Model SDM830-M

830 nm Spectrum Stabilized Laser Module

User's Manual

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Declaration of Conformity

We declare that the accompanying product, identified with the CE mark, complies with requirements of the Electromagnetic Compatibility Directive, 2004/108/EC and the Low Voltage Directive 2006/95/EC.

Model Numbers: SDM Series

Year CE mark affixed: 2015

Type of Equipment: Electrical equipment for measurement, control and laboratory use in industrial locations.

Manufacturer: Innovative Photonic Solutions
4250 US Route 1, Suite 1
Monmouth Junction, NJ 08535
United States of America

Importer: Newport Corporation
1791 Deere Avenue
Irvine, CA 92606
United States of America

Standards Applied:

Compliance was demonstrated to the following standards to the extent applicable:

BS EN61326-1: 2006 “Electrical equipment for measurement, control and laboratory use – EMC requirements”.

This equipment meets the CISPR 11:2009+A1:2010 Class A Group 1 radiated and conducted emission limits.

BS EN 61010-1:2010, “Safety requirements for electrical equipment for measurement, control and laboratory use”.

Mark Carroll
Sr. Director, Instruments Business
Newport Corporation
1791 Deere Ave, Irvine, CA92606 USA

Warranty

Newport Corporation warrants that this product will be free from defects in material and workmanship and will comply with Newport's published specifications at the time of sale for a period of one year from date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's option.

To exercise this warranty, write or call your local Newport office or representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the product, freight prepaid, to the indicated service facility. Repairs will be made and the instrument returned freight prepaid. Repaired products are warranted for the remainder of the original warranty period or 90 days, whichever first occurs.

Limitation of Warranty

The above warranties do not apply to products which have been repaired or modified without Newport's written approval, or products subjected to unusual physical, thermal or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling. This warranty also does not apply to fuses, batteries, or damage from battery leakage.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. NEWPORT CORPORATION SHALL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE PURCHASE OR USE OF ITS PRODUCTS.

First printing 2016

This manual has been provided for information only and product specifications are subject to change without notice. Any change will be reflected in future printings.

Newport Corporation
1791 Deere Avenue
Irvine, CA, 92606
USA

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Service Information

This section contains information regarding factory service for the source. The user should not attempt any maintenance or service of the system or optional equipment beyond the procedures outlined in this manual. Any problem that cannot be resolved should be referred to Newport.

Technical Support Contacts

North America

Newport Corporation

1791 Deere Ave, Irvine, CA 92606

Telephone: (877) 835-9620

Telephone: (949) 863-3144

Europe

Newport/MICRO-CONTROLE S.A.

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Newport Corporation Calling Procedure

If there are any defects in material or workmanship or a failure to meet specifications, promptly notify Newport's Returns Department by calling 1-800-222-6440 or by visiting our website at www.newport.com/returns within the warranty period to obtain a **Return Material Authorization Number (RMA#)**. Return the product to Newport Corporation, freight prepaid, clearly marked with the RMA# and we will either repair or replace it at our discretion. Newport is not responsible for damage occurring in transit and is not obligated to accept products returned without an RMA#.

E-mail: rma.service@newport.com

When calling Newport Corporation, please provide the customer care representative with the following information:

- Your Contact Information
- Serial number or original order number
- Description of problem (i.e., hardware or software)

To help our Technical Support Representatives diagnose your problem, please note the following conditions:

- Is the system used for manufacturing or research and development?
- What was the state of the system right before the problem?
- Have you seen this problem before? If so, how often?
- Can the system continue to operate with this problem? Or is the system non-operational?
- Can you identify anything that was different before this problem occurred?

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1 Safety Precautions

1.1 Definitions and Symbols

The following terms and symbols are used in this documentation and also appear on the Model SDM830-M laser module where safety-related issues occur.

1.1.1 General Warning or Caution

Figure 1 *General Warning or Caution Symbol*

The Exclamation Symbol in the figure above appears on the product and in Warning and Caution tables throughout this document. This symbol designates that documentation needs to be consulted to determine the nature of a potential hazard, and any actions that have to be taken.

1.1.2 Electric Shock

Figure 2 *Electrical Shock Symbol*

The Electrical Shock Symbol in the figure above appears throughout this manual and on the product. This symbol indicates a hazard arising from dangerous voltage. Any mishandling could result in irreparable damage to the equipment, and personal injury or death.

1.1.3 European Union CE Mark

Figure 3 *CE Mark*

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

1.1.4 On

Figure 4 *On Symbol*

The symbol in the figure above represents a power switch position on a Model SDM830-M laser module. This symbol represents a Power On condition.

1.1.5 Off

Figure 5 *Off Symbol*

The symbol in the figure above represents a power switch position on the Model SDM830-M laser module. This symbol represents a Power Off condition.

1.1.6 Ground

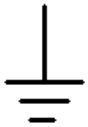

Figure 6 *Ground Symbol*

The symbol in the figure above appears on the Model SDM830-M laser module to indicate the frame or chassis terminal.

1.2 Warnings and Cautions

The following are definitions of the Warnings, Cautions and Notes that are used throughout this manual to call your attention to important information regarding your safety, the safety and preservation of your equipment or an important tip.

WARNING

Situation has the potential to cause bodily harm or death.

CAUTION

Situation has the potential to cause damage to property or equipment.

NOTE

Additional information the user or operator should consider.

Situation has the potential to cause the product to not comply with applicable European Union regulations.

1.2.1 General Warnings

Observe these general warnings when operating or servicing this equipment:

- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- Route power cords and other cables so that they are not likely to be damaged.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp lint-free cloth.
- Lockout all electrical power sources before servicing the equipment.
- To avoid fire hazard, use only the specified fuse(s) with the correct type number, voltage and current ratings as referenced in the appropriate locations in the service instructions or on the equipment. Only qualified service personnel should replace fuses.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Qualified service personnel should perform safety checks after any service.

1.2.2 General Cautions

Observe these cautions when operating this equipment:

- If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.

- To prevent damage to equipment when replacing fuses, locate and correct the problem that caused the fuse to blow before re-applying power.
- Do not block ventilation openings.
- Do not position this product in such a manner that would make it difficult to disconnect the power cord
- Position the equipment so that access to the mains disconnect On/Off switch is readily available.
- Use only the specified replacement parts.
- Follow precautions for static sensitive devices when handling this equipment.
- This product should only be powered as described in the manual.
- There are no user-serviceable parts inside the Model SDM830-M laser module.
- Adhere to good laser safety practices when using this equipment.

1.2.3 Summary of Warnings and Cautions

The following general warning and cautions are applicable to this instrument:

WARNING

Before operating the Model SDM830-M laser module, please read and understand all of Section 1.

WARNING

Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact Newport technical support for advice before attempting to plug in and operate damaged equipment.

WARNING

Do not point laser or allow laser light to be directed or reflected toward other people or reflective objects.

WARNING

Do not modify unit or remove protective covers or housings.

WARNING

Laser light emitted from this equipment may be sufficient to ignite some materials and initiate fire.

WARNING

Never operate laser if unit is defective or if safety covers, interlocks, and labels are damaged or missing.

WARNING

If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired and may result in hazardous radiation exposure.

WARNING

Before cleaning the enclosure of the Model SDM830-M laser module, the power cord must be disconnected from the wall socket.

CAUTION

There are no user serviceable parts inside the Model SDM830-M laser module. Work performed by persons not authorized by Newport will void the warranty.

WARNING

While the Model SDM830-M laser module's rear panel switch turns power OFF to the internal electronics, it should not be depended upon to fully disconnect the unit from MAINS power. Disconnect the power cord to fully isolate the Model 6700 from MAINS power.

The Model SDM830-M laser module is intended for use in an industrial laboratory environment. Use of this product in other environments, such as residential, may result in electromagnetic compatibility difficulties due to conducted as well as radiated disturbances.

2 Features & Specifications

2.1 System Overview

The SDM830-M 830 nm Spectrum Stabilized Laser Module provides the user with a powerful and extremely stable laser source that is ideal for scientific applications including Raman Spectroscopy and Illumination.

The SDM830-M is a Class 3B laser product with laser emission at 830 nm and output power levels exceeding 350 mW. Extreme care should be taken when operating this unit to avoid potentially hazardous exposure to both eyes and skin. Users should wear eye protection when operating this unit and should avoid exposure to the output beam.

2.2 Specifications

2.2.1 Performance Specifications

	Minimum	Typical	Maximum
Wavelength	829.5 nm	830 nm	830.5 nm
Spectral Linewidth		0.1 nm (0.07 nm for –NL version)	0.15 nm (0.1 nm for –NL version)
Output Power			
-350 Version	350 mW		499 mW
-500 Version	500 mW		800 mW
Modulation Rate*	Continuous		1 kHz
Pulse Length	20 µs		Continuous
Beam Divergence**	10 degrees		20 degrees
Beam Profile	Multi-mode – Flat top spatial output		
Internal Fiber Type	105 micron core multi-mode fiber (0.22 NA)		
Maximum Permissible Exposure			1.9 mW/cm^2
Nominal Ocular Hazard Distance	140 cm		

* Based upon user defined input signal and operation in "External" mode configuration

** 62.5 or 105 micron core multi-mode fiber pigtail with 0.22 N.A. (Full Angle)

2.2.2 Electrical Specifications

Input Power	100-240 VAC, 50-60 Hz, 0.4 A
Fuse Rating	250 V, 1 A, Fast Blow, 5 mm x 20 mm, 2 each

2.2.3 Mechanical Specifications

Dimensions	9.45" x 6.94" x 4.14"
Weight	48 oz

2.2.4 Environmental Specifications

Operating Temperature	+10 to +35 deg C
Storage Temperature	-10 to +55 deg C
Humidity	<80%, non-condensing

2.2.5 Laser Safety Eyewear Specifications

Optical Density	ND5 or higher at 830 nm, ND1 or lower at 600 nm
Shielding	Top and side shield protection
Certification	CE certified

3 Getting Started

3.1 Unpacking and Inspection

The SDM830-M is carefully assembled, tested, and inspected before shipment. Upon receiving this instrument, check for any obvious signs of physical damage that might have occurred during shipment. Report any such damage to the shipping agent immediately.

NOTE

Retain the original packing materials in case reshipment becomes necessary.

3.2 Included Components

The SDM830-M 830 nm Spectrum Stabilized Laser Module comes complete with an internal spectrum stabilized laser module that contains an integral Thermo-Electric Cooler (TEC) and thermistor for monitoring the internal temperature of the laser platform. The unit comes complete with a laser enable switch for safety, an LED readout, an output power control dial, a safety key lockout, a remote interlock, and an emergency shut-off switch.

3.3 Fuse Replacement

The SDM830-M has 2 ea 250 V, 1 A Fast blow fuses located in a removable panel immediately above the AC power socket. Replacement fuses must be rated at 250 V, 1 A, Fast Blow and be 5 mm x 20 mm. To remove fuse panel, pinch panel retention clips on each side and gently pull. The fuses will be seated in sockets within the removed panel and can be gently lifted out. Once fuses have been checked or replaced, slide panel back in place until panel is firmly seated - an audible click will indicate when panel is seated properly.

4 System Operation

4.1 Laser Start-Up (Controlling Via Front Panel)

1. Insert AC power plug into the socket on the back of the laser module. Plug in the AC power plug into a standard 100 V – 240 V AC electrical outlet making sure that the Master Power key is set to the off (Vertical) position.
2. Connect a suitable FC/PC or SMA (depending on version) connectorized fiber patch cord to the FC/PC or SMA (depending on version) bulkhead connector.
3. Ensure that the Emergency Shut-off Switch (EMO) is in the "ready" position by turning the button clockwise until it pops out slightly.
4. Turn the master power key switch 90 degrees clockwise from the Vertical "off position" to the Horizontal "on position". A green LED will light indicating that system power is on.
5. Dial the laser adjust dial to the desired drive current setting as read out on the LED panel.
6. Depress the Laser On switch. A red LED will illuminate indicating that the laser is in operation and the laser will turn on roughly 2 seconds after the switch is depressed. Note that the laser enable switch is a momentary contact. Users should allow switch to return to its natural center position after depressing. It should also be noted that this switch will function as a manual reset. In the event of a power interruption, failure, or interlock break, the laser will be automatically disabled. To re-enable, simply toggle the laser enable to the on position once again.

4.2 Laser Start-Up (External Power Control Mode)

The SDM830-M is normally designed for operation by interacting with front panel controls, however users may wish to modulate or adjust the output power of the laser module in some circumstances. The SDM830-M is equipped with an external DC bias port located on the back panel of the module. The following steps should be taken if the user wishes to control the laser output power remotely via a signal generator or computer:

1. Ensure that the laser is not operating by pressing the laser ON switch and assuring that the laser on LED is not illuminated.
2. Switch the mode selection switch located on the back panel to the "External" position (the Amber operating mode LED labeled "External" will be illuminated).
3. Connect a BNC cable to the port labeled "Control" on the back panel. The user may apply a DC bias between 0 and 1.2 V for the -300 version or 0 to 1.45 V for the -500 version to modulate the laser or to adjust the laser's output power. 0 V

corresponds to no power, 1.2 V or 1.45 V corresponds to full power. The unit can be modulated at rates up to approximately 1 kHz.

4. Turn on the laser by momentarily depressing the Laser On switch on the front panel. The laser will now output a variable amount of output power that is dependent upon the DC bias voltage that has been applied to the Control port on the back panel.

4.3 Laser Shut Down

1. Depress the Laser On button on the front panel and assure that the Laser On LED is not illuminated.
2. Turn the master power key switch on the back panel counter clockwise from the horizontal "On" position to the vertical "Off" position.
3. Disconnect fiber patch cord and power cables as needed.

4.4 Performance Features

4.4.1 Remote Interlock

The SDM830-M is equipped with a remote interlock feature that may be utilized by the operator to shut down the laser in the event that a door or enclosure is opened. The interlock is located on the back panel and utilizes a RJ-11 plug. The remote interlock is normally open circuit, so the RJ-11 connector provided or a user configured closed loop interconnect is required to be emplaced for proper function of the laser module. Users may decide to enable a remote interlock mechanism when integrating into a laboratory or system environment. To enable the remote interlock, the user must obtain a RJ-11 plug (or modify the plug provided) and create a closed circuit between the 2 signal terminals of the plug and insert the closed circuit RJ-11 plug into the interlock jack. The laser will function normally when it senses a closed circuit, however it will disable laser output when an open circuit is detected. To re-enable laser function, the user must assure that the interlock is closed circuit and manually reset the unit by toggling the laser enable switch on the front panel to the "ON" position.

4.4.2 Manual Laser Reset

The SDM830-M is equipped with a manual laser reset. In the event of a power interruption, power failure, or interlock breach, the laser will default to a laser off position. To re-enable the laser, the user must toggle the laser enable switch on the front panel to the "ON" position.

5 Maintenance and Service

	**WARNING** **There are no user serviceable parts inside the Model SDM830-M laser module. Work performed by persons not authorized by Newport Corporation will void the warranty.**

5.1 Enclosure Cleaning

	**WARNING** **Before cleaning the enclosure of the SDM830-M laser module, the power cord must be disconnected from the wall socket and from the unit.**

Clean module with soft cloth dampened with water as needed. Abrasives, chemical solvents and cleaning agents should not be used to clean laser module.

5.2 Technical Support

Information and advice about the operation of any Newport product is available from our technical support engineers. For quickest response, ask for "Technical Support" and know the model and serial number for your product.

Hours: 8:00–5:00 PST, Monday through Friday (excluding holidays).

Toll Free: 1-877-835-9620

Support is also available by fax and email:

Fax: 1-949-253-1479

Email: service@newport.com

We typically respond to faxes and email within one business day.

5.3 Service

Your SDM830-M laser module has been designed to provide years of trouble-free operation. Virtually no maintenance is required except for ensuring that the unit is not damaged, contaminated, or used in an unsafe manner.

5.4 Obtaining Service

The SDM830-M laser module contains no user serviceable parts. To obtain information regarding factory service, contact Newport or your Newport representative. Please have the following information available:

1. Instrument model number (on the rear panel).
2. Instrument serial number (on rear panel or bottom of enclosure).
3. Description of the problem.

If the instrument is to be returned to Newport, you will be given a Return Number, which you should reference in your shipping documents. Please fill out a copy of the service form, located on the following page, and have the information ready when contacting Newport. Return the completed service form with the instrument.

5.5 Warranty

Newport Corporation guarantees its products to be free of defects for one year from the date of shipment. During the warranty period, Newport will, at its option, either repair or replace products which prove to be defective. Opening, modification and or servicing of this unit is expressly prohibited and will result in nullification of product warranty. This is in lieu of all other guarantees, expressed or implied, and does not cover incidental or consequential loss. Warranty does not cover Catastrophic Optical Damage (COD) caused by 100% retro-reflection of the laser light. If retro-reflection of this magnitude is expected, then an optical isolator is required.

5.6 Service Form

Newport Corporation
Office: 877-835-9620
FAX: 949-253-1479

Name _____ Return Authorization #_____
(Please obtain RA# prior to return of item)

Company _____
(Please obtain RA # prior to return of item)

Address _____ _____Date _____

Country _____ Phone Number _____

P.O. Number _____ FAX Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description _____

Reason for return of goods (please list any specific problems):