310 3.7G NR MMU (MT6407) Installation Manual

Describes the product installation and re

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SAMSUNG

November 2020

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Document Version 1.0

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This manual should be read and used as a guideline for properly installing and/or operating the product.

This manual may be changed for system improvement, standardization and other technical reasons without prior notice.

Updated manuals are available at:

https://systems.samsungwireless.com/

For questions on the manuals or their content, contact

NetSys Tech Writer@sea.samsung.com

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This installation manual describes the installation procedures of 3.7GHz MMU (Massive MIMO Unit). It also provides the procedures for connecting the power and interface cables.

Relevance

This manual applies to the following products/software.

Name Type MT6407 (3.7 GHz) Hardware

Conventions in this Document

Samsung Networks product documentation uses the following conventions.

Symbols

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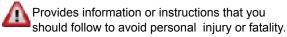
Symbol Description

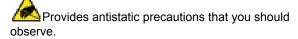


Indicates a shortcut or an alternative method.



Provides information or instructions that you should follow to avoid service failure or damage to equipment.





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.

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User Input and Console Screen Output Text

• 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 bold capital letters and Courier New font. 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 lists all versions of this document.

Publication Date

November 2020

Document Version Remarks 1.0 First version

Organization of This Document

Title
7039
Before Installation
Installing System
Connecting Cables
Inspect the Installation
Acronyms
Clean the Optical Connectors
Standard Torque

Section Description

Chapter 1 This chapter provides the introduction to the installation procedure.

Chapter 2 This chapter introduces a MMU and describes the equipment and items that should be understood before installation.

Chapter 3 This chapter describes the procedures to install the MMU.

Chapter 4 This chapter describes the procedures to connect the cables to the installed MMU.

Chapter 5 This chapter describes the procedures of inspecting installation status after the completion of MMU installation and cabling.

Appendix A This appendix spells out the acronyms used in this manual.

Appendix B This appendix describes the procedure of cleaning the optical connector and cleaning tool.

Appendix C This appendix describes the standard torque when fastening the bolt.

Related Documentation

• 101 5G NR gNB System Description

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Personal and Product Safety

This product safety information includes European directives, which you must follow. If these do not apply in your country, please follow similar directives that do apply in your country.

Electrical

All structural parts are grounded and all input and output 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 optic 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

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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 2.5 mm².

Rack-mountable equipment must be placed in a standard 19-inch rack and secured with the appropriate fixings as detailed in the installation manual.

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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

To protect against potential fire due to current overload, 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 cools down by its own set of cooling fans housed in a fan module. Each fan module detects a fan that is not operating normally. LEDs on the front

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panel of the fan tray provide an alarm indication in the event of fan failure.

In the event of fan failure, take urgent remedial action to restore full cooling capacity.

Take appropriate measures to ensure that fan modules do not start spinning during repair and maintenance procedures.

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.

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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

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

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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.

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Battery Disposal

The product contains a battery on the processor card. The battery should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC Directive 2006/66. The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery.

End of life recycling materials information is available from Samsung.

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.'

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Preface Equipment Markings

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, and 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.

Correct disposal of batteries in this product (Applicable in countries with separate collection systems.)

The marking on the battery, manual or packaging indicates that the battery in this product should not be disposed of with other household waste. Where marked, the chemical symbols Hg, Cd or Pb indicate that the battery contains mercury, cadmium or lead above the reference levels in EC

Directive 2006/66.

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The battery incorporated in this product is not user replaceable. For information on its replacement, please contact your service provider. Do not attempt to remove the battery or dispose it in a fire. Do not disassemble, crush, or puncture the battery. If you intend to discard the product, the waste collection site will take the appropriate measures for the recycling and treatment of the product, including the battery.

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

Product should be grounded.

Chapter 1 Introduction

The installation procedure is provided for system installation, including before installation, installing system, connecting cables and checking installation status.

The following figure depicts the procedure to install the system.

Figure 1. Installation Procedure

Before

InstallationInstalling

SystemConnecting

Cables Checking Installation Status

This is divided into the following chapters. This section gives a brief overview of information covered in each chapter.

· Before Installation

This chapter introduces the system and describes the equipment and items you

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should understand before installation.

· Installing System

This chapter describes the procedures to install the system.

Connecting Cables

This chapter explains the cabling procedure, the guidelines for handling cabling, the cabling diagram, the grounding process, and the external interface connection.

Checking Installation Status

This chapter explains the procedures to check installation status.

Acronyms

This appendix spells out the acronyms used in this manual.

Cleaning Optical Connectors

This appendix describes the procedure to clean the optical connectors.

• Standard Torque

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Chapter 2 Before Installation

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

System Configuration and Interface

This section provides the pictorial view of the MMU and its interfaces.

Figure 2. MMU Configuration

[Top View]

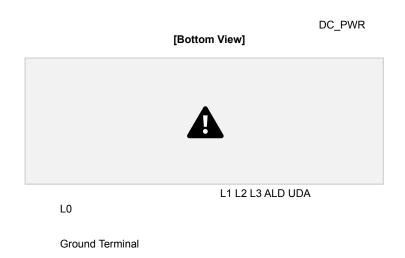
16.06 (408)



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[Left View] [Right View] [Bottom View]

Figure 3. MMU Interface



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Chapter 2 Before Installation

Specifications

The following table outlines the main specifications of the MMU.

Table 1. Specifications

Item MT6407

Air technology 5G NR

Operating Frequency (MHz) 3,700 to 3,980 MHz (n77)

RF Chain 64T64R

RF Output Power 200W Max

Carrier Bandwidth 20/40/60/80/100MHz

Optic Interface 25Gbps x 4, CPRI/eCPRI

Max. No. of Carriers 2 (Contiguous, Non-Contiguous)

Antenna Configuration 4V16H with 192AE (3x1 Sub-Array, H 0.54λ V 0.78λ @3,840MHz)

EIRP(User Beam Gain) (User Beam Gain = 25.5dBi) 78.5dbm

IBW/OBW 280M/200M

Capacity • NR 1C: 20/40/60/80/100M

·NR 1CC+1CC 20/40/60/80/100M+ 20/40/60/80/100M

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Layer • DL: 16Layers

· UL: 8Layers (16Rx) per Carrier

Input Voltage · -48 V DC (-38 V DC to -57 V DC)

External Alarm UDA Support

Operating Temperature a) -40 to 55°C (without solar load)

Operating Humidity a) 5 % - 100 %

RH, non-condensing, not to exceed 30 g/m3 absolute humidity.

Dimensions (W × H × D, in.)

× 140 mm) (50.95 L)

• 16.06 × 35.06 × 5.51 (408 mm × 890.5 mm

Weight (kg) • 37 or less (without Bracket)

Cooling · Natural Convection cooling

Waterproof/Dustproof • IEC 60529 IP65

Earthquake Telcordia GR-63-Core, Zone4

Power Consumption (W) 1,395 @ 100% RF load, room temperature 1,428

@ 100% RF load, all temperature

a) Temperature and humidity are measured at 1.5 m above the floor and at 400 mm away from the front panel of the equipment.



Cautions for Installation

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

Installation should be 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.
- With guardrails or fences, block open areas such as connecting parts, roof, and scaffold.
- The system power should be cut off before installing.

Although Samsung declares this product suitable for most outdoor environments, this does not cover installations where the planned installation site for the unit is a potential microclimate location.

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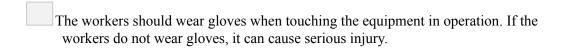
Install the system in the Restricted Access Area.
The product can be installed after checking for Electric leakage.
Do not work at heights when you come across any of the following situations: - Thunder, lightning, rain, or wind greater than force 6 occurs. - Water remains on the surface of the steel tube. - There may be other danger.
The worker should be aware of the safety requirement before working.
Everyone who enters the site should always wear helmets and safety shoes to prevent serious injury resulting from unexpected accidents.

Chapter 2 Pefero Installation
Chapter 2 Before Installation
While Installing
During installation, ensure the following:
Ensure the power switch of power supply is OFF when installing the system. Installing the system with power switch ON can cause system damage or fatal human injury when cables are not correctly connected.
Do not wear accessories such as watches and rings to prevent electrical shock.
Never allow foreign substances to be inserted into unused ports by covering them with a cap.
To prevent foreign substances, outdoor air, and moisture from entering the cable inlet (including cable gland and conduit), do the following: - 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 tape, compressed sponge, rubber packing, and silicon.
At the site, if they attach film to the random antenna or use paint, please send us a
sample, a decision will be taken after the test.
This product should avoid excessive impact during transportation / installation / operation.
Must use the rope that satisfies following specification or more Material: Polyethylene (P.E) rope

	 Thickness: 10 to 12 mm Tensile strength: 1.11 to 1.2 ton Rope usage period: within 2 years
	Equipment may be damaged if a strong impact or strong force is applied to the product during installation or operation.
	When tightening bolts or connectors, be sure to check the torque value suggested in the appendix of the installation manual and use a suitable tool. If it is not tightened with the correct torque, the bolts and connectors can be damaged or not securely fastened and the performance of the equipment can deteriorate.
	This product should not be installed only with the installation method described in the installation manual.
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	Chapter 2 Before Installation
After Insta	lling
	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. Handle the optical cables with care as the laser beam can seriously damage the eyes of the worker.
	Ensure that the worker does not damage the installed cables while cleaning the system.
	While cleaning the power supply device, take caution that the device is not exposed to foreign objects that may cause power failure.
	When you install the MMU, the MMU should be within the protective angle (left/right side 45° each from the central axis) to prevent the antenna from lightning damage. Lightning Rod
	7Ω3Q2



45°



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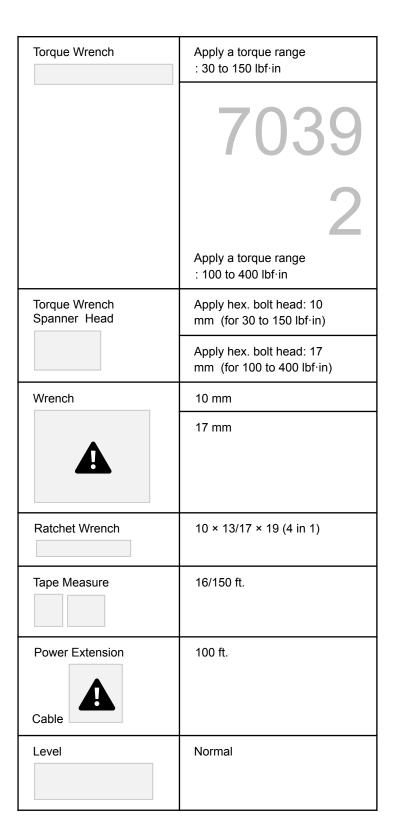


Installation Tools

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

Table 2. Basic Installation Tools

Name	Specification
Torque Driver	Apply a torque range : 20 to 90 lbf·in
Screw Driver Bit	'+', No. 3
Screw Driver	'+', No. 3



No. Purpose of use 1 Fastening M6 Screw

2 Fastening M6 Screw 3 Fastening M6 Screw

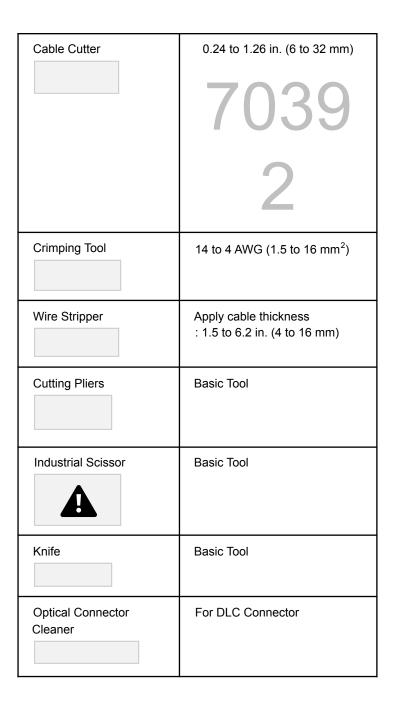
- 4 Tightening M6 Hex. bolt Tightening M10 Hex. bolt
- 5 Tightening M6 Hex. bolt Tightening M10 Hex. nut
- 6 Tightening M6 Hex. bolt Tightening M10 Hex. bolt
- 7 For fastening Hex. bolt
- 8 Tape measure for length measurement
- 9 Basic tool 10 For horizontality and verticality

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Chapter 2 Before Installation

Name	Specification	
Hammer Drill	Normal	
Concrete Drill Bit	14 mm	
Anchor Punch	M10	
Hammer	Normal	
Vacuum Cleaner	Normal	
Heating Gun	50 to 300°C	



No. Purpose of use 11 Wall type drilling

12 For the M10 Set anchor 13 For the M10 Set anchor

14 Anchor fixing

15 For removing dust during the drilling work

16 Shrinking the feeder cable tube

18 Pressure terminal for crimping 19 For removing cable sheath
20 For cutting cable and cable tie 21 Cutting

22 Cutting

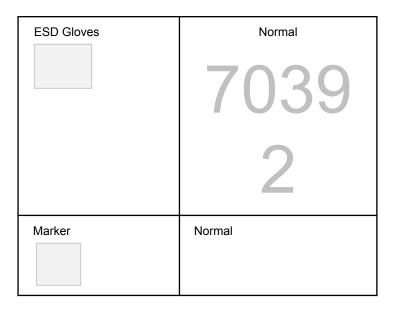
17 Cable cutting

23 For optical connector cleaning

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Chapter 2 Before Installation Specification Name Optical Transceiver Normal . Removal Tool Digital Multimeter **Digital Pocket Tester** Fiber Optical Test Set Wave length: 1310 nm, 1550 nm (single mode) 850 nm, 1310 nm (multi-mode) Angle Meter Normal Compass Normal



No. Purpose of use 24 For separating the optical mod	se 24 For separating the optical	separating	24 For	pose of use	No. Pur
--	----------------------------------	------------	--------	-------------	---------

25 To check the voltage and current measurements when cable

disconnection is suspected

- 26 Optical level check
- 27 Antenna angle measurement 28 Check azimuth during installation
- 29 Electrostatic Protection 30 For Marking

The required installation tools can vary depending on the site conditions. In addition to the basic tools, a protractor, ladder, safety equipment, cleaning tools, and so on should also be arranged in consideration of the site conditions.

Chapter 3 Installing System

Fixing System

This chapter describes the installation procedures of the MMU.

Installation Procedure

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

Figure 4. Procedure to Install the MMU

Foundation Work

Bringing in Items

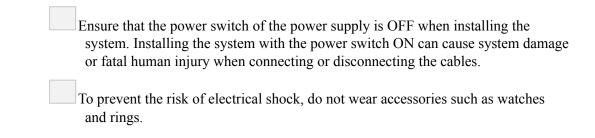
Transporting and Unpacking

Unpacking Items

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System Levelling

Fixing System



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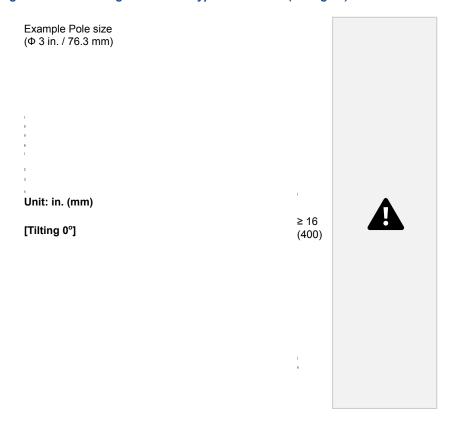
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Chapter 3 Installing System

System Arrangement

A minimum clearance should be secured around the MMU, in each direction for installation and maintenance.

Figure 5. MMU Arrangement Pole Type Installation (Tilting 0o)





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[Top View]

≥ 16 (400)

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Chapter 3 Installing System

Figure 6. MMU Arrangement_Pole Type Installation (Tilting 15°)



Unit: in. (mm)

[Up Tilting 15°]



[Top View] [Top View]

The dimensions of the installation space differ based on the tilting angle of the MMU. The dimensions when the tilting of the MMU is 15° are depicted in the figure above.

- The dimensions of the front of the MMU change according to the tilt angle and the maximum dimensions are described in the following figure (MMU Arrangement_Down Tilting 15°/Up Tilting 15°).
- When fixing the mounting bracket, the length of carriage bolts is 230 mm for the pole diameter 50 to 100 A

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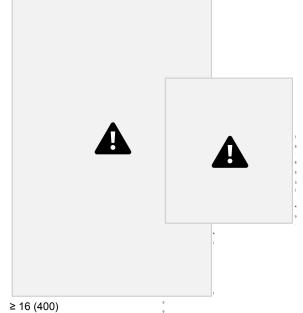
Chapter 3 Installing System

Figure 7. MMU Arrangement_Wall Type Installation (Tilting 0o)

2 0

Unit: in. (mm)

≥ 16 (400)



≥ 16 (40

70 ² 39

[Front View] [Top View]

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Chapter 3 Installing System

Figure 8. MMU Arrangement_Wall Type Installation (Tilting 15°)

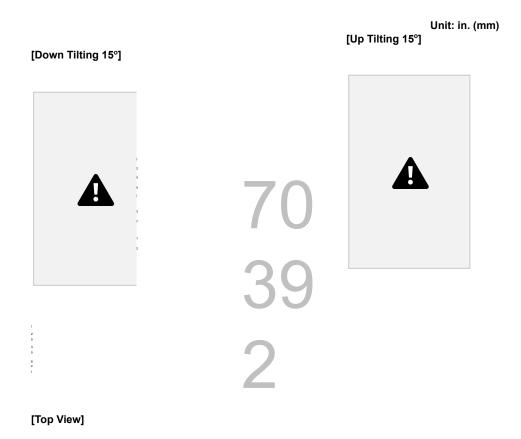
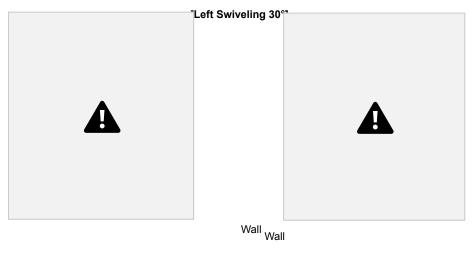




Figure 9. MMU Arrangement_Wall Type Installation (Swiveling 30o)

Unit: in. (mm)

[Right Swiveling 30°]



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17.32 (440) [Top View]

17.32 (440) [Top View]

The dimensions of the installation space differ based on the tilting angle of the MMU. The dimensions when the tilting of the MMU is 30° are depicted in the figure above.

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Chapter 3 Installing System Transporting and

Unpacking

This section describes the procedures to unpack the cabinets and other components and to transport them to the installation site.

Transporting Items

To transport items, ensure the following:

- Carry boards in packed state and unpack them when installing or mounting.
- When carrying the system, tighten the system firmly to the transport vehicle to prevent damage from a vibration or shock.



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- When carrying system, use a lift to prevent accidents. However, if people are carrying the system, ensure that there are enough people to carry it safely.
- Before moving the system, check the storage place for the system and remove obstacles in advance.
- Before moving the system, engineer should complete the site survey to check availability of space for installation and routing.
- While moving system, boards and other equipment should be protected from any physical shock caused by dust, moisture, and static electricity.
- While carrying heavy-duty equipment, alone ensure the equipment is carried by two people as there is a risk of damage to the equipment when carrying it.



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• While carrying the equipment, hold the bottom of the box as there is a risk of slipping that can damage to the equipment.



Unpacking Items

To unpack the items, ensure the following:

- The items should be packed until they reach the installation site.
- The items are classified in accordance with the job specification and stored at a place that does not interfere with working.

- Unpacked systems should be installed immediately. If not installed, the systems should be stored at the installation site temporarily.
- Unpack only external packing, leaving the internal packing in packed state. Unpack the inner packaging after each system is placed on its installation

recycle the by 70392 -products location.

• Scrap by-products (packaging waste) in accordance with the rule. Do not

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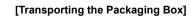
MMU Handling

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

Lifting Hazard

Get help when moving or lifting the equipment.

Figure 10. Transporting the MMU





Packaging Box Handle

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[Transporting the MMU]



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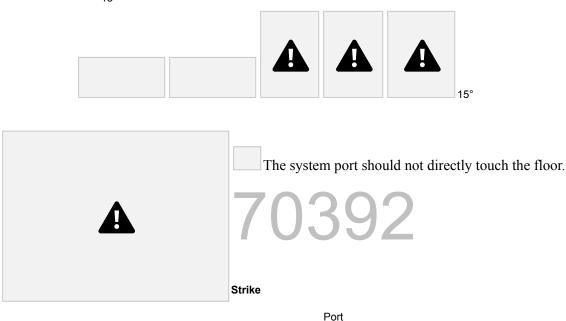


Fixing MMU

This section describes the procedures to fix the system.

This product does not support horizontal installation. Horizontal installation can cause problems. If it is necessary to install outside the range of installation angle that is not specified, it should be consulted.

[Up/Down Tilting 15°][Horizontal installation] [Off-the-set installation]



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Fixing Unit Bracket

This section describes the procedure to fix the unit bracket.

Prerequisites

Before proceeding with fixing the unit bracket, ensure that you have the items mentioned in the following table:

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

Category Description

Unit Bracket	
Fastener s	M6 Hex. bolt (Washer assembly)
M6 Hex. Bolt	

Parts 2 EA 8 EA

Recommended Torque Value 34 to 52 lbf ■ in Working Tools • Torque Wrench (30 to 150 lbf ■ in)

- Torque Wrench Spanner Head (apply Hex. head: 10 mm)
- · Wrench (10 mm)

To fix the unit bracket, do the following:

- 1 Check the position for mounting the unit bracket on the back of the MMU and place it in that position.
- 2 Fix the unit bracket using fasteners. 70392

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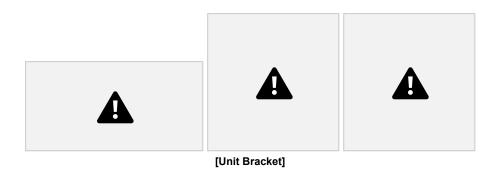
Chapter 3 Installing System

3 Fixing Unit Bracket

[Rear Side]



The 'UP' sign of the unit brackets should be oriented toward the top of the MMU.



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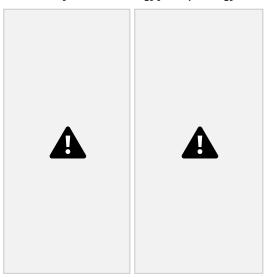
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Chapter 3 Installing Systen

Fixing Pole Type

There are two installation types (installation for the up tilting and installation for the down tilting) to fix the MMU on a pole.

[For Down Tilting] [For Up Tilting]



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Down Tilting MMU Fixation (Pole Type)

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

Down Tilting Bracket Assembly (Pole Type)

Prerequisites

Before proceeding with assembling the mount bracket (pole type), ensure that you have the items mentioned in the following table:

Table 4. Parts and Tools for Assembling the Down-Tilting Bracket (Pole Type)

Category Description

Scissors Bracket

Pole Mount B Bracket Assembly

M10 Flange Nut
M10 Hex. Nut

Parts 1 EA 1 EA

Recommended Torque Value 174 to 260 lbf·in

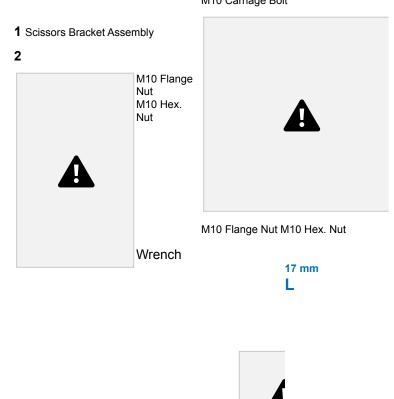
Working Tools • Torque Wrench (100 to 400 lbf·in)

- · Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)

Chapter 3 Installing System

- To assemble the mount bracket (pole type), do the following:
- 1 Remove the fastening materials from the unit bracket of the scissors bracket assembly.

Figure 11. Down Tilting Bracket_Pole Type Assembly (1)
M10 Carriage Bolt



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- **2** Align the scissors bracket assembly with the top fixing holes of the unit bracket.
- **3** Fix the unit bracket and scissors bracket using fasteners.

Position the scissors bracket assembly so that the 'DOWN TILT-UP' sign points upward.

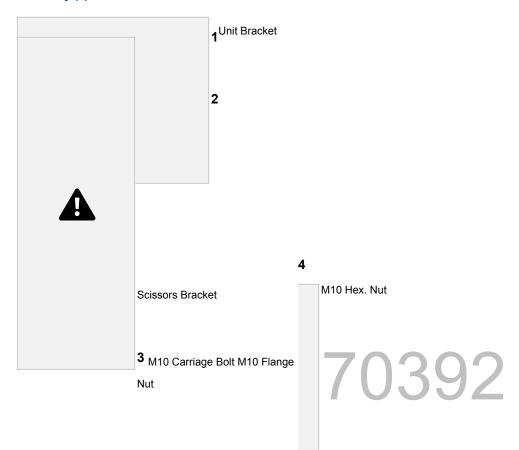


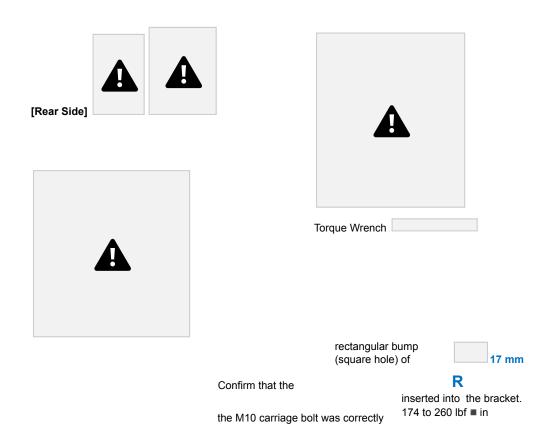
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Figure 12. Down Tilting Bracket Pole Type Assembly (2)





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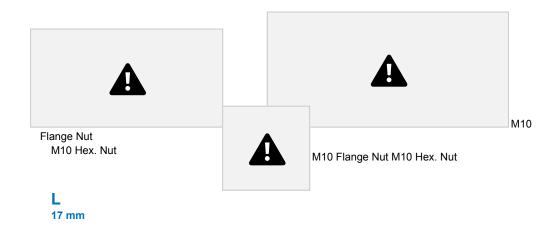
4 Remove the fastening materials from the unit bracket of the Pole Mount B bracket assembly.

Figure 13. Down Tilting Bracket_Pole Type Assembly (3)

2

1_{M10} Carriage Bolt

Pole Mount B Bracket Assembly



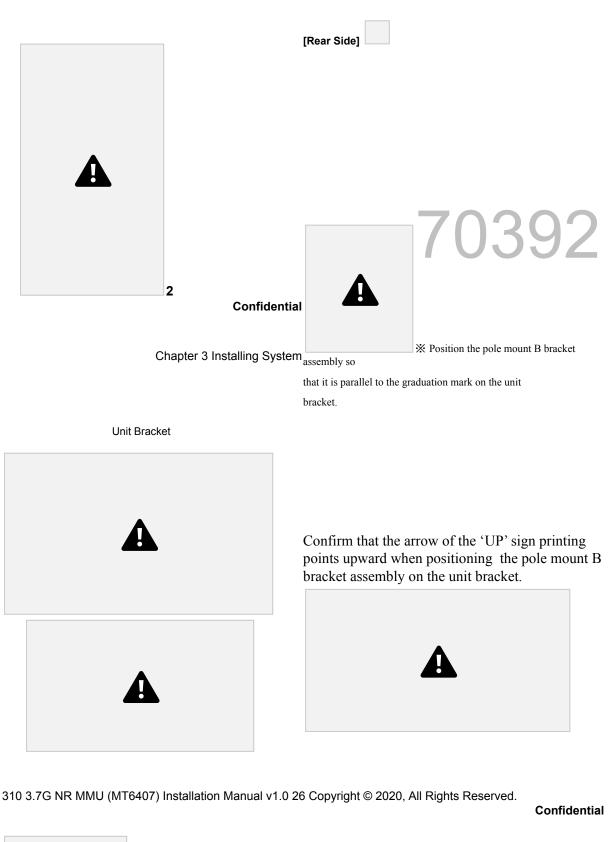
5 Align the pole mount B bracket assembly with the bottom fixing holes of the

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unit bracket.

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Assembly (4) 1



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6 Fix the unit bracket and pole mount B bracket assembly using fasteners.

Figure 15. Down Tilting Bracket Pole Type Assembly (5)



bracket.

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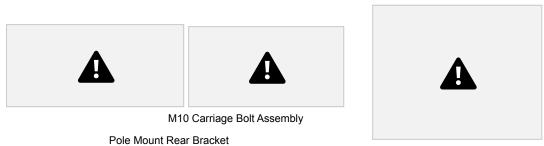
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7 Remove the M10 carriage bolt assembly from the rear right side of pole mount rear bracket.

Figure 16. Down Tilting Bracket_Pole Type Assembly (6)

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Lifting MMU and Pole Mount A Bracket Assembly

- To lift the MMU/ pole mount A bracket assembly, do the following:
- **1** Tie the rope in three carrying points of the MMU and the pole mount A bracket assembly.

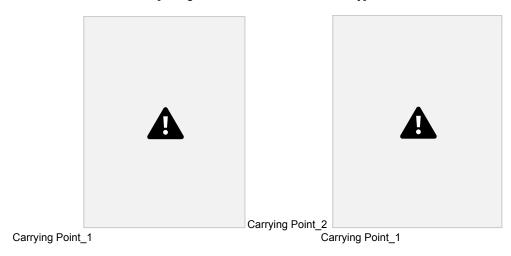


Carrying Point_3

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Carrying Point_2

[Lifting: Pole Mount A Bracket Assembly]

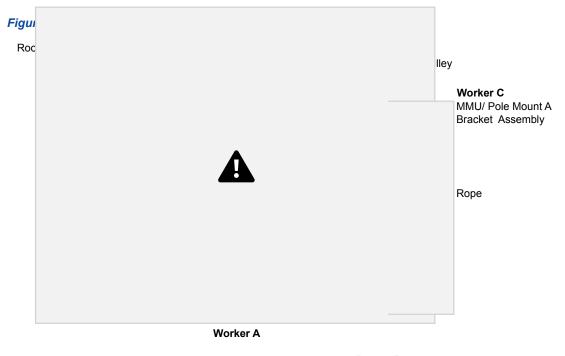


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Chapter 3 Installing System

- **2** While worker A pulls the rope to pull up the MMU, worker B and D pull the rope outward so that the MMU and pole mount A bracket assembly do not hit the surrounding objects.
 - **3** When the MMU and the pole mount A bracket assembly arrive at the installation site, the worker C catches it so that it does not hit the surrounding objects.



703 Worker D

Figure 19. Lifting MMU & Pole Mount A Bracket

Assembly_Tower Tower

Worker C

Pulley

MMU/ Pole Mount A Bracket Assembly Tower Platform

Rope

Worker D

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Chapter 3 Installing System

Fixing the Pole Mount A Bracket Assembly (Pole Type)

Prerequisites

Before proceeding with to fix the pole mount A bracket assembling (pole type), ensure that you have the items mentioned in the following table:

Table 5. Parts and Tools for Fixing the Pole Mount A Bracket Assembly (Pole Type)

Category Description

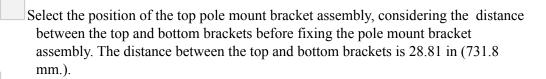
Pole Mount A Bracket Assembly

M10 Flange Nut M10 Hex. Nut

Parts 1 EA Recommended Torque Value 174 to 260 lbf·in

Working Tools • Torque Wrench (100 to 400 lbf·in)

- · Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)





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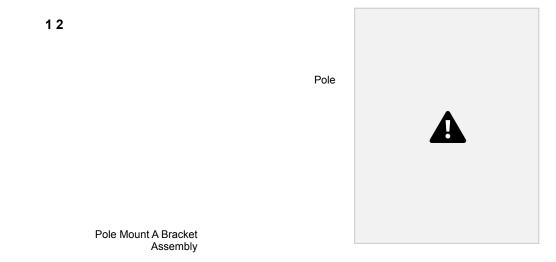
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Chapter 3 Installing System

To fix the Pole Mount A Bracket Assembly (Pole Type), do the following: 1

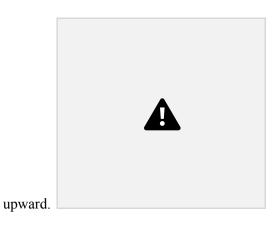
Place the pole mount A bracket assembly on the fixing positions for the pole.

Figure 20. Down Tilting Pole Mount A Bracket Assembly Fixation (1)



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Position the pole mount rear bracket so that the "UP" sign printing points



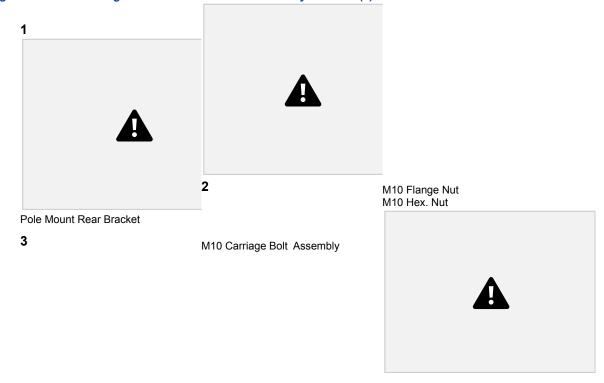
- **2** Place the pole mount rear bracket horizontally in the fixed position.
- **3** Insert the unfastened M10 carriage bolt assembly to the fixing holes of the Pole mount rear bracket.
- **4** Tighten the M10 flange nut and M10 Hex. Nut fastened on the M10 carriage bolt assembly.

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Figure 21. Down Tilting Pole Mount A Bracket Assembly Fixation (2)



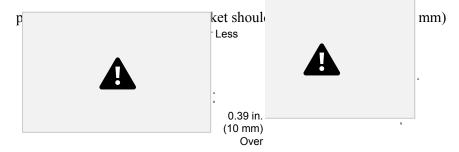
R 17 mm

174 to 260 lbf·in

Torque Wrench

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After fastening the left and right bolt bolts, the length of the left and right bolt

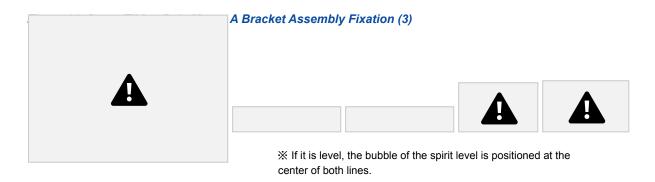


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Chapter 3 Installing System

5 Confirm that pole mount A bracket assembly is level using a spirit level.



Down Tilting MMU Fixation (Pole Type)

Prerequisites

Before proceeding with to fix the down-tilting MMU (pole type), ensure that you have the items mentioned in the following table:

Table 6. Parts and Tools for Down Tilting MMU Fastening (Pole Type)

Category Description

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M10 Flange Nut M10 Hex. Nut

Recommended Torque Value 174 to 260 lbf·in

Working Tools • Torque Wrench (100 to 400 lbf·in)

- Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)

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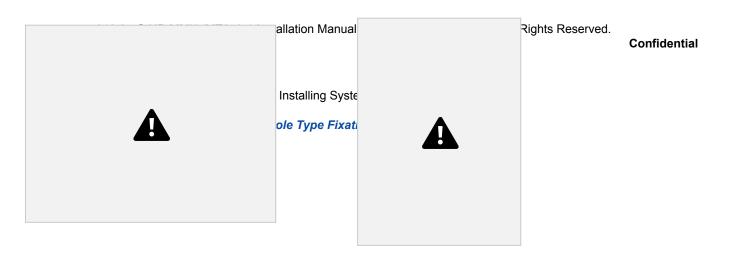
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Chapter 3 Installing System

- To fix the down-tilting MMU to the pole, do the following:
- **1** Align the MMU with the fixing part of the pole mount A bracket assembly fixed to the pole.
- **2** Place the pipe of the scissors bracket assembly assembled at the top of the MMU in the fixing groove of the pole mount A bracket assembly.
- Interference may occur if the M10 Hex. Bolt for fixing the scissors bracket and the pole mount A bracket assembly is protruded.



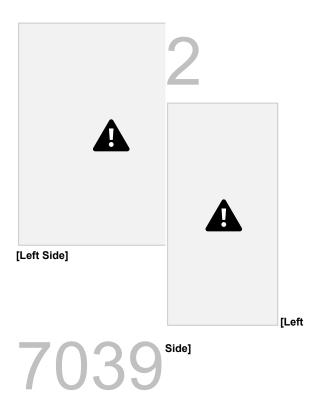
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Pole Mount A Bracket Assembly

Scissors Bracket

1



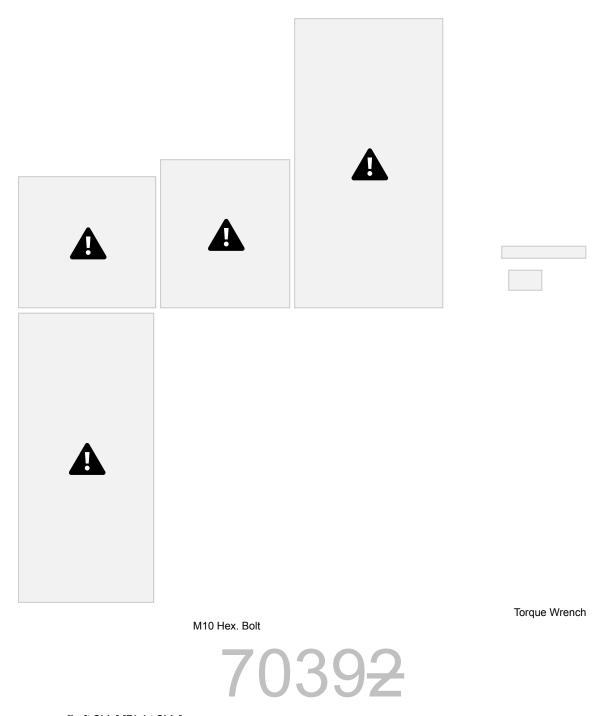
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Chapter 3 Installing System

3 Fix the scissors bracket by tightening the M10 Hex. Bolt of pole mount A bracket assembly.

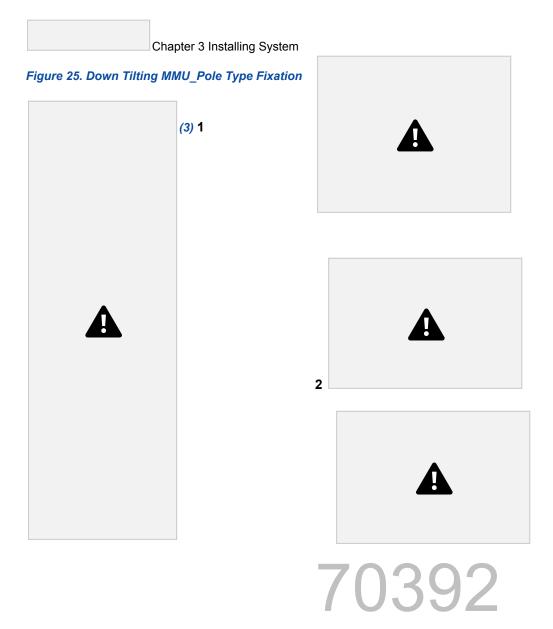
Figure 24. Down Tilting MMU_Pole Type Fixation (2)

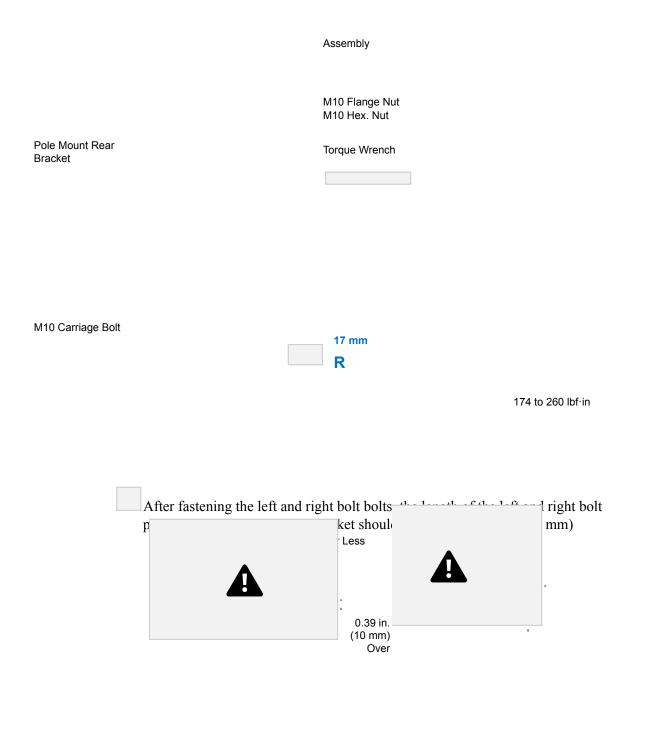


[Left Side] [Right Side]

R 17 mm174 to 260 lbf·in

4 Horizontally place the pole mount rear bracket assembled in the pole mount B bracket assembly at the fixed position, insert the unfastened M10 carriage bolt assembly into the fixing hole of the pole mount rear bracket, and fix the M10 flange nut and M10 hex. nut.





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Chapter 3 Installing System

Up Tilting MMU Fixation (Pole Type)

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

The parts of the scissors bracket assembly should be swapped with each other to tilt the MMU upward.

Scissors

Bracket Assembly

for Down-TiltingPole Mount B Bracket Assembly for Up-Tilting

Change

Change

Pole Mount B Bracket Assembly for Down-Tilting

Type) Prerequisites
Scissors Bracket Assembly for Up-Tilting

Up Tilting Bracket Assembly (Pole

Before proceeding with assembling the mount bracket (pole type), ensure that you have the items mentioned in the following table:

Table 7. Parts and Tools for Assembling the Up Tilting Bracket (Pole Type)

Category Description

Scissors Bracket

Pole Mount A Bracket Assembly

M10 Flange Nut
M10 Hex. Nut

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Chapter 3 Installing System **Category Description** Working Tools • Torque Wrench (100 to 400 lbf·in) • Torque Wrench Spanner head (apply Hex. Head: 17 mm) · Wrench (Hex. Head: 17 mm) To assemble the mount bracket (pole type), do the following:

1 Remove the fastening materials from the unit bracket of the scissors bracket assembly.

Figure 26. Up Tilting Bracket_Pole Type Assembly (1)



2 Align the scissors bracket with the fixing holes of the unit bracket.

3 Fix the unit bracket and scissors bracket using fasteners.

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Figure 27. Up Tilting Bracket_Pole Type Assembly (2)

1 2



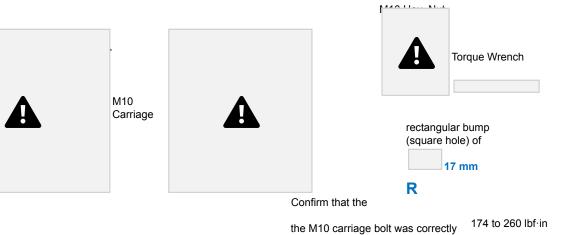
Unit Bracket Scissors Bracket



M10 Flange Nut



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inserted into the bracket.

Position the scissors bracket so that the 'UP TILT-UP' sign printing points upward.



4 Remove the fastening materials from the unit bracket of the Pole mount B bracket assembly.

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Figure 28. Up Tilting Bracket_Pole Type Assembly (3)

Pole Mount B Bracket Assembly

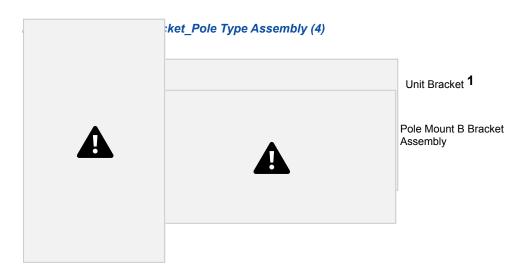
Flange Nut M10 Hex. Nut

M10 Flange Nut M10 Hex. Nut

L
17 mm

Chapter 3 Installing System

5 Align the pole mount B bracket assembly with the fixing holes of the unit bracket.



2

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※ Position the pole mount B bracket assembly so that it is parallel to the graduation mark on the unit bracket.

[Rear Side]

Confirm that the arrow of the 'UP' sign printing points upward when positioning the pole mount B bracket assembly on the unit bracket.



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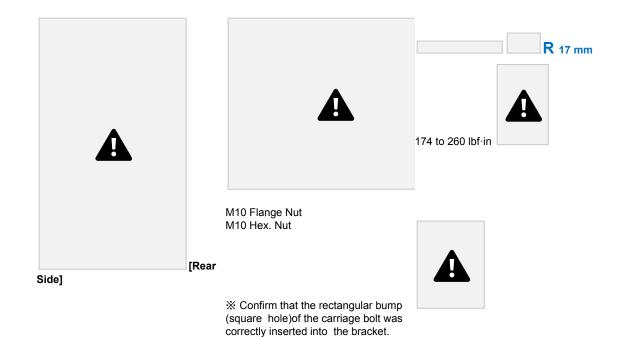
Chapter 3 Installing System

6 Fix the fastening materials that were removed from the pole mount B bracket assembly to the unit bracket.

Figure 30. Up Tilting Bracket_Pole Type Assembly (5)



M10 Hex. Nut
M10 Flange Nut



Torque Wrench

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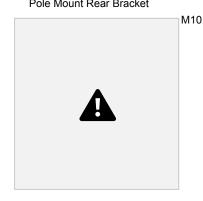
7 Remove the M10 carriage bolt assembly from the right side of the pole mount rear bracket.

Figure 31. Up Tilting Bracket_Pole Type Assembly (6)

123

Pole Mount Rear Bracket







Lifting MMU and Pole Mount A Bracket Assembly (Pole Type)

For more information, refer to the lifting procedure of the MMU and pole mount A

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bracket assembly (pole-type).

Fixing the Pole Mount A Bracket Assembly (Pole Type)

Prerequisites

Before proceeding with assembling the pole mount A bracket (pole type), ensure that you have the items mentioned in the following table:

Table 8. Parts and Tools for Fixing the Pole Mount A Bracket Assembly (Pole Type)

Category Description

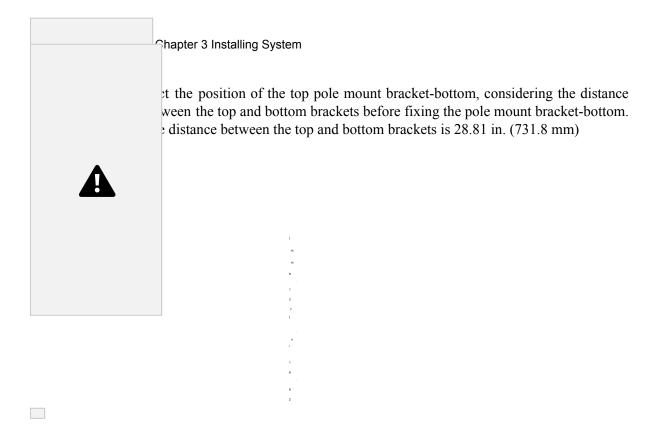
Pole Mount A Bracket Assembly

M10 Flange Nut M10 Hex. Nut

Parts 1 EA Recommended Torque Value 174 to 260 lbf·in

Working Tools • Torque Wrench (100 to 400 lbf·in)

- Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)



To fix the pole mount A bracket assembly (pole type), do the following:

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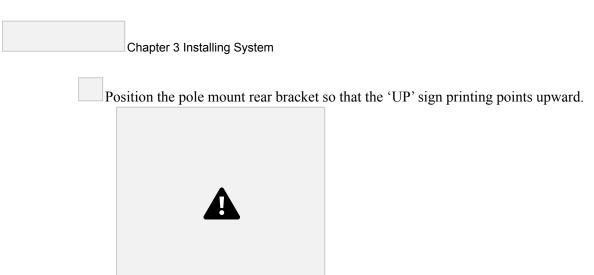
1 Place the pole mount A bracket assembly on the fixing positions for the pole.

Figure 32. Up Tilting Pole Mount Bracket Assembly Fixation (1)

12
Pole

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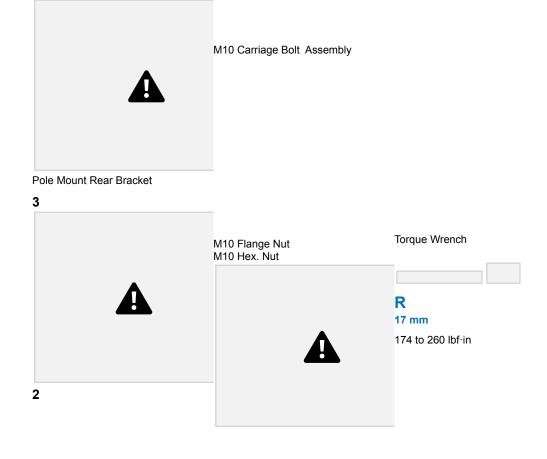
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- **2** Place the pole mount rear bracket horizontally in the fixed position.
- **3** Insert the unfastened M10 carriage bolt assembly to the fixing holes of the Pole mount rear bracket.
- **4** Tighten the M10 flange nut and M10 hex. nut fastened on the M10 carriage bolt assembly.

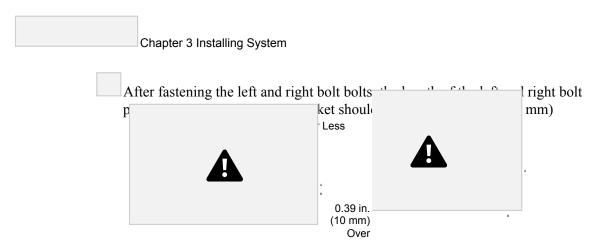
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Figure 33. Up Tilting Pole Mount Bracket Assembly Fixation (2)



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5 Confirm that pole mount bracket assembly is level using a spirit level.

Figure 34. Up Tilting Pole Mount Bracket Assembly Fixation (3)





% If it is level, the bubble of the spirit level is positioned at the center of both lines.

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6 Loosen the fastening materials of the scissors bracket assembly fixing unit. (Ensure that the fastening materials are kept safe as they are required again when fixing the MMU.)

Up Tilting MMU Fixation (Pole Type)

Prerequisites

Before proceeding with fix the up-tilting MMU to the pole, ensure that you have the items mentioned in the following table:

Table 9. Parts and Tools for Up Tilting MMU Fastening (Pole Type)

Category Description

M10 Flange Nut M10 Hex. Nut

Recommended Torque Value 174 to 260 lbf·in

Working Tools • Torque Wrench (100 to 400 lbf·in)

- Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)

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- To fix the up-tilting MMU to the pole, do the following:
- 1 Align the MMU with the fixing part of the pole mount A bracket assembly fixed to the pole.
- 2 Place the pipe of the scissors bracket assembled at the bottom of the MMU in

Interference may occur if the M10 Hey Rolt for fixing the scissors bracket and the

the fixing groove of the pole mount A bracket assembly.

Interference may occur if the M10 Hex. Bolt for fixing the scissors bracket and the pole mount A bracket assembly is protruded.



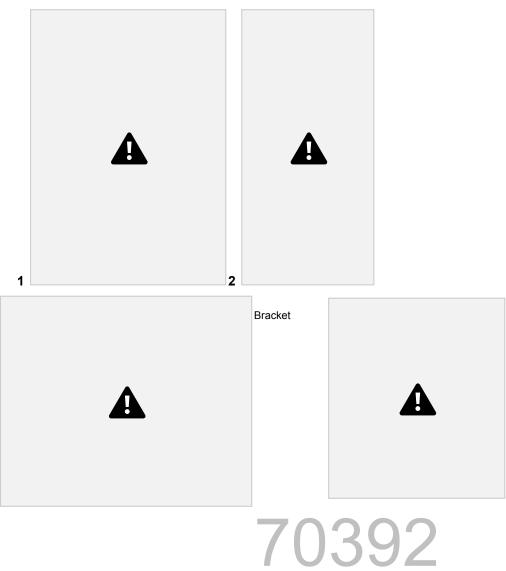
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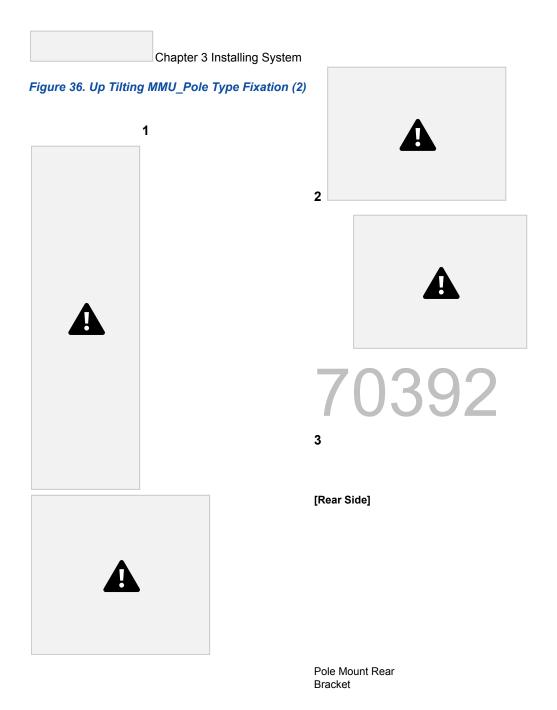
Figure 35. Up Tilting MMU_Pole Type Fixation (1)



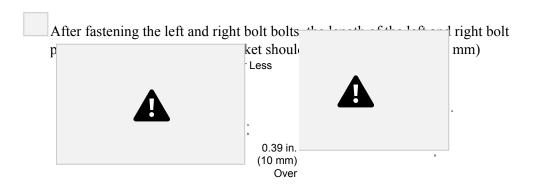
Scissors

Pole Mount A Bracket Assembly

> **3** Horizontally place the pole mount rear bracket assembled in the top pole mount bracket assembly at the fixed position, insert the unfastened M10 carriage bolt assembly into the fixing hole of the pole mount rear bracket, and fix the M10 flange nut and M10 hex. nut fastened on the M10 carriage bolt assembly.



M10 Flange Nut M10 Hex. Nut



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4 Fix the scissors bracket by tightening the M10 Hex. Bolt of pole mount A bracket assembly.

Figure 37. Up Tilting MMU_Pole Type Fixation (3)

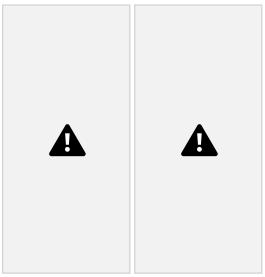


174 to 260 lbf·in

Fixing Wall Type

There are two installation types (installation for the up tilting and installation for the down tilting) to fix the MMU on a wall

[For Down Tilting] [For Up Tilting]



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Marking and Drilling for Wall Mounting

Before proceeding with marking on the wall, ensure that you have the items mentioned in the following table.

Table 10. Tools for Marking

Category Description
Working Tools • Tape Measure

- · Permanent Maker
- Level

To mount the system on a wall, perform the leveling test by referring to System Leveling to check the positions that are marked as horizontal or vertical before drilling. If the result displays they are not horizontal or vertical, modify the marking positions.

When the position where the system is to be placed is determined, place the system on that position, and then mark the positions where anchor bolts are to be fixed. This reduces the marking error range.

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To mark on a wall, do the following:

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

Figure 38. MMU Marking Dimensions_Wall Type

Unit: in. (mm) : Anchor Bolt Hole

[For Down Tilting] [For Up Tilting]

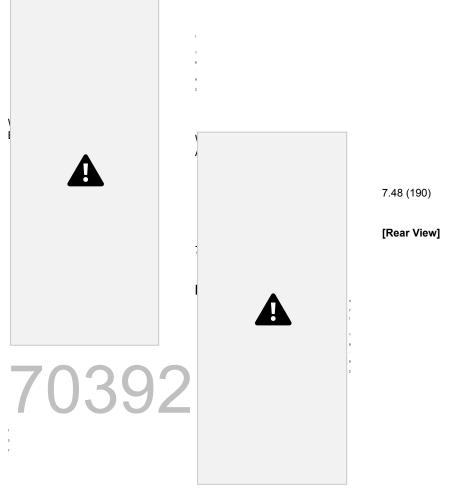
Wall Mount

Wall Mount A Bracket Assembly

Anchor Bolt Hole

Anchor Bolt Hole

B Bracket Assembly



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.

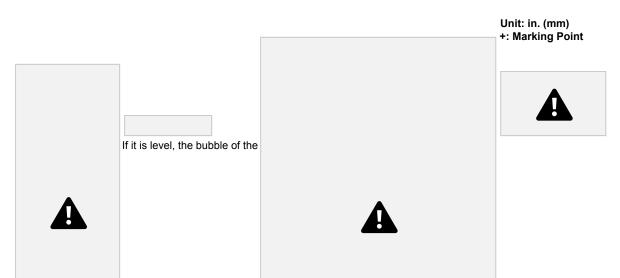
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3 If the level status is normal, mark the anchor bolt holes on a wall.

Figure 39. Marking





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7 48 (100)

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Drilling and Anchoring

To drill an anchor hole, do the following:

1 Prepare the components outlined in the following table.

Table 11. Parts and Tools for Drilling & Anchoring

Category Description

M10 Set Anchor Assembly

M10	Hex.	Nut

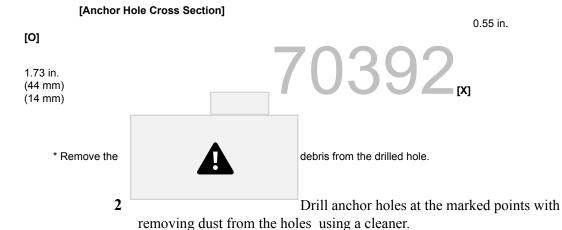
Parts 4 EA Recommended Torque Value 174 to 260 lbf·in Working Tools · Hammer Drill

- · Concrete Drill Bit (0.55 in. (14 mm))
- · Vacuum Cleaner
- Hammer
- · Anchor Punch (for M10 Set Anchor)

Table 12. Anchor Bolt Drill Bits and Hole Depth

Anchor Bolt	Drill Bits
M10	0.55 in. (14 mm)

Category Hole Depth Wall Type 1.73 in. (44 mm)



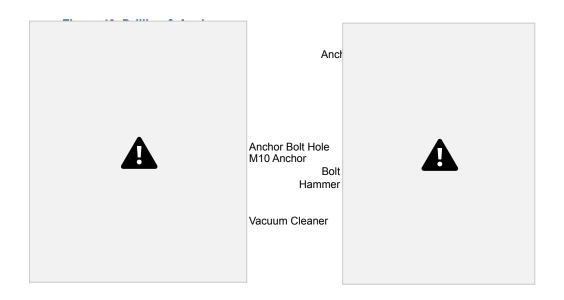
The worker may drill after drill template is removed or remove the drill template after drilling according to the installation site conditions.

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3 Fix set anchor to the drilled hole.



Hammer Drill

[Drill Bit]

0.55 in. (14 mm)

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Down Tilting MMU Fixation (Wall Type)

Down Tilting Bracket Assembly (Wall Type)

Prerequisites

Before proceeding with assembling the mount bracket (wall type), ensure that you have the items mentioned in the following table:

Table 13. Parts and Tools for Assembling the Down-Tilting Bracket (Wall Type)

Category Description

Scissors Bracket

Wall Mount B Bracket Assembly

M10 Flange Nut
M10 Hex. Nut

Parts 1 EA 1 EA

Recommended Torque Value 174 to 260 lbf·in

Working Tools ${\bf \cdot}$ Torque Wrench (100 to 400 lbf·in)

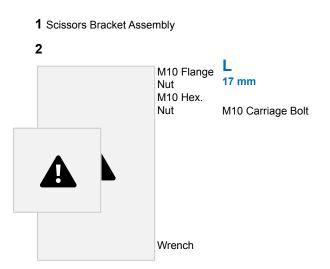
- · Torque Wrench Spanner head (apply Hex. Head: 17 mm)
- · Wrench (Hex. Head: 17 mm)

To assemble the mount bracket (wall type), do the following:

1 Remove the fastening materials from the unit bracket of the scissors bracket assembly.

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Figure 41. Down Tilting Bracket_Wall Type Assembly (1)





M10 Flange Nut M10 Hex. Nut

2 Align the scissors bracket assembly with the top fixing holes of the unit bracket.

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3 Fix the unit bracket and scissors bracket using fasteners.

Position the scissors bracket assembly so that the 'DOWN TILT-UP' sign printing points upward.



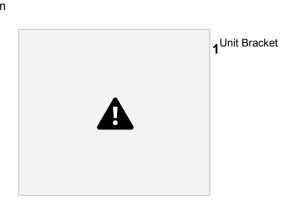
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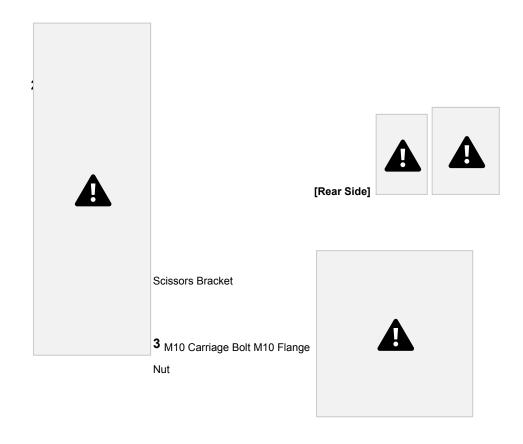
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Figure 42. Down Tilting Bracket_Wall Type Assembly (2)







M10 Hex. Nut

WITO FIEX. NUL

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rectangular bump (square hole) of

17 mm

Confirm that the

R inserted into the bracket. 174 to 260 lbf·in

the M10 carriage bolt was correctly



4 Remove the fastening materials from the unit bracket of the Wall mount B bracket assembly.

Figure 43. Down Tilting Bracket_Wall Type Assembly (3)



M10 Flange Nut

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5 Align the Wall mount B bracket assembly with the bottom fixing holes of the unit bracket.

Figure 44. Down Tilting Bracket_Wall Type Assembly (4)



1

※ Position the all mount B bracket assembly so that the UP sign printing points upward.



Wall Mount B Bracket Assembly

Unit Bracket





2 [Left Side]

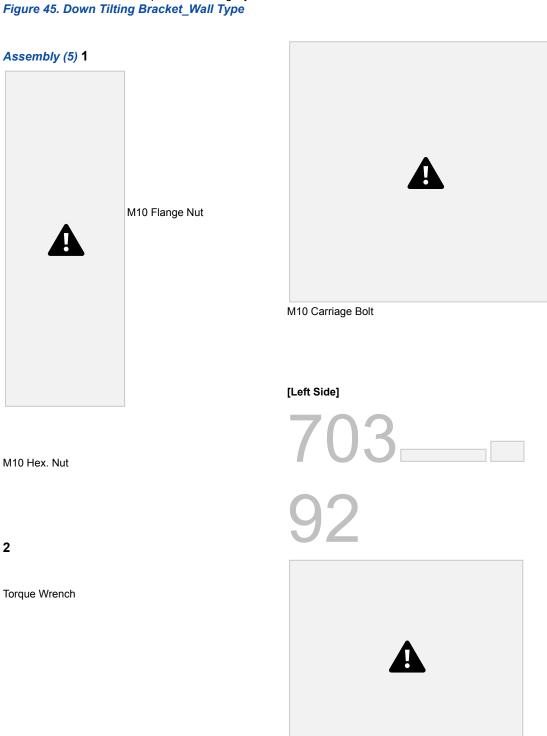
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※ Position the wall mount B bracket assembly so that it is parallel to the graduation mark on the unit bracket.

6 Fix the unit bracket and wall mount B bracket assembly using fasteners.

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R

17 mm

Fixing the Wall Mount A Bracket Assembly

To fix the Wall Mount A Bracket Assembly to the wall, do the following:

1 Prepare the components outlined in the following table.

Table 14. Parts and Tools for Fixing the Wall Mount A Bracket Assembly

Category Description

Wall Mount A Bracket Assembly
M10 Hex. Nut

Parts 1 EA Recommended Torque Value 174 to 260 lbf·in Working Tools • Torque Wrench (100 to 400 lbf·in)

- Torque Wrench Spanner head (apply Hex. head: 17 mm)
- · Wrench (Hex. Head: 17 mm)

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