REICHERT

AUSTRIA

Zetopan - Binolux

OPERATING INSTRUCTIONS

for the

"BINOLUX III" Twin Lamp Unit

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2. GA E 3/75

Ultraviolet radiation is harmful to the unprotected eye and produce unpleasant conjunctivitis The following points should therefore be strictly observed. When adjusting the mercury–vapor lamp and during all operations when light from the lamp can reach the eye directly without passing through an ultraviolet absorption filter it is essential to wear the

spectacles with ultraviolet absorption filter

which are supplied with the Twin Lamp Unit. During microscopic examination and photomicrography using the mercury–vapor lamp it is essential to use the absorption filters specified in the table on page 15. The slides used in fluorescence microscopy must have good transparency for ultraviolet light and must not exhibit any primary fluorescence; only slides made from UV glass, Cat. No. 89 00 53, should therefore be used. Ordinary slides are satisfactory for immuno fluorescence with blue light, however. Details on specimen preparation and the most important literature references on fluorescence microscopy will be found in our publication "Fluorescence Microscopy with Fluorochromes, Recipes and Tables". This publication will gladly be sent on request.

Details on the life of the high–intensity lamp are given in the enclosed Operating Instructions of the Manufacturers. We recommend that they should not be operated beyond this period, especially in fluorescence work, since the light output then generally becomes insufficient for the requirements due to blackening of the lamp envelope and in addition there is a danger of explosion.

"BINOLUX III" Twin Lamp Unit

Application

The "BINOLUX III" Twin Lamp Unit is designed for use on the "ZETOPAN" Large Research Microscope. It comprises a lamp housing for a high–intensity lamp and a second housing for a 100 W quartz halogen lamp into which can also be fitted the Reichert Micro Flash Equipment.

The housing for the high–intensity lamp is available in two forms:

The Twin Lamp Unit "BINOLUX III A"for the xenon lamp XBO 150 W/1 and the mercury–vapor lamp HBO 200 W/2. These two lamps work on d.c. and are operated from the control unit Cat. No. 62 02 01.

The Twin Lamp Unit "BINOLUX III C" takes the mercury–vapor lamp HBO 200 W/4 or CS 200 W/4. These lamps are worked on a.c. and are operated from the control unit Cat. No. 62 10 01.

Different types of illumination can be produced in rapid succession with the Twin Lamp Unit, using a mirror slide with two deviating mirrors (one of them semi–transparent) in conjunction with a sliding shutter; they are:

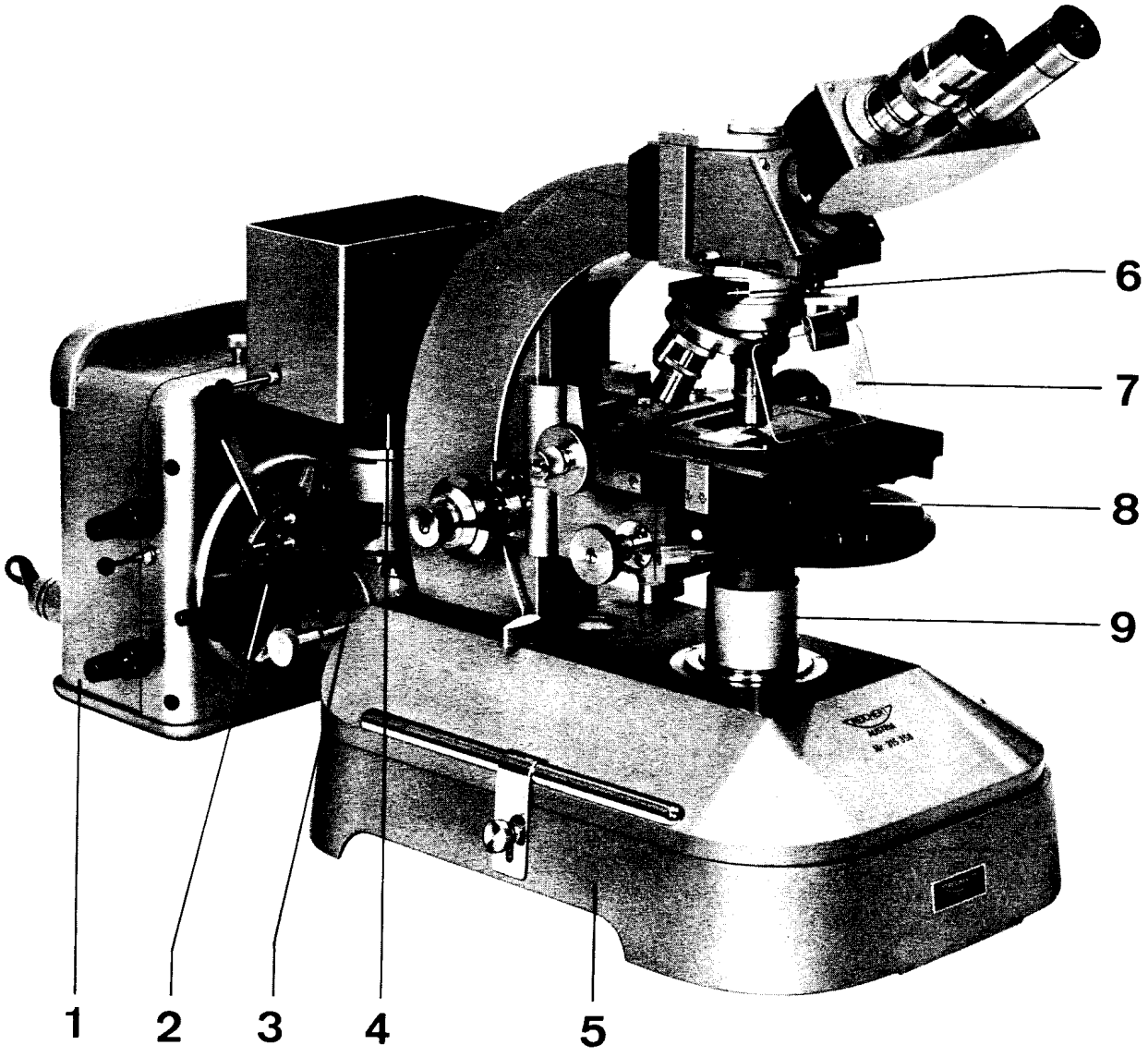
I) illumination with the low–voltage lamp or the micro flash equipment alone;
II) illumination with the high–intensity lamp alone;
III) combined illumination with both lamps, the light from the high–intensity lamp being supplemented by 10 % of the light output from the low–voltage lamp.

The quartz halogen lamp is employed for all normal work in transmitted and incident light and can also be used with the FITC filter for immuno fluorescence.

The mercury–vapor lamp or the xenon lamp forms a light source of maximum intensity for microprojection, photomicrography, phase contrast etc; a heat and UV absorption filter has to be inserted. The mercury–vapor lamp is also used for fluorescence microscopy.

Combined illumination is found useful in those cases where it is desirable to superimpose on the fluorescence image a normally illuminated image of appropriate intensity, e.g. for locating fluorescing details within a larger specimen.

The rapid changeover from UV to visible light, together with the possibility of using combined illumination, make the "BINOLUX III" Twin Lamp Unit particularly suitable for conventional fluorescence, alternating bright ground, dark ground or contrast fluorescence, and simultaneous dark ground or contrast fluorescence.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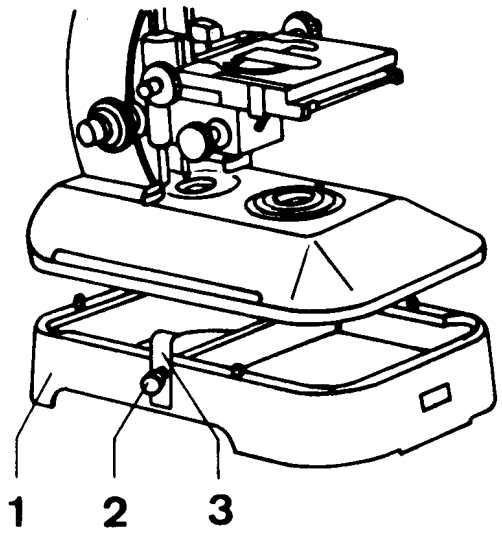
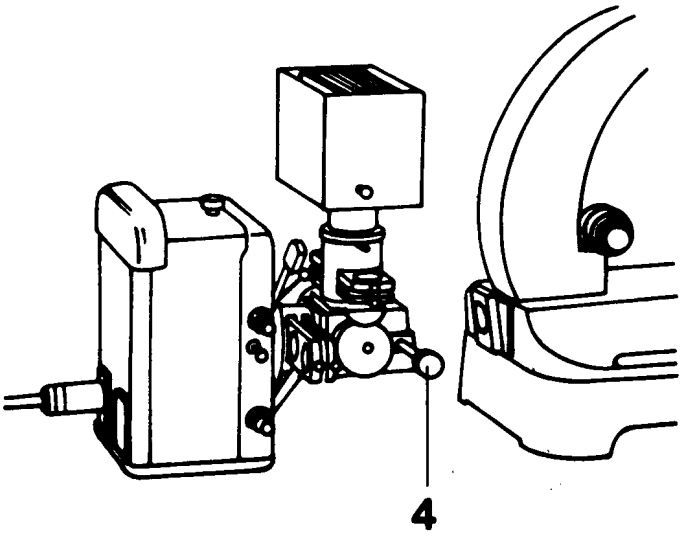
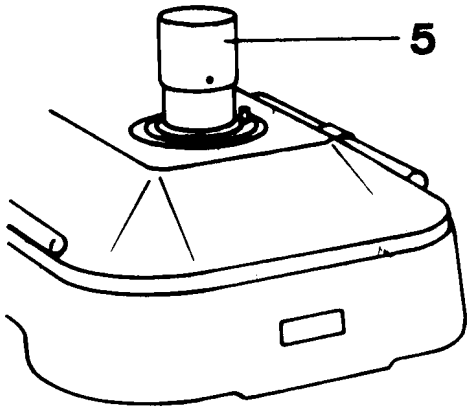






Assembling "ZETOPAN" and "BINOLUX"

Working position

The working position should be as free as possible from dust, moisture, chemical fumes and vibration. During fluorescence work it is convenient to black out the room.

Mounting the "ZETOPAN" on the sub–base

Loosen the two clamping screws (2) and place the "ZETOPAN" on the sub–base (1) (the front of the sub–base carries the Reichert label). Pull the two clips(3) over the strips on the "ZETOPAN" and re–tighten the clamping screws (2).

Fitting the "BINOLUX III" on the "ZETOPAN"

When the "ZETOPAN" carries a low–voltage lamp this is removed from the dovetail guide on the "ZETOPAN" after releasing its clamping screw.
The "BINOLUX III" Twin Lamp Unit is inserted into the dovetail guide and secured with the clamping screw (4).

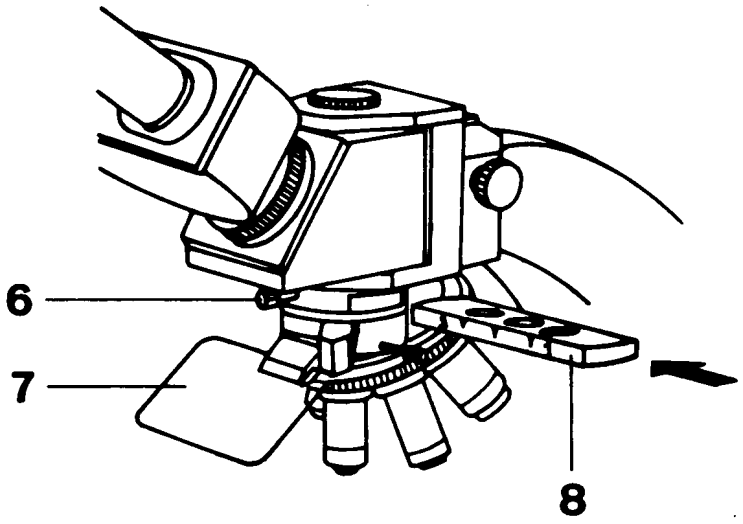
Light trap

The light trap (5) is placed on the light exit aperture. It consists of two telescopic tubes.

Inserting the absorption filter slide

Slightly unscrew the spring–loaded clamping screw (6). Insert the absorption filter slide (8) into the microscope head in place of the blank slide or analyser so that the filter designations can be read from the front.

When working with visible light the filter slide is placed into the central position; the colorless absorption filter "2" is then in the beam. Further details on the use of the absorption filters are given on page 14.

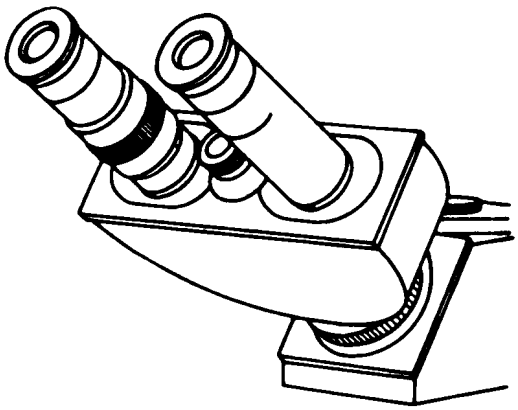


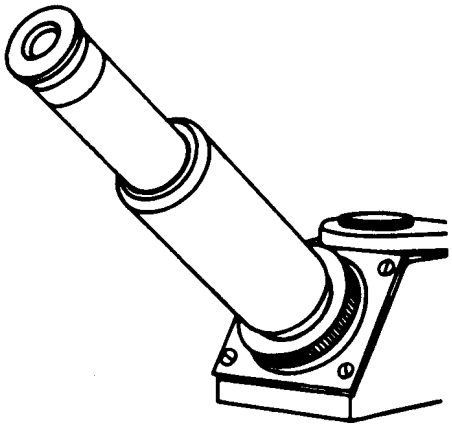
Tilting screen

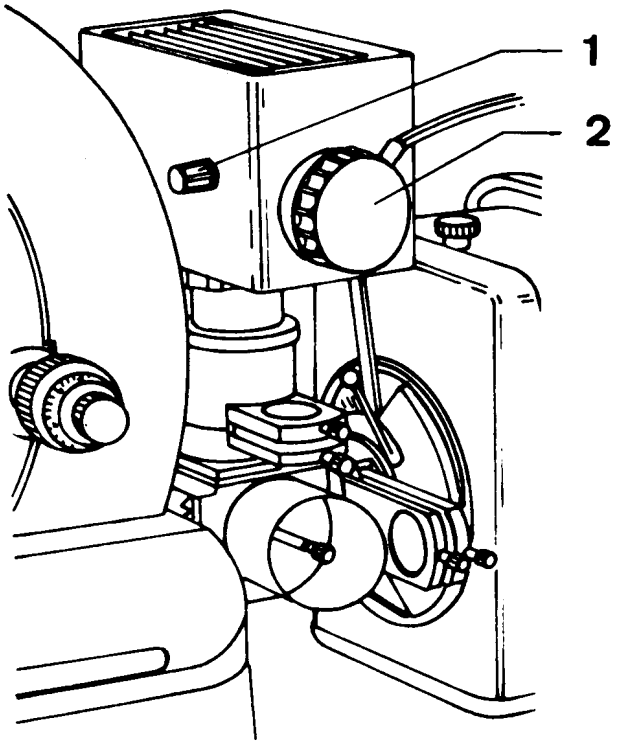
The tilting screen (7) is inserted with its slide into the compensator slot in place of the blank slide and adjusted so that the stage is viewed through the UV absorption screen.

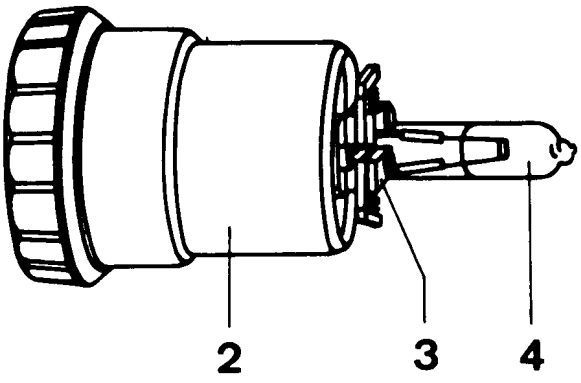
Microscope bodies

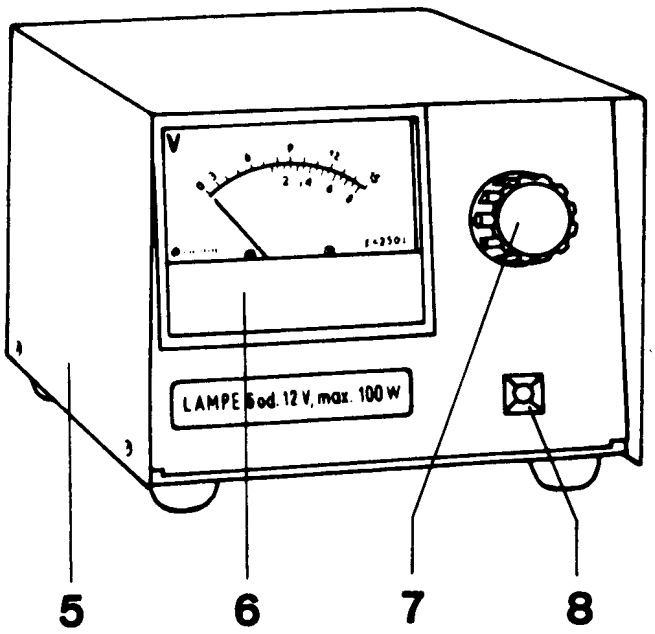
Strongly fluorescing specimens are observed with the inclined binocular body; for weakly fluorescing specimens the monocular body is recommended. The bodies are interchanged as explained in the "ZETOPAN" Instruction Manual.











'Lux US" Lamp Housing

Fitting the quartz halogen bulb

Release the clamping screw (1) and withdraw the lamp holder (2) from the lamp housing. Remove the bulb (4) together with its protective cover from the packing and carefully insert its base into the holder (3) up to the stop. Before this can be done the two clips on the lamp holder must be pressed together. After the clips are released the bulb is locked in position.

Remove the cover and clean off any dirt on the bulb. Then fit the lamp holder in the housing so that the axis of the bulb filament is perpendicular to the axis of the lamp condenser and the connecting cable points upwards at 45° towards the back of the lamp housing.

Regulating transformer

The regulating transformer (5) is used for operating both 6 V and 12 V low–voltage lamps.

For a.c. only! Voltage range 110 – 125 V and 200 – 250 V. If the mains voltage does not agree with the voltage marked on the back of the transformer, unscrew the four screws at the sides, remove the cover and reconnect the transformer in accordance with the circuit diagram. Secure the cover back into position with the screws. The fuse on the back of the transformer must also be changed (fuse T 1,25 B for 100 – 125 V,fuse T 0,8 B for 200 – 250 V).

The front of the transformer carries the voltmeter (6), the rotary control (7) and the signal lamp (8). The upper voltmeter scale is used for the 12 V range, the lower one for the 6 V range. The voltmeter pointer must not move beyond the red marks at 12 V or 6 V respectively.

The back of the transformer carries two sockets for the special noninterchangable plugs for the 6 V and 12 V low–voltage lamps. Next to them is the socket for the mains supply cable and the fuse.

The lamp is switched on by turning the control clockwise. The red signal lamp lights up. The brightness can be adjusted continuously with the control. The voltmeter pointer indicates the voltage.

The quartz halogen bulb should only be operated at 12 V when this is actually required since the life of the bulb decreases rapidly as the voltage increases.

Filter set on the "Lux US" lamp housing

The filter set consists of two filter slides (12) and (13) which carry the following filters:

Frosted daylight filter (color light blue)
for reducing the light intensity and adjusting the color of the illuminator to that of daylight. For color–correct exposures on panchromatic photographic material.

Green filter
usually used for monochrome photomicrography provided correct tone reproduction is not required. A powerful contrast filter for red specimens. Also used occasionally in microscopy of unstained specimens (phase contrast) to achieve a clearer image.

Neutral filters N 4 (T = 6.3%) and N 6 (T = 1.6%)
for reducing excessively intensive illumination.

The neutral filter N4 in the lower filter slide can be replaced by the red filter 30,8 X 2 RG 610 for simultaneous dark ground fluorescence or simultaneous contrast fluorescence.

Frosted screen in the "Lux US"lamp housing

Use of the built–in frosted screen ensures uniform illumination of the field, especially at low magnifications.

To insert the frosted screen:
move in handle (9) up to the stop

To remove the frosted screen:
pull out handle (9) up to the stop.

Illumination by the low–voltage lamp

Move the mirror slide to the left with the knobs (15) up to the stop. A fully reflecting mirror now directs the light from the low–voltage lamp into the microscope. The shutter (14) has automatically also been moved to the left and is in its empty position.

Adjusting the quartz halogen bulb

Switch on the lamp with the regulating transformer.

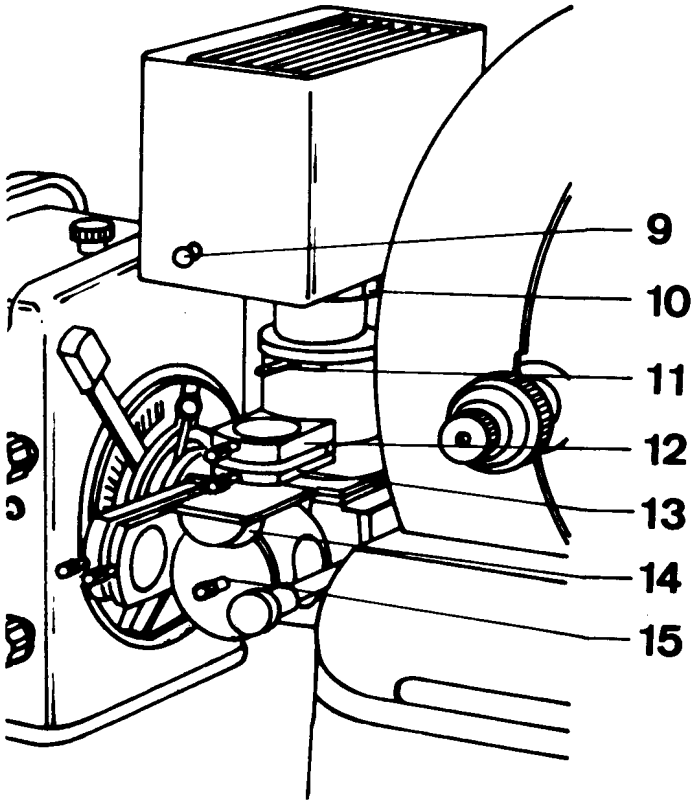
Remove all light filters (move both filter slides to the center position).

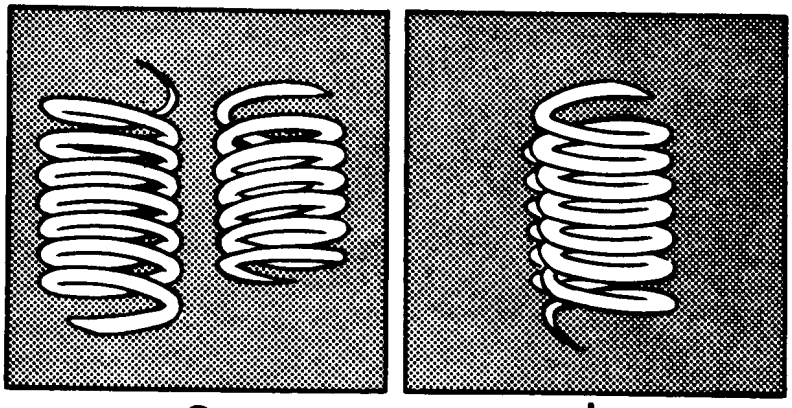
Also swing out the frosted screen in slide (pull the lever out of the lamp housing up to the stop).

Set the "ZETOPAN" for transmitted light illumination; move the levers on the base outwards to the left and right respectively.

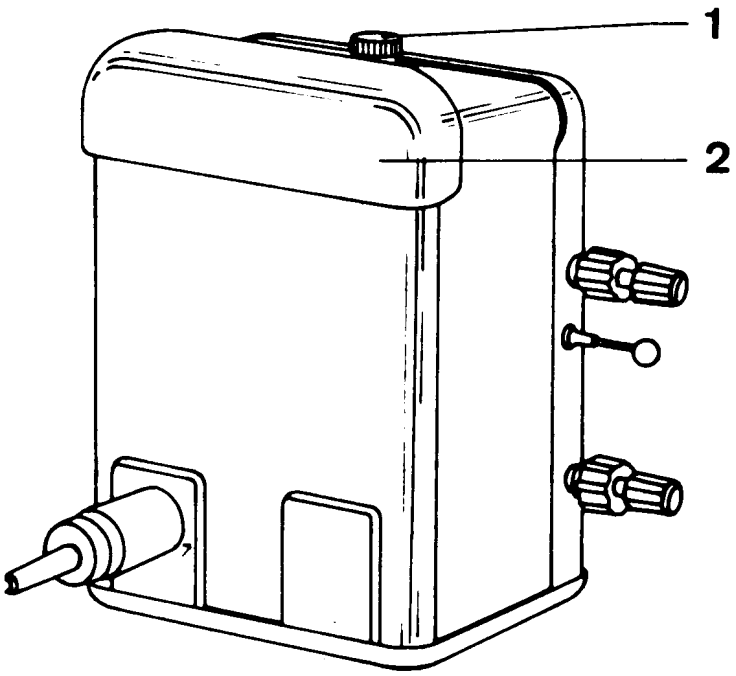
Set the illumination lens in the base to "EX".

Place a sheet of paper on the light exit aperture. Adjust the lamp condenser with the knurled ring (10) and close the lamp field diaphragm with the lever (11) to project the image of the filament on the paper. Set this image to the center of the light exit aperture by rotating the lamp insert or moving it sideways after releasing the clamping screw (1). Then arrange it to coincide with its mirror image there.





Any dark gaps between the windings of the filament are filled with parts of the mirror image.
The lamp holder is then secured with the clamping screw (1).



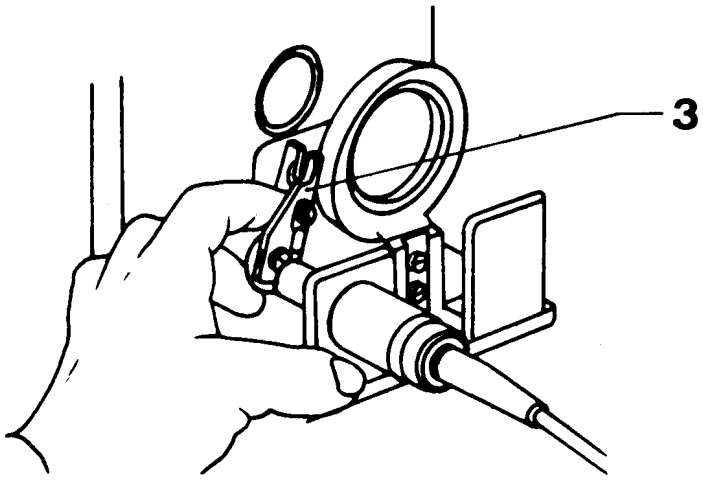
High–intensity Illuminator

Fitting the high–intensity lamp

Lift off the cover (2) after releasing the nut (1).

The lamp carrier (3) in the housing is arranged to pivot through 90° to simplify insertion of the lamp. Using the index and middle fingers of the left hand, see drawing, the lamp carrier (3) is pulled axially until it is felt to disengage, and is then turned upwards anticlockwise until it is vertical and has clicked home. Swing out the frosted screen, pull lever (7) out of the housing up to the stop.

PLEASE NOTE: handle the lamp with care to avoid mechanical damage; do not hold it by the quartz envelope but by its electrodes. Before switching on the mercury–vapor lamp for the first time it should be wiped with a clean cloth moistened with alcohol to prevent traces of grease or perspiration (finger marks) being burnt into the envelope. If the quartz envelope of the xenon lamp XBO 150 W/1 has been touched inadvertently it must similarly be cleaned before switching it on for the first time.

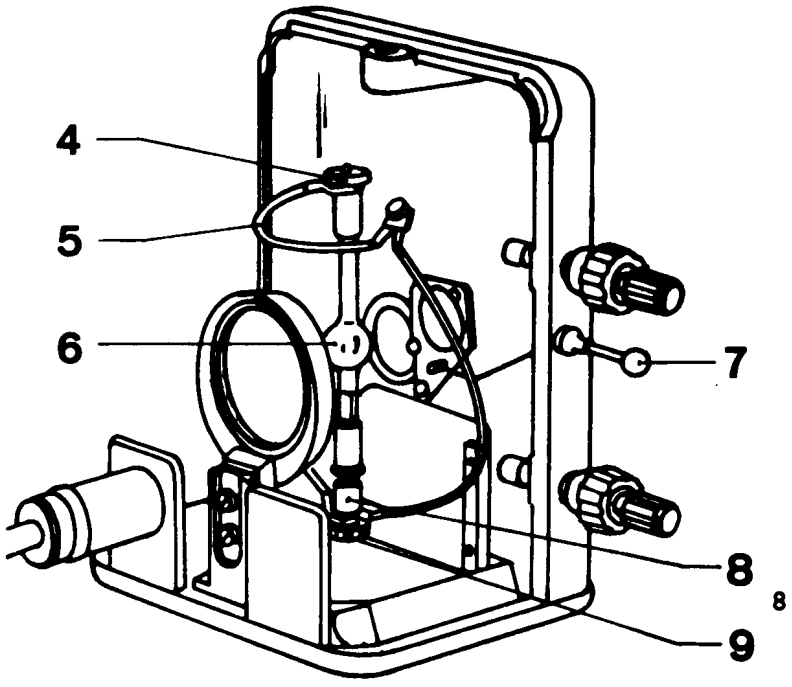


a) Mercury–vapor lamp HBO 200 W/4 or CS 200 W/4

Unscrew the two knurled nuts from the lamp (6). Screw the spacer (8) on the terminal marked with the type designation and insert it together with the lamp in the lamp carrier. Line up the lamp so that the sealing pip of the quartz envelope is upwards or downwards and will not be in the optical path when the lamp is swung into position. Secure the lamp with knurled the nut (9).

Swing the lamp carrier (3) together with the lamp back into the operating position until it clicks home. The mercury–vapor lamp HBO 200 W/4 is vertical, the terminal marked with the type designation is at the bottom. Place the connecting lug of the cable (5) on the thread of the upper terminal and clamp it with the knurled nut (4).

Fit the cover (2) into position and secure it with the nut (1).



b) Xenon lamp XBO 150 W/1

The xenon lamp (13) operates at a pressure of several atmospheres. To ensure the safety of the operator he has to wear a protective mask when removing the protection sleeve (12).

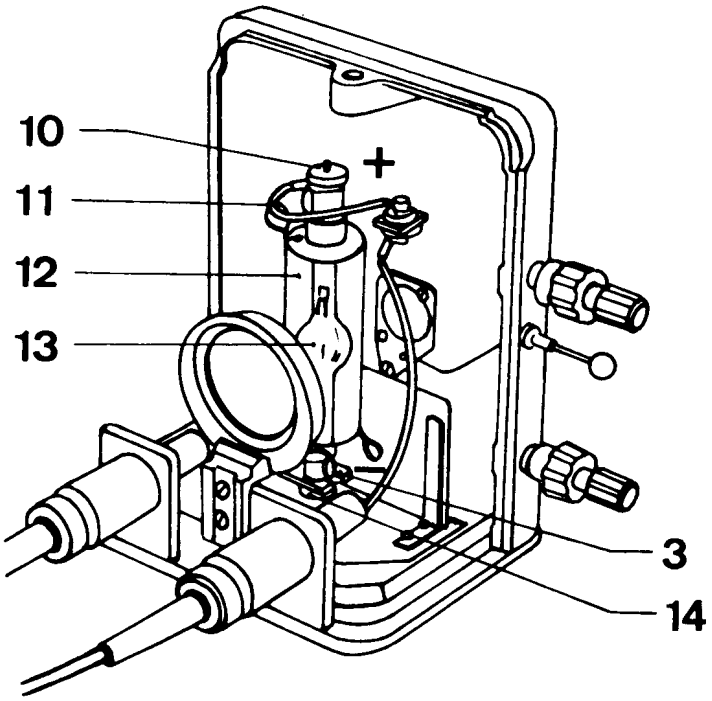
Initially the protection sleeve (12) is left in position.

Unscrew the nut (10) on the anode terminal (marked with a plus sign) and loosen the nut (14) on the cathode terminal far enough so that the lamp can be inserted with the cathode terminal into the carrier (3). Line up the lamp so that the sealing pip on the quartz envelope points upwards or downwards and will not be in the optical path when the lamp is swung into position. Clamp the lamp with the nut (14).

Swing the lamp carrier (3) together with the lamp back into the operating position. The xenon lamp XBO 150 W/1 is vertical, the anode terminal is at the **top.**

Place the connecting lug of the cable (11) on the thread of the anode terminal and clamp it with the nut (10).

Place a protective mask over the face, remove the two clamps and take off the split protection sleeve (12). Place the housing cover (2) into position and secure it with the nut (1).



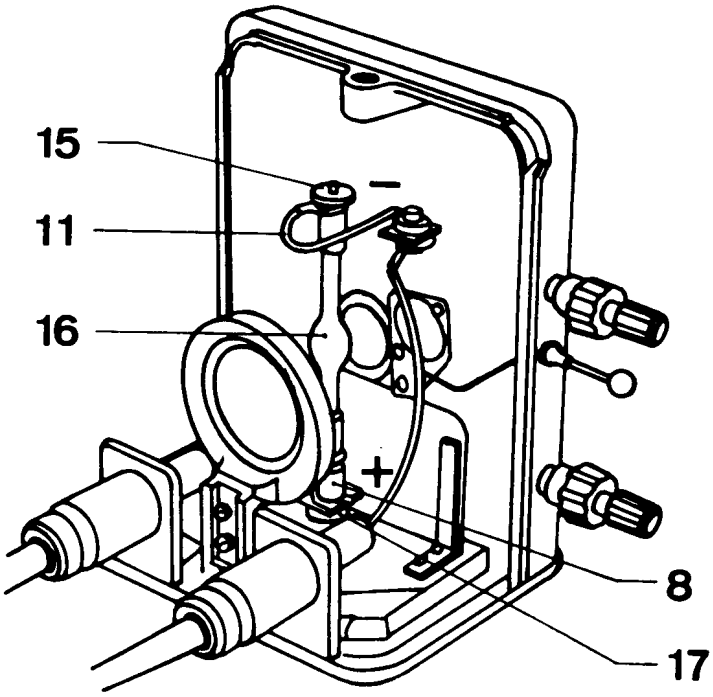
c) Mercury–vapor lamp HBO 200 W/2

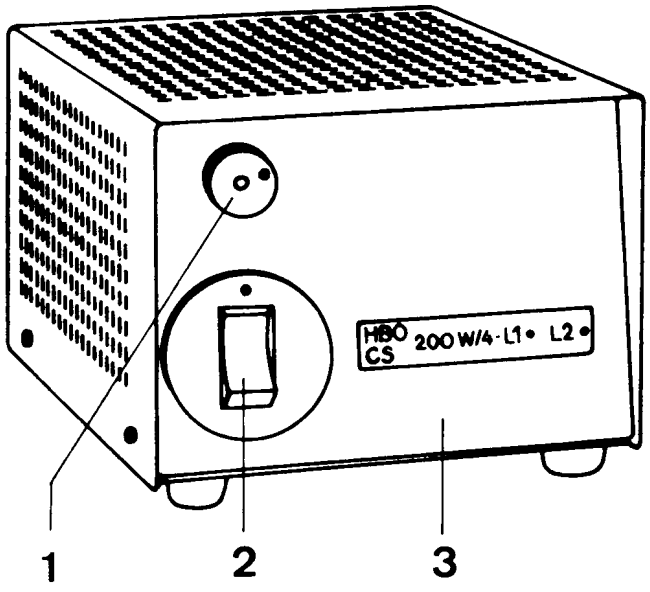
Unscrew the two nuts on the lamp (16). Screw the spacer (8) on the anode terminal (marked with a plus sign) and insert it together with the lamp in the lamp carrier (3). Line up the lamp so that the sealing pip of the quartz envelope is upwards or downwards and will not be in the optical path when the lamp is swung into position. Clamp the lamp with the nut (17).

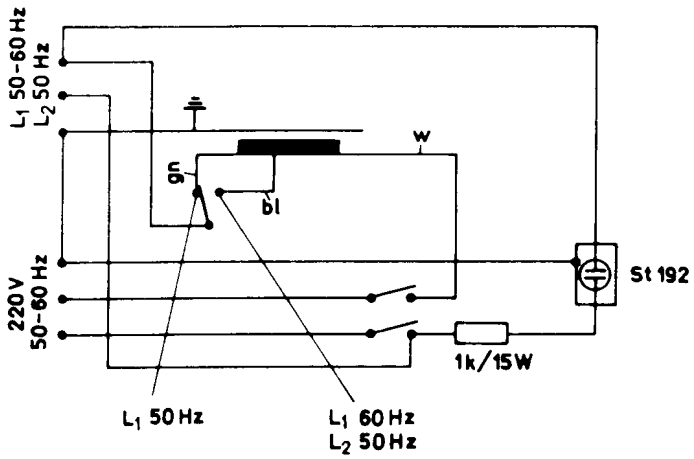
Swing the carrier (3) together with the lamp into the operating position until it clicks home. The mercury–vapor lamp HBO 200 W/2 is vertical, the anode terminal is at the **bottom.**Place the connecting lug of the cable(11) on the thread of the cathode terminal and clamp it with the nut (15).

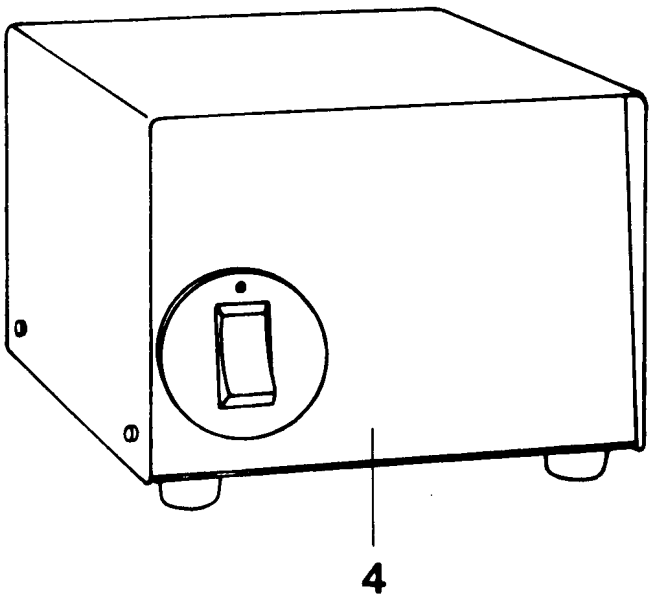
It is not necessary to reverse the polarity of the lamp housing since the lamp will also operate on reverse current.

Fit the cover (2) into position and secure it with the nut (1).









Control unit for the high–intensity lamp

PLEASE NOTE! before switching on the high–intensity lamp, do not forget to fit the cover on the lamp housing.

a) Control unit (3), Cat. No. 62 10 01.

For the "BINOLUX III C" lamp housing used with the mercury–vapor lamps HBO 200 W/4 or CS 200 W/4.

The control unit (3) is intended for operation on 220 V a.c. supply. For other supply voltages, i.e. 110V, 125 V, 150 V or 250 V, an intermediate transformer (4), Cat. No. 62 11 01, is available; it must be connected between the mains supply and the control unit. This intermediate transformer has a 10 A fuse on 110–125 V, a 6.3 A fuse on 150 V and a 4 A fuse on 250 V.

The front of the control unit (3) carries the toggle switch (2) and the safety starter (1). Two sockets are arranged on the back of the unit. The multipin plug from the lamp housing is inserted in the left–hand socket while the right socket takes the mains cable.

The control unit (3) is normally arranged for "L1" lamps.

After removing the cover it can be re-connected for "L2" lamps in accordance with the circuit diagram shown alongside.

PLEASE NOTE: before starting the lamp, insert the UV absorption filter "O2" with the thick filter slide close to the lamp, and a neutral or green filter with the thin filter slide.

The lamp is switched on with the toggle switch (2). As soon as the lamp has ignited the neon lamp of the safety starter (1) goes out; the light in the toggle switch shows that the lamp is operating. If the lamp does not ignite, the red button of the safety starter jumps out automatically to protect the ignition circuit. Before switching on the toggle switch again the red button must be pushed in to reset it.