

INSTRUCTIONS

OPERATING MANUAL

MODEL : BLM-10 BINOCULAR RESEARCH MICROSCOPE



MVTEX

Connecting Ideas For Years

Warning

This Instruction Manual is for the use of the MVTEX Binocular Microscope. We recommend you to read this manual carefully in order to familiarize yourself fully with the use of it to obtain

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INTRODUCTION

This microscope uses a light bulb to illuminate the microscope slide. It is also called a compound microscope because two lens systems are used to produce the image that your eye sees.

The compound microscope is one of the principal tools of the biological laboratory. As a biology student or pathologist one must learn proper use of the microscope. Proper use of the instrument demands practice. A little extra time now will pay off later when you are asked to do much more difficult microscopy.

A microscope is really only a sophisticated arrangement of magnifying lenses, constructed to see small objects. The compound microscope consists of a light source, three glass lens systems, plus the human eye. The lenses focus light. The important parts of the microscope are:

1. **Light source**
2. **Condensing lens system** to collect and focus light from the source onto the specimen
3. **Objective lens system** to form and magnify the image of the specimen
4. **Ocular lens** to enlarge the image made by the objective lens and to project this image onto the retina of the eye or to photographic film. The ocular produces no new detail. The detail you see is produced by the objective lens.

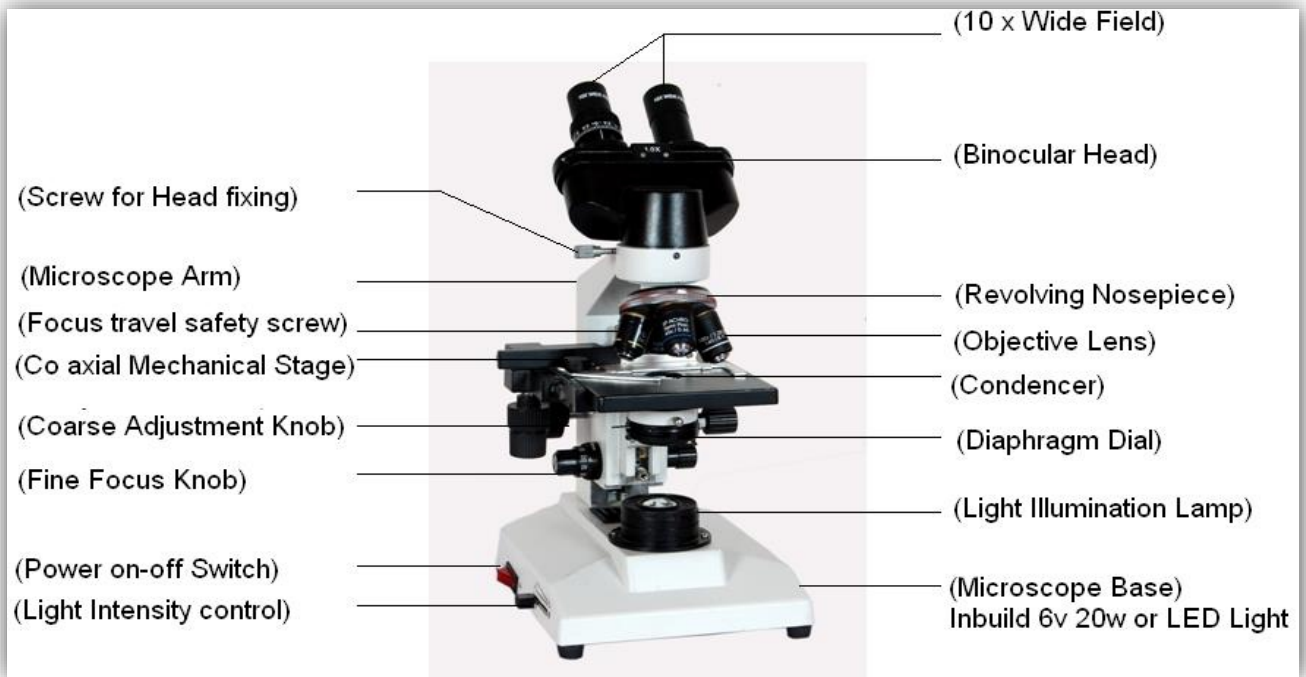
Light is reflected upward through the opening in the stage, passes through the specimen on the slide, and then into the body tube of the scope, ultimately forming an image on the retina of the users' eye.

The quality of the light determines the quality of the image so it is important to learn how to adjust the light. The microscope has two mechanisms for this purpose: the iris diaphragm controls the amount of light entering the microscope and the condenser focuses the light.

Resolution (or resolving power) is the ability to see two objects that are close together as two separate objects rather than one blurred object. The human

eye, unaided by optical devices, can resolve about 0.2 mm. By means of the light microscope, objects as small as 0.0002 mm or 0.2 micrometers (a micrometer is 0.0001 meter) can be seen and resolved. This represents a 1000X improvement in resolution beyond that of the naked eye.

PARTS LAYOUT



Different Types of Interchangeable Observation Head



1) Monocular Head 2) Trinocular Head 3) Binocular Nikon Type

PRECAUTIONS

A compound microscope is a delicate and expensive precision instrument. Treat it with care!

- **Always carry the microscope upright with two hands: one hand on the arm and one hand under the base.**
- **When you are ready to use a microscope, place the microscope securely on the table (not too close to the edge) and plug it in, check to make certain that the light is working, make sure that the low-power lens is in position over the opening in the stage,**
- **Only use lens paper to clean the lenses. Any other type of paper may scratch the glass lenses, produce lint, or transfer oil from your fingers to the lens. Never touch the lenses with your fingers. You can distinguish between dirt on the ocular and dirt on the objective by rotating the ocular while looking through the microscope. If the dirt is on the ocular, the dirt will rotate with the lens.**
- **CAUTION! DO NOT move the body tube/stage when changing from a low power to a high power lens.**
- **Never touch the lens to water. Always use a square, plastic cover slip when making a wet mount.**
- **Clean the slide with lens paper, hold the slide up to the light to get an approximate location of the object you will be looking for, secure it with the co axial mechanical stage and use the coarse adjustment knob to locate the object you wish to study.**
- **Once you have located the object you wish to study and have it in approximate focus, use the fine adjustment knob to bring it into fine focus and then you can switch to another power.**

- When you are finished with the microscope, put the 4x/5x objective lens in place and raise the stage as high as it will go. Wrap the electrical cord loosely around your hand and drape the coil over the tube of the microscope. Do not wrap the cord around the base because this will damage the condenser lens, diaphragm, and the cord. Put the dust cover back on. Return the scope to cabinet.

TECHNICAL DATA OF RESEARCH MICROSCOPE

Your Microscope comes complete with the following standard accessories:

- 10x Wide field
- 15 x Hygeniun Eyepiece (optional)
- 4x/5x Scanning Objective lens (Magnification = 40x/50 x)
- 10x Low Power Objective lens (Magnification = 100 x) spring loaded
- 40x/45x High Power Objective lens (Magnification = 400 x/450x) Spring loaded
- 100x Oil Immersion Objective (Magnification = 1000 x) Spring loaded
- Microscope Dust cover with cloth for cleaning
- Immersion Oil for 100x Objective Lens
- Blue Filter

Items	Specifications
Objective Lens	Achromatic Objective

Nosepiece	Quadruple nosepiece with positive click stop
Mechanical Stage	120mm x 120mm Co axial Mechanical Stage for X-Y movement of specimen.
Illuminator	Built-in electric illuminator; 6v/20W tungsten
Diaphragm	Disc diaphragm with Blue filter holder slot
Head	Binocular head, 45° incline, 360° rotatable
Focuser	Course focus; Fine focus adjustments

ASSEMBLING THE MICROSCOPE

Before you can view through your microscope, the objective lenses must first be attached.



Installing the Objective Lenses:

- Remove the all four objective lenses from their individual containers. Unscrew the container Lids from the threaded portion of the objective lens.
- Thread the end of the 4x/5x objective lens into one of the holes on the objective lens rotator It may be necessary to lower the specimen stage by turning the coarse focus knob.
- Now turn the objective rotator to the next opening and thread each of the remaining Objective lenses into the remaining holes. Your microscope is

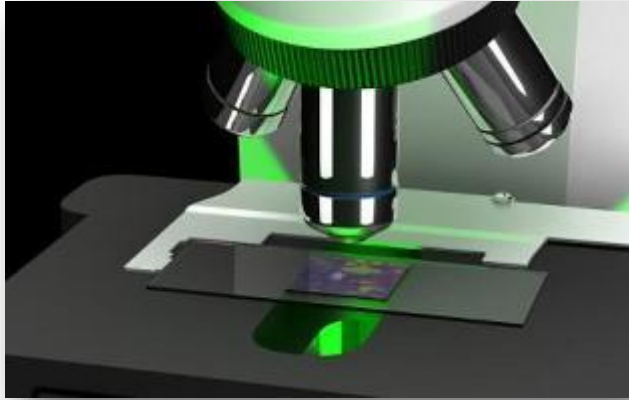
now ready to view specimens. Microscope Operation Powering the illuminator.

- Your microscope has a built-in illuminator powered by 220v AC power. To power the Illuminator.
- Plug the power cord into a wall outlet.
- Turn the power switch to the "on" position.
- To regulate the amount of light shining on the specimen, rotate the diaphragm dial. The diaphragm dial has a blue filter slot to hold the Blue filter.

PROCEDURE FOR VIEWING A SPECIMEN

Always use this procedure when you look at a new microscope slide:

- Turn the 4x/5x objective lens into place
- Put the slide into the holder on the stage center the object to be seen over the opening in the stage
- Use the coarse adjustment knob to move the stage as close to the lens as it will go (a brake will prevent the slide from actually hitting the lens)
- While looking through the ocular, use the coarse adjustment knob to move the stage away from the objective lens until the image is in focus.
- Adjust the iris diaphragm for the proper amount of light
- To increase magnification, slowly turn the 10X objective lens into place.
- Use the fine focus knob to bring it into proper focus.



This microscope is **PARFOCAL** which means that when the image is in focus with one objective lens, it will be almost in focus at the next higher magnification. You should only need to make slight adjustments to bring it into perfect focus.

- Adjust the iris diaphragm for the proper amount of light.
- To increase magnification further, slowly turn the 40x/45x objective into place.

This microscope is equipped with a focus travel safety screw which allows you to regulate the range of travel on the focuser. This assures that the objective lenses will not accidentally come in contact with specimen slide, breaking the slide or scratching the objective lens. To adjust the travel on the focuser

Generally, you will need the 10X objective when viewing a tissue and the 40x/45x objective when viewing individual cells. As you become more experienced, you will learn which magnification is most appropriate for that which you want to see.

You should adjust the amount of light entering your specimen in order to form the best image possible.

You will probably need to increase the amount of light as you increase magnification and decrease the amount of light as you decrease magnification. If the field is dark or the image very grainy, then increase the amount of light. If the image appears "washed out", reduce the amount of light reaching the

specimen.

FOCUSING & MECHANISIM

- Lower the specimen stage by rotating the course focus adjustment knobs.
- Partially unscrew the focus travel safely screw so that about 1 inch is sticking up.
- Turn the objective lens rotating nosepiece until the 40x/45x lens is directly over the light condenser.
- Use the focus knobs to raise the stage until the tip of the lens is slightly above the specimen slide. (Be careful not to touch the slide to the objective lens).
- Thread the focus travel safely screw down until it stops against the focuser mechanism.
- Rotate the knurled locking nut downward to lock the safety screw in place.
- Now that the specimen slide is placed directly under the objective lens, use the course focus knob to focus on the specimen.
- Always start with the scanning 4x/5x objective lens and switch to Low Power 10x following by higher power 40x/45x and then 100x oil immersion by rotating the objective lens revolving nosepiece.

Be cautious not to let the objective lens touch the specimen Slide when changing to higher power. Use the fine focus knob to change the depth of field on the specimen you are observing.

If you run out of upward travel before reaching sharp focus, you can unscrew the focus travel Safety screw to allow for more upward travel. Once again be careful not to let the objective lens touch the specimen slide.

REPLACING THE ILLUMINATOR LAMP

- Raise the specimen mechanical stage to its highest position by rotating the coarse focus adjustment knob.
- Unscrew the black metal illuminator housing and lift it straight up over the light bulb.
- Turn the light bulb counterclockwise while gently pushing down.
- Replace with a new 6v/20w tungsten bulb.
- Slide the illuminator housing back over the light bulb and thread into place.

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