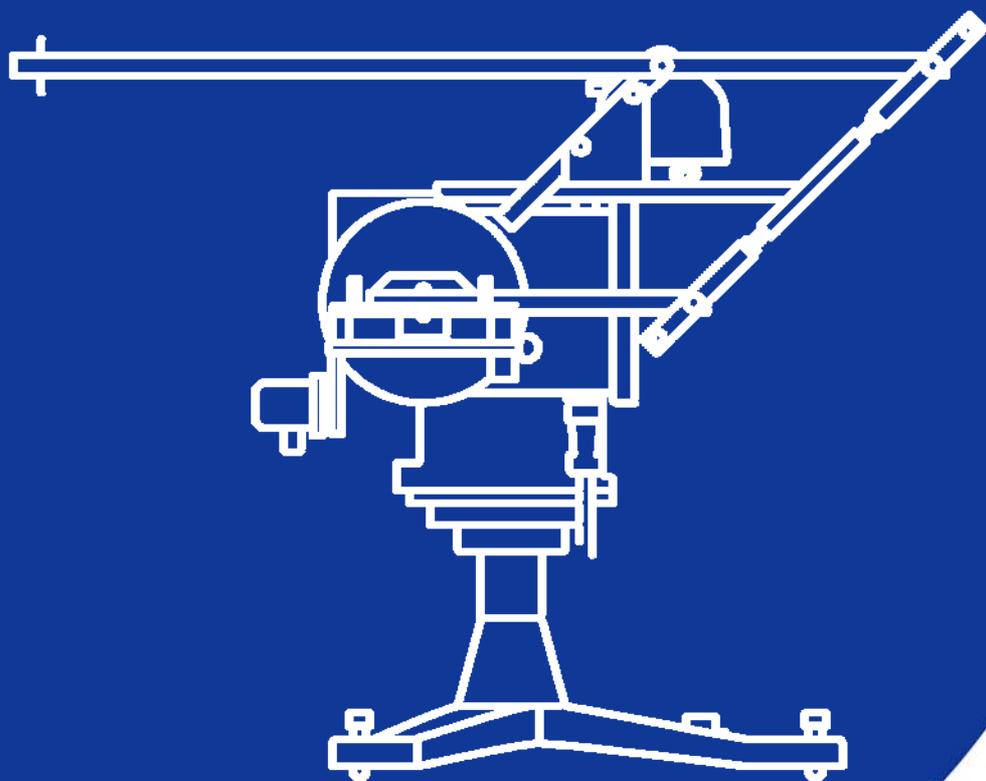


INSTRUCTION MANUAL

Shading Device

MD-81



EKO

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2. Important User Information

Thank you for using EKO Products

Make sure to read this instruction manual thoroughly and to understand the contents before starting to operate the instrument. Keep this manual at safe and handy place for whenever it is needed.

For any questions, please contact us at one of the EKO offices given below:

2-1. Contact Information

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2-2. Warranty and Liability

For warranty terms and conditions, contact EKO or your distributor for further details.

EKO guarantees that the product delivered to customer has been verified, checked and tested to ensure that the product meets the appropriate specifications. The product warranty is valid only if the product has been installed and used according to the directives provided in this instruction manual.

In case of any manufacturing defect, the product will be repaired or replaced under warranty. However, the warranty does not apply if:

- Any modification or repair was done by any person or organization other than EKO service personnel.
- The damage or defect is caused by not respecting the instructions of use as given on the product brochure or the instruction manual.

2-3. About Instruction Manual

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This manual was issued: 2017/3/29
Version Number: 1

2-4. Environment

1. WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment)

This product is not subjected to WEEE Directive 2002/96/EC however it should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

2. RoHS Directive 2002/95/EC

EKO Instruments has completed a comprehensive evaluation of its product range to ensure compliance with RoHS Directive 2002/95/EC regarding maximum concentration values for substances. As a result all products are manufactured using raw materials that do not contain any of the restricted substances referred to in the RoHS Directive 2002/95/EC at concentration levels in excess of those permitted under the RoHS Directive 2002/95/EC, or up to levels allowed in excess of these concentrations by the Annex to the RoHS Directive 2002/95/EC.

3. Safety Information

EKO Products are designed and manufactured with consideration for safety; however, please make sure to read and understand this instruction manual thoroughly to be able to operate the instrument safely in the correct manner.



WARNING CAUTION

Attention to user; pay attention to the instructions given on the instruction manual with this sign.



HIGH VOLTAGE WARNING

High voltage is used; pay special attention to instructions given on this instruction manual with this sign to prevent electric leakage and/or electric shocks.



HIGH TEMPERATURE WARNING

Touching or getting close to the device may lead to burn.



3-1. WARNING/CAUTION

1. Setup

- Accidents or injury may occur if the tracker is installed in a site where it is hard to perform maintenance.

2. Approaching to the Instrument

- During installation or servicing, always switch off the main power. The sun tracker with shading device contains rotating parts that may cause severe injury or accident to your body when your body and/or clothing get caught.
- The sun trackers do not have any automatic stop safety mechanism, but can only be stopped by disconnecting the main power.



3-2. HIGH VOLTAGE WARNING

1. Power Supply of Sun Tracker

- To prevent electric shock or electronic damage by lightning or surge, make sure the earth cable or power plug is connected to ground.
- Check the supply voltage corresponding to the voltage requirements of the sun tracker (100 – 230 VAC or 24 DC)

4. Introduction

This shading disk system MD-81 is for MS-80 series, which is compact and lightweight compared to our conventional model.

With a sun tracker STR-21G, Pyranometer MS-80 and Pyrhemliometer MS-56 / 57, high precision solar measurement system can be assembled in affordable cost.

4-1. Main Functions

1. Simple Component

In combination with EKO Sun Tracker STR-21G and MS-80 Pyranometer, the DHI measurements are optimized very easily.

2. Expandability

2 types of Top plate are available. One is for small plate to mount just one MS-80 or MS-80 with ventilation unit MV-01 to measure DHI. The other is large plate to mount two MS-80 or MS-80 with MV-01 to measure DHI and GHI.

4-2. Package Contents

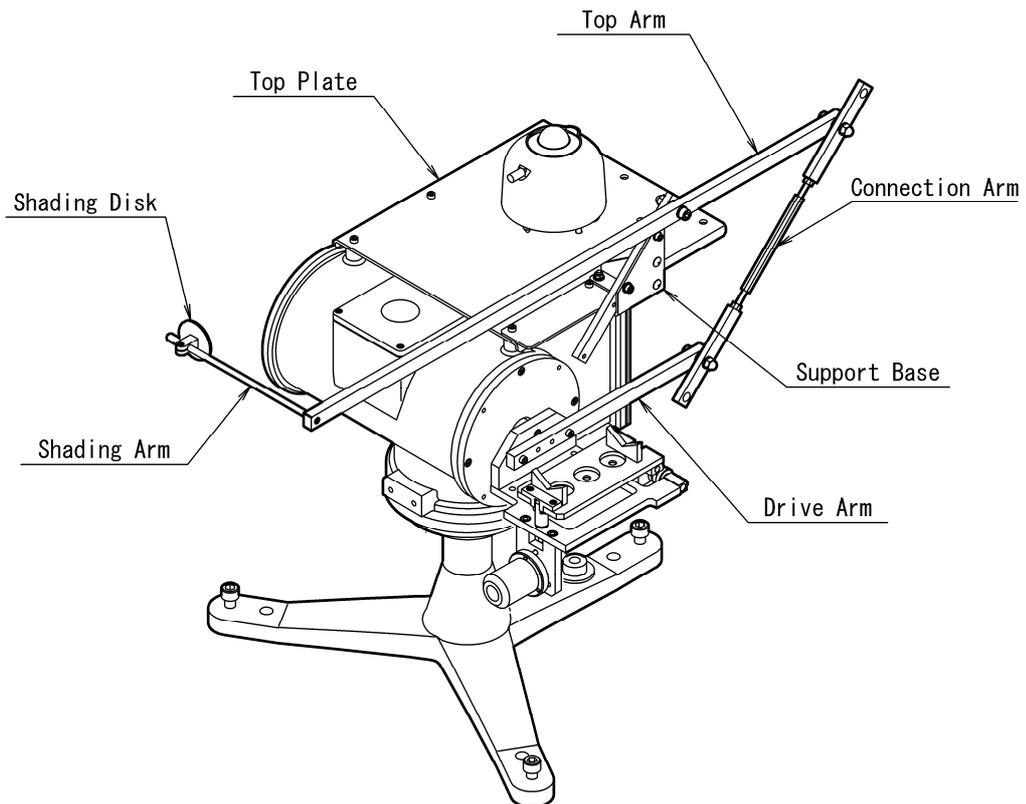
Check the package contents first; if any missing item or damage is noticed, please contact EKO immediately.

Table 4-1 Package Contents

Standard Items	Qty.	Remarks
Support Base	1	With 1-CAP screw M6x30,1-Box nut M6
Shading Arm	1	With 1-CAP screws M3x12 Shading Disk is assembled
Connection Arm	1	With 2-CAP screw M6x30,2-Box nut M6
Drive Arm	1	With 2-CAP screws M4x18 Supplied with Connection Arm
Top Arm	1	Supplied with Connection Arm
Top Plate	1	For DHI or For DHI+GHI With 2-CAP screws M4x12(P3), 2-CAP screws M4x15(P3)
Spare Parts	1	1-CAP screw M6x30(black), 1-Box nut M6(black) 1-CAP screws M4x18, 1-CAP screws M4x12 1-CAP screw M3x12, 2- Washer M4 1-CAP screw M4x12(P3), 1- CAP screw M4x15(P3) 5-Shoulderwasher,
Instruction Manual	1	Download from EKO website

5. Getting Started

5-1. Parts Name



5-2. Setup

1. For installation space, see [7-1 Dimensions].
2. For how to setting Sun Tracker and Sensors, see each instruction manual.
3. Make sure the Sun Tracker is in the origin point when setting up the shading device.
4. Shading device setup should be done on a sunny day as it requires shade of shading device itself to make fine alignment at the last step.

5-3. Installation

1. Preparation

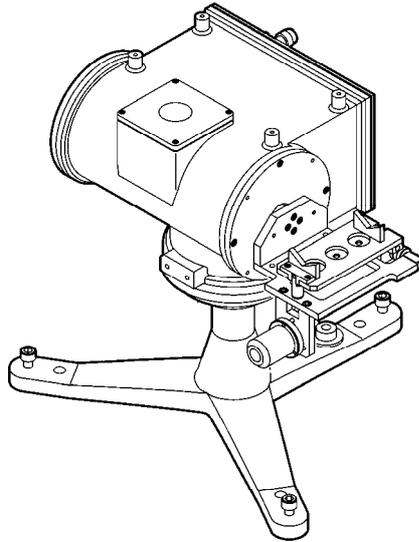
For assembling the Shading Ball, prepare the following tools:

Hexagon wrench 2.5 (for M3 screws)

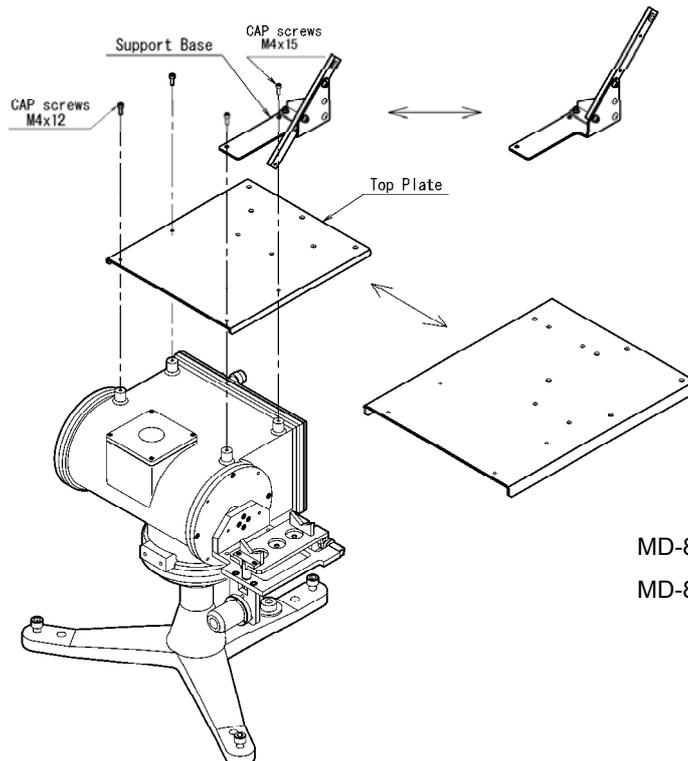
Hexagon wrench 3 (for M4 screws)

Hexagon wrench 4 (for M6 screws)

2. Beginning



3. Support Base and Top Plate Assembling



For MV-01

Reassemble the Support Base
when MV-01 installing

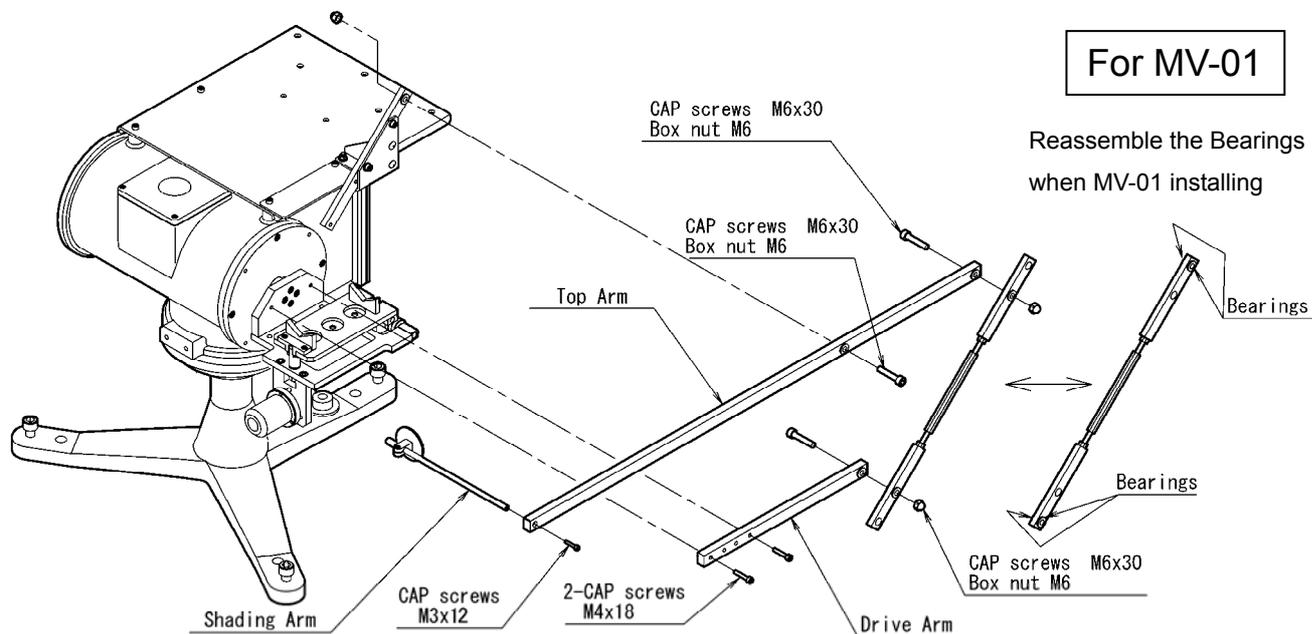
For DHI+GHI

MD-81-11 includes Top Plate for DHI

MD-81-12 includes Top Plate for DHI + GHI

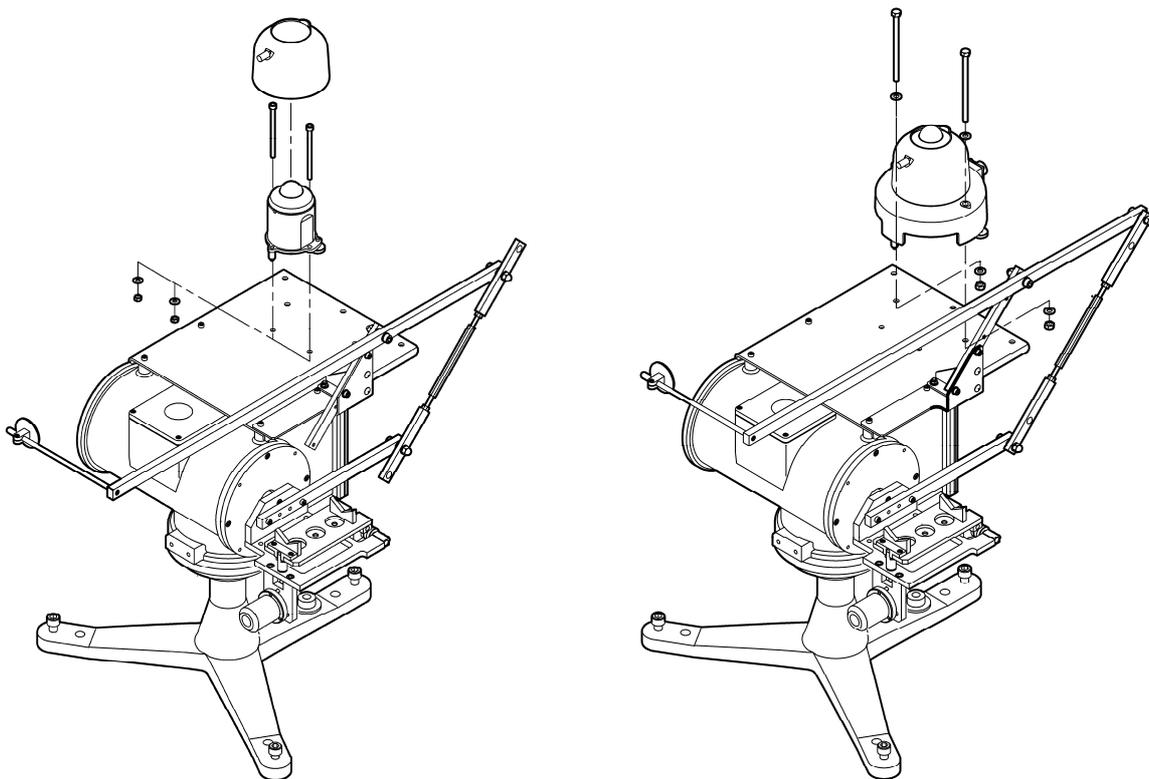
4. Arm Assembling

If the Box nut is too loose, the parts will fall apart, yet fastening too tight will create excess load to the parts during operation and may lead to damaging the instrument. Be careful with tightening the Box nut .

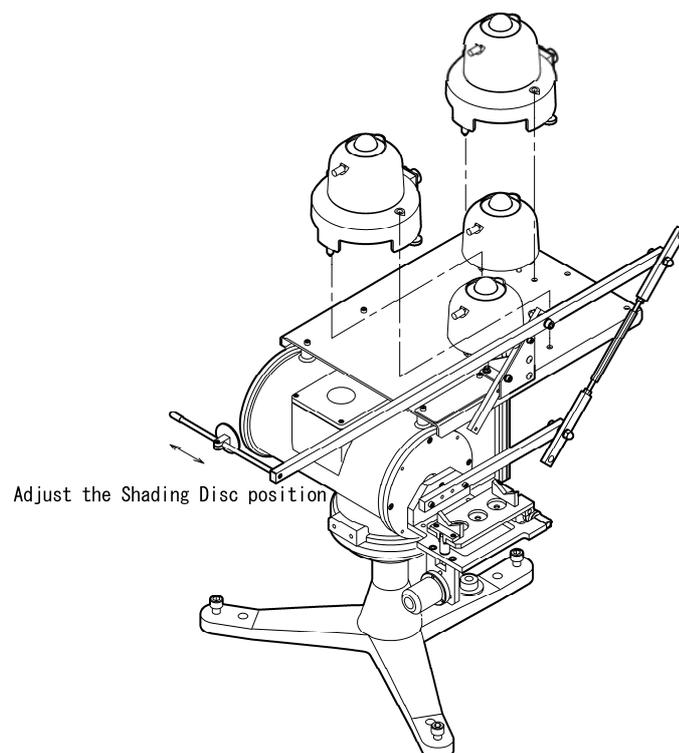


5. Pyranometer Installing

MD-81-11 for DHI



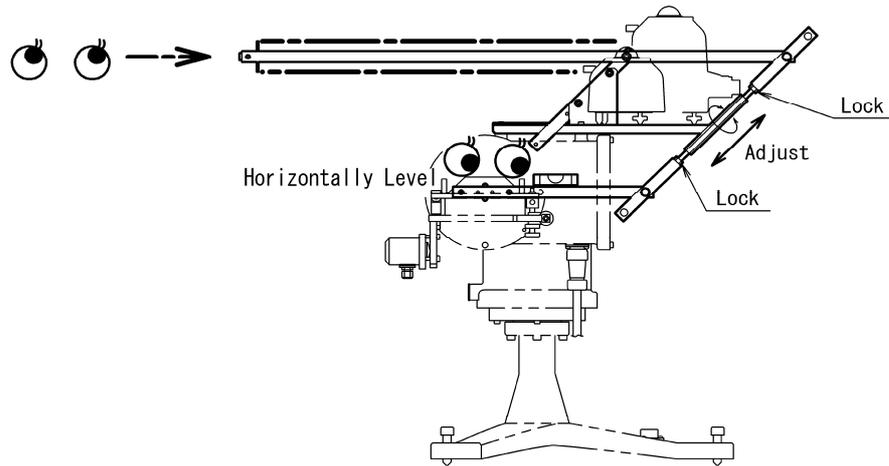
MD-81-12 for DHI+GHI



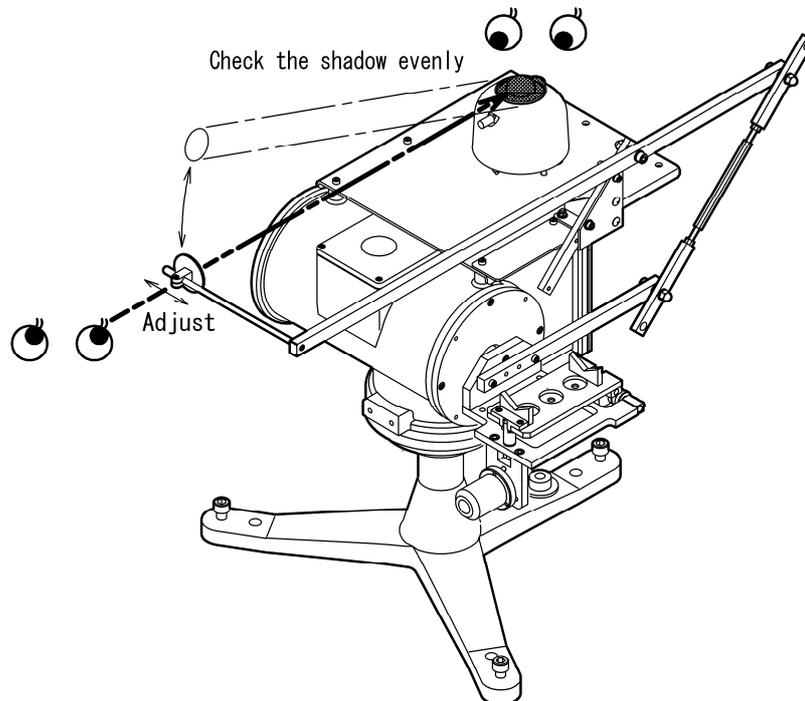
6. Final Adjustment

Connect the power cable to the connector on Sun Tracker. After 1~2 seconds Sun Tracker starts to search for the origin point, pull out the power cable and stop the Sun Tracker in the origin point position.

- 1) Check the Drive Arms that they are horizontally leveled.
- 2) Visually check the position of shading disk; adjust the height and side positions making sure it covers the pyranometer dome when it is looked from the front position.



- 3) Insert the power cable to the connector, and check and make adjustment so that the shading disk shadow covers the glass dome evenly.

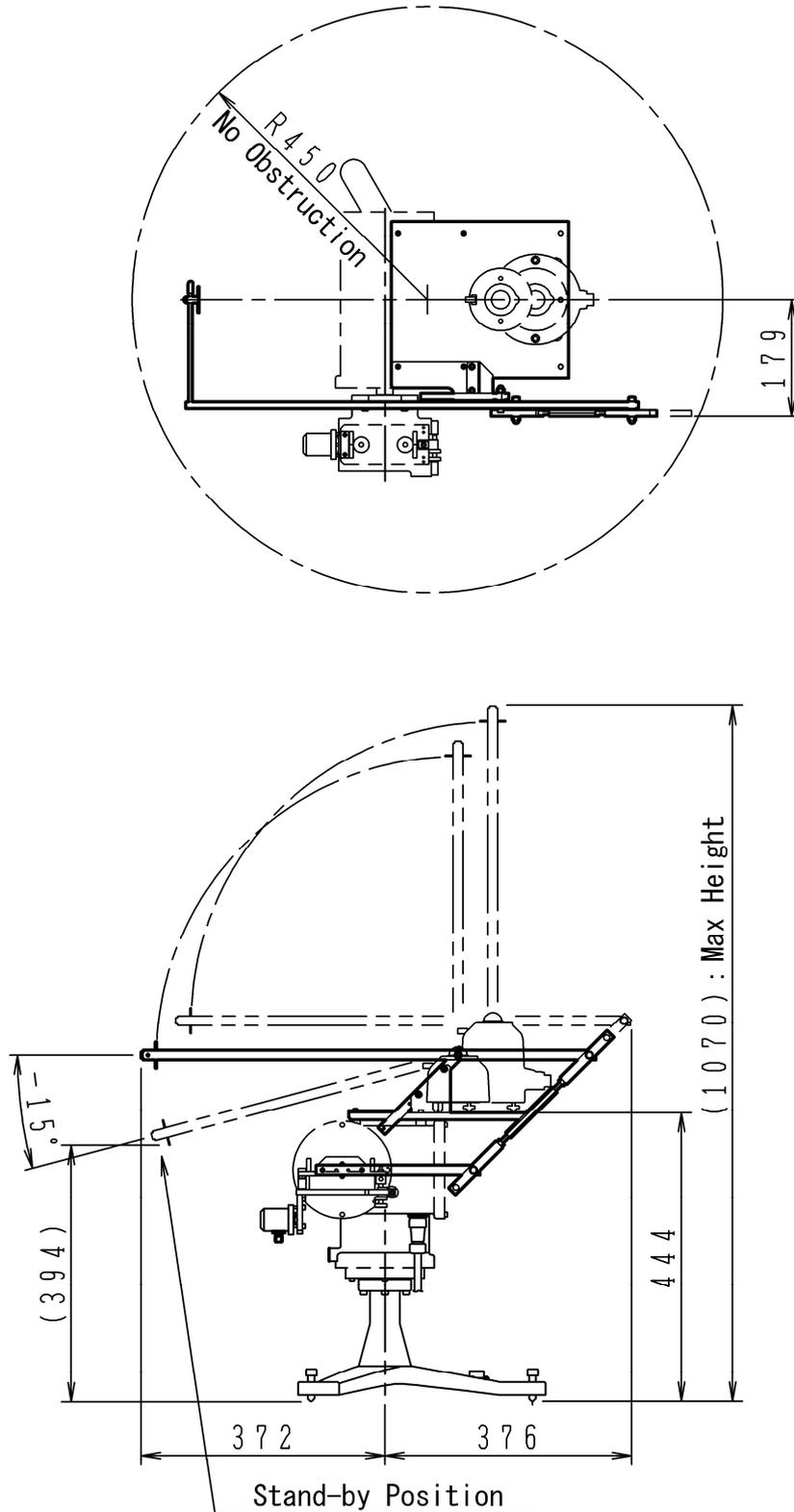


Check the position of shading disk shadow position as the Sun Tracker is tracking the sun; adjust the shading disk position as necessary.

After the adjustment is completed, fasten each screw securely.

6. Specification

7-1. Dimensions





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