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Durst Laborator 138 S

Operating instructions





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DURST LABORATOR 138 S

Professional Precision Enlarger for all negative formats from 35 mm $(24 \times 36 \text{ mm})$ to 5×7 in. $(13 \times 18 \text{ cm})$, with manual focusing.



Height adjustment of the enlarger head (1) is made by turning the knob (30). When the knob is released, the enlarger head comes to rest automatically and may be secured in the desired position by means of the clamps (29). To make a rapid height-adjustment, rotate the knob (30) in the direction towards the enlarger head, at the same time placing the left hand on or under the head and exerting pressure. Adjustment of focus is carried out by turning the second knob (33) after first releasing the clamp situated behind it (32); this clamp secures the lens mounting sleeve against the risk of slipping during such operations as, for example, sets or series of enlargements. The bellows extends according to focal length of the lens; to effect this, the tube (31) supporting the lens is adjusted by releasing or tightening the knob (28). For short focal lengths the tube should be pushed up, for long focal lengths, pulled down.

To swing the enlarger head round to the horizontal position for wall projection, turn the handle (24) in an anti-clockwise direction from position « F » to position « L ». After the enlarger head has been tilted slightly, set knob (24) to 90° so that it snaps in precisely at this angle. To lock it again in this position return the knob to position « F ».

The six scales provided on the apparatus facilitate orientation with regard to the various settings and adjustments; notes should be taken of the various settings (perhaps in form of a table) so that the data are available for quick positioning when various types of work have to be repeated.

The scales denote:

Scale (18) indicates vertical adjustment of the baseboard.

- Scale (23) indicates the degree of inclination of the enlarger head for distortion correction.
- Scale (40) indicates degree of lens inclination for distortion correction.
- Scale (43) indicates horizontal adjustment of optical axis (needed for so-called « total » corrections).
- Scale (22) indicates vertical adjustment of the enlarger head.
- Scale (20) permits, in conjunction with the fine focusing device (cross hairs)
 - a) the correct centering of the baseboard beneath the optical axis (see under «negative carrier NEGA 138»);
 - b) the correct positioning and re-setting of any required inclination of the baseboard.

The table (2) on the front of the lamp housing sets out the enlarging factors for various lenses, together with condenser combinations and lamps for the different focal lengths.

After releasing the milled screw (25), open the lamp housing door and screw the lamp into its mounting. Although the overall electrical layout is quite safe, it is recommended that, failing a Schuko-type connection, the enlarger should be earthed as a precautionary measure to the screw (53). The plug from the lamp cover should be inserted into the socket on the baseboard. The lead from the board is intended for connecting to the mains. An exposure timer can be introduced between enlarger head and baseboard.

To ensure good overall illumination of negative formats of 5×7 in. (13 × 18 cm) or under conditions involving high enlarging factors, or with a lens of focal length greater than 150 mm, it is essential that the opal lamp should have a bulb of at least 110 mm diameter. We are able to supply large bulbs (code-word OPAL) of 200, 300 and 500 watts – also the PROLA 500 projector lamp, which has an Edison

Enlarger Head

Scales

Illumination

mounting and an extra-large compound filament giving good lightspread and high intensity. When using this lamp one should work with the largest aperture, unless a LAPAL ground-glass diffusing screen has been inserted into the filter-holder (26). Other suitable projector lamps are available from dealers; we recommend the Philips 375 E 500-watt or the General Electric DMS PH/500 TS.

It is possible, by undoing the two milled screws, to reverse the L-shaped lamp holder of the LABORATOR 138 S so that the lamp may be used in the horizontal position (for example, Nitrophot or Photoflood lamps). It is also possible to use mercury vapour lamps (such as the Philips HP or HPL, or lamps of a similar type from OSRAM with impedance coil). Since, however, this type of lamp takes a few minutes to reach its full light-output, exposures with it cannot be made by means of the enlarger switch, but only by keeping the lamp burning throughout and resorting to either the red filter or a shutter fixed in front of the lens.

When maximum focus, reproduction of detail and the shortest possible time of exposure are required, it is advisable to use the low voltage point-light source PULAM/PUTRA which is available as an accessory. This consists of a low voltage point-light lamp (12 V/100 W) with Edison socket which is connected to the mains supply via the PUTRA transformer. The L-shaped lamp holder should be replaced by the special PUPLA holder which offers better centring facilities for the lamp. Replace also (a) the standard deflecting mirror by the specially treated mirror LASPE P, and (b) the standard glasses in the negative carrier by the specially treated glasses GLAS T. The condenser combinations used in conjunction with opal lamps are not always suitable for point-light lamps. In these cases condensers LATICO 240 P and LATICO 110 will be needed for certain enlarging factors and focal lenghts. We supply, therefore, with the point-light kit a table of suitable condenser combinations. When centring the lamp take care to align the filament helix exactly in parallel with the deflecting mirror. When the enlarging factor has to be altered, move the point-light source forwards or backwards using handle (45) to ensure uniformity of illumination. Use a large aperture when working with the point-light installation as otherwise Newton rings will be produced. It will be found that in spite of the large aperture, the definition so obtained will be better than that obtainable with a low aperture and an opal light. Furthermore, the time of exposure needed will be considerably shorter.

For lamps of more than 300 watts it is essential to use the LAFAN cooling fan, which is available separately. The tube of the cooler should be connected to the lamp hood, after removing the small cover (27). In addition there is on the top of the lamp housing a recess, fitted with a metal cover, to which a suction cooler may be attached.





LAFAN





Before using an opal lamp it should be examined thoroughly. When held against a very strong lamp, blemishes in the glass or spots of soot inside the opal lamp can easily be seen. Frequent voltage fluctuations and long use may cause such residues from combustion resulting in uneven illumination. For this reason the lamp should be checked from time to time.

The lamp is centered by adjusting the handles (45) and (46) on the left side under the enlarger head. Slightly loosen locking ring (47), adjust height of the lamp and tighten locking ring. With handle (45) lamp can be pushed forward or backward, whereas handle (46) is for lateral centering. To assist in determining the best filament position, the actual lamp mounting is designed to be turned in either direction. When centering the lamp, focus should be adjusted in advance, using a lens of medium or long focal length; do not allow the lamp to come into contact with the heat-filter (48).

It is also possible to use electronic lighting unit or xenon lamps of various brands as light-sources for the DURST LABORATOR 138 S. For certain processes we recommend the DURST LACOLI 138/LA-COTRA 138 cold-light, which has been developed specially to suit the LABORATOR and fits the condenser drawers.

Used without condenser, the LACOLI 138 provides a very soft contrast illumination for all types of monochrome work, especially effective for printing hard negatives of all sizes from 35 mm to 5×7 in. $(24 \times 36 \text{ mm} - 13 \times 18 \text{ cm})$. Its highly actinic light output permits brief exposures even with the slower types of paper (approx. 7 - 10 times shorter than with a 200 W opal lamp). The unique quality of this illumination subdues scratches and blemishes on the negative, virtually eliminating the need for retouching.

The HT fluorescent tube of the LACOLI 138, set in a plastic holder, is fed by 110-240 volts AC (45-60 cycles), through the LACOTRA 138 special transformer.

Condensers

Lenses

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The condenser combinations vary according to the focal length of the lens, and in some cases even with the same focal length, depending on enlarging factors. (See table showing condenser combinations for both horizontal and vertical projection).

Insertion or removal of lens is carried out after undoing the milled screw (42). Lenses of from 10 to 24 cm focal length should be mounted on bed plates LAPLA. Our SCHNEIDER DURST COMPO-NON lenses, supplied in focal lengths 240, 210, 180 and 150 mm, and ready equipped with the necessary fitting mountings, may be inserted direct into the lens turret (41). COMPONON lenses of focal lengths 135 and 105 mm should be mounted on a LAPLA bed plate: and COMPONAR and COMPONON lenses of 75-80 mm on the SEIPLA 75 semi-sunk lens board. (Bed plates are available separately). Lenses of 50-60 mm focal length are catered for by the LA-TUB II tube (also available separately), with LEICA M 39 thread. Lenses used with the M 25 thread require an IXODAP adaptor ring for the LATUB II tube. Both LATUB II and SEIPLA must be removed before turning the lens turret (41). The tube LATUB II is provided with an easily read dial which facilitates adjustment of the aperture. Insert the lens into the LATUB II as follows: separate the two sprung clamping arms (a) until they reach the stop, press the two buttons (b) thus arresting the arms in this position, unscrew the flat bed plate (c) from the tube and mount the lens on it. Set the lens aperture to the maximum aperture notch and screw the flat bed plate (c) with lens on to the LATUB II. Turn the aperture adjusting ring (d) on the LATUB II until the black dot faces the figure on the ring dial (e) which corresponds to the maximum lens aperture. Without moving the adjusting ring (d), press the two clamping arms (a) briefly outwards until the locking device is released, then guide the arms (a) inwards until they touch the milled aperture adjusting ring (d) of the lens. The required aperture may now be selected by turning the adjusting ring (d) on the LATUB II and may be read off the graduated dial (e) of the LATUB II.



LATUB II

Table of LABORATOR 138 S condenser combinations for vertical projection

Lens mm/inch	Neg. format cm/inch	magn. factor max. min.	Condenser combination	Arrangement	Opal lamp diam.
240 mm	13 x 18 cm	4.4 x - 1.7 x	<u>240</u> 240	X	_ 110 mm
91⁄2	5 x 7"	1.7 x - 0.90 x	240 R 240		
210 mm	13 x 18 cm	5.3 x - 1.2 x	<u>240</u> 240	X	(
81⁄2''	5 x 7''	1.2 x - 0.76 x	240 R 240	×	- 110 mm
180 mm	10 x 15 cm	6.6 x - 3.2 x	<u>240</u> 200	X	
7 ¹ /8"	4¼ x 6"	3.2 x - 0.55 x	<u>240</u> 240	X	– 110 mm
150 mm	9 x 12 cm	8.5 x - 1:1	<u>240</u> 200	X	
6''	4 x 5''	1:1 - 0.43 x	<u>240</u> 240	X	- 90 mm
135 mm	8.5 x10 cm	9.5 x - 1:1	<u>240</u> 160	X	
5¼"	3¼ x 4¼"	1:1 - 0.4 x	<u>240</u> 240	X	- 90 mm
120 mm	6.5 x 9 cm	11 x - 1:1	<u>240</u> 130	X	
43⁄4''	21⁄2 x 31⁄2"	1:1 - 0.3 x	<u>240</u> 240	X	- 90 mm
105 mm	6.5 x 9 cm	11.8 x - 1.6 x	<u>240</u> 130	X	
4 ¹ /8"	21⁄2 x 31⁄2''	1.6 x - 0.28 x	240	X	90 mm
80 mm 3¼″	6 x 6 cm 2¼ x 2¼"	17.5 x - 0.6 x	<u>200</u> 130	X	90 mm
75 mm 3''	6 x 6 cm 2¼ x 2¼″	18 x - 0.4 x	<u>200</u> 130	X	90 mm
60 mm 2 ³/ ₈ ''	4 x 4 cm 11⁄2 x 11⁄2''	23.5 x - 2.9 x	<u>130</u> 85	\mathbb{X}	65 mm
50 mm 2"	24 x 36 mm 35 mm	28.5 x - 3.8 x	<u>130</u> 85		65 mm

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Table of LABORATOR 138 S condenser combinations for horizontal projection

Lens mm/inch	Neg. format cm/inch	magn. factor max. min.	Condenser combination	Arrangement	Opal lamp diam.
240 mm 91⁄2''	13 x 18 cm 5 x 7''	21 x - 4.4 x	240 240	Ħ	110 mm
210 mm 8½''	13 x 18 cm 5 x 7''	21 x - 5.3 x	240 240 H	Ħ	110 mm
180 mm 7 ¹ /8"	10 x 15 cm 4¼ x 6''	26 x - 6.6 x	<u>240</u> 200	¥	110 mm
150 mm 6''	9 x 12 cm 4 x 5''	30 x - 8.5 x	240 200	¥	110 mm
135 mm 5¼″	8.5 x10 cm 3¼ x 4¼″	39 x - 9.5 x	<u>200</u> 160	¥	90 mm
120 mm 4¾''	6.5 x 9 cm 21⁄2 x 31⁄2 ''	44 x - 11 x	200 130	¥	90 mm
105 mm 4 ¹ /8"	6.5 x 9 cm 21⁄2 x 31⁄2''	44 x - 11.8 x	<u>200</u> 130	¥	90 mm
80 mm 31⁄4''	6 x 6 cm 21⁄4 x 21⁄4''	65 x - 17.5 x	_ <u>160</u>	X	90 mm
75 mm 3''	6 x 6 cm 21⁄4 x 21⁄4''	65 x - 18 x	<u>160</u> 130	¥	90 mm
60 mm 2 ³/ ₈ ''	4 x 4 cm 11⁄2 x 11⁄2''	92 x - 23.5 x	<u>130</u> 85	X	65 mm
50 mm 2''	24 x 36 mm 35 mm	102 x - 28.5 x	<u>130</u> 85	X	65 mm

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To avoid reflections from stray light it is absolutely necessary, masking down to the area actually needed for enlarging, using the built-in masks (knob [5]). When making enlargements from section of negatives, the best optical performance of the lens is obtained by bringing the desired section as precisely as possible under the centre (optical axis) of the lens, either by moving the negative carrier NEGA 138 (4) or by adjusting the masks (5). To facilitate this adjustment, the pairs of masks are coupled thus forcing the use of the middle section of the lens (if the marginal zones of the lens were used for enlarging sections, the print quality would be considerably diminished).

An even distribution of light can be attained only when the lens focal length is greater than the diagonal measurement of the negative to be enlarged. The height of the red filter (6) below the lens is adjustable, making possible its use with all lenses.

a) NEGA 138

The LABORATOR 138 S is equipped with the standard NEGA 138 negative carrier (4), by means of which sheet films and plates of up to 5×7 in. (13×18 cm) may be enlarged. The NEGA 138 consists of a frame with a swivel-mounted top part on sprung bearings. Each top and bottom pressure glass is fastened by four spring clips. To obviate the possibility of the appearance of Newton rings, the upper of the two NEGA glass plates (GLAS) is available to order with an anti-Newton coating (GLAS AN). For glassless enlarging LAPFE format masks (mask and mask backing) are available in the commonest metric or inch formats; these may be inserted into the negative carrier in place of the twin glass plates. To insert the NEGA 138 negative carrier into the enlarger head, press the springs (a) gently upwards and then, pushing inwards towards the centre of the enlarger, downwards; in this way the studs will slide along the guide-grooves in the enlarger head and engage in their respective holes. In order to bring the negative carrier into precise line with the optical axis, it must be pushed home far enough to allow the studs to come to rest in the rearmost pair of retaining holes.



Negative carriers



NEGA 138

The test mark (with crossed threads) incorporated in the negative carrier (d) is brought into the optical axis by pushing the negative carrier only so far that the studs engage the front pair of retaining holes.

The test mark serves the following purposes:

- It enables sharp focusing adjustment to be carried out, particularly when the negative itself is unsharp or over-dense. This is done by first using the milled knob (e) to adjust to the focusing level of the lower glass plate (or frame, as the case may be); the adjustment is then fixed by the other milled knob (f). Next, the negative carrier is pulled into the front retaining holes, thereby projecting the test mark. When changing over from glass plates to LAPFE mask, or vice versa, the focusing level must be adjusted again.
- 2. It facilitates calculation of enlarging factor.
- 3. It enables one to redetermine the correct stage inclination when carrying out distortion correction, using the test mark in



LAPFE

conjunction with the scale in the centre of the base-plate. By projecting the negative, the actual inclination of the base-plate may be read off on the scale (20); this is extremely useful when repeating a previous operation. As an accurate starting point, the centre of the scale must be brought into exact congruence with the crossed threads. To this end, the base-plate should be adjusted after undoing the supporting arm clamp (19), using the handle (13) for forward or backward, and the milled nut on the side of the baseboard (35) for lateral adjustment. To obtain frontal distortion correction of the projected image, turn handle (c) of the NEGA 138 negative carrier clockwise. This will lift the front edge of the test mark. Read the angle of inclination off the dial, reset handle (c) to 0 after the distortion has been corrected.

The negative carrier NEGA 138 will also enlarge $2\frac{1}{4} \times 3\frac{1}{2}$ in. (6×9 cm) roll film (including 70 mm films). To avoid having to remove the negative carrier from the apparatus every time the film has to be wound on, turn handle (c) anti-clockwise as far as « F ». The top part of the negative carrier is thereby lifted and the film can now be wound on without being scratched. The top part of the negative carrier may be completely removed after the two latches (b) have been turned through 180°.

b) LADANE 138

To enlarge roll films up to $2\frac{1}{2} \times 3\frac{1}{2}$ in. (6.5×9 cm) - including 70 mm films - a pair of masks LADANE 138 is available separately, equipped regularly with two AUDA 70 glass plates as well as with the masks DIFMA and DIFOB 138. A glass AUDA 70 AN with anti-Newton coating is available separately, which is inserted in the mask (b) in place of AUDA 70.

LADANE 138 can be used in connection with the negative carrier NEGA 138 only: insert mask (a) in place of the lower and mask (b) in place of the upper cover glass (GLAS).

For enlarging without glasses, negatives of the size 24×36 mm, the metal mask DIFMA is inserted in place of the lower glass AUDA 70 and metal mask DIFOB 138 in place of mask (b). Further metal masks without glasses for the sizes 6×6 cm (AUMET 70), 26×26 mm (AUMET 126), 24×24 mm (AUMET 244) 18×24 mm (AUMET 124) and 12×17 mm (AUMET 117) are available separately. These metal masks are inserted in place of AUDA 70 in the masks (a+b), for that purpose the strips (f) are removed.

The mask (a) is fitted with four adjustable guiding pins (c) for the most usual sizes. To secure and centre single negatives the spring (e), adjustable by setting the knurled knob (d) is used. To allow the film to be advanced the knurled knob [(c) of the negative car-



LADANE 138



LADANE 138

rier NEGA 138] is turned to the left; by this the upper part of the negative carrier is raised, so that scratches in the film can be avoided.

Base-board-adjustment mechanism

Make quite sure that the lower column has been cleaned completely free of any packing material.

Then release the large locking handle (12) on the right front of the supporting arm (11); take hold of the table somewhat behind the middle of the two side edges, and depress the pedal (17). The baseboard may now be raised or lowered with no great effort. The base plate should not be forced up or down, or the carrying arm may become jammed on the column.

When the table has reached the desired position, release the pedal, let go off the base plate and make it fast by tightening the locking handle (12) (this is especially to be recommended when working on sets of an enlargement).

The scale (18) shows the distance between the highest position and the carrying arm.

Never allow the enlarger to be moved or shaken by taking hold of the base plate, as this may cause damage to the automatic servo adjustment mechanism.

IMPORTANT

In order to ensure perfect functioning of the servo-table adjustment mechanism it should be regularly and thoroughly oiled (about once a fortnight) by the red ring on the top of the carrying arm cover (44).



The condenser combination table at the end of the instructions sets out the minimal and maximal enlargement factors obtainable with various lenses. The largest workable format can be arrived at by multiplying the appropriate negative format by the enlargement factor. Moving the enlarger head by means of the knob (30) gives the required format; turning the handle (33) will ensure that the format is filled and the picture sharp.

Exposure can be made by means of either the baseboard switch (51) or a time-clock. To achieve enlargements of more than 24×32 in. (60×80 cm) (the size of the baseboard), use wall-projection (first turning the enlarger head through 90°).

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The drawer (26) on the left-hand side of the lamp housing is intended to take colour filters of format $4\frac{3}{4}$ in., sq. (12×12 cm); a retaining spring keeps them in position in the enlarger head. To insert filters, pull out the drawer as far as it will go, using the handle (26). By gently tilting the drawer upwards, it may be withdrawn. It may also be inserted on the other side; to do this, remove the metal cover (54) and fix the retaining screw for the drawer on the upper side and assemble the metal cover on the other side of the enlarging head.

For the production of colour enlargements by the additive process, the LATIRAD filter turntable (available separately) is required; while the LAVAKO attachment is necessary when the Agfa colour head is being used with continuous colour filters. (See Accessories section).

For reducing work a lens should be chosen the length of which corresponds to the image-diagonal of the reduction required. If, for instance, a $7 \times 91/_2$ in. $(18 \times 24 \text{ cm})$ original is to be reduced to $21/_2 \times 31/_2$ in. $(6.5 \times 9 \text{ cm})$, the required focal length is 105 mm. When making reductions it is necessary on account of illumination to move the lamp close to the heat filter; care should however be taken that they do not actually come into contact. Relevant possibilities for reductions are calculated by reference to the table, multiplying the negative format and the factor. In order to make possible reductions with a 5 cm focal length, the lens (which for enlargements was screwed to the LATUB II tube in the sunken position) must be mounted on the flat LAPLA bed plate; if this is not done, it will not be possible to bring the lens close enough to the base plate.

A 7.5 cm lens can only be brought close enough to the base plate to permit reductions down to $0.55 \times$ that is to say, a 9×12 cm negative may be reduced to 9×0.55 by $12 \times 0.55 = 4.95 \times 6.60$ cm.

Generally speaking, the principle holds good for distortion correction, that the three optical planes (negative, lens and projection planes) are so inclined that their lines, if continued, would intersect in a single point; this means that the projected image will be sharp over its entire surface, with no need to stop down. Distortion control with the LABORATOR 138 S may be carried out by any one of four different methods, each of which gives equally good results.

 a) After turning the handle (24), swing the enlarger head round to « L » as required, and by turning the same handle (24) secure it at « F ». The extent of tilt of the enlarger head may be read off from the large scale (23).

Enlarging and focusing

Colour enlargements

Reductions

Distortion control

After loosening and exerting slight pressure on the handle (39), bring the lens holder back to the horizontal position.

In order to effect complete distortion control, the base plate also must be inclined, after releasing the retaining lever (34) and undoing the two support pins (10). (For possible previous centering of the base plate - see under NEGA 138 negative carrier).

- b) Allow the enlarger head to remain in the vertical position, inclining towards each other the lens holder and base plate only.
- c) Allow the base plate to remain in the horizontal position, inclining only the enlarger head and lens holder.
- d) Incline towards each other the base plate, and enlarger head with lens holder.

Care should be taken to ensure that the whole of the lens is always fully utilised, and every falling-off in brightness or sharpness is eliminated. In order to achieve this, bring the lens back into the optical axis by turning the lens mounting (41). The movement involved can be read off on the scale (43).



Copying

In order to use the LABORATOR 138 S as a copying apparatus, the following special accessories are required:

1. LARKA copying cassette. It consists of a closed frame and a ground-glass focusing screen. Plateholders, reducing adaptors for $1\frac{3}{4} \times 2^{3}\frac{8}{8}$ (4.5×6 cm), $2\frac{1}{2} \times 3\frac{1}{2}$ (6.5×9 cm), $3\frac{1}{2} \times 4\frac{3}{4}$ (9×12 cm) and 4×6'' (10×15 cm) plates, sheet-film adaptors for the film sizes $1\frac{3}{4} \times 2^{3}\frac{8}{8}$ (4.5×6 cm), $2\frac{1}{2} \times 3\frac{1}{2}$ (6.5×9 cm),

 $3\frac{1}{2} \times 4\frac{3}{4}$ " (9×12 cm), 4×6" (10×15 cm) and 5×7" (13×18 cm) as well as sheet-film holders for $3\frac{1}{4} \times 4\frac{1}{4}$ " (8×11 cm) (quarter-plate), $4\frac{3}{4} \times 6\frac{1}{2}$ " (12×16.5 cm) (half-plate), 4×5" (10×13 cm) and 5×7" (13×18 cm) films, are supplied to special order.

2. DURST RILU Copy Light Unit featuring two hard-chromium plated steel arms which support the lamps and are attached to the rear edge of the baseboard by means of sturdy clamps. The height of the arms can be regulated, and they can be locked in position by means of a screw. Each arm has two individually circuited lamps, which can be moved backwards and forwards along the arm and swung up and down. Opal lamps of up to 150 W are used in each one. Each lamp is also equipped with a light diffusing screen to ensure even illumination of the baseboard. Special effects can be achieved by using colour or polarization filters instead of the diffusing screen. The lamp arms can be swung back when the lamps are not in use, so that they are not in the way.

The RILU copy light unit can also be used in conjunction with other enlargers or copy cameras. If it is not possible to attach it directly to the baseboard with the clamps, the connecting pieces supplied with the unit should be screwed onto the baseboard first. Special extension arms RILAR can be supplied separately for providing uniform illumination of originals larger than 12×16 in. $(30 \times 40 \text{ cm})$ in size.



Mode of operation when copying

The LARKA copying cassette is pushed right home into the enlarger head in place of the normal negative carrier. To insert the cassette, grasp it by the two hinged retaining clips (a) so that they can be slid past the right-hand control knob for operating the format masks without fouling it.

There is a clamping screw (b) on each of the two clips, and on the right-hand clip there is also a locking screw (c) for eliminating lateral play in the cassette. After the LARKA has been inserted into the enlarger head, the two retaining clips (a) are folded downwards so that their jaws engage beneath the ribs on the enlarger head. Then tighten first the locking screw (c) and subsequently the two clamping screws (b). The size and definition of the image may be adjusted by either of the two following methods:

- a) By viewing it in the mirror: Undo the knurled screw (49) holding the lamphouse cover and swing the cover upwards, take out the mirror (50) by means of its handgrip and replace it in its grooves with the silvered surface facing downwards. Then switch on the copy-board illumination, whereupon the original and the negativeformat grid lines on the groundglass screen (f) will appear reflected in the mirror (50). The size of the image can then be adjusted to fit within the required area by moving the enlarger head up or down the column, whilst the focus is controlled by turning the appropriate handwheel. When viewed from above, the original must appear free from specular reflections. When undertaking all forms of copying work the lens should be well stopped-down (preferably to f/11) in order to obtain the best possible definition.
- b) By projection: Switch on the enlarger lamp and project the negative-format grid lines on the ground-glass screen (f) on to the original to be copied. By adjusting the elevation of the enlarger head it will be possible to make the area covered by the projected format grid-lines coincide with that of the original. Finally focus the image of the grid sharply by turning the appropriate handwheel.



Slide the guide bar (d) right up to its left-hand stop by means of the milled grip (e), and position the plate-holder, loaded with a suitable plate or sheet film, beneath the ground-glass screen with the darkslide facing downwards. Then hook the clip (g) of the guide bar (d) on to the plate-holder and pull the bar as far as it will travel towards the right, which action will slide the plate-holder completely underneath the focusing screen (f). In order to ensure that the darkslide only is withdrawn when exposing the film or plate, the holder should be locked in position by turning the knurled knob (i) to the right. In order to open plate-holder, push the guide bar (d) as far as it will go to the left. By turning the milled grip (e) on the guide bar (d), the opening travel of the darkslide can be adjusted. The film or plate may then be exposed by switching the copyboard lighting unit on and off. Finally, close the darkslide once again by pulling the guide bar (d) towards the right.

Rotate the knurled knob (i) in a counter-clockwise direction and then push the guide bar (d) towards the left. The closed plateholder may then be withdrawn from the frame and can be detached by pressing the clip (g) together.



The DURST LABORATOR 138 S has been designed to stand up to intensive use yet demanding a minimum of maintenance. It never fails to give the highest performance even in the most unfavourable working conditions. In order to maintain the automatic lubrication of the rollers on the column, oil should be applied to the red-marked points (44) from time to time, after the dust-impregnated greasy film has been removed from both column and guides. For this purpose we recommend the use of the rothenized special oil (codeword OIL) best suited for phototechnical precision equipment, available in plastic tubes of approx. 60 cubic cm contents on special order.

On no account use heavy oils or greases and lubricants containing acids. If after long use the enlarger head should tend to slip when the ball handle (30) is operated, remove black cover plate (38) (after undoing the 3 screws) and retension the spiral spring by tightening the now accessible square nut. The highest position of the head is recommended when the enlarger is not in use.

For dusting and cleaning the cover glasses of the carriers, condensers and mirror, a chamois leather of soft brush should be used. Antistatic agents are also recommended. Do not allow the opal lamp to burn unnecessarily and use only the switch on the baseboard for exposures. LARKA

Maintenance

Accessories

LAVAKO Adapter for use of Colour Filter Head If it is desired to use the AGFA Colour-Head with continuous colour filters with the DURST LABORATOR 138 S, the LAVAKO attachment will be required. First remove the metal ring of the filter head by unscrewing the four screws. Use these screws to attach the LAVAKO, employing the screw holes provided on the AGFA colour filter head. All controls to face the front.

The lid of the LABORATOR housing should be taken off by first removing the hinge pin, then the mirror. Now, place the LAVAKO (to which the colour head has been attached) into the grooves of the LABORATOR housing and secure it with the two lateral knurled screws. The plug of the colour head is plugged into the socket on the base board. (Note the voltage of the lamp!). The correct operation of the colour head is described in the AGFA instructions. When using the AGFA colour head with the LABORATOR, the condenser combinations should be employed as indicated in the table (LAVAKO + AGFA Colour-Head) at the end of this booklet. The most suitable illumination is obtained by adjusting, that is to say, turning the LAVAKO knob. A graduated dial makes it easy to reset any previously used setting.



LAVAKO

Pris filte Peris-filte Dem d a c b g e f

LATIRAD

LATIRAD Turntable filter-disc

The LATIRAD filter turret can be used for:

- 1. Making colour enlargements by the additive method, using three standard tri-colour filters;
- 2. producing colour separations for process work;
- 3. enlarging on variable-contrast papers.

The LATIRAD consists of a revolving plastic disc with four circular apertures in which filters of 70 mm diameter (and up to 4.2 mm thickness) can be fitted. The filter turret is fitted in place of the red filter, on the same spindle.

The opening in the upper cover disc has a rubber rim which surrounds the lens in use. To obtain an absolutely light-tight seal

between the lens and the filter turret, three plastic rings are provided, which can be cut out to suit the lenses employed in the enlarger.

A supplementary turret (LAZURAD) is available for using more than three colour filters; one or even two of these turrets can be fitted on the spindle. Very thin gelatine or celluloid filters, if used, should be held in place with LARING retaining rings.

OPERATION

With the lens already in position, detach the normal red filter by removing the screw at the end of the filter spindle, taking care not to lose the ball-catch. Now fit the turret cover (a) by sliding the bush (b) over the swing-filter spindle, so that the inscription is uppermost and the aperture (c) faces the front. The actual turret (d) - with the filters in position - is then slid over the bush and both components are secured by fitting locking ring (e) and tightening the knurled screw (f). The cover (a) and the turret disc (d) should fit closely although not too tightly together; knurled screw (f) must not of course project into the aperture (c). If a perfect light-seal between the filter and lens is required for particular types of work, then a plastic washer (g) should be laid over the opening in the cover (a). Cut the washer so that its diameter is slightly greater than of the front lens. Finally push the whole LATIRAD unit up the swing-filter spindle until the washer (g) is in contact with the lens; it should however still be possible to adjust the lens diaphragm.

Adjustable extension tube for reductions and macro-photographs. The lens is screwed on DUTUB II and so far from the negative plane.

DUTUB II Extension tube



DUTUB II



GRAHAL



GRANE 138

To ensure precision in all photographic operations requiring extreme accuracy of register, the following interchangeable accessories are available, for use in the punch register system: the GRAHAL positioning frame, the GRANE 138 negative carrier for films up to 5×7 in. (13×18 cm), and the GRALO precision perforator.

The GRAHAL positioning frame is inserted in place of the normal NEGA negative carrier and fastened in place so that it will not

GRANE 138, GRAHAL and GRALO (registration equipment) move; it incorporates a guide device for the automatic centering of the GRANE negative carrier. This makes use of centering pins on to which the film (already perforated by the punch) is fitted. The film lies between two glass plates, the upper of which is also available in a special finish with anti-Newton coating.

For punching even the thinnest film, the GRALO precision punch is used, which has adjustable distances between punch-holes (80 and 120 mm) as well as from the margin (1 to 5 mm). Smallformat films should be perforated by means of the micro-perforator (MIGRALO), and centered by means of the MIGRAFI metal adaptors in the formats 35 mm (24×36 mm), $1\frac{1}{2}$ " sq. (4×4 cm), $2\frac{1}{2}$ " sq. (6×6 cm) and $2\frac{1}{2} \times 3\frac{1}{2}$ " (6.5×9 cm).

The GRAVACU suction plate, which is part of the standard equipment of the LABORATOR G 139 enlarger, can also in certain circumstances be mounted on the carrying arm (11) of the LABORATOR 138 S, by making use of the VADAP adaptor piece.



GRALO





MIGRAFI



MIGRAFI

LACUF Protection cover

DURST ME 500, ME 1000 and ME 2000 Voltage regulators Practical plastic dust cover providing protection against dust and humidity of the darkroom.

Further accessories

The voltage stabilizers DURST ME 500/1000/2000 designed for use with enlargers up to a total load of 500, 1000 and 2000 W respectively, are absolutely essential to avoid faulty exposure, particularly with colour film, if the mains voltage is inclined to fluctuate. These stabilizers are fully automatic and will maintain any adjusted voltage between 110 and 220 V within a variation of \pm 1%. Naturally, lamps can be choked or overrun. It is also possible to connect several enlargers to one and the same stabilizer.

A useful addition to your darkroom is the safelight lamp PENTA-COLOR. It is equipped with five interchangeable colour filters - white, orange, ruby red, olive green and pan green. The filters are fitted



in a turntable, so that the type of light required for the darkroom can be instantly adjusted. A heat-absorbing filter prevents blistering or warping of the filters. Direct or indirect lighting can be obtained by swivelling the lamp, which can be either attached to the wall or placed on the table.

This masking frame relieves the operator of much manual and mental labour when enlarging on different paper sizes. It consists of a cast frame, which is coated with annealing lacquer and impervious to chemical action, with independently adjustable mask bands. Any required width of edge from 5/32 in. to 13/8 in. (4 to 35 mm) can be obtained with the aid of these mask bands and a paper stop, which is adjusted by means of a milled knob.

All paper formats up to 10×12 in. (24×30 cm) can be used. The frame can be easily adapted to formats in inches, and can be supplied at extra charge with a baseboard covered with formica.

DURST 243

TESTNEGATIVE



Check the performance of your lens with the aid of this test negative, available separately; it can also be used as a focusing aid. This test negative is available in the formats 35 mm (24×36 mm), $2\frac{1}{2} \times 3\frac{1}{2}$ " (6.5×9 cm) and 5×7 " (13×18 cm).

Test negative

Descriptions and illustrations without warranty

DURST 243 Masking frame