

SmartShutter STEPPER-MOTOR DRIVEN SHUTTER

SUTTER INSTRUMENT



The **SmartShutter** is designed to complement SUTTERs growing line of optical products and sets a new standard for shutter performance and reliability. In the traditional shutter design there are two or more “leaves” that rub against each other. Given time, the blades will wear down, bind, and the shutter will fail to open. The **SmartShutter** is designed with only one moving part, which virtually eliminates the effects of wear and markedly improves performance. In the traditional shutter design there is an additional issue of the leaves binding in extreme temperature conditions. The improved design uses heat resistant material that performs well under very high temperature conditions, extending the life of the shutter.

The **SmartShutter** incorporates a new high-performance motor drive and precision stepper-motor to provide added control and durability. Traditional shutters use a solenoid actuator requiring a high initial opening voltage for rapid opening of the shutter. This can overheat or burn out the coil of the shutter if the shutter is opened too frequently. With SUTTERs microprocessor controlled motor/wiper design, they can control the trajectory of each move and optimize the motion of the blade for speed or for smoothness.

The **SmartShutter**, in either the 25mm or 35mm version, operates with open/close times of 8msec from the command (3msec from the start of motion). Since our robust design does not rely on over-driving the windings, we can achieve continuous operation at certain frequencies up to 40 Hz for the 25mm version, and 20 Hz for the 35mm model. While the 25mm **SmartShutter** can run at frequencies up to 40 Hz, some repetition rates may excite undesirable resonances that interfere with proper operation. A small adjustment in frequency will normally correct this. Because the shutter blade is stopped by the action of the motor rather than mechanical stops, SmartShutter units tested for over 100 million cycles show no sign of failure. The standard SmartShutter blade is made of untreated aluminum. Non-reflective coatings are available upon request and are not recommended for use with arc lamps. The microprocessor-based controller provides exceptional versatility and is adaptable to various modes of operation and function. The **SmartShutter** can be programmed for a variety of movement profiles or to produce a variable aperture by determining the degree of shutter opening. When used in our Lambda LS xenon light source and coupled with a liquid light guide, the shutter acts as a programmable neutral density filter. In addition, while the impulse of our shutter is minimal, a “soft” action mode can be selected to decrease vibration.

The **LB10-B/IQ** controller for the **SmartShutter** is capable of driving up to two shutters. To support this function a TTL input is supplied for remote triggering of the shutter, as well as a TTL output to support remote triggering of external devices such as a camera. The controller can also be operated locally (manually) from the controller keypad or remotely from a computer through either the USB or serial port.

A dedicated single shutter controller, the **Lambda SC** is also available and provides a USB port, serial, TTL in and TTL sync out. The **Lambda SC** allows programmable control over the exposure time, and the delay between trigger and shutter opening.

Originally designed to be integrated into our 25mm and 32mm filter wheels, housings are also available for stand-alone units and for use in Sutter’s **Lambda LS**, **Lambda XL**, and **Lambda DG-4/DG-5** optical products. The modularity of the SmartShutter assures that repairs, should they be necessary, are simple and economical.

Features

- Robust design
- Life tested to 100 million cycles
- Modular repairable design
- Opening time 8msec from trigger (for 25mm & 35mm versions)
- Continuous operation frequencies as high as 40Hz
- Stand-alone or use with Sutter filter wheel
- Mountable in Lambda LS, Lambda XL and Lambda DG-4/DG-5
- Microprocessor based controller
- “Soft” action mode provides minimum vibration
- Selection partial opening function for neutral density
- Serial USB and TTL interfaces
- Manual input via keypad (on LB10B/IQ)
- Universal power supply

Controller

LB10-B/IQ Includes one Lambda SC control unit, serial, CIQ-2, and USB cables, power cable and manual

LB-SC Includes one Lambda 10-B control unit, serial and USB cables, power cable and manual

SmartShutter

IQ12-SA 12.5mm **SmartShutter** with stand-alone housing

IQ25-SA¹ 25mm **SmartShutter** with stand-alone housing

IQ25-W² 25mm **SmartShutter** with housing to fit filter wheel

IQ25-LS 25mm **SmartShutter** with housing to fit **Lambda LS**

IQ25-DG 25mm **SmartShutter** with housing to fit **Lambda DG-4/DG-5**

IQ25-XL 25mm **SmartShutter** with housing to fit **Lambda XL**

IQ35-SA 35mm **SmartShutter** with stand-alone housing

IQ35-W 35mm **SmartShutter** with housing to fit filter wheel

IQ50-SA 50mm **SmartShutter** with stand-alone housing

¹ Where vignetting may be an issue, we recommend the 35mm shutter.

² For upgrading a 25mm filter wheel with existing Unibit® shutter to SmartShutter.