

LEICA M690



Leica

User manual • Mode d'emploi
Gebrauchsanweisung • Manual de empleo

Contents

Controls

Adjustments before the operation

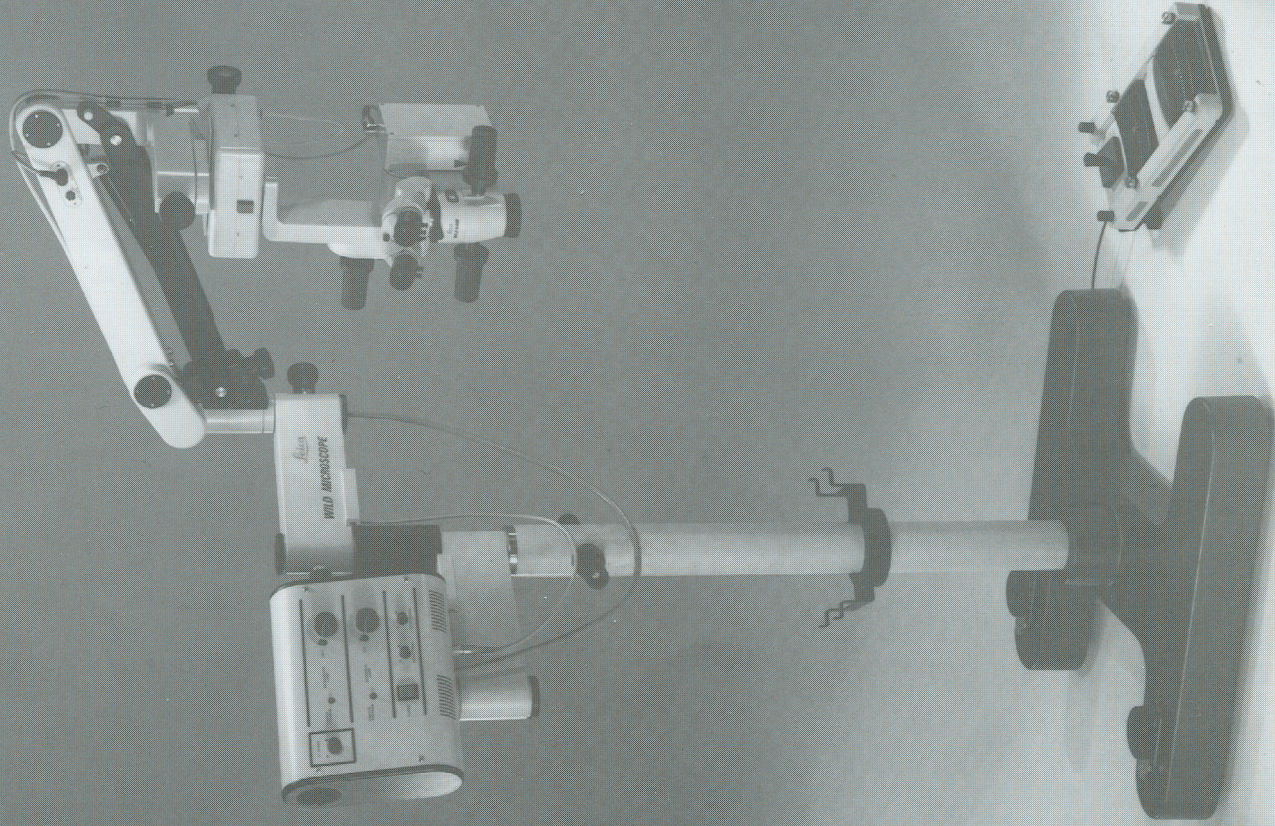
I. Components of the LEICA M690 zoom surgical operating microscope

1. LEICA M690 zoom surgical operating microscope
2. Binocular tubes
3. Optics
 - 3.1 Objectives
 - 3.2 Objectives with zero-degree illumination optics
 - 3.3 Eyepieces
4. Stands
 - 4.1 Control unit
 - 4.2 Footpedals
 - 4.3 Handswitch
5. Illumination
 - 5.1 Zoom illuminator
 - 5.2 Connecting the illuminator
 - 5.3 Automatic fuse
 - 5.4 Fitting the bulb
 - 5.5 Quick-change lamp mounts
 - 5.6 Filterholder
 - 5.7 Oblique illuminator
 - 5.8 Slit illuminator

II. Use

6. Securing the swingarm
7. Articulation brakes
8. Tilttable joint and microscope carrier
 - 8.1 Using the perforated disc
 - 8.2 Tilting and inclining
 - 8.3 Rotatable joint
9. Positioning the stand
10. Counterbalance
11. Interpupillary distance
12. Eye contact
13. Setting the zoom- and focusing speeds
14. Dioptic correction
 - 14.1 Dioptic correction without graticule (reticle)
 - 14.2 Dioptic correction with graticule (reticle)
15. Focusing
16. Depth of field
17. Sterile covers

The LEICA M690 operating microscope for ophthalmology on floor stand with XY-unit



III. Accessories

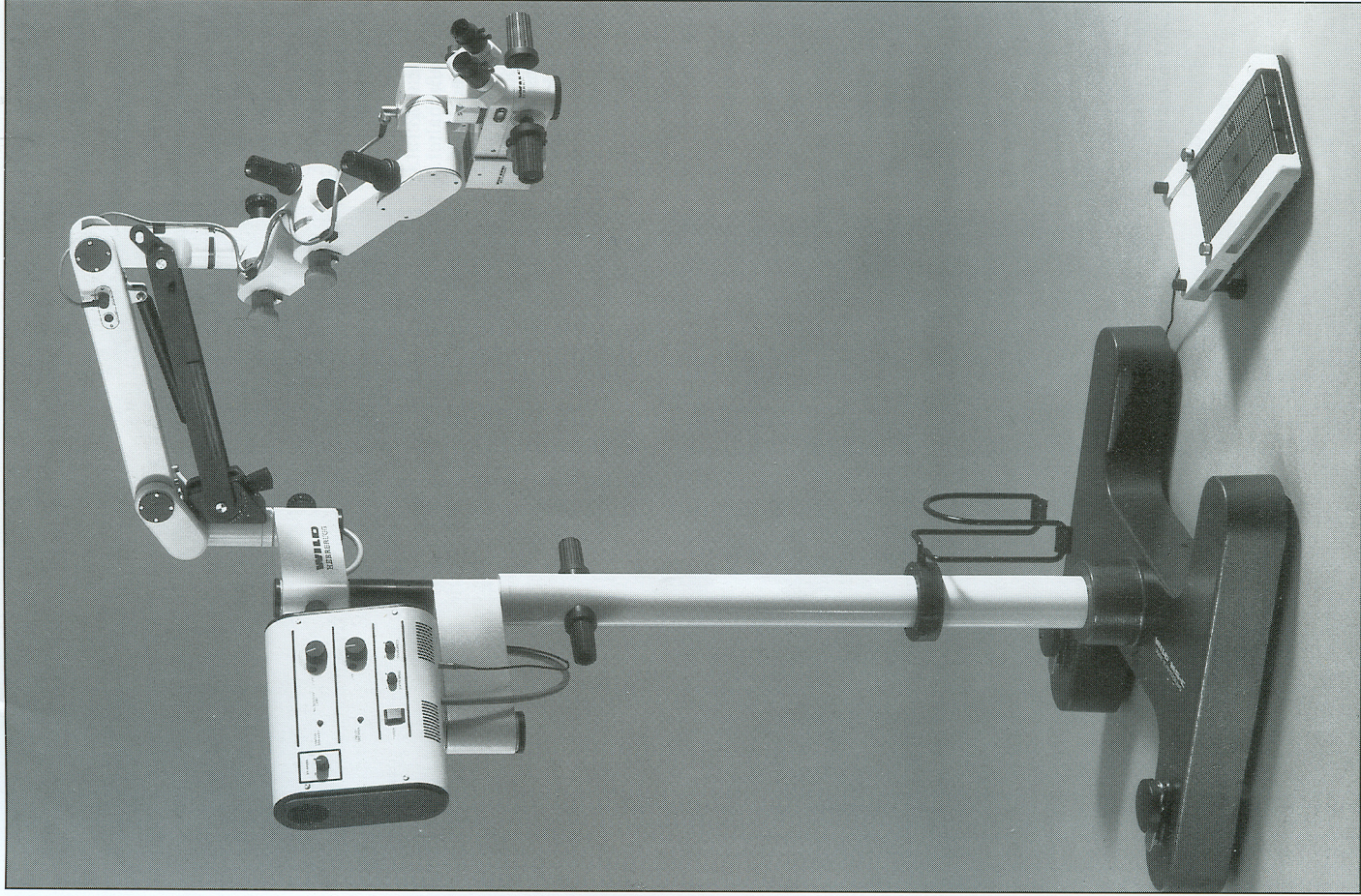
- 18. Beam splitter
- 18.1 Tube for second observer
- 18.2 Stereo attachment for second observer
- 18.3 Phototube
- 18.4 Cine/TV tube
- 18.5 Focusing and framing graticule (reticle) for photo- and cine/TV tubes
- 18.6 Dual attachment
- 19. 0° assistant's microscopes, stereo
- 20. 90° assistant's microscopes, stereo
- 21. 180° dual stereo attachment
- 22. XY-unit

IV. Care of the instruments

V. Optical data

This instruction booklet describes the functions of the LEICA M690 surgical operating microscope, its stands and its accessories. The assembly of the stand, control unit and optics carrier are explained in a separate instruction booklet (M2-690-104).

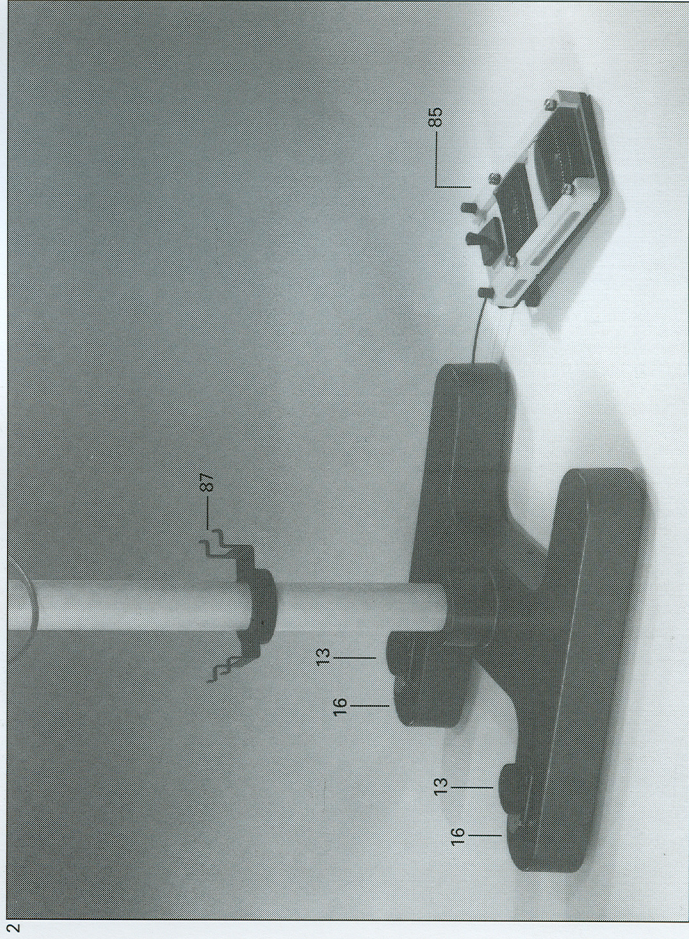
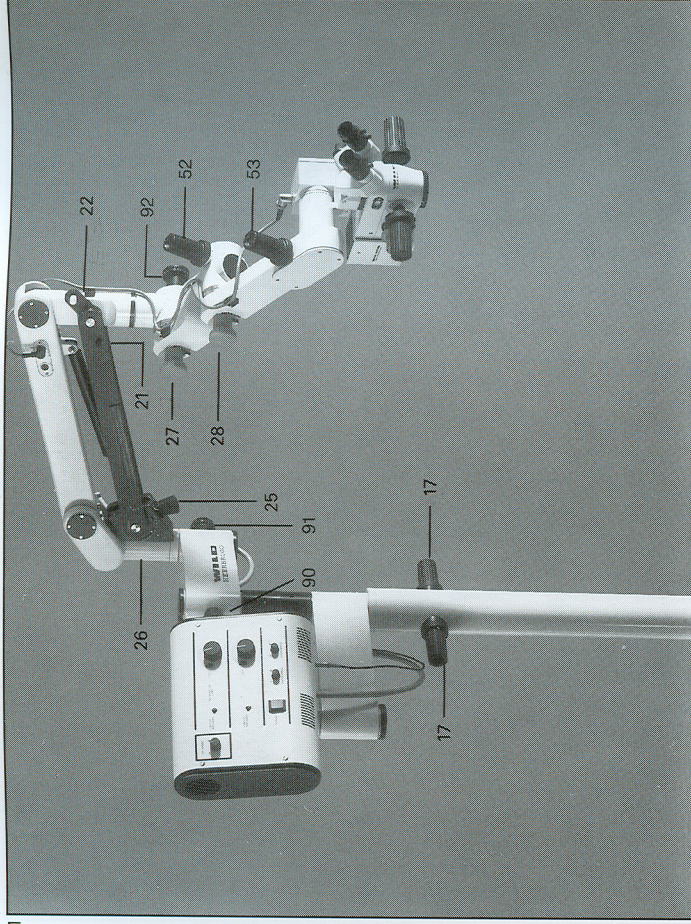
The LEICA M690 multidisciplinary operating microscope on floor stand with tiltable joint and microscope carrier

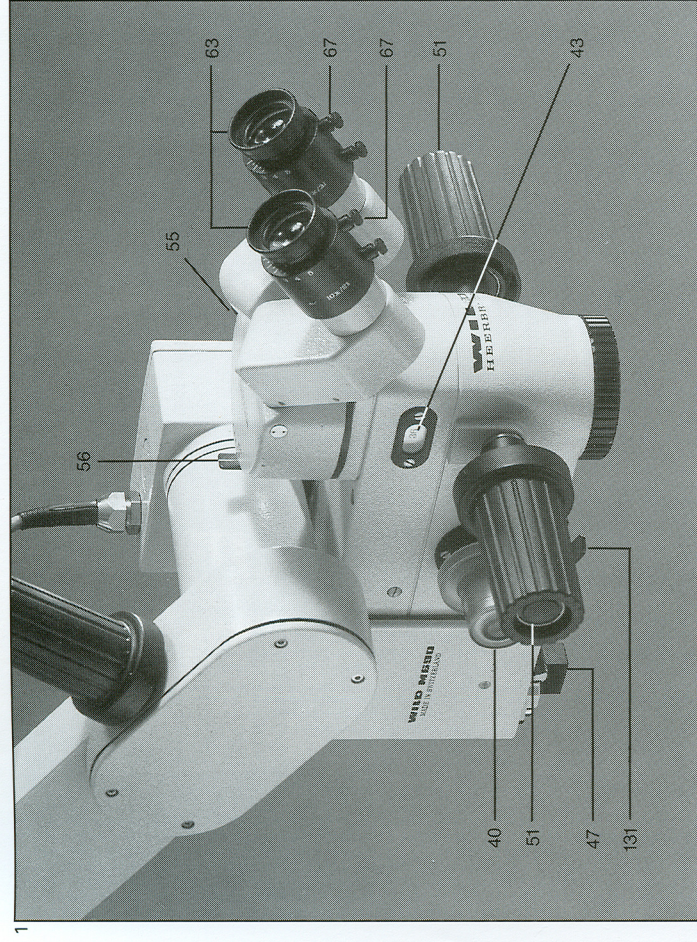


Controls

Stand

- (13) Footbrakes
- (16) Metal levers to release footbrakes
- (17) Handles for pushing the floor stand MS-C
- (21) Knob of retaining pin for disengaged safety hook
- (22) Safety hook to secure swingarm
- (25) Tension adjustment knob
- (26) Tension scale
- (27) Orange knob on swingarm, for securing tiltable joint or microscope carrier
- (28) Orange knob on tiltable joint, for securing microscope carrier
- (52) Drive on tiltable joint, for tilting microscope
- (53) Drive on microscope carrier, for inclining microscope
- (90) Brake knob for lateral movement around column
- (91) Brake knob for lateral movement of whole swingarm
- (92) Brake knob for rotational movement of front end of swingarm
- (85) Footswitch
- (87) Holder for footswitch



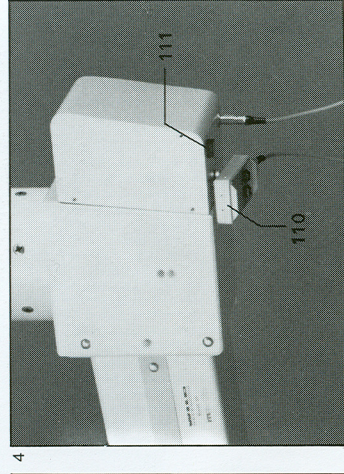
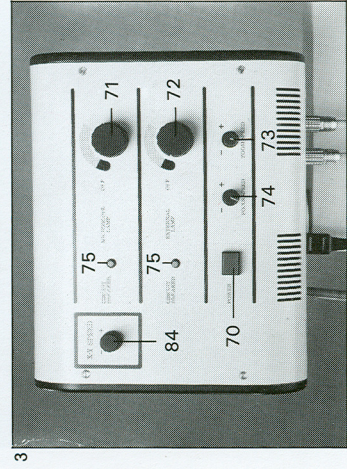
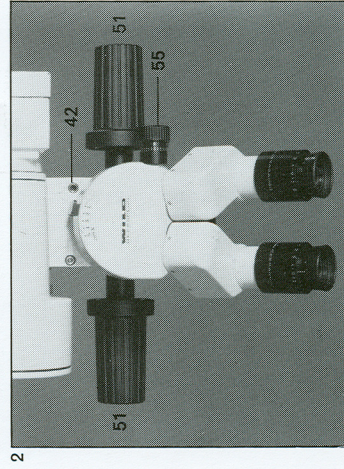


Surgical operating microscope

- (40) Knob for manual override of the motorized zoom illuminator
- (42) Recessed square for manual override of the motorized zoom magnification changer by means of tool
- (43) Magnification scale
- (47) Quick-change lamp mount
- (51) Positioning handles
- (55) Drive for adjusting interpupillary distance, with scale
- (56) Double-iris diaphragm
- (63) Eyelens mount with diopter scale
- (67) Screw to lock dioptic setting
- (131) Lever to cut out microscope illumination (there is also a filter slide here)

Control unit

- (70) POWER
Power switch
- (71) MICROSCOPE LAMP
Regulating knob for built-in illumination
- (72) EXTERNAL LAMP
Regulating knob for second electrical outlet
- (73) ZOOM SPEED
Speed control knob for motor-driven zoom
- (74) FOCUS SPEED
Speed control knob for motor-driven focusing
- (84) XY SPEED
Speed control knob for XY-unit
- (75) CIRCUIT BREAKER
Automatic fuses



Ceiling mount

- (110) Handswitch to control ceiling mount
- (111) Power switch of ceiling mount

Adjustments before the operation

Stand

- Position the stand Section 9
- Position the tiltable joint and the microscope carrier with the perforated disc Section 8
- Fit the accessories required Section 18-21
- Adjust the counterbalance Section 10
- Adjust the brakes Section 7
- Adjust the focusing and zoom speeds Section 13
- (adjust the xy-speed if necessary) Section 21

Réglages avant l'opération

Statif

- Positionnement Chapitre 9
- Réglage du joint basculant et du porte-microscope au moyen du disque perforé Chapitre 8
- Montage des accessoires prévus Chapitres 18-21
- Contrepoids Chapitre 10
- Réglage de la dureté des freins des joints pivotants Chapitre 7
- Réglage de la vitesse des mouvements de mise au point et zoom Chapitre 13
- (réglage év. de la vitesse du module XY) Chapitre 21

Einstellungen vor der Operation

Stativ

- Positionieren Kap. 9
- Einrichten von Schwenkgelenk und Mikroskopträger mit der Lochscheibenverstellung Kap. 8
- Vorgesehenes Zubehör montieren Kap. 18-21
- Gewichtsausgleich Kap. 10
- Gängigkeit der Gelenkbremsen einstellen Kap. 7
- Fokussier- und Zoom-Geschwindigkeit einstellen (evtl. Geschwindigkeit der XY-Kupplung einstellen) Kap. 13
- Kap. 21

Ajuste antes de la operación

Estativo

- Puesta en posición Cap. 9
- Disponer la articulación regulable y el portamicroscopio con el ajuste del disco perforado Cap. 8
- Montar los accesorios previstos Cap. 18-21
- Compensación del peso Cap. 10
- Regular la marcha de los frenos de articulación Cap. 7
- Regular la velocidad del enfoque y del zoom Cap. 13
- (regular la velocidad del módulo XY) Cap. 21

Optics

- Inspect, and if necessary clean, the eyepieces and objectives
- Set the interpupillary distance
- Attach the spacing rings and the eyecups
- Adjust the diopter settings
- Treat the eyepieces with an antifogging compound

Section 3
Section 11
Section 12
Section 14

Illumination

- Switch on the control unit (and ceiling mount if fitted)
- Test the illumination, if necessary changing the bulb and introducing the filter
- Test the footpedal/handswitch LEDs

Section 4.1
Section 9
Section 5
Section 4
Section 4.1

Final preparations

- Set the focusing drive to its mid-position
- Engage the lowest magnification
- Position the microscope in relation to the operating table
- Position the footpedals
- Release the safety hook
- If appropriate, attach handswitch to positioning handle
- Fit sterile items

Section 15
Section 13
Section 9, 8
Section 4.2
Section 6

Optique

- Oculaires et objectifs, contrôle, nettoyage éventuel, mise en place
- Réglage de l'écartement pupillaire
- Mise en place des bagues d'écartement et des oculières sur les oculaires
- Réglage des dioptries
- Traitement des oculaires par des substances antibuée

Chapitre 3
Chapitre 11
Chapitre 12
Chapitre 14

Contrôle du fonctionnement

- Enclenchement de l'alimentation
- (év. statif de plafond)
- Contrôle de l'éclairage. Changement éventuel d'une ampoule défectueuse et mise en place du filtre
- Contrôle de la commande à pédale/manuelle
- Diodes lumineuses!

Ultimes préparations

- Mouvement de mise au point en position médiane

Chapitre 15

- Choisir le grossissement le plus faible
- Positionnement de l'instrument près de la table d'opération
- Positionnement de la commande à pédale
- Déclenchement du levier de blocage
- Fixation éventuelle de la commande manuelle sur la poignée de positionnement
- Montage des éléments stérilisés

Chapitre 13
Chapitre 9, 8
Chapitre 4.2
Chapitre 16
Chapitre 17

Optik

- Okulare und Objektiv kontrollieren, ev. säubern, einsetzen
- Augenabstand einstellen
- Distanzringe und Augenummischeln auf die Okulare schrauben
- Dioptriekorrektur
- Behandlung der Okulare mit Antibeschlagmittel

Kap. 3
Kap. 11
Kap. 12
Kap. 14

Funktionskontrolle

- Steuergerät einschalten (evtl. Deckenstativ einschalten)
- Beleuchtung kontrollieren, evtl. defekte Glühlampe auswechseln und Filter einsetzen
- Fuß-/Handschalter testen
- Leuchtdioden!

Kap. 4.1
Kap. 9
Kap. 5
Kap. 4
Kap. 4.1

Letzte Vorbereitungen

- Fokussiertrieb in Mittelstellung einstellen
- Schwächste Vergrößerung einstellen
- Positionieren des Instrumentes am Operationstisch
- Fußschalter positionieren
- Lösen des Sperrhebels
- ev. Handschalter am Positioniergriff befestigen
- Sterile Komponenten anbringen

Kap. 15
Kap. 13
Kap. 9, 8
Kap. 4.2
Kap. 16
Kap. 17

Optica

- Controlar, y si fuera necesario, limpiar, colocar oculares y objetivos
- Regular la distancia interocular
- Atornillar sobre los oculares los anillos distanciadores y las anteojeras
- Corrección de las dioptrías
- Tratar los oculares con un producto contra el empañamiento

Cap. 3
Cap. 11
Cap. 12
Cap. 14

Control del funcionamiento

- Conectar el aparato de mando (y si fuera necesario, conectar el estativo de techo)
- Controlar la iluminación, eventualmente cambiar la bombilla defectuosa y colocar el filtro
- Controlar el dispositivo de control por pedal/manual
- Diodos luminosos!

- Mandó de enfoque en la posición central

Ultimos preparativos

- Seleccionar el aumento más pequeño
- Emplazar el instrumento en la mesa de operación
- Colocar el dispositivo de control por pedal
- Soltar la palanca de bloqueo
- Eventualmente, fijar el dispositivo de control manual en la empuñadura de posicionamiento
- Colocar los componentes esterilizables

Cap. 13
Cap. 9, 8
Cap. 4.2
Cap. 16
Cap. 17

1. Components of the LEICA M690 zoom surgical operating microscope

The LEICA M690 surgical operating microscope has a 1 : 5 zoom magnification changer and a focusing system which are both driven by electric motors and controlled by foot-pedals.

The built-in illuminator is linked to the zoom magnification changer so that the field of view is fully illuminated at all magnifications and the light intensity remains constant for the surgeon.

A conversion kit is available if the 180° dual stereo attachment is to be used.

1. LEICA M690 zoom surgical operating microscope

The LEICA M690 optics carrier includes:

- a motor-driven 1 : 5 zoom magnification changer
- a motor-driven focusing system
- a built-in zoom coaxial illuminator
- a quick-change lamp mount
- a swing-in filterholder, a built-in heat-absorbing filter, and a stop to cut out the microscope illumination

The optics carrier also includes two metal handle axes with sterilizable positioning handles, a sterilizable control for manual override of the motorized zoom magnification changer, and a sterilizable knob for manual override of the motorized zoom illuminator.

The optics carrier will accept any binocular tube and any accessory (beam splitter, assistant's microscope etc.) at any time.



2. Binocular tubes

Inclined binocular tubes (fig. 1) and **straight binocular tubes** (fig. 2), both with double-iris diaphragm and with drive for adjusting the interpupillary distance, are available. A simplified version of each, without diaphragm and with manual interpupillary distance adjustment, can also be supplied. The **15° tube wedge** enables the angle of observation to be increased or decreased by 15°. The **binocular tube with variable angle of observation** (fig. 3) ensures an ergonomically-sound instrument configuration. It provides for fatigue-free body positions with all types of instrument assembly and with any combination of accessories. The angle of observation can be steplessly varied by up to 90° in either direction from the vertical. In addition, the binocular tube can be set for either of two viewing heights. The image remains the right way up, irrespective of the tube inclination.

A binocular tube with variable angle of observation, 10° - 50°, is available for ophthalmic surgery.

Fitting a binocular tube:

- Place the binocular tube on the optics carrier
- Straight binocular tube: Push the eyepiece tubes apart
- Secure the binocular tube to the optics carrier using the clamping screw (45).

To set the interpupillary distance, see section 11.

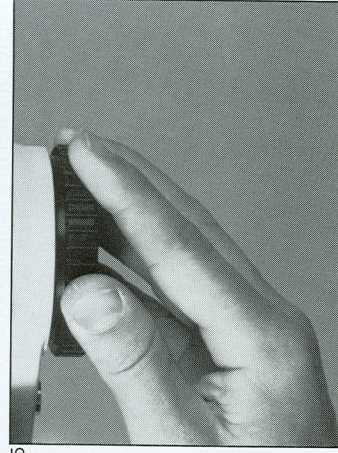
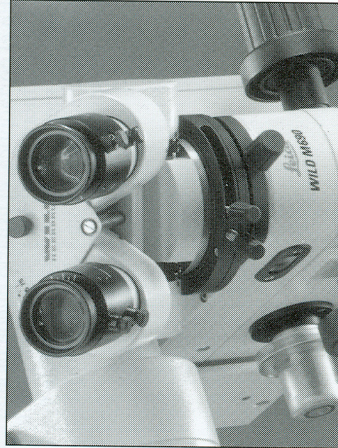
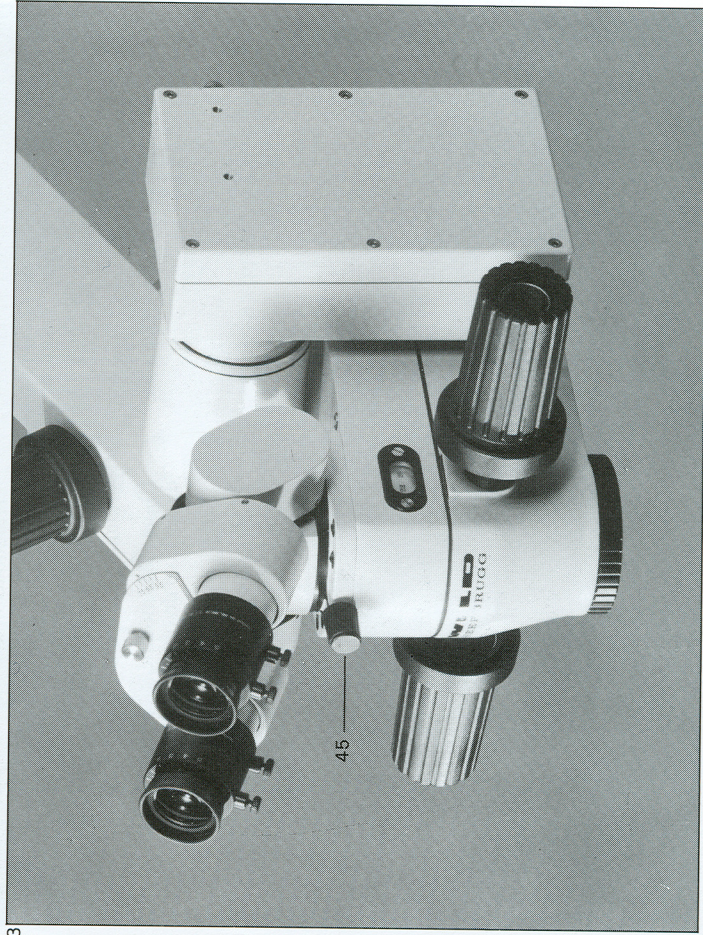
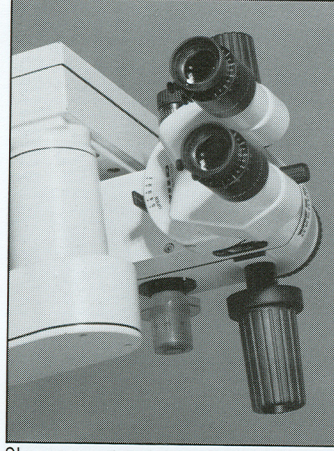
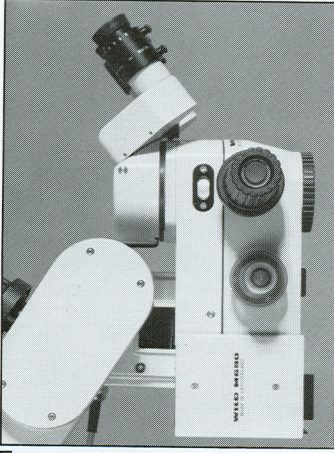
The rotatable tube adapter also fits in the same manner between the binocular tube and either the optics carrier or the beam splitter (fig. 4). It enables the binocular tube to be turned laterally by up to 30° when the instrument is in a tilted position.

3. Optics

3.1 Objectives

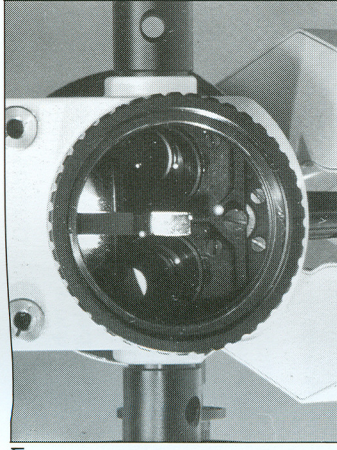
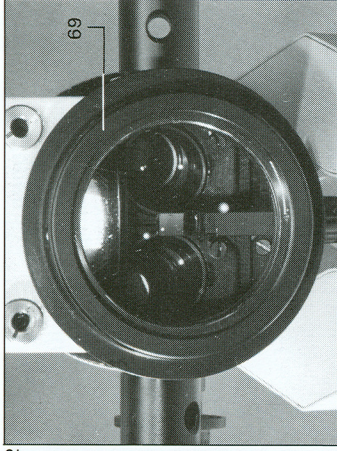
Objectives with focal lengths 100, 150, 175, 200, 225, 250, 275, 300, 350 and 400 mm are available for the LEICA M690 zoom surgical operating microscope. The working distances are tabulated in section V.

Screw the required objective on to the underside of the microscope in an anticlockwise direction (fig. 5). Location of the thread is helped by initially turning the objective clockwise until it is heard to engage.



3.2 Objectives with zero-degree illumination optics

The objectives with zero-degree illumination optics are available with focal lengths 175 mm and 200 mm and, like the other objectives, are attached with a screw thread to the surgical operating microscope. The incorporated illumination optics direct part of the light precisely into the illumination beam path of the surgical operating microscope at an angle of 0°. The vertically-incident light is suitable for lens extractions, because fine details on the posterior capsule can be recognized within the red fundus reflex. The surrounding area is illuminated in the usual way. The illumination optics system can be swung in and out (figs. 1, 2) and clicks into position. Sterile operation is ensured by a sterilizable rotatable ring (69).



3.3 Eyepieces

The eyepieces for spectacle wearers fit into any binocular tube and into the second observer tubes.

- (61) Sleeve for graticule (reticle)
- (62) Graticule (reticle), in mount
- (63) Eyelens
- (64) Spacing ring
- (65) Flexible eyecup

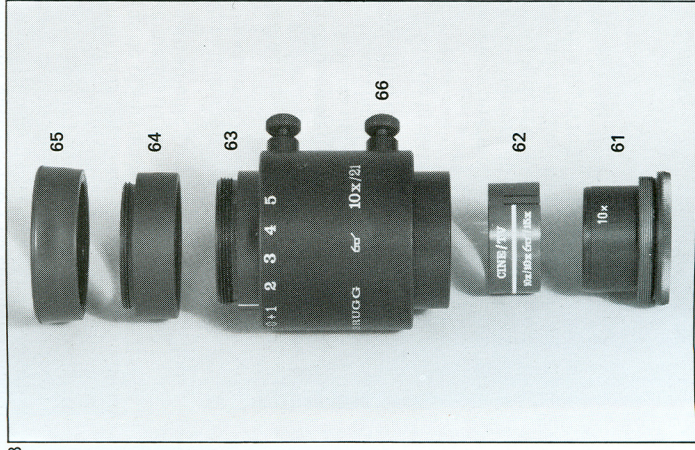
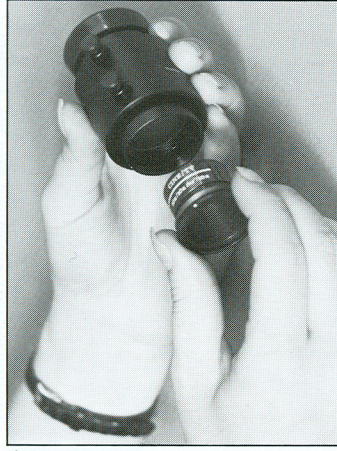
Fitting the eyepieces:

- Remove the dust caps from the eyepiece tubes and fully slacken screw (66) of the eyepieces. Insert the eyepieces into the tubes so that the screws are opposite to the slits of the spring shackles. Secure each eyepiece with the screw.
- Screw the spacing ring or rings in between the eyecup and the eyelens (see section 1.2). If preferred, the eyecups can be folded back.
- The diopter correction is set on the eyelens mount of the eyepiece (see section 1.4).

For photomicrography and cinematography a focusing and framing graticule is to be placed in that eyepiece of the binocular tube which is nearer to the cine/TV tube. It enables the image to be accurately focused in the film plane, and indicates the area of the subject which will appear on the picture.

Fitting the graticule in the eyepiece:

Unscrew the sleeve from the underside of the eyepiece, slide the mount of the graticule over it, align the pattern of the graticule with the white spot on the sleeve, screw the sleeve back into position (fig. 4), and secure the eyepiece in the eyetube.



4. Stands

The LEICA M690 zoom surgical operating microscope can be fitted to the **rollable floor stand MS-C** (fig. 1), or to the **ceiling mount MS-F** (fig. 4).

Components common to all of these stands are the swingarm, the tilttable joint, the microscope carrier, and the control unit with carrier.

The **rollable floor stand** is 183 cm high and enables the microscope to be brought up to the vicinity of the operating table instead of vice versa. Four double rollers beneath the base ensure that it moves easily and smoothly, and two footpedals are used to brake it securely when required.

The **ceiling mount** enables the instrument to be effortlessly matched to the dictates of the space available, and leaves the floor and walls completely unobstructed. The stand has a cantilever of 240 cm.

The position the stands, see section 9.

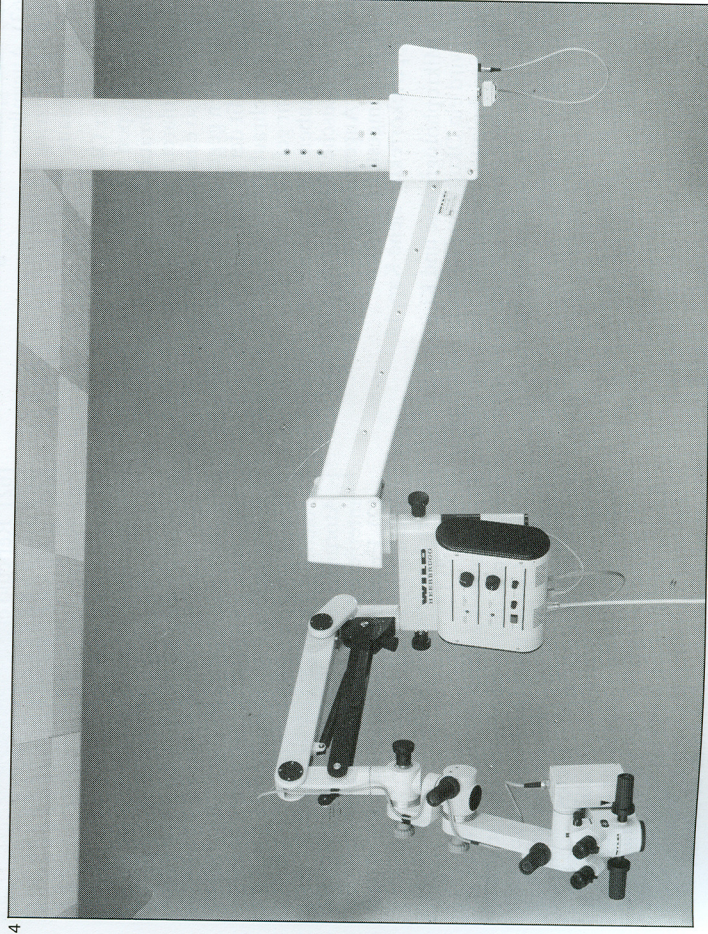
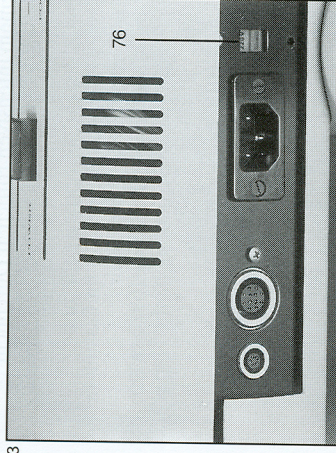
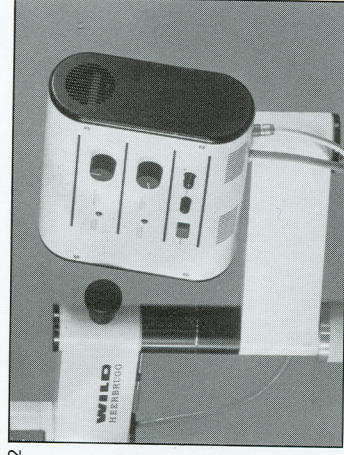
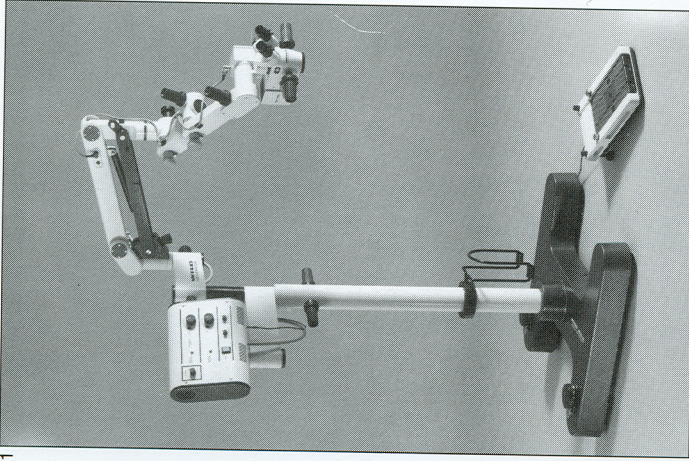
4.1 Control unit

The control unit supplies two secondary circuits, the outputs from which can be independently and steplessly varied. Automatic thermomagnetic fuses protect each circuit from overloading. Wherever possible, the cables are concealed within the swingarm.

At the side are thirteen LEDs, which enable the source of a fault to be located (see separate assembly instructions).

The control unit has knobs for varying the speeds of zoom, focusing and xy movement, and for altering the voltage supplied to an internal and an external light source. There is a built-in stabilizer for the power supply.

- Set the voltage selector (76) to the supply voltage:
 - 115V position for voltages of 100-120 V
 - 220V position for voltages of 200-240 V
- Connect the power cable to the socket and to the power supply.



4.2 Footpedals

The six-function footswitch governs zoom (Z), focusing (F), microscope illumination (ML) and an additional function.

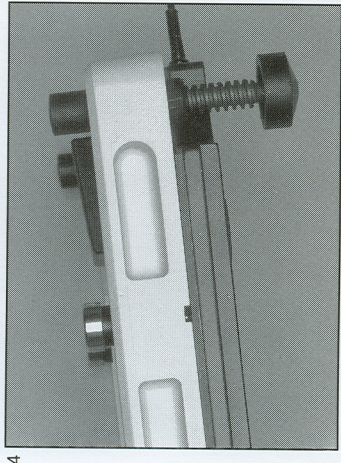
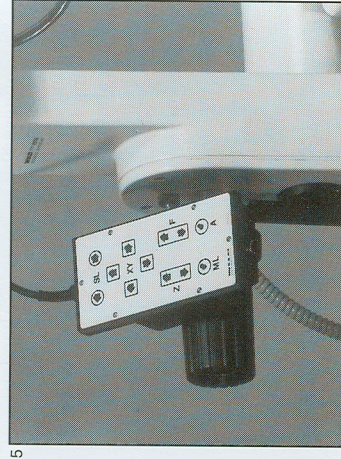
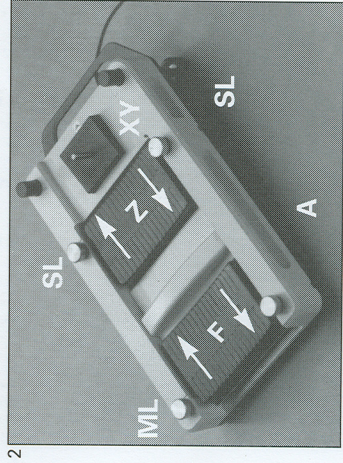
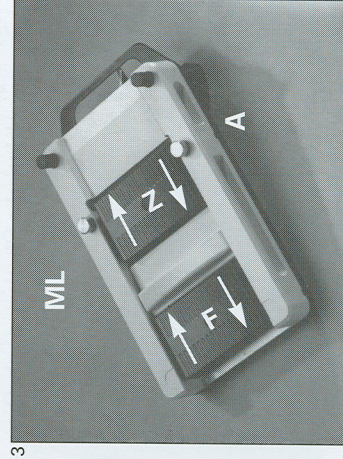
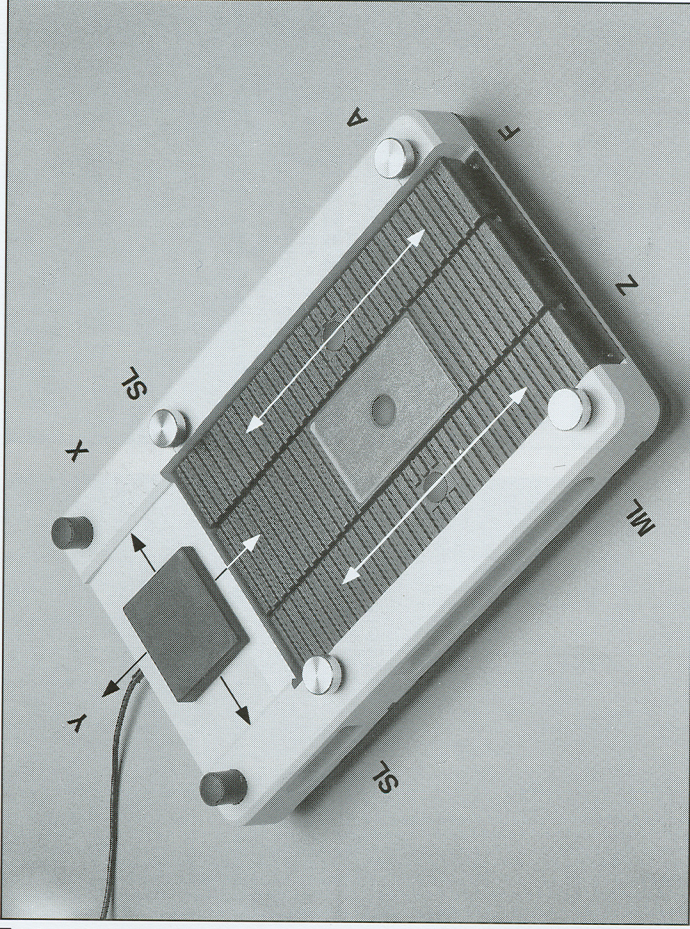
The twelve-function footswitch governs zoom (Z), focusing (F), microscope illumination (ML), an additional function (A), the XY-unit and the slit illuminator (SL).

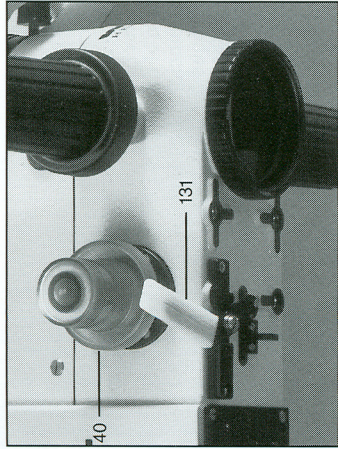
With the exception of the XY controls it is possible to arrange all of the functions in accordance with individual requirements. The zoom/focus pedals can be arranged either lengthwise as in type A (fig. 1) or crosswise as in type B (figs. 2 and 3). Both types have an XY control plate and an XY joystick.

The surgeon can adjust the tilt of the footswitch by rotating the spindles (fig. 3). The footswitches are watertight. If a thorough cleaning is required, take away the zoom/focus pedals and the XY control plate (see assembly instructions).

4.3 Handswitch

The twelve-function handswitch governs zoom (Z), focusing (F), microscope illumination (ML), an additional function (A), the XY-unit and the slit illuminator (SL). The handswitch can either be used loose or it can be attached to the sterilizable holder (fig. 4)





5. Illuminator

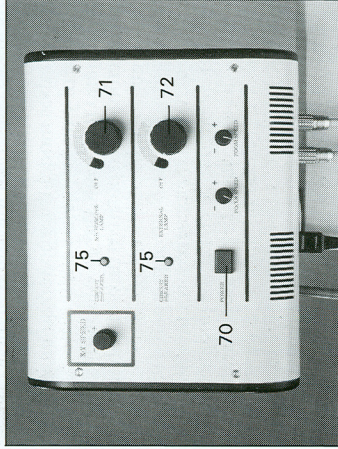
5.1 Zoom illumination

The built-in coaxial illuminator is linked to the zoom magnification changer, so that any field of view is always correctly illuminated. The image-side brightness is kept constant by optical means without influencing the colour temperature; these conditions apply to the image as seen by the surgeon or by the assistant and to filming, television and photography. The fatiguing effect of brightness changes is thus appreciably reduced.

The intensity of the microscope illumination is governed by the regulating knob (71) and that of the slit illuminator with the regulating knob (72).

The foot- and handswitches can be used to turn the microscope illumination on and off and to change the tilt of the slit illuminator. If desired, the light intensity and the size of the illuminated area can be varied manually by means of a sterilizable control for stepless manual override of the zoom changer (40). When the zoom magnification is subsequently altered, the normal relationship between zoom position and illuminated field of view is automatically re-established.

The subject is protected from excessive warmth by a built-in heat filter. The microscope illumination can be cut out by using the lever (131).



WARNING!

Zum Schutz des Patientenauges vor Lichtschädigung muß bei der Anwendung des Operationsmikroskopes in der Ophthalmologie der UV Sperrfilter GG 475, Artikel-Nr. 439 064, verwendet werden. Zusätzlich zur Verhinderung der Austrocknung des Auges muß ein Infrarotfilter verwendet werden.

WARNING!

If the surgical microscope is used in ophthalmology, the UV barrier filter GG 475 (stock no. 439 064) must be used to protect the eyes of the patient from damage caused by ultra-violet light. In addition, an infrared filter must be used to prevent drying of the eyes.

AVERTISSEMENT!

Si le microscope d'opération est appliqué en ophtalmologie, il est nécessaire d'utiliser le filtre GG 475 (n° d'art. 439 064) afin de protéger l'œil du patient contre les rayonnements ultraviolets. En outre, il faut utiliser un filtre infrarouge pour éviter le dessèchement de l'œil.

AVISO!

Si se emplea el microscopio quirúrgico en oftalmología, debe emplearse el filtro GG 475 (núm. art. 439 064), para proteger el ojo del paciente de daños causados por rayos ultravioletas. Adicionalmente, ha de emplearse un filtro infrarrojo a fin de prevenir la desecación del ojo.

5.2 Connecting the illuminator

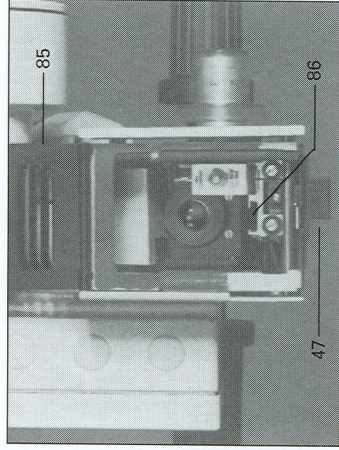
- (70) Power switch with pilot lamp
- (71) Regulating knob for the built-in lamp
- (72) Regulating knob for the second outlet
- (75) Automatic fuses

- Inspect the voltage selector (see section 4.1).
- Connect the cable from the motor housing to the socket 'MICROSCOPE' on the swingarm and press the cable into the clips, ensuring enough latitude for the movement of the instrument.
- Turn on at the main switch (70). The pilot lamp shines.

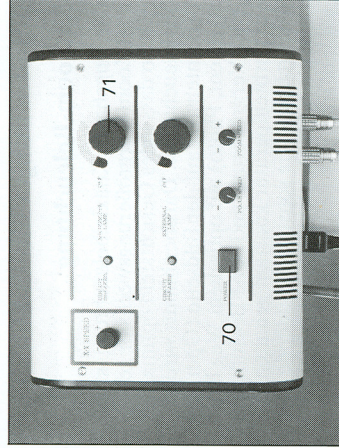
5.3 Automatic fuse

If this happens, turn off the secondary voltage with the regulating knob (71), depress the appropriate button (75) after a few seconds (if necessary with a rod, such as a pencil) so that it engages, and turn on the regulating knob (71) again.

1



2

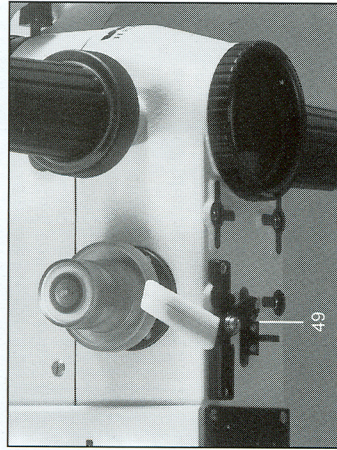


5.4 Fitting the bulb

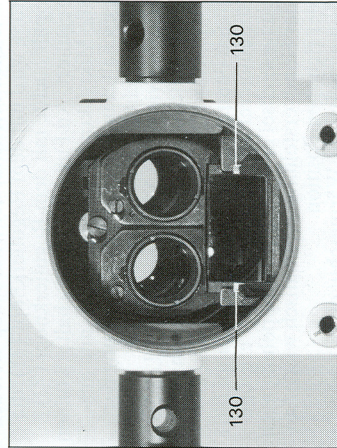
- A lamp housing for two centred 12 V / 50 W halogen bulbs is built on to the optics carrier.
- Before inserting the bulb, always turn off at the main switch (70).
 - Lift the housing cover (85). Remove the bulb from its packing without touching the quartz envelope.
 - Slide the bulb, pointing upwards, along the guide rail (86).
 - Turn on at the main switch (70). The pilot lamp lights up.

The built-in lamp can be switched on with the regulating knob (71) and its intensity adjusted steplessly. The fields around the regulating knob indicate three voltage ranges. Because of the high light output of the lamp, it is often sufficient to use the lowest range (shown in black), which prolongs the life of the halogen bulb.

3



4



5.5 Quick-change lamp mounts

The LEICA M690 zoom surgical operating microscope has a quick-change lamp mount for two bulbs. If a bulb should fail during the operation, move the bar of the quick-change lamp mount (47) beneath the lamp housing; the second bulb takes the place of the first. Before starting the next surgical operation, replace the defective bulb.

5.6 Filterholder

Green, grey and daylight filters, and various UV barrier filters, are available for the built-in filterholder, and are positioned in the illumination beam path with the filter slide (49).

Fitting the filter:

- Move the filter slide (49) towards the observer.
- Unscrew and remove the objective, and tilt the optics carrier until the filterholder is accessible (fig. 4).
- Position the filter so that the locating hole is facing downwards and push it into the golden-coloured spring clips (130) of the filterholder until it engages, steadying the filter slide (49).
- Screw on the objective.

The UV barrier filters produce a yellow cast in photography.

5.7 Oblique illuminator

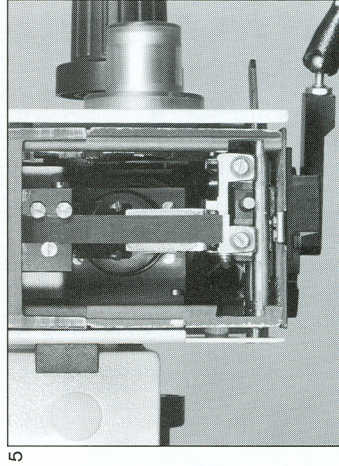
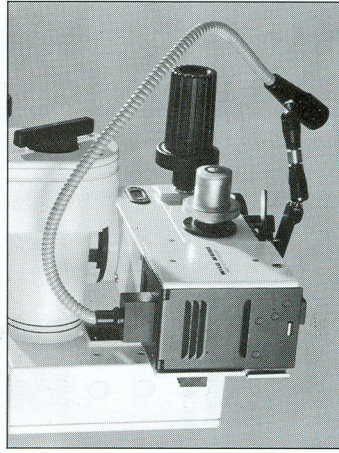
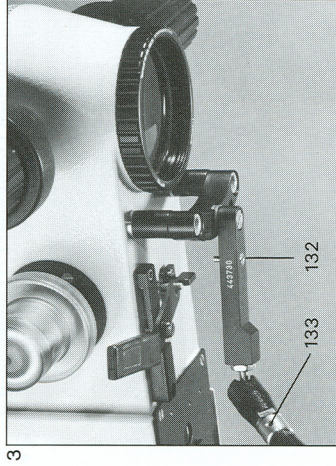
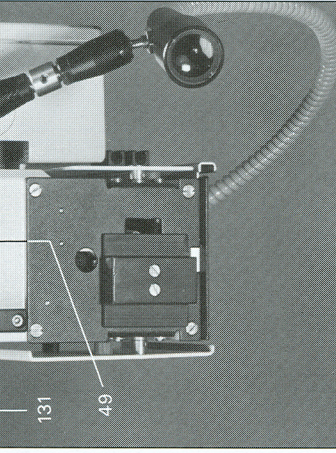
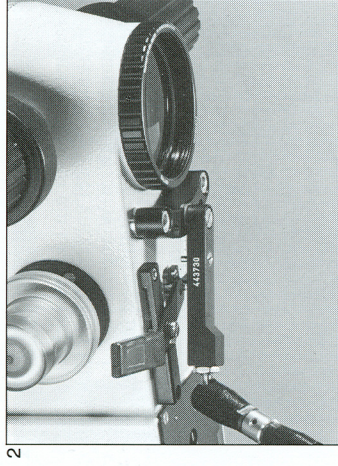
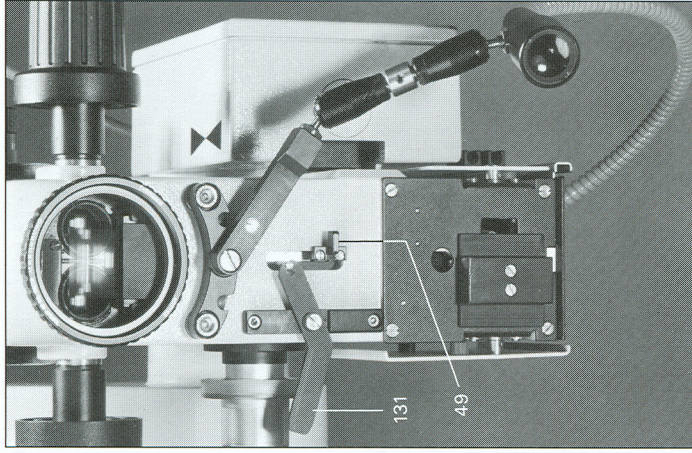
The oblique illuminator can be used on those LEICA M690 surgical operating microscopes which are equipped with a double filter slide and with a socket for a fibre-optic guide. The obliquely-incident light beam can be so aligned that it encounters less sensitive parts of the retina.

The lampholder swings horizontally on a pivot beneath the surgical operating microscope. If an objective with zero-degree illumination optics is used, limiting stops prevent contamination of the sterilizable rotatable ring.

During the operation phase with the oblique illuminator, the built-in coaxial illuminator can be completely darkened by means of a diaphragm in a slide (131) with sterilizable control lever. When the coaxial illuminator is in use, a filter can be introduced into the beam path by means of the filter slide (49) (see section 5.6).

Assembly:

- Secure the bearing block and the lampholder to the underside of the optics carrier by means of two hollow screws (figs. 1, 2).
- If a slit illuminator and an objective with zero-degree illumination optics are used, the lamp has to be swung across in front of the objective. For this purpose the pin (132) which engages the end-stops must be unscrewed, and the bearing block for the lampholder arm is to be positioned lower down by means of two bolts (fig. 3).
- Connect the fibre-optic guide to the top of the lamp housing (fig. 4). This socket can also be used for other fibre-optic guides.
- Adjust the movement of the articulated arm by means of the grub screw (133).
- A halogen bulb built into the surgical operating microscope serves simultaneously as light source for both the coaxial illuminator and the oblique illuminator, and is therefore blocked in its middle position; it can only be withdrawn when in one of the free positions, either on the left or on the right (fig. 5).



5.8 Slit illuminator

⚠ To ensure the stability of the rollable floor stand MIS-C, an additional weight is required (see assembly instructions).

The slit illuminator can be used with any LEICA surgical operating microscope which has the appropriate adapter. The adapter is precisely adjusted, so that the slit image lies precisely at the focal point of the $f=200$ mm SL objective or of the $f=200$ mm objective with zero-degree illumination optics. Slide the slit illuminator into the adapter on the base of the optics carrier and secure it with the screw. Connect the cable to the second socket on the swingarm (fig. 2).

Connect the free cable on the control part to the slit illuminator. Attach the connecting cable to the control part and to the control unit.

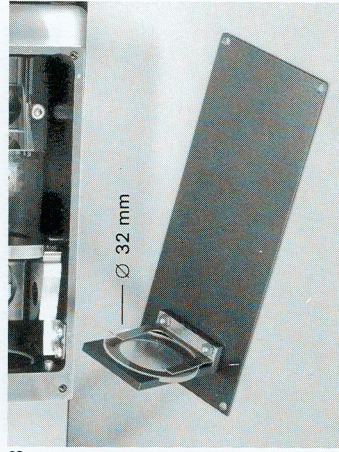
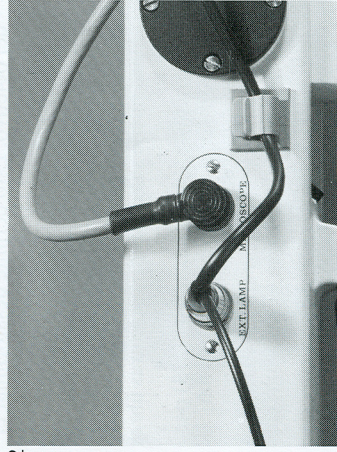
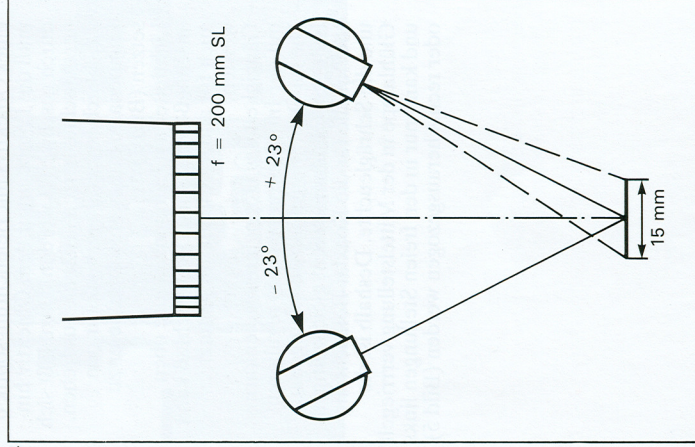
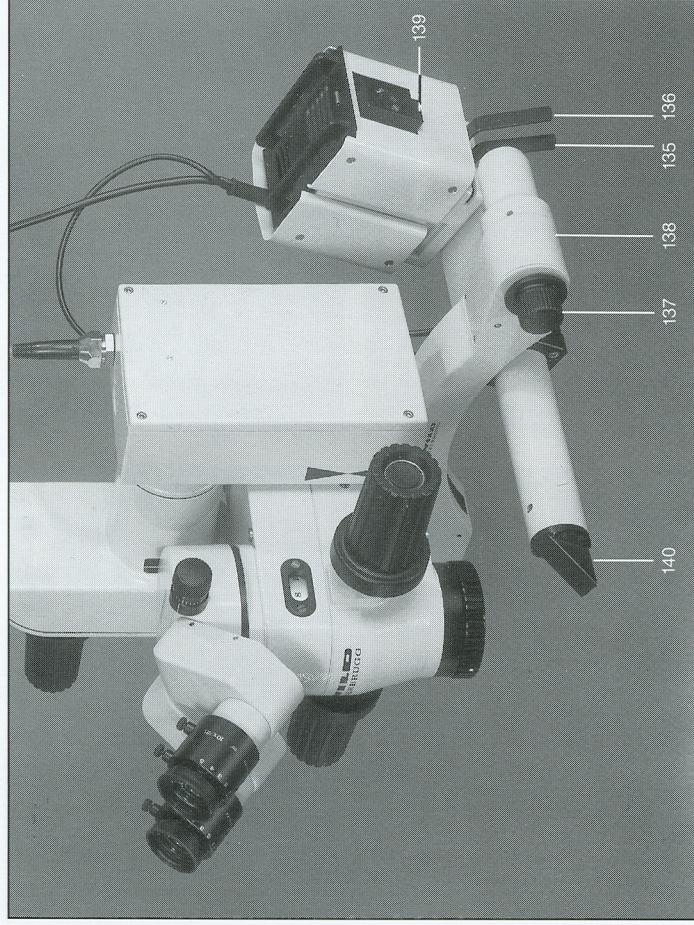
The lateral tilt range of the slit illuminator is $\pm 23^\circ$ and the tilt can be set with the footswitch or with the handswitch.

Manual operating is possible using the sterilizable knob (137). By turning the sterilizable sleeve (140) slightly, the slit can be displaced laterally by 15 mm.

The slit width (from 0.01 mm to 15 mm) is adjustable with the lever (135); the slit height (from 3 mm to 15 mm) is adjustable with the other lever (136).

If the lamp housing is rotated, the slit is rotated by 180° . The lamp housing has a quick-change lamp mount with two precision-centred halogen bulbs (either 12V/30W or 12V/50W) which can be swung into the beam path with the switch (139).

A fluorescence filter can be swung in by using the knob (138). The built-in GG435 UV barrier filter can be changed if necessary. To do this, open the base of the slit illuminator (fig. 3). A heat-absorbing filter is also built in.



II. Use

6. Blocking the swingarm

⚠ The swingarm must be secured with the safety hook (22) in the following circumstances:

- During assembly:
 - Fitting the swingarm to the column
 - Adding the tiltable joint and the microscope carrier
- When the accessories are **changed**
- When the **relative position** of the tiltable joint and the microscope carrier are **altered** with the perforated disc
- When the rollable floor stand MS-C is **moved**
- During **work breaks**.

Engaging the safety hook:

Engage the safety hook by pulling out the knob (21) and slightly moving the swingarm until it clicks into position.

Releasing the safety hook:

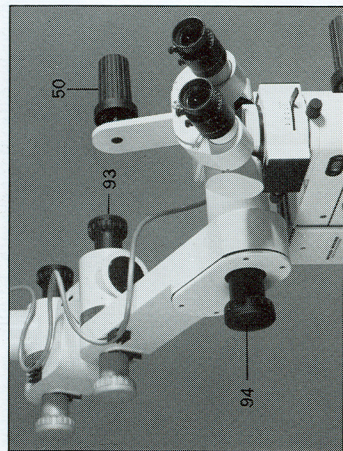
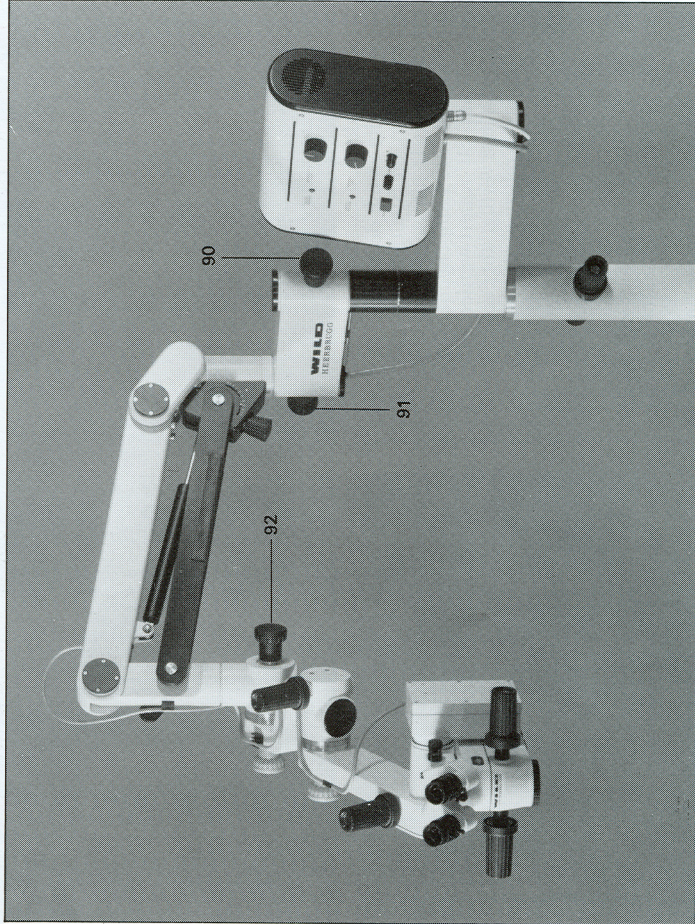
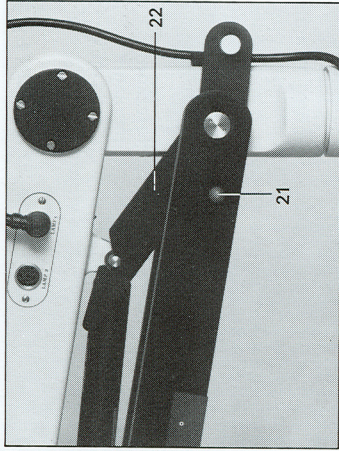
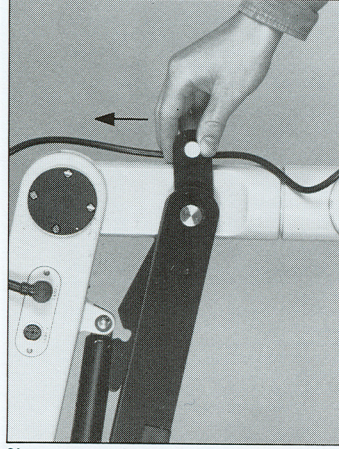
Push the lever upwards (fig. 2) and slightly move the swingarm until the retaining mechanism controlled by knob (21) clicks into position.

7. Articulation brakes

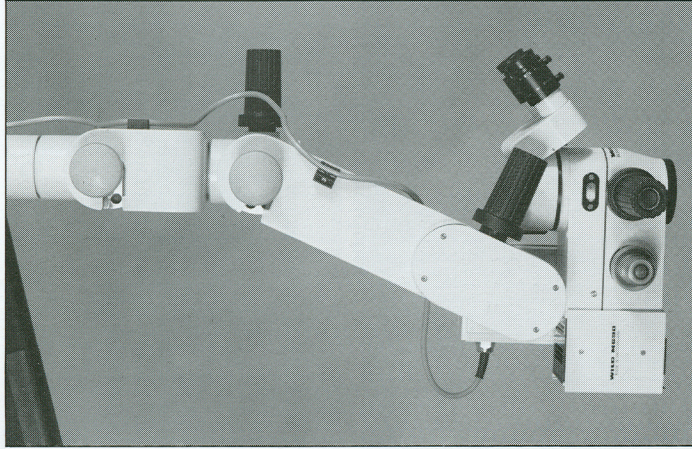
⚠ Adjust the freedom of movement of the brake knobs before the operation, in order that these non-sterile knobs may be covered.

The ease of movement of the articulation brakes on the swingarm is continuously adjustable over a wide range. The brake knobs for the articulation (90, 91, 92) are round and black, to distinguish them from the round orange knobs (27, 28) used to disconnect hooked components, and from the cylindrical black handles which serve to move the instrument around.

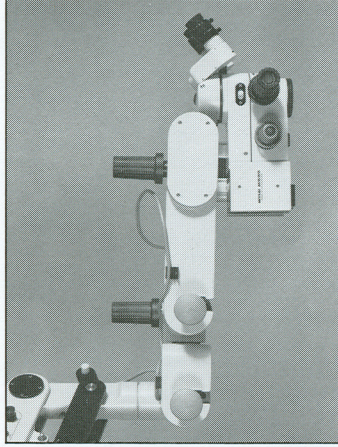
- (90) Brake knob for lateral movement around column
- (91) Brake knob for lateral movement of whole swingarm
- (92) Brake knob for rotational movement of front end of swingarm



1



2



8. Tilttable joint and microscope carrier

8.1 Using the perforated disc

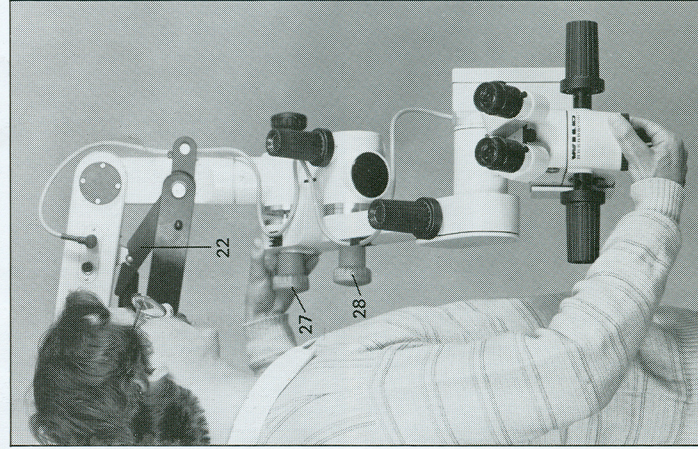
The tilttable joint and the microscope carrier can be initially positioned as desired with the aid of the system of perforated discs.

Each perforated disc offers five possible positions, so that an appropriate combination of positions for the tilttable joint and the microscope carrier can always be found (examples: figs. 1 and 2). In the vertical configuration, for example (fig. 1), the microscope can be so rotated about the optical axis so that the field of operation remains constantly visible down the microscope.

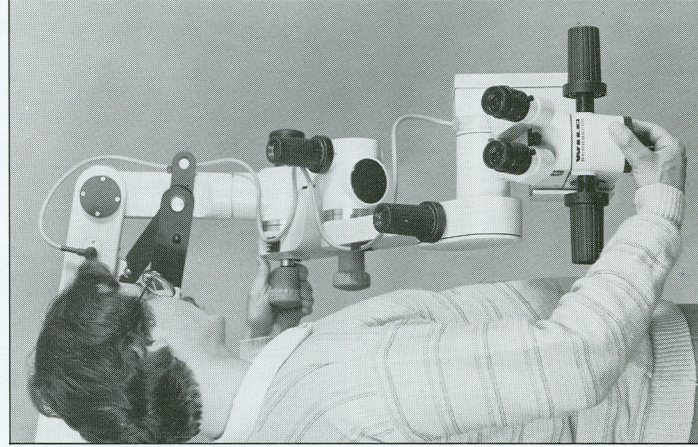
The microscope carrier and the tilttable joint are hooked so that they will not fall off if loosened by mistake. The knobs for disconnecting hooked components are round and orange; to distinguish them from the round black brake knobs.

⚠ Never change the configuration whilst the equipment is positioned over the field of operation!

3



4



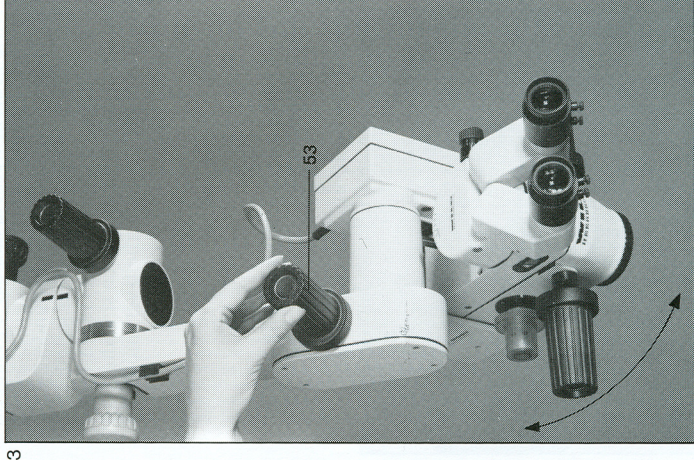
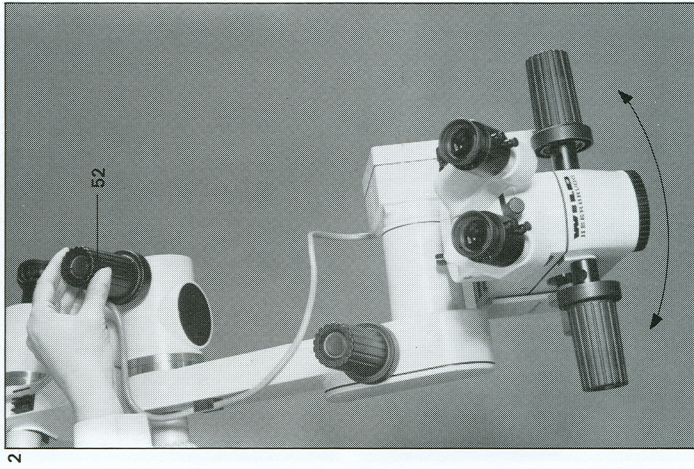
Changing the configuration:

- Tighten the swingarm with the safety hook (22) (see section 6)
- Tighten the brakes (see section 7)
- Slacken the orange knob (27 or 28) of the swingarm or of the tilttable joint with one hand until the end of the steel axle is seen, supporting the microscope with the other (fig. 3).
- Engage the steel pins in the required position on the perforated disc, push them fully in, and tighten the orange knob (27 or 28) (fig. 4).



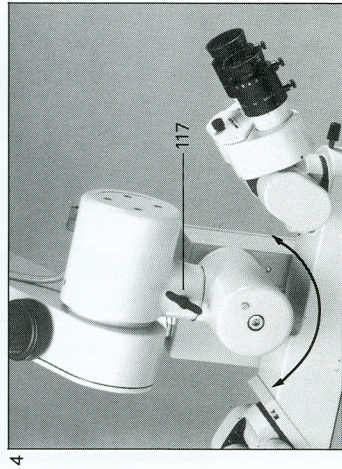
8.2 Tilting and inclining

The microscope is best positioned over the field of operation by placing both hands on the handles of the optics carrier (fig. 1), and never by holding the binocular tube. The tilttable joint and the microscope carrier enable it to be positioned accurately by tilting and inclining, movements which are analogous to x- and y-displacements respectively. The operating microscope can be fully rotated in either of these directions. Where the tilttable joint and the microscope carrier have been supplied with drive, they can be very precisely moved by means of the drive handles (52, 53).

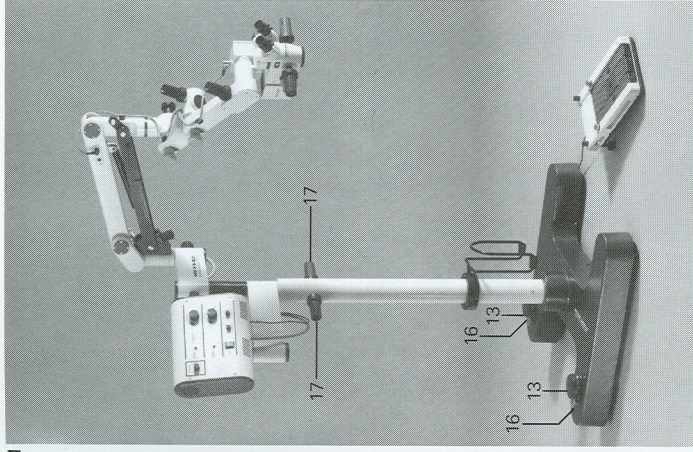


8.3 Rotatable joint

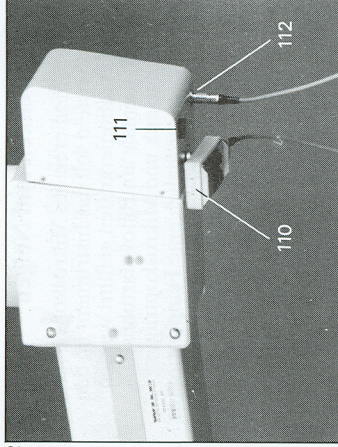
The rotatable joint enables the surgical operating microscope to be positioned at right-angles to the microscope carrier when the swingarm is fully extended (fig. 4). This configuration is useful in gynaecology, urology and plastic surgery, and when the 180° dual stereo attachment is fitted. The clamping screw (117) is used to secure the instrument in the required position.



1



2



9. Positioning the stand

The choice of a position for the surgical operating microscope should take into account the fact that the instrument needs to be readily swung out of the way during phases of the surgical operation when it is not required, and readily recalled on demand. The location of sterile and non-sterile personnel relative to the sterile controls of the surgical operating microscope must also be considered. The maximum flexibility of the articulation is best exploited if the swingarm does not point upwards at a highly acute angle.

To move the floor stand:

Release the foot brakes by depressing the metal lever (16) at the side of each round footpedal. Ensure that the safety hook and the brakes for the articulation are applied (see sections 6 and 7), in order to avoid random wandering of the swingarm. Store the footswitch in the holder on the column.

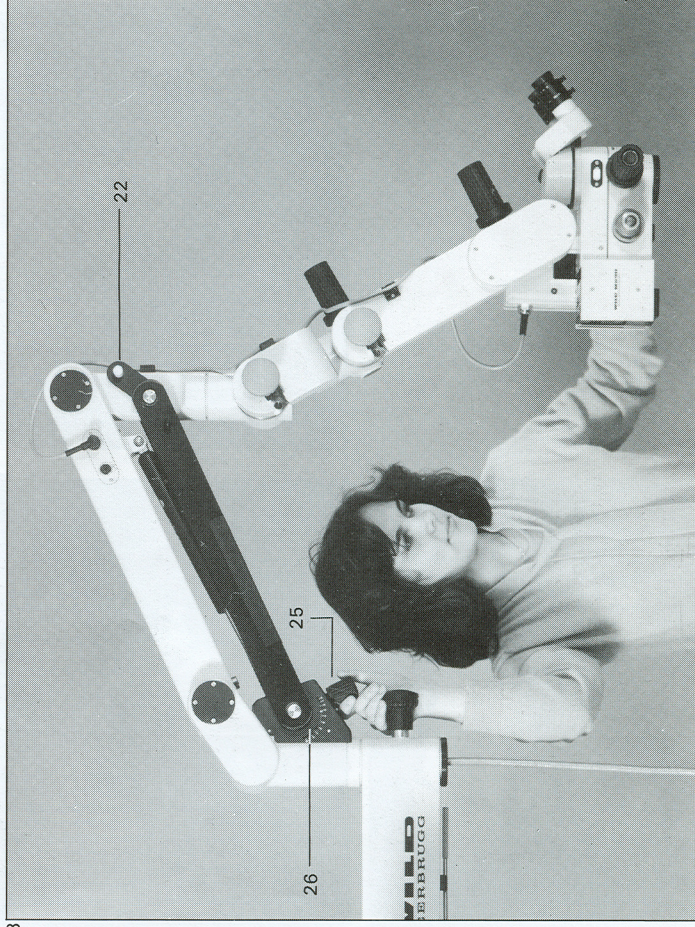
Only push the stand by means of the handles (17) provided on the column.

To render the floor stand immobile:

Apply the brakes by depressing the two round footpedals (13) firmly so they are heard to engage.

The jib of the **ceiling mount** can be swung through 300°. It is furnished with the main switch and pilot lamp (111) and with a socket (112) for the handswitch (110). The latter controls the vertical movement of the jib; the range is 60 cm.

3



10. Counterbalance

⚠ Never change the counterbalance whilst the equipment is positioned over the field of operation!

The stands must be counterbalanced when they are installed and when their loading is altered by the addition or removal of accessories.

During the counterbalancing procedure, the safety hook (22) must be disengaged (see section 6).

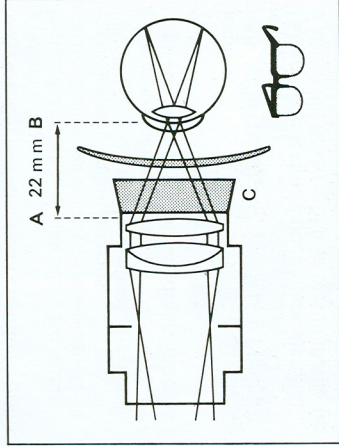
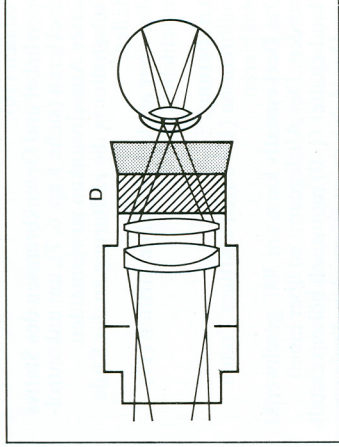
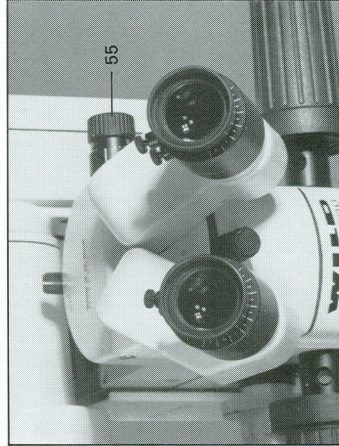
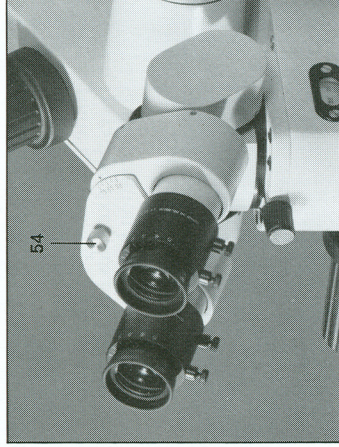
Steady the microscope by means of the positioning handles so that it does not drift up or down (fig. 2). Rotate the tension adjustment knob (25) until this tendency to drift is eliminated and the swingarm is in equilibrium; a swingarm position will be found at which the knob can easily be turned. The scale shows tension values (low loading, low figure).

11. Interpupillary distance

The interpupillary distance is set before the surgical operation is commenced. The **binocular tubes T** have an interpupillary distance adjustment drive with scale (55) from 52 mm to 76 mm.

It is worth drawing up a list of the interpupillary distances of the various people who will be using the surgical operating microscope.

For the binocular tube with variable angle of observation, the individual interpupillary distance can be set by hand within the range 52 mm to 76 mm and retained with the fixing screw (54). The value is shown on a scale.



12. Eye contact

When adjustable eyepieces for spectacle wearers are used, the correct distance between the eyelens of the eyepiece (A) and the pupil of the eye (B) is 22 mm (fig. 3). This distance allows spectacle wearers to operate. In order to see the entire field of view, the observer's eye must be at this distance; the more it deviates from this position, the more of the peripheral field is lost.

The flexible eyecups (C) prevent the spectacle lenses from becoming scratched; if the whole working distance is required, they can be folded back.

If the user wears no spectacles, the degree of eye contact can be changed by inserting spacing rings (D) (figs. 4, 5). The 6 mm and 9 mm spacing rings, which are screwed into position between the eyecup and the eyelens of the eyepiece (fig. 6), can be used in any combination to obtain the most comfortable viewing position.

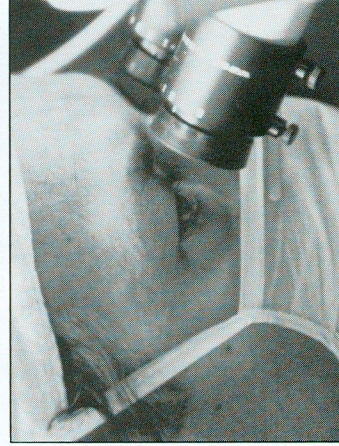
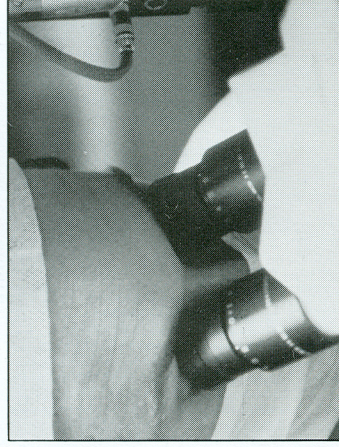
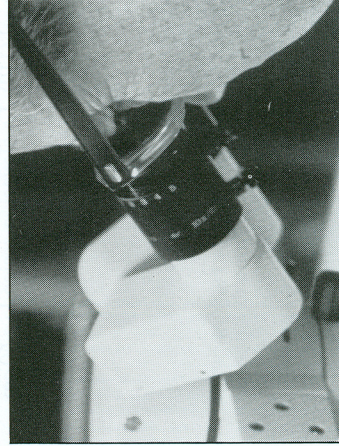
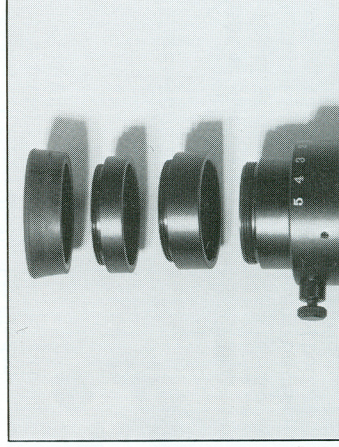


Fig. 5: Observation through spectacles – no spacing rings; eyecups folded back

Fig. 7: Observation without spectacles, eyes distant from eyecups – no spacing rings

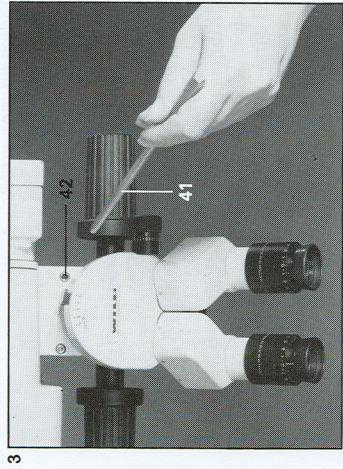
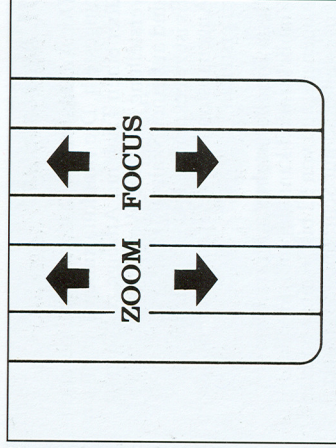
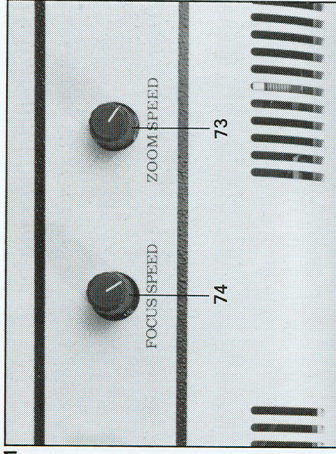
Fig. 8: Observation without spectacles, eyes close to eyecups – with 6 mm and 9 mm spacing rings, eyecups folded back.

13. Setting the zoom- and focusing speeds

The zoom magnification changer and the focusing are motor-driven. Their speeds can be changed by means of two potentiometers on the control unit.

The **zoom speed** is set with the control knob (73). The magnification changer is normally operated with a footswitch or handswitch, but if necessary by turning the recessed square (42) with the sterilizable tool (41). The zoom scale (43) (from 7x to 36x) relates to 10x eyepieces and $f = 100$ mm objectives.

The **focusing speed**, which is independent of the loading, is varied with the control knob (74). The focusing range is 50 mm; the index mark at its mid-point facilitates the positioning of the instrument before the operation (fig. 5). The focusing drive is operated with a footswitch or handswitch (section 4.2).



14. Dioptric correction

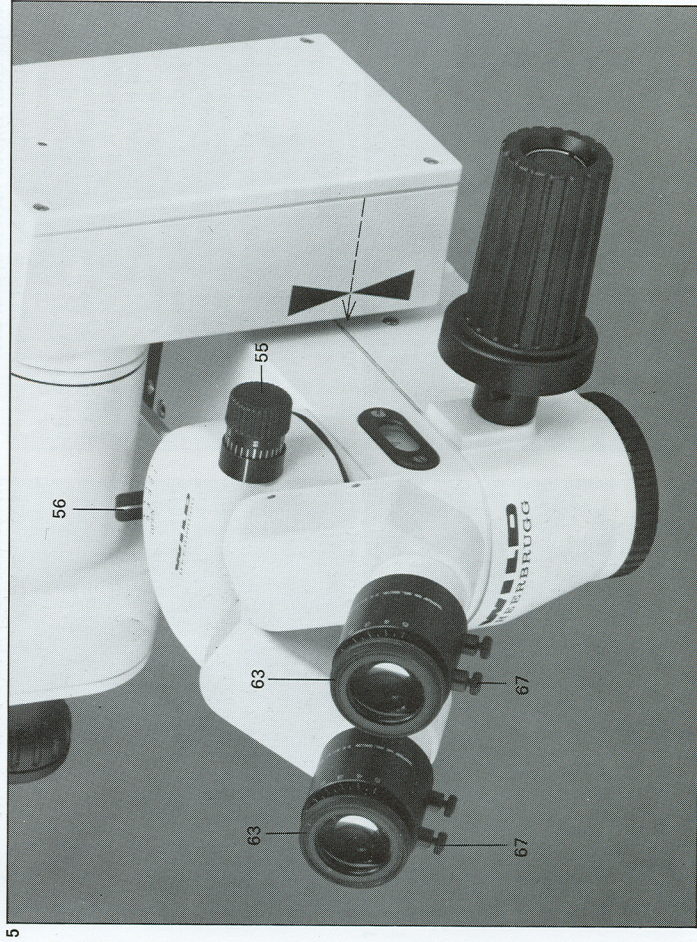
Ametropia is corrected by rotating the calibrated eyelens mounts of the adjustable eyepieces for spectacle wearers. The scale runs from -5 to $+5$ diopters. A correction may also be necessary for spectacle wearers, particularly if special glasses for operating or for reading are used.

The dioptric correction is affected by accommodation, which itself is influenced by various factors (brightness, time of day, age, fatigue).

- (56) Lever of double-iris diaphragm
- (63) Eyelenses
- (67) Screw to lock dioptric setting
- (55) Interpupillary drive

Preliminary steps:

- Set the interpupillary distance
- Set the eyelens mounts to 'O'
- Set the double-iris diaphragms to 'OPEN'
- Set the focusing drive to its mid-position (arrow apex opposite groove, see dotted line).



14.1 Dioptic correction without graticule

- a) Set the changer to the **highest magnification**.

Place a **flat test specimen** with sharply-defined features (e.g. a cross marked on paper) at the working distance of the objective used and focus on it using the focusing drive.

- b) Set the changer to the **lowest magnification**.

Turn each eyelens mount to position +5 without looking into the eyepieces.

Focus on the specimen for each eye by turning each eyelens mount in the minus direction until the image is sharp. At this point the eye is relaxed and focused at infinity, which largely ensures fatigue-free working.

Secure the diopter setting with the locking screw (67).

- c) Set the changer to the **highest magnification** again.

Inspect the focusing, adjusting it if necessary with the drive handles. The specimen should now remain in focus for all zoom positions.

If it does not, repeat the procedure.

14.2 Dioptic correction with graticule

If a graticule (reticle) is fitted in the eyepiece (see section 3.3), the dioptic correction value must be determined with this in position as it has an effect optically.

- a) Fit the graticule into one of the eyepieces (see section 3.3).

Turn the eyelens mount of **this eyepiece** to +5.

- b) Bring the **graticule** into focus by slowly turning the eyelens mount in the minus direction until the two parallel vertical hairlines are visible separately.

Secure the diopter setting with the locking screw (67).

- c) Now correct **the other eyepiece** as described in section 14.1.

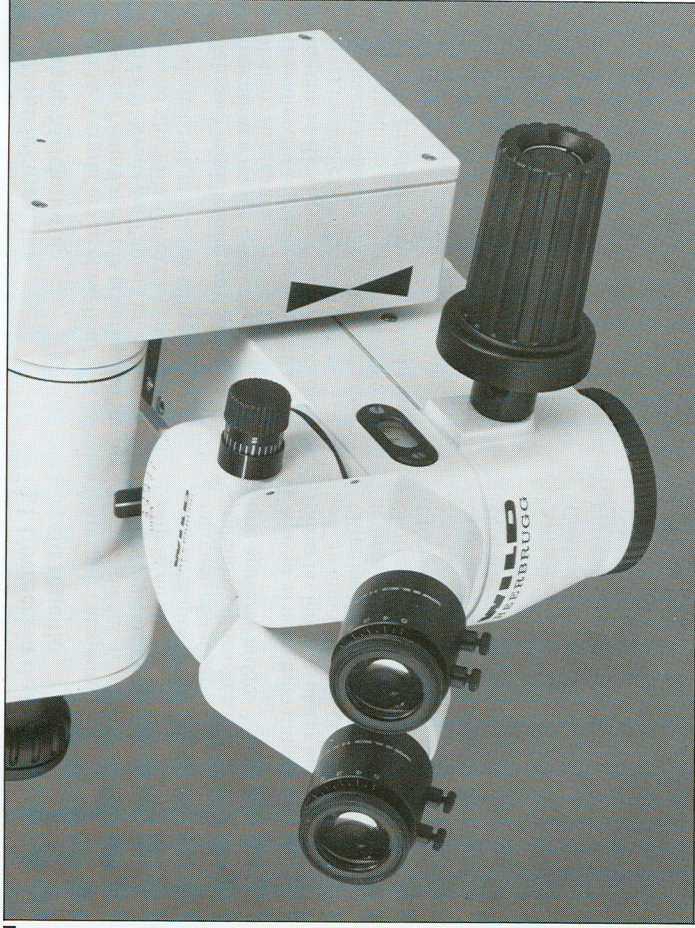
Finally, check for freedom from parallax: When the head is moved slightly from side to side, there should be no relative movement between the image of the graticule and that of the subject, i.e. the two must be sharply imaged in the same plane.

15. Focusing

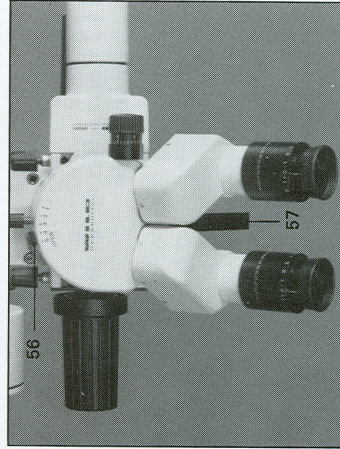
The focusing mechanism of the LEICA M690 surgical operating microscope is motor-driven. The focusing speed is determined before the operation (see section 13).

The focusing will only work properly if the diopter settings have first been properly adjusted (see section 14).

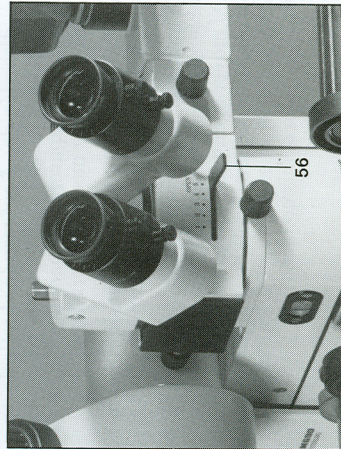
- Set the focusing drive so that the crossing-point of the double arrow is level with the groove in the optics carrier (fig. 1).
 - To obtain an overall view, engage the **lowest zoom magnification**
 - Manoeuvre the **instrument across to the operating field** and lower it towards the subject until the latter is recognizable down the microscope. The working distance now approximates to the focal length of the objective selected.
 - **Focus on the subject using the footswitch or the handswitch.**
- If the diopter correction has been set properly, the subject will remain in focus at all zoom positions, provided that the working distance is not changed. Closer and more distant features can be brought into focus by operating the footpedal. The focusing range of 50 mm is generally enough to make alterations to the stand position unnecessary.



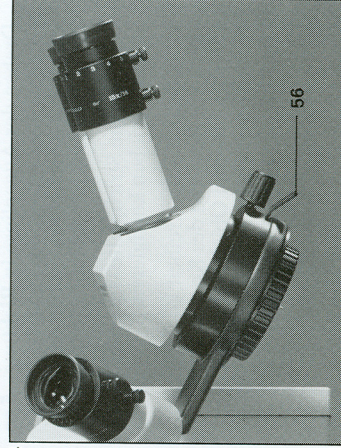
1



2



3



4

16. Depth of field

The binocular tubes T and the beam splitters have a built-in double-iris diaphragm, operated with the lever (56), for increasing the depth of field. For sterile work, the lever can be fitted with a sterilizable extension (57). The 90° assistant's microscope and the 180° dual stereo attachment also have a built-in double-iris diaphragm which is individually adjustable by its user (fig. 4).

17. Sterilize covers

All of the controls which the surgeon may need to touch during the operation have sterilizable covers.

- (59) Protective glass for objective, gas-sterilizable
- (51) Clip-on handles for all drive knobs, steam-sterilizable
- (52) Transparent cover for knob for manual override of the motorized zoom illuminator
- (57) Extension for lever of double-iris diaphragm, steam-sterilizable

The clip-on handles engage when pushed over the metal handle axes. To remove them, press the axial button (fig. 2). They are steam-sterilizable.

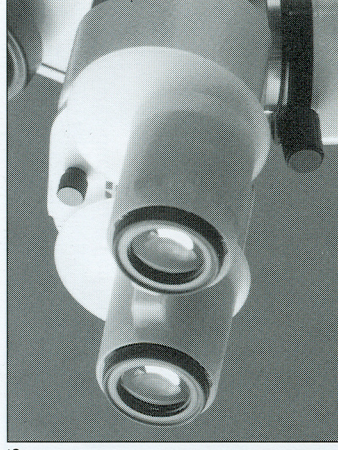
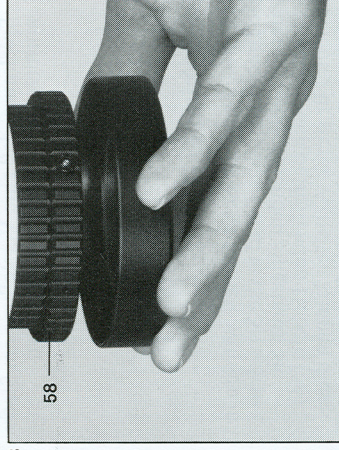
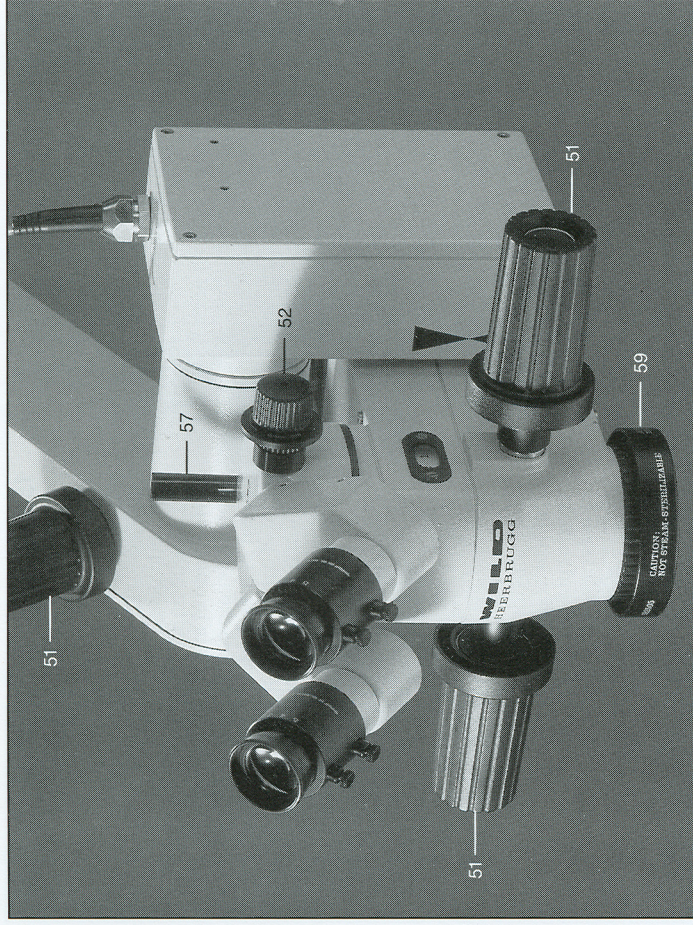
The transparent cover for the magnification changer is merely pressed into position. The drive knob for adjusting the interpupillary distance on the «T» version binocular tubes is also to be provided with a sterilizable transparent cover.

Because of its high-quality optical coating, the protective glass for the objective is not steam-sterilizable; we recommend that it be gas-sterilized. A metal ring (58) is threaded on to the objective mount and the protective glass is then snapped into position (fig. 3).

A sterilizable extension (57) is available for the lever of the double-iris diaphragm. Sterilizable covers permit the binocular tube with variable angle of observation to be tilted under sterile conditions. They fit over the eyepieces (fig. 5).

In addition, disposable covers are available (fig. 4).

A sterilizable rotatable ring is available for objectives with zero-degree illumination optics. When fitting it, note the index marks on the objective and on the ring. These inform the user whether the illumination optics are swung in or out. When removing the rotatable ring, take care not to bend it.



III. Accessories

The Leica surgical operating microscopes can be equipped for dual observation, for an assistant, for photomicrography, for cinemicrography and for television.



Before adding accessories, engage the safety hook (section 6). After adding them, adjust the counterbalance (section 10).

Never change the configuration whilst the equipment is positioned over the field of operation!

18. Beam splitter

The beam splitter, which has two lateral outlets, is the nucleus of the modular system of second observer tubes, phototubes and cine tubes.

The beam splitter directs 50% of the light to the observer, the remainder being available at the lateral outlets.

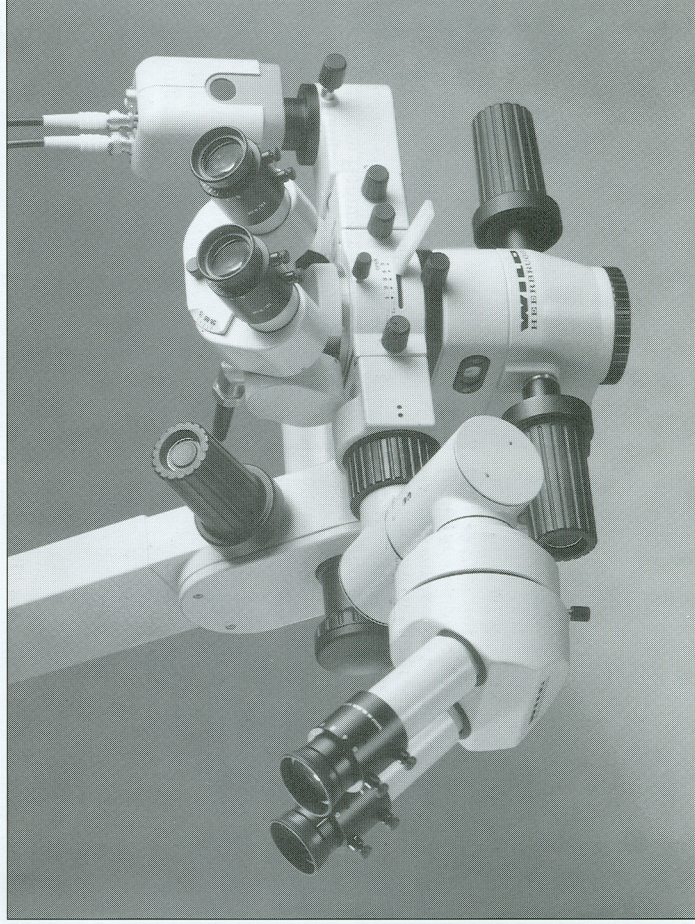
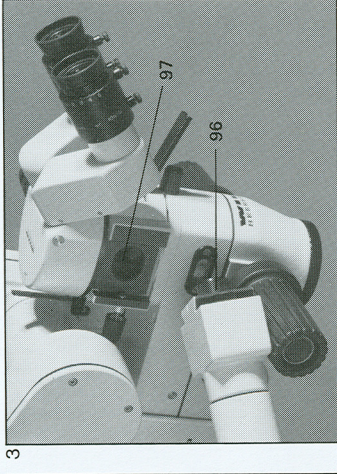
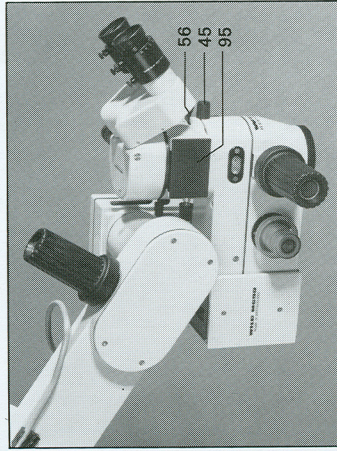
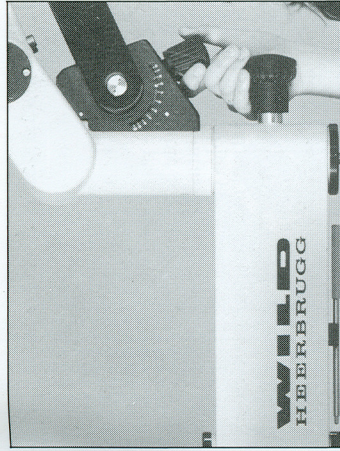
The beam splitter is fitted on the optics

carrier or to the assistant's microscope so that its diaphragm lever (56) points towards the observer, and is secured by a screw (45).

Place the binocular tube in position.

Unscrew the cover plate (95) from the outlet on the side of the beam splitter to be used. Both outlets can be used simultaneously, e.g. for photography while a second observer is looking down the instrument (fig. 4).

The double-iris diaphragm, which is operated with the lever (56), serves to increase the depth of field. It simultaneously influences the light going to the binocular tube and to the two lateral outlets of the beam splitter. The attachable accessories such as second-observer tubes, the stereo attachment, the dual attachment, the phototube and the cine/TV tube have self-centring mounts (96) which engage the dovetail (97) of the beam splitter and are secured with the clamping screw.





18.1 Tube for second observer

A long monocular tube (fig. 1) is available for use by a second observer. It can be rotated about two axes, and consequently positioned at any angle; the image is kept vertical by turning the knurled sleeve (98).

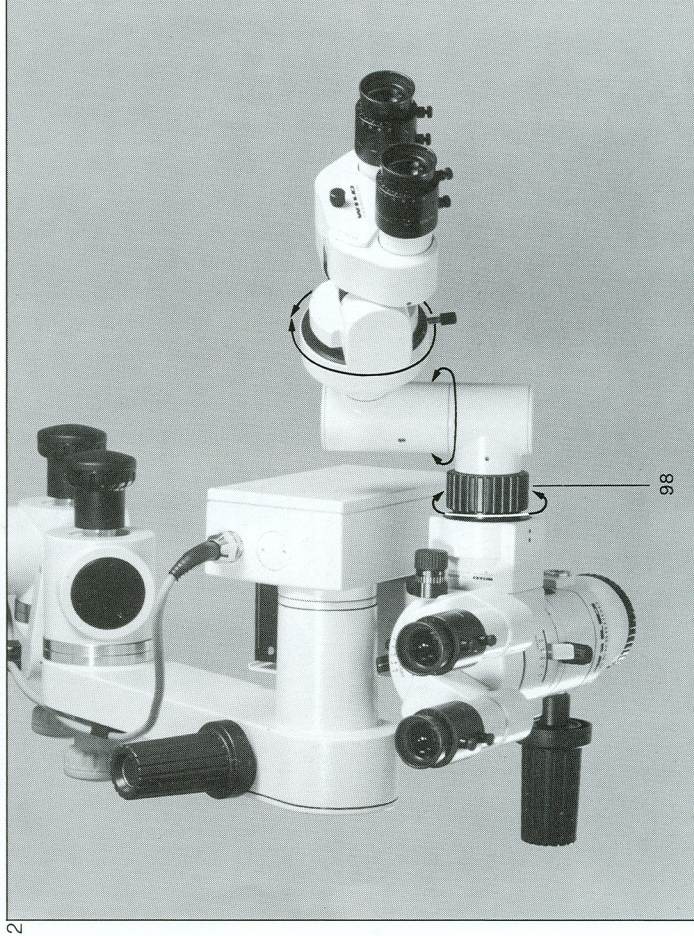
Mounting:

Introduce the dovetail of the tube (96) into the dovetail mount (97) of the beam splitter and secure it.

Insert the eyepiece and secure it. If the surgeon and the second observer use the same eyepiece magnifications, they will have the same total magnification and will see the same field of view.

Add the spacing ring or rings (see section 12). Adjust the diopter setting for the eye to be used (see section 14).

If the second observer is responsible for framing during photography, fit a graticule into the eyepiece (see section 3.3).



18.2 Stereo attachment for second observer

The stereo attachment (fig. 2) enables an assistant to observe surgical procedures along with the surgeon and, because of the spatial image, to participate.

Carefully position the stereo attachment in the self-centring dovetail mount of the beam splitter and secure it.

Add the straight binocular tube, the 45° inclined binocular tube or the low inclined binocular tube and fit the eyepieces.

The stereo attachment for second observer is rotatable about three axes and can therefore be positioned in relation to the assistant no matter what the instrument configuration. The rotation of the image is corrected with the ring (98).

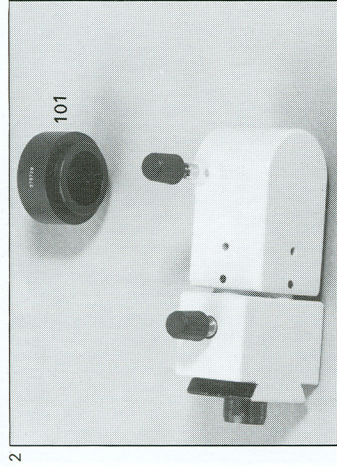
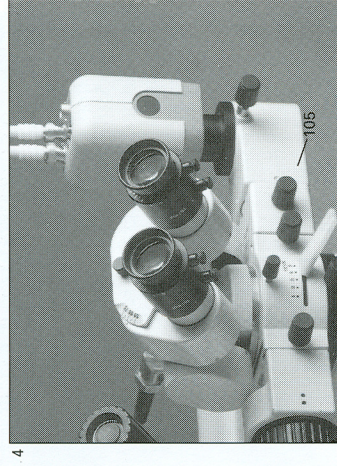
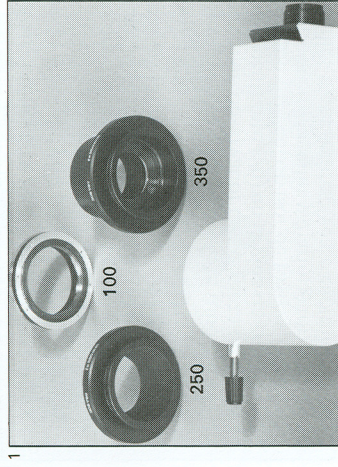
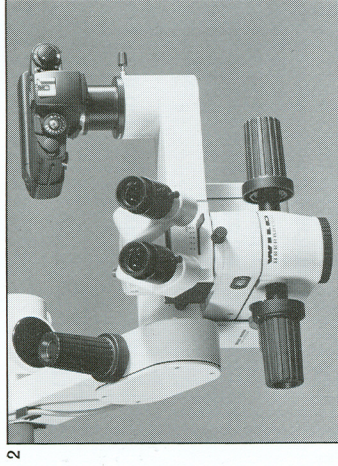
18.3 Phototube for single-lens reflex camera

Introduce the phototube carefully into the dovetail of the beam splitter and secure it. Fit the camera adapter (T-mount) (100) to either the $f=250$ mm or the $f=350$ mm adapter and connect the combined unit to the camera.

Fit this assembly to the phototube (fig. 2).

A focusing and framing graticule is to be placed in that eyepiece of the binocular tube which is nearer to the phototube (see section 3.3).

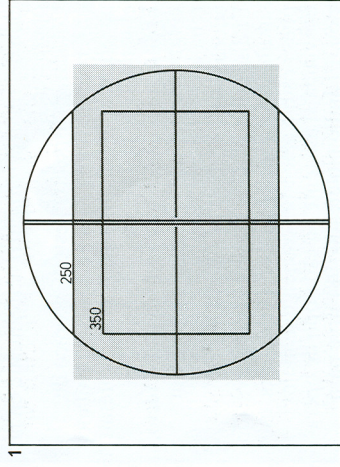
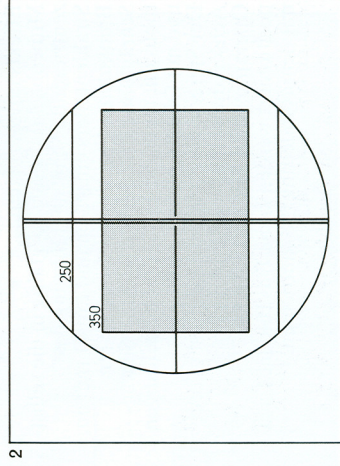
If daylight colour films are used, a blue filter can be swung in to compensate the colour temperature. Colour films for artificial light are however much to be preferred.



18.4 Cine/TV tube

Introduce the cine/TV tube carefully into the beam splitter and secure it (fig. 3).

Fit the C-mount adapter (101) to the appropriate camera. Mount this combination on the cine/TV tube and secure it. After the screw (105) has been slackened, the camera can be rotated to any of the four basic positions (at 90° to one another) and secured, taking into account the final orientation of the image.



18.5 Focusing and framing graticule (reticle)

For photomicrography and cinemicrography it is necessary to insert a focusing and framing graticule into one of the eyepieces of the binocular tube (see section 3.3). It enables the image to be accurately focused in the film plane, and indicates the area of the subject which will appear on the picture (see section 14.2). Accurate focusing is essential to the sharpness of the image.

Fig. 1: Phototube $f = 250$ mm:

Format 35 mm

Fig. 2: Phototube $f = 350$ mm:

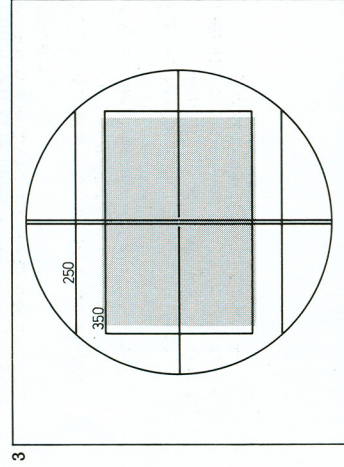
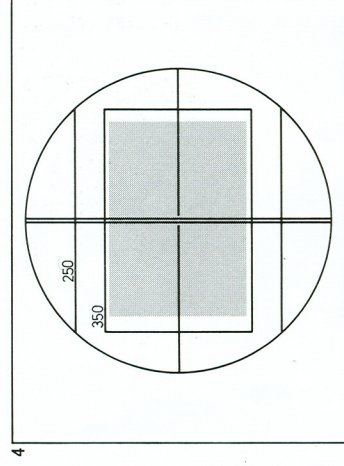
Format 35 mm

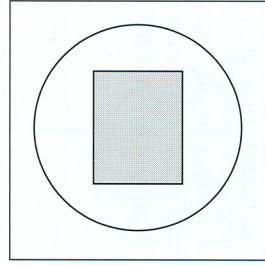
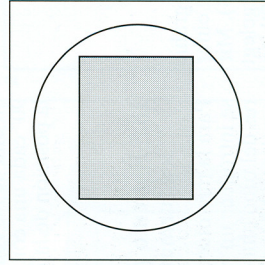
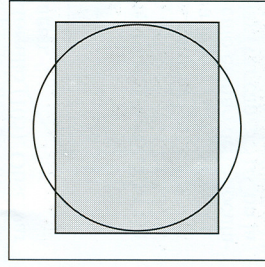
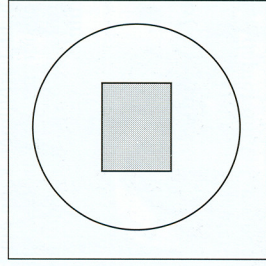
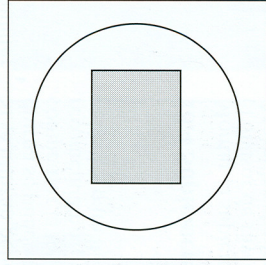
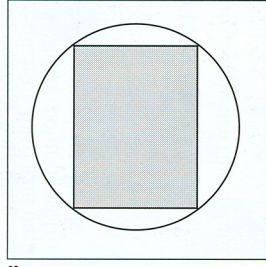
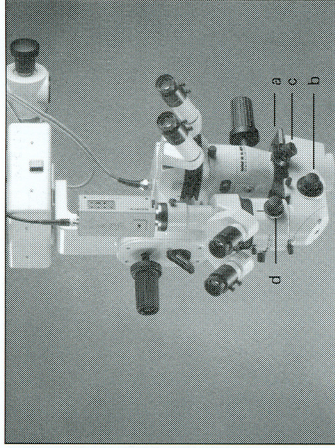
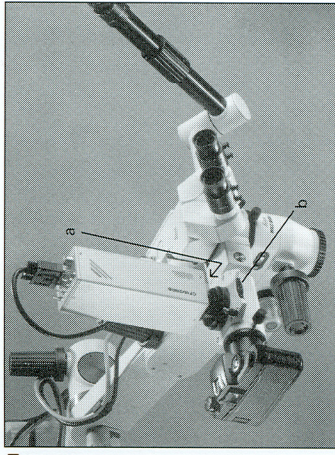
Fig. 3: Cine/TV tube $f = 107$ mm:

Format 7.16 mm x 9.6 mm

Fig. 4: Cine/TV tube $f = 107$ mm:

Format $\frac{3}{4}$ in. video $\Delta 6.6$ mm x 8.8 mm





18.6 Dual attachment

Connect the dual attachment to the beam splitter (page 49).

TV camera

- Equip the TV camera with a TV objective.
- Fit it into the dual attachment.
- Tighten the clamping screw.
- Release the clamping screw (a) and engage the TV camera in one of the 45° click stop positions.
- Tighten the clamping screw (a).

Photo camera

- Fit the camera adapter to the camera.
- Screw the photo objective to the camera adapter.
- Fit the camera to the dual attachment.
- Tighten the clamping screw.

Adjusting the brightness for TV

The filter changer (b) contains filters with transmittances 30%, 50% and 100% respectively, one of which can be replaced by the 8% filter supplied with the equipment:

- Remove the TV camera.
- Exchange the filter in the TV outlet.

TV- and photo formats with the dual attachment

For 35 mm format, see section 18.5.

19. 0° assistant's microscope, stereo

The assistant's microscope, stereo (fig. 2), can be fitted on the right or on the left, is usable with or without magnification changer, and can be combined with various binocular tubes. It is illustrated with trinocular tube and TV camera.

Fitting

- Unscrew and remove positioning handle from left or right side of microscope.
- Use 2 hollow screws to secure carrier (a) to underside of microscope (illustration: Carrier for objectives with zero-degree illumination optics).
- Screw objective into position.
- Slide assistant's microscope, stereo, facing left or right, into guide on carrier. Tighten clamping screw.
- Secure magnification changer and tube adapter (both optional), and binocular tube.

Using the rotary knobs

- b Focusing
- c Engaging and disengaging zero-degree illumination optics
- d Changing magnification (bilateral).

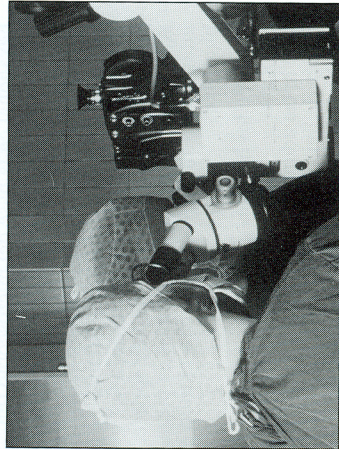
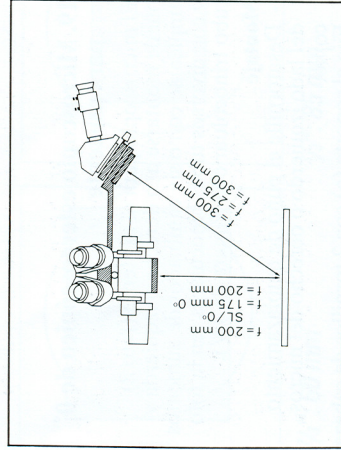
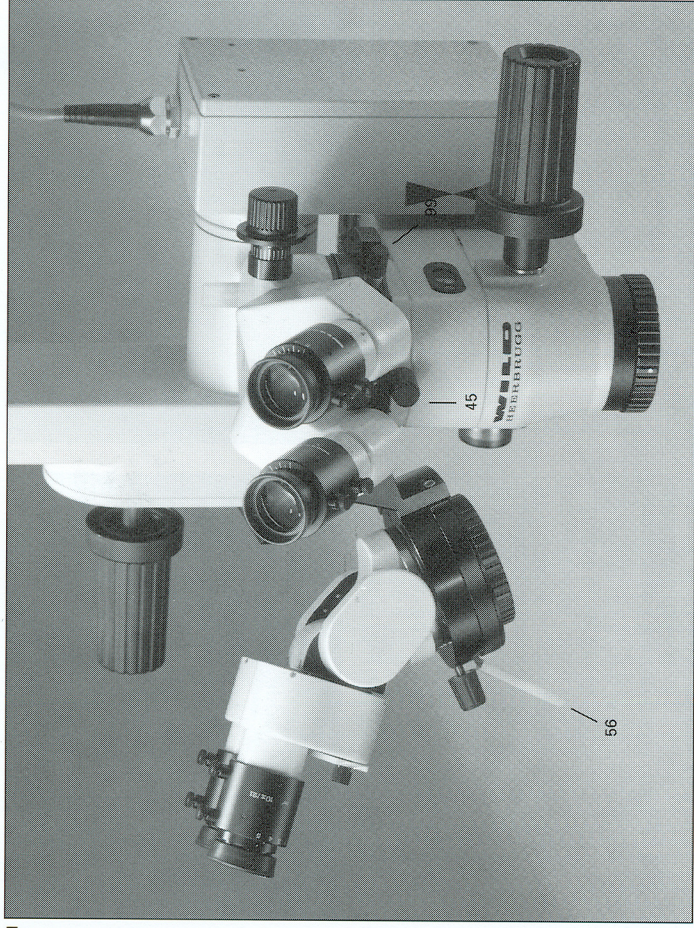
20. 90° assistant's microscopes, stereo

The assistant's microscope can be fitted either to the left or the right of the optics carrier, and can be swung out laterally.

Mounting:

- Fit the assistant's microscope directly to the optics carrier, because the focal lengths of the two microscopes are matched (fig. 2).
- 2) The beam splitter, if used, is fitted between the mount of the assistant's microscope and the binocular head of the surgical operating microscope.
- The 90° assistant's microscope can be turned about the surgical operating microscope if the grub screw supplied is first substituted for the clamping screw (45). The assistant's microscope can be secured in any desired position by means of the other clamping screw (99).
- The assistant may use either a low inclined binocular tube, or a normal 45° inclined binocular tube, or a binocular tube with variable angle of observation.
- Screw the appropriate objective into position (fig. 2).
- Insert the eyepieces:
- The assistant can match field of view and magnification with the 10x, 16x or 25x eyepieces. Introduce the dioptic correction (see section 14). If the assistant is also responsible for determining format limits in photography, a format-indicating graticule is to be inserted into one of the eyepieces of the assistant's microscope (see section 3.3).
- The assistant can use the built-in double-iris diaphragm (56) to change the depth and image brightness independently of the surgeon.

A magnification changer having the steps 6x, 10x, 16x, 25x and 40x can be fitted on the assistant's microscopes between the carrier and the binocular tube (fig. 3).



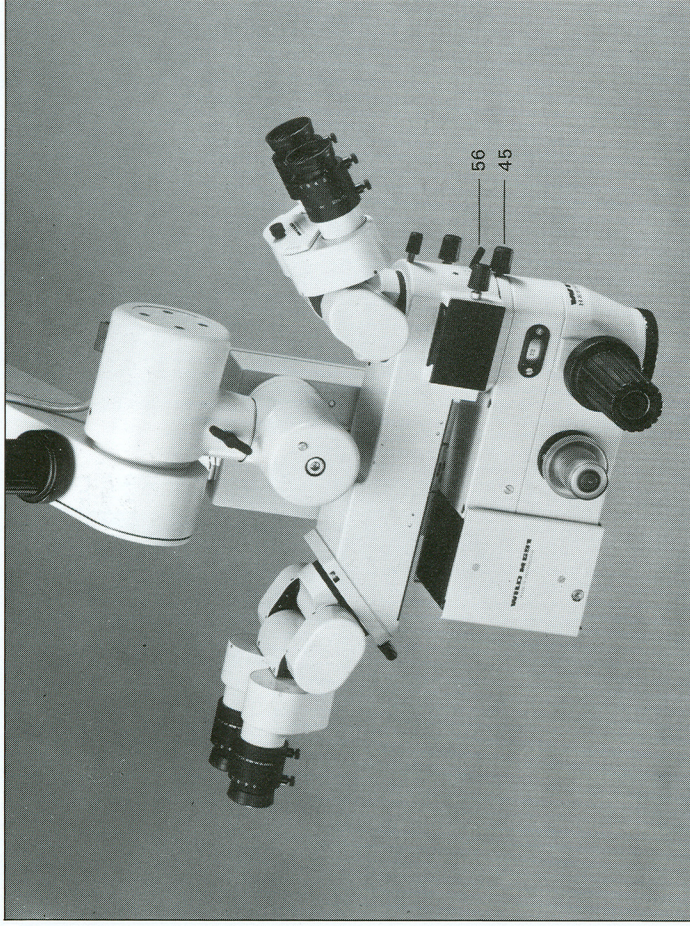
21. 180° dual stereo attachment for M691

The 180° dual stereo attachment enables two surgeons to work at the surgical operating microscope simultaneously. The 180° dual stereo attachment is mounted on the optics carrier like a binocular tube and is secured with the clamping screw (45). The binocular tubes for the two surgeons are then added. The following combinations have been found useful:

- with microscope horizontal:
 - Operator: Low inclined binocular tube T
 - Assistant: Straight binocular tube T
- with microscope steeply inclined:
 - Operator: Low inclined binocular tube T
 - Assistant: Binocular tube with variable angle of observation

The **rotatable joint** (see section 8.3) is recommended in circumstances where more space should be made available for the two surgeons.

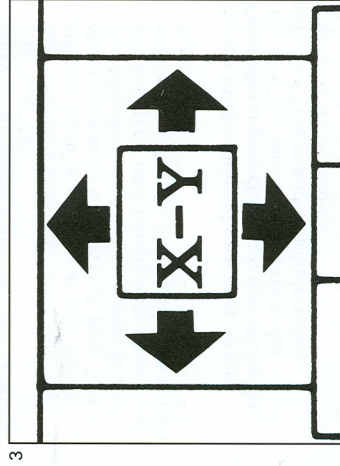
The dual stereo attachment incorporates a **double-iris diaphragm** (56) and a **beam splitter** (50/25) with two lateral outlets for photography, cine and multi-station viewing (see section 18).



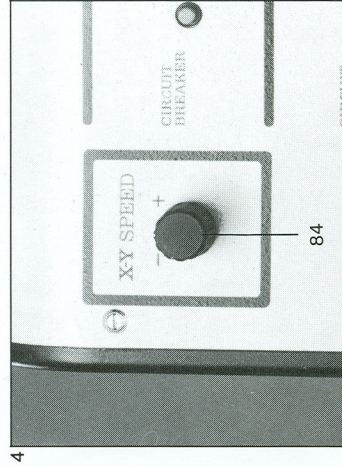
22. XY-unit

⚠ Fit a connecting piece between swing-arm and control unit if floor stand, XY-unit and slit illuminator are used together (stability!) (see assembly instructions).

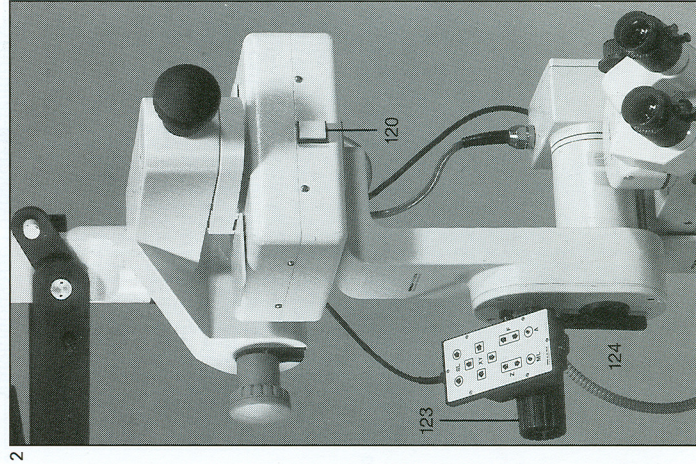
The XY-unit (fig. 2) enables the surgical operating microscope to be displaced from its central position along the x- and y-axes and also diagonally (displacement range 58mm x 58mm). The movement is controlled by a foot- or handswitch (fig. 3). The displacement speed is steplessly adjustable by means of the rotary switch (84) on the control unit. A touch on key (120) causes the surgical operating microscope to travel automatically at highest speed to the centre. The key lights up when the centre is reached. The microscope carrier enables the surgical operating microscope to be inclined by means of the drive (123). The braking effect of the inclining mechanism is steplessly adjustable by means of the braking knob (124).



3



4



2

IV. Care of the instrument

▲ Only authorized service staff may effect repairs and maintenance.

1. Never dismantle optical, mechanical or electronic components unless directions for doing so are given in the user manual.
2. Protect the instrument from dust, damp, and acid or alkali vapours.
3. Do not store any chemicals in the neighbourhood of the instrument.
4. If the instrument no longer functions satisfactorily, call in a specialist or your local Leica agent.

5. Optics :

Dirty eyepieces and objectives have a very bad influence on the image quality. Dust is best removed with a pneumatic rubber bulb.

Eyepieces and objectives are to be cleaned with a clean soft cloth.

Fingerprints and tenacious marks can be removed with a cloth dipped in alcohol or ether (remove the eyecups first).

Objectives are best cleaned from the centre outwards.

Eyepieces, tubes without eyepieces, and optics carriers without tubes should be protected against dust by means of the covers provided. Store accessories in a dustfree environment.

6. Stands:

Stand, when not in use, should be protected by a dust cover.

Do not grease or oil any parts.

Do not substitute electrical plugs.

Guarantee

We guarantee the quality of each of our instruments. Our guarantee covers all faults in materials and manufacture. It does not, however, cover damage resulting from careless or improper handling.

Netzanschluss Primär

115 V / 220 V ~ + 15 %
220 V A 50 / 60 Hz - 10 %

Sicherung 2 x 2,5 AT (5 x 20 mm)

Schutzklasse

Typ B ▲ Klasse 1

Ausgang

Microscope : WILD M690 für Lampentyp
12 V / 50 W

Ext. Lamp : Zusatzbeleuchtung oder

Spaltleuchte

12 V = 60 W max.

für Lampentypen

12 V / 30 W

und 12 V / 50 W

Achtung !

Das Steuergerät wurde im Werk auf

Netzspannung 220 V eingestellt.

Umschaltung der Netzspannung siehe

Kap. 4.1.



**Vor Öffnen des Steuergerätes
Netzkaabel ziehen.**

Verwendung des Gerätes nur in medizinisch
genutzten Räumen nach VDE 0107.

Betrieb des Gerätes nicht in explosions-
gefährdetem Bereich.

Power supply Primary

115 V / 220 V ~ + 15 %
220 V A 50 / 60 Hz - 10 %

Fuses 2 x 2,5 AT (5 x 20 mm)

Safety class

Typ B ▲ Class 1

Output

Microscope : WILD M690 for lamp type
12 V / 50 W

Ext. Lamp : Additional illuminator

or slit lamp

12 V = 60 W max.

for lamp types

12 V / 30 W

and 12 V / 50 W

Care !

The control unit was set to **220 V grid**

voltage in the factory. To change the grid

voltage setting, refer to section 4.1.



**Pull out the cable before you open the
control unit.**

Use the instrument only in medically-
designated rooms in accordance with
VDE 0107. Do not use the instrument

where there is the danger of explosion.

Connexion au réseau Primaire

115 V / 220 V ~ + 15 %
220 V A 50 / 60 Hz - 10 %

Fusible 2 x 2,5 AT (5 x 20 mm)

Classe de protection

Typ B ▲ classe 1

Sortie

Microscope : WILD M690 pour type de
lampe 12 V / 50 W

Ext. Lamp : Eclairage supplémentaire ou

lampe à fente

12 V = 60 W maxi

pour types de lampe

12 V / 30 W

et 12 V / 50 W

Attention !

Le bloc de commande a été ajusté en usine

pour une **tension de réseau 220 V**. Pour

changer la tension, voir chap. 4.1.



**Avant d'ouvrir le bloc de commande,
dérancher le câble réseau.**

L'instrument ne doit être utilisé que dans
des locaux à usage médical répondant à la
norme VDE 0107 et non pas dans des zones
explosives.

Conexión de red Primario

115 V / 220 V ~ + 15 %
220 V A 50 / 60 Hz - 10 %

Fusibles 2 x 2,5 AT (5 x 20 mm)

Clase de protección

Typo B ▲ clase 1

Salida

Microscope : WILD M690 para tipo de
bombilla 12 V / 50 W

Ext. Lamp : Iluminación adicional

o lámpara de hendidura.

12 V = 60 W máx.

par tipos de lámpara

12 V / 30 W

y 12 V / 50 W

¡Atención !

El aparato de control viene ajustado de

fábrica para una **tensión de red de 220 V**.

Para cambiar la tensión, consulte capítulo 4.1.



**Antes de abrir el aparato de mando,
desenchufe el cable de red.**

No emplee el instrumento sino en recintos
de uso médico exclusivamente. Absténgase
de utilizar el instrumento en zonas con
peligro de explosión.

VI. Optical data / Données optiques / Optische Daten / Datos ópticos

LEICA M 690 surgical operating microscope LEICA M690 Microscope d'opération Operationsmikroskop LEICA M690 Microscopio de operación LEICA M690

Eyepiece Oculaire Okular Ocular	Objective / Objectif / Objektiv / Objetivo										
	f=100mm (1.0x)	f=150mm (0.67x)	f=175mm (0.6x)	f=200mm (0.5x)	f=225mm (0.44x)	f=250mm (0.4x)	f=275mm (0.36x)				
	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 91 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 140 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 165 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 190 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 215 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 240 mm	Working distance Distance de travail Arbeitsabstand Distancia de trabajo 265 mm				
	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø	Total magnification Grossesummenvergrößerung Aumento total Field diameter Champ visuel Ø Gesichtsfeldmesser Campo visual Ø				
	Magnification changer position Vergrößerungswechslerstufe Position del cambiador de aumentos										
	7	7	7	7	7	7	7				
	10	10	10	10	10	10	10				
10x/21 B	22	22	22	22	22	22	22				
	31	31	31	31	31	31	31				
	36	36	36	36	36	36	36				
	7	7	7	7	7	7	7				
	10	10	10	10	10	10	10				
	22	22	22	22	22	22	22				
16x/14 B	31	31	31	31	31	31	31				
	36	36	36	36	36	36	36				
	7	7	7	7	7	7	7				
	10	10	10	10	10	10	10				
	22	22	22	22	22	22	22				
25x/9.5 B	31	31	31	31	31	31	31				
	36	36	36	36	36	36	36				

Eyepiece Oculaire Okular Ocular	Magnification changer position Changeur de grossissement en position Vergrößerungswechselstufe Posición del cambiador de aumentos			Objective / Objectif / Objektiv / Objetivo		
	f=300mm (0.33x)	f=350mm (0.28x)	f=400mm (0.25x)	Working distance Distance de travail Arbeitsabstand Distancia de trabajo	Working distance Distance de travail Arbeitsabstand Distancia de trabajo	Working distance Distance de travail Arbeitsabstand Distancia de trabajo
10x/21 B	7	2.3x	90.0	290 mm	340 mm	390 mm
	10	3.3x	63.0	Total magnification Grossissement total Totalvergrößerung Aumento total	Total magnification Grossissement total Totalvergrößerung Aumento total	Total magnification Grossissement total Totalvergrößerung Aumento total
	22	7.3x	28.6			
	31	10.3x	20.3	Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
	36	12.0x	17.5			Field diameter Champ visuel Gesichtsfeld Campo visual
	7	3.7x	60.0	Total magnification Grossissement total Totalvergrößerung Aumento total	Total magnification Grossissement total Totalvergrößerung Aumento total	
10	5.3x	42.0	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
22	11.7x	19.1		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
31	16.5x	13.5	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
36	19.2x	11.7		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
7	5.8x	40.7	Total magnification Grossissement total Totalvergrößerung Aumento total			Total magnification Grossissement total Totalvergrößerung Aumento total
10	8.3x	28.5		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
22	18.3x	13.0	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
31	25.8x	9.2		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
36	30.0x	7.9	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
7	5.0x	47.5		Total magnification Grossissement total Totalvergrößerung Aumento total	Total magnification Grossissement total Totalvergrößerung Aumento total	
10	7.1x	33.3	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
22	15.7x	15.1		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
31	22.1x	10.7	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
36	25.7x	9.2		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
7	4.4x	54.3	Total magnification Grossissement total Totalvergrößerung Aumento total			Total magnification Grossissement total Totalvergrößerung Aumento total
10	6.3x	38.0		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
22	13.8x	17.3	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual
31	19.4x	12.3		Field diameter Champ visuel Gesichtsfeld Campo visual	Field diameter Champ visuel Gesichtsfeld Campo visual	
36	22.5x	10.6	Field diameter Champ visuel Gesichtsfeld Campo visual			Field diameter Champ visuel Gesichtsfeld Campo visual

Leica Microsystems – the brand for outstanding products

The Leica Microsystems Mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, has grown from five brand names with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Leica symbolizes both tradition and innovation.

**Leica Microsystems – an international company
with a strong network of customer services**

Australia:	North Ryde/NSW	Tel. +61 298 863 000	Fax +61 298 887 526
Austria:	Vienna	Tel. +43 149 544 160	Fax +43 1495 441 630
Canada:	Willowdale/Ontario	Tel. +1 4164 972 460	Fax +1 4164 978 516
Denmark:	Herlev	Tel. +45 44 540 101	Fax +45 44 540 111
Finland:	Espoo	Tel. +35 896 153 555	Fax +35 895 022 398
France:	Rueil-Malmaison	Tel. +33 147 328 585	Fax +33 147 328 586
Germany:	Bensheim	Tel. +49 62 511 360	Fax +49 6251 136 155
Hong Kong:		Tel. +85 225 642 299	Fax +85 225 644 163
Italy:	Milan	Tel. +39 257 401 955	Fax +39 257 402 855
Japan:	Tokyo	Tel. +81 332 929 830	Fax +81 332 929 777
Korea:	Seoul	Tel. +82 25 146 543	Fax +82 25 146 548
Norway:	Oslo	Tel. +47 22 252 270	Fax +47 22 163 232
Portugal:	Lisbon	Tel. +35 113 889 112	Fax +35 113 854 668
Singapore:		Tel. +65 7 797 823	Fax +65 7 730 628
Spain:	Barcelona	Tel. +34 934 949 530	Fax +34 934 949 532
Switzerland:	Glattbrugg	Tel. +41 18 093 333	Fax +41 18 107 937
United Kingdom:	Milton Keynes	Tel. +44 1908 666 663	Fax +44 1908 609 992
USA:	Allendale/New Jersey	Tel. +1 2012 365 900	Fax +1 2012 365 908

and representatives of Leica in more than 100 countries.

Contact:

<http://www.leica.com>
Fax +49 6441 293 399



EU-Bevollmächtigter:

Leica Microsystems Holdings Ltd, D-3558 Wetzlar
Telephon +49 6441-290, Fax +49 6441-29 33 99

Leica Microscopy Systems Ltd, Heerbrugg, Switzerland, has been certified as being equipped with a quality system which meets the International Standard of Quality Management and Quality Systems (ISO standard 9001).

Microscopes

Compound
Stereo
Surgical
Laser Scanning
Photomicrography
Video Microscopy
Measuring Microscopes

Advanced Systems

Image Analysis
Spectral Photometry
Automated Inspection
Stations
Measurement Systems
Electron Beam Lithography

Laboratory Equipment

Tissue Processors
Embedding Systems
Routine & Immunostaining
Coverslippers
Refractometers

Microtomes

Rotary & Sliding
Cryostats
Ultramicrotomes
EM Sample Preparation