INSTRUCTION MANUAL



L-46 STEREO MICROSCOPE (Zoom Type)

Thank you for purchasing the HOZAN L-46 STEREO MICROSCOPE. With proper care and handling, this fine instrument will provide years of trouble-free operation. Please read this entire instruction manual carefully before attempting to place this instrument in service. Please keep this instruction manual available for reference.



Specifications

Total magnification	7-45X
Objectives	0.7-4.5X(zoom ratio 6.4)
Eyepieces	WF10X, Field number:20 (L-546-10)
Eyesight adjustment	Independent left and right, ± 5 Dptr
Working distance	84mm (attaching lens filter w. adapt ring)
Focusing	Raise/lower stereo head (range 50 mm)

Stereo head type	45° inclined tube
Pupil distance range	54-75mm left/right interlocking
Table dimensions	200(W)X255(D)mm
Post height	282mm
Distance between lens center and post	133mm
Weight	4.2kg

Warning and caution symbols

These symbols are used throughout the instruction manual to alert the user to potential safety hazards as follows :

Warning ··· Notice when incorrect handling could cause the user's death or serious injury.

▲ **Caution** ··· Notice when incorrect handling could cause injury to the user or material damage.

Even if the instructions do not have $\underline{\mathbb{A}Caution}$ mark, there are some possibilities for a serious situation. Follow the instructions.

Precautions

∆ Warning

- 1. To prevent the unit from falling and possibly causing injury to personnel, do not place this unit on unstable places, on tables with casters.
- 2. Do not unnecessarily remove the stereo head or the holder from the post or the holder. If it becomes necessary to remove them, hold them with both hands to prevent dropping them and possibly causing injury to personnel.

∆ Caution

- 1. Do not disassemble or modify the L-46 yourself, otherwise this could cause a malfunction.
- 2. Always keep the lens filter in place to prevent dust or fumes from contaminating the interior of the microscope.
- 3. When using the rubber mat, be sure to ground, otherwise this could damage the object such as PCB.
- 4. Protect the unit against physical shock or vibration during transport. Otherwise, this could cause a malfunction.
- 5. Do not expose the unit to prolonged direct sunlight, high temperature, high humidity, or dust. Such exposure could cause a malfunction.

Preparation

First, make sure that the contents are complete.

Procedures in case of not using the ESD rubber mat

1 Settle the table accompanied by the post and the holder on an appropriate place.

Put on the stage. Orient it pressing the spring at the end of the hole as shown in the photo.

Choose black and white faces of the stage in accordance with object to be inspected.



Preparation



Preparation

Procedures in case of using the ESD rubber mat

The provided rubber mat is a static controlled ESD rubber mat. Use it with grounding when inspecting electronic components which are sensitive to static electricity.

- Settle the table accompanied by the post and the holder on an appropriate place. Also the stage should be set on the table.
- 2 Loosen the holder set knob and remove the holder. Then, remove the clips. Finally, insert the rubber mat through the post with the green side up.
- 3 Attach the hook and loop fasteners to the top of the table and the black side of the rubber mat so that they can stick together.
- 4 Insert the alligator clip into the insulation cover for protection of electric shock. Then, attach the socket of the ground cord to the stud of the rubber mat behind the post. Finally, connect the insulated* alligator clip to the ground.

*Cut the cover to the proper length as needed.

5 Mount the holder on the post.

After this procedure, refer to 2-5 of "Procedures in case of not using the ESD rubber mat" on pages 3-4.

Operation

Be agreed "0" of the graduation with each setting dot, refer to the photo, of both the eyepieces.





Operation

- 2 Adapt the eyepiece distance with your pupil distance to view a single circle of the field. The stereo barrels will rotate drawing arcs interlocking with (refer to the photo).
- Place an object just under the objectives. Prepare lighting apparatus such as Hozan's L-711 LED LIGHT (refer to page 7) if necessary.
- 4 Adjust the zoom adjust knob to 4.5 maximum magnification.
- 5 Adjust for proper focus with the focus knob while looking with both eyes. If the focus knob does not focus enough, move the holder up and down under loosening the holder set knob.

Always aim the same point if the surface of the object is not simply flat, otherwise the working distance* could differ from before and this could not come into focus.

*Working distance means the dimension from the top of lens filter to the object.

ens filter to the

Loosen the holder set knob while supporting the holder with one hand when move it up and down. Otherwise, the holder could fall down suddenly damaging the unit, the object and the operator.

∧ Caution

- 6 Adjust the zoom adjust knob to 0.7.
 - If the image is out of focus, it is due to the difference of right and left eyesight. First, turn the graduated tube for proper focus by looking with the dominant eye while closing the other eye.

Then, adjust the other evepiece similarly.

Proceed to procedure **8** if the image looking with both eyes is in focus. If the image is still not in focus, adjust each eyepiece again.

Regarding "-" "+" of the graduation

A nearsighted person should turn to minus side and a farsighted person should turn to plus side.

8 Treat procedures 4 to 7 and check if the image is in focus.

Repeat these procedures so that a clear image can be obtained whenever the zoom magnification is changed.





Operation

9 Store the L-46 putting the dust sheet provided on after use. Taking notes of sight adjust value can omit procedure **7** when the next work.

Transfer

Hold the table by one hand and the post by the other hand tightly when transfer the L-46.

Inspecting a long object

The section of a long object and such can be inspected through the hole from which the stage has been detached.

▲ Caution

Carefully work not to throw the table down.



Adjusting the tightness of the focus knob

The tightness of the focus knob for vertical movement can be adjusted. Turn the right focus knob counterclockwise while holding the left focus knob securely to decrease the tightness, or turn it clockwise to increase the tightness. *Do not loosen unnecessarily, otherwise the stereo head could suddenly slide down.

Lock device for zoom adjust knob

The zoom adjust knob can be locked. This is useful to prevent from unexpected fluctuation of magnification.

Insert the hex key 2mm provided into the opening, then turn clockwise as the arrow indicated under the opening. To release, turn counterclockwise against the arrow. *Do not try to turn the zoom adjust knob under locked state, otherwise this could cause a malfunction.



Use only the following optional accessories manufactured by HOZAN.

Lighting systems

L-711 LED light

The light has few fluctuations of brightness and no flicker at all.

Various lighting systems can be used. Please refer to our catalog or web catalog.

Option lenses

- L-546-10 Eyepieces (10X), standard L-546-20 Eyepieces (20X)
- A pair per pack
- With eyecups (long & short) * Evecups (short) are attached when ship.

L-57-0.5 Conversion lens (0.5X) L-57-1.5 Conversion lens (1.5X) L-57-2.0 Conversion lens (2X)

To install, first remove the lens filter, then replace the conversion lens and lens filter. Do not remove the adapt ring.

The magnification, filed of view and working distance gotten when combining evepieces, objectives and conversion lenses are follows.

Magnifi	nification table Standard item											
Objective	0.7-4.5X											
Conversion lens	No		L-57-0.5		L-57-1.5		L-57-2					
Eyepiece	Magni- fication X	Field of view $\min \phi$	Working distance mm	Magni- fication X	Field of view $\min \phi$	Working distance mm	Magni- fication X	Field of view $\min \phi$	Working distance mm	Magni- fication X	Field of view $\min \phi$	Working distance mm
L-546-10 (Standard)	7- 45	28.5- 4.4	94	3.5- 22.5	57.1- 8.9	160	10.5- 67.5	19.0- 2.9	12	14- 90	14.3- 2.2	26
L-546-20	14- 90	14.3- 2.2	04	7- 45	28.5- 4.4	100	21- 135	9.5- 1.5	43	28- 180	7.1- 1.1	20

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*The "working distance" is the distance from the end of the filter to the subject.

L-846 Lens unit L-846-3 Adapter

Connecting the microscope and a digital camera with C mount, images of the full field being seen actually through the microscope are taken in high-definition.







1 -711

L-546-10

Daily care

Lenses

- Wipe away any dust gently with a soft cloth or a piece of gauze.
- Clean away fingerprints or oil stains with a cloth which is lightly soaked in IPA or denatured alcohol (such as ethyl alcohol or methyl alcohol).
 - * Alcohol is extremely flammable, so handle it with care.

Stereo head and plastic parts

- Wipe with a soft, dry cloth.
 Do not use any organic solvents such as thinner, alcohol or either.
- When out of use for an extended period, store this unit in a dry dust-free place.

Antistatic standards

HOZAN's ESD-safe products are controlled with reference to the Japanese standard (RCJS-5-1*) which is based on the international standard (IEC61340-5-1).

Products which bear the $\left\| \left(\underbrace{\mathbf{A}}_{\text{EFA}} \right) \right\|$ mark are products to which the standard values (see table below) apply. The "ESD Standard" listed on each of the product pages denote the HOZAN standard for the product.

ESD-safe item requirements (Excerpted from RCJS-5-1) [Item-specific requirements]						
	Point to point resistance Rp (Ω)	EPA ground resistance or resistance Rg (Ω) of groundable point				
Work surfaces, Storage shelves, Trolleys, and Carts	$1 \times 10^4 \le Rp \le 1 \times 10^{10}$	$7.5 \times 10^{5} \le \text{Rg} \le 1 \times 10^{9} $ *1				
*1A resistance lower than the minimum-limit resistance is acceptable of approved by the ESD coordinator.						

Reliability Center for Electronic Components of Japan (RCJ).

"Protection of Electronic Devices from Electrostatic Phenomena-General Requirements" (RCJS-5-1)

HOZAN TOOL INDUSTRIAL CO., LTD.

1-2-12 Saiwaicho, Naniwa-ku, Osaka 556-0021, Japan https://www.hozan.co.jp/E/ E-mail:th@hozan.co.jp