Solar Sure Manual

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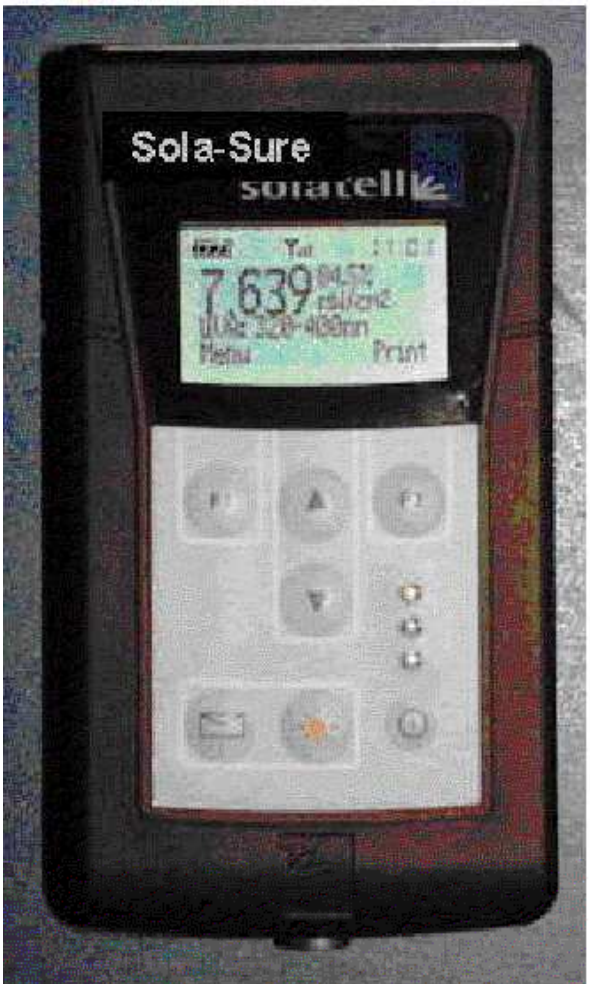

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2 Key to notations in this manual.

Keywords – Terminology that relates to menus, icons, buttons or functions of the Sola-Sure.

F1/2 (Function) Key – When referring to either the ***F1*** or ***F2 Key***, the text in the brackets indicates the text that is displayed on the Sola-Sure screen above the relevant key to indicate its function.

Main Screens – The main screens are the screens that display information about the scan, namely the ***Total UVR***, ***UVB***, ***UVA***, ***UVA1***, ***UVA2***, ***Te Time: FDA/CDEH*** and ***Te Time: CIE/IEC*** screens.

3 Sola-Sure Terminology

3.1 Stray Light

Stray Light is optical noise, light that has entered an optical system and taken a different path to the path that was expected.

3.2 Stray Light Compensation

Stray Light Compensation is a method of removing the ***Stray Light*** from the reading taken by the Sola-Sure to ensure that the data presented only represents the light of interest.

3.3 Erythemal Action Spectra

The ***Erythemal Action Spectra*** defines the skins response to UV Light.

3.4 MED

The Minimum Erythema Dose.

3.5 Te Time

The ***Te Time*** is the maximum recommended exposure time (and maximum timer interval).[1]

3.6 Auto-Ranging Scan

A feature of the Sola-Sure that calculates the required ***Intensity Range*** needed to take a reading of a lamp without the reading ***saturating***.

[1] Reference : FDA Document 21 CFR 1040.20

4 What Information Does the Sola-Sure Display and What Does It Mean?

4.1 Areas

The Sola-Sure will calculate five ***Energetic Area*** readings, four of which are customisable. The default ranges are:

Name	Range	Customisable
Total UVR	280-400 nm	No
UVB	280-320 nm	Yes
UVA	320-400 nm	Yes
UVA1	340-400 nm	Yes
UVA2	320-340 nm	Yes

The ***Energetic Area*** readings give the ***Power per Unit Area (mW/cm^2)*** that radiates on the Sola-Sure (and ultimately the person in the sun bed). These readings are not ***Erythemally*** weighted.

4.2 Te Times

The Sola=Sure calculates two ***Te Times***, one based on the ***FDA/CDRH Erythemal Action Spectra*** and ***MED denominator*** and one based on the ***CIE/IEC Erythemal Action Spectra*** and ***MED*** value.

The ***Te Time*** is the maximum recommended exposure time (and maximum timer interval). It is defined as the time taken to reach 4 × ***MED*** for an un-tanned Type II skin (always burns, then tans slightly).[2]

[2] Reference : FDA Document 21 CFR 1040.20

5 Sola-Sure Buttons and Icons

5.1 Buttons

Button	Name	Purpose
F1	***F1 Key***	Enter menu when not in a menu. Select a menu option when in a menu.
F2	***F2 Key***	***Print*** current data to printer when not in a menu. Navigate a menu level up when in a menu.
▲	***Up Key***	Scroll up through either readings or menus
▼	***Down Key***	Scroll down through either readings or menus
✉	***Memory Key***	None
☀	***Scan Key***	Quick press – ***Scans*** the sensor using the current intensity range. 2 second press – Performs an ***Auto-Ranging Scan***
⏻	***Power Key***	Switches the Sola-Sure on and off.

5.2 Icons

Icon	Name	Purpose
🔋	***Battery Icon***	Displays the current charge status of the battery and indicates when the battery is charging.
✉	***Stored Data Icon***	Indicates that the information displayed on the screen relates to the ***Stored data***.
📶	***Arial Icon***	Indicates how close to ***saturation*** the previous ***scan*** was.
00:00	***Clock***	Displays the time during normal operation and the time left for the ***scan*** to finish when the Sola-Sure is scanning.

6 Using the Sola-Sure

6.1 Switching the Sola-Sure on and off.

The Sola-Sure can be turned on and off by pressing the ***Power Key***. The Sola-Sure will take a few seconds to start up. Once on, the Sola-Sure will power off immediately by pressing this key.

6.2 Viewing the current reading

When the Sola-Sure is switched on the first screen will display the ***Total UVR*** reading, to view the ***Areas*** and ***Te Times*** press the ***Up*** and ***Down Keys***.

6.3 Printing the current reading

With the optional thermal printer attached, from any of the main screens, press the ***F2 (Print) Key*** and the current data will be printed.

6.4 Scanning with the Sola-Sure

To perform a standard scan press the ***Scan Key*** and the Sola-Sure will start ***scanning*** using the current settings. To perform an ***Auto-Ranging Scan***, press and hold the ***Scan Key*** for two seconds.
(For more information on scanning see the "Taking a reading with a Sola-Sure" chapter.)

6.5 General Menu Navigation

Navigating the menu structure of the Sola-Sure is designed to be very simple and only uses the ***F1***, ***F2***, ***Up*** and ***Down Keys***. The ***Up*** and ***Down Keys*** scroll through the currently displayed menu. The ***F1 (Select) Key*** will change to the currently selected menu item (that could be another menu or a setting option) and the ***F2 (Back) Key*** will navigate up a menu level taking you back to the previous menu. To enter the menu system, press the ***F1 (Menu) Key*** from any of the main screens.

7 Stray Light Compensation

Stray Light Compensation is a feature that removes Stray Light from the reading taken by the Sola-Sure and requires no user interaction.
By default the Sola-Sure will have ***Stray Light Compensation*** set to ***Solarium Mode*** and the ***Stray Wavelength Limit*** set to 295nm, although it is possible to alter these settings it is not recommended.

7.1 Enabling/Disabling Stray Light Compensation

- From any on the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Stray Light*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Stray Mode*** menu item is highlighted and press the ***F1 (Select) Key***.
- There are now two menu items in the menu displayed.
    - To enable ***Stray Light Compensation***, select the ***Solarium Mode*** menu item.
    - To disable ***Stray Light Compensation***, select the ***OFF*** menu item.

7.2 Stray Wavelength Limit Setting

- From any on the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Stray Light*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Wavelength Limit*** menu item is highlighted and press the ***F1 (Select) Key***.
- Use the ***Up*** and ***Down Keys*** to alter the ***Wavelength Limit*** to the required value and press the ***F1 (OK) Key*** to confirm the setting.

8 Taking a reading with a Sola-Sure

8.1 Scan Settings

8.1.1 Intensity Range

The ***Intensity Range*** settings sets the maximum ***Intensity*** that the sensor can read before ***saturation*** occurs. Set the ***Intensity Range*** to value just above the peak output ***Intensity*** of the lamp to be measured for optimum performance. If the peak output ***Intensity*** of the lamp is unknown an ***Auto-Ranging Scan*** may be performed (see later).
(NOTE – The lower the ***Intensity Range*** the longer the ***Sample Time***.)

8.1.2 Optimisation

The ***Optimisation Level*** sets the number of scans taken by the Sola-Sure during a single reading to improve the accuracy of the lower ***Intensity*** sections of the spectrum. The ***Optimisation Level*** can be set from 1 to 7, each scan taking half the time of the scan before it. The first scan will take $sample_time \times \left(2^{(optimise-1)}\right)$ seconds, the second (if there is one) will take $sample_time \times \left(2^{(optimise-2)}\right)$ seconds and so on.

For example if the ***Intensity Range*** set gives a 1 seconds ***Sample Time*** and the ***Optimisation Level*** is set to 3 then the overall maximum ***Sample Time*** will be:

$$\left(1 \times \left(2^{2}\right)\right) + \left(1 \times \left(2^{1}\right)\right) + \left(1 \times \left(2^{0}\right)\right) = 4 + 2 + 1 = 7 \text{ seconds.}$$

This is a maximum ***Sample Time*** because if the first scan does not ***saturate*** then the Sola-Sure will not take any more readings as it already has all the data it needs.

As a general rule, the shorter wavelength accuracy can be improved by increasing the ***Optimisation Level***. A faster reading can be obtained by reducing the ***Optimisation Level***. The default ***Optimisation Level*** is 5.

8.2 Taking a Standard Scan

A ***Standard Scan*** will scan using the currently set ***Intensity Range***.

- To take a ***Standard Scan*** simple press the ***Scan Key***.
- The ***Clock*** icon will count down the number of minutes and seconds left before the scan finishes.
- When the scan finishes the three LEDs on the front of the Sola-Sure will flash twice.

8.3 Taking an Auto-Ranging Scan

An ***Auto-Ranging Scan*** is used to set the Intensity Range of the Sola-Sure if the required ***Intensity Range*** is not known.

- To take a ***Auto-Ranging Scan*** simply press and hold the ***Scan Key*** for two seconds.

- The ***Clock*** icon will disappear for a few seconds while the Sola-Sure calculates the required Intensity Range.
- The ***Clock*** will then display the number of minutes and seconds left before the scan finishes.
- When the scan finishes the three LEDs on the front of the Sola-Sure will flash twice.

(NOTE – Once the ***Intensity Range*** is set using an ***Auto-Ranging Scan***, ***Standard Scans*** can be used for all subsequent scans until the Sola-Sure is moved or the light source is changed.)

8.4 Scan Warning Messages and Saturation

8.4.1 Saturation

If the ***Intensity Range*** of the Sola-Sure is set too low (too sensitive) for the lamp it is measuring then ***saturation*** will occur. ***Saturation*** is the point where the Sola-Sures detector array has "absorbed" the maximum amount of light it can to take an accurate reading. If a scan does ***saturate*** then increase the ***Intensity Range***. Saturation is indicated by the Sola-Sure displaying "Saturated" instead of a reading on the main screens.

8.4.2 Scan Warning Messages – Unable to Compensate for Stray Light

The Sola-Sure is capable of reading a much wider range than the 280-400nm range it displays. It is possible for ***saturation*** to occur outside this range without the Sola-Sure informing the user. As the ***Stray Light Compensation*** feature accounts for the entire spectrum, if a section outside the 280-400nm range is ***saturated*** then the ***Stray Light Compensation*** feature will not work, the Sola-Sure will indicate this by displaying the following message for 2 seconds at the end of the scan.

** Warning **
Unable to Compensate
For Stray Light

When this message is displayed, increase the ***Intensity Range*** to avoid any part of the spectrum ***saturating*** and the warning will disappear.

9 Other Settings

9.1 Customising the Area Ranges

- From any of the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Areas*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the area you want to alter is highlighted and press the ***F1 (Select) Key***.
- Select either the ***Min Wavelength*** or ***Max Wavelength*** menu item depending on which you want to alter and press the ***F1 (Select) Key***.
- Use the ***Up*** and ***Down Keys*** to alter the selected area limit and press the ***F1 (Set) Key*** to confirm the changes.

9.2 Logging

The Sola-Sure has the ability to ***log*** each reading it takes to a printer allowing easy data collection.

To enable or disable ***Logging***:

- From any of the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Logging (On/Off)*** menu item is highlighted and press the ***F1 (Select) Key***.
- To enable ***Logging*** highlight the ***On*** menu item and press the ***F1 (Select) Key***, to disable ***Logging*** highlight the ***Off*** menu item and press the ***F1 (Select) Key***.

9.3 Continuous Scan and Scan Interval

The Sola-Sure can be set to automatically scan at a set time interval or scan as quickly as possible. The interval is defined by the ***Scan Interval*** setting and the feature can be activated or disabled using the ***Continuous Scan*** setting.

To set the ***Scan Interval***:

- From any of the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Scan interval*** menu item is highlighted and press the ***F1 (Select) Key***.
- Use the ***Up*** and ***Down Keys*** to select the required ***Scan Interval*** and press the ***F1 (OK) Key*** when the required interval is set.

(NOTE – A ***Scan Interval*** of 0 minutes will set the Sola-Sure to scan as quickly as possible.)

To enable or disable ***Continuous Scan***:

- From any of the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.

- Scroll through the menu until the ***Continuous Scan*** menu item is highlighted and press the ***F1 (Select) Key***.
- To enable ***Continuous Scan*** highlight the ***On*** menu item and press the ***F1 (Select) Key***, to disable ***Continuous Scan*** highlight the ***Off*** menu item and press the ***F1 (Select) Key***.

9.4 Lock

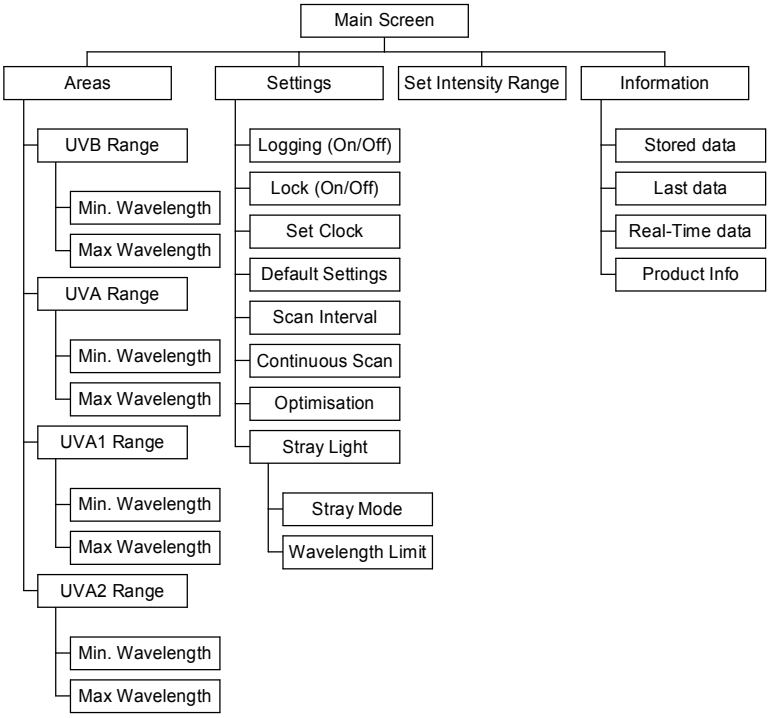
To ensure that no accidental alterations are made to the settings of the Sola-Sure it is possible to enable a lock preventing any changes.

To enable or disable the ***Lock***:

- From any of the main screens press the ***F1 (Menu) Key***.
- Scroll through the menu until the ***Settings*** menu item is highlighted and press the ***F1 (Select) Key***.
- Scroll through the menu until the ***Lock (On/Off)*** menu item is highlighted and press the ***F1 (Select) Key***.
- To enable the ***Lock*** highlight the ***On*** menu item and press the ***F1 (Select) Key***, to disable the ***Lock*** highlight the ***Off*** menu item and press the ***F1 (Select) Key***.

10 Appendix A - Menu Navigation and Menus Purpose

10.1 Menu Navigation Structure



10.2 Menus Purpose

10.2.1 Areas

Allows the range limits of the UVB, UVA, UVA1 and UVA2 ranges to be changed.

10.2.2 Settings

10.2.2.1 Logging (On/Off)

Enables and disables the ***Logging*** feature.

10.2.2.2 Lock (On/Off)

Turns the Settings Lock on and off so that no accidental alterations can be made to the settings.

10.2.2.3 Set Clock

Allows the setting of the internal clock on the Sola-Sure

10.2.2.4 Default Settings

Resets the settings on the Sola-Sure to their factory default settings.

10.2.2.5 Scan Interval

Alters the time interval in minutes between scans when ***Continuous Scan*** feature is active.

10.2.2.6 Continuous Scan

Enables and disables the ***Continuous Scan*** feature for automatic data collection

10.2.2.7 Optimisation

Alters the ***Optimisation Factor*** that is used when taking a scan. (See the "Taking a reading with a Sola-Sure" chapter for more information.)

10.2.2.8 Stray Light

10.2.2.8.1 Stray Mode

Alters the ***Stray Light Compensation*** mode. (See the "Stray Light Compensation" chapter for more information.)

10.2.2.8.2 Wavelength Limit

Alters the ***Stray Light Wavelength Limit***. (See the "Stray Light Compensation" chapter for more information.)

10.2.3 Set Intensity Range

Sets the ***Intensity Range*** that the sensor will scan at. (See the "Taking a reading with a Sola-Sure" chapter for more information.)

10.2.4 Information

10.2.4.1 Stored data

Displays information about the ***Stored Scan*** data.

10.2.4.2 Last data

Displays information about the ***Last Scan*** taken using the Sola-Sure.

10.2.4.3 Real-Time data

Displays the ***Time*** and ***Date***, ***Sensor*** and ***Probe Temperature*** and the currently set ***Sample Time***. (NOTE – the ***Probe Temperature*** will only be displayed if a probe with a ***Thermocouple*** is attached.)

10.2.4.4 Product Info

Displays the Calibration due date, Serial Number, Attachment Information, Software version, Hardware version, Wavelength range and Saturation dose for the Sola-Sure.

11 Trademarks and Acknowledgements

Brands and product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.