SAMSUNG

MT6402-48A
Installation Manual

Describes product installation and requirement procedure.

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Radio Access Network

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SNMTC-v3-0312

This manual should be read and used as a guideline for properly installing and/or operating the product. Owing to product variations across the range, any illustrations and photographs used in this manual may not be a wholly accurate depiction of the actual products you are using.
This manual may be changed for system improvement, standardization and other technical reasons without prior notice.
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Official Website: **www.samsungnetworks.com/**
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Preface

This manual describes how to install the CBRS MMU (MT6402-48A) including how to connect the cables.

Conventions in this Document

Samsung Networks product documentation uses the following conventions.

Symbols

Symbol	Description
	Indicates a task.
	Indicates a shortcut or an alternative method.
	Provides additional information.
	Provides information or instructions that you should follow to avoid service failure or damage to equipment.
	Provides information or instructions that you should follow to avoid personal injury or fatality.
	Provides antistatic precautions that you should observe.

Menu Commands

menu | command

This indicates that you must select a command on a menu, where **menu** is the name of the menu, and **command** is the name of the command on that menu.

File Names and Paths

These are indicated by a bold typeface. For example:

Copy **filename.ext** into the **/home/folder1/folder2/bin/** folder.

User Input and Console Screen Output Text

This section describes the text format used for user input and console screen output.

- The input and output text is presented in the Courier New font. For example, `context <designated epc-context-name>`
- The CLI command is presented in capital letters and Courier New, bold style. For example, Type the **`RTRV-NE-STS`** command in the input field.

- The YANG object is presented in the small letters and boldface. For example, **eutran-cell-conf-idle**

Revision History

The following table describes all versions of this document.

Document Version	Publication Date	Remarks
1.0	May 2019	First version

Organization of This Document

The following table describes all sections of this document.

Section	Title	Description
Chapter 1	Before Installation	This chapter introduces MMU and describes the items that should be understood before installation.
Chapter 2	Installing System	This chapter describes the procedures to install the MMU.
Chapter 3	Connecting Cables	This chapter describes the procedures to connect the cables to the installed MMU.
Chapter 4	Inspect the Installation	This chapter describes the procedures of inspecting installation status after the MMU installation and cabling is completed.
Appendix A	Acronyms	This appendix describes the acronyms used in this manual.
Appendix B	Clean the Optical Connectors	This appendix describes the procedure of cleaning the optical connector and cleaning tool.
Appendix C	Standard Torque	This appendix describes the standard torque when fastening the bolt.

Personal and Product Safety

Electrical

The product is designed to operate from a -48 V DC supply and is therefore classified as Safe Extra Low Voltage (SELV) equipment.

All structural parts are grounded and all input and outputs have built-in isolation from the network. All input and output ports that connect to external power sources are designed to meet relevant national safety requirements.

The product contains hazardous energy levels as defined by EN 60950. Care must be taken when maintaining this equipment as injury to personnel or damage to the equipment could result from mistakes. Maintenance should only be carried out by trained and competent engineers who are familiar with the relevant procedures and instructions.

Lasers

The product is fitted with optical modules rated as Class 1 radiation-emitting devices under EN 60825-1. During installation, operation, and maintenance, never look into the end of an optical fiber directly or by reflection either with the naked eye or through an optical instrument. Do not operate equipment with exposed fiber connectors-cover these with fiber cables or blanking caps. Do not remove equipment covers during operation unless requested to do so in the documentation. Carry out normal safety precautions when trimming fibers during installation.

Manual Handling

Care should be taken when handling equipment. Give due consideration to the weight of the equipment, the physical capability of the individual(s) handling the equipment, and movements such as twisting, bending and stooping, which could lead to skeletal and muscular injuries.

Installation

Installation must be carried out by trained and competent engineers only. All relevant safety measures should be taken to ensure equipment is not connected to live power and transmission sources during installation. Equipment must be correctly installed in order to meet the relevant safety standards and approval conditions.

Each power feed to the unit requires a separate fused feed from the provided power supply. The cable between the power distribution point and the installed equipment must have a minimum cross-sectional area of 10 mm^2.

Maintenance

Maintenance must only be carried out by a suitably trained and competent

technician. All safety instructions must be carefully observed at all times. Equipment covers should not be removed while live power and transmission is connected unless in a controlled environment by trained technicians.

Fire

The product is powered from a -48 V DC supply. To protect against fire, the equipment is fused.

Environment

The product must be operated in an environment with the specified relative humidity and ambient temperature ranges.

Keep all liquids away from the equipment as accidental spillage can cause severe damage.

Cooling

The product is natural convection cooling type.

Anti-Static Precautions

The circuit boards and other modules in the product are sensitive to and easily damaged by static electricity. If any card or sub-assembly is removed from the unit, the following anti-static precautions must be observed at all times:

- Service personnel must wear anti-static wrist straps.
- Circuit boards and sub-assemblies must be placed on ground conductive mats or in conductive bags.
- All tools must be discharged to ground before use.
- The anti-static wrist strap and cord must be checked at regular intervals for their suitability for use.

Grounding

To comply with EN 60950, the equipment must be connected to a safety grounding point via a permanent link. Grounding points are located on the product for this purpose. Always connect the ground cable before fitting other cables. The product must remain grounded continuously unless all connections to the power supply and data network are all removed.

If equipment is grounded through a cabinet or rack, make sure it is done so properly according to the installation instructions.

Power Supply Connection

The equipment is designed to be powered from a -48 V DC supply. Power

connections and installation of associated wiring must be carried out by a suitably qualified technician.

Only devices that comply with all relevant national safety requirements should be connected to the unit's power supply inlets. Other usage will invalidate any approval given to this equipment.

Connection of this equipment to devices that are not marked with all relevant national safety requirements may produce hazardous conditions on the network.

When the power supply is obtained by a rectifier/safety isolation transformer, the supply must meet the requirements of EN 60950 providing double/reinforced insulation between hazardous voltages and SELV/TNV circuits. Any battery must be separated from hazardous voltages by reinforced insulation.

Indirect Connection

Before indirectly connecting any equipment to another device through a shared power supply, ALWAYS seek advice from a competent engineer.

Devices that are not marked according to the relevant national safety standards may produce hazardous conditions on the network.

Product Disposal

To reduce the environmental impact of products, Samsung has joined WEEE compliance activities.

The WEEE symbol on the product indicates that the product is covered by the European Directive 2002/96/CE for the disposal of Waste Electrical and Electronic Equipment (WEEE). This means that the product should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. This will help prevent potential negative consequences for the environment and human health. Please check the terms and conditions of the purchase contract for information about correct disposal.

California USA Only

This Perchlorate warning applies only to primary CR (Manganese Dioxide) Lithium coin cells in the product sold or distributed ONLY in California USA

‘Perchlorate Material-special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate.’

Compliance Statements for the USA

Any changes or modifications that art not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

Equipment Markings

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

Hot surface warning

Allow to cool before servicing.

Do not touch before cooling.

Notice! Be careful not to touch due to high temperature.

The system must be installed in a restricted area, and make sure the work is done by personnel properly trained for the job.

Protective earth

MMU should be grounded.

Chapter 1 Before Installation

This chapter introduces the MMU system and describes the items that you should know before installation.

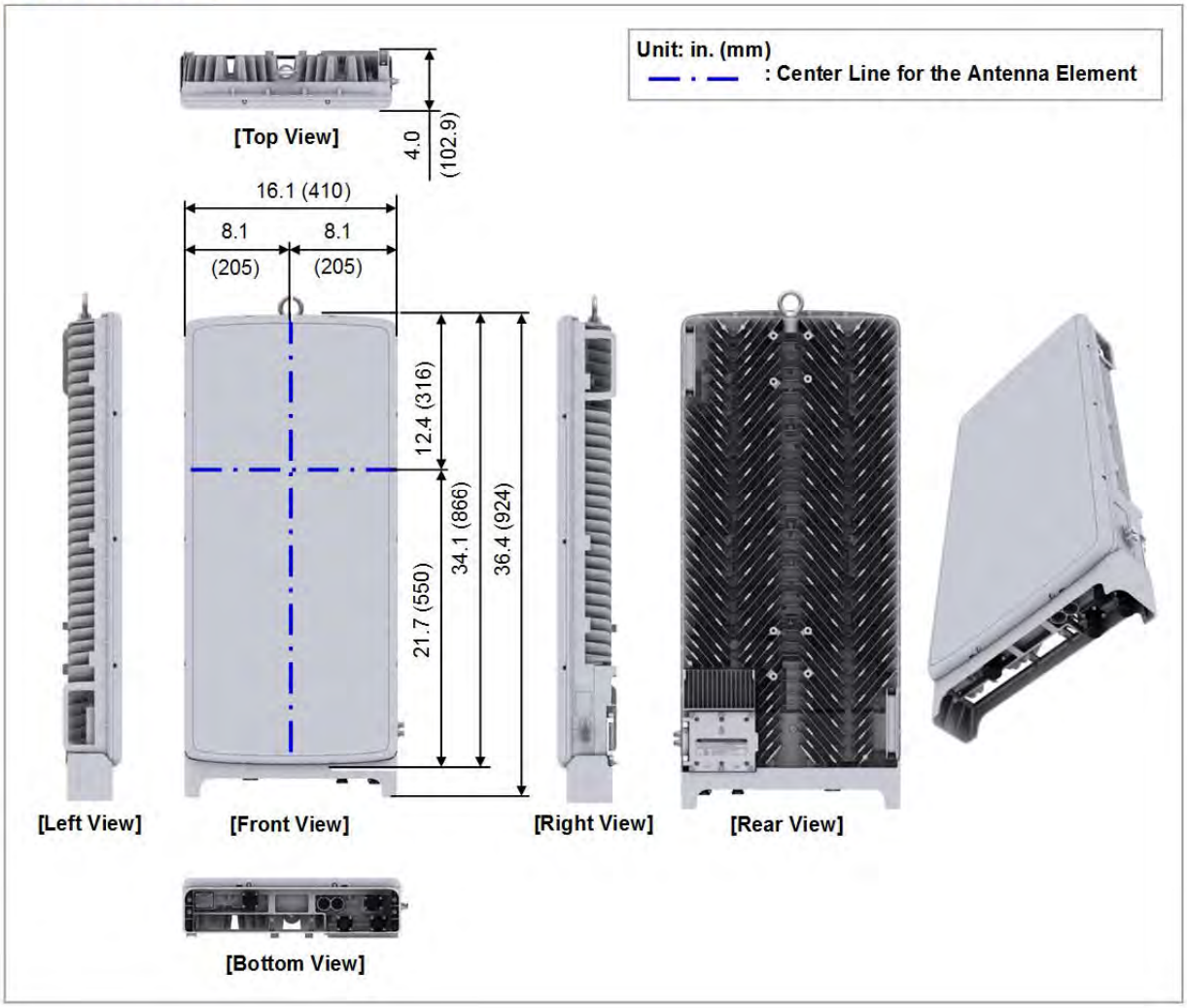
MMU View and External Interface

This section provides the physical structure overview of the MMU and its interfaces.

MMU View

The following figure depicts the physical structure of the MMU.

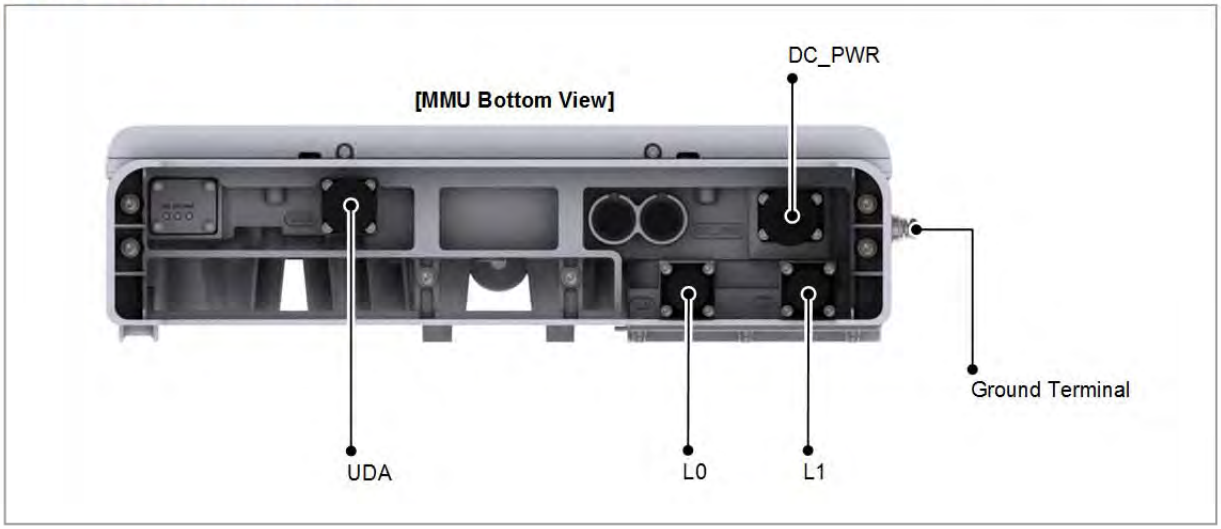
Figure 1. MMU View



MMU External Interface

The following figure depicts the external interface structure of the MMU.

Figure 2. MMU External Interface



Specifications

The following table outlines the main specifications of the MMU.

Table 1. Specifications

Item	MT6402-48A	
Air technology	LTE 5G NR (HW ready)	
Operating Frequency (MHz)	3,550 to 3,700	
RF Chain	64T64R	
Antenna Element	128 (4V16H)	
IBW/OBW	150/60 MHz, 100 MHz (HW ready)	
Channel Bandwidth/Capacity	• LTE: 10/20 MHz × 3 Carrier • LTE: 10/20MHz × 6Carrier (HW ready) • NR: 10/20/40/50/60/80/100 MHz (HW ready)	
RF Output Power/EIRP	12W (47 dBm per 10 MHz EIRP) 20 W (HW ready)	
Modulation (DL/UL)	Up to 1024 QAM (1 dB output power back off)/64 QAM	
MIMO Layer	DL: 16L, UL: 4L	
Fronthaul	CPRI (10 Gbps × 6 port, Duplex) eCPRI (HW ready)	
Input Voltage	-48 V DC (-38 to -57 V DC)	
Power Consumption	• LTE: 700 W, 100 % load, room temp. U/D 2 to 7 • NR: 750 W, 100 % load, room temp. DL:UL = 4:1	
Dimension (W × D × H)	16.1 in. (410 mm) × 4.1 in. (102.9 mm) × 34.1 in. (866 mm)	
Weight	< 61.73 lb (28 kg)	
Operating Temperature	-40 to 55°C (without Solar load)	
Operating Humidity	5 to 100 [%] (RH), condensing, not to exceed 30 g/m^3 absolute humidity	
Cooling Method	Natural convection cooling	
Function Split	• LTE: DL-Option 7-2a, UL-Option 8 • DL-Option 7-2a/7-2x, UL-Option 7-2a/7-2x (HW ready) • NR: DL-Option 7-2a/7-2x, UL-Option 7-2a/7-2x (HW ready)	
Spectrum Analyzer	TX, RX	
Altitude	-60 to 1,800 m	
Earthquake	Telcordia GR-63-CORE Section 4.4.1 (Earthquake Risk Zone4)	
Vibration in Use Transportation Vibration	Telcordia GR-63-CORE Section 4.4.4 Telcordia GR-63-CORE Section 4.4.5	
IP rating	IP65	
EMC	FCC Title 47 CFR Part 15 subpart B	
RF	FCC Title 47 CFR Part 96	
Beam Steering Range	Horizontal	-45°±3° to +45°±3° @ 3 dB Loss

Item	MT6402-48A	
	Vertical	-17°±2° to +17°±2° @ 3 dB Loss
Safety	UL 60950-1 UL 60950-22	
Installation	Pole mount, Wall mount	

Cautions for Installation

Observe the safety instructions described in this section when installing the system.

Installation should be done in accordance with the applicable local electric codes.

Before Installing

Before starting the installation, ensure the following:

- Post "warning" signs in areas where high-voltage cables are installed.
- Post "off limit" signs in areas where accidents are most expected.
- Use guardrails or fences to block open areas such as ditches, open roof areas, and scaffolds.

Install the system in the restricted access area.

While Installing

During installation, ensure the following:

The system power must be cut off before installing.

Ensure that the main switch of the power supply is off when installing the system. Installing the system with power on may cause system damage or fatal human injury when connecting or disconnecting cables.

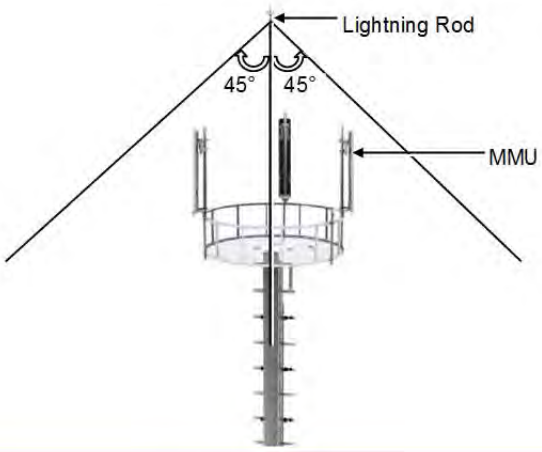
Ensure that the workers wear protection gloves and goggles to prevent injury from debris while drilling holes in a wall or ceiling.

Do not wear accessories such as watches and rings to prevent electrical shock.

Cover unused ports with a cap. This prevents foreign substances entering into the unused ports.

To prevent foreign substances, outdoor air, and moisture entering into the cable inlet (including cable gland and conduit), finish the cable inlet as follows:
- Unused inlet: Use the hole finishing materials including cap and rubber packing.
- Cable-installed inlet: After cable installation, block any space in the inlet with the tape, compressed sponge, rubber packing, and silicone.

When operator installs the MMU, the MMU must be within the protective angle (left/right side 45° each from the central axis) to prevent the MMU from lightning damage.



After Installing

After installation, remove any debris produced during the work and clean up the installation site.

In the system, the laser beam light runs through the optical cable. The workers must handle the optical cables with care, because the laser beam can seriously damage the eyes.

Ensure that the workers do not damage installed cables while cleaning the system.

While cleaning the power supply device, take precaution that the device does not come in contact with foreign objects that may cause power failure.

Installation Tools

The basic tools required for installation are listed in the table below. The additional tools required for each site need to be identified and arranged during a site survey before starting the installation.

Table 2. Basic Installation Tools

No.	Name	Specification	Purpose of use
1	Torque Driver 	Apply a torque range: 20 to 90 lbf·in	Fastening M6 SEMS
2	Screw Driver Bit 	'+', No. 3	Fastening M6 SEMS
3	Screw Driver 	'+', No. 3	Fastening M6 SEMS
4	Torque Wrench 	Apply a torque range: 10 to 50 lbf·in	Tightening M6 hexagonal bolt
		Apply a torque range: 100 to 400 lbf·in	Tightening M10, M12 hexagonal bolt
5	Torque Wrench Spanner Head 	Apply hexagonal bolt head: 10 mm (for 10 to 50 lbf·in)	Tightening M6 hexagonal bolt
		Apply hexagonal bolt head: 17 mm (for 100 to 400 lbf·in)	Tightening M10 hexagonal nut
		Apply hexagonal bolt head: 19 mm (for 100 to 400 lbf·in)	Tightening M12 hexagonal nut
6	Spanner 	10 mm	Tightening M6 hexagonal bolt
		17 mm	Tightening M10 hexagonal bolt
		19 mm	Tightening M12 hexagonal bolt
7	Tape Measure 	16 ft./150 ft.	Measuring length
8	Level 	Normal	Levelling horizontality and verticality
9	Power Extension Cable 	100 ft.	Basic tool
10	Hammer Drill 	Normal	Wall Type Drilling

No.	Name	Specification	Purpose of use
11	Optical Connector Cleaner 	For LC Connector	Cleaning Optical Connector
12	MPO Connector Cleaner 	IBC™ Brand Cleaner MT38-Cleans MT based M38999	For MPO Connector Cleaning
13	Cleaner Jig Receptacle and Plug 	-	Cleaning MPO connector
14	Concrete Drill Bit 	17 mm	Setting M12 Anchor
15	Anchor Punch 	M12	Setting M12 anchor
16	Hammer 	Normal	Fixing anchor
17	Permanent Marker 	Should be marked ‘Permanent’ on the pen (Black Color, 2 mm Tip)	After system installation, I-marking To mark the site ID, Name on the name plate, and so on. (Not to erase permanently)
18	Vacuum Cleaner 	Normal	Removing dust during the drilling work
19	Cable Cutter 	0.2-1.3 in. (6 to 32 mm)	Cutting cable
20	Crimping Tool 	14 AWG-4 AWG (1.5 to 16 mm^2)	Crimping pressure terminal
21	Cable Stripper 	Apply cable thickness: 1.5 to 6.2 in. (4 to 16 mm)	Removing cable sheath
22	Nipper 	Basic Tool	Cutting cable
23	Flush cutter 	Basic Tool	For cutting cable tie
24	Industrial Scissor 	Basic Tool	Cutting
25	Knife	Basic Tool	Cutting

No.	Name	Specification	Purpose of use
			
26	Heating Gun 	50 to 300°C	Shrinking the feeder cable tube
27	Multi tester 	Digital Pocket Tester	Checking voltage and current to detect cable disconnection
28	Angle Meter 	Normal	Checking MMU Tilting
29	Fiber Optical Test Set 	Wave length: 1270 nm, 1310 nm, 1550 nm (single mode) 850 nm, 1310 nm (multi-mode)	Checking optical level
30	Antenna Alignment Tool 	-	Checking azimuth and tilting

The required installation tools may vary depending on the site conditions.
In addition to the basic tools, protractor, ladder, safety equipment and cleaning tools must be arranged considering the site conditions.

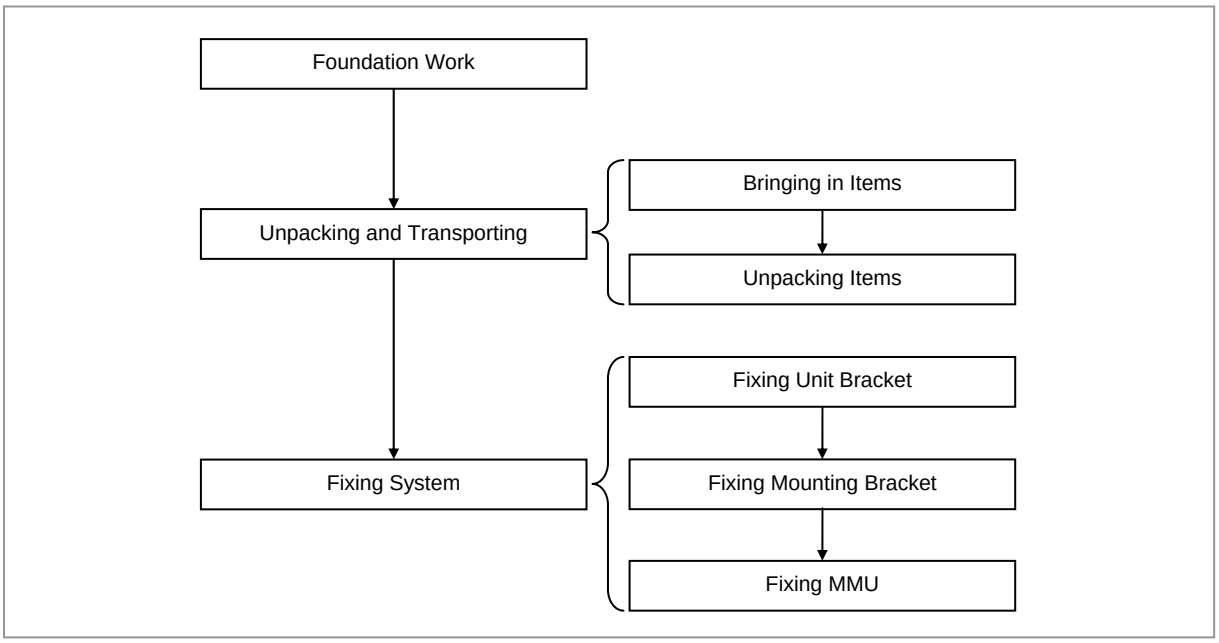
Chapter 2 Installing System

This chapter describes the procedures for transporting, unpacking, and installing the MMU.

Installation Procedure

The figure below depicts the overall procedures for installing the MMU.

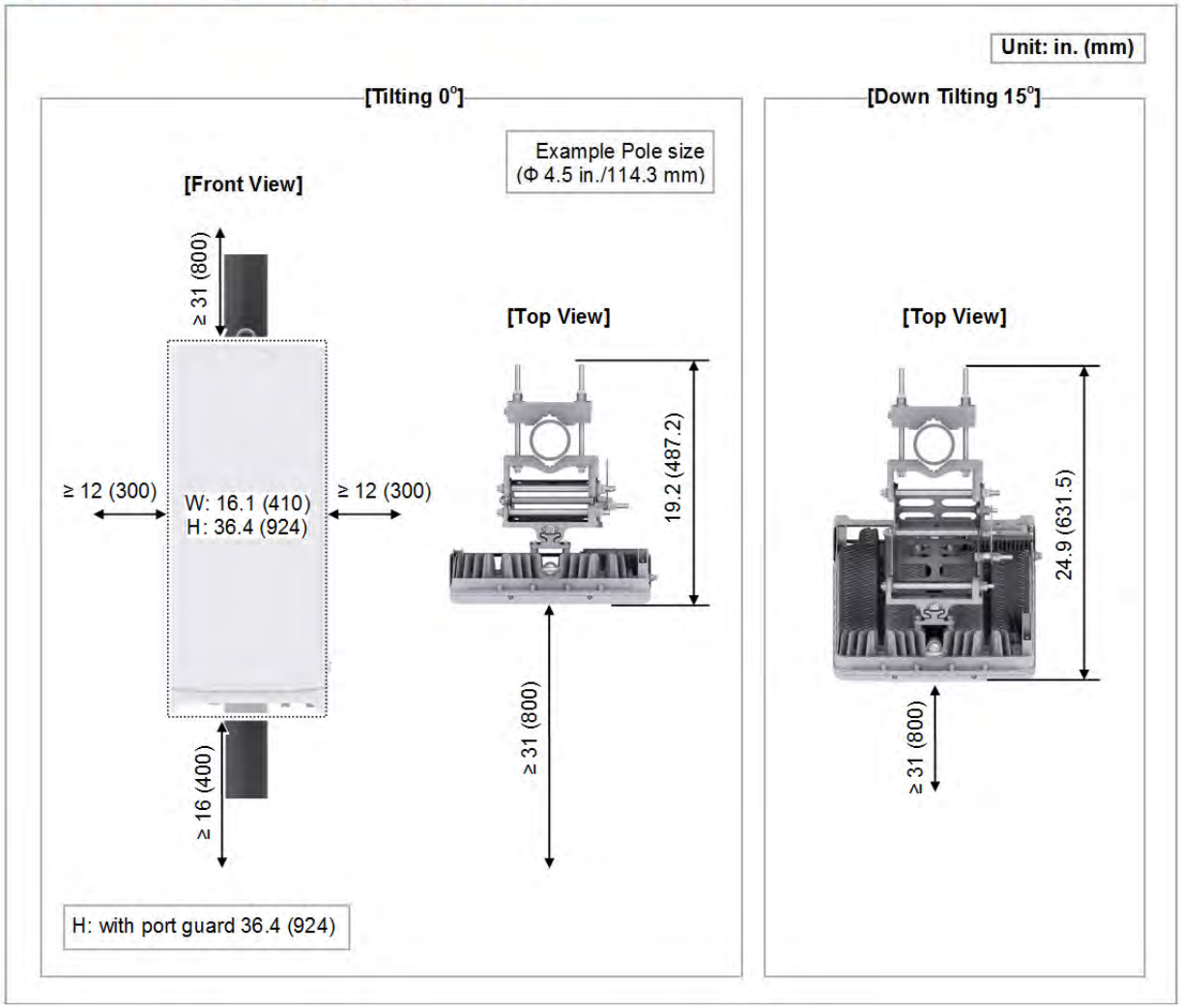
Figure 3. Procedure to Install the MMU



System Arrangement

A minimum distance must be provided around the MMU in each direction for installation and maintenance.

Figure 4. MMU Arrangement_Pole Type Installation

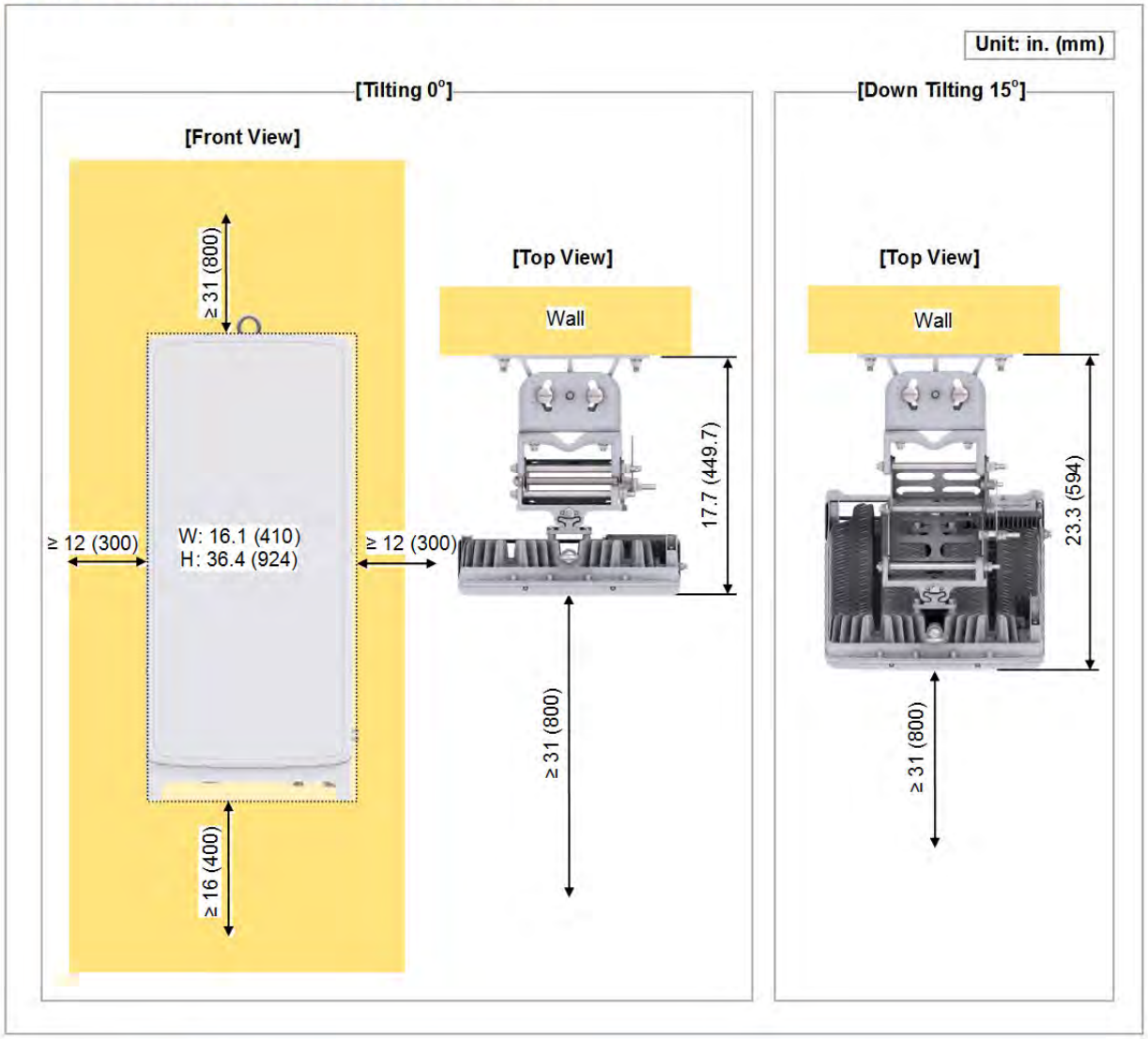


The dimensions of the front MMU changes according to the tilt angle, and the maximum dimensions are described in the following figure (MMU Arrangement_ Down Tilting 15°).

When fixing a mounting bracket, the length of stud bolts should be 8.7 in (220 mm) is required for the pole diameter with 50 to 100 A.

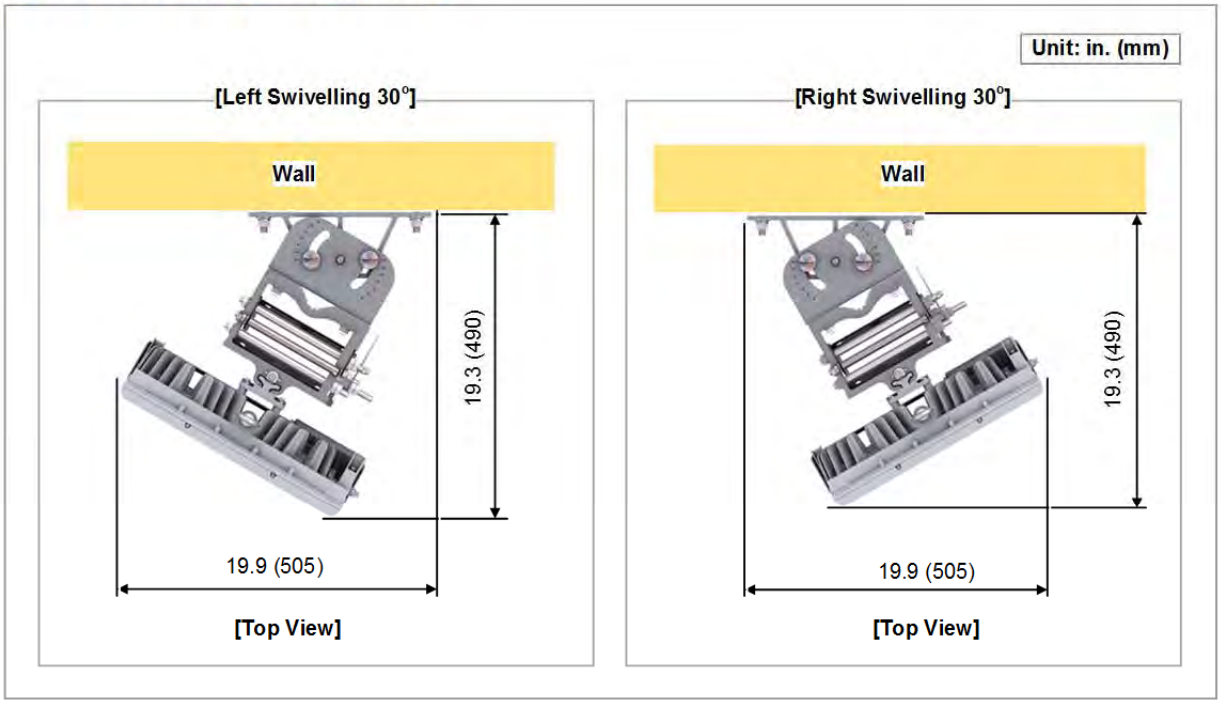
Pole Size (Diameter)	Length of Stud Bolt
50 A, 65 A, 80 A, 90 A, 100 A	8.7 in. (220 mm)

Figure 5. MMU Arrangement_Wall Type Installation



The dimensions of the front of the MMU changes according to the tilt angle, and the maximum dimensions are described in the following figure (MMU Arrangement_Down Tilting 15°).

Figure 6. MMU Arrangement_Swivelling



The dimensions of the front of the MMU changes according to the tilt angle, and the maximum dimensions are described in the following figure (MMU Arrangement_ Left, Right Swivelling 30°).

Transporting and Unpacking

This section describes how to transport the items to the installation place and provides the procedure to unpack cabinets and other components.

Bringing in Items

Ensure the following at each stage of transporting the items:

- Before moving a system, check storage place for the system and remove obstacles in advance.
- When carrying the system:
  - Fasten the system firmly to the transport vehicle or carrier to prevent damage to the system from a vibration or shock.
  - Use an elevator to prevent accidents.
  - If the system must be carried by people, ensure there are enough people to carry the system.
- The system must not be shocked physically.
- The system should be protected from dust, moisture, and static electricity.

Unpacking

To unpack the items, ensure the following:

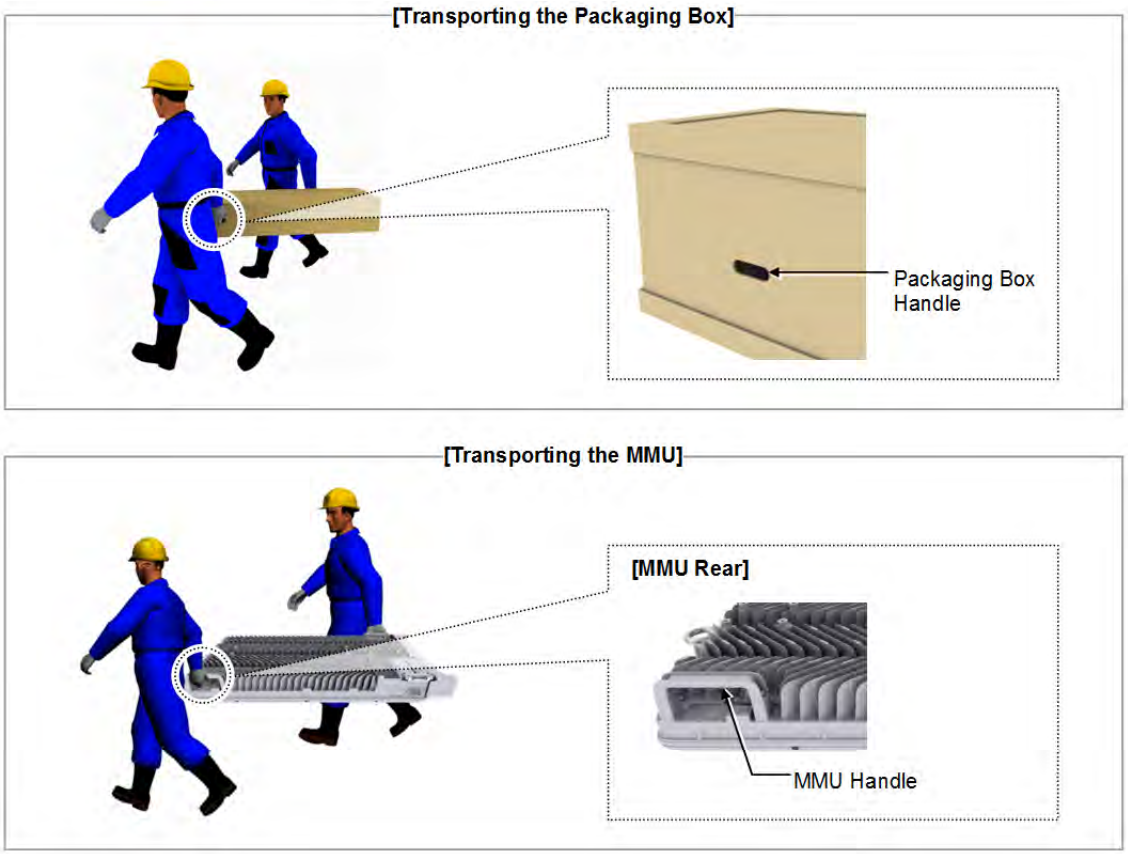
- The items must be packed until those reach the installation place.
- The items are classified in accordance with each job specification and stored in a place that does not interfere with working.
- Unpacked systems must be installed immediately. If immediate installation of the systems is not planned, the systems must be stored in the installation place temporarily.
- Unpack only external packing, leave the internal packing in unpacked status.
- Unpack the inner packaging after each system is placed on its installation location.
- Dispose by-products (packaging waste) in accordance with management rules. Do not recycle the by-products.

MMU Handling

When moving the MMU or its packaging box, use the handles located on both sides of the MMU or its packaging box.

Lifting Hazard
Single person lift could cause injury. Get the help when moving or lifting the MMU.

Figure 7. Transporting the MMU



Fixing MMU

This section describes the procedures to fix the MMU by different methods.

Fixing Unit Bracket

These instructions for mounting a unit bracket to the MMU apply to all installation types.

To fix the unit bracket, do the following:

Prerequisites

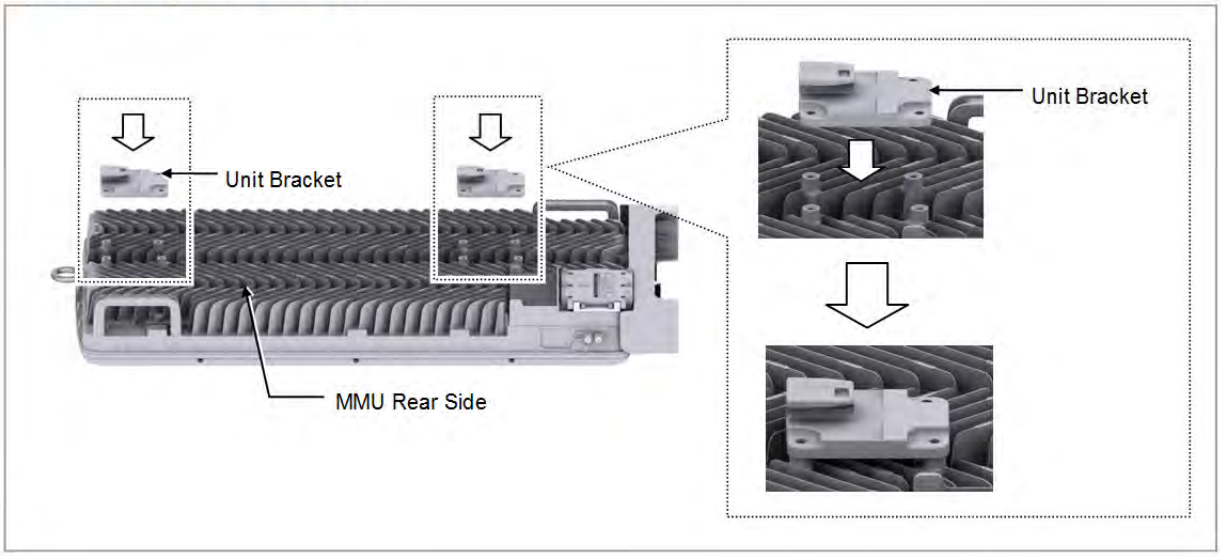
Before proceeding with fixing the unit bracket, make sure that you have the items described in the following table.

Table 3. Parts and Tools for Fixing Unit Bracket on MMU

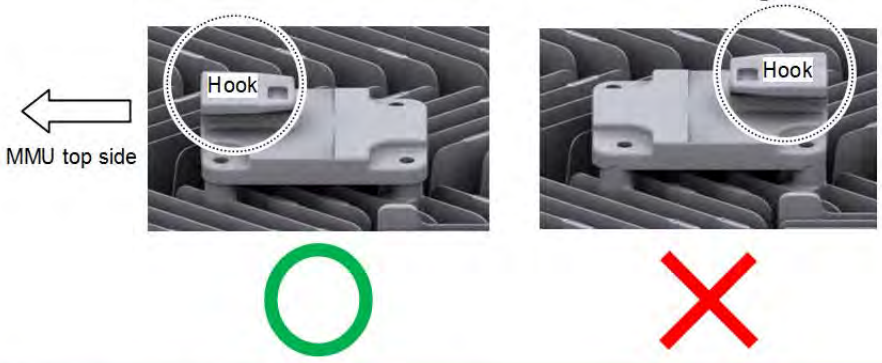
Category	Description		
Parts	Unit Bracket		2 EA
	Fasteners	M6 × L20 hexagonal bolt (Washer assembly)	8 EA
Recommended Torque Value	M6 hexagonal bolt		43 lbf·in
Working Tools	• Torque Wrench (10 to 50 lbf·in) • Torque Wrench Spanner Head (hexagonal head: 10 mm) • Spanner (hexagonal head: 10 mm)		

1 Check the position for mounting the unit bracket on the back of the MMU and place the unit bracket it in that position.

Figure 8. Fixing Unit Bracket (1)

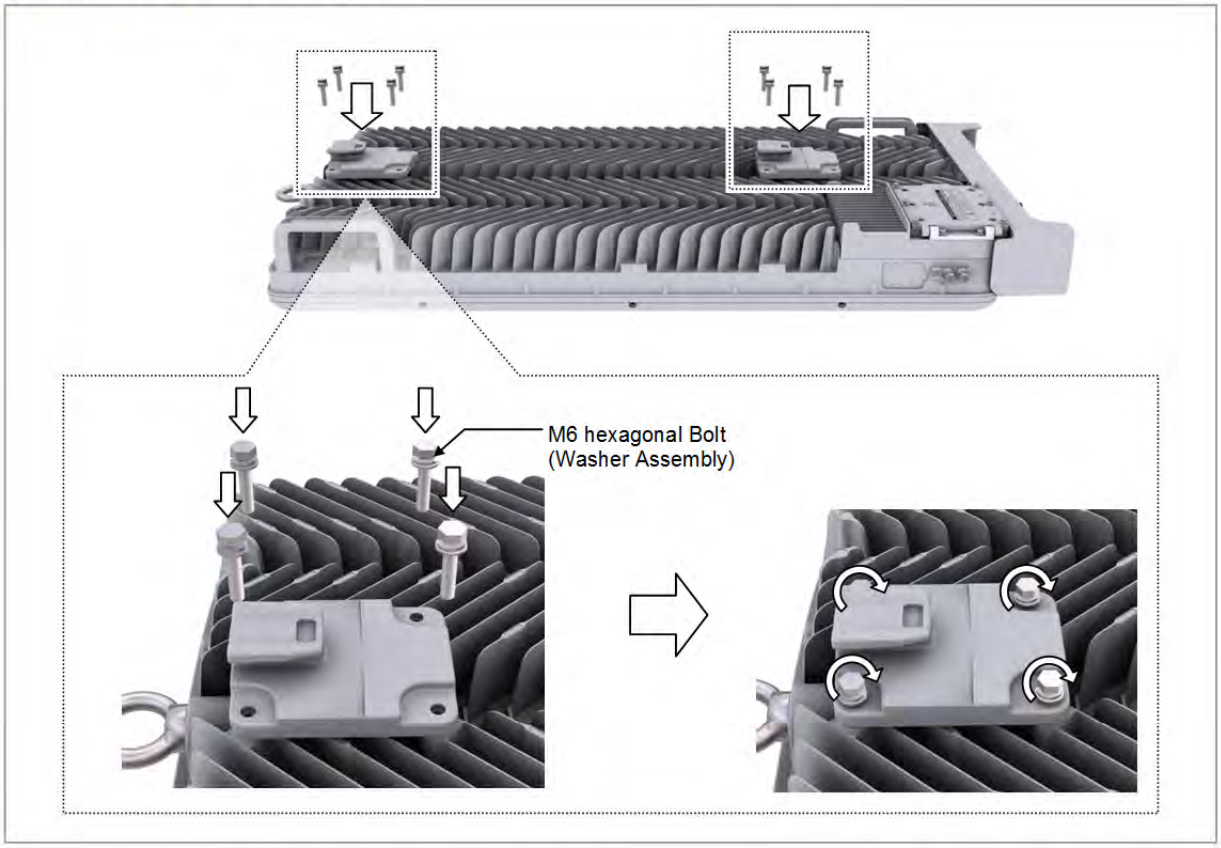


The hooks of the unit brackets should be oriented towards the top of the MMU.



2 Fix the unit bracket using fasteners.

Figure 9. Fixing Unit Bracket (2)



Fixing Pole Type

This section describes the procedures for fixing the system on the pole.

Assembling Pole Mount Bracket-Bottom

To assemble the pole mount bracket-bottom, do the following:

Prerequisites

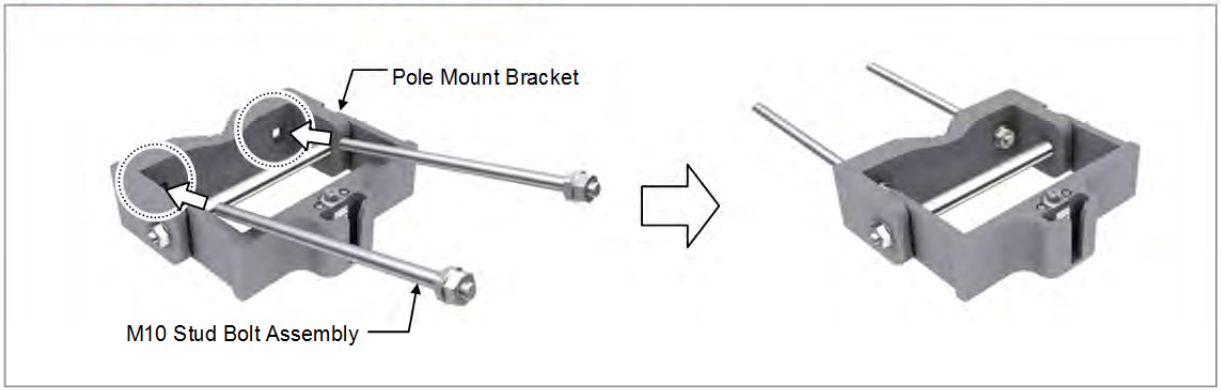
Before proceeding with assembling the pole mount bracket-bottom, make sure that you have the items described in the following table.

Table 4. Parts and Tools for Assembling Pole Mount Bracket-Bottom

Category	Description		
Parts	Mounting Bracket-Bottom Assembly		1 EA
	Rear Bracket		1 EA
	Fasteners	M10 × L220 Stud Bolt Assembly	2 EA
		M10 Flange nut M10 Hexagon nut	2 EA 2 EA
Recommended Torque Value	M10 nut		217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (hexagonal head: 17 mm) • Spanner (17 mm)		

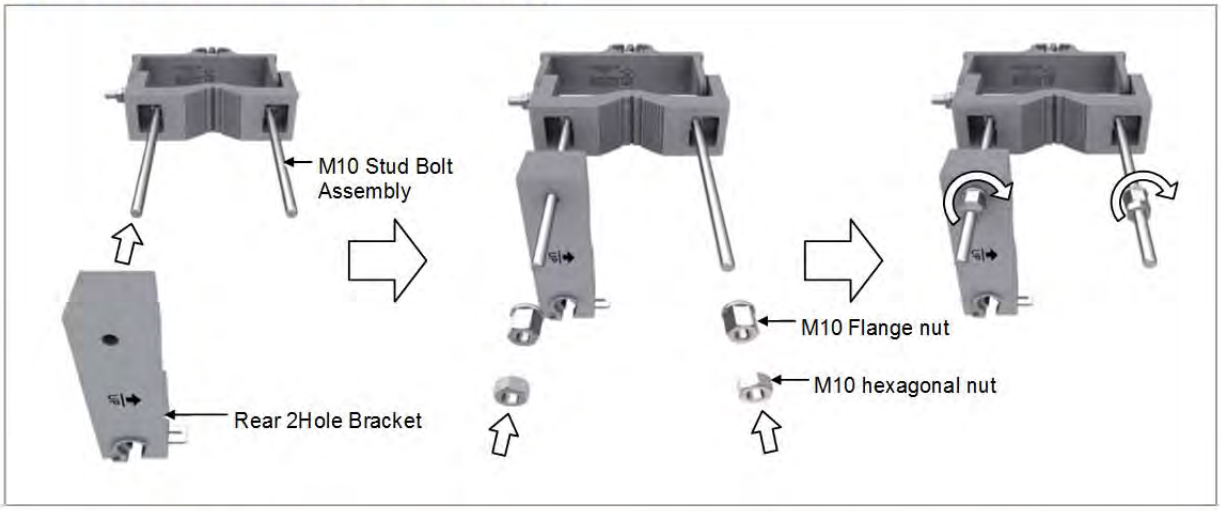
1 Pass the stud bolt assembly through the pole mount bracket holes.

Figure 10. Fixing Pole Mount Bracket-Bottom (1)

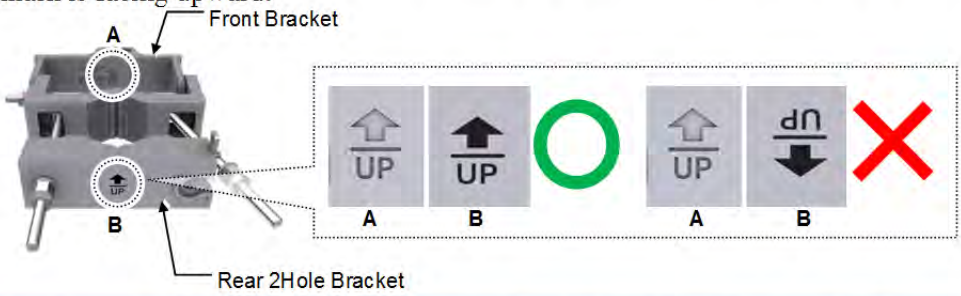


2 Insert the rear bracket into the stud bolt assembly and tighten the fasteners temporarily.

Figure 11. Fixing Pole Mount Bracket-Bottom (2)

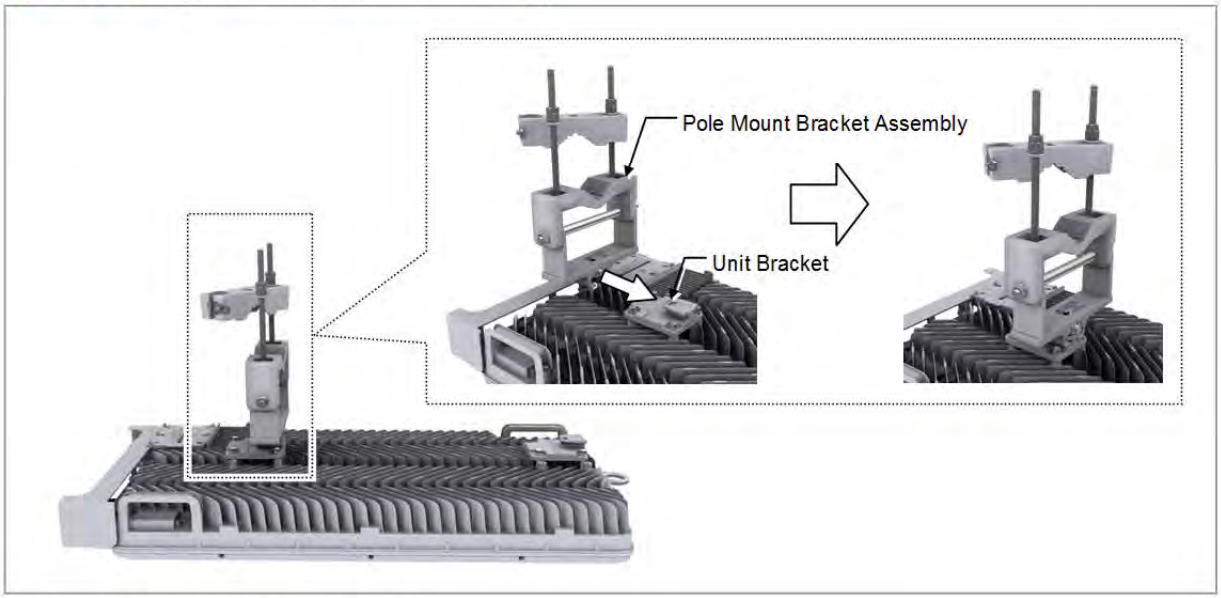


When assembling the front bracket and rear 2hole bracket, make sure the up arrow mark is facing upward.

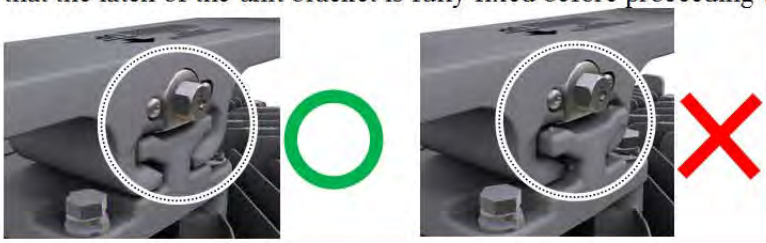


3 Move the latch of the unit bracket until the lock of the pole-mount bracket assembly is engaged.

Figure 12. Fixing Pole Mount Bracket-Bottom (3)



If the latch of the unit bracket is not fully inserted and fixed, the pole-mount bracket assembly may detach and fall, which can damage the equipment. Ensure that the latch of the unit bracket is fully fixed before proceeding to the next step.



Assembling Pole Mount Bracket-Top

To assemble the pole mount bracket-top, do the following:

Prerequisites

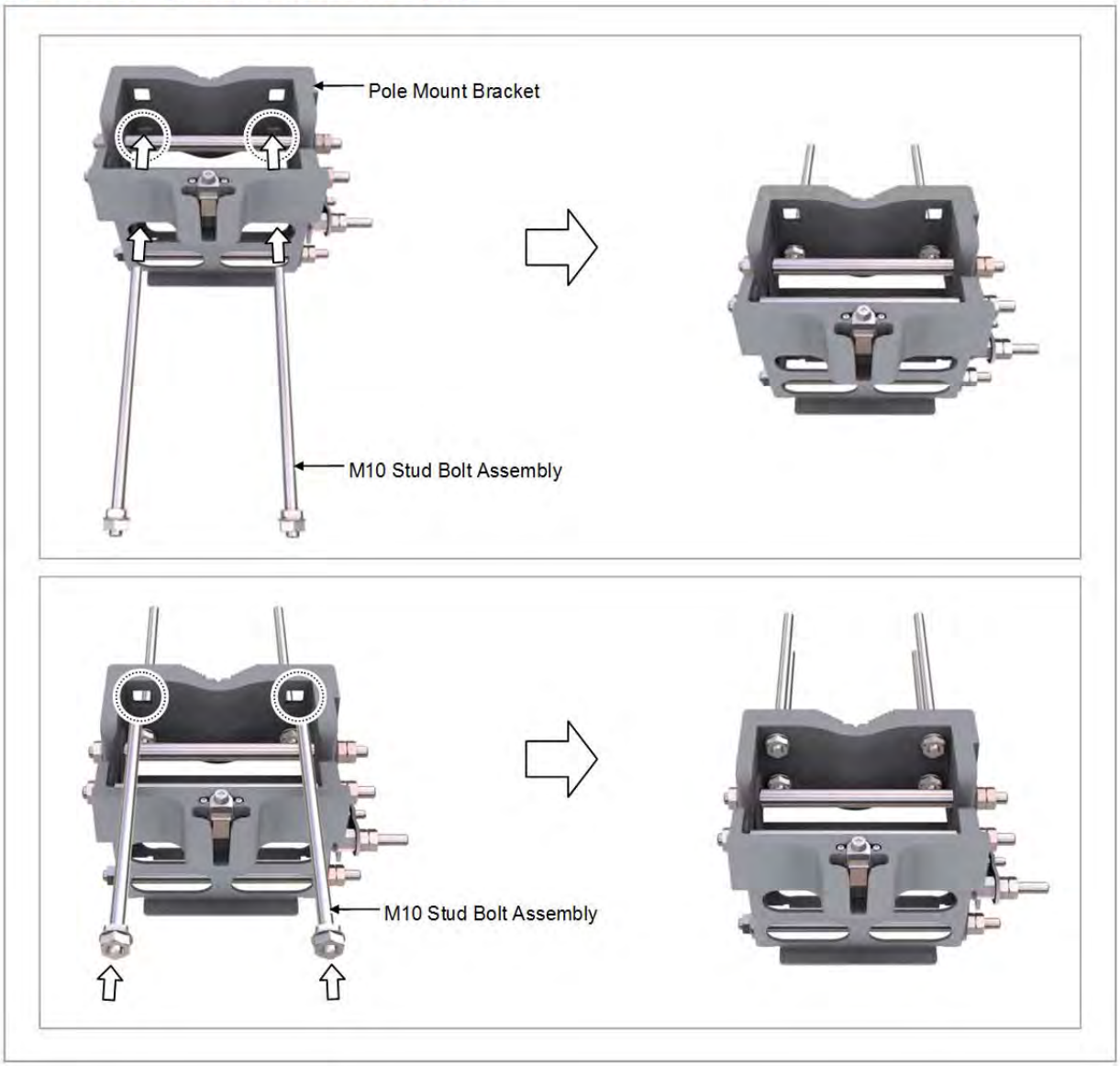
Before proceeding with assembling the pole mount bracket-top, make sure that you have the items described in the table below:

Table 5. Parts and Tools for Fixing Pole Mount Bracket-Top

Category	Description		
Parts	Mounting Bracket-Top Assembly		1 EA
	Rear Bracket		1 EA
	Fasteners	M10 × L220 Stud Bolt Assembly	4 EA
		M10 Flange nut M10 Hexagon nut	4 EA 4 EA
Recommended Torque Value	M10 nut		217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (hexagonal head: 17 mm) • Spanner (17 mm)		

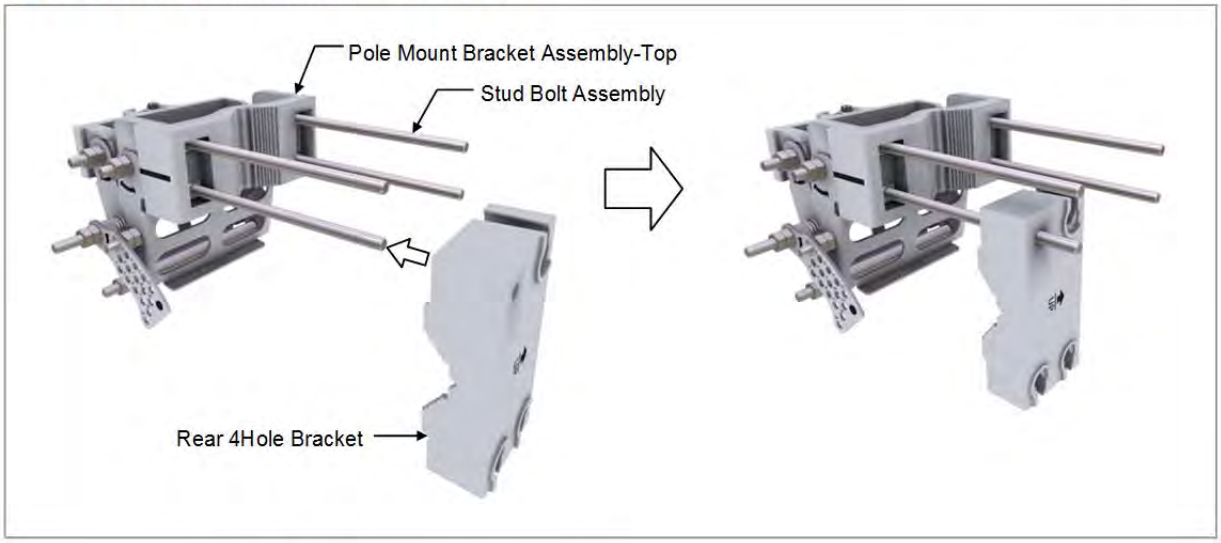
1 Move the stud bolt assembly through the pole mount bracket holes.

Figure 13. Fixing Pole Mount Bracket-Top (1)



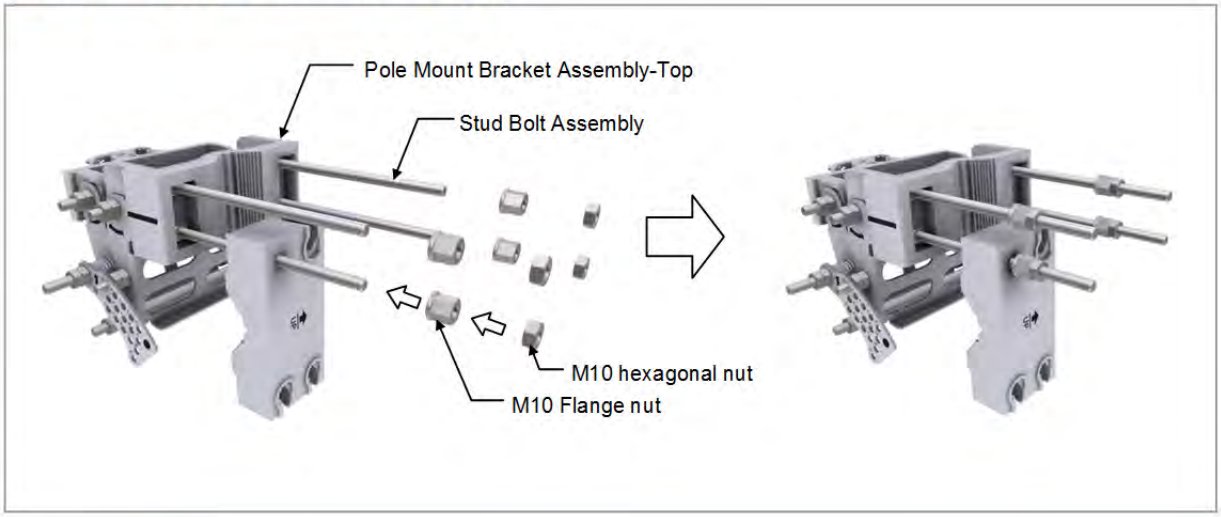
2 Insert the rear 4-hole bracket into the stud bolt.

Figure 14. Fixing Pole Mount Bracket-Top (2)

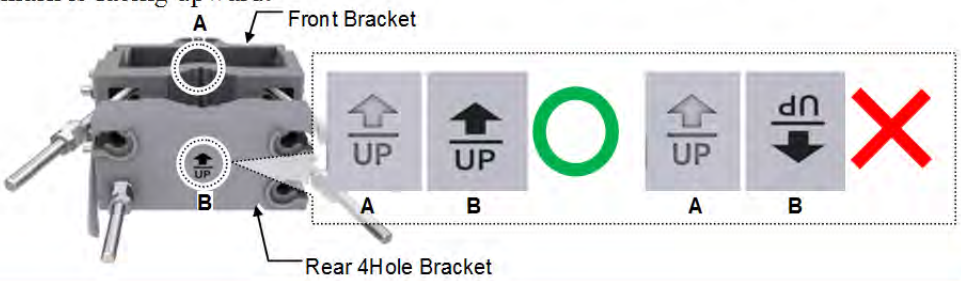


3 Fix the fasteners temporarily.

Figure 15. Fixing Pole Mount Bracket-Top (3)



When assembling the front bracket and rear 4hole bracket, make sure the up arrow mark is facing upward.

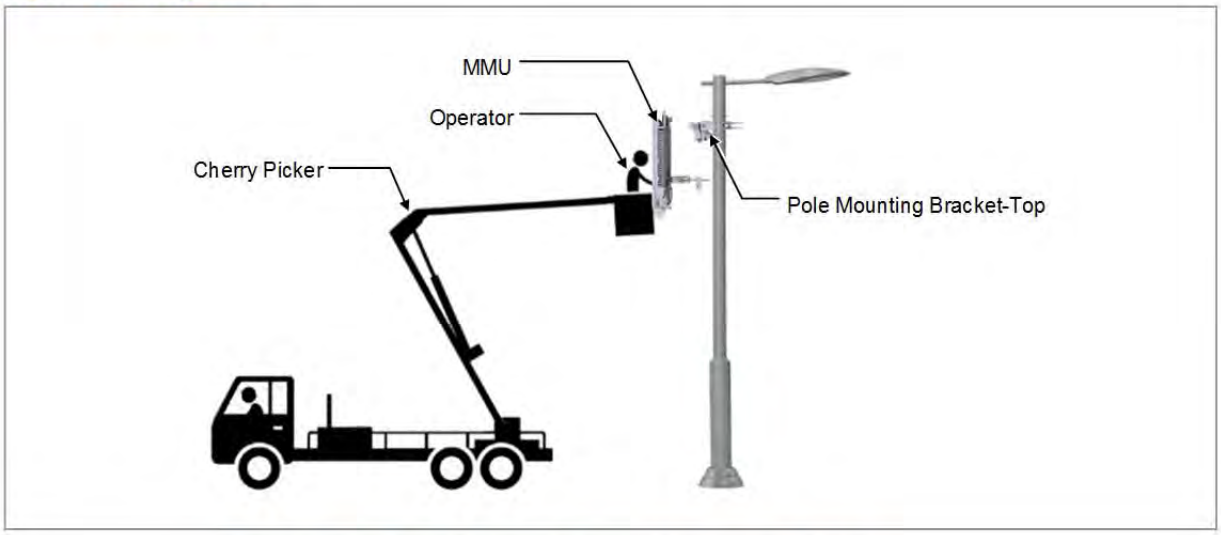


Lifting MMU & Pole Mount Bracket Assembly-Top

To lift the MMU, do the following:

Lift the **MMU** with a cherry picker.

Figure 16. Lifting MMU



Fixing Pole Mount Bracket Assembly-Top on the Pole

To fix the pole mount bracket assembly-top on the pole, do the following:

Prerequisites

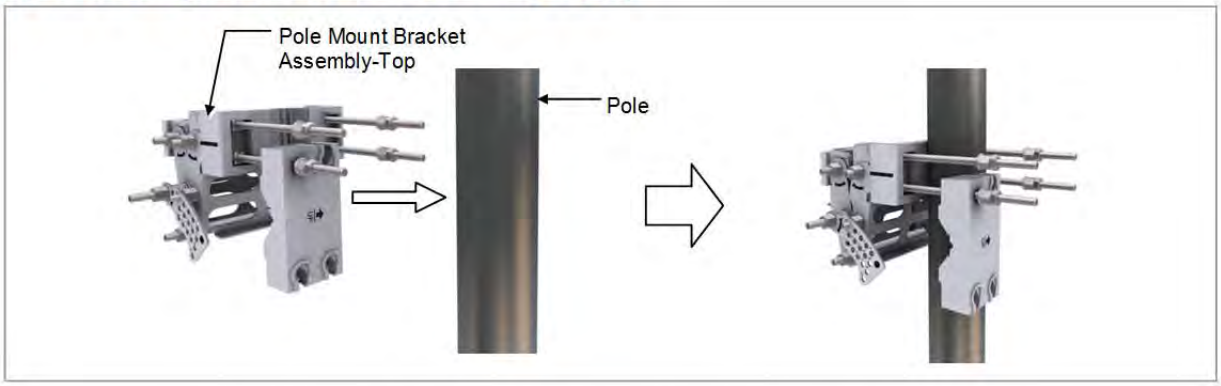
Before fixing the pole mount bracket assembly-top on the pole, make sure that you have the items described in the following table.

Table 6. Parts and Tools for Fixing Pole Mount Bracket Assembly-Top

Category	Description	
Parts	Pole Mount Bracket Assembly-Top	1 EA
Recommended Torque Value	M10 nut	217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (hexagonal head: 17 mm) • Spanner (17 mm)	

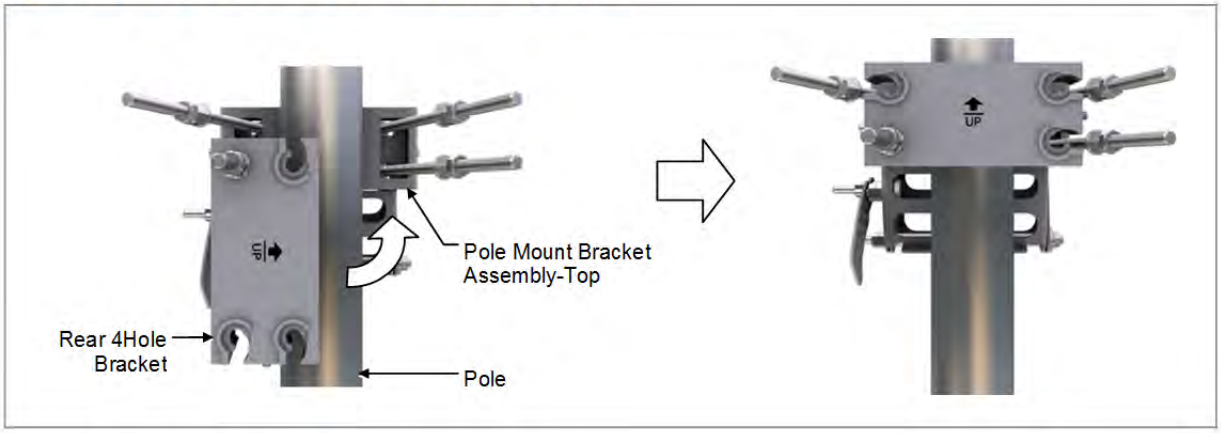
1 Place a pole mount bracket assembly-top to the pole.

Figure 17. Fixing Pole Mount Bracket Assembly-Top (1)



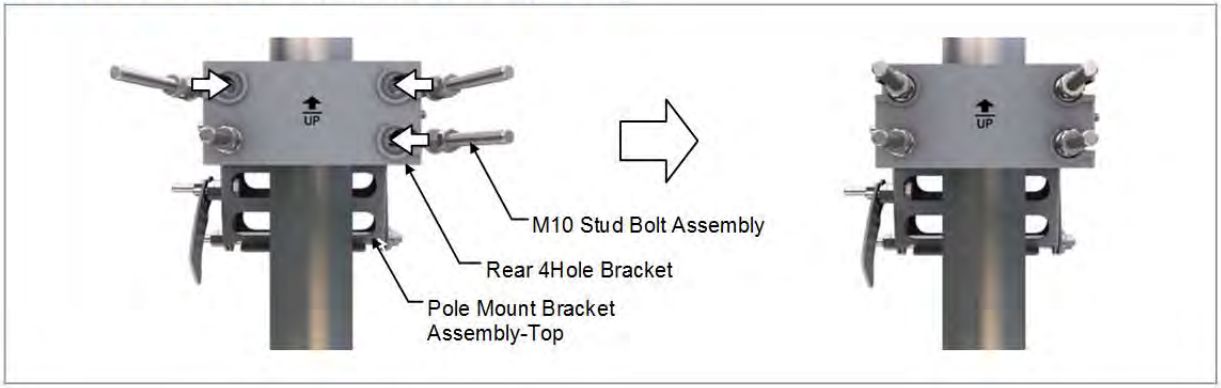
2 Place the rear 4-hole bracket horizontally in the fixed position.

Figure 18. Fixing Pole Mount Bracket Assembly-Top (2)



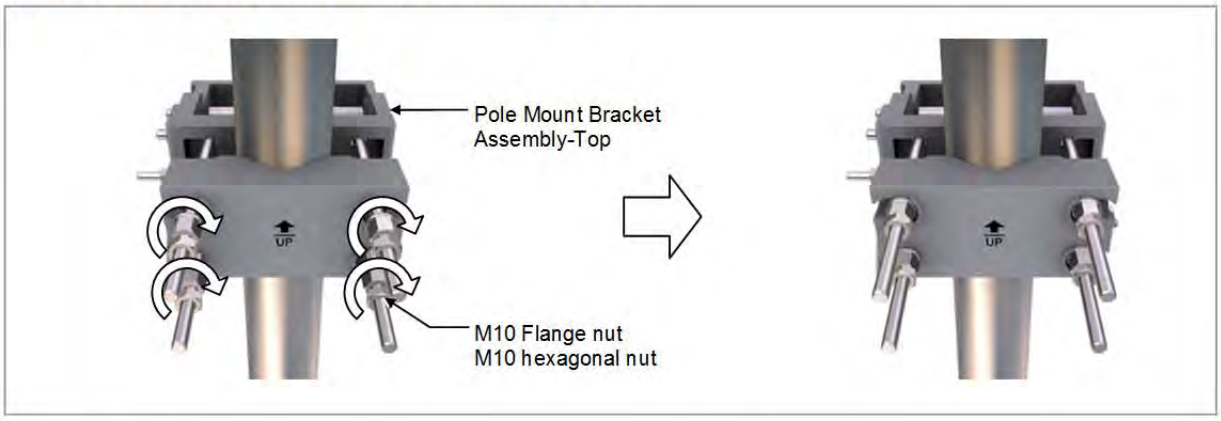
3 Insert the three loosened stud bolt assemblies into the fixing hole of the rear 4-hole bracket.

Figure 19. Fixing Pole Mount Bracket Assembly-Top (3)

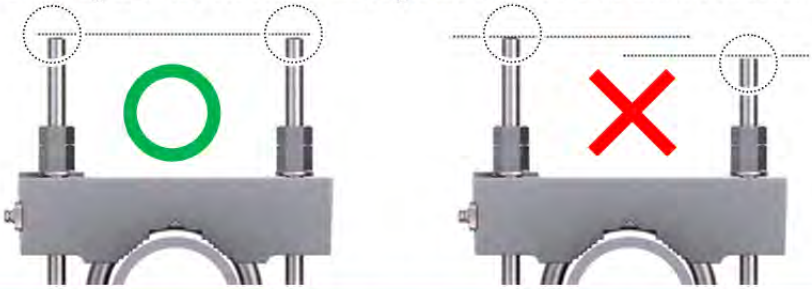


4 Tighten the flange and the hexagon nuts that are fastened to the stud bolt assembly.

Figure 20. Fixing Pole Mount Bracket Assembly-Top (4)

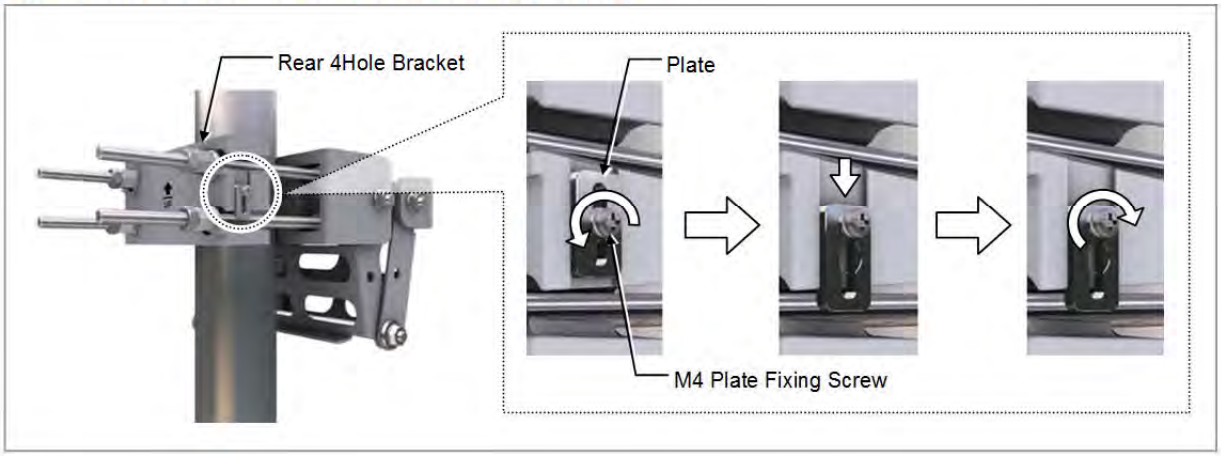


The length of the stud bolts through the rear brackets must be same.

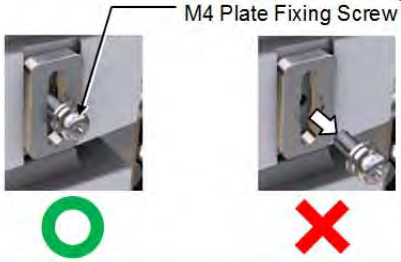


5 Re-fix the plate by rotating counterclockwise at the back of rear 4hole bracket.

Figure 21. Fixing Pole Mount Bracket Assembly-Top (5)

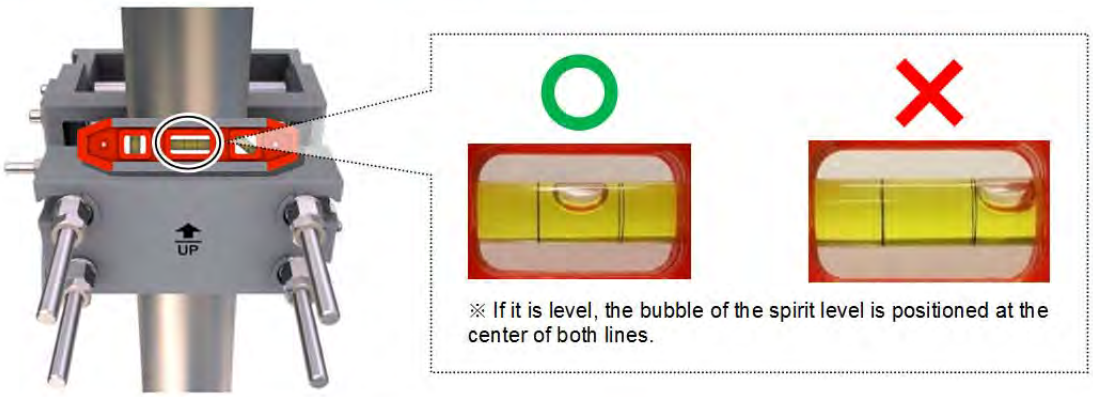


Do not take the fasteners out completely.



6 Check the level of pole mount bracket assembly-top on the pole and adjust the level.

Figure 22. Fixing Pole Mount Bracket Assembly-Top (6)



When fixing the pole mount bracket assembly-top on a pole, ensure to check the level of bracket. After finishing the installation, you can do only minor adjustments.

When poor levelling occurs, adjust the position of fasteners, which is used to fix the pole mount bracket assembly-top or its levelling status.

Fixing MMU on the Pole

To fix the MMU on the pole, do the following:

Prerequisites

Before proceeding with fixing the MMU on the pole, make sure that you have the items described in the table below.

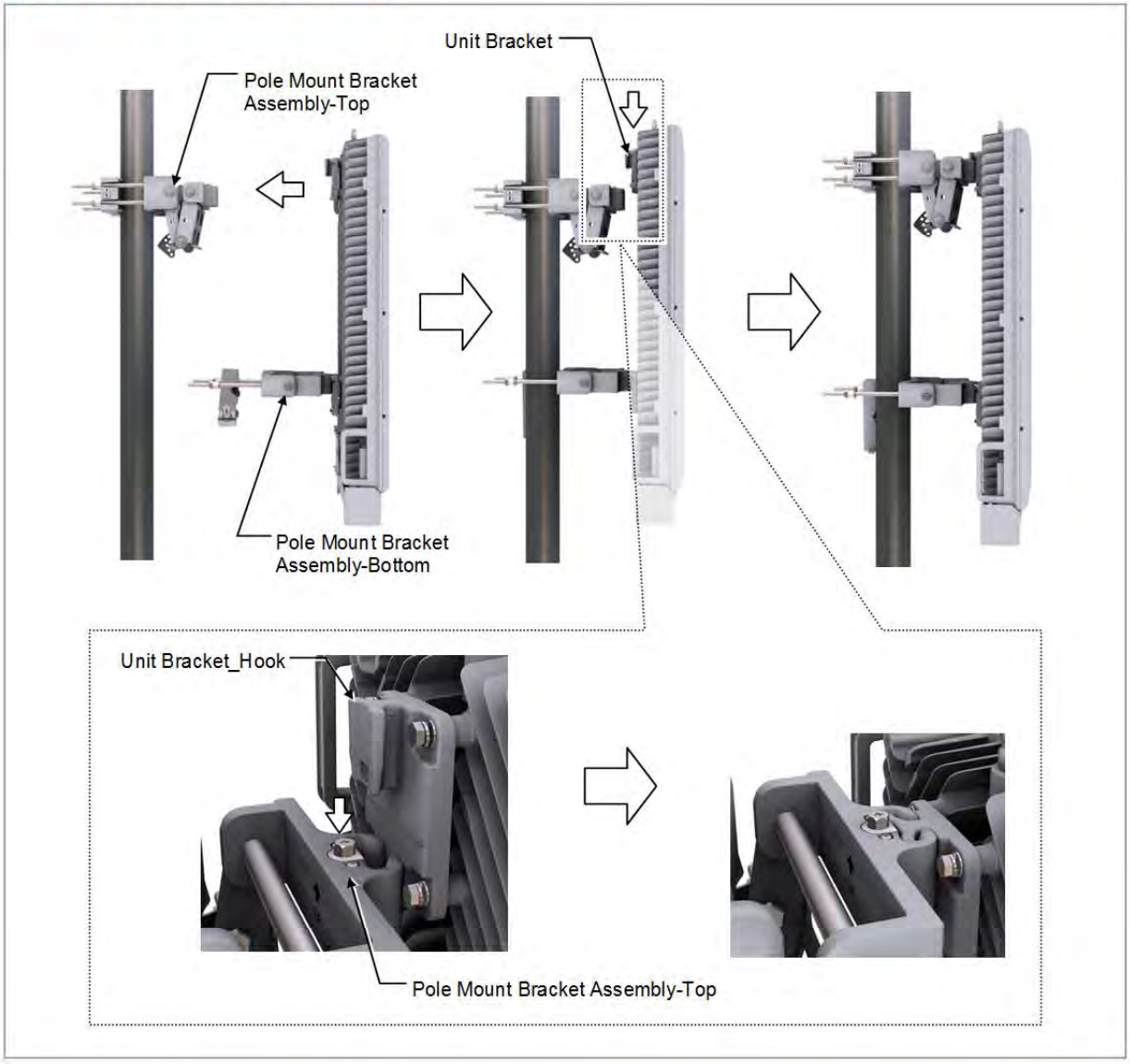
Table 7. Parts and Tools for Fixing MMU on the Pole

Category	Description	
Recommended Torque Value	M10 nut	217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (hexagonal head: 17 mm)	

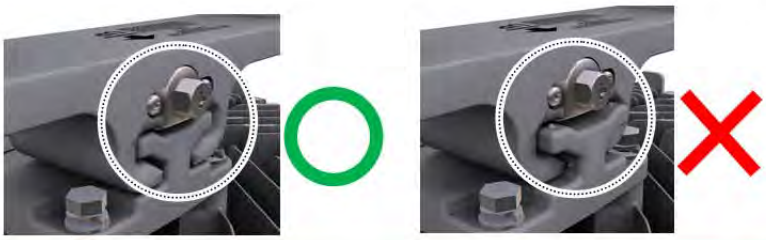
Category	Description
	• Spanner (17 mm)

1 Hang the unit bracket hook of MMU on the pole mount assembly-top hook's groove.

Figure 23. Fixing MMU on the Pole (1)

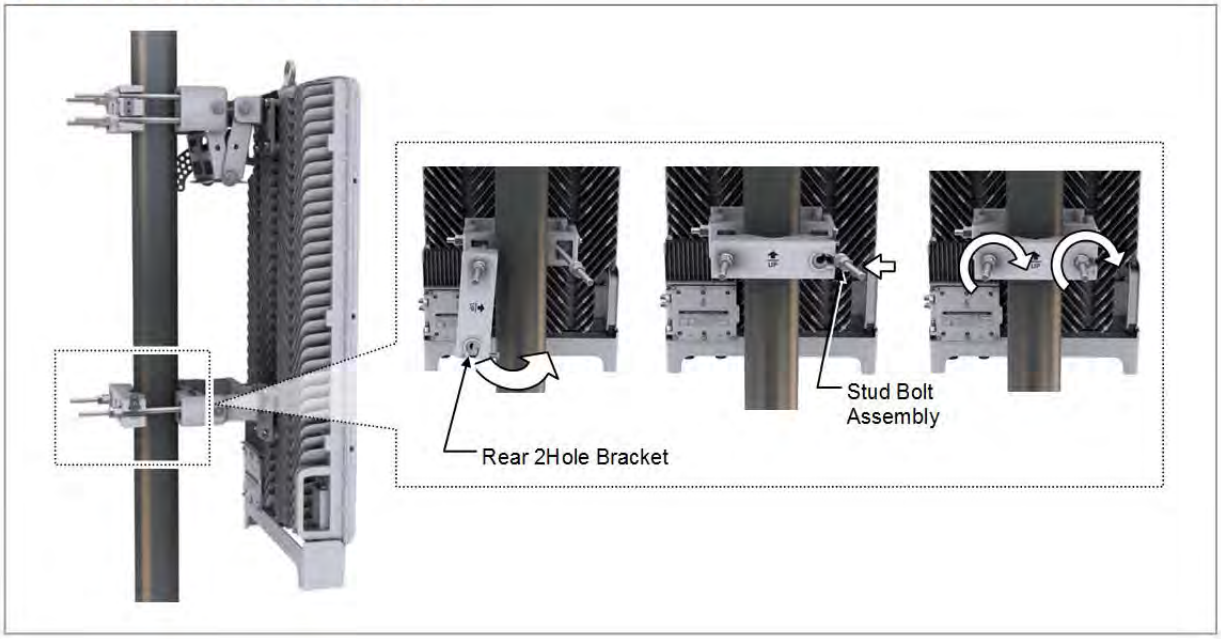


When the MMU is fixed to the mount bracket assembly, the hooks of the unit brackets must be completely inserted into the fixing grooves of the mount bracket assembly. This ensures that the unit brackets stay intact during vibration or external influences.

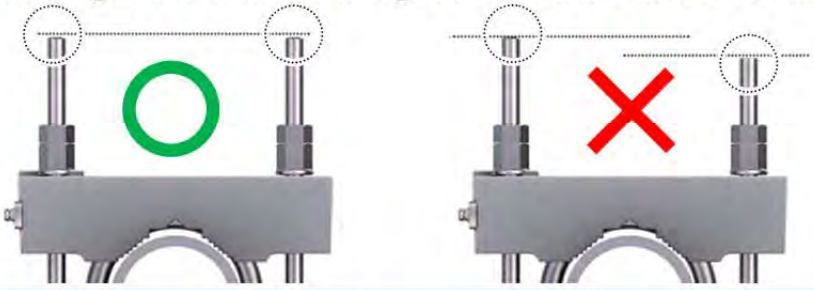


2 Place the rear 2-hole bracket horizontally in the fixed position, insert the stud bolt assembly into the rear 2-hole bracket fixing hole, and fix the flange and hexagon nuts.

Figure 24. Fixing MMU on the Pole (2)

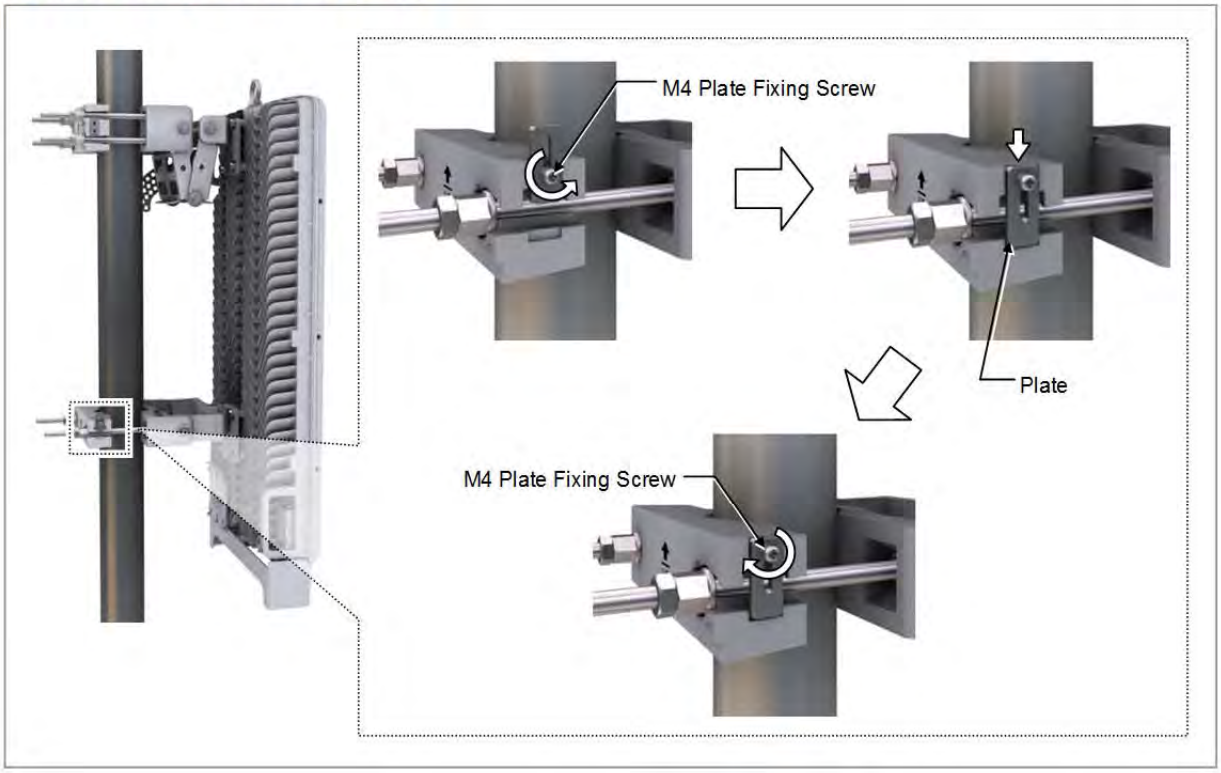


The length of the stud bolts through the rear brackets must be the same.

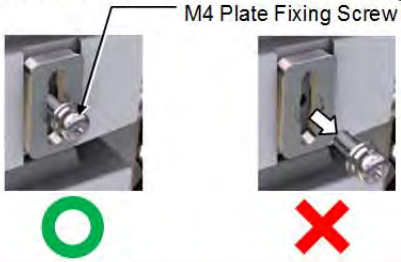


3 Re-fix the plate by rotating counterclockwise at the back of the rear 2hole bracket.

Figure 25. Fixing MMU on the Pole (3)



Do not take the fasteners out completely.



4 By using the RF alignment tool, check the tilt and the azimuth, and adjust when there is an issue.

For detailed instructions of how to use the RF alignment tool, refer to the user manual per each manufacturer.

Fixing Wall Type

This section describes the procedures for fixing the system on the wall.

Marking

To marking, do the following:

Prerequisites

Before proceeding with the marking, make sure that you have items described in

the following table.

Table 8. Tools for Marking

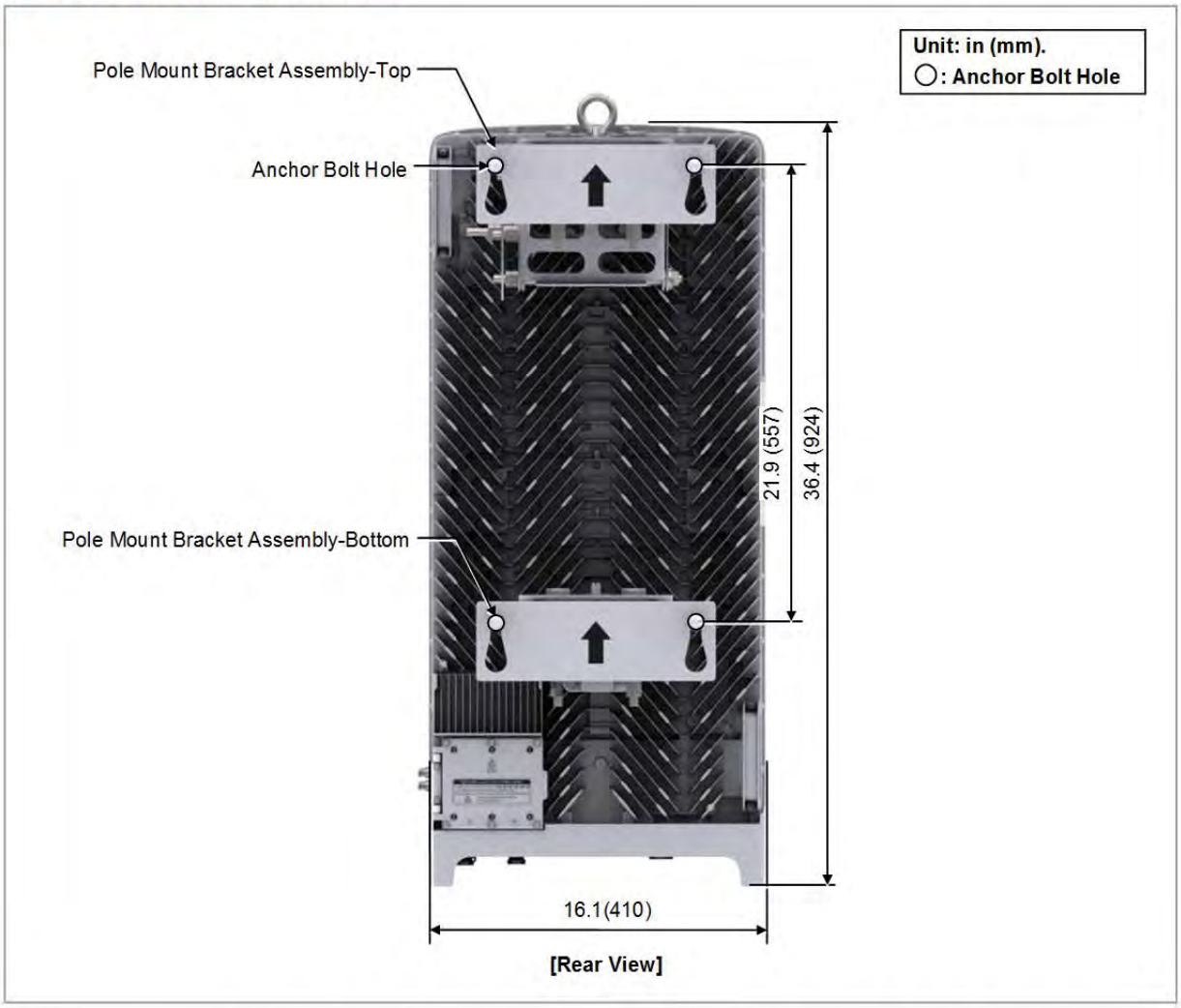
Category	Description	
Part	Marking paper	1 EA
Working Tools	• Tape Measure • Permanent Maker • Level	

To mount the system on a wall, perform the leveling test (refer System Leveling) to check the positions that are marked to be horizontal or vertical before drilling. If the result shows they are not horizontal or vertical, modify the marking positions.

When the position is determined for placing the system, place the system on that position and then mark the positions where anchor bolts will be fixed. This will reduce the marking error.

1 Check the distance between the location, for fixing the MMU and the anchor bolt hole.

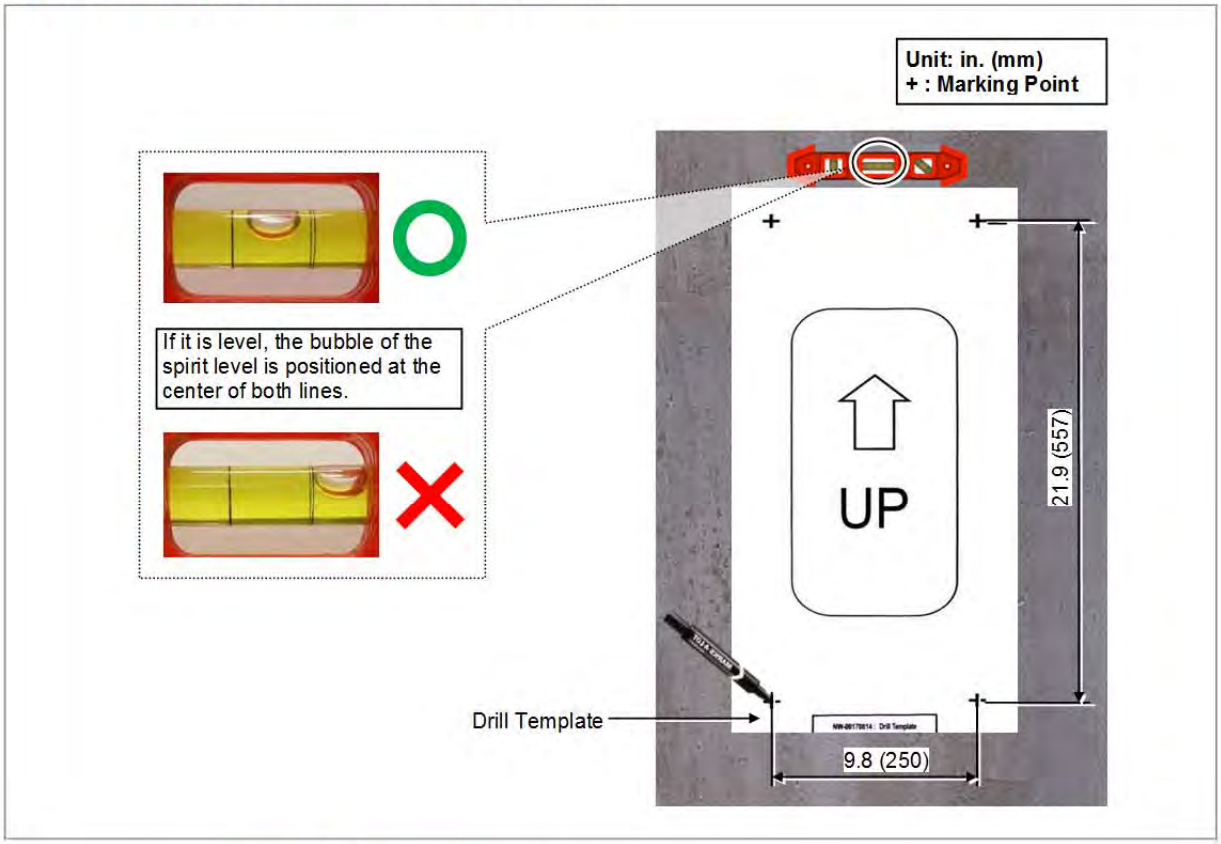
Figure 26. MMU Marking Dimensions



2 Place a marking paper on the fixing location, and then check the level status using a level and adjust the level of marking paper.

3 If the level status is normal, mark the anchor bolt holes on a wall.

Figure 27. Marking_Wall Mount Bracket-Top Assembly



Drilling & Anchoring

To drill an anchor hole, do the following:

Prerequisites

Before proceeding with the drilling and anchoring process, ensure that you have the items described in the following tables.

Table 9. Parts and Tools for Drilling & Anchoring

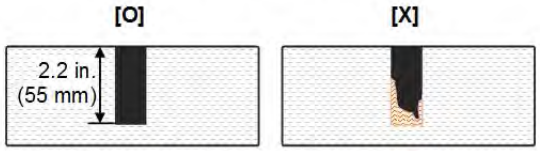
Category	Description	
Parts	M12 × L125 Set Anchor Assembly	4 EA
Working Tools	• Hammer Drill • Concrete Drill Bit [0.7 in. (17 mm)] • Vacuum Cleaner • Hammer • Anchor Punch (for M12 Set Anchor)	

Table 10. Anchor Bolt Drill Bits and Hole Depth

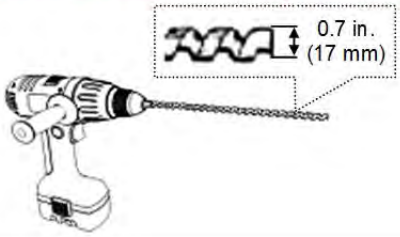
Category	Anchor Bolt	Drill Bits	Hole Depth
Wall Type	M12	0.7 in. (17 mm)	2.2 in. (55 mm)

Category	Anchor Bolt	Drill Bits	Hole Depth

[Anchor Hole Cross Section]



* Remove the debris from the drilled hole.

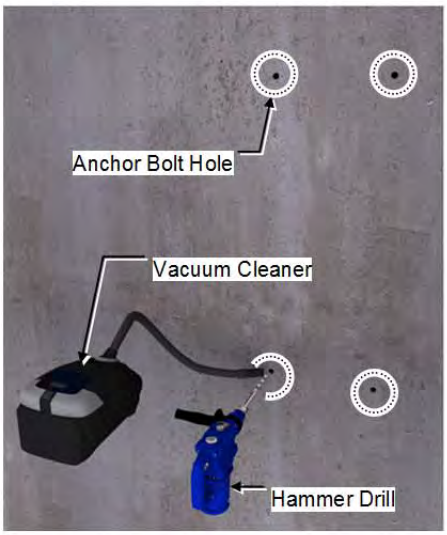


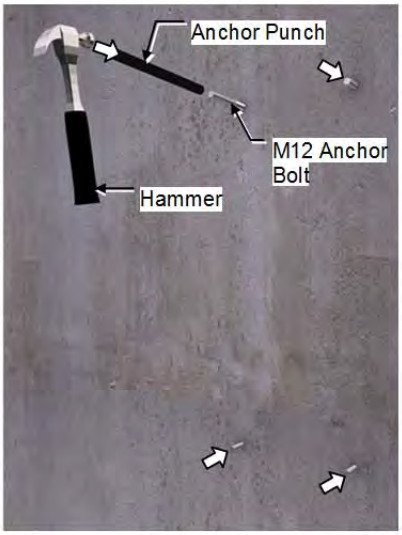
1 Drill anchor holes at the marked points, and remove the dust from the holes using a cleaner.

Operator can drill after drill template is removed or remove the drill template after drilling according to the installation site conditions.

2 Fix set anchor to the drilled hole.

Figure 28. Drilling & Anchor (1)

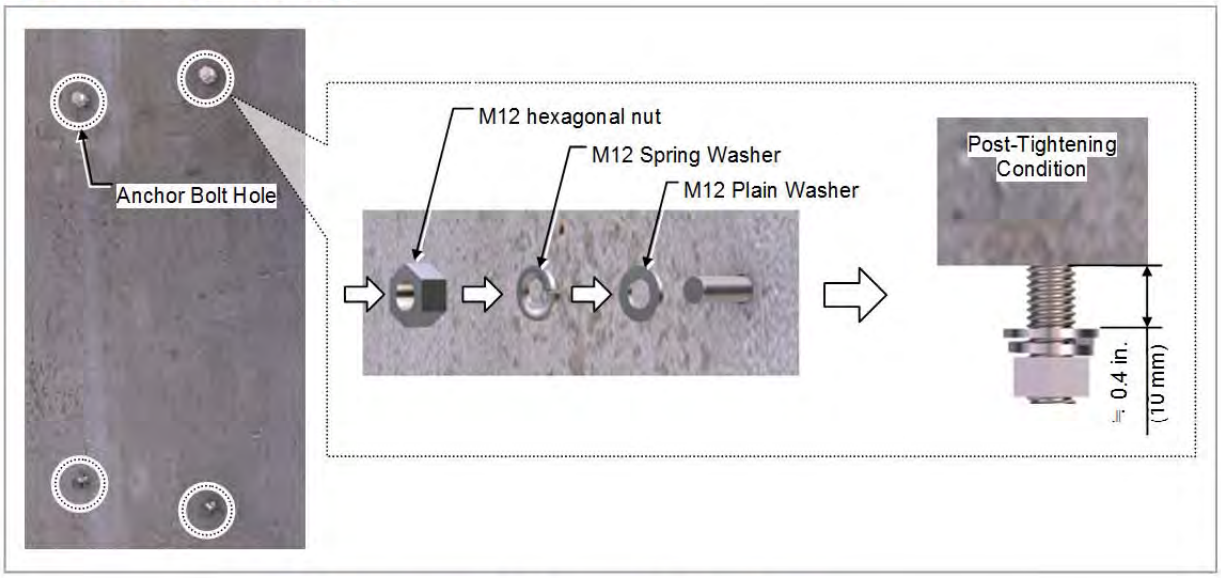




[Drill Bit]

3 Fix fasteners to anchor bolt temporarily.

Figure 29. Drilling & Anchor (2)



Fixing Mount Bracket-Top Assembly on the Wall

To fix the mount bracket-top assembly on the wall, do the following:

Prerequisites

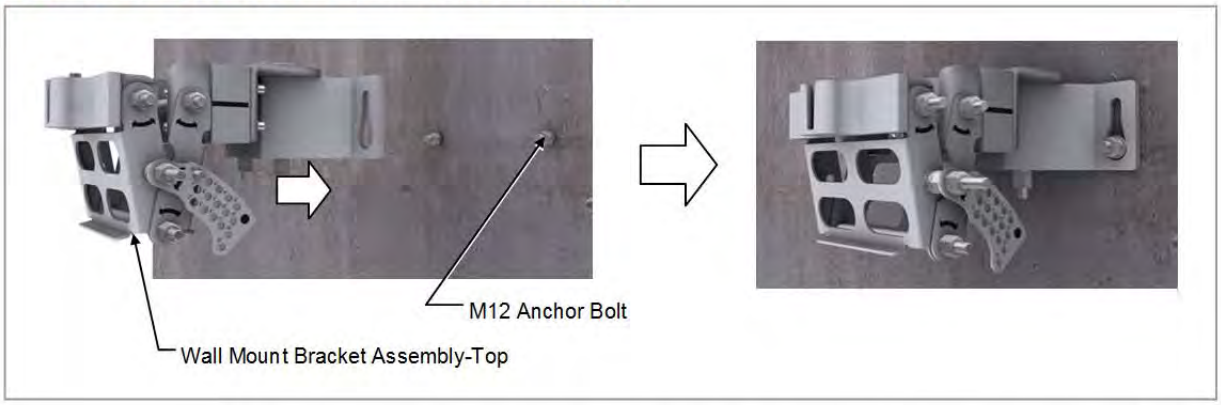
Before proceeding with fixing the mount bracket-top assembly on the wall, ensure that you have the items described in the following table.

Table 11. Parts and Tools for Fixing Mount Bracket-Top Assembly

Category	Description	
Parts	Wall Mount Bracket Assembly-Top Assembly	
Recommended Torque Value	M12 hexagonal nut	372 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner Head (hexagonal head: 19 mm) • Spanner (19 mm)	

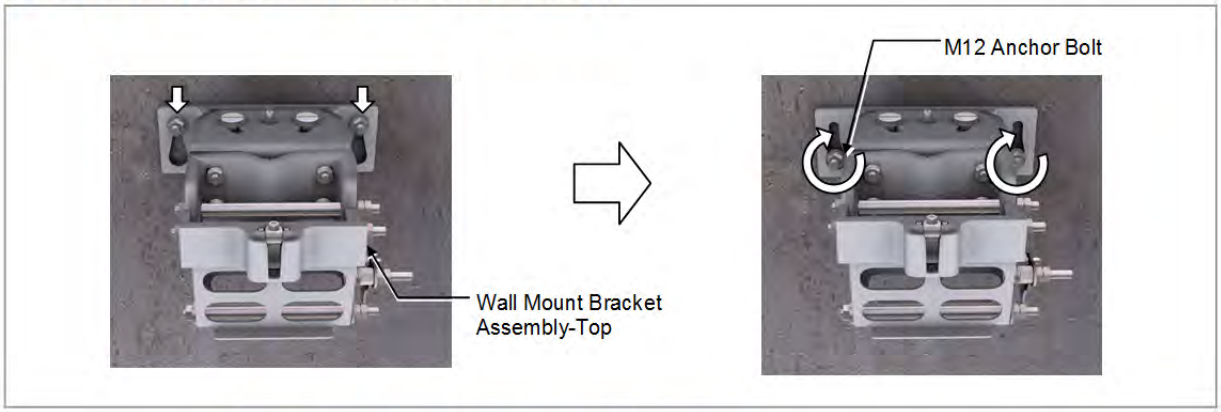
1 Hang the mounting bracket-top assembly fixing hole of the MMU rear to the anchor bolt, which is fixed on the wall.

Figure 30. Fixing Wall Mount Bracket-Top Assembly (1)



2 Fix mounting bracket-top assembly using fasteners at all the sides (right/left and top/bottom).

Figure 31. Fixing Wall Mount Bracket-Top Assembly (2)



Assembling Pole Mount Bracket-Bottom

To assemble the pole mount bracket-bottom, do the following:

Prerequisites

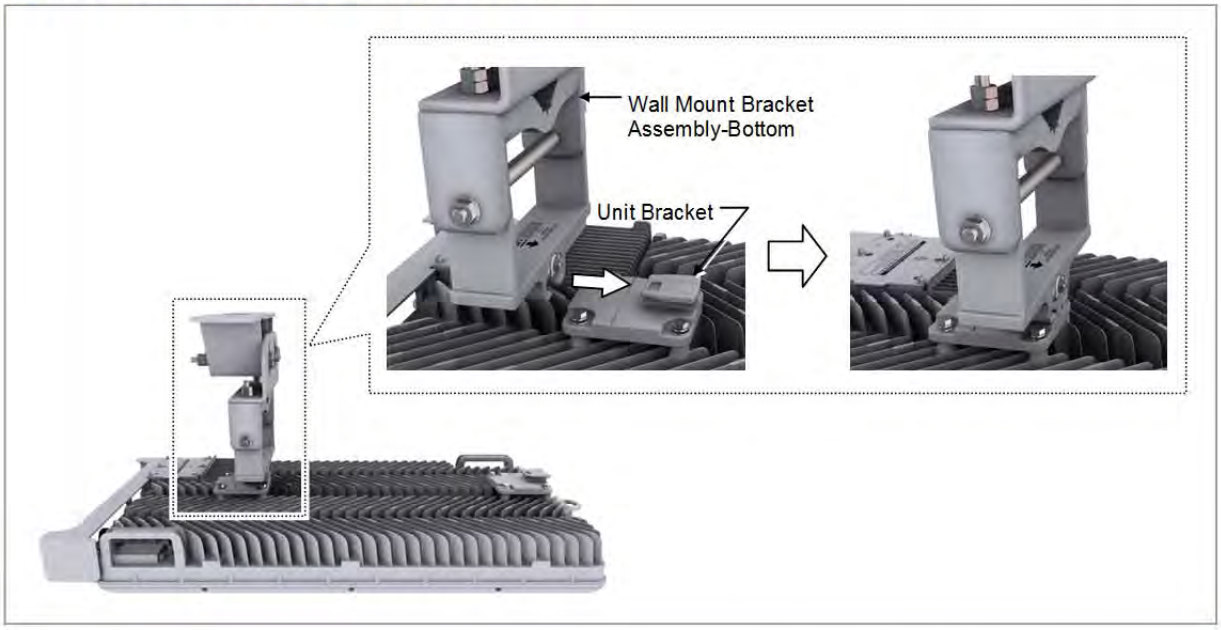
Before proceeding with assembling the pole mount bracket-bottom, make sure that you have the items described in the following table.

Table 12. Parts and Tools for Assembling Wall Mount Bracket-Bottom

Category	Description	
Parts	Wall Mount Bracket Assembly-Bottom	1 EA

Move the latch of the unit bracket until the lock of the wall mount bracket-bottom assembly is engaged.

Figure 32. Assembling Wall Mount Bracket-Bottom



If the latch of the unit bracket is not fully inserted and fixed, the wall mount bracket assembly may detach and fall, which can damage the equipment. Ensure that it is fully fixed before proceeding to the next step.

Fixing MMU on the Wall

To fix the MMU on the wall, do the following:

Prerequisites

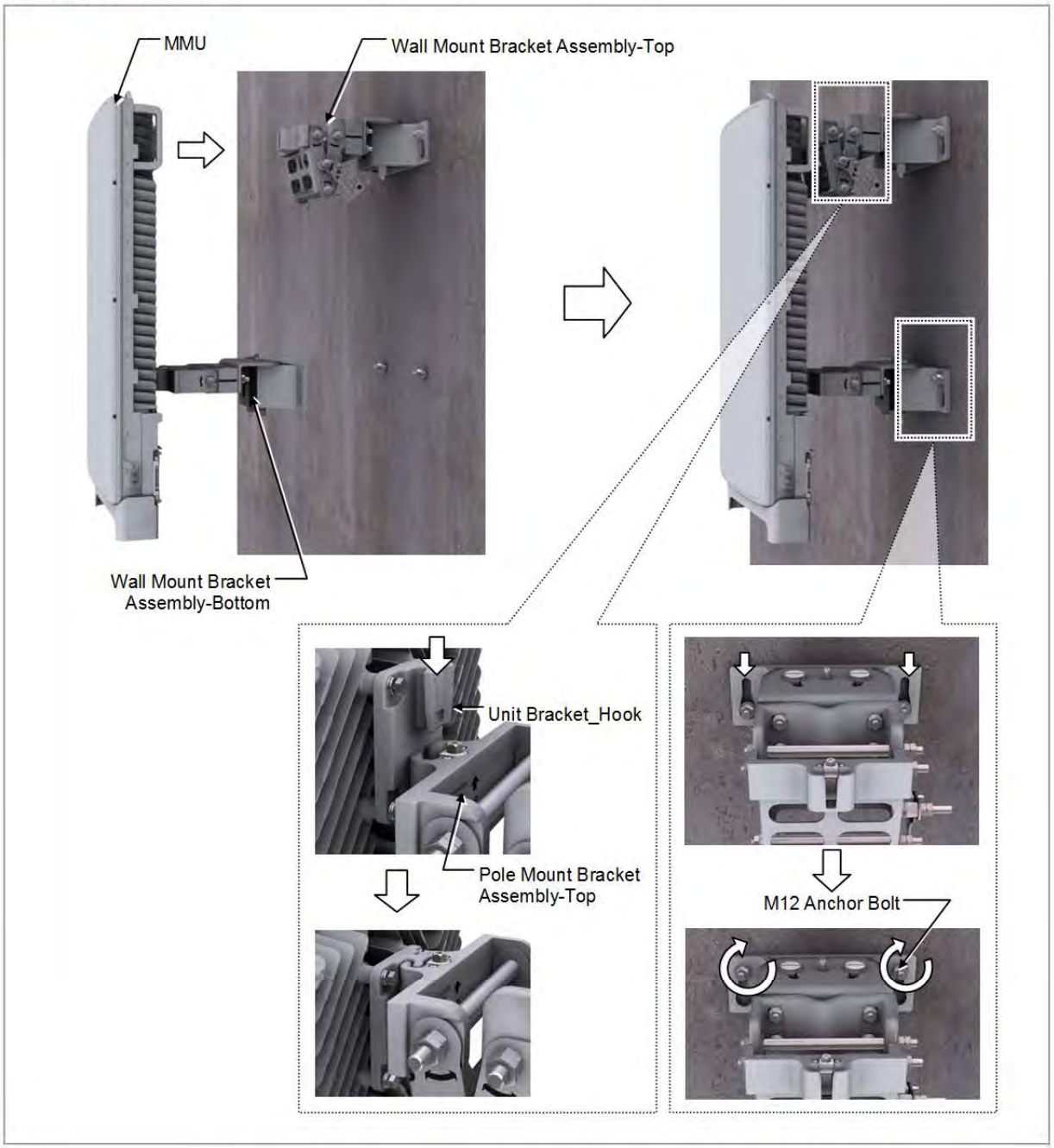
Before proceeding with fixing the MMU on the wall, ensure that you have the items described in the following table.

Table 13. Parts and Tools for Fixing MMU

Category	Description	
Recommended Torque Value	M12 hexagonal nut	372 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner Head (hexagonal head: 19 mm) • Spanner (19 mm)	

1 Push the hook of the MMU unit bracket completely into the mount bracket-top assembly and fix the fastening material of the lower anchor bolt.

Figure 33. Fixing MMU



2 By using the RF alignment tool, check the tilt and the azimuth, and adjust when there is an issue.

For detailed instructions of how to use the RF alignment tool, refer to the user manual per each manufacturer.

MMU Tilting & Swivelling

Tilting

MMU Down Tilting Adjustment

To adjust the MMU down tilting, do the following:

Prerequisites

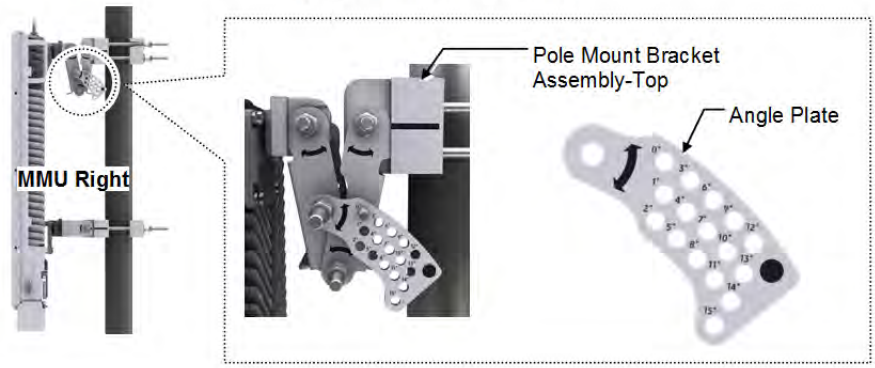
Before proceeding with adjusting the MMU down tilting, make sure that you have the items described in the following table.

Table 14. MMU Down Tilting Adjustment Tools

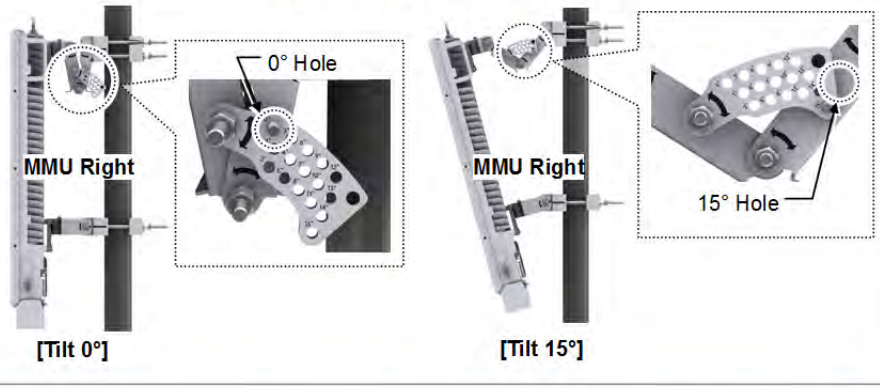
Category	Description	
Recommended Torque Value	M10 Hexagon nut	217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (hexagonal head: 17 mm) • Spanner (17 mm)	

The MMU tilt angle can be adjusted down from 0° to 15° by 1°, and the angle plate is used when tilting.

[Angle Plate Configuration]



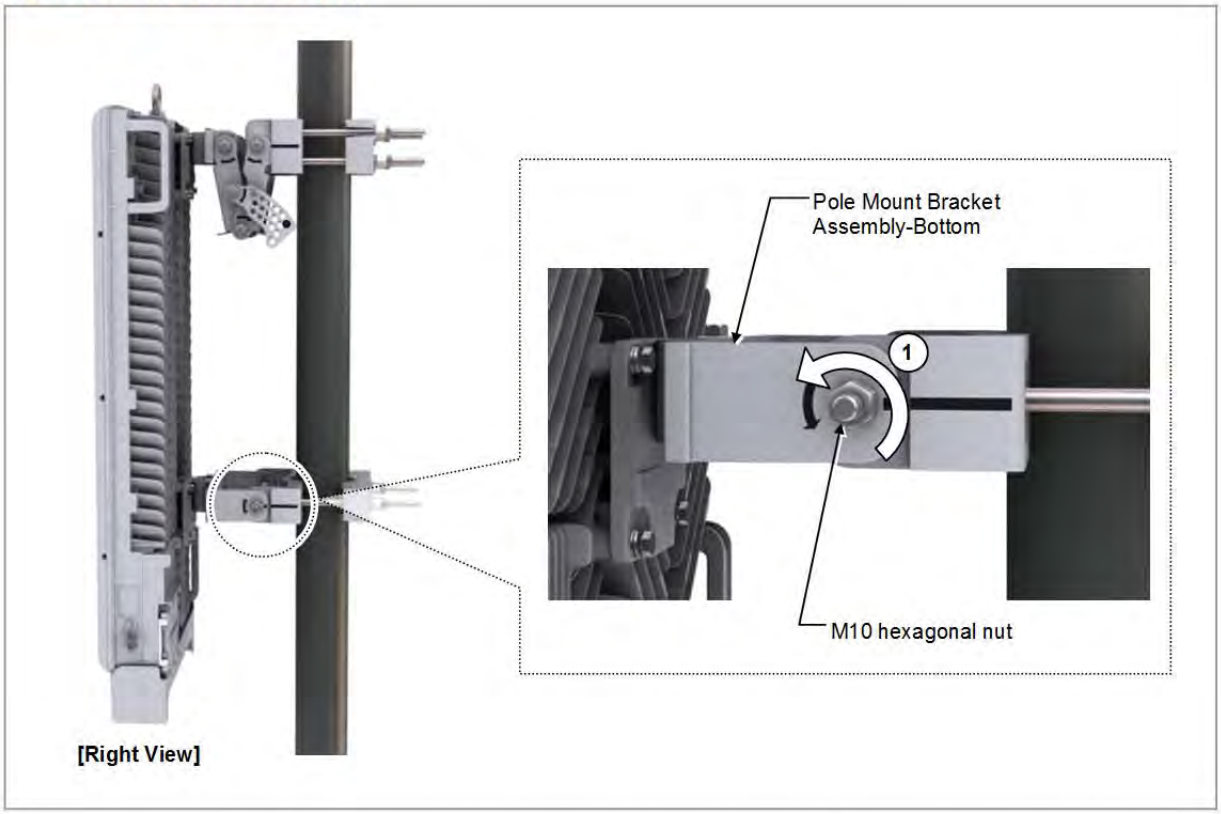
[Example of Using Angle Plate]



1 Rotate the fasteners counterclockwise on the mount bracket assembly-bottom

at the once or twice to loosen them.

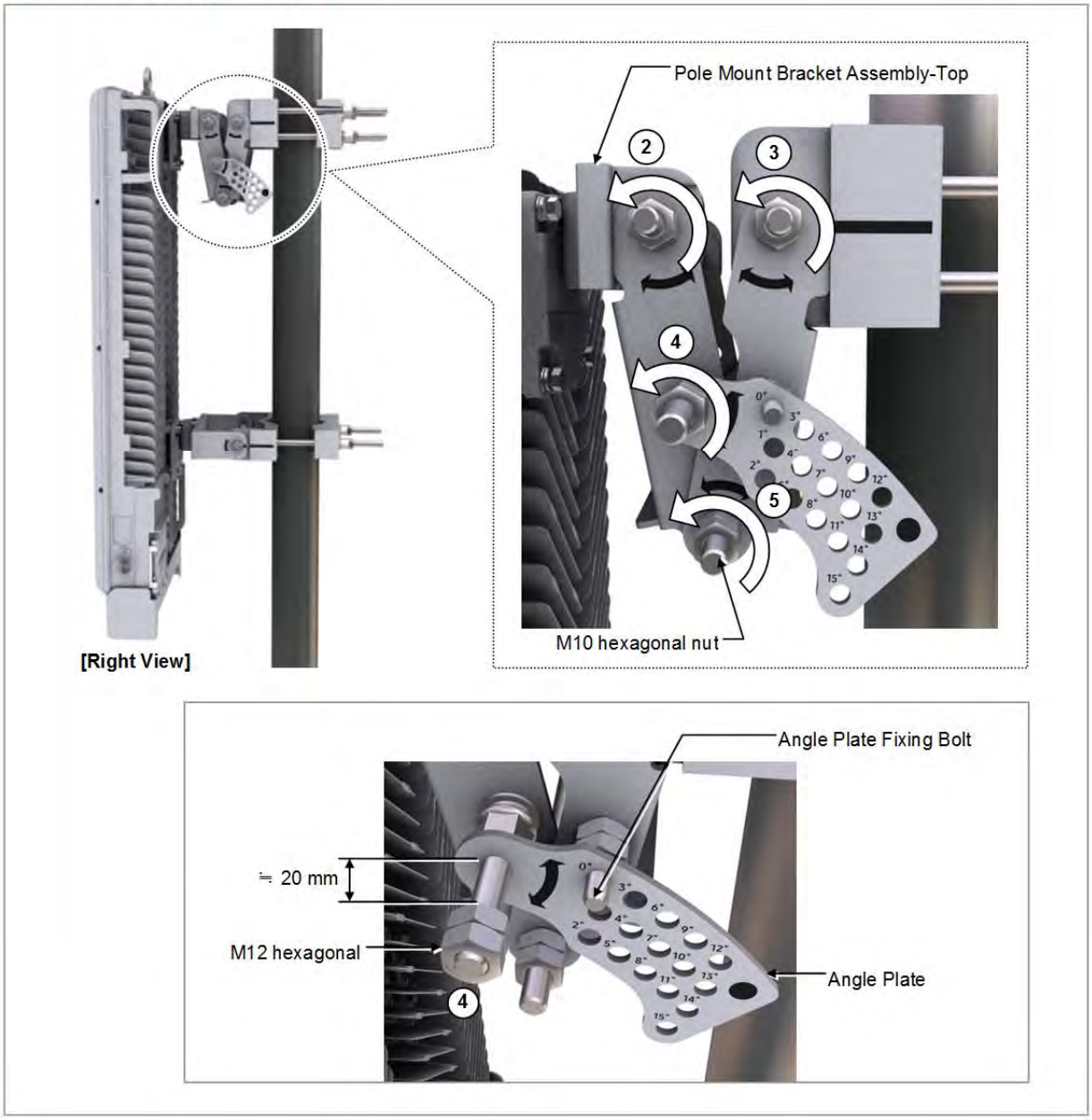
Figure 34. MMU Down Tilting (1)



2 Rotate the fasteners counterclockwise (number 2, 3, 5) on the mount bracket-top assembly at the once or twice to loosen them.

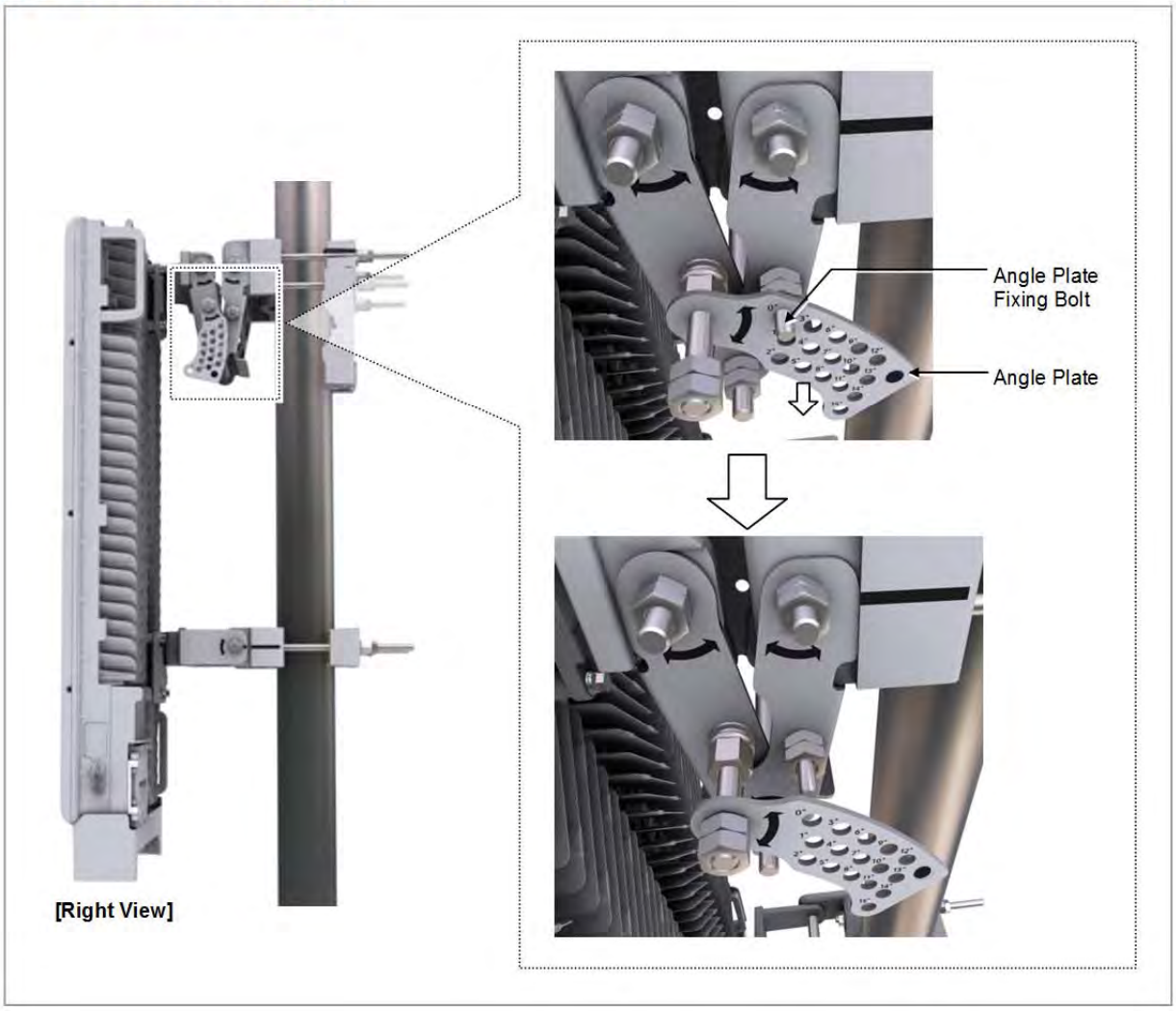
3 Do not detach the fasteners completely, and loosen the fasteners only (number 4) 20 mm (number 4) from the angle plate.

Figure 35. MMU Down Tilting (2)



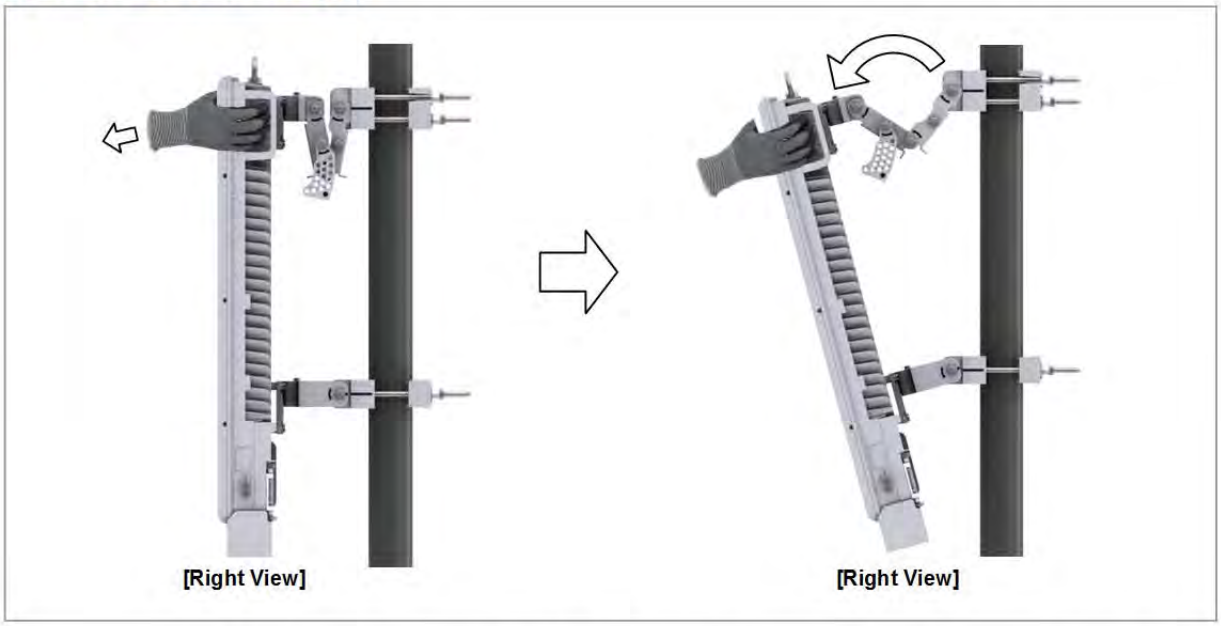
4 Remove the angle plate fixing bolt by pushing the angle plate outward.

Figure 36. MMU Down Tilting (3)



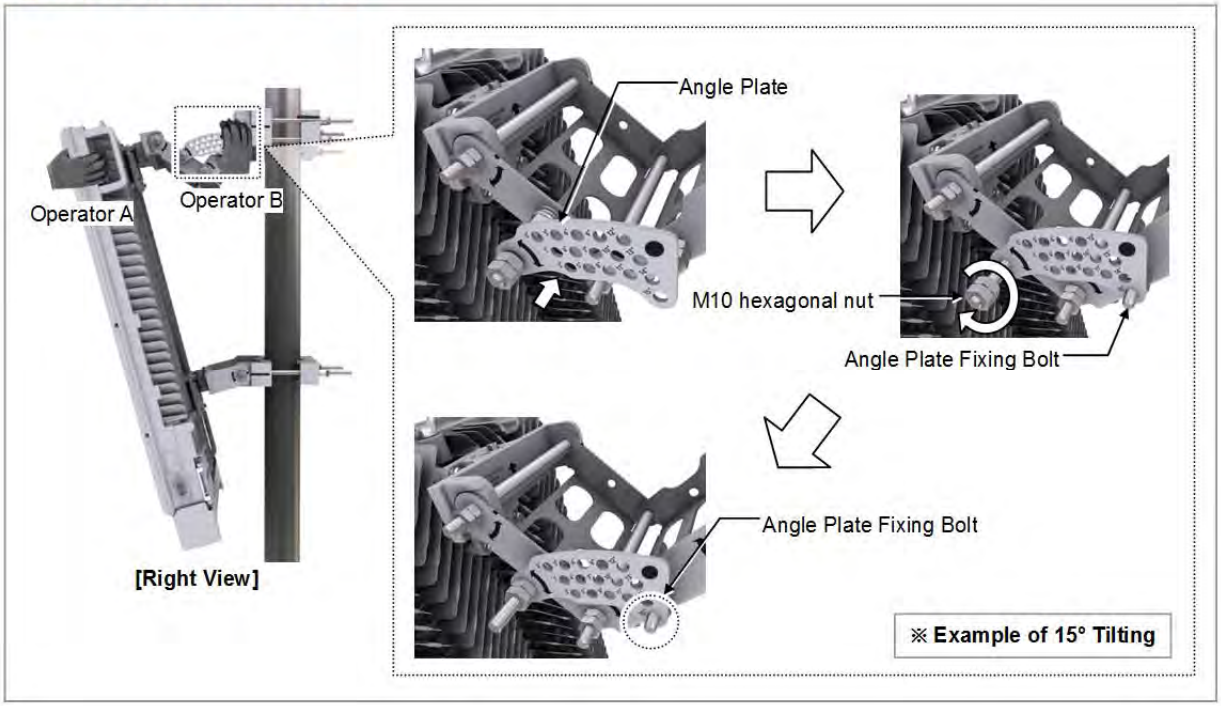
5 Adjust the tilt by pulling the MMU forward.

Figure 37. MMU Down Tilting (4)



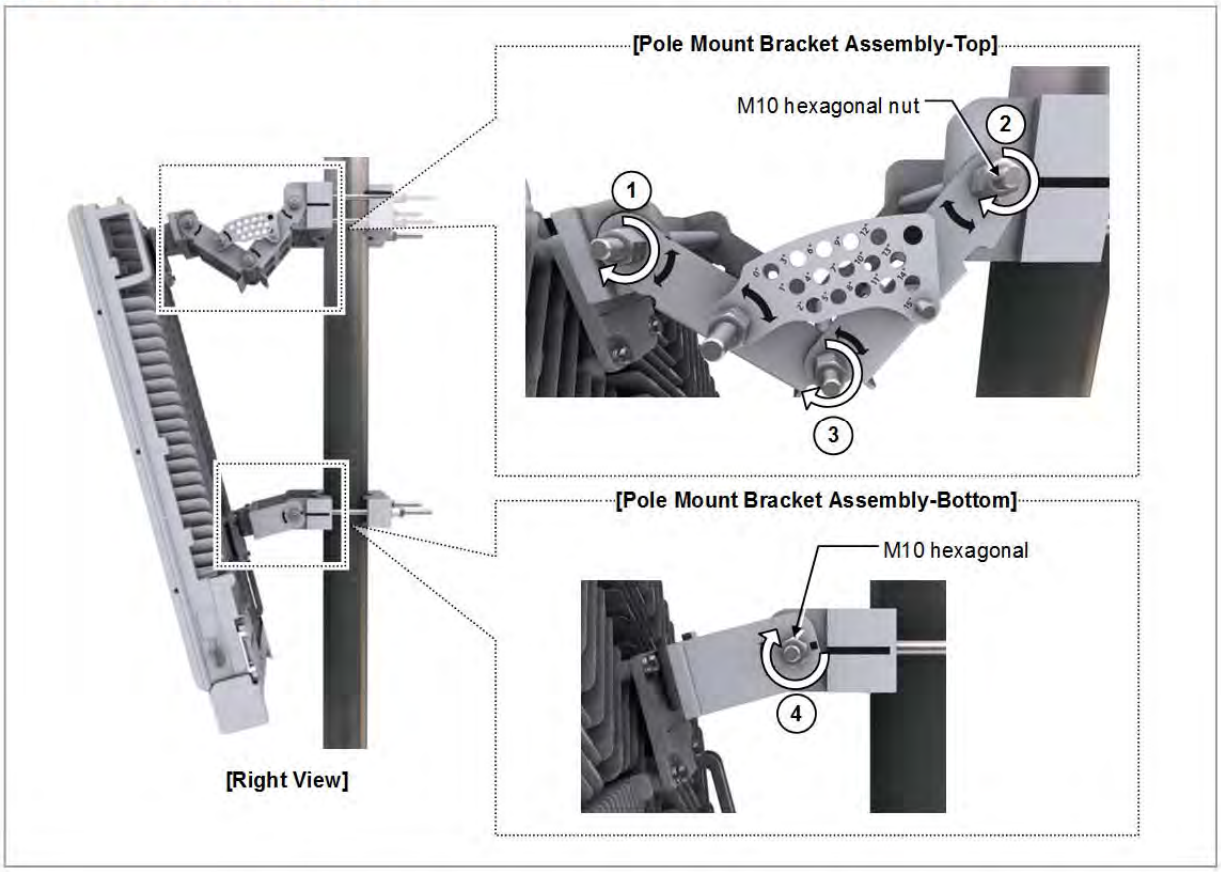
6 Adjust the down tilt of the MMU with the down tilting holes on the angle plate and place the angle plate on the angle plate fixing bolt.

Figure 38. MMU Down Tilting (5)



7 Re-tighten the loosened fasteners.

Figure 39. MMU Down Tilting (6)



8 By using the RF alignment tool, check the tilt and the azimuth, and adjust when there is an issue.

For detailed instructions of how to use the RF alignment tool, refer to the user manual per each manufacturer.

MMU Up Tilting Adjustment

To adjust the MMU up tilting, do the following:

Prerequisites

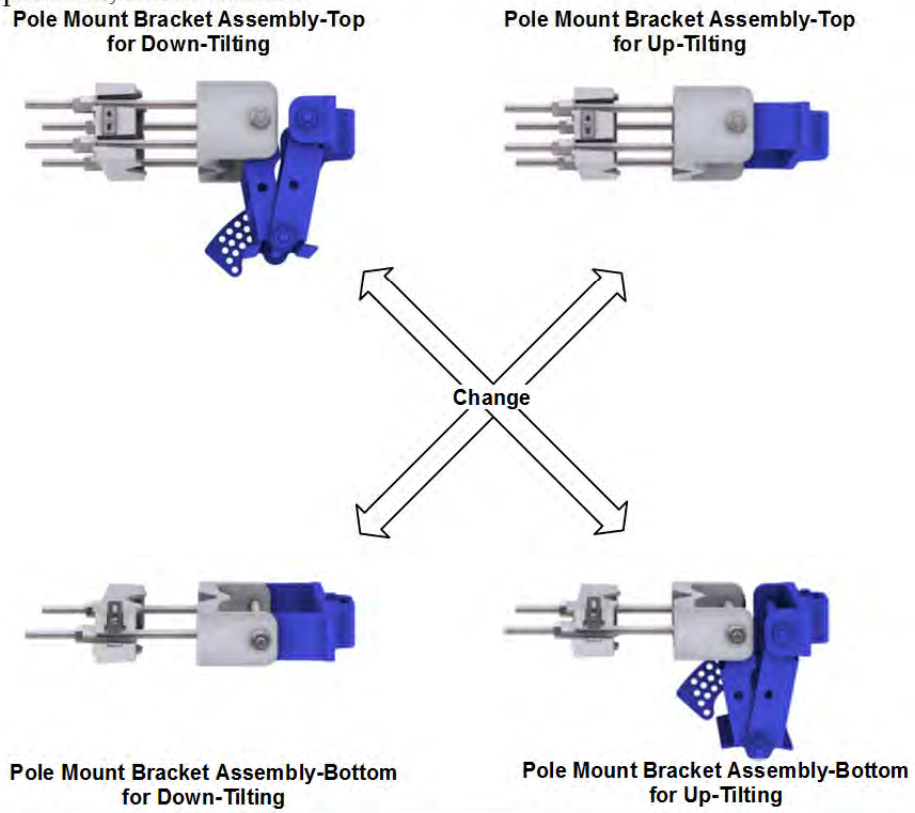
Before proceeding with adjusting the MMU up tilting, make sure that you have the items described in the following table below

Table 15. Parts and Tools for MMU Up Tilting

Category	Description	
Parts	Pole Mount Bracket Assembly-Top	1 EA
	Pole Mount Bracket Assembly-Bottom	1 EA
Recommended Torque Value	M10 nut	217 lbf·in
Working Tools	• Torque Wrench (100 to 400 lbf·in)	

Category	Description
	• Torque Wrench Spanner head (hexagonal head: 17 mm) • Spanner (17 mm)

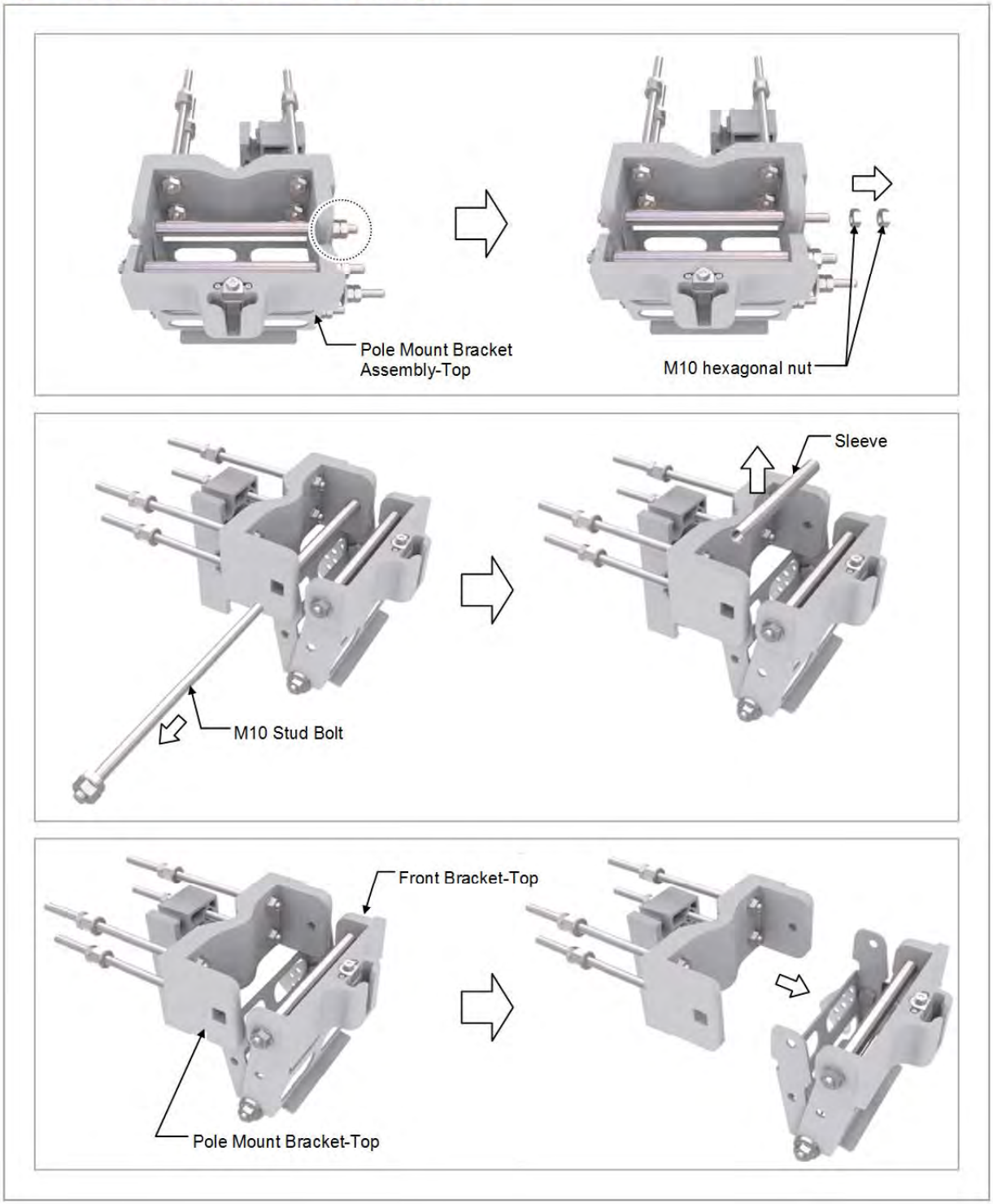
When installing a pole type up tilting, separate the mount bracket assembly-top/bottom, and reassemble.



1 Loosen the fasteners (M10 hexagonal nut 2 EA) of the pole mount bracket on the mount bracket assembly-top and remove the stud bolt and sleeve.

2 Remove the front bracket-top from the pole mount bracket-top.

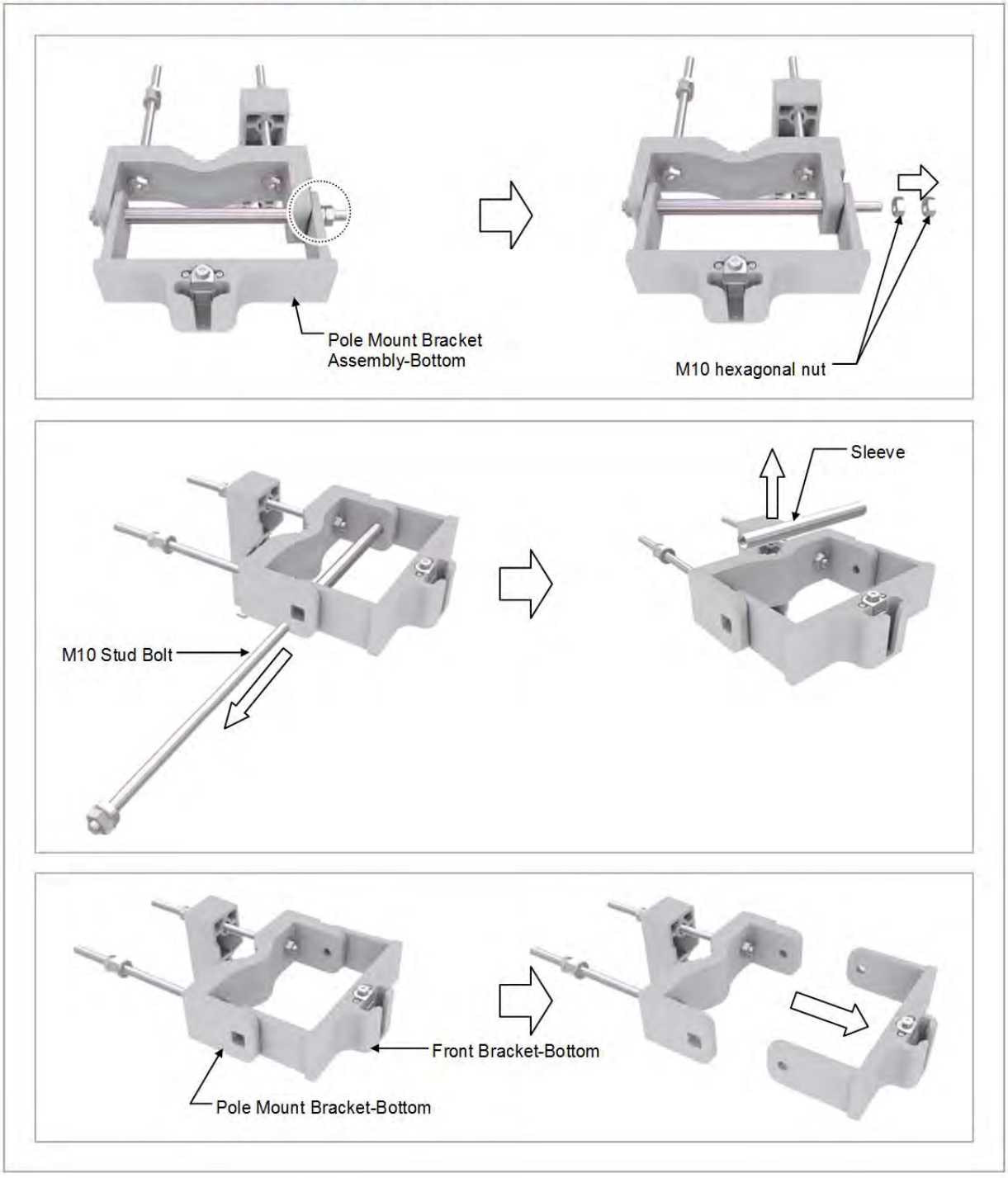
Figure 40. Bracket Change for MMU Up Tilting (1)



3 Loosen the mounting bracket (M10 hexagonal nut 2 EA) of the pole mount bracket on the mount bracket assembly-bottom and remove the stud bolt and sleeve.

4 Remove the front bracket-bottom from the pole mount bracket-bottom.

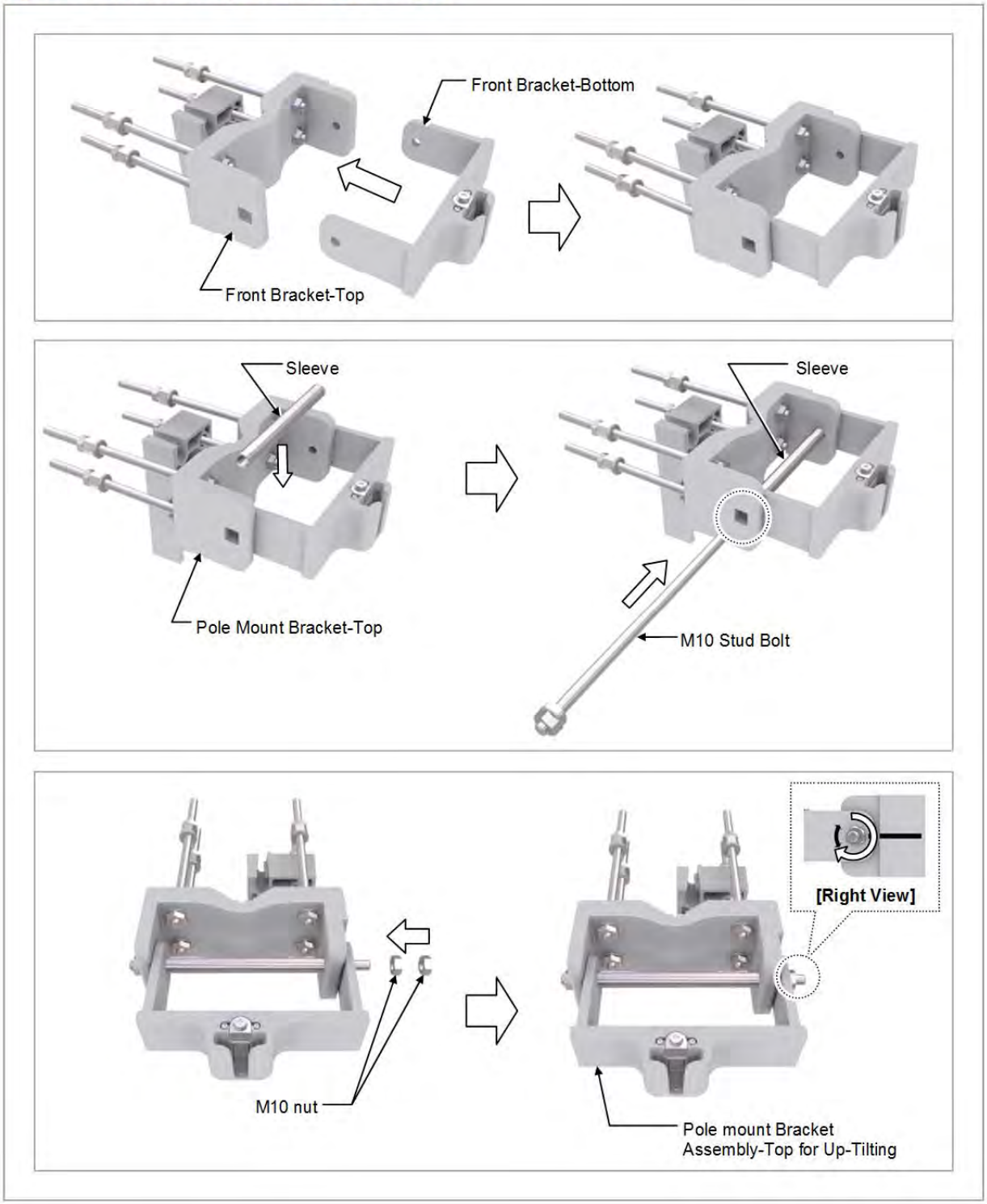
Figure 41. Bracket Change for MMU Up Tilting (2)



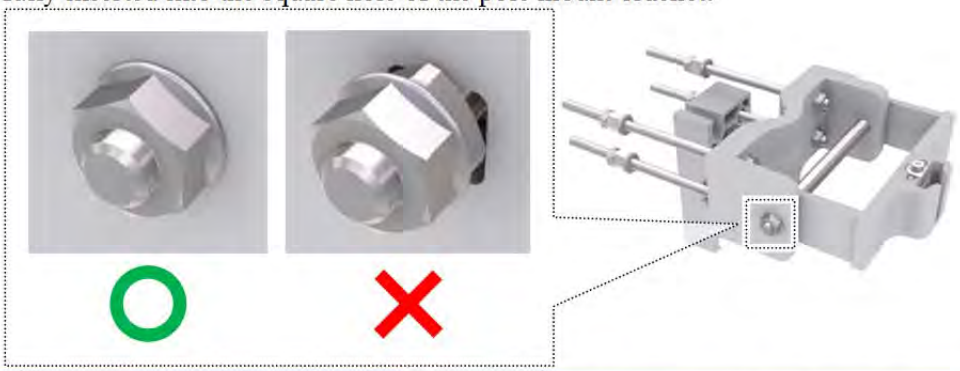
5 Position the front bracket-bottom in line with the fixing hole of the pole mount bracket-top.

6 Fix the sleeve and stud bolt with the M10 hexagonal nut 2 EA.

Figure 42. Bracket Change for MMU Up Tilting (3)



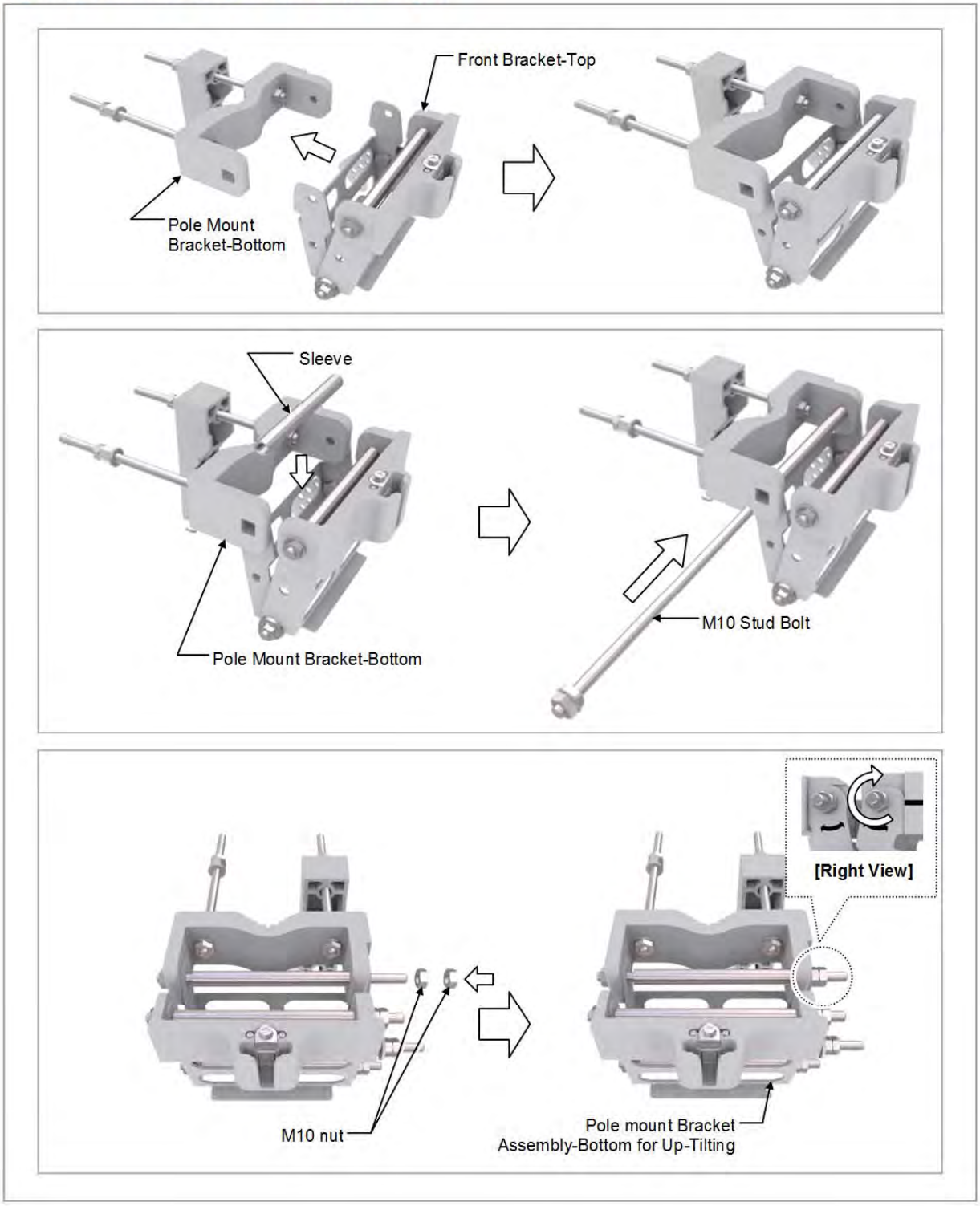
The square nut that is fastened to the stud bolt should be positioned so that it is fully inserted into the square hole of the pole mount bracket.



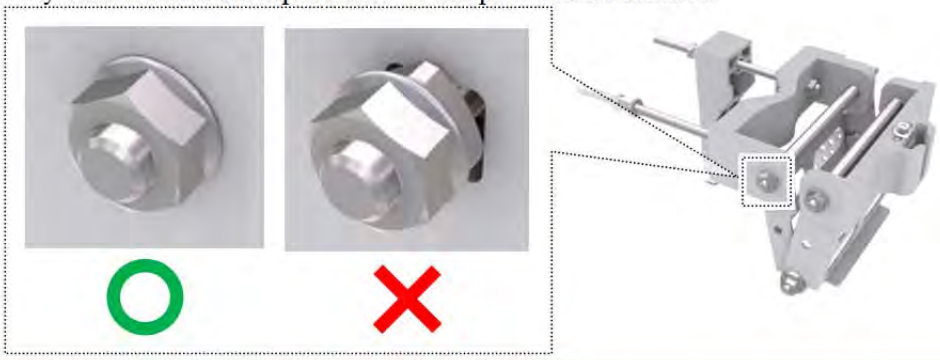
7 Position the front bracket-bottom in line with the fixing hole of the pole mount bracket-bottom

8 Fix the sleeve and stud bolt with the M10 hexagonal nut 2 EA.

Figure 43. Bracket Change for MMU Up Tilting (4)

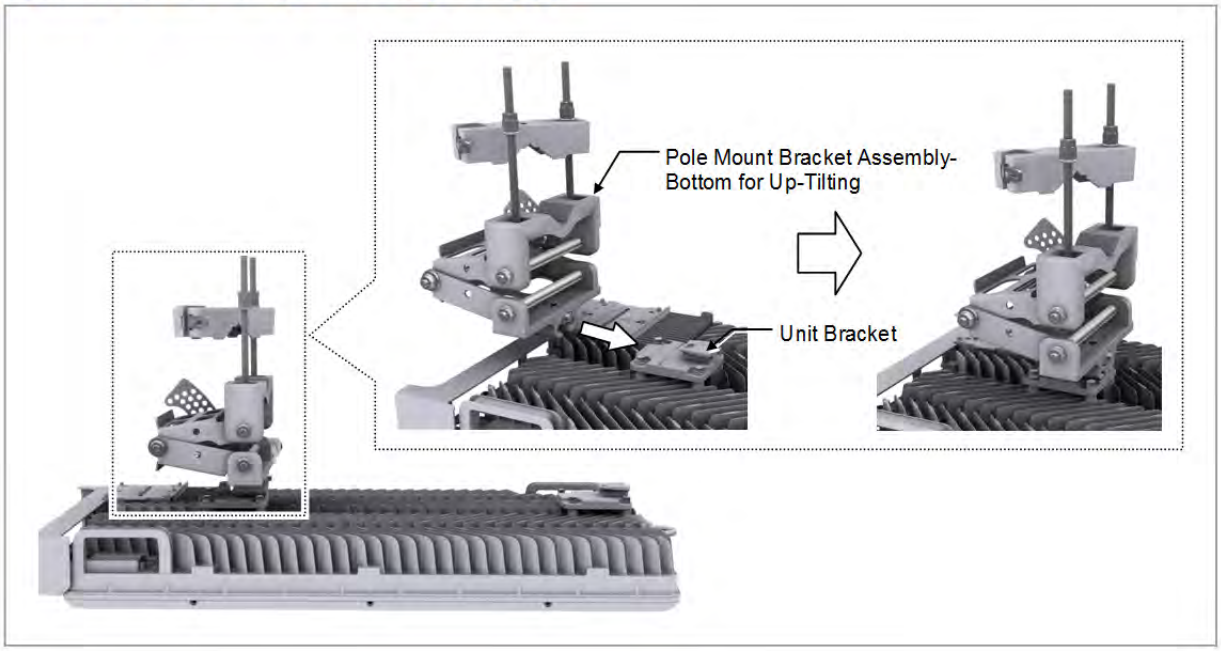


The square nut that is fastened to the stud bolt should be positioned so that it is fully inserted into the square hole of the pole mount bracket.



9 Move the latch of unit bracket until the lock of the pole mount bracket assembly-bottom is engaged.

Figure 44. Bracket Change for MMU Up Tilting (5)



If the latch of the unit bracket is not fully inserted and fixed, the pole-mount bracket assembly may detach and fall, which can damage the equipment. Ensure that it is fully fixed before proceeding to the next step.