EKO

ISO 9060: 2018 Class A / Class B / Class C

Pyranometer

Quick Start Guide

MS-80 MS-60 MS-40 Analog Output [mV]

MS-80S MS-60S MS-40S Current Output [4-20mA] [0-10mA]
*Voltage Output [V]
Digital Output [RS485 Modbus®RTU] [SDI-12]

Thank you for purchasing EKO products.

This sheet provides the basic instruction for setup. See the Instruction Manual for further detailed information about this product.

Product Warranty

Please contact EKO Instruments or your distributor for further details. The warranty is only subjected to the instrument which is installed and used in correct manner. EKO will not be reliable for any loss or damage caused from improper installation or use.

Model	Dimension (mm) (W x D x H)	Weight
MS-80	96 x 96 x 101	0.35 kg
MS-80S	96 x 96 x 101	0.37 kg
MS-60	96 x 96 x 107.5	0.37 kg
MS-60S	96 x 96 x 107.5	0.39 kg
MS-40	96 x 96 x 101	0.33 kg
MS-40S	96 x 96 x 101	0.35 kg

*0-10mA: 0-1V through 100Ω external shunt resistor (Please prepare separately)

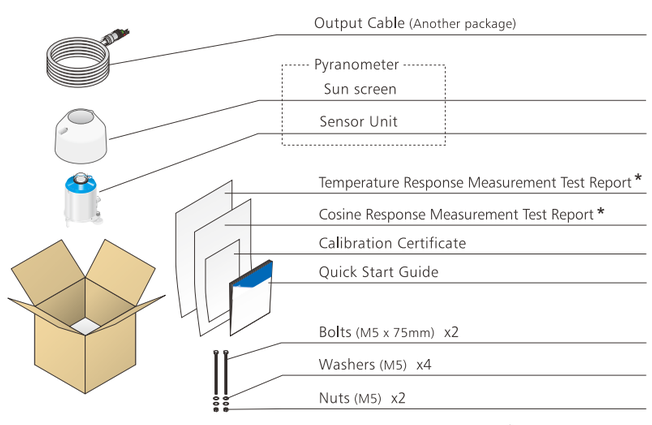
Defalut settings of Modbus(MS-80S/60S/40S)

Address**	Lower 2digits of product S/N
Baud rate	19200bps
Data length	8bit
Stop bit	1bit
Parity check	None

** In case of the lower 2digits of S/N is "00", the address is set to "100".

1 Package Contents

First, please check the package contents. If any part is missing or damaged, please contact EKO.

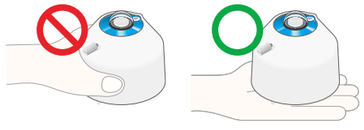


* for MS-80, MS-80S only

・Please see the manual for further information about the product. Manual can be downloaded from the eko website.
・It is recommended to keep the original packaging in case pyranometer is shipped back for recalibration or repair.

Caution for handling

⚠ Always hold the pyranometer from the bottom when carrying. Do not hold the sun screen part; sensor unit may drop.

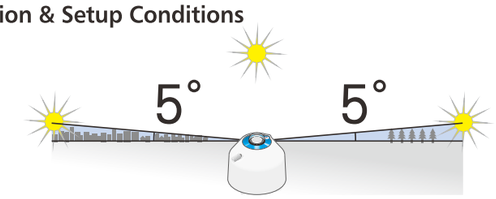


2 Preparation to Install

1 Required Tools

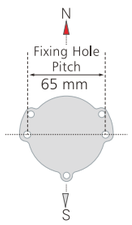
Please prepare these tools.

2 Location & Setup Conditions

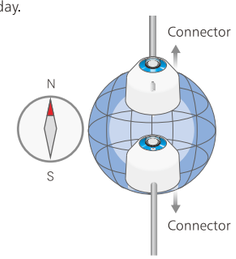


● Select a location with free horizon, without any obstructions and light relfections throughout the day.

● Fixing Holes on Installation Base



● Place the pyranometer with the Cable Connector facing the nearest pole.



3 Installation

1 Mount the pyranometer on installation base.

2 Level the pyranometer.

Horizontal surface:
Level the pyranometer by adjusting the leveling screws.

Inclined surface:
Install to an inclined surface after adjustment of the leveling screws at a horizontal place.

3 Fasten the pyranometer with attached bolts.

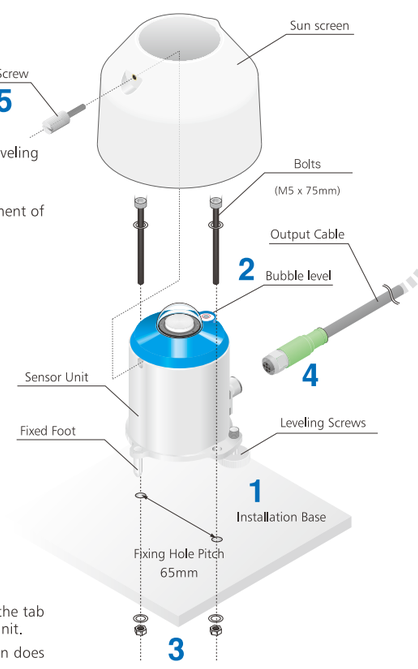
⚠ For installation do not remove the leveling screws.

4 Insert output cable to the connector plug securely.

5 Attach the sun screen.

Place the sun screen in the proper position; insert the tab inside the sun screen to the groove on the sensor unit.

Fasten the knurling screw, make sure the sun screen does not come off.



4 Measurement & Maintenance

Measurement Range

Set measurement range on the measuring instrument according to the below output range.

	MS-80* MS-60. MS-40	MS-80S MS-60S MS-40S		
Output Range	0 ~ 14 [mV]	4 ~ 20 [mA]**	0 ~ 10 [mA] / 0 ~ 1 [V]***	Digital Output
Measurement Range	0 ~ 20 [mV]	4 ~ 20 [mA]	0 ~ 10 [mA] / 0 ~ 1 [V]	RS485 Modbus®RTU / SDI-12

⚠ * When using a data logger, use device with input impedance more than 100MΩ.
** When using a shunt resistor to measure voltage, please use a resistor of <150Ω.
*** When using the 0-1V, please prepare the precision resister 100Ω.
0-10mA/0-1V output line is disabled and can be enabled through the EKO configurator.

Calculate Solar Irradiance

Using following formulas, pyranometer output value can be converted into solar irradiance.

Analog Output

$$I_{[W/m^2]} = \frac{E_{[\mu V]}}{S_{[\mu V/W \cdot m^{-2}]}}$$

I : Solar Irradiance [W/m²]
E : Pyranometer Output Voltage [μV]
S : Sensitivity [μV/W·m⁻²]

Voltage Output

$$I_{[W/m^2]} = (V_{out\,[V]}) \times 1600 \quad \text{[default settings]}$$

I : Solar Irradiance [W/m²]
V_{out}: Pyranometer Output Voltage [V]

Current Output

$$I_{[W/m^2]} = (I_{out\,[mA]} - 4) \times 100$$

I : Solar Irradiance [W/m²]
I_{out}: Pyranometer Output Current [mA]

Digital Output

Conversion is not necessary as the output can be obtained as solar irradiance in W/m².

Periodic Maintenance

Bubble level: Check if the bubble is within the center ring. Readjust if necessary.

Glass Dome: Keep the glass dome clean by wiping with soft cloth and alcohol. Make sure there are no scratches on the glass dome.

Connector & Cable Condition: Check and make sure the connector is connected securely and the cable is not damaged. Also check the cable is fixed.

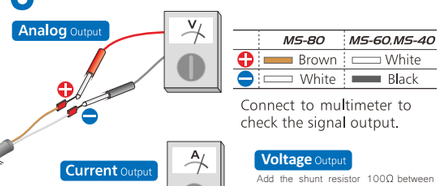
Recalibration

To maintain a proper measuring condition, it is recommended to recalibrate every 5 years* for MS-80/80S. Please contact EKO for recalibration service.

* MS-60/60S and MS-40/40S: recommended to recalibrate every 2 years.

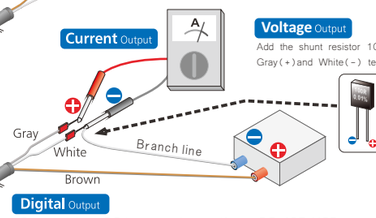
6 Checking the Output

Analog Output



Connect to multimeter to check the signal output.

Current Output



Voltage Output

Add the shunt resistor 100Ω between Gray(+)and White(−) terminal.

Digital Output

Connect to a PC through the optional RS-485/USB converter cable (Download free configurator software through EKO website)

Approximate Output Values

Conditions	Cloudy	Partly Cloudy	Clear
Solar Irradiance [W/m²]	< 300	> 300	> 700
Analog Output Output Voltage [mV]	< 3.0	> 3.0	> 7.0
Current Output Output Current [mA]	< 7.0	> 7.0	> 11.0
Voltage Output Output Voltage [V]	< 0.19	> 0.19	> 0.44

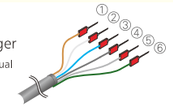
7 Wiring

⚠ To Prevent signal noise always connect the cable shield to the measurement device common ground.
Connect fuse for MS-80S, MS-60S , MS-40S.
Fix the cables to prevent swinging by wind.
Connect the shield wire for power cable to prevent electrical shocks.

Analog Output

Connect to data logger

Refer to the installation manual for measuring the body temperature. (MS-80 only)



Current Output Connect to datalogger

Pin numbers	4-20mA	0-10mA (0-1V*)
① Brown	DC 5 - 36V (+)	DC 5 - 36V (+)
② White	4-20mA(-)/GND	0-10mA(-)/GND/0-1V*(-)
③ Blue	-----	-----
④ Black	-----	-----
⑤ Gray	4-20mA(+)	0-10mA(+)/0-1V*(+)
⑥ Shield	FG	FG

* When connect the precision resistor 100Ω between the line of ②White and ⑤Gray.

Digital Output Connect wires according to below arrangements.

Pin numbers	Modbus RTU	SDI-12
① Brown	DC 5 - 36V (+)	DC12V (+)
② White	GND	GND
③ Blue	RS485/+/B	SDI-12 Data
④ Black	RS485/-/A	-----
⑤ Gray	-----	-----
⑥ Shield	FG	FG

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