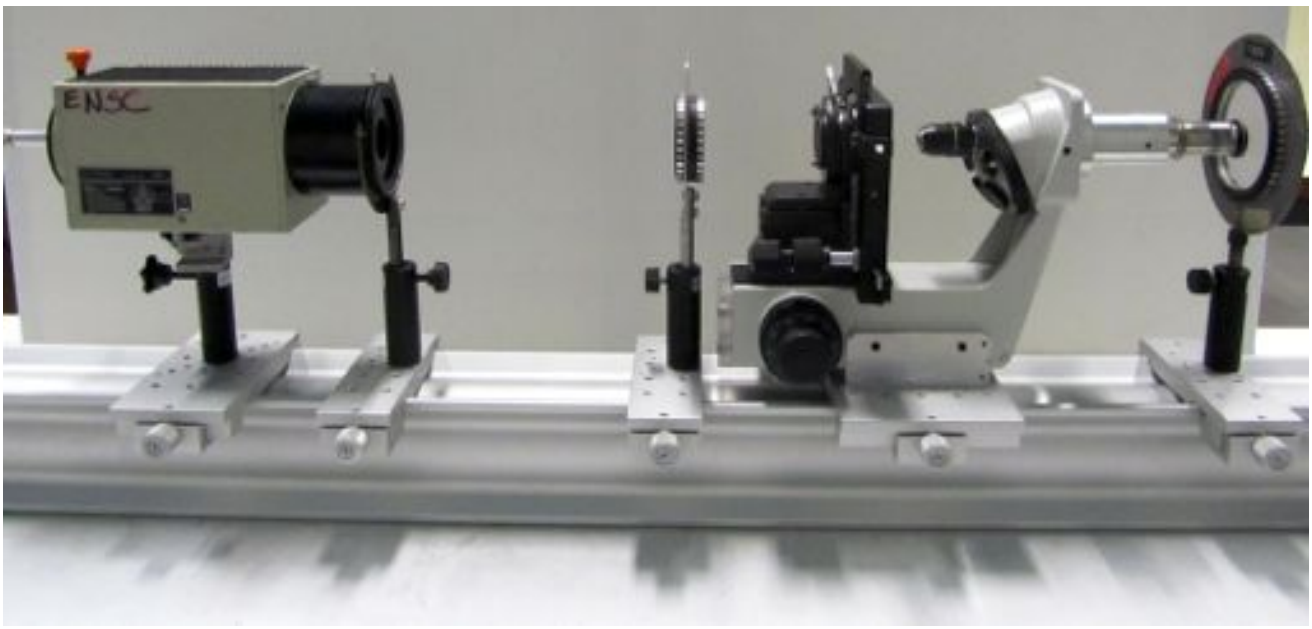
notice 0.68

Microscope sur banc, avec éclairage de Kholer



Notice simplifiée, à destination des oraux de l'agrégation.

1- matériel inclus
2- intervalle optique
3- réglage de l'éclairage

1- Matériel inclus

Cet ensemble comporte :
- un banc (Newport, X-95)
- une lanterner quartz-Iode (spindler-Hoyer, 030-123), avec un condenseur + cavalier X-95.
- un diaphagme + un cavalier X-95 permettant de diaphragmer le condenseur de la lanterne
- un cavalier X-95 permettant d'installer un filtre anti-calorique
- un microscope, avec condenseur d'Abbe centrable, monté sur cavalier (modèle MOTIC B3-220)
- un objectif *10/0,25, norme DIN
- un tube spécial, réglable en longueur
- un oculaire gradué(spécialement associé à ce tube), WF (champ large). La mire de l'oculaire a une longueur totale de 10,00 mm (une graduation tous les 1/10 de mm).
- un cavalier X-95 permettant d'installer une lentille convergente en sortie du microscope, soit pour constituer un oeil artificiel, soit pour imager différents diaphragmes du microscope
- une mire (Nikon) avec une graduation tous les 1/100 de mm (objet à observer).
- un composant comportant trois petits réseaux 100, 300 et 600 traits/mm. Le format du composant permet de l'installer sur le microscope facilement, afin qu'il constitue l'objet à observer.

- une clef 6 pans 1,27 mm pour la vis de serrage du tube.
- un doublet +1000, monté sur tige

Tous les composants de cet ensemble sont marqués "microscope 2" ou "mic. 2"

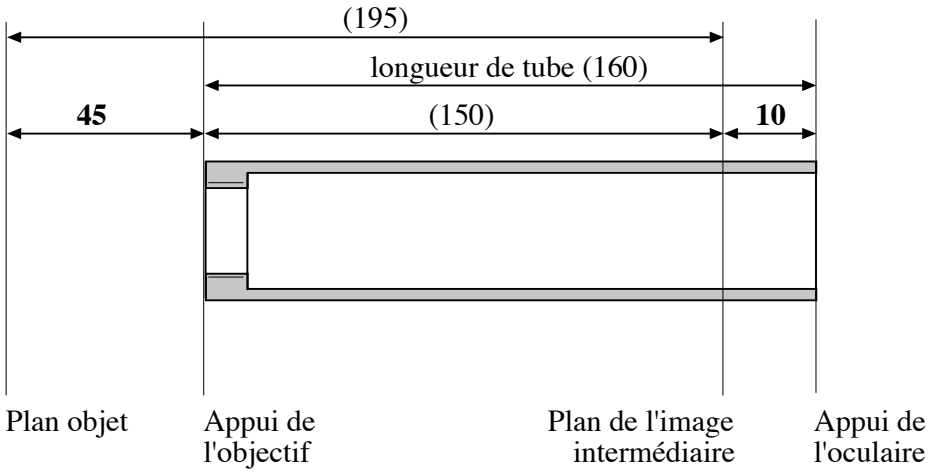
Pour être utilisé, il est nécessaire de compléter cet ensemble par :
- un filtre anticalorique.
Un filtre standard de la collection d'optique de l'ENS de Cachan convient (diamètre 50 mm, monté sur tige diam 10mm, hauteur entre le centre de l'optique et le bas pied au moins égale à 170 mm).
- une alimentation pour la lanterne (transformateur 220v-> 12V 100W)

Ce matériel pourra en outre être complété par :
- un doublet de +100, et un de +200 (visualisation des diaphragmes de l'instrument).

2- intervalle optique

- la longueur du tube est réglable. Ce tube est gradué :

Par exemple ici, la graduation correspond à 155 mm
Dans ce cas (si la graduation vaut 155) tout se passera comme si on utilisait un microscope de norme DIN (longueur de tube de 160 mm ; oculaire tel que l'image intermédiaire est située à 10 mm de l'épaulement ; voir figure ci-dessous).
Si l'on utilise un objectif prévu pour la norme DIN (c'est le cas ici), on obtient alors un grandissement qui correspond à l'indication gravée sur l'objectif.



Principales longueurs d'un microscope normalisé (en mm).

Remarquer que l'intervalle optique Δ du microscope n'est pas directement égal à la longueur du tube. On a Δ= longueur du tube + cste (cste > 0 ou <0).
Si l'on souhaite remonter à la focale de l'objectif, la longueur connue est la distance totale objet/image intermédiaire (195 mm), et non l'intervalle optique.

Enfin, il est possible de faire varier la longueur du tube.

Rqes :
- Si la graduation lue est 155, tout se passe comme si l'on avait à faire à un microscope de norme DIN (voir ci-dessus). Mais, en fait, ce microscope ne correspond pas à cette norme : l'oculaire est spécifique à ce tube (la distance épaulement-image intermédiaire ne vaut pas 10 mm). On veillera donc à ne pas dé-solidariser cet oculaire de ce microscope.
- Avec un oculaire normalisé, si l'on veut travailler dans les conditions standard, il faut que la longueur de tube vaille 160 mm. Pour cela, il faut se placer sur la graduation 157.

3- Réglage de l'éclairage.

(description succincte, tirée de la notice fabricant du microscope motic B3-220)

a- positionner la lanterne pour que son axe soit à peu près parallèle au banc et à la même hauteur que l'axe du microscope.

b- faire l'image du filament au niveau du diaphragme du condenseur.
Centrer cette image sur le diaphragme à l'aide du réglage x-y de position de l'ampoule (deux vis à l'arrière de la lanterne).

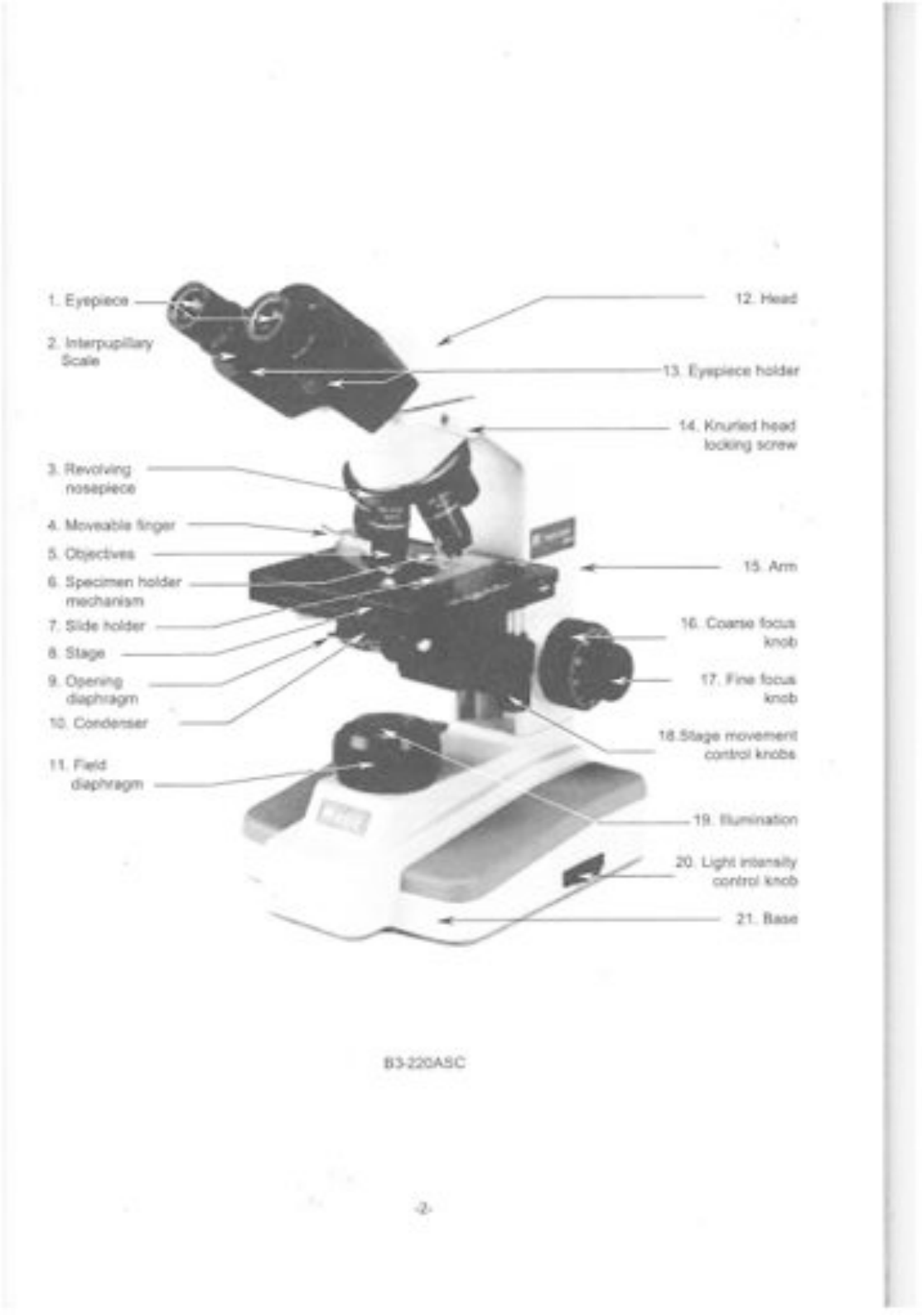
c- Observer un objet quelconque à travers le microscope. Régler alors le condenseur du microscope (x, y et z) pour que l'image du diaphragme de la lanterne se forme dans le même plan que l'objet à observer, et soit bien centrée au milieu du champ visible.
Pour ce réglage, ne pas hésiter à fermer le diaphragme de la lanterne. Le centrage (x-y) du condenseur se fait en ajustant les deux vis de réglage (tournevis nécessaire) située de part et d'autre du condenseur.

d- Reprendre éventuellement légèrement le réglage b (le condenseur ayant un peu bougé lors du réglage c).

Une fois ces réglages effectués, le diaphragme du condenseur du microscope constitue le diaphragme d'ouverture de l'éclairage. Tandis que le diaphragme de la lanterne constitue le diaphragme de champ de l'éclairage.

RQE : ce microscope est initialement conçu pour être utilisé verticalement. En position horizontale, on est plus sensible au jeu présent dans la crémaillère de translation du plateau. Cela explique l'hystéris dans le réglage fin de mise au point , et de petits désagréments (perte de mise au point) survenant parfois lors du réglage du condenseur.

annexe : Notice Motic



Introduction

Thank you for your purchase of a Motic microscope. Motic microscopes are precision instruments, subjected to meticulous examination in order to reach you in perfect condition. Their design combines easy management and optimum functioning with minimum maintenance.
The information contained in this manual is likely to go beyond what the average user needs to know to use the microscope. However, it is provided to answer any queries that may arise.

Your new microscope combines high performance features, with an excellent degree of optical resolution and clarity of image. It incorporates a mechanical stage that provides a travel range of 70mm x 50mm, in X and Y directions with a graduation of up to 0.1 mm, thus permitting the perfect positioning of the specimen. Also included are objectives located on a dial bearing nosepiece allowing movement in both directions; a precision coarse and fine focusing system; a removable Abbe condenser with a numerical aperture of 1.25 N.A. and a built-in 12V 20W halogen variable light source.

These instructions should be read carefully before operating the microscope. They will permit you to use your new microscope to its fullest capabilities. Terminology used to describe components and controls can be found in the diagram on page 2.

These instructions are based on the assembly and use of the B3-220 (Binocular) with additional notes applying specifically to other models in the series.

Unpacking

All components of the microscope have been carefully packed to make sure they reach you in perfect condition. We recommend that you do not discard any packing containers in case you need to return the microscope or store it for long periods of time, or should it become necessary to transport it to a technical service for any repair, or maintenance procedure.

The box should contain the following components, depending on the model:

- B3-220 (Binocular): Stand, Power cable, monocular head, two eyepieces, two eyepiece protectors, four objectives, condenser, sample holder mechanism, blue, green and yellow and frosted filters, fuse, dust cover, a bottle of immersion oil and a 2mm hexagonal key.
- B3-223 (Trinocular): Stand, Power cable, trinocular head, two eyepieces, two eyepiece protectors, four objectives, condenser, sample holder mechanism, blue, green and yellow and frosted filters, fuse, dust cover, a bottle of immersion oil and a 2mm hexagonal key.

Remove, and handle the microscope and all its components with extreme care.

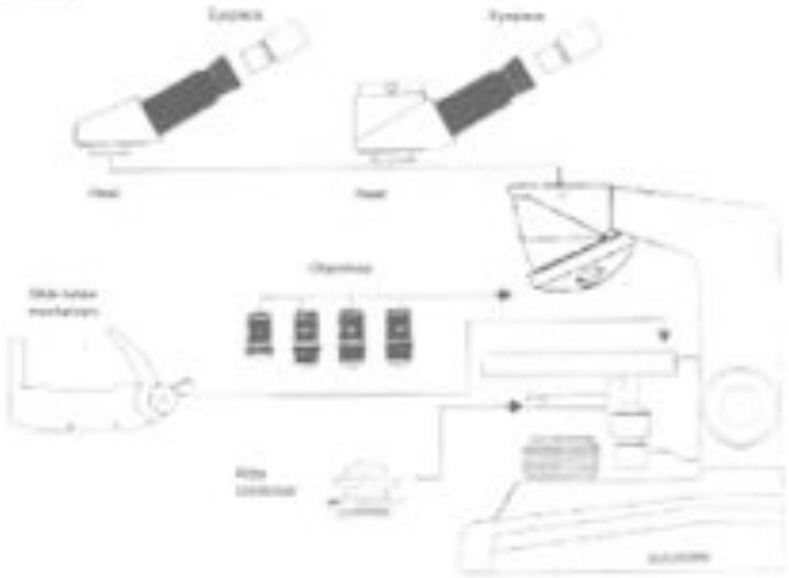
Avoid touching the lenses of the optical elements and keep clear of contact with dust, water or other contaminating agents, as they could stain, or damage the lens surface and affect the quality of the image.

A. Place the microscope in an upright position on a flat, stable and clean surface.

B. Unscrew the black plastic protectors from the revolving nosepiece (3).

C. Remove the rest of the components from the box.

Assembly



All the steps described for the assembly of the microscope must be undertaken with extreme care, and without forcing the placement of the distinct parts and elements of the microscope.

A. Condenser (13)

a. Turn the coarse focus knob (16) until the stage (8) is in its highest position.

b. Turn the focusing knob on the condenser (Fig.1), until the condenser holder reaches its lowest position.

Fig.1

c. Unscrew the locking screws that also center the condenser (Fig. 2).

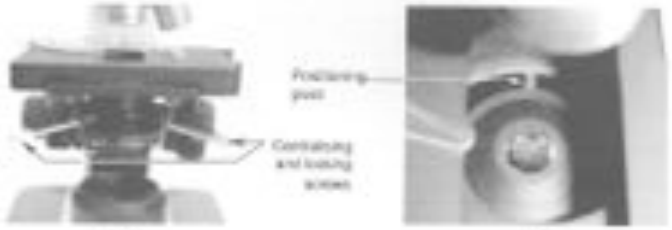


Fig. 2

Fig. 3

d. Insert the condenser in the support, so that the slot on the collar lines up with the positioning pivot. (Fig. 3)

e. Tighten the locking screws and centralise, until well supported and turn the focusing knob of the condenser until it is in its highest position.

B. Specimen holder mechanism (6): Turn the coarse focus knob (10) until the stage (8) reaches its lowest position. Unscrew the two locking screws (Fig. 1) of the specimen holder mechanism. Place the mechanism on the stage with the moveable finger pointing upwards (4) so the holes on the mechanism line up with the locking screws. Tighten locking screws firmly.

C. Objectives (5): Ensure that the revolving nosepiece (3) is well positioned: i.e. that it does not revolve freely, but rotates until a "click" is heard, showing that it is secure in place. Place objectives, starting with the lowest magnification 4X in any of the holes in the revolving nosepiece. Next, place that of the second lowest magnification 10X in the hole alongside, and so forth the 40X objective, and finally the 100X objective can be placed.

D. Head (12): Loosen the knurled locking screw on the head (14) and remove the protective cover on the collar where the head is placed. Insert the head, until it is well supported on the stand (16). Although the head can be placed in any position, we recommend for your comfort that the eyepiece tubes (11) face forward on the microscope. Firmly re-tighten the knurled locking screw.

E. Eyepieces (1): Remove the protective covers on the eyepiece tubes (13). Gently place the eyepieces in the tubes without touching the lens surface.

F. Filter: Place the blue filter on the illuminator (19). Make sure that the filter is well positioned.

G. Power cable: Insert the power cable in the connector situated in the lower back part of the microscope. (Fig. 4)

Warning: Before connecting the microscope to a power source, make sure that the voltage coincides with that of the microscope.

Operation

A. Starting Up

1. Before using the microscope, adjust the light intensity control (23) to minimum position. This should be repeated every time the microscope is switched on or off to avoiding the use of the bulb.
2. Switch to position ON. (Fig. 4)
3. Turn illumination control until the image is luminescent.
4. Light intensity must be adjusted according to the objective used (5), or the type of preparation to be observed.

B. Interpupillary adjustment of head:

1. Look through the eyepieces (1) move the eyepiece holder tubes (13) by rotating them on their axis.
2. When the field of vision is complete through both eyepieces, ie. that the two images unify into one, interpupillary distance is correct.
3. Each person may have to adjust interpupillary distance to receive the same image.

C. Focusing the microscope:

1. Rotate the nosepiece (3) and place the 10X objective (5) in the optical path, making sure that it correctly clicks into place.
2. Rotate the coarse focus knob (10) until the stage (8) rests in its lowest position.
3. Place a microscopic sample on the stage, make sure the cover slip faces upwards.
4. Using the moveable finger (4) on the mechanism (6), support the slide against the side holder (7) and gently release the moveable finger, until the slide is well supported.
5. Ensure that the sample on the slide is in the optical path, to do so, move the stage using the knobs controlling the X/Y movement of the stage. (18)
6. Looking through the eyepiece (1), turn the coarse focus knob until the preparation appears in-focus.
7. Readjust the focus with the fine focus knob (19) until the image appears sharply defined.

D. Adjusting diopter for differences in eyesight:

1. With your right eye, look into the right eyepiece tube (1) and adjust the sharpness of the image using the fine focus knob (19).
2. With your left eye, looking through the left eyepiece, adjust the focus by rotating the diopter corrector (2) on the left hand eyepiece tube until the image is sharp. Do not use the fine focus knob.

E. Abbe illumination.

The ideal kind of illumination when all illumination elements are brought into proportion, basically, by the condenser and the field diaphragm.

1. Focus on a sample with the 10X objective (5).
2. Close the field diaphragm (11) turning the ring situated on the illuminator (16), until it appears in the field of vision.
3. Next, focus the field diaphragm, moving the condenser (15) using its focusing control (Fig. 1). Do not use the coarse (14) or the fine focus control knobs (17).

   NB: The focus of the field diaphragm is not completely sharp, although it can be adjusted to the maximum possible.
4. Center the condenser using the locking and centering screws (Fig. 2). As a consequence, the field diaphragm will be centred.
5. Once field diaphragm is focused and centred, open the diaphragm just enough so that the field of vision disappears. It must not be fully opened if optimum illumination is to be obtained.

   NB: For each objective used, the field diaphragm must be opened to a different degree. If anything irregular appears in the field of vision, an element of the illuminator or filter for example, appears in focus, move the condenser just enough to remove it from view.

F. Adjusting the opening diaphragm.

The opening diaphragm (9) must not be used to regulate light intensity. Its function is to obtain the best resolution possible of the object, and proportion best image contrast. The less the iris is opened, the better the image contrast, although reducing the opening too much will worsen image contrast. The best means of finding the best image contrast is to experiment with the size of the opening. Suggested apertures (openings) are as follows:

OBJECTIVE:	IRIS APERTURE:
4X	Totally closed to 1/8 open
10X	From 1/8 to 1/4
40X	From 1/4 to 1/2
100X	From 1/2 to 3/4

G. Changing magnification:

1. Position the 10X objective (X) in the optical path.
2. This microscope arrives particularised, although it is possible that small differences exist between objectives. If so, readjust slightly using the fine focus knob (10).
3. When the 40X and 100X objectives are changed, it must be done with suitable care, in particular making sure that the objectives do not make contact with the slide as this could damage the objective front lens.
4. To obtain maximum resolution with the 100X objective, it is necessary to apply immersion oil between the slide and the front lens of the objective.
   a. Use a very small amount of immersion oil, a tiny drop should be enough.

   b. If air bubbles appear, they can be removed by moving the revolving nosepiece (3) slightly back and forth.
   c. After using the microscope, all parts that have come into contact with immersion oil must be cleaned. Using a soft cotton cloth lightly dampened with Xylene. If the 100X objective is not cleaned, oil could dry on the lens surface resulting in the lens being blocked, and possible damage occurring. This must be repeated each time the microscope is used.

NB: Immersion oil must ONLY be used with the 100X objective, which is the only objective prepared for it. If any other objective comes into contact with immersion oil, it must be cleaned immediately.

How to adapt a photographic, or a video camera. (Only for B3-223 model)

Model B3-223 comes equipped with a vertical port on the top of the head that permits the attachment of a photographic, or reflex type camera through use of the corresponding adaptors.

The two position sliding rod allows the microscope image to appear visibly through the front part.

- When the rod is pushed completely into the head, 100% of the image is directed to the binocular eyepiece for observation.
- In the extended position, 20% is directed to the binocular eyepiece, and 72% to the vertical port.

A. To adapt a photographic camera, an adaptor tube is required (Fig. 5). This tube includes a 2,5X lens for photography which measures the particularity correctly between the images of the binocular and vertical ports. The adaptor tube also requires a T mount adapter to fit the T threads of all photographic camera brands on the market.

Fig. 4

1. To install the camera on the microscope, first extract the removable lens on the camera, and place the appropriate T thread. Then attach the adapter tube to the thread.
2. Loosen the knurled screw located on the side of the vertical port until the protective cap can be removed. (Fig.6).
3. Insert the adapter tube with the camera already connected to the vertical port. If it does not fit easily, unscrew the knurled screw until the adaptor tube fits in and is firmly in place.
4. Tighten the knurled screw to secure the camera well.
5. Place the sliding rod to not or extended position so that the image can be projected to the photographic camera.
6. Operate the camera according to manufacturers instructions.

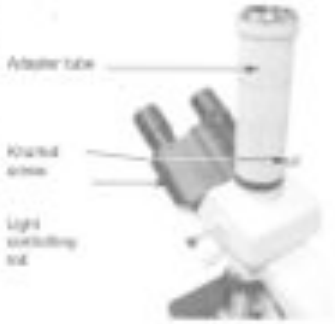


Fig. 5

B. To adapt a video camera, an adapter tube is required. (Fig. 6). This adapter includes a 0.5X lens for videos that measures the correct particularity between the images of the binocular and vertical ports shown on an image on the TV monitor. The adapter tube also includes a "C" knurled ring and a "CS" type ring to accommodate different types of video cameras.

1. To install the camera to the microscope, screw the adapter tube to the video camera.
2. Loosen the knurled screw (Fig. 6) located on the side of the vertical port of the head, until the protective cap can be removed.
3. Insert the adapter tube with the camera already connected to the vertical port. If it does not connect easily, unscrew the knurled screw until the adapter tube fits in, and is secure in place.
4. Tighten the screw, to secure the camera.
5. Place the viewing out, to mid or extended position to allow the image to be projected to the camera.
6. Operate the camera according to the manufacturers instructions.
7. If the image on the TV monitor does not appear in focus when the objective is changed, this is possibly due to the "CS" mount. Place it, or remove it, according to the procedure to obtain particularity.

Maintenance

WARNING: FOR YOUR SECURITY, SWITCH OFF AND REMOVE PLUG FROM POWER SOURCE OUTLET BEFORE MAINTAINING YOUR MICROSCOPE IN ORDER TO AVOID SHOCK OR FIRE HAZARD.

CONSULT YOUR DISTRIBUTOR IF YOUR MICROSCOPE REQUIRES ANY MAINTENANCE OR REPAIR PROCEDURE NOT COVERED IN THIS INSTRUCTION MANUAL.

A. Optical Maintenance

1. Do not attempt to remove any optical components.
2. Before cleaning any lens, remove surface traces of dust using a fine brush, especially for lenses, or with low pressure. Both can be obtained in any photography shop.
3. Cleaning the eyepieces

   a. Do not remove the eyepiece (1) from the eyepiece tube (10).

   b. Only clean the lens surface, misting the lens with breath.

   c. Afterwards, dry the lens with special lens paper in circular movements, from center out to the exterior of the lens. Do not wipe the lenses when dry, as they can be easily scratched.
4. Cleaning the objectives

   a. Do not remove the objectives (5) from the microscope.

   b. Only clean the surface area. Use a soft cotton cloth dampened with Xylene. Dry the lens using the same cloth.

5. Cleaning the condenser

   a. Only clean the top lens surface of the condenser (12) using any of the methods mentioned above for cleaning the eyepieces or objectives.

6. Cleaning the illuminator lens

   a. Only clean the top lens of the illuminator (16) using any of the methods mentioned above for cleaning the eyepieces or objectives.

B. Electrical maintenance

WARNING: FOR YOUR SECURITY, SWITCH OFF AND REMOVE PLUG FROM POWER SOURCE OUTLET BEFORE MAINTAINING YOUR MICROSCOPE IN ORDER TO AVOID SHOCK OR FIRE HAZARD.

1. Changing the bulb

   a. Lay the microscope on its side taking extreme care, especially with the eyepieces (1) and the specimen stage holder mechanism (9).

   b. Unscrew the screw marked by the arrow (Fig. 7).

   c. Open the cap where the bulb is located.

   d. With a cloth, carefully grasp the bulb and pull it out to disconnect it from the socket.

   e. Do not touch the replacement bulb with fingers, use a clean cloth to insert the pins of the bulb into the socket.

Fig. 6

   f. If bulb is touched accidently, it must be cleaned as this could affect the transmission of light and duration of the bulb.

   Replace the cap, and screw down firmly.

2. Changing the fuse

   a. With a flat screwdriver, press lightly on the slot on the fuse cap (Fig. 6) and turn 1/4 in the direction of the arrow indicated.

   b. Release pressure and the fuse cap should be able to be removed easily. Remove it completely.

   c. Remove the fuse by pulling it out, and insert the new one. Ensure that a 3.5 amp fuse is being used.

   d. Replace the fuse cap.

   e. Repeat step (a.) this time 1/4 in the opposite direction of the arrow indicated. The cap should be well closed.

C. Mechanical maintenance.

1. Adjusting the tension of the coarse focus control.

The tension adjustment control (Fig. 8) is located between the coarse focus knob (10) and the arm (12). The coarse focus knobs comes pre-adjusted by the manufacturer. The ideal tension point is that which permits coarse focus knob to move as loosely as possible, without the stage (8) moving down on its own.

a. To tighten the focussing controls of the coarse focus knob, the ring must be turned in an anti-clockwise direction, as indicated by the arrow. To loosen it, the ring must be turned clockwise.

Fig. 7

2. Adjusting the stage stopper

The 40X and 100X (colored) objectives incorporate security measure in that the lens tip recesses to avoid damage to the front of the lens should it come into contact with the slide. An additional measure of security consists of an adjustable stopper on the ascending movement of the stage. The stopper comes pre-adjusted by the manufacturer for standard slides with cover slips 0.17mm thick. For observing other types of samples, however, it may become necessary to readjust the stage stopper.

a. Loosen the stage stopper screw (Fig. 8) with a 2mm hexagonal key.

b. Focus on the sample using only the fine focus knob (9) with firstly the 4X objective, and 10X objective.

c. Tighten the stage stopper screw until firm enough for the stage is supported, and cannot descend further.

Troubleshooter

ELECTRICAL

PROBLEM	CAUSE	SOLUTION
Bulb does not work.	Plug outlet does not work Cable not connected Bulb burned out Fuse blown Wrong bulb	Repair by a qualified specialized technician Connect cable Replace bulb Replace fuse Replace by the correct bulb
Bulb burns out in short time	Voltage too high.	Reduce light intensity to a minimum before turning the microscope on or off.
Bulb burns out immediately	Wrong bulb	Replace with the correct one.
Bulb flickers.	The bulb is not correctly inserted into the socket. Bulb about to burn out Fuse holder not locked into proper position. Loose connection at plug outlet	Insert correctly. Replace bulb Close correctly. Repair by a qualified specialized technician.
Fuse blows in short time	Wrong fuse.	Replace with the appropriate fuse
Fuse blows immediately	Short circuit	Repair by a qualified technician

IMAGE QUALITY

PROBLEM	CAUSE	SOLUTION
No image.	Nosepiece not positioned properly. Image too bright	Turn until clicks into place. Reduce the intensity of the light.
Poor resolution.	Dirty objective. Dirty eyepiece. Slide upside down. Wrong cover slip used with slide. Light too bright. Dirty condenser.	Clean objective. Clean eyepiece. Replace the slide with the cover slip facing upwards. Use 0.17mm thick cover slips. Reduce light intensity or adjust the diaphragm aperture. Clean condenser.
Spots in field of view	Dirty eyepiece. Dirty slide. Dirty condenser.	Clean eyepiece. Clean preparation. Clean condenser.
Uneven illumination of field.	Nosepiece not positioned properly. Diaphragm aperture not sufficiently open.	Turn until it clicks into place. Adjust appropriately.

MECHANICAL

PROBLEM	CAUSE	SOLUTION
It does not stay in focus.	The stage is sliding down on its own.	Adjust the tension of the coarse focus knob.
It does not focus.	The stopper on the ascending movement of the stage needs adjusting.	Readjust the stopper.

Moving the microscope

- Avoid moving the microscope if possible.
- Carry the microscope in both hands, with one hand holding the arm (10), and the other supporting the base (21).
- Keep the microscope in an upright position.

Repairs

If the microscope needs repairing, or revision by authorised personnel, we would recommend that it be stored in its polystyrene box and returned to the distributor. Attach a note with a description of the problem, or details of the required revision.

Warranties

All MOTIC microscopes are warranted against any manufacturing defect for a 5 year period. Damage occurring by any unauthorised repair work, or occurring through misuse or modification of the microscope will not be included under the conditions of the warranties. Bulbs and fuses are not under warranties.

The warranties service is provided by MOTIC, or its authorised distributors. Defective products will be repaired free of charge when returned to MOTIC, or one of its distributors. Transport costs will be covered by the purchaser.

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