GENERAL®

UV254SD
USER'S MANUAL

UVA AND UVC LIGHT METER
WITH DATALOGGING SD CARD

Please read this manual carefully and thoroughly before using this product.

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INTRODUCTION

Thank you for purchasing General Tools & Instruments' UV254SD UVA and UVC Light Meter with Datalogging SD Card. Please read this user's manual carefully and thoroughly before using the instrument.

Many industrial and commercial applications require or can benefit from measurement of the intensity of UVA and/or UVC light. Among them are welding (to minimize exposure to "blue light" radiation), UV sterilization of food, photochemical matching, erasure of electrically programmable read-only memory (EPROM) chips, production of graphic arts products, exposure of photoresists, and curing of inks, adhesives and coatings.

The UV254SD has the performance and features needed to satisfy the most demanding aspects of these applications. For example, it combines the capabilities of UVA (black light in the long-wave 365-nm band) and UVC (short waves in the 254-nm band) measurement in one instrument. The meter also can measure surface temperature, if mated with a Type K or Type J thermocouple. A UVA probe and a UVC probe are supplied with the instrument.

Because it is microprocessor-based, the UV254SD can make full use of the portability, reliability and large storage capacities that SD memory cards offer. Measurements of light intensity or temperature can be made automatically at any of 11 sampling rates between one second and one hour. After time-stamping and storing the measurements on an SD card plugged into the instrument (a process called datalogging), the user can remove the card and transfer the measurements to a laptop or desktop computer either directly or via a USB card reader.

The UV254SD has a backlit 2-1/2 in. diagonal display and is powered by six "AA" Alkaline batteries or an optional 9-VDC AC adapter.

KEY FEATURES

- Includes UVA and UVC probes
- Measures light intensity within two automatically switched full-scale ranges: 2 mW/cm^2 and 20 mW/cm^2
- Displays maximum and minimum readings
- Performs real-time automatic datalogging at sampling time settable from 1 second to 1 hour
- Also supports manual logging and changing of card storage location
- Comes with 2 GB SD memory card, but works with cards up to 16 GB
- Big (2.5 in. diagonal) front-panel green backlit LCD is easy to read
- Auto power off function
- Powered by six "AA" batteries or 9V AC/DC adapter

OPERATING INSTRUCTIONS

WHAT'S IN THE CASE

The UV254SD comes fully assembled in a carrying case along with a UVA probe, a UVC probe, a 2 GB SD memory card and this user's manual.

Figure 1 shows all of the controls and indicators on the front, back, top, bottom and right side of the UV254SD. It also shows the main components of the supplied UVA and UVC probes. Familiarize yourself with their positions and functions before moving on to the setup procedure.
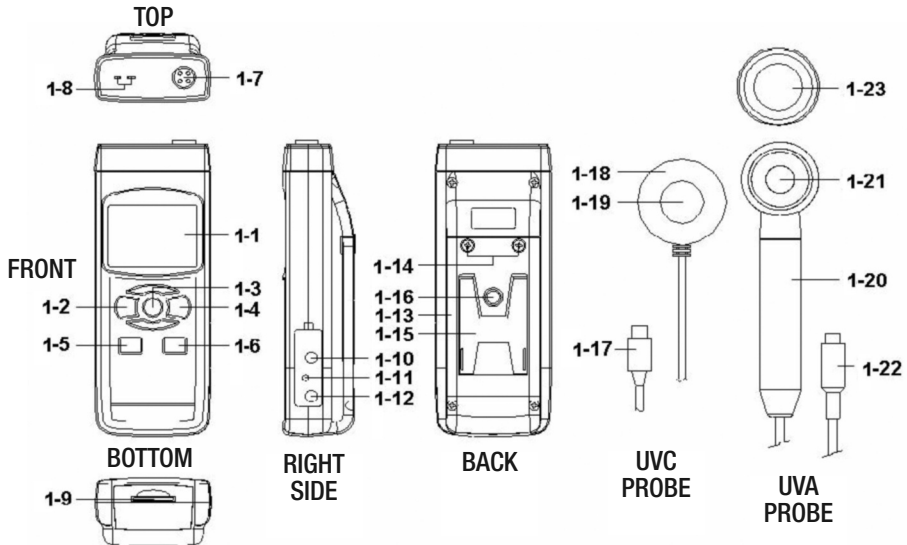

Fig. 1. The controls and indicators and other physical features of the UV254SD and its two supplied probes

1-1 Liquid-crystal display

1-2 POWER/ESC button

1-3 FUNC./HOLD/NEXT button

1-4 REC/ENTER button

1-5 SET ▼ button

1-6 LOGGER ▲ button

1-7 Socket for UVA and UVC probes

1-8 Socket for Type K or Type J thermocouple

1-9 SD card socket

1-10 RS232 output jack

1-11 RESET button

1-12 Socket for 9VDC AC adapter

1-13 Battery compartment cover

1-14 Battery compartment cover screws

1-15 Kickstand

1-16 Tripod attachment nut

1-17 UVC probe plug

1-18 UVC sensor housing

1-19 UVC sensor

1-20 UVA probe handle

1-21 UVA sensor

1-22 UVA probe plug

1-23 UVA sensor cap

SETUP

1. Choose the power source. Before using the UV254SD, be sure it is powered by fresh batteries or an optional 9VDC AC adapter plugged into the bottom jack on its right side (callout 1-12).

To remove the battery compartment cover, remove the two screws holding it in place (callout 1-14). Then install six "AA" batteries in the correct orientation, using the polarity marks on the inside of the compartment as a guide. Replace the cover by replacing the two screws.

2. Install an SD card. To prepare for setup, also install the supplied 2 GB SD memory card or another card with a capacity from 1 GB to 16 GB in the socket on the bottom of the UV254SD (callout 1-9). When installing the card, make sure its gold contacts are facing front and push the card into the socket until you hear a click. To remove the card, push it in until you hear a click and the card pops out.

Now power on the instrument by pressing the POWER/ESC button (callout 1-2) to generate a short beep. (To power off the UV254SD, press the POWER/ESC button and hold it until the instrument responds with a long beep.)

When the meter powers on, a series of transient startup screens will briefly appear. Once the display has stabilized, perform the following eight setup steps in the order presented.

3. Set the date and time. Press the SET ▼ button (callout 1-5) and hold it for at least five seconds, until "SEt dAtE" appears on the display. Quickly (within three seconds) press the REC/ENTER button. The word "dAtE" will appear in the center of the display, along with the flashing value "00.00.00" at the lower left, above "yy.mm.dd".

(If you press buttons too slowly in setup mode, the screen will revert to the normal display. To return to the setup sequence, press and hold the SET ▼ button again. To move ahead to the next field in the sequence or to the next parameter, press the FUNC./HOLD/NEXT button (callout 1-3).)

Set the current year by pressing the SET ▼ or LOGGER ▲ button repeatedly until the correct value appears above "yy". Quickly (within three seconds), press the REC/ENTER button to store the setting. The next screen that appears will have the value above "mm" flashing. Use the SET ▼ or LOGGER ▲ button to navigate to the current month and press the REC/ENTER button to store the setting. When the next screen flashes the value above "dd", again use the SET ▼ or LOGGER ▲ button to navigate to the current day and press the REC/ENTER button to store the setting.

Once you have set the date, the display will prompt you to set the hour, minute and second of the current time. Again use the SET ▼ or LOGGER ▲ buttons to navigate to the correct values, and the REC/ENTER button to store the settings.

4. Choose a period or a comma to represent the decimal division between integers and fractions (for example, American-style 20.88 vs. European-style 20,88). Press the SET ▼ button to make "bASIC" (American style) or "Euro" appear in the upper display, as desired. Press the REC/ENTER button to store the selection.

5. **Enable or disable auto power off**. Once the format of decimal divisions has been set and stored, the display will show the word "yES' over the term "PoFF". Press the SET ▼ button until the desired automatic power off management scheme ("yES" for enable; "no" for disable) is displayed. Press the REC/ENTER button to store the selection. If enabled, the power off function shuts off the UV254SD after a period of inactivity of ten minutes.

6. **Enable or disable the beeper**. Once the desired power management function has been set and stored, the display will show the word "yES" over the word "bEEP". Press the SET ▼ button until the desired setting ("yES" or "no") is displayed, and then press the REC/ENTER button to store the selection.

7. **Select the thermocouple type**. Once the beeper has been enabled or disabled, the display will show the word "Set" over the word "type". Press the SET ▼ button until your optional thermocouple's type (K or J) appears on the right side of the display. Then press the REC/ENTER button to store the selection.

8. **Select the temperature unit**. Once the thermocouple type has been set and stored, the lower part of the display will show the term "t-CF". Press the SET ▼ or LOGGER ▲ button until the unit you prefer ("F" for Fahrenheit, "C" for Celsius") is displayed. Then press the REC/ENTER button to store the selection as the default.

9. **Set the datalogging sampling time**. Once the thermocouple type has been selected and stored, the display will show a value above the letters "SP-t". Press the SET ▼ or LOGGER ▲ button to decrease or increase the value until the desired sampling time appears above "SP-t". The options are 0, 1, 2, 5, 10, 30, 60, 120, 300, 600, 1800 and 3600 seconds (0 seconds to 1 hour).

10. **Format the SD card**. Once the sampling time has been set and stored, the term "Sd-F" will appear in the lower half of the display. Press the REC/ENTER button.

Pressing the REC/ENTER button causes the word "no" or "yES" to appear over the term "Sd-F". Press the ▼ button to make a selection. Choose "yES" whenever a new SD card is being used, or when a used card is being repurposed (from use with another SD card instrument or a camera, for example) and all data on it is to be erased. Choose "no" to preserve any data on a card previously used with this instrument.

If you choose "yES", after you press the REC/ENTER button the instrument will prompt you to confirm that decision by displaying the term "Ent" below "yES" and sounding three beeps. To confirm that you want to begin the erasure/formatting procedure, press the REC/ENTER button. "Ent" will then flash several times and the instrument will sound another three beeps to confirm that the SD card has been erased and formatted.

Once the SD card has been formatted (or not), the display will either return to the first of the eight steps in the setup sequence—setting the current date and time—or show the term "ESC". If "ESC" appears, press the POWER/ESC button to exit the setup procedure and enter normal operating mode.

NORMAL OPERATION

The UV254SD can measure and store three different kinds of values:

- The intensity (in mW/cm^2) of UVA light
- The intensity (in mW/cm^2) of UVC light
- Temperature (in ºF or ºC), as sensed by a Type K or Type J thermocouple

Pressing and holding the FUNC./HOLD/NEXT button will bring up, in order, three blank five-digit displays above the terms "A" (for UVA light), "C" (for UVC light) and "tP" (for temperature). Each display also automatically shows the correct unit for the parameter.

1. To select the measurement mode, release the FUNC./HOLD/NEXT button when the desired parameter appears. This becomes the meter's default measurement mode until you change it.

Whenever the UV254SD is in measurement mode, you can turn off the backlight (which is on by default) by briefly pressing (but not holding) the POWER/ESC button. To reactivate the backlight, briefly press the button again.

Whenever the meter is in measurement mode, you also can check the current date and time by briefly pressing the SET ▼ button. Doing so causes both values to appear briefly at the lower left of the display.

2. To measure the intensity of UVA light, seat the UVA probe (with its cap on) in the socket at the top of the UV254SD (callout 1-7) and use the FUNC.HOLD/NEXT button to select UVA measurement mode. If the display shows a value other than zero, press the LOGGER ▲ button (which has the word "Zero" stenciled above it) and hold it for at least three seconds until you hear a beep. Then remove the cap from the probe.

Holding the probe by its handle, point the sensor at its end directly at the light source. The display will read out the intensity of the source's UVA light component in units of mW/cm^2.

3. To measure the intensity of UVC light, seat the UVC probe (with its cap on) in the socket at the top of the UV254SD and use the FUNC.HOLD/NEXT button to select UVC measurement mode. If the display shows a value other than zero, press the LOGGER ▲ button (which has the word "Zero" stenciled above it) and hold it for at least three seconds until you hear a beep. Then remove the cap from the probe.

Holding the probe by its handle, point the sensor at its end directly at the light source. The display will read out the intensity of the source's UVC light component in units of mW/cm^2.

4. To measure temperature, first make sure neither the UVA nor the UVC probe is plugged into the instrument. Then use the FUNC.HOLD/NEXT button to select temperature measurement mode.

Obtain a Type K or Type J thermocouple and seat it in the socket (callout 1-8) on the top of the UV254SD. The display will read out the sensed temperature in degrees F or C, (depending on the setting chosen during setup), along with the type of thermocouple it is configured for.

To change the unit of measurement, press the SET ▼ button to enter setup mode and perform Step 8 of the setup procedure. To configure the meter for use with a Type J thermocouple (Type K is the default), press the SET ▼ button to enter setup mode and perform Step 7 of the setup procedure.

HOLDING AND STORING MEASUREMENTS

1. **To hold a measured value** of light intensity or temperature, press the FUNC./HOLD/NEXT button during the measurement. Doing so will cause the word "HOLD" to appear at the top of the display. Pressing the FUNC./HOLD/NEXT button again releases the hold.

2. **To record and recall readings**, press the REC/ENTER button while making measurements. This will make the term "REC" appear at the top of the display. Pressing the REC/ENTER button again, briefly, will make the term "MAX" appear to the right of "REC" and switch the display to the maximum value stored in memory during the last recording session. Pressing the REC/ENTER button again, briefly, will make the term "MIN" appear to the right of "REC" and switch the display to the minimum value stored during the last session.

3. **To exit recording mode**, press and hold the REC/ENTER button for at least three seconds, until the term "REC" disappears from the top line of the display. The display will then revert to showing the current reading.

AUTOMATIC VS. MANUAL DATALOGGING

The UV254SD can automatically log data using any of 11 sampling times from 1 second to 1 hour. To view the sampling time for which the instrument was set up, press the LOGGER ▲ button once. To change the sampling time, press the SET ▼ button to enter setup mode and perform Step 9 of the setup procedure.

1. **To start automatic datalogging**, press the REC/ENTER button once. The top line of the display will then show the term "REC". Pressing the LOGGER ▲ button at this point will make REC flash and add the flashing term "LOGGER" at the top right of the display. This indicates that the instrument is currently storing measured values and their time stamps in memory.

2. **To pause automatic datalogging**, press the LOGGER ▲ button once; this action makes the flashing term LOGGER disappear from the top right of the display and changes the term "REC" from flashing to constant. Pressing the LOGGER ▲ button again resumes automatic datalogging.

3. **To end automatic datalogging**, press the REC/ENTER button and hold it for at least two seconds. This action causes the "REC" message to disappear.

4. **To log data manually**, set the sampling time to zero using Step 9 of the setup procedure. Then press the REC/ENTER button once. The display will show the term "REC" on the top line, a value in the middle, and below it the letter "P" on the left and a number from 1 to 99 on the same line to the right. The number indicates the position on the SD card that will be used to store manually logged data.

Now press the LOGGER ▲ button. This will cause the beeper to sound and the term "LOGGER" to briefly appear at the upper right of the display. As in automatic datalogging mode, in this mode the instrument is storing measurements and their time stamps on the SD card.

In manual datalogging mode, however, measurements are being stored continuously (with a sampling time of zero), and their locations on the card can be changed.

5. To change the storage location of manually logged data, press the SET ▼ button once; this causes the "P" to disappear from the left side of the display and the value on its line to begin flashing. Once the flashing begins, you can use the SET ▼ and LOGGER ▲ buttons to change the flashing value to any number between 1 and 99. Once you have chosen the storage location, press the REC/ENTER button to save the setting. This causes the value to stop flashing and the "P" to return.

6. To end manual datalogging, press the REC/ENTER button and hold it for at least three seconds. This action causes the "REC" message to disappear from the top line of the display.

TRANSFERRING DATA FROM THE SD CARD TO A COMPUTER

After automatic or manual datalogging of measurements, remove the SD card from the UV254SD and plug it into your computer either directly (if it has an SD card port) or through an SD card reader.

Because the files containing the time-stamped data logs have the extension .xls, they open in Microsoft's Excel application. Figures 2 and 3 show two kinds of Excel presentations: a data-only screen and a graphics-only screen.

	A	B	C	D	E	F
1	Place	Date	Time	Value	Unit	
2	1	2009/12/11	09:55:56	2.37	UVA mW/cm2	
3	2	2009/12/11	09:55:58	2.4	UVA mW/cm2	
4	3	2009/12/11	09:56:00	2.38	UVA mW/cm2	
5	4	2009/12/11	09:56:02	3.29	UVA mW/cm2	
6	5	2009/12/11	09:56:04	3.74	UVA mW/cm2	
7	6	2009/12/11	09:56:06	3.89	UVA mW/cm2	
8	7	2009/12/11	09:56:08	3.14	UVA mW/cm2	
9	8	2009/12/11	09:56:10	2.23	UVA mW/cm2	
10	9	2009/12/11	09:56:12	0.953	UVA mW/cm2	
11	10	2009/12/11	09:56:14	1.011	UVA mW/cm2	
12	11	2009/12/11	09:56:16	0.981	UVA mW/cm2	
13	12	2009/12/11	09:56:18	0.673	UVA mW/cm2	
14	13	2009/12/11	09:56:20	0.892	UVA mW/cm2	
15	14	2009/12/11	09:56:22	2.16	UVA mW/cm2	
16	15	2009/12/11	09:56:24	3.55	UVA mW/cm2	
17	16	2009/12/11	09:56:26	3.97	UVA mW/cm2	
18	17	2009/12/11	09:56:28	3.94	UVA mW/cm2	
19	18	2009/12/11	09:56:30	3.94	UVA mW/cm2	
20	19	2009/12/11	09:56:32	3.94	UVA mW/cm2	
21	20	2009/12/11	09:56:34	3.95	UVA mW/cm2	

Fig. 2. Typical Excel data-only screen
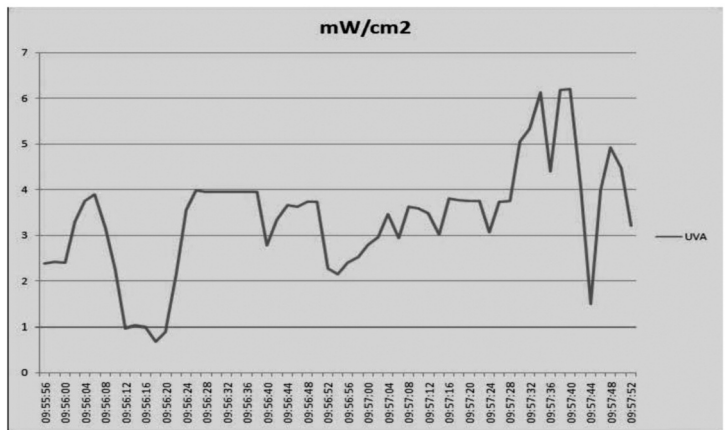
Fig. 3. Typical Excel graphics-only screen

SPECIFICATIONS

Embedded microcontroller	Custom one-chip LSI device
Display type	Liquid-crystal with green backlight
Display size	2.05 x 1.5 in. (52 x 38mm)
UV light types measured	UVA, UVC
Measurement range	240nm to 390nm
Measurement accuracy	±4% of full-scale reading + 2 digits
Full-scale autoranges	2 mW/cm^2 and 20 mW/ cm^2
Stored readings	Maximum, minimum
Datalogging sampling times	1 second to 1 hour (automatic mode)
SD card capacity	1 GB to 16 GB
Settable parameters	Date, time, auto power off, beep sound, temperature unit (ºF or ºC), sampling time, thermocouple type (K or J), decimal point or comma
Operating temperature	32º to 122ºF (0º to 50ºC)
Operating relative humidity	0 to 85%
Power source	6 Alkaline "AA" batteries or optional 9-VDC AC adapter
Power consumption	6.5 mADC (normal operation, with backlight off and SD card not saving data; 30 mADC with backlight on)
Dimensions of meter	6.97 x 2.68 x 1.77 in. (177 x 68 x 45mm)
Weight of meter	12.38 oz. (351g)
Dimensions of UVA probe head	1.77 in. (diagonal) x 1.26 in. (L) (45 x 32mm)
Dimensions of UVA probe handle	0.94 in. (diagonal) x 4.92 in. (L) (24 x 125mm)
Weight of UVA probe	3.53 oz. (100g)
Dimensions of UVC probe	1.50 (diagonal) x 0.98 in. (L) (38 x 25mm)
Weight of UVC probe	3.63 oz. (103g)

MAINTENANCE & TROUBLESHOOTING TIPS

Keep the UV light probes clean and their sensors under their protective covers when not in use.

When the icon ⊏✕⊐ appears in the left corner of the display, it's time to replace the six "AA" batteries that power the instrument (although measurements will remain valid for several hours after the low-battery indicator first appears). Replacing the batteries requires removing the two screws that hold the battery compartment cover in place, as explained in Step 1of the setup procedure on page 5. After inserting fresh batteries in the correct orientation, tighten the screws to secure the cover.

If the meter "freezes" (like a computer) and buttons become unresponsive, try resetting the instrument by pushing the RESET button on its right side (callout 1-11 of Fig. 1) with the end of a paper clip.

Remove the batteries when storing this product for an extended period of time.

Do not drop or disassemble the instrument or immerse it in water.

REPLACEMENT PARTS & OPTIONAL ACCESSORIES

- Type K and Type J thermocouples
- 9-VDC adapter for 110VAC power supply
- Spare UVA probe
- Spare UVC probe

WARRANTY INFORMATION

General Tools & Instruments' (General's) UV254SD UVA and UVC Light Meter with Datalogging SD Card is warranted to the original purchaser to be free from defects in material and workmanship. Subject to certain restrictions, General will repair or replace this instrument if, after examination, the company determines it to be defective in material or workmanship for a period of one year.

This warranty does not apply to damages that General determines to be from an attempted repair by non-authorized personnel or misuse, alterations, normal wear and tear, or accidental damage. The defective unit must be returned to General Tools & Instruments or to a General authorized service center, freight prepaid and insured.

Acceptance of the exclusive repair and replacement remedies described herein is a condition of the contract for purchase of this product. In no event shall General be liable for any incidental, special, consequential or punitive damages, or for any cost, attorneys' fees, expenses, or losses alleged to be a consequence of any damage due to failure of, or defect in any product including, but not limited to, any claims for loss of profits.

RETURN FOR REPAIR POLICY

Every effort has been made to provide you with a reliable product of superior quality. However, in the event your instrument requires repair, please contact our Customer Service to obtain an RGA (Return Goods Authorization) number before forwarding the unit via prepaid freight to the attention of our Service Center at this address:

General Tools & Instruments
80 White Street
New York, NY 10013
212-431-6100

Remember to include a copy of your proof of purchase, your return address, and your phone number and/or e-mail address.

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