Netra™ ft 1800 Hardware Installation Manual

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Preface

This document describes the installation procedures for the core hardware used in the Netra™ ft 1800.

Who Should Use This Book

This guide is intended to be read by installation engineers and service personnel. It is not intended for the end user of the system.

How This Book Is Organized

This guide is arranged as follows:

Chapter 1 “Before Installation” gives guidelines on site preparation and environmental considerations.

Chapter 2 “Hardware Installation” describes how to unpack the system and install the chassis in a rack.

Chapter 3 “Electrical Supply Installation” provides the information required to install the electrical supply.

Chapter 4 “Powering on the System” tells you how apply power to the Netra ft 1800.

Related Books

- *Netra ft 1800 Hardware Reference Manual* (Part No. 805-4531-11)
- *Netra ft 1800 Safety and Compliance Manual* (Part No. 805-7019-10)

Symbols

The following symbols mean:

Note – A note provides information which should be considered by the reader.

Caution – Cautions accompanied by this Attention icon carry information about procedures or events which if not considered may cause damage to the data or hardware of your system.

Caution – Cautions accompanied by this Hazard icon carry information about procedures which must be followed to reduce the risk of electric shock and danger to personal health. Follow all instructions carefully.

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CHAPTER 1

Before Installation

This section provides information on what should be considered when choosing a location for a Netra ft 1800 system.

Note – This equipment is only intended for installation in a Restricted Access Location as defined by UL1950, 3rd Edition, and EN60950: 1992 / A11: 1997.

Electrical Supply Considerations

Before you install the system, verify that the correct power supply is available. Refer to “DC Source Site Requirements” on page 36 for further information.

Environmental Considerations

The system can be installed in an environment with the following specific parameter ranges:

- Ambient temperature
  - Operating: 0 to 40 degrees Celsius (short term operation up to a temperature of 50 degrees Celsius is possible; however, the operation of removable media devices cannot be guaranteed.)
  - Storage: –40 to 70 degrees Celsius

- Relative humidity
  - Operating: 5 to 85% noncondensing[1]
  - Storage: 10 to 90% noncondensing[1]
- Elevation
  - Operating: 0 to 3000 meters
  - Storage: 0 to 12000 meters

Dimensions

- Height: 1466.85 mm (57.75 inches) 33U NOM
- Width: 437.60 mm (17.22 inches)
- Depth: 392.8 mm (15.4 inches)
- Weight: Maximum 190.5 kg (420 lb) (excluding rack or AC converter items)
- Maximum rate of heat release for fully configured system: 3000W (10,200 Btu / hour)
- GR 63 CORE heat release calculation result: 425.4 W per square foot [3000 W / (3.25 ft x 2.17 ft)] (4579 W per square meter).

These dimensions are for the product without rack-mount flange adapters; the overall width of the flanges varies according to the equipment mounting requirements.

The depth given does not include any I/O or power connectors. The power connectors add 50 mm (2 inches) to the depth.

Airflow Consideration when Mounting in the Equipment Frame

The Netra ft 1800 system has been designed to function while mounted in a natural convection airflow, but to meet the declared environmental specification the following rules apply. Refer to FIGURE 1-1 on page 1-4 and FIGURE 1-2 on page 1-5.

1. Adequate airflow through the equipment frame must be ensured. The Netra ft 1800 system utilizes internal fans that can achieve a maximum airflow of 840 cfm in free air.

2. The inlet air must enter at the bottom of the Netra ft 1800 cabinet and in front of the Power Supply Units (PSUs); the airflow exhausts vertically from the top of the cabinet.

3. Inlet and exhaust ventilation require a minimum open area of 400 cm^2 (62 in^2) each.

1. Subject to a maximum absolute humidity of 0.024Kg of water per Kg of dry air.

4. A minimum of 2U (88.9 mm / 3.5 inches) clearance must be allowed at both top and bottom of the Netra ft 1800 cabinet when mounted unless unobstructed vertical airflow can be ensured. Refer also to “Mounting Requirements” on page 6.

5. The Netra ft 1800 system must not be mounted above any heat-generating sources within the same frame *unless* a heat deflector is used to provide fresh inlet air at ambient temperature.

6. To maintain adequate airflow, replace the environmental filters every six months (contact your local support organization for further information). The environmental filter replacement kit (X-Option No.X6952A) contains six PSU filters and three base filters.

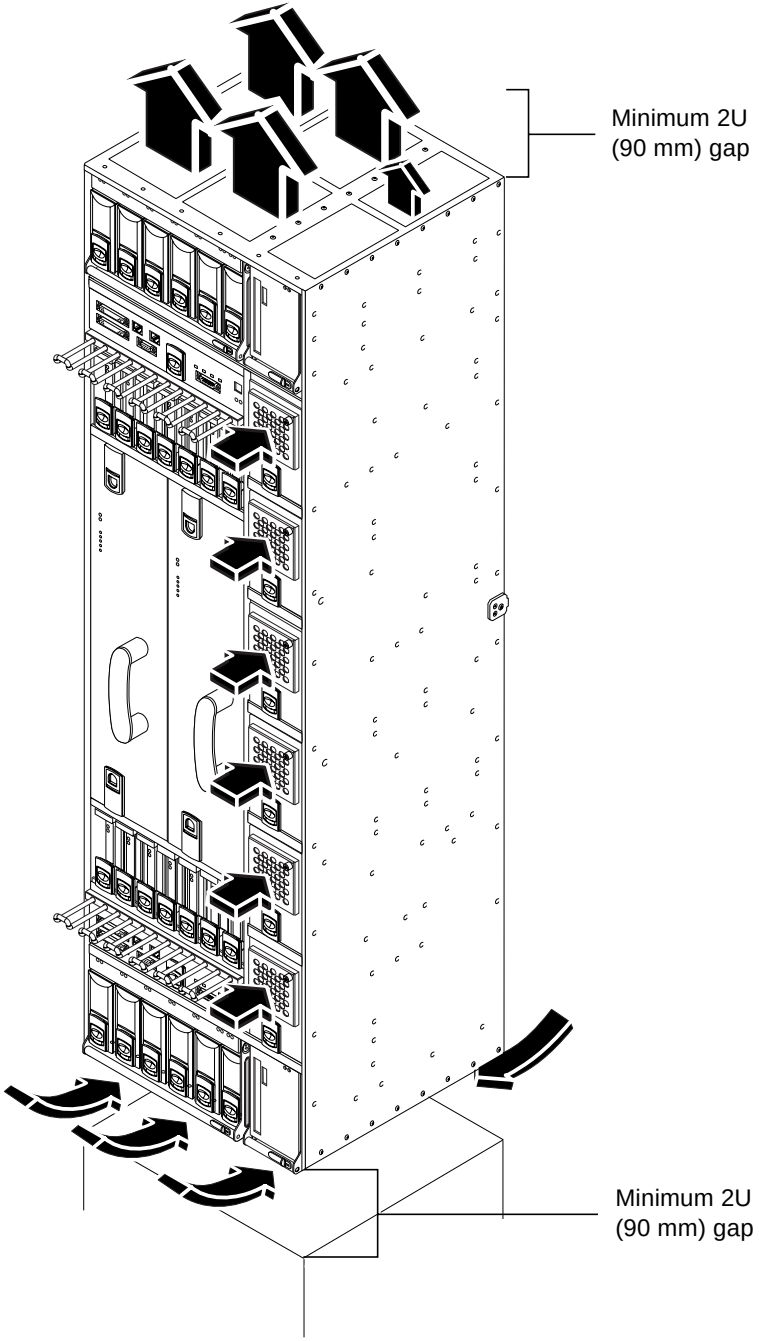


FIGURE 1-1 Netra ft 1800 Airflow Requirements (External)

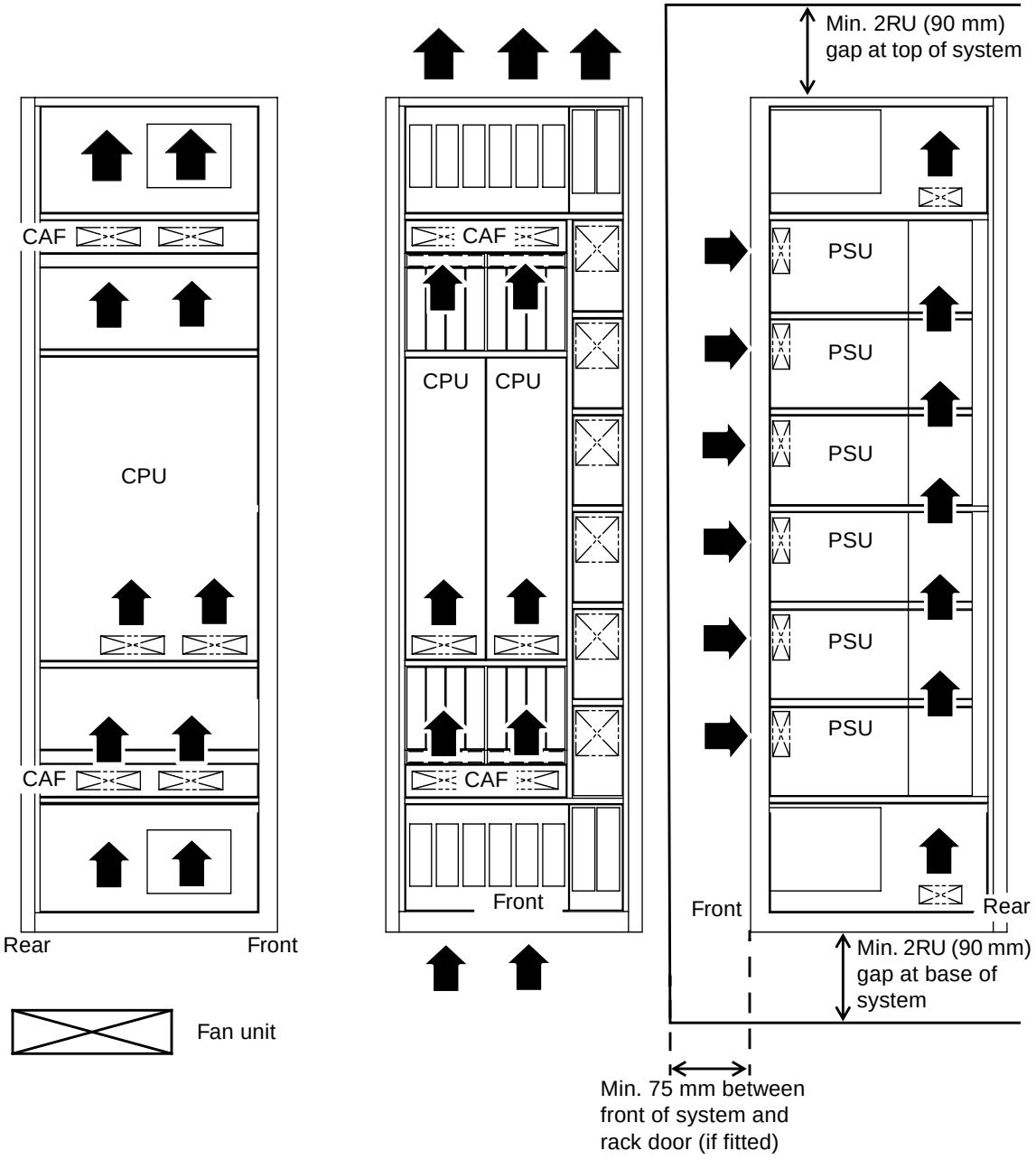


FIGURE 1-2 Netra ft 1800 Airflow Requirements (Internal)

Mechanical Considerations when Mounting in the Equipment Frame

Caution – Mechanical assistance is required if installing a loaded chassis.

If you intend not to use a lifting device for installation, all modules other than the motherboards must be removed from the system prior to lifting. The empty chassis weighs approximately 49 kg (108 lb), or 68 kg (150 lb) with the motherboards, plus the adaptors. The weight of any removable module depends on its configuration. Weight warning labels are for guidance only.

See “Removing and Installing Modules” on page 16 for information about adding modules to the motherboard.

The Netra ft 1800 chassis has been designed to accommodate most mounting configurations. Adaptor flanges to suit 19-inch, 23-inch, 24-inch and 600-mm (ETSI) rack sizes are available as required.

The Netra ft 1800 system is shipped with a plinth, which protects the bottom of the chassis during transit and handling, and also ensures that the correct airflow inlet plenum is provided during installation. The plinth must be removed once the Netra ft 1800 is installed in a rack, then stored in a safe place.

The Netra ft 1800 chassis must be mounted using screws suitable for the equipment frame. The screws should be M5, M6 or 10-32 UNF. All screws must be fitted. The recommended tightening torque value for either M5 or 10-32 UNF recess head screws is 3.8 Nm (2.8 lbf/ft), and that for M6 screws is 6 Nm (4.4 lbf/ft).

Mounting Requirements

The Netra ft 1800 is available with the following removable mounting flanges:

- 19 inch EIA pattern
- 23 inch EIA pattern
- 24 inch EIA pattern
- 600 mm IEC917 (ETSI) pattern

Any of these flanges can be fitted in the following positions:

- Flush with the front of the system
- 65 mm (2.56 inches) from front of system
- 196.1 mm (7.72 inches) from front of system

The second and third positions are intended for use with 5-inch web open frames (relay racks).

Adjustable rear flanges can be fitted. They provide a mounting face anywhere between 400 mm and 500 mm (15.75 inches and 19.7 inches) from the front of the system.

The vertical mounting hole pattern should conform to the standard dimensions given in TABLE 1-1.

TABLE 1-1 Mounting Hole Pattern Dimensions

Standard	Pattern
EIA/RETMA (RU)	Repeating pattern of 5/8 inch, 5/8 inch, 1/2 inch
IEC917/ETSI (SU)	Constant pitch of 25 mm

The tapped mounting holes on the Netra ft 1800 chassis are arranged as shown in FIGURE 1-3.

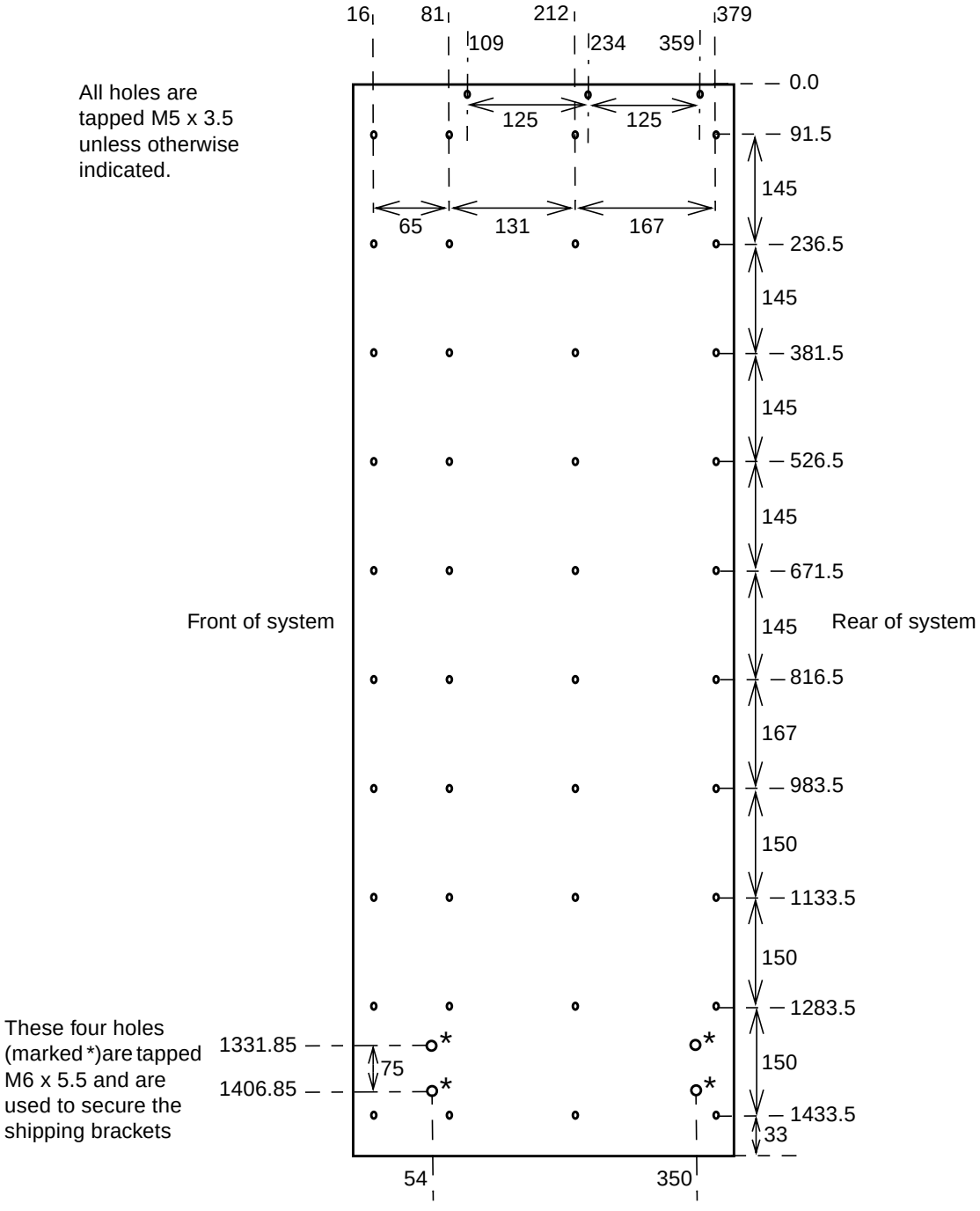


FIGURE 1-3 Chassis Mounting Hole Arrangement (all measurements in millimeters)

Loading

The rack must be capable of supporting 230 kg (500 lbs) for a fully configured and cabled Netra ft 1800.

In Seismic (Earthquake) Risk Zones 3 and 4, it is recommended that the Netra ft 1800 is installed in an appropriate secured seismic rack or cabinet.

Vertical space

The Netra ft 1800 chassis occupies 33RU (146.7 cm / 57.75 inches) of vertical height.

To allow adequate airflow, the rack must provide either:

- Unobstructed vertical airflow via vents of adequate size in the top and/or bottom panels. In this case the vertical height required is 35RU (155.6 cm / 61.25 inches). The chassis should be mounted cengrally, providing a 1RU-high plenum adjacent to each vent grille.

  or:

- A minimum of 37RU (164.5 cm / 74.75 inches) of rackable height, with the provision of 2RU vertical space (8.9 cm / 3.5 inches) for front and/or rear vents at both top and bottom.

If you intend to fit the Netra ft 1800 into a rack with its red transit plinth in place, 4RU (17.8 cm / 7 inches) of clearance must be provided beneath the chassis. This space permits removal of the plinth after installation.

Note – The plinth must be removed to allow fitment of the chassis environmental filters.

Depth

The front door (if fitted) must provide a minimum of 75 mm (3 inches) of clearance across the entire front surface of the Netra ft 1800 to allow for routing of I/O cables.

As all I/O cables must be routed from the front of the Netra ft 1800 system, due consideration should be made of the space required within the rack for these cables, as well as the power cables at the rear of the system.

There must be a minimum of 545 mm (21.5 inches) usable internal depth in the rack/cabinet. This dimension includes space for connector housings, cabling and the power inlet filters.

Safety

All racks must be bolted to the floor, to adjacent frames or to both. This must be done in accordance with the rack manufacturer's instructions, using the recommended hardware and fixings.

Free-standing racks with a footprint of less than 600 mm x 600 mm (23.6 inches x 23.6 inches) are likely to be unstable and should be treated with caution.

CHAPTER 2

Hardware Installation

This chapter provides information on the initial hardware installation procedure, including installing modules and external I/O connections.

Unshipping the System

Once you have removed the packaging from the system, you must then unship the system from the delivery pallet and brackets before attempting to mount the chassis in a rack.

Caution – Do not attempt to remove the red plinth before the chassis has been mounted in the rack.

There is an instruction card attached to the front of the system; the instructions below are intended to supplement this.

Note – Do not discard the packaging after removing it from the system. It should be stored in safe, dry place so it can be used in the event that the system requires moving or returning for repair.

Tools

The tools required to unship the system are contained in a cloth bag in the shipkit box.

Note – Do not discard the tools after unshipping and mounting the system. They can be stored in the cloth bag supplied and attached to the rack adjacent to the system for easy access when required.

▼ To Unship and Mount the System

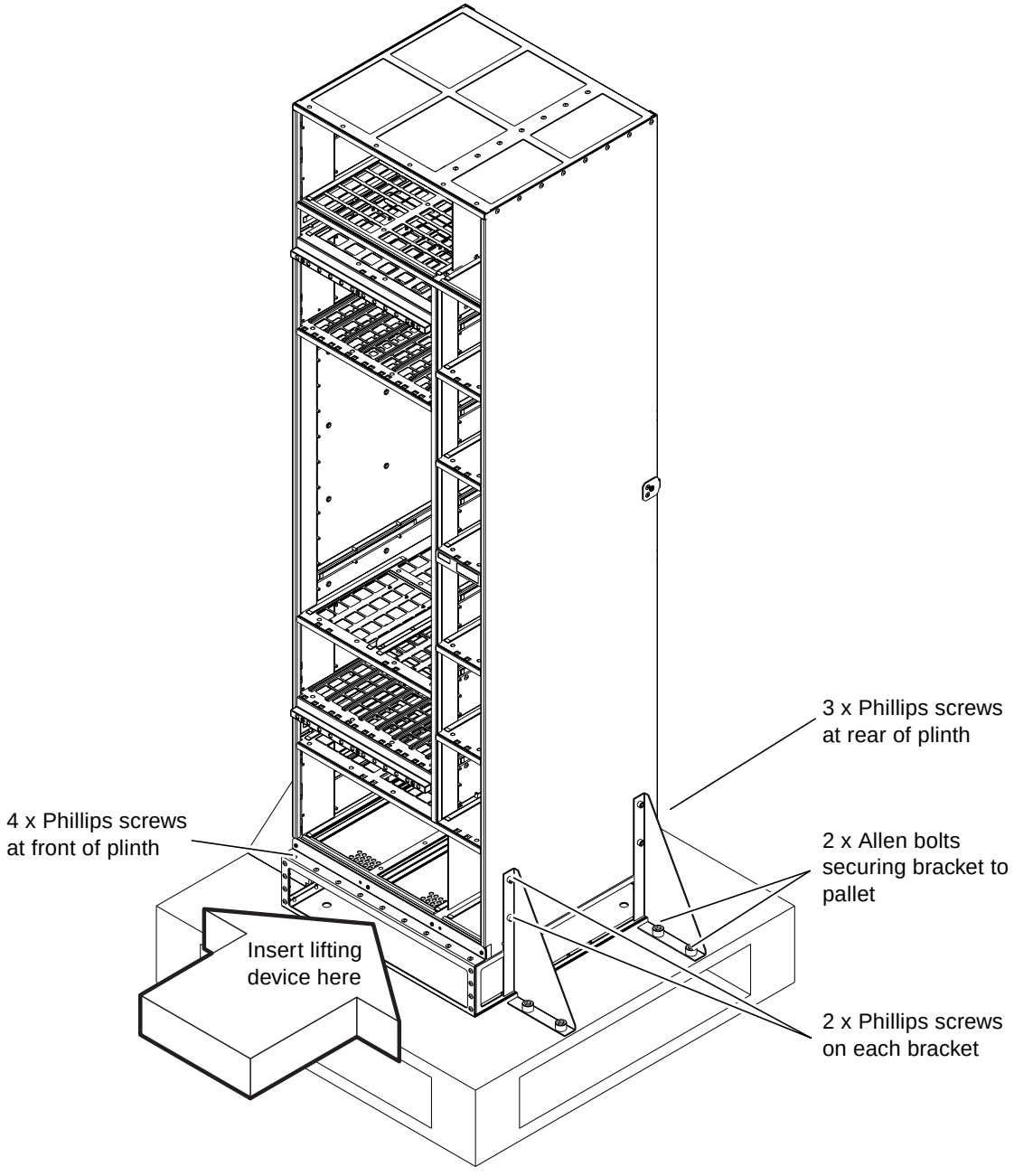


FIGURE 2-1 Shipping Brackets and Sacrificial Plinth

1. **Remove all modules except the motherboards from the chassis and put them in a safe place.**

   Refer to “Removing and Installing Modules” on page 16.

2. **Using the Phillips No.2 screwdriver (supplied), remove the two Phillips screws securing the four red brackets (two on each side) to the chassis (see** FIGURE 2-1**).**

   You may also need to remove the brackets from the pallet. Use the Allen key supplied to remove the two Allen screws from each bracket. The brackets are not attached to the red mounting plinth.

3. **Install the appropriate mounting flanges.**

   Refer to the documentation accompanying the mounting flange kit.

4. **Use an appropriate lifting device to lift the chassis by the red mounting plinth, and install it in the rack.**

Caution – If using a fork-lift device, ensure the tines of the lift extend right through the mounting plinth and beyond the rear of the chassis. The chassis could deform if you use incorrect lifting techniques.

5. **Secure the chassis into the rack using the appropriate mounting points.**

   See the documentation accompanying the mounting flange kit.

6. **Remove the mounting plinth.**

   Use the No.2 Phillips screwdriver supplied to remove the four screws from the front and the three screws from the rear.

   Mounting the chassis with the plinth attached ensures that the minimum amount of clearance for air flow is provided beneath the system.

7. **Install the two large and one small filter trays in the spaces immediately beneath the chassis revealed by the removal of the plinth.**

   Refer to “To Install the Filter Trays” on page 29. The filter tray thumbscrews are inserted in the tapped threads exposed by removal of the mounting plinth.

8. **Install the modules into their appropriate locations.**

   Refer to “Removing and Installing Modules” on page 16.

Cable Bracket Assemblies

Six cable bracket mounting assemblies are provided with each mounting flange kit. These can be fitted to the mounting flanges to facilitate cable management.

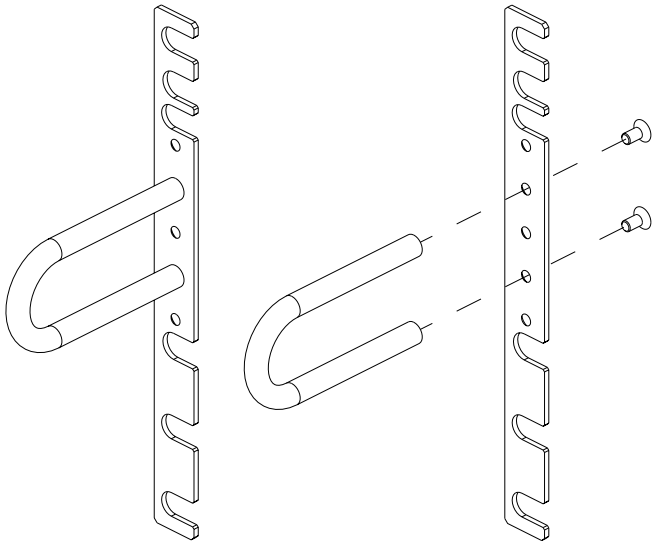


FIGURE 2-2 Cable Bracket Assembly

The brackets can be fixed to the mounting flanges in the required position, using the same screws that fix the flanges to the rack. The hooks can be fitted to the brackets in one of three positions using the countersunk M3 screws supplied. The hooks must be fitted before the brackets are fixed to the mounting flange / rack.

Removing and Installing Modules

This section describes how to remove and insert:

- CPUset, PCI, CAF and PSU modules (“To Remove a Module” on page 17)
  - CPUset modules: “CPUset Modules” on page 18
  - PCI modules: “PCI Modules” on page 21
  - CAF modules: “CAF Modules” on page 20
  - PSU modules: “PSU Modules” on page 22
- Drive chassis (“Replacing a Disk Chassis” on page 25)
- Removable media module (“Replacing an RMM” on page 23)

Caution – The wrist-strap provided must be used when replacing modules, or making cable connections to the rear of the system. The wrist-strap connection point on the Netra ft 1800 system is located on the panel at the bottom rear of the chassis.

All modules have their own guides in slots in the chassis, into which they fit exactly. No module will fit into a slot allocated to a different class of module. No module will fit into its own slot if it is upside down.

Configuration Limitations

If only one PSU is configured on each side, or two PSUs are configured in 1+1 redundancy, the configuration of optional modules on each side is limited to the following:

- A CPUset with two processors and not more than 512 Mbytes of memory
- A combined total of not more than five disks and PCI cards
- An RMM with one CD-ROM drive and one DAT drive

If two non-redundant PSUs are present on each motherboard, or three PSUs configured in 2+1 redundancy, all possible modules can be configured on each motherboard.

Module Injector/Ejector Mechanisms

All the modules except the disk chassis (DSK) and RMM have an injector/ejector lever (CPUset modules have two). They are all similar in function and usage. A common feature is a slide which engages and disengages the module’s electrical

connection to the motherboard, and a lever which physically engages and disengages the module. When the latch is disengaged, a red dot is exposed. This facilitates the identification of unlatched injectors.

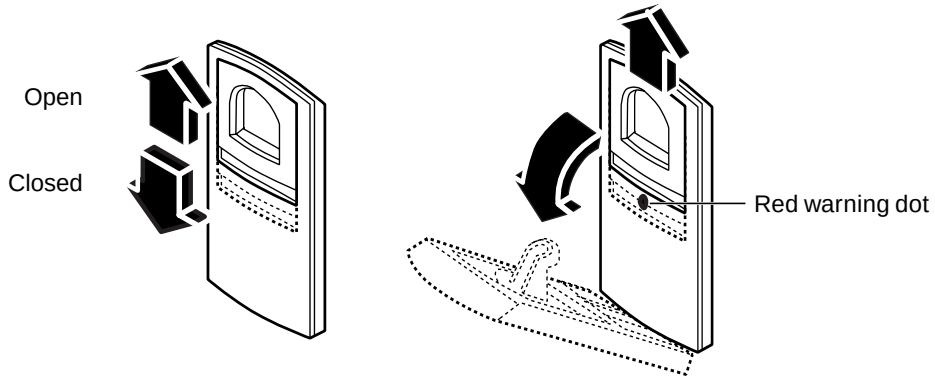


FIGURE 2-3 Module Injector / ejector Lever

The module is disengaged from its electrical connection when the slide is moved towards the rounded end of the lever, exposing the red warning dot.

The general procedure refers to CPUset, CAF, PCI and PSU modules. For more specific instructions for the RMM and disk chassis, refer to:

- "Replacing an RMM" on page 23
- "Replacing a Disk Chassis" on page 25

▼ To Remove a Module

1. **Move the slide in the lever on the module to the disengaged position.**

   This will expose the red warning dot.

2. **Lower the lever.**

   The module will slide out a small amount when the lever is fully lowered.

3. **Slide the module out of its slot, using the handle if there is one.**

   For specific procedures relating to individual modules, refer to:

   - "CPUset Modules" on page 18
   - "CAF Modules" on page 20
   - "PCI Modules" on page 21
   - "PSU Modules" on page 22

CPUset Modules

CPUset modules have two injector levers which must be operated simultaneously.

As you pull out the CPUset module, the handle in the top panel pops up and must be depressed again manually in order to withdraw the module fully from the chassis (see FIGURE 2-4). Once the handle is clear of the crossbar and has popped up again, it can be used to take the weight of the module.

Caution – CPUset modules are very heavy. The weight warning label on the CPUset is for guidance only. The actual weight of a CPUset depends on its configuration. Both the front and top handles must be used simultaneously once the module has been withdrawn as illustrated in FIGURE 2-4.

On inserting the CPUset module the handle must be depressed in order to push the module fully into the chassis.

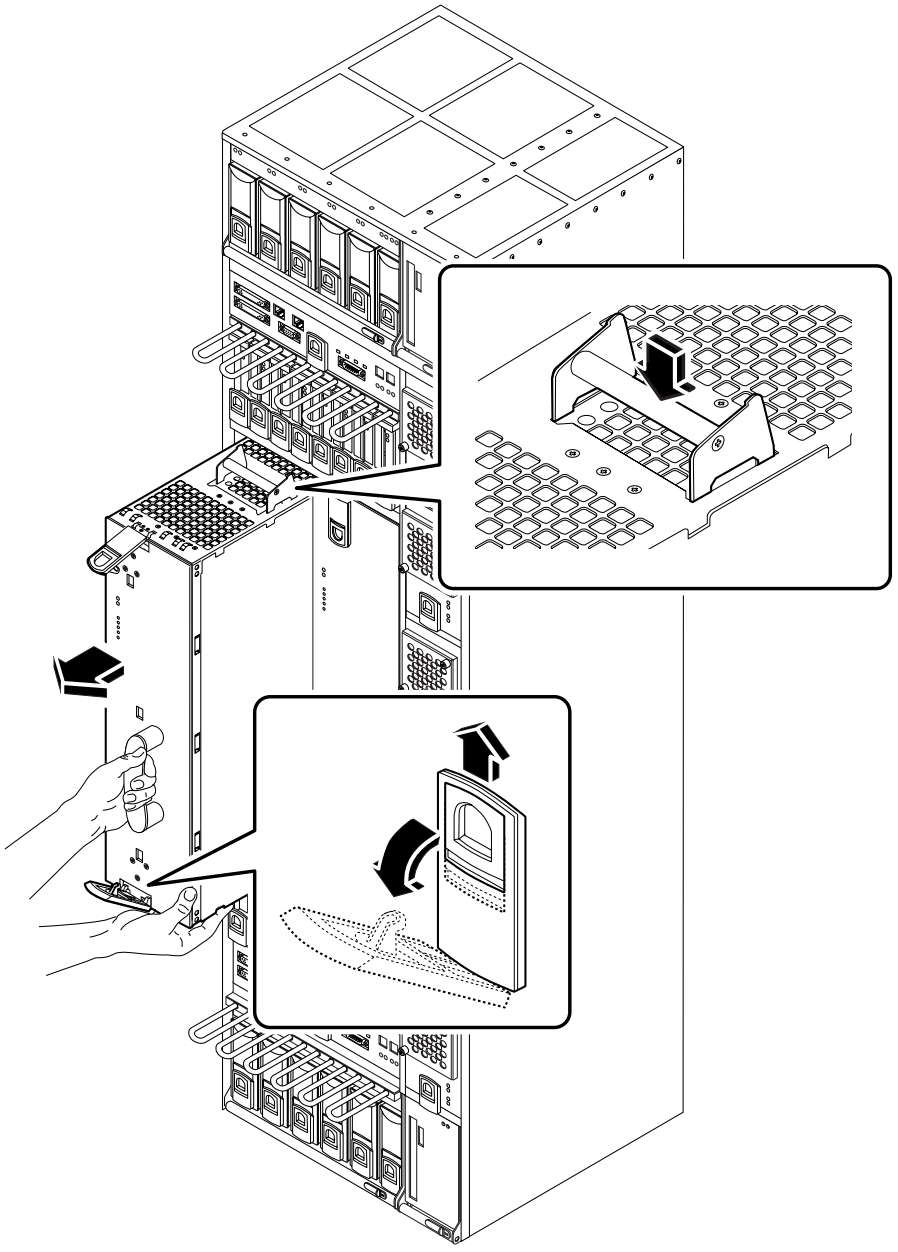


FIGURE 2-4 Removing a CPUset Module

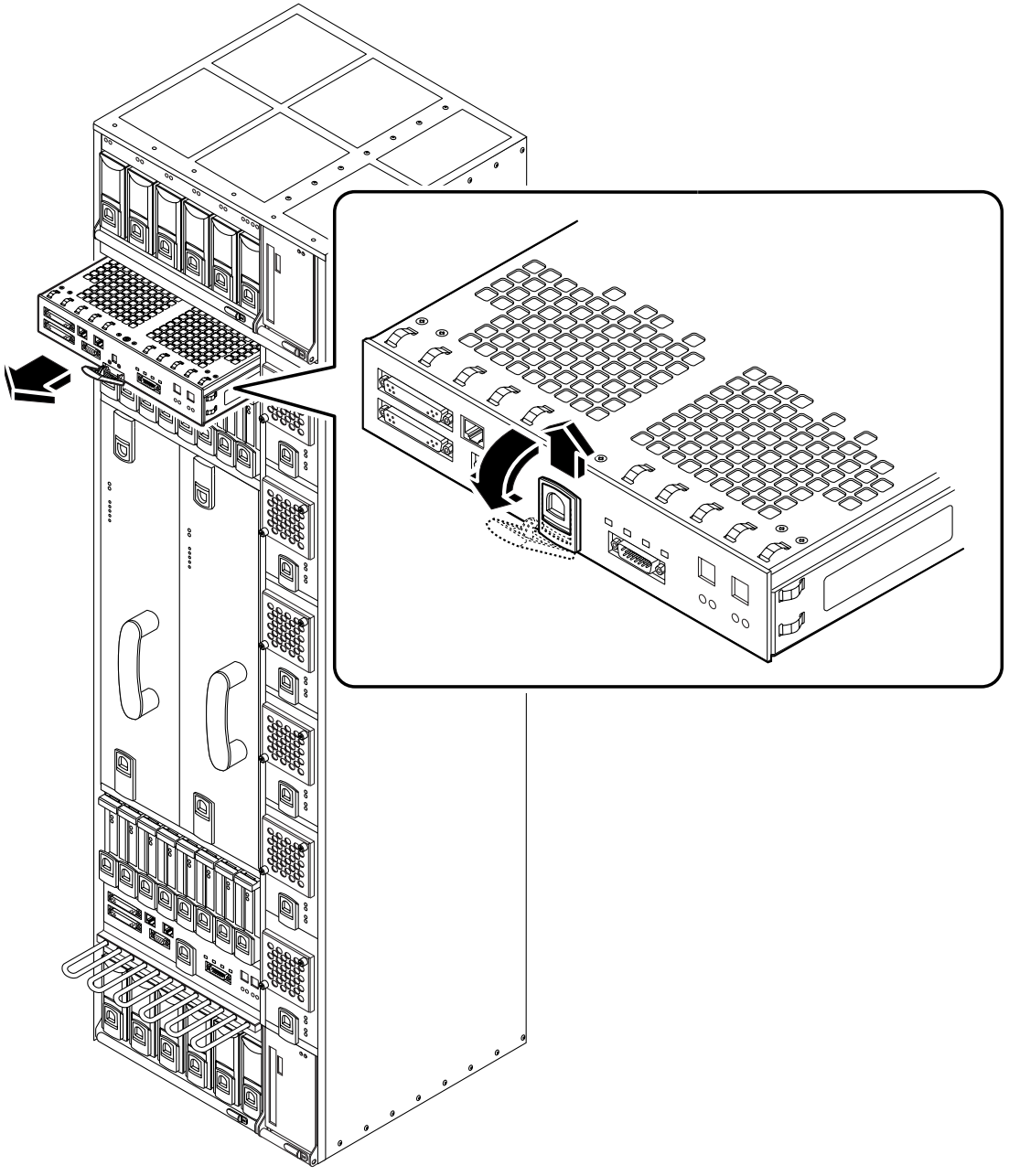


FIGURE 2-5 Removing a CAF

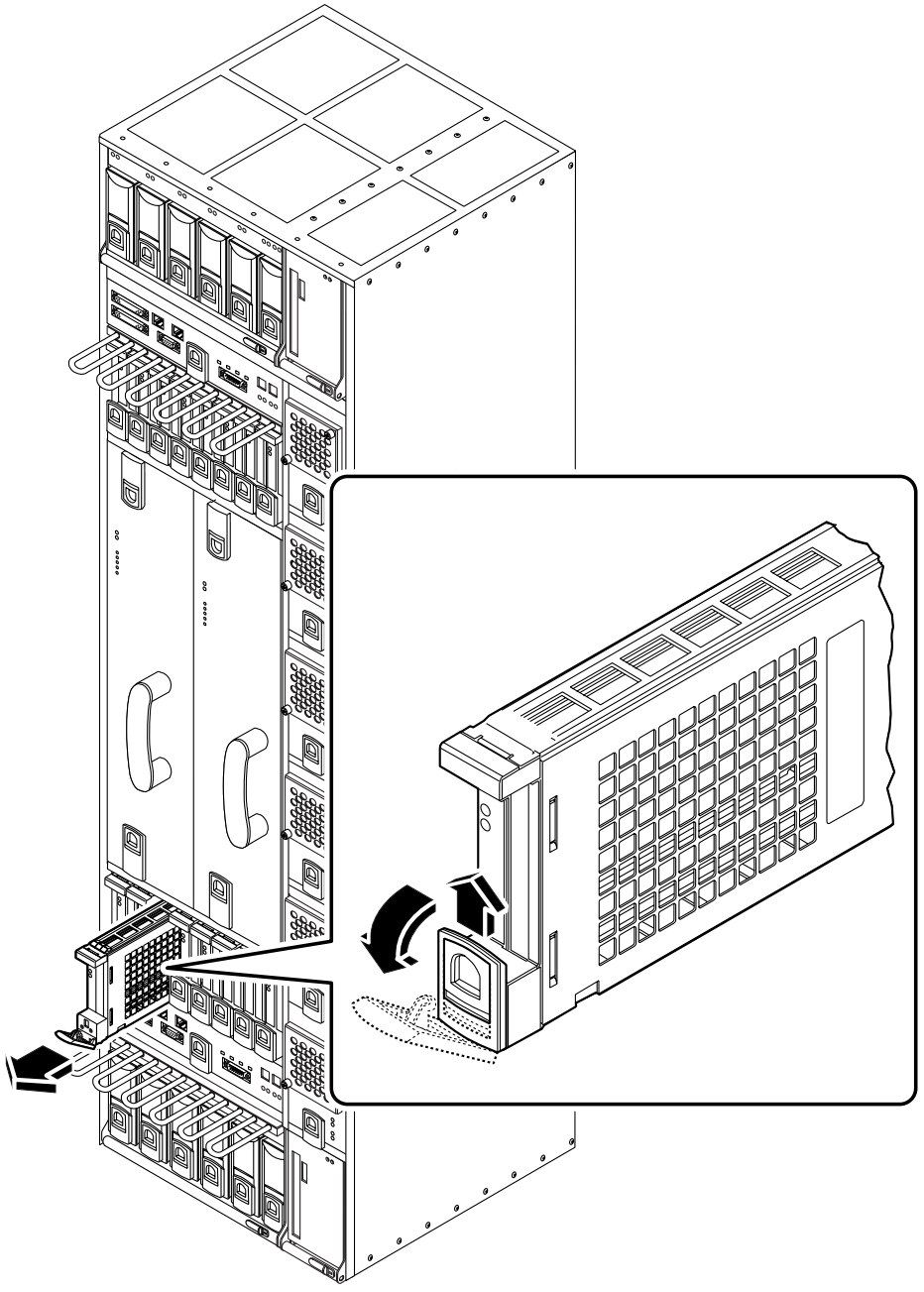


FIGURE 2-6 Removing a PCI Card Carrier

PSU Modules

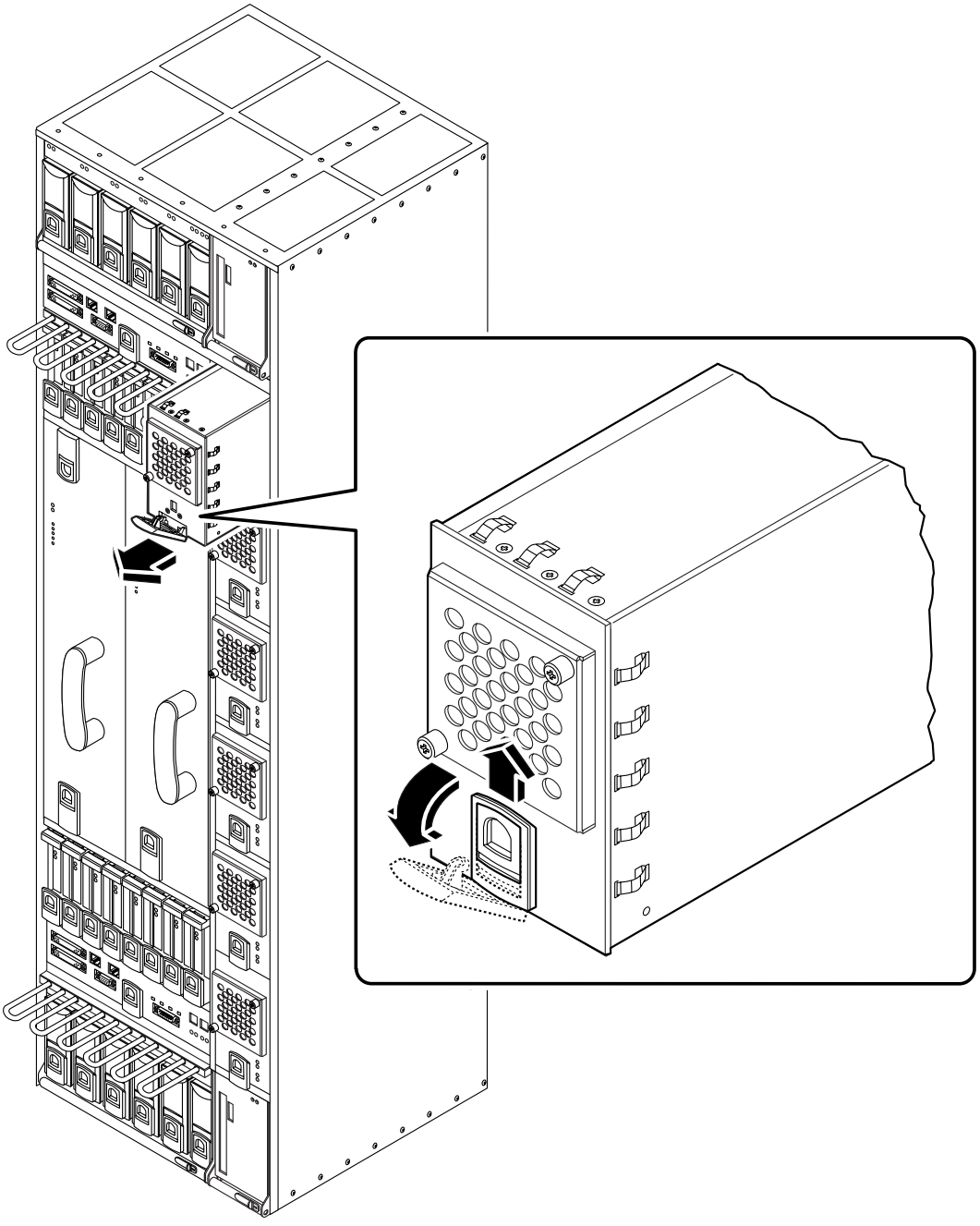


FIGURE 2-7 Removing a Power Supply

▼ To Replace a Module

1. **Slide the module into its slot but not fully home.**

   A module will not fit into a slot designed for a different class of module.

2. **When the lever engages with the chassis, raise it to push the module fully home.**

3. **Move the slide in the lever into the engaged position.**

Replacing an RMM

RMM modules have a slide with an actuator microswitch on an ejector handle. The slide controls the electrical connection to the motherboard. When the slide is closed (to the right), the electrical connection is engaged; when it is open (to the left), the electrical connection is disengaged. The handle is lifted to disengage the module physically, and lowered to engage it.

▼ To Remove the RMM

1. **Slide the latch in the handle of the RMM to the left (towards the ‘unlocked’ symbol).**

2. **Lift the handle.**

3. **Slide the RMM out of its slot.**

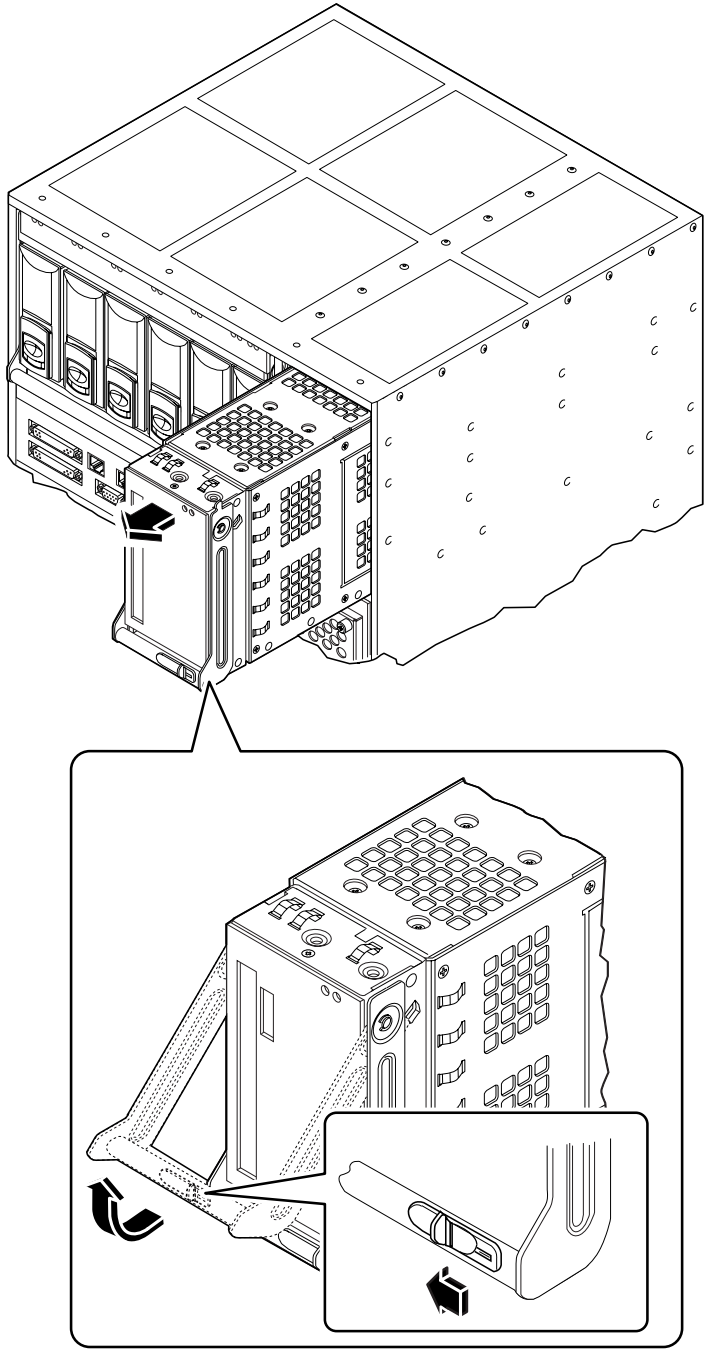


FIGURE 2-8 Removing an RMM Module

▼ To Replace the RMM

1. **Slide the RMM into its slot until it is almost completely home.**

   A module will not fit into a slot designed for a different class of module.

2. **Lower the handle to engage the RMM fully in its slot.**

3. **Slide the latch in the handle to the right (towards the 'locked' symbol).**

Replacing a Disk Chassis

DSK modules have a slide on an ejector handle. The handle is lifted to disengage the module physically, and lowered to engage it.

▼ To Remove the Disk Chassis

1. **Remove any HDD modules (hard disks) in the disk chassis.**

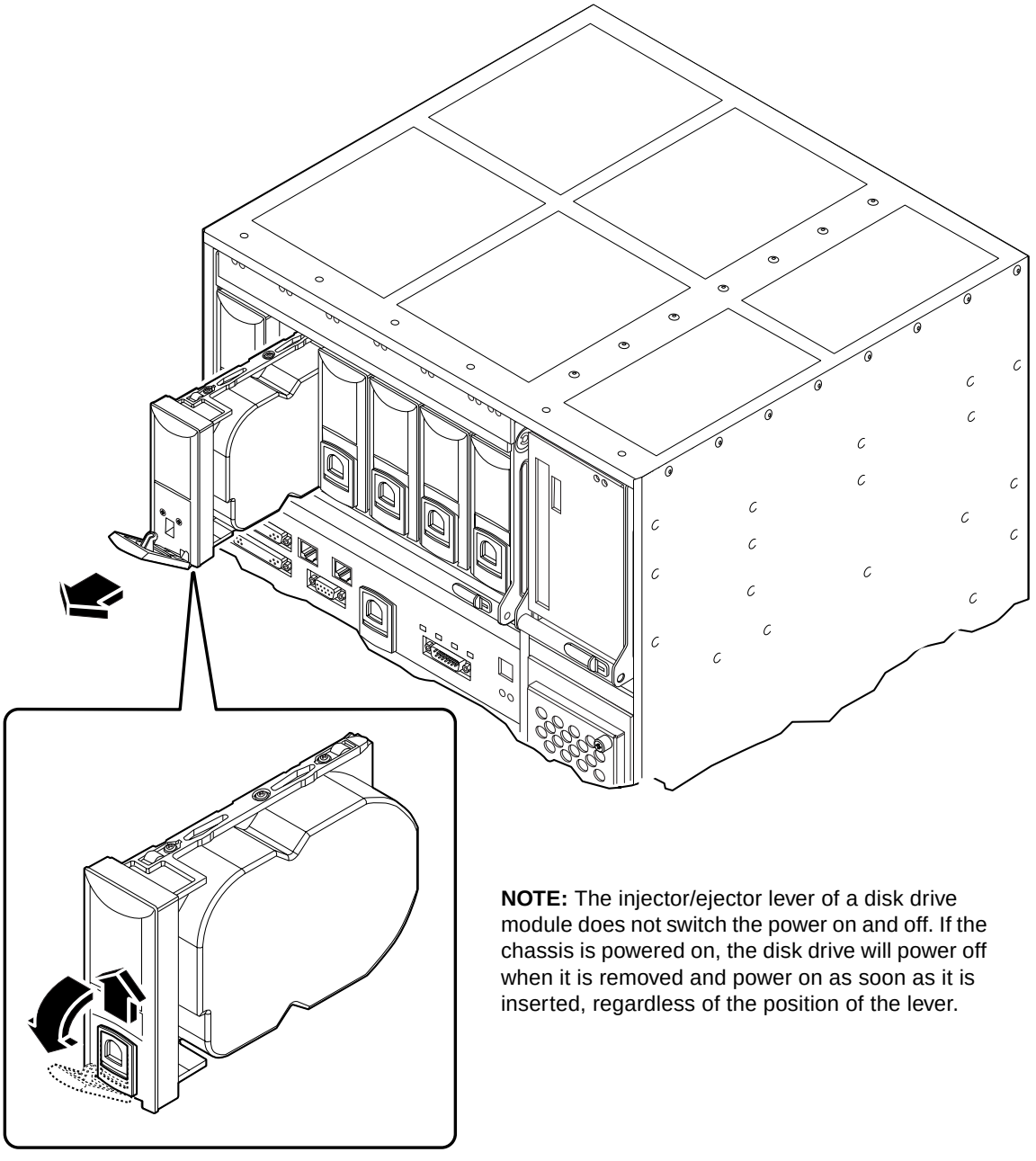
   Refer to FIGURE 2-9 on page 26.

Caution – Always remove all hard disk drive modules before removing a disk chassis. Always put a hard disk back in the same location from which you removed it.

2. **Slide the latch in the handle of the disk chassis to the left (towards the 'unlocked' symbol).**

3. **Lift the handle.**

4. **Slide the disk chassis out of its slot.**



NOTE: The injector/ejector lever of a disk drive module does not switch the power on and off. If the chassis is powered on, the disk drive will power off when it is removed and power on as soon as it is inserted, regardless of the position of the lever.

FIGURE 2-9 Removing a Disk Drive

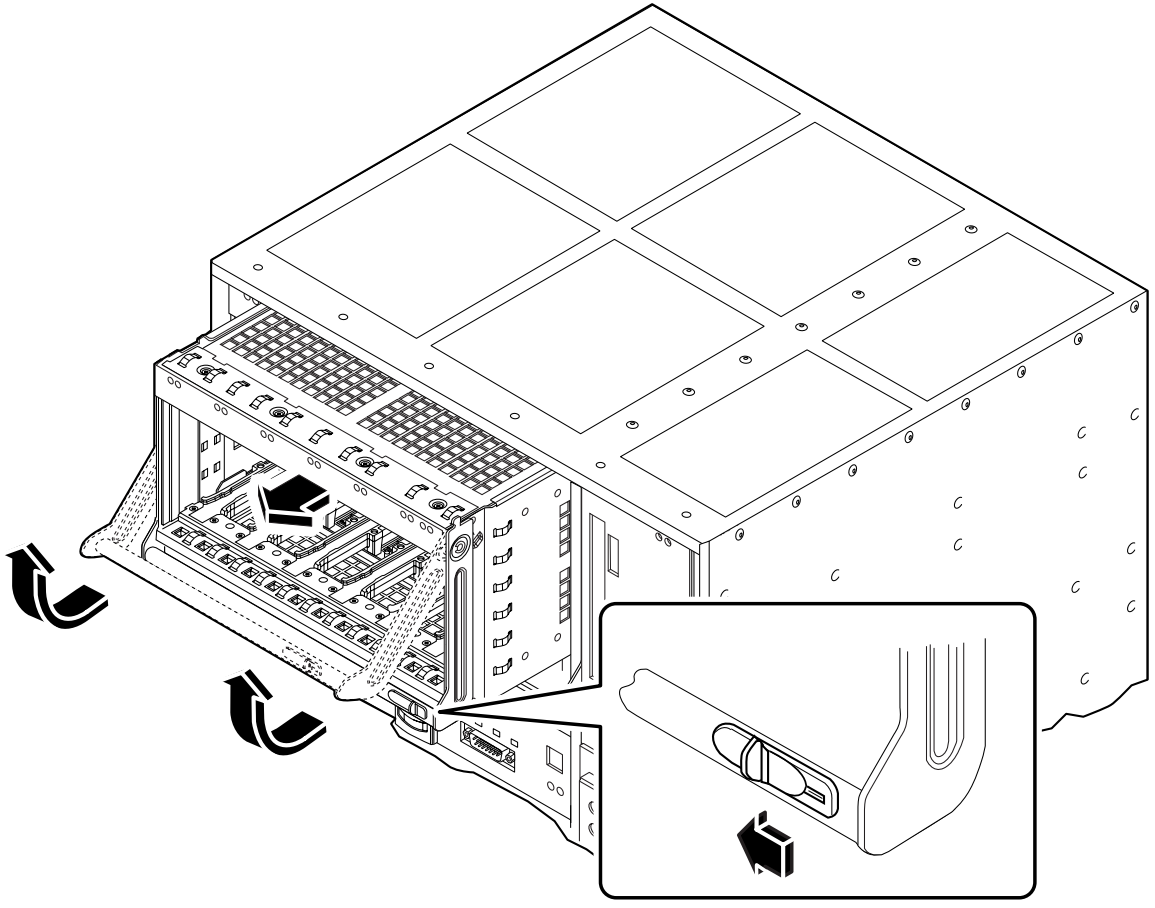


FIGURE 2-10 Removing a DSK Module

▼ To Replace the Disk Chassis

1. **Slide the disk chassis into its slot until it is almost completely in.**
2. **Lower the handle to engage the disk chassis fully in its slot.**
3. **Slide the latch in the handle to the right (towards the ‘locked’ symbol).**
4. **Replace the hard disk drives.**

Flexible Module Cabling

The cable management shelf is illustrated in FIGURE 2-11.

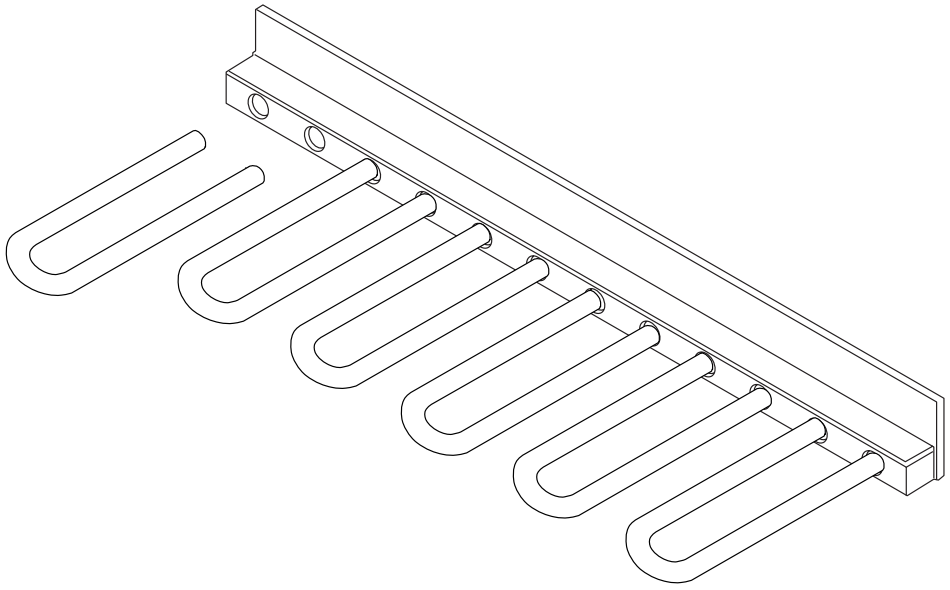


FIGURE 2-11 Cable Management Shelf

The cable management shelf adjacent to the PCI card locations is flexible and can be used in a number of different configurations. The holes are equidistant, and the hooks can be inserted in whatever position is required. The hooks are a firm push-fit into the holes.

Installing the Filter Trays

The Netra ft 1800 has three filter trays, two large and one small.

▼ To Install the Filter Trays

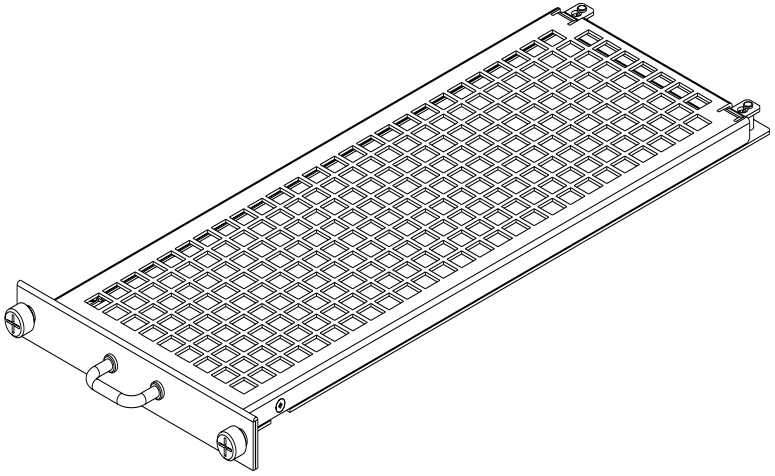


FIGURE 2-12 Large Filter Tray

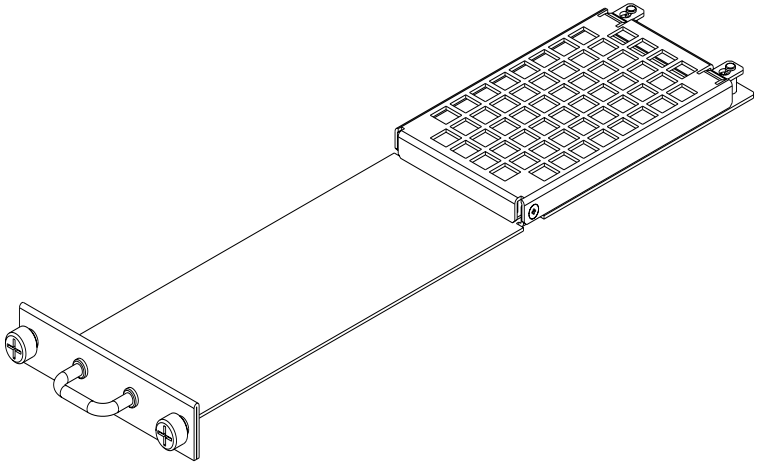


FIGURE 2-13 Small Filter Tray

1. **Insert the trays into the appropriate apertures at the base of the chassis; the two large trays are fitted on the left and the small tray on the right.**

   It is unimportant which way up the trays are fitted.

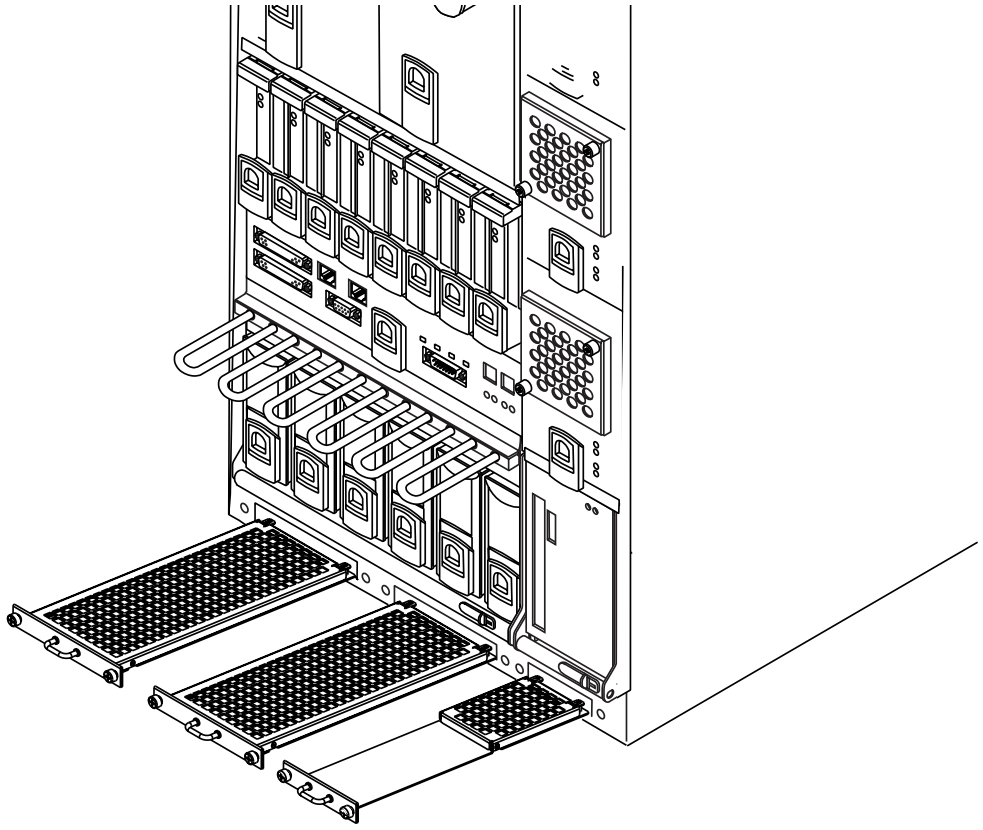


FIGURE 2-14 Inserting the Environmental Filters

2. **Push the trays securely home and hand-tighten the two thumbscrews on each.**

   The thumbscrews are inserted into the tapped threads exposed by removal of the sacrificial mounting plinth.

CAF External I/O Connections

The Netra ft 1800 system has the following connectors on each CAF module:

- Female 25-pole D-type connectors for the system console and modem ports (RS232).
- A female 9-pole D-type connector for the Remote Control Processor (RCP) ports.
- A male 15-pole D-type connector for the alarm relay/reset signals.
- Two RJ45 Ethernet ports.

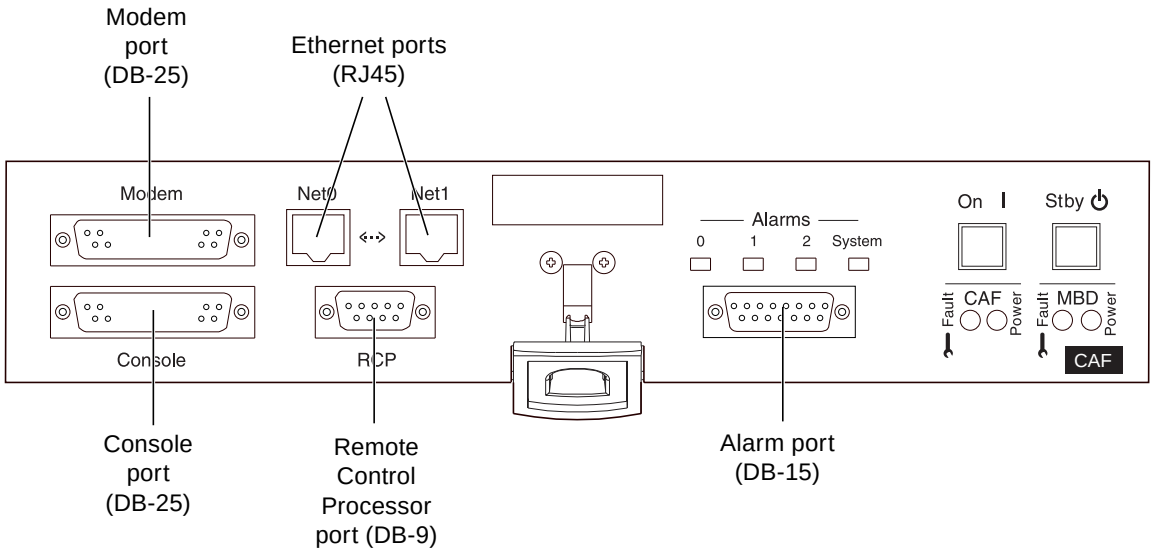


FIGURE 2-15 External I/O Connections on CAF Module

System Console Terminal Connections

The system console and modem connections are provided on separate 25-pole female D-type connectors. TABLE 2-1 shows the pin allocation on these connectors.

TABLE 2-1 Console Connector Pinout

Pin	Function	Description
1	GND	Chassis ground
2	TxD	Output data
3	RxD	Input data
7	SREF	Signal reference
Shield		Chassis ground

Except for pin 1, all pins of the console and modem connectors are isolated from the frame ground of the Netra ft 1800 system.

The connectors have two screw-threaded mounting pillars with 4-40 UNC threads. You should secure the cable headshell in place with the screws engaged in these pillars. If you use a cable headshell without securing the screws, make sure that the pillars do not prevent full engagement of the connector. This can happen with some types of cable headshell where screw heads can foul against the mounting pillars.

You must also secure the other end of the cable to the console terminal if the terminal provides some means of locking.

Note – To ensure EMC compliance always use a high quality screened cable that has metal connector shells.

TABLE 2-2 shows the console terminal configuration parameters for both console and modem ports. You can modify these parameters using Solaris utilities such as `stty`(1). Refer to the *Solaris System Administration Guide* for more details.

TABLE 2-2 Console and Modem Port Parameters

Parameter	Setting
Transmit rate	9600 baud
Receive rate	9600 baud
Data bits	8

TABLE 2-2 Console and Modem Port Parameters *(Continued)*

Parameter	Setting
Stop bits	1
Parity enable / sense	off / off
XON / XOFF protocol	on

System consoles can be connected only to the CAF module.

Modem Port Connections

The modem port pinout is described in TABLE 2-3.

TABLE 2-3 Modem Port Pinout

Pin	Function	Description
1	GND	Chassis ground
2	TxD	Output data
3	RxD	Input data
4	RTS	Output handshake
5	CTS	Input handshake
7	SREF	Signal reference
8	DCD	Input status
20	DTR	Output status
Shield		Chassis ground

Alarms Port Connections

The alarms port pinout is described in TABLE 2-4.

TABLE 2-4 Alarms Port Pinout

Pin	Description	Pin	Description
1	RESET0+	9	ALARM0-NC
2	RESET0-	10	ALARM0-COM
3	RESET1+	11	ALARM1-NO
4	RESET1-	12	ALARM1-NC
5	SYSTEM-NO	13	ALARM1-COM
6	SYSTEM-NC	14	ALARM2-NO
7	SYSTEM-COM	15	ALARM2-COM
8	ALARM0-NO		

RCP Port

There is an RS232 connection to the Remote Control Processor (RCP) on the motherboard. Connection is via a female DB-9 whose pinout is shown in TABLE 2-5.

TABLE 2-5 Remote Control Processor Port Pinout

Pin	Function	Description
2	TxD	Output data
3	RxD	Input data
5	SREF	Signal reference
Shield		Chassis ground

CHAPTER 3

Electrical Supply Installation

This chapter provides information about the Netra ft 1800 system switches and the installation of the electrical supply. See the *Netra ft 1800 Hardware Reference Manual* for full details of the electrical supply hardware.

The Netra ft 1800 has six power input feed pairs, three for each side, which plug in to the back of the system. These must be assembled by the user, as described in “Connecting the Power Leads” on page 47.

Note – This equipment is only intended for installation in a Restricted Access Location as defined by UL1950, 3rd Edition, and EN60950: 1992 / A11: 1997.

Note – In NORWAY, this equipment must only be installed in areas where equipotential bonding has been applied, e.g. a telecommunication Central Office.

Note – The system will only power up if the input voltage is in the range –40 to –60 VDC.

System Switch

The Netra ft 1800 in fault tolerant mode consists of two *sides*: processors and associated modules which function and are powered as separate systems. The system switches of the Netra ft 1800 function as standby devices for their respective sides, enabling and disabling the power supply units (PSU) outputs. The system switches are push, momentary switches. They are located on the CAF module on each side of the system.

The system does not contain any integral circuit breakers. The only means of isolating the system from power is by means of external circuit breakers, to be provided by the user.

Note – The system On and Stby switches handle low voltage signals only; the high-power circuits do not pass through these switches.

DC Source Site Requirements

The DC source site requirements are as follows:

- Suitable for use in –48 VDC (classified SELV) nominal or –60 VDC (classified TNV-2) nominal systems.
- The supply source must be electrically isolated by double or reinforced insulation from any hazardous AC or DC source.
- The DC source must be reliably connected to earth (for example, battery room positive bus is connected to the grounding electrode).
- The DC source must be capable of providing up to 925W of continuous power per feed pair. The sum of all three feeds on one side will be less than 1500W for single-feed and 3000W for dual feed.

Overcurrent Protection Requirements

Overcurrent protection devices must be provided as part of each host equipment rack.

The supply source must be electrically isolated from any AC source or other voltages by double or reinforced insulation.

Circuit breakers meeting the requirements shown in TABLE 3-1 must be fitted between the DC source and the Netra ft 1800 such that they are ON in the UP position.

TABLE 3-1 Overcurrent Protection Requirements

Current rating	30A maximum
Voltage	Maximum 60 VDC rated in –48 VDC power systems Maximum 75 VDC rated in –60 VDC power systems
Type	Fast trip

TABLE 3-1 Overcurrent Protection Requirements *(Continued)*

Protection	EITHER: Double pole breaking (both grounded and ungrounded conductor open on fault) OR: Single pole breaking ungrounded conductor (–48V) to open on fault. Circuit breakers can be used in configurations to match those shown in FIGURE 3-4 on page 41, FIGURE 3-5 on page 42 and FIGURE 3-6 on page 43. Double Pole breakers MUST be used in the configuration shown in FIGURE 3-3 on page 40.
Contact gap	Minimum 3 mm
Nuisance tripping	Circuit breaker must not operate when presented with an inrush current of 27 amps and a duration of 2.5 microseconds
Quantity	One per feed, up to 12 per system

Caution – Double pole circuit breakers are required for installations with dual feeds to any Netra ft 1800 PSU but without a local common return point. The reason for this is the possibility of high currents looping in the return conductors and through the PSU due to a fault elsewhere in the installation. FIGURE 3-1 shows the fault situation where a problem external to the Netra ft 1800 causes an unrestricted current flow through the PSU (shown by the dotted line).

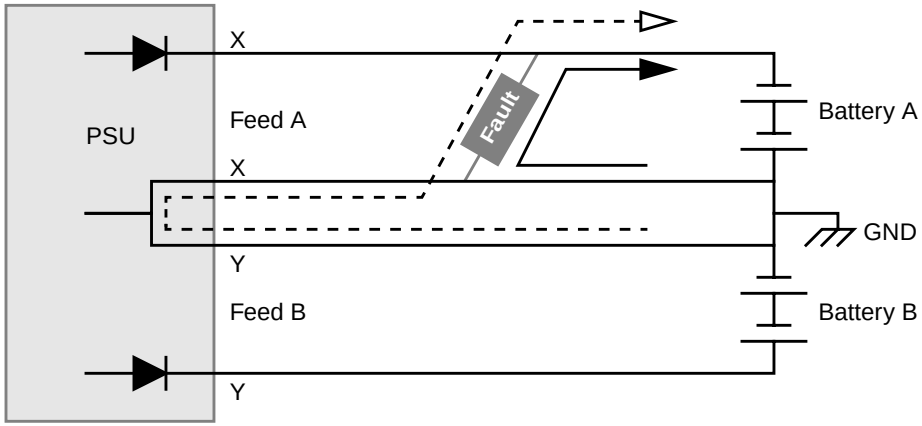


FIGURE 3-1 PSU Fault Situation

Caution – Only by placing double pole circuit breakers at X-X and Y-Y can the return path through the PSU be broken.

Note – Four single pole breakers do not provide an alternative, as one of the breakers in the return can be open without indicating a failure in the PSU.

Note – Overcurrent devices must meet applicable national and local electrical safety codes and be approved for the intended application.

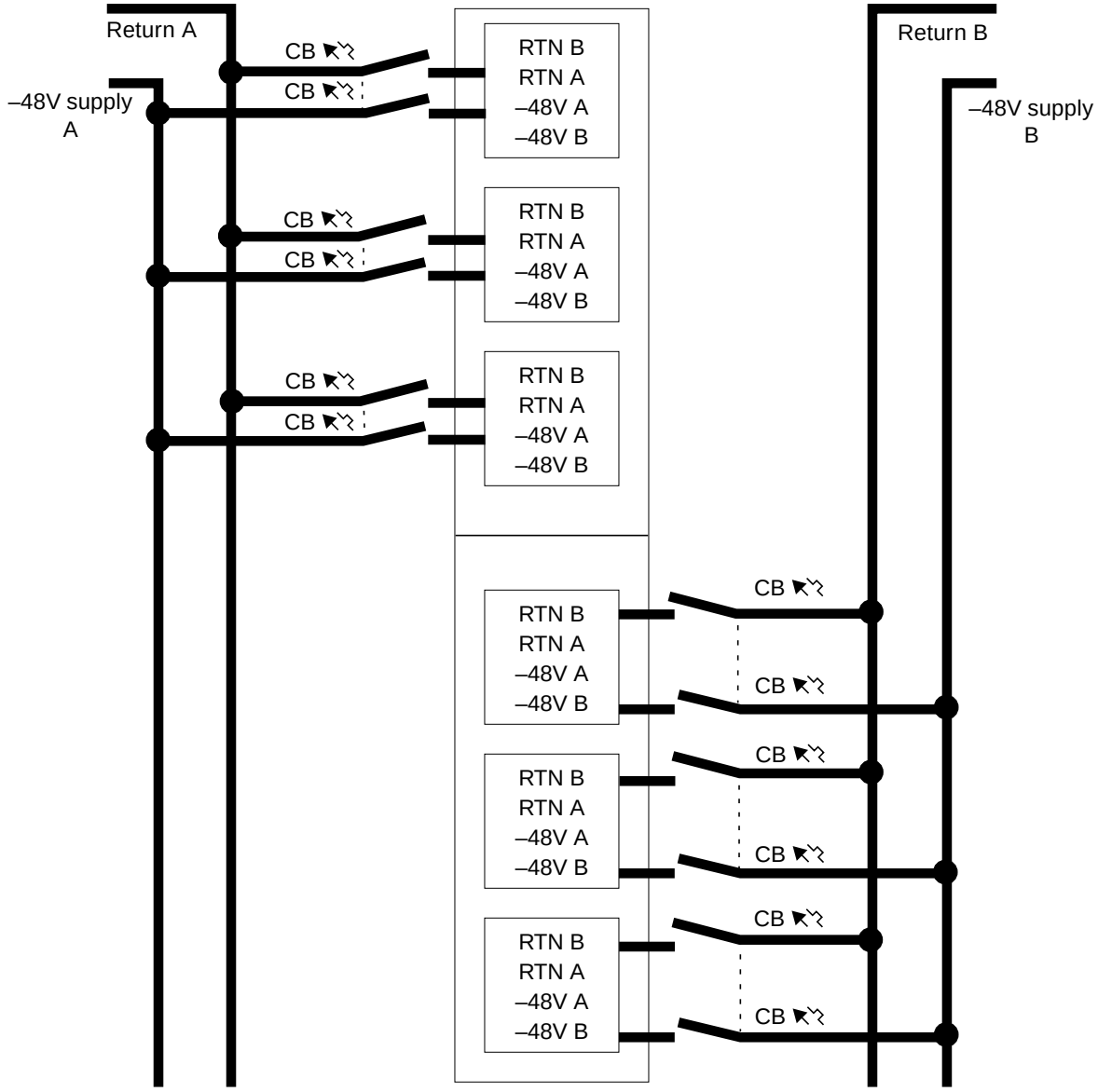


FIGURE 3-2 Circuit Breakers for Single Power Rails

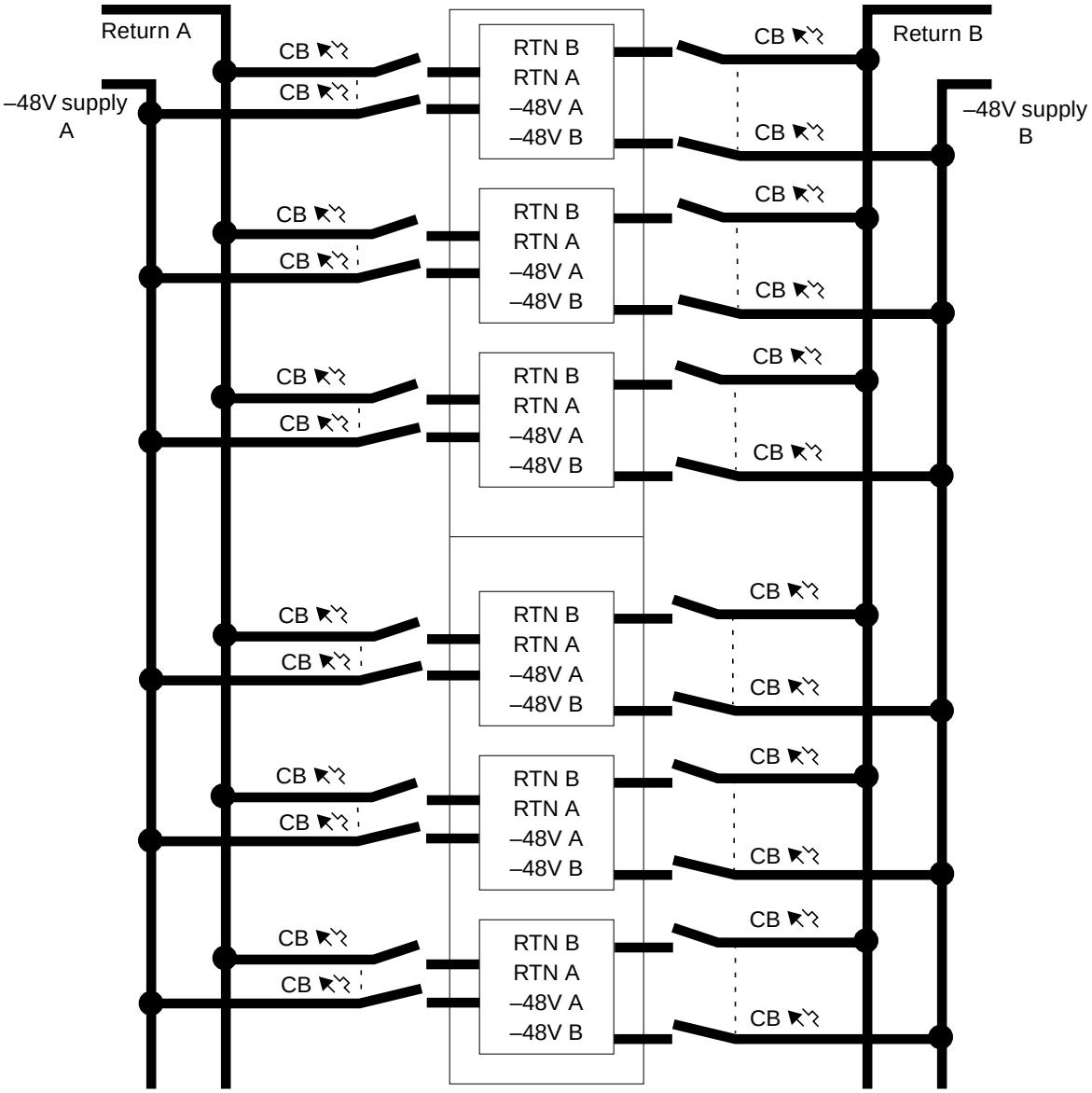


FIGURE 3-3 Circuit Breakers for Dual Power Rails

Note – Dual feed configuration with independent return circuits to source. Double pole circuit breakers must be used.

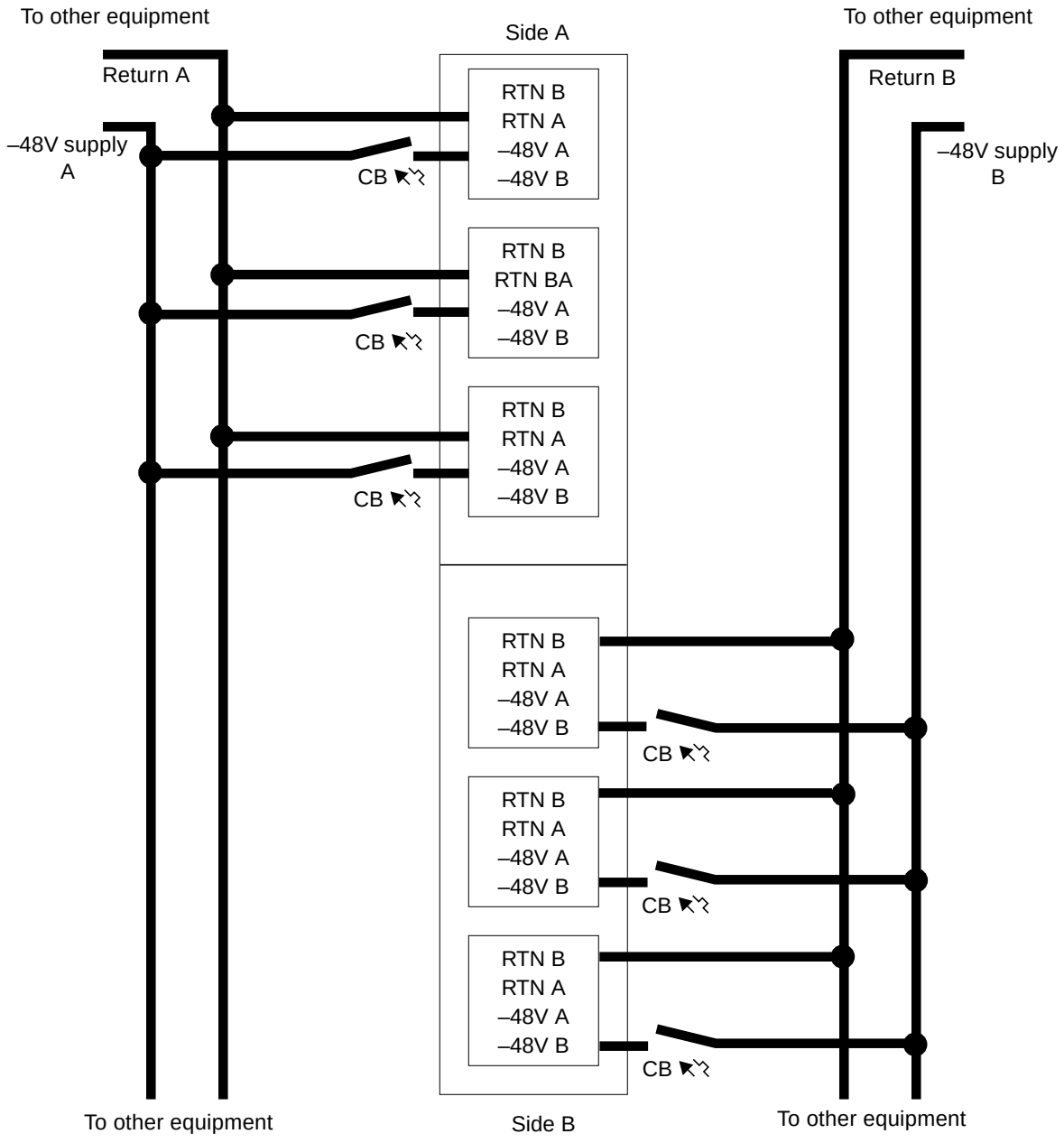


FIGURE 3-4 Sided Independent Feeds with Single Pole Circuit Breakers

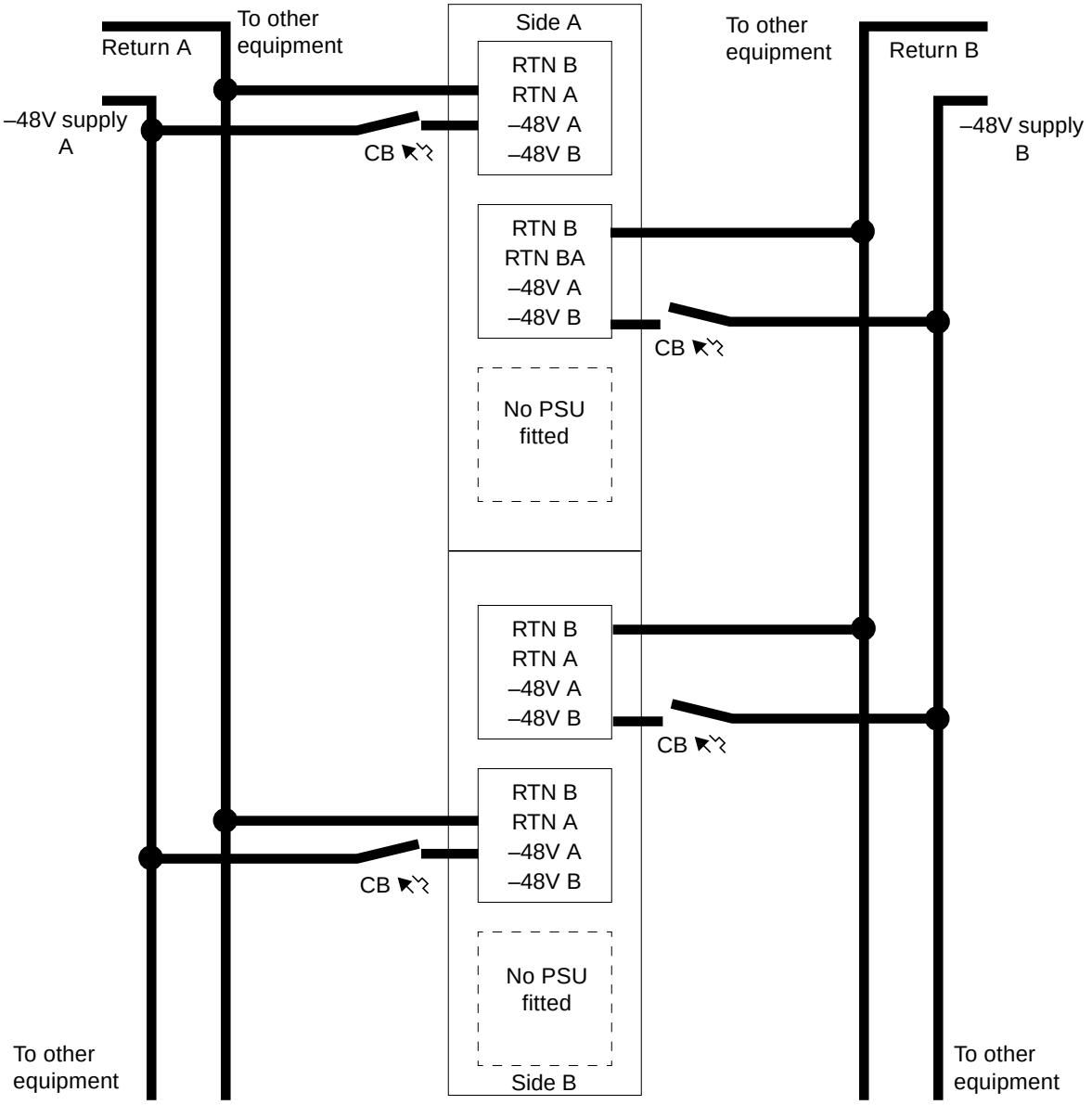


FIGURE 3-5 Side-independent Feeds to Each PSU with Single Pole Circuit Breakers (double pole can be used)

Note – This is only applicable for smaller Netra ft 1800 configurations, that is, those with only two PSUs per side configured to provide redundancy.

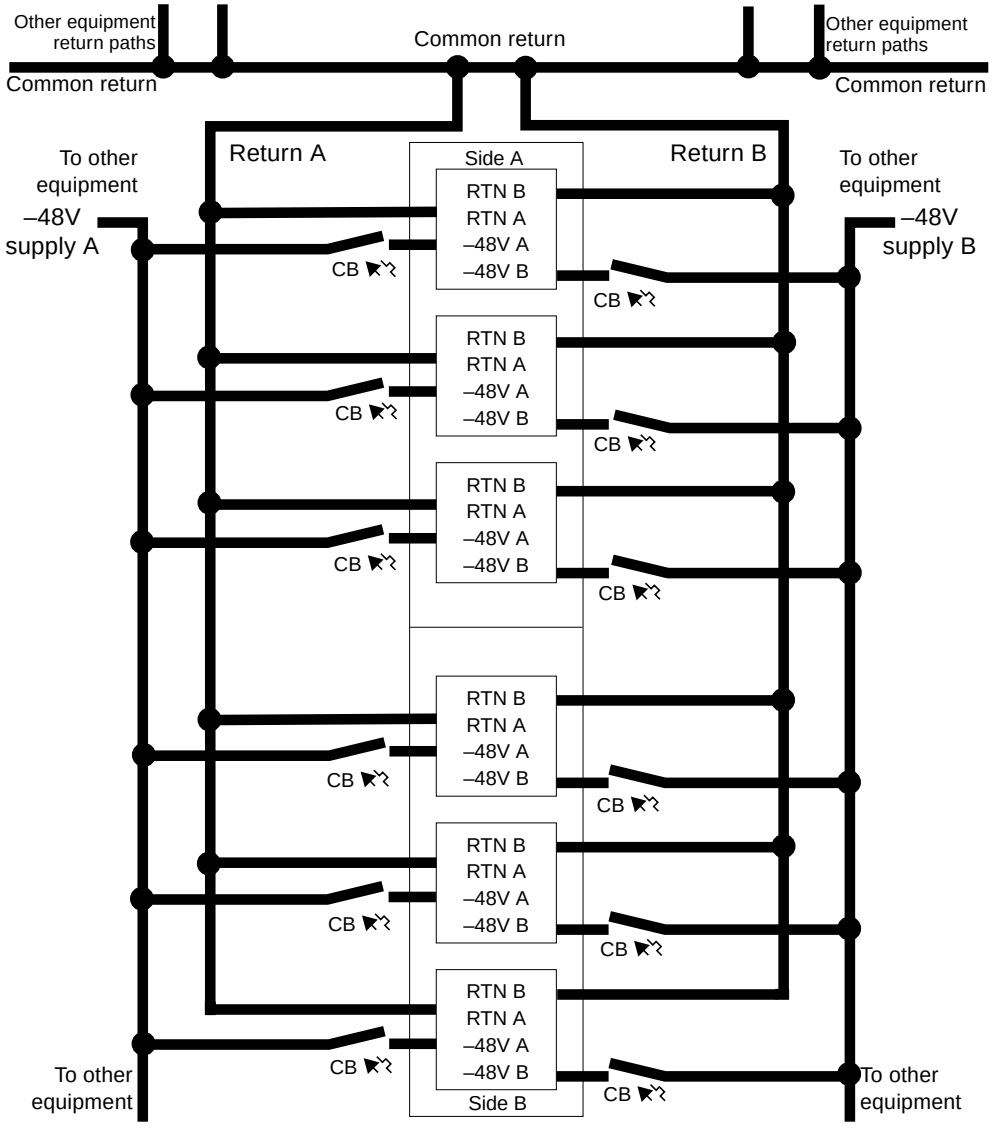


FIGURE 3-6 Dual Feeds with Local Common Return – Single Pole Circuit Breakers (double pole can be used)

Caution – To meet the criterion of a Local common return, the return lines from the Netra ft 1800 must go directly to the Common point without linking to the returns from other equipment. The Return A and Return B lines for each PSU must be adjacent on the Common point (within 100 mm of each other).

Required Connection Materials

DC branch circuits:

- The required number of field wiring kits are supplied in the shipkit with each system, according to configuration.

Grounding:

- One Thomas & Betts two-hole lug (part number: 54204-UB) suitable for 8 AWG conductor or UL/CSA approved equivalent having 5/8-inch pitch; torque value: 3.5 Nm maximum.
- A Thomas & Betts crimping tool (part number: TBM 5-S), or approved equivalent to secure the lug on to the cable.
- A grounding bus bar that is near the equipment and easily accessible.

Dual Grounding Environment:

- Additional Thomas & Betts two-hole lug for logic 0V studs.

Caution – External filtering and/or surge suppression devices may be required on the power feeds where branch circuit electromagnetic characteristics are unknown.

DC Supply and Ground Conductor

The requirements are:

- Suitable conductor material: copper only.
- Supply conductors: 8 AWG (6 sq.mm) (between the Netra ft 1800 and the circuit breaker).
- Ground conductor: 8 AWG.
- Cable insulation rating: minimum 75 degrees Celsius, Low Smoke Fume (LSF), Flame Retardant.
- Cable type must be one of:
  - UL style 1028 or other UL 1581 compliant equivalent.
  - IEEE 383 compliant.
  - IEEE 1202-1991 compliant or classified.
- Branch circuit cable insulation color: per applicable national electrical codes.
- Grounding cable insulation color: green/yellow.

Dual Grounding Environment

Caution – To be compatible with grounding environments requiring isolation between logic 0V and chassis ground, the fitted grounding bridge plate must be removed and individual connections made to logic 0V and chassis ground studs. The grounding bridge plate is located on the middle rear left edge of the unit between the motherboards. The grounding studs at the base of the chassis are M5 studs with appropriate nuts already installed.

Before installation for dual grounding systems, remove the link from the chassis to logic 0V. This exposes a 2-hole lug with tapped M5 threads (refer to FIGURE 3-7).

Caution – The use of certain PCI cards causes the frame and logic grounds to be commoned. Refer to the documentation supplied with the PCI card.

▼ To Connect the Ground Lead

1. **Strip 9 mm of insulation from each end of the grounding lead.**
2. **Insert the lead into the Thomas & Betts two-hole lug provided (part no. 52024-UB).**

   Ensure that both the conductor and its insulation are gripped by the lug.
3. **Position the lug and grounding lead assembly over the grounding studs.**

   Refer to FIGURE 3-7 on page 46. Tighten the two M5 nuts over the locking washers provided.
4. **Make the connection to the earthing bar at the end of the grounding lead.**

   Ensure there is adequate strain relief for the cable.

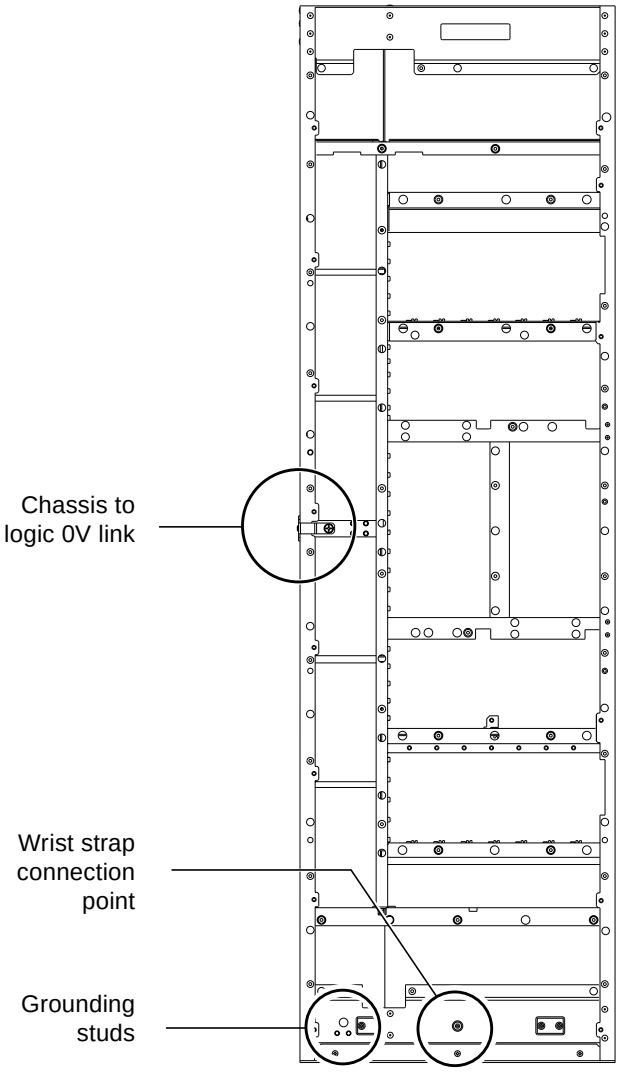


FIGURE 3-7 Location of Chassis-to-Logic-0V Link and Grounding Points, and Wrist Strap Connection Point

Connecting the Power Leads

The inlet power connector must be plugged into the power sockets on the motherboards at the back of the Netra ft 1800, then the six power leads must be attached to the input power connector.

Note – Disengage all the PSUs before you insert the power connectors. Inserting the connectors with the PSUs engaged can damage the connectors.

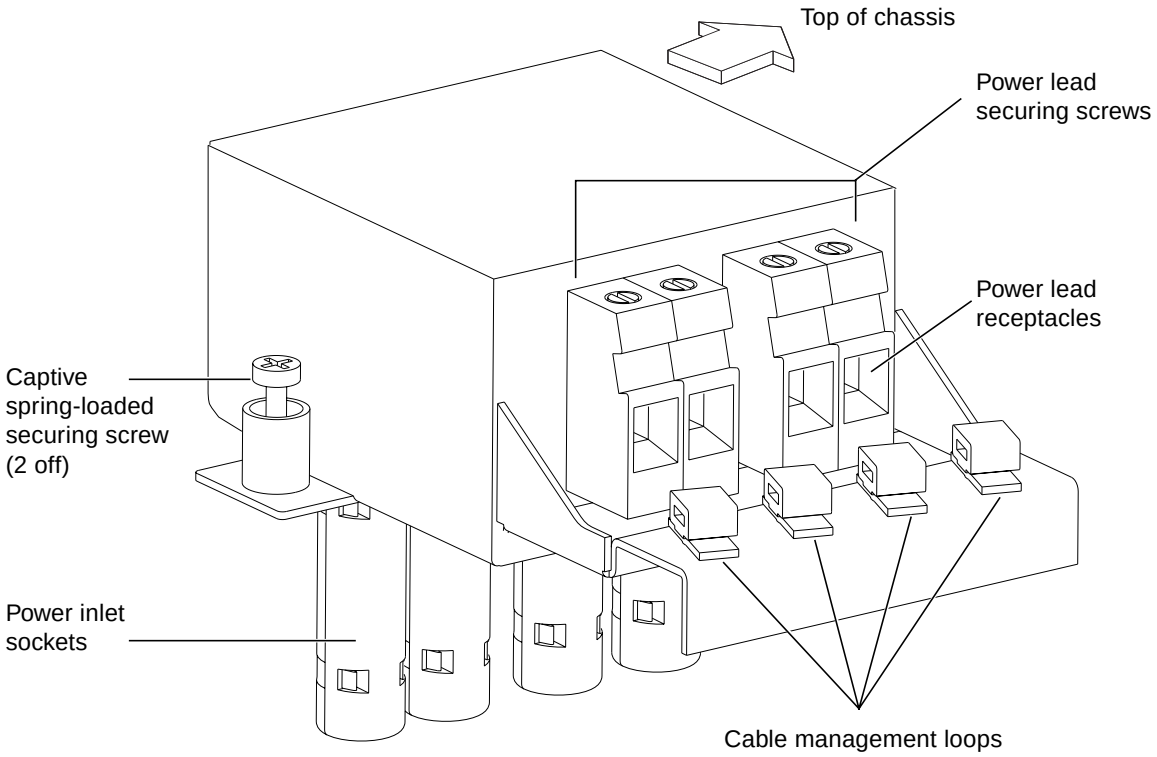


FIGURE 3-8 Power Inlet Connector

▼ To Assemble the Power Inlet and Leads

1. **Insert the socket in the appropriate slot on the motherboard.**

   The socket can only be inserted one way round. The label on the front of the connector indicates the correct orientation.

2. **Tighten the captive spring-loaded screws, preferably finger-tight only.**

   If you use a screwdriver, these screws should be tightened no more than 6 in-lbf (0.68 Nm). Refer to FIGURE 3-9.

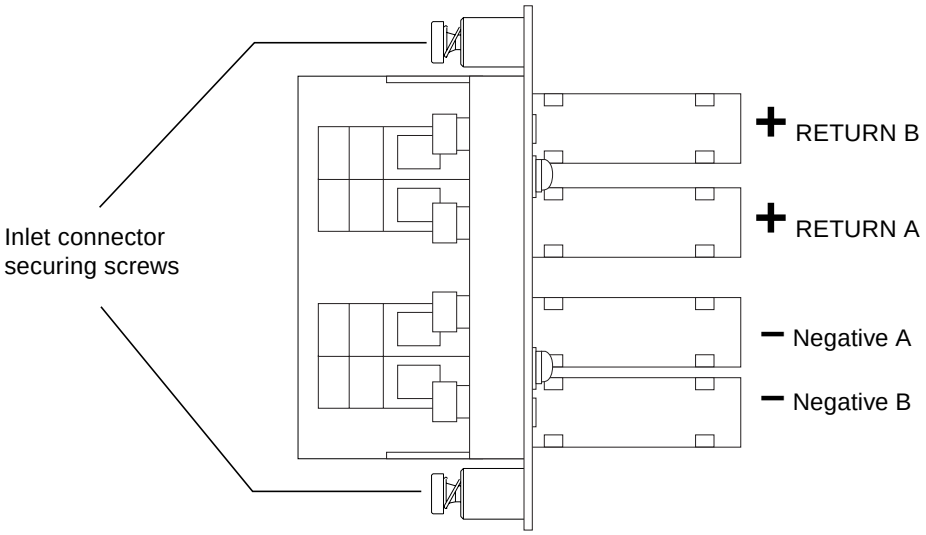


FIGURE 3-9 Power Connector Wiring Polarity and Securing Screws

3. **Strip 9 mm of insulation from boths ends of each power lead.**

   The connectors will not accommodate leads of greater than 8 AWG (6 sq.mm).

4. Insert the leads into the appropriate receptacles in the terminal block.

Refer to FIGURE 3-10.

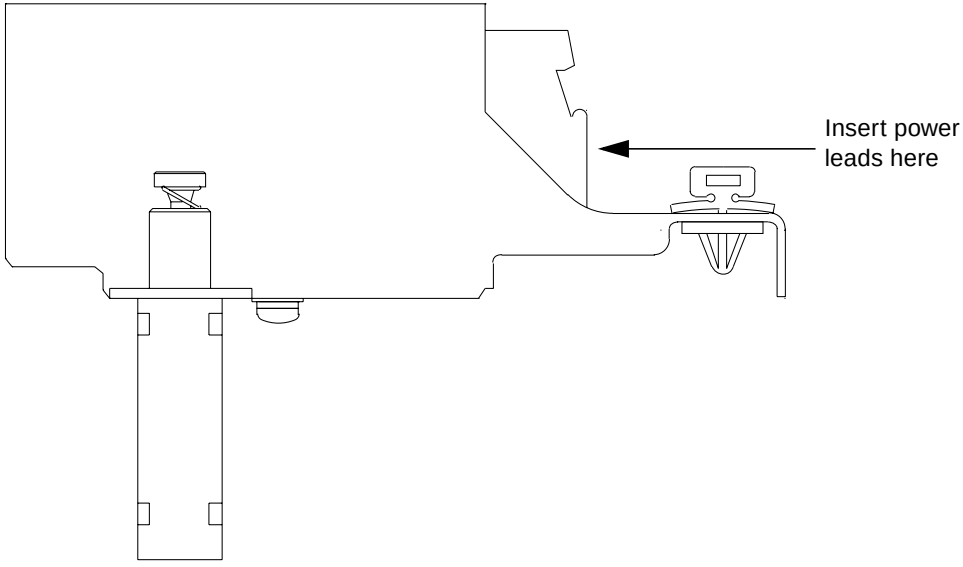


FIGURE 3-10 Power Lead Receptacles

5. Tighten the terminal block power lead M4 securing screws to 1.5-1.8 Nm.

Refer to FIGURE 3-11.

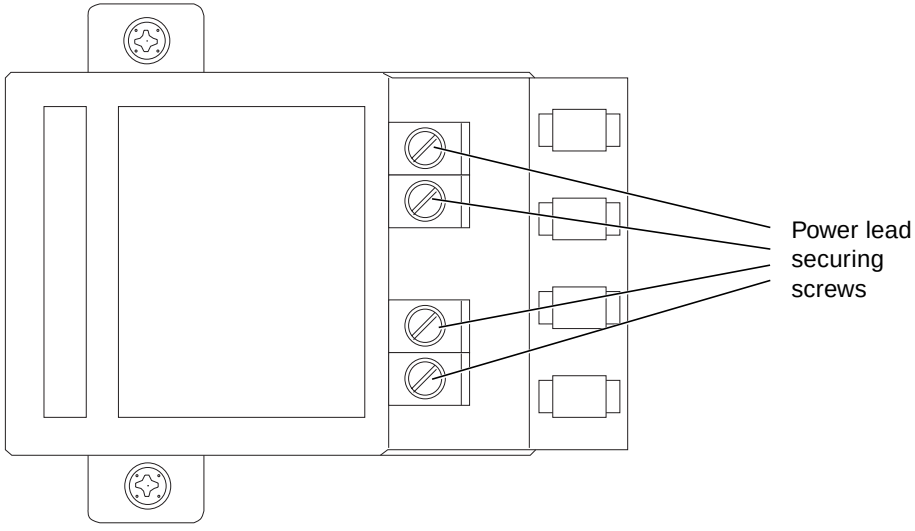


FIGURE 3-11 Power Lead Securing Screws

6. **Use cable ties to secure the wires to the swivel loops in the mounting bracket (see** FIGURE 3-12**).**

   The loops can be rotated to a convenient position. This strain relief method *must* be implemented.

Caution – Observe correct working practices regarding the termination of cable ties.

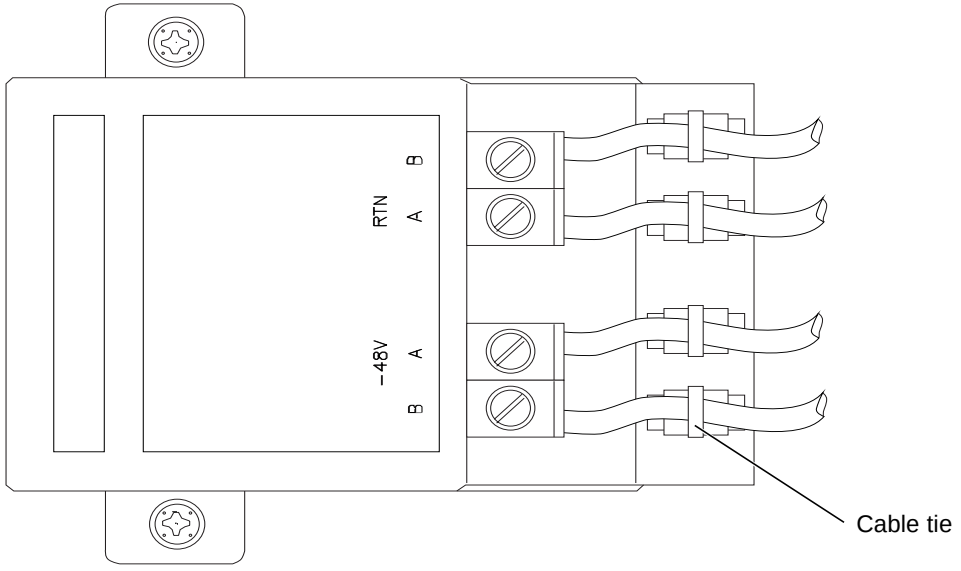


FIGURE 3-12 Power Cable Arrangement for Strain Relief

7. **Ensure the circuit breakers are open, then connect the other ends of the leads to the circuit breakers.**

   Secure the cables using adequate strain relief.

CHAPTER 4

Powering on the System

This chapter describes the procedure for powering on the Netra ft 1800.

▼ To Power On the System

1. **Prior to powering on, inspect the supply conductors for mechanical security.**
2. **Activate the external circuit breakers.**

Note – The power supply units (PSUs) remember their last requested state. They are shipped in the ON state. Because the external circuit breaker is activated when the last state of the PSU was ON, the PSU will power up at this point.

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3. **Push the On (green) system switch on either CAF.**

4. Push the other On (green) system switch (on the other CAF front panel).

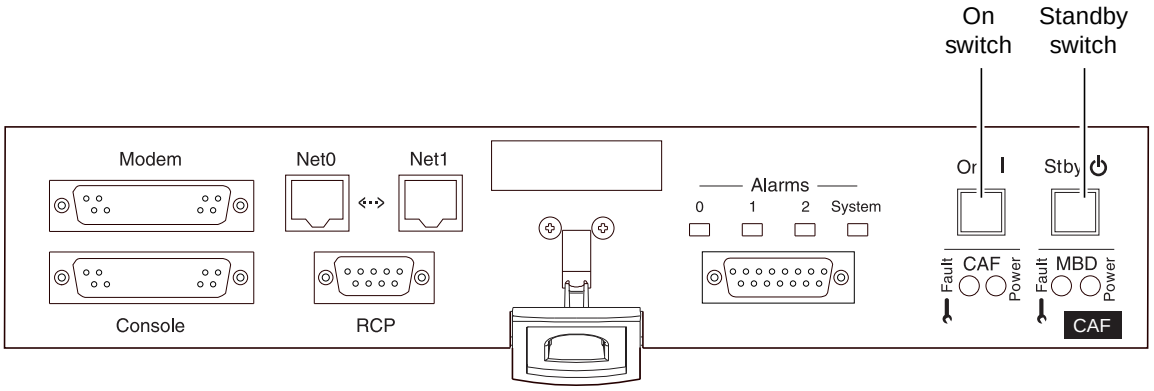

FIGURE 4-1 System Switches (Front Panel)

The PSU, CPUset and CAF *Power* LEDs will successively light, and the terminal will display the output from the Power On Self Test (POST). The POST sequence may take some time.

The CPUset LEDs will perform their own test sequence towards the end of the POST procedure, then the *Target* LED on one of the CPUsets will flash as the OBP ok prompt appears.

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