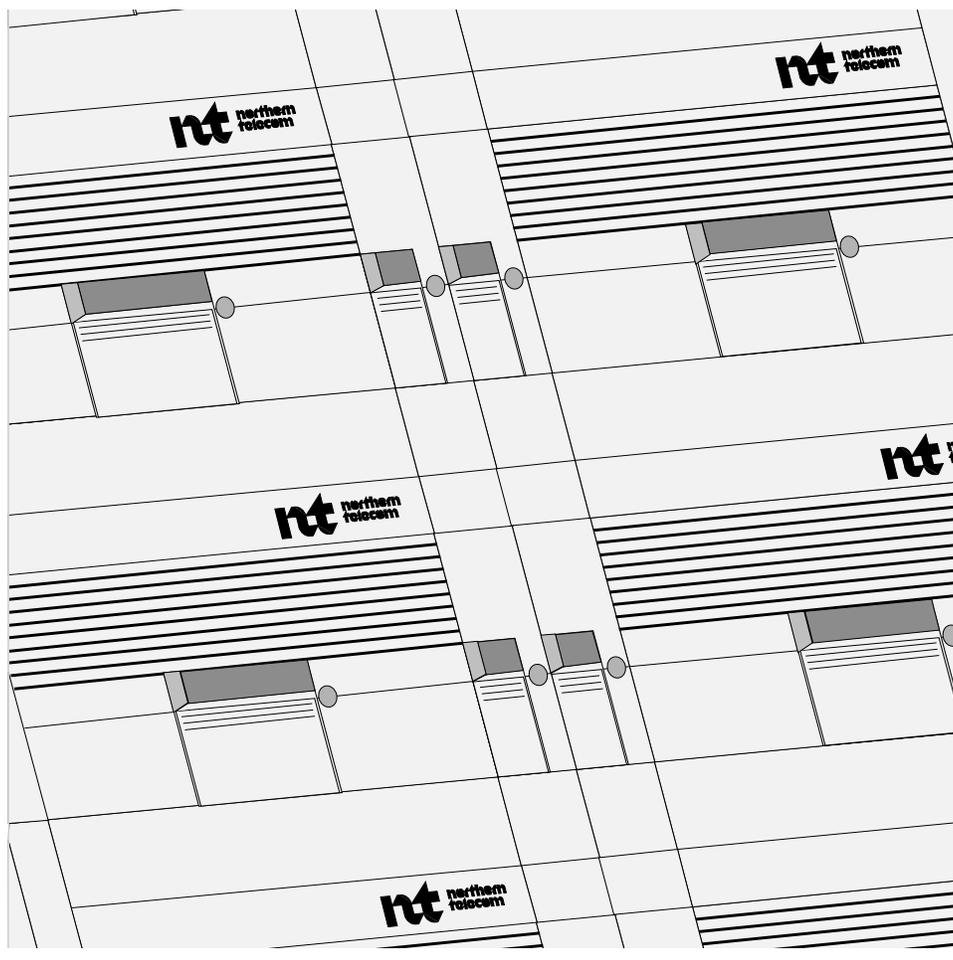**NT4K00LA**   **323-3001-546**

SONET Products

AccessNode

Routine Maintenance Procedures

Issue 2.0   October 1999

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AccessNode

Routine Maintenance Procedures

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FWP06 standard release of the document.

Contents

About this document

Audience

This document give maintenance personnel procedures for performing routine maintenance on AccessNode equipment.

How to use this document

Use the chapter contents in Chapter 1 as a guide to locate the procedures you need to perform. This list points you to the correct procedure and page number. You need only perform the procedures for your specific task.

For AccessNode Express routine maintenance procedures, refer to the *AccessNode Express Maintenance Guide*, 323-3051-211.

For routine maintenance intervals for cabinets, refer to the individual NTPs for those cabinets.

References in this document

This document refers to the following documents:

Installation documents

- *Equipment Installation Operation and Maintenance*, 169-2071-500
- *Modular Business Package Installation Manual*, 323-3001-206
- *Series 800A Outside Plant Cabinet Installation Manual*, 323-3001-210

Commissioning and Testing, Volume 3

Operations, Administration, and Provisioning, Volume 4A

- *System Administration Procedures,* 323-3001-302

Maintenance Volume, 5A

- *Alarm and Trouble Clearing Procedures,* 323-3001-543

Maintenance Volume, 5C

- *Module Replacement Procedures*, 323-3001-547

AccessNode Express documents

- *AccessNode Express Maintenance Guide*, 323-3051-211

Overview of routine maintenance procedures

This chapter provides procedures for performing routine maintenance on AccessNode equipment.

For information on procedures for performing routine maintenance on the AccessNode Express, refer to the *AccessNode Express Maintenance Guide*, 323-3051-211.

Routine maintenance tasks

In the following table, look up the task you are required to perform, and proceed to the page or document specified. If you cannot successfully complete these procedures, contact your next level of support.

Topic	See
Procedure 2-1, Changing the air filter in a bay	page 2-2
Procedure 2-2, Vacuuming the cooling unit grille in a bay	page 2-4
Procedure 2-3, Changing lamps on the breaker interface panel	page 2-8
Procedure 2-4, Replacing the display circuit pack on the breaker interface panel	page 2-12
Procedure 2-5, Cleaning OPC tape drive heads	page 2-14
Clean and assemble optical connectors	*Commissioning and Testing*, Volume 3
Procedure 3-1, Removing the breaker interface panel cover	page 3-2
Procedure 3-2, Replacing the breaker interface panel cover	page 3-3
Procedure 3-3, Installing the common-equipment shelf cover	page 3-4
—continued—	

Topic	See
Procedure 3-4, Removing the common-equipment shelf cover	page 3-6
Procedure 4-1, Maintaining the OPC	page 4-2
Procedure 4-2, Cleaning the OPC internal digital data storage (DDS) tape drive heads	page 4-5
Procedure 5-1, Checking and adjusting MPP rectifier float and equalize voltages	page 5-2
Procedure 5-2, Changing the MBP air filter	page 5-3
Remove or install the MBP/MPP equipment covers	*Modular Business Package Cabinet Installation Guide*, 323-3001-206
Open and close the doors of the S800A OSP cabinet	*Series 800A Outside Plant Cabinet Installation*, 323-3001-210
Procedure 6-1, High voltage shutdown adjustments for replacement rectifiers	page 6-2
Procedure 6-2, Setting equalize (EQL) voltage level	page 6-7
Procedure 6-3, Adjusting the float voltage	page 6-9
Procedure 6-4, Load sharing adjustments for replacement rectifiers	page 6-11
Procedure 6-5, Replacing the fan filters in the heat exchanger roof	page 6-15
Procedure 6-6, Replacing the fan filters in the air induction roof	page 6-17
—**end**—	

Performing routine maintenance

Chapter contents

In the following table, look up the routine maintenance task you are to perform, and proceed to the specified page or document.

> *Note:* For information on procedures for performing routine maintenance on the AccessNode Express, refer to the *AccessNode Express Maintenance Guide*, 323-3051-211.

If you cannot successfully complete these procedures, contact your next level of support.

Topic	See
Procedure 2-1, Changing the air filter in a bay	page 2-2
Procedure 2-2, Vacuuming the cooling unit grille in a bay	page 2-4
Procedure 2-3, Changing lamps on the breaker interface panel	page 2-8
Procedure 2-4, Replacing the display circuit pack on the breaker interface panel	page 2-12
Procedure 2-5, Cleaning OPC tape drive heads	page 2-14
Clean and assemble optical connectors	*Commissioning and Testing*, Volume 3

Procedure 2-1
Changing the air filter in a bay

Use this procedure to change the air filter element every six months, or sooner if required. The air filter unit is located at the top of the bay cooling unit, and under the bottom-most shelf in the frame. The frequency of replacement depends on the environmental conditions in the equipment location. It is up to the customer to determine the frequency.

Note 1: Although the illustration in this procedure shows the air filter above the cooling unit (NT4K18AA only), the procedure is the same for changing the air filter under the bottom-most shelf.

Note 2: The part number of the air filter element is listed in *Engineering and Ordering Information*, 323-3001-032, in Engineering, Configuration, and Ordering Guide, Volume 1.

Action

| Step	Action
1	Disengage the air filter unit from its locking mechanism by quickly pushing and releasing the front face of the air filter unit.
2	Remove the air filter unit by pulling it outwards, as shown in Figure 2-1.
3	Lift the filter retaining lid, remove the old air filter element, and replace it with a new air filter element, as shown in Figure 2-1.
	Note: Make sure the new air filter element is positioned correctly for the air flow (per air filter manufacturer's instructions). Ensure that the filter frame is entirely covered.
4	Close the filter retaining lid, and reinsert the air filter unit into the shelf until it locks into place.

—continued—

Procedure 2-1 (continued)
Changing the air filter in a bay

Step	Action

Figure 2-1
Removing and replacing the air filter
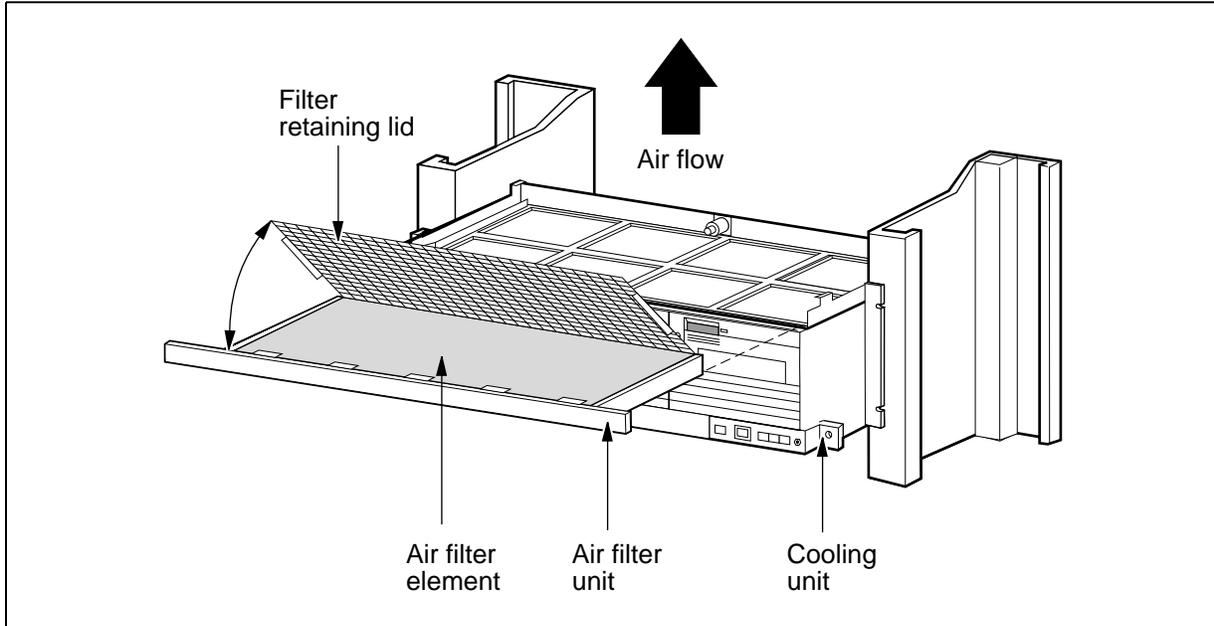
—**end**—

Procedure 2-2
Vacuuming the cooling unit grille in a bay

Use this procedure to remove the build up of dust that may accumulate on the grille at the back of the bay cooling unit (NT4K18AA/BB only). This occurs infrequently because the grille has sufficiently wide holes so that dust does not get trapped.

Action

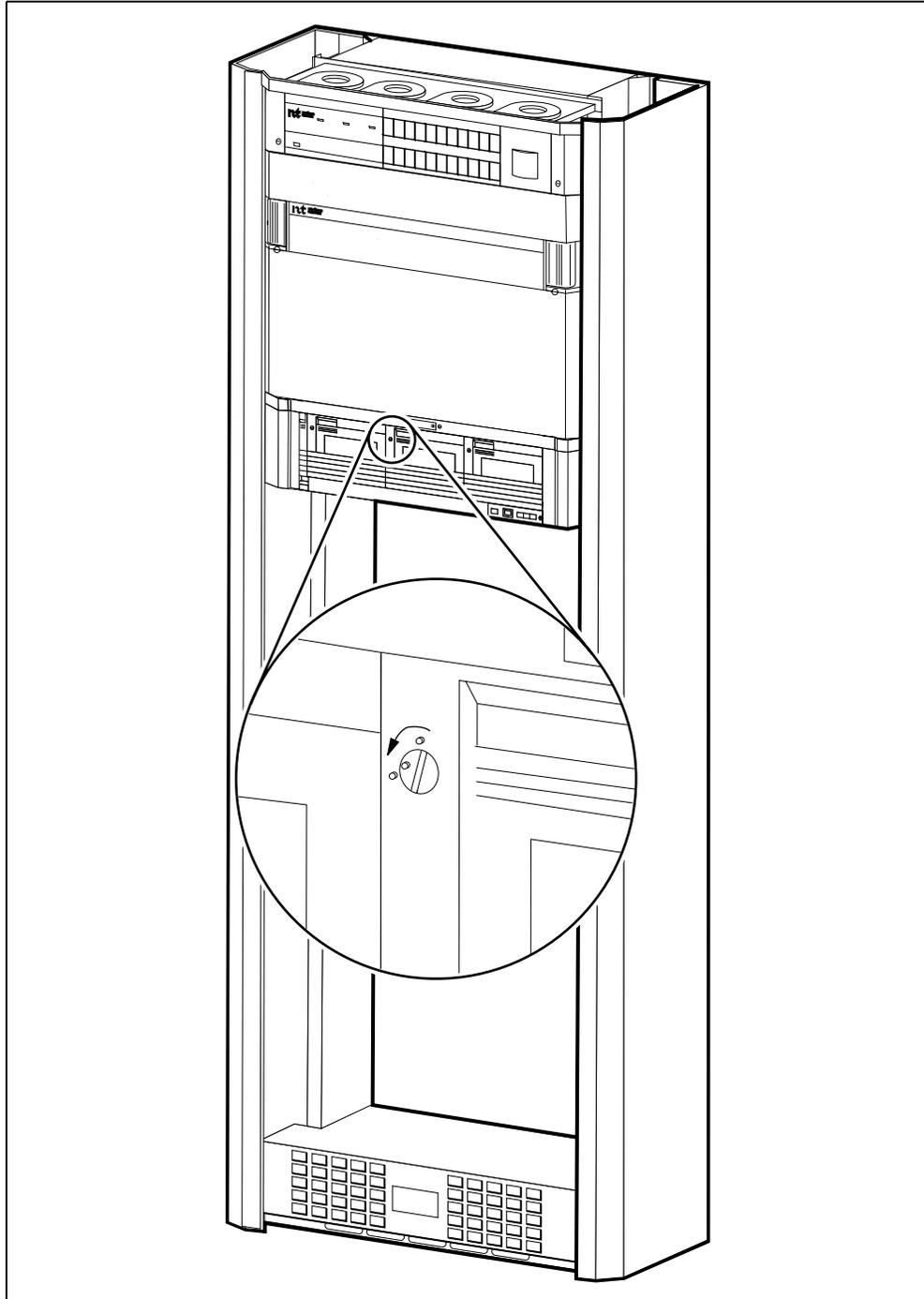| Step	Action
1	Unlock the cooling module handle by rotating the screw head until the raised dots are no longer aligned. Figure 2-2 on page 2-5 shows the location of the locking screw on the cooling module.

—**continued**—

Procedure 2-2 (continued)
Vacuuming the cooling unit grille in a bay

Figure 2-2
Location of cooling module locking screw

PC-10361

—continued—

Procedure 2-2 (continued)
Vacuuming the cooling unit grille in a bay

Step	Action
2	Grasp the handle on the front of the cooling module and pull straight out until the module just disengages from the backplane.
	Note: You may notice that the fan speed increases when you pull the cooling module away from the backplane. This occurs because the cooling modules that are still operating are trying to compensate for the removal of one of the cooling modules.
3	

> **DANGER**
> **Risk of personal injury**
> Keep your fingers away from the fan blades.
> The fan blades may still be rotating and can cause bodily harm. Wait for the fan blades to stop rotating before proceeding.

> **CAUTION**
> **Heavy equipment**
> The cooling module is heavy. Support the module with one hand while pulling with the other.

Use both hands to carefully pull the module all the way out of the cooling unit, as shown in Figure 2-3.

| Step	Action
4	Gently push on the slot cover, insert the vacuum cleaner nozzle into the cooling module slot, and vacuum the area inside the slot.
5	Reinsert the cooling module into the cooling unit and press firmly to engage the module into the cooling unit backplane.
	As the module engages the backplane, the red LED will turn on very briefly to indicate connection.
6	Repeat from step 1 for each cooling module.

—**continued**—

Procedure 2-2 (continued)
Vacuuming the cooling unit grille in a bay

**Figure 2-3
Removing a cooling module**

PC-10388

Support with hand
while pulling
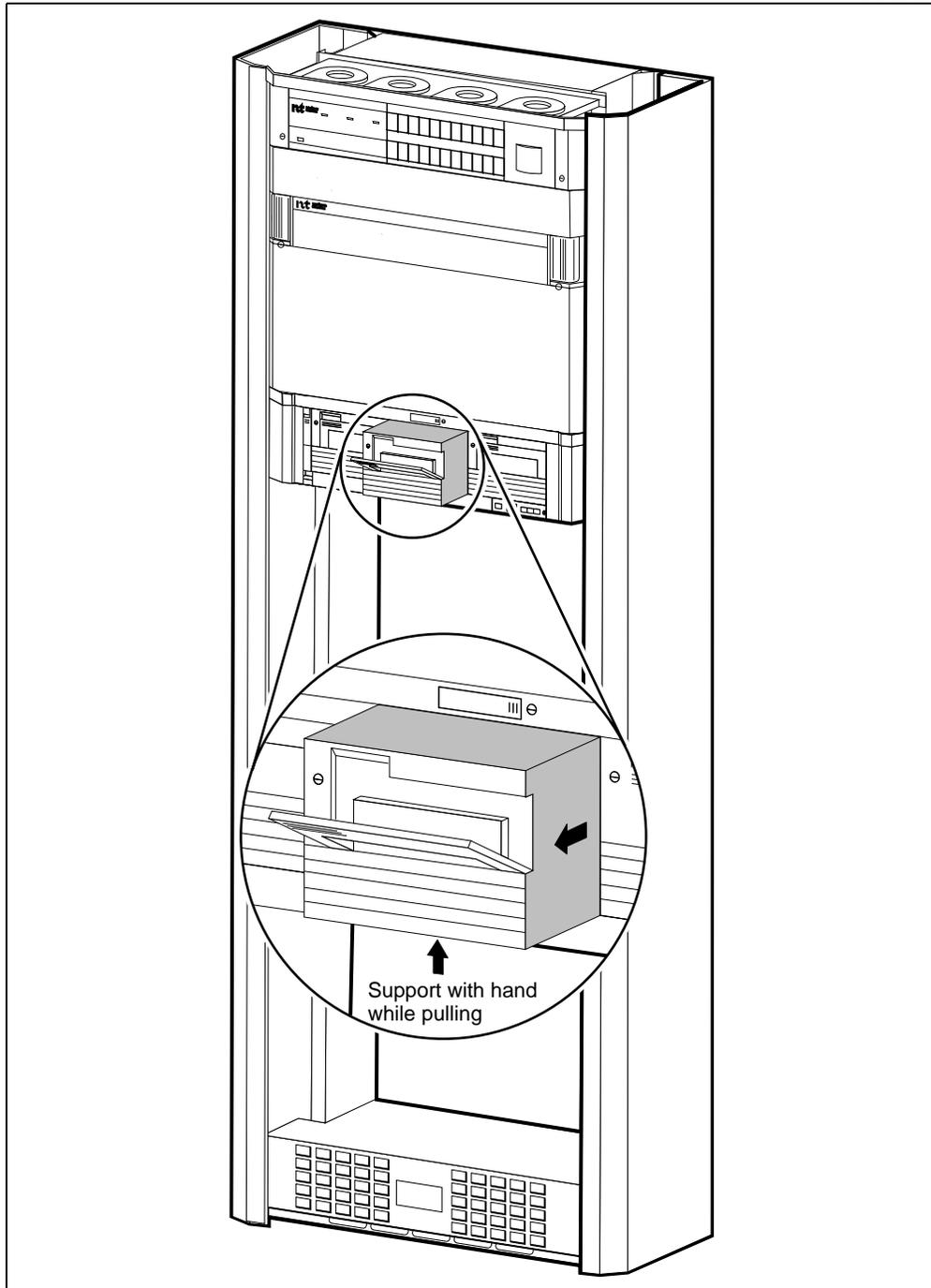
—**end**—

Procedure 2-3
Changing lamps on the breaker interface panel

Use this procedure to replace alarm lamps on the NT4K14AA ABM breaker interface panel (BIP), and the NT7E56AA TBM BIP. Read the requirements section for the correct type of lamp to use. To replace the alarm LED card in an NT4K14AB BIP, see *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C. The alarm LED card on the NT4K14BA BIP is not field replaceable. To replace the alarm lamps on the NT7E56CA BIP, see Procedure 2-4, "Replacing the display circuit pack on the breaker interface panel," on page 2-12.

Figure 2-4 on page 2-10 shows the NT4K14AA BIP, and Figure 2-5 on page 2-11 shows the NT7E56AA/AB BIP.

Requirements

The following table lists the bulb requirements for each type of BIP.

BIP type	Replacement lamp
NT4K14AA, ABM BIP	A0368415, industry standard #85, 28 Vdc (each pair of alarm lamps is wired in series)
NT7E56AA, TBM BIP	A0368415, industry standard #85, 28 Vdc (each pair of alarm lamps is wired in series)
NT7E56AB, TBM BIP	A0380959, industry standard #79, 6 Vdc (each pair of alarm lamps is wired in parallel)

Note: It is recommended to replace lamps in pairs. For example, if one Critical lamp burns out, replace the adjacent lamp as well.

Action

Step	Action
1	To locate defective lamps on the TBM BIP, press the **ACO/lamp test** button on the front of the TBM BIP. The lamps will light as long as the button is depressed. To locate defective lamps on the ABM BIP, press the **ACO/lamp test** button on the local craft access panel (LCAP). The lamps will light for 30 seconds. *Any BIP lamp that does not light is defective, and must be replaced.*
2	Remove the BIP cover, as described in Procedure 3-1, "Removing the breaker interface panel cover," on page 3-2.

—continued—

Procedure 2-3 (continued)
Changing lamps on the breaker interface panel

Step	Action
3	Remove the burned out BIP lamp by pulling the lamp straight out of its socket.
	Figure 2-4 on page 2-10 shows the location of the sockets on the NT4K14AA BIP. Figure 2-5 on page 2-11 shows the location of the sockets on the NT7E56AA/AB BIP.
4	Obtain the correct lamp and carefully install it by gently pushing the new lamp straight into the socket, as shown in Figure 2-4 for the ABM BIP, or Figure 2-5 for the TBM BIP. See the requirements section at the beginning of this procedure for the correct lamp.
5	To test the replacement lamps on the TBM BIP, press the **ACO/lamp test** button on the front of the TBM BIP. The lamps will light as long as the button is depressed.
	To test the replacement lamps on the ABM BIP, press the **ACO/lamp test** button on the local craft access panel (LCAP). The lamps will light for 30 seconds.
6	Replace the BIP cover, as described in Procedure 3-2, "Replacing the breaker interface panel cover," on page 3-3.

—**continued**—

Procedure 2-3 (continued)
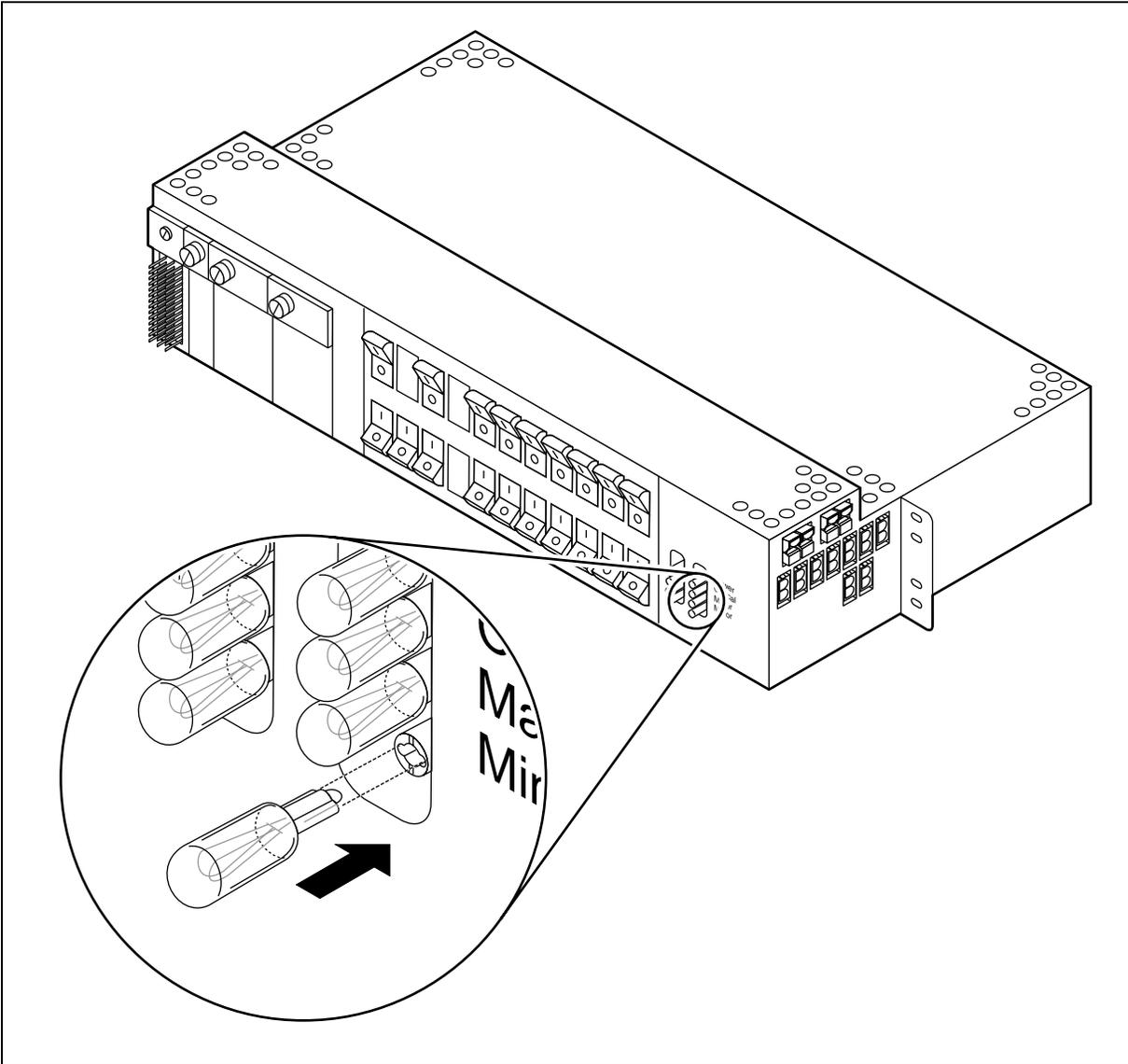**Changing lamps on the breaker interface panel**

Step	Action

Figure 2-4
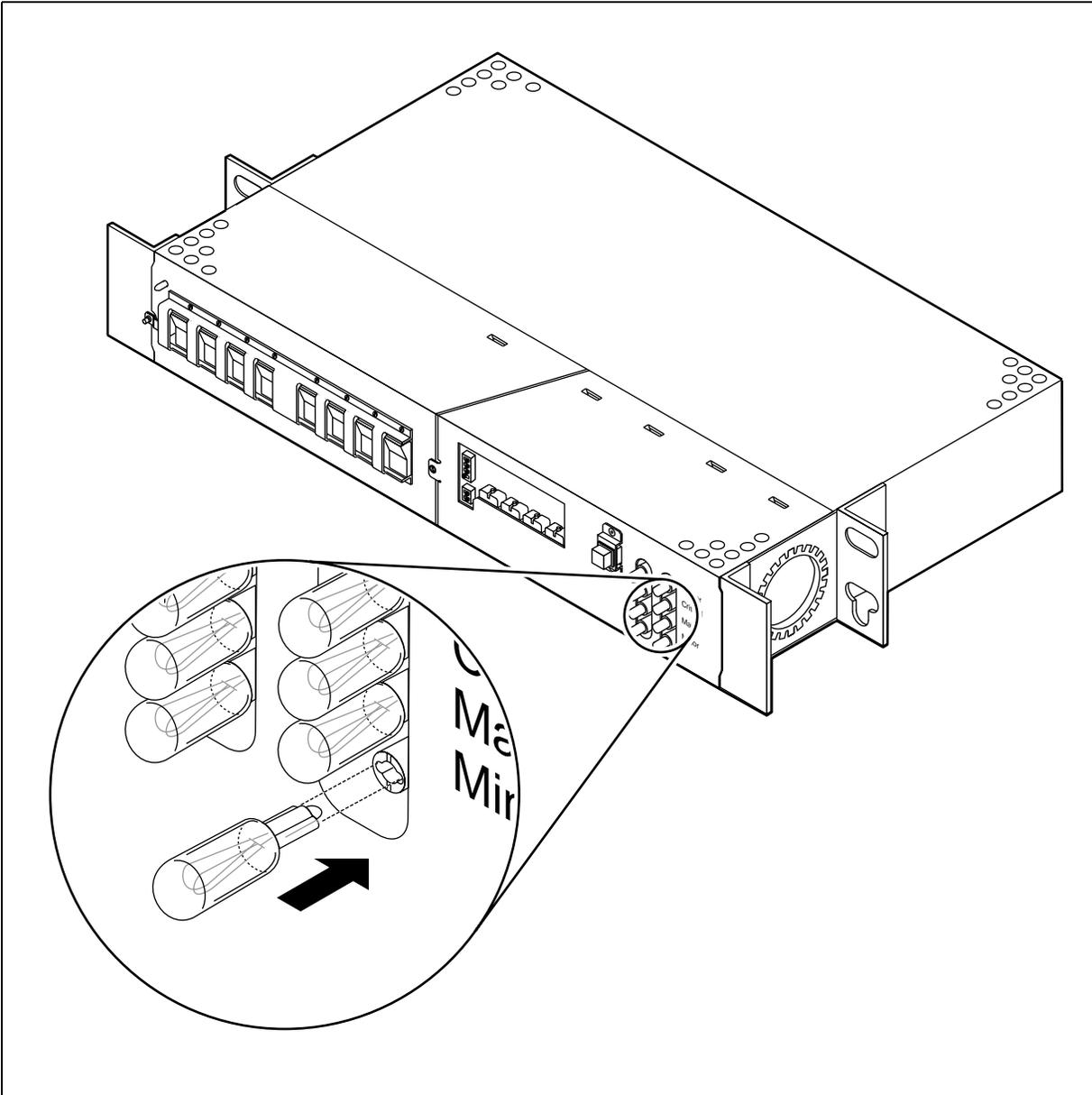**Replacing lamps on the NT4K14AA ABM BIP**

PC-10811

—continued—

Procedure 2-3 (continued)
Changing lamps on the breaker interface panel

Step   Action

Figure 2-5
Replacing lamps on the NT7E56AA/AB TBM BIP

PC-10812

—**end**—

Procedure 2-4
Replacing the display circuit pack on the breaker interface panel

Use this procedure to replace the NT7E5662 display circuit pack on an NT7E56CA BIP. This pack must be replaced when it is faulty or if the LED displays have burned out. The lamps are LEDs which can only be replaced by replacing the entire display circuit pack.

Requirements

The following table lists the bulb requirements for the NT7E56CA BIP.

BIP type	Replacement lamp
NT7E56CA, TBM BIP	A0368415, industry standard #85, 28 Vdc (each pair of alarm lamps is wired in series)

Tools and materials

The following tools and materials are required:

- 1/4 in. slotted screwdriver
- 1/4 in. nut driver
- wire wrap tool
- spare tie wraps

Step	Action
1	Remove the snap-on cover from the BIP.
2	Disable any CO alarm signals connected to this BIP by following local office procedures.
3	Record all wire-wrap connections to the CO alarms wire-wrap connections field located on the front of the display card, as seen from the front of the BIP. Record option switch settings SW1 as seen from the front of the BIP.
4	Remove all wire-wrap connections.
5	Locate the locking screw in the center front section of the BIP and release it by turning it 90° counterclockwise.
6	Remove BIPA and BIPB fuses located in the center front section of the BIP.

—**continued**—

Procedure 2-4 (continued)
Replacing the display circuit pack on the breaker interface panel

Step	Action
7	Undress the CO alarms cable from the rear of the display card and right-hand door. Remove the cable.
8	Disconnect the flat ribbon cable that runs between the display card and the logic pack on the logic pack face plate.
9	Remove the plastic cover from the back of the display pack.
10	Remove the 1/4 in. plastic standoffs with the 1/4 in. nut driver.
11	Carefully remove the display pack. Transfer the cable to the new pack and place the new display pack in position. Secure the pack with 1/4 in. plastic standoffs.
12	Replace the plastic cover.
13	Dress the CO alarms cable onto the right door and dress the connecting wires to the front of the display pack as originally found.
14	Secure the CO alarms cable to the lances in the right-hand door with spare tie wraps.
15	Connect the flat ribbon cable to the logic pack. Ensure that the cable is folded correctly, and that the front door closes properly, without putting stress on the cable.
16	Replace BIPA and BIPB fuses.
17	Close the right door and secure it by turning the locking screw 90° clockwise.
18	Set the option switch SW1 as recorded in step 3.
19	Wire-wrap the CO alarms connections as recorded in step 3.
20	Enable the CO alarms signals by following local office procedures.
21	Replace the BIP snap-on cover.
22	Ensure that the BIP visual alarms represent any alarms seen on individual equipped shelves.

—end—

Procedure 2-5
Cleaning OPC tape drive heads

Use this procedure to clean the tape drive heads on the operations controller (OPC) module.

The tape drive heads should be cleaned after approximately 50 hours of tape drive operation, or as indicated when the green LED on the tape drive flashes slowly.

> *Note:* The slowly flashing green LED may also refer to a damaged tape or a tape nearing the end of its life. If cleaning the tape drive heads does not stop the green LED from flashing, replace the tape cassette with a new one.

Requirements

This procedure requires a DDS DAT cleaning cassette designed for DDS drives. For example, use a Sony DG-5CL type cleaning cassette.

> *Note:* Do not use an audio DAT cleaning cassette. It will not be properly recognized by the tape drive.

Action

Step	Action
1	Insert the cleaning cassette into the OPC tape drive.
	The drive automatically loads and runs the cleaning cassette for about 10 seconds, then ejects the cassette.
	Note: A cleaning cassette can be used for approximately 100 cleanings. When the cleaning cassette no longer advances when inserted in the tape drive, it is time to replace the cleaning cassette.

—end—

Common procedures

This chapter contains procedures that are common to other procedures in this document.

Chapter contents

In the following table look up the task you are required to perform, then proceed to the page specified.

If you cannot successfully complete these procedures, contact your next level of support.

| Topic	Page
Procedure 3-1, Removing the breaker interface panel cover	page 3-2
Procedure 3-2, Replacing the breaker interface panel cover	page 3-3
Procedure 3-3, Installing the common-equipment shelf cover	page 3-4
Procedure 3-4, Removing the common-equipment shelf cover	page 3-6

Procedure 3-1
Removing the breaker interface panel cover

Use this procedure to remove the cover from the NT4K14 BIP. Other procedures in this document will call upon this procedure.

Action

Step	Action
1	Turn the left and right locking screws until the dots are no longer aligned, then pull on the cover latches to remove the cover, as shown in Figure 3-1.

Figure 3-1
Removing the BIP cover

PC-16504

BIP cover
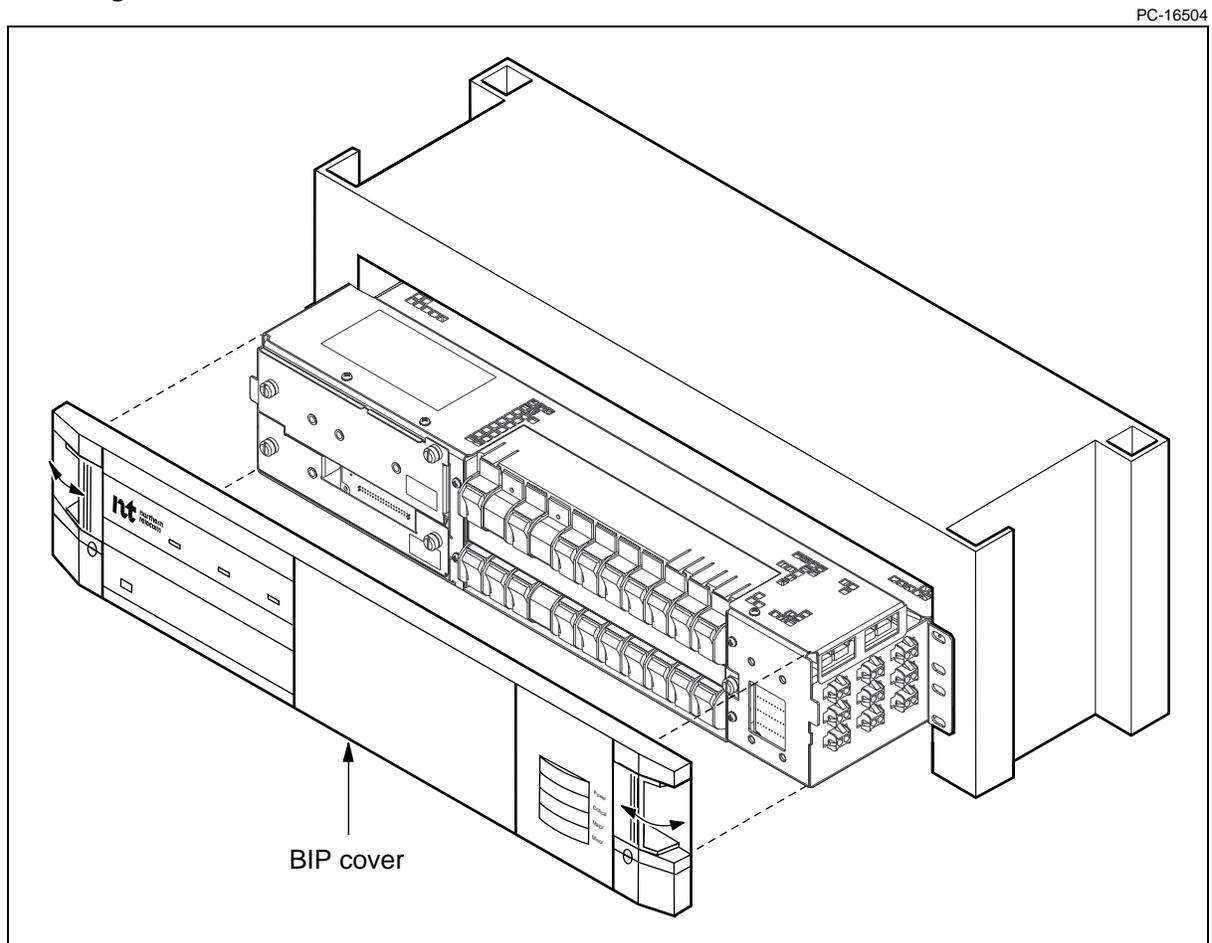
—**end**—

Procedure 3-2
Replacing the breaker interface panel cover

Use this procedure to replace the cover on the NT4K14 BIP. Other procedures in this document will call upon this procedure.

Action

Step	Action
1	Push the cover into place, close both latches, and secure the cover by turning the right and left locking screws until the dots are aligned, as shown in Figure 3-2.

Figure 3-2
Replacing the BIP cover

PC-16504

BIP cover
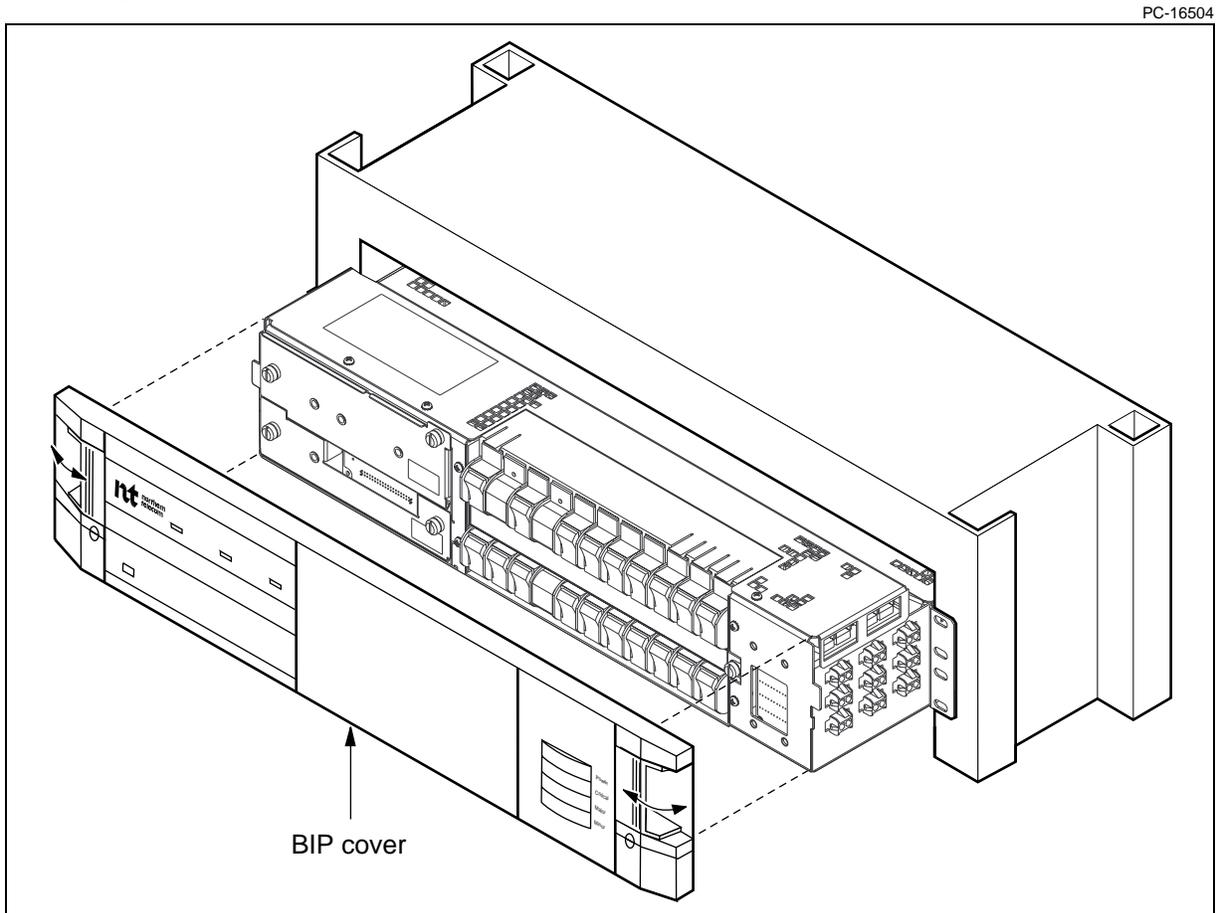
—**end**—

Procedure 3-3
Installing the common-equipment shelf cover

Use this procedure to install the shelf cover on a common-equipment shelf. This procedure applies to both the access bandwidth manager (ABM) shelf and to the transport bandwidth manager (TBM) shelf whether they are mounted in a bay, or in a modular business package (MBP), or in a Series 800A outside plant cabinet.

> **CAUTION**
> **Risk of electromagnetic interference (EMI)**
> For proper EMI protection, the shelf cover must be replaced after you have finished testing.

Requirements

You need a screwdriver with a 1/4-inch wide flat blade.

Action

Step	Action

> **CAUTION**
> **Risk of equipment damage**
> Use only a flat-bladed screwdriver with a 1/4-inch blade to release the locking screws on the ABM shelf cover. Do not use a coin. A coin or a screwdriver of the wrong size will damage the slot on the locking screws, and may slip and damage the finish on the equipment cover.

1 On the front cover of the shelf, use a flat-bladed screwdriver to rotate the locking screws to the unlocked position.

2 Grasp the cover by the two handles and engage the aligning pins at the bottom of the shelf. Push the cover in towards the shelf until the handles snap into the closed position.

3 Using a screwdriver with a flat 1/4- inch wide blade, rotate the locking screws 90 degrees to the locked position, as shown in Figure 3-3.
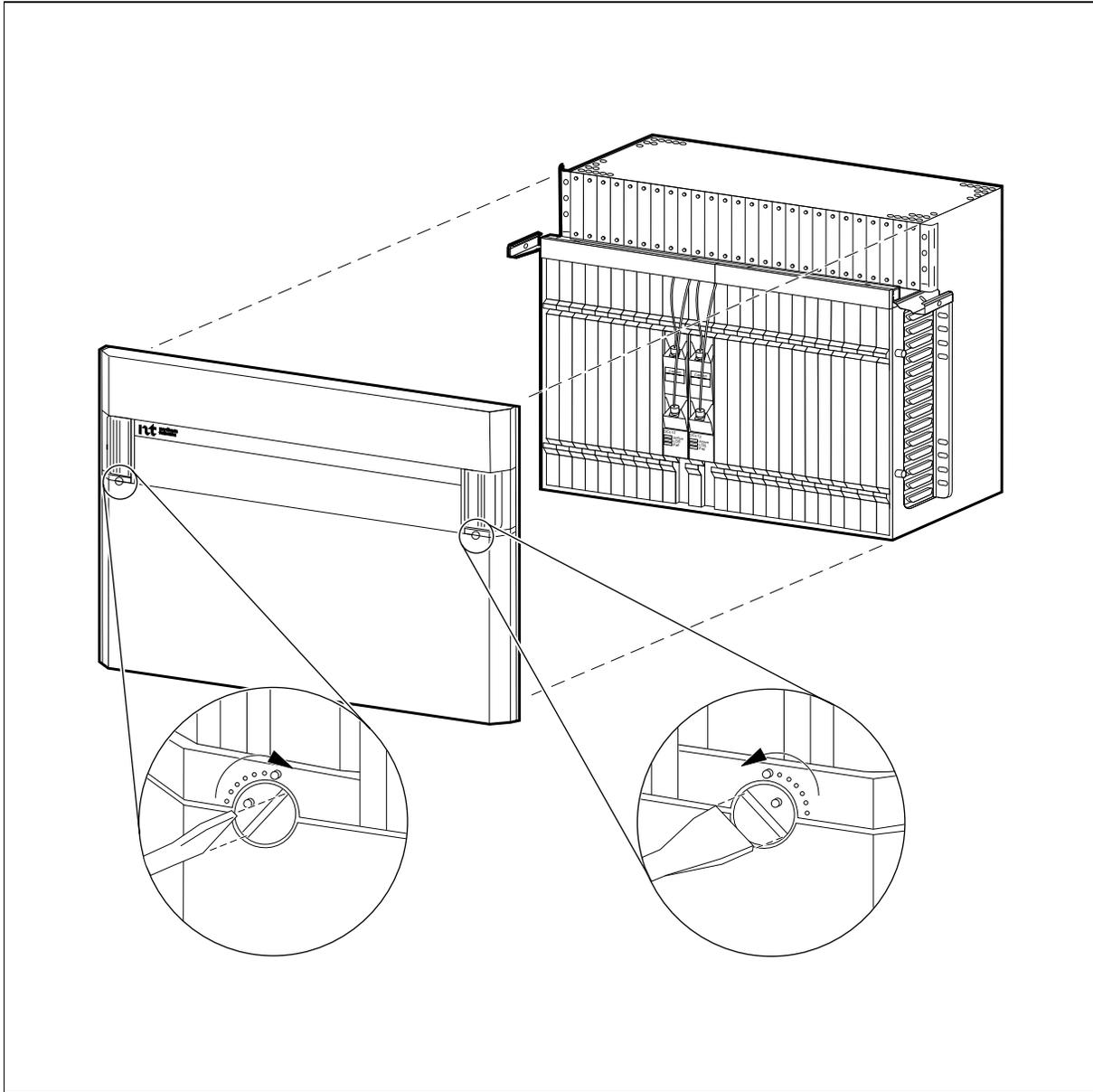
—continued—

Procedure 3-3 (continued)
Installing the common-equipment shelf cover

Step	**Action**

Figure 3-3
Installing the common-equipment shelf cover

PC-10533

—**end**—

Procedure 3-4
Removing the common-equipment shelf cover

Use this procedure to remove and store the common-equipment shelf cover, in order to gain access to the equipment for testing purposes. This procedure applies to both the access bandwidth manager (ABM) shelf and to the transport bandwidth manager (TBM) shelf.

Requirements

The following tools and materials are required:

- sheet of cardboard or foam, in a clean, dry, dust-free area, on which to rest the equipment cover
- screwdriver, flat blade, 1/4-inch wide

If the shelf is mounted in an MBP cabinet or in a Series 800A outside plant cabinet, refer to *MBP Cabinet Installation Manual*, 323-3001-206 or *Series 800A Outside Plant Cabinet Installation*, 323-3001-210.

Action

Step	Action
1	Remove the front cover of the ABM shelf, as shown in Figure 3-4.

Note: If this is an MBP cabinet, removing the cover of the ABM shelf is easier if the DEM separator is removed first. Refer to the *Modular Business Package Cabinet Installation Manual*, 323-3001-206.

.

> ⚠️ **CAUTION**
> **Risk of equipment damage**
> Use only a flat-bladed screwdriver with a 1/4-inch blade to release the locking screws on the ABM shelf cover. Do not use a coin. A coin or a screwdriver of the wrong size will damage the slot on the locking screws, and may slip and damage the finish on the equipment cover.

    a. Using a screwdriver with a flat 1/4-inch wide blade, rotate the locking screws 90 degrees to the unlocked position.

    b. Grasp the cover at the top edges and tilt it outwards to remove it.

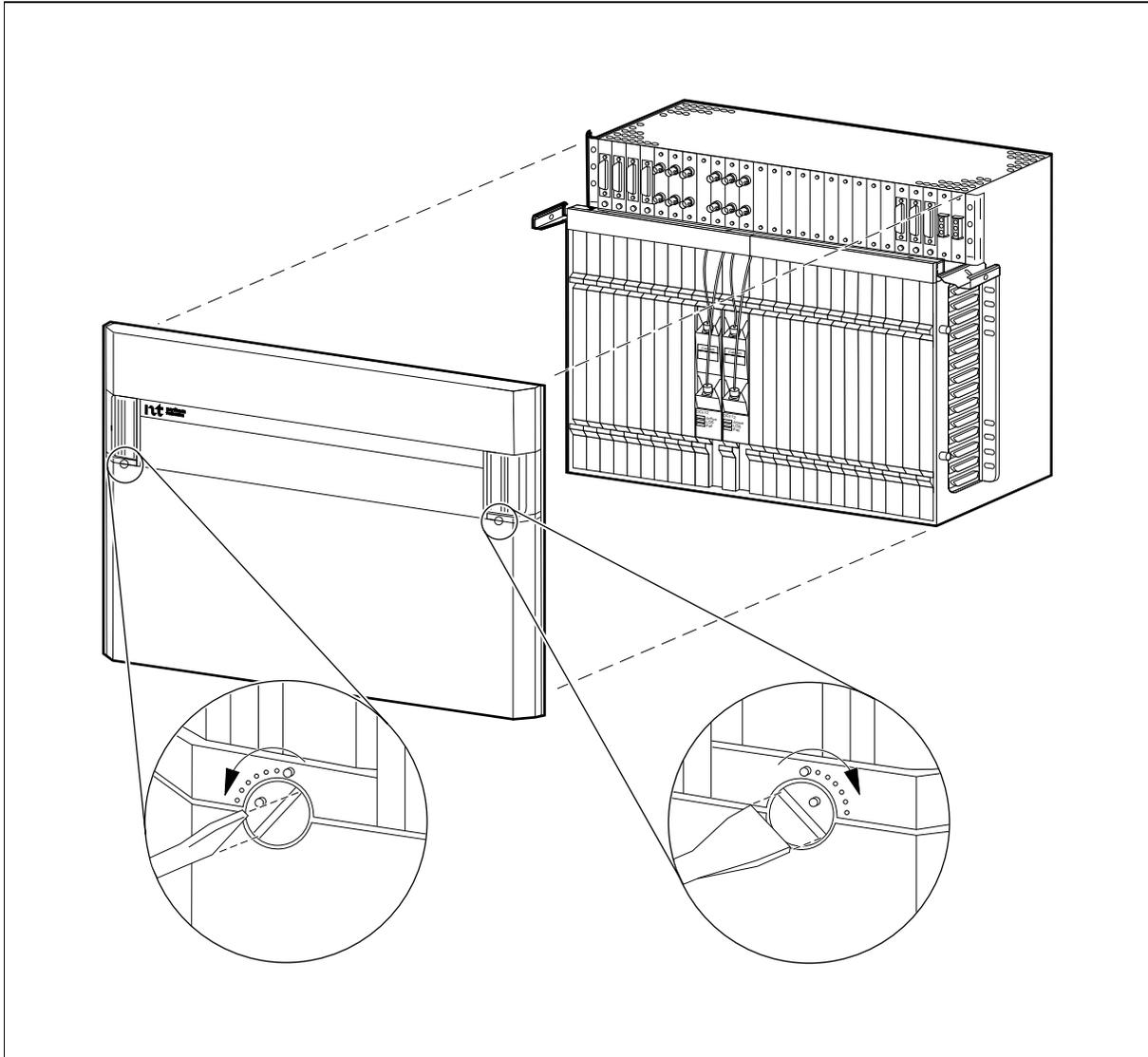   **c.** Store the cover carefully on the protective material to avoid damage.

—continued—

Procedure 3-4 (continued)
Removing the common-equipment shelf cover

Step	Action

Figure 3-4
Removing the common-equipment shelf cover

PC–10017

—**end**—

Routine maintenance (OPC)

The AccessNode operations controller (OPC) requires routine maintenance. The following procedures should be performed as detailed.

Chapter contents

Procedure 4-1
Maintaining the OPC

This procedure provides the routine steps that need to be performed when maintaining an OPC with or without a backup OPC.

Maintenance should be performed every four months or earlier.

Action

Step	Action

With operational backup OPC present

1 Set the primary OPC's port B to terminal. See *System Administration Procedures,* 323-3001-302 in *Operations, Administration, and Provisioning*, Volume 4A.

2 Connect a VT100-compatible terminal to the primary OPC port B. See *System Administration Procedures,* 323-3001-302 in *Operations, Administration, and Provisioning*, Volume 4A.

3 Shut down and remove the primary OPC.

4 Ensure that the backup OPC becomes active and has associations to all network elements.

5 Insert the primary OPC.

6 Ensure that the boot diagnostics are displayed on the primary OPC.

7 Ensure that the boot diagnostics pass on the primary OPC.

8 Ensure that there are no boot diagnostic error or fail messages.

9 Ensure that the primary OPC becomes active.

10 Ensure that the backup OPC becomes inactive.

11 Return port B to its original setting.

12 Clean the digital data service (DDS) tape heads according to Procedure 4-2, "Cleaning the OPC internal digital data storage (DDS) tape drive heads," on page 4-5.

13 Replace the OPC SRT tape, if applicable.

14 Open the Event Browser and ensure that the following events are running every night:

- Centralized User Administration
- OPC data synchronization
- ring configuration (if applicable)
- synchronous transport signal (STS) connections (if applicable)
- save to tape (if applicable)

—continued—

Procedure 4-1 (continued)
Maintaining the OPC

Step	Action
15	Open the NE Database Manager and ensure that the network elements have been updating every night.
16	Set the backup OPC port B to terminal.
17	Connect the VT100-compatible terminal to the backup OPC port B.
18	Shut down and remove the backup OPC.
19	Ensure that the primary OPC remains active and has associations to all network elements.
20	Insert the backup OPC.
21	Ensure that the boot diagnostics are displayed on the backup OPC.
22	Ensure that the boot diagnostics pass on the backup OPC.
23	Ensure that there are no boot diagnostic error or fail messages.
24	Ensure that the primary OPC remains active.
25	Ensure that the backup OPC becomes inactive.
26	Return port B to its original setting.
27	Clean the DDS tape heads according to Procedure 4-2, "Cleaning the OPC internal digital data storage (DDS) tape drive heads," on page 4-5.
28	Replace the OPC SRT tape, if applicable.

Without operational backup OPC present

Step	Action
29	Set the primary OPC port B to terminal. See *System Administration Procedures,* 323-3001-302 in *Operations, Administration, and Provisioning*, Volume 4A.
30	Connect the VT100-compatible terminal to the primary OPC port B. See *System Administration Procedures,* 323-3001-302 in *Operations, Administration, and Provisioning*, Volume 4A.
31	Shut down and remove the primary OPC.
	Note: Operations, administration, maintenance, and provisioning (OAM&P) is lost to all network elements.
32	Insert the primary OPC.
33	Ensure that the boot diagnostics are displayed on the primary OPC.
34	Ensure that the boot diagnostics pass on the primary OPC.
35	Ensure that there are no boot diagnostic error or fail messages.
36	Ensure that the primary OPC becomes active.
37	Return port B to its original setting.

—**continued**—

Procedure 4-1 (continued)
Maintaining the OPC

Step	Action
38	Clean the DDS tape heads according to Procedure 4-2, "Cleaning the OPC internal digital data storage (DDS) tape drive heads," on page 4-5.
39	Open the Event Browser and ensure the following events are running every night:

- Centralized User Administration

- OPC data synchronization

- ring configuration (if applicable)

- STS connections (if applicable)

- save to tape (if applicable)

—**end**—

Procedure 4-2
Cleaning the OPC internal digital data storage (DDS) tape drive heads

A build-up of magnetic dust and debris can accumulate after prolonged operation of the internal digital data storage (DDS) tape drive. Therefore, the DDS drive heads must be cleaned under the following circumstances:

- when a new operations controller (OPC) is installed in the system
- if the tape drive is used less than once a week, clean the tape heads before each use
- if the tape drive is used at least once a week, clean the tape heads after every 25 hours of use
- before every system software upgrade

   Note: If you suspect that a tape has contaminated the heads with tape drive lubricant, clean the tape heads three times consecutively.

The tape is not usable if the OPC software consistently fails with tape errors, even after cleaning the tape drive.

The LEDs on the tape drive indicate tape drive status, for example, when the tape drive encounters excessive errors because of dirty heads or defective tapes.

A flashing green LED indicates that the tape read or write operation generated excessive errors. The LED flashes slowly for read problems and quickly for write problems.

The flashing green LED does not necessarily indicate a loss of data or that the operation of the DDS tape drive is affected. However, it can indicate the following conditions:

- the tape drive heads are dirty and must be cleaned using a cleaning tape
- the tape is a pre-recorded audio tape and is not recognized by the DDS tape drive

   Note: The amber LED on the tape drive unit is also lit if a pre-recorded audio tape is inserted.

- the tape is damaged or nearing the end of its life and must be replaced

—continued—

Procedure 4-2 (continued)
Cleaning the OPC internal digital data storage (DDS) tape drive heads

Note 1: If the OPC red Fail LED is also lit, clear the associated "OPC circuit pack fail" alarm by following the procedures in, *Alarm and Trouble Clearing Procedures*, 323-3001-543 in *Maintenance*, Volume 5A, before assuming that the tape is damaged.

Note 2: If cleaning the DDS drive head does not correct the flashing LED condition, replace the DDS tape. The tape is not usable if the OPC software fails consistently with tape errors even after cleaning the tape drive.

The life of a DDS tape is measured by the number of passes (read, write, or rewind operations) it can support. Available DDS tapes support 1000 to 2500 passes. Because each read or write pass requires a rewind, a typical DDS tape is good for 500 to 2250 read/write operations.

Applications such as save to tape and software upgrades require several read/write operations. Because not all applications require the same number of read/write operations, the life of a DDS tape depends on the type of applications for which it is used.

The following table summarizes the expected useful life of a DDS tape that can support 1000 read/write operations.

Application	Read/write operations required	Useful life (runs)
Save-to-tape operations	5	200
Software upgrades	5	200
Installing OPC software loads using the **install_release -f** UNIX command	12	83
Checking the validity of files on the tape using the **verify_tape** UNIX command	11	91
Note: Dirty DDS tape drive heads contaminate DDS tapes and reduce their expected life.		

Requirements

To clean the heads of the DDS drive, use a DDS certified cleaning cassette (NT7E24TB).

Note: DDS cleaning tapes must be ordered with each OPC.

—continued—

Procedure 4-2 (continued)
Cleaning the OPC internal digital data storage (DDS) tape drive heads

> **CAUTION**
> **Risk of data loss and data corruption**
> DDS tapes have been specifically designed to meet the
> demands of information storage. You must use a certified
> data grade 4-mm DDS tape in the OPC. The DDS data tape
> and cleaning tapes must bear the following DDS logo in
> order to be certified.
>
> **DDS** Digital Data Storage ▌▌▌▌

> **CAUTION**
> **Risk of data loss**
> Keep DDS tapes away from varying environmental
> conditions such as humidity, dust, extreme hot and cold
> temperatures, and magnetic fields and devices. When
> handling DDS tapes around equipment, be aware that data on
> the tape can be damaged or lost as a result of electrostatic
> discharge. Always ground yourself before handling the tape.
> Make sure the cassette is at room temperature before using it
> in the OPC tape drive.

Action

Step	Action
1	Insert the DDS cleaning cassette in the tape drive with the write-protect opening at the top.
	The DDS drive loads and runs the cassette for about 10 seconds and then ejects it.
	Note: Each time the cleaning cassette is used, the tape advances over an unused portion. Eventually, the entire tape is used (after approximately 50 uses) and a new cleaning cassette is required. When the cleaning cassette no longer advances when inserted in the tape drive, replace the DDS cleaning cassette.
2	Remove the DDS cleaning cassette from the tape drive.

—**end**—

MBP and MPP routine maintenance

This chapter provides procedures for performing routine maintenance on modular business package (MBP) and modular power package (MPP).

Chapter contents

In the following table, look up the routine maintenance task you are to perform, and proceed to the specified page or document.

If you cannot successfully complete these procedures, contact your next level of support.

Topic	See
Procedure 5-1, Checking and adjusting MPP rectifier float and equalize voltages	page 5-2
Procedure 5-2, Changing the MBP air filter	page 5-3
Remove the MBP/MPP equipment covers	*Modular Business Package Cabinet Installation,* 323-3001-206
Install the MBP/MPP equipment covers	*Modular Business Package Cabinet Installation,* 323-3001-206

Procedure 5-1
Checking and adjusting MPP rectifier float and equalize voltages

Step	Action
1	Check rectifier voltage settings every 6 months.
2	To gain access to the MPR25 rectifiers housed in the modular power package (MPP) cabinet, remove the equipment covers. If you do not know how to do this refer to *Modular Business Package Cabinet Installation Guide*, 323-3001-206.
	Note: For detailed procedures on how to adjust the NT5C06 MPR25 rectifier housed in the MPP cabinet, see the document 169-2071-500, *Equipment Installation Operation and Maintenance*, for MPR25 / MPR15 Series Single Phase −48V, 25A Switch Mode Rectifier NT5C06.
3	Adjust the float and equalize voltages to the following AccessNode system requirements:

- For installations with batteries, set both the float and equalize voltages to −56.0 V dc.

- For installations without batteries, set both the float and equalize voltages to −52.0 V dc.

—end—

Procedure 5-2
Changing the MBP air filter

Use this procedure to change the air filter in the modular business package (MBP) cabinet every 6 months, or sooner if required. The frequency of replacement depends on the environmental conditions in the equipment location. It is up to the customer to determine the frequency. The air filter unit is located above of the blower module.

Requirements

A0383922 air filter assembly

Action

Step	Action
1	Remove the front pedestal grille from the MBP cabinet, as shown in Figure 5-1 on page 5-4.
	a. Release the two captive screws that hold the pedestal grille in place.
	b. Grasp the top left and top right edges of the grille.
	c. Tilt the grille outward and lift it upward to remove it.

Procedure 5-2 (continued)
Changing the MBP air filter

Step	Action

Figure 5-1
Removing the MBP pedestal grille

PC-10852

2. Grasp

2. Grasp

3. Tilt and lift

1. Loosen captive screws
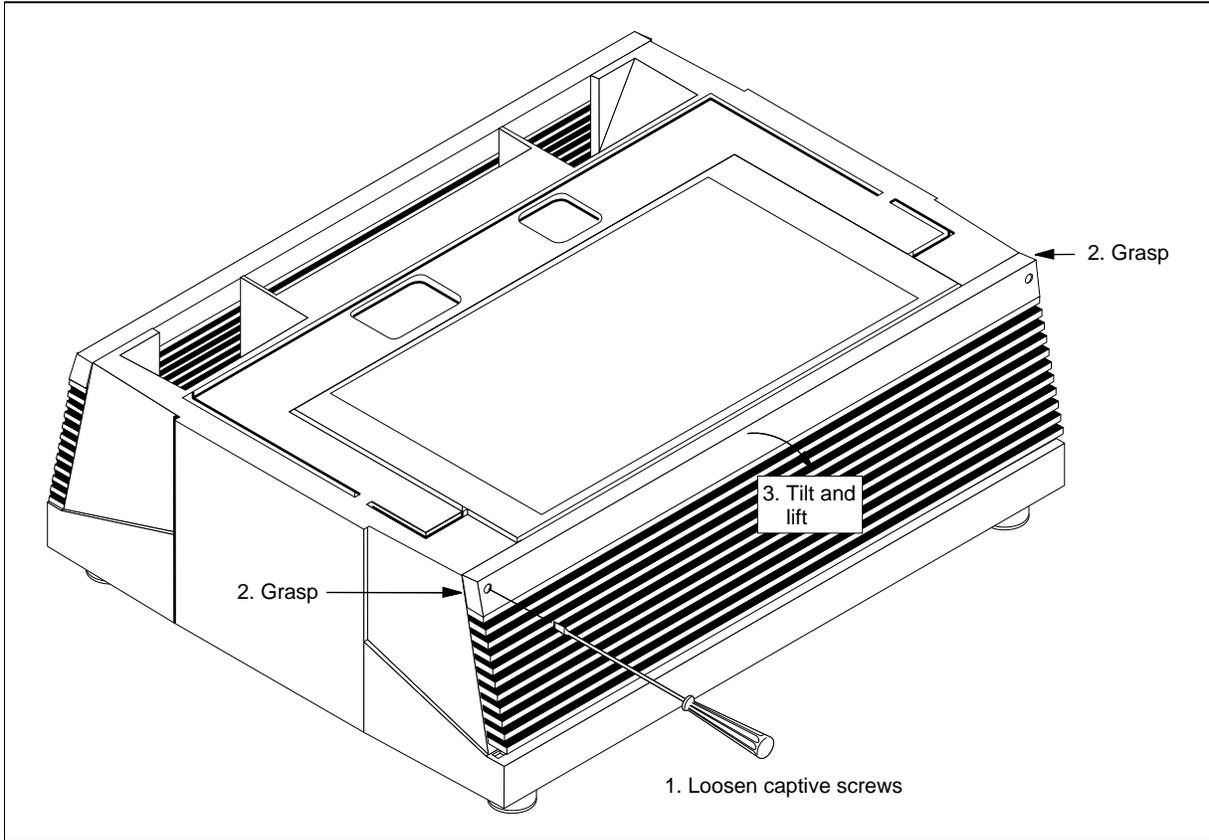
—continued—

Procedure 5-2 (continued)
Changing the MBP air filter

Step	Action
2	Pull the filter toward you to withdraw it from its slot, as shown in Figure 5-2.
3	Insert the replacement filter into the slot.

Figure 5-2
Removing the MBP air filter

PC-10900
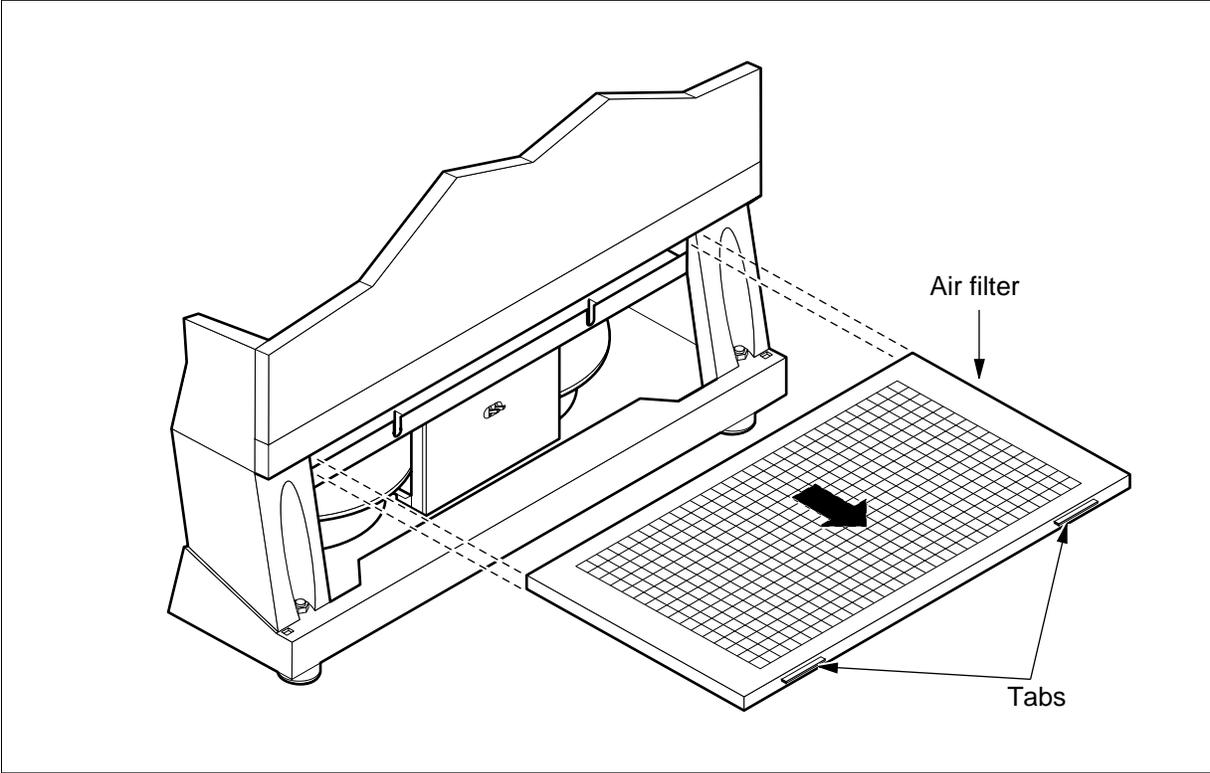
Air filter

Tabs

—**continued**—

Procedure 5-2 (continued)
Changing the MBP air filter

Step	Action
4	Replace the pedestal grille as shown in Figure 5-3.

Figure 5-3
Installing the MBP pedestal grille

PC-10853

2. Swing
closed

3. Tighten
captive screws

1. Align lugs and
insert grille
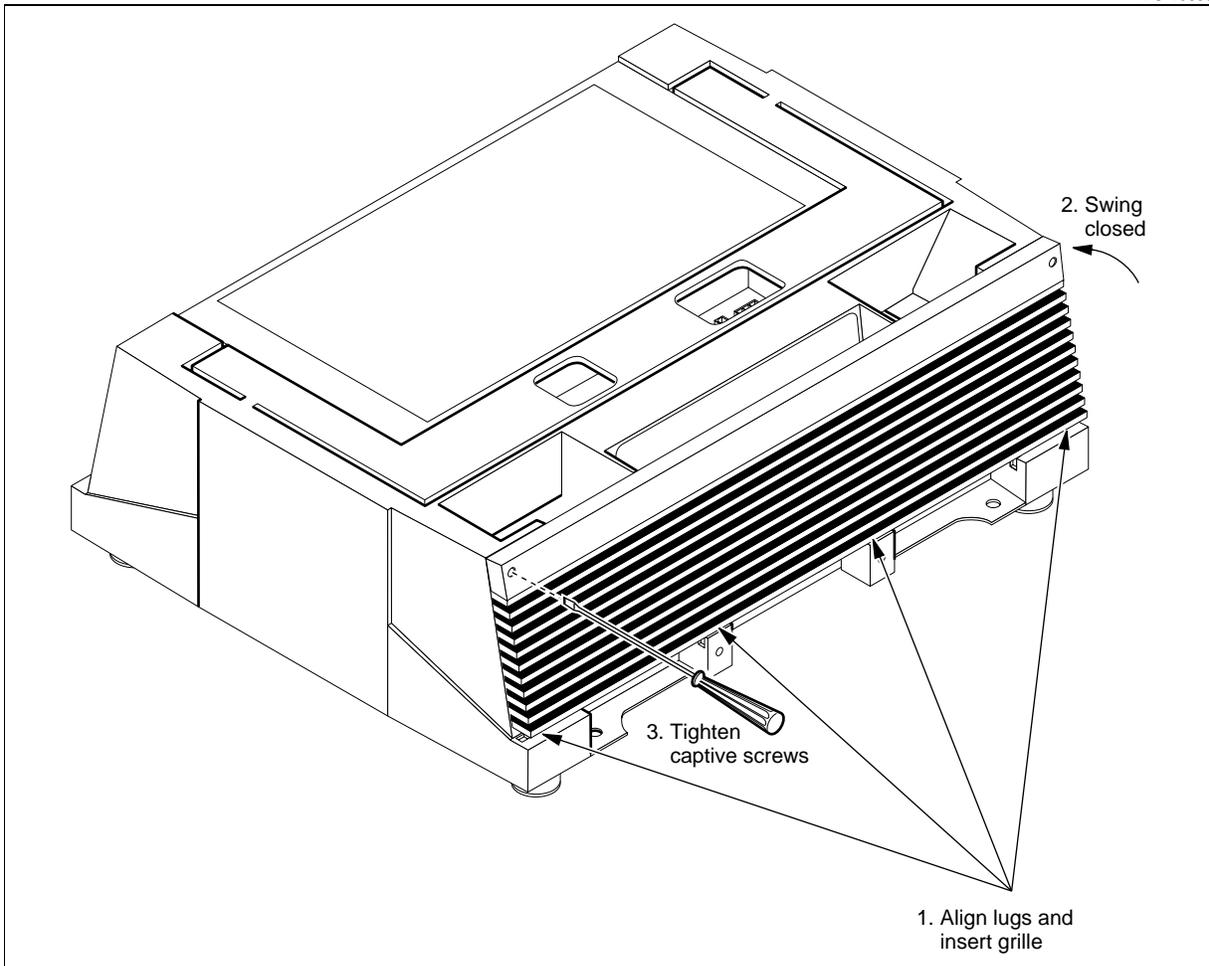
—**end**—

Series 800A OSP routine maintenance procedures

This chapter contains procedures for performing routine maintenance on AccessNode, Series 800A outside plant (OSP) cabinet equipment.

Chapter contents

In the following table find the task you are required to perform, then go to the specified page or document.

If you cannot successfully complete these procedures, contact your next level of support.

Topic	See
Open and close the doors of the S800A OSP cabinet	*Series 800A Outside Plant Cabinet Installation, 323-3001-210*
Procedure 6-1, High voltage shutdown adjustments for replacement rectifiers	page 6-2
Procedure 6-2, Setting equalize (EQL) voltage level	page 6-7
Procedure 6-3, Adjusting the float voltage	page 6-9
Procedure 6-4, Load sharing adjustments for replacement rectifiers	page 6-11
Procedure 6-5, Replacing the fan filters in the heat exchanger roof	page 6-15
Procedure 6-6, Replacing the fan filters in the air induction roof	page 6-17

Procedure 6-1
High voltage shutdown adjustments for replacement rectifiers

Use this procedure to adjust a replacement rectifier for high voltage shutdown in an S800A cabinet that is currently carrying traffic.

If the rectifiers that are to be replaced are installed in a new installation or in a cabinet that is not in-service, see *Series 800A Outside Plant Cabinet Installation*, 323-3001-210 for rectifier installation and adjustment.

> ⚠ **CAUTION**
> **Risk of service interruption**
> This procedure is service affecting. Perform the high voltage shutdown adjustment procedures during low traffic hours.

Documentation references
−48 V, 25A Switch Mode Rectifier NT5C06 in Equipment Installation, Operation, and Maintenance Manual, 169-2071-500.

Test sets
Voltmeter rms Fluke 8050A (or equivalent).

Tools
Screwdriver, slotted, small (0.1-inch width).

Cautions
Observe all cautions listed in *Module Replacement Procedures*, 323-3001-547 in *Maintenance*, Volume 5C.

—continued—

Procedure 6-1 (continued)
High voltage shutdown adjustments for replacement rectifiers

Rectifier and battery adjustments and connections

Table 6-1 shows the Nortel Networks recommended rectifier settings for the optional battery selections.

Table 6-1
Rectifier adjustment settings

Battery manufacturer	High voltage shutdown (HVSD)	Equalize (EQL)	Float (FLT)	Low voltage alarm	Low voltage disconnect
Gates	−56.0 ± 0.1	−55.5 ± 0.1	55.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Eagle-Picher	−56.0 ± 0.1	−55.4 ± 0.1	54.7 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Yuasa	−56.0 ± 0.1	−54.0 ± 0.1	54.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1

Note: Batteries are individually fused on the battery breaker panel (BBP).

Action

Step	Action
1	Turn the circuit breakers on the battery breaker panel to the OFF position.
	Note: On the faceplate of the rectifier module are test points labeled outputs V+ and V− (see Figure 6-1 on page page 6-4).
2	Insert the test leads of the digital voltmeter (DVM) into the test points (negative to negative, positive to positive).
3	Set the EQL/ FLT switch on the rectifier to the FLT position.
4	Verify the voltage reading on the DVM:

If the voltage reading on the DVM is	Then **SLOWLY** adjust the FLT potentiometer
> −56.0 V dc	Counterclockwise until the DVM reads −56.0 V dc. See CAUTION 2 on page 6-5.
< −56.0 V dc	Clockwise until the DVM reads −56.0 V dc. See CAUTION 2 on page 6-5.
= to −56.0 V dc	Go to step 11.

—continued—

Procedure 6-1 (continued)
High voltage shutdown adjustments for replacement rectifiers

Figure 6-1
MPR25 rectifier (NT5C05CA-3) test points

—continued—

Procedure 6-1 (continued)
High voltage shutdown adjustments for replacement rectifiers

Step	Action

CAUTION 1
Risk of equipment damage
When increasing or decreasing the float voltage on a working system with batteries connected, always proceed very slowly. Only turn the float potentiometer 1/4 turn at any one time then allow the batteries to stabilize before adjusting the FLT potentiometer again.The batteries require a period of time to stabilize to the new voltage and current levels.

CAUTION 2
Risk of equipment damage
Do not adjust the voltage above −56.0 Vdc as damage to the AccessNode equipment may result.

5   Slowly and slightly adjust the HVSD potentiometer by turning it counterclockwise to decrease the HVSD level until HVSD occurs.

   Note: The ON/RFA LED illuminates red and the rectifier shuts down.

6   Record the voltage measurement.

7   Turn the FLT POT counterclockwise to reduce the voltage (about two turns).

8   Reset the ac breaker to the ON position.

9   Watch the DVM readings and slowly (see CAUTION 2) adjust the FLT potentiometer clockwise to increase the float voltage until either −56.0 V dc is reached or High Voltage Shutdown (HVSD) occurs.

   Note 1: The ON/RFA LED illuminates red and the rectifier shuts down. Record the voltage measurement.

   Note 2: If the −56.0 V level cannot be reached, hold the FLT/EQL switch in the EQL position while adjusting the FLT potentiometer.

—**continued**—

Procedure 6-1 (continued)
High voltage shutdown adjustments for replacement rectifiers

Step	Action

10 Verify the HVSD level:

If the HVSD	Then
Occurred at −56.0 Vdc	Go to step 11.
Occurred before −56.0 V dc	Slowly and slightly adjust the HVSD potentiometer clockwise to increase the HVSD limit.
Did not occur before −56.0 V dc was reached	Slowly and slightly adjust the HVSD potentiometer counterclockwise to decrease the HVSD limit.

11 Continue rectifier adjustments by using Procedure 6-2.

—**end**—

Procedure 6-2
Setting equalize (EQL) voltage level

Use this procedure to adjust a replacement rectifier for equalize voltage in an S800A cabinet that is currently carrying traffic.

If the rectifiers that are to be replaced are installed in a new installation or in a cabinet that is not in-service, see *Series 800A Outside Plant Cabinet Installation*, 323-3001-210 for rectifier installation and adjustment.

Documentation references
−48 V, 25A Switch Mode Rectifier NT5C06 in Equipment Installation, Operation, and Maintenance Manual, 169-2071-500

Test sets
Voltmeter rms Fluke 8050A (or equivalent)

Tools
Screwdriver, slotted, small (0.1-inch width)

Cautions
Observe all cautions listed in *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

Rectifier and battery adjustments and connections
Table 6-2 shows the Nortel Networks recommended rectifier settings for the optional battery selections.

Table 6-2
Rectifier adjustment settings

Battery Manufacturer	High voltage shutdown (HVSD)	Equalize (EQL)	Float (FLT)	Low voltage alarm	Low voltage disconnect
Gates	−56.0 ± 0.1	−55.5 ± 0.1	55.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Eagle-Picher	−56.0 ± 0.1	−55.4 ± 0.1	54.7 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Yuasa	−56.0 ± 0.1	−54.0 ± 0.1	54.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1

Note: Batteries are individually fused on the BBP.

—continued—

Procedure 6-2 (continued)
Setting equalize (EQL) voltage level

Action

Step	Action

1   Turn the FLT POT counterclockwise to reduce the voltage (about two turns).

> **CAUTION**
> **Risk of equipment damage**
> When increasing or decreasing the float voltage on a working system with batteries connected, always proceed very slowly. Only turn the float potentiometer 1/4 turn at any one time then allow the batteries to stabilize before adjusting the FLT potentiometer again.The batteries require a period of time to stabilize to the new voltage and current levels.

2   Adjust the EQL POT counterclockwise two full turns.

3   Reset the ac breaker to the ON position.

4   Hold the FLT/EQL momentary switch to EQL position.

5   Watch the DVM readings and slowly adjust the FLT potentiometer clockwise to increase the EQL voltage to −55.5 V dc.

6   Release the FLT/EQL switch. The unit should operate normally.

7   Continue with Procedure 6-3.

—**end**—

Procedure 6-3
Adjusting the float voltage

Use this procedure to adjust a replacement rectifier for float voltage in an S800A cabinet that is currently carrying traffic.

If the rectifiers that are to be replaced are installed in a new installation or in a cabinet that is not in-service, see *Series 800A Outside Plant Cabinet Installation*, 323-3001-210 for rectifier installation and adjustment.

Documentation references
–48 V, 25A Switch Mode Rectifier NT5C06 in Equipment Installation, Operation, and Maintenance Manual, 169-2071-500.

Test sets
Voltmeter rms Fluke 8050A (or equivalent).

Tools
Screwdriver, slotted, small (0.1-inch width).

Cautions
Observe all cautions listed in *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

Rectifier and battery adjustments and connections
Table 6-3 shows the Nortel Networks recommended rectifier settings for the optional battery selections.

Table 6-3
Rectifier adjustment settings

Battery Manufacturer	High voltage shutdown (HVSD)	Equalize (EQL)	Float (FLT)	Low voltage alarm	Low voltage disconnect
Gates	−56.0 ± 0.1	−55.5 ± 0.1	55.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Eagle-Picher	−56.0 ± 0.1	−55.4 ± 0.1	54.7 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Yuasa	−56.0 ± 0.1	−54.0 ± 0.1	54.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1

Note: Batteries are individually fused on the BBP.

—continued—

Procedure 6-3 (continued)
Adjusting the float voltage

Action

Step	Action
1	Set the EQL/FLT switch to the FLT position.
2	The EQL/FLT switch on the rectifier must be in the FLT position when adjusting the float voltage.
3	Insert the test leads of the digital voltmeter (DVM) into the test points (negative to negative, positive to positive).
	Note: On the faceplate of the rectifier module are test points labeled outputs V+ and V- (see Figure 6-1 on page 6-4).
4	Slowly adjust the FLT potentiometer clockwise to raise the float voltage or counterclockwise to lower the float voltage to the level proscribed by the battery manufacturer (see Table 6-3 on page 6-9).
5	Continue with Procedure 6-4.

—**end**—

Procedure 6-4
Load sharing adjustments for replacement rectifiers

Use this procedure to adjust the load sharing of the replacement rectifier.

If the rectifiers that are to be replaced are installed in a new installation or in a cabinet that is not in-service, see *Series 800A Outside Plant Cabinet Installation*, 323-3001-210 for rectifier installation and adjustment.

Documentation references
−48 V, 25A Switch Mode Rectifier NT5C06 in Equipment Installation, Operation, and Maintenance Manual, 169-2071-500.

Test sets
Voltmeter rms Fluke 8050A (or equivalent).

Tools
Screwdriver, slotted, small (0.1-inch width).

Cautions
Observe all cautions listed in *Module Replacement Procedures*, 323-3001-547, in *Maintenance*, Volume 5C.

Rectifier and battery adjustments and connections
Table 6-4 shows the Nortel Networks recommended rectifier settings for the optional battery selections.

Table 6-4
Rectifier adjustment settings

Battery Manufacturer	High Voltage ShutDown (HVSD)	Equalize (EQL)	Float (FLT)	Low Voltage Alarm	Low Voltage Disconnect
Gates	−56.0 ± 0.1	−55.5 ± 0.1	55.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Eagle-Picher	−56.0 ± 0.1	−55.4 ± 0.1	54.7 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1
Yuasa	−56.0 ± 0.1	−54.0 ± 0.1	54.0 ± 0.1	−47.0 ± 0.1	−43.0 ± 0.1

Note: Batteries are individually fused on the BBP.

—continued—

Procedure 6-4 (continued)
Load sharing adjustments for replacement rectifiers

Action

Step	Action
1	Examine all rectifiers for the status of the RFA LEDs (see Figure 6-2).

Figure 6-2
NT5C10CE rectifier shelf equipped with three MPR25 (NT5C05CA-3) rectifiers
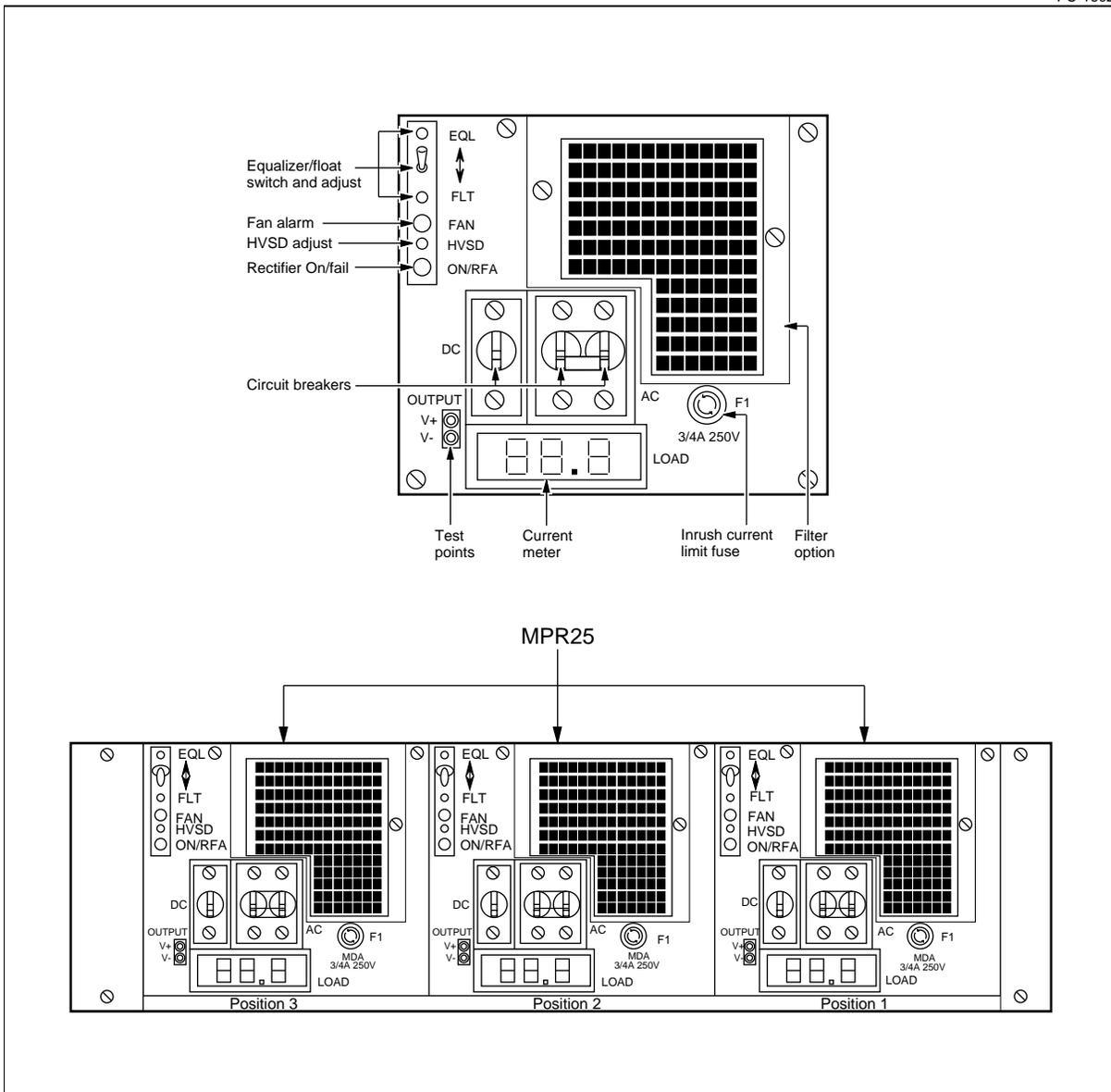
—continued—

Procedure 6-4 (continued)
Load sharing adjustments for replacement rectifiers

Step	Action
2	Perform the load sharing adjustment steps shown in Table 6-5.
	Table 6-5 lists the RFA LED indications and the associated steps to adjust the load sharing of multiple rectifiers.

Table 6-5
Rectifier load sharing adjustments

If the RFA LED indication is	and the number of rectifiers installed is	then the indication means	so perform these steps
Only one RFA LED is illuminated GREEN	two	that the rectifier with the GREEN RFA LED is floating slightly too high	Slowly and <u>very slightly</u> adjust the FLT potentiometer of the rectifier that has the RFA LED illuminated GREEN counterclockwise until the RFA LEDs of at least one of the other rectifiers illuminate GREEN. Go to step 3.
Only two RFA LEDs are illuminated GREEN	three	that the rectifier with the RED RFA LED is floating slightly too low	Slowly and <u>very slightly</u> adjust the FLT potentiometer of the rectifier that has the RFA LED illuminated RED clockwise until the RFA LED illuminates GREEN. Go to step 3.
All installed rectifier RFA LEDs are illuminated GREEN	any number of rectifiers	that the rectifiers are sharing the load closely	Go to step 4.

3	Repeat from step 1 until all rectifiers RFA LED are illuminated GREEN.
4	Examine and compare the display of the ammeters on the rectifiers.
	Note: Nortel Networks recommends that the ammeters of all installed rectifiers read within 0.1 V dc of each other for proper load sharing.

—**continued**—

Procedure 6-4 (continued)
Load sharing adjustments for replacement rectifiers

Step	Action
5	Adjust the FLOAT voltage of the rectifier that has the lowest current reading on the rectifier ammeter display by slowly and *very slightly* adjusting the FLT potentiometer clockwise until the ammeter reading is no longer the lowest of the installed rectifiers.
	Note: The FLT potentiometer load sharing adjustment is very sensitive. Small adjustments can reflect large changes in the ammeter readings.
6	Adjust the FLOAT voltage of the rectifier that has the highest current reading on the rectifier ammeter display by slowly and *very slightly* adjusting the FLT potentiometer counterclockwise until the ammeter reading is no longer the highest of the installed rectifiers.
	Note: The FLT potentiometer load sharing adjustment is very sensitive. Small adjustments can reflect large changes in the ammeter readings.
7	Repeat from step 4 until all rectifiers have RFA LED illuminated GREEN and the ammeter displays all read within 0.1 A of each other.

—**end**—

Procedure 6-5
Replacing the fan filters in the heat exchanger roof

This procedure explains how to replace the intake and exhaust fan filters in the Series 800A cabinet with the NT7A69DA-FA heat exchanger roof options.

Requirements

- Can wrench (216 tool) with Harris insert part number 10660-001 (tool and insert are shipped inside the cabinet)
- NT7A6930 fan filter replacement kit

Action

Step	Action
1	Remove the filter retaining bracket on the underside of the rain louvers by loosening the two 1/4 turn fasteners (see Figure 6-3 on page page 6-16).
2	Place the filter retaining bracket in a safe place.
3	Remove the filter by pulling down on the two filter removing straps.
4	Inspect the filter. If possible tap the filter on the ground or rinse with water to remove any dirt or insects.
5	If filter cannot be reasonably cleaned, then replace with new filter.
	Note: Make sure the new filter removing straps are oriented properly at the bottom of the filter before installing.
6	Replace the filter retaining bracket.
7	Repeat step 1 through step 6 for each of the remaining 3 filters.

—continued—

Procedure 6-5 (continued)
Replacing the fan filters in the heat exchanger roof

Step	Action

Figure 6-3
Replacing fan filters in the heat exchanger roof

PC-15161

Filter (4)

Filter retaining bracket with 1/4 turn screws (Loosen and pull filter straight down)

Front view

Side view
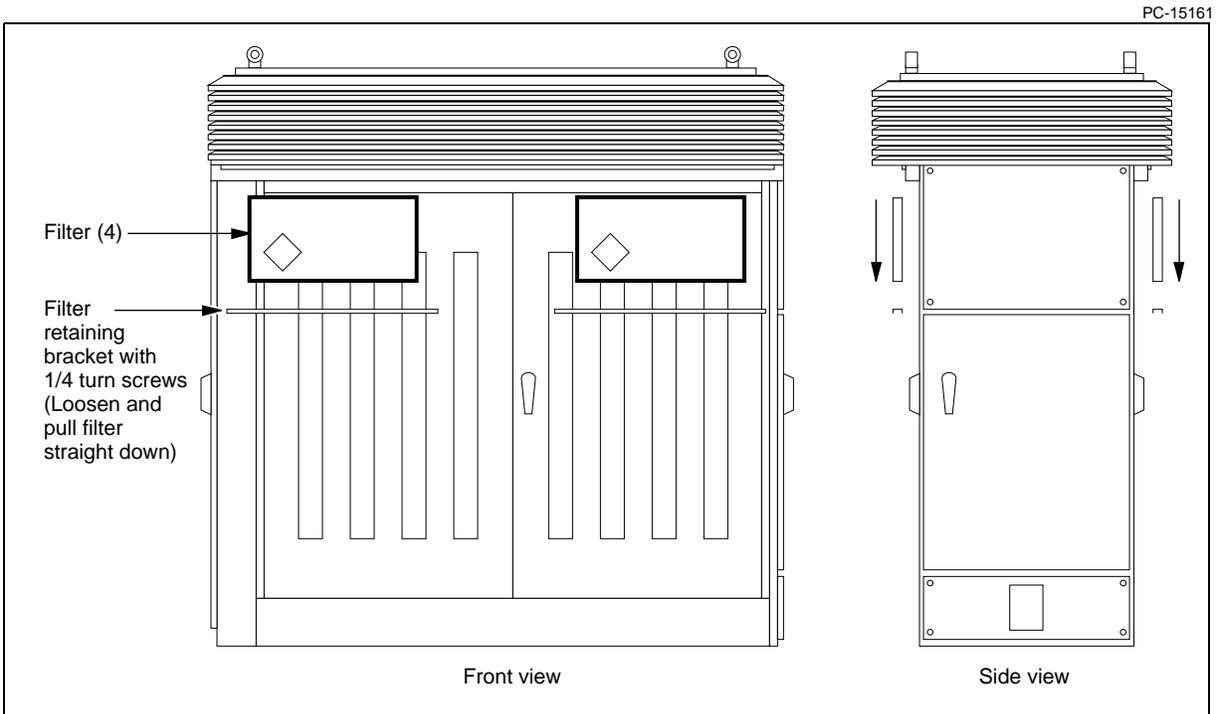
—end—

Procedure 6-6
Replacing the fan filters in the air induction roof

This procedure explains how to replace the intake and exhaust fan filters in the Series 800A cabinet with the NT7A69AA-CA air induction roof options.

Requirements

- screwdriver, flat head, medium
- NT7A6920 fan filter replacement kit

Action

Step	Action
1	Open all four equipment compartment doors (front and rear).
2	Switch circuit breakers CU A and CU B on the breaker interface panel (BIP) to the OFF position.
3	Use a screwdriver to loosen the eight thumb screws (four on each side) on the hinged filter cover on the exhaust fan side (six fans) and the intake fan side (five fans).
4	Allow the hinged fan cover to swing down (see Figure 6-4 on page 6-18).
5	Remove and discard the old exhaust and intake fan filters.

> **CAUTION**
> **Risk of equipment damage**
> Make sure both filters are seated against the grate for its entire length. Improper installation allows air to bypass the filter.

Step	Action
6	Replace with new fan filters and tighten thumbscrews.
7	Switch CU A and CU B on the BIP to the ON position.
8	Make sure air is flowing into the cabinet through the rain louver intake and out of the cabinet through the rain louver exhaust.
9	Close the equipment compartment doors.

—continued—

Procedure 6-6 (continued)
Replacing the fan filters in the air induction roof

Step   Action

Figure 6-4
Cross section of air induction roof with filters

PC-15162

Filter material

Latch

—end—

Index

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Routine Maintenance Procedures

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