

Description of the AC power cables

The installation requires the following AC power cable or cables.

- #10 AWG 3-wire - for the heaters
- #14 AWG 3-wire - for the convenience outlet, if applicable (not present in international cabinets)



DANGER

Electrical Shock Hazard

Installation of the Modular Cell 4.0B cabinets require connections to be made that require AC power to be turned off at specific circuit breakers in the non-Lucent power source. Failure to follow instructions to turn off these breakers can create an electrical shock hazard. Failure to follow the order of the installation procedure (as written) can also create an electrical shock hazard. The procedures in this manual do not include safety procedures regarding working on energized equipment. When this manual is used to install equipment in an energized system, the appropriate safety procedures must be followed in addition to the procedures in this manual.

Follow these rules:

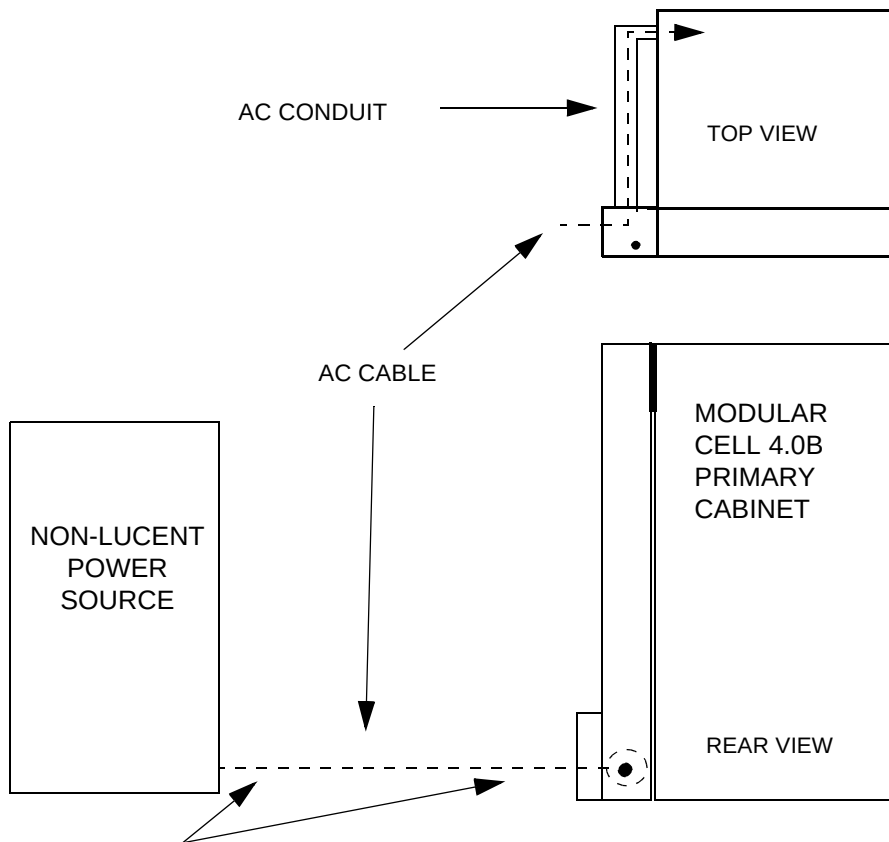
- 1. Perform installation steps in the order provided.*
- 2. Observe and strictly follow all safety precautions.*
- 3. When completing electrical connections, always use tools that are properly insulated.*

**Route the AC power cables
to the Modular Cell 4.0B
primary cabinet**

Important! If installing a 4.0B dual band cabinet, skip to [Cable pre-installation instructions for the dual band cabinet](#) on Page B - 50 to continue the installation.

Use the following procedure to route the AC power cable or cables.

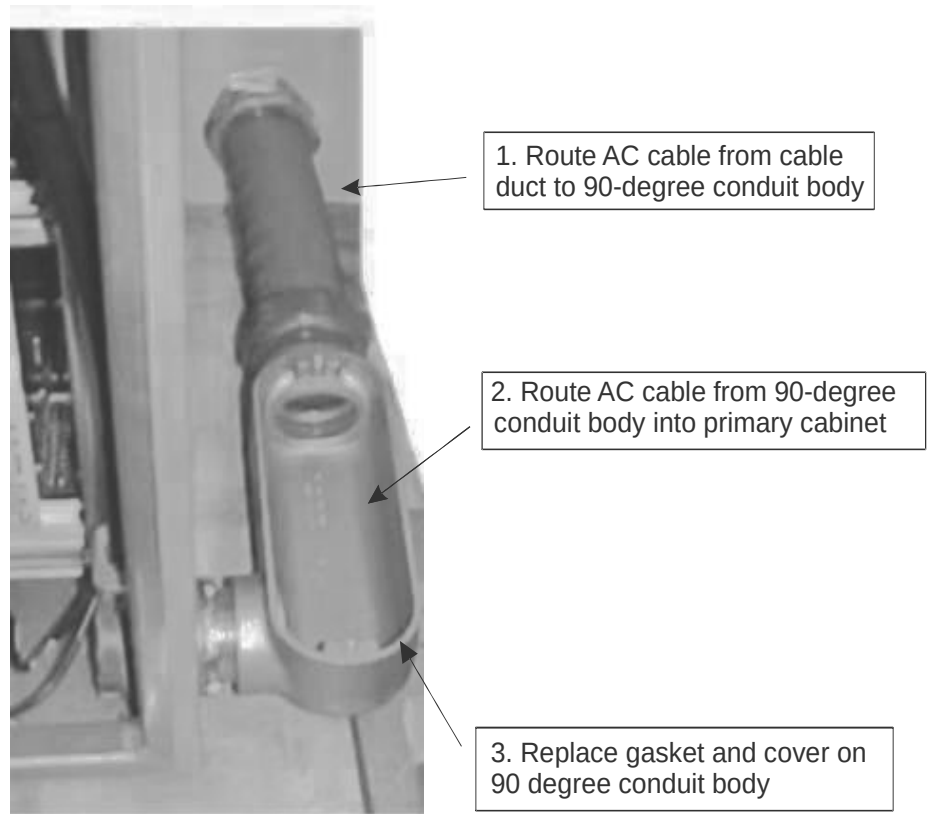
- 1 At the non-Lucent power source, set the AC circuit breaker(s) to the off position and locate the AC power cable or cables. There will be a heater cable (and a convenience outlet cable, if applicable).
- 2 Route the AC power cables (1 or 2) through the AC conduit (if applicable) and into the cable duct. Refer to the figure below



If flush mounting is not possible, the bottom (2-inch) conduit (example) is used for routing of cables from the non-Lucent power source to the cable duct.

-
- 3** Pull the cable or cables through the AC conduit at the front of the cable duct, through the 90 degree conduit body, and into the bottom of the Modular Cell 4.0B primary cabinet. Refer to the figure below.
-

- 4** Replace the gasket and cover on the 90-degree conduit body. Refer to the figure below.



How to route and connect the AC power cables at the Modular Cell 4.0B primary cabinet

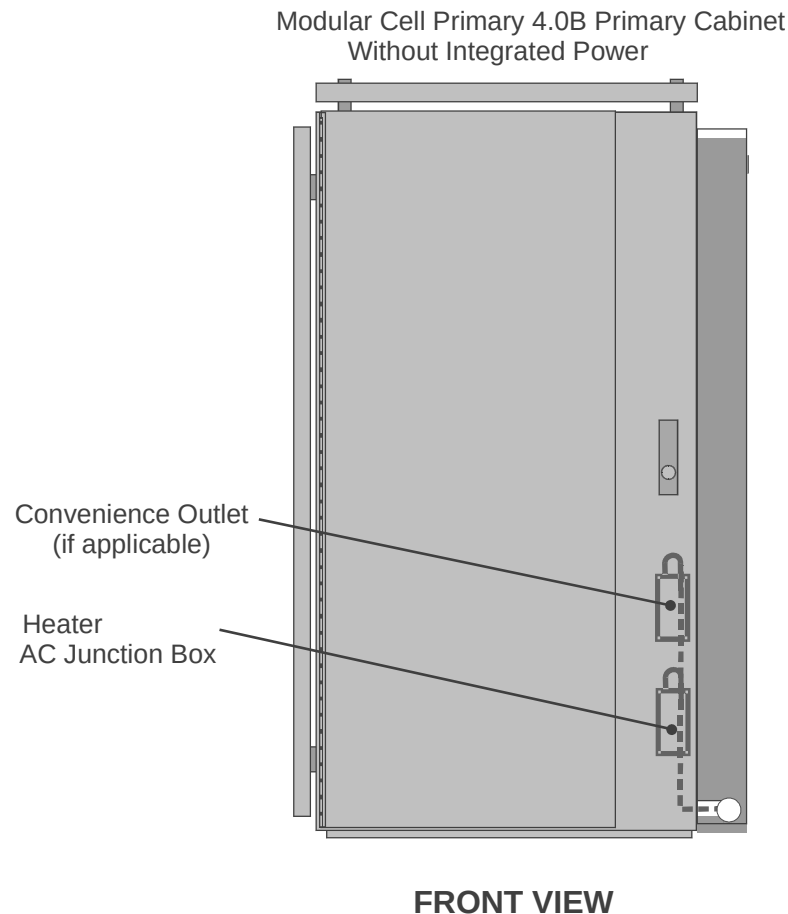
Overview **Important!** If installing a 4.0B dual band cabinet, skip to [Cable pre-installation instructions for the dual band cabinet](#) on Page B - 50 to continue the installation.

This procedure module provides instructions for the routing and connection of the AC power cable or cables at the primary cabinet. Step-by-step instructions are provided for the following tasks.

Connect the AC power cable for the heaters in the primary cabinet	B - 46
Connect the AC power cable for the convenience outlet in the primary cabinet (NAR only)	B - 48

Location of the AC junction box and the convenience outlet

Refer to the figure below for the location of the AC heater junction box in the primary cabinet (as well as the convenience outlet, if applicable).



Description of the AC power cables

The installation requires the following AC power cable or cables.

- #10 AWG 3-wire - for the heaters
- #14 AWG 3-wire - for the convenience outlet, if applicable (not present in international cabinets).

**Connect the AC power
cable for the heaters in the
primary cabinet**

Use the following procedure to connect the AC power cable for the heaters. Refer to the figure on Page B - 45 for the location of the heater junction box. Refer to the figure on Page B - 47 for connections.

-
- 1** At the non-Lucent power source, set the AC circuit breaker(s) to the off position.

-
- 2** Identify the correct cable for the heaters. This is the larger of the two cables (10 AWG), with three wires colored black (L1), red (L2) and green with a yellow stripe (GND).

Important! Alternately, a three-wire cable with the following color code may also be used: brown (L1), blue (L2) and green with a yellow stripe (Ground).

-
- 3** Allow adequate slack and cut this power cable to the correct length.

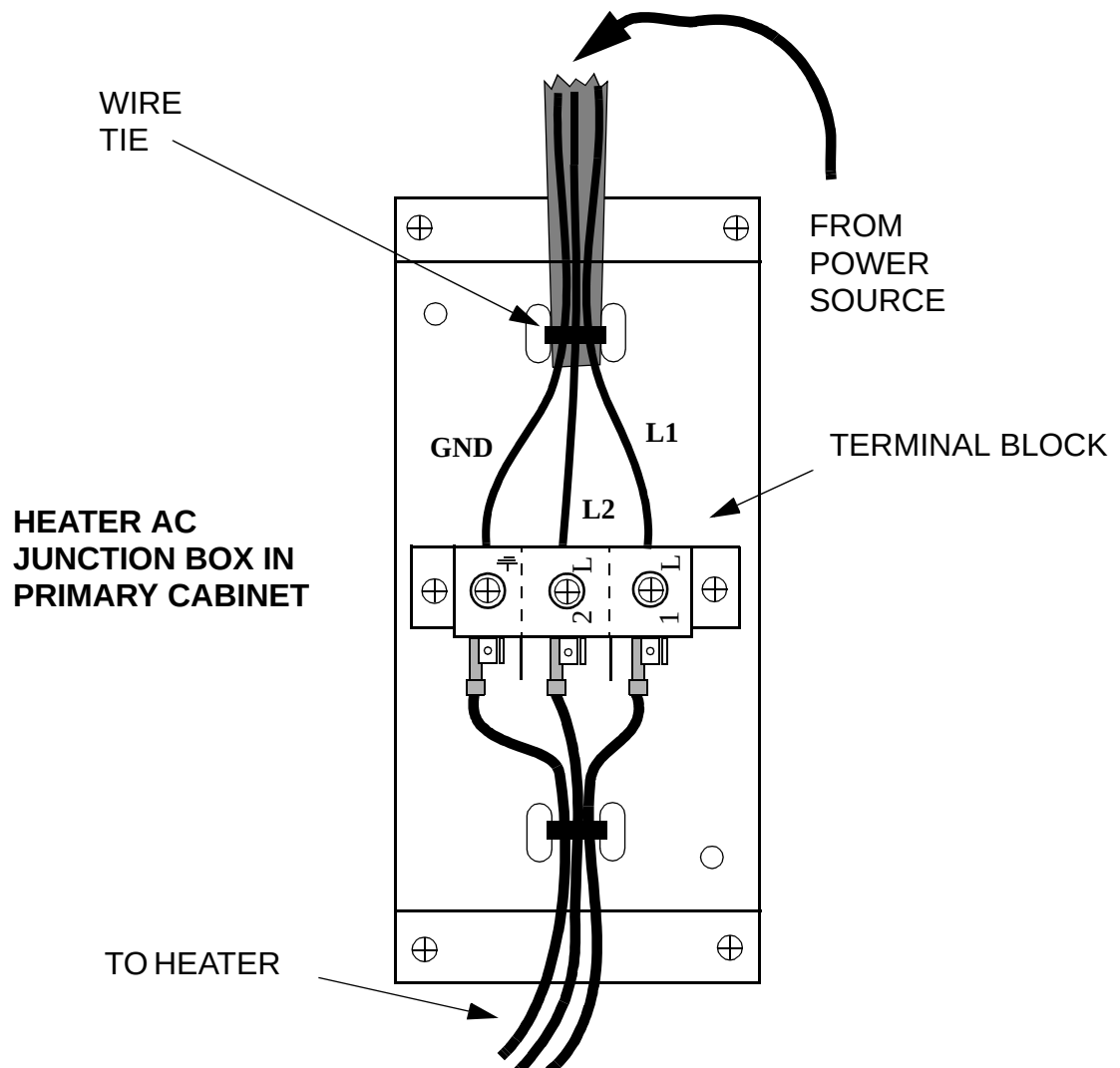
-
- 4** Strip the insulation off of the cable to expose the individual wires and then strip the insulation off of the ends of the individual wires.

-
- 5** Loosen the three terminal block screws. Refer to the figure on Page B - 47.

6 Connect each labeled/colored wire to the AC junction box terminal block as shown in the figure below.

- Black/Brown to L1
- Red/Blue to L2
- Green/Yellow to ground (symbol).

MODULAR CELL 4.0B PRIMARY CABINET: DETAIL VIEW



7 Install and tighten a wire tie as shown in the figure above. Then install the AC junction box cover.

Connect the AC power cable for the convenience outlet in the primary cabinet (NAR only)

Use the following procedure to connect the AC power cable for the convenience outlet. Refer to the figure on Page B - 45 for the location of the convenience outlet. Refer to the figure on Page B - 49 for connections.

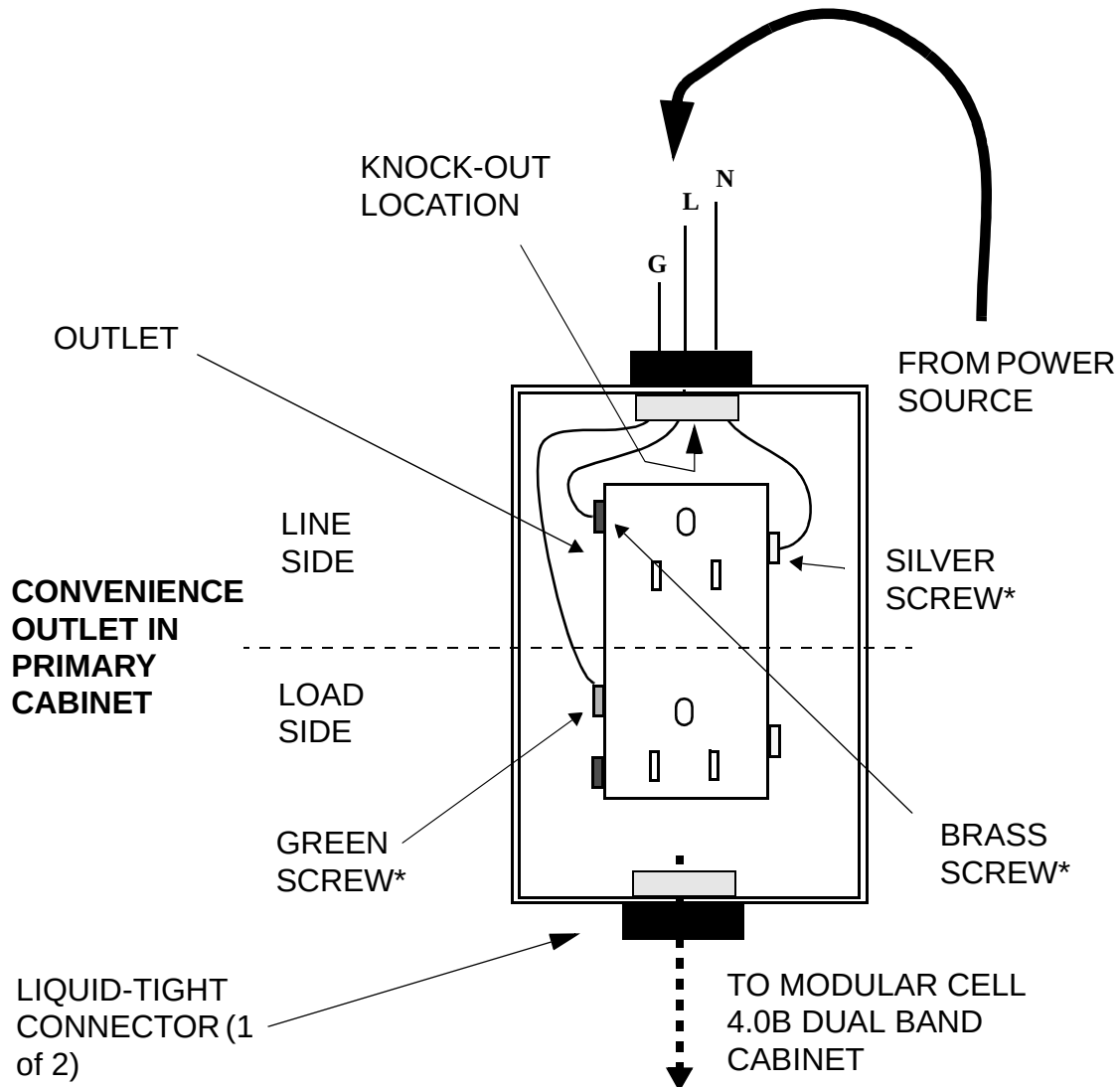
- 1 At the non-Lucent power source, set the AC circuit breaker(s) to the off position.
- 2 Identify the correct cable for the convenience outlet. This is the smaller of the two cables (14 AWG), with three wires colored black (L), white (N) and green with a yellow stripe (GND).
- 3 Prepare the end of this power cable.
 1. Allow adequate slack and cut off the cable to the correct length.
 2. Strip the insulation off of the cable to expose the individual wires.
 3. Strip the insulation off of the ends of the individual wires.
- 4 Remove the knock-out, if required. Refer to the figure on Page B - 49.
- 5 Route the cable through the liquid-tight connector into the junction box and tighten the connector.

Important! When performing the next step, the location of the screws may vary depending upon the vendor. Make sure that the wires are connected to the "Line" side of the outlet.

- 6 Connect the L and N wires to the correct screw terminal on the Line side of the supplied outlet and the GND wire to the green ground screw as follows. Refer to the figure on Page B - 49.
 - Black wire (L) to brass screw
 - White wire (N) to silver screw
 - Green-yellow striped wire (GND) to green screw

-
- 7 Install the outlet into the junction box.

MODULAR CELL 4.0B PRIMARY CABINET: DETAIL VIEW



* SCREW LOCATION MAY VARY BY OUTLET VENDOR

-
- 8 Install the AC junction box cover.

-
- 9 Return to Chapter 7 to finish the installation.

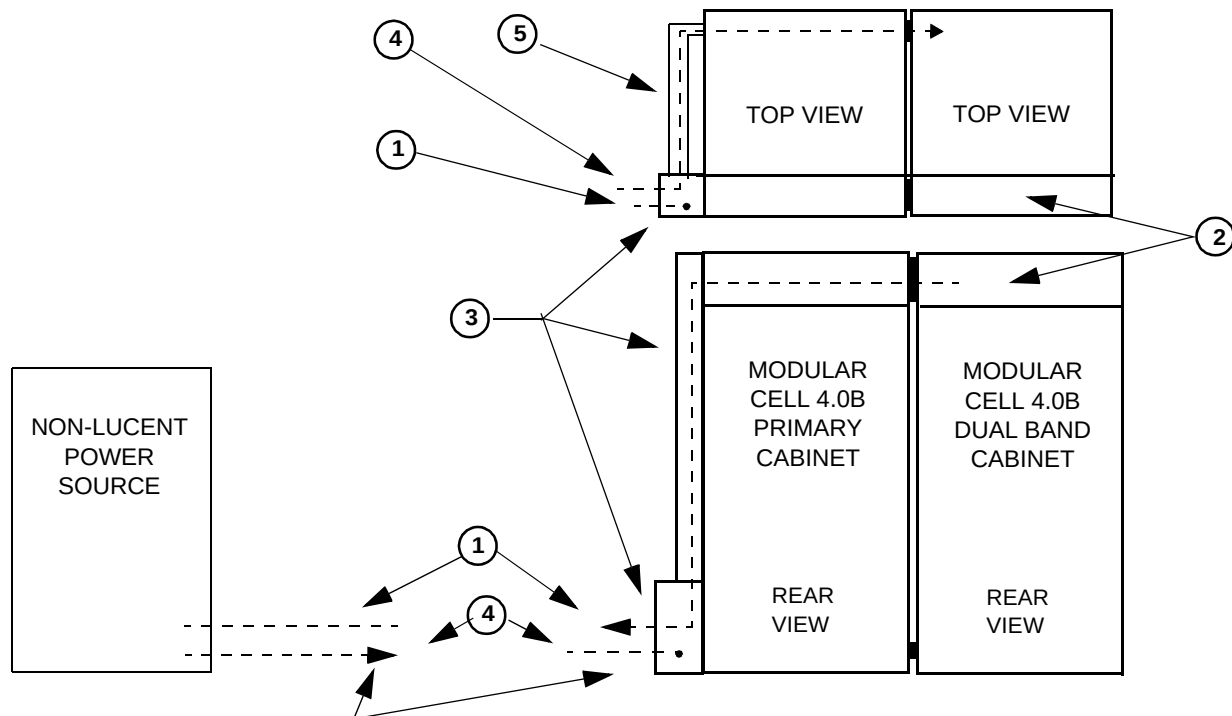
Cable pre-installation instructions for the dual band cabinet

Wiring overview

Important! If installing a Modular Cell 4.0B primary cabinet, return to Chapter 7 to finish the installation.

The following is the wiring overview, item number coded to the figure below.

- a. DC load and return wiring (see item 1), is routed from the antenna cable cover (see item 2) of the Modular Cell dual band cabinet, through the antenna cable cover of the Modular Cell primary cabinet, and follows a vertical route down the cable duct assembly (see item 3), through the top (2-1/2 inch) opening at the bottom of the cable duct. They are then routed through the top conduit to the non-Lucent power source.
- b. AC wiring from the non-Lucent power source (see item 4) is routed through the bottom 2-inch conduit through the bottom 2-inch opening in the cable duct (see item 3), forward through the AC conduit (see item 5), through the opening at the bottom front of the cabinet, and through the primary cabinet and into the dual band cabinet.



If the power source is not flush mounted with zero spacing to the cable duct, a 2-1/2 conduit (item 1) is used for routing of DC cables between the cable duct. and the non-Lucent power source. Ac is routed through a 2-inch conduit (item 4)

How to install ancillary hardware for the dual band cabinet DC cables

Overview The non-Lucent power source may have been connected directly to the cable duct assembly, or alternately, located away from the primary cabinet with a conduit utilized for cable routing to the cable duct assembly. Perform one of the following procedures to install the 2-1/2-inch chase nipple or conduit required for routing of DC cables to the dual band cabinet.

This section covers the following procedures, as applicable.

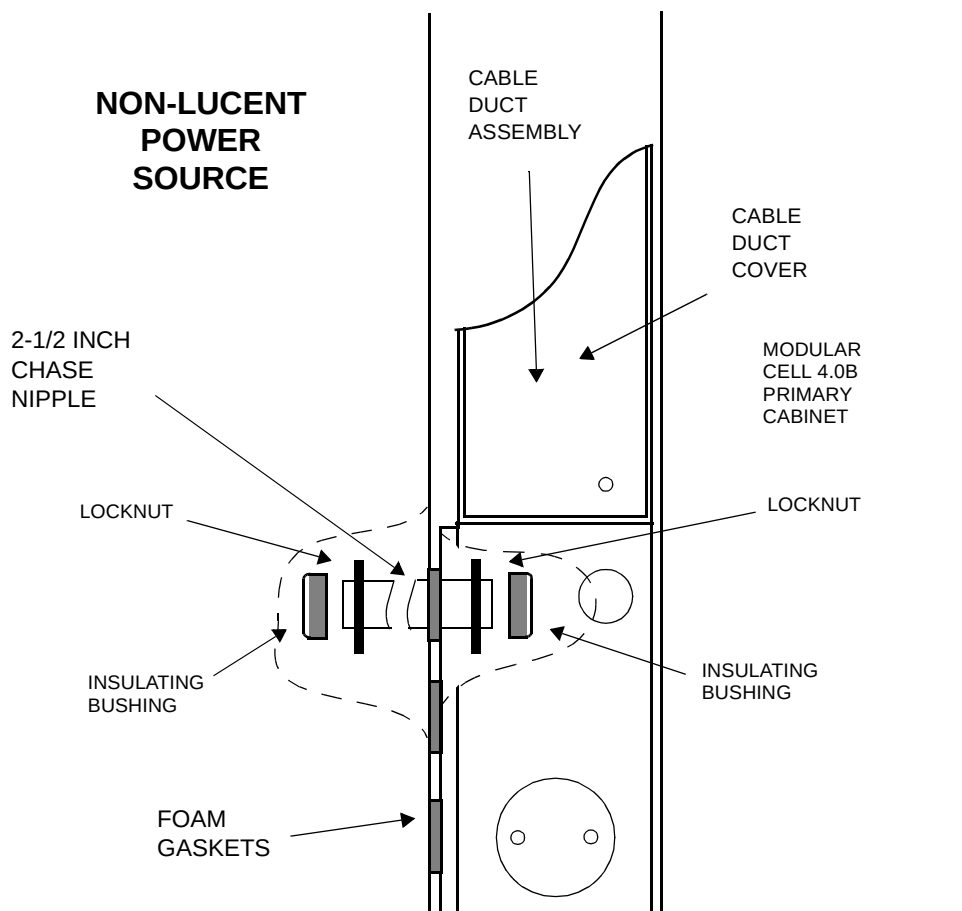
<u>Install the 2-1/2-inch chase nipple if the power source is connected directly to the cable duct</u>	B - 52
<u>Install a 2-1/2-inch conduit if the power source is not connected directly to the cable duct</u>	B - 53

Install the 2-1/2-inch chase nipple if the power source is connected directly to the cable duct

Important! If conduits were used to attach the non-Lucent power source to the cable duct, skip to Install a 2-1/2-inch conduit if the power source is not connected directly to the cable duct on Page B - 53

Use the following steps to install the chase nipple if the power source is connected directly to the bottom of the cable duct assembly (zero spacing).

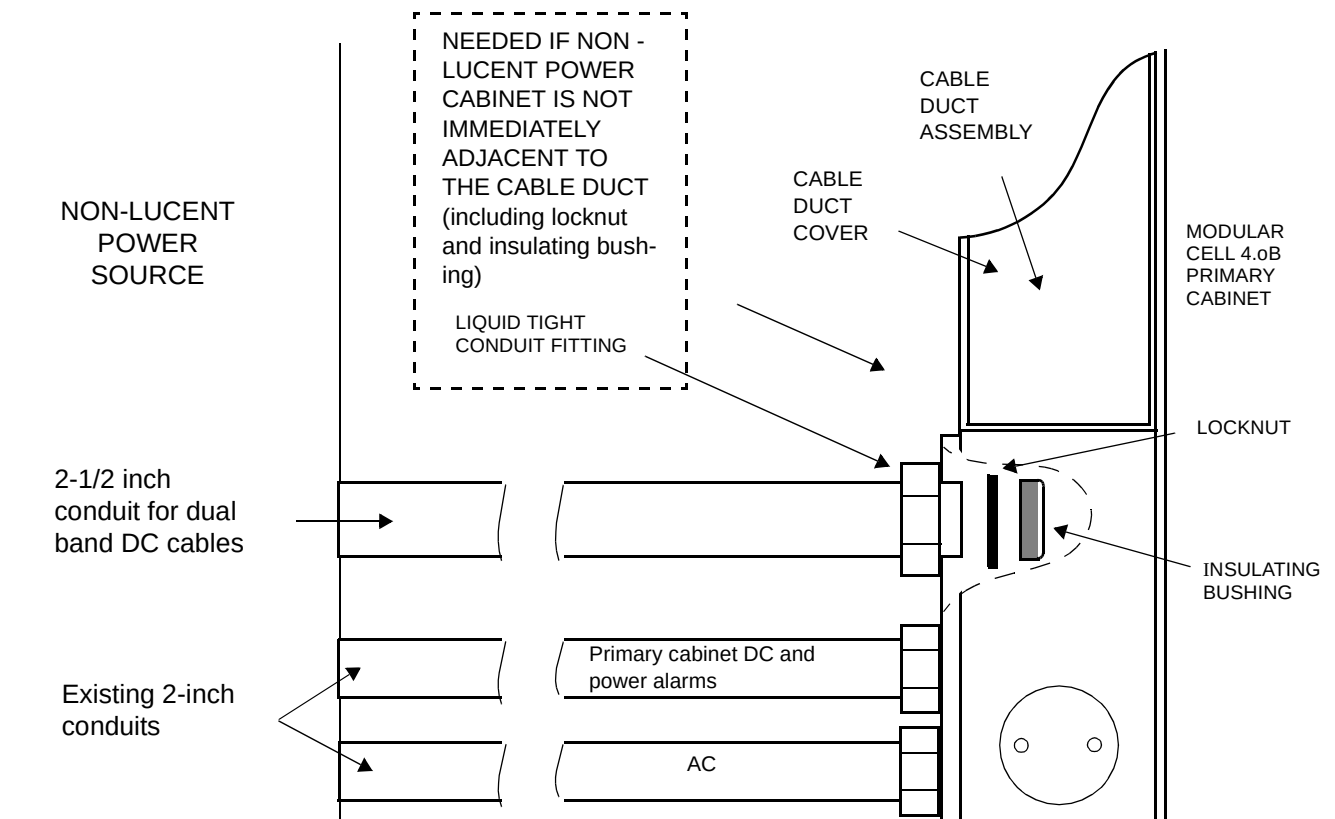
- 1 Install the 2-1/2 chase nipple, lock nuts, and insulating bushing into the top opening, and hand-tighten. Refer to the figure below.
- 2 Hold the lock nut inside of the non-Lucent power source with a wrench, and tighten the lock nut inside of the cable duct with a hammer and a screwdriver (two technicians needed). Refer to the figure below.



Install a 2-1/2-inch conduit if the power source is not connected directly to the cable duct

Important! If the non-Lucent power source is attached directly to the cable duct, skip to [How to route and connect DC power cables to a Modular Cell 4.0B dual band cabinet](#) on Page B - 54.

- 1 Remove the cover from the top (2-1/2inch) opening in the cable duct and install a 2-1/2inch conduit (from the power source) and conduit fitting at the opening. Refer to the figure below.
- 2 Thread a locknut and insulating bushing onto the end of the conduit fitting inside of the cable duct, and hand-tighten. Refer to the figure below.
- 3 Hold the fitting with a wrench, and tighten the locknut inside of the cable duct with a hammer and a screwdriver (two technicians needed). Refer to the figure below.



How to route and connect DC power cables to a Modular Cell 4.0B dual band cabinet

Overview **Important!** If installing a Modular Cell 4.0B primary cabinet, return to Chapter 7 to finish the installation.

This procedure provides instructions for the installation of the DC power cables from non-Lucent power source to a 4.0B dual band cabinet.

If the requirements listed in the applicable document have been met, refer to the applicable vendor documentation and use this document for power connections.

Step-by-step instructions are provided for the following tasks.

<u>Label dual band cabinet +24VDC cables</u>	B - 57
<u>Label dual band cabinet 24VDC return cables</u>	B - 57
<u>Route the DC cables from the dual band cabinet to the non-Lucent power source</u>	B - 59
<u>Connect the DC cables at Modular Cell 4.0B dual band cabinet</u>	B - 62

For DC power requirements, refer to Appendix E of the following document.

- *Flexent® Modular Cell 4.0/4.0B Outdoor Site Preparation Guidelines, 401-703-413*

Description of the DC power cables

Modular Cell cabinets without integrated power require DC power cables, red feed cables (+) and black return cables (-) for attachment from a separate power source. Note that the terminal lugs for attachment at the Modular Cell 4.0B dual band cabinet are supplied with the cabinet.

DC feeders and connection interface

Each Modular Cell outdoor cabinet requires three DC feeds as shown in the table on the next page. One additional DC feed is required if the Modular Cell is equipped with an A6 amplifier shelf.

Alternate wire gauges may be used for the DC feeders, but shall be sized to limit the round trip voltage drop between the power system output terminals and the Modular Cell input terminals to less than one volt (for +24 VDC systems).

A current level equal to 80% of the circuit breaker current rating specified shall be used for this calculation. The wire used for the DC feeders shall be rated for the environmental condition in which it is used and shall be rated and sized according to the applicable section in the National Electrical Code or Canadian Electrical Code, Part I (NAR markets) and IEC 60364, or the local electrical code in effect (international markets). The circuit breaker shall be type 51 with DC trip-delay curve characteristics. The DC power terminal block is located at the top rear of a Modular Cell outdoor cabinet. The tables below provide the circuit breaker sizes, wire gauges, maximum wire lengths and lug dimensions for DC feeders #1, #2, #3, and #4 for 4.0B Modular Cells.

DC cable specifications The following table provides the DC cable specifications for 4.0B cabinets. The fourth feed is required for the A6 amplifier shelf only.

DC feeders and connection interface: Modular Cell 4.0B				
Modular Cell 4.0B	Feeder 1#, #2, #3, #4 (Note 1)			Dimensions for lug on DC terminal block
	Circuit breaker (AMPS)	Wire size (AWG)	Max. Length (Feet)	
+24 VDC	150	1 (Note 2)	40	5/16 (threaded stud) 11/16 (max. width)

Table Notes

Note 1: The fourth feed is required for the A6 amplifier shelf only

Note 2: DC wires and lugs must be rated for 90 degrees C. For longer wire runs, calculate wire size and circuit breaker rating according to the National Electric Code or canadian Electrical Code, Part I (NAR markets) and IEC 60364, or local electrical code in effect (International markets).

**Label dual band cabinet
+24VDC cables**

Label the dual band cabinet +24VDC cables as shown in the table below. The (number) in parentheses indicates the DC terminal block position for connection of each cable. A dual band cabinet has DC terminal block positions numbered 5 through 8 from right to left. Refer to the figure on Page B - 63.

If installing:	Then label cables:
4.0B Dual Band Cabinet (L6A required for first growth cabinet with A6 shelf)	• #1 AWG: Label L4 (5) • #1 AWG: Label L5 (6) • #1 AWG: Label L6 (7) • #1 AWG: Label L6A (8) (for A6 shelf only)

**Label dual band cabinet
24VDC return cables**

Label the dual band cabinet 24VDC Return cables as shown in the table below. The (number) in parentheses indicates the DC terminal block position for connection of each cable. A dual band cabinet has DC terminal block positions numbered 5 through 8 from right to left. Refer to the figure on Page B - 63.

If installing:	Then label cables:
4.0B Dual Band Cabinet (6A required for first growth cabinet with A6 shelf)	• #1 AWG: Label 4 (5) • #1 AWG: Label 5 (6) • #1 AWG: Label 6 (7) • #1 AWG: Label 6A (8) (for A6 shelf only)

Observe safety considerations

The safest condition for installing and connecting the dual band cabinet is with the system de-energized. If a dual band cabinet is to be added to an operating system, the owner/operator of the system must be consulted. The owner/operator must provide approval as to whether and when the system will be fully or partially de-energized. The customer may request that the work be performed while the system is energized. If so, observe the following caution.

**DANGER****Electrical Shock Hazard**

Installation of a Modular Cell 4.0B dual band cabinet requires DC connections to be made in the non-Lucent power source with AC power on (unless the installation is performed during a maintenance window that allows AC power to be turned off at the main panel and the batteries disconnected).

The procedures in this manual do not include safety procedures regarding working on energized equipment. When this manual is used to install equipment in an energized system, the appropriate safety procedures must be followed in addition to the procedures in this manual. Failure to follow the order of the installation procedure (as written) can create an electrical shock hazard.

Follow these rules:

- 1. Perform installation steps in the order provided.*
- 2. Observe and strictly follow all safety precautions.*
- 3. When completing electrical connections, always use tools that are properly insulated.*

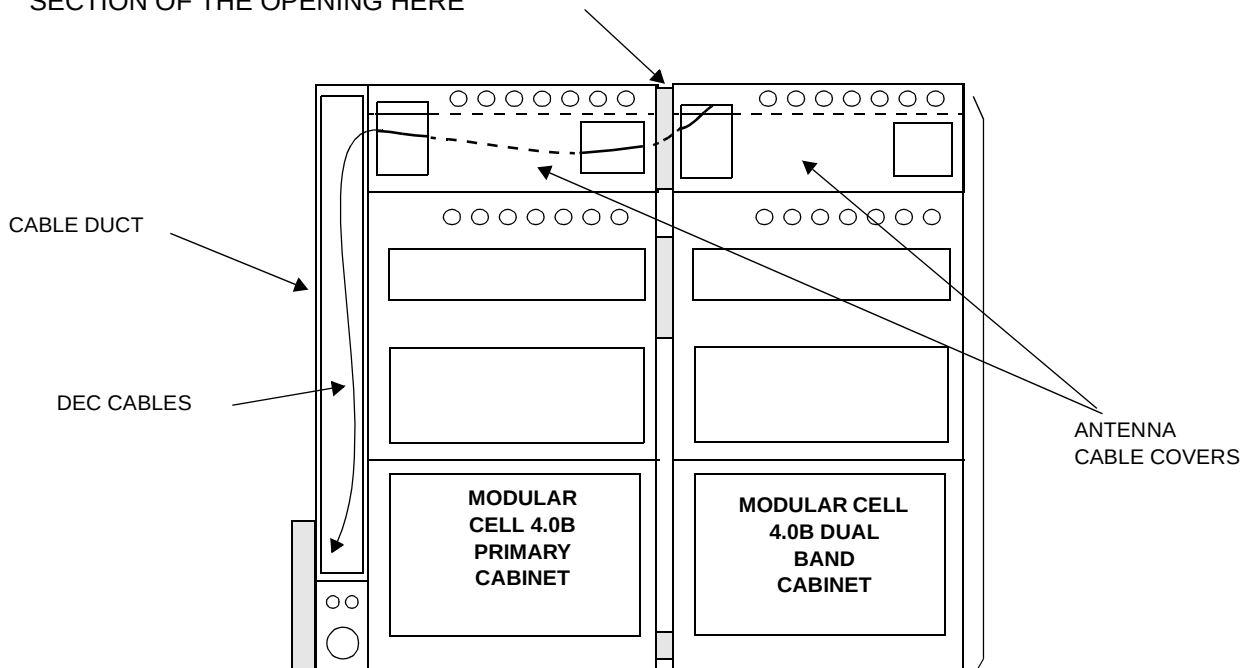
**Route the DC cables from
the dual band cabinet to
the non-Lucent power
source**

Important! In order to make the routing of the DC cables as easy as possible, it is recommended that they be routed in a direction from the dual band cabinet to the non-Lucent power source, prior to connection at either end.

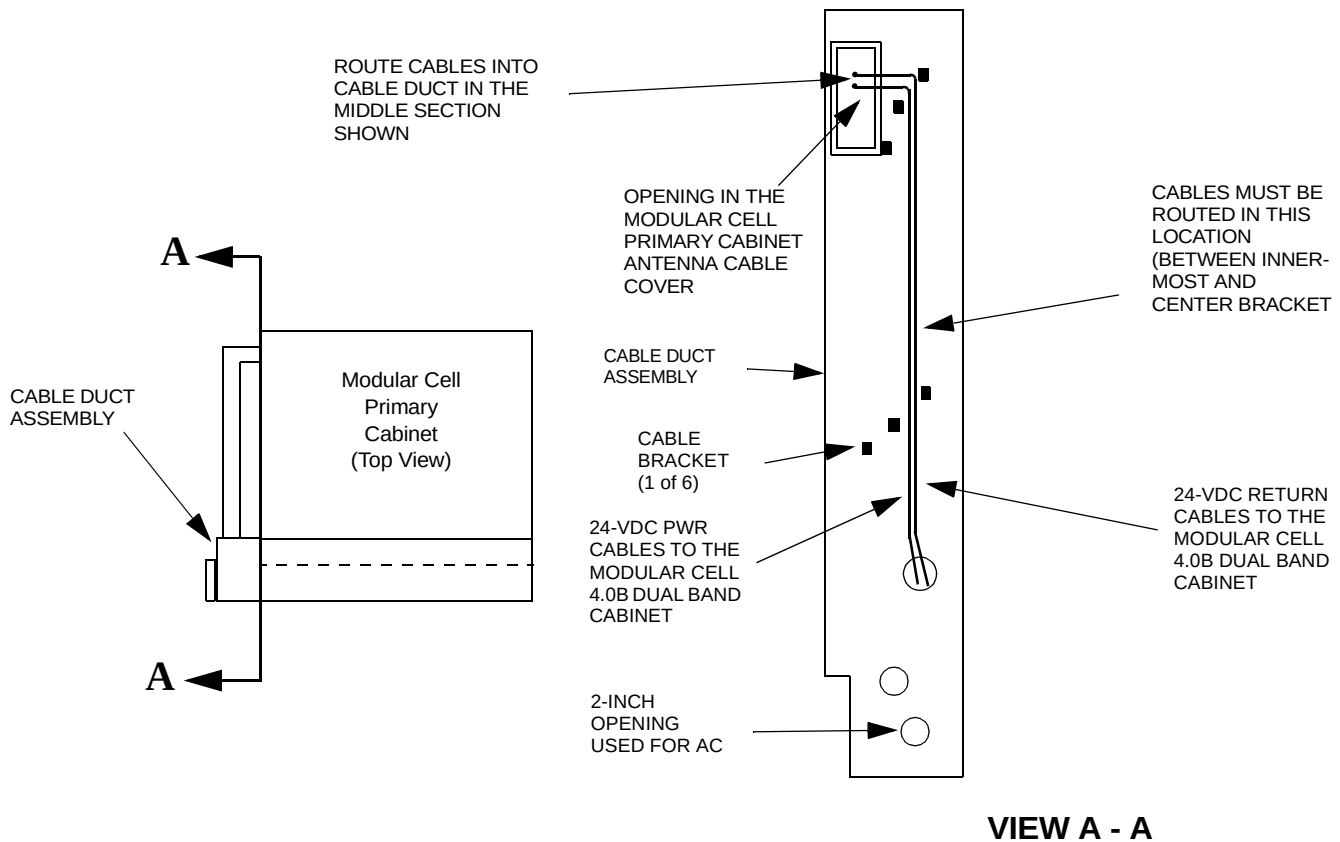
Perform the following steps to route the DC cables from the dual band cabinet to the non-Lucent power source.

- 1 Thoroughly tape over the ends of all cables, and start the routing of the cables from the area of the DC terminal block at the top of the dual band cabinet.
- 2 Route two cables at a time through the middle section of the opening between the antenna cable covers, and through the antenna cable cover of the Modular Cell primary cabinet to the cable duct. Refer to the figure below.

ROUTE THE CABLES THROUGH THE MIDDLE
SECTION OF THE OPENING HERE

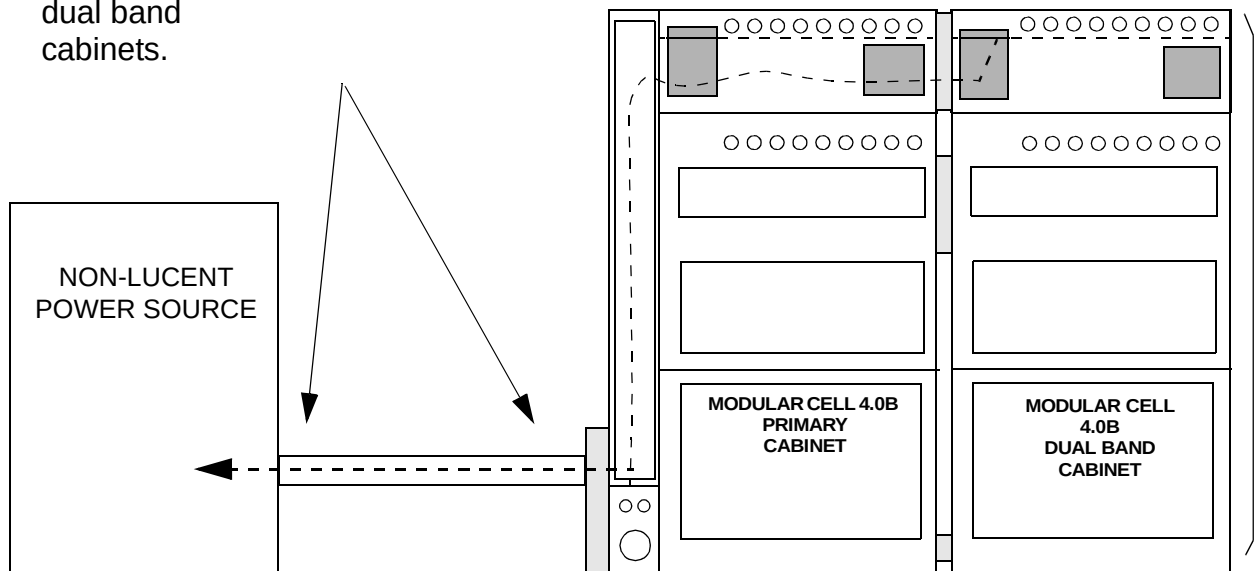


-
- 3 Route the ends of the DC cables into the cable duct through the middle section of the opening. Refer to the figure below.
-
- 4 Within the cable duct assembly, route the cables *downward between the inner-most cable brackets and the middle cable brackets*, as shown in the figure below. Attach later with wire ties.
-



-
- 5 Route the cables through the top (2-1/2 inch) opening at the bottom of the cable duct. Refer to the figure below.
-
- 6 Route the cables to the non-Lucent power source through the 2-1/2 inch conduit. Refer to the figure below.
-

The top (2-1/2 inch) conduit should be used for routing of DC cables for the dual band cabinets.



-
- 7 If the DC cables need to be shortened before they are attached in the non-Lucent power source, the labels may be cut off. Remember to re-label each cable immediately after it is cut.
-

Important! The installer may wish to wait until after the DC cables are connected in the non-Lucent power source before performing the next procedure

**Connect the DC cables at
Modular Cell 4.0B dual
band cabinet**

Refer to the figure on Page B - 63 and perform the following steps to connect the DC cables at Modular Cell 4.0B dual band cabinet.

-
- 1** At the top of the dual band cabinet, remove the terminal block cover, if provided, from the terminal block.

-
- 2** Remove the straight single-hole terminal lugs from the DC power terminal block (or from the loose parts bag shipped with the Modular Cell primary cabinet).

Important! When performing the next step, keep all of the DC cables at the top of the opening between the cable duct assembly and the antenna cable cover.

-
- 3** At the top of the cable duct assembly, cut each cable to the correct length (allow adequate slack).

Important! The cable markings/tags may be cut off when the excess cable is removed. Re-mark or tag each cable after cutting.

-
- 4** Strip the insulation at the end of each cable.

-
- 5** Slide a section of the supplied heat shrink onto the end of each cable.

-
- 6** Crimp a terminal lug onto the end of each cable, and then slide the heat shrink over the terminal lug and shrink with a heat gun.

-
- 7** Connect the 24-VDC return cables (black) to the cabinet DC power terminal block.

Important! Use the four lower terminals labeled *RETURN*, and connect the cables by label number in order *from right to left*. Refer to the figure on Page B - 63. Use the applicable terminals listed in the table on Pages B - 57.

-
- 8 Hand-tighten the nuts to guard against cross-threading, and then torque the 5/16-inch, 24-VDC return cable connections to 75 in.-lb. (8 Nm). Do not use the torque specifications provided in Chapter 1.
-

- 9 Connect the +24-VDC cables (red) to the cabinet DC terminal block.

Important! Use the upper terminals labeled *LINE* (+24 VDC), and connect the cables by label number in order *from right to left*. Use the applicable terminals listed in the table on Pages B - 57. Refer to the figure below.

- 10 Hand-tighten the nuts to guard against cross-threading, and then torque the four 5/16-inch, +24-VDC cable connections to 75 in.-lb. (8 Nm). Do not use the torque specifications provided in Chapter 1.
-

- 11 Replace the terminal block cover.
-



Warning:

Hand-tighten the nuts before using the torque wrench

TORQUE LUG NUTS TO 75 IN-LBS
OVERTIGHTENING MAY RESULT IN DAMAGE



CONNECT 1 AWG HERE IF DUAL
BAND CABINET HAS AN A6
AMPLIFIER SHELF

1 AWG

How to route and connect AC power cables for a 4.0B dual band Modular Cell cabinet

Overview **Important!** If installing a primary cabinet, return to Chapter 7 to finish the installation.

This procedure module provides instructions for the routing and connection of the AC power cable or cables to a dual band cabinet.

Step-by-step instructions are provided for the following tasks.

<u>Route and connect the WH103 AC cable for the heater from the primary to the dual band cabinet</u>	B - 66
<u>Route and connect the WH104 AC cable for the convenience outlet, from the primary to the dual band cabinet (NAR cabinets only)</u>	B - 70

Description of the AC power cables

The installation requires the following AC power cable or cables.

- #10 AWG 3-wire - for the heaters
- #14 AWG 3-wire - for the convenience outlet, if applicable (not present in international cabinets).



DANGER

Electrical Shock Hazard

Installation of the Modular Cell 4.0B cabinets require connections to be made that require AC power to be turned off at specific circuit breakers in the non-Lucent power source. Failure to follow instructions to turn off these breakers can create an electrical shock hazard. Failure to follow the order of the installation procedure (as written) can also create an electrical shock hazard. The procedures in this manual do not include safety procedures regarding working on energized equipment. When this manual is used to install equipment in an energized system, the appropriate safety procedures must be followed in addition to the procedures in this manual.

Follow these rules:

- 1. Perform installation steps in the order provided.*
- 2. Observe and strictly follow all safety precautions.*
- 3. When completing electrical connections, always use tools that are properly insulated.*

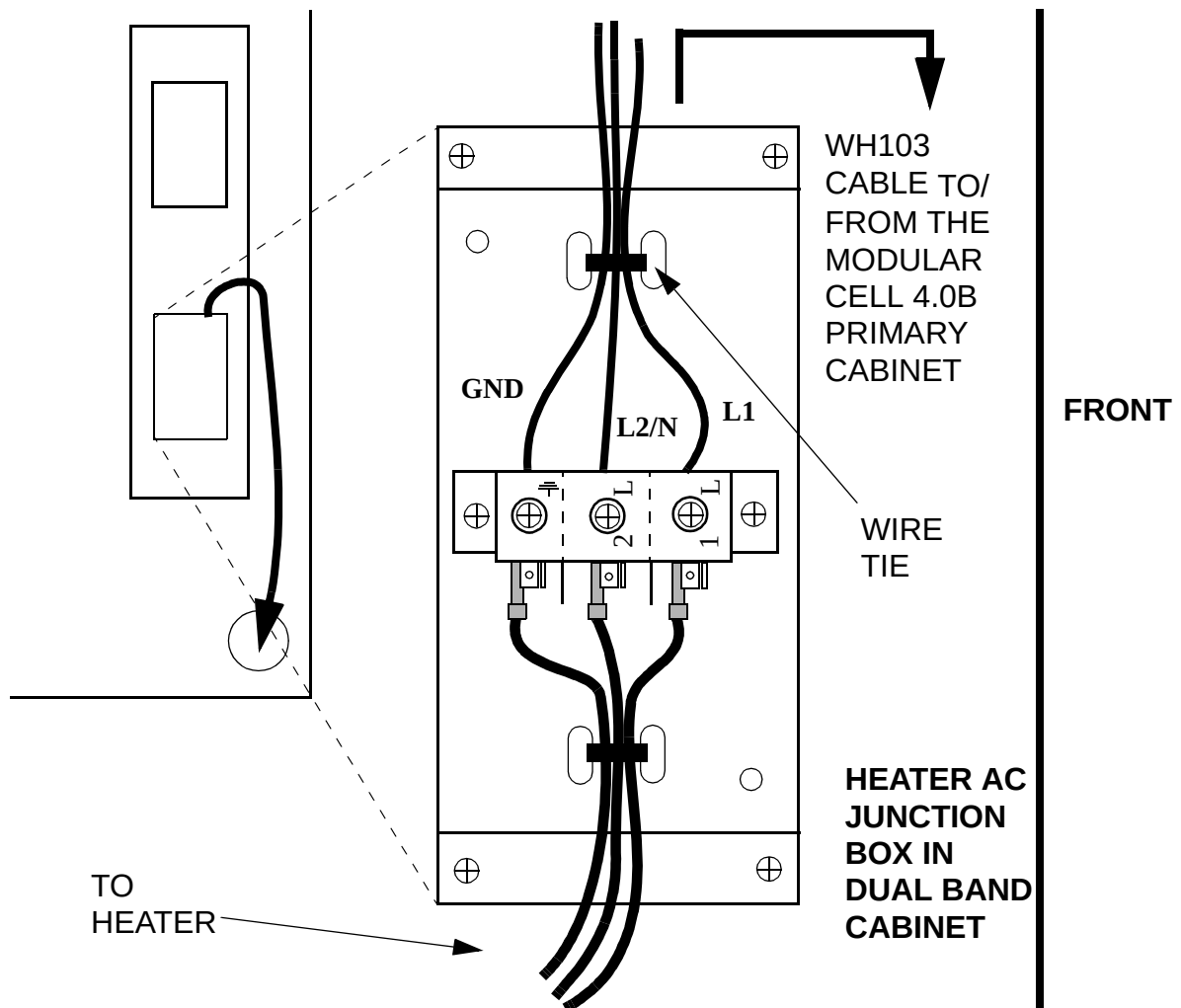
**Route and connect the
WH103 AC cable for the
heater from the primary to
the dual band cabinet**

Use the following procedure to route and connect the WH103 heater AC power cable between the primary and the dual band cabinet. Refer to the figure on Page B - 45 for the location of the heater junction box in the primary cabinet. It is in the same location in the dual band cabinet. Refer to the figure on Page B - 67 for connections.

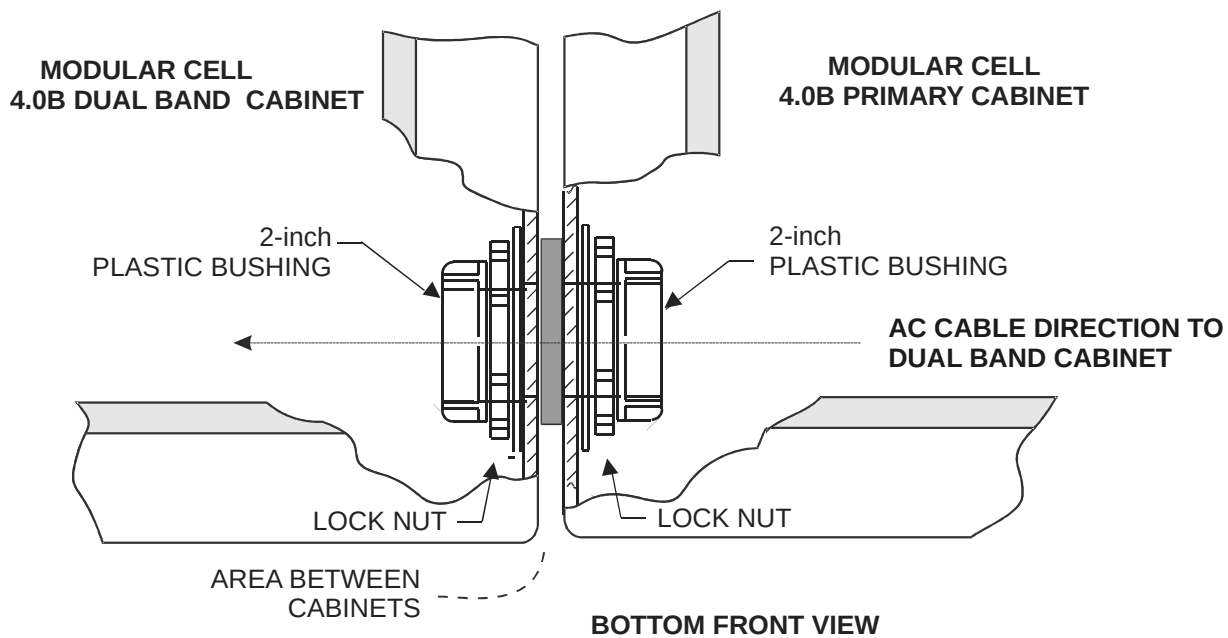
-
- 1** At the non-Lucent power source, set the AC circuit breaker(s) to the OFF position.
 -
 - 2** Identify the cable that is supplied with the dual band cabinet for the heater connection. This is the larger (12 AWG) of the two supplied cables, marked WH103, with three wires marked L1, L2/N and GND (ground).
 -
 - 3** Strip the ends of the wires on the end of the cable *that does not have spade lugs*.
 -
 - 4** Refer to the figure on Page B - 67. Locate and identify the heater junction box, on the interior right side of the Modular Cell dual band cabinet.

-
- 5 Connect the stripped ends of the WH103 cable to the screw terminals in the AC junction box as labeled and shown below. Secure with the supplied wire tie and install the junction box cover.

MODULAR CELL 4.0B DUAL BAND CABINET: DETAIL VIEW



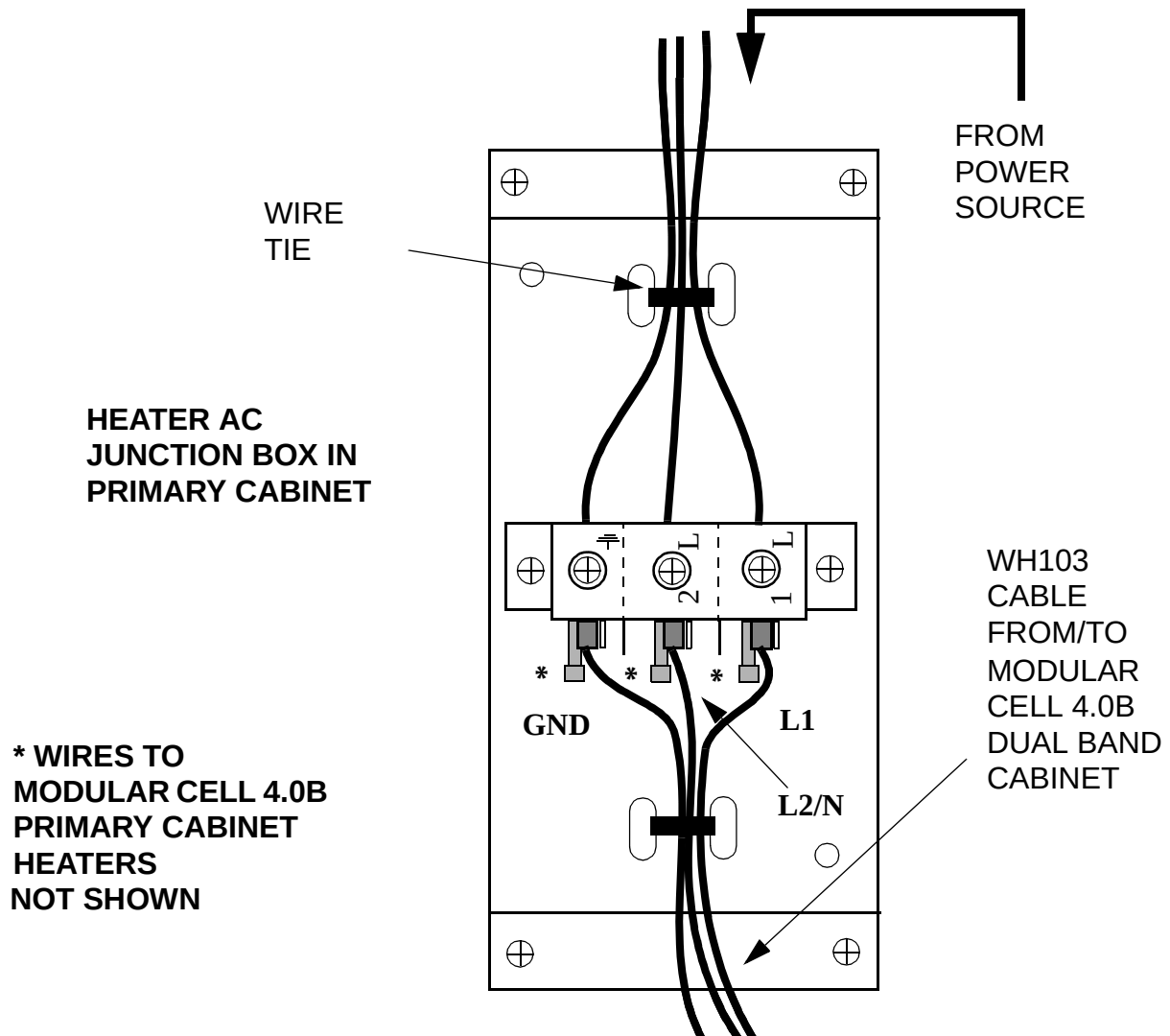
-
- 6** Route the WH103 cable from the Modular Cell dual band cabinet to the Modular Cell 4.0B primary cabinet via the conduit coupling between the cabinets. Refer to the figure below.



-
- 7 Remove the cover from the heater junction box in the Modular Cell 4.0B primary cabinet. Refer to the figure below.
-

- 8 Refer to the figure below and connect the spade lugs of the cable to the top (horizontal) lugs as shown.

MODULAR CELL 4.0B PRIMARY CABINET: DETAIL VIEW



-
- 9 Secure with the supplied wire tie and install the junction box cover, and then turn on the breaker (that was set to the OFF position in Step 1).
-

Route and connect the WH104 AC cable for the convenience outlet, from the primary to the dual band cabinet (NAR cabinets only)

Use the following procedure to route and connect the WH104 convenience outlet AC cable from the Modular Cell 4.0B primary cabinet to the Modular Cell 4.0B dual band cabinet (NAR cabinets only). Refer to the figure on Page B - 45 for the location of the convenience outlet in the primary cabinet. It is in the same location in dual band cabinet. Refer to the figure on Page B - 72 for connections.

- 1 At the non-Lucent power source, set the AC circuit breaker(s) to the OFF position.
- 2 Identify the cable that is supplied with the dual band cabinet for the convenience outlet connection. This is the smaller (14 AWG) of the two cables, marked WH104, with three wires marked L1, N and GND (ground).
- 3 Strip the prepared ends of the three wires on both ends of the cable.
- 4 Route the WH104 cable from the Modular Cell 4.0B primary cabinet to the Modular Cell 4.0B dual band cabinet via the conduit coupling between the cabinets. Refer to the figure on Page B - 68
- 5 At the Modular Cell 4.0B primary cabinet, remove the cover and the outlet from the convenience outlet junction box.
- 6 Remove the indicated knock-outs from both junction boxes, if required. Refer to the figure on Page B - 72 for the Modular Cell 4.0B primary cabinet junction box. Refer to the figure on Page B - 73 for the Modular Cell 4.0B dual band cabinet junction box.

-
- 7 Loosen the applicable liquid-tight connector on both junction boxes and route each end of the WH104 cable into their respective junction boxes.
-

- 8 Tighten the liquid-tight connector.

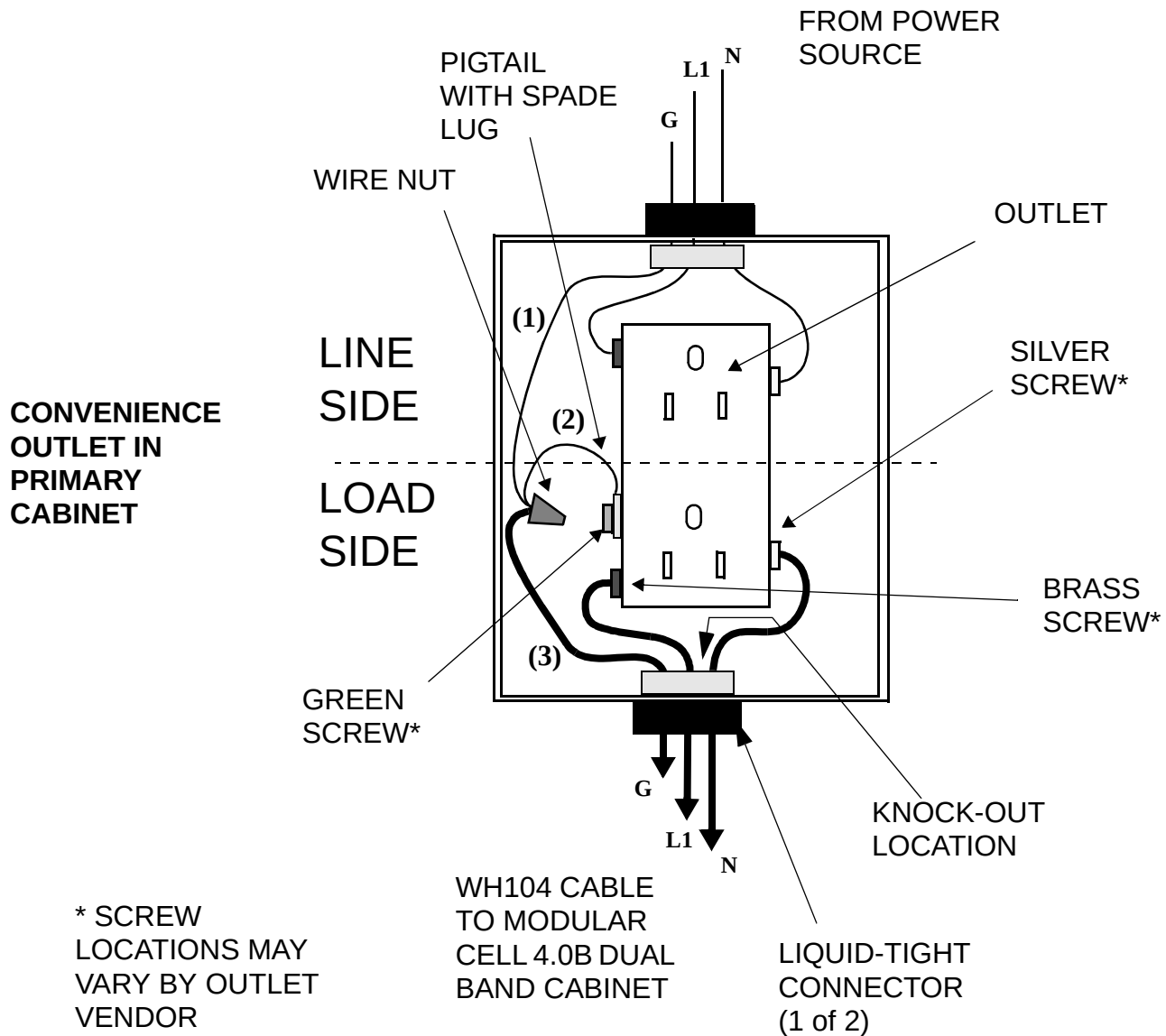
Important! When performing the next step, the location of the screws may vary depending upon the vendor. Make sure to connect the wires to the load side of the outlet.

- 9 At the Modular Cell 4.0B primary cabinet convenience outlet junction box, connect the L1 wire of the WH104 cable to the brass screw, and the N wire of the WH104 cable to the silver screw on the Load side of the removed outlet. Refer to the figure on Page B - 72.
-

- 10 At the Modular Cell 4.0B primary cabinet convenience outlet junction box, connect the ground wire as follows. Refer to the figure on Page B - 72.
- a. Disconnect the power cabinet ground wire (1) from the green ground screw.
 - b. Connect the disconnected ground wire (1) to the supplied pigtail wire (2) and the ground wire of the WH104 cable (3) using the supplied wire nut.
 - c. Connect the pigtail wire spade lug to the green ground screw.

- 11 Reinstall the outlet in the junction box and replace the cover.

MODULAR CELL 4.0B PRIMARY CABINET: DETAIL VIEW

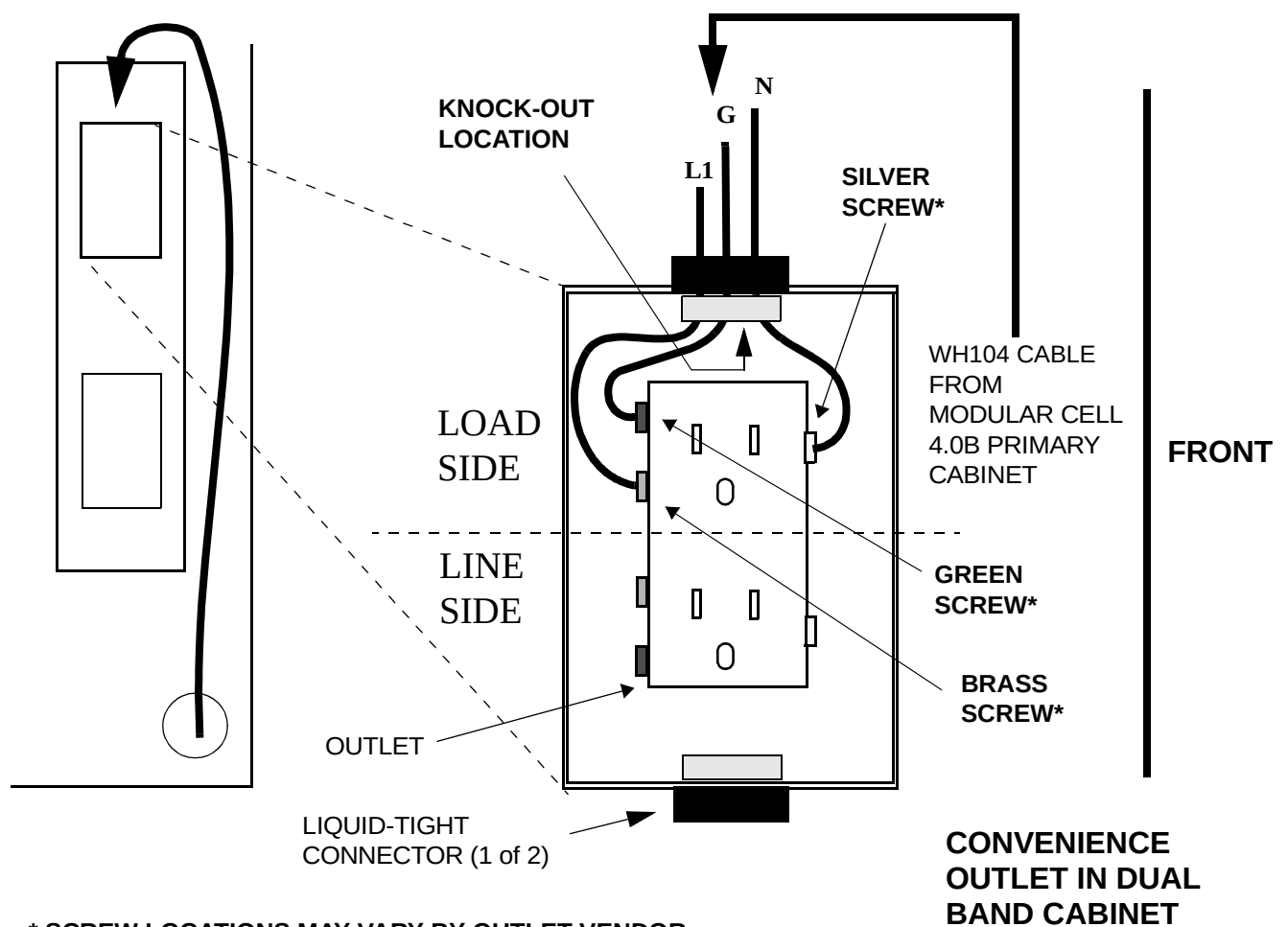


Important! When performing the next step, the location of the screws may vary depending upon the vendor. Additionally, if the outlet box is plastic, there will be no ground screw attached to the box. Refer to the figure on Page B - 73.

- 12** At the Modular Cell 4.0B dual band cabinet convenience outlet junction box, connect the wires of the WH104 cable to the correct screw terminal on the line side of the removed outlet, as follows. Refer to the figure below.

- Wire marked L1 to brass screw
- Wire marked L2/N to silver screw
- Wire marked GND to the green screw.

MODULAR CELL 4.0B DUAL BAND CABINET: DETAIL VIEW



*** SCREW LOCATIONS MAY VARY BY OUTLET VENDOR**

- 13** Install the outlet in the junction box and install the cover, and then turn on the breaker (that was set to the OFF position in Step 1).

Finishing the installation

Finish the installation If an any additional cabinet remains to be installed during the current installation, proceed to the applicable chapter or appendix at this time. If all cabinets have been installed, refer to the appropriate sections of Chapter 7 to finish the installation.



Appendix C: Post-installation checklists by cabinet

Post-installation checklists

Overview This appendix contains instructions for using the post-installation checklists along with the checklists for the following cabinets, plus the (final) punchlist.

The following post-installation checklists may be used by all installers to record completion of individual installation requirements. To use the checklists, make a copy of each page, as applicable, for each installation. Chapter, or other document references are given in the event that a particular requirement requires review. Note that the checklists are followed by an "Installation Punchlist Sheet". For instructions on how to use the checklists and the Installation Punchlist Sheet, refer to Instructions for use of the checklists and punchlist on page C-2.

<u>Instructions for use of the checklists and punchlist</u>	C-2
<u>IN1: Modular cell cabinets</u>	C-3
<u>IN1: Modular cell cabinets (continued)</u>	C-5
<u>IN1: Modular cell cabinets (continued)</u>	C-7
<u>IN2: WNG24-BC battery cabinets and EZBFo battery frames (first or second)</u>	C-9
<u>IN3: Installation Punchlist Sheet</u>	C-11

Instructions for use of the checklists and punchlist

The checklist tables that follow list the post-installation requirements for the Flexent® Modular Cell Cabinets, as well as for the first and second WNG24-BC battery cabinets, or first and second EZBFo battery frames. They also provide columns for indicating compliance or non-compliance (Yes or No), and a column to indicate "not applicable" (N/A). The Chapter Reference (Ch. Ref.) column provides the specific chapter for each installation procedure, or "Doc. 401-200-115" for grounding specifications. An "N/A" entry indicates that the question does not necessarily relate to EDs or the Installation Manual. Use the following directions to use the checklists, and the punchlist that follows at the end.

- 1 Make copies of sheets IN-1 and IN-3, as applicable to the specific installation.
- 2 Fill out IN-1 sheets (and the IN-2 sheet, if applicable) according to the following instructions:
 - For each checklist sheet, fill in the cabinet serial number.
 - For each item check the "Yes", "No" or "N/A" column, as applicable.

Important! Observe that the right-hand column labeled "Ch. Ref." lists the specific chapter for each installation procedure, or "Doc. 401-200-115" for grounding specifications. An "N/A" entry indicates that the question does not necessarily relate to EDs or the Installation Manual.
- 3 Make multiple copies of sheet IN-3, as needed.
- 4 Fill out sheet(s) IN-3, the "Installation Punchlist", using the "No" column entries from sheets IN-1 (and IN-2, if applicable), and add comments for each.
- 5 Retain the completed sheets.

IN1: Modular cell cabinets

Overview The table below lists the post-installation requirements for the Flexent[®] Modular Cell Cabinets.

Serial number Modular Cell Cabinet Serial Number: _____

	Item/Description	Yes	No	N/A	Ch. Ref.
1.	Is the cabinet secured to a sub-structure per earthquake zoning requirements?				2
2.	Is the cabinet properly grounded?				2
3.	Have the cable conduits been properly installed & sealed?				2
	Have eye bolts been replaced with filler bolts and washers?				2
4.	Have proper drip loops been provided in RF cable runs at the antenna cable cover?				2/7
5.	Is weatherization properly installed and are all covers / conduits sealed and screws tightened?				2/7
6.	Are all RF & DC cable connections torqued to the appropriate value?				2/4/7
7.	Are RF cable connections weatherproofed?				2/7
8.	Have wire protection bushings been installed on AC wiring conduits?				2/4
9.	Have all unused EMI feed-through connectors been sealed with a piece of wire or filler plug? (For example, insert a plastic plug or a 3" piece of #6 AWG wire or equivalent).				3
10.	Are all used EMI feed-through connectors properly tightened?				3
11.	Have all ancillary hardware seams been sealed per Lucent Site Preparation documentation?				N/A

IN1: Modular cell cabinets (continued)

Serial number

Modular Cell Cabinet Serial Number: _____

	Item/Description	Yes	No	N/A	Ch. Ref.
12.	Are the heat exchanger air intake & exhaust vents free of debris and unobstructed?				N/A
13.	Have all external alarms been connected to the cabinet punch-down block?				3
14.	Have facilities twisted pairs been connected to the cabinet punch-down block?				3
15.	Are protectors plugged in for all applicable alarm and TELCO signals?				3
16.	Is a surge protector present, connected and torqued correctly for each antenna (including GPS)?				3/7
17.	Is the heater AC circuit breaker in the ON position?				7
18.	Is the equipment properly frame-grounded per Lucent Doc. 401-200-115 specifications? Please note conductor(s) quantity, size & type: _____				Doc. 401- 200-115
19.	Are all DC circuit breakers for installed equipment in the ON position?				7
20.	Have all installation & integration tests been completed?				N/A
21.	Are all DC fuses properly installed?				N/A
22.	Have all doors, covers, panels, etc. been properly installed on cabinets?				7
23.	Are all panel/door latches in the locked position?				7

IN1: Modular cell cabinets (continued)

Serial number

Modular Cell Cabinet Serial Number: _____

	Item/Description	Yes	No	N/A	Ch. Ref.
24.	Are rectifier output voltages set to accommodate battery plant float voltage?				N/A
25.	Is the battery temperature compensation probe connected?				5
26.	Has proper spacing around the cabinet been provided per Lucent Site Preparation documentation?				N/A
27.	Are all rectifiers properly seated in each shelf?				5
28.	Are all battery, AC, and DC cable connections properly torqued?				4/5
29.	Are power alarm indicators (LEDs) extinguished?				N/A
30.	Have battery retaining brackets been properly installed?				5
31.	Is the main circuit breaker in the ON position?				7
32.	Is the battery heater AC circuit breaker in the ON position (if applicable)?				7
33.	Are all in-use AC circuit breakers in the ON position? [Note: Leave unused circuit breaker(s) in the OFF position.]				7
34.	Are battery quick disconnects properly mated (or battery disconnect circuit breakers ON) for strings in use?				5
35.	Are battery compartment vents free of debris and unobstructed?				7
36.	Has required battery information been recorded and provided to the customer?				5
37.	Are rectifier output voltages set to accommodate battery plant float voltage (if applicable)?				N/A

IN2: WNG24-BC battery cabinets and EZBFo battery frames (first or second)

Overview The table below lists the post-installation requirements for the first or second WNG24-BC battery cabinets or EZBFo battery frames.

WNG24-BC Battery Cabinet Serial Number: _____

	Item/Description	Yes	No	N/A	Ch. Ref.
1.	Have eye bolts been replaced with filler bolts and washers?				2/App D
2.	Is the cabinet / rack properly secured to a sub-structure per Lucent Engineering Drawings & earthquake zoning requirements?				2/5/App D
3.	Have the correct type & number of batteries been installed?				5/App D
4.	Are battery temperature compensation probes connected to 60C power cabinet interface cables?				5/App D
5.	Are all interface conduits sealed (outdoor only)?				5/App D
6.	Is the backup cabinet AC circuit breaker in the power cabinet in the ON position?				5/App D
7.	Are battery compartment vents free of debris and unobstructed?				N/A
8.	Are battery quick disconnects properly mated?				5/App D
9.	Have battery retaining brackets been properly installed?				5/App D
10.	Is equipment grounded per Lucent Doc. 401-200-115 specifications? Please note conductor quantity, size & type: _____				Doc. 401-200-115
11.	Are all panel/door latches in the locked position?				5/App D
12.	Has required battery information been recorded and provided to the customer?				N/A
13.	Are all power and alarm interface cables connected and the cable access ports sealed properly?				5/App D

IN3: Installation Punchlist Sheet

Severity Column Definitions:

1. Equipment installation is not complete and may void the warranty, potentially cause personal injury or prevent RF optimization from occurring.
2. Equipment installation is not complete. RF optimization can occur but items must be rectified prior to handoff to customer or service turn-up so that the warranty is not voided.
3. RF optimization, handoff to customer or service turn-up can occur, but not per Lucent recommendations.

Check- list Sheet Number	Item #	Comment/Description	Severity (1/2/3)	Corrective Action Required	
				(Y/N)	Comp. Date

Inspection Checklist Completion Sign-off:

Inspector's Name:	Inspector's Function:
Inspector's Signature:	Date:



Glossary

0-9 12IR125

Battery designed to withstand the rigors of harsh environments and uncontrolled temperatures.

24 VDC

DC connection block for 24-volt power source (See VDC).

240 VAC

AC connection block for 24-volt power source (See VAC).

-48 VDC

DC connection block for 48-volt power source.

60ECv2

Battery cabinet which provides additional backup batteries to supplement the batteries in the PowerHouse24/G cabinet.

60ECv2G

Version of the 60ECv2 battery cabinet for connection to the "G" version of the PowerHouse24 cabinet for additional backup batteries.

850 CDMA

CDMA technology in the Cellular Frequency Band (824-894 MHz).

A AC (Alternating Current)

Continuously variable current, rising to a maximum in one direction, falling to zero, then reversing direction and repeat the cycle in the other direction.

AC convenience outlet

Modular Cell sites must be equipped with at least two duplex outlets for installation and maintenance procedures. The outlets are required to power test equipment and installation tools.

AC distribution panel

Module equipped with various circuit breakers and fuses which provides AC power to various equipment.

AC interface kit

Hardware installed between Modular Cell Cabinet #1 and the PowerHouse24 cabinet, which provides a weatherproof conduit for routing AC power cables.

Ambient temperature

The temperature of air or other media in a designated area, particularly the area surrounding the equipment.

Anchor

Device that is buried in the ground and fastened to the cabinet for stability.

Antenna

An elevated device for radiating or receiving radio waves. It changes electrical currents into electromagnetic waves, and vice versa.

Antenna cable cover

A section on the top-rear of the outdoor Modular Cell cabinets which provides a weather resistant housing for antenna cables.

ANSI (American National Standards Institute)

The U.S. standards organization that establishes procedures for the development and coordination of voluntary American standards.

AWG (American Wire Gauge)

American wire gauge standard

B Backup

Facility used to replace an element which has failed.

Boom line

Rope extended from a derrick or other lifting device used for lifting a cabinet.

Boot

Weather resistant connection for GPS and RF jumper cables.

Bus bar

One or more conductors that serve as a common connection for a group of related devices.

C CDMA (Code Division Multiple Access)

Assigns each active call a unique pseudonoise code that is used by the system to distinguish that call from all other calls that occupy the same CDMA carrier band. CDMA uses spread-spectrum digital modulation techniques.

Cell

A geographical area, usually depicted as hexagon-shaped, that is served by a cellular system. Cellular technology is based on the premise that a group of radio frequencies used within one cell can be used again in distant cells.

Cell site

An installation located within a cell that houses the equipment needed to set up and complete calls on cellular telephones; for example, FM radio transmitter and receiver equipment, antennas and computers.

Circuit

1. The complete path between two terminals over which one-way or two-way communications may be provided. 2. An electronic path between two or more points, capable of providing a number of channels. 3. A number of conductors connected together for the purpose of carrying an electrical current. 4. An electronic closed-loop path among two or more points used for signal transfer. 5. A number of electrical components, such as resistors, inductances, capacitors, transistors, and power sources connected together in one or more closed loops.

CLGC

Closed Loop Gain Control.

CO (Central Office)

Grounding cable that is connected to the facility ground bus bar on the power frame.

Cord grip seal assembly

EMI/RF1 liquid-tight fitting for T1/E1, user alarms, and power alarm cables.

C-tap

Clamp used to connect a power lead to a main power conductor without breaking and terminating the conductor.

D DC (Direct Current)

Current flow in one direction.

DC distribution panel

Module equipped with various circuit breakers and/or fuses to provide DC current to load.

DIN (Deutsches Institut für Normung)

Germany's standards-setting organization.

Drip loop

A cable which has been curved with the arc facing the ground to prevent water from flowing to the connectors at either end of the cable. When it rains, the water drips from the lowest point of the curve towards the ground.

Dual Band

A dual band cabinet is a growth cabinet in which one or more of the carriers are of a different band than the carriers in the primary cabinet.

E E1

A four-wire voice and data trunking facility that carries 30 duplex channels in 64-kbps time slices. E1 facilities are standard for digital telecommunications in all continents except for North America.

Earthquake zone

Seismic ratings ranging from zone 1 (relatively low central office operational shock and vibration levels) to the most severe zone 4 levels. Equipment must be able to withstand earthquake zone requirements under both operational and non-operational conditions.

ED (Equipment Drawings)

Provides cabinet layout, dimensions, and installation requirements.

EMI (Electromagnetic Interference)

Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics or electrical equipment (see RFI).

ESD

Electro Static Discharge

External User Alarms

Alarms generated external to the Modular Cell Cabinet #1, but routed to its punch-down block for reporting purposes.

F Facility Interface Panel

Pull-down component on Modular Cell Cabinet #1 where the punch-down terminal block is located for terminating T1/E1, user alarm, and power system alarms.

Feed

To supply a signal to the input of a system, subsystem, equipment or component, such as a transmission line or antenna.

Filter

A frequency selective network that transmits/recieves signals of desired frequencies while greatly attenuating all other frequencies.

Fish tape

Narrow, springy steel tape designed for pushing through short lengths of ducting in order to pull cables in from the far end.

Flexent[®]

Registered trademark of Lucent Technologies.

G GND (Ground)

See Ground.

GPS (Global Positioning System)

A system of 24 satellites that provide, among other things, extremely accurate timing information to CDMA-equipped cell sites.

Ground

A conducting connection between equipment or an ectrical circuit and earth, or other conductive body that is used in place of the earth.

Grounding Electrode System

The conductive objects that are intentially bonded to furnish connection to earth (i.e. buried ring ground with ground rods, electrically continuous buried metallic water pipe, electrolytic ground electrode, etc.).

I IDC (Insulation Displacement Connector)

Block which provides electrical protection and/or termination location inside the Modular Cell cabinet.

Interconnect

Linkage used to join two or more communications units, or equipment.

J Jumper

Connections between terminal blocks on the two sides of a distribution frame.

Junction box

Steel box inside equipment where low-voltage power cable joints are made.

K Knockout

Discs partially punched out on the side or base of a terminal or junction box to the appropriate size for feeding cable into the box.

L Landline

A telephone accessed by landline media.

Lifting eyes

Bolts located on the top of the cabinet for connecting slings to lift the cabinet.

Line side

Portion of a device that is connected to an external facility that provides power from a power source.

Load side

Portion of a device that is connected to an external facility that is using the power from a power source.

Lugs

A tag or projecting terminal onto which a wire may be connected by crimping or soldering.

M Modular Cell

Provides radio access interfaces and radio resources management functions, as well as call handling with the 5ESS® Switch at Cellular and PCS frequencies.

Multiplexer

Equipment that provides a means of transmitting two or more signals over the same transmission path.

MGB (Main Bus Bar)

A copper bus bar used to provide the electrical interface for connection of the isolated ground plane to the integrated ground system.

N NAR

North American Region

NEC (National Electric Code)

Standard that governs the use of electrical wire, cable, and fixtures, and electrical and optical communication cable installed in buildings.

NFPA (National Fire Prevention Association)

Standards and code writing organization made up of volunteer industrial and institutional subject-matter-expert committees.

Neutral ground

An intentional ground applied to a neutral conductor or neutral point of a circuit, equipment, or system.

Network Interface

The demarcation between the LEC infrastructure and the Customer Premises Equipment (CPE). Equipment located at this point is intended to allow the LEC to determine whether transmission problems are within the network itself or the CPE.

O OA&M (Operation, Administration, and Maintenance)

Generic name given to functions such as technical interfaces, diagnostics, service measurements, and status reports.

OMP (Operation Management Platform)

This component provides a centralized point of access for wireless systems operation and maintenance. The OMP provides a dedicated processor from which system operators can perform multiple operation, administration, and maintenance (OA&M) tasks simultaneously.

Open circuit

A path that contains an infinite impedance, and is available for use.

P Paired cable

Cable made up of one or more separately insulated twisted-wire pairs, none of which is arranged with another to form quads.

Panelboard

A flat board consisting of buses and automatic over-current devices with or without switches, for the control of electrical circuits. The panelboard is designed to be placed in a cabinet with only front access.

PCS (Personal Communications Services)

Services for digital RF equipment operating in the 2-GHz spectrum.

PCB (Power Circuit Breaker)

The primary switch used to apply and remove power from equipment. Used on AC circuits rated in excess of 1500 V.

Pigtail

A short length of electrical conductor permanently affixed to a component, used to connect the component to another.

Positive terminal

The terminal from which conventional current leaves the battery.

PowerHouse™ 24 cabinet

Power cabinet for typical outdoor Modular Cell Site using 24 volts power source.

PowerHouse™ 24G cabinet

Global version of the PowerHouse24 cabinet for outdoor Modular Cell Site using 24 volts power source. This power cabinet has a different AC distribution panel, and convenience outlets are not equipped with the cabinet.

Pull-box

Small box with above-ground access which is inserted in a long run single conduit to facilitate pulling a cable through the duct.

Punch-down terminal block

Used for terminating T1/E1, User alarms, and power cables. The block is located in the facility interface panel inside the Modular Cell Cabinet #1.

R Rectifiers

Device for converting alternating current (AC) into direct current (DC).

Return

A return path for current.

RF (Radio Frequency)

The electromagnetic wave used for, among other things, cellular voice and data communications.

RFI (Radio Frequency Interference)

See EMI.

RTV

Silicone used for sealing or potting compound.

S Shield

A housing, screen, sheath, or cover that substantially reduces the coupling of electric, magnetic, or electromagnetic fields into or out of circuits or transmission lines.

Short circuit

A direct low resistance connection between conductors not normally in contact with each other.

STBY (Standby)

System operations pertaining to a power saving condition or status of operation of equipment that is ready for use, but not in use.

String

A series of elements considered as a whole.

Surge protector

Protective device used to limit surge voltages by discharging or bypassing any unwanted surge current that may enter a building or equipment.

System test

Test performed after installation and power-up of the cabinets, and after GPS antenna jumper cable is connected. The RF jumper cable is not connected during testing.

T T1

A four-wire voice and data trunking facility that carries 24 duplex channels over 56-kbps time slots.

Terminal

A device capable of sending, receiving or sending and receiving information over a communications channel.

Thermal Probe

Device used for sensing the temperature of an object or air.

TIP N TELL

Indicator on cabinet's package that indicates if the cabinet was mishandled or tipped during shipment.

TDMA

Time Division Multiple Access. TDMA divides each carrier frequency into a number of time slots, each of which constitutes an independent telephone circuit. Current North American digital systems use TDMA.

Torque

Moment of force acting on a body and tending to produce rotation about an axis.

Twisted-pair cable

See Paired cable.

U UL (Underwriters Laboratories)

Laboratories that test materials and equipment against pre-determined performance standards.

Upgrade

To improve service by offering better facilities.

W Weatherproof

Designed to be used outdoors under any number of specified climatic conditions.

Z Zero Clearance Installation

Cabinets are placed in close proximity to a wall or other structure, and the available space behind the cabinet does not permit the installer to access the rear cabinet mounting brackets.