



MD 52 User Manual

Laboratory Microscope



To ensure proper use of this instrument as well as to avoid injury while operating Instrument, understanding this manual completely before use is highly recommended.

PREFACE

Congratulations for purchasing Your **MIKO** laboratory Microscope. The laboratory Microscope will have another capability of photography, if you purchase the appliance with the photography accessories. At the same time, in order to meet the needs of the customs, we provide sorts of accessories, which can be used widely. Please read this manual carefully for the sake of your best use.

GENERAL REQUIREMENTS FOR SAFETY

Please read carefully about following precautions to avoid unexpected personal injury as well as the product being damaged and other possible dangers.

PRECAUTIONS

1. Do not use this instrument in the environment prone to fire and blast or where there is much dust and with high temperature. Use it in the room and simultaneously be careful to keep it clean and dry.
2. Check that all the wires are correctly and firmly connected before using. Ensure that the instrument is well grounded.
3. Please pay attention to all the ratings of the electrical connecting terminal.
4. Only use fuse according to the specifications and rated values stipulated by our product.
5. Use the power cable supplied with this instrument.
6. Don't touch the surface of the lens and prism with hand or hard objects.
7. Turn off the main power first before replacing the main bulb, flash lamp and fuse.
8. To prevent the instrument from falling down to floor, it should be placed on the floor where the inclination angle is less than 10°.
9. Turn off the power and cover the instrument with dust-proof hood when it is not in use.
10. In case there is any trouble, please first refer to the trouble-shooting guide. If it still can't work, please contact with the authorized distributor or our Repair Department.

CONTENTS

1. Introduction	4
2. Photographic View	5-6
3. Standard Components	7
4. Technical specification Sheet	8
5. Unpacking Your Microscope	8
6. Common sense & Safety Instructions	9-12
7. Initial setup	9-12
8. Microscopic Procedure	13-16
9. Summary of bright field observation procedure	17
10. Detailed observation procedure	18
11. Care & maintenance	19
12. Troubleshooting	19
13. Glossary	20
14. Warranty	20
15 notes	21

1 INTRODUCTION

We congratulate you on becoming the proud owner of our **MD52** microscope. A product of years of research, your **MD52** microscope is an instrument of ultra modern Design incorporating the latest developments in the optical and mechanical fields.

MD52 sales offers the state-of-the art features-a microscope with you in mind, the Pathologist, who needs fatigue free observations of large number of specimens a day, and The researcher who needs consistent, accurate results and high fidelity resolution.

The slides travelling on ball bearing guide ways with co-axial coarse and fine focusing Controls enable the highest degree of working convenience and eliminate back lash.

Extra clarity and high contrast observation head is rotatable through 360° and inclined at 45° of the horizontal. High quality dins standard achromatic objectives and high eye point extra wide field Eye pieces comprise the optical system of your microscope.

The high power objectives are Spring loaded and all the objective are provided with a par focal ring to adjust the par focal Distance of each objective as per specimen requirements. Low friction and fully par focal nosepiece revolves on ball bearings and built-in click stop Ensures perfect alignment for common field center of each objective.

The nosepiece has a Soft ribbed grip for easy rotation, preventing damage from gripping the objectives.

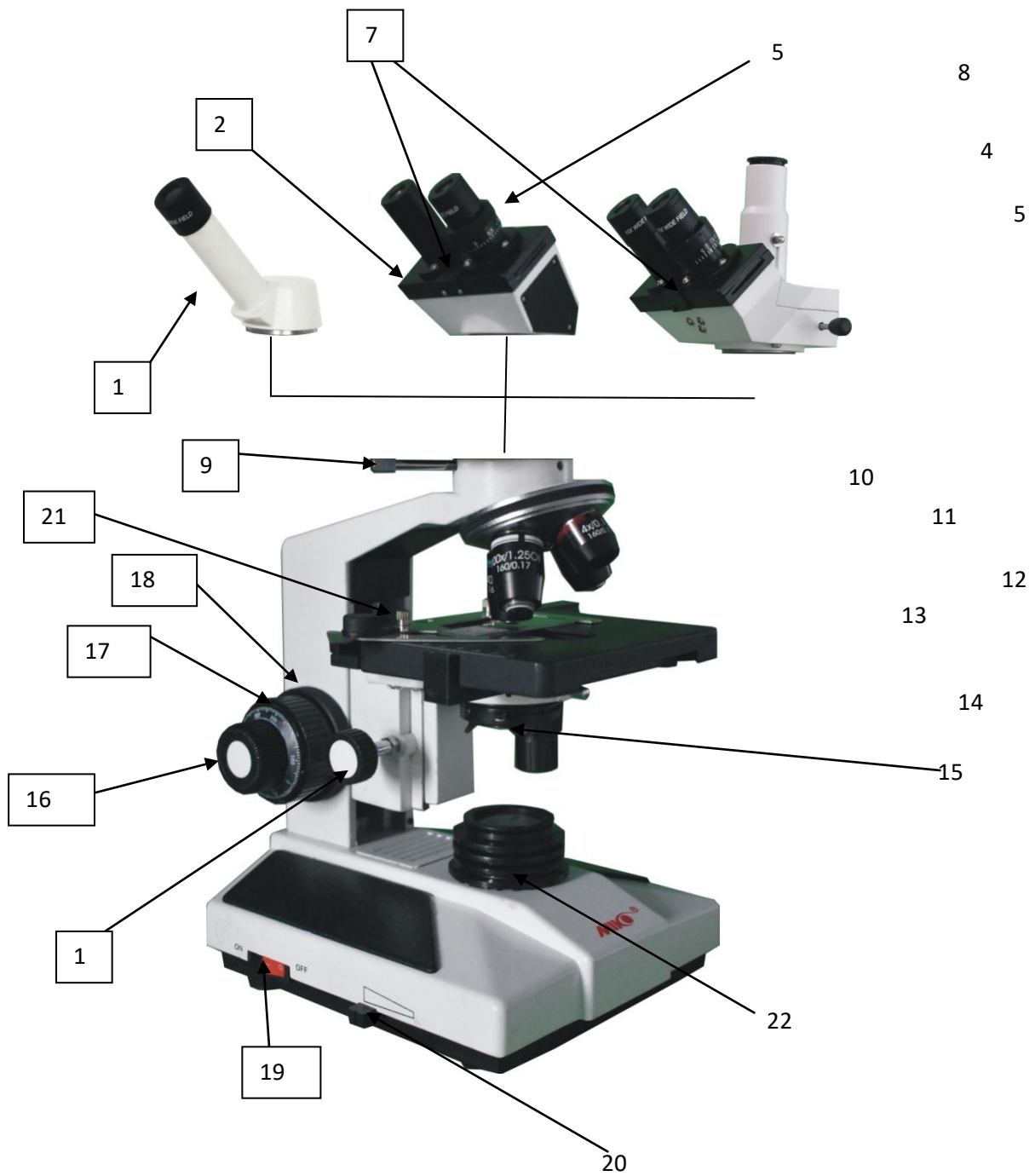
Extra large stage size with travel range of 76 mm along the x-axis and 50mm along the y- Axis for easy scanning of large specimens-with co-axial controls.

The **MD52** comes equipped with a removable N.A 1.25 abbe condenser for brighter illumination levels and iris diaphragm for better resolution and contrast control.

The compact well controlled base allows comfortable resting of hands during operation.

The built-in-illumination system incorporates a 6v-20w halogen lamp or a led illumination with electronically variable luminosity control.

2 PHOTOGRAPHIC VIEWS



3 STANDARD COMPONENTS

1. Monocular Tube
2. Binocular tube
3. Trinocular tube
4. Eye piece
5. Eye piece Diopter
6. Light path way(100:0::0:100)
7. Sliding IP distance
8. Camera tube
9. Screw to tighten the head
10. Turret
11. Turret rubber grip
12. Objective
13. Mechanical stage
14. Abbe condenser
15. Filter holder
16. Fine motion
17. Coarse motion
18. Coarse torque motion
19. On/off switch
20. Intensity controller
21. Upper stage stopper
22. Lamp
23. Dustcover
24. Spare lamp
25. Instruction manual

OPTIONAL ACCESSORIES

Accessories such as Phase Contrast Kit, Dual viewing attachment, Phase slider, Polarizing Kit ,Video Adapters, Photo adaptor for 35mm SLR Camera Along with 10x Photo eyepiece, as ordered.



Phase Contrast Kit

Please note, optional accessories are not shipped as part of standard equipments and are shipped in separate Packing as orders.

4 TECHNICAL SPECIFICATION SHEET

Product name	: Laboratory Microscope
Model Name	: MD52
Environmental Conditions	
Designed for indoor use	
Installation category II	
Pollution degree 2	
Indoor use	
Altitude	: 2000 Meters
TEMP	: 5 ⁰ C to 40.5 ⁰ C
Relative Humidity	: Max 80% at temp up to 31 deg c
Supply voltage shall not exceed $\pm 10\%$ of the rated input voltage given below	
Supply voltage	: 190 VAC to 240VAC (standard model) : 95vac to 245vac (optional model)
Frequency	: 50/60 Hz
Fuse	: F1.0 AMP
Power supply to the halogen lamp	: 6V at 20W
Power supply to the led lamp	: 3.5 W



CAUTION

: HIGH VOLTAGE FUSE
REPLACEMENT



WARNING

: HIGH VOLTAGE POWER INLET



EARTH

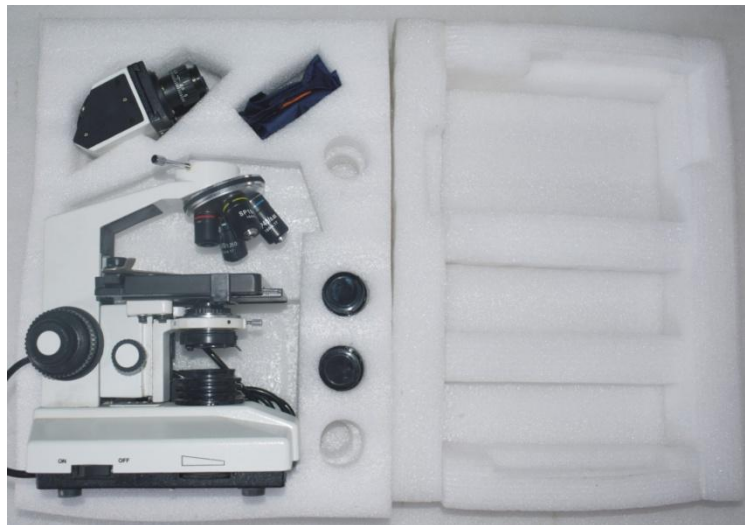


WARNING

: HIGH TEMPERATURE BULB
REPLACEMENT

5 UNPACKING

Remove the microscope components carefully from the packing box.



Please ensure the following components before discarding the packing material.

MICROSCOPE BODY
ALLEN WRENCH/HEAD LOCKING SCREW
MIRROR ATTACHMENT (IF ORDERED)
DAYLIGHT (BLUEFILTER) POWER CORD
EYEPIECE
6V20W HALOGEN BULB /LED BULB
SPARE FUSES

6 COMMON SENSE SAFETY INSTRUCTIONS

1. PURPOSE:

Use these microscope only microscopic observations. Do not use this microscope for any purpose because the protection provided by the Equipment may be impaired.

2. NEVER DISSEMBLE THE MICROSCOPE:

There are no user serviceable parts inside the microscope. Disassembly will void the warranty, and could degrade the performance, cause electrical shock or personal injury, or damage the Instrument. If you have a service problem, contact your nearest MIKO representative.

3. CHECK THE INPUT VOLTAGE.

The input voltage is indicated at the below Of the microscope on the name plate.

Confirm that this input voltage indicator Corresponds to the voltage provided in Your region. The use of microscope with The different input voltage indications Will cause over current and overheating, Which may result in fire or sever? Damage to the microscope.

WARNING!!	
!	<ul style="list-style-type: none">• In replacing the lamp turnoff the main switch and with until the lamp cools down• Do not unplug the power cord when in use• Handle with care as product consists of optical glasses.
	INPUT-110/220V LAMP-6V20W / 3WLED

INPUT VOLTAGE INDICATOR

4. KEEP THE MICROSCOPE FREE OF MOISTURE AND FOREIGN MATTER.

Keep the microscope free of moisture to prevent short circuiting that could result in Overheating or other malfunctions .If water splashes on the microscope, immediately turn off the power switch and unplug the power cord. Then wipe off the water with a dry cloth. Short circuiting can also result when foreign matter is trapped inside the microscope. If foreign matter or water had entered the microscope, do not use the microscope and contact your nearest **MIKO** representative.

5. CARRYING THE MICROSCOPE

The microscope is a precision instrument. Handle it gently strong shocks and forcible operation will damage the instruments. Shock to the objective, especially could degrade image precision

When carrying the microscope hold it at its base with both hands. Do not hold the focusing knobs, the eyepiece tube or the stage.

6. HANDLING THE LAMP

Do not touch the glass part of the lamp with bare hands. Wear gloves or use a cloth when handling the lamp so as not to leave finger prints on the surface. Wipe off any fingerprints or stains using a clean cloth moistened with alcohol. Finger prints will etch into hot surface of the lamp and reduce the brightness, damage the lamp or reduce its service life Handle the lamp gently. Shocks and vibration will damage the lamp or reduce its service life When changing the lamp , be sure that the contact is not damaged .if the contact is damaged ,the lamp may not light up or may overheat .insert the lamp's contact pins fully into the socket holes. If the pins are loose, the lamp could come off or result in a contact failure, which will cause overheating or smoke.

INSTRUCTIONS (continuous)

7. FOCUSING KNOB

Do not turn the right and left focus knob simultaneously in the opposite directions. Do not turn the coarse focus knob any further after the stage has been moved up or down to its limit. These operations will damage the focusing mechanism.

8. OIL IMMERSION OBSERVATION.

Use only a minimum quantity of oil. If too much oil is applied, surplus oil could flow out to the stage and the condenser which could lead to degraded performance

When using petroleum benzene or absolute alcohol to wipe off immersion oil or clean the lenses, follow instructions provided by their manufactures .Absolute alcohol and petroleum benzene are inflammable. Take great care when handling them.

7INITIAL SETUP

Objective- Objective is factory set. Objective is par-centers and par focalized during assembly phase. All Objective have been secured for a tight fit to prevent them from coming loose during transit. to remove an objective , rotate it counter clockwise while holding it with a rubber sheet etc to avoid any slippage

Observation Head- Unpack it to install using following procedures.

Loosen the Head Locking screw.

Place the Observation Head on the stand and engage the dovetail ring provided at the bottom into the engaging recess provided on the stand.

Tighten the Head locking screw after rotating the Observation head to your preferred direction of use

Eyepieces- Insert the Eyepieces into the ocular tubes of Observation Head

And secure the Eyepieces firmly.

ASSEMBLY

Installation or replacing the bulb/ Halogen Bulb

Before attaching the bulb. Remove the parts that may drop such as filter and specimen from the Microscope frame and place the Microscope on its back so that the bottom plate is exposed

Open the screw on the bottom to open lamp housing door Hold the halogen bulb without taking it out of the polyethylene bag so as not to taint the bulb with fingerprints and push the bulb into the pin holes after attaching removable the polyethylene bag With the lock knob pulled out close the lamp housing door then push the lock knob back to lock the cover Always.

For LED bulb Replacement

Rotate the lamp and pull out the lamp holder. Tilt the slide on both side and replace the Led bulb below the lamp holder.

Mounting the day light Blue filter

The filter modifies the color of observation light into a natural color (daylight color)

Fit the daylight filter into the bottom of the condenser until it clicks into place.

OPTIONAL ACCESSORIES

Reflection Mirror: The reflection mirror is designed to be used in outdoor observation setting wherein a power source is not readily available. The Mirror attachment makes it possible to use natural light to illuminate your specimen.

The Microscope should be installed in any place that is not exposed to direct sunlight. Direct sunlight reflection can cause eye injury, or in some cases, blindness.

The eye pieces should be oriented towards the rear of the microscope so that the reflection mirror receives unobstructed light. To do this, loosen the observation tube clamping knob and rotate the tube 180° Fit the reflection mirror in the window lens of the microscope frame by aligning the mounting tab.

Remove the daylight filter because it renders the image blue under natural light conditions. The reflection mirror should be pointed toward anywhere with stray light .while

SETUP (continuous)

observing the image through the eyepieces, adjust the orientation of the reflection mirror to capture stray light.

A planar reflection mirror is used normally. However, if the image brightness is uneven or the outside view is visible in the image, use a concave reflection mirror.

Optional Eye Piece

The standard 10X eyepieces are clamped

Insert the optional eyepieces into the ocular sleeve

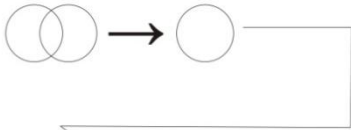
Phase contrast Kit

Check the phase contrast kit manual

8 MICROSCOPIC PROCEDURE

Turn On the lamp & Adjust the interpupillary distance

- 1.0 Turn on the power switch
- 2.0 widen or narrow to merge the view field into one



- 3.0 Adjust Brightness too

Adjust the diopter

- 1.0 Switch to the 40x focus with this knob



- 2.0 Switch to the 10x use your left eye



And focus with this ring

Focus with 10x Objective

- 3.0 Adjust Brightness too

Match the "zero" with dot



- 2.0 Place Specimen Slide on the stage (Cover glass Up)

- 3.0 Swing the 10x in the optical path



Use this knob for focusing

Magnify the image and observe

- 1.0 check the magnifying power



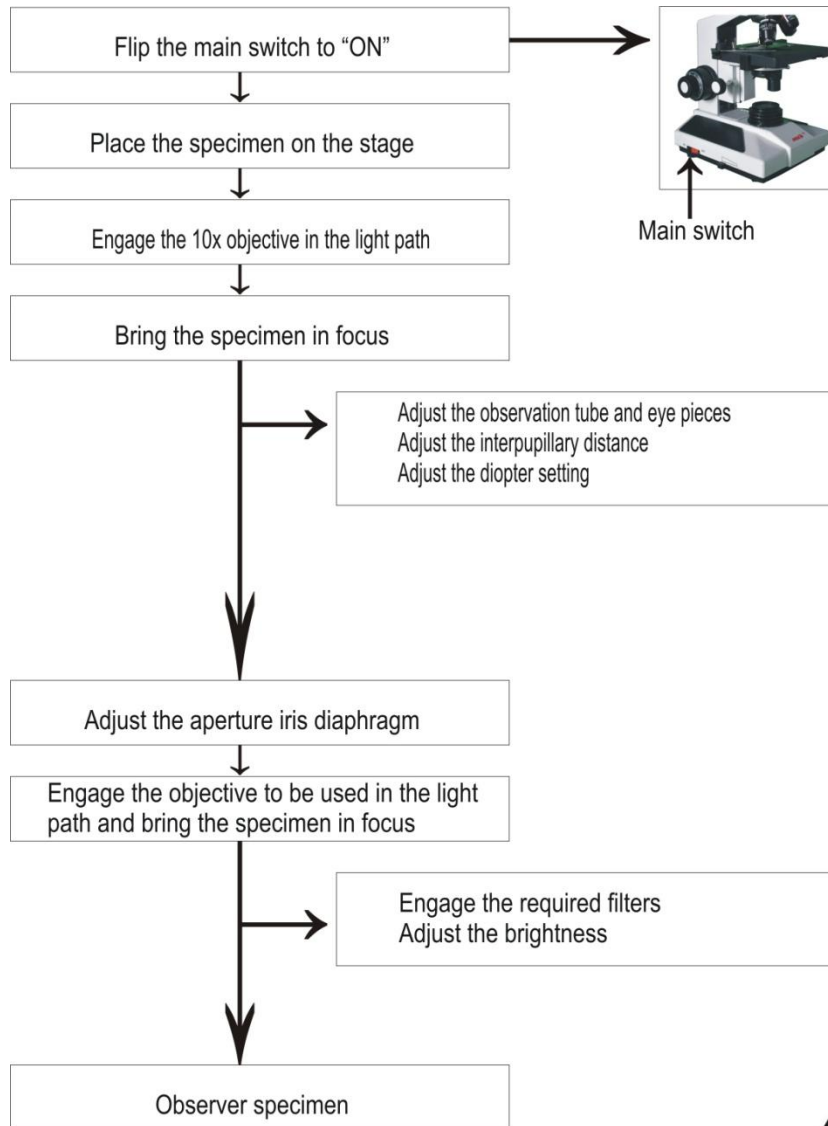
- 2.0 Move The condenser for best illumination



- 3.0 Observe

Turn off the power
wait till the microscope cools down before storing

9 SUMMARY OF BRIGHT FIELD OBSERVATION PROCEDURE



10 DETAILED OSERVATION PROCEDURE

This procedure explains how to use **MD52** Microscope; it does not include information on general techniques of microscopy.

- Make sure all the exposed optical surfaces are free of dirt. Plug the power cord into a Grounded outlet. Switch on the power and maintain light intensity to lowest level.
- Adjust the observation head to a convenient working position (Fine adjustment of Monocular /Binocular/Trinocular observation head is explained later in this manual.)
- Rotate the nosepiece until the lowest power objective is in the viewing position. The Lower the power of the objective, the great the field of view. Lower powers of objective also have a much greater depth of focus and are generally used for initial focusing and viewing.
- Take down the stage to a fairly low position with the help of coarse focus knob.
- Make sure that the stage surface is free of dust, grit or any other material that will interfere with the movement of the specimen slide across the surface of the stage or Scratch the slide and the stage between the stage fingers. Position the specimen area of the slide (cover glass up-ward) over the centre of stage aperture. Use the stage control Knobs to move the specimen slide to the desired position.
- Rotate the nose piece with the help of soft feel rubber grip nosepiece ring to bring lowest Magnification objective (4x) in the viewing position. Looking through the Observation Head, raise the stage adjusting the coarse focus knob until an image appears. Focus As sharply as possible with coarse focus knob.
- Adjust the fine focus to sharpen the image in the center of the field of view.
- Looking at the image and adjust the condenser aperture to obtain the clearest possible Image. The clarity of the image depends upon the size of the aperture. As the aperture becomes smaller, the contrast and the depth of focus increases, but the resolving power decreases. The clearest image is produced by the combination of these three factors.
- Examine the specimen. Move the slide at suitable position to observe some specific features of the specimen at higher magnification.
- Use the fine focus knob to sharpen the image. Until you gain sufficient experience in use of this microscope, it is wise to always obtain an image and to do the focusing with lower power objective and then to increase magnification by going to successively high One step at a time.
- When using objective of higher numerical aperture (N.A.) proper focusing of the Abbe Condenser is important. Focus the Abbe Condenser by racking the condenser movement knows up and down so that the field is evenly illuminated.
- **MD52** have a rotary potentiometer from low to high as you go from low magnification to high magnification Objectives for obtaining best light in the field of view.

SETTING UP KOEHLER LIGHT

Switch on the illumination of the microscope. Close the iris diaphragm of the critical mount completely and open the iris diaphragm of the abbe condenser. Bring 4x Objectives in the light path and sharp focus the critical mount opening with the help of coarse focus adjustment till a Small round image is focused. Bring the round image to

PROCEDURE (continuous)

The center of view by adjusting with help of three centering screws provided at the Abbe Condenser.

The procedure for examining specimen using the oil immersion objective is as follow:

- Rotate the nosepiece so that the low power objective is in the light path.
- Place one drop of immersion oil on the lighted area of the specimen slide. Dust or air bubbles in the oil can destroy the definition of the image. If the bubbles are trapped between the objective lens and the slide, clean off the oil and start again. Keep the oil tightly stopper and don't shake the bottle.
- Rotate the nosepiece so that the 100x Oil immersion objective is in the light path.
- With your eye at the level of the stage, use coarse focus knob to raise the stage with specimen cover glass. When you see a flash of light at this location, objective lens has made contact with the immersion oil and microscope can be focused using the fine focus knob.
- Each time you finish using the oil immersion objective, swipe off all traces of oil from the objective and the specimen cover glass with a lens tissue or clean soft cloth.
- Prevent dust and dirt from accumulation on the lens of the objective and degrading its optical performance.
- Keep the slide clean to work with.
- Prevent oil from contaminating the high dry objective (40x) and reducing its optical Performance. Since this objective has a short working distance it might accidentally contact oil.
- Keep your hand free of oil. Only finger prints accidentally transferred to the optical elements degrade their performance.

FINE ADJUSTMENT OF MONOCULAR/ BINOCULAR/ TRINOCULAR HEAD

- Rotate the Monocular/Binocular/Trinocular head to bring it to a convenient position. Normally it is kept aligned and not rotated.

Adjust interpupillary distance by bringing the eyepiece tubes closer or apart till you see one fused image.

If the image from both oculars does not fuse, you are required to do dioptic adjustment on the oculars as explained below:

ADJUSTING THE EYE SIGHT DIFFERENCE

- Set dioptic scale on focusing (left) ocular at Zero.
- Bring IP series infinity corrected 10x objective in position and focus the slide in the right eye with coarse and fine focus knobs keeping the left eye closed.
- Close the right eye and seeing through the left eye, focus the left ocular up and down by rotating the focusing sleeve till the image is in sharp focus.
- Look through both the eyes. If interpupillary adjustment required, do so as explained earlier.

ADJUSTING THE TENSION

Grip the Coarse motion knob with gear house from the Opposite side and rotate the tension adjusting ring in the Anti clockwise direction for increasing and vice-versa for Decreasing the tension.

PROCEDURE (continuous)

CHANGING OF BULB

Unplug the microscope cord, keeping the regulator in off position

Rest the microscope on the flat back of the arm

Pull the plunger to open the door

Replace the bulb with due care and caution

Use tissue paper to handle bulb. Direct contact with fingers will leave grease/Stain on bulb which will degrade its performance.

CAUTION HANDLING

- Avoid Sharp Knocks: Handle the microscope gently taking care to avoid sharp Knocks.
- Location of microscope: Avoid DUST, VIBRATION exposure to high temperature, Moisture direct sunlight.

11 CARE AND MAINTENANCE

Your microscope has been engineered for long life and with a minimum of maintenance required. In general, routine maintenance is limited to keeping the microscope clean. Always protect the microscope with dust cover when not in use.

- **Cleaning the lenses:**
To clean the lens surfaces, remove dust using a soft brush or gauze. Only for removing finer marks or grease, soft cotton cloth, lens tissue or gauze lightly moistened with absolute alcohol (ethanol or methanol) should be used. For cleaning the objective only xylene is used. Observe sufficient caution in handling alcohol and xylene.
- **Cleaning the painted surfaces:**
Avoid the use of any organic solvent (e.g. thinner, xylene, ether, alcohol etc.) for cleaning the painted surfaces and plastic parts of the instrument. Painted surfaces may be cleaned with dry cloth.
- **Never attempt to dismantle:**
Never attempt to dismantle the instrument so as to avoid the possibility of impairing the operational efficiency and accuracy.
- **Periodical checking:**
To maintain the performance of the instrument, we recommend the customers to get the instrument checked periodically. For details, contact your nearest agency.

The performance and life of 100x oil immersion objective is warranted only if proper immersion oil of such E-Merck or Cargille labs is used. Liquid paraffin is highly corrosive to the front lens elements and must never be used.

12 TROUBLESHOOTING

Trouble	Cause	Solution
The edge of the field of view is dark or the brightness is not uniform	The nosepiece is not in the located position (objective and light path not coaxial)	Locate the nosepiece properly where it clicks
	The surface of the lamp becomes black	Change a new lamp bulb
	A lens (the objective, condenser ,eye piece or collector) is dirty	Clean it thoroughly
Dirt or dust is visible in the field of view	Dirt/dust on the specimen	Replace with a clean specimen
	Dirt/dust on the eyepieces	Clean them
Visibility is poor image is not sharp contrast is poor details are indistinct	Specimen is not covered	Add cover glass on it
	The thickness of the cover glass is not suitable	Use standard cover glass with thickness of 0.17mm
	Specimen is placed reversely	Turn it over
	Dry objective has oil on it (especially for 40x objective)	Wipe the oil
	A lens (the objective, condenser , eyepiece or collector) is dirty	Clean it
	Immersion oil is not used with the 100X objective	Use specified oil
	Air bubbles existed in the immersion oil	Eliminate the bubble
	The aperture iris diaphragm is stooped down too far	Adjust the aperture iris diaphragm property
One side of image is blurred	Dirt or dust on the eye piece	Clean it
	Condenser is not properly engaged	Centre the condenser with the centering screw
	The nosepiece is not properly engaged	Engage the nosepiece properly
The image is yellowish	The specimen is not clamped	Clamp it with the stage clips
	The blue Filter is not used	Use the blue filter
	The aperture iris diaphragm is too small	Adjust it properly
The brightness is not enough	The condenser is too low	Adjust it properly
	A lens(the objective ,condenser, eye piece or collector) is dirty	Clean it
Mechanical system		
Trouble	Cause	Solution
Image cannot be focused	When adjusting stage height you forgot to reattach upper stopper screw	Reattach upper stopper screw
Objective makes contact with specimen before focus is obtained	Specimen is mounted upside down	Mount specimen correctly
The specimen cannot be moved freely	The slide is not clamped	Clamp the slide firmly
Field of view of one eye does not match that of the other	Interpupillary distance is incorrect	Adjust interpupillary distance
Observation is tiring	The diopter is not proper	Adjust the diopter properly
	The brightness of the illumination is not proper for eyes	Adjust the lamp voltage

TROUBLESHOOTING (continuous)

Electrical system		
Trouble	Cause	Solution
The Bulb cannot light	No power supply	Check the power cord connection
The bulb burns out suddenly	The voltage is too high	Lower the voltage
The illumination is not bright enough	The voltage is too low	Raise the voltage
Image flicks	The bulb is about to burn out	Replace with a new one
	The Bulb is not inserted deeply	Check it connection

13 GLOSSARY

Working Distance:	The distance from the specimen or cover glass to the nearest point of object.
Numerical Aperture:	The N.A. represents a performance number which could be compared to the relative aperture (f-number) of a camera lens. The quantity of light which the objective receives from the object increases with the square of the performance number.
Resolving power	the resolving power of a lens is measure by its ability to separate two points.
Field number:	A number that represents the diameter in mm of image of the field Diaphragm that is formed by lens in from of it.
Total magnification	equals the objective magnification multiplied by the eyepiece magnification.

14 WARRANTY

This product is warranted by **Micro Instrument CO.** against defective material and workmanship under normal use for a period of one year from the date of invoice to the original purchaser. (An authorized dealer shall not be considered an original purchaser.) Under this warranty, **MIKO** sole obligation is to repair or replace the defective part or product at **MIKO** discretion.

This warranty applies to new products and does not apply to a product that has been tampered with, altered in any way, misused, damaged by accident or negligence, or which has had the serial number removed, altered or effaced. Nor shall this warranty be extended to a product installed or operated in a manner not in accordance with the applicable **MIKO** instruction manual, nor to a product which has been sold, serviced, installed or repaired other than by a **MIKO** factory, Technical Service Center, or authorized **Micro Instrument CO.** Dealer. Lamps, bulbs, charts, cards and other expendable items are not covered by this warranty. All claims under this warranty must be in writing and directed to the **Micro Instrument CO** factory, Technical Service Center, or authorized instrument dealer making the original sale and must be accompanied by a copy of the purchaser's invoice.

This warranty is in lieu of all other warranties implied or expressed. All implied warranties of merchantability or fitness for a particular use are hereby disclaimed. No representative or other person is authorized to make any other obligations for **MIKO**. **MIKO** shall not be liable for any special, incidental, or consequent damages for any negligence, breach of warranty, strict liability or any other damages resulting from or relating to design, manufacture, sale, use or handling of the product.

PRODUCT CHANGES

MIKO reserves the right to make changes in design or to make additions to or improvements in its products without obligation to add such to products previously manufactured.

CLAIMS FOR SHORTAGES

We use extreme care in selection, checking, rechecking and packing to eliminate the possibility of error. If any shipping errors are discovered:

1. Carefully go through the packing materials to be sure nothing was inadvertently overlooked when the unit was unpacked.
2. Call the dealer you purchased the product from and report the shortage. The materials are packed at the factory and none should be missing if the box has never been opened.
3. Claims must be filed within 30 days of purchase.

CLAIMS FOR DAMAGES IN TRANSIT

Our shipping responsibility ceases with the safe delivery in good condition to the transportation company. Claims for loss or damage in transit should be made promptly and directly to the transportation company. If, upon delivery, the outside of the packing case shows evidence of rough handling or damage, the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If within 48 hours of delivery, concealed damage is noted upon unpacking the shipment and no exterior evidence of rough handling is apparent, the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order for the dealer to maintain the right of recovery from the carrier.



ISO-9001/13485 Registered



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