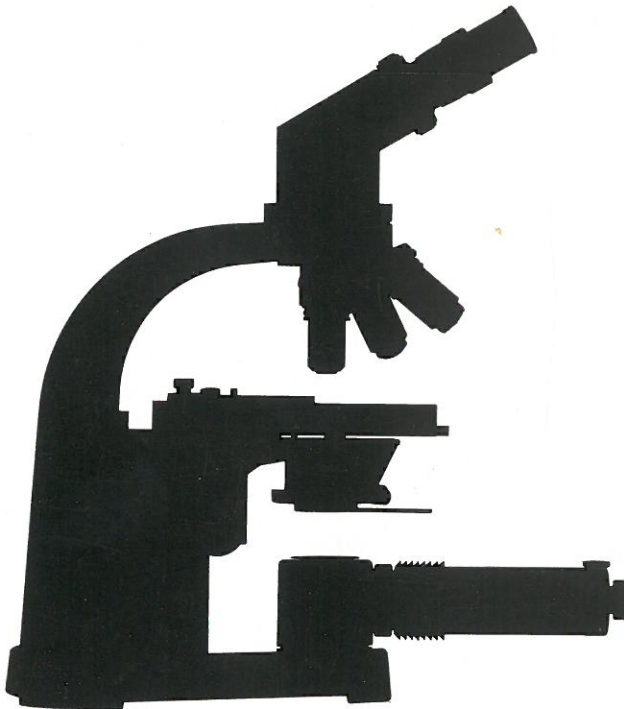


SM MICROSCOPE



INSTRUCTIONS



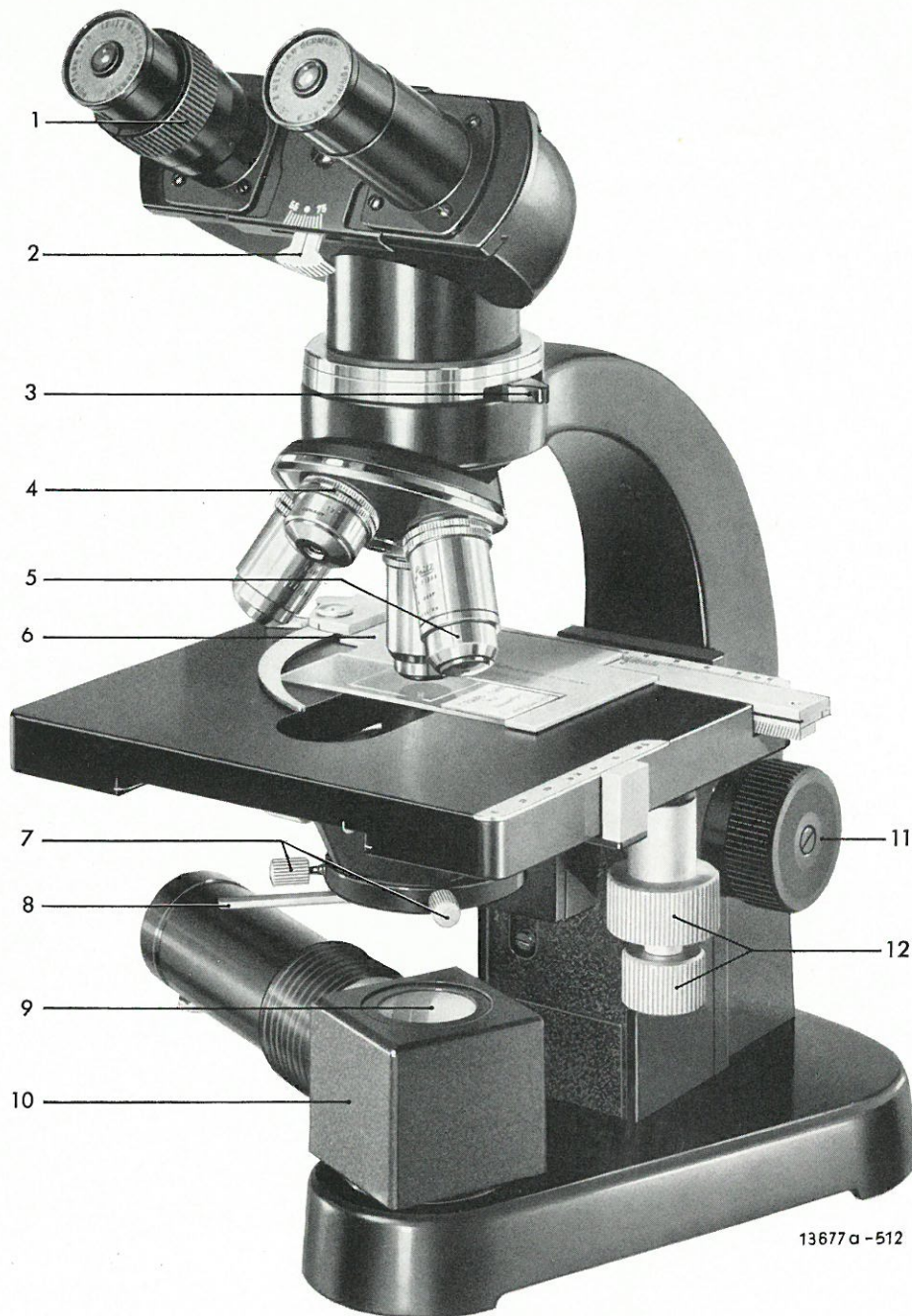
SM MICROSCOPE



INSTRUCTIONS

This booklet contains the directions necessary for setting up and operating the SM microscope correctly. Although the user is expected to have a general knowledge of microscopy, important optical re-

lationships are explained in sufficient detail to ensure a thorough understanding of the special design features of this microscope.



13677 a - 512

- 1 knurled ring for focusing the eyepiece for differential visual acuity
- 2 lever for setting the interpupillary distance
- 3 tube locking lever
- 4 nosepiece threads with objectives in position. The threads are numbered. The objective/eyepiece table enclosed with each instrument indicates the nosepiece threads with which the individual objectives are matched
- 5 spring-loaded front mount of the medium- and high-power objectives to protect front lens and specimen
- 6 holder for object slides of 100 mm maximum length; it can be removed so that a free space is available on the stage for large specimens. The reading of the two scales of the mechanical stage is independent of the setting of the object holder
- 7 centring screws of the swing-out condenser No. 601
- 8 aperture diaphragm of the condenser
- 9 dust-glass of the lamp attachment
- 10 6 v 15 W lamp attachment
- 11 single-knob control for focusing the microscopical image
- 12 coaxial control for the mechanical stage movements

Shipment and unpacking of the microscope

The microscope tube and mirror or lamp attachment are packed separately.

All parts are housed in the carrying case. During unpacking, examine the packing material carefully for small parts and immediately check the contents with the packing note. Place the parts on a clean table ready for assembly.

All mechanical and optical parts are thoroughly cleaned before despatch, and should therefore be carefully protected against dust and dirt; the glass surfaces of objectives and eyepieces should never be touched. Any finger marks on such surfaces must at once be removed with a soft piece of chamois leather or of well-washed linen; even minute, invisible traces of finger moisture may rapidly attack the surface of high-quality glass.

Work room and work place

The work room must meet certain basic requirements; it should, as far as possible, be free from dust, and from oil- and chemical fumes liable to attack the optical and mechanical parts of the microscope. Large temperature variations are undesirable. A mains socket should be available near the workplace. A 5 amp. fuse will be adequate.

Fig. 1
SM microscope with mechanical stage No. 48,
binocular tube S, and 6 v 15 W lamp attachment

Assembling the microscope

1. Place the microscope stand on a table and remove the piece of wood below the object stage support inserted for the protection of the fine adjustment during transport.
2. When the microscope is dispatched in its carrying case, the objectives are left on the revolving nosepiece in their appropriate threads (see the objective/eyepiece (magnification) table included with the microscope). This arrangement ensures their parfocality. If the objectives had for any reason to be removed from the nosepiece care should be taken to return them to their appropriate thread.
3. The tube (monocular or binocular) is inserted as follows: – Open the locking lugs with the lever 3, insert the tube in the holder, and release lever 3. The tube can be rotated on the microscope through 360°.
4. The condenser is already in its working position in its dovetail- or sleeve mount below the object stage.
5. The objective/eyepiece table mentioned under 2) also lists the best objective/eyepiece combinations. For binocular observation obviously only paired objectives of the same magnification and type must be used.
6. One of the various lamp attachments can be inserted in the foot of the microscope instead of the microscope mirror (1/10).

Technical details

The various structural elements of the SM are described in detail in our list 512-37. Information essential to the operation of the instrument is given in the following.

Tubes

The S tube is used for binocular observation. It has a lever for setting the interpupillary distance; where this is not known, this lever (2/2) is adjusted during binocular observation until a single, circular field of view appears. Furthermore, the left-hand eyepiece tube is provided with an adjustment for compensating different acuities of the user's eyes: – focus the specimen with the right eye (right eyepiece). Observe with the left eye (left eyepiece), rotating the knurled collar (2/1) of the eyepiece tube until the image appears sharp also to the left eye.

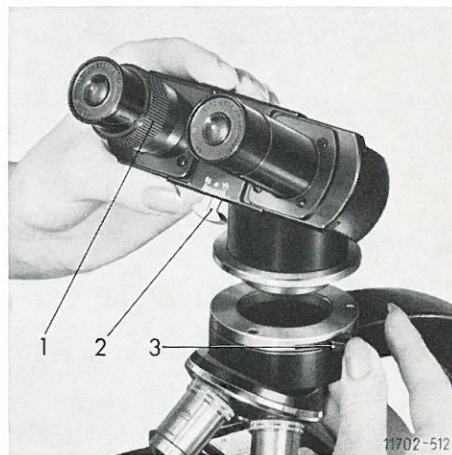


Fig. 2
Inserting the tube
1 knurled ring for compensating differential visual acuity
2 lever for setting the interpupillary distance
3 tube locking lever

Revolving nosepiece

The revolving nosepiece has threads for four objectives. After removal of the objectives for any reason, these must be replaced in their proper order (objective-eyepiece table). The magnification is changed by rotation of the revolving nosepiece.

Brightfield condensers for transmitted light

Two sleeve-mounted condensers are available for the simple version of the SM.

The single-lens condenser No. 65, N. A. 0.65 has an aperture diaphragm and a swing-out filter holder, and is designed for work with dry systems.

The two-lens condenser No. 66, N. A. 1.20, also has an aperture diaphragm and a swing-out filter holder. It is used for bright-field work with both dry and oil immersion objectives.

The following points should be observed for the interchange of these condensers: –

Release knurled screw (3/14). Pull condenser No. 65 downwards out of the sleeve mount. Before inserting condenser No. 66, unscrew its knurled screw (5/19); push the condenser fully into the sleeve; after orientating it so that the threaded bush for the knurled screw is visible in the guide slot replace the knurled screw (5/19).

Two condensers are available for the laboratory version of the SM: –

The aspherical swing-out condenser No. 601, N. A. 0.90, consisting of the bottom part No. 600 with aperture diaphragm and condenser lens, and the swing-out condenser top No. 001. This condenser is suitable for all bright-field work with dry and immersion objectives unless the full aperture of the immersion objective must be illuminated. It can also be used for fluorescence investigations.

The condenser No. 72r, N. A. 1.40 also has an aperture diaphragm and a swing-out filter holder. Owing to its large aperture it is used mainly in fluorescence microscopy, but also when oil immersion objectives have to be fully illuminated.

These condensers are readily interchanged in their dovetail mount.

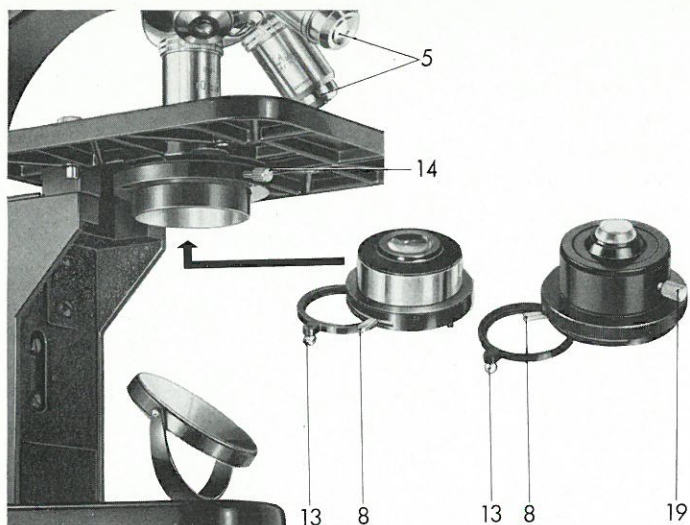


Fig. 3
Sleeve changer for condensers in sleeve mount
5 spring loaded front lens mount of objectives
14 fixing screw for the condenser (this screw has been omitted in new models)



Fig. 4
Condenser No. 65
8 Aperture diaphragm
13 filter holder
19 knurled screw

Fig. 5
Condenser No. 66
8 aperture diaphragm
13 filter holder
19 knurled screw

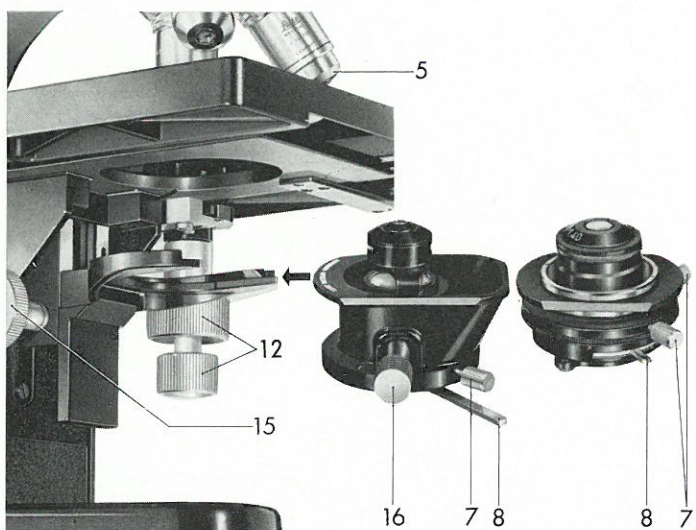


Fig. 6
Dovetail changer for condensers in dovetail mount
5 spring loaded front lens mount of objectives
12 Coaxial controls for the mechanical stage movements
15 knurled knob for the vertical adjustment of the condenser

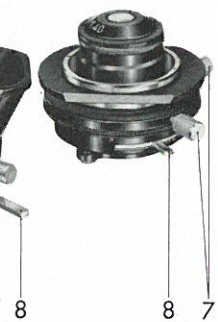


Fig. 7
Swing-out condenser No. 601
7 centring screws
8 aperture diaphragm
16 knob for swinging out the condenser top

Fig. 8
Condenser No. 72r
7 centring screws
8 aperture diaphragm

Objectives

In addition to our firm's emblem, and, with oil immersion and high-power dry objectives, the serial number, our microscope objectives are engraved with a number of data briefly described below: - **170** indicates the mechanical tube length for which the objective has been computed. This is the distance in mm from the shoulder of the objective to the rim of the tube. This distance cannot be maintained with our inclined binocular tubes. Nevertheless, the objectives are still used under optimum conditions here, since the tube lens transfers the image to the new intermediate image plane without loss of quality. The magnification is thereby increased by the factor 1.25, which is engraved on the tube. It must be included in the calculation of the final magnification.

0.17 denotes the thickness of the coverglass protecting the specimen. Most LEITZ objectives are computed for this thickness. Objectives suitable for use with and without coverglass have a dash instead of 0.17 engraved on their mount, and those which **must** be used without coverglass, 0.

Dry systems of large apertures (above 0.90) are supplied in correction mounts which by the adjustment of a knurled ring can be set on coverglass thicknesses ranging from 0.12 to 0.22.

40 is the simplified expression of the reproduction scale of the objective (40:1). In the objective table the term "reproduction scale" is replaced by "magnification".

0.65 is the numerical aperture of the objective.

With **Fluorite** systems and **Apochromats**, the correction is also stated on the mount. These symbols reappear in the table. Immersion objectives bear the additional term "**Oel**" and a blackring on their mounts. Objectives with iris diaphragms are denoted "**Iris**". Achromats have no special sign of distinction.



Fig. 9 Various objectives

6219-513

Objectives for transmitted-light investigations in bright- and darkfield Tube length 170 mm

Designation of objectives		Focal length	Free-working distance	Cover glass correction ¹⁾	Type of eye-piece ³⁾
	magnification/aperture	mm	mm		
Achromatic dry systems	2,5/0,07	57	14	DO	P
	3,2/0,12	40	35	DO	H
	3,5/0,10	32	23	DO	H
	6/0,18	23	18	DO	H
	10/0,25	16	5,7	DO	H
	25/0,50	7,1	0,92	D	P
	40/0,55	4,5	0,67	D	P
	63/0,85	2,9	0,29	D!	P
	Iris 63/0,85	2,9	0,29	D	P
Achromatic immersion objectives (W = water-immersion objectives)	Oel + W 22/0,65	8,1	0,32	DO	P
	W 90/1,20	2,1	0,09	D	P
	Oel 100/1,30	1,9	0,13	D ⁴⁾	P
	Iris Oel 100/1,30-1,10	1,9	0,13	D ⁴⁾	P
Fluorite dry system	Fl 40/0,85	4,3	0,38	D!	P
Fluorite oil immersion objectives	Fl Oel 54/0,95	3,4	0,22	DO	P
	Fl Oel 95/1,32	2,0	0,15	D ⁴⁾	P
	Iris Fl Oel 95/1,32-1,10	2,0	0,15	D ⁴⁾	P
Apochromatic dry systems	Apo 12,5/0,30	13	2,5	DO	P
	Apo 25/0,65	7,3	0,86	D	P
	Apo 40/0,95	4,5	0,12	D! ²⁾	P
	Apo 63/0,95	3,0	0,12	D! ²⁾	P
Apochromatic oil immersion objectives	Apo Oel 90/1,32	2,0	0,14	D	P
	Apo Oel 90/1,40	2,0	0,06	D	P

All objectives from 3.5/0.10 are parfocal on the nosepiece.

1) D: with coverglass $D = 0.17$ (coverglass thickness should be observed to within ± 0.05 mm)

O: without coverglass, DO: can be used or without coverglass

D!: coverglass thickness 0.17 mm should be observed accurately to within ± 0.01 mm, or should be accurately set with the correction mount where it varies from this value.

2) These objectives have a correction mount with automatic sharpness compensation. Its adjustment has hardly any effect on image sharpness. Ideal method of focusing when the thickness of the coverglass is unknown.

3) H = use Huygens eyepiece

P = use PERIPLAN® or PERIPLAN widefield eyepieces.

4) These oil immersion objectives may also be used for uncovered subjects (smear preparations without coverglass); the negligible reduction of image quality can be ignored.

Light sources

The microscope mirror for daylight or separate light sources has a plane and a concave surface. The latter (aperture 0.35) is used preferably without condenser for small light sources, or low-power objectives, the plane surface together with a condenser for large light sources, or with high-power objectives, or with separate microscope lamps with collector lens. Artificial light sources should be set up approximately 25 cm (10") in front of the microscope. The concave mirror must be used to eliminate disturbing features of natural light sources, such as window frames, between light-source (sky) and microscope.

The 220 v 15 W micro-dia lamp attachment

has been designed for direct mains connection. Its illumination is bright enough even for brightfield oil immersion work. The lamp is attached to the foot of the microscope by means of a bayonet lock, ensuring a precise fit in any position. An on/off switch is provided on the lamp socket.

For replacement the lamp is withdrawn with its socket from the sleeve mount (see Fig. 10) and unscrewed. The new lamp is screwed in, and inserted fully into the sleeve mount with its socket.

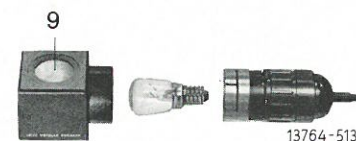


Fig. 10
Micro-dia lamp attachment
9 dust-glass (blue)

6 v 15 W lamp attachment. This lamp can be centred. It is attached to the stand by means of a bayonet lock which ensures a precise fit in any position, and can be connected to the mains only by means of one of the following transformers (a. c.).

500 099 adjustable to 3.1, 4.2; 6 v - 2.5 amp. and 8 v - 0.6 amp.

Cable with Europa plug.

500 123 continuously adjustable from 2-8 v 2.5 amp. Voltmeter included.

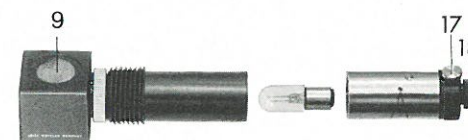


Fig. 11
6 v 15 W lamp attachment
9 dust-glass
17 lamp socket clamping screw
18 lamp centring screw

Single-knob control

The single-knob coarse- and fine focusing control on both sides of the stand permits very rapid and reliable operation in all ranges of magnification.

The mechanism functions as coarse adjustment if the operating knob is rotated in one direction only. The fine adjustment is engaged automatically as the rotation is reversed. Its range covers approx. $\frac{1}{3}$ turn of the operating knob. Movement beyond this range will produce a slight resistance which indicates that the coarse adjustment is again engaged.

During the focusing of a specimen it is advisable first to move the coarse adjustment a little beyond the critical focusing position of the image; optimum sharpness is obtained by reversing the rotation. This preserves enough freedom of movement for final focusing with the fine adjustment without reaching its limits even after a changeover to more powerful objectives.

Operating the microscope

Focusing the specimen

Secure a contrasty section on the object-stage by means of an object guide or stage clips, turn in a medium-to-low power objective, preferably 10x, N. A. 0.25 (engraved 10/0.25), and insert a Huygens 10x or PERIPLAN 8x eyepiece.

Switch on the lamp.

Focus the specimen with the single-knob control. Raise the stage a little higher than required by the free working distance of the objective, so that the image again appears a little out of focus. Final focusing is obtained by reversing the rotation of the single-knob control.

When the binocular tube is used, correct for interpupillary distance and any visual defects as described under the chapter "Tubes". Repeat this after the condenser has been focused, and check from time to time.

Illumination of the microscopic image

Perfect illumination of the specimen is essential for a good microscope image. The following paragraphs are therefore of particular importance and should be closely adhered to.

Adjusting the mirror. Open the aperture diaphragm of the condenser fully. Look through the eyepiece, moving the mirror until light enters the objective; remove the eyepiece, and adjust the mirror until the rear lens of the objective is evenly filled with light. It may be necessary for this purpose to lower the condenser slightly. Now replace the eyepiece and check the illumination of the microscopic image.

The **micro-dia lamp attachment** is locked in the foot of the stand; it does not need special centring.

Adjusting the 6v 15W lamp attachment. It is advisable to check the adjustment of the 6v 15W lamp before observation is begun. Unscrew the clamping screw (11/17) and push the lamp mount fully home.

By slowly withdrawing the lamp from the smallest possible image of a patch of light on the dust glass of the lamp. After loosening the clamping screw (11/18), you can centre this circular patch on the dust glass by adjusting the lamp mount.

Then, while steadily looking into the microscope, push the lamp mount in again until the very best illumination of the microscopic image is obtained. Tighten the fixing screw (11/17) again.

Use of the condensers

a) Condenser No. 65

Turn in objective 10/0.25.

Raise the condenser fully.

Open aperture diaphragm (4/8) fully.

Focus the specimen with the single-knob control.

The specimen now appears uniformly bright throughout. However, it may be possible to increase the brightness by a slight lowering of the condenser, especially after the changeover to higher-power objectives. Remove the eyepiece from the tube. Slowly close the aperture diaphragm until it obscures $\frac{1}{3}$ of the rear lens of the objective. A few remarks about the correct use of the aperture diaphragm will be appropriate in this context. You will be well advised to pay close attention to this point, since the performance of the microscope largely depends on it.

While with specimens of normal contrast range the aperture diaphragm can be closed so that it obscures $\frac{1}{3}$ of the rear lens of the objective at the outset, the following procedure is advisable for specimens of little contrast: - Open the aperture diaphragm so that it is only just visible in the rear lens of the objective (remove the eyepiece). The aperture of the condenser and that of the objective will now be identical. After sufficient sharpness has been obtained in all the object details, gradually close the condenser diaphragm until the less contrasty structural elements also become conspicuous. It will generally be advisable to close it so that it reveals about $\frac{2}{3}$ of the full objective aperture. Any further closing of the diaphragm leads to a rapid decrease in the resolving power of the objective and therefore of the performance of the microscope. The aperture diaphragm must not be used for regulating the image brightness. This should be done either by means of the transformer, or, in the case of colour photomicrography, with neutral density screens.

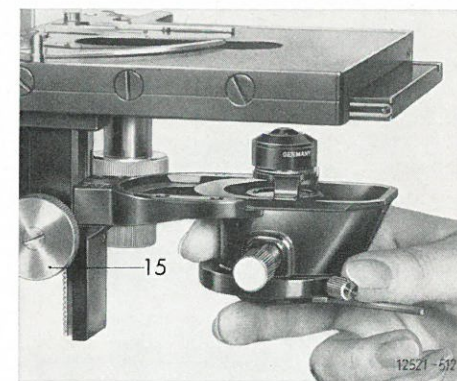


Fig. 12
Inserting the swing-out condenser No. 601
15 knob for lowering the condenser dovetail changer
the rigid version of the swing-out condenser No. 601
must be inserted with the condenser top swung-out.

b) Condenser No. 66

Turn in objective 10/0.25

Focus specimen with the single-knob control

Loosen clamping screw (3/14) (with older models only)

Raise condenser fully (clockwise turn of the condenser mount)

Open the aperture diaphragm (5/8) fully. The image appears uniformly bright, however, the brightness can be further increased by a slight lowering of the condenser.

Remove the eyepiece from the observation tube.

Check full illumination of the rear lens of the objective; if necessary correct vertical condenser adjustment slightly.

Tighten clamping screw (3/14) (with older models only)

Slowly close the aperture diaphragm until it reveals only $\frac{2}{3}$ of the rear lens of the objective (For details about the use of the aperture diaphragm see also condenser No. 65 – p. 8).

Insert the eyepiece.

c) Swing-out condenser No. 601

This condenser can be centred. Its centration should be checked from time to time.

For the SM with condenser dovetail change the swing-out condenser No. 601 is supplied without centring device.

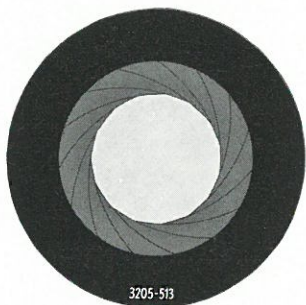


Fig. 13
Appearance of the aperture diaphragm in the objective, with the eyepiece removed

1) Centring with the 220v 15W micro-dia lamp attachment or the 6v 15W lamp attachment

Switch on illumination

Turn in objective 3.5/0.10 or 2.5/0.07.

Focus the specimen

Swing in condenser top (knob 7/16)

Open aperture diaphragm (7/8) fully

Slowly lower the condenser from its top position until the edge of the diaphragm of the micro-dia lamp attachment, or the rim of the collector lens of the 6v 15W lamp attachment, appears sharp in the microscope field of view.

Centre the edge of the diaphragm or the rim of the collector lens with the image by means of the condenser centring screws (7/7).

Raise the condenser fully

Close the aperture diaphragm according to the object and the objective; see also p. 8.

2) Centring with the microscope mirror

Turn in objective 10/0.25

Remove microscope mirror. This reveals the mirror bush, which can be used for centring by illuminating it with a table lamp etc.

Focus the specimen

Swing in the condenser top (knob 7/16).

Lower the condenser from its top position until the mirror bush appears sharp in the microscope.

Centre the mirror bush in the image by means of the condenser centring screws (7/7).

Raise the condenser fully

Replace the microscope mirror

Remove the eyepiece and adjust the mirror until the rear lens of the objective is evenly illuminated (see p. 12)

Replace the eyepiece

The following table provides information about the use of the swing-out condenser No. 601 with the various objectives.

Objective aperture	Condenser top	Vertical adjustment of the condenser
larger than 0.25	remains swung in	remains in top-most position
smaller than 0.25	swing out	Lower condenser until the best illumination is produced

d) Condenser No. 72r

cf. Swing-out condenser No. 601

Change of magnification

As all LEITZ objectives from 3.5/0.10 upwards are parfocal on the revolving nose-piece, only slight refocusing with the fine adjustment is necessary when the magnification is changed.

Oil immersion objectives

Immersion objectives are identified by the engraved black ring at the lower end of the mount and by the word "Oel" (see p. 9).

The refractive index of the immersion oil, $n = 1.515$, is approximately the same as that of the coverglass and the front lens of the objective, which makes the spherical surface of the objective front lens the first refracting surface after the object. The focal length and hence the working distance of most immersion objectives is very short; great care is therefore necessary in their use. They must be focused under constant microscopical control. The formation of air bubbles must be avoided when the immersion oil is applied. Only LEITZ immersion oil and, for fluorescence microscopy, LEITZ non-fluorescing immersion oil should be used.

Condenser and oil immersion

Generally, a condenser aperture of 0.90 is completely adequate for most examinations with dry and with oil immersion objectives (N. A. 0.90 corresponds with stopping an objective aperture of 1.40 down by $\frac{2}{3}$). It will rarely be necessary to illuminate the entire objective aperture. Maximum resolving power of an objective is almost invariably bought at a loss of contrast, so that the theoretical resolving power is only rarely obtainable. Only when the resolution of the very finest structures is essential will a condenser of an aperture larger than 0.90 be called for (i. e. our condensers No. 66 or 72r). Here the condenser, too, must be immersed, i. e. oil must be introduced between condenser top and the underside of the object slide.

Working with oil immersion

Open the aperture stop of the condenser (8), and lower the stage with the single-knob control. Place a drop of oil on the coverglass of the specimen, raise the stage, observing its movement across the stage top, until the objective dips into the immersion oil. Look through the eyepiece and focus the specimen carefully by first moving slightly beyond the focusing plane with the coarse adjustment, and obtaining critical sharpness with the fine adjustment.

Close the aperture diaphragm (8) to suit the requirements of the specimen.

If the large apertures of the condensers No. 66 or 72r must be utilized fully (extremely fine object structures), immersion oil must be introduced between the front lens of the condenser and the underside of the object slide. The condenser No. 72r should be slightly lowered for this purpose with the rack-and-pinion movement (4/15).

The examination completed, all optical surfaces in contact with immersion oil must be carefully cleaned with a soft rag soaked in xylene, and polished with a dry rag. **Alcohol (spirit) must never be used for cleaning objectives and condensers.** All pressure must be avoided during cleaning as this might push the lenses out of their mounts. Mostly this would damage not only the front lens, but also the following lens of the objective.

Photomicrography

Tube: straight monocular tube 0

Light sources: -

1) 220 v 15 W Micro-dia lamp attachment

This lamp includes a built-in daylight filter, but should be used only for black-and-white photomicrography, since with colour material the colour balance will be disturbed in the various spectral regions. It is of course suitable for visual observation. The use of a yellow-green filter is an advantage in black-and-white photography.

2) **6 v 15 W lamp attachment.** The colour temperatures of this filament lamp are matched for artificial-light films. The curve shown in Fig. 14 illustrates the dependence of the colour temperature on the current intensity and makes it possible to adapt the lamp to the chosen artificial-light film by regulation of the current. However, care should be taken to exceed the admissible continuous load of 2.5 amp. only for the actual period of photography in order to avoid a considerable shortening of the life of the lamp. Daylight colour films can be used with the aid of the conversion filter included with the lamp; the current load must be 2.5 amp. Any excess of light must be suppressed by means of neutral density screens, never by operation of the aperture stop.

3) **150 W xenon high-pressure lamp.** This can be used in the lamp housing 250 only. Its practically continuous spectrum, at a colour temperature of 6000° K, permits the use of daylight colour film without filter. Any excess light should be reduced with neutral density screens.

Objectives: Standard objectives, i. e. achromats, fluorite systems or apochromats depending on the optical outfit of the microscope.

Eyepieces: Huygens, PERIPLAN®, or PERIPLAN widefield eyepieces

Exposure meter: - MICROSIX-L

The SM microscope can be combined with the following photographic equipment:
SM with ARISTOPHOT

and 9x12 cm camera,
camera with 4" x5" international back,
or 4" x5" camera with fully automatic exposure control,
or the LEICA®.

SM with 9x12 cm attachment camera

SM with micro-attachment, or micro-attachment for the LEICA with vibration absorber and the LEICA.

For detailed information please consult our lists 540-8, 540-3, 540-22, and 540-28.

Special methods of microscopy

Examinations in darkfield illumination and phase contrast

In SM models with dovetail changer and rack-and-pinion movement for vertical condenser adjustment the brightfield condenser can be replaced by the darkfield or by the phase contrast condenser. In the latter case the objectives, too, must be replaced by phase contrast objectives on the nosepiece; care should be taken to screw them into the numbered threads indicated in the objective/eyepiece table included with the microscope. Our list 513-31 contains detailed instructions about the use of darkfield illumination and list 513-21 about the use of phase contrast equipment.

Examination in polarized light

In the condensers No. 65, 66, and 72r the mount of the polarizer is screwed into the swing-out filter holder. The mount has a slot for the λ or $\lambda/4$ plate and can in turn be swung out on the filter holder.

The swing-out condenser No. 601 is equipped with a special polarizing device to be attached to its bottom part; it has a swing-out mount with two slots for the polarizer and λ or $\lambda/4$ plates. Polarizer and compensator can be rotated through 90°.

The analyser is pushed over the ring with locating lug visible in the top of the tube carrier after removal of the tube. Extinction is produced by rotation of the polarizer.

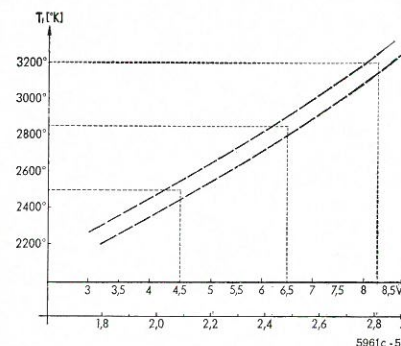


Fig. 14
Dependence of the colour temperature of the 6 v 15 W tungsten lamp on the current intensity

Maintenance and care of the microscope

The microscope should be kept under its dust cover when not in use. The stand should be cleaned occasionally with a piece of linen or chamois leather. On no account should spirit be used for cleaning as it attacks the varnish of the microscope. Benzene, on the other hand, is most suitable for this purpose.

Bright patches on the object stage caused by benzene are easily removed by treating them with liquid paraffin or acid-free vaseline. Special caution is necessary during examinations involving acids (particularly acetic acid) or other corrosive substances. Their direct contact with optical parts and the stand must be strictly avoided, and all parts should be thoroughly cleaned after use.

The optical parts of the microscope should be kept scrupulously clean. Remove dust on glass surfaces by brushing with fine, dry sable brush, accompanied by gently blowing across the surface. If the dirt resists this treatment it should be removed with a piece of clean linen or soft leather soaked in distilled water. If this method, too, is unsuccessful, benzene or xylene, **but on no account alcohol (spirit)**, should be used.

Objectives must never be dismantled for cleaning. If they have sustained internal damage they should be sent to the factory for repair.

Special care is recommended during the cleaning of the antireflex layers of the lenses. The external surfaces of the eyepieces and the front lenses of the objectives are coated with layers as hard as glass. They should be cleaned with the same care as uncoated surfaces. On the other hand, some of the layers on the internal surfaces of eyepieces and objectives are extremely soft, and here the only method of removing dust is blowing it gently away. It is therefore inadvisable to clean the internal surfaces, even of eyepieces.

Expert care ensures optimum performance of a LEITZ microscope for many years. However, should the overhaul or repair of an instrument become necessary, please contact one of our agencies or our factory.



ERNST LEITZ GMBH WETZLAR GERMANY

Subsidiary: Ernst Leitz (Canada) Ltd., Midland, Ontario

® = Registered Trademark

Design subject to alteration without notice.

List 512 - 38 c / Engl.

Printed in Germany

V/69/BX/L