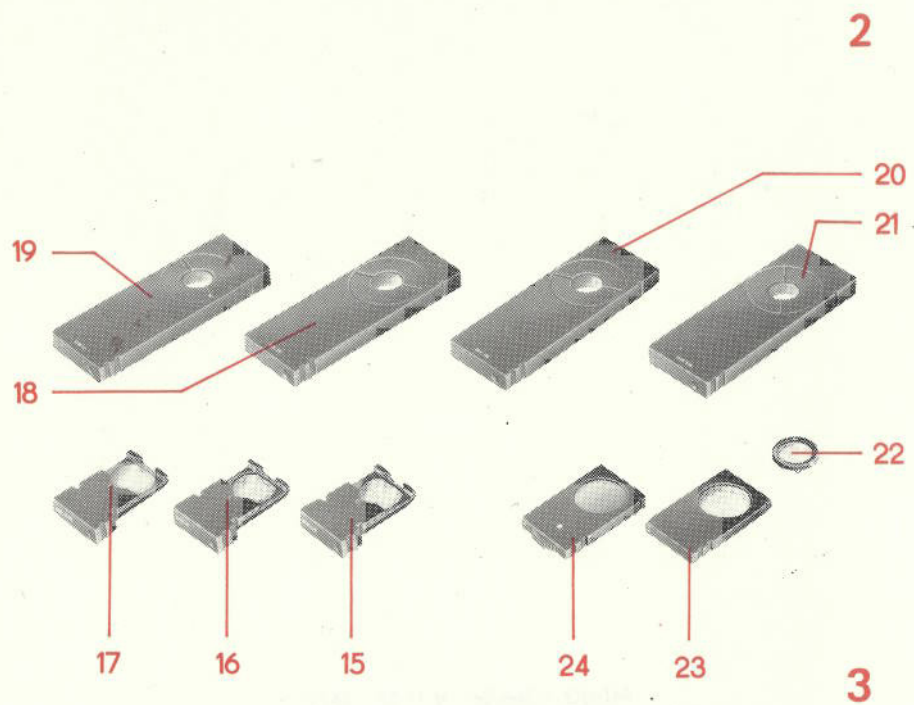
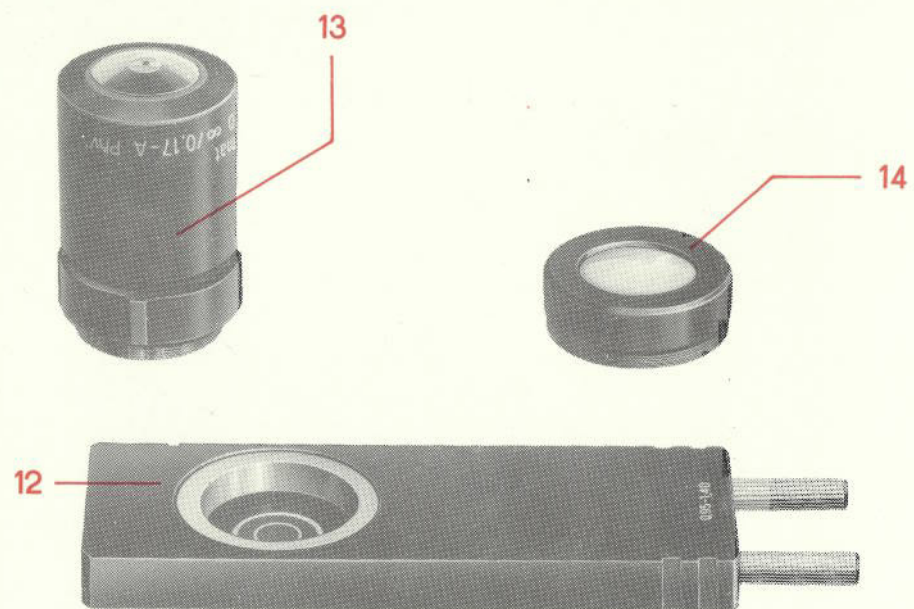
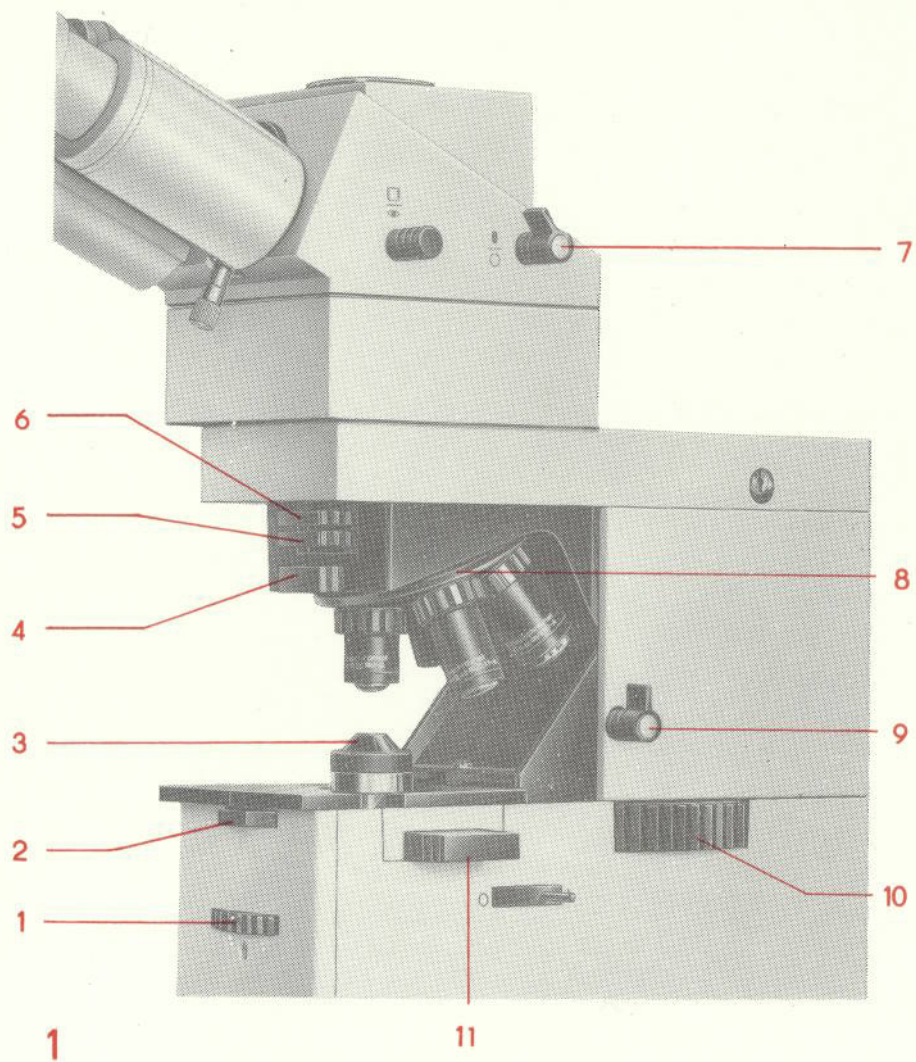






**Contrast methods with the
JENAMED-2/JENAMED-2-
fluorescence Microscopes**



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DDR-6900

**Gebrauchsanleitung
Инструкция по эксплуатации
Operating instructions
Mode d'emploi
Instrucciones para el uso**

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Living unstained biological preparations and many technical objects of the microworld are phase objects.

They mainly influence only the phase of the transmitting light and become visible as microscopic image only if being optically contrasted by appropriate interventions into the imaging system.

The most popular contrasting methods are phase contrast and differential interference contrast which can both be employed on the JENAMED-2/JENAMED-2-fluorescence microscopes. They can, however, not be utilized on the special-purpose JENAMED-2-histology microscope.

1. Viewing in phase contrast

The phase contrast equipments with achromats or plane-achromats comprise one set each of phase contrast objectives and corresponding annular stop slides.

The simple phase contrast equipments contain one phase contrast objective each with corresponding annular stop slide. The phase contrast equipment for counting chambers includes an additional 0.6 N.A. condenser head besides objective GF-PA 40X/0.65 ω /0.17 phv and annular stop slide 0.65 cond 0.6.

Operation

- Screw the phase contrast objective into revolving nose-piece (8 Fig. 1), move green filter (1 Fig. 1) into light path, open aperture diaphragm (2 Fig. 1) completely.
 - When using the phase contrast equipment for counting chambers, exchange condenser head.
- For this purpose, it is recommended to raise the objectives by means of quick-action focusing control (9 Fig. 1), loosen the clamp screw at the stage and remove the me-

chanical stage from the stand. Unscrew condenser head 0.9 (3 Fig. 1) by turning it counterclockwise and screw condenser head 0.6 in its place.

Subsequently, re-attach the mechanical stage.

- Position the specimen for viewing and illuminate it.
When using the specimen slide holder and a phase contrast objective with a numerical aperture > 0.9 , perfect phase contrast can be obtained with specimen slides of 0.7... 1.4 mm thickness.
- Pull out push-pull rod with handle (7 Fig. 1) to move Bertrand lens of photo tube into the light path, and turn the handle to focus it until the image of the objective's phase annuli appears to be sharp.
- Replace slide plug (11 Fig. 1) by the annular stop slide being appropriate for the screwed-in phase objective.
Push annular stop slide in up to stop with the inscription of aperture (e.g. 0.65) or aperture range (e.g. 0.95... 1.4) being on top.
The annular stop slide 0.65 is suitable for objectives GF-PA 40X/0.65 $\omega/0.17$ phv and Apo 25X/0.65 $\omega/0.17$ phv.
The annular stop slide 0.95 - 1.4 is appropriate for objectives PA HI 100X/1.30 $\omega/0.17$ phv, Apo 50X/0.95 $\omega/0.17$ phv, as well as Apo HI 100X/1.40 $\omega/0.17$ phv.
- Actuate the adjusting screws of the annular stop slide to have the phase annuli of the objective and the annular stop superimposed.
When using phv objectives, the aperture diaphragm (2 Fig. 1) can be closed until only the small annulus remains visible (strong phase contrast). When both annuli are visible, normal phase contrast has been set. Objectives with the engraving "ph" contain one phase annulus only.
- Push in push-pull rod (7 Fig. 1) to remove the Bertrand lens from the light path. If necessary, focus the specimen which is imaged now in phase contrast.

Quick change-over to bright field

Pull the annular stop slide out up to the detent position. With high-aperture phase contrast objectives, however, the phase annuli may prove to be disturbing in bright field.

When scanning e.g. wedge shaped specimens the contrast may decrease. In this case, check the superimposition of the phase annuli and the annular stop and realign them, if necessary.

2. Viewing in differential interference contrast

The DIK-d-PA differential interference contrast equipment comprises the following components:

1. Illumination-side prism slides equipped with DIK prism and polarizer (complete set including 4 slides) (18-21 Fig. 3)
2. Image-side prism slides equipped with DIK prism (complete set including 3 slides) (15-17 Fig. 3)
3. DIK analyzer slide (rotary) (24 Fig. 3)
4. $\lambda/4$ compensator (as slide) (23 Fig. 3)
5. λ compensator (as plate) (22 Fig. 3)

The simple DIK-d equipments contain one illumination-side prism slide and one image-side prism slide. Additionally required: analyzer, $\lambda/4$ compensator, λ compensator.

Prism slides and objectives are assigned to each other as given in the following table:

Illumination-side prism	Image-side prism	Objective
DIK 10 cond	DIK 10/20 obj	PA 10X/0.20 $\omega/-$
DIK 20 cond	DIK 10/20 obj	PA 20X/0.40 $\omega/0.17$
DIK 40 cond	DIK 40 obj	GF-PA 40X/0.65 $\omega/0.17$
DIK 100 cond	DIK 100 obj	PA HI 100X/1.30 $\omega/0.17$

The DIK-d-PA equipment and the simple DIK-d equipment work only in conjunction with the given objectives. It is useful to set the specimen in bright field before adjusting interference contrast:

- Use weakly structured specimen.
- Swing low-power objective to operating position.
- Set aperture diaphragm (2 Fig. 1) to normal working position (opened up to 2/3 of respective objective aperture).
- Focus specimen by means of fine motion (10 Fig. 1).

The interference contrast itself is adjusted as follows:

- Remove slide plug (11 Fig. 1).
- Select illumination-side prism slide (18-21 Fig. 3) acc. to above table and push it up to the stop into the slot on the right-hand side below the mechanical stage. The slide's inscription should be on top.
- Remove slide plugs (4, 5, 6 Fig. 1) above the revolving nosepiece. Push DIK analyzer slide (24 Fig. 3) into the top slot (6 Fig. 1) and the appropriate image-side prism slide (15-17 Fig. 3) into the bottom slot (4 Fig. 1).
- Rotate the analyzer by means of the respective control until the field appears darkest.
- Use the square socket wrench to adjust image-side prism slide (15-17 Fig. 3) until the field appears darkest. Adjust the prism of illumination-side prism slide (18-21 Fig. 3) by means of the square socket wrench to set the field darkest.
- Slide $\lambda/4$ compensator (23 Fig. 3) into middle slot (5 Fig. 1).
- Variations in contrast:

Grey contrast: Rotate the analyzer by means of the respective control until the desired contrast has been set.

Colour contrast: Remove image-side prism slide (15-17 Fig. 3), put the λ compensator (22 Fig. 3) into the mount on the prism slide, push the prism slide back into its slot, and rotate the analyzer by means of its control until the desired colour contrast appears.

A quick change-over from interference contrast to bright field is possible by removing the image-side prism slide and pulling the illumination-side prism slide out up to the detent position.

For the other contrasting methods the following instructions are available:

- "Azimuth diaphragms for oblique illumination"
Instructions for Use, Publication No. 30-G0310
- "Transmitted-light dark field"
Instructions for Use, Publication No. 30-G0306
- "Equipment for qualitative polarization"
Instructions for Use, Publication No. 30-G0530

3. Index to illustrations

Fig. 1. JENAMED-2, total view

- 1 Filter turret
- 2 Aperture diaphragm
- 3 Condenser head (interchangeable)
- 4 Slide plug; slot for image-side prism slide
- 5 Slide plug; slot for $\lambda/4$ compensator
- 6 Slide plug; slot for analyzer slide
- 7 Bertrand lens
- 8 Revolving nosepiece
- 9 Quick-action focusing control
- 10 Fine motion
- 11 Slide plug; slot for phase contrast annular stop slide and for illumination-side prism slide (DIK)

Fig. 2. Components of phase contrast equipment

- 12 Annular stop slide
- 13 Phase contrast objective
- 14 Condenser head 0.6

Fig. 3. Components of the equipment for differential interference contrast (complete)

- 15 Image-side prism slide for objective
PA HI 100X/1.30 $\omega/0.17$
- 16 Image-side prism slide for objective
GF-PA 40X/0.65 $\omega/0.17$
- 17 Image-side prism slide for objectives
PA 10X/0.20 $\omega/-$ and
PA 20X/0.40 $\omega/0.17$
- 18 Illumination-side prism slide for objective
PA 20X/0.40 $\omega/0.17$
- 19 Illumination-side prism slide for objective
PA 10X/0.20 $\omega/-$

- 20 Illumination-side prism slide for objective
GF-PA 40X/0.65 $\omega/0.17$
- 21 Illumination-side prism slide for objective
PA HI 100X/1.30 $\omega/0.17$
- 22 λ compensator
- 23 $\lambda/4$ compensator
- 24 Analyzer slide