

Opto-Mechanics



Opto-Mechanics Guide

C004

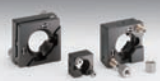
Mirrors

Mirror Holders Application Note

C008

Mirror Holders Selection Guide

C010



Kinematic Center Mirror Mount  
MHI

C012



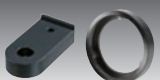
Kinematic Mirror Mount  
MHGT

C013



NOMI LOCK™ Model  
Kinematic Mirror Holder  
MHG-MP-NL/MHG-HS-NL

C014



Options for Kinematic Mirror Holders  
MHG-BPRO/KAD/MAD/PAD/20LDU/FMB

C016



Vertical Control Small Mirror Holders  
LMMH-R

C019



Small Kinematic Mirror Holders  
MMHN/MKAD

C020



Vertical Control  
Gimbal Beamsplitter Holders  
BSHL-2/BSHL-TF/BSHL-BP

C022



Gimballed Mirror Mounts  
MHAN-S/MHA/MHAN-DM

C024



Gimbal Beamsplitter Holders  
BHAN-S/BHAN-DM

C026



High Rigidity Mirror Holders  
MHL

C028



Topmike Vertical Control Mirror Holders  
LMHB/LMHBP

C030



Large Precision Gimbal Mirror Holders  
MHD/MHD-P

C032

Mirrors



Beam Steering Holders  
Precision Beam Steering Assembly  
BSR/BSRU

C034

Lenses

Lens Holders Selection Guide

C036



Fixed Lens Holders  
LHF/LHF-S/LHG

C037



Two Axis Lens Holders  
LHCM

C040



Retaining Rings/Resin Washers  
Retaining Ring Spanners Wrench  
RR/DR/NRS

C041



Three-axis/Five-axis Lens Holders  
ALHN-3RO/ALHN-5RO/ALHN-3/ALHN-5

C042



Mini Lens Holders  
TLH

C044



V-Groove Lens Holders  
LHA

C044



Caliper Variable Lens Holders  
SLH

C045



Small Lens Claws  
MLH

C046



Micro Lens Claws  
MLH

C047



Adjustable Cylindrical Lens Holders  
CHA

C048



Fixed Multi-element Lens Holders  
LHF-UDL/LHF-M







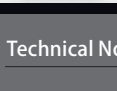







C049

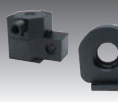




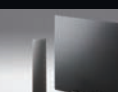









Objective Lens Holders  
LHO

C050



Prisms		Prism Holders KKD/PLH/PAD	<b>C051</b>	
		Polarizer Holders MPH/PH/SPH	<b>C053</b>	
		Polarizing Prism Holders GTPC-PH/GTPC-SPH/GTPC-ADP	<b>C055</b>	
Lasers		Rod Form Laser Mounts Adjustable Laser Holders (with a stand) LAH/LAHU/LAHU-A	<b>C056</b>	
		Kinematic Laser Holders LAH-4	<b>C057</b>	
Beam Forming		Holder for Laser Beam Expanders KLH-BE	<b>C058</b>	
		Technical Note	<b>C059</b>	
		Spatial Filter Holders SFB	<b>C060</b>	
		Precision Pinhole/Air Slits PA/FSL	<b>C061</b>	
		Two-axis Pinholes Objective Holders TAT	<b>C062</b>	
		Iris Diaphragm Holders IH	<b>C063</b>	
		Iris Diaphragms IDC/IH-30N	<b>C064</b>	
		Adjustable Slits PSL/SLX	<b>C065</b>	
	Filters		Filter Wheels NDWH	<b>C066</b>
			Filter Holders FHS/FH	<b>C067</b>

Shutters		Automatic Shutters SSH	<b>C068</b>	
		1 axis / 4 axis Shutter Controller SSH-CRA	<b>C068</b>	
		Shutter Controller SSH-C	<b>C069</b>	
Others		Square Plate Holders KMH	<b>C070</b>	
		Camera Holders CMH	<b>C070</b>	
		Light Shade plate BBP	<b>C071</b>	
		Test Target Holders TGH	<b>C072</b>	
		Beam Dumps BD	<b>C072</b>	
	Fiber		Fiber Optics Mounts FOM	<b>C073</b>
			Mini-Fiber Optics Holders MFH	<b>C074</b>
			Fiber Optics Holders OFH/OFH-DM	<b>C075</b>
			FC Type Fiber Optics Holders FOP/FOP-DM	<b>C076</b>
			SMA Type Fiber Optics Holders FOP-SMA/FOP-DM-SMA	<b>C077</b>
		Adjustable Fiber Collimator FOPT	<b>C078</b>	

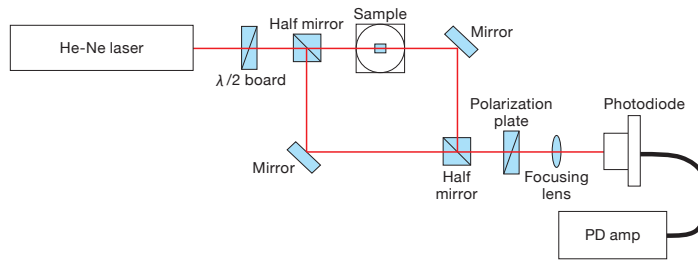
# HOLDERS Guide

There are many parameters that must be taken into account when choosing optics holders. The optics holders need the correct dimensions and have the required adjustments for the optical system.

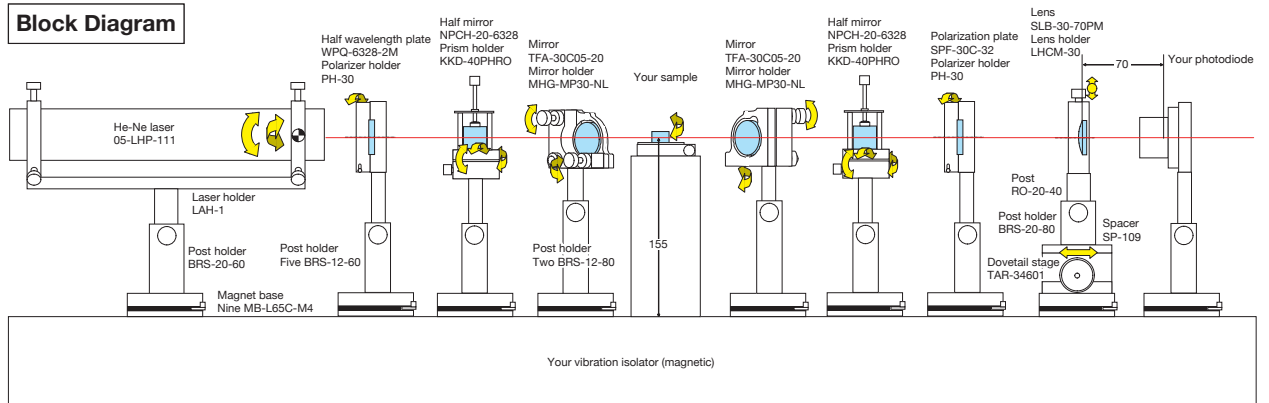
Below are some examples of optical systems to give an idea of OptoSigma's selection.

First, prepare an optical path diagram for the optical system. Usually, only optics and devices are drawn, The holders are left out. The optical path diagram should look similar to the following diagram.

Optical Path Diagram



Block Diagram



Mounted optics must be placed in relation to the laser beam source to set up the optical system. Note the adjustment axes of the mounts on your block diagram according to each element's application. During final review of the optical system, ensure that the holders do not physically interfere with each other. Also, make sure each element has the correct adjustments along the correct axes.

## Optical Axis Height

Generally, optical systems are set up on a horizontal plane and secured to a baseplate as most laser sources emit beams horizontally. OptoSigma has a wide variety of post holders, and spacers to align optic heights with laser heights. If there is a fixed optical axis height in the system, use the fixed height as the standard height for all other components. When there are no fixed optical axis heights, set the optical height no lower than the lowest optical height of the holders.

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



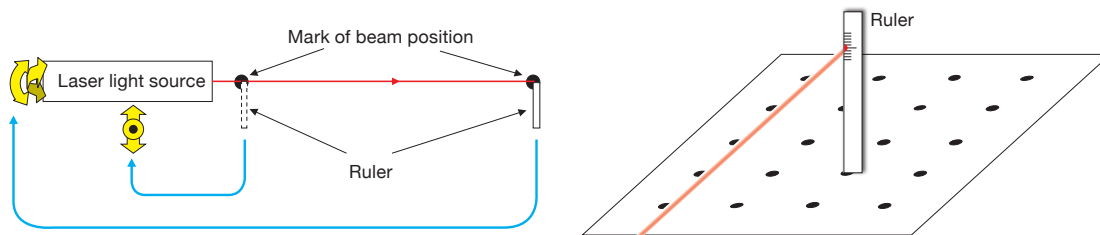
## Alignment

Typically, the path that light takes through an optical system cannot be seen directly. The process of directing the light along the desired path using the optical elements is referred to as optical alignment. Here, we present a few alignment techniques that may be useful.

### ● Laser beam adjustment

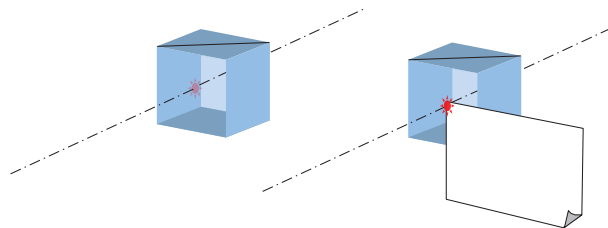
Mark the intended beam path on the top of the base plate. Having the path go through the centers of the tapped holes in the base plate makes aligning the holders easier in most cases.

Position the laser and turn on the beam. Place a ruler onto the breadboard as shown below. Adjust the beam to the desired z-height and x-y location. Move the ruler along the beam path to the edge of the breadboard. Adjust the laser source so that the height and location are the same as the first measurement. To get a nice parallel beam, perform the same measurement at intermediate locations between first measurement and the edge of the breadboard. After beam adjustment, the laser source can be secured.



### ● Passing light through the center of the optic

When a laser beam irradiates the surface of an optic, faint scattered light can be seen. Adjust the position of the optic so that the scattered light passes through the center of the optic. Sometimes scattered light cannot be seen if the laser beam is dim and the surface of the optic is very clean. In such cases, check the position of the laser and align it with the center of the optic using the corner of a piece of paper to scatter light.



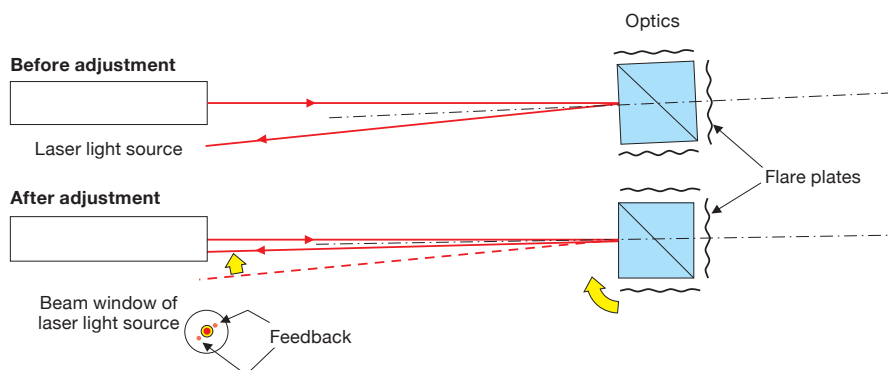
### ● Placing optics perpendicular to the beam

When flat optics are irradiated with a laser beam perpendicular to the surface, the beam reflected off the optic returns to the light source. Note the position of the reflected beam. If there are multiple reflected beams from other optics, block all but the adjusted beam of interest with flare plates.

Adjust the angle of the optic so that the reflected beam is close to the laser beam window. When multiple reflected beams return from the optic, adjust the optic angle so that the middle of each beam is in the laser beam window.

[Note] If the reflected beam enters to laser, the oscillations of the laser may become unstable.

Adjust the reflected beam so that the beam spots are just outside of the laser port.



# Holders Guide

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

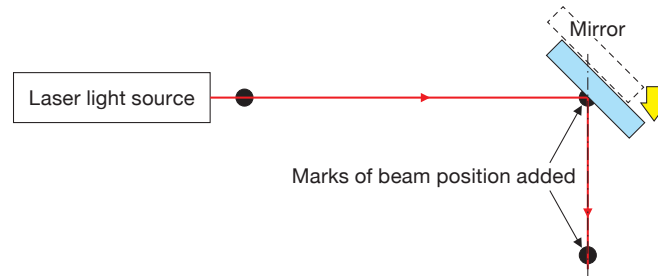
Fiber

## ● Placing optics at 45 degrees incidence

On the baseplate, mark locations of the beam source, mirror, and the angle where the beam will be reflected as shown in the following figure.

Set up a holder with mirror at 45 degrees so that the center of the reflected surface can form a right angle beam when a laser is incident.

Rotate and tilt the mirror so that the laser beam reflected beam is parallel to the breadboard.



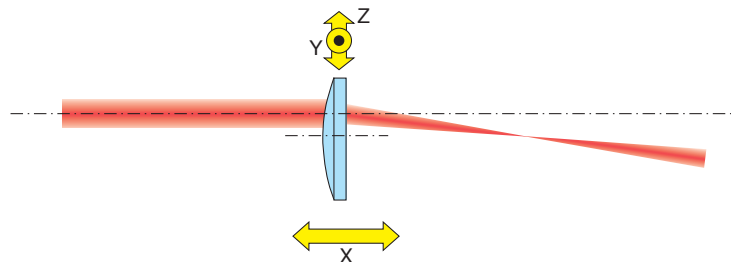
## ● Adjustment of lens optical axis

If the irradiation point of the laser beam is not along the center of the lens, the transmitted beam will deviate away from the optical axis. A YZ lens adjustment needs to be used to center the lens properly with the laser.

Also, some lenses require an X-axis adjustment mechanism to set the point where the laser beam focuses. Adjustment mechanisms such as dovetail stages that allow large and quick travel are suitable for this.

([Attention] Lenses with short focal length such as objective lenses require a precise fine-tuning mechanism for the X-axis.) In a general optical system, lens tilt adjustment is not required.

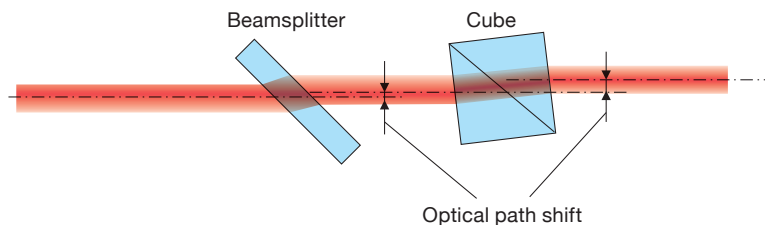
The direction of beam that passes the optical axis does not change even when a lens is tilted. However, aberration caused by lens tilt can be a problem in a precise optical system such as interferometers or laser processing. In these cases, the lens tilt needs to be adjusted while observing the intensity distribution of wavefront and focus spot to optimize the optical system.



## ● Transmitted light path of beamsplitter

When an incident laser beam is perpendicular to the surface of a plane parallel optic, the transmitted light does not deviate. If the plane parallel optic is tilted, the output path is shifted parallel to the incident light path. The shift distance depends on the refractive index, angle of incidence, and the thickness of the optic. [Reference](#) B342

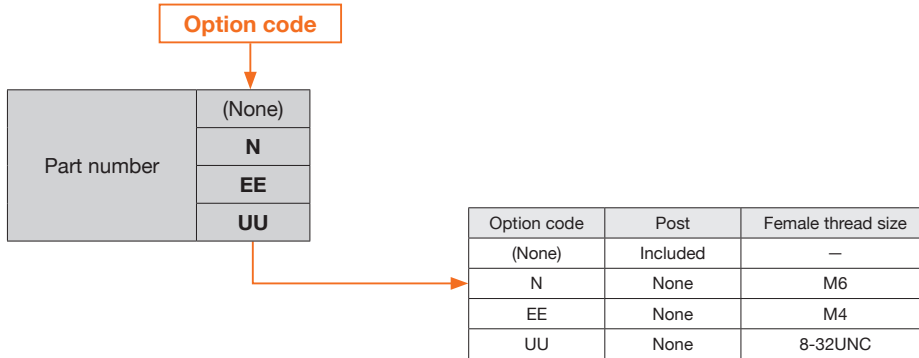
A tilted beam splitter can alter beam paths significantly. When designing optical systems with beam splitters, use a baseplate on a breadboard that has multiple mounting hole patterns which will allow for less constraints in the system.





## Choosing threads on Stands and Post Holders

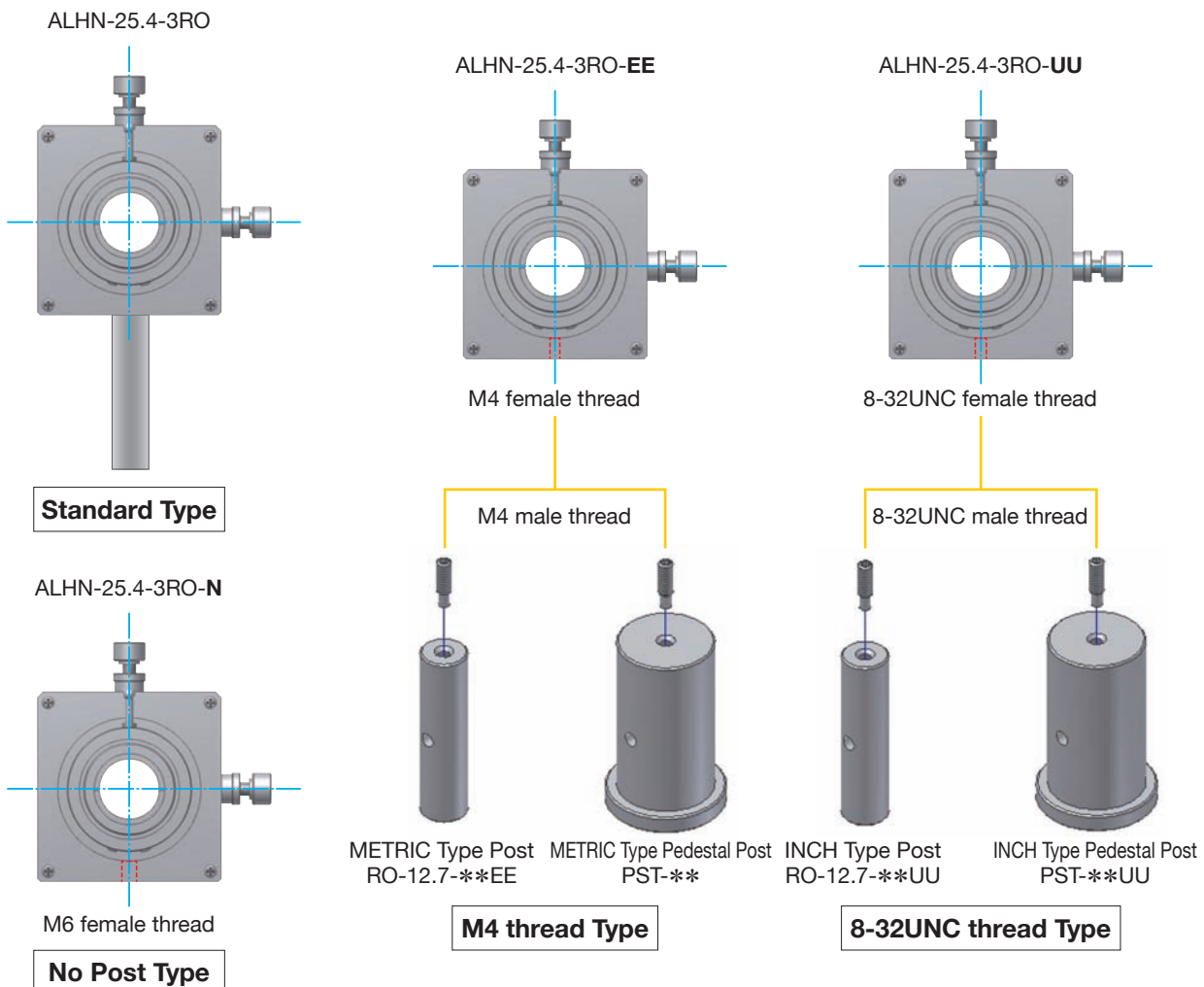
Most holders in the catalog are mounted with a M6 male thread post. To call out a different male thread post, the female internal thread must be changed according to the post type. Specifying an option code to the suffix of the part number allows to change the female thread for post mounting to 8-32UNC female or M4 female. The following charts show the different suffixes.



©Specify the necessary female thread by adding the option code as the suffix of the catalog part number.

## Example of connection of various holder options

A holder part number with an option code does not come with a post. To use the holder or post with an inch-based baseplate select the UU specification for 8-32UNC. For metric M4 thread post or baseplate, please select EE as the specification.



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



# Mirror Holders Application Note

Mirror holders are divided into six categories by function.

## Classification of Mirror Holder Functions

Part Number	Mounting Center	Rotational Mechanism	Fine Adjustment Center	Optics Fixation	Control Direction	Control
<b>MHG</b>	Offset	None	Offset	Lateral side set screw	Back	Screw
<b>MMHN</b>	Offset	None	Offset	Mirror case	Back	Screw
<b>MHAN/MHA</b>	Mirror center	Mirror center	Mirror center	Retaining ring	Front/Back	Screw/Micro
<b>BHAN</b>	Mirror center	Mirror center	Mirror center	Retaining ring	Front/Back	Screw/Micro
<b>BSHL</b>	Offset	None	Mirror center	Retaining ring	Vertical	Screw

### (1) Center of Mounting

Mirror holders fitted with a post (such as MHAN) are designed so that the reflective surface of the mirror is along the center of the post.

MMHN-25RO and MMH-50M6 are excluded. By having the reflective optical axis and center post coaxial, the position of the laser beam irradiated on mirrors will not change even when the mounting direction of the holder is changed. In such cases where the center of mounting has offset, attention is required to the positional relationship between the laser beam and the mirror holder. Mirror holders that do not come standard with posts must be aligned when mounted to a post. The holder will come with an offset to position the mirror and laser beam correctly. (The following figure on the right shows this.)

To install a mirror holder that has an offset at the center of mounting, roughly position the angle of the mirror before fixing the holder.

Find the position of the mirror where the laser beam irradiates at the center of the mirror at the specified incidence angle, and fix the mirror holder at that position. The mounting screws for the baseplate may not match the hole position of the breadboard. If such a case arises, use a magnetic baseplate or a different baseplate designed for offset positions.

Special plates for mounting posts (MHG-BPRO) are available for the MHG holders to match the center of the post to the center of the reflective surface of the mirror.

Image of MHAN Holder Installation

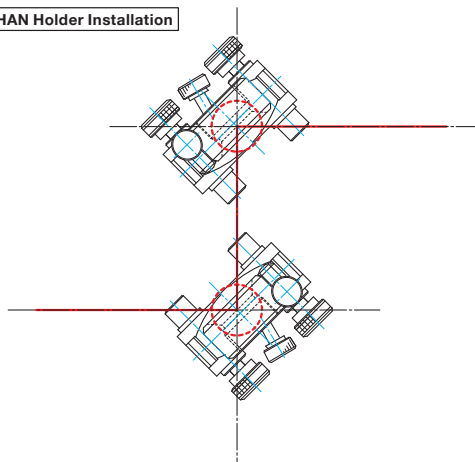
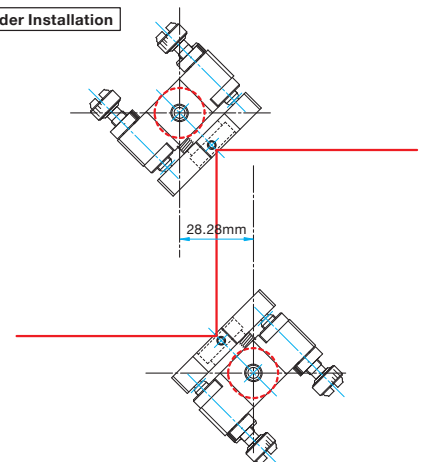


Image of MHG Holder Installation



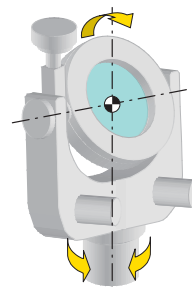
### (2) Rotational Mechanism

With their two-axis gimbal structure, the MHAN and BHAN holders can be positioned to face any laser beam source in any direction.

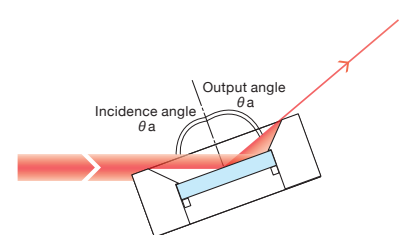
The rotational center of the gimbal mechanism is at the center of the reflective surface; therefore, a laser beam irradiated at the center of the mirror will stay at the center of the mirror regardless of mirror rotation. There are no constraints on mirror rotation, thus the reflected beam can be directed at angles vertically, diagonally, or horizontally.

The reflected beam may become partially blocked by the mirror holder frame depending on the beam diameter or angle of incidence.

Image of Gimbal Type Mirror Holder



Schematic of Beam Loss due to Mirror Frame



### (3) Fine Adjustment Center

Mirror holders are capable of fine angle adjustments using one of two mechanisms.

The first type of fine adjustment mechanism is the gimbal type which allows for rotation of the reflective surface of the mirror. The second type, kinematic type, allows for rotating around the outside of reflective surface.

The only differences in stability between the two adjustment mechanisms arise when dealing with interferometers and laser resonators.

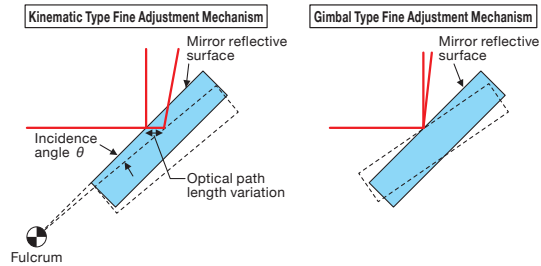
Optical path length variations caused by angle adjustment are shown in the table to the right for kinematic mirror holders.

Using the gimbal fine adjustment is advantageous for small optical path length variations.

Conversely, the kinematic adjustment has issues with small optical path variations. The physical and temperature stability of the kinematic adjustment make them excellent for laser resonators applications.

Variation in optical path length by angle adjustment of kinematic mirror holder

Part Number	Adjustment Range [°]	Max Optical Path Length Deviation (Incidence angle 0 degree) [mm]	Optical Path Length Variation when Turned by 0.5° (mm)	
			Incidence Angle 0°	Incidence Angle 45°
MHG-12.7	±3	0.5	0.17	0.12
MHG-30	±3	1.0	0.33	0.24
MHG-50	±2	1.0	0.51	0.36
MHG-80	±2	1.5	0.77	0.55
MHG-100	±2	2.1	1.03	0.73



### (4) Mounting Method of Optics

Mirrors with high surface accuracy are used in optical experiments with interferometers or laser concentration. Beam deviation may not be seen due to the thickness or hardness of the material, but a slight bump to the holder can cause deviations in the shape of the beam. The deviation can be observed in the more precise optical experiments. It is imperative to choose the correct mounting method for mirrors, and to mount the mirrors securely.

#### ●Retaining Ring Mount

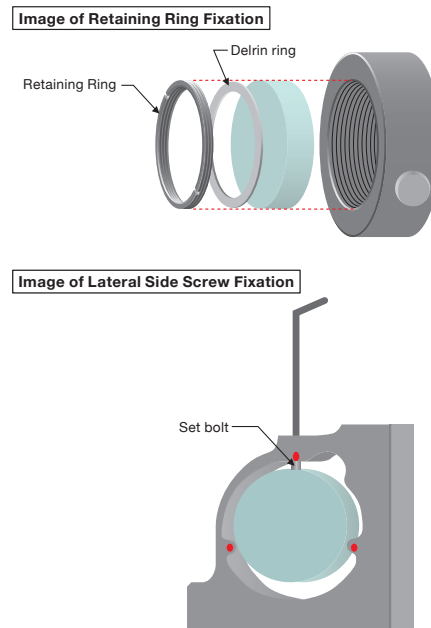
With retaining rings, the mirror is pressed against a resin ring secured by an aluminum threaded ring.

The position of the reflective surface of the mirror does not change because it is pressed against the face of the mirror frame. Optics will rarely fall out of their holders due to vibration or impact with these mounting method. The retaining rings must not be over tightened or the mirrors will be in stress.

#### ●Lateral Side Screw Mount

The mirror is held on its edge with two points and one resin set screw as shown in the figure to the right. Changes in thickness of the mirrors shifts the position of the reflective surface because the mirror is mounted by its edges and not by its face. The mirror can be tilted relative to the frame with this mounting method.

Stressed is induced with the torque of the set screw, and can be changed after lens installation. The mirror can fall out of the holder in situations with high vibrations or potential impact.



### (5) Control Directions

When holders are used in complex crowded optical systems or narrow spaces, operating the mechanisms becomes difficult. Mirror holders with vertical or horizontal adjustment control directions can be used to make adjustments easier.

### (6) Types of Adjustment Mechanisms

There are two types of adjustment mechanisms for holders. The graduated micrometer has a long knurled rotating knob that allows for frequent and easy manipulations. The other type of adjustment is a 0.25 mm pitched screw. These screws are shorter than micrometers allow for fine adjustments in confined spaces.

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

# Mirror Holders Selection Guide

## Emphasis on workability

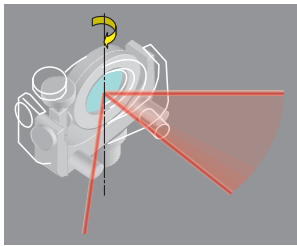
MHAN series  
BHAN series



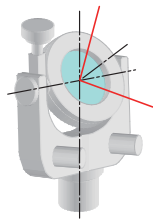
These holders are easily manipulated and have simple alignment

Advantages:

- The mirror can be mounted 45 degrees
- Easily mounted to an optical bench
- Can change the reflected beam path easily



- Holders have enough adjustments to be in 3-D optical systems



## Emphasis on stability

MHG series



The MHG series holders have high stability due to less moving parts.

Advantages:

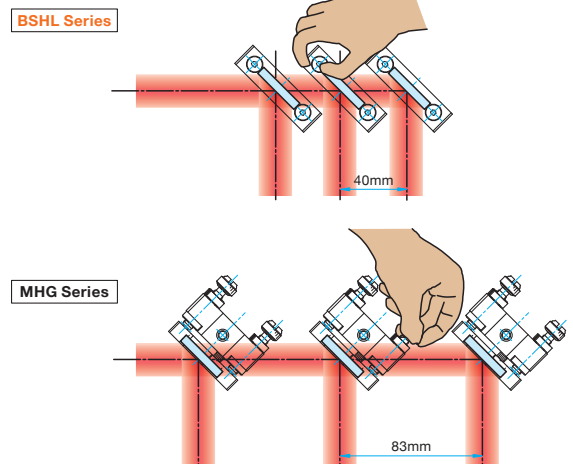
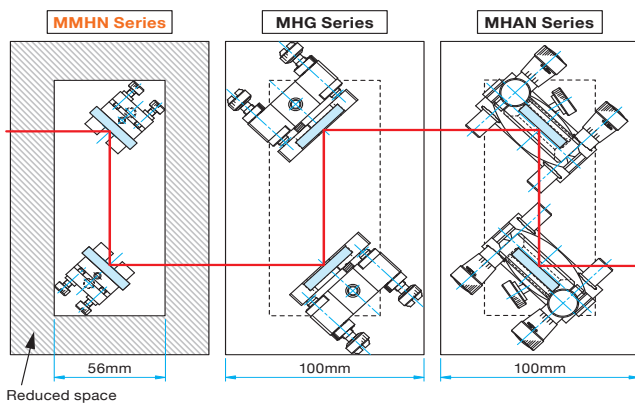
- Holders work well in optical systems with low optical height axis.
- Holders provide stability in environments with vibration, or temperature fluctuations.

Interferometer configured with MHG mirror holder



## Downsizing

MHG and MHAN mirror holders require working areas of about two diameter sizes of the mirrors. MMHN and BSHL mirror holders are good for applications that do not require high operability or resolution. The BSHL series adjustment is vertical allowing for the holders to be arranged close to each other.



Application Systems  
Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

**Mirrors**

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber





## Beamsplitter compatible mirror holders

Some mirror holders can be used only for mirrors, while other mirror holders can hold a beamsplitter and handle transmitted light.

Furthermore, among the holders which can handle transmitted light, some holders like the BHAN series can handle beams from both left and right directions, while other holders like the MHG and MHI series can handle transmitted beam from only one side.

When using a holder with transmitted light, please check the transmitted beam diameter at 45 degrees incidence listed in the specification table of each product.

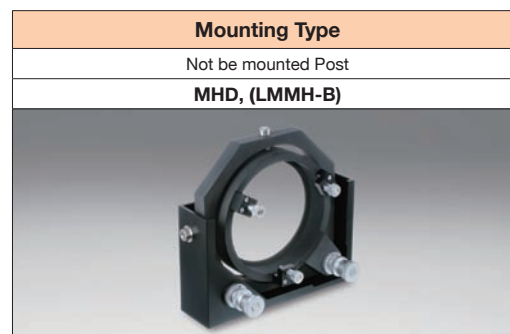
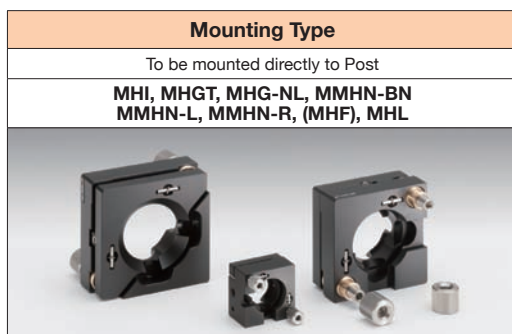
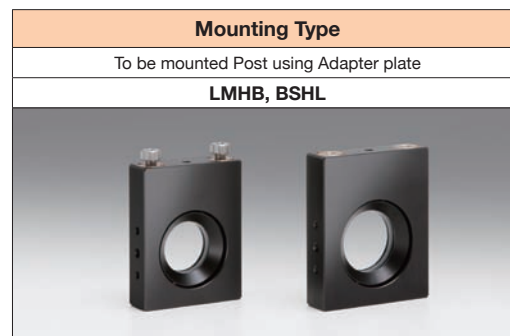
Not Suitable for Use with Transmitted Beam	Used for Transmitted Beam from Only One Direction	Used for Transmitted Beam from Two Directions
<b>LMHB, LMMH, MMHN, MHD, MHL</b>	<b>MHG-NL, MHI, MHGT</b>	<b>BSHL, MHAN, BHAN</b>
<p>These models cannot be used with transmitted beams at 45 degrees incidence even with a center aperture. However, some can be used for transmitted beams at 0 degrees incidence.</p>	<p>These models are used in observation systems containing coaxial illumination or a Mach-Zehnder interferometer. The direction of transmitted light can be changed by rotating the holder.</p>	<p>These models can be used in a Michelson interferometer. The transmitted beam diameter varies depending on the specific model holder.</p>

## Post type and Mounting type

The two types of mirror holders are the post type that come with a post, and the mounting type that can be mounted onto a base plate or adapter plate.

The post type of mirror holders is useful when adjusting optical axis height frequently. The mounting type is useful when space is limited in the optical system, or used in an OEM device application. The optical axis height must be set in the design because the mounting type has a fixed height.

Some of the mounting type holders can be mounted onto a post directly, or converted to fit a post using an adapter plate.



# Kinematic Center Mirror Mount

MHI

RoHS

Catalog Code W4102

The Kinematic Center Mount is designed to allow the mirror to be loaded from the rear, keeping the reflective front surface centered above the mounting hole.

- When this mount is rotated 45 degrees on an optical bench, the center of mirror will stay at the optical axis.
- Cutouts and bevels allow these to be used as beamsplitter holders and not interfere with the transmitted beam.
- Building the mirror frame into the support of the holder keeps the mount thin with a small footprint.
- The small footprint allows more room to access the adjusters compared to regular kinematic mirror holders.
- Includes alignment pin holes to accurately place mount in OEM instruments( $\phi$ 3H7 except MHI-12.7, which is  $\phi$ 2H7).

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



### Guide

- ▶ Vertical control gimbal mirror and beamsplitter holders (BSHL) where the rotation of the fine adjustment matches the mirror center are also available. [Reference](#) C022
- ▶ Can be mounted using an M4 low head screw to secure them from the top or an M6 threaded post from the bottom. (MHI-12.7 can be mounted with an M3 low head screw from the top and M4 threaded post from the bottom.)

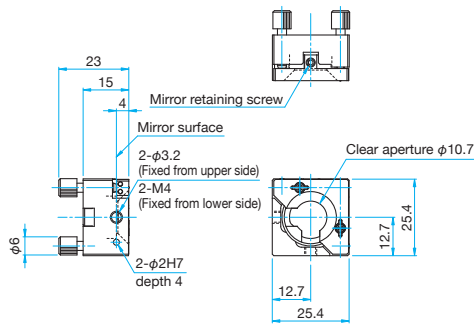
### Attention

- ▶ MHI-12.7 limits the tilt and rotation to be  $\pm 1^\circ$  and  $\pm 2^\circ$  respectively, even when a low and small head hexagon socket head cap screw is used.
- ▶ When securing a mirror with a low head hexagon socket head cap screw, a hex wrench may interfere with the mirror. Please retract the mirror by turning the rotation and tilt adjustment screws before tightening the low head hexagon socket head cap screw.
- ▶ When securing a mirror on a baseplate with a M4 low head hexagon socket head cap screw, there will be  $\pm 1\text{mm}$  clearance.

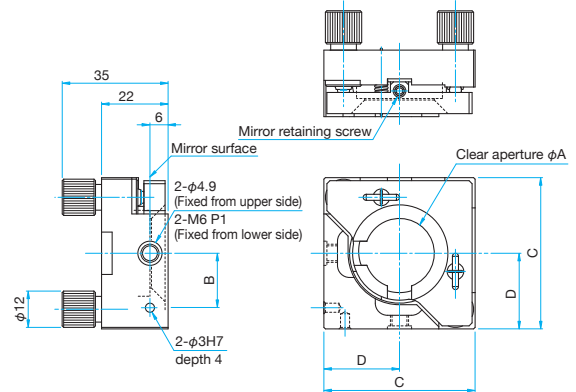


### Outline Drawing

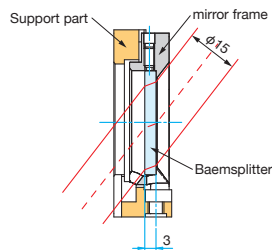
**MHI-12.7** Low head hexagon socket head cap screw M3x6...1 screw



**MHI-25.4/30** Low head hexagon socket head cap screw M4x8...1 screw



### Cross-section view of MHI-30



Part Number	B (mm)	C (mm)	D (mm)
MHI-25.4	18	50	25
MHI-30	20	55	27.5

### Specifications

Part Number	Options specified <sup>*1</sup>	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Clear aperture $\phi$ A [mm]	Reflected Beam Clear Aperture (45° incidence) [mm]	Transmitted Beam Clear Aperture (45° incidence) <sup>*2</sup> [mm]	Adjustment Range		Resolution		Weight [kg]
							Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
MHI-12.7	—	$\phi$ 12.7	2 - 9	$\phi$ 10.7	$\phi$ 6.8	$\phi$ 5	$\pm 3$	$\pm 3$	about 0.74	about 0.74	0.05
MHI-25.4	UU	$\phi$ 25, $\phi$ 25.4	3 - 10	$\phi$ 23	$\phi$ 15.5	$\phi$ 13	$\pm 1.5$	$\pm 1.5$	about 0.4	about 0.4	0.12
MHI-30	UU	$\phi$ 30	3 - 10	$\phi$ 27	$\phi$ 18.3	$\phi$ 15	$\pm 1.5$	$\pm 1.5$	about 0.35	about 0.35	0.13

Primary material: Aluminum (Brass only for MHI-12.7)  
Finish: Black Anodized (Chrome only for MHI-12.7)

\*1 For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007  
\*2 When light is transmitted through a BK7 plane parallel substrate of 3mm thickness.

A new design based on the Kinematic mirror holders (MHG) resulting in reduced prices. These holders are best for experiments using many simple mirror holders or for use in production devices.

- a small footprint offers more adjustment space compared to the MHG series.
- Mirrors are held are at three points along the side to distribute the stress on the mirror evenly.
- The thin frame and setscrew mounting method insure that large clear apertures can be obtained with reflected or transmitted light.



### Guide

- ▶ Threaded and counterbored mounting holes allow MHGT to be mounted on female threaded M4 posts or on male threaded M6 posts.
- ▶ If lockable adjusters are required, see MHG-NL mirror holders. [Reference](#) C014

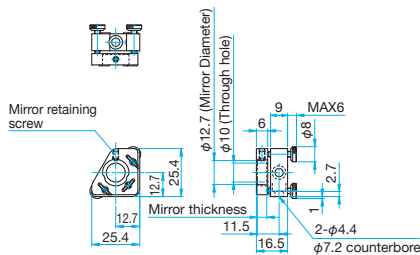
### Attention

- ▶ The installation center of the post is offset from the mirror reflective surface. These holders cannot be used for installation on an optical bench at 45 degrees incidence. Please use the mirror holders without offset (MHI). [Reference](#) C012
- ▶ The rotation center of fine adjustment does not match the mirror reflective surface. For fine measurement, Please use gimbal mirror holders (MHAN) of which rotation center of fine adjustment matches the mirror reflective surface. [Reference](#) C024

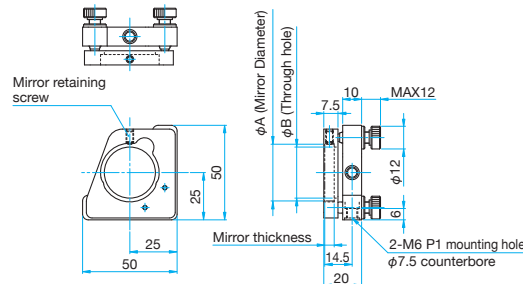


### Outline Drawing

**MHGT-12.7** Hexagon socket head cap screw M4x6...1 screw

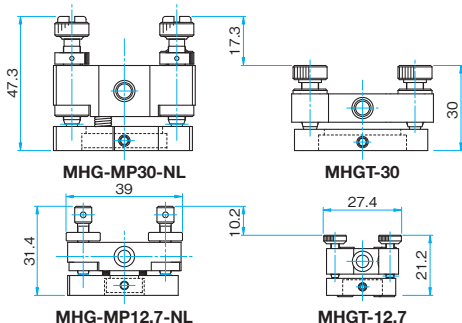


**MHGT-25.4/30** Hexagon socket head cap screw M4x10...1 screw

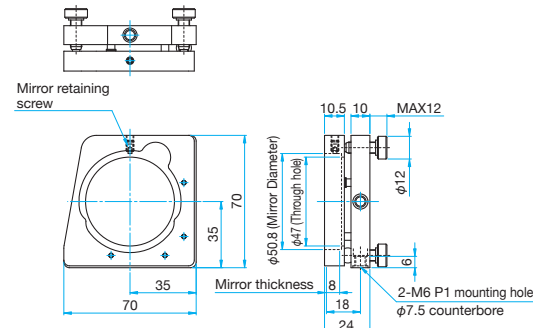


Part Number	φA (mm)	φB (mm)
MHGT-25.4	φ25, φ25.4	φ22
MHGT-30	φ30	φ27

### Compare the size of the MHG-NL and MHGT



**MHGT-50.8** Hexagon socket head cap screw M4x10...1 screw



### Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter φA [mm]	Compatible Optics Thickness [mm]	Through hole φB [mm]	Number of Adjustment Axes	Adjustment Range		Resolution		Weight [kg]
						Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
MHGT-12.7	—	φ12.7	3 – 5	φ10	2	±3	±3	0.74	0.74	0.013
MHGT-25.4	UU	φ25, φ25.4	3 – 5	φ22	2	±3	±3	0.39	0.39	0.067
MHGT-30	UU	φ30	3 – 5	φ27	2	±3	±3	0.39	0.39	0.067
MHGT-50.8	UU	φ50.8	5 – 9	φ47	2	±3	±3	0.25	0.25	0.12

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

**NOMI LOCK™ is the new locking mechanism from OptoSigma. It can adjust the torque of the adjustment screws and lock down the screws with negligible shift. It is best suited for use in interferometers or laser processing devices where beam displacement can cause issues. NOMI LOCK™ is a registered trademark of SIGMA KOKI CO., Ltd.**

- Kinematic mirror holders have excellent rigidity and stability. These qualities make them perfect for use in interferometers and laser resonators.
- There are two types of mirror holders, a high stability model (MHG-HS) and a production model (MHG-MP).
- The MHG-HS high stability model is fitted with large adjustment knobs. These knobs allow for movement in the vertical direction as well making it a 3 axis mount.
- NOMI LOCK™ will have a single fringe displaced in the optical axis when used in interferometers. (There are individual differences in the operation of the lock.)
- Three point fixation of the mirrors reduce the stress caused by mounting greatly.
- These holders have a large aperture for reflective or transmitted light. The retaining rings to not reduce the clear aperture.



### Guide

- ▶ This product can be mounted on pedestal stands (PST: optional) or posts with an M6 external thread (RO: optional).
- ▶ Production model (MHG-MP) can be fixed directly on plates or stages with M4 screws.
- ▶ Production model (MHG-MP) comes with a special wrench for NOMI LOCK™.

### Attention

- ▶ The rotation center of the production model (MHG-MP) is outside the mirror (fulcrum of holder).
- ▶ To mount the high stability model (MHG-HS) on a flat surface, use the plates for mounting posts (MHG-\*\*BPRO). [Reference](#) C016
- ▶ When the plates for mounting posts (MHG-\*\*BPRO) are used, the optical axis will move 10mm upward.
- ▶ The back surface of the mirror is the reference surface when the mirror is mounted in the holder. Due to this condition, the location of the front surface will vary with the thickness of the mirror.

### NOMI LOCK™ Adjustment Method

	Control Method Lock knob      Adjustment screw	Interference Fringe Image (Image)	
(1) Free			Loosening the knob allows for easy movement of the adjustment screw.
(2) Half lock			Tightening the locking knob about 30 degrees to make fine adjustments where this is just a little resistance in the adjustment screw. (When changing from free to half-lock, the interference fringe changes greatly.)
(3) Lock			Tightening the locking knob all the way so that it will not move. When changing from half-lock to lock, the interference fringe only changes by about 1 fringe.

Specifications		Primary material: Aluminum (Brass only for MHG-MP12.7-NL) Finish: Black Anodized (Super Black Chrome only for MHG-MP12.7-NL)							
Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Number of Adjustment Axes [mm]	Adjustment Range		Resolution Rotation [°/rotation]	Resolution Tilt [°/rotation]	Weight [kg]
					Tilt [°]	Rotation [°]			
MHG-MP12.7-NL	—	φ12.7	3 – 5	3	±3	±3	about 0.74	about 0.74	0.04
MHG-MP20-NL	UU	φ20	3 – 5	2	±3	±3	about 0.39	about 0.39	0.12
MHG-HS20-NL	UU	φ20	3 – 5	3	±3	±3	about 0.39	about 0.39	0.12
MHG-MP25-NL	UU	φ25, φ25.4	3 – 5	2	±3	±3	about 0.39	about 0.39	0.12
MHG-HS25-NL	UU	φ25, φ25.4	3 – 5	3	±3	±3	about 0.39	about 0.39	0.12
MHG-MP30-NL	UU	φ30	3 – 5	2	±3	±3	about 0.39	about 0.39	0.12
MHG-HS30-NL	UU	φ30	3 – 5	3	±3	±3	about 0.39	about 0.39	0.12
MHG-MP50-NL	UU	φ50	5 – 8	2	±2	±2	about 0.26	about 0.26	0.24
MHG-MP50.8-NL	UU	φ50.8	5 – 8	2	±2	±2	about 0.26	about 0.26	0.24
MHG-MP80-NL	UU	φ80	7 – 12	2	±2	±2	about 0.18	about 0.18	0.38
MHG-MP100-NL	UU	φ100, φ101.6	10 – 15	2	±2	±2	about 0.13	about 0.13	0.56

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

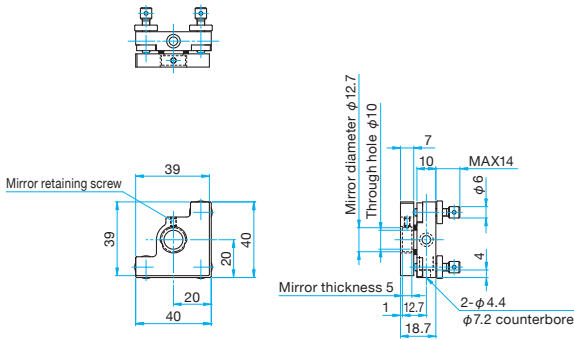


**Outline Drawing**

**MHG-MP12.7-NL**

Hexagonal socket head cap screw M4x8...1 screw  
Spanner for lock knob...1 screw

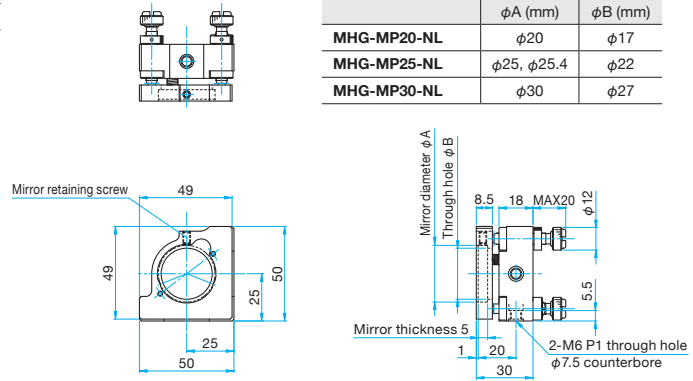
Part Number	Mirror Diameter (mm)
MHG-MP12.7-NL	φ12.7



**MHG-MP20-NL/25-NL/30-NL**

Hexagonal socket head cap screw M4x10...1 screw  
Spanner for lock knob...1 screw

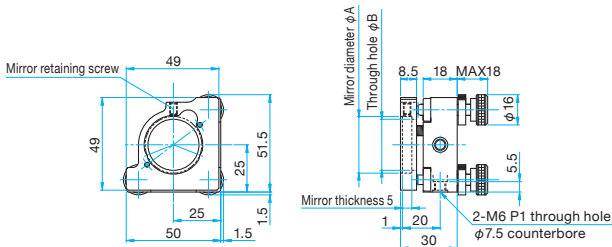
Part Number	Mirror Diameter φA (mm)	Through hole φB (mm)
MHG-MP20-NL	φ20	φ17
MHG-MP25-NL	φ25, φ25.4	φ22
MHG-MP30-NL	φ30	φ27



**MHG-HS20-NL/25-NL/30-NL**

Hexagonal socket head cap screw M4x10...1 screw  
Spanner for lock knob...1 screw

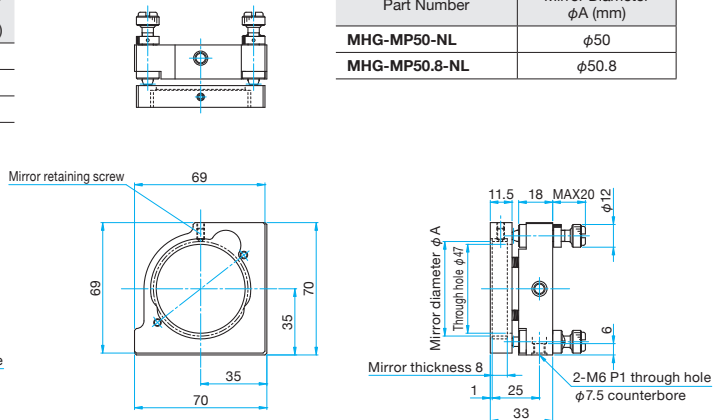
Part Number	Mirror Diameter φA (mm)	Through hole φB (mm)
MHG-HS20-NL	φ20	φ17
MHG-HS25-NL	φ25, φ25.4	φ22
MHG-HS30-NL	φ30	φ27



**MHG-MP50-NL/50.8-NL**

Hexagonal socket head cap screw M4x10...1 screw  
Spanner for lock knob...1 screw

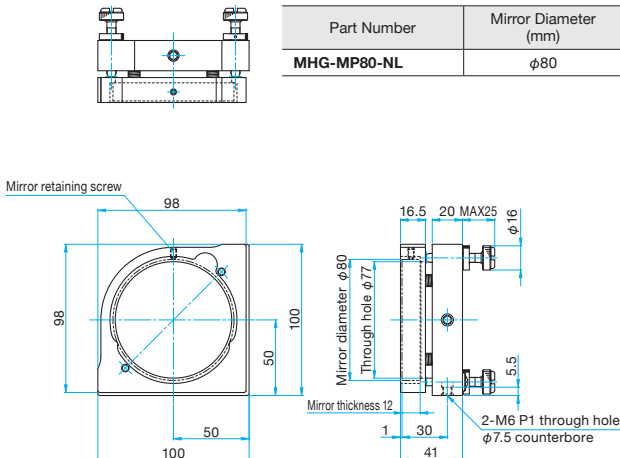
Part Number	Mirror Diameter φA (mm)
MHG-MP50-NL	φ50
MHG-MP50.8-NL	φ50.8



**MHG-MP80-NL**

Hexagonal socket head cap screw M4x10...1 screw  
Spanner for lock knob...1 screw

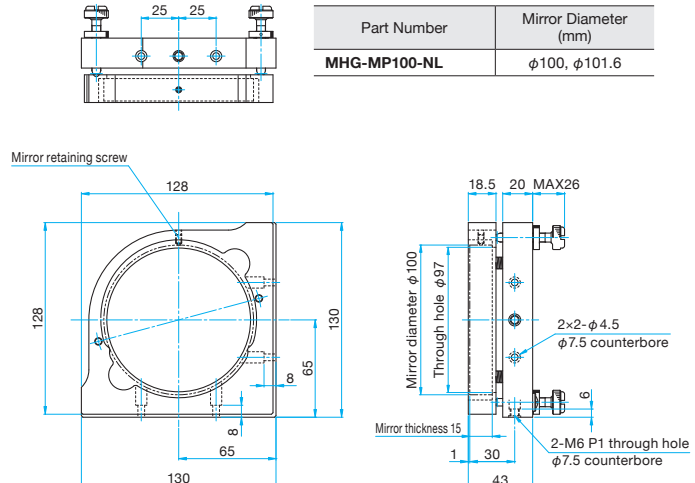
Part Number	Mirror Diameter (mm)
MHG-MP80-NL	φ80



**MHG-MP100-NL**

Hexagonal socket head cap screw M4x12...3 screws  
Spanner for lock knob...1 screw

Part Number	Mirror Diameter (mm)
MHG-MP100-NL	φ100, φ101.6



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

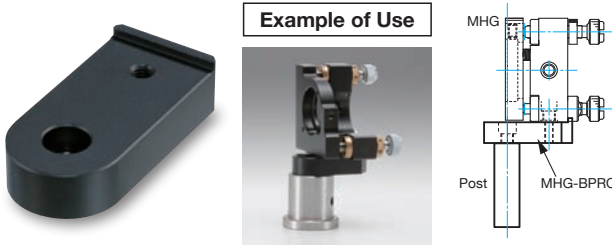
Fiber

### Post Adapter Plates | MHG-BPRO

RoHS Catalog Code W4002

These plates correct the distance offset between the center of the mirror and the mounting hole.

- When post adapter plates are used, the optical axis will move 10mm upward. (12.3mm only for MHG-12 and 7BPRO.)
- Post adapter plates can be fixed not only on posts but also on stages or baseplates using M4 screws.
- The adapters are designed for use with a mirror of 5mm thickness. Offset remains if a mirror of thickness other than 5mm is used.

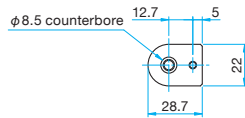


Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Holders	Weight [kg]
<b>MHG-12.7BPRO</b>	MHG-MP12.7	0.02
<b>MHG-30BPRO</b>	MHG-MP20-NL/MHG-HS20-NL MHG-MP25/-HS25 MHG-MP30/-HS30	0.025
<b>MHG-50BPRO</b>	MHG-MP50/-MP50.8	0.025
<b>MHG-100BPRO</b>	MHG-100	0.075

### Outline Drawing

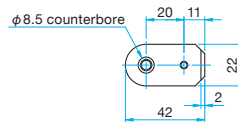
#### MHG-12.7BPRO

- Hexagonal socket head cap screw M4x12...1 screw
- Flat washer



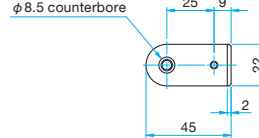
#### MHG-30BPRO

- Hexagonal socket head cap screw M4x10...1 screw
- Flat washer



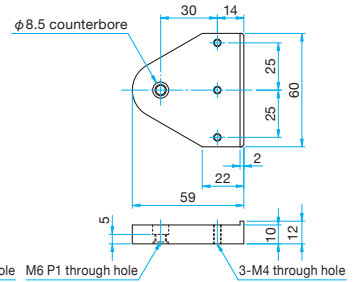
#### MHG-50BPRO

- Hexagonal socket head cap screw M4x10...1 screw
- Flat washer



#### MHG-100BPRO

- Hexagonal socket head cap screw M4x10...1 screw
- Flat washer

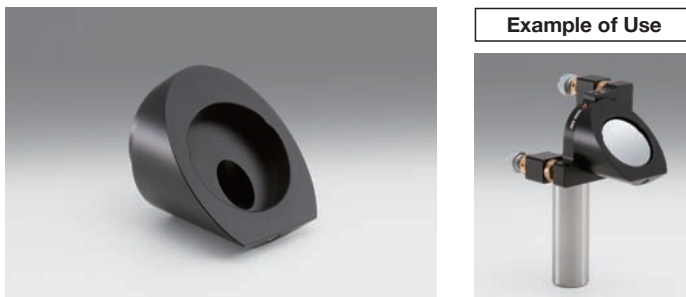


### 45° Optics Adapters | MHG-KAD

RoHS Catalog Code W4003

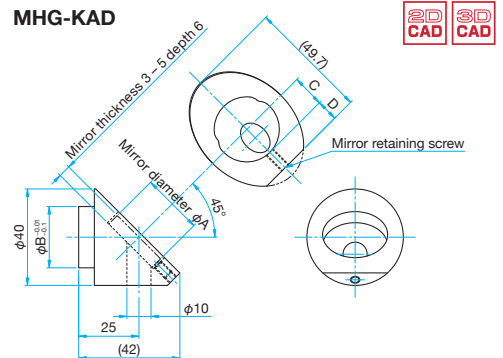
Used in a MHG kinematic mirror holder to direct a beam upwards or downwards on optical benches.

- The adjustment range and resolution of mirror holders are changed using these adapters.
- Mirrors are mounted at three points on the side.
- Since adapters are fitted in the mirror frame of the mirror holder, the orientation of the tilted surface of the mirror can be rotated about the central axis of the adapter cylinder.



### Outline Drawing

#### MHG-KAD



### Specifications

Specifications		Primary material: Aluminum Finish: Black Anodized		
Part Number	Compatible Holders	Compatible Optics Diameter $\phi A$ [mm]	Compatible Optics Thickness [mm]	Weight [kg]
<b>MHG-25.4KAD</b>	MHG-MP25.4/-HS25.4	$\phi 25.4$	3 – 5	0.07
<b>MHG-30KAD</b>	MHG-MP30/-HS30	$\phi 30$	3 – 5	0.07

Part Number	$\phi B$ (mm)	C (mm)	D (mm)
<b>MHG-25.4KAD</b>	25.4	13.5	9
<b>MHG-30KAD</b>	30	15.5	7



## Mirror Mount Adapters | MHG-MAD

RoHS

Catalog Code W4004

Adapters for mounting smaller diameter mirrors.



- Adapters are designed so that the end faces of mirror frames are aligned with the end faces of adapters when adapters are attached to kinematic mirror holders (MHG). However, the reflective surface of a mirror is positioned 1mm inside the end face of adapter.
- Mirrors are fixed at three points on the lateral side.
- Before mounting adapters to mirror holders, fix mirrors to the adapters. Mirrors cannot be mounted once the adapter is mounted in a mirror holder.
- The reflective surface position is dependant on the mirror thickness.

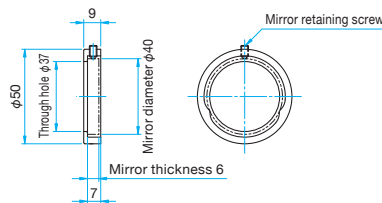
## Example of Use



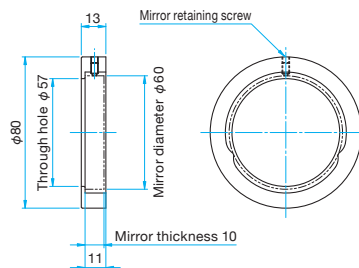
Specifications				Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Holders	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]
MHG-40MAD	MHG-MP50	φ40	4 – 6	0.015
MHG-60MAD	MHG-80	φ60	6 – 10	0.06
MHG-25.4SMAD	MHG-MP25/-HS25	□25, □25.4	3 – 5	0.018

## Outline Drawing

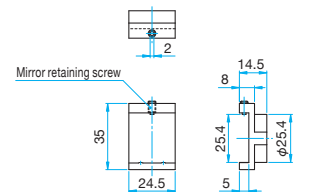
## MHG-40MAD



## MHG-60MAD



## MHG-25.4SMAD



## Prism Adapters | MHG-PAD

RoHS

Catalog Code W4007

Adapters for holding cube optics such as beamsplitters or prisms. Provide extended stability with NOMI LOCK™.

- Rotation ( $\theta$  or yaw) and tilt ( $\alpha$  or pitch) of prisms and cube optics can be fine adjusted with this adapter.  
To adjust yaw tilt ( $\beta$ ), fit the prism adapters in kinematic mirror holders after adjusting the orientation.
- There is a through hole on the moun so that prisms can be used on all four faces.
- There is an offset of 40mm from the baseplate mounting hole of the kinematic mirror holder to the center of cube.
- The clamp allows for different sized cubes to be mounted.

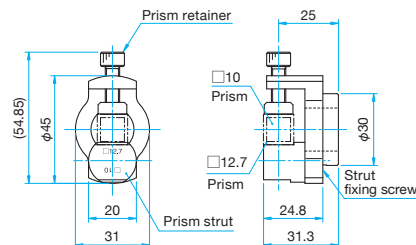


## Example of Use

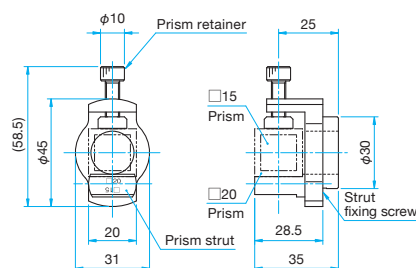


## Outline Drawing

## MHG-12.7PAD



## MHG-20PAD



## Specifications

Specifications				Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Holders	Compatible Optics Diameter [mm]	Weight [kg]	
MHG-12.7PAD	MHG-MP30/-HS30	□10·□12.7	0.06	
MHG-20PAD	MHG-MP30/-HS30	□15·□20	0.055	

## Optical Path Flip Mounts | FMB

RoHS Catalog Code W4006

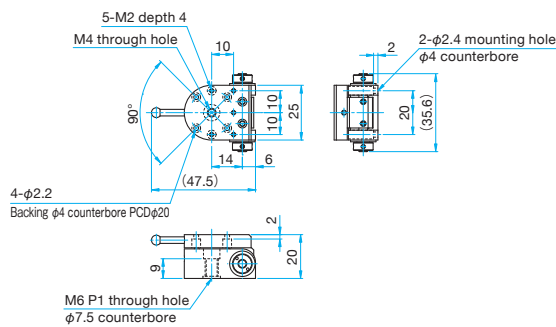
Flip mounts remove and insert mirrors/lenses from an optical paths.



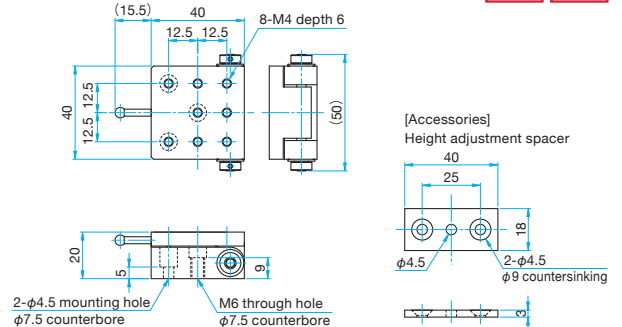
- A 3 mm thick mirror and MHG-MP20-NL can be used to for a mirror at the center with 45 degrees incident light. FMB-25 can be used in combination with a mirror mount (MHI or BSHL).
- These flip mounts have 5" repeatability. NOMI LOCK™ mounts used with these flip mounts will have excellent repeatability
- To mount the high precision mirror holder (MHG-HS\*\*-NL), use the accessory spacer for adjusting height in order to avoid interference with adjustment screws.

### Outline Drawing

**FMB-25** Hexagonal socket head cap screw M4x12...1 screw



**FMB-40** Hexagonal socket head cap screw M4x12...1 screw  
Countersunk head screw M4x8...2 screws



Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number	Repeatability ["]	Weight [kg]
<b>FMB-25</b>	5 (25μrad)	0.04
<b>FMB-40</b>	5 (25μrad)	0.1

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

### Example of Use



## Laser Mounts | MHG-20LDU

RoHS Catalog Code W4005

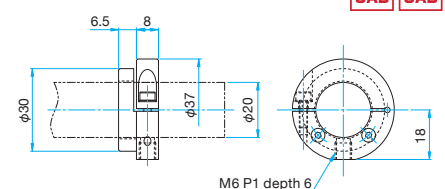
Adapter for mounting laser diodes (LDU33) or other φ20 mm laser diodes with kinematic mirror holders.



- Split clamp structure of the laser mounts fix laser diodes securely. Caution: excessive clamping might damage laser diodes.
- Mounts can be used as fixed LD holders when a post is attached to the bottom of the mounts.
- Laser diodes (LDU33) are sold separately. Refer to the light sources section for details of the specifications. [WEB Reference](#) [Catalog Code](#) W5001

### Outline Drawing

**MHG-20LDU**



Specifications			Primary material: Aluminum Finish: Black Anodized	
Part Number	Compatible Holders	Compatible Laser	Compatible Diameter [mm]	Weight [kg]
<b>MHG-20LDU</b>	MHG-HS30/-MP30	LDU33 series	φ20	0.02

Top adjust mirror holders can be used in small areas reducing the footprint of systems.

- Mirrors are held on their edge with a resin screw.
- These holders can be positioned and operated close to each other.



### Guide

▶ Vertical control gimbal mirror and beamsplitter holders (BSHL) where the adjustment is along the reflective surface of the mirror are available too. [Reference](#) C022

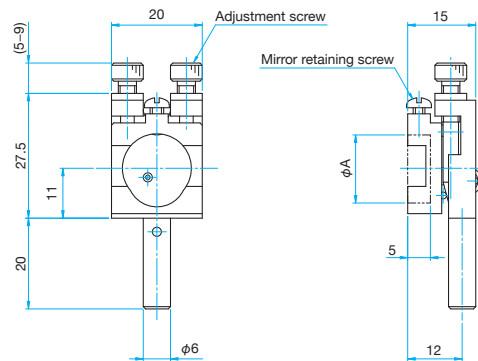
### Attention

- ▶ Mirror thickness will change the position of the reflective surface of the mirror.
- ▶ The front surface of the mount is 12 mm from the center axis of the post/mounting hole.



## Outline Drawing

LMMH-R M4 P0.7



Specifications								Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter $\phi A$ [mm]	Compatible Optics Thickness [mm]	Adjustment Range		Resolution		Weight [kg]
				Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
LMMH-10R	N	$\phi 10$	5	$\pm 2.5$	$\pm 2.5$	about 0.28	about 0.3	0.03
LMMH-12.7R	N	$\phi 12.7$	5	$\pm 2.5$	$\pm 2.5$	about 0.28	about 0.3	0.03
LMMH-15R	N	$\phi 15$	5	$\pm 2.5$	$\pm 2.5$	about 0.28	about 0.3	0.03

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Rectangular mirrors can be bonded to the front plate and circular mirrors can be bonded or held with the mirror adapters (MKAD).

- MKAD adapters allow for easy removal and mounting of circular mirrors.
- Two baseplate versions are available. MMHN-25L type has the mounting holes on the mirror side, and MMHN-25R type has mounting on the adjustment screw side.
- To align the reflective surface of the mirror to the mounting post axis use MMHN-25LRO mirror holders.



### Guide

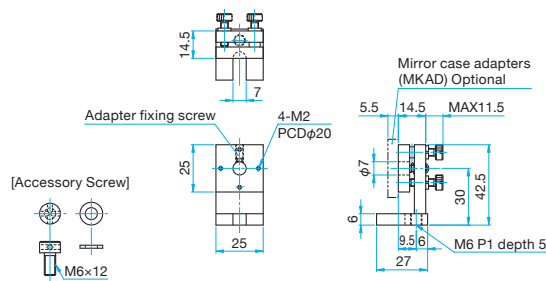
- ▶ 25mm square aluminum flat mirrors (TFA-25S05-10) are available. [WEB Reference](#) [Catalog Code](#) W3403

### Attention

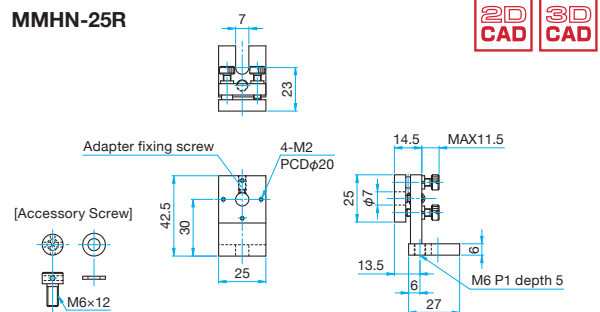
- ▶ The adjustment is not along the reflective surface of the mirror. Gimbal mirror holders (MHAN) have the adjustment along the reflective surface the mirrors. [Reference](#) C024

## Outline Drawing

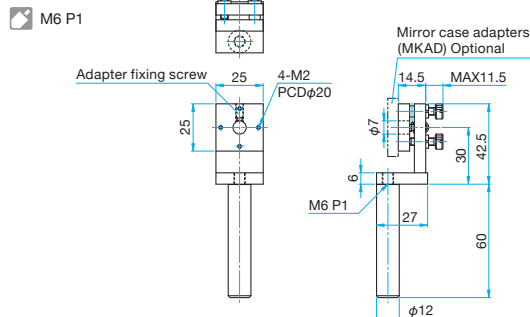
### MMHN-25L



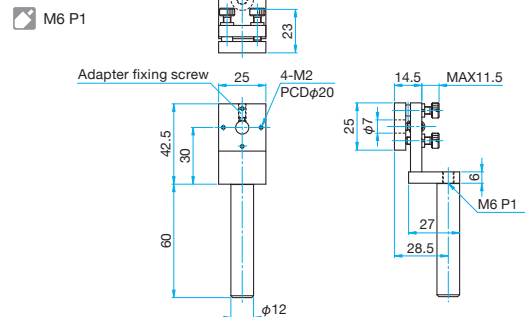
### MMHN-25R



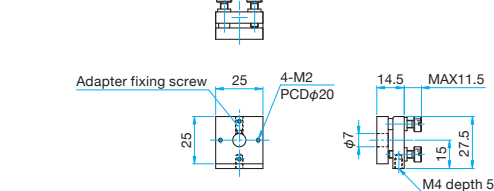
### MMHN-25LRO



### MMHN-25RRO



### MMHN-25BN





Specifications		Primary material: Aluminum Finish: Black Anodized					
Part Number	Options specified*	Compatible Optics Diameter [mm]	Adjustment Range		Resolution		Weight [kg]
			Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
MMHN-25L	EE/UU	□25 or less φ25 or less	±5	±5	about 0.9	about 0.9	0.04
MMHN-25R	EE/UU		±5	±5	about 0.9	about 0.9	0.04
MMHN-25LRO	—		±5	±5	about 0.9	about 0.9	0.09
MMHN-25RRO	—		±5	±5	about 0.9	about 0.9	0.09
MMHN-25BN	—		±5	±5	about 0.9	about 0.9	0.03

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

**Option** Mirror Adapters | MMHN-MAD

RoHS Catalog Code W4133



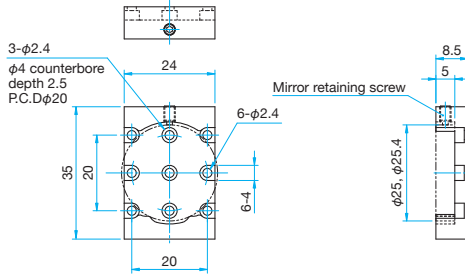
Can be used to change the mounting position of mirrors relative to the mirror holder.

- Round and rectangular reflective optics can be fixed.
- With nine fixed screw holes with 10mm interval, can easily achieve 10mm offset adjustment.
- The optics can be held at three points on the side.

Outline Drawing

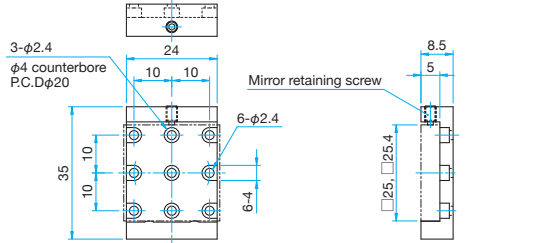
MMHN-25CMAD

Hexagonal socket head cap screw M2x3...3 screw



MMHN-25SMAD

Hexagonal socket head cap screw M2x3...3 screw



Specifications		Primary material: Aluminum Finish: Black Anodized	
Part Number	Compatible Optics Dimensions [mm]	Weight [kg]	
MMHN-25CMAD	φ25, φ25.4	0.01	
MMHN-25SMAD	□25, □25.4	0.01	

**Option** Mirror Cells | MKAD

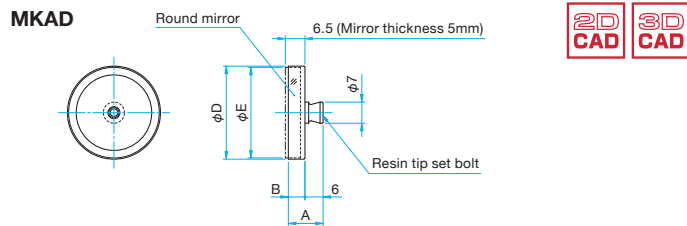
RoHS Catalog Code W4122

Mirror cells provide a method of mounting mirrors in compact mirror holders (MMHN-25) without adhesive.

- A split from provides a spring force to maintain a secure grip on mirrors inserted into these cells.
- To remove the mirror, push the mirror out by turning the M4 resin tipped setscrew clockwise.



Outline Drawing



Specifications		Primary material: Aluminum Finish: Black Anodized					
Part Number	Compatible Optics Diameter [mm]	A [mm]	B [mm]	Min Mirror Thickness [mm]	φD [mm]	φE [mm]	Weight [kg]
MKAD-12.7	φ12.7	10.5	4.5	3	φ13.4	φ12.7 <sup>+0.15</sup> <sub>-0.1</sub>	0.002
MKAD-19.05	φ19.1	12	6	4.5	φ19.9	φ19.1 <sup>+0.15</sup> <sub>-0.1</sub>	0.003
MKAD-25.4	φ25.4	11.5	5.5	4	φ26.1	φ25.4 <sup>+0.15</sup> <sub>-0.1</sub>	0.005
MKAD-30	φ30	11.5	5.5	4	φ30.8	φ30 <sup>+0.15</sup> <sub>-0.1</sub>	0.006

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

# Vertical Control Gimbal Beamsplitter Holders

BSHL-2/BSHL-TF

RoHS

These vertical holders are ideal for small spacers due to their thin design and vertical adjustment. Holders can be positioned close to each other reducing optical system size.



- There are two types, one is fitted with knobs on top (BSHL-2), and the other is without knobs and adjusted by hex wrench (BSHL-TF).
- This product provides large clear aperture of transmitted beam even if beamsplitter is placed at 45 degrees.
- The gimbal design maintains the center position of mirror even when fine adjusted.
- Adjustment screws can be fixed with the clamp screws on the back of the mounts.
- Two M4 mounting holes are also provided on both sides to mount the holder horizontally.

### Guide

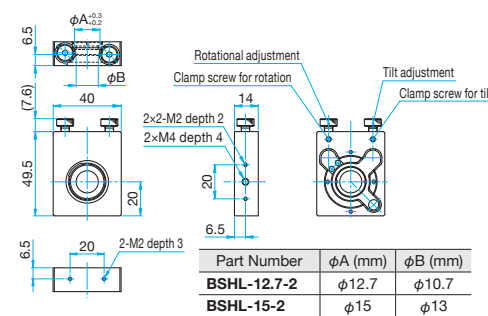
- ▶ M6 mounting plates are available for purchase. [Reference](#) C023
- ▶ Can be mounted on post stands (PST-\*\*) using the M4 tapped holes of holders. [WEB Reference](#) [Catalog Code](#) W6039
- ▶ Custom baseplates can be made to order.

### Attention

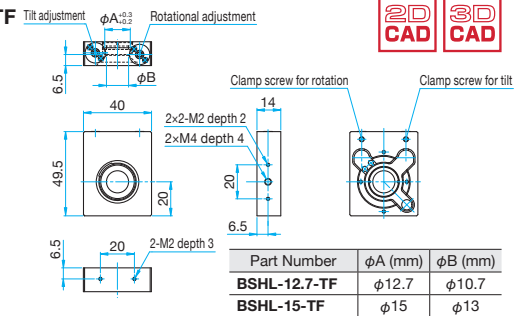
- ▶ The locking clamps prevent the adjustment screws from rotating.
- ▶ To adjust the BSHL-TF mounts, a hex wrench is required. A ball end wrench set (SKB-JBX6) is available. [WEB Reference](#) [Catalog Code](#) W6077

### Outline Drawing

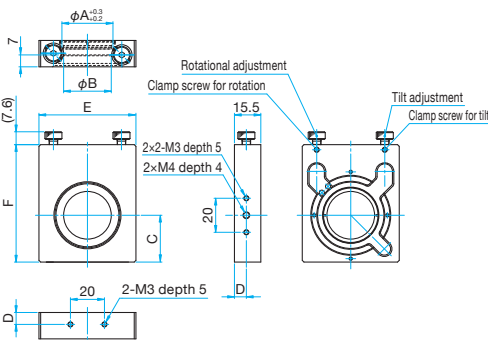
BSHL-12.7-2  
BSHL-15-2



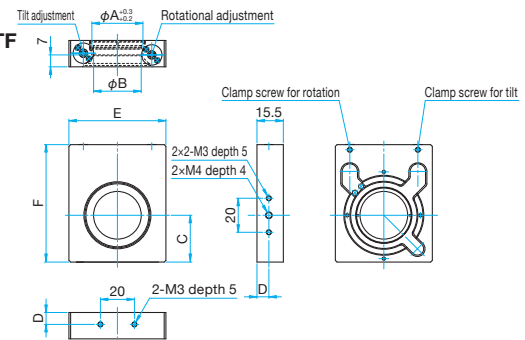
BSHL-12.7-TF  
BSHL-15-TF



BSHL-20-2  
BSHL-25.4-2  
BSHL-30-2



BSHL-20-TF  
BSHL-25.4-TF  
BSHL-30-TF



With Knobs Part Number	Without Knobs Part Number	φA (mm)	φB (mm)	C (mm)	D (mm)	E (mm)	F (mm)
BSHL-20-2	BSHL-20-TF	φ20	φ18	25.2	7	50.4	64
BSHL-25.4-2	BSHL-25.4-TF	φ25.4	φ23.4	25.2	7	50.4	64
BSHL-30-2	BSHL-30-TF	φ30	φ28	27.5	7	57	69

### Specifications

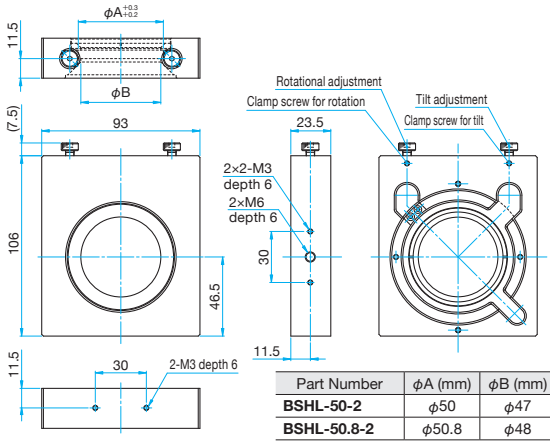
With Knobs Part Number	Without Knobs Part Number	Compatible Optics		45° Incidence		Fine Adjustment Range		Fine Adjustment Resolution		Weight [kg]
		Diameter [mm]	Thickness [mm]	Reflected Beam Diameter [mm]	Central Transmission Beam Diameter [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
BSHL-12.7-2	BSHL-12.7-TF	φ12.7	1 – 3	φ6.8	φ2.51	±1.5	±1.2	0.6	0.6	0.06
BSHL-15-2	BSHL-15-TF	φ15	1 – 3	φ8.4	φ4.13	±1.5	±1.2	0.6	0.6	0.06
BSHL-20-2	BSHL-20-TF	φ20	3 – 5	φ12	φ7.67	±1.2	±1.2	0.35	0.45	0.11
BSHL-25.4-2	BSHL-25.4-TF	φ25, φ25.4	3 – 5	φ15.8	φ11.49	±1.2	±1.2	0.35	0.45	0.11
BSHL-30-2	BSHL-30-TF	φ30	3 – 5	φ19	φ14.74	±1.2	±1.2	0.34	0.4	0.13
BSHL-50-2	BSHL-50-TF	φ50	5 – 8	φ31	φ27.39	±1.5	±1.5	0.23	0.27	0.48
BSHL-50.8-2	BSHL-50.8-TF	φ50.8	5 – 8	φ31	φ28.10	±1.5	±1.5	0.23	0.27	0.48

Primary material: Aluminum  
Finish: Black Anodized

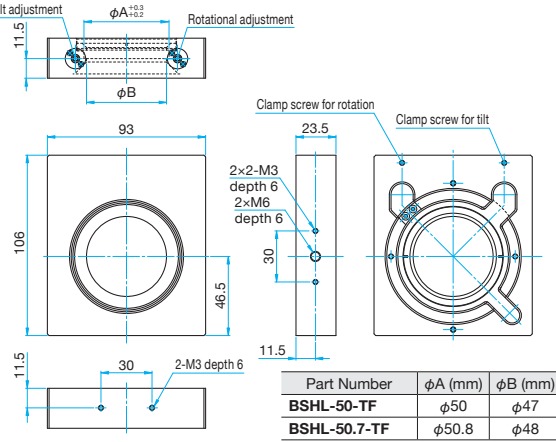


Outline Drawing

**BSHL-50-2/BSHL-50.8-2**



**BSHL-50-TF/BSHL-50.8-TF**



**Option Options for Vertical Control Gimbal Beamsplitter Holders | BSHL-BP**

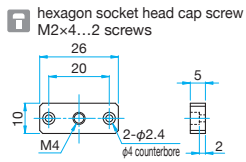


Base plates for mounting BSHL mirror holders on optical breadboards or optical baseplates. Base plates are available to mount the BSHL at 0 degrees and 45 degrees incidence positions.

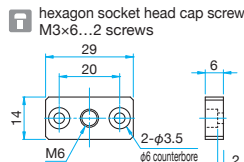
- BSHL-BPRO adapter plates for mounting posts (RO-12/20) on the bottom of the BSHL.
- BSHL-12.7BP mounts BSHL-12.7/15 holders on base plates with M2 threads on 10mm spacing at 0 degrees and 45 degrees incidence positions.
- When securing with an M4 thread, use the M6-M4 conversion adapter (AD-M6-M4). [WEB Reference](#) [Catalog Code](#) W6030

Outline Drawing

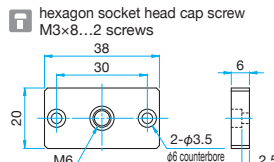
**BSHL-12.7BPRO**



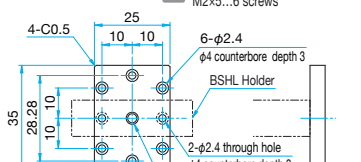
**BSHL-20BPRO**



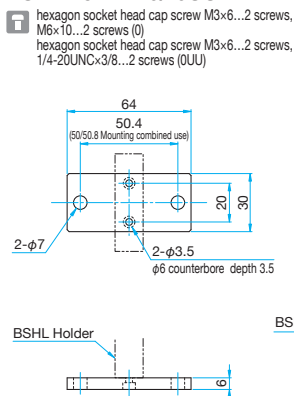
**BSHL-50BPRO**



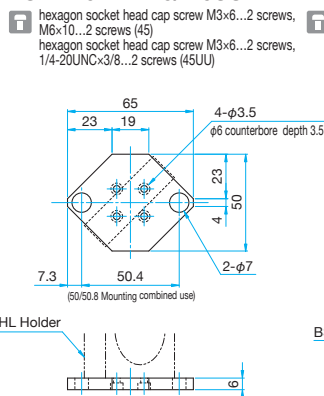
**BSHL-12.7BP**



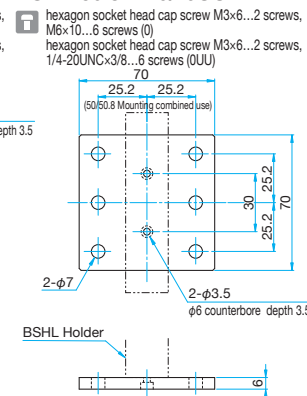
**BSHL-25.4BP-0/-0UU**



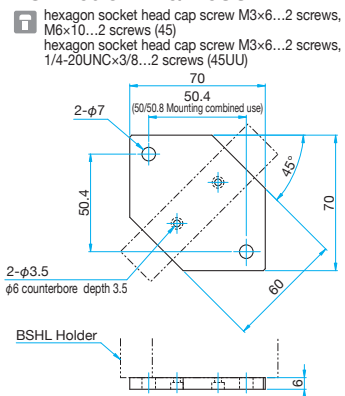
**BSHL-25.4BP-45/-45UU**



**BSHL-50.8BP-0/-0UU**



**BSHL-50.8BP-45/-45UU**



Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number		Type	Compatible Holders	Weight [kg]
METRIC	INCH			
<b>BSHL-12.7BPRO</b>	—	M4-Rod	BSHL-12.7, BSHL-15	0.01
<b>BSHL-20BPRO</b>	—	M6-Rod	BSHL-20, BSHL-25.4, BSHL-30	0.01
<b>BSHL-50BPRO</b>	—	M6-Rod	BSHL-50, BSHL-50.8	0.02
<b>BSHL-12.7BP</b>	—	Combined use 0° and 45° Incidence	BSHL-12.7, BSHL-15	0.01
<b>BSHL-25.4BP-0</b>	<b>BSHL-25.4BP-0UU</b>	0° Incidence	BSHL-20, BSHL-25.4, BSHL-30	0.03
<b>BSHL-25.4BP-45</b>	<b>BSHL-25.4BP-45UU</b>	45° Incidence	BSHL-20, BSHL-25.4, BSHL-30	0.03
<b>BSHL-50.8BP-0</b>	<b>BSHL-50.8BP-0UU</b>	0° Incidence	BSHL-50, BSHL-50.8	0.08
<b>BSHL-50.8BP-45</b>	<b>BSHL-50.8BP-45UU</b>	45° Incidence	BSHL-50, BSHL-50.8	0.06

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

**Mirrors**

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

**Mirrors can rotate 360 degrees in the pitch direction.**

**Ideal for applications where the incident light has multiple angles of incidence.**

- The angle of the mirror can be fine tuned with the coarse/fine switching clamp.
- The mount is designed to have the reflective surface at the center of rotation of the mount. Mirror thickness does not affect this.
- 0.25 mm fine pitch screw adjusters or differential micrometers can be used to save space and provide finer adjustment for MHAN mounts  $\phi 50.8$  mm and under



### Guide

- ▶ The RO-20-60 post (diameter  $\phi 20$ mm, length 60mm) is included but it can be replaced with other sizes. Special tools are required to remove the post. Different sized post can be specified at the time of purchase.
- ▶ Kinematic mirror holders, MHG-NL, should be used for low optical axes applications. [Reference](#) C014

### Attention

- ▶ Beam splitters mounted at 45 degrees will have the beam blocked by the aluminum frame. The BHAN gimbal beamsplitter holders are recommended and have a larger transmitted clear aperture. [Reference](#) C026
- ▶ Use the coarse/fine switching clamp to lock down the mount after the desired adjustment.
- ▶ The post should be well secured before adjusting the mount.

### Mirror Mounting Methods

When mounting a mirror in a mirror holder, use gloves or finger cots so that finger prints do not get on the mirror.

When securing a mirror to the gimbal mirror holder, place the reflective surface downward so that the mirror will be tight against the bottom (face side) of the mirror frame. Place a Delrin ring on the mirror from the top, so that it does not scratch the mirror. Secure the retaining ring into the mirror frame using a spanner wrench or similar tool.

Guide:

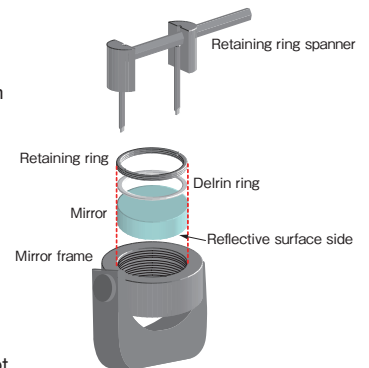
First, tighten the retaining ring until it just contacts the mirror.

Second, firmly tighten the retaining ring once, until mirror frame and mirror, Delrin ring, and retaining ring are all in tight contact.

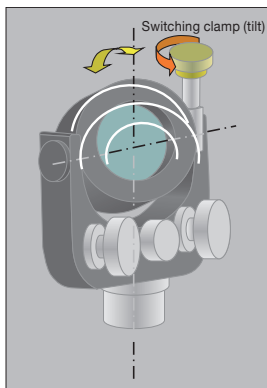
Third, loosen the retaining ring until the mirror can move.

Finally, slowly tighten the retaining ring, stopping at the position where the retaining ring is held lightly. So as not to put stress on the mirror.

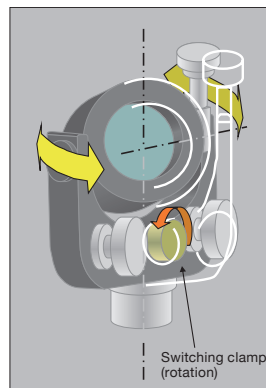
When shipping or when used in locations with a lot of vibration, it is possible that the retaining ring will come loose, and the mirror will fall off. In this case, either firmly tighten the retaining ring so that it does not come loose, or secure the retaining ring with thread locking adhesive.



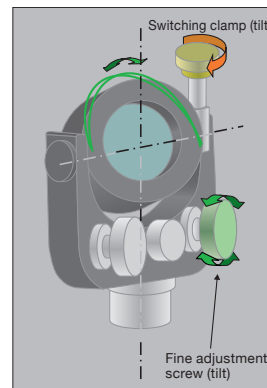
### How to Use the Coarse / Fine Switching Clamp and Fine Adjustment Screws



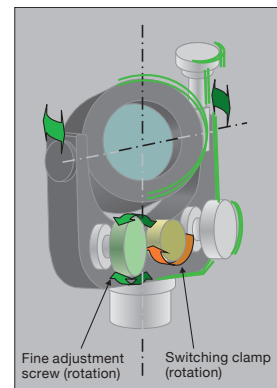
Tilt (pitch) coarse movement control



Rotation (Yaw) coarse movement control



Tilt fine movement control



Rotational fine movement control

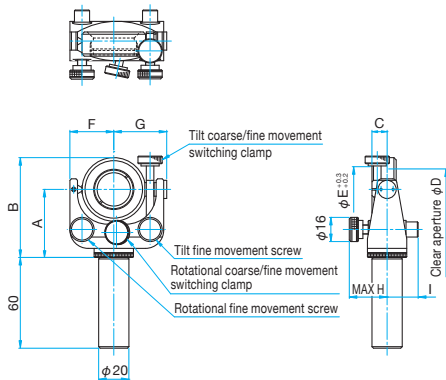




**Outline Drawing**

**MHAN-S**

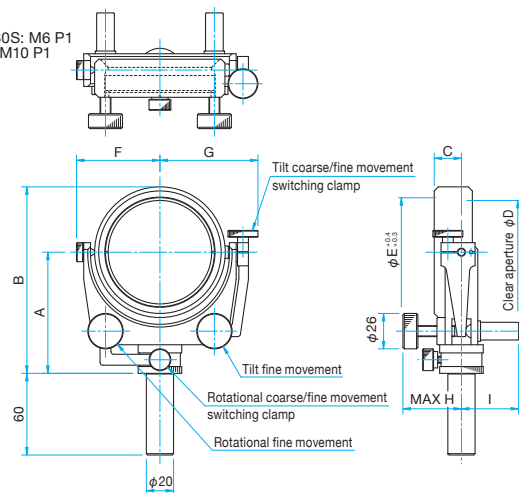
M6 P1



Part Number	A (mm)	B (mm)	C (mm)	φD (mm)	φE (mm)	G (mm)	F+G (mm)	MAX H (mm)	I (mm)
MHAN-20S	40	56	10	φ17	φ20	30	54	26.5	20.5
MHAN-25.4S	45	66	10	φ22	φ25.4	35	64	27	20.5
MHAN-30S	45	66	10	φ27	φ30	35	64	27	20.5
MHAN-40S	52.5	79.5	12	φ37	φ40	41	76	27.5	20.5
MHAN-50S	60	92	15	φ46	φ50	46	86	29	20.5
MHAN-50.8S	60	92	15	φ47	φ50.8	46	86	29	20.5
MHAN-60S	65	102	15	φ56	φ60	51	96	28.5	20.5

**MHA**

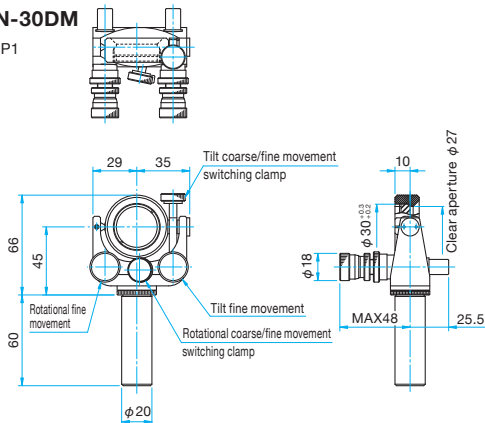
MHA-80S: M6 P1  
Other: M10 P1



Part Number	A (mm)	B (mm)	C (mm)	φD (mm)	φE (mm)	G (mm)	F+G (mm)	MAX H (mm)	I (mm)
MHA-80S	89	137	20	φ75	φ80	72	133	48	42.5
MHA-100SA	115	177	21	φ95	φ100	101	184	48	45
MHA-130SA	128	205	24	φ124	φ130	116	214	48	45
MHA-150S	140	227	26	φ144	φ150	126	234	48	45

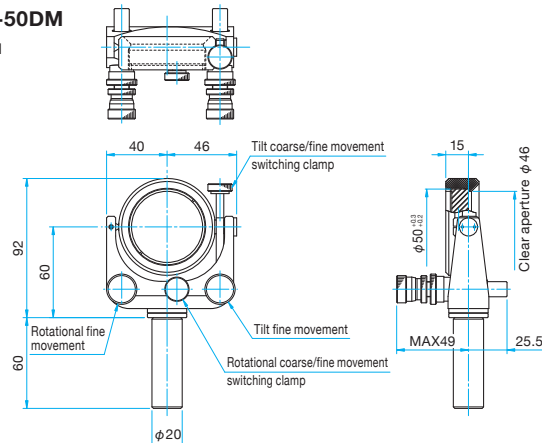
**MHAN-30DM**

M6 P1



**MHAN-50DM**

M6 P1



**Screw Type**

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics		Reflected Beam Clear Aperture (45° incidence) [mm]	Fine Adjustment Range		Fine Adjustment Resolution		Weight [kg]
		Diameter [mm]	Thickness [mm]		Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
MHAN-20S	N/UU	φ20	2 - 6	φ9.2	±4	±4	about 0.54	about 0.68	0.3
MHAN-25.4S	N/UU	φ25, φ25.4	2 - 6	φ12.7	±4	±4	about 0.54	about 0.68	0.4
MHAN-30S	N/UU	φ30	2 - 6	φ16.3	±4	±4	about 0.54	about 0.68	0.4
MHAN-40S	N/UU	φ40	2 - 8	φ23.3	±4	±4	about 0.45	about 0.55	0.6
MHAN-50S	N/UU	φ50	3 - 11	φ30.4	±4	±4	about 0.35	about 0.48	0.7
MHAN-50.8S	N/UU	φ50.8	3 - 11	φ30.4	±4	±4	about 0.35	about 0.48	0.7
MHAN-60S	N/UU	φ60	3 - 11	φ37.5	±3	±4	about 0.31	about 0.41	0.9
MHA-80S	-	φ80	4 - 15	φ50.9	±3.5	±5	about 0.49	about 0.72	1.6
MHA-100SA	-	φ100	4 - 15	φ65.1	±3.4	±5	about 0.35	about 0.52	1.9
MHA-130SA	-	φ130	7 - 18	φ86.3	±2.9	±4	about 0.30	about 0.42	2.3
MHA-150S	-	φ150	4 - 20	φ100.4	±2.5	±4	about 0.26	about 0.38	2.5

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

**Precision Type**

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics		Fine Adjustment Range		Fine Adjustment Resolution		Ultra Fine Adjustment Resolution		Ultra Fine Adjustment Indicator Conversion		Weight [kg]
		Diameter [mm]	Thickness [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	Tilt [°/rotation]	Rotation [°/rotation]	Tilt [°/DIV]	Rotation [°/DIV]	
MHAN-30DM	N/UU	φ30	2 - 6	±4	±4	about 1.08	about 1.35	about 0.11	about 0.14	about 0.002	about 0.002	0.47
MHAN-50DM	N/UU	φ50	3 - 11	±3	±4	about 0.71	about 0.95	about 0.07	about 0.10	about 0.001	about 0.002	0.58

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

# Gimbal Beamsplitter Holders

BHAN-S/BHAN-DM

RoHS

Catalog Code

W4011

The frame of these mounts are narrow to accommodate a greater clear aperture at 45 degrees incident. The transmitted beam diameter is just about the same as the reflected beam diameter. Appropriate for beam branching optical systems or Michelson interferometers.

- BHAN-S functions the same as MHAN.



### Guide

- ▶ The RO-20-60 post (diameter  $\phi 20\text{mm}$ , length 60mm) is included but it can be replaced with other sizes. Special tools are required to remove the post. Different sized post can be specified at the time of purchase.

### Attention

- ▶ Resin rings are sold separately and are recommended.
- ▶ BHAN uses retaining rings unique to this mount. Contact the Sales Division for replacements..
- ▶ The mount will have some backlash if a large wedged beamsplitter is used. Wedges work better when they are secured on their edges. Kinematic mirror holders (MHG-NL) are recommended for circular wedges. [Reference](#) C014

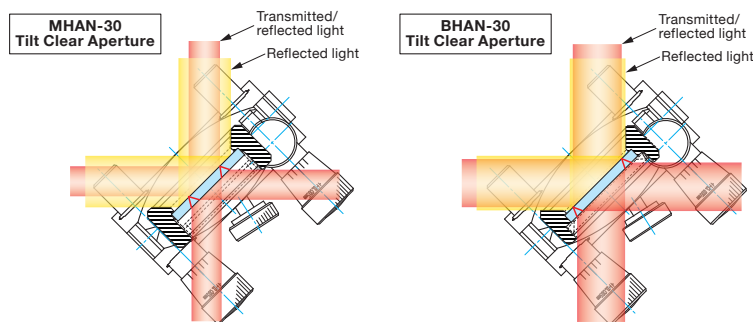
Screw Type									Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Fine Adjustment Range Tilt [°]	Fine Adjustment Range Rotation [°]	Fine Adjustment Resolution Tilt [°/rotation]	Fine Adjustment Resolution Rotation [°/rotation]	Weight [kg]	
BHAN-30S	UU	$\phi 30$	3 – 5	$\pm 4$	$\pm 4$	about 0.54	about 0.68	0.4	
BHAN-50S	UU	$\phi 50, \phi 50.8$	5 – 8	$\pm 4$	$\pm 4$	about 0.31	about 0.48	0.5	

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Precision Type												Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Fine Adjustment Range Tilt [°]	Fine Adjustment Range Rotation [°]	Fine Adjustment Resolution Tilt [°/rotation]	Fine Adjustment Resolution Rotation [°/rotation]	Ultra Fine Adjustment Resolution Tilt [°/rotation]	Ultra Fine Adjustment Resolution Rotation [°/rotation]	Ultra Fine Adjustment Indicator Conversion Tilt [°/DIV]	Ultra Fine Adjustment Indicator Conversion Rotation [°/DIV]	Weight [kg]
BHAN-30DM	UU	$\phi 30$	3 – 5	$\pm 4$	$\pm 4$	about 1.08	about 1.35	about 0.11	about 0.14	about 0.002	about 0.002	0.45
BHAN-50DM	UU	$\phi 50, \phi 50.8$	5 – 8	$\pm 3$	$\pm 4$	about 0.71	about 0.95	about 0.07	about 0.10	about 0.001	about 0.002	0.55

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

### Reflection and Transmission Clear Aperture at 45° Incidence

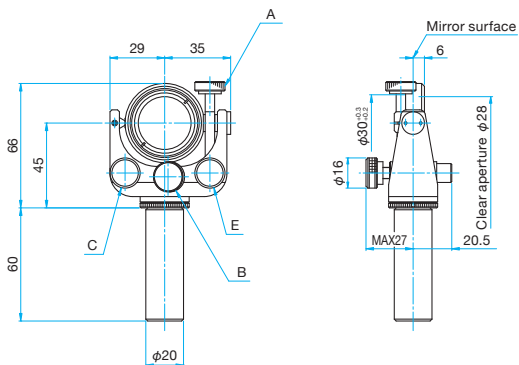
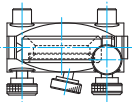


### Clear Aperture of Beamsplitter Holder

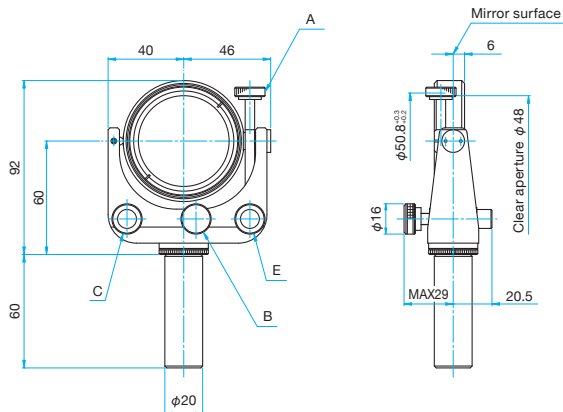
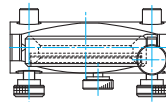
Part Number	Beamsplitter Thickness [mm]	Transmitted/Reflected Beam Clear Aperture	
		45° incidence [mm]	0° incidence [mm]
BHAN-30S	3	15.4	28
MHAN-30S	3	9.9	27
BHAN-50S	5	31.1	48
MHAN-50S	5	18.3	47
MHAN-20S	2	2.2	17
MHAN-25.4S	3	6.7	22
MHAN-40S	4	14.7	37
MHAN-60S	6	26.1	57
MHA-80S	8	34.5	76
MHA-100S	10	50.0	96
MHA-130S	13	69.3	126
MHA-150S	15	80.2	146

Outline Drawing

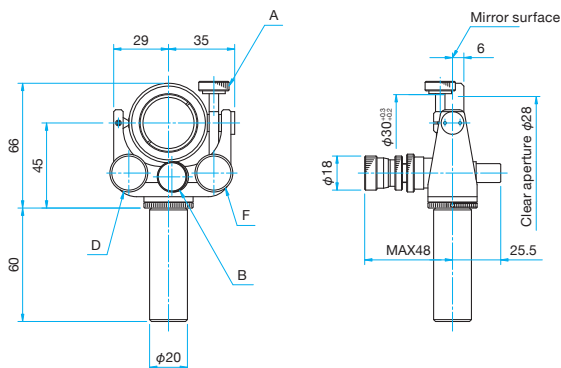
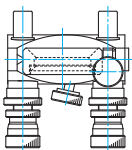
BHAN-30S M6 P1



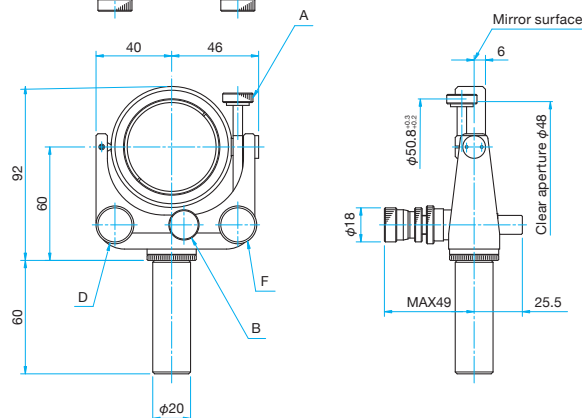
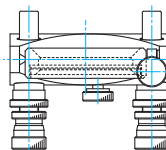
BHAN-50S M6 P1



BHAN-30DM M6 P1



BHAN-50DM M6 P1



A: Tilt coarse/fine movement switching clamp  
 B: Rotational coarse/fine movement switching clamp  
 C: Rotational fine movement screw

D: Rotational fine movement Differential micrometer head  
 E: Tilt fine movement screw  
 F: Tilt fine movement Differential micrometer head

- Application Systems
- Optics & Optical Coatings
- Opto-Mechanics
- Bases
- Manual Stages
- Actuators & Adjusters
- MotORIZED Stages
- Light Sources & Laser Safety
- Index
- Guide
- Mirrors
- Lenses
- Prisms
- Polarizers
- Lasers
- Beam Shaping Diffusers
- Filters
- Shutter
- Others
- Fiber

The MHL kinematic mirror holder incorporates a steel flexure spring for high rigidity and suppression of positional shifts due to shocks or vibrations.

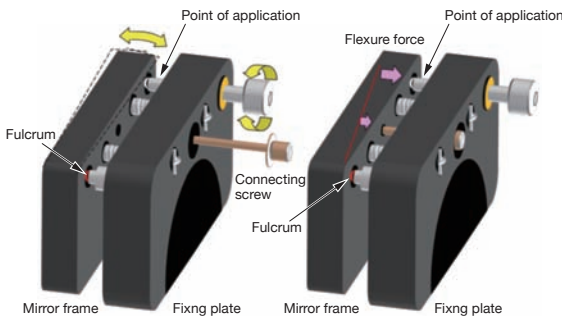
- Includes provisions for post mounting (M6 tapped hole with counterbore for M4 or 8-32 thread inserts).
- Baseplates (MHL-BP) available for mounting directly to breadboards.
- Mirror holder cell is removable and can be replaced by custom cells or adapters.
- Setscrew locking mechanism for preventing accidental changes after adjusting mirror angle.



**Mirror frame with locking mechanism**

① By loosening the connecting screw, angle can be adjusted.

② By tightening the connecting screw, flexure force will act on point of application. Then mirror frame and fixing plate can be fixed. \*Lock will be released when adjusting screw is moved.



**Guide**

- ▶ Manual adjustment screws can be replaced by motorized actuators. Please contact Sales Division for more information.
- ▶ Remove mirror cell using four Philips head screws on front of mount.
  - Unscrew retaining ring and remove Resin washer.
  - Insert mirror with reflective surface facing the flange.
  - Tight against Resin washer.
  - Insert mirror cell into body and reattach using four Philips head screws.

**Attention**

- ▶ MHL has different design from MHB. Please confirm the dimension by CAD drawings.
- ▶ Posts and base plates are not included. Please purchase separately.
- ▶ Depending on the angle of incidence, the beam will be shaded by the frame of mirror mount. For the usage of 45 degrees transmittance, Kinematic Mirror Holder (MHG) or Gimbal Beamsplitter Holders (BHAN) is available. [Reference](#) C014, [Reference](#) C026
- ▶ Rotation center of MHL doesn't match the center of mirror surface. If the rotation center is needed to match the center of mirror surface, Vertical Control Gimbal Beamsplitter Holders (BSHL-2) or Gimballed Mirror Mounts (MHAN) are available. [Reference](#) C022, [Reference](#) C024

Specifications								Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics		Number of Adjustment Axis	Adjustment Range		Resolution		Weight [kg]
	Diameter [mm]	Thickness [mm]		Tilt [°]	Rotation [°]	Tilt [°/Rotation]	Rotation [°/Rotation]	
MHL-25.4S	φ25, φ25.4	3 – 9	2	±2	±2	±0.3	±0.3	0.28
MHL-30S	φ30	3 – 9	2	±2	±2	±0.3	±0.3	0.29
MHL-50S	φ50	4 – 16	2	±3	±3	±0.2	±0.2	0.56
MHL-50.8S	φ50.8	4 – 16	2	±3	±3	±0.2	±0.2	0.56

Application Systems  
Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motorized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

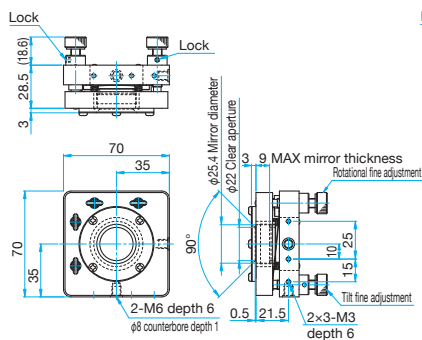
Fiber



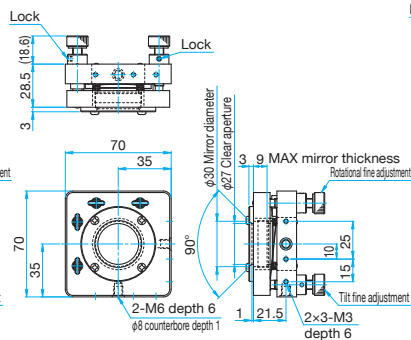


Outline Drawing

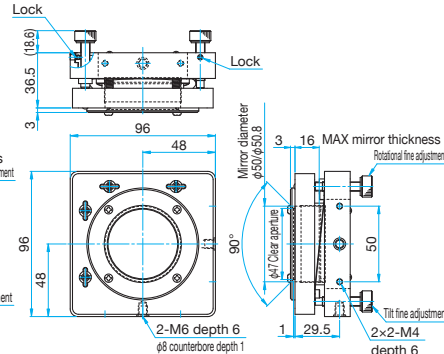
MHL-25.4S



MHL-30S



MHL-50S/50.8S



Option Base Plate for MHL | MHL-BP

RoHS Catalog Code W4146

Base plates for MHL series mirror holders to mount holder directly to baseplate or breadboards.



Example of use

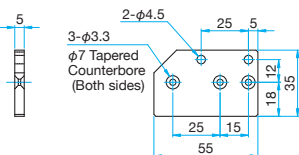
By reversing the base plates and also changing the mounting surface, it is possible to mount MHL in a symmetric orientation.



Outline Drawing

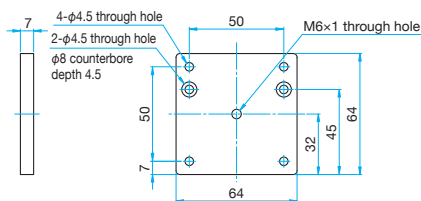
MHL-30BP

- Countersunk head screw M3x10...3 screws
- Pan head screw M4x10...2 screws



MHL-50BP

- Pan head screw M4x8...2 screws
- Pan head screw M4x12...4 screws



Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Compatible Holders	Weight [kg]
MHL-30BP	MHL-25.4S, MHL-30S, KLH-BE-M22H	0.03
MHL-50BP	MHL-50S, MHL-50.8S, KLH-BE-M34H LAH-4TS-32, LAH-4TS-35, LAH-4TS-45	0.08

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Top adjustment of these mirror mounts allow for devices to be placed in close proximity with each other.

The mount can be mounted so that the micrometers are facing upwards or horizontally with the correct baseplate.

- The optical axis of the mount does not change with vertical or horizontal mounting.
- Each baseplate will work with the mount vertically or horizontally.



### Guide

- ▶ Vertical control gimbal mirror and beamsplitter holders (BSHL) of which rotation center of fine adjustment matches the center of the mirror reflective surface are also available. [Reference](#) ▶ C022

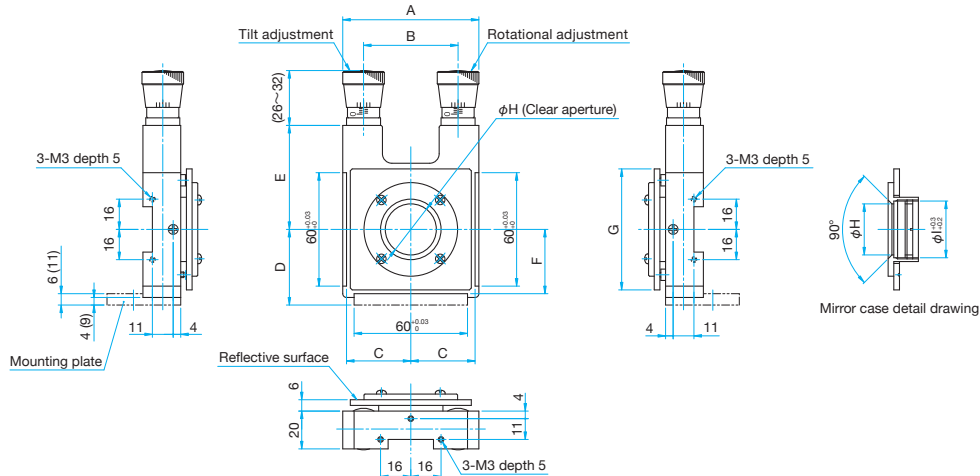
### Attention

- ▶ LMHBP plates are required to install the mount onto an optical table.
- ▶ Beamsplitters will have the transmitted beam partially blocked at 45 degrees incident. MHG or MHAN mounts are commended for beamsplitters. [Reference](#) ▶ C014, C024



## Outline Drawing

### LMHB



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	φH (mm)	φI (mm)
LMHB-25.4M	72	50	34	40	55	34	64	φ22	φ25.4
LMHB-30M	72	50	24	40	55	34	64	φ27	φ30
LMHB-50M	102	80	49	55	69	49	94	φ47	φ50
LMHB-50.8M	102	80	49	55	69	49	94	φ47	φ50.8
LMHB-60M	102	80	49	55	69	49	94	φ57	φ60

## Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Compatible Optics		Adjustment Range		Resolution		Weight [kg]
	Diameter [mm]	Thickness [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
LMHB-25.4M	φ25.4	3 – 9	±2.8	±2.8	about 0.006	about 0.006	0.44
LMHB-30M	φ30	3 – 9	±2.8	±2.8	about 0.006	about 0.006	0.44
LMHB-50M	φ50	2 – 16	±1.8	±1.8	about 0.004	about 0.004	0.75
LMHB-50.8M	φ50.8	2 – 16	±1.8	±1.8	about 0.004	about 0.004	0.75
LMHB-60M	φ60	4 – 17	±1.8	±1.8	about 0.004	about 0.004	0.75

# Option Plates for Topmike Vertical Control Mirror Holders | LMHBP

RoHS Catalog Code W4503

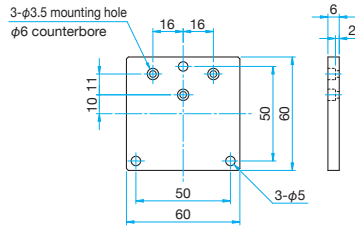
These plates are for mounting vertical control mirror holders (LMHB) on an optical breadboard, optical baseplates, or post.



## Outline Drawing

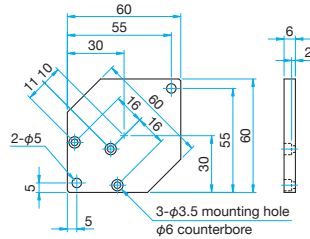
### LMHBP-0

☐ Pan head screw M3×6...3screws,  
Hexagon socket head cap screw M4×10...3 screws



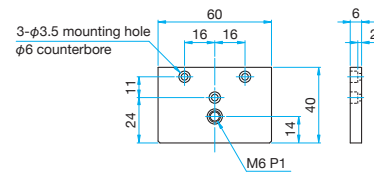
### LMHBP-45

☐ Pan head screw M3×6...3screws,  
Hexagon socket head cap screw M4×10...2 screws



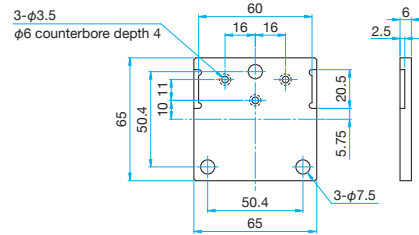
### LMHBP-M6

☐ Pan head screw M3×6...3 screws



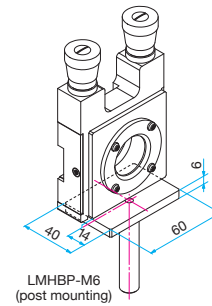
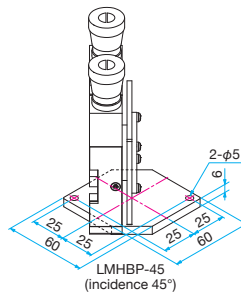
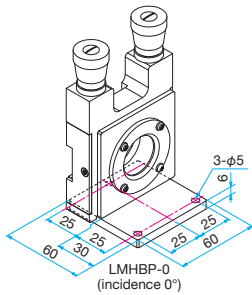
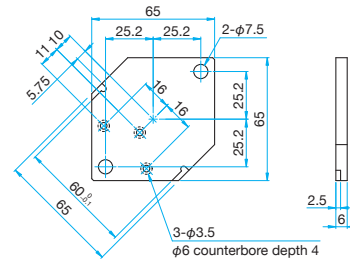
### LMHBP-0EE/0UU

☐ Pan head screw M3×6...3 screws, Hexagon socket head cap screw M6×12...3 screws (EE)  
☐ Pan head screw M3×6...3 screws, Hexagon socket head cap screw 1/4-20UNC×1/2...3 screws (UU)



### LMHBP-45EE/45UU

☐ Pan head screw M3×6...3 screws, Hexagon socket head cap screw M6×12...2 screws (EE)  
☐ Pan head screw M3×6...3 screws, Hexagon socket head cap screw 1/4-20UNC×1/2...2 screws (UU)



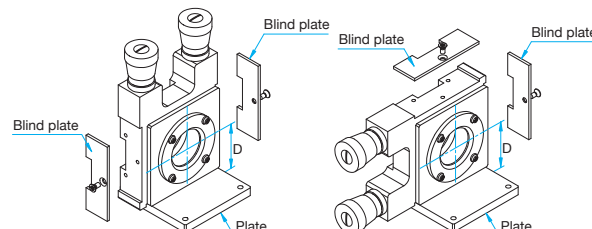
## Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number		Type	Weight [kg]
METRIC	INCH		
LMHBP-0	—	0°Incidence, M4 Screw	0.06
LMHBP-0EE	LMHBP-0UU	0°Incidence, M6 or Inch Screw	0.06
LMHBP-45	—	45°Incidence, M4 Screw	0.05
LMHBP-45EE	LMHBP-45UU	45°Incidence, M6 or Inch Screw	0.05
LMHBP-M6	—	Post of M6 threaded	0.04

## Method to Change the Control Direction

To change the control direction for adjusting a mirror to left or right, please change the direction of the LMHB and mount it on a plate. Change in the control direction does not change the optical axis height (D). Please remove the blindfold boards attached on the sides of the holder, and mount the plate on one side of the holder.



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Gimbal mirror holders designed for mirrors  $\phi 100\text{mm}$  to  $\phi 300\text{mm}$ .

These mirror holders can minimize optical path length difference, a problem in large mirrors, caused by mirror tilt adjustment.

- It is structured to fix the mirror with the three resin tip screws from the back, and it is designed to fix the mirror of various thickness.
- Differential micrometer heads with large knobs are used for fine angular adjustment.



**Guide**

- ▶ Custom style MHD mounts can be made to order. Contact our Sales Division for more information.

**Attention**

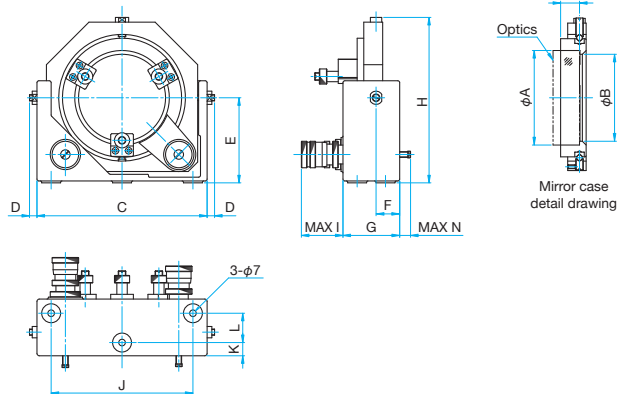
- ▶ Remove the retaining screw brackets to insert a mirror. Then screw the brackets back on.
- ▶ Pressing an optics hard with the resin tip screw of the mirror retainer may distort the mirror and worsen the surface accuracy.



**Outline Drawing**

**MHD**

- MHD-100: Hexagon socket head cap screw M6x10...3 screws
- MHD-150/200: Hexagon socket head cap screw M6x12...3 screws
- MHD-254: Hexagon socket head cap screw M6x14...3 screws
- MHD-300: Hexagon socket head cap screw M6x18...3 screws
- MHD-101.6/152.4/203.2: Hexagon socket head cap screw 1/4-20UNCx1/2...3 screws
- MHD-254-UU: Hexagon socket head cap screw 1/4-20UNCx1/2...3 screws
- Common Accessories: Washer for M6...3 Pieces, Special tool, long hexagon wrench...1 Piece



Part Number	$\phi A$ (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)	L (mm)	M (mm)	N (mm)
MHD-100	$\phi 100_{-0.4}^{+0.7}$	92	180	8	90	25	60	175	65	150	14	31	20	30
MHD-101.6	$\phi 101.6_{-0.4}^{+0.7}$	92	180	8	90	25	60	175	65	150	14	31	20	30
MHD-150	$\phi 150_{-0.4}^{+0.7}$	138	240	8	120	25	65	234	70	190	15	34	30	30
MHD-152.4	$\phi 152.4_{-0.4}^{+0.7}$	138	240	8	120	25	65	234	70	190	15	34	30	30
MHD-200	$\phi 200_{-0.4}^{+0.8}$	188	295	10	150	30	84	293	70	250	17	50	35	25
MHD-203.2	$\phi 203.2_{-0.4}^{+0.8}$	188	295	10	150	30	84	293	70	250	17	50	35	25
MHD-254	$\phi 254_{-0.4}^{+0.8}$	242	347	10	180	33	90	350	70	300	18	50	45	25
MHD-300	$\phi 300_{-0.6}^{+1.1}$	288	405	10	211	33	90	407	70	350	18	50	45	25

**Specifications**

Primary material: Aluminum  
Finish: Black (main unit) Black Anodized (Holder)

Part Number	Options specified*	Compatible Optics		Adjustment Range		Coarse Adjustment Resolution		Fine Adjustment Indicator Conversion		Weight [kg]
		Diameter [mm]	Thickness [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	Tilt [°/DIV]	Rotation [°/DIV]	
MHD-100	—	$\phi 100$	5 – 28	$\pm 5.7$	$\pm 5.7$	about 0.57	about 0.57	about 0.0008	about 0.0008	2.1
MHD-101.6	—	$\phi 101.6$	5 – 28	$\pm 5.7$	$\pm 5.7$	about 0.57	about 0.57	about 0.0008	about 0.0008	2.1
MHD-150	—	$\phi 150$	5 – 38	$\pm 4.3$	$\pm 4.3$	about 0.43	about 0.43	about 0.0006	about 0.0006	3.3
MHD-152.4	—	$\phi 152.4$	5 – 38	$\pm 4.3$	$\pm 4.3$	about 0.43	about 0.43	about 0.0006	about 0.0006	3.3
MHD-200	—	$\phi 200$	20 – 44	$\pm 3.4$	$\pm 3.4$	about 0.34	about 0.34	about 0.0005	about 0.0005	4.9
MHD-203.2	—	$\phi 203.2$	20 – 44	$\pm 3.4$	$\pm 3.4$	about 0.34	about 0.34	about 0.0005	about 0.0005	4.9
MHD-254	UU	$\phi 254$	40 – 54	$\pm 2.8$	$\pm 2.8$	about 0.28	about 0.28	about 0.0004	about 0.0004	6.2
MHD-300	—	$\phi 300$	40 – 54	$\pm 2.3$	$\pm 2.3$	about 0.23	about 0.23	about 0.0003	about 0.0003	11.0

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007



**Option** Plates for MHD Large Precision Gimbal Mirror Holders | MHD-P

**RoHS** Catalog Code **W4507**

Base plates for mounting large precision gimbal mirror holders (MHD) on optical breadboards or optical baseplates.

- Available in both inch and metric hole patterns.

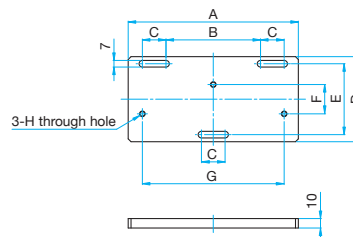


Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number		Compatible Holders
METRIC	INCH	
<b>MHD-100PEE</b>	<b>MHD-100PUU</b>	MHD-100, MHD-101.6
<b>MHD-150PEE</b>	<b>MHD-150PUU</b>	MHD-150, MHD-152.4
<b>MHD-200PEE</b>	<b>MHD-200PUU</b>	MHD-200, MHD-203.2
<b>MHD-254PEE</b>	<b>MHD-254PUU</b>	MHD-254

**Outline Drawing**

**MHD-100P/150P/200P/254P**

- Hexagon socket head cap screw M6x18...3 screws (EE)
- Hexagon socket head cap screw 1/4-20UNCx3/4...3 screws (UU)



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H
<b>MHD-100PEE</b>	180	100	25	90	75	31	150	M6 P1
<b>MHD-150PEE</b>	240	150	25	120	100	34	190	M6 P1
<b>MHD-200PEE</b>	295	200	25	120	100	50	250	M6 P1
<b>MHD-254PEE</b>	348	250	25	140	125	50	300	M6 P1
<b>MHD-100PUU</b>	180	101.6	25.4	90	76.2	31	150	1/4-20UNC
<b>MHD-150PUU</b>	240	152.4	25.4	90	76.2	34	190	1/4-20UNC
<b>MHD-200PUU</b>	295	203.2	25.4	120	101.6	50	250	1/4-20UNC
<b>MHD-254PUU</b>	348	254	25.4	140	127	50	300	1/4-20UNC

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

**Mirrors**

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

# Beam Steering Holders Precision Beam Steering Assembly

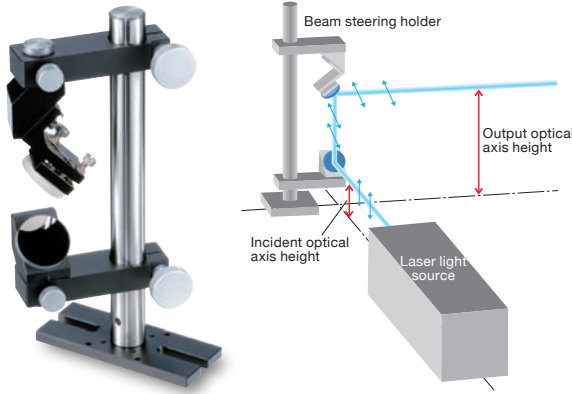
BSR  
BSRU

BSR

RoHS Catalog Code W4013

Beam steering mounts are designed to easily change the height and direction of laser beams.

- Length of the optional post (PO-20-\*\*\*\*) can be specified at the time of purchase. [▶ WEB Reference](#) [Catalog Code](#) W6053
- Mirrors  $\phi 25\text{mm}$  or less with a thickness of 5mm can be bonded to the holder.
- The clamps can be coarsely adjusted when rotated 50 mm about the center post.
- Adjustment screws are provided on the output side of the mirror to fine tune the direction of the output beam.



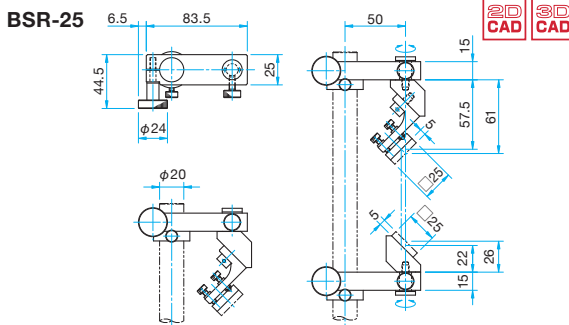
### Guide

- ▶ The photograph shows a typical configuration combining baseplate (BSP-40100), post (PO-20-200) and two mirrors (TFA-30C05-10).
- ▶ Adjustable mirror mounts in both locations are also available.

### Attention

- ▶ Depending on the direction reflected with the two mirrors, the polarization direction of the laser may change 90°. (See the illustration)
- ▶ RTV silicone adhesives are recommended to bond the optics.
- ▶ When you select this item, please note below points;
  - Incident optical axis height : higher than 58mm
  - Output optical axis height : higher than 20mm from the incident optical axis height
  - Length of posts : higher than 70mm from the output optical axis height

### Outline Drawing



Specifications			Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight* [kg]
BSR-25	$\square 25$ or less $\phi 25$ or less	3 – 5	0.4

\* Weight does not include the weight of posts and baseplates.

BSRU

RoHS Catalog Code W4014

Beam steering mounts are designed to easily and precisely change the height and direction of laser beams.

- The  $\phi 38.1\text{mm}$  dampened pole, and two holders are sold as a set.
- High stability is obtained from the damping properties of the poles and the rigidity of the holders.
- Use the optional mirror ( $\phi 30\text{mm}$ , thickness 5mm) by bonding it to the holder.
- The mirror holders can be coarsely adjusted 75 mm about the pole.
- Adjustment screws are provided on the output side of the holders to tilt the mirror, and angle adjustment of the output beam can be performed.



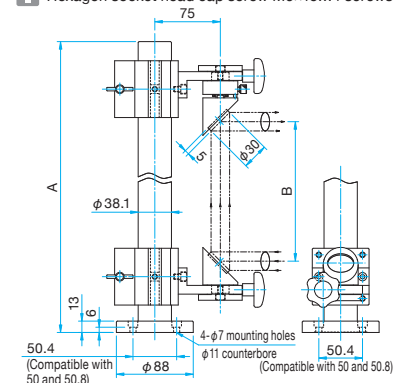
### Attention

- ▶ For best results, use on a laboratory or vibration isolating table.

### Outline Drawing

BSRU-177/355 [▶ 2D CAD](#) [▶ 3D CAD](#)

Hexagon socket head cap screw M6x15...4 screws



Specifications					
Strut material: Stainless steel, Finish: None Control part primary material: Aluminum, Finish: Black Anodized					
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	A [mm]	B [mm]	Weight [kg]
BSRU-177	$\phi 30$	5	177.8	33 – 40	3
BSRU-355	$\phi 30$	5	355.6	33 – 220	4.6

# Introducing Other Mirror Holders |

You will find more detail in the WEB Related Products and mirror holder that was not available in the catalog.

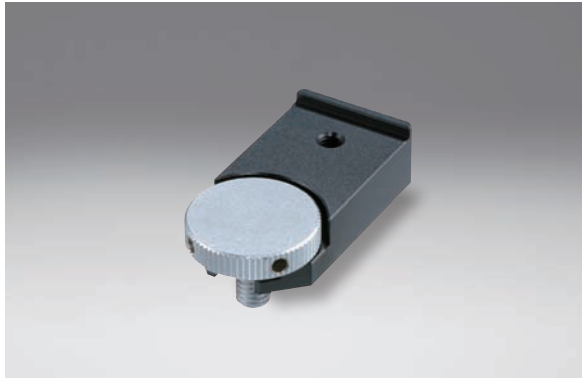
## Horizontal Prism Adapter | MHG-HPA

Catalog Code W4008



## Base Plates for Kinematic Mirror Holders | MHG-BP

Catalog Code W4123



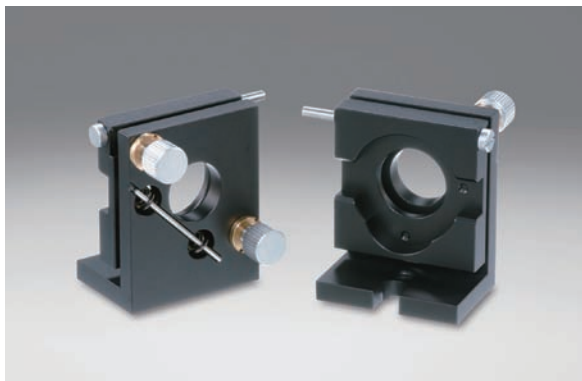
## Adaptor Mounts | MAD-30/MAD-50

Catalog Code W4109



## One-touch Kinematic Mirror Holder | MHF

Catalog Code W4502



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters




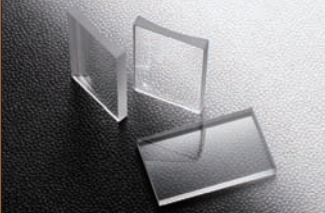







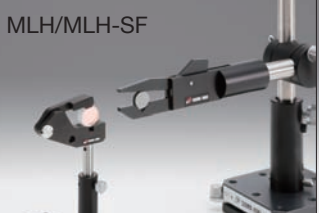

Shutter

Others

Fiber

# Lens Holders Selection Guide

Lens holders are available for a wide variety of lens sizes and shapes.

		Fixed Type	Movable Type
<b>Lenses</b>		 <p>LHF-S/LHF LHG</p>	 <p>LHCM/ALHN</p>
<b>Cylindrical lenses</b>		 <p>CHA</p>	
<b>Objective lenses</b>		 <p>LHO</p>	 <p>Two-axis pinholes/objective holders TAT + Adapters TAT-180A</p>
<b>Focusing lenses</b>		 <p>LHF-M LHF-UDL</p>	
<b>Small diameter lenses</b>		 <p>MLH/MLH-SF</p>	 <p>Fiber Optics Holders FOP + MLH-10ADP-2 + MLH-SF</p>

Lens holders that can hold a range of different size lenses are also available.



SLH



LHA

Lightweight and compact fixed lens mount specialized for lenses with thin edge.

- These holders are best for single convex lenses and a new design resulting in reduced prices.
- Available for lens diameters from 12.7mm to 50.8mm, with either inch or metric threaded mounting hole.
- Since the metal retaining ring is used, powder of the resin does not occur.



Guide

- ▶ Post is not included. Purchase posts (RO) and post holders (PST) separately.
  - ▶ [WEB Reference](#) [Catalog Code](#) W6052, [WEB Reference](#) [Catalog Code](#) W6039
  - ▶ Spacers are available (PS-SP) for use with a post stand (PST) to align the optical axis to inch height. [WEB Reference](#) [Catalog Code](#) W6042
  - ▶ By using an adapter nut (AND-M6), LHG-30/ LHG-50 / LHG-50.8 can convert its mounting hole pattern into M4 or 8-32UNC.
    - ▶ [WEB Reference](#) [Catalog Code](#) W6078

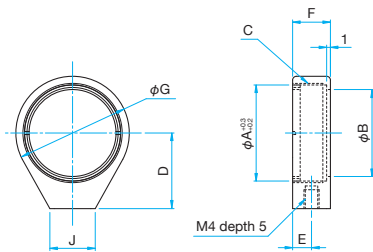
Attention

- ▶ Resin washer is not included. A delrin washer (DR) between the optic and the metal retaining ring is recommended if the optic is made of easily damaged material. [Reference](#) C041
- ▶ LHG-12.7, LHG-20, and LHG-25.4 can not be mounted on M6posts. Please use post holders (PST) or M4 posts (ROC).
  - ▶ [WEB Reference](#) [Catalog Code](#) W6039, [WEB Reference](#) [Catalog Code](#) W6052



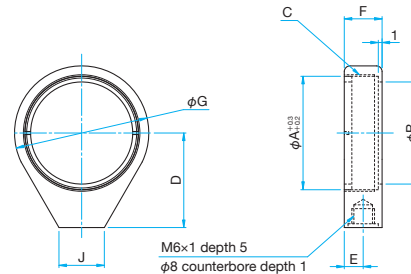
Outline Drawing

LHG-12.7/20/25.4



Part Number	φA (mm)	φB (mm)	C (mm)	D (mm)	E (mm)	F (mm)	φG (mm)	J (mm)
LHG-12.7	φ12.7	φ11.5	M13.55×0.75	12.7	3.5	7.5	φ17.5	7
LHG-20	φ20	φ17.5	M20.85×0.75	20	5	10	φ25	12
LHG-25.4	φ25.4	φ23	M26.25×0.75	20	5	10	φ30	12

LHG-30/50/50.8



Part Number	φA (mm)	φB (mm)	C (mm)	D (mm)	E (mm)	F (mm)	φG (mm)	J (mm)
LHG-30	φ30	φ27	M30.85×0.75	25	5	10	φ35.5	12
LHG-50	φ50	φ46	M50.85×0.75	35	6.5	12.5	φ55.8	20
LHG-50.8	φ50.8	φ47	M51.65×0.75	35	6.5	12.5	φ55.8	20

Specifications

Primary material: Aluminum  
Finish: Black anodized

Part Number	Compatible Optics		Clear Aperture φB [mm]	C	Optical Axis Height D [mm]	Weight [kg]
	Diameter φA [mm]	Thickness [mm]				
LHG-12.7	φ12.7	2 – 5.4	φ11.5	M13.55 P0.75	12.7	0.0032
LHG-20	φ20	2 – 7	φ17.5	M20.85 P0.75	20	0.0088
LHG-25.4	φ25.4, φ25	2 – 7	φ23	M26.25 P0.75	20	0.0085
LHG-30	φ30	2 – 7	φ27	M30.85 P0.75	25	0.012
LHG-50	φ50	2 – 9	φ46	M50.85 P0.75	35	0.0263
LHG-50.8	φ50.8	2 – 9	φ47	M51.65 P0.75	35	0.024



A lens holder that can be used in two ways, Metric (M6) and Inch (1/4-20 UNC). It is convenient to use in an experiment where metrics and inch parts are mixed.

- To set the optical axis height from the baseplate to round figures such as 55mm or 60mm, replace posts with post stands (PST-\*\*). (W6039)
- This item can firmly hold thin single lenses as well as thick lenses such as achromatic lenses.
- Best suited when the holders are in close proximity and when setting up an optical system such as folded beam go through the right next to the lens holder because the outer diameter of the holder is small.
- Resin retaining ring fix lenses securely without scratching them. (Resin ring is not attached.)



Guide

- ▶ Post length can be changed by specifying the post length when you place an order. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ Adapter nuts (AND) are available to convert M6 female threads to M4 or 8-32UNC female threads. [WEB Reference](#) [Catalog Code](#) W6078

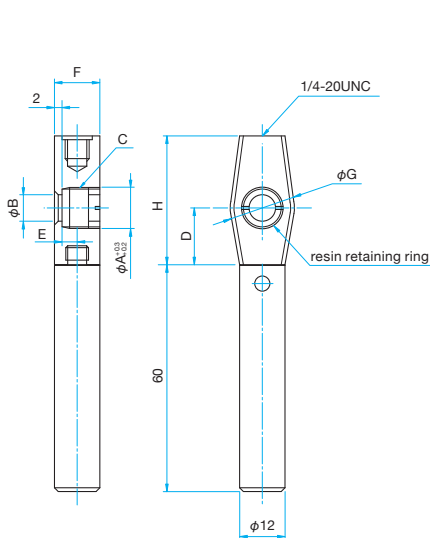
Attention

- ▶ Aluminum retaining rings are suitable for clean rooms or high-power laser applications (RR-\*\*). [Reference](#) C041

Outline Drawing

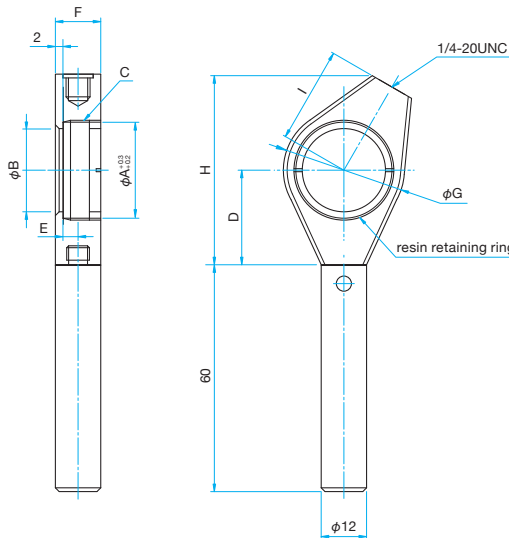
LHF-10S/12.7S/15S/20S

M6 P1



LHF-25S/25.4S/30S/30AS/40S/40AS/50S/50AS/50.8S/60AS

M6 P1



Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter φA [mm]	Thickness t [mm]	Clear Aperture φB [mm]	C	Optical Axis Height D [mm]	E [mm]	F [mm]	φG [mm]	H [mm]	I [mm]	Weight [kg]
LHF-10S	N	φ10	2 - 7	φ7	M10.85 P0.75	15	4	12	φ17	34.05	-	0.06
LHF-12.7S	N	φ12.7	2 - 7	φ10	M13.55 P0.75	15	4	12	φ17	34.05	-	0.06
LHF-15S	N	φ15	2 - 10	φ12	M15.85 P0.75	20	5	15	φ20	39.05	-	0.07
LHF-20S	N	φ20	2 - 13	φ17	M20.85 P0.75	20	7	18	φ27	39.05	-	0.08
LHF-25S	N	φ25	2 - 11	φ22	M25.85 P0.75	25	6	16	φ32	50	25.4	0.09
LHF-25.4S	N	φ25.4	2 - 7	φ22	M26.25 P0.75	25	4	12	φ32	50	25.4	0.08
LHF-30S	N	φ30	2 - 7	φ26	M30.85 P0.75	25	4	12	φ36	50	25.4	0.09
LHF-30AS	N	φ30	3 - 12	φ26	M30.85 P0.75	25	7	18	φ36	50	25.4	0.11
LHF-40S	N	φ40	2 - 13	φ37	M40.85 P0.75	30	7	18	φ46	66	38.1	0.11
LHF-40AS	N	φ40	3 - 15	φ37	M40.85 P0.75	30	8	20	φ46	66	38.1	0.12
LHF-50S	N	φ50	3 - 13	φ46	M50.85 P0.75	35	7	18	φ57	71	38.1	0.11
LHF-50AS	N	φ50	3 - 19	φ46	M50.85 P0.75	35	10	24	φ57	71	38.1	0.13
LHF-50.8S	N	φ50.8	2 - 13	φ47	M51.65 P0.75	35	7	18	φ58	71	38.1	0.11
LHF-60AS	N	φ60	3 - 16	φ56	M60.85 P0.75	40	13.5	27	φ67	76	38.1	0.13

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

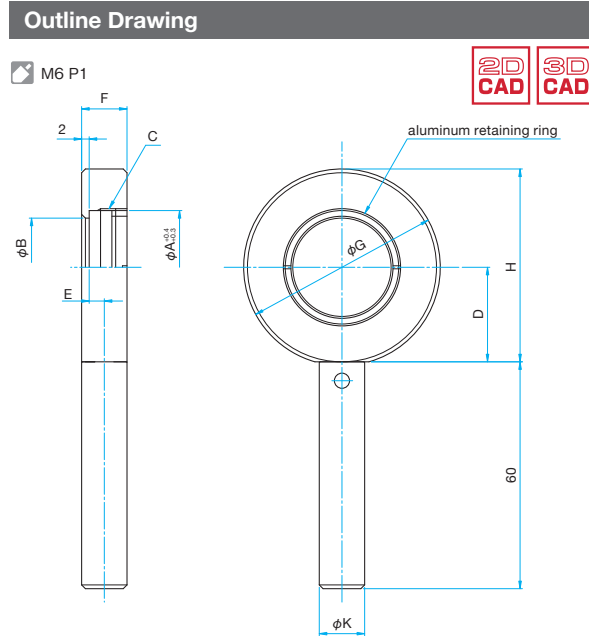
Shutter

Others

Fiber

It can firmly fix from a thin single lens to a thick acromatic lens.  
 Since the outer diameter of the holder is large, it has an effect on blocking stray light.

- For large diameter lenses over 80mm, “A type” holders are available for thick lenses .



Guide

- ▶ Post length can be changed by specifying the post length when you place an order. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ Thin frame lens holders (LHF-S). [Reference](#) C038
- ▶ Lens holder with rotation center adjustment (LHCM) is also available. [Reference](#) C040

Standards											Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter $\phi A$ [mm]	Thickness [mm]	Clear Aperture $\phi B$ [mm]	C	Optical Axis Height D [mm]	E [mm]	F [mm]	$\phi G$ [mm]	$\phi K$ [mm]	Weight [kg]
LHF-10	EE/UU	$\phi 10$	3 – 6	$\phi 7$	M10.85 P0.75	15	4	12	$\phi 32$	$\phi 12$	0.07
LHF-15	EE/UU	$\phi 15$	3 – 10	$\phi 12$	M15.85 P0.75	20	5	16	$\phi 42$	$\phi 12$	0.07
LHF-20	EE/UU	$\phi 20$	3 – 12	$\phi 17$	M20.85 P0.75	20	7	18	$\phi 42$	$\phi 12$	0.09
LHF-25	EE/UU	$\phi 25$	3 – 10	$\phi 21$	M26.25 P0.75	25	6	16	$\phi 52$	$\phi 12$	0.1
LHF-25.4	EE/UU	$\phi 25.4$	3 – 6	$\phi 22$	M26.25 P0.75	25	4	12	$\phi 52$	$\phi 12$	0.09
LHF-30	EE/UU	$\phi 30$	3 – 6	$\phi 26$	M30.85 P0.75	25	4	12	$\phi 52$	$\phi 12$	0.09
LHF-30A	EE/UU	$\phi 30$	3 – 12	$\phi 26$	M30.85 P0.75	25	7	18	$\phi 52$	$\phi 12$	0.11
LHF-38.1	EE/UU	$\phi 38.1$	3 – 12	$\phi 34$	M38.95 P0.75	30	7	18	$\phi 62$	$\phi 12$	0.13
LHF-40	EE/UU	$\phi 40$	3 – 12	$\phi 36$	M40.85 P0.75	30	7	18	$\phi 62$	$\phi 12$	0.13
LHF-40A	EE/UU	$\phi 40$	4 – 14	$\phi 36$	M40.85 P0.75	30	8	20	$\phi 62$	$\phi 12$	0.14
LHF-50	EE/UU	$\phi 50$	3 – 12	$\phi 45$	M50.85 P0.75	35	7	18	$\phi 72$	$\phi 12$	0.14
LHF-50A	EE/UU	$\phi 50$	4 – 18	$\phi 45$	M50.85 P0.75	35	10	24	$\phi 72$	$\phi 12$	0.17
LHF-50.8	EE/UU	$\phi 50.8$	3 – 12	$\phi 46$	M51.65 P0.75	35	7	18	$\phi 72$	$\phi 12$	0.14
LHF-52	EE/UU	$\phi 52$	3 – 15	$\phi 47$	M52.85 P0.75	40	8.5	21	$\phi 82$	$\phi 12$	0.18
LHF-60	EE/UU	$\phi 60$	3 – 15	$\phi 55$	M60.85 P0.75	40	8.5	21	$\phi 82$	$\phi 12$	0.18
LHF-60A	EE/UU	$\phi 60$	4 – 21	$\phi 55$	M60.85 P0.75	40	11.5	27	$\phi 82$	$\phi 12$	0.21

\* For specifying options, please refer to “Conversion of Posts, Post Holders and Pedestal Bases of Holders”. [Reference](#) C007

Large Lens											Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter $\phi A$ [mm]	Thickness [mm]	Clear Aperture $\phi B$ [mm]	C	Optical Axis Height D [mm]	E [mm]	F [mm]	$\phi G$ [mm]	$\phi K$ [mm]	Weight [kg]
LHF-80	EE/UU	$\phi 80$	3 – 15	$\phi 73$	M81.1 P1	50	8.5	21	$\phi 102$	$\phi 20$	0.31
LHF-80A	N	$\phi 80.4$	4 – 23	$\phi 73$	M81.1 P1	50	12.5	29	$\phi 102$	$\phi 20$	0.37
LHF-100	EE/UU	$\phi 100$	4 – 18	$\phi 93$	M101.1 P1	60	11	26	$\phi 122$	$\phi 20$	0.39
LHF-100A	N	$\phi 100$	4 – 22	$\phi 93$	M101.1 P1	60	13	30	$\phi 122$	$\phi 20$	0.42
LHF-130	N	$\phi 130$	4 – 18	$\phi 122$	M131.1 P1	75	11	26	$\phi 152$	$\phi 20$	0.45
LHF-150	N	$\phi 150$	5 – 20	$\phi 142$	M151.1 P1	85	12	28	$\phi 171$	$\phi 20$	0.62

\* For specifying options, please refer to “Conversion of Posts, Post Holders and Pedestal Bases of Holders”. [Reference](#) C007

# Two Axis Lens Holders | LHCM

Two-axis lens holders with compact centering mechanism.

The compact centering adjustment mechanism makes a low optical axis easy to accommodate. Can be used for adjusting the focus point of a laser beam or the direction of a collimated beam.

- For Lens diameters from 10mm to 50.8mm.
- Deep enough to hold thick achromatic lenses.
- The thin frame allows optics to be placed close to the front and back of the lens.



### Guide

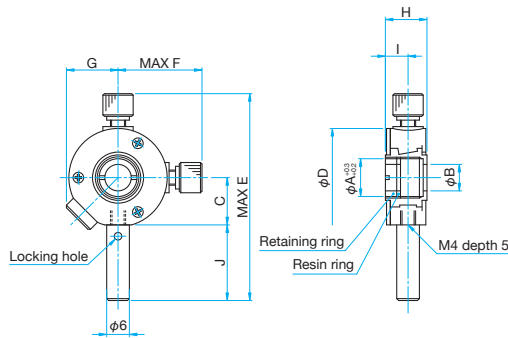
- ▶ Can be mounted on a dovetail stage or a micrometer adjustment stage to allow focus adjustment. Contact our Sales Division for recommendations regarding appropriate stages.
- ▶ Three-axis lens holders (ALHN-3RO) with high resolution lens centering adjustment and lockable adjusters are also available. [Reference](#) C042
- ▶ Five-axis lens holders (ALHN-5RO) with additional tip and tilt adjustments are also available. [Reference](#) C042
- ▶ Post length can be changed by specifying the post length when you place an order. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ The adjustment mechanism may not work properly when something heavy other than a lens is mounted.

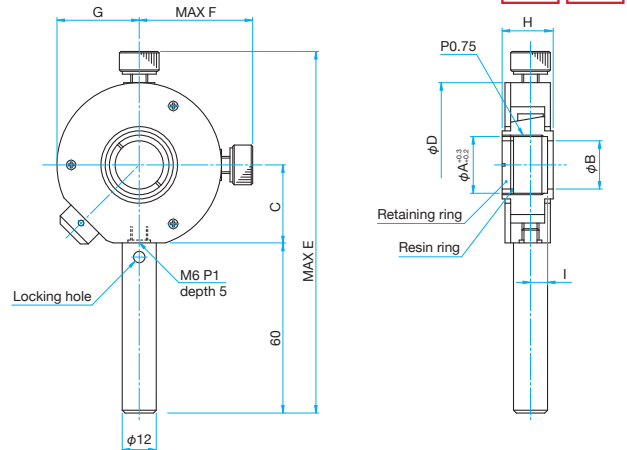
### Outline Drawing

LHCM-10/12.7/15 M4 P0.7



Part Number	φD (mm)	MAX E (mm)	MAX F (mm)	G (mm)	H (mm)	I (mm)	J (mm)
LHCM-10	φ26	57	24	14	11	6	20
LHCM-12.7	φ41	83	32	22	13	7	30
LHCM-15	φ41	83	32	22	13	7	30

LHCM-20/25/25.4/30/40/50/50.8 M6 P1



Part Number	φD (mm)	MAX E (mm)	MAX F (mm)	G (mm)	H (mm)	I (mm)
LHCM-20	φ58	130	42	29	18	6
LHCM-25	φ64	137	46	32	18	6
LHCM-25.4	φ64	137	46	32	18	6
LHCM-30	φ64	137	46	32	18	6
LHCM-40	φ78	150	52	39	20	7
LHCM-50	φ88	160	57	44	20	7
LHCM-50.8	φ88	160	57	44	20	7

### Specifications

Part Number	Options specified*	Compatible Optics Diameter φA [mm]	Compatible Optics Thickness t [mm]	Clear Aperture φB [mm]	Optical Axis Height C [mm]	Centering Adjustment Range [mm]	Weight [kg]
LHCM-10	N	φ10	1 – 6	φ7	12.5	φ1	0.03
LHCM-12.7	N	φ12.7	1 – 8	φ10	20	φ2	0.05
LHCM-15	N	φ15	1 – 8	φ12	20	φ2	0.05
LHCM-20	N/EE/UU	φ20	2 – 12	φ17	27.5	φ3	0.27
LHCM-25	N/EE/UU	φ25	2 – 12	φ22	30	φ3	0.28
LHCM-25.4	N/EE/UU	φ25.4	2 – 12	φ22	30	φ3	0.28
LHCM-30	N/EE/UU	φ30	2 – 12	φ27	30	φ3	0.28
LHCM-40	N/EE/UU	φ40	2 – 14	φ36	37.5	φ3	0.31
LHCM-50	N/EE/UU	φ50	2 – 14	φ46	42.5	φ3	0.36
LHCM-50.8	N/EE/UU	φ50.8	2 – 14	φ46	42.5	φ3	0.36

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

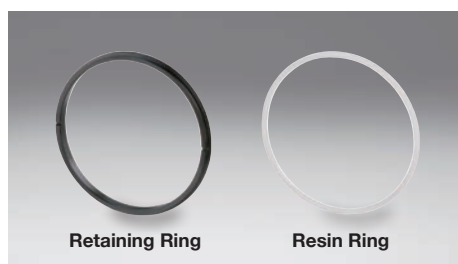
# Retaining Rings/Resin Washers Retaining Ring Spanner Wrench

RR/DR  
NRS

RR/DR

RoHS Catalog Code W4017

Accessories for mirror holders and lens holders.



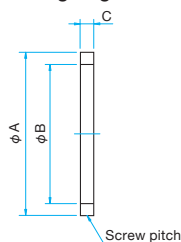
Retaining Ring

Resin Ring

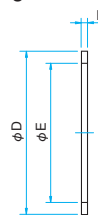
- Retaining rings and Resin rings are sold separately in sets of five.
- The retaining ring spanner wrench (NRS) is used to tighten the retaining rings.

## Outline Drawing

Retaining ring



Resin ring



### Guide

▶ Please contact our Sales Division regarding tapered retaining rings for beamsplitter holders.

### Attention

▶ We cannot guarantee our retaining rings will fit into non Opto-Sigma threaded holes.

Retaining Ring					Primary material: Aluminum Finish: Black Anodized
Part Number	Quantity [Pieces]	Outer Diameter φA [mm]	Inner Diameter φB [mm]	Thickness C [mm]	Screw Pitch [mm]
RR-10-5	5	φ10.85	φ7	3	0.75
RR-12.7-5	5	φ13.55	φ9.7	3	0.75
RR-15-5	5	φ15.85	φ12	3	0.75
RR-20-5	5	φ20.85	φ17	3	0.75
RR-25-5	5	φ25.85	φ22	3	0.75
RR-25.4-5	5	φ26.25	φ22	3	0.75
RR-30-5	5	φ30.85	φ27	3	0.75
RR-38.1-5	5	φ38.95	φ35	3	0.75
RR-40-5	5	φ40.85	φ37	3	0.75
RR-50-5	5	φ50.85	φ46	3	0.75
RR-50.8-5	5	φ51.65	φ47	3	0.75
RR-52-5	5	φ52.85	φ48	3	0.75
RR-60-5	5	φ60.85	φ56	3	0.75
RR-80-5	5	φ81.1	φ75	3.5	1
RR-100-5	5	φ101.1	φ95	4	1
RR-130-5	5	φ131.1	φ124	4	1
RR-150-5	5	φ151.1	φ144	4	1

Resin Ring					Primary material: POM Finish: None
Part Number	Quantity [Pieces]	Outer Diameter φD [mm]	Inner Diameter φE [mm]	Thickness F [mm]	
DR-10-5	5	φ10	φ7	1	
DR-12.7-5	5	φ12.7	φ9.7	1	
DR-15-5	5	φ15	φ12	1	
DR-20-5	5	φ20	φ17	1	
DR-25-5	5	φ25	φ22	1	
DR-25.4-5	5	φ25.4	φ22	1	
DR-30-5	5	φ30	φ27	1	
DR-38.1-5	5	φ38.1	φ35	1	
DR-40-5	5	φ40	φ37	1	
DR-50-5	5	φ50	φ46	1	
DR-50.8-5	5	φ50.8	φ47	1	
DR-52-5	5	φ52	φ48	1	
DR-60-5	5	φ60	φ56	1	
DR-80-5	5	φ80	φ75	1.5	
DR-100-5	5	φ100	φ95	1.5	
DR-130-5	5	φ130	φ124	2	
DR-150-5	5	φ150	φ144	2	

NRS

RoHS Catalog Code W4018

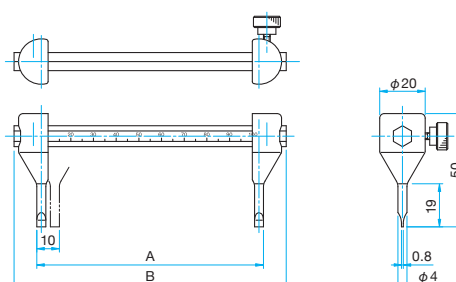
Spanner wrenches can be used on retaining rings of various diameters.  
Optics can be securely fixed in holders without scratching the optics or retaining rings.



- The scale on the wrench correlates to the outer diameter of the lens to be fixed.

## Outline Drawing

NRS



Specifications				Primary material Shaft: Stainless, Claw: Steel Finish Shaft: None, Claw: Chrome plating
Part Number	Size Used [mm]	A [mm]	B [mm]	
NRS-50	For φ10 – φ50	50	70	
NRS-100	For φ10 – φ100	100	120	
NRS-150	For φ10 – φ150	150	170	

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Multi-axis lens holders are a convenient way to align a lens on an optical axis. Can be used in adjusting the collimating lens for laser applications.

- Five-axis adjustment holder (ALHN-5RO) can adjust lenses for wavefront and intensity distribution.
- To focus a lens, rotate the lens tube with the lever while moving the tube forwards or backwards.
- The centering mechanism is fitted with a nut clamp, and the focus adjustment is fitted with a screw clamp.
- Single/doublets up to 28 mm thick can be used.

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



Guide

- ▶ Multi-axis lens holders (ALHN-3/ALHN-5) on a baseplate are available. [Reference](#) C043
- ▶ X-Y lens holders (LHCM) without a focus adjustment function are also available. [Reference](#) C040
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

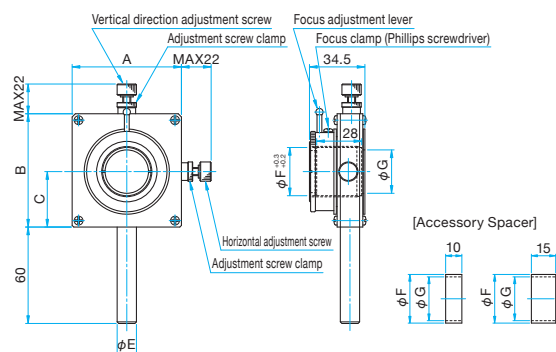
Attention

- ▶ Two spacers are included with these mounts to allow positioning of the lens within the lens tube.
- ▶ When the focal length of lens is long, adjustment does not work effectively because the focus adjustment range is too narrow. In such a case, please use the dovetail stages or optical benches.

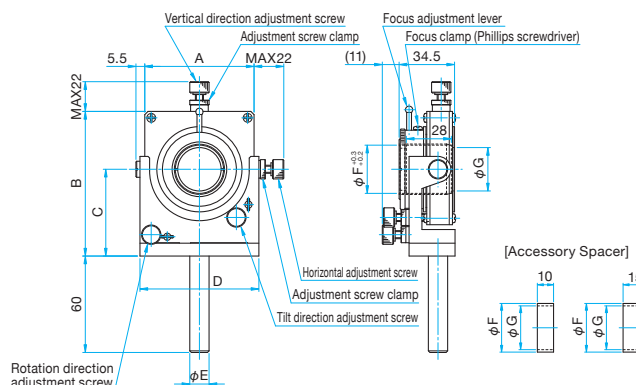


Outline Drawing

ALHN-3RO M6 P1



ALHN-5RO M6 P1



Part Number	A (mm)	B (mm)	C (mm)	φE (mm)	φF (mm)	φG (mm)
ALHN-25-3RO	68	70.5	34.5	φ12	φ25	φ22
ALHN-25.4-3RO	68	70.5	34.5	φ12	φ25.4	φ22
ALHN-30-3RO	68	70.5	34.5	φ12	φ30	φ27
ALHN-50-3RO	88	91	45	φ20	φ50	φ46
ALHN-50.8-3RO	88	91	45	φ20	φ50.8	φ46

Part Number	A (mm)	B (mm)	C (mm)	D (mm)	φE (mm)	φF (mm)	φG (mm)
ALHN-25-5RO	68	90	54	74	φ12	φ25	φ22
ALHN-25.4-5RO	68	90	54	74	φ12	φ25.4	φ22
ALHN-30-5RO	68	90	54	74	φ12	φ30	φ27
ALHN-50-5RO	88	112.7	66.7	94	φ20	φ50	φ46
ALHN-50.8-5RO	88	112.7	66.7	94	φ20	φ50.8	φ46

Three-axis Post Type

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Centering Adjustment Range [mm]	Centering Adjustment Resolution [mm/rotation]	Focus Adjustment Range [mm]	Weight [kg]
ALHN-25-3RO	N/EE/UU	φ25	0 - 28	φ6	0.25	±3	0.31
ALHN-25.4-3RO	N/EE/UU	φ25.4	0 - 28	φ6	0.25	±3	0.31
ALHN-30-3RO	N/EE/UU	φ30	0 - 28	φ6	0.25	±3	0.31
ALHN-50-3RO	N/EE/UU	φ50	0 - 28	φ6	0.25	±3	0.5
ALHN-50.8-3RO	N/EE/UU	φ50.8	0 - 28	φ6	0.25	±3	0.5

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Five-axis Post Type

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Centering Adjustment Range [mm]	Centering Adjustment Resolution [mm/rotation]	Tilt Range [°]	Tilt Resolution [°/rotation]	Focus Adjustment Range [mm]	Weight [kg]
ALHN-25-5RO	N/EE/UU	φ25	0 - 28	φ6	0.25	±4	about 0.5	±3	0.46
ALHN-25.4-5RO	N/EE/UU	φ25.4	0 - 28	φ6	0.25	±4	about 0.5	±3	0.46
ALHN-30-5RO	N/EE/UU	φ30	0 - 28	φ6	0.25	±4	about 0.5	±3	0.46
ALHN-50-5RO	N/EE/UU	φ50	0 - 28	φ6	0.25	±3	about 0.36	±3	0.72
ALHN-50.8-5RO	N/EE/UU	φ50.8	0 - 28	φ6	0.25	±3	about 0.36	±3	0.72

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007



Multi-axis lens holders are a convenient way to align a lens to the optical axis. These plate-type holders mount securely and provide a stable low optical axis.

- Five-axis adjustment type (ALHN-5) allows lens tilt adjustment for applications where achieving the best possible focusing is required.
- Lens focus adjustment is done by rotating the lens tube with the lever, moving the position of the lens forward or backward.
- The XY centering adjustments include locking nuts and the focus adjustment includes a locking screw.
- In addition to single lenses, thick lenses or combined lens tubes up to thickness 28mm can be mounted directly in the holder.



### Guide

- ▶ Two axis lens holders (LHCM) without focus adjustment function are also available. [Reference](#) ▶ C040
- ▶ Two Axis lens holders (LHCM) for lenses  $\phi 20\text{mm}$  or less are also available.
- ▶ Please contact our Sales Division if you require a specific optical axis height.

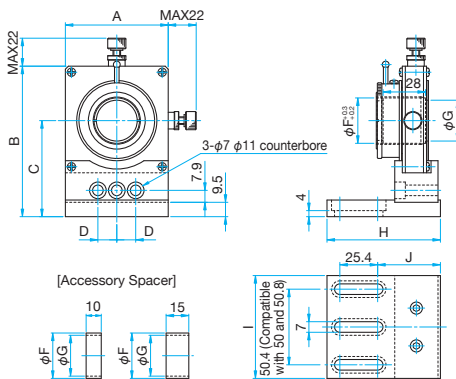
### Attention

- ▶ Two spacers are included with these mounts to allow positioning of the lens within the lens tube.
- ▶ When the focal length of lens is long, adjustment does not work effectively because the focus adjustment range is too narrow. In such a case, please use the dovetail stages or optical benches.

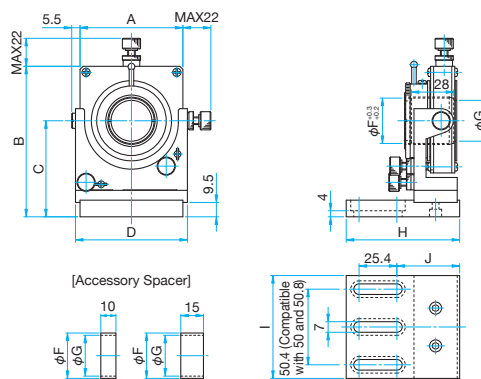


### Outline Drawing

**ALHN-3** Hexagonal socket head cap screw M6×10...3 screws



**ALHN-5** Hexagonal socket head cap screw M6×10...3 screws



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	$\phi F$ (mm)	$\phi G$ (mm)	H (mm)	I (mm)	J (mm)
ALHN-25-3	68	99.5	63.5	12.5	$\phi 25$	$\phi 22$	75	68	41.3
ALHN-25.4-3	68	99.5	63.5	12.5	$\phi 25.4$	$\phi 22$	75	68	41.3
ALHN-30-3	68	99.5	63.5	12.5	$\phi 30$	$\phi 27$	75	68	41.3
ALHN-50-3	88	122.2	76.2	25	$\phi 50$	$\phi 46$	95	75	59.8
ALHN-50.8-3	88	122.2	76.2	25	$\phi 50.8$	$\phi 46$	95	75	59.8

Part Number	A (mm)	B (mm)	C (mm)	D (mm)	$\phi F$ (mm)	$\phi G$ (mm)	H (mm)	I (mm)	J (mm)
ALHN-25-5	68	99.5	63.5	74	$\phi 25$	$\phi 22$	75	68	41.3
ALHN-25.4-5	68	99.5	63.5	74	$\phi 25.4$	$\phi 22$	75	68	41.3
ALHN-30-5	68	99.5	63.5	74	$\phi 30$	$\phi 27$	75	68	41.3
ALHN-50-5	88	122.2	76.2	94	$\phi 50$	$\phi 46$	95	75	59.8
ALHN-50.8-5	88	122.2	76.2	94	$\phi 50.8$	$\phi 46$	95	75	59.8

Three-axis Plate Type						Primary material: Aluminum Finish: Black Anodized	
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Centering Adjustment Range [mm]	Centering Adjustment Resolution [mm/rotation]	Focus Adjustment Range [mm]	Weight [kg]	
ALHN-25-3	$\phi 25$	0 – 28	$\phi 6$	0.25	$\pm 3$	0.49	
ALHN-25.4-3	$\phi 25.4$	0 – 28	$\phi 6$	0.25	$\pm 3$	0.49	
ALHN-30-3	$\phi 30$	0 – 28	$\phi 6$	0.25	$\pm 3$	0.49	
ALHN-50-3	$\phi 50$	0 – 28	$\phi 6$	0.25	$\pm 3$	0.78	
ALHN-50.8-3	$\phi 50.8$	0 – 28	$\phi 6$	0.25	$\pm 3$	0.78	

Five-axis Plate Type									Primary material: Aluminum Finish: Black Anodized	
Part Number	Compatible Optics		Centering Adjustment		Tilt Range		Tilt Resolution		Focus Adjustment Range [mm]	Weight [kg]
	Diameter [mm]	Thickness [mm]	Range [mm]	Resolution [mm/rotation]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]		
ALHN-25-5	$\phi 25$	0 – 28	$\phi 6$	0.25	$\pm 4$	$\pm 4$	about 0.5	about 0.5	$\pm 3$	0.5
ALHN-25.4-5	$\phi 25.4$	0 – 28	$\phi 6$	0.25	$\pm 4$	$\pm 4$	about 0.5	about 0.5	$\pm 3$	0.5
ALHN-30-5	$\phi 30$	0 – 28	$\phi 6$	0.25	$\pm 4$	$\pm 4$	about 0.5	about 0.5	$\pm 3$	0.5
ALHN-50-5	$\phi 50$	0 – 28	$\phi 6$	0.25	$\pm 3$	$\pm 3$	about 0.36	about 0.36	$\pm 3$	0.75
ALHN-50.8-5	$\phi 50.8$	0 – 28	$\phi 6$	0.25	$\pm 3$	$\pm 3$	about 0.36	about 0.36	$\pm 3$	0.75

# Mini Lens Holders V-Groove Lens Holders

TLH  
LHA

## TLH

RoHS Catalog Code W4101

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



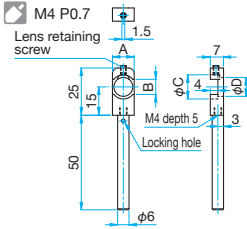
These fixed lens holders are designed to be narrower than the diameter of lenses they hold.

- Intended for compact optical layouts where the lenses need to be placed close to each other in parallel.
- Place the plano side of a lens against the holder.
- The simple setscrew mounting method makes replacement of lenses easy.
- Can secure plano concave lenses with edge thickness of 1mm.

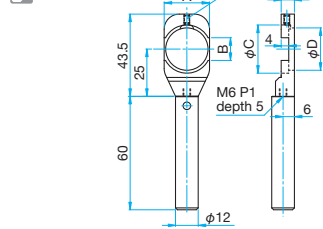


### Outline Drawing

TLH-5-DRi  
TLH-10-DRi  
TLH-12.7-DRi



TLH-25.4-DRi  
TLH-30-DRi



### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ Over tightening the lens retaining screws can bend these holders. Tighten screw lightly only until the lens does not move.
- ▶ Lenses may come loose when these holders are used in environments subject to vibration or transported while lenses are mounted.
- ▶ Cannot hold biconvex lenses which have short focal length.

Specifications							Primary material: Aluminum Finish: Black Anodized	
Part Number	Options specified*	Compatible Optics Diameter $\phi C$ [mm]	Clear Aperture $\phi D$ [mm]	Height optical axis [mm]	Compatible Optics Thickness [mm]	A [mm]	B [mm]	Weight [kg]
TLH-5-DRi	N	$\phi 5$	$\phi 3$	15	1 - 3	4.5	4	0.013
TLH-10-DRi	N	$\phi 10$	$\phi 7$	15	1 - 4	8.5	7	0.013
TLH-12.7-DRi	N	$\phi 12.7$	$\phi 10$	15	1 - 4	11.5	8	0.014
TLH-25.4-DRi	N	$\phi 25.4$	$\phi 22.4$	25	1 - 4	24	12	0.065
TLH-30-DRi	N	$\phi 30$	$\phi 27$	25	1 - 4	28.5	15	0.065

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

## LHA

RoHS Catalog Code W4020

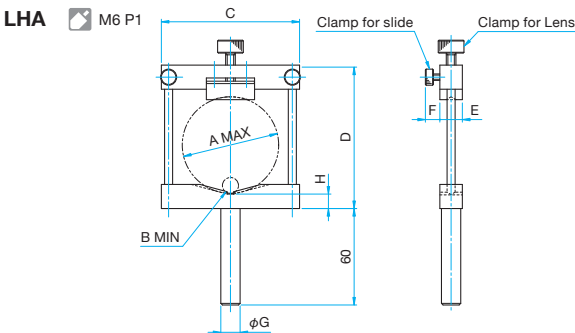


Designed to hold lenses of various sizes.  
Appropriate When non standard diameter lenses are used.

- The v-groove can hold other cylindrical components like light sources.
- The clamp and v-groove secure the lenses.



### Specifications



Part Number	$\phi A$ (mm)	$\phi B$ (mm)	C (mm)	D (mm)	E (mm)	F (mm)	$\phi G$ (mm)	H (mm)
LHA-25	$\phi 25.4$	$\phi 5$	40	45	12	(8)	$\phi 12$	7.5
LHA-60	$\phi 60$	$\phi 10$	86	88	14	(9)	$\phi 12$	9
LHA-100	$\phi 101.6$	$\phi 20$	134	135	19	(13)	$\phi 20$	8
LHA-150	$\phi 150$	$\phi 30$	200	195	19	(14)	$\phi 20$	14

### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ Make sure to tighten the slide clamps along the two poles before tightening the lens clamp.

Specifications				Primary material: Aluminum Finish: Black Anodized	
Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]	
LHA-25	N/EE/UU	$\phi 5 - \phi 25.4$	1 - 2.5	0.1	
LHA-60	N/EE/UU	$\phi 10 - \phi 60$	1 - 4.7	0.2	
LHA-100	N/EE/UU	$\phi 20 - \phi 101.6$	1 - 7	0.5	
LHA-150	N	$\phi 30 - \phi 150$	1 - 7	0.8	

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Designed to hold lenses with a range of diameters at a consistent center height. Best used in applications where different diameter lenses are swapped out often.

- The three jaws of the holder will clamp edge of the lenses with spring pressure.
- Squeezing the levers towards each other will open the three jaws. Releasing the levers will close the jaws.
- The position of the three jaws is locked by tightening the clamp.



### Guide

- ▶ Post length can be changed. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts.
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

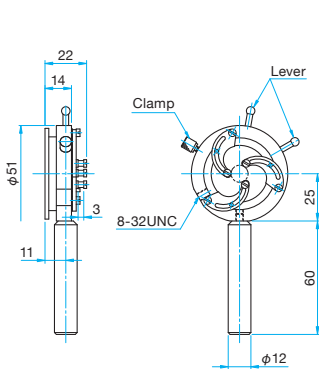
### Attention

- ▶ Thin lenses may tilt and fall out from the holders when they are held with excessive spring pressure.
- ▶ ALHN lens holders are recommended when precise lens manipulation is required. [Reference](#) C042

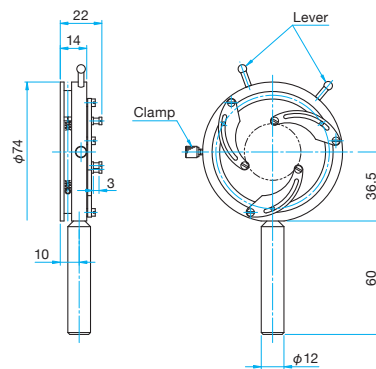


### Outline Drawing

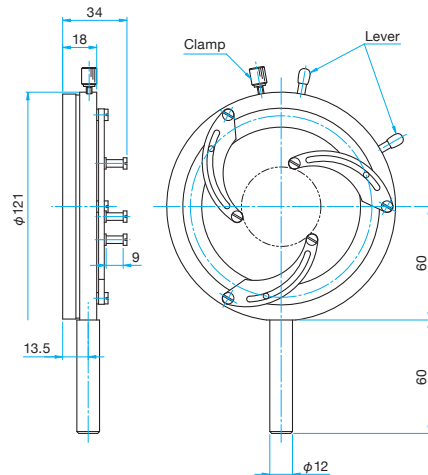
SLH-25 M4 P0.7 with taper



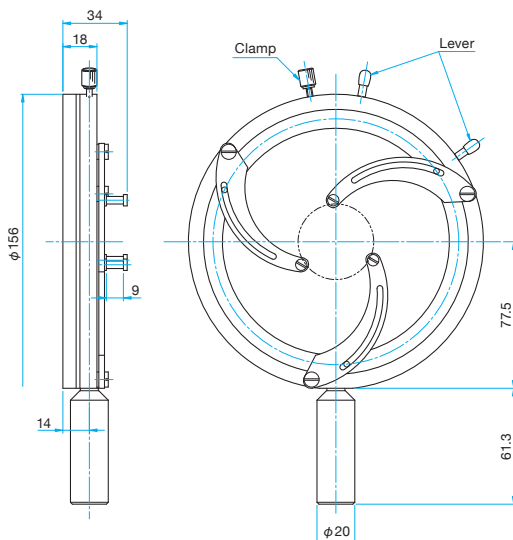
SLH-50 M4 P0.7 with taper



SLH-80 M6 P1



SLH-120 M6 P1 with taper



Specifications				Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]
SLH-25	EE/UU	φ5 - φ25	1 - 3	0.10
SLH-50	—	φ30 - φ50	1 - 3	0.15
SLH-80	EE/UU	φ25 - φ80	1 - 9	0.35
SLH-120	—	φ40 - φ110	1 - 9	0.70

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

# Small Lens Claws | MLH

RoHS Catalog Code W4021

Mounts designed to hold small diameter lenses of  $\phi 15\text{mm}$  or less.

- The spring-loaded arm holds the lenses.
- MLH-10 allows small lenses to be held close to each other.
- MLH-10 can be installed with cross clamps (CCHN). [▶ WEB Reference](#) **Catalog Code** W6054



### Guide

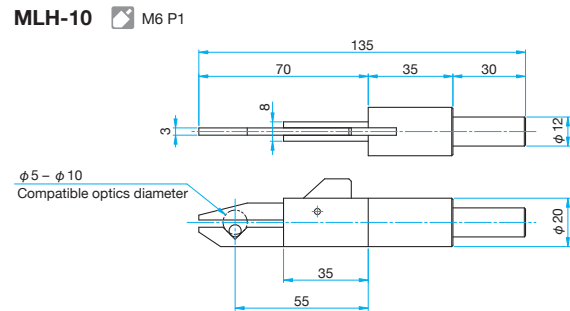
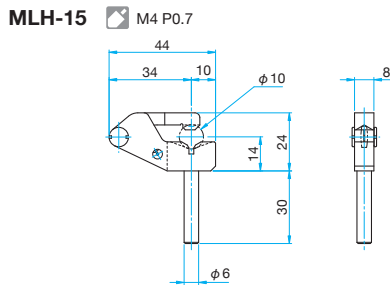
- ▶ Micro Lens Claws (MLH-SF) are available for micro lenses with diameter of  $\phi 5\text{mm}$  or less. [Reference](#) C047
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ Different diameters affect the center point of the lens in relation to the optical axis..
- ▶ To mount a lens in MLH-10: place the lens on a flat surface and gently release the clamp to secure the lens.



## Outline Drawing



Specifications			Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]
<b>MLH-15</b>	$\phi 5 - \phi 15$	1 - 6	0.02

Specifications			Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics Diameter [mm]	Weight [kg]	
<b>MLH-10</b>	$\phi 5 - \phi 10$	0.15	

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

## Holders for micro lenses of $\phi 3\text{mm}$ or less.

Designed to hold small optics at the end of a long and thin arm to allow other optical elements to be placed close to the element being held. Typical uses include collimator lenses for fiber or laser diodes.

- A light spring force holds the optic securely in place.
- Optics can be mounted easily and securely by clamping an optic in the groove at the end of the arm.
- The MLH-10ADP-2 is an adapter to mount the MLH-SF on a fiber holder (FOP), enabling adjustment of position and tilt. [Reference](#) C076
- The MLH-10ADP-2 can also mount on a  $\square 40\text{mm}$  XYZ stage (TSD-405L), enabling precision position adjustment of optics. [WEB Reference](#) [Catalog Code](#) W7078



**Guide**

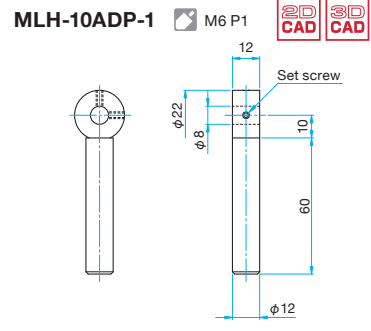
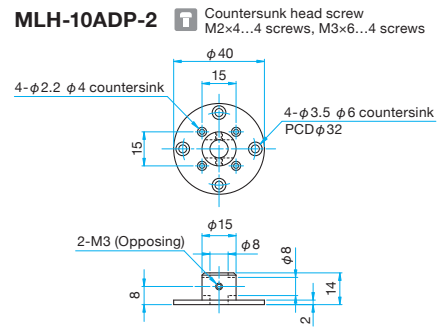
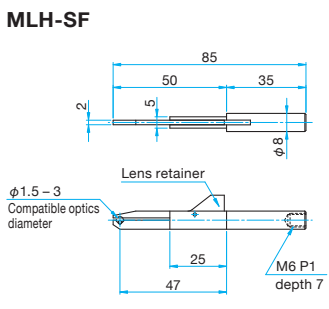
- ▶ A tapped M6 screw hole on the end of the MLH-SF allows the holder to be directly mounted on a post.
- ▶ Because there is no step on the arm, lens of thickness 2mm or higher can be fixed.

**Attention**

- ▶ Because the tip of the arm has a V groove, rectangular optics can be mounted tilted. Either fix at a position away from the V groove, or fix with the optic glued to the flat plane on the top of the arm.
- ▶ The MLH-10ADP-2 cannot be mounted on two-axis pinholes/objective holders (TAT) other than the FOP.
- ▶ When the MLH-10ADP-2 is mounted on an FOP, it is necessary to remove the FOP adapter. Delivery of MLH-10ADP-2 and MLH-SF assembled on the FOP is available. Contact our International Sales Division for more information.

Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics Diameter [mm]	Weight [kg]
MLH-SF	$\phi 1.5 - \phi 3$	0.02
MLH-10ADP-1	—	0.06
MLH-10ADP-2	—	0.01

## Outline Drawing

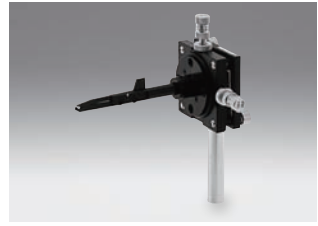


## Example of Use

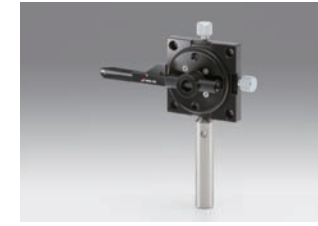
**Fixed Micro Lens Claws**  
Assembled with the MLH-SF and MLH-10ADP-1  
When fixing microscopic lenses simply



**Micro Lens Claws with four-axis adjustment mechanism**  
Example of mounting the MLH-SF and MLH-10ADP-2 assembly on a fiber holder (FOP-2DM)  
Configured for up/down left/right position adjustment of devices such as microscopic prisms, and tilt adjustment of device surfaces



**Micro Lens Claws with two-axis adjustment mechanism**  
Example of mounting the MLH-SF and MLH-10ADP-2 assembly on a fiber holder (FOP-1)  
Configuration enables optical axis adjustment of microscopic lenses



**Micro Lens Claws with three-axis adjustment mechanism**  
Example of mounting the MLH-SF and MLH-10ADP-2 assembly on a XYZ Axis Translation Stages (TSD-405SL)



Refer to the fiber holder (FOP). [Reference](#) C076

Refer to the fiber holder (FOP). [Reference](#) C076

Refer to the XYZ Axis Translation Stages (TSD-405SL). [WEB Reference](#) [Catalog Code](#) W7078



## Mounts for rectangular optics.

- The space saving sliding clamp allows optics to be placed in close proximity. The top and bottom of the lens mounting area is made of cork to prevent lenses from slipping.



### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

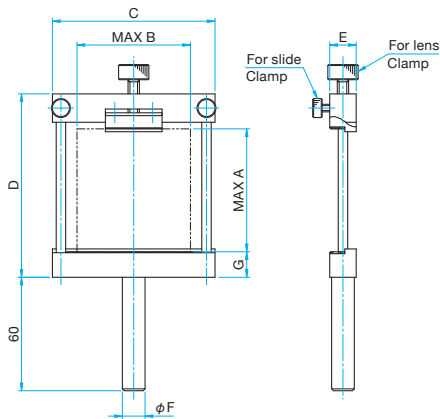
### Attention

- ▶ Make sure to tighten the slide clamps along the two poles before tightening the lens clamp.
- ▶ Not recommended for round lenses. Use LHA [Reference](#) C044

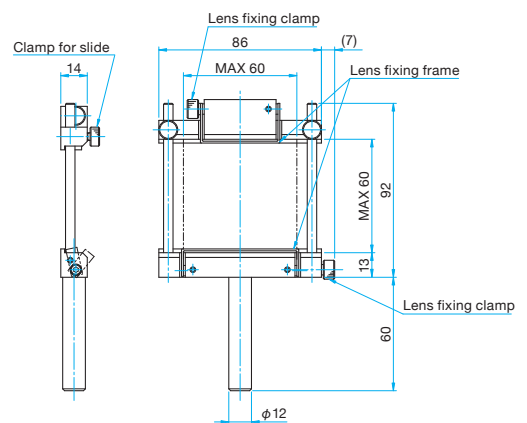


## Outline Drawing

CHA M6 P1



CHA-60F M6 P1



Normal Type										Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Thickness [mm]	Compatible Optics Dimensions		C [mm]	D [mm]	E [mm]	φF [mm]	G [mm]	Weight [kg]
			MAX A [mm]	MAX B [mm]						
CHA-25	N/EE/UU	MAX6.5	30	25	40	45	12	φ12	9	0.1
CHA-60	N/EE/UU	MAX7.5	65	60	86	93	14	φ12	13.5	0.2
CHA-130	—	MAX7.5	55	130	160	82	14	φ20	12.5	0.5

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Flexible Type						Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Thickness [mm]	Compatible Optics Dimensions		Weight [kg]	
			MAX (vertical) [mm]	MAX (horizontal) [mm]		
CHA-60F	N/UU	MAX9.5	60	60	0.19	

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Used to mount multi-element focusing lenses in optical experiments.

- Female threads fit a wide range of OptoSigma threads. See the compatibility table for appropriate combinations.



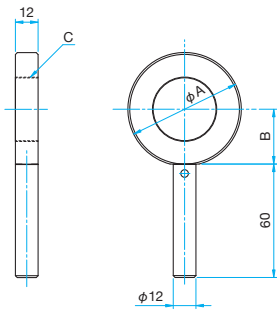
### Guide

- The focusing lenses family is ATL/NADL, etc.
  - WEB Reference Catalog Code W3078
- For cover glass and cover glass holders, refer to Protective Windows / Protective Window Holders.
  - WEB Reference Catalog Code W3081
- Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

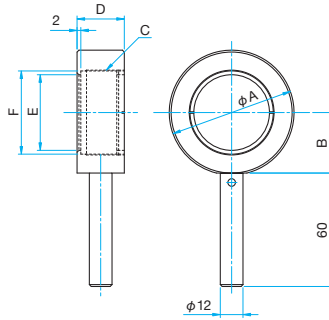


### Outline Drawing

LHF-M M6 P1



LHF-UDL M6 P1



### Example of Use



### Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Options specified*	φA [mm]	B [mm]	C	D [mm]	E [mm]	F [mm]	Weight [kg]
LHF-M29-25	N/UU	φ56	27	M29 P0.75	—	—	—	0.11
LHF-M34-30	N/UU	φ60	29	M34 P0.75	—	—	—	0.11
LHF-M50.9-50	N/UU	φ70	34	M50.9 P0.75	—	—	—	0.11
LHF-UDL-30	N/UU	φ56	27	M34.85 P0.75	23	30	34	0.15
LHF-UDL-40	N/UU	φ66	32	M44.85 P0.75	25	40	44	0.18
LHF-UDL-50	N/UU	φ76	37	M54.85 P0.75	28	50	54	0.22

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

### Compatibility Table for Focusing Lenses

Focusing Lens Part Number	Catalog Code	Cover Glass	Cover Glass Holder	Compatible Holders
<b>Visible Spectrum Achromats</b>				
ATL-30-40PY2	WEB Reference Catalog Code W3078	PG-33	PGH-36	LHF-M34-30
ATL-30-50PY2				
ATL-30-60PY2				
NADL-30-80PY2				
NADL-30-100PY2				
NADL-30-150PY2				
<b>YAG Laser Focusing Lenses</b>				
NYTL-25-20PY1	WEB Reference Catalog Code W3079	PG-21	PGH-24	LHF-M29-25
NYTL-30-30PY1		PG-27	PGH-30	LHF-M34-30
NYTL-30-40PY1				
NYTL-30-50PY1				
NYDL-30-60PY1				
NYDL-30-80PY1		PG-33	PGH-36	LHF-M34-30
NYDL-30-100PY1				
NYDL-30-150PY1				
<b>Focusing Lenses for Fiber Laser</b>				
HFTLSQ-15-20PF1	WEB Reference Catalog Code W3080	PG-21	PGH-24	Special adapter + LHF-M29-25
HFTLSQ-20-30PF1		PG-27	PGH-30	Special adapter + LHF-M34-30
HFTLSQ-30-40PF1				
HFTLSQ-30-50PF1				
HFTLSQ-30-60PF1				
HFTLSQ-30-80PF1		PG-33	PGH-36	LHF-M34-30
HFTLSQ-30-100PF1				
HFDLSQ-30-150PF1				
HFTLSQ-50-100PF1				
HFDLSQ-50-200PF1				
HFDLSQ-50-300PF1				
HFDLSQ-50-200PF1				
HFDLSQ-50-300PF1				
<b>LHF-M50.9-50</b>				

Focusing Lens Part Number	Catalog Code	Cover Glass	Cover Glass Holder	Compatible Holders
<b>Excimer Laser Focusing Lenses</b>				
ETL-30-40P	WEB Reference Catalog Code W3082	PG-33	PGH-36	LHF-M34-30
ETL-30-50P				
ETL-30-60P				
ETL-30-80P				
NEDL-30-100P				
NEDL-30-150P				
NEDL-30-200P				LHF-M50.9-50
EDL-50-100P				
EDL-50-150P				
EDL-50-200P				
EDL-50-250P				
EDL-50-300P				
<b>Ultraviolet Achromats</b>				
UDL-30-50P	WEB Reference Catalog Code W3083	PG-33	PGH-36	LHF-UDL-30
UDL-30-80P				
UDL-30-100P				
NUDL-30-150P				
NUDL-30-200P				
UDL-40-80P				
NUDL-40-100P				LHF-UDL-40
NUDL-40-150P				
NUDL-40-200P				
NUDL-40-250P				
UDL-50-100P				
NUDL-50-150P				
NUDL-50-200P				LHF-UDL-50
NUDL-50-250P				
NUDL-50-300P				

# Objective Lens Holders | LHO

RoHS

Catalog Code W4024

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Used to objective lenses in optical experiments.

- Female threads fit a wide range of OptoSigma threads. See the compatibility table for appropriate combinations.
- There are two styles of objective holder mounts. Both have M20.32 threads. One is the standard type (LHO-20.32) that allows placement of targets in close proximity to lenses, and the other is the hooded type (LHO-20.32A) that blocks stray light.
- The images from the objectives will be stable due to the rigidity of the mount.



### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ Adapters, TAT-180A, adjust the center of objective lenses. A two-axis pinhole/objective holder (TAT) is also available.

Reference C062

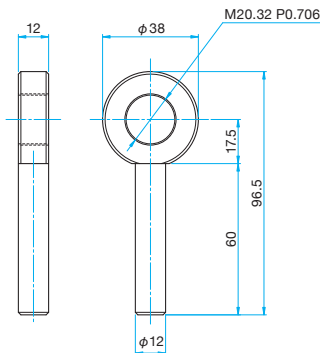
### Attention

- ▶ Thread compatibility with non OptoSigma threads is not guaranteed.
- ▶ A translation stage can be used under the objective holder for fine focus adjustment.

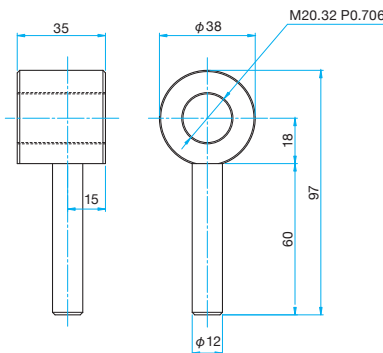


### Outline Drawing

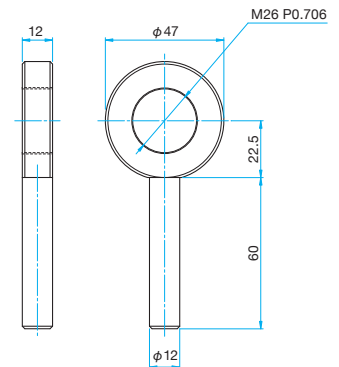
LHO-20.32 M6 P1



LHO-20.32A M6 P1



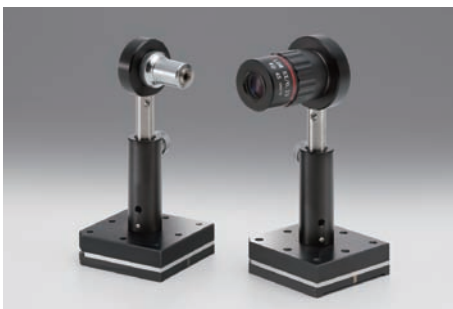
LHO-26 M6 P1



Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Weight [kg]
LHO-20.32	N/EE/UU	0.08
LHO-20.32A	N/UU	0.13
LHO-26	N/UU	0.09

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders".  
Reference C007

### Example of Use



Designed to hold cubed optics or right angle prisms.  
All four polished surfaces of a cubed prism can be used with these mounts.

- The KKD series has tip, tilt and yaw rotation for fine adjustment of reflected beams.
- The clamp screw will not rotate the prism when clamping.



**Guide**

- ▶  $\theta\alpha\beta$  axis stages without prism retainer and strut (KKD-C) are also available. [WEB Reference](#) [Catalog Code](#) W7111
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

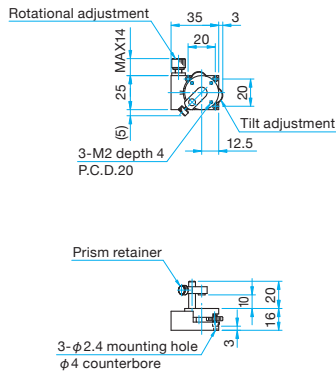
**Attention**

- ▶ KKD-25PH and PLH-25 might not exert sufficient pressure to retain a prism, and there is a risk that optics might fall out. Use after making sure that the prism is fixed.
- ▶ After adjusting the KKD series, if the prism retainer is lifted, the prism table sometimes moves, throwing off adjustment of tilt and rotation. Use without touching the prism retainer after adjustment.

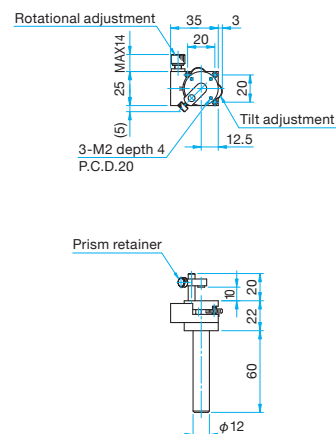


**Outline Drawing**

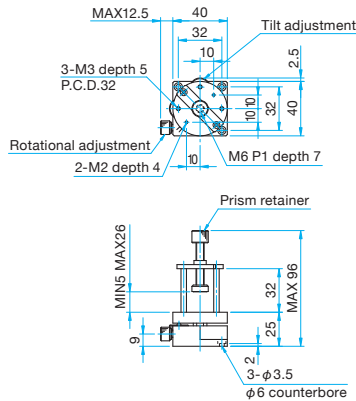
**KKD-25PH** Pan head screw M2x6...3 screws



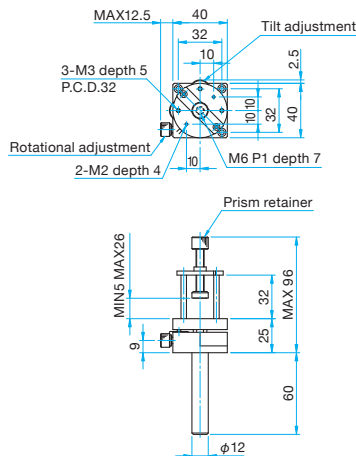
**KKD-25PHRO** M6 P1



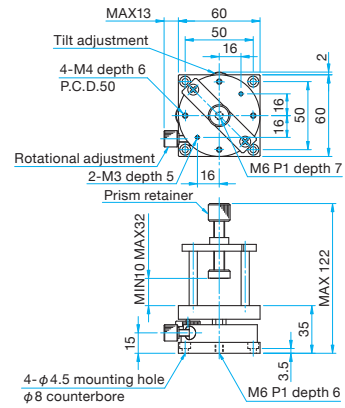
**KKD-40PH** Pan head screw M3x6...3 screws



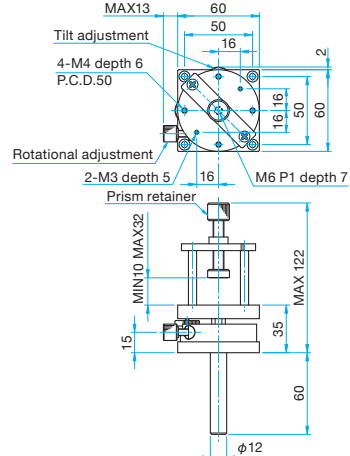
**KKD-40PHRO** M4 P0.7



**KKD-60PH** Pan head screw M4x8...4 screws



**KKD-60PHRO** M6 P1



**With Tilt and Rotational Adjustment**

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Compatible Optics Dimensions [mm]	Adjustment Range Rotation [°]	Adjustment Range Tilt [°]	Resolution		Weight [kg]
				Rotation [°/rotation]	Tilt [°/rotation]	
KKD-25PH	□5 - □10	±3	±3	about 0.9	about 2.2	0.05
KKD-25PHRO	□5 - □10	±3	±3	about 0.9	about 2.2	0.11
KKD-40PH	□5 - □26	±3	±3	about 2.0	about 1.5	0.20
KKD-40PHRO	□5 - □26	±3	±3	about 2.0	about 1.5	0.25
KKD-60PH	□10 - □32	±3	±3	about 1.7	about 1.0	0.40
KKD-60PHRO	□10 - □32	±3	±3	about 1.7	about 1.0	0.45

# Prism Holders | KKD/PLH/PAD

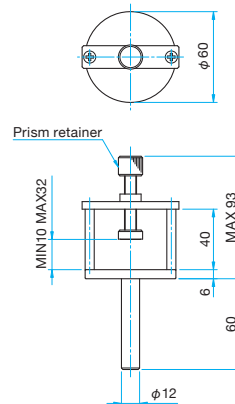
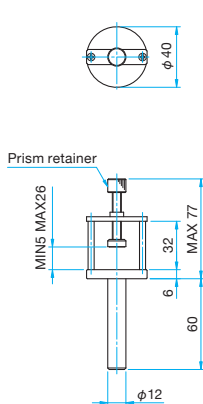
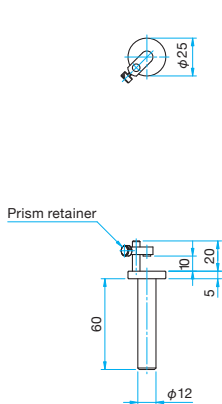


## Outline Drawing

PLH-25 M4 P0.7

PLH-40 M6 P1

PLH-60 M6 P1



Specifications			Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Compatible Optics Dimensions [mm]	Weight [kg]
PLH-25	N	□10	0.08
PLH-40	N	□5 – □26	0.14
PLH-60	N	□10 – □32	0.29

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

## Prism Holder | PAD

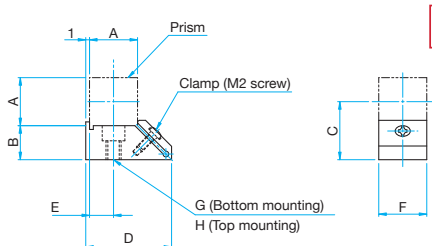
W4103



**Compact Mount for cube beamsplitters.**  
By clamping on the lower edges of the cube more of the prism faces are available for use.

- It is possible to put close to other optical elements because the holder shapes match to the width of the prism.

## Outline Drawing



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G	H
PAD-10	10	10	15	20	5	10	M4	M3
PAD-12.7	12.7	8.65	15	22.7	6.35	12.7	M4	M3
PAD-15	15	12.5	20	25	7.5	15	M4	M3
PAD-20	20	15	25	35	10	20	M6	M4
PAD-25.4	25.4	12.3	25	39	12.5	25.4	M6	M4

### Guide

- ▶ Can be mounted on posts, pillars or directly on a baseplate or stage with an M4 thread.

### Attention

- ▶ Over tightening the clamp may break glass. Please tighten with the minimum necessary force to insure the cube does not move.
- ▶ Recommended for use with prisms with outer dimension tolerance of  $\pm 0.2\text{mm}$ .

Primary material: Aluminum Finish: Black Anodized		
Part Number	Compatible Optics Dimensions [mm]	Weight [kg]
PAD-10	□10	0.005
PAD-12.7	□12.7	0.006
PAD-15	□15	0.01
PAD-20	□20	0.022
PAD-25.4	□25.4	0.026



Used to adjust the direction of polarization of waveplates and polarizer optics. The mount has 360 degrees of smooth rotation.

- The SPH series uses a micrometer for fine adjustment.
- The scale plate on the PH and SPH series can be positioned to provide a convenient reference to the polarizer or crystal axis.
- The SPH can be post mounted with the micrometer at the top or at the side for convenient operation in a variety of environments.
- The SPH includes a locking mechanism to prevent accidental adjustments.
- Optics are held in place with retaining rings and resin rings.
- The MPH series is designed for use in small systems and narrow spaces.



### Guide

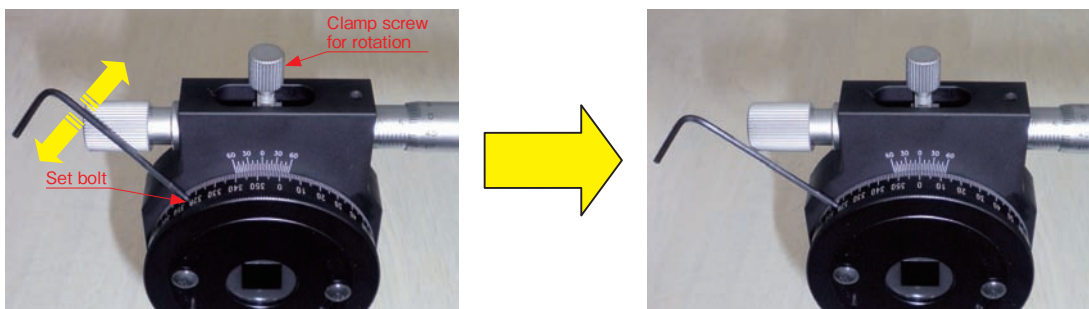
- ▶ Holders for optics sizes not listed in the catalog can be made to order.
- ▶ Adapters for polarizing prisms are available for both the PH and SPH holders. [Reference](#) C055
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ M6 screws should not go deeper than 5 mm into the mounts. Longer screws will prevent the mount from rotating.

### Variable Scale Plate

The angle scale position of PH-ARS, SPH-ARS, GTPC-PH and GTPC-SPH can be freely adjusted. The scale is easily adjusted to the polarizing axis or the crystal axis of a waveplate by changing the position of this scale plate. This scale plate enables customers to change the scale position during an experiment, or to adjust the scale to the polarizing axis or the crystal axis precisely. (The default direction is aligned to the vertical axis, within  $\pm 1$  degree.)



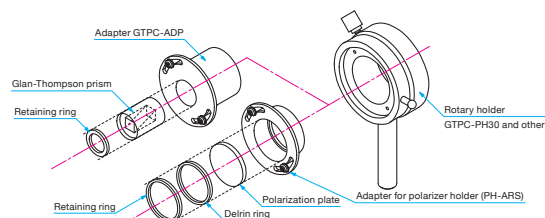
### [How to adjust scale plate]

- (1) Mount a polarizing optic in the polarizer holder, and set the direction of the polarizing axis and crystal axis to the polarization reference coordinate. [Reference](#) B093
- (2) Tighten the clamp screw for rotation, loosen the set bolt that secures the scale plate, and rotate the scale plate.
- (3) Set the scale mark to the required scale position, and tighten the scale plate with the set bolt.

### Mounting Compatibility of Polarizer Holders and Polarizing Prism Holders

Polarizer holders (PH-ARS, SPH-ARS) can be used as polarizing prism holders by purchasing an adapter (GTPC-ADP) additionally. Also, by purchasing the adapter (GTPC-ADP), a polarizing prism holder for either of the three diameter sizes,  $\phi 15$ ,  $\phi 25.4$  or  $\phi 30$ mm, can be used for the other two sizes. However, the adapter is not compatible with the old type prism holders of custom orders (GTPC-PH-\*\*, GTPC-SPH-\*\*).

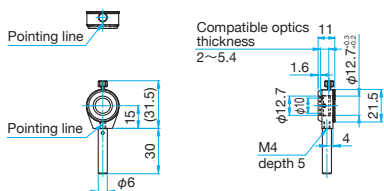
Adapters (for optic diameter of  $\phi 30$  and  $\phi 50$ mm) for polarizer holders (PH-ARS) are also available as a single item. Contact our International Sales Division for more information.



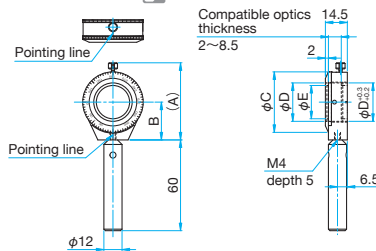


Outline Drawing

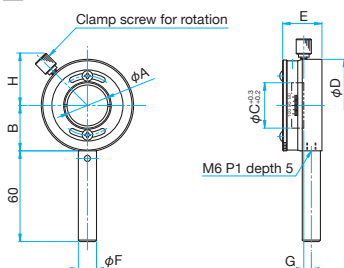
MPHN-12.7R M4 P0.7



MPHN-25.4R/30R M4 P0.7

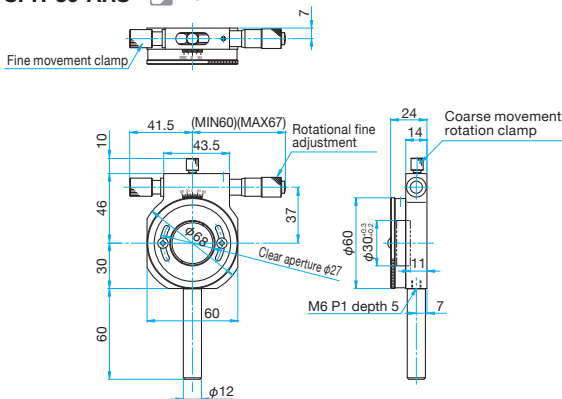


PH-ARS M6 P1 (Only PH-100 with taper)

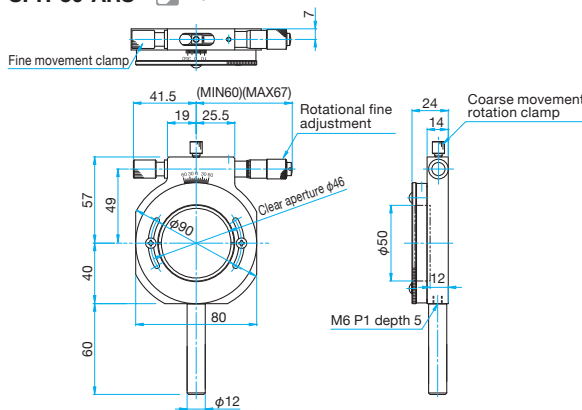


Part Number	φA (mm)	B (mm)	φC (mm)	φD (mm)	E (mm)	φF (mm)	G (mm)	H (mm)
PH-20-ARS	φ17	25	φ20	φ51	23	φ12	3.5	29
PH-25.4-ARS	φ22	30	φ25.4	φ61	26	φ12	4	35
PH-30-ARS	φ27	30	φ30	φ61	26	φ12	4	35
PH-50-ARS	φ46	40	φ50	φ81	26	φ12	5	42
PH-50.8-ARS	φ47	40	φ50.8	φ81	26	φ12	5	42
PH-100-ARS	φ95	73	φ100	φ148	30	φ20	4	66

SPH-30-ARS M6 P1



SPH-50-ARS M6 P1



Thin Type

Part Number	Options specified*	Compatible Optics Diameter φD [mm]	Compatible Optics Thickness [mm]	Scale MIN Reading [°]	Clear Aperture φE [mm]	Optical Axis Height B [mm]	A (MAX) [mm]	φC [mm]	Weight [kg]
MPHN-12.7R	N	φ12.7	2 - 5.4	2.5	φ10	15	32	φ22	0.07
MPHN-25.4R	N	φ25.4	2 - 8.5	2	φ22	25	51	φ40	0.083
MPHN-30R	N	φ30	2 - 8.5	2	φ27	27.5	56	φ45	0.09

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

Simple Type

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Clear Aperture φA [mm]	Scale MIN Reading [°]	Weight [kg]
PH-20-ARS	N/UU	φ20	2 - 10	φ17	1	0.14
PH-25.4-ARS	N/UU	φ25.4	2 - 10	φ22	1	0.19
PH-30-ARS	N/UU	φ30	2 - 10	φ27	1	0.19
PH-50-ARS	N/UU	φ50	2 - 10	φ46	1	0.25
PH-50.8-ARS	N/UU	φ50.8	2 - 10	φ47	1	0.25
PH-100-ARS	N/UU	φ100	2 - 10	φ95	1	0.81

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

Precision Type

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Clear Aperture [mm]	Fine Adjustment Range [°]	Vernier MIN Reading [']	Micro Indicator Conversion [°/DIV]	Weight [kg]
SPH-30-ARS	N/UU	φ30	2 - 10	φ27	±5	5	about 0.014	0.32
SPH-50-ARS	N/UU	φ50	2 - 10	φ46	±3	5	about 0.012	0.46

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Used to adjust polarizing prisms such as Glan-Thompson prisms. Best used for precision alignment of Glan-Thompson prisms or for polarimetry devices.

- The fine adjustment mechanism in the SPH can be used to detect an extinction ratio of  $10^{-5}$  or less.
- The scale plate on the PH and SPH series can be positioned to provide a convenient reference to the polarizing axis.
- Reference C053
- The SPH can be post mounted with the micrometer at the top or at the side for convenient operation in a variety of environments.
- The SPH includes a locking mechanism to prevent accidental adjustments.
- Polarizing prisms are held in place with retaining rings.



Guide

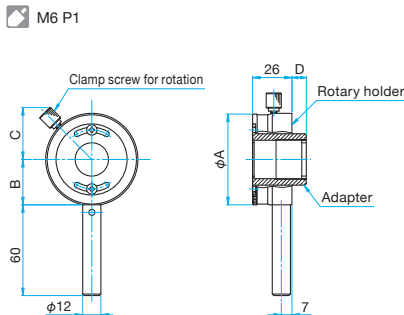
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ Holders for polarizing prisms of diameters or thickness not in the specifications listed in the catalog can be made to order.

Attention

- ▶ These holders are sold separately from the corresponding optics.
- ▶ WEB Reference Catalog Code W3450
- ▶ Rotary holders and adapters (GTPC-ADP) are also sold separately. Purchase the combination of three items, a Glan-Thompson prism, adapter and rotary holder, by checking the combinations listed in the following specification table.

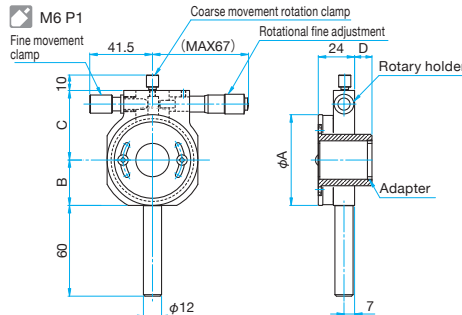
Outline Drawing

GTPC-PH30/GTPC-PH50 & GTPC-ADP



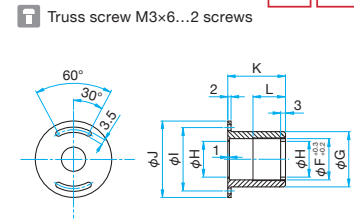
Holder Part Number	Adapter Part Number	φA (mm)	B (mm)	C (mm)	D (mm)
GTPC-PH30	GTPC-ADP15-29	φ60	30	34.3	7.5
GTPC-PH30	GTPC-ADP25.4-38	φ60	30	34.3	16.5
GTPC-PH30	GTPC-ADP30-39	φ60	30	34.3	17.5
GTPC-PH30	GTPC-ADP30-53	φ60	30	34.3	31.5
GTPC-PH50	GTPC-ADP38-49	φ80	40	41.3	27.5

GTPC-SPH30/GTPC-SPH50 & GTPC-ADP



Holder Part Number	Adapter Part Number	φA (mm)	B (mm)	C (mm)	D (mm)
GTPC-SPH30	GTPC-ADP15-29	φ60	30	46	9.5
GTPC-SPH30	GTPC-ADP25.4-38	φ60	30	46	18.5
GTPC-SPH30	GTPC-ADP30-39	φ60	30	46	19.5
GTPC-SPH30	GTPC-ADP30-53	φ60	30	46	33.5
GTPC-SPH50	GTPC-ADP38-49	φ80	40	57	29.5

GTPC-ADP



Adapter Part Number	φF (mm)	φG (mm)	φH (mm)	φI (mm)	φJ (mm)	K (mm)	L (mm)
GTPC-ADP15-29	φ15	φ34	φ12	φ39	φ47	33.5	19
GTPC-ADP25.4-38	φ25.4	φ34	φ22	φ39	φ47	42.5	20
GTPC-ADP30-39	φ30	φ34	φ27	φ39	φ47	43.5	21
GTPC-ADP30-53	φ30	φ34	φ27	φ39	φ47	57.5	19
GTPC-ADP38-49	φ38.1	φ54	φ35	φ60	φ67	53.5	26

Simple Type

Holder Part Number	Adapter Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Scale MIN Reading [°]	Total Weight [kg]
GTPC-PH30	GTPC-ADP15-29	φ15	15 – 29	1	0.25
GTPC-PH30	GTPC-ADP25.4-38	φ25.4	16 – 38	1	0.22
GTPC-PH30	GTPC-ADP30-39	φ30	23 – 39	1	0.21
GTPC-PH30	GTPC-ADP30-53	φ30	39 – 53	1	0.22
GTPC-PH50	GTPC-ADP38-49	φ38	28 – 48.9	1	0.41

Precision Type

Holder Part Number	Adapter Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Fine Adjustment Range [°]	Vernier MIN Reading [']	Micro Indicator Conversion [°/DIV]	Total Weight [kg]
GTPC-SPH30	GTPC-ADP15-29	φ15	15 – 29	±5	5	about 0.014	0.33
GTPC-SPH30	GTPC-ADP25.4-38	φ25.4	16 – 38	±5	5	about 0.014	0.30
GTPC-SPH30	GTPC-ADP30-39	φ30	23 – 39	±5	5	about 0.014	0.29
GTPC-SPH30	GTPC-ADP30-53	φ30	39 – 53	±5	5	about 0.014	0.30
GTPC-SPH50	GTPC-ADP38-49	φ38	28 – 48.9	±3	5	about 0.012	0.62

# Rod Form Laser Mounts Adjustable Laser Holders (with a stand)

LAH  
LAHU/LAHU-A

LAH

RoHS Catalog Code W4029

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

Motoeized Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

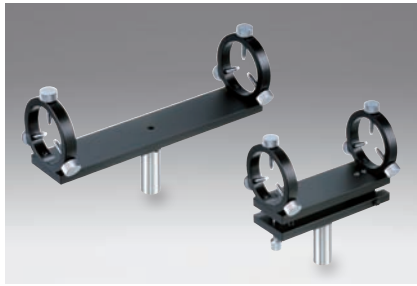
Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

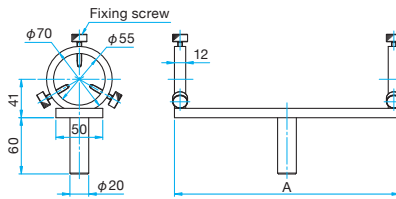


**Holder for He-Ne lasers.**  
The six screws can be used to adjust the height and angle of the mounted laser tube.

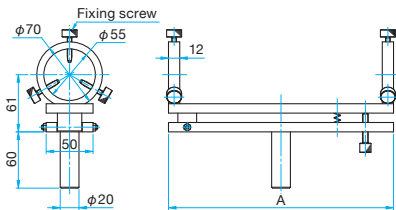
- Laser tube diameters from  $\phi 18$  to  $\phi 54$ mm can fit in this holder by adjusting the three screws on both sides.
- The angle of beam tilt can also be changed by adjusting the six screws.
- The LAH-2 also includes an adjustment mechanism for changing the beam tilt angle.

Outline Drawing

LAH-1T/LAH-1 M6 P1



LAH-2T/LAH-2 M6 P1



Guide

► Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

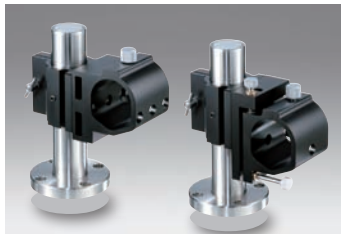
Attention

► After beam adjustment, make sure that the laser is fixed securely with the six fixing screws. Looseness in one screw will cause displacement in the optical axis or vibration.

Three-Point Support Type				Primary material: Aluminum Finish: Black Anodized	
Part Number	Compatible Laser Diameter [mm]	Length A [mm]	Adjustment Range Tilt [°]	Resolution Tilt [°/rotation]	Weight [kg]
LAH-1T	$\phi 18 - \phi 54$	140	—	—	0.31
LAH-1	$\phi 18 - \phi 54$	240	—	—	0.51
LAH-2T	$\phi 18 - \phi 54$	140	$\pm 4$	about 0.5	0.45
LAH-2	$\phi 18 - \phi 54$	240	$\pm 2.4$	about 0.3	0.91

LAHU/LAHU-A

RoHS Catalog Code W4030



**Cylindrical Laser mounts for use with vibration isolated Rod Mount system.**  
The dampened structure makes the holders ideal for use in holograms or interferometry.

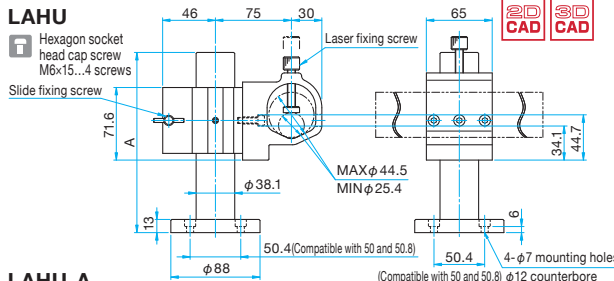
- Cylindrical lasers of  $\phi 25.4$  to  $\phi 44.5$ mm diameter fit in the V-grooved section and are held in place by a single clamping screw.
- Holders can be mounted at any position by sliding along the damped rod.
- Can be directly mounted on a vibration isolator or optical breadboard with 50x50mm matrix M6 screw holes or 1/4-20 UNC holes on 2" spacing.
- LAHU-A mounts can adjust beam tilt and rotation.

Outline Drawing

LAHU

Hexagon socket head cap screw M6x15...4 screws

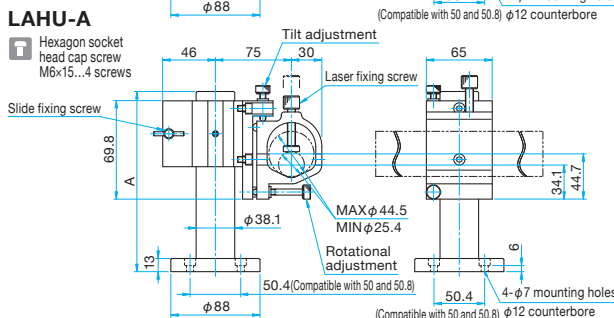
Slide fixing screw



LAHU-A

Hexagon socket head cap screw M6x15...4 screws

Slide fixing screw



Guide

► Consult our Sales Division if holders with an optical axis height of 300mm or higher is necessary.

Attention

► The holder may slide due to its weight when changing the height. Be careful not to drop the holder when adjusting.  
► Lasers are very delicate instruments. Pushing in a fixing screw with excessive force sometimes deteriorates the laser performance.

Stand Type

Strut: Stainless steel Finish: None  
Holder material: Aluminum Finish: Black Anodized

Part Number	Strut Length A [mm]	Compatible Laser Diameter [mm]	Adjustment Range Tilt [°]	Rotation [°]	Weight [kg]
LAHU-45-POS177	177.8	$\phi 25.4 - \phi 44.5$	—	—	2.6
LAHU-45-POS355	355.6	$\phi 25.4 - \phi 44.5$	—	—	3.9
LAHU-45A-POS177	177.8	$\phi 25.4 - \phi 44.5$	$\pm 2$	$\pm 2$	2.7
LAHU-45A-POS355	355.6	$\phi 25.4 - \phi 44.5$	$\pm 2$	$\pm 2$	4.0

**LAH-4 is a high stability laser holder for He-Ne laser. Easy to use, two axis thumbscrews with locks.**

- High stability kinematic mechanism suitable even for large He-Ne lasers. As it is easy to adjust angle of output beam, this holder can also be used for alignment of a guide laser for an invisible laser.
- Compatible with a variety of laser diameters: 31.8 mm, 35.1 mm, 44.5 mm, and 45mm.



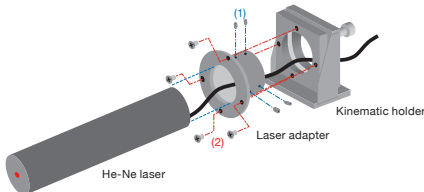
Example of use



### How to Mount He-Ne Lasers

Remove the laser adapter from the kinematic (tilt adjustment) holder first by removing the four pan head screws. If the cable of a He-Ne laser cannot be pulled out, put the He-Ne laser through the hole of the kinematic holder first.

- (1) Insert the He-Ne laser in the laser adapter half way, and fix with four set screws.
- (2) Mount the adapter in which the laser is mounted in the kinematic holder with four pan head screws.



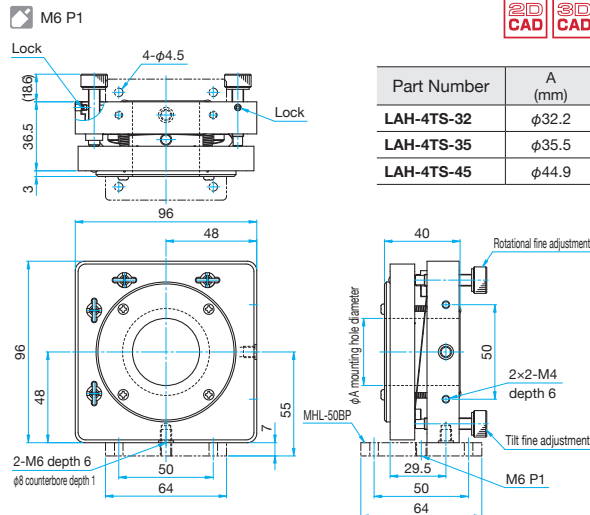
### Guide

- ▶ Can be mounted on a post or baseplate. Posts (RO) and Post Holders (PST).
  - ▶ [WEB Reference](#) [Catalog Code](#) W6052, ▶ [WEB Reference](#) [Catalog Code](#) W6039
  - ▶ Baseplate, MHL-50BP, for directly mounting on the optical table/ bread board. [Reference](#) C029
- ▶ Replacement for discontinued item LAH-3T.

### Attention

- ▶ Overtightening setscrews that hold the laser tube may cause the degradation of laser quality.
- ▶ For best performance, center the tube in the holder.

### Outline Drawing



### Specifications

Part Number	Compatible Laser Diameter φA [mm]	Optical Axis Height [mm]	Adjustment Range		Resolution		Weight [kg]
			Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
LAH-4TS-32	φ31.8	48*	±2	±2	0.2	0.2	0.63
LAH-4TS-35	φ35.1	48*	±2	±2	0.2	0.2	0.63
LAH-4TS-45	φ44.5	48*	±2	±2	0.2	0.2	0.63

\*With MHL-50BP, 7mm thick baseplate, the height of optical path would be 55mm, the same height as LAH-3T Series.



Four axis adjustable mount for Laser Beam Expanders BE and LBED. Tip, Tilt and centering can be adjusted.

- Stable design for large size laser beam expanders .
- KLH-BE is equipped with lock mechanism for angle and centering. These locking mechanism enable to keep the orientation after adjustment.
- Mountable on posts or posts holders.

▶ [WEB Reference](#) [Catalog Code](#) W6052, ▶ [WEB Reference](#) [Catalog Code](#) W6039

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



### Attention

▶ Baseplate for mounting on the optical table or bread board is available (MHL-BP). [Reference](#) C029

### Guide

- ▶ If the centering mechanism clamp is not sufficiently loosened, the range of movement of the centering mechanism will be narrow.
- ▶ Changing focus after the adjustment of tilt, rotation and centering may cause the deviation of output beam angle and centering.

### Example of Use

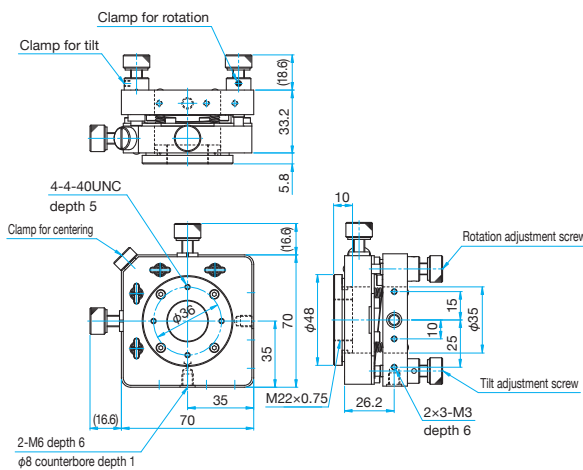


Assembled with the KLH-BE-M22H and LBED10

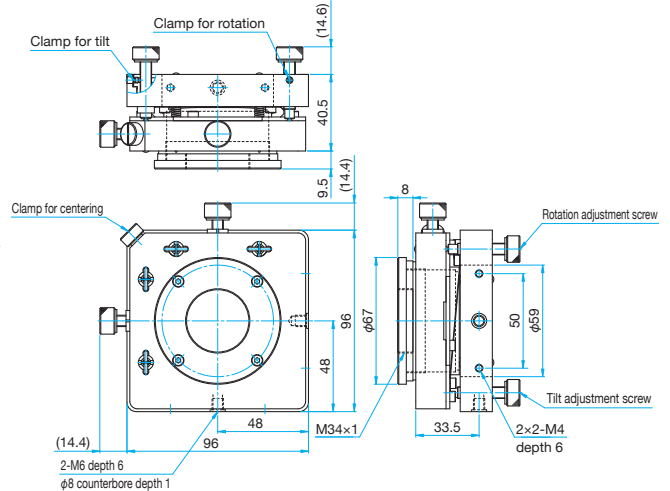


### Outline Drawing

#### KLH-BE-M22H M6 P1



#### KLH-BE-M34H M6 P1



### Specifications

Part Number	Compatible Mounting Screw Size [mm]	Centering adjustment range [mm]	Centering Adjustment Resolution [mm/rotation]	Angle Adjustment Range		Angle Adjustment Resolution		Weight [kg]
				Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	
KLH-BE-M22H	M22 P0.75	φ2	0.25	±2	±2	0.3	0.3	0.38
KLH-BE-M34H	M34 P1	φ2	0.25	±3	±3	0.2	0.2	0.68

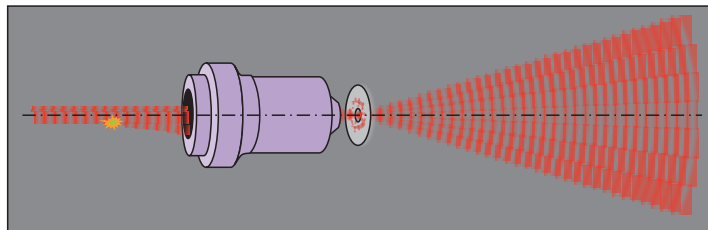
Primary material: Aluminum  
Finish: Black Anodized

## Spacial Filters

The wavefront of a laser beam can be distorted as it goes through an optical system. Fine dust particles can create disturbing diffraction patterns. Spacial filters provide a method to remove many of these disturbances, leaving a clean spherical wavefront.

### Principles

Focusing plane waves with an ideal lens concentrates light at a small spot. In the case of a typical laser beam, where the beam diameter is less than the diameter of the lens, the intensity distribution at the focus spot will have the same gaussian distribution that the incoming laser beam had. If the planar wavefront is disturbed, the intensity distribution at the focus spot will not be the same as the incoming beam anymore. Instead, the disturbances will alter the intensity distribution such that it has additional spots and rings separate from the central spot. By placing a pinhole at the central spot, the extra spots and rings can be blocked, allowing only the undisturbed wavefront to continue. To use a spatial filter, you need to match the hole size to the size of focus point (focus spot) of the objective lens. A hole diameter much larger than the focus spot diameter may not block all of the distortion and noise. On the other hand, a hole diameter much smaller than the focus spot diameter may produce diffraction rings of concentric circles around a dispersed beam and reduce the total amount of light passed by an unacceptable amount.



Diffraction rings produced when the focus spot is smaller than the pinhole diameter



Intensity distribution when the pinhole diameter matches the focus spot

### Configuration

A spatial filter consists of a microscope objective lens and a pinhole. The objective lens is fitted with a linear motion stage for changing the distance to the pinhole and a two-axis pinhole holder that positions the pinhole in a plane perpendicular to the optical axis.

To align the spatial filter holder, refer to the chapter on interferometers. [WEB Reference](#) Interferometers Guide

### Pinhole Selection

To use a spatial filter, the pinhole diameter needs to match the focus spot diameter.

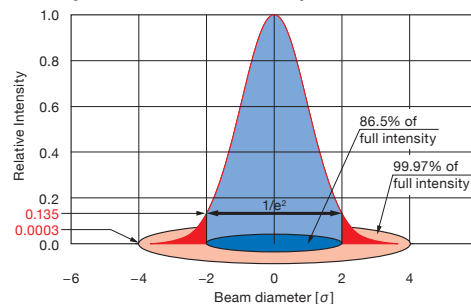
Calculate the focus spot diameter from the diameter of incident beam and the focal length of the objective lens. Since the beam spot diameter ( $2\omega_0$ ) is defined to be where the intensity falls to  $1/e^2=0.135$  times the peak value, 15% of incident light intensity will be lost if the pinhole is the same diameter. Moreover, diffraction rings will be generated when the laser beam irradiates the edge of the pinhole. For this reason, select a pinhole twice as large as the spot diameter ( $1/e^2$ ). If the pinhole is twice the diameter of the spot, the loss of incident light intensity will be 0.003%, and there will be no need to worry about laser light irradiating on the edge of the pinhole.

$$\text{Pinhole diameter } A=4\omega_0$$

$$2\omega_0 = \frac{2\lambda}{\pi \cdot NA}$$

Beam diameter of focus spot (Diameter,  $1/e^2$ ):  $2\omega_0$   
Wavelength used:  $\lambda$   
 $NA = \frac{d}{2f}$  Focal length of objective lens:  $f$   
Incident beam diameter (Diameter,  $1/e^2$ ):  $d$

#### Intensity Distribution of Beam Spot



### Example of Use

Case (A) He-Ne laser 05-LHP-111 Beam diameter ( $1/e^2$ ) 0.59mm  
Objective lens OBL-20 focal length 9mm  
⇒ Pinhole of choice is PA-25 (25 $\mu$ m) [Appropriate product: SFB-16RO-OBL20-25](#) [WEB Reference](#) [Catalog Code](#) W3085

Case (B) He-Ne laser 05-LHP-171 Beam diameter ( $1/e^2$ ) 1.02mm  
Objective lens OBL-10 focal length 16.56mm  
⇒ Pinhole of choice is PA-25 (25 $\mu$ m) [Appropriate product: SFB-16RO-OBL10-25](#) [WEB Reference](#) [Catalog Code](#) W3085

### Results

	Laser Incident Beam Diameter $d$ [mm]	Objective Lens Focal Length $f$ [mm]	Calculation Results $A$ [ $\mu$ m]	Pinhole Diameter (selected) [ $\mu$ m]
Case (A)	0.6	9.00	24.2	25
Case (B)	1.0	16.56	26.7	25

Wavelength used 632.8nm

### Notes

The above calculation results are for when the distance between the laser and the objective lens is short. The longer the distance between the laser and the objective lens, the larger the incident beam diameter becomes due to divergence of the laser beam.

The focus spot diameter decreases in inverse proportion to the increase in the incident beam diameter.

Thus a pinhole of smaller size needs to be selected.

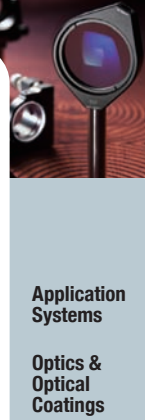
Incident beam diameter can be calculated with the formula shown on the right.

$$d = d_n + \alpha \times L$$

Laser output beam diameter (Diameter,  $1/e^2$ ):  $d_n$

Laser beam divergence (full angle):  $\alpha$

Distance from laser to objective lens:  $L$



Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Spatial filters eliminate distorted laser wavefronts and noise to emit clean spherical waves for beams. Used in optical systems such as interferometers and holograms where wavefront quality is critical.

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



- A well corrected achromat in the output beam of the spatial filter can be used to collimate the filtered beam.
- The translation stage and two-axis pinhole allows the light through the objective lens to have good reproducibility..
- Designed with an emphasis on stability, beam movement during adjustment is minimal.
- A PA-25 (hole diameter 25µm) pinhole is included. Pinholes can be changed to match the diameter of the laser spot.
- A Coarse/fine pinhole adjustment (SFB-16DMRO) is also available.
- To meet a variety of requirements, the mounting position of the objective lens can be changed, allowing objective lenses with different magnifications to be used.

### Guide

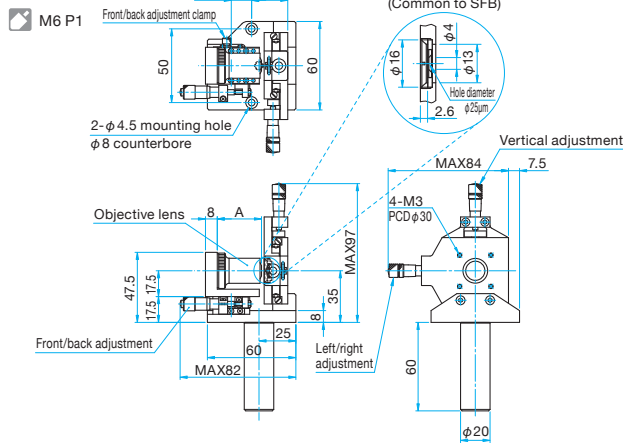
- ▶ SFB-16RO-N and SFB-16DMRO-N, which are postless spatial filters are also available.
- ▶ Pinholes can be replaced with different diameter pinholes. Pinhole diameters can be specified at the time of purchase. When changing pinhole diameter, change the number “-25” at the end of the part number to the desired pinhole size in microns.
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

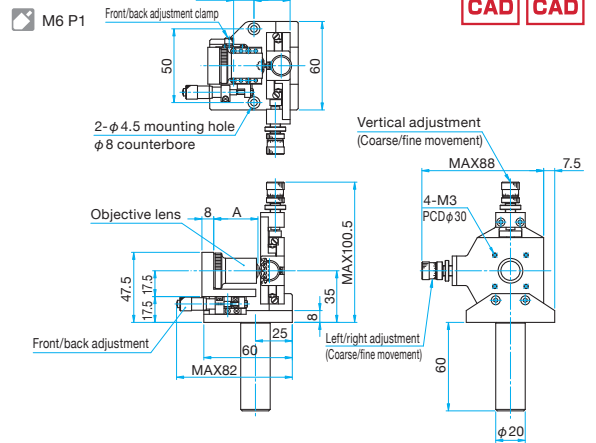
- ▶ The type of objective lens and pin hole diameter depends on laser wavelength and incident beam diameter. [Reference](#) C059
- ▶ Our Sales Division will gladly help you choose the correct combination also.
- ▶ The unstamped side of the pinhole should touch the retaining ring side. The pinhole may not work correctly if mounted incorrectly.
- ▶ We do not recommend using spatial filters for high-power lasers, pulsed lasers, or ultraviolet lasers. Lasers in the near infrared region will have poor transmittance.
- ▶ Objectives should be unscrewed before swapping out pinholes.

### Outline Drawing

#### SFB-16RO



#### SFB-16DMRO



Micrometer									
Primary material: Steel, Aluminum Finish: Super Black Chrome, Black Anodized									
Part Number	Objective Lens	Objective Lens Length A [mm]	Compatible Incidence Beam diameter (1/e <sup>2</sup> ) [mm]	Pinhole Diameter [µm]	Pinhole XY Adjustment Range [mm]	Objective Lens Front and Back Adjustment Range [mm]	Pinhole XY Scale MIN Reading [mm/DIV]	Objective Lens Front and Back Scale MIN Reading [mm/DIV]	Weight [kg]
SFB-16RO-OBL10-25	OBL-10	30.5	φ1.0	φ25	±2	±3	0.01	0.01	0.56
SFB-16RO-OBL20-25	OBL-20	35.2	φ0.6	φ25	±2	±3	0.01	0.01	0.56
SFB-16RO-OBL40-25	OBL-40	36.4	φ0.3	φ25	±2	±3	0.01	0.01	0.56

Coarse/Fine Movement										
Primary material: Steel, Aluminum Finish: Super Black Chrome, Black Anodized										
Part Number	Objective Lens	Objective Lens Length A [mm]	Compatible Incidence Beam Diameter (1/e <sup>2</sup> ) [mm]	Pinhole Diameter [µm]	Pinhole XY Adjustment Range [mm]	Objective Lens Front and Back Adjustment Range [mm]	Pinhole XY Coarse Resolution [mm/rotation]	Pinhole XY Scale MIN Reading [mm/DIV]	Objective Lens Front and Back Scale MIN Reading [mm/DIV]	Weight [kg]
SFB-16DMRO-OBL10-25	OBL-10	30.5	φ1.0	φ25	±2	±3	0.5	0.0025	0.01	0.6
SFB-16DMRO-OBL20-25	OBL-20	35.2	φ0.6	φ25	±2	±3	0.5	0.0025	0.01	0.6
SFB-16DMRO-OBL40-25	OBL-40	36.4	φ0.3	φ25	±2	±3	0.5	0.0025	0.01	0.6

**Mounted metal foil with a pinhole or slit 400µm or less.**

**Used in spatial filters, laser diffraction experiments and microscopic magnification correction.**

- A precision etching process creates holes with high circularity and slits with high parallelism.
- For YAG lasers (1064nm) and CO<sub>2</sub> lasers (10.6µm), pinholes made of high copper coated with gold should be used.
- Pinholes and slits are pre-mounted in aluminum frames for ease of handling and mounting.



**Guide**

- ▶ Contact our Sales Division to purchase unmounted pinholes or slits.
- ▶ When an aperture φ1mm or above is required, use an iris diaphragm (IH). [Reference](#) C063
- ▶ Custom pinholes can be made to order.

Common Specifications			
Part Number	PA	PA-HEL	FSL
Hole Geometry	Perfect circle	Perfect circle	Slit
Pinhole Material	Nickel	Copper	Nickel
Foil Thickness [µm]	20±5	20±5	20±5
Pinhole Finish	None	Gold coat (both faces)	None
Damage Threshold (reference)	—	50MW/cm <sup>2</sup> (@700nm)	—
Wavelength Used	Any	700nm – 10.6µm	Any
Frame Material	Aluminum		
Frame Finish	Black Anodized		

**Attention**

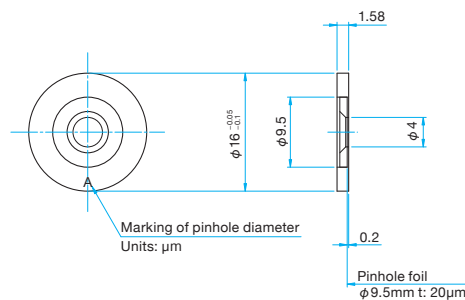
- ▶ Dust can obstruct the light through a pinhole. Use and optic bulb blower to remove the dust. Canned air may break tear the foil.
- ▶ Take care when handling unmounted pinholes. The foil is thin and fragile.
- ▶ The holes and slits are only visible under high magnification.
- ▶ For fixed slits, when the number that represents the width of the slit is at the bottom, the long side of the slit is oriented in the horizontal direction.
- ▶ Pinholes can be damaged if the laser power is higher than the laser damage threshold.

Perfect circle		
Part Number	Pinhole Diameter [µm]	Weight [kg]
PA-1	φ1 <sup>+1</sup> <sub>-0</sub>	0.001
PA-2	φ2±1	0.001
PA-5	φ5±2	0.001
PA-10	φ10±2	0.001
PA-15	φ15±2	0.001
PA-20	φ20±2	0.001
PA-25	φ25±3	0.001
PA-30	φ30±3	0.001
PA-40	φ40±3	0.001
PA-50	φ50±4	0.001
PA-100	φ100±5	0.001
PA-200	φ200±6	0.001
PA-400	φ400±8	0.001

Perfect Circle for High Energy Laser		
Part Number	Pinhole Diameter [µm]	Weight [kg]
PA-5HEL	φ5±2	0.001
PA-10HEL	φ10±2	0.001
PA-15HEL	φ15±2	0.001
PA-25HEL	φ25±3	0.001
PA-50HEL	φ50±4	0.001
PA-100HEL	φ100±4	0.001
PA-200HEL	φ200±6	0.001

**Outline Drawing**

**PA/FSL**



Slit			
Part Number	Slit Width [µm]	Length [mm]	Weight [kg]
FSL-5	5±2	3	0.001
FSL-10	10±2	3	0.001
FSL-25	25±3	3	0.001
FSL-50	50±4	3	0.001
FSL-100	100±5	3	0.001
FSL-150	150±5	3	0.001
FSL-200	200±6	3	0.001



Two-axis mounts for precision pinholes (PA) or precision air slits (FSL). Microscope objectives can be mounted when the TAT-180A adapters are used.

- The ball guide design allows for fine adjustment and travel.
- Two types of adjusters are available. The standard micrometer (TAT-16, TAT-16RO) allows smooth adjustment down to a few microns. The differential micrometer (TAT-16DM, TAT-16DMRO) has submicron resolution.
- A unique two-axis integrated guide makes the body only 16mm thick. Lenses can be placed close to the front and back for the pinholes.
- Two-axis pinhole/objective holders have  $\phi 9\text{mm}$  transmission diameter. Contact our Sales Division if you need custom pinhole mounts.



### Guide

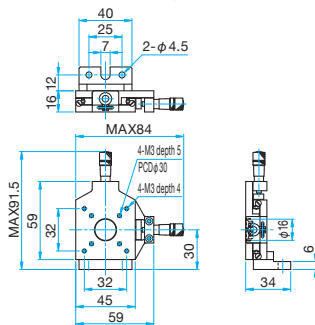
- ▶ Fiber optics holders (FOP) with integrated optical fiber receptacles (FC connector, SMA connector) are also available. [Reference](#) C076
- ▶ TAT-30 has a large transmission diameter. Simplified pinhole holders (AH-1) are also available. [WEB Reference](#) [Catalog Code](#) W4514

### Attention

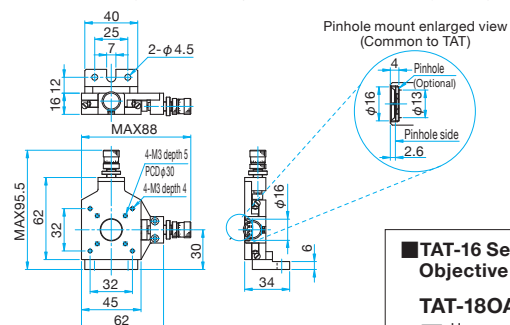
- ▶ Pinholes (PA) are sold separately from TAT holders. [Reference](#) C061
- ▶ Retaining rings are included with TAT holders. Adapters for pinholes are not required.
- ▶ If you need a post, purchase a part that ends in -RO.

## Outline Drawing

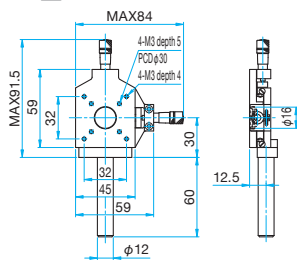
**TAT-16** Hexagonal socket head cap screw M6x12...1 screw  
Hexagonal socket head cap screw M4x10...2 screws, Accessory: Retaining ring



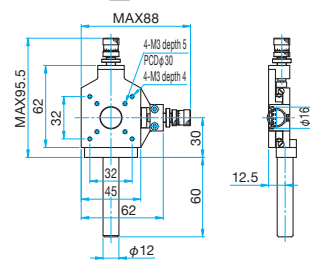
**TAT-16DM** Hexagonal socket head cap screw M6x12...1 screw  
Hexagonal socket head cap screw M4x10...2 screws, Accessory: Retaining ring



**TAT-16RO** M6 P1, Accessory: Retaining ring



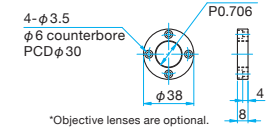
**TAT-16DMRO** M6 P1, Accessory: Retaining ring



### TAT-16 Series Objective Lens Adapters

#### TAT-180A

Hexagonal socket head cap screw M3x8...4 screws



Specifications					Primary material: Iron Finish: Super Black Chrome
Part Number	Pinhole XY Adjustment Range [mm]	Coarse Resolution [mm/Rotation]	Fine Resolution [mm/Rotation]	Scale MIN Reading [mm/DIV]	Weight [kg]
TAT-16	±2	0.5	—	0.01	0.26
TAT-16RO	±2	0.5	—	0.01	0.32
TAT-16DM	±2	0.5	0.05	0.0025	0.30
TAT-16DMRO	±2	0.5	0.05	0.0025	0.36

Objective Lens Adapters			Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Holders	Compatible Objective Lenses	Weight [kg]
TAT-180A	TAT-16 series	OBL, EPL, EPLE	0.02



**Iris diaphragm holders that can change the aperture size without changing the center of the aperture. Can be used to change the depth of field in imaging systems. And passing necessary laser beam while blocking optical feedback or stray light in laser experiments.**

- You can change the aperture diameter by loosening the adjustment lever and moving it from side to side.
- The scale provides an estimate on the aperture diameter.



### Guide

- ▶ Unmounted iris diaphragms (IDC/IH) can be purchased. **Reference** C064
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

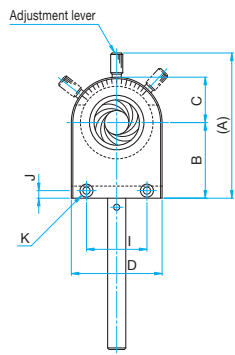
### Attention

- ▶ Take care when adjusting the lever and handling the iris diaphragms.
- ▶ These parts are not recommended for high power lasers. The heat from the lasers may cause the blades to seize. (recommended max power: CW 500mW or less, pulse 30mJ or less).
- ▶ The scale is only a rough guide. There is considerable backlash due to the structure of the iris diaphragm. There may be a difference between the hole diameter of iris diaphragm and the scale.
- ▶ The iris diaphragm is a very delicate mechanism. Do not push or pull on the blades.



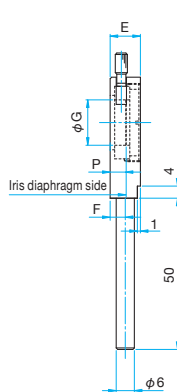
## Outline Drawing

### IH-R



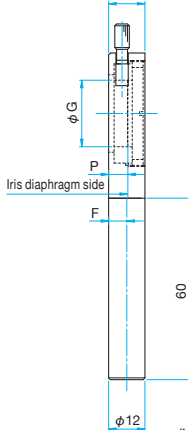
### IH-08R/12R/15R

M4 P0.7

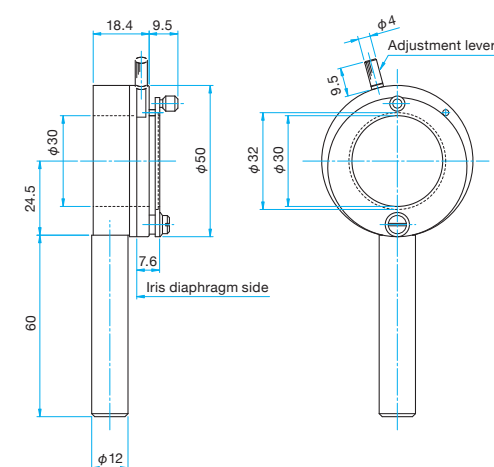


### IH-22R/36R/50R

M6 P1



### IH-30 M6 P1



(Units: mm)

Part Number	A	B	C	D	E	F	MAX Aperture Diameter φG	I	J	K	P
IH-08R	38.5	20	10	20	10	4.7	φ8	15	2.5	2-φ2.4 mounting hole, φ4.2 counterbore	4.9
IH-12R	41	20	12.5	25	10	5.3	φ12	20	2.5	2-φ2.4 mounting hole, φ4.2 counterbore	5.2
IH-15R	48	25	15	30	10	5	φ15	20	2.5	2-φ2.4 mounting hole, φ4.2 counterbore	5.2
IH-22R	57.5	30	19	38	12	6	φ22	28	10	2-φ4.5 mounting hole, φ8 counterbore	6.2
IH-36R	75	35	30	60	12	6.4	φ36	44	10	2-φ4.5 mounting hole, φ8 counterbore	6.9
IH-50R	95	45	40	80	14	7.4	φ50	60	10	2-φ4.5 mounting hole, φ8 counterbore	7.9

φ8 - φ50		Primary material: Aluminum Finish: Black Anodized		
Part Number	Options specified*	Aperture Diameter		Weight [kg]
		MAX [mm]	MIN [mm]	
IH-08R	N	φ8	φ0.7	0.03
IH-12R	N	φ12	φ0.8	0.03
IH-15R	N	φ15	φ0.9	0.09
IH-22R	N/EE/UU	φ22	φ0.9	0.10
IH-36R	N/EE/UU	φ36	φ1.3	0.15
IH-50R	N/EE/UU	φ50	φ1.5	0.20

φ30		Primary material: Aluminum Finish: Black Anodized		
Part Number	Options specified*	Aperture Diameter		Weight [kg]
		MAX [mm]	MIN [mm]	
IH-30		φ30	φ1	0.12

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". **Reference** C007

# Iris Diaphragm | IDC/IH-30N

RoHS Catalog Code W4040

Iris diaphragm holders that can change the aperture size without changing the center of the aperture. Primarily used in the limited spaces of optical instruments to set an aperture size.

- Unmounted iris diaphragms are ideal for OEM applications or for use when space is a premium.
- The IDC series's thinness allows optics to be placed closed to each other..
- The adjustment lever also functions as a lock to fix the aperture diameter.



### Guide

- ▶ Iris diaphragm holders (IH-30/IH-R) which can be fixed to the post holder are also available. [Reference](#) C063
- ▶ Fixed pinholes (PA) with hole diameter 400µm or less are also available. [Reference](#) C061

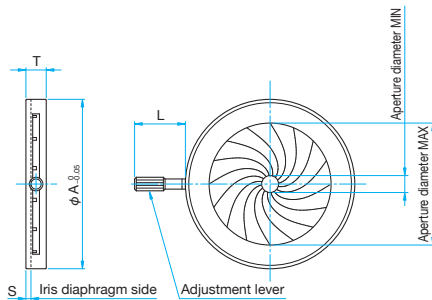
### Attention

- ▶ Take care when adjusting the lever and handling the iris diaphragms.
- ▶ The iris diaphragm is a very delicate mechanism. Do not push or pull on the blades.
- ▶ These parts are not recommended for high power lasers. The heat from the lasers may cause the blades to seize. (recommended max power: CW 500mW or less, pulse 30mJ or less).
- ▶ The iris diaphragm does not have a scale. Use the iris diaphragm holder when a scale is needed.

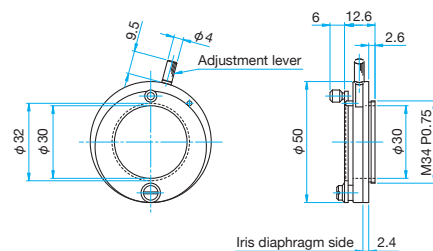


## Outline Drawing

### IDC



### IH-30N



Part Number	φA [mm]	T [mm]	L [mm]	S [mm]
IDC-000	φ14.8	4.5	11	1.30
IDC-001	φ19.8	5	11	1.25
IDC-003	φ24	5	11	1.45
IDC-009	φ33	5.5	11	1.43
IDC-017	φ50	6	15	1.60
IDC-025	φ70	7.5	15	2.05

φ8 - φ50		Primary material: Aluminum Finish: Black Anodized		
Part Number	Aperture Diameter MAX [mm]	MIN [mm]	Number of Blades [blades]	Weight [kg]
IDC-000	φ8	φ0.7	9	0.003
IDC-001	φ12	φ0.8	11	0.005
IDC-003	φ15	φ0.9	12	0.007
IDC-009	φ22	φ0.9	14	0.012
IDC-017	φ36	φ1.3	16	0.024
IDC-025	φ50	φ1.5	16	0.062

φ30		Primary material: Aluminum Finish: Black Anodized		
Part Number	Aperture Diameter MAX [mm]	MIN [mm]	Number of Blades [blades]	Weight [kg]
IH-30N	φ30	φ1	10	0.03

Application Systems  
Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

Adjustable slits have two razor sharp opposing blades that can be adjusted to vary the air gap between them.

Typical uses include spectrophotometers, Schlieren optical systems and diffraction experiments.

- A precision positioning mechanism keeps the blades straight and parallel with minimum incremental motion on the order of tens of microns.
  - Two types are available. The PSL-0 is intended for ultraviolet, visible and infrared radiation. The SLX-1 is intended for use with X-rays and has tantalum blades to efficiently block X-rays.
  - The PSL-0 moves the blades left and right simultaneously, enabling adjustment of slit width without changing the center position of the slit.
  - The SLX-1 moves the blades independently, left and right, or up and down, thus enabling change of slit position and rectangular shape.
- The slit length on the PSL-0 is adjusted by sliding the adjustment plate.



#### Guide

- ▶ A micrometer version (PSL-2) that allows adjustment of slit width in increments of less than 10 microns is also available.
- ▶ [WEB Reference](#) [Catalog Code](#) W4515
- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

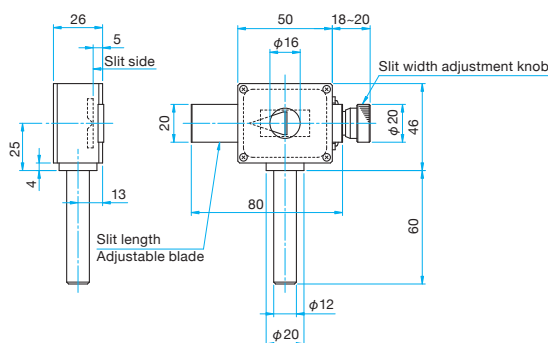
#### Attention

- ▶ High power lasers may damage the blades. Contact our sales team for custom applications.

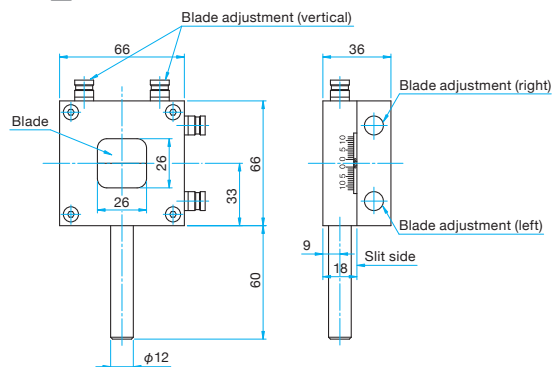


#### Outline Drawing

PSL-0 M6 P1



SLX-1 M6 P1



#### For UV/Visible/IR

Primary material: Aluminum, Brass  
Finish: Black Anodized, Chrome Plated

Part Number	Options specified*	Blade Material	Slit Width Variable Range [mm]	Slit Width Scale MIN Reading [ $\mu\text{m}/\text{DIV}$ ]	Slit Length Variable Range [mm]	Weight [kg]
PSL-0	EE/UU	Stainless steel (No Finish)	0 - 4	20	0 - 12	0.24

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

#### For X-ray

Primary material: Aluminum  
Finish: White Alumite

Part Number	Options specified*	Blade Material	X-ray Resistance [ $\text{keV}/\text{cm}^2$ ]	Blade Variable Range [mm]	Blade Position Scale MIN Reading [ $\mu\text{m}/\text{DIV}$ ]	Weight [kg]
SLX-1	UU	Tantalum (No Finish)	300	0 - 10	10	0.52

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

# Filter Wheels | NDWH

**RoHS** **Catalog Code** W4042

This holder mounts several filters in a turret allowing different filters to be placed into the optical path by rotating the turret. It can also be used for adjusting the transmitted light intensity by switching ND filters of different transmittance, or for switching transmitted wavelength by mounting color filters.

- Two types are available. The NDWH-15S has a single turret that holds six filters. The NDWH-15W has two turrets that hold six filters each.
- Each type is also available with either a fixed base (NDWH-15S/NDWH-15W) or mounted on a post (NDWH-15SRO/NDWH-15WRO).
- The turret has an index every 30 degrees (point where rotation stops). Using this index, the filter can be located at the positions 0 degrees, 30 degrees, 60 degrees, and 90 degrees.



### Guide

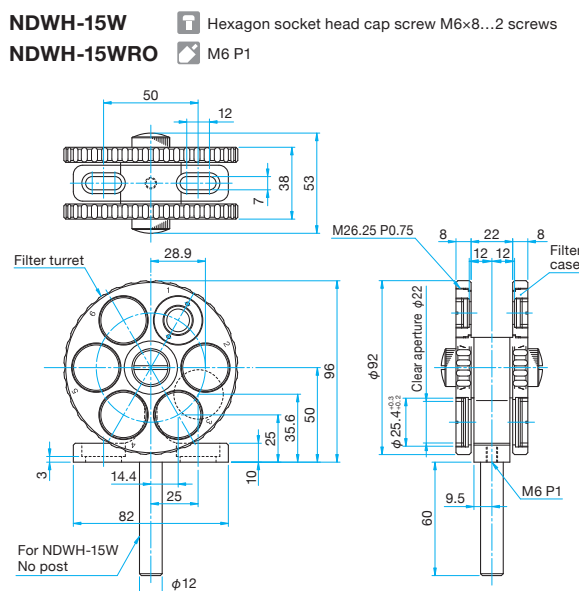
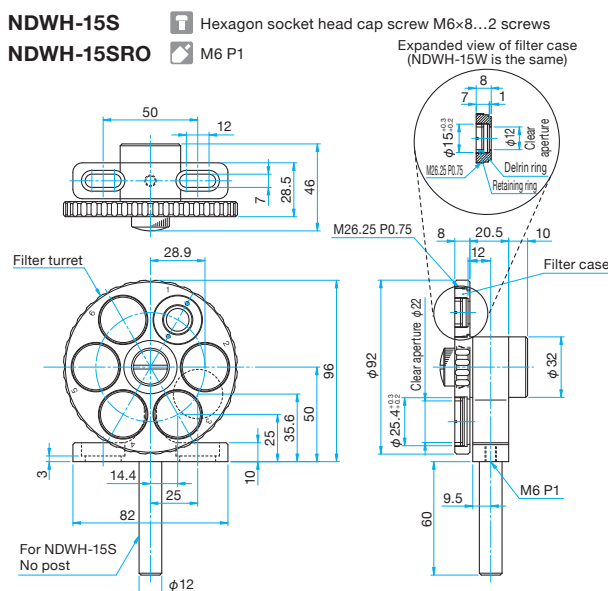
- ▶ The filter wheels do not include ND filters. Select from among the ND filters (AND-15C/FND-15C02).  
[▶ WEB Reference](#) **Catalog Code** W3093, [▶ WEB Reference](#) **Catalog Code** W3098
- ▶ Rotating Variable Reflective ND Filter Holders (NDHN) to continuously change transmitted light intensity are also available.  
[▶ WEB Reference](#) **Catalog Code** W3101
- ▶ Post length can be changed for NDWH-15SRO and NDWH-15WRO. If the length of post is specified at the time of purchase, this product will be delivered with the specified length post. We may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ Filter wheels for 25.4mm diameter filters are also available.  
[▶ WEB Reference](#) **Catalog Code** W4042

### Attention

- ▶ In the case of the lowest filter of the lens turret, the strut of the holder interferes and light cannot pass through. Except for this position, all the indexes let light pass through.
- ▶ Special tools are required when removing the filter case. When using a  $\phi 25.4$ mm filter after removing the filter case, a retaining ring (NR-25.4) is required. Please contact our International Sales Division for more information.
- ▶ It is necessary to mount post types with offset for the optical axis. The amount of offset will vary depending on the position of lens turret holes.



### Outline Drawing



### Specifications

Part Number	Compatible Optics Diameter [mm]	Compatible Optics Max Thickness [mm]	Max Number of Mounts [Units]	Weight [kg]
NDWH-15S	$\phi 15$	3	6	0.2
NDWH-15SRO	$\phi 15$	3	6	0.26
NDWH-15W	$\phi 15$	3	12	0.34
NDWH-15WRO	$\phi 15$	3	12	0.4

Primary material: Aluminum  
Finish: Black Anodized

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

HOLDERS for transmissive optics that do not require optical alignment such as ND filters and color filters. Designed to accommodate different thicknesses and make it easy to change filters.

- Available in a variety of sizes and clamping methods.
- Filter holders can be used with both round filters and rectangular filters. (Note, the FH-10 can only be used with round filters.)
- FH-25 and FH-50 are ideally suited for fine intensity adjustment and transmitted wavelength adjustment because these can hold several filters simultaneously.



**Guide**

- ▶ The FH-10 utilizes two spring loaded knobs to hold the filter. This maximizes the clear aperture available while providing a secure clamping force.
- ▶ The FHS-25 and FHS-50 have spring clips to make changing the filter easy while still holding the filter securely.
- ▶ The FH-25 and FH-50 have no clamping mechanism, but provide a rack to hold multiple filters, making it easy to combine multiple filters and quickly change them. Contact our sales team regarding increasing the capacity of these filter racks.
- ▶ The supplied post length can be changed. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts.
- ▶ To insure that the filters remain square to the optical axis in the FH-25 and FH-50 mounts, we recommend framed ND filters (MAN, MFND) which are ND filters of various transmittances fitted with filter adapters (FAD) are also available.

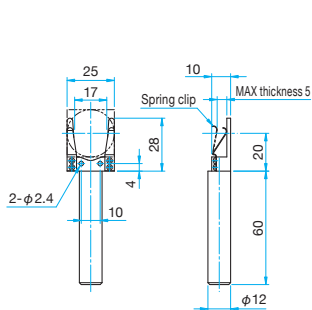
▶ WEB Reference Catalog Code W3094, ▶ WEB Reference Catalog Code W3098

**Attention**

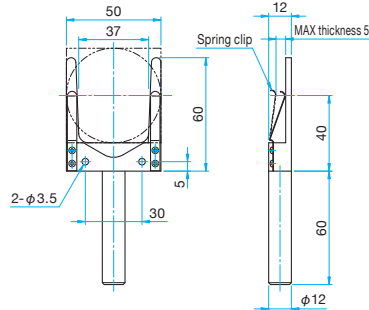
- ▶ Because the posts for FH-25 and FH-50 have a special shape, they cannot be replaced with standard posts (RO-\*\*\*-\*\*\*). Contact our International Sales Division regarding different length posts.

**Outline Drawing**

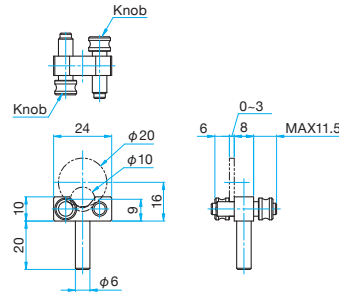
FHS-25 M6 P1



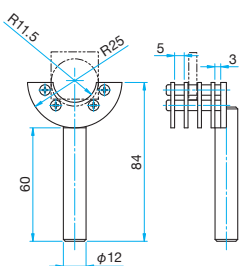
FHS-50 M6 P1



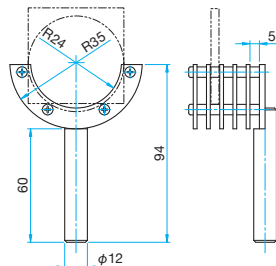
FH-10 M4 P0.7



FH-25 Custom shape special post

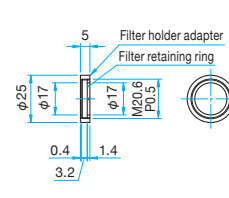


FH-50 Custom shape special post

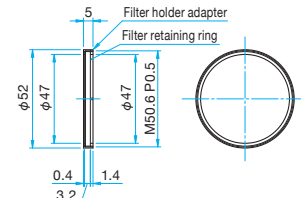


**Adapter**

FAD-20



FAD-50



**Filter Holders**

Part Number	Options specified*	Compatible Optics		MAX Number of filter [Units]	Weight [kg]
		Dimensions [mm]	Thickness [mm]		
FHS-25	N/EE/UU	φ25, □25	0 - 5	1	0.06
FHS-50	N/EE/UU	φ50, □50	0 - 5	1	0.08
FH-10	N	φ10 - φ20	0 - 3	2	0.02
FH-25	-	φ25, □25	0 - 3 (MAX three units)	4	0.10
FH-50	-	φ50 - φ52 □50	0 - 5	5	0.11

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

**Adapter**

Part Number	Compatible Optics		Weight [kg]
	Diameter [mm]	Thickness [mm]	
FAD-20	φ20	0 - 3	0.01
FAD-50	φ50	0 - 3	0.01

Primary material: Aluminum  
Finish: Black Anodized



# Automatic Shutters 1 axis / 4 axis Shutter Controller

SSH  
SSH-CRA

## SSH

RoHS Catalog Code W4045



These electromagnetic shutters are intended for applications including remote on/off of laser light and for timed exposures.

Requires dedicated shutter controller (SSH-C2B) and cable (SSH-CA2-LOAA) for operation.

- SSH-S is intended for small diameter laser beams ( $\phi 4\text{mm}$  or less) while SSH-25RA is intended for use with large diameter imaging lens systems ( $\phi 24\text{mm}$  or less).
- Typical applications include holography, exposure of photosensitive materials and as safety measures of laser optical systems.
- By removing the post, the shutters can be installed directly on a base-plate with M3 threads.
- Shutters can be operated with a PC via the two-axis shutter controller (SSH-C2B).



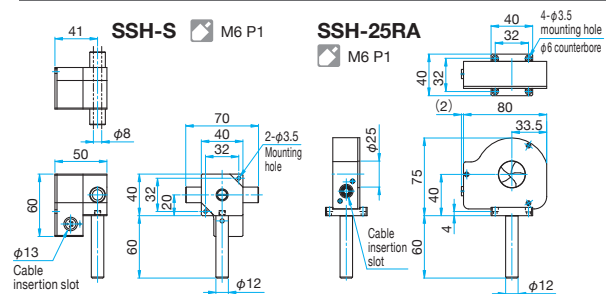
### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- ▶ Automatic shutters cannot be used with high power lasers or high power pulse lasers. Please use high power laser shutters (SHPS).
- ▶ Please always use these automatic shutters with the dedicated controller. Otherwise, these shutters may not operate properly.
- ▶ SSH-25RA cannot operate with the old type shutter controllers (SSH-C4B, SSH-C1R). SSH-S can operate with SSH-C4B.
- ▶ These shutters and controllers do not come with cables.
- ▶ Please order the dedicated cables along with them.

### Outline Drawing



### Specifications

Primary material: Aluminum  
Finish: Black anodized (Finish of blades of SSH-25RA-W Shutter : None)

Part Number	Shutter Type	Aperture Diameter [mm]	Compatible Controller	Shutter Speed [s]	Weight [kg]
SSH-S	Solenoid	$\phi 8$	SSH-C2B	about 0.7 -	0.28
SSH-25RA	Blades type (Black)	$\phi 25$	SSH-C2B	0.1 -	0.5
SSH-25RA-W	Blades type (Black)	$\phi 25$	SSH-C1RA, SSH-C4RA		

## SSH-CRA

RoHS Catalog Code W4120

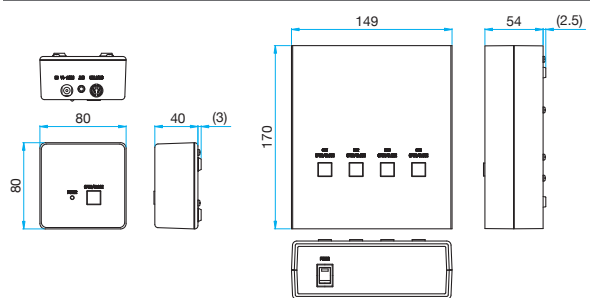


Controller for driving the SSH-RA series electromagnetic shutters.

- Shutters can be manually opened and closed using the shutter buttons on the controller body.
- Shutters can also be opened and closed using a TTL signal from an external controller.
- 4-axis shutter controller (SSH-C4RA) can independently control up to four shutters.



### Outline Drawing



### Guide

- ▶ Controller does not include a shutter. Compatible only with SSH-RA series auto-blade shutters.
- ▶ Cable to connect the controller and the shutter is not included. Use the dedicated cable (SSH-CA2-LORA). [Reference](#) C069
- ▶ If timer functions are required, we recommend using the SSH-C2B shutter controller. [Reference](#) C069
- ▶ controllers come with AC adapter(DC5V) and 3.5mm Stereo mini plug (for TTL)

### Attention

- ▶ This shutter controller is only compatible with the SSH-RA series.
- ▶ Please do not connect to any electromagnetic shutter other than SSH-RA series. Due to differences in the electrical driving characteristics, other shutters can be damaged.
- ▶ Please contact our sales team for TTL cable to be connected to an external device.
- ▶ In SSH-C1RA and SSH-C1RA-H, the logic of TTL connecting to external equipment is inverted. If you need the shutter controller SSH-C4RA with TTL logic inverted, please contact our Sales Division.

### Specifications

Primary material: Aluminum  
Finish: Black anodized

Part Number	Controllable Number of Units [unit]	Compatible Shutters	External input Signal (TTL)	Power Source [V]	Power consumption [VA]	Weight [kg]
SSH-C4RA	4	SSH-RA	Open/Close:0/5V	DC5	1	0.45
SSH-C1RA	1	SSH-RA	Open/Close:0/5V	DC5	0.25	0.07
SSH-C1RA-H	1	BSH2	Open/Close:5/0V	DC5	0.25	0.07

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber

## Controllers for driving SSH electromagnetic shutters. Can operate two electromagnetic shutters of different types concurrently.

- Controller can control the SSH-R (old blade type), SHPS (for high-power laser), and BSH2 (for bio) shutters in addition to SSH-25RA and SSH-S.
- Shutter speed, delay time, and repeat count is set using the front panel control knob.
- Sample software is available for shutter control and changing various settings using a PC.
- Controller allows registration of control signals (up to three types) for unknown mechanical electromagnetic shutters (only those for which control signal formats are released), and can close and open the shutters according to their performance. (Please check the instruction manual and make sure that setting of control signals is possible before use.)



Shutter Controller	
Part Number	<b>SSH-C2B</b>
Controllable Number of Units	2ch
Power Source	DC24V
Power consumption	120VA
Operating temperature	5 – 40°C
Functions	Shutter type switching TIMER/BULB mode switching External signal polarity switching Timer setting Number of times of opening and closing integration
Shutter Control Voltage *1	5V – 24V
Shutter control current *2	each CH 0.5A (current limit 1A)
Shutter Speed	0.2ms – 99990s
Delay Time	0.1ms – 999.9ms
External input	0 – 5V Input 2ch, Interlock contact input
External output	0 – 5V Output 2ch
Interface	RS232C (D-sub 9 pin female), USB, (TTL)
Display	LCD ( with white backlight)
Accessories	AC Adapter (DC24V), Interlock connector

\*1 The voltage range of control signals that can be set when an unknown shutter is used.

\*2 The current is determined depending on the resistance value of the electromagnetic shutter to be connected.

### Guide

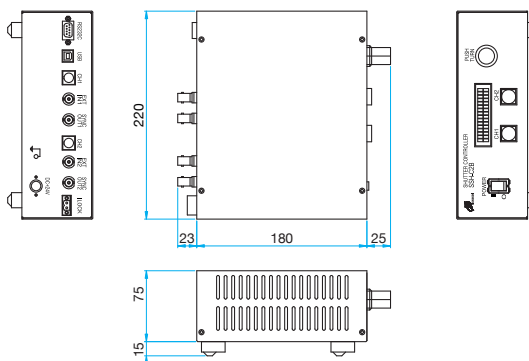
- ▶ USB cables (USB-2) and RS232C cables (RS232C/STR-3) are available to connect to a PC. [▶WEB Reference](#) [Catalog Code](#) W9053

### Attention

- ▶ This shutter controller does not come with cables. Check the shutter specification and select the appropriate cable.
- ▶ If the shutter connected to the controller is different from the shutter type selected on the controller, shutter will not operate properly.
- ▶ To use a shutter other than Opto Sigma shutters, please set the appropriate voltage and pulse time. Incorrect settings may damage the shutter.



### Outline Drawing



Shutter Cable			
Product Name	Shutter Cable for SSH-25RA	Shutter Cable for SSH-S	Extension cable for shutter
Part Number	<b>SSH-CA2-LORA</b>	<b>SSH-CA2-LOAA</b>	<b>SSH-CA2-LOAB</b>
Cable Length [m]	2	2	2
Connector (controller side)	One-touch lock type plug (4-pin male)	One-touch lock type plug (4-pin male)	One-touch lock type plug (4-pin male)
Connector (shutter side)	One-touch lock type Round plug (4-pin male)	One-touch lock type plug (4-pin male)	One-touch lock type Cable with socket (4-pin female)

# Square Plate Holders Camera Holders

KMH  
CMH

KMH

RoHS Catalog Code W4047

Holders for square plates such as flare plates (BBP), test targets and square filters.

- Designed to gently hold glass plates, the holder include a soft cork lined back plate and resin tipped clamping screws.



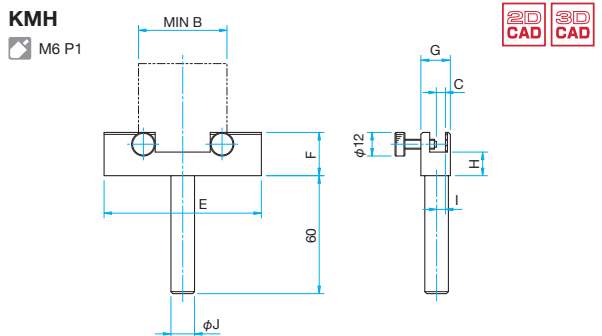
### Guide

- Use the sliding cylindrical lens holder (CHA) to hold rectangular lenses. [Reference](#) C048
- Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.

### Attention

- Glass can break if screws are over tightened.

### Outline Drawing



Part Number	MIN B (mm)	MAX C (mm)	MIN C (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)	φJ (mm)
KMH-30	10	5	3	30	15	12	10	3.5	φ12
KMH-80	45	7	1	80	22	15	12.5	4.5	φ12
KMH-150	100	17	6	150	30	30	15	10.5	φ20

Specifications		Primary material: Aluminum Finish: Black Anodized		
Part Number	Options specified*	Compatible Optics Dimensions [mm]	Compatible Optics Thickness [mm]	Weight [kg]
KMH-30	N/EE/UU	□10 – □45	3 – 5	0.08
KMH-80	N/EE/UU	□45 – □100	1 – 7	0.11
KMH-150	N	□100 – □180	6 – 17	0.38

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

CMH

RoHS Catalog Code W4104

Post mounted ball head camera mount. Allows cameras with standard 1/4-20 mounting holes to be used on an optical breadboard.

- Loosen the clamp to freely position the camera, and tighten the clamp to lock in place.
- These platforms can mount any camera because they use the mounting screw standard commonly used for cameras.
- Posts with 1/4-20 screws can be directly attached to cameras for applications where tilt adjustment is not needed.

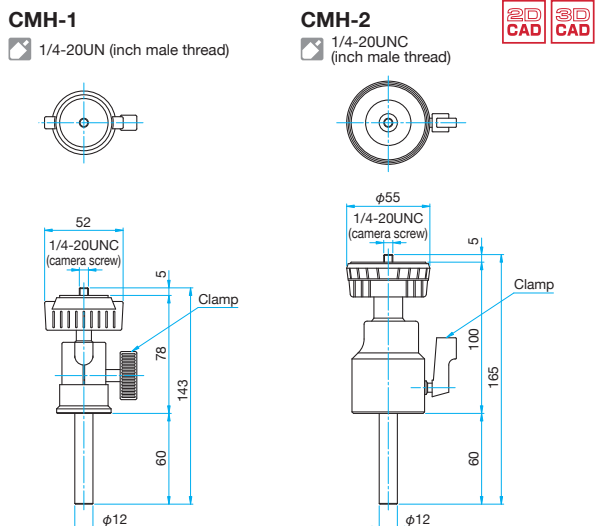
[WEB Reference](#) [Catalog Code](#) W6052



Specifications		Primary material: Aluminum Finish: Black Anodized	
Part Number	Options specified*	MAX Load Capacity [N]	Weight [kg]
CMH-1	N	29.5 (about 3kgf)	0.17
CMH-2	N	40 (about 4kgf)	0.34

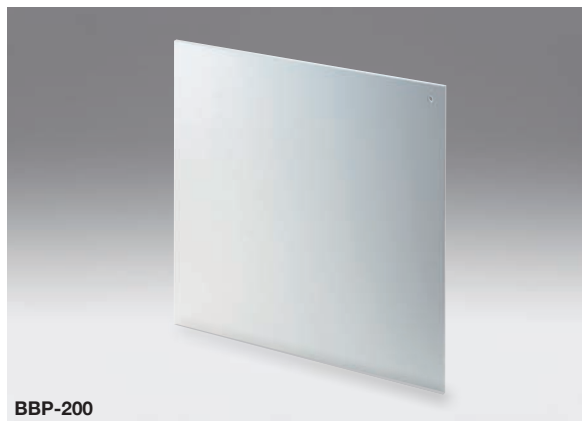
\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

### Outline Drawing



Light shields can be used to block stray light in laser experiments and can also be used as viewing screens for interferometers or other setups requiring a projection screen.

- BBP-2505B includes a measurement scale to allow easy adjustment of the height of the optical axis of laser beam.
- BBP-3130B can block light in a wide area.
- BBP-2505B and BBP-3130B include magnet bases.
- BBP-200 has a white matte finish for use as a viewing screen.



BBP-200

### Guide

▶ The Square Optics Holder (KMH-80) can be used to hold the BBP-200.

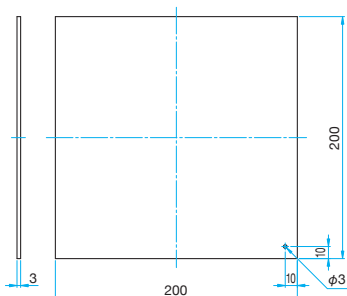
### Attention

▶ Be sure to wear laser safety goggles. When high-power laser or high energy pulsed laser strike these surfaces, there is a potential for scattered light to be directed to the eyes.

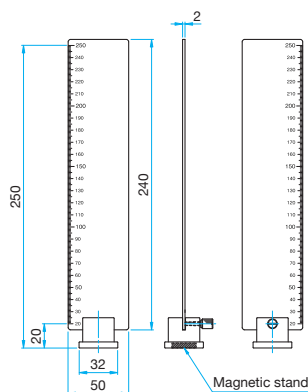


### Outline Drawing

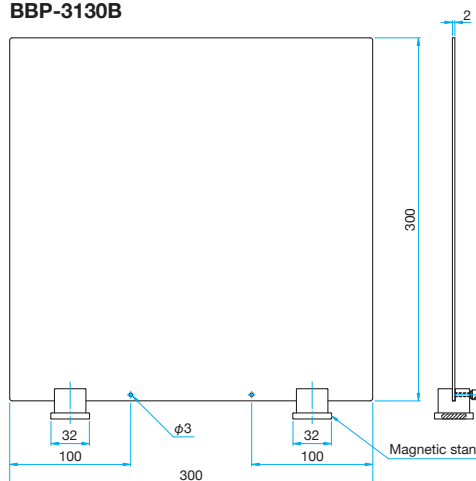
BBP-200



BBP-2505B



BBP-3130B



### Specifications

Primary material: Aluminum  
Finish: Clear anodize (BBP-200 only), Black anodize

Part Number	Accessory	Scale	Weight [kg]
BBP-200	—	—	0.32
BBP-2505B	Magnetic stand (1pc)	Both sides	0.18
BBP-3130B	Magnetic stand (2pcs)	—	0.70

# Test Target Holders Beam Dumps

TGH  
BD

## TGH

RoHS Catalog Code W4049

Fixtures used for optical axis adjustment of non-visible lasers. Insert IR sensor cards or van paper in the path using the spring clips, rotate cross wires into the laser light to confirm the positional relationship of the shadow of beam and cross wire.

- The cross wires are retractable and are placed in the center of posts to enable good repeatability.
- If two target holders are placed leaving an interval, they can be used as a laser beam tilt adjustment jig.



Specifications				Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Clear Aperture [mm]	MAX Holding Thickness [mm]	Weight [kg]
TGH-30	N/UU	φ30	3	0.09

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

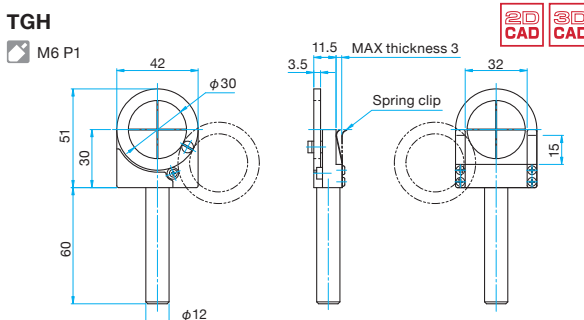
### Guide

- ▶ Iris diaphragm (IH) convenient for visible light lasers is also available. [Reference](#) C063

### Attention

- ▶ Use IR sensor cards with large light receiving surface. Card type IR/UV sensors (SIRC-1 or SUVC-1) cannot be used.

### Outline Drawing



## BD

RoHS Catalog Code W4050

Beam Dumps safely terminate the beam of high-power lasers and high energy pulse lasers. The laser light is scattered and absorbed in the beam dump and converted into heat.

- Because the incident laser beam is scattered onto a conical surface, the light scatter back to the incident side can be greatly attenuated.
- BD-40 for small beam diameter (φ5mm or less) and BD-80 for large diameter beams (φ30mm or less) are available.



Specifications				Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Aperture Diameter [mm]	Weight [kg]	
BD-40	N/EE/UU	φ10	0.15	
BD-80	N/EE/UU	φ52	0.65	

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

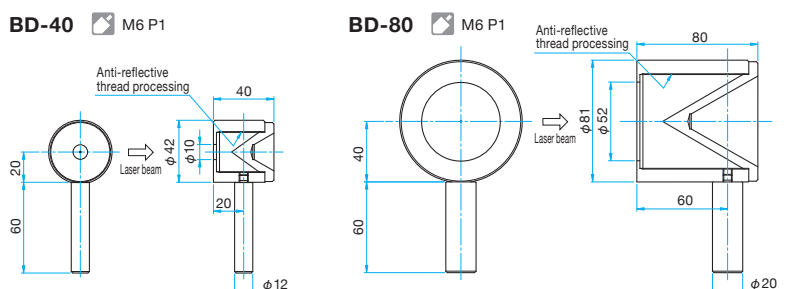
### Guide

- ▶ High-power laser shutters (SHPS) combining optical path switching shutter and beam diffuser are available. [WEB Reference](#) [Catalog Code](#) W4110

### Attention

- ▶ When used with a high-power laser, the beam diffuser might become quite warm. Be careful not to touch the beam diffuser directly.
- ▶ When used with a high energy pulse laser, the finish of the conical surface may be lost. The volume of scattering will increase somewhat, but as long as the conical shape is not changed, the beam diffuser will maintain performance.
- ▶ When a repeatedly oscillating high energy pulse laser irradiates the beam diffuser, the beam diffuser sometimes makes a sound like it is striking metal. This is due to the shock wave produced when the laser changes to heat on a metallic surface, not damage on the beam diffuser.

### Outline Drawing





Fiber holders equipped with an adjustment mechanism for three axes including vertical, horizontal and focus direction. These holders can handle fibers with various connectors by replacing adapters.

- The large slit on the adapter cylinder enables connection of various fiber connectors inside the adapter cylinder.
- It is capable of rotating the polarizing axis of a polarization-preserving fiber for 360 degrees. (See Attention)
- The focus adjustment lever of the 3-axis holder can move the tip of a fiber in the optical axis direction.
- Each adjustment mechanism of the 3-axis holder has a clamp mechanism to fix adjustment positions.
- Adapters compatible with the FC, SMA, and ST connectors of various fibers are available.



### Guide

▶ Fiber holders equipped with tilt and rotational adjustment mechanisms (FOP-2, FOP-2-SMA) are also available.

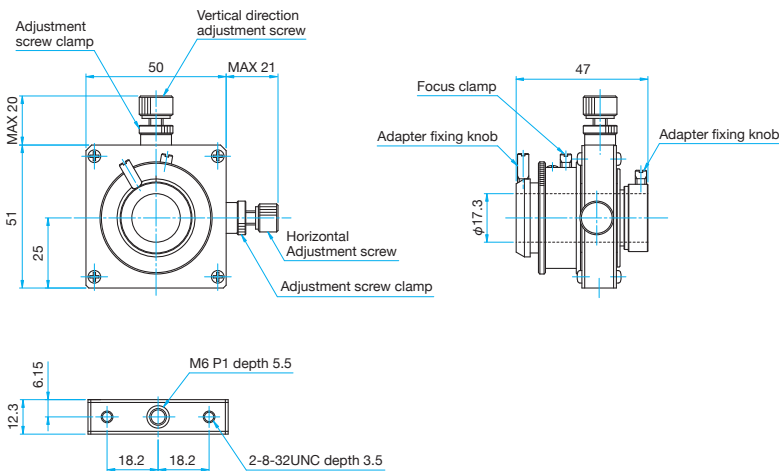
### Attention

- ▶ Rotating the fiber chuck can cause displacement of the fiber core in the X and Y directions. When turning the chuck, fine adjustment of the XY axes of the holder may be required.
- ▶ Pulling a fiber cord hard may cause misalignment of the holder.
- ▶ Readjustment is necessary when the chuck is removed and reinstalled.
- ▶ For post mounting please purchase a post (PO) separately.

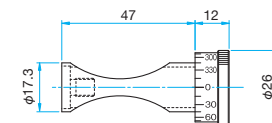


## Outline Drawing

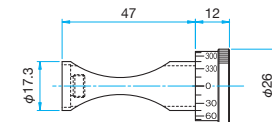
FOM-3 M6 P1



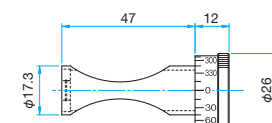
FOM-ADP-SMA



FOM-ADP-FC



FOM-ADP-ST

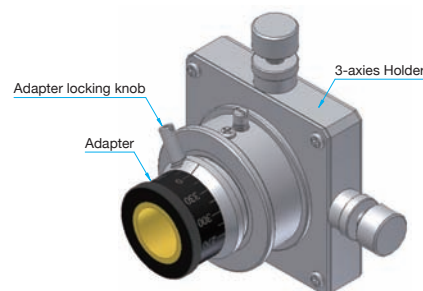


3-axis Holder					Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Centering Adjustment Range [mm]	Resolution [mm/rotation]	Focus Adjustment Range [mm]	Weight [kg]
FOM-3	UU	±2	0.25	±3	0.14

\* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". [Reference](#) C007

Adapter			Primary material: Brass Finish: None
Part Number	Compatible Fiber Connector	Weight [kg]	
FOM-ADP-FC	FC	0.05	
FOM-ADP-SMA	SMA	0.05	
FOM-ADP-ST	ST	0.044	

### Attaching the adapter



- ① Please connect a fiber connector into the adapter cylinder.
- ② Please insert the adapter into the 3-axis holder, and secure it by using the adapter locking knobs located on both ends of the 3-axis holder.

# Mini-Fiber Optics Holders Adapter for Mini-Fiber Optic

**MFH**  
**MFH-ADP**



Catalog Code **W4523**  
Catalog Code **W4524**

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

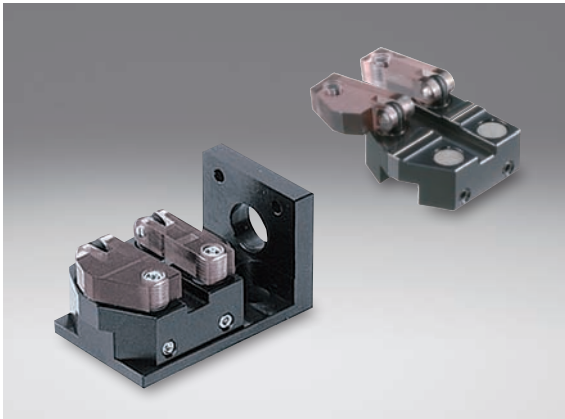
Shutter

Others

Fiber

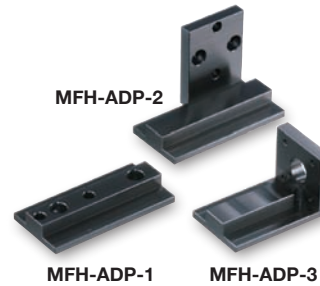
Holders used for holding optical fiber strands of various jacket diameters (coating diameters). By replacing the mounting adapters (MFH-ADP), these holders can mount on various stages in addition to two-axis pinholes/objective holders.

- Using the V groove and the resin clamps, these holders hold the tip of an optical fiber where the coating is removed for approximately 15mm. The V groove and the resin clamps also fix the 900µm jacket right next to the portion to immobilize the optical fiber.
- The resin clamps have built-in magnetizable set bolts, and gently fasten an optical fiber by the magnetic force of the magnets of these fiber holders.
- There is a keyway on the bottom of these holders. The keyway can be installed on the keys of various mounting adapters (MFH-ADP) to slide back and forth. The holders are securely fastened on the mounting adapters with set bolts.



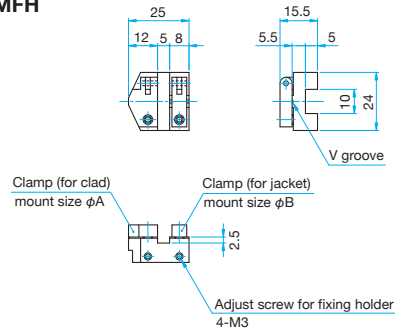
**Attention**

► These holders cannot be installed in the fiber alignment systems (DAU). Please contact our International Sales Division for holders for the fiber alignment systems.



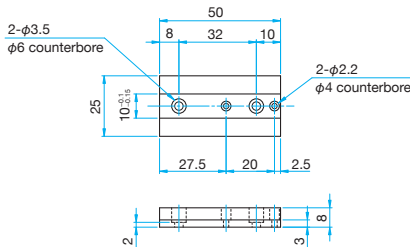
**Outline Drawing**

**MFH**



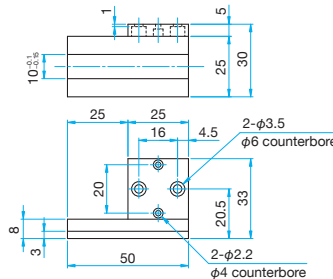
**MFH-ADP-1**

1 Pan head screw M2x6...2 screws  
Pan head screw M3x6...2 screws



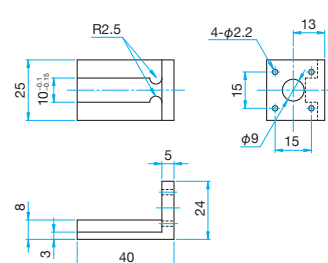
**MFH-ADP-2**

1 Pan head screw M2x6...2 screws  
Pan head screw M3x6...2 screws



**MFH-ADP-3**

1 Pan head screw M2x8...4 screws



Holder	Primary material: Aluminum Finish: Black Anodized		
Part Number	Jacket diameter $\phi B$ [µm]	Cladding diameter $\phi A$ [µm]	Weight [kg]
<b>MFH-250</b>	$\phi 150 - \phi 250$	$\phi 60 - \phi 130$	0.03
<b>MFH-500</b>	$\phi 500$	$\phi 125 - \phi 250$	0.03
<b>MFH-900</b>	$\phi 900$	$\phi 125 - \phi 250$	0.03

Adapter	Primary material: Aluminum Finish: Black Anodized	
Part Number	Overview	Weight [kg]
<b>MFH-ADP-1</b>	For fixing flat surface (M2, M3 counterbored)	0.02
<b>MFH-ADP-2</b>	For fixing perpendicular (M2, M3 counterbored) to convert the 90 ° orientation	0.03
<b>MFH-ADP-3</b>	For fixing perpendicular (M2 counterbored)	0.03

Holders used for securing and adjusting optical fibers with ferrules (fibers before connectors are attached). When used in combination with the adapter for fiber optics holders (OFH-ADP), these holders can hold  $\phi 0.3\text{mm}$  to  $\phi 4\text{mm}$  ferrules.



- Focus adjustment knob enables collimation adjustment in combination with the lens.
- The OFH-1 two-axis holder allows positioning of optical fibers.
- The OFH-2 four-axis holder adds tip and tilt capability.
- Both OFH-1 and OFH-2 are available with high precision differential adjusters for more demanding applications.
- Custom sleeves (OFH-ADP) are available to hold ferrules from 0.3mm to 4.0mm diameters. Two setscrews in the body of the holder clamp the sleeve tight and hold the fiber and sleeve in place.

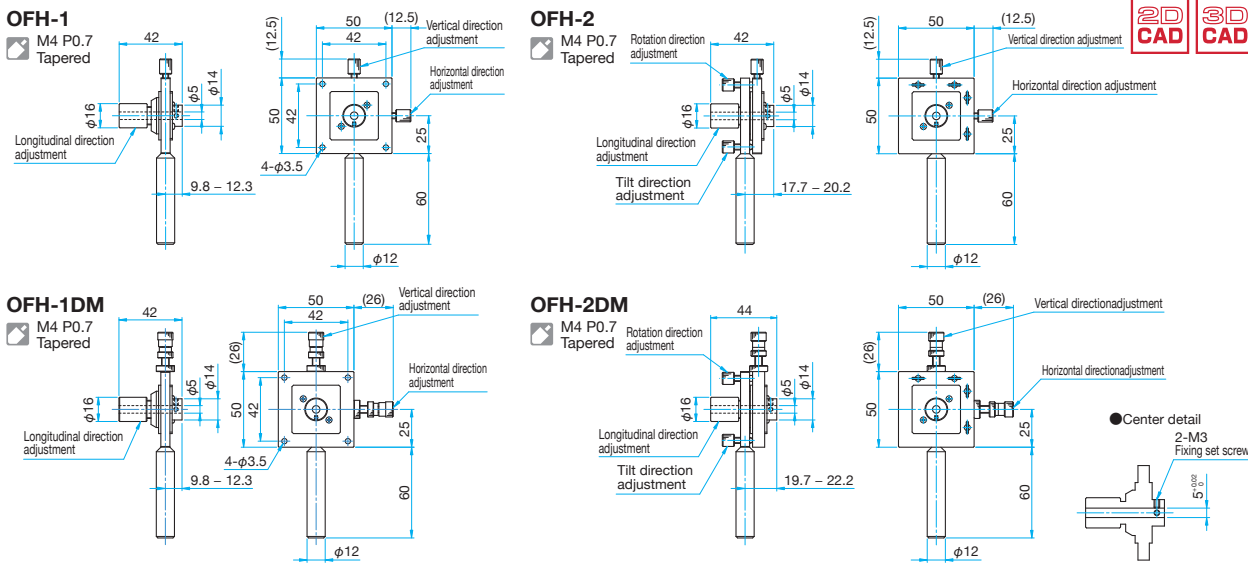
### Guide

- ▶ Fiber optics holders for FC connectors (FOP) and for SMA connectors (FOP-SMA) are also available. [Reference](#) C076
- ▶ Post length can be modified for an additional charge. Contact our Sales Division for more information.

### Attention

- ▶ For information regarding use with single mode fibers, contact our Sales Division.
- ▶ OFH-ADP sleeves are made to order. Contact our Sales Division for delivery times.
- ▶ To hold bare fibers without a ferrule, we recommend using the mini-fiber optics holders (MFH). [Reference](#) C074

### Outline Drawing



### Specifications

Primary material: Aluminum  
Finish: Black Anodized

Part Number	Centering Adjustment Range [mm]	Adjustment Range Tilt [°]	Adjustment Range Rotation [°]	Focus Adjustment Range [mm]	Centering Adjustment Resolution [mm/rotation]	Centering Fine Adjustment Resolution [mm/rotation]	Adjustment Resolution Tilt [°/rotation]	Adjustment Resolution Rotation [°/rotation]	Weight [kg]
OFH-1	±1.25	—	—	±1.25	0.5	—	—	—	0.12
OFH-2	±1.25	±2	±2	±1.25	0.5	—	about 0.7	about 0.7	0.15
OFH-1DM	±1.25	—	—	±1.25	0.5	0.05	—	—	0.14
OFH-2DM	±1.25	±2	±2	±1.25	0.5	0.05	about 0.7	about 0.7	0.17

## Adapter Sleeve for Fiber Optics Holders | OFH-ADP



Made to order according to the ferrule diameter of your optical fiber. Available with inner diameter between  $\phi 0.3$  and  $\phi 4.0$  by 0.1mm increments.

### Attention

- ▶ These adapters are not standard ceramic split sleeve alignment sleeves for ferrules. They are a custom design for this application.

### Specifications

Primary material: Delrin  
Finish: None

Part Number	Outer Diameter [mm]	Inner Diameter [mm]	Inner Diameter MIN unit [mm]
OFH-ADP	$\phi 5$	$\phi 0.3 - \phi 4.0$	0.1

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

Shutter

Others

Fiber



## Two-axis pinhole style holders for optical fibers with FC connector.

- Two types of actuators are available; the screw type (FOP) provides simple adjustment suitable to multimode fibers, and the coarse/fine screw type (FOP-DM) which is capable of fine adjustment required for single mode fibers.
- The FOP-1 has a two-axis adjustment mechanism.
- The FOP-2 has four axes of adjustment providing tip and tilt as well as X and Y adjustments.
- The FC receptacles of FC type fiber optics holders can be replaced with the receptacles for SMA type fiber holders (FOP-ADP-SMA) or mini-fiber optics holders (MFH-ADP-3). [Reference](#) C074

### Guide

- ▶ Two-axis pinholes/objective holders for SMA connectors (FOP-SMA) are also available.
- ▶ We can change the post length. Please specify the post length when you place an order, then we will deliver the product after replacing the post with one with your specified length. Because those fiber optics holders use a special post, replacement of the post is at your expense.
- ▶ These holders will be delivered attached with dummy FC connector. This connector cannot be used for an optical fiber.

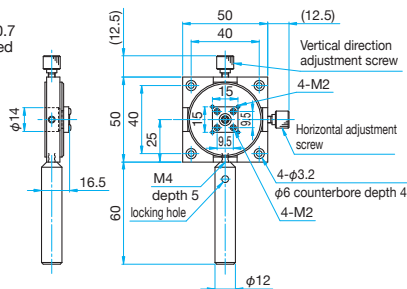
### Attention

- ▶ The design of the standard FC receptacle includes a stop that the end of the fiber ferrule rests against. This positions the tip of the fiber 1.5mm from the end face of the receptacle. If it is necessary to align the end of the FC ferrule with the end face of the holder, use the connectors for FC type fiber optics (FLAD).
- ▶ Detaching and reattaching the fiber will likely result in the fiber needing realignment.

### Outline Drawing

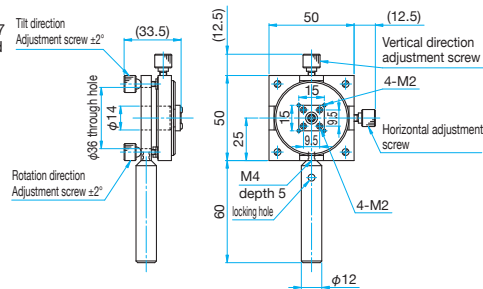
#### FOP-1

- ☑ M4 P0.7 Tapered



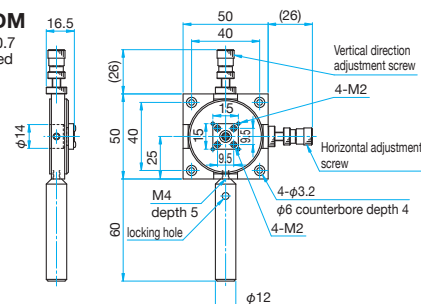
#### FOP-2

- ☑ M4 P0.7 Tapered



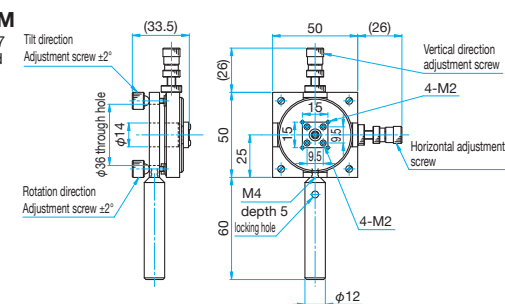
#### FOP-1DM

- ☑ M4 P0.7 Tapered



#### FOP-2DM

- ☑ M4 P0.7 Tapered



### Specifications

Part Number	Centering Adjustment Range [mm]	Adjustment Range Tilt•Rotation [°]	Centering Adjustment Resolution [mm/rotation]	Centering Fine Adjustment Resolution [mm/rotation]	Micro Indicator Conversion [mm/DIV]	Adjustment Resolution Tilt•Rotation [°/rotation]	Primary material: Aluminum
							Finish: Black Anodized
FOP-1	±1	—	0.5	—	—	—	Weight [kg]
FOP-2	±1	±2	0.5	—	—	about 0.7	0.14
FOP-1DM	±1	—	0.5	0.05	0.0025	—	0.22
FOP-2DM	±1	±2	0.5	0.05	0.0025	about 0.7	0.15
							0.24

## Adapters for Ferrule | FOP-ADP/FLAD



FOP-ADP

FOP-ADP includes a standard FC receptacle and FC connector. FOP-ADP comes with an FC connector. Be aware that attaching the FC connector to a fiber requires special tools and skills to achieve a quality termination.



FLAD

FLAD is designed to hold a bare ferrule or the tip of a connectorized ferrule.

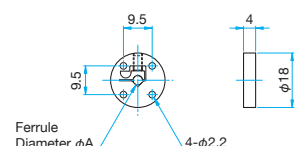
- Tightening the set screw located on the top of the adapter clamps the ferrule from the side.
- When using this adapter for a nonstandard ferrule or for something other than a ferrule, insure that the diameter of the part matches the diameter marked on the FLAD adapter.

Specifications		Primary material: Aluminum (FLAD)
		Finish: Black Anodized (FLAD)
Part Number	Ferrule Diameter φA [mm]	Weight [kg]
FOP-ADP	—	—
FLAD-2.5	φ2.5	0.003
FLAD-3.05	φ3.05	0.003

### Outline Drawing

#### FLAD

- ☑ hexagon socket head cap screw M2x6...4 screws





Two-axis pinhole style holders for optical fibers with SMA connector.

- Two types of actuators are available; the screw type (FOP-SMA) provides simple adjustment suitable to multimode fibers, and the coarse/fine screw type (FOP-DM-SMA) which is capable of fine adjustment required for single mode fibers.
- The FOP-1-SMA has a two-axis adjustment mechanism.
- The FOP-2-SMA has four axes of adjustment providing tip and tilt as well as X and Y adjustments.
- The SMA receptacles can be replaced with mini-fiber optics holders (MFH-ADP-3). Reference C074

Application Systems  
Optics & Optical Coatings  
Opto-Mechanics  
Bases  
Manual Stages  
Actuators & Adjusters  
Motorized Stages  
Light Sources & Laser Safety

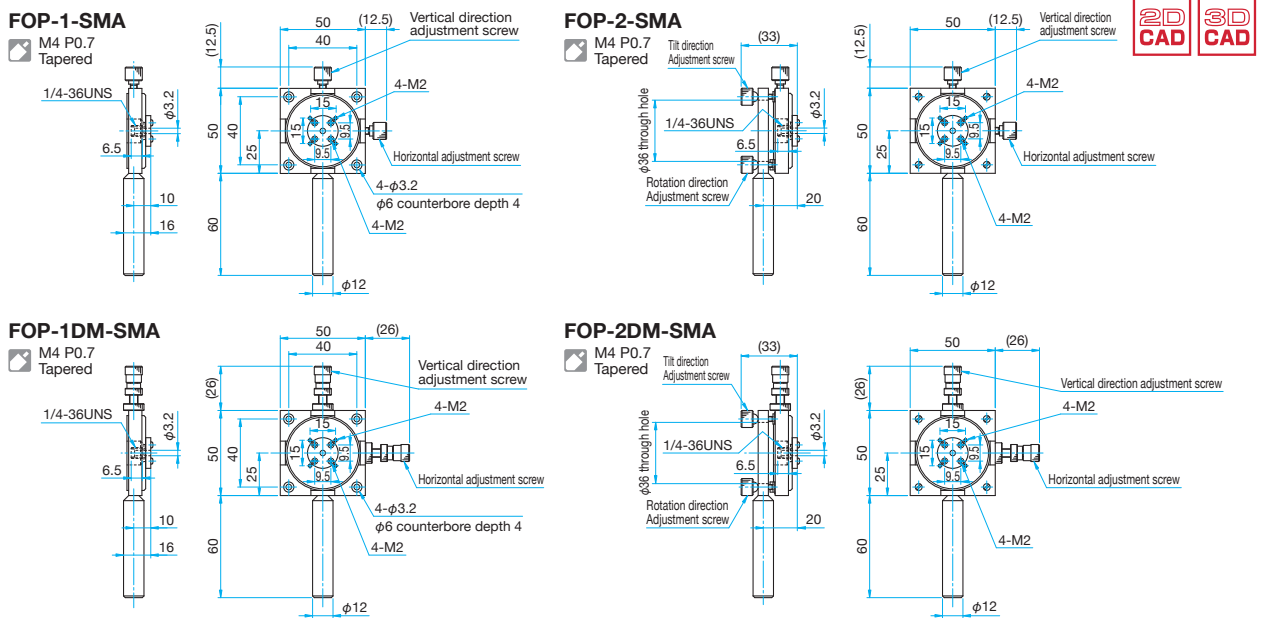
Guide

- ▶ Two-axis pinholes/objective holders for FC connectors (FOP) are also available.
- ▶ We can change the post length. Please specify the post length when you place an order, then we will deliver the product after replacing the post with one with your specified length. Because those fiber optics holders use a special post, replacement of the post is at your expense.

Attention

- ▶ Detaching and reattaching the fiber will likely result in the fiber needing realignment.
- ▶ Due to SMA connectors having short nuts, it is hard to tighten them completely by hand. To tighten them securely or to remove them, needle nose pliers are suggested.

Outline Drawing



Specifications							Primary material: Aluminum Finish: Black Anodized
Part Number	Centering Adjustment Range [mm]	Adjustment Range Tilt•Rotation [°]	Centering Adjustment Resolution [mm/rotation]	Centering Fine Adjustment Resolution [mm/rotation]	Micro Indicator Conversion [mm/DIV]	Adjustment Resolution Tilt•Rotation [°/rotation]	Weight [kg]
FOP-1-SMA	±1	—	0.5	—	—	—	0.14
FOP-2-SMA	±1	±2	0.5	—	—	about 0.7	0.22
FOP-1DM-SMA	±1	—	0.5	0.05	0.0025	—	0.15
FOP-2DM-SMA	±1	±2	0.5	0.05	0.0025	about 0.7	0.24

Receptacle for SMA Type Fiber Holder | FOP-ADP-SMA

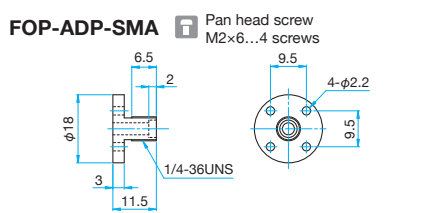
Adapter designed to mount to FOP style holders allow SMA fiber connectors to be used with existing FOP holders.



**Attention**  
▶ The position of the tip of an optical fiber differs depending on the type of SMA connector. Please check the specifications of SMA connectors.

Specifications		Primary material: Aluminum Finish: Black Anodized
Part Number	Weight [kg]	
FOP-ADP-SMA	<0.003	

Outline Drawing





# Adjustable Fiber Collimator | FOPT

RoHS

Catalog Code W4526

Application Systems

Optics & Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators & Adjusters

MotORIZED Stages

Light Sources & Laser Safety

Index

Guide

Mirrors

Lenses

Prisms

Polarizers

Lasers

Beam Shaping Diffusers

Filters

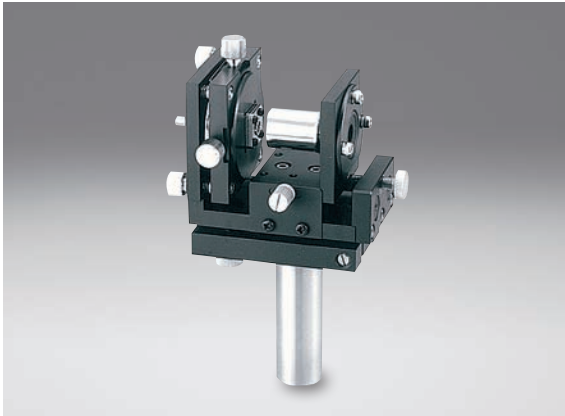
Shutter

Others

Fiber

The adjustable collimator holder can be used to collimate the output of an optical fiber of FC or SMA type connector.

- These holders can adjust the divergence, outgoing direction, and center position of the luminance distribution (fiber rotation and tilt) of a beam.
- The objective lens included with this holder has a short focal length (OBL-10) so that collimated light with small beam diameter can be obtained.
- The objective lenses used in these holders are standard microscope objectives so that high transmittance and high performance (spherical aberration) can be obtained in the visible light range.
- When used with a single-mode fiber, the output beam will have a Gaussian distribution.



### Guide

- ▶ Post length can be changed by specifying the post length when you place an order. We may charge the difference in price depending on the length. Contact our Sales Division for more information.
- ▶ A dummy FC connector is included, but should not be used for an optical fiber.

### Attention

- ▶ To launch light into a single-mode fiber, a more precise adjustment mechanism is required. Contact our Sales Division for more information.
- ▶ Some types of connectors may be difficult to mount on the receptacles of two-axis pinholes/objective holders.
- ▶ The collimated beam diameter changes depending on the NA of the fiber. Generally, beam diameter D is found with the following formula.  

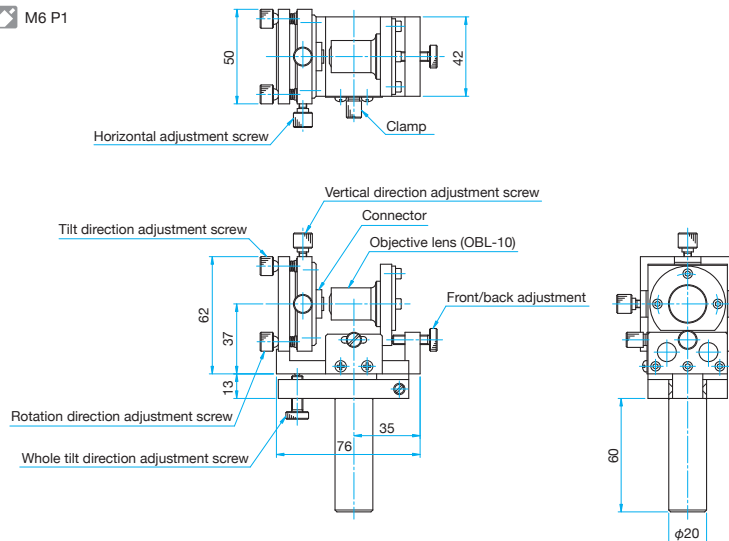
$$D = 2 \times NA \times f$$
 f: Focal length of objective lens, NA: Numerical aperture of fiber



## Outline Drawing

### FOPT

M6 P1



## Specifications

Part Number	Compatible Connector	Focal length Objectives Lens [mm]	Centering Adjustment Range [mm]	Focus Adjustment Range [mm]	Fiber Adjustment Range Tilt·Rotation [°]	Holder Adjustment Range Tilt [°]	Centering Adjustment Resolution [mm/rotation]	Fiber Adjustment Resolution Tilt [°/rotation]	Fiber Adjustment Resolution Rotation [°/rotation]	Holder Adjustment Resolution Tilt [°/rotation]	Weight [kg]
FOPT-FC	FC	16.6	±1	±5	±2	±2.5	0.5	about 0.7	about 0.7	about 0.53	0.55
FOPT-SMA	SMA	16.6	±1	±5	±2	±2.5	0.5	about 0.7	about 0.7	about 0.53	0.55

Primary material: Aluminum  
Finish: Black Anodized