삼원과학산업㈜

Biological Microscope

Model :NSB-50T/DN-20AB/ VDN-21A

This instruction manual is to ensure the safety and obtain satisfactory Performance and familiarize yourself with the use of this microscope, Please study the manual thoroughly before the operation

***Note: In the case of DN-20A, DN-20B and VDN-21A, please study the camera manual(installation, operation) in the CD-disk for the details.**

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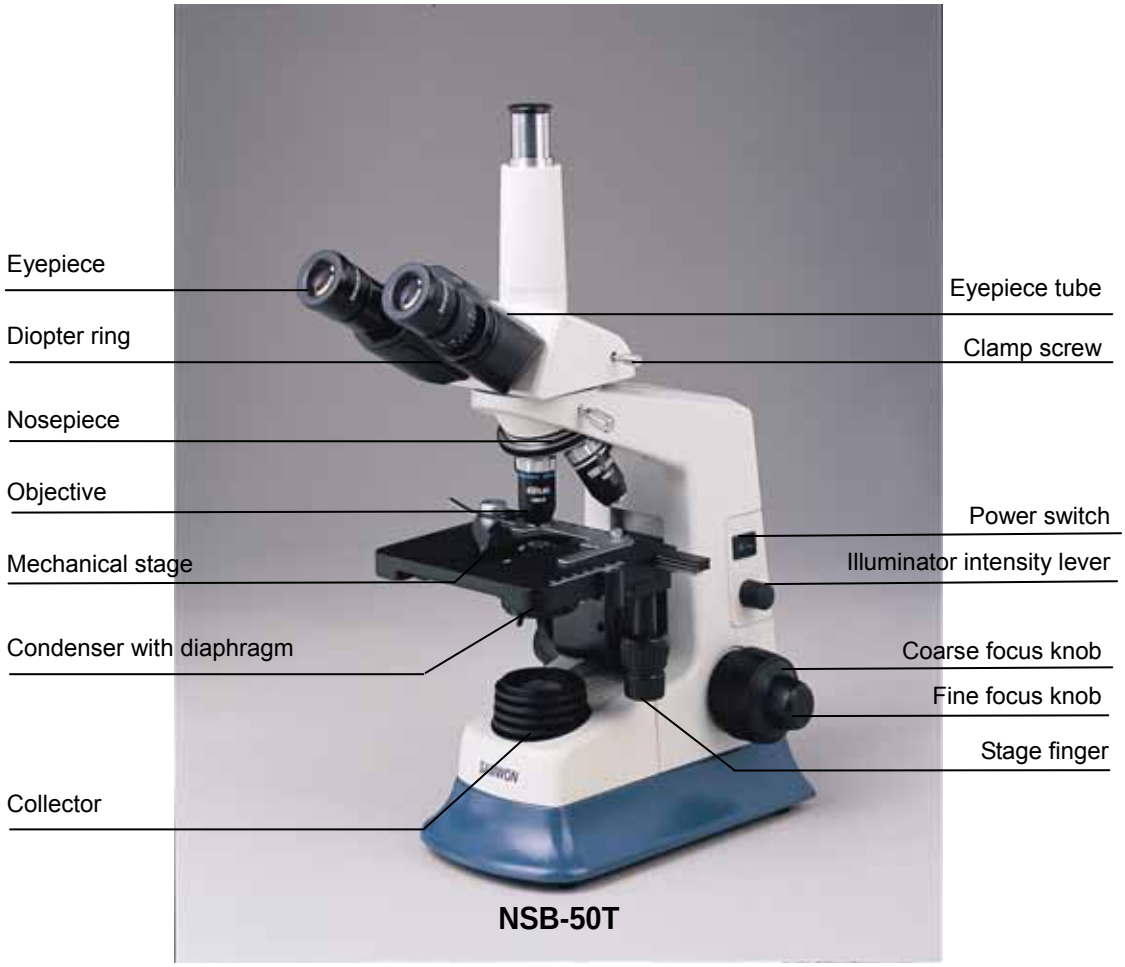

Preface

Model NSB-50T/DN-20AB/VDN-21A laboratory biological microscope is one specialized lab instrument used in biological and medical field. This microscope is characteristic of its infinity optical system. It has excellent image; new outlook. Its design is capable for long-time operation. This microscope adopts advanced structure, such as compensation free binocular head, backward quadruple nosepiece, push-in collector holder, and even illumination system and power switch. This microscope also can have many attachments, to realize bright-field, dark-field, phase-contrast, photographic and fluorescence functions.

I. Main Technical Parameters and Specifications

1. Mechanical tube length :160mm

2. Objectives

(1) CF High Contrast Objectives

Objective	Numerical	Slide Cover Thickness	Working Distance (W.D.)	Working
4X	0. 1	0.17mm	9mm	Dry
10X	0.25	0.17mm	0. 7mm	Dry
40X	0. 65	0.17mm	0.39mm	Dry
100X	1. 25	0.17mm	0. 12mm	Oil

(2) Plan-achromatic Objectives

Objective	Numerical	Slide Cover Thickness	Working Distance (W.D.)	Working
4X	0. 1	0.17mm	6mm	Dry
10X	0.25	0.17mm	3.83mm	Dry
40X	0.65	0.17mm	0.48mm	Dry
100X	1. 25	0.17mm	0.08mm	Oil

3. Eyepiece

● EW10X Eyepiece, View field diameter : Φ20mm

4. Condenser

● Abbe Condenser NA=1.25, with Iris Diaphragm.

5. Mechanical Stage

● Area : 140×140mm

X-movement: Y-movement: 75X50mm

6. Focus Adjustment

● Coaxial Coarse and Fine Focus Adjustment with tighten attachment.

● Division of Fine Focus Adjustment: 0.002mm

7. Interpupillary Distance

● 55-75MM

8. Illuminator

● 6v 30w Halogen Lamp, regular collector or regular collector with field diaphragm.

9. Filtler

● Blue

10. Built-In Power Switch

● 220V 50Hz/60Hz

II. The Specification List of Model NSB-50/DN-20AB/VDN-21A

<table>
<tr><th colspan="3">SPECIFICATION</th></tr>
<tr><td colspan="2" rowspan="2">Microscope main body (including stage, quadruple nosepiece, coaxial coarse and fine focus adjustment, condenser up-down holder, adjustable illumination, halogen lamp and collector)</td><td>regular collector</td></tr>
<tr><td>collector with field diaphragm (Option)</td></tr>
<tr><td colspan="3">Compensation free binocular head inclined at 30˚</td></tr>
<tr><td rowspan="2">Condenser</td><td colspan="2">regular</td></tr>
<tr><td colspan="2">with auxiliary lens (Option)</td></tr>
<tr><td rowspan="5">Objective</td><td rowspan="4">CF High-contrast objective</td><td>4X</td></tr>
<tr><td>10X</td></tr>
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<tr><td colspan="3">High-point and wide-field eyepiece EW10X/20 (pair)</td></tr>
<tr><td colspan="3">Blue filter</td></tr>
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<tr><td colspan="3">Spare halogen lamp (6v30w)</td></tr>
</table>

Note: The eyepiece are one pair each, others are only one piece.

III. Assembly

1. Place the Microscope in the Following Environment.

● Room temperature: 0℃ to 40℃, the maximum relative humidity: 85%.

● High temperature and humidity will cause molds, dew formation and damage.

● Avoid placing the microscope in dusty surroundings. When the microscope is not in use, cover it up with a vinyl cover.

● Place the microscope flat on the place free of vibration

2. Input Voltage Check

● Confirm that the input voltage indication at the rear or the bottom of the microscope corresponds to your line voltage. The use of microscope with the different input voltage indication will cause severe damage to the microscope.

3. Lamp

● The lamp has been fit on the right position before the microscope leaves the factory.

● Lamp and vents are very hot during and right after the illumination. Be careful not to get yourself burnt.

● Use the Halogen lamp bulb only. (Specified Halogen lamp: Rating: 6v30w)

● Change the lamp bulb : The lamp bulb has a certain operating life. Once it is broken, it must be changed. Before exchanging lamp bulbs, turn off the power switch and unplug the power connector. After the lamp is cooling, stand upside down. Pull up the lamp cover and remove the cover. Securely insert the lamp's contact pins into the socket holes. Return the cover to their original place.

Do not touch the glass part of the bulb by bare hands. Wear gloves keep the protecting cover on the bulb during installation. Wipe off any fingerprints or stains using clean cloth moistened with pure alcohol since those burned into the bulb surface will decrease brightness and cause lamp breakage.

4. Eyepiece Tube

● Mount the eyepiece : tube onto the arm, and tighten the clamp screw.(NSB-

50T)

5. Eyepieces

● Insert the eyepieces into the eyepiece sleeves, and tighten the clamp screw.

6. Objectives

● Lower the stage to its full limit, then screw the objectives into the revolving nosepiece

7. Condenser

● The condenser in the center position of the stage should have adjustable margin, it should be moved comfortably.

8. Collector

● The collector has been fit on the right place before the microscope leaves the factory. Turn counterclockwise 45˚, it could be pulled out from the assembling hole of the base.
● Two types of collector are available, one with field diaphragm, and the other without.
● The collector which has the field diaphragm, the field diaphragm is assembled on the condenser base. It could be pulled out and it is convenient for assembling and removing.

9. Filter

● The blue filter could be put directly onto the filter holder in condenser.

10. Power Cord

● Turn Off the power switch before connecting the power cord. (Turn the Brightness control dial toward the rear of the microscope till the limit.) Power cord is of 3-conductor grounding type. Connect on end(socket) to the AC IN connector of the microscope. Connect the other end(plug) to an AC line receptacle with the ground conductor(earth conductor).

FOR 220-240V AREA

- Use only the 3-pole power supply cord that must be approved according to DIN VDE 0625.The plug and the outlet are to be approved according to DIN VDE 0625 respectively.
- Class equipment should be connected to PE (protective earth) terminal.
- In case of using the extension cord, use only the power supply cord including PE wire.

IV. Microscopy

1. Lamp illumination

- Turn the brightness control dial forward to achieve the desired brightness. The brightness is decided by several conditions, such as the contrast of the specimen, the magnification of the objective, the adjustable ability of the eyes etc. It is not suitable if the light is too poor or too strong. Usually do not turn the light to the full brightness. It will shorten the operating life of the bulb when it is under full loading.

2. Focus

- Mount with cover glass facing upwards. Put the specimen in the center of the stage. Use the 10X objective and 10X eyepiece first. To prevent the hit between objective and the specimen, please raise the stage so that the specimen is closed to the objective. Then focus down the stage, during this time you may achieve the focus purpose.
- Slowly clockwise focus the knob rotation in order to let the specimen down. At the same time seek the picture though the 10X eyepiece. At last rotate the fine focus knob to get the clear picture. Then you can change to other objectives so that the specimen wouldn't be damaged.
- The tightness of focus knob has been adjusted before it is sold. If it is too loose, (the stage falls automatically) please counterclockwise rotate the tighten-adjustable ring until it is suitable.

3. Condenser Centering

● The condenser should be co-axial with the objective. At this time:
● The illumination lights will be full of viewfield, especially for 4X objective
● The field diaphragm should be in the center of the viewfield.
● You may adjust the center-control screw to achieve the above purposes.

4. Adjust the Height of the Condenser

● The condenser can be moved up and down by rotating the focus knob of the condenser. When using the high-power objectives, the condenser should be risen. When using the low-power objectives, the condenser should be fallen.
● For the microscope with field diaphragm, close the field diaphragm to its minimum aperture. Focus the field diaphragm image on the specimen surface by moving the condenser up or down. Then open the field diaphragm, you can observe the specimen.

5. Limit the Condenser Holder

● The heighten-pole of the condenser holder is locked before it is sold. Usually you needn't adjust it. It should be under the stage surface for about 0.2mm.
● For suiting different demands, the heighten-pole can be loose with an allen wrench. You can lock it after adjusting at a suitable position.

6. Aperture Diaphragm Adjustment

● This diaphragm is designed for numerical aperture adjustment, not for brightness
● Generally, a good image of sufficient contrast can be achieved with the aperture diaphragm stopped down to approximately 70%-80% of the objective's numerical aperture. To observe the diaphragm image, remove the eyepiece and look down the open tube at the exit pupil of the objective.

7. Field diaphragm Adjustment

(For the field lens unit with field diaphragm)

● Stop down the field diaphragm until the illuminated area closely circumscribes the eyepiece viewfield.
● The field diaphragm is used to control the specimen's illuminated area relative

to the microscope viewfield. If it is opened to a larger aperture than necessary, extraneous light will enter the viewfield, reducing image quality and contrast.

8. Interpupillary Distance Adjustment

- The interpupillary distance label of the compensation free binocular head is on the black round division circle of the up surface. For the demands of different operators, the interpupillary distance range is between 55-75mm so that the pictures in two eyepieces will combine into one.
- The two eyepiece tubes both have the 55~75mm interpupillary distance label. The white dot on the cover plate is the indicating dot of the interpupillary distance. When operating, the indicating numeral on the two tubes should be the same.

9. Diopter Adjustment

- Rotate the diopter ring to make the zero division and the white dot(interpupillary distance) below to be alignment. At this time, it is the zero diopter position.
- For the operator who has different diopter between two eyes, you may adjust the diopter to achieve the fine viewfield in both eyes.

10. Oil-immersion Observation

- The black band around the barrel end of the look objective indicates that it is an oil-immersion type requiring the application of immersion oil between its lens tip and the cover-glass.
- If air bubbles enter the oil layer, a poor image will result. To remove the air bubbles, rotate the revolving nosepiece several times, or apply an additional drop of oil.
- After completing oil-immersion observation, be sure to clean the front lens of the objective and any other parts coated with oil.

V . Troubleshooting Tables

If difficulties should be encountered in the course of operation, and no major instrument malfunctions can initially be detected, please recheck the symptoms, referring to the tables provided below, before contacting the service representative.

1. Optical

Symptoms	Causes	Countermeasures
Darkness at the periphery, or uneven view field brightness.	Revolving nosepiece not in click-stop position (objective not centered in optical path)	Revolve to click-stop position (swing the objective correctly into the optical path)
	Field diaphragm not centered.	Centering
	Field diaphragm closed too far.	Open properly
	Dirt or dust on the lens (condenser, objective, eyepiece, slide).	Cleaning.
Dirt or dust in the view field.	Dirt or dust on the lens (condenser, objective, eyepiece, field lens).	Cleaning.
	Dirt or dust on the slide.	Cleaning
	Condenser position too low.	Correct positioning
Poor image quality (low resolution or contrast).	No cover glass attached to slide.	Attach cover glass.
	Cover glass too thick or thin.	User cover glass of specified thickness. (0.17mm)
	Slide upside-down	Turn over the slide.
	Immersion oil on dry system objective (especially 40X).	Cleaning.
	Dirt or dust on the lens (condenser, objective, eyepiece, slide).	Cleaning.
	No immersion oil used on immersion system objective.	Use immersion oil.
	Air bubbles in immersion oil.	Remove bubbles.
	Unspecified immersion oil used.	Use specified immersion oil.
Poor image quality (low resolution or contrast),	Dirt or dust on the entrance lens.	Cleaning
	Condenser aperture closed too far.	Open properly
	Condenser position too low.	Raise to the position where the field diaphragm image is in focus.

Image dark on one side.	Revolving nosepiece not in click-stop Position.	Revolve to click-stop position.
	Floating specimen.	Fasten securely.
Image shifts during focus.	Specimen rises from stage surface.	Place it stable.
	Revolving nosepiece not in click-stop Position.	Revolve to click-stop position.
Image tinged yellow.	Daylight filter not used.	Use daylight filter.

2. Mechanical

Symptoms	Causes	Countermeasures
Image not focusable with high power objectives.	Slide upside-down	Turn slide over
	Cover glass too thick.	Use cover glass of specified thickness (0.17mm).
High power objective contacts slide when changed-over from low power	Slide upside-down	Turn slide over.
	Cover glass too thick.	Use cover glass of specified thickness (0.17mm).
Specimen image movement unsmooth.	Mechanical stage not securely fastened.	Tighten all fasteners.
Binocular images not integrated.	Interpupillary distance not correctly adjusted.	Adjustment.
Excessive eye fatigue.	Incorrect diopter adjustment	Correct adjustment.
	Inadequate brightness or illumination.	Adjustment brightness with control dial.

3. Electrical

Symptoms	Causes	Countermeasures

Lamp does not light when switched ON.	No electrical power	Check power cord connection.
	Lamp bulb not inserted	Insert correctly.
	Lamp failure.	Replacement. If the same symptom occurs after replacing the lame, Contact your dealer.
Sudden lamp failure.	Unspecified lamp bulb used.	Replace with specified lamp bulb. If the same symptom occurs after replacing the lamp, contact your dealer.
Insufficient illumination brightness.	Unspecified lamp bulb used	Replace with specified lamp bulb
	Voltage too low.	Increase brightness with control dial.
Flickering, or unstable lamp brightness.	Lamp bulb about to fail.	Replacement.
	Lamp bulb not correct inserted into socket.	Check for positive connection.

VI. Care and Maintenance

1. Cleaning Lenses

- Dust is best removed with a soft brush or gauze.
- More persistent dirt, such as fingerprints, grease and oil, may be removed with soft cotton, lens tissue, or gauze lightly moistened with absolute alcohol (ethyl alcohol or methyl alcohol).
- To clean immersion oil off the oil-immersion type objective, use lens tissue, soft cotton or gauze lightly moistened with petroleum benzene only. If petroleum benzene is not available, use methyl alcohol. In this case, you need to wipe three or four times because the detergency of the methyl alcohol is somewhat weak.
- Do not use petroleum benzene to clean the entrance lens at the bottom of the eyepiece tube or prism surfaces inside the eyepiece tube.
- Absolute alcohol and petroleum benzene are quite inflammable. Take great

care when handling them and when setting the power switch on and off. Be very careful with fire.

2. Cleaning Painted or Plastic Surfaces

- Avoid use of any organic solvents (such as alcohol, ether, thinner, etc.) to clean the painted or plastic surfaces of the instrument. We recommend the use of silicon cloth. More persistent dirt may be cleaned with mild detergent solution.
- Printed plastic surfaces should be cleaned only by soft cloth moistened with water.

3. When not in Use

- When the microscope is not in use, cover it up with a vinyl cover, and store it in a dry place not subject to mold.
- When especially recommend that the objectives and eyepieces be kept in a container with desiccant in it

4. Periodical Inspection

- To maintain the performance of the microscope, periodical inspection is recommended.

품 질 보 증 서

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제 품 명	디지털생물현미경	보 증 기 간	
모 델 명	VDN-21A	1년	
제 조 번 호	SW-013485		
구 입 자 주 소			
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