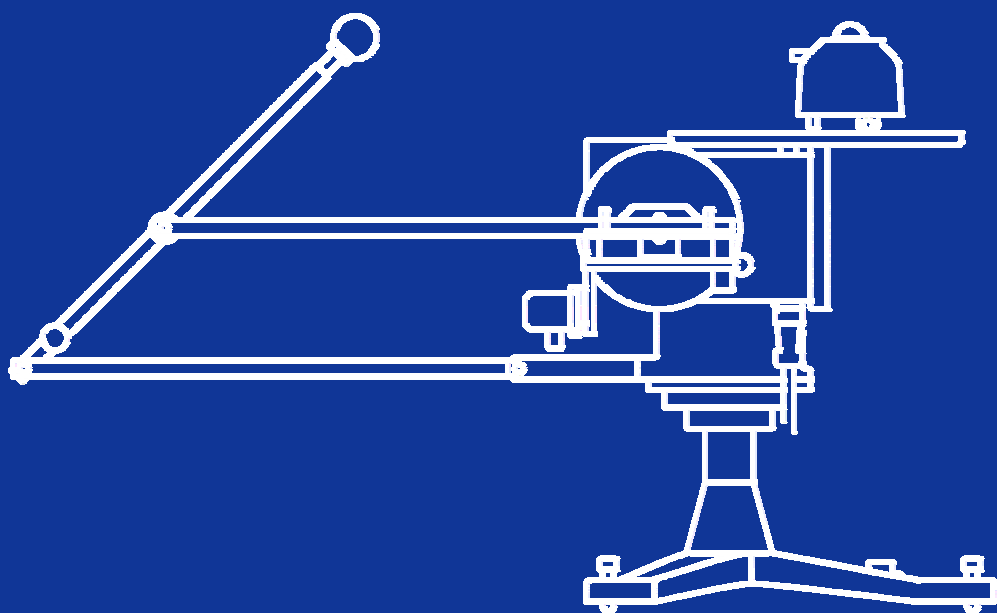


INSTRUCTION MANUAL

Shading Device

# MB-82-11

# MB-82-12



EKO

# 1. Index

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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

#### EKO INSTRUMENTS CO., LTD.

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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.

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## 2-3. About Instruction Manual

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This manual was issued: 2019/7/9  
Version Number: 2

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## 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.



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## 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 system MB-82 is redesigned for MS-80 series, which is compact and lightweight compared to our conventional model.

MB-82 has the advantage of not needing to raise the Sun Tracker base height because the arms are short and will not touch the ground.

### 4-1. Main Functions

#### 1. Simple Component

In combination with EKO Sun Tracker STR-22 and MS-80 Pyranometer, the DHI measurements are optimized very easily.

#### 2. Expandability

MB-82 is available for different instrument configurations.

- MS-80 for DHI measurement
- MS-80 for DHI measurement and MS-80 for GHI measurement

MS-80 with MV-01 can also be mounted on MB-82.

### 4-2. Package Contents

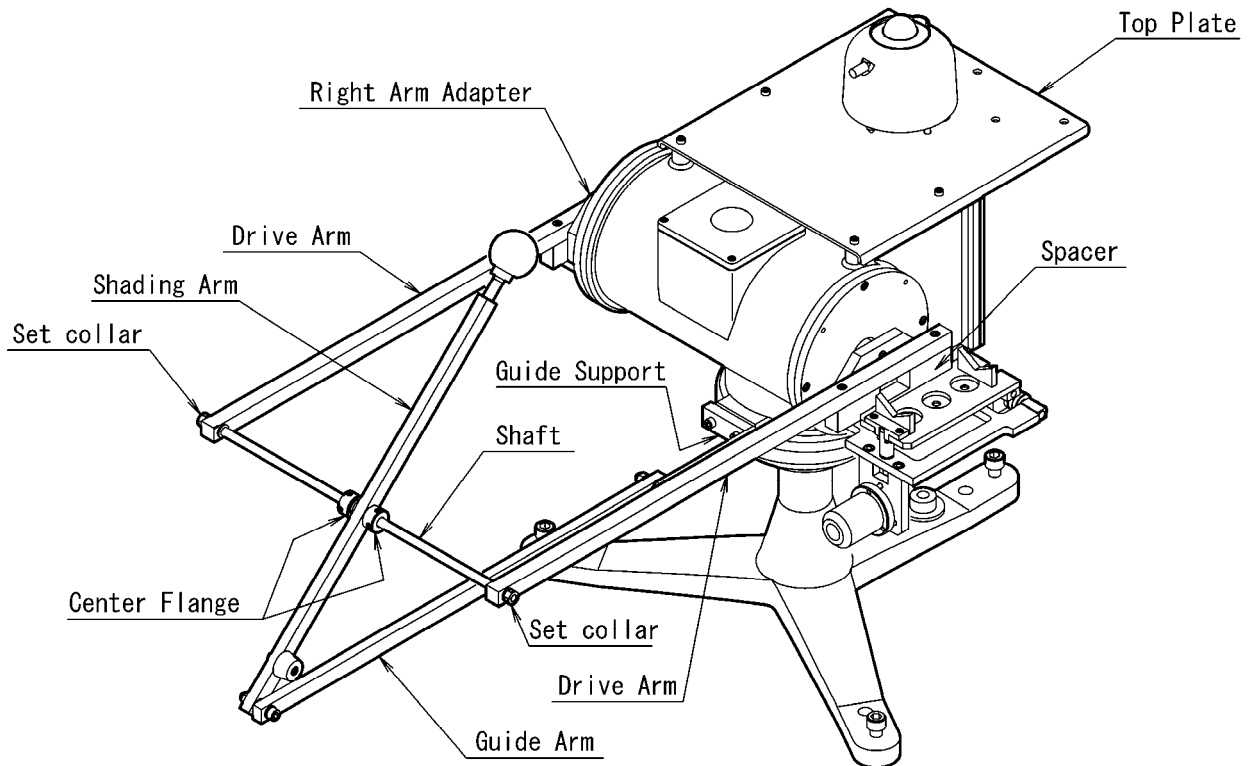
Check the package contents first; if any missing item or damage is noticed, please contact EKO immediately.

Table 4-1 Package Contents

Standard Items	Qty.	Remarks
Right Arm Adapter	1	With 6-CAP screws M4x18
Spacer	1	With 2-CAP screws M5x12, 2-CAP screws M4x18
Guide Support	1	With 1-CAP screw M6x35,1-Box nut M6
Drive Arm	2	
Guide Arm	1	Supplied with Drive Arms
Shading Arm	1	With 1-CAP screw M6x40,1-Box nut M6
Shaft	1	With 2- Box nut M6 Supplied with Shading Arm
Center Flange	2	Supplied with Shaft
Top Plate	1	For DHI or For DHI+GHI , With 4-CAP screws M4x12(P3)
Spare Parts	1	1-CAP screw M6x35,1-CAP screw M6x40, 1-CAP screw M5x12 1-CAP screws M4x30, 2-CAP screws M4x18,1-Setscrew M3 1-CAPscrewM3x12(black),1-Washer(black)M3, 1-CAP screws M4x12(P3) 1- Washer M4 1-Nut M4,1-Shoulderwasher,1-Box nut M6
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. Since the arms are short, there is no need to raise Sun Tracker base height.
3. For how to setting Sun Tracker and Sensors, see each instruction manual.
4. Make sure the Sun Tracker is in the origin point when setting up the shading device.
5. 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:

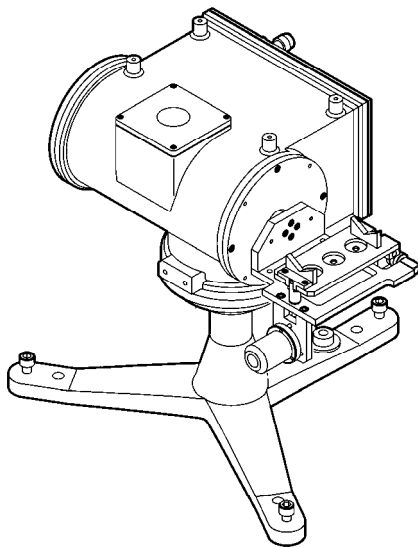
Hexagon wrench 2 (for set screws)

Hexagon wrench 2.5 (for M3 screws)

Hexagon wrench 3 (for M4 screws)

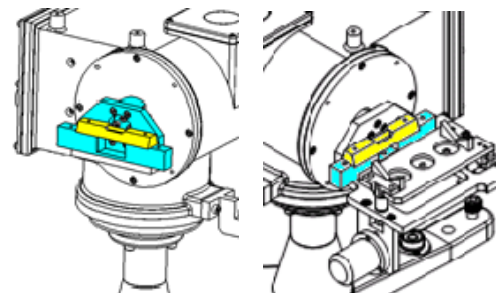
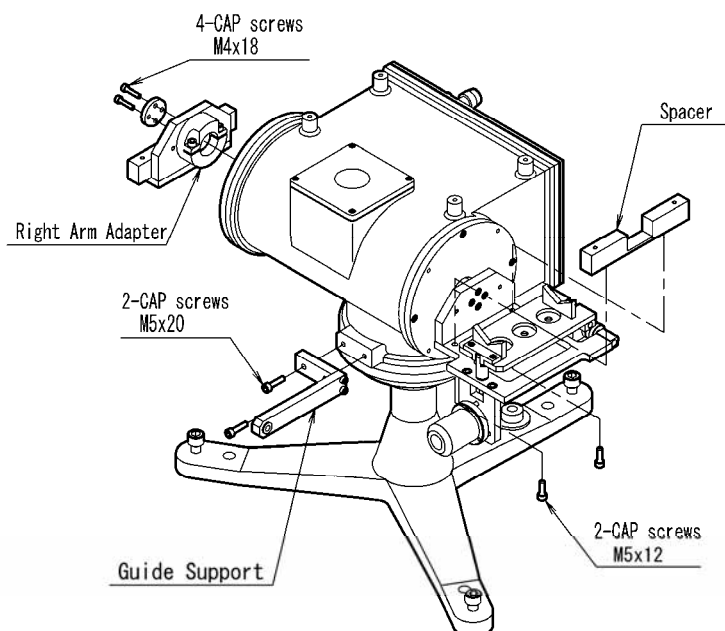
Hexagon wrench 4 ,Box wrench10 (for M6 screws Box nut)

### 2. Beginning



Connect the power cable to the receptacle of Sun Tracker. After 1~2 seconds Sun Tracker starts to search for the original position. When Sun Tracker stops, pull out the power cable immediately, then Sun Tracker keeps the original position.

### 3. Bracket Assembling



Position the arm axis to the origin position in the altitude direction. Place the spirit level on the Spacers, check the level. Loosen the CAP screws which are fixing these parts and adjust the level as necessary, so that the air bubble in the spirit level comes to the center. Once these parts are leveled, fasten the Right Arm Adapter and the Spacer securely.

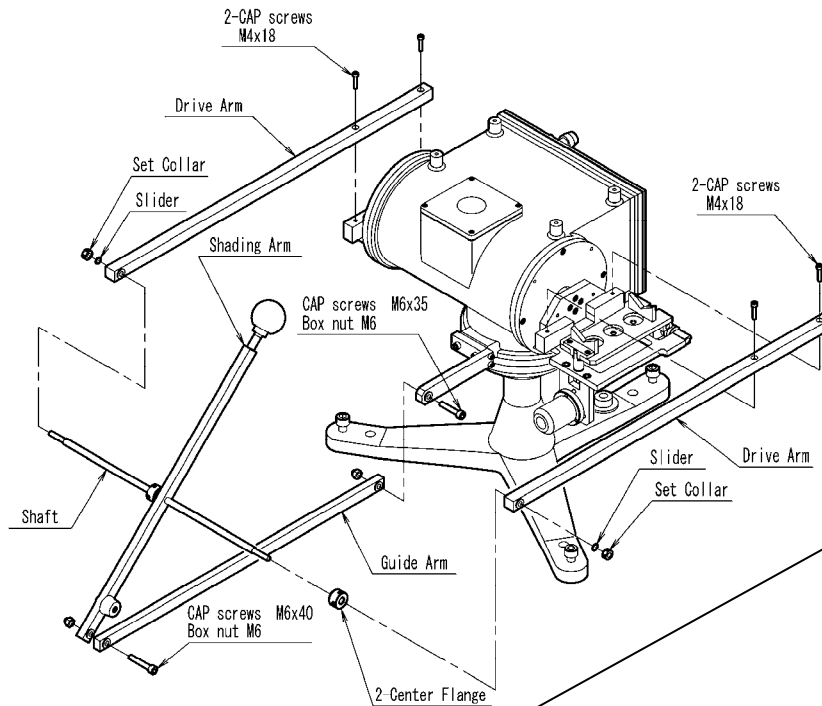
\*If these parts are attached too loose, it may lead to defects and/or miss-measurements.



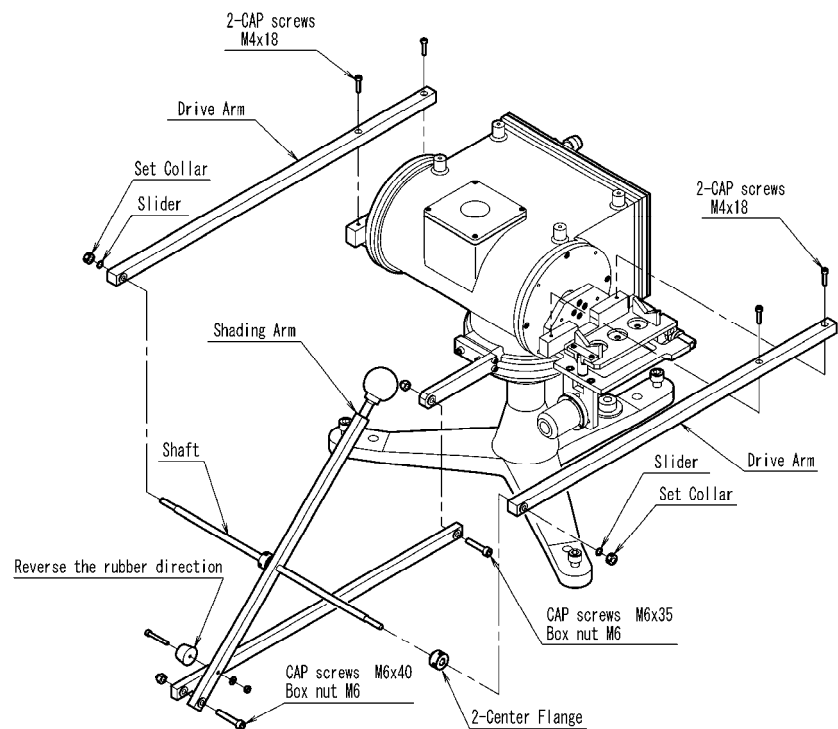
## 4. Arm Assembling

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 .

### For DHI Measurement

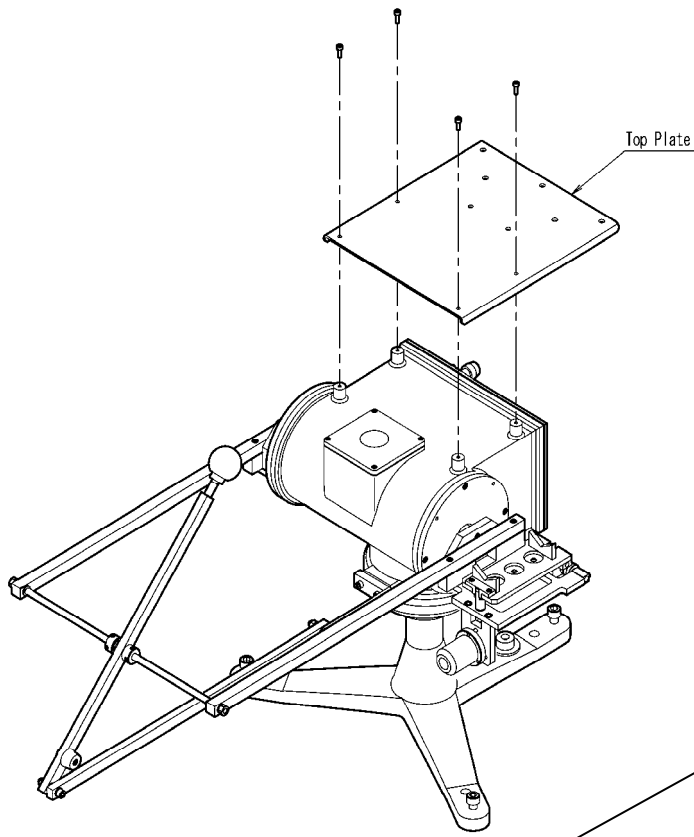


### For DHI & GHI Measurement

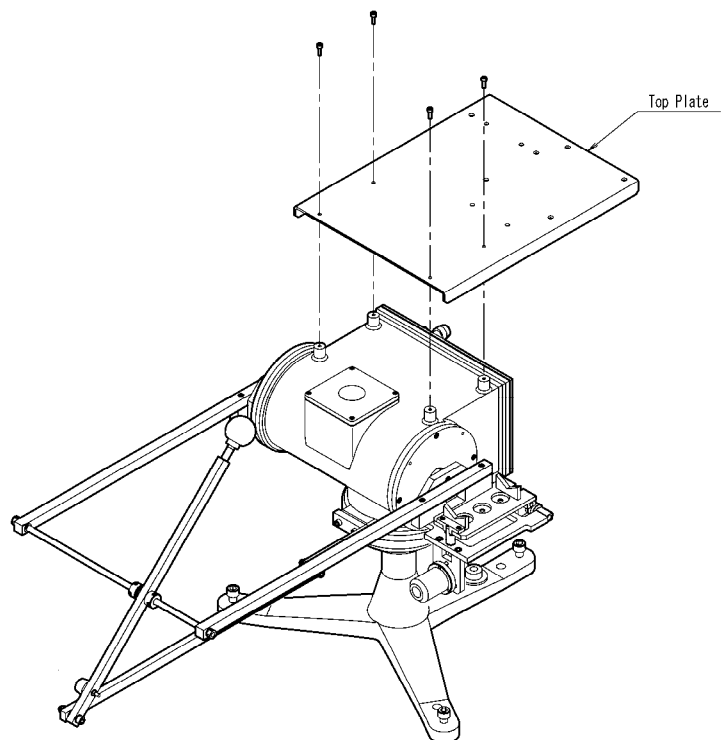


## 5. Top plate Assembling

For DHI Measurement

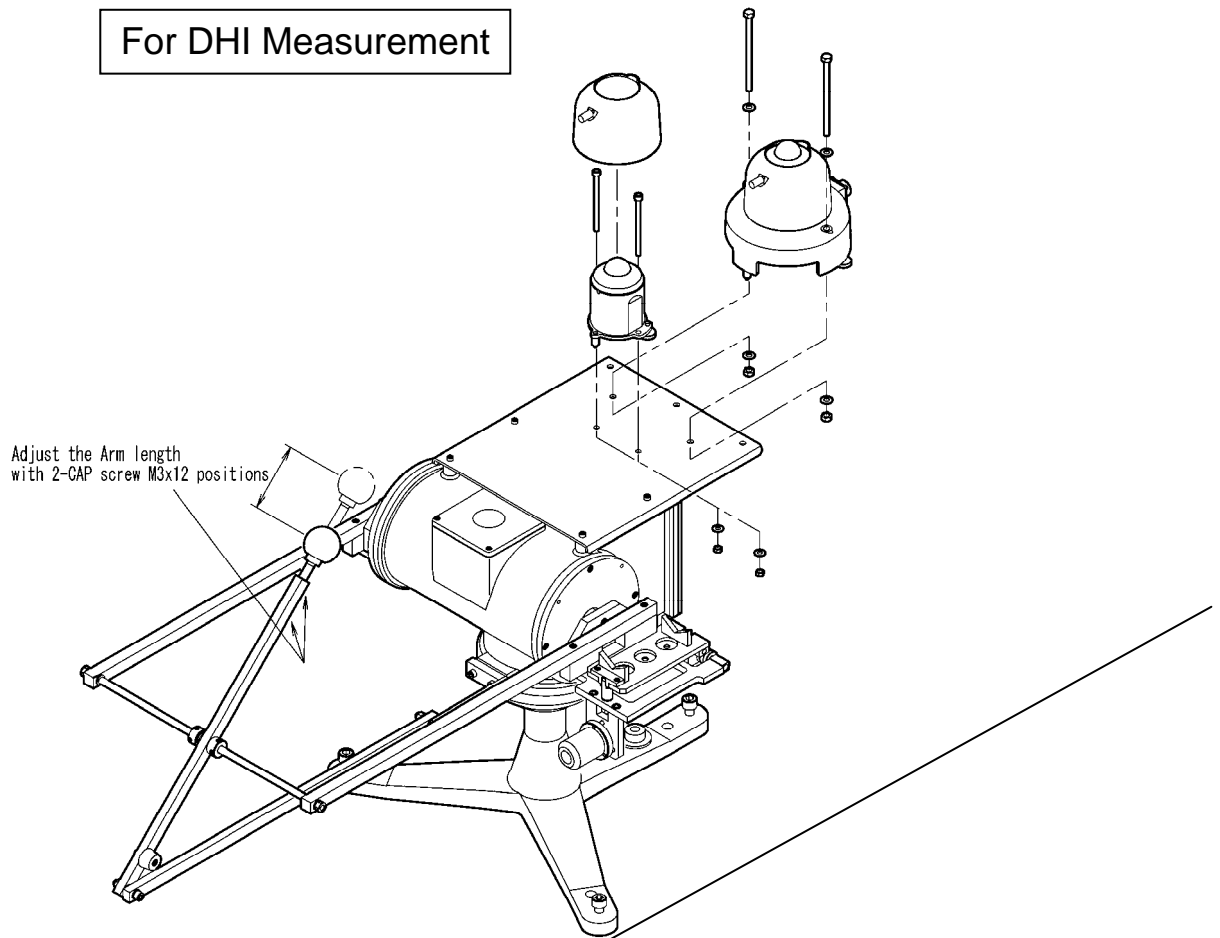


For DHI & GHI Measurement

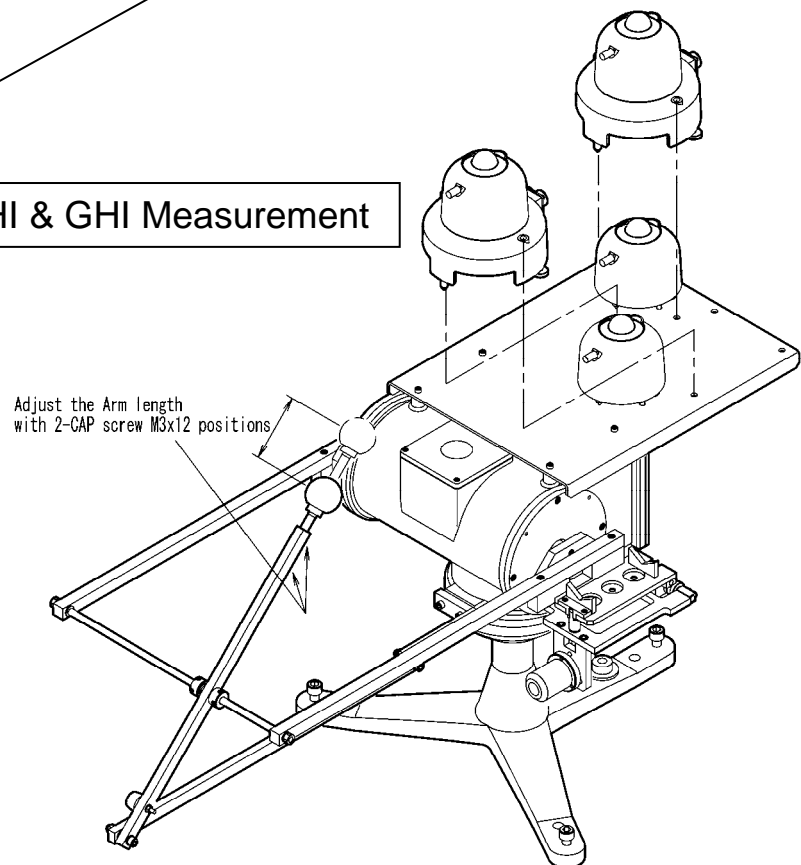


## 6. Pyranometer Installing

For DHI Measurement



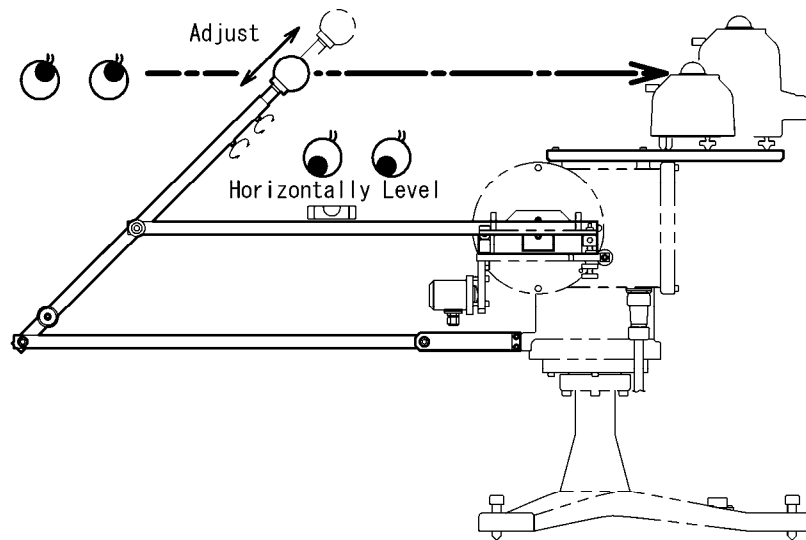
For DHI & GHI Measurement



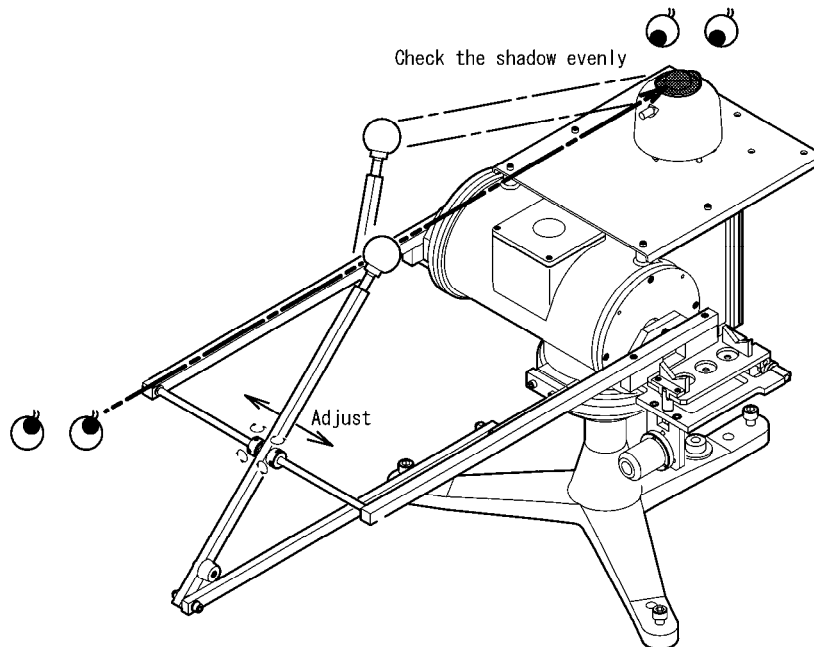
## 7. Final Adjustment

Connect the power cable to the receptacle of Sun Tracker. After 1-2 seconds Sun Tracker starts to search for the original position. When Sun Tracker stops, pull out the power cable immediately, then Sun Tracker keeps the original position.

- 1) Check the Drive Arms that they are horizontally leveled on both sides.
- 2) Visually check the position of shading ball; 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 ball shadow covers the glass dome evenly.



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

After the adjustment is completed, fasten each screw securely.

# 6. Maintenance & Troubleshooting

## 6-1. Maintenance

To maintain accurate measurement, it is recommended to check and do the following:

\*Before/After bad condition, maintain instrument regardless of frequency.

Table 6-1. Maintenance Items

Items	Frequency	How To	Effects
Appearance Condition	Monthly*	Check for cracks or deformations of any parts such as arms, the ball, shafts and so on.	Structures and sensors may get damaged and cause dysfunctions.
Connected Pieces	Weekly*	Check for foreign objects biting and loose screws.	Arms may stop rotating and/or fall down.
Tangles of Cable	Weekly*	Check for any restrictions on arms by entangled cables	Structures and sensors may get damaged and cause dysfunctions.

## 6-2. Troubleshooting

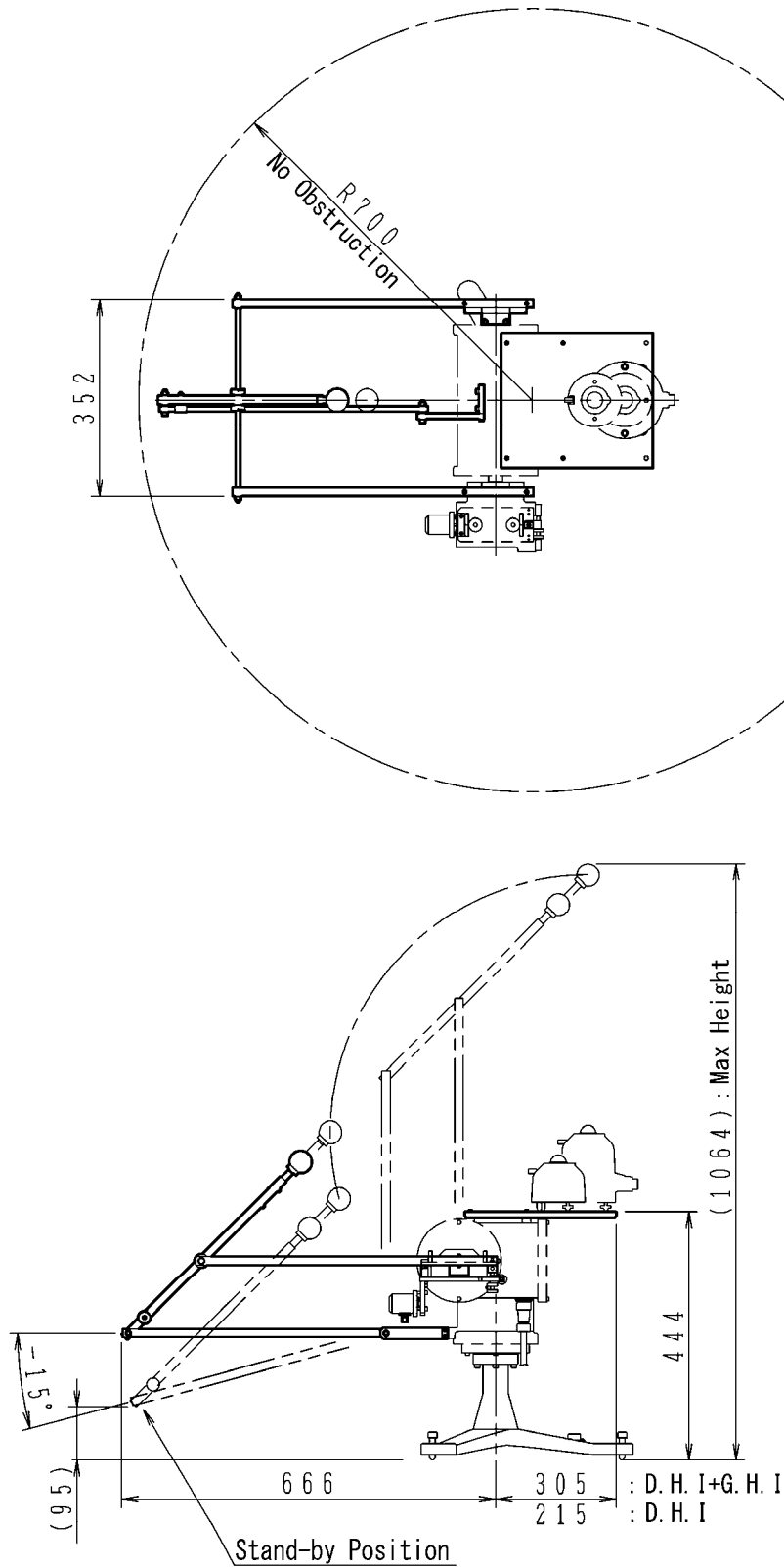
Check the following items in case of trouble with the instrument. If any questions should remain, contact EKO for further technical support.

Table 6-2. Troubleshooting

Failure	Action
Arms do not move	Turn off the power of the tracker before checking. Check whether something such as the cable or foreign objects are caught in arms. If so, remove them carefully.
Shading ball degradation	Replace the damaged shading ball with new shading ball.

# 7. Specifications

## 7-1. Dimensions





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