

- Drilling template optional tool
  - Lucent install order number = ITE-6069
  - Self-install order number = 300325594
- Drill - Pneumatic Hammer (R-5006), Roto-Stop Hammer Kit (R-4416) or equivalent to drill anchor holes
- Driver for supplied TR 25 Keytorx bit
- Electrical conduit installation equipment and materials
- Electrical tape
- ESD wrist strap (not provided with cabinets)
- Eyebolt tool number: R-ITE-6113
- Fish tape
- Flashlight or drop light
- Forklift, Hoist, Rol-A-Lift, or equivalent lift (non-tilt) capable of lifting and moving the cabinet into final position [minimum lifting capacity: 1500 lb. (680 kg)]
- Gloves - low voltage rubber lineman's gloves (R-4285)
- Hammer, 16 oz. (.5 kg) for anchor installation. etc.
- Heat gun for heat shrink
- Insulated hand tools (for completing electrical connections)
- Insulated gloves
- Ladder - 6 ft. or work stand/stool
- Level (4-ft.- 1.5 m) (steel)
- Measuring tape
- Mirror (for viewing rear of AC terminal block in Modular Cell cabinets)
- Nut driver set (decimal) - with 10-inch extension
- Nut driver set (metric) - with 250-mm extension
- Ohmmeter (Multimeter, volt/ohmmeter (or equivalent))
- Pliers
- Pry bar
- Punchdown impact tool (comcode 407974849, AMP 552714-1) for T1/E1 and alarms
- Safety goggles or glasses (R-3055)
- Screwdrivers (power and manual), flat-blade, Phillips

- Silicone caulk
- Socket sets (decimal and metric) various drives
- Stripping tool (for LDF4 antenna jumper cables) part number 74Z-0-12-15
- Talcum powder
- Tools for preparing cables
- Torque wrenches, 35 - 300 in.-lb. (4 - 34 Nm)
- Torque wrenches, 4.4 -150 ft.-lb. (6 - 200 Nm)
- Thread sealing tape
- Vacuum cleaner or equivalent, as required for clearing debris from anchor holes
- Volt/ohmmeter
- Wire cutter/stripper
- Wire rope slings, 7/16-inch (11 mm), 7 feet long (2 m), minimum (quantity: 2)
- Wrench - adjustable, (3/4 in./20 mm) open-ended wrench (or set of fixed open-ended wrenches)

The following supplies are required.

- 1-inch and 2-inch flexible conduit and connecting hardware
- Antioxidant compound (provided)
- Cable - #2-AWG (35-mm<sup>2</sup>) grounding wire for cabinet grounds (provided as part of site preparation)
- Foam gasket tape
- Shims - for leveling and final placement of cabinet (some are provided with anchoring kit)
- Tags or labels - for marking cables
- Talcum powder (or equivalent, for fitting the cable boots over the antenna jumper cables)
- Tape - electrical
- Tape/marker or equivalent for labeling cable
- Tie wraps and/or twine
- Two #2-AWG double-hole terminal lugs with connecting hardware for cabinet grounds (supplied with cabinet)

User alarm cable (supplied as part of site preparation)

## Safety precautions

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**General** Always observe all warnings and cautions as they appear in individual chapter text.

### Examples

- Chapter 2, “Modular Cell cabinet handling, placement, anchoring and grounding”, has a set of safety precautions specific to the handling of heavy objects.
- Chapter 4, “Power and power alarm connections” has specific power-related cautions.

**Safety statement** “All Lucent Technologies Modular Cell Cabinets are \*UL Listed for US & Canada. *Any modifications or changes (other than official CN/CCN) to these cabinets is not permitted without review & official authorization from the Lucent Technologies Inc., Global Products Compliance Laboratory located in Holmdel, NJ, 07733, Crawfords Corners Rd., Building 11B, Rm 175 which may require approval by Underwriters Laboratories. Safety information, cautions & warnings are generally to be found inside the front and rear access doors/panels of this equipment and should be understood and observed by appropriate installation/maintenance personnel.*”

“This equipment is to be installed in accordance with all National, State (Provincial) & Local Safety Codes for US and Canada and National Laws, Codes for other countries. All AC powered equipment *must be* properly grounded, in accordance with these codes.”

## Safety - General precautions for installation procedures

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### **WARNING**

**Failure to observe these safety precautions may result in personal injury or damage to equipment.**

- *Read and understand all instructions.*
- *Follow all warnings and instructions marked on this product.*
- *Installation and maintenance procedures must be followed and performed by trained personnel only.*
- *Earthing and circuit continuity is vital for safe operation of the equipment. Never operate the equipment with earthing/bonding conductor disconnected.*
- *Install only equipment identified in the product's installation manual. Use of other equipment may result in an improper connection, which could lead to fire or injury.*
- *Use caution when installing or modifying telecommunications lines.*
- *The product has multiple power inputs. Before servicing, disconnect all inputs to reduce the risk of electric shock or energy hazards.*
- *For continued protection against risk of fire, all fuses used in this product must be replaced only with fuses of the same type and rating.*
- *Never install telecommunications wiring during a lightning storm.*
- *Never install telecommunications connections in wet locations.*
- *Never touch uninsulated telecommunications wiring or terminals unless the telecommunications line has been disconnected at the interface.*

- *Never touch uninsulated wiring or terminals carrying direct current or ringing current, and never leave this wiring exposed. Protect and tape uninsulated wiring and terminals to avoid risk of fire, electrical shock, and injury to personnel.*
- *Never push objects of any kind into the product through slots, as they may touch dangerous voltage points or short-out parts that could result in a fire or an electrical shock.*
- *Never spill liquids of any kind on the product.*
- *Slots and openings in the product are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered. The product should not be placed in a built-in installation unless proper ventilation is provided.*
- *To reduce the risk of an electrical shock, do not disassemble the product. Opening and removing covers and/or circuit boards may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electrical shock when the unit is subsequently used.*

## Safety - Specific hazards

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### **DANGER**

#### **Lightning Strikes!**

*Lightning strikes are possible during stormy weather, and could result in death or severe injury.*

*Do not work on the installation itself or on the power supply lines or antenna feeders of a Modular Cell during stormy weather.*



### **WARNING**

#### **Energy Hazard!**

*Some parts of all electrical installations are energized.*

*Failure to observe this fact and the safety warnings may lead to bodily injury and property damage.*

*For this reason, only trained and qualified personnel (electrical workers as defined in IEC 215 + A1 or EN 60215) may install or service the installation.*



### **WARNING**

#### **Energy Hazard!**

*The power supply lines to the network element are energized. Short circuits can cause burns to the face and hands.*

*Open the load disconnect switch in the distribution box to completely de-energize the network element.*



## **WARNING**

### **Beryllium Oxide Poisoning Hazard!**

*The transmitter units include components which contain beryllium oxide (BeO). In this form, BeO ceramics do not constitute a hazardous material as long as this material is not destroyed by external mechanical forces.*

*In the event that repair work is carried out by the customer or by third parties, the following regulations must be observed:*

- *Applicable version of the Regulation on Hazardous Materials in the Workplace*
- *Appropriate accident prevention regulations*

*The following must be specifically observed:*

- *Do not eat, drink, or smoke in areas where work is taking place on BeO ceramic components.*
- *Wash your hands carefully under running water after working with BeO ceramic components.*

*If the following symptoms occur, contact a physician:*

- *Irritation of the respiratory organs*
- *Difficulty breathing or skin irritation*



## **CAUTION**

### **Condensation may cause a short circuit!**

*Sudden changes in the weather may lead to the formation of condensation on components. Operating the unit when condensation moisture is present can destroy the unit.*

*Units which show signs of condensation must be dried before power is applied.*



## **CAUTION**

### **Electrostatically Sensitive Components!**

*Semiconductor elements can be damaged by static discharges.*

*The following rules must be complied with when handling any module containing semiconductor components:*

- *Wear conductive or antistatic work clothes (for example, a coat made of 100% cotton).*
- *Wear grounded ESD wrist strap.*
- *Wear shoes with conductive soles on a conductive floor surface or work mat.*
- *Leave the modules in their original packaging until ready for use.*
- *Make sure there is no difference in potential between yourself, the workplace, and the package before removing, unpacking, or packing a module.*
- *Hold the module only by the grip without touching the connection pins, tracks, or components.*
- *Place modules removed from the equipment on a conductive surface.*
- *Test or handle the module only with grounded tools on grounded equipment.*
- *Handle defective modules exactly like new ones to avoid causing further damage.*



## Safety labels

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**Overview** This section provides illustrations of certain Modular Cell safety labels.

### **Safety labels**

The following door safety label is found on the Modular Cell cabinets.



## Product safety

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### **Compliance statement**

The Flexent® Modular Cell 4.0B cabinet is UL Listed, Information Technology Equipment. The UL Listing applies to both the USA and Canada and is Marked on the Equipment main nameplate label. Should the local Authority Having Jurisdiction (AHJ) require prior or additional verification of this Listing, a Product Certificate of Compliance from Underwriters Laboratories can be obtained by contacting the Lucent Technologies Global Product Compliance Laboratory located in Holmdel, NJ 07733 on Crawfords Corners Rd. Any modifications to this equipment are not permitted without review and official authorization from the Lucent Technologies Global Product Compliance Laboratory. Modifications or changes authorized by official CN/CNN are assumed to have received prior approval from this Lab.

### **Equipment safety**

Safety information for this equipment can be found on various Caution, Warning, and Danger information labels or instructions affixed to or included with the cabinet, its internal assemblies or included within this document. Informational and cautionary labels may appear near the item they address or may be grouped in a single location on the equipment. Warnings are typically adjacent to the hazard that is noted on the label. The instructions, cautions and warnings found on these labels must be understood and observed by all personnel involved with the equipment installation and maintenance.

**Important!** Refer to the section "About this Information Product" for definitions of safety labels.

## FCC statements

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**FCC statement** Antenna installations for the Flexent Modular Cell 4.0B shall be performed in accordance with all applicable manufacturer's recommendations, and national laws and regulations. To ensure correct antenna installation, the antenna installer shall perform all necessary calculations and/or field measurements to evaluate compliance with applicable national laws or regulations regarding exposure to electromagnetic fields. The antenna manufacturer or supplier shall deliver all technical data necessary to perform this compliance evaluation (for example, antenna gain pattern, antenna dimensions, etc.). Information on the methodology and results of the compliance evaluation shall be available for inspection by officials of the governing authorities.



### **CAUTION**

*Changes or modifications not expressly approved by Lucent Technologies, Inc. could void the user's authority to operate the equipment.*

**47 CFR part 1, subpart 1 statement** Pursuant to 47 CFR Part 1, Subpart I, all installations must be evaluated for requirements contained in Table 1 "Limits for maximum permissible exposure" of section 1.1310.

**47 CFR part 2 statement** This device complies with Part 2 of the FCC rules.

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

**Class B**

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

**47 CFR part 22 statement** This device complies with Part 22 of the FCC rules for cellular products.

**47 CFR part 24 statement** This device complies with Part 24 of the FCC rules for PCS products.

**47 CFR part 68 statement**

The Flexent Modular Cell 4.0B complies with Part 68 of the FCC rules. At the upper right-hand corner inside the cabinet assembly of this equipment is a label that contains, among other information, the FCC registration number. If requested, this number must be provided to the telephone company. This equipment connects to the network via a punchdown block. The Facility Interface Code for this equipment is 04DU9-1SN. The Service Order Code for this equipment is 6.0N. These two numbers are required when the customer orders service from the telephone company.

If this Flexent Modular Cell 4.0B equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. However, if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

If trouble is experienced with this equipment, repair or warranty information may be obtained by contacting:

Lucent Technologies Technical Support Services within the United States: 1 866 LUCENT8 (866 582 3688), prompt 1

## Canadian standards

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**ICES-003 Interference-Causing Equipment Standard Digital Apparatus**

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

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

**CS-02 Specification for Terminal Equipment, Terminal Systems, Network Protection Devices, Connection Arrangement.**

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

## Eco-environmental statements

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**Overview** The following are eco-environmental statements for the equipment:

### Eco-Environmental Statements

#### **Packaging Collection and Recovery Requirements**

Countries, States, Localities, or other jurisdictions may require that systems be established for the return and/or collection of packaging waste from the consumer, other final user, or from the waste stream. Additionally, reuse, recovery and/or recycling targets for the return and/or collection of the packaging waste may be established.

For more information regarding the requirements for the collection and recovery of Packaging and Packaging Waste within specific jurisdictions, please contact the Lucent Technologies' Field Services/ Installation - Environmental Health and Safety Organization.

For installations not performed by Lucent Technologies, please contact the Lucent Customer Support Center at:

Technical Support Services

Lucent Technologies

Within the United States: 1 866 LUCENT8 (866 582 3688), prompt 1

From all other countries: +1 630 224 4672, prompt 2

#### **Recycling/Take-Back/Disposal of Product**

Waste electronic products should be handled appropriately, in compliance with applicable legislation. They should not be disposed of as part of unsorted municipal waste. Due to materials that may be contained in the product, such as heavy metals or batteries, the environment and human health may be negatively impacted as a result of inappropriate disposal.



Moreover, in compliance with Legal requirements, where applicable, Lucent Technologies will offer to provide for the collection and treatment of Waste from Lucent Technologies products, or from products displaced by Lucent Technologies offers, in accordance with applicable legislation.

For information regarding Take-Back of equipment by Lucent Technologies, or for more information regarding the requirements for recycling/disposal of product, please contact your Lucent Account Manager or in Europe call +353 1 692 4444.



## Packaging collection and recycling

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### **Packaging collection recovery requirements**

Countries, States, Localities, or other jurisdictions may require that systems be established for the return and/or collection of packaging waste from the consumer, other final user, or from the waste stream. Additionally, reuse, recovery and/or recycling targets for the return and/or collection of the packaging waste may be established.

For more information regarding the requirements for the collection and recovery of Packaging and Packaging Waste within specific jurisdictions, please contact the Lucent Technologies' Field Services/ Installation - Environmental Health and Safety Organization.

For installations not performed by Lucent Technologies, please contact the Lucent Customer Support Center at:

Technical Support Services Lucent Technologies

Within the United States: 1 866 LUCENT8 (866 582 3688), prompt 1

From all other countries: +1 630 224 4672, prompt 2

### **Recycling and disposal**

This product contains materials such as heavy metals that require appropriate handling in recycling/disposal.

For more information regarding the requirements for recycling/disposal of product, please contact the Lucent Customer Support Center at:

Technical Support Services Lucent Technologies

Within the United States: 1 866 LUCENT8 (866 582 3688), prompt 1

From all other countries: +1 630 224 4672, prompt 2

## Minimum installation temperatures

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- General** Power wire insulation tends to crack while being handled during installation at extremely cold temperatures. For this reason minimum temperatures have been established for the installation.
- Affected installations** The following installations are affected by the minimum working temperatures:
- All Modular Cell 4.0 radio cabinets *that do not have integrated power* being installed with PowerHouse 24 or WNG24-K power cabinets or non-Lucent power
  - The WNG24-BC or 60ECv2 battery cabinets, and the EZBFo battery frame
- Affected wire sizes** The following are the affected wire sizes:
- 2 AWG and larger
- Affected wire insulation type** The following are the affected wire insulation types:
- THHN
- Minimum temperatures** The following are the minimum working and storage temperatures:
- Working (Installation): -25 degrees C (-13 degrees F)
  - If installation has to proceed at -25 deg. C or below, see "Storage prior to installation" on the next page.

- Storage prior to installation: 20 degrees C (68 degrees F)
  - If installation has to proceed at -25 deg. C or below, cables must be stored in heated areas (Min. 20 deg. C) for 24 hours prior to installation. Extra care should be taken to keep cables sheltered from winds and temperature below -25 deg. C during installation. The use of a heated tent is highly recommended.
  - If installations have to occur at temperatures below -25 deg. C and shelter cannot be provided, the following cable along with the associated hardware is recommended.
    - Industrial Wire & Cable Corp. Type MTW Machine Tool Wire, MTWxxxx \*
    - FCI Terminal Lug (or equivalent), 3/8" Bolt Size, Straight, 2-Hole, 1" Center to Center \*
    - FCI Terminal Lug (or equivalent), 1/4" Bolt Size, Straight, 2-Hole, 5/8" Center to Center \*
    - FCI Terminal Lug (or equivalent), 5/16 Bolt Size", Straight, One-Hole \*
    - Panduit (or equivalent) Type HSTTV 75-T2 Insulating Sleeve, Heat Shrink, Red \*
    - Panduit (or equivalent) Type HSTTV 75-T Insulating Sleeve, Heat Shrink, Black \*

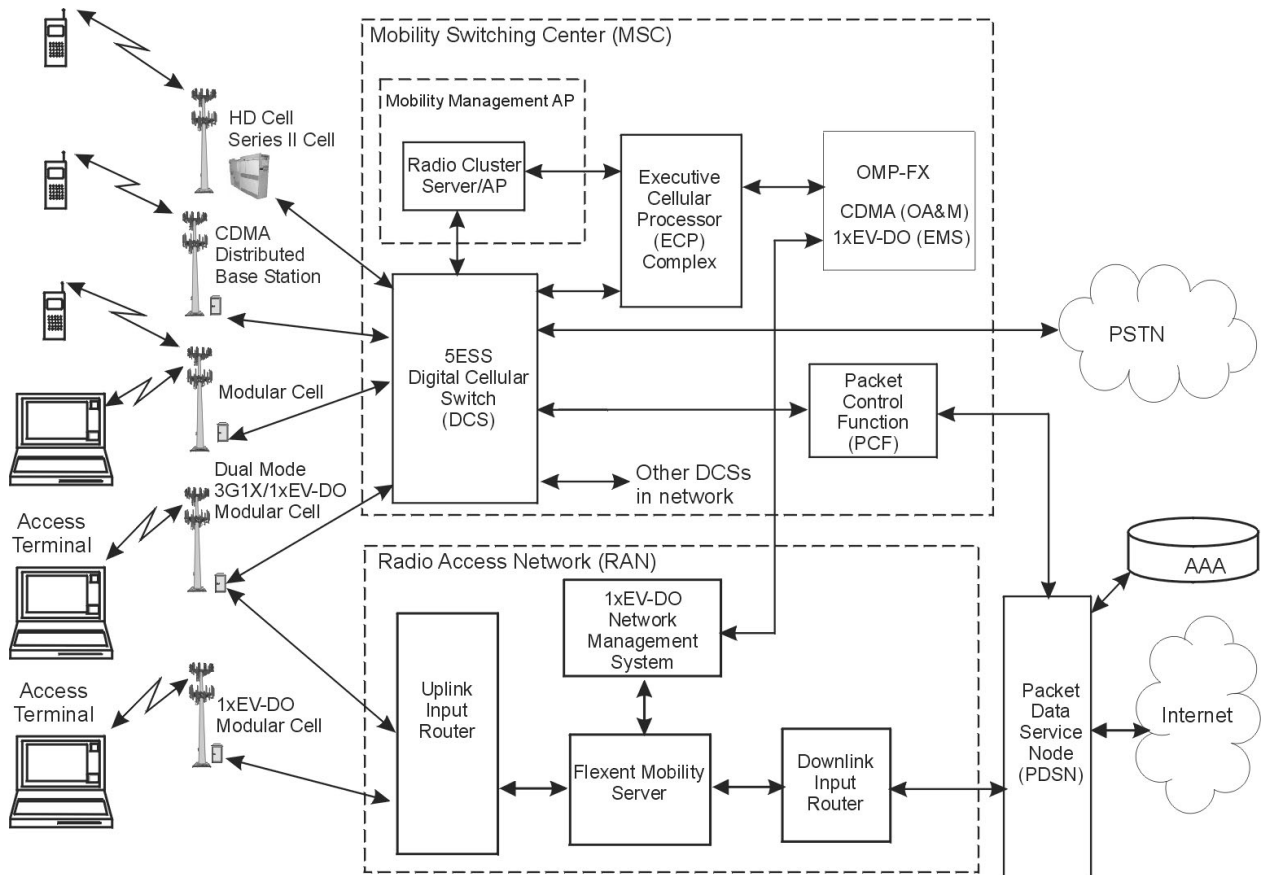
\* Depends on wire gauge being used.

# Network description

**Overview** A high level overview of a 2G/3G wireless network is presented below describing how base station locations are selected, the different base hardware that may be deployed, and their interconnection with other base stations, the Public Switched Telephone Network, and the Internet.

## Wireless network block diagram

A simplified block diagram showing how the different Lucent base station cabinets interface with the mobile Switching Center and the 1xEV-DO radio access network (RAN) to form a wireless network, is shown in the figure below.



**Base station location**

The location of each cell site is carefully planned by RF engineers so that a continuous radio coverage of a geographical area is maintained. This planning will ensure that service to each mobile user is uninterrupted as the user moves throughout the coverage area. At the center of each cell site is a base station, which is available for a number of different RF deployment configurations based on the size of the cell, the expected voice/data call load, its indoor/outdoor location, and the base station release (when the base station was installed).

**AUTOPLEX® and Flexent®  
platforms**

In some markets, Lucent CDMA wireless networks are deployed on two platforms: the earlier AUTOPLEX system, using Series II base stations, and the newer Flexent system, using smaller, more compact modular base stations. The two platforms can co-exist within the same network, as shown. Because the Series II base stations are no longer manufactured, the Flexent base station will be used for all future installations.

The primary difference between Series II and Flexent base stations is that the former contains dedicated radio control data processing circuitry. For voice and 3G1X data calls in the Flexent system, radio control data processing is centralized for all Flexent base stations by the Mobility Management Application Processor (AP) in the mobile switching center (MSC, Refer to the figure on Page 1-51). Additionally, a Flexent base station can be configured to service 2G voice and 3G voice/data calls, in addition to 3G 1xEV-DO high speed data transmissions. Although 1xEV-DO can be collocated in the same base station with 2G/3G voice service, its deployment is outside the MSC domain and it requires a Radio Access Network (RAN) ground network. Despite the versatility of the Flexent base station, handling three technologies: 2G voice, 3G voice/data, and 3G 1xEV-DO high speed data, base station installation is transparent of the technology.

**T1/E1 connection to base station**

Regardless of the 2G/3G1X base station deployment configuration, each base station within a graphical area is connected to a mobile switching center (MSC) via one or more T1/E1 lines. Each T1/E1 line is used to transfer call traffic for a number of mobile users to and from the base station. The call traffic over the T1/E1 line from each user, which may either be voice or 3G data message, is transferred in a time-share fashion, where the traffic data from each mobile is transferred in discrete DS0 time slots.

In addition to call traffic, a control DS0 time slot is used to transmit signaling and control information between the base station and MSC. In 1xEV-DO base station, and base stations that include 1xEV-DO, the T1/E1 lines goes to uplink input router in the RAN network.

**Mobile Switching Center (MSC)**

The T1/E1 lines carrying voice calls from all the base stations within a covered area are received at the MSC by a 5ESS Digital Cellular Switch (DCS). The DCS switches each voice call either to other DCSs in the cellular network or the Public Switch Telephone Network (PSTN) to complete mobile calls. When 3G -1X data messages are received, the DCS provides connectivity to the Internet via the Packet Data Service Node (PDSN). This connectivity is handle by the Packet Control Function (PCF) in the MSC. The operation of the PDSN is discussed in “Accessing the internet” on page 56.

The registering and routing of each call switched through the DCS is controlled by the Executive Cellular Processor (ECP). The ECP maintains the control database for all the base stations in the system. After each base station is installed, the operating characteristics of the base station and how the base station interacts with other neighboring base stations is downloaded into the ECP as part of Operations, Administration and Maintenance (OA&M) via the Operation/Maintenance platform (OMP-FX). The database for base stations is than used by the a group of Radio Cluster Server (RCS)/AP under the supervision of Mobility Management AP to control the traffic data though the base stations. Each RCS/AP is a dedicated computer running up to 16 incidence of Radio Cluster Server (RCS) software on a UNIX operating system. Each cellular call is register through the RCS which generate switching signal information, causing the DCS to routed the call from/to a base station that is in closest proximity to its mobile user.

### **Completing landline initiated calls**

When a landline to mobile call is initiated, call signaling from the PSTN, containing the mobile directory number, is sent to the DCS. The call signaling is registered by the ECP via the AP interface. The ECP converted the mobile directory number to its associated electronic mobile serial number. Not knowing where the mobile user is, the mobile serial number is transferred via the AP interface to the DCS and is sent out to all the base stations via a control DS0 time slot on the T1/E1 lines. As a result, each base station will broadcast the mobile serial number over a paging channel. The paging channel is a pre-assigned channel broadcast over each sector in the base station domain. When the target mobile identifies its serial number on the paging channel, it will transmit a response to acknowledge the page. The response is sent to the base station and sector that are in close proximity to the mobile. The base station receiving this response, then sends the page acknowledgement to its associated RCS, indicating that the call may be forward to the targeted mobile. Subsequently, the RCS generates the appropriated signals causing the DCS to route the call traffic from the PSTN to the base station to acknowledge the page. The call traffic is routed on an available DS0 time slot on one of the E1/T1 lines going to the base station. At this time, the base station establishes a duplex RF channel with the targeted mobile to complete the call.

### **Completing mobile initiated calls**

If a call is initiated by a mobile user, when the send button on the mobile is activated, the call directory number entered by the mobile user is transmitted to the base station sector closest to the mobile. The base station then sends the directory number to the MSC via the control DS0 slot on its T1/E1 line. If the directory number is associated with a landline telephone, the number is routed to the PSTN to complete the call, and an RF channel is allotted to handle the call traffic. If the directory number is associated with another mobile within the cellular service provider network, the directory number is converted to its associated mobile serial number by ECP. As a result, the serial number is broadcast over the paging channels in the service provider network. If the location of the terminal mobile is unknown, the serial number is routed to other DCSs in the service provider network to widen the page coverage. When the landline phone or terminal mobile is answered, the call is registered in the ECP. At this time, the allotted RF channel is activated, and the DCS is configured by the RCS to route the call traffic between the base station where the call was initiated, and the telephone or mobile where the call is terminated. When the call is terminated to an in-network mobile, the call traffic is routed directly between the DCS where the call is initiated to the DCS where the call is terminated.

## **1xEV-DO service**

The installation of a 1xEV-DO base station is the same as a 2G/3G base station installation regardless whether the 1xEV-DO base station is a stand-alone base station or co-located with 2G or 3G-1X base station. The difference is the destination of the T1/E1 lines. Rather than going to the MSC, the T1/E1 lines are connected by a Flexent Mobility Server (FMS) within the RAN network. Users will access the RAN through an Access Terminal (AT) that maintains an air interface with a 1xEV-DO base station. The AT may be used in a laptop computer, a hand-held device such a Palm Pilot or personal digital assistant, or multi-mode mobile with AMPS/IS-95 and 3G-1X/1xEV-DO capabilities.

The FMS is analogous with the mobility management AP in the 2G/3G voice network and provides call processing functionality allowing an AT user to acquire the RAN network. Each FMS frame is capable of interfacing and handling the call processing function for 48 base stations, and the RAN network can use up to six FMS frames. Therefore, the RAN network can service up to 288 base stations. The uplink input router, which is a bidirectional device and provides a common point to terminate back haul T1/E1 lines from all 1xEV-DO base stations, steers and converts the uplink data stream received over the T1/E1 line to the FMS frames.

User maintenance and controls for the six FMS within the RAN are provided through Element Management System (EMS), which runs on the Flexent OMP-FX platform. System and base station control and configuration database is downloaded from the Flexent OMP-FX platform into the 1xEV-DO network management system. When the RAN network is integrated with a Lucent wireless voice network, as shown in the figure, the same OMP-FX platform may be used for voice and 1xEV-DO data networks. The FMS-processed data is connected to PDSN via the downlink input router.



## Accessing the internet

Each time a user accesses the Internet, either a dynamic Internet Protocol (IP) address is assigned to the user, or the user asserts its own static IP address. The dynamic IP address is assigned for the duration of the Internet session by the PDSN, which is operated as a Home Agent (HA) for the Internet Service Provider (ISP). As its agent, the ISP allocates the PDSN to open an Internet session with a petitioning AT, in the 1xEV-DO system, or a 3G mobile in a 3G1X system.

Prior to allowing an AT/3G mobile network access, the AT/3G mobile is challenged for authentication to determine if the AT/3G mobile is not masquerading under a false ID, and also for authorization to determine if the AT/3G mobile is permitted (authorized) to access the network. This challenge is implemented by the Authentication, Authorization and Accounting (AAA) server via a server/client relationship with the PDNS client. The AAA maintains a subscriber database which is used to validate the user's ID and password. The PDSN records AT/3G mobile data usage to provide accounting information to the AAA Server.

The IP address defines a physical location on the Internet. When an IP session is established with an AT/3G mobile, the most significant digits of the IP address, which are listed in the Internet routing tables, are used to direct Internet data traffic associated with the AT/3G mobile to and from the PDSN. The PDSN maps the AT/3G mobile to the IP address so that data reaching the PDSN is directed to the AT/3G mobile. Therefore, no matter where the user may go on the Internet, the IP address ensure that response data is routed back to the uses via the PDSN.



# 2 Modular Cell 4.0B and WNG24-BC cabinet handling, placement, anchoring and grounding

## Overview

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**Purpose** This chapter provides general instructions for anchor and optional mounting base installation and cabinet handling, as well as cabinet placement, anchoring and grounding.

**Contents** This chapter contains the following sections.

<u>Installation of anchors and optional mounting bases, if applicable</u>	2 - 2
<u>Cabinet handling</u>	2 - 21
<u>Cabinet placement, anchoring and grounding</u>	2 - 28

# Installation of anchors and optional mounting bases, if applicable

## Overview

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**Purpose** This section provides the information required for the installation of anchors and optional steel mounting bases, if applicable.

Anchor holes should be drilled for all cabinets to be installed, including primary, dual band, and battery cabinets. Note that anchors for mounting bases must be "set" in the drilled anchor holes, prior to placement of the mounting base.

**Contents** This section covers the following procedures.

<u>How to determine the anchoring requirements</u>	2 - 3
<u>Anchor installation</u>	2 - 5
<u>Installation of optional steel mounting bases for a 4.0B primary cabinet with integrated power, and battery cabinets if applicable</u>	2 - 11
<u>Installation of optional steel mounting bases for a 4.0B dual band cabinets</u>	2 - 16

## How to determine the anchoring requirements

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**Overview** Cabinet anchoring must meet all requirements of the local codes, taking into consideration the seismic zone of the installation site.

**Anchoring options** Use the following table to determine how many anchors are required.

<b>If installation is:</b>	<b>Then:</b>
Zone 0, 1, 2, 3, or 4	Install 4 anchors.
Customer-supplied raised floor or platform Zone 0, 1, 2, 3, or 4	Customer shall supply anchor hardware. (1/2" bolt size, corrosion resistant)
Zone 3 or 4 (EZBFo battery base module only)	Install 8 anchors.

**Anchor specifications** Use the following table to determine the specific anchor to use, and the hole size and depth required. Note that anchors for cabinets may be set in the drilled hole before or after cabinet placement, whereas anchors for mounting bases must be set before placement of the mounting base.

Key	Seismic Zone(s)	Anchor Type	Hole Size / Depth	Anchor set before or after unit placement?
A	0, 1, 2	(4) 1/2" drop in	5/8" (16-mm) bit / 2" (50-mm) deep	Before or after
A	3, 4	(4) 12-mm expansion stud (outdoor)	11/16" (18-mm) bit / minimum 4" (100-mm) deep	Before or after
B	0, 1, 2	(4) 1/2" dia. drop in	5/8" bit / 2" (50 mm) deep	Before
B	3, 4 *	(8) 1/2" dia. drop in	5/8" bit / 2" (50 mm) deep	Before
C	0, 1, 2	(4) 1/2" drop in	5/8" bit (16-mm) / 2" (50-mm) deep	Before
C	3, 4	(4) 12-mm expansion stud	11/16" (18-mm) bit / minimum 4" (100-mm) deep	Before

**Table Note**

\* A EZBFo frame in Zone 4 requires a "Zone 4 kit" if a second add-on module is added.

**Application key**

- A = Modular Cell Cabinets/ WNG battery cabinets
- B = EZBFo battery base module
- C = Mounting bases

## Anchor installation

---

### Mark and drill the anchor holes

**Important!** Note that outdoor cabinets may be mounted directly on a concrete or on optional steel mounting bases. EZBFo battery frames may be mounted directly on a concrete pad. Procedures for the preparation of other types of mounting surfaces are the responsibility of the customer.

If not already accomplished during site preparation, use the following procedure to mark and drill the anchor holes in a concrete surface.

---

- 1 Mark the surface for all cabinets to be installed (using the information provided in the document listed below) for cabinet anchoring dimensions, or steel mounting base anchoring dimensions.

- *Flexent<sup>®</sup> Modular Cell 4.0/4.0B Site Preparation Guidelines*, 401-703-413.
- 

- 2 If installing a EZBFo battery base module, consult the above document and skip to Appendix A to continue the installation.
- 

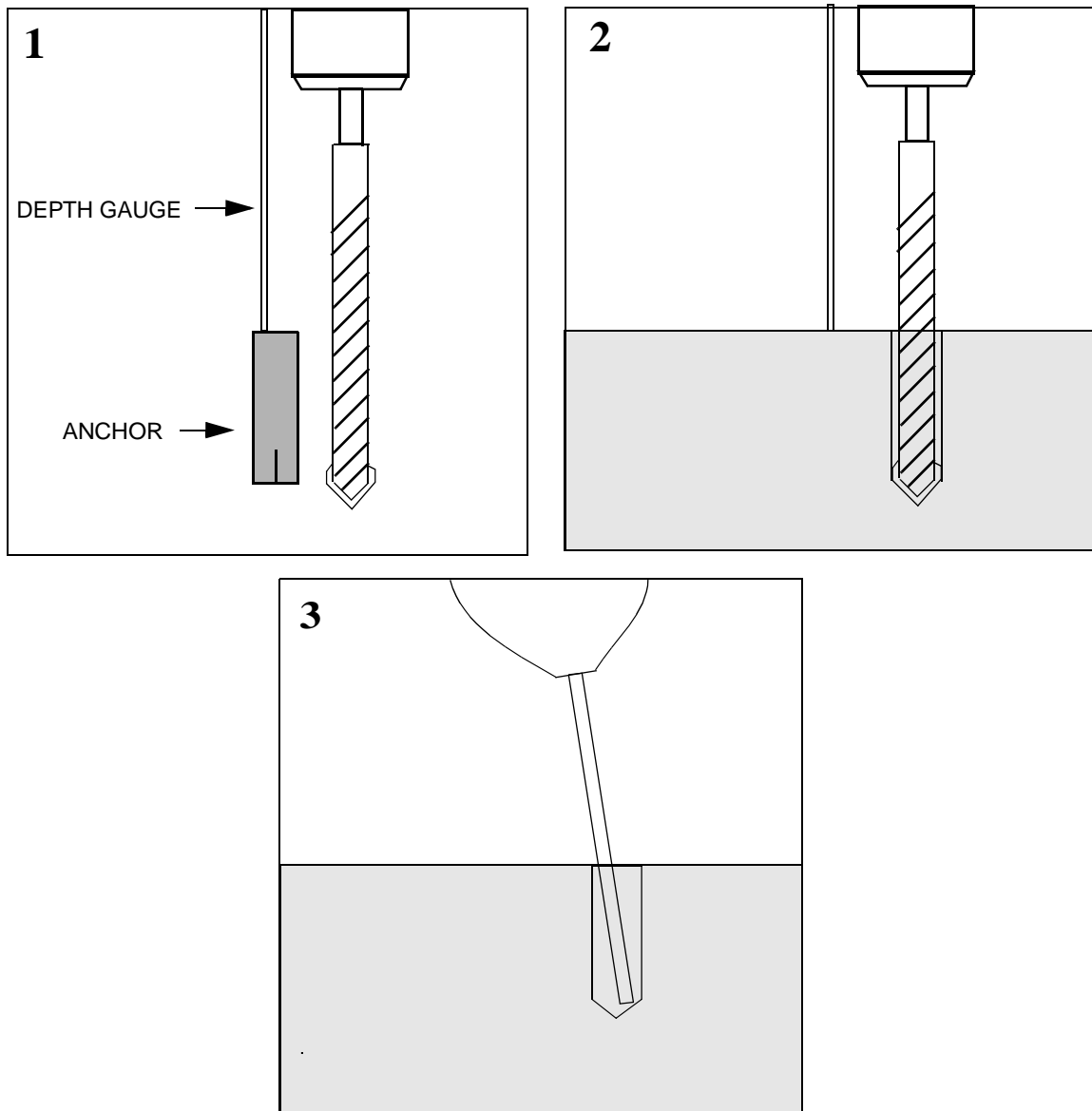
- 3 Drill the anchor holes to the proper size and depth as specified in the previous table. Refer to the figure on Page 2-6 for the anchor hole drilling method.

**Important!** If a 4-inch hole depth cannot be attained for a 12-mm expansion stud anchor (seismic zones 3 and 4), a spacer may be removed from the anchor assembly, prior to the anchor being set. In this case, 1 inch must be cut from the end of the threaded rod, prior to the anchor being set. Refer to the instructions provided with the anchor setting procedure.

---

- 4 Vacuum out the holes. Refer to the figure on Page 2-6.

- 5 If not setting the anchors at this time, tape over the open hole to prevent debris from falling into the hole. Then:
- If installing on mounting bases, skip to Installation of optional steel mounting bases for a 4.0B primary cabinet with integrated power, and battery cabinets if applicable on Page 2 - 11 and continue the installation from that point.
  - If installing directly on concrete, skip to Cabinet handling on Page 2 - 21 and continue the installation from that point.



**Set the 1/2-inch drop-in  
anchor (if applicable)**

**Important!** If using “12-mm expansion stud anchors” with mounting bases, skip to Set the 12-mm expansion stud anchors for mounting bases on Page 2 - 9 and continue the installation from that point.

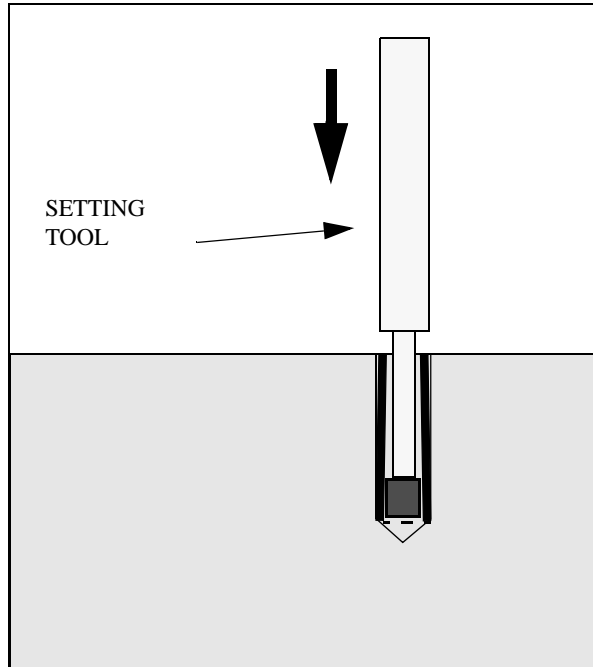
**Important!** If using “12-mm expansion stud anchors” *without* mounting bases, skip to Cabinet handling on Page 2 - 21 and continue the installation from that point.

Use the following procedure to install the 1/2-inch drop-in anchor.

- 
- 1 Tap in the anchors.
- 
- 2 Set the anchors using the setting tool. Refer to the figure on Page 2-8.



- 
- 3 Tape over the open anchor to prevent debris from falling into the hole.



**Set the 12-mm expansion stud anchors for mounting bases**

**Important!** If using “12-mm expansion stud anchors” *without* mounting bases, skip to Cabinet handling on Page 2 - 21 and continue the installation from that point.

Perform the following steps to install the 12-mm expansion stud anchors for mounting bases. Refer to the figure on Page 2-10. Note that the black shouldered spacer and red cap, included in each zone 3 and 4 anchor kit, are not used.

**Important!** When performing the next step, use a 1/4-inch socket to protect the head of the threaded rod if it is necessary to tap the anchor assembly into place. Note that the black shouldered spacer and red cap, included in each zone 3 and 4 anchor kit, are not used.

**Important!** If a 4-inch hole depth was not attained for the anchor, the removable spacer may be removed from the anchor assembly and 1 inch may be cut from the end of the threaded rod.

- 
- 1** Remove the tape and insert the anchor assembly into the hole until the large washer is flat against the surface. Refer to the figure on Page 2-10, Item A.

---

  - 2** Tighten the top nut with a torque wrench to 50 ft-lb (68 Nm). This sets the anchor, as shown in the figure, Item B.

---

  - 3** Loosen the nut, as shown in the figure, Item C1.

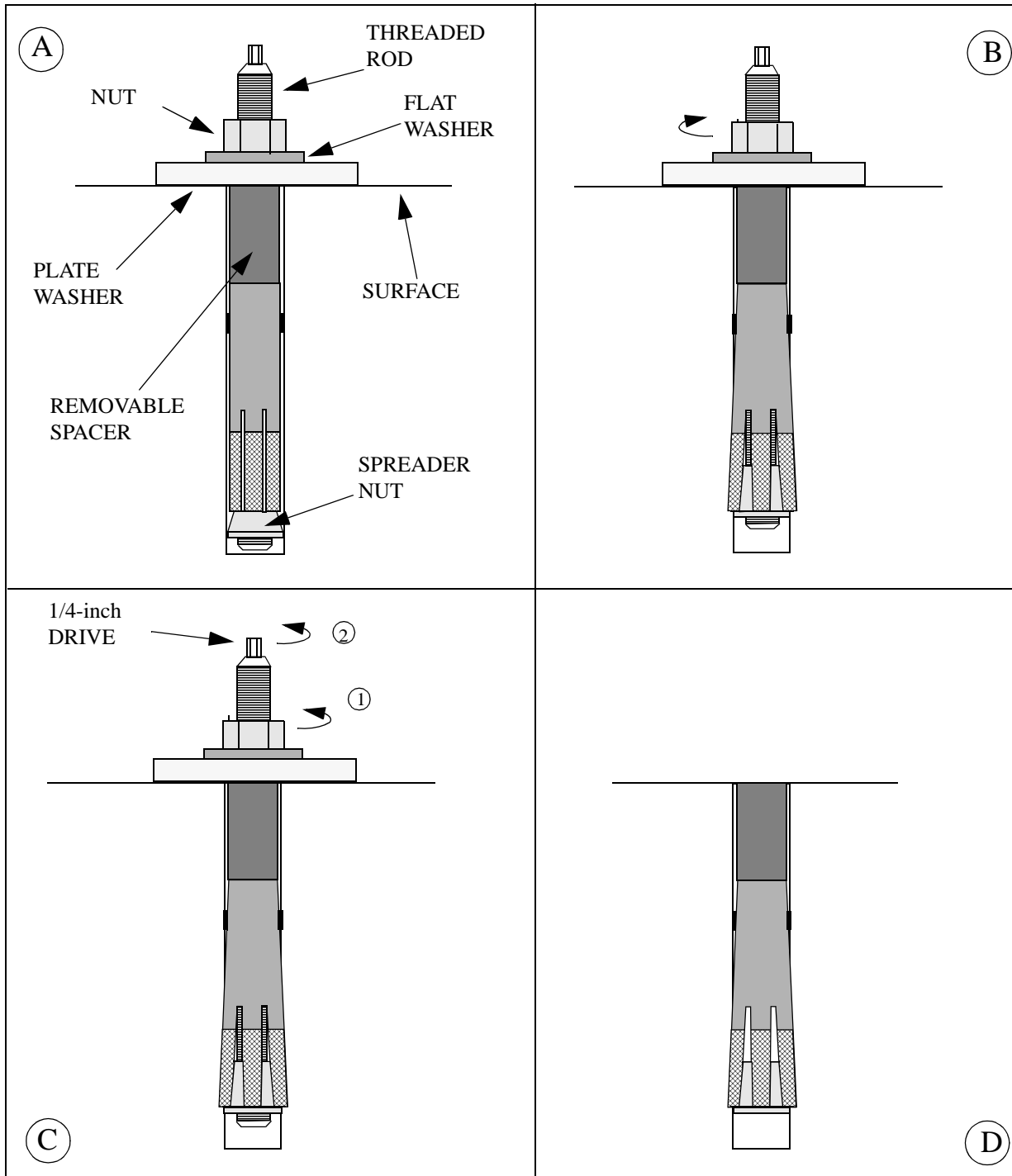
---

  - 4** Remove the threaded rod and nut assembly (with washers) using the 1/4-inch drive at the top, as shown in the figure, Item C2. The set anchor remains in the anchor hole, as shown in the figure, Item D.

---

  - 5** Tape over the open anchor to prevent debris from falling into the hole.

6 Repeat Steps 1 through 5 for all four holes for each mounting base to be placed.



# Installation of optional steel mounting bases for a 4.0B primary cabinet with integrated power, and battery cabinets if applicable

---

**Overview** Important: If installing a dual band cabinet on a mounting base, skip to Installation of optional steel mounting bases for a 4.0B dual band cabinets on Page 2 - 16 to continue the installation.

This section provides procedures for the installation of optional steel mounting bases, for primary and battery cabinets, at various seismic zone sites.

This section covers the following procedures.

<u>Install the optional bases for the primary cabinet, and battery cabinets if applicable, using zone 0, 1, and 2 type anchors</u>	<b>2 - 11</b>
<u>Install the optional mounting bases for the primary cabinet, and battery cabinets if applicable, using zone 3 and 4 type anchors</u>	<b>2 - 13</b>

## **Install the optional bases for the primary cabinet, and battery cabinets if applicable, using zone 0, 1, and 2 type anchors**

**Important!** If using zone 3 or 4 anchors, skip to Install the optional mounting bases for the primary cabinet, and battery cabinets if applicable, using zone 3 and 4 type anchors on Page 2 - 13 and continue the installation from that point.

**Important!** If installing a mounting base for the first battery cabinet only, perform only the Step 4 instructions. If installing a mounting base for the second battery cabinet only, perform only the Step 5 and Step 6 instructions.

Perform the following steps to install mounting bases using zone 0, 1, and 2 type anchors.

- 
- 1** Align the Modular Cell 4.0B cabinet mounting base mounting holes with the anchor holes.
- 
- 2** Place the two washers onto each anchor bolt, and insert the anchoring bolts through the mounting base holes and into the anchors. Refer to the figure on Page 2-12. Level the mounting base (as required) using shims.

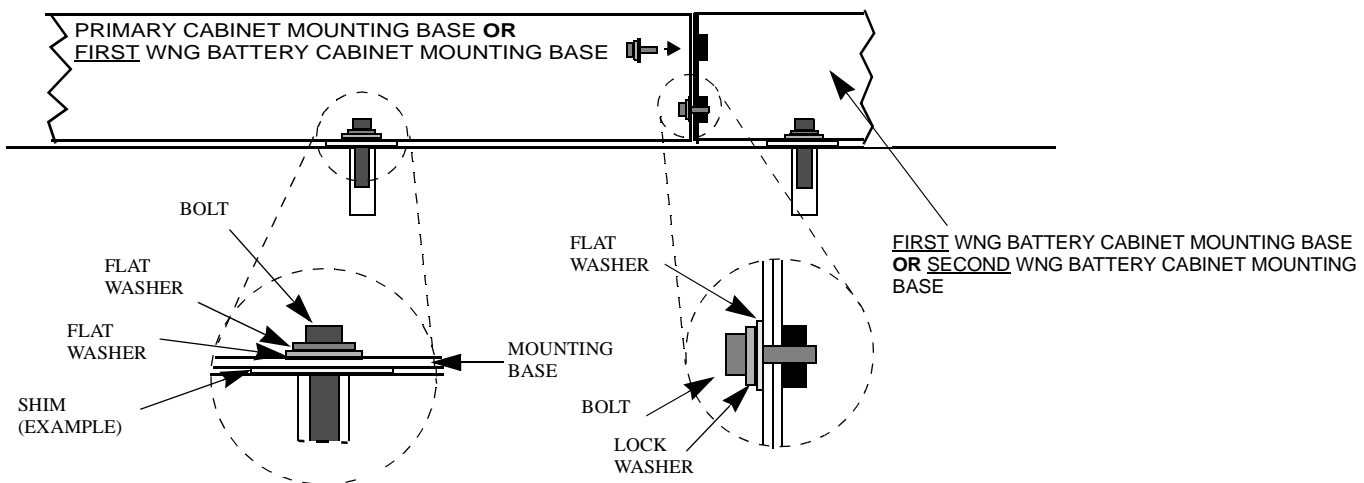
- 3 Start threading the anchoring bolts, but leave them loose (they will be tightened later).

**Important!** If not installing the first battery cabinet mounting base at this time, tighten all four anchor bolts to 18 ft-lb (24 Nm) and then skip to Cabinet handling on Page 2 - 21 to continue the installation.

- 4 Repeat Steps 1 through 4 for the first battery cabinet mounting base and then attach it to the Modular Cell 4.0B mounting base using the four bolts, flat washers and lock washers supplied. Refer to the figure on Page 2-12.

**Important!** If not installing the second battery cabinet mounting base at this time, tighten all eight anchor bolts to 18 ft-lb (24 Nm) and then skip to Cabinet handling on Page 2 - 21 to continue the installation.

- 5 Repeat Steps 1 through 4 for the second battery cabinet mounting base and then attach it to the first battery cabinet mounting base (as shown below) using the four bolts, flat washers and lock washers supplied.



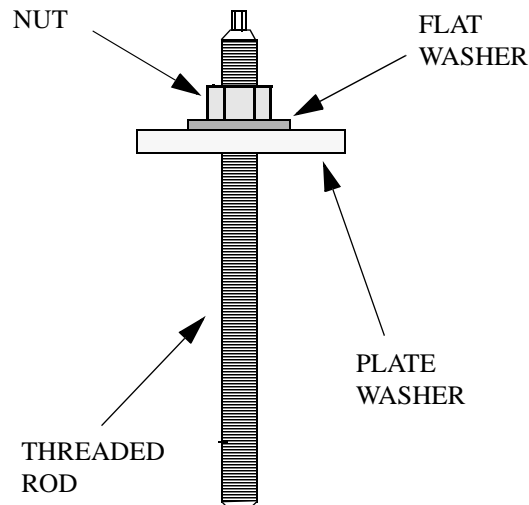
- 6 Tighten all twelve anchor bolts to 18 ft-lb (24 Nm), and then skip to Cabinet handling on Page 2 - 21 to continue the installation.

**Install the optional mounting bases for the primary cabinet, and battery cabinets if applicable, using zone 3 and 4 type anchors**

**Important!** If not using zone 3 or 4 anchors, skip to [Cabinet handling](#) on Page 2 - 21 and continue the installation from that point.

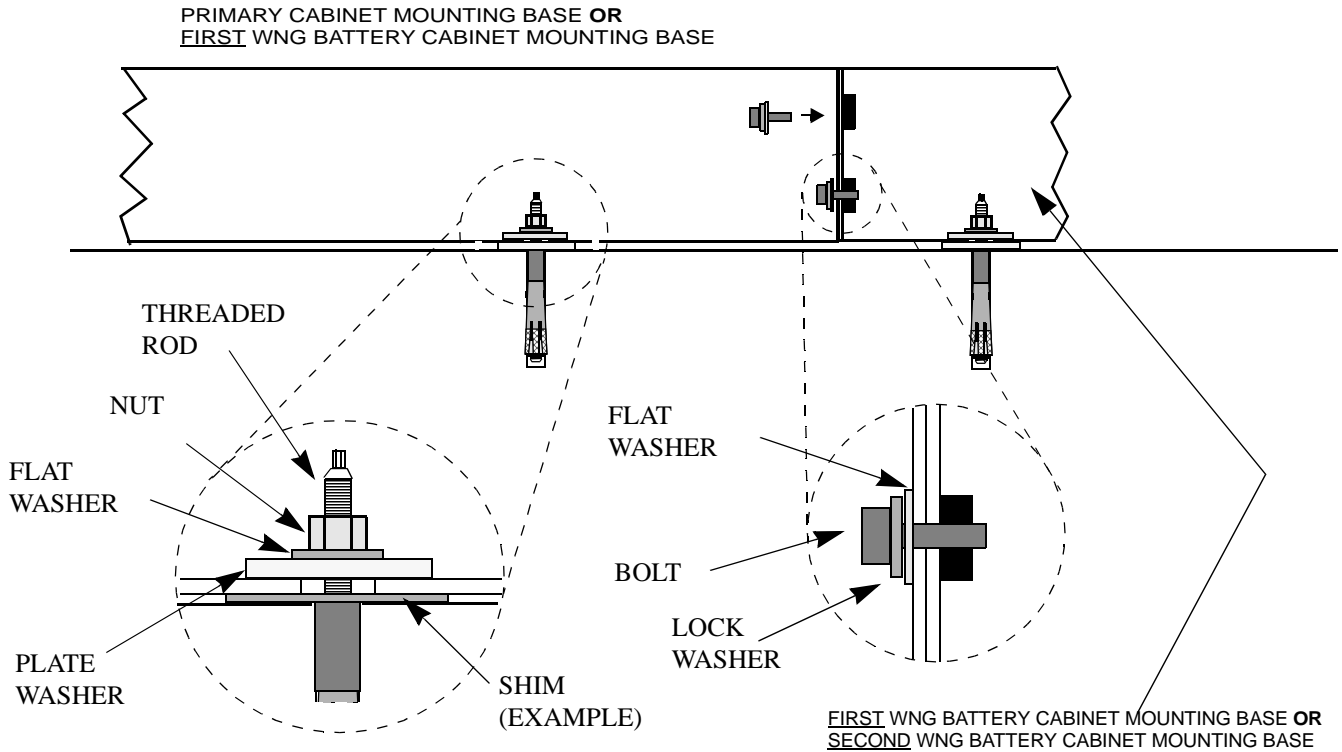
Perform the following steps to install the mounting bases using zone 3 and 4 type anchors.

- 1 Align the Modular Cell 4.0B mounting base mounting holes with the anchor holes.
- 2 Insert the threaded rod assemblies (shown below) through the holes in the mounting base and into the anchors. Refer to the figure on Page 2-14.



- 3 Level the mounting base (as required) using shims.

- 4 Hand-tighten the nuts, but leave them loose (they will be tightened later).

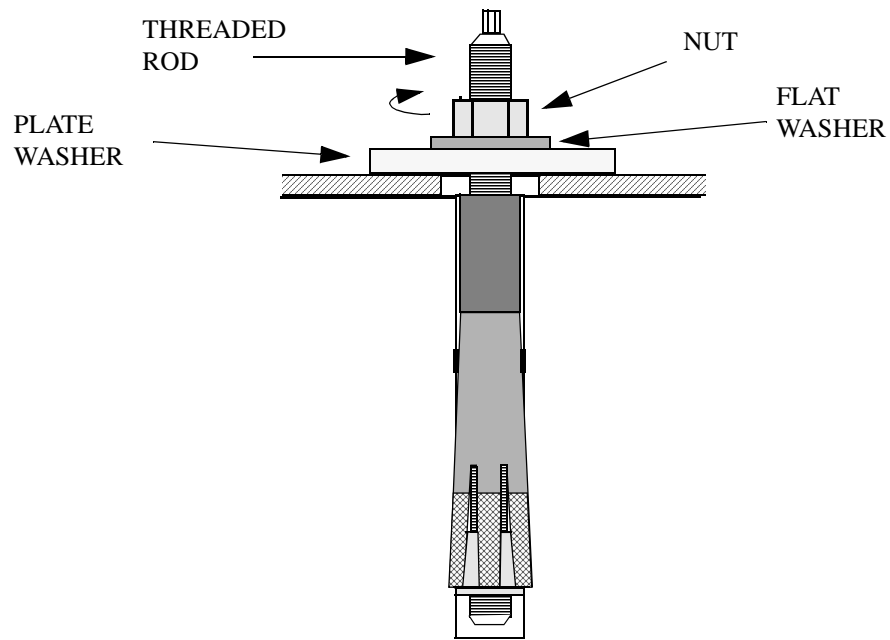


**Important!** If not installing the first battery cabinet mounting base at this time, tighten all four nuts to 58 ft-lb (79 Nm). Refer to the figure on Page 2-15. Then skip to Cabinet handling on Page 2 - 21 to continue the installation.

- 5 Repeat Steps 1 through 4 for the first battery cabinet mounting base and then attach it to the Modular Cell 4.0B mounting base using the four bolts, flat washers and lock washers supplied. Refer to the figure on Page 2-14.

**Important!** If not installing the second battery cabinet mounting base at this time, tighten all eight nuts to 58 ft-lb (79 Nm). Refer to the figure on Page 2-15. Then skip to Cabinet handling on Page 2 - 21 to continue the installation.

- 
- 6** Repeat Steps 1 through 4 for the second battery cabinet mounting base and then attach it to the first battery cabinet mounting base using the four bolts, flat washers and lock washers supplied. Refer to the figure on Page 2-14.
- 
- 7** Tighten each of the twelve zone 3 and 4 nuts to 58 ft-lb (79 Nm) as shown below.





## Installation of optional steel mounting bases for a 4.0B dual band cabinets

---

**Overview** This section provides procedures for the installation of optional steel mounting bases, for a 4.0B dual band cabinet, at various seismic zone sites.

This section covers the following procedures.

Install the optional mounting bases for a dual band cabinet, using zone 0, 1, and 2 type anchors 2 - 17

Install the optional mounting bases for a dual band cabinet using zone 3 and 4 type anchors 2 - 19

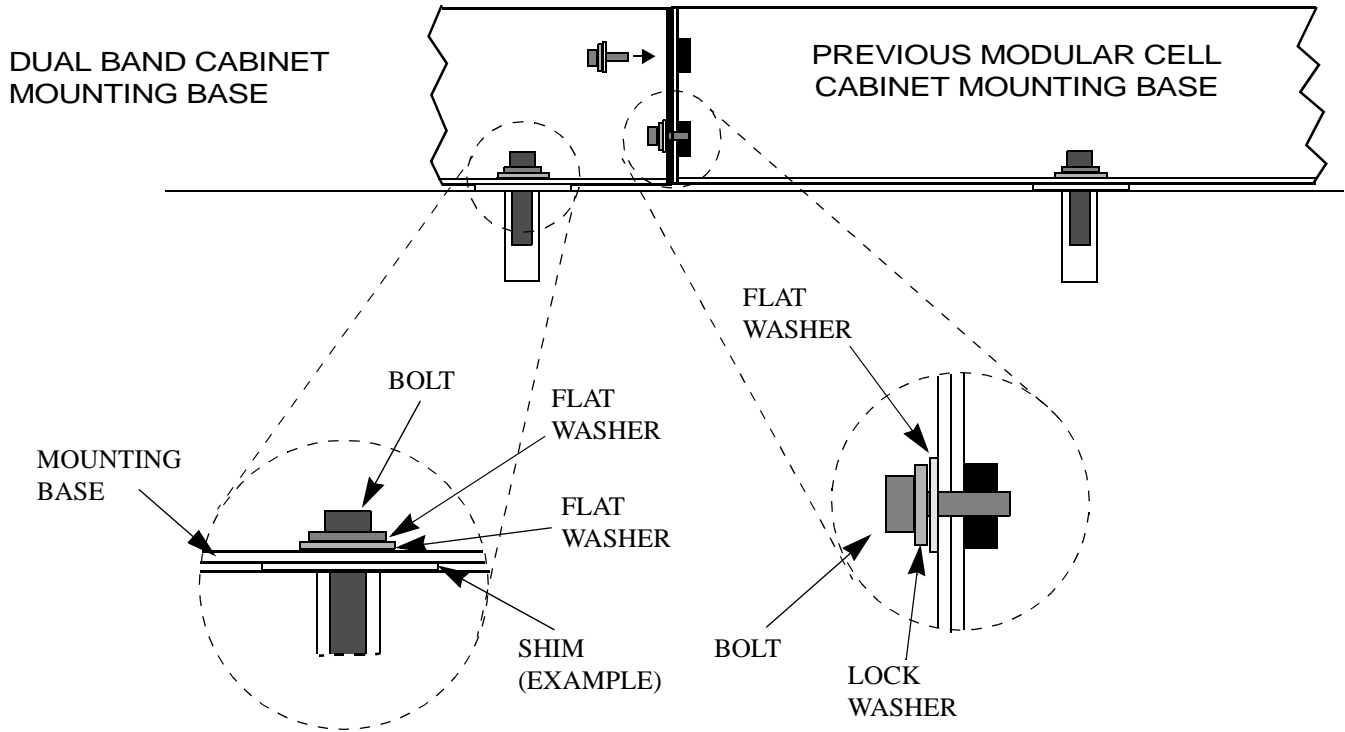
**Install the optional  
mounting bases for a dual  
band cabinet, using zone 0,  
1, and 2 type anchors**

**Important!** If using zone 3 or 4 anchors, skip to Install the optional mounting bases for a dual band cabinet using zone 3 and 4 type anchors on Page 2 - 19 and continue the installation from that point.

Perform the following steps to install the dual band cabinet mounting base using zone 0, 1, and 2 type anchors.

- 1 Align the cabinet mounting base mounting holes with the anchor holes.
- 2 Place the two washers onto each anchor bolt, and insert the anchoring bolts through the mounting base holes and into the anchors. Refer to the figure on Page 2-18.
- 3 Level the mounting base (as required) using shims.
- 4 Start threading the anchoring bolts, but leave them loose (they will be tightened later).
- 5 Attach the dual band cabinet mounting base to the previous Modular Cell mounting base using the four bolts, flat washers and lock washers supplied. Refer to the figure on Page 2-18.

- 6 Tighten all eight anchor bolts to 18 ft.-lb (24 Nm).



- 7 Skip to Cabinet handling on Page 2 - 21 to continue the installation.

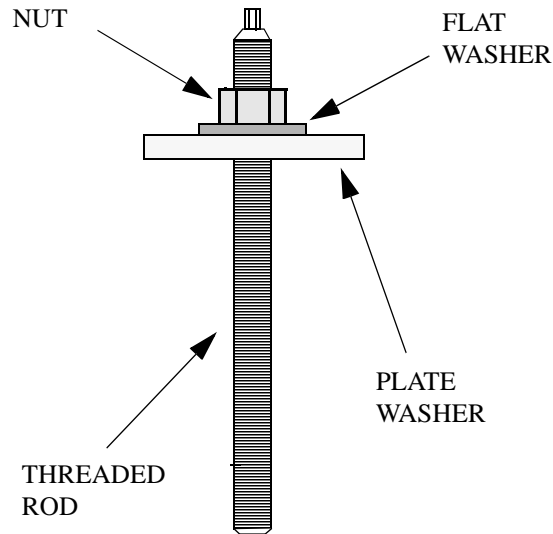
END OF STEPS

**Install the optional  
mounting bases for a dual  
band cabinet using zone 3  
and 4 type anchors**

**Important!** If not using zone 3 or 4 anchors, skip to Cabinet handling on Page 2 - 21 and continue the installation from that point.

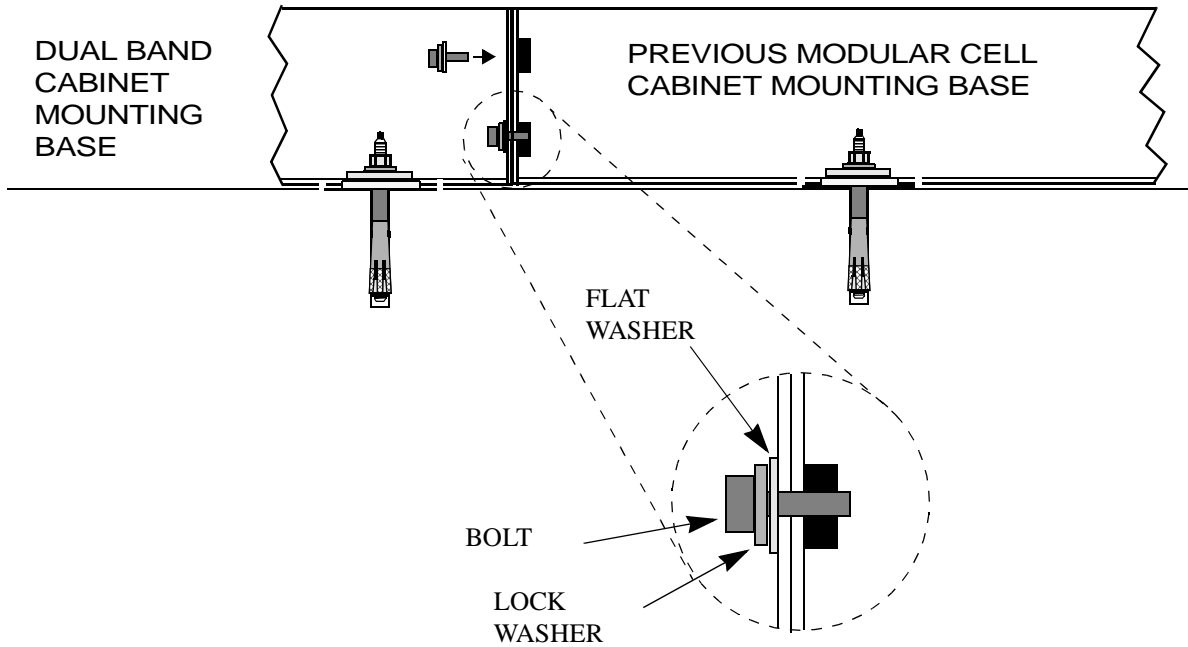
Perform the following steps to install the dual band cabinet mounting base using zone 3 and 4 type anchors.

- 
- 1** Align the dual band cabinet mounting base mounting holes with the anchor holes.
- 
- 2** Insert the threaded rod assemblies (shown below) through the holes in the mounting base and into the anchors. Refer to the figure on Page 2-20.

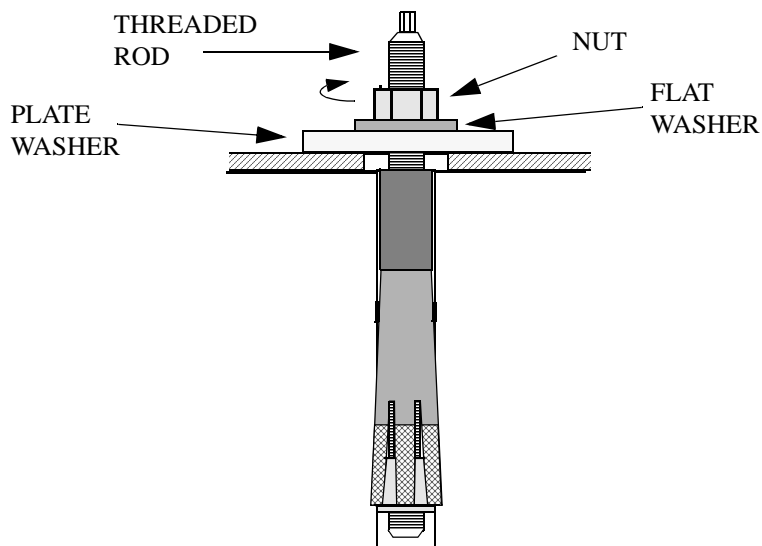


- 
- 3** Level the mounting base (as required) using shims.
- 
- 4** Hand-tighten the nuts, but leave them loose (they will be tightened later).

- 5 Attach the dual band mounting base to the previous Modular Cell mounting base using the four bolts, flat washers and lock washers supplied. Refer to the figure below.



- 6 Tighten each of the eight zone 3 and 4 nuts to 58 ft.-lb (79 Nm), as shown below.



# Cabinet handling

## Overview of this section

---

**Purpose** This section provides information about standard practices for handling cabinets. These practices are common to all installations.

**Contents** This section covers the following procedures.

<u>Unpack the cabinet</u>	2 - 24
<u>Lift cabinet using boom tip winch</u>	2 - 25
<u>Transport cabinet</u>	2 - 27
<u>Remove cabinet from pallet</u>	2 - 27

## Handling a cabinet

---

**Overview** This section provides standard practices for handling a cabinet.

### General



### **WARNING** **Equipment damage**

*When handling a cabinet, never use an equipment dolly that utilizes straps to secure the cabinet to the dolly. Damage to the cabinet's left side solar shield (if equipped) or heat exchanger can easily result.*

Cabinets are usually shipped to the customer via truck and are delivered to a staging area. At the staging area, a forklift truck may be used to lift the packed cabinet. When lifting the cabinet with a forklift, the forks must be at least 4 feet long. Cabinets may be equipped with lifting eye bolts that are used for handling if a forklift is unavailable or not practical. Cabinets are equipped with lifting eye bolts shipped loose. They must be removed after installation.

The cabinet is shipped from the factory with protective packaging that includes a bottom pallet, and protective cardboard sides and/or "bubble wrap". The cabinet is bolted to the bottom pallet. The protective packaging should not be removed until the cabinet is at the job site.

**Before you begin** Here is some useful task preparation information.

### **Tools needed**

The following equipment and tools may be required.

- Derrick truck
- Forklift (if required)
- Power screwdriver (#2 Phillips)
- Four Eyebolts
- Eyebolt tool number: R-ITE-6113

### **Supplies needed**

The following supplies are required.

- Head gear
- Insulated gloves

### **Safety precautions for handling equipment**

- Only those operators who are specifically trained and meet company requirements will be permitted to operate the derrick or forklift equipment.
- All persons working with derrick trucks or forklifts, must wear standard safety headgear, eye protection, and insulated gloves (if required).
- Do not operate a derrick until both stabilizers are extended and firmly supported. Stabilizers should not be extended after a load is suspended from the derrick.
- While raising the derrick from the stowed position, be alert for overhead obstructions, such as power lines, that may interfere.
- At all times, keep bystanders away from the work area.
- Operators must not suspend loads over people, nor can any person be permitted to work, stand, or pass under a suspended load.
- Personnel must stay clear of the concrete pad when tower work is performed.



**Unpack the cabinet** Use the following procedure to unpack the cabinet.

.....  
**1** Make note of the "TIP N TELL" indicator on the package to see if the cabinet was mishandled or tipped during shipment.

.....  
**2** Remove the bubble wrap.

**Important!** Keep cabinet upright.

.....  
**3** Check cabinets for signs of damage.

.....  
**4** Report damage as required.

.....  
**5** Secure mounting hardware and the instructions sheet inside of each cabinet. These sheets provide additional instructions for handling the cabinets.

.....  
E N D O F S T E P S  
.....

**Install the lifting eye bolts** Use the following procedure to install lifting eye bolts, if available.



**WARNING**  
**Equipment damage**

*When performing the next step, the nut on the top of the cabinet must be held in position while the lifting eye bolt is tightened. Otherwise, the nut can become loose and result in water leakage into the cabinet. Do not overtighten the lifting eye bolt.*

.....  
**1** At the applicable cabinet, install the four lifting eye bolts for handling and placing the cabinet.

## Lift cabinet using boom tip winch



### CAUTION

#### Personnel injury or equipment damage

*Derrick equipment or a forklift must be used to lift the cabinet. Do not attempt to move the cabinet manually, or remove it from the pallet manually.*

**Important!** Before attempting to use derrick equipment, refer to Page 2 - 23, “Safety precautions for handling equipment”.

Use the following procedure to lift a cabinet using a rotating derrick equipped with a boom tip winch.



### WARNING

#### Personnel injury or equipment damage

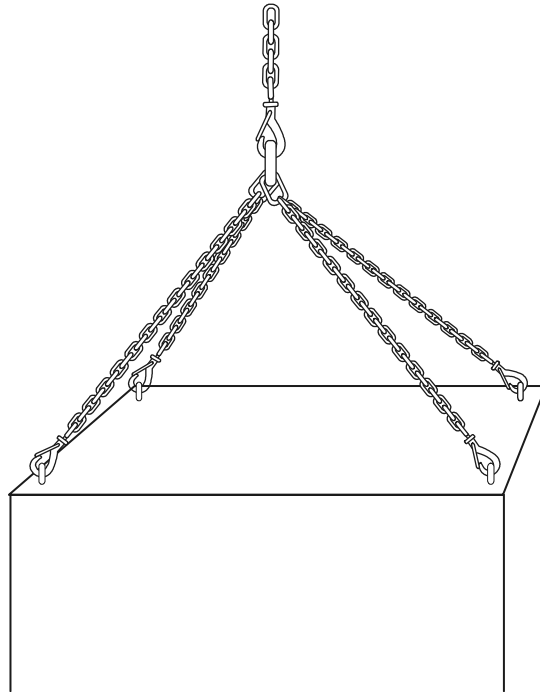
*Cabinets are too heavy to move without appropriate lifting devices.*

*When moving the cabinet, use appropriate lifting devices and a sufficient number of personnel.*

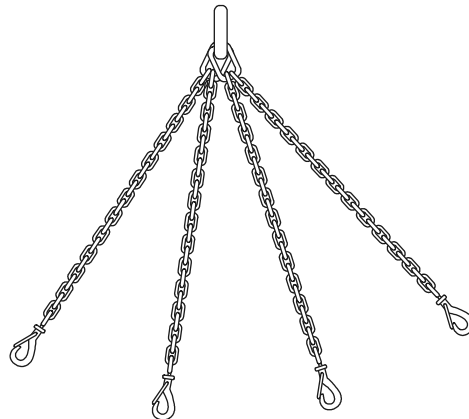
- 1 Refer to *Corner Mounted Rotating Derrick Equipped with Hydraulic Digger- Description and Maintenance*, 649-300-021 for operating procedures and precautions. Also consult *Slings*, 649-310-115, and *B Connecting Links*, 081-410-105.

**Important!** Make sure that the previously obtained lifting eye bolts are properly installed before performing the next step. Also make sure that the slings are long enough to prevent excessive side stress on the lifting eye bolts.

- 
- 2** Attach the slings to the boom line with a B connecting link or clevis.



- 
- 3** Attach the other ends of the slings to the lifting eye bolts with a B connecting link or clevis.



**Transport cabinet** Use the following steps to transport the cabinet after attaching it to the derrick.



**CAUTION**

*When moving a cabinet in the following procedures, do not tilt the cabinet beyond 30 degrees. Do not stand under the cabinet.*

- 1 Tie a rope from one end of the pallet, with sufficient length to hold and guide the cabinet while it is transported from the truck. The rope prevents the cabinet from tilting or swinging.
- 2 Lift the cabinet carefully from the truck, keeping the boom line tight to prevent the cabinet from tipping while it is moving.
- 3 Slowly place the cabinet on the ground.

END OF STEPS

**Remove cabinet from pallet** Use the following procedure to remove the cabinet from the pallet.

- 1 Make sure that the boom line is tight.
- 2 Open the front door.
- 3 Use a 3/4-inch deep socket and ratchet to remove the four bolts that hold the cabinet to the pallet.

**Important!** Do not attempt to move the cabinet manually.

- 4 Carefully lift the cabinet and remove the pallet.

END OF STEPS



# Cabinet placement, anchoring and grounding

## Overview

---

**Purpose** **Important!** Instructions for placement, anchoring, and grounding of the EZBFo battery base modules are provided in Appendix A.

This section provides the following placement, anchoring, grounding, and associated instructions.

- Flexent Modular Cell 4.0B primary, as well as physical connection of a 4.0B dual band cabinet to a Modular Cell 1.0/2.0/3.0/4.0 first or second growth cabinet, as applicable
- WNG24-BC battery cabinet, both first and second, and physical connection to a 4.0B integrated power primary cabinet, or first battery cabinet, as applicable
- Heat exchanger and solar shield applications, solar shield installation, as applicable, and door adjustment.

**Contents** Use the following procedures, as applicable.

<a href="#"><u>Anchor and torque requirements</u></a>	2 - 29
<a href="#"><u>Placement and anchoring of the Flexent , Modular Cell 4.0B primary cabinet</u></a>	2 - 30
<a href="#"><u>Placement and anchoring of the WNG24-BC battery cabinets</u></a>	2 - 34
<a href="#"><u>Placement and anchoring of a Flexent Modular Cell 4.0B dual band cabinet</u></a>	2 - 50
<a href="#"><u>Install the cabinet grounding cables</u></a>	2 - 65
<a href="#"><u>Remove the lifting eye bolts</u></a>	2 - 67
<a href="#"><u>Install the top solar shield</u></a>	2 - 70
<a href="#"><u>Install the right side solar shield on the primary cabinet (reference, if applicable)</u></a>	2 - 75
<a href="#"><u>Adjust the door roller bearing (if required)</u></a>	2 - 76

## Anchor and torque requirements

---

**Anchor and torque requirements** The following table provides torque requirements for the installation of the Modular Cell 4.0B cabinet and WNG battery cabinet anchor bolts.

Seismic Zone(s)	Anchor Type	Wrench	Torque	
			Newton Meters	Foot pounds
0, 1, 2	(4) 1/2" drop in	3/4"	24 Nm	18 ft-lb
3, 4	(4) 12-mm expansion stud	19-mm	79 Nm	58 ft-lb

## Placement and anchoring of the Flexent<sup>®</sup> Modular Cell 4.0B primary cabinet

---

**Overview** This procedure module provides instructions for placement, anchoring and grounding of the Modular Cell 4.0B primary cabinet.

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

<u>Move/lift the primary cabinet into position</u>	2 - 31
<u>Install anchoring bolts or anchor assemblies and level the primary cabinet</u>	2 - 32

**Move/lift the primary cabinet into position**

Use the following procedure to move/lift the cabinet into position.



**WARNING**

**Personnel injury or equipment damage**

*Cabinets are too heavy to move without appropriate lifting devices.*

*When moving the cabinet, always use appropriate lifting devices and a sufficient number of personnel.*

- 1** If installing directly to a concrete surface, remove tape and any debris covering the anchor holes.

---

- 2** Place cabinet into position.
  - On mounting bases *or*
  - On concrete, over the anchor holes or the set anchors

---

- 3** Open the front door of the cabinet to view the front mounting holes. Note that the key must remain in the latch to open the door.

---

- 4** Align the cabinet mounting holes with the set anchors or anchor holes, as applicable.

END OF STEPS

---



**Install anchoring bolts or  
anchor assemblies and  
level the primary cabinet**

Use the following procedure to install anchoring bolts or anchor assemblies and level the cabinet.

**Important!** When performing the next step, do not seal the anchor holes. In the event that water should collect, it must be allowed to drain out of the cabinet through the anchor holes.

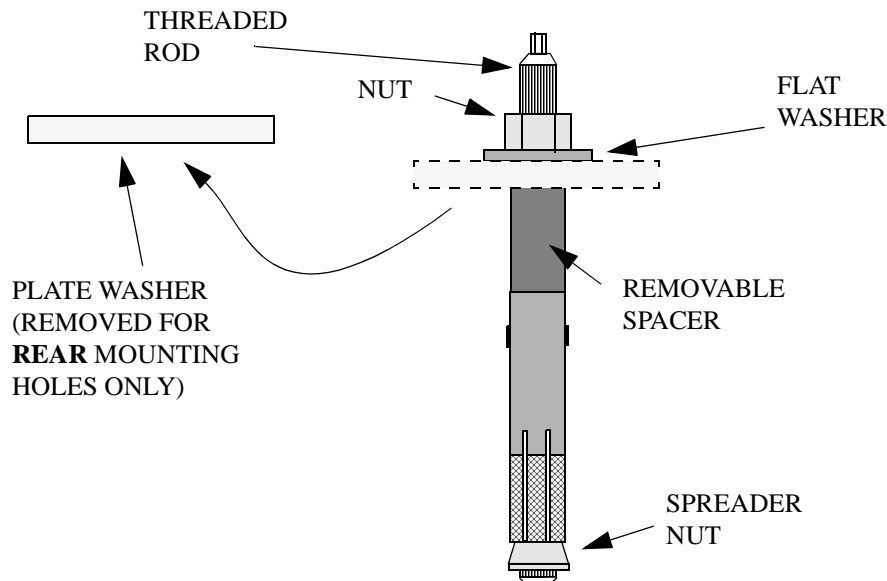
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**1** Anchor the cabinet.

- **Seismic zones 0, 1, and 2:**
  - a. If the anchors *have not been set*, tap in the anchors and set them using the setting tool. Refer to the figure on Page 2-8. Then, install the four anchor bolts with two washers each.
  - b. If the anchors *have already been set*, install the four anchor bolts with two washers each.
  - c. Do not torque the bolts at this time if a 4.0B dual band cabinet remains to be installed. If not, level the cabinet using the supplied shims, and torque to 18 ft-lb (24 Nm).
- **Seismic zones 3 and 4:**
  - Refer to the figure on Page 2-33. Note that the black shouldered spacer and red cap, included in each zone 3 and 4 anchor kit, are not used.
  - If the anchors *have not been set*, you will be inserting the entire anchor assembly (12-mm expansion stud assembly) into each hole, but without the large washer for the rear holes. Note that if a 4-inch hole depth was not attained for the anchor, the removable spacer may be removed from the anchor assembly, and 1 inch cut from the end of the threaded rod.
  - If the anchors *have been set*, you will be inserting only the threaded rod into each hole, but without the large washer for the rear holes. Note that if a 4-inch hole depth was not attained for the anchor, and the 1-inch spacer was removed from the anchor assembly, 1 inch *must* be cut from the end of the threaded rod.

If it is necessary to tap the anchor assembly into place when performing the next procedure, use a 1/4-inch socket to protect the head of the threaded rod.

- a. Place two expansion stud assemblies, or threaded rods, into the front mounting holes using both washers on each assembly. Refer to the figure below.
- b. Place two expansion stud assemblies, or threaded rods, in the back mounting holes, *without* the large washer on each assembly.
- c. Do not torque the nuts at this time if a 4.0B dual band cabinet remains to be installed. If not, level the cabinet using the supplied shims, and torque to 58 ft-lb (79 Nm).



---

**2** Verify that the cabinet door aligns properly when closed.

**Important!** If the cabinet door does not align properly when closed, the cabinet may be relevelled until correct door alignment is achieved, or the door may be adjusted, as applicable. Refer to [Door adjustment procedure](#) on Page 2 - 76 for the adjustment procedure. Since it may be necessary to re-level the primary cabinet when connecting a battery or dual band cabinet, you may wish to delay adjustment of the door(s) until all cabinets have been placed, leveled, and anchored.

---

**3** If no further cabinets remain to be installed, proceed to [Install the cabinet grounding cables](#) on Page 2-65 to continue the installation.

## Placement and anchoring of the WNG24-BC battery cabinets

---

**Overview** This procedure module provides the following instructions.  
For the purpose of these instructions, the WNG24-BC battery cabinet will be hereafter referred to as the first or second battery cabinet, or the *existing* cabinet when required.

- Placement, anchoring and grounding the WNG24-BC battery cabinet, both first and second.
- Physical connection of a WNG24-BC battery cabinet to the primary Modular Cell 4.0B or a second WNG24-BC battery cabinet to the first battery cabinet (since the instructions are the same, references will be to attaching a battery cabinet to the *existing* cabinet)

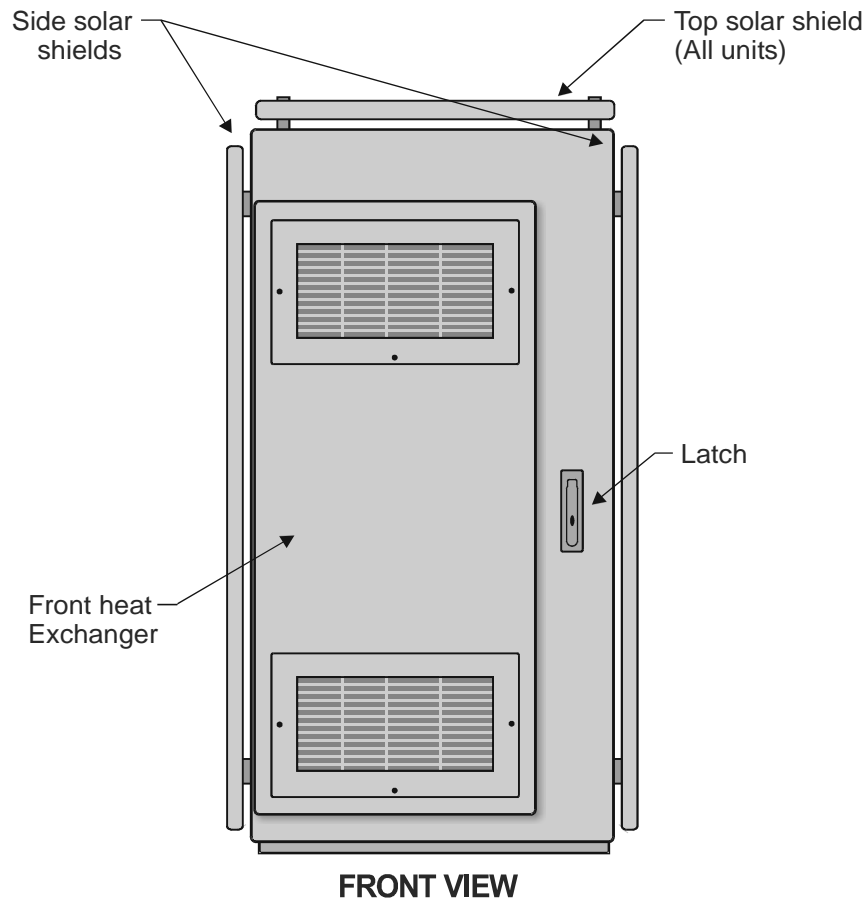
This module contains the following procedures.

<u>Prepare the existing cabinet for attachment of an additional cabinet</u>	2 - 35
<u>Prepare the cabinet being installed for attachment to the existing cabinet</u>	2 - 37
<u>Partially install the AC cable guide in the cabinet being installed</u>	2 - 39
<u>Move/lift the cabinet being installed into position</u>	2 - 40
<u>Attach the cabinets together at the square cable support (with second battery cabinet only)</u>	2 - 42
<u>Install anchoring bolts or anchor assemblies and level the battery cabinet(s)</u>	2 - 45
<u>Complete the installation of the AC feed-through coupling and tighten the anchor bolts or nuts</u>	2 - 48

**Prepare the existing cabinet for attachment of an additional cabinet**

Use the following procedure to prepare the existing cabinet for attachment of an additional cabinet.

- 1 Make sure the front door of the existing cabinet is open. Refer to the figure below. Note that the existing cabinet may be the first battery cabinet, in which case the front heat exchanger and solar shields will not be present.

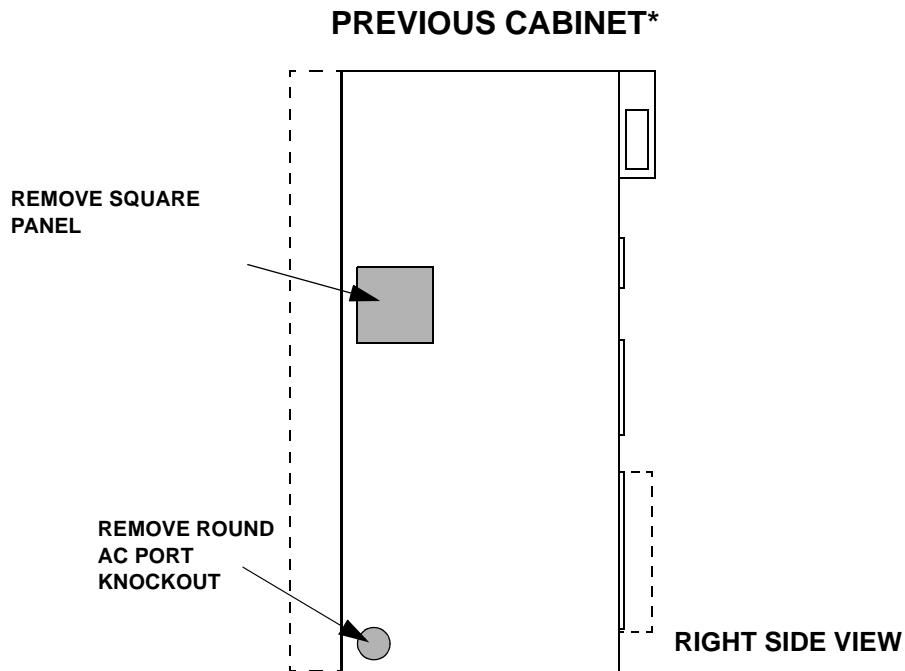


- 2 If a first battery cabinet is being attached to the primary cabinet, and the primary cabinet has a right solar shield, remove the solar shield at this time. It will not be reused.

**Important!** When performing the next step, use care not to bend or otherwise damage the side wall of the existing cabinet, which can result in failure of the subsequently installed conduit seal to prevent water leakage. Use a slow, careful rocking motion to remove the knockout.

- 
- 3** Remove the AC port knockout from the lower-right side, near the front of the existing cabinet (viewed from the front), shown shaded in the figure below.
- 

- 4** Remove the square panel from the right side, near the front of the cabinet (viewed from the front), shown shaded in the figure below.



\* MODULAR CELL 4.0B PRIMARY CABINET OR FIRST BATTERY CABINET (IF INSTALLING SECOND BATTERY CABINET)

**Prepare the cabinet being  
installed for attachment to  
the existing cabinet**

Use the following procedure to prepare the battery cabinet for attachment to the existing cabinet.

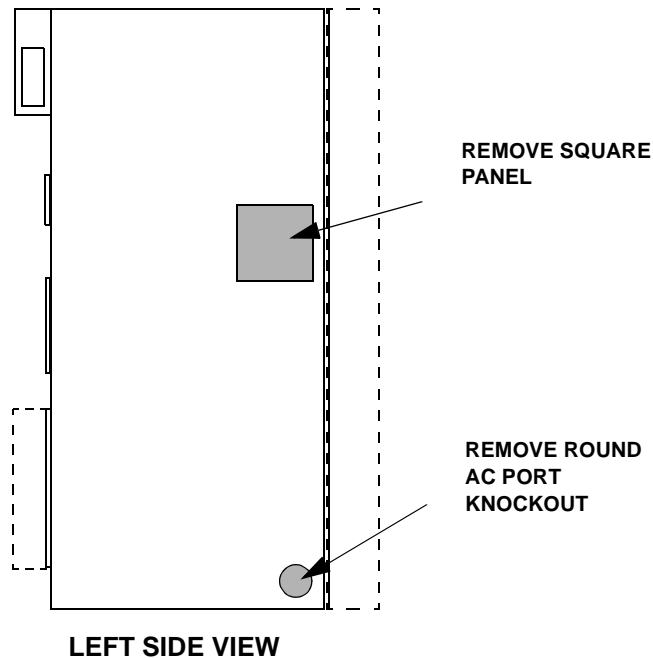
- 
- 1 Open the front door of the cabinet being installed. Refer to the figure on Page 2-35.

**Important!** When performing the next step, use care not to bend or otherwise damage the side wall of the existing cabinet, which can result in failure of the subsequently installed conduit seal to prevent water leakage. Use a slow, careful rocking motion to remove the knockout.

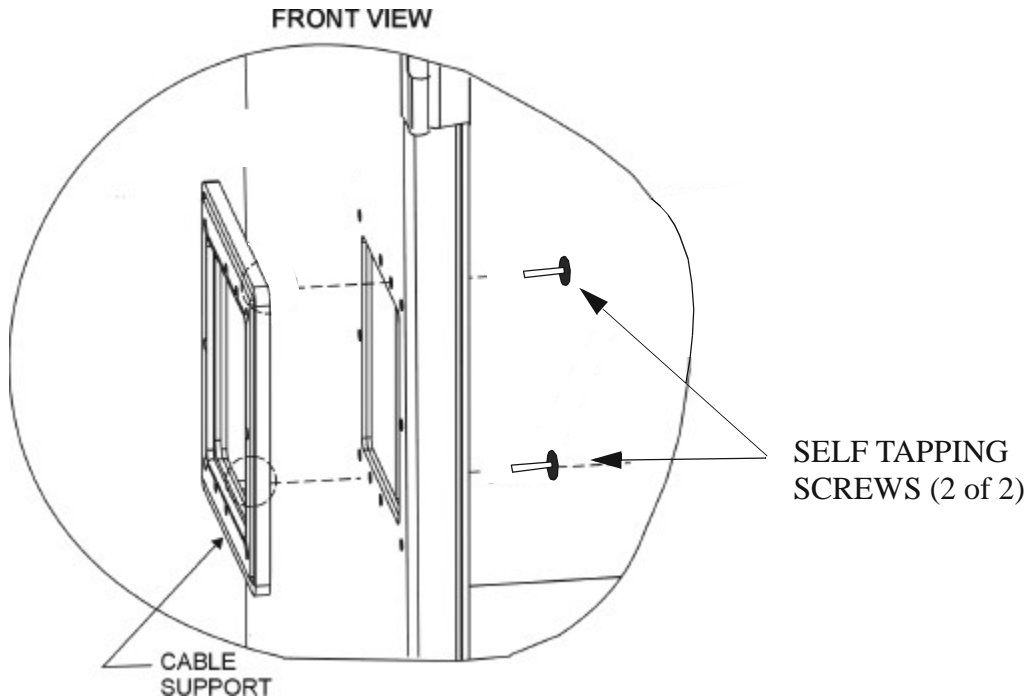
- 
- 2 Remove the AC port knockout from the lower-left side, near the front of the cabinet to be installed (viewed from the front), shown shaded in the figure below.

- 
- 3 Remove the square panel from the left side, near the front of the cabinet (viewed from the front), shown shaded in the figure below.

**FIRST OR SECOND BATTERY CABINET**



- 
- 4 Place the DC cable support against the side of the cabinet being installed, and *temporarily* attach the DC cable support with the two supplied self-tapping screws, as shown in the figure below.



- 
- 5 Close the cabinet front door.

**Important!** When performing the step, the nut on the top of the cabinet must be held in place while the lifting eye bolt is tightened. Otherwise, the nut can become loose and result in water leakage into the cabinet. Do not overtighten.

- 
- 6 Install the four lifting eye bolts if required for handling and placing the cabinet.

**Partially install the AC  
cable guide in the cabinet  
being installed**

Refer to the figure on Page 2-39 and perform the following steps to partially install the AC cable guide in the battery cabinet.

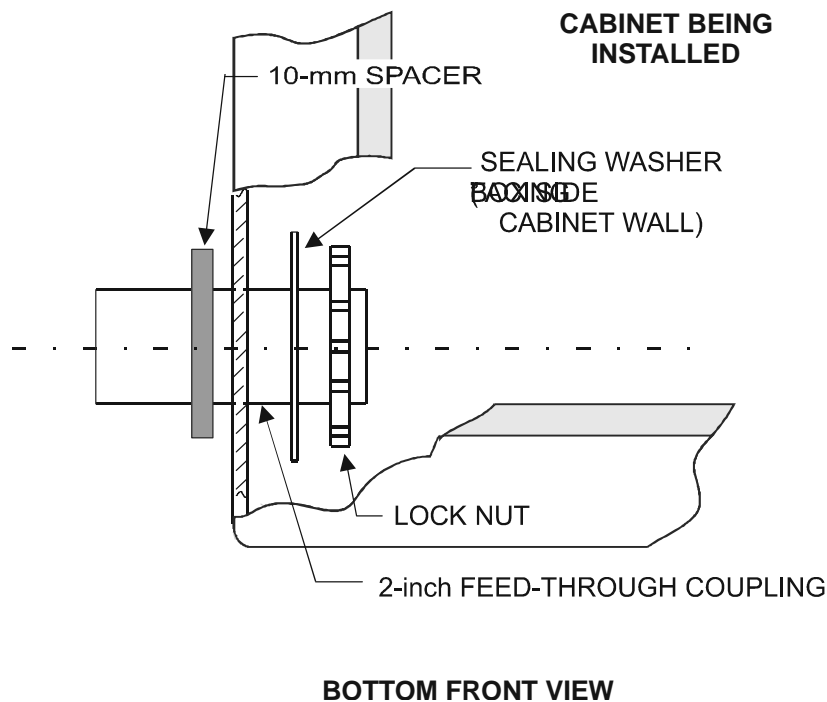
**Important!** The following steps must be performed before moving the WNG battery cabinet into position against the existing cabinet.

- 1 Refer to the figure on Page 2-39 and place a sealing washer (“BOX SIDE” facing the cabinet wall) and lock nut on one end of the 2-inch feed-through coupling.

**Important!** Do not disfigure the sealing washer in any way. Otherwise the watertight seal will be lost (at a point near the bottom of the cabinet).

- 2 Insert the other end of the 2-inch coupling through the cabinet wall.

- 3 Position the 10-mm spacer on the coupling on the outside of the cabinet wall, as shown in the figure below.





**Move/lift the cabinet being  
installed into position**



**WARNING**

**Personnel injury or equipment damage**

*Cabinets are too heavy to move without appropriate lifting devices. When moving the cabinet, use appropriate lifting devices and a sufficient number of personnel.*

Perform the following steps to position the cabinet being installed.

- 
- 1** If installing directly to a concrete surface, remove tape and any debris covering the anchor holes.

- 
- 2** Place cabinet into the approximate position on mounting bases *or* on concrete, over the anchor holes or the set anchors.

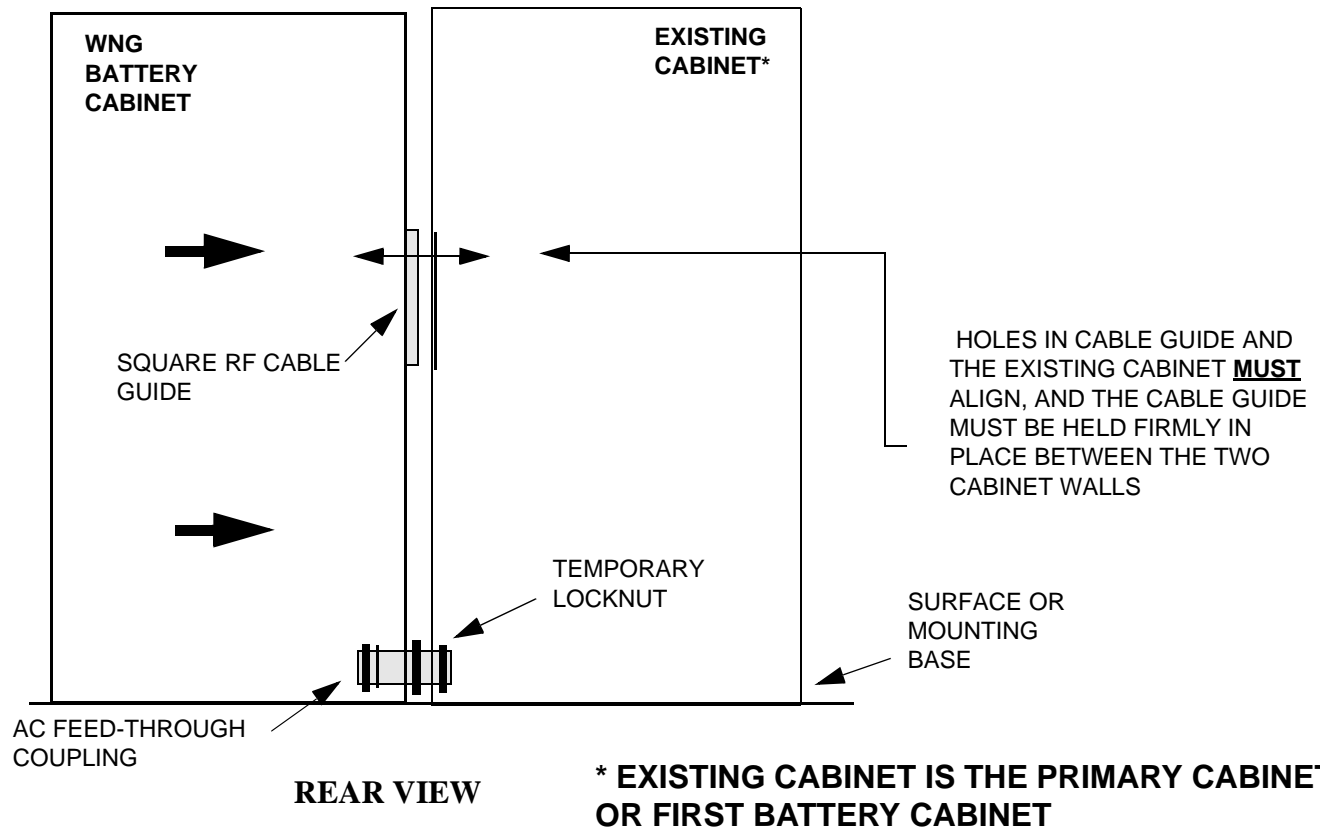
**Important!** When performing the next step, align the AC feed-through conduit with the port opening in the wall of the existing cabinet. Refer to the figure on Page 2-41. Also, use care not to damage any wires located in the lower right front of the existing cabinet.

- 
- 3** Position the cabinet approximately 10 mm away from the existing cabinet, while at the same time inserting the AC feed-through coupling through the wall of the existing cabinet.

- 
- 4** Align the cabinet with the anchor holes in the mounting surface or the holes in the mounting bases, as applicable.

**Important!** If installing on mounting bases, you must immediately install the bolts that secure the cabinet to the base. Do not torque the bolts at this time.

- 5 Perform a *preliminary* leveling of the cabinet being installed, using the supplied shims.
- 6 Temporarily thread a locknut onto the AC feed-through coupling inside of the existing cabinet. This is to hold the feed-through coupling in place until it is permanently attached. Refer to the figure below.



- 7 Perform another leveling of the cabinet being installed using shims. Note that the holes in the cable supports *must* align with the holes in the opposite cabinet.
- 8 If installing a second battery cabinet, continue the installation on the next page. If installing the first battery cabinet, skip to Install anchoring bolts or anchor assemblies and level the battery cabinet(s) on Page 2 - 45 for the procedure to anchor the battery cabinet.

**Attach the cabinets  
together at the square  
cable support (with second  
battery cabinet only)**

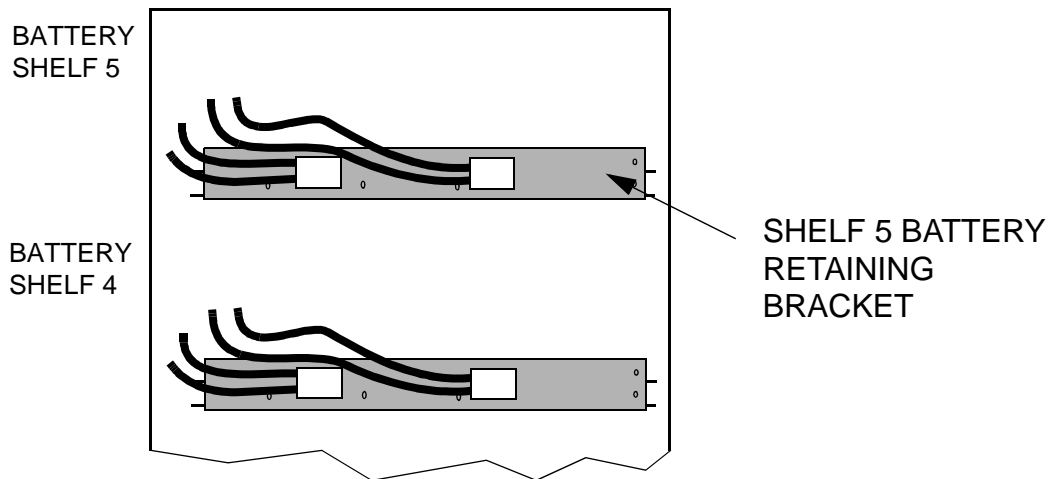
**Important!** If installing the first battery cabinet, do not perform the instructions below. Note that the first battery cabinet will be connected to the Modular Cell 4.0B cabinet at the cable support when the cable interface is installed in Chapter 4. Skip to Install anchoring bolts or anchor assemblies and level the battery cabinet(s) on Page 2 - 45 to continue the installation.

If installing the second battery cabinet, continue with the instructions below.

Perform the following steps to attach the cabinets together at the cable support.

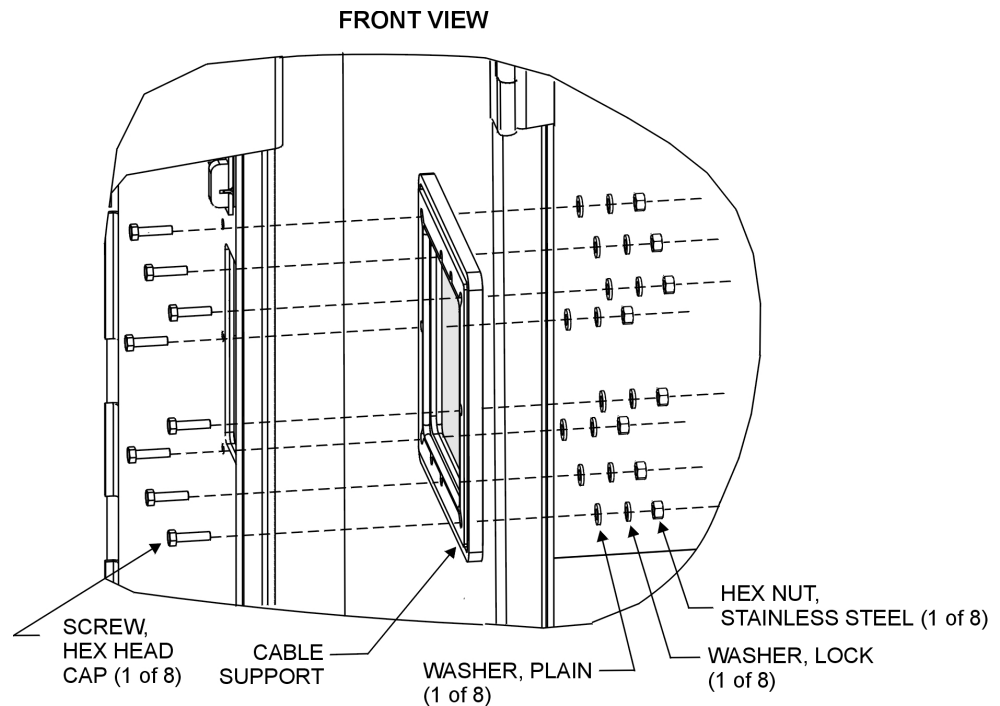
**Important!** If there is no battery retaining bracket mounted on the top shelf (shelf 5), skip the first step.

- 1 Refer to the figure below and remove the top (shelf 5) battery retaining bracket from the first battery cabinet. Do not replace the retaining bracket at this time.



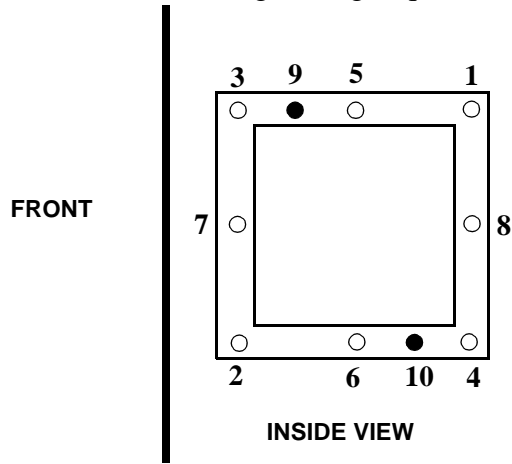
**Important!** It is preferred that the screws be installed from inside the first battery cabinet so that all of the nuts are inside of the second battery cabinet when they are tightened in the next step.

- 2 Attach the second battery cabinet to the first battery cabinet at the cable support. Use the eight sets of hex-head cap screws, plain washers, lock washers and nuts. Refer to the figure on Page 2-43.



**Important!** When performing the next step, the nuts must be tightened to a point that no gasket material is visible around the cable support.

- 3 Refer to the figure below and tighten the cable support nuts using the tightening sequence shown.



NOTE:

Nuts 1 through 8 are threaded on bolts coming from the first battery cabinet. Screws 9 and 10 were installed to hold the cable guide to the second battery cabinet during the connection of the cabinets.

**Install anchoring bolts or  
anchor assemblies and  
level the battery cabinet(s)**

Use the following procedure to install anchoring bolts or anchor assemblies and level the cabinet.

**Important!** When performing the next step, do not seal the anchor holes. In the event that water should collect, it must be allowed to drain out of the cabinet through the anchor holes.

.....

**1** Anchor the cabinet.

• **Seismic zones 0, 1, and 2:**

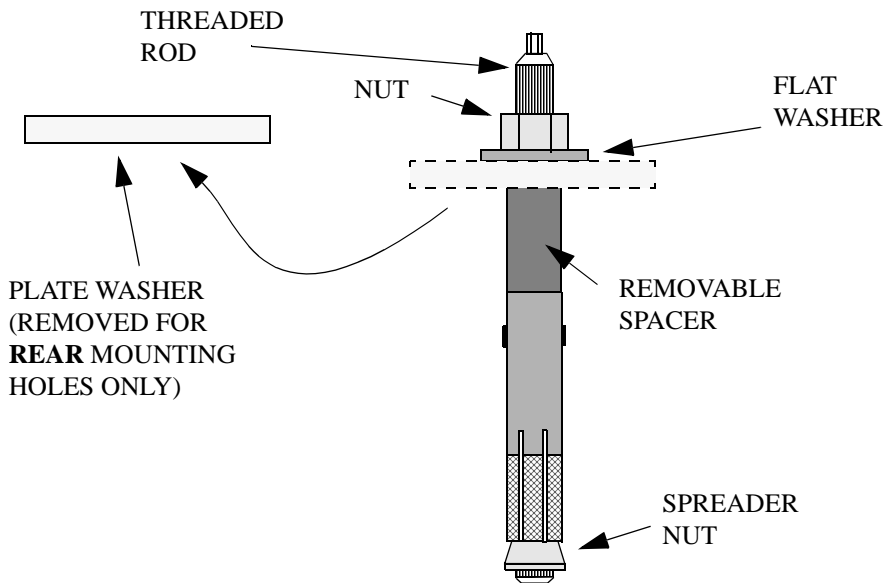
- If the anchors have not been preset, tap in the anchors and set them using the setting tool. Refer to the figure on Page 2-8. Then, install the four anchor bolts with two washers each.
- d. If the anchors have already been set, install the four anchor bolts with two washers each.
- e. Do not torque the bolts at this time.

• **Seismic zones 3 and 4:**

- Refer to the figure on Page 2-46. Note that the black shouldered spacer and red cap, included in each zone 3 and 4 anchor kit, are not used.
- If the anchors have not been preset, you will be inserting the entire anchor assembly (12-mm expansion stud assembly) into each hole, but without the large washer for the rear holes. Note that if a 4-inch hole depth was not attained for the anchor, the removable spacer may be removed from the anchor assembly, and 1 inch cut from the end of the threaded rod.
- If the anchors have been preset, you will be inserting only the threaded rod into each hole, but without the large washer for the rear holes. Note that if a 4-inch hole depth was not attained for the anchor, and the 1-inch spacer was removed from the anchor assembly, 1 inch must be cut from the end of the threaded rod.

If it is necessary to tap the anchor assembly into place when performing the next procedure, use a 1/4-inch socket to protect the head of the threaded rod.

- a. Place two expansion stud assemblies, or threaded rods, into the front mounting holes using both washers on each assembly. Refer to the figure below.
- b. Place two expansion stud assemblies, or threaded rods, in the back mounting holes, without the large washer on each assembly.
- c. Do not torque the nuts at this time.



**Important!** If the cabinet door does not align properly when closed in the next step, the cabinet may be relevelled until correct door alignment is achieved, or the door may be adjusted, as applicable. Refer to [Door adjustment procedure](#) on Page 2 - 76 for the adjustment procedure. Since it may be necessary to re-level the primary cabinet when connecting a battery or dual band cabinet, you may wish to delay adjustment of the door(s) until all cabinets have been placed, leveled, and anchored.

- 
- 2 If the cabinet being installed has a front heat exchanger, verify that the cabinet door aligns properly when closed.

**Important!** When leveling the cabinet in the next step, the holes for the cable supports must align with the holes in the opposite cabinet.

- 
- 3** Level the cabinet (as required) using the supplied shims.

**Important!** If the cabinet door does not align properly when closed, the cabinet must be re-leveled until correct door alignment is achieved.

- 
- 4** Verify that the cabinet door aligns properly when closed.

- 
- 5** Do not tighten the anchor bolts or nuts at this time.

END OF STEPS

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**Complete the installation of  
the AC feed-through  
coupling and tighten the  
anchor bolts or nuts**

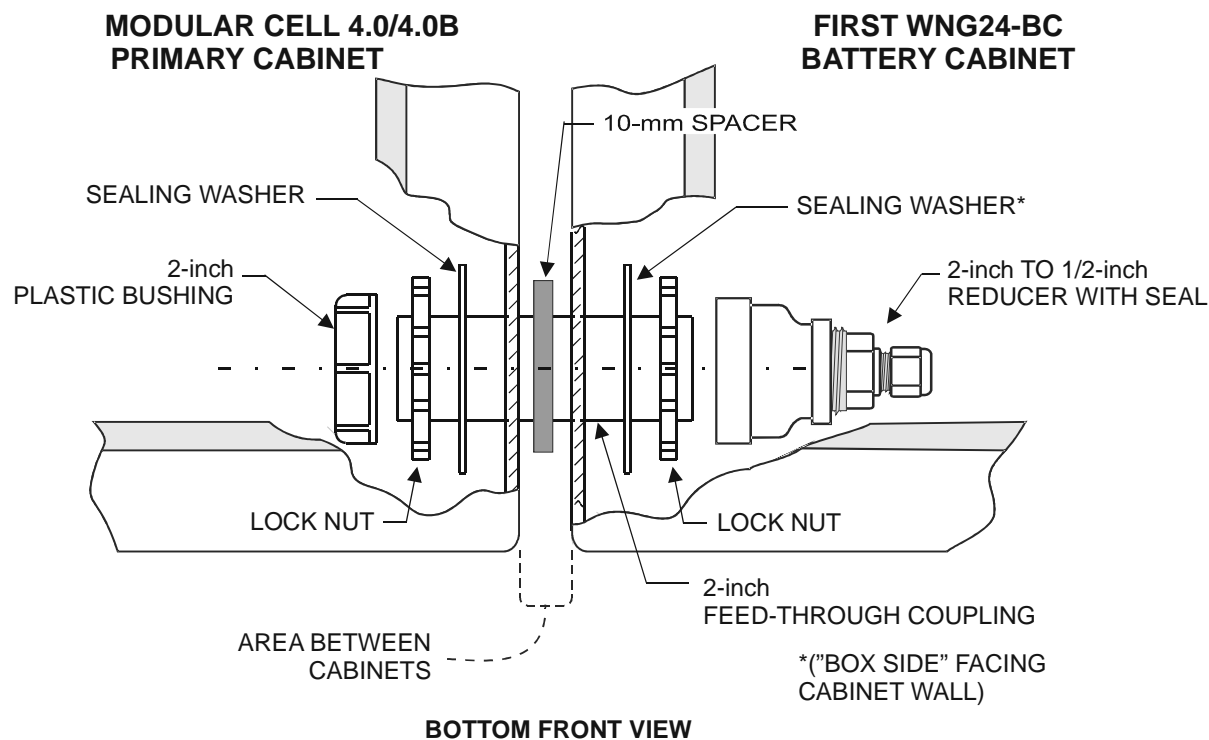
Refer to the figure below and perform the following steps to complete the installation of the AC feed-through coupling and tighten the anchor bolts or nuts.

- 1 Remove the temporary locknut from the AC coupling inside of the existing cabinet and fully install a sealing washer ("BOX SIDE" facing the cabinet wall) onto the AC coupling.

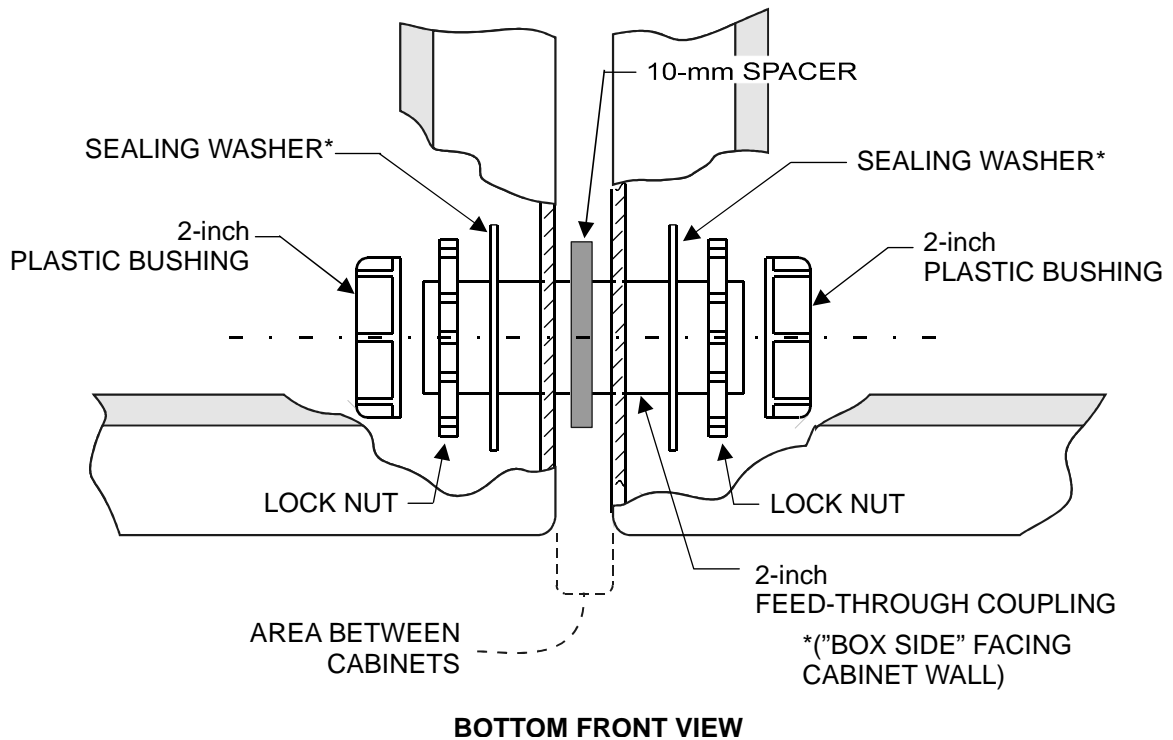
- 2 Replace and tighten the locknut and install a 2-inch plastic bushing on the end of the coupling.

**Important!** If installing a second battery cabinet, skip the next step.

- 3 If installing a first battery cabinet, tighten the locknut and assemble the 2-inch to 1/2-inch reducer on the coupling inside of the first WNG24-BC battery cabinet, as shown in the figure below.



- 4 Tighten the locknut inside of the second battery cabinet (if applicable), and install a 2-inch plastic bushing on the end of the coupling, as shown in the figure below.



**Important!** When performing the next step, do not seal the anchor holes in any way. In the event that water should collect, it must be allowed to drain out of the cabinet through the anchor holes.

- 5 Tighten the anchor bolts or nuts on both cabinets as follows.
  - On mounting bases: torque to 50 ft-lb (68 Nm)
  - Seismic zones 0, 1, and 2: Torque the bolts to 18 ft-lb (24 Nm).
  - Seismic zones 3 and 4: Torque the nuts to 58 ft-lb (79 Nm).Refer to the table on Page 2 - 29.
- 6 Proceed to Install the cabinet grounding cables on Page 2-65 to continue the installation.

## Placement and anchoring of a Flexent Modular Cell 4.0B dual band cabinet

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**Overview** This section provides the following instructions. The instructions assume that the primary cabinet, regardless of model, 1.0/2.0/3.0/4.0, or 4.0B, is already in place, and that if the primary cabinet is not a 4.0B, that Legacy first and second growth may already be in place.

1. Placement, anchoring and grounding of an outdoor Flexent Modular Cell 4.0B dual band cabinet in the G-1 position with a 4.0B primary cabinet
2. Placement, anchoring and grounding of a Flexent Modular Cell 4.0B dual band cabinet in the G-2 or G-3 position with Legacy previous cabinets.

For purposes of these instructions the cabinet to which the 4.0B dual band cabinet is to be attached will be referred to as the *previous* cabinet, regardless of model or position in the existing line-up.

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

<u>Prepare the previous Modular Cell cabinet for connection of a 4.0B dual band cabinet</u>	2 - 51
<u>Partially install the AC cable guide in the previous Modular Cell cabinet, if applicable</u>	2 - 53
<u>Prepare the 4.0B dual band cabinet for connection to the previous Modular Cell cabinet</u>	2 - 54
<u>Position the 4.0B dual band Modular Cell cabinet</u>	2 - 56
<u>Install anchoring bolts or anchor assemblies and level the 4.0B dual band cabinet</u>	2 - 58
<u>Finish the installation of the AC cable guide and tighten the anchor bolts</u>	2 - 60
<u>Attach the 4.0B dual band Modular Cell cabinet to the previous Modular Cell cabinet at the RF cable guide</u>	2 - 62