LASERMET

GLASER JAILER

INSTRUCTION MANUAL

glaser jailer

active laser safety window

ACTIVE WINDOW

LASER PROTECTION SYSTEM

LASERMET GLASER JAILER
Instruction Manual

Contents

1 Declaration of Conformity

LASERMET LIMITED

Glaser Jailer – Active Laser Guarding Window
Part no. GLASER JAILER

DECLARATION OF CONFORMITY

This is to certify that Lasermet's Glaser Jailer Active Laser Guarding Window System has been tested in accordance with the following directives and standards and found to comply.

Lasermet certifies that this product complies with the basic requirements for health and safety as provided by the following directives and standards:

Directives: Machinery Directive 2006/42/EC June 2010
Low Voltage Directive 2014/35/EU
EMC Directive 2014/30/EU

Standards:	EN 60825-4:2006 +A2: 2011	*Safety of Laser Products – Laser Guards*
	EN ISO 13849-1:2015	*Safety of Machinery - Safety-related parts of Control Systems*
	EN 60947-1:2007 +A2:2014	*Low Voltage Switchgear and Controlgear*
	EN 61010-1:2010 +A1:2016	*Safety Requirements for Electrical Equipment*

The Glaser Jailer Active Guarding Window System has a response time of 50ms and meets Performance Level 'e' (PLe) under EN ISO 13849-1.

The Active Guard Protection Times, in accordance with EN IEC 60825-4 are shown below.

The user must ensure that the Laser Termination Time is less than the Active Guard Protection Time to ensure safety. The window must be installed with the active element between the laser and the passive filter window. Both active window circuits must be connected to the interlock controller Dual Active Guard Board (01811-00-000) on an ICS-6 System, or the Active Guard Monitor Board (01675-00-000) on ICS-6-OEM System.

Active Guard Response Time		
Beam Area	**Average Irradiance**	**Active Guard Protection Time**
4 mm^2	1.25 GW/m^2	150 ms
4 mm^2	250 MW/m^2	700 ms
80 mm^2	62 MW/m^2	1 s
80 mm^2	12 MW/m^2	4 s
2000 mm^2	2.5 MW/m^2	8 s
2000 mm^2	0.5 MW/m^2	48 s

Supplier: Lasermet Limited, Lasermet House, 137 Hankinson Road, Bournemouth BH9 1HR, Dorset, United Kingdom

Country of Origin: England

Signed:

Paul Tozer
Managing Director

Date: 10 June 2019

LASERMET LIMITED

Passive Filter Window

Part no. FW-LM-1064-7

DECLARATION OF CONFORMITY

This is to certify that the Laser Protection Filter Window (Passive Filter Window) designated by Lasermet Part Number FW-LM-1064-7 has been tested in accordance with the following directives and standards and found to comply.

Lasermet certifies that this product complies with the basic requirements for health and safety as provided by the following directives and standards:

Standards:	EN 207:2009 +AC:2011 *Essential Requirements according to* *Annex II of the PPE Directive 89/686/EEC*
Product Type:	Laser Protection Filter Window – screen for laser working places
Material and Mechanical Properties:	PMMA, Increased Robustness (S)

Wavelength Ratings

EN 207:2009 +AC:2011

180 - 315	D LB8 + IR LB4
> 315 - 380	D LB4 + IR LB6 + M LB6Y
915 - 1180	D LB6 + IR LB7
2720 - 2940	DI LB4
5000 - 11000	DI LB3

Supplier: Lasermet Limited,
Lasermet House
137 Hankinson Road
Bournemouth BH9 1HR
Dorset
United Kingdom

Country of Origin: England

Signed:

Paul Tozer
Managing Director

Date: 10 June 2019

2 Safety Warnings

This device is intended to be used as part of a safety system which may be used to protect personnel and equipment from possible injury, damage, or loss.

As such it must be installed and wired according to these instructions and tested by suitably qualified persons. No attempt may be made to tamper with the parts, open them, or use them outside of the parameters contained herein.

The units are only designed to be fixed to surfaces using their inbuilt fixing holes. They must not come into contact with each other or any other moving part when in use. The parts should never be subject to impact or mechanical strain.

Safety switches should never be defeated or bypassed. It is imperative that all steps are taken to ensure that any spare actuators are made unavailable, such that they cannot be used to defeat the switch or reduce the protection offered by the system in any way.

3 Concept

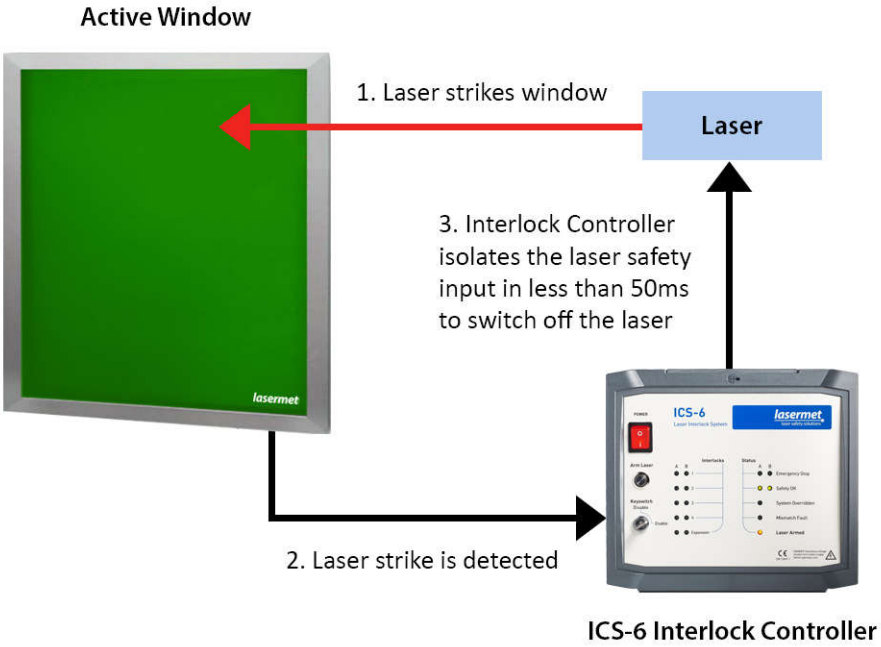
Lasermet's Active Laser Window, called Glaser Jailer, detects a laser beam striking the window surface and causes the laser beam to be turned off.

The system uses an inherently fail-safe laser detecting sensor panel. This is sandwiched between the glass layers. The sensor is electrically connected to a monitoring and detection circuit board which is fitted inside a Lasermet Interlock Control System (ICS). In addition, a passive protection layer is provided.

The ICS-6 monitors the Active Window circuitry and other interlocked devices. The ICS-6 is connected to the interlock connector on the laser to disable the laser beam if there is an inadvertent laser strike on the window.

Because of the inherently fail-safe detection technique used, any failure of the sensor will also disable the laser. There are no maximum or minimum beam diameter requirements and no maximum or minimum laser power limits (very low power densities may not cause the system to trip but they will also be too low to cause any damage to the sensor or pass through the passive protection layer).

When the Active Window system is tripped, the monitoring and detection circuit latches off. The window must be replaced, and the system manually reset in order to re-arm the system.



Every effort should be made in the first instance to reduce the risk of a laser beam striking the walls or window. Careful alignment and setting-up should always be made prior to enabling the beam.

The Active Window system can disable a multi-kilowatt laser before the passive protection layer fails. The function of the passive protection layer is to contain the laser beam for long enough to allow the laser to be shut down. The Protection Time quoted in the Protective Exposure Limit (PEL) specification is the minimum time for which the Window will contain the laser beam, at the quoted PEL, after the control system has issued the shutdown command. The user must ensure that the laser beam emission can be shut down within this time.

Lasermet provides a full range of laser interlock equipment including control systems, interlock switches, illuminated warning signs, laser shutters, door locks, external power supplies etc. which can be connected to provide a complete laser interlock system. Full support, design and installation is available from Lasermet, please contact us for any queries. Contact details are given at the end of this manual.

4 Wiring

The Active Window has four connections to the ICS-6 via the plug-in Active Window Interface Card. These connect to the start and end of two conductive tracks on the window's sensor panel. The terminal blocks on the Active Window Interface Card are marked A and B to indicate the separate circuits. The two circuits are interchangeable.

The Active Window is terminated in a 1m 4-core lead which is wired to the Active Window Interface Card, via terminals, by the installer. The connections are as follows:

Cable Core	Window Track	ICS Input Pin	Marked
Red	A start	1	A
Yellow	B start	2	B
Blue	A end	3	A
Green	B end	4	B

5 Operation

Turn on the ICS power switch.

When all the relevant interlocked doors are closed the system may be armed, as follows:

ICS-6

Press the 'Arm Laser' button on the front of the ICS-6. The ICS-6 will briefly test the operation of the active window interface by applying a simulated fault. If the associated safety relays do not open at this point, the laser will not arm. If the relays open correctly, the test will cease and the simulated fault will be removed. The 'Laser Armed' light will illuminate to indicate that the system is armed.

5.1 Laser Detection

If a powerful laser beam strikes the Active Window, the detection system in the interlock controller will shut off the laser beam. The 'hit' is recorded by a Fault latch. The setting of this latch is indicated on the front panel of the ICS, as follows:

ICS-6

A yellow light is illuminated next to the legend 'Expansion'.

If this happens the system needs to be investigated and repaired prior to release of the fault latch.

Although it may be possible (though unlikely) to arm the laser after a laser strike to the window, it is strongly recommended that a damaged window is repaired or replaced prior to any use of the laser.

6 Specifications

IEC 60825-4 Protective Exposure Limit

8900 x 540mm Active Window

For 450 – 1200 nm wavelength

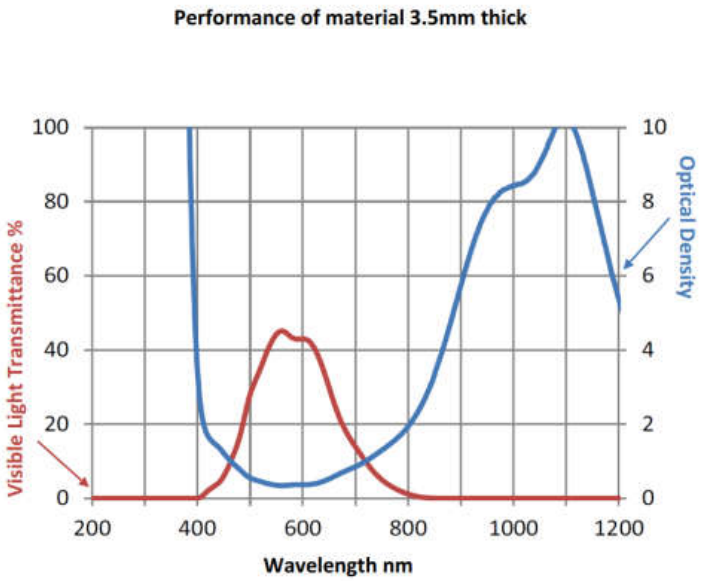
Area	PEL	Active Guard Protection Time
4 mm^2	5 GW/m^2	0.5 s
2000 mm^2	10 MW/m^2	5 s

Note that the Active Guard Protection time is the time the window will contain the laser beam after the Interlock Control System has issued the shutdown signal. Therefore, the laser must cease output within 0.5 s of receiving the signal from the Lasermet Interlock Controller.

EN 13849-1 Performance Level

When included in ICS-6, the Active Window subsystem meets EN13849 PLe.

6.1 Filter Window Specification



Lasermet's filter window for fibre lasers, FW-LM-1064-7, is amongst the best performing material available today.

The material can be supplied to engineering drawings ready for assembly in sizes up to a maximum of 600 x 800mm.

Laser Filter viewing windows enable processes to be viewed within a laser enclosure.

Specifications

Part No.	FW-LM-1064-7
Wavelength	920 - 1175nm
Material	Acrylic
Maximum Size	800 x 600
Thickness	3.5mm
Wavelength	1064
OD	7+
VLT	40%

Wavelength Ratings to relevant standards

EN 207:2009 +AC:2011

180 - 315	D LB8 + IR LB4
> 315 - 380	D LB4 + IR LB6 + M LB6Y
915 - 1180	D LB6 + IR LB7
2720 - 2940	DI LB4
5000 - 11000	DI LB3

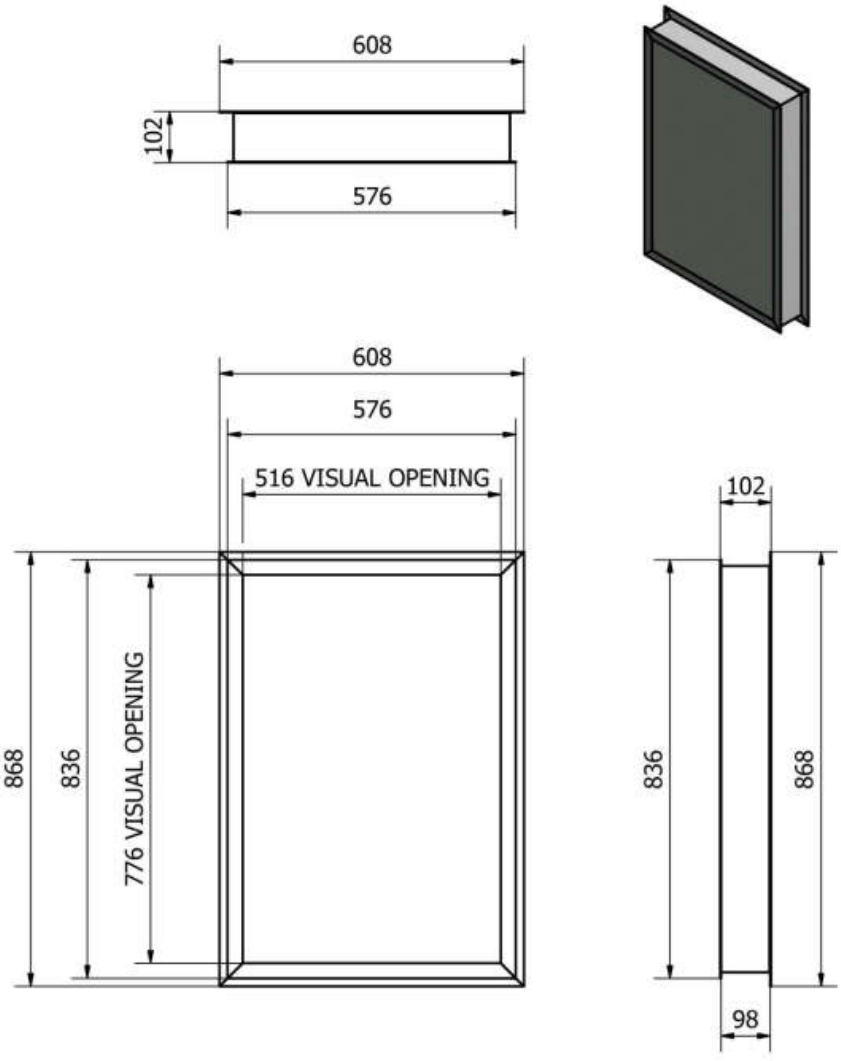
EN 12254: 2010 +AC:2011

D AB8 + IR AB3 180 - 315
D AB5 + IR AB6 + M AB6Y > 315 - 380
D AB5 + IR AB7 915 - 1180
D AB2 2720 - 2940
D AB2 + I AB3 5000 – 11000

6.2 Dimensions

The active protection is effective only on the window area and not on the mounting flange. The window is mounted with the flange on the outside of the laser enclosure.

Dimensions are approximate. Values given as 'typical' are average values measured across a number of samples and are not guaranteed. Lasermet reserve the right to alter any specification without prior notice.



6.3 Environmental Conditions

Operating and Storage: -10°C to +55°C 10% - 80% relative humidity non-condensing.

The window is intended for fixed indoor benign environments and should not be exposed to water or moisture exceeding the above limits.

7 Warranty

Lasermet provide a 12-month warranty for defects in materials and manufacture, from the date of installation or delivery. Installations completed by Lasermet are covered against defects in workmanship for 12 months.

Damage or defects caused by other factors are not covered. For example, industrial contamination, incorrect cleaning, storm damage. Consequential loss is not covered under warranty. Compensation for indirect or direct loss or damage is expressly excluded. Rectification of the defects or a replacement does not initiate a new warranty period.

For all deliveries, payments and other legal transactions, English law takes precedence for any litigation.

8 Contact Details

Lasermet provide a full range of laser interlock equipment including interlock switches, illuminated warning signs, laser shutters, entry keypads with built-in fail-safe override timer, door locks, external power supplies etc. which can be interconnected to provide a complete system. We also supply equipment and consultancy covering all aspects of laser safety. Full support, design, and installation is available from Lasermet, please contact us for any queries.

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