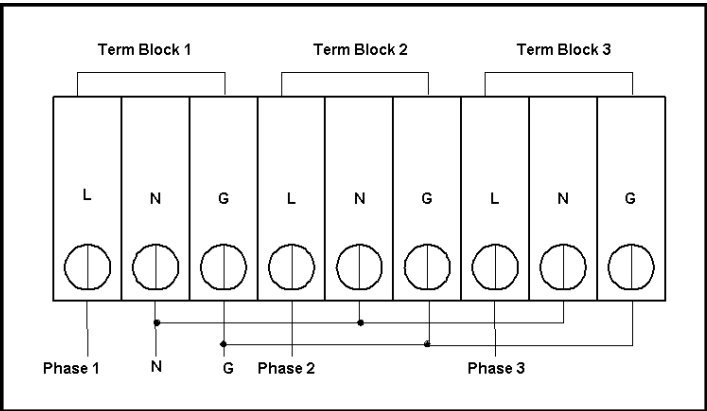


Figure 10 Configuration for 3-Phase, Y-Connect, 5-Wire Circuits

TERMINAL BLOCK TIGHTENING TORQUE			
MAIN:			
#3-#2	:	50 LB-IN	(5.6 N-m)
#6-#4	:	45 LB-IN	(5.1 N-m)
#8	:	40 LB-IN	(4.5 N-m)
#14-#10	:	35 LB-IN	(4.0 N-m)
BRANCH:			
#18-#10	:	7 LB-IN	(0.8 N-m)

Figure 11 Tightening Torque Guidelines

AC Input for the Precision Rack 1000

AC input is through two AC connectors type IEC 60320-C14. Each AC input is protected by a 12A power switch/circuit breaker. Plug the appropriate end of each power cord into the AC connector and the other end into branch circuits that will support both 12A loads (~120V or ~240V).

Cabling Connections

Multiplexing for Density Systems

Cubix Density Series systems contain integrated multiplexors which allow a single monitor, keyboard and mouse to be shared among multiple processors installed within the systems. A total of eight Density Systems can be multiplexed, or up to 64 processors can share a monitor, mouse and keyboard.

Multiplexing between the Density Systems is accomplished by "daisy-chaining" between the systems and connecting the beginning of the chain to a special interface or breakout module. Terminate the end of the chain by inserting a video termination plug into the last Density System (refer to figure 12).

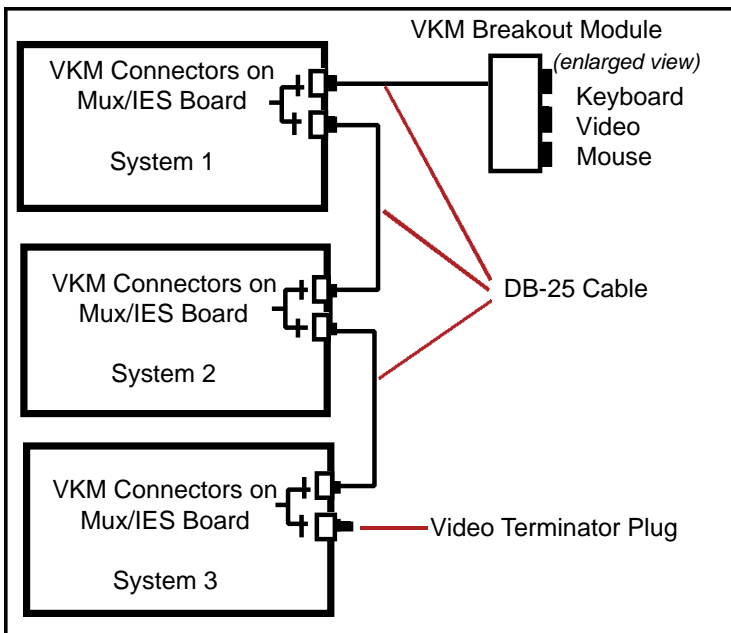


Figure 12 Daisy-Chaining the V/K/M Module and Density Systems

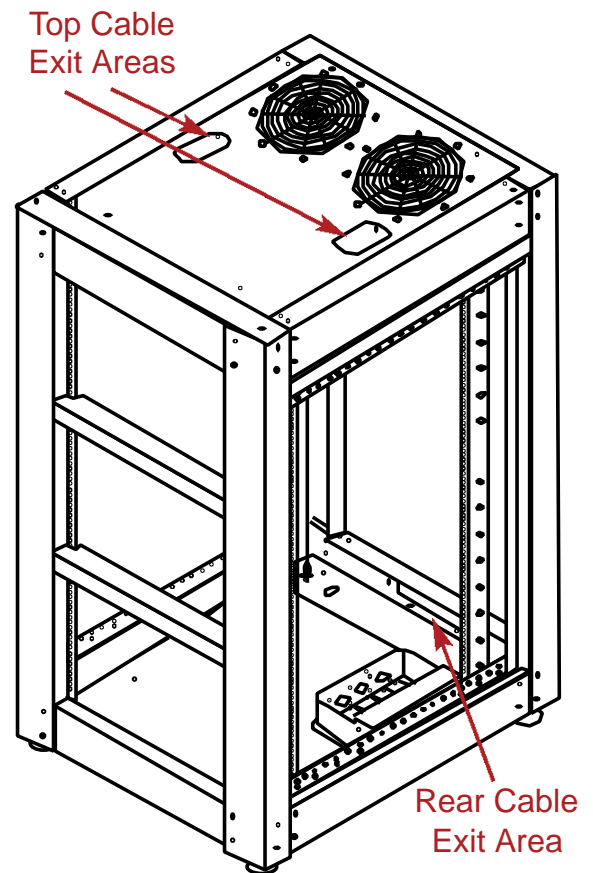


Figure 13 Cable Exit Areas

The monitor, mouse and keyboard which are connected to the interface module, are shared between all the Density Series systems in the chain via the DB-25 cabling. Figure 13 shows the 3 entrance/exit areas. The cabling can exit any of these 3 points and be routed to enter an adjacent cabinet for continuance of the daisy-chain.

V/K/M Interface Module

The video/keyboard/mouse breakout module is located on the upper right rail of the Precision Rack (refer to figure 14). The V/K/M breakout module interface connects to the Density Series system (refer to figure 15) and the peripheral equipment (refer to figure 16). The V/K/M interface module allows the video, keyboard and mouse to be shared between all the Density Systems. Refer to the section on Monitor Power before connecting the monitor. If you wish to relocate the V/K/M breakout module, see Chapter 3, Relocating the V/K/M Breakout Module.

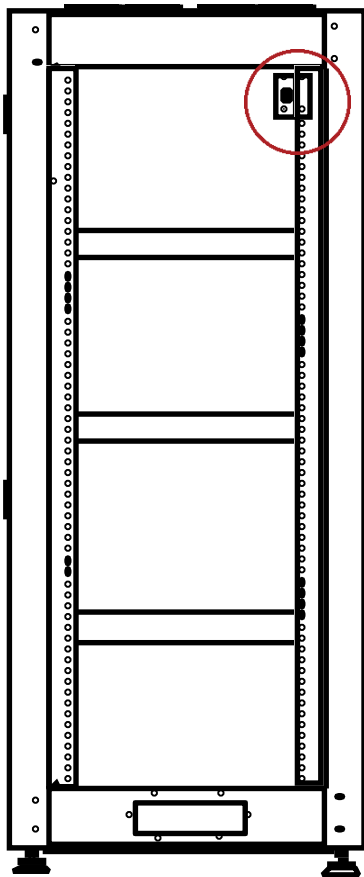


Figure 14 Location of V/K/M Interface Module (view from rear)

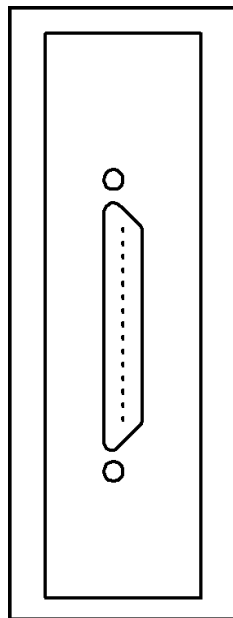


Figure 15 V/K/M Interface Module Side 1 - Density Interface

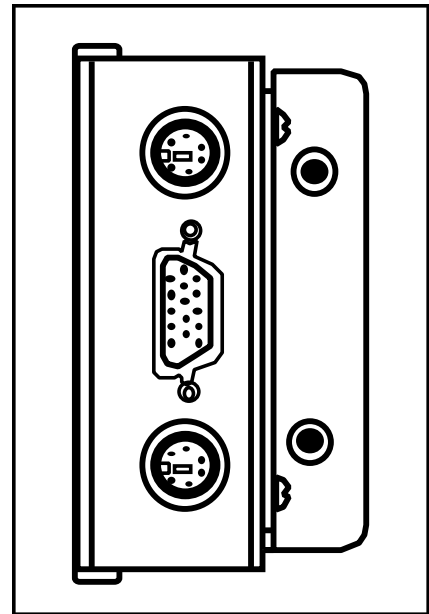


Figure 16 V/K/M Interface Module Side 2 - Peripheral Ports

Monitor Power

The video monitor can be plugged into a monitor receptacle located at the top of the AC power distribution assembly (refer to figure 17), or into any other convenient receptacle outside of the Precision Rack. The receptacle on the AC distribution assembly is located at the top of the assembly in all Precision Racks. Verify the electrical specifications for the monitor to make sure it is compatible with the electrical configuration of your Precision Rack. Once verification of the electrical specifications has been made, connect the monitor to the V/K/M breakout module.

CAUTION!

Verify electrical specifications for the monitor to make sure it matches electrical specifications for the terminal block. The monitor receptacle is connected to terminal block 1. Depending on electrical installation, the monitor must be specified as either ~120V or ~240V.

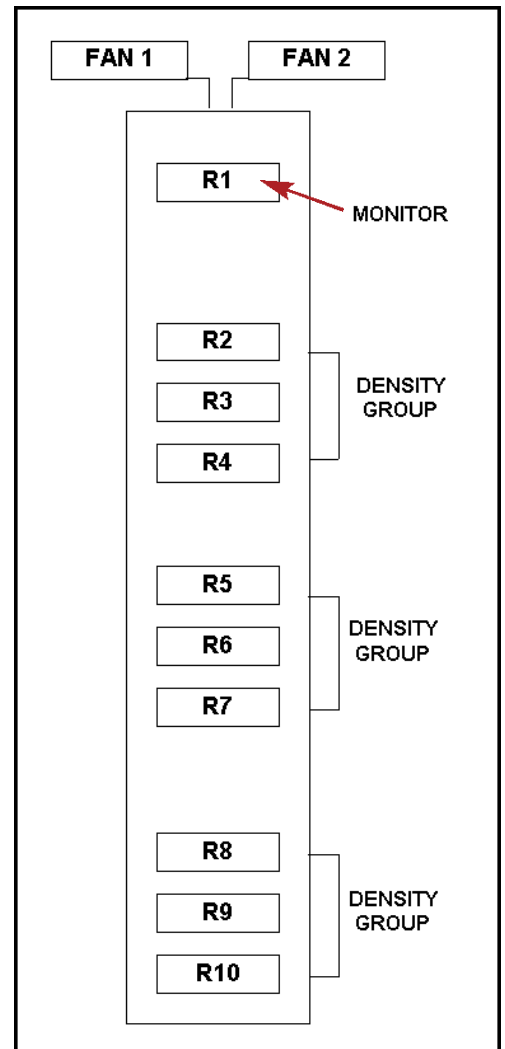


Figure 17 AC Power Receptacles for Monitor and Density Systems

Density System Receptacles

Each group of receptacles is designed to accommodate a single Density System. The system comes equipped with three power cord receptacles for each Density System. The Precision Racks are supplied with three power cords per group. Insert the female end of each power cord into a Density receptacle. Plug the male end of the power cord into the AC receptacle rail. Use the three receptacles within a group for the three power cords coming from one Density System. This assures proper load balance.

CAUTION!

Third party products are not to exceed 6A per receptacle.

If third party products are used in the Precision Rack **DO NOT** exceed 6A per receptacle.

Chapter 3— Replaceable/Removable Units

Back Door

In the event the back door panel needs to be switched around for purposes of easier access, instructions on how to switch the back panel go as follows:

1. Open the back door of the Precision Rack.
2. Find the two #8 flathead screws located on the bottom bracket on the inside of the door. Remove the two screws with a flat-bladed screw driver.
3. Find the two #8 flathead screws located on the top of the door which secures the top bracket. Before removing these screws, secure the door firmly so it does not drop. Remove the screws.
4. When the screws have been removed, take the door off from the cabinet.
5. Using a Phillips screw driver, remove the four #6 screws from the "document container" located in the center, on the inside of the door. Turn the document container upside down and re-attach it to the door.
6. With the handle facing away from the rack, turn the door 180 degrees (refer to figure 18).
7. Realign the door with the cabinet, so the hinges on the top and bottom connect with the appropriate holes on the opposite side of the RETMA frame.
8. Replace the two #8 flathead screws in the top bracket. Next, replace the two #8 flathead screws in the bottom bracket. Tighten.

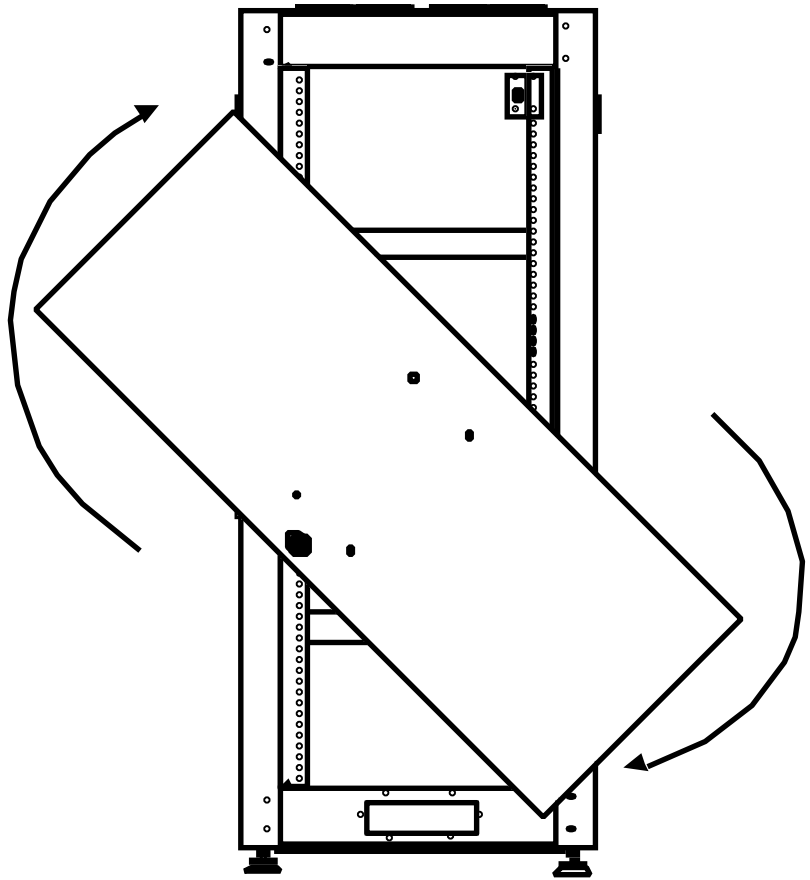


Figure 18 Back Door Reversal

Fan Assembly Replacement Instructions

The Precision Racks are equipped with two 10" ~120V or ~240V 550 CFM fans. These ball bearing fans keep cabinet air constantly circulating for even cooling throughout the enclosure. These fans are highly reliable components. However, should a malfunction occur, the following instructions explain how the fans can be easily removed and replaced. It should be noted that if a fan is not working properly, it should be replaced as soon as possible so that adequate cooling can be maintained throughout the cabinet. Make sure when ordering a new fan, to specify either ~120V or ~240V.

Instructions for fan replacements are as follows:

1. Open the back door of the Precision Rack.
2. Remove the four screws on the top panel (refer to figure 19).
3. Lift the top panel (from the fan end). Firmly support the top panel and disconnect the fan plug. Remove the ground wire using a Phillips screw driver (refer to figure 20).
4. Pull the top panel far enough forward so the eight screws and nuts securing the fan can be easily removed (a Phillips screw driver will need to be used). Hold the fan while undoing the screws so it does not drop.
5. Remove the old fan and replace it with the new fan.

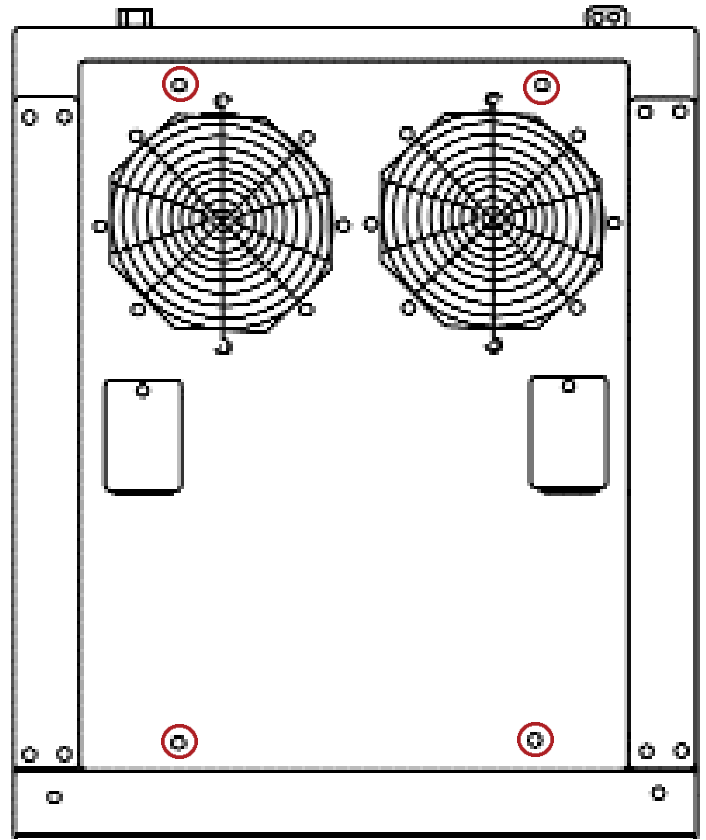


Figure 19
Location of Screws Securing Top Panel

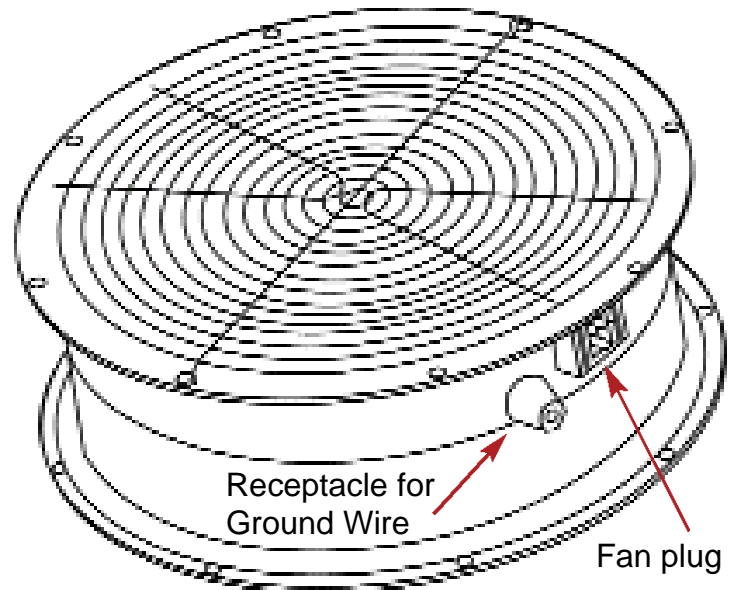


Figure 20
Fan Assembly

6. While holding the fan in place, replace the eight screws and secure a nut to each screw, being careful not to let a nut fall.
7. Move the top cover far enough back so the fan plug can be reconnected. Replace the ground wire depicted in figure 21.
8. Replace the top panel and secure with the four screws.
9. Close the back door.

Relocating the V/K/M Interface Module

The V/K/M interface or breakout module can easily be replaced or removed by following these simple instructions.

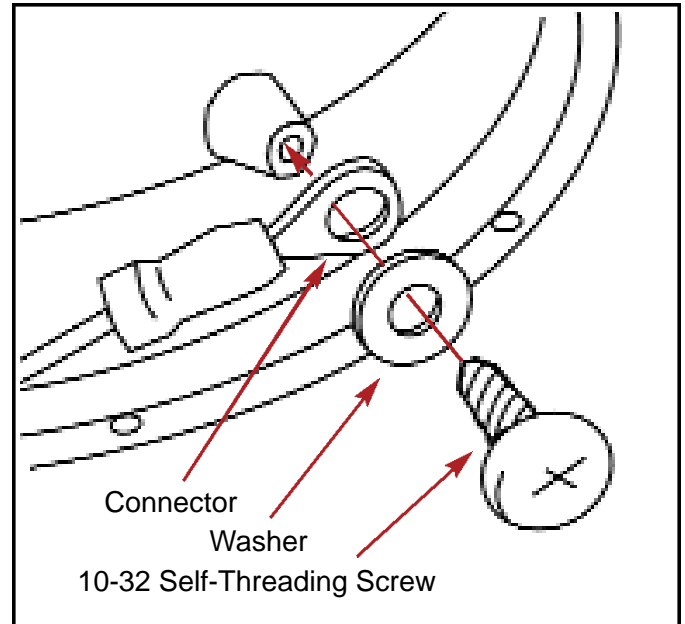


Figure 21
Ground Screw and Wire Connection

1. On the front console of each Density chassis in the V/K/M chain, check the status of the *Select Chassis* button. If the *Select* LED light is green, press the *Select Chassis* button until it turns red.
2. Open the back door and right side panel of the Precision Rack.
3. Unplug all connectors from the V/K/M breakout module.
4. Unscrew the two 10-32 screws that are holding the V/K/M bracket (use a Phillips screw driver), holding on to the bracket so it does not drop to the floor.
5. Move or replace the V/K/M module on the RETMA rail. Insert the 10-32 screws and secure.
6. Plug all connectors in the proper positions in the V/K/M module.
7. Re-select the Density System you would like to enable to control the video, mouse and keyboard by pressing the *Select Chassis* button for that system.

Chapter 4—Specifications

Mechanical Specifications for the Precision Rack 2000

The mechanical specifications of the Precision Rack 2000 are as follows:.

Dimensions:	(Inches)	Height: 63	Width: 26.9	Depth: 31.8
	(cm)	Height: 160	Width: 68.3	Depth: 80.8
Rack Space:	(Inches)	Vertical:	54.45	
	(cm)		138.3	
			31U	
	(Inches)	Horizontal:	Standard 19"	
Cooling:		Two 550 CFM fans		
Weight:		Approximately 165 lbs.		

Mechanical Specifications for the Precision Rack 1100 and the Precision Rack 1000

The mechanical specifications of the Precision Rack 1100 and the Precision Rack 1000 are as follows:

Dimensions:	(Inches)	Height: 50.55	Width: 26.9	Depth: 31.8
	(cm)	Height: 128.4	Width: 68.3	Depth: 80.8
Rack Space:	(Inches)	Vertical:	40.25	
	(cm)		102.2	
			23U	
	(Inches)	Horizontal:	Standard 19"	
Cooling:		Two 550 CFM fans		
Weight:		Approximately 135 lbs.		

*Note: The Density receives air from the **front only** and exhausts through the top and back of each unit. For this reason proper spacing of Density systems **must be** maintained. Do not reposition rack spacing.

Electrical Specifications

AC Power Input for Precision Rack 2000 and Precision Rack 1100

Three AC distribution circuits:

(~120V-30A, 50/60Hz) x 3

(~120V-15A, 50/60Hz) x 3

Option 1: 3 independent 3-wire
service, (line, neutral, earth)

Option 2: 3-phase y-connect 5-wire
service, (Phase 1, Phase 2,
Phase 3, Neutral, Earth)

Fans: Two types ~120V or ~240V (50/60Hz)

AC Power Input for the Precision Rack 1000

AC power input is supplied to equipment through a detachable power cord:

North America: SJT, 13A/125V, 3 X AWG16

European: HO5 VV-F, 10A/250V, 3 X 1mm²

External: IEC 60320-C14 AC Input Receptacle x 2

(~120V-12A, 50/60Hz) x 2, or

(~240V-12A, 50/60Hz) x 2

Power Switch/Circuit Breaker (x 2): 1 Pole-12A

Fans: Two types ~120V or ~240V (50/60Hz)

Internal Power Cords for all Precision Racks

AC output power is supplied to equipment through a detachable power cord.

The following types of power cords are supplied for the Density Systems:

North America: NEMA 5-15P to IEC-60320-C13
SJT, 13A/125V, 3 X AWG16

European: IEC-60320-C14 to IEC-60320-C13
HO5 VV-F, 10A/250V, 3 X 1mm²

Load Balancing via Terminal Blocks

Figures 22, 23 and 24 show which receptacle connects to which terminal block. Equipment should be connected so that the AC distribution circuits are balanced and not overloaded.

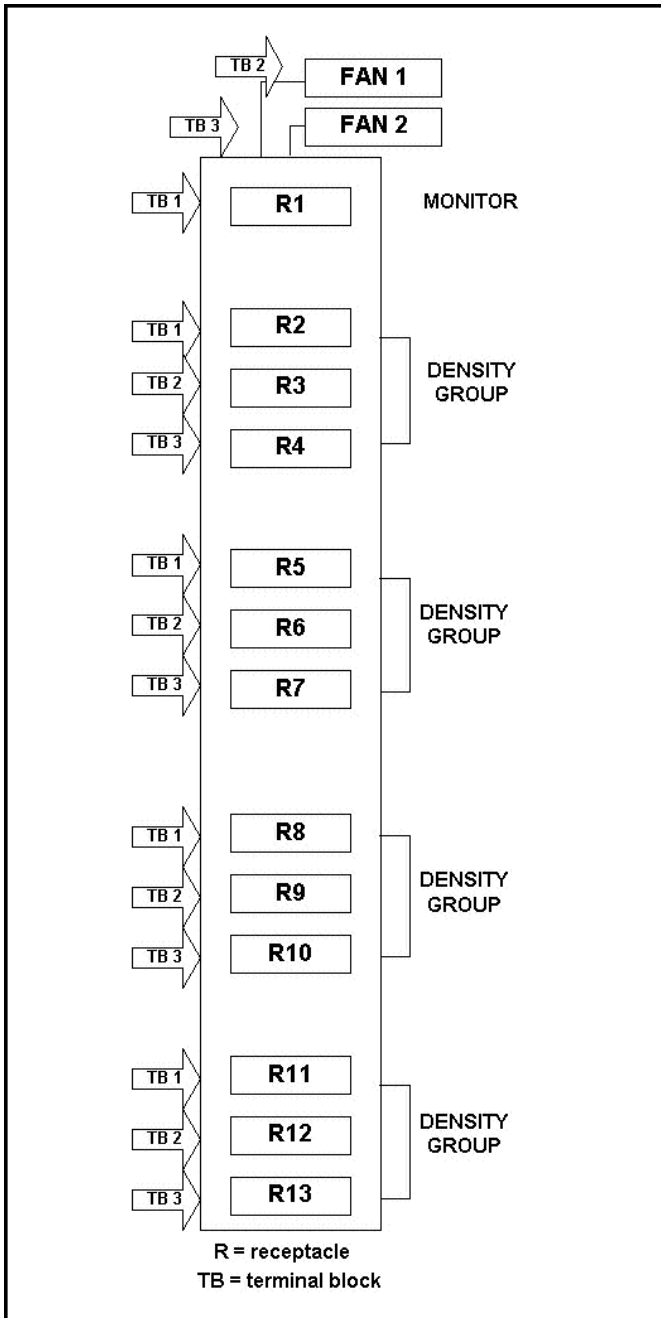


Figure 22

Load Balancing for Precision Rack 2000

**North America: R1 thru R13 NEMA 5-15P
Europe: R1 thru R13 IEC-60320-C13**

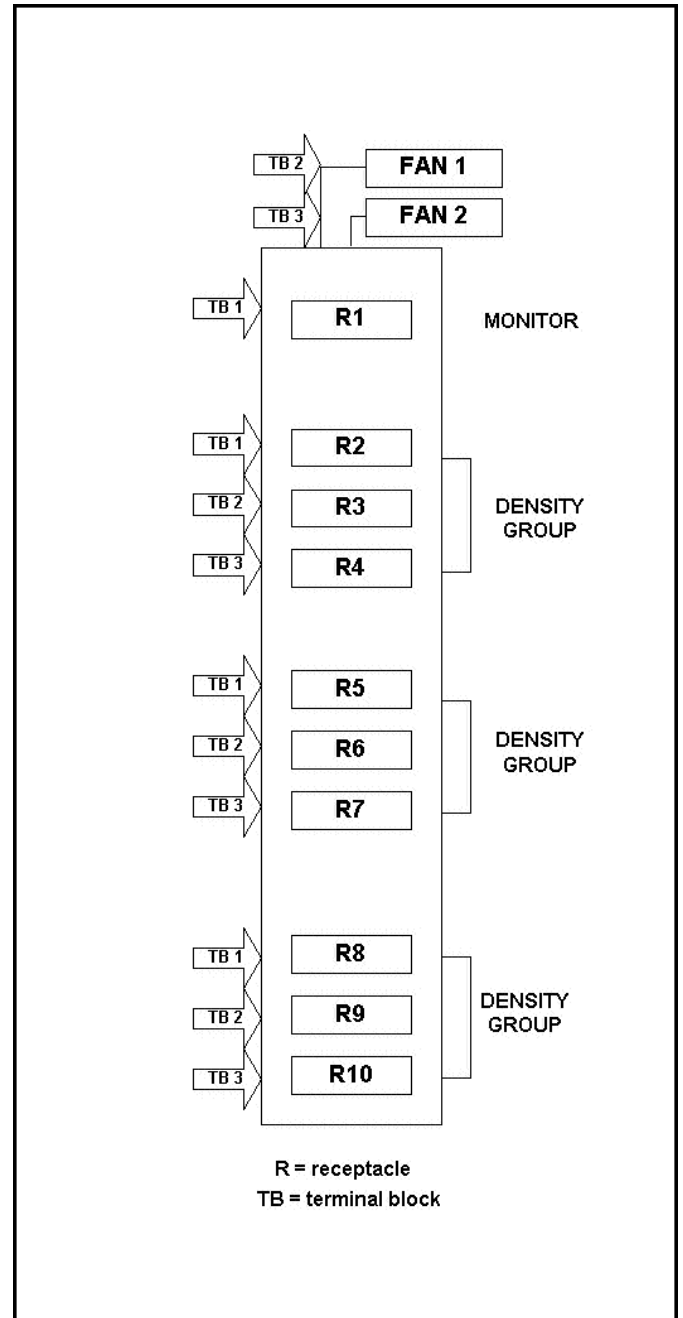


Figure 23

Load Balancing for Precision Rack 1100

**North America: R1 thru R10 NEMA 5-15P
Europe: R1 thru R10 IEC-60320-C13**

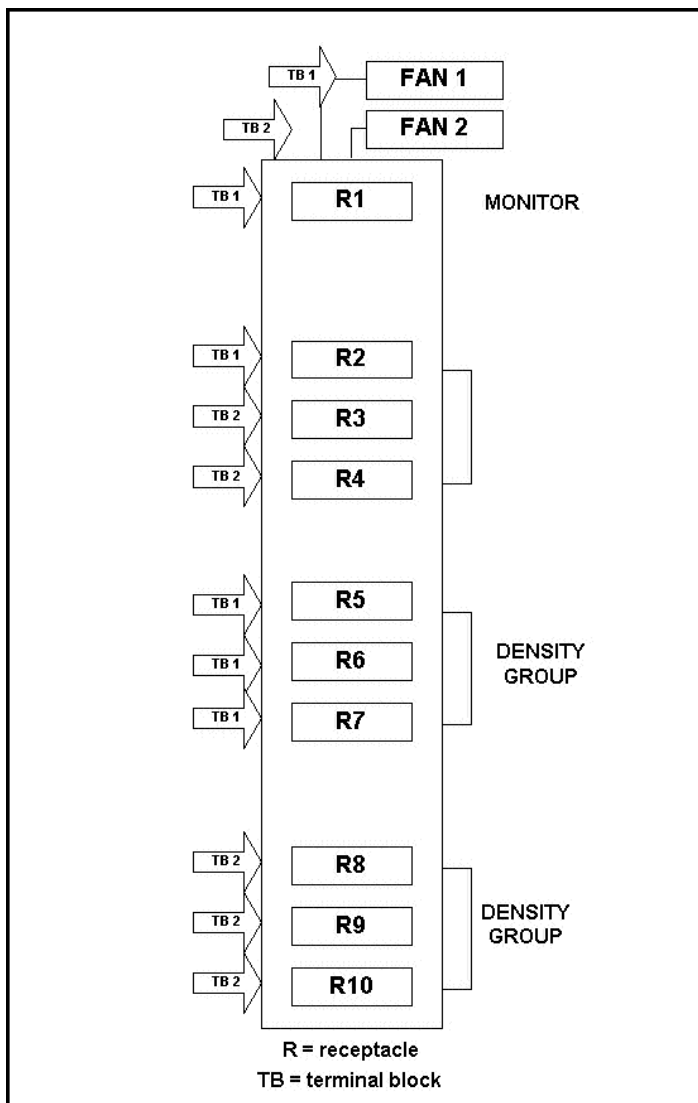


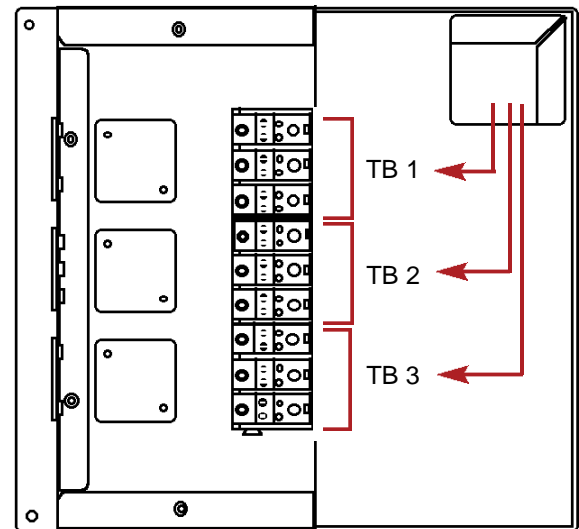
Figure 24

Load Balancing for Precision Rack 1000

North America: R1 thru R10 NEMA 5-15P

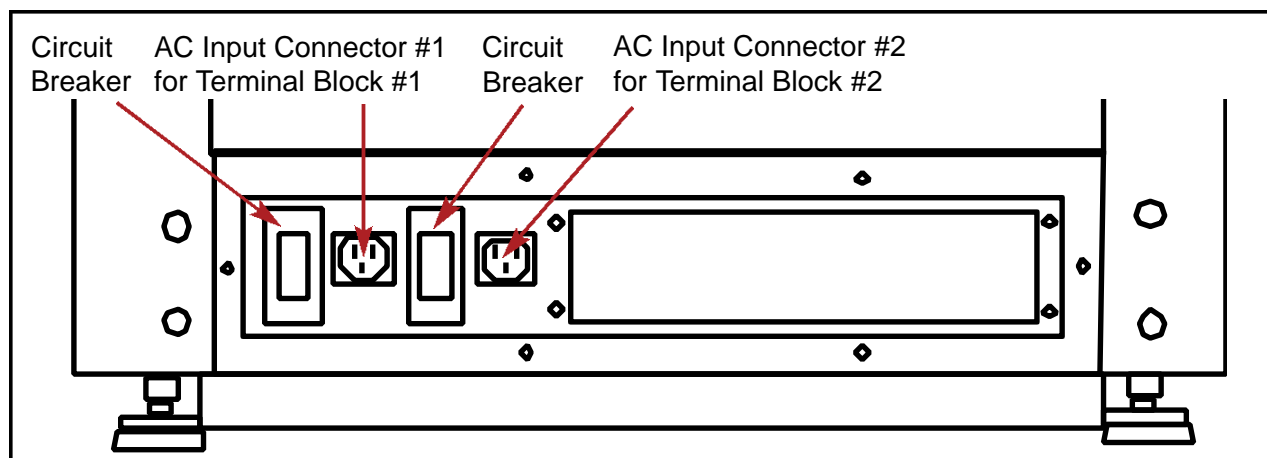
Europe: R1 thru R10 IEC-60320-C13

Figure 25 shows terminal block location in the base of the Precision Racks. The Precision Rack 1000 utilizes only two of the terminal blocks (terminal blocks 1 and 2). The location of these two terminal blocks will be the same as shown in figure 25.



**Figure 25 Terminal Block Location for Precision Racks
(View from Front, Looking Down)**

Figure 26 shows the location of the two AC input connectors which supply power to the Precision Rack 1000. Two detachable power cords will be supplied with the rack.



**Figure 26 Precision Rack 1000 AC Power Input Connector Locations
(View from Back of Precision Rack 1000)**

APPENDIX A

CUSTOMER SERVICE INFORMATION

For Customer Service Information: (800) 829-0551

Customer Service available from:

5:00 am to 5:00 pm PST Monday through Friday
Also, from 8:00 am to 4:00 pm PST on Saturday
Closed holidays and holiday weekends

Use the Cubix Web site for trouble-shooting aids and for access to the latest information on Cubix products.

Customer Service Web site: <http://www.cubix.com/support>

Customer Service Email address: customerservice@cubix.com