EKO

MS-20SH Pyrgeometer

Thank you for purchasing this EKO product.

The Quick Start Guide provides basic instructions to help you set up and get started. Please see the Instruction Manual for more detailed information about this product.
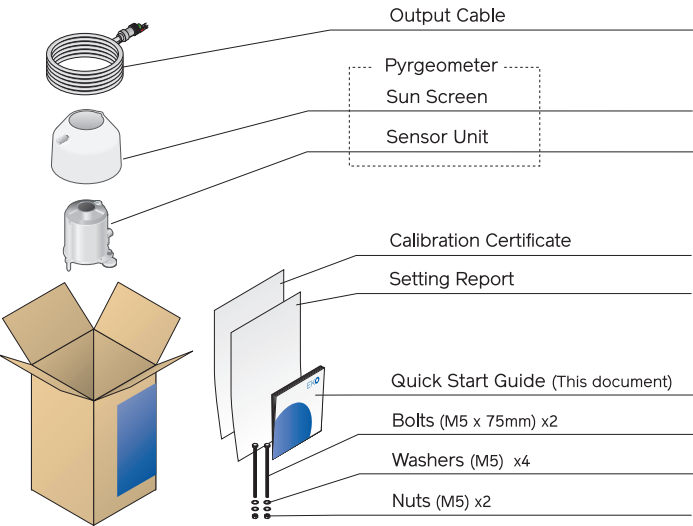
Product Warranty

The warranty term is 5 years. For warranty conditions, please consult the Instruction Manual, EKO Instruments, or your distributor for further information.

Please Note: All of our products are tested to ensure that they meet their published specifications. The warranty included in the conditions of delivery is valid only if the product has been installed and used in accordance with the instructions provided in the Instruction Manual.

1 In the Box

Output Cable
Pyrgeometer ......
Sun Screen
Sensor Unit

Calibration Certificate
Setting Report

Quick Start Guide (This document)
Bolts (M5 x 75mm) x2
Washers (M5) x4
Nuts (M5) x2

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

- Please download the instruction manual from the EKO website.

  `EKO MS-20SH` 🔍

- We recommend that you keep the original packaging for return shipping in case of recalibration or repair.
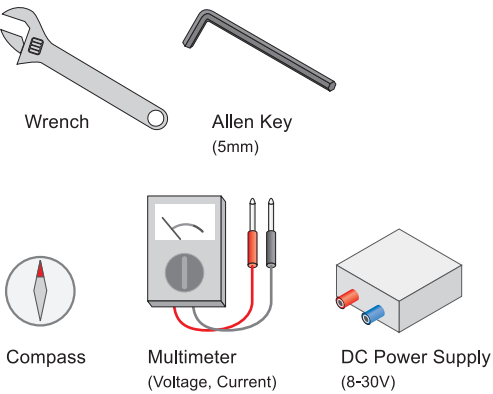
Handling Caution

⚠️ Always hold the pyrgeometer from the bottom when carrying. Do not hold the sun screen part as the sensor unit may drop.
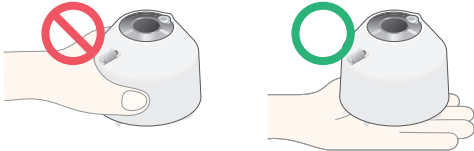
2 Preparing to Install

1 Required Tools

Wrench
Allen Key (5mm)
Compass
Multimeter (Voltage, Current)
DC Power Supply (8-30V)

2 Location & Setup Conditions

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

5°   5°

- Orientate the Fixing Holes on the Installation Base.

  Fixing Hole Pitch
  65 mm

- Place the pyrgeometer with the Cable Connector facing the nearest pole.

  Connector
  Connector

3 Installation

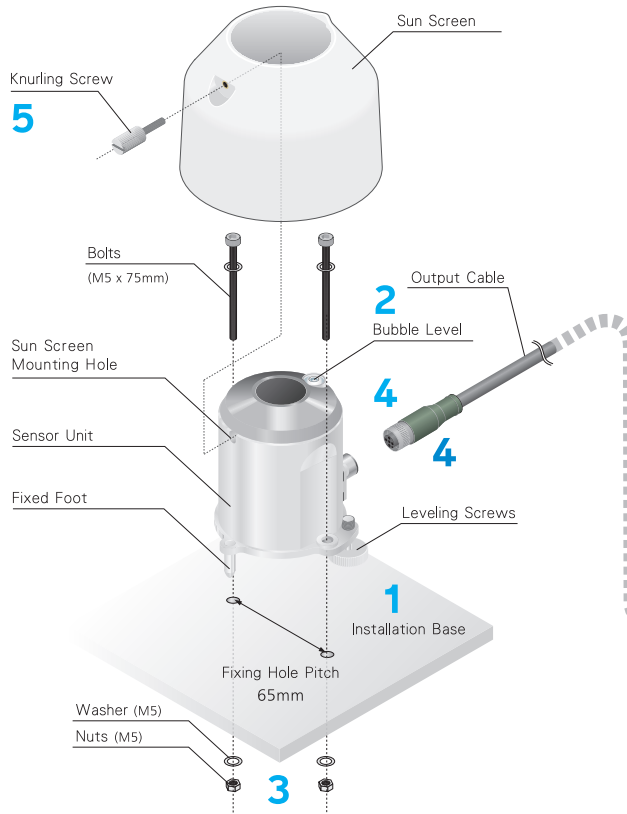## 1 Mount the Pyrgeometer on the Installation Base

2 Level the Pyrgeometer

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

Inclined surface:
Install on an inclined surface after leveling the pyrgeometer by adjusting the leveling screws on a horizontal surface.

3 Fasten the Pyrgeometer to the Installation Base

⚠️ For installation do not remove the leveling screws

Sun Screen
Knurling Screw
5
Bolts (M5 x 75mm)
Sun Screen Mounting Hole
Sensor Unit
Fixed Foot
Output Cable
Bubble Level
2
4
4
Leveling Screws
1
Installation Base
Fixing Hole Pitch 65mm
Washer (M5)
Nuts (M5)
3

4 Securely Insert the Output Cable Into the Sensor Unit

Insert the output cable into the connector port on the back of the sensor unit and tighten it all the way. Push the connector in, and check to make sure the screw is tight.

⚠️ If the connection is loose, water can enter the unit and cause it to malfuction.

— Secure the length of the cable to avoid it from being pulled loose.

⏚ Connect the FG terminal to the earth terminal of the power supply.

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, and check that it is secure.

6 Wiring

Connect the output cable to each terminal

Connect to		Digital Output	
Cable		**Modbus** (5-30 VDC)	**SDI-12** (12 VDC)
1 ■ Brown	V +		
2 ■ White	V −		
3 ■ Blue	RS485 +		
4 ■ Black	RS485 −		
5 ■ Gray	SDI-12 Data		
FG ■ Green& Yellow	Frame Ground Shielded Wire		

D : DAQ System - Data Acquisition System
F : Fuse (0.5A) - Connect in series between power supply lines.
E : Earth Connection - Be sure to connect it to the ground terminal of the power supply. Otherwise, noise will be generated in the output signal and correct measurement cannot be performed.

6
1 ■ Brown
2 ■ White
3 ■ Blue
4 ■ Black
5 ■ Gray
FG ■ Green& Yellow

Communication Settings
Modbus RTU :
19200bps / 8bit / Even / 1 stop bit / xx *
* Last two digits of the product serial number.
SDI-12 :
1200bps / 7bit / Even / 1 stop bit / Address 0

7 Dome Heating Function Control

The heating system of the MS-20SH can be controlled via an on/off switch using our free Hibi software or Modbus RTU/SDI-12 commands.

Please note: The default setting of the heating system is 'ON'. For detailed operating instructions, see the Hibi section of this manual or the Modbus RTU/SDI-12 commands section of the full instruction manual, available online.

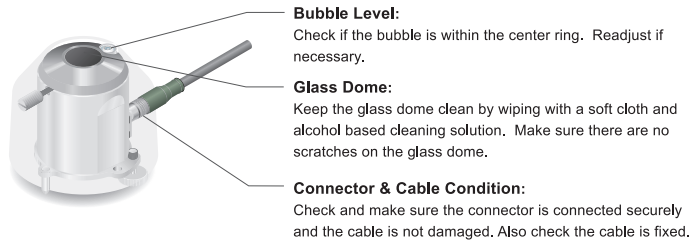# 4 Measurement & Maintenance

Dome Heating Function

- A power supply of at least 8 VDC is required to use the dome heating function.
- The dome heating function is set to ON when the product is shipped.
- The dome heating function can be switched on and off with a simple toggle button in Hibi or by rewriting the respective registers of the Modbus RTU and SDI-12.
- On switching the dome heating function on or off it can take up to 3 hours for the dome temperature to stabilise.

Infrared Irradiance

The digital output enables infrared irradiance (W/m²) to be obtained without conversion.

Typical value (Night time)

Conditions	☁️ Cloudy	🌙 Clear
Infrared irradiance at an air temperature of 30°C [W/m²]	450	430
Infrared irradiance at an air temperature of 0°C [W/m²]	250	220

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 a soft cloth and alcohol based cleaning solution. 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 & Desiccant Replacement

To maintain the highest levels of measurement accuracy we recommend periodic recalibration of your product (every 5-years for the MS-20SH). Please contact EKO Instruments for more information about our 'Recalibration Services'.

Thanks to the advanced design of your sensor, there is no need to change the desiccant, and attempting to change the desiccant may void your warranty.

Specifications

	MS-20SH
a : Fixing Hole Pitch	65 mm
b : Width	Φ96 mm
c : Height	88 mm
Mass	0.41 kg
Operating Temperature	-40 to 80 ˚C
Input Power	Modbus : 5V or 8 to 30 V DC
	SDI-12 : 12 V DC
Power Consumption	Without Heating : ＜0.2 W
	With Heating : ＜1.4 W

a :
Fixing Hole
Pitch

c :
Height

b :
Width
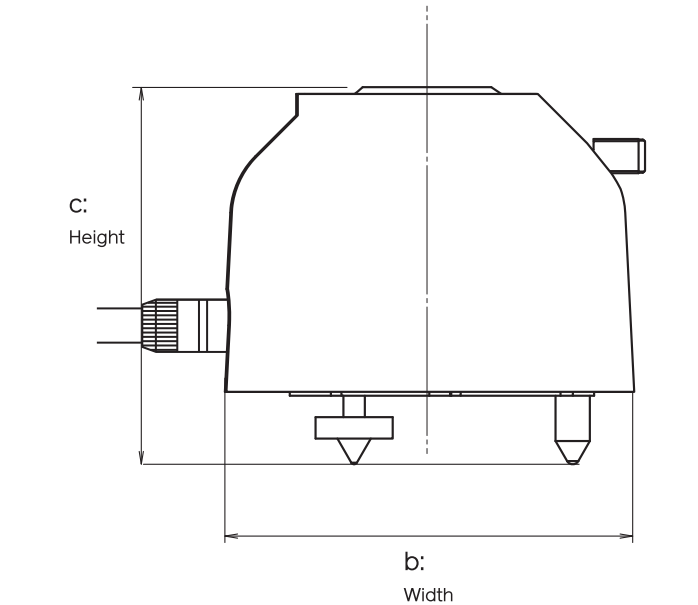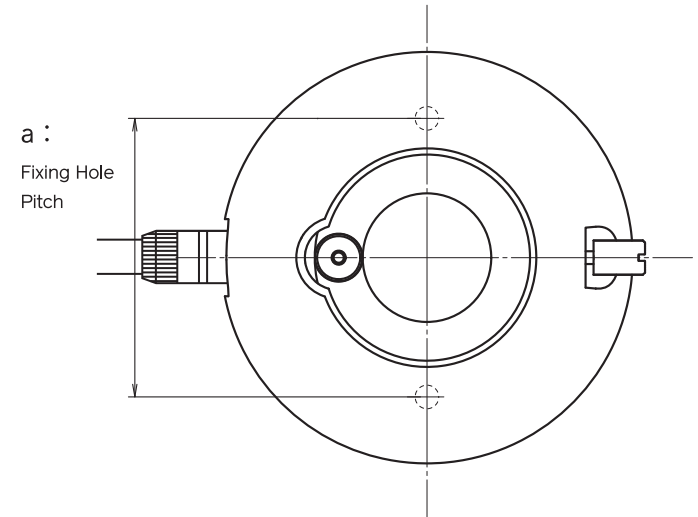
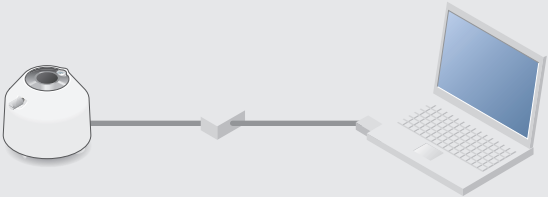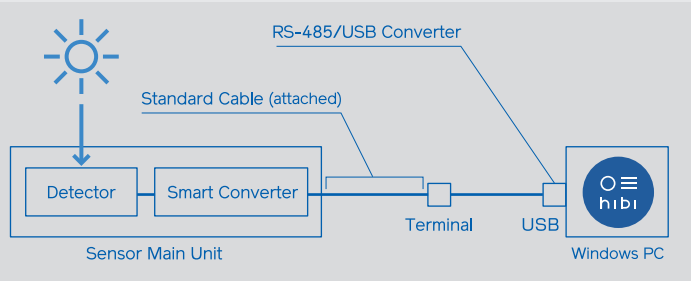# Hibi Software

hibi

Meet Hibi

Hibi, available for Windows from the EKO website, is a free software programme designed to help you get the most from your sensor. Use Hibi to visualise detection signals, change settings, set communication parameters, check the status of your pyrgeometer, and rapidly troubleshoot any issues.

RS-485/USB Converter

Standard Cable (attached)

Detector | Smart Converter

Terminal | USB

Sensor Main Unit

Windows PC

What can Hibi do?

● **Change your sensor's signal converter settings**
Manage the communication protocol and output signal settings.

● **Realtime display of measurement values and sensor conditions**
Get instant, easy to read measurement values and live information on the condition of your sensor (temperature, humitidy, tilt).

● **Record measurement data**
Measurement data can be recorded and output to CSV (comma delimited).

● **Toggle dome heating function**
The heating function can be switched on or off. The default setting is on.

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1 Preparation

1 Download

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EKO MS-20SH
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Download Hibi from any s-series pyrgeometer product page on the EKO website.
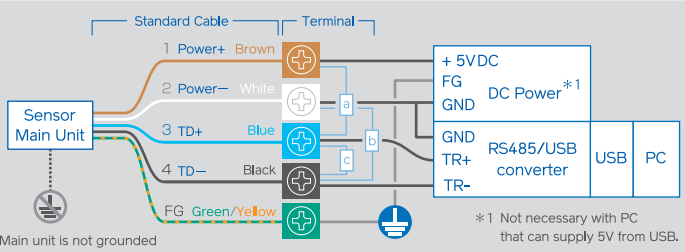
2 Install

Execute the installer file (.exe) and install Hibi on your PC. If a dialogue window appears during the installation process, click 'Run Anyway'.
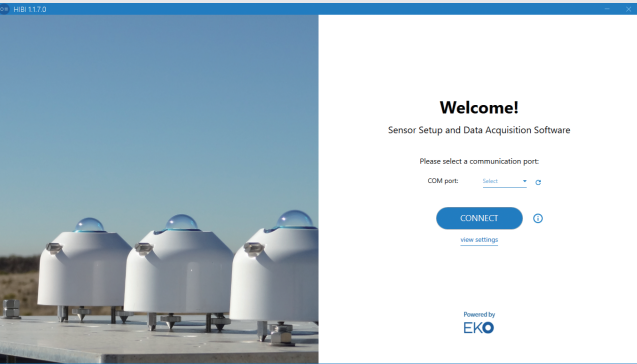
3 Connect sensor and PC using cable

Connect 5 cable terminals as shown in the Communication Cable Wiring Diagram.

Communication Cable Wiring Diagram
How to connect to PC when using general purpose RS-485/USB cable.

Standard Cable | Terminal

1 Power+ Brown
2 Power− White
3 TD+ Blue
4 TD− Black
FG Green/Yellow

Sensor Main Unit

+ 5VDC
FG
GND   DC Power ＊1

GND
TR+   RS485/USB
TR−   converter   USB | PC

Main unit is not grounded

＊1 Not necessary with PC
that can supply 5V from USB.

a : Pull-up resistor 680Ω   b : Pull-down resistor 680Ω   c : Terminating resistor 120Ω

Depending on the converter cable type and specifications, pull-up/pull-down resistors and a termination resistor are required. However, with the optional EKO Converter cable, additional resistors are not necessary.

4 Start up Hibi

Welcome!
Sensor Setup and Data Acquisition Software

Please select a communication port:

COM port: Select

CONNECT

more settings

Powered by
EKO

5 Reconnect Cable

To automatically connect, remove the cable from the sensor, click CONNECT, then reconnect the cable within 10 seconds.

Connecting your sensor...
Please connect your sensor cable connector within 10 seconds.

Cancel X
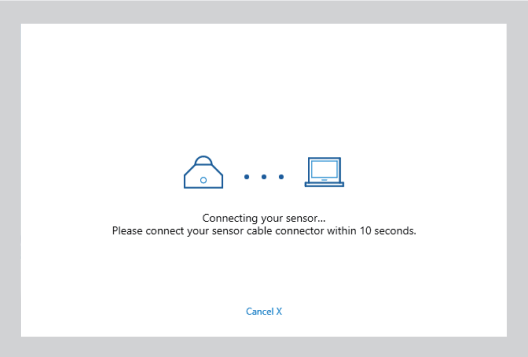
Hibi cannot operate without an established connection to the sensor.

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2 Operation

Once the connection between Hibi and the sensor is established, the Hibi dashboard will automatically load. See manual for more detailed information.

1 Dashboard

Current sensor output value is displayed in realtime.

ⓐ IR Irradiance (Instantaneous Value)
ⓑ Internal Temperature
ⓒ Internal Humidity
ⓓ Tilt Angle
ⓔ IR Irradiance Graph
ⓕ Data Logging Setting
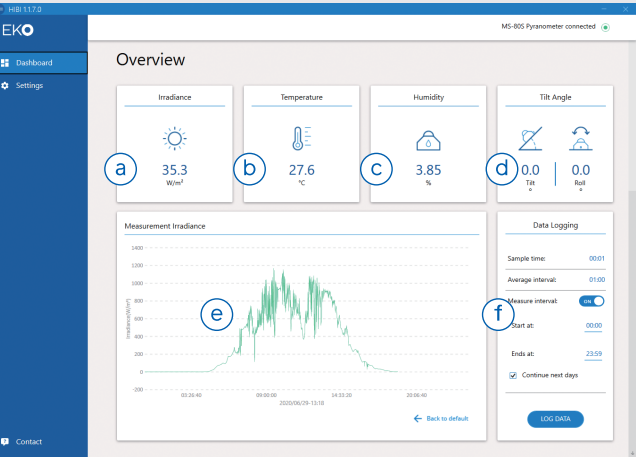
2 Settings

− **COMMUNICATION**
Communication settings can be changed

− **SENSOR INFORMATION**
Sensor information, such as serial number and calibration value can be viewed.

− **DOME HEATING** : Can be switched on or off (Default: ON).

− **TEMPERATURE** : Temperature Unit [˚C / ˚F / K] (Default: ˚C)

− **SENSOR POSITION** : Tilt sensor zero-point adjustment

− **DATA FILES** : Save location of measurement data and setting data
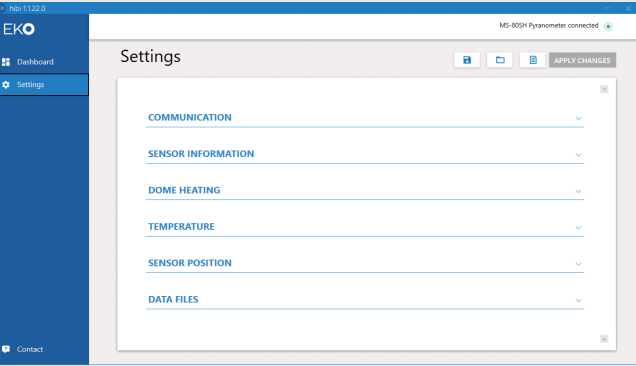
Please refer to the APPENDIX (Communication Specifications) of the instruction manual for Modbus and SDI-12 communication settings.

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