



# SOLA SM and SOLA SM 365 Light Engine® Instruction Manual



## Regulatory Models

Lumencor utilizes regulatory model names for all certified and CE marked products. The regulatory model names are traceable to all regulatory documentation, third party reports and certifications.

“**Regulatory Model: Sola**” is used as a representative model for all certified and CE marked Sola Products.

## Emissions

This equipment has been tested and found to comply with the limits of EMC directive 2014/30/EU and FCC part 15 (CISPR 11:+A1:2016). 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

TÜV SÜD America, CB Certification (IEC 61010-1:2010)

TÜV SÜD America, NRTLus Certification (UL 61010-1:2012/R:2016-04)

TÜV SÜD America, cNRTL Certification (CAN/CSA-C22.2 No. 61010-1:2012/U2:2016-04)

TÜV SÜD America, EN Certification (EN 61010-1:2010)

## CE Marking

Low Voltage Directive (2014/35/EU)

EMC Directive (2014/30/EU)

RoHS Directive (2011/65/EU+2015/863/EU)

REACH Regulation (EC) No. (1907/2006/EC)

EU Declarations of Conformity can be found at <https://lumencor.com/company/compliance>



For EU customers discarding end-of-life Lumencor electrical and electronic equipment: Please submit an RMA request with “Recycle product under WEEE” in the Description of Issues field.

For disposal in countries outside of the European Union: This symbol is only valid in the European Union (EU). If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

Lumencor Light Engines as supplied, and as represented in this manual, meet safety and regulatory requirements For Research Use Only. If the light engine is incorporated into an instrument or system for a specific end-use application, it is the responsibility of the system integrator to verify that the light engine, and the system into which it is incorporated, meet all safety and regulatory requirements of that end-use application.

**Lumencor, Inc.** | 14940 NW Greenbrier Parkway | Beaverton, OR 97006 USA | 503.213.4269 | [www.lumencor.com](http://www.lumencor.com)

Document Number 57-10003

Revision C

091721

# Table of Contents

1. Introduction
2. Precautions and Warnings
3. Installation and Operating Instructions
4. Spectral Output
5. Product Specifications
6. Routine Maintenance and Trouble Shooting
7. Customer Support
8. Warranty

## 1. Introduction

Lumencor's SOLA SM light engines are designed for laboratory use by bioanalytical researchers and/or developers of life science instrumentation. SOLA SM light engines generate white light output by combining the outputs of multiple solid state light sources. The light output on/off status is manually controlled via a rocker switch located on the front panel or a foot pedal toggle switch accessory (part number 29-10045) that plugs into the 3.5 mm connector on the rear panel. This manual covers both SOLA SM and SOLA SM 365 light engine models, which are defined by their different ultraviolet/violet spectral outputs as described in Section 4.

## 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 SM 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 SM afin d'écartier 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 SM light engine. Alternative approved/certified 24 V DC 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 SM is not fused. The equipment is required to be supplied by a properly approved/certified DC power source meeting the minimum electrical ratings of the product. 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 SM. Il est possible d'utiliser une autre CC approuvée/certifiée 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 SM ne comporte pas de fusible. L'équipement doit être fourni par un / certifié DC réunion de source d'alimentation correctement approuvé les ratings électriques minimales du produit. Brancher le cordon électrique sur une prise de courant protégée par une borne de terre.

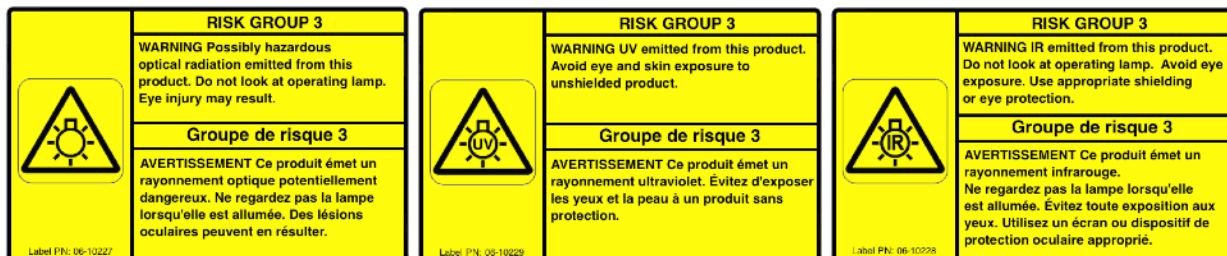
**Warning: DO NOT look into the output of the light engine.** The brightness of this light source is higher than most commercial lighting fixtures and is required to couple directly into a microscope or other bioanalytical instrument.

**Avertissement: NE PAS regarde directement la sortie de la source lumineuse.** 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.

**Warning: DO NOT turn on the light unless the output end of the light guide is safely directed into an enclosed optical path.** DO NOT point the light output directly onto any flammable or burn-susceptible material. This includes all animal or vegetable tissues, plastics, fabrics, paper and liquids.

**Avertissement: NE PAS allumer la lumière sans l'extrémité de sortie du guide de lumière dirigée en toute sécurité dans un chemin optique fermé.** NE PAS pointer la sortie de lumière directement sur un matériau susceptible d'être inflammable ou susceptible de brûler. Cela comprend tous les tissus, les plastiques, les tissus, le papier et les liquides animaux ou végétaux.

### RISK GROUP 3



**Warning:** Possibly hazardous optical radiation emitted from this product. Do not look at operating lamp. Eye injury may result.

**Warning:** Infrared (IR) emitted from this product. Do not look at operating lamp.

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

### GROUPE DE RISQUE 3

**Avertissement:** Infrarouge (IR) émise par ce produit. Ne regardez pas la lampe d'exploitation.

**Avertissement:** Rayonnement optique Peut-être dangereux émis par ce produit . Ne regardez pas la lampe d'exploitation. Une blessure oculaire peut entraîner.

**Avertissement:** UV émis par ce produit . Évitez les yeux et la peau exposition au produit non blindé.

**Caution: DO NOT open the unit.** There are no serviceable parts inside the light engine chassis and opening the light engine enclosure will void the manufacturer's warranty.

**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.

**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 misaligned 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 SM light engine being used in a way for which it was not intended and in complete disregard for any 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 SM autre que celle prévue et du mépris total de les mesures de sécurité et mises en garde affichées.**

### 3. Operating Instructions

#### 3.1 Contents

The SOLA SM light engine ships with the following list of standard components:

1. SOLA SM light engine configured with an output adapter for coupling to a 3 mm diameter liquid light guide.
2. A 24 V /5 A DC power supply (Lumencor part number 27-10001).
3. A region-specific 6 ft AC power cord for the power supply (see adjacent table).

AC Power Cords

Region	Part Number
North America	29-10002
Europe	29-10005
United Kingdom	29-10004
Israel	29-10008
Australia/New Zealand	29-10024

The model name and unique 4- or 5- digit serial number of the light engine are marked on a label affixed to the back panel (Figure 1). SOLA SM 365 light engines are identified by a model name containing “V” (e.g. SOLA SM 5-LCR-VA, Figure 1) and a **UV** marking on the rear panel (Figure 1). Performance specifications for individual light engines are listed on the certificate of conformance included with the shipping documents e-mailed to the customer. It is important to retain the certificate of conformance for reference. In the event that the light engine is sold or transferred, the certificate of conformance should be conveyed to the new owner.

#### 3.2 Installation

NOTE: Any end-product/system incorporating or coupled to a Lumencor Light Engine shall be fully evaluated to verify all applicable safety and regulatory compliance requirements prior to use.

SOLA SM light engines incorporate fan-assisted air cooling. When positioning the SOLA SM for use, place the unit on a hard surface and avoid blocking or restricting airflow at the air intake (front panel) and exhaust ports (rear panel; Figure 1). The light engine must be operated in a non-condensing environment (dew point <10°C with controlled ambient temperature <30° C). Restricting the airflow will cause the unit to operate at elevated temperatures and will result in decreased operating lifespan 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 in the top left corner of the rear panel controls electrical power to the unit. A green LED above the switch indicates that power to the light engine is ON. Refer to Figure 1 for the rear panel locations of the input DC power connection, the foot pedal connection and the master electrical power switch. Note that the foot pedal is an on/off toggle switch. Its on/off status cannot be determined from its position. Before connecting the foot pedal, make sure the electrical power switch (Figure 1) is in the OFF position to avoid unintentional initiation of light



**Figure 1.** SOLA SM 365 light engine rear panel



output. After connecting the foot pedal, and with the light guide output safely directed into an enclosed optical path (e.g. microscope input collimator or a beam dump), turn the power switch ON to begin operation.

**WARNING:** Prior to turning the light output on, be sure the output end of the liquid light guide or optical fiber is safely directed into an enclosed optical path (e.g. a beam dump).

**AVERTISSEMENT :** avant d'activer la sortie de lumière, assurez-vous que l'extrémité de sortie du guide de lumière liquide ou de la fibre optique est dirigée en toute sécurité dans un chemin optique fermé (par exemple, une décharge de faisceau).

The SOLA SM light engine has a safety interlock for the light guide that prevents light output 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 in the light guide port (Figure 2). 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 and prevent inadvertent disconnection. Prior to turning the light on, be sure to remove the red dust caps from the liquid light guide and direct its output into an enclosed optical path (e.g. microscope input collimator or a beam dump). Do not bend the light guide beyond its specified minimum bending radius (40 mm or 1.6 inches). Extreme bending of the light guide may cause permanent deformation, resulting in decreased light transmission. **Take necessary precautions to protect yourself and others from the high intensity light when turning on the unit.**

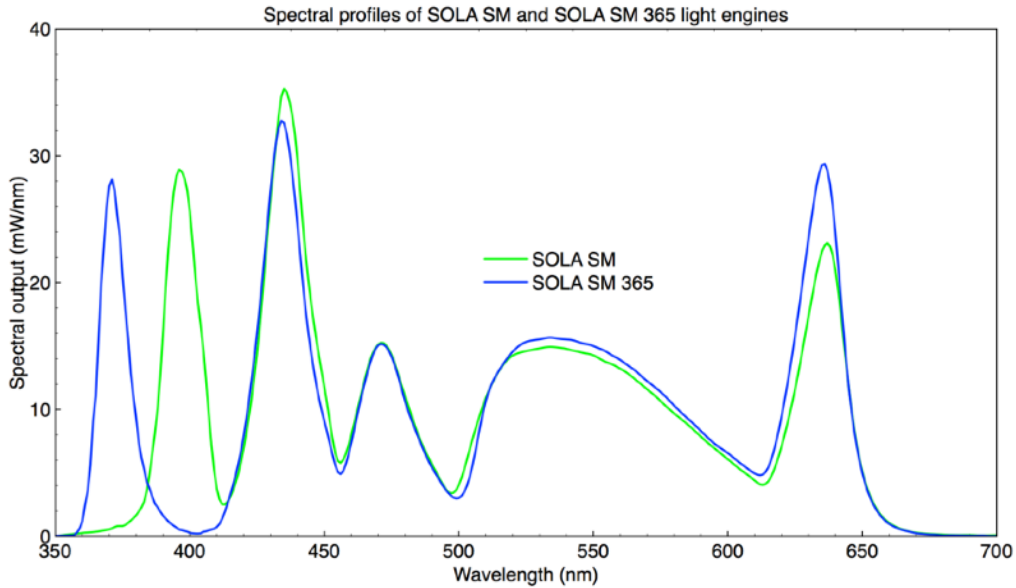
### 3.3 Operation

The SOLA SM light output can be turned on or off using the manual light output switch on the front panel or using the foot pedal toggle switch accessory. Do not combine the operation of these switches. If the front panel rocker switch is used to turn the light on, that same switch should be used to turn it off. If the foot pedal is used to turn the light on, the foot pedal be used to turn the light off. An amber indicator LED above the manual light output switch indicates active light output. There is no warm-up time; the light engine output stabilizes less than 1 second after the manual light output switch is moved to the “on” position. Light output can be switched off during intervals when it is not required for active viewing or data collection. After light output is switched off, the cooling fan will continue to run for 5 minutes, after which it will automatically stop until light output is turned back on. Light output is set to a single maximum intensity level. SOLA SM light engines do not provide electronically-controlled output attenuation.

In the event that the liquid light guide becomes disconnected from the unit during operation, the safety interlock will be opened and light output will cease immediately. In order to turn the light output back on, you will need to: 1) turn the electrical power off, 2) fully insert the light guide into the light guide port, 3) turn the electrical power back on and then 4) activate light output using either the front panel rocker switch or the foot pedal toggle switch.

## 4. Spectral Output

Typical spectral output distributions of SOLA SM and SOLA SM 365 light engines are shown below (Figure 3).



**Figure 3.** SOLA SM and SOLA SM 365 light engine spectral output distributions.

## 5. Product Specifications

SOLA SM light engines must be operated and stored within the specified environmental conditions. Performance specifications for individual light engines are listed on the certificate of conformance included with the shipping documents e-mailed to the customer. It is important to retain the certificate of conformance for reference. In the event that the light engine is sold or transferred, the certificate of conformance should be conveyed to the new owner. Certificates of conformance are also recorded in Lumencor's database and copies can be requested by e-mail to [techsupport@lumencor.com](mailto:techsupport@lumencor.com). The request message must include the 4- or 5- digit serial number of the light engine.

Specification	Detail
<b>Temperature</b>	
Operating	32 to 95° F (0 to 35° C)
Non-operating	-4 to 158° F (-20 to 70° C)
<b>Humidity</b>	
Operating and non-operating	0 to 80% relative humidity, non-condensing
<b>Altitude</b>	
Operating	0 to 10,000 feet (3,048 meters)
Non-operating	0 to 45,000 feet (13,176 meters)

Specification	Detail
<b>Dimensions (W x L x H)</b>	4.9 in x 10.4 in x 6.40 in / 12.5 cm x 26.3 cm x 16.3 cm
<b>Weight</b>	8.0 lb / 3.6 kg
<b>Input Power Requirements</b>	24 V DC / 5.0 A, 120 W maximum, power supply included
Power consumption	90 W (light output on); 3 W (light output off, fan on)
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)
Warranty	18 months parts and labor

## 6. Routine Maintenance and Trouble Shooting

No routine maintenance is required. There are no user-replaceable components or sub-assemblies in the SOLA SM light engine. Opening the light engine enclosure will void the manufacturer's warranty. In the event that the light engine fails to perform in accordance with the specifications listed on the certificate of conformance, please contact Lumencor Technical Support for assistance, as directed in Section 7.

## 7. Customer Support

For technical support of SOLA SM and SOLA SM 365 light engines, please contact Lumencor by phone at 503.213.4269 or via e-mail at [techsupport@lumencor.com](mailto:techsupport@lumencor.com). Please be prepared to provide the 4- or 5-digit serial number of the light engine (see Figure 1), a description of the problems encountered and information on the usage context (e.g. what microscope is being used). This information will help to determine whether the problems can be resolved in situ by adjustments to the system configuration, or whether a fault has developed in the light engine that requires its return to Lumencor's facility in Beaverton, Oregon for evaluation and, if necessary, repair. Any light engine return to Lumencor for service or repair requires a material authorization (RMA) number. To request an RMA number, fill out and submit the [online request form](#). It is the customer's responsibility to properly package and safely ship products to Lumencor. Instructions for shipping will be provided in the e-mail giving notification of the RMA number.

## 8. Warranty

SOLA SM and SOLA SM 365 light engines come with a 18 month warranty, starting on the original date of shipment from Lumencor. Light Engines qualifying for warranty service must be verifiably delivering performance that is substantially at variance with the levels documented in the certificate of conformance. The light engine must also have been used and maintained under operating conditions consistent with the specifications given in Section 5, and observing all the Precautions and Warnings notified in Section 2. This warranty does not extend to light engines that have been subject to misuse, accident, tampering or improper installation. Accessories including (but not limited to) liquid light guides, optical fibers, collimators, cables and control consoles are not covered by the warranties attached to light engines. Please fill out and submit the [online warranty registration form](#). This will facilitate provision of warranty service should it be required.