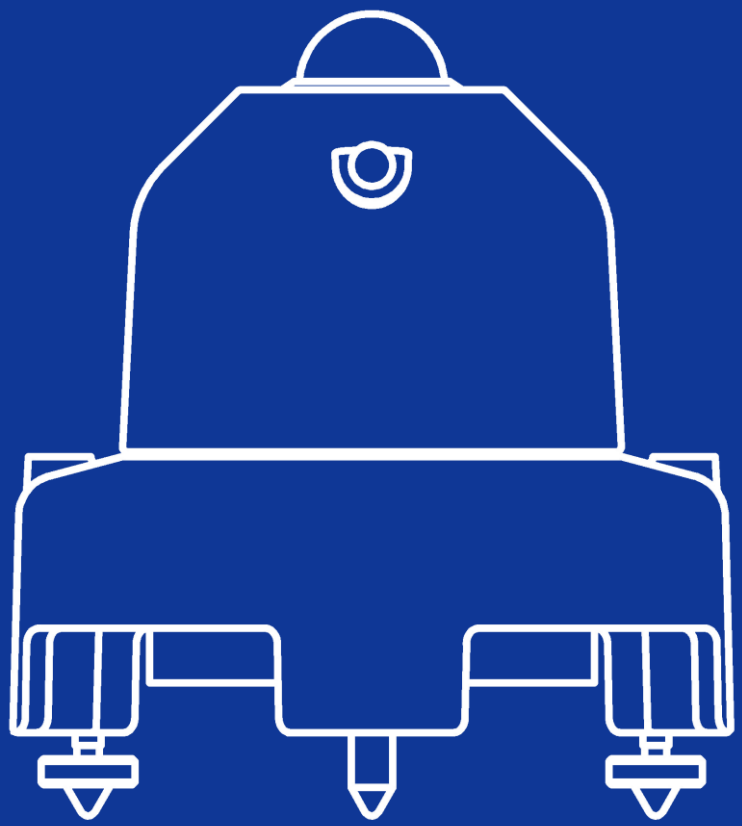
INSTRUCTION MANUAL

MV-01

Ventilation Unit



EKO

1. Index

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

This manual was issued: 2019/11/11

Version Number: 4

2-4. Environment

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

In August of 2005, the European Union (EU) implemented the EU WEEE Directive 2002/96/EC and later the WEEE Recast Directive 2012/19/EU requiring Producers of electronic and electrical equipment (EEE) to manage and finance the collection, reuse, recycling and to appropriately treat WEEE that the Producer places on the EU market after August 13, 2005. The goal of this directive is to minimize the volume of electrical and electronic waste disposal and to encourage re-use and recycling at the end of life.

EKO products are subject to the WEEE Directive 2002/96/EC. EKO Instruments has labeled its branded electronic products with the WEEE Symbol (figure Trash bin) to alert our customers that products bearing this label should not be disposed of in a landfill or with municipal or household waste in the EU.

If you have purchased EKO Instruments branded electrical or electronic products in the EU and are intending to discard these products at the end of their useful life, please do not dispose of them with your other household or municipal waste. 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

EKO

IMPORTANT USER INFORMATION

CE

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: Shuji Yoshida

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 devise 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 if there is an error in the type of power supply (AC or DC) or voltage for measurement, and then connect this product. If you make a mistake, it may cause a failure or an accident of this product.
- Do not supply more than DC16V to the heater power supply line. Overcurrent protection works and stops working.

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 several kinds of pyranometer models (MS-80/80A/80M, MS-60/60A/60M and MS-40/40A/40M), pyrgeometer model (MS-20). 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 pyranometer, pyrgeometer and UV radiometer, 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 8.4 watt, which is sufficient to prevent snow and ice deposition on the sensor (dome and sun screen).

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, pyrgeometers or UV radiometer operated in harsh environments, the 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: 8.4W, fan 1.9W, heater: 6.5W)
- Wide range of operating temperature (-40℃ to +70℃), the MV-01 can be operated in many different areas of the world.
- Overheating protection trough 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.

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	
Main Body Fixing Bolts	2pcs	M6 x100mm, bolts used for fixing the MV-01 main body in installation position
Fixing Bolts	3pcs	M5 x 10mm, bolts used for fixing equipment to MV-01, Fine pitch thread, 1pc spare screws attached.
Washers (M6)	4pcs	
Nuts (M6)	2pcs	
Hex Wrench (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 or pyrgeometer 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.

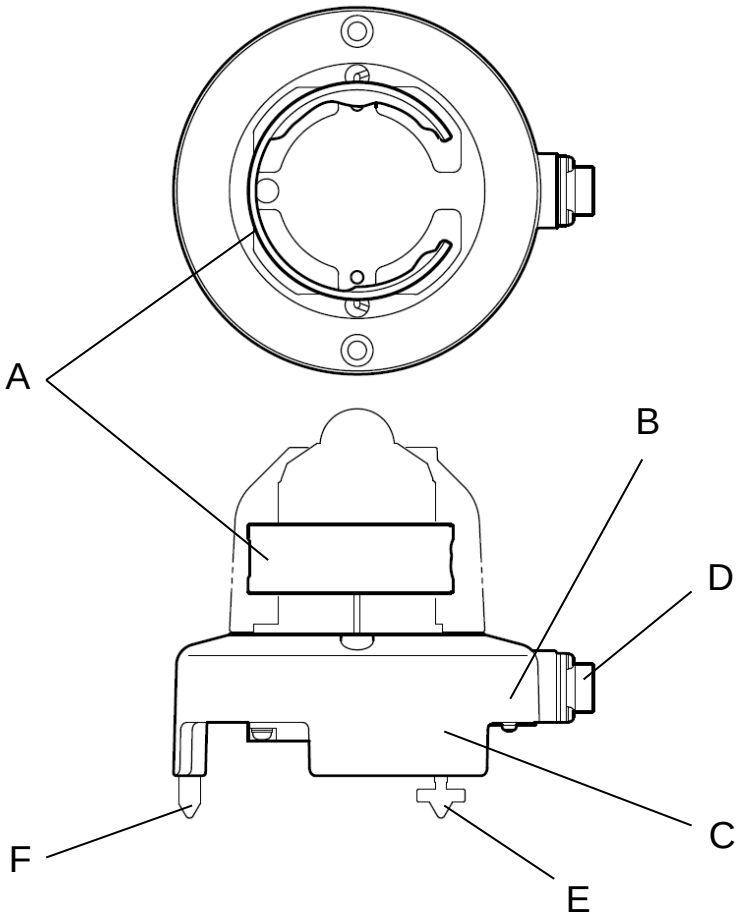


Figure 5-1. Parts Names

Table 5-1. Parts Name

Parts Names
A. Heater Unit
B. Overcurrent protection
C. Fan Unit
D. Cable Connector
E. Leveling Screws
F. Fixed foot

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 glass dome and sun screen.

2. Overcurrent protection

Overcurrent protection is included to prevent damage due to excessive temperature rise of the heater.

* Do not operate the heater in case the ambient temperature will be over 50℃ and the heater supply voltage more than DC16V. Overcurrent protection may be activated and stopped to supply to the heater current.
Since the MV-01 cannot be used for snow melting, please operate the fan and heater beforehand.
The heater should be used with the fan unit.

3. Fan Unit

Forced air provide a constant turbulent airflow accross the 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 equipment installed on MV-01 in horizontal position.

The Leveling Screws are not included in this package; use the leveling screws attached on the pyranometer or pyrgeometer.

5-2. Installation

1. Installing pyranometer, pyrgeometer on MV-01

(1) Remove the two leveling screws and fixed foot attached to the lower part of the solar radiation sensor, and attach it to the lower part (screw hole) of the MV-01.

(2) Pass the provided fixing bolts (M5 x 10 mm 2pcs) through the fixing holes (2 places) of the solar radiation sensor. * Please be careful not to mistake the place which passes the fixing bolt

(3) With the solar radiation sensor's cable connector and the MV-01 cable connector facing in the same direction, place it on the center of the MV-01 from above.
Securely fix the fixing bolt, which has been passed through the fixing hole of the solar radiation sensor, to the MV-01 using the supplied hex wrench.

(4) Adjust the level with the leveling screws while checking the level of the solar radiation sensor.
If installing on an inclined surface, adjust the level on the horizontal surface first, and then install on an inclined surface.

(5) Please fix MV-01 to the installation stand with the main body fixing bolt (each 2: M6 x 100 mm, washer, nut).

(6) Connect the cable of this product and solar radiation sensor to each connector.

(7) Finally, cover the hood from above and secure it by turning the knurled screw.

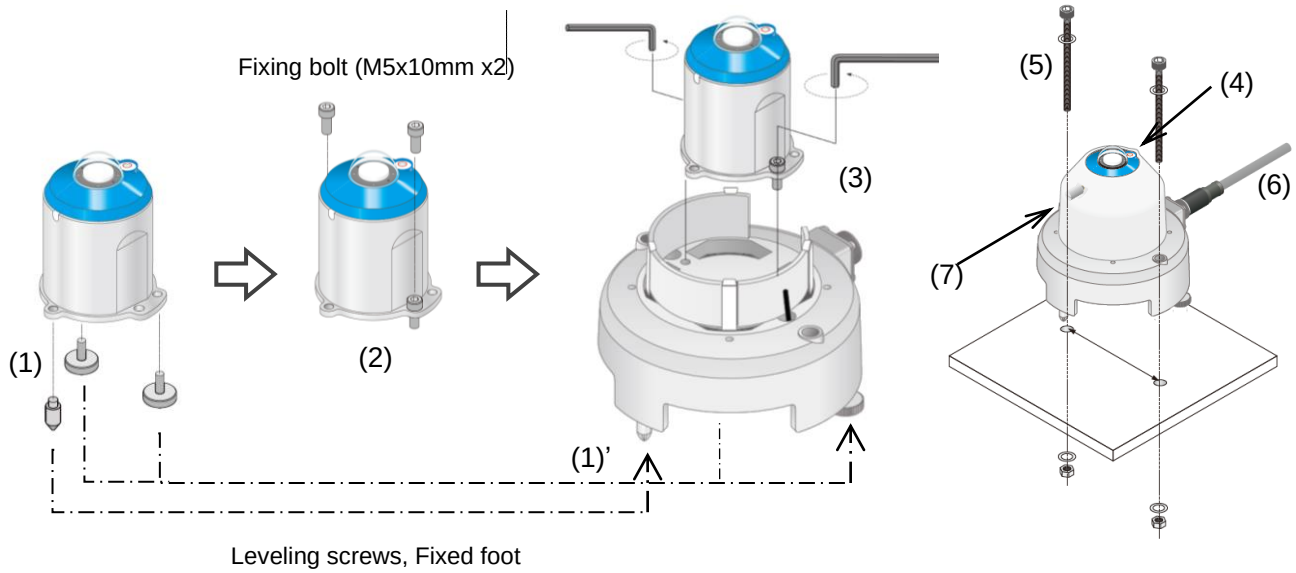


Figure 5-2. Installing the solar radiation sensor on MV-01

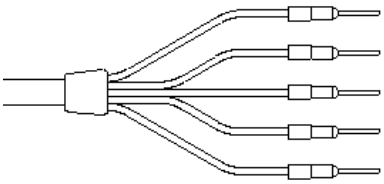
2. Wiring

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)
5.	Gray	Heater Power Supply Input (no polarity)

2-1. Power Supply (Fan)

Apply a power supply with a rated specification (DC 12V±10%, 100mA, 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)

Apply a power supply with a rated specification (DC 12 V ± 10%, 580 mA, 7 W).

When using a cable longer than the standard length, the input voltage may fall below the rating due to the voltage drop, so increase the power supply voltage within the rated input range (voltage drop with AWG22 cable: -0.17 V / 10 m)

An overcurrent protection device is incorporated to prevent the generation of heat, burns and fire when a voltage exceeding the specified range is applied to the heater. Make sure that the input voltage is rated DC12 V ± 10% before using.

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 tacho signal can be measured using a frequency meter or pulse counter (12VDC / Pulse signal ~100Hz / ~2,900rpm).

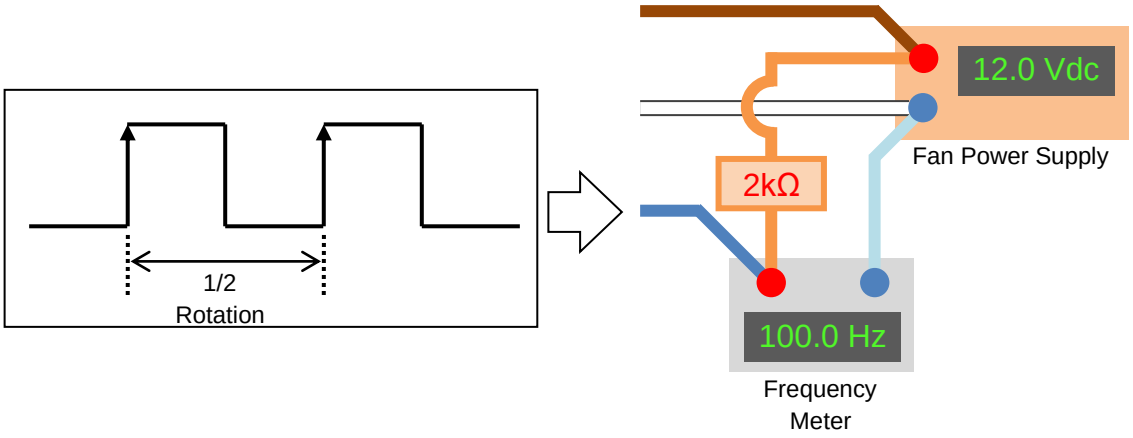


Figure 5-3. Tachometer Signal

*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 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.

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.
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 21Ω+/-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, MS-60/60A/60M, MS-40/40A/40M, MS-20
Operating Voltage Range	DC 10.8 to 13.2V (DC12V±10%)
Power Consumption (When DC12V input)	Fan: 1.9W + Heater: 6.5W
Operating Temperature Range	-40℃ to +70℃ (Ambient Temperature)
Tacho output	Pulse / 100Hz / 2900 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)
Body Surface Treatment	Acrylic Painted
Heater Surface Treatment	Urethane
Heater Resistance	Approximately 22Ω
Outer Dimension	Φ138mm x 69mm (Fan Unit) Φ138mm x 141mm (with Pyranometer)
Mass	0.7kg (without cable)

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. Fixed foot*	16 mm
D. Overall width	Φ138 mm

*Use fixed foot and leveling screws which are attached on solar radiation sensor by attaching them to MV-01

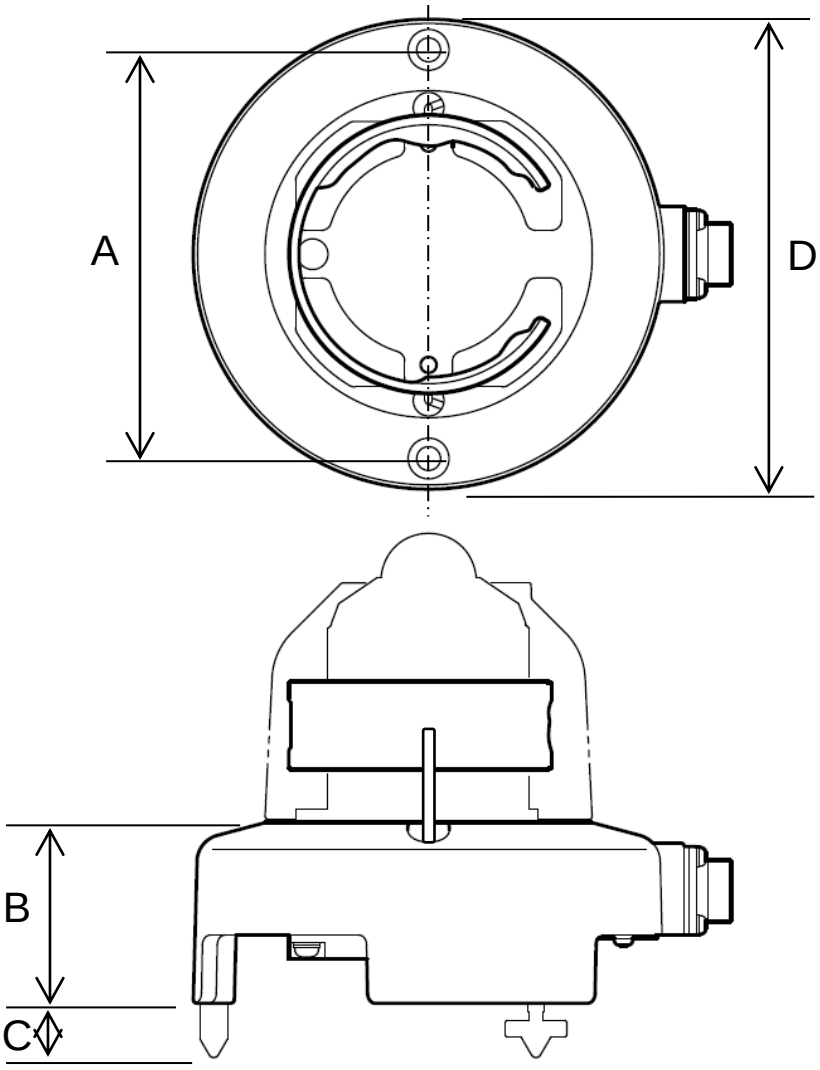


Figure 7-1. MV-01 Dimensions

7-3. Cables

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

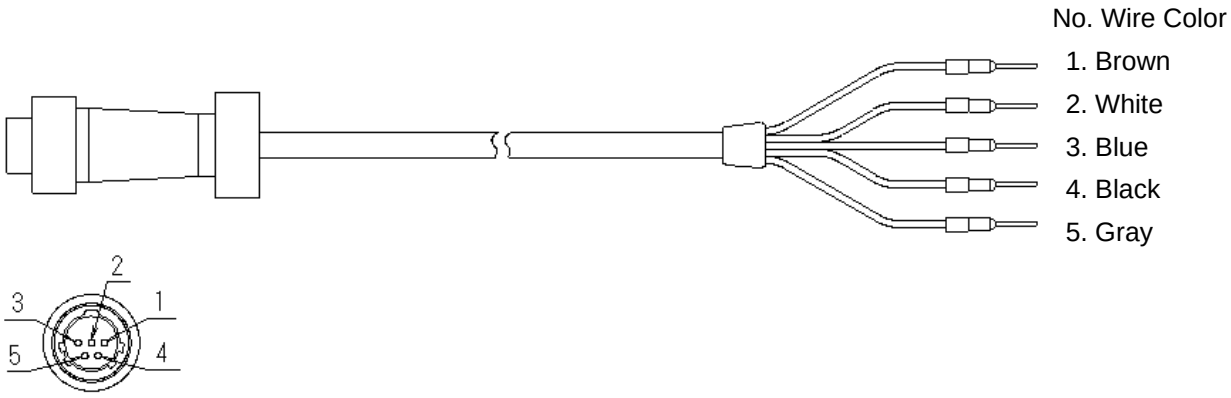


Figure 7-2. Cable

7-4. Accessories List

Table 7-3. Accessories List

Option Items	Remarks
Output Cable	Cable Length: 20m, 30m, 50m Terminals: Fork terminal, round terminal

EKO Asia, Oceania
1-21-8 Hatagaya,
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