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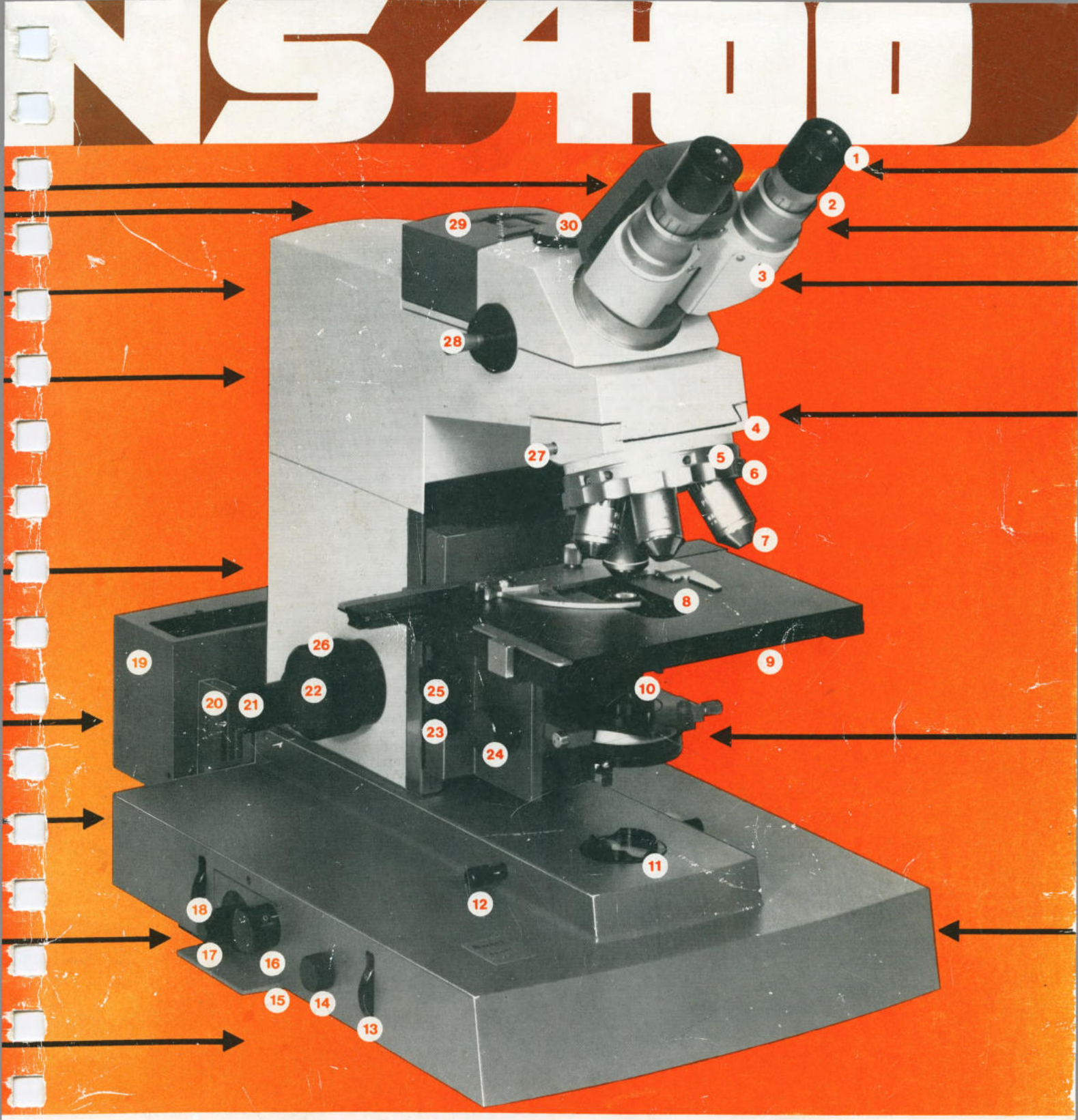
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NS400



1 Eyepiece
2 Focusing Eyepiece Tube
3 Binocular Body
4 Objective Changer Bracket
5 Objective centering screw
6 Objective Changer
7 Objective
8 Specimen carrier
9 Stage
10 Substage
11 Illumination Window
12 Field iris centering controls
13 Field lens
14 Field iris control
15 Phase annuli unit
16 Phase annuli selector
17 Phase annuli centering controls
18 Aperture iris diaphragm
19 Q.I. Lamp Housing
20 Filter Holder
21 Fine focusing control
22 Coarse focusing control
23 Stage traverse control (East-West)
24 Substage focusing control
25 Stage traverse control (North-South)
26 Coarse focusing tension Lever
27 Analyser Slide
28 Beam Splitter
29 Transfer optics unit
30 Exit port for Photography and Projection

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LEAFLET 1864 A

NS 400 MICROSCOPE
INSTRUCTION MANUAL

Before assembling the microscope read carefully the following instructions.

Care should be taken to ensure that any items packed separately in the case are not discarded with the packing materials. Check that all items delivered conform to the packing note.

Part 1. Assembling the microscope

Part 2. Use and application of common accessories

Part 3. Use in normal and polarized transmitted light

Part 4. Phase Contrast

Part 5. Interference Contrast (transmitted light)

Part 6. Dark Ground (transmitted light)

Part 7. Fluorescence (transmitted and incident light)

Part 8. Incident light, normal, polarized and CIN

Part 9. Interferometry in incident light

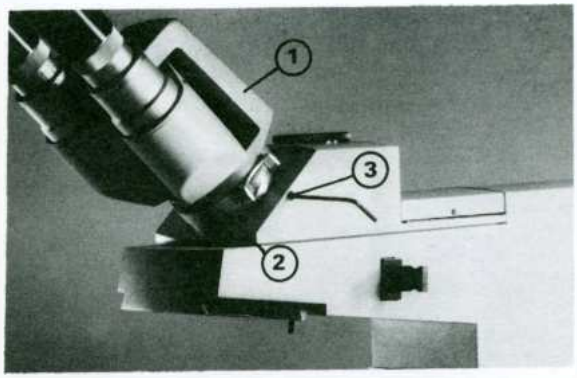
Part 10. Photography

Part 11. Projection head

Part 12. Maintenance and cleaning

Part 13. Miscellaneous (Lamp Q.I. - C.S.I. etc.)

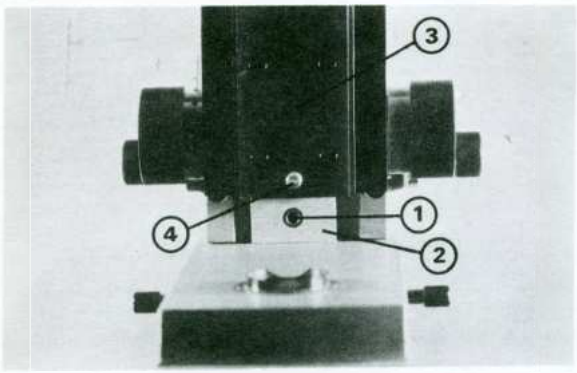
NS 400 MICROSCOPE
ASSEMBLING THE MICROSCOPE



BINOCULAR HEAD

Transmitted-Incident Light

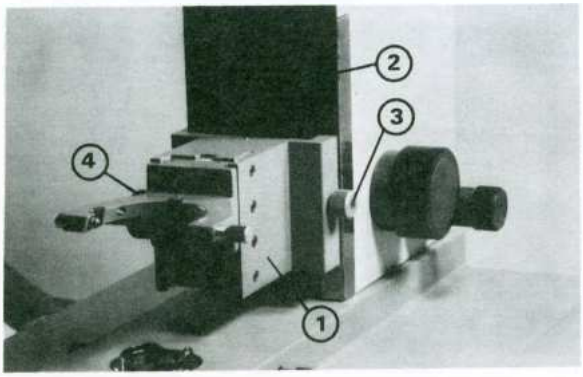
Insert the binocular head (1) into the socket fitting (2) of the microscope limb and clamp with screw (3).



FOCUSING MOVEMENT SUPPORT BLOCK

Transmitted-Incident Light

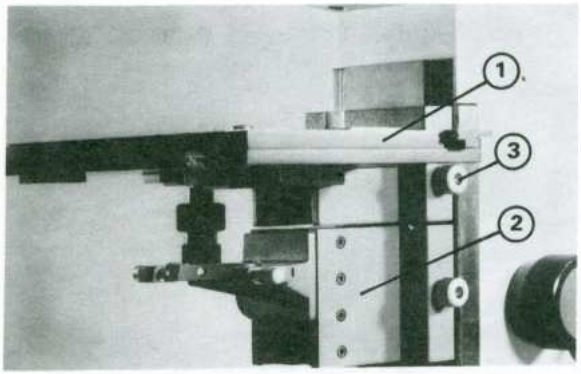
The block has been placed in the substage in order to protect the focusing movement during transport. Release screw (1) securing the wedge (2) holding the focusing block (3) by the stop pin (4). Lower gently to avoid damage to the focusing mechanism.



SUBSTAGE

Transmitted light

Attach the substage assembly (1) to the focusing block dovetail slide (2) ensuring that it rests on the stop pin (see (4) photo 2) and secure with milled clamp screw (3). Rack down the substage by means of focusing knob (4).



STAGE

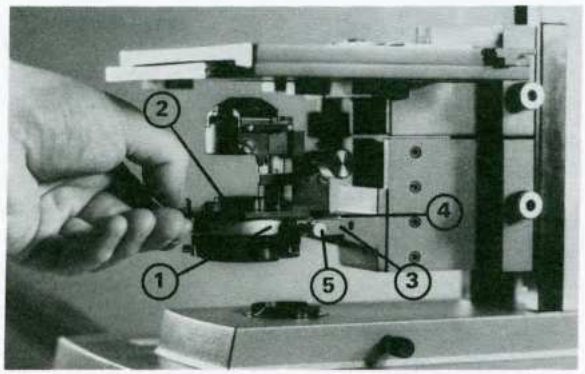
Transmitted light

Attach the stage (1) in the same way as above allowing it to rest on the substage assembly (2) and secure with milled clamp screw (3).

STAGE

Incident light

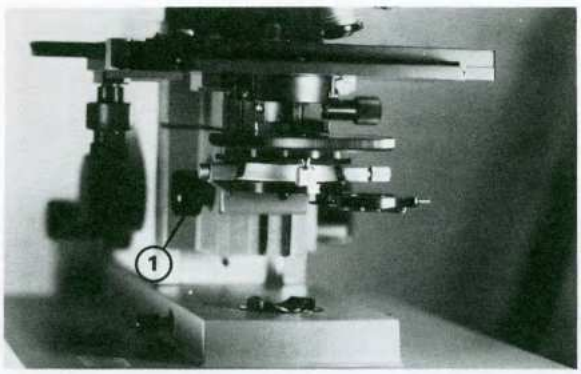
Attach the stage (1) to the focusing block dovetail slide and secure with clamp screw (3).
In incident light the absence of the substage assembly allows the stage to be locked in any position on the focusing block dovetail slide allowing larger specimens to be accomodated.



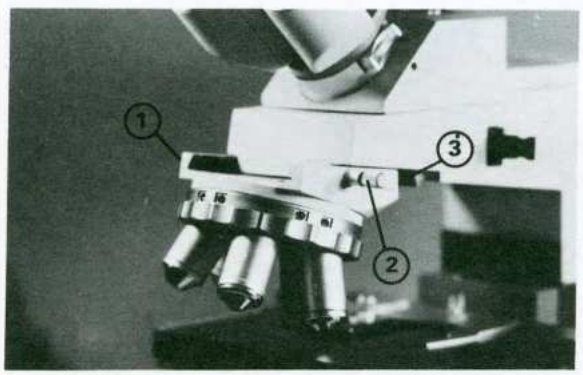
UNIVERSAL CONDENSER

Transmitted light

Slide the cone fitting (1) of the universal condenser (2) into the substage fork (3) ensuring that its slot engages on to the locating pin situated at the centre of the fork (4). Gently lock in position with the milled clamp screw (5).



Rack the substage up to its highest position by means of the condenser focusing (1).

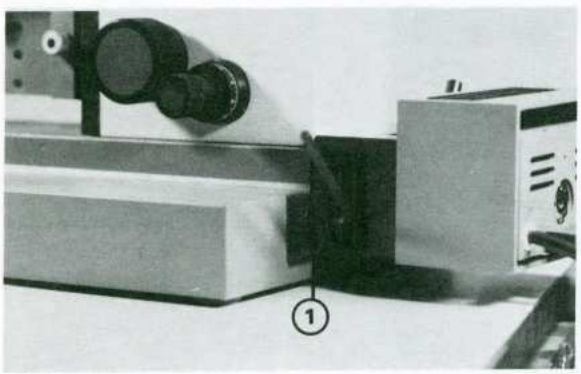


OBJECTIVE CHANGER

Transmitted-Incident Light

IMPORTANT. NEVER TOUCH THE OBJECTIVES WHEN HANDLING THE OBJECTIVE CHANGER.

Fully lower the stage by means of the coarse focusing knob. With the clamp screw (2) to the right, slide the objective changer bracket (1) fully home on to the dove-tail. Lock in position with the milled clamp screw (2) avoiding undue force.



LAMP HOUSING

Transmitted Light

Attach the lamp housing to the rear of the microscope base ensuring that the locating ring is engaged into the recess. Secure by two screws (1) on each side of the housing.

LAMP HOUSING

Incident light

Attach the lamp to the top rear of the limb taking care to insert between the limb and lamp flange the fibre isolating washers supplied with the four fixing screws.

NS 400 MICROSCOPE
USE AND APPLICATION OF COMMON ACCESSORIES

Q. 1. BULBS 12 V. 100 W		
Voltage	Mean life	Colour temperature
9,5 V	1000 h	3000° k
10 V	400 h	3050° k
10,5 V	250 h	3100° k
11 V	150 h	3175° k
11,5 V	100 h	3250° k
12 V	50 h	3300° k

TRANSFORMER 12 V 100 W

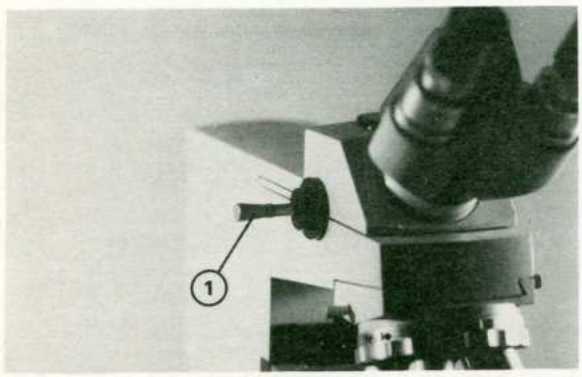
When switching on the transformer turn the rheostat control to its lowest setting before increasing the voltage. This will ensure a longer bulb life.
Switch the 6V-12V voltage selector to the 12 V position. Turn the lamp on by switching to position M.
Rotate the rheostat control to regulate the light intensity. Do not go beyond 12 V.

HALOGENE BULB 12 V 100 W

The light source is a low voltage 12 V 100 bulb operated through a transformer.
At 9. 5 V the life of the bulb is greatly prolonged.
Below 9. 5 V a blackening of the bulb will occur.

IMAGE BRILLIANCE

Image brilliance will depend on the method of observation and the type of specimen being studied and is controlled by regulating the rheostat and inserting neutral density filters N°. 1 and N°. 2 in the Lamp filter holder. For comfortable viewing the use of the yellow-green filter N° 4 is recommended.

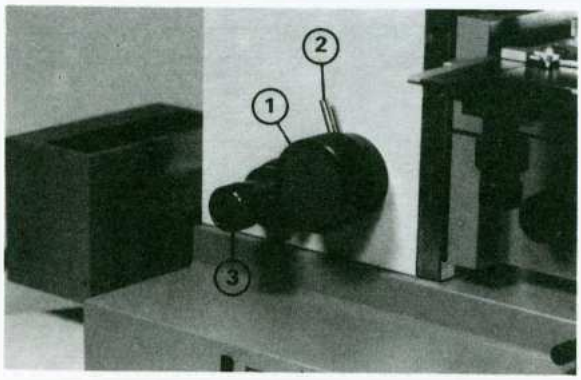


BEAM SPLITTER FOR PHOTO OR PROJECTION SCREEN

The slider (1) allows:

When fully home 100% of the light is directed to the eyepieces.

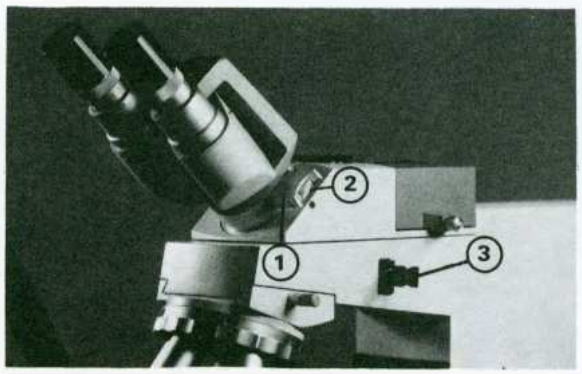
When fully retracted 20 % of the light is directed to the eyepieces and 80 % to the vertical exit to the camera or projection screen.



FOCUSING MOVEMENTS

The coarse focusing controls (1) are situated one on each side of the limb and their tension is adjustable by the lever (2).

The fine focusing movement is also operated by milled controls (3) situated on both sides of the limb, the right hand knob being graduated in microns.



BERTRAND LENS

The Bertrand lens allows a magnified image of the back aperture of the objective to be examined enabling : -
1) The aperture iris diaphragm to be correctly set with regard to the numerical aperture of the objective.
2) The Phase annuli and phase rings to be adjusted to obtain exact coincidence.
3) Inspection of the interference figure in Polarized light work.
To operate the lens push in the slider (1) and focus with milled wheel (2).

GRATICULES

These are inserted into the limb at (3) and can be viewed on the projection screen and the camera plane as well as normal viewing.

Identification number	Designation
0	Heat absorbing filter
1	Neutral density filter 1
2	Neutral density filter 2
3	Blue daylight filter
4	Yellow-green filter
5	Green filter V2
6	FITC 4 Interference filter
7	Exciter Filter BG 12
8	Suppressor Filter BG 38
9	Monochromatic Interference filter

FILTER SLIDES

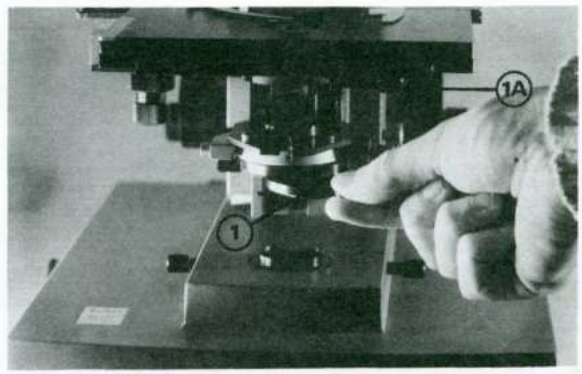
The filters listed opposite are available for the NS 400. Their identity numbers are listed in column I and are engraved on the filter mounts. These indentification numbers are always visible when the filter is inserted in the lamp from the right. Alternative filters are available on request.

NS 400 MICROSCOPE
USE IN NORMAL OR POLARIZED TRANSMITTED LIGHT

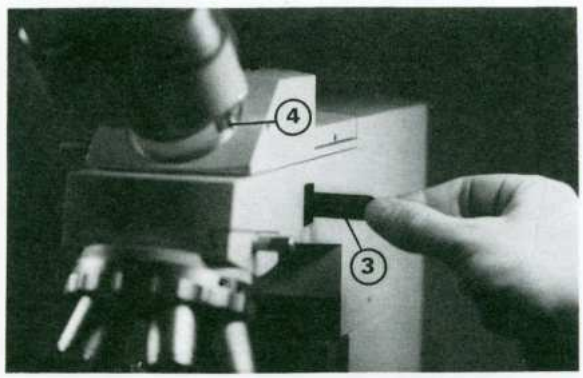
NOTE : When viewing in normal or polarized light with the microscope equipped with phase contrast or interference contrast it is advisable to : -

— Turn the phase annuli turret to position 0
— Turn the phase ring turret to position 0
— Turn the interference contrast compensator turret to position 0
— Remove the interference contrast prism slide.

ADJUSTMENT FOR BRIGHT FIELD KOHLER ILLUMINATION







— Switch on transformer

— Swing polarizer (1) out of the light path

— Retract the analyser slide (2)

— Focus each eye on the cross wire graticule (3) by means of the eyepiece focusing tubes ensuring that the Bertrand lens (4) is fully retracted.

— Withdraw the cross wire graticule and focus on a suitable specimen.

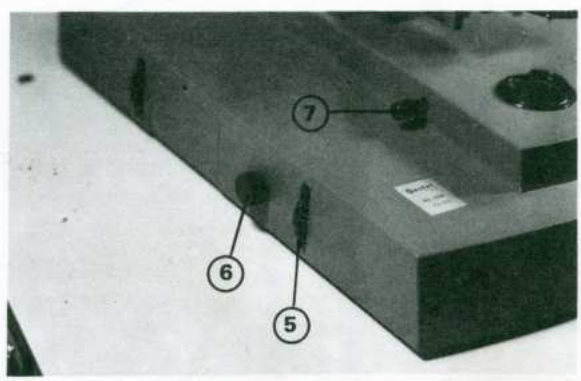
— For objectives ^16 x the condenser is used with is top lens in position. For objectives of power ^ 10 X the front lens is swung out. To swing the top lens in or out, use the milled knob (1A), and rack to the end of its stop.

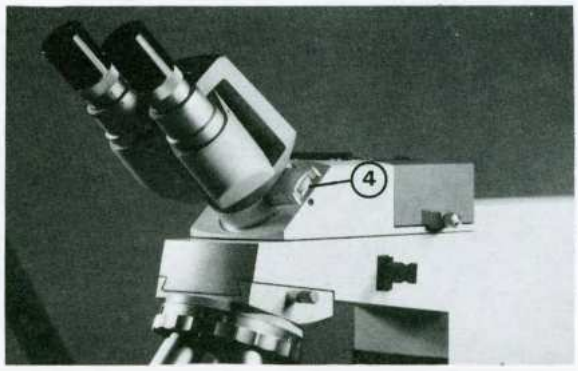
— Bring the field lens in the base into position ^16 or ^ 10 according to the objective in use by means of the milled wheel (5).

— Close the field iris by means of control (6) and focus by racking the condenser up or down. (Slides of thicknesses 1.00 — 1.2 mm only).

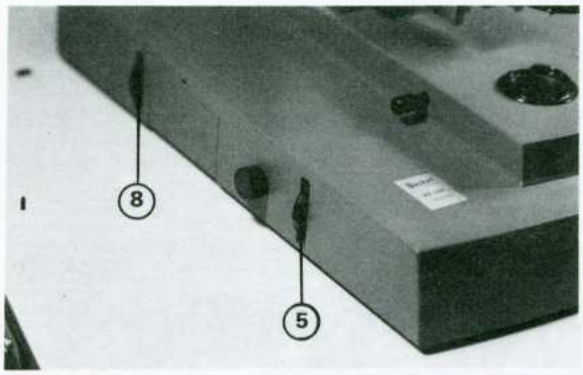
— Centre the field iris by the two adjusting screws on each side of the base (7).

— Re-open the iris until it just disappears from the field of view.



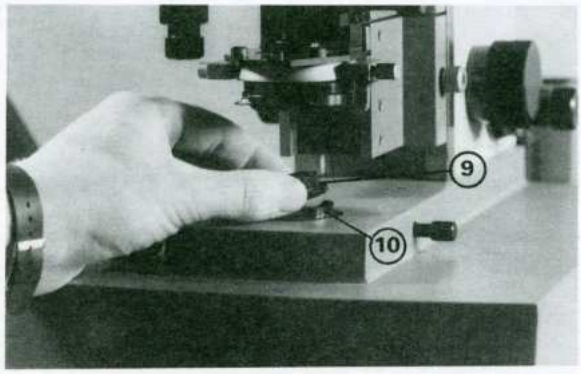


— With the aid of the Bertrand lens (4) focus on the back aperture of the objective, open the aperture diagphragm (8) and focus the lamp filament by adjusting the lamp condenser. Centre the filament by means of the two alien screws on the top of the lamp housing.



— Close the aperture diaphragm (8) until approximately 2/3 of the back aperture is filled with light. Specimen contrast can be controlled by small adjustments of this diaphragm.

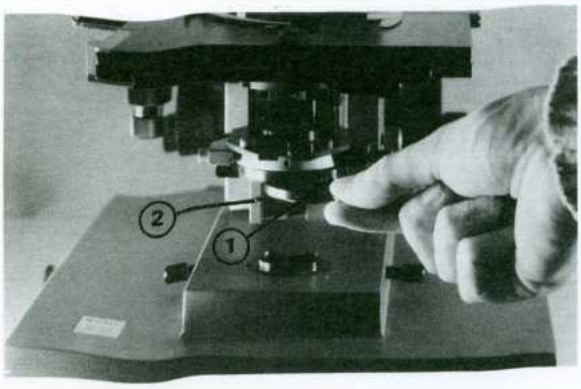
— Retract the Bertrand lens.
The microscope has now been set for Kohler illumination.



NOTE : 2.5 X Objective.

When using the 2.5 X objective, swing out the front lens of the universal condenser and turn milled wheel (5) on base to ^.10.

Place the supplementary lens (9) with the large diameter of the mount facing downwards on to the window.



POLARIZED LIGHT

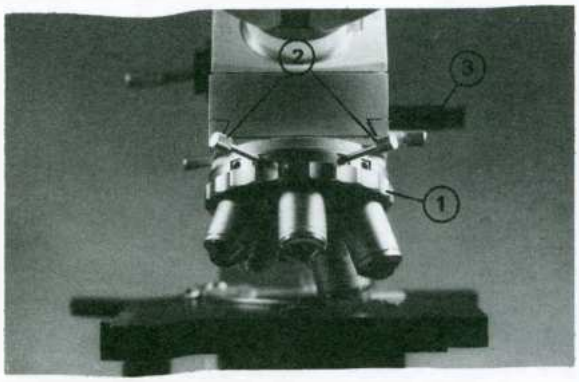


The settings and adjustments of the microscope for polarized light are exactly the same as with normal transmitted light but with the addition of a polarizer and analyser.

The polarizer (1) is mounted in a swing out mount and is rotatable by means of the lever (2). When the lever is rotated to the rear as far as its stop the polarizer is in crossed orientation with the analyser.

The analyser is placed in the optical path by pushing slide (3) fully home.

CENTRING OF OBJECTIVES



IMPORTANT : Always turn the objective changer by the ring (1) and never by the objectives themselves as these are individually centred. Should the objectives need centring this can be carried out in the following manner.

1. Focus on a specimen slide using the 16X or the 25x objective.

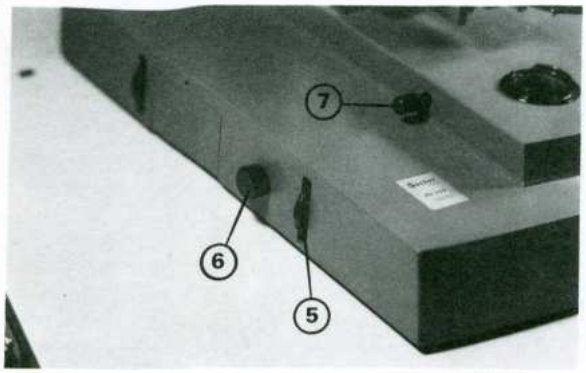
2. Swing out the top lens of the universal condenser and bring the field lens in the base to ^10 (5).

3. Close the field iris (6) and centre with the two centring screws (7).

4. Swing in the top lens of the condenser and return the field lens in the base to ^16 (5).

5. Re-open the field iris (6) and centre by adjusting the objective with the two special keys (2).

6. Repeat 2, 3, 4 and 5 until correct.



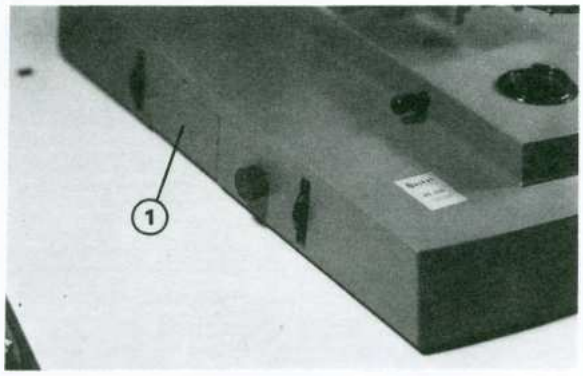
Following the above adjustments insert the cross wire graticule (3).
Place a well defined detail of the specimen on the centre of the cross wires (or use a ring slide) and centre all the objectives in turn on to this mark. Adjust only by means of the centring keys on each objective.

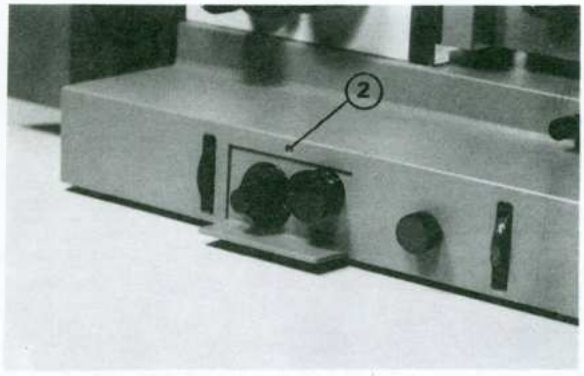
If the microscope is equipped with a second objective changer fitted with metallurgical objectives, these can be centred in relation to the first changer provided the reference point is not moved.

NOTE : All centration and adjustments should be carried out in normal transmitted light only.

NS 400 MICROSCOPE
PHASE CONTRAST

The equipment comprises of a removable unit containing the annuli rings mounted in the base, and a transfer optics unit containing the phase rings.





MOUNTING THE ANNULI RING UNIT

This operation is only necessary if the unit is delivered at a later date. If ordered at the same time as the microscope it will be already fitted.

To avoid damage to the objective and coarse focusing mechanism it is advisable before mounting the unit to :

— Lower the stage with the coarse focusing.

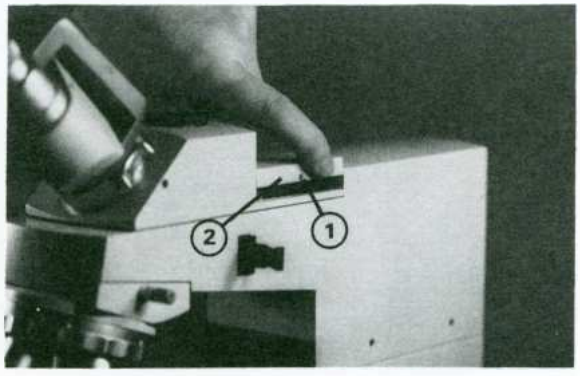
— Remove the objective changer.

— Remove the stage.

— Remove the substage.

— Remove the cover plate (1) by tilting the microscope approximately 45° to the right and remove the two fixing screws on the underside of the base. After removing the cover plate insert the annuli ring unit and secure by alien screw (2).

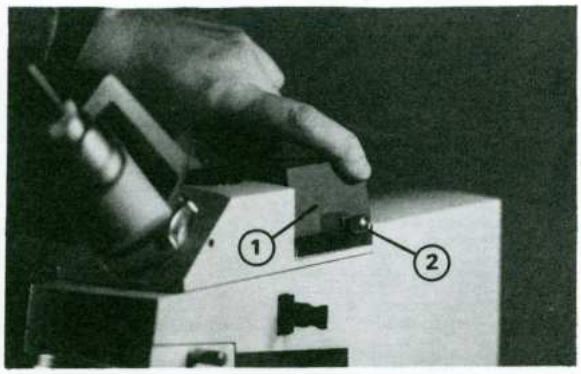
— Replace the substage, stage and finally the objective changer.



MOUNTING THE PHASE RING UNIT

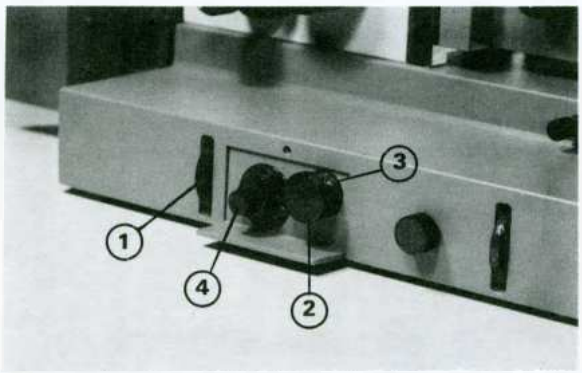
This item is never delivered ready mounted on the microscope.

— Release the screw (1) and remove the cover plate (2) by tilting to the left.



— Insert the phase ring unit (1) by holding against the left side of the limb at approximately 45° and lower into place. Secure by clamp screw (2).

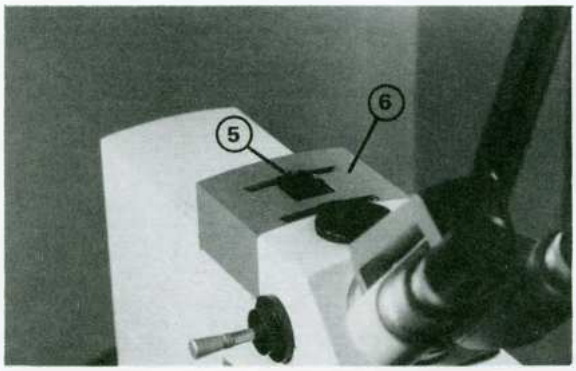
PHASE CONTRAST OPERATION



— Set the instrument for Kohler illumination with the selected objective. (See part 3 - p. 1).

— Open the aperture diaphragm (1) fully.

— Place the annulus corresponding to the objective in use (3) into the optical path by means of the selector drum (2).



— Turn the selector drum on the phase ring transfer unit (5) to the power corresponding to the objective (6).

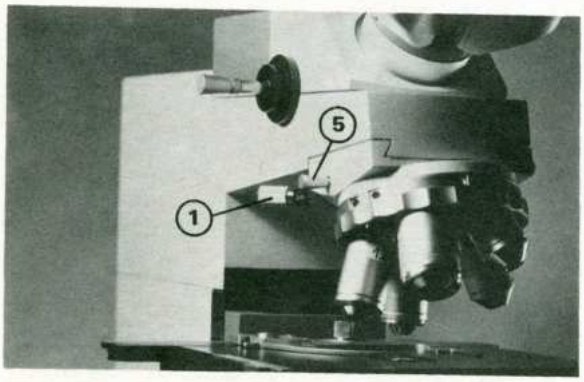
— Insert the Bertrand lens and focus on to the phase annulus and phase ring.

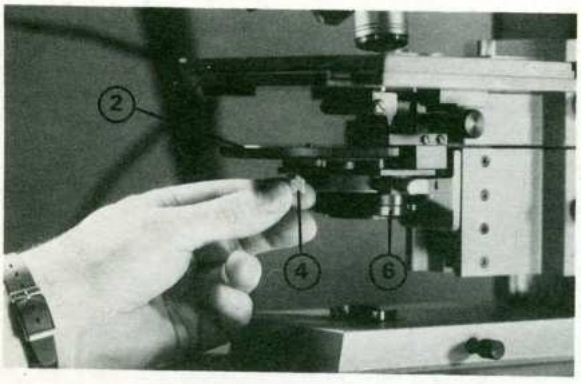
— With the aid of the two concentric knobs (4) adjust the two rings until they are in exact coincidence.

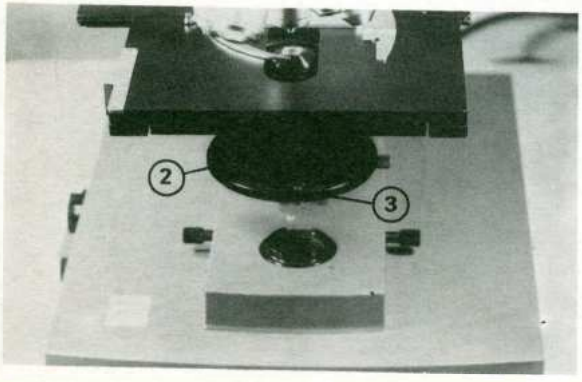
— Retract the Bertrand lens.

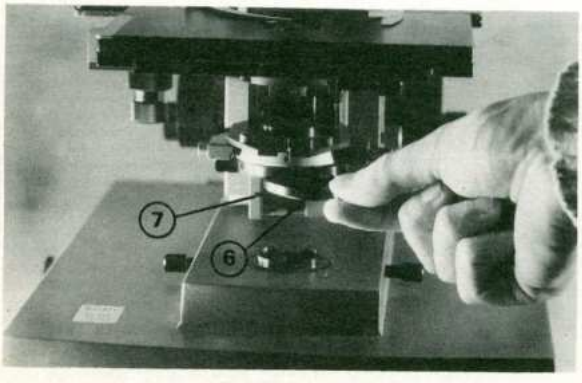
NOTE: The above adjustment should be checked with each change of the objective.

NS 400 MICROSCOPE
INTERFERENCE CONTRAST (TRANSMITTED LIGHT)









The equipment comprises.

A) Two sliding prisms (1). One for use with objectives 6.3 x and 10 X the other for use with objectives 16 X and above.

B) A turret (2) mounted in the substage consisting of 6 apertures in which are mounted the compensators corresponding to the objectives.

ASSEMBLY

Slide the turret (2) with the clamp screw (4) below, and compensator indicator numbers (3) facing the observer on to the condenser carrier, ensuring that the slot in the turret engages on to the small locating pin.

Engage fully up to its stop and clamp (4).
Insert the prism slide (1) for the selected objectives into the slot at the rear left of the objective changer mount.

OPERATION

Adjust the instrument for Kohler illumination with the selected objective. (See part 3). Slide in the analyser (5). Swing the polarizer (6) into position and rotate to crossed orientation with the analyser by means of the lever (7) rotated to the rear as far as its stop.

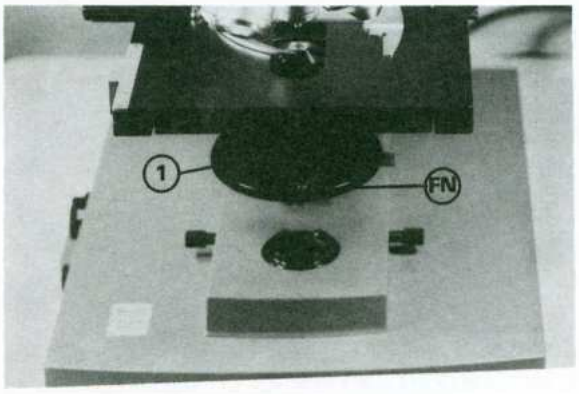
Insert the prism slide (1).

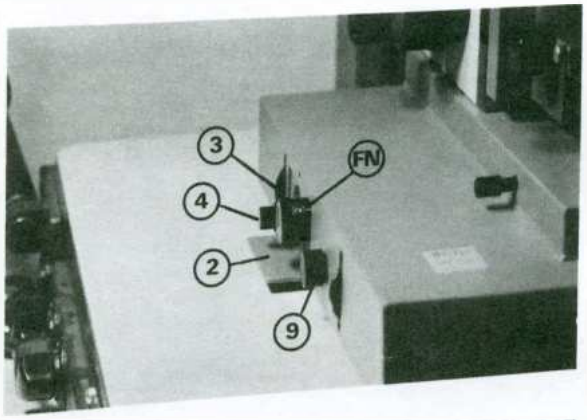
Turn the compensator turret to correspond to the objective in use (3).

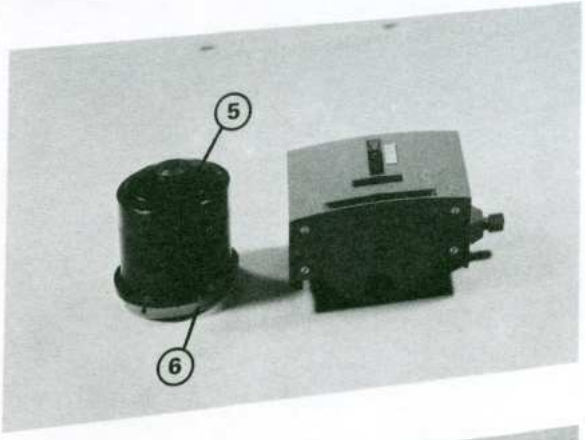
FOR PHASE OBJECTS (UNSTAINED) adjust the prism by the milled screw (1) until optimum contrast is achieved.

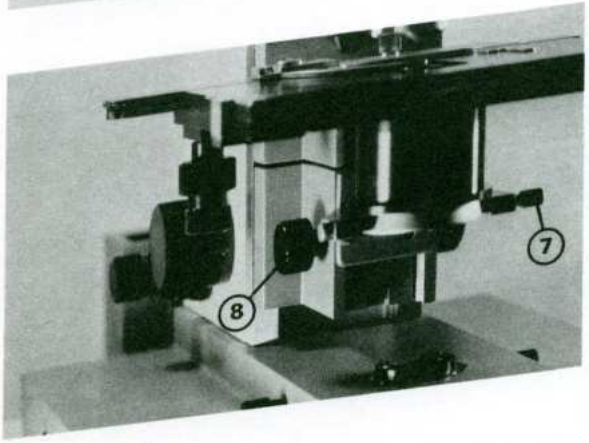
FOR AMPLITUDE OBJECTS (STAINED) adjust the prism by the milled screw (1) until a dark field is seen (on the black fringe) and slightly uncross the polarizer until optimum contrast is achieved.

NS 400 MICROSCOPE
DARK GROUND TRANSMITTED LIGHT









DARK GROUND WITH LOW POWER OBJECTIVES FROM 4 X TO 40 X

Dark ground can be achieved with the universal condenser providing the instrument is equipped with a compensator turret or a phase annuli unit. Either can be fitted with dark ground patch stops. Three such patch stops are available. One is mounted in the compensator turret (1) In place of one of the compensators for objectives 16 X - 25 X and 40 X.

The other two are mounted in the phase annuli unit (2) in place of the annuli rings. One for the 10X objective and the other for objectives 4x, 6.3X, 16X.25X and 40X.

— Adjust the instrument for Kohler illumination (see part 3).

— Open the aperture iris (3).

— Turn the compensator turret or the phase annuli unit, which ever is being used, to the dark ground position (FN). Check that the patch stop in the phase annuli unit is centred using the Bertrand lens and a 6.3X objective. Adjust with centring controls (4).

DARK GROUND WITH OBJECTIVES FROM 25 X to 100 X

The universal condenser is replaced by the oil immersion dark ground catadioptric condenser (N.A. 1.16-1.42).

DARK GROUND WITH OBJECTIVES 25 X, 40 X and 63 X dry

— Rack the substage assembly to its lowest position (8).

— Remove the universal condenser.

— Slide the dark ground condenser (5) on to the substage fork ensuring that its slot (6) engages on to the locating pin of the fork. Secure with clamp screw (7).

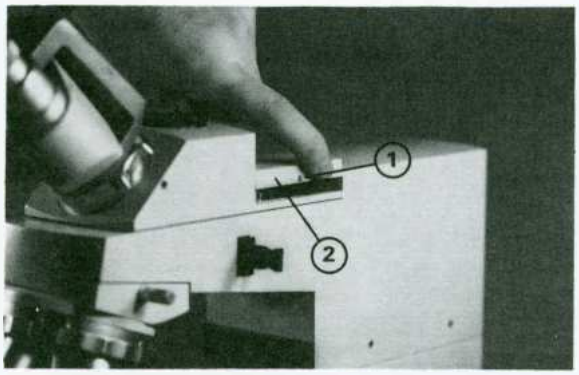
— Rack the substage up to its highest position (8).

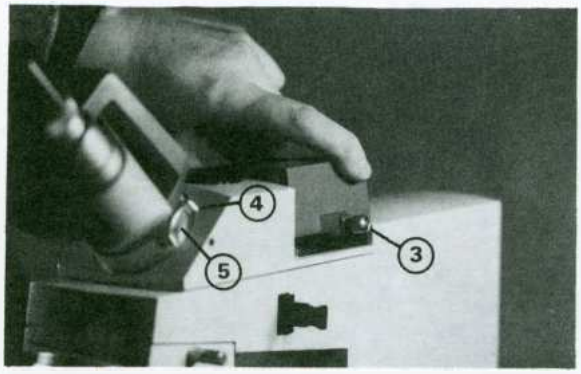
— Deposit a few drops of immersion oil on to the top lens of the condenser and place the specimen straight on the stage taking care to avoid air bubbles in the oil in order to obtain a complete homogeneity between slide and condenser.

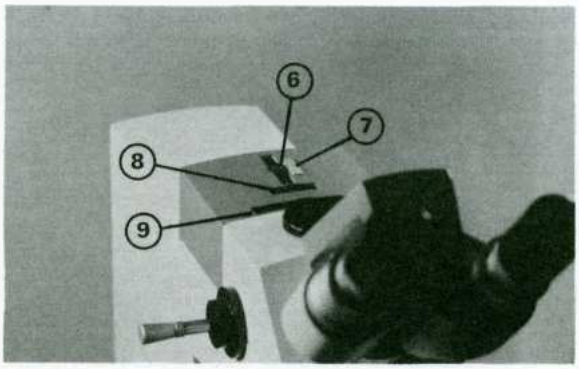
— Open the aperture diaphragm (3).

— Focus on to the specimen.

— Adjust (8) the heigt of the condenser until the field iris can be seen, then open the iris. (This adjustment is made easier by using the 25X objective).







OBJECTIVES 63 X OIL AND 100 X OIL

When using the oil immersion objectives the dark ground transfer unit with iris diaphragm is employed.

MOUNTING THE DARK GROUND TRANSFER OPTICS

Release the screw (1) and remove the cover plate (2) by tilting to the left. Insert the dark ground transfer unit by holding the unit against the left side of the limb at approximately 45° and lower into place. Secure by clamp screw (3).

SETTING UP

Adjust as for the dry objectives. Open the iris diaphragm on the transfer unit by means of the milled control (8) and with the aid of the Bertrand lens (4) focus (5) on the ring of light formed by the condenser.

NOTE : The ring of light is normally only seen with the 100X objective.

— Close the iris diaphragm (8) and, without touching the Bertrand lens, focus by moving the control (6).

NOTE : One can also use the numbers 100 ond 63 engraved on the transfer unit for this adjustment.

— Withdraw Bertrand lens (4).

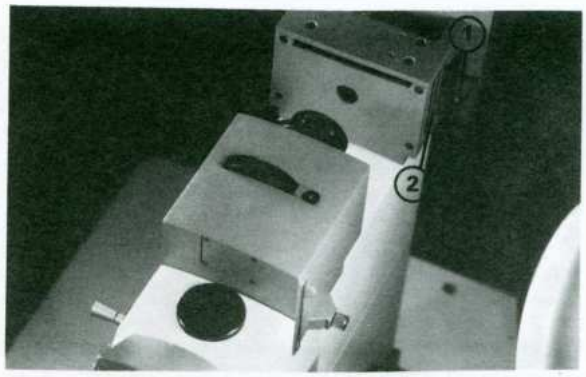
— Close the iris diaphragm (8) until good dark ground illumination is obtained.

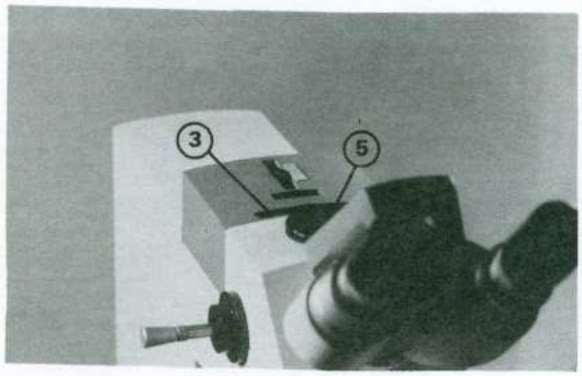
REMARKS : For examination in dark ground the filter turret (9) must be placed on position 1 (clear aperture).

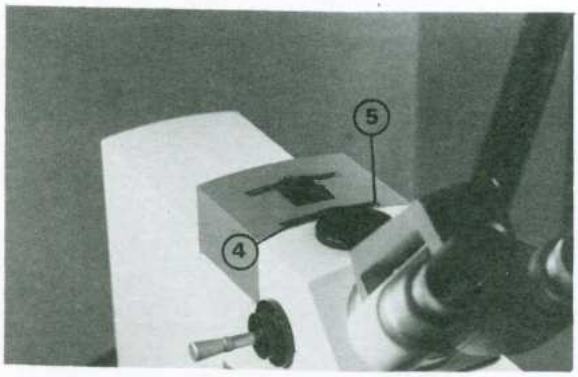
It is sometimes easier to deposit the oil on to the condenser before it is placed into the substage.

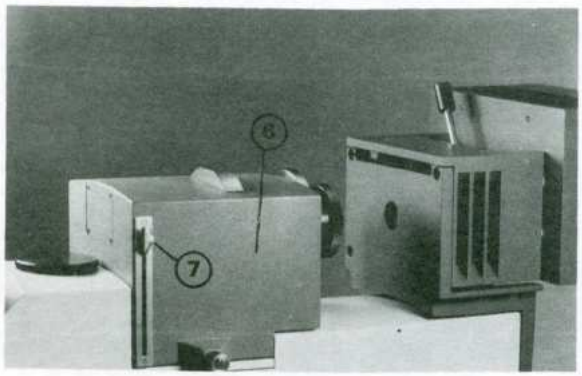
NS 400 MICROSCOPE
TRANSMITTED AND INCIDENT LIGHT FLUORESCENCE

in the blue and violet using the Q. I. light source (12 V 100 W)









FILTERS EMPLOYED

A) FILTERS MOUNTED IN SLIDES (1) - These are inserted into the lamp filter holder (2).

Heat absorbing filter - slide n° 0. This must be used at all times to protect the other filters from heat and is inserted into the lamp filter holder nearest to the light source.

F.I.T.C. 4 - Slide n° 6

B.G. 12 - Slide n° 7

B.G. 38 - Slide n° 8 (Red suppressor filter).

B) BARRIER FILTER W 15 G - As its name implies this filter acts as a barrier against any harmful rays reaching the eyes.
For transmitted light it is mounted in the dark ground transfer unit (3) or phase ring unit (4) and is in position when the number 2 appears opposite the index mark (5).
For incident light it is mounted in the pivoting arm on the right of the illuminator (6) and is in position when the lever (7) is lowered.

FILTER COMBINATIONS

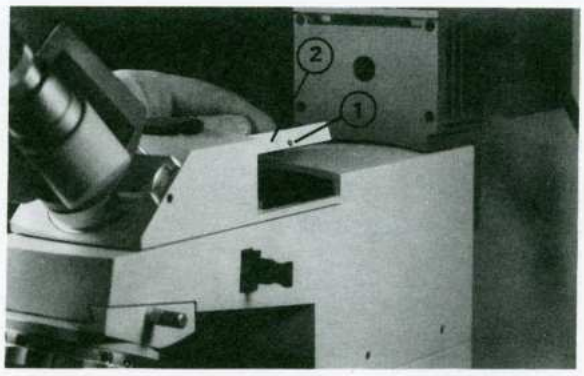
A) TRANSMITTED LIGHT

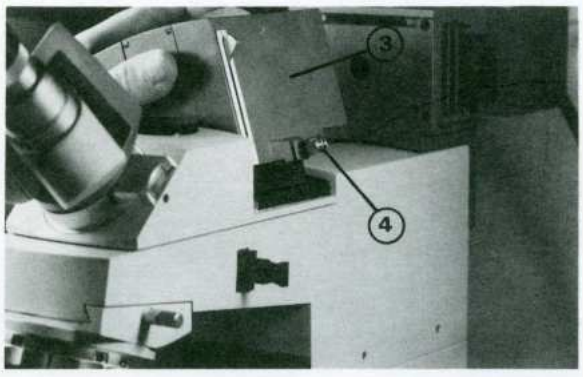
1) Bright field fluorescence.
- Heat absorbing filter Slide n° 0.
- F.T.C. 4 filter - Slide n° 6.
- B.G. 12 filter Slide n° 7 (as required).
- Barrier filter W 15 G Index mark 2 on transfer unit turret.

2) Dark Ground Fluorescence
- Heat absorbing filter - Slide n° 0.
- F.I.T.C. 4 filter - Slide n° 6.
- B.G. 38 filter - Slide n° 8 (as required).
- Barrier filter W 15 G - Index mark 2 on transfer unit turret.

B) INCIDENT LIGHT
- Heat absorbing filter Slide n° 0.
- F.I.T.C. 4 filter - Slide n° 6.
- B.G. 38 filter - Slide n° 8 (as required).
- Barrier filter W 15 G - Lever in lowest position.

NOTE — In general most specimens will require the use of the FITC filter only (plus the heat absorbing filter). In certain cases 1 or 2 B.G. 12 filters may be used in place of the F.I.T.C. 4.



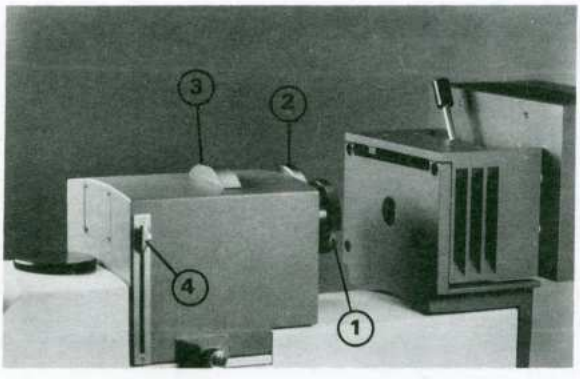


MOUNTING THE DICHROIC REFLECTOR ILLUMINATOR

Release the screw (1) and remove the cover plate (2) by tilting to the left.

Insert the illuminator (3) by holding the unit against the left side of the limb at approximately 45° and lower into place. Secure by clamp screw (4).

Connect the Lamp to the transformer but before switching on see part 2. Transformer 12 V 100 W.



OPERATION

Open the aperture diaphragm by turning the small milled ring (1) clockwise.

Open the field diaphragm by turning the large milled ring (2) colckwise.

- Push the milled sector (3) tot the right. When the sector is pushed to the left the figure '4' will appear and is only used when the 4x Objective is employed.
- Place the W 15 G Barrier filter into light path by lowering the lever (4).
- Focus onto the specimen.

Centring the Q.I. Bulb.

See part 12. Care and cleaning but read X10 objective instead of X8.

NS 400 MICROSCOPE
INCIDENT LIGHT FLUORESCENCE

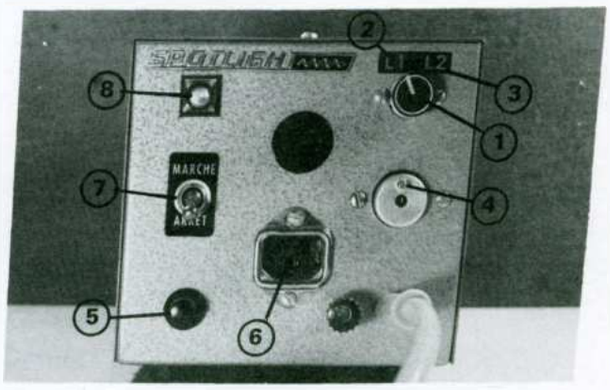
using the HBO 50 W mercury vapour lamp

Technical data for the Osram HBO 50 W Bulb (as supplied by the manufacturers)

Supply: 220 V alternating current only.

Mean life of bulb :

- 100 hours for operating time of at least 2 hours.
- Reduced by half for operating time of less than 20 minutes.
- The lamp should not be run for less than 15 minutes at a time.



Stabilizing Choke

A specially designed ballast choke is necessary when the HBO bulb is used on alternating current.

The base of each bulb is marked LI or L 2 and the selector (1) must be switched (2) or (3) to correspond to the bulb marking. THIS IS VERY IMPORTANT.

Starter (4)

Owing to the set separation of the HBO bulb electrodes, a starting voltage of a few seconds is required.

Fuse (5)

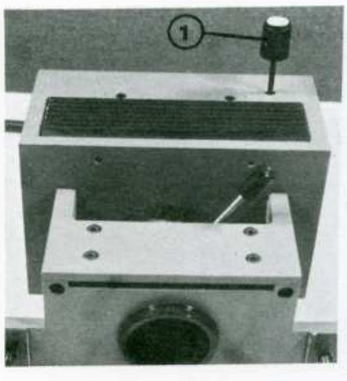
To remove the fuse press the button (5) against the spring, unscrew a fraction of a turn and release.

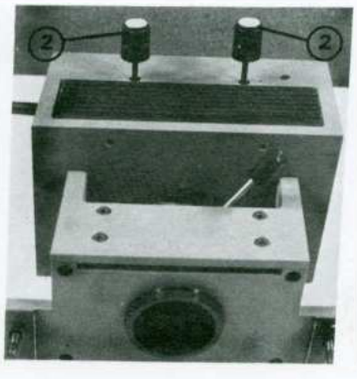
Operating the ballast

Connect the lamp to the ballast at (6).

Place the switch (7) to the Marche position. The pilot light (8) will indicate that the unit is switched on. If the bulb fails to strike press the starter button (4) always leaving a short cooling period should the starter button have to be operated a second time. Full intensity is achieved after a short warm up period. Re-ignition must never be attempted until the bulb has cooled down.

A period of 15-30 minutes.





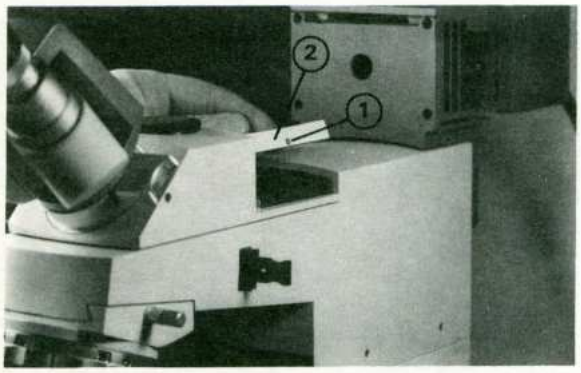
Adjusting the HBO 50 W Lamp

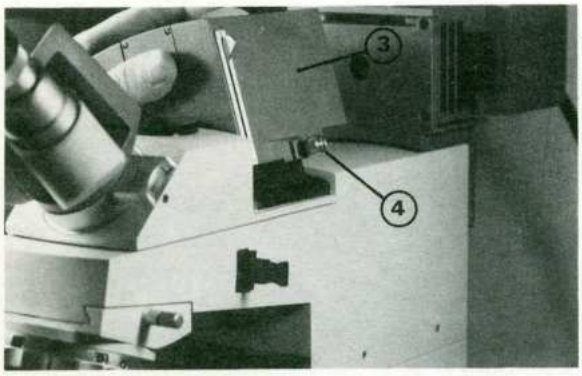
Adjustment is achieved by *releasing the* screw *(1) and* sliding the rear of the lamp backwards or *forwards until a* sharp image of the *electrodes is focused onto the aperture* iris mount of the *illuminator. The closing of the* aperture iris (small milled ring) will *facilitate this* operation. When complete re-open iris.

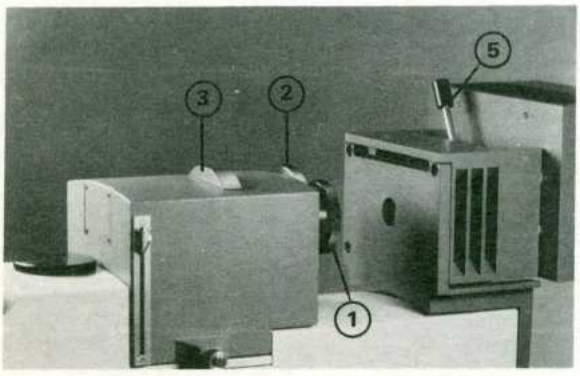
Centre the electrodes with the two screws *(2).*

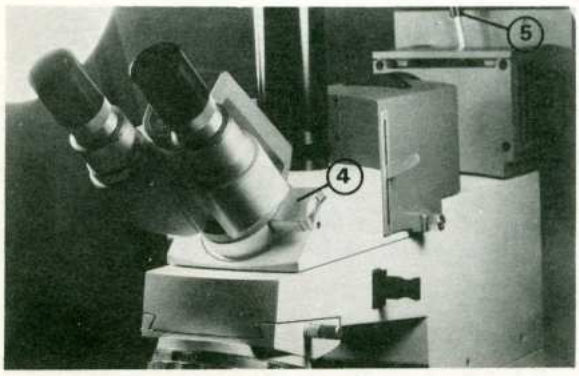
Details of lamp *exchanging is supplied with each lamp.*

NS 400 MICROSCOPE
INCIDENT LIGHT









MOUNTING THE ILLUMINATOR

— Release the screw (1) and remove the cover plate (2) by tilting to the left.

— Insert the incident illuminator (3) by holding the unit against the left side of the limb at approximately 45° and lower into place. Secure by the clamp screw (4).

— Connect the lamp to the transformer
(see part 2 transformer 12 V 100 W).

PLAIN ILLUMINATOR

(Bright field only)

Adjustement

— Open the aperture diaphragm by turning the small milled ring (1) clockwise.

— Open the field iris diaphragm by turning the large milled ring (2) clockwise.

— Push the milled sector (3) to the right. When the sector is pushed to the left the figure '4' will appear and is only used when the 4x objective is employed.

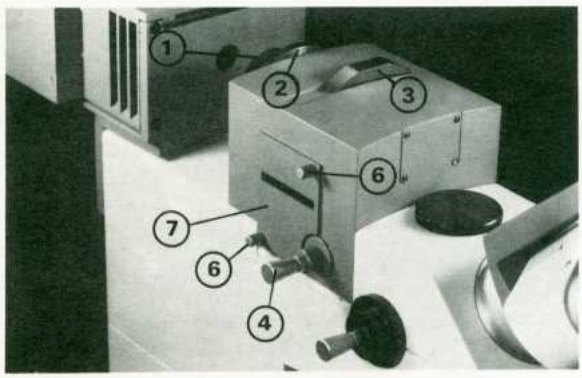
— Focus on to the specimen using the 8X, 16X or 40X objectives.

— Adjust the field iris (2) until it just disappears from the field.

— Insert the Bertrand lens (4) and focus on the back focal plane of the objective and adjust the lamp filament until it is in focus using the lamp condenser (5) and centre the filament by means of the two alien screws on top of the lamp.

— Close the aperture iris (1) until approximately 2/3 of the objective back aperture is filled with light. Specimen contrast can be controlled by small adjustments of the aperture.

— Retract the Bertrand lens (4).



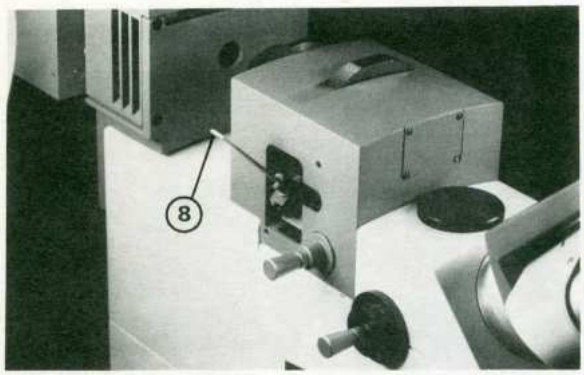
INCIDENT CIN ILLUMINATOR

(for normal light, polarized light and interference contrast)

The CIN incident illuminator is similar to the simple incident illuminator regarding the aperture (1) and field (2) diaphragms and the sector (3), but with the addition of: -

An adjustable mechanism to take the interference contrast slides.

A polarizer (4) and an analyser (5).



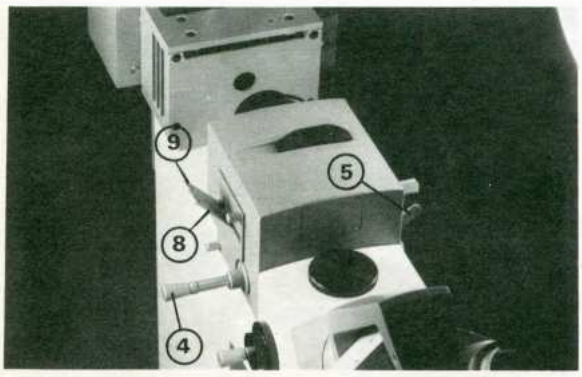
INSERTING THE PRISM SLIDE

— Remove the cover plate (7) by unscrewing the two milled screws.

— Place the prism slide (8) marked ^16 into the slot nearest the binocular head and push in as far as the first notch.

Place the prism slide (8) marked ^.40 into the slot nearest the lamp and push in as far as the first notch.

— Replace the cover plate (7).



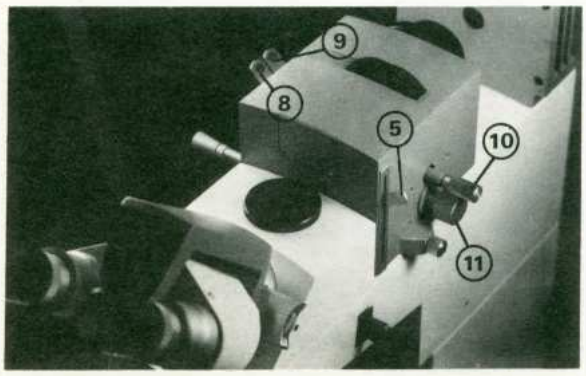
EXAMINATION IN NORMAL INCIDENT LIGHT

Ensure that the polarizer (4) is pulled out and the analyser lever (5) is in the top position.

Ensure that the two prism slides (8) are retracted.
Finally adjust as for the simple illuminator.

EXAMINATIONS IN POLARIZED LIGHT

As above but with the polarizer pushed in and the analyser in its lower position.



EXAMINATION IN INTERFERENCE CONTRAST

As for polarized light but with the prism slide corresponding to the objective being used, depressed fully to the second notch.

^16 for objectives 8X and 16X (8).

^40 for objectives 40, 80 X and 100X (9).

Adjust the contrast with the small milled control (10). With the aid of the milled control (11) spread a fringe until good, even illumination is achieved over the whole field.

NS 400 MICROSCOPE

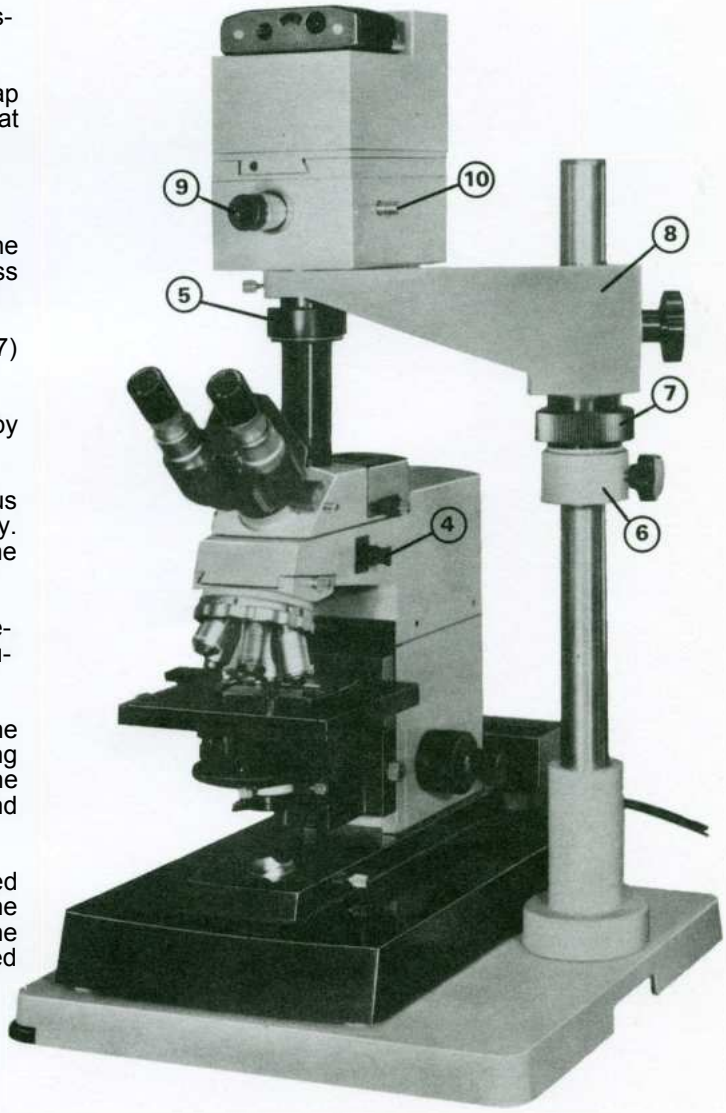
NS 901 FOTOMAT EQUIPMENT

Assembly and use of the NS 901 Fotomat

(See leaflet Fotomat NS 901 n° 1865)

Assembly and adjustment with the NS 400 Microscope

- Place the NS 400 Microscope on the Fotomat base and position against the 3 stops.
- Remove the straight body tube cover plate by unscrewing.
- Place the straight body tube complete with light trap in position and secure by the threaded milled ring at the base of the tube.
- Withdraw the beam splitter slide to the left.
- Adjust approximately the height and orientation of the cross arm (8) to allow the light trap (5) of the cross arm to slide over the light trap of the straight body tube.
- Bring the support collar (6) with its adjusting ring (7) into contact with the cross arm (8).
- Focus the crossline graticule of the NS 901 Fotomat by means of the viewing eyepiece (9).
- Insert the crossline graticule (4) into the limb and focus carefully with each focusing tube of the binocular body. The crossline indicates the centre of the field and the framing graticule the area exposed.
- Focus carefully through the binocular onto a well defined detail of a specimen ensuring also that the illumination is correctly adjusted.
- Align the limb crossline graticule (4) onto the crossline of the NS 901 Fotomat viewing eyepiece (9) by adjusting the 3 stop screws on the base and re-orientating the cross arm. The 3 stops are eccentrically mounted and are adjusted by releasing an alien screw.
- Ensure that the correctly focussed specimen as viewed through the binocular is simultaneously in focus in the viewing eyepiece (9). If not adjust the height of the cross arm by screwing or unscrewing the threaded ring (7).
- Re-check the alignment of the graticules.
- Withdraw the semi transparent reflector (10).
- A photograph can be taken with or without the limb graticule provided the binocular is correctly focused. If the graticule is left in position this will appear on the photograph.



NOTE — To check the simultaneous focus of the crossline graticule in the viewing eyepiece and the specimen slide, move the eye from side to side when the centre of the crossline and the specimen should appear stationary. If not re-adjust the Fotomat height but not the microscope focus which should be correct when viewed through the binocular.

Photomicrography in colour :

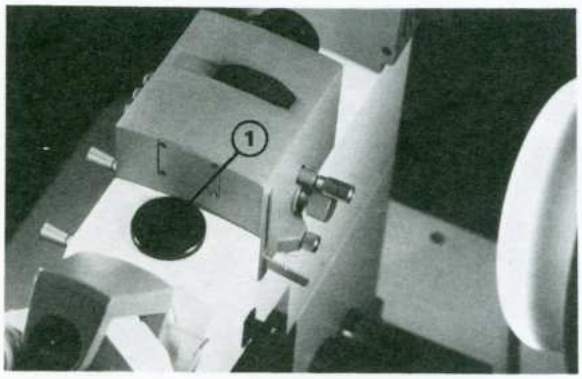
Filters for routine outdoor photography are used to enhance or reduce contrast to produce a better rendering of certain colours, but there are also filters that will correct the colour temperature of a given light source.

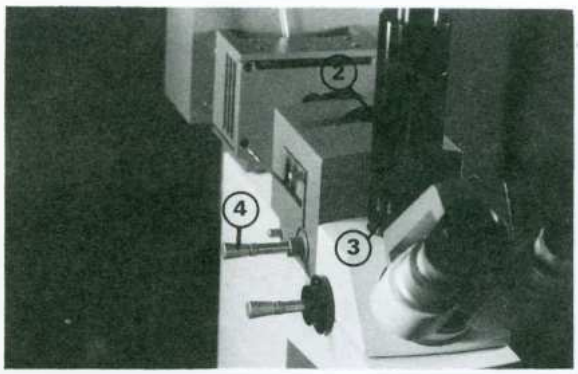
The following filters are suitable to correct the colour temperature for the majority of colour films.

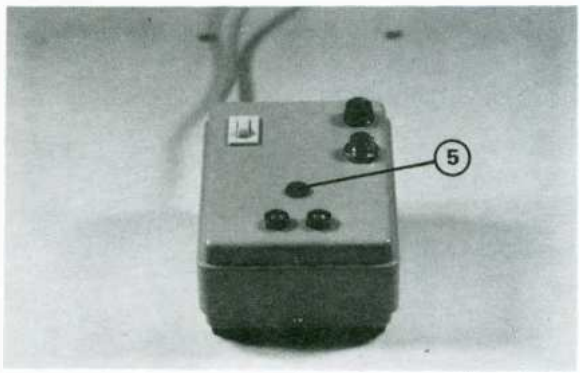
Colour temperature of the Q.I. 100 W Bulb	to obtain 3400° K	to obtain 6100° K	Polacolor film
3200° K at 11.2V	82 A Filter	82 A Filter	Tiffen 820 B or Kodak-Wratten 80 B + CC20B

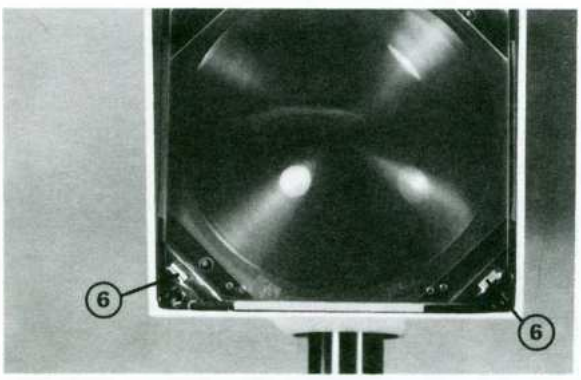
NOTE — The filters must always be placed on the microscope illumination window. Never place gelatine filters (Kodak-Wratten) near a hot light source.

NS 400 MICROSCOPE
160 MM DIAMETER PROJECTION HEAD EQUIPMENT









A) PROJECTION HEAD WITH FRESNAL SCREEN

Assembly

- Remove the cover plate (1) by unscrewing.
- Pace the straight body tube (2) in position and secure by the threaded milled ring.
- Locate the projection head onto the straight tube and when fully engaged secure by the three screws.
- The projection head is equipped with an eyepiece which automatically engages into the straight tube when the head is placed in position.

Withdraw the beam splitter slide (4) to the left.

B) PROJECTION HEAD WITH LIQUID CRYSTAL SCREEN

The liquid crystal screen uses the property of Nematic crystals to diffuse light when influenced by an electric field.

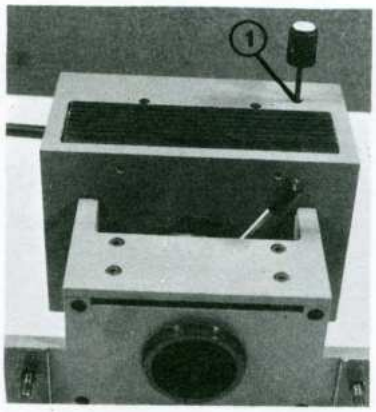
To operate connect the power unit and switch on.

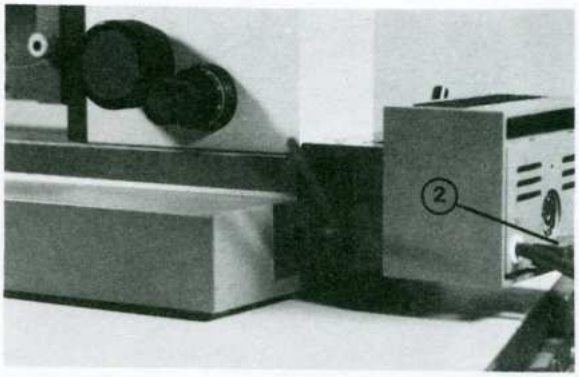
If required the potentiometer can be adjusted by means of the small screw (5). This will vary the electric field thereby changing the diffusion angle of the crystal.

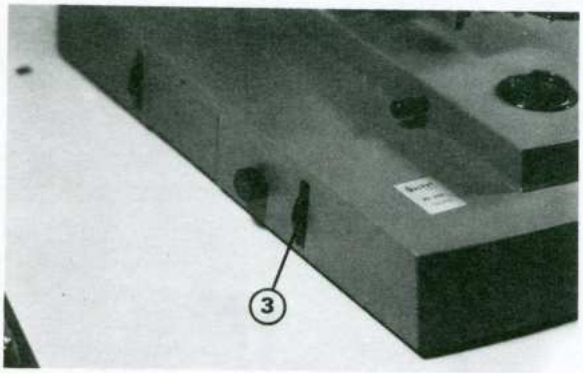
In the event of the equipment not functioning, remove the screen frame (4 screws) and verify that the leads (6) are making good contact and if so please return the power unit to us for inspection.

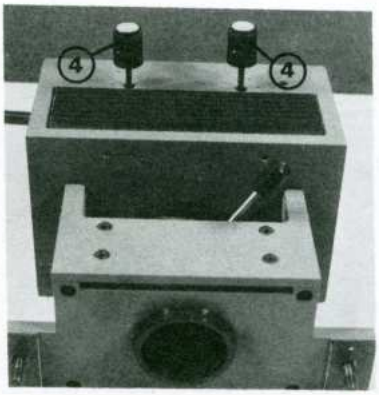
NOTE. — The speckles that are visible on the screen when switching on will disappear after a few minutes.

NS 400 MICROSCOPE
CARE AND CLEANING OF THE MICROSCOPE









A) REPLACING THE Q. I. 12 V 100 W BULB

- Switch the transformer off
- Unscrew the locking screw (1) and completely withdraw the Lamp with the aid of the handle (2).
- Remove the bulb.
- Replace with a new bulb carefully following the instructions supplied with the bulb.
  Never touch the bulb with bare fingers.
- Replace the lamp by locating onto its guide and push fully home.
  Lock into position with screw (1).

CENTRING THE FILAMENT

- In Transmitted Light :
With the front lens of the condenser swung out and using a 40 x or 63 x objective focus on a lightly stained specimen.
Turn the field lens (3) to position ^10 and with the aid of the Bertrand lens observe the back aperture of the objective and focus the bulb filament by means of the lamp condenser lens and centre with the two adjusting screws (4).

• In Incident Light :
Focus onto a good reflecting object using a x8 objective and with the aid of the Bertrand lens observe the back aperture and focus the bulb filament by means of the Lamp condenser lens and centre with the two adjusting screws (4).

B) CARE OF THE MICROSCOPE

When not in use always keep the microscope covered with its plastic dust cover and when cleaning use only a soft dry cloth such as linen.

The chrome can be cleaned with a little alcohol.

- Do not use grease on any of the slides or ball bearing movements nor on the teflon guides to avoid loss of friction.
- The transfer optics aperture must always be covered either by the cover plate or by one of the transfer optics units, phase unit, dark ground unit, illuminator etc.
- Never attempt to clean the mirrors.
- Always leave a pair of Eyepieces in the binocular to avoid the introduction of dust.

C) CLEANING OF OBJECTIVES AND EYEPIECES

The oil immersion objectives must always be cleaned after use using a soft linen or lens tissue. The last traces of oil can be removed with a lens tissue moistened with a solvent such as trichlorethylene.

High power dry objectives :
Objectives of power x25 and above have a concave front lens and are more easily cleaned by using a lens tissue wrapped round the end of a piece of pointed pegwood and moistened in alcohol.

Lower power Objectives and Eyepieces :
Clean the front lens and the eye lens of the Eyepieces frequently with a soft cloth or lens tissue. Dust can also be removed with a camel hair brush cleaned in ether and dispersed with a small puffer such as a rubber ear syringe.

NS 400 MICROSCOPE
100 W Q. I. AND 250 W C.S.I. COMBINED LAMP

Q.I. 100 W CHARACTERISTICS

(see part 2, p. 1)

C.S.I. 250 **W** (data as supplied by Philips)

The metal halide C.S.I. 250 W gives a white light with an excellent colour rendition and is equally suitable for fluorescence excitation in the blue or green.

- Consumption 250 W. Striking voltage 800 W.
- Arc voltage 60 + 5 V.
- Lamp current 4,8 A.
- Colour temperature 3400° K.
- Warm up period 2 minutes.
- Life of 300 hours if burning period is kept to at least 30 minutes.

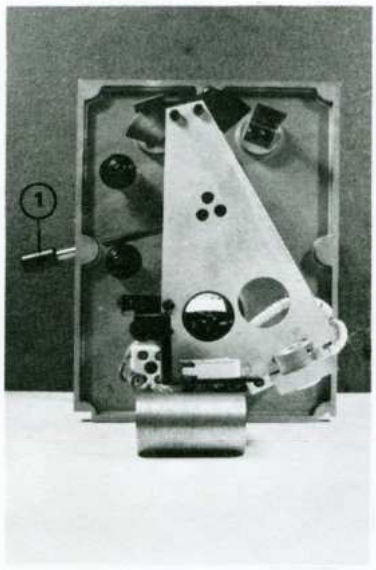
The mounting and fixing of the lamp is the same as for the Q.I. Lamp.

With transmitted light the microscope has to be raised a little unless the NS 901 Fotomat base is used.

ELECTRICAL CONNECTIONS

Connect the Q.I. 100 W lead to the 12 V 100 W Transformer (see precautions part 1).

Connect the C.S.I. 250 W lead to the ballast (220 V A.C.).



OPERATION

Q.I. : Lever (1) in bottom position.

C.S.I. : Lever (1) in top position.

CHANGING THE BULBS

- Switch of the ballast and the transformer.
- Unscrew the milled screw at the rear of the lamp, pull the plate away slightly from the housing, lift and remove.
- Remove the used bulb and replace by a new one after referring to the instructions supplied with each new bulb.
- Replace the unit into the housing.

ADJUSTMENT

- Centration of the Q.I. 100 W bulb is made by adjusting the 2 lower alien screws at the rear of the lamp in the same way as with the standard Q.I.
- Lamp. (Note : Access to the lower screw is through the circular aperture).

ADJUSTMENT CONTINUED

- The C.S.I. Bulbs are constructed to ensure that the height of the arc is always constant. Only lateral adjustment is required and this is achieved by adjusting the top alien screw situated at the rear of the lamp.
- Neutral density filters must be employed when using low power objectives (x 10 or X 8).
- With the aid of the Bertrand lens focus the electrodes by means of the lamp condenser and centre with the alien screw.

NOTE : With incident light the electrodes can be focused onto the mount of the illuminator and centred.

FUSE

To remove the fuse press the button down against the spring, unscrew a fraction of a turn and release.



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