LEITZ DIAPLAN

SCIENTIFIC AND CLINICAL MICROSCOPE

Instructions

WILD LEITZ

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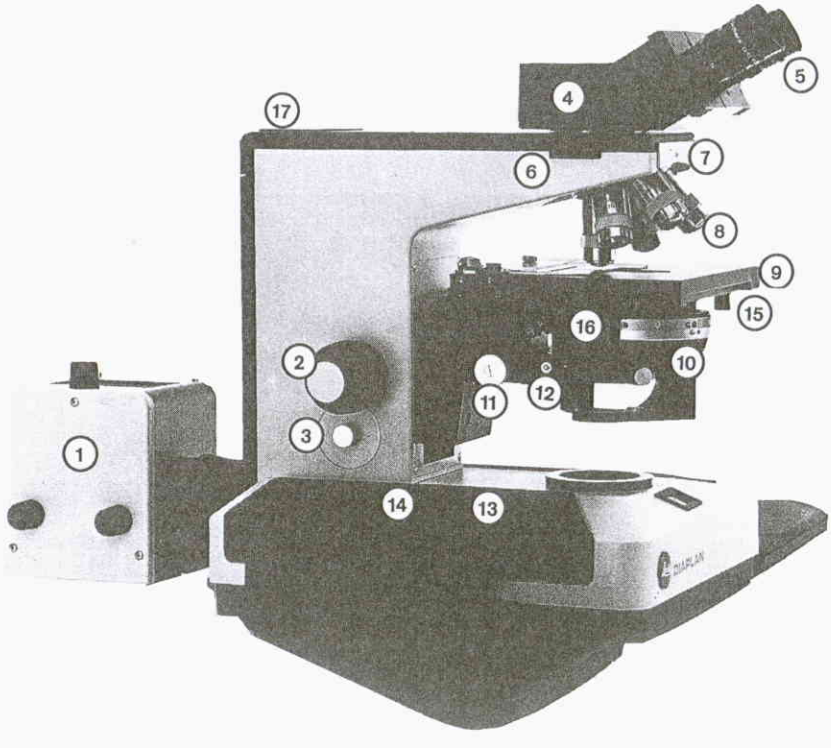


Tubes

Binocular observation tube S
With viewing angle 30°. Adjustable eyepiece mounts for mechanical tube length compensation of interpupillary distance setting.

Binocular observation and phototube FSA
Viewing angle 30°. Automatic compensation of the mechanical tube length to the interpupillary distance setting. Also contains a beam splitter with following settings:

↑ 100% of light to the eyepieces
0% to the photo port

↑→ 50% to the eyepieces
50% to the photo port

→ 10% to the eyepieces
90% to the photo port

Binocular observation and phototube FSA-R
Viewing angle 30°. Includes back-reflection for use of the LEITZ VARIO ORTHOMAT 2 camera system or the LEITZ MPV compact microscope photometer, otherwise same as FSA tube.

Binocular observation tube SV
Viewing angle can be varied between 0° and 40°, allowing the most comfortable working and sitting position to be adopted. Integrated image erection system for laterally and vertically correct images.

Fig. 2
Binocular observation tube S

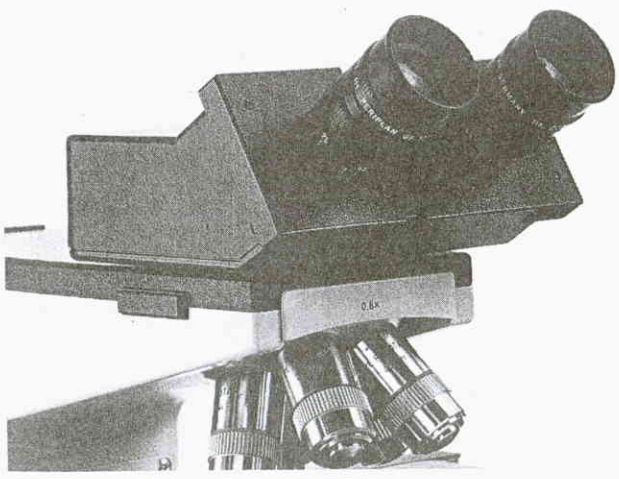
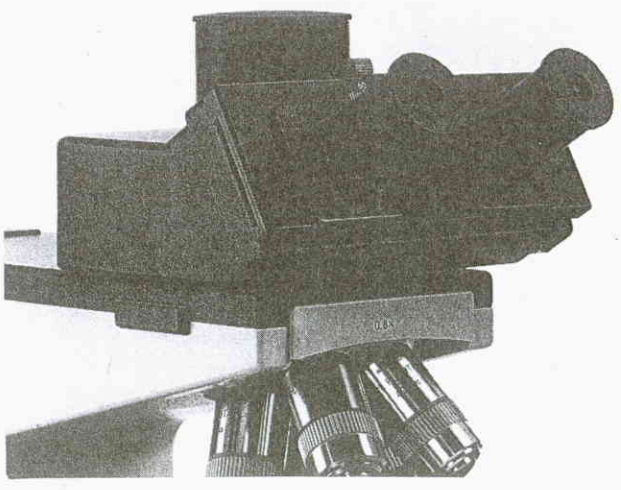


Fig. 3
Binocular observation and phototube FSA



Binocular observation and phototube FSA-VR
As for SV tube, but also with back-reflection and photo port with tube factor 1.25x.
Fields of view up to 20mm (with the 1x objective nosepiece) or 25mm (with the 0.8x nosepiece) can be observed with the S, FSA, FSA-R, SV and FSA-VR tubes.

Binocular and phototube FSA-GW-R
Viewing angle 30°. For PERIPLAN largefield eyepieces with field of view index 26 or 28. Tube factor 1.25x. Automatic tube length compensation of interpupillary distance setting, plus beam splitter with settings as for tube FSA.

Binocular observation and phototube FSA-GW-R with second photo port
The light intended for image recording (settings as for tube FSA) can be further split 50:50 or 90:10 in favor of either photo port. Otherwise as for FSA-GW-R tube.

Together with the 0.8x objective nosepiece, the FSA-GW-R largefield tubes give an effective field of view index corresponding to that of the eyepiece in use, i.e
26 for the PERIPLAN GW 10x/26 M
28 for the PERIPLAN GW 8x/28 M.

Fig. 4
Binocular observation tube SV

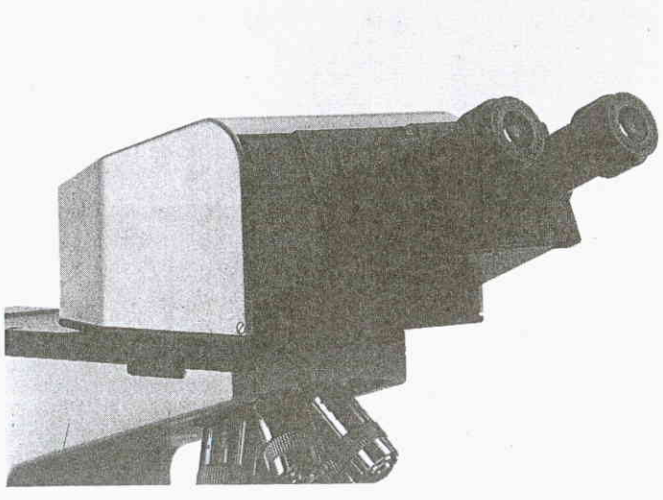
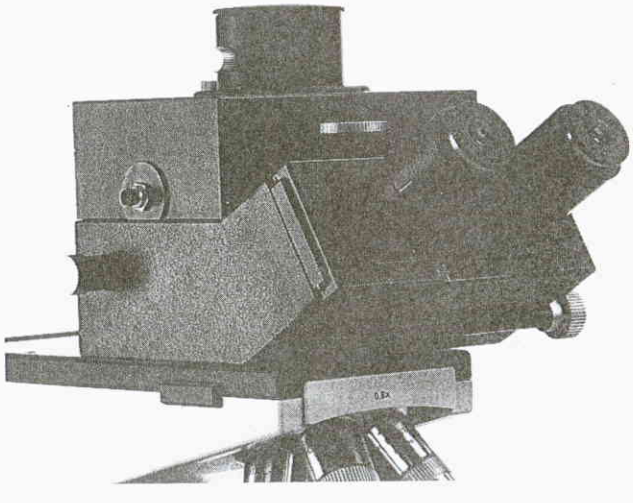


Fig. 5
Binocular observation and phototube FSA-GW-R with second photo port



Mechanical stage No. 87

200 x 159mm, with 90° rotation. The stage can be rotated, without changing the position of the specimen slide, using knob (1.15) and clamped in any position with screw (1.16).

The full range of rotation of the stage can only be utilised if the specimen is placed within a region 20 x 20mm in the center of a standard specimen slide (76 x 26mm). If the specimen is placed anywhere else, the rotation is limited (stage comes into contact with the stand). This situation is indicated if the zero mark of at least one vernier lies within the range marked in red along the scale.
Scales and verniers enable the position of a specimen detail to be read off to an accuracy of 0.1mm.

Focus controls

The coaxial coarse and fine focus controls (1.2), located on both sides of the stand for left- or right-handed use, act on the microscope stage with a range of movement of 25mm. One division on the fine focus scale corresponds to a height difference of about 2 μm.
The focus stop (1.3) enables the plane of focus, once determined, to be quickly reproduced.

Lamphousings

Lamphousing 103 (33.8)
For 12V 100W halogen lamp. Factory-centered reflector and lamp holder, horizontally adjustable collector.

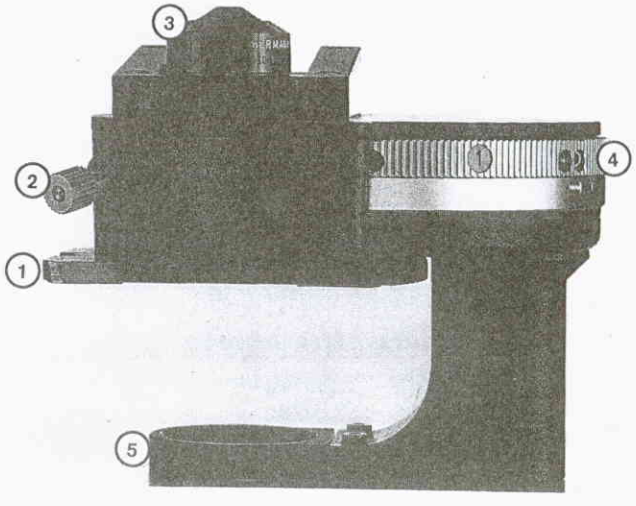
Lamphousing 103Z (1.1)
For halogen and gas discharge lamps up to 100W. Reflector and lamp holder are centered separately, collector is horizontally adjustable.

Condensers

UKO universal condenser
With sliding mount. Disengageable holder for condenser tops coupled to a supplementary lens. Can be adapted for various applications. Turret (accessory) for phase contrast (p. 17) and interference contrast. An adjustable stop (33.10) ensures reproducible setting of the condenser height.

D 0.80-0.95 dry darkfield condenser
With sliding mount. For darkfield studies with objectives of numerical aperture < 0.75.

D 1.19-1.44 Oil immersion darkfield condenser
With sliding mount. For darkfield studies with objectives of numerical aperture < 1.10.



Condenser tops for the UKO condenser

CondensOr Top	Top in/out	Use
0.90 S 1.1	Out (suppl. lens in)	With objective aperture < 0.25
0.90 S 1.1	In (suppl. lens out)	With objective aperture > 0.25
OEL 1.40	In (suppl. lens out) Immersion oil on front element.	With high aperture objectives

Fig. 6
UKO universal condenser
1 Mount
2 Centring screws for ring stops (one hidden)
3 Top
4 Turret
5 Supplemetary lens

Objectives

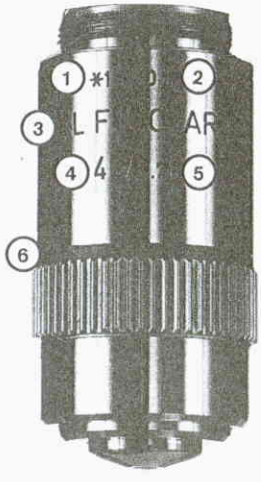
All LEITZ objectives which are designed for a mechanical tube length of 160mm can be used on the DIAPLAN. Those designed for a tube length of 170mm are suitable from 16x magnification.
The objective engravings have the following meanings (see Fig. 7):

1 **160/** (or 170/): mechanical tube length (the distance from the screw-mount flange to the upper edge of the eyepiece mount, in mm) for which the objective is designed.
2 **/0.17:** coverglass thickness. A coverglass of thickness 0.17 must be used when working with this objective. If, instead of the figures, a dash (–) is engraved, specimens with or without a coverglass can be studied.
3 **PL FLUOTAR:** semi-apochromatic plan objective with field flattened to 25mm intermediate image.
PLAN: achromatic plan objective with field flattened to 20mm intermediate image.
PL APO: apochromatic plan objective with field flattened to 28mm intermediate image.
PL: achromatic plan objective with field flattened to 28mm intermediate image.
PHACO: engraved additionally to the objective type for objectives suitable for phase contrast work. Also indicated is the UKO condenser turret setting (e.g. PHACO 1 = turret setting 1).
4 **40/:** magnification, i.e. the size ratio of intermediate image to specimen.
5 **/0.70:** numerical aperture.
6 **Immersion objectives** have an indication of the immersion medium and a black (oil) or white (water) ring.
All objectives have a colored ring indicating the magnification according to the table below:

Magnification	2.5x	4x	6.3x	10x
Color	brown	red	orange	yellow

16x	25x	40x	63x	100x
pale green	dark green	pale blue	dark blue	white

Fig. 7
PL FLUOTAR objective



Eyepieces

LEITZ eyepieces designed for a mechanical tube length of 160mm are used on the DIAPLAN. The PERIPLAN GF 10x and 12.5x eyepieces have a field of view index of 20, and the PERIPLAN GW 8x and 10x field of view indices of 26 and 28 respectively.
The field of view of an eyepiece is defined as the diameter of the intermediate image visible in the tube using the eyepiece. It appears magnified by the eyepiece factor. The image diameter of an eyepiece, as it appears to the observer at a distance of 250mm, is calculated from the product of the eyepiece magnification and the field of view index. An example with the PERIPLAN GF 12.5x/20 M eyepiece:

Eyepiece magnification	12.5x
Field of view index	20
Image diameter	12.5 x 20 = 250mm

If one divides the field of view diameter by the objective magnification and any tube factor present (e.g. 0.8x, 1.25x), the diameter of the visible specimen area is obtained. With the GF 12.5x/20 eyepiece again, plus the PL FLUOTAR 25/0.60 objective and a tube factor of 1x, an area of diameter

$$\frac{20\text{mm}}{25 \times 1} = 0.8\ \text{mm}$$

of the specimen can be seen. With a tube factor of 0.8x, this would be

$$\frac{20\text{mm}}{25 \times 0.8} = 1.00\text{mm}$$

The overall microscope magnification is calculated from the objective magnification x eyepiece magnification x tube factor. Example:

Objective:	PL FLUOTAR 25/0.60
Eyepiece:	PERIPLAN GF 12.5x/20 M
Tube factor:	0.8x
Overall magnification:	25 x 12.5 x 0.8 = 250x

2. Assembly

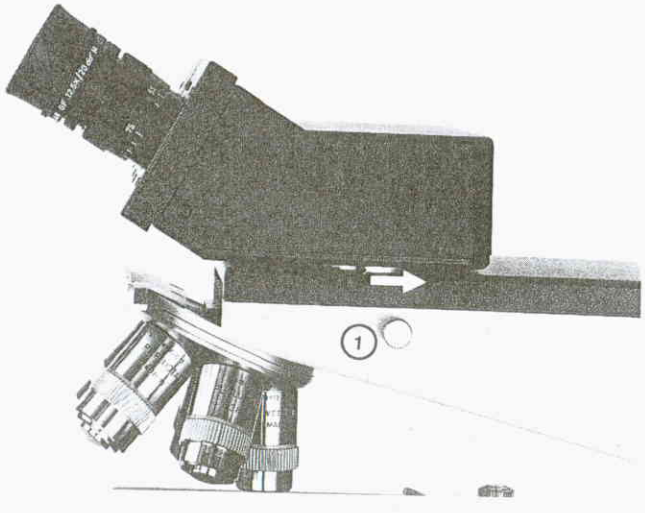
Tube

Push the lever (33.4) in the arrowed direction (Fig. 8) and insert the tube into the mount (without tilting). Allow the lever to slide back top its initial position. The tube can be rotated through 360° and clamped in any position by gently pulling on the lever.

Eyepieces

Eyepieces with fixed eye lenses can be inserted directly into the mounts. Eyepieces with adjustable eye lenses must first be set, by rotating the latter, so that the edge of the field of view or, if appropriate, the cross wires, appear sharp. This is best carried out by looking through the eyepiece at a pale surface such as a wall or the sky. After adjustment, insert the eyepieces in the mounts.

Fig. 8
Mounting the tube, eyepieces and objective nosepiece



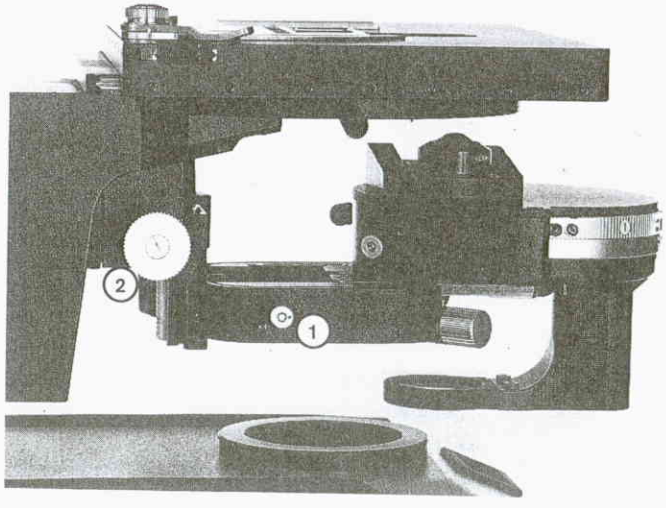
Objective nosepiece

Screw the objectives into the nosepiece in such an order that a continuous increase in magnification is possible when rotating the nosepiece.
Lower the stage a little using the coarse focus control (1.2) and slide the nosepiece into the dovetail guide to its stop, making sure that the clamp screw (8.1) is first loosened. Clamp in place by tightening the screw.

Condenser

Rotate the condenser clamp so that the markings on the clamp and the condenser holder are aligned.
Lower the condenser holder using the control (9.2) until the condenser can easily be slid in to the stop. Tighten the clamping screw. Raise the condenser to its upper stop.

Fig. 9
Mounting the condenser



Lamphousing

Lamphousing 103
Undo screw (33.9) and remove the lamphousing cover. Insert a 12V 100W halogen lamp into the holder. It must be ensured that the lamp's protective cover is only removed the lamp is in the holder (avoid finger marks). Close the lamphousing. Set the mounting bayonet lever to the upright position, insert the lamphousing into the mount and turn the lever to the side to clamp. Connect the cable to the voltage regulator built into the base of the DIAPLAN. Adjust the lamphousing collector as described on p. 16.
Before replacing a defective lamp, first disconnect the cable to the microscope base.

Lamphousing 103 Z
Open the lamphousing cover after first loosening the screws (10.1) with the supplied screwdriver. Move the collector to its frontmost position by turning the knob (12.2). Insert a 12V 100W halogen lamp into the holder (11.1), making sure that the lamp's protective cover is only removed when the lamp is in the holder (avoid finger marks).
Slide the lamp holder with the side guide slots (22.4) into the lamphousing and clamp with screws (11.2). When closing the lamphousing cover, make sure that the pins in the cover engage in the sockets (11.3) in the lamphousing. These are part of the cut-off switch which automatically switches off the current when the lamphousing is opened. Retighten the screw (10.1).

Lamphousing 103 Z is mounted on the microscope as for lamphousing 103. To replace a defective lamp, disconnect the power cable before opening the cover. Loosen the clamp screw (11.2) and pull the lamp holder out from the housing. Remove the defective lamp and insert the new one as described above.

Fig. 10
Lamphousing 103Z

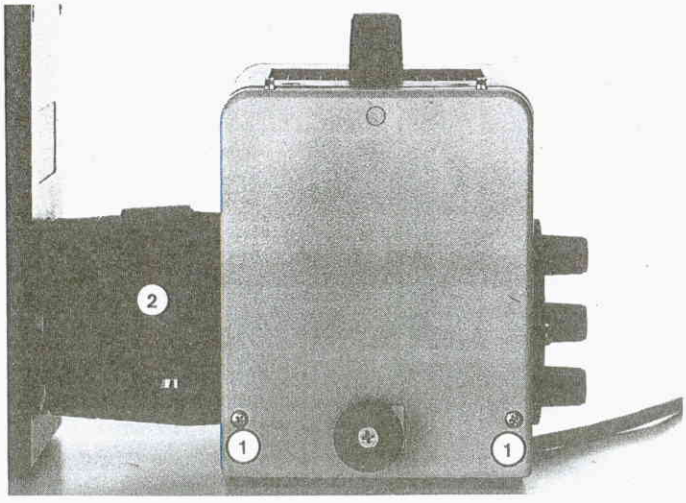
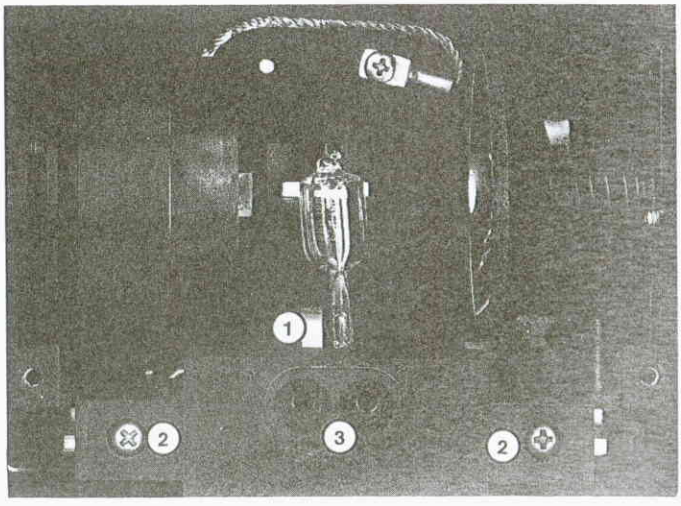


Fig. 11
Lamphousing 103 Z, open



3. Operation

General

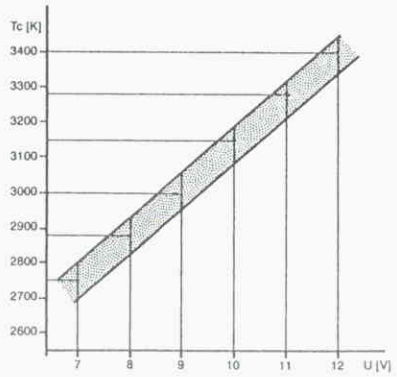
Before switching on, make sure that the voltage selector in the base is set correctly for the local mains power supply. Connect the microscope power cable and plug into the mains. Switch on the illumination (at the rear right-hand side of the base) and adjust the brightness using the rotary control (33.7). For colour photography the required colour temperature must also be set with knob (33.7), e.g. about 10.5 V for an artificial light film with 3200 K (see diagram).

Voltage regulator:

Max. power consumption:	125W
Mains voltage:	220/240V or 110/120V, 50/60Hz switchable
Fuse:	1x F 2A

Safety Class 1

Colour temperature as a function of lamp voltage.



The DIAPLAN left the factory in a state of perfect safety. In order to maintain this condition and to ensure safe operation, the user must note and adhere to the directions and warnings contained in this instruction manual.

The mains plug may only be inserted into an earthed socket, and any extension cable used must be similarly earthed. Any break in the earth lead inside or outside the instrument can render the unit dangerous. Intentional severance is forbidden.

Live components can be exposed if covers or parts are removed, even if this is possible by hand. Sockets and connectors can also carry current.

If it is suspected that the instrument is unsafe to operate, the equipment must be disconnected form all power supply points and safeguarded against unintentional operation.

The microscope must be set up on a firm, level work surface (without cloth covering or similar) so that cooling air can flow through the slits in the base. The cooling slits at the rear as well as those next to the right-hand arm rest must also be kept claer at all times. The base plate, which also allows cooling of the power supply, may only be removed by our Service Engineers.

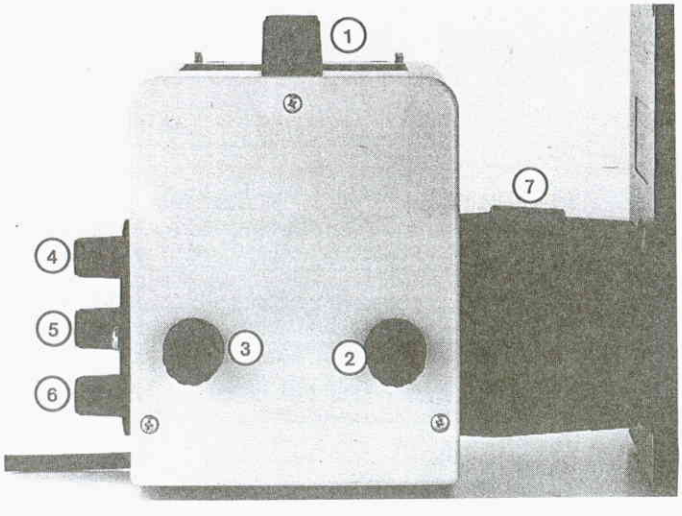
Centring the lamp in lamphousing 103Z

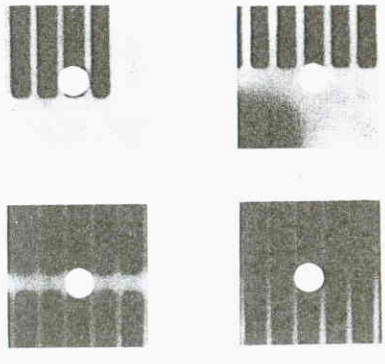
Switch on the lamp. Remove the light trap (12.7) and any filters from the filter mount. Locate the centring aid (10.2) in the light path (horizontal position).
Focus the image of the lamp filament on the centring aid's screen using the collector knob (12.2). Use the centring knob (12.1) to move the image into the upper half of the illuminated area, and then use the centring knob (12.3) to move the image horizontally until it completetly fills the upper half of the illuminated area.

Now use centring knobs (12.4) and (12.6) to move the mirror image into the lower half of the illuminated area, focus with control (12.5), and fill the lower half of the illuminated area with the image.

Finely adjust the knobs (12.1) and (12.4) until the two images just touch in the center.
Remove the centring aid (45° setting) and replace the filters and/or light trap.

Fig. 12
Lamphousing 103Z





Clamping the specimen

Insert the specimen slide into the holder on the stage. The tightness of the clamp can be adjusted by pressing the knurled button on the specimen holder joint down and turning it to the left (tighter) or to the right (looser), then pulling it up until it clicks into place.

Tube adjustments

When adjusting the tube, it is most convenient to use an objective of medium magnification, e.g. the PL FLUOTAR 16/0.40. The condenser top should be slid into the light path, and the aperture diaphragm (1.14) and field diaphragm (1.13) should be opened fully.

On the binocular **observation tubes S and SV,** set the interpupillary distance to suit the operator by pulling or pushing the grips until the images seen with both eyes completely cover each other and appear as a single circular image.
Read off the distance from the scale on the tube front and transfer this to both eyepiece mounts, e.g. for an interpupillary distance of 65mm, set this on both eyepiece mounts.

Fig. 13
Clamping the specimen

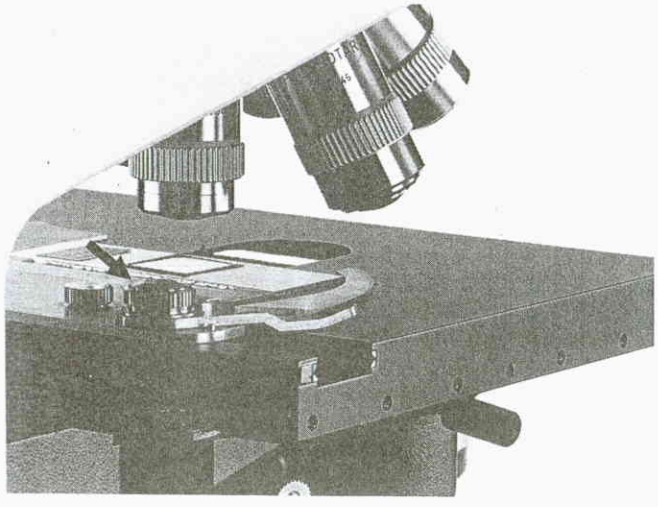
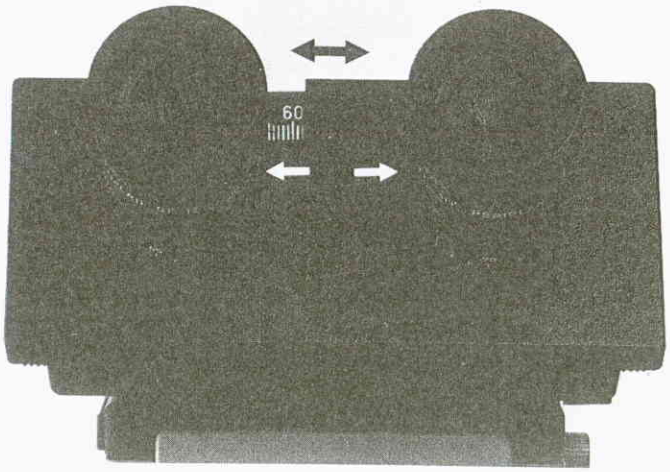


Fig. 14
Setting the interpupillary distance



The tubes can be corrected for differing vision in each eye as follows: look through the left eyepiece with the left eye and focus the specimen with the fine focus control. Then, with the right eye, look through the right eyepiece and turn the eyepiece mount until the same specimen detail as before is sharp; do not touch the focus controls during this. If an adjustable eyepiece is being used, this correction is carried out by adjusting the front element without turning the eyepiece mount.

For the **FSA, FSA-R, FSA-GW-R phototubes,** the interpupillary distance is set as for the S and SV tubes, but the mechanical tube length compensation is automatic, i.e. the distance setting is not transferred to the mounts. Differing vision in each eye is corrected by adjusting the eyepiece front lens.
The FSA-GW-R tube, with or without second photo port, has a tube factor of 1.25x which must be taken into account when calculating the microscope magnification; all other tubes have factor 1x.

If using the **magnification changer** (accessory), this may only be set to 1.25x, 1.6x and 2x.

Centring the condenser

Focus the specimen with the coarse and fine controls (1.2). The adjustable focus stop prevents the stage being raised too far. It is best set just below the plane of focus of the objectives; this is accomplished by means of the knurled screw (33.3).
For optimum illumination, the condenser must be centered accurately. This is carried out as follows:

1. Close the field diaphragm (1.13).
2. Turn the condenser height stop screw (33.10) to the left and raise the condenser as far as possible using the height control (1.11).
3. By turning the condenser stop screw to the right, lower the condenser until the edge of the field diaphragm is in focus.
4. Use the two screws (33.3) to move the image of the field diaphragm to the center of the field of view.
5. Open the field diaphragm until its image is just larger than the field of view.

The condenser may have to be slightly recentered each time a different objective is used.

Field diaphragm

The field diaphragm protects the specimen from unnecessary heat by blocking all the light which is not required for the illumination. It should, therefore, only be opened so that its image is just larger than the field of view. A change of objective hence always demands an adjustment of the field diaphragm.

Aperture diaphragm

The aperture diaphragm (1.14) determines the contrast and resolution of the image. For most well-prepared specimens, the best optical performance is obtained when the objective aperture and the aperture diaphragm are the same size. If the aperture diaphragm is closed to a size less than that of the objective aperture, the resolution will be reduced, but the contrast increased. The eye notices a reduction in resolution when the aperture diaphragm is closed to less than ⅓ of the aperture of the objective; this should, therefore, be avoided.
To set the aperture diaphragm correctly, remove an eyepiece from its mount, and close the aperture diaphragm until the image is just visible on the rear objective element. This is the normal setting. Replace the eyepiece. For specimens of low contrast, the aperture diaphragm can be closed further so that less contrasty structures are clearly visible.

Note: The aperture diaphragm should **not** be used to adjust the image brightness. Only the rotary brightness control (33.7) or neutral density filters should be used for this purpose.
When using objectives of aperture <0.25, slide the condenser top out of the light path. The condenser remains in the same position as otherwise. For the PL 1.6/0.05 objective, the aperture diaphragm must be opened fully.

Lamp collector

The lamp collector should be adjusted using an low-powered objective (1.6x or 2.5x with the condenser top out of the light path or 10x with the condenser top in position). Focus on the specimen, then adjust the collector (knob 12.2) until the field of view is evenly illuminated.

Oil immersion

Oil immersion objectives are engraved with the word "OEL" and a black ring on the lower edge of the mount.
Immersion oil has the same refractive index ($n_e = 1.515$) as the coverglass and the front element of the objective. The focal lengths and free working distances of immersion objectives are usually very small. For this reason, care is required when working with them. It should also be ensured that the oil is free from air bubbles.
In general, condenser top 0.90 S 1.1 should be adequate for most work with oil immersion, but, if it is necessary to use the full aperture (e.g. to resolve very fine details), the aplanatic-chromatic OEL 1.40 top is available. In this case, a drop of oil should also be applied to the condenser top and to the underside of the specimen slide. After completion of work, all surfaces which have come into contact with the immersion oil should be cleaned carefully with a soft alcohol-moistened cloth.

Transmitted light darkfield

For darkfield studies, condenser top D 0.80-0.95 is used with objectives of aperture <0.75 and top D 1.19-1.44 with those of aperture >0.75. For apertures >1.10, an iris diaphragm should be used.
The illumination is set as follows:
Place the specimen on the stage. Turn the condenser stop screw (33.10) to the right as far as the stop, then mount the darkfield condenser and raise it to the stop. When using the D 1.19-1.44 condenser, first put a drop of immersion oil on the surface of the top before raising the condenser until the oil touches the underside of the specimen slide. This point is reached when the slide lights up somewhat.
Focus on the specimen using the 10x or 16x objective, and close the field diaphragm. After turning the stop screw to the left, raise the condenser until the edges of the stop can be seen sharply in focus whilst viewing the specimen.
Center the image of the stop using the two keys, then open the field diaphragm until it just disappears from the field of view.

Phase contrast

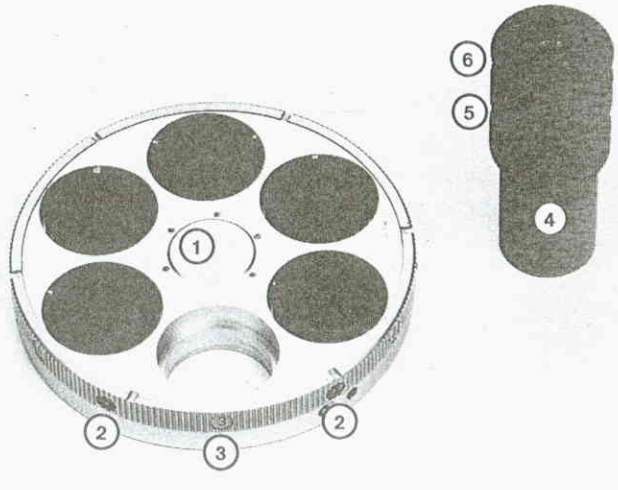
The UKO condenser can be equipped as a phase contrast condenser by using the ring stop turret. This is fitted with the desired ring stops (or Wollaston prisms for interference contrast) in the factory, but can be re-fitted by the user himself at any time.

Insertion or exchange of the stops
All the ring stops are engraved with the necessary turret position and condenser top. For example, "3 S 1.1" means the stop is for use with the PHACO 3 objective and the S 1.1 condenser top.
Before inserting or removing the stops, loosen the centring screws (15.2) by means of the supplied key until their heads are level with the knurled turret grip ring. Press the stop, with the engraving facing upwards, with the orientation slot against the spring pin and insert or remove. Screw both centring screws in until the stop is in the center of its mount. Stick the appropriate plastic label to the grip ring (15.3) **opposite** the mount. The mount opposite the label "H" (fitted in the factory) is intended for brightfield work and should remain empty; it has, for this reason, no centring screws. The ring stops are designated by the numbers 1-4, the darkfield stop by the letter D.

Inserting the turret
Slide the condenser top into the light path. Loosen the screw on the underside of the condenser (Fig. 16). Pull the dust cover out from the condenser and insert the turret so that the ring stops face upwards. Retighten the clamping screw.

Setting phase contrast
Screw the phase contrast objectives into the nosepiece and slide the latter into its mount, clamping with the screw (33.5). Insert the UKO condenser with ring stop turret into its mount and raise it as far as possible. Set the aperture diaphragm to "PH" for phase contrast. Place the specimen on the stage, select the 10/0.30 PHACO 1 or 16/0.40 PHACO 1 objective, and set the ring stop turret to position "1". Focus on the specimen using the coarse and fine focus controls.

Fig. 15
Turret and adjustment telescope



Close the field diaphragm, then adjust the height of the condsenser using the height control and stop screw so that the rim of the field diaphragm appears sharp. Center the diaphragm image by means of the two centring screws, and open the field diaphragm until its image is just larger than the field of view. Remove an eyepiece from its mount and replace it with the adjustment telescope (15.4). Loosen the clamping ring (15.5) and adjust the eyelens (15.6) until the light and phase rings are in focus. Using the ring stop centring keys (16.1, push in and turn), adjust the light ring so that it exactly covers the objective phase ring (Fig. 17). This should be repeated for each objective/ring stop combination and need not be altered later.

Fig. 16
UKO universal condenser

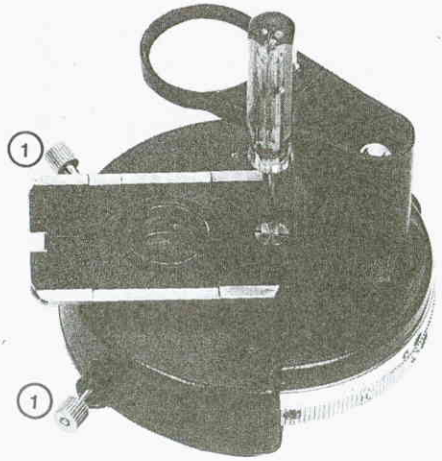
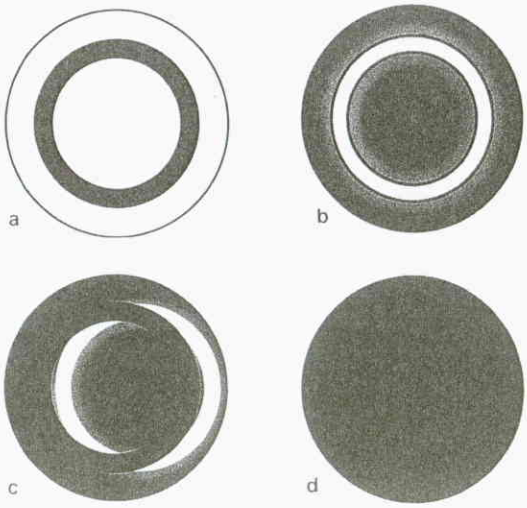


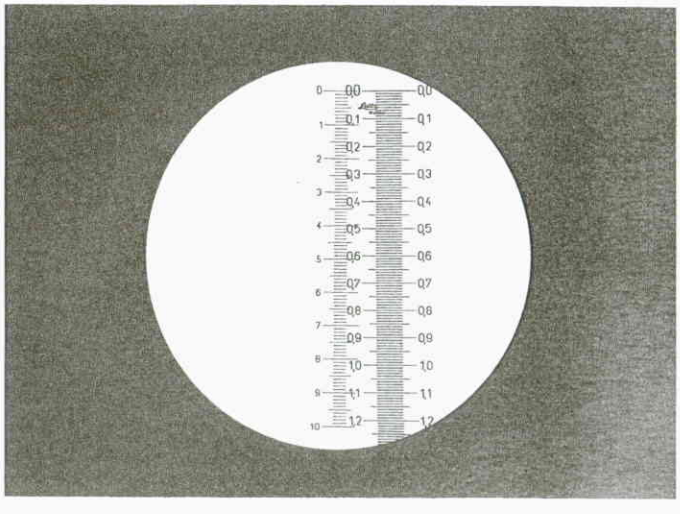
Fig. 17
Light and phase rings as seen through the adjustment telescope
a Brightfield
b Phase contrast, centered
c Phase contrast, decentered
d Darkfield



Microscopic measuring

The meaurement of microscopic objects is carried out using a measuring eyepiece (usual scale; 10 mm = 100 divisions). Before starting the measurement, the micrometer value of the objective in use must be known. The micrometer value is the distance in the specimen plane which produces an image exactly one division long on the graticule scale in the measuring eyepiece. As the optical constants of the objectives fluctuate slightly, it is recommended that the micrometer value be determined initially with the aid of a specimen micrometer.
Examples:
Evaluation of the micrometer value with a specimen micrometer (2 mm = 200 divisions) and a measuring eyepiece with graticule (10 mm = 100 divisions).
Move the micrometer until the zero lines on both it and the measuring eyepiece coincide; the micrometer value can be read off from the end of the measuring eyepiece scale.
In this example (fig. 19), the end of the eyepiece scale (100 divisions) coincides with 1.220 mm on the micrometer scale. 100 divisions therefore is equivalent to 1.220 mm, and 1 division = 0.01220 mm = 12.0 μm.
For low-power objectives where the micrometer scale does not cover the entire eyepiece scale, only 10 eyepiece scale divisions are measured. For example, if the tenth division corresponds to 0.036 mm on the micrometer scale, then 1 division = 0.036 mm = 36 μm.
For very precise measurements, the screw micrometer eyepiece is available; further details from brochure 513–017.

Fig. 18
Graticule scale in the eyepiece (left) and specimen micrometer image (right).



Incident light fluorescence
3-λ PLOEMOPAK incident light fluorescence illuminator

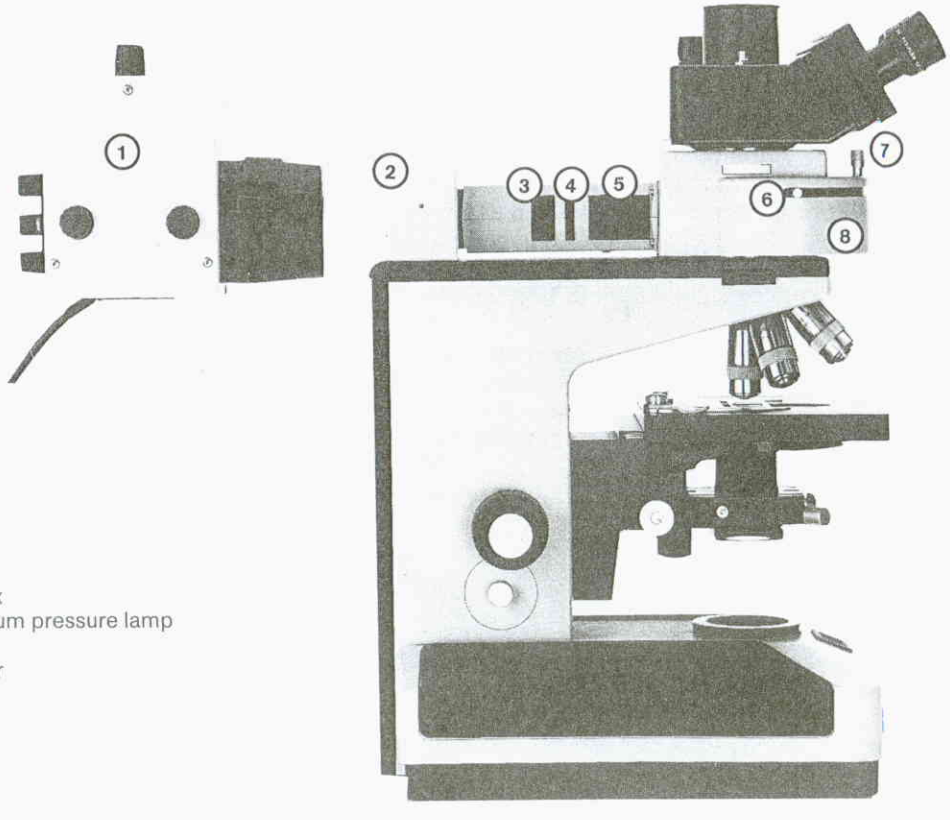


Fig. 19
3-lambda PLOEMOPAK with tube factor 1x
1 Lamphousing 103 Z with 50W Hg maximum pressure lamp
2 Lamphousing mount
3 Disengagable BG 38 red-absorption filter
4 Excitation light blocking slide
5 Field diaphragm
6 Filter block interchange control
7 Stop for twin wavelength study
8 3-lambda PLOEMOPAK

Insertion or exchange of filter blocks
The filter blocks can be fitted or replaced after removing the cover as shown below. The key for loosening or tightening the fixing screws is located inside the cover.

Fig. 20
3-λPLOEMOPAK with filter block cover removed

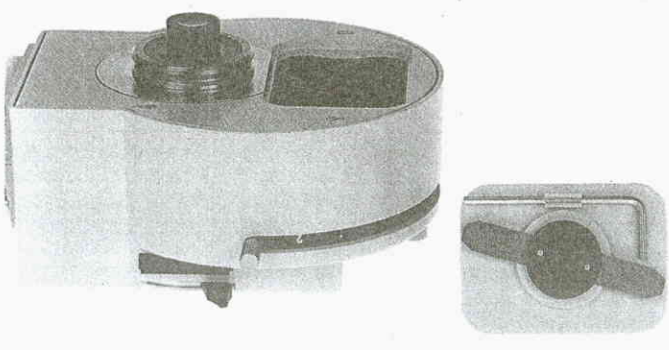
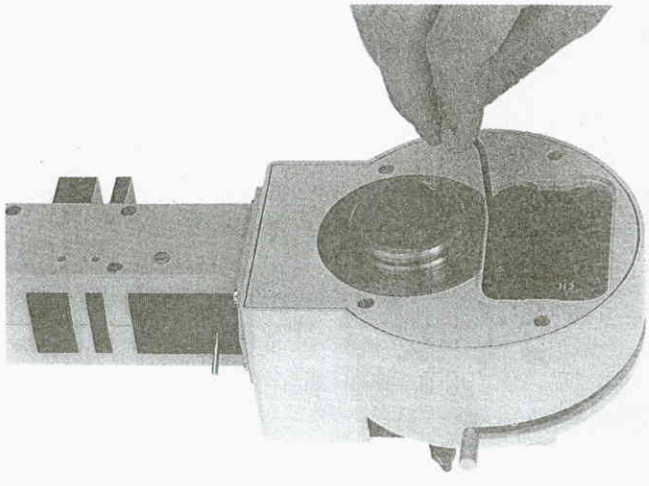


Fig. 21
Loosening/tightening the filter block



Mounting the PLOEMOPAK

Remove the cover plate and screw the lamphousing mount for the PLOEMOPAK to the top of the stand. Remove the observation tube from the microscope, then mount the PLOEMOPAK onto the stand using the tube mount and the lamphousing mount. Insert the light-blocking slide into its slot in the PLOEMOPAK. Insert the tube into the mount on top of the PLOEMOPAK. Attach the lamphousing to the holder, making sure that the clamping lever is in the upright position. Clamp by turning the lever to the left. Replace the condenser by the light trap (fig. 21).

The PLOEMOPAK can only be used with objective nosepieces without a tube lens (tube factor 1x) or with tube factor 1.25x.

50W mercury lamp

Insertion:

Remove the lamp holder from the lamphousing. Insert the lamp between the clamping jaws (1, fig. 23) and fix with the screw (2). Loosen pin (3), insert the labeled lamp socket into the holder and tighten the pin. Insert the lamp holder with lamp into the lamphousing and connect to the transformer.

Note:

Before replacing the lamp, pull out the mains plug and allow the lamp to cool.

Fig. 22
Inserting the light trap

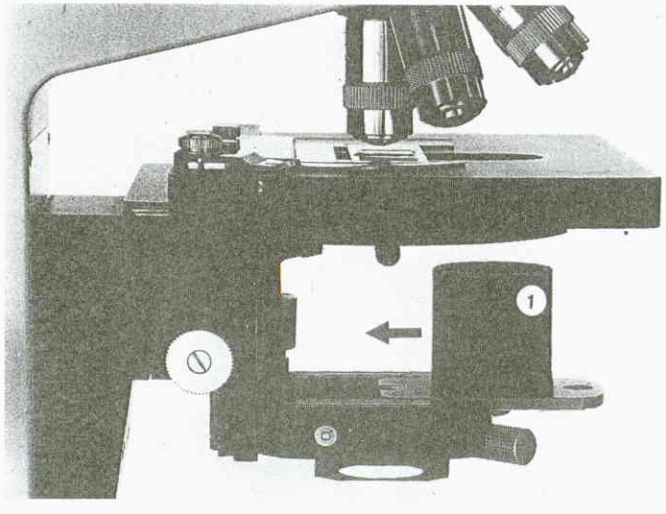
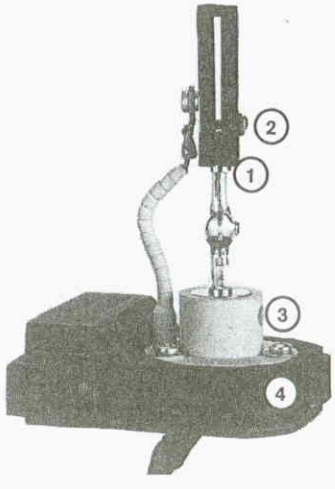


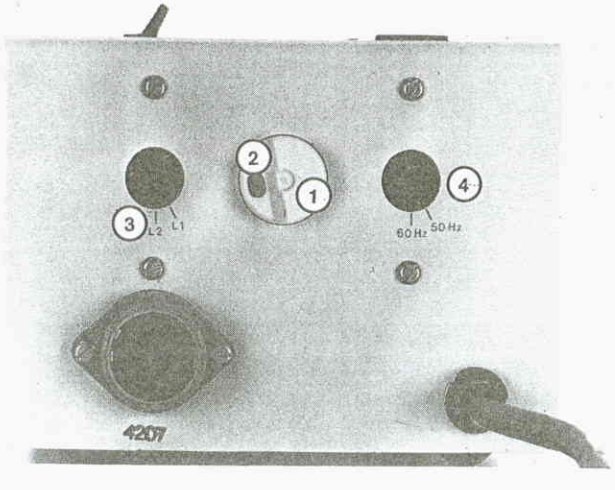
Fig. 23
Lamp holder with 50W Hg lamp



Operation:
Connect the lamphousing to the transformer and connect the latter to the mains. Before switching on, it should be ensured that the mains voltage is 220V and that the frequency is correctly set on the transformer (50/60 Hz). The transformer can only be used for 220V ± 10%. If, for example, the mains voltage is 120V, a corresponding transformer must be used. It should further be ensured that the markings on the lamp socket and the setting on the transformer correspond. For example, if L_1 or L_2 is marked on the lamp socket, then the transformer must be set to L_1 or L_2 on the mains connection side in order to use the lamp fully and to extend its life.

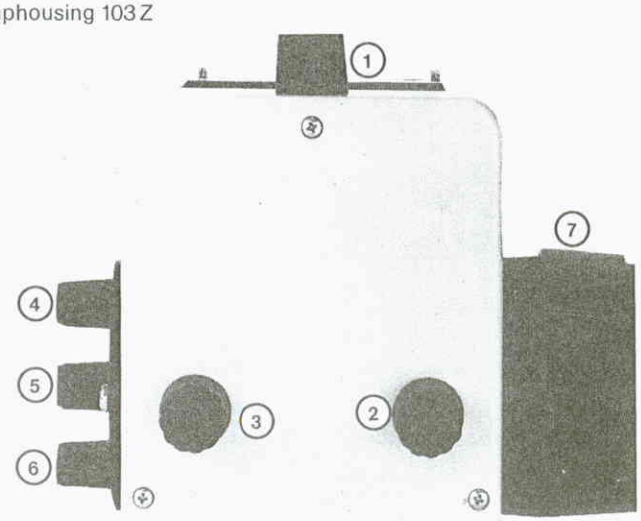
The safety starter (1), e.g. No. 192 by Osram, is initially responsible for the lamp start-up. If it does not light properly after several attempts (still warm or faulty), the safety starter switches off. When the lamp has cooled down or been replaced by a new one, the starter can be reset by pressing the red button (2). It can be removed by turning to the left and replaced. If it carries the inscription "für HBO 75W", this means that it was originally developed for this lamp, but may also be used with other similar lamps. Please also note the instructions accompanying the lamp.

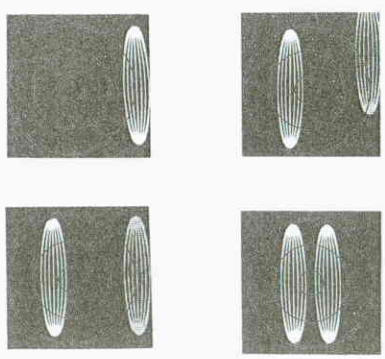
Fig. 24
Transformer for 50W mercury lamp
1 Safety starter
2 Reset button



Centration
Switch on the lamp, and remove the light trap (26.7) and any filters from the filter mount. Position the centring aid (10.3) in the light path (horizontal position).
Center the lamp as follows: Adjust the collector adjustment knob (26.2) until the discharge arc image on the centring aid screen is in focus.
Turn the lamp height adjuster (26.1) until the discharge arc image is at the correct height according to the illustration.
Turn the lamp horizontal adjuster (26.3) until the discharge arc image is positioned in the centre according to the illustration.
Adjust the mirror adjustment knob (26.5) until the reflected discharge arc image is in focus.
Turn the reflected image height adjuster (26.4) until the reflected image is at the same height as the direct image.
Now adjust the horizontal control (26.6) until both images are next to one another.
Finally, the collector (26.2) should be adjusted until the image is homogenously illuminated.
Swing the centring aid back to its 45° position, and replace the filters and light trap.

Fig. 25
Lamphousing 103 Z

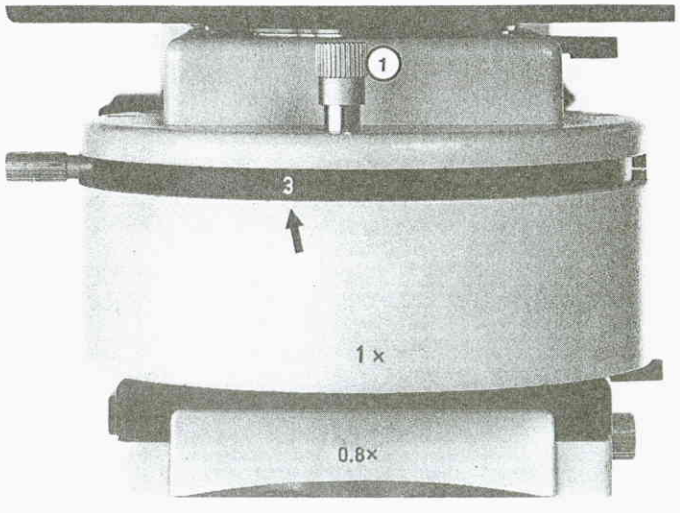




Twin wavelength method
This method can be used by employing the stop as indicated in Fig. 27 and serves for recognition of small amounts of one fluorochrome in the presence of large quantities of a second. By alternate excitation with two wavelengths, the specific fluorescence can be separately observed from the other. Two different components can then, for example, be recognised inside one or in separate cells.
The arrowed number indicates the filter block currently in place in the light path. The stop (1) clicks into place when the block is correctly positioned. Only filter blocks 1 and 2 can now be used; the stop prevents selection of block 3, thus allowing rapid interchange between 1 and 2. The stop can be disengaged by raising and slightly rotating knob (1).

Transmitted-light insert
In place of one of the three filter blocks, a transmitted-light insert can be used in the PLOEMOPAK for normal transmitted-light microscopy. The microscope can thus be used alternately for transmitted-light brightfield work and incident-light fluorescence studies.

Fig. 26
3-lambda PLOEMOPAK



Filter blocks

Filter block	Excitation range	Excitation filters	Dichromatic mirror	Suppression filter	Type of filter Excitation	Suppression
A	ultra-violet	BP 340–380	RKP 400	LP 430	G	F
A 2	ultra-violet	BP 270–380	RKP 380	BP 410–580	G	F
B 2	uv + violet	BP 340–410	RKP 455	LP 470	G	F
D	uv + violet	BP 355–425	RKP 455	LP 460	IKP	F
E 3	blue	BP 436/7	RKP 475	LP 490	IBP	F
G	uv + violet + blue	BP 350–460	RKP 510	LP 520	G	F
H 3	violet + blue	BP 420–490	RKP 510	LP 520	IKP	F
I 2/3	blue	BP 450–490	RKP 510	LP 520	IKP	F
K 3	blue	BP 470–490	RKP 510	LP 520	IKP	F
L 3	blue	BP 450–490	RKP 510	BP 525/20	IKP	IBP
M 2	green	BP 546/14	RKP 580	LP 580	IBP	F
N 2	green	BP 530–560	RKP 580	LP 580	IKP	F
N 2.1	green	BP 515–560	RKP 580	LP 580	IKP	F

Transmitted light insert also available, replaces a filterblock

BP = band pass filter
F = gelatine filter (combination)
G = colored glass filter (combination)
IBP = high-performance interference band filter
IKP = high-performance interference short-pass filter
LP = long-pass filter
RKP = reflection short-pass filter

Filter blocks with dichromatic mirror, but without excitation or suppression filters (fitted by user).
RKP 400 for uv excitation
RKP 455 for violet excitation
RKP 510 for blue excitation
RKP 580 for green excitation
Other dichromatic mirrors on request.

1-λ PLOEMOPAK incident light fluorescence illuminator

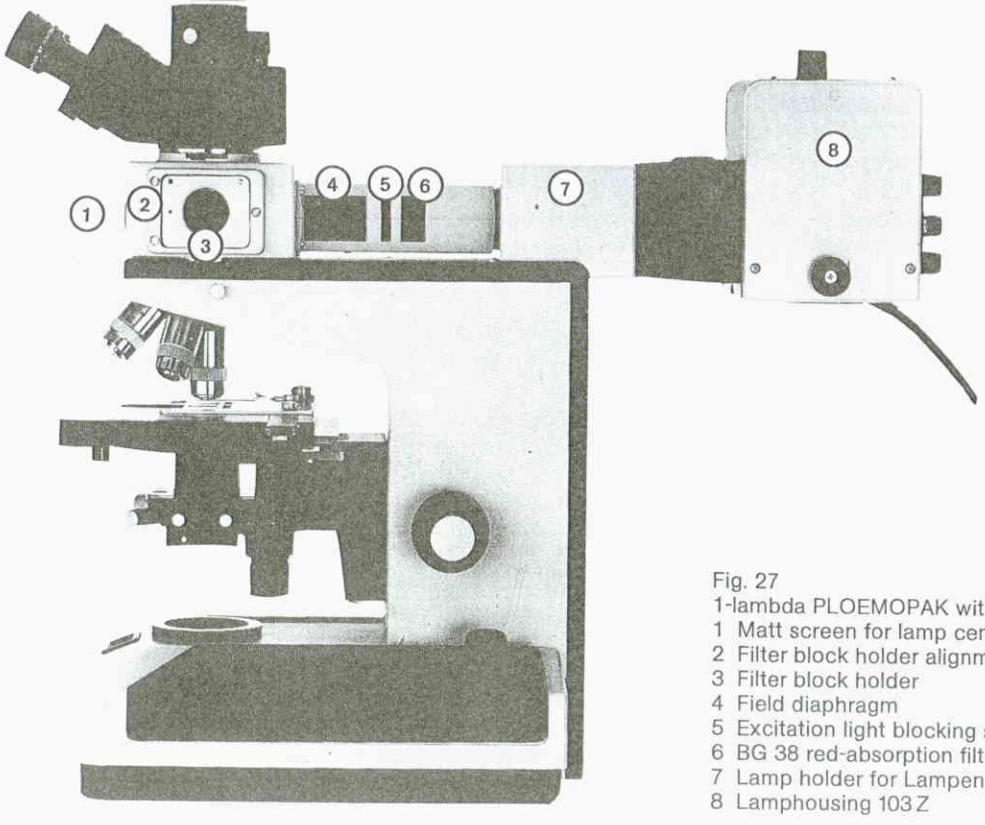


Fig. 27
1-lambda PLOEMOPAK with tube factor 1x
1 Matt screen for lamp centring
2 Filter block holder alignment dots
3 Filter block holder
4 Field diaphragm
5 Excitation light blocking slide
6 BG 38 red-absorption filter
7 Lamp holder for Lampenhousing 103 Z
8 Lamphousing 103 Z

Assembly and operation
Analogous to the 3-λ PLOEMOPAK. The image of the discharge arc and its reflected image can be centred using the matt screen; the filter block changing unit should first be removed for this purpose (cf p. 24).

Fig. 28
Removing the filter block changing unit

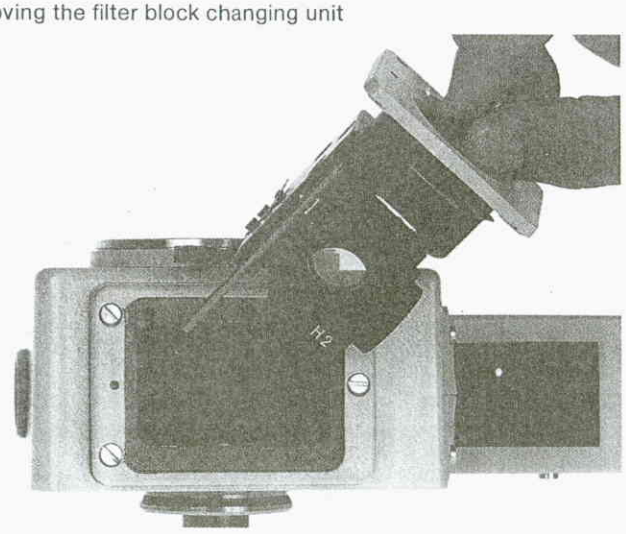
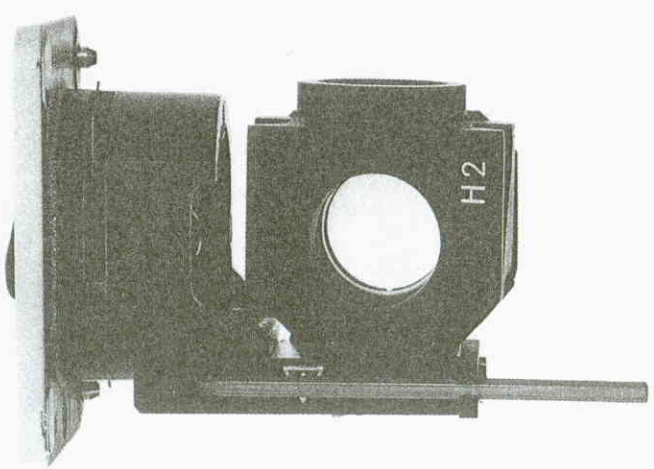


Fig. 29
Removed changing unit with key for loosening/tightening the filter block



Insertion or replacement of the filter block
When inserting the filter block into the holder, the block engraving (31.1) and the marking on the holder (31.2) must face the same way.
When inserting the holder into the PLOEMOPAK, the two arrowed dots (Fig. 32) must be aligned.

Fig. 30
Loosening/tightening of the filter block

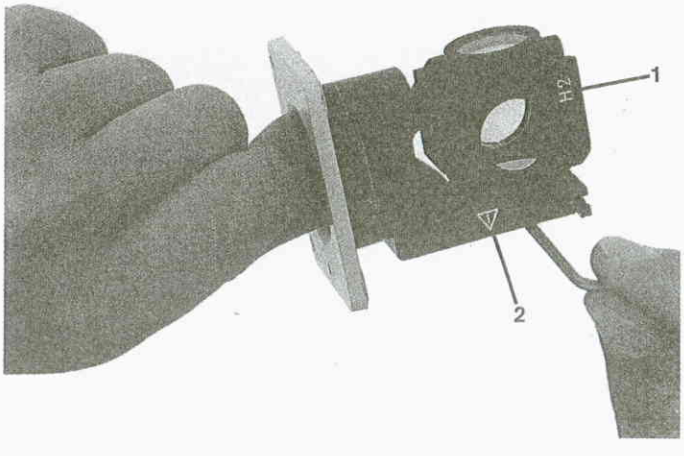


Fig. 31
Inserting the filter block holder into the PLOEMOPAK

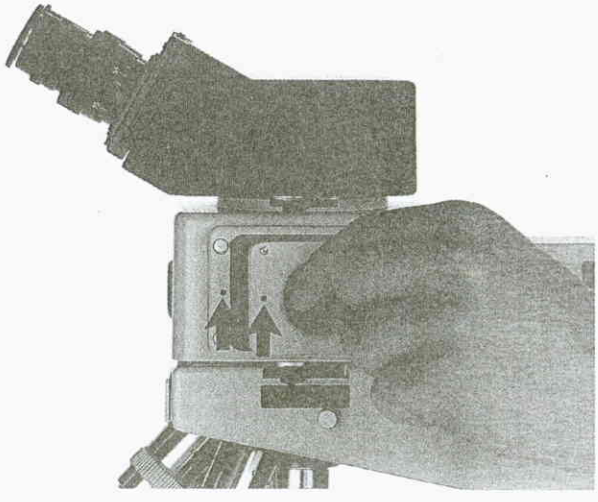
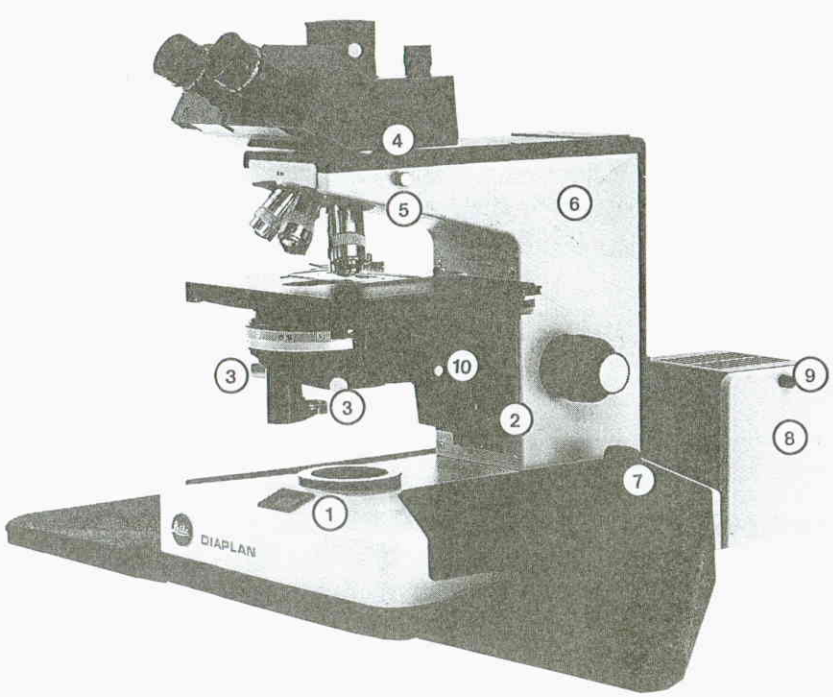


Fig. 32
DIAPLAN with lamphousing 103, UKO universal condenser, No. 87 mechanical stage, and binocular observation and phototube FSA

1 Voltmeter
2 Stage x- and y-movement controls
3 Condenser centring screws
4 Tube clamp
5 Objective nosepiece clamp screw
6 Stand
7 Lamp brightness control
8 Lamphousing 103
9 Cover screw
10 Condenser height stop



4. Care and Maintenance

Dust protection is provided by a flexible dust cover which should always be used when the instrument is not in use. The stand should be cleaned from time to time with a linen or leather cloth; alcohol must not be used as it attacks the paint, but petroleum is well suited for cleaning the painted surfaces. Pale spots on the object stage can be removed by rubbing with paraffin oil or vaseline.

Particular care should be taken when undertaking studies using acids or other aggresive chemicals. Direct contact of these substances with the stand or optics must be avoided under all circumstances, and all parts should be carefully cleaned after use. The optics must be kept scrupulously clean. Dust can be removed from glass surfaces by means of a dry, fine-haired brush, blowing gently across the surface whilst brushing. If the dirt is difficult to remove, a clean cloth, moistened with distilled water, can be used or, if this also has no effect, pure alcohol may be applied. Particular care should be taken when cleaning anti-reflection coatings. The outer eyepiece surfaces and the front elements of the objectives have coatings of approximately the same hardness as glass and must be correspondingly carefully cleaned.

Objectives should not be screwed apart during cleaning. If damage or dirt is noticed inside them, they should be ruturned to us for repair. Cleaning of the inner surfaces of the eyepieces is also advised against.

Microscopes being used in hot and/or humid climates require special care. It should be ensured that a build-up of fungus does not occur, which is managed, in the first place, by thorough and meticulous cleaning and storage in a cupboard whose inside temperature is at least 5° C above that of the room. It must also be provided with airing holes, loosely plugged with cotton wool or gauze as protection against dust. If this type of storage is not possible, the microscope must be kept in a closed container with an adequate amount of drying agent (e. g. silica gel). These measures should be taken even in laboratories with air conditioning. In warm and dry climates, dust is the greatest enemy. The instrument should, therefore, be covered with the dust cover immediately after use or cleaning and stored in a cupboard. If a humid period of longer than one month occurs, storage in a warm cupboard, as described above, is desirable.

Proper handling of the microscope will ensure decades of service. If, however, a check over or repair becomes necessary, please contact your Leitz agency or our Technical Service direct.

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