MICROLUX IV

COMPOUND MICROSCOPE
USER'S MANUAL



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Every Seiler Medical Division team member is here to provide you with outstanding service, quality, and knowledge. Our number one priority is, and always will be, providing 100% customer satisfaction to every one of our customers. If you need any further information about the equipment or just have a question, please contact us using the information below.

Thank you again for your purchase and we look forward to serving all of your optical needs for years to come.

Sincerely,

Dane Carlson
Medical Division Manager

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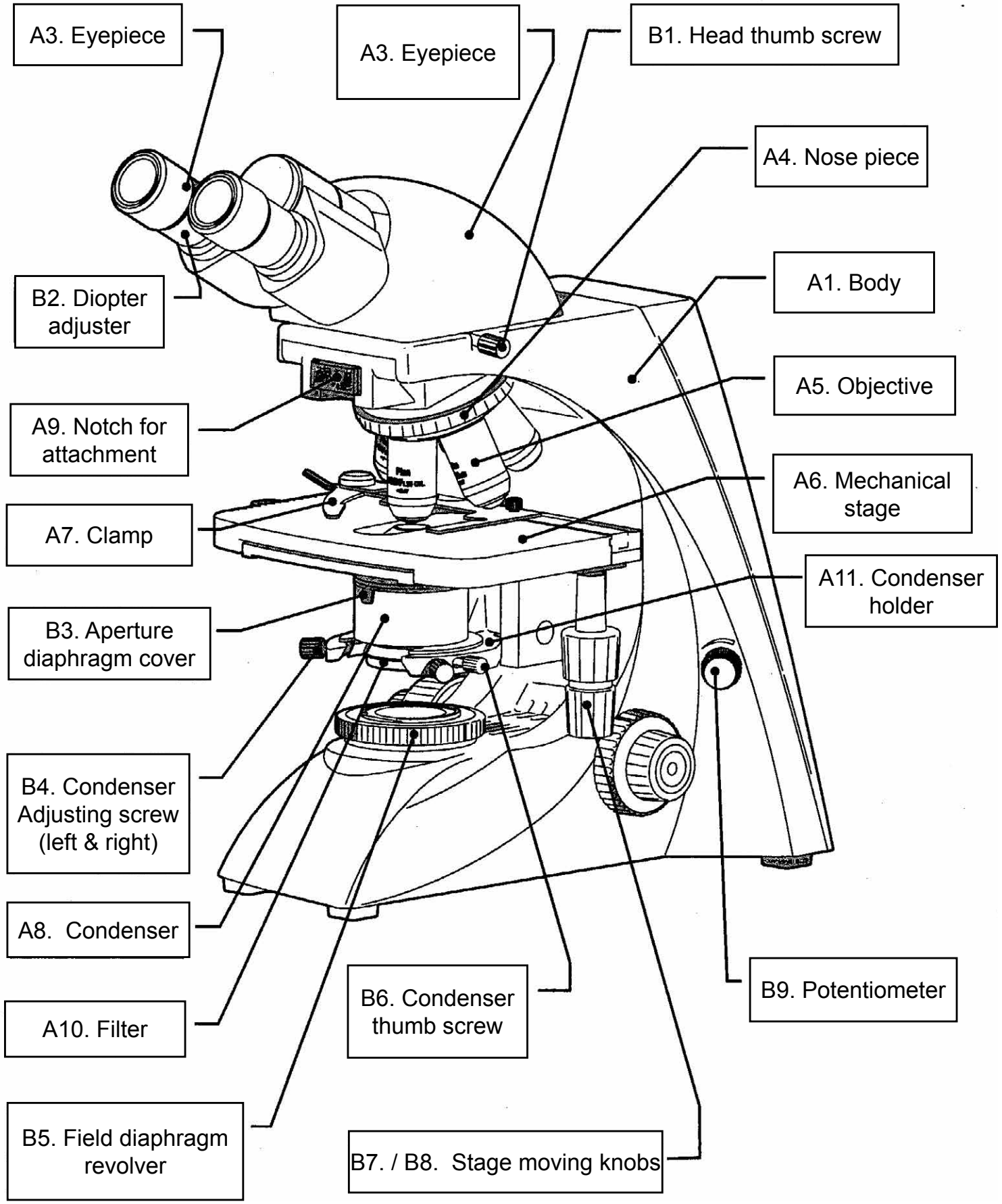

Medical


Planetarium



Design Solutions

PARTS NAME
FIG. 1-1



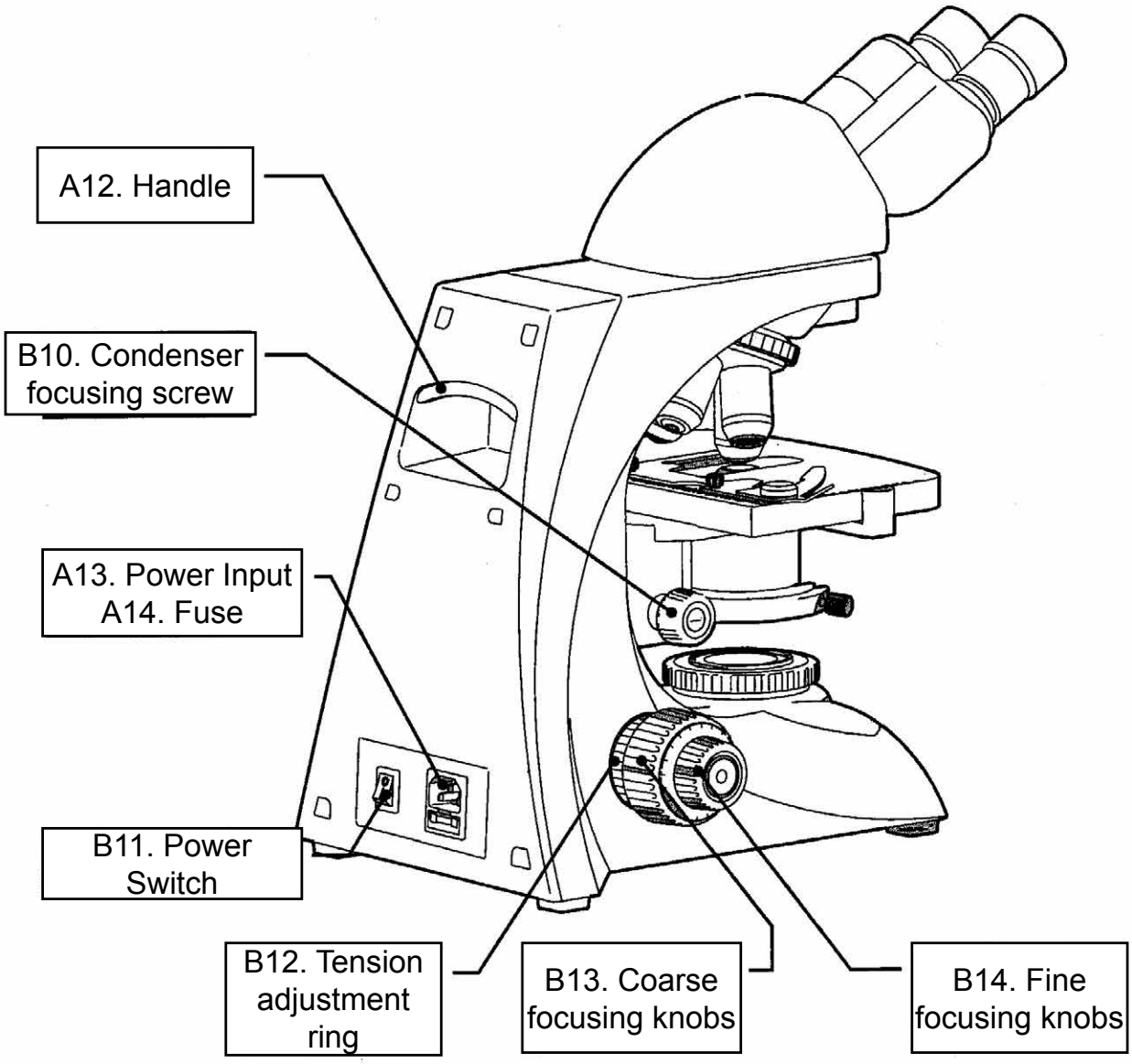


FIG. 1-2

A1. Body
A2. Seidentopf binocular head
A3. Eyepiece
A4. Nosepiece
A5. Objective
A6. Mechanical Stage
A7. Clamp
A8. Condenser
A9. Notch for attachment
A10. Filter
A11. Condenser holder
A12. Handle
A13. Power Input
A14. Fuse
A15. Lamp Plate

B1. Head thumb screw
B2. Diopter adjuster
B3. Aperture diaphragm lever
B4. Condenser adjusting screw
B5. Field diaphragm revolver
B6. Condenser thumb screw
B7. / B8. Stage moving knobs
B9. Potentiometer
B10. Condenser focusing screw
B11. Power switch
B12. Tension adjustment ring
B13. Coarse focusing knobs
B14. Fine focusing knobs
B15. Lamp plate thumb screw

SPECIFICATION

2.1 total magnifications

Objectives / Eyepiece	4X	10X	20X	40X	100X
10X	40X	100X	200X	400X	1000X
16X	64X	160X	320X	640X	1600X

2.2 Objectives (with eyepiece 10x)

Objectives		N.A.	Objective Field (mm)	Resolving Power (μm)	Working Distance (mm)	
			Field Number Φ20		Achromatic objective	Plan objective
Finite	4×	0.10	5	2.8	/	16
	10×	0.25	2	1.1	/	2.1
	40×(spring)	0.65	0.5	0.42	/	0.63
	100× (oil, spring)	1.25	0.2	0.22	/	0.45
Infinite	4×	0.10	5	2.8	9.5	6.73
	10×	0.25	2	1.1	1.7	4.19
	20×(spring)	0.40	1	0.69	/	2.14
	40×(spring)	0.66	0.5	0.42	0.39	0.45
	100× (oil, spring)	1.25	0.2	0.22	0.12	0.12

2.3 The other specification

2.3.1 Mechanical tube length: 160mm

2.3.2 Conjugate distance: Finite 195mm
Infinite

2.3.3 Head: Seidentopf binocular (trinocular) 30º
Interpupillary adjustable distance is 50-75mm
Diopter adjustable range ±5,
Anti-fungal systems

2.3.4 Nose piece: Quadplex or quinplex nose piece

2.3.5 Mechanical Stage: Size 190mm X 140mm
X-Y travel 55mm X 78mm

2.3.6 Focusing systems: Coaxial coarse and fine focusing knobs
Coarse stroke 25mm, fine division 2 μm
Condenser up-down range 25mm

2.3.7 Condenser: Abbe condenser, N.A. 1.25, Adjustable aperture
Aperture center is adjustable

2.3.8 Illumination: Koehler illumination system

2.3.9 Filter: Blue filter is for standard outfits, green and amber is optional

2.3.10 Electric components: Input voltage AC 85-265V, 50/60Hz
Output voltage DC1.2-12V
12V/20W halogen lamp
Rotation potentiometer
Fuse 2A 5 X 20

INSTALLATION

Please install the microscope as follows:

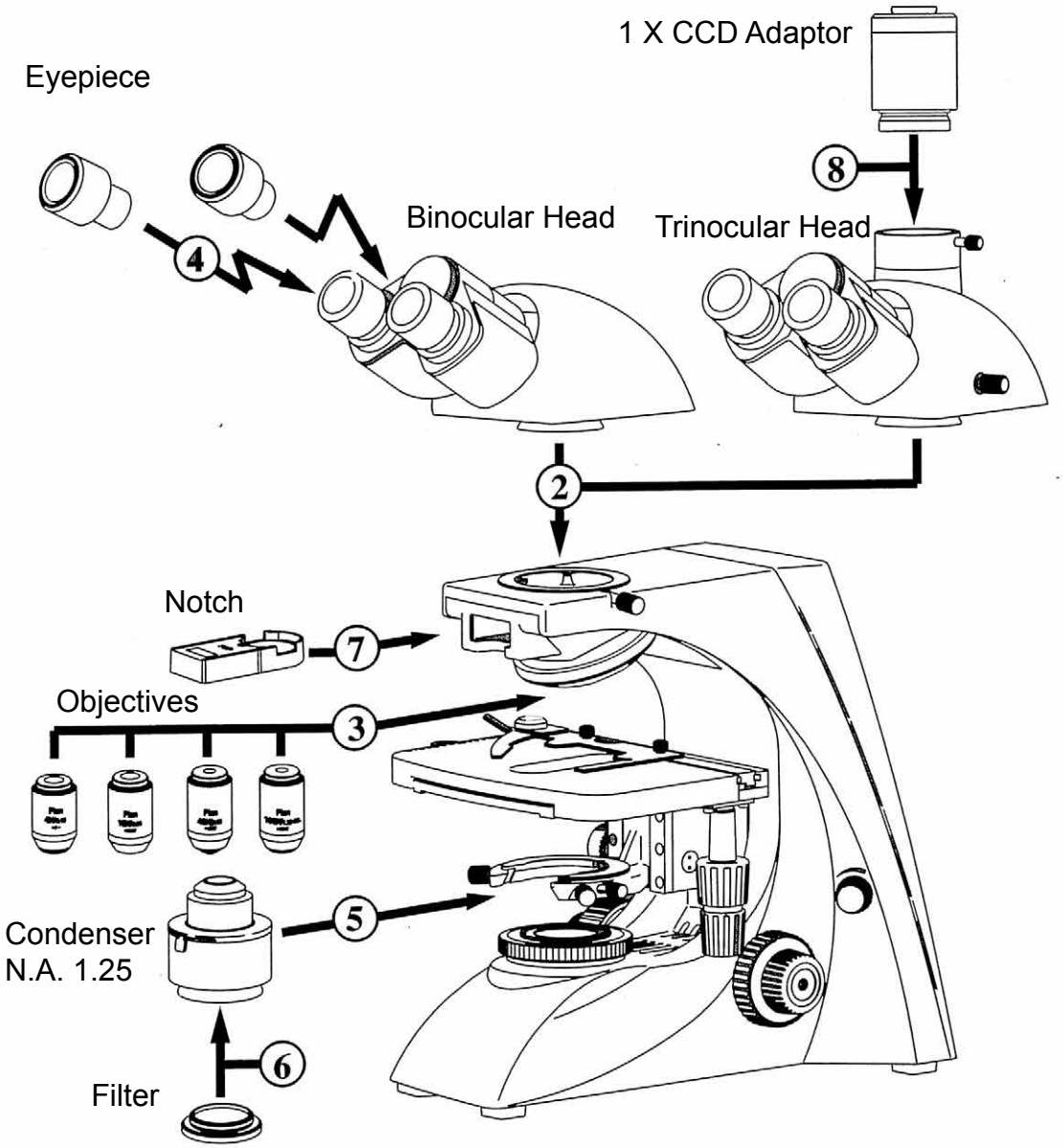
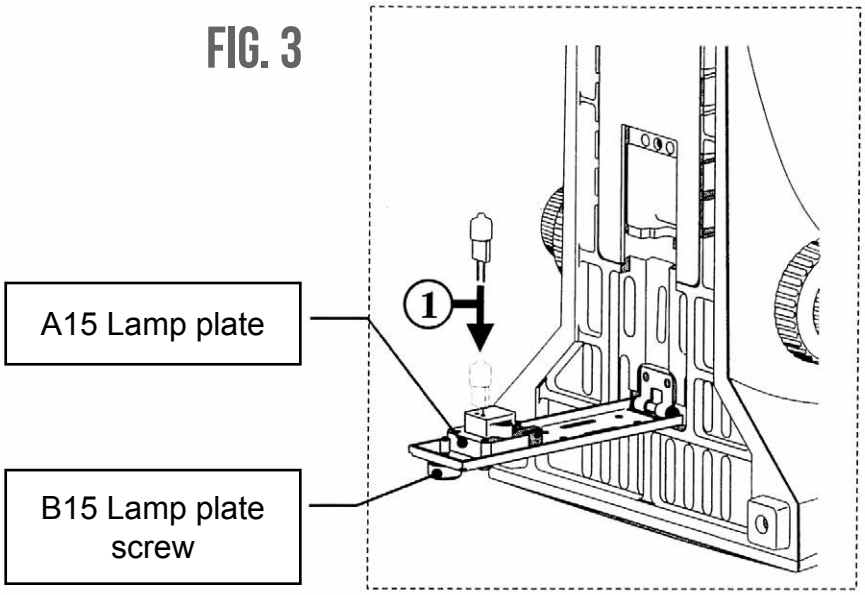


FIG. 2

Installation Process: (see Figure 3 on page 5)

1) Installing Lamp (if the lamp is installed before purchase, skip this step)
   a. Take down the base of microscope, loosen the screw B15, pull out the lamp plate (Fig. 3);
   b. Take a new lamp from the lamp package, and hold the lamp with the foam;
   c. Insert the lamp into lamp holder as the show in the picture, then put back A15 lamp plate and the screw.
   d. Take the microscope up and turn on the power.
2) Installing binocular head
   Loosen B1 binocular head thumb screw, put out A2 head, put it on top of body as in Fig. 1, tighten the screw.

FIG. 3



3) Installing objectives
Take out the objective from the packing box, and drive them into the holes of nose-piece orderly and tightly according to times.

4) Installing eyepiece
Take out the eyepiece tube cover, then get the eyepiece from the packing bag, and insert into the tubes.

5) Installing condenser
a. Turn B13 coarse focusing knob, rise A6 mechanical stage to top;
b. Turn B10 condenser focusing screw, and take A11 condenser holder to the lowest position;
c. Loosen B6 condenser thumb screw, put the condenser to the holder, tighten B6 condenser thumb screw.
d. Turn B10 condenser focusing screw, and raise the condenser to working position.

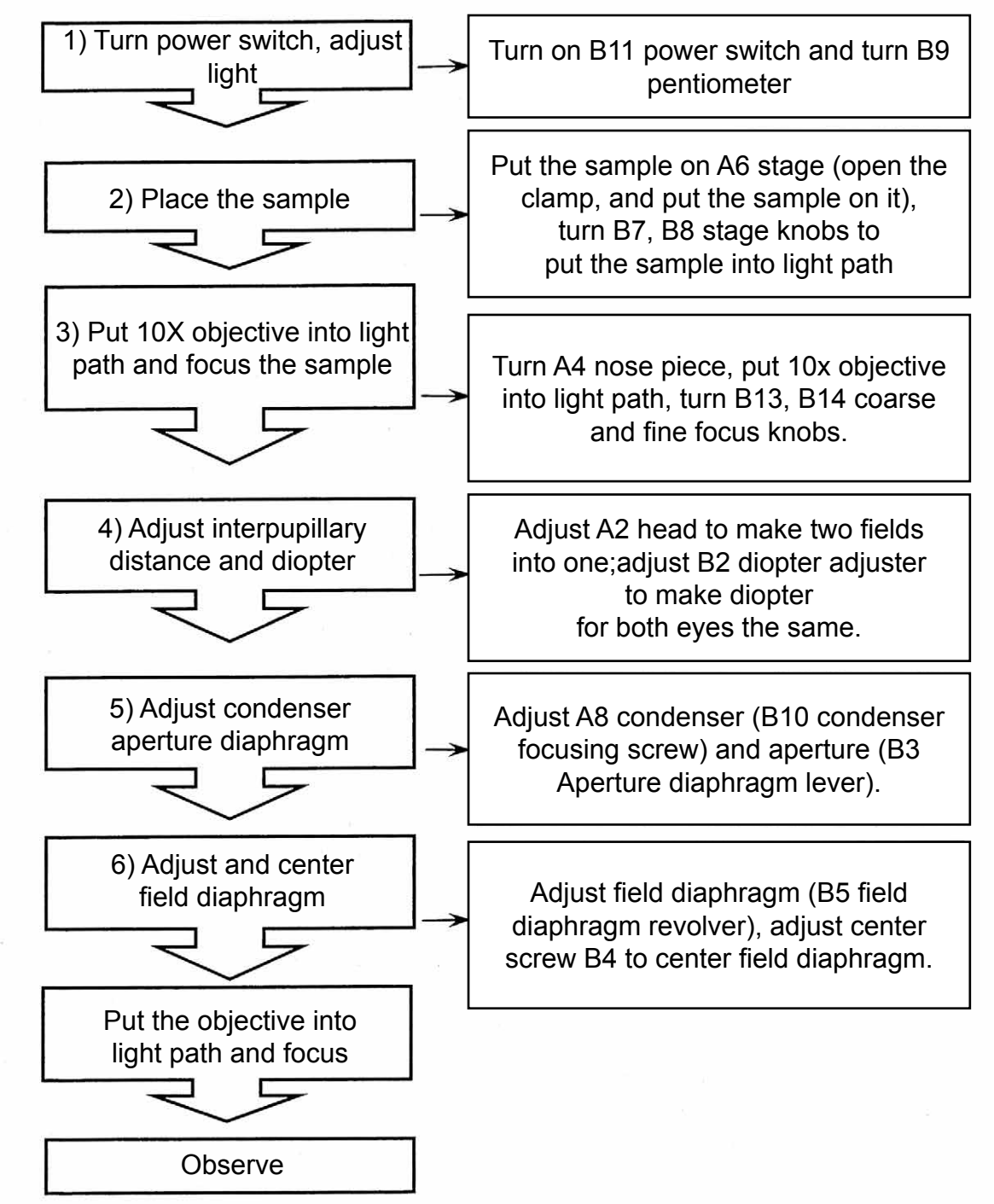
6) Installing blue filter or the other attachment
If blue filter will be used, the installation should be done before process 5, or do the installing during process 5-C, then put A10 blue filter or the other attachment to the bottom hole of A8 condenser.

7) Installing the module attachment
The microscope can be with A9 module attachment and is multi-functional. Analyzer and wave length plate can be installed in A9 notch. Polarizer is installed over field diaphragm or below the condenser.
Filter can be installed in the notch if the other attachment is in the bottom hole of condenser.

8) Installing CCD adaptor
Loosen the thumb screw in trinocular tube, put the CCD adaptor into trinocular tube, then tighten the screw.

OPERATION

4.1 Operation process instructions



4.2 Operation

1) Illumination

1. Confirm the voltage is available, the take power
2. Turn on power switch B11
3. Turn B9 potentiometer to adjust light

2) Sample placing

Put the sample (cover is up) on stage A6 and fit it with clamp A7. Turn B7, B8 stage knobs to put the sample into the light path (Fig. 4).

- Two samples can be placed on the stage together

Fig. 4

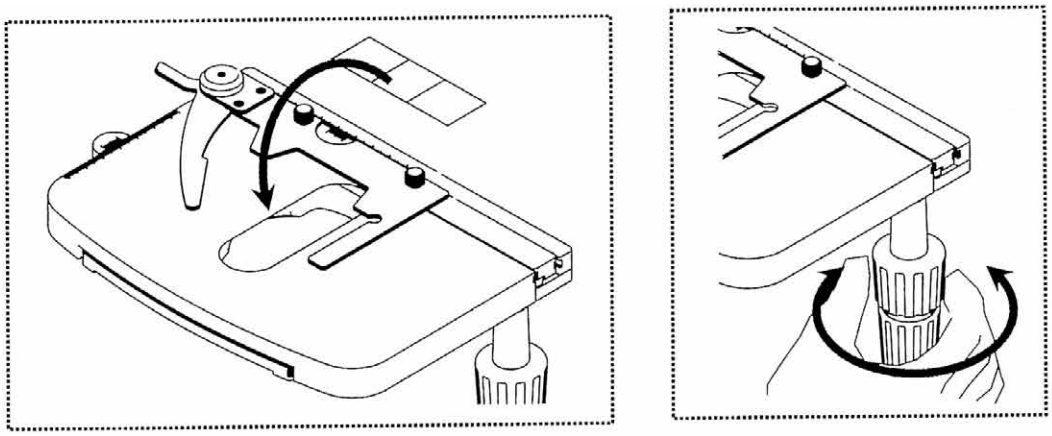
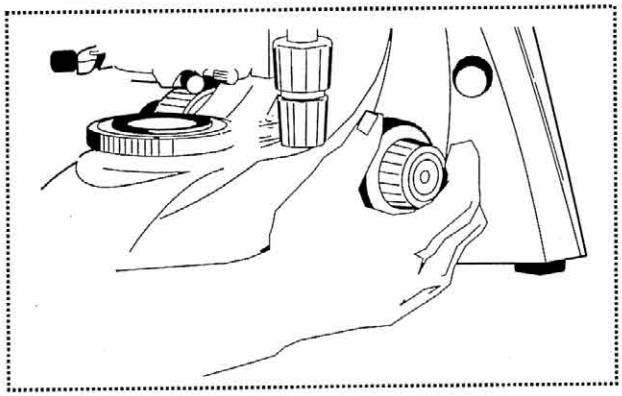


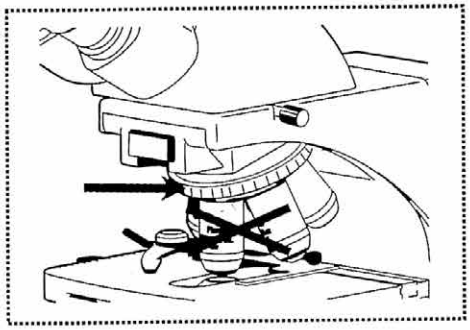
Fig. 5



3) Focusing (Fig. 5)
Put 10x objective into light path, turn coarse focusing knob B13, observe from right eyepiece with right eye, then turn slowly fine focusing knob B14 to make the image clear after finding image.

- The tension adjustment ring B12 can adjust the tension of the coarse and fine focusing unit to prevent the stage from sliding down automatically and to improve the comfort of operation. Rotate clockwise to decrease tension, rotate counter-clockwise to increase tension.
- Don't turn left and right coarse and fine focusing knobs in different directions with power at the same time, if so, the focusing system will be damaged. (Fig. 6)

Fig. 6



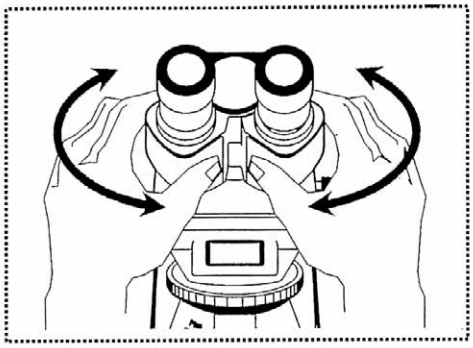
4) Interpupillary distance and diopter adjustment

a. Interpupillary distance adjustment
Interpupillary distance is different for everyone, so interpupillary distance should be adjusted before using binocular microscope. Please take the two eyepiece tubes to turn until the bright rings observed by two eyes are in superposition entirely. (Fig. 7)

b. Diopter adjustment (Fig. 8)
As focusing for binocular, user should observe right eyepiece with right eye and make the right eyepiece clear by focusing adjustment, then observe the left eyepiece at the same time, adjust the diopter ring of the left eyepiece tube to make the image of the left eyepiece clear as same as the right eyepiece.

5) Condenser and aperture diaphragm adjustment

Fig. 7



a. Condenser up-down
Turn the condenser focusing screw B10 to adjust the distance between condenser front and the specimen, and change the equal illumination to obtain the best brightness.
b. Aperture diaphragm adjustment
Stir the handle of iris aperture of condenser to adjust size of iris aperture for adjusting the contrast of the specimen.

6) Centering field diaphragm (this process is for microscope with field diaphragm)
a. Put 10x objective into light path, turn B5 condenser focusing screw, adjust condenser up or down to get the image of field diaphragm.
b. Observe through eyepiece, turn B10 condenser focusing screw, adjust condenser up or down to get image of field diaphragm.
c. Turn B4 condenser adjusting screw to move the image to the center of field.
d. Put 40x objective into light path, turn B5 field diaphragm revolver to make the field diaphragm image bigger than field diaphragm. Please center it again if the image is not in center.

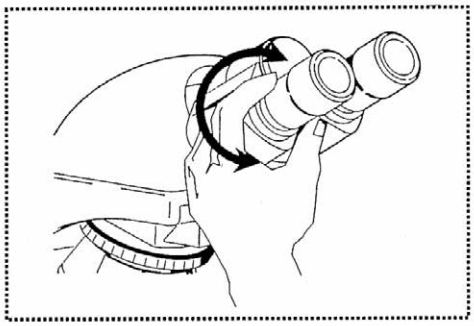


Fig. 8

4.3 Usage of immersion oil objective
The 100x objective of B series microscope can be used for observation even without immersion oil. However, adding moderate immersion oil between the front lens of 100x objective and the cover glass of specimen can make the image clearer. Please pay attention that air bubbles and impurities cannot be in the immersion oil, otherwise, the image would be affected.

First, take 40x objective which has been focused well out from bright path, then take 100x objective into bright path. At this time, nose-piece or stage moving knob should be turned slightly, and also slightly turn fine focusing knob to clear away the air bubble of immersion oil, otherwise, the air bubble would affect the image badly.

- After immersion oil is used, the oil of specimen and the microscope surface should cleaned by absorbent cotton, lens paper, gauze or soft cotton cloth with moderate mixture of pure industrial alcohol and ether (proportion 1:4)

- Standard thickness 0.17mm cover glass should be chosen when high times objective used, and thickness error should be within 0.01mm, otherwise, image definition would be affected.

4.4 Points of attention after using

4.4.1 Power of microscope should be turned off after using and the plug should be pulled out. If immersion oil used, clean objective and specimen. Finally, cover the microscope with dust cover.

4.4.2 Please take eyepiece and objectives out of microscope if not being used for a long period of time. Place eyepiece and objectives into drier with drying agent. Cover microscope with dust cover.

5. Installing and operation for Attachments

The microscope can be used with different kinds of accessories, for example, phase contrast unit, camera, darkfield unit or polarizing unit.

5.1 Polarizing Unit

Polarizing unit includes polarizer and analyzer.

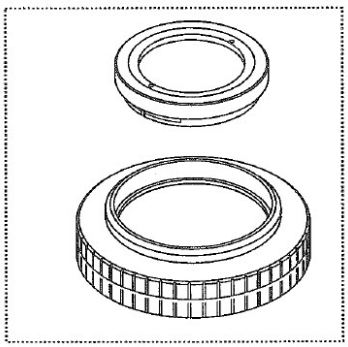
5.1.1 Installation

Pull out A9 unit of the stand front, and place the analyzer into the round groove of A9 unit steadily.

Insert A9 unit into the groove as per step 7.

Loosen the condenser thumb screw B6 of condenser stand A11, and pull out the condenser. Thread the polarizer into the bottom of the condenser. Put the condenser into the microscope.

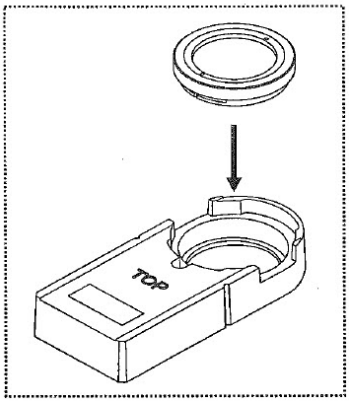
Polarizing Unit



5.1.2 Use

Enlarge diaphragm of condenser to PH position, and turn the polarizer to make the field of eyepiece darkest when there is no sample in stage. Put the sample to observe.

Installation of Analyzer



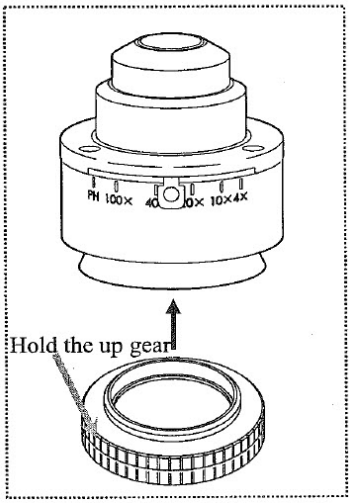
5.2 Installation of the Phase Contrast Unit

The phase contrast unit includes simple phase contrast unit and aperture phase contrast unit.

5.2.1 Installation

Take off objectives and condenser as per step 3 and 5 and install phase contrast objectives simple phase contrast condenser or aperture phase contrast condenser.

Installation of Polarizer



5.2.2 Use

10X, 20X, 40X, 100X phase slides are supplied for simple phase contrast unit, and there is mark in the slides.

Enlarge the diaphragm of condenser to PH position, put the phase contrast objective into optical path.

Insert the slide into the groove of the condenser by right side.

The spot slide has been adjusted, and don't need to center it.

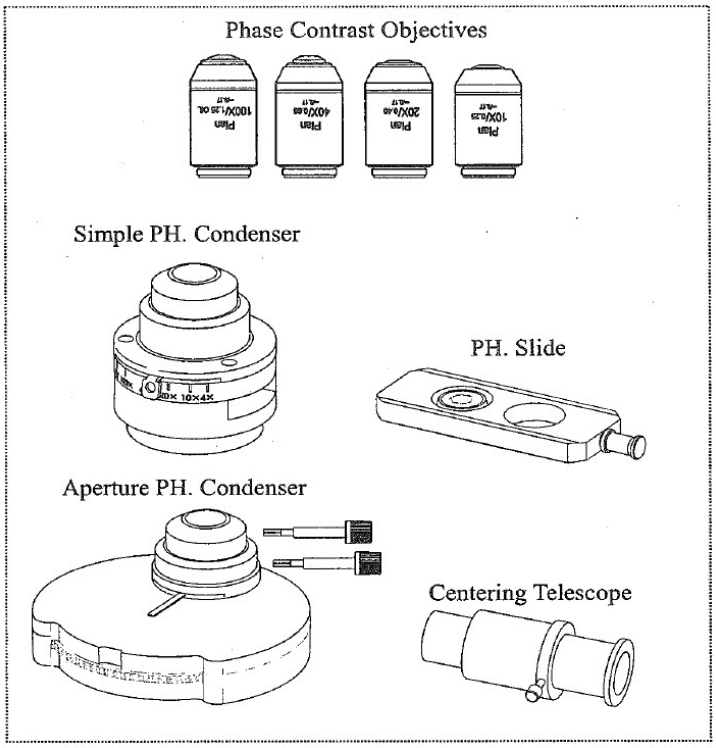
The face marked TOP is up when installing.

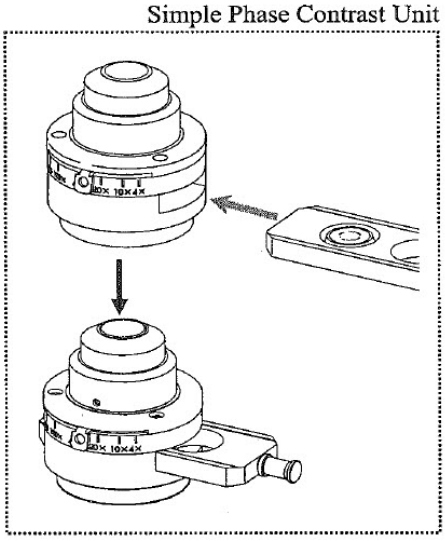
5.3 Use of Aperture phase contrast unit

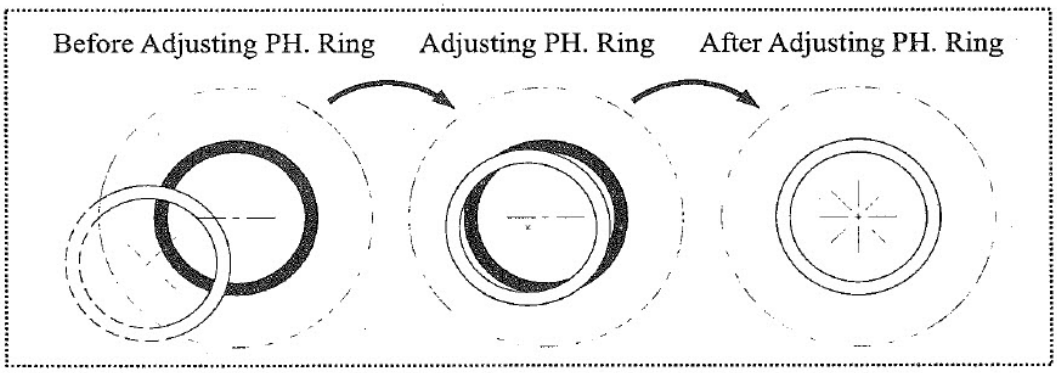
Move the turning disk of aperture phase contrast condenser to the location marked "0", adjust the instrument as per universal way. Move the turning disk of aperture phase contrast condenser to location marked "10X", then

enlarge the aperture diaphragm to the maximum, and put the 10X PH objective into optical path.

Replace eyepiece by the centering telescope, then loosen its stop screw and slide telescope axially to make the phase ring (dark) and the annular diaphragm (bright ring) image clear (user can adjust slightly the condenser holder knob), tighten the stop screw again. Put the two handles of back condenser to adjusting location, turn and adjust the center of spot to overlap the bright ring and dark ring, “superimposed”. Replace the centering telescope by eyepiece to observe.







6. Installing and using camera and CCD attachment

6.1 Installing

Connect the C-mount with CCD camera or connect with camera adapter, then connect it with c-mount, finally put it into microscope.

6.2 Using

First get a clear image from eyepiece, then pull out lever on the side of trinocular head and collect image with camera. Clear image should be in screen. Adjust B14 fine focusing knobs to get it clear if image isn’t clear.

7. Maintenance

7.1 Clean microscope

7.1.1 Do not touch the lens with hand. Dust on lens should be cleaned by soft brush, absorbent cotton or lens paper with a mixture of alcohol and ether (proportion 1:4)

7.1.2 Alcohol and ether are flammable, please keep them away from fire. Be careful when turning power on and off.

7.1.3 Don't clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of both. Silicon cloth or soft cleaning preparation is suggested to clean it.

7.1.4 Plastic should be cleaned by soft cloth with clear water.

7.2 Environment of using and placing

7.2.1 Microscope should be used and placed in a cool, dry, non-dust, non-shake and non-corrosive environment.

7.2.2 Microscope should be used in environment of indoor temperature 0º – 40º C and maximum relative humidity of 85%.

7.2.3 Removing equipment is suggested to be installed when microscope is used in heavy humidity area to avoid fungus and mist damage.

7.2.4 Please pay attention to prevent the microscope from violent shaking and vibration in applications and carrying. Don't drag it on the surface of worktable to avoid damage to microscope and worktable.

7.3 Replacement of bulb

7.3.1 Turn off power and pull out plug.

7.3.2 Wait for the bulb to completely cool.

7.3.3 Lay aside microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.

7.3.4 Pull over the lamp housing cover.

7.3.5 Pull out the bulb, hold the new bulb with a silk cloth to avoid fingerprints and dust that can affect bulb brightness and service life. Fully insert the contact pins into the bulb socket.

7.3.6 Close the lamp housing cover and screw the knurled thumb screw.
*after working for 10 hours or more, it's best to turn off the microscope for 30 minutes.

7.4 Replacement of fuse (shown in Fig. 8)

7.4.1 Cut off power of microscope and pull out the plug.

7.4.2 Unscrew fuse cap in the back of the base. Remove old fuse.

7.4.3 Replace with a new fuse and screw on fuse cap.

8. Troubleshooting

In the period of using, if any trouble occurs, please refer to the following chart for some common resolutions.

Trouble	Cause	Remedy
Power on but no light	Plug is unreliable	Plug in again
	Bulb is broken	Change bulb
	Fuse is broken	Change fuse
Brightness of view field isn't enough or uneven	Brightness isn't adjusted correctly	Adjust rotation potentiometer
	Objective isn't in correct position	Put the objective in correct position
	The size of iris aperture is too small	Adjust the size of iris aperture
	Lens (objective, eyepiece, condenser, light collector) has dust	Clean it
	Position of condenser is too low	Higher condenser
Image isn't clear (contrast or definition isn't enough)	Cover glass of specimen doesn't meet the requirement	Use required thickness cover glass (0.17mm)

Trouble	Cause	Remedy
Image isn't clear (contrast or definition isn't enough)	Cover glass of specimen isn't in up direction	Place specimen correctly
	Surface of objective lens is dirty (especially it is easy for the front lens of 40x objective to dip in immersion oil)	Clean it
	Immersion oil isn't used for 100x objective (oil)	Use immersion oil
	Immersion oil doesn't meet the requirment	Use immersion oil supplied by us
	There is a bubble in immersion oil	Clear the bubble away
	Size of iris aperture isn't proper	Adjust the size of iris aperture
	Position of condenser is too low	Readjust the position of condenser
One side of image is dark or image is moving as focusing	Objective isn't in correct position	Make the objective in correct position
	Specimen isn't placed correctly	Place specimen levelly on stage and clip it with clamp
Objective touches specimen as changing low times objective to high times objective	Cover glass of specimen isn't in the up direction	Place specimen correctly
	Cover glass doesn't meet the requirement	Use required thickness cover glass (0.17mm)
Image observed by two eyes aren't in superposition entirely	Interpupillary distance isn't adjusted correctly	Adjust interpupillary distance according to two eyes
It is easy for eyes to be tired during observing	Diopter isn't adjusted correctly	Readjust diopter

Dear Purchaser,

Congratulations on the purchase of your microscope. Your instrument has been carefully assembled and shipped to you. Please complete the Warranty Registration online at the link below and answer the questions to activate and guarantee your warranty. Retain this warranty document for your records.

Thank you for purchasing a Seiler microscope.

LIFETIME WARRANTY

Except as set forth in this Limited Lifetime Warranty, Seiler Instrument Company ("SIC") hereby warrants that each Seiler microscope product manufactured and/or sold by SIC shall be free from defects in materials and workmanship under normal use and service for the life of the product. Lifetime Warranty includes mechanics, optics, hardware (such as casters, knobs, tension band). This warranty is non-transferable and is valid only with respect to the original purchaser of the product. SIC obligation under this warranty shall be limited to repairing or replacing, at SIC facility and at SIC expense, any parts or components which are demonstrated to be defective. The purchaser shall be responsible for shipment of the product to SIC facility at 3433 Tree Court Industrial Blvd., St. Louis MO 63122, Attention: Micro Product Department, or such other facility as SIC may otherwise designate. Under certain circumstances which are pre-approved by SIC, necessary repairs may be made at the purchaser's facility. A return authorization is required before returning any product for warranty service by calling 1-800-489-2282 x347.

This warranty shall not apply to electronic and electrical components of the microscope or accessories such as video equipment, monitors and laptop which carry a three (3) year warranty OR any components which are consumable or are required to be replaced or disposed of in normal use of the product, such as lamps, fiber-optic cables and rubber eye cups OR any product which was purchased prior to April 29, 2016.

This warranty shall be void and of no effect: (1) if the product is damaged due to misuse, use in a manner other than pursuant to the instruction for the use of the product, abuse, physical mishandling or natural causes such as flood, fire, earthquake or other perils, as determined by SIC, or (2) if any repairs are made by persons unauthorized by SIC to perform such services.

The warranties set forth here are in lieu of any and all other warranties expressed or implied, including, without limitation, warranties of merchantability and fitness for a particular purpose. Purchaser's rights thereunder are granted in lieu of any other rights purchaser may have and purchaser hereby waives all other rights, warranties, remedies or guarantees whatsoever with respect to the product.
SIC shall not be liable for any reason to any third parties in respect of the product or its performance. Further, SIC shall not be liable for, and purchaser hereby releases SIC from any direct, indirect, consequential, special, incidental or punitive damages in respect to the product. In no event shall SIC be liable for any breach of warranty or other claim in an amount exceeding the purchase price of the product.

The customer is responsible for the shipping costs to Seiler Instrument Company. Seiler Instrument Company will pay the most economical method of shipping back to the customer. Any special shipping method will be paid by the customer.

Warranty must be registered online at:
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Congratulations on the purchase of your microscope. Your instrument has been carefully assembled and shipped to you. Please complete the Warranty Registration online at the link below and answer the questions to activate and guarantee your warranty. Retain this warranty document for your records.

Thank you for purchasing a Seiler microscope.

INTERNATIONAL WARRANTY

Except as set forth in this Three (3) Year International Warranty, Seiler Instrument Company ("SIC") hereby warrants that each Seiler microscope product manufactured and/or sold by SIC shall be free from defects in materials and workmanship under normal use and service for three years. International Warranty includes mechanics, optics, and hardware (such as casters, knobs, tension band). This warranty is non-transferable and is valid only with respect to the original purchaser of the product. SIC obligation under this warranty shall be limited to repairing or replacing, at SIC facility and at SIC expense, any parts or components which are demonstrated to be defective. The purchaser shall be responsible for shipment of the product to SIC facility at 3433 Tree Court Industrial Blvd., St. Louis MO 63122, Attention: Micro Product Department, or such other facility as SIC may otherwise designate. Under certain circumstances which are pre-approved by SIC, necessary repairs may be made at the purchaser's facility. A return authorization is required before returning any product for warranty service by calling 1-800-489-2282 x347.

This warranty shall not apply to electronic and electrical components of the microscope or accessories such as video equipment, monitors and laptop which carry a three (3) year warranty OR any components which are consumable or are required to be replaced or disposed of in normal use of the product, such as lamps, fiber-optic cables and rubber eye cups OR any product which was purchased prior to April 29, 2016.

This warranty shall be void and of no effect: (1) if the product is damaged due to misuse, use in a manner other than pursuant to the instruction for the use of the product, abuse, physical mishandling or natural causes such as flood, fire, earthquake or other perils, as determined by SIC, or (2) if any repairs are made by persons unauthorized by SIC to perform such services.

The warranties set forth here are in lieu of any and all other warranties expressed or implied, including, without limitation, warranties of merchantability and fitness for a particular purpose. Purchaser's rights thereunder are granted in lieu of any other rights purchaser may have and purchaser hereby waives all other rights, warranties, remedies or guarantees whatsoever with respect to the product.
SIC shall not be liable for any reason to any third parties in respect of the product or its performance. Further, SIC shall not be liable for, and purchaser hereby releases SIC from any direct, indirect, consequential, special, incidental or punitive damages in respect to the product. In no event shall SIC be liable for any breach of warranty or other claim in an amount exceeding the purchase price of the product.

The customer is responsible for the shipping costs to Seiler Instrument Company. Seiler Instrument Company will pay the most economical method of shipping back to the customer. Any special shipping method will be paid by the customer.

Warranty must be registered online at:
http://www.seilermicro.com/products/warranty-registration/

SEILER
MEDICAL DIVISION

Toll-Free: 800.489.2282 | Local: 314.968.2282 | Fax: 314.968.3601 | E-mail: micro@seilerinst.com | www.seilerinst.com



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