

Kuhnke Laser Shutter DS200X8

Technical Information



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Safely trapping the light

Kendrion Kuhnke Automation introduces an innovative laser shutter with built-in self-monitoring for highly reliable operation. It matches applications employing laser technology with up 100 watts and matches a wide range of applications in medical technology and industrial processes.

From the DVD player to optical fibers and impressive light shows, laser technology is omnipresent and has become an integral part of everyday life. More than that, it has revolutionized numerous manufacturing processes, since it allows measurements of utmost precision and is an innovative alternative for a wide range of mechanical processes.

Generally speaking, the term laser stands for Light Amplification by Stimulated Emission of Radiation. It describes a monochromatic light source consisting of a highly concentrated light beam consisting of only one specific wave length. Depending on that wavelength, the laser beam can be perceived visually or will remain completely invisible to the human eye.

Addressing the safety issue

Laser technologies are described depending on the light source, the laser medium and the related hazards involved. International standards differentiate between four classifications, ranging from low-power lasers such in DVD-players (class 1) to high-energy lasers for industrial applications (class 4).

Although it “only” consists of light, a laser beam is anything but harmless. Even with low power applications, any direct exposure of laser light to the human eye can result in permanent damages all the way to total blindness. Therefore, such hazards need to be prevented by all means. With high-power applications a laser beam is strong enough to cut even through steel – and anything that crosses its path.

This means, designing a high-power laser application calls for extra precautions. Not only to prevent injuries, but also to maintain the functional safety of the machine or device.



Blocking and trapping the light

Here is where a laser shutter comes in. Basically speaking, a laser shutter is nothing else but a small metal plate, which is pivoted into the path of the light beam in order to prevent it from reaching the intended target. Usually, such a shutter is spring loaded and remains closed while it is in its initial state. A solenoid driven rotary switch is used to keep the shutter open while the machine or device is operating in a safe state.

Usually, a laser shutter is part of the overall safety concept of an application. For this purpose it is connected to a variety of sensors that monitor the dangerous zone of the application and trigger the shutter as soon as any dangerous intrusion is detected.

However, when it comes to class 2 lasers or higher, simply blocking the laser beam in a hazardous situation is not sufficient. Instead, high-power laser applications require a laser shutter with built-in light trap. Instead of a metal shutter blade such shutters feature a mirror that deflects the laser beam into a built-in light trap or beam dump that is designed to completely absorb the energy of the laser.

Functional safety

Kendrion Kuhnke is an expert when it comes to specialized rotary solenoids for laser applications. The very latest Kuhnke Laser Shutter DS200X8 is an example of the superior expertise of the company that realizes enhanced process reliability and functional safety. The shutter is made of solid aluminum. It combines a highly durable mechanical design with intelligent diagnostics for reliable operation. Manufactured under clean room condition, the shutter is available with many options and can be adapted to a wide range of customer requirements.

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Characteristics

- Photocell end position detection
- Redundant temperature monitoring of the mirror
- Closing of the aperture in the case of power failure
- Low emission materials
- Laser beam dump
- Connection for flushing air
- Heat absorption with additional water cooling



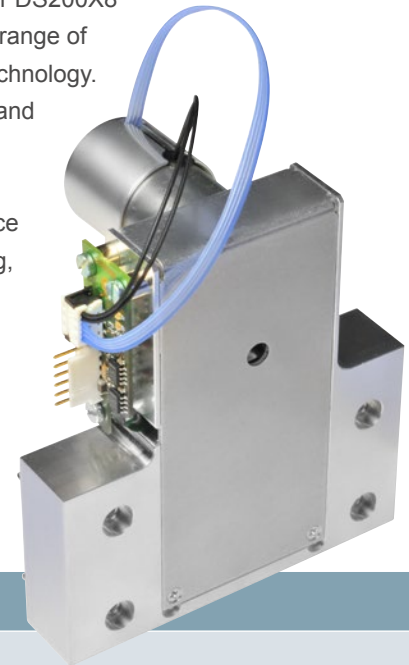
The Kuhnke Laser Shutter DS200X8 features an aperture of 6 mm (other apertures available on request) and is made for laser beams with diameters between 0.8 and 2 mm (other dimensions available on request). The shutter is tested for a minimum life cycle of 10 million switching operations and offers a response time of less than 15 ms.

The deflection mirror is also available with coatings for different wave lengths, the Kuhnke Laser Shutter also features redundant NTC temperature monitoring in order to continuously monitor the

reflectivity of the mirror. For effective cleaning the light trap and mirror area of the shutter is equipped with a purge air connection. For reliable operation, the end positions of the deflection mirror are monitored by light barriers. In case of any malfunction of the shutter, the aperture will be locked automatically in order to maintain the operational safety of the laser application.

For additional cooling of the light trap, the Kuhnke Laser Shutter DS200X8 can be connected to a water-based cooling system. In this way it can be used with laser sources generating up to 100 W.

The Kuhnke Laser Shutter DS200X8 perfectly matches a wide range of applications in medical technology. It also takes care of safe and reliable operation when it comes to industrial processes, such as surface treatment, welding, drilling, sintering, quality analysis, product identification and distance measurements.



Technical Data

Aperture	6 mm, other diameters on request
Laser power	up to 100 W with additional water cooling
Wave length	266 nm, 355 nm, 532 nm, 1064 nm, other wave lengths on request
Switching frequency	up to 5Hz
Closing time	<15 ms
Beam diameter	0.8...2 mm, other diameters on request
Mechanical durability	10 million switching actions
Sensors	Photocell positioning, temperature monitoring with NTC, TTL output
Case	Aluminium carrier, dimensions approx. 100 x 60 x 100 mm
Mounting	Mounting holes, exact positioning on request
Power supply	12 V DC pull voltage, 6 V DC holding voltage, other voltages on request
Power requirements	approx. 4 W (@ 6 V DC)
Storage requirements	-25 °C...+60 °C



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