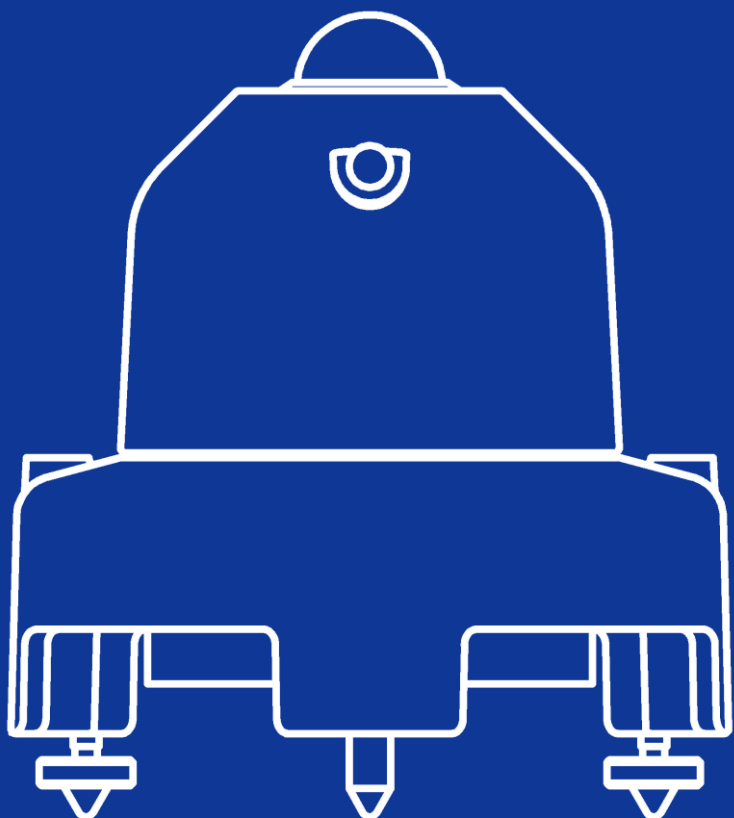


INSTRUCTION MANUAL

Ventilation Unit

MV-01



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: 2016/09/26

Version Number: 2

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.

2-5. CE Declaration



IMPORTANT USER INFORMATION



DECLARATION OF CONFORMITY

We: EKO INSTRUMENTS CO., LTD
1-21-8 Hatagaya Shibuya-ku,
Tokyo 151-0072 JAPAN

Declare under our sole responsibility that the product:

Product Name: Ventilation unit for Pyranometer
Model No.: MV-01

To which this declaration relates is in conformity with the following harmonized standards of other normative documents:

Harmonized standards:

EN 61326-1:2013 Class A (Emission)
EN 61326-1:2013 (Immunity)

Following the provisions of the directive:

EMC-directive: 2014/30/EU
Low Voltage- directive: 2006/95/EC

Date: Jan. 14, 2016

Position of Authorized Signatory: Deputy General Manager of Quality Assurance Dept.

Name of Authorized Signatory: Shuji Yoshida

Signature of Authorized Signatory: 

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

- The installation base or mast should have enough load capacity for the instrument to be mounted. Fix the pyranometer securely to the base or mast with bolts and nuts; otherwise, the instrument may drop due to gale or earthquake, which may lead to unexpected accidents.
- Make sure the instrument and the cables are installed in a location where they will not get soaked.
- Do not use this product in environment where corrosive gas, such as ammonia and sulfurous acid gas, are generated. It may cause malfunction.
- Do not install in area that cause salt damages. It may cause malfunction by paint peeling off or corrosion. When installing in area with risk of salt damages, make sure to take following measures: 1. Wrap the connector with self-fusing tape, 2. Change the fixing screw to bolt screw made of aluminum, 3. Run the cables in resin pipe or metal pipe treated with salt-resistant paint such as molten zinc plating, 4. Periodically clean.
- Do not use this instrument in vacuum environment.
- If the cable and main unit are in risk for getting damaged by birds and small animals, protect the cable and the main unit by using: 1. Reflective tape, 2. Repellent, 3. Cable duct, 4. Installing bird-spike

2. Fan Operation

- Do not let your body parts, clothes, papers, animals and plants get close to the MV-01 while it is in operation. You may be injured by getting your body part or clothing caught into the fan, or may cause accidents by damaging the fan.

3. Power Supply

- Make sure to check the power supply voltage and type (AC/DC) before connecting the fan unit to the power supply. Connecting the fan unit to other power supplies than specified will lead to damage and accidents

Use this ventilation unit with 2A fuse connected to the power supply line in series. Without connecting the fuse, it has risks of generating heat and fire due to large-current flowing by the power supply when internal damage on the electronic swill occurs.

4. High Temperature

- Do not touch metal parts while heater is in operation as it will become high temperature. You may get burn. Use the MV-01 in place where out of reach of children.
- To avoid the temperature increase, always turn on the fan first before turning on the heater.

4. Introduction

EKO's Ventilation Unit MV-01 can be used in combination with MS-80 pyranometer models (MS-80, MS-80A and MS-80M). The MV-01 will reduce the need for maintenance and assures the availability of solar irradiance data when deployed in cold climate regions or desert environments. Due to the compact and integrated design with the MS-80 pyranometer, the heating and airflow dynamics are optimized. The power consumption of the ventilator is only 1.9 Watts, which makes it suitable for solar powered systems. When the heater is activated the total power consumption will be about 8.9 watt, which is sufficient to prevent snow and ice deposition on the sensor (dome and sun screen).

The pyranometer with ventilator can be mounted in horizontal or tilted plane, which make it suitable for PV monitoring applications. The Tacho output provides a data pulse to monitor the fan speed.

For the pyranometers operated in harsh environments, the irradiance measurements can be easily affected by environmental factors. In such case the MV-01 will keep the pyranometer dome free of dew, ice and snow. In combination with the MV-01 ventilator the best possible measures are taken for reliable unattended operation.

4-1. Main Features

- Low power consumption (power consumption: 8.9W, fan 1.9W, heater: 7W)
- Wide range of operating temperature (-40°C to +70°C), the MV-01 can be operated in many different areas of the world.
- Overheating protection through temperature fuse
- Using the ventilation with long expected life has made possible to offer 2-year warranty.
- By measuring the rotation signal (pulse signal) of the MV-01, the rotation frequency of the fan can be monitored.

4-2. Package Contents

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

Figure 4-1. Attached Fixing Parts and Bots



Table 4-1 Package Contents

Standard Items	Qty.	Remarks
Ventilation Main Unit MV-01	1 set	Constructed with combination of heater unit and fan unit
Power Supply Cable [*]	1pc	
Heater Fixing Part A	1pc	
Heater Fixing Parts B	2pcs	
Heater Fixing Parts C	2pcs	
Screws for Fixing Parts	4pcs	M3 x 6mm, 2pc spare screws attached.
Fixing Bolts for Main Unit	2pcs	M6 x100mm, bolts used for fixing the MV-01 main unit in installation position
Fixing Bolts	5pcs	M5 x 10mm, bolts used for fixing pyranometer to MV-01, Fine pitch thread
Washers (M6)	4pcs	
Nuts (M6)	2pcs	
Allen key (M5)	1	Used for fixing Pyranometer to MV-01
Inspection Report	1	
Instruction Manual	1	Download from EKO website
Quick Start Guide	1	

[*] Standard length of the Power Supply Cable is 10 meters. Contact EKO when longer cables are required.
Pyranometer is not included in this package.

5. Getting Started

5-1. Parts Name and Descriptions

Each part name and its main functions are described below.

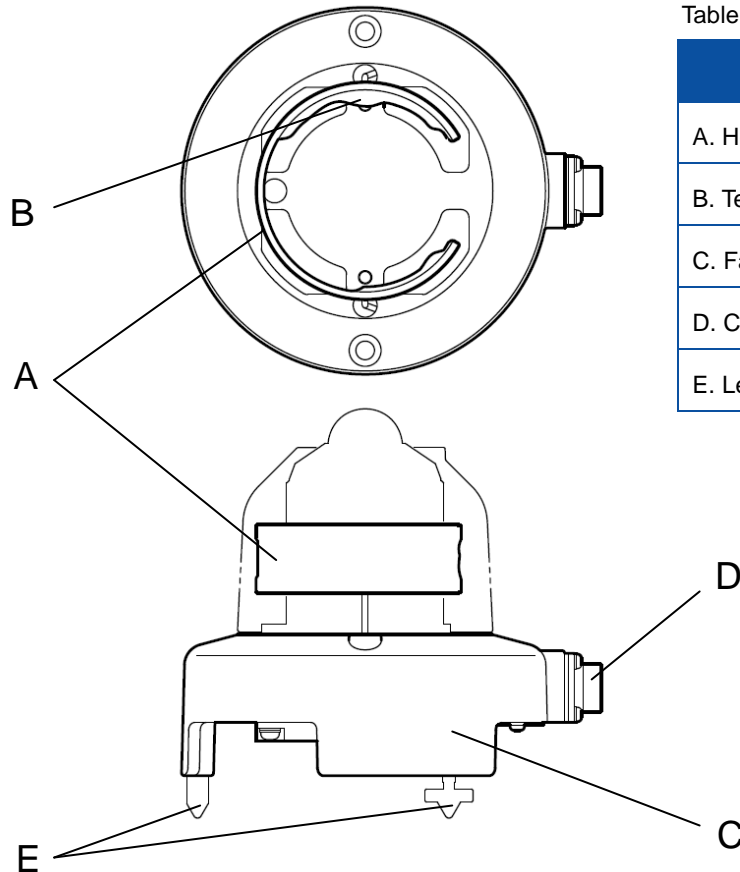


Table 5-1. Parts Name

Parts Names
A. Heater Unit
B. Temperature Fuse
C. Fan Unit
D. Cable Connector
E. Leveling Screws

Figure 5-1. Parts Names

1. Heater Unit

Heater can be used together with the fan unit to increase the forced air temperature. When the instruments are used in cold regions and/or snowy regions, turn on the heater unit to prevent snow and ice getting on the pyranometer dome and sun screen.

*Do not operate the heater in case the ambient temperature will be over 50°C and the heater supply voltage more than DC13.2V. Thermal fuse may be activated and limits the heater current.

MV-01 cannot be used for the purpose to melt snow. Use the MV-01 constantly before snow starts to fall. Also the heater should be used with the fan unit. Using heater alone for continuous time may cause the temperature fuse to go off and require replacing the Heater.

2. Temperature Fuse

The temperature fuse is applied to prevent excessive temperature increase of the heater for safe operation and protection of the sensor. The temperature fuse will be activated at a temperature of 115°C and limits the heater current.

3. Fan Unit

Forced air provide a constant turbulent airflow accross the pyranometer glass dome. The dome will remain free of condensation, snow and ice. It will rduce the amount of dust that can deposit to the dome.

4. Cable / Connector

MV-01 comes with 10m cable*.

Durable materials are used for cable and connector; pin terminals are attached to the cable ends for easy connection with DC power supply and data logger.

*If you require a longer cable than the standard 10m and/or round terminals or fork terminals, please contact EKO. (See [7-4. Accessories] section for optional items)

5. Leveling Screws

Leveling Screws are used for maintaining the pyranometer installed on MV-01 in horizontal position.

The Leveling Screws are not included in this package; use the leveling screws attached on the Pyranometer MS-80

5-2. Installation

1. Installing the Pyranometer on MV-01

- (1) Remove the three leveling screws from MS-80.
- (2) Attach the heater fixing parts A and B (x2) to MS-80 using provided fixing bolts (M5 x 10mm, 3pcs).
*Make sure the position and orientation of fixing parts are correct.
- (3) Shift the heater behind and put the MS-80 on the MV-01 from the top and fix the MS-80 to ventilation unit using provided fixing bolts (M5 x 10mm, 2pcs). Then attach the leveling screws, which were removed from MS-80, to MV-01.
*Make sure the MS-80 cable connector and MV-01 cable connector are facing towards the same direction.
- (4) Place the heater on the heater fixing parts which are attached to MS-80, and fix it with heater fixing parts C (x2) in the direction shown on the figure and fixing screws (M4 x 6mm, 2pcs).
- (5) Level the MV-01 to horizontal position.
*If installing in the instruments in tilted position, adjust the level on horizontal surface first then install to the tilted position.
- (6) Fix the MV-01 on mounting plate using fixing bolts (M6 100mm, 2pcs).
Then insert cables to MV-01 and MS-80. Attach sun screen on MS-80

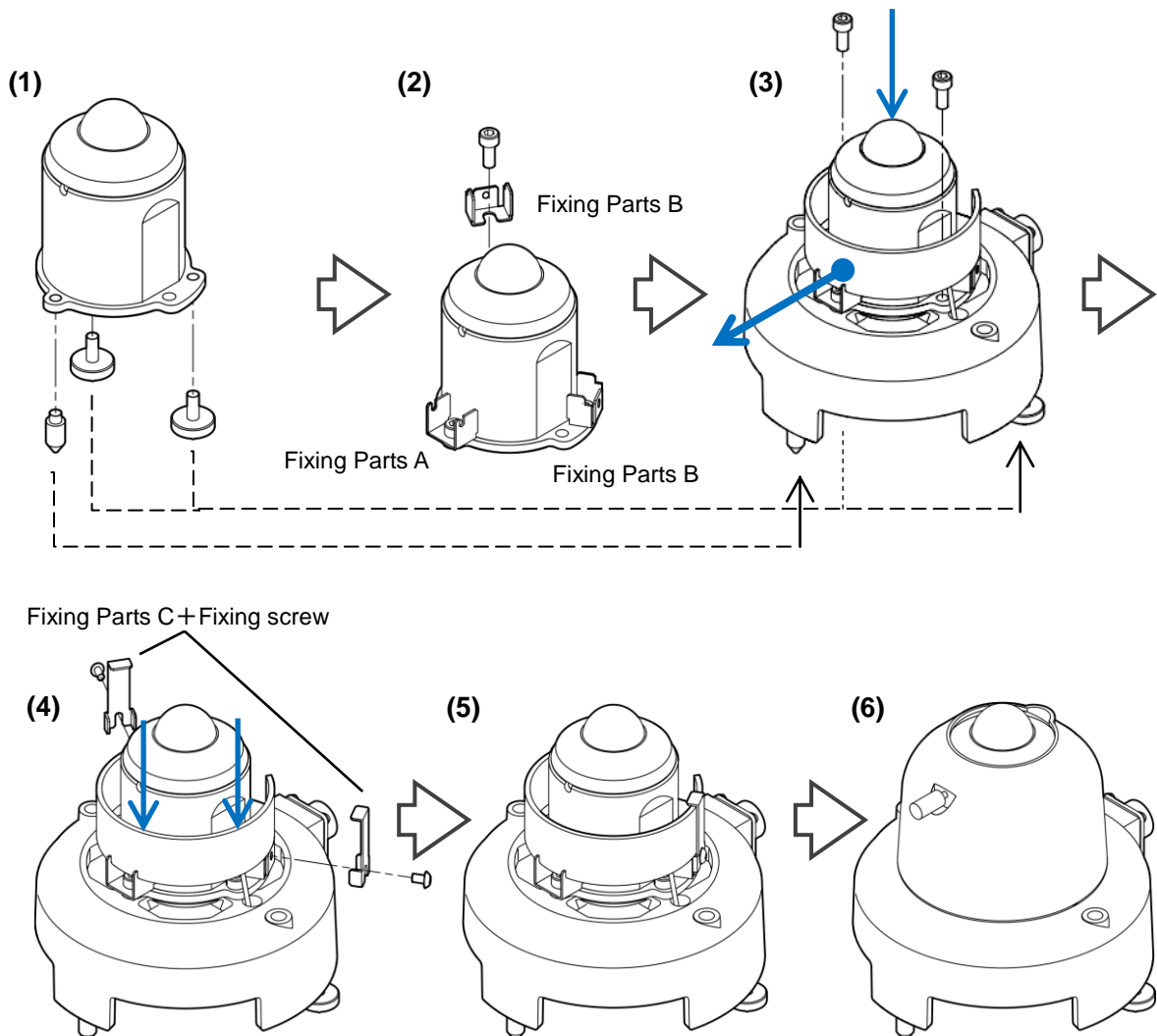


Figure 5-2. Installing the Pyranometer on MV-01

2. Air Filter Installation (Optional)

Before starting replacing the air filter, make sure the Ventilator Unit power is turned OFF. You may get burned by the heater and/or get injured by fan if Ventilator Unit is left powered ON. Work in a stable location to prevent dropping the instruments.

- (1) Remove the filter cover locks by inserting flathead screwdriver in the slots (A) under the front (connector) side of the instrument
- (2) Insert a finger from B, and remove the 2 other filter cover locks. Pull the filter cover from the front side of the instrument.
- (3) Place the air filter on the filter cover. Then insert the filter cover from the front side of the instrument and lock the 4 locks.

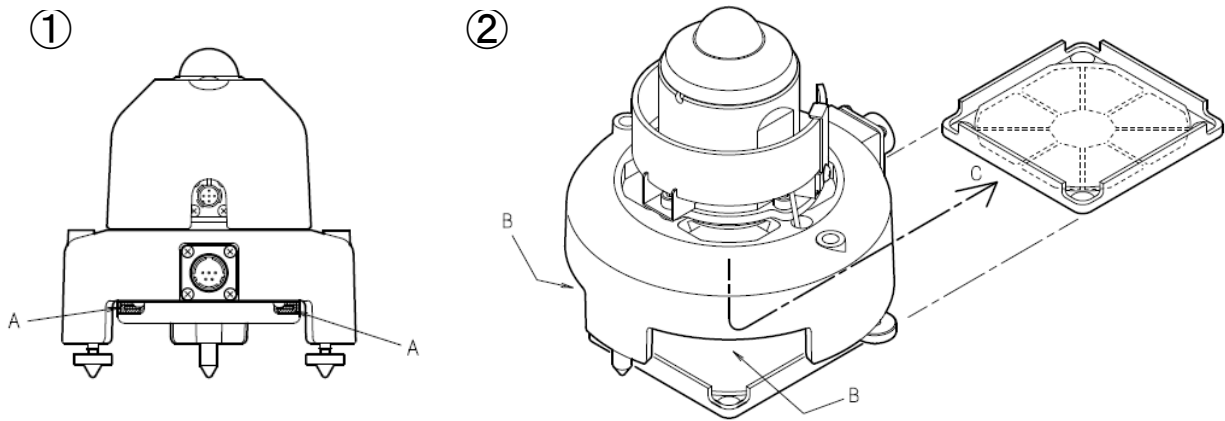


Figure 5-3. Air Filter installation

3. Wiring

To extend the cable lifetime, place the cable in a cable conduit and make sure that the cables are not exposed to direct sun light or rain/wind. Fasten the cable does not swing or move by wind blowing. Excess length of cable should be cut.

- 1) Make sure the cable connector and the main unit chassis connector are in right position before inserting. After inserting the cable connector properly, rotate the coupling nut to fix the connector. Do not use excessive force as the connector will break.

- 2) Cable wiring

The cable contains following five color wires:

No.	Wire Color	Connect to
1.	Brown	Fan Power Supply Input (+)
2.	White	Fan Power Supply Input (-)
3.	Blue	Fan Rotation Signal Output (Tacho)
4.	Black	Heater Power Supply Input (no polarity *1)
5.	Gray	Heater Power Supply Input (no polarity)

2-1. Power Supply (Fan)

Apply a power supply with a rated specification (DC 12V \pm 10%, 1.9W). Note the input voltage can drop when longer cable are used. Make sure the polarity is correct; otherwise, the fan will be damaged(Voltage drop in AWG22 cable: -0.17V/10m)

2-2. Power Supply (Heater)

*1 For the purpose of protection of power supply side, apply to connect a fuse in series (2A).

Apply a power supply with a rated specification (DC 12V \pm 10%, 7W). Note the input voltage can drop when longer cable are used.

The temperature fuse (operating temperature: approx. 115°C) is installed in the heater to prevent causing fire due to applying voltage more than the heater specification range.

2-3. Ventilator Tachometer Signal

See [5-3. Ventilator Tachometer] for details.

5-3. Ventilator Tachometer

1. Tachometer Signal

The tach output can be monitored and conveys rpm information in the form of a square wave (2 block pulses per revolution). The frequency of this square wave output is proportional to the rotation of the shaft. The tach signal can be measured using a frequency meter or pulse counter (12VDC / Pulse signal ~100Hz / ~3,000rpm).

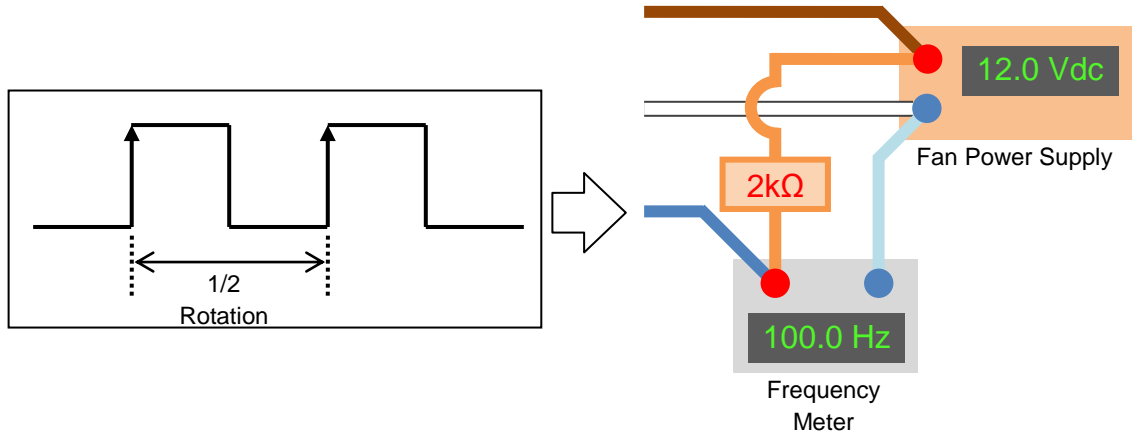


Figure 5-4. Tachometer Signal

*Fixed resistance of 2kΩ shown on the above figure is not provided and need to be prepared by customer.
(Fixed resistance more than 2kΩ can be measured.)

6. Maintenance & Troubleshooting

6-1. Maintenance

It is recommended to check and do the following:

Table 6-1. Maintenance Items

Items	Frequency	How To	Effects
Visual Check	Monthly	Check for any cracks and scratches on Fan and Heater Units.	Using damaged parts may lead to electrical shock or performance degradation. Replace the damaged parts. For replacing the parts, please contact your nearest distributor or EKO directly.
Check Spirit Level	Weekly	Check the pyranometer spirit level; readjust when necessary. (applicable only when installed in horizontal level)	Cause directional response error
Check Cable	Monthly	Check for any damages, disconnection of cables, and loose connector.	Damaged cables and/or loose connectors may lead to malfunction.
Check Installation	Monthly	Check for loose bolts, any damages to the installation base/plate.	Products may drop due to loosen bolts and may get damaged.
Check Fan Operation	Monthly	Check for any obstacles like trash, plants, and bugs are stuck in the fan; check for any noise from the fan.	Continuing use of fan with things stuck in fan may lead to damage and/or cause fire.
Replace Fan	Every 2 years	Replace the fan. For replacing the fan, please contact your nearest distributor or EKO directly.	Continuing use of fan after its lifetime may lead to fan malfunction, decrease in rotation frequency, and operation stop.
Clean Air Filter (Optional)	Monthly	Clean the air filter	Ventilation capacity will be lower when the air filter gets soiled.
Replace Air Filter (Optional)	Within 6 months	Replace the air filter within 6 months.	Ventilation capacity will be lower when the air filter gets soiled.

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
Fan does not rotate	Check for proper connection, supply power and voltage, and make sure there are no loose connections. Also check for any obstacles like trash, plants and bugs are not stuck in the fan.
Fan RPM is low	Make sure the supply voltage is appropriate. Long cables cause a supply voltage drop; adjust to the appropriate voltage level on the plug side. Check for any trash, plants and bugs are not stuck in the fan. If air filter is used, clean or replace the air filter
Fan making noise	Check for any trash, plants and bugs are not stuck in the fan.
Heater temperature does not get hot	Check for proper connection, supply power type and voltage. Make sure the resistance between heater lines +/- is $21\Omega \pm 10\%$. When the temperature fuse is active, it will be in open circuit condition.

7. Specification

7-1. Main Unit

Table 7-1. Main Unit Specification

Characteristics	Details
Compatible Instruments	MS-80/80A/80M
Operating Voltage Range	DC 10.8 to 13.2V
Power Consumption (When DC12V input)	Fan: 1.9W + Heater: 7W
Operating Temperature Range	-40°C to +70°C (Ambient Temperature)
Temperature increase (Temp increase of glass dome)	<0.25°C (when heater is 0W) >1.0°C (when heater is 7W)
MS-80's Zero Offset A + B (Only fan in operation)	<1W/m ²
MS-80's Zero offset A + B (with fan & heater in operation)	<1W/m ² (when heater is 7W)
Tacho output	Pulse / 100Hz / 3000 RPM
Environmental Protection (IP)	IP 54 equivalent (IEC60529)
Standard Cable Length	10m (Optional: 20m, 30m, 50m)
Output Cable (Outer diameter)	AWG22: 0.5mm ² x 5pins (Φ6.7mm)
Surface Treatment	Acrylic Painted
Heater Resistance	Approximately 21Ω
Outer Dimension	Φ138mm x 69mm (Fan Unit) Φ138mm x 141mm (with Pyranometer)
Mass	0.7kg (without cable)
Air Filter Replacement Period (Optional)	<6 months

7-2. Dimensions

Below is the dimension of MV- 01.

Table 7-2. Dimensions

	MV-01
A. Fixing Holes Pitch	120 mm
B. Body Height (Fan Unit part)	53 mm
C. Leveling Screw Height*	16 mm
D. Overall width	Φ138 mm

*Use leveling screws which are attached on MS-80/80A/80M by attaching them to MV-01

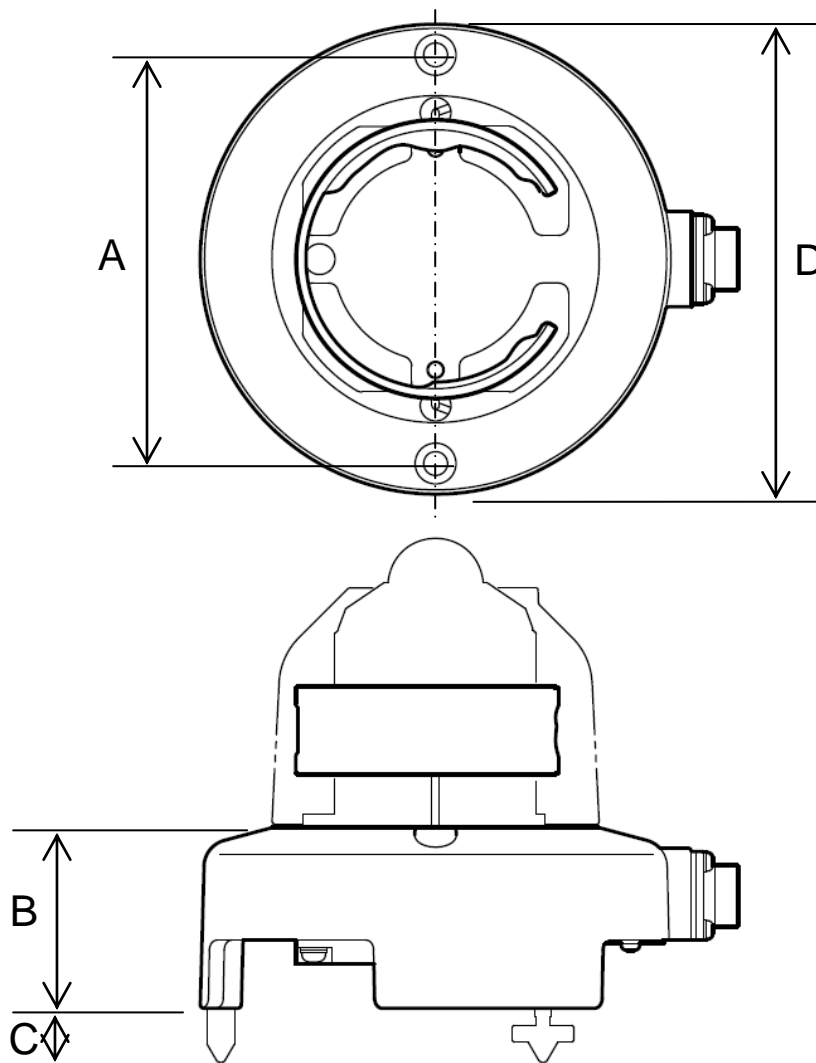


Figure 7-1. MV-01 Dimensions

7-3. Cables

See [5-2. Installation, 2. Wiring] for power supply cable wiring details.

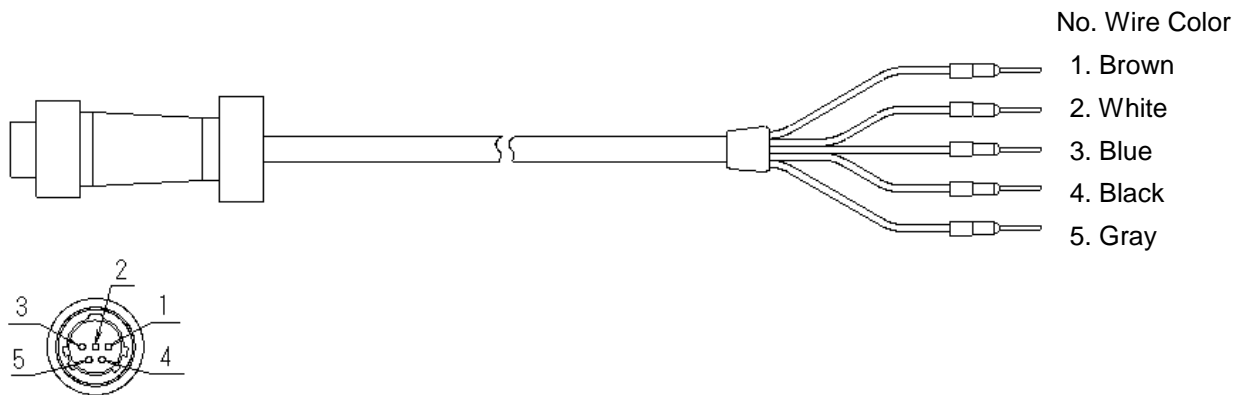


Figure 7-2. Cable

7-4. Accessories List

Table 7-3. Accessories List

Option Items	Remarks
Output Cable	Cable Length: 20m, 30m, 50m Terminals: Fork terminal, round terminal
Air Filter Kit	Filter: Polyurethane Foam



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