

# Choosing a Microscope Shutter

The purpose of this document is to help users with the selection of an external shutter for specific microscope systems. These are typically applications where the user requires control of the microscope's light source or sources.

Typical applications involving shutters with microscopes include epi-fluorescence excitation (see figure #1), fluorescence imaging and bright field (transmitted light) microscopy (see figure #2). The type of application is useful in determining which light source is required to be shuttered. The research type microscopes usually apply to shutters. Each different microscope manufacturer has its own mounting scheme for applicable light sources. Mounting adapters which attach to the shutter housings are available for several microscope types. The shutter is an external device and is commonly attached to the light source's lamp-housing for most fluorescence applications.

The first step would be to cross reference your type of microscope with the *UNIBLITZ*<sup>®</sup> mounting systems available. You can get a listing of the available mounting systems at <http://www.uniblitz.com/products/mounting.cfm> or by going to our web site, [www.uniblitz.com](http://www.uniblitz.com) clicking on the "products" tab and then clicking on the "Mounting System" link. We may also have any new mounting systems available listed on our web site under "new products".

The next step is determining the actual shutter model number. Typically, a 25 mm or 35 mm shutter aperture diameter is recommended for microscope applications. A 25 mm shutter (VS25 Series) can open and expose faster, but limits the microscope's field of view. A 35 mm shutter (VS35 series) is slower, but can minimize vignetting with its larger aperture diameter. This trade-off should be considered with an imaging-related application. This truncated option is automatically included when the shutter model number specifies a microscope mount (-21 through -31).

The #2 case option would be required for all microscope shutter applications. The #2 case option provides the necessary mounting holes and threads for attachment to various mounting adapters. The #2 case, which is machined from black anodized aluminum material, also serves as a heat sink for the shutter's actuator coil. The #2 case for microscope applications is configured with a truncated flat cut from its round diameter. The truncated #2 case provides a clearance that is necessary for attachment to some microscope models. See a drawing (for the VS25 at [http://www.uniblitz.com/products/vs14\\_25\\_layout.cfm](http://www.uniblitz.com/products/vs14_25_layout.cfm) and for the VS35 at [http://www.uniblitz.com/products/vs35\\_layout.cfm](http://www.uniblitz.com/products/vs35_layout.cfm).)

A reflective blade option is recommended for all microscope shutters. The shutter would be equipped with a reflective blade on its input side and this is the side that would be adjacent to the light source. The purpose of a reflective blade is to minimize the heating effect on the shutter assembly. Typically, the "ZM" shutter blade, which is an AlMgF2 reflective coating over a BeCu substrate, is

recommended for microscope light sources. An alternative shutter blade option is the “S” blade, which is a stainless-steel substrate that is polished. Be advised, the “S” blade is not highly reflective and does not dissipate heat as well as the recommended “ZM” blade, but is less in cost and the finish is more durable. The electronic synchronization output available for a shutter is optional, but is typically recommended. This option is referred to as the “SYNC” and it serves to provide a signal to indicate when the shutter opens to 80% of its full aperture. This effectively “synchronizes” the opening of the shutter to some external event.. The “SYNC” output from a shutter is synchronous with the open/close state of the aperture. The shutter’s “SYNC” output signal can let a user know when a shutter (normally-closed configuration) has transferred to the open state. The “SYNC” output signal is only available from the controller used to control the shutter, typically any device in the VMM or VCM series.

The shutter can also be built with a special stop-damping system that is reliable in a high-temperature environment. This option is referred to as the “R1” high-temperature modification. The “R1” option is recommended for light sources that are rated for 100 watts or greater and all types of mercury-arc lamps. Also, in order for an “R1” stop-damping system to be effective, a reflective shutter blade (typically “ZM”) would be specified as well.

The mounting adapter for the specific microscope is the last part of the shutter model number that would be specified. The microscope manufacturer, model number and intended light source need to be known in order to determine the appropriate adapter, if applicable. The mounting adapter is a two digit part number and is preceded with a dash when specified as part of the entire shutter model number. The specification of a microscope mounting adapter at the end of a shutter model number signifies that the #2 truncated housing is to be employed.

Once a complete shutter model is selected, the final consideration is the device used to control it. Vincent Associates presently has four units available. The VMM-D1 (single channel driver, see <http://www.uniblitz.com/products/vmmd1.cfm>, The VMM-D3 (three channel driver, see <http://www.uniblitz.com/products/vmmd3.cfm>, The VMM-D4 (four channel driver, see <http://www.uniblitz.com/products/vmmd4.cfm>, and the VMM-T1 (single channel timer/driver, see <http://www.uniblitz.com/products/vmmt1.cfm>. Data sheets on any of these devices can be found on our web site, [www.uniblitz.com](http://www.uniblitz.com) clicking on the “products” tab and then clicking on the “Drive Units” link. All of these devices are bench top and operate from either 115VAC 60Hz or 230VAC 50Hz. 100VAC versions are available for Japan and can be designated with a “J” after the channel number, i.e. VMM-D1J. If your application requires CS/UL/CSA certification, a new drive system (similar to the VMM-D1) the VCM-D1 is now available.

The combination of the shutter and the controller selected offer a quick, turnkey solution for complete control of your microscope’s light source or sources. If we do not have a standard microscope mount to fit your particular application, please contact our technical staff at [support@uniblitz.com](mailto:support@uniblitz.com). We can work with you to design your required shutter mounting system.

TYPICAL MICROSCOPE/SHUTTER APPLICATION (FLUORESCENCE)

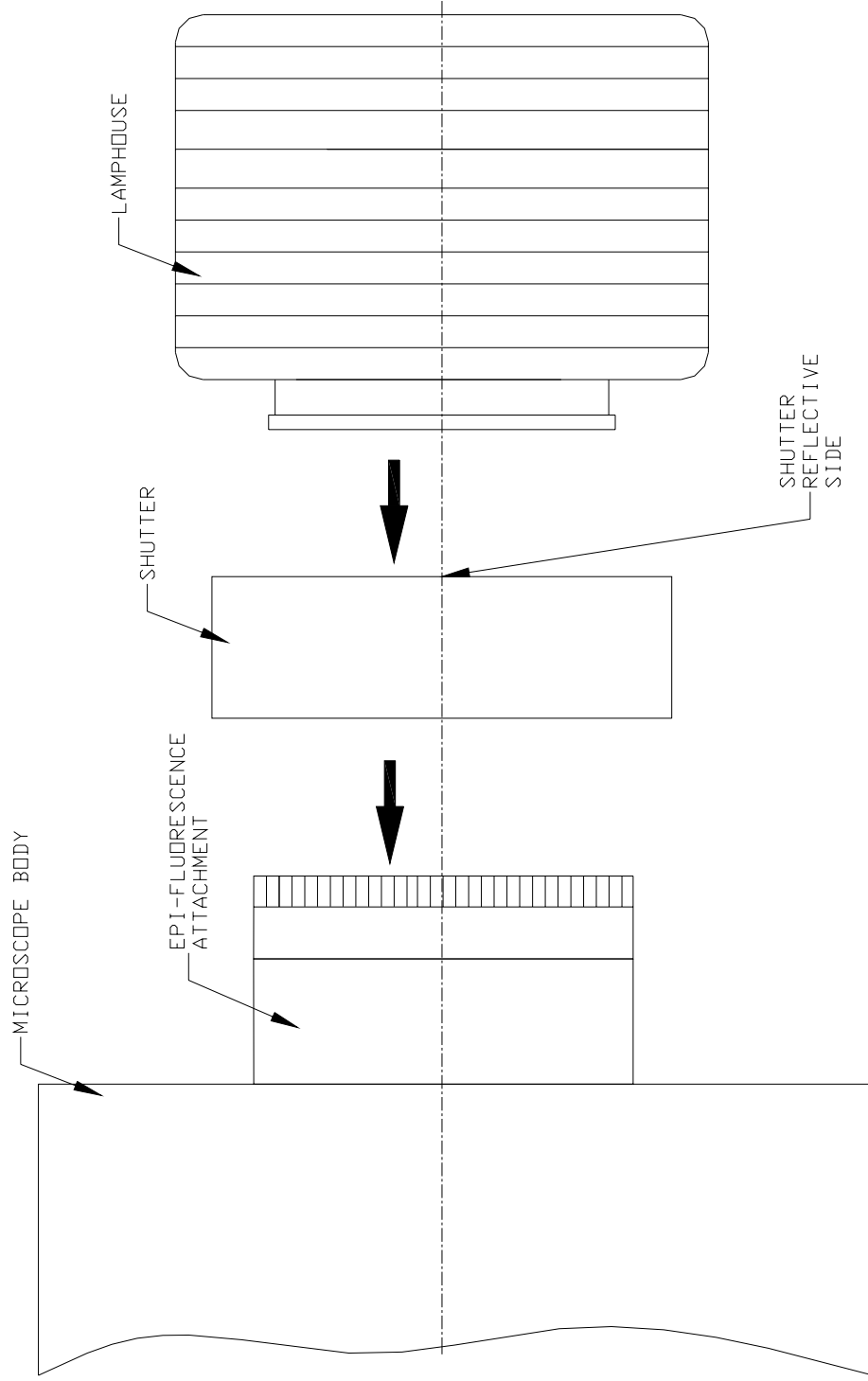


FIGURE #1

TYPICAL MICROSCOPE/SHUTTER APPLICATION (TRANSMITTED)

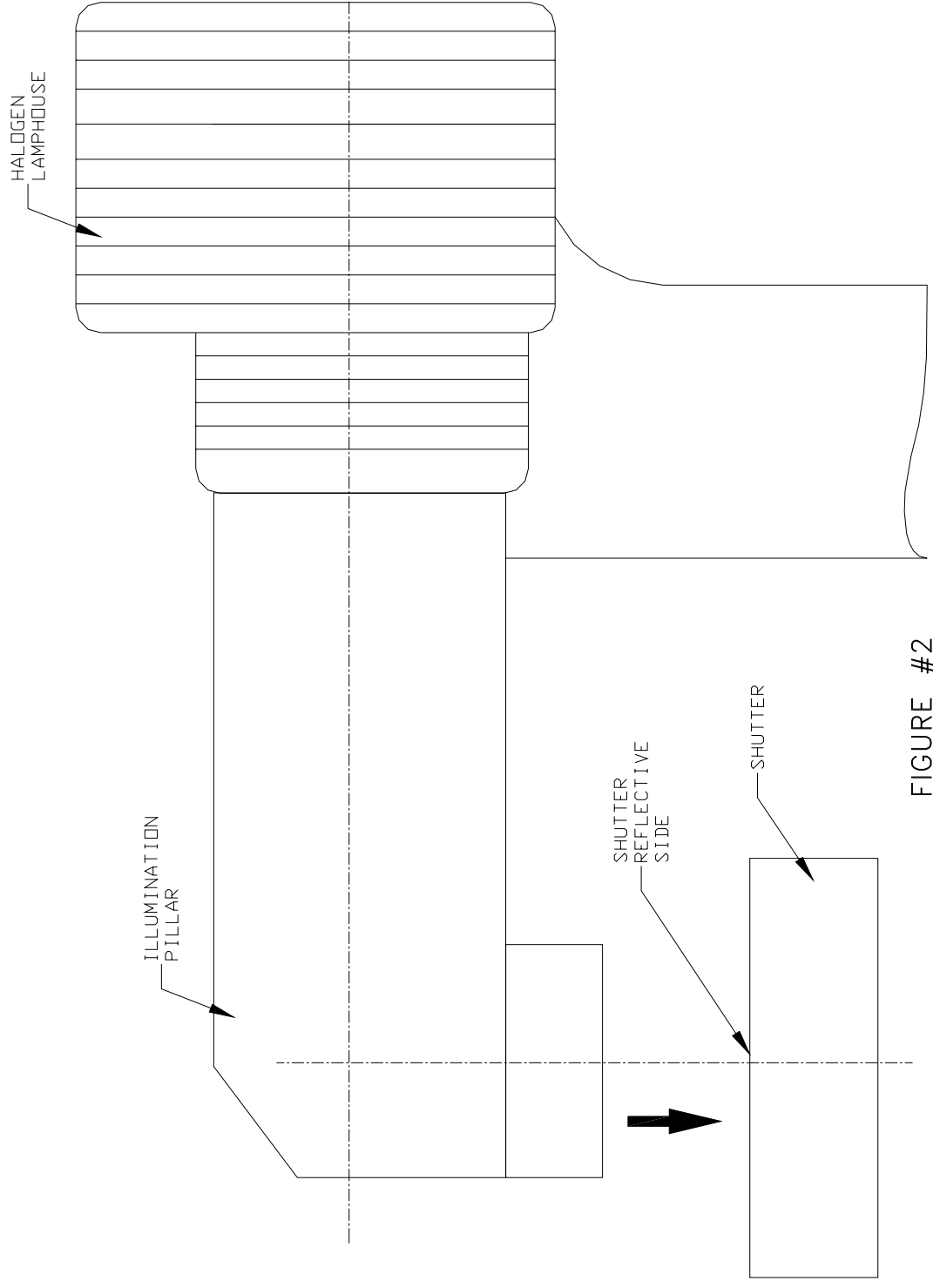


FIGURE #2