SOLA SE II Light Engine
Instruction Manual

Emissions Certifications

This equipment has been tested and found to comply with the limits of EMC directive 2004/108/EC. 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.

Safety Certifications

CB Scheme (IEC 61010-1:2010)
CE Declaration of Conformity
EMC Directive 2004/108/EC
Low Voltage Directive 2006/95/EC
IEC/EN 62471:2008, Photobiological Safety of Lamps and Lamp Systems Certification
TÜV SÜD America, NRTL Listing (UL 61010-1:2012)
TÜV SÜD America, Canadian Listing (CAN/CSA-C22.2 No. 61010-1:2012)
TÜV SÜD America, European License (EN 61010-1:2010)

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1. Introduction

The Lumencor SOLA light engine family is designed for laboratory use by bioanalytical researchers and/or developers of life science instrumentation. The light engine provides a white light output by combining discrete, bright, light outputs directly to a sample; or in the case of fluorescence microscopy, to the objective. The SOLA SE II light engine is a powerful, solid state illumination source that is both efficient and reliable.

The solid state light sources within the SOLA SE II are electronically controlled using a computer and third party software or a Control Tablet accessory with the SOLA app. The rocker switch located on the front panel or the optional latching foot switch (with 12 ft cable) accessory that plugs into the 3.5 mm connector on the rear panel can also be used for on/off operation.

Model numbering for the electronically controllable SOLA SE II product is defined as follows: SOLA SE 5-XXX-YZ. The XXX denotes 000-999 and/or AAA-ZZZ and defines the light engine recipe. Y is any single alpha numeric and defines the version while Z is any alpha numeric which denotes the revision level.

2. Precautions and Warnings {Précautions et mises en garde}

A few simple practices will ensure trouble-free operation for the life of the light engine.

Les quelques règles simples suivantes permettront d'assurer un fonctionnement fiable pendant toute la durée de service de la source lumineuse.

Safety Instructions:
Please read and follow all safety instructions provided **BEFORE** using your new SOLA SE II light engine. Failure to comply with the safety instructions may result in fire, electrical shock, or personal injury and may damage or impair protection provided by equipment. Please save all safety instructions.

Instructions de sécurité:
Veiller à lire et à respecter toutes les instructions de sécurité fournies **AVANT** d'utiliser le nouveau SOLA SE II afin d'écarter les risques d'incendie, de décharge électrique, de blessure corporelle et de possibles dommages ou défaillance de la protection offerte par l'appareil. Conserver toutes les instructions de sécurité.

Safety Definitions {Définitions relatives à la sécurité}:

Warning: Statements identify conditions or practices that could result in personal injury.

Avertissement: déclarations qui identifient des situations ou des pratiques susceptibles d'entraîner des blessures corporelles.

Caution: Statements identify conditions or practices that could result in damage to your equipment.

Attention: déclarations qui identifient des situations ou des pratiques susceptibles d'endommager le matériel.

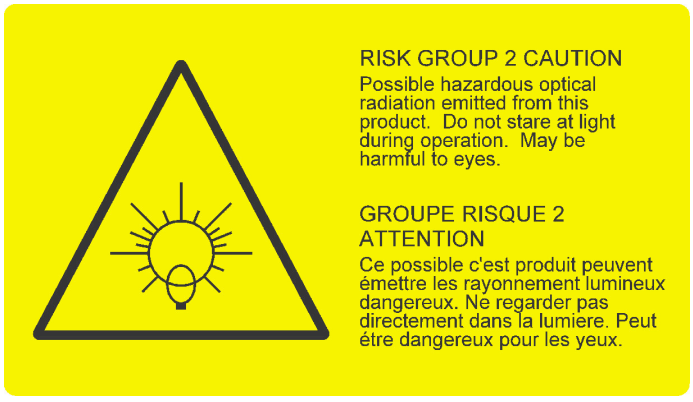
Safety Items {Mesures de sécurité}:

Warning: DO NOT use an unapproved power supply. The Lumencor-supplied external power supply is recommended for use with the SOLA SE II light engine. Alternative 24 VDC power supplies may be used provided that the current is limited to 5.0 A max. Also, it is imperative that the alternative power supply has output over-current protection, as the power input of the SOLA SE II is not fused. The equipment is required to be supplied by a DC power source that has been assessed to meet the requirements of a limited current circuit per clause 9.3 of IEC 61010-1. Connect the AC power cord to a receptacle with a protective safety (earth) ground terminal.

Avertissement : NE PAS utiliser une alimentation électrique non homologuée. Il est conseillé d'utiliser l'alimentation électrique externe fournie par Lumencor avec la source lumineuse SOLA SE II. Il est possible d'utiliser une autre alimentation électrique continue 24 V à condition que l'intensité soit limitée à 5,0 A maximum. En outre, il est impératif qu'elle présente une protection de sortie contre les surintensités, car l'entrée d'alimentation du SOLA SE II ne comporte pas de fusible. Le matériel doit être alimenté par une source d'alimentation continue qui a été déclarée conforme aux critères d'un circuit d'énergie limitée en vertu de la clause 9.3 de CEI 61010-1. Brancher le cordon électrique sur une prise de courant protégée par une borne de terre.

Warning: RISK GROUP 2 CAUTION: Possibly hazardous optical radiation emitted from this product. Do not stare at the output of the light engine. It may be harmful to the eyes. The brightness of this light source is higher than most commercial lighting fixtures and is intended to couple directly into a microscope or other bioanalytical instrument.

Avertissement: GROUPE DE RISQUE 2 ATTENTION: Ce possible c'est produit peuvent émettre les rayonnement lumineux dangereux. Ne regardez pas à la sortie du moteur de lumière. Il peut être dangereux pour les yeux.. L'intensité lumineuse de cette source est supérieure à celle de la majorité des appareils d'éclairage disponibles dans le commerce et est conçue pour un raccordement direct à un microscope ou autre appareil de bioanalyse.



Caution Label on SOLA SE II Light Engine Package

Caution: DO NOT open the unit. There are no serviceable parts inside and opening the light engine chassis and opening the light engine enclosure will void the manufacturer's warranty. Changes or modifications not expressly approved by Lumencor void the user's authority to operate the equipment.

Attention: NE PAS ouvrir l'appareil. Il ne contient aucune pièce réparable et l'ouverture de son boîtier a pour effet d'annuler la garantie. Les changements ou modifications non approuvés expressément par Lumencor annuler l'autorité de l'utilisateur à faire fonctionner l'équipement.

Caution: DO NOT set liquids on the light engine. Spilled liquids may damage your light engine.

Attention: NE PAS placer de liquide sur la source lumineuse. Les liquides renversés peuvent endommager la source lumineuse.

Caution: DO NOT drop the light engine. It contains glass optical components that could be damaged or mis-aligned by the shock produced by a drop onto a hard surface.

Attention: NE PAS laisser tomber la source lumineuse. Elle contient des composants optiques en verre susceptibles d'être endommagés ou désalignés par le choc résultant d'une chute sur une surface dure.

DISCLAIMER: Lumencor shall not be liable for injury to the user or damage to the product resulting from the SOLA SE II light engine being used in a way for which it was not intended and in complete disregard for all posted safety precautions and warnings.

AVIS DE NON-RESPONSABILITÉ: Lumencor décline toute responsabilité pour les blessures corporelles ou les dommages au produit résultant d'une utilisation du SOLA SE II autre que celle prévue et du mépris total de toutes les mesures de sécurité et mises en garde affichées.

3. Operating Instructions

The SOLA SE II light engine ships with the following list of standard components.

1. SOLA SE II light engine configured with an output adapter for a 3 mm diameter liquid light guide.
2. A 24 V / 5.0 A power supply (Lumencor part no. 27-10001).
3. A 6 ft AC power cord for the power supply (Lumencor part no. 29-10002 for North American customers, 29-10004 for UK customers, 29-10005 for European customers, 29-10024 for Australia/New Zealand and 29-10008 for customers in Israel).
4. One USB cable, 2 m length for electronic communication

3.1 Installation

When setting up the SOLA SE II light engine for use, be sure to place the unit on a hard surface and avoid blocking or restricting airflow at the air inlets or exhaust ports on the enclosure. Restricting the airflow will cause the unit to operate at elevated temperatures and will result in decreased product life and/or premature failure.

Position the unit in an orientation that allows unrestricted access to the DC power connector at the back of the light engine. In an emergency, you may need to disconnect power to the unit quickly. The rocker switch on the rear panel controls the power to the unit. Refer to the photo on the right for the location of the input power connection, the foot switch connection and the power switch, all located on the rear panel.

Rear Panel of SOLA SE II

The SOLA SE II light engine has a safety interlock for the light guide that prevents operation unless a liquid light guide is fully inserted into the light guide port. Before operating the unit, make sure the 3 mm diameter liquid light guide is properly installed into the light guide port (see picture below). The set screw should be loosened using a 2 mm hex wrench so the light guide slides all the way into the receptacle without obstruction. Once the light guide is fully inserted, lightly tighten the set screw to hold it in place. Prior to turning the light on, be sure the output end of the light guide is in a safe position, pointed away from anything that could be damaged by high intensity light, including people.

Take necessary precautions to protect yourself and others from the high intensity light when turning on the unit. The SOLA SE II light engine output can be turned on or off using electronic communication, the front panel rocker switch or a foot pedal switch. Intensity settings can be adjusted using software or the app provided with the Control Tablet accessory. A green indicator light on the front panel lets the user know that the illumination sources are on.

Light Guide Port

Alternatively, a foot switch can be used to turn the light on or off. It is recommended the foot switch be plugged into the connector when the light engine power is off, since you cannot observe whether the foot switch is in the on state or the off state by looking at the foot pedal. If the foot pedal is in the on state when the SOLA SE II light engine is powered on, the light output will turn on immediately.

If the front panel rocker switch is used to turn the light on, that same switch will need to be used to turn it off. If the foot pedal is used to turn the light on, the foot pedal will need to be used to turn the light off.

As a safety feature, light from the SOLA SE II light engine cannot be activated unless the light guide is fully inserted into the light guide port. In the event that the light guide is pulled from the unit during operation, the light output will cease immediately. In order to turn the light back on, you will need to: 1) turn the light engine power off, 2) fully insert the light guide into the light guide port, 3) turn the light engine power back on, and then 4) activate the light using either the front panel rocker switch or the foot switch.

3.2 Operation Using SOLA GUI

The SOLA SE II light engine can be electronically controlled using a GUI (graphical user interface) that is available for free download on the Lumencor website. Setup instructions are as follows:

Front Side of SOLA SE II

1. Download the zip file for the SOLA GUI from http://www.lumencor.com/software_control.html.
2. Unzip the file and run setup.exe to install the SOLA GUI.
3. Connect the USB cable between the computer and the SOLA SE II light engine. If the computer does not recognize the FTDI device then you must run the FTDI driver installer, CDM20814_Setup.exe.
4. Connect the power supply to the SOLA SE II light engine and turn the power switch on. The green LED next to the switch should light. The light output switch on the front panel should be in the off position.
5. Run the SOLA GUI by going to the Program Menu and selecting SOLA Controller.
6. In the COM pulldown menu, select the COM port assigned to USB communications. If you are unsure which port is being used, then go to Control Panel, then System, then the Hardware tab. Select Device Manager to see the hardware profile. Expand “PORTS (COM & LPT)” to see which COM port is assigned to

the “Communications Port” and select that port in the GUI. The computer should now have control of the SOLA SE II light engine.

7. Click the INIT button to re-establish communication between the computer and the light engine. This step is necessary whenever the SOLA SE II light engine is power cycled or when the SOLA GUI is started. Once the communication link is established, you will have the ability to turn the white light output ON or OFF and adjust the intensity from 0% to 100% in steps of 1%.

3.3 Operation Using Control Tablet

The SOLA SE II light engine can be controlled using an optional Control Tablet (P/N 90-10077). The Control Tablet will connect to the SOLA SE II light engine using wireless Bluetooth® communication. An app is pre-loaded onto the Control Tablet allowing the user to adjust the white light intensity and the on/off operation using the device’s touchscreen display. The tablet can be paired to work with one light engine at a time.

The SOLA app will detect appropriate SOLA SE II light engines in the vicinity and allow the user to select the appropriate unit for pairing. Once pairing occurs the control GUI will be initiated. If the Bluetooth connection is not made or the commands are not being executed, it may be necessary to power off the Control Tablet and then turn it back on to re-establish the Bluetooth communication with that unit. The light output switch on the front panel of the light engine should be in the off position for the Control Tablet to control on/off operation.

3.4 Operation Using Lab Software

There are numerous third party lab software programs that interface to the SOLA SE II light engine. A table of the companies and programs that will operate the light engine can be found under the Lab Software tab at http://lumencor.com/support/software-control/.

Additionally, there is a SOLA Interface Specification available that provides details on the command strings and bit definitions for users who want to develop their own software support of the SOLA SE II light engine. Examples are provided to help programmers develop appropriate code.

3.5 Operation Using the Electronic “Shutter” Function

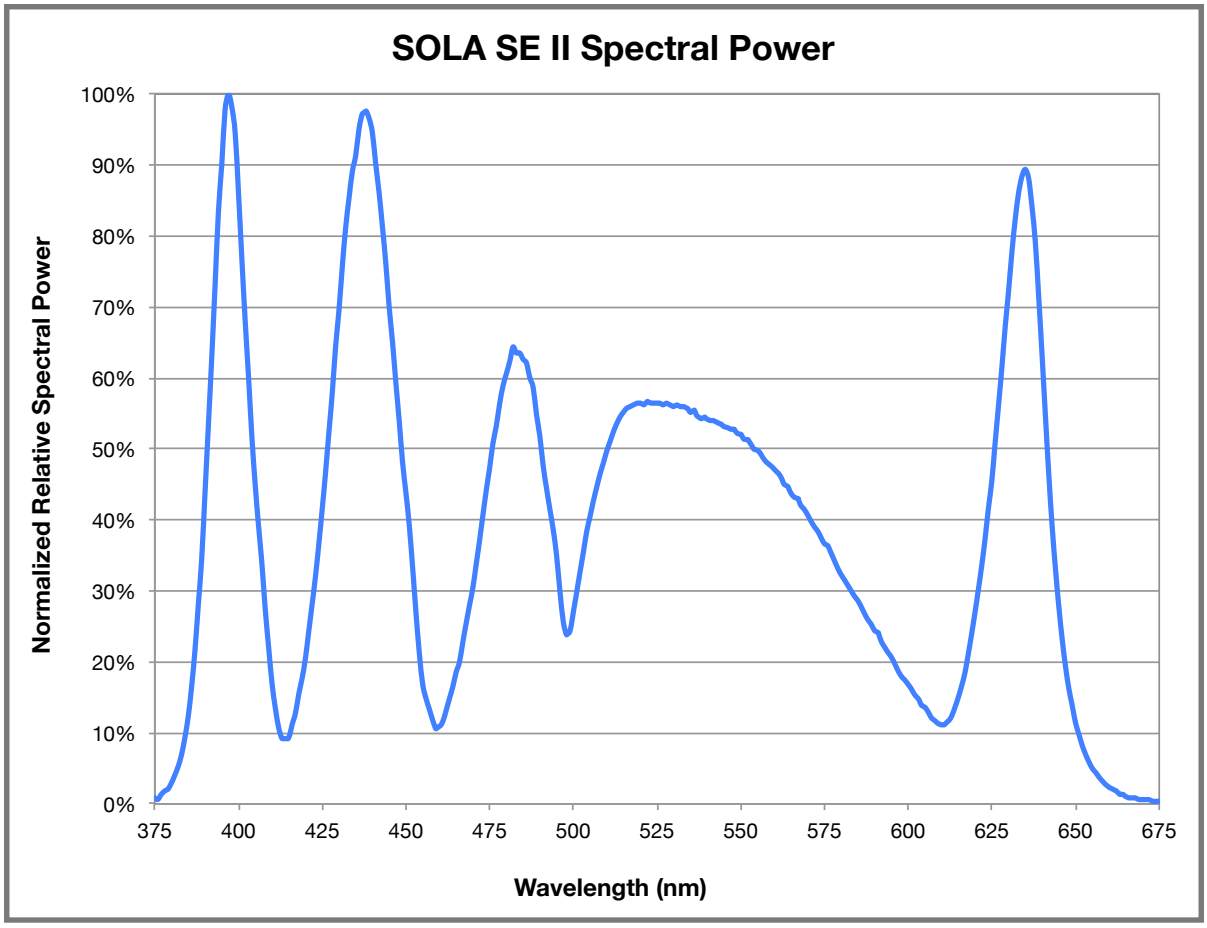
The SOLA SE II light engine includes a global electronic “shutter” function that turns the illumination off. The shutter function is electronically controlled using the BNC connectors on the rear panel. A positive TTL level will effectively “open” the shutter and a low TTL level will “close” the shutter. This shutter control is only operational when the light engine is in an “on” state.

The light engine can be turned on by the front panel switch, foot pedal, Control Tablet or USB serial command. This requirement provides an interlock so the shutter will not open until the user enables the light engine's output.

An optional Leica trigger cable (P/N 29-10054) accessory is available that allows the user to initiate the shutter function using a gating signal from a Leica microscope. The DB9 connector of the Leica Trigger Cable should be attached to Leica's 9-pin I2C cable, which connects to any EXT port on the Leica microscope. The trigger signal from the microscope will enable or disable the light engine output. Any intensity adjustments will need to be made using software or the Control Tablet.

4. Spectral Output

The normalized spectrum shown below is representative of the SOLA SE II light engine output.



5. Product Specifications

The SOLA SE II light engine must be operated and stored within the environmental conditions specified.

Specification	Detail
Temperature	
Operating	32 to 95° F (0 to 35° C)
Non-operating	-4 to 158° F (-20 to 70° C)
Humidity	
Operating and non-operating	0 to 80% relative humidity, non-condensing
Altitude	
Operating	0 to 10,000 feet (3,048 meters)
Non-operating	0 to 20,000 feet (6,096 meters)
Dimensions (WxLxH)	4.90 x 10.4 x 6.40 in^3 / 12.5 x 26.3 x 16.3 cm^3
Weight	8.0 lb / 3.6 kg
Lifetime	> 20,000 hr
Input Power Requirements	24 VDC / 5.0 A, 120 W maximum, power supply included
Warm-up Period	1 s
Protection	IP Rating of X0
Sound Level	Sound Level at 1 m < 10 db(A)
Connections	3.5 mm foot switch (optional accessory), USB A, two BNC connections for shuttering
Warranty	36 months parts and labor for end users

6. Routine Maintenance and Trouble Shooting

Remove any built-up dust or accumulation on the air intake ports. A vacuum may be used to remove debris so that a steady supply of air is available for cooling. It is recommended that the air intake ports be cleaned by a gentle suction device at least every 6 months and more often in dusty or smoke-filled environments.

There are no user-replaceable components or sub-assemblies in SOLA SE II light engines. Opening the light engine enclosure will void the manufacturer's warranty.

7. Customer Support

For technical support of the SOLA SE II light engine, please contact Lumencor by phone at 503.213.4269 or through email at techsupport@lumencor.com. Support information can be found on Lumencor's website at http://www.lumencor.com/support/software_control.

Any light engine return to Lumencor for technical support requires a manufacturer's issued return material authorization (RMA) number. An RMA number must be issued before returning a unit to Lumencor. Write to techsupport@lumencor.com to request an RMA number. Units that are returned to Lumencor without an RMA number will not be received. It is the customer's responsibility to properly package and safely ship products to Lumencor. RMA units should be be shipped to Lumencor, Inc., 14964 NW Greenbrier Parkway, Beaverton, OR 97006 U.S.A.

8. Warranty

The SOLA SE II light engine comes with a 36 month warranty to end users. An extended warranty option is available; extended warranties must be purchased in advance of receipt of goods or within 60 days of the light engine delivery.

9. Declaration of Conformity

The presence of the CE Mark on a product means that this instrument has been designed, tested and certified compliant to all applicable European Union (CE) regulations and recommendations.

Manufacturer: Lumencor, Inc.
14964 NW Greenbrier Parkway
Beaverton, OR 97006
United States of America

Product Name: SOLA SE II light engine
Model Numbers: SOLA SE 5-XXX-YZ
Year mark affixed: 2014
Type of Equipment: Photo-optical apparatus for illumination in research, clinical and laboratory use.

We declare under our sole responsibility that the SOLA SE II light engine, identified with the CE mark, conforms to the following directives and regulations:

CB Scheme (IEC 61010-1:2010)
CE Declaration of Conformity
EMC Directive 2004/108/EC
Low Voltage Directive 2006/95/EC
IEC/EN 62471:2008, Photobiological Safety of Lamps and Lamp Systems Certification
RoHS Directive 2002/95/EC
REACH (Registration, Evaluation, Authorization of Chemicals Regulation) Directive 1907/2006
TÜV SÜD America, NRTL Listing (UL 61010-1:2012)
TÜV SÜD America, Canadian Listing (CAN/CSA-C22.2 No. 61010-1:2012)
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June 1, 2014
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