CONTROLS THREE WHEELS AND TWO SHUTTERS OR TWO WHEELS AND THREE SHUTTERS

30 - 40 MSEC SWITCHING TIMES

*SMART*SHUTTER® SUPPORT AND UNIBLITZ® DRIVERS

7 SPEED SETTINGS

SERIAL, USB, AND PARALLEL INTERFACES

LAMBDA 10-3 OPTICAL FILTER CHANGER

The **Lambda 10-3** is the latest generation of Sutter's high performance filter wheel changers. The controller now offers faster switching times, synchronous independent control of 3 filter wheels and 2 shutters (or 2 filter wheels and 3 shutters), and expanded communication interface options. Recent advances in motor technology allow the **Lambda 10-3** to achieve switching times of 40msec between adjacent filters. In addition, the controller commands can now be accessed via USB, serial, parallel, and keypad interfaces.

The **Lambda 10-3** controls a variety of standard Sutter filter wheels including the popular 10 position 25mm wheel, a lighter 4 position 25mm wheel, a 10 position 32mm wheel, 5 position 50mm wheel, and a compact belt-drive 4 position wheel. The embedded controllers automatically detect the equipment installed and the source of the external commands, so there are no jumper wires or switches to set. There are seven speed settings available to optimize the rate of movement in accordance with the load of the wheel. The **Lambda 10-3** can operate up to 40msec switching time with the traditional 25mm filter wheel as well as our newer, high-speed 32mm version. The 4 position wheel

(LB10-NWHS4) provides additional speed and can achieve switching times of less than 33msec. Nearly all of our filter wheels employ a direct drive system. This design eliminates problems with belt slippage and backlash, assuring that our wheels are exceptionally robust.

Each wheel will accommodate filters from 1 to 9mm in thickness, allowing multiple filters to be used in each position. For instance, this allows users to insert a neutral density filter along with an interference filter in a single position. We have designed the body of the filter wheel with a trap to eliminate light scatter. For added stability, non-emission filter wheels come with a sturdy support stand and 12 inch rods. In addition to filter wheels, the **Lambda 10-3** controller supports our patented stepper-motor controlled *Smart*Shutter® as well as the **Uniblitz**® shutter. Either shutter can be mounted directly onto the wheel, providing a compact wheel/shutter package for systems with mounting constraints.

Both shuttered and non-shuttered filter wheels can be installed directly on the microscope in a number

of locations: excitation, emission, Keller ports, and the trinocular head. Up to two excitation and/or neutral density filter wheels can be used with the **Lambda LS** xenon light source and liquid light guide, in vibration sensitive systems. The *Smart*Shutter can be mounted independently from the wheel in any location in the light path (including the **Lambda LS** and **Lambda DG-4/DG-5**), and driven in a stand-alone configuration by the **Lambda 10-3** controller. The microscope specific adapters necessary for any configuration of wheels and shutter are listed in the Microscope Adapters section of the catalog.

The **Lambda 10-3** commands are a superset of the **Lambda 10-2**, thus integrating all previously available features into the new design. Additional commands are incorporated to access the third wheel as well as the special *Smart*Shutter features. These configurations can be programmed through the keypad making it easy to use the previous shutter commands to access the *Smart*Shutter specific functions such as the neutral density or the 'soft' shutter mode.

SUTTER INSTRUMENT

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Filter selection can be made directly from the keypad or from a computer via the serial, parallel, or USB port. The controller determines the shortest route to the selected filter and an acceleration/deceleration algorithm minimizes vibrations during the movement of the wheel. Internal sensors ensure correct filter positioning and current filter position is displayed on the front panel. The serial port accepts RS-232 level signals through a DB-9 connector. USB input is made through a standard connector and can be directly connected to a PC USB port.

The universal power supply will automatically switch to accommodate the line voltage – no user adjustment is required. An optional liquid light guide is available for applications requiring absolute vibration isolation, and/or spatial illumination uniformity.

GETTING FASTER FILTER SWITCHING TIMES WITH MANY FILTERS INSTALLED
The Sutter filter wheel systems have always been optimized for fast switching of a lightly loaded wheel. When many thick filters are installed, the added mass requires an increase in the time required to switch from one filter to another. Switching times improve significantly with filters made on a thin substrate that do not require a thick layer of additional glass to obtain the desired blocking. Semrock® has the required coating technology to offer filters with substrates down to 2 mm in thickness.

We have now taken the additional step of designing a special threaded ring that Semrock can install in place of their typical plain filter cells. Filters mounted in these rings can be threaded directly into the body of our filter wheels when our standard filter cups have been removed. Semrock filters actually weigh less than the filter cup and retaining ring normally used to mount filters in the Sutter wheels. Thus, if you remove our filter cups and mount the new threaded filters directly in the wheel, even a fully loaded wheel will be able to run at speeds that previously could only be used with just 2 filters installed.

Semrock is now ready to provide filters for our 25 mm filter wheels with 32 mm filters available shortly. If you are installing these filters in a Sutter wheel that has filter cups, you will need to remove the cup from the position you intend to use to mount the threaded filter. Contact Sutter for details. When installing the new threaded filters you will want to use the new wrench designed for this purpose.

CONTROLLER

LB10-3	Includes one Lambda 10-3 controller unit, serial, parallel and USB cables, power cable and manual

WHEELS

25mm Filter Wheels – 10 position

LB10-NW	10 position 25mm filter wheel without shutter
LB10-NWIQ	10 position 25mm filter wheel with *Smart*Shutter®
LB10-NWS	10 position 25mm filter wheel with Uniblitz® shutter
LB10-NWE	10 position 25mm filter wheel set up for emission

25mm Filter Wheels – 4 position

LB10-WHS4	4 position 25mm filter wheel without shutter
LB10-WHS4IQ	4 position 25mm filter wheel with SmartShutter
LB10-WHS4E	4 position 25mm filter wheel set up for emission

25mm Dual Filter Wheels

LB10-WD	Back to back mounting of two 25mm filter wheels without shutter. No drop-in filter holders
LB10-WDIQ	Back to back mounting of two 25mm filter wheels with SmartShutter and one slide-in filter holder
LB10-WDS	Back to back mounting of two 25mm filter wheels with one Uniblitz shutter and one slide-in filter holder

32mm Filter Wheels – 10 position

LB10-W32	10 position 32mm filter wheel without shutter
LB10-W32IQ	10 position 32mm filter wheel with *Smart*Shutter
LB10-W32S	10 position 32mm filter wheel with Uniblitz shutter

50mm Filter Wheel – 5 position

LB10-W50	5 position 50mm filter wheel without shutter

Specialty Wheels

LB10-W12	10 position 12.5mm filter wheel without shutter
LB4-W	Belt drive 4 position 25mm filter wheel without shutter

*SMART*SHUTTER®

IQ12-SA	12.5mm SmartShutter with stand-alone housing
IQ25-SA[1]	25mm SmartShutter with stand-alone housing
IQ25-W[2]	25mm SmartShutter with housing to fit filter wheel
IQ25-LS	25mm SmartShutter with housing to fit Lambda LS
IQ25-DG	25mm SmartShutter to fit in Lambda DG-4/DG-5
IQ35-W	35mm SmartShutter with housing to fit filter wheel
IQ35-SA	35mm 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 Uniblitz® shutter to SmartShutter.

CABLES AND ACCESSORIES

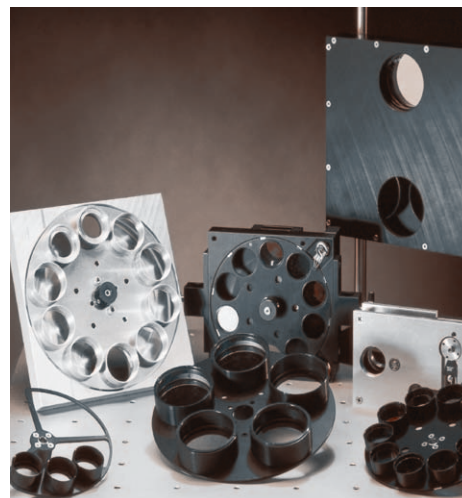|	
CIQ-2	One 25 pin connector to two 9 pin connectors (Allows connection of one stand-alone *Smart*Shutter® to controller)
SLIDE-IN[1]	Slide-in filter holder for 25mm wheel
DROP-IN[2]	Drop-in filter holder for 25mm wheel
DROP-IN/32	Drop-in filter holder for LB10-W32IQ
X100120	25mm filter cup
X100150	25mm spacer
X100160	25mm retaining ring
X100122	32mm filter cup
X100152	32mm spacer
X100162	32mm retaining ring
X100124	50mm filter cup
X100125	50mm short filter cup
X100154	50mm spacer
X100164	50mm retaining ring
LLG	Liquid light guide (2 meters, 3mm diameter) C-mount, lens, and lens tube
SHUTTER	25mm replacement shutter for Uniblitz® shutter (not an upgrade)
W621510	15 pin shielded cable for standard filter wheel
W620009	25 pin cable for wheels with *Smart*Shutter
W621520	USB cable
X100111	35mm replacement Uniblitz shutter (not an upgrade)
X100208	8 inch guide rod for stand (each)
X100210	10 inch guide rod for stand (each)

Mounting adapters for Nikon, Zeiss, Leica and Olympus microscopes are available. Please see the Microscope Adapters section of the catalog or contact Sutter Instrument for pricing and further information.

[1] Slide-in filter holders are for wheels with a shutter.

[2] Drop-in filter holders are for wheels without a shutter.

CE

RoHS Compliant

OEM WHEELS AVAILABLE

For OEM applications, the Lambda 10-3 can readily be modified to meet your specific requirements. By utilizing the 10-3 controller to drive customized wheels, we can provide an economical solution to your OEM design specification. To date we have made custom 2, 3, 4, 5, 10 and 12 position wheels and have designed for 50mm, 32mm and 25mm filters. Our technical staff will be happy to discuss with you special application requirements.