

JENAVAL
Durchlicht-
Forschungsmikroskop

aus JENA

Gebrauchsanleitung

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JENAVAL

Transmitted light research microscope

Instructions

(1) basic adjustment the Kontrasttubus equipment of the guns with modulators:

- They receive two illustration-lateral modulator guns (fig. 5/43) with the Kontrasttubus. In order to save adjusting expenditure, one is equipped this gun also firmly inserted phase contrast modulators of 100 pos KT and 100 neg KT for the objective REAR ONE 100x. All remaining eyes of the guns can after free choice and in free one on the other follow with modulators KT for positive and negative phase contrast, differential interference contrast and central dark field to be occupied.

The shape of the modulator versions and the appropriate photographs in the gun exclude the wrong inserting of the Modulatoren.

The modulator 12.5/25 DIK KT functions both with the objective 12,5x and with the objective 25x.

- If an eye of the picture-lateral modulator gun is not to be equipped with a contrast modulator (light field), indieses eye the modulator "0" to begin.
- White writing panels at the knurled ring of the gun mark (pencil, india ink, foil writer) that abgele will sen from the outside can, which modulator is in the path of rays.
- Lightinglateral modulator gun (fig. 5/48) with the illustration-lateral gun corresponding the modulators cond occupy. The sequence of the modulators cond must be the same as the order of the modulators KT!

White writing panels in the window of the gun mark that is to be read off, which modulator in the path of rays is.

Adjust

- Linkage for photo exit (fig. 4/37) push in
- Shift levers for lens 1/1.6 (fig. 4/41) on symbol 1x flat ten
- Contrast loop switch on: Lever (fig. 4/38) symbol
- Polarizer, λ and $\lambda/4$ -Platte (fig. 5/48) from the radiation course swing out
 - Objectively 25x switch on, preparation present and after
 - Köhler light up ► (0); A finding and a focusing with difficulty more visibly (phase) objects favourably with to a large extent ge schlossener aperture diaphragm, thereafter aperture diaphragm again fully open.
- Lightinglateral modulator gun (fig. 5/47) into the appropriate swallow guidance of the condensor lens A TRAILER to attack slide and with knurled nut (fig. 3/34) wedge.
 - Ring screen 0.5/0.9 switch on.
 - • Bertrandlinse switch on: Lever (fig. 4/36) on symbol; Bertrandlinse on the picture of the ring screen focus pull out or push (course in bar)
- Aperture diaphragm restrict, until their picture becomes visible. Aperture dazzles with centering screws center (fig. 1/9) carefully to the edge of the visible of lit circular area (= exit pupil of the objective).
- Box spanners (fig. 6/53) on the left and on the right into the centre holes in the lightinglateral gun would bring in, into those, which were appropriate for the Z-axis next; Ring screen to the aperture dazzles centers.
- Illustration-lateral modulator gun (fig. 5/43) to on impact into the outbreak of the Kontrasttubus push in



(Fig. 5) and modulator of 25 pos or 25 neg or 25 DF KT for positive or negative phase contrast or central dark field into the path of rays switch on.

Box spanner (fig. 6/59) into the hole (fig. 5/42) would bring in and the pictures of the phase rings KT and/or the dark field rings KT with the picture of the lightinglateral ring screen cond to the over covering bring. (The gun is movable with the help of the key only in a direction. To the shift in against of set direction keys against-intimately and guns with the hand turn in the Kontrasttubus push in). The cover is correct then for all 3 ring modulators, which is equipment for positive and negative phase contrast and central dark field adjusts, for this objective. During the transition to other objectives the cover of phase rings KT and ring screens is made only with that tigen ring screen.

Illustration-lateral modulator DIK 12.5/25 KT into the path of rays scolded.

Lightinglateral modulator DIK 25 cond 0.9 and polarizer switch on. Lever of the polarizer between the two Markierungsstriche place.

- Bertrandlinse (fig. 4/36) switch off and field observe.

Box spanners (fig. 6/53) on the left and on the right into those the Z-axis of nearest holes in lightinglateral modulator gun would bring in, keys turn to the field appear darkest and no relief-like contrasting to see are.

Thus all optical members for the procedures positive and negative phase contrast, differential Interferenzkon are trast and central dark field to each other adjusted. Execution of the contrast procedures ► (13)

(2) the filter change-over switch

The Filteraufnahmen in filter change-over switch (fig. 1/16) can be equipped after the requirements also freely selected filters. The photographs in the filter change-over switch 5x are furnished to one for filter thick up to 4 mm, in the filter change-over switch 10x are intended the gun for the admission of filters or filter combinations (Fluoreszenzmikroskopie) up to 10 mm of thickness.

The equipment of the filter change-over switch with filters:

- Clamping screw (fig. 1/17) with box spanner loosen, filter change-over switch upward fold up and dig
- Circlip of the Filteraufnahme take out, filter in set or exchange, to good seat (perpendicular to the passage of light) pay attention, circlip replace.

Proposal for filter placing of the standard equipments (on this placing the available operating on line purchase takes):

Filter D 281 (neutralgrey) into the admission, those that Marking 1 faces

Filter C 312 (conversion filters blue) into the admission, those the marking 2 faces

Filter V 231 (green) into the admission, those the marking 3 faces

The admission opposite the marking 0 remains as freer Passage empty.

(3) necessary requirements of the preparations

- Slide formats: The object owners at the JENAVAL tables are 26 mm co-ordinated with object carrier of the format 76 mm x. Tighten right object owner part after loosening of the clamping screw into suitable position schie ben and screw with en idiom of shorter slides again.
- Slide thickness: The slide thickness is not 1.5 mm if possible over cry ten, if accurately after Köhler is to be lit up (loss at lighting aperture!).
- Use of coverglass: The objectives of the standard equipments with apertures $>0,25$ are counted for the observation of preparations on coverglass (excluded all rear objectives for homogeneous immersion). Marking e.g.: GF-PA 40x/0,65 ∞ /0,17. Uncovered preparations

lead with these objectives to decreased image quality, drying of systems of high aperture reacts very sensitively! Uncovered preparations require the observation with whether jeztiven, which - with apertures $>0,25$ - is counted for this purpose. Marking e.g.: GF-PA 50x/0,80 $\infty/0$ (see to it Bestelliste). One observes at present inzunehmendem measure also uncovered biomedical preparations (large series of celdeleted or thin cut). Absolutely consider:

- Most uncovered (colored) would celdelete oderDünnschnitte lead when observation with Trockensystemennur to good image quality if they are covered with lacquer. The lacquer prevents the "Verschwärzlichung" of the object colors and superelevated outline contrast, those as consequence to large refractive index differences between object
- and develop for surrounding air. Commercial cover glass lacquer with brush or as spray as thinly as possible (!) up carry.
- With cover glass lacquer covered preparations are to be observed with drying systems, which are without coverglass-counted for preparations, if the objective apertures 0.25 over walk!

(4) adjustable attack for condensor lenses

At the admission for the condensor lens A TRAILER a set screw (fig. 3/31) is, with which an attack can be specified for those-highest position of the condensor lenses. To the operation:

- Preparation on slides with "standard thickness" select (e.g. Thick ones of the slide 1, to 0 mm) and on microscope table for observation furnish.
 - Set screw (fig. 3/31) on approximately 10 mm of length out screw.
 - Annunciator screen picture focus and center
 - Set screw so far screw in, until clear against stood becomes perceptible. The condensor lens must sharp-illustrate the annunciator screen after lowering and again raising to attack.
 - In the case of observation of all following preparations maintain the ge fundene attack position of the condensor lens (or if necessary again with condensor lens impulse start), to correct without those sharpness of the annunciator screen picture.
- Operating advantage when using slides, of them
Thick one not too much of the selected "standard thickness" deviates!


If the full cut width of the condensor lenses must be used (e.g. for accurate lighting after Köhler with thicker slides), set screw on approximately 10 mm of length out to screw. The attack is waived thereby. Also in this condition it is guaranteed that the achromatic aplanatische of condensor lens 0.9 beyond the table surface and can dig the preparation.

(5) the Bertrandlinse/work with the aperture diaphragm

With the help of the Bertrandlinse it is possible to make the withdrawal pupil of the objective in image field visible as well as in the proximity of the pupil-lying pictures of some optical elements and these elements controlled serves, e.g. Aperture diaphragm and contrast modulators (lightinglateral ring screens and picture-lateral phase rings for phase contrast).

Operation:

- Lighting after Köhler stop.

- And/or scolded toggles (fig. 4/36) on symbol pull linkage out ( fig. 2/19) (Bertrandlinse switched on)
- See into the eyepiece; focus Bertrandlinse with toggle at the linkage (fig. 2/19) and/or with linkage (fig. 4/36), until objective pupil (lit circle limited surface sharply), aperture diaphragm or contrast modulators sharply he seem.
- , Necessary handles observe pupil for setting-up

the lighting would drive through:

e.g.: general control of the correct aperture diaphragm opening. For light field is usually valid:

- Aperture diaphragm opening not more largely than objective pupil (aperture diaphragm so far opened that their edge at the edge of the bright circular area is evenly still visible).
- Diameter of the aperture diaphragm opening not smaller than $\frac{1}{2}$ diameters of the objective pupil
- The “correct” opening of the aperture diaphragm represents a compromise between limit values: large opening: high resolution, good color contrast at the expense of the outline contrast small opening: high outline contrast at the expense of the dissolution and the color contrast,

Center the aperture diaphragm: The aperture diaphragm is usually centered to the pupil (centering screws fig. 1/9).

Reproducible adjusting of the aperture diaphragm opening (for reproducible contrast) centering the modulators e.g. for phase contrast

- Bertrandlinse switch off, field observe.

(6) illuminating large fields for objectives with enlargements smaller than 12,5x _____

For illuminating these fields the overview condensor lens aplanatic lens 0.12 is switched on (fig. 3/32).

- Preparation with middle drying system focus.
- Annunciator screen picture with condensor lens 0.9 focus and center.
 - GF-PA 1x at the same time Vergrößerungswechsler and/or shift lever (fig. 4/41) on marking o place. Focus the picture with this objective with focusing ring at the objective
 - (Fig. 4/40).
- Condensor lens 0.9 against overview condensor lens 0.12 change.

- Handles with the thumb of the left hand (fig. 1/13) after in the back down press. Condensor lens 0.9 releases and drives to attack downward.

- Condensor lens 0.9 to the left to attack swing out; to it-favourably the right centering screw for aperture diaphragm (fig. 1/9) as if handles use.

- Annunciator screen open, until the edge of their picture disappears evenly at the edge of field.
- Regulate 0.12 contrast with tension ring for aperture diaphragm at the condensor lens.

Shift back to condensor lens 0,9:

- Condensor lens 0.9 to attack to the right swivel; right centering screw (fig. 1/9) as if handles use.

- With index finger of the left hand under (fig. 1/13) seizes and condensor lens handles the 0.9 to attack drives upward.

(7) the work with the objectives REAR ONE 100x

Image field illuminate.

- Preparation with middle drying system focus.
- Annunciator screen picture with condensor lens 0.9 focus and center.
- Immersion objective switch on, always-crave, object sharp place.
- , Correct sharpness and centring of the annunciator screen picture close annunciator screen completely (observe field favourably with factor 0.8 of the Vergrößerungswechslers).

- Annunciator screen open, until their picture at the edge of field en shrinks.
- Aperture diaphragm fully open. With dull contrast the aperture diaphragm should be closed only slightly: Loss at dissolution!

Note! When observations in the light field on the fact it respects that the iris screen existing in the objective is opened: Marking at the tension ring consider or with Bertrandlinsekontrollieren (► (5)).

Objectively scolded

switch on:

- Preparation with middle or strong drying system focus. This focusing maintain!
- Lens turrets in such a way place that immersion objective point and-neighbouring drying objective as far as possible forward: both objectives are distant from the work situation (rest) equal far and the preparation place which can be observed are accessible.
- Oil droplets on the preparation bring.
- Touch immersion objective at the engraved case, press case against the spring pressure of the preparation protection toward on schraubgewinde. Objectively in working position flat ten, case slowly to lower leaves, until the front surface of the objective dives into the oil droplet.
- Preparation focus and observe.

switch off:

- Hold focused condition of the objective the preparation.
- It raises engraving case, switches objective off, vorteilhaftso that a neighbouring weak system in work position rests (otherwise danger, the Frontlinse of Objekti ven small work distance with oil to moisten).
- Preparation change or oil eliminate or work other requirements continue.

(8) the objective lens 1/1.6 in the Vergrößerungswechsler the mechanism. Large field plan achromatic objective 1x/0,03 spec

In the Kontrasttubus (fig. 5/45) is the lens 1/1.6, which with the lever (fig. 4/41 into the path of rays too scolded is, if with the objective GF-PA 1x/0,03 spec were to be worked. This objective results in-gun-balanced system for a Objektfeld of 25 mm in diameter together with the lens 1/1.6. Focus the picture with the tension ring (fig. 4/40) at the objective (not with rough or Feintrieb of the stand!).

Objective lens 1/1.6 not in connection with other objectives switch on, it comes off no picture!

In the standard equipment JENVAL without Kontrasttubus is the position o at the Vergrößerungswechsler by a screen abge covers. The microscope can be re-tooled with the mechanism large field plan achromatic objective 1x/0,03 spec.

- Clamping screw (fig. 2/21) with box spanner loosen and en off large change-over switch from the stand take. Thus the RH of the Vergrößerungswechslers becomes accessible.
- One of the gun eyes is abge by a black sheet metal covers. Retaining screws loosen, sheet metal off take.
- Screw objective lens in 1/1.6 to attack into free the eye of the gun become (fingerprints avoid!)
- Vergrößerungswechsler on the stand put on, to attack forward pull and clamping screw (fig. 2/21) again tighten.
- Screw objectively 1x in into lens turrets. Note! With this objective the picture with the tension ring at the objective is focused, not with focus-rubbed amStativ.

(9) correction of defective vision with diopter ring amBinokulartubus _

Different defective vision of the two eyes should absolutely place when micro copying without eyeglasses by correct in the diopter ring (fig. 1/2) at the left connecting piece of the Binokulartubus to be compensated (fatigue-poor working with relaxed eyes!). The diopter ring needs to be adjusted only once, if always the same person micro-copies.

- Preparation for observation with middle or strong drying system furnish and after Köhler light up.
- Eyepiece placable eyepieces (in right connecting pieces of the Binokulartubus) out or in-turn to the line figure of the eyepiece plate

or - if without eyepiece plate to be worked was - the edge of the field screen appears sharp. Afterwards object picture with focus-rubbed for the right eye sharply places.

Object picture for the left eye with the diopter ring sharply place (not with Feintrieb!).

(10) the work with the voltage regulator for light HS 6/25 _____

The operating voltage for the light HS 6/25 is steplessly placable over the range from ≈ 2 up to ≈ 7 V. Agreement criteria for correct handling of the voltage regulator (fig. 2/24):

- The life span of the lamp amounts to with 6 V-enterprise ≈ 100 hours. It rises with enterprise with undervoltage importantly, e.g. to ≈ 2000 hours with enterprise with 4,8 V, and drops during overvoltage, e.g. on ≈ 50 hours with enterprise with 6,5 V.
- The color temperature of the lamp amounts to with enterprise with identification tension 6 V 3200 K (= "art light"). With enterprise with under the red light portions increase tension at the expense of the blue. For subjective observing of the field this Verschie is still insignificant and usually few disturbing bung the spectral characteristic of the light with 4,8 V. Floated with ≈ 4.8 V represents a favorable compromise between color impression of the field and life span of the lamp. Further absorption of the light-current if necessary with filter D 282 (position 1 at the filter change-over switch ► (2)).
- When subjective observing with lamp tensions < 4.8 V kann (too red) the color impression by switching on of the Fil on ters C 312 to be improved (position 2 at the filter change-over switch ► (2)).
- To the color micro photography should be always worked with the full identification tension 6 V: Indicator announcement 6 Skalentei le (further references to the color micro photography you find in the instructions to the micro-photographic putting on camera system mf-AKS).
- The indicator instrument (fig. 2/25) is not a tensiometer, it indicates the relative measure of the lamp tension. With 220 V input voltage indicates the scale line to 6 exactly 6 V. In the range between 4 up to ≤ 6 V is to be counted on deviations up to 0.3 V.

(11) Phase contrast with the standard equipment without Kontrasttubus _

Information about the procedure and about the delivery offer of phase contrast mechanisms, recommendable equipment, advantages and possibilities of the small mechanisms for phase contrast find you in block letters No. 30-G0540

Operation of the mechanism for phase contrast GF-PA

- Phase objectives pH and/or phv into the lens turret screw in (allocation of the objectives to the gun eye target the work project adapted its, usually in such a way that with the rotation of the lens turret in the clockwise direction ever weils the next-stronger objective is switched on, dadie ring screens in the modulator gun in this way ange arranges is).
- Ring screen guns into the appropriate swallow guidance of the condensor lens A TRAILER to attack push in and with knurled nut (fig. 3/34) wedge.
- Ring screen guns scolded in such a way that in the sight the symbol appears **O** (free passage).
- Switch on objectively; Preparation present, focus and after Köhler light up (with difficulty visible objects with far going closed aperture diaphragm to focus favourably. Afterwards aperture dazzles again fully opens).
- Bertrandlinse switch on focus (► (5)) and on (grey on brightly shining underground appearing) the phase rings of the objective.
- Aperture diaphragm so far close, to their edge becomes visible and with centering screws (fig. 1/9) to the phase rings to center.
- Ring screen guns scolded in such a way that in the sight the en größerung the switched on objective appears. Now in the objective pupil is overlaid the picture of the phase rings (grey) by the picture of the ring screen (black).
- Box spanners on the left and on the right into the centre holes at the ring screen gun would bring in, into those, which were to that-optical axle because of next. Bring the picture of the lighting ring with the keys with that of the phase rings to the cover.
- Aperture diaphragm close, until only more largely and a small bright ring is visible: normal phase contrast (with objectives 25x,

40x and REAR ONE 100x; with objective 12,5x is only a large ring watch) the small bright ring is visible: strict phase contrast (with objectives 25x, 40x and REAR ONE 100x) if the picture of the aperture diaphragm centrically to Bildder ring screens is not appropriate, for aperture diaphragm with centering screws place behind (fig. 1/9).

- Bertrandlinse switch off. In the field appears the picture of the object in the phase contrast, which is improved by connecting the green of filter.

The instruction in a general manner following the appropriate ring screens are centered to the remaining, in the context of the microscopic intention intended objectives. The individual ring screens are independently shifted. After unique centring objectives and ring screen guns can be usually switched without further centring expenditure.

Quick change between phase contrast and quasi - light field is possible:

- by full opening of the aperture diaphragm (with objectives 25x, 40x and REAR ONE 100x),
 - through scolded the ring screen gun on symbol ○.
 - Operation of the small mechanisms for phase contrast
- Objectively and/or phv into the lens turret screw pH in and scolded into working position. Is to be worked alternatively with a small mechanism DIK D, an empty intermediate ring must between phase objective and lens turret (with white marking; Intermediate ring is a component of the small DIK mechanism) to be screwed in, in order the off lengthens the objectives to secure.
- Ring screen into the single screen admission insert, objektivwärts pointing inscription of the ring screen; Finger forces away avoids.
- Preparation present, focus and after Köhler light up favourably focus (with difficulty visible objects with to a large extent geschlossene aperture diaphragm. Afterwards again fully open aperture diaphragm).
- Bertrandlinse switch on focus (▶ (5)) and on (grey brighten up bright underground appearing) the phase rings of the objective.
- Single screen admission into the appropriate swallow guidance of the Kondensorsinhängers to attack push in and with knurling tool mother (fig. 3/34) wedge. In the objective pupil the picture (grey) of the phase rings is overlaid now by the picture (black) of the Ringblende.
- Aperture diaphragm so far close, to their edge becomes visible and with centering screws (fig. 1/9) to the phase rings to center.
- Bring the picture of the lighting ring with the help of the centering screws at the single screen admission with the picture of the phase rings to the cover.
- Following work procedures in a general manner as during mechanism for phase contrast GF-PA.

(12) Differential interference contrast (DIK d) with the standard equipment without Kontrasttubus _

Information about the procedure and about the delivery offer of DIK mechanisms, recommendable equipment, advantages and possibilities of the small mechanisms DIK D find you in block letters No. 30-G0540

Operation of the mechanism for differential interference contrast GF-PA _

- Intermediate rings of the mechanism DIK D onto the objectives GF-PA of the standard equipment screw; the allocation intermediate ring objective goes out of the imprinted en größerung out (the intermediate rings DIK D 12.5/25 to function both with GF-PA 12,5x as well as with GF-PA 25x).
- The combinations intermediate ring objective into the objective RH screw in. The objective 12,5x in at the gun with 1 marked eye, remaining objectives in the number of rising enlargements into the eyes 2, 3, 4... screw in a general manner favourably. This allocation even with later work with the DIK mechanism maintained, in order adjusting spends to avoid.
- Prism guns into the appropriate swallow guidance of the condenser lens A TRAILER to attack push and with knurling tool mother in (fig. 3/34) wedge. Prism guns scolded in such a way that in the sight the symbol appears ○.

- Analyzer DIK D into the outbreak of the objective change-over switch push (fig. 1/5) in to attack.
- Filteraufnahme (fig. 1/12) forward from the Stativfuß take off and to its place the polarizer DIK D postpone; trick cash polarizer in such a way place that the lever comes to lie between the two lines. λ -und $\lambda/4$ -Platte from the path of rays swing out.
- Switch on objectively, preparation present, scharfstel len and after Köhler light up. (Finding and focusing with difficulty visible objects favourably with to a large extent geschlos sener aperture diaphragm. Afterwards again fully open aperture diaphragm).
- Bertrandlinse switch on (► (5)). Aperture diaphragm with centering screws center (fig. 1/9) to the pupil.
- Pin levers in one of the two slots in the ZwischenringDIK D would bring and thus the knurled internal ring so for a long time turn, to the central, black visibly becoming in the pupil interference fringes in lie horizontally.
- Prism guns scolded in such a way that the enlargement of the objective in the window appears. The Interferenzstrei fen must in the pupil disappear; if number doubles itself its on, the prism lies in the intermediate ring DIK D around 180 in the azimuth twistedly. Shift back in this case prism gun \circ , prism in the intermediate ring um180° keep turning, until the interference fringe system appears again horizontal; again prism guns on work objectively scolded, the interference fringes in the pupil disappeared now.
- Bertrandlinse switch off and field observe.
- Box spanners on the left and on the right into the centre holes in the prism gun would bring in, into those, which schen opti axle next lay. Keys turn, until the field appears darkest and no relief-like contrasting to be seen is.
- Prism in the intermediate ring DIK D with pin lever slight-adjust, until the field appears darkest. Thus the mechanism is adjusted.
- Adjust the contrast: Grey contrast:
 $\lambda/4$ -Platte swing polarizer turn, until the desired contrast enters.

With the rotation of the polarizer over $\pm 45^\circ$ changes the course differentiated Δ over $\pm \lambda/4$, thus from a light position over the dark position (= “quasi-dark field”, no relief effect) for other light position. In many cases the best grey contrast is appropriate for $\lambda/8$. with Δ for instance.

Color contrast: Additionally switch λ -platte on, polarizer turn, until the desired color contrast enters.

With the rotation of the polarizer over ± 45 changes the course differentiated Δ over $\lambda \pm \lambda/4$, i.e. from blue over the “critical color”. (= sensitive teint), in which the relief effect disappears, to red.

Quasi-light field:

λ - and $\lambda/4$ -Platte switch and polarizer off up
 $+ 45^\circ$ or -45° turn.

Operation of the small mechanisms for differential interference contrast _____

- Intermediate ring DIK D on the objective which can be equipped aufschrau user the allocation comes out from the imprinted enlargement. (The intermediate rings DIK D 12.5/25 so probably function with GF-PA 12,5x as also with GF-PA 25x)
- Screw combination in intermediate ring objective into the lens turret (with repetitive work with the mechanism notes one favourably the eye in the lens turret to avoid around adjusting expenditure). If alternatively in differen tiellen interference contrast and in the phase contrast to be observed is, empty intermediate ring between phase objective, marked by white ring, and lens turrets screw (alignment length!).
 - Preparation present, focus and after Köhler light up. (Finding and focusing with difficulty visible objects
 - to a large extent closed aperture diaphragm. Afterwards again fully open aperture diaphragm.)
- Filteraufnahme (fig. 1/12) from stand forward take off and by the polarizer DIK D replace. Swivelling polarizer in such a way place that the lever comes to lie between the two white lines. λ - and $\lambda/4$ -Platte from the path of rays swing out.

- Analyzer DIK D in the outbreak of the objective change-over switch push (fig. 1/5) in to attack.
- Bertrandlinse switch on (► (5)). Aperture diaphragm with centring screw center (fig. 1/9) to the pupil.
- Pin levers in one of the two slots in the Zwischenring DIK D would bring in and thus the knurled internal ring so for a long time turn, until the central black interference fringes visibly becoming in the pupil lies horizontally.
- Prism DIK D cond with writing, the fitting the objective, upward in such a way into the outbreak of the single screen admission insert that the springy pin of the screen admission comes to lie into the notch of the Prismenfassung (fingerprints vermei). Prism with centering screws in the screen admission fix.
- Single screen admission into the appropriate swallow guidance of the condensor lens A TRAILER to attack push in and with knurled nut (fig. 3/34) wedge. The interference fringes must disappear from the pupil, if their number doubles itself, lie the prism in the intermediate ring DIK D around 180° in the azimuth twistedly. Pull in this case single screen admission out again, prism in the intermediate ring around 180 far turn, until the interference fringe system appears again horizontal; again, disappeared now the interference fringes push single screen admission in from the pupil.
- Bertrandlinse switch off, field observe.
- Turn at the centering screws of the single screen admission, until the field appears darkest and no relief-like contrasting to be seen is.
- Prism in the intermediate ring DIK D with pin lever slightly adjust, until the field appears darkest. Thus the mechanism is adjusted.
- Adjust the contrast in a general manner as descriptive with the Einrichtung DIK D GF-PA.

(13) Positive and negative phase contrast, differential interference contrast and central dark field with the Kontrasttubus

If the optical members after (1), leave themselves simply, rapid the contrast procedures are to each other adjusted and in fast change would drive through.

- Shift levers for lens 1/1.6 (fig. 4/41) on symbol 1x flat ten
- Contrast loop switch on: Lever (fig. 4/38) on symbol
 - Switch on objectively, preparation present and after Köhler light up.
- Differential interference contrast
- Lightinglateral modulator DIK cond, picture-lateral modulator DIK KT, $\lambda/4$ -Platte and polarizer into the path of rays scolded.
 - Polarizer turn, until optimal contrast enters.
 - With the rotation of the polarizer over $\pm 45^\circ$ changes the course differentiated Δ over $\pm \lambda/4$, thus from a light position over the dark position (= “quasi-dark field”, no relief effect) for other light position. In many cases the best grey contrast lies with $\Delta \approx \lambda / 8$.
- Color contrast: λ - plate additionally switch on, polarizer turn, until the desired color contrast enters. With the rotation of the polarizer over $\pm 45^\circ$ changes the course differentiated between Δ over $\lambda \pm \lambda/4$, is called from blue over the “critical color” (sensitive =teint), in which the relief effect disappears, to red.
 - Quasi-light field: λ - and $\lambda/4$ -Platte switch off and polarizer on “45” turn.

- Positive and negative phase contrast, central dark field

- Lightinglateral modulator for phase contrast and picture lateral modulator for phase contrast KT einschalten; Polarizer, λ -und $\lambda/4$ plate switch off; Green filters switch on.
- Bertrandlinse switch on. If necessary correct cover of the modulator figures (with ring screen). Aperture diaphragm close, until in the exit pupil of the objective only the large and small ring is visible: normal phase contrast (and/or normal dark field.), which small ring is visible, strict phase contrast (and/or strict dark field).
- Bertrandlinse switch off.



To the change between positive and negative phase contrast as well as central dark field it meets to switch on only the desired modulator KT through tricks of the gun KT.

Quasi-light field: Aperture diaphragm fully open

With the objective 12,5x only normal phase contrast and/or normal dark field is possible. For overview light field Modula cond on free passage scolded.

The contrast abates with surveying the preparation, over Bertrandlinse cover of the modulator figures kontrol lieren. With shifting keiliger preparations the ring of pictures can apart-run.

(14) Dark field

Dark field with the DF-condensor lens 1,2

By its high aperture and in connection with the integration ring lens supply the condensor lens darks field of maximum luminous intensity for objectives with enlargements from 25x to REAR ONE 100x ten. Rear objectives with apertures > 1 must be provided with an iris screen. The condensor lens requires homogeneous immersion between condensor lens front lens and preparation.

Operation:

- Condensor lens with a trailer to at the stand installs; it makes certain that a trailer sits downward on attack. Condensor lens change ► (25).
- Set screw (fig. 3/31) on approximately 10 mm of length herauschrau users.
- , Applies a drop immersion oil downward drives condensor lens with condensor lens impulse some millimeters away from the upper attack on the condensor lens front surface (favourable-further drops on the lower surface of the slide up bring - drops in work situation of the preparation hanging!). Condensor lens with impulse upward drive, until the area between condensor lens front lens and slide lower surface is filled out with oil bubble-free.
- Preparation with work objective focus
- Annunciator screen close
- Leuchterscheinung in the field by lifting or lowering the condensor lens on as small a diameter as possible bring and with centering screws of the condensor lens in the field center
- Annunciator screen open, field observe.

If the cut width of the condensor lens is fully used, slides up to ≤ 1.5 mm of thickness for observations in the dark field can be used.

Suggestion for fluorescence dark field in the short-wave light with DF-condensor lens 1,2: With actual working time > the permeability of the ring lens post can leave 1000 hours with HBO lights. The ring lens is as spare part in the offer.

- Vorschraubring under the ring lens unscrew, ring out lens take (falls out with careful Aufklopfen of the condensor lens automatically).
- , Vorschraubring replace new ring lens einschrau users.

To the use of the DF-condensor lens 0.12 - 0.85 orient themselves you please in the guidance, which is added to the equipment.

Central dark field with the Kontrasttubus ► (13) (15) observations with the mechanism for orienting polarization _

The mechanism serves the observation in the polarized by falling light, e.g. with crossed polar one (anisotropy) or from dichroism.

Operation:

- Slidegate valves over light outlet (fig. 1/12 and/or fig. 5/49) pull out and by slidegate valves with polarizer for the time being replace (without compensators λ and $\lambda/4$).
- Analyzer slidegate valve up to the first rest into the admission at the Tubusträger push in (fig. 1/5).
- Preparation for observation furnish and after Köhler light up.
- Analyzer slidegate valves up to the 2nd rest push in.
- Polarizer and analyzer on 0 place (0 in relation to point of index). Thus are the polar one crossed.
- Preparation take away, field observe, by slight correction of the direction of the polarizer toward maximum darkness in the field stop, polarizer with wedging screws in this situation determine. Preparation again up put.
- Tricks of the table, inserting and rotation of the compensators λ and $\lambda/4$ after the requirements of the investigation of a goal.

For the diagnosis of dichroism without analyzer work (analyzer in first detent).

Quick change between observations with crossed polar ones and in the light field by shifting the analyzer between first and second rest.

(16) Observations with the azimuth screen for inclined Beleuchtung _____

Inclined lighting - with the help of an azimuth screen at height of the aperture diaphragm - is a simple procedure phase whether jekte to make well contrasted visible. The screen is applicable with all objectives of the enlargements from 12,5x to HI100x.

Operation:

- Preparation for observation furnish and after Köhler light up (visiting and focusing with difficulty visible objects advantage detention with complete or to a large extent closed aperture diaphragm. Aperture diaphragm thereafter again open).
- Bertrandlinse switch on, aperture diaphragm to the Objektivpu pill center, Bertrandlinse off again switch.
- Azimuth screen admission onto the appropriate swallow more amKondensoreinhänger to attack push and with knurling tool mother (fig. 3/34) wedge.
- Field observe. Mobile arm of the azimuth screen first to attack pull out, afterwards sensitivly again push in, until optimal contrast enters.
- Screen with the help of the lever arm azimuthal turn, until optimal contrast enters.

(17) Connection of the mechanisms of the micro-photographic putting on camera system mf-AKS __

The mechanically optical building groups of all Einrichtungenmf AKS become always over a Tubusanpassung (a component of all mf-AKS-mechanisms) in the photo exit of the photo tubus (fig. 1/1) and/or installed in the photo exit of the Kontrasttubus (fig. 5/46).

The electronic mf-AKS controller matic.mot is set up stationarily right beside the stand. All remaining electronic building groups can be localvariable placed.

Fototubus 100/100

An adjustable detour element leads the entire light-current alternatively to the visual or to the photo exit. Thus the Tubus is to be preferably used for the photography of faint pictures.

The Fototubus 100/100 is installed in place of the Fototubus 80/20 100 to the stand:

- Clamping screw (fig. 2/21) with box spanner loosen, Vergrößerungswechsler off with mounted Fototubus 80/20 100 from the stand take.
- In the Vergrößerungswechsler from downside group of 4 large screws become ago visible, which connect the Vergrößerungswechsler with the Fototubus. These screws solve, Fototubus 80/20 100 from the Vergrößerungswechsler trennen and by Fototubus 100/100 replace. Fototubus 100/100 bolt.
- Complex Vergrößerungswechsler - Fototubus 100/100 on the stand put on, until draw attack forward and indieser situation by tightening the clamping screw fix.

For the use of the different mf-AKS-mechanisms in en connection with JENAVAL you orient yourselves please in serving guidance to micro-photographic putting on camera the system mf-AKS, which is attached to the mechanisms.

(18) The secondary observation tube

With this mechanism the microscopic picture for two observers sitting next to each other becomes at the same time visibly ge makes. Object details can be marked with a shining arrow, which lets itself lead freely across the field.

Assembly:

- Binokulartubus from the stand remove, secondary observation tube in its place set (connecting pieces for light arrow downward pointing) and clamp.
- Binokulartuben set and in comfortable operation position firm wedge.
- Reducer for eyepieces 30/23.2 into Okularaufnahmedes the Großfeld Binokulartubus use, both Binokulartuben with eyepieces GF-P 10x (18) equip: The placable eyepiece belongs in the right connecting pieces of the Großfeld Binokulartubus!
 - Cables at the light arrow connecting piece over Trafo to the net on close.
- Operation:
 - Preparation for observation furnish and after Köhler light up.
 - Light arrow at the Trafo switch on and with handles to the guidance of the light arrow approximately into the center of the field bring.
- Observer at the Großfeld Binokulartubus: Light arrow through out or screwing of the eyepiece of the position of cash eyepiece in

for the right eye focus. Mikroskopisches picture with Feintrieb for the right eye focus. Light arrow and microscopic picture with diopter ring anlinken connecting piece of the Binokulartubus for the left eye focus. With correct work arrow and field for both eyes must be at the same time sharply shown more obachter now for this both.

- Second observer: Light arrow and microscopic picture for the right and the left eye successively through tricks of the right and the left diopter ring at the binocular tubus focus. Afterwards both observers must see arrow and field sharp.
- With filter slidegate valves contrast to light arrow in an appropriate way to the preparation (white-green) and brightness of the light arrow with field brightness co-ordinate.
- Arrow with handles for guidance into desired position on the image field brings. Turn (table in such a way favourably that x and Y-directions of the table impulses with horizontal vertical movements are coordinated when leading the arrow).

Lamp change: Switch transformer off or pull power supply plugs. Bulb socket pull out, lamp exchange, version in again put.

(19) References to the mechanisms to measuring and counting

Information to the complete offer at auxiliary units and their achievements find you in block letters No. 30-0515. Technical and methodical references to handling these mechanisms take you please from the operating instructions, which are attached to the units.

Insert from eyepiece plates into placable eyepieces

In each case one of the eyepieces of all standard equipments JENAVAL is placable. Thus the microscopic picture and the picture of the line figure of an eyepiece plate can (e.g. Measuring plate, cross-line, photo format figure) to be independently focused and seen at the same time sharp.

- Screwed ring at that the eyepiece opposite Endedes of placable eyepiece unscrew, eyepiece plate with line illustrated page downward into the screwed ring insert, screwed ring in again into the eyepiece screw.
- Place-cash eyepiece into the right connecting piece of the binocular Tubus insert. Place-cash eyepiece first out screw, until the picture of the line figure is to be seen indistinct, afterwards eyepiece into the eyepiece screw in, until the line figure appears sharp. Microscopic picture with focus-rubbed for the right eye focuses.
- Image definition for the left eye with diopter ring (fig. 1/2) correct (not with focus-rubbed!).

If no eyepiece plate is present and/or if for the time being not with eyepiece plates is to be worked, indiesem case the eyepiece of the placable eyepiece is focused not the line figure, but on the edge of the Okularblende. One proceeds in a general manner, as is descriptive above.

Monokularer Meßtubus 10x

- Meßtubus in place of the Binokulartubus set, then orient that the Meßtrommel (or left) points to the right, and afterwards wedge.
- Place-cash eyepiece unscrew, until the strobos appear sharp un, afterwards eyepiece again hineinschrau ben, until the strobos are to be seen sharp. Mikroskopisches picture with focus-rubbed for the left (right) eye focuses, which means for the eye, with which one would like the field observing.
- Hollow mirror align that one can see the scale cutout, in which is to be read off good. One reading those Skale favourably with the right (link) eye off. In that the observer turned scale windows can be read off also directly.
- One measures with the Meßtubus as with a conventional micrometer screw eyepiece. If the measuring direction should turned, clamping screw (direct under the measuring instrument) to solve, measuring instrument after the requirements of the whether of jektes to turn and screw again wedge.

Eyepiece change:

- Eyepiece at the engraving case touch and from the Tubus unscrew.
- Change eyepiece accordingly into the Tubus screw in.

(20) Streckenmessungen in 2-Richtung (parallel to-optical axle)

With limited requirement at accuracy can such Measurements with the Feintrieb to be accomplished. One proceeds thereby as follows:

- Measuring object for observation furnish, after Köhler light up; Objectively as high an aperture as possible use (the more largely the aperture, the smaller the sharpening deep, all the more largely the measuring accuracy).
- Object with Feintrieb lower (in the clockwise direction turn Triebknopf), until the upper terminator point the Z-distance which can be measured appears sharp, this attitude slightly (up to the Unschärfe) over-drive.
- Focusing direction turn around (turn Triebknopf against hand sense), until the upper terminator point appears sharp to the Z-distance. Scale values from the Feintrieb read off = $Z_1 \cdot Z_2$ over drive he to the lower terminator point of the measuring section seem sharp. Scale values from the Feintrieb read off = Z_2 .

The distance between Z_1 and Z_2 must be driven through without reversal of the focusing direction, in order to avoid that the reversal span of the impulse ($\leq 2\mu\text{m}$) enters as error measurement.

Repetitions of the measurement in the same, indicated direction would always drive through.

- Computation of the material distance ΔZ :

$$\Delta Z = Z \cdot \frac{n}{n'} - Z'$$

n = refractive index of the object, usually for instance the Brech number of the medium accordingly, into which the object is embedded.

n' = refractive index of the medium between Frontlinse of the whether jektivs and cover glass; usually 1 (for air) or 1.515 (for immersion oil).

(21) The achromatic condenser lens head 1.3

In consideration of rapid and simple operation one uses rear objectives with apertures favourably > 1 with the condenser lens 0.9, although luminous intensity and resolving power of these objectives are not exhausted. If its full achievement is to be used, the immersionskondensator head 1.3 must be used.

Operation:

- Lower condenser lens 0.9 with impulse (fig. 1/14), screw wedging (fig. 3/30) solve and condenser lens including a trailer of the stand remove. Upper section of the condenser lens 0.9 abschrauben and by condenser lens head 1.3 replace. Condenser lens and in trailer of on the left of again into the swallow guidance insert, to the right in correct fit fold, downward attack taps to mount let and with Rändelschrau fuel element (30) wedge.

Or

If the overview condenser lens 0.12 in working position rests ► (6), prevent a perpendicularly oriented tap that this rest will over-drive. This taps - nachdemman - removed the condenser lens A TRAILER herausschrauben and away-put. Install afterwards a trailer the stand, as described above. Advantage: The condenser lens 0.9 can be swung out now fully to the left; it will accessible, in order to exchange its upper section against the condenser lens head 1.3 and/or always-crave around the condenser lens head comfortably.

- Apply a drop immersion oil on the Frontlinse of the Kondensator (favourably apply a further drop on the lower surface of the slide - drops in work situation hanging!).
- Condenser lens head (over change mechanics swing if necessary) in work situation lift, to the area between Condenser lens front surface and slide lower surface are with oil-filled out.
- Lighting after Köhler stop.
- Aperture diaphragm fully open! (Again reduced Kondensatorapertur would waive the advantage of the condenser lens immersion again). The condenser lens head 1.3 can be used also drying. Maximum aperture into this case approx. 0,8.

(22) Mechanical brakes

Grobtrieb, condensor lens impulse and Binokulartubus contain en placable brakes.

Grobtrieb and condensor lens impulse

Both Triebknöpfe firmly cover. Left Triebknopf festhalten, right Triebknopf in the clockwise direction turn: Course more heavily against clockwise direction turn: Course more easily

Binokulartubus

The brake in the Binokulartubus ensures for it that the eingeregelt viewing distance of the connecting pieces of the Tubus remains and itself not automatically changed. To placing the brake behind:

- Connecting pieces of the Binokulartubus on closest viewing distance stellen, 2 groups of 3 screws each become visible
- Small screws with screwdriver tighten: Course more heavily lösen: Course more easily
- The seat of the large screws may not be changed!

(23) Swivelling Kreuztisch D

The table is work-centered and around 180° swivelling. For the rotation of the table the complex Y-vernier/clamp favourably screw (fig. 2/22, 23) as if handles use, thus do not even tuell stopped X/Y coordinates not to be adjusted.

With the clamp (fig. 2/22) the Y-impulse of the object of leader knows and with the clamp (fig. 2/23) can the table turn be locked.

Note! If the Y-impulse of the object leader over the work area for slide 26 x is adjusted 76 mm outside. Table carefully turn, so that it does not fasten at the Stativsäule!

(24) Table change

- Clamping screws under the table (fig. 3/28) with hexagonal key (fig. 6/59) loosen. Table to the right schieben und from the swallow guidance take off.
- The table, with which is to be now worked, in those swallow guidance of the table carrier (fig. 3/29) to attack to push in to the left and with clamping screws clamp.

(25) Condensor lens change

JENAVAL can be equipped - depending upon the microscopic work project - with different condensor lenses. Except achromatic aplanatischer) condensor lens 0.9 the standard out arms are available:

aplanatischer condensor lens 0.9 (for transmitted light fluorescence) achromatic aplanatischer condensor lens head 1,3DF-Kondensor 0.12-0.85 for dark field with objectives 6,3x/0,12 to 50x/0,80DF-Kondensor 1.2 for dark field with objectives 25x/0,50bis REAR ONE 100x/1,25

Change against DF-condensor lens 0.12-0.85 and DF-condensor lens 1,2

- Condensor lens with impulse lower, to clamping screw (fig. 3/30) becomes accessible. Clamping screw loosen. A trailers to the left swing out and take out.
- DF-condensor lens in appropriate way from left into the Schwalbenführung use,

to the right in correct fit fold,
downward attack taps to mount leave.

- Knurled thumb screw tighten (to the work with DF condensor lens 1.2 ► (14)

Change against aplanatischen condensor lens 0,9

One proceeds in a general manner, how under (21) described, in place of the condensor lens upper section becomes the entire condensor lens ausge exchanges.

Change against achromatic condensor lens head 1.3 ► (21) (of 26) changes of the halogen bulb 6 V 25 W

- Switch light off, pull power supply plugs!
- Knurled thumb screw at the light rear wall loosen, light on off clothes to the rear take. Thus the lamp becomes accessible.
- Knurled thumb screws to both sides of the lamp piston loosen and lamp out as well as mother board take.
- Spare lamp on mother board into the slots of the lamp admission push in. Mother board in such a way align that it both sides on the noses of the ceramic lamp admission mount and one of the noses comes to lie into the notch of the carrier base. Knurled thumb screws wedge. Note! Quartz flasks of the lamp directly with the fingers do not affect (pistons with white spirits clean if necessary!)
- Light lining postpone and with knurled thumb screw fix. Power supply plugs attach, light on switch.

(27) The object marker

Without having to give the attitude up of the image definition, object details can be marked, which are to be regained later problem-free. The object marker sits like an objective at the lens turret. It contains three fiber donates. The interesting preparation place is marked by three points. The points are because of the corners of a equivalent lateral triangle with 4 mm of edge length, which describes the place drawing to knowing. The marker is seen to middle objectives priority for the work with weak to pre.

Install:

- Knurled ring at the upper end of the marker unscrew. Ge slit cover plate with screwdriver or suitable coin unscrews. Outer sleeve of the marker in such a way turn that a constant slot develops. The marker contains 2 spiral springs; the upper (stronger) out take.
- Schutzdeckel of the fiber pin cartridge remove, cartridge in indie case of the marker push: Fiber pins toward the eccentric cam, cartridge-handles into the slot. The cartridge sits correctly, if their handles at closed end of the slot fastens. Strong spiral spring into the gap between cartridge and case insert. Slit cover plate to attack screw in. Knurled ring to attack screw on.
- Markers with the left hand at the eccentric cam touch, hand have the cartridge with the thumb of the right hand toward knurled ring to press, cartridge to attack in the marker case turn and handle release. With correct work the hole must be locked in the baseplate of the eccentric cam now.
 - Object markers to attack into an eye of the objective of gun screw in. Object markers in working position bring and straight so far again unscrew, until the eccentric cam cartridge-handles to the rear and forward points. Markers in this position with knurled ring more anObjektivrevolver clamp.
- Mark:
- Marking object place into the center of the field drive

- Object markers in working position scolded. Cartridge hand has (with the thumb) to press upward, until lead attack to the left and release (open for the pin chamber), afterwards (with index finger) shortly after down press (stamps).
- Cartridge-handles press again upward, to the right lead and release (latches of the pin chamber).
- Restart afterwards work objective.

The laid on points dry in less than one Minute.

To the marking suitable surfaces: Glass, cover glass lacquer.

Points are steady against immersion oil and xylene; immediately solving in water.

Regain:

- Preparation after direct view in such a way on the Mikroskopisch orient that the mark points lie symmetrically to the Objektfeld lit up by the condensor lens.
- Work objective switch on, the looked for object place lies in the field. For higher requirements at regaining accuracy: Marking point with weak objective visit and preparation shift, until the points lie symmetrically in the field. Switch afterwards to stronger work objective.

Cartridge change:

One proceeds in a general manner as descriptive under “installing”.

Maintenance:

The solvent of the ink in the pin cartridge is volatile. The pin chamber must be locked from there after each marking, if the marker is to work reliably. En sehentlich left open markers becomes often again quick, if they are kept locked over night; giving if into the opened pin chamber in bring and draw let some drops water; Chamber thereafter one while en closed hold. Otherwise cartridge replacement.

(28) Maintenance

JENAVAL has a long life span. Maintenance and servicing are simple. Consider please the following references:

- Carefully, before direct exposure to the sun, temperatures treat equipment over + 50 °C, frost, humidity, chemically aggressive substances and - as far as possible - before dust contactors.
- Instructions consider.
- Dust on optical surfaces with Gummipuste remove or with nature hair brushes, which were degreased in alcohol and dried thereafter. Enclosed cleaning cutlery en turn.
- Persistent impurities and fingerprints with dust for free rag and/or leather and light gasoline remove. Not with alcohol! Front surfaces of objectives with magnifying glass controlling (kidnapped immersion oil at drying systems!).
- Immersion oil at rear objectives with dust free rag and light gasoline remove.
- Objective caps and other plastic containers with xylene do not treat.
- More diminishing or to heavy course of Grobtrieb, condensor lens impulse and Binokulartubus ► (22)
- Arising damage does not repair, equipment handed over at our responsible agency or treaty system place to examination.
- Maintenance of the object marker ► (27)

(29) Wearing parts

Part number lamp HS S 5a 6 V 25 W 105.859/6Ringlinse for DF-
condensor lens 1.2 304313:002.04 /2 5 fiber pin cartridges for object marker 025250:001.28 /4 immersion oil 10 ml

Fusible plugs T 200 (for net tension 240 V and 220 V) or 343.28

Fusible plugs T 400 (for net tension 110 V and 127 V) 343.30

(30) Symbols

- switched off
- at the Vergrößerungswechsler and/or at the Kontrasttubus: Objective lens 1/1.6 switching on

1x Tubuslinse (factor 1) switched on

| switching on



| at the Kontrasttubus: direct path of rays contrast loop switched on linkage for photo exit
Bertrandlinse switching on (31) unpacking and assembly

To foam material packing thus put tape to remove that the impressing are cash les. Covers take off.

Standard equipment JENAVAL contrast/GF Pa

Stand (fig. 1/10), light HS 25 Watts with intermediate optics, filter house and filter change-over switch (fig. 1/18, 15) as well as rear wall D and lens turret (fig. 1/6) are already installed.

On this building group:

Vergrößerungswechsler (fig. 1/4) with Fototubus begin (fig. 1/3) according to illustration 1 from the top into the swallow guidance, until attack forward draw and with wedge screws (fig. 2/21) fix (box spanners B use) fig. 6/58).

Kontrasttubus (fig. 5/45) according to illustration 4 and 5 from the top on in swallow guidance insert, to attack after in front-pulled and with Klemmschrau fuel element (fig. 4/39) fix. (Box spanners B use) fig. 6/58).

Table carriers (fig. 6/29) according to illustration 3 from the top into the swallow guidance to attack push in and with clamping screw fix (box spanner B, fig. 6/58).

Condensor lens guidance with Triebknopf (fig. 1/14) to attack off lower. Condensor lens A TRAILERS with the condensor lenses 0.9 and 0.12 (fig. 6/54) from left to the condensor lens guidance set, lower attack to mount let and with clamping screw (fig. 3/30) wedge.

Kreuztisch D (fig. 1/7) from on the right of ago into the swallow of guidance of the table carrier (fig. 3/29) begin, to attack to the left push and with to the two clamping screws (fig. 3 28) fix (hexagonal wrenches (fig. 6/59) use). Condensor lens with Triebknopf (fig. 1/14) to attack raise.

Objective ones screw in, favourably in such a way that with the rotation of the gun in the clockwise direction the next-stronger in each case whether rests jektiv in working position; weakest objective in eye No. 1

Binokulartubus set and wedge; Eyepieces use, the placable eyepiece belonged in the right connecting pieces of the binocular tubus

Filters in filter change-over switch (fig. 6/15) use: Orient yourselves please with (2)

Left and right hand rest (fig. 6 and 1/11) on the foot of the microscope set and after your discretion align that focusing and table impulses with comfortably resting upon hand serves become can.

Polarizer DIK D (fig. 5/48) according to illustration 5 into the swallow guidance amMikroskopfuß push in, until to the rear push attack.

Assembly of the picture and shine-lateral modulator gun (fig. 5/43) with Modula gates (fig. 6/55) as well as further assembly and basic adjustment of the equipment are under (1) described.

Thus the equipment is installed and can be taken in enterprise. ► (O)

Fig. 1

1 photo exit 2 diopter ring 3 Fototubus of 80/20 100 4 Vergrößerungswechsler with gun outbreak for analyzer slidegate valves (with assigned dust shield) of 6 lens turrets 7 Kreuztisch D 8 centering screws for condensor lens 0.9 9 centering screws for aperture diaphragm stand 11 hand rests of 12 slidegate valves with light outlet and filter holder 13 handles 16 guns of the filter change-over switch 17 clamping screw for filter change-over switch 18 light 6 V/25 W for condensor lens change mechanics 14 condensor lens impulse filter change-over switch

Fig. 2

19 linkage for Bertrandlinse

Linkage for photo exit 21 clamping screw for Vergrößerungswechsler 22 stop screw for Y-direction of the table impulse 23 stop screw for table turn 24 voltage regulator button

Indicator instrument for lamp tension 26 adjusting wheel for annunciator screen

Fig. 3

27 achromatic aplanatischer condensor lens 0.9 28 clamping screws for tables of 29 table carriers 30 clamping screw for condensor lens A TRAILER 31 set screw for variable condensor lens attack 32 overview condensor lens 0.12 33 tension ring for aperture diaphragm 34 knurled nut for modulator guns cond 35 outbreak for modulator guns cond

Fig. 4

36 linkage for Bertrandlinse in the Kontrasttubus 37 linkage for photo exit in the Kontrasttubus of 38 change over switches contrast loop/directly 39 clamping screw for Kontrasttubus 40 focusing ring at the objective GF-PA 1x/0,03 spec of 41 shift levers for lens 1/1,6

Fig. 5

42 centering pin for modulator gun KT of 43 modulator guns KT of 44 Vergrößerungswechsler 45 Kontrasttubus KT 46 photo exit at the Kontrasttubus KT of 47 modulator guns cond 48 slidegate valves with polarizer DIK D, λ and $\lambda/4$ -Platte

Fig. 6

49 filters 50 4 lamps HS 6 V 25 W of 51 eyepieces AP-Pw 10x (25) and AP-Pw 10x (25) placable 52 analyzer DIK of 53 centring keys for modulator guns cond

54 55 Achromatic aplanatischer condensor lens of 0.9 with in trailers 0.12 and overview condensor lens container for modulators KT and cond

56 57 Cleaning cutlery Binokulartubus W

58 Box spanner B

59 Centring key for modulator gun KT and Hexagonal wrench for Kreuztisch D

60 Immersion oil

61 Hand rests

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Note!

The Kontrasttubus becomes transport secured before the dispatch. Before putting the Kontrasttubus KT on (45) on the stand (10) must the red marked cheese head screw (trans haven protection), which is at the lower surface of the Kontrasttubus KT, to be unscrewed. With Nichtbeachten of this reference the change over switch contrast loop can not be operated/directly (38)!

Insert to block letter No. 30-G0020a JENAVAL

(0) Bedienung des Mikroskopes

JENAVAL mit Leuchte 6 V 25 W

JENAVAL contrast mit Leuchte 6 V 25 W

Auspacken und Montage		(31)
	Grundjustierung des Kontrasttubus	(1)
<ul style="list-style-type: none"> Bertrandlinse ausschalten: Zugstange (Bild 2/19) einschieben Fotoausgang ausschalten: Zugstange (Bild 2/20) einschieben 	<ul style="list-style-type: none"> Bertrandlinse ausschalten: Knebel an Zugstange (Bild 4/36) auf Symbol O Fotoausgang ausschalten: Zugstange (Bild 4/37) einschieben Alle Kontrastmodulatoren aus dem Strahlengang nehmen: Modulatorrevolver KT (Bild 5/43) auf freien Durchgang stellen oder Kontrasttubus auf direkten Strahlengang schalten (Umschalter, Bild 4/38 auf Symbol) Beleuchtungsseitigen Modulatorrevolver (Bild 5/47) auf freien Durchgang stellen. Polarisator und Kompensatoren λ und $\lambda/4$ (Bild 5/48) ausklappen Schalthebel für Linse 1/1,6 (Bild 4/41) auf Symbol lx schalten 	
Netzstecker an das Netz anschließen	Achtung! Nennspannung des Netzes muß mit der auf der Rückwand des Mikroskopes markierten Betriebsspannung übereinstimmen	
Leuchte einschalten	Spannungsreglerknopf (Bild 2/24) nach rechts drehen, Einschalttrast überfahren und Spannung auf =4,8 Volt regeln (schwarz markierter Bereich in der Skalenmitte)	
Dämpfungsfilter einschalten	Filterwechsler (Bild 1/16 auf Ziffer 1 (gegebenenfalls nach Bedarf auf andere Position) stellen	(2)
Präparat einlegen	Präparat in Objekthalter einlegen und mit Tischtrieben in Arbeits-Stellung fahren	(3)
Arbeitsobjektiv einschwenken	Für das nachfolgende Einrichten der Beleuchtung geht man vorteilhaft von mittleren Objektiven aus: GF-PA 12,5x oder 25x	
Präparat scharfstellen		
Beleuchtung nach Köhler einrichten	<p>Leuchtfeldblende in der Objektebene abbilden:</p> <ul style="list-style-type: none"> Kondensor 0,9 in oberen Anschlag fahren Öffnung der Leuchtfeldblende mit Stellrad (Bild 2/26) so regeln, daß ihr Rand (gegebenenfalls unsharp) im Bildfeld sichtbar wird Bild der Leuchtfeldblende mit Kondensortrieb möglichst scharf stellen Bild der Leuchtfeldblende mit Zentrierschrauben (Bild 1/8) im Bildfeld zentrieren Leuchtfeldblende mit Stellrad (Bild 2/26) so weit öffnen, daß ihr Bild im Feld gerade eben nicht mehr sichtbar ist. <p>Kontrast regeln:</p> <ul style="list-style-type: none"> Aperturblende mit Stellring (Bild 3/33) so einstellen, daß optimaler Kontrast eintritt 	(4)
	Ausleuchtung der schwachen Objektive GF-PA 1x, 3,2x und 6,3x	(6)
	Ausleuchtung und Gebrauch des Objektives GF-PA HI 100x	(7) (21)
Okularvergrößerung wählen	<p>Vergrößerungswechsler (Bild 1/4) auf gewünschte Vergrößerung einstellen (gegebenenfalls Größe des Leuchtfeldblendenbildes nachregeln)</p> <p>Vergrößerungswechsler (Bild 5/44) auf gewünschte Vergrößerung einstellen (gegebenenfalls Größe des Leuchtfeldblendenbildes nachregeln)</p>	(8) (9)
Bildhelligkeit regeln	Helligkeit des Feldes mit Spannungsreglerknopf (Bild 2/24) oder Filterwechsler (Bild 1/16) nach den Erfordernissen des Arbeitsvorhabens und der Raumbelichtung abstimmen	(10)
Beobachten	<p>im Phasenkontrast</p> <p>im differentiellen Interferenzkontrast</p> <p>im Dunkelfeld</p> <p>im polarisierten Licht</p> <p>mit schiefer Beleuchtung</p>	(11) (12) (13) (14) (15) (16)

