

Multi-Mode Diode Lasers

Quick Start Guide



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Manufactured by

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What is in the box

The box contains a Multi-Mode Diode Laser source, an optional power supply unit and cables to connect it to control equipment.



Box content checklist

Quantity	Description		Identifier (*)
1	Multi-Mode Diode Laser, class-4		-
1	Power supply unit, 12 VDC input 100 V to 240 V AC, 50 Hz to 60 Hz Included: power cable with country specific jack NOT present if shipment includes the Riscure Safety Box, or the customer already owns one. ^[1]		PSU
2	Signal cables: - SMB-to-SMB, 50 Ω , 6 ft.		SMB2SMB

[1] By default, the Safety Box is shipped together with Multi-Mode Diode Laser module and serves as the power supply of it. Under rare circumstances, where the Safety Box is specifically excluded from the order, the discrete power supply is shipped.

Depending on your order, the laser has one the following wavelengths:

- 445 nm, blue
- 808 nm, red
- 1064 nm, near infrared

What does it do

The Multi-Mode Diode Laser is a source of light produced by laser diodes with energy levels up to 20W power. Multi-Mode Diode Lasers are designed to operate in pulsed mode.

The Multi-Mode Diode Laser is normally attached to the Diode Laser Station and operated for optical Fault Injection (FI) attacks on semiconductors.



Figure 1 Multi-Mode Diode Laser.

How to build a setup

Follow the next steps to install the Multi-Mode Diode Laser on the Laser Station.


Installing the laser

1. Select the laser to be installed.

Note: Which laser to choose is outside the scope of this guide.



2. Adjust the spot size reducer for the wavelength of the laser.

	Laser wavelength	Gap width
	445 nm (blue)	0 mm
	808 nm (red)	0 mm
	1064 nm (near infrared)	2 mm

- Unscrew the head lock to release the spot size reducer head. Requires hex screwdriver M1.5.
- Turn the reducer head clockwise to reduce the gap width.
- Fasten the head lock to secure the reducer head.

3. Insert the laser on top of the spot size reducer.
4. Fasten the upper 2 lock screws to secure the laser. Requires hex screwdriver M1.5.



Verification of the setup

Follow the next checks to verify you have built a working setup.

1. Is the Multi-Mode Diode Laser powered?
2. Is the Multi-Mode Diode Laser connected?
3. Is the Multi-Mode Diode Laser responding to commands?

Please ensure that a check is successful, before proceeding to the next check.

If a check is not successful, refer to section “Common problems”.



DO NOT attempt to use the laser source outside the Safety Box.



DO WEAR eye protection.

Red and infrared laser light is almost invisible and but 20W is powerful enough to damage your eyes when unprotected!

Check 1 - Is the Multi-Mode Diode Laser powered?

There are no signals if the power supply is applied.

Check 2 - Is the Multi-Mode Diode Laser connected?

The interlock connector coming from the Safety Box 2 must be inserted into the back of the Multi-Mode Diode Laser.

Check 3 - Is the Multi-Mode Diode Laser responding to commands?

Connect an oscilloscope to the current monitor connector at the laser. The current monitor should give negative voltage peaks for the duration of the laser pulse and proportional to the power of the laser pulse.

Help and troubleshooting

Common problems

There are no issues reported.

Still have questions?

Visit the Riscure Support portal: <http://support.riscure.com>.

Technical specifications

Operational conditions

- Room temperature 20 - 30 °C, (68 – 86 °F), preferred

Power supply input

- 12 V DC, max 2.5 A (accommodating two lasers)

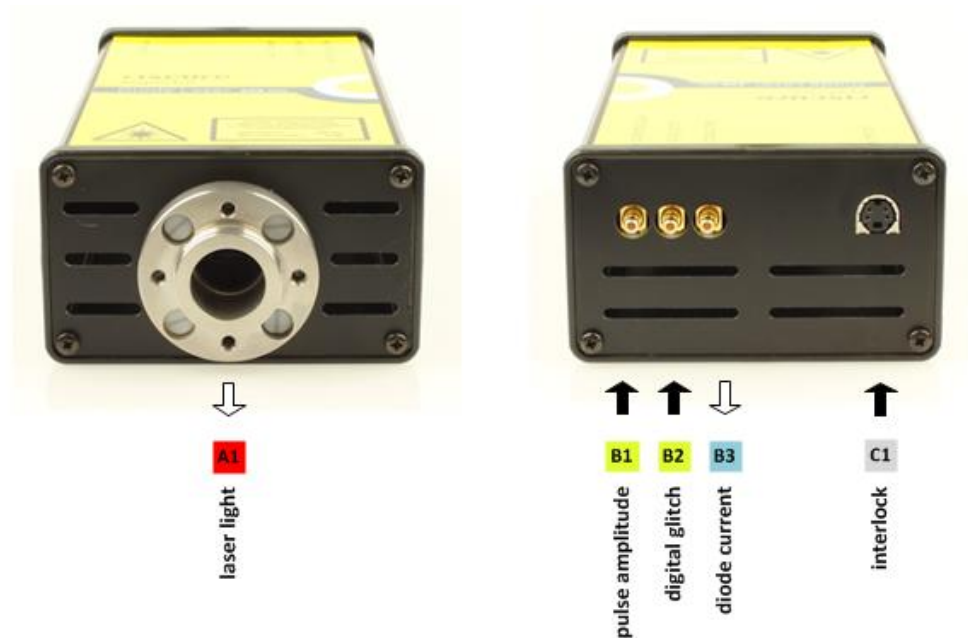
Laser

- Diode laser Class-4
- Blue laser, wavelength 445 nm, 10 W
- Green laser, wavelength 532 nm, 10 W
- Red laser, wavelength 808 nm, 14 W
- Near infrared laser, wavelength 1064 nm, 20 W
- Activation frequency, max. 25 MHz
- Activation pulse duration, min. 20 ns, max 100 µs.
- Pulse amplitude full range settling time 1 s.
- Diode current feedback test signal, -20 A/V @ 50 Ω.

Product dimensions

- Length x Width x Height: 200 x 95 x 56 [mm], 7.8 x 3.7 x 2.2 [inch]

Connectors



Port	Label	Description
A1	-	Diode laser light output
B1	pulse amplitude	SMB, 1 k Ω . Analog input 0.0 – 3.3 V Laser power level control: 0.0V = 0%, $\geq 3.3V$ = 100% (max).
B2	digital glitch	SMB, 50 Ω . Binary input 0.0 – 3.3 V. Laser light activation: Active high.
B3	diode current	SMB, 50 Ω . Analog output -1.5 – 1.5 V. Feedback signal proportional to diode current. Negative on activation.
C1	interlock	12 V DC Power supply connection from Safety Box PSU.

Safety instructions

Laser safety

The Multi-Mode Diode Laser is power compatible with a Class 4 laser product as defined in international Standard IEC 60825-1.



The operator of the Multi-Mode Diode Laser should observe the general precautions:



DO NOT attempt to use the laser sources outside the Safety Box.



DO NOT disassemble the laser source or the Safety Box, while the Safety Box is connected to a power supply



DO NOT attempt to disable the door interlocks of the Safety Box.



ONLY operate the laser

- when the diode laser source is mounted on the microscope together with the camera, light guide and objectives
- or when the laser fiber is attached to the micromanipulator of the DLS/Multi Area Unit.



Caution: Use of controls or adjustments or performance of procedures other than those specified may result in hazardous laser radiation exposure.

Recommendations for safe use of lasers

The standard reference for laser safety is the American Standard for the Safe Use of Lasers, Z136.1-2000, developed by the American National Standards Institute (ANSI). This reference is the basis for many of the federal regulations for laser and laser system manufacturers, and for the Occupational Safety and Health Administration (OSHA) laser safety guidelines. It contains detailed information concerning proper installation and use of laser systems.

While the ANSI standard itself does not have the force of law, its recommendations, including warning signage, training, and the designation of a laser safety officer, may be compulsory under local workplace regulations when operating laser systems above Class I. It is the operator's responsibility to ensure that the installation and operation of the laser source with safety box is performed in accordance with all applicable laws.

Copies of ANSI Standard Z136.1-2000 are available from:

Laser Institute of America
12424 Research Parkway, Suite 125
Orlando, FL 32826
(407) 380-1553

The safety features of the Riscure Safety Box are described in section Safety Features and Regulatory Compliance.

Electrical safety

The safety box is powered by a 12V power supply unit. The AC input to the 12V power supply unit is potentially lethal and is fully contained with the power supply unit.



DO NOT open the 12 V power supply unit while the unit is plugged in. Opening the power supply unit may expose the operator to the unit's AC input power.



DO NOT open the laser source while the laser source is plugged in. Opening the laser source may expose the operator to the internal voltage to drive the laser diode.



DO NOT open the laser source while the laser source is connected via the interlock plug to the safety box. Opening the laser source may expose the operator to the internal voltage to drive the laser diode.



DO NOT make or break any electrical connections to the system while the unit is switched on.

Fire safety

High power laser systems represent a fire hazard in combination with light absorbing surfaces and flammable or ignitable materials.



DO NOT use any flammable or combustible materials, explosives or volatile solvents such as acetone, alcohol or gasoline inside the safety box



ALWAYS keep a properly maintained and inspected fire extinguisher at hand.

Safety features and regulatory compliance

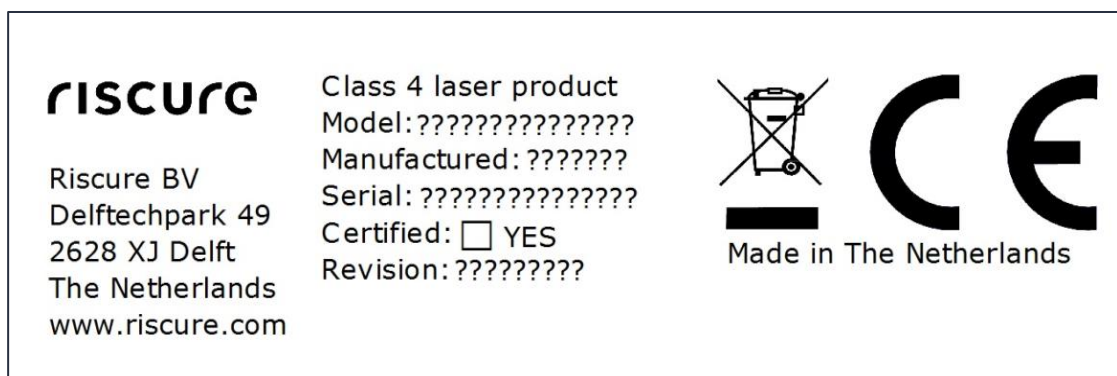
Riscure has incorporated specific safety features into the Multi-Mode Diode Laser to meet the requirements of 21 CFR 1040 and the International Standard IEC 60825-1.

These safety features included in 21 CFR 1040 and IEC 60825-1 require that certification, identification, and warning labels be placed on laser products.

Reproductions of labels on the Riscure laser sources and Riscure safety box follow, with their locations specified:

1. Certification/Identification Label:

This label is located on the back side of the safety box.



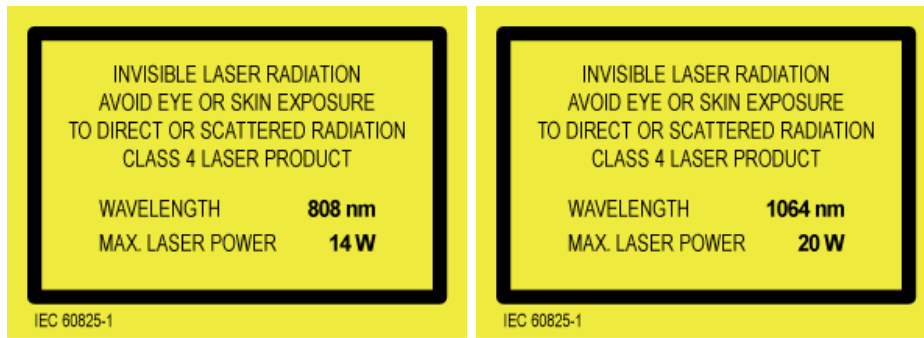
2. Warning label:

This label is located on the front of the laser source.

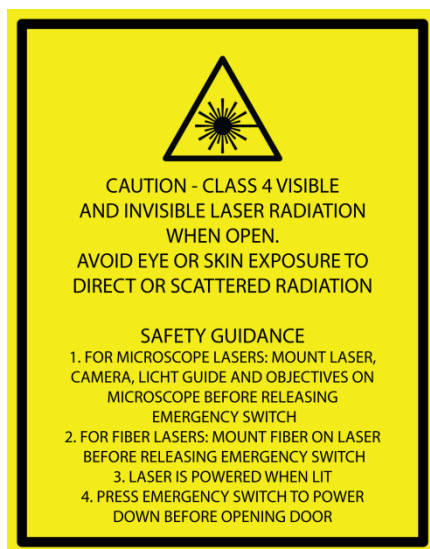


3. Explanatory labels:

These labels identify the classification of the laser sources in accordance with IEC 60825-1. The labels are located on the side of the laser source:



Interlocked protective housing safety label. This label is located on the door of the safety box.



4. Aperture safety label:

This label is located at the bottom of the laser source, next to the laser beam exit.



Declaration of conformity



Warning:

Declaration of conformity nullified if the laser module is operated outside the Riscure Safty Box.

EC-DECLARATION OF CONFORMITY

Suppliers Details

Name

Riscure B.V.

Address

Frontier Building, Delftechpark 49, 2628 XJ Delft, The Netherlands

Product Details

Product Name

Inspector

Model Name(s)

Diode Laser Station

Trade Name

Riscure

Applicable Standards Details

Directives:

- MD (2006/42/EC) - LVD (2006/95/EC) - EMC directive (2004/108/EC)

Standards:

- IEC 60825-1; IEC 320 C8; IEC 60950-1; 21 CFR 1040; ANSI/ESD S20.20:2007; BS EN 61340-5-1:2007; EN55022-B; EN61000-4-2, 4-5; EN-ISO 12100:2010; CISPR 11; CISPR22-B; UL 1950

Supplementary Information

The appliance fulfils the relevant requirements of the above mentioned directives according to our technical documentation TCD-Diode Laser Station. Riskassessment according to the EN-ISO 12100:2010.

Declaration

I hereby declare under our sole responsibility that the product(s) mentioned above to which this declaration relates complies with the above mentioned standards and Directives

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Name

Dr.ir. F.G. de Beer /
Technical Director

Issued Date

02 / 05 / 2013



Signature of representative

