

# OmniCure® S1500 PRO S2000 PRO/ELITE

## USER'S GUIDE

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# OmniCure®

## UV Bonding • In Control

### *User Guide*

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S1500 and S2000 PRO/ELITE User's Guide

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- 1 -

**EXCELITAS®**  
TECHNOLOGIES

## 1 Table of Contents

Excelitas Canada Inc.....	I
<b>1 Table of Contents .....</b>	<b>2</b>
<b>2 Table of Figures.....</b>	<b>4</b>
<b>3 Introduction .....</b>	<b>5</b>
<b>4 Getting Started .....</b>	<b>6</b>
4.1 Box Contents: .....	6
4.2 Front Panel .....	7
4.3 Rear Panel.....	8
<b>5 Safety Precautions .....</b>	<b>9</b>
5.1 Glossary of Symbols .....	9
5.2 Optical Safety Data .....	9
5.3 Safety Precautions.....	10
<b>6 Installing the Lamp Module .....</b>	<b>13</b>
<b>7 Inserting and Removing the Light Guide.....</b>	<b>17</b>
<b>8 Powering Up and Powering Down.....</b>	<b>18</b>
<b>9 Output Intensity Modes/Calibration Process.....</b>	<b>19</b>
<b>10 Adjusting the Light Output .....</b>	<b>21</b>
10.1 Adjusting the Light Output in the Relative Mode (“CAL” LED is OFF).....	21
10.2 Adjusting the Light Output in the Absolute Mode.....	22
<b>11 Locking and Unlocking the UP/DOWN Adjustment Button .....</b>	<b>24</b>
<b>12 Timed Exposures.....</b>	<b>25</b>
12.1 Adjusting the Exposure Time .....	25
12.2 Running a Timed Exposure.....	25
<b>13 Interfacing with the S2000 PRO/ELITE.....</b>	<b>26</b>
13.1 Connection Options .....	26
13.2 Input/ Output Signals and Descriptions .....	26
13.3 Radiometer RS-232 Phono Connector: Signal Descriptions.....	31
13.4 Audio Style Foot Pedal Connector: Signal Descriptions .....	31
<b>14 Viewing the Accumulated Lamp Hours.....</b>	<b>31</b>
<b>15 Messages / Indicators .....</b>	<b>32</b>
<b>16 LED Light Ring .....</b>	<b>33</b>
<b>17 Clearing Audible Alarm .....</b>	<b>34</b>
<b>18 Remote Automated Control Requirements.....</b>	<b>34</b>
18.2 Com Port Configuration: .....	34
18.3 Message Format and Protocol: .....	34
18.4 Command Descriptions:.....	35
18.5 Command Timing Specification:.....	41
18.6 Graphic User Interface Control: .....	41
18.7 Sample Code: .....	41
<b>19 S2000 PRO/ELITE WEB Graphical User Interface .....</b>	<b>44</b>
<b>20 StepCure .....</b>	<b>44</b>
<b>21 Routine Care and Maintenance .....</b>	<b>45</b>

21.1	Replacing the Lamp Module .....	46
21.2	Replacing the External Fuses .....	46
21.3	Replacing the Air Filter.....	46
21.4	Replacing The Bandpass Filter .....	47
21.5	Light Guide Cleaning .....	47
<b>22</b>	<b>Troubleshooting .....</b>	<b>49</b>
<b>23</b>	<b>Technical Specifications.....</b>	<b>53</b>
23.1	Lamp Module .....	54
23.2	Light Guide .....	55
23.3	I/O Ports (including RS-232) .....	56
23.4	USB Interface .....	56
23.5	Environmental Conditions .....	56
23.6	Noise and the OmniCure S2000 PRO/ELITE .....	57
<b>24</b>	<b>Regulatory Compliance.....</b>	<b>59</b>
24.1	Product Safety and Electromagnetic Compatibility: .....	59
24.2	FCC Part 15 Subpart B, Class A - Unintentional Radiators .....	59
24.3	FCC Part 15 Subpart C, Intentional Radiators.....	59
24.4	WEEE Directive .....	60
24.5	China RoHS.....	61
24.6	Mechanical Specifications.....	61
24.7	Radio specifications .....	61
24.8	Miscellaneous .....	62
<b>25</b>	<b>Warranty.....</b>	<b>63</b>
25.2	Replacement Bulb Warranty .....	64
25.3	Returning your S2000 PRO/ELITE to Excelitas Canada .....	64
<b>26</b>	<b>Contact Information .....</b>	<b>65</b>
<b>27</b>	<b>Addendums.....</b>	<b>66</b>

## 2 Table of Figures

Figure 1 Front Panel.....	7
Figure 2 Rear Panel .....	8
Figure 3 Lamp Housing Panel .....	13
Figure 4 Lamp Direction .....	14
Figure 5 Lamp Connection .....	14
Figure 6 Active Low Signal Circuit Configuration: .....	27
Figure 7 Active High Signal Circuit Configuration: .....	27
Figure 8 Rear Panel Sample Connection .....	28

## List of Tables

Table 1 “P1” Pin-Out .....	29
Table 2 “P3” Pin-Out .....	30
Table 3 RS-232 Phono-Connector Pin-Out .....	31
Table 4 Foot Pedal Pin-Out .....	31
Table 5 LED Status .....	33
Table 6 Unit Status.....	43
Table 7 Lamp Part Number .....	46
Table 8 Replacement Filter Part Numbers.....	47
Table 9 Message References.....	49
Table 10 Front Panel LED Descriptions.....	50
Table 11 Front Panel Button Descriptions .....	51

## 3 Introduction

The OmniCure® S2000 PRO/ELITE represents a new standard in UV Curing. It gives you the power, control and reliability never before available in such a cost effective UV curing system. The S2000 PRO/ELITE joins the Excelitas Canada family of light systems offering the same high level of innovation, quality and reliability that our customers have come to expect. Since 1982, Excelitas Canada has combined next generation optical engineering, state-of-the-art electronics and fibre-optics to produce sophisticated technologies that employ light. Today Excelitas Canada is a leading developer of light based systems for sectors ranging from manufacturing to bio-medicine and we are unmatched in our commitment to quality and service.

The heart of the OmniCure® S2000 PRO/ELITE is a proprietary 200-watt mercury short arc lamp with a 2000-hour guaranteed lifetime. This extended lifetime is made possible by the proprietary technology incorporated into the design of the system. The lamp is mounted in an elliptical reflector with a proprietary coating to provide excellent spectral and power output.

Control for the OmniCure® S2000 PRO is provided with a rotary Iris mechanism. The S2000 Elite contains the iris as well as a mechanical precision shutter. The iris is adjustable in 1% increments to provide very precise amounts of light to your application. In order to set your OmniCure S2000 PRO/ELITE system at specific irradiance levels (W/cm<sup>2</sup>), we suggest adding the OmniCure model R2000 handheld Radiometer to your OmniCure S2000 PRO/ELITE system. Other standard features incorporated in the S2000 PRO/ELITE include: Closed-Loop Feedback, 4.3" LCD touch screen display, new intuitive Graphics User Interface, a pre-aligned Intelli-Lamp® 2 system, band pass filter, exposure timer, an accumulative lamp hour meter, "lock out" protection, NFC communication functionality, field interchangeable optical filters, advanced Step Cure programmer with ladder logic interface and PLC controller,

We suggest that you read this manual to discover all features of the OmniCure® S2000 PRO/ELITE, and how to use them.

## 4 Getting Started

### 4.1 Box Contents:

1. The S2000 PRO/ELITE UV/Visible Spot Curing Unit
2. The 200W lamp module
3. Optical filter (Selected wavelength)
4. UV Safety Glasses
5. Foot Pedal Switch
6. Lamp Housing Access Tool (fastened beneath the system housing)
7. Grounded POWER Cord
8. USB Type-B Cable
9. Quick-Start Guide and User Manual

If your packaged unit is missing any of the above components, call Excelitas Canada Inc. at (905-821-2600) or 1-800-668-8752.

Any additional optional items purchased to customize the unit will also be present.

#### 4.2 Front Panel

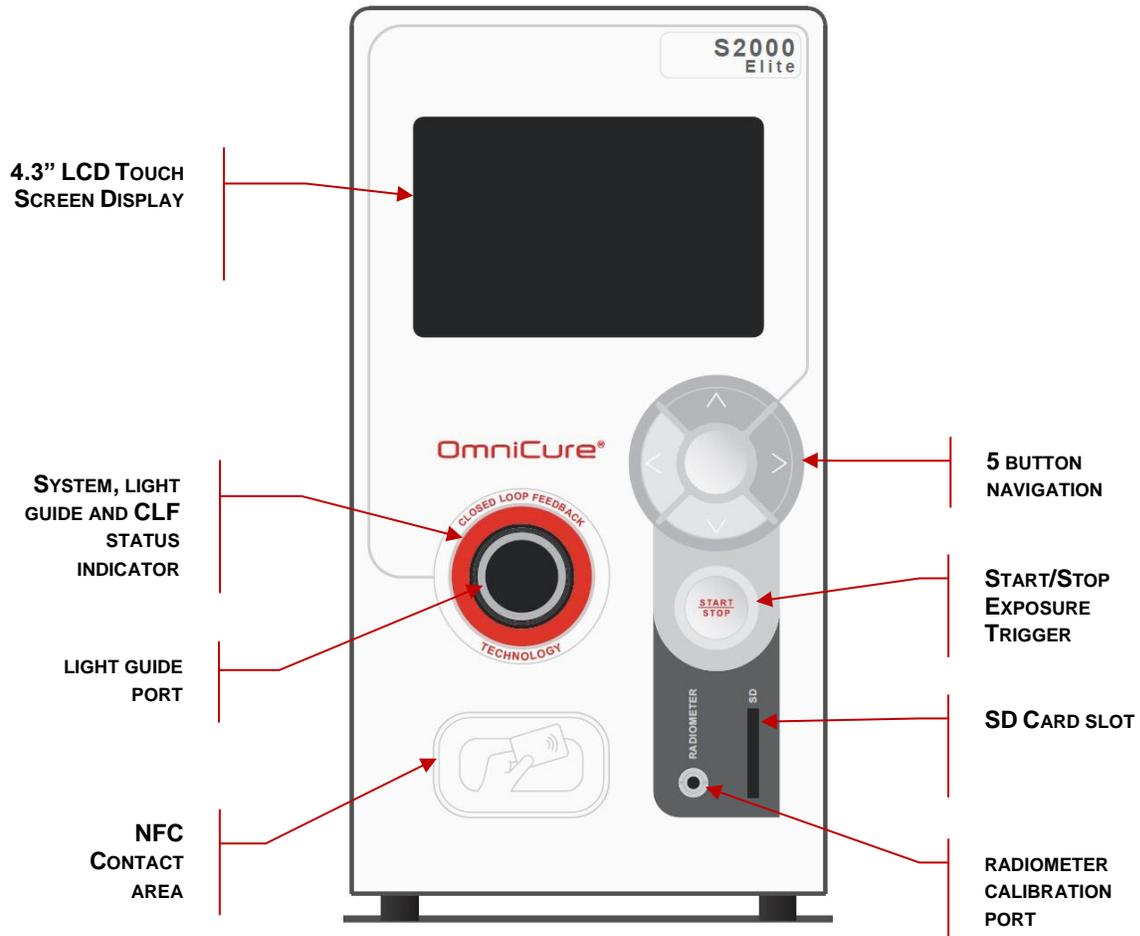


Figure 1 Front Panel

### 4.3 Rear Panel

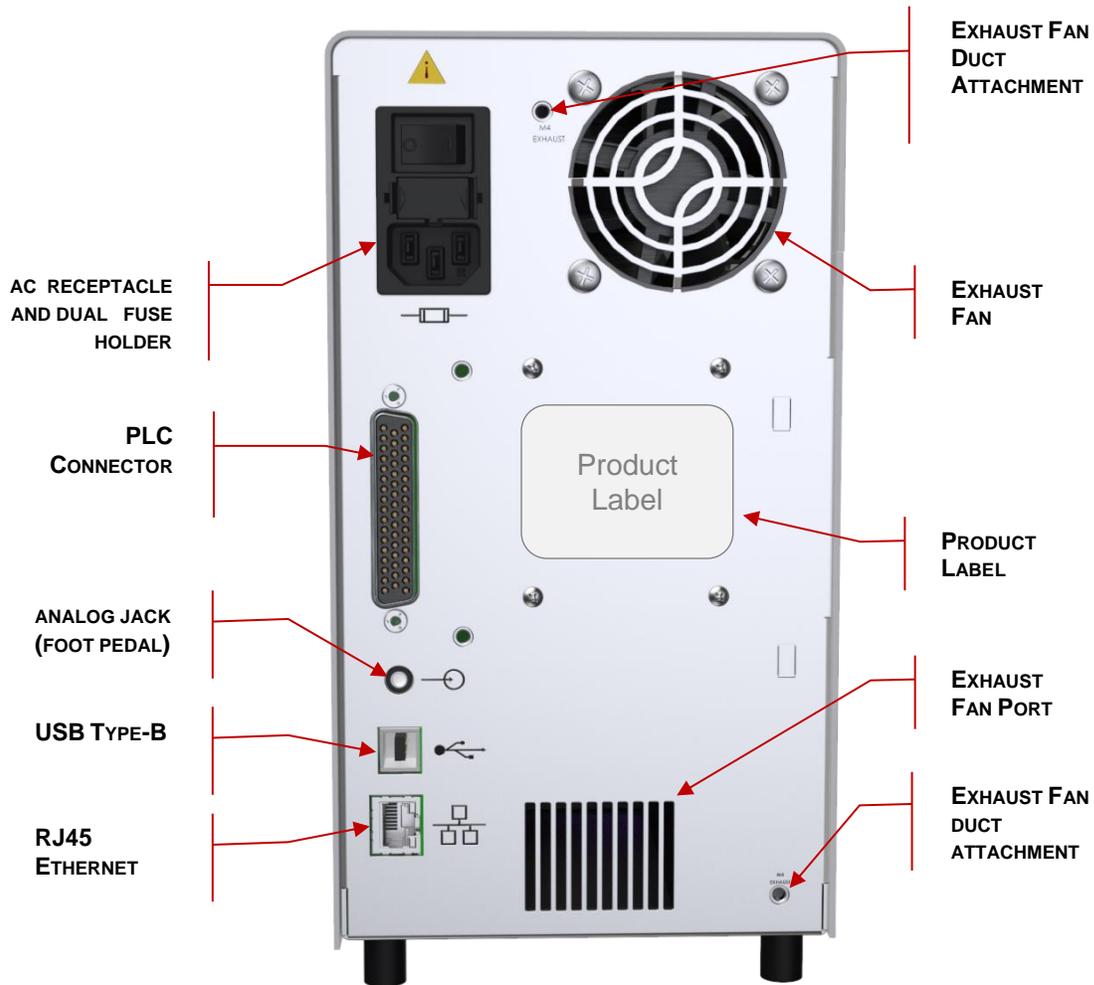


Figure 2 Rear Panel

## 5 Safety Precautions

### 5.1 Glossary of Symbols



Caution risk of danger – consult accompanying documents.

#### Risk Group



WARNING: UV emitted from this product. Avoid eye and skin exposure to unshielded product.

WARNING: Possibly hazardous optical radiation emitted from this product. Do not stare into operating lamp.



Caution eye damage may result from directly viewing ultraviolet light – protective eye shielding and clothing must be used at all times.



Input/Output Signals



Input Signal

### 5.2 Optical Safety Data

IEC 62471: Photobiological Safety of Lamps and Lamp Systems  
Resulting Classification and Labelling



### 5.3 Safety Precautions

The S2000 PRO/ELITE is equipped with two safety sensors to protect the user from accidental UV exposure. In addition, please observe the following precautions during use. This Series of cautions, warnings and dangers relate to the operation and maintenance of the S2000 PRO/ELITE. They are also presented throughout this User's Guide where necessary.

#### Warning



Eye damage may result from directly viewing the light produced by the lamp used in this product. Always use the UV protective eyewear supplied with the unit and always turn the lamp off before removing lamp housing cover.



Warning: UV protective eyewear must meet the following recommended optical specifications:

**Spectral range; 320-500 nm**



WARNING: Do not stare directly at the light emitted from the lamp. This may be harmful, resulting in eye injury. Always use UV protective eyewear as indicated below. Additionally, protect any exposed skin with appropriate clothing or shielding as required.



#### Caution

Never look into the light emitting end of the light guide. The light could severely damage the cornea and retina of the eye if the light is observed directly. Eye shielding must be used at all times as well as clothing to protect exposed skin.

#### Warning



Always make sure the light guide is properly inserted into the S2000 PRO/ELITE prior to turning on POWER to the unit. This will minimize the risk of exposure to the UV light.

#### Warning



To reduce the risk of fire or shock, always replace the fuses with the same type and rating. Always detach the POWER supply cord prior to attempting to replace fuses!

#### Warning



Disconnecting of the main supply source is only possible by unplugging the POWER cord.



#### **Danger**

This unit contains HIGH VOLTAGE components. It is recommended that ONLY QUALIFIED TECHNICAL PERSONNEL perform any testing or repairs.



#### **Monitoring the unit during manual operation**

The Level of UV energy supplied by the S2000 PRO/ELITE is sufficient to ignite flammable substances. During manual operation, the unit must be attended at all times by a qualified operator. The unit must not be left unattended while turned on. If an operator leaves the work area of the unit, the POWER switch must be turned off.



#### **Monitoring the unit during automated operation**

The Level of UV energy supplied by the S2000 PRO/ELITE is sufficient to ignite flammable substances. Therefore, when the unit is operated unattended in an automated environment, an alarm function must be provided by the user to indicate a malfunction in the associated equipment used.



#### **Warning**

Hg – LAMP CONTAINS MERCURY, Manage in Accord with Disposal Laws, see: [www.lamprecycle.org](http://www.lamprecycle.org) or 1-800-668-8752



#### **Danger: Exposure to Mercury represents a health hazard to humans.**

When unpacking or installing the lamp, always wear protective clothing and a face mask. Operate lamp only in the S2000 PRO/ELITE lamp housing. This prevents direct viewing of the arc and in the case of lamp bursting, contains the lamp particles. In the rare instance in which a lamp bursting occurs, and the mercury content is released, the following safety precautions are recommended: all personnel should be immediately evacuated from the area to prevent inhalation of the mercury vapour. The area should be well ventilated for a minimum of 30 minutes. Prior to clean up ensure an approved mercury respirator mask and non-porous gloves such as latex or rubber are used. After the lamp housing elements have cooled, the mercury residue should be collected with the use of a special absorbing agent available from laboratory equipment suppliers.

Listed below are examples of internet web sites for obtaining Mercury Spill Kits;

- <https://www.amazon.com/mercury-spill-kit/s?k=mercury+spill+kit>
- [https://www.uline.ca/BL\\_272/Mercury-Spill-Kit](https://www.uline.ca/BL_272/Mercury-Spill-Kit)
- [http://www.coleparmer.ca/catalog/product\\_index.asp?cls=43577](http://www.coleparmer.ca/catalog/product_index.asp?cls=43577)
- [http://www.alibaba.com/products/spill\\_kit/4.html](http://www.alibaba.com/products/spill_kit/4.html)



#### **Warning**

Should this S2000 PRO/ELITE unit be used in a manner not specified by Excelitas Canada, the protection provided by the equipment may be impaired.

**Warning**

The method in which lamps are disposed of must comply with local rules & regulations for disposal of hazardous materials. Lamps may be returned to Excelitas Canada, providing they are returned in its original packaging. Excelitas Canada will dispose of them in the appropriate manner.

**Caution**

The lamp module's operational life can be significantly shortened if it is handled incorrectly. Do not touch the bulb's glass envelope or the inside surface of the reflector. Skin oils can cause the lamp module to fail prematurely.

**Caution**

Prior to opening the unit and handling the lamp module, allow the lamp module to cool down completely (approximately 20 min).

**Caution**

Any electronic equipment connected to the S2000 PRO/ELITE must be IEC950 certified.

**Cleaning**

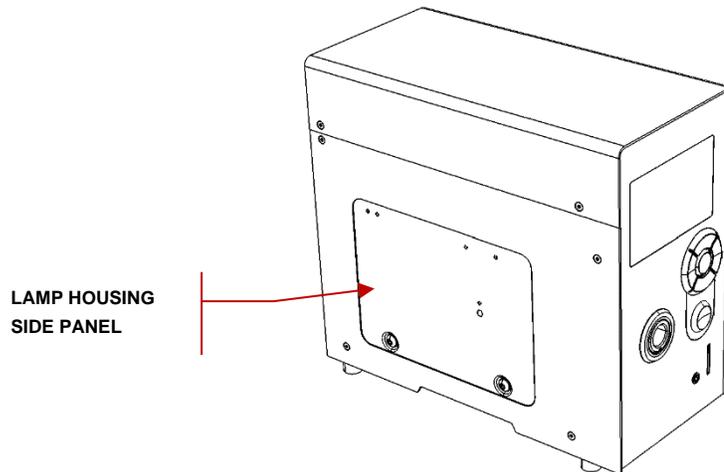
Clean exterior of the unit with a water dampened cloth and simple detergent only.

## 6 Installing the Lamp Module

The S2000 PRO/ELITE curing system can detect and adjust its parameters for all lamp options offered with the product. Please follow these steps to install the lamp.

**Note: Refer to Section 3 – Safety Precautions before proceeding**

- 6.1.1 Be sure the AC POWER cord is disconnected from the unit.
- 6.1.2 Remove the screw from the lamp housing side panel using the tool provided and remove the panel from the unit cover.



**Figure 3 Lamp Housing Panel**

- 6.1.3 Carefully remove the lamp module from its container, holding only the ceramic component and lamp rim.

**Caution!**

The lamp module's operational life can be significantly shortened if handled incorrectly. Be sure only to handle the ceramic surfaces and the lamp rim. Do not touch the bulb's glass envelope or the inside surface of the reflector. Skin oils can cause the lamp module to fail prematurely.

- 6.1.4 As illustrated below position the lamp facing towards the front of the unit with the POWER leads facing towards you. The lamp should be aligned so that the leading edge of the reflector (lamp rim) fits into the mounting groove on the lamp holder assembly.

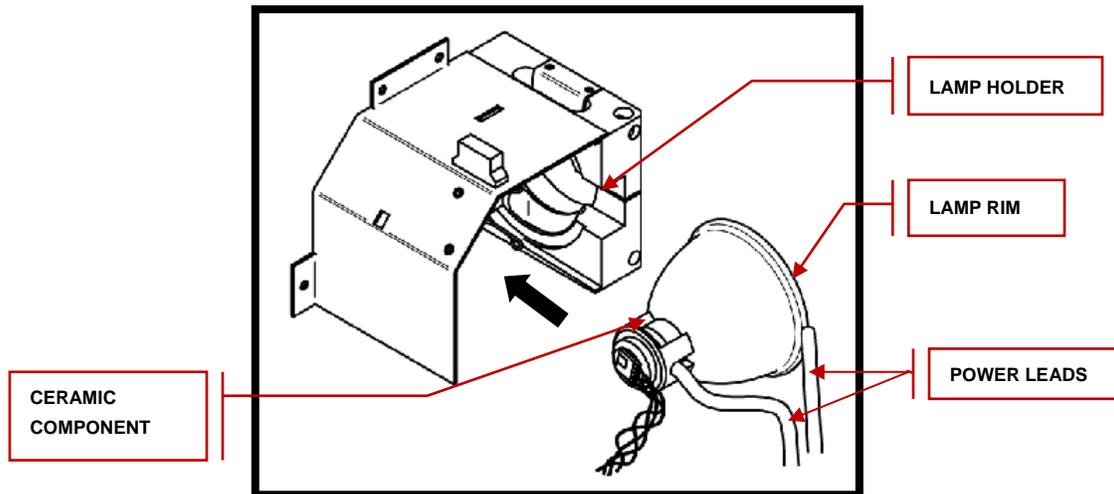


Figure 4 Lamp Direction

- 6.1.5 Make sure the middle of the lamp is in position to fit into the spring clamp. Slide the lamp until it snaps into the spring clamp. The leading edge of the reflector (lamp rim) should fit snugly into the lamp holder recess.

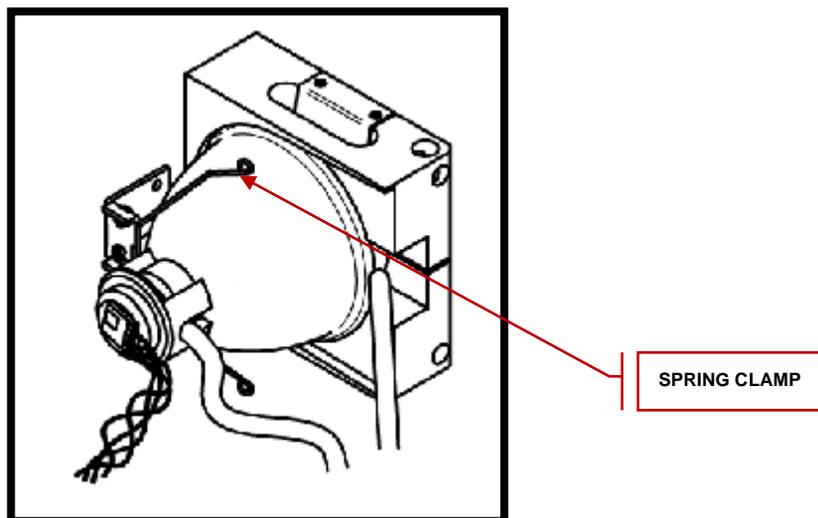
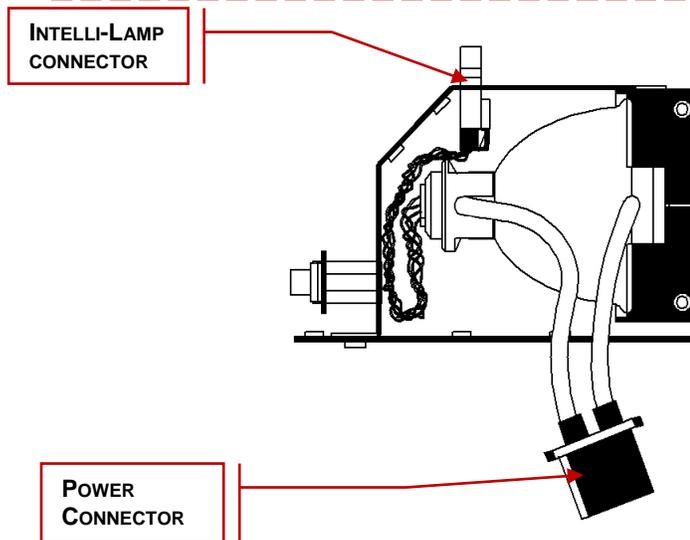


Figure 5 Lamp Connection

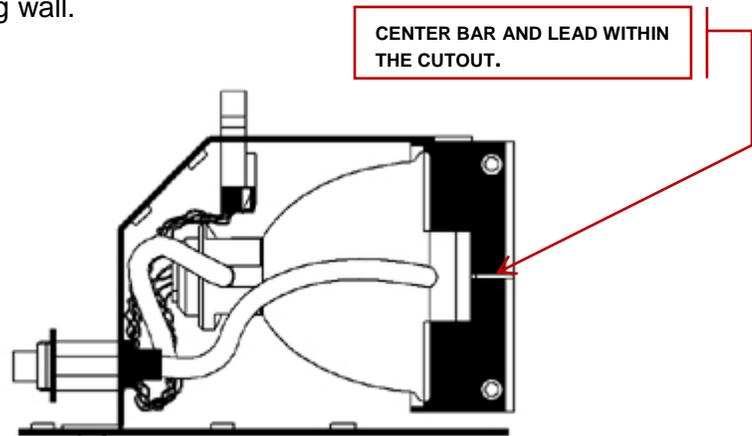
- 6.1.6 Locate the 4-pin Intelli-Lamp sensor connector at the rear of the lamp module and connect it to its mate located on the top of the lamp-housing wall.

**Tip:** the Intelli-lamp connector will only attach in the correct orientation. If you are having difficulty attaching the connector, try rotating it by 180°.

**Note:** if the Intelli-lamp connector is not installed correctly, the lamp will not strike and the “bulb” message will display when POWER is turned on to the unit.



- 6.1.7 Locate power connector with two leads and connect it to its mate located on the side of the lamp-housing wall.



- 6.1.8** Ensure the lamp anode cooling fin (bar) and lamp power lead, at the front of the lamp, are centered within the lamp holder cut out. Rotate the lamp as required.
- 6.1.9** Replace the lamp housing side panel and tighten the fastening screw.

**Note 1:** *if the lamp housing panel is not secured completely the lamp will not strike and the system will not turn on.*

**Note 2:** *if the wrong type of lamp has been installed in your unit, a message will appear on the LCD display. Refer to section 22 for troubleshooting information.*

## 7 Inserting and Removing the Light Guide

**Note:** 3mm single leg liquid light guides are not compatible with the S2000 PRO/ELITE!

- 7.1.1 Ensure that the protective end caps are removed from both the input and output ends of the light guide prior to installation.
- 7.1.2 Insert the light guide into the light guide port located on the front panel of the unit. Push the light guide in until it seats with a second positive "click".

**Tip:** When the light guide is fully inserted, the light ring will illuminate Green, Yellow or Magenta. If the light guide is not fully inserted the light ring will illuminate red.

**Note:** the shutter will not open if the light guide is not fully inserted.

- 7.1.3 During installation or removal, grasp the light guide on the strain-relief nearest the input end of the light guide.

**Note:** Never grip the light guide during installation or removal in a place other than the strain relief portion of the light guide.

- 7.1.4 To remove the light guide, firmly grip the strain relief near the light guide retainer and pull out firmly.
- 7.1.5 Refer to section 21.5 for Light Guide Cleaning Instructions.

**Note:** The S2000 PRO/ELITE is designed for use with Excelitas Canada Light Guides. Excelitas Canada can not guarantee the performance of the S2000 PRO/ELITE if using light guides other than those supplied by Excelitas Canada.

## 8 Powering Up and Powering Down



### Lamp Warm-UP:

The ARC lamp has 3 distinct phases of operation;

1. Ignition.

2. **Warm-up.** Excelitas Canada **recommends 20 minutes of proper warm-up and to ensure a stable optical output.**

3. Stable Operation.

It is recommended that phase 1 and 2 are not interrupted. This can result in shortened lamp life. **The lamp must be allowed to warm-up uninterrupted.**

- 8.1.1 Ensure that the lamp and light guide have been properly installed and that the lamp housing panel is securely fastened.
- 8.1.2 Plug the S2000 PRO/ELITE unit into a properly grounded AC outlet.
- 8.1.3 Turn on the mains POWER switch “I”, located on the rear panel and check the fan for airflow.
- 8.1.4 As soon as the LED screen turns on, a splash screen will appear and transition into a warm-up indicator screen.
- 8.1.5 Phase 2 (warm-up) takes approximately 4 minutes. Once the timer has run out, you may enter the run screen. Excelitas Canada **recommends 20 minutes to ensure a stable optical output.**



**Warning:** *If the lamp is turned off, and an attempt is made to turn it back on before it has fully cooled, the “cool” message will appear on the display. The lamp will automatically re-strike when the lamp has cooled.*

- 8.1.6 To power down the unit, set the mains power located on the back panel to “0”.
- 8.1.7 10 exposures must be run to save any new exposure settings (intensity & timer) into memory for it to remember next time the system is powered-up.

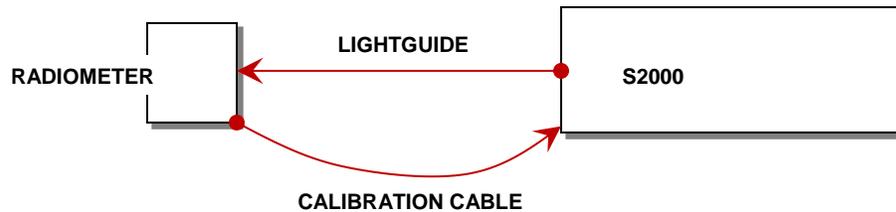
## 9 Output Intensity Modes/Calibration Process

- 9.1.1 Calibration of the exposure timer is not required.
- 9.1.2 The S2000 PRO/ELITE system uses a quartz crystal to generate its system clock signal. It provides a stable and precise clock signal to the S2000 PRO/ELITE control system and sub-systems, including the timing module of the light intensity control shutter.
- 9.1.3 The accuracy of the S2000 PRO/ELITE exposure time is therefore determined by the oscillating frequency stability of its quartz crystal. Quartz crystals are well known to oscillate at a constant frequency throughout their lifetime.
- 9.1.4 The S2000 PRO/ELITE design allows Excelitas Canada to Guarantee the Exposure Timer Tolerance for the lifetime of the product. The exposure does not need calibration.

**S2000 PRO/ELITE Exposure Timer Tolerance:  
+/- 250ms or +/- 1% of the exposure time setting, whichever is greater.**

- 9.1.5 The S2000 PRO/ELITE system can operate in two different output intensity modes: Absolute or Relative.
- 9.1.6 Absolute mode: refers to the condition when the S2000 PRO/ELITE has been calibrated. The display will show an absolute value of irradiance in W/cm<sup>2</sup>.
- 9.1.7 Relative mode: refers to the condition when S2000 PRO/ELITE has not been calibrated. The display will show the percentage of iris opening.
- 9.1.8 Section 10 describes adjusting the light output in both relative and absolute modes in greater details.
- 9.1.9 The S2000 PRO/ELITE can be calibrated and correspondingly set to a specified irradiance (set point) by the R2000 Radiometer. The R2000 Radiometer connects to the S2000 PRO/ELITE via the front panel RS-232 radiometer port.
- 9.1.10 While the CAL button on the radiometer is pressed, the display will indicate the current set point and the SET icon will be flashing. If the CAL button on the radiometer is pressed for less than 5 seconds the current radiometer set-point will be sent to the S2000 PRO/ELITE.
- 9.1.11 Holding this button for 5 seconds will store the current optical input into the radiometer's set point (this feature can be enabled or disabled via PC). The SET Icon will cease flashing and be continuously on until the button is released.

- 9.1.12** When the CAL button is pressed for less than 5 seconds, and then released, the radiometer will send the set point to the S2000 PRO/ELITE thus setting the S2000 PRO/ELITE in the absolute mode. Additionally, the current light guide diameter value selected by the radiometer will be transferred to the S2000 PRO/ELITE. This light guide diameter will be used by the S2000 PRO/ELITE to calculate the proper output irradiance in W/cm<sup>2</sup>.
- 9.1.13** For detailed operating instructions regarding calibration of the S2000 PRO/ELITE, refer to the R2000 user's guide.



## 10 Adjusting the Light Output

Your S2000 PRO/ELITE system includes an iris adjustment to control the intensity level of the light output from the unit. The intensity level adjustment is possible from the RUN screen using the touch panel or the navigation UP and navigation Down button.

The S2000 PRO/ELITE system offers 2 different operating modes: *Relative* or *Absolute*.

**Relative Mode:** offers an un-calibrated intensity level output which is displayed as a percentage of iris opening on the LCD display.

**Absolute Mode:** offers a calibrated intensity level output from the unit which is displayed in irradiance (W/cm<sup>2</sup>) on the LCD display. This mode is accessible only when the S2000 PRO/ELITE has been calibrated with an R2000 Radiometer

**Note:** Removing the light guide from the front panel optical port while in Absolute Mode will cancel the unit's calibration, and the unit will automatically return back to the Relative Mode.

### 10.1 Adjusting the Light Output in the Relative Mode ("CAL" LED is OFF)

#### 10.1.1 - Blank -

**Note:** The Closed-Loop Feedback will be OFF if the exposure alarm is activated or the iris is at 100%.

**Note:** Closed Loop Feedback shut-off @exposure time of .3 sec and lower.



**Warning:**

UV light will be emitted from the light guide. The light could severely damage the cornea and retina of the eye if the light is observed directly. UV protective eye shielding must be used at all times as well as clothing to protect exposed skin.

**Note:** The shutter will not open if the light guide is not inserted properly.

#### 10.1.2 - Blank -

**Note:** While in Level Mode, pressing the **start/stop** button will manually open the shutter until the **start/stop** button is pressed again to close the shutter. The timer function will not be activated.

#### 10.1.3 - Blank -

#### 10.1.4

**Note:** The shutter must be in the open position to make adjustments to the iris position.

#### 10.1.5 Blank

#### 10.1.6 Blank

**10.1.7** For any setting at 99% or less, the S2000 PRO/ELITE will record the optical output intensity using internal sensors for the Closed-Loop Feedback circuit. Each subsequent exposure will automatically generate the same optical output intensity, even as the lamp ages. As a result of lamp aging, subsequent exposures may display a higher iris open percentage value; however, the output intensity will be consistent with the original setting (+/-5% or 200mW/cm<sup>2</sup>, whichever is greater).

**Note:** Closed Loop Feedback shut-off @exposure time of .3 sec and lower.

### 10.2 Adjusting the Light Output in the Absolute Mode

**Note 1:** The S2000 PRO/ELITE must be calibrated using the R2000 Radiometer.

**Note 2:** Removing the light guide at any time from the front panel light guide port will require re-calibration of the S2000 PRO/ELITE.

#### 10.2.1 Blank



#### **Warning**

*UV light will be emitted from the light guide. The light could severely damage the cornea and retina of the eye if the light is observed directly. Eye shielding must be used at all times as well as clothing to protect exposed skin.*

**Note:** *The shutter will not open if the light guide is not inserted properly.*

10.2.2 Blank

10.2.3 Blank

10.2.4 Blank

10.2.5 Blank

10.2.6 Blank

**Note:** *While in Count Up mode, pressing the start/stop button will manually open the shutter until the start/stop button is pressed again to close the shutter. The timer will show the total time the shutter was opened.*

**Note:** *While in Absolute Mode, and while the shutter is closed, the displayed irradiance value is the user defined Set Point. Whenever the shutter is opened the S2000 PRO/ELITE will immediately attempt to adjust the optical output to within +/-2% of the Set Point. The actual output irradiance will be displayed at this point and will vary slightly (to within +/-5% or 200mW/cm<sup>2</sup>, whichever is greater) from exposure to exposure.*

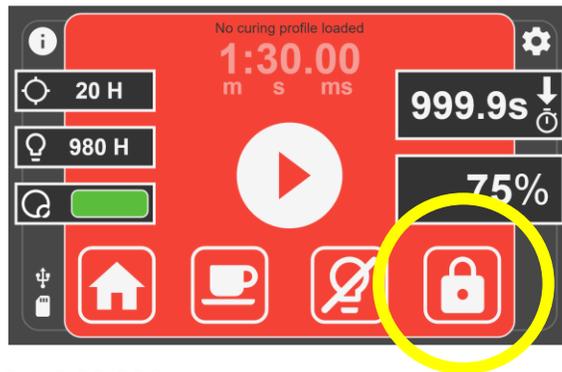
**Note:**

OmniCure® S2000 PRO/ELITE Minimum Adjustable Irradiance Level:  
0.5W/cm<sup>2</sup>

## 11 Locking and Unlocking the UP/DOWN Adjustment Button

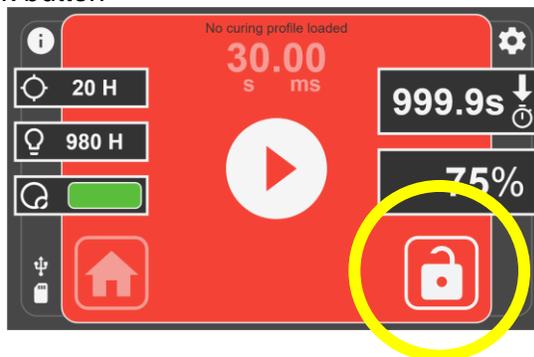
11.1.1 Your S2000 PRO/ELITE system allows you to disable all but basic run functions. When the system is locked, no modifications to the set time, the optical output power or the system's settings can be made. This can help to ensure process control when multiple operators are using the same equipment.

11.1.2 To Lock the run screen, press the lock button.



11.1.3 To Unlock the run screen:

A. Press the unlock button



B. Prompt will appear to enter password. Use the system's password to unlock the run screen.

**Note:** The front panel can also be locked via the PLC I/O's (P1-pins 14 & 4) or via connection of the PC side software.

## 12 Timed Exposures

Your S2000 PRO/ELITE system includes a timer to automatically close the shutter after a user selected amount of time. Adjustments to the exposure time can only be made when the S2000 PRO/ELITE unit is in Count Down mode.

### 12.1 Adjusting the Exposure Time

- 12.1.1 Set the mode to Count Down from the Run screen
- 12.1.2 Press the timer box on the LCD to enter a set time or use the Left or Right navigation buttons.
- 12.1.3 Blank

### 12.2 Running a Timed Exposure

- 12.2.1 While in Counted Down mode, press the start /stop button. The shutter will open and the exposure time will begin to count down. When the exposure time has elapsed to zero, the shutter will close.
- 12.2.2 Blank
- 12.2.3 Blank

**Note:** The shutter will not open if the light guide is not inserted properly.

**Note:** To pause a timed exposure from running, press the start /stop button. The shutter will close and the exposure time will pause. To reset the timer, press the reset icon on the LCD screen. To resume the timer, press the Start/Stop button.

## 13 Interfacing with the S2000 PRO/ELITE

### 13.1 Connection Options

- 13.1.1** The S2000 PRO/ELITE is designed to be fully automated both quickly and easily via PLC control or computer control using the RS-232 port. All of the advanced features ensuring process control and curing repeatability can be accessed through built in standard optically isolated I/O signals. [Add info](#)
- 13.1.2** Additionally, a stereo phono connector is available for a simple RS-232 radiometer connection on the front panel.
- 13.1.3** The PLC I/O's, foot pedal and RS-232 port are optically isolated from the control S2000 PRO/ELITE control electronics. This has been done in order to maximize the S2000 PRO/ELITE's immunity to noise and minimize its noise output. Even the analog inputs and outputs (intensity monitor output and intensity control input) are optically isolated from the control circuitry.

### 13.2 Input/ Output Signals and Descriptions

#### 13.2.1 Output Signals

- an output signal is said to be active when the output is ON
- a signal is said to be ON when the transistor side of it's respective optocoupler is conducting current
- the description of current conduction is dependant upon its' end configuration, selectable by the user
- an output can be configured as active high in which case the transistor is sourcing current, or active low in which case the transistor is sinking current

**Note:** Refer to the following page for examples of output signal circuit configurations.

The "digital" outputs have the following characteristics:

>polarized type, output device:	optocoupler, NPN transmitter
>logic Level:	uncommitted emitter and collector can be used as active high or active low
>maximum voltage withstand:	30VDC capability (Vce):
>maximum carry current:	8 mA

**Note:** a signal is said to be active when the transistor side output of the optocoupler is on/conducting and inactive when the transistor side of the optocoupler is off.







#### 13.2.6 Blank



Table 2 "P3" Pin-Out

### 13.3 Radiometer RS-232 Phono Connector: Signal Descriptions

- 13.3.1** The front panel RS-232 stereo phono connector is labelled “Radiometer”. This connector is used to connect S2000 PRO/ELITE to the R2000 Radiometer for calibration and setup purposes. It is a RS-232 connector dedicated to communication with the R2000 Radiometer.

PIN NO	SIGNAL NAME
1 (Shield)	GND
2 (Ring)	Tx
3 (Tip)	Rx

**Table 3 RS-232 Phono-Connector Pin-Out**

### 13.4 Audio Style Foot Pedal Connector: Signal Descriptions

- 13.4.1** The rear panel foot pedal connector, a 3 mm audio style jack, has the following pin-out:

Connection Point	SIGNAL NAME
Outer Rim	Positive input, active low
Center Pin	Common ground (GND)

**Table 4 Foot Pedal Pin-Out**

- 13.4.2** This is a simple 2-wire, audio style jack that can be connected to a foot pedal (supplied with each unit) or any other electro-mechanical triggering device. This is an exposure trigger input used to start an exposure. The shutter activation input and front panel START/STOP button will also trigger the shutter.

## 14 Viewing the Accumulated Lamp Hours

- 14.1.1** Your S2000 PRO/ELITE system automatically accumulates the number of hours that the lamp is on and shows this information on the LCD display.
- 14.1.2** Navigating to Info/Lamp Info to view this information

## **15 Messages / Indicators**

The S2000 PRO/ELITE display provide information to the user to aid in unit operation and to advise when certain conditions exist.

## 16 LED Light Ring

The LED light ring indicator displays the status of the following:

- Light Guide
- Lamp
- Shutter
- Calibration

The following table describes LED status and descriptions of each status in details.

Description	LED Indicator
Closed-loop feedback calibration in-process	Green – Blinking 1 second
Closed loop feedback active	Green
Light guide not detected	Red
Light guide detected (closed loop feedback active)	Green
Light Guide detected (closed loop feedback at 95% to 99% intensity level)	Yellow
Light guide detected (closed loop feedback inactive)	Magenta
Lamp warming up from cold (Power off) or sleep	Blue
Lamp warming up from idle mode	Cyan
Lamp not lit (Sleep Mode)	White – Blinking 1 second
no lamp detected	Red – Blinking 1 second
Alarm or Fault detected	Red – Blinking 0.5 second

**Table 5 LED Status**

## 17 Clearing Audible Alarm

17.1.1 The S2000 PRO/ELITE provides an audible alarm to alert the user of various error conditions.

17.1.2 To clear the audible alarm:

1. Press the front panel start/stop button or prompt on LCD screen

**Note:** *Alternately, depressing the foot pedal, or providing a momentary contact closure on the rear panel analog jack, will clear an audible alarm.*

2. The audible alarm can be also cleared remotely:
  - From a PC through I/O port when the “CLR” command is sent to the S2000 PRO/ELITE.
  - Through the PLC I/O port via P2: pin 1 and pin 15

## 18 Remote Automated Control Requirements

18.1.1 The S2000 PRO/ELITE system is designed to provide remote automated control of the UV spot curing system from a PC.

18.1.2 The S2000 PRO/ELITE PC software requirement specification below is used to describe the communication protocol between the S2000 PRO/ELITE unit and a PC.

**WARNING:** *If the user does not observe and adhere to the protocol and command timing specifications, abnormal unit operation will result!*

### 18.2 Com Port Configuration:

<b>Baud rate:</b>	19200
<b>Data bits:</b>	8
<b>Parity:</b>	None
<b>Stop bits:</b>	1
<b>Flow Control:</b>	None

### 18.3 Message Format and Protocol:

18.3.1 All commands sent to the S2000 PRO/ELITE and responses from the S2000 PRO/ELITE include 3 pieces of data: the command section, a CRC8, and a carriage return (“\r” in C code or chr\$(13) in basic code). The CRC8 (one byte value) is entered as a hex string. Please refer to CRC8 routine for details in section 18.7

- 18.3.2** When the carriage return character (CR) is received, the S2000 PRO/ELITE will respond with an error message if there is a problem.

*For example:*

*Error Message Response: "Err67v"*

- 18.3.3** If there are no errors, the S2000 PRO/ELITE will respond as indicated below. In the example, the XX presents one byte CRC8 value.

**Note:** The command "CONN18v" must be sent out first to establish communication with the connected PC. If a "READY0Av" is received from the S2000 PRO/ELITE, communications can commence with the unit, otherwise, the command "CONN18v" should be resent until the response "READY0Av" is received.

#### 18.4 Command Descriptions:

**1. Connect S2000 PRO/ELITE**

Command to S2000 PRO/ELITE; **CONN**  
Response from S2000 PRO/ELITE; **READY**

**2. Disconnect S2000 PRO/ELITE**

Command to S2000 PRO/ELITE; **DCON**  
Response from S2000 PRO/ELITE; **CLOSE**

**3. Lock the front panel**

Command to S2000 PRO/ELITE; **LOC**  
Response from S2000 PRO/ELITE; **Received**

**4. Unlock the front panel**

Command to S2000 PRO/ELITE; **ULOC**  
Response from S2000 PRO/ELITE; **Received**

**5. Clear Alarm**

Command to S2000 PRO/ELITE; **CLR**  
Response from S2000 PRO/ELITE; **Received**

**6. Get unit status**

Command to S2000 PRO/ELITE; **GUS**  
Response from S2000 PRO/ELITE; **n** (n represents a integer number)

Example:

If "50XX\r" is received, the unit status is as follows:  
Alarm - Off; Shutter Home – Pass; Lamp – On; Lamp  
Ready – Yes; Shutter – Close; Front Panel – locked;  
Calibration – No; Exposure Fault – No.

**Note:** Please refer to Table 6 Unit Status for details.

#### 7. Run a timed exposure

Command to S2000 PRO/ELITE; **RUN**

Response from S2000 PRO/ELITE; **Received**

#### 8. Open Shutter

Command to S2000 PRO/ELITE; **OPN**

Response from S2000 PRO/ELITE; **Received**

#### 9. Close Shutter

Command to S2000 PRO/ELITE; **CLS**

Response from S2000 PRO/ELITE; **Received**

#### 10. Turn On Lamp

Command to S2000 PRO/ELITE; **TON**

Response from S2000 PRO/ELITE; **Received**

#### 11. Turn Off Lamp

Command to S2000 PRO/ELITE; **TOF**

Response from S2000 PRO/ELITE; **Received**

#### 12. Get Lamp Configuration

Command to S2000 PRO/ELITE; **GLH**

Response from S2000 PRO/ELITE; **n** (n represents a integer number)

Bit 15: Abuse Bit (0=OK, 1=lamp abused)

Bit 14: Lamp Type (0= surface curing, 1=standard)

Bit 13 – Bit 0: Lamp Hours

Example:

If "20XX\r" is responded, the lamp configuration is as follows:

No abuse bit set, surface curing with 20 hours lamp.

#### 13. Get calibrated lamp hours

Command to S2000 PRO/ELITE; **CLH**

Response from S2000 PRO/ELITE; **n** (n represents a integer number in hours)

Example:

If “20XX\r” is responded, the unit was calibrated when the lamp hours was 20.

**Note:** Need CAL – the S2000 PRO/ELITE need to be calibrated before the calibrated lamp hours can be obtained.

#### 14. Get iris Level

Command to S2000 PRO/ELITE; **GIL**

Response from S2000 PRO/ELITE; **n** (n represents a integer number 1-100)

Example:

If “20XX\r” is responded, the iris Level will be 20%.

#### 15. Clear unit calibration

Command to S2000 PRO/ELITE; **CLC**

Response from S2000 PRO/ELITE; **“Done”**

#### 16. Get exposure time

Command to S2000 PRO/ELITE; **GTM**

Response from S2000 PRO/ELITE; **n** (n represents a integer number in 100’s of msec)

Example:

If “20XX\r” is responded, the exposure time will be 2 seconds.

#### 17. Get software versions from main board

Command to S2000 PRO/ELITE; **VEB**

Response from S2000 PRO/ELITE; **n** (n represents a integer number)

Example:

If “10XX\r” is responded, the software version on the main board will be 1.0.

#### 18. Get software versions from I/O board

Command to S2000 PRO/ELITE; **VIO**

Response from S2000 PRO/ELITE; **n** (n represents a integer number)

Example:

If “10XX\r” is responded, the software version on the I/O board will be 1.0.

#### 19. Get S2000 PRO/ELITE serial number

Command to S2000 PRO/ELITE; **GSN**

Response from S2000 PRO/ELITE; **n** (n represents a integer number)

Example:

If “20XX\r” is responded, the S2000 PRO/ELITE serial number will be 20.

#### 20. Get light guide diameter

Command to S2000 PRO/ELITE; **GLG**

Response from S2000 PRO/ELITE; **n** (n represents a float number)

Example:

If “2.5XX\r” is responded, the light guide diameter will be 2.5mm

#### Note:

- If “3.402823466e38XX\r” is responded, no light guide diameter information is available.
- If the unit is in LEVEL mode, “Need CAL” will be the response.
- If “-3.403823466e38XX\r” is responded, no light guide diameter information is available. The S2000 PRO/ELITE displays LEVEL instead of irradiance.

#### 21. Get S2000 PRO/ELITE POWER set point

Command to S2000 PRO/ELITE; **GPW**

Response from S2000 PRO/ELITE; **n** (n represents a float number in Watts)

Example:

- If “1.222XX\r” is responded, the S2000 PRO/ELITE LEVEL set point will be 1.222 W.
- If the unit is in LEVEL mode, “Need CAL” will be the response.

#### 22. Get S2000 PRO/ELITE irradiance set point

Command to S2000 PRO/ELITE; **GIR**

Response from S2000 PRO/ELITE; **n** (n represents a float number in Watts per square cm)

Example:

- If “15.66XX\r” is responded, the S2000 PRO/ELITE irradiance set point will be 15.66 W/cm<sup>2</sup>.
- If the unit is in LEVEL mode, “Need CAL” will be the response.

### 23. Get S2000 PRO/ELITE actual irradiance reading

Command to S2000 PRO/ELITE; **GIM**

Response from S2000 PRO/ELITE; **n** (n represents a float number in Watts per square cm)

If the unit is in LEVEL mode, “Need CAL” will be the response.

Example:

If “15.66XX\r” is responded, the S2000 PRO/ELITE irradiance reading will be 15.66 W/cm<sup>2</sup>.

### 24. Get S2000 PRO/ELITE maximum irradiance output

Command to S2000 PRO/ELITE; **GMP**

Response from S2000 PRO/ELITE; **n** (n represents a float number in Watts per square cm)

If the unit is in LEVEL mode, “Need CAL” will be the response.

Example:

If “35.66XX\r” is responded, the S2000 PRO/ELITE maximum irradiance output will be 35.66 W/cm<sup>2</sup>.

### 25. Set iris Level

Command to S2000 Pro/Elite; **SILn**

**Note:**  $0 < n \leq 100$

*n must be a integer number*

Example:

If “SIL20XX\r” is set, the S2000 PRO/ELITE iris Level will be 20%.

Response from S2000 PRO/ELITE;

**Received** – if the value n is valid

**Invalid** – if the value n is out of range

**Done CAL** – the S2000 PRO/ELITE has been calibrated, so the value can not be set.

**EXP** – the S2000 PRO/ELITE is running a timed exposure, so the value cannot be set.

#### 26. Set exposure time

Command to S2000 PRO/ELITE; **STMn**

**Note:**  $2 \leq n \leq 9999$

*n must be a integer number*

Example:

If “STM10XX\r” is set, the S2000 PRO/ELITE exposure time will be 1 second

Response from S2000 PRO/ELITE;

**Received** – if the value n is valid

**Invalid** – if the value n is out of range

**EXP** – the S2000 PRO/ELITE is running a timed exposure, so the value cannot be set.

#### 27. Set LEVEL set point

Command to S2000 PRO/ELITE; **SPWn**

**Note:**  $n \geq .1$  (5mm LG)

$n \geq .25$  (8mm LG) and n is a float number

Example:

If “SPW2.55XX\r” is set, the S2000 PRO/ELITE LEVEL set point will be 2.55 W.

Response from S2000 PRO/ELITE;

**Received** – if the value n is valid

**Invalid** – if the value n is out of range

**Need CAL** – the S2000 PRO/ELITE need to be calibrated before the value can be set.

**EXP**- the S2000 PRO/ELITE is running a timed exposure, so the value cannot be set.

#### 28. Set irradiance set point

Command to S2000 PRO/ELITE; **SIRn**

**Note:**  $n > 0$ , and n is a float number

Example:

If “SIR15.32XX\r” is set, the S2000 PRO/ELITE irradiance set point will be 15.32 W/cm<sup>2</sup>.

Response from S2000 PRO/ELITE;

**Received** – if the value n is valid

**Invalid** – if the value n is out of range

**Need CAL** – the S2000 PRO/ELITE need to be calibrated before the value can be set.

**EXP** – the S2000 PRO/ELITE is running a timed exposure, so the value cannot be set.

#### 29. Get PLC Mode

Command to S2000 PRO/ELITE; **GPM**

Response from S2000 PRO/ELITE; **n**

**Note:** If *n* is '1' then trigger level mode is enabled, if it is '0' then trigger level mode is disabled.

#### 30. Set PLC Mode

Command to S2000 PRO/ELITE; **SPMn**

**Note:** *n*, if *n* is 0 then trigger level mode is disabled. If *n* is 1 then trigger level mode is enabled.

Response from S2000 PRO/ELITE;

**Received** – if the command has been accepted.

**Invalid** – if the value is outside the specified range.

### 18.5 Command Timing Specification:

**18.5.1** The minimum amount of time required for data to be received by the PC is over 20mS except for any commands related to iris movement which is over 200msec. The next command must be sent after the previous command is responded by the unit. Failure to adhere to this requirement will result in dropped responses as well as other undesirable effects.

### 18.6 Graphic User Interface Control:

**18.6.1** When the unit is connected to PC, the unit front panel will be automatically locked out. The unit status will be sampled at twice per second. Refer to section 20 for detailed operating description of the GUI.

### 18.7 Sample Code:

#### Example Borland C++ code for command "GLG" – Get light guide diameter

```
void __fastcall TForm1::Cmd33Click(TObject *Sender)
{
    signed char Tries = 4;
    float LG_diameter;

    unsigned char *Command;
```

```
String      Textcom= "GLG";
int         Command_CRC;

Timer1->Enabled = false;
Cmd33->Enabled = false;

Command = Textcom.c_str();
Command_CRC = CalcCRC8(0, Command, 3); // Calculate CRC8 for the
command "GLG"

Screen->Cursor = crHourGlass; // Show hourglass
cursor
Application->ProcessMessages();

while (Tries--)
{
    ComPort->FlushInBuffer();
    ComPort->FlushOutBuffer();
    ComPort->PutString(Textcom); // send the
command "GLG"
    ComPort->PutChar(Asc[Command_CRC>>4]); // send the
CRC8 in hex string
    ComPort->PutChar(Asc[Command_CRC & (0xF)]); // send the CRC8
in hex string
    ComPort->PutChar('\r');

    a=0;
    UnitResponse = "";

    TimeOut = false;
    TimeOutTimer = 1;
    while (TimeOutTimer) Application->ProcessMessages();

    if (a == '\r')
    {
        a = 0;
        if (CompareCRC()) // Check if the data is
received correctly
        {
            if ( strcmp(RdPtr, "Err") == 0) {
                MessageDlg("Command is wrong", mtError, TMsgDlgButtons() <<
mbCancel, NULL);
                Screen->Cursor = crDefault;
                Cmd33->Enabled = true;
                Timer1->Enabled = true;
                Application->ProcessMessages();
            }
        }
    }
}
```



#### CRC8 sample code:

```
unsigned char CalcCRC8(unsigned char *Data)                // calc 8 bit CRC
{
    unsigned char LoopCntr;
    unsigned char CRC8;
    unsigned char A;
    unsigned char i;

    CRC8 = 0;                                              // reset CRC8

    for (i = 0; i < 8; i++){                               // data loop
        A = *Data++;                                       // get first data byte
        for (LoopCntr = 0; LoopCntr < 8; LoopCntr++, A >>= 1){ // 8 bit loop
            if ((A ^ CRC8) & 0x01){                         // test bit 0 of (OneWire.Data XOR
                CRC8 ^= 0x18;                               // toggle bits 3 and 4 of CRC8
                CRC8 >>= 1;                                 // rotate right CRC8, 1 time
                CRC8 |= 0x80;                               // set bit 7 of CRC8
            }else
                CRC8 >>= 1;                                 // rotate right CRC8, 1 time
        }
    }
    return CRC8;
}
```

## 19 S2000 PRO/ELITE WEB Graphical User Interface

Blank

## 20 StepCure

20.1.1 Blank

## 21 Routine Care and Maintenance



1. Operate the unit in a well ventilated area with at least six inches clearance at the rear of the unit for proper air flow. Do not place any objects below the unit, between the feet as this will restrict airflow through the bottom of the front face plate.
2. For safe operation, use only a grounded outlet.
3. Avoid physical shocks or jarring to the unit especially while the unit is operating. Such sudden movements reduce the lamp module life.
4. The lamp module must be operated for a minimum of 20 minutes each time it is turned on to prevent damaging the lamp. Increasing the time between turning the lamp module on and off will maximize lamp life.



5. Replace the air filter, found under the front face plate, frequently to ensure unrestricted air flow. It is recommended as a minimum that the air filter be removed and washed with a mild detergent and water every time the lamp module is replaced.

**Note:** *restricted airflow can cause the lamp temperature to increase above optimum temperature, significantly reducing lamp life.*

6. When necessary, clean the light emitting end of the light guide using an optical cleaning solution.
7. Cleaning of unit is not required, however if cleaning is desired, disconnect the AC power cord from the unit and use only a water and simple detergent solution. Ensure that cleaning solution does not come in contact with any optical, moving mechanical or electrical parts.
8. Recommended operation of S2000 PRO/ELITE is in horizontal position using S2000 PRO/ELITE beyond 15% of tilt from a horizontal position will wear lamp life.

## 21.1 Replacing the Lamp Module

- 21.1.1** The S2000 PRO/ELITE comes with a choice of a standard or surface curing lamp. Please ensure that the appropriate type lamp has been selected for your curing application. The part number of the lamp module is available on the lamp box.

Excelitas Canada Part #	Description
012-****	Standard Curing Lamp
012-****	Surface Curing Lamp

**Table 7 Lamp Part Number**

Refer to Section 6 for lamp module replacement instructions  
Refer to Section 22 for messages regarding troubleshooting and lamp module replacement.

## 21.2 Replacing the External Fuses



- 21.2.1** The external (mains) fuses are located in the fuse drawer which is located in the AC inlet module on the rear panel.
- 21.2.2** Turn off the main POWER switch and remove the AC POWER cord from the unit.
- 21.2.3** Gently pull out the drawer with the aid of a flat-head screwdriver.
- 21.2.4** Carefully lever one end of the blown fuse up from its retaining clip with a small flat-head screwdriver and lift it out.
- 21.2.5** Replace the damaged fuse(s) only with the same type and rating (F5A, 250V). The rear compartment must contain two active fuses.
- 21.2.6** Close the fuse drawer.
- 21.2.7** Reconnect the AC POWER cord.



## 21.3 Replacing the Air Filter



- 21.3.1** The external air filter is located under the front face plate of the S2000 PRO/ELITE.
- 21.3.2** Turn off the main POWER switch and remove the AC POWER cord from the unit.
- 21.3.3** Remove screws holding the filter cover in place and remove the filter.
- 21.3.4** Push in the replacement filter so that it sits flat in place and re-install filter cover.

#### 21.4 Replacing The Bandpass Filter

**21.4.1** The S2000 PRO/ELITE includes a bandpass filter to limit the wavelengths of light for your application. There are 5 bandpass filters available, which are selected at the time of purchase

Part #	Description
*	Filter 365 nm
*	Filter 250-450 nm
*	Filter 400-500 nm
*	Filter 320-390 nm
*	Filter 320-500 nm
*	Custom filter

**Table 8 Replacement Filter Part Numbers**

**21.4.2** The bandpass filter currently installed on your S2000 PRO/ELITE system will be identified on the packaging label as well as on the filter assembly.

#### 21.5 Light Guide Cleaning

##### Instructions for cleaning the light emitting end (output) of the light guide

###### Materials:

- Lens Tissue sheets
- Optical Swabs
- IPA (Isopropyl Alcohol) solution
- Wooden stick (eg; tongue depressor/popsicle stick)

**Caution:**

*Before using Isopropyl Alcohol consult the manufactures MSDS Sheets for proper handling and storage.*

**Caution:**

*Never look directly into the light emitting end (output) of the light guide. The light could severely damage the cornea and retina of the eye. Protective eye wear must be used at all times and always turn the system off before removing the lightguide.*

**Notes:**

1. The staining which appears on the light emitting end of the light guide is the result of gaseous burn-off from the UV adhesive.
2. Inspect light guide optical input port of R2000 Radiometer for signs of residual gaseous burn-off powder/dirt, transferred from the light emitting end of the light guide, clean as stated below.
3. Never apply a dirty tissue/swab to the end of the light guide or R2000 optical input port.
4. Never use a razor blade or any other metallic apparatus to scrape off adhesive build up from the quartz lens on the light emitting end of the light guide. This may cause permanent damage (scratches) to the quartz lens.

**Procedure:**

1. Turn off power to the UV spot curing system and let the light guide cool down for at least 10 minutes.
2. If required, remove light guide output end from the production fixture.
3. Remove the light guide from the light guide port of the UV spot curing system.
4. Place the protective cap onto the light guide input end while cleaning output end.
5. Wipe output end of light guide with non-abrasive lint free lens tissue or optical swab saturated with an IPA cleaning solution until the staining has disappeared.
6. For excessive adhesive build up on the light emitting end lightly scrape the adhesive build up with a wooden stick such as tongue depressor/popsicle stick. Take care not to damage the quartz lens.
7. Re-install the light guide as per the instructions located in the relevant UV spot curing manual/user guide.
8. For cleaning R2000 optical input port; wipe surfaces with non-abrasive lint free lens tissue or optical swab saturated with an IPA cleaning solution until the staining has disappeared. Care is to be taken to avoid puddling/over saturation of input port.





Front Panel Buttons	Position	Description
Start/Stop Button	Depressed	Shutter Activation
Center button	Momentary Depressed	Select
UP Button	Momentary Depressed	Navigates up. Increases intensity value.
DOWN Button	Momentary Depressed	Navigates down. Decreases intensity value
Left Button	Momentary Depressed	Navigates left. Decreases time.
Right Button	Momentary Depressed	Navigates right. Increases time.

**Table 11 Front Panel Button Descriptions**



**Service to be completed by qualified repair personnel only!**

- 22.1.1** If the unit fails to POWER up or function properly, use the following checklist to eliminate the most common causes of problems. Check that:
1. The AC POWER cord is securely plugged into a functional AC wall plug.
  2. The AC POWER cord is securely plugged into the AC inlet on the rear of the unit.
  3. The mains AC POWER switch is in the ON position.
- 22.1.2** If the LED display lights and the fan starts, but the lamp will not turn on, check for the following:
1. The LCD display indicates “cooling” message. This indicates the lamp is too hot to strike. The lamp will automatically strike when it has cooled.
- 22.1.3** If the shutter does not open, check that:
1. The light guide is fully inserted; The lamp is warmed-up; the display is not displaying errors. The shutter interlock input is not active (P1, pins 6 & 4).
  2. The LCD displays shutter failure. POWER down the unit, wait a few minutes and turn POWER on to the unit. If the unit displays a shutter failure again, contact your local Excelitas Canada Service Centre to have your unit serviced.
- 22.1.4** If the light intensity is too low, check that:
1. The percent iris opening is set high enough.
  2. There are no foreign substances on the emitting end of the light guide.

3. There are no bends, kinks, or other physical damage to the guide. Replace the light guide if there is any physical damage.
4. The lamp has been installed correctly. See section 6 – Installing the Lamp Module.

***It may be necessary to replace the lamp or to replace the light guide. Contact your Excelitas Canada sales representative for information on purchasing a new lamp or light guide.***

#### **22.1.5** If the LCD display does not light:

1. If the fan is functional, POWER down the unit, wait approximately 20 seconds then POWER it up again
2. If the problem persists, contact your local Excelitas Canada Service Centre.

#### **22.1.6** If one or more fans do not work:

1. If the LED display is functional, POWER down the unit, wait approximately 20 seconds then POWER it up again
2. If the problem persists, contact your local Excelitas Canada Service Centre.

## 23 Technical Specifications

**OmniCure® S2000 PRO/ELITE Exposure Timer Tolerance:**

+/- 250ms or +/- 1% of the exposure time setting, whichever is greater.

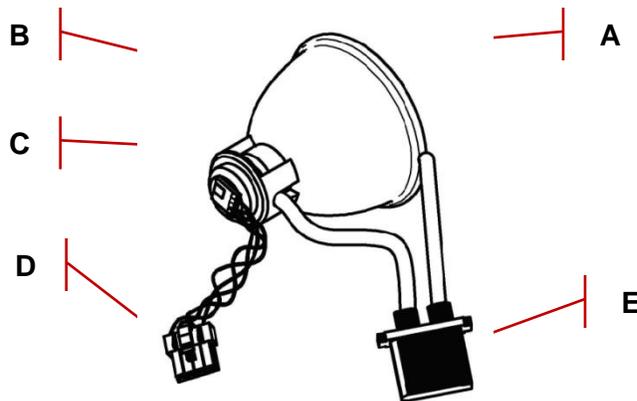
**OmniCure® S2000 PRO/ELITE Output Accuracy (with close-loop feedback activated):**

+/-5% or 200mW/cm<sup>2</sup>, whichever is greater.

**OmniCure® S2000 PRO/ELITE Minimum Adjustable Irradiance Level:** 0.5W/cm<sup>2</sup>

**OmniCure® S2000 PRO/ELITE Closed Loop Feedback shut-off @exposure time of .3 sec and lower.**

### 23.1 Lamp Module



**A** – Rim of Lamp Reflector  
**D** – Intelli-Lamp Connector

**B** – Reflector  
**E** – Power Connector

**C** – Back ceramic Mount

#### Lamp Module

Excelitas Canada 200W Mercury DC: Standard or Surface

Curing

**Focal Point of Spot**

52.875 mm

**Lamp Module Life**

2000 hours

**Warm Up**

4 minutes (min)

**Lamp Voltage (new bulb)**

60VDC nominal

**Lamp Voltage (range)**

36VDC to 95VDC

**Lamp Current**

3.33A typical, 5.7A maximum



#### Warning

The method in which lamps are disposed of must comply with local rules & regulations for disposal of hazardous materials. Lamps may be returned to Excelitas Canada providing they are returned in its original packaging. Excelitas Canada will dispose of them in the appropriate manner.

#### Warning

Hg – LAMP CONTAINS MERCURY, Manage in Accord with Disposal Laws, see:

[www.lamprecycle.org](http://www.lamprecycle.org) or 1-800-668-8752

### 23.2 Light Guide

**Light Delivery** Flexible High Power Fibre Light Guides will be available in a variety of lengths with a variety of core diameters.

**Note:** 3mm single leg liquid light guides are not compatible with the S2000

**Power** Input

**Power Supply:** Power Factor Corrected, Universal Input

**Input Voltage:** 100 - 240VAC, 50/60Hz

**Current:** 3.5A max at 120VAC  
2.0A max at 240VAC

**Input Surge:** 50A max. (cold start)

**Protection:** Short circuit auto-recovery  
Overvoltage (up to 135%, +/- 5% of nominal)  
EMI filtering integrated into the power supply  
Power supply has integrated thermal cut-off

**Fuse Rating:** Dual fuse system: each fuse rated at F5.0A 250V, 5x20mm type located in the AC receptacle

### 23.3 I/O Ports (including RS-232)

**23.3.1** The S2000 PRO/ELITE has 5 different I/O ports; 4 located on the back of the unit. The 1st port is a simple 2-wire, audio style jack that can be connected to a foot pedal (supplied with each unit) or any other electro-mechanical triggering device. This is an exposure trigger input used to start an exposure. The 2nd port is a RS-232 port (9 pin) to be connected to a PC and is described in more detail in section 19. The 3rd and 4th ports (15 pin DE style) are for PLC interfacing. A 5th port is a RS-232 port located on the side of the front panel which is used to connect to the R2000 Radiometer for calibration of the S2000 PRO/ELITE.

### 23.4 USB Interface

**23.4.1** Blank

### 23.5 Environmental Conditions

#### Operating Conditions

<b>Ambient Temperature:</b>	15°C to 40°C
<b>Altitude:</b>	2000m max.
<b>Atmospheric Pressure:</b>	700 to 1060 hPa
<b>Relative Humidity:</b>	15% to 95% (non-condensing)
<b>Installation Category:</b>	II
<b>Pollution Degree:</b>	2

#### Transport and Storage Conditions

<b>Temperature:</b>	-40 to +70°C
<b>Relative Humidity:</b>	10% to 100%
<b>Atmospheric Pressure:</b>	500 to 1060 hPa

## 23.6 Noise and the OmniCure S2000 PRO/ELITE

### Using the S2000 PRO/ELITE in a Noisy Environment

What is Noise?

"Electrical noise" is a term used to describe unwanted electronic emissions. Noise is actually comprised of RFI (Radio Frequency Interference) EMI (Electro Magnetic Interference) and other similar sources of energy. Electronic equipment may behave in a non-standard manner (exhibit erratic operation) with the presence of high Levels of noise. They will continue to behave erratically as long as the noise is present, unless protected with noise suppressors.

#### 23.6.1 What are Sources of Noise?

Sources of noise are any electronic equipment which utilize or generate a high frequency AC current and voltage. Specifically, equipment such as metal halide arc lamps, mercury short arc lamps, xenon arc lamps, switch mode POWER supplies, pulsed lasers, x-ray equipment, welding equipment and RFI generators are a few classic examples of large noise producing equipment.

#### 23.6.2 Determining the Noise Level in Your Environment

If the S2000 PRO/ELITE, along with other pieces of equipment, operate abnormally, in an intermittent or continuous manner, it is quite possible that large Levels of noise are present. It is recommended that prior to installing the S2000 PRO/ELITE, the user examine any equipment nearby. If any of the equipment falls into the category of equipment listed above it is further advised that the user examine the ratings and description labels on each piece of equipment. Any equipment that does not have a label indicating that it meets Industry Canada, FCC, or IEC- EMC requirements is a possible noise source. If any equipment is deemed a noise source, or even suspected to be a noise source, then additional noise protection should be incorporated during the installation of the S2000 PRO/ELITE.

#### 23.6.3 Shielding

Any wire or cable assembly entering or exiting the S2000 PRO/ELITE may act like an antenna which will pick up noise and transmit it to the internal electronics. This may cause the S2000 PRO/ELITE to operate erratically.

There are several ways in which the S2000 PRO/ELITE can be shielded (protected). Excelitas Canada recommends the use of shielded cables for all cable assemblies: the AC line cord, the I/O cables and the foot switch. Furthermore, it is advised that clamp-on ferrite shield beads be added to every cable assembly. Suitable ferrite shield beads are: P/N: 0443164251 by Fair-Rite Products Corp. (or) P/N: 28A2025-0A0 by Steward.

Noise suppression products are also available in the form of AC power bars that incorporate surge suppression and noise suppression circuitry. Either type will help in protecting the S2000 PRO/ELITE from noise. Providing the S2000 PRO/ELITE with an AC line that is separate from any other noise producing equipment will also be beneficial.

Depending on the noise Level in the environment, any combination or all of the above shielding recommendations may be necessary to protect the S2000 PRO/ELITE from noise and ensure smooth operation. We can help you to shield the S2000 PRO/ELITE from electrical noise. Please contact Excelitas Canada for further assistance.

## 24 Regulatory Compliance

### 24.1 Product Safety and Electromagnetic Compatibility:

\*to be completed after regulatory\*\*

#### CE Marking

Council Directive 2014/35/EU	Low Voltage Directive	
Council Directive 2014/30/EU	EMC Directive	
Council Directive 2012/19/EU	WEEE Directive	
Council Directive 2011/65/EU as amended by (EU) 2015/863	RoHS	
Council Directive 2014/53/EU	Radio Equipment	

### 24.2 FCC Part 15 Subpart B, Class A - Unintentional Radiators

#### FCC Class A Digital Device or Peripheral - Information to User

##### NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this equipment not expressly approved by the party responsible for compliance may void the FCC authorization to operate this equipment.

### 24.3 FCC Part 15 Subpart C, Intentional Radiators

This device contains licence-exempt transmitter(s)/receiver(s) that comply with intentional radiator requirements of Part 15, Subpart C.

**FCC ID: 2AXSI-SSERIES**  
**IC ID: 26590-SSERIES**

**Canada**

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent ap-pareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

**WARNING**

Changes or modifications not expressly approved by Excelitas Technologies could void the user's authority to operate the equipment.

**24.4 WEEE Directive**



The symbol above indicates that this product should not be disposed of along with municipal waste, that the product should be collected separately, and that a separate collection system exists for all products that contain this symbol within member states of the European Union.

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems.

Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol indicated above invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.



### 24.5 China RoHS

The symbol above indicates that this product is in compliance with China RoHS requirements.

### 24.6 Mechanical Specifications

#### Dimensions

<b>Height:</b>	TBC
<b>Depth:</b>	TBC
<b>Width:</b>	TBC
<b>Unit Weight:</b>	TBC

### 24.7 Radio specifications

High performance multi-protocol NFC frontend IC supports the following operating modes:

#### Transmitter:

Center Frequency: 13.56 MHz +/- 0.01%

Modulation:

#### ISO\_14443 Type A

ASK Percentage: 100%

#### ISO\_14443 Type B

ASK Percentage: 10%

**Receiver:**

Carrier Frequency: 13.56 MHz

Subcarrier Frequency: 847.5 kHz

Subcarrier Data:

**ISO\_14443 Type A**

Modified Manchester

**ISO\_14443 Type B**

NRZ\_L BPSK

### **24.8 Miscellaneous**

**Display:** 4.3" LCD touch screen

**Keypad:** 6 tactile buttons, 4 navigation, 1 select, 1 start/stop

Specifications may vary slightly and are subject to change without notice.

## 25 Warranty

- 25.1.1** Excelitas Canada warrants the original purchaser for a period of one (1) full year, calculated from the date of purchase, that the equipment sold is free from defects in material and workmanship. All repairs are warranted for 90 days.
- 25.1.2** In the event of a claim under this warranty, the equipment is to be sent postage and carriage paid to the [Excelitas Canada Service Centre](#). Returned equipment will not be received without a Return Authorization (RA) Number, issued by the appropriate Service Centre.
- 25.1.3** In order for us to serve you better, include a written description of the fault and the name and telephone number of a contact person who may be contacted for additional service related questions.
- 25.1.4** Any claims for units received with defects in material or workmanship must be reported to an authorized [Excelitas Canada Service Centre](#) within 30 days from the original date of receipt and returned within 30 days of reporting to a an authorized [Excelitas Canada Service Centre](#). Excelitas Canada will repair or replace these reported defects free of charge. The equipment must be sent postage and carriage paid.
- 25.1.5** Package the equipment in its original shipping case or as appropriate to prevent damage during transport.
- 25.1.6** In the case of damage caused by wear and tear, careless handling, neglect, by the use of force or in the case of interventions and repairs not carried out by an [Excelitas Canada Authorized Service Center](#), the warranty ceases to be valid. This warranty may not form the basis for any claims for damages, in particular not for compensation of consequential damages.
- 25.1.7** This warranty is not transferable.
- 25.1.8** No warranty is extended to perishable items (if purchased separately or included in systems). These may include, but are not limited to, fuses, air filters, optical filters, cables, light guides and light guide adapters.

**Warning:** *Apart from lamps (for certain equipment), fuses, air filters, or optical filters (for certain equipment) there are no field serviceable parts within the equipment. Opening the equipment main enclosure will void the warranty.*

## 25.2 Replacement Bulb Warranty

- 25.2.1** If the S2000 PRO/ELITE bulb fails to strike during the warranty period of 2000 hours, the bulb will be replaced under warranty. In the event of a claim under this guarantee, the lamp is to be sent postage and carriage paid, including a description of the fault, to the [Excelitas Canada Service Centre](#). Returned equipment will not be received without a Return Authorization (RA) Number, issued by the appropriate Service Centre. Lamps must be purchased from an authorized Excelitas Canada Representative or Distributor to be eligible for the warranty replacement. This warranty is non-transferable.
- 25.2.2** In the case of damage caused by careless handling, neglect, by the use of force or in the case of interventions and repairs not carried out by an Excelitas Canada Service Centre to the S2000 PRO/ELITE system, the guarantee ceases to be valid.

## 25.3 Returning your S2000 PRO/ELITE to Excelitas Canada

- 25.3.1** Please make a note of the problem encountered, the steps followed to isolate the problem and the result of any trouble shooting steps taken.
- 25.3.2** Telephone the nearest Excelitas Canada Service Centre to obtain a Return Authorization Number so that repairs may be completed quickly and efficiently. In North America, request for Return Authorization number can be made online from website [https://www.excelitas.com/ox\\_service\\_request\\_form](https://www.excelitas.com/ox_service_request_form)
- 25.3.3** Enclose details of the problem with the unit and return both to the Excelitas Canada Service Centre. The unit should be returned in its original packaging if possible. Please do not ship the unit with the lamp installed.
- 25.3.4** Include a phone number and contact person who may be reached for any additional service-related questions.

## 26 Contact Information

Excelitas Canada 2260 Argentia Road

Mississauga, Ontario

L5N 6H7 CANADA

Tel.:+1 905 821-2600

Toll.:+1 800 668-8752 (USA and Canada)

Fax:+1 905 821-2055

<https://www.excelitas.com/omnicure-x-cite-inquiries>

## Technical Assistance

[techsupport@excelitas.com](mailto:techsupport@excelitas.com)

[https://www.excelitas.com/ox\\_service\\_request\\_form](https://www.excelitas.com/ox_service_request_form)

For a complete listing of Authorized OmniCure Distributors and Service Centers, please go to the main web site: <https://www.excelitas.com/dealer-search>

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## **27 Addendums**

### **27.1.1** Blank