

Maintenance of Embedded Laser

HSE Guide

An embedded laser system is a Class 1 laser product which contains one or more lasers of higher class (Class 2 to Class 4). The laser emissions are inaccessible to users during normal operation, e.g. the total laser power does not exit the manufacturers housing. These systems are safe under normal operating condition and if undamaged; however, maintenance/service and repair shall not be performed by the users unless the user complies with all safety requirements associated with the laser Class that is embedded in the system. In addition, access panels should be labelled or interlocked or require a tool to remove, this should be detailed in the manual.

Do NOT Open the embedded laser system unless you are authorized and trained to do so.

Please consult with HSE if you decided that you want to carry out the maintenance/service/repair of such system.

- Identify if you can use any laser viewing cards.
- Always do service/maintenance of the laser system with another person.
- Take regular breaks to avoid tiredness.

During Work

- Deactivate the interlocks to allow operation of the laser system when the panels are removed.
- **Always wear laser safety eyewear; do not remove them or lift them to view the beam.**
- Follow the procedure given by the manufacturer or in the manual.
- Be aware of the laser path and possible reflections on the system.
- Use laser viewing cards or IR viewer if possible to locate the beam.
- Always block the beam behind the area of work using appropriate beam block to ensure the beam remains under control.
- If you move some of the optics ensure they are fixed again.

Hazards

Embedded laser systems are safe if used under normal operating conditions. However, if the equipment is operated with open panels, etc. the eye and skin can be exposed to the laser beam. This can lead to radiation exposure above the Maximum Permissible Exposure level (MPE) for eye and/or skin leading in some cases to irreversible injuries.

Precautions

Only attempt to carry out the service and maintenance of the laser embedded in the system if you are experienced; otherwise it is recommended that it is done by the manufacturer or an experienced person.

You are encouraged to contact Lab Equipment Maintenance (LEM) as they have a dedicated laser engineer who may be able to assist with the maintenance of the laser system.

LEM contact: lem@kaust.edu.sa

Before operating a laser system in service mode (i.e. access to laser radiation).

- Ensure that you have taken the online Laser Safety Training.
- Ensure that a Standard Operating Procedure for service/maintenance is available.
- The person carrying out the service/maintenance must have received practical training to do this type of work.
- The laboratory/room must be designated as Laser Controlled Area.
- Add a warning sign at the entrance of the laboratory/room and ensure that nobody enters while the laser is operating.
- Identify the correct laser protection eyewear for working with the laser's wavelength and power.

After Completing Work

- Check that all the optics are fixed.
- Place all the panels back and correctly.
- Re-instate all the safety interlocks.
- Remove the warning sign at the entrance of laboratory.

Emergency Procedures

EYE INJURY

You must block the beam and switch the system off. You must attend KAUST Health Emergency Department as soon as possible or within 24 hours if possible. Doctor will assess the injury and may refer you to a specialist hospital in Jeddah for further checks.

Call 911 on a landline phone for medical assistance or 012-808-0911 from a mobile phone.

SKIN INJURY

You must block the beam and switch the system off. If the injury is minor, treat it onsite using the first aid kit. If the injury is severe, you must attend KAUST Health Emergency Department as soon as possible.