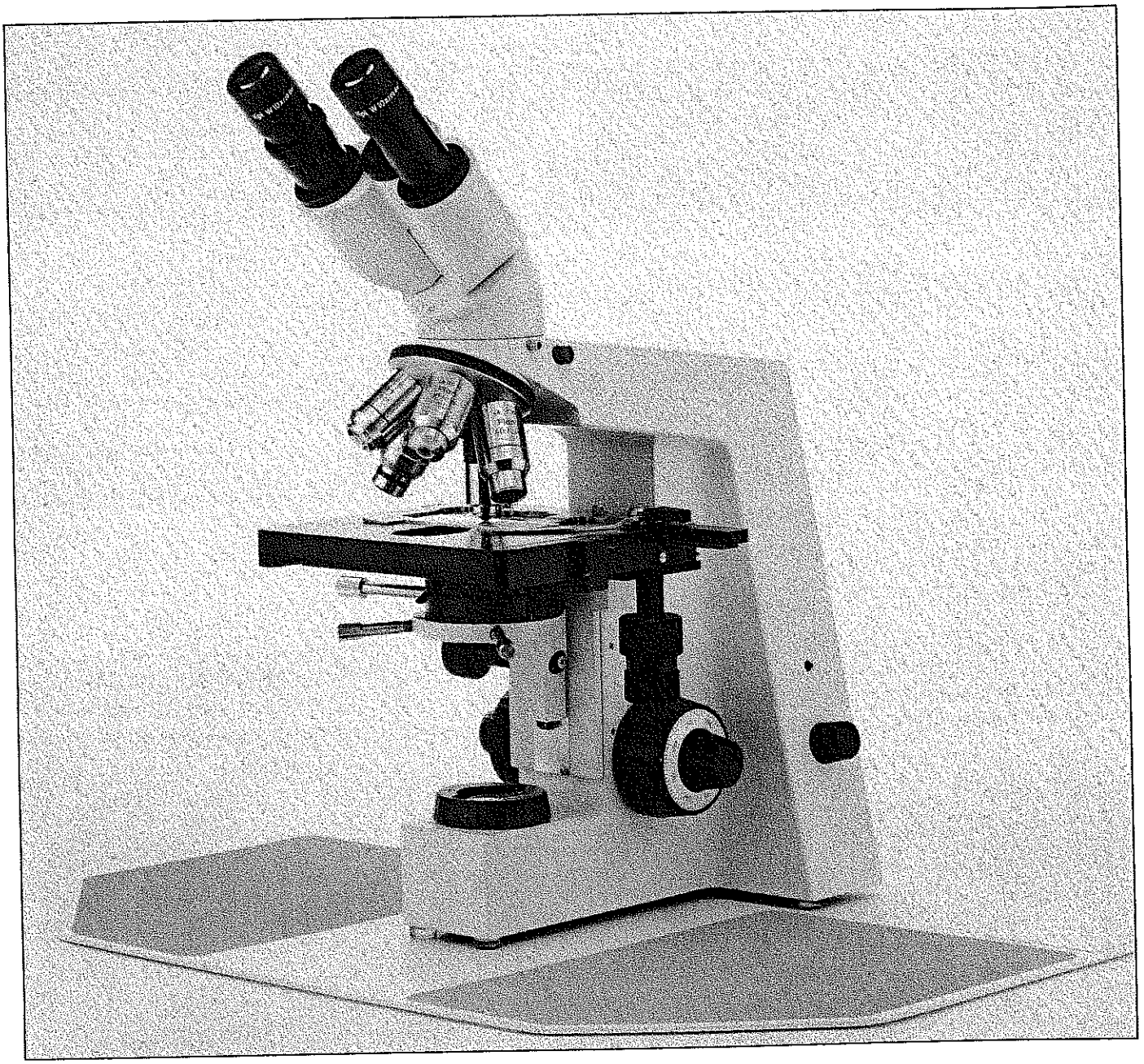

Standard 25 binocular microscope for brightfield

Contents

Special notes:

* The 6- or 10-digit numbers, e.g. 45 74 65, are ordering numbers of instruments or components.
* Changes and/or repairs of the instruments should be carried out only by the manufacturer or his authorized representative.
* Specifications subject to change.

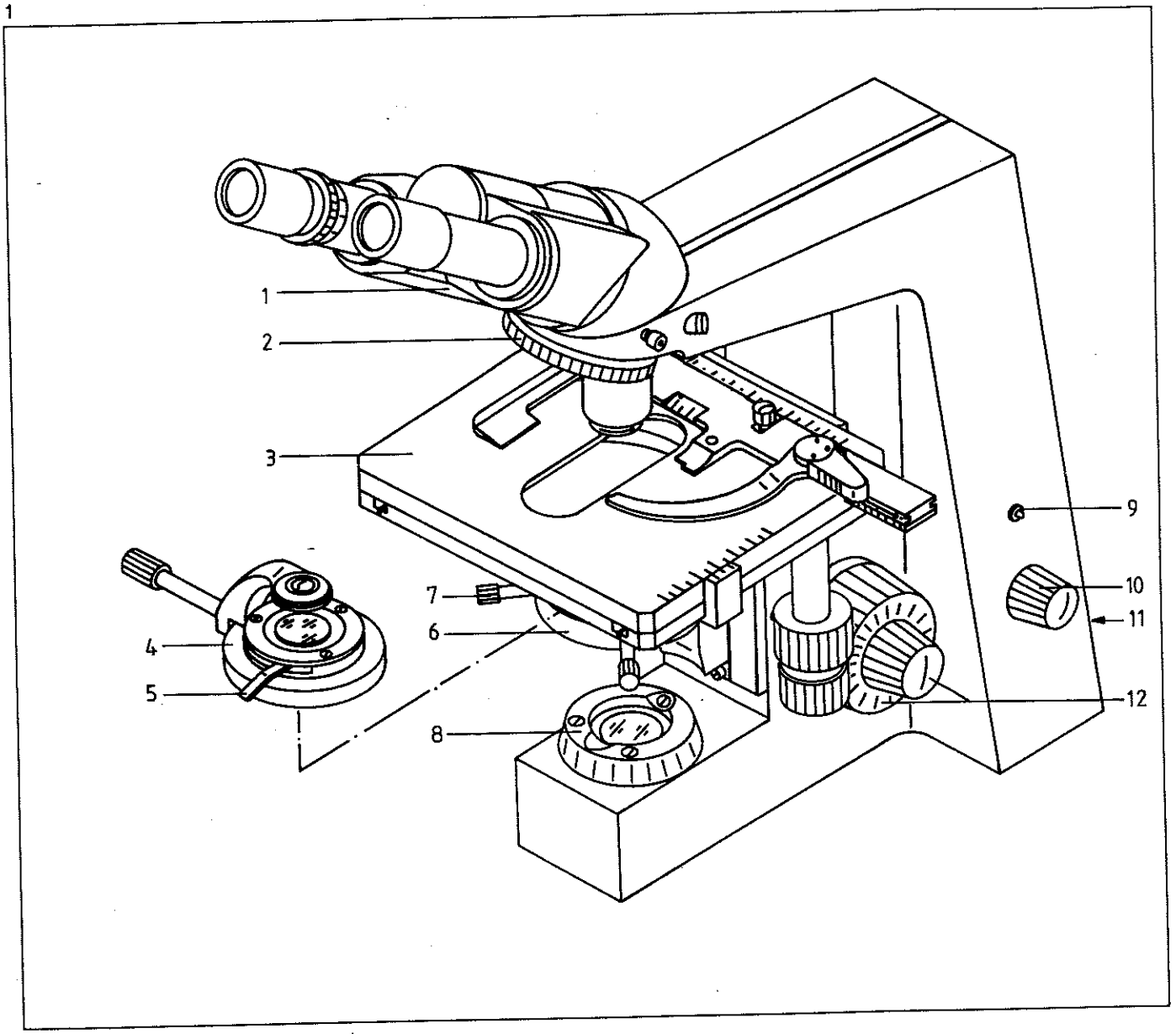

Fig. 1: Standard 25 binocular microscope for brightfield

1 Binocular tube D 1 (or S/30) with KF (or Kpl) eyepieces
2 Nosepiece 5x with objectives
3 Mechanical stage 75x30mm
4 Condenser 0.9 Z
5 Condenser (aperture) diaphragm
6 Condenser carrier
7 Condenser centering screws
8 Luminous field diaphragm
9 Green LED
10 Potentiometer for integral illuminator
11 ON/OFF switch
12 Coaxial coarse/fine focusing control

Microscope adjustment in brief
(Brightfield)

Note: Numbers such as [1.1] refer to the full description of the instrument starting on page 6.

- Check data on power rating plate on instrument back, connect microscope to the line with power cable, switch it on with (11) (rear left) and adjust mean brightness with (10). The green LED in the display (9) is on.
- Load a high-contrast specimen on specimen stage (3) (cover glass face up).
- Turn in 10x objective (yellow ring) on the nosepiece (2) and check the 0-position on the adjustable tube (1) (or on the eyepiece scale, if any).
- Move condenser (4) to topmost position with (6); the front lens is swung into the light path.
- Close the aperture diaphragm about half with (5).

You should now see light spots (the exit pupils) behind the eyepieces. If you use a binocular phototube with sliding prism, the pushrod must be slid in.
When looking through the tube you will see a bright circle (the eyepiece diaphragm) with each eye. By turning the two eyepiece tubes to your PD you will merge the two circles into one.

For the adjustment of Köhler illumination proceed as follows:
- Focus the specimen with the coarse/fine focusing control (12). (If your eyes have different powers, and for microscopy without spectacles see [4.3] and [4.4], page 9).
- Close luminous field diaphragm (8) moderately; it will become visible in the image (A).
- Focus the diaphragm image by lowering the condenser slightly with (6).
- With screws (7) move the diaphragm image to the center of the field of view (C), and
- open luminous field diaphragm (8) until it just disappears from the field of view (D).

Depending on the type of specimen the contrast is now adjusted with the condenser diaphragm (5). If you are not certain how far to stop down, remember that approx. 2/3 of the rear lens element of the objective (visible at the tube bottom if you take the eyepiece out of the tube) should be illuminated if a specimen is of moderate contrast (E).
Field of view and objective aperture change, of course, with each objective exchange, so that the last-mentioned manipulations must be repeated in each case.
If a low-power objective images more than the condenser can illuminate, you should swing the front lens out of the light path. For details see the description of the condenser on page 8.

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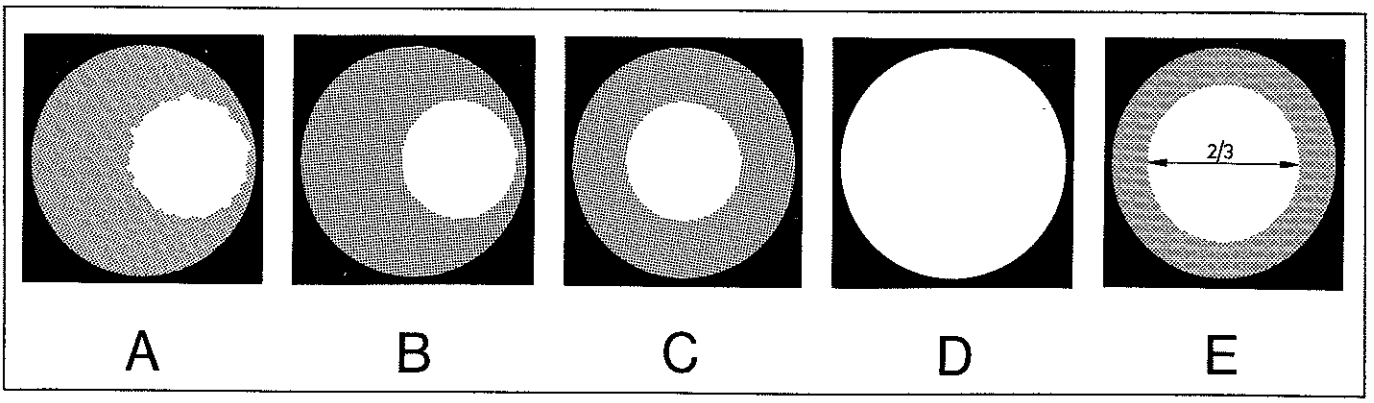
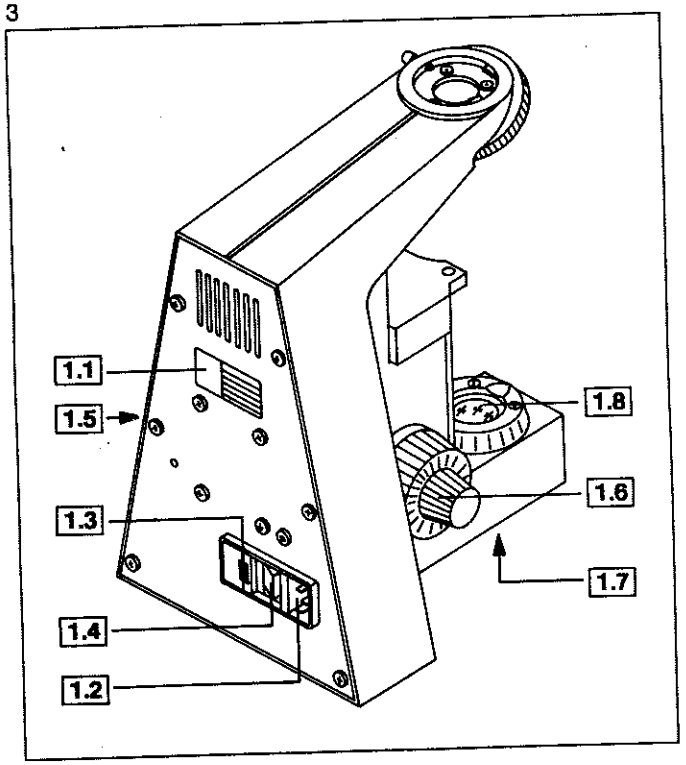


Special notes
Place the microscope on the supplied support; only then is proper ventilation of the integral illuminator assured.
The following tool is supplied with the equipment:
Screwdriver SW 3 with red handle for tube clamping screw on the stand, fluorescence illuminator and microscope base plate.

3



1.0 Lamp power supply and stand base

The 6V 20W lamp power supply is integrated in the stand.
1.1 The power rating plate displays the adjusted input voltage of the instrument:
230V for 220...240V line voltage or
115V for 100...127V line voltage.
Voltage tolerance: +10%, -15%.
Frequency: 50 ... 60Hz.

The stabilized output voltage is variable from 1.5 ... 6V.
Max. power consumption 40VA.
The equipment belongs to protection class I, type B; it is radio-screened, short-circuit proof and in compliance with VDE, IEC, CSA and UL regulations.

Fuses are integrated in the
1.2 instrument power plug.

1.3 Depress the lock marked with an arrow with a screwdriver: the insert with 2 fuses can be taken out.
Spare fuses:
for 230V: 0.2A SB (38 01 27-0130)
for 115V: 0.4A SB (38 01 42-2850)

1.4 Power switch

1.5 Potentiometer supplying 6V when turned fully clockwise.

1.6 Coaxial coarse/fine focusing control
acts on the stage carrier and moves the specimen stage with the condenser up and down.
The stage is lowered if the knob is turned toward the user.
Total travelling range (including fine focusing control): 15mm.
One revolution of the coarse focusing control corresponds to 4mm travel. Gear ratio of the fine focusing control: 1:10.
The index line on the coarse focusing control can be used to roughly measure the object thickness: 1 scale division corresponds to approx. 5 µm.

1.7 Integral illuminator containing a centered lamp socket with fitted 6V 20W halogen lamp (38 00 79-9690).
A diffusing screen and a collector above the lamp serve to correctly illuminate the field and the pupil.
For exchange of the lamp see page 18.

1.8 Luminous field diaphragm adjusted with knurled ring.
A 32mm dia. filter can be accommodated on the removable dust cover glass.
Frequently used filters:
Green interference filter 32x4 (46 78 03) for contrast enhancement in B/W photography of stained sections and in phase contrast.
Conversion filter CB 12, 32x2 (46 78 50-9901) for daylight color film.

2.0 Specimen stage

Standard outfit is a

2.1 mechanical stage 75x30mm with easy-to-use controls to the right (45 35 15) with

2.2 specimen holder with spring clip to the right (47 34 48) for standard 26x76mm specimen slides or special 26x45mm slides.

2.5 Specimen holder (45 35 48) for single-hand use eases slide-in of specimen. Place the specimen on the specimen stage, press it lightly down with two fingers, and slide it into the specimen holder along

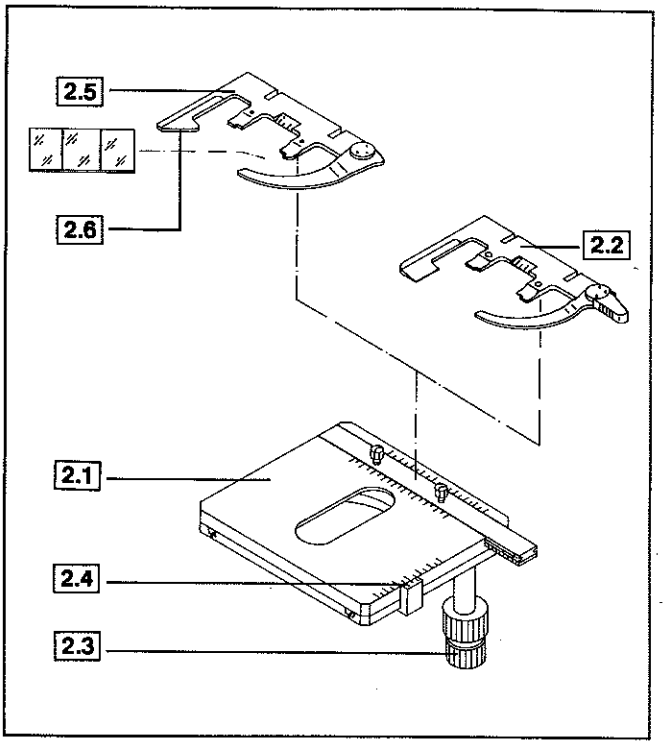
2.6 the guide edge.

2.3 Coaxial controls for 75mm x 25mm travel.

2.4 Graduations and verniers serve to relocate specific specimen features.

The mechanical specimen stage is firmly screwed to the stage carrier.

4



3.0 Condensers

The condenser is mounted in

3.1 condenser carrier

with the following operating controls:

3.2 Vertical adjusting control

The stiffness is factory-adjusted. The vertical condenser adjustment is limited by a stop to prevent a specimen from being pressed out by mistake.

3.3 Spring pin for orientation

3.4 Two condenser centering screws to center the image of the luminous field diaphragm during illumination adjustment (see page 5).

3.5 Condenser 0.9 Z, with swing-in front lens (44 52 11)

for brightfield

3.6 Swing-in front lens, aperture 0.9

3.7 Lever to swing the front lens in or out (for objectives 2.5x...4x)

3.8 Lever for aperture iris diaphragm

Phase contrast is produced with this condenser plus carrier with annular phase-contrast diaphragm Ph 2 (see page 14).

3.9 Phase-contrast condenser II Z 0.9 Ph 1, 2, 3 (44 52 10)

with

3.10 swing-in front lens, aperture diaphragm 0.9 and

3.11 turret with click-stop positions equipped for

- brightfield with aperture diaphragm (J)
- Phase contrast 1 (1)
- Phase contrast 2 (2)
- Phase contrast 3 (3)

The turret has 3 further empty positions.

3.12 and 3.13 Clamping lever and knob to center the aperture diaphragm for brightfield and the 3 annular phase-contrast diaphragms.

3.14 Control for aperture diaphragm size

3.15 Index for aperture reading.

3.16 Readout of adjusted turret position.

The phase-contrast condenser acts as darkfield condenser if the inner illuminating aperture of the annular phase-contrast diaphragm is larger than the objective aperture. In position Ph 3 this inner aperture is 0.44.

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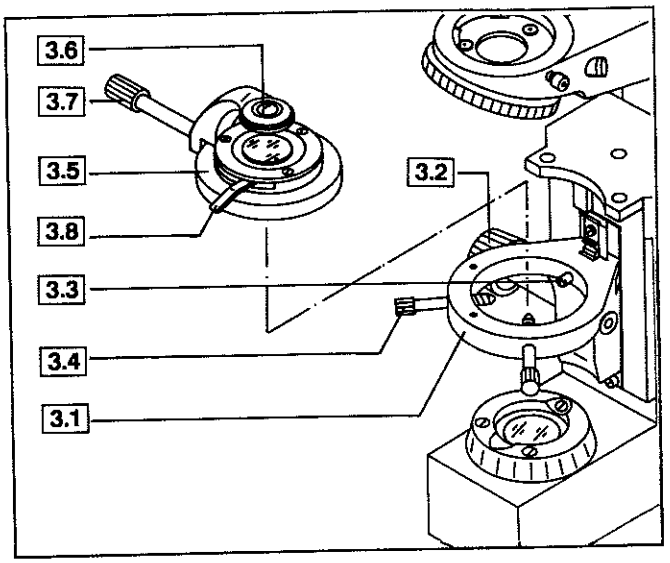

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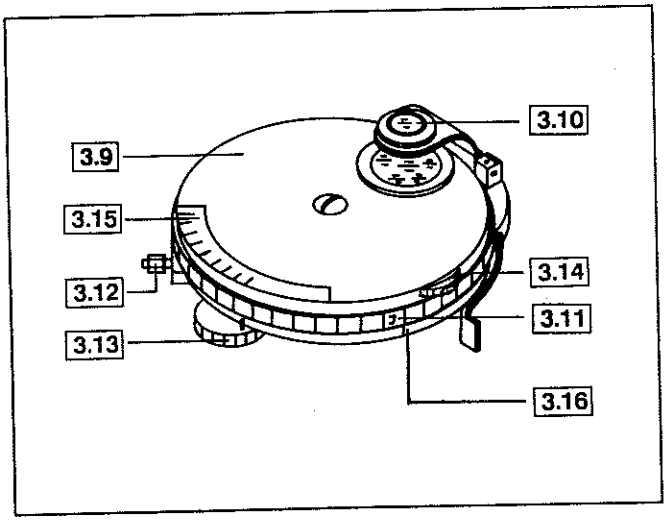


Inserting the condenser in the condenser carrier

If necessary, proceed as follows:

- Turn the condenser 0.9 Z 3.5 so that the aperture diaphragm lever 3.8 can be conveniently operated from the front. Press the dovetail ring of the condenser against spring pin [3.3] and insert it completely in the holder.
- Align the phase-contrast condenser II Z 3.9 straight forward, press spring pin 3.3 against the orientation notch which points straight to the rear, and let the dovetail ring snap in.

4.0 Image forming components

4.1 The objectives are the most important elements of the microscope and should be meticulously clean, especially the front lens surfaces. (To clean the lens surface breathe on it and wipe over it with a clean Q-tip. For thorough cleaning refer to the brochure G 41-100, "Microscopy from the very beginning").
The objective designation may be e.g.
Achromat 40/0.65 160/0.17, where

40	is the (individual) magnification;
0.65	the numerical aperture;
160	the image distance in mm
0.17	signifies that the objective is calculated for a cover glass thickness of 0.17mm.

The (individual) magnification multiplied by the eyepiece magnification (generally 10x) yields the microscope magnification, e.g. 400x.

The numerical aperture x 1000, that is 650 in the above example, is the highest useful magnification; no more details will be revealed above this value. The numerical aperture is important in darkfield illumination for the selection of the darkfield diaphragm.

The designation 160 is to remind the user that these objectives cannot be used on microscopes with objectives with the engraving " ∞ ". The microscope described here has a mechanical tube length of 160mm, that is the distance between the eyepiece shoulder and the objective shoulder.

The cover glass thickness of 0.17mm must be the more adhered to the higher the numerical aperture of the objective. Certain objectives (with correction mounts) are adjustable to different cover glass thicknesses; use a high-contrast specimen feature to find out in which position of the correction mount the focus is optimized (re-focusing will always be necessary). Only immersion objectives are insensitive to differences in the cover glass thickness.
Because of their short working distances, 25x objectives and those with higher powers have spring mounts for specimen protection. To prevent immersion objectives from contaminating the specimen with oil when the nosepiece is turned, it is possible to "lock in" the objective spring mount in topmost position by a clockwise turn (don't forget to disengage them from "lock-in" position!).

The air between an immersion objective and the cover glass is replaced by a liquid, generally immersion oil. We supply a plastic oiler containing 50ccm PCB-free immersion oil (46 29 58) with the instrument. Some experience is needed to obtain a bubble-free layer. Some microscopists turn the objective from the side into the oil drop on the cover glass, whereas others lower it from "lock-in" position of the spring mount. A check of the exit pupil (look through the empty tube, see page 5) should always be made, because this reveals instantly any bubbles. If turning in the objective repeatedly does not eliminate the bubbles, clean the specimen and repeat the procedure.

4.2 Nosepiece, rigidly connected with the microscope stand.

4.3 and/or **4.4** Eyepieces with the engraving K which stands for KF and Kpl, are compensating eyepieces for objectives designated 160. Generally the eyepieces have 10x magnification, a field of view number 18 or 20, and angular fields from 40.4° to 43°. They are equally well suited for spectacle wearers (Br) and provided with an exchangeable rubber ring to protect the spectacles. If the microscope tube is non-adjustable, e.g. **4.7**, one of the two eyepieces must be a focusing eyepiece (foc) if your eyes have different powers or if you work without spectacles. You must then proceed as follows:

In the binocular tube D 1 **4.6** use 2 non-focusing eyepieces:
- Look through the fixed tube and focus the specimen.
- Adjust the focus for the other eye with the adjustable tube, until the focus is the same for both eyes.

For the binocular tube S/30° **4.7**:
- Look through the fixed eyepiece and focus the specimen.
- Re-adjust the focus for the other eye with the eyelens of the focusing eyepiece until the focus is the same for both eyes.

Microscopists who work without spectacles must take into account poor focus after objective exchange (objective parfocalization).
If you have a "cylinder" in your spectacles you should always wear them for microscopy.

The binocular tubes are adjustable to PDs from 55...75mm by turning the tube halves in or out. The tube factor is 1x. The tubes are mounted after loosening Allen screw

4.5 and secured by tightening it.

The binocular tubes D 1, S/45° and S/30° are not provided with notches; slide back the pins for orientation of the focusing eyepieces with a small screwdriver, unless this has not been done in the factory.

4.6 Binocular tube D 1 (45 29 00), viewing angle 45°, left tube adjustable

4.7 Binocular tube S/30° (45 29 01), viewing angle 30°

4.8 Binocular phototube 45° (45 29 02)
pushrod pushed in: 100% of the light for observation
pushrod pulled out: 40% for observation and 60% to the camera
The viewing angle is 45°.
Align the eyepiece with photo reticle in the viewing tube parallel with the camera. An adhesive ring is provided in both eyepiece tubes, which secures the orientation of the reticle after turning.
The orientation must be corrected after change of the PD.
The upper tube port accepts:

- MC 80 or MC 100 microscope camera via

4.9 adapter (23.2 mm dia.) (45 60 02),
photo eyepiece S-Kpl 10x or Kpl 10x/20 Br. for MC 100
or projection lens 2.5x (45 60 20) for MC 80.

- SLR camera housings via T2 adapter **4.12** and

4.10 Adapter for SLR cameras (45 60 01) 2.5x, without eyepiece

- TV cameras with C mount via

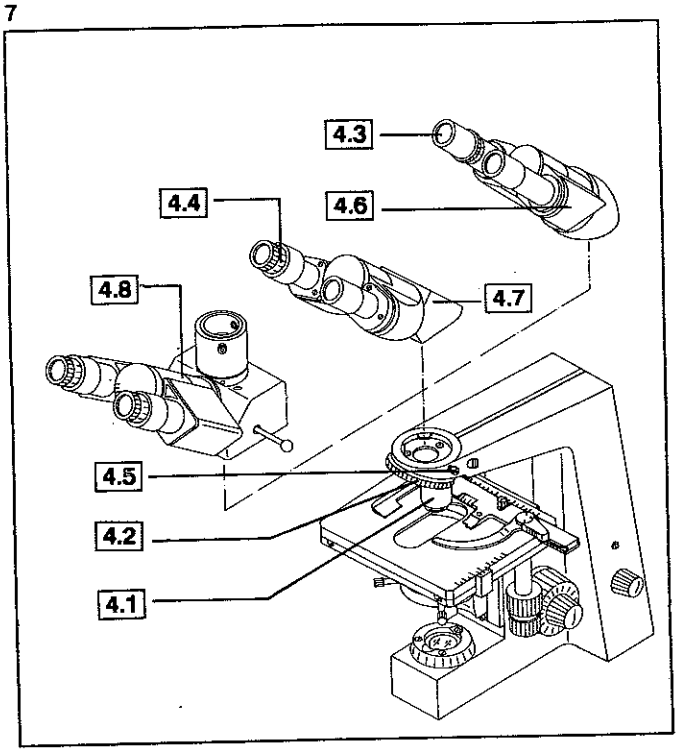
4.11 adapter (45 61 01), without eyepiece

Also available is a
Binocular phototube with sliding prism 30° (45 29 03)
pushrod pushed in: 100% of the light for observation
pushrod pulled out: 20% for observation and 80% to the camera.
The viewing angle is 30°.
The focusing eyepiece with photo reticle and pin for orientation is fitted in a notch in the tube and thus secured. The tube is provided with reticle erection
The following items are mounted on the upper tube port similar to Fig. 8:

- MC 80 with projection lens 2.5x (45 60 20), or
  MC 100 with eyepiece Kpl 10x/20 Br. or Kpl-S 10x.
- SLR camera housings via T2 adapter and objective f=63mm in T2 mount with clamping ring for 40 mm dia. (45 60 29).
- Adapter for TV cameras with C mount (47 79 21) and intermediate piece for TV (45 29 80)

(exchangeable for the straight phototube part by loosening the 3 screws and turning it out).

7



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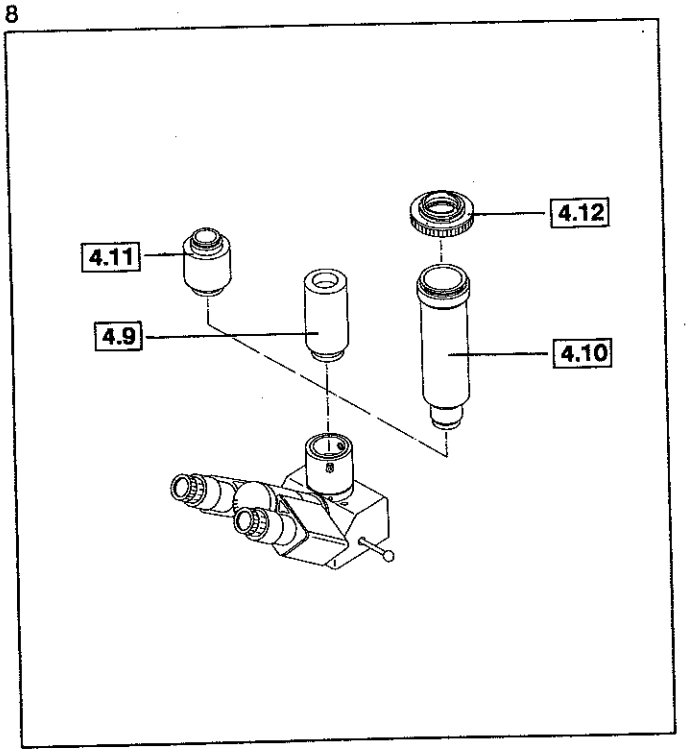

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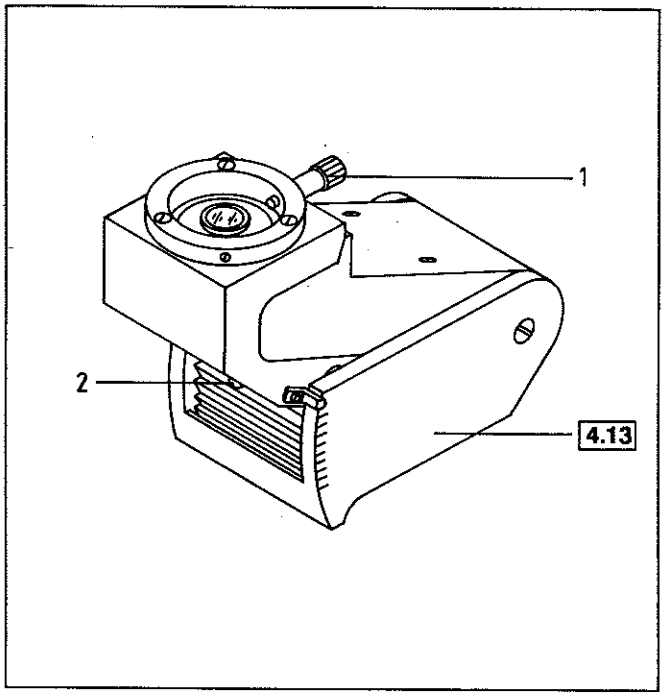

4.13 Intermediate tube with variable viewing height (45 08 62)

An accessory which fits between microscope stand and tube, preferably an S/30° binocular tube, reverses the image and synchronizes the movements of image and object. If a 30° tube is used, the viewing height is variable between 385 and 465mm: depress the black knob (2) and release it in the desired position. To secure the binocular tube turn and pull the knurled screw (1) with spring pin.

Drawing tube (45 46 20)

An accessory which is mounted between the microscope stand and the binocular tube. Both the drawing surface and the microscopic image can then be seen in the eyepieces.
For details see operating instructions G 41-473.

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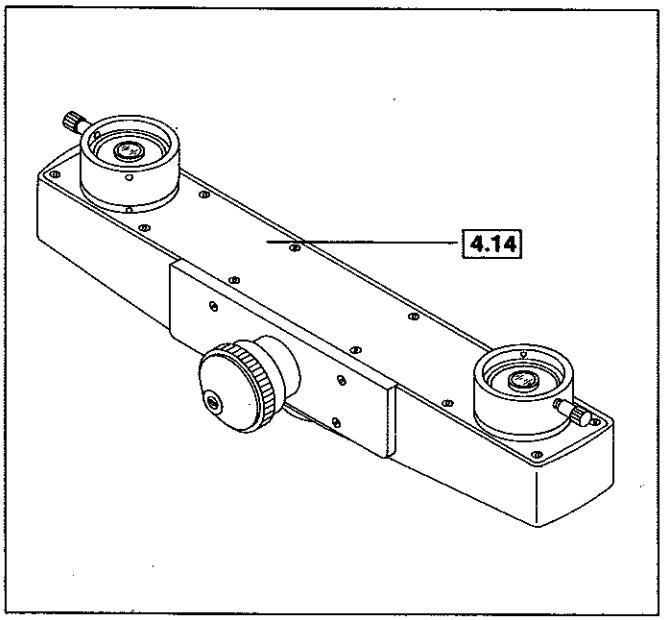


4.14 Coobservation bridge with light pointer (45 08 60)

An accessory which is used with two binocular tubes S/30°.
A microscope base plate (see below) stabilizes the equipment.
For a full description of the coobservation bridge see G 41-290.

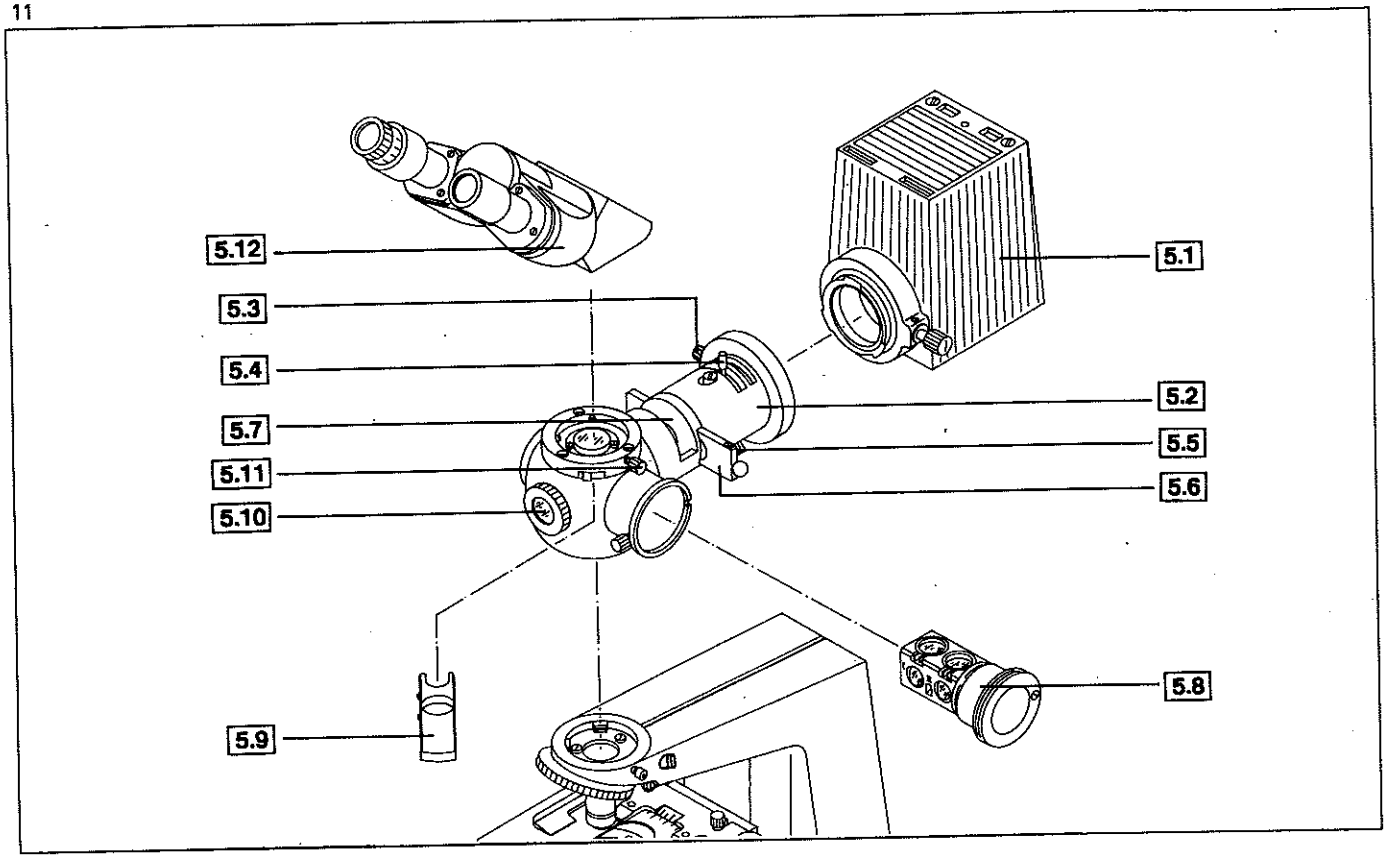
Mounting the microscope base plate (45 08 93), a T-piece:

- Put microscope stand without tube upside down.
- Unscrew 2 Allen screws M3, assigned to the two boreholes in the plate, from the sheet metal cover of the integral illuminator.
- Fix the T-piece with the 2 supplied longer screws.

The plastic supports in the stand still serve as spacers.

- Place the microscope on the supplied microscope support.

11



5.0 Fluorescence equipment

For fluorescence microscopy the instrument is equipped with

5.1 Fluorescence illuminator with aspheric collector and HBO 50 mercury lamp which is supplied from a power supply of its own (see page 18 for the exchange of the HBO 50 lamp).

5.2 Epi-fluorescence condenser IV FL (44 63 30) featuring from back to front:

5.3 Clamping screw for illuminator

5.4 Luminous field diaphragm

5.5 Centering device for luminous field diaphragm

5.6 Shutter and filter slide with 2 apertures for 18mm dia. filters. Basic equipment including inserted red-attenuating filter BG 38 (46 79 91-9902). A max. 4mm thick filter can be accommodated in the second aperture.

5.7 Filter holders for additional exciter filters, 32mm dia. with holding ring (46 72 52), or 18mm dia. filter with additional adapter ring 18/32mm (46 78 93).

5.8 Reflector housing 2 FI (46 63 01) (for 2 optional filter sets). The basic equipment comprises filter set 09 for blue excitation 450-490 (48 77 09). Exciter filter, chromatic beam splitter and barrier filter are exchangeable (barrier filter 18mm dia. max. 6mm thick, chromatic beam splitter 22mm dia.).

5.9 Sealing and filter slide 20x6mm (47 37 90) for additional 18mm dia. barrier filter max. 5mm thick.

5.10 Black glass to control the lamp centration

5.11 Clamping screw for tube

5.12 Binocular tube S/30°

Especially suitable optical equipment:

- Neofluar objectives (for UV excitation)
- Kpl 10x widefield eyepieces
- Combination with transmitted-light phase contrast

For more information about fluorescence sets see operating instructions G 41-356 for epi-fluorescence condenser IV FL.

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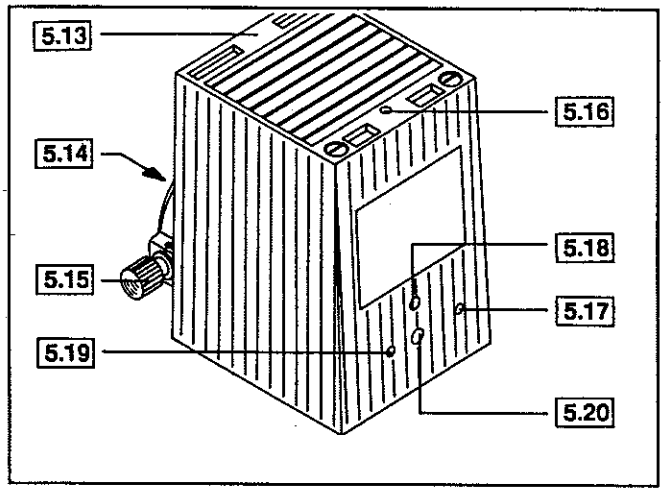

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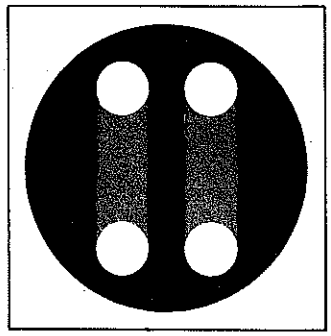

NB: The HBO 50 lamp should be exchanged after 100 operating hours which corespond approximately to its average life (see p. 18). The intensity of the lamp decreases with the time it is in use, and homogeneous illumination of the object field is no longer secured. There will also be **danger of explosion.** The life of the lamp may be controlled on the running time meter of the power supply unit.

5.13 Features of the HBO 50 lamp housing:

5.14 Light exit
Dovetail ring mount to attach the illuminator on the epi-fluorescence condenser IV FL:

- Unscrew clamping screw 5.3 of the condenser dovetail ring mount sufficiently.
- Insert inclined ring mount of lamp housing in the opening opposite the clamping screw, tilt the illuminator on to the seating surface and tighten the clamping screw.

5.15 Knob for collector adjustment; it must be pulled to take out the condenser.

5.16 Vertical lamp adjustment

5.17 Lateral lamp adjustment

5.18 Vertical adjustment of mirror image (red dot)

5.19 Lateral adjustment of mirror image (red dot)

5.20 Focusing of mirror image

Centering the HBO 50 mercury lamp:

- Connect lamp to power supply (39 26 42) and switch on.
- During centration observe the light patterns on the black glass 5.10 of the condenser. Slide 5.6 must be set to aperture for free light path. The filter set for green or light-blue excitation is the most suitable for adjustment.
- With collector 5.15 produce a sharp image of the brighter of the two light-arc images. Closing the luminous field diaphragm 5.4 improves the focus.
- Center the light-arc image with the screwdriver SW 3 on screws 5.16 and 5.17.
- Focus the unsharp light spot with screw 5.20. Make sure that focal-spot image and mirror image are of equal size. With the red screws 5.18 and 5.19 align the focused mirror image so that it is directly adjacent to the real image (see Fig. 13). The two images should not overlay each other.
- When changing to fluorescence observation, vary the collector focusing so that the object image is evenly illuminated.

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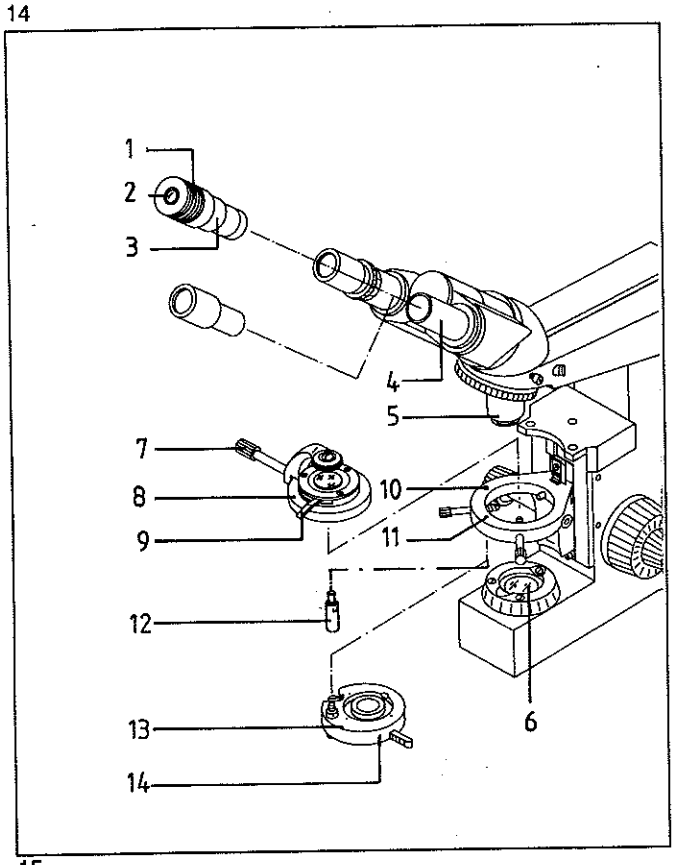

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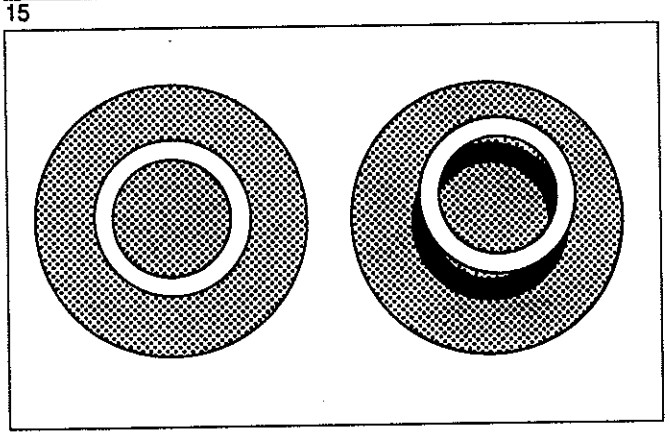

It is applied mainly to enhance the contrast of unstained specimens.

Required equipment

Either (A) :
- annular phase-contrast diaphragm Ph 2 on carrier (47 08 64),
- condenser 0.9 Z with swing-in lens (44 52 11) (8), and
- objectives (5) designated "Ph 2", which are equally well suited for brightfield microscopy;

or (B) :
- phase-contrast condenser II Z 0.9 Ph 1, 2, 3 (44 52 10)
- objectives (5) designated "Ph 2", which are equally well suited for brightfield microscopy.

The necessary adjustments using equipment (A)

Remove carrier with diaphragm Ph 2 (13) from the light path and swing in the condenser front lens with (7).

- Adjust an object at first in brightfield (narrow luminous field diaphragm, focus, center and open it; see p. 5).
- Turn in e.g. 40x objective designated "Ph 2".
- Swing condenser lens out of light path using (7).
- Turn in carrier with diaphragm Ph 2,
- adjust lamp brightness to the object,
- open luminous field diaphragm (6) and condenser diaphragm with (9).
- Perfect phase contrast is produced only if the dark phase-contrast ring in the objective and the bright annular phase-contrast diaphragm are brought to full coincidence.

This may be controlled, without eyepiece, at the bottom of the tube, like the condenser diaphragm adjustment described on p. 5. Insert the centering telescope (46 48 22-9902) (3) in tube (4) and focus by moving the eyelens (2) of the centering telescope; hold the centering telescope on knurled ring (1).

- To bring the two phase-contrast rings (Fig. 15) to coincidence, adjust the 2 centering screws (14) of the carrier with annular diaphragm Ph 2 with a screwdriver.

Retrofitting the carrier with phase-contrast diaphragm Ph 2 (if ordered separately)

- Screw hinge pin with fitted diaphragm carrier (13) into front borehole (11) of condenser carrier and tighten with socket screw wrench.
- Screw stop pin (12) into rear borehole (10) and tighten with socket screw wrench. The carrier with the diaphragm must snap in the stop pin.

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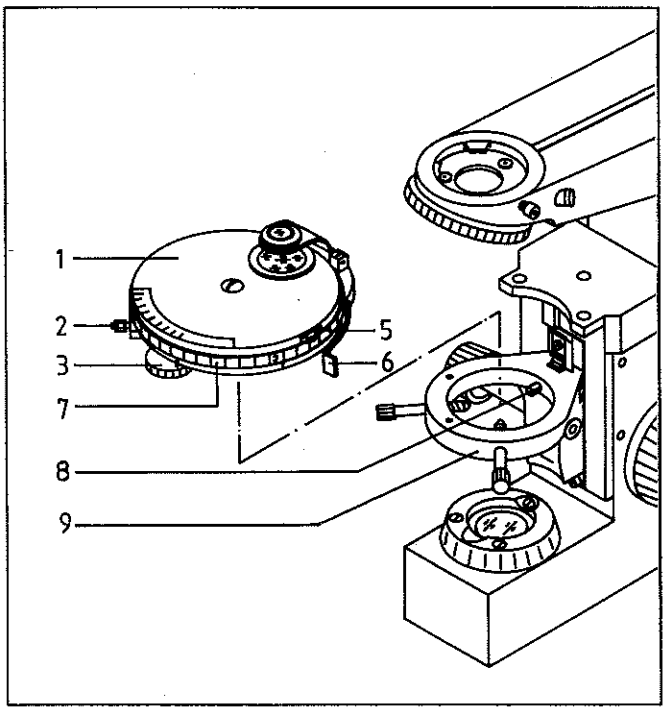

The necessary adjustments using equipment (B)
(phase-contrast condenser II Z 0.9 Ph 1, 2, 3 (44 52 10))

- The condenser II Z is inserted in condenser carrier (9) so that it is aligned straight to the front. Spring pin (8) engages the orientation notch of the condenser which points vertically to the back.
- Objectives Ph are in the light path.
- Adjust object at first in brightfield by letting turret (7) snap in position "J", and swing in front lens with lever (6).
- Narrow luminous field diaphragm, focus, center and open it. Optimum image contrast in brightfield is adjusted with knob (5) of the aperture diaphragm; it may be centered with clamping lever (2) and knob (3) (see p. 5).
- With turret (7) turn in suitable diaphragm Ph 1, Ph 2 or Ph 3 for objective Ph.
- Bring the bright phase-contrast diaphragm Ph in the condenser to coincidence with the dark phase ring in the objective Ph by adjusting with clamping lever (2) and knob (3). Check the centration of both phase rings (Fig. 15) with the centering telescope (14.3) inserted in the tube (see p. 14).

Special note
Phase-contrast microscopy requires even more than brightfield microscopy meticulously clean glass/air surfaces of the specimen (avoid fingerprints).

It is applied

- to study exceptionally small objects or object features such as treponemas, spirochaetae, flagellates, etc., or emulsions, if phase contrast does not supply sufficient contrast;
- if the specific colors of natural (unstained) objects are well visible (living organisms in water like algae, unicellular organisms, lower animals).

Necessary equipment

- Special objectives with integral iris diaphragm only for higher magnifications, but
- always a condenser with central stop and a numerical aperture which is higher than that of the objective used.

For further details see the opposite table.

Necessary adjustments

- Adjust the illumination as for brightfield. The luminous field diaphragm must be imaged and centered. Adjust the condenser vertically until optimum darkness of the background is obtained.
- Check the objective pupil for perfect darkness: remove the eyepiece from the tube and observe the objective exit pupil (see p. 5). The apertures of objectives with iris diaphragm are too high for darkfield. They must be stopped down with the iris as far as the limit aperture. The most important criterion is, of course, the absolutely dark background of the eyepiece image, which may be influenced by the position of the luminous field diaphragm, especially towards the edge of the field of view.

Special notes

The cleanliness of the specimens is much more important in darkfield than in other methods; grease films (fingerprints) are especially disturbing because they light up the background. Pre-centering with a low-power objective eases darkfield adjustment. The luminous field becomes visible only where particles light up, but wide areas of a specimen may be "blank". We recommend to use a specimen with uniform feature distribution for the initial adjustment, e.g. a blood smear.

Darkfield illumination
Various possible aperture ranges of the objectives

Condenser Illuminating aperture	Objective aperture
Condenser II Z 0.9 (44 52 10) in position Ph 3 ≥ 0.44	≤ 0.4
Dry darkfield condenser 0.7 - 0.85 (46 55 06) on condenser holder Z (44 52 15)	0.4 - 0.6
Dry darkfield condenser 0.8 - 0.95 (46 55 05) on condenser holder Z (44 52 15)	0.6 - 0.75
Ultra condenser 1.2 - 1.4 (46 55 00) on condenser holder Z (44 52 15)	0.75 - 1.0

Equipment including swing-in polarizer and analyzer with auxiliary object first-order red on slide

- Polarizer oriented E-W (45 36 15) (1) is mounted on swing-in carrier.
- Analyzer oriented N-S (2) and auxiliary object first-order red (3) are mounted on separate slides (45 36 92) and integrated in the stand head. Retrofitting by our maintenance service is possible.

Required adjustments:

- Without polarizer, adjust the illumination as in brightfield (see p. 5).
- Swing polarizer (1) into the light path.
- Black-and-white polarizing contrast is produced if analyzer slide (2) is slid in alone with black operating control. If the auxiliary object first-order red is added, colored polarizing contrast is produced. The slides containing analyzer and auxiliary object must be slid in all the way to assure full polarizing effect and prevent the field of view from being cut off.

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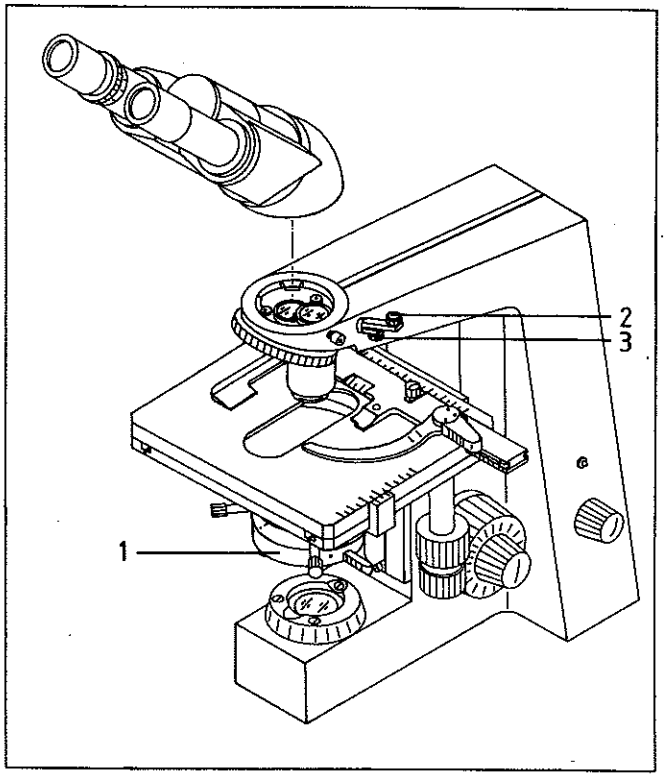

Exchange of 6V 20W halogen lamp

- Before lamp exchange:

Switch off lamp power supply with power switch [1.4] on the back of the instrument and pull the power cable.

- Disconnect microscope from the line and place it on the back.
- Hinge down lid (2).
- Pull out socket pins of defective lamp (1).
- Hold new 6V 20W lamp on protective cover or with clean tissue paper and slide the contact pins all the way into the lamp socket.

Use only a 6V 20W halogen lamp (38 00 79-9690). Other commercially available lamp types do not have the required geometry (flat-core coil) and coil position, and will cause difficulties.

- Hinge up lid (2). Erect the stand and connect the microscope to the line.

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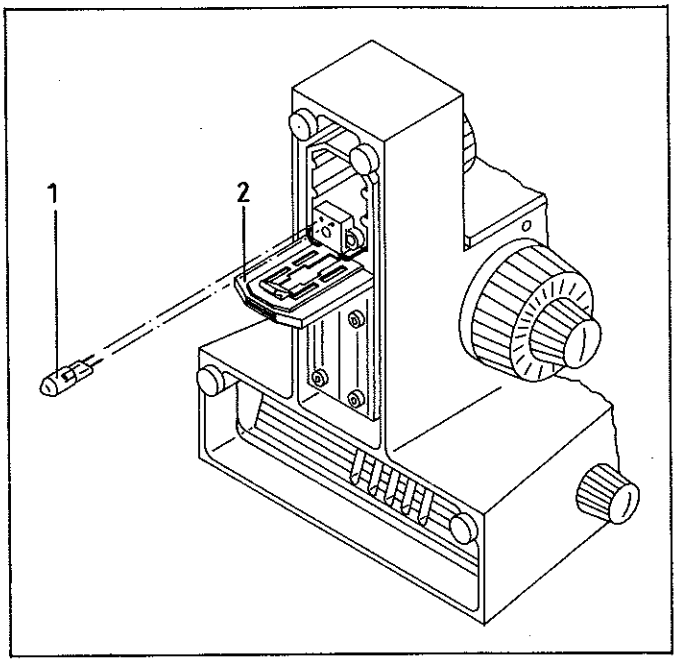

Exchange of the HBO 50 mercury lamp

- Pull plug (15) of lamp socket on the power supply, loosen screw [5.3] in Fig. 11 and take off lamp housing (4) from the epi-fluorescence condenser IV FL.
- Set collector (3) to foremost position.
- Loosen clamping screw (9) and take lamp socket (14) out of the lamp housing.
- Loosen (7) and (13) and pull out lamp (11) and wire loop (12); loosen (10) and (6) and remove dissipator.
- Insert that end of the lamp socket which bears the lamp number in the dissipator and clamp with Allen key; the melt tip must be aligned parallel with the dissipator.
- Plug wire loop into dissipator, align it parallel with the dissipator and secure.
- Insert lamp with dissipator and wire loop in the corresponding openings of the lamp socket and secure with hexagon nut (13) and knurled screw (7). Make sure that the longer side of the dissipator, the lead end, the wire loop and the melt tip are in one line.
- Insert lamp socket (14) with new lamp all the way in the lamp housing. Pin (8) must engage borehole (17) of the lamp socket.
- Fix lamp socket (14) on the lamp housing with screwdriver SW 3 (16).
- The HBO 50W/AC lamps are supplied in two types. The type is indicated on the enclosed ticket. The power supply unit must be set to L1 or L2.

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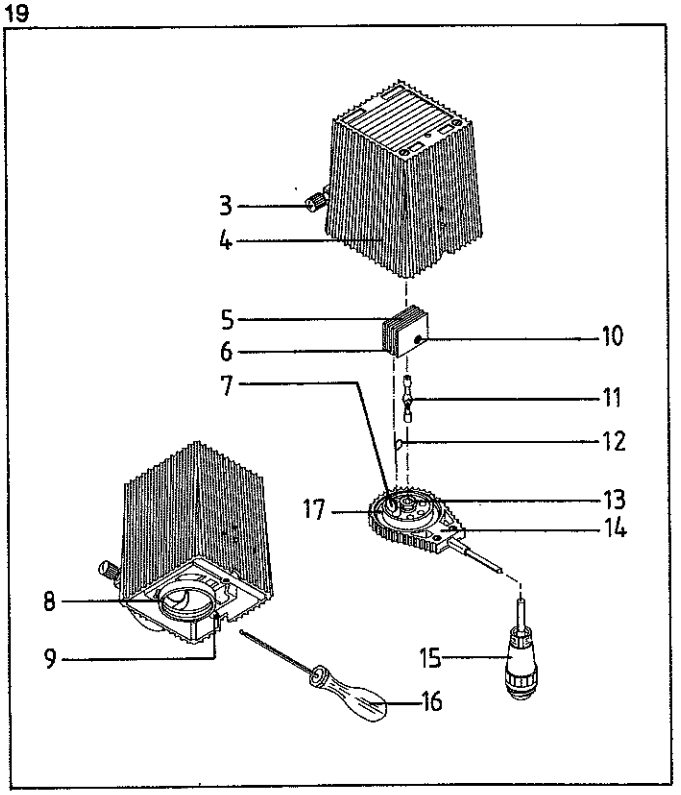

Halogen lamp	(38 00 79-9690)
Voltage	6V
Output	20W
Color temperature at 6V	2800K*
Luminous flux	280lm
Average life	1000hrs
Luminous surface	2.0x2.0mm

* For photography using artificial-light color reversal film sensitized for 3200K, a conversion filter CB 3 (46 78 52) in the light path will provide for the correct color temperature.

HBO 50W/AC mercury lamp	(38 16 19)
Lamp voltage	L1: 39...45V/L2: 34...39V
Lamp current	L1: 1.30A/L2: 1.45A
Output	50W
Line spectrum	
Mean luminous flux	2000lm
Approx. average life	100hrs
Luminous surface (arc)	0.3x1mm

L1; L2: the HBO 50W/AC are produced in two different types; the type is indicated on the enclosed ticket. The power supply unit must be set to L1 or L2.