

Cable Descriptions

Overview

This chapter provides the descriptions of the site cabling.

Procedures for routing cables (through metallic or conductive conduit) to the outdoor equipment are found in [Chapter 4 Access Point Hardware Installation](#).



NOTE

Cabling is one of the most noticeable aspects of workmanship. Straight runs and proper turns are critical for a positive evaluation of the work.

Configurations Supported

This chapter supports cable installation for 3 and 4 sector configurations.

Cable Installation Order

1. Ground Cabling
2. Power Cabling
3. Antenna Cabling
4. RGPS or RF GPS Cabling
5. Ethernet Cabling
6. Fiber Optic Cabling
7. Customer Defined Input/Output Cabling

Cable Labels

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Cable Descriptions and Part Numbers

Table 3-1 gives the cable descriptions and part numbers of the various cables that will connect to the Base Control Unit (BCU) and RF head.

Table 3-1 Cable Description and Part Numbers

Cable	Qty	Part Number	Description
A	2	Customer Supplied	Ground cable, 6 AWG or larger, insulated copper wire. Requires one two-hole lug connectors.
B	2-8	3089492T02	Antenna Cable, 300 mm (1 ft.)
C	1	T472AA	RGPS cable, 15 m (50 ft.)
		T472AB	RGPS cable, 38 m (125 ft.)
		T472AC	RGPS cable, 76 m (250 ft.)
		T472AD	RGPS cable, 152 m (500 ft.)
		T472AE	RGPS cable, 304 m (1000 ft.)
		T472AF	RGPS cable, 608 m (2000 ft.)
C1	1	SGKN4386	Punch block to CBIO Board, 15 pin D-connector on one end and loose wires on the other end. Cable is Motorola P/N 3086433H12.
D	1	SGRG4030A CGDSGPSKITF4NM50	Assembly, Receiver, GPS, RF Module Antenna, GPS, with mounting and 50 ft. cable.
E	2	Customer Supplied	AC Power Cable, 10 AWG, copper
F	1	SGLN6414A	Assembly, Installation, Installation HDW Pkg BCU
G	1-4	3089298C01 — 05	RF Head DC Power Cable
H	1-4	3089843T01 —05	Fiber Optic Cable
J	6	Customer Supplied	Ethernet cables, RJ-45 connectors, straight
K	1	SGRG4030A CGDSGPSKITF 4NM50	Assembly, Receiver, GPS, RF Module Antenna, GPS, with mounting and 50 ft. cable.

Cable Lengths

Table 3-2 Cable Length Requirements

From	To	Cable Designation	Cable length
BCU DC Source	RF Head DC Connector	G	5 lengths, 20 to 100 m in 20 m increments (65.6 to 328 ft)
BCU RF Connector	RF Head RF Connector	B	300 mm (1 ft)
AC Source	BCU Customer Interface Compartment	E	Length as required.
Customer Output Source	BCU Customer Interface Compartment	F	Length as required.

Earth Ground and Power Cables

The objective of this procedure is to install the power and earth ground cabling for the Base Control Unit (BCU) and RF Head.

Grounding Considerations

Above Ground For ground rings and the interconnection of internal and external ground rings, #2 to #6 AWG may be used. For grounding of equipment and miscellaneous metallic objects, #6 AWG minimum is required.

Exceptions Connection from an isolated ground bar (IGB) to master ground bar (MGB) is accomplished using #2 to #6 AWG. The external ground bar (EGB) is grounded through a 2-inch wide, 16-gauge copper strap, if available; otherwise, 2-#6 AWG wires can be used. If the #6 AWG wires are used, then they must be connected at opposite ends of the EGB and have a minimum separation of 12-inches between them.

Below Ground All wire must be #2 AWG as a minimum. Ground rods are to be a minimum of 8 feet long and 5/8-inch in diameter. In the case of a deep basement next to the rod, the rod must be long enough to extend 3 feet below the basement floor.

Power Considerations

The Base Control Unit (BCU) is designed for 100/240 VAC (88–300 Vrms) @ 45–66 Hz, +21 to +30 VDC or –60 to –40VDC.

The system configuration determines which power cables are installed. The ground cable is always installed first. Based on the system configuration perform the appropriate procedures described in [Chapter 4 Access Point Hardware Installation](#) .

DC Power (RF Head)

The DC power cable is orderable in a variety of lengths as indicated in [Table 3-3](#) below. Depending on site configuration all of one length or a combination of lengths (up to 4) may be used.

Table 3-3 RF Head DC Power Cable Description and Part Numbers

Cable	Qty	Part Number	Description
F	1-4	3089298C01	Power Cable, 20 m (65.6 ft)
	1-4	3089298C02	Power Cable, 40 m (131.2 ft)
	1-4	3089298C03	Power Cable, 60 m (196.8 ft)
	1-4	3089298C04	Power Cable, 80 m (262.4 ft)
	1-4	3089298C05	Power Cable, 100 m (328.0 ft)

Antenna Cable

Objective

This section contains general information on the antenna cabling.

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Table 3-4 Cable Description and Part Numbers

Cable	Qty	Part Number	Description
B	2 – 4	3089492T02	Antenna Cable, 300 mm (1 ft.)

Antenna Cable Pin and Signal Information

The antenna cabling uses a 50-Ohm coaxial cable. The inner conductor provides signaling and the outer conductor provides shielding and ground.

Figure 3-1 Antenna Cable Detail

Table 3-5 Pin and Signal Information for Antenna Cable

Antenna	Inner Conductor	Outer Conductor
B	TX/RX	Ground

Remote GPS Cable

Objective

This section contains general information on the Remote Global Positioning System (RGPS) cabling. Installation information is found in [Chapter 4 Access Point Hardware Installation](#), beginning with [Procedure 4-6](#).

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter. Cable C is available in different kits covering several lengths.

RGPS Cables

[Table 3-6](#) provides the quantities and descriptions of the cables.

Table 3-6 Cables Needed for RGPS Connections

Cable	Qty	Part Number	Description
C	1	T472AA	RGPS cable, 15 m (50 ft.)
		T472AB	RGPS cable, 38 m (125 ft.)
		T472AC	RGPS cable, 76 m (250 ft.)
		T472AD	RGPS cable, 152 m (500 ft.)
		T472AE	RGPS cable, 304 m (1000 ft.)
		T472AF	RGPS cable, 608 m (2000 ft.)
C1	1	SGKN4386	15 pin D-connector on one end and loose wires on the other end. Cable is Motorola P/N 3086433H12.

Mounting Considerations

The RGPS Head requires specific mounting considerations in order to properly observe the GPS satellites.

- The mounting pipe for the RGPS head should be mounted vertically with less than five degrees of tilt.
- It is recommended that the RGPS head be installed using the supplied mounting mast and mounting hardware. Care should be taken to ensure that the RGPS chassis does not come into contact with any metal surfaces. Failure to properly isolate the RGPS chassis from other conductive surfaces can lead to RGPS head failure. The supplied mounting hardware has been designed to provide the required RGPS chassis isolation.
- Position the RGPS head to have an unobstructed view of the sky and to minimize the chance of debris (leaves, dirt, snow, ice, etc.) accumulating on the radome of the RGPS head.
- The RGPS head must have a clear view of the sky, preferably to within 10 degrees of the horizon in all directions. The total blockage of the sky (due to buildings, mountains, etc.) should be less than 50%.
- Place the RGPS head as far away from the transmit antenna as possible to avoid RF interference issues.
- Place the RGPS head at least 15 m away from lightning rods, towers, or structures that attract lightning. RGPS head damage is usually not the result of a direct lightning strike, but of a lightning strike on a nearby structure. Also, since a lightning rod is connected to an earth ground, it can act as a shield and create a shadow that may block or reduce the signal from a satellite.
- After the Base Control Unit (BCU) is powered up (approximately 15 minutes), check the RGPS signal strengths with the *gstatus* command on the BCU MMI port.
 - c An optimal installation will have at least one satellite (SV) with an RSSI value ≥ 50 , and at least four (4) satellites with RSSI values ≥ 45 .
 - c A minimal installation should have at least four (4) satellites with RSSI values ≥ 40 .
- The RGPS head is rated for ambient air temperatures from -40°C (-40°F) to 75°C (167°F), and has ratings for humidity, shock, waterproof, UV light resistance, vibrations, salt fog, ESD, EMI, and altitude.
- The RGPS system used for the Access Point will support up to 1 km (3280 ft.) of overall cable length from the RGPS head. If a long cable run needs to be broken into pieces, minimize the number of breaks in the cable.

RF GPS Cable

Objective

This section contains general information on the Radio Frequency Global Positioning System receiver (RF GPS) antenna cabling. More commonly referred to as Local GPS. Refer to for installation information.

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Table 3-7 Local GPS Cable Description and Part Numbers

Cable	Qty	Part Number	Description
D	1	Receiver SGRG4030	Assembly, GPS, RF Module
	1	CGDSGPSKITF4NM50	Assembly, Receiver, RF GPS with 50 ft. cable

An SMA to N adapter is required; otherwise, a smaller diameter cable must be made with an SMA connector on one end, with a maximum loss of <4.5 dB.

Surge Protection

RF GPS antenna requires lightning protection.

Mounting Considerations

Refer to [Table 3-8](#) for Local GPS mounting considerations.

Table 3-8 Local GPS Antenna Mounting Considerations

Heading2	
1	The mounting pipe for the Local GPS Head should be mounted vertically with less than five (5) degrees of tilt.
2	The Local GPS Head requires a clear view of the sky, preferably to within ten (10) degrees of the horizon in all directions. The more sky that is observed increases the number of potential satellites that can be tracked, resulting in better Local GPS performance.
3	During normal operation, the Local GPS Head continuously tracks a minimum of four (4) GPS satellites. However, it is theoretically possible to operate the BTS by tracking only one (1) GPS satellite. Motorola does not recommend tracking only one (1) GPS satellite unless there has been an accurate site survey.
4	Place the Local GPS Head where RF obstructions of the sky are minimal. The <i>sky</i> includes everything to within ten (10) degrees of the horizon in all directions. RF obstructions include buildings, towers, natural rock formations, snow, foliage, and debris.

**NOTE**

The mounting of the Local GPS head on antenna towers is not recommended due to increased risk of damage due to lightning strikes. If tower mounting is necessary the Local GPS head should be mounted at the lowest point possible and still maintain an unobstructed view of the sky.

5	Separate the Local GPS Head from other radiating sources. Excessive RF energy can degrade the Local GPS Head's ability to observe the GPS satellites. The Local GPS Head receives on the GPS L1 frequency of 1575.42 MHz and incorporates filters to minimize the effects of potential RF interference, however, strong radiants can overwhelm the filters, thus degrading the units reception capability.
6	The Local GPS Head is rated for ambient air temperatures in the range -40 to +50 degrees C, and has ratings for humidity, shock, waterproofing, UV light resistance, vibrations, salt, fog, ESD, EMI, and altitude.
7	An RF gain of between +10 dB and +26 dB should be provided to the Local GPS receiver antenna input. The GPS antenna supplied in the CGDSGPSKITF4NM50 kit provides a nominal gain of +25 dB. The total signal loss from the CGDSGPSKITF4NM50 antenna output and Local GPS antenna input must be less than 15 dB at 1.575 GHz.

Ethernet Cable

Objective

This section contains general information on the Ethernet Cabling. Refer to [Chapter 4 Access Point Hardware Installation](#) for ethernet cable installation information.

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Tools and Materials

There are no tools and materials required to install the Ethernet Cables.

Fiber Optic Cable

Objective

This section contains general information on the fiber optic cable

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Cable Description and Part Number

The fiber optic cable is orderable in a variety of lengths as indicated in [Table 3-9](#) below. Depending on site configuration all of one length or a combination of lengths (up to 4) may be used.

Table 3-9 Fiber Optic Cable Description and Part Number

Cable	Qty	Part Number	Description
H	1-4	3089843T01	Fiber Optic, 20 m (65.6 ft)
	1-4	3089843T02	Fiber Optic, 40 m (131.2 ft)
	1-4	3089843T03	Fiber Optic, 60 m (196.8 ft)
	1-4	3089843T04	Fiber Optic, 80 m (262.4 ft)
	1-4	3089843T05	Fiber Optic, 100 m (328.0 ft)

Customer Defined Input/Output Cables

Objective

This section contains general information on the Customer Defined Input (CDI) and Output (CDO) cables. Refer to [Chapter 4 Access Point Hardware Installation](#) for installation information.

Cable Label

Refer to [Table 3-1](#) for the labels used to identify the cables that will be shown in illustrations throughout this chapter.

Cable Descriptions and Part Numbers

[Table 3-10](#) gives the cable descriptions and part numbers used to install the Customer I/O connectors.

Table 3-10 Customer Defined I/O Cable Description and Part Numbers

Cable	Qty	Part Number	Description
F	1	SGLN6414A	Assembly, Installation, Installation Hdw Pkg BCU

Customer Defined Input and Output Connector Pinouts

Input Pins [Table 3-11](#) lists the pinouts for the Customer Defined Input 1-4 and 5-8 connectors. Refer to [Figure 4-17](#).

Table 3-11 Customer Defined Input Connector Pins 1-4 and 5-8

Pin Number	Description	Pin Number	Description
Connector 1-4		Connector 5-8	
1	Customer Defined Input 1	1	Customer Defined Input 5
2	Customer Defined Input 1 Return	2	Customer Defined Input 5 Return
3	Customer Defined Input 2	3	Customer Defined Input 6
4	Customer Defined Input 2 Return	4	Customer Defined Input 6 Return
5	Customer Defined Input 3	5	Customer Defined Input 7
6	Customer Defined Input 3 Return	6	Customer Defined Input 7 Return
7	Customer Defined Input 4	7	Customer Defined Input 8
8	Customer Defined Input 4 Return	8	CustomerDefined Input 8 Return

[Table 3-12](#) lists the pinouts for the Customer Defined Input 9-12 and 13-16 connectors. Refer to [Figure 4-17](#)

Table 3-12 Customer Defined Input Connector Pins 9-12 and 13-16

Pin Number	Description	Pin Number	Description
Connector 9-12		Connector 13-16	
1	Customer Defined Input 9	1	Customer Defined Input 13
2	Customer Defined Input 9 Return	2	Customer Defined Input 13 Return
3	Customer Defined Input 10	3	Customer Defined Input 14
4	Customer Defined Input 10 Return	4	Customer Defined Input 14 Return
5	Customer Defined Input 11	5	Customer Defined Input 15
6	Customer Defined Input 11 Return	6	Customer Defined Input 15 Return
7	Customer Defined Input 12	7	Customer Defined Input 16
8	Customer Defined Input 12 Return	8	Customer Defined Input 16 Return

Output Pins Table 3-13 lists the pinouts for the Customer Defined Output connectors 1-2 and 3-4.

Table 3-13 Customer Defined Output Connector Pins 1-2 and 3-4

Pin Number	Description	Pin Number	Description
Connector 1-2		Connector 3-4	
1	Customer Defined Output 1 NC	1	Customer Defined Output 3 NC
2	Customer Defined Output 1 C	2	Customer Defined Output 3 C
3	Customer Defined Output 1 NO	3	Customer Defined Output 3 NO
4	Customer Defined Output 2 NC	4	Customer Defined Output 4 NC
5	Customer Defined Output 2 C	5	Customer Defined Output 4 C
6	Customer Defined Output 2 NO	6	Customer Defined Output 4 NO

Access Point Hardware Installation

Installation Overview

Overview

This chapter provides procedures for Base Control Unit (BCU) and RF Head installation and associated cabling.

All required cables have been installed at the site and routed to the BCU. The following items are covered in this chapter.

- Assemble the BCU mounting hardware
- Assemble the RF Head mounting hardware
- Attach signal cables to the BCU and RF Head
- Attach power cables to BCU and RF Head
- Complete the installation completion checklist

The site cabling has been installed and routed to the location of the BCU.

Procedure Order

The process of installing the outdoor unit requires that the following procedures be completed in the order shown:

- 1.** Attach the BCU mounting bracket assembly to wall/pole or mount on pedestal
- 2.** Install BCU.
- 3.** Attach the RF Head mounting bracket assembly to pole
- 4.** Install RF Head
- 5.** Install Antennas
- 6.** Install RGPS or RF GPS antenna
- 7.** Connect earth ground cables
 - o To BCU
 - o To RF Head
 - o Between RF Head and tower
 - o Between antennas and tower
 - o To GPS
- 8.** Connect AC power cable
- 9.** Connect DC power cables from RF Head to BCU
- 10.** Connect antenna cables to BCU
- 11.** Connect GPS cables to BCU
- 12.** If present, connect Ethernet cables
- 13.** Connect Fiber Optic cable from RF Head to BCU
- 14.** If required, power on units
- 15.** Clean up site
- 16.** Fill out the installation completion checklist

Installation Kits

The following items are the kits that may have been shipped to the site.

- STHX4003 — 3.5 GHz RF Head
- STLN6518 — 3.5 GHz RF Head Mounting Bracket
- SC1666 — Base Control Unit (AC)
- SXXX — BCU Pole Mount Bracket

GPS Kits

The following items are the Global Positioning System (GPS) kits that may have been shipped to the site.

- STRG4037 — RF GPS Module
- CGDSGPSKITF4NM50 — RF GPS Head
- T472AA — T472AF — Remote GPS Receiver Kit
- SGKN4386 — Remote GPS Cable Kit

Connector Locations

Base Control Unit Connector Locations

[Figure 4-1](#) shows the location of the cable connectors on the BCU.

RF Head Connector Locations

Refer to [Figure 1-4](#) for the location of the cable connectors on the RF Head.

Base Control Unit Installation

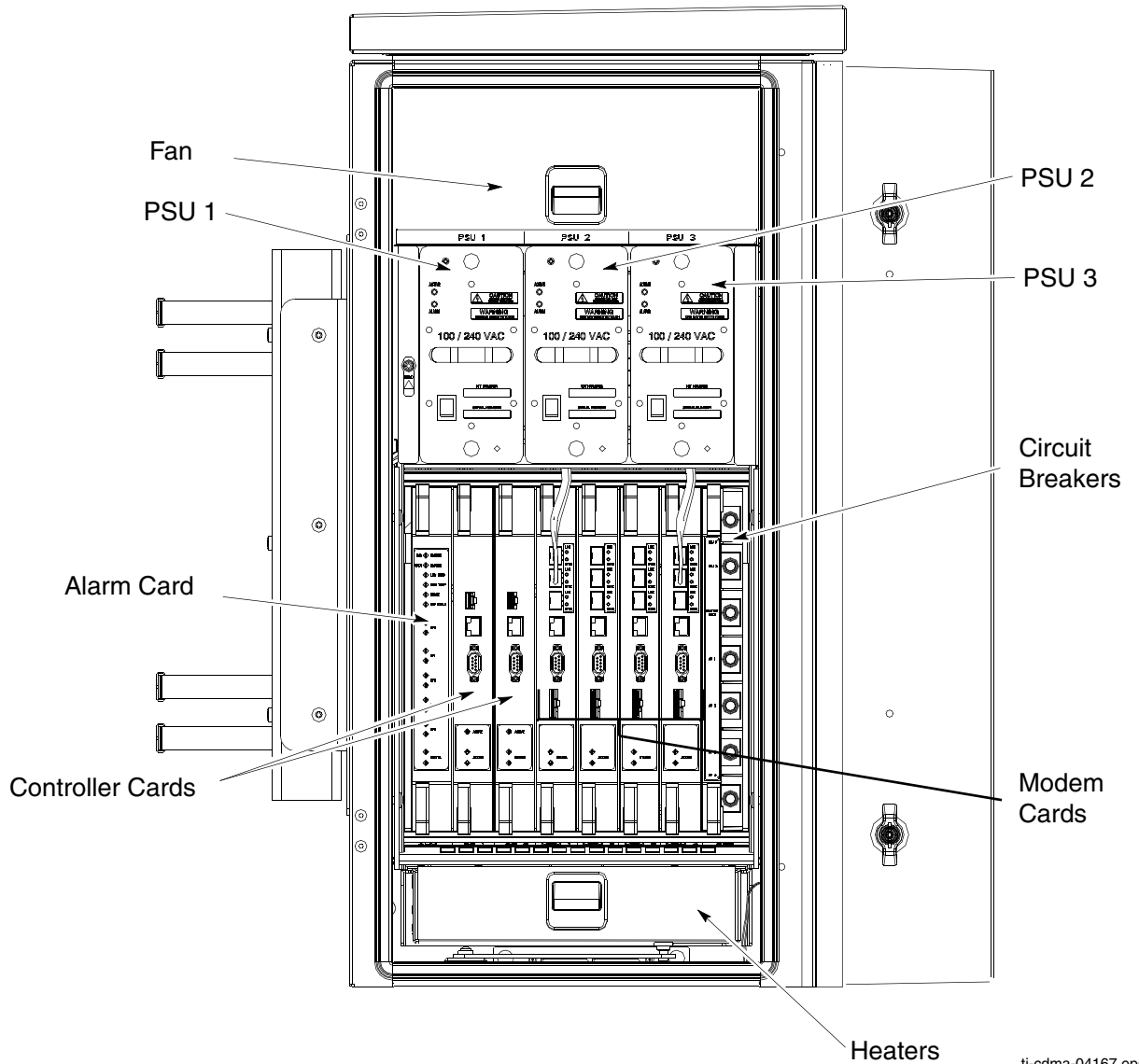
Overview

This section contains procedures for installing a Base Control Unit (BCU). Refer to [Figure 1-1](#) for an overall view of the BCU.

BCU Compartments

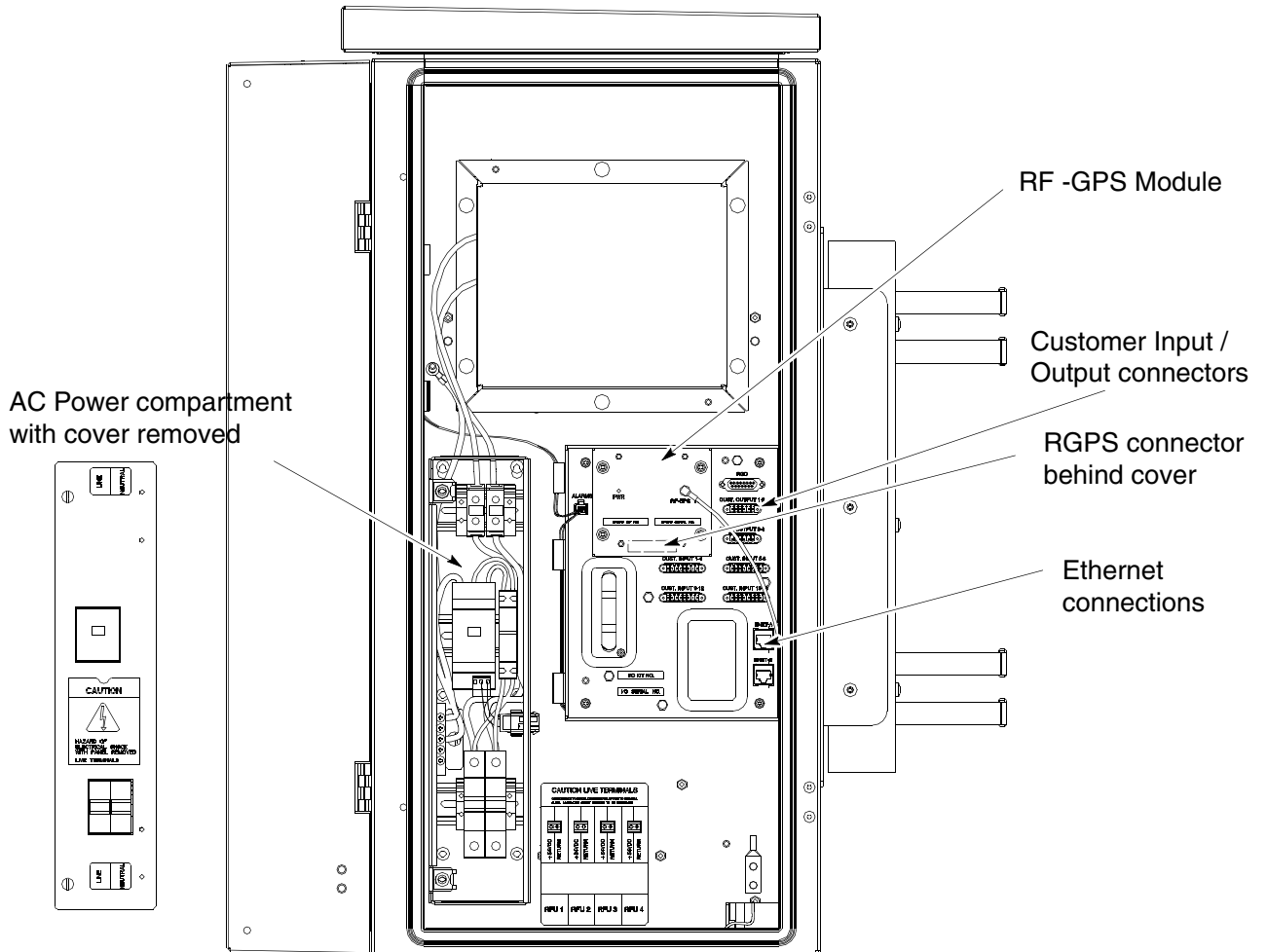
[Figure 4-1](#) and [Figure 4-2](#) show the two major compartments that make up the BCU.

Figure 4-1 BCU Card Cage Compartment



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Figure 4-2 BCU Power and Customer Interface Compartment



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Electrical

The BCU is designed to use 100–240 VAC, +27 VDC, or –48 VDC.

If powered by single phase AC voltage (customer supplied), the range is 100–240 V (88–300 VRMS) at 45–66 Hz. The AC voltage is converted to +54 VDC within the Power Supply Modules (PSM).

If powered by +27 VDC (customer supplied) the range is +21 to +30 VDC.

If powered by –48 VDC (customer supplied) the range is –60 to –40 VDC.

Battery Backup

Battery backup or associated charging/control circuitry for the AC version of the BCU is not supported.

Dimension and Weight



CAUTION

If the BCU must be physically adjusted/moved, Motorola recommends that a minimum of two people perform this function.

- Dimension: 508 mm (20 in.) **W** x 760 mm (30 in.) **H** x 508 mm (20 in.) **D**
- Weight: 68 kg (150 lbs)

The dimension measurements do not include connectors, hinges, handles, or latches.

Conduit Sizes

Refer to [Table 4-1](#) for the proper conduit sizes.

Table 4-1 Conduit Types and Sizes

No.	Designation	Required Size	Hole Size
1	Ethernet	1 inch	1 inch
2	Power	1-1/4 inch	1-1/4 inch
3	Fiber Optic	None	Bulkhead connector

Tools and Materials

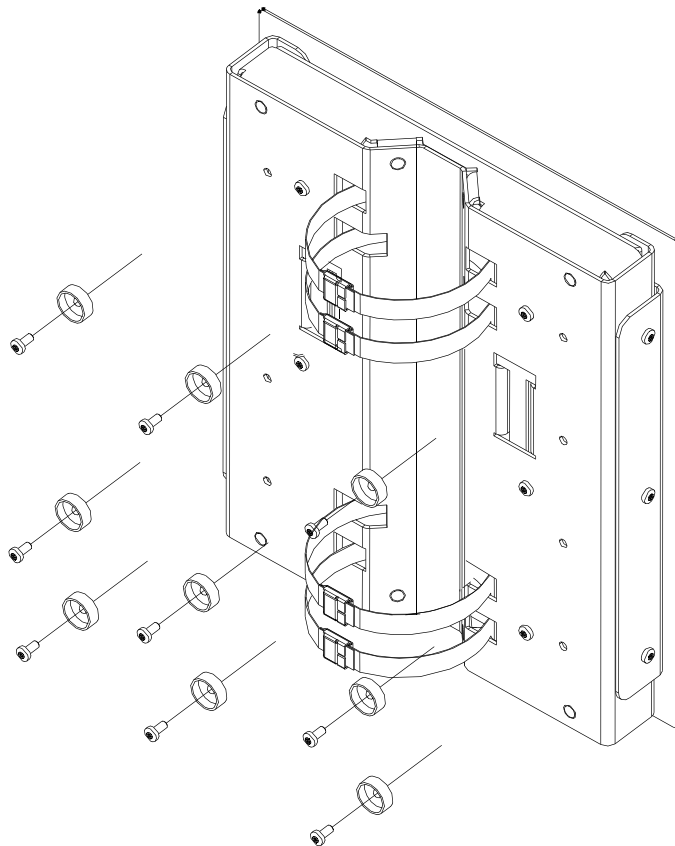
The following tools and materials or equivalent are required to install the BCU.

- Bucklestrap Cutting Tool (Motorola P/N 6604809N01) for pole mounting bracket assembly
- Safety Glasses
- 13/16 Breakaway Torque Wrench 38 in-lb
- Chalk
- Tape Measure
- Electrical Tape
- Crescent Wrench
- Socket Driver
- Metric or Standard Socket Set for 1/4-in or 3/8-in driver

BCU Mounting Bracket Assembly Installation

Figure 4-3 shows the Wall Mounting Bracket and Mounting Bracket Assembly.

Figure 4-3 BCU Pole Mounting Bracket Assembly



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BCU Mounting Bracket Assembly Procedure

Pole Mount Follow the procedure in [Procedure 4-1](#) to install the pole mounting bracket assembly and wall mounting bracket for pole mounting the BCU.



WARNING

Once the BCU is installed, DO NOT use it as a step ladder. It is not designed to support a person hanging from or standing on top of it.

Procedure 4-1 Procedure to Install Mounting Bracket Assembly on a Pole

1	Slide non-buckle end of strap through openings in Pole Mounting Bracket Assembly.
2	<div style="display: flex; align-items: center;"> <div style="background-color: #00FFFF; padding: 5px; border: 1px solid black; font-weight: bold; margin-right: 10px;">NOTE</div> </div> <p>Initial height is determined by customer. The bottom of the BCU is a minimum of 1 meter from the ground. Adjust Pole Mounting Bracket Assembly to account for this minimum distance.</p>
3	Wrap strap around the pole, slide non-buckle end through strap loop and pull snug.
4	<div style="display: flex; align-items: center;"> <div style="background-color: #00FFFF; padding: 5px; border: 1px solid black; font-weight: bold; margin-right: 10px;">NOTE</div> </div> <p>Attach Bucklestrap Cutting Tool (slide strap through openings in tool, pull gripper lever to slide strap into spindle head), slide tool towards buckle. Place cutting tool end of tool as close to the buckle as possible.</p> <p>The strap can be cut to a more manageable length prior to using the tool. Bucklestrap Cutting Tool is a ratchet spindle and cutter in one.</p>
5	Turn spindle clockwise until strap is tight. Bend the excess strap over tightened strap, cut strap, fold the cut tab into the buckle, then close buckle.
6	Using the tool bend the strap over towards the buckle. Remove tool and use a hammer to bend the strap more.

Continued



Procedure 4-1 Procedure to Install Mounting Bracket Assembly on a Pole (Continued)

7	Use the hammer to bend buckle tabs over strap. Use electrical tape to cover over the buckle and straps.
8	Perform step 3 through step 8 , for the remaining straps.
9	Secure Mounting Bracket to Pole Mounting Bracket Assembly using 9 M6 bolts and washers (Refer to Figure 4-3). Torque bolts to 3.4 N-m (30 in-lbs).
10	Mounting bracket is ready for BCU attachment.

Installing the BCU

Follow the steps in [Procedure 4-2](#) to install the Base Control Unit (BCU).

Procedure 4-2 Procedure to Install the BCU

1	Perform the procedure for attaching the mounting bracket described in Procedure 4-1 .
2	Mount the BCU onto the mounting bracket and secure using 8 screws.  <div style="background-color: #00b050; color: white; padding: 5px; display: inline-block; margin-left: 10px;">NOTE</div> It is recommended that a minimum of two people attach the BCU on the pole mounting bracket.
3	If not already open, open the BCU Customer Interface compartment. Route ground cable to BCU and connect.  <div style="background-color: #00b050; color: white; padding: 5px; display: inline-block; margin-left: 10px;">NOTE</div> The cable access holes are covered. Remove the wing nuts and covers before routing cables to and from the BCU Customer Interface Compartment.
4	Ensure the AC power is disabled at the source before attempting to install the AC power cabling. For AC power cable perform Procedure 4-4 .
5	For RF Head DC power cable installation, perform Procedure 4-5 .
6	For Antenna cable installation, perform .
7	For fiber optic cable installation, perform
8	For RF GPS cable installation, perform Procedure 4-7 For RGPS cable installation, perform Procedure 4-6 .

Continued

Procedure 4-2 Procedure to Install the BCU (Continued)

9	For Customer Input and Output cable installation, perform Procedure 4-10 . To avoid confusion tag the output cables.
10	For ethernet cable installation (if available), perform Procedure 4-8 .

Diversity Access Point (DAP) RF Head Assembly Installation

Overview

This section contains the procedures for installing the Diversity Access Point RF Head Assembly which is comprised of the RF Head and antenna radome. Refer to [Figure 1-2](#) for an overall view of the DAP.

DAP RF Head

Refer to [Figure 1-4](#) for the major components of the DAP RF Head.

Electrical Requirements

The RF Head is designed to use 40 to 59 VDC (nominal +54 VDC) supplied through the Base Control Unit (BCU).

Dimensions and Weight

- Dimension: 228.6 mm (9 in) **W** x 712 mm (28 in) **H** x 406.4 mm (16 in) **D**
- Weight: 25.4 kg (56 lbs)

The dimension measurements do not include connectors, hinges, handles, or latches.

Conduit Sizes

Refer to [Table A-1](#) for conduit sizes.

Table 4-2 Conduit Requirements

No.	Designation	Required Size
1	Power	1-1/4 inch
2	Fiber Optic	None

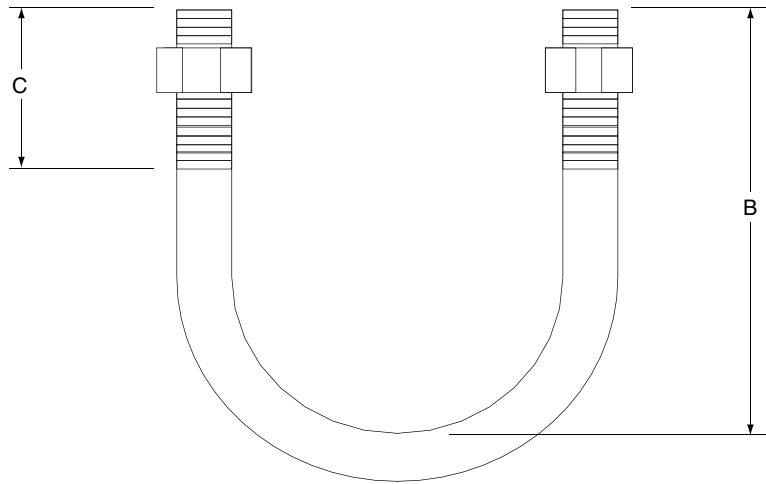
Tools and Materials

- Mounting Bracket Assembly
- U-bolts
- Set of metric sockets (3/8-in or 1/4-in drivers)
- Set of standard sockets (3/8-in or 1/4-in drivers)
- Socket 3/8-in or 1/4-in driver
- Torque Driver
- Cordless Power Driver
- Ground Lug
- Crimp Tool
- T30 Torx Screw Driver
- Adjustable Crescent Wrench
- Tie-wraps of varying lengths

U-Bolt Specifications

Reference [Figure A-1](#) and [Table A-2](#) to determine the proper U-bolt to use. Pole mounting bracket is designed to use 3/8-inch hardware.

Figure 4-4 U-Bolt Sizing



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Table 4-3 DAP U-Bolt Sizing

Pipe OD		Minimum Dimension B		Minimum Dimension C	
(in)	(mm)	(in)	(mm)	(in)	(mm)
2.067	52.50	3.886	98.70	0.6	15
2.469	62.71	4.429	112.50	0.6	15
3.068	77.93	5.098	129.50	0.6	15

Increasing dimension B beyond that indicated above will result in a corresponding increase in dimension C in order to maintain proper clamping force

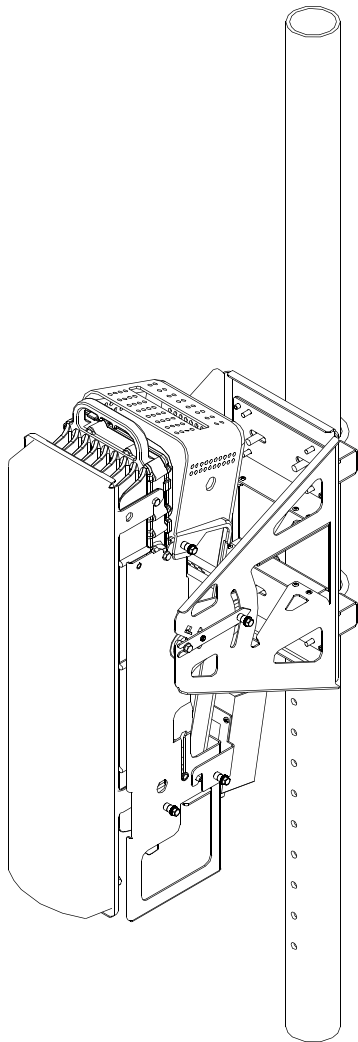
RF Head Assembly Installation Procedure

Follow the steps in [Procedure A-1](#) to install the RF Head Assembly including main Support Bracket Assembly.



NOTE

The following procedure is based on the RF Head arriving already assembled. If the RF head must be assembled at the site then follow the procedure in Appendix A.

Figure 4-5 RF Head Assembly


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Procedure 4-3 Procedure to Install RF Head Assembly

-
- | | |
|----------|--|
| 1 | If cables have already been routed to the tower, proceed to step 4 .
Otherwise, proceed to step 2 |
|----------|--|
-


Continued

Procedure 4-3 Procedure to Install RF Head Assembly (Continued)

2	 <div style="background-color: #00b050; color: white; padding: 5px; display: inline-block; margin-left: 10px;">NOTE</div> <p>On the inside of the Customer Interface Compartment are color coded stickers and matching tie-wraps. The colors are matched to the RF Head DC power cables. The colors are as follows:</p> <ul style="list-style-type: none"> ● RFU 1 = RED ● RFU 2 = BLUE ● RFU 3 = YELLOW ● RFU 4 = GREEN <p>Remove the appropriate color sticker and apply it to the underside of the RF Head. Use the appropriate tie-wraps to identify the DC power cables and the Fiber Optic cables. For Example: The first RF Head used would have the power connector identified with the RED sticker, and the power and fiber cables would be tagged with the RED tie-wraps.</p>
3	<p>Prepare the RF Head for hoisting. Attach carabiner to handle of RF Head. Use the block and tackle to carefully hoist (so cables will not be damaged) the RF Head Assembly up to the tower. Proceed to step 5.</p>
4	<p>Prepare the RF Head for hoisting. Attach carabiner to handle of RF Head. Use the block and tackle to carefully hoist the RF Head Assembly up to the tower. Proceed to step 5.</p>
5	<p>Remove nuts and plate from both ends of the U-bolt.</p>
6	<p>Set RF Head Assembly at the required height.</p>
7	<p>Slide first U-bolt around pole and through top slots of Main Support Bracket Assembly. Slide plate (or washers) over threaded ends of U-bolt. Thread nuts on U-bolt and hand tighten.</p>
8	<p>Slide second U-bolt around pole and through bottom slots of Main Support Bracket Assembly. Slide plate (or washers) over threaded ends of U-bolt. Thread nuts on U-bolt and hand tighten.</p>
9	<p>Align Main Support Bracket Assembly on pole and tighten nuts using a socket wrench. Torque nuts to 23.5 in-lbs (2.6 N-m).</p>

Continued

Procedure 4-3 Procedure to Install RF Head Assembly (Continued)

10	<p>Ensure that the RF Head is properly mounted and its movement is not obstructed. To adjust the azimuth (up/down angle) loosen 2 M6 screws on each side of unit using a 10 mm socket or crescent wrench. Range of motion is ± 25 degrees from horizontal. The retention bracket serves as an indicator of the azimuth in degrees. When RF Head is set at the desired position, tighten captive bolts on retention bracket. Torque bolts to 45 in-lbs (8.2 N-m). Tighten captive screws at pivot on each side of unit to secure RF Head. Torque bolts to 45 in-lbs (8.2 N-m). Proceed to step 11 to connect cables. If cables have been previously routed to the tower, proceed to step 13</p>
11	<p>Connect Fiber Optic Cable to RF Head. (Fiber cable has been marked with a color coded tie-wrap.) Torque nut 20 in-lbs (2.3 N-m).</p>
12	<p>Connect DC power cable to RF Head. Follow color code (Power cable has been marked with the appropriate color coded tie-wrap, and RF Head DC Power connector has been marked with the appropriate color coded sticker.) Proceed to step 15</p>
13	<p>Open BCU Customer Interface compartment, verify that DC power cables are properly color coded. If not already connected, connect DC power cables per the color code.</p>
14	<p>Verify that the Fiber Optic cable is properly color coded and connected to the proper FIBER connector on the underside of the BCU.</p> <div style="text-align: center;">  <div style="display: inline-block; border: 2px solid black; background-color: yellow; padding: 5px; margin: 0 10px;">CAUTION</div> </div> <p>The bend of the Fiber Optic cable is not to exceed 90 mm.</p>
15	<p>Verify that all cables are connected. Close and lock Customer Interface Compartment.</p>

Ground Cabling Installation

Objective

This section contains the procedures for installing the ground cable to the Antenna, BCU, RGPS, and RF Head.

General Grounding Guidelines

The site should have had an external ground ring or bus bar being used. The ground ring and bus bar should be an integral part of the structures that will hold the equipment. Reference *Grounding Guidelines for Cellular Radio Installations (Motorola part number 68P81150E62)* or *Appendix C of Standards and Guidelines for Communication Sites*.

BCU Grounding

The BCU should be tied to a single point grounded to the system master ground. All interconnect cables should be in metallic sealtight type conduit or solid shield RF cables. It is recommended that these cables be run in raceways to reduce the loop dimensions of the cable runs. This minimizes the effect of inducted currents caused by the intense electromagnetic field of lightning current.

RF Head Grounding

All RF cables should be in metallic sealtight type conduit or solid shield RF cables. It is recommended that these cables be run in raceways to reduce the loop dimensions of the cable runs. This minimizes the effect of inducted currents caused by the intense electromagnetic field of lightning current. A ground lug with captive screws is provided on the RF Head to attach the ground wire.

DC Power Grounding

The DC power cables from the BCU to the RF Head are routed through conduit. The conduit is grounded to the master ground.

Antenna Grounding

The antenna is grounded through the RF Head.