



MRP-3001 Binocular Microscope

User Manual

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1 Introduction

The MRP-3001 Binocular Microscope adopts international advanced design and manufacturing technology, featuring a versatile and simple operation. This microscope features the following technical specifications:

Category	Specification
Achromatic objectives	4X, 10X, 40XS, 100XSO
Total magnification	40X~1000X
Field of view	φ0.8mm~φ4.5mm
Mechanical tube length	160mm
Object to primary image distance	195mm
Coarse focus adjustment travel range	22mm
Fine focusing sensitivity	0.002mm



Important: Before first use, read this manual for operating, safety, and other instructions and information.

Technical Terms

- **S:** The “S” in the 40XS achromatic objective means “spring loaded”
- **SO:** The “SO” in the 100XSO achromatic objective means “spring loaded oil immersion”
- **Total magnification:** (magnification of objective) X (magnification of eyepiece)
- **Field of view:** (line field of view of the eyepiece selected) ÷ (magnification of the objective selected)
- **Mechanical tube length:** The distance between the objective shoulder and the ocular shoulder.
- **Object to primary image distance:** The distance between the object plane and the primary image plane. The conjugate distance is fixed.
- **N.A.:** $n \cdot \sin \alpha$ (max); The numerical aperture of the microscope objective. N.A. is a measure of the objective’s ability to gather light and resolve fine specimen detail at a fixed object distance. The “N” is the refractive index of the medium (air or immersion oil) between the cover glass of the objective and the specimen. The “A” is the half of the aperture angle. The larger the N.A., the higher the objective resolution.

Product inspection

Upon receipt, immediately inspect the components and accessories. If the unit is not the model you ordered, there is damage, or it is not consistent with your order, immediately contact C & A Scientific.

Do the following:

- The microscope and accessories are packaged in a molded Styrofoam container. Remove the container from the outer carton, carefully laying the container on its back.
- Carefully open the container, preventing optical pieces from dropping and being damaged.
- Ensure all parts are present and have no visible damage. See the [Packing list](#) section for the complete list of parts.

If the unit and accessories pass your inspection, the machine is safe for use. If not or you are missing parts or accessories, contact C & A Scientific. **Do not attempt repair without professional guidance!**

Packing list

Ensure the shipment contains the following parts:

Item	Quantity	Note
Binocular head	1	
Base	1	
Eyepiece	2	
Objectives (Lenses)	4	1 piece each: 4X, 10X, 40XS, 100XSO
Power adapter	1	Detachable UL-approved AC adapter
Filters	3	1 piece each color: Blue, yellow, green
Accessories	4	Vinyl dustcover (1) Immersion oil (1) Rubber eye guard (2)
Optional items (with upgrade)	1 - 3	<ul style="list-style-type: none"> • Simple Phase Contrast set MP15 10X, 40X, 100X • Turret Annular Phase Contrast kit MP20 10X, 20X 40X, 100X • Dark field condenser
Warranty	1	
Certificates	2	Quality certificate (1) Product certificate (1)
Operating instructions	1	User Manual

Packing Staff: _____

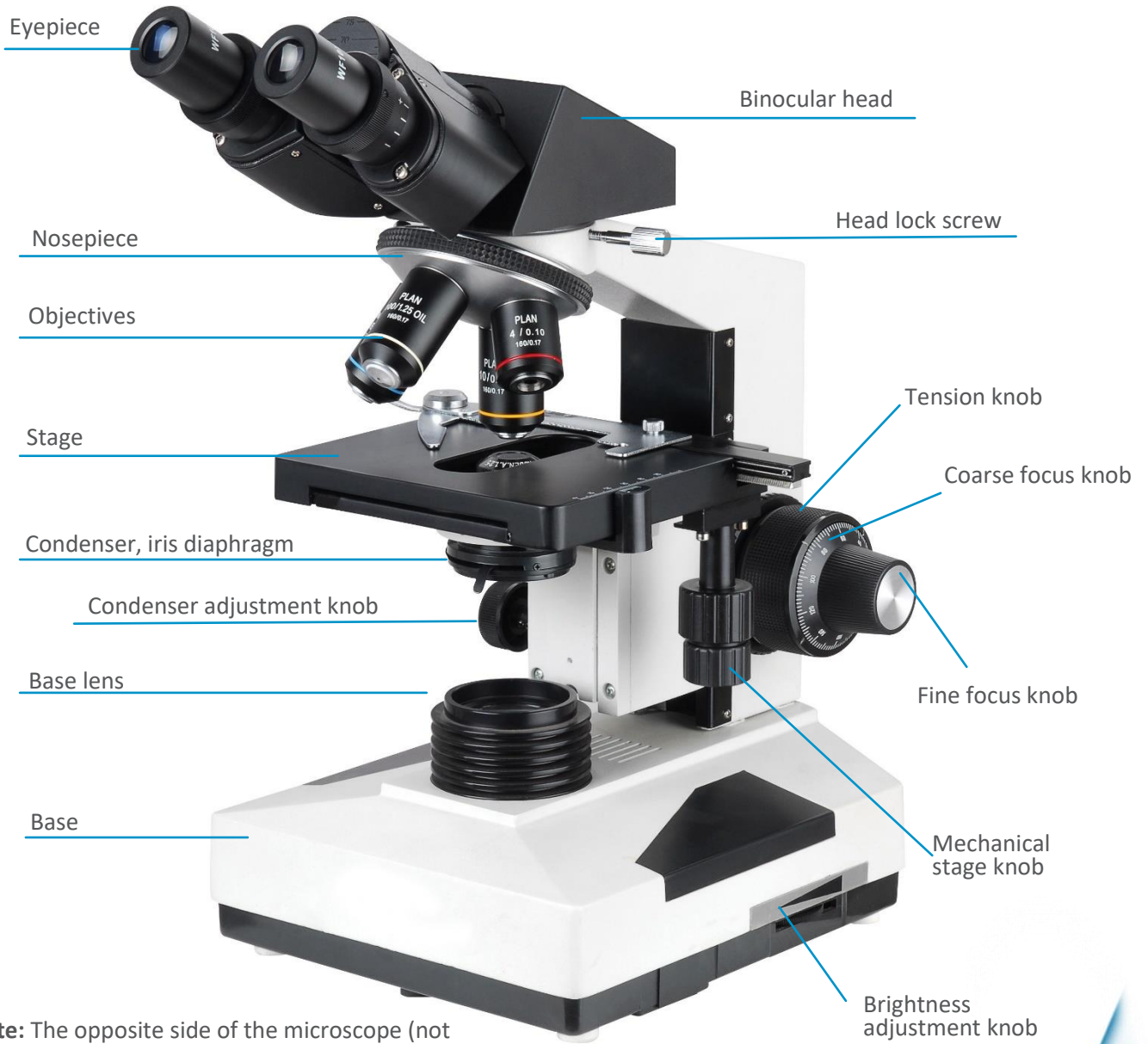
Inspector: _____

Date: _____

Date: _____

Product components

Figure 1



Note: The opposite side of the microscope (not shown) features the **Coarse adjustment** and **Limit stop** knobs.

2 Assembly instructions

Minimal assembly is required before first use. Use the image in **Figure 1** to assist with assembly.

1. Place the base on a flat, clean, and dry surface.
2. Place the binocular head onto the top of the base and then tighten the head-lock screw.
3. To install the objectives, do the following:
 - a. Lower the stage to the lowest position. This helps avoid damage while installing the objectives.
 - b. To avoid contaminating the lenses, only remove each objective's cover just before installing it.
 - c. Install each objective, from the lowest magnification to the highest (starting with the 4X objective) into the nosepiece. Use a clockwise direction from the rear of the nosepiece.
4. Remove each eyepiece's cover, being careful to not contaminate the lenses, and insert the eyepieces into the eyepiece tubes.
5. Attach the eye guards to the eyepieces.

3 Safety and operating environment



Before first use, read this manual for operating, safety, and other instructions and information.

Neglect of safety and environmental operation procedures, laws, regulations, and other governing rules and guidelines of the country and the locality of the installation can cause harm to personnel, the unit, and the environment. To avoid damage to surrounding objects, personnel, and environments, comply with all safety and operating environment instructions in this user manual.

- The use of the following materials is prohibited with the unit:
 - Flammable and explosive materials
 - Strong chemical materials
 - Toxic or radioactive substances
 - Pathogenic microorganisms
- Use C & A Scientific accessories. C & A Scientific is not responsible for damage caused by use of accessories from other suppliers.
- Only authorized personnel using appropriate tools may repair the unit. Failure to comply will void the warranty.

Safety precautions



It is strictly prohibited to:

- Plug in or unplug the power cord while the Power button is ON
- Plug in or unplug the power cord and switch the power ON or OFF with wet hands
- Clean the machine while the Power button is ON
- Place the unit on an unstable surface

Operating environment

The unit must be used:

- Indoors only and away from water sources and direct sunlight
- At a working environmental temperature range of +32 to +104°F (+0 to +40°C)

Keep the unit away from:

- Vibration and air flow that may influence performance
- Conductive dust, explosive gas, and corrosive gases in the ambient air

These factors may damage the external and internal microscope components:

- High environmental temperature
- Dropping or otherwise impacting the microscope
- Strong chemicals
- Environmental impacts, including natural ultraviolet radiation
- Wear and tear or corrosion of the parts of the protective cover and other components

4 Operating instructions

Power

1. Plug the AC adapter power cord into the back of the arm and then the other end into the power supply.
2. On the back of the base, switch the power on.

Angle of observation

You can adjust the observation angle on the binocular head.

1. On the **Binocular head**, loosen the **Head lock** screw, and then turn the head to a comfortable position.
2. Tighten the **Head lock** screw to hold the position.

Set the specimen slide

1. Place the specimen to be studied on a glass slide and then fix it using the slide-holders on the stage.
2. Turn the Mechanical **stage** knob to center the specimen over the stage opening.

Adjust brightness

You can lighten or darken the field of view.

1. Ensure the unit is powered on.
2. Turn the **Brightness adjustment** knob to adjust the light.

Adjust the focus

1. To adjust the interpupillary distance (area between the eyepieces), hold both ends of the **head cover** and push or pull the cover until one circle of light appears in the viewer.
2. To change the graduation value, do the following:
 - a. Look at the graduation value in the middle of the head cover.
 - b. On the binocular head, close to the eyepiece, turn the **two-diopter ring** and aim the same graduation value at the graduation line on the eye tube.
 - c. While avoiding decline of the stage, rotate the **Tension** knob clockwise to set the stage.
 - d. If needed, reduce tension by rotating the **Tension** knob counterclockwise.
3. Loosen the **Limit stop** knob.
4. Adjust the **Coarse focusing** knob to bring the slide into focus.
5. Lock the **Limit stop** knob to avoid impact between the objective and slide.
6. Adjust the **Fine focusing** knob to sharpen the image.

Adjust the binocular head diopter

If the diopter (optical power) of the two eyepieces is not the same, you can adjust it.

1. Turn the **nosepiece** to the **4X** objective.
2. Adjust the **Fine Focusing** knob to focus the view.
3. Observing through the right eyepiece, turn the **Diopter ring** up and down to clarify the image.

Adjust the condenser

Adjust the condenser to concentrate the light and brighten the view.

1. Rotate the **Condenser adjustment** knob to move the condenser up or down.

Adjust the diaphragm

Adjust the background brightness of the view.

1. To adjust the brightness, rotate the aperture of the **iris diaphragm**, located under the Condenser.

Choose the objective

Choose the 4X, 10X, 40XS, or 100XSO lenses.

1. Rotate the nosepiece to select the 4X objective first, then select other objectives as needed.

Note: Generally, use the lowest magnification first to reveal the general structure of the image, then use higher powered objectives to reveal smaller details.

2. Ensure that the selected objective is set vertically, above the slide.
3. When using the oil objective 100XSO, apply a small amount of the immersion oil between the objective and the cover glass.

Replace the bulb

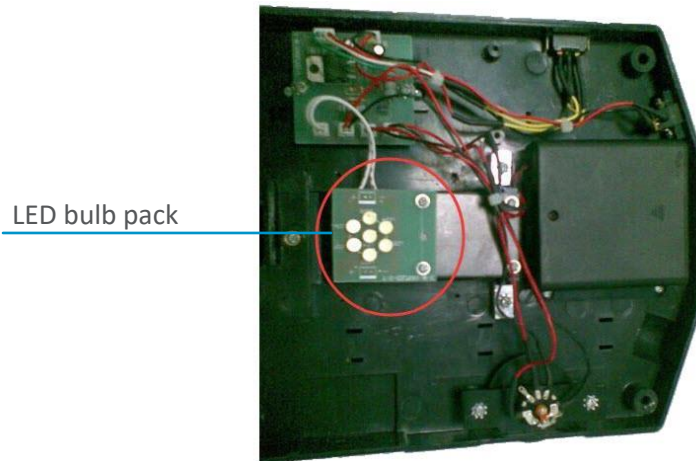
1. Ensure the power cord is unplugged from the power source and that the lamp is cool to the touch.



Danger! High Voltage! The risk of electric shock!

2. On the bottom of the unit, loosen and remove the base's bottom cover.
3. Replace the LED bulb pack.

Figure 2



4. Reattach the bottom cover to the base.

Cleaning, storage, and maintenance

Frequent and proper cleaning will help ensure a long product lifespan.

If you plan to return the unit or accessories, contact C & A Scientific to ensure it is eligible for return. Before returning it, you must ensure all equipment is properly cleaned and cannot cause harm to the human body.

If the equipment or an accessory is polluted with pathogenic, toxic, or radioactive substances, proper cleaning is your responsibility. Consult your laboratory's biosafety guidelines for further instruction.



When performing maintenance, cleaning, or storing the microscope, ensure the power is OFF or the unit is unplugged.

- Keep all glass surfaces clean.
 - Fine dust on the optical surface should be removed by a handheld blower or gently wiped with a soft lens tissue.
 - Remove oil and fingerprints on the lens with a tissue moistened with lens cleaning solution.
- Clean the remaining components, especially all plastic parts, with a neutral detergent. Remove any detergent residue with a clean, damp cloth.

- Do NOT use organic solutions to clean the remaining components.
- After use, cover the microscope with the dustcover provided.
- When in storage, ensure the unit is powered **OFF** or unplugged.
- Keep the microscope in a dry, clean environment to prevent rust.
- If a major problem occurs, such as the unit does not operate properly with the power supply, immediately discontinue use and contact C & A Scientific.



Do not attempt repair without the guidance of an authorized professional.

Repair and maintenance record

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5 Troubleshooting and support

The table below lists causes and solutions for commonly known issues. Contact C & A Scientific if you cannot resolve an issue after troubleshooting.



If an issue occurs, turn the power off, unplug the unit, troubleshoot, and then start the unit again.

Troubleshooting

Optical issues

Issue	Causes and Solutions
The side of the field of view is dark or uneven	<ul style="list-style-type: none"> • The nosepiece is not in the right position. Turn the nosepiece to adjust. • A stain or dust has accumulated on the condenser, objective, eyepieces, or base lens. Clean the component.
Stain or dust is observed in the field of view	<ul style="list-style-type: none"> • Stains have accumulated on the specimen. Clean the specimen. • Stains have accumulated on the lens. Clean the lens.
Unclear image	<ul style="list-style-type: none"> • No cover glass on the specimen slide. Add the cover glass. • The cover glass is not standard. Use a standard 0.17mm thickness cover glass. • The specimen faces down. Turn the specimen face up. • The immersion oil has accumulated on the dry objective. Clean the objective thoroughly. • The immersion oil is not used for oil objective 100XR. Apply the immersion oil. • An air bubble in the immersion. Remove the air bubble. • Used the wrong immersion oil. Clean and then apply the correct oil. • The aperture is not opened to correct size. Adjust the iris diaphragm. • A stain or dust has accumulated on the lens in the inlet of the head. Clean the lens. • The condenser is not in the right position or the stage is set too low. Adjust the condenser or stage.
One side of the field of view is dark or the image moves while focusing	<ul style="list-style-type: none"> • The specimen slide is not fixed. Affix the slide with clips. • The nosepiece is not in the correct position. Turn the nosepiece to the correct position.

Issue	Causes and Solutions
The field of view is not bright enough	<ul style="list-style-type: none"> The iris diaphragm is not big enough. Adjust the iris diaphragm. The condenser is not in the right position. Adjust the condenser. A stain or dust has accumulated on the condenser, objective, eyepieces, or base lens. Clean the lens. The brightness-adjustment knob is not in the right position. Adjust the knob.
The image color is not true	<ul style="list-style-type: none"> No filter is being used. Use the correct filter.

Mechanical issues

Issue	Causes and Solutions
The image is not focused while using high power objective	<ul style="list-style-type: none"> The cover glass faces down. Turn the cover glass face up. The cover glass is not the standard size. Use a standard 0.17mm thickness cover glass.
The objective touches the cover glass while turning the nosepiece	<ul style="list-style-type: none"> The cover glass faces down. Turn the cover glass face up. The cover glass is not the standard size. Use a standard 0.17mm thickness cover glass.
The slide does not move smoothly	<ul style="list-style-type: none"> The slide is not affixed correctly. Adjust the slide. The movable specimen holder is not affixed correctly. Tighten it.
Focus-knob is not flexible	<ul style="list-style-type: none"> The tension knob is too tight. Loosen the tension knob a little at a time until the image is clear.
The stage makes the image unclear	<ul style="list-style-type: none"> The tension knob is too loose. Tighten the tension knob a little at a time until the image is clear.
When focusing up, the coarse-focusing knob does not rotate	<ul style="list-style-type: none"> The limit-stop knob is locked. Loosen the limit-stop knob and then lock it after refocusing.

Electrical issues

Issue	Causes and Solutions
The bulb does not work	<ul style="list-style-type: none"> No power supply. Check the connection to the power cord. The bulb is inserted incorrectly. Remove and then reinsert the bulb. The bulb burned out. Replace the bulb.
The bulb burned out	<ul style="list-style-type: none"> The voltage is too high. Use the correct power supply.

Issue	Causes and Solutions
unusually fast	<ul style="list-style-type: none"> The wrong bulb is in use.
The fuse burned out unusually fast	<ul style="list-style-type: none"> The voltage is too high. Use the correct power supply.
The bulb flickers or the brightness is unstable	<ul style="list-style-type: none"> The bulb is about to burn out. Replace the bulb.

*If your issue remains unresolved, contact C&A Support.

Support

C & A Scientific

Service and support contact (U.S.): contact@cnascientific.com or (703) 330-1413



If you plan to return the unit or accessories, or if maintenance is required, you must ensure all equipment is properly sanitized and cannot cause harm to the human body.

6 Warranty

C & A Scientific Co., Inc. one-year Warranty assures that the microscope is guaranteed against defects in material and workmanship for one year upon the receipt date of the product. Electrical and video components are covered for one year from purchase date; frame (body) is covered for one year after purchase. The following is not covered under the warranty: Normal wear, eyepieces, eye tubes, turrets, mechanical stages, light bulbs, bases, batteries, fuses, objectives, AC power cords, accessories, damage resulting from repair by unauthorized parties, accident, alteration, damage in transit, misuse or abuse. If one of the parts does not work upon initial receipt, please contact your distributor. Warranty service is provided by C & A Scientific Co., Inc. Determination of warranty is at the company’s discretion. Defective products covered by the warranty will be repaired free of charge when they are returned, postpaid, to C & A Scientific Co., Inc. For out of warranty repairs, service may be available depending upon availability of parts. Please contact contact@cnascientific.com for more information.

Warranty Scope

- The user must operate and maintain the product according to the requirements and instruction presented in this user manual.
- Modification, adjustments (including changes in electrical components), and other changes from the intended design may only be conducted by C & A Scientific.
- In the event you do not meet the above requirements, any damage caused by misuse will be repaired by C & A Scientific at your expense.

7 Quality Certificate

Warranty Period: **1 year from day of receipt**

Customer name: _____

Email: _____ Phone: _____

Your Address: _____

Serial number (S/N): _____

Purchase date: _____

Select one: Replacement Repair Reject

Reason for replacement, repair, or rejection:

8 Product Certificate

Product Name: Binocular Microscope

Product Model: MRP 3001

Production Date: _____

This product is inspected by a quality inspector and in compliance with national standards and industrial binocular microscope production standards. The performance is stable and reliable. Electrical parts are in line with the CE directives of LVD and EMC.

Serial Number (S/N): *Paste here*

Quality Control Stamp: **QC Stamp here**

Date: