

# Instruction Manual

## MG-11

### (UV Radiometer)



1. Product Features and Applications
  2. Product Specification and Configuration
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  4. Front Panel Explanation
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-

## 1. Product Features and Application

### 1) Features

Display is 5 types : Relative Power (RP), Accumulative Time (AT) and Absolute Power (AP)

Max power, Dose display ( $\text{mJ}/\text{cm}^2$ )

Output is 3 types : DC Voltage, DC Current and Relay

### 2) Applications

UV Lamp Monitoring / Water Sterilizer / Air Cleaner/ UV Curing / UV Irradiator

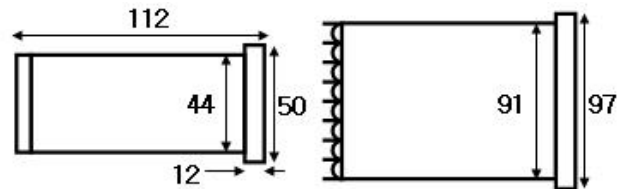
## 2. Product Specification and Configuration

### 1) Display Panel

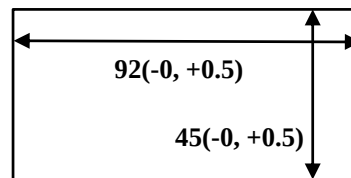
- Panel Size:  $97 \times 50 \times 112 \text{ mm}^3$ , Panel cutting size :  $92 \times 45 \text{ mm}^2$  (Tolerance :  $-0, +0.5 \text{ mm}$ )
- Power Supply:  $85 \sim 265 \text{ VAC}$  ( $50/60 \text{ Hz}$ ), Consumption :  $\leq 5 \text{ W}$
- Operating Temperature:  $0 \sim 50 \text{ }^\circ\text{C}$ , Operating Humidity:  $35 \sim 85 \text{ \% RH}$
- Relay :  $250\text{AC } 3\text{A}$
- Current Output :  $4\text{-}20 \text{ mA } 300 \text{ } \Omega \text{ Max.}$



(1) Display Panel



(2) Size of Display Panel( Unit : mm )



(3) Panel Cutting Size

Panel Cut Out( Unit : mm )

**Fig. 1 UV Radiometer MG-11**

### 2) Sensor Probe Wiring

9 ~ 24VDC Voltage Type Probe: Red Line : #17, Green Line : #8, Black Line : #9

5VDC Voltage Type Probe: Red Line : #16, Green Line : #8, Black Line : #9

9 ~ 24VDC Current Type probe : Red Line : #17, Green Line: #10, Black Line : #9

Information of Sensor Probe is in the enclosed Certificate of Quality (CQ)

3) Power cable and output cable ( $4\text{-}20 \text{ mA}$  current output,  $1\text{-}5\text{V}$  voltage output, relay) are not supplied.

4) Modbus RTU Communication : #11 (RS485+ (A )) , #12 (RS485- (B))

## 5) Wi-Fi, Bluetooth Module

## - Protocol

|           |                 |                                                                                                               |
|-----------|-----------------|---------------------------------------------------------------------------------------------------------------|
| Wi-Fi     | Protocols       | 802.11 b/g/n (802.11n up to 150 Mbps)<br>A-MPDU and A-MSDU aggregation and 0.4 $\mu$ s guard interval support |
|           | Frequency range | 2.4 GHz ~2.5 GHz                                                                                              |
| Bluetooth | Protocols       | Bluetooth v4.2 BR/EDR and BLE specification                                                                   |
|           | Radio           | NZIF receiver with -97 dBm sensitivity                                                                        |
|           |                 | Class-1, class-2 and class-3 transmitter                                                                      |
|           |                 | AFH                                                                                                           |

## - Wi-Fi Radio

| Parameter                              | Condition       | Min  | Typical       | Max  | Unit     |
|----------------------------------------|-----------------|------|---------------|------|----------|
| Operating frequency range <i>note1</i> | -               | 2412 | -             | 2484 | MHz      |
| Output impedance <i>note2</i>          | -               | -    | <i>note 2</i> | -    | $\Omega$ |
| TX power <i>note3</i>                  | 11n, MCS7       | 12   | 13            | 14   | dBm      |
|                                        | 11b mode        | 17.5 | 18.5          | 20   | dBm      |
| Sensitivity                            | 11b, 1 Mbps     | -    | -98           | -    | dBm      |
|                                        | 11b, 11 Mbps    | -    | -89           | -    | dBm      |
|                                        | 11g, 6 Mbps     | -    | -92           | -    | dBm      |
|                                        | 11g, 54 Mbps    | -    | -74           | -    | dBm      |
|                                        | 11n, HT20, MCS0 | -    | -91           | -    | dBm      |
|                                        | 11n, HT20, MCS7 | -    | -71           | -    | dBm      |
|                                        | 11n, HT40, MCS0 | -    | -89           | -    | dBm      |
|                                        | 11n, HT40, MCS7 | -    | -69           | -    | dBm      |
| Adjacent channel rejection             | 11g, 6 Mbps     | -    | 31            | -    | dB       |
|                                        | 11g, 54 Mbps    | -    | 14            | -    | dB       |
|                                        | 11n, HT20, MCS0 | -    | 31            | -    | dB       |
|                                        | 11n, HT20, MCS7 | -    | 13            | -    | dB       |

*Note*

1.Devices should operate in the frequency range allocated by regional regulatory authorities. Target operating frequency range is configurable by software.

2.For the modules that use IPEX antennas, the output impedance is 50  $\Omega$ . For other modules without IPEX antennas, users do not need to concern about the output impedance.

3.Target TX power is configurable based on device or certification requirements.

### 3. Production Installation

#### 1) Mounting the Sensor Probe

- a. Operation temperature of Sensor Probe is  $-30 \sim 85^{\circ}\text{C}$  ( $-22 \sim 185^{\circ}\text{F}$ )
- b. UV sensor of Sensor Probe and UV light source should be fixed in set distance to do vertically.  
Distance is your choice. But optical power should not exceed the  $100.00 \text{ mW/cm}^2$  because it is the maximum of Display.  
Once a mounting distance has been determined, make sure to use the same distance for any additional sensors used for other lamps; doing so will provide a more accurate comparison of irradiance among different lamps.
- c. In LW series, Sensor Probe connects after close Teflon tape 3~4 times in screw page.
- d. After mounting and positioning the sensor probe, make sure the window of Sensor Probe is clean and dry.  
If it is not clean, then gently wipe it off with a lint free swab.

#### 2) Mounting the Display Panel

- a. Mount the Display Panel in a temperature & humidity of less than  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) &  $35 \sim 85\% \text{RH}$ .
- b. 3 wires of Sensor Probe connect to # 16(5V) or #17(9 ~ 24V) , #8, #9 and #10 of Display.  
9 ~ 24VDC Voltage Type Probe: Red Line : #17, Green Line : #8, Black Line : #9  
5VDC Voltage Type Probe: Red Line : #16, Green Line : #8, Black Line : #9  
9 ~ 24VDC Current Type probe : Red Line : #17, Green Line: #10, Black Line : #9
- c. Power cable(85 ~ 265 V) connect to #1and #2 of Display. (Power is AC voltage. Be careful!)
- d. Voltage Output is 1~5 V DC along relative power, and it is the # 5 (-) and # 4(+) of Display.
- e. Current Output is 4-20 mADC ( $300\Omega$  max load) along relative power, and it is the # 5(-) and # 6(+) of Display.
- f. Relay can use the 3A / 230VAC, and its criterion is the setting value of C-01.  
# 19 is N/O (Normal Open), # 18 is N/C (Normal Close), and # 20 is Comm (Common).

If you want to get the short signal under 70 %, you should set 70 in C-01and connect the each wires in #18 and #19 of Display.

- g. RS 485 Communication Terminal is #11 A(+), #12 B(-).

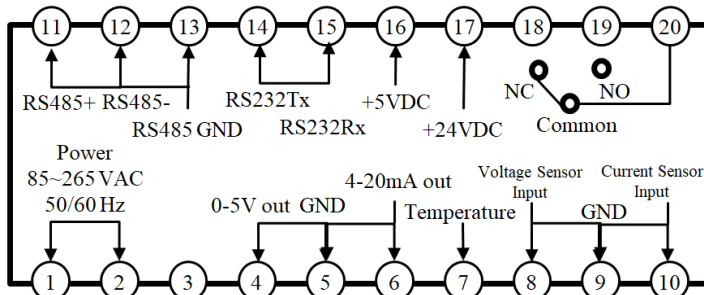


Fig. 2 Connection Diagram of UV Radiometer MG-11

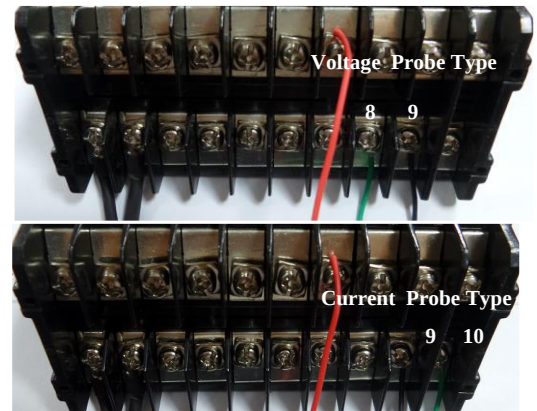
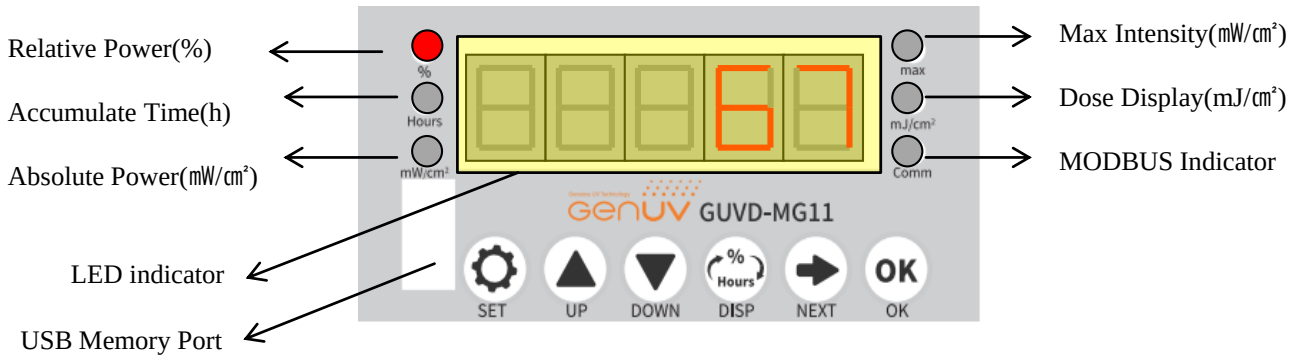


Fig. 3 Connection picture of UV Radiometer MG-11

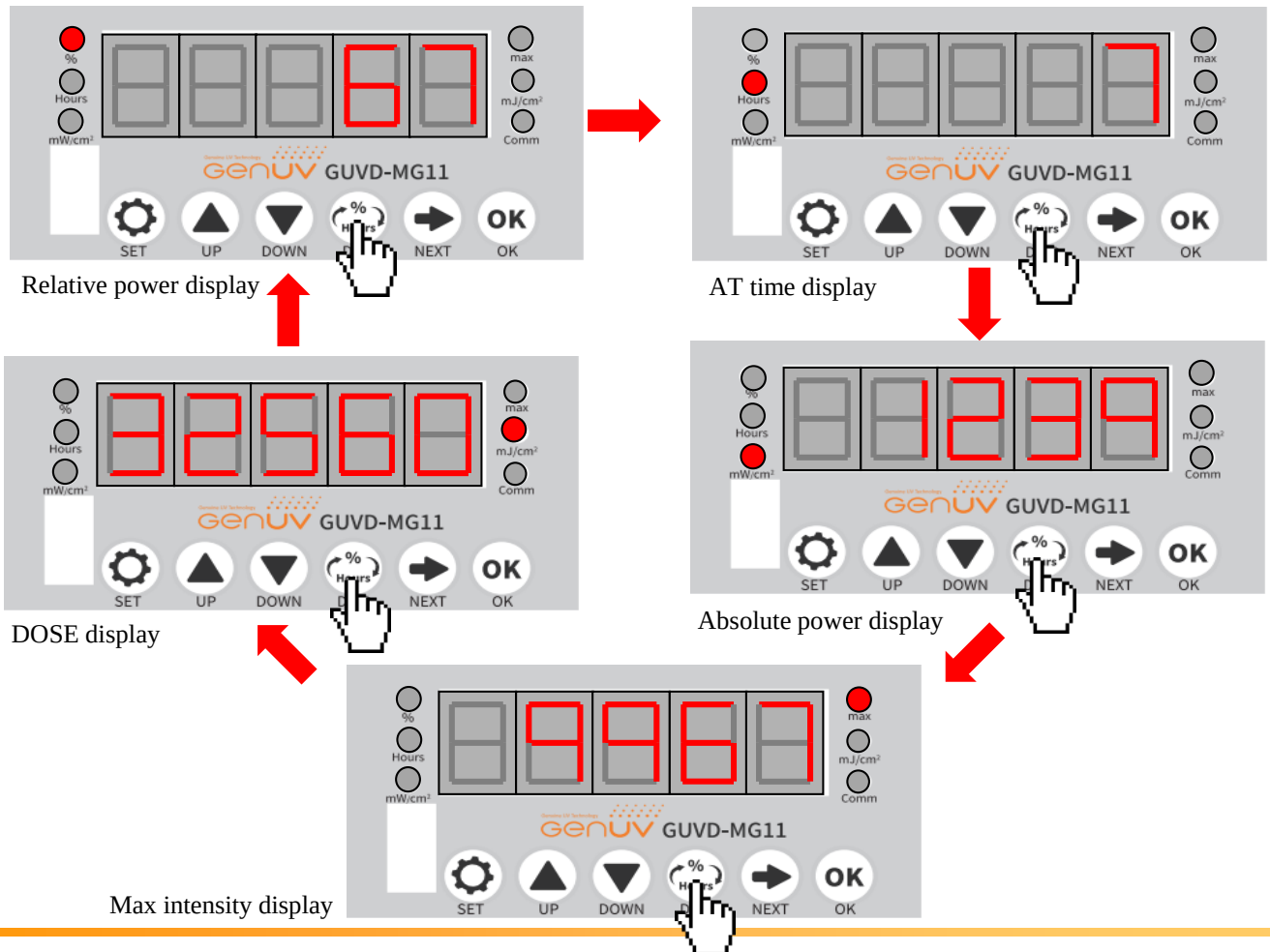
## 4. Front Panel Explanation



## 5. Function Explanation

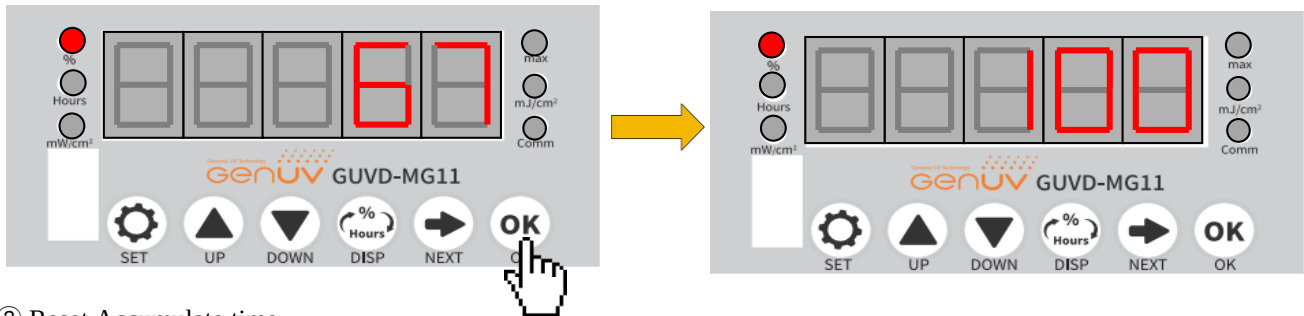
### 1) Basic function description

- OK button : Resetting RP(%), Reset Max power, Reset dose time
- DISP button : Switchover the display mode
- You can change display mode to press mode button



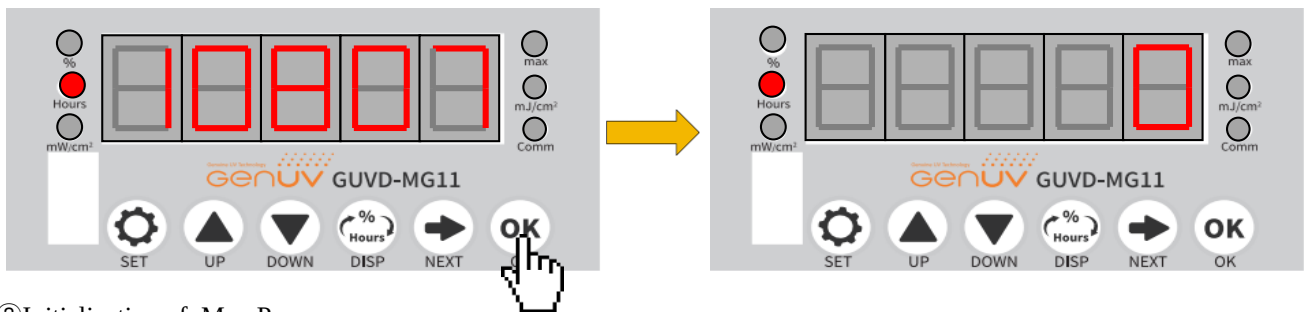
## ① Setting Relative power

- In the Relative power display mode , Press the OK button for 3 seconds.
- Press the Set button over 3 second, current optical power will be 100%.



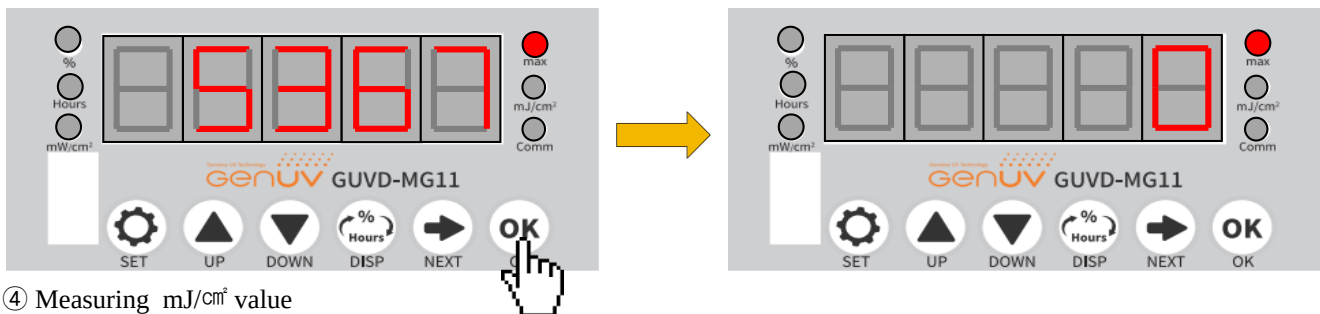
## ② Reset Accumulate time

- In the Accumulate time , Press the OK button for 3 seconds.
- Press the Set button over 3 second, Accumulate time value will set to zero.

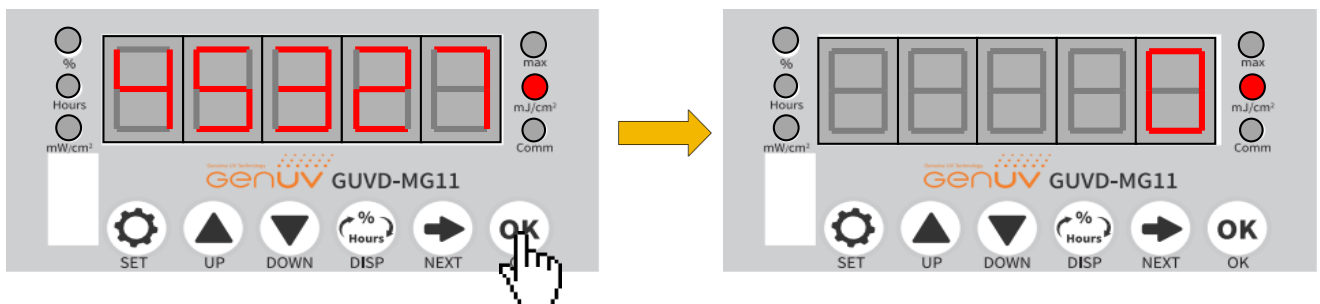


## ③ Initialization of Max Power

- In the Max power display mode , Press the OK button for 3 seconds. The measured light amount is displayed.
- Press the OK button over 3 second. The current value is saved as the maximum light level.

④ Measuring  $\text{mJ}/\text{cm}^2$  value

- In the Dose  $\text{mJ}/\text{cm}^2$  display mode , press OK button. (DOSE is reset every hour.)
- Then the  $\text{mJ}/\text{cm}^2$  value will set to zero and calculate the  $\text{mJ}/\text{cm}^2$



## 2) Entering setting mode

a. Press the SET button for more than 5 seconds to enter the setting mode.

Push UP, DOWN button , When switch on the parameters setting plate , C-01 ~ C- 13 would shown.

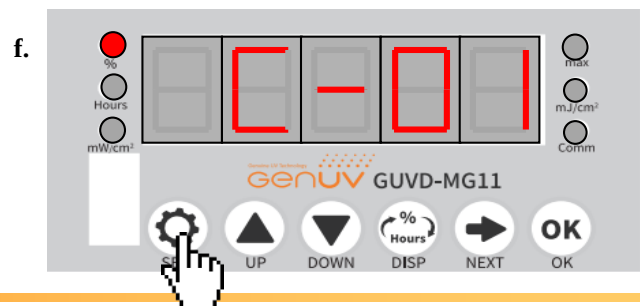
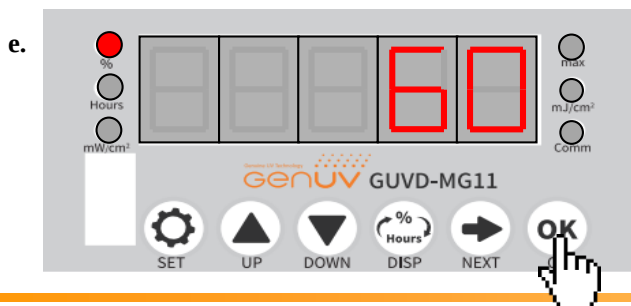
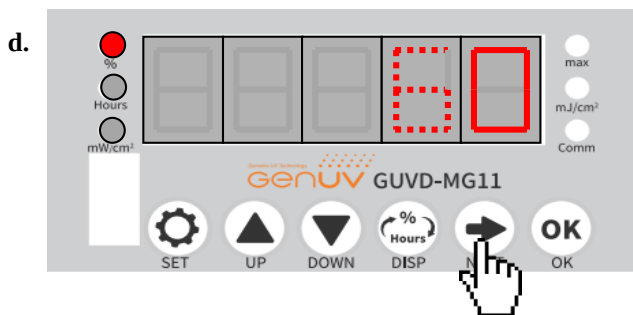
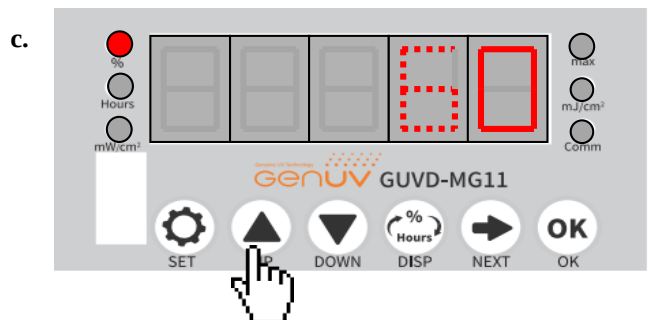
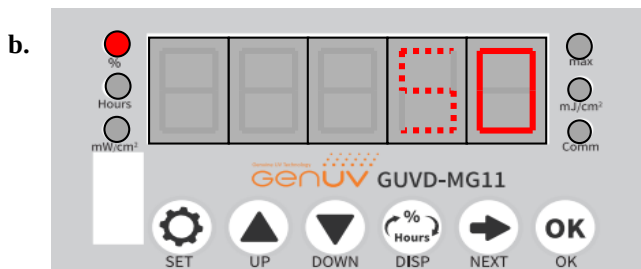
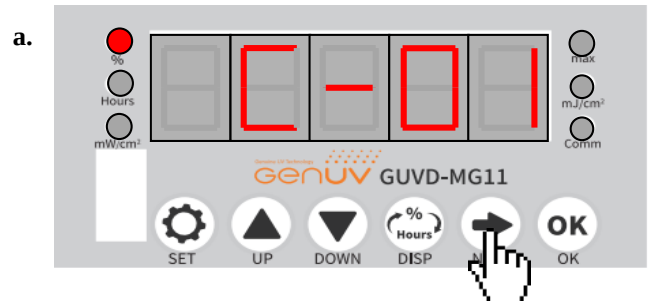
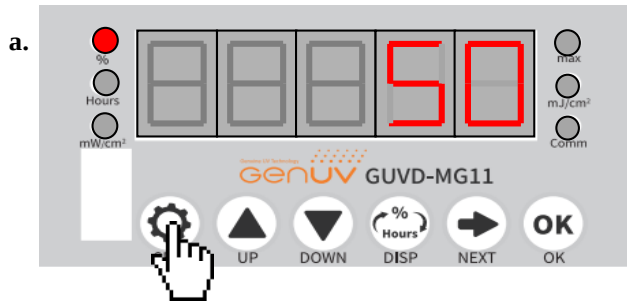
b. The first value of the setting will blink.

c. Use the UP and DOWN buttons to set the value.

d. Press the NEXT button to move sideways.

e. Press the OK button for 3 seconds to save the setting.

f. Press the SET button for 5 seconds to return to display mode.



## 3) Function setting table

| Function Settings |                                                   |                           |                                                                              |
|-------------------|---------------------------------------------------|---------------------------|------------------------------------------------------------------------------|
| Symbol            | Item                                              | Adjust range              | Note                                                                         |
| C – 01            | RP Power(%) Alarm                                 | 0 ~ 99                    | Alarm if less than this relative light level.                                |
| C – 02            | AT Time Alarm                                     | 0 ~ 19999                 | Set usage time, alarm when set time is exceeded.                             |
| C – 03            | Setting of maximum value for displayed intensity. | 0 ~ 19999                 | <b>This is a manufacturer setting. Do not change it.</b>                     |
| C – 04            | Max. intensity display Toggle                     | ON / OFF                  |                                                                              |
| C – 05            | mJ/cm <sup>2</sup> display Toggle                 | ON / OFF                  |                                                                              |
| C – 06            | RS485 Device No. Setting                          | 1 ~ 99                    |                                                                              |
| C – 07            | RS485 Baud rate                                   | 2400, 4800 , 9600, 115200 | 115200 is displayed as 1152                                                  |
| C – 08            | Log measure counter                               | 0 ~ 99999                 | Number of log saves                                                          |
| C – 09            | Log Interval                                      | 1~3600                    | unit : Second                                                                |
| C – 10            | Probe type                                        | Current/Voltage           | <b>This is a manufacturer setting. Do not change it.</b>                     |
| C – 11            | Feedback Control                                  | ON/OFF                    |                                                                              |
| C – 12            | RP Power(%) for AT Time                           | 0 ~ 100                   | Default: 5%<br>If the RP Power level is greater than 5%,AT time accumulates. |
| C – 13            | Log Start/Stop                                    | START/STOP                | Start or stop logging.                                                       |

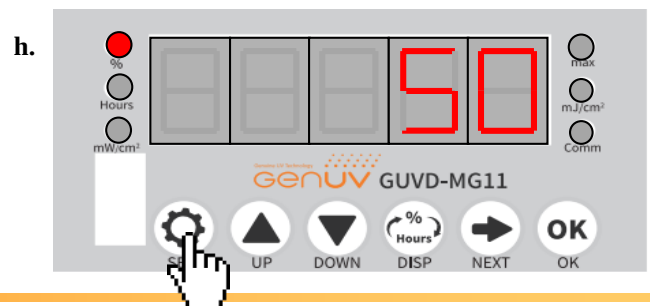
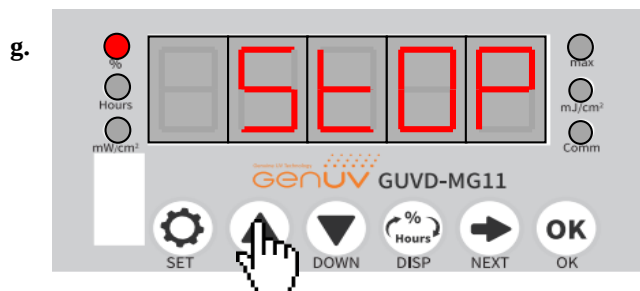
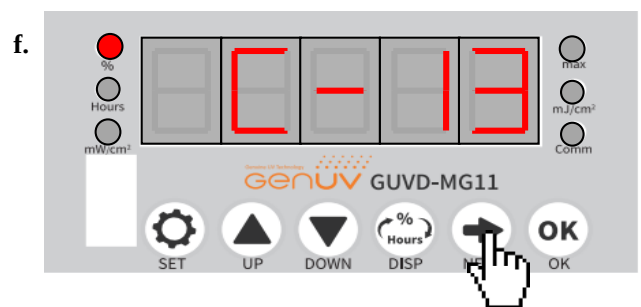
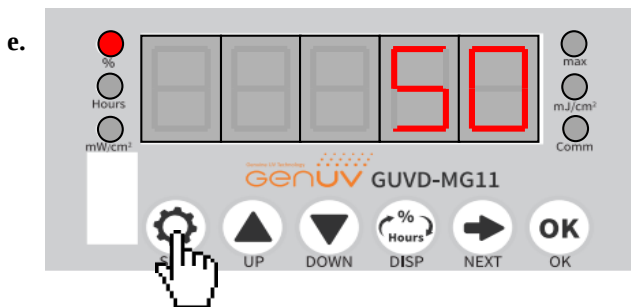
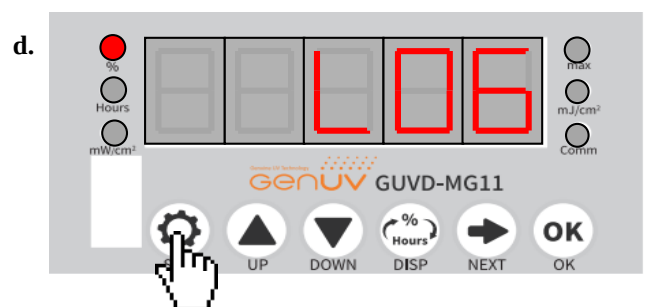
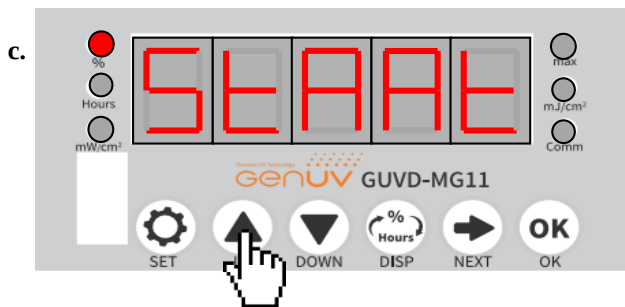
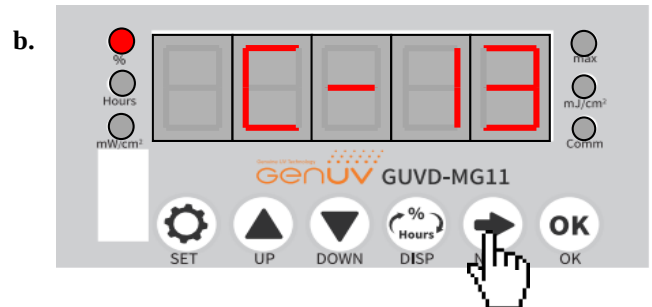
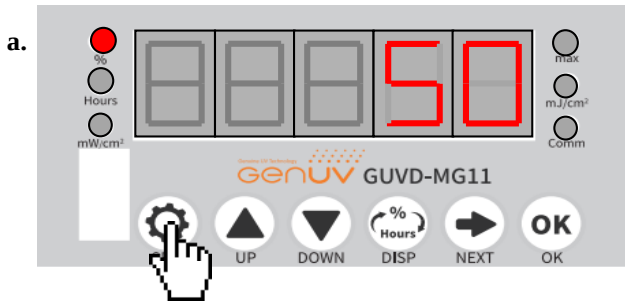
#### 4) Logging Function

##### - Getting started with log

- Press the SET button for more than 5 seconds to enter climax mode.
- Using the UP and DOWN buttons, press NEXT at C-13.
- Using the UP and DOWN buttons, display START.
- Logging begins.

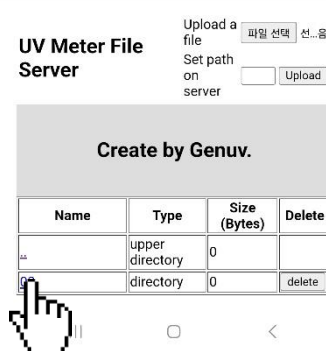
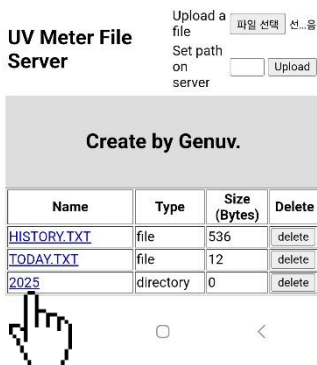
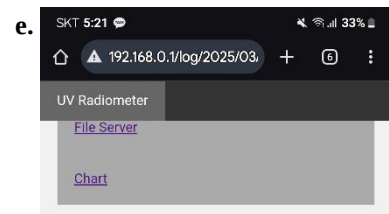
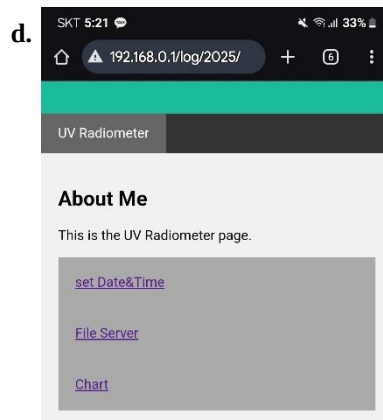
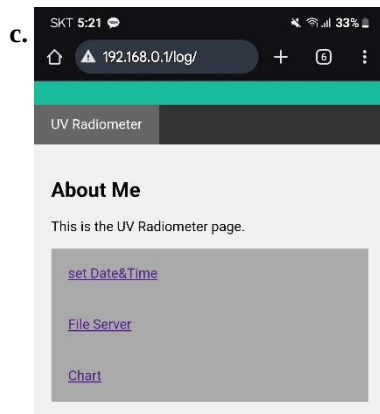
##### - Ending the log

- Press the SET button for more than 5 seconds to enter climax mode.
- Using the UP and DOWN buttons, press NEXT at C-13.
- Using the UP and DOWN buttons, display STOP.
- Logging ends.



## 5) Checking the log (Checking on a Smartphone or Laptop )

- Press and hold the Wi-Fi button to access Wi-Fi settings.
- Connect to the AP starting with MGSB000.
- The connection password is genicom0701.
- After connecting, open an internet browser and access the following address to view the log file:  
`http://192.168.0.1/log/`
- Click the Year and Month folders in order to view the Date\_Serial\_Number.txt file, or right-click to download it.



## 6) Adjusting the meter's internal time (Checking on a Smartphone or Laptop)

a. Press and hold the Wi-Fi button to access Wi-Fi settings.

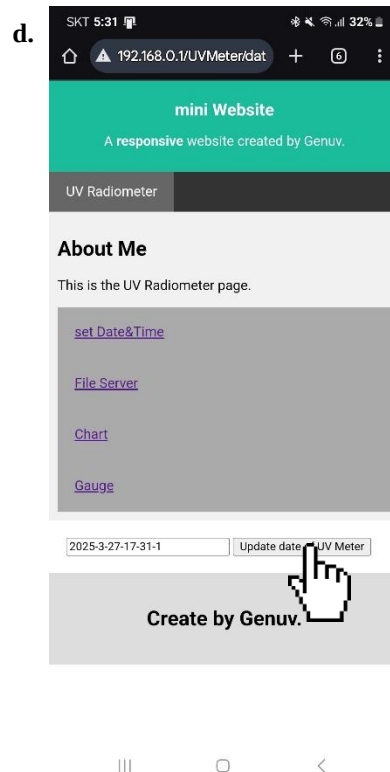
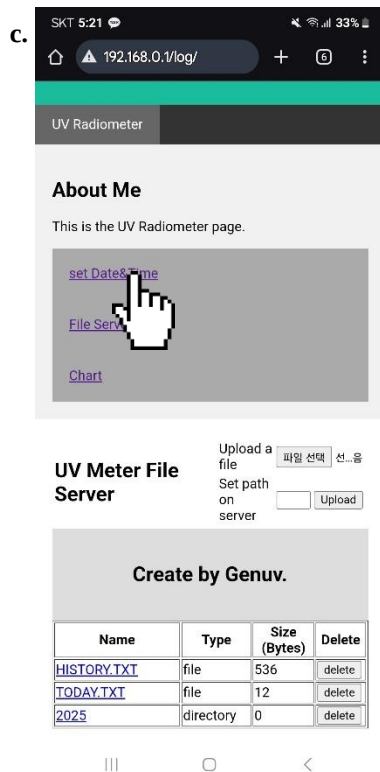
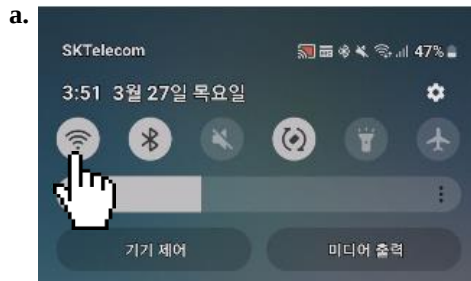
b. Connect to the AP starting with MGSB000.

The connection password is genicom0701.

c. After connecting, open an internet browser and access the following address to view the log file:

<http://192.168.0.1/log/>

d. Click "Set Date & Time" and then "Update Date of UV Meter" to synchronize the time.



## 6. A/S Request in Case of Product Failure

- 1) Should any failure is found in product, please call the sales company or customer center for A/S.
- 2) Product warranty period is 1 year from the date of procurement with no charge.

However, failure which is caused by user's misuse or carelessness within warrant period or any failure after the warrant period shall be chargeable for it's A/S.

- 3) Product inquiry and on-line customer service

Tel : +82-42-862-3982, Fax : +82-42-862-2982

E-mail : [genuv@geni-uv.com](mailto:genuv@geni-uv.com)

Web site : <http://www.geni-uv.com>

## 7. Notes

### 1) CAUTION

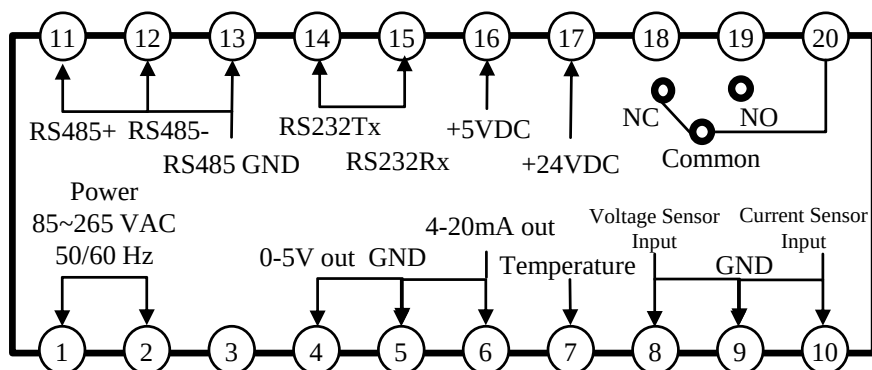
TURN ALL POWER OFF. NEVER EXPOSE EYES OR SKIN TO UV LIGHT FROM ANY SOURCE  
WEAR GLOVES, FACE SHIELD/GLASSES(PER ANSI Z87.1)  
AND COVER ALL EXPOSED SKIN. DO NOT TOUCH LAMP GLASS WITHOUT GLOVES.

### 2) NOTE

Read this entire instruction sheet before starting the installation.

## 8. Relay Operation Method

### 1) Wiring diagram



**Fig4. Wiring diagram of UV Radiometer MG-11**

a. Connect AC power Terminal #1 and #2..

See Figures 5 and 6.

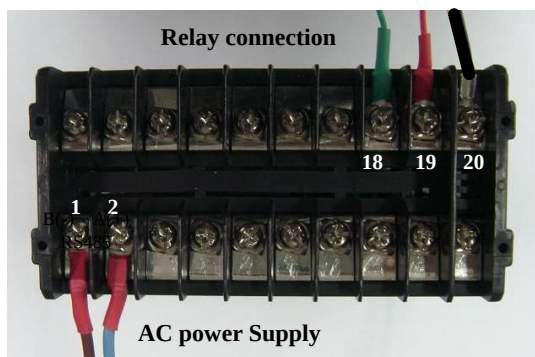
b.. The relay output terminal is (#18 to #20).

Turn off the display before connecting the output signal.

If #19 and #20 (N/O, normally open) are connected, they are open normally and are connected when a signal is generated.(Red light On)

#18 and #20 (N/C, normally closed) are connected normally and disconnected when a signal occurs.(Green light Off)

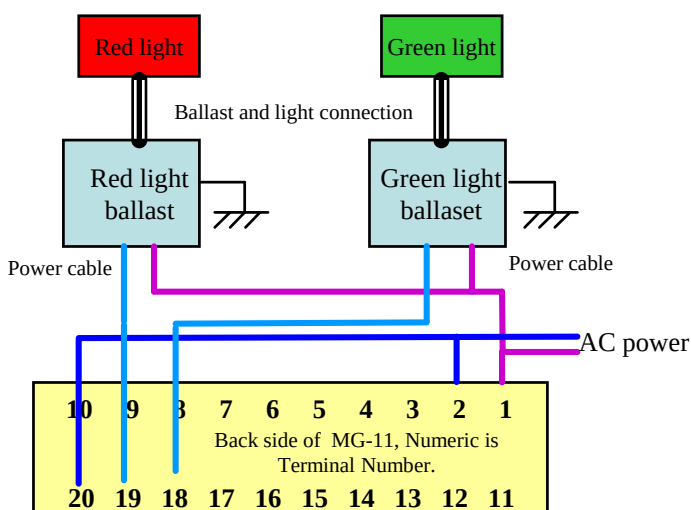
c. Voltage output(1~5Vdc) terminal is #4(+) and #5(-) and Current output(4-20mA) terminal is #6(+) and #5(-).



**Fig 5. Connect diagram of MG-11**

※ In normal status , the relay will connect #18 and #20 , the Green light will be ON and Red light will be off.

In abnormal status , the relay will connect #19 and #20 , the Green light will be off and Red light will be ON.



**Fig 6. Wiring diagram of Green light and Red light**  
(Red light means abnormal , Green light means normal)

## 9. MODBUS RTU Communication Protocol

1)Modbus 485 communication protocols:

Instruction data are hexadecimal format, write data into the query instructions and directives.

Each instruction includes: address code, function code, numerical data length, CRC16 checksum

(Check code by the preceding instruction data obtained calculate, specific calculation methods to locate relevant information!

Can test the software Automatic calculation of checksum)

=====

2) Read commands

01 03 00 00 00 06 [CRC high] [CRC low]

(01: address code, 03: function code, 00 00:start address, 00 06: numerical 2-byte data length 2 bytes, CRC checksum)

Ex)

TX send instructions: 01 03 00 00 00 06 CRCH CRCL

RX received instructions: 01 03 0C 01 45 00 00 23 20 00 01 00 00 72 9C CRCH CRCL

Note: addresses (01), the function code (03), the data length of 1 bytes (0C), relative intensity (01 4B), operation time 2 bytes (00 00),Absolute intensity 2 bytes (23 21), the temperature of the symbol (00 01), temperature (00 00) , a dose of 2 bytes (4F 7C), CRCH(A4), CRCL(48)

3)Write Data command

01 00 00 28 00 06 CRCL CRCH (address code, function code, a value of 2 bytes, the data length of 2 bytes, CRC checksum)

Function code contains seven kinds: 00 / 01 / 05 / 06 / 07 / 08 / 09 function code corresponding to set parameters key operation.

E.g:

TX send instructions: 01 06 00 00 00 64 1D D6

RX receives instructions: 01 06 00 00 00 64 1D D6

NOTE: The address (01), function code (06), relative intensity alarm register address(00 00), modify% relative intensity alarm value (00 64),CRC High(1D), CRC low(D6)

=====

# MEMO

