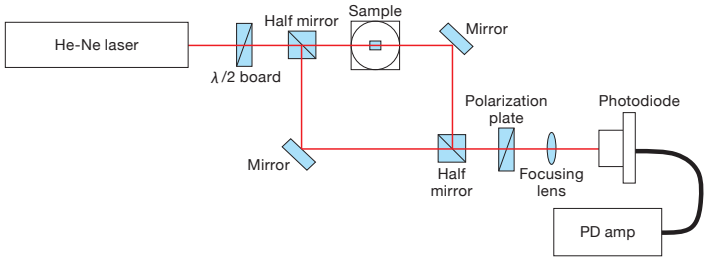
Holders

Holders Guide

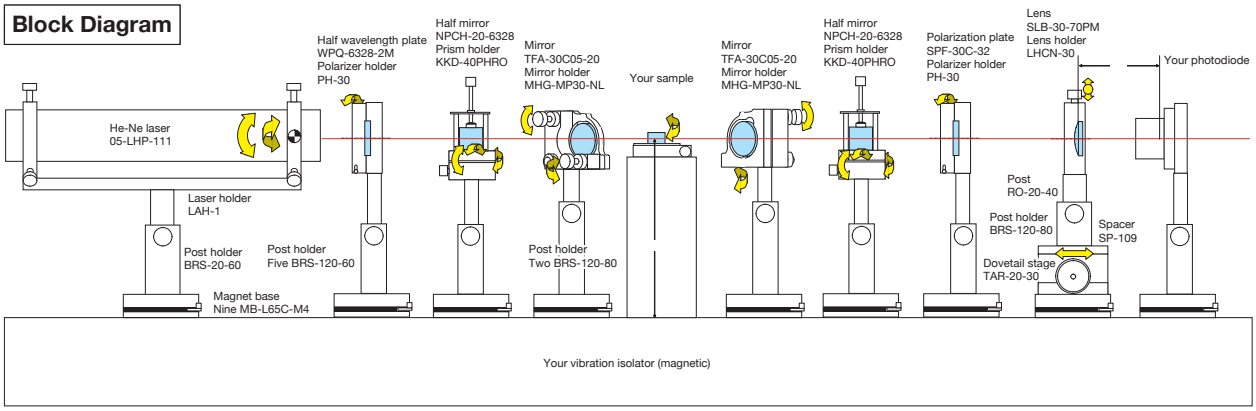
There are many parameters must to be taken into consideration for a right choice of optics holders. Make sure that the required adjustments and the dimensions are adequate to the function of the optical system set up that you are going to realize.
Here below we are showing some set up examples which will provide you an idea for your selection.

First prepare an optical path diagram based on experimental principles to make the optical experiment system.
However, the optics and devices are drawn on most optical path diagrams, but holders and adjustment axes are not.
Thus, create a block diagram like the following from the optical path diagram and experimental conditions.

Optical Path Diagram



Block Diagram



Optics need to be placed in appropriate positions one by one, versus the laser beam, in order to set up an optical system. Also, because the holders and adjustment axes utilized will vary depending on the type of optics and their application method, this information should be reflected in the block diagram.
In particular by looking over the entire optical system, the final parts structure is decided by confirming whether the optical axis heights are arranged, whether the placed holders are interfering, and whether the required adjustment mechanisms have been provided in order to satisfy the performance of the optical system.

Optical Axis Height

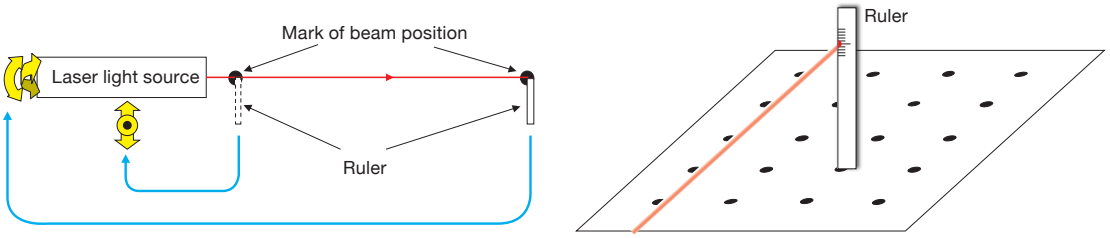
A general optical experiment system is deployed in a horizontal plane on a secure baseplate. Most lasers set up on a baseplate emit beams in the horizontal direction. Optics are placed with the laser beam as the standard.
Ideally, the optics used in an optical system are all the same height as the laser beam. However, because the optical axis height of holders will often differ when types of optics vary, select post holders and spacers of proper length so that optics have the same height.
If the optical axis height of components such as laser light sources or measurement samples cannot be changed, then set the optical axis height of other optics with that height as a standard. Also when there is nothing to restrict optical axis height, set the optical axis of other optics with a holder not lower than the lowest optical axis height as the standard.
[Attention] If optical axis height has not been decided prior to purchasing holders and baseplates, repurchase of holders and additional parts might be required.

Alignment

Light cannot be touched, nor can its flight trajectory be seen directly. Although the laser beam is striking the optics, where it is doing so, and at what angle cannot be seen directly.
For this reason, the positional relationship between laser beam and optics is judged by observing the light of the laser beam reflected by the optics and the light transmitted through the optics. This method of optical adjustment is called “alignment”. Here, we present a few alignment methods used when assembling optical systems.

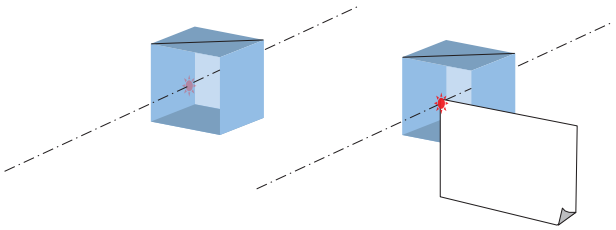
●Laser beam adjustment

Make a mark beforehand at the location where the laser beam will pass through on the baseplate. It is convenient to pass the laser beam along the position of the holes in cases where an optical breadboard with mounting holes opening in matrix shape is used.
Position the laser light source to emit the laser beam, and confirm the position of the laser beam with a ruler standing on the baseplate. Stand the ruler on the mark right next to the laser light source, and adjust the beam height by shifting the laser up or down, left or right.
Next, stand the ruler on the farthest mark, and while moving the angle of the laser, adjust it so that the height of the beam irradiating the ruler is the same height as that of the nearest mark. A laser beam at a certain height and parallel to the marks will be obtained by repeating the parallel adjustment and angle adjustment of the laser several times.
After adjustment, secure the laser light source so that the beam will not move.



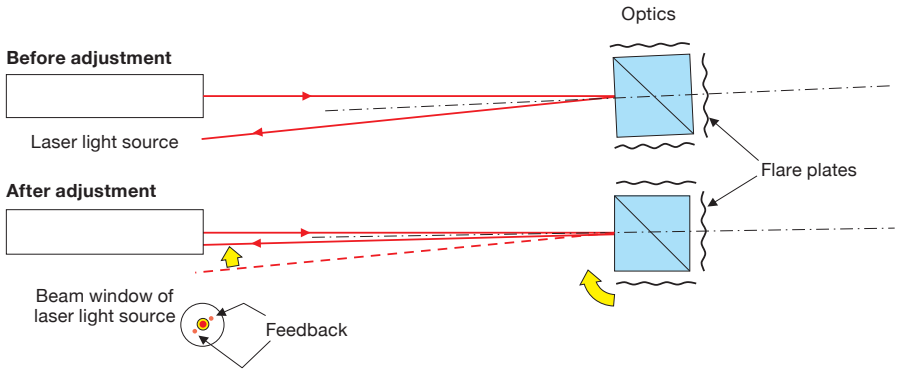
●Passing light through the center of the optic

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

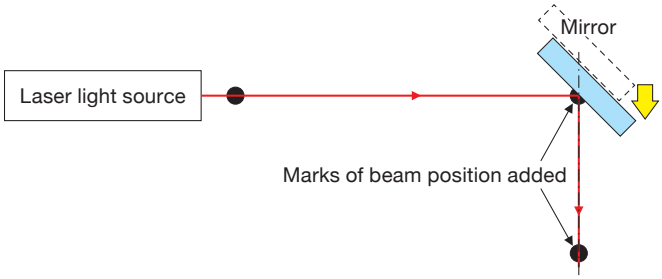
When flat optics are irradiated with a laser beam, the beam reflected with the optic returns to the light source. Confirm the position of the reflected beam at this time. Depending on the optical system, reflected beams sometimes come from multiple optics. In such cases, remove reflected beams from other than the target optic with a flare plate in order to leave only the reflected beam of the optic being adjusted.
Adjust the angle of the optic so that the reflected beam will return close to the laser beam window. When multiple reflected beams are returned from the optic, match the angle of the optic so that the middle of each reflected beam will be in the laser beam window.
[Attention] If the reflected beam completely returns to the laser beam window, then the oscillations of the laser may become unstable.
Adjust reflected beams so that the beam spots can be seen entirely beside the beam window.



Holders Guide

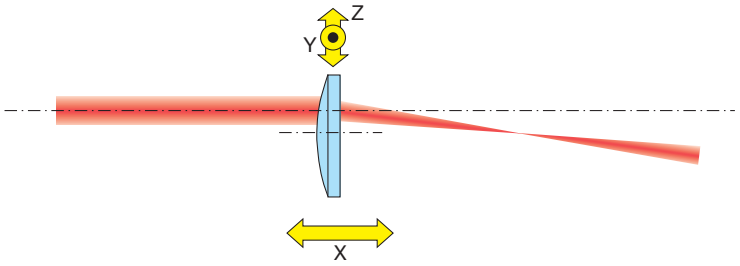
●Placing optics at 45 degrees incidence

On the baseplates where the optical system is set up, place marks at locations on the mirror position and at a right angle to where the reflected beam will pass.
Set up a holder so that the center of the reflective surface of the mirror is on the extended line connecting the location where the reflected beam passes and the position of the mirror.
Move the mirror holder parallel to the extended line, and fix it at a position where the laser beam irradiates the center of the reflective surface of the mirror.
Finally, adjust the mirror holder in rotation and tilt so that the laser beam passes at the same height above the mark of the reflected beam and parallel to the optical breadboard.



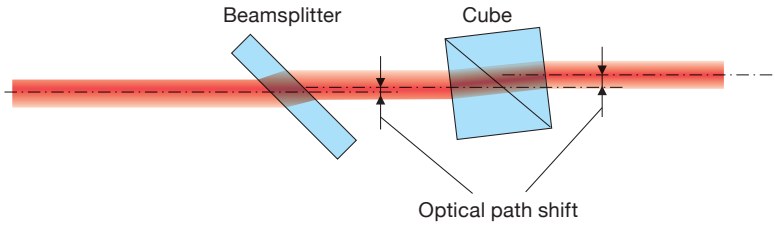
●Adjustment of lens optical axis

If the irradiation point of the laser beam is deviating from the center of the lens, the beam transmitted through the lens proceeds with a tilt against the optical axis. Therefore the lens needs YZ adjustment to set the center of the lens in the laser beam.
Also, some lenses require an X-axis adjustment mechanism to set the point where the laser beam concentrates on the designated point. Adjustment mechanisms such as dovetail stages that allow large and quick travel are suitable for this X-axis adjustment mechanism because it does not require fine tuning.
([Attention] Lenses with short focal length such as objective lens require a precise fine-tuning mechanism for the X-axis.)
In a general optical system, adjustment does not require tilting of lenses. The direction of beam that passes the axis does not change even when a lens is tilted. However, aberration caused by tilt of a lens can be a problem in a precise optical system such as interferometers or laser processing. In such cases, tilt of the lens needs to be adjusted while observing the intensity distribution of wavefront and focus spot to find out the conditions to gain the best characteristics.



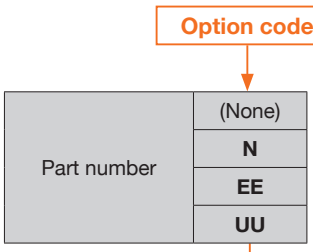
●Transmitted light path of beamsplitter

A transmitted light path does not deviate when an incident laser beam is perpendicular to the surface of a plane parallel optic. If the optic is tilted, however, the output light path is shifted parallel to the incident light path. The amount of this shift varies depending on the refractive index and thickness of the optic as well as the incidence angle. Reference C286
When a tilted beamsplitter is inserted in a light path after optical adjustment, arranged laser beam, optics and holder center might be displaced. For this reason, if a tilted beamsplitter will be inserted later, place optics considering the shift in beam from the beginning.
For example, use a baseplate that can be fixed at any position for optics to be placed behind the beamsplitter in order to fix the optics without constraints of mounting hole positions of the optical breadboard.



How to convert Stand or Post of Holder

Most of the holders listed in the catalog have a M6 male thread post mounted.
When removing this post and replacing it with a male thread post of different specification, the female thread of the holder for post mounting needs to be changed according to the post specification.
To change the female thread for post mounting to an inch-based female thread (8-32UNC) or M4 female thread, it can be specified by adding an option code as the suffix of the holder part number.

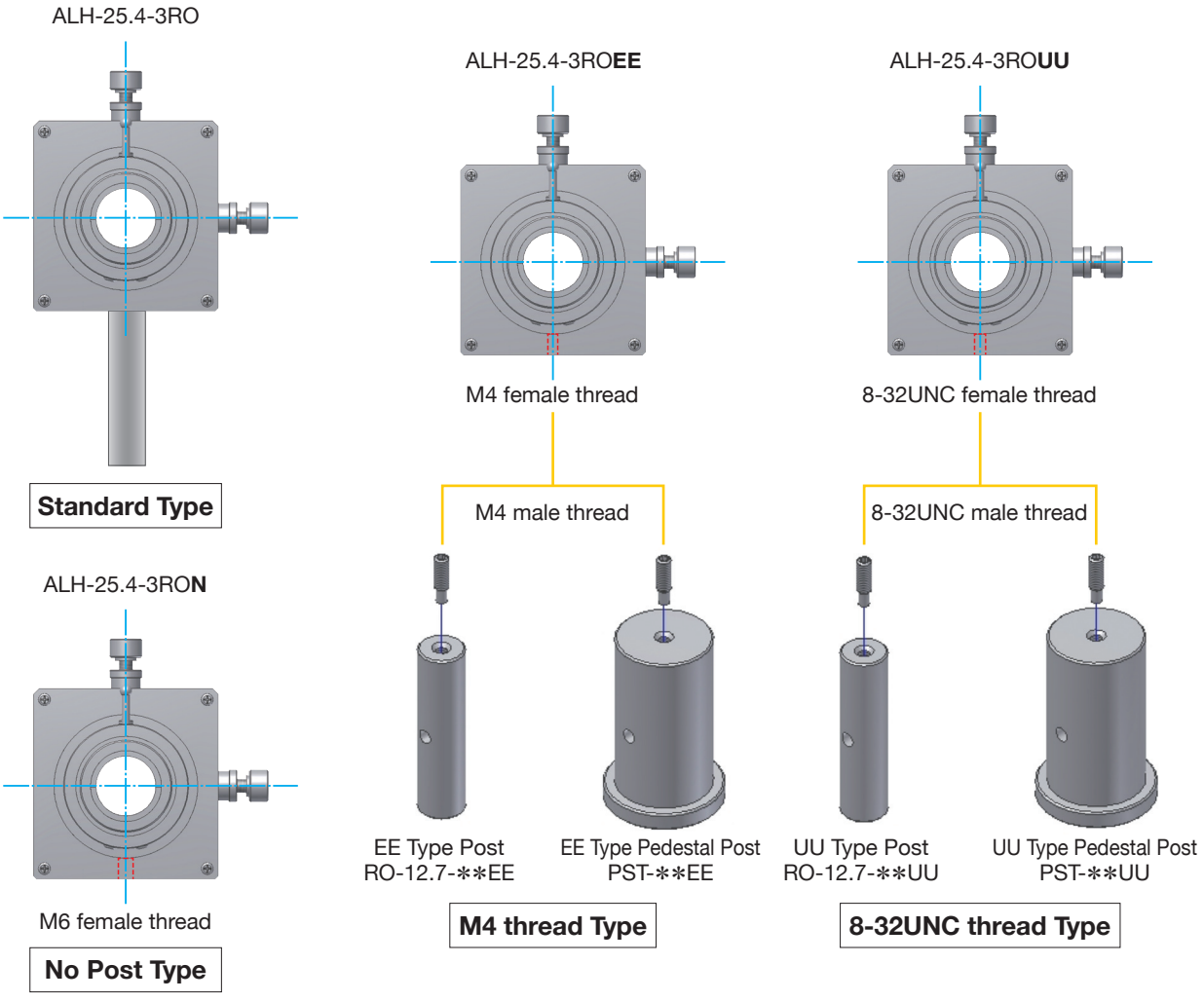


Option code	Post	Female thread size
(None)	Included	—
N	None	M6
EE	None	M4
UU	None	8-32UNC

◎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

When the option code is added to the holder part number, the holder does not come with a post.
To use the holder with an inch-based or M4 thread post or baseplate, please select an EE specification or UU specification post holder or pedestal base.



Mirror Holders Application Note

**We often hear that it is difficult to choose mirror holders because of the large selection of them.
So we sorted the functions of various mirror holders into six categories.
You can easily select the ones that suit for your purpose once you understand the six functions.**

Classification of Mirror Holder Functions

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

(1) Center of Mounting

Some mirror holders are fitted with posts, and the others are not.
The models fitted with posts (such as MHAN) are designed so that the center of the reflective surface of a mirror comes to the center of the post (except MMHN-25RM6 and MMH-50M6). Therefore, once the mirror holders are installed with the center of the post holder aligned to the optical axis, the position of laser beam irradiated on mirrors will not change even when the mounting direction of the mirror holders changes, which allows easy installation of the mirror holders.
When mirror holders not fitted with posts are mounted on posts, the center of a post may not be aligned with the center of a mirror. 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. (Refer to the following figure on the right.)
To install a mirror holder that has offset at the center of mounting, first roughly adjust the angle of the mirror before fixing the holder.
Find the position where the laser beam irradiates at the center of the mirror with the specified incidence angle, and then fix the mirror holder at that position. At this time, the mounting screws of the baseplate and the like used for fixing the holder may not fit the hole positions on the optical breadboard or breadboard. For this reason, use a baseplate designed to fix the mirror holder at the offset position, or a baseplate that provides flexibility in installation position (such as a magnet baseplate). Especially, use of an optical bench requires attention because the center of the mirror needs to be at the center of the bench.
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

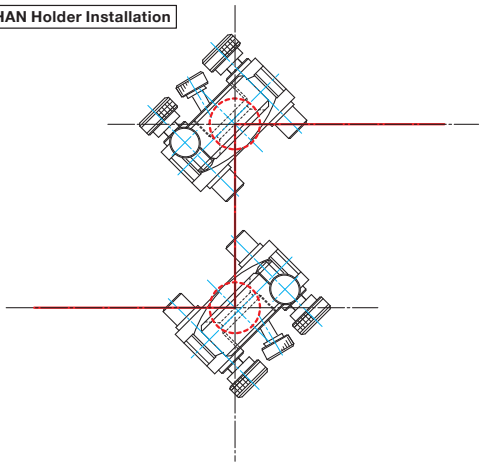
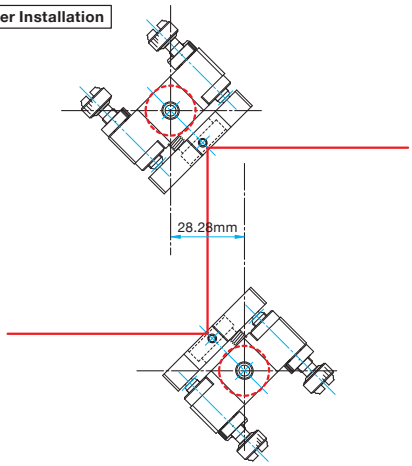


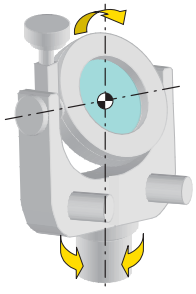
Image of MHG Holder Installation



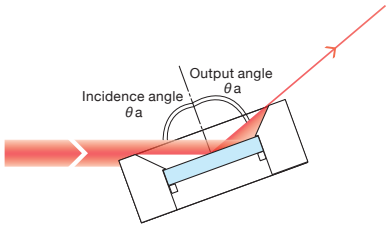
(2) Rotational Mechanism

With their two-axis gimbal structure, the MHAN and BHAN holders can face the reflective surface of the mirror in any direction. Since the rotation center of the gimbal mechanism matches the center of the reflective surface of the mirror, once the laser beam is irradiated at the center of the mirror, the beam stays at the center of the mirror even when the direction of the mirror is changed. The beam can be reflected without changing the incidence beam position or holder installation position. There are no constraints on the range of mirror rotation, thus the reflected beam can be directed in vertical or diagonal directions in addition to horizontal angles.
Depending on the beam diameter or incidence angle, however, part of the beam may be shaded by the mirror holder frame, which shapes the reflected beam different from the incident beam.

Image of Gimbal Type Mirror Holder



Schematic of Beam Loss due to Mirror Frame

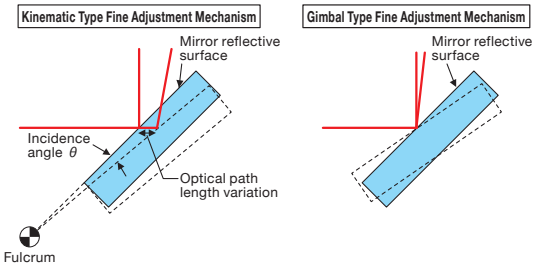


(3) Fine Adjustment Center

Mirror holders are fitted with fine adjustment mechanisms enabling sensitive angle adjustments.
There are two types of fine adjustment mechanisms, the gimbal type enables adjustment of the rotational center of the reflective surface of the mirror, and the kinematic type for a rotational center outside the reflective surface of the mirror.
No differences occur in general usage, but in usages where infinitesimal optical path length variation is an issue such as interferometers or laser resonators, some differences may occur.
Optical path length variations caused by angle adjustment are shown in the table to the right for representative kinematic mirror holders.
The gimbal type has the advantage of small optical path length variations.
In contrast, the kinematic type causes some optical path length variations, but structure is simple, the number of parts is small, and temperature characteristic and variation over time are stable.
In laser resonators requiring high precision, the stable kinematic type is utilized in spite of the sense of shortcoming that adjustment of optical path length becomes cumbersome.

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



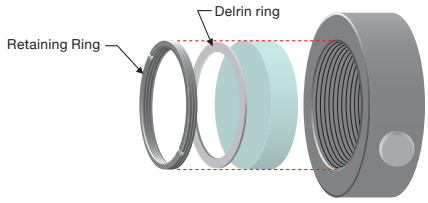
(4) Mounting Method of Optics

In a precision optics experiment such as interferometers or laser concentration, mirrors with high surface accuracy are used. Deviation in shape might not be perceived due to the thickness and hardness of the mirror material. Actually, however, merely slight pressure with a finger will cause minute deviations in the shape of the mirror. The deviation cannot be observed visually, however in precise experiments with light, a size which cannot be disregarded is sometimes observed. Therefore, when fixing mirrors to mirror holders, it is necessary to choose an appropriate mounting method.

●Retaining Ring Mount

The mirror is held with Delrin rings and aluminum retaining rings. Because the mirror will be pressed on the face side of the mirror frame, the position of the reflective surface of the mirror does not change even if the thickness of the mirror changes. There is little risk of optics falling out of their holders due to vibration or impact during shipping, and they can be used safely. When a precise optical system is used, retaining rings must be tightened so that there is no stress on mirrors, and difficulty in the degree of tightening is a shortcoming.

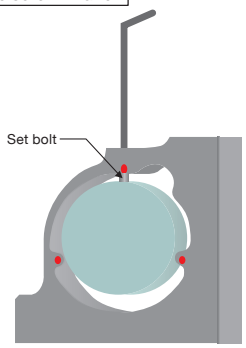
Image of Retaining Ring Fixation



●Lateral Side Screw Mount

The mirror is held on the lateral side with two points on the holder frame and with one resin screw point. Change in the thickness of mirror changes the position of the reflective surface because the end surface of the mirror frame supports the back surface of the mirror. Moreover, since the mirror is supported by the lateral side, it may be mounted tilted relative to the mirror frame.
Stress exerted on mirrors can be controlled using the torque of the screw that presses down against the lateral side of the mirror, and the torque can also be changed after the holder is installed. Attention is required when used in locations subjected to impact or vibration because of the risk that the mirror can fall out.

Image of Lateral Side Screw Fixation



(5) Control Directions

In a complex optical system or an optical system configured in a narrow space, it is sometimes difficult to operate holders, or adjustment mechanisms of the holders may interfere with each other. In such cases, holders with different control directions for fine-tuning mechanisms are convenient. Vertical control and lateral control are available when needed. It may complicate mechanisms for some holders and destabilize them.

(6) Types of Adjustment Mechanisms

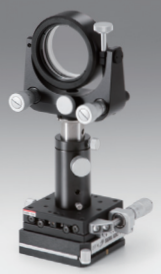
There are two types of adjustment mechanisms for fine-tuning holders, one is the graduated micrometer type, and the other is the fine-pitched precision screw type (pitch size is 0.25mm). The micrometer type provides a long knob, which is easy to hold* and appropriate for frequent operations.
The precision screw type provides as fine adjustment as the micrometer, while making the adjuster short so that a compact optical system is possible.

* Sensitivity will vary among different individuals.

Mirror Holders Selection Guide

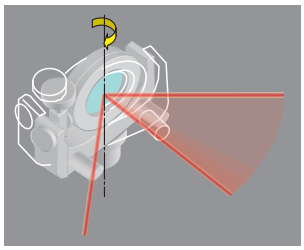
Emphasis on workability

MHAN series
BHAN series

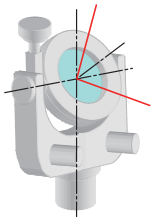


High performance adjustable mechanisms that enable simple alignment without awareness of motion of holders

- ○When used at 45 degrees incidence (MHAN is convenient for beginners.)
- ○When placed on an optical bench
- ○When changing direction of the reflected beam

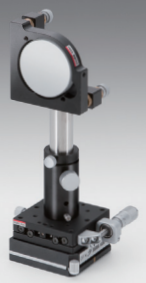


- ○When configuring a three-dimensional optical system



Emphasis on stability

MHG series



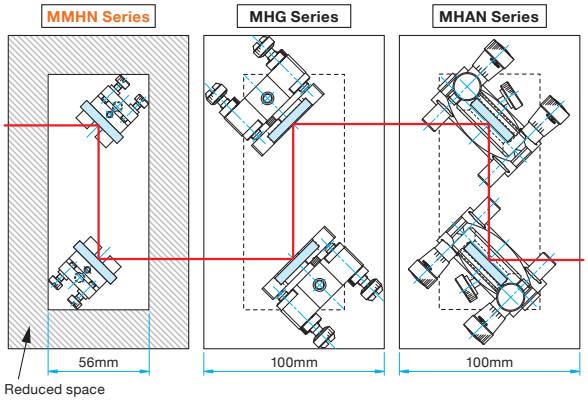
Achieved high stability with its simple structure from where adjustable mechanisms other than fine tuning mechanisms are left out

- ○When the optical system is configured on a low optical axis
- ○When desiring to avoid impact of vibration and temperature fluctuation
- ○When stability of the optical system is required
  Laser resonators, interferometers

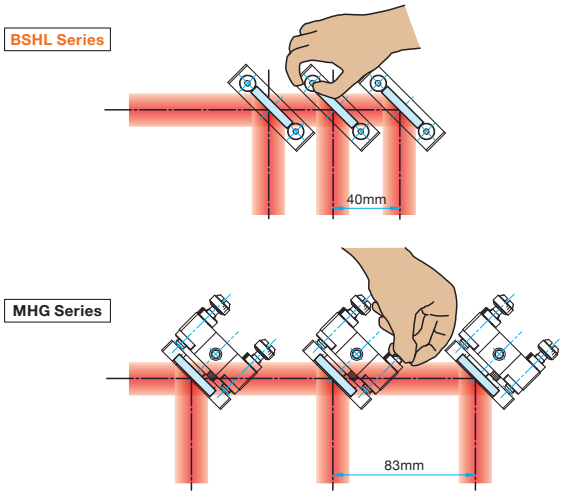
Interferometer configured with MHG mirror holder

Downsizing

The MHG and MHAN mirror holders require a large space of about two circumferences for the size of the optics (mirrors) for adjustment mechanism and operation space. If operability and resolution are not an issue, the space of the optical system can be reduced by using the MMHN and BSHL mirror holders.

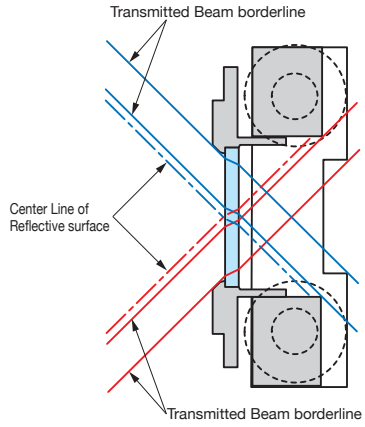
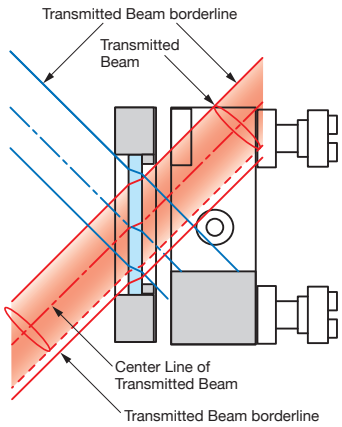
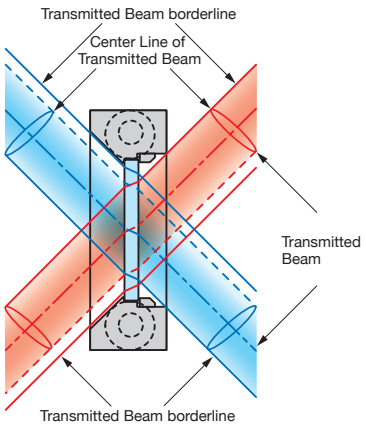


In particular, because the operation direction of the BSHL series is vertical (or lateral), space for adjusting holders becomes unnecessary, enabling proximity to the holders.



Mirror holder that can be used by the beamsplitter

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
LMHB, LMMH, MMHN, MHD	**MHG-NL, MHI, MHGT, MHE**	**BSHL, BSHL, HMAN, BHAN**
		
This type of holder cannot be used with transmitted beam at 45 degrees incidence even when the holder has a center aperture. However, some can be used for transmitted beam at 0 degrees incidence.	This type of holder is used when adding to an observation system with coaxial illumination or using in a Mach-Zehnder interferometer. The direction of transmitted light can be changed by adjusting the installation direction of the holder.	This type of holder can be used in a Michelson interferometer.The transmitted beam diameter varies depending on the holder.

Post type and Mounting type

There are two types of mirror holders; the post type which comes with a post, and the mounting type which is mounted directly on a base plate.
When selecting the post type, it is easy to adjust the optical axis height of the mirror holder using a post holder.
The mounting type is used for making a compact optical system, or incorporated into a device.
It is necessary to check the optical axis height of each mirror holder, and design a base plate beforehand so that the optical axis heights of the holders are the same.
Some mounting type mirror holders can be mounted directly on a post, or converted to the post type using an adapter plate.

Post Type

MHAN, LMMH-R, BHAN, MMHN-RO, MHE

Mounting Type

To be mounted Post using Adapter plate

LMHB, BSHL

Mounting Type

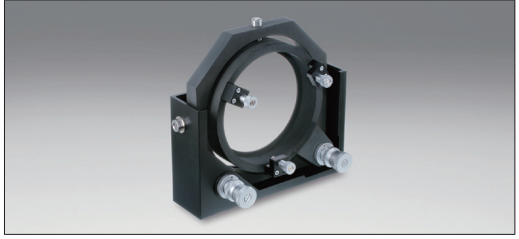
To be mounted directly to Post

MHI, MHGT, MHG-NL, MMHN-BN
MMHN-L, MMHN-R, (MHB-S), (MHF)

Mounting Type

Not be mounted Post

MHD, (LMMH-B)



Kinematic Center Mirror Mount | MHI

RoHS Catalog Code W4102

The mirror reflective surface of these kinematic mirror holders is not offset from the axis of the post even when the mirror thickness changes.

- Because the center axis of the post matches the reflective surface of an optic when the holder mounts on a post, even when the optic is tilted 45 degrees on an optical bench, the center of the mirror will stay at the optical axis.
- These holders can be used as beamsplitter holders because a transmitted beam can be extracted in one direction.
- The mirror frame is incorporated into the support portion of the holders to make these holders thin.
- These holders can offer more space for adjustment work compared to the kinematic mirror holders (MHG).
- For installation of these holders, please use an M4 low head screw to secure them from the top and an M6 thread post from the bottom. (MHI-12.7 can be mounted with an M3 low head screw from the top and M4 thread post from the bottom.)
- The direction of the mirror holders can be fixed at designed positions by setting pins on a baseplate and using the positioning holes (ϕ3H7) of these mirror holders (the positioning hole size of MHI-12.7 is ϕ2H7).

Guide

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

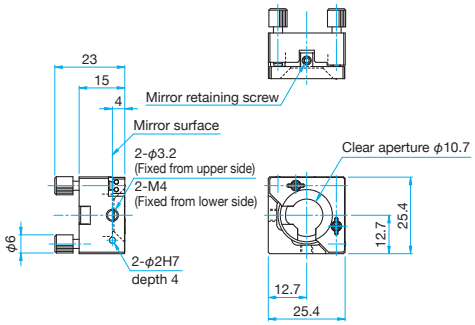
Attention

- MHI-12.7 limits the tilt and rotation to be ±1° and ±2° 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 ±1mm clearance.

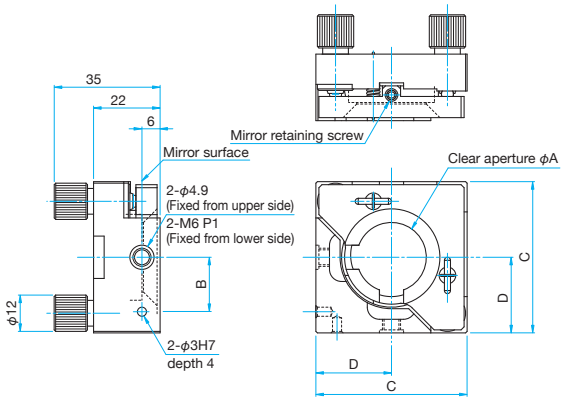
2D CAD 3D CAD

Outline Drawing

MHI-12.7 low head hexagon socket head cap screw M3×6…1 screw

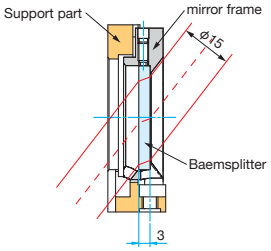


MHI-25.4/30 low head hexagon socket head cap screw M4×8…1 screw



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

Cross-section view of MHI-30



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*1	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Clear aperture ϕA [mm]	Reflected Beam Clear Aperture (45°incidence) [mm]	Transmitted Beam Clear Aperture (45°incidence)*2 [mm]	Adjustment Range Tilt [°]	Adjustment Range Rotation [°]	Resolution Tilt [°/rotation]	Resolution Rotation [°/rotation]	Weight [kg]
MHI-12.7	—	ϕ12.7	2 – 9	ϕ10.7	ϕ6.8	ϕ5	±3	±3	about 0.74	about 0.74	0.05
MHI-25.4	UU	ϕ25, ϕ25.4	3 – 10	ϕ23	ϕ15.5	ϕ13	±1.5	±1.5	about 0.4	about 0.4	0.12
MHI-30	UU	ϕ30	3 – 10	ϕ27	ϕ18.3	ϕ15	±1.5	±1.5	about 0.35	about 0.35	0.13

*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.

Improvement of the conventional design of kinematic mirror holders (MHG) brought a further reduced price. These holders are suitable for experiments which use a large number of simple mirror holders or for incorporation of mirror holders into production devices.

- These thinned holders can offer larger space for adjustment work compared to MHG.
- These holders hold a mirror at three points from the side in order to adjust the stress occurring when holding the mirror.
- Retaining rings do not cause constraints on the clear aperture so that a large clear aperture can be obtained with reflected light or transmitted light.

Guide

- MHG-NL mirror holders which have a locking mechanism for adjustment screws are also available. Reference C014
- Can be mounted on the post holders (PST: Sold separately) or the M6 thread post (RO: Sold separately).

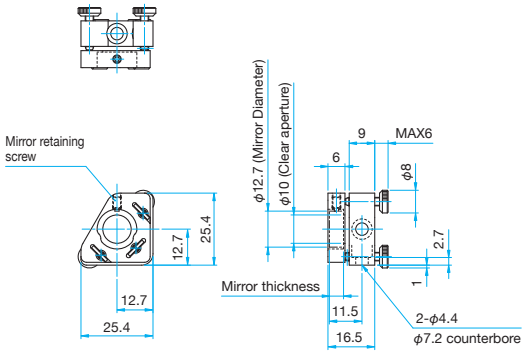
Attention

- 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 C026

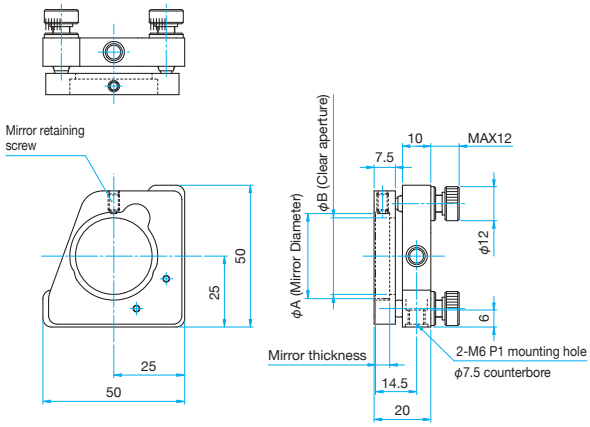
2D CAD 3D CAD

Outline Drawing

MHGT-12.7 hexagon socket head cap screw M4×6...1 screw

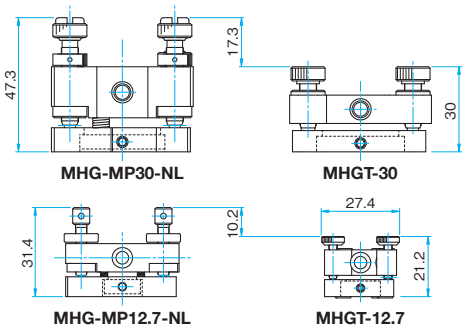


MHGT-25.4/30 hexagon socket head cap screw M4×10...1 screw



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



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter ϕA [mm]	Compatible Optics Thickness [mm]	Clear aperture ϕB [mm]	Number of Adjustment Axes	Adjustment Range Tilt [°]	Adjustment Range Rotation [°]	Resolution Tilt [°/rotation]	Resolution Rotation [°/rotation]	Weight [kg]
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

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

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

High stability Kinematic Mirror Holder with SIGMA KOKI's unique locking mechanism (NOMI LOCK™). NOMI LOCK™ is a new type of locking mechanism that enables adjustment of the torque of adjustment screws.
It is best suited for usage in interferometers or laser processing devices where beam displacement after adjustment is a problem.
NOMI LOCK™ is a registered trademark of SIGMA KOKI CO., Ltd. (Trademark Registration: 5313722)

- With their simple structure, excellent rigidity and stability, kinematic mirror holders are used 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 high stability model (MHG-HS) is fitted with large knobs, and allows adjustment of the point of support in addition to the two points of action as well as displacement of mirrors in the vertical direction.
- When NOMI LOCK™ is used in interferometers, the displacement in the optical axis will be within a single fringe. (There are individual differences in the operation of the lock.)
- Mirrors are fixed at three points on the lateral side so that the stress caused by fixing mirrors can be adjusted.
- Provide large clear aperture of reflected light or transmitted light since retaining rings and the like do not impose any constraints on clear aperture.

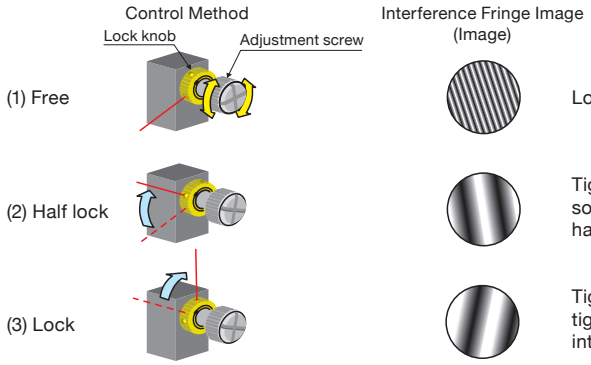
Guide

- This product can be mounted on pedestal stands (PS: 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



Loosen the locking knob and the adjustment screw can be moved easily.

Tighten the locking knob about 30 degrees to make fine adjustments with some resistance in the adjustment screw. (When changing from free to half-lock, the interference fringe moves greatly.)

Tighten the locking knob to the end and the adjustment knob becomes tight and 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 Tilt [°]	Adjustment Range Rotation [°]	Resolution Rotation [°/rotation]	Resolution Tilt [°/rotation]	Weight [kg]
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 0.18	0.56

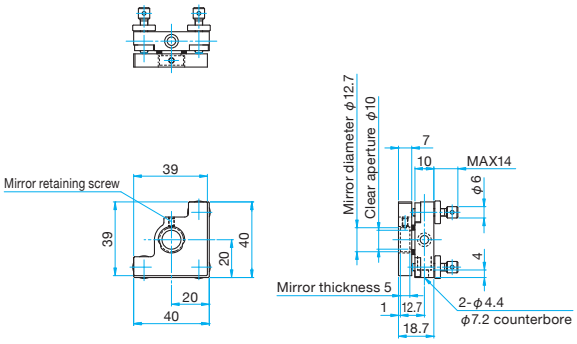
* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

Outline Drawing

MHG-MP12.7-NL

Hexagonal socket head cap screw M4×8…1 screw

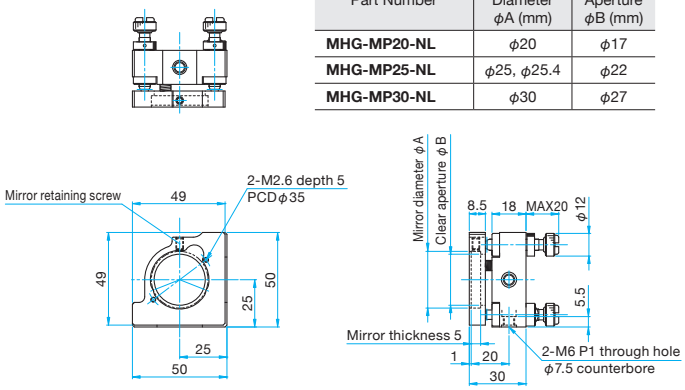
Part Number	Mirror Diameter (mm)
MHG-MP12.7-NL	ϕ12.7



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

Hexagonal socket head cap screw M4×10…1 screw
Spanner for lock knob…1 screw

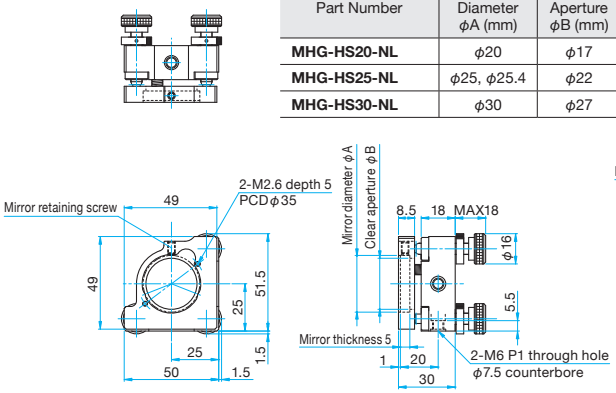
Part Number	Mirror Diameter ϕA (mm)	Clear Aperture ϕB (mm)
MHG-MP20-NL	ϕ20	ϕ17
MHG-MP25-NL	ϕ25, ϕ25.4	ϕ22
MHG-MP30-NL	ϕ30	ϕ27



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

Hexagonal socket head cap screw M4×10…1 screw

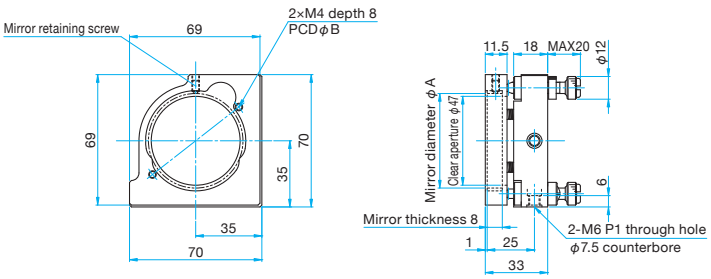
Part Number	Mirror Diameter ϕA (mm)	Clear Aperture ϕB (mm)
MHG-HS20-NL	ϕ20	ϕ17
MHG-HS25-NL	ϕ25, ϕ25.4	ϕ22
MHG-HS30-NL	ϕ30	ϕ27



MHG-MP50-NL/50.8-NL

Hexagonal socket head cap screw M4×10…1 screw
Spanner for lock knob…1 screw

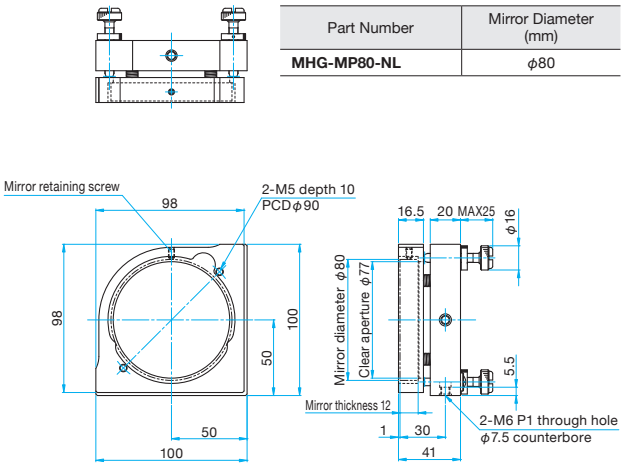
Part Number	Mirror Diameter ϕA (mm)	PCD ϕB (mm)
MHG-MP50-NL	ϕ50	ϕ58
MHG-MP50.8-NL	ϕ50.8	ϕ59



MHG-MP80-NL

Hexagonal socket head cap screw M4×10…1 screw
Spanner for lock knob…1 screw

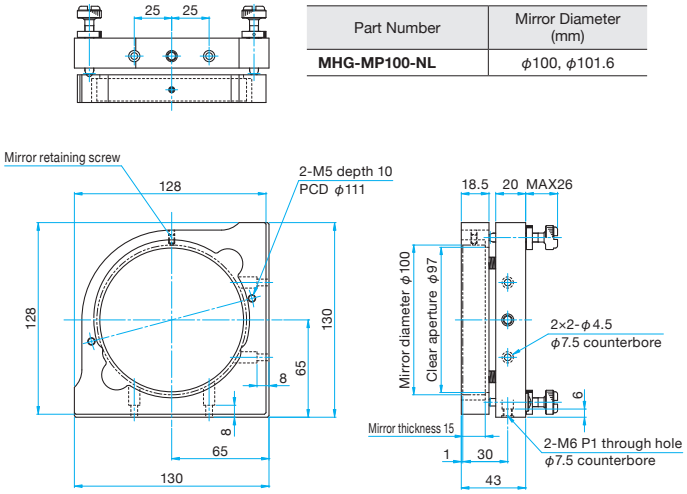
Part Number	Mirror Diameter (mm)
MHG-MP80-NL	ϕ80



MHG-MP100-NL

Hexagonal socket head cap screw M4×12…3 screws
Spanner for lock knob…1 screw

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



Options for Kinematic Mirror Holders | MHG-BPRO/MHG-KAD

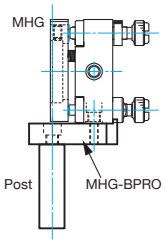
Post Adapter Plates | MHG-BPRO

RoHS Catalog Code W4002

Plates for correcting the offset between the center of mirror reflective surface and the holder mounting position.

- 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.

Example of Use



Specifications Primary material: Aluminum Finish: Black Anodized

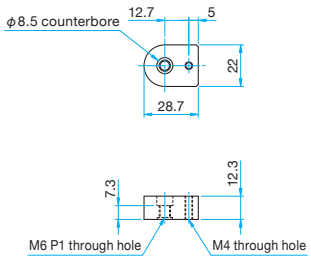
Part Number	Compatible Holders	Weight [kg]
MHG-12.7BPRO	MHG-MP12.7	0.02
MHG-30BPRO	MHG-MP20/-HS20 MHG-MP25/-HS25 MHG-MP30/-HS30	0.025
MHG-50BPRO	MHG-MP50/-MP50.8	0.025
MHG-100BPRO	MHG-100	0.075

Outline Drawing

2D CAD 3D CAD

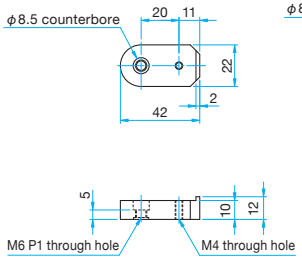
MHG-12.7BPRO

Hexagonal socket head cap screw M4×12...1 screw
Flat washer



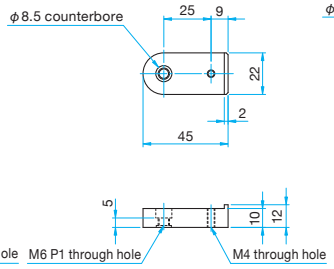
MHG-30BPRO

Hexagonal socket head cap screw M4×10...1 screw
Flat washer



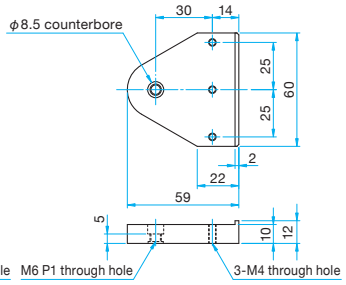
MHG-50BPRO

Hexagonal socket head cap screw M4×10...1 screw
Flat washer



MHG-100BPRO

Hexagonal socket head cap screw M4×10...1 screw
Flat washer

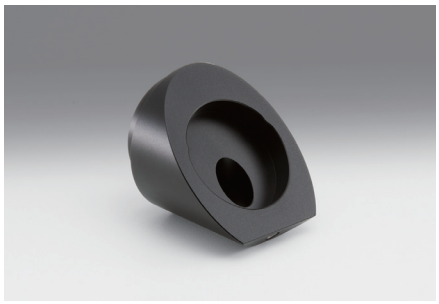


45° Optics Adapters | MHG-KAD

RoHS Catalog Code W4003

Used when directing the beam vertically up (or down) using kinematic mirror holders (MHG) installed on optical benches.

- Since the reflective surface of kinematic mirror holders is tilted 45 degrees when 45° optics adapters are mounted, the travel of the mirror surface does not agree with the adjustment range or resolution in the specifications of mirror holders.
- Mirrors are mounted at three points on the side.
- Since adapters are fitted in the mirror frame of the mirror holder, the direction of the tilted surface of the mirror can be changed by rotating on the central axis of the adapter cylinder.



Example of Use

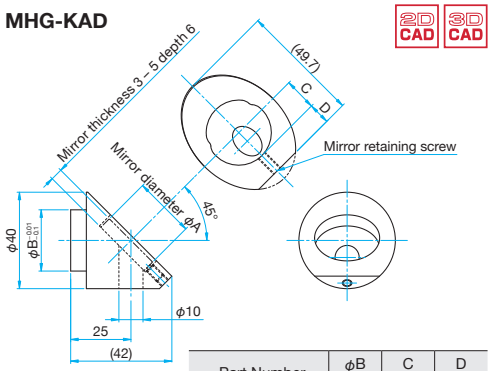
Specifications Primary material: Aluminum Finish: Black Anodized

Part Number	Compatible Holders	Compatible Optics Diameter ϕA [mm]	Compatible Optics Thickness [mm]	Weight [kg]
MHG-25.4KAD	MHG-MP25.4/-HS25.4	ϕ25.4	3 – 5	0.07
MHG-30KAD	MHG-MP30/-HS30	ϕ30	3 – 5	0.07

Outline Drawing

MHG-KAD

2D CAD 3D CAD



Part Number	ϕB (mm)	C (mm)	D (mm)
MHG-25.4KAD	25.4	13.5	9
MHG-30KAD	30	15.5	7

Adapter Mounts | 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. If the adapters are mounted on the mirror holders first, mirrors cannot be fixed.
- Change in the thickness of mirror also changes the position of the reflective surface because the mirror frame end is on the back surface of the mirror.

Example of Use

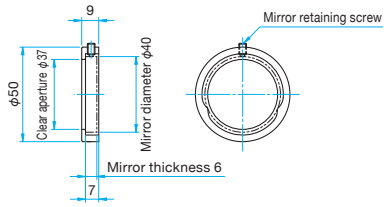
Specifications

Primary material: Aluminum
Finish: Black Anodized

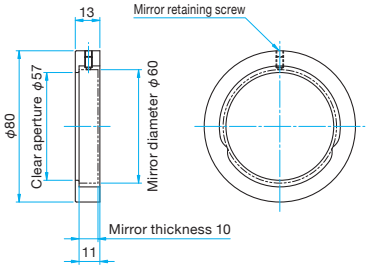
Part Number	Compatible Holders	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]
MHG-40MAD	MHG-MP50	ϕ40	4 – 6	0.015
MHG-60MAD	MHG-80	ϕ60	6 – 10	0.06
MHG-25.4SMAD	MHG-MP25/-HS25	□25, □25.4	3 – 5	0.018

Outline Drawing

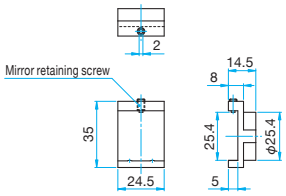
MHG-40MAD



MHG-60MAD



MHG-25.4SMAD 2D CAD 3D CAD



Prism Adapters | MHG-PAD

RoHS Catalog Code W4007

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

- Rotation (θ or yaw) and tilt (α or pitch) of prisms and cube optics can be fine adjusted, but roll tilt (β) cannot be adjusted. To adjust yaw tilt (β), fit the prism adapters in kinematic mirror holders after adjusting the direction, and fix them.
- The mounting part of the prism adapters has a transmission hole so that cube optics can be used in four directions.
- There is an offset of 40mm from the baseplate mounting hole of the kinematic mirror holder to the center of cube. Use this product considering misalignment of cube optic position that might occur depending on the fixed position of holders or adjustment of cube optics.
- By changing the top and bottom direction of the prism support of prism adapter, cube optics with two different dimensions can be accommodated.

Example of Use

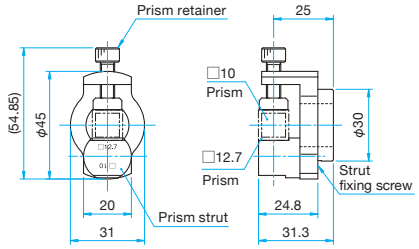
Specifications

Primary material: Aluminum
Finish: Black Anodized

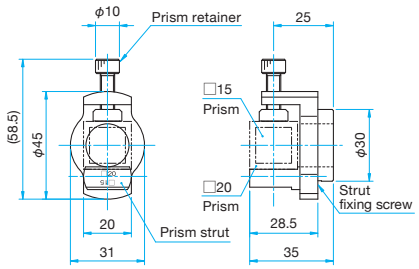
Part Number	Compatible Holders	Compatible Optics Diameter [mm]	Weight [kg]
MHG-12.7PAD	MHG-MP30/-HS30	□10·□12.7	0.06
MHG-20PAD	MHG-MP30/-HS30	□15·□20	0.055

Outline Drawing

MHG-12.7PAD 2D CAD 3D CAD



MHG-20PAD



Options for Kinematic Mirror Holders | FMB / MHG-20LDU

Optical Path Switching Mounts | FMB

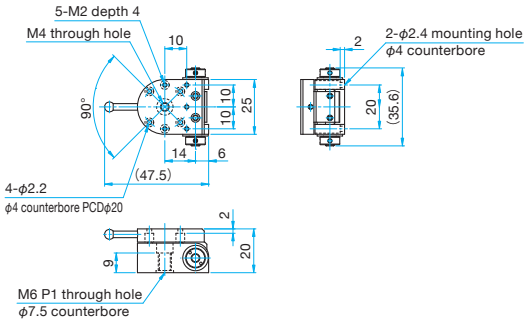
RoHS Catalog Code W4006

Mounts for removing and inserting mirror holders from optical paths in order to switch optical paths in a optical system.

- To place the mirror center at the mounting center with 45 degrees incidence, use a combination of 3mm thickness mirror (TFA-20C03-10) and MHG-MP20-NL.
- High repeatability of removal and insertion is achieved when used with mirror holders fitted with NOMI LOCK™.
- To mount a high precision mirror holder (MHG-HS**-NL), use an accessory spacer for adjusting height in order to avoid interference with adjustment screws.

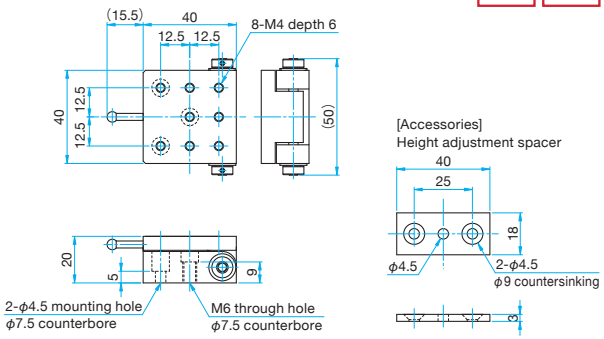
Outline Drawing

FMB-25 Hexagonal socket head cap screw M4×12...1 screw



FMB-40 Hexagonal socket head cap screw M4×12...1 screw
Countersunk head screw M4×8...2 screws

2D CAD 3D CAD



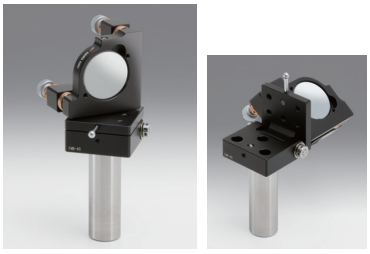
Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Repeatability [″]	Weight [kg]
FMB-25	**UU**	5 (25μrad)	0.04
FMB-40	**—**	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) 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 optional. Refer to the chapter of light sources for details of the specifications. Reference H006

Specifications

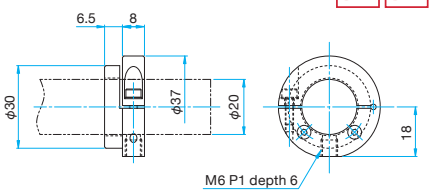
Primary material: Aluminum
Finish: Black Anodized

Part Number	Compatible Holders	Compatible Laser	Compatible Diameter [mm]	Weight [kg]
MHG-20LDU	MHG-HS30/-MP30	LDU33 series	ϕ20	0.02

Outline Drawing

MHG-20LDU

2D CAD 3D CAD



Vertical Control Small Mirror Holders | LMMH-R RoHS Catalog Code W4501

Compact mirror holders with vertical control.
Because these mirror holders can be positioned in a small space and controlled from the top, they can make optical systems compact without extending in side directions.

- These holders hold a mirror with resin screws from the side in order to adjust the stress occurring when holding the mirror.
- These holders can be positioned close to each other without worsening operability because the control for adjustment is located on the top.

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

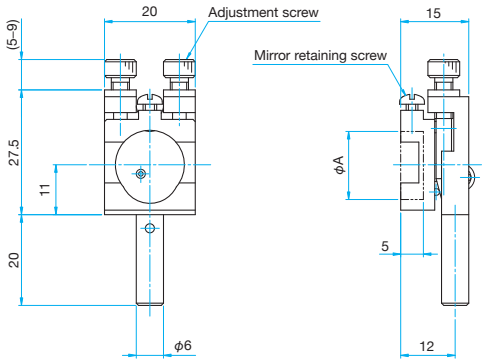
Attention

- Change in the thickness of the mirror also changes the position of the reflective surface because the mirror frame end is on the back surface of the mirror.
- The mirror reflective surface is offset 12mm from the axis center of the post (installation center).

2D CAD 3D CAD

Outline Drawing

LMMH-R M4 P0.7



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter ϕA [mm]	Compatible Optics Thickness [mm]	Adjustment Range Tilt [°]	Adjustment Range Rotation [°]	Resolution Tilt [°/rotation]	Resolution Rotation [°/rotation]	Weight [kg]
LMMH-10R	**N**	ϕ10	5	±2.5	±2.5	about 1.08	about 1.1	0.03
LMMH-12.7R	**N**	ϕ12.7	5	±2.5	±2.5	about 1.08	about 1.1	0.03
LMMH-15R	**N**	ϕ15	5	±2.5	±2.5	about 1.08	about 1.1	0.03

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

Small Kinematic Mirror Holders | MMHN

RoHS

**Compact mirror holders with minimum necessary functions.
Compatible with various sizes of mirrors by attaching the mirror to the holder using adhesive.
These holders are intended for applications including installation in devices which do not require removal of mirrors, and for holding mirrors at a position displaced from the center of the holder.**

- With the mirror case adapters (MKAD), standard mirrors can be easily mounted and removed.
- In order to avoid interference with other holders, there are two choices for the baseplate mounting hole position; MMHN-25L type has the mounting holes on the mirror side, and MMHN-25R type has it on the adjustment screw side.
- To align the reflective surface of the mirror to the post axis use holders MMHN-25LRO.

Guide

▶25mm square aluminum flat mirrors (TFA-25S05-10) are available.
Reference B032

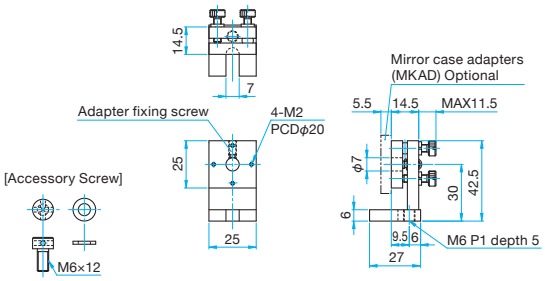
Attention

▶These holders do not have a function to hold mirrors. To hold a mirror, please use adhesive or a mirror case adapter (MKAD).
▶Since these are kinematic mirror holders, the rotation center of the fine-adjustment mechanism is not on the reflective surface of mirror. Gimbal mirror holders (MHAN) that have the rotation center of fine adjustment on the reflective surface of mirror are also available.
Reference C026

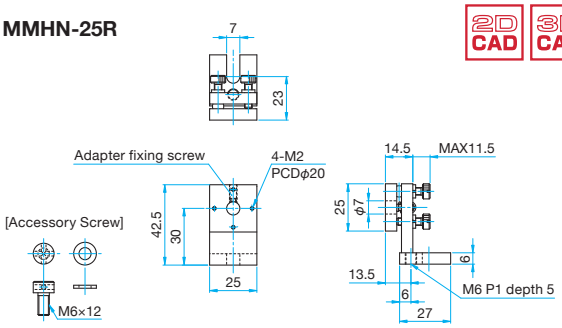
Outline Drawing

2D CAD 3D CAD

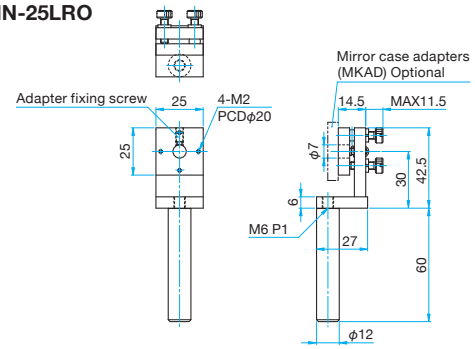
MMHN-25L



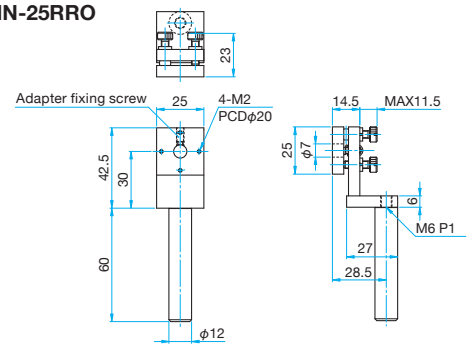
MMHN-25R



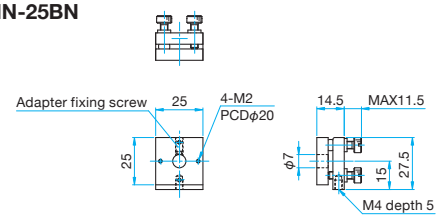
MMHN-25LRO



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	—	□25 or less ϕ25 or less	±5	±5	about 0.9	about 0.9	0.04
MMHN-25R	—		±5	±5	about 0.9	about 0.9	0.04
MMHN-25LRO	EE/UU		±5	±5	about 0.9	about 0.9	0.09
MMHN-25RRO	EE/UU		±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

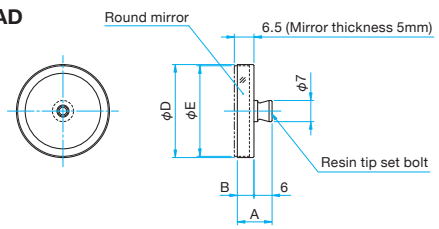
Option Mirror Case Adapters | MKAD

Adapters for holding mirrors in compact mirror holders (MMHN-25) without adhesive.

- This product can securely fix a mirror by fitting the mirror in its split frame with the mirror surface facing the front.
- To remove the mirror, push the mirror out from the frame by inserting an M4 resin set bolt point from the back.

Outline Drawing

MKAD



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	$\phi 12.7^{+0.15}_{+0.1}$	0.002
MKAD-19.05	ϕ19.1	12	6	4.5	ϕ19.9	$\phi 19.1^{+0.15}_{+0.1}$	0.003
MKAD-25.4	ϕ25.4	11.5	5.5	4	ϕ26.1	$\phi 25.4^{+0.15}_{+0.1}$	0.005
MKAD-30	ϕ30	11.5	5.5	4	ϕ30.8	$\phi 30^{+0.15}_{+0.1}$	0.006

Vertical Control Gimbal Beamsplitter Holders | BSHL-2/BSHL-TF RoHS

The space required for holder adjustment was eliminated from around the holder by making the control direction of adjustment screws vertical.
Holders can be installed close to each other, which significantly downsizes optical systems.
Using vertical control for all mirror holders improves workability of optical adjustment in optical systems configured with various directions of beamsplitters and mirrors.
Compact footprint for use in systems where space is at a premium.

- There are two types, one is fitted with knobs on top (BSHL-2), and the other is without knobs and not adjusted after installation (BSHL-TF).
- When a beamsplitter is used, this product provides large clear aperture of transmitted beam even if placed at 45 degrees incidence.
- Its Gimbal mechanism maintains the center position of mirror even when fine adjusted.
- Adjustment screws can be fixed after adjustment with the set screws on the back surface.
- Mounting holes (M4 - two places) are also provided on both sides of the holders so that they can be used as horizontal control holders.

Guide

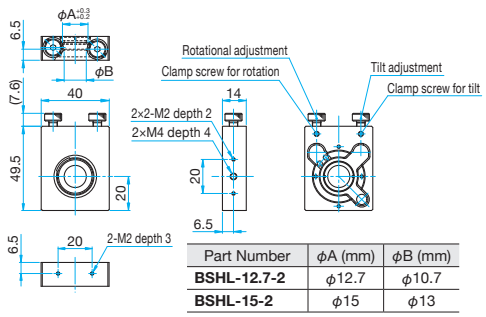
- Various types of plates are available for fixing with M6 screws. Reference C023
- Can be mounted on post stands (PST-**) using the lateral side M4 tap holes of holders.
- We accept production of plates for mounting on various types of baseplates.

Attention

- The locking clamps prevent the adjustment screws from turning. Under high accelerations, the mirror itself may still move. If you need mounts for high acceleration environments, pleas contact us.
- Optional adapter plates are available to mount these holders on a post or pillar. Reference C023
- To adjust the BSHL-TF mounts, a standard hex wrench is required. A ball end wrench set (SKB-JBX6) is available. Reference D063

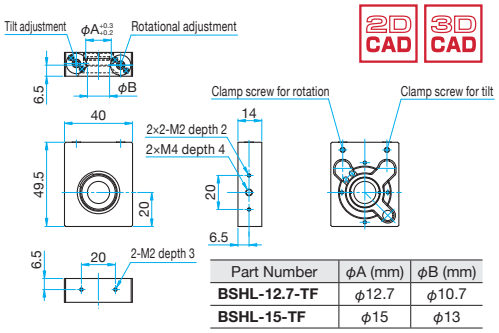
Outline Drawing

BSHL-12.7-2
BSHL-15-2



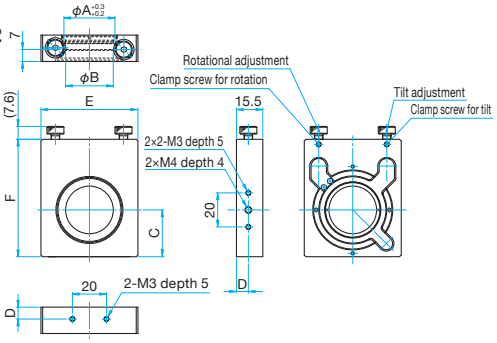
Part Number	ϕA (mm)	ϕB (mm)
BSHL-12.7-2	ϕ12.7	ϕ10.7
BSHL-15-2	ϕ15	ϕ13

BSHL-12.7-TF
BSHL-15-TF

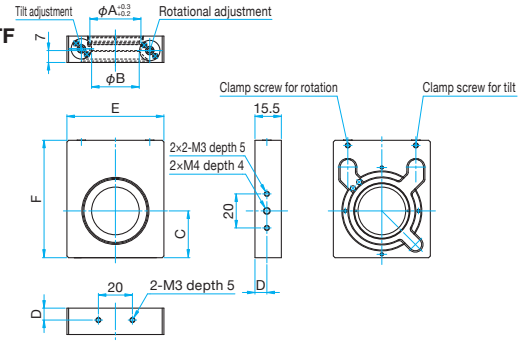


Part Number	ϕA (mm)	ϕB (mm)
BSHL-12.7-TF	ϕ12.7	ϕ10.7
BSHL-15-TF	ϕ15	ϕ13

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

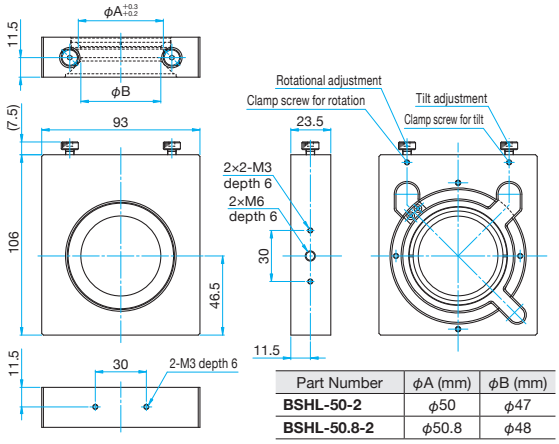
Specifications

Primary material: Aluminum
Finish: Black Anodized

With Knobs Part Number	Without Knobs Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	45° Incidence Reflected Beam Diameter [mm]	45° Incidence Central Transmission Beam Diameter [mm]	Fine Adjustment Range Tilt [°]	Fine Adjustment Range Rotation [°]	Fine Adjustment Resolution Tilt [°/rotation]	Fine Adjustment Resolution Rotation [°/rotation]	Weight [kg]
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

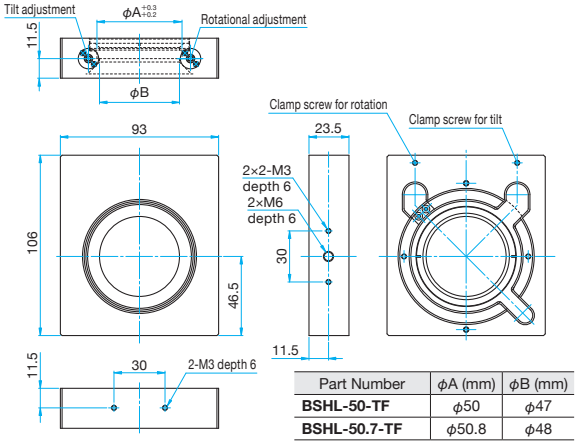
Outline Drawing

BSHL-50-2/BSHL-50.8-2



Part Number	ϕA (mm)	ϕB (mm)
BSHL-50-2	ϕ50	ϕ47
BSHL-50.8-2	ϕ50.8	ϕ48

BSHL-50-TF/BSHL-50.8-TF



Part Number	ϕA (mm)	ϕB (mm)
BSHL-50-TF	ϕ50	ϕ47
BSHL-50.7-TF	ϕ50.8	ϕ48

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

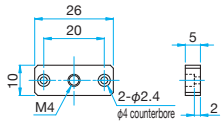
Base plates used for fixing the BSHL mirror holders on optical breadboards or optical baseplates. These base plates can install the BSHL at 0 degrees and 45 degrees incidence positions.

- BSHL-BPRO are adapter plates for mounting posts (RO-12/20) on the bottom of the BSHL.
- BSHL-12.7BP can mount BSHL-12.7/15 holders on M2-10mm matrix base plates at 0 degrees and 45 degrees incidence positions.
- When securing with an M4 thread, please use the M6-M4 conversion adapter (AD-M6-M4). Reference D063

Outline Drawing

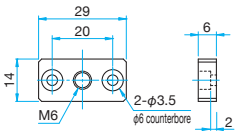
BSHL-12.7BPRO

hexagon socket head cap screw M2×4…2 screws



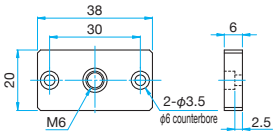
BSHL-20BPRO

hexagon socket head cap screw M3×6…2 screws



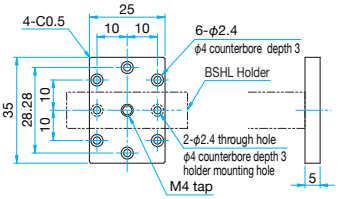
BSHL-50BPRO

hexagon socket head cap screw M3×8…2 screws



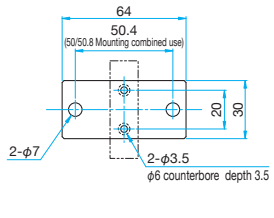
BSHL-12.7BP

hexagon socket head cap screw M2×5…6 screws



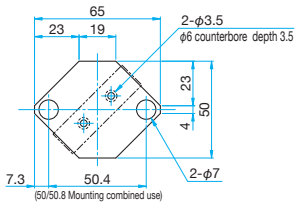
BSHL-25.4BP-0/-0UU

hexagon socket head cap screw M3×6…2 screws, M6×10…2 screws (0)
hexagon socket head cap screw M3×6…2 screws, 1/4-20UNC×3/8…2 screws (0UU)



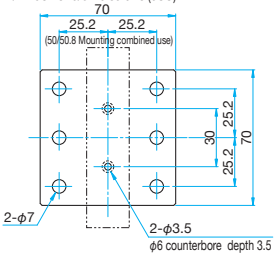
BSHL-25.4BP-45/-45UU

hexagon socket head cap screw M3×6…2 screws, M6×10…2 screws (45)
hexagon socket head cap screw M3×6…2 screws, 1/4-20UNC×3/8…2 screws (45UU)



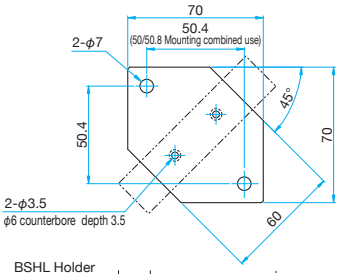
BSHL-50.8BP-0/-0UU

hexagon socket head cap screw M3×6…2 screws, M6×10…6 screws (0)
hexagon socket head cap screw M3×6…2 screws, 1/4-20UNC×3/8…6 screws (0UU)

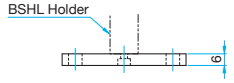


BSHL-50.8BP-45/-45UU

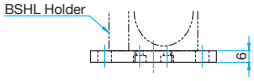
hexagon socket head cap screw M3×6…2 screws, M6×10…2 screws (45)
hexagon socket head cap screw M3×6…2 screws, 1/4-20UNC×3/8…2 screws (45UU)



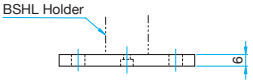
BSHL Holder



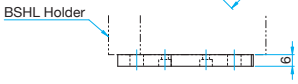
BSHL Holder



BSHL Holder



BSHL Holder



Specifications

Primary material: Aluminum
Finish: Black Anodized

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

Topmike Vertical Control Mirror Holders | LMHB RoHS Catalog Code W4503

These kinematic type mirror holders enable control of mirrors from the top or side of optical systems when optics or devices are positioned very close to the front and back of a mirror, or when it is difficult to make adjustment by inserting the hand in an optical path.
Control directions can be changed among top, left or right by installing these mirror holders using dedicated plates.

- Change in control direction from vertical to horizontal by changing the installation direction of the LMHB does not change the optical axis height from the bottom surface of the dedicated plate.
- By replacing the dedicated plates, the LMHB can offer various installation options. Also, the installation direction of the LMHB can be changed on all the dedicated plates.

Guide

▶Compact type 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

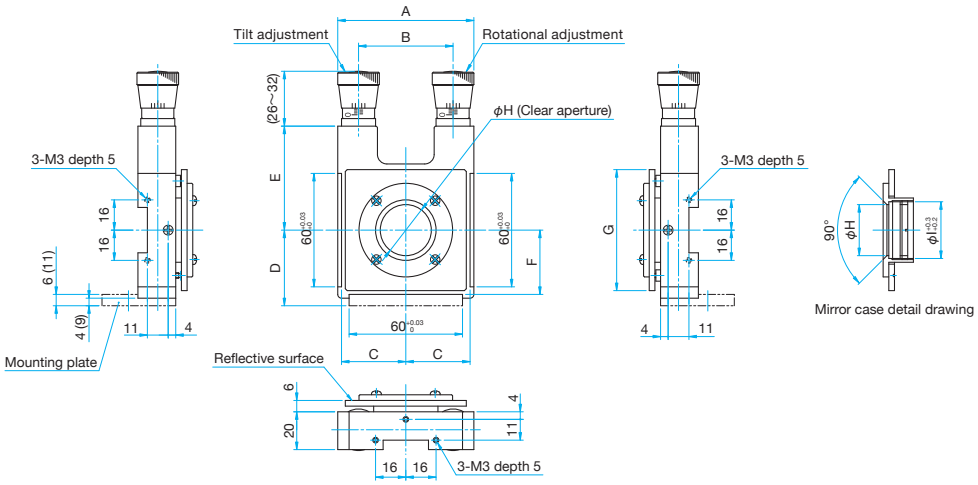
Attention

▶Without the dedicated plates (LMHBP), the LMHB cannot be installed directly on a base plate.
▶When a beamsplitter is used at 45 degrees incidence, beams are partially blocked by the mirror frame and the clear aperture of the transmitted light becomes smaller. Please use MHG or MHAN for 45 degrees incidence. Reference C014, C026

2D CAD 3D CAD

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

Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Compatible Optics		Adjustment Range		Resolution		Weight
	Diameter [mm]	Thickness [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	[kg]
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

Option Plates for Topmike Vertical Control Mirror Holders | LMHBP

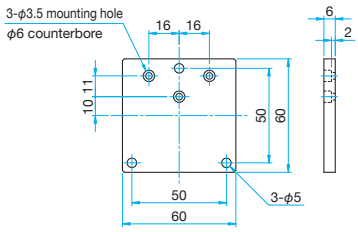
These conversion plates are dedicated for use in mounting of vertical control mirror holders (LMHB) on an optical breadboard, optical baseplates, or post.

2D CAD 3D CAD

Outline Drawing

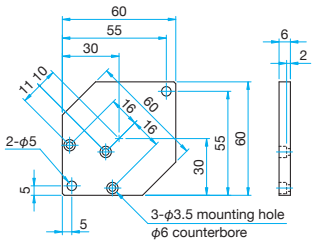
LMHBP-0

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



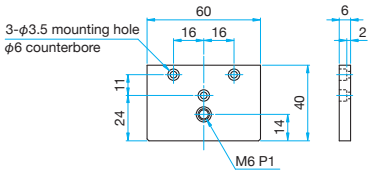
LMHBP-45

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



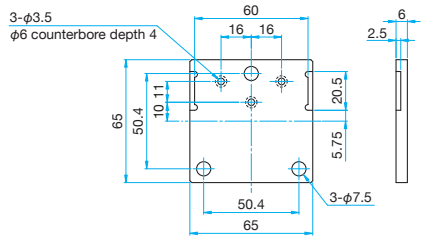
LMHBP-M6

Pan head screw M3×6…3 screws



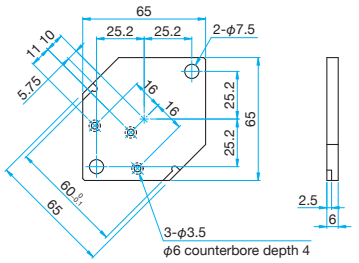
LMHBP-0EE/0UU

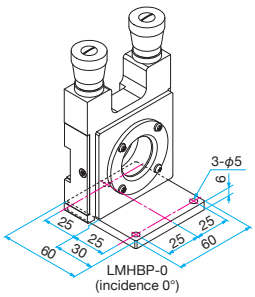
Pan head screw M3×6…3 screws, Hexagon socket head cap screw M6×12…3 screws (EE)
Pan head screw M3×6…3 screws, Hexagon socket head cap screw 1/4-20UNC×1/2…3 screws (UU)

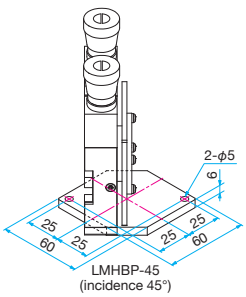


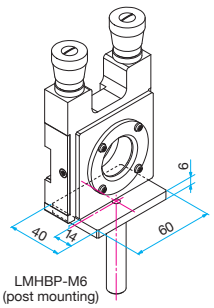
LMHBP-45EE/45UU

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)









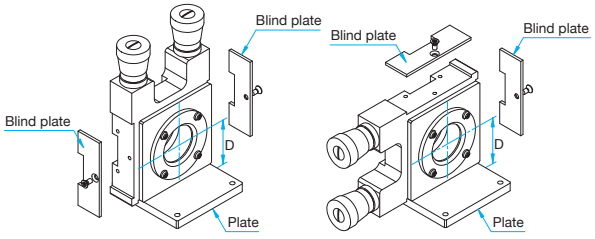
Specifications

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.



Gimballed Beamsplitter Mounts | MHAN-S/MHA/MHAN-DM RoHS

The gimbal structure allows the mirror angle to be changed freely at the rotational center of the mirror reflective surface.
Appropriate when dealing with laser beams or changing reflected beam direction.

- Fine tuning of the angle of reflected beams can be performed in all directions by means of the gimbal structure and fine adjustment mechanism with coarse/fine switching clamp.
- With the retaining ring the reflective surface will always be in the rotational center because the reflective surface of the mirror will be pressed on the face side of the mirror frame, and the position of the reflective surface will not change even if mirror thickness changes.
- Space saving and precise angle adjustment are achieved by using 0.25mm pitch adjustment screws with holders for mirror diameters less than ϕ60mm.

Guide

- The RO-20-60 post (diameter ϕ20mm, length 60mm) is included but it can be replaced with other sizes. However, removal and assembly of posts require tools such as a vise and pliers. If the length of post is specified at the time of purchase, this product will be with the specified post. Post replacement is gratis, however please contact our International Sales Division as there may be a price adjustment due to differences in length.
- Use the kinematic mirror holder (MHG-NL) for enhanced stability on low optical axes. Reference C014
- NHAN-M mounts with graduated micrometers instead of adjustment screws are also available. WEB Reference Catalog Code W4508

Attention

- When the beamsplitter is used at 45 degrees incidence, the beam is partially blocked by the mirror frame and the transmitted clear aperture becomes smaller. When mounting a beamsplitter, we recommend the (BHAN) gimbal beamsplitter holder to obtain a larger transmitted clear aperture. Reference C028
- After adjustment of the optical system confirm that the coarse/fine switching clamps for the mirror holder are tightened to prevent accidental movement.
- When mounted to a post holder, always adjust the mirror holder after securing the post so that the post does not move. When a post is held with an intermediate ring on the post holder, make sure to tighten the post holder.

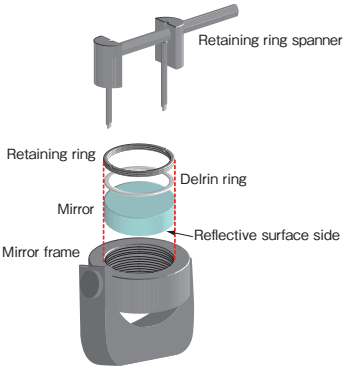
Mirror Mounting Methods

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

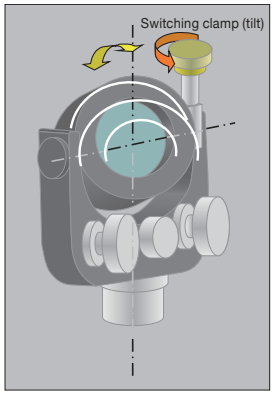
When securing a mirror to the gimbal mirror holder, place the reflective surface downward so that the mirror will be tight against the bottom (face side) of the mirror frame. Place a Delrin ring on the mirror from the top, so that it does not scratch the mirror. Secure the retaining ring into the mirror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

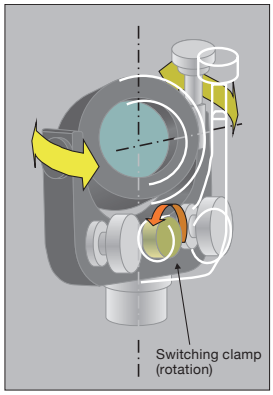
When shipping or when used in locations with a lot of vibration, it is possible that the retaining ring will come loose, and the mirror will fall off. In this case, either firmly tighten the retaining ring so that it does not come loose, or secure the retaining ring with thread locking adhesive.



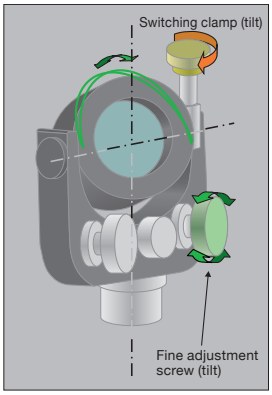
How to Use the Coarse / Fine Switching Clamp and Fine Adjustment Screws



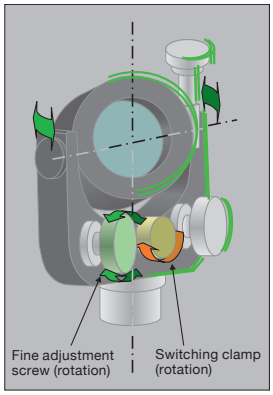
Tilt (pitch) coarse movement control



Rotation (Yaw) coarse movement control



Tilt fine movement control



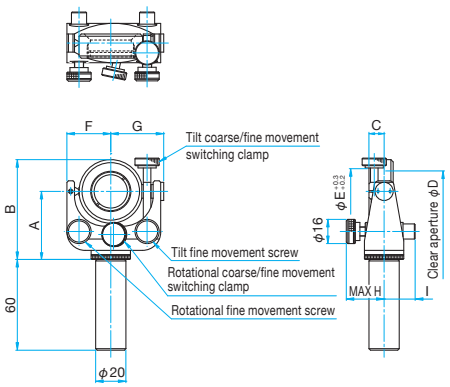
Rotational fine movement control

2D CAD 3D CAD

Outline Drawing

MHAN-S

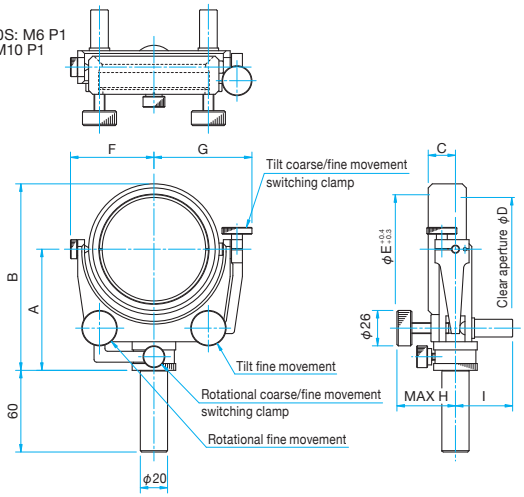
M6 P1



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

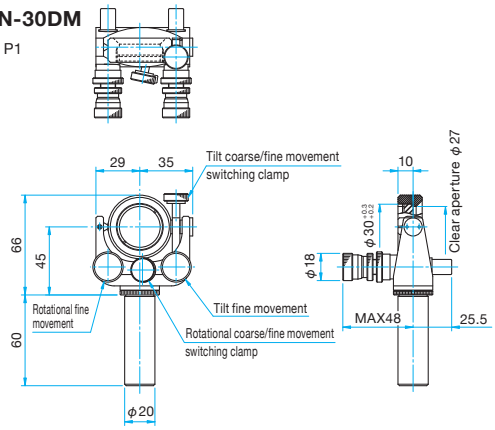
MHA-80S: M6 P1
Other: M10 P1



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-100S	115	177	20	ϕ95	ϕ100	101	184	48	45
MHA-130S	128	205	23	ϕ124	ϕ130	116	214	48	45
MHA-150S	140	227	26	ϕ144	ϕ150	126	234	48	45

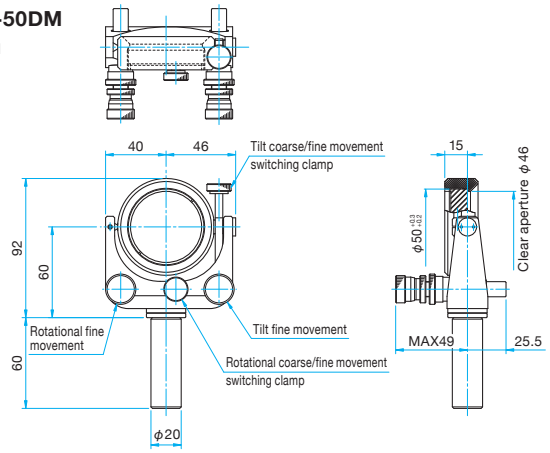
MHAN-30DM

M6 P1



MHAN-50DM

M6 P1



Screw Type

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Reflected Beam Clear Aperture (45° incidence) [mm]	Fine Adjustment Range Tilt [°]	Fine Adjustment Range Rotation [°]	Fine Adjustment Resolution Tilt [°/rotation]	Fine Adjustment Resolution Rotation [°/rotation]	Weight [kg]
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	**N/UU**	ϕ80	4 – 15	ϕ50.9	±3.5	±5	about 0.49	about 0.72	1.6
MHA-100S	**N/UU**	ϕ100	4 – 14.5	ϕ65.1	±3.4	±5	about 0.35	about 0.52	1.9
MHA-130S	**N/UU**	ϕ130	7 – 17	ϕ86.3	±2.9	±4	about 0.30	about 0.42	2.3
MHA-150S	**N/UU**	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 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]
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

Gimbal Beamsplitter Holders | BHAN-S/BHAN-DM RoHS Catalog Code W4011

Gimbal mirror holders with narrow mirror frame for increased aperture at 45 degrees incidence. Provide a transmitted beam diameter virtually the same as the reflected beam diameter. Appropriate for beam branching optical systems or Michelson interferometer.

● Basic functions other than the mirror frame are the same as those of MHAN.

Guide

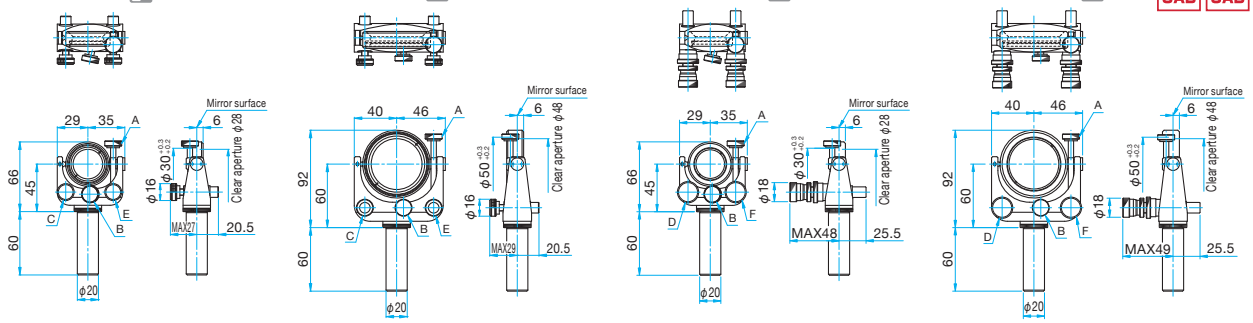
▶ The RO-20-60 post (diameter ϕ20mm, length 60mm) is connected, but it can be interchanged with other sizes. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts. However, removal and assembly of posts require tools such as a vise and pliers. Post replacement is gratis, but consult our International Sales Division because there may be extra charges due to differences in length.

Attention

▶ Delrin rings are not included in the mirror frames of BHAN-S and BHAN-DM. Consult our International Sales Division when optics have backlash after tightening retaining rings, or you want to protect optics from scratches.
▶ BHAN uses a special type of retaining rings. If you have lost the retaining rings, consult our International Sales Division.
▶ If wedge beamsplitters are used with this product, a gap between an optic and holder frame may occur, resulting in backlash. To securely fix optics, use of kinematic mirror holders (MHG-NL), which fix optics at three points on the lateral side, is recommended. Reference C014

Outline Drawing

BHAN-30S M6 P1 **BHAN-50S** M6 P1 **BHAN-30DM** M6 P1 **BHAN-50DM** M6 P1 2D CAD 3D CAD



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

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**	ϕ30	3 – 5	±4	±4	about 0.54	about 0.68	0.4
BHAN-50S	**UU**	ϕ50	5 – 8	±4	±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

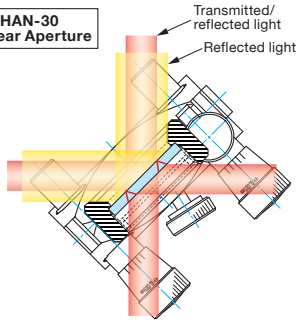
Primary material: Aluminum
Finish: Black Anodized

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**	ϕ30	3 – 5	±4	±4	about 1.08	about 1.35	about 0.11	about 0.14	about 0.002	about 0.002	0.45
BHAN-50DM	**UU**	ϕ50	5 – 8	±3	±4	about 0.71	about 0.95	about 0.07	about 0.10	about 0.001	about 0.002	0.55

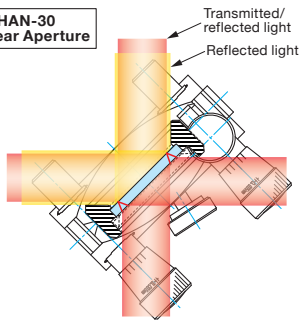
* For specifying options, please refer to “Conversion of Posts, Post Holders and Pedestal Bases of Holders”. Reference C007

Reflection and Transmission Clear Aperture at 45° Incidence

MHAN-30 Tilt Clear Aperture



BHAN-30 Tilt Clear Aperture



Clear Aperture of Beamsplitter Holder

Part Number	Beamsplitter Thickness [mm]	Transmitted/Reflected Beam Clear Aperture 45° incidence [mm]	Transmitted/Reflected Beam Clear Aperture 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

The cantilever support for the gimbal rotation mechanism of these mirror holders allows installation of two mirror holders close to each other.
To align the controls in the same direction, please use the R-type and L-type as a pair.

- The cantilever support for the gimbal rotation mechanism of these mirror holders allows installation of two mirror holders close to each other.
- To align the controls in the same direction, please use the R-type and L-type as a pair.

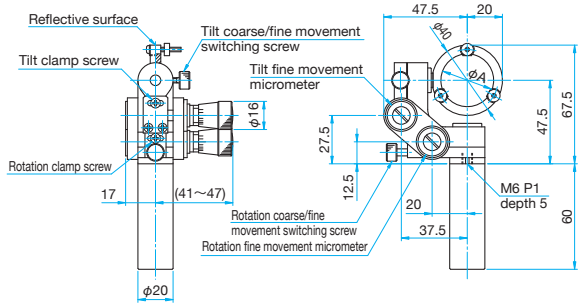
Attention

▶When a beamsplitter or the like is positioned at 45 degrees incident angle, a micrometer head or screw may block beams.To obtain a large clear aperture of transmitted light and reflected light, please use gimbal beamsplitter holders (BHAN). Reference C028

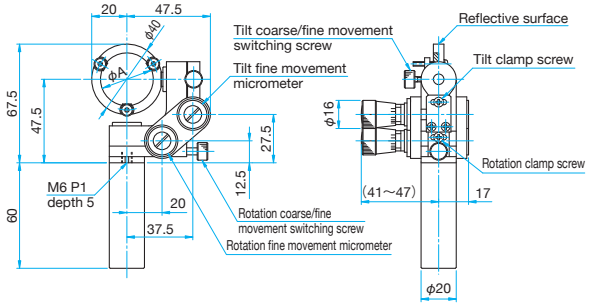
2D CAD 3D CAD

Outline Drawing

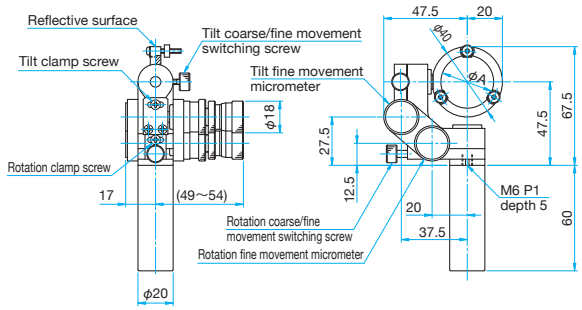
MHE-25.4/30MR M6 P1



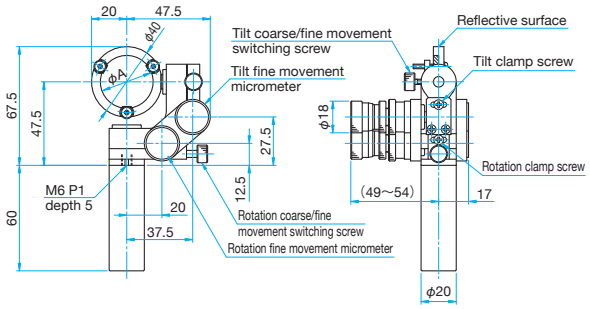
MHE-25.4/30ML M6 P1



MHE-25.4/30DMR M6 P1



MHE-25.4/30DML M6 P1



Standard 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]	Micrometer Indicator Conversion Tilt [°/DIV]	Micrometer Indicator Conversion Rotation [°/DIV]	Weight [kg]
MHE-25.4ML	**EE/UU**	ϕ25.4	1 – 10	±8	±5.5	about 0.7	about 0.7	about 0.014	about 0.014	0.43
MHE-25.4MR	**EE/UU**	ϕ25.4	1 – 10	±8	±5.5	about 0.7	about 0.7	about 0.014	about 0.014	0.43
MHE-30ML	**EE/UU**	ϕ30	1 – 10	±8	±5.5	about 0.7	about 0.7	about 0.014	about 0.014	0.43
MHE-30MR	**EE/UU**	ϕ30	1 – 10	±8	±5.5	about 0.7	about 0.7	about 0.014	about 0.014	0.43

* 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]
MHE-25.4DML	**EE/UU**	ϕ25.4	1 – 10	±8	±5.5	about 1.4	about 1.4	about 0.14	about 0.14	about 0.003	about 0.003	0.49
MHE-25.4DMR	**EE/UU**	ϕ25.4	1 – 10	±8	±5.5	about 1.4	about 1.4	about 0.14	about 0.14	about 0.003	about 0.003	0.49
MHE-30DML	**EE/UU**	ϕ30	1 – 10	±8	±5.5	about 1.4	about 1.4	about 0.14	about 0.14	about 0.003	about 0.003	0.49
MHE-30DMR	**EE/UU**	ϕ30	1 – 10	±8	±5.5	about 1.4	about 1.4	about 0.14	about 0.14	about 0.003	about 0.003	0.49

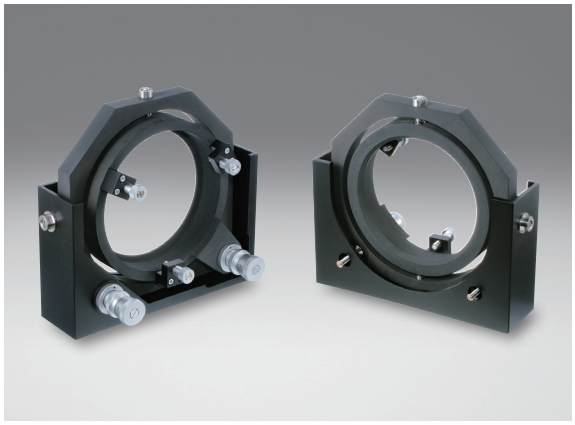
* For specifying options, please refer to “Conversion of Posts, Post Holders and Pedestal Bases of Holders”. Reference C007

Larger Precision Gimbal Mirror Holders | MHD

RoHS Catalog Code W4507

Gimbal mirror holders intended for use with mirrors with diameter of ϕ100mm or larger. These mirror holders can minimize optical path length difference, a problem in large mirrors, caused by mirror tilt adjustment.

- The mirror retainers consist of a set bolt and a nut so that they can be fixed at appropriate positions using the nuts. Please fix the mirror retainers at positions where stress is not exerted on the mirror.
- Differential micrometer heads with a large knob are used for fine angle adjustment.



Guide

▶We can provide mirror holders of your specified size. Please contact our International Sales Division for more information.

Attention

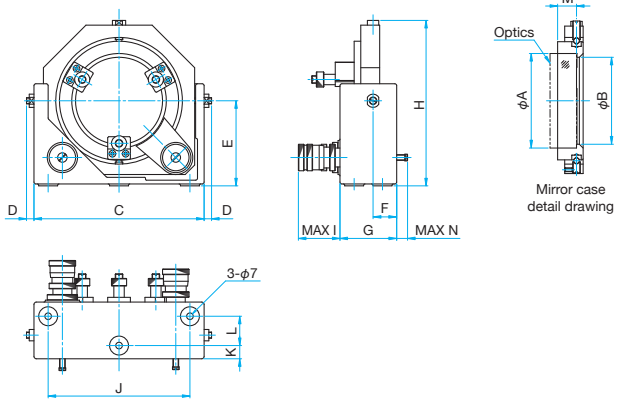
▶To replace the mirror, please remove the mirror retaining bracket using a wrench before inserting a mirror.
▶Pressing an optic hard with the mirror retainer may distort the mirror and worsen the surface accuracy.

2D CAD 3D CAD

Outline Drawing

MHD

MHD-100: Hexagon socket head cap screw M6×10…3 screws
MHD-150/200: Hexagon socket head cap screw M6×12…3 screws
MHD-254: Hexagon socket head cap screw M6×14…3 screws
MHD-300: Hexagon socket head cap screw M6×18…3 screws
MHD-101.6/152.4/203.2:
Hexagon socket head cap screw 1/4-20UNC×1/2…3 screws
MHD-254UU:
Hexagon socket head cap screw 1/4-20UNC×1/2…3 screws
Common Accessories
Washer for M6…3 Pieces
Special tool, long hexagon wrench…1 Piece



Part Number	ϕA (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	ϕ100$^{+0.7}_{+0.4}$	92	180	8	90	25	60	175	65	150	14	31	20	30
MHD-101.6	ϕ101.6$^{+0.7}_{+0.4}$	92	180	8	90	25	60	175	65	150	14	31	20	30
MHD-150	ϕ150$^{+0.7}_{+0.4}$	138	240	8	120	25	65	234	70	190	15	34	30	30
MHD-152.4	ϕ152.4$^{+0.7}_{+0.4}$	138	240	8	120	25	65	234	70	190	15	34	30	30
MHD-200	ϕ200$^{+0.8}_{+0.4}$	188	295	10	150	30	84	293	70	250	17	50	35	25
MHD-203.2	ϕ203.2$^{+0.8}_{+0.4}$	188	295	10	150	30	84	293	70	250	17	50	35	25
MHD-254	ϕ254$^{+0.8}_{+0.4}$	242	347	10	180	33	90	350	70	300	18	50	45	25
MHD-300	ϕ300$^{+1}_{+0.6}$	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		Coarse Adjustment Resolution		Weight [kg]
		Diameter [mm]	Thickness [mm]	Tilt [°]	Rotation [°]	Tilt [°/rotation]	Rotation [°/rotation]	Tilt [°/DIV]	Rotation [°/DIV]	
MHD-100	—	ϕ100	5 – 28	±5.7	±5.7	about 0.57	about 0.57	about 0.0008	about 0.0008	2.1
MHD-101.6	—	ϕ101.6	5 – 28	±5.7	±5.7	about 0.57	about 0.57	about 0.0008	about 0.0008	2.1
MHD-150	—	ϕ150	5 – 38	±4.3	±4.3	about 0.43	about 0.43	about 0.0006	about 0.0006	3.3
MHD-152.4	—	ϕ152.4	5 – 38	±4.3	±4.3	about 0.43	about 0.43	about 0.0006	about 0.0006	3.3
MHD-200	—	ϕ200	20 – 44	±3.4	±3.4	about 0.34	about 0.34	about 0.0005	about 0.0005	4.9
MHD-203.2	—	ϕ203.2	20 – 44	±3.4	±3.4	about 0.34	about 0.34	about 0.0005	about 0.0005	4.9
MHD-254	UU	ϕ254	40 – 54	±2.8	±2.8	about 0.28	about 0.28	about 0.0004	about 0.0004	6.2
MHD-300	—	ϕ300	40 – 54	±2.3	±2.3	about 0.23	about 0.23	about 0.0003	about 0.0003	11

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

Option Plates for Larger Precision Gimbal Mirror Holders | MHD-P

Base plates used for fixing larger precision gimbal mirror holders (MHD) on optical breadboards or optical baseplates.

● These base plates can fix the holders on either metric- or inch-based optical breadboards or optical baseplates.

2D CAD 3D CAD

Specifications

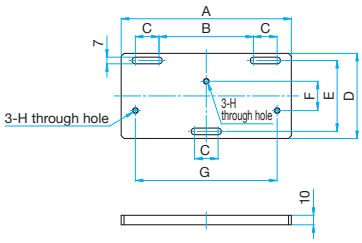
Primary material: Aluminum
Finish: Black Anodized

Part Number		Compatible Holders
METRIC	INCH	
MHD-100PEE	**MHD-100PUU**	MHD-100, MHD-101.6
MHD-150PEE	**MHD-150PUU**	MHD-150, MHD-152.4
MHD-200PEE	**MHD-200PUU**	MHD-200, MHD-203.2
MHD-254PEE	**MHD-254PUU**	MHD-254

Outline Drawing

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

Hexagon socket head cap screw M6×18…3 screws (EE)
Hexagon socket head cap screw 1/4-20UNC×3/4…3 screws (UU)



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

Beam Steering Holders
Precision Beam Steering Assembly

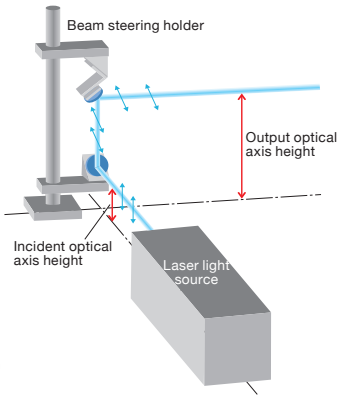
BSR
BSRU

BSR

RoHS Catalog Code W4013

Beam steering mounts are designed to make it easy to change the height and direction of a laser beam.

- Length of the optional post (PO-20-***) can be selected, allowing extension of the adjustment range.
- Use the optional mirror (ϕ25mm or less, thickness 5mm) by bonding it to the holder.
- In addition to the optical axis height of the mirror, the position of the mirror (on a circumference of a 50mm radius from the post) and mirror orientation can be coarse adjusted, and securely fixed with clamps.
- 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.

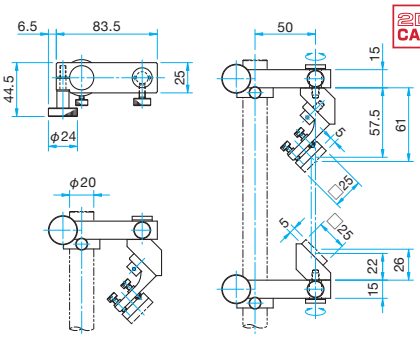
Attention

- Depending on the direction reflected with the two mirrors, the polarization direction of the laser may change 90°. (See the illustration)
- Top and bottom holders require 127mm allowance. Select length of posts to match the required optical axis height.

Outline Drawing

BSR-25

2D CAD 3D CAD



Specifications			Primary material: Aluminum Finish: Black Anodized
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight* [kg]
BSR-25	□25 or less ϕ25 or less	3 – 5	0.4

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

BSRU

RoHS Catalog Code W4014

- The ϕ38.1mm strut fitted with a vibration isolation function, and two top and bottom holders are a product set.
- High stability is obtained from the damping properties of the strut and the rigidity of the holders.
- Use the optional mirror (ϕ30mm, thickness 5mm) by bonding it to the holder.
- In addition to the optical axis height of the mirror, the position of the mirror (on a circumference of a 75mm radius from the post) and mirror orientation can be coarse adjusted, and securely fixed with clamps.
- Adjustment screws are provided on the output side of the mirror, and angle adjustment of the output beam can be performed.

Attention

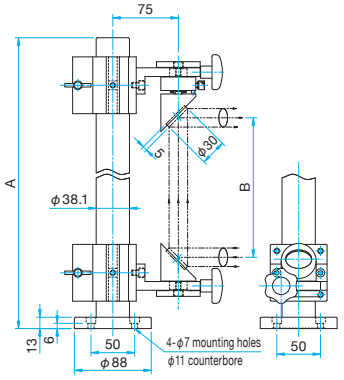
- To use damping properties, set up the strut directly on the laboratory table or a vibration isolator.

Outline Drawing

BSRU-177/355

2D CAD 3D CAD

Hexagon socket head cap screw M6×15...4 screws



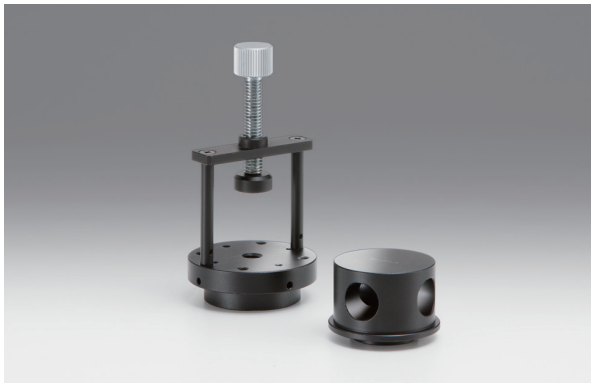
Specifications			Strut material: Stainless steel, Finish: None Control part primary material: Aluminum, Finish: Black Anodized		
Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	A [mm]	ϕB [mm]	Weight [kg]
BSRU-177	ϕ30	5	177.8	ϕ33 – ϕ40	3
BSRU-355	ϕ30	5	355.6	ϕ33 – ϕ220	4.6

Introducing Other Mirror Holders

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

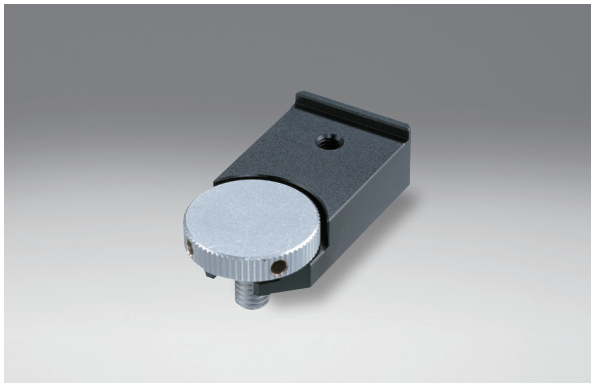
Horizontal Prism Adapter | MHG-HPA

Catalog Code W4008



Base Plates for Kinematic Mirror Holders | HMG-BP

Catalog Code W4108

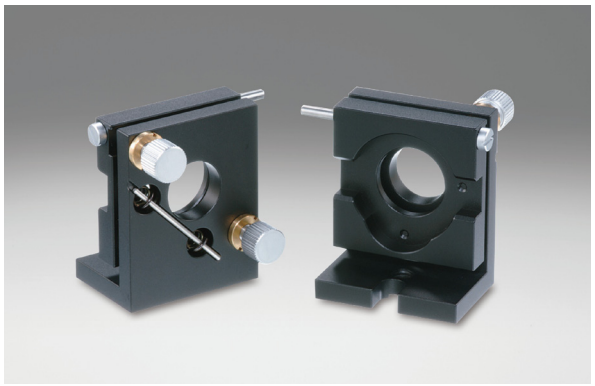


Kinematic Mirror Holder | MHB-S

Catalog Code W4504

One-touch Kinematic Mirror Holder | MHF

Catalog Code W4502

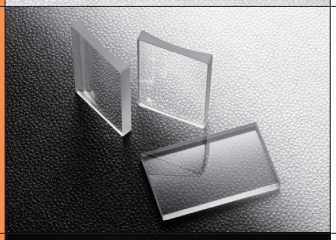
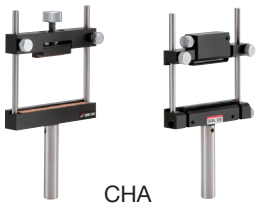


Adaptor Mounts | MAD-30/MAD-50

Catalog Code W4109

Lens Holders Selection Guide

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

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

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

SLH

LHA

Fixed type holders without a lens centering adjustment mechanism.
These holders can hold thin lenses as well as thick lenses such as achromatic lenses.

- The thin frame type which has a smaller diameter, and the large lens type which is intended for use with a large lens with diameter of ϕ80mm or larger are available.
- The thin frame type can set the optical axis height from the baseplate to round numbers such as 55mm or 60mm by replacing the post with a post stand (PST-**).
- The thin frame type can set the height in inches when it is turned upside down. Inch-based post stands are also available. Reference D040
- The resin retaining rings (made of Delrin) used in the thin frame type can securely hold lenses without scratching them. (Delrin rings are not attached.)

Guide

▶Post length can be changed. (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. Post replacement is free of charge, but please consult our International Sales Division because there may be extra charges due to differences in length.)

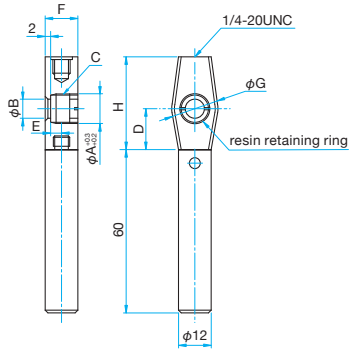
Attention

▶Friction between the resin retaining ring used in the thin frame type and the main body may cause resin powder. For use in clean rooms or high-power lasers, please replace with aluminum retaining rings (NR-**).

Outline Drawing

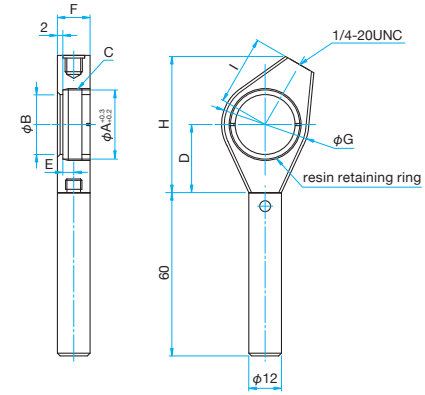
LHF-10S/12.7S/15S/20S

M6 P1



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

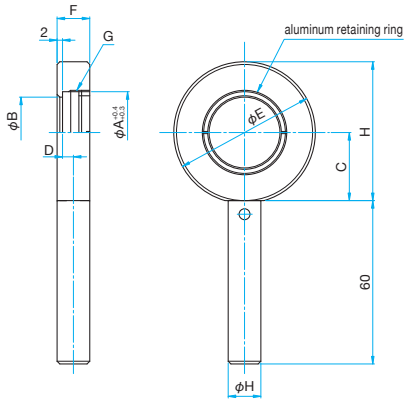
M6 P1



LHF-80/80A/100/100A/130/150

2D CAD 3D CAD

M6 P1



Thin Frame

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter ϕA [mm]	Compatible Optics Thickness t [mm]	Clear Aperture ϕB [mm]	C	Height optical axis 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

* 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 ϕA [mm]	Compatible Optics Thickness t [mm]	Clear Aperture ϕB [mm]	G	Height optical axis C [mm]	D [mm]	F [mm]	ϕE [mm]	H [mm]	Weight [kg]
LHF-80	**EE/UU**	ϕ80	3 – 15	ϕ73	M81.1 P1	50	8.5	21	ϕ102	101	0.31
LHF-80A	**—**	ϕ80	4 – 23	ϕ73	M81.1 P1	50	12.5	29	ϕ102	101	0.37
LHF-100	**EE/UU**	ϕ100	4 – 18	ϕ93	M101.1 P1	60	11	26	ϕ122	121	0.39
LHF-100A	**—**	ϕ100	4 – 22	ϕ93	M101.1 P1	60	13	30	ϕ122	121	0.42
LHF-130	**—**	ϕ130	4 – 18	ϕ122	M131.1 P1	75	11	26	ϕ152	151	0.45
LHF-150	**—**	ϕ150	5 – 20	ϕ142	M151.1 P1	85	12	28	ϕ171	170	0.62

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

Three-axis/Five-axis Lens Holders (Post Type) | ALHN-3RO/ALHN-5RO

RoHS

Catalog Code W4016

Multi-axis lens holders are a convenient way to align a lens to the optical axis. Typical uses include adjusting the collimating lens in laser applications.

- Five-axis adjustment type (ALHN-5RO) that has lens tilt adjustment function required for adjustments such as interferometer wave front and intensity distribution of focus spots is also available.
- Lens focus adjustment is possible by rotating the lens tube with the lever, and moving the position of the lens forward or backward.
- The centering mechanism is fitted with a nut clamp, and the focus adjustment is fitted with a screw clamp.
- In addition to single lenses, thick lenses or combined lens tubes up to thickness 28mm can be fixed.

Guide

- Baseplate type that can be mounted on optical breadboard with M6 tap open or breadboard is also available.
- Centering lens holders (LHCM) without focus adjustment function are also available. Reference C038
- Centering lens holders (LHCM) for lenses ϕ20mm or less are also available.
- 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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

Attention

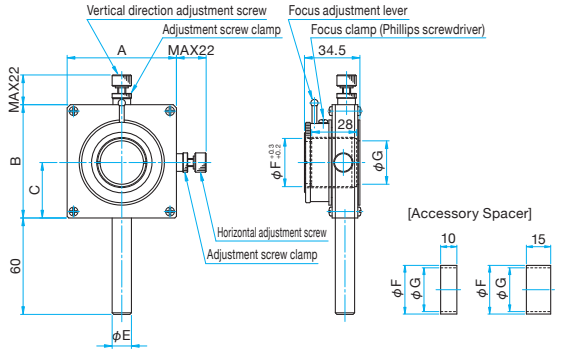
- Two spacers are included with these mounts to allow positioning of the lens within the lens tube.
- When the focal length of lens is long, adjustment does not work effectively because the focus adjustment range is too narrow. In such a case, please use the dovetail stages or optical benches.
- There is no clamp on the tilt adjustment mechanism of the lens.

2D CAD 3D CAD

Outline Drawing

ALHN-3RO

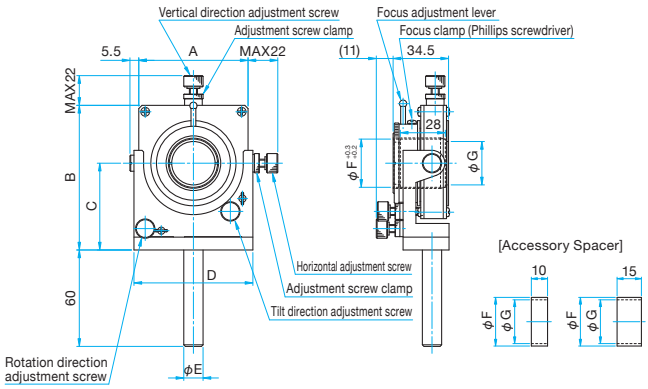
M6 P1



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

ALHN-5RO

M6 P1



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		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-25-5RO	N/EE/UU	ϕ25	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.46
ALHN-25.4-5RO	N/EE/UU	ϕ25.4	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.46
ALHN-30-5RO	N/EE/UU	ϕ30	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.46
ALHN-50-5RO	N/EE/UU	ϕ50	0 – 28	ϕ6	0.25	±3	±3	about 0.36	about 0.36	±3	0.72
ALHN-50.8-5RO	N/EE/UU	ϕ50.8	0 – 28	ϕ6	0.25	±3	±3	about 0.36	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 are strong against vibration and can be used for a stable low optical axis.

- Five-axis adjustment type (ALHN-5) that has lens tilt adjustment function required for adjustments such as interferometer wave front and intensity distribution of focus spots is also available.
- Lens focus adjustment is possible by rotating the lens tube with the lever, and moving the position of the lens forward or backward.
- The centering mechanism is fitted with a nut clamp, and the focus adjustment is fitted with a screw clamp.
- In addition to single lenses, thick lenses or combined lens tubes up to thickness 28mm can be fixed.

Guide

- Centering lens holders (LHCM) without focus adjustment function are also available. Reference C038
- Centering lens holders (LHCM) for lenses ϕ20mm or less are also available.
- Please contact our International Sales Division if you desire to specify the optical axis height.

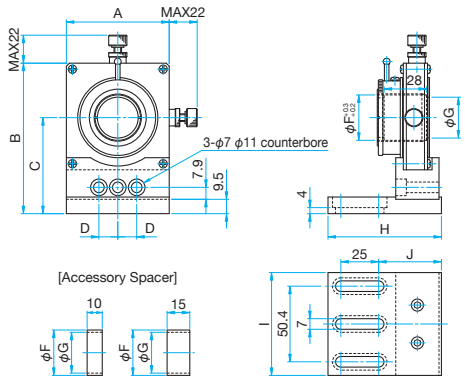
Attention

- 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 slotted holes of the mounting plate.
- There is no clamp on the tilt adjustment mechanism of the lens.

2D CAD 3D CAD

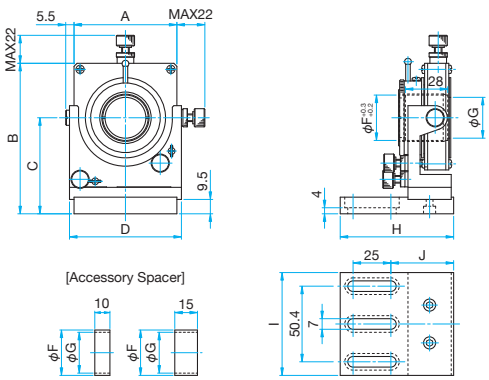
Outline Drawing

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



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	ϕF (mm)	ϕG (mm)	H (mm)	I (mm)	J (mm)
ALHN-25-3	68	99.5	63.5	12.5	ϕ25	ϕ22	75	68	41.3
ALHN-25.4-3	68	99.5	63.5	12.5	ϕ25.4	ϕ22	75	68	41.3
ALHN-30-3	68	99.5	63.5	12.5	ϕ30	ϕ27	75	68	41.3
ALHN-50-3	88	122.2	76.2	25	ϕ50	ϕ46	95	75	59.8
ALHN-50.8-3	88	122.2	76.2	25	ϕ50.8	ϕ46	95	75	59.8

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



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	ϕF (mm)	ϕG (mm)	H (mm)	I (mm)	J (mm)
ALHN-25-5	68	99.5	63.5	74	ϕ25	ϕ22	75	68	41.3
ALHN-25.4-5	68	99.5	63.5	74	ϕ25.4	ϕ22	75	68	41.3
ALHN-30-5	68	99.5	63.5	74	ϕ30	ϕ27	75	68	41.3
ALHN-50-5	88	122.2	76.2	94	ϕ50	ϕ46	95	75	59.8
ALHN-50.8-5	88	122.2	76.2	94	ϕ50.8	ϕ46	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	ϕ25	0 – 28	ϕ6	0.25	±3	0.49
ALHN-25.4-3	ϕ25.4	0 – 28	ϕ6	0.25	±3	0.49
ALHN-30-3	ϕ30	0 – 28	ϕ6	0.25	±3	0.49
ALHN-50-3	ϕ50	0 – 28	ϕ6	0.25	±3	0.78
ALHN-50.8-3	ϕ50.8	0 – 28	ϕ6	0.25	±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	ϕ25	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.5
ALHN-25.4-5	ϕ25.4	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.5
ALHN-30-5	ϕ30	0 – 28	ϕ6	0.25	±4	±4	about 0.5	about 0.5	±3	0.5
ALHN-50-5	ϕ50	0 – 28	ϕ6	0.25	±3	±3	about 0.36	about 0.36	±3	0.75
ALHN-50.8-5	ϕ50.8	0 – 28	ϕ6	0.25	±3	±3	about 0.36	about 0.36	±3	0.75

Caliper Variable Lens Holders | LHCM

RoHS Catalog Code W4512

Two-axis lens holders with a compact centering mechanism.
The compact centering adjustment mechanism makes these holders capable of handling a low optical axis. These holders can be used for adjusting the focus point of a laser beam or the direction of a collimated beam.

- These holders can be centering adjustment of the lens of various sizes up to ϕ50.8mm from ϕ10mm.
- These holders can hold and adjust thick achromatic lenses.
- The thin frame of these holders allows optics to be placed close to the front and back of the lens.

Guide

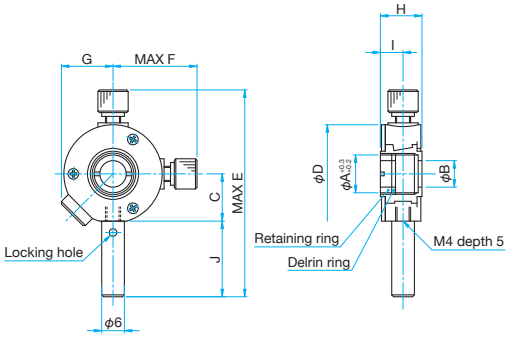
- For the focus adjustment of lenses, please use a dovetail stage or a micrometer adjustment stage. Please contact our International Sales Division for more information on the selection of models.
- Three-axis lens holders (ALHN-3RO) which have high resolution for lens centering adjustment and can clamp the adjustment axis are also available. Reference C036
- Five-axis lens holders (ALHN-5RO) which can adjust the tilt of lenses are also available. Reference C036
- 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. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Please contact our International Sales Division for more information.)

Attention

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

Outline Drawing

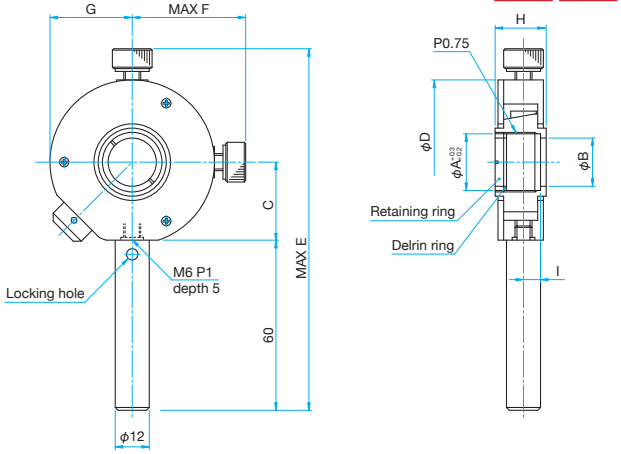
LHCM-10/12.7/15 M4 P0.7



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

LHCM20/25/25.4/30/40/50/50.8 M6 P1

2D CAD 3D CAD



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

Primary material: Aluminum
Finish: Black Anodized

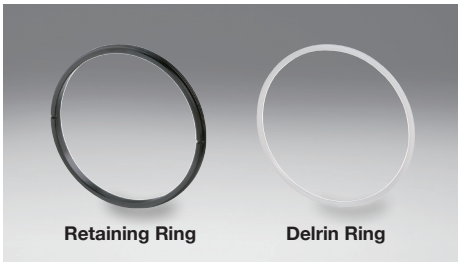
Part Number	Options specified*	Compatible Optics Diameter ϕA [mm]	Compatible Optics Thickness t [mm]	Clear Aperture ϕB [mm]	Height optical axis C [mm]	Centering Adjustment Range [mm]	Weight [kg]
LHCM-10	**N**	ϕ10	1 – 6	ϕ7	12.5	ϕ1	0.03
LHCM-12.7	**N**	ϕ12.7	1 – 8	ϕ12	20	ϕ2	0.05
LHCM-15	**N**	ϕ15	1 – 8	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

RR/DR

RoHS Catalog Code W4017

Accessories for mirror holders and lens holders.



- Retaining ring and Delrin ring are one set in five each. Retaining rings and Delrin rings are sold separately.
- The retaining ring spanner (NRS) a special tool to tighten retaining rings is available.

Guide

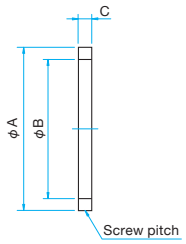
▶Please contact our International Sales Division regarding tapered wide retaining rings for beamsplitter holders.

Attention

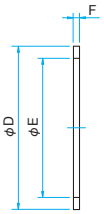
▶If these are used in products not in our company's catalog, screws sometimes will not turn. Do not use these for products not listed in our catalog.

Outline Drawing

Retaining ring



Delrin ring



2D CAD 3D CAD

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

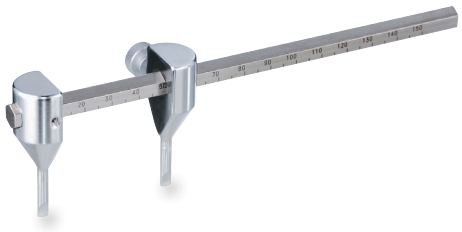
Delrin Ring — Primary material: Delrin, Finish: None

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

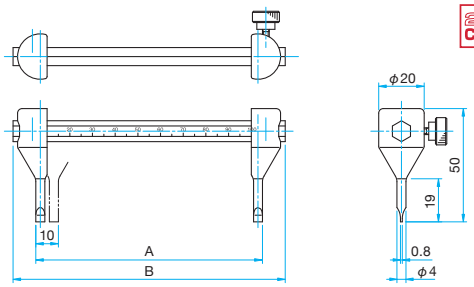
Special purpose retaining ring spanner wrench that can support retaining rings of various sizes. Optics can be securely fixed in holders without scratching the optics or retaining rings.



- By matching the scale to the outer diameter of the lens, the wrench spacing can be easily set to the correct spacing.

Outline Drawing

NRS



2D CAD 3D CAD

Specifications — Primary material: Stainless, Finish: 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

Mini Lens Holders
Adjustable Round Lens Holders

TLH
LHA

TLH

RoHS Catalog Code W4101

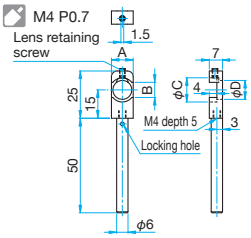
These lens holders are the thinnest to hold lenses.
The width of these holders are designed to be narrower than the diameter of lenses.

- Optical systems which use lenses can be placed close to each other in parallel.
- Please bring the plane side of a lens against the holder.
- The simple fixation method makes replacement of lenses easy.
- Can secure plano concave lenses with edge thickness of 1mm.

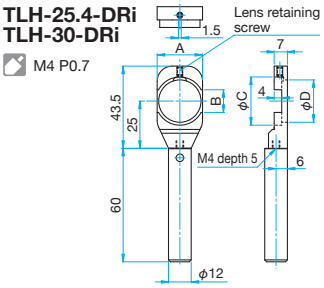
2D CAD 3D CAD

Outline Drawing

TLH-10-DRi
TLH-12.7-DRi



TLH-25.4-DRi
TLH-30-DRi



Guide

- We can change the post length. (If the length of post is specified at the time of purchase, this product will be delivered after replacing posts. Post replacement is free of charge, but please consult our International Sales Division because there may be extra charges due to differences in length.)

Attention

- Tightening the lens retaining screws hard will bend these holders. Please hold lenses lightly to the extent that they do not move.
- Lenses may come off 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 ϕC [mm]	Clear Aperture ϕD [mm]	Height optical axis [mm]	Compatible Optics Thickness [mm]	A [mm]	B [mm]	Weight [kg]
TLH-10-DRi	**N**	ϕ10	ϕ7	15	1 – 4	8.5	7	0.054
TLH-12.7-DRi	**N**	ϕ12.7	ϕ10	15	1 – 4	11.5	8	0.060
TLH-25.4-DRi	**N**	ϕ25.4	ϕ22.4	25	1 – 4	24	12	0.065
TLH-30-DRi	**N**	ϕ30	ϕ27	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

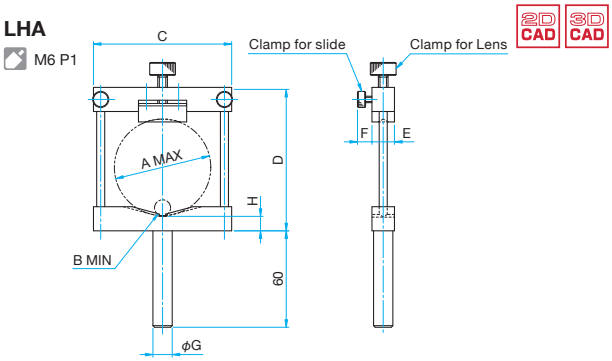
RoHS Catalog Code W4020

Holders for fixing round lenses of any diameter size.
Appropriate for use in applications where there are no lens holders of compatible diameter or the lens diameter is not decided.

- The bottom surface of the holder has a V-grooved section, which can fix cylindrical components other than lenses.
- Round lenses are fixed securely with the slit on the bottom surface and the lens clamps.

Specifications

LHA



2D CAD 3D CAD

Part Number	ϕA (mm)	ϕB (mm)	C (mm)	D (mm)	E (mm)	F (mm)	ϕG (mm)	H (mm)
LHA-25	ϕ25	ϕ5	40	45	12	(8)	ϕ12	7.5
LHA-60	ϕ60	ϕ10	86	88	14	(9)	ϕ12	9
LHA-100	ϕ100	ϕ20	134	135	19	(13)	ϕ20	8
LHA-150	ϕ150	ϕ30	200	195	19	(14)	ϕ20	14

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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

Attention

- Make sure to tighten the slide clamps before tightening the lens clamp.
- A variety of Post Holders are available to adjust the height of the mounted lens.

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**	ϕ5 – ϕ25	1 – 2.5	0.1
LHA-60	**N/EE/UU**	ϕ10 – ϕ60	1 – 4.7	0.2
LHA-100	**N/EE/UU**	ϕ20 – ϕ100	1 – 7	0.5
LHA-150	**—**	ϕ30 – ϕ150	1 – 7	0.8

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

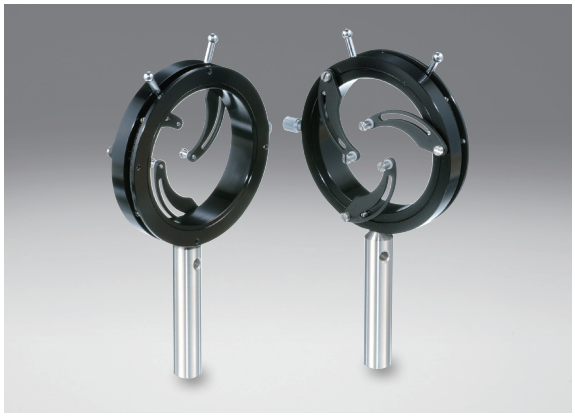
Caliper Variable Lens Holders | SLH

RoHS * Except SLH-120

Catalog Code W4019

Designed to hold lenses with a range of diameters at a consistent center height. Appropriate for applications where the lenses get changed out very often.

- The three jaws of the holder will contact the edge of the lenses, and hold them with spring pressure.
- Move the levers closer to each other to open the three jaws, and loosen their hold to 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.
- Replacement of holders with tapered posts will be charged. Contact our International Sales Division for more information.

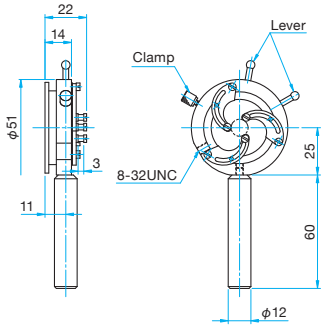
Attention

- Thin lenses may tilt and fall off from the holders when they are held with excessive spring pressure. Hold lenses with care.
- Slight displacement will occur in the center of a lens every time a lens is released and gripped. For precise measurement, use two-axis lens holders with a centering mechanism (ALHN). Reference C036

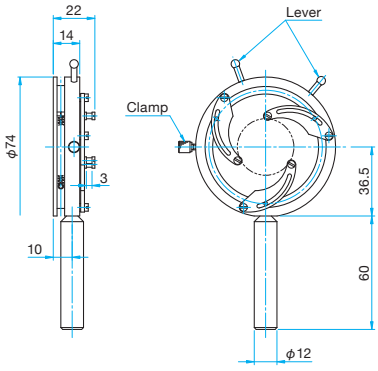
2D CAD 3D CAD

Outline Drawing

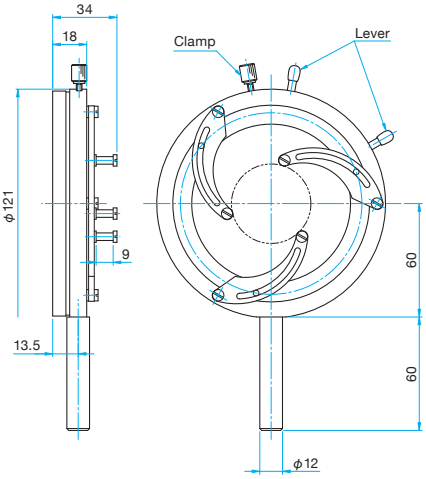
SLH-25 M4 P0.7 with taper



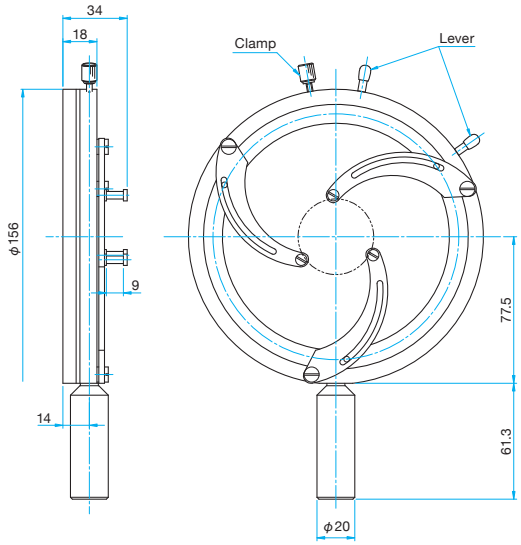
SLH-50 M4 P0.7 with taper



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	0.1
SLH-50	—	ϕ30 – ϕ50	1 – 3	0.15
SLH-80	EE/UU	ϕ25 – ϕ80	1 – 9	0.35
SLH-120	—	ϕ40 – ϕ110	1 – 9	0.7

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

Small Lens Claws | MLH

RoHS Catalog Code W4021

Holders for fixing small diameter lenses of ϕ15mm or less.

- Hold round lenses of any small diameter by clamping them with a spring-loaded arm.
- MLH-10 is compact in the longitudinal direction, which enables placement of samples (objects) in proximity to lenses.
- MLH-10 can be installed in a horizontal position using cross clamps (CCHN).

Guide

- Selfoc® lens claws (MLH-SF) are available for micro lenses with diameter of ϕ5mm or less. Reference C043
- 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 replacement is gratis, but consult our International Sales Division because there may be extra charges due to differences in post diameter.

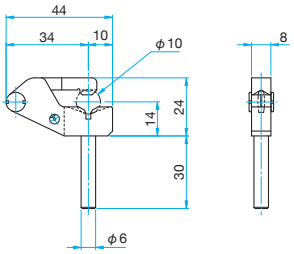
Attention

- If diameter size changed, it changes the center of lens. Use after adjusting the optical axis height.
- Recommended mounting method for MLH-10: place the lens on a horizontal surface and gently release the clamp to secure the lens.

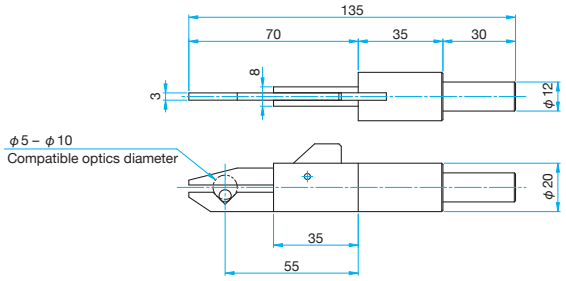
2D CAD 3D CAD

Outline Drawing

MLH-15 M4 P0.7



MLH-10 M6 P1



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Weight [kg]
MLH-15	ϕ5 – ϕ15	1 – 6	0.02

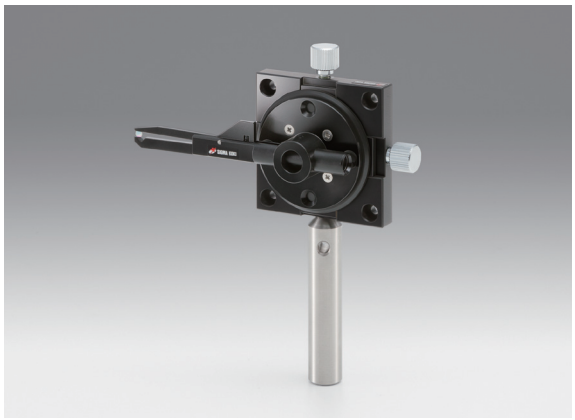
Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Compatible Optics Diameter [mm]	Weight [kg]
MLH-10	ϕ5 – ϕ10	0.15

Holders for fixing micro lenses of ϕ3mm 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 first removing the MLH-SF from the adapter, and then clamping an horizontally placed optic from left and right with its arm.
- The MLH-10ADP-2 is mounted on a □40mm XYZ stage (TSD-405L), enabling precision position adjustment of optics. Reference E148
- The MLH-10ADP-2 is mounted on a fiber holder (FOP), enabling adjustment of position and tilt.



Guide

- Because there are M6 screw holes on the hips of the MLH-SF, the post can be extended. However, the post (RO) cannot be mounted on the MLH-10ADP.
- Because there is no step on the arm, lens of thickness 2mm or higher can be fixed.
- Selfoc® Lens is a registered trademark of Nippon Sheet Glass Co., Ltd.

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.

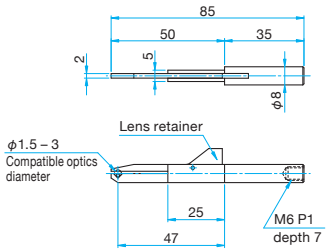
Specifications

Primary material: Aluminum
Finish: Black Anodized

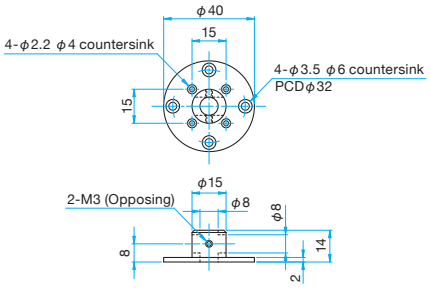
Part Number	Compatible Optics Diameter [mm]	Weight [kg]
MLH-SF	ϕ1.5 – ϕ3	0.02
MLH-10ADP-1	—	0.06
MLH-10ADP-2	—	0.01

Outline Drawing

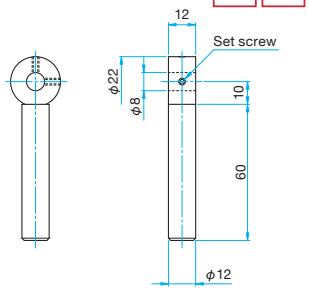
MLH-SF



MLH-10ADP-2 Countersunk head screw M2×4…4 screws, M3×6…4 screws



MLH-10ADP-1 M6 P1



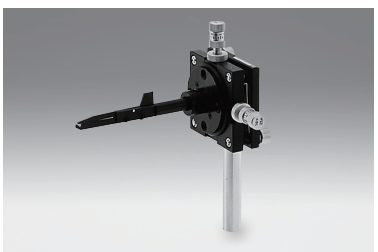
Example of Use

Fixed Selfoc® Lens Claws

Assembled with the MLH-SF and MLH-10ADP-1
When fixing microscopic lenses simply

Selfoc® 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



Refer to the fiber holder (FOP). Reference C074

Selfoc® 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

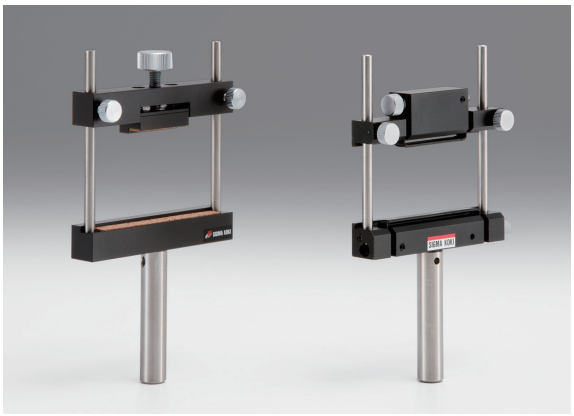
Refer to the fiber holder (FOP). Reference C074

Adjustable Cylindrical Lens Holders | CHA

RoHS Catalog Code W4022

Holders for square lenses (cylindrical lenses). Easy to fix square lenses of any size with its sliding system.

- Space saving sliding clamp allows optics to be placed in close proximity. The standard type has a cork sheet bonded to the top and bottom of lens clamping sections to prevent lenses slipping.
- The flexible type clamps lenses from the front and back with the lens fix frames and lens frames attached to the top and bottom sections in order to fix thick lenses and prevent lenses falling off.



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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

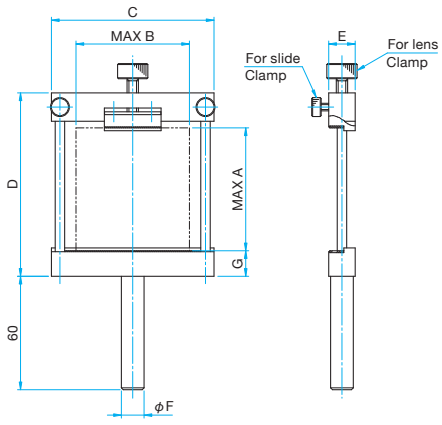
Attention

- When using the standard type, make sure to tighten the slide clamps before tightening the lens clamp.
- When using the standard type, gently tighten the lens clamp to prevent stressing the lens.
- Not recommended for round lenses. Use LHA Reference C040

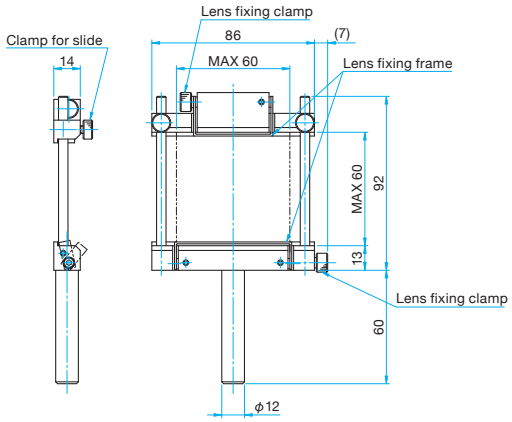
2D CAD 3D CAD

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 MAX A [mm]	MAX B [mm]	C [mm]	D [mm]	E [mm]	ϕF [mm]	G [mm]	Weight [kg]
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 MAX (vertical) [mm]	MAX (horizontal) [mm]	Weight [kg]
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

Special holders for multi-element focusing lenses.
Appropriate for installing focusing lenses in an optical experiment system.

- Female screws are tailored to fit mounting screws of various focusing lenses. See the compatibility table for appropriate combinations.

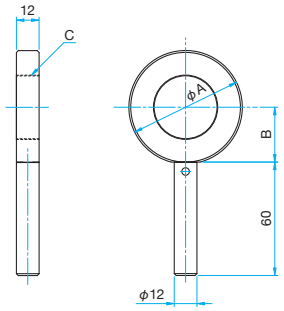
Guide

- For details of focusing lenses, refer to Optics > ME Optics > Focusing Lenses. Reference B183
- For details of cover glass and cover glass holders, refer to Optics > ME Optics > Focusing Lenses. Reference B183
- 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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

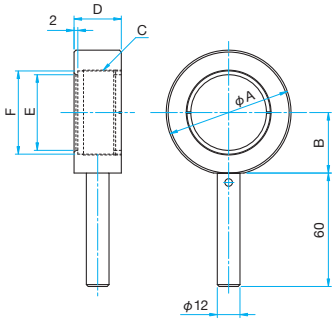
2D CAD 3D CAD

Outline Drawing

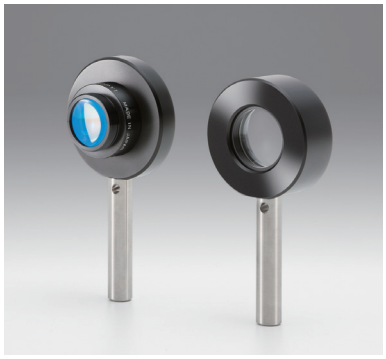
LHF-M M6 P1



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	Reference	Cover Glass	Cover Glass Holder	Compatible Holders
Visible Spectrum Achromats				
ATL-30-40PY2	Reference B180	PG-33	PGH-36	**LHF-M34-30**
ATL-30-50PY2				
ATL-30-60PY2				
NADL-30-80PY2				
NADL-30-100PY2				
NADL-30-150PY2				
NADL-30-200PY2				
YAG Laser Focusing Lenses				
NYTL-25-20PY1	Reference B181	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		PG-33	PGH-36	
NYDL-30-80PY1				
NYDL-30-100PY1				
NYDL-30-150PY1				
Focusing Lenses for Fiber Laser				
HFTLSQ-15-20PF1	Reference B182	PG-21	PGH-24	Special adapter + LHF-M29-25
HFTLSQ-20-30PF1		PG-27	PGH-30	Special adapter + LHF-M34-30
HFTLSQ-30-40PF1				**LHF-M34-30**
HFTLSQ-30-50PF1				
HFTLSQ-30-60PF1		PG-33	PGH-36	
HFTLSQ-30-80PF1				
HFTLSQ-30-100PF1				
HFDLSQ-30-150PF1				
HFTLSQ-50-100PF1				**LHF-M50.9-50**
HFDLSQ-50-200PF1				
HFDLSQ-50-300PF1				

Focusing Lens Part Number	Reference	Cover Glass	Cover Glass Holder	Compatible Holders
Excimer Laser Focusing Lenses				
ETL-30-40P	Reference B184	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				
EDL-50-100P				**LHF-M50.9-50**
EDL-50-150P				
EDL-50-200P				
EDL-50-250P				
EDL-50-300P				
Ultraviolet Achromats				
UDL-30-50P	Reference B185			**LHF-UDL-30**
UDL-30-80P				
UDL-30-100P				
NUDL-30-150P				
NUDL-30-200P				
UDL-40-80P				**LHF-UDL-40**
NUDL-40-100P				
NUDL-40-150P				
NUDL-40-200P				
NUDL-40-250P				
UDL-50-100P				**LHF-UDL-50**
NUDL-50-150P				
NUDL-50-200P				
NUDL-50-250P				
NUDL-50-300P				

Objective Lens Holders | LHO

RoHS Catalog Code W4024

Special holders for objective lenses. Appropriate for installing objective lenses in an optical experiment system.

- Female screws are tailored to fit mounting screws of various objective lenses. See the compatibility table for appropriate combinations.
- There are two types of objective lens holders for mounting with M20.32, 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.
- Provide stable images at high magnification since objective lenses are mounted on simple and highly rigid holders.

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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.
- Adapters (TAT-18OA) for adjusting the center of objective lenses with two-axis pinhole/objective holders (TAT) are also available.
Reference C060

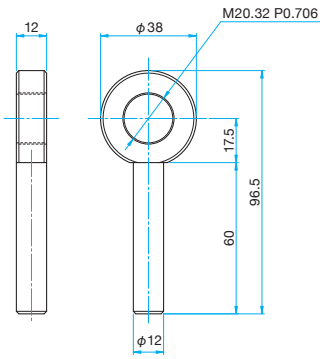
Attention

- Compatibility of objective lenses from other companies is not guaranteed even if the screws meet the same standard.
- High magnification objective lenses require fine adjustment mechanisms for centering and focus adjustment. Install an adjustment stage under an objective holder or under a sample (object).

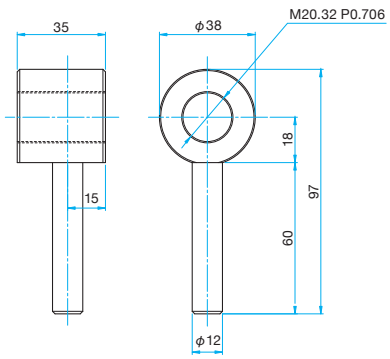
2D CAD 3D CAD

Outline Drawing

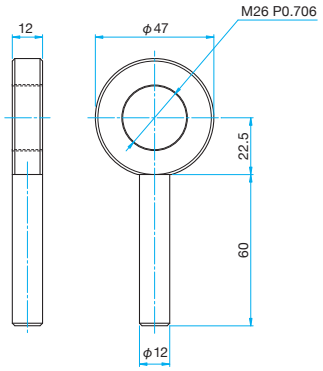
LHO-20.32 M6 P1



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

Compatibility Table for Objective Lenses

Objective Lens Part Number	Compatible Holders
Objective Lenses	
OBL-10	**LHO-20.32 LHO-20.32A**
OBL-20	
OBL-40	
Long Working Distance Objective Lenses	
EPL-5	**LHO-20.32 LHO-20.32A**
EPL-10	
EPLE-20	
EPLE-50	
EPLE-100	
SPAL-2	**LHO-26**
SPAHL-5	
SPAL-10	
SPAHL-20	
SPAHL-50	

Objective Lens Part Number	Compatible Holders
Near-ultraviolet Objective Lenses Near-infrared Objective Lenses	
PAL-20-NUV	**LHO-26**
PAL-50-NUV	
LMPAL-20-NIR	
LMPAL-50-NIR	
Ultraviolet Objective Lenses	
NPAL-10-UV-YSF	**LHO-26**
NPAL-20-UV-YSF	
NPAL-50-UV-YSF	
NPAL-10-NUV-YST	
NPAL-20-NUV-YST	
NPAL-50-NUV-YST	
Objective Reflection Lenses	
OBLR-10A	**LHO-20.32 LHO-20.32A**
OBLR-20A	
OBLR-30	
OBLR-40A	

Holders for mounting block-shaped optics such as cube beamsplitters or right-angle prisms.
All four faces of a prism can be used by mounting a cube prism diagonal to the prism retainer strut.

- The KKD series is fitted with bidirectional tilt and rotational adjustment mechanisms, enables fine adjustment of the reflected beam.
- Any optic size within the specified range can be fixed.
- Prism retaining screw has a non-rotating tip to insure the prism does not rotate when clamping in place.

Guide

- ▶$\theta\alpha\beta$ axis stages without prism retainer and strut (KKD-C) are also available. Reference E193
- ▶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 replacement is gratis, but consult with our International Sales Division because there may be extra charges due to differences in length.

Attention

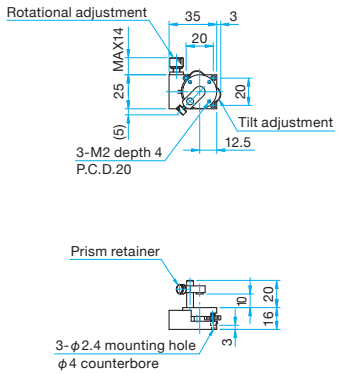
- ▶KKD-25PH and PLH-25 might not exert sufficient pressure to retain a prism, and there is a risk that optics might fall out. Use after making sure that the prism is fixed.
- ▶After adjusting the KKD series, if the prism retainer is lifted, the prism table sometimes moves, throwing off adjustment of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

2D CAD 3D CAD

Outline Drawing

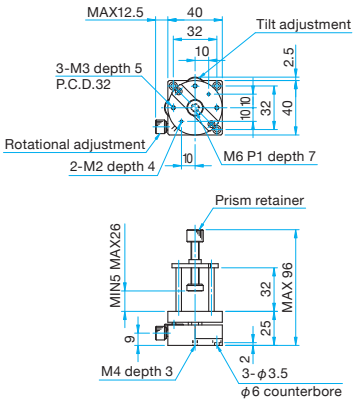
KKD-25PH

Pan head screw M2×6...3 screws



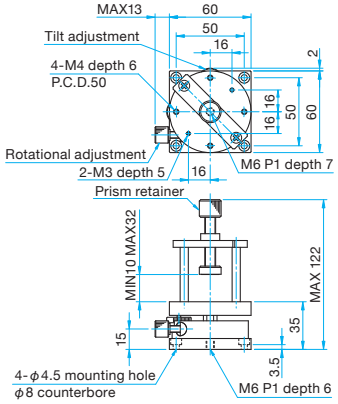
KKD-40PH

Pan head screw M3×6...3 screws



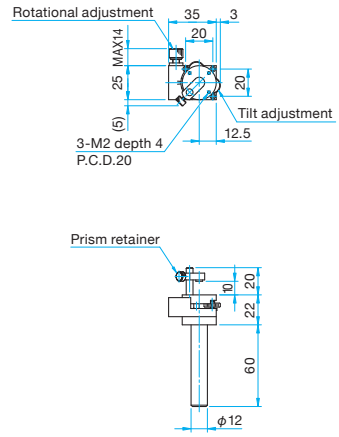
KKD-60PH

Pan head screw M4×8...4 screws



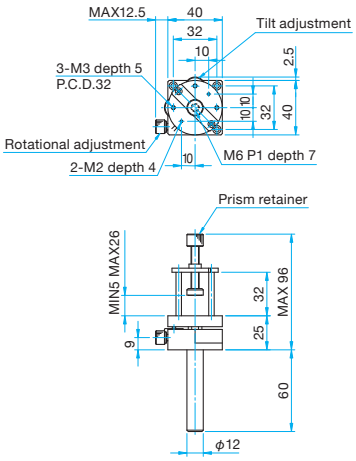
KKD-25PHRO

M6 P1



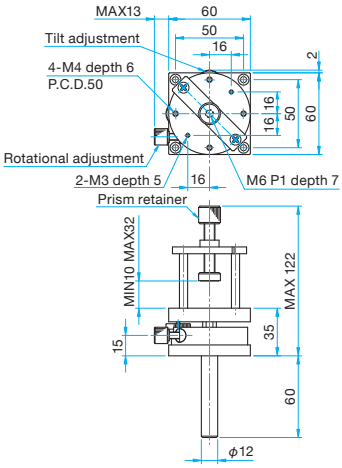
KKD-40PHRO

M4 P0.7



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 Rotation [°/rotation]	Resolution Tilt [°/rotation]	Weight [kg]
KKD-25PH	– □10	±3	±3	about 0.9	about 2.2	0.05
KKD-25PHRO	– □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

Application Systems
Optics & Optical Coatings
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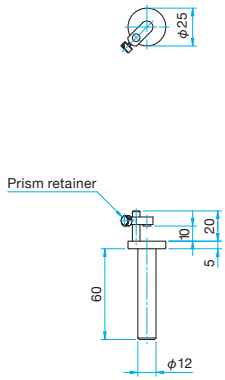
Bases
Manual Stages
Actuators
Motoeized Stages
Light Sources
Index
Guide
Mirrors
Lenses
Prisms
Polarizers
Lasers
Beam Shaping Diffusers
Filters
Shutter
Others
Fiber

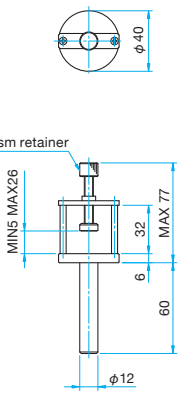
2D CAD 3D CAD

Outline Drawing

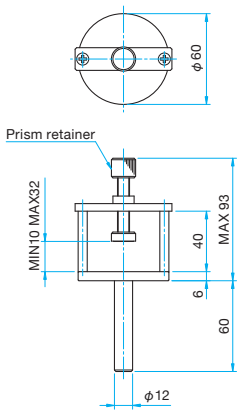
PLH-25 M4 P0.7



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

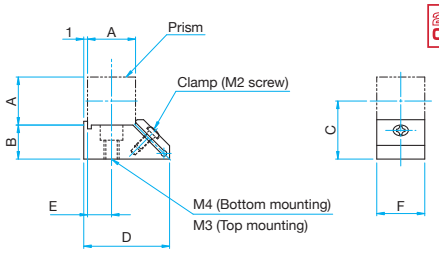
RoHS Catalog Code W4103

Holders for holding cube beamsplitters.
By eliminating the post of the prism holding, and because it clamps the lower portion of the side surface of the cube with a thin nail clamp, it is possible to use a larger effective diameter in all four directions of the cube prism.

- Can be mounted on posts or post stands. These holders can also be mounted directly on a baseplate or stage with an M4 thread.

Outline Drawing

2D CAD 3D CAD



Part Number	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
PAD-10	10	10	15	20	5	10
PAD-12.7	12.7	8.65	15	22.7	6.35	12.7
PAD-15	15	12.5	20	25	7.5	15

Guide

- Prism holders (KKD) which can adjust the reflected beam angle of a beamsplitter are also available.

Attention

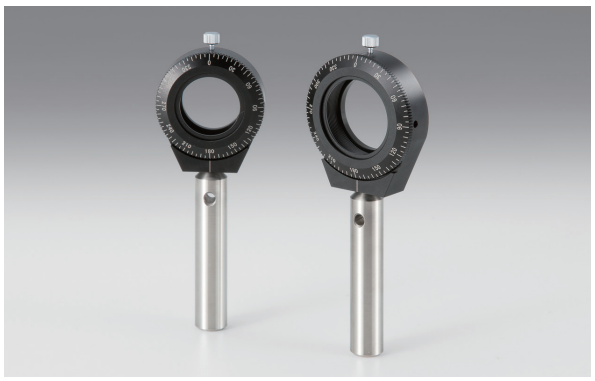
- Tightening the screw hard may break glass. Please tighten a cube with the minimum necessary force to the extent that it does not move.
- Please use with prisms with outer dimension tolerance of ±0.2mm. These holders may not be able to mount prisms with large outer dimension tolerance.

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

Holders used to adjust the direction of polarization plates and waveplates. Appropriate for use in precision polarization experiments as the mechanism allows smooth 360 degrees rotation on the optical axis.

- SPH is fitted with a fine adjustment mechanism in its rotation mechanism, and can be used to create high extinction states by enabling very fine adjustment of polarization plates.
- 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 Delrin rings.
- The MPH series is designed for use in small systems and narrow spaces.



Guide

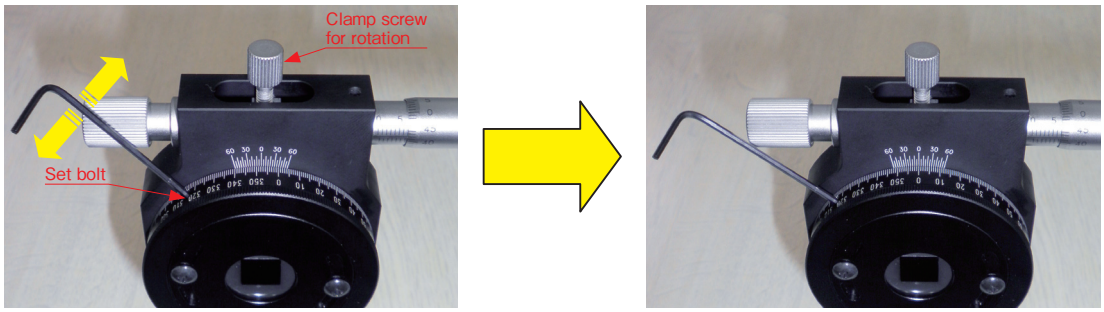
- Holders for optics sizes not listed in the catalog can be made to order.
- Adapters for polarizing prisms are available for both the PH and SPH holders. Reference C051
- Post length can be changed. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts. Post replacement is gratis, but check with our International Sales Division because there may be extra charges due to differences in length.

Attention

- If the accompanying post is removed from the PH or SPH series and an M6 screw is used instead to fix the holder, make sure that the tip of the screw does not go inside further than 5mm from the bottom surface of the holder.
- The holder may not rotate smoothly if a long screw is used because the tip of the screw might interfere with the rotational mechanism.

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 ±1 degree.)

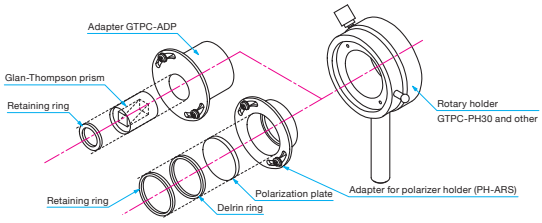


[How to adjust scale plate]

(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, ϕ15, ϕ25.4 or ϕ30mm, 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 ϕ30 and ϕ50mm) for polarizer holders (PH-ARS) are also available as a single item. Contact our International Sales Division for more information.



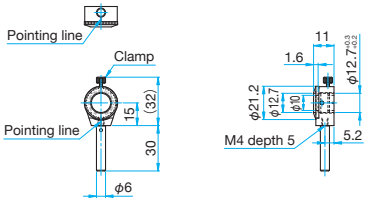
Polarizer Holders | MPH/PH/SPH

Catalog Code W4027

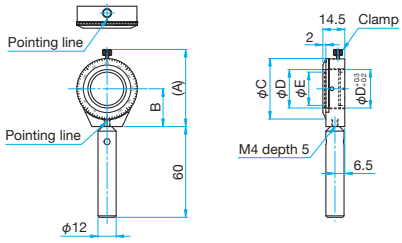
2D CAD 3D CAD

Outline Drawing

MPH-12.7R

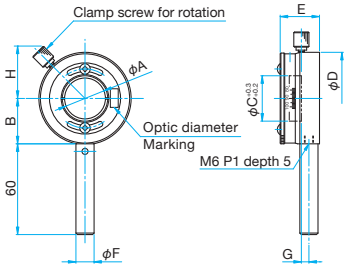


MPH-25.4R/30R



PH-ARS

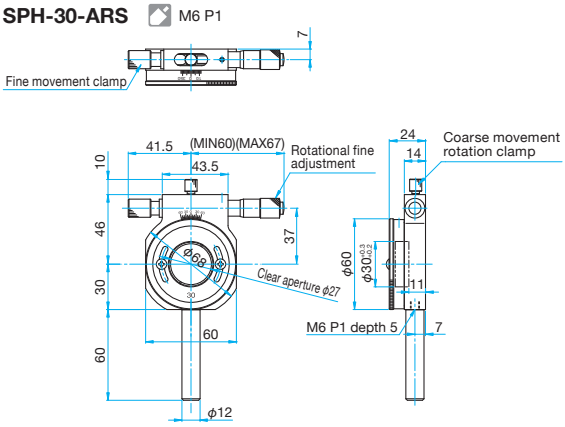
M6 P1 (Only PH-100 with taper)



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

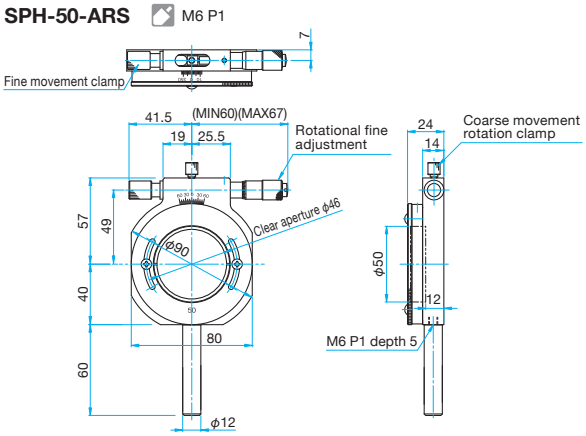
SPH-30-ARS

M6 P1



SPH-50-ARS

M6 P1



Small Type

Primary material: Aluminum
Finish: Black Anodized

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]
MPH-12.7R	**N**	ϕ12.7	2 – 7	5	ϕ10	15	32	ϕ22	0.07
MPH-25.4R	**N**	ϕ25.4	2 – 8.5	5	ϕ22	25	51	ϕ40	0.083
MPH-30R	**N**	ϕ30	2 – 8.5	5	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

Primary material: Aluminum
Finish: Black Anodized

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

Primary material: Aluminum
Finish: Black Anodized

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	27	±5	5	about 0.014	0.32
SPH-50-ARS	**N/UU**	ϕ50	2 – 10	46	±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

Holders for adjusting the direction of various sizes of polarizing prisms including Glan-Thompson prisms. Appropriate for precision alignment of Glan-Thompson prisms or for polarimeter 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 C049
- 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. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts. Post replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.
- Holders for polarizing prisms of diameters or thickness not in the specifications listed in the catalog can be made to order.
- Please contact our International Sales Division if you need adapters equipped with an incidence angle adjustment function for polarizing prism.
- Please contact our International Sales Division if you need adapters equipped with eliminated light exit port for gran laser prism.

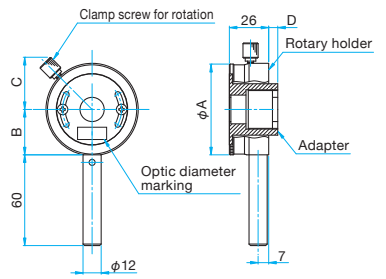
Attention

- The prices of rotary holders and adapters do not include the price of Polarizing prisms. Purchase Polarizing prisms separately. Reference B094
- Rotary holders and adapters (GTPC-ADP) are sold separately. Purchase the combination of three items, a Polarizing prism, adapter and rotary holder, by checking the combinations listed in the following specification table.

Outline Drawing

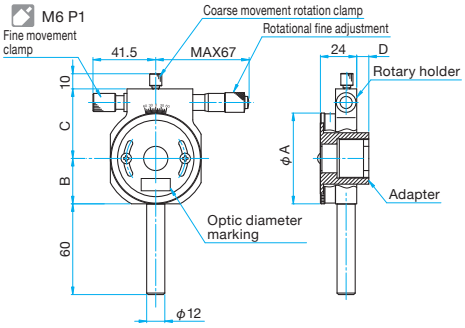
GTPC-PH30/GTPC-PH50 & GTPC-ADP

M6 P1



GTPC-SPH30/GTPC-SPH50 & GTPC-ADP

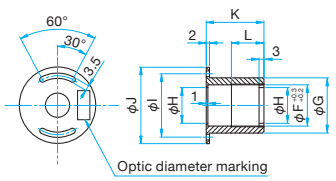
M6 P1



GTPC-ADP

Truss screw M3×6...2 screws

2D CAD 3D CAD



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-ADP25.4-31	ϕ60	30	34.3	9.5
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

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-ADP25.4-31	ϕ60	30	46	11.5
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

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-ADP25.4-31	ϕ25.4	ϕ34	ϕ22	ϕ39	ϕ47	35.5	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

Primary material: Aluminum
Finish: Black Anodized

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-ADP25.4-31	ϕ25.4	16 – 31	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

Primary material: Aluminum
Finish: Black Anodized

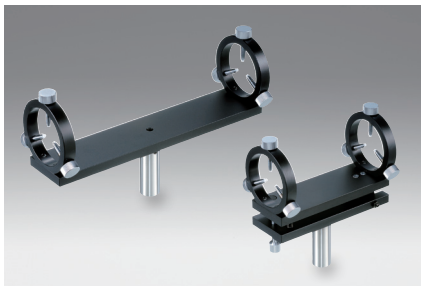
Holder Part Number	Adapter Part Number	Compatible Optics Diameter [mm]	Compatible Optics Thickness [mm]	Fine Adjustment Range [°]	Vernier MIN Reading [′]	Micro Indicator Conversion [°/DIV]	Total Weight [kg]
GTPC-SPH30	GTPC-ADP15-29	ϕ15	15 – 29	±5	5	about 0.014	0.33
GTPC-SPH30	GTPC-ADP25.4-31	ϕ25.4	16 – 31	±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	±5	5	about 0.014	0.62

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

LAH
LAHU/LAHU-A

LAH

RoHS Catalog Code W4029



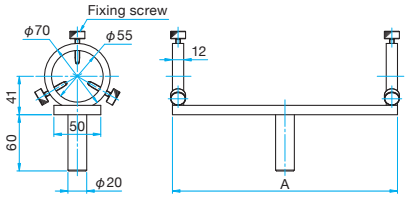
Holders for He-Ne lasers.
The six screws can be used to adjust the height and angle of the mounted laser tube.

- Laser tube diameters from ϕ18 to ϕ55mm are accommodated by changing the engagement length of the two groups of three screws.
- The angle of beam tilt can be changed by changing the engagement length of the six screws.
- The LAH-2 also includes an adjustment mechanism for changing the beam tilt angle.

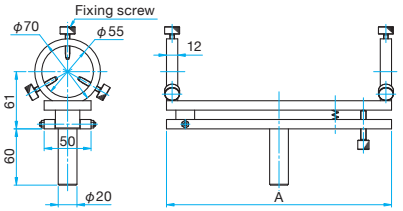
Outline Drawing

2D CAD 3D CAD

LAH-1T/LAH-1 M6 P1



LAH-2T/LAH-2 M6 P1



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 replacement is gratis, but check with our International Sales Division because there may be extra charges due to differences in length.

Attention

- After beam adjustment, make sure that the laser is securely fixed with 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	ϕ18 – ϕ55	140	—	—	0.31
LAH-1	ϕ18 – ϕ55	240	—	—	0.51
LAH-2T	ϕ18 – ϕ55	140	±4	about 0.5	0.45
LAH-2	ϕ18 – ϕ55	240	±2.4	about 0.3	0.91

LAHU/LAHU-A

RoHS Catalog Code W4030

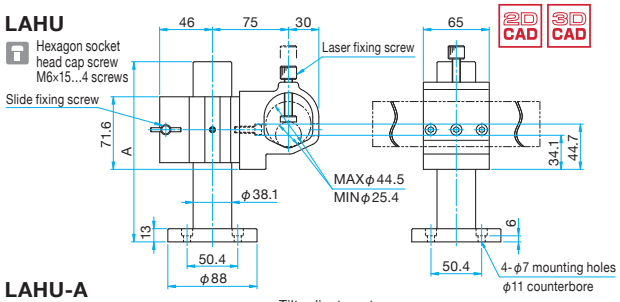
Cylindrical Laser mounts for use with vibration isolated Rod Mount system. The damped structure makes the holders appropriate for use in holograms or interferometry.

- Cylindrical lasers of ϕ25.4 to ϕ44.5mm 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 50×50mm matrix M6 screw holes.
- LAHU-A includes a mechanism to adjust beam tilt and rotation.

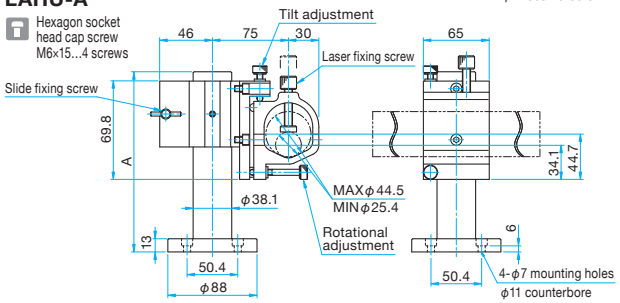
Outline Drawing

2D CAD 3D CAD

LAHU



LAHU-A



Guide

- Consult our International Sales Division if holders with an optical axis height of 300mm or higher is necessary.
- Consult our International Sales Division if a vibration isolator or optical breadboard does not have 50×50mm matrix M6 screw holes.

Attention

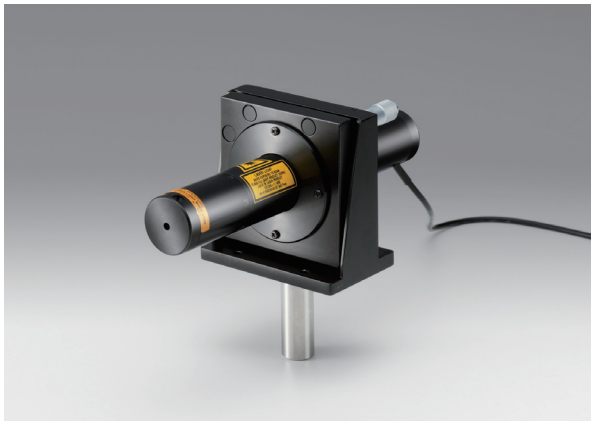
- Combined weight of laser and holder is heavy. Pay attention so as not to drop the holder when loosening the fixing screw of the slide because it may be too heavy to support with one hand.
- Lasers with protrusion or in a shape other than cylindrical shape may not be fixed securely with the holders.
- 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 [°]	Adjustment Range Rotation [°]	Weight [kg]
LAHU-45-POS177	177.8	ϕ25.4 – ϕ44.5	—	—	2.6
LAHU-45-POS355	355.6	ϕ25.4 – ϕ44.5	—	—	3.9
LAHU-45A-POS177	177.8	ϕ25.4 – ϕ44.5	±2	±2	2.7
LAHU-45A-POS355	355.6	ϕ25.4 – ϕ44.5	±2	±2	4.0

Holders for precisely adjusting tilt and rotation of He-Ne lasers.
Appropriate for holding a guide laser of invisible laser and use as a fixed type pointer.

- Two actuator styles are available. The M type includes standard micrometers with millimeter markings. The S type includes simple screw adjusters for minimal protrusion beyond the holder.
- Three sizes are available for He-Ne lasers of diameter ϕ31.8mm, ϕ35.1mm and ϕ44.5mm. Reference H006



Guide

- To use with a high optical axis, mount a post (optional) on a post holder.
- To adjust optical axis height, three-point support types (LAH-1, LAH-2) and stand types (LAHU) are available.
- Holders for laser diameters not listed in the catalog can be made to order.

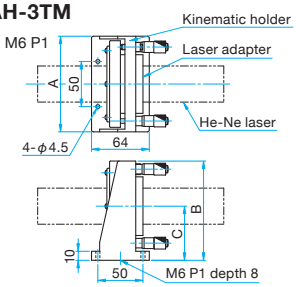
Attention

- Lasers with protrusion or in a shape other than cylindrical shape may not be fixed with the holders.
- Lasers are very delicate instruments. Pressing a laser excessively with a set bolt sometimes deteriorates the laser performance.
- Fixing the rear end (or front end) of a laser with a laser adapter may disable adjustment of a kinematic holder. Fix the laser in the laser adapter at or around the laser's center of gravity.

Outline Drawing

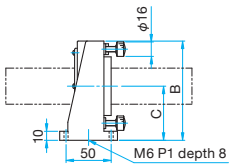
LAH-3TM

M6 P1



LAH-3TS 2D CAD 3D CAD

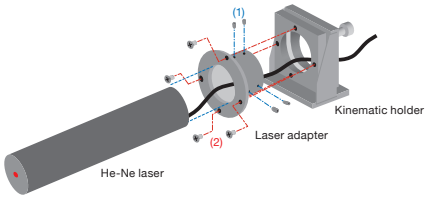
M6 P1



Part Number	A (mm)	B (mm)	C (mm)	Accessory Screw Diameter × Length [mm]
LAH-3TM	100	100	55	M4×10, M4×12 (2 units), M4×14
LAH-3TS	100	100	55	M4×10, M4×12 (2 units), M4×14

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.



Kinematic Type

Primary material: Aluminum
Finish: Black Anodized

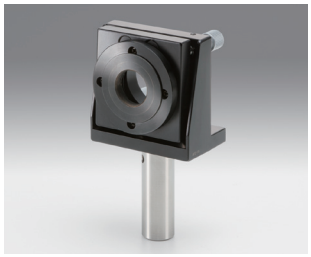
Part Number	Compatible Laser Diameter [mm]	Optical Axis Height C [mm]	Adjustment Range Tilt [°]	Adjustment Range Rotation [°]	Resolution Tilt [°/rotation]	Resolution Rotation [°/rotation]	Angle Conversion for a Scale Mark Tilt [°/DIV]	Angle Conversion for a Scale Mark Rotation [°/DIV]	Weight [kg]
LAH-3TS-32	φ31.8	55	±2.4	±2.4	about 0.4	about 0.4	—	—	0.63
LAH-3TS-35	φ35.1	55	±2.4	±2.4	about 0.4	about 0.4	—	—	0.63
LAH-3TS-45	φ44.5	55	±2.4	±2.4	about 0.4	about 0.4	—	—	0.63
LAH-3TM-32	φ31.8	55	±2.4	±2.4	about 0.4	about 0.4	about 0.008	about 0.008	0.63
LAH-3TM-35	φ35.1	55	±2.4	±2.4	about 0.4	about 0.4	about 0.008	about 0.008	0.63
LAH-3TM-45	φ44.5	55	±2.4	±2.4	about 0.4	about 0.4	about 0.008	about 0.008	0.63

Laser Diode Holders

Catalog Code W4005

Kinematic mirror holders (MHG-MP30-NL/MHG-HS30-NL) can be used as laser diode (LDU33) holders when combined with laser mounts (MHG-20LDU). Reference H006
Laser mounts (MHG-20LDU) can be used as fixed LD holders when a post (M6) is attached to the bottom of the mounts. Reference C018

Holders for Laser Beam Expanders | BE-M/LBED-H/LBED-YH RoHS Catalog Code W4032

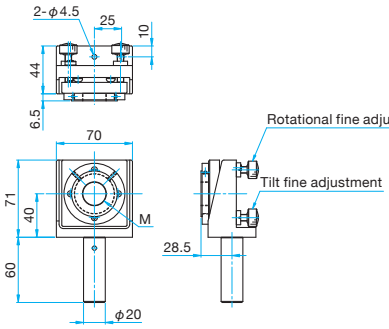


Holders for adjusting the angle of a laser beam expander. Compatible with various beam expanders with mounting threads on the input side of the expander. (BE, LBED)

- Two different threads are avaiable for mounting the beam expander to the holder. Check the compatible holder table before purchase.
- Strong springs are used in tilt and rotational adjustment mechanisms in order to enable fine adjustment for beam expanders with long lens tubes.
- When the post is removed, the holder can be directly mounted to a baseplate with two M4 screws.

Outline Drawing

BE-M22H/BE-M34H M6 P1 2D CAD 3D CAD



Laser Expander Part Number	Compatible Holders
BE-∗-266	BE-M34H
BE-∗-355	BE-M34H
BE-∗-V	BE-M22H
LBED-∗	BE-M22H
BE-∗-LD	BE-M34H
BE-∗-1064	BE-M34H
LBED-∗Y	BE-M34H

Guide

- Holders with integrated laser beam expanders (LBE) are also available. Reference C054
- For vertical and horizontal adjustment of beam expander, refer to the page of beam expander adapters (LBE-ADP). Reference C056
- 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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

Attention

- The rotation center of the tilt and rotational adjustment is away from the optical axis of beam expander (bottom right edge of holder). For this reason, great movement of the adjustment mechanism sometimes causes displacement of the beam center position from the optical axis of beam expander, or vignetting of the output beam.
- Moving the collimation adjustment of beam expander after tilt and rotational adjustment may also move the direction of output beam.

Specifications

Primary material: Aluminum
Finish: Black Coating

Part Number	Compatible Mounting Screw Size M	Angle Adjustment Range Tilt [°]	Angle Adjustment Range Rotation [°]	Angle Adjustment Resolution Tilt [°/rotation]	Angle Adjustment Resolution Rotation [°/rotation]	Weight [kg]
BE-M22H	M22 P0.75	±4.3	±4.3	about 0.62	about 0.62	0.7
BE-M34H	M34 P1	±4.3	±4.3	about 0.62	about 0.62	0.8

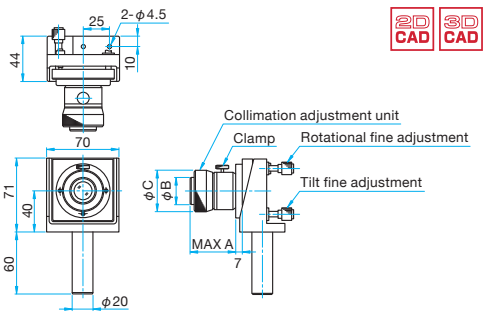
Laser Beam Expander [with Collimation Adjustment] (with holder) Catalog Code W4033

Lens system that enlarges a small laser beam to a large collimated beam. Fine adjustment of collimation is possible with the collimation ring. Holders with fine tilt and rotation adjustment mechanisms enable setting of the direction of output collimated beam to the same angle as incident beam.

- The optical system of beam expanders has an air-gap structure with no adhesive bonded lenses. This structure allows use of high-power lasers.
- The Galilean lens design reduces the number of aberration correction lenses needed and shortens the length of beam expander.
- By rotating the ring attached to the center of beam expander, a focused beam can be changed to a collimated beam and to a divergent beam. Use when precise collimation adjustment is required or beam waist position needs to be changed. Reference B198

Outline Drawing

LBED-H
LBED-YH
M6 P1 2D CAD 3D CAD



Guide

- For vertical and horizontal adjustment of beam expander, refer to the page of beam expander adapters (LBE-ADP). Reference C056

Attention

- Using the beam expander in reverse can reduce the size of the beam, but it will not generally produce a collimated beam due to the diffraction of small beams.
- Moving the collimation adjustment after tilt and rotational adjustment may also move the direction of the output collimated beam. Adjust tilt and rotation again after collimation adjustment.
- If the incident beam is not vertical to the incident aperture of the beam expander, the output beam may become elliptical or partly vignetted.

Beam Expander Assembled

Primary material: Aluminum
Finish: Black Anodized

Part Number	Beam Expander Part Number	Holders Part Number	Designed Wavelength [nm]	Expansion Ratio	MAX Entrance Clear Aperture [mm]	Lens Tube Length MAX A [mm]	φB [mm]	φC [mm]	Weight [kg]
LBED-3H	LBED-3	BE-M22H	400 – 700	3	φ5.4	45	φ26	φ40	0.82
LBED-5H	LBED-5		400 – 700	5	φ3.2	54	φ26	φ40	0.82
LBED-10H	LBED-10		400 – 700	10	φ2.6	113	φ36	φ40	0.88
LBED-2YH	LBED-2Y	BE-M34H	1064	2	φ15.1	53	φ48	φ60	1.06
LBED-3YH	LBED-3Y		1064	3	φ10.2	69	φ48	φ60	1.08
LBED-4YH	LBED-4Y		1064	4	φ8.6	98	φ48	φ60	1.14

Lens system that enlarges a small laser beam to a large collimated beam for simple experiments. Holders with fine tilt and rotation adjustment mechanisms enable setting of the direction of output collimated beam to the same angle as incident beam.

- The optical system of beam expanders has air-gap structure with no adhesive bonded lenses. This structure allows use of high-power lasers.
- The Galilean lens design reduces the number of aberration correction lenses and shortens the length of beam expander.
- Collimation adjustment (diopter adjustment) is fixed at the optimum position. Collimation adjustment cannot be changed.

Reference B200

Guide

- This product is delivered with a laser beam expander integrated into a tilt and rotation adjustment holder.
- For vertical and horizontal adjustment of beam expander, refer to the page of beam expander adapters (LBE-ADP). Reference C056
- 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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

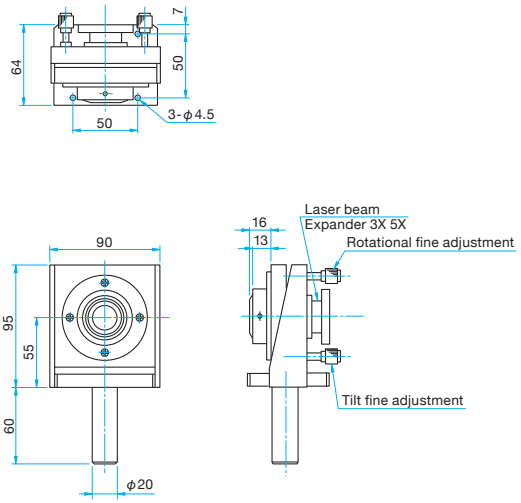
Attention

- Using the beam expander in reverse can reduce the size of the beam, but it will not generally produce a collimated beam due to the diffraction of small beams.
- If the incident beam is not vertical to the incident aperture of the beam expander, the output beam may become elliptical or partly vignetted.

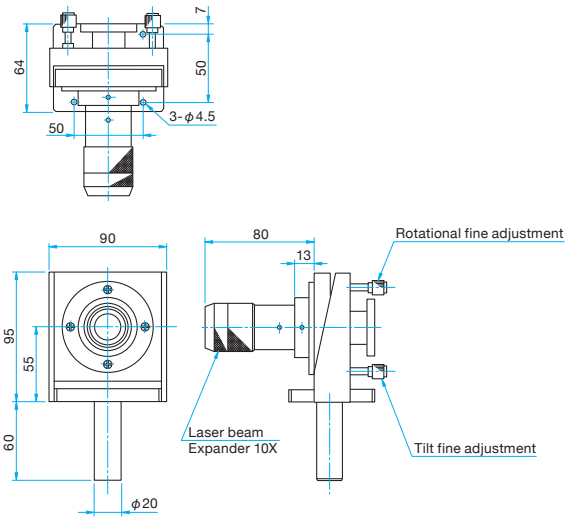
2D CAD 3D CAD

Outline Drawing

LBE-3/LBE-5 M6 P1



LBE-10 M6 P1



Specifications

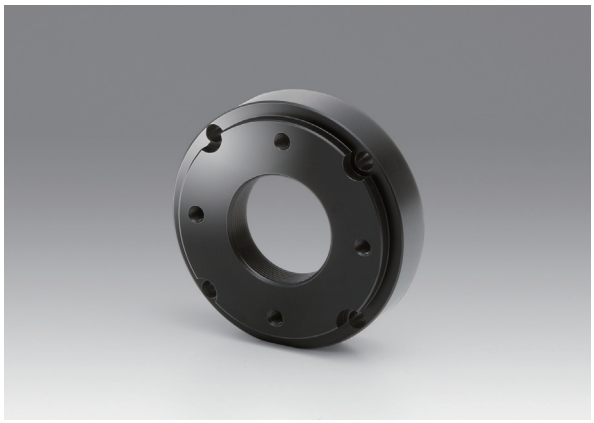
Primary material: Aluminum
Finish: Black Coating, Black Anodized

Part Number	Beam Expander Part Number	Wavelength Designed [nm]	Expansion Ratio	MAX Entrance Clear Aperture [mm]	Angle Adjustment Range Tilt [°]	Angle Adjustment Range Rotation [°]	Angle Adjustment Resolution Tilt [°/rotation]	Angle Adjustment Resolution Rotation [°/rotation]	Weight [kg]
LBE-3H	LBE-3	400 – 700	3	φ3.8	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-5H	LBE-5	400 – 700	5	φ2.7	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-10H	LBE-10	400 – 700	10	φ1.7	±3.7	±3.7	about 0.46	about 0.46	0.91
LBE-3LH	LBE-3L	780 – 830	3	φ3.8	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-5LH	LBE-5L	780 – 830	5	φ2.7	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-10LH	LBE-10L	780 – 830	10	φ1.7	±3.7	±3.7	about 0.46	about 0.46	0.91
LBE-3YH	LBE-3Y	1064	3	φ3.8	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-5YH	LBE-5Y	1064	5	φ2.7	±3.7	±3.7	about 0.46	about 0.46	0.8
LBE-10YH	LBE-10Y	1064	10	φ1.7	±3.7	±3.7	about 0.46	about 0.46	0.91

Adapters for Laser Beam Expanders | LBE-ADP RoHS Catalog Code W4035

Adapters for mounting laser beam expanders to lens holders.
Compatible with all beam expanders of BE/LBED/LBE.

- Mount laser beam expanders to a variety of lens and mirror holders that mount ϕ50 optics.
- Can be used as a fixed type beam expander holders by mounting the adapters directly on posts.
- Can be mounted on mirror holders (MHG-MP50-NL) or two-axis pinhole/objective lens holders (TAT-16RO) using 4-M3 screws.



Guide

- For details of the specifications of centering mechanism, refer to five-axis lens holders (ALHN-50-5RO). Reference C036
- Adapters for fixing He-Ne laser light sources are provided as accessories of beam expanders (BE, LBED).
- For details, refer to laser beam expanders. Reference B198

Attention

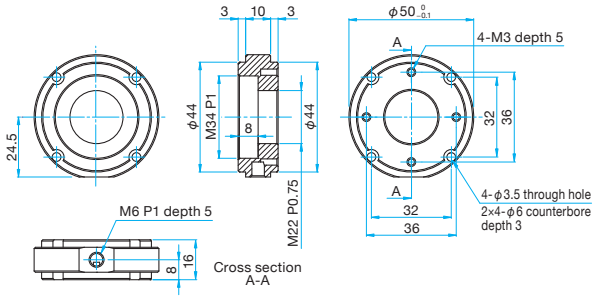
- To mount a beam expander on a five-axis lens holder (ALHN-5RO), make sure to fix the beam expander on the other side of the retaining ring. It cannot be mounted in the opposite direction.
- When fixing a beam expander on a adjustable holder other than a five-axis lens holder, the adjustable mechanism of the holder may not work correctly depending on the combination. Contact our International Sales Division for more information in advance.

2D CAD 3D CAD

Outline Drawing

LBE-ADP

Hexagon socket head cap screw M3×16…4 screws, M3×10…4 screws



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Weight [kg]
LBE-ADP	0.04

Example of Combinations

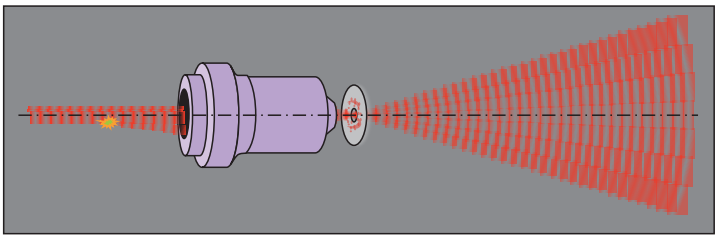
ALHN-50-5 + LBE-ADP + LBED

RO-20-60 + LBE-ADP

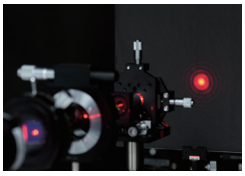
Spacial Filters

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.

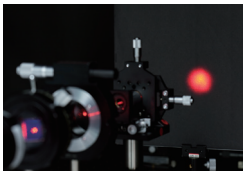
●Principles



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. Reference A033

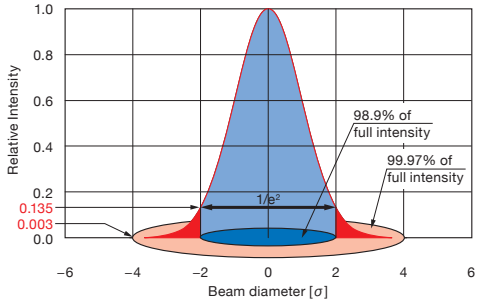
●Pinhole Selection

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, 1.1% 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 0.03%, and there will be no need to worry about laser light irradiating on the edge of the pinhole.

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: λ
$NA=\frac{d}{2f}$ 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 (25μm) Appropriate product: SFB-16RO-OBL20-25 Reference C058

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 (25μm) Appropriate product: SFB-16RO-OBL10-25 Reference C058

Results

	Laser Incident Beam Diameter d [mm]	Objective Lens Focal Length f [mm]	Calculation Results A [μm]	Pinhole Diameter (selected) [μm]
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.

$d=d_h+\alpha \times L$

Laser output beam diameter (Diameter, $1/e^2$): d_h
Laser beam divergence (full angle): α
Distance from laser to objective lens: L

Spatial Filter Holders | SFB

RoHS Catalog Code W4036

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

- A well corrected achromat in the output beam of the spatial filter can be used to collimate the filtered beam.
- Since the objective lens is fitted with a linear motion stage with micrometer to adjust focal point position, and the pinhole is fitted with a precision two-axis pinhole holder to adjust in-plane position, spot light of the laser will pass the pinhole with 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 with high resolution pinhole (XY) adjustment, making alignment of small pinholes easier. The coarse alignment screws and the linear stage all include locking mechanisms to further enhance stability during use.
- 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-16 and SFB-16DM, which are SFB-16RO and SFB-16DMRO without posts, are also available.
- Pinholes can be replaced with different diameter pinholes. If pinhole diameter is specified at the time of purchase, this product will be delivered with the preferred size. Pinhole replacement is gratis, but consult our International Sales Division as there may be extra charges due to differences in hole diameter. When changing pinhole diameter, change the number "-25" at the end of the part number to the desired pinhole size.
- Post length can be changed. If the length of post is specified at the time of purchase, this product will be delivered with the preferred length posts. Post replacement is gratis, but contact our International Sales Division as there may be extra charges due to differences in length.

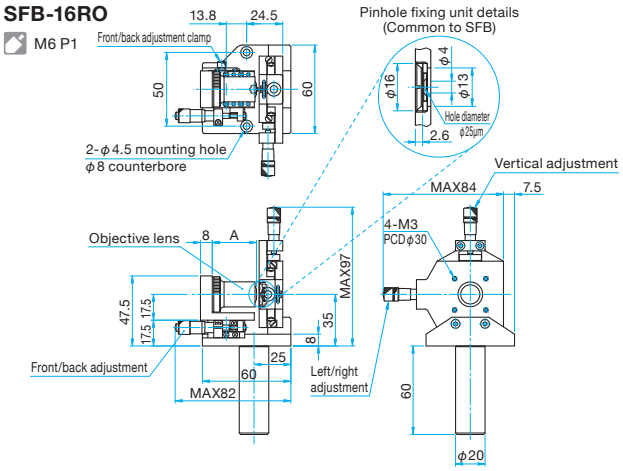
Attention

- Depending on laser wave length and beam diameter, the combination of objective lenses and pinholes will vary. Refer to the technical notes before purchase, and confirm diameter of objective lenses and pinholes. Reference C057
- If the distance from the laser to the spatial filter is long, the incident beam diameter in the spatial filter will be large. Therefore, confirm the combination of objective lens and pinhole diameter using the value of the incident beam diameter.
- Mount the unstamped side of the pinhole to the retaining ring side. If mounted on the reverse side, adequate adjustment range may not be available due to objective lens and pinhole interference.
- Spatial filters should not be used with high-power lasers or pulse laser due to the high energy density at the spot damaging the pinhole.
- They cannot be used with lasers in the ultraviolet region. When used with lasers in the near infrared region, non-reflective films are not effective and transmittance is poor.
- When replacing pinholes, remove the objective lens first, to allow access to the retaining ring.

Outline Drawing

SFB-16RO

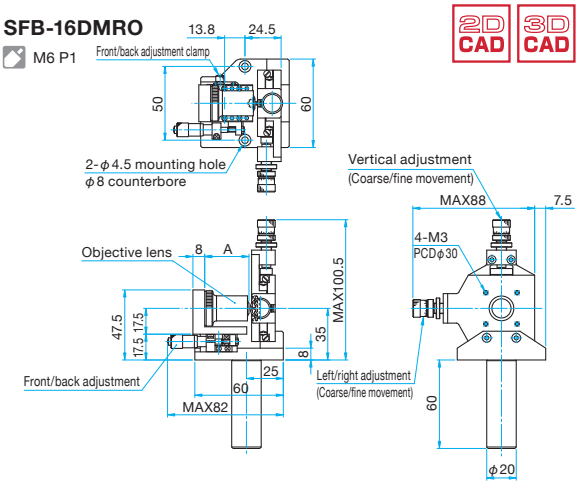
M6 P1



SFB-16DMRO

M6 P1

2D CAD 3D CAD



Micrometer

Primary material: Steel, Aluminum
Finish: Super Black Chrome, Black Anodized

Part Number	Objective Lens	Objective Lens Length A [mm]	Compatible Incidence Beam diameter ($1/e^2$) [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 ($1/e^2$) [mm]	Pinhole Diameter [µm]	Pinhole XY Adjustment Range [mm]	Objective Lens Front and Back Adjustment Range [mm]	Pinhole XY Coarse Resolution [mm/revolution]	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

Thin metal foil with a pinhole or slit of less than 400µm.
Used in spatial filters, laser diffraction experiments and microscopic magnification correction.

- A precision etching process is used to achieve holes with high circularity and slits with high parallelism.
- For YAG lasers (1064nm) and CO_2 lasers (10.6µm), use pinholes for high energy lasers that are made of high thermal conduction copper coated with high reflectance gold.
- Pinholes and slits are pre-mounted in aluminum frames for ease of handling and mounting.

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^2 (@700nm)	–
Wavelength Used	Any	700nm – 10.6µm	Any
Frame Material	Aluminum		
Frame Finish	Black Anodized		

Guide

- Contact our International Sales Division when pinhole foil or slit foil without aluminum frames are required.
- When an aperture ϕ1mm or above is required, use an iris diaphragm (IH). Reference C061
- Pinholes of diameters not listed in the catalog can be made to order.

Attention

- Sometimes light will not pass through if dust has adhered to a pinhole. When light will not pass through clearly, blow lightly near the hole of the pinhole with an air blower.
- The structure of pinhole foil or slit foil is very thin and fragile. Pressure with the fingers or contact with pointed objects can easily damage the foil.
- The holes are usually not visible to the naked eye. A high magnification microscope can be used to inspect the pinholes and slits.
- For fixed slits, the vertical direction where the marking of the slit width faces down is the longitudinal direction of the slits.
- When pulse lasers are focused, even pinholes for high-power lasers can be easily damaged. When high-power lasers or pulse lasers are used, calculate the energy density of the laser spot, and use after confirming that the damage threshold is not exceeded.

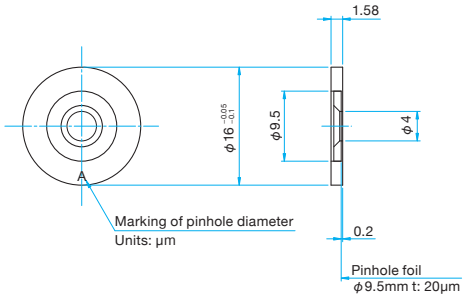
2D CAD 3D CAD

Perfect circle

Part Number	Pinhole Diameter [µm]	Weight [kg]
PA-1	$\phi 1^{+1}_{0}$	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

Outline Drawing

PA/FSL



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

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 Pinhole/Objective Holders | TAT

RoHS Catalog Code W4038

Holders for mounting a precision pinhole (PA) or precision air slit (FSL) and to adjust the position of the pinhole. Can be used to mount microscope objectives when objective lens adapters (TAT-18OA) are used.

- Precision ball guide allows smooth travel and fine positioning.
- Two types of adjusters are available. The micrometer type (TAT-16, TAT-16RO) allows smooth adjustment down to a few microns. The differential micrometer type (TAT-16DM, TAT-16DMRO) that allows fine adjustment to less than a micron.
- A unique two-axis integrated guide makes the body only 16mm thick, allowing placement of lenses in proximity to both the front and back of a pinhole.
- Two-axis pinhole/objective holders provide ϕ9mm transmission diameter. This transmission diameter makes this product appropriate for positioning of various devices. For mounting other devices, consult our International Sales Division.

Guide

- Fiber optics holders (FOP) with integrated optical fiber receptacles (FC connector, SMA connector) are also available. Reference C074
- Two-axis pinhole/objective holders with large transmission diameter (TAT-30) and simplified pinhole holders (AH-1) are also available. WEB Reference Catalog Code W4514

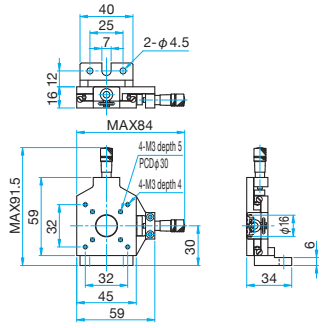
Attention

- Pinholes (PA) are not included with TAT holders. Purchase pinholes together with two-axis pinhole/objective holders. Reference C059
- Retaining rings are included with TAT holders. Adapters for pinholes are not required.
- TAT-16 and TAT-16DM do not include a post or post stand. Use TAT-16RO or TAT-16DMRO to include a post.

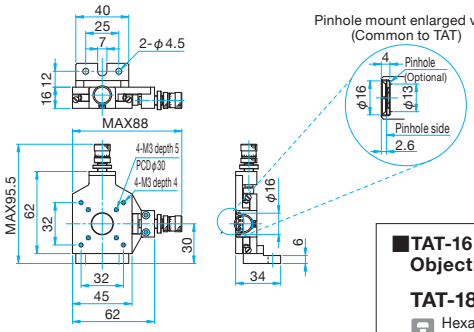
Outline Drawing

2D CAD 3D CAD

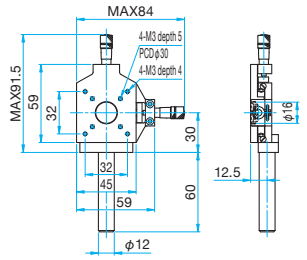
TAT-16 Hexagon socket head cap screw M6×12...1 screw
Hexagonal socket head cap screw M4×10...2 screws, Accessory: Retaining ring



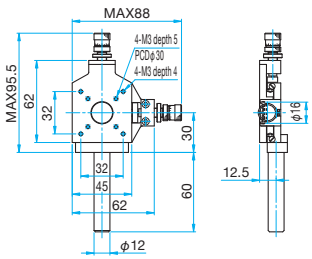
TAT-16DM Hexagon socket head cap screw M6×12...1 screw
Hexagonal socket head cap screw M4×10...2 screws, Accessory: Retaining ring



TAT-16RO M6 P1, Accessory: Retaining ring



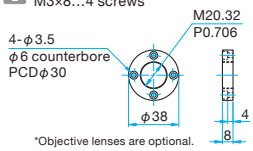
TAT-16DMRO M6 P1, Accessory: Retaining ring

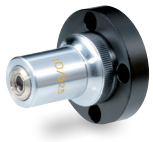


TAT-16 Series Objective Lens Adapters

TAT-18OA

Hexagon socket head cap screw M3×8...4 screws





Specifications

Primary material: Iron
Finish: Super Black Chrome

Part Number	Options specified*	Pinhole XY Adjustment Range [mm]	Coarse Resolution [mm/Rotation]	Fine Resolution [mm/Rotation]	Scale MIN Reading [mm/DIV]	Weight [kg]
TAT-16	**UU**	±2	0.5	—	0.01	0.26
TAT-16RO	**—**	±2	0.5	—	0.01	0.32
TAT-16DM	**UU**	±2	0.5	0.05	0.0025	0.3
TAT-16DMRO	**—**	±2	0.5	0.05	0.0025	0.36

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

Objective Lens Adapters

Primary material: Aluminum
Finish: Black Anodized

Part Number	Compatible Holders	Compatible Objective Lenses	Weight [kg]
TAT-18OA	TAT-16 series	OBL, EPL, EPLE	0.02

Iris diaphragm holders that can change the aperture size without changing the center of the aperture. Uses include changing the depth of field by controlling the lens aperture in imaging systems and passing necessary laser beam while blocking optical feedback or stray light in laser experiments.

- Various aperture sizes are available to suit a variety of requirements.
- The adjustment lever also functions as a clamp to fix the aperture diameter.
- Aperture diameter can be adjusted roughly using included scale.

Guide

- Iris diaphragms (IH) without mount or scale are also available. Reference C062
- 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 replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

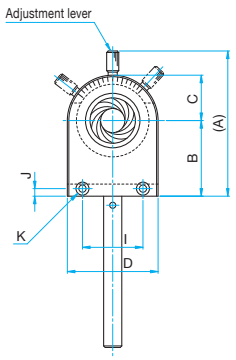
Attention

- Aperture diameter can be changed by moving the adjustment lever lightly. The adjustment lever can break if pressed with excessive force exceeding the adjustment range, or pressed on the wrong direction. Handle with care.
- The iris diaphragm consists of thin metal blades. Heat from high-power lasers may deform the blades and cause them to seize. Not recommended for use with high-power lasers. (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.

2D CAD 3D CAD

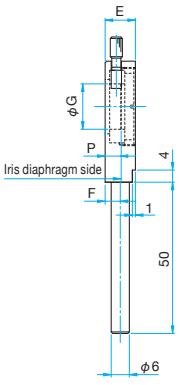
Outline Drawing

IH-R



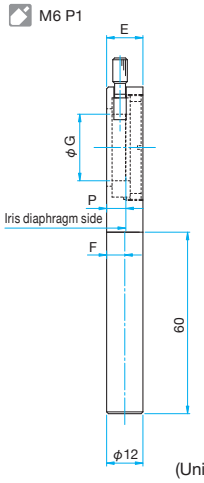
IH-08R/12R/15R

M4 P0.7



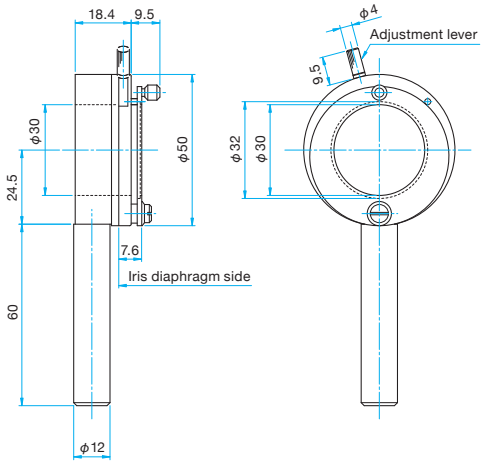
IH-22R/36R/50R

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 MAX [mm]	Aperture Diameter MIN [mm]	Weight [kg]
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

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

ϕ30 — Primary material: Aluminum, Finish: Black Anodized

Part Number	Aperture Diameter MAX [mm]	Aperture Diameter MIN [mm]	Weight [kg]
IH-30	ϕ30	ϕ1	0.12

Iris Diaphragm | IDC/IH-30N

RoHS Catalog Code W4040

An iris diaphragm is used to adjust an aperture without changing the center of the aperture. Primarily used in the limited spaces of optical instruments to set an aperture size.

- Bare, unmounted iris diaphragms are ideal for applications where mounted irises are too large or otherwise not appropriate.
- The IDC series has a thin body, which allows placement of optics in proximity to the front and back of the iris diaphragm.
- Various aperture sizes are available to suit the usage.
- The adjustment lever also functions as a clamp 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 C061
- Fixed pinholes (PA) with hole diameter 400µm or less are also available. Reference C059

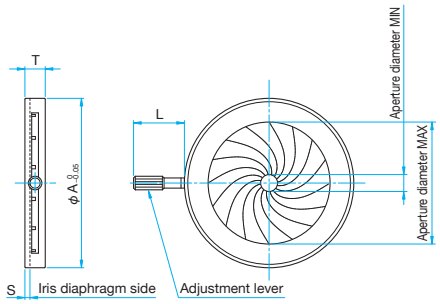
Attention

- Aperture diameter can be changed by moving the adjustment lever lightly. The adjustment lever can break if pressed with excessive force exceeding the adjustment range, or pressed on the wrong direction. Handle with care.
- The iris diaphragm is a very delicate mechanism. Do not push or pull on the blades.
- The iris diaphragm consists of thin metal blades. Heat from high-power lasers may deform the blades and cause them to seize. Not recommended for use with high-power lasers. (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.

2D CAD 3D CAD

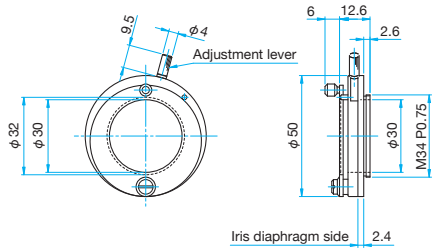
Outline Drawing

IDC



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

IH-30N



ϕ8 – ϕ50 — Primary material: Aluminum, Finish: Black Anodized

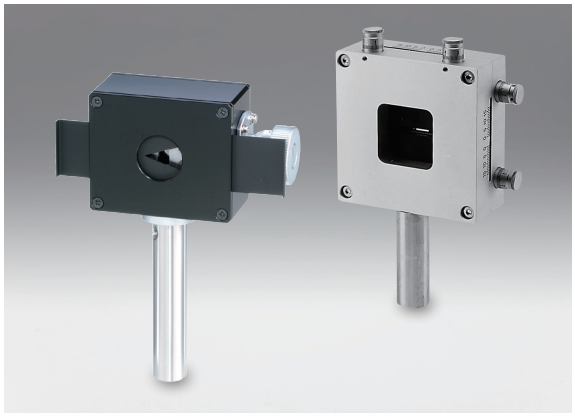
Part Number	Aperture Diameter MAX [mm]	Aperture Diameter MIN [mm]	Number of Blades [blades]	Weight [kg]
IDC-000	ϕ8	ϕ0.7	9	0.003
IDC-001	ϕ12	ϕ0.8	11	0.005
IDC-003	ϕ15	ϕ0.9	12	0.007
IDC-009	ϕ22	ϕ0.9	14	0.012
IDC-017	ϕ36	ϕ1.3	16	0.024
IDC-025	ϕ50	ϕ1.5	16	0.062

ϕ30 — Primary material: Aluminum, Finish: Black Anodized

Part Number	Aperture Diameter MAX [mm]	Aperture Diameter MIN [mm]	Number of Blades [blades]	Weight [kg]
IH-30N	ϕ30	ϕ1	10	0.03

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. Especially useful in spectrometry and Schlieren optical systems where the slit can be varied to optimize the light intensity and resolution of the instrument.

- 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 slit length adjustment plate.



Guide

- A Micrometer head type (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. If the length of post is specified at the time of purchase, this product will be delivered after replacing posts. Post replacement is gratis, but contact our International Sales Division because there may be extra charges due to differences in length.

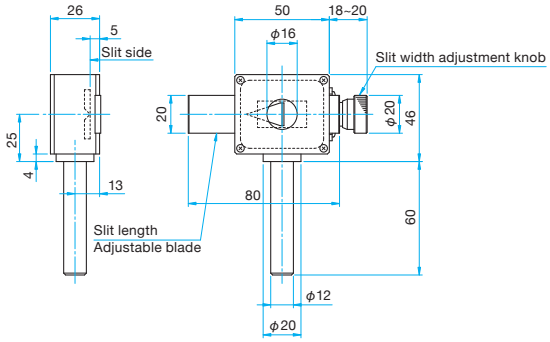
Attention

- When high-power lasers or pulse lasers are focused, holes might appear in the blades. Use after lowering laser output or widening the beam.

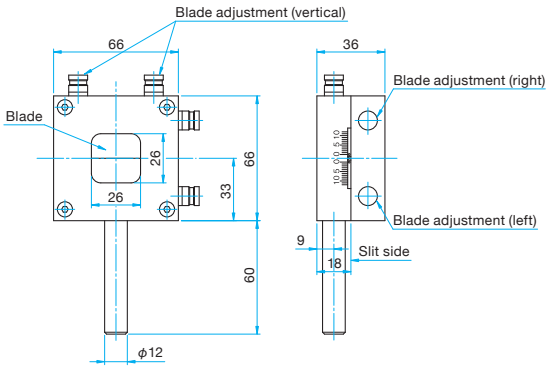
2D CAD 3D CAD

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 [μm/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 [keV/cm^2]	Blade Variable Range [mm]	Blade Position Scale MIN Reading [μm/DIV]	Weight [kg]
SLX-1	**UU**	Tantalum (No Finish)	300	0 – 4	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 axis 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). Reference B213
- Rotary reflection adjustable ND filter holders (NDHN) to continuously change transmitted light intensity are also available. Reference B224
- Contact our International Sales Division if the filter case has been lost or spare cases are required.
- 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 after replacing posts. Post replacement is gratis, but contact our International Sales Division as there may be extra charges due to differences in length.

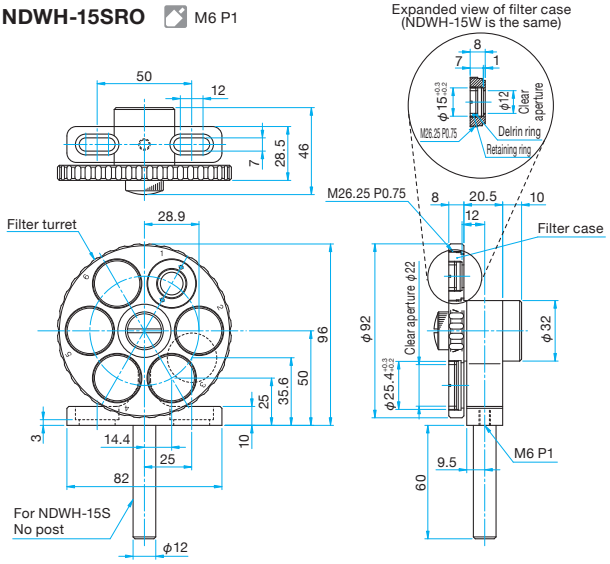
Attention

- 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 ϕ25.4mm 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.

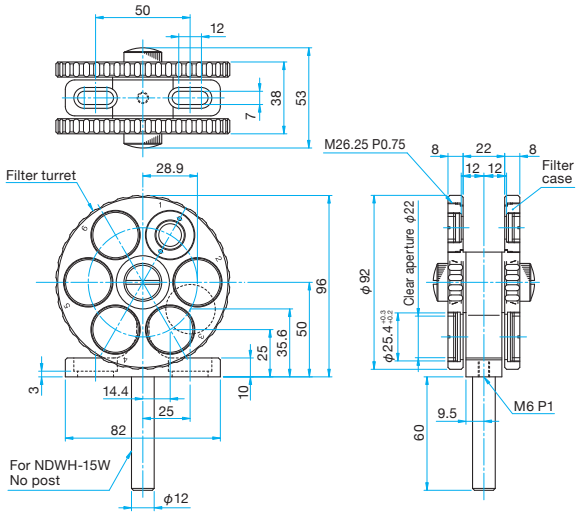
2D CAD 3D CAD

Outline Drawing

NDWH-15S Hexagon socket head cap screw M6×8…2 screws
NDWH-15SRO M6 P1



NDWH-15W Hexagon socket head cap screw M6×8…2 screws
NDWH-15WRO M6 P1



Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	Compatible Optics Diameter [mm]	Compatible Optics Max Thickness [mm]	Max Number of Mounts [Units]	Weight [kg]
NDWH-15S	**EE/UU**	ϕ15	3	6	0.2
NDWH-15SRO	**–**	ϕ15	3	6	0.26
NDWH-15W	**EE/UU**	ϕ15	3	12	0.34
NDWH-15WRO	**–**	ϕ15	3	12	0.4

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

Holders for optics that require frequent placement and removal in optical experiments such as ND filters and color filters. Filters with different plate thickness can be changed easily.

- The small filter holder (FH-10) holds a filter by clamping it between the main body and two spring loaded knobs. After mounting the holder, pull the knobs to create a space between the main body and the knobs then insert a filter in that space. When the knobs are released, springs return the knobs, and the filter is clamped between the main body and the knobs.
- 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

- To hold additional filters with the FH-25 and the FH-50 contact our International Sales Division for more information.
- 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. There are fees for post replacement in order to use special posts.
- Framed ND filters (MAN, MFND) which are ND filters of various transmittances fitted with filter adapters (FAD) are also available.
Reference B213, B219

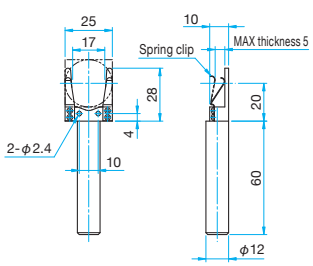
Attention

- When thin filters are placed in FH-25 or FH-50, the filters might move, causing the optical axis of the optical system to shift by minute amounts. When used in precision experiments, mount filters in adapters (FAD).
- 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.

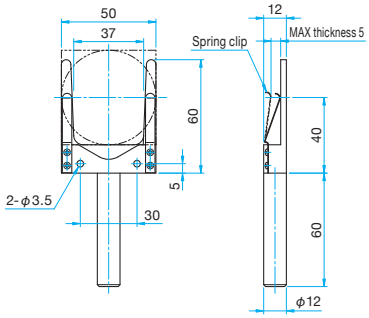
Outline Drawing

2D CAD 3D CAD

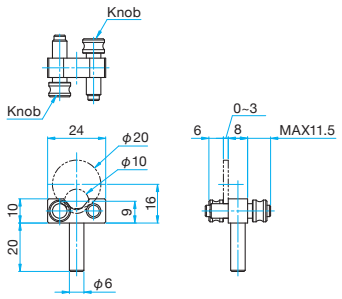
FHS-25 M6 P1



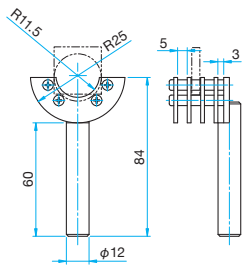
FHS-50 M6 P1



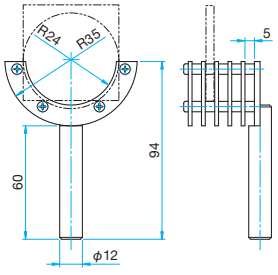
FH-10 M4 P0.7



FH-25 Custom shape special post

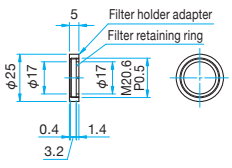


FH-50 Custom shape special post

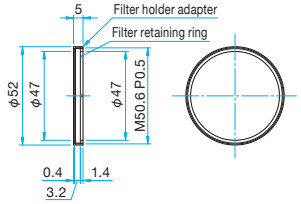


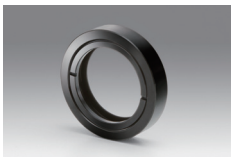
Adapter

FAD-20



FAD-50





Filter Holders

Part Number	Options specified*	Compatible Optics: Dimensions [mm]	Compatible Optics: Thickness [mm]	MAX Number of filter [Units]	Weight [kg]
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) 0– 5	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

Primary material: Aluminum
Finish: Black Anodized

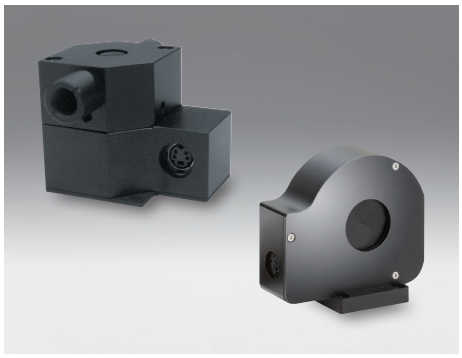
Part Number	Compatible Optics: Diameter [mm]	Compatible Optics: Thickness [mm]	Weight [kg]
FAD-20	ϕ20	0 – 3	0.01
FAD-50	ϕ50	0 – 3	0.01

Automatic Shutters
High Power Laser Shutter Unit

SSH
SHPS

SSH

RoHS Catalog Code W4045



These electromagnetic shutters are intended for applications including remote on/off of laser light and for timed exposures. Please connect a dedicated controller to use these shutters.

- SSH-S is intended for small diameter laser beams (ϕ4mm or less) while SSH-25RA is intended for use with large diameter imaging lens systems (ϕ24mm 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 baseplate with M3 threads.
- Shutters can be operated with a PC via the two-axis shutter controller (SSH-C2B).

2D CAD 3D CAD

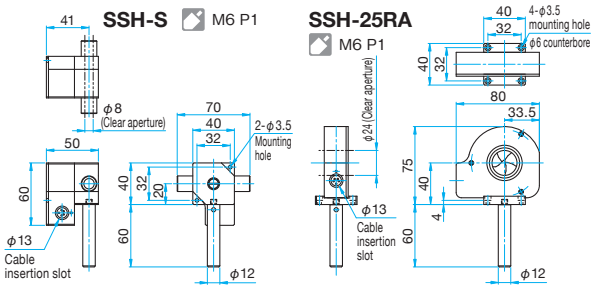
Guide

- 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. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Please contact our International Sales Division for more information.

Attention

- Automatic shutter holders 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

Part Number	Shutter Type	Aperture Diameter [mm]	Compatible Controller	Shutter Speed [s]	Weight [kg]
SSH-S	Solenoid type	ϕ8	SSH-C2B	about 0.7 –	0.28
SSH-25RA	Leaf type	ϕ25	SSH-C2B	0.1 –	0.5

SHPS

Catalog Code W4110

These electromagnetic shutters switch an optical path using a laser mirror for high power, and are compatible with high power pulse lasers. Selection of a wavelength that is a multiple of YAG laser frequency is possible.

- Typical application is as external shutters used in experiments where stable laser oscillation is required.
- When the power supply is cut off or the wiring is disconnected, laser light is shut off for safety.
- While the shutter is closed, laser light is safely terminated by beam dumps.

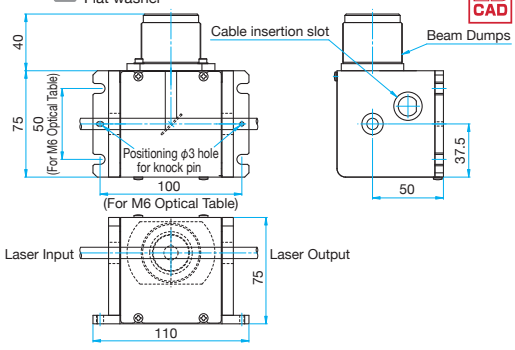
Guide

- We can make this product compatible with wavelengths or beam diameters not listed in the catalog.
- Please order the dedicated shutter controller (SSH-C2B) along with this product.

Outline Drawing

SHPS Hexagonal socket head cap screw M6×12…4 screws
Flat washer

2D CAD 3D CAD



Attention

- The dedicate cable (SSH-CA2-LOAA) is not included. Please order the cable along with the controller.
- Before ordering this product, please make sure that the energy density of your laser does not exceed the laser damage threshold.
- Please always use this shutter unit with the dedicated controller. Otherwise, these shutters may not operate properly.
- When the shutter is closed, the sound of metal being hit might come out from the beam dumps. The sound is caused by a shock wave generated when laser light converts to heat on the metal surface. It is not the sound of a mirror breaking in the shutter unit.
- The beam dumps might become very hot when a high power laser is used. Please be careful of burns.

Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Wavelength Range [nm]	Aperture Diameter [mm]	Laser Damage Threshold (Typical) [J/cm²]	Laser Power Limit [W]	Shutter Speed [ms]	Weight [kg]
SHPS-266	266	ϕ8	5	<20	about 200	about 0.8
SHPS-355	355	ϕ8	8	<20	about 200	about 0.8
SHPS-532	532	ϕ8	26.5	<20	about 200	about 0.8
SHPS-1064	1064	ϕ8	28	<20	about 200	about 0.8

Controllers for driving SSH electromagnetic shutters.
It can operate two units of different types of electromagnetic shutters concurrently.

- By switching the shutter type, this controller can control the SSH-R (old blade type), SHPS (for high-power laser), and BSH (for bio) shutters in addition to SSH-25RA and SSH-S.
- What is required for changing settings such as shutter speed, delay time, and repeat count is only the control knob.
- With the dedicated software, shutter control and change of various settings can be done with a PC.
- This 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.)

Guide

- Cables compatible with the old type shutters are also available.
- USB cables (USB-2) and RS232C cables (RS232C/STR-3) are also available to connect with a PC.

Attention

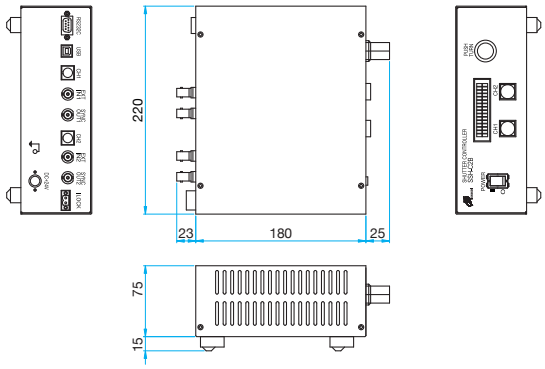
- This shutter controller does not come with cables. Please check the shutter specification and select the appropriate cable.
- A shutter does not open and close properly if the shutter connected to the controller is different from the shutter type selected with the controller. Please specify the correct shutter type.
- To use a shutter other than Sigma Koki shutters, please set the appropriate voltage and pulse time. Wrong settings may damage the shutter.

2D CAD 3D CAD

Shutter Controller	
Part Number	**SSH-C2B**
Part Number	2ch
Controllable Number of Units	DC24V
Power Source	120VA
Power consumption	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)
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.

Outline Drawing



Shutter Cable			
Product Name	Shutter Cable for SSH-25RA	Shutter Cable for SSH-S	Extension cable for shutter
Part Number	**SSH-CA2-LORA**	**SSH-CA2-LOAA**	**SSH-CA2-LOAB**
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 Optics 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.

Specifications

Primary material: Aluminum
Finish: Black Anodized

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

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

Guide

- Use the sliding cylindrical lens holder (CHA) to hold rectangular lenses. Reference C044
- 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 replacement is gratis, but consult our International Sales Division as there may be extra charges due to differences in length.

Attention

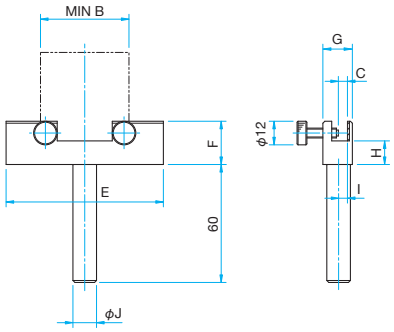
- Glass can break if screws are over tightened.

Outline Drawing

KMH

M6 P1

2D CAD 3D CAD



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

CMH

Catalog Code W4104

Platforms used for fixing a still camera or video camera.
Since these platforms come with a post, they allow a camera to be used as a part of an optical system.

- Please loosen the clamp to freely change the direction of the camera, and tighten the clamp to fix the direction.
- These platforms can mount any camera because they use the mounting screw standard commonly used for cameras.
- Posts with inch-based screws which can be directly mounted on a camera are also available. Reference D048

Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Options specified*	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

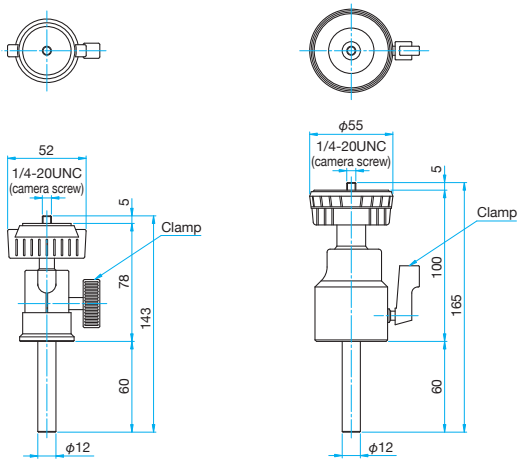
CMH-1

1/4-20UN (inch male thread)

CMH-2

1/4-20UNC (inch male thread)

2D CAD 3D CAD

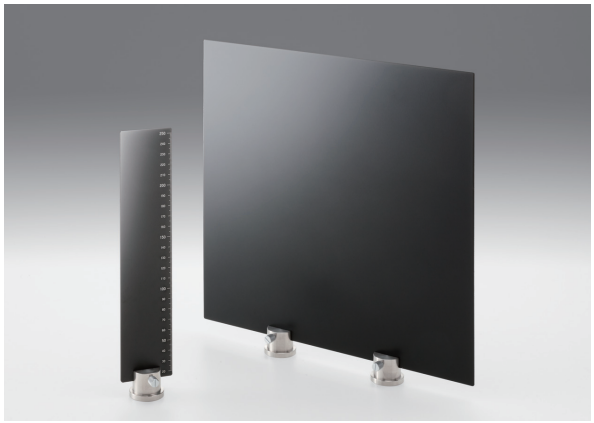


Light Shade plate | BBP

RoHS Catalog Code W4048

Can be used as the light shield for stray light of laser in optical experiment, and also used as the screen for interferometer or schlieren optics.

- BBP-2505B is added the scale and it allows easy adjustment of the optical axis of laser beam.
- BBP-3130B can block out the light in a wide area.
- With BBP-2505B and BBP-3130B, base unit with magnet is attached to fix easily.
- BBP-200 is appropriate for observation of bright profile view as surface finished over white matte.
- Put a graph paper or black paper to suit the customer's purpose.



BBP-200

Guide

▶Appropriate the Square Optics Holders (KMH-80) for BBP-200 to fix.

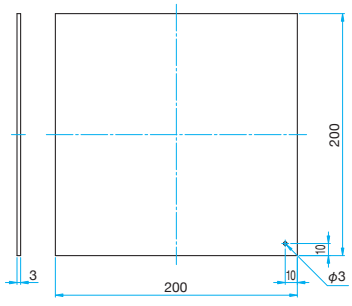
Attention

▶Be sure to wear laser safety goggles. When high-power laser or high energy pulsed laser are exposed to the light shade plate directly, it is danger scattering light by Light Shade plate enters to eye directly.

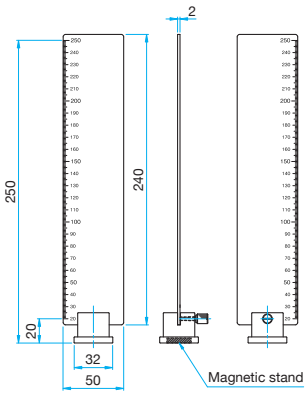
2D CAD 3D CAD

Outline Drawing

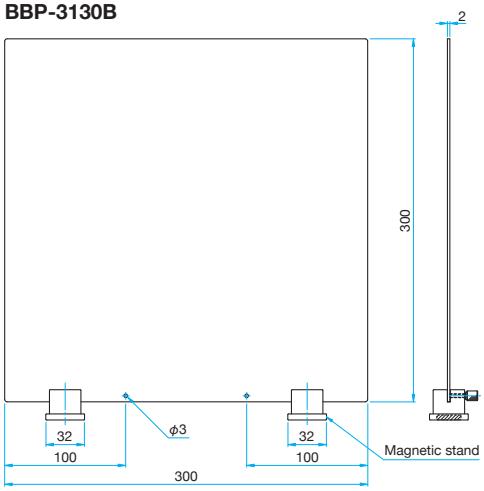
BBP-200



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

Holders used for optical axis adjustment of non-visible light laser etc. Fix IR sensor cards or van paper with spring clips, insert cross wires in 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 C061

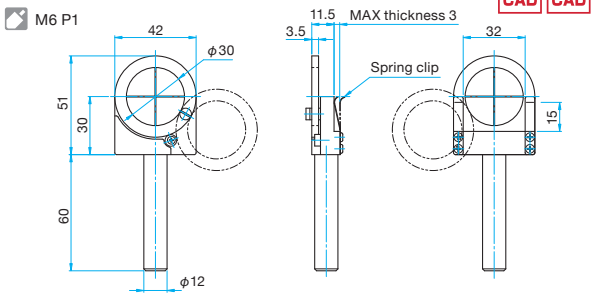
Attention

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

Outline Drawing

TGH

2D CAD 3D CAD

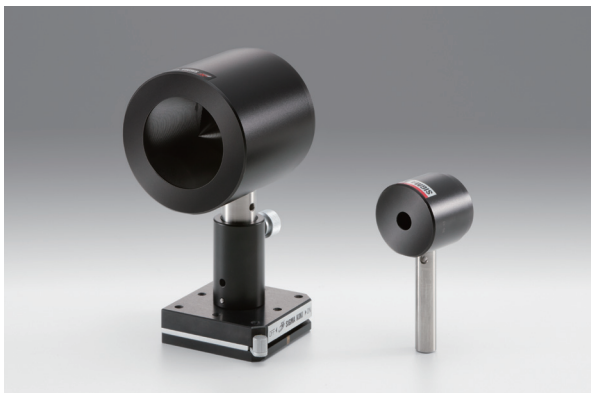


BD

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.



Guide

▶High-power laser shutters (SHPS) combining optical path switching shutter and beam diffuser are available. Reference C066

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.

2D CAD 3D CAD

Specifications

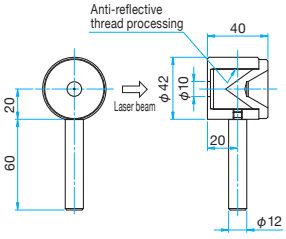
Primary material: Aluminum
Finish: Black Anodized

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

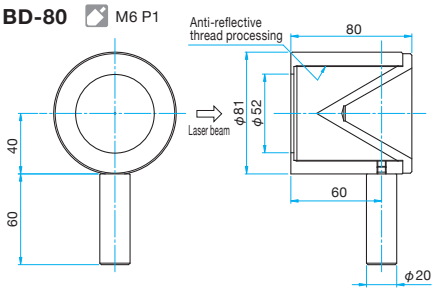
* For specifying options, please refer to "Conversion of Posts, Post Holders and Pedestal Bases of Holders". Reference C007

Outline Drawing

BD-40 M6 P1



BD-80 M6 P1



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 available.

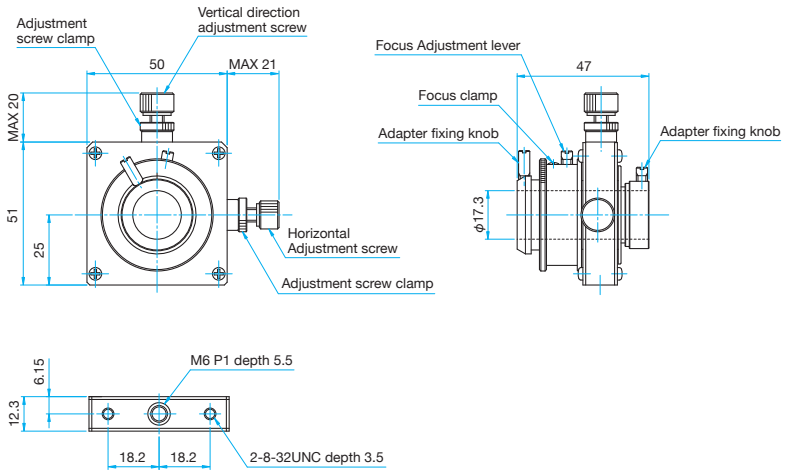
Attention

▶Turning the adapter fitted in the 3-axis holder causes the eccentricity of the fiber core. When turning the adapter, please make sure to do the fine adjustment of the XY axes of the holder.
▶Pulling a fiber cord hard may cause misalignment of the holder.
▶Readjustment is necessary every time a fiber is taken out.
▶This product does not come with a post. If a post is necessary, please purchase a post (PO) separately.

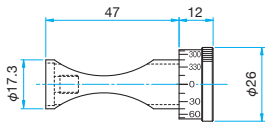
2D CAD 3D CAD

Outline Drawing

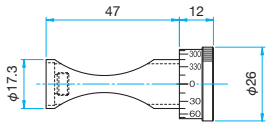
FOM-3 M6 P1



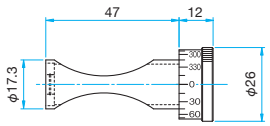
FOM-ADP-SMA



FOM-ADP-FC



FOM-ADP-ST

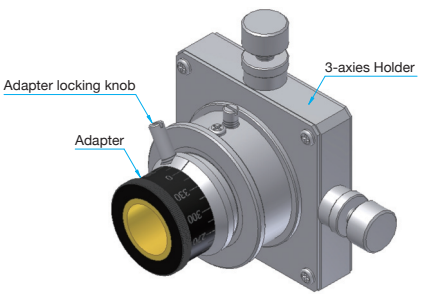


3-axis Holder					Primary material: Aluminum Finish: Black Anodized
Part Number	Options specified*	Centering Adjustment Range [mm]	Centering Adjustment Resolution [mm/rotation]	Focus Adjustment Range [mm]	Weight [kg]
FOM-3	**UU**	□2	0.25	±3	0.14

* 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 Connecter	Weight [kg]
FOM-ADP-FC	FC	0.05
FOM-ADP-SMA	SMA	0.05
FOM-ADP-ST	ST	0.044

Attaching the adapter



- Please connect a fiber connector into the adapter cylinder.
- 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.

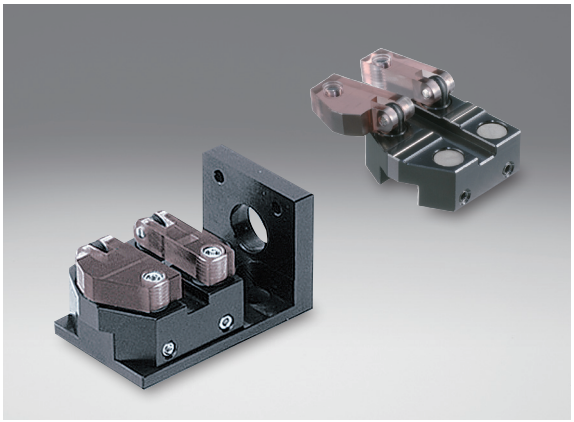
Mini-Fiber Optics Holders | MFH

RoHS

Catalog Code W4523
Catalog Code W4524

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.



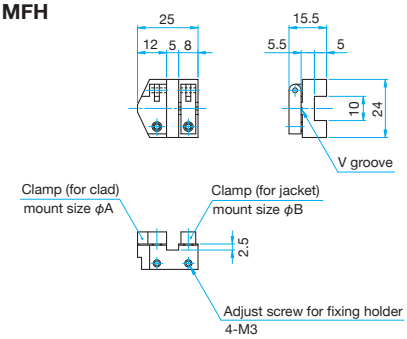
Attention

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

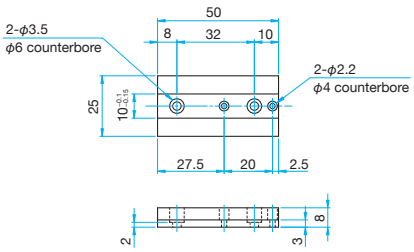
2D CAD 3D CAD

Outline Drawing

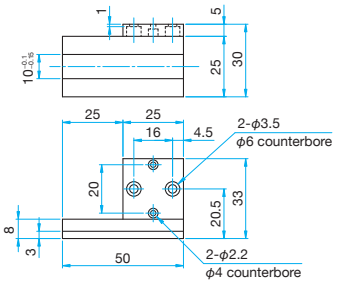
MFH



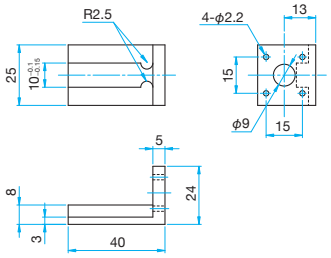
MFH-ADP-1 Pan head screw M2×6…2 screws, Pan head screw M3×6…2 screws



MFH-ADP-2 Pan head screw M2×6…2 screws, Pan head screw M3×6…2 screws



MFH-ADP-3 Pan head screw M2×8…4 screws



Holder			Primary material: Aluminum Finish: Black Anodized
Part Number	Jacket diameter ϕB [µm]	Cladding diameter ϕA [µm]	Weight [kg]
MFH-250	ϕ150 – ϕ250	ϕ60 – ϕ130	0.03
MFH-500	ϕ500	ϕ125 – ϕ250	0.03
MFH-900	ϕ900	ϕ125 – ϕ250	0.03

Adapter		Primary material: Aluminum Finish: Black Anodized
Part Number	Overview	Weight [kg]
MFH-ADP-1	For fixing flat surface (M2, M3 counterbored)	0.02
MFH-ADP-2	For fixing perpendicular (M2, M3 counterbored) to convert the 90 ° orientation	0.03
MFH-ADP-3	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 ϕ0.3mm to ϕ4mm ferrules.

- Turning the longitudinal direction adjustment knob moves the tip of an optical fiber back and forth, and enables collimation adjustment in combination with the lens.
- There are two types, one type which enables only positioning of optical fibers (OFH-1), and the other type which is also capable of adjusting tilt of optical fibers (OFH-2). There is also the type which is capable of fine adjustment in addition to the forementioned two types of positioning (DM).
- The ferrule of an optical fiber is inserted in the adapter with a slit (OFH-ADP), and then the optical fiber with the adapter is put through these fiber optics holders. Tightening the two set bolts located on the edges of these holders secures the adapter and optical fiber together.

Guide

- Fiber optics holders for FC connectors (FOP) and for SMA connectors (FOP-SMA) are also available. Reference C074
- 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.

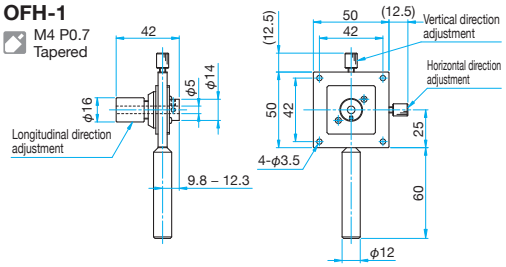
Attention

- To transmit light into a single-mode fiber, a minute and fine adjustment mechanism is required. Please contact our International Sales Division for more information.
- We keep these holders in stock, however the adapter for fiber optics holders is produced by order. If you will order the adapter, please check the delivery date of the adapter.
- These holders cannot be used with optical fiber strands without ferrules. Please use the mini-fiber optics holders (MFH). Reference C072

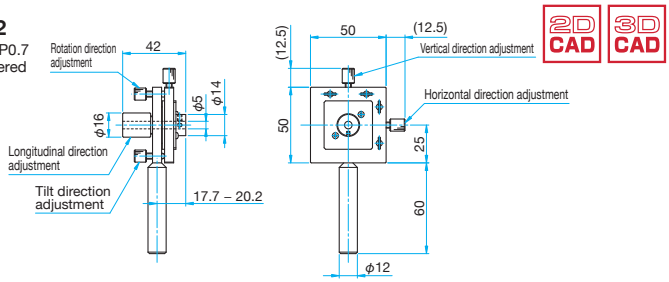
Outline Drawing

2D CAD 3D CAD

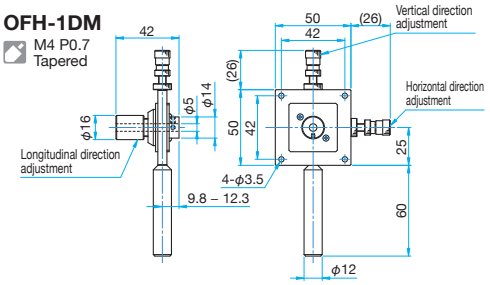
OFH-1
M4 P0.7 Tapered



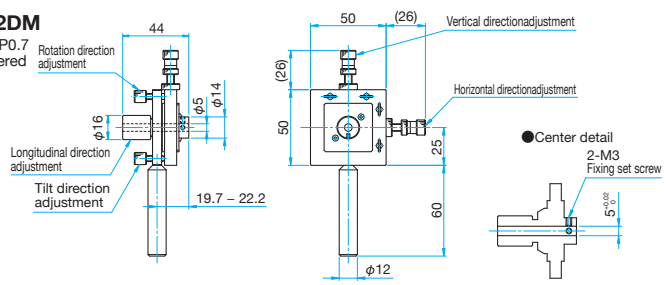
OFH-2
M4 P0.7 Tapered



OFH-1DM
M4 P0.7 Tapered



OFH-2DM
M4 P0.7 Tapered



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]	Centering Fine Adjustment Resolution [mm]	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

Adpter for Fiber Optics Holders | OFH-ADP

Catalog Code W4527

We will manufacturer this adapter according to the ferrule diameter of your optical fiber. We can provide this adapter with inner diameter between ϕ0.3 and ϕ4.0 by 0.1mm increments.

Attention

- This adapter is not a slit sleeve for ferrules.

Specifications

Primary material: Delrin
Finish: None

Part Number	Outer Diameter [mm]	Inner Diameter [mm]	Inner Diameter MIN unit [mm]
OFH-ADP	ϕ5	ϕ0.3 – ϕ4.0	0.1

FC Type Fiber Optics Holders | FOP/FOP-DM

RoHS Catalog Code W4521

Two-axis pinholes/objective holders for optical fibers with FC connector. These holders are used for collimating light from a fiber.

- There are two types; the screw type (FOP) which is capable of simple adjustment, and the coarse/fine screw type (FOP-DM) which is capable of fine adjustment.
- There are FOP-1 which only has a two-axis adjustment mechanism and FOP-2 which can minutely adjust the center of the luminance distribution of the collimated beam using a fiber tilt adjustment mechanism.
- 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 C072

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.

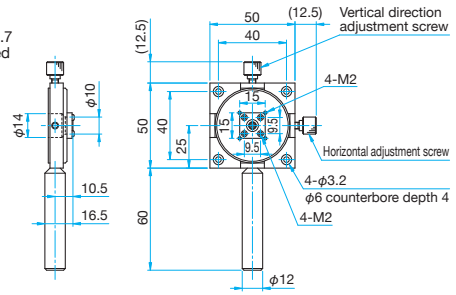
Attention

- Because the end of an FC connector comes up against the receptacle, it is 1.5mm recessed from the end face. When it is necessary to align the end of the FC connector with the end face of the holder, please use the connectors for FC type fiber optics (FLAD).
- If the optical fiber is connected or disconnected once, there is a possibility that the adjustment of the holder will be misadjusted. When an optical fiber is reinserted, the adjustment mechanism of the holder needs to be readjusted.

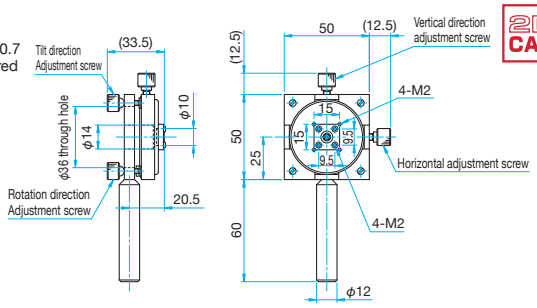
Outline Drawing

2D CAD 3D CAD

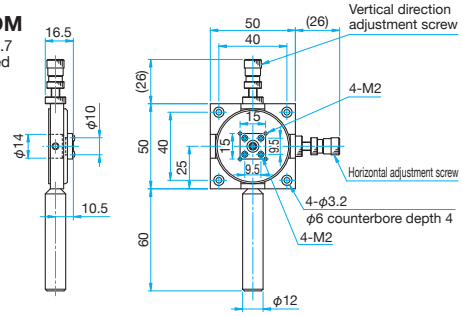
FOP-1
M4 P0.7 Tapered



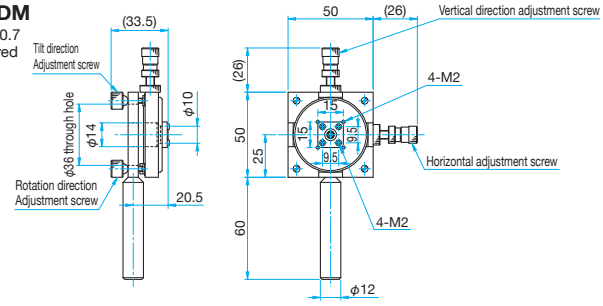
FOP-2
M4 P0.7 Tapered



FOP-1DM
M4 P0.7 Tapered



FOP-2DM
M4 P0.7 Tapered



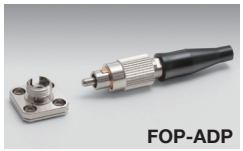
Specifications

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	±1	—	0.5	—	—	—	0.14
FOP-2	±1	±2	0.5	—	—	about 0.7	0.22
FOP-1DM	±1	—	0.5	0.05	0.0025	—	0.15
FOP-2DM	±1	±2	0.5	0.05	0.0025	about 0.7	0.24

Adapters for Ferrule | FOP-ADP/FLAD

Catalog Code W4528



FOP-ADP

Receptacle for FC connector used for FOP.
It comes with a connector, but requests a professional to connect the connector to a fiber.

FLAD

Adapter for fixing a fiber with ferrule, the end of FC connector, or various small diameter cylindrical devices, and mounting them on two-axis pinholes/objective holders.

- Tightening the set bolt located on the top of the adapter fastens the ferrule from the side.
- When using this adapter for a nonstandard ferrule or for something other than a ferrule, please make sure that the compatible diameter of the adapter is appropriate for the target diameter.

Specifications

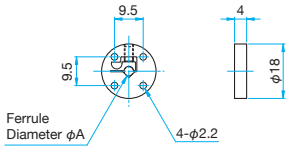
Primary material: Aluminum (FLAD)
Finish: Black Anodized (FLAD)

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

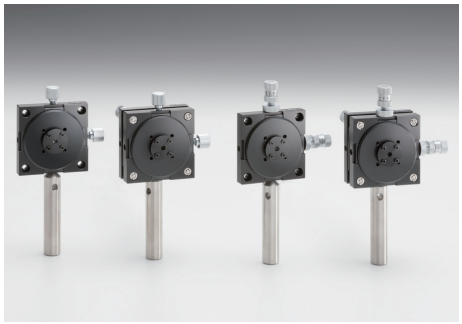
FLAD

hexagon socket head cap screw M2×6…4 screws



SMA Type Fiber Optics Holders | FOP-SMA/FOP-DM-SMA

RoHS Catalog Code W4522



Two-axis pinholes/objective holders for optical fibers with SMA connector. These holders are used for collimating the light from a fiber or for introducing light into a fiber (MMF) such as a small spectroscope.

- There are two types; the screw type (FOP-SMA) which is capable of simple adjustment, and the coarse/fine screw type (FOP-DM-SMA) which is capable of fine adjustment.
- There are FOP-1-SMA which only has a two-axis adjustment mechanism and FOP-2-SMA which can minutely adjust the center of the luminance distribution of the collimated beam using a fiber tilt adjustment mechanism.
- The SMA receptacles of SMA type fiber optics holders can be replaced with the adapters for mini-fiber optics holders (MFH-ADP-3). Reference C072

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

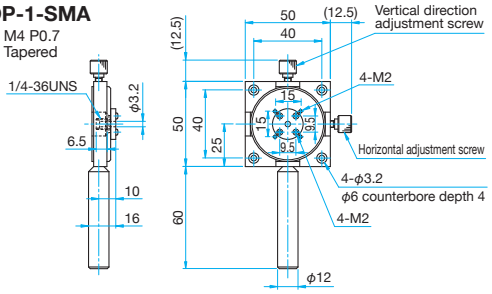
- If the optical fiber is connected or disconnected once, there is a possibility that the adjustment of the holder will be misadjusted.
- When an optical fiber is reinserted, the adjustment mechanism of the holder needs to be readjusted.
- Because SMA connectors have short nuts, it is hard to tighten them completely with the finger.
- To tighten them securely or to remove them, please use radio pliers or other tools with a thin tip.

Outline Drawing

2D CAD 3D CAD

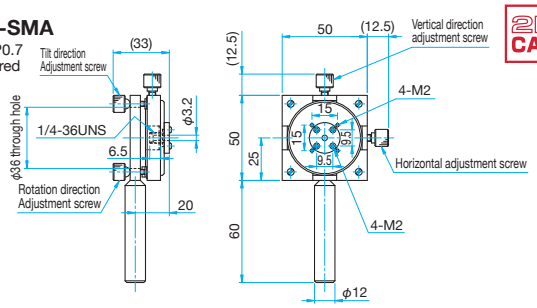
FOP-1-SMA

M4 P0.7 Tapered



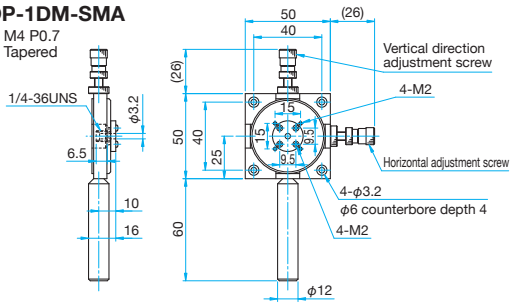
FOP-2-SMA

M4 P0.7 Tapered



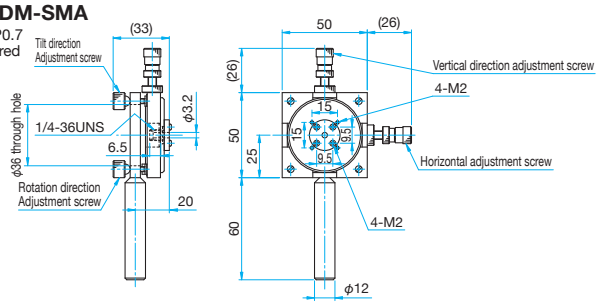
FOP-1DM-SMA

M4 P0.7 Tapered



FOP-2DM-SMA

M4 P0.7 Tapered



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

Catalog Code W4529

Adapter for changing the two-axis pinholes/objective holders for FOP or MFH-FOP to the two-axis pinholes/objective holders for SMA.

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.

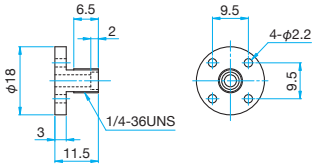
Specifications

Part Number	Weight [kg]
FOP-ADP-SMA	<0.003

Outline Drawing

FOP-ADP-SMA

hexagon socket head cap screw M2×6…4 screws

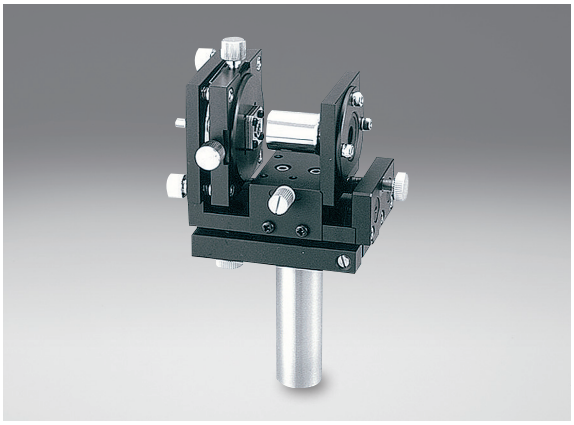


Laser Forcasing Holder | FOPT

RoHS Catalog Code W4526

These holders convert the diverging ray from an optical fiber with FC or SMA type connector to a collimated beam using an objective lens.
These holders can adjust the divergence, outgoing direction, and center position of the luminance distribution (fiber rotation and tilt) of a beam.

- The objective lenses used in these holders have short focal length (OBL-10) so that collimated light with small beam diameter can be obtained.
- The objective lenses used in these holders are for microscope so that high transmittance and high performance (spherical aberration) can be obtained in the visible light range.
- When used with a single-mode fiber, these holders can gain a collimated beam with Gaussian distribution.



Guide

- 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. Replacement of the post is free of charge, but we may charge the difference in price depending on the length. Please contact our International Sales Division for more information.
- These holders will be delivered attached with dummy FC connector. This connector cannot be used for an optical fiber.

Attention

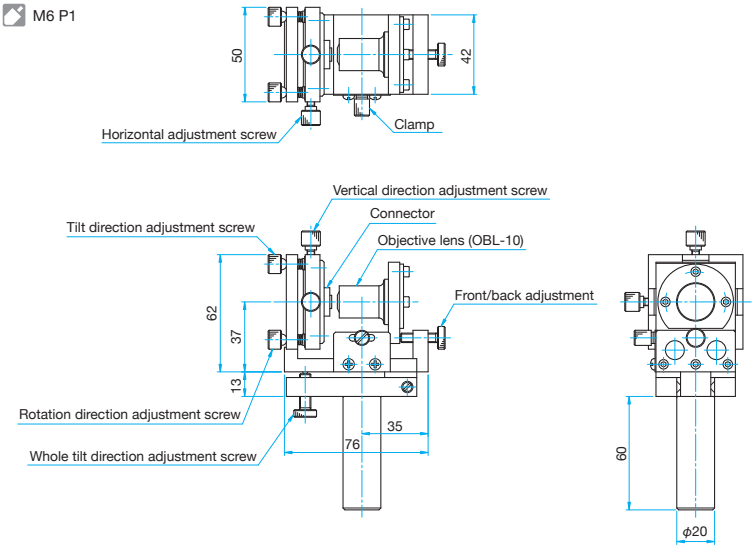
- To transmit light into a single-mode fiber, a precise adjustment mechanism is required. Please contact our International Sales Division for more information.
- Some types of connectors are difficult to mount on the receptacles of two-axis pinholes/objective holders.
- The collimated beam diameter changes depending on the NA of the fiber. Generally, beam diameter D is found with the following formula.
  D = 2 × NA × f
  f: Focal length of objective lens, NA: Numerical aperture of fiber

2D CAD 3D CAD

Outline Drawing

FOPT

M6 P1



Specifications

Primary material: Aluminum
Finish: Black Anodized

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