RT Technologies
World Class Laser Safety

LS-200 Laser Shutter

LS-200 Standard and LS-200 SIL 24 laser shutters

Main Features:

- Gravity close blade
- Range of blade options
- Three control options
- Optional beam dumps: Air cooled or water cooled
- Safety rated options
- LS-200 (Standard) EN IS0 13849-1 PL 'c'
- LS-200 SIL-24 EN ISO 13849-1 PL 'e'
  IEC 61508-1 SIL 3

Overview of the shutter

The LS200 Laser Safety Shutter is designed to prevent accidental exposure to potentially harmful laser beams.

When the shutter is open the laser beam passes in clear air through the shutter. When closed, the shutter deflects the incoming laser beam out of a separate port to an appropriate beam dump which must be fitted.

The photograph above shows an air cooled beam dump. However, water cooled beam dumps can also be used to absorb higher powers.

The shutter uses a gravity close blade and force-disconnect proving contacts and is designed to form part of a high-integrity safety system.

A SIL3 dual version is also available which when correctly wired with the Lasermet Interlock Controller System can provide a safety interlock which meets Safety Integrity Level 3 to EN 61508 and ISO 13849-1 Performance Level 'e'.

The shutter has a Ø50mm aperture.

At 20°C ambient the standard stainless steel blade can dissipate 5W, the copper blade option 2.5W. Tests may need to be undertaken to establish the suitability of any shutter when used with powerful lasers.

Control Options

The Shutter is usually controlled and powered by a Lasermet interlock controller when all safety interlocks have been closed. If the interlock is tripped out, the shutter closes immediately. It cannot be opened until the interlock system is re-armed. There are three options in wiring the shutter.

1. Arming the interlock system enables the operation of the shutter. The shutter can then be opened or closed using the buttons on the top of the shutter.
2. In addition to option 1 above, the shutter may be remotely opened or closed by external controls such as Lasermet's LS-20 LS-RS units.
3. Arming the interlock opens the shutter immediately.

Blade options and blade cleanliness

Blade options include: stainless steel, copper, ceramic and coated glass.

Cleanlines of the blad is important. A perfectly clean blade will successfully divert a beam. It is essential that the blad is kept clean to avoid excessive heat absorption as this can lead to ablation of stainless steel blades.

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LS-200 laser shutter specifications

Aperture	Ø50mm
Weight	Single Shutter: 1.6Kg
	Dual SIL Shutter: TBC
	Air-Cooled Beamdump: 1Kg
Mounting	2 x M6 threads, T-Nuts supplied
Power Supply	24VDC
Current	Closed: 40mA
	Opening: 210mA
	Open: 110mA
User Controls	Open, Close
LED Indications	Power, Open, Closed
Operating Time	Fully Open 800ms
	Fully Closed 200ms

Laser Blocking Specification

Maximum average beam power:

Using standard blade	20 W
Using mirror blade	As per mirror specification

Safety Specification

Standard LS-200	EN ISO 13849-1:2008 performance level 'c'
LS-200 SIL-24	EN ISO 13849-1:2008 performance level 'e'
	IEC 61508-1 SIL 3 when correctly wired to a suitably rated control system.

The LS-200 SIL-24 is a dual channel electromechanical safety laser shutdown device.

Power Density

Typically the LS-200 standard shutter using a stainless steel blade can handle 100W based on a 10mm beam diameter. Users must ensure the beam dump can absorb and dissipate the laser power.

The PEL ratings to the right are for a standard stainless steel blade.

Irradiated Area	PEL (T2) 100 s	PEL (T1) 10000s
4 mm²	**5 MW/m²**	**5 MW/m²**
20 mm²	**2.5 MW/m²**	**2.5 MW/m²**
80 mm²	**1.3 MW/m²**	**1.3 MW/m²**

Hardware Fault Tolerance

When correctly connected to a Lasermet ICS-5 control system the LS-200-SIL-24 has the following characteristics. This can also be achieved by correctly connecting to another suitable safety control system which has dual channel monitoring of the shutdown device.

Safe Failure Fraction 95%

Probability of Failure to Danger (PFD) 1.56×10^{-7}

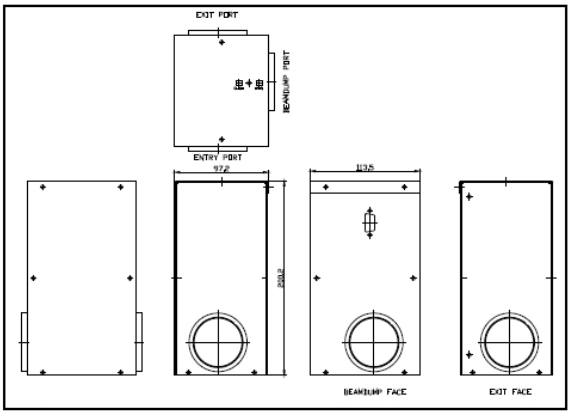
When used as described above, the LS-200SIL-24 is suitable for use as the sole laser shutdown device in a system which is required to achieve Safety Integrity Level 3 (SIL 3) or lower as defined in IEC 61508.

(NB The actual SIL rating of the entire system will depend on the other system components, how they are connected together and how the system is used).

Reliability

Mean time to dangerous failure (MTTFd)	100 years
Number of operations after which 10% of units have failed (B10d)	> 1×10^7

Overall dimensions



System type: Type A System

Conformity: Certificate of Conformity is provided CE

RT Technologies Inc.
2391 Briarleigh Way
Dunwoody, GA 30338

Telephone: *770-332-0092*
Fax: *770-332-0092*
Email: *contact@rtlasersafety.com*
Web: *www.rtlasersafety.com*

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