

# Laser Jailer

## The Active Laser Guarding System with Inherent Fail Safe Technology

The Laser Jailer active laser guarding system combines an inherently fail safe detection technique and Lasermet's proven interlock system technology to create an active laser guarding system which is fail safe to Machinery Directive Standard EN13849-1.

The system is designed to contain high power laser beams in an enclosure which is smaller and lighter than would otherwise be necessary.

It comprises of an outer passive enclosure and an inner active enclosure made up of detector tiles. These tiles are connected to Lasermet's ICS interlock system, so that if a stray laser beam impacts on one of the tiles, the Interlock will immediately switch off the laser.

Virtually any size of enclosure can be accommodated from small enclosures as shown above to full room size enclosures containing robot welding machines.

### Benefits

- Inherent Fail Safe Technology
- Conforms to the Design Safety requirements of EN13849-1
- Conforms to EN60825-4
- Versatile
- Modular
- Scalable
- Provides maximum protection
- Lightweight
- Proven technology
- Standard or custom designed
- Easy to maintain
- Rapid availability
- Reduces building infrastructure



*The above example enclosure is fitted with the ICS-5 Lasermet interlock system, a backlit LED active Laser warning sign, emergency stop button and an Arm Laser button*

**lasermet**  
laser safety solutions\*

# Laser Jailer Fail Safe Technology

**The Laser Jailer Active Laser Guarding System ensures the laser is made safe if its beam becomes either directly or indirectly pointed at the laser enclosure walls, floors or ceiling.**

The system is designed to accommodate all laser powers, wavelengths and waveforms.

In accordance with EN13849-1, the laser is rendered safe and contained within the enclosure irrespective of its power.

The power to the laser is switched off in less than 50ms via the Lasermet Interlock Controller if the laser is directed at the wall of the enclosure.

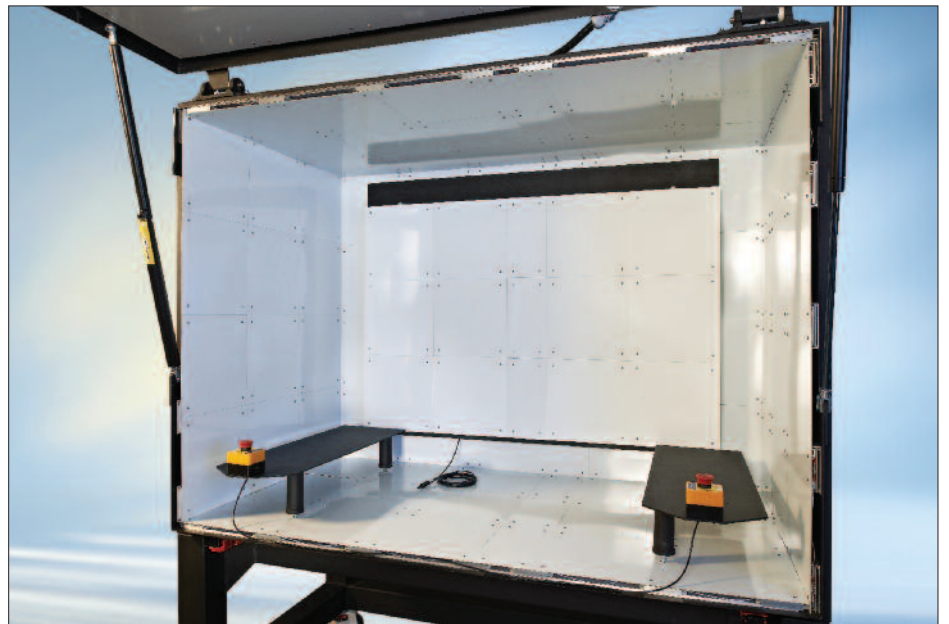
This lightweight, cost effective system can be installed in virtually any size of enclosure (or room) due to its modular design.

## Overview

Conventional laser enclosures have to be robust enough to withstand accidental exposure to the laser.

Passive laser guards have to be robust enough to withstand accidental exposure to the laser for the foreseeable maximum exposure time. Typically this will be between 10s and 10,000s depending on the situation.

High beam, power (>1kW) in small beam diameters will cut through steel and even firebricks in a relatively short period of time. For very high



*The photograph above shows an example of the Laser Jailer Active Laser Guarding panels built into a laser safety enclosure measuring 1.7m wide x 1.35m tall x 0.95m deep. Although the enclosure is steel, the safety of the laser is maintained by the Active Laser Guarding System. This example has a floating floor installed to mount the optical table and laser.*

beam powers (>5kW), even large beam diameters have the potential to break through concrete. In these circumstances passive guards must be far enough removed from the laser aperture to ensure they can withstand the beams power density. This is not always practical. An active guard allows you to have a much smaller enclosure, as the required containment time is 50ms.

*The panels are a close fit to ensure that all of the potential laser exit points are covered.*



## System description

The system comprises of an enclosure which is lined throughout with detector tiles. These are connected to the Lasermet interlock system, so that if a stray laser beam impacts on one of the tiles, the Interlock will immediately switch off the laser. A warning sign on the front of the enclosure shows if the laser is on or off. Laser Arming and Emergency stop buttons are also installed on the enclosure door.

# Active Laser Guarding System



## How it works

Each tile (300 x 300mm panel) contains a laser detector which is connected to the Lasermet interlock.

If a high power laser is directed at any of the tiles, a signal is sent to the interlock system to turn the laser off. The power to the laser is then switched off by the Interlock system in less than 50ms.

The Interlock Controller constantly monitors the system and disables the laser if the signals it receives are either incorrect or absent rendering it fail safe. If an impact is registered the laser is disarmed immediately. The system is manually reset once the tile has been replaced.

## Active Tiles

Due to the extremely high power of some lasers, the tiles have been designed to be easily replaced once they have been activated.

These sacrificial tiles are a standard size (300 x 300) with additional 150mm x 300mm being available for the extreme internal edges of the enclosure. Customised panel sizes can be provided in cases where the standard panels cannot fit precisely.

## Modular Design

The tiles are mounted on a framework which is first installed in the enclosure. The framework and tiles can be installed on the walls, ceiling and even the floor. However, the tiles are not designed to be walked on or to take heavy loads.

Therefore, a suspended floor would be required to take the required weight and the tiles would be mounted under the structure.

## High power laser containment - the Lasermet solution

### Considered factors

Passive systems cannot contain high power lasers that have a small beam. Options for laser guarding of small diameter laser beams include using thicker steel walls and using larger rooms/enclosures which are heavy and expensive.

The Lasermet system design is lightweight, adaptable, repeatable and maintainable, and uses fail safe technology.



## In service contract and tile replacement

Lasermet can provide an in-service maintenance contract to replace tiles in the event of an incident. If a tile needs to be replaced due to damage caused by the laser, this can be carried out - in accordance with the contract - by the Lasermet engineering team who will replace the tile with a new one and retest and re-certify that the system is safe to be used.

### Mechanical Specification

**Main Panel dimensions**  
300 x 300 x 2mm

**Half Panel dimensions**  
150 x 300 x 2mm

### Laser specification

Minimum beam diameter at the tile surface is 3mm.

### Switching time < 50ms

### Main system components

- Active detector tiles
- Integrated tile mounting system
- Interlock system with detector module
- Illuminated laser warning sign
- Laser Arming button
- Emergency stop button.

### Conformance

**CE** The system is certified for use in accordance with EN 60825-4.

The system is designed to conform to the requirements of BS EN ISO 13849-1:2008 and conforms to the following European Directives:

- Machinery Directive
- Low Voltage Directive
- Electromagnetic Compatibility Directive

### Ordering information

To specify the Active Laser Guarding System you require, the following items must be addressed.

1. Specification of the laser
2. The intended use of the laser
3. The dimensions and specification of the laser safety enclosure
4. Identification of relevant safety interlocks (doors, switches, maglocks etc).