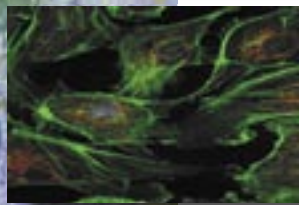
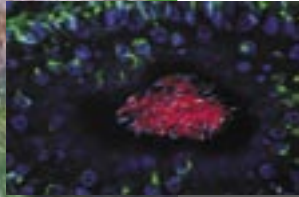


# Filter Wheels

High Performance Filter Changers for Quantitative Microscopy



True DC servo drive

Direct microscope mount or free-standing

Filter carriers for 25 and 32mm filters

Modular control system



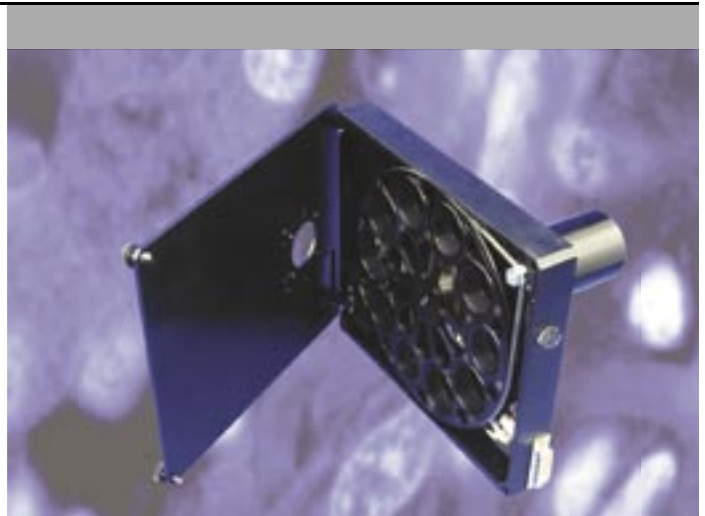
Ludl Electronic Products Ltd.

## High Performance Filter Wheels

Quantitative fluorescence microscopy requires rapid, reliable, automated filter selection. The LEP filter wheels offer state of the art performance, support and integration.

There are six LEP filter wheels, each designed to address different requirements for different applications. From the compact emission filter wheels to the dual ten position wheels, there is a filter wheel that can directly meet most requirements.

LEP filter wheels integrate seamlessly with existing microscope systems and are widely supported by most imaging software applications.



## Excitation and Emission Applications

Excitation filter wheels are designed to control the illumination wavelength before it enters the microscope. The LEP six and ten position filter wheels offer the most flexibility, performance and reliability. The standard filter wheels can accept 25 and 32mm diameter filters in any combination. The integral shutter is designed to easily withstand high temperatures and is rated for 20 million cycles. The high performance DC servo drive ensures repeatable and reliable filter positioning.

- Microscope specific mounting flanges
- Electronic synchronization option
- Programmable shutter exposure
- Accepts 25 and 32mm filters
- Integral electronic shutter
- Precision DC servo drive
- Six or ten positions



The LEP emission filter wheels are specifically designed for the task. The compact, light weight, shutterless design enables the wheel to be easily mounted to the camera port on most microscopes: upright and inverted. Mounting flanges enable the filter wheel to be effectively inserted into the optical path without affecting camera or eyepiece focus.



- *Six filter positions*
- *Precise DC servo drive*
- *Compatible with all LEP filter wheel commands*
- *Accepts standard 25mm diameter filters.*
- *Compact, shutterless design for space critical mounting*
- *5 degree tilted filter version for reduction of internal aberrations*

## Modular Control System

Configuration flexibility is assured with the MAC 5000 automation controller system. The modular design of the MAC 5000 provides for the addition of multiple filter wheels and shutters as well as other devices including XY stages, focus controls and other options to control almost any aspect of the microscope. To expand the MAC 5000 system, additional control modules are simply stacked onto the existing base unit. Up to 20 modules can be combined to create an integrated, custom high performance automation system.



## Dual Wheel Option

The dual filter wheel can be used to gain additional filter positions or to add the flexibility to program combinations of filters. The dual filter wheel is available in either six or ten position versions, providing 10 to 18 unique filter positions. When used to combine filters, the bandpass excitation filter and neutral density filters can be programmed to control both the wavelength and intensity of the fluorescence illumination.

The dual wheels have the same features as the standard filter wheels: 25 or 32mm filter capability, integral electronic shutter and high reliability servo control.



## Operator Keypad

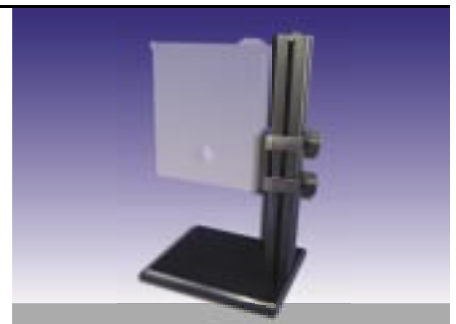
The operator keypad for the filter wheel is a useful addition for direct control of the filter wheels as well as a display for filter position. The convenient keypad enables single-key control for the filter wheel selection, wheel position and shutter open/close. At-a-glance status of the wheels and shutters is indicated by LED. A powerful macro function can combine the movement of two wheels simultaneously and integrate sequences of filter combinations.



## Filter Wheel Stand

The filter wheel stand provides an adjustable, rigid support for all LEP filter wheels and shutters. The unique design of the stand assures flexibility to accommodate almost all requirements. The sturdy base can support and isolate the filter wheel and light source from the microscope to eliminate vibration.

The filter wheel can be positioned at any height and orientation on the 4 sided vertical spar.



## Electronic Shutter

The LEP electronic shutter is available as a separate component or integrated with most of the filter wheels. Designed for high reliability without sacrificing speed, the shutter is unaffected by the high heat from intense illumination sources. The single moving part in the shutter is rated to 20 million cycles.

A separate shutter-only controller is also available. This controller is capable of driving up to 4 shutters. Digital inputs and outputs are provided and can be setup by software command to synchronize the shutter with cameras and other acquisition devices via USB and RS-232 interface.



## Specifications

Application	Part Number	Filter Capacity	Internal Shutter	Dimensions*	Weight	Adjacent Change
Fluorescence Filter Change with Integral Electronic Shutter	99A350	10 pos 25/32mm diam.	YES	203x170x28.56mm	1.5kg	60ms
	99A354	6 pos 25/32mm diam.	YES	188x133x28.56mm	980g	50ms
Fluorescence Emission (no shutter)	99A351	6 pos 25mm diam.	NO	147x98x28.56mm	650g	50ms
	99A357	6 pos 25mm diam. w/5° tilt	NO	147x98x28.56mm	650g	50ms
Dual Filter Wheels with High Filter Capacity, Includes Integral Electronic Shutter	99A355	2x 10 pos 25/32mm diam.	YES	203x170x50.8mm	2.5kg	60ms
	99A356	2x 6 pos 25/32mm diam.	YES	188x133x50.8mm	1.8kg	50ms
Separate shutter either brightfield or fluorescence illumination	99A360	n/a	YES			
*excluding motor housing						

## Ordering Information

Every system requires at minimum a controller and a shutter or filter wheel. Typically mounting flanges are also required for system integration. Additional options can be added to expand the functionality of the system.

Part Number	Description	Application
<b>System Controllers</b>		
995066	MAC 5000 DC filter wheel/shutter controller	Includes host interface and filter wheel/shutter control module. Supports up to two filter wheels and three shutters. Expandable system
995068	MAC 5000 Stand-alone shutter controller	Supports up to 4 independent shutters. RS-232 / USB interface. No expansion options.
<b>Options</b>		
99A010	Stand for filter wheel support	Stable support for filter wheels for effective decoupling from microscope
99A144	Foot switch for shutter control	Remote hands-free control of shutters
99Axxx	Mounting flanges, excitation and emission solutions for most microscopes	Microscope specific mounting of filter wheel or shutter between lamphouse/camera and stand
73005047	Filter wheel operator keypad	Keypad control of filter wheel position with LED status indication



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