STANDARD Microscope with LUCIGEN Illuminator

Operating Instructions

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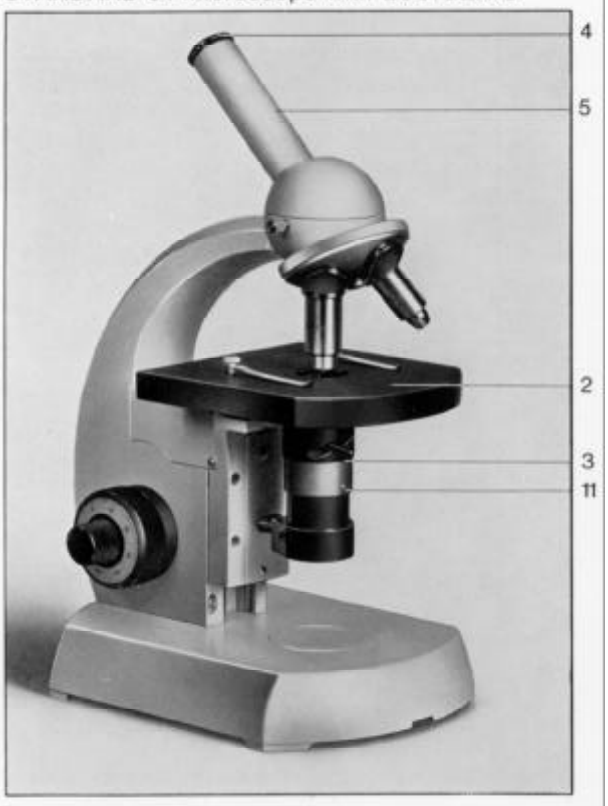
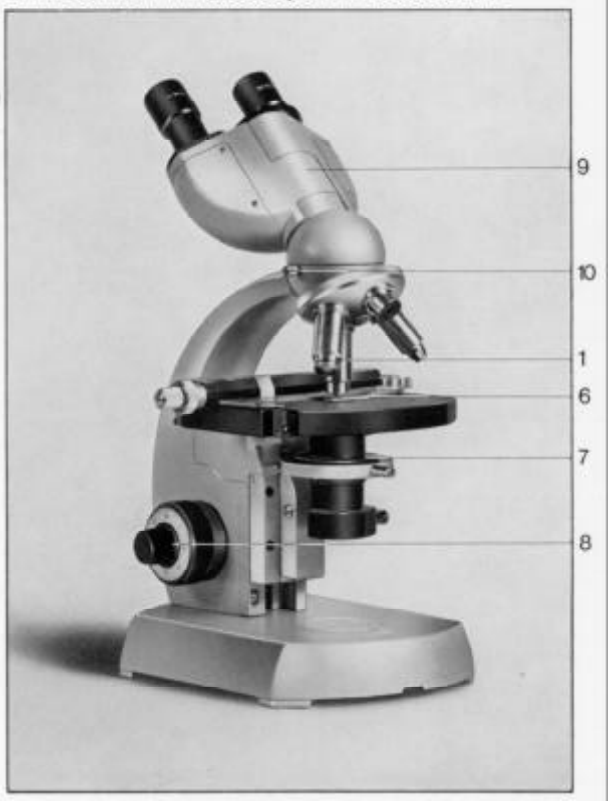
STANDARD 04 Microscope with LUCIGEN S



STANDARD 14 Microscope with LUCIGEN Z



1 Objective on quadruple revolving nosepiece

2 Fixed square stage

3 LUCIGEN S

4 Eyepiece

5 Inclined monocular tube

6 Plain mechanical stage

7 LUCIGEN Z

8 Coarse and fine-adjustment knobs

9 Binocular body

10 Clamp screw for tube

11 Clamp screw for lamp socket

In this type of microscope we distinguish between the two basic stands 04 and 14. In the simple STANDARD the LUCIGEN S illuminator is vertically adjustable in a substage drawtube. The STANDARD 14, on the other hand, features a rack-and-pinion carrier for the LUCIGEN Z. Contrary to the standard types 04 and 14, the STANDARD 05 and 15 stands are designed for use in conjunction with a 1.6x magnification changer (page 7) or a 0.8x wide-field changer (page 9).

Unpacking

The STANDARD microscope is supplied in a Styropor case containing tightly fitting compartments for the stand and the diffrent compomente of transportation, the microscope should not be stored in this case for prolonged periods, since the unavoidable humidity of the air will be trapped in the perfectly sealed case and may attack the instrument. he styropor case should, however, be kept as it may become necessary to ship the instrument in the future.
Before starting to assemble the instrument, check the consignment for completeness with the aid of the packing slip.

Assembling the microscope

Screw the **low-voltage filament lamp,** 38 00 29-7180 into the lamp socket of the LUCIGEN. Slide the socket from below into the LUCIGEN so that the screw **(11)** of the socket engages a cutout. Then tighten this screw with a screwdriver.

To attach the **body tube,** slightly turn back the clamp screw **(10)** in the top of the limb. With the aid of the dovetail ring of the slightly inclined body, push the spring bolt back until the body can be inserted. Then tighten the clamp screw.

If the clamp screw is slackened by a quarter to half a revolution, the body tube can be rotated without coming off. It is thus possible to turn it so that, for example, a second observer can look into the microscope.

The **transformer** must be set to the correct power supply voltage.

Once the **objectives** have been screwed into the revolving nosepiece and the **eyepieces** inserted in the body tube, the microscope is ready for use.

Working procedure

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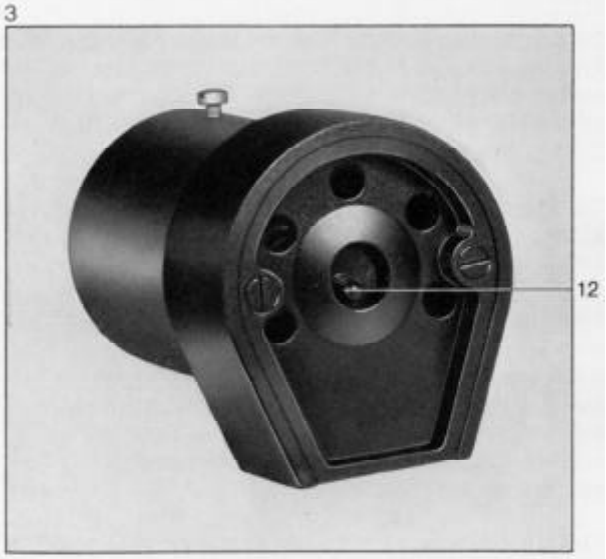

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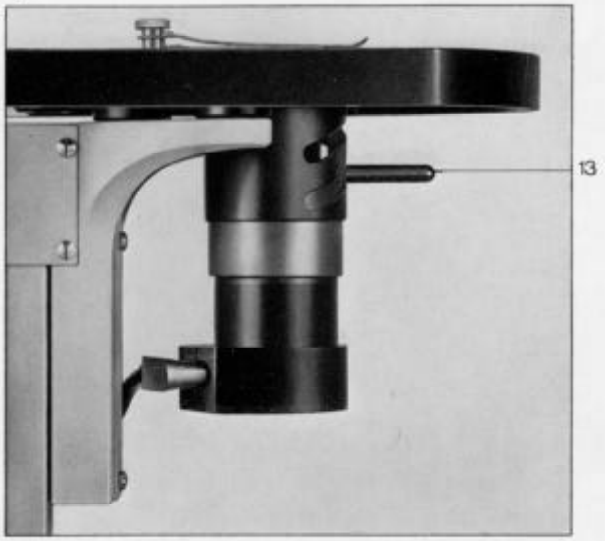

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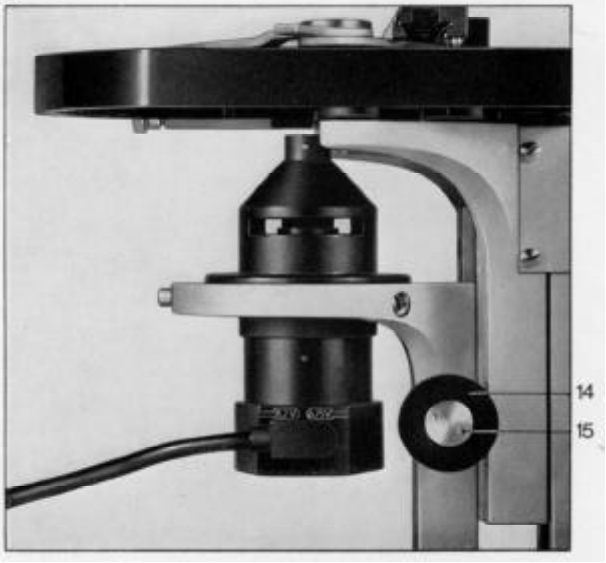

1. Place the specimen (with cover glass facing up) on the microscope stage and switch on the lamp. With the aid of the pin **(12)** below the lamp socket center the lamp so that the opal glass disk of the LUCIGEN is evenly illuminated.

2. Start focusing with the objective of lowest power. Use the coarse and fine adjustment to focus on the specimen.

3. Control image contrast by adjusting the height of the LUCIGEN.
On LUCIGEN S, use lateral lever **(13)**
on LUCIGEN Z, use rack and pinion **(14)**.
Rule of thumb: Remove eyepiece and look into the tube with the unaided eye. The setting is correct if about two thirds of the visible objective pupil are filled with light. Then replace the eyepiece.
When the LUCIGEN is in its top position, its aperture is in almost all cases optimally suited also for oil immersion objectives. If in special cases an illuminating aperture higher than 1.0 is desired, it will be necessary to connect the LUCIGEN and the underside of the specimen slide with oil, as would be done with the corresponding condensers.

If the holder for the LUCIGEN Z slides down, tighten it by turning disk **(15)** with pin wrench.

4. The brightness of the microscopic image can be varied in two steps. Apart from the rated voltage of 6.75 volts, the lamp may also be overrun at 8.2 volts. However, higher than rated voltage should only be used for brief periods, because while the intensity of the light will increase by 100%, the life of the lamp will be reduced to $^{1}/_{10}$.

The microscope in detail

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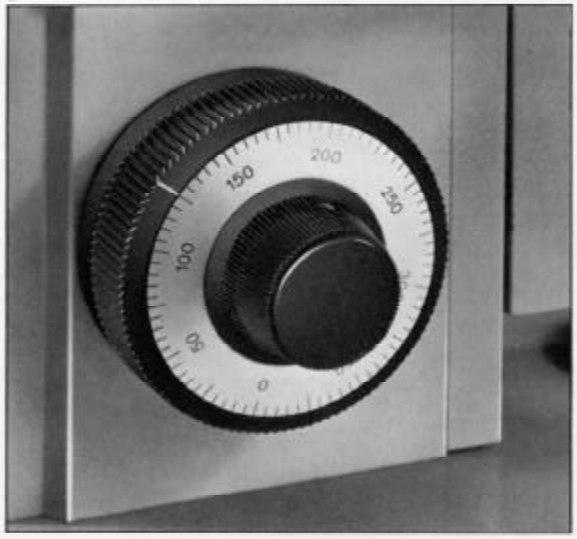

Coarse and fine-adjustment knobs for focusing are coaxial. The coarse-adjustment range is limited by stops. One scale interval of the fine adjustment corresponds to a vertical stage displacement of 5 μ = 0.005 mm.

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Objectives
For the STANDARD with LUCIGEN we normally supply achromatic objectives **(20)**. The initial magnification and numerical aperture of each objective is engraved on its mount. "Oel" identifies oil immersion objectives.

Fig. 7: Achromat 100/1.25 oil
Fig. 8: Planachromat 16/0.35

Our objectives are parfocalized. As a result, the image remains visible after an exchange of objectives and need only be refocused with the fine adjustment for optimum sharpness.
All objectives guarantee perfect specimen protection. For this purpose, high-power systems for short working distances are provided with resilient mounts.

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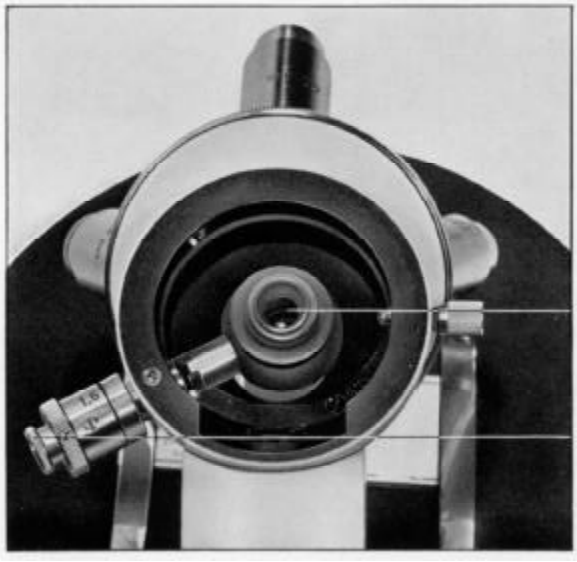
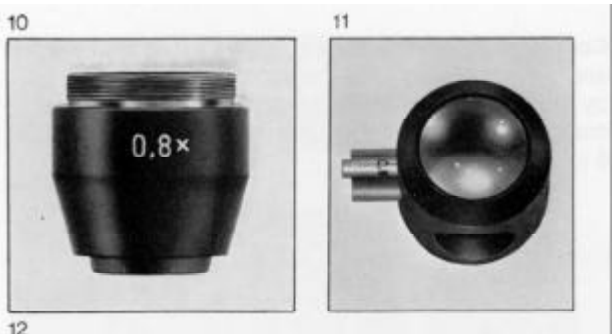
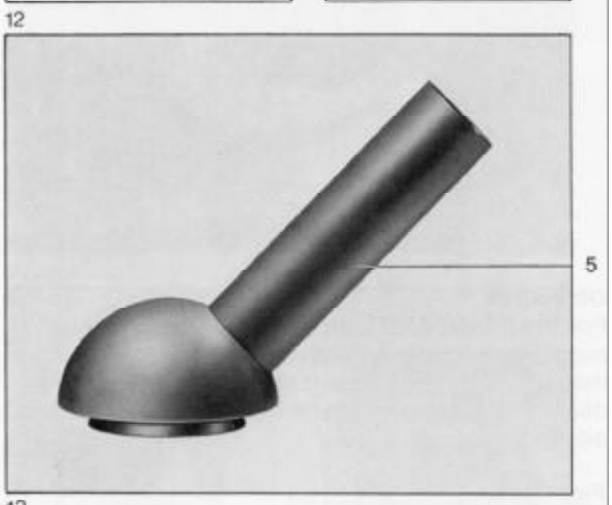


The **1.6x magnification changer,** 47 30 60 **(17)**, is held fast during insertion into the top of the limb and at the same time secured by means of the small knurled knob **(16)** projecting from the shaft of the control knob. When it is in the light path (red dot up), it will increase the power of the eyepieces by 1.6x. The magnification of the 8x eyepieces is thus increased to 12.5x so that a second pair of eyepieces is made superfluous.

The magnification changer can only be installed in microscope stands which are designed to take this accessory.





The **0.8x wide-field system** 47 30 67 (Fig. 10) with adapter ring 47 36 95 can be screwed into the inclined binocular tubes 47 30 11/13.

The **0.8x wide-field changer** 47 30 68 (Fig. 11) is screwed onto the holder of the limb top instead of the magnification changer.

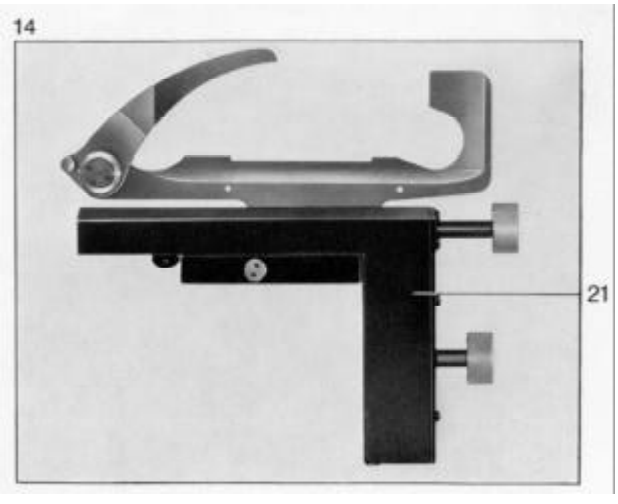
The above 0.8x wide-field systems are to be used with Kpl wide-angle eyepieces and flat-field objectives.

Body tubes

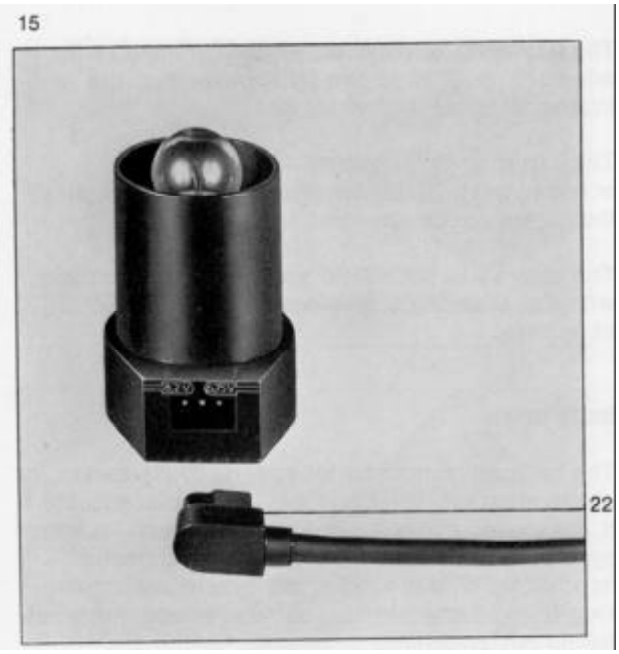
The **inclined monocular tube,** 47 30 00 **(5)**, serves for observation with only one eye. It is indispensable if, for example, a camera lucida or special-purpose eyepieces are used which have to be clamped in position. With the aid of the eyepiece clamping ring 46 49 10 any eyepiece can be protected against falling out or turning.

The interpupillary distance is set on the **binocular body (9)** by swivelling the tube halves. First focus the specimen in the right fixed eyepiece with focusing knob. Then focus the left eyepiece to maximum sharpness with the adjustable eyepiece tube.

The **attachable mechanical stage (21)** is available with or without graduation. It is mounted onto the plain specimen stage 47 34 20 for guiding specimens.



Illumination



With the LUCIGEN we have developed a microscope illuminator for routine visual observation, which affords equally good illumination for the large object fields provided by low-power objectives and the numerical apertures of high-power objectives. Erroneous settings are completely eliminated. The only means of control consists in a variation of the illuminating aperture to achieve optimal contrast. A reduction of the aperture to excessively small values – which would result in diffraction phenomena spoiling the microscopic image – is impossible.

This illuminator works on the following principle: A diffusion disk of 8 mm diameter is illuminated by a low-voltage lamp and forms a secondary radiator of maximum illuminating aperture. This secondary radiator is imaged in the exit pupil of the objective, the size of its image depending on the distance from the objective. As a result, simple lowering of the LUCIGEN serves to control the illuminating aperture and thus to achieve optimum contrast.

For reasons of intensity, the LUCIGEN finds its limits where the range of purely visual observation is left. It is therefore unsuited for photomicrography, projection and light-attenuating illumination techniques.

The 6-v, 5-w-low voltage filament lamp, 38 00 29-7180, is fed with either 6.75 or 8.2 volts through a suitable transformer. To vary the output voltage it is only necessary to reconnect the plug **(22)** in accordance with the symbols on the lamp socket.

Lamp socket for LUCIGEN. When the plug is inserted as shown in Fig. 15, the lamp voltage is 6.75 V, as indicated by the symbol.

The illustrations are not binding in every detail for the design of the instruments.