

Laser light scattered from dust particles residing on optical surfaces may produce interference patterns resembling holographic zone planes. Such patterns can cause difficulties in interferometric and holographic applications by forming a highly detailed, contrasting and confusing background that interferes with desired information. Spatial filtering is a simple way of suppressing this interference and maintaining a very smooth beam irradiance distribution. The scattered light propagates in different directions from the laser light and, consequently, is spatially separated at a lens focal plane. By centering a small aperture around the focal spot of the direct beam, it is possible to block scattered light while allowing the direct beam to pass unscathed. The result is a cone of light that has a very smooth irradiance distribution and can be refocused to form a diffraction-limited spot or a collimated beam.

As described above, a spatial filter comprises a focusing optic, a pinhole, and a mounting stage. In many applications a microscope objective is then used to focus the emerging, filtered output. In some applications, a precision slit is used in place of the pinhole.

Spatial Filters

Precision 3-Axis Spatial-Filter Mount

This open laboratory-style three-axis spatial filter mount allows access to the laser beam as it traverses the pinhole filter. The spatial filter consists of a precision, differential-micrometer-driven y - z stage, which controls the pinhole location, and a single-axis translation slide for the focusing lens.

The spatial filter mount accepts 04 PPM-series mounted pinholes and 04 OAS-series microscope objectives.

SPECIFICATIONS:

Precision 3-Axis Spatial-Filter Mount

Range of Travel	
Optical Axis	± 6 mm
y, z Axes	± 3 mm (fine), ± 12.5 μm (differential)
Resolution	
Optical Axis	2 μm
y, z Axes	1.5 μm (fine), 0.15 μm (differential)
Material	Black-anodized aluminum with stainless steel slides

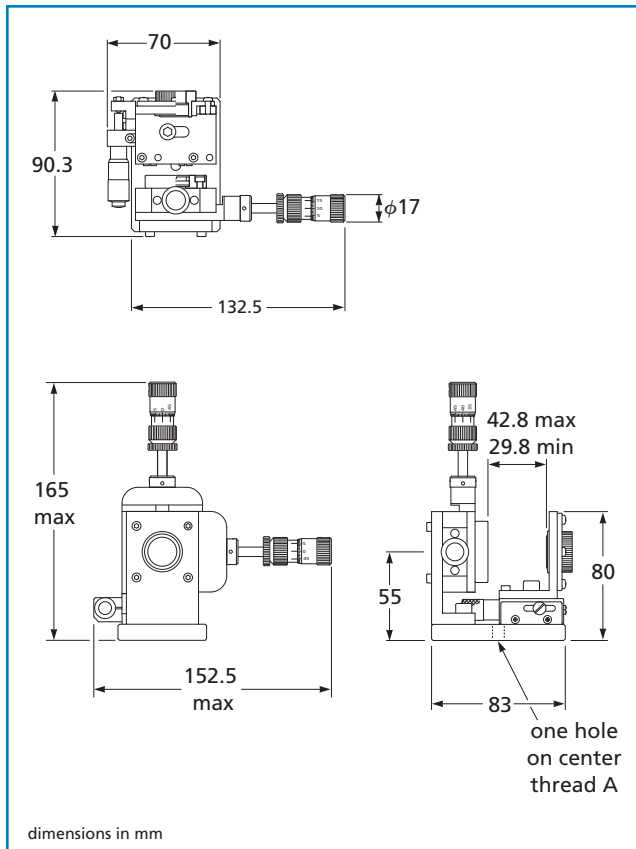
Precision 3-Axis Spatial-Filter Mount

Description	Thread	PART NUMBER
3-Axis Spatial-Filter Mount	1/4-20	07 SFM 201
3-Axis Spatial-Filter Mount	M6	07 SFM 701

continued

Aligning Your Spatial Filter

It is frequently necessary to align a spatial filter accurately with respect to a laser beam. Translation stages and rotational stages can be used for this purpose.



07 SFM 001 precision 3-axis spatial filter mount

Do you need ...

MICROSCOPE OBJECTIVES



Standard Microscope objectives can be used to construct spatial filters. The visible and infrared CVI Melles Griot microscope objectives are achromatic (i.e., color corrected at 656.3 nm and 486.1 nm). Color coding makes identifying objective power easy when numerical markings cannot be seen. The RMS mounting thread (0.8 inch, 36 TPI) matches the industry standard making these objectives compatible with non-CVI Melles Griot microscopes. The housing, made of brass, has a black finish on all surfaces. All objectives are antireflection coated. The visible objectives are coated for 400–700 nm; the infrared objectives are coated for 1300–1500 nm. The power magnification ranges from $1.0 \times$ to $40.0 \times$ with a tolerance of $\pm 5\%$.