Keysight Laser Fault Injection Safety Box

DS1106A Laser Fault Injection Safety Box

KEYSIGHT

USER MANUAL

Notices

Trademark Acknowledgments

Manual Part Number

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Safety Notices

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

https://www.keysight.com/us/en/product/DS1106A/laser-fault-injection-safety-box.html

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

https://support.keysight.com

Information on preventing instrument damage can be found at:

https://www.keysight.com/find/PreventingInstrumentDamage

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

https://www.keysight.com/find/techsupport

Product and Solution Cybersecurity

Keysight complies with multinational regulations for the cybersecurity of its own products and is committed to providing information to assist you in protecting your products and solutions from external cyber threats. For more information, see:

https://www.keysight.com/us/en/about/quality-and-security/security/product-and-solution-cyber-security.html

Keysight also recommends that you secure your IT environments using appropriate third-party tools. For instruments that run the Microsoft Windows operating system, Keysight concurs with Microsoft's recommendations for ensuring that the instrument is protected:

— Get the latest critical Windows updates

— For network-connected instruments, use an Internet firewall (in Keysight instruments, Windows Firewalls enabled by default)

— For network-connected instruments, use up-to-date antivirus and anti-spyware software

Responsible Disclosure Program

Keysight recommends that security researchers share the details of any suspected vulnerabilities across any asset owned, controlled, or operated by Keysight (or that would reasonably impact the security of Keysight and our users) using this form:

https://www.keysight.com/us/en/contact/responsible-disclosure-program.html

Report a Product Cybersecurity Issue

If you discover a cybersecurity issue that you suspect may involve Keysight's proprietary software, or third-party software supplied by Keysight as part of a product, or that may affect the operation of Keysight products, we encourage you to report it to us using this form:

https://www.keysight.com/us/en/about/quality-and-security/security/product-and-solution-cyber-security.html

Contents

Manufacturer Address

Keysight Technologies Netherlands Riscure B.V.

Delftechpark 49

2628 XJ Delft, The Netherlands

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

Before operation, you should review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

General

WARNING

This product has been manufactured and tested according to international safety standards. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

WARNING

Use only the Keysight supplied power cord or cords with the same or better electrical rating.

Using other power cords may present a fire hazard or cause serious to deadly injury.

WARNING

Use only the Keysight supplied power supply.

Using other power supplies may present a fire hazard or cause serious to deadly injury.

Before Applying Power

Verify that all safety precautions are taken. The power cable inlet of the instrument serves as a device to disconnect from the mains in case of hazard. The instrument must be positioned so that the operator can easily access the power cable inlet. When the instrument is rack mounted the rack must be provided with an easily accessible mains switch.

Do not Operate in Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do not Remove the Instrument Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Instrument Markings

Instrument Marking	Description
	The instruction manual symbol. The product is marked with this warning symbol when it is necessary for the user to refer to the instructions in the manual.
	Direct Current
	Alternate Current

Specification

Environmental Specifications

Parameter	Description	Comment
Ambient operating temperature	10 – 30 °C	
Ambient non-operating temperature	-10 – 50 °C	
Humidity	< 90 %	Non-condensing
Operating altitude	Up to 2000 m	
Overvoltage category	II	
Pollution degree	2	For indoor use only

Electrical Specifications

For detailed power input ratings of this product please refer to the rating label placed on the product.

Electrical Specifications (AC Adaptors)

Parameter	Description	Comment
Line Voltage	100 – 240 V~	
Line Frequency	50 – 60 Hz	
Input Current	1.0 A max.	
Line Voltage Fluctuations	± 10 %	
Output Voltage	6 / 12 / 15 / 24 V⎓	Depending on model
Output power	36 W max.	

Electrical Specifications (Keysight U8002A Power Supply)

If your product is delivered with a Keysight Technologies U8002A Power Supply, please also review the U8002A Power Supply and its manual for safety markings and instructions. You must also follow these to ensure safe operation and to maintain the instrument in safe condition.

Physical Specifications

The physical specification of the product, in detail the dimensions and the weight is documented in the specific User Manual delivered with your product.

Cleaning the instrument

WARNING

To prevent electrical shock, disconnect the instrument from mains before cleaning.

Use a dry cloth slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

Connections to External Circuits

All external I/O connections are supplied by non-hazardous voltages supplied by circuits of limited energy.

WARNING

All external inputs connected to ports shall provide reinforced or double insulation against hazardous voltages for protection against electric shock and shall have voltage below 30 Vrms and 42.4 Vpeak or 60 VDC.

CAUTION

Connecting an instrument to voltages other than rated may introduce excessive voltage and damage the device. Excessive voltage can lead to thermal stress, breakdown of insulating materials, or direct electrical failure, necessitating repairs or replacements. Always refer to product model specifications to avoid such damage.

What It Does

The Laser Fault Injection Safety Box is a protective enclosure for experiment setups used in Side Channel Analysis (SCA) and Fault Injection (FI).

The Laser Fault Injection Safety Box is designed for containing laser-based experiments using the Fault Injection Laser System. It also provides excellent electromagnetic shielding.

Figure 1 Laser Fault Injection Safety Box with door placed in left- and in right-handed position.

The Laser Fault Injection Safety Box includes a power supply unit with connectors for powering up to two (diode) lasers.

The Laser Fault Injection Safety Box provides ample space to accommodate the higher Diode Pumped Solid State Fault Injection Laser setup and use of the wider Base plate with grid and fixtures for Fault Injection Laser System.

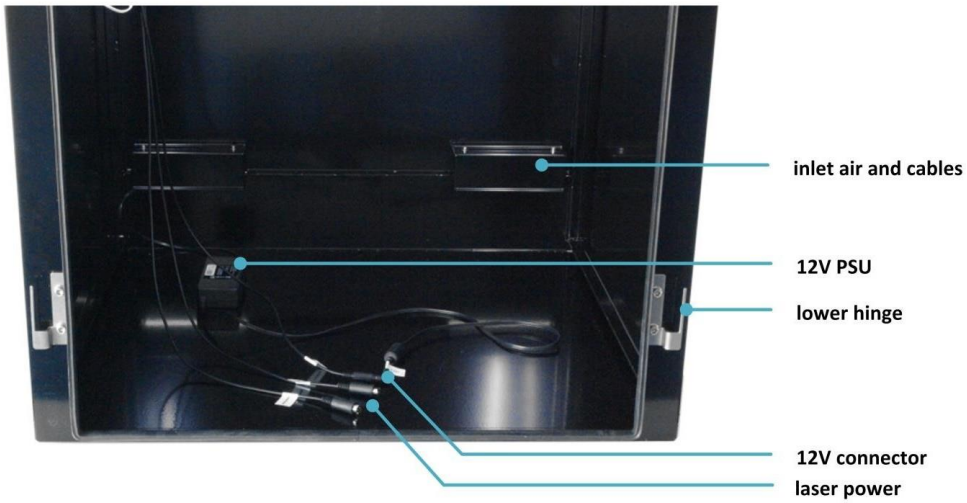
Unauthorized access to the laser setup is protected with a physical key lock. Opening the door disconnects the laser(s) from the power supply and activates the internal illumination.

How to Build a Setup

Install the power supply unit

1. Lead the power cable through a cable inlet at the back panel.
2. Connect the power cable to the mains input of the PSU.

Figure 2 Inlet of the power cable to the PSU

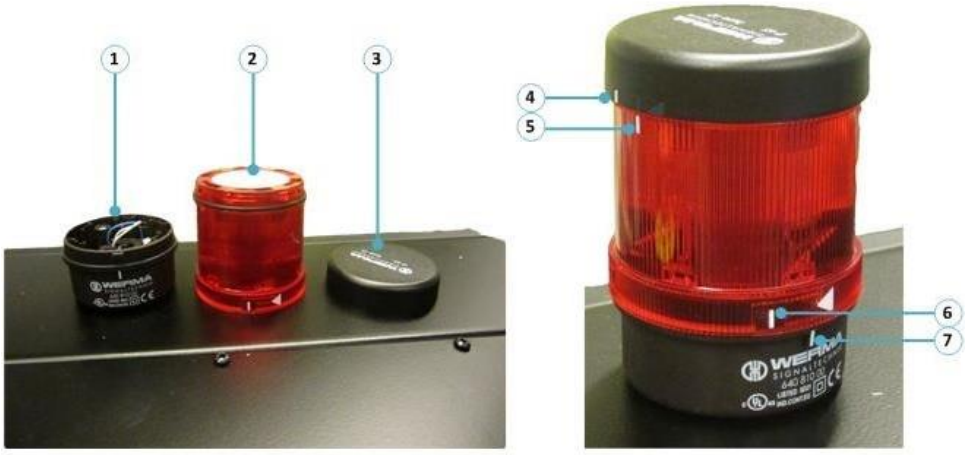


3. Connect the PSU output jack with the 12V connector of the Laser Fault Injection Safety Box. This connector enables an easy replacement of the PSU without the need to disassemble the internal wiring.
4. Connect the power cable with mains. The internal illumination goes ON.

Install the warning light

The warning light is delivered disassembled. Before using the Laser Fault Injection Safety Box, assemble it as follows:

Figure 3 Use the different alignment marks to assemble the warning light.



1. Unscrew cap (3) from socket (1).
2. Place cap (3) on glass (2).
   Align mark (4) with mark (5) and turn the cap clockwise (in arrow direction) until the cap locks.
3. Place glass (2) on socket (1).
   Align mark (6) with mark (7) and turn the glass clockwise (in arrow direction) until the glass locks.

NOTE

The 12 V light bulb of the warning light is pre-installed.
If the light bulb needs replacement, reverse step 3 to access the light bulb.

Install the laser experiment

1. Open the Laser Fault Injection Safety Box door.
   If required, use the key to unlock the door first.
2. Apply power to the Laser Fault Injection Safety Box PSU.
   The internal illumination goes ON.
3. Assemble the laser experiment setup (Refer to the Fault Injection Laser System User Manual)

4. Lead all outgoing signal cables through the cable entries in the back panel.
5. Connect the laser power jacks to the Lasers.
6. Close the Laser Fault Injection Safety Box door.

The experiment setup is now finished.

Arm the laser setup

WARNING To enable execution of a laser experiment, the Laser Fault Injection Safety Box must be armed by unlocking the emergency button.

Figure 4 Emergency button pressed (a), turn to unlock (b), and button in unlocked state (c).

(a) (b) (c)

NOTE The expression “arming” the Laser Fault Injection Safety Box means enabling the power supply to the lasers. The activation of the laser itself is controlled by the Inspector application.

NOTE If the emergency button has been pressed, it locks itself. You must resolve the cause of an emergency before unlocking it.

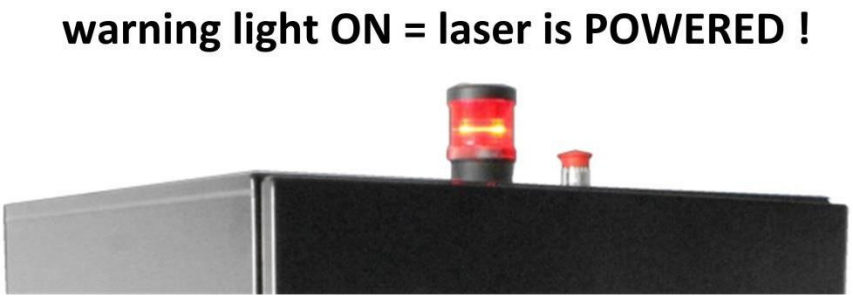
NOTE It is safe to press the emergency button any time to disrupt an ongoing laser experiment, or if access to the experiment is required.

WARNING

Opening the door will disconnect laser power temporarily. This power is reconnected if the door is closed again.

To permanently disconnect laser power, press the emergency button.

Figure 5 An active warning light means the lasers are electrically powered.



Help and Troubleshooting

Common problems

Signal or behavior	Cause	Solution
Laser does not respond to controls	Laser Fault Injection Safety Box door not closed.	Close and lock the door.
	Laser Fault Injection Safety Box is not armed.	Unlock the emergency button by turning it clockwise.
	Diode Laser not connected to the PSU.	Connect PSU laser power (Figure 7: B3 or B5) to the Diode Laser
Warning light not ON	Laser Fault Injection Safety Box door not closed.	Close and lock the door.
	Laser Fault Injection Safety Box is not armed.	Unlock the emergency button by turning it clockwise.
	Laser Fault Injection Safety Box is not powered.	Verify if the power cable of the Laser Fault Injection Safety Box: — - Is still connected to the PSU — - Is connected to an active mains power group
Internal illumination is not ON when door is open	Laser Fault Injection Safety Box is not powered.	Verify if the power cord of the Laser Fault Injection Safety Box: — Is still connected to the PSU, — Is connected to an active mains power group.

Still have questions?

Visit the Keysight Support Portal at https://support.keysight.com.

Technical Specifications

Operational conditions

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

CAUTION Do not block the ventilation gap on top of the box.

Power supply input

- 12 V DC, load max. 6.6 A, power max. 80 W
- Two connectors (5 pin PS2) to power Keysight laser products

CAUTION Use of a PSU other than supplied by Keysight is not supported. Power spikes may cause internal damage and loss of accuracy.

Casing

- Steel plating, 1.5 mm, painted black
- Ventilation gap in top panel
- Two cable entry openings in back panel
- Internal illumination: 2 x LED-strip 12 V

Door

- Door handle with key lock, two-point lock system
- Door locking bar has top and bottom rollers
- Transferable for use with left- or right-side hinges

Product

— Dimensions H x W x D: 1050 x 700 x 670 [mm], 41.34 x 27.56 x 26.38 [inch]

Figure 6 Laser Fault Injection Safety Box outside case view

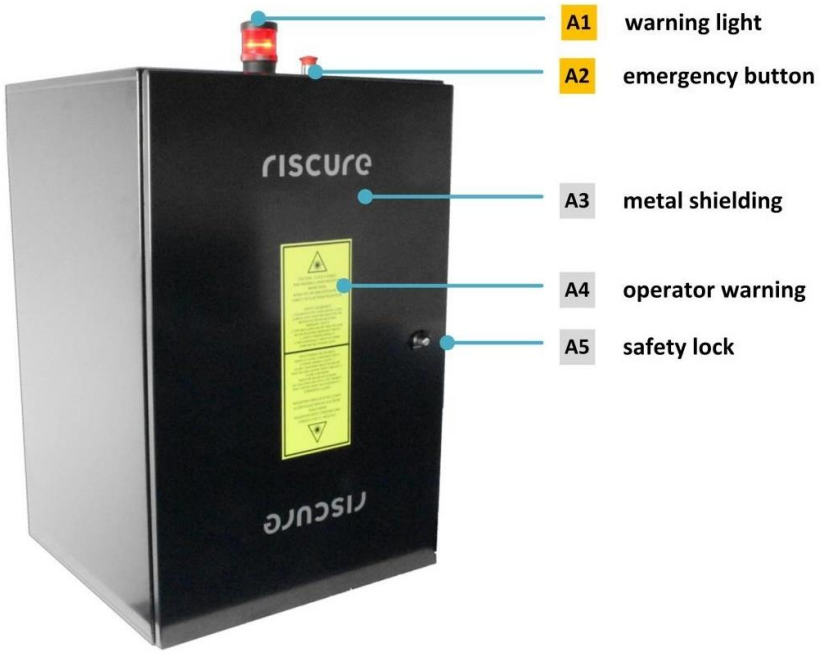


Figure 7 Laser Fault Injection Safety Box interior - bottom area

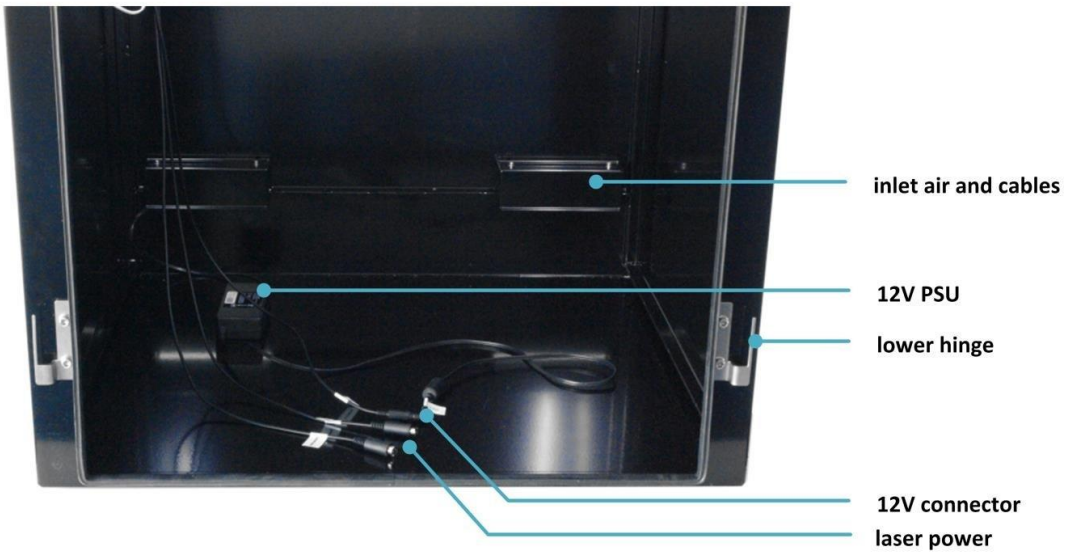
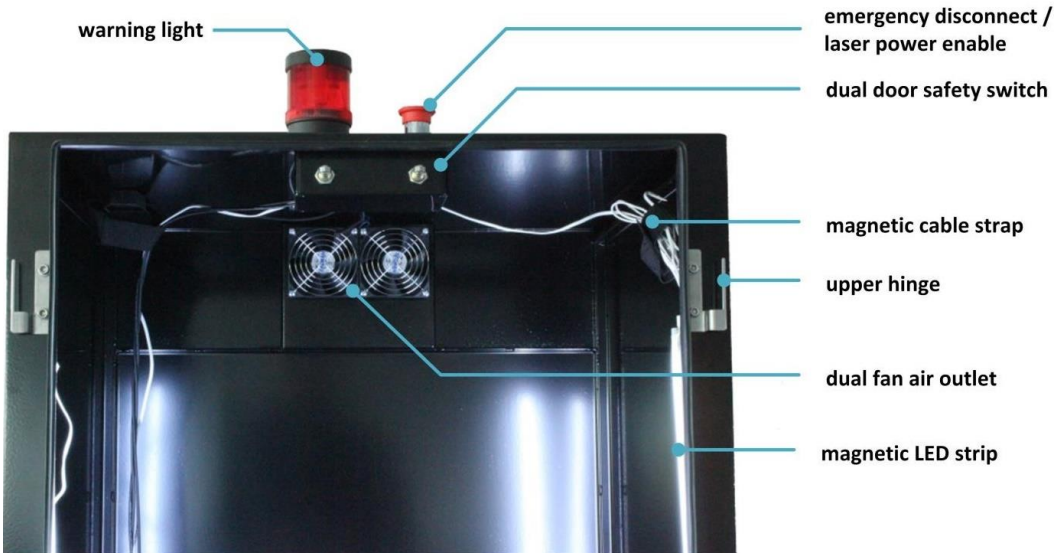


Figure 8 Laser Fault Injection Safety Box interior - roof area



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