SOLAR®
LIGHT

USER MANUAL

DCS 2.0
Dose Controller/Meter

For SPF Testing using the
Model 601 Multiport®
Simulator.

Solar Light Company, LLC
100 East Glenside Avenue
Glenside, PA 19038, USA
Tel: (1) 215-517-8700
Fax: (1) 215-517-8747
www.solarlight.com

Model Number: DCS 2.0
Serial Number:

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1 Warranty

SOLAR LIGHT COMPANY, LLC herein referred to as "Solar Light" warrants that the equipment has been carefully tested, inspected and shipped from the factory in proper working condition, free of visible defects. Solar Light warrants the equipment to be free from defects in material and workmanship, under normal use and operation, for a period of one (1) year from date of shipment. Stocking distributors will have eighteen (18) months from the date of shipment from the Factory or one (1) year from installation date whichever occurs first.

The warranty is limited to the replacement of defective parts including labor during the first year, FOB factory, Philadelphia. Shipping cost to Solar Light is the customer's responsibility. Solar Light will pay return shipping costs. Solar Light reserves the right to replace defective parts with new or rebuilt parts at their discretion. Defective parts replaced under this warranty shall become the property of Solar Light.

This warranty is subject to the following conditions:

1. Solar Light equipment must be purchased from an authorized Solar Light representative.

2. Solar Light must supply all repairs and maintenance parts used during the warranty period and the factory must perform all service work or it must be done by an authorized Solar Light field service representative or directly.

3. The equipment must be operated within Solar Light's specifications and in accordance with the operating and preventive maintenance instructions.

4. This warranty is non-transferable.

The warranty shall not apply to damages resulting from errors in installation, nor shall it apply to any equipment, which has been subjected to damages, alterations or misuse by the purchaser or freight carrier. Parts of the equipment that would be generally considered normal wear and tear maintenance items are not covered under this warranty.

If the lamp explodes, it may be replaced at the manufacturer's discretion, but derivative damages will not be covered. Only lamps obtained through Solar Light can be warranted. Explosion debris must be returned to Solar Light.

Before shipping equipment back to Solar Light for warranty service, we require that you contact Solar Light for our Return Material Authorization (RMA) procedures.
Unauthorized returns will not be accepted and shipments will be returned to the sender at their expense.

Solar Light must accept any variations to the above warranty in writing prior to equipment purchase, for it to be valid.

This warranty is subject to change without notice.

2 General Description

The DCS 2.0 Dose Controller/meter is a bench model Dose controller and Radiometer for use with the Solar Light Company range of Solar Simulators. It continuously monitors the intensity and the dose being delivered to the subject. When the dose or time reach the pre-set value, the shutter automatically closes, terminating the UV irradiation. Either UVA or Erythema UV (also referred to as Sunburning UV (SUV) is monitored by one of the two sensors supplied.

The DCS 2.0 has a capacitance touch screen for easy operation and an intuitive color screen set enable set up and test control with fewer keystrokes. Several preset menus are included for running standard tests, and a keypad screen is included to set up custom tests as required. Many features such as last run memory, automatic sequence setting, pause and resume or pause and reset are also included to facilitate faster more efficient testing.

The DCS 2.0 will work with all models of Solar Light Company's simulators to carry out a wide range of different tests. These are SPF testing, Pre irradiation, PV Cell testing, Materials testing and Biological testing. It has the same unique, patented automatic sensor identification capability found in the PMA series products, and is compatible with all the PMA21xx series sensors.

NOTE: This manual is intended to cover all the functions in specific tests, using any of our simulators. If a button is "grayed out" and inactive when pressed, it means that the function is not applicable to the chosen simulator.

3 Operation

This unit is for use with Solar Light Company's Model 601 Multiport® Solar Simulators.

3.1 DCS 2.0 Indicators

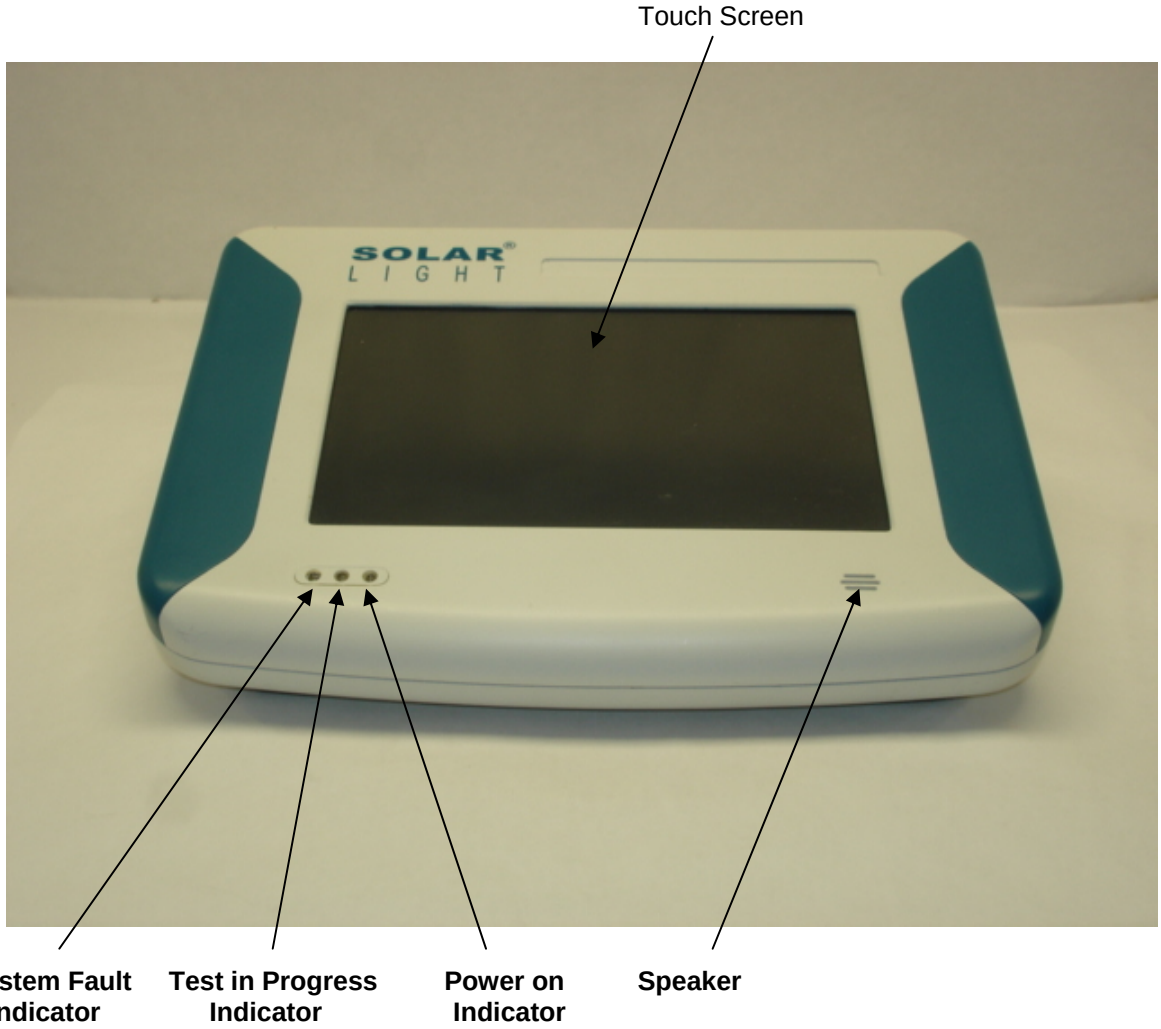
System Fault: Shutter is not being controlled.

Test in Progress: Flashes when test is in progress

Power on: Lit when power supply is connected

Speaker: Gives audible signals when functions are completed

3.2 Front Panel Details



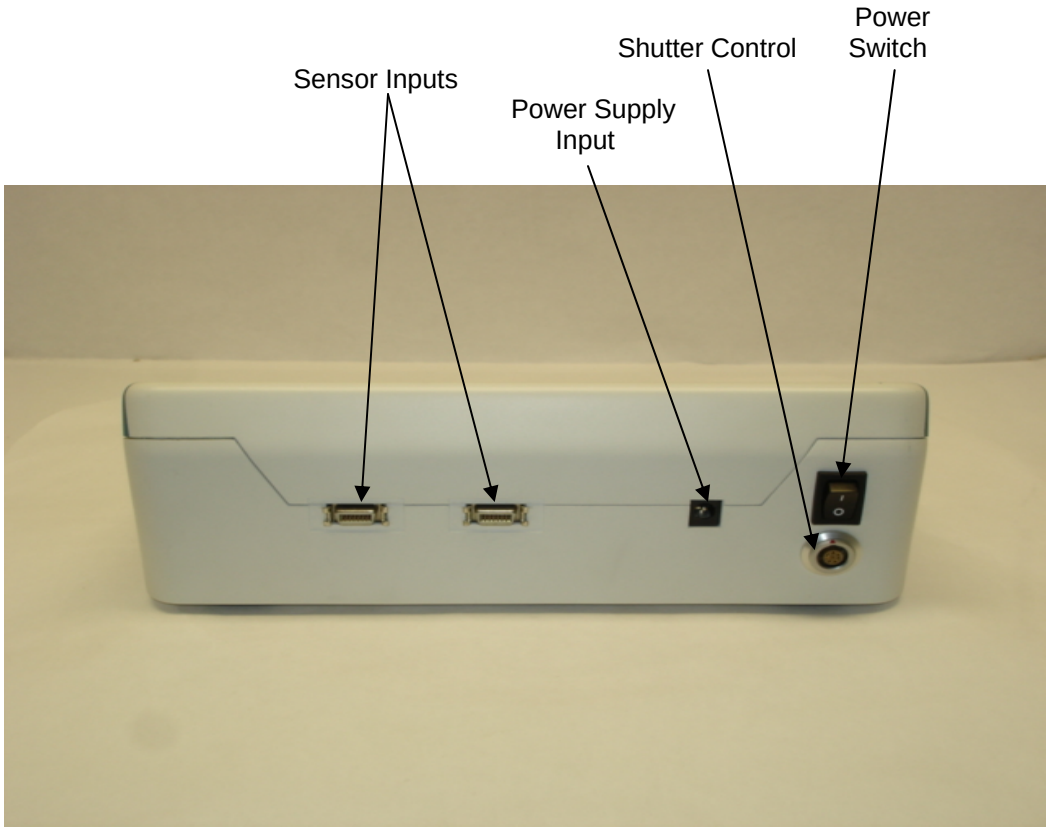
3.3 Rear Panel

Power switch: Controls the application of power to the DCS 2.0. This powers the internal control circuits.

Shutter Control Connection: control cable to simulator: The eight pin circular connector on the rear panel allows remote control of the simulator's shutter. When connected, the shutter can be controlled in dose delivered mode or a timed exposure mode.

Sensor inputs: Connect one or two sensors simultaneously if desired, depending on application. One sensor must always be connected. Sensors are automatically recognized by the DCS 2.0.

3.4 Rear Panel Details



3.5 Startup Instructions

Ensure the simulator is turned on and the lamp is enabled. Check the shutter control on the XPS power supply is closed.
Ensure that the Shutter Control cable is connected to the DCS 2.0 and the XPS power supply.

Connect one or both sensors to the DCS 2.0.
Connect the **MAINS** power and turn the DCS 2.0 on.

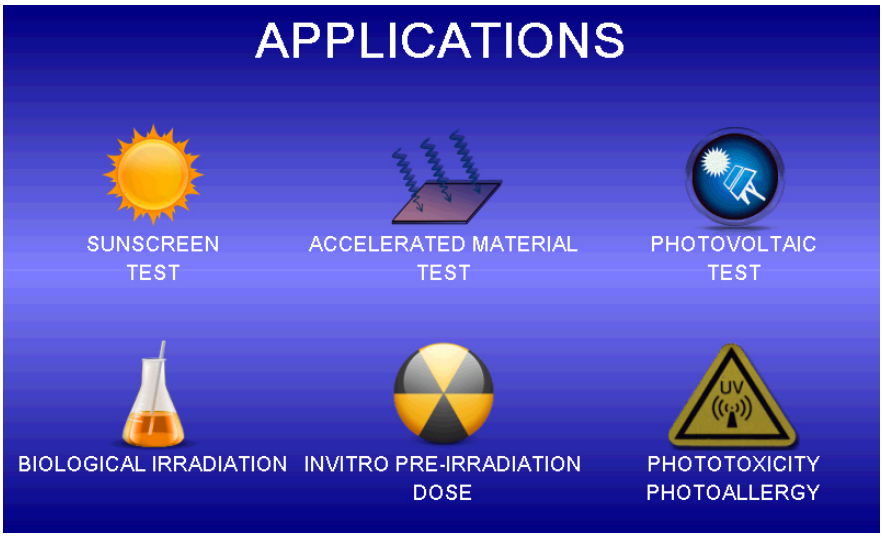
When turning the DCS 2.0 on for the first time, it will ask you to set the sensing %. The Factory default is 0%. Please set the sensing to 100% when new. You will only be asked to do this once for each new sensor.

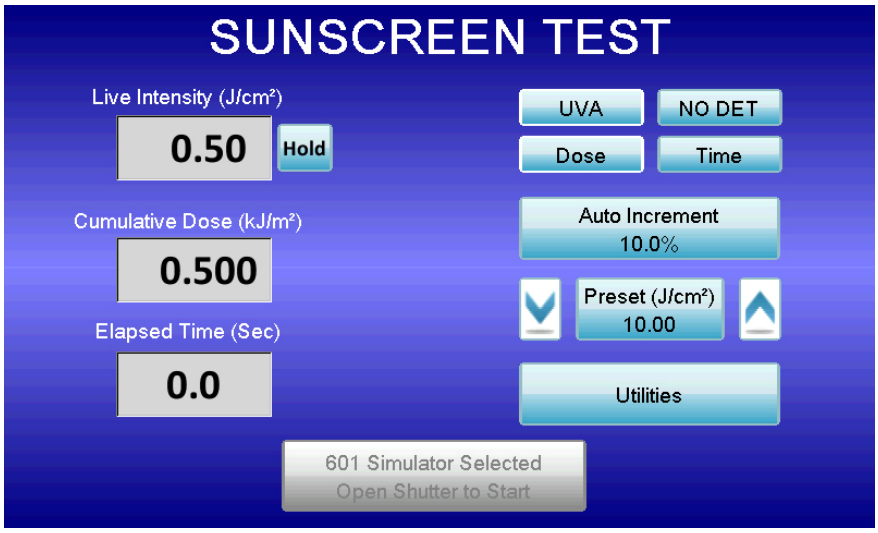
3.6 Shut down Instructions

When all testing has finished, turn off Lamp Enable switch on the power supply to turn off the lamp. Wait for 10 to 20 minutes for the fan to cool the lamp, and then turn off the power supply power switch at the rear. Turn off the DCS 2.0 using the Power Switch on the rear panel.

4 Test Selection and Configuration

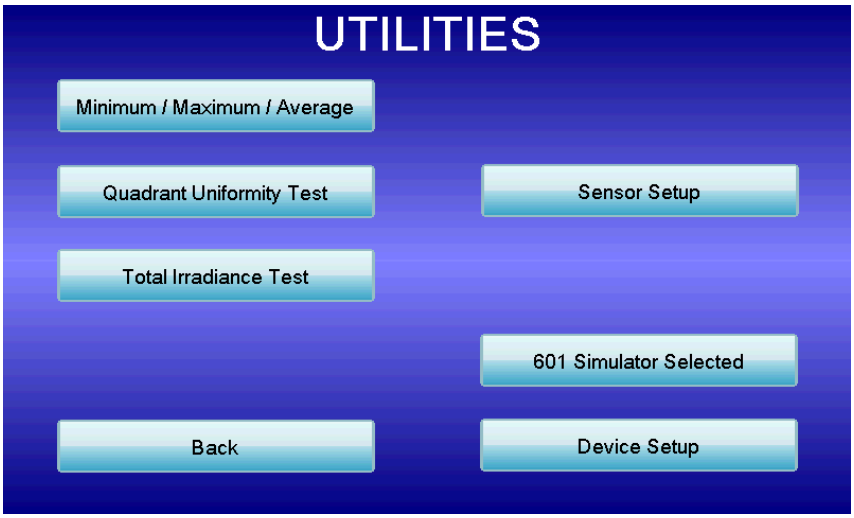
From the Applications Screen, touch the icon that indicates SPF Testing. This will take you to the home screen of that particular application.





4.1 Utilities

Touch this button on any chosen application screen. This allows you to perform various configurations for the applications you select. Touch the Back button to exit Utilities and return to your chosen Applications screen.



4.1.1 Device Setup.

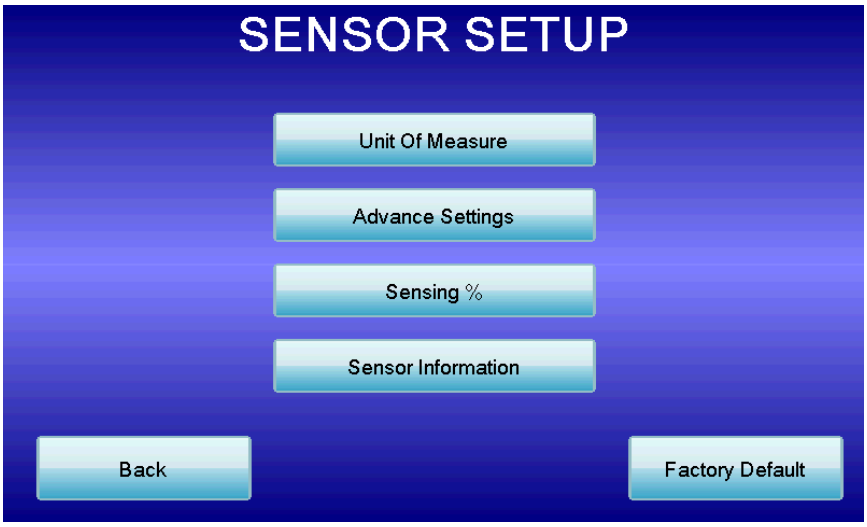
This screen allows you to set the physical parameters in terms of brightness, volume and sleep time. It also allows you to set the date and time, calibrate the touchscreen, change applications and reinstate Factory defaults. These settings will apply to all of the screens. When finished, touch the Save and then Back buttons to return to the utilities menu.

4.1.2 Simulator Selected.

Touch this button to toggle between 16S, 601 and LS1000 to select the simulator you are using.

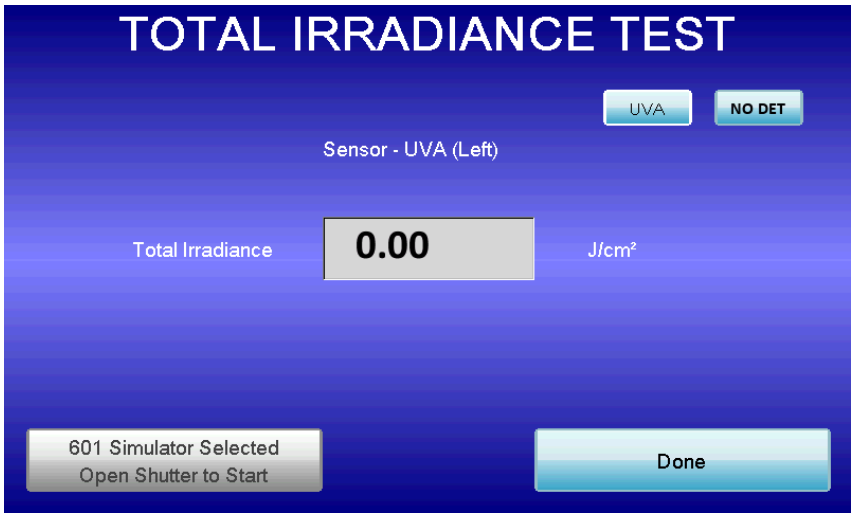
4.1.3 Sensor Setup.

This allows you to set the sensor units of measure, scale and offset settings, sensing (always 100%) and sensor data. Touch the back button to return to Utilities screen.



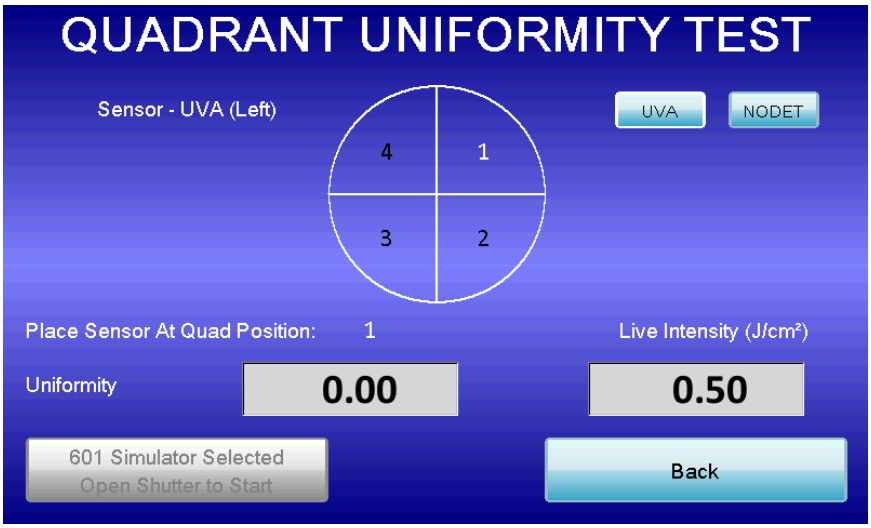
4.1.4 Total Irradiance Test.

Touch this button to measure the total irradiance of the simulator, with the PMA Total Irradiance Sensor, when using it for SPF Testing. This is a requirement of FDA and ISO to ensure the total irradiance from the simulator does not exceed 1,500/1,600mW/cm^2. Touch the Done button to return to the Utilities screen.



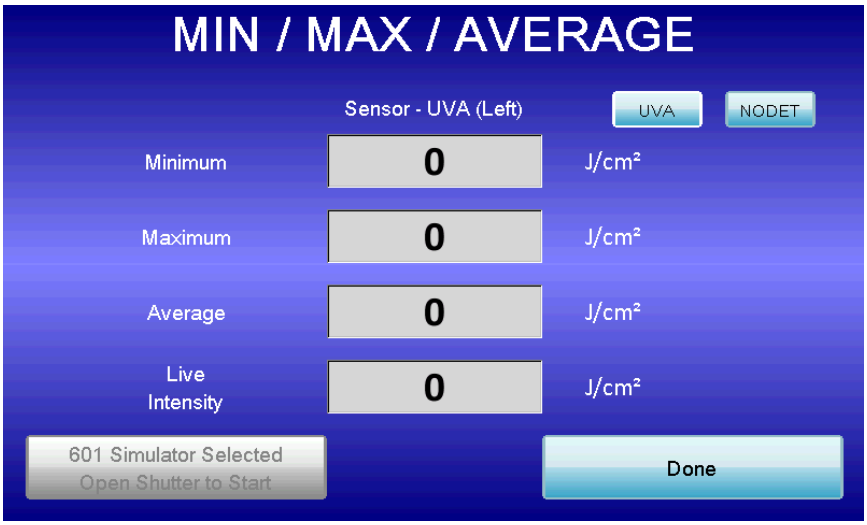
4.1.5 Uniformity Test.

Touch this button to measure the beam uniformity of the simulator, with the PMA Quadrant Sensor, when using it for SPF Testing. It is a requirement of FDA to ensure the intensity in each quadrant of the beam does not differ by more than 20%. Follow the on-screen instructions to carry out the test. Touch the Done button to return to the Utilities screen.



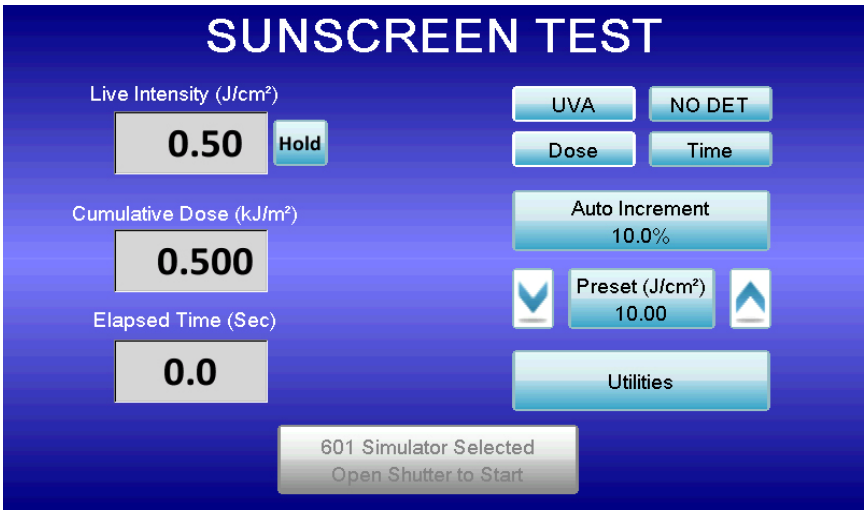
4.1.6 Min/Max/Average.

Touch this button to use the min/max/average feature when measuring beam intensities prior to testing. Touch the Done button to return to the Utilities screen.



4.2 Sunscreen Test. Model 601 Multiport set up and run

With Model 601 Multiport selected, from the Applications screen, touch the Sunscreen Test icon to enter the Sunscreen Test screen. To exit the SPF Test screen, touch the Utilities, Device Setup and Change Application buttons to return to the Applications Screen.



4.2.1 Dose and Time.

Touch Dose or Time buttons to select which you would like to use to run your test. If Dose is chosen, the Preset button will indicate the measurement parameter in Joules/cm2 for UVA testing or MED for Erythema testing . If Time is selected, the parameter is Seconds.

4.2.2 Auto Increment.

NOTE: **This button is not active for 601 Simulators**

4.2.3 Preset.

Use this button to set a preset dose or time for the SPF test. Touch the Enter and Back buttons to return to the SPF Test screen. Use the ^ and v buttons either side of the Preset button to increase or decrease the preset value shown.

4.2.4 Start.

To start, open the shutter manually.

To set up a sequence when using the 601 Multiport, place the Erythema sensor on each port in turn and measure the intensity in MED/Hr (see 4.1.6). Decide on the port you will use for the Expected Erythema, usually port 3.

A Typical example of a timed sequence would be:
Pt.1: (Erythema – 25%) – 25%
Pt.2: (Erythema – 25%)
Pt.3: Erythema
Pt.4: (Erythema + 25%)
Pt 5: (Erythema + 25%) + 25%
Pt 6: Not used or used as a control.

Measure the intensity at Port 5 with the occulter fully open, and note it down. This will be your highest intensity.
Measure the intensity at Port 4, and adjust the intensity with the occulter until it is 25% lower than Port 5. Continue for Ports 3, 2 and 1.
Port 3 is the Erythema port.
For a Timed Exposure, take the value in MED/Hr at Port 3 and divide it into 3600 to give you the time to achieve a 1 MED dose. Set this value as the Preset Time on the SPF Test screen.
For a Dose Exposure, Place the sensor on Port 3 to measure the intensity. On the SPF Test screen, press the hold button next to the Live Intensity indicator, and this will hold that value. Press the Preset (MED) button and set the value to 1.
For UVA Testing, follow the same procedure for the expected MPPDDu value. The UVA sensor will operate using mW and Joules.

5 Specifications

Mains voltage	100VAC to 240VAC
Current	0.8A
Line frequency	50/60 Hz
Output	24VDC
Current	1.25A
Operating temp range	0 to 50 deg. C. No precipitation
Display	7” Touch Screen
Sensor Inputs	2
Weight	2.1 lbs (930 g)
Size	9.5” (241mm) x 3.5” (89mm) x 8.5” (216mm)