

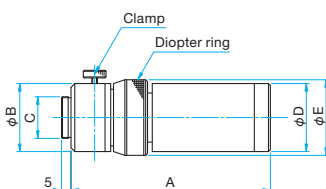
This is an optical system for expanding a small collimated laser beam to a larger one. Fine adjustment of the collimator is available using the diopter correction function. You can use in a high precision optical system like an interferometer or laser processing with lens designed for wave front aberration.

- The beam expander optical system is air-space with no bonded lenses and can be used for high powered laser applications.
- With the Galilean type lens configuration, it reduces the number of aberration corrections and shortens the length of the beam expander.
- By turning the diopter ring on the beam expander, you can have a varied collimated beam with beam divergence on the focused beam. A beam waist or an accurate adjustment of the collimation is required.
- There is a wide variety with different magnification and wavelengths to choose from.
- With the different types of BE-V and LBED visible lasers, can be attached to a He-Ne (05-LHP) lasers with an adapter (included).



Outline Drawing

(in mm)

**Guide**

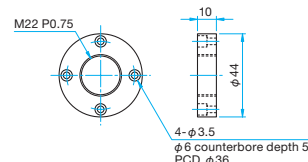
- ▶ We provide the laser beam expander holders (KLH-BE) for optical-axis adjustment of the laser beam expander.
▶ [WEB Reference](#) [Catalog Code](#) W4147
- ▶ We can also fabricate achromatic beam expanders with multiple wave lengths other than those found in on-line and in our catalog, call our Sales Division for more information.
- ▶ Fabrication of beam expander for high-energy pulsed laser is also available. [Reference](#) B200

Attention

- ▶ By using in the opposite direction, it will not create a reduction in diameter of the collimated beam. Please use the appropriate optical system by determining the position of the beam waist and the divergence angle of the laser beam.

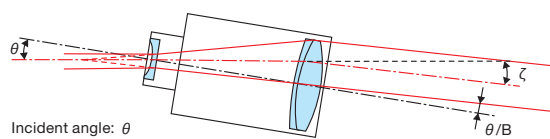
Accessories for visible light (BE-V/LBED)**Connection adapters for He-Ne laser**

- #4-40UNC, L=3/8...4 screws

**For adjustment of the laser beam expander**

If the incident beam is inclined to the optical axis of the laser beam expander, a larger collimated light is emitted from the direction of the incident beam is inclined.

Therefore, it is necessary to precisely align the optical axis of the beam expander for the incident beam.

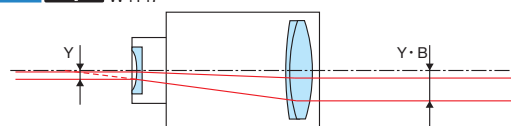


Incident angle: θ
Magnification: B
Deviation angle of beam: $\zeta = \theta - \theta/B$

If the center of the incident beam is translated from the optical axis of the laser beam expander, the emission is emitted with enlarged and magnified amounts of deviation of the incident beam. For this reason, if you need the expanded beam with no chipping or deformation, the incident beam must be strictly in accordance with the center of the optical axis.

We recommend the laser beam expander holder (KLH-BE) to adjust the beam expanders tilt and the center of the optical axis.

- ▶ [WEB Reference](#) [Catalog Code](#) W4147

**Compatible Optic Mounts**

KLH-BE-M22H, M34H

Specifications

Primary material: Aluminum
Finish: Black Anodized

Part Number	Design wavelength [nm]	Expansion ratio	Input aperture (MAX) [mm]	Barrel length A [mm]	φB [mm]	Mounting thread C	φD [mm]	Diameter φE [mm]	Laser Damage Threshold* [J/cm ²]	Weight [kg]
BE-2-266	266	2.0	φ15.5	72.0±4	φ57	M34 P1	φ48	φ60	1.4	0.3
BE-3-266	266	3.0	φ10.5	79.5±4	φ57	M34 P1	φ48	φ60	1.4	0.3
BE-4-266	266	4.0	φ9.0	90.5±4	φ57	M34 P1	φ48	φ60	1.4	0.3
BE-5-266	266	5.0	φ7.0	119.5±4	φ57	M34 P1	φ48	φ60	1.4	0.4
BE-7.5-266	266	7.5	φ4.5	129.0±4	φ57	M34 P1	φ48	φ60	1.4	0.4
BE-10-266	266	10.0	φ3.5	173.0±4	φ57	M34 P1	φ48	φ60	1.4	0.4
BE-2-355	355	2.0	φ15.5	75.0±4	φ57	M34 P1	φ48	φ60	2	0.3
BE-3-355	355	3.0	φ10.5	83.0±4	φ57	M34 P1	φ48	φ60	2	0.3
BE-4-355	355	4.0	φ9.0	94.5±4	φ57	M34 P1	φ48	φ60	2	0.3
BE-5-355	355	5.0	φ7.0	125.0±4	φ57	M34 P1	φ48	φ60	2	0.4
BE-7.5-355	355	7.5	φ4.5	134.5±4	φ57	M34 P1	φ48	φ60	2	0.4
BE-10-355	355	10.0	φ3.5	181.0±4	φ57	M34 P1	φ48	φ60	2	0.5
BE-2-V	400 – 700	2.0	φ6.0	42.0 ⁺³ ₋₂	φ36	M22 P0.75	φ26	φ40	4	0.12
LBED-3	400 – 700	3.0	φ5.4	42.0 ⁺³ ₋₂	φ36	M22 P0.75	φ26	φ40	4	0.12
BE-4.1-V	400 – 700	4.1	φ4.1	62.0±3	φ36	M22 P0.75	φ26	φ40	4	0.13
LBED-5	400 – 700	5.0	φ3.2	50.5±3	φ36	M22 P0.75	φ26	φ40	4	0.12
BE-6-V	400 – 700	6.0	φ4.3	102.0±3	φ36	M22 P0.75	φ36	φ40	4	0.17
BE-7.6-V	400 – 700	7.6	φ3.4	80.0±3	φ36	M22 P0.75	φ36	φ40	4	0.15
BE-8.4-V	400 – 700	8.4	φ3.1	89.5±3	φ36	M22 P0.75	φ36	φ40	4	0.16
LBED-10	440 – 700	10.0	φ2.6	109.5±3	φ36	M22 P0.75	φ36	φ40	4	0.18
BE-12.6-V	450 – 700	12.6	φ2.1	138.0±3	φ36	M22 P0.75	φ36	φ40	4	0.2
BE-14.3-V	460 – 700	14.3	φ1.8	158.5±3	φ36	M22 P0.75	φ36	φ40	4	0.2
BE-16.8-V	480 – 700	16.8	φ2.1	190.0±3	φ36	M22 P0.75	φ46	φ40	4	0.3
BE-18.5-V	500 – 700	18.5	φ1.9	211.0±3	φ36	M22 P0.75	φ46	φ40	4	0.3
BE-21-V	510 – 700	21.0	φ1.7	241.0±3	φ36	M22 P0.75	φ46	φ40	4	0.3
BE-1.5-LD	780 – 830	1.5	φ16.1	51.0 ⁺⁴ ₋₂	φ57	M34 P1	φ48	φ60	4	0.3
BE-2-LD	780 – 830	2.0	φ15.3	53.0±4	φ57	M34 P1	φ48	φ60	4	0.3
BE-3-LD	780 – 830	3.0	φ10.1	64.0±4	φ57	M34 P1	φ48	φ60	4	0.3
BE-4-LD	780 – 830	4.0	φ8.9	95.5±4	φ57	M34 P1	φ48	φ60	4	0.3
BE-5-LD	780 – 830	5.0	φ7.2	125.5±4	φ57	M34 P1	φ48	φ60	4	0.4
BE-7.5-LD	780 – 830	7.5	φ4.7	135.5±4	φ57	M34 P1	φ48	φ60	4	0.4
BE-10-LD	780 – 830	10.0	φ3.6	186.5±4	φ57	M34 P1	φ48	φ60	4	0.5
BE-1.5-1064	1064	1.5	φ16.0	52.0 ⁺⁴ ₋₃	φ57	M34 P1	φ48	φ60	4	0.3
LBED-2Y	1064	2.0	φ15.1	49.0 ⁺⁴ ₋₃	φ57	M34 P1	φ48	φ60	4	0.3
LBED-3Y	1064	3.0	φ10.2	64.5±4	φ57	M34 P1	φ48	φ60	4	0.3
LBED-4Y	1064	4.0	φ8.6	93.5±4	φ57	M34 P1	φ48	φ60	4	0.3
BE-5.3-1064	1064	5.3	φ6.8	127.5±4	φ57	M34 P1	φ48	φ60	4	0.4
BE-7-1064	1064	7.0	φ5.1	179.5±4	φ57	M34 P1	φ48	φ60	4	0.5
BE-10-1064	1064	10.0	φ3.6	188.5±4	φ57	M34 P1	φ48	φ60	4	0.5

* Laser pulse width 10ns, repetition frequency 20Hz

Lens configuration

Beam expander is divided into two main types depending on the configuration of the lens.

Galilean type

Combination of convex and concave type

- Features. ● Can shorten the overall length of the beam expander.
● High performance with small number of lenses.
● Usable with high powered lasers.



Keplerian type

Uses two convex lenses. (It is not used for this product.)

- Features. ● You can insert a pin hole in the expander.
● You can obtain a clean Gaussian beam emitted by the effect of the pinhole spatial filter.



Note: Do not use with high energy lasers
It can cause a spark in the focal point of the laser causing the transmitted wave front to collapse.

Diopter and diopter correction function

By using the diopter correction function, it is available to adjust the divergent light beam to the parallel beam.

If it is necessary to use exact optical laser system, recommended to use the beam expander with diopter correction function.

And if the parallel light beam incident into the beam expander, the light would be emitted in expanded beam.

However, since most laser is slightly divergent, the beam will not be emitted by parallel beam.

In addition, parallel light emitted from the beam expander will be shifted in various factors. Such as LD (laser diode) which has a possibility that wavelength will change, and by the changes of the temperature.

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