

EXHIBIT 3

Section 2.1033 (c)(3) INSTALLATION AND OPERATING INSTRUCTIONS

A copy of the installation and operating instructions to be furnished to the user. A draft copy of the instructions may be submitted if the actual document is not available. The actual document shall be furnished to the FCC when it becomes available.

Response

A copy of Alcatel-Lucent 9764 LightRadio™ Metro Cell Outdoor B13 LTE 2x5W Hardware Installation manual is attached to this exhibit.



Alcatel-Lucent 9764

lightRadio™ Metro Cell Outdoor V1.0 B13 LTE 2x5W

Hardware Installation

3MN-01651-0002-RJZZA

Issue 0.05 | January 2013

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About this document

Purpose

The purpose of this document is to provide hardware installation instructions for an Alcatel-Lucent Metro Cell Outdoor LTE 2x5W BC13 700 MHz.

Procedures are provided for mounting, grounding, powering, and cabling the Metro Cell.

Reason for reissue

The reissue reasons are:

Issue number	Issue Date	Reason for reissue
0.05	January 2013	Further updates
0.04	September 2012	Post GCD review
0.03	May 2012	Post mock install
0.02	May 2012	Post review
0.01	April 2012	Review

New in this release

This is a new document.

Intended audience

The audience for this document is Installation

personnel. Supported systems

This document applies to the Alcatel-Lucent 9764 lightRadioTM Metro Cell Outdoor 2x5W B13 LTE product.

How to use this document

Start with the first chapter and work through the manual to the end. Once you have done this, you will have carried out the hardware installation completely and in the proper sequence.

Prior to installing the cabinet, the installer should be familiar with the safety precautions, warnings, and product conformance statements. Required tools and materials recommended for installation, and a process checklist, are listed in topic “Pre-installation information”.

Safety information

For your safety, this document contains safety statements. Safety statements are given at points where risks of damage to personnel, equipment, and operation may exist. Failure to follow the directions in a safety statement may result in serious consequences.

Prerequisites

None

Conventions used

Vocabulary conventions

In this document, all parts are described as they are shipped. Metric parts are specified in metric units. Non-metric parts are specified in non-metric units.

Lengths and other measurements are given in metric units, with non-metric units given as equivalents for use in non-metric markets.

For manufactured parts, the following system of conventions is used:

- Metric sizes of nuts, bolts, flat washers, and lock washers are identified by an uppercase letter M followed immediately by a size in millimeters (example: M10)
- American fractional sizes of nuts, bolts, anchor bolts, and washers are identified by a number followed immediately by a double apostrophe (example: 3/8"). In the case of lengths measured in feet, “2 feet” is used rather than “2” so that the single apostrophe is not overlooked.

The illustrations in this document do not contain all details and exceptions, but are intended to highlight main points. Dimensions are usually shown in millimeters, with inches in parentheses. For example, 680.0 (26.77) equals 680 millimeters or 26.77 inches.

Wire gauges are specified in metric units. Equivalent sizes in the American Wire Gauge (AWG) system are given in the following table:

Standard cross-sections and wire diameter of round copper conductors

The following table is from CEI/IEC 60947-1:2004, *Table 1, Standard cross-sections of round copper conductors and approximate relationship between mm² and AWG/kcmil sizes* for reference. Additional wire sizes are included in this document as appropriate for the topic.

ISO rated cross-sectional area (mm ²)	AWG/kcmil size
0.2	24
0.34	22
0.5	20
0.75	18
1	-
1.5	16
2.5	14
4	12
6	10
10	8
16	6
25	4
35	2
-	1
50	0 (1/0)
70	00 (2/0)
95	000 (3/0)
-	0000 (4/0)
120	250 kcmil
150	300 kcmil
185	350 kcmil
-	400 kcmil
240	500 kcmil
300	600 kcmil
NOTE: The dash, when it appears, counts as a size when considering connecting capacity (see 7.1.7.2 in the standard).	

Typographical conventions

The following typographical conventions are used in this document:

Appearance	Description
<i>italicized text</i>	<ul style="list-style-type: none"> • File and directory names • Emphasized information
<i>IP reference</i> , reference number	Related document that is referenced in the document

Related information

For information on subjects related to the content of this document, refer to the documents listed in the following table:

Refer to this document	At this location	For more information on
Alcatel-Lucent Metro Cell Outdoor LTE 2x5W BC13 700 MHz - Site Preparation, 401-382-030	http://www.cic.lucent.com/	Site preparation
Standard for Installation of Lightning Protection Systems, NFPA		Lightning protection systems
Recommended Practices on Surge Voltages in Low Voltage AC Power Circuits, IEEE C62.41 (Latest Edition)		Power

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1 Safety statements

Overview

Purpose

This chapter provides general information on the structure of safety instructions and summarizes general safety requirements.

General safety and residual risk

The equipment has been developed in line with state-of-the-art technology and conforms with current national and international safety requirements.

The equipment is considered safe during normal operation when safe working practices are complied with. However, hazards may arise if procedures are not followed correctly or safe working practices are not complied with.

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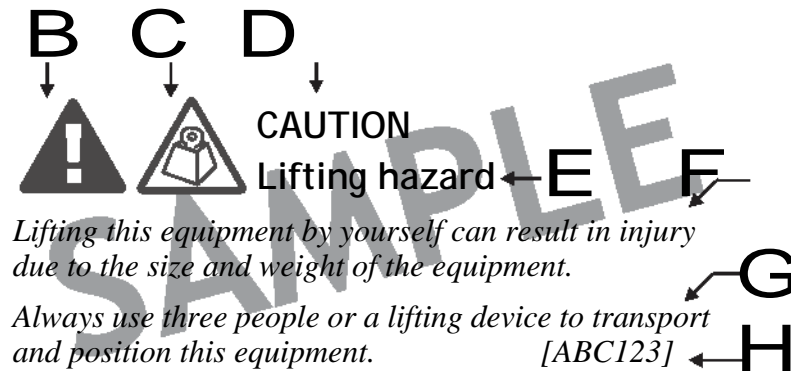
Structure of safety statements

Overview

This topic describes the components of safety statements that appear in this document.

General structure

Safety statements include the following structural elements:



Item	Structure element	Purpose
B	Safety alert symbol	Indicates the potential for personal injury (optional)
C	Safety symbol	Indicates hazard type (optional)
D	Signal word	Indicates the severity of the hazard
E	Hazard type	Describes the source of the risk of damage or injury
F	Safety message	Consequences if protective measures fail
G	Avoidance message	Protective measures to take to avoid the hazard
H	Identifier	The reference ID of the safety statement (optional)

Signal words

The signal words identify the hazard severity levels as follows:

Signal word	Meaning
DANGER	Indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazardous situation not related to personal injury.

Safety

General precautions for installation procedures



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.*
- *The equipment must be provided with a readily accessible disconnect device as part of site preparation.*
- *Grounding and circuit continuity is vital for safe operation of the equipment. Never operate the equipment with grounding/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 equipment.*
- *Before servicing, disconnect power input to reduce the risk of 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 equipment during a lightning storm or when conditions are wet.*
- *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 spill liquids of any kind on the product.*
- *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.*
- *for PERMANENTLY CONNECTED EQUIPMENT, a readily accessible disconnect device must be incorporated external to the equipment.*

Safety - specific hazards

**DANGER****Electric-shock hazard**

Working in severe weather can result in personal injury or death and damage to the equipment.

Never install or perform maintenance during severe weather (high winds, lightning, blizzards, hurricane etc.).

**DANGER****Noxious-substance hazard**

Use of unspecified cleaning agents can result in personal injury. Use only specified cleaning agents. Never use flammable solvents.

Always ensure there is adequate ventilation in the work area and wear the appropriate personal protective equipment.

**CAUTION****RF hazard**

RF exposure in excess of applicable limits can result in personal injury.

Metro Cells are designed and installed in order that they are compliant with the international exposure guidelines laid down by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

For all staff that are required to work in close proximity to the equipment, for example maintenance personnel, contact with the antenna should be avoided. No such persons shall stay in front of the product at a distance of less than 8 cm.

No other persons shall stay in front of the product at a distance of less than 22 cm.

**WARNING****Electric-shock 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 60215, A1 or EN 60215) may install or service the installation.

**WARNING****Electric-shock hazard**

The power supply lines to the network element are energized. Contact with parts carrying voltage can cause health problems, possibly including death, even hours after the event.

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

**WARNING****Electric-shock hazard**

This product may be connected to an AC main power supply and may contain an internal battery supply. Disconnecting one power source may not de-energize the system, and can lead to serious injury.

Disconnect and lock out the AC main power supply, if present, and the internal battery supply, if present, before servicing the equipment.

**CAUTION****Electric-shock hazard****DOUBLE POLE/NEUTRAL FUSING**

A fuse is used in the neutral of single-phase equipment either permanently connected or provided with a non-reversible plug. After operation of the fuse, parts of the equipment that remain energized might represent a hazard during servicing.

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

**CAUTION****Hot-surface hazard**

The surfaces of the MCO can become hot enough to cause burns on unprotected skin. On the product label, the universal symbol for Hot Surface (shown here) emphasizes this hazard.

Before handling the unit, wait until its surfaces have cooled and, where the following conditions apply, ensure that it is mounted out of the public's reach.

For installations in ambient temperatures exceeding 46° C, surface temperature may exceed 70° C. In these situations, this equipment is intended for installation where access is restricted to only qualified service personnel.



Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

NOTICE

Condensation

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 installation.

NOTICE

Tools

Tools left in the working area can cause short circuits during operation which can lead to the destruction of units.

Make sure after finishing your work that no tools, testing equipment, flashlights, etc., have been left in or on the equipment.

Product safety

Equipment safety

Safety information for this equipment can be found on various Caution, Warning, Danger, information labels or instructions affixed to or included with the product 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.

2 Product overview

Overview

Purpose

This chapter provides an overview of the Alcatel-Lucent lightRadio™ Metro Cell Outdoor 2x5W B13 LTE product.

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Functional description

General description

A Metro Cell is a public wireless access node that uses licensed spectrum with substantially lower coverage and serving a smaller number of users than Macro Cells. The Alcatel-Lucent 9764 lightRadio™ Metro Cell Outdoor 2x5W B13 LTE specified here supports 3GPP Band 13 (DL 746-756MHz, UL 777-787MHz).

The Metro Cell is for targeted for high user density locations where additional capacity is required or even in areas where increased wireless coverage is needed at short notice. The product can be deployed by mobile operators to provide a transparent outdoor capacity layer to complement the macro cell “umbrella” coverage layer.

Product features and attributes

The product capabilities in this release are:

- Supports Band 13 Upper C block (DL 746-756MHz; UL 777-787MHz)
 - Utilizes 115V or 220V AC
 - Supports 2x2 MIMO transmit/receive configurations (2 transmit and 2 receive streams)
 - Supports traffic backhauled through the standard IP network. The default backhaul connection from the Access Point is via one Gigabit Ethernet 1000Base-X (SFP module) port (optical or electrical)
 - Antenna configuration:
 - Omnidirectional antennas mounted directly onto transmit/receive connectors
 - Antenna cables mounted directly onto transmit/receive connectors for connection to remote antenna site.
- Utilizes GPS Synchronization
- Utilizes GPS Synchronization
 - Front access installation and service.

Installation options

The Metro Cell is designed to be used outdoors can be installed using the following options:

- pole mounted
- wall mounted
- floor mounted (via floor stand)

Physical description

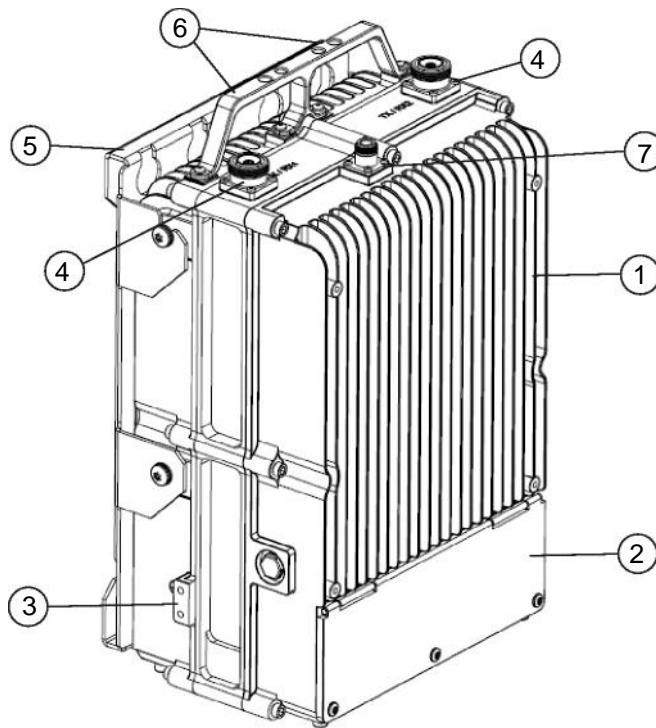
Product overview

The Metro Cell Outdoor is housed in a weatherized, rated Type 4 and/or IP65 outdoor, passively cooled enclosure containing the following active components:

- Backhaul/Digital/Radio board (DA Board)
- RF Filter
- Power board
- Power Amplifier board

The Metro Cell Outdoor 2x5W product is shown in the following figures:

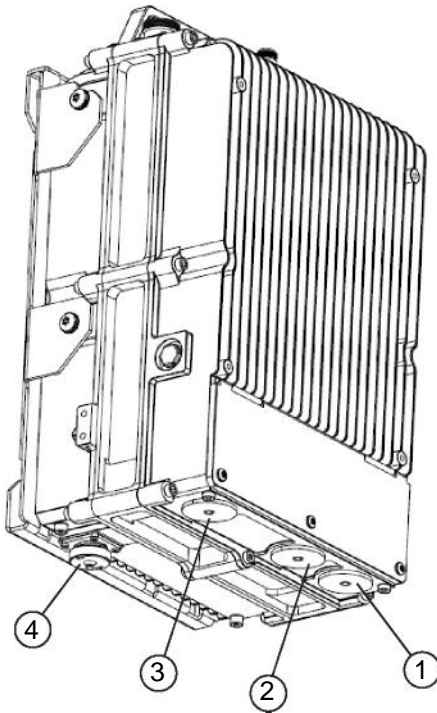
Figure 2-1 Metro Cell Outdoor (front/top view)



Legend:

1	Metro Cell Outdoor 2x5W	5	Metro Cell mounting bracket
2	Metro Cell connection panel	6	Metro Cell lifting points
3	Metro Cell Outdoor grounding point	7	GPS Antenna connector
4	RF Antenna connector(s)		

Figure 2-2 Metro Cell Outdoor (front/bottom view)



Legend:

1	Power and electrical ground cable <u>entry point</u>	3	Backhaul cable entry point (via Pflitch <u>grand</u>)
2	Backhaul cable entry point (via conduit)	4	Junction box cable entry point

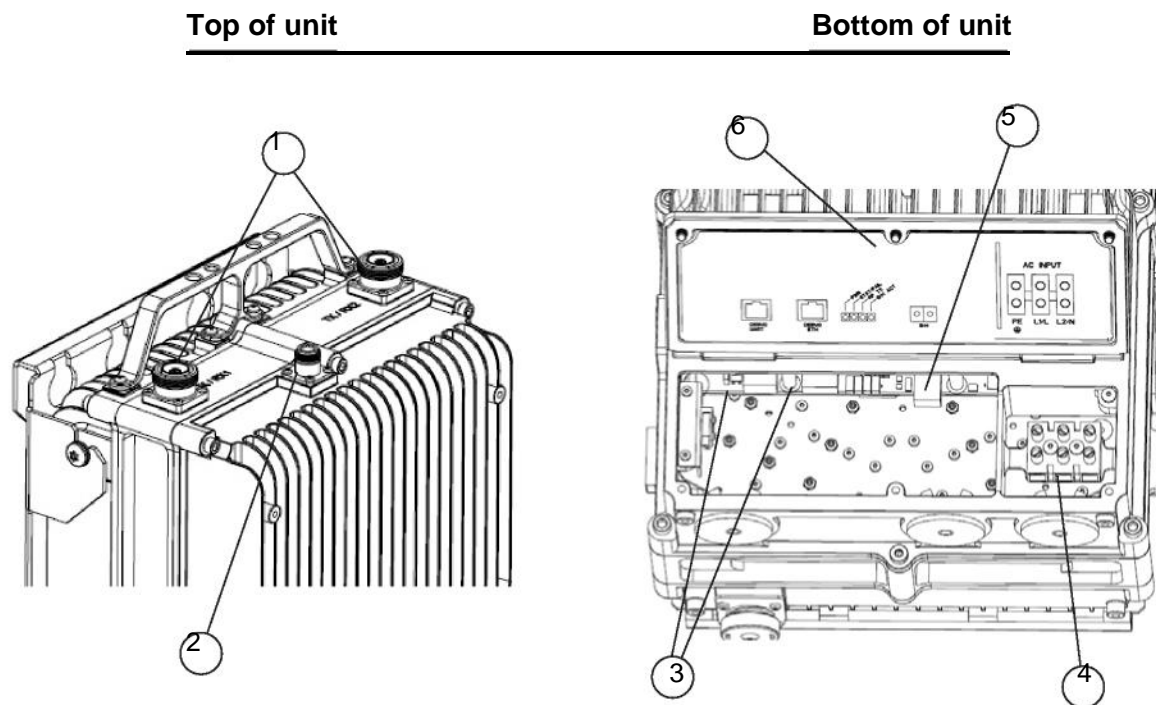
The physical dimensions of the Metro Cell Outdoor (excluding solar cover, antenna, and mounting hardware) are:

Dimension	Value
Height x Width x Depth	400mm x 270mm x 176mm (15.8 x 10.6 x 6.9 inches)
Volume	18L
Weight	18 kg (39.6 lbs).

Connection interfaces

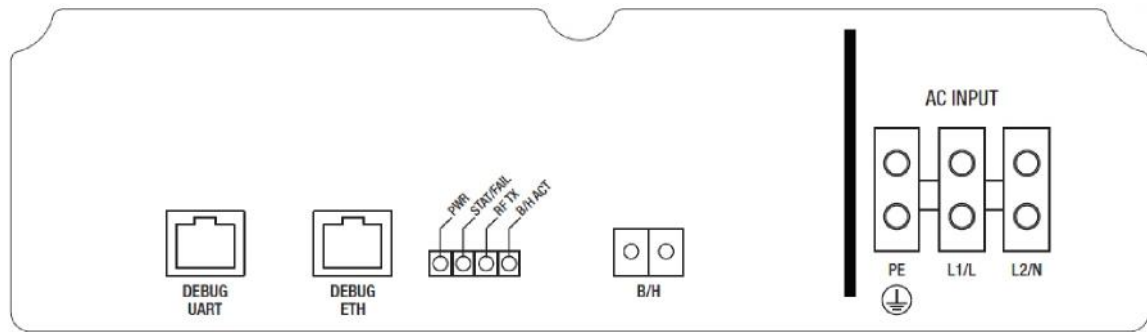
The following figure shows the connection interfaces for antenna, power and backhaul cabling on the Metro Cell Outdoor.

Figure 2-3 Metro Cell connection interfaces



Legend:

1	RF Antenna connectors (7/16" DIN male)	4	Power and grounding terminal block
2	GPS Antenna connector (N Type male)	5	SFP port supporting either: <ul style="list-style-type: none"> • 1000Base-X GigE optical transceiver • 10/100/1000Base-T electrical transceiver
3	RJ-45 connection points (Debug UART and Debug ETH)	6	Cable connection cover

Figure 2-4 Metro Cell connection cover label

Connectors provided are external and waterproof. They are also protected by surge and lightning arrestor.

Power supply

The Metro Cell requires 115 VAC or 220 VAC nominal (60 Hz, Single Phase).

The Metro Cell does not contain surge protection, therefore external surge protection is required. Surge protection requirements are:

- First level (no damage to equipment, no service interruption): +/-2KV, 1.2/50us; 1KA, 8/20us; 5 repetitions each polarity from Line to Neutral, Line to Ground, and Neutral to Ground
- Second level (no safety hazard): +/-6KV, 1.2/50us; 3KA, 8/20us; 1 repetition each polarity from Line to Neutral, Line to Ground, and Neutral to Ground

RF Antenna

The Metro Cell Outdoor has two external Rx/Tx antenna connectors (7/16" DIN male) located on the top the device allowing for the following antenna connection options:

- +2dBi Omnidirectional antennas mounted directly onto transmit/receive connectors
- Antenna cables mounted directly onto transmit/receive connectors for connection to remote antenna site.

GPS Antenna

The Metro Cell Outdoor has an external GPS antenna connector located on the top the device allowing for the GPS antenna connection options:

- GPS antenna mounted directly on the product
- GPS antenna cable connection for cabling to a remote GPS antenna site.

Debug interface

When the external connection interface cover is open a number of LEDs are available for debugging purposes.

LED	Label	Description	Color
LED1	PWR	Power	Green
LED2	STAT/FAIL	Fault	Red/Yellow/Green
LED3	RF TX	RF TX active	Red/Yellow/Green
LED4	B/H ACT	Backhaul active	Red/Yellow/Green

Additional LEDs for Ethernet connectivity status are available at the SFP and RJ-45 connectors.

Product labelling

A product label provides the following information:

- Model name
- Part number
- Serial number
- MAC address
- CE Approval marking
- Environmental marking (WEEE/ROHS) applicable to the device.

Product base items and configuration

The Metro Cell Outdoor product is delivered with the following base items:

- Metro Cell Outdoor 2x5W 700 MHz unit
- Wall mount bracket

Ancillary orderable items

In addition to the Metro Cell Outdoor base items the following ancillary and variable items can be ordered depending on the product configuration and deployment scenario:

- RF Antenna:
 - Directly mounted +2dBi Omnidirectional Antennas
 - RF Antenna cables for cabling to a remote antenna site
- GPS Antenna:
 - Directly mounted GPS Antenna with support brackets
 - GPS Antenna cable for cabling to a remote GPS Antenna site

-
- Pole mounting kit
 - Wall mounting kit
 - Floor mounting kit
 - Solar shield installation kit
 - “Pflitsch” cable gland kit

3 Installation

Overview

Purpose

This chapter provides general instructions for mounting and grounding the Metro Cell.

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Installation

Overview

Purpose

This sections contains instructions for mounting the Metro Cell.

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Pre-installation information

Product delivery contents

The following items are supplied with the Metro Cell:

- Wall mounting kit

Note: The wall mounting bracket, also referred as the main bracket, is required for all mounting options.

Variable parts and ancillary items

In addition to the standard delivered parts, the following variable and ancillary items are supplied as needed:

- RF Antennas:
 - Pair of directly mounted +2dBi omnidirectional antennas
 - RF antenna cables for cabling to a remote antenna site
 - External GPS antenna:
 - Directly mounted GPS Antenna with support brackets
 - GPS antenna cable for cabling to a remote GPS antenna site
- Pole mounting kit:
 - With pole band bracket for small diameter pole
 - With through pole bracket for large diameter pole
 - With back-to-back bracket for 50 mm diameter pole
- Solar shield installation kit
- “Pflitsch” cable gland kit

Installation tools required

The following tools may be used during installation:

Tool	Purpose
10 mm socket	Grounding bolts
14 mm socket	Unistrut mounting bolts
17 mm socket	Floor stand or pole mount bracket mounting bolts
Flat blade screwdriver	AC input terminal block
T20 Torx driver	AC input protective cover securing screw
T25 Torx driver	Mounting screws for faceplate cover solar shield and solar shield

Tool	Purpose
T25 secure Torx driver	I/O panel cover
T40 secure Torx driver	Metro to wall mount bracket securing screws
11/4" (33 mm) torque wrench	DIN 7/16 connector
3/4" torque wrench	N-type connector
RF jumper stripping tool	
PPC tool kit	
Level or plumb line	Ensuring the Metro Cell is level

Procedure 3-1: To mount the hardware to a wall

Purpose

This topic describes the procedures to be followed when installing the Metro Cell onto a solid concrete wall. The Metro Cell can be mounted either directly onto the wall, or indirectly using the Unistrut system.

Prerequisites

A site survey has been conducted and a location for the device has been selected that is both central to the public space and elevated, to maximize coverage.

Before installation begins, ensure that the following are in place:

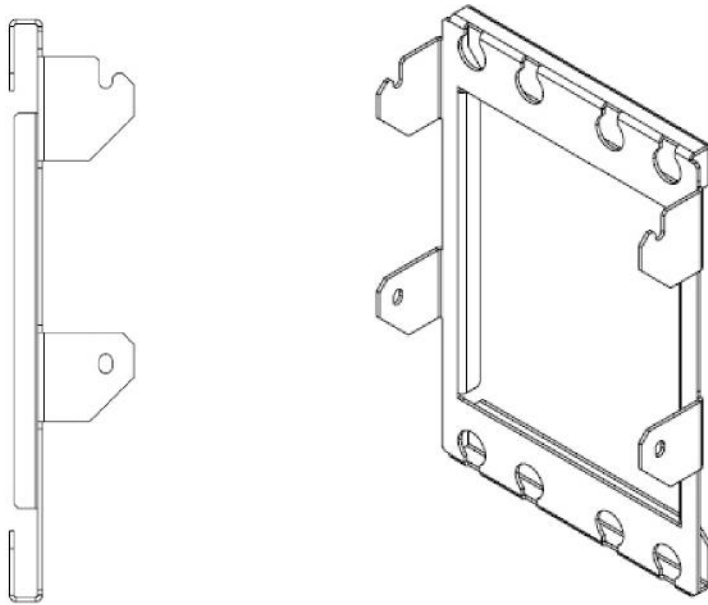
- Internet service is available for backhaul.
- The fiber optic Ethernet cable has been routed and is in place.
- The ground cable has been routed and is in place.
- Site specific fixing materials (screws, washers, wall plugs) are available for wall mounting the Metro Cell.
- 120-240 V AC power is available
- Anchors or Unistrut in place on the wall

Wall mount brackets

Various building materials and construction methods dictate that the Metro Cell must be fastened to the wall with appropriate mounting hardware. It is the responsibility of the customer to provide any necessary support material and structures to ensure that the installation will be in compliance with Building Officials and Code Administrators (BOCA), Uniform Building Code (UBC), and all local codes.

The following figure illustrates the wall mounting bracket (also referred to as the main bracket) that is required to mount the Metro Cell onto a wall:

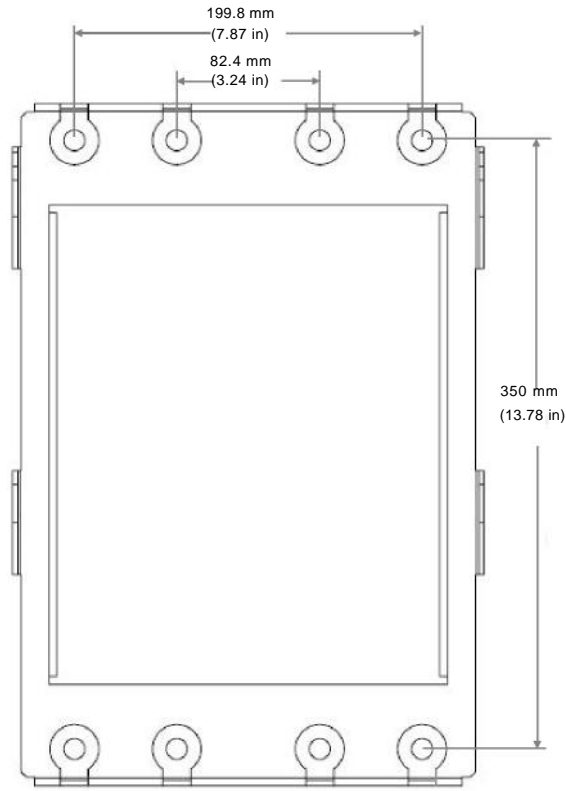
Figure 3-1 Wall mounting bracket (main bracket)



Wall mounting bracket hole pattern

The following graphic shows the wall mounting bracket hole pattern for the Metro Cell. The dimension shown are in millimeters and inches:

Figure 3-2 Wall mounting bracket hole pattern



Indirect wall mounting bracket (Unistrut)

You can mount the Metro Cell either directly onto a wall, or to a Unistrut wall mounting bracket. If a Unistrut wall mounting bracket is used, it must have been attached to the wall during site preparation.

The following figure shows the Unistrut wall mounting bracket:

Figure 3-3 Unistrut wall mounting bracket



Before you begin

Note: Record the 11 digit serial number before mounting the Metro Cell.

Install Metro Cell directly onto wall



Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

To mount the Metro Cell directly onto a wall or flat surface, perform the following steps:

- 1 Using the hole pattern of the wall bracket as a as a guide, ensure that the anchor locations are correct. See [Figure 3-2, “Wall mounting bracket hole pattern”](#) (p. 3-7).

Check the horizontal position with a spirit level.

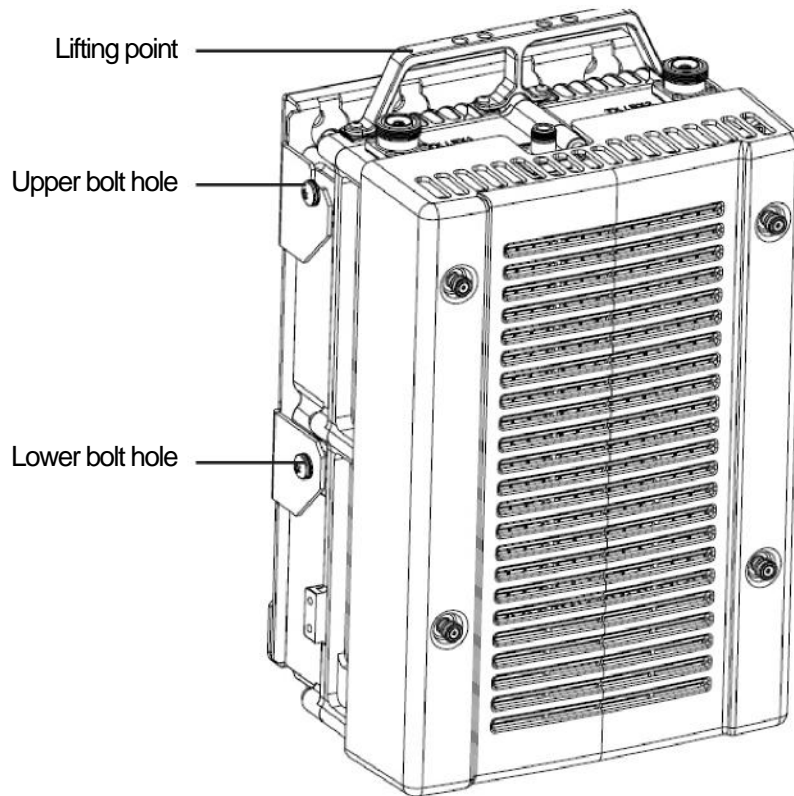
- 2 Attach the main bracket to the wall using appropriate screw fixings.

Note: Depending on the wall the device must be mounted to, different screw fixings might be needed. After site survey these mounting accessories must be procured locally.

- 3 Insert the appropriate screws into the upper two bolt holes of the Metro Cell, but do not tighten them.
-

- 4 Using the lifting point on the Metro Cell, align the bolt holes on the Metro Cell with the bolt holes in the main bracket. Do this by hanging the Metro Cell from the upper bolt holes in the main bracket, and then swing the Metro Cell down to align the lower bolt holes. The bolt holes are shown in the following figure:

Figure 3-4 Bolt holes and lifting point on the Metro Cell



Important! When lifting the Metro Cell, do not rest the bottom side on the ground.

5 Insert the appropriate screw fixings into the lower bolt holes and tighten all four screw fixings using a T40 secure Torx driver.

6 After mounting the Metro Cell to the wall, the cables must be connected. Continue with [Procedure 3-7: “Metro Cell cabling” \(p. 3-31\)](#).

END OF STEPS

Install Metro Cell onto Unistrut bracket



CAUTION

Personal Injury

The bolts on the Metro Cell can pinch and damage your fingers. Keep fingers clear when lowering the Metro Cell into position.

To mount the Metro Cell onto a Unistrut wall mounting bracket, perform the following procedure:

- 1 Attach the main bracket to the Unistrut bracket using four M10 (3/8 in) hex bolts with flatwasher, lockwasher and, springnut. Level and properly torque the bolts.
- 2 Loosely attach the two side top M10 hex bolts, flat washers, and lock washers to the Metro Cell as supplied with the wall mounting kit. Do not tighten yet. Tape the washers to the heads of the bolts.

Important! When lifting the Metro Cell, do not rest the bottom side on the ground.

- 3 Lift the Metro Cell into position. Position to the M10 hex bolts on the Metro Cell in the top mounting slots of the main bracket. Do not tighten the bolts yet.
- 4 Install the two bottom side M10 hex bolts, flat washers, and lock washers through the main bracket.
Remove tape from top hardware.
- 5 If necessary, level brackets to insure that the Metro Cell will be mounted level. Use a level to level the top of the Metro Cell.
- 6 Tighten all the M10 hex bolts and use a torque wrench to tighten all the nuts 32.2 Nm (25 ft-lb).

- 7 Install tamper-proof screws.

-
-
- 8** After mounting the Metro Cell to the Unistrut bracket, the cables must be connected.
Continue with [Procedure 3-7: “Metro Cell cabling” \(p. 3-31\)](#).

END OF STEPS

Pole mount installation overview

Overview

This section describes the procedures to be followed when installing the Metro Cell on a pole.

There are three types of pole mounting installation:

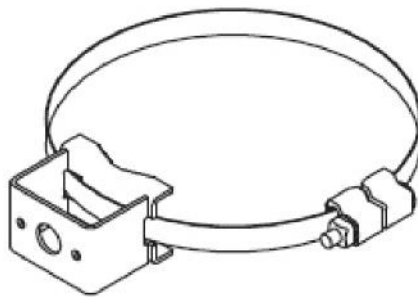
- Pole band brackets for small pole diameters
- Through pole brackets for large pole diameters
- Back to back mounting brackets for small pole diameters

Pole mounting brackets

This topic shows the types of brackets that can be used to mount a Metro Cell to a pole. **Pole band bracket**

For pole diameters from 50 mm to 152 mm, pole band brackets are required.

Figure 3-5 Pole band bracket

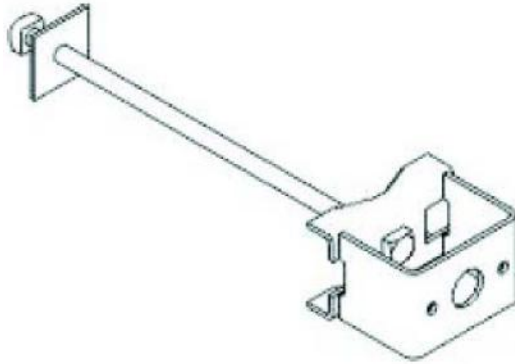


Pole band bracket

Through pole bracket

For pole diameters from 50 mm to 152 mm, through pole brackets are required.

Figure 3-6 Through pole bolt

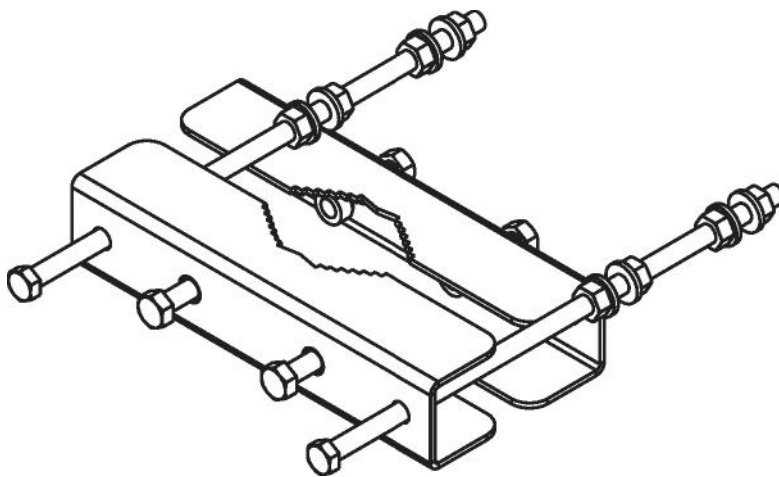


Through pole bracket

Back to back mounting brackets

For pole diameters from 50 mm to 152 mm, back to back mounting brackets can be used.

Figure 3-7 Back to back mounting bracket



Bact-to-back pole bracket

Procedure 3-2: To mount hardware to pole with pole bands

Purpose

This section describes the procedures to be followed when installing the Metro Cell on a 152 (6 in) mm to 380 mm (15 in) diameter pole with pole brackets.



Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

Before you begin

The following mounting hardware is required to mount up to the Metro Cell on a pole:

- Pole mounting bands (qty. 2)
- Pole brackets (qty. 2)
- Main bracket
- M10 bolts, lock washers, and flat washers (qty. 4).

Measure and mark pole and pole bands

Perform the following procedure to measure and mark the upper and lower pole band locations and the pole bands.

- 1** Use a tape measure to determine and mark the position of the upper and lower pole bands 350 mm (13.8 in) apart for Metro Cells. Refer to specific cell site engineering information for measurement details.

- 2** Measure the circumference (distance around the pole) at the heights of the bands to be installed.

- 3** Measure the distances you calculated in Step 2 on the pole bands from the fixed retainer extrusion.

- 4** Mark the bands at that point.

-
-
- 5 Use a nail and a chalked plumb line or plumb bob to mark a vertical line on the pole so that the upper and lower brackets will be aligned.

END OF STEPS

Place weldment(s) on pole bands

Perform the following procedure to place the pole weldment on the upper and lower pole bands.

-
- 1 Remove the sliding retainer extrusion from the pole bands.
-
- 2 Thread the weldment(s) onto the pole bands.
-
- 3 Replace the sliding retainer extrusion on each pole band so that the beveled ends of extrusion faces the open end of the band.

END OF STEPS

Bend the bands

Perform the following procedure to bend the upper and lower pole bands.

-
- 1 Bend the bands at the previously marked spot so that the pointed end of the band will be inside the band after installation.
-
- 2 Strike the bands with a hammer to create a sharp radius that allows the retainer to lock into place.
-
- 3 Make a 90 degree bend at the base of each retainer extrusion to allow the retainers and carriage bolt to properly align and lock into place.

END OF STEPS

Install pole bands on pole

Perform the following procedure to install the upper and lower pole bands on the pole.

- 1 Place the pole bands around the pole at the determined height.

- 2 Insert the carriage bolt through both retainers, making sure that the head of bolt properly locks into the fixed retainer.

- 3 Install the nut and tighten it just enough so that the band and weldment(s) maintain their position on the pole. Do not fully tighten the nut.

- 4 Adjust the position of the weldment(s) so that they are centered on the horizontal and vertical lines marked on the pole. Use a level or plumb line to verify that the weldment(s) are level.

- 5 Adjust the bands so that they are snug and do not slide down pole (the bands may need adjustment when attaching the main bracket).

- 6 Attach main bracket using four M10 hex bolts, lockwasher, and flatwasher. Use a level or plumb line to verify that the brackets are level.

- 7 Torque each bolt 32.2 Nm (25 ft lb.).

- 8 Fully tighten each band.

END OF STEPS

Procedure 3-3: To mount hardware to pole with through pole bolts

Purpose

This section describes the procedures to follow when installing the Metro Cell on a pole with M16 (5/8 in) through bolts.

Mounted bracket

The following graphic shows a pair of through pole brackets mounted on a wooden pole:

Figure 3-8 Through pole brackets mounted on a wooden pole





Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

Before you begin

The following mounting hardware is required to mount the Metro Cell on a pole using through pole bolts:

- 16 mm (5/8 inch) through bolts with nuts (qty. 2)
- Pole weldment (qty. 2)
- Main bracket
- M10 bolts, lock washers, and flat washers (qty. 4)
- Curved washers (qty. 2).

Measure and mark pole and attach weldments

Perform the following procedure to measure and mark the upper and lower through bolt locations and attach weldments.

- 1** Use a tape measure to determine and mark the position of the upper and lower through bolts on the pole. Refer to specific cell site engineering information for measurement details.
- 2** Mark and drill two 19 mm (0.75 in) holes at a distance of 540 mm (21.26 in) apart.
Job aid Use a nail and a chalked plumb line or plumb bob to mark a vertical line on the pole so that the upper and lower weldments will be aligned.
- 3** Line up the upper pole weldment and insert a M16 (5/8) through bolt with washer through the center hole and loosely attach to pole at the other end, using M16 (5/8") curved washer and hex nut.
- 4** Repeat previous step for the lower bracket.
- 5** Pre-install four M10 hex bolts, lock washers and flat washers.

Important! Do not tighten yet. The main bracket of the Metro Cell will need to be hung on these four bolts.

END OF STEPS

How to continue

Continue hardware installation with the installation of the Metro Cell on the pole weldment assemblies: [Procedure 3-5: “To install the Metro Cell on pole weldment assemblies”](#) (p. 3-24)

Procedure 3-4: To mount hardware to pole with back-to-back pole brackets

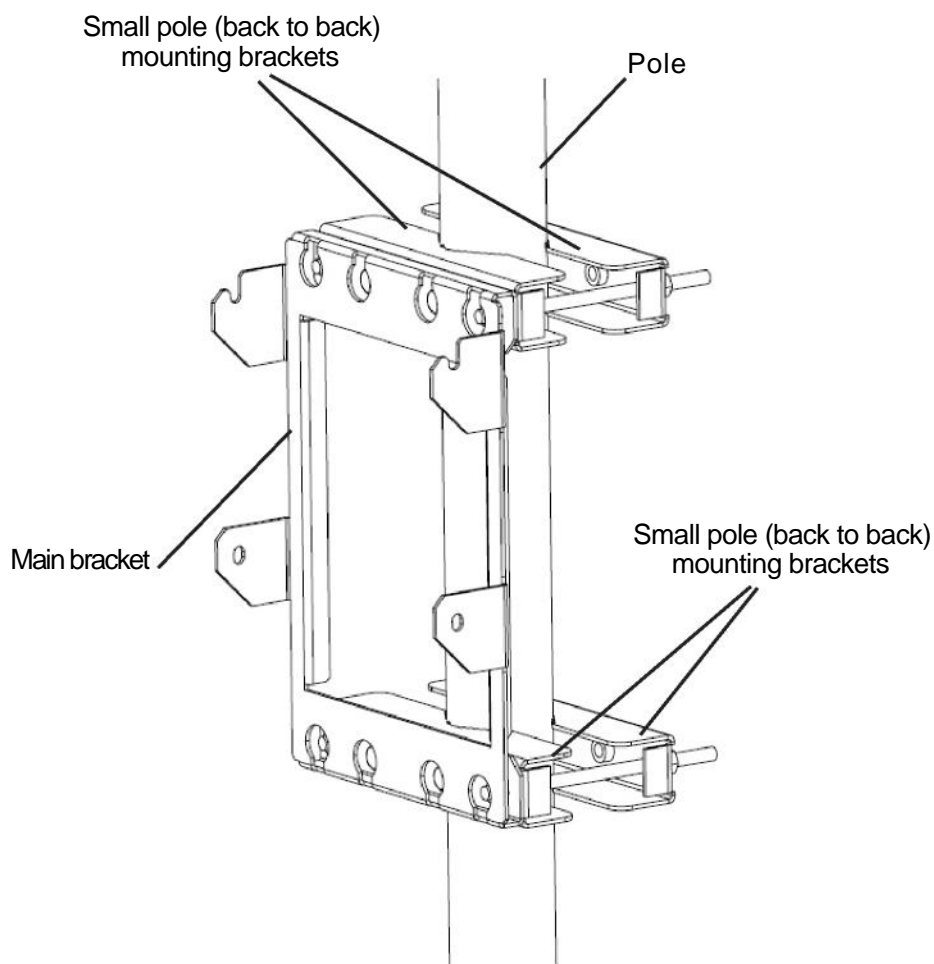
Purpose

This section describes the procedures to be followed when installing the Metro Cell on a 50 mm (2 in) to 152 mm (6 in) diameter pole with back-to-back pole brackets.

Mounted bracket

The following graphic shows a pair of back-to-back pole brackets mounted on a pole:

Figure 3-9 Back-to-back pole brackets mounted on a pole





WARNING

Fall hazard

Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

Before you begin

The following mounting hardware is required to mount up to the Metro Cell on a small diameter pole:

- Pole mounting brackets (qty. 2x2)
- 300 mm M10 hex nut bolts (qty. 4)
- 80 mm M10 hex nut bolts (qty. 4)
- Lock washers (qty. 12), flat washers (qty. 12), for M10 bolts
- M10 nuts (qty. 4)
- Main bracket

Measure and mark pole and attach pole brackets

1 Use a tape measure to determine and mark the position of the upper pole bracket.

2 Attach the upper pole bracket to the main bracket using two 80 mm long M10 hex bolts, lock washers, flat washers. Insert bolts through inner holes of the main bracket.

Repeat for the lower pole bracket.

3 Insert a 300 mm M10 hex bolt, equipped with lock washer and flat washer, through the upper left-most hole in the bracket, through the attached pole bracket.

4 Insert opposite bracket over threaded portion of the 300 mm bolt, and secure with flat washer, lockwasher, and hex nut.

5 Adjust to estimated pole diameter.

6 Lift the subassembly to the marked height.

7 Insert 300 mm long, M10 hex bolt, lock washer, and flat washer through the right- most upper hole in main bracket, through the attached pole bracket and the opposite bracket, and secure with lock washer, flat washer and hex nut.

8 Equally tighten all bolts.

9 Install opposite end of lower pole bracket using 300 mm, M10 long hex bolts, lock washers, and flat washers.

10 Equally tighten all bolts.

END OF STEPS

How to continue

Continue hardware installation with the installation of the Metro Cell: [Procedure 3-5: “To install the Metro Cell on pole weldment assemblies” \(p. 3-24\)](#)

Procedure 3-5: To install the Metro Cell on pole weldment assemblies

Purpose

This section describes the procedures to be followed when installing the Metro Cell to pole weldment assemblies.



Falls can occur when working at heights resulting in serious personal injury or death.

To prevent a fall when working at heights (ladder, scaffold, manlift, roof etc.) follow safe work practices and wear appropriate fall protection equipment.

Before you begin

Site preparation activities must have been completed.

Install Metro Cell on pole weldment assemblies

Perform the following procedure to install the Metro Cell on the mounting hardware.

1 Carefully raise the Metro Cell into position.

2 Loosely attach the two side top M10 hex bolts, flat washers, and lock washers to the Metro Cell as supplied with the wall mounting kit. Do not tighten yet, install only halfway. Tape the washers to the bolts.

Note: When lifting the Metro Cell, do not rest the bottom side of the Metro Cell on the ground.

3 At the upper corners of the Metro Cell, pull the washers to the sides. Position the M10 hex bolts on the Metro Cell in the top mounting slots of the bracket.

4 Install the two bottom side M10 hex bolts, flat washers, and lock washers through the wall mount bracket.

Remove tape from top hardware.

5 If necessary, level brackets to insure that the Metro Cell will be mounted level. Use a spirit level to level the top of the Metro Cell.

6 Tighten all the M10 hex bolts and use a torque wrench to tighten all the nuts to 32.2 Nm (25 ft/lb).

7 Install tamper proof screws.

END OF STEPS

Procedure 3-6: To mount the hardware to a floor stand

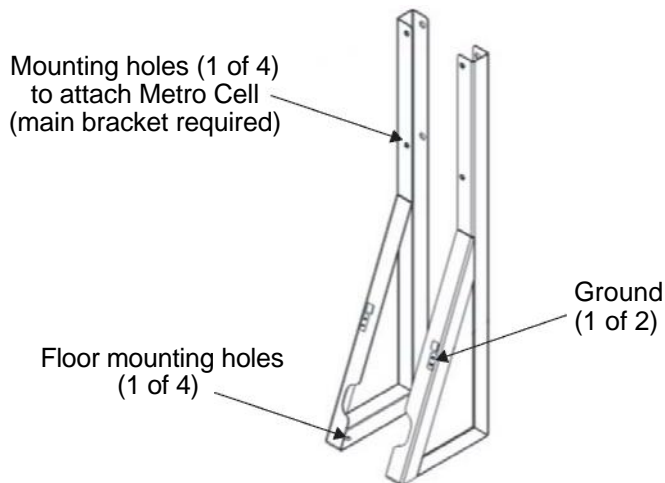
Purpose

This topic describes the procedures to install the Metro Cell onto a floor stand.

Floor stand

The following figure shows the floor stand and the positions of the mounting holes.

Figure 3-10 Floor stand and mounting holes



Prerequisites

A site survey has been conducted and a location for the device has been selected that is both central to the public space and elevated in order to maximize coverage.

Before installation begins, ensure that the following are in place:

- Internet service is available.
- The Ethernet cable has been routed and is in place.
- The ground cable has been routed and is in place.
- Site specific fixing materials (screws, washers) for mounting the Metro Cell.
- Anchor holes for the floor stand have been prepared.
- A main bracket is available to attach the Metro Cell to the floor stand.

Before you begin

Note: Record the 11 digit serial number before mounting the Metro Cell.

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Fix the floor stand to the floor

If the floor stand has not already fixed to the floor at the selected installation location, perform the following steps to fix the floor stand to the floor:

- 1 Center the floor stand over the drilled anchor holes.
- 2 Set and torque the anchor bolts.

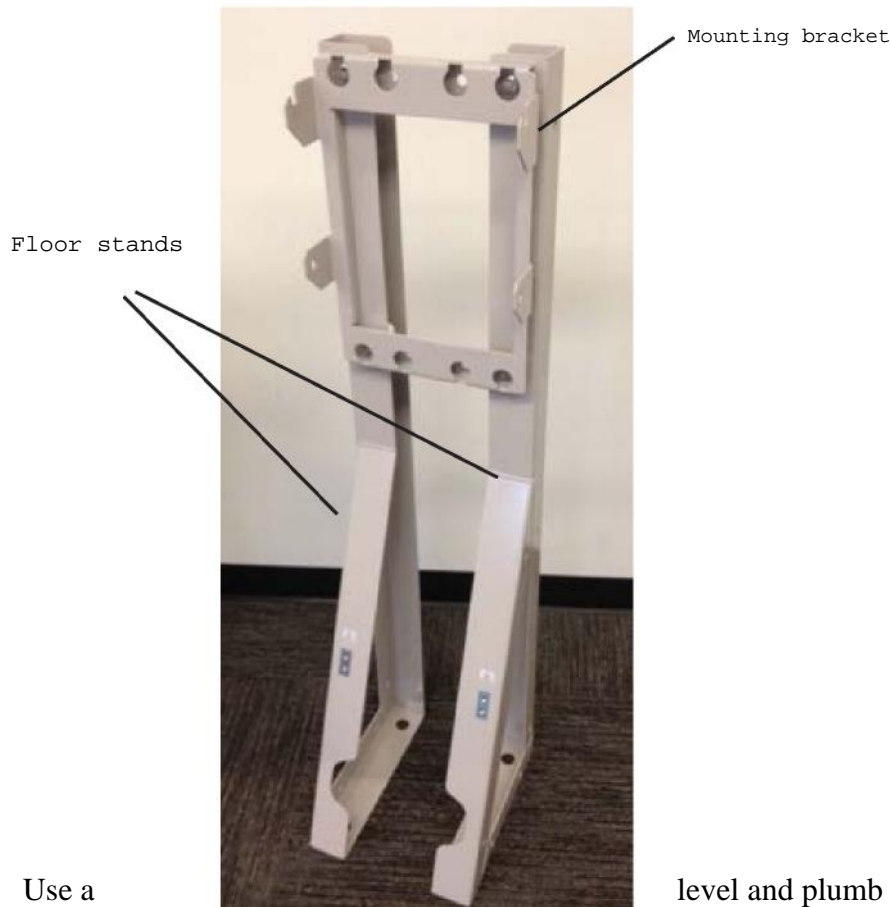
END OF STEPS

Mount the Metro Cell onto the floor stand

To mount the Metro Cell onto a floor stand perform the following steps:

- 1 Attach the main bracket to the floor stand using M10 or 3/8 inch bolts, as shown in the following figure:

Figure 3-11 Floor stand with main bracket attached



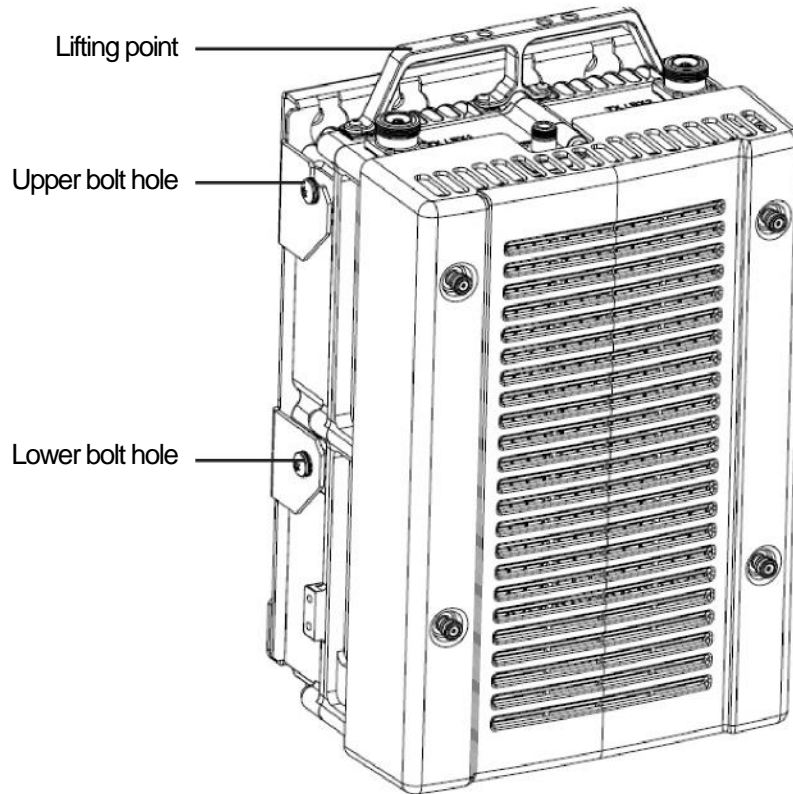
Use a
using a 17 mm socket wrench.

level and plumb line to verify that the
bracket is level. Tighten the bolts

2 Insert the appropriate screws into the upper two bolt holes of the Metro Cell, but do not tighten them.

3 Using the lifting point on the Metro Cell, align the bolt holes on the Metro Cell with the bolt holes in the main bracket. Do this by hanging the Metro Cell from the upper bolt holes in the main bracket, and then swing the Metro Cell down to align the lower bolt holes, as shown in the following figure:

Figure 3-12 Lifting point and bolt holes on Metro Cell



Important! When lifting the Metro Cell, do not rest the bottom side on the ground.

4 Insert the appropriate screw fixings into the lower bolt holes and tighten all four screw fixing using a T40 secure Torx driver.

5 After mounting the Metro Cell to the floor stand, the cables must be connected. Continue with [Procedure 3-7: “Metro Cell cabling”](#) (p. 3-31).

END OF STEPS

Cabling

Overview

Purpose

This section contains instructions for connecting cables to the Metro Cell.

Contents

Procedure 3-7: Metro Cell cabling	3-31
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Procedure 3-7: Metro Cell cabling

Purpose

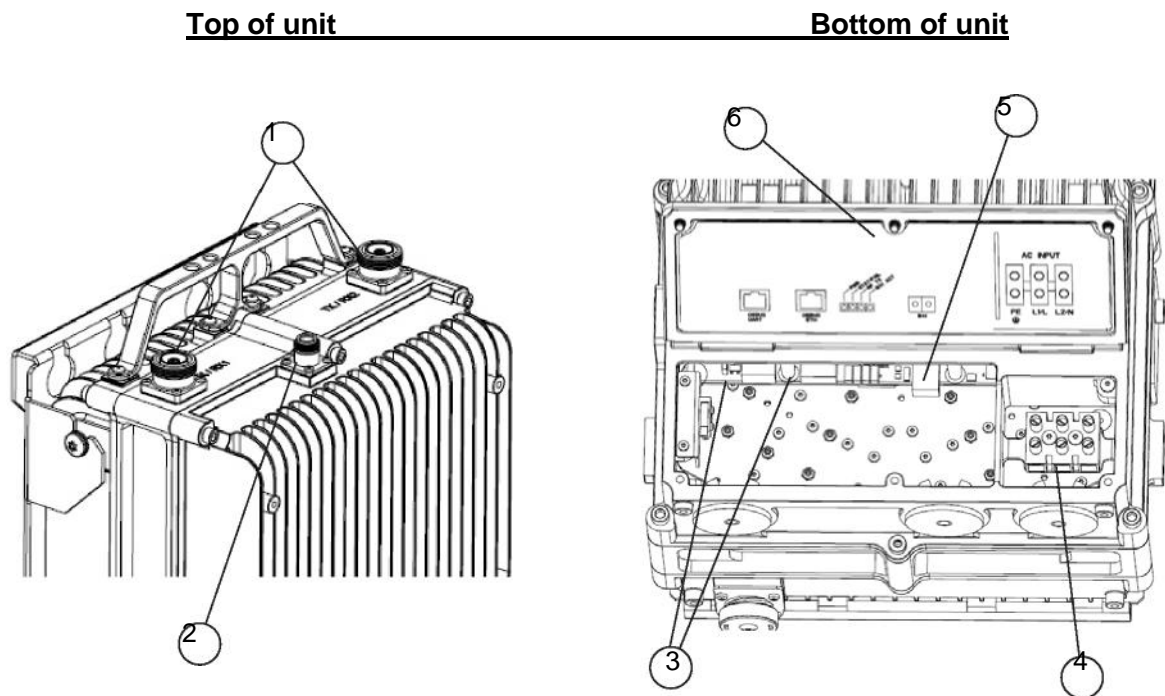
This topic describes the procedures to be followed when connecting the following cables to the Metro Cell:

- Ground
- RF cables for connection to remote omnidirectional antennas
- RF cable for connection to remote assisted GPS (A-GPS) antenna
- Optical fiber Ethernet backhaul
- AC power

Connections

The following figure shows the connection interfaces of the Metro Cell:

Figure 3-13 Connection interfaces



Before you begin

Ensure the following:

- All site preparation activities for cabling have been completed.
- All installation procedures for the Metro Cell have been completed.

Connect the ground cable

Note: The Metro Cell must be grounded with a 16 mm² ground cable (Type NYY-1x16 mm² or similar) to a grounding system.

The grounding cable is not included in the delivery and must be locally supplied.

To attach the ground cable perform the following steps:

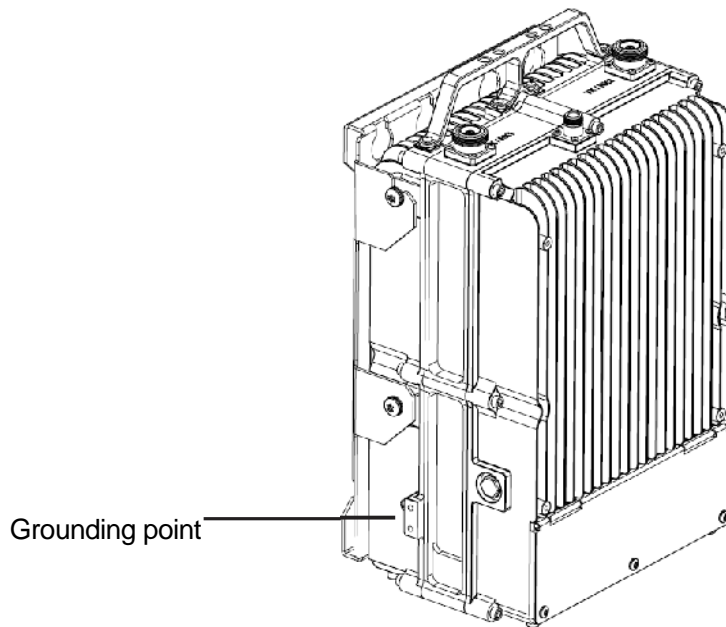
1 Route the ground cable from the ground system to the Metro Cell.

2 At the Metro Cell cut the cable to a proper length, strip the cable end and crimp a ground lug, with a hole suitable for an M6 screw, on the end of the cable.

Clean the contact surface area and use antioxidant to avoid oxidation.

3 Connect the ground lug to the grounding point on the Metro Cell using the supplied M6 screws, lock washers, and flat washers. Use antioxidant at the grounding pads.

Figure 3-14 Position of grounding point



4 Finally, secure the grounding cable to the wall, pole or floor stand.

END OF STEPS

Connect the omnidirectional antennas

To attach the omnidirectional antennas perform the following steps:

1

If...	Then...
You wish to mount the antennas directly onto the Metro Cell	Connect the pair of omnidirectional antennas to the 7/16 DIN external RF antenna connectors on the top of the Metro Cell.
You wish to connect antennas at a remote site to the Metro Cell using a cable	Connect the antenna cables to the 7/16 DIN external RF antenna connectors on the top of the Metro Cell.

Important! Alcatel-Lucent recommends that the antenna connection nuts are torqued to between 0.7 Nm (0.516 lb-ft) minimum and 1.1 Nm (0.811 lb-ft) maximum, to avoid loose connections.

Note: Antenna connectors are at least IP 67 rated, therefore no additional weatherproofing of the connectors is required if these are torqued to the recommended value. However, if additional waterproof protection is thought necessary, then PIB (self-amalgamating) tape can be applied to the connector joint and then overlaid with 3M Super 33+ vinyl tape (for UV protection).

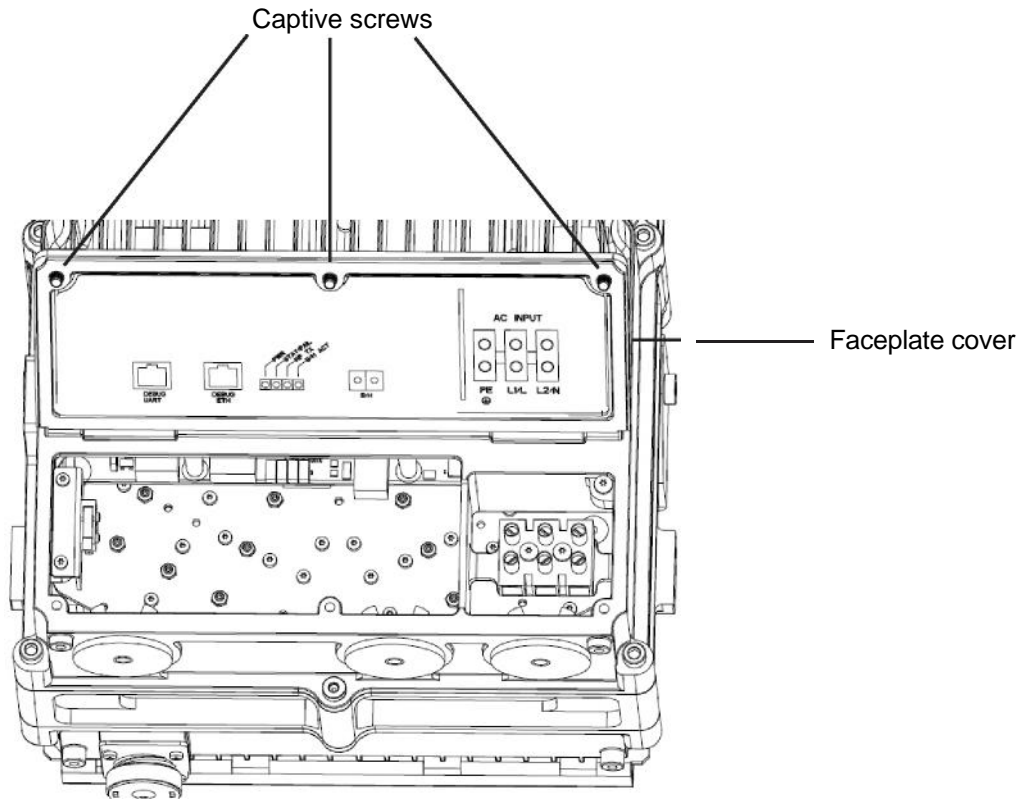
END OF STEPS

Open faceplate cover

Perform the following steps to open the cable connection cover (faceplate cover):

- 1 Unscrew the three captive screws on the lower edge of the faceplate. Then swing the faceplate cover up.

Figure 3-15 Faceplate cover



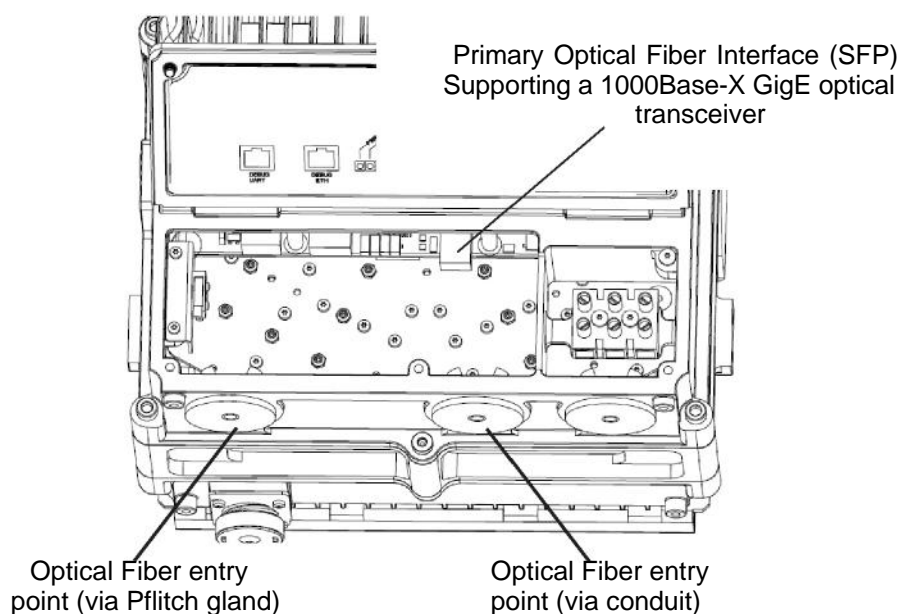
END OF STEPS

Connect the Ethernet cable

To attach the Ethernet cable, perform the following steps:

- 1 Route the supplied Ethernet cable from the Metro Cell to the router. The maximum length of the Metro Cell copper backhaul cable is 100 m.
- 2 To connect an optical fiber Ethernet cable to the Metro Cell, attach the connector at the end of the cable to the optical Ethernet SFP connector on the bottom of the Metro Cell as shown in the following figure:

Figure 3-16 Position of optical fiber entry point



- 3 To connect a copper backhaul cable to the Metro Cell, cut the cable to the required length and crimp the supplied RJ45 connector onto the end of the cable. Then plug the RJ45 connector at the end of the Ethernet cable into the RJ45 connector on the bottom of the Metro Cell.
- 4 Finally, secure the Ethernet cable to the wall, pole or floor stand.

END OF STEPS

A-GPS antenna cable connection

The Metro Cell has Assisted GPS (A-GPS) capability for localization of the unit. One Type N connector is provided for the connection of an external A-GPS antenna.

To attach the A-GPS antenna, perform the following steps:

1

If...	Then...
You wish to mount the antenna directly onto the Metro Cell	Connect the A-GPS antenna to the Type N connector on the top of the Metro Cell.
You wish to connect an antenna at a remote site to the Metro Cell using a cable	Connect the A-GPS cable to the Type N connector on the top of the Metro Cell.

END OF STEPS

Power supply

Power is supplied to the Metro Cell using 120/220 V AC. The power cable is routed through a 1 inch conduit.

To attach the AC power cable perform the following steps:

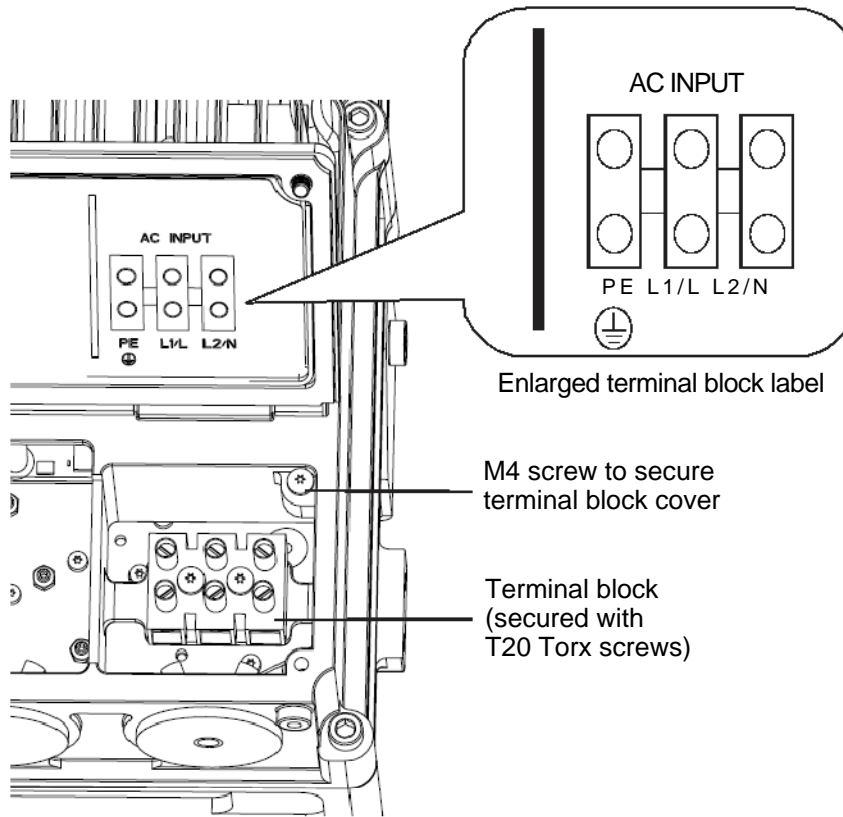
1 Remove the plastic cover from the terminal block by unscrewing the M4 screw in the top right corner of the plastic cover.

2 Route the power cable through the conduit.

3 Connect the conduit to the cabinet and tighten the conduit fittings.

4 Connect the AC power cable to the terminal block on the bottom right of the Metro Cell.

Figure 3-17 Terminal block



The following table shows the connections on the terminal block to use for different AC voltages.

Voltage	L1?L	L2/N
120	L	N
220	L1	L2

- 5 Replace the plastic cover over the terminal block and fix it in place using the M4 screw in the top right corner of the plastic cover.

END OF STEPS

How to continue

After the antenna and cable connections have been completed, continue with [“Post-installation activities” \(p. 3-39\)](#).

Post-installation activities

Overview

Purpose

This section contains instructions for the post-installation activities and checks.

Contents

Procedure 3-8: Close faceplate cover	3-40
Procedure 3-9: Install the solar shield	3-41
Procedure 3-10: Post installation activities and checks	3-42

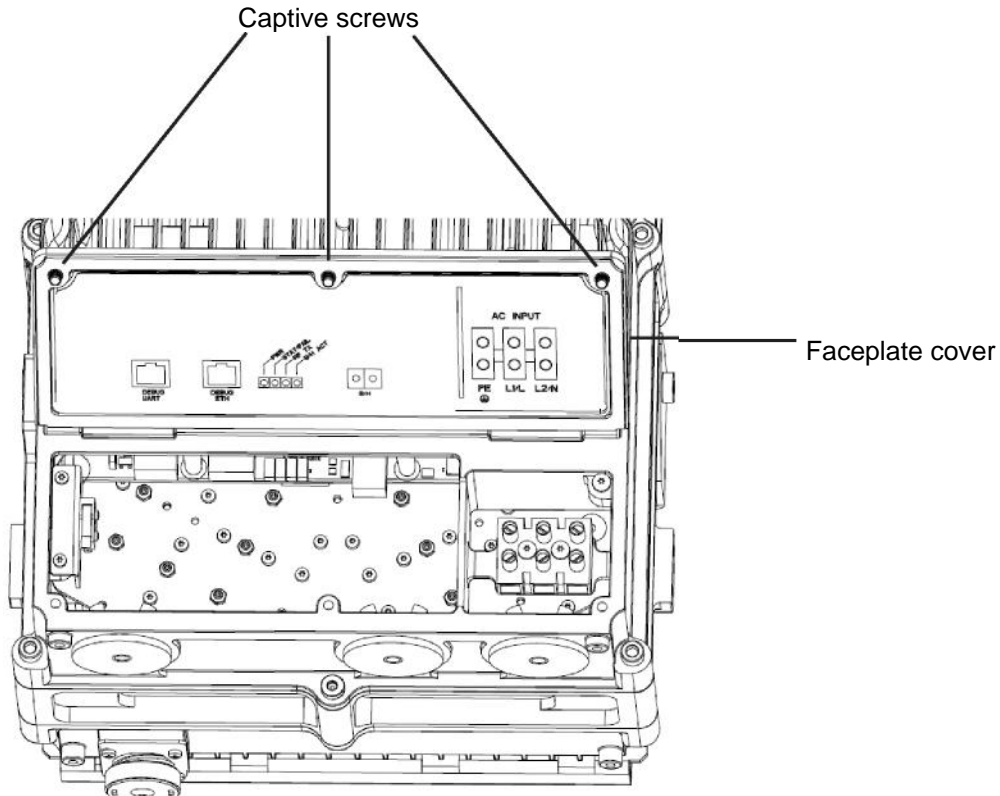
Procedure 3-8: Close faceplate cover

Close faceplate

Once the Metro Cell is installed, perform the following steps to close the cable connection cover (faceplate cover):

-
- 1 Check all cable connections are secure and correctly routed.
-
- 2 Swing the faceplate cover down, then screw the faceplate to the Metro Cell using a T25 secure Torx driver to tighten the three captive screws on the lower edge of the faceplate. Torque to 1.5 Nm (13 lb in).

Figure 3-18 Faceplate cover



END OF STEPS

Procedure 3-9: Install the solar shield

Overview

A solar shield may be needed if a Metro Cell is used outdoors. This topic provides all necessary information and procedural instructions to install the optional solar shield onto a Metro Cell.

A torque driver (1.5 Nm) with Torx T20 bit is required to complete the installation.

Install the solar shield

Perform the following steps to install the solar shield onto a Metro Cell:

-
- 1 Locate the solar shield on the front of the Metro Cell and align the four captive screws the solar shield with the screw holes on the front of the Metro Cell.

Figure 3-19 Solar shield



-
- 2 Secure the solar shield onto the Metro Cell using the captive screws. Use a T25 Torx driver to tighten them.

END OF STEPS

Procedure 3-10: Post installation activities and checks

Final installation checks

Before leaving the installation site, check the following:

-
- 1 Secure all cables along their routes.

 - 2 Verify that all the exterior conduit and cable connections are secure.

 - 3 Inspect the site for loose tools, materials, and parts. Remove all such loose tools, materials, and parts.

END OF STEPS
