

UNIVERSAL Microscope

PHOTOMICROSCOPE

Low-power photography with LUMINAR objectives

Operating Instructions

The LUMINAR equipment may be used on the UNIVERSAL microscope and the PHOTOMICROSCOPE in conjunction with a 35 mm single-lens reflex camera equipped with a focal-plane shutter. Image scales in the film plane are between 2:1 and 22:1. In this case, the integral automatic camera of the PHOTOMICROSCOPE cannot be used. Transparent specimens are illuminated by means of the illuminator incorporated in the microscope and a suitable spectacle-lens condenser.

Image scales as referred to the film negative:

LUMINAR	Image scales	Object field size in mm
16 mm	14:1 – 22:1	2.6 × 1.7 – 1.6 × 1.1
25 mm	8:1 – 14:1	4.5 × 3 – 2.6 × 1.7
40 mm	4:1 – 8:1	9 × 6 – 4.5 × 3
63 mm	2:1 – 4:1	18 × 12 – 9 × 6

The Luminar head, 47 20 50, attached to the stand instead of the tube head, supports the objective and the camera. The telescopic extension provided for variation of the camera extension can be clamped in any desired position with the aid of two screws. It is normally supplied with a bayonet thread suited for attachment of the CONTAREX camera. However, single-lens reflex cameras of other manufacture can also be attached, provided that their lens is interchangeable. If a special adapter is desired in the Luminar head, the required details should be specified in the order.

LUMINARS are high-performance photomicrographic objectives designed for single-stage image formation. To ensure that the focusing movement of the microscope stage is sufficient for satisfactory focusing of the specimen, LUMINARS are supplied with holders of different height.

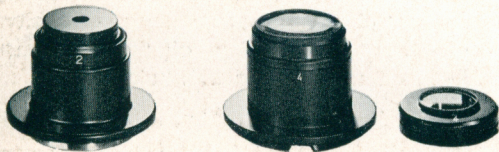
The iris diaphragm of LUMINAR objectives must be fully opened for photography by transmitted light. It serves to increase the depth of field if



1 Luminar holder, 47 25 51, with rectangular stop in place. 16 mm, 25 mm and 40 mm LUMINARS.



2 Luminar holder, 47 25 52, and 63 mm LUMINAR.



3 Spectacle-lens condensers and auxiliary lens 4 for spectacle-lens condenser 4.

three-dimensional objects have to be photographed by reflected light. The diaphragm is engraved with factors by which the exposure time determined for full aperture must be multiplied.

Every LUMINAR has a **spectacle-lens condenser** of its own. A clip-on stop, which is located directly beneath the specimen when the condenser is properly set, serves as a fixed field diaphragm. In the spectacle-lens condenser 4 for the 63 mm LUMINAR the clip-on stop is replaced by an auxiliary clip-on lens 4.

With all LUMINARS, the **BL illuminating lens**, 46 70 90, is inserted into the light-exit opening in the microscope base. It may only be omitted if the microscope is equipped for use of the pancreatic condenser.

Assembly

1. Remove the tube head of the microscope and replace it by the Luminar head, 47 20 50.
2. Screw the LUMINAR into the corresponding Luminar holder and attach the latter in the usual manner with its dovetail ring to the Luminar head. Then clamp it.

With the LUMINARS from 16 to 40 mm first insert the rectangular stop, 47 25 53, from above into the Luminar holder. Its correct position may be checked by looking from above into the telescope tube: turn the Luminar holder until the two visible rectangular stops are properly located.

3. Remove the lens of the CONTAREX and attach the camera — red dot facing red dot — with the aid of the bayonet mount to the telescope tube.
4. Insert the spectacle-lens condenser corresponding to the LUMINAR used (identical color of engraving) and rack it fully up by means of the condenser movement.
5. Insert the BL illuminating lens, 46 70 90, into the light-exit opening of the microscope base.

This does not apply if the microscope is equipped for use of the pancreatic condenser.

LUMINAR	Luminar holder	Spectacle-lens condenser Diameter of clip-on stop	
16 mm 46 25 11	47 25 51 with rectangular stop	1	3.5 mm
25 mm 46 25 13		2	6 mm
40 mm 46 25 15		3	9 mm
63 mm 46 25 17	47 25 52	4 without clip-on stop, but with auxiliary lens 4	

Procedure

- Switch on the base illuminator. Insert the 32 mm light filter or polarizing filter into the filter holder underneath the condenser or above the rectangular stop in the separate Luminar holder.

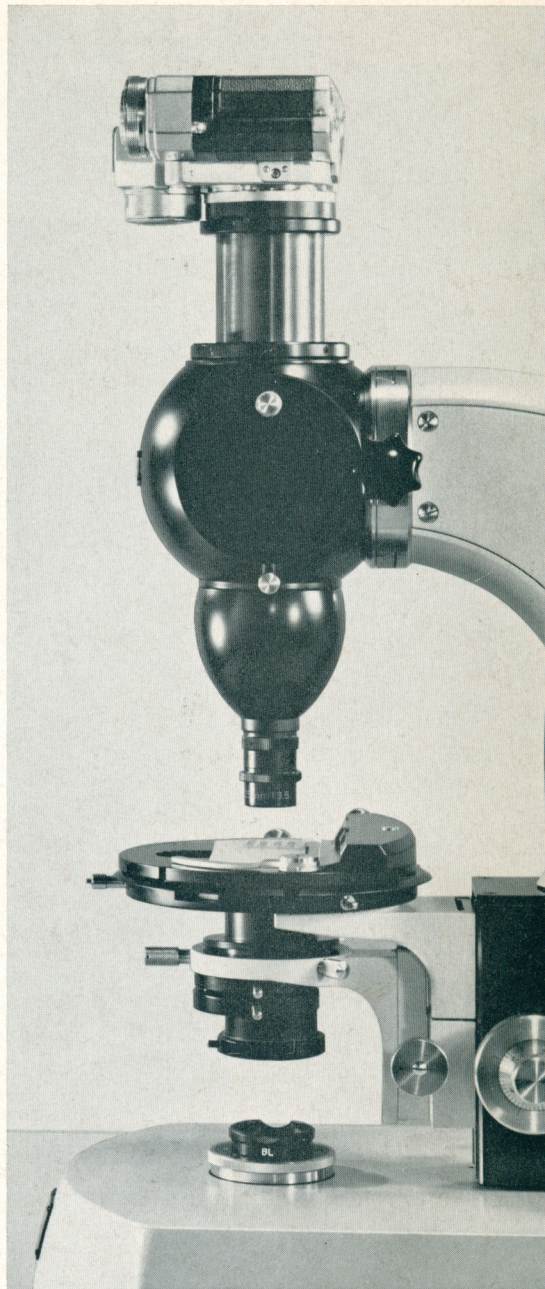
For microscopes without a lateral diaphragm in the base (Fig. 5):

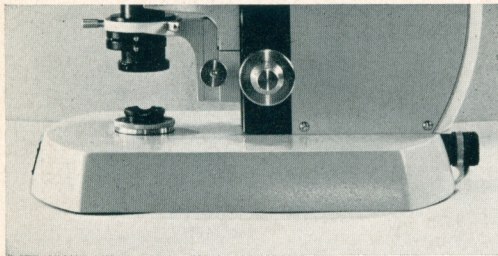
With 16 to 40 mm LUMINARS swing auxiliary condenser lens in, with 63 mm LUMINAR swing it out.

For microscopes with a lateral diaphragm in the base (Fig. 6):

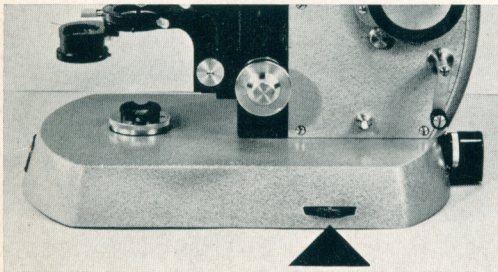
Always swing out the auxiliary lens and fully open the diaphragm in the light-exit opening (front diaphragm).

- Look into the camera viewfinder and focus on the specimen using the coarse and fine adjustments of the microscope. Obtain the desired image scale by varying the camera extension (drawing out the telescope tube) and refocus.
- Control image contrast and resolution by means of the aperture diaphragm.





5 UNIVERSAL without a lateral diaphragm in the base.



6 PHOTOMICROSCOPE with a lateral diaphragm in the base.

A compromise must be sought here, because a wide open diaphragm means high resolution and low contrast, while a stopped-down diaphragm reduces the resolution but enhances contrast.

For microscopes without a lateral diaphragm in the base (Fig. 5):

The diaphragm in the light-exit opening serves as aperture diaphragm.

For microscopes with a lateral diaphragm in the base (Fig. 6):

The rear lateral diaphragm serves as aperture diaphragm.

Always open the iris diaphragm of the LUMINARS fully.

9. If the camera used does not have a through-the-lens light metering system, determine the required exposure with the aid of a series of calibration exposures.

The exposure determined with a hand-held meter through the camera viewfinder or, with the camera removed, through the telescope tube at $f/2$ may serve as a guide.



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