

IBM iDataPlex Rack Type 7197



Installation and Maintenance Guide

IBM iDataPlex Rack Type 7197



Installation and Maintenance Guide

Note:

Before using this information and the product it supports, read the general information in Appendix A, "Getting help and technical assistance," on page 77 and Appendix C, "Notices," on page 81.

Third Edition (August 2013)

© Copyright IBM Corporation 2013.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Safety	v
Chapter 1. Introduction	1
The IBM Documentation CD	1
Hardware and software requirements	1
Using the Documentation Browser	2
Related documentation	3
Notices and statements in this document	3
Chapter 2. Site preparation and requirements	5
Site preparation overview	5
Size and weight requirements	7
Space requirements (creating a floor plan)	11
Power requirements	12
Chapter 3. Installing the rack	13
Installation tools	13
Unpacking the rack	15
Moving the rack	19
Installing the stabilizer feet	21
Installing the side panels	22
Removing and installing rack doors	22
Removing the front doors	23
Installing the front doors	23
Removing the rear door	24
Installing the rear door	26
Attaching rack cabinets in a suite	29
Removing and installing the casters	31
Removing the casters	31
Installing the casters	31
Filling the manifold with water	32
Preparation and requirements	34
Initial tool filling/bringup procedure	34
Connecting power to the rack	39
Chapter 4. Removing and installing the rails	41
Removing and installing rails	41
Removing and installing 2U chassis rails	41
Removing and installing optional device rails	44
Chapter 5. Removing and replacing components	47
Installation tools	47
Bleeding the air from the manifold	47
Replacing manifold quick connect in a Direct Water Cooled (DWC) rack	50
Removing the manifold	59
Installing the manifold	65
Installation guidelines	65
Draining the fill tool	71
Appendix A. Getting help and technical assistance	77
Before you call	77
Using the documentation	77
Getting help and information from the World Wide Web	77

Software service and support	78
Hardware service and support	78
IBM Taiwan product service	78
Appendix B. CRU and FRU information and part numbers	79
Appendix C. Notices	81
Trademarks	81
Important notes.	82
Particulate contamination	83
Documentation format	83
Telecommunication regulatory statement	84
Electronic emission notices	84
Federal Communications Commission (FCC) statement	84
Industry Canada Class A emission compliance statement	84
Avis de conformité à la réglementation d'Industrie Canada	84
Australia and New Zealand Class A statement	84
European Union EMC Directive conformance statement.	85
Germany Class A statement	85
VCCI Class A statement	86
Japan Electronics and Information Technology Industries Association (JEITA) statement	86
Korea Communications Commission (KCC) statement	86
Russia Electromagnetic Interference (EMI) Class A statement.	87
Taiwanese Class A warning statement	87
Index	89

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφαλείας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

DANGER

- **Always lower the leveling pads on the rack cabinet.**
- **Always install stabilizer brackets on the rack cabinet.**
- **Always install servers and optional devices starting from the bottom of the rack cabinet.**
- **Always install the heaviest devices in the bottom of the rack cabinet.**

Statement 4:



Electrical current from power, telephone, and communication cables is hazardous.

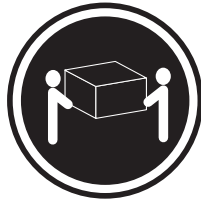
To avoid a shock hazard:

DANGER

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**
- **Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	To Disconnect:
<ol style="list-style-type: none">1. Turn everything OFF.2. First, attach all cables to devices.3. Attach signal cables to connectors4. Attach power cords to outlet.5. Turn device ON.	<ol style="list-style-type: none">1. Turn everything OFF.2. First, remove power cords from outlet.3. Remove signal cables from connectors.4. Remove all cables from devices.

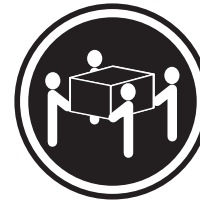
Statement 5:



≥ 18 kg (39.7 lb.)



≥ 32 kg (70.5 lb.)



≥ 55 kg (121.2 lb.)

CAUTION:
Use safe practices when lifting.

Statement 6:

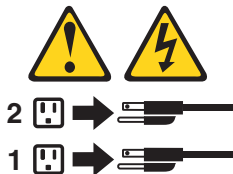


CAUTION:
Do not place any object on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

Statement 7:



CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



Statement 8:



DANGER

- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Statement 9:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

Statement 12:



CAUTION:

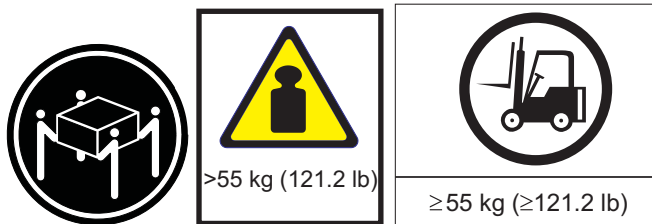
See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

Statement 13:



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



DANGER

HEAVY EQUIPMENT -- PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE MAY RESULT IF MISHANDLED

Because of the size and weight of this product, the transportation of this equipment must be performed by professional movers/riggers who are trained to handle large heavy objects. The IBM authorized service provider will only perform minimal frame repositioning within the computer room, as needed, to perform required service actions. (D006)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork trunk unless it is properly packaged, secured on the top of the supplied pallet. (R004)

  <p>> 500 lbs. (> 227 kg.)</p>	<p>Use Only Professional Movers!</p> <p>يجب الاستعانة بخبرات نقل متخصة</p> <p>Utilizar somente transportadores profissionais</p> <p>Faire appel à des professionnels seulement pour déplacer l'équipement.</p> <p>只能使用专业搬运机</p> <p>Maak gebruik van professionele verhuizers</p> <p>Faites exclusivement appel à des déménageurs professionnels.</p> <p>Nur professionelle Transportunternehmen mit der Durchführung beauftragen.</p> <p>Να μετακινείται μόνο από επαγγελματίες μεταφορείς</p> <p>העזרו במובילים מקצועיים בלבד</p> <p>Csak hivatásos szállítóval költöztesse</p> <p>Avvalersi solo di trasportatori esperti</p> <p>機器を移動するには専門の業者に依頼してください。</p> <p>전문 운송 인력만이 이동시킬 수 있습니다.</p> <p>Należy korzystać wyłącznie z usług wyspecjalizowanych firm.</p> <p>El traslado del equipo debe realizarlo personal especializado</p> <p>Trebaju raditi samo profesionalni transportni radnici</p> <p>Použite pouze profesionální stěhováky</p> <p>Brug kun professionelle flyttefolk.</p> <p>Käytä vain ammattitaitoista kuljetusliikettä</p> <p>Utstyret må kun flyttes av godkjent flyttepersonell</p> <p>Contacte apenas transportadoras profissionais</p> <p>Используйте только профессиональных грузчиков</p> <p>Na presun použite len profesionálov</p> <p>Använd endast professionell flyttpersonal</p>
  <p>Use Only Professional Movers!</p>	

Statement 14:



CAUTION:

The water might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

(C034)

CAUTION:

Goggles are needed for the procedure.

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen.

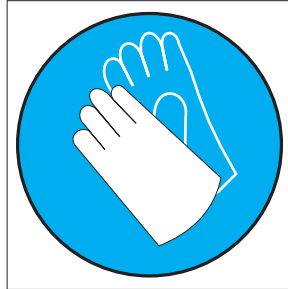
(L011)



CAUTION:
Chemical resistant gloves are needed for this procedure.

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden.
(L014)

(L014)



Chapter 1. Introduction

This document contains site preparation, requirements, and installation instructions for the IBM® iDataPlex Rack Type 7197 and many of the common optional devices that you can install in the rack cabinet. Always read the documentation that comes with your server or optional device for detailed installation instructions.

The IBM iDataPlex Rack Type 7197 is a 43U high 120 cm (47.25 in.) wide rack cabinet that can hold up to 84 preconfigured 1U type servers, ac line voltage power distribution units (PDU), optional rack management hardware, and switch solutions.

Important: To help maintain proper cooling for all components installed in the rack, make sure that fillers are installed over all unoccupied bays.

This documentation might be updated occasionally to include information about new features, a translated version of the documentation might be available in your language, or technical updates might be available to provide additional information that is not included in this documentation. These updates are available from the IBM Web site. To check for updated documentation and technical updates, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product Support** section, click **System x**.
3. Under popular links, click **Publications lookup**.
4. From the **Product Family** menu, select **iDataPlex Rack** and click **Go**.

The updated iDataPlex documentation also is available from the IBM Systems Information Center. To check for updated information, complete the following steps.

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://publib.boulder.ibm.com/infocenter/systems/index.jsp>.
2. In the **Contents** pane, select **Combined IBM Systems Information**.
3. Select **Systems hardware**.
4. Select **iDataPlex information**.

The IBM Documentation CD

The IBM *Documentation* CD contains documentation for your rack product in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows XP, Windows 2000, or Red Hat Linux
- 100 MHz microprocessor
- 32 MB of RAM

- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in your computer and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
 - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`

where *e* is the drive letter of the CD or DVD drive, and click **OK**.
 - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:
`sh runlinux.sh`

Select your rack product from the **Product** menu. The **Available Topics** list displays all the documents for your rack product. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Ctrl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Related documentation

This *Installation and User's Guide* provides general information about the rack, including information about planning and how to get help. In addition to this document, the printed *Important Notices* document and the following documentation is provided in Portable Document Format (PDF) on the IBM *Documentation CD*:

- *Rack Safety Information*

This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Rack Safety Information* document.

- *Warranty and Support Information*

This document contains information about the terms of the warranty and getting service and assistance.

Notices and statements in this document

The caution and danger statements that appear in this document are also in the multilingual *IBM Rack Safety Information* document, which is on the IBM *Documentation CD*. Each statement is numbered for reference to the corresponding statement in the *IBM Rack Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Chapter 2. Site preparation and requirements

This chapter contains information that is the customer's responsibility in order to make sure that the facility is properly prepared to receive and allow the iDataPlex Rack Type 7197 cabinets to be installed.

Site preparation overview



DANGER

HEAVY EQUIPMENT -- PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE MAY RESULT IF MISHANDLED

Because of the size and weight of this product, the transportation of this equipment must be performed by professional movers/riggers who are trained to handle large heavy objects. The IBM authorized service provider will only perform minimal frame repositioning within the computer room, as needed, to perform required service actions. (D006)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork trunk unless it is properly packaged, secured on the top of the supplied pallet. (R004)

Before you unpack or install the rack cabinet, complete the following tasks:

- Understand the rack cabinet specifications and requirements.
- Measure all door openings, ensuring that they are a minimum of 2110 mm (83 in.) high and 851 mm (33.5 in.) wide.
- Prepare a layout of the rack cabinet or suite of rack cabinets.
- Prepare the physical site (location) where you will install the rack cabinet.
- Read “Unpacking the rack” on page 15.

Physical site planning includes determining the following factors:

- Floor area that is required by the equipment
- Floor-load capacity
- Space that is needed for future expansion
- Location of columns or other unmovable building structures
- Power and environmental requirements

Create a floor plan to check for clearance problems. If necessary, make a full-scale template of the rack cabinet and carry it along the access route to check for potential clearance problems through doorways and passageways, around corners, and in elevators.

Remember to provide space for storage cabinets, card files, desks, communication facilities, daily storage of tapes, and other supplies.

Before you install the rack, prepare the site by making sure that the following requirements are met:

- There is enough space for the rack cabinet to pass safely by any pre-existing equipment or facility fixtures.
- All necessary power and data cables are ready for installation in the rack cabinet.
- Any necessary cooling lines are ready for attachment to the manifold.

Size and weight requirements

The RackCenter Type 7197 is an Electronic Industries Alliance (EIA) standard rack cabinet. See Table 1 and Table 2 for the dimensions and weights of the rack cabinet.

Note: The dimensions and weights shown are for the primary rack cabinet. Expansion rack cabinets, where applicable, have the same physical dimensions but weigh less because they do not have side panels.

Table 1. IBM iDataPlex Rack Type 7197 cabinet physical dimensions

Configuration	Dimensions
Rack cabinet with casters or front doors (no covers)	1200 mm x 840 mm x 2093 mm (47.25 in. x 33.07 in. x 82.4 in.)
Rack cabinet (no doors, covers, or casters)	1200 mm x 600 mm x 2093 mm (47.25 in. x 23.6 in. x 82.4 in.)
Rack cabinet and rear door	1200 mm x 844 mm x 2093 mm (47.25 in. x 33.23 in. x 82.4 in.)
Rack cabinet and side covers	1235 mm x 840 mm x 2093 mm (48.6 in. x 33.07 in. x 82.4 in.)
Rack cabinet, side covers, front and rear doors	1235 mm x 844 mm x 2093 mm (48.6 in. x 33.23 in. x 82.4 in.)

Table 2. IBM iDataPlex Rack Type 7197 cabinet weights

Configuration	Weight (approximate)
Empty (rack, manifold, front door pair, thin rear door, and side cover pair)	301 kg (664 lb)
Populated (rack, 42 2u chassis, 4 Infiniband switches, 2 Ethernet switches, 3 PDUs)	1361 kg (3000 lb)
Populated with water	1373 kg (3026 lb)

A rack cabinet requires a minimal service and operational clearance in the front and back to ensure proper ventilation and access to open the front and rear doors. An extended service clearance provides easier access to the rack cabinet so that you can install and service optional devices.

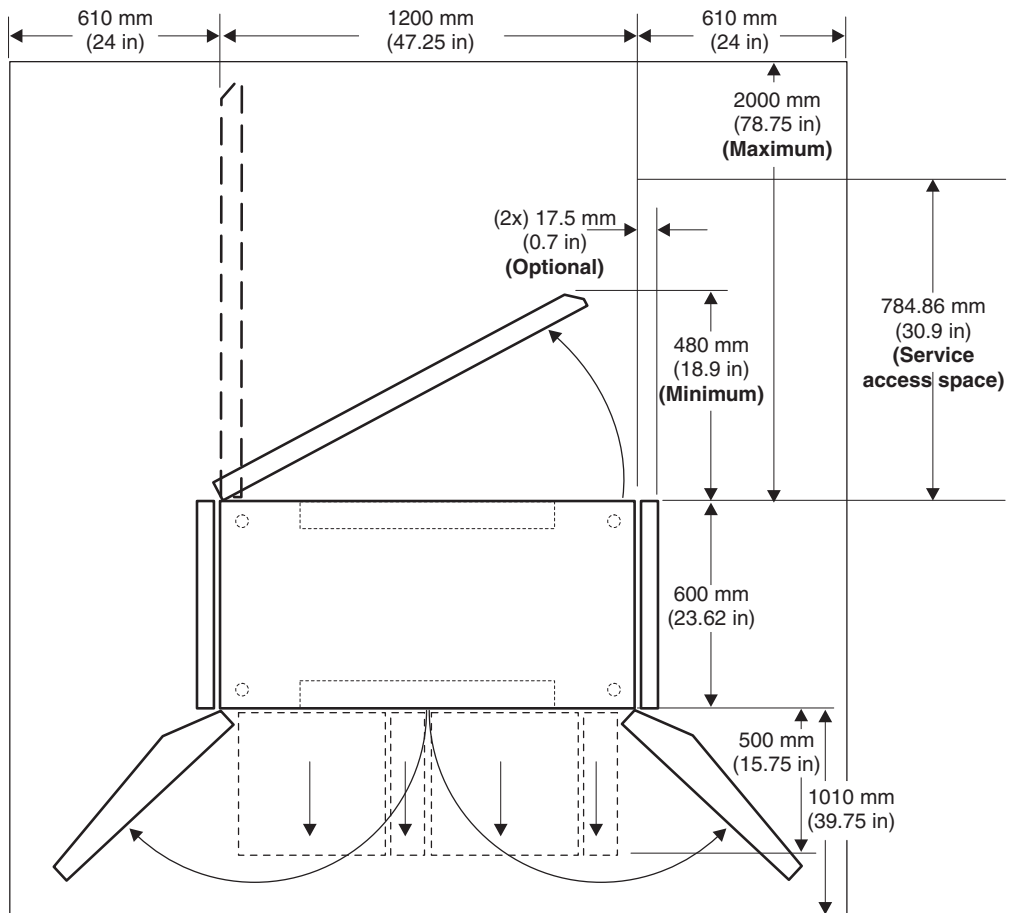
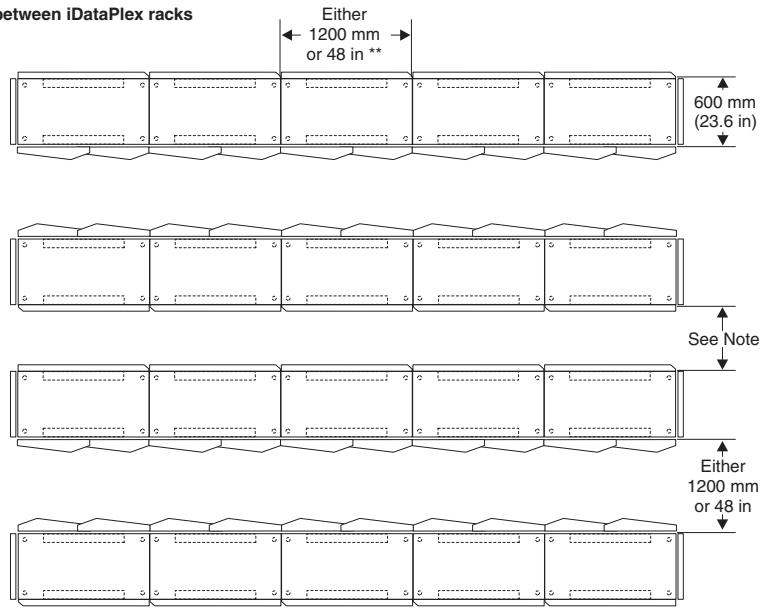


Figure 1. Providing service and operational clearance for the IBM iDataPlex Rack Type 7197

When you attach iDataPlex rack cabinets together to form a suite of rack cabinets, you must keep a minimum distance between suites in the same room. See Figure 2 on page 9 for information on the minimum distance between suites. Make sure that the fronts or rears of rack cabinet suites face each other. This provides proper ventilation and allows access to install and service optional devices.

Note: The access space that is needed to service the rack depends on the devices that are installed and your installation and service agreement. Unless your installation and service agreement specifies a smaller minimum access space.

Space between iDataPlex racks

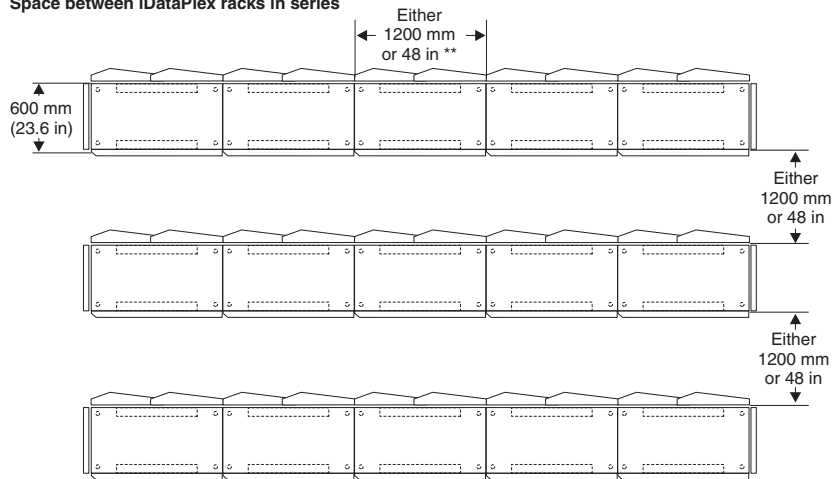


Note: Guidelines for space between racks:

- 600 mm or 24 in (no rear door heat exchangers installed)
- 1200 mm or 48 in (rear door heat exchangers installed)

** Depending on floor tile size. (European = 600 mm x 600 mm, English = 24 in. x 24in.)

Space between iDataPlex racks in series



When you attach iDataPlex rack cabinets together to form a suite of rack cabinets, you must keep a minimum distance between suites in the same room. This distance provides proper ventilation and allows access to install and service optional devices.

Notes:

1. The access space that is needed to service the rack depends on the devices that are installed and your installation and service agreement. Unless your installation and service agreement specifies a smaller access space, use the distance guidelines in Figure 2.
2. For this layout, rear door heat exchangers must be installed.

** Depending on floor tile size. (European = 600 mm x 600 mm, English = 24 in. x 24 in.)

Figure 2. Leaving space between rack cabinet suites

The internal dimensions of the rack cabinet conform to the EIA standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*. See Figure 3 for rack cabinet internal dimensions.

The internal measurements in the following illustration are of one column in the rack cabinet.

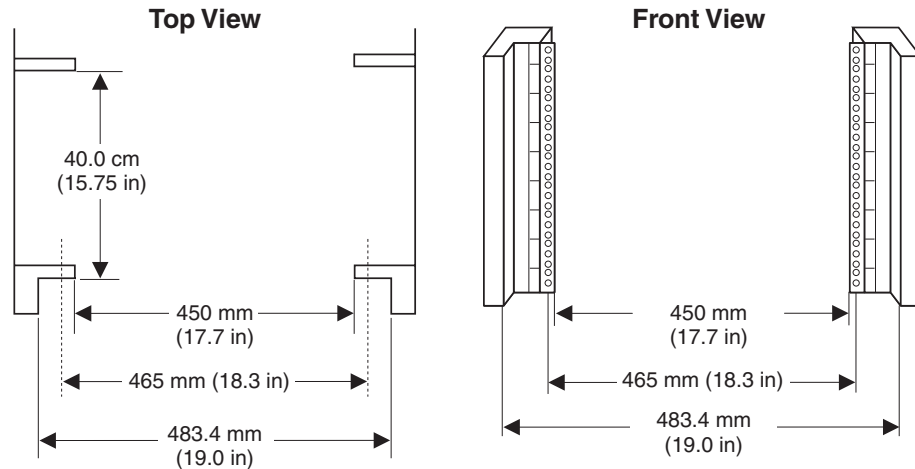


Figure 3. Measuring inside of the rack cabinet

All vertical rack cabinet measurements are given in rack units (U), where 1U is equal to 44.5 mm (1.75 in.) The U levels are marked on labels on the front and rear mounting flanges inside of the rack cabinet, as shown in Figure 4.

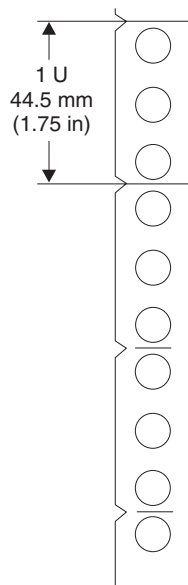


Figure 4. Measuring U levels within rack cabinets

Space requirements (creating a floor plan)

To be sure that you have enough space for the rack cabinet or suite of rack cabinets, create a floor plan before you install any rack cabinets. You might have to prepare and analyze several plans before you choose a final one. If you install more than one rack cabinet in more than one installation stage, prepare a separate plan for each installation stage. Consider the following factors when you prepare each plan:

- Flow of work and personnel within the area
- Operator access to units, as required
- If the placement will be on a raised floor:
 - Maximum cable lengths
 - Positioning over a cooling register
 - Routing and maximum length of cooling lines for the rear door heat exchanger and the direct water cooled (DWC) rack, if necessary
- If the placement will not be on a raised floor:
 - Maximum cable lengths
 - Routing and maximum length of cooling lines for the rear door heat exchanger and the direct water cooled (DWC) rack, if necessary
 - Need for cable guards, ramps, or other similar items to protect equipment and personnel
- Location of any planned safety equipment
- Future expansion

Begin with an accurate drawing of the installation area (blueprints and floor plans are appropriate). Be sure to include the following information in your floor plan:

- Service clearances that are required for each rack cabinet or suite of rack cabinets
- If the placement will be on a raised floor:
 - Things that might obstruct cable or cooling line routes
 - The height of the raised floor
- If the placement will not be on a raised floor:
 - The placement of cables and cooling lines to minimize obstruction.
 - The amount of cable that is required. (If the cable is routed indirectly between rack cabinets, such as along walls or suspended from the ceiling, additional cable might be required.)
 - The amount of hose for cooling lines that is required. (If the cooling lines are routed indirectly between rack cabinets, such as along walls or suspended from the ceiling, additional hose might be required.)
- Locations of equipment, furniture, and building features:
 - Power receptacles.
 - Air conditioning equipment and controls. (Air conditioning outlets should be located between fronts of facing suites of rack cabinets. Exhausts in the ceilings should be located between rears of rack suites.)
 - File cabinets, desks, and other office equipment.
 - Room emergency power-off controls.
 - All entrances, exits, windows, columns, and pillars.

Review the final floor plan to ensure that cable lengths are not too long and that the rack cabinets have enough clearance.

Power requirements

The rack cabinet does not require electricity, but the servers and optional devices that you install inside a rack cabinet do require connection to properly wired and grounded electrical outlets. You might need an electrician to assist you with planning for electrical requirements. For example:

- Each rack cabinet requires at least one uninterruptible power supply or power distribution unit (PDU) for servers and optional devices that you install in the rack cabinet.
- Each PDU or uninterruptible power supply requires a separate ac power branch circuit.
- The input voltage-selection switch on each device that you install in the rack cabinet must match the output voltage on the uninterruptible power supply or PDU.
- Power cords must match electrical outlets at the location where you install the rack cabinet.
- UPS power requirements: it is recommended that all equipment (pumps, dry cooler, CDUs,...) used to provide the water flow and at correct temperature by placed on a UPS backup electrical system. This backup service is required for as long as required until a generator connects in and provides sustained power.

Review the following safety information as you plan for your rack cabinet.

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Chapter 3. Installing the rack

Note: This section will be performed by professional movers/riggers and not the IBM service team.

The rack cabinet includes all the hardware for building a suite of rack cabinets, and you can order it with any combination of the following components:

- One side panel
- Two side panels
- No side panels
- Front door
- Rear door

The rack cabinet conforms to Electronic Industries Alliance (EIA) standard *EIA-310-D Cabinets, Racks, Panels, and Associated Equipment (1992)*.

Important: To help maintain proper cooling for all components installed in the rack, make sure that fillers are installed over all unoccupied bays.

Installation tools

Use the following tools to install or attach the IBM iDataPlex Rack Type 7197 cabinets, doors, or optional rear door heat exchanger:

- Leveler wrench (provided with rack)
- Phillip screwdriver (doors and brackets)
- M7 hex driver (doors and brackets)
- M10 hex driver (doors and brackets)
- Flat blade screwdriver (doors and brackets)
- Goggle (FRU part number 5514880) or proper eye protection with side shields that meet the appropriate country standards
- Glove (FRU part number 5514881)

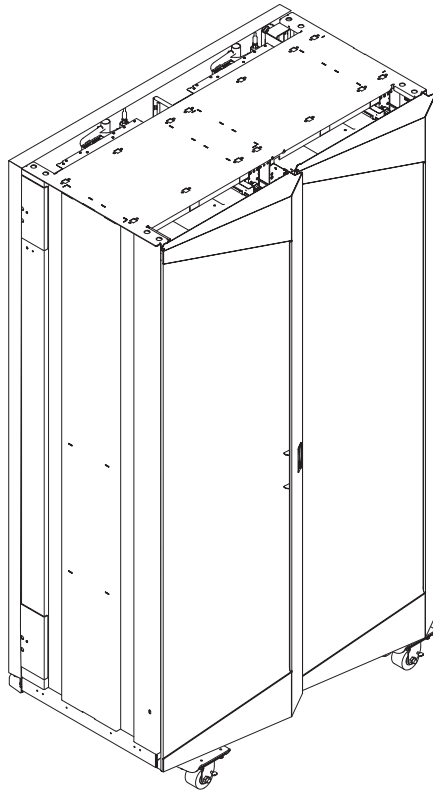


Figure 5. IBM iDataPlex Rack Type 7197

Unpacking the rack

Note: This section will be performed by professional movers/riggers and not the IBM service team.



DANGER

HEAVY EQUIPMENT -- PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE MAY RESULT IF MISHANDLED

Because of the size and weight of this product, the transportation of this equipment must be performed by professional movers/riggers who are trained to handle large heavy objects. The IBM authorized service provider will only perform minimal frame repositioning within the computer room, as needed, to perform required service actions. (D006)

DANGER

Racks with a total weight of > 227 kg (500 lb.), Use Only Professional Movers! (R003)

DANGER

Do not transport the rack via fork trunk unless it is properly packaged, secured on the top of the supplied pallet. (R004)

To unpack the IBM iDataPlex Rack Type 7197 cabinet, complete the following steps:

1. Remove the banding and cardboard from the rack cabinet.
2. Remove the pallet ramp from the front of the palletized rack cabinet and set it aside.
3. Remove the rest of the cardboard and system bag from the rack cabinet.
4. Remove the shipping brackets that secure the rack cabinet to the pallet:

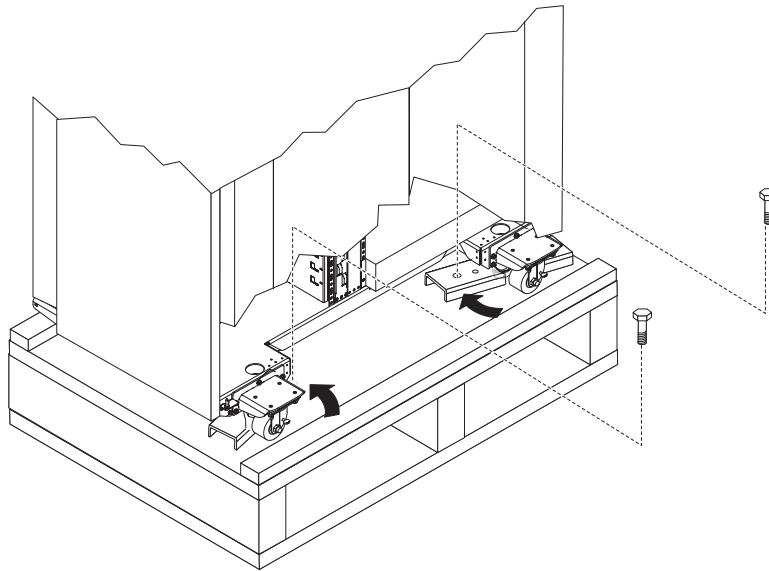


Figure 6. Removing the shipping brackets

- a. Loosen the two bolts that secure the shipping bracket; then, remove the inside bolt from the shipping bracket and set it aside.
- b. Rotate the shipping bracket out of the way; then, loosen the jam nuts on each leveler until the jam nut comes in contact with the top of the leveler foot.
- c. Raise the leveler all the way up.
- d. Repeat steps 4a and 4b for each of the brackets; then, continue to step 5.

5. Install the pallet ramp on either side of the pallet.

Attention: Do not attach the pallet ramp to the front or rear of the pallet. Pushing the rack cabinet off the front or rear of the pallet will cause the rack cabinet to tip over, causing a safety hazard.

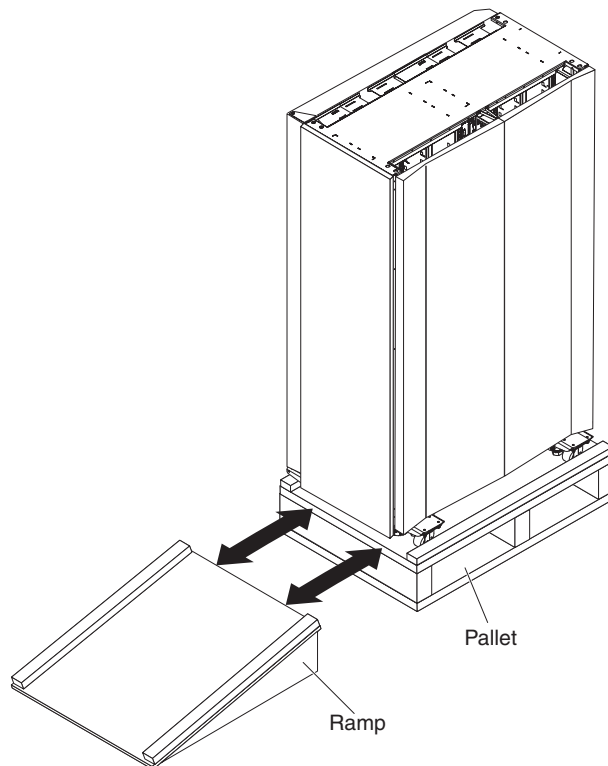


Figure 7. Install the ramp on the side of the pallet

- a. Position the pallet ramp with the angled end of the ramp away from the pallet.
 - b. Using the supplied wrench and the mounting bolts from the shipping brackets, secure the pallet ramp to the pallet.
6. Use the wrench that comes with the rack cabinet, raise each of the four leveling feet.

Statement 12:



CAUTION:

See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

7. Slowly push the rack cabinet off the pallet and down the ramp.

8. Remove the rear door shipping bracket located on the bottom left corner of the rear door.

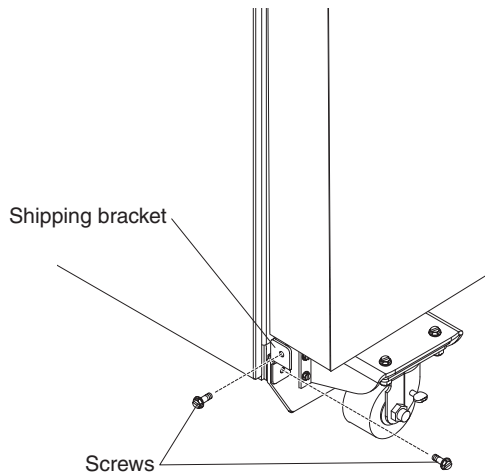


Figure 8. Removing the rear door shipping bracket

9. Remove the rack shipping braces:
 - a. Cut the diagonal metal strapping with a tin snips and then remove it from the corner braces.
 - b. The corner braces can then be removed by taking out the 7 M6 screws that secure the bracket assemblies to the rack.
 - c. Remove the screws that attach the clamping brackets to the main shipping bracket. Leave the two screws which secure the bracket to the EIA flanges for last.
 - d. Make sure you have a secure hold of the brackets while removing the screws. Otherwise, when the last screw is removed, the braces will fall.

Moving the rack

See Table 5 for empty and fully populated rack cabinet weights.

Note: The door opening must be at least 82.75 in. high and 33.5 in. wide for the IBM iDataPlex Rack Type 7197 cabinet to pass through the opening.

Table 3. IBM iDataPlex Rack Type 7197 cabinet weights

Configuration	Weight (approximate)
Empty (rack, manifold, front door pair, thin rear door, and side cover pair)	301 kg (664 lb)
Populated (rack, 42 2u chassis, 4 Infiniband switches, 2 Ethernet switches, 3 PDUs)	1361 kg (3000 lb)
Populated with water	1373 kg (3026 lb)

When you move a rack cabinet, observe the following precautions.

Statement 8:



DANGER

- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Do not use a ramp inclined at more than ten degrees.
- If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent.
- Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.
- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.
- Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

Statement 12:



CAUTION:

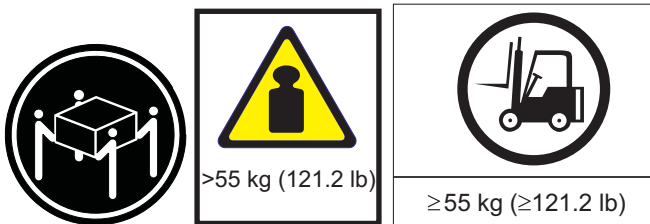
See the instructions in the rack documentation before you install devices, remove devices, or relocate the rack.

Statement 13:



CAUTION:

The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



Installing the stabilizer feet

To install the stabilizer feet, complete the following steps.

Statement 2:



DANGER

- Always lower the leveling pads on the rack cabinet.
- Always install servers and optional devices starting from the bottom of the rack cabinet.
- Always install the heaviest devices in the bottom of the rack cabinet.

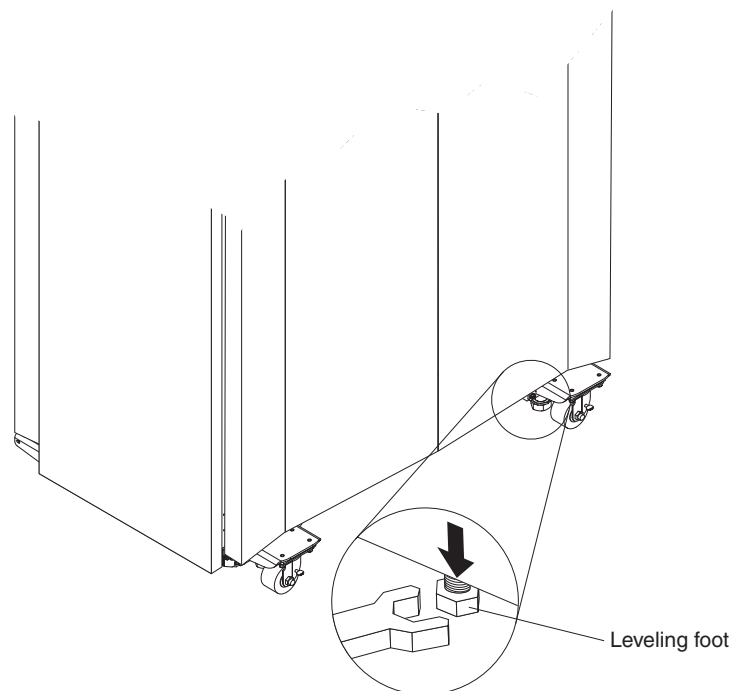


Figure 9. Lowering the leveling feet

1. Use the wrench that comes with the rack cabinet to lower each of the four leveling feet just enough so that they touch the floor.
2. Place a level on the cabinet and adjust the leveling feet until the cabinet is level front to back and side to side.
3. Tighten the jam nuts on each foot against the underside of the rack cabinet.

Installing the side panels

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team.

To install the side panels, complete the following steps.

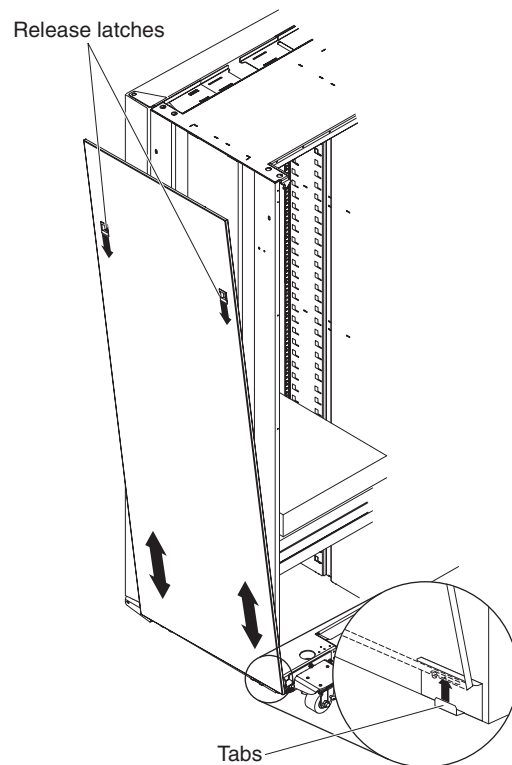


Figure 10. Installing the rack side panels

1. Tilt the side panel slightly toward you; then, lift the side panel and insert the tabs on the bottom of the rack cabinet into the slots in the side panel.
2. Push down on the release latches and rotate the top of the side panel toward the rack cabinet; then, release the latches.
3. Repeat steps 1 and 2 to install the other side panel.

Removing and installing rack doors

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team.

Remove the rack doors when you install and remove optional devices in the rack cabinet. All rack cabinets come with front and rear doors installed.

Note: You have to remove a door only if part of the rack cabinet is obstructed by the door as you install the optional device.

Removing the front doors

To remove the front doors, complete the following steps.

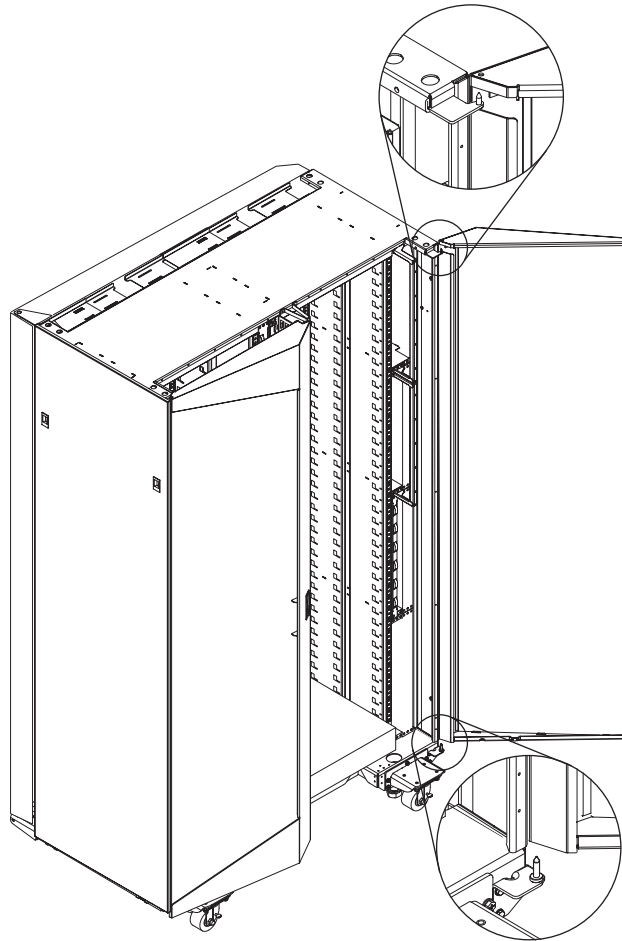


Figure 11. Removing a front door from the rack cabinet

1. Unlock and open the front doors fully. To remove a front door, it must be opened a minimum of 15° so that the slot in the door clears the hinge bracket.
2. While you support the door, lift the door off the hinge pins and pull the door away from the rack cabinet; then, set the door aside.
3. Repeat steps 1 and 2 to remove the other door.

Installing the front doors

To install the front doors, complete the following steps.

Attention: When you install a front door, be sure to align the hinge pins with the holes on the door before you set the hinge pins into place.

1. While you support the door, lift the door and align the hole in the bottom of the door with the bottom hinge pin first; then, lower the door slightly. Do not lower the door completely.
2. While continuing to support the door, align the hole in the top of the door with the top hinge pin and lower the door.
3. Repeat steps 1 and 2 to install the other door.
4. Close the doors completely and check their fit and the operation of the latch.

Removing the rear door

To remove the standard rear door, complete the following steps.

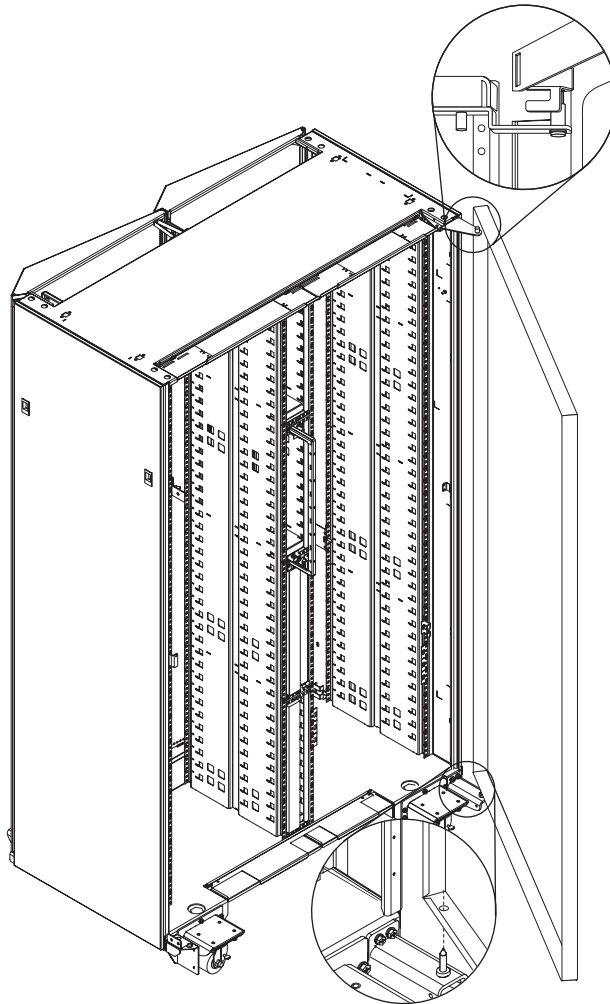


Figure 12. Removing a rear door from the rack cabinet

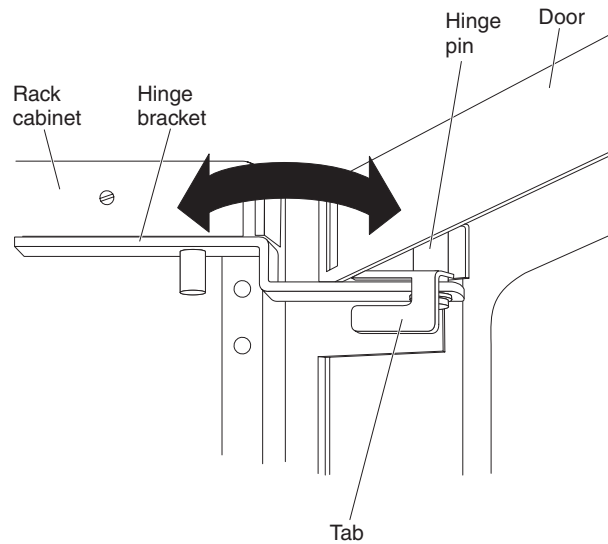


Figure 13. Open the door so that the tab clears the hinge bracket

1. Unlock and open the rear door. To remove the rear door, it must be opened a minimum of 15° so that the tab on the rear door clears the hinge bracket.
2. While you support the door, lift the door off the hinge pins and pull the door away from the rack cabinet; then, set the door aside.

To remove the rear door hinge brackets, complete the following steps.

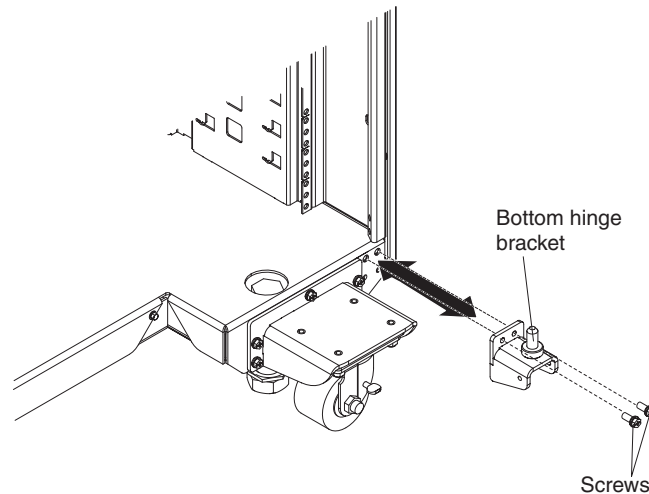


Figure 14. Remove the bottom hinge bracket

1. Remove the bottom hinge bracket on the right side of the rack cabinet.

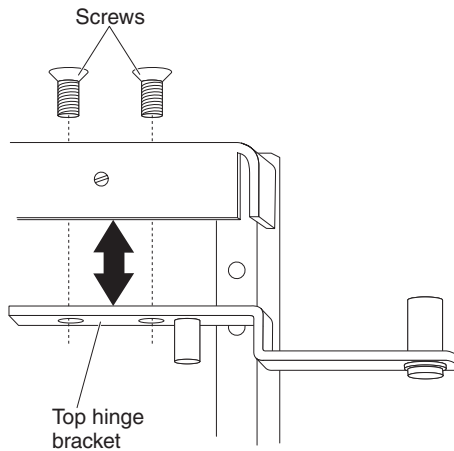


Figure 15. Install the top hinge bracket

2. Position a ladder near the right side of the rack cabinet. Climb the ladder to remove the screws and top hinge bracket.

Installing the rear door

To install the standard rear door, complete the following steps.

Note: For instructions to remove or install the rear door heat exchanger, see the *IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide* on the IBM Documentation CD.

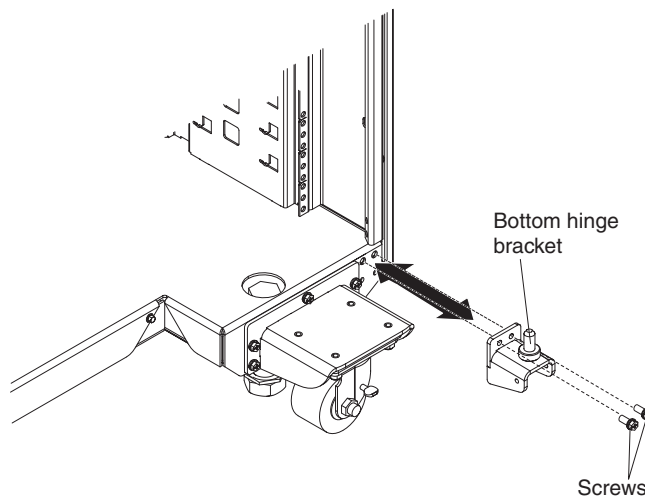


Figure 16. Install the bottom hinge bracket

1. Align the holes in the hinge bracket with the mounting holes on the right side of the rack cabinet; then, install the screws.

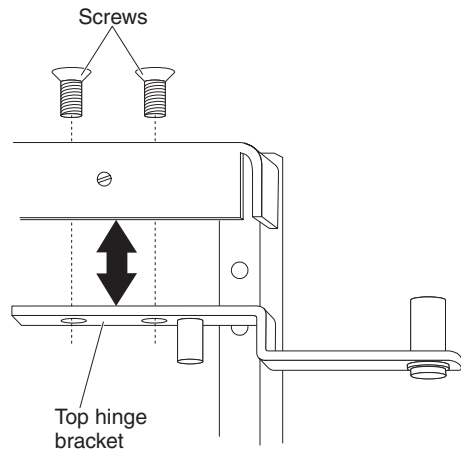


Figure 17. Install the top hinge bracket

2. Position a ladder near the right side of the rack cabinet. Climb the ladder to install the top hinge bracket and screws.

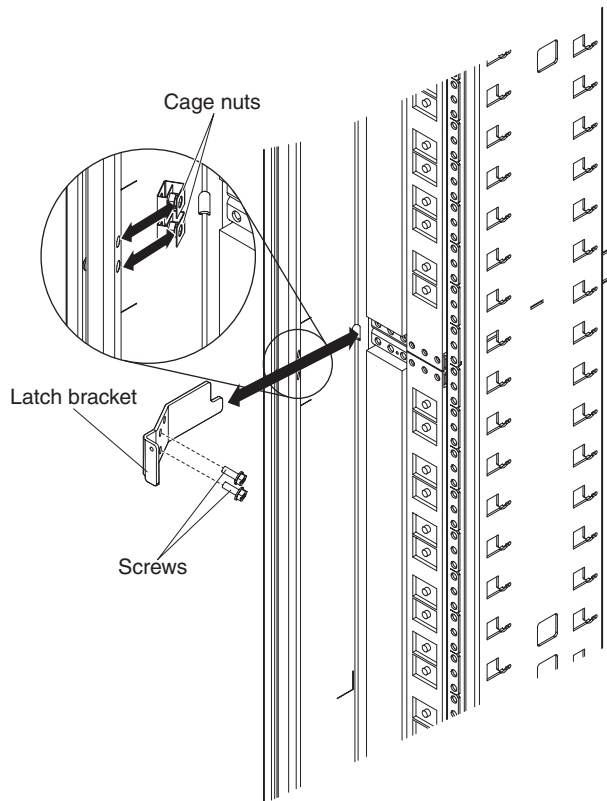


Figure 18. Install the latch bracket

3. If necessary, install the latch bracket on the left side of the rack cabinet.
 - a. Install the two cage nuts on the right-side rail of the rack cabinet.
 - b. Align the holes in the latch bracket with the holes in the rail and nut clips; then, secure the latch bracket in place with two M6 screws.
4. Position the rear door near the right side of the rack cabinet.
5. While you support the door, lift the door and align the holes in the top and bottom of the door with the hinge pins.
6. Lower the door onto the hinge pins.
7. Before you continue, make sure that the latch is open on the door.
8. Check the fit of the door. Close it to make sure that it swings freely and the door latches correctly.

Attaching rack cabinets in a suite

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team.

The rack cabinets come with all the hardware that is required for you to attach rack cabinets together and form a suite. To attach the rack cabinets together in a suite, complete the following steps.

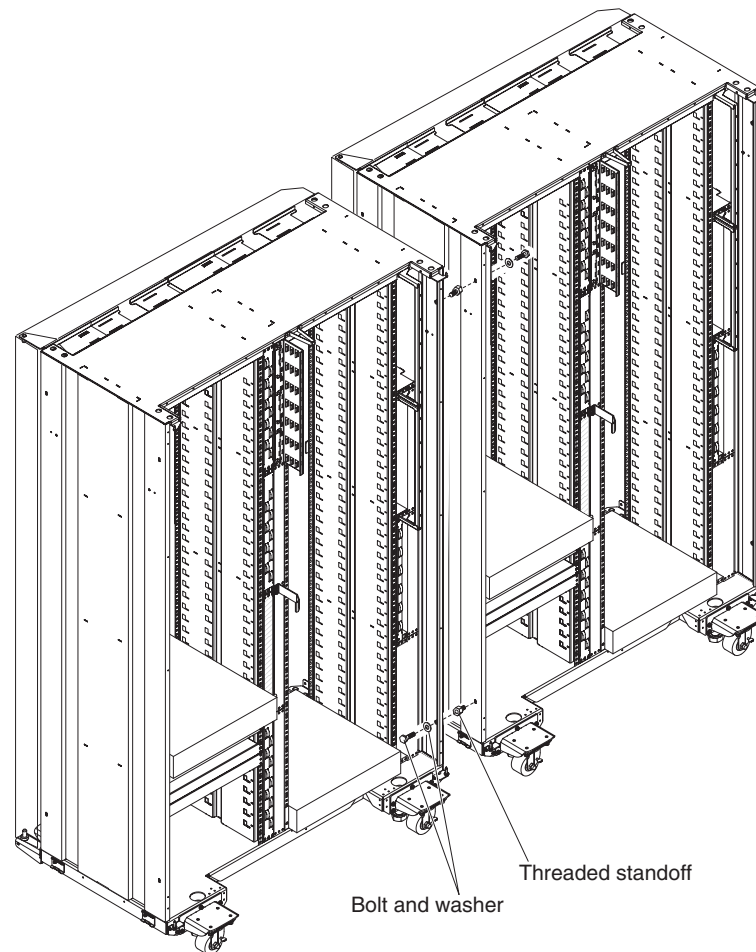


Figure 19. Attaching two adjacent rack cabinets to each other to form a suite

1. If necessary, remove the front and rear doors (see “Removing the front doors” on page 23 and “Removing the rear door” on page 24) from both rack cabinets.
2. On the facing sides of the two adjacent rack cabinets, install the four threaded standoffs:
 - a. Install two threaded standoffs on the rack cabinet to the left, one on the top front and one on the bottom rear.
 - b. Install the other two threaded standoffs on the rack cabinet to the right, one on the bottom front and one on the top rear.
3. Attach the rack cabinets together, using four bolts and washers.

Note: You must install the top front and bottom rear bolts from right to left; then, install the bottom front and top rear bolts from left to right.

4. Repeat steps 1 through 3 until you have attached all the rack cabinets in the suite; then, continue to the next step.
5. If necessary, install the side panels on each end of the suite. See “Installing the side panels” on page 22 for information.
6. If necessary, install the front and rear doors on all the rack cabinets.

Removing and installing the casters

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team.

The casters can be removed or left in place once the rack cabinet is installed. All rack cabinets come with four casters installed.

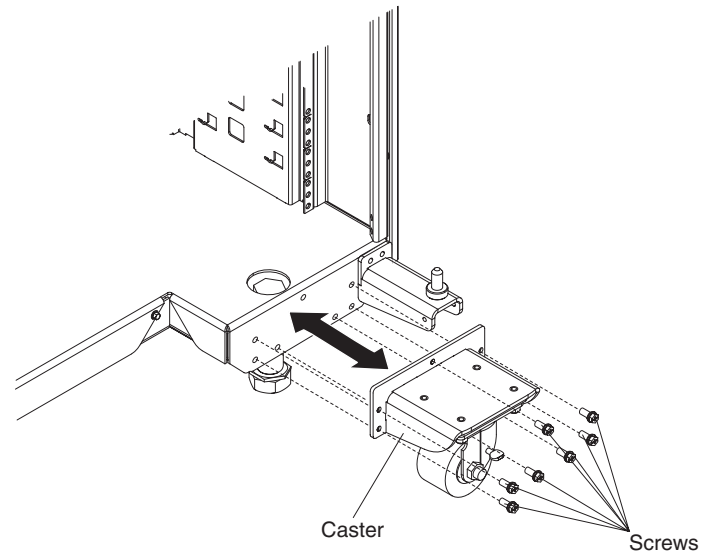


Figure 20. Install and remove the casters

Note: Make sure that all of the weight of the system is being carried by the leveling feet before starting.

Removing the casters

To remove the casters, complete the following steps.

1. Unlock and open the rack cabinet doors fully.
2. Remove the caster.

Installing the casters

To install the casters, complete the following steps.

1. Unlock and open the rack cabinet doors fully.
2. Position the caster so that the wheel is facing the floor; then, align the mounting holes with the holes in the rack cabinet.
3. Use seven M6 screws to secure the caster to the cabinet.
4. Repeat steps 2 through 3 for each of the remaining casters.
5. Close and lock the rack cabinet doors.

Filling the manifold with water

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team. The IBM service team will be performing this task if a manifold replacement is required.

Statement 14:



CAUTION:

The water might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

(C034)

CAUTION:

Goggles are needed for the procedure.

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen.

(L011)



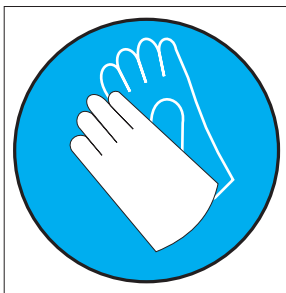
CAUTION:

Chemical resistant gloves are needed for this procedure.

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden.

(L014)

(L014)



Attention: Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

Preparation and requirements

Follow these guidelines when you fill the manifold with water.

- Read the safety information that begins on page iii. This information will help you work safely.
- Pump should be OFF until all hose connections are made.
- For partial rack orders (less than 84 nodes) use the following procedure:
 - Install bypass tools in all empty manifold connections (this will help bleed out trapped air).
 - Sometime during fill process remove bypass tools according to below:
 - Greater than 12 nodes on order, remove all bypass tools (62).
 - Less than 12 nodes on order, leave this many bypasses installed = (12 - # of nodes) and remove all others.
 - Flow rate should be as close to $5 * (\#Nodes)$ L/Min as possible, but NOT over $6 * (\#Nodes)$ L/Min.
- Valve on fill tool should be closed to start.
- Fill tool reservoir well above 'Minimum', but less than the 'Maximum' mark on the reservoir.
- IBM PN 00J0351 is the specification that describes the details for the IBM required water treatment.
- Have extra water on hand to maintain water level in the tank above the minimum level as tool reservoir will begin to empty when the pump is turned on and nodes fill.
 - A manifold with all dummy loops (bypass tool was provided during customer installation will contain approximately 7 Liters of water when filled. A manifold with 84 nodes will contain ~12 liters of water when filled. Therefore, start with the tank with water well above the minimum level. Then run fill process.
- Have water absorbing material on hand, there will be a little bit of water in Eaton ball valves when they are disconnected.
- The Eaton ball valves should always be covered w/ caps or connected to each other when the manifold is not hooked up to the chiller/rinse/drain tool. This will prevent contaminants from getting into the system and possibly creating a leak (stuck open quick connect).

Initial tool filling/bringup procedure

Complete the following steps only if you fill the tool for the first time or the tool is drained.

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. Make sure that all hose clamps are tight and both the pump inlet and control/supply valves are open. Make sure the tank drain valve is closed.
3. Connect supply and return hoses A and B together and place on floor.

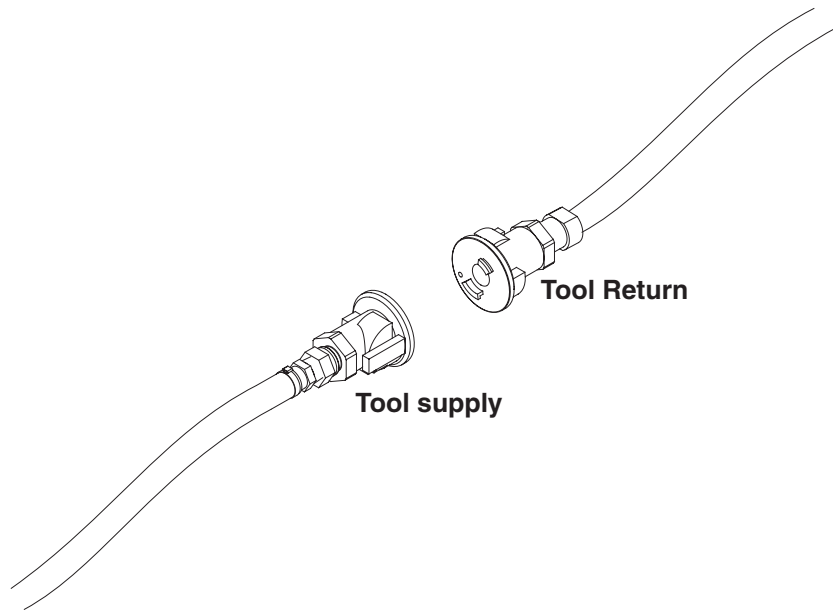


Figure 21. Connect the hoses

4. Add water to the tank until water level is close to the maximum level.
5. You should be able to see the water flowing into the filters. Press the red vent buttons on the filters to expel air, until water starts coming out. Add as much water as needed to fill filters and tank to close to the maximum level.
6. Close the supply valve.
7. Turn the pump on. Then, slowly open the supply valve to circulate water.
8. Press the vent buttons on the filters as needed to expel the remaining air.
9. Let it run for approximately 5 minutes to filter out any particles from the water.
10. Turn the pump off and disconnect hoses A and B. The tool should now be ready for the rack fill procedure.

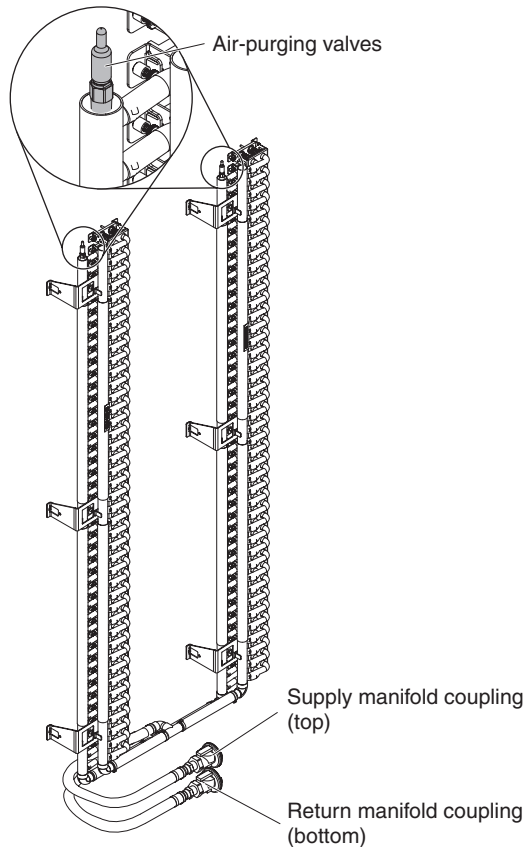


Figure 22. Locations of air-purging valves and drain valve

To fill the manifold with water, complete the following steps.

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. For a FRU manifold replacement, depressurize the manifold by plugging in a quick connect socket into the top of the manifold (air purging valve). Once attached, all pressurized air should be removed in several seconds. This tool was provided during customer installation.
3. Connect the supply A of the fill tool to the supply of the rack manifold, and the return hose of the rack manifold to the return. The manifold fill tool will be located at the front of the rack since that is the location of the hose connections.

Note: Incorrectly connecting the hoses will result in inadequate filling.

4. The control/supply valve should be closed for initial start up of the pump. However, do not run the pump with supply valve closed for extended periods.
5. Turn on the pump (and the pressure gauge if needed).

Note: Pressure readings are needed only for trouble-shooting.

6. Make sure the water level in the tank is adequate.
7. Slowly open supply valve while observing the flow meter, and adjust to the desired flow rate. The flow meter has roughly 10-15 seconds lag before it shows flow rate changes, and the small movements of the valve can create large flow rate changes, so make small adjustments and make sure that the flow meter reading is steady before further adjustment, especially if the rack is not fully populated with nodes and the flow rates could exceed the maximum

recommendations. It is normal for the hoses to vibrate while filling which is why it is important to slowly open the valve to allow the air to escape.

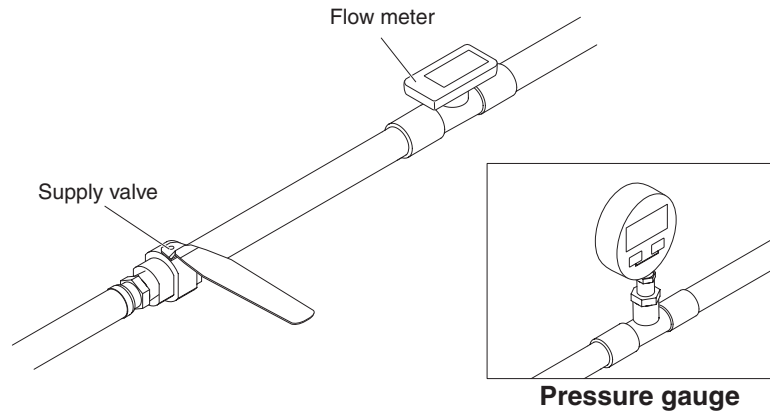


Figure 23. Check the water level with the flow meter

8. For fully populated racks, the flow rate should be as high as possible but not exceed 95 liters/minute (25 GPM). For partially populated racks, the flow rate should be as close to $5 * (\#Nodes)$ liters/minute as possible, but NOT over $6 * (\#Nodes)$ liters/minute. The total flow rate should not exceed 95 liters/minute (25 GPM).
9. While the pump is running the whole time, and the flow rate is set, do the following:
 - a. Connect the clear hose C to the left vent SMC, run for 2 minutes.

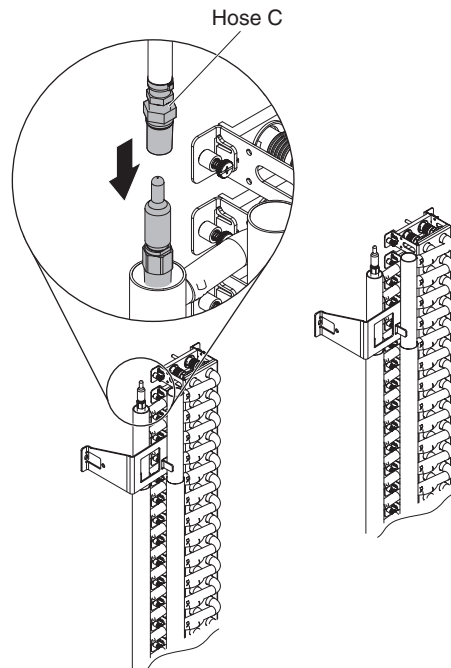


Figure 24. Connect hose C (left vent)

- b. Switch the clear hose C to the right vent SMC, run for 2 minutes.

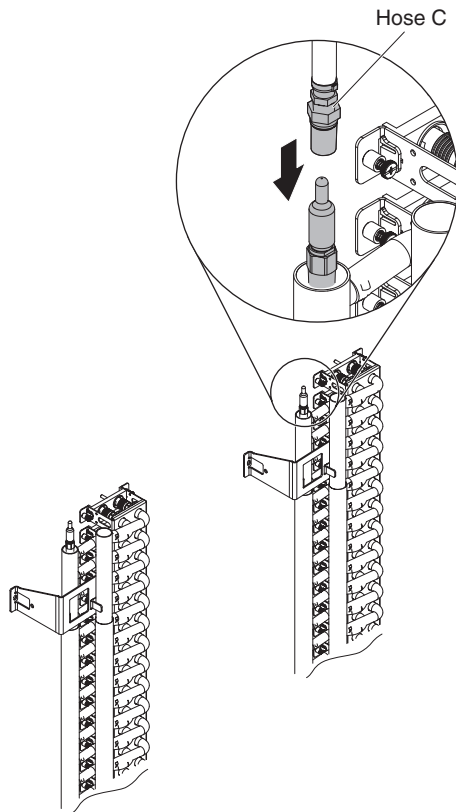


Figure 25. Connect hose C (right vent)

- c. Switch the clear hose C to the left vent SMC, run for 2 minutes.
- d. Switch the clear hose C to the right vent SMC, run for 2 minutes.
- e. Disconnect the clear hose C from the rack and run for 8 minutes.
- f. Reconnect the clear hose C to the left vent SMC, run for 3 minutes.
- g. Switch the clear hose C to the right vent SMC, run for 3 minutes.
10. Disconnect the clear hose C from the rack completely. Then turn the pump off.

Note: Turning the pump off with the clear hose attached will draw air back into the rack, requiring another fill process.

11. After the pump is off, disconnect ball valve hoses A and B.
12. If manifold ball valve are disconnected, place protective caps on them.
13. When plugging or reconnecting any water connection, inspect the connection after installation. Make sure it is fully seated and no leaks are present.

Connecting power to the rack

Note: This section is performed only by the IBM service team.

Connect power to the rack cabinet by using pigtailed with a standard plug. You can connect 120 V, 220 V, or three-phase (208 V, 220 V, or 240 V) to the power distribution units.

The power distribution unit (PDU) installs vertically in the vertical bays of the rack cabinet. When you choose an installation location, make sure that power cables from other devices can reach the PDU. See the documentation that comes with the PDU for detailed installation instructions.

Statement 8:



DANGER

- **Plug power cords from devices in the rack cabinet into electrical outlets that are located near the rack cabinet and are easily accessible.**
- **Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet before servicing any device in the rack cabinet.**
- **Install an emergency-power-off switch if more than one power device (power distribution unit or uninterruptible power supply) is installed in the same rack cabinet.**
- **Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.**

Use the following general procedure to install a PDU in a vertical bay of a rack cabinet.

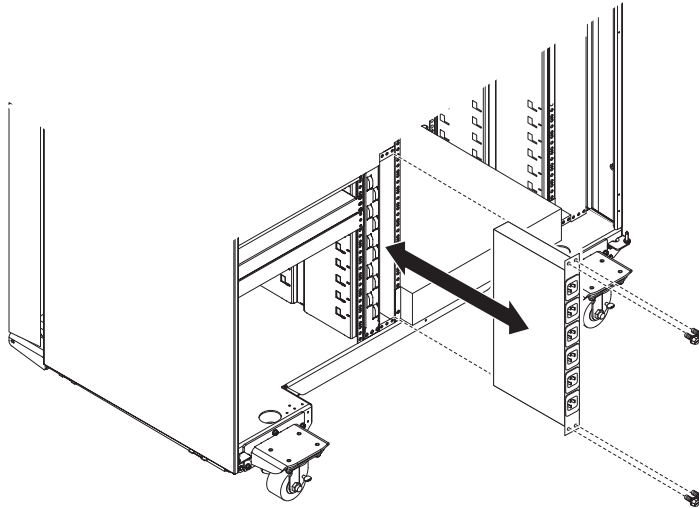


Figure 26. Installing a PDU vertically in a rack cabinet

1. See the PDU documentation for detailed installation information.

Note: If the PDU has a circuit breaker switch, make sure that the switch is in the Off position before you install the PDU in the rack cabinet.

2. Install the PDU inside one of the vertical mounting areas of the rack cabinet with the M6 screws and nuts that come with the PDU.
3. See the PDU documentation for information about how to connect cables.

Chapter 4. Removing and installing the rails

This chapter contains information about the installation and removal of rails in the iDataPlex Rack Type 7197 cabinet.

Notes:

1. Remove the rack doors when you install and remove optional devices in the rack cabinet. All rack cabinets come with front and rear doors installed.
2. You have to remove a door only if part of the rack cabinet is obstructed by the door as you install the optional device.

Removing and installing rails

This section provides the information needed to install and remove the 2U chassis rails and optional device rails.

Removing and installing 2U chassis rails

The 2U chassis rails are used to secure 2U iDataPlex chassis enclosures in an iDataPlex rack cabinet. If you are removing or installing the optional device rails, see “Removing and installing optional device rails” on page 44 for instructions.

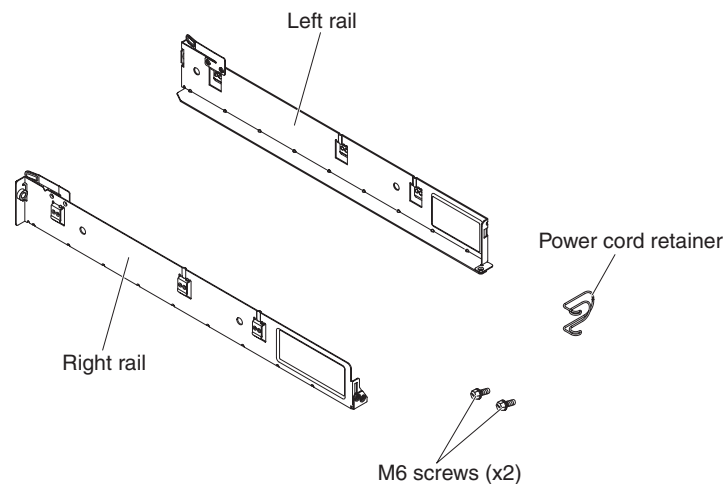


Figure 27. 2U chassis rails

Removing the 2U chassis rails

To remove the standard rails from the rack cabinet, complete the following steps.

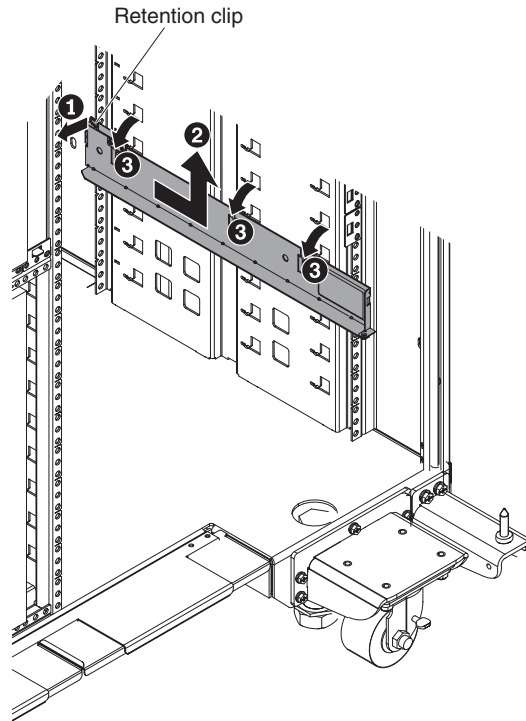


Figure 28. Removing the 2U chassis rails

1. Turn off the power to the system-board trays; then, remove the chassis from the rack. See the *Problem Determination and Service Guide* on the IBM Documentation CD for instructions.
2. Remove a rail from the rack.
 - a. Pull out on the retention clip on the front of the rail.
 - b. While holding the retention clip out, pull the rail toward the rear of the rack cabinet until it stops.
 - c. Rotate the top edge of the rail away from the rack cabinet wall and lift the rail up and out of the rack cabinet.
 - d. Repeat steps 4a through 4c for the remaining rail.

Installing the 2U chassis rails

To install the 2U chassis rails in the rack cabinet, complete the following steps.

1. Install a rail in the rack cabinet.

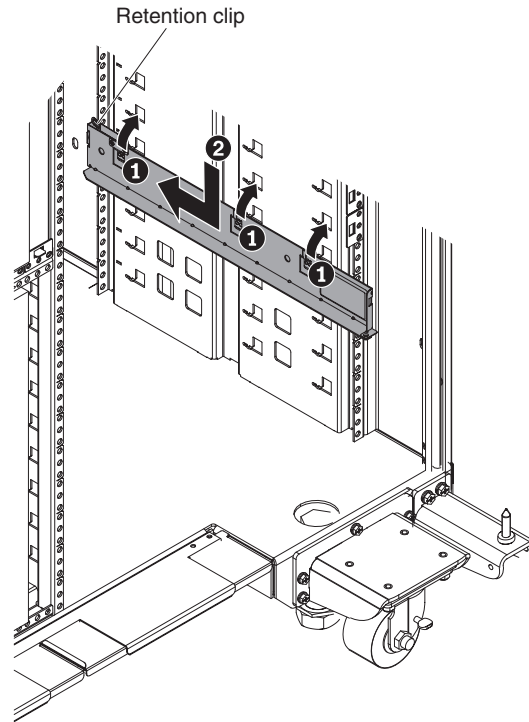


Figure 29. Installing the 2U chassis rail

- a. Align the three retention tabs on the rail with the mounting slots in wall of the rack cabinet.
 - b. Place the retention tabs into the mounting slots and rotate the top edge of the rail toward the rack cabinet wall.
 - c. Push the rail down until it stops.
 - d. Push the rail toward the front of the rack cabinet. When the rail is in position, the retention clip will click into place.
 - e. Repeat steps 1a through 1d for the remaining rail. If you are installing or replacing the left rail, continue to step 2; otherwise, skip to step 3.
2. Plug the power cord into a PDU.
 3. Install the chassis in the rack; then, turn on the system-board trays. See the *Problem Determination and Service Guide* on the IBM *Documentation CD* for instructions.

Removing and installing optional device rails

The optional-device rails are used to secure optional devices in the iDataPlex rack cabinet. If you are installing or remove 2U chassis rails, see “Removing and installing 2U chassis rails” on page 41 for instructions.

Removing the optional device rails

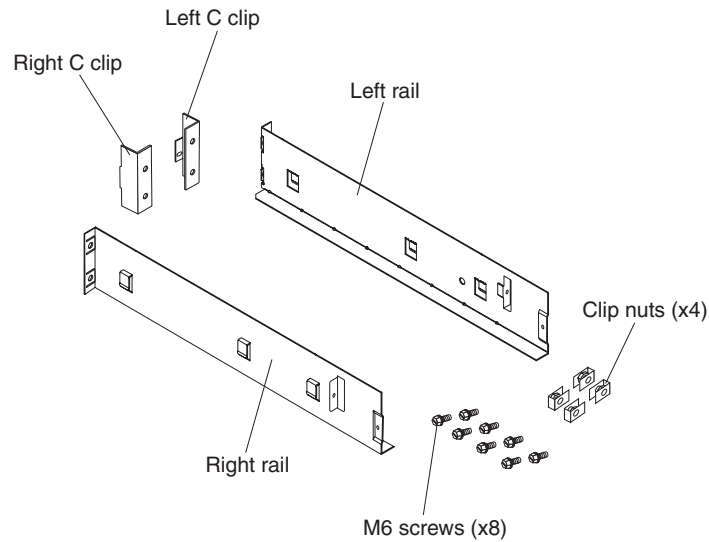


Figure 30. Optional-device rails

To remove an optional-device rail from the rack cabinet, complete the following steps.

1. Turn off the device; then, remove it from the rack. See the documentation that came with the device for instructions.
2. Unplug the power cord from the PDU.
3. Remove a rail from the rack.

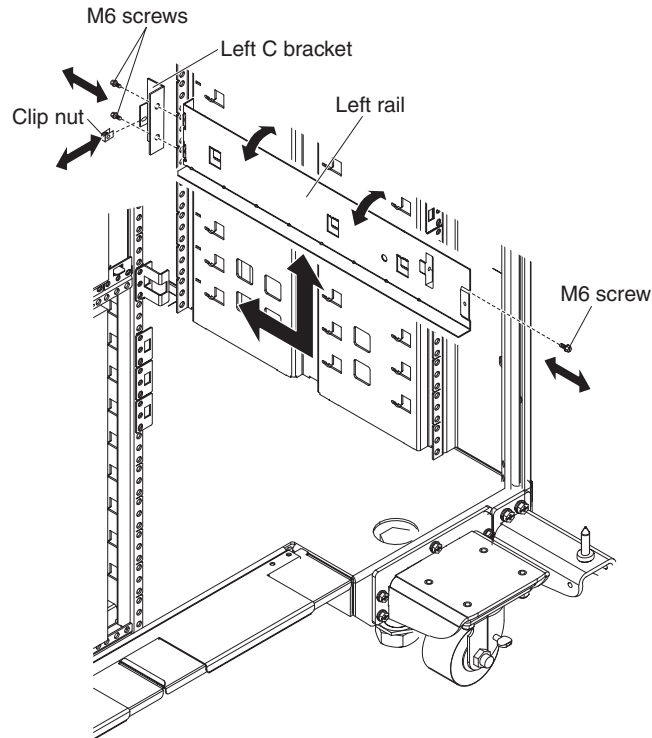


Figure 31. Removing the optional device rails

- a. Remove the two M6 screws from the front of the rail and one M6 screw from the rear. The front M6 screws also secure the C-bracket. You must hold the C-bracket in place while removing the screws.
- b. Pull the rail toward the rear of the rack cabinet until it stops.
- c. Rotate the top edge of the rail away from the rack cabinet wall and lift the rail up and out of the rack cabinet.
- d. Repeat steps 3a through 3c for the remaining rail.

Installing the optional device rails

To install an optional-device rail on the rack cabinet, complete the following steps:

1. Install an optional-device rail in the rack cabinet.

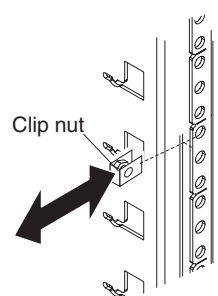


Figure 32. Installing the rear clip nut

- a. If necessary, install a clip nut on the vertical rail of the rack cabinet in the first hole of the second U. When the rail is installed, the hole in the rail's rear flange should align with this clip nut.

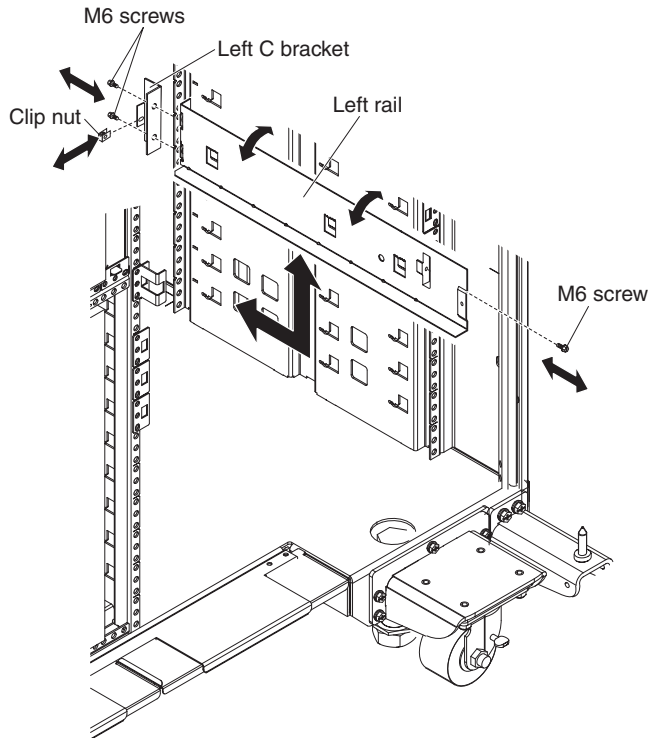


Figure 33. Installing the optional device rails

- b. Align the three retention tabs on the rail with the mounting slots in the wall of the rack cabinet.
 - c. Place the retention tabs into the mounting slots and rotate the top edge of the rail toward the rack cabinet wall.
 - d. Push the rail down until it stops.
 - e. Push the rail toward the front of the rack cabinet. When the rail is in position, the rails front flange will be flush against the back of the rack cabinet vertical rail.
 - f. Install the C-bracket on the front of the rack cabinet:
 - 1) Align the holes in the C-bracket with the threaded holes of the rail.
 - 2) Using two M6 screws, secure the C-bracket to the rail and rack cabinet.
 - 3) Install a clip nut on the front of the C-bracket.
 - g. Repeat steps 1a through 1f for the remaining rail.
2. Install the device in the rack and plug the power cord into a PDU; then, turn on the device. See the documentation that came with the device for instructions.

Chapter 5. Removing and replacing components

Installation tools

The following tools are required to remove or replace parts on the IBM iDataPlex Rack Type 7197.

- Phillips screwdriver (FRU part number 00P6969)
- Flat blade screwdriver
- Adjustable wrench (FRU part number 0454353)
- Node Fill/Drain Tank (Included with racks by IBM)
- Hose pliers (Included with racks by IBM)
- Manifold bracket tools (Included with racks by IBM)
- Hose clamp pliers (Included in Hose Kit FRU part number 90Y8030)
- Manifold fill tool (Included with racks by IBM)
- Goggles (FRU part number 5514880) or proper eye protection with side shields that meet the appropriate country standards
- Gloves (FRU part number 5514881)

Bleeding the air from the manifold

Note: Initial installation will be performed by the onsite installation team with participation of the IBM service team. The IBM service team will be performing this task if a manifold replacement is required.

This process may be required anytime that air may have been introduced to the facility line such as pump repair, filter replacement, facility maintenance, etc. To bleed the air from the manifold, complete the following steps.

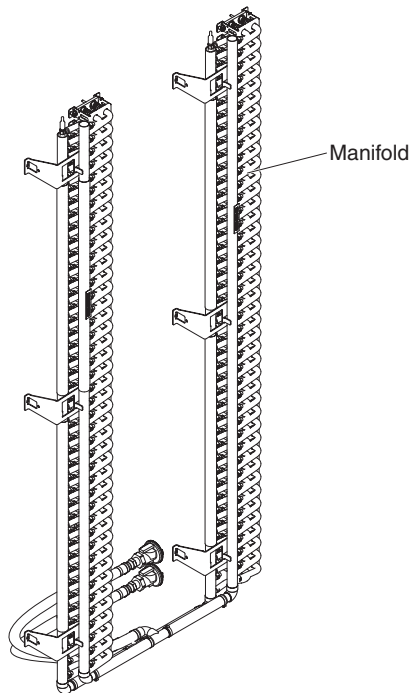


Figure 34. Manifold component

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. Locate and connect the power to the RO or DI water source.
3. Open water hose valve and water spigot and allow water to flow for several minutes to bleed water that has been sitting in pipe.
4. Open valve downstream of water hose valve.
5. Make sure the system is pressurized with water to replace any water that will be removed when purging the manifolds. Method of connecting water may be different at each customer.
6. Use the node fill drain tank as the reservoir for the water that is bled from the rack manifold. Place the tank on the floor in front of the rack manifold.
7. Place the open end of the hose inside the node fill drain tank and insure that it will not come out once connected to the rack.

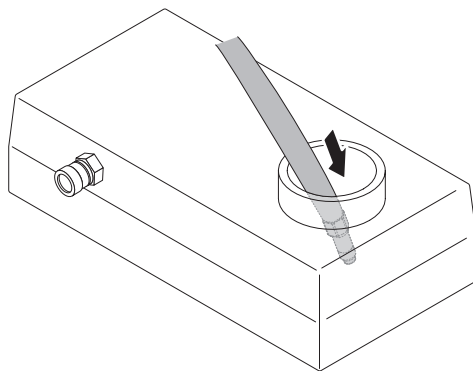


Figure 35. Installing the hose

8. Connect the left hose quick connect plug to the left side of the manifold and allow to drain for 15 seconds or until there is no air in the water stream. Remove and repeat the same process for 15 seconds or no air with the right side of the manifold.

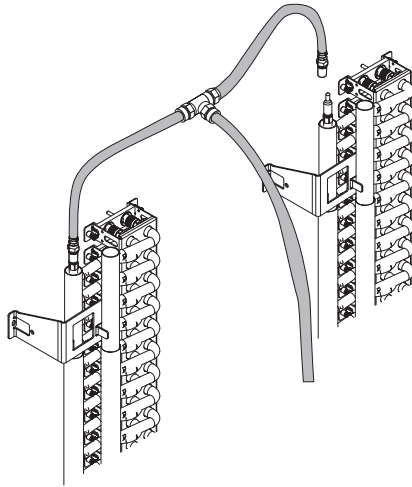


Figure 36. Draining the water from the hose

9. Be careful to watch the level of the drain tank to prevent from over filling. If necessary, disconnect hoses from manifold and empty the tank.
10. Disconnect the right side and repeat for the left side for 15 seconds or until all air appears to be removed. Remove and repeat for the right side for 15 seconds or until air is removed.

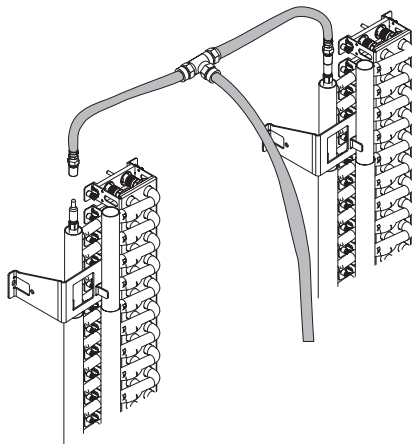


Figure 37. Draining the water from the hose

11. Watch for any air coming out of clear hose line. This process can be repeated if air is possibly still trapped.
12. Move to the next rack and repeat process.

Replacing manifold quick connect in a Direct Water Cooled (DWC) rack

Note: This section is performed only by the IBM service team.

Statement 14:



CAUTION:

The water might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

(C034)

CAUTION:

Goggles are needed for the procedure.

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen.

(L011)



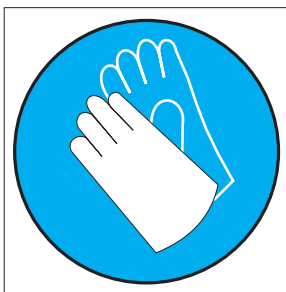
CAUTION:

Chemical resistant gloves are needed for this procedure.

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden.

(L014)

(L014)



Attention: Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

Refer to this section to replace a leaking or dripping manifold quick connect in a Direct Water Cooled (DWC) Rack Manifold. This quick connect is located on the back of each chassis housing assembly. Verify that you have determined the original source of the water leak since it can cascade down through the rack.

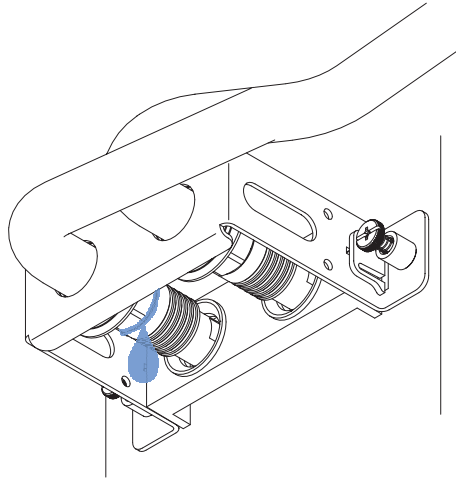


Figure 38. Leaking/dripping at manifold quick connect

Use the following general procedure to replace manifold quick connect in a Direct Water Cooled (DWC).

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. Turn off power to the Rack being Serviced and all installed components.
3. Once power is removed to the rack, while positioned at the front of the rack, rotate one side of the ball valve for the Supply side. Repeat this operation for one side of the Return side. This closes off the facility water supply to the rack without the need to disconnect the hoses from each other.

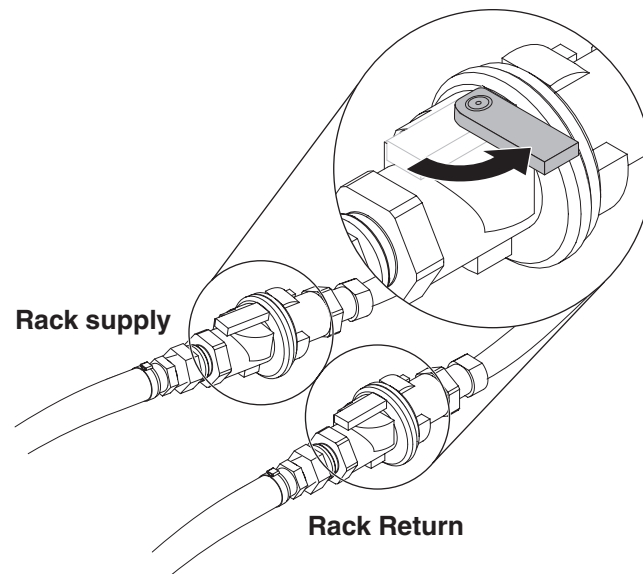


Figure 39. Leaking/dripping at manifold quick connect

4. At the front of the node that requires repair, loosen the velcro on each side holding the cables in place and unlatch all cables from the front of the node. Slide out the node far enough that the quick connects on the node rear are no longer coupled with the manifold quick connects, approximately 3 to 4 inches (75 – 100 mm).

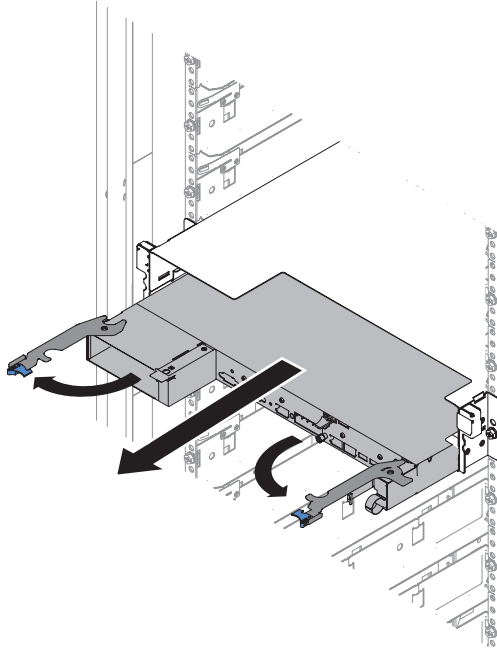
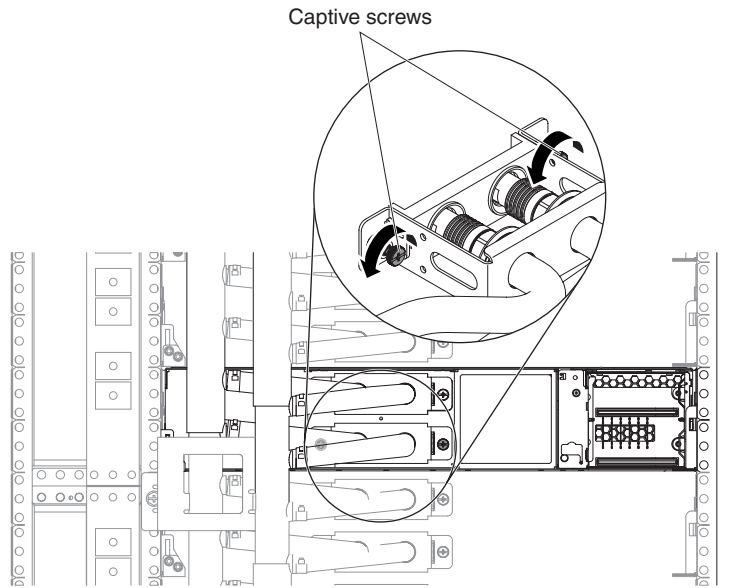


Figure 40. Unlatch the node

5. Loosen the manifold bracket screws (one captive screw on each side of the bracket) from the rear of the chassis. Make sure that you are loosening the correct bracket assembly from the chassis that requires quick connect replacement.



Rack Rear

Figure 41. Loosening screws from the quick connect

6. Disconnect the manifold bracket assembly from the rear of the chassis by gently pulling it away from the chassis to provide additional working area.
7. Using the hose pliers that were provided with the customer tools, close the pliers onto the hose approximately 2 inches (50 mm) from the hose connection to the manifold. The hose should be located in the center of the plier jaws. This action is required only on the hose where quick connect will be replaced. Squeeze the pliers closed to insure that the hose is completely sealed. Once squeezed closed, the pliers will not accidentally loosen. For reference, Craftsman hose pliers.

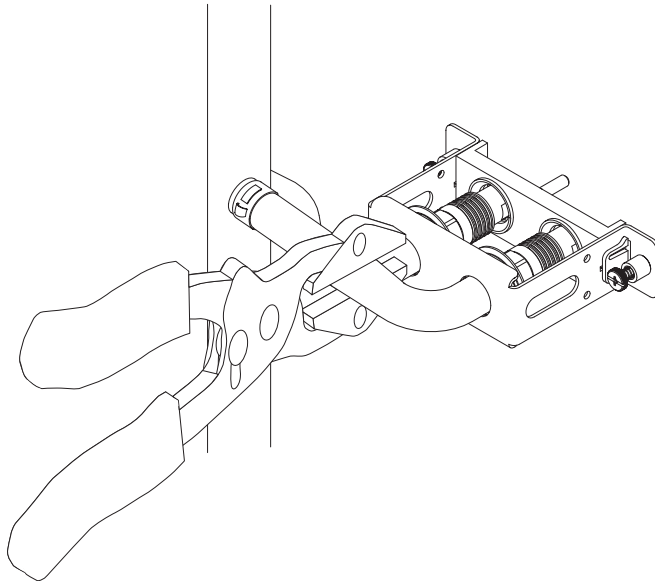


Figure 42. Squeezing the pliers

- Using the tool provided at the customer facility, slide the tool along the side surface of the manifold bracket toward the captive screw. Push the brown piece all the way toward the screw to completely unlatch the snap. Once in place, gently pull the white piece away from the sheet metal. This will unlatch the white plastic piece and allow it to unsnap from the sheet metal bracket. This will need to be performed on the other side as well to completely disconnect from the sheet metal bracket.

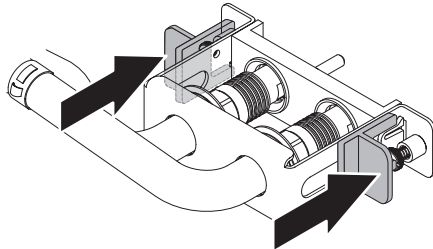


Figure 43. Sliding the tool into the manifold bracket

- This can also be performed with a tool on each side at the same time and unsnap the piece from the bracket on each side at the same time.

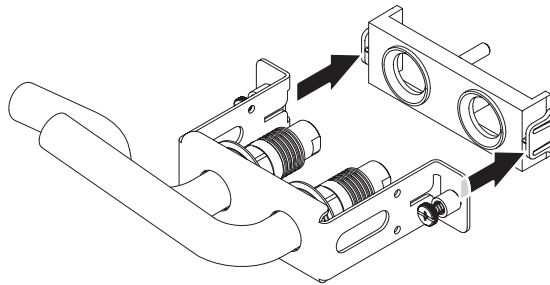


Figure 44. Unsnapping the piece from the bracket

- Once the white piece is unsnapped, disconnect it from the sheet metal bracket. This part needs to be saved as it will be required during re-assembly.

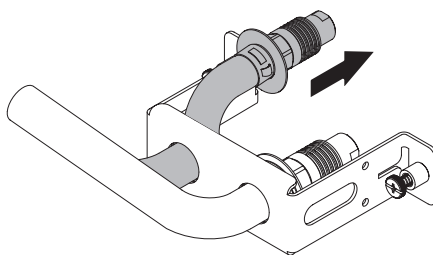


Figure 45. Disconnecting the white piece from the sheet metal bracket

- Plug a (male) quick connect plug into the socket quick connect (female) that will need to be replaced to remove any small amount of water. Use a towel to catch any excess water. The amount of water is very small. The (male) quick connect plug is provided with the tools that were left at the customer location.

12. With the Oetiker hose clamp pliers that are part of the Hose Kit FRU, pinch/squeeze the 2 embosses of the Oetiker hose clamp and use your thumb or index finger to release the tab at the end of the clamp that holds the clamp closed.
13. Once the clamp is released, move the clamp away from the washer and quick connect. This clamp can be discarded since the Hose Kit FRU contains 4 new Oetiker hose clamps.

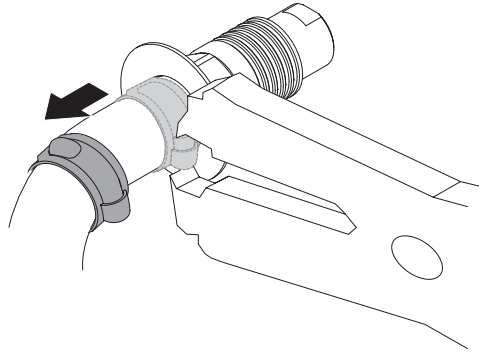


Figure 46. Removing the clamp away from the washer and quick connect

14. While holding the hose in one hand, using an adjustable wrench, rotate the quick connect to break the hose and quick connect bond and allow the quick connect to rotate inside the hose.

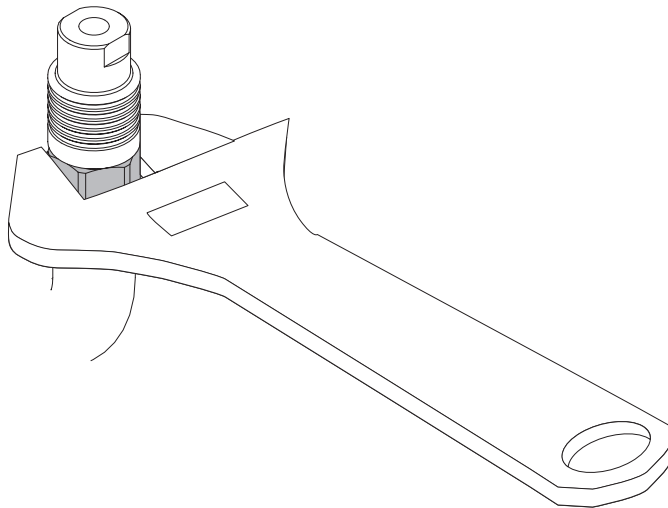


Figure 47. Rotating the quick connect

15. Work the socket back and forth until the quick connect can be removed from the end of the hose. Retain the large washer as it will be required during re-assembly.

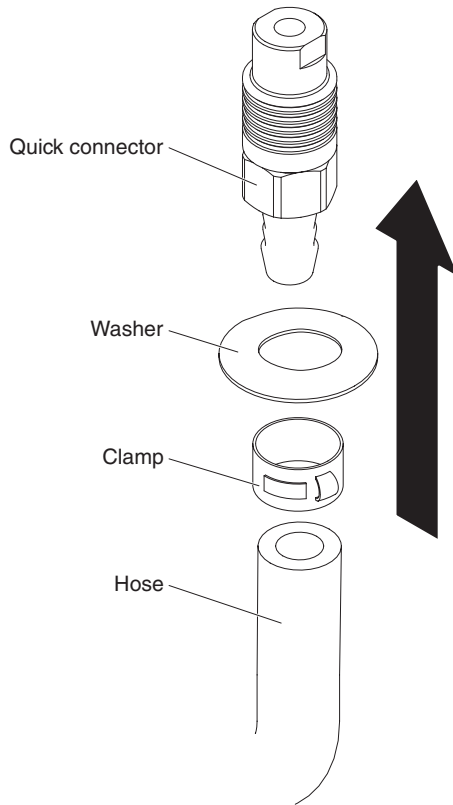


Figure 48. Removing the quick connect

- Using parts from the Hose Repair Kit FRU, slide a new clamp on the hose. The new quick connect that is in the FRU will need to be removed from the hose. Repeat Steps 8, 9, 10, 12, 13, 14, 15. Place the large washer on the new quick connect from the FRU kit and install into the hose until it bottoms out on the washer. Using the Oetiker hose clamp pliers, locate the new clamp in place (1-2 mm from the end of the hose) and tighten the clamp. Use the existing hose as a reference for locating the clamp. Make sure that the tab is located correctly under the emboss as shown in the picture. Make sure that the assembly has all parts installed in the correct order.

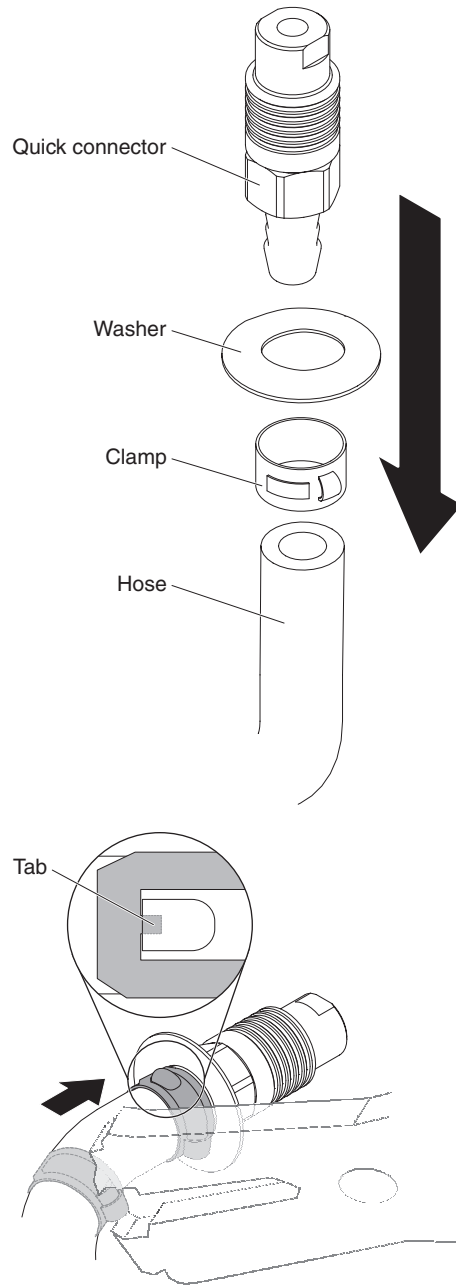


Figure 49. Replacing the new quick connect

17. Locate the white piece that was previously removed and slide it into place on the metal bracket. It is very important that each quick connect float freely in the openings of the white plate before latching the white piece into place in the bracket.

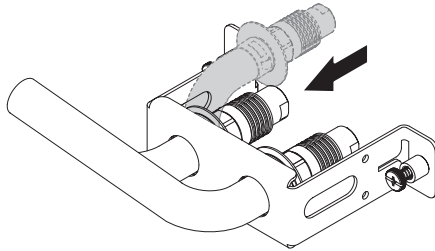


Figure 50. Replacing the white bracket

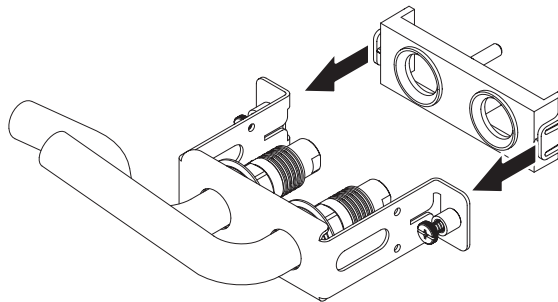


Figure 51. Replacing the housing block assembly

18. With the 2 quick connects floating freely, latch the 2 white piece snaps into the sheet metal bracket on each side. Make sure that both snaps are locked in place. There should be no bowing of the white part or binding of the quick connects after re-assembly.
19. Release the hose pliers that were installed in Step 7. The hose pliers can be released by pulling the handles apart until they release. Inspect for any leaks at this point. Re-attach the housing block assembly to the rear of the chassis. Use the center 2 posts in the center of the white bracket to align with the 2 alignment holes in the rear of the chassis.
20. Once located in place, use a long Phillips head screw driver to tighten the 2 captive screws. Be careful to not strip the screws during this operation. Make sure the screw is properly aligned with the chassis before tightening.

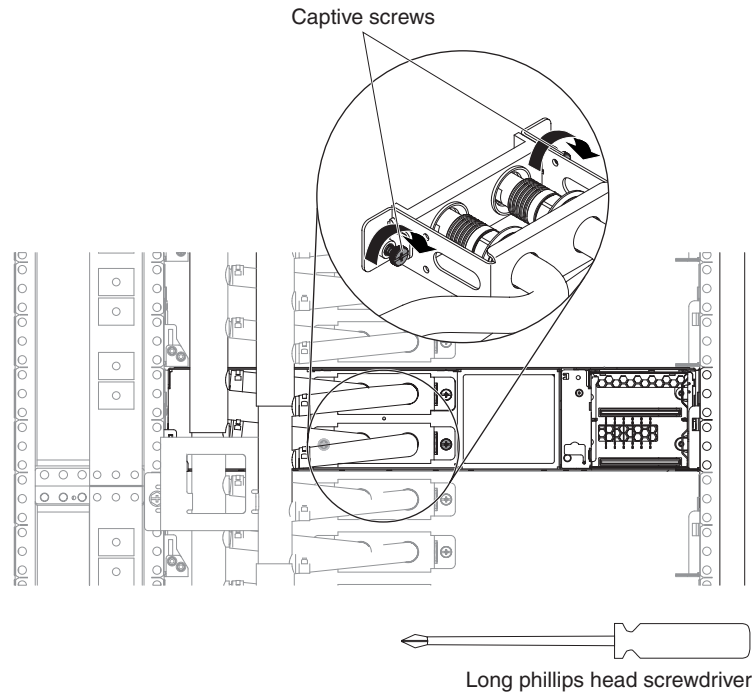


Figure 52. Installing the screws into the quick connect

21. Slide node into the chassis and close handles.
22. Snap cables into the front of the node and attach the velcro.
23. At the front of the rack, open each of the ball valve levers that were previously closed in Step 3.
24. Inspect for leaks around the replaced quick connect for the next 15 to 30 minutes.
25. If any leaks appear, undock and redock the affected node 3 times. Again, wait 15 minutes for any leaks to appear.
26. If no leaks are found, power can be applied to the rack.

Removing the manifold

Note: This removal section is performed only by the IBM service team.

If there is damage to the manifold or there is a significant problem with the manifold, it needs to be replaced as a FRU. This section provides the details and steps.

Statement 4:

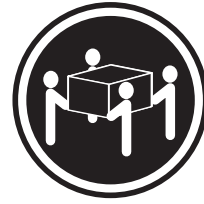




≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Attention:

1. Because of the size and weight of the manifold, a minimum of three trained service technicians are required to remove or install the manifold.
2. You must remove the power from the rack cabinet and all components before you connect or disconnect the water supply lines and drain or fill the manifold.

To remove the manifold, complete the following steps.

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. Turn off the power to the rack cabinet and all installed components.

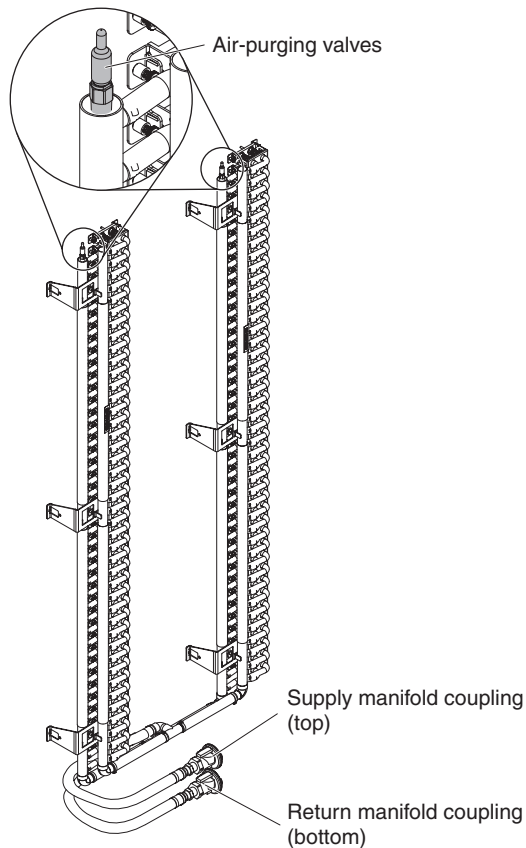


Figure 53. Locations of air-purging valves and drain valve

Statement 14:



CAUTION:

This lubricant might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

(C034)

CAUTION:

Goggles are needed for the procedure.

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen.

(L011)



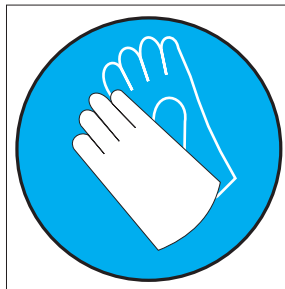
CAUTION:

Chemical resistant gloves are needed for this procedure.

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden.

(L014)

(L014)



Attention: Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information is provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

3. Drain the manifold. This process will remove enough water for manifold replacement.
 - a. Place the node tool drain tank on the floor at the front of the rack near the rack hoses and connect hose A of the node tool drain tank to the ball valve assembly as shown. Then connect the ball valve assembly to the rack

supply ball valve. This will be performed at the front of the rack.

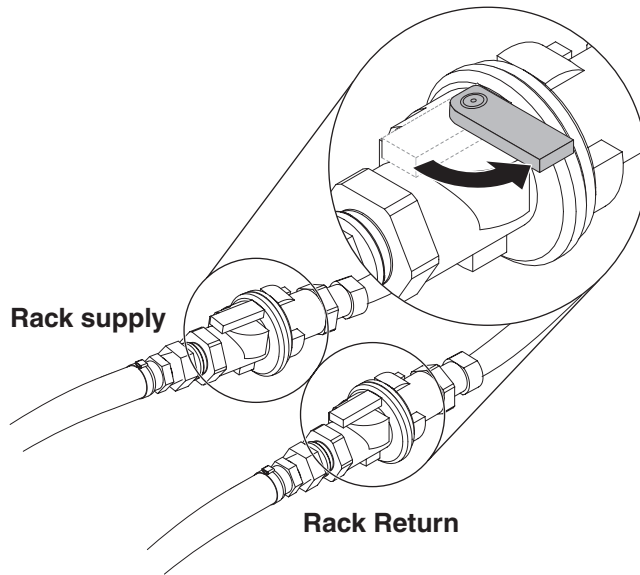


Figure 54. Connect the ball valve assembly to the rack supply ball valve

- b. Place the center hose in a bucket and then connect each of the 2 hose B's to the top of the rack vent quick connects. This will allow air into the top of the manifold and allow water to drain by gravity into the tank through the Rack supply hose. Let water drain by gravity for at least 3 minutes or until water stops flowing into the tank.

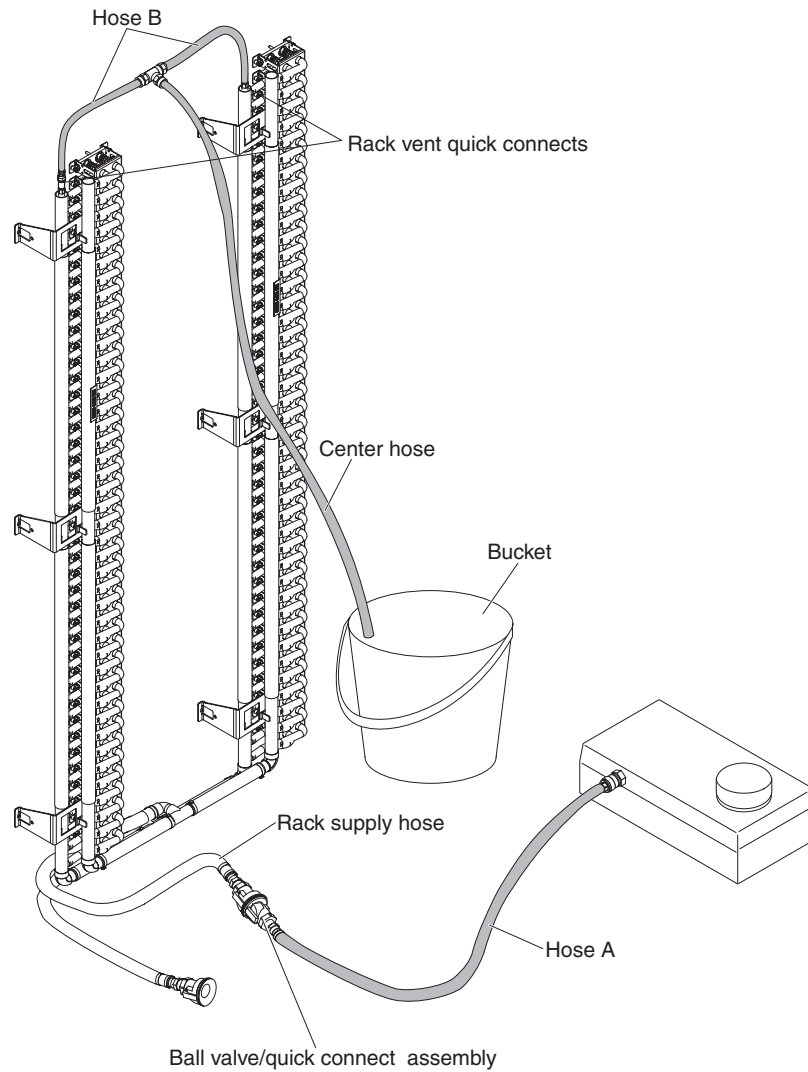


Figure 55. Connect the hose to the manifold

- c. Now detach the rack Supply hose from hose A and attach the rack Return hose, and let water drain for another 3 minutes by gravity or until water stops flowing into the tank.

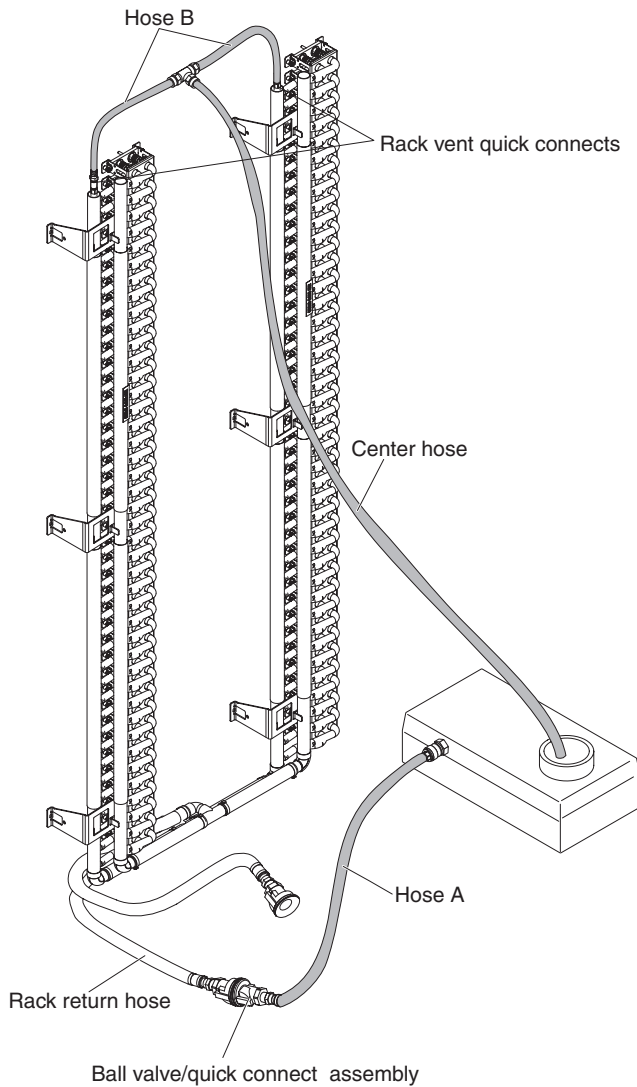


Figure 56. Connect the hose to the manifold

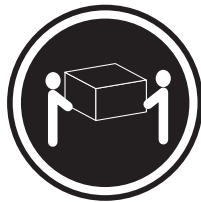
- d. At the front of each node, loosen the velcro on each side holding the cables in place and unlatch all cables from the front of the node. Slide out each node far enough that the quick connects on the node rear are no longer coupled with the manifold quick connects, approximately 3 to 4 inches (75 – 100 mm).
 - e. From the front of the rack, undock all nodes and pull them from the chassis approximately 3 inches. This disconnects each node from the manifold.
 - f. On the rear of each chassis, there are 2 hose block assemblies that are attached to the chassis using 2 Phillips captive screws. Carefully loosen each Phillips captive screw on each side of the hose block and once loose, it can be unattached from the chassis. Perform this operation for all 84 manifold assemblies.
4. The manifold hoses are located at the front of the rack and will require the bottom chassis on the right side (when facing the rack front) located in bottom right position to be removed in order for the hoses to be pulled through the rack.
 - a. Remove both nodes from the chassis. Loosen the 2x Phillips screws that hold the chassis to the rack.
 - b. At the rear of the chassis, disconnect the 2x power supply line cords.

- c. Slide the chassis out of the rack.
 - d. With all of the hose blocks unattached from each chassis and the bottom most chassis removed, the rack/manifold mounting screws can be removed.
 - e. Person #4 loosens and removes all M6 screws while persons #1 to #3 hold the manifold by the copper pipes in position on the rear of the rack. Leave the nut clips in place. They will be needed when the new manifold is installed.
5. Once the screws are all removed, persons #1 to #3 can take the manifold away from the rack.
 6. Place the manifold on the floor. The manifold is now ready to be moved.

Installing the manifold

Note: This installation section is performed only by the IBM service team.

Statement 4:



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

CAUTION:
Use safe practices when lifting.

Attention:

1. Because of the size and weight of the manifold, a minimum of three trained service technicians are required to remove or install the manifold.
2. You must remove the power from the rack cabinet and all components before you connect or disconnect the water supply lines and drain or fill the manifold.

Installation guidelines

Follow these guidelines when you install the manifold.

- Read the safety information that begins on page iii. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed packing materials, tools, and other parts in a safe place.
- Do not overtighten plumbing fittings or connections. This will cause leaks and might damage the plumbing fittings.
- Although no plumbing connections should need to be made, if they are, use Teflon tape or pipe dope on all threaded plumbing connections to ensure against leaks.

- If Teflon tape is used for attaching, fittings care must be taken to make sure the tape is not allowed to be inside the fitting or it can break off inside the pipe and flow into the system.
- Do not try to bend or reposition copper tubing. Excessive movement or bending of copper tubing might damage the tubing and create leaks. If you find leaks, check all plumbing connections and fittings for leaks before you connect power to the rack cabinet or any of the installed components.
- Repair all leaks before you connect power to the rack cabinet or any of the installed components.
- After the manifold is filled, be sure to remove any excess water that might be left over from the filling process.
- When plugging or reconnecting any water connection, inspect the connection after installation. Make sure it is fully seated and no leaks are present.
- If the manifold core or copper tubing is leaking or is damaged, remove it from the rack cabinet and see Appendix A, “Getting help and technical assistance,” on page 77 for information.

To install the manifold, complete the following steps.

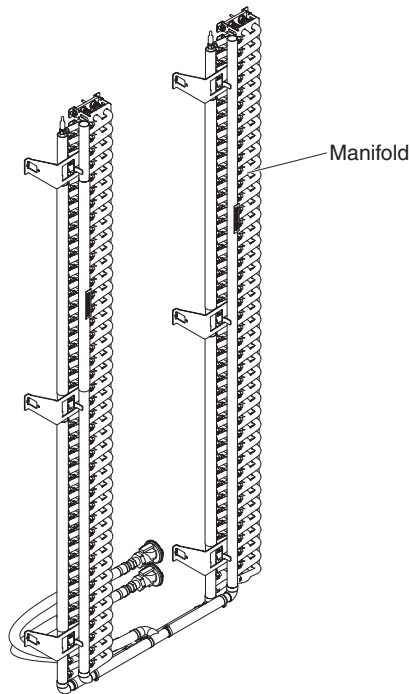


Figure 57. Manifold components

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. If you are installing the manifold in the first time, from the rear of the rack, install the 6 clip nuts in the left and right upper EIA positions of the marked 4th U, the 22nd U, and the 40th U respectively.

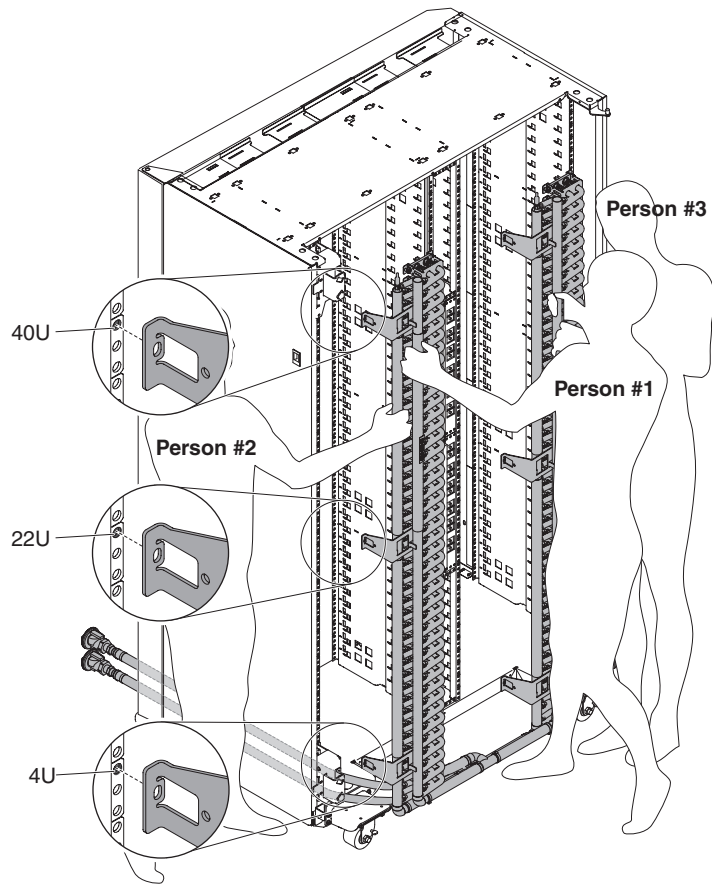


Figure 58. Installing the manifold

3. Persons #1 to #3 lift the manifold by the copper pipes and hold it in position on the rear of the rack.
4. Make sure to route the manifold supply and return hoses through opening in the rack where the chassis was removed. Once the hoses are pulled completely through to the front, the manifold can be properly located on the rear of the rack.
5. Person #4 starts with left center manifold bracket and aligns the bracket with the clip nut and installs a M6 screw through the bracket into rack clip nut.

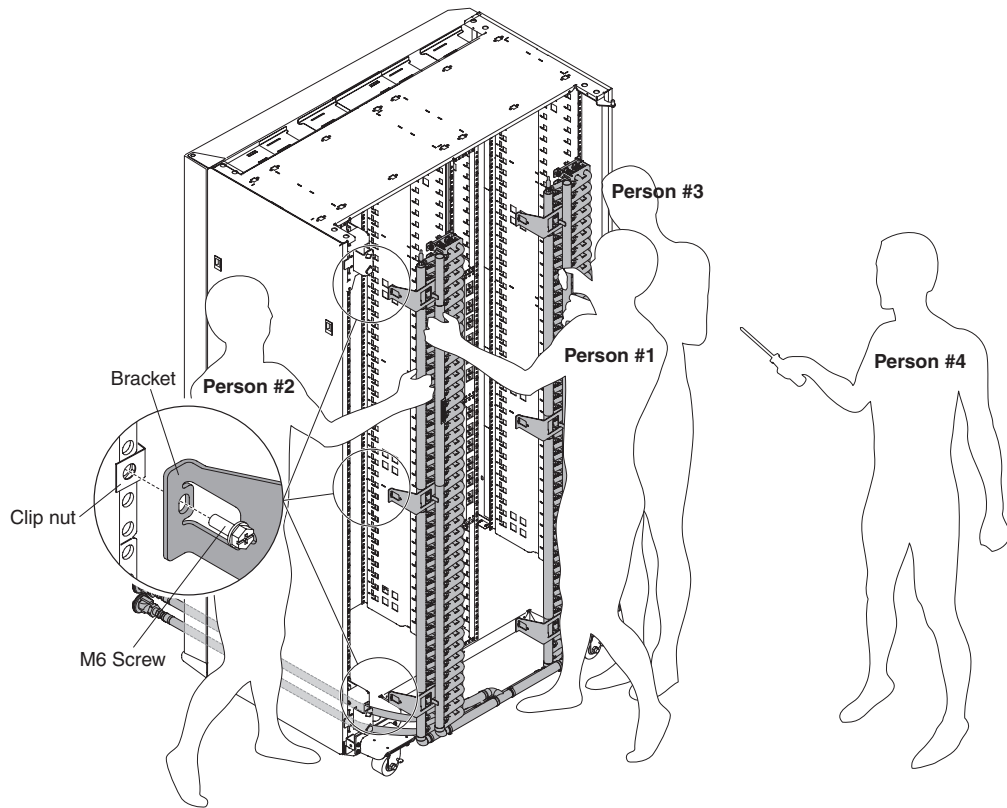


Figure 59. Installing the manifold

6. Once the left side manifold is aligned with the center screw in place, person #4 can align the bottom bracket with the screw opening. Then, person #4 can install the screw.
7. Repeat for the top screw, align the bracket, and then install the screw.

Note: Screws only need to be loosely tightened at this point.

8. Person #4 moves to the right side of the manifold and repeats the same steps as performed on the left side.

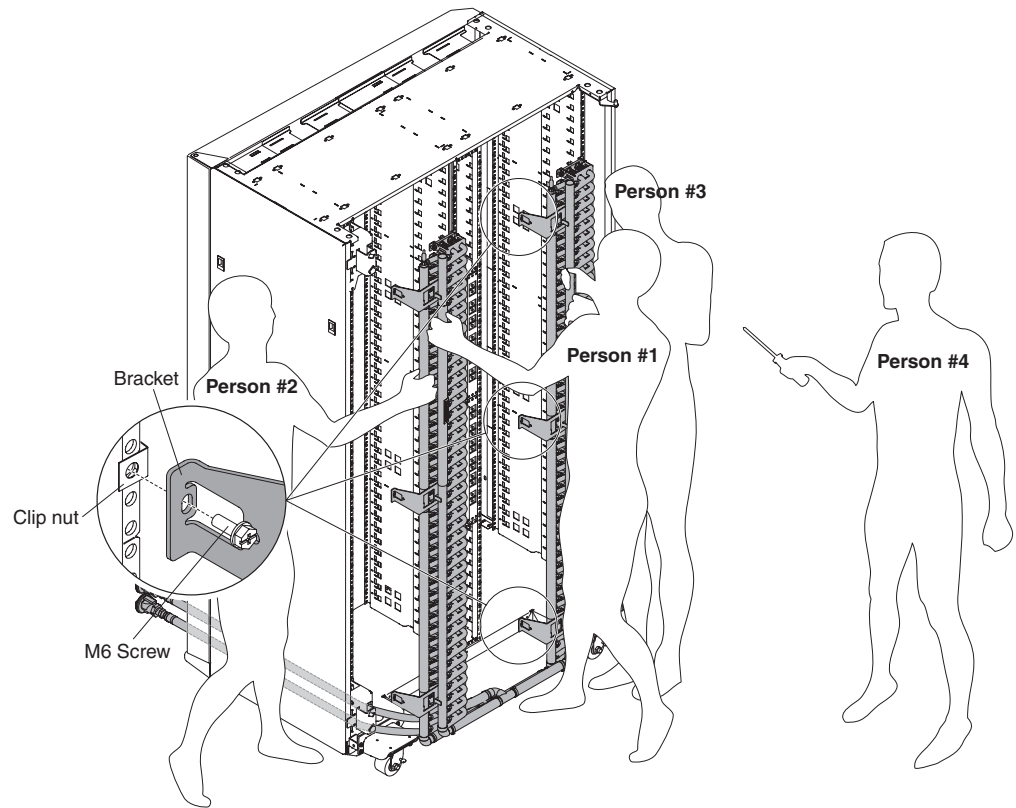


Figure 60. Installing the manifold

9. Once both screws are installed on the right side, persons #1 to #3 can release the manifold at this point.
10. Person #4 torques all M6 screws to 30 in/lb.

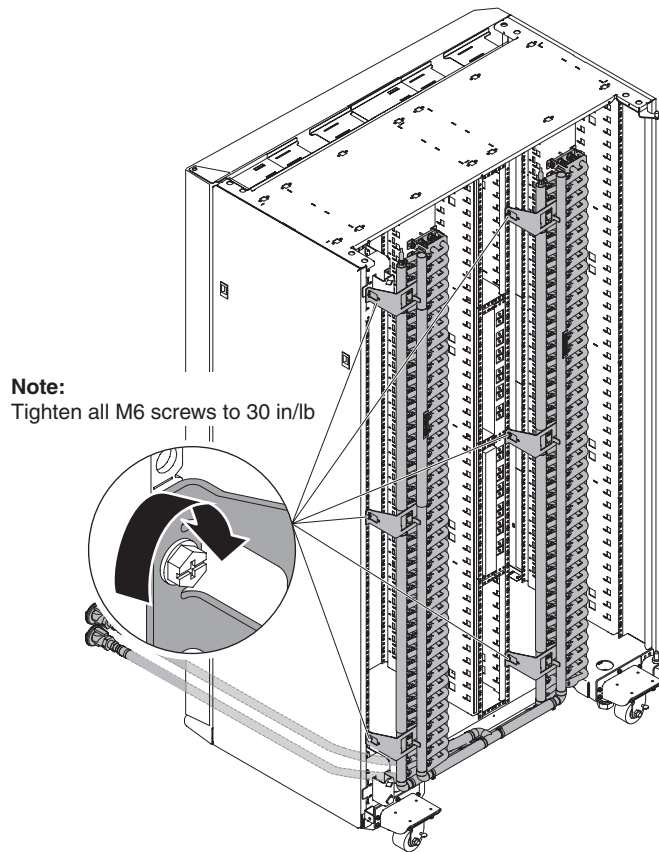


Figure 61. Installing the manifold

11. Slide the chassis into the rack.
12. Install the 2x Phillips screws to hold the chassis to the rack.
13. Connect the 2x power supply line cords.
14. Install both nodes from the chassis.
15. Re-attach the housing block assembly to the rear of each chassis.
16. Use the center 2 posts in the center of the white bracket to align with the 2 alignment holes in the rear of the chassis.
17. Once located in place, use a long Phillips head screw driver to tighten the 2 captive screws. Be careful to not strip the screws during this operation. Make sure the screw is properly aligned with the chassis before tightening.
18. Reinstall each node into the chassis.
19. At the front of each node, connect each cable and attach the velcro on each side.
20. Fill the manifold with water (see "Filling the manifold with water" on page 32).

Draining the fill tool

Note: The IBM service team will be performing this task if maintenance of a manifold is required.

Statement 14:



CAUTION:

This lubricant might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

(C034)

CAUTION:

Goggles are needed for the procedure.

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen.

(L011)



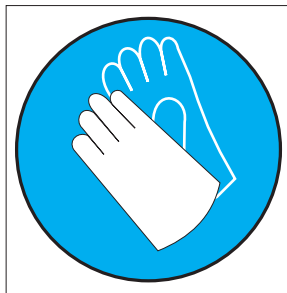
CAUTION:

Chemical resistant gloves are needed for this procedure.

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden.

(L014)

(L014)



Attention: Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information is provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

1. Read the safety information that begins on page iii and “Installation guidelines” on page 65.
2. The piping from tank to pump is glued or threaded except for two points which allow easy disassembly of the tank from the cart (if ever needed). They are the rubber joint above the big valve and the big coupling in the bottom horizontal pipe section.
3. When draining the tool, first drain from the drain valve on the tank and also from the supply/return hoses by inserting a mating ball valve into each to allow water to escape. The tank drain faucet uses a garden hose thread, not the normal $\frac{3}{4}$ ” pipe thread. A bucket can be held under the faucet if no garden hose is available. The cart can be tilted to remove water in the tank.

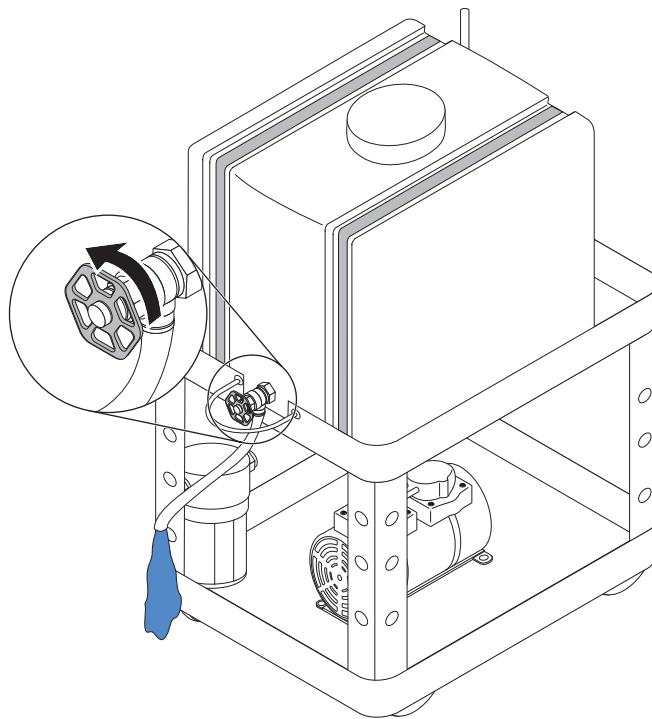


Figure 62. Drain from the drain valve

4. To remove the remaining water from the pump and big plastic piping connecting the tank and pump, use a shallow tray and place below the coupling 'A'. Open the coupling by rotating the big outer ring clockwise if viewing the tool as in the picture. Slowly open and catch as much water as the tray or container can capture. Close the coupling, dump the water from the tray and repeat until all the water stops pouring out. Then the coupling can be loosened all the way and rubber joint removed by loosening the clamps which hold it.

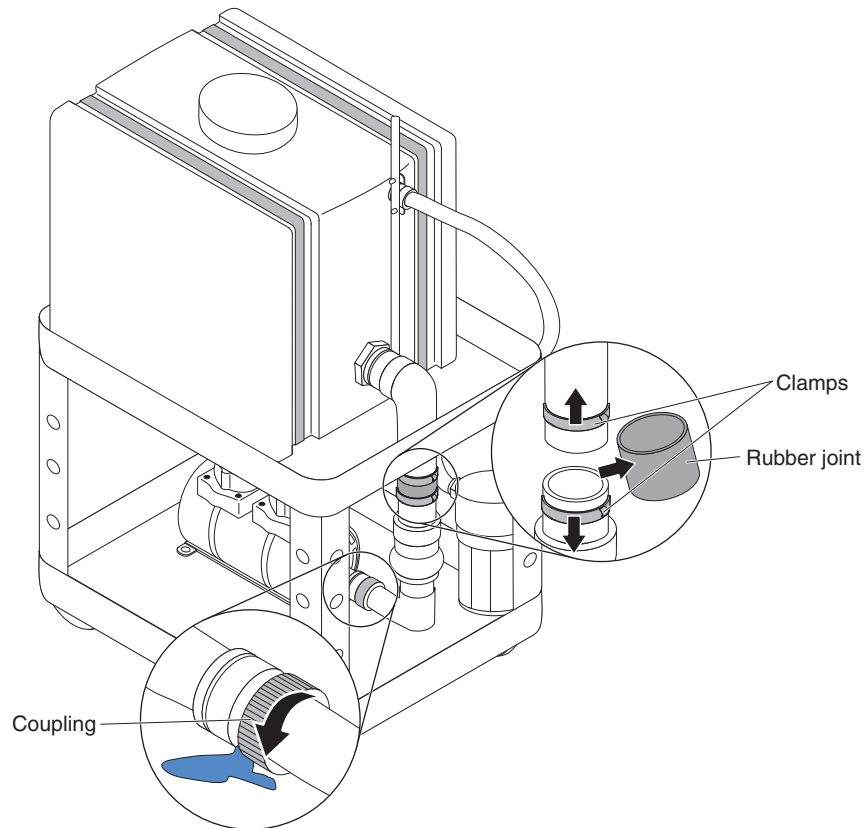


Figure 63. Remove the remaining water

5. The remainder of the water at the bottom of the tank can be removed by removing the straps and bracket which hold the tank to allow tilting. Any remaining water can be removed with a small paper cup and paper towels.

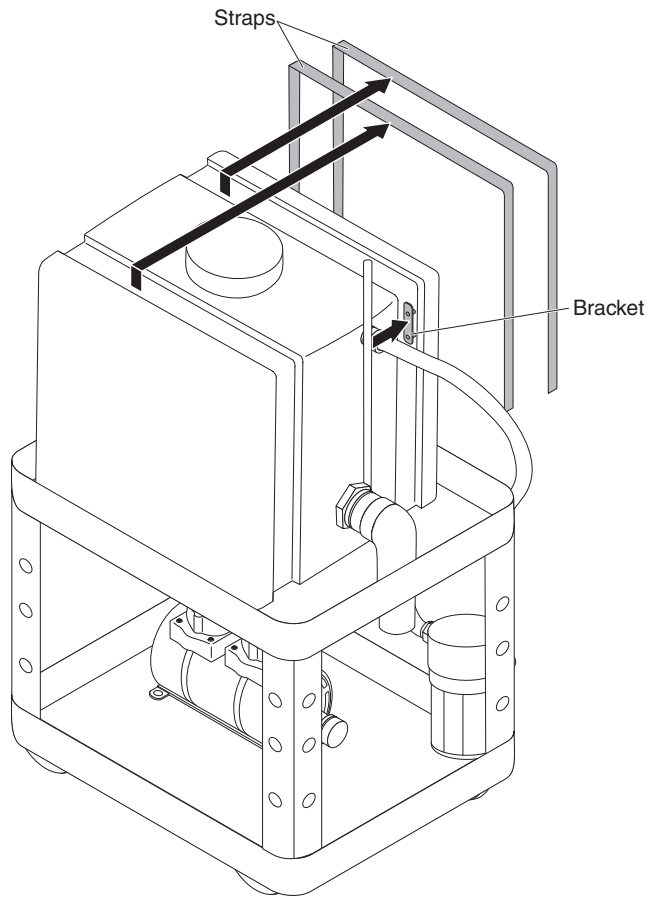


Figure 64. Remove the remainder of the water at the bottom of the tank

6. The filters can be drained by loosening the clamps on the hoses, pulling the hoses off the barbs and lifting the filter housings from the zip-ties that hold them.

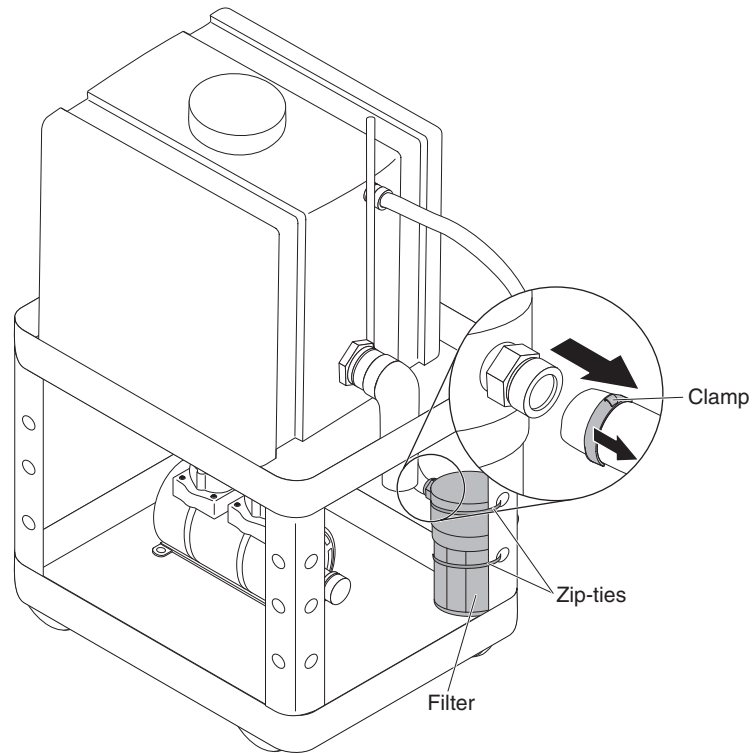


Figure 65. Remove the remainder of the water at the bottom of the tank

7. The cart can be lifted around 20 degrees from the handle side to fully drain the pump and hoses.

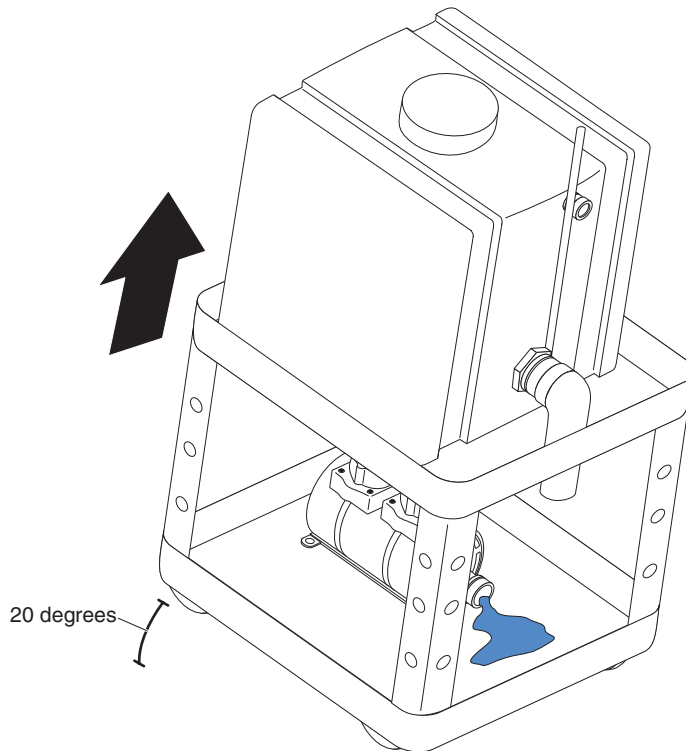


Figure 66. Remove the remainder of the water at the bottom of the tank

8. If possible, leave the filters and the filter containers open for several days prior to re-assembly.
9. Reassemble the components once completely dry.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the *IBM Documentation CD* that comes with your system.
- Go to the IBM support website at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/systems/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x[®] and xSeries information is <http://www.ibm.com/systems/x/>. The address for IBM iDataPlex information is <http://www.ibm.com/systems/x/hardware/idataplex/>

index.html. The address for IBM BladeCenter information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation® information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/supportportal/>.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

Appendix B. CRU and FRU information and part numbers

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

For an updated parts listing on the Web, complete the following steps:

Note: Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product Support** section, click **System x**.
3. Under popular links, click **Parts documents lookup**.
4. From the **Product Family** menu, select **iDataPlex Rack** and click **Go**.

The following replaceable components are available for the IBM iDataPlex Rack Type 7197.

Table 4. CRU/FRUs, IBM iDataPlex Rack Type 7197

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
Cable management 1U belt		46C6298	
Cable management handle bracket		46C6306	
Cable management IB plate assembly		46C6299	
Cisco 2960 rear hardware kit		46C6312	
Cisco 4948 rear hardware kit		46C6313	
Cisco 3750 rear hardware kit		46C6314	
Cyclades ACS-48 hardware kit		46C6315	
C/C rail kit		46C6316	
Door brackets		46C6968	
Duct assembly, short pocket		46C6291	
Front cover acc kit		46C6967	
Front cover hardware parts kit		46C6307	
HX purge kit		46C6345	
Ladder			45E0998
Left front cover assembly		46C6296	
Lower air baffle		46C6300	
Lower rear door hinge assembly	46C6294		
Lower rear door hinge brackets			46C6969

Table 4. CRU/FRUs, IBM iDataPlex Rack Type 7197 (continued)

Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
Line Cord, 30A/208V	39M5493		
Line Cord, 32A/240V	39M5495		
Line Cord, 32A/250V	39M5497		
Line Cord, 30A/250V	39M5499		
Rack Caster Asm			46C6290
Rack to rack hardware kit		46C6311	
Rack label kit	46C6308		
Rack latch		46C6931	
Rack manager hardware mounting kit		46C6317	
Rack manifold hose repair			90Y8030
Rack manifold with mounting			90Y8110
Rail kit		44W4793	
Rear door shipping bracket	46C6337		
Right front door assembly		46C6297	
Side cover assembly		46C6292	
S2S Right duct assembly		46C6295	
S2S Left duct assembly		46C6309	
S2S Rear duct assembly		46C6310	
Thin rear door assembly			46C6970
Upper air baffle		46C6301	

Appendix C. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM 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:

*IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS 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. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product, and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

IBM, the IBM logo, and [ibm.com](http://www.ibm.com) are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at <http://www.ibm.com/legal/copytrade.shtml>.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven[®], including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the server to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the server, IBM may condition provision of repair or replacement of servers or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 5. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none">The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹.Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.The deliquescent relative humidity of the particulate contamination must be more than 60%².The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none">Copper: Class G1 as per ANSI/ISA 71.04-1985³Silver: Corrosion rate of less than 300 Å in 30 days

¹ ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

² The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

³ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

*Information Development
IBM Corporation
205/A015
3039 E. Cornwallis Road
P.O. Box 12195
Research Triangle Park, North Carolina 27709-2195*

U.S.A.

In the request, be sure to include the publication part number and title.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Telecommunication regulatory statement

This product is not intended to be connected directly or indirectly by any means whatsoever to interfaces of public telecommunications networks, nor is it intended to be used in a public services network.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:
IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland
Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
Email: tjahn@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

VCCI Class A statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

jeita

Japanese Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для
снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

声 明

此为 A 级产品。在生活环境中，
该产品可能会造成无线电干扰。
在这种情况下，可能需要用户对其
干扰采取切实可行的措施。

Taiwanese Class A warning statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Index

Numerics

2U chassis rails 42

A

accessible documentation 83
assistance, getting 77
attention notices 3

C

caution statements 3
Class A electronic emission notice 84
clearance
 between rack suites 8
 minimal operational 7
 minimal service 7
connecting power 39
contamination, particulate and gaseous 83
creating a floor plan 11
CRU part numbers 79

D

danger statements 3
documentation CD 1
documentation format 83
documentation updates 1, 79
documentation, related 3

E

electronic emission Class A notice 84

F

FCC Class A notice 84
filling the manifold 32
floor plan 11
FRU part numbers 79

G

gaseous contamination 83
getting help 77

H

hardware service and support 78
help, getting 77
how to
 fill the manifold
 initially 32

I

IBM Support Line 78
IBM System Information Center 1
important notices 3
install 42
installing
 front doors 23
 hinge bracket
 bottom 26
 top 26
 latch bracket 28
 manifold 66
 pallet ramp 17
 power distribution unit 39
 rails 41
 rear door 26
 latch bracket 28
 side panels 22
 stabilizer feet 21
 the rack 13
internal rack dimensions 10

M

manifold
 fill 32
 installation guidelines 65
moving
 the rack 19

N

notes 3
notes, important 82
notices 81
 electronic emission 84
 FCC, Class A 84
notices and statements 3

O

online publications 79
overview
 safety information vi

P

particulate contamination 83
power 12
 connecting 39
public services network, use in 84
public telecommunications network, connection to 84

R

- rack
 - attaching in a suite 29
 - dimensions 7
 - internal dimensions 10
 - moving the 19
 - specifications 7
 - unpacking 15
 - weight 7
- related documentation 3
- remove 42
- removing
 - front doors 23
 - hinge bracket
 - bottom 25
 - top 25
 - hinge brackets 25
 - manifold 60
 - rear door 24
 - shipping brackets 15
- removing and installing
 - 2U chassis rails 41
 - front doors 23
 - optional device rails 44
 - rack doors 22
 - rails 41
 - rear door 24
- requirements
 - power 12
 - size 7
 - space 11
 - weight 7

S

- safety information
 - overview vi
- site
 - planning 5
 - preparation 5
 - requirements 5
- software service and support 78
- statements and notices 3
- support, website 77

T

- telephone numbers 78
- tools 13
- trademarks 81

U

- U measurement 10
- United States electronic emission Class A notice 84
- United States FCC Class A notice 84
- unpacking
 - rack 15

W

- web site
 - publication ordering 77
 - support line, telephone numbers 78
- website
 - support 77



Part Number: 00V9942

Printed in USA

(1P) P/N: 00V9942

