



User Manual

Outdoor UV Index Indicator

(GUVB-S11GS-AG03)

- 1. Product Functions**
- 2. Product Specification and Content**
- 3. Product Installation Method**
- 4. Response curve of UV sensors**
- 5. Repair and Maintenance**
- 6. Part list**
- 7. Data logger**
- 8. Product Service Policies**

1. Product functions

- Our product is UV sensor that displays UV Index value and this is designed to operate by solar energy with no other power supply.

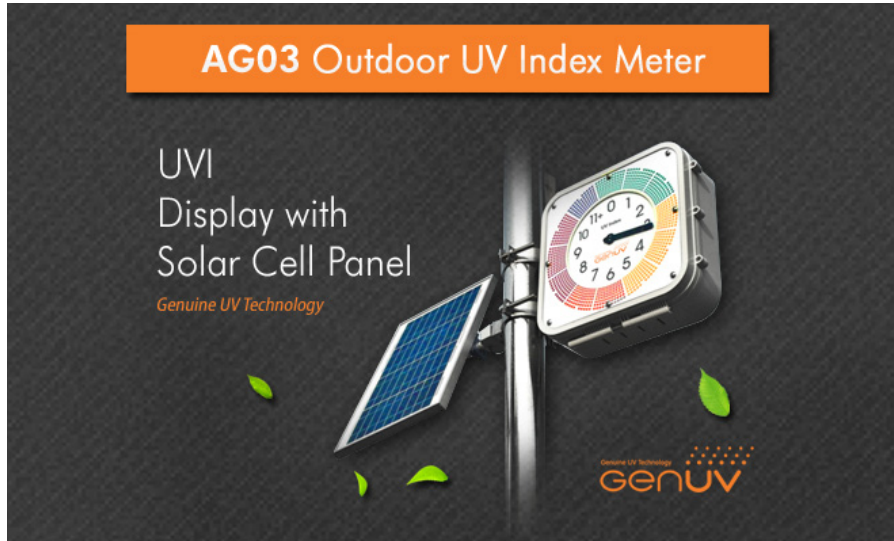


Fig 1. Product Photo

2. Product specification and product content

This product includes the main body, a solar cell and a fixing part.

- Sensor Probe : It has a GUVB-S11GD sensor for UV Index that wavelength detection range is 280 ~ 400 nm.
- Display Part: 19 levels from 0 UVI to over 18 UVI are displayed by the index pointer. .
- Power supply: built-in battery with Solar cell operation. No other power supply is needed.

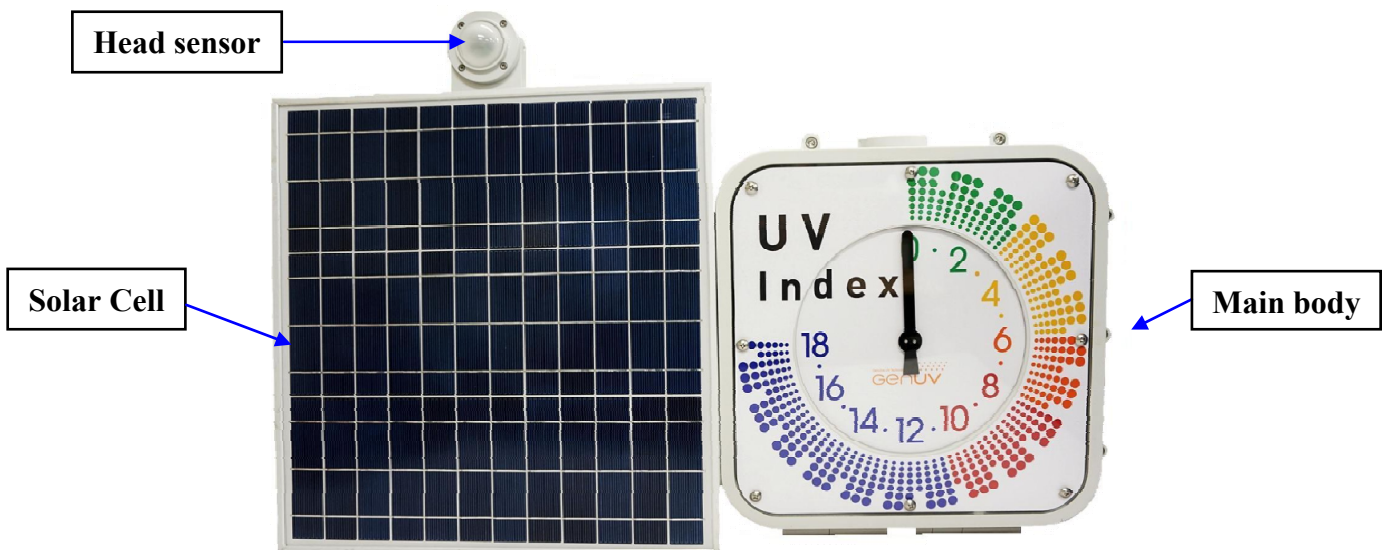


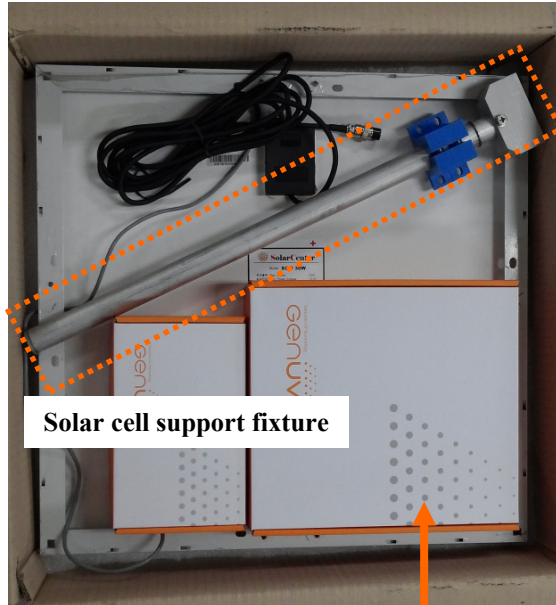
Fig2. Product configurations

3-1. Product installation method

1) Unpacking package



Fig3-①. Unpacking package



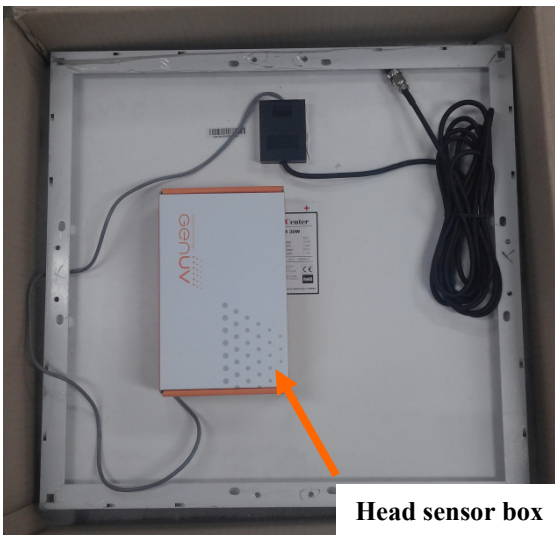
Solar cell support fixture

Accessories box

Fig3-②. Solar cell supporter fixture

①. When you open the box, you can see accessory box

②. On the second floor, you can find solar cell support fixture And Accessories box



Head sensor box

Fig3-③. Solar cell

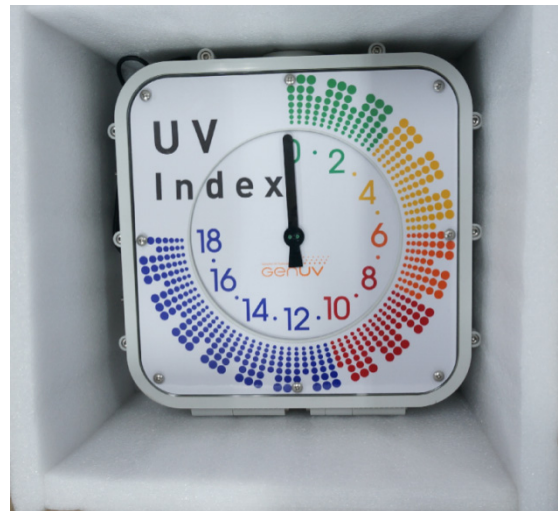
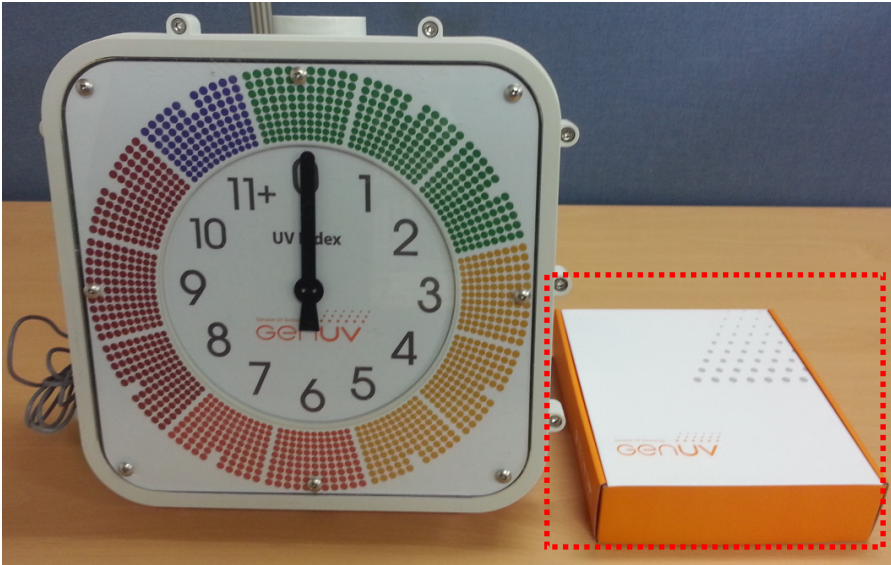


Fig3-④. Main body

③. On the third floor, you can find solar cell panel.

④. On the last floor, you can find main body.

2) Assembling main body fixture

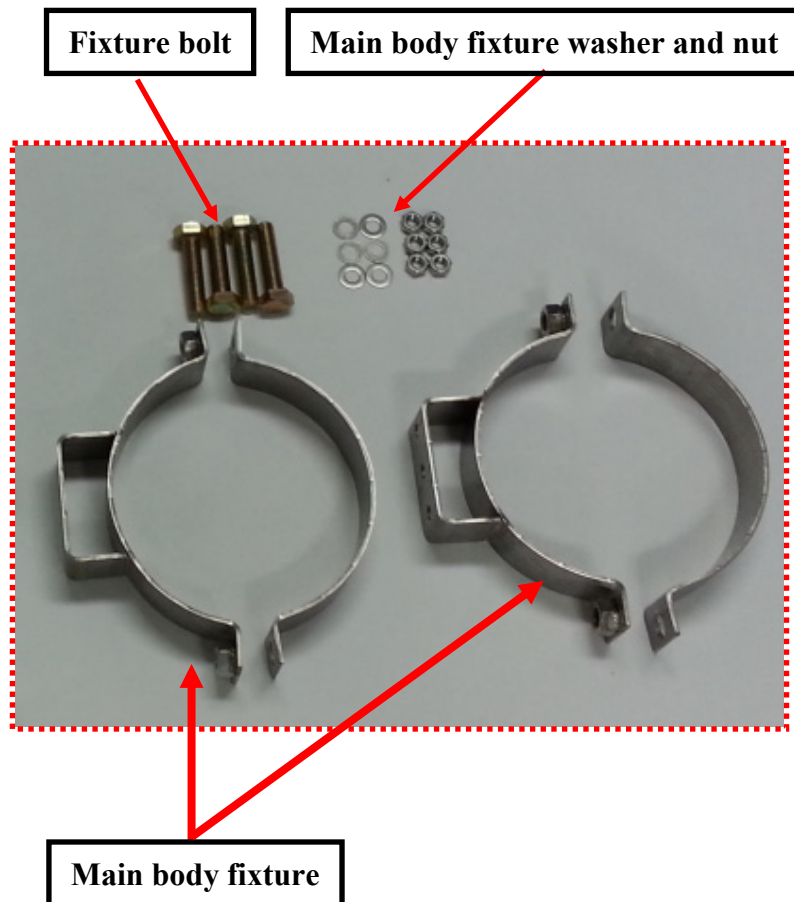


Check the parts in the accessory box.

* Part list

- Main body fixture..... 2 Pair
- Fixture bolt.....4ea
- Main body fixture nut.....6ea
- Main body fixture washer.....6ea

Fig4. Accessories box



2) Assembling main body fixture



Fig5-① Insert main body fixture hole to bolts



Fig5-②. Insert washer and nut, tighten the nut using a spanner.



Fig5-③. As shown image, assemble the parts.

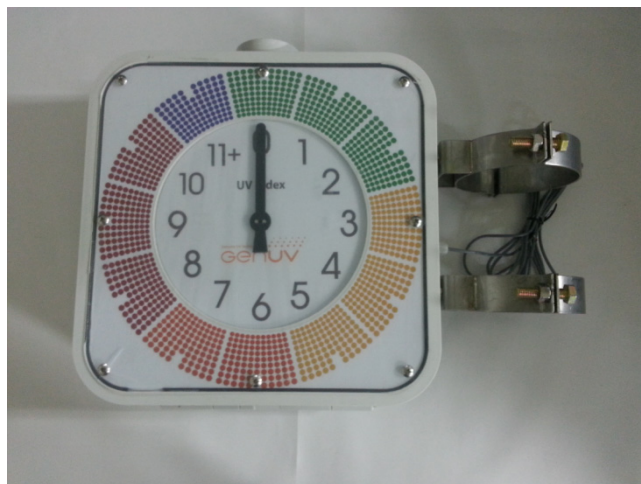


Fig 5-④. Assembled image

3) Install solar cell fixture

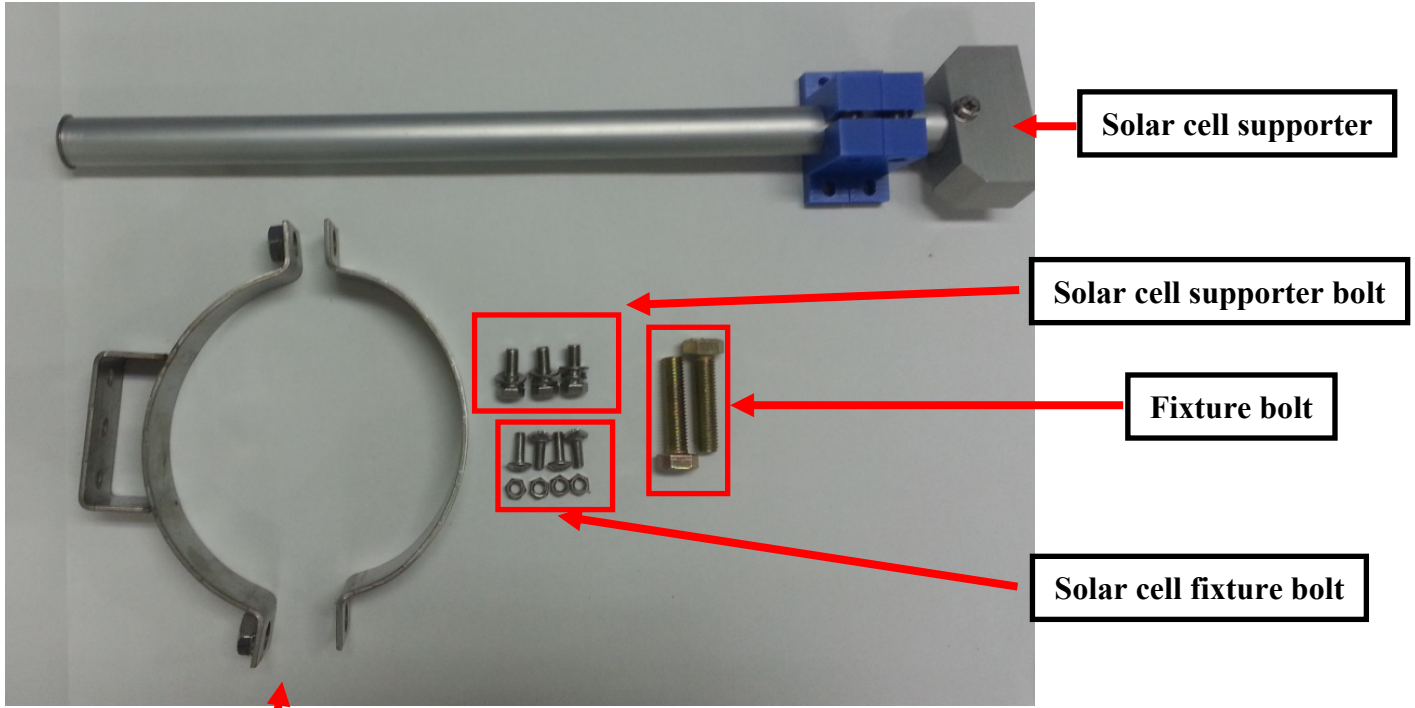


Fig 6. Solar cell fixture

Solar cell fixture

3) Install solar cell fixture

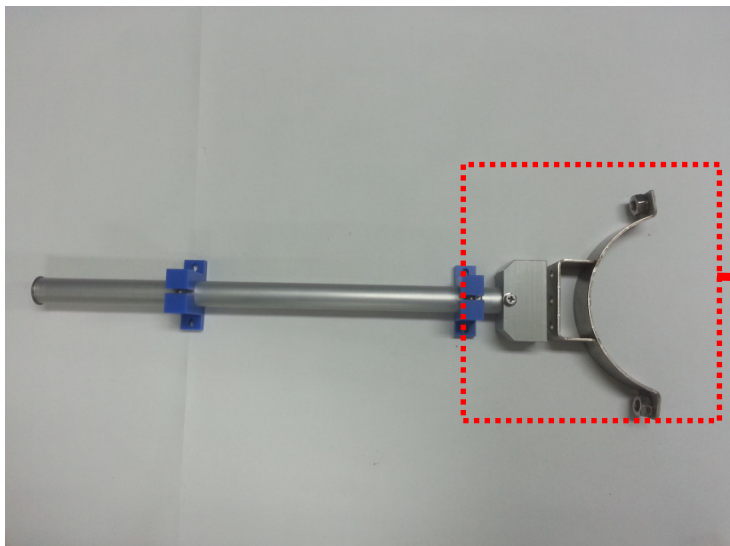


Fig 7-①. Solar cell fixture



Fig 7-②. Solar cell fixture assembly

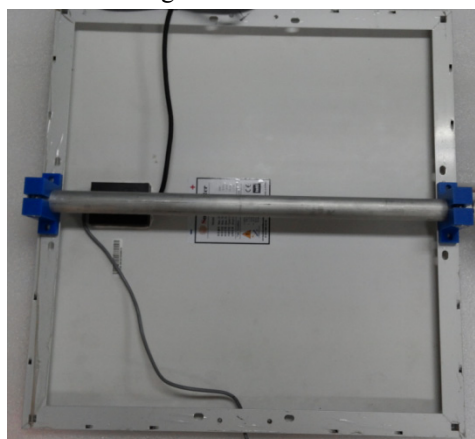


Fig 7- ③. Adjust width and tighten with hexagon wrench

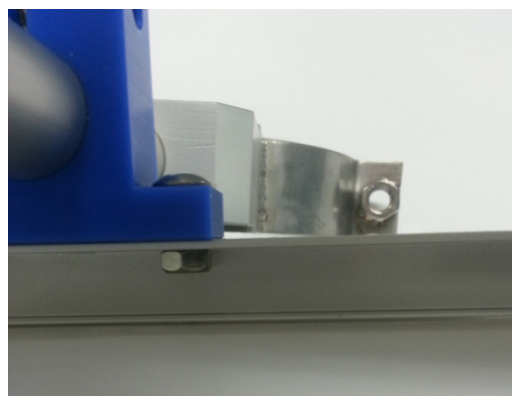


Fig7-④. Fix solar cell by solar cell fixture bolt and nut.



Fig 7-⑤. Connect with solar cell connector and body connector.

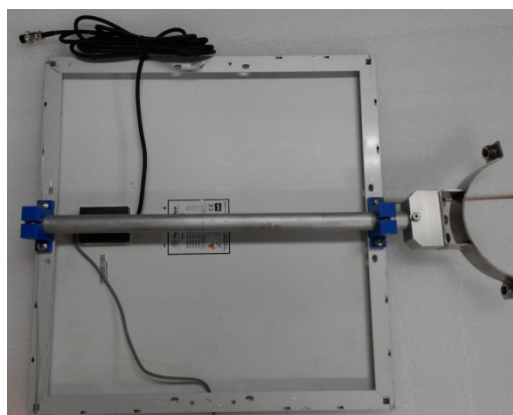


Fig 7-⑥. Assembled image

4) Set up head sensor probe

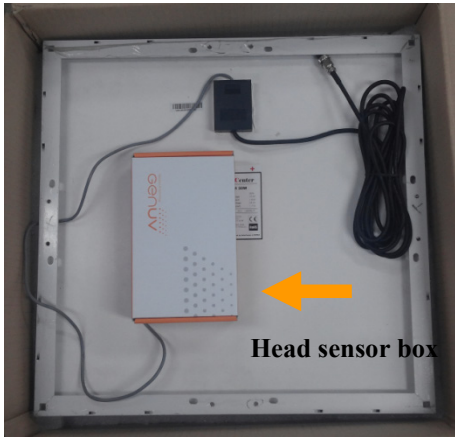


Fig8-①. Open Junction box direction arrow.

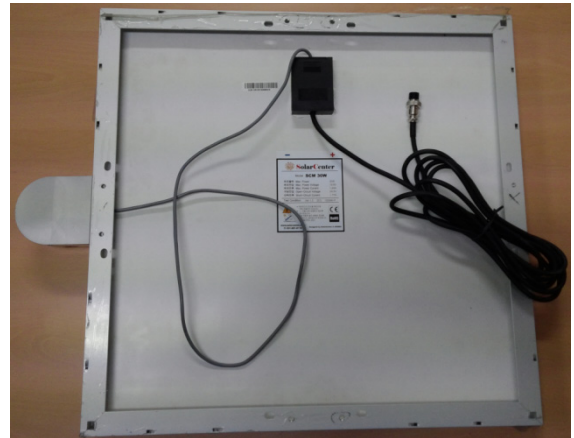


Fig8-②. Locate head sensor

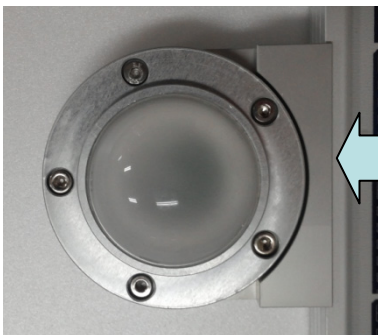


Fig8- ⑤. Head sensor probe



Fig8- ④. Tighten head sensor bolt

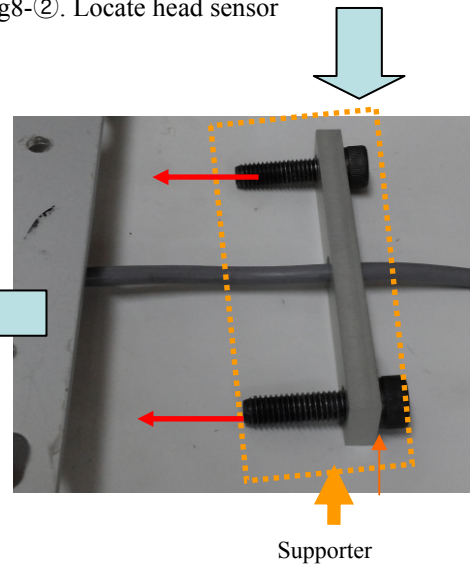


Fig8- ③. Junction box inner image

1. Un boxing head sensor box (Fig8- ①)
2. Locate head sensor like Fig 8-②
3. As figure Fig8- ③, push head sensor support.
4. Tighten head sensor support fixture bolt.
5. Connection with solar panel cable and main body cable.

5) Installation method

- ① Find a proper place to install the product on a column which is at least 3m height from the ground. And the installation place has to be a place where the sunshine is not blocked over the head sensor part and solar cells.
- ② Fasten the product on the fixed supporter using screws and make sure the light receiving sensor part is on the top. The height of the installing place has to be outside the reach of adults.
- ③ After installation, the pointer will move and stop at '0', and then it shows the current UV Index.
- ④ The diameter of the installation pole must be 13cm ~ 16cm.

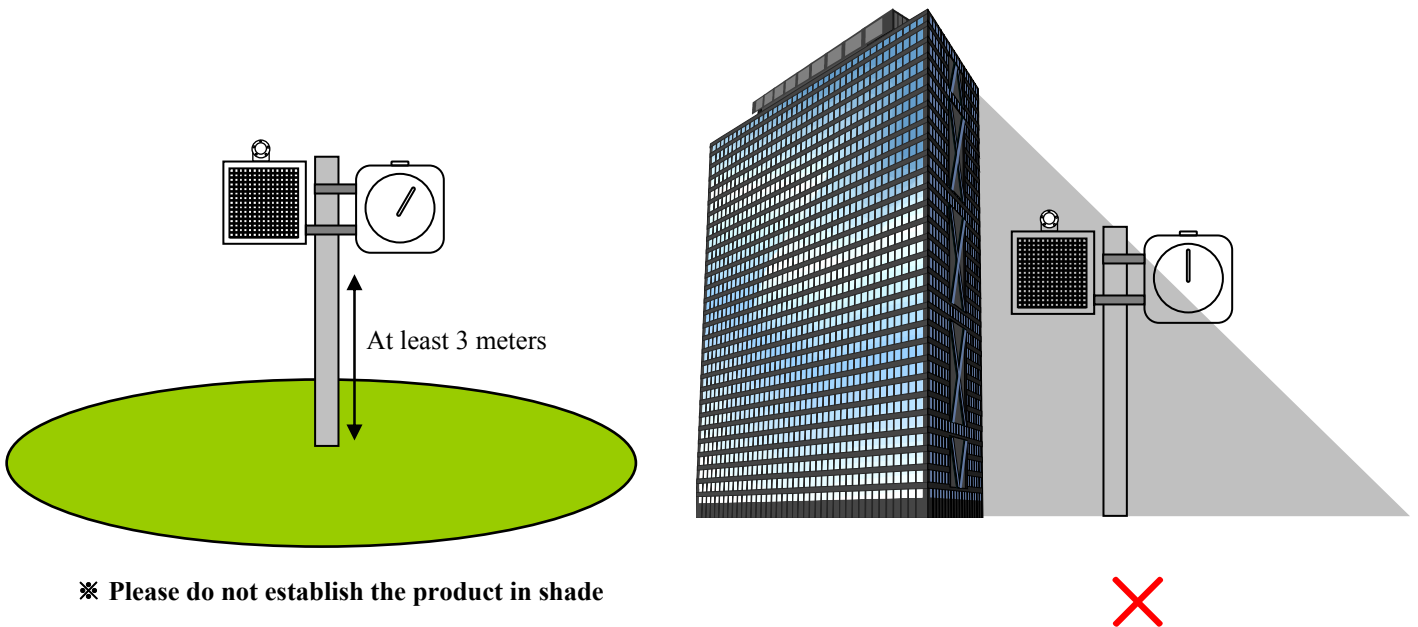
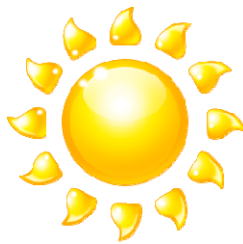


Fig.9 Installation of AG - 03

3-2. Installation of solar cell

1) Solar panel must be full south direction

To get maximum recharging effects, the installation angle of solar panel have to be tilt like latitude of installation place.

Eg) Latitude of Korea is about 35 degrees.
(Be located in Northern hemisphere)

Summer : $35^{\circ} + 15^{\circ}$
Winter : $35^{\circ} - 15^{\circ}$

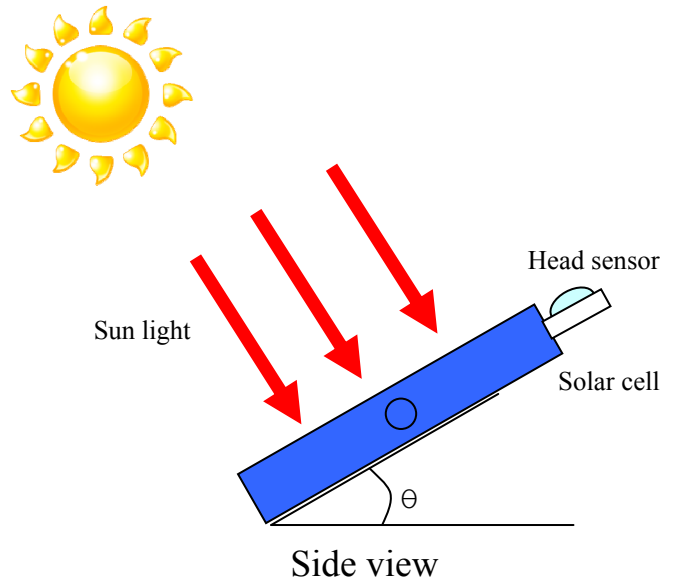
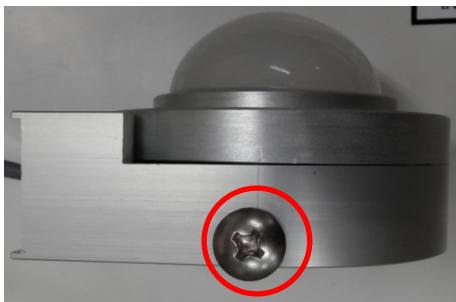


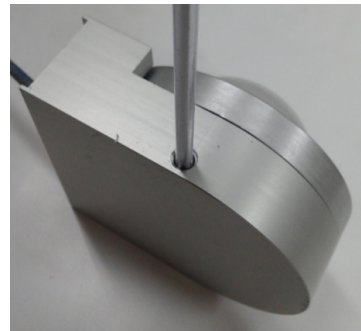
Fig10. Solar cell installation

3-3. Adjust UV index

1) If correction of UV INDEX value is required, You can adjust UV Index value..



1. Loosen head sensor screw.



2. Use a Phillips screwdriver to change the value of the variable resistor.

3. After the adjustment, Reassemble the head sensor screw.

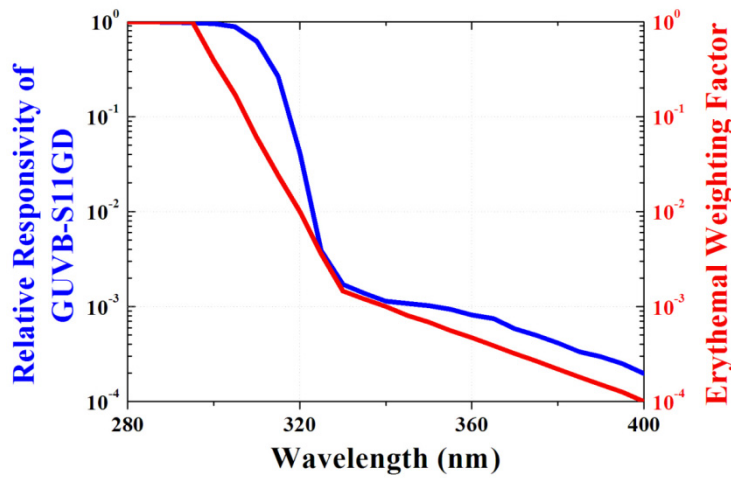


Fig11. Solar cell installation

$$\frac{\int_{280}^{400} E_{\lambda} \cdot S_{er}(\lambda) d\lambda}{\int_{280}^{400} E_{\lambda} \cdot R_{re}(\lambda) d\lambda} = 104\%$$

E_{λ} [W/m².nm] = Solar spectral irradiance
 $S_{er}(\lambda)$ = Erythema reference action spectrum
 R_{re} = Relative sensor responsivity

Erythema Curve

The Erythema curve indicates the UV exposure required to induce Erythema of human skin - a redness of the skin resulting from inflammation, in this case, as caused by sunburn.

- Note that the Erythema curve includes the human skin response to UV-A (wavelengths between 315nm and 400nm) and UV-B (wavelengths between 280nm and 315nm). UV-C is absorbed by the ozone layer and does not reach the earth's surface. However, in the Southern Hemisphere there are holes in the ozone layer and UV-C must be considered here.

-Taking a couple of readings from the Erythema curve, it shows that, for example, at a wavelength of 295nm the skin is a thousand times more sensitive than to UV at 340nm.

[UV Index and dangers of UV exposure]

UV INDEX	0	1	2	3	4	5	6	7	8	9	10	11+
EPA*	MINIMAL		LOW		MODERATE		HIGH			VERY HIGH		
CANADA	LOW			MODERATE			HIGH		EXTREME			
KOREA	MINIMAL		LOW		MODERATE		HIGH		VERY HIGH			
WHO**	LOW		MODERATE			HIGH		VERY HIGH		EXTREME		

* EPA : U.S. Environmental Protection Agency
 ** WHO : The World Health Organization

5-1. Troubleshooting

A. Severe changes in UV Index or Indicating irrelevant UV Index

-> Replace the UV Sensor Module PAGE 14

B. UV Index does not move from 0 -> Replace the UV sensor module

Sensor probe window contamination-> Clean window (wipe with soft cloth)

Sensor board failure-> Replace head sensor.....PAGE 14

Stepping motor failure -> Replace stepping motor.....PAGE 15

main controller board failure- -> Replace main controller boardPAGE 17

Battery discharge-> Replace battery..... PAGE 18

Solar charge controller failure -> Replace solar charge controller..... PAGE 19

C. Zero point cannot be set

Continuing to rotate the hand of indicator-> Replace photo interrupterPAGE 16

Replace main controller boardPAGE 17

Stepping motor failure -> Replace stepping motor..... PAGE 15



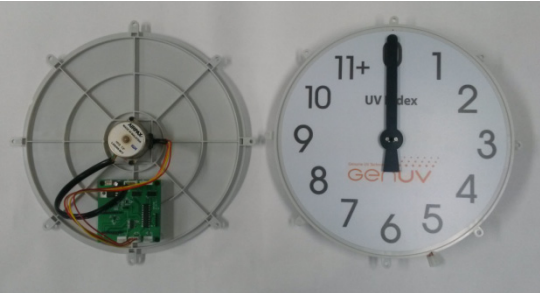
D. The UV index in both panels do not match or the dial hand does not turn.

1. Reset UV index meter -> Turn off the power switch and turn on


2. Replace stepping motor..... PAGE 15

3. Replace main controller boardPAGE 17

1)Part list

Item	Part name	Remark
	<p>Front cover</p>	<p>When broken front cover When broken cover window</p>
	<p>Main body</p>	<p>When broken main body When broken cover window</p>
	<p>Display & Controller</p>	<p>Replace motor Replace main controller board Replace photo interrupter</p>

1)Part list

Item	Part name	Remark
	Solar cell part	Replace solar cell
	Head sensor part	Replace head sensor or Replace UV sensing module
	Solar charge controller	Replace solar charge controller
	Solar charge controller part	Replace battery

5-2. How to replace head sensor

- ①. Unfasten the screw in the Top cover using hexagon wrench as shown in the Fig12-①
- ②. Cut the Head sensor cable.
- ③. Open solar cell junction box as shown in the Fig 12 – ①
- ④. Wiring connection as shown in the Fig 12 - ③
- ⑤. When you replace the light receiver part, follow the steps of ①, ② and ③ and install a new light receiver part.
But, check the O-Ring.



Fig12-① Head sensor



Fig12-② UV sensor module

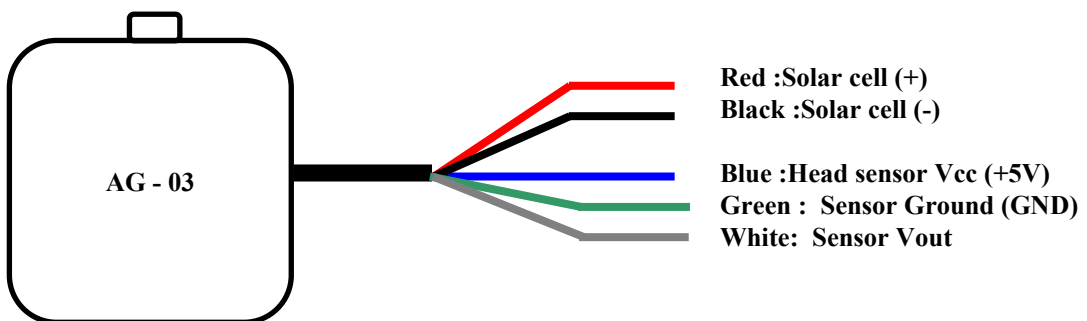


Fig12-③ Junction box Connection diregram

Fig12. How to change head sensor part sensor

5-3. How to replace stepping motor



Fig13-①. Unfasten the screw the hexagonal screw by using hexagonal wrench and open front panel

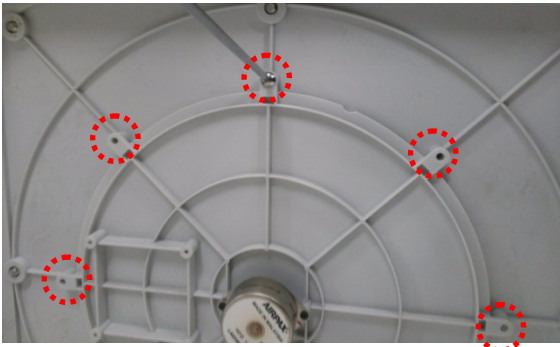


Fig13-②. Unfasten the '+' screw with screw driver.



Fig13- ③. Separate the cross head screws from hand of a indicator.



Fig13-④. Separate the stepping motor screws at back side of panel.



Fig13-⑤. Separate the supporter of hand of indicator with hexagonal wrench.

After changing stepping motor, assemble method is inverse of separation method.

5-4. How to change photo interrupter



Fig14-①. Unfasten the screw the hexagonal screw by using hexagonal wrench and open front panel

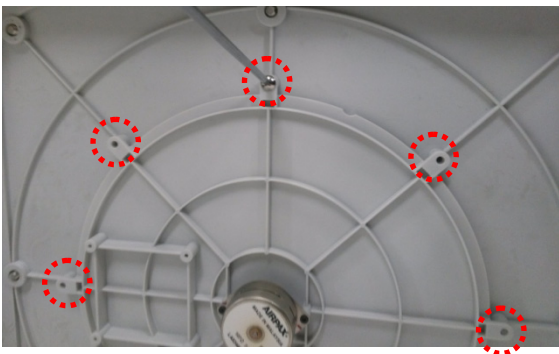


Fig14- ②. Separate cross head screw from circular panel.



Fig14- ③. Separate the cross head screws from hand of a indicator.



Fig14- ④. Separate the stepping motor screws at back side of panel.

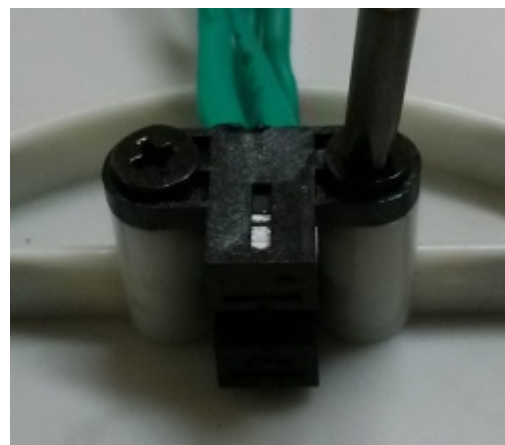


Fig14- ⑤. After the cross head screws are separated, change new photo interrupter.

※ After assemble new photo interrupter, assemble method is inverse of separation method.

5-5. How to change the main board

1) Unfasten the screw the hexagonal screw by using hexagonal wrench as shown in the Fig. 5



Fig.15-① Detaching the cover from the main body

2) Open front panel cover



Fig.15-② Opening front panel cover

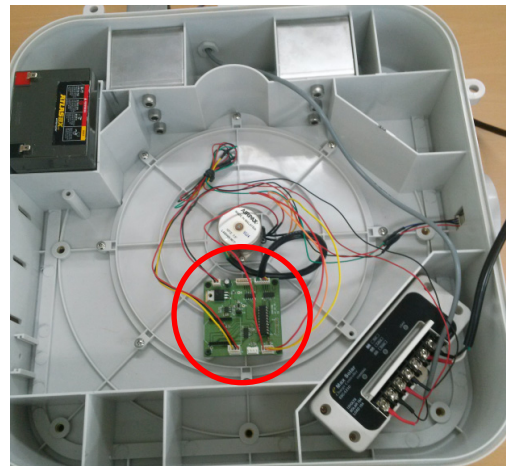


Fig.15-③. Main board (red circle)

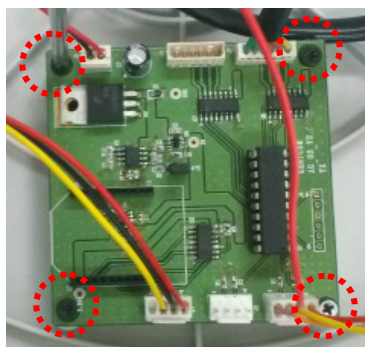


Fig.15-④. Detaching the main board

3) Unfasten and separate the main board by using phillips driver and replace new main board.

5-6. How to replace battery

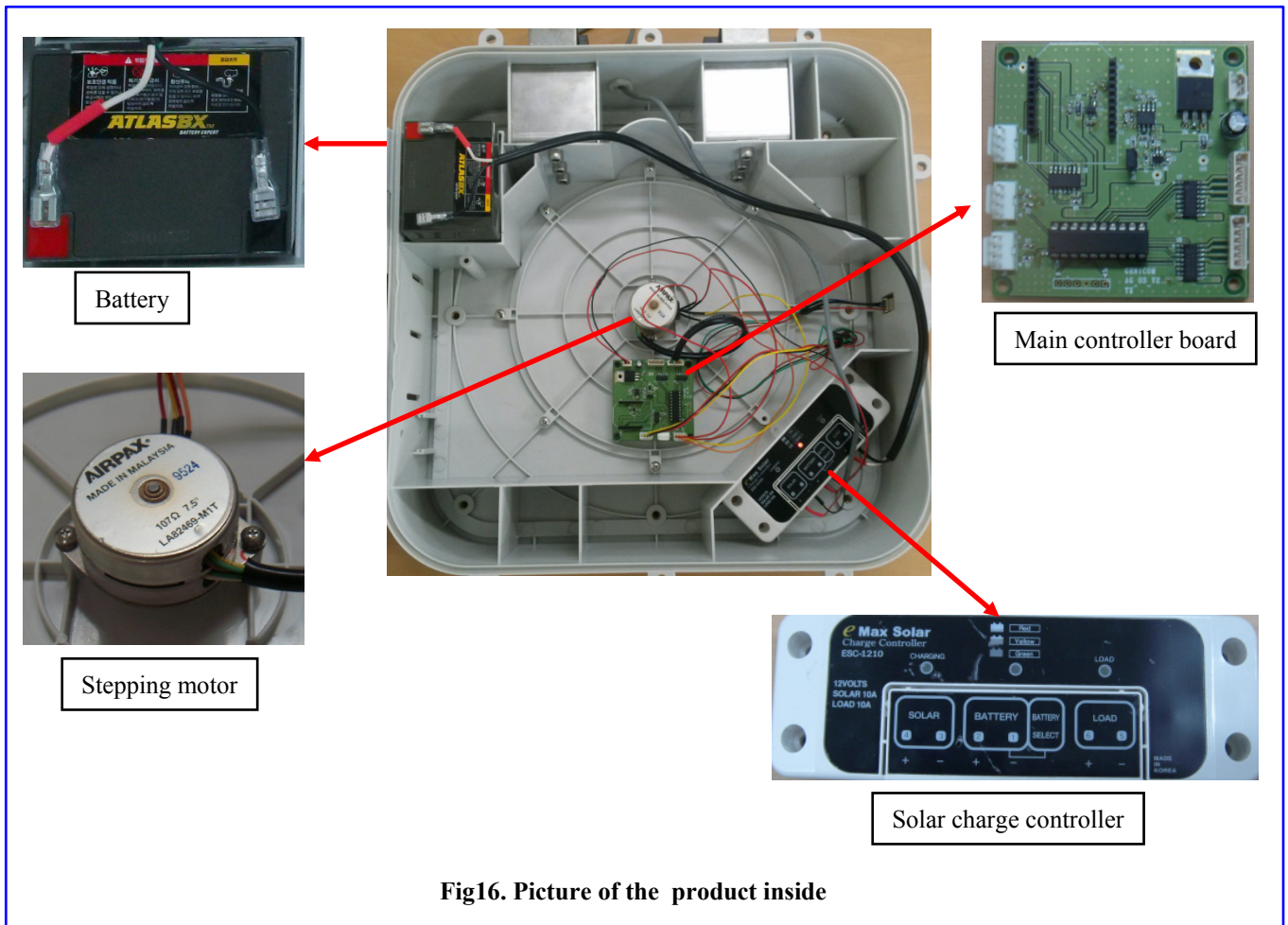
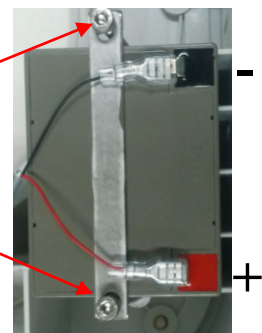


Fig16. Picture of the product inside

- How to replace the battery

- ①. Unfasten the screw by using a M5 size hexagonal wrench to disassemble the battery and replace it with a new one.
- ②. Install the battery in the reverse order of disassembly.
- ③. After replacing the battery, pay attention to the polarity of it when you connect to the terminals.
- ④. Replace the battery only when the device does not operate after the battery recharge.

Unfasten the battery by using a M5 size hexagonal wrench and re-assemble it in the reverse order..



5-7. How to replace solar charge controller

- ①. Release power cords connected to each jack by using a Phillips-head screwdriver, and disassemble it by unfastening the screws on four corners.
- ②. Pay proper attentions to avoid a risk of electric shock when removing the battery connecting terminal and the solar terminal.
- ③. After replacement, re-assemble them in the reverse order. connect the terminals referring to the fig17.
- ④. Take proper care when you make connections not to give a damage to the product.

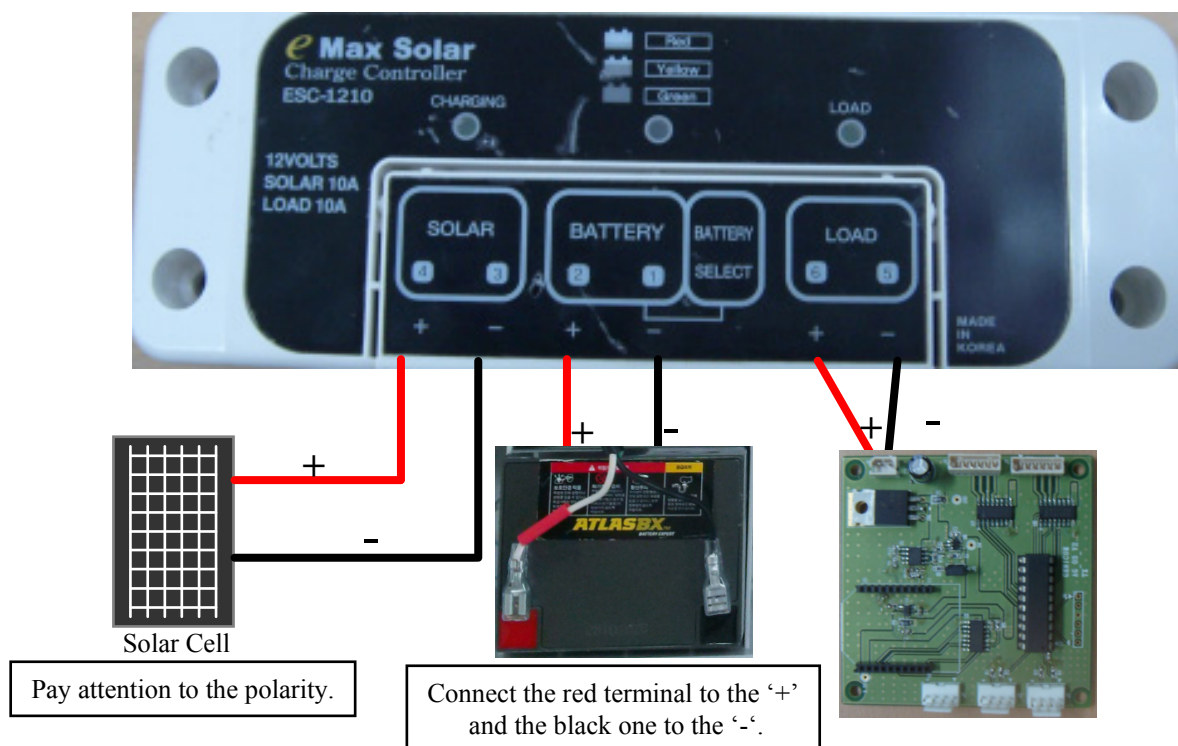


Fig17. Internal line connection diagram

5-8. Internal line connection method

- ①. Pay attention no make a wrong connection when you make connection to the wireless module by confusing it with power supply terminal.
- ②. Make sure the connection of the wireless communication antenna. If the device is operated without connection to the antenna, it will damage the wireless module.
- ③. Pay attention to the polarity of when you make connections.

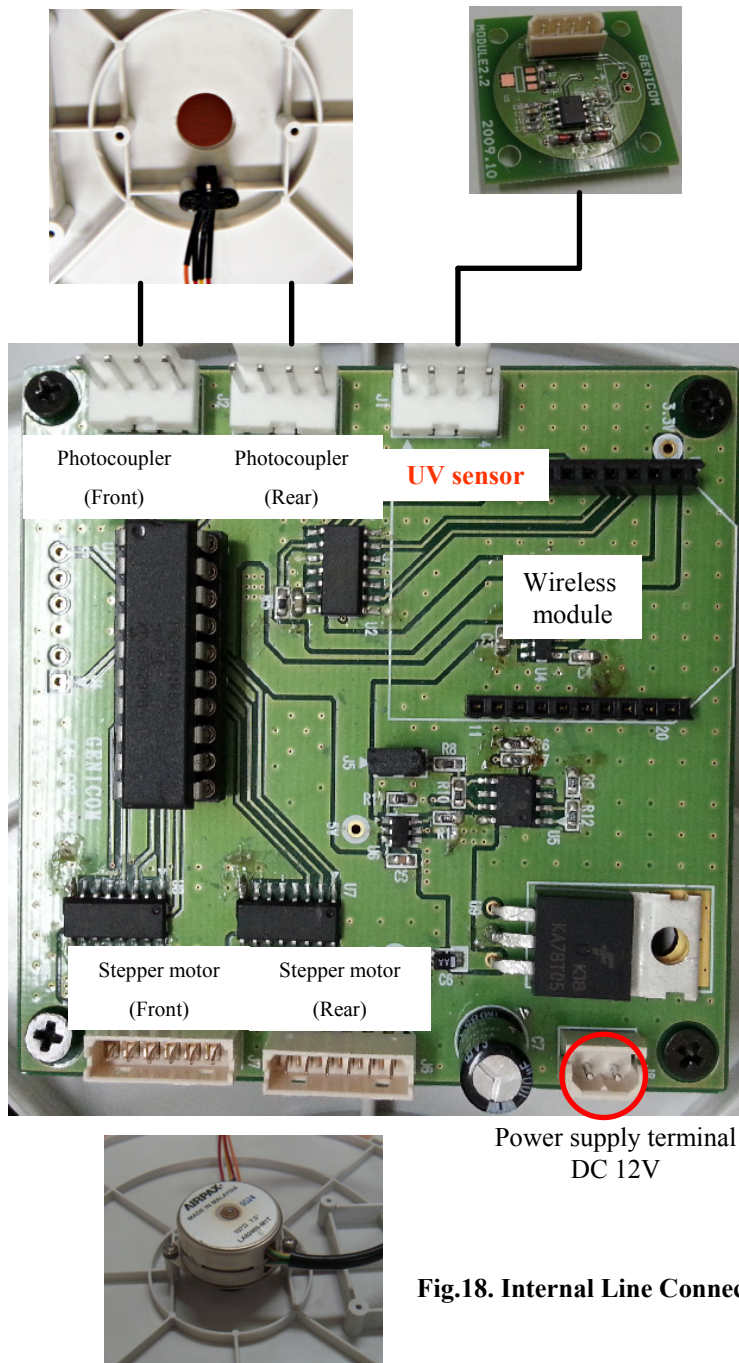





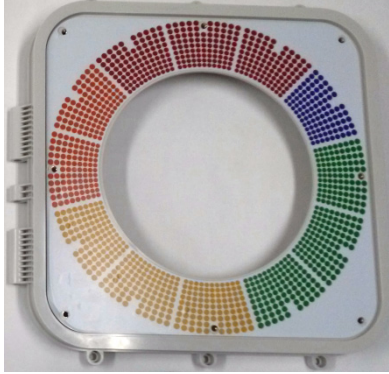



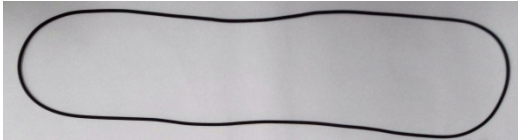


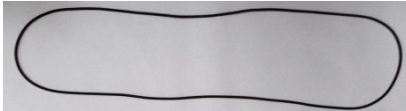





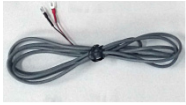
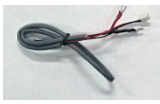
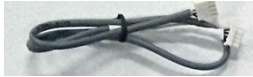


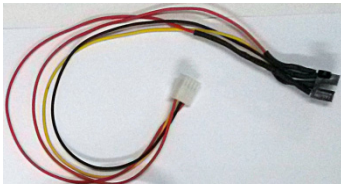
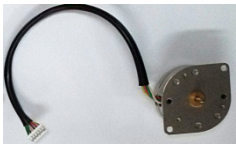









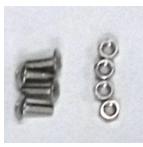
Fig.18. Internal Line Connection Method


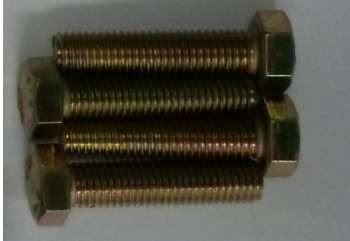


Part name	Picture	Quantity
Top cover	 A circular, light-colored plastic top cover with a central circular hole and four smaller holes around the perimeter.	1
Top cover O-ring	 A black, circular O-ring seal.	1
Quartz window	 A small, circular, light-colored quartz window.	1
Top cover fixture bolt	 Four small, silver-colored metal bolts.	4
UV sensor module fixing bolt	 Four black, self-drilling screws.	4


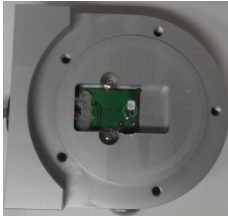



Part name	Picture	Quantity
Front cover		1
Cover window		1
Cover window bolt		8
Hinge core		2
Front cover O-ring		1

Part name	Picture	Quantity
Main body		1
Cover window		1
Main body O - ring		1
Main body fixture		2
Rechargeable battery		1
Solar controller		1
Cover window bolts		8
Main body supporter bolts , nuts , washers		6,12,6
Solar cell power cable		1
Main controller board power cable		1
Main controller board power cable		1

Part name	Picture	Quantity
Circular panel		2
Main controller board		1
Photo interrupter		2
Stepping motor		2
The hand of a indicator		2
The hand of a indicator fixture		2 Set

Part name	Picture	Quantity
Solar cell		1
Solar cell supporter		1
Solar cell supporter fixture		2
Solar cell fixture bolt		3
fixture bolt		2
Fixture - bolts ,nut		4 , 4

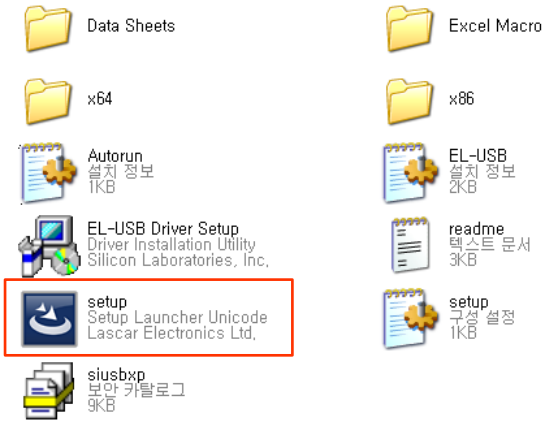
Part name	Picture	Quantity
Main body fixture	 A circular metal fixture with a central opening and a handle at the top.	1
Fixture bolt	 Four brass-colored bolts with hexagonal heads.	4
Fixture nut	 Six silver-colored nuts.	6
Fixture washer	 Six silver-colored washers.	6

Part name	Picture	Quantity
Head sensor cover	 A circular, metallic head sensor cover with four mounting holes around its perimeter.	1
Head sensor body & Sensor board	 The head sensor body with a green sensor board mounted inside.	1
Head sensor Fixture nut	 Two black hexagonal head nuts with threaded shafts.	2
Head sensor O-ring	 A black, circular O-ring seal.	1
Head sensor cover Fixture bolt	 Three stainless steel hex head bolts with threaded shafts.	1

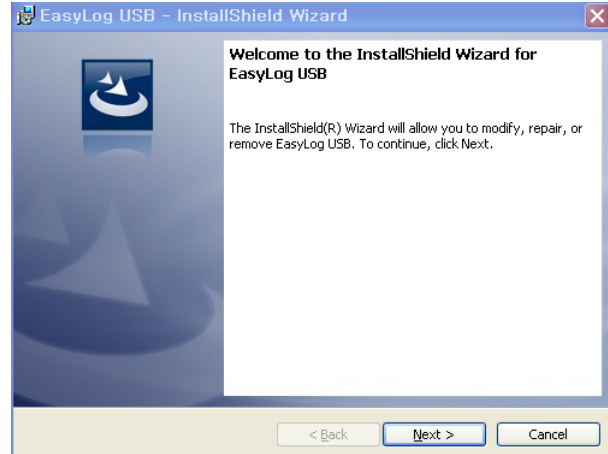
DATALOGGER is installed inside the AG-03.4

-It is possible by using the data logger, to confirm the change of the voltage output.

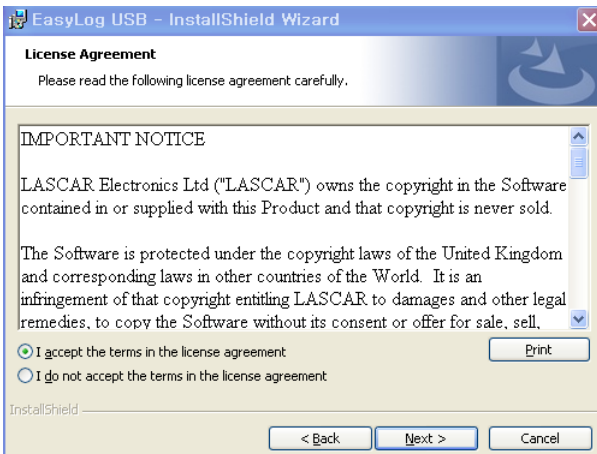
7-1. Install Software & USB Driver.



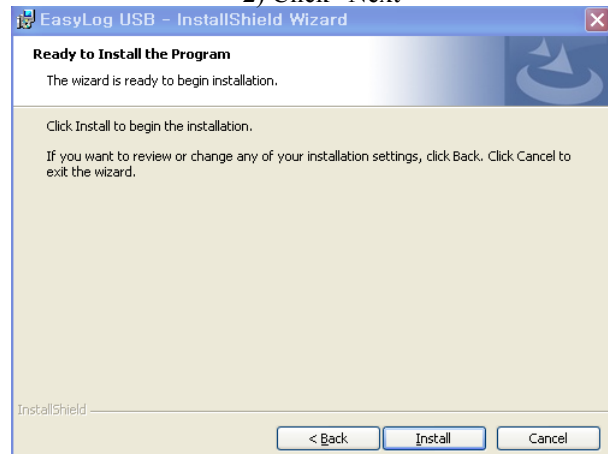
1) Unzip the EL-USB and click Setup.



2) Click "Next"



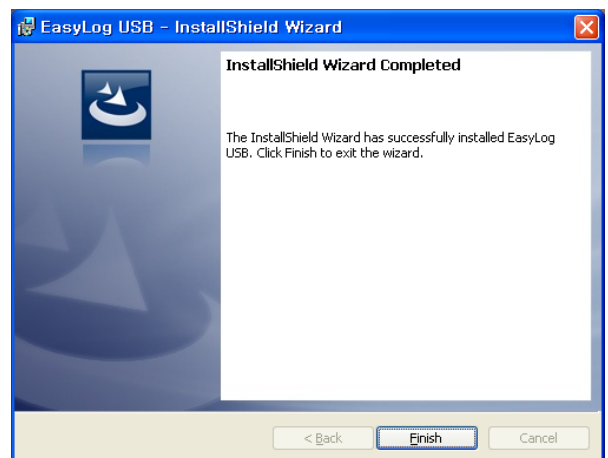
3) Read the "IMORTANT NOTICE", Select "I agree" and "Next"



4) Click "Install"



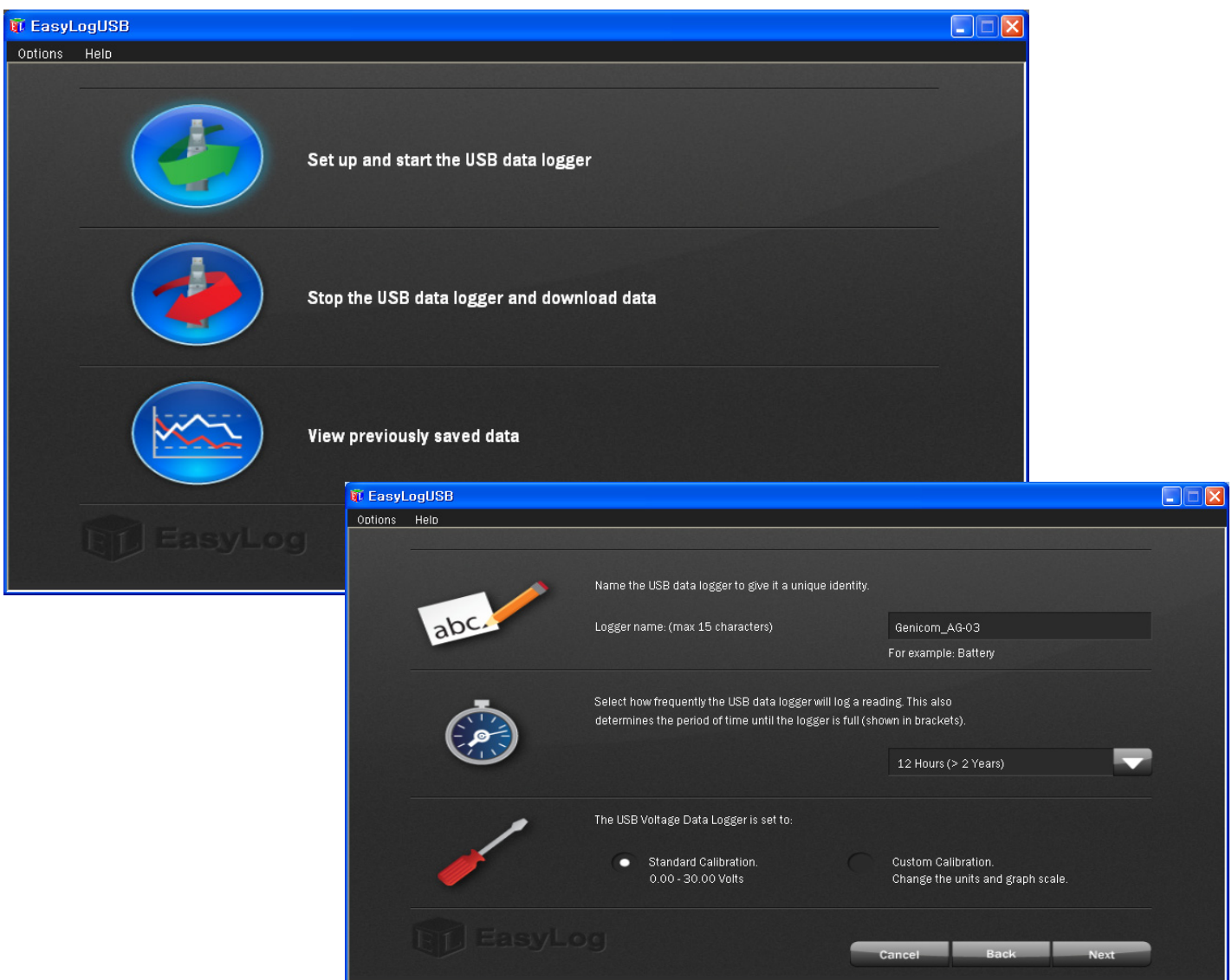
5) Click "Install"



6) Click "Finish"

7-2. Data Logger is Ready for Use.

- 1) Ensure the battery is correctly installed.
- 2) Insert the data logger into an available USB port on your PC
- 3) Double click on the Easy Log USB icon on your Windows desktop.
- 4) This will load the configuration software. Setup the data logger for a new log.
Download a data logger that has been recording, view previously saved data in graph format and check the current status of the attached data logger (including the serial number)
- 5) When setup is complete, the data logger should be removed from the USB port to begin recording.
- 6) Do not leave data logger in the USB port as this will cause some of the battery capacity to be lost.



7-3. Download Data logger data

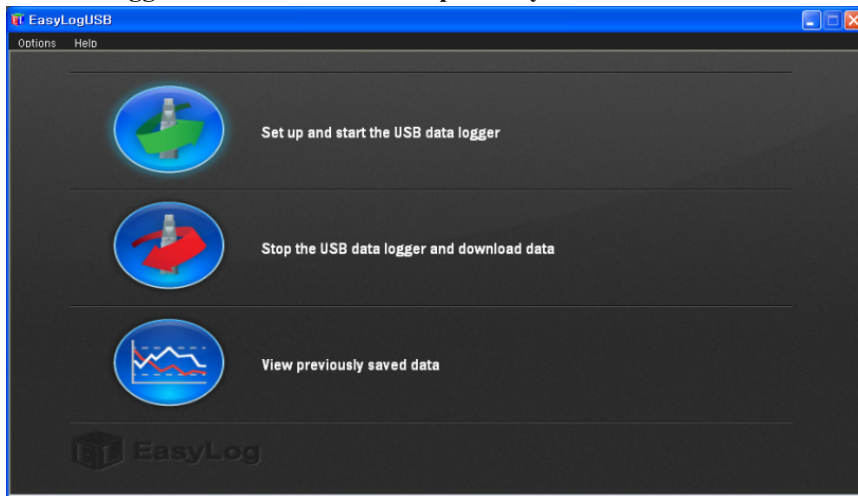
- 1) Unfasten the screw the hexagonal screw by using hexagonal wrench as shown in fig.



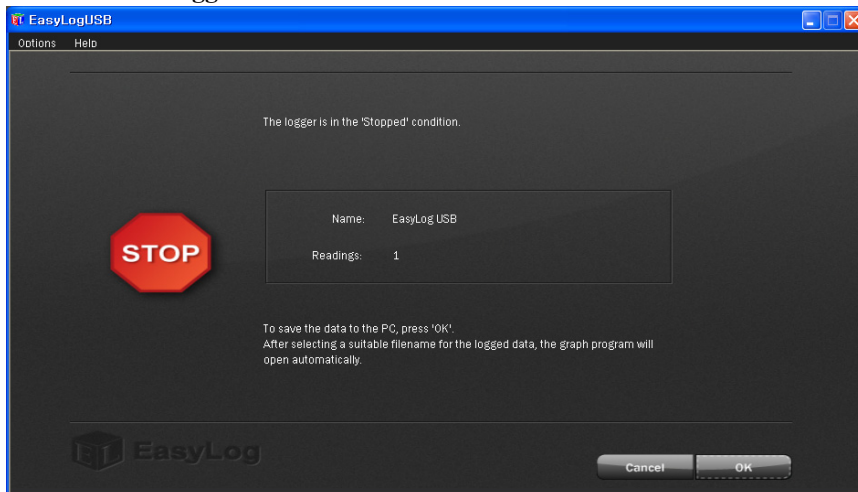
- 2) Open front panel cover
- you can find EL-USB-3 Data logger



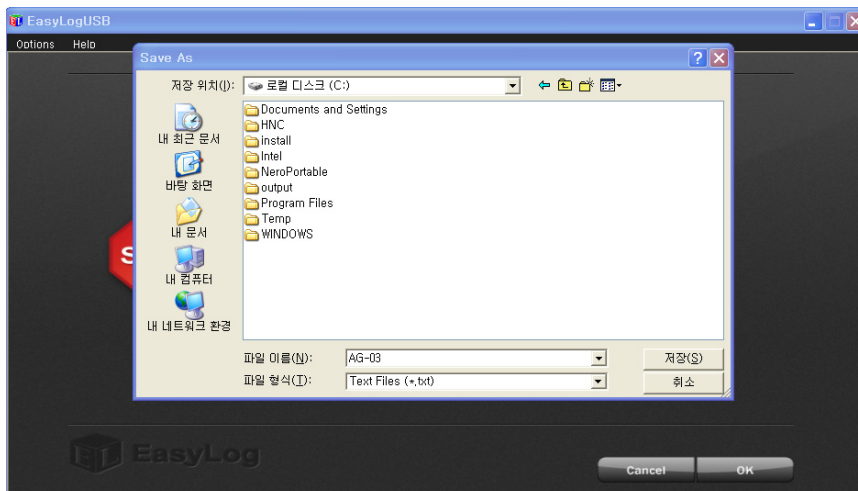
3) Insert the data logger into an available USB port on your PC



4) Click the USB data logger and download data



5) Click OK



- Service policies for product defects

- 1) Please cleaning head sensor's window with soft cloths every six months.
- 2) Period of calibration is two years.
- 3) Please do not apply excessive force or impact to the product
- 4) Be cautious inflow water or dust through vent hole under product.
- 5) Do not keep in high temperature place (over 80°C).
High storage temperature can be caused deformation of product.
- 6) Do not use for any purpose other than UV Index measurements.
- 7) Do not disassemble or convert. In this case, you can not be protected from A/S.
- 8) When there is a product defect, please contact the store you bought the product from or our customer center. Product warrant period is one year from the purchase.

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