Durst Laborator 138 S and Color Laborator 138

Operating manual

Durst®

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Exclusive agent for Durst Large Format optical enlargers.

www. durst-pro-usa.com

1600 NE 25th AVENUE, HILLSBORO, OR. 97124.

USA - Phone 503 846 1492 - Fax 503 640 1878

Email; sales@world-images-inc.com

With the Durst Laborator 138 S you have acquired a high-performance product of Durst Inc., Bolzano, Italy, assuring outstanding quality with utmost care in workmanship and quality control. This top-class unit with its convenient and reliable operation will serve you well for all colour and black-and-white enlarging work. Successful operation however depends on precisely following the operating instructions. This manual aims to explain systematically both the assembly and the handling of your unit. Please take the time and trouble to read this manual thoroughly. By becoming familiar with all operations and controls you avoid annoying errors or even damage.

Contents

1.0.0. General note

The Durst Laborator 138 S is a universal enlarger for all negative sizes up to 5 x 7 inches or 13 x 18 cm. The Laborator 138 S is supplied equipped either with a condenser lamphouse as a black-and-white enlarger or with one of the two colour mixing heads (CLS 301 or CLS 300) as a colour enlarger. The Durst Laborator 138 S is suitable for use as a vertical or as a horizontal colour and black-and-white enlarger.

2.0.0. The outfit

2.1.0. Technical data

Dimensions and weight

Overall height (fully raised enlarger head)	86 5/8 inches (2200 mm)
Height of stand	81 7/8 inches (2080 mm)
Highest position of negative carrier	73 3/4 inches (1875 mm)
Optical axis/column distance	14 1/8 inches (360 mm)
Baseboard size	31 1/2 x 23 5/8 inches (800 x 600 mm)
Usable baseboard area	31 1/2 x 23 5/8 inches (800 x 600 mm)
Filter size for filter drawer	4 3/4 x 4 3/4 inches (120 x 120 mm)
Floor space requirement	25 5/8 x 31 1/2 inches (650 x 800 mm)
Net weight (standard outfit)	121 lbs (55 kg)

Magnification and reduction ranges

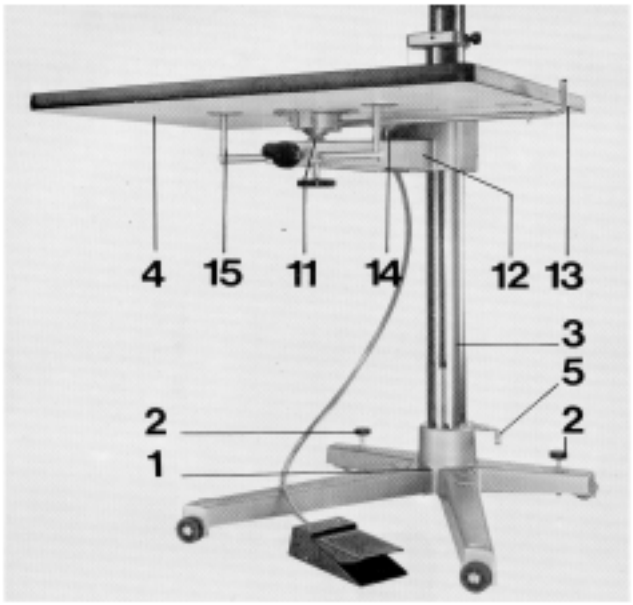
Focal length of lens		Linear magnification	
mm	inches	maximum	minimum
50	2	28.5	0.40
75	3	18	0.40
100/105	4 1/8	11.8	0.28
135	5 1/4	9.5	0.40
150	6	8.5	0.43
180	7 1/8	6.6	0.55
210	8 1/4	5.3	0.76
240	9 1/2	4.4	0.90

2.2.0. Checking out

The Laborator 138 S is shipped in a special packing to protect it against breakage. Before assembly clean all parts carefully with a cloth. First check that all components are there. To make the assembly instructions clearer, all components of the enlarger and the operating controls are numbered. This numbering covers the basic unit and the condenser lamphouse for black-and-white enlarging. Detailed assembly instructions and a numbered listing of the elements of the CLS 301 and CLS 300 colour mixing heads are contained in the appropriate instruction manuals.

2.3.0. Components and controls of the basic unit

1 Base
2 Locking screws for base
3 Lower column
4 Baseboard
5 Clamping lever for lower column
6 Clamping lever to lock upper column
7 Upper column
8 Milled screw
9 Shaft of milled screw
10 Bolts for wall mounting
11 Ball joint of baseboard adjustment
12 Baseboard carrying arm
13 Baseboard clamping lever
14 Baseboard adjustment screw
15 Baseboard support stays
16 Milled screw for mirror housing
17 Mirror flap
18 Mirror
19 Condenser guides
20 Bolts to fix colour mixing head
21 Mask adjustment knobs
22 Springs to hold pressure glasses
23 Negative carrier springs
24 Rear location holes
25 Hairline cross of focusing negative
26 Front location holes
27 Focusing negative of NEGA 138
28 Milled wheel of NEGA 138 negative carrier
29 Lever to raise negative carrier
30 LADANE 138 guide pins
31 LADANE 138 clamping strip
32 LADANE 138 spring
33 LADANE 138 latch
34 NEGA 138 distortion control knob
35 Enlarger head
36 GRAHAL clamping cheeks
37 GRAHAL clamping screw
38 GRAHAL securing screw
39 GRAHAL release knob
40 Bent up panel of NEGA MC
41 Centering guides of NEGA MC
42 Milled screw of lamphouse panel
43 Lamp fitting
44 Red milled screws of LANIT
45 Heat filter guides
46 Cover of LAFAN socket
47 Lamp centering knob
48 Lamp centering knob
49 Lamp centering clamping ring
50 Filter drawer
51 Enlarger head adjustment knob
52 Enlarger head locking knobs
53 Rapid adjustment lever (disengages the friction drive)
54 Locking knob of servo mechanism
55 Foot pedal of baseboard servo adjustment
56 Focusing knob
57 Lens carriage locking screw
58 Coarse focusing clamping knob
59 Scale of vertical enlarger head movement
60 Scale of vertical baseboard movement
61 Focusing scale (vertical lens carriage movement)
62 Enlarger head tilt scale
63 Lens tilt scale for distortion control
64 Knob to incline enlarger head
65 Stop in LAFIL filter drawer
66 Lens carriage tilting knob
67 LARKA 138 ground glass screen
68 LARKA 138 guide bar
69 Milled knob of LARKA 138
70 LARKA 138 film/plate holder
71 Clip on LARKA 138 guide bar
72 Milled knob of LARKA 138
73 Lubricating nipple
74 Cover plate of vertical movement



2.4.0. Assembly

2.4.1. The base and lower column

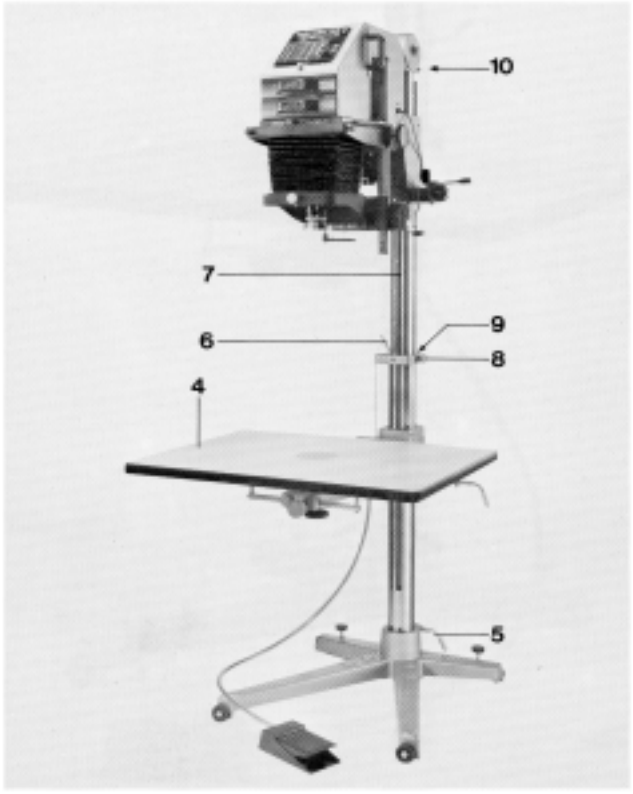
Place the base (1) on the floor and screw in the two screws (2) to stop it from moving. Check that the base stands really firmly without rocking. Insert the lower column (3) with the baseboard (4) mounted on it into the base (1) and clamp tight with the clamping lever (5). If the Laborator 138 S is set up for horizontal projection, the unit should be mounted on rails to run accurately towards or away from the projection easel. T-rails are ideal and should either be concreted into the floor or bolted down on it. Details of the required rail type and dimensions are given on page 16.

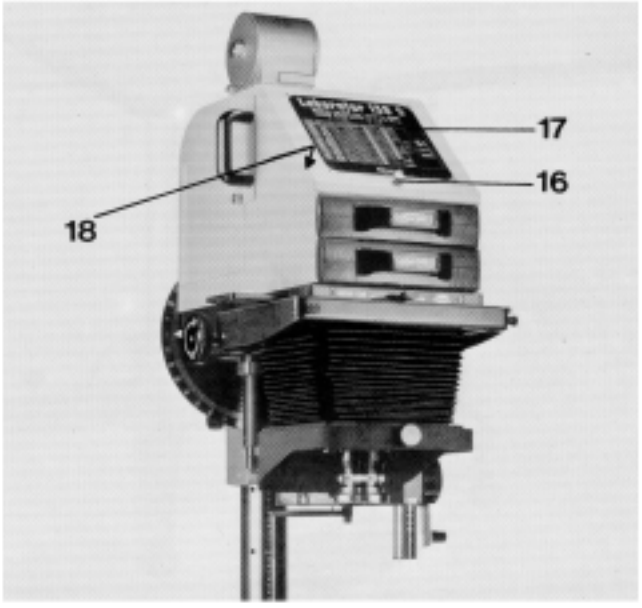
2.4.2. The top section

Slack off the clamping lever (6) and insert the upper column (7) into the lower column (3). Check first that the milled screw (8) is fully slack. The shaft (9) of the milled screw must engage the slot of the column. This secures it in the lower column (3). Then tighten the clamping lever (6). Where the Laborator 138 S is used exclusively for vertical projection, it can in addition be attached to the darkroom wall with wall hooks. The column top of the Laborator 138 S carries two small screw bolts (10) to take the wall hooks.

2.4.3. The baseboard

Place the baseboard (4) with its ball joint (11) on the carrying arm (12) and secure with the locking knob (13). Note that the baseboard (4) is supported at the rear by the adjustment screw (14). This adjustment screw and the two supporting stays (15) hold the baseboard truly level.





2.4.4. The condenser lamphouse

Where the Durst Laborator 138 S is ordered as a black-and-white enlarger with condenser lamphouse, the latter is already mounted on the enlarger head. Turn the milled screw (16) to open the mirror flap (17) of the Laborator 138 S and remove all packing material from the mirror (18). Refit the mirror (18) and close the flap (17). The Laborator 138 S is supplied with or without condensers, as ordered. Push the two LATICO single condensers, with their curved sides facing each other, into the guides (19) provided for the purpose.

2.4.5. The CLS 301 and CLS 300 colour mixing heads

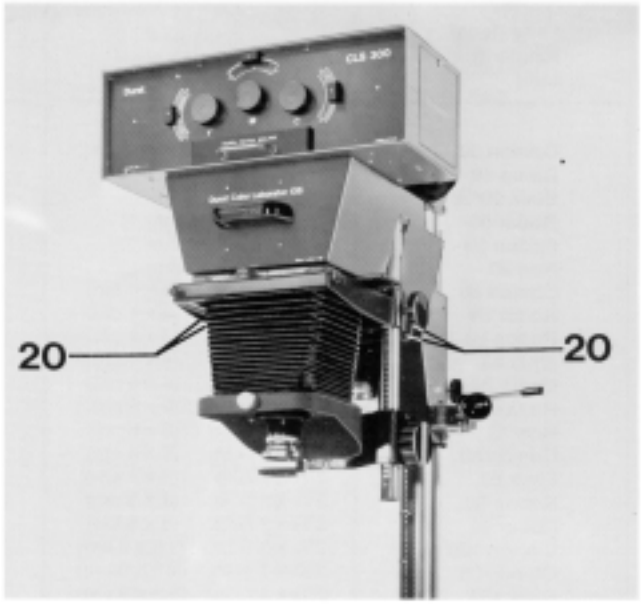
Where the Laborator 138 S is supplied complete with the CLS 301 or CLS 300 colour mixing head, this is mounted on the enlarger head with the four bolts (20). For further details on the operation of the colour mixing head see the appropriate instruction manual.

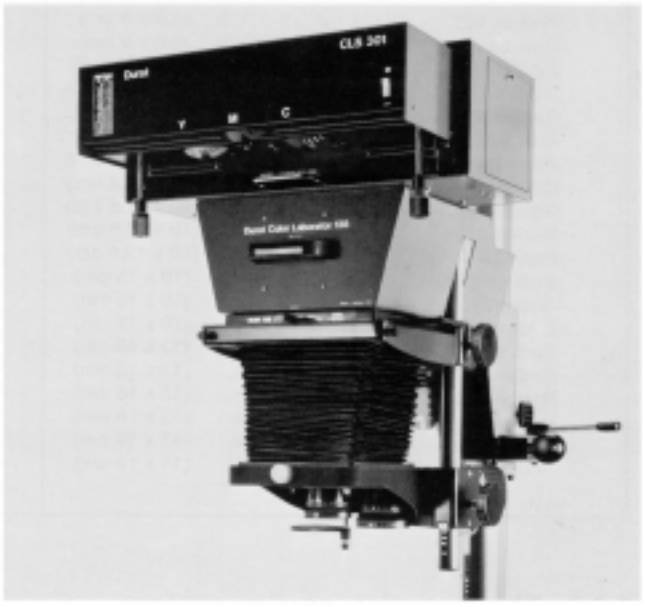
2.4.6. The BLAWIKIT 138 diffused lighting system

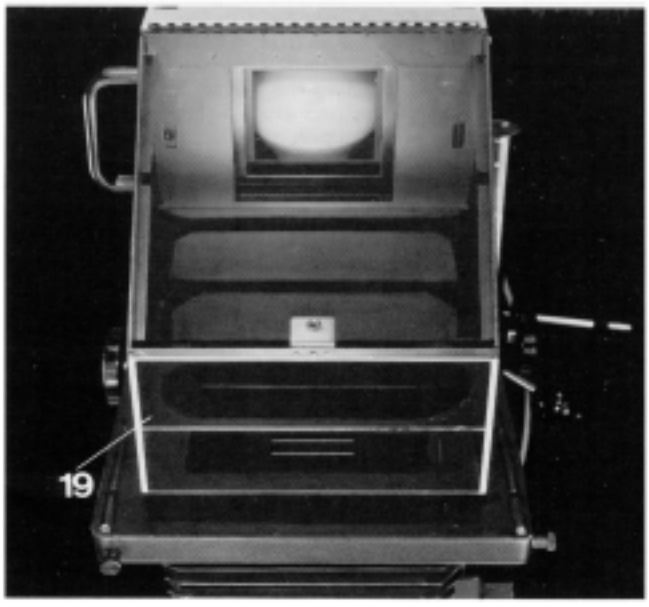
Where the Laborator 138 S is supplied with the BLAWIKIT condenserless black-and-white lighting unit, this again is mounted on the enlarger head with the four bolts (20).

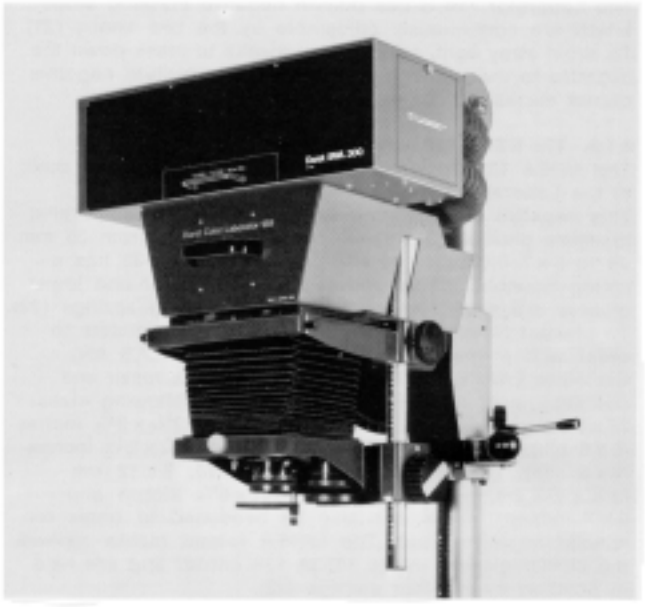
3.0.0. Lenses and lens mounting

The Laborator 138 S takes all lenses of focal lengths from 50 to 240 mm. The lenses are fitted either on a single UNIPLA panel or a TRIPLA three-lens turret. When fitting the lens select the panels according to the following table; this also shows the largest negative size with which the various focal lengths can be used.









Lens (focal length in mm)	Largest negative size	Lens panel and basic panel
Comon 50	24 x 36 mm	LATUB + IXODAP on UNIPLA or SEIMAR + IXODAP on TRIPLA
Comp 50	24 x 36 mm	LATUB on UNIPLA or SEIMAR on TRIPLA
Elnik 50/28	24 x 36 mm	LATUB on TRIPLA or UNIPLA
Rodar 50	24 x 36 mm	LATUB on TRIPLA or UNIPLA
Rodon 50	24 x 36 mm	LATUB K on UNIPLA
Ron 50	24 x 36 mm	LATUB + IXODAP on UNIPLA or SEIMAR + IXODAP on TRIPLA
Comon 60	$1^5/_8$ x $1^5/_8$ in. (4 x 4 cm)	LATUB + IXODAP on TRIPLA or UNIPLA
Rodar 60	$1^5/_8$ x $1^5/_8$ in. (4 x 4 cm)	LATUB on TRIPLA or UNIPLA
Rodon 60	$1^5/_8$ x $1^5/_8$ in. (4 x 4 cm)	LATUB K on TRIPLA or UNIPLA
Elnik 63	$1^5/_8$ x $1^5/_8$ in. (4 x 4 cm)	LATUB on TRIPLA or UNIPLA
Comp 75	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7525 on UNIPLA or TRIPLA
Rodar 75	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7539 on UNIPLA or TRIPLA
Ron 75	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7525 on UNIPLA or TRIPLA
Comon 80	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7525 on UNIPLA or TRIPLA
Elnik 80	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7539 on UNIPLA or TRIPLA
Rodon 80	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7539 on UNIPLA or TRIPLA
Rodar 90	$2^1/_4$ x $2^1/_4$ in. (6 x 6 cm)	SEIPLA 7539 on UNIPLA or TRIPLA
Comon 100	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 32 on UNIPLA or TRIPLA
Comp 105	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 32 on UNIPLA or TRIPLA
Elnik 105	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 39 on UNIPLA or TRIPLA
Rodar 105	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 39 on UNIPLA or TRIPLA
Rodon 105	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 39 on UNIPLA or TRIPLA
Ron 105	$2^1/_2$ x $3^1/_2$ in. (6.5 x 9 cm)	LAPLA 32 on UNIPLA or TRIPLA
Comon 135	$3^3/_8$ x 4 in. (8.5 x 10 cm)	LAPLA 42 on UNIPLA or TRIPLA
Rodar 135	$3^3/_8$ x 4 in. (8.5 x 10 cm)	RODING 5071 on UNIPLA or TRIPLA
Rodon 135	$3^3/_8$ x 4 in. (8.5 x 10 cm)	RODING 3917 on UNIPLA or TRIPLA
Ron 135	$3^3/_8$ x 4 in. (8.5 x 10 cm)	SORING 3975 on UNIPLA or TRIPLA
Aron 150	4 x 5 in. (10 x 12.5 cm)	SORING 26.5 on UNIPLA or TRIPLA
Comon 150	4 x 5 in. (10 x 12.5 cm)	LAPLA 42 on UNIPLA or TRIPLA
Rodar 150	4 x 5 in. (10 x 12.5 cm)	RODING 5071 on UNIPLA or TRIPLA
Rodon 150	4 x 5 in. (10 x 12.5 cm)	RODING 5071 on UNIPLA or TRIPLA
Ron 150	4 x 5 in. (10 x 12.5 cm)	SORING 32 on UNIPLA or TRIPLA
Comon 180	4 x 6 in. (10 x 15 cm)	SORING 50 on UNIPLA or TRIPLA
Rodar 180	4 x 6 in. (10 x 15 cm)	RODING 58 on UNIPLA or TRIPLA
Rodon 180	4 x 6 in. (10 x 15 cm)	RODING 5072 on UNIPLA or TRIPLA
Comon 210	5 x 7 in. (13 x 18 cm)	SORING 55 on UNIPLA or TRIPLA
Rodar 210	5 x 7 in. (13 x 18 cm)	RODING 72 on UNIPLA or TRIPLA
Rodon 210	5 x 7 in. (13 x 18 cm)	RODING 58 on UNIPLA or TRIPLA
Aron 240	5 x 7 in. (13 x 18 cm)	SORING 5375 on UNIPLA or TRIPLA
Comon 240	5 x 7 in. (13 x 18 cm)	SORING 66 on UNIPLA or TRIPLA
Rodon 240	5 x 7 in. (13 x 18 cm)	RODING 72 on UNIPLA or TRIPLA

4.0.0. The negative carrier system

The Laborator 138 S has built-in negative masking strips which are continuously adjustable by the two knobs (21). To avoid stray light, adjust these masks to mask down the negative to the required image area. The built-in negative carrier masks can be used with all negative carriers.

4.1.0. The NEGA 138 negative carrier system

The NEGA 138 negative carrier is part of the basic outfit of the Laborator 138 S.

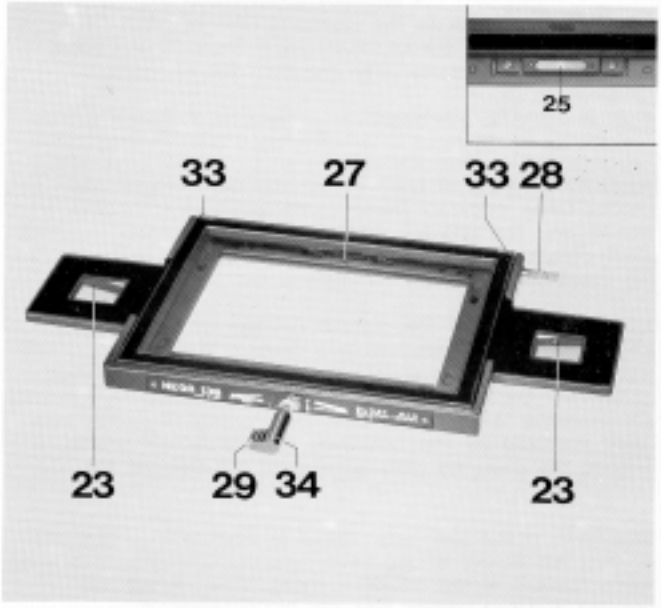
This negative carrier contains two matched plane-parallel pressure glasses (GLAS) which take all films from 35 mm up to 5 x 7 inches or 13 x 18 cm. The NEGA 138 has a spring-mounted, hinged top section. The upper and lower glasses are each secured with four clamping springs (22). To prevent Newton's rings, the top glass is available to order with a special anti-Newton coating (GLAS AN). Glassless LAPFE mask sets (consisting of a mask and counter mask) are also available in the following sizes: 24 x 36 mm, $1^3/_4$ x $2^1/_4$ inches (4.5 x 6 cm), $2^1/_4$ x $2^1/_4$ inches (6 x 6 cm), $2^1/_4$ x $2^7/_8$ inches (56 x 72 mm), $2^1/_4$ x $3^1/_4$ inches (6 x 9 cm), $2^1/_2$ x $3^1/_2$ inches (6.5 x 9 cm), 9 x 12 cm ($3^1/_2$ x $4^3/_4$ inches), 4 x 5 inches, $4^3/_4$ x $6^1/_2$ inches and 5 x 7 inches. Masks can also be produced to order for special negative sizes. The LAPFE format masks replace the carrier glasses in the NEGA 138 carrier and are held in position by the four springs (22).

To permit rapid centering of the NEGA 138 carrier in the optical axis, and to hold it securely in position during horizontal enlarging, the enlarger head carries locating holes. When inserting the NEGA 138 carrier in the enlarger head, first press the springs (23) slightly upwards, and then press them down while pushing the carrier into the centre of the enlarger head so that the studs sliding along the guide grooves engage the appropriate location holes. For correct centering of the carrier in the optical axis, push it in until the studs engage the rear location holes (24).

To centre the focusing negative (27) with hairline cross (25), push in the carrier only far enough to allow the studs to engage in the front location holes (26). A once-and-for-all adjustment of the milled wheel (28) brings the focusing negative (27) into the focal plane of the lower glass or insert. Lock it in this position with the milled wheel (28). As long as the same glass plate or insert is used, the image can then be focused with the focusing negative (27) alone. This also has scales for calculating magnification.

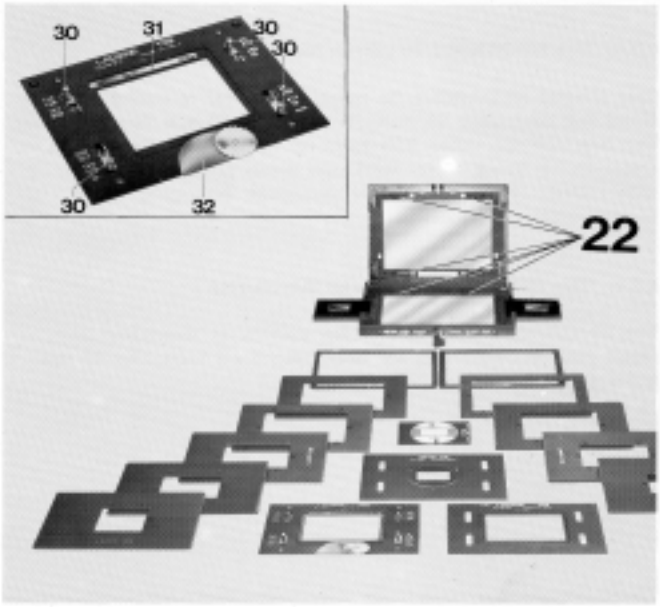
The NEGA 138 negative carrier also takes roll films up to 70 mm wide. To avoid having to remove the negative carrier from the enlarger head when advancing the film strip, turn the lever (29) to the left. This slightly raises the top section of the carrier. The LADANE 138 mask set is recommended for enlarging roll films. This mask set is placed in the NEGA 138 carrier in place of the glass plates and held in position by the four springs (22). The bottom mask of

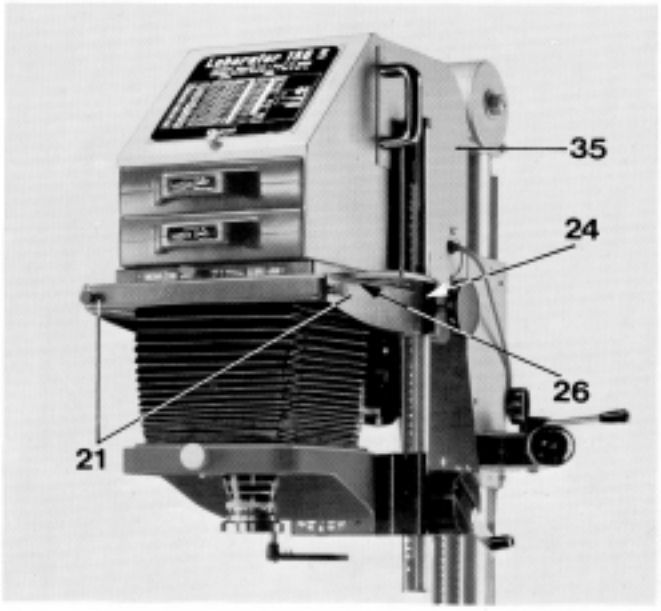
the LADANE 138 insert carries four adjustable guide pins (30) for the most usual film widths. These pins accurately guide the film as the strip is pulled through the carrier. Normally the LADANE 138 set is supplied with two AUDA 70 glass plates. An AUDA 70 AN glass, treated to prevent Newton's rings, can also be used in place of the upper glass plate. For glassless enlarging with the LADANE 138, sets of AUMET masks are available for the following negative sizes: 2¼ x 2¼ inches (6 x 6 cm), 24 x 36 mm, 26 x 26 mm, 18 x 24 mm and 12 x 17 mm. Fit the AUMET metal masks into the LADANE 138 mask set after pushing back the clamping strip (31). Single negatives can be held in position and centered by the spring (32) which is adjustable on turning the milled wheel (28).
The top section of the NEGA 138 is removable on swinging out the two latches (33). In addition, the NEGA 138 carrier also has a distortion control device. To correct converging verticals in the fore-and-aft direction of the projected image, turn the knob (34) to the right. This raises the negative carrier glasses or mask inserts at the front, permitting slight distortion correction of the projected image.

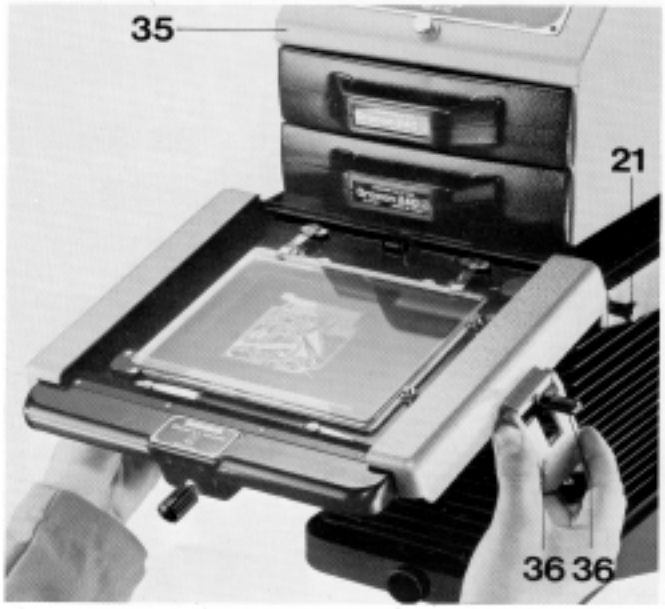


4.2.0. The register negative carrier system

The GRAHAL/GRANE 138 register negative carrier is useful when the Laborator 138 S is to be employed for masking or combination printing techniques. This carrier is also indispensible for graphic arts operations and other special effects. Push the GRAHAL locating frame fully into the enlarger head (35), holding it by the movable clamping cheeks (36) so that these clear the right-hand mask adjustment knob (21). Both cheeks have a clamping screw (37) each at the bottom. The right-hand cheek also has an outside securing screw (38) to eliminate all backlash between the frame and the guide plate of the enlarger head. To ensure correct positioning of the frame, the clamping and securing screws must be slack before pushing the







locating frame into the enlarger head. Once the frame is pushed in, swing down the clamping cheeks (36) to engage below the bracing ribs of the enlarger head. Then tighten first the securing screw (38) and then the clamping screws (37).
Push the GRANE 138 negative carrier fully into the GRAHAL frame, now rigidly fixed in the enlarger head. To remove the negative carrier, turn the release knob (39) of the locating frame to the right or left. The GRANE 138 register negative carrier takes originals from 35 mm up to 5 x 7 inches or 13 x 18 cm. The GRANE 138 is equipped with two matched plane-parallel GRAGLAS 138 pressure plate glasses. Secure the lower glass plate by turning the red milled knob.

Mount the GRADAP 138 register pin bar with its register pins in the GRANE 138 negative carrier. The films, punched with the MIVALO punch, are then fitted with the punched holes over the GRADAP 138 pins. Separate MIGRAFI inserts are available for $2^1/_2$ x $3^1/_2$ inch (6.5 x 9 cm), $2^1/_4$ x $2^1/_4$ inch (6 x 6 cm) and 35 mm negatives. The MIGRAFI inserts replace the pressure plate glasses in the GRANE 138.

Important: If the Laborator 138 S is used with a CLS 300 or CLS 301 colour mixing head, use the GRAHAL C locating frame instead of the GRAHAL frame. The GRANE 138 register negative carrier also fits the GRAHAL C.

4.3.0. The NEGAROLL 70 carrier for 70 mm roll film

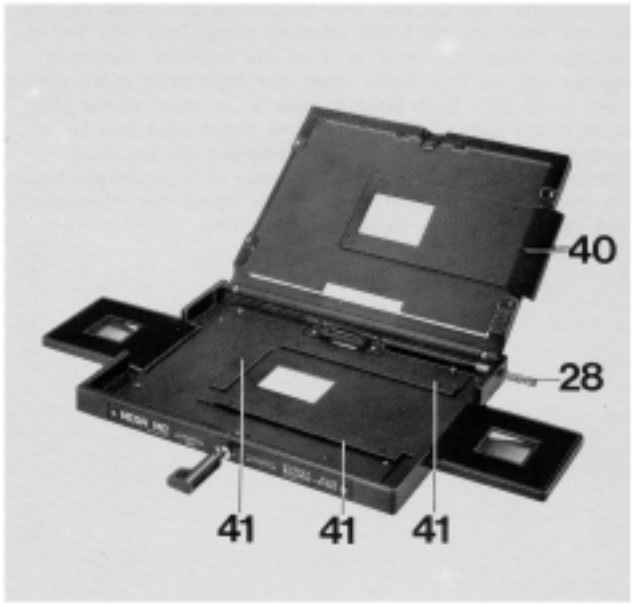
The special NEGAROLL 70 negative carrier is available from Durst for enlarging 16 mm, 35 mm and 70 mm film on reels. The NEGAROLL takes film rolls up to 100 feet (30 metres) and can be fitted either with two glass plates (GLAS) or with LAPFE mask inserts for glassless enlarging (see accessories).

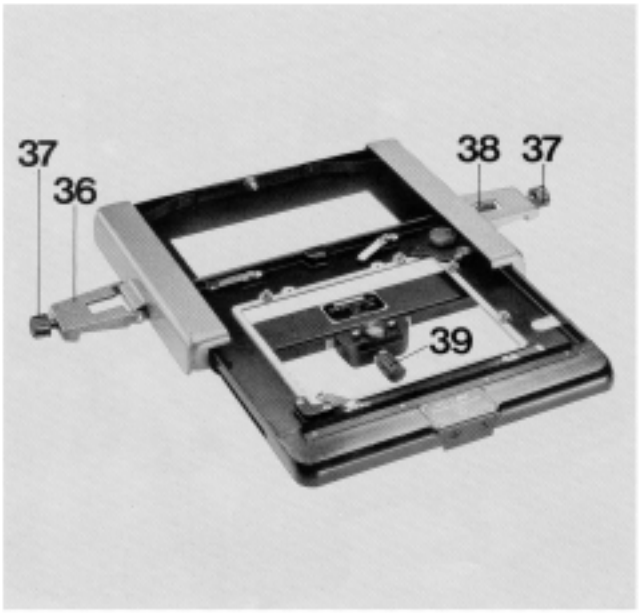
4.4.0. The NEGAROLL 138 aerial film carrier

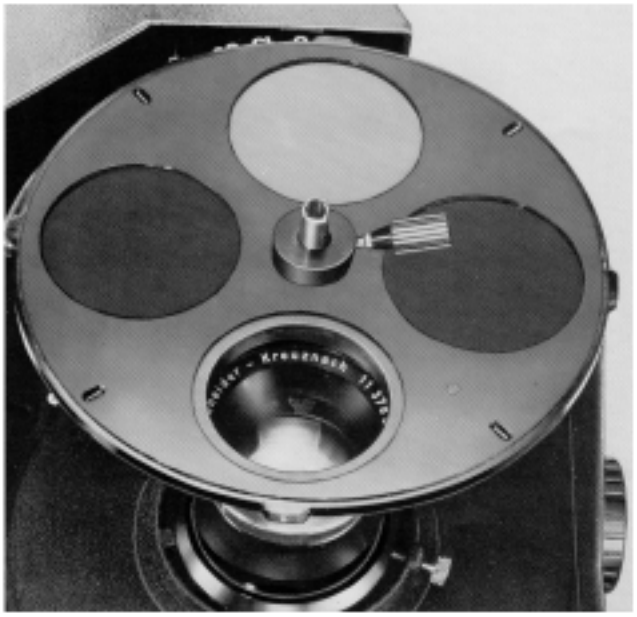
The NEGAROLL 138 aerial film carrier is available from Durst (see accessories) for enlarging 5 x 5 inch and 70 mm wide aerial films.

4.5.0. The NEGA MC carrier for microfilm aperture cards

This is a special negative carrier for enlarging aperture cards holding unperforated 32 x 45 mm microfilm negatives. The NEGA MC consists of a frame with a spring mounted pivoted top section. The NEGA MC handles the microfilm aperture cards without glasses. There is no need to remove the negative carrier from the enlarger head to insert the microfilm aperture card; simply turn the milled lever (29) through half a turn from the left-hand to the right-hand index marking, as shown on the panel on the front of the carrier. This slightly raises the top section of the carrier and allows aperture cards to be pushed in fully from the right underneath the curved plate (40). The guides (41) accurately centre the negative in the card. Then turn the milled lever (29) back again to lower the top section of the carrier and to hold the card fully flat. Like the NEGA 138, the NEGA MC carrier also has a built-in focusing negative with hairline cross. This is handled and used in the same way as with the NEGA 138 carrier.





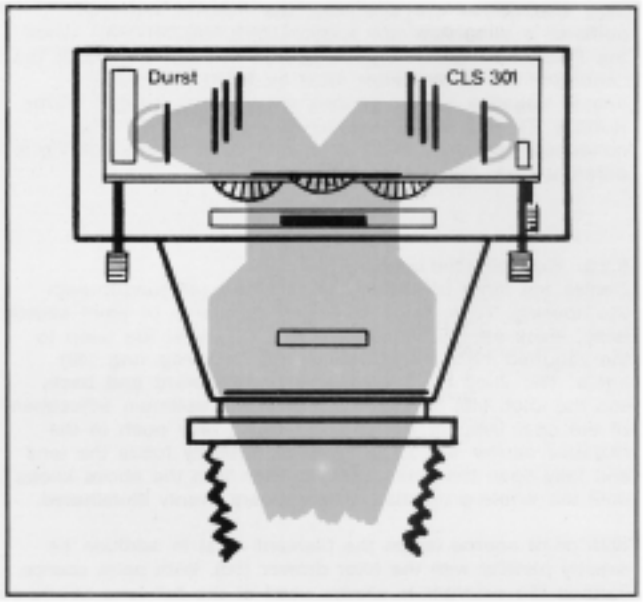


5.0.0. Lighting systems

5.1.0. Colour enlarging

5.1.1. The CLS 301 colour mixing head

When equipped with this colour mixing head, the Laborator 138 S handles all negative-positive and positive-positive colour enlarging work. This colour mixing head contains two 300 watt tungsten-halogen lamps and fadeproof, infinitely variable dichroic filters. Three knobs introduce the filters progressively into the light path. Interchangeable mixing boxes of various sizes ensure optimum diffused illumination of all negative formats.
The assembly and operation of the CLS 301 colour mixing head is described in detail in the appropriate instruction manual.

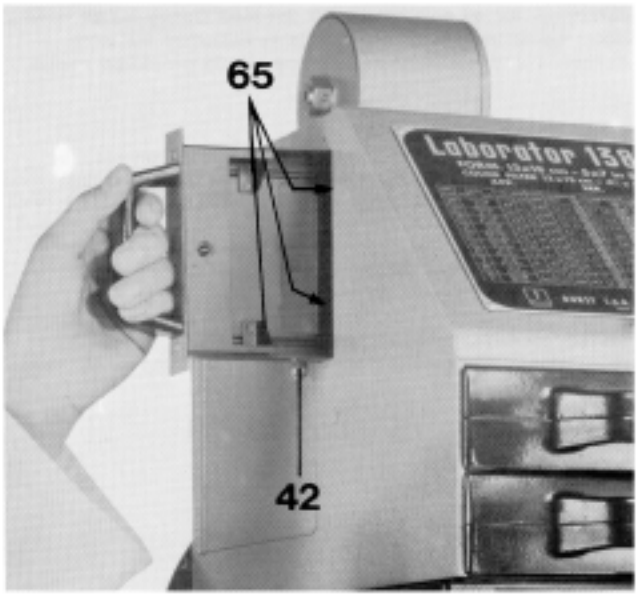


5.1.2. The CLS 300 colour mixing head

Where the Laborator 138 S is primarily intended for horizontal projection, the more powerful CLS 300 colour mixing head is recommended. The CLS 300 uses a pair of 1000 watt tungsten-halogen lamps which allow reasonably short exposure times even at high magnifications. The CLS 300 is similarly equipped with dichroic filters, a diffused lighting system and interchangeable mixing boxes.

5.1.3. The LAFIL filter drawer

The condenser lamphouse of the Laborator 138 S has a built-in filter drawer taking $4^3/_4 \times 4^3/_4$ inch (12 x 12 cm) filters. The drawer is fully removable for easy filter insertion. Glass mounted filters can be held in position with the spring-loaded retaining stop (65).

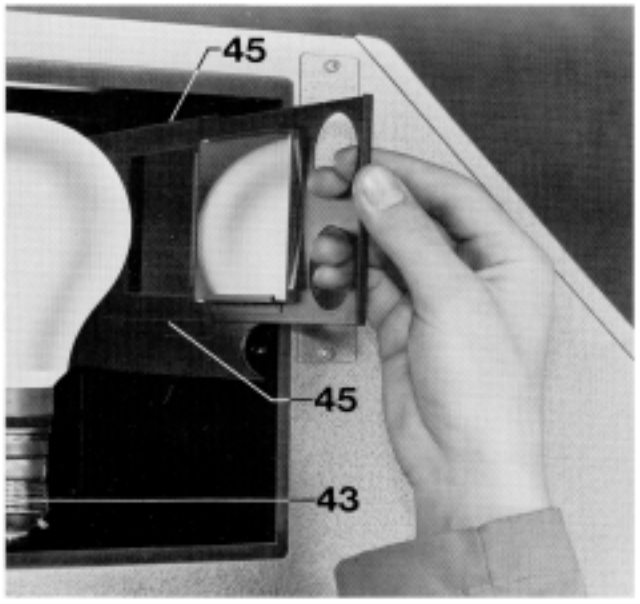


5.1.4. The filter turret

Colour filters can also be fitted underneath the lens with the LATIRAD filter turret (available as an accessory) which is mounted on the red filter shaft of the UNIPLA or TRIPLA lens panels.

5.2.0. Condenser lighting

Slack off the milled screws (42), open the lamphouse flap and screw a lamp in the fitting (43). Then connect the lead of the lamphouse to the mains supply. A timer can be connected between the two.
To ensure even illumination over a whole of larger negative areas, use the large opal bulbs available from Durst (Order Code OPAL for 200, 300 and 500 watts). For smaller negatives up to $2^1/_2 \times 3^1/_2$ inches or 6.5 x 9 cm use smaller opal bulbs. Before use hold each opal bulb against a powerful light source to check for possible flaws in the glass or deposits on the inside of the glass envelope. After prolonged service, or as a result of frequent voltage fluctuations, deposits may be formed on the inside of the bulb which can lead to uneven illumination. With lamps of over 250 watts use the heat filter (Order Code LACALO, available separately). This fits into the guides (45). The LAFAN 138 blower (available separately, see accessories) must be used with lamps of 300 watts and over. Connect the LAFAN hose to the lamphouse after removing the cover (46).



5.2.1. Condenser combinations for opal lamps

The required condenser combination depends on the focal length of the lens and in some cases also on the magnification with a given lens. Note the table of condenser combinations for opal lamps on pages 11-12

5.2.2. Condenser combinations for point source lighting

Where maximum sharpness, detail resolution and contrast is required with shortest exposure times, a point source lighting system is recommended for the Laborator 138 S.

Two alternatives are available: the PULAM/VARIPUT outfit or a zirconium arc source (ZIRLAM/ZIRTRA). When the PULAM or ZIRLAM point source system is used in the Laborator 138 S, the latter must be fitted with surface coated negative carrier glasses (GLAS T), a coated mirror (LASPE T) and coated condensers (LATICO T). The condenser combination required with point source lighting is different from that for opal lamps.

5.2.3. Centering the lamp

Centre the lamp by the knobs (47) and (48) underneath the housing. To raise or lower the opal lamp or point source lamp, slack off the clamping ring (49), adjust the lamp to the required height and tighten the clamping ring (49) again. The knob (47) moves the lamp forward and back, and the knob (48) adjusts it laterally. For optimum adjustment of the opal lamp in the enlarger head, fully push in the negative carrier without a negative. Sharply focus the lens and fully open the lens aperture. Then turn the above knobs until the whole projection area appears evenly illuminated.

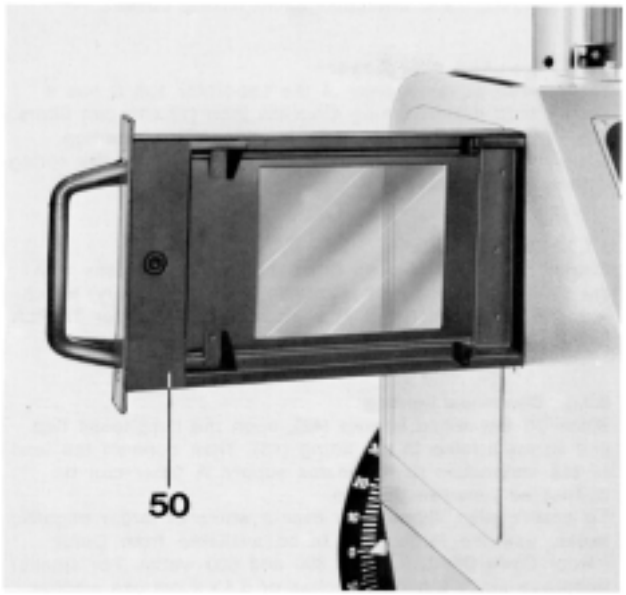
With point source lamps the filament must in addition be exactly parallel with the filter drawer (50). With point source lighting the enlarger is always used at the full lens aperture. With opal lamps the full aperture is used only for lamp centering; for all enlarging work the lens should be stopped down by at least two stops. This is essential for even definition and illumination over the whole projected image.

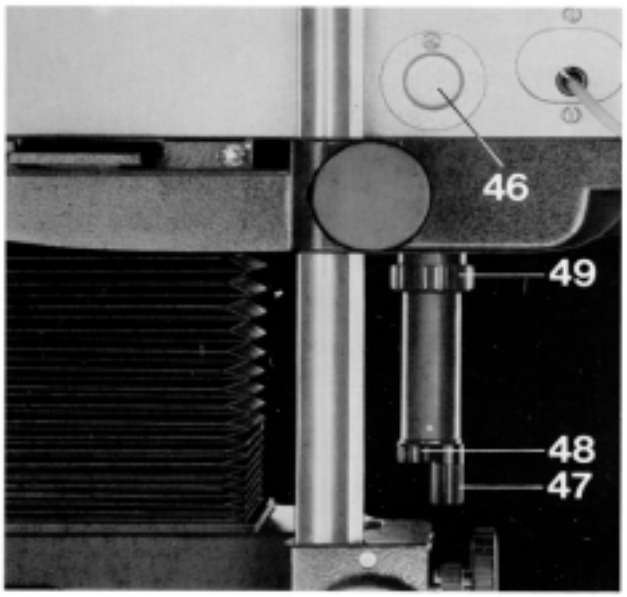
5.2.4. Cold cathode lighting

The two condensers in the Laborator 138 S can also be replaced by the LACOLI 138/LACOTRA 138 high-actinic cold cathode lighting system. The LACOLI and LACOTRA are fully pushed into the condenser compartment. The soft diffused light of the cold cathode system is ideal for enlarging high contrast black-and-white negatives. The high light output permits short exposure times even with very dense negatives or slow papers. The LACOLI/LACOTRA system suppresses scratches and flaws in the negative, thus largely eliminating the need for retouching or spotting.

5.2.5. Diffused lighting for black-and-white and colour

With the CLS 301 or CLS 300 colour mixing head the mixing box must be changed when switching the negative sizes. These mixing boxes concentrate the entire available light into the appropriate negative or transparency area. The same applies to the use of the BLAWIKIT 138 black-and-white lamphouse.





Condenser combinations Durst LABORATOR 138 S equipped with opal lamps and Componon lenses

VERTICAL PROJECTION

Lens f = mm / inch	Negative size mm / inch	Linear magnification factors min.	max.	Condenser combinations	Upper / lower	Opal lamp min. Ø mm
240 9 1/2	130 x 180 5 x 7	1.7x	4.4x	240/240		110
		0.9x	1.7x	240R/240		
210 8 1/2	130 x 180 5 x 7	1.2x	5.3x	240/240		
		0.7x	1.2x	240R/240		
180 7 1/8	100 x 150 4 1/4 x 6 1/2	3.2x	6.6x	240/200		
		0.5x	3.2x	240/240		
150 6	100 x 125 4 x 5	1.0x	8.5x	240/200		90
		0.4x	1.0x	240/240		
135 5 1/4	85 x 100 3 1/4 x 4 1/4	1.0x	9.5x	240/160		
		0.4x	1.0x	240/240		
105 4 1/8	65 x 90 2 1/2 x 3 1/2	1.6x	11.8x	240/130		
		0.3x	1.6x	240/200		
80 3 1/4	60 x 60 2 1/4 x 2 1/4	0.6x	17.5x	200/130		
60 2 3/8	32 x 45 40 x 40 1 1/2 x 1 1/2	2.9x	23.5x	130/85		65
50 2	24 x 36 35 mm	3.8x	28.5x	130/85		

Condenser combinations Durst LABORATOR 138 S equipped with opal lamps and Componon lenses

HORIZONTAL PROJECTION

Lens f = mm / inch	Negative size mm / inch	Linear magnification factors min.	max.	Condenser combinations	Upper / lower	Opal lamp min. Ø mm
240 9 1/2	130 x 180 5 x 7	4.4x	21.0x	240/240		110
210 8 1/2	130 x 180 5 x 7	5.3x	21.0x	240/240H		
180 7 1/8	100 x 150 4 1/4 x 6 1/2	6.6x	26.0x	240/200		
150 6	100 x 125 4 x 5	8.5x	30.0x	240/200		
135 5 1/4	85 x 100 3 1/4 x 4 1/4	9.5x	39.0x	200/160		90
105 4 1/8	65 x 90 2 1/2 x 3 1/2	11.8x	44.0x	200/130		
80 3 1/4	60 x 60 2 1/4 x 2 1/4	17.5x	65.0x	160/130		
75 3	60 x 60 2 1/4 x 2 1/4	18.0x	65.0x	160/130		
60 2 3/8	32 x 45 40 x 40 1 1/2 x 1 1/2	23.5x	92.0x	130/85		65
50 2	24 x 36 35 mm	28.5x	102.0x	130/85		

Condenser combinations Durst LABORATOR 138 S equipped with opal lamps and Rodagon lenses

VERTICAL PROJECTION

Lens f = mm / inch	Negative size mm / inch	Linear magnificazion factors min.	max.	Condenser combi-nations	Upper / lower	Opal lamp min. Ø mm
180 7 1/8	130 x 180 5 x 7	3.0x	6.3x	240 / 240H		110
		1:0x	3.0x	240H / 240		
		0.6x	1.0x	240 / 240R		
150 6	100 x 150 4 1/4 x 6 1/2	0.5x	8.2x	240H / 240H		
135 5 1/4	100 x 125 4 x 5	0.9x	9.3x	240H / 200		
		0.5x	0.9x	240H / 240		
105 4 1/8	85 x 100 3 1/4 x 4 1/4	0.3x	12.6x	200 / 240H		
80 3 1/4	65 x 90 2 1/2 x 3 1/2	0.8x	17.0x	160 / 130		
60 2 3/8	60 x 60 2 1/4 x 2 1/4	2.4x	23.3x	160 / 110		90
50 2	32 x 45 40 x 40 1 1/2 x 1 1/2	3.5x	28.3x	160 / 130		

Condenser combinations Durst LABORATOR 138 S equipped with opal lamps and Rodagon lenses

HORIZONTAL PROJECTION

Lens f = mm / inch	Negative size mm / inch	Linear magnification factor min.	max.	Condenser combinations
180 7 1/8	130 x 180 5 x 7	6.3x	20.6x	240 / 240H
150 6	100 x 150 4 1/4 x 6 1/2	6.8x	25.5x	240H / 200
135 5 1/4	100 x 125 4 x 5	7.6x	30.5x	240H / 200
105 4 1/8	85 x 100 3 1/4 x 4 1/4	10.3x	39.0x	200 / 160
80 3 1/4	65 x 90 2 1/2 x 3 1/2	17.5x	44.3x	160 / 130
60 2 3/8	60 x 60 2 1/4 x 2 1/4	23.0x	67.8x	160 / 110
50 2	32 x 45 40 x 40 1 1/2 x 1 1/2	28.0x	93.4x	130 / 110

Condenser combinations Durst LABORATOR 138 S equipped with point-light and Componon or Rodagon lenses

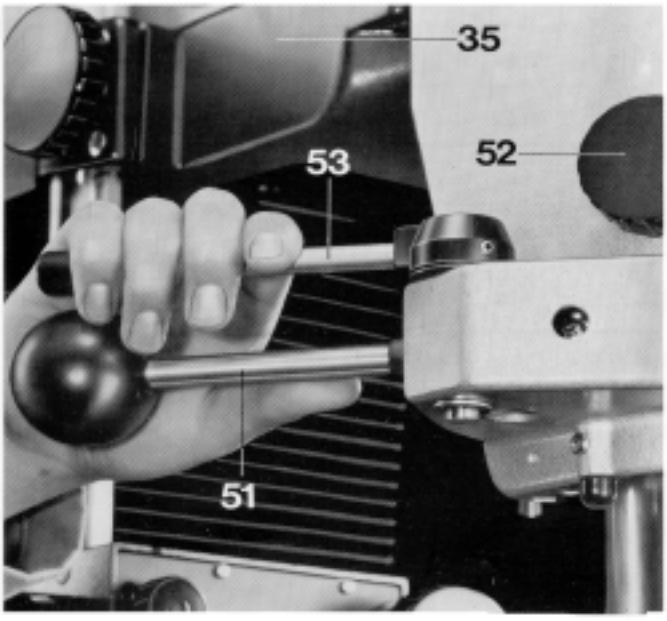
VERTICAL PROJECTION

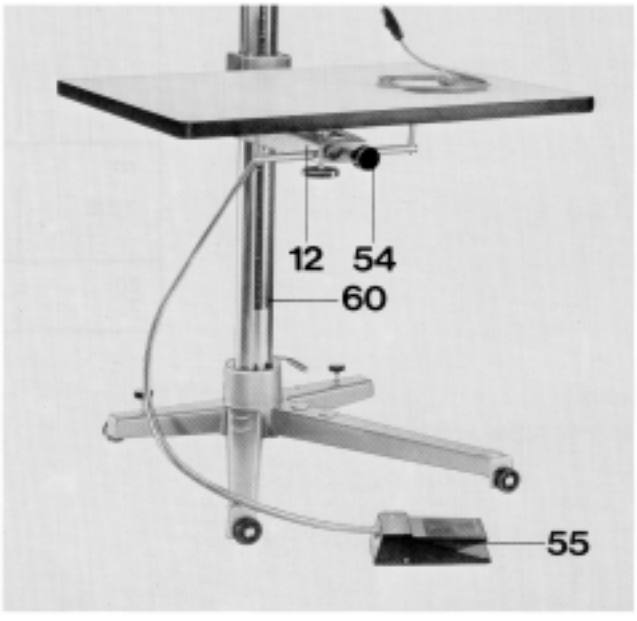
Lens f = mm / inch	Negative size mm / inch	Linear magnification factors min.	max.	Condenser combination	Upper / lower
240 9 1/2	130 x 180 5 x 7	2.2x	4.4x	240PT 240T	
		0.9x	2.2x	240PT 240PT	
210 8 1/2	130 x 180 5 x 7	2.1x	5.3x	240PT 240T	
		0.7x	2.1	240PT 240PT	
180 7 1/8	100 x 150 4 1/4 x 6 1/2	1.2x	6.6x	240T 240T	
		0.5x	1.2x	240RT 240T	
150 6	100 x 125 4 x 5	2.5x	8.5x	240T 200T	
		0.8x	2.5x	240T 240T	
		0.4x	0.8x	240RT 240T	
135 5 1/4	85 x 100 3 1/4 x 4 1/4	1.6x	9.5x	240T 200T	
		0.7x	1.6x	240T 240T	
		0.4x	0.7x	240RT 240T	
105 4 1/8	65 x 90 2 1/2 x 3 1/2	2.5x	11.8x	240T 130T	
		0.9x	2.5x	240T 160T	
		0.4x	0.9x	240T 240T	
		0.3x	0.4x	240RT 240T	
80 3 1/4	60 x 60 2 1/4 x 2 1/4	3.6x	17.5x	160T 110T	
		1.3x	3.6x	200T 130T	
		0.8x	1.3x	200T 160T	
		0.6x	0.8x	240T 160T	
60 2 3/8	32 x 45 40 x 40 1 1/2 x 1 1/2	4.0x	23.5x	130T 85T	
		2.9x	4.0x	130T 85T	
50 2	24 x 36 35 mm	3.8x	28.5x	130T 85T	

Condenser combinations Durst LABORATOR 138 S equipped with point-light and Componon or Rodagon lenses

HORIZONTAL PROJECTION

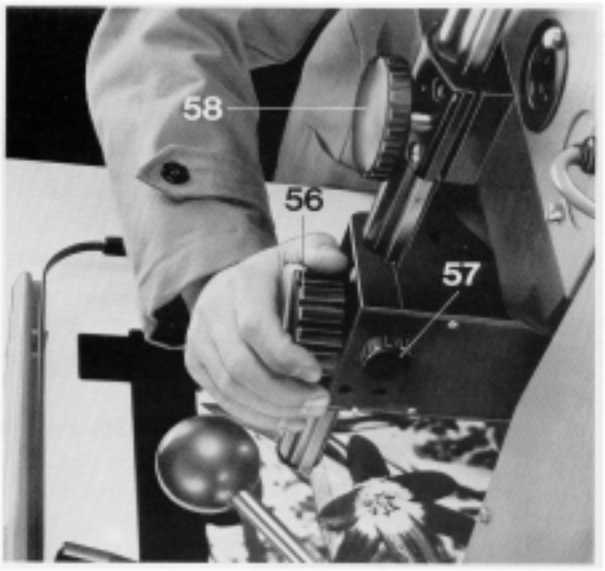
Lens f = mm / inch	Negative size mm / inch	Linear magnification factors min	max	Condenser combi-nations	Upper / lower
240 9 1/2	130 x 180 5 x 7	4.4x	22.4x	240PT 240T	
210 8 1/2	130 x 180 5 x 7	5.3x	8.2x	240PT 240T	
		8.2x	20.5x	240PT 240HT	
180 7 1/8	100 x 150 4 1/4 x 6 1/2	6.6x	13.5x	240T 240T	
		13.5x	27.2x	240T 240HT	
150 6	100 x 125 4 x 5	8.5x	32.5x	240T 200T	
135 5 1/4	85 x 100 3 1/4 x 4 1/4	9.5x	42.0x	240HT 200T	
105 4 1/8	65 x 90 2 1/2 x 3 1/2	11.8x	47.0x	240T 130T	
80 3 1/4	60 x 60 2 1/4 x 2 1/4	17.5x	75.0x	160T 110T	
60 2 3/8	32 x 45 40 x 40 1 1/2 x 1 1/2	23.5x	104.0x	130T 110T	
50 2	24 x 36 35 mm	28.5x	116.0x	130T 110T	





6.0.0. Operation

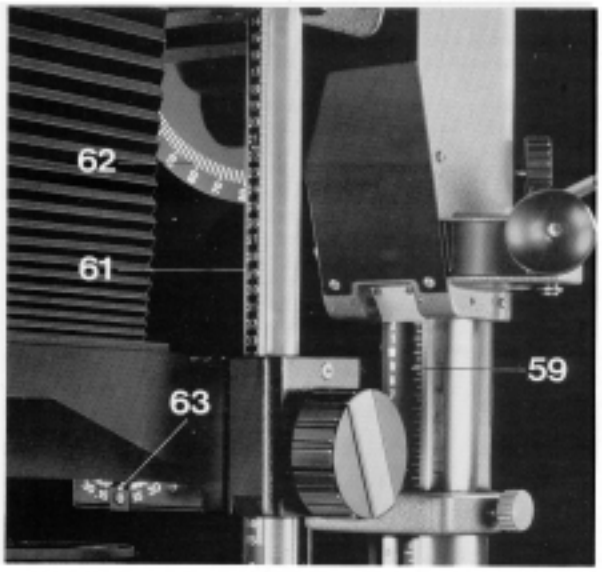
6.1.0. Adjusting the magnification
Adjust the magnification on the Laborator 138 S by moving the enlarger head and the baseboard. The vertical movement of the enlarger head (35) is controlled by the knob (51). On releasing the knob, the enlarger head automatically stays in position and can be firmly locked at that height by the clamping knobs (52). For rapid movement of the enlarger head, move the lever (53) towards the head; this disengages the friction drive for free movement of the enlarger head. The baseboard adjustment involves a servo-release. To adjust the baseboard, release the large locking knob (54) at the front right of the carrying arm (12), grip the table along both lateral edges just behind the centre, and press the foot pedal (55). The baseboard now rides smoothly up or down without any effort. Never push the baseboard up or down by force, as this could jam the carrying arm on the column. Once the baseboard has reached the required position, release the foot pedal, let go off the baseboard and lock the latter by tightening the locking knob (54).



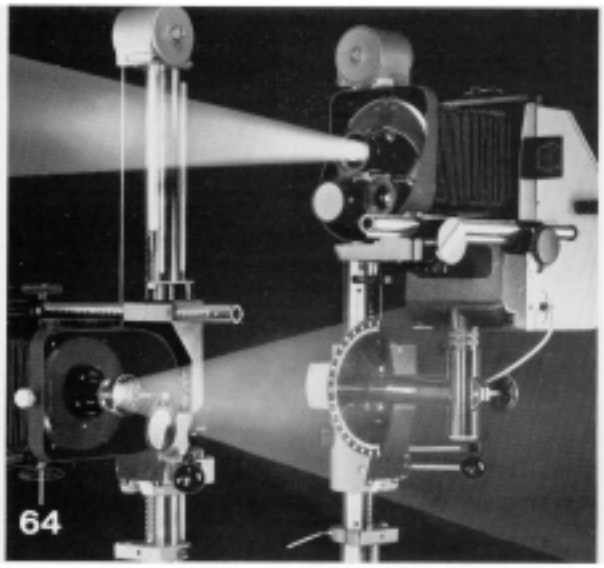
6.2.0. Focusing
Optionally the Laborator 138 S may be focused via the FOMOT 138 motor drive and the FODES control unit. This motorised focusing system can be supplied built into the Laborator 138 or fitted subsequently. The manual focusing knob (56) on the lens carriage of the Laborator 138 S adjusts the bellows extension on the lens carrier rail. The locking screw (57) behind the knob (56) must be slack when you focus. This locking screw (57) clamps the lens carriage, for instance when making a series of enlargements at fixed settings. The clamping knob (58) is used for coarse focusing. On releasing this knob, the lens carrier rail can slide up or down to adjust the required bellows extension.

6.3.0. Scales
The five scales of the Laborator 138 S indicate the different settings for easy adjustment. If you note the value of the various pointer positions you can easily reset the enlarger at any time to a specific setting.

The Laborator 138 S has the following scales:
Scale (59): Vertical movement of enlarger head
Scale (60): Vertical movement of baseboard
Scale (61): Vertical movement of lens carriage
Scale (62): Tilt of enlarger head (35)
Scale (63): Lens tilt for distortion control
The tables on pages **11,12,13** give the maximum magnifications for vertical projection with the Laborator 138 S.



6.4.0. Horizontal projection
The Laborator 138 S is ideal for making colour or black-and-white enlargements by horizontal projection. For horizontal colour enlarging we recommend the more powerful CLS 300 colour mixing head in place of the CLS 301 colour head. For horizontal projection, tilt the enlarger head to the left or right through 90°. To tilt the head, turn the knob (64) to the left to "L" on its scale. Start tilting the enlarger head to the left or right, turn the knob (64) to "90°" and continue tilting the head until it engages exactly in the horizontal position. Then lock the head by turning the knob to "F". To return the enlarger head to vertical projection, turn the knob (64) to "L" again, start inclining the enlarger head and turn the knob to "90°", so that the head engages exactly in its vertical position. Lock the knob (64) again by turning it to "F".
To ensure accurate alignment of the Laborator 138 S square to the projection surface, it must run on rails. We recommend T-rails. Appropriate dimensions and specifications are shown in the diagram below.
To simplify focusing with horizontal projection, use the FOMOT 138/FODES electric focusing drive.
To project negatives in horizontal format, suitably remount the enlarger head on the column via the LAWIN adapter (available separately, see accessories).



6.5.0. Distortion control
The general rule for correcting converging verticals is that the three principal optical planes (negative plane, lens plane and image plane) must be inclined towards each other in such a way that their imaginary extensions intersect in a common line. This yields uniform sharpness over the whole projected image without stopping down the lens.
You can correct converging verticals with the Laborator 138 S by four different procedures, all of which yield equally good results.

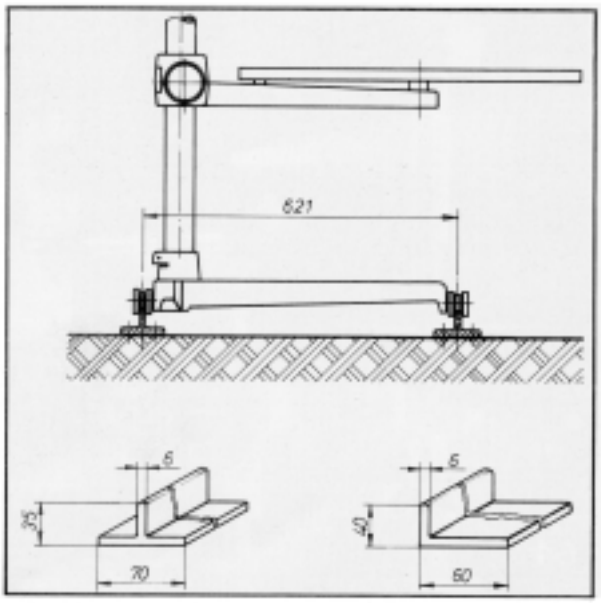
a) Turn the knob (64) to "L" and tilt the enlarger head as required, locking it by turning the knob (64) to "F". The large tilt scale (62) shows the actual tilt of the head. Slack off and slightly push in the knob (66) to re-align the lens carrier horizontally.
To tilt the baseboard, slack off the clamping lever (13) and swing down the two support stays (15).

b) Keep the enlarger head vertical, and incline only the lens standard and the baseboard.

c) Keep the baseboard horizontal and incline only the enlarger head and lens carrier.

d) Incline the enlarger head with the lens standard and the baseboard towards each other.

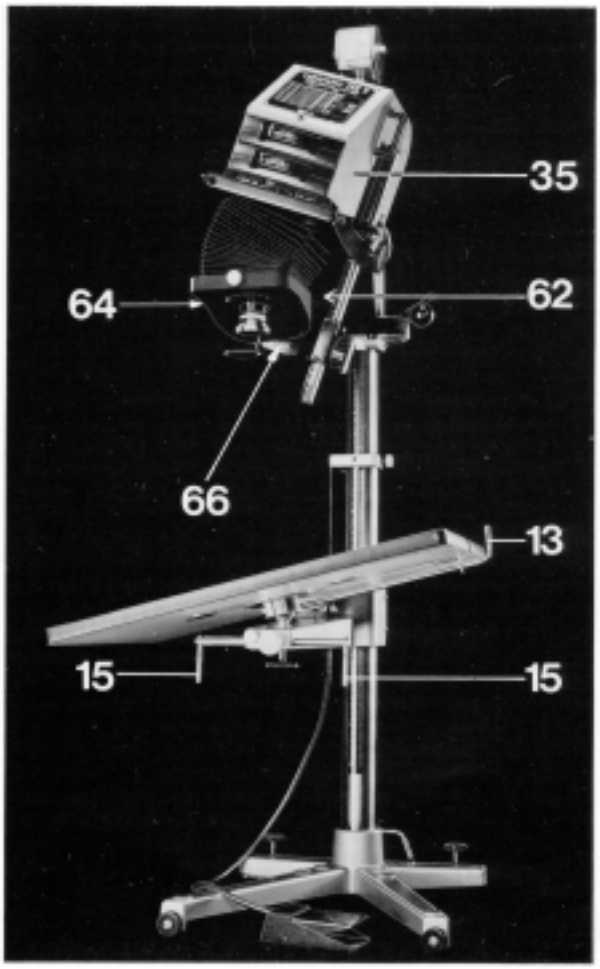
6.6.0. Reductions
For reductions use a lens of a focal length equal to the diagonal of the reduced image. For instance, to reduce a 5 x 7 inch or 13 x 18 cm original down to a $2^1/_2 \times 3^1/_2$ inches (6.5 x 9 cm) the required focal length is 105 mm.
To find the smallest reduced image size, multiply the negative dimensions by the factor indicated in the table.
For reductions with a 50 mm lens — which for enlargements is normally mounted recessed in the LATUB panel — mount the lens on the flat LAPLA panel.
Otherwise you cannot get the lens near enough to the baseboard. The nearest distance of the 75 mm lens from the baseboard permits reductions down to 0.55 times, i.e. a 9 x 12 cm negative can be reduced to 4.95 x 6.6 cm (= 9 x 0.55 and 12 x 0.55).



7.0.0. Copying
The following special accessories turn the Laborator 138 S into a copying unit:

1. The LARKA 138 copying film holder. This consists of a self-contained frame and a ground glass screen. Plate and sheet film holders are available separately, as are reducing adapters and film sheaths for $1^3/_4 \times 2^1/_4$ inch (4.5 x 6 cm), $2^1/_2 \times 3^1/_2$ inch (6.5 x 9 cm), 9 x 12 cm ($3^1/_2 \times 4^3/_4$ inch), 10 x 15 cm (4 x 6 inch), $4^3/_4 \times 6^1/_2$ inch (12 x 16.5 cm) and 5 x 7 inch or 13 x 18 cm materials.

2. The RILU copying lighting unit. This consists of two chrome-plated steel lamp support arms mounted at the rear of the baseboard with powerful clamps. The arms are adjustable in height and can be locked with a clamping screw. Each arm takes two separately switched lamp reflectors for opal lamps up to 150 watts. The reflectors are adjustable laterally and can tilt vertically. Each reflector has a graduated diffuser for even illumination of the original. For special effects colour or polarising filters can replace the diffusers. When not in use, the lamp arms swing to the rear to be out of the way during enlarging. The



RILU copying lamps can also be used with other copying outfits or enlargers. Where direct fixing with the clamps is not possible, screw the sockets provided to the baseboard. RILAR extension arms are available for the RILU for uniform illumination of originals larger than 12 x 16 inches or 30 x 40 cm.

Copying procedure

Push the LARKA 138 copying film holder fully into the enlarger head in place of the negative carrier. To do this, hold the film holder by the two movable clamping cheeks (a) so that these clear the right-hand mask adjustment knob. The two clamping cheeks each carry a clamping screw (b) and the right-hand cheek also a securing screw (c) to eliminate all lateral movement of the copying film holder. Once the LARKA 138 is in position in the enlarger head, swing down the two clamping cheeks (a) so that they engage underneath the bracing ribs of the enlarger head. Now tighten the securing screw (c) and then the two clamping screws (b). Adjust the image size and sharpness by either of the two following procedures:

a) By viewing in the mirror: To do this unscrew the milled screw (16), swing up the lamphouse cover, pull out the mirror (18) by its handle and push it into the recess with the silvered side downwards. Switch on the copying lighting; the original and the format frames of the ground glass screen (67) now appear in the viewing mirror (18). Adjust the image size by raising or lowering the enlarger head and focus by turning the appropriate knob. As seen from above, the original must be evenly illuminated without hot spots. Stop down the lens for optimum sharpness in copying, preferably to about f/11.

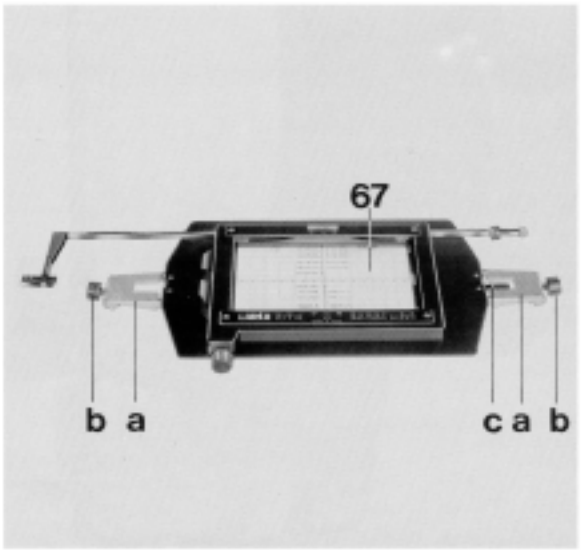
b) By projection: Switch on the enlarger lamp and project the format frame of the ground glass screen (67) onto the original to be copied.

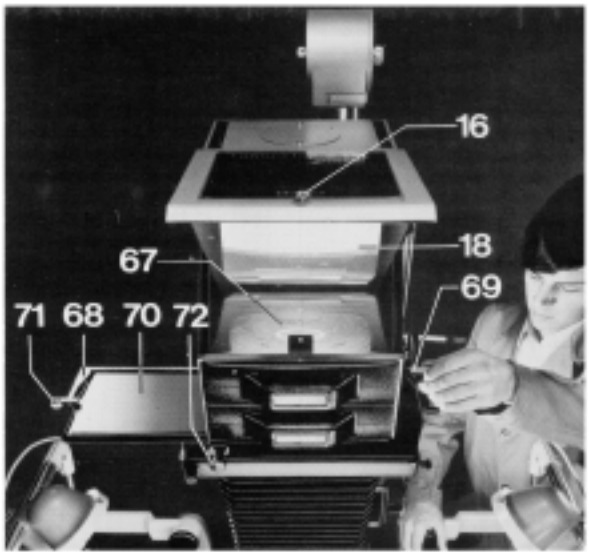
Raise or lower the enlarger head to make the format grid coincide with the area of the original. Then focus by turning the appropriate knob.

Push the guide bar (68) fully to the left by the milled knob (69). Place the film/plate holder (70), loaded with a suitable sheet film or plate, underneath the ground glass screen (67). The drawslide of the holder must face downwards. Engage the holder (70) in the clip (71) of the guide bar (68) and pull the latter fully to the right. This pushes the film/plate holder fully underneath the ground glass screen (67).

Turn the milled knob (72) to the right to lock the film holder (70) in position. To open the holder (70), push the guide bar (68) fully to the left. The opening travel of the drawslide is adjustable by turning the milled knob (69) of the guide bar (68). Now expose by switching the lighting unit on and off. Finally close the drawslide by pulling the guide bar (68) to the right again. Turn the milled knob (72) to the left and then push the guide bar (68) to the left.

This pulls the closed film/plate holder (70) out of the frame. The holder can now be removed on pressing the clip (71).



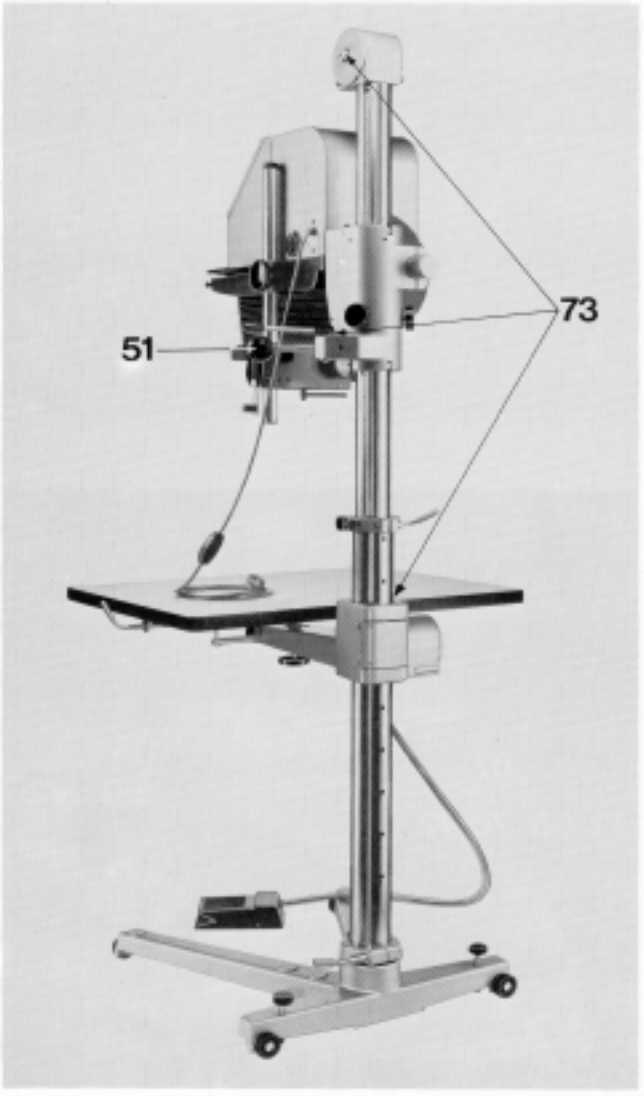


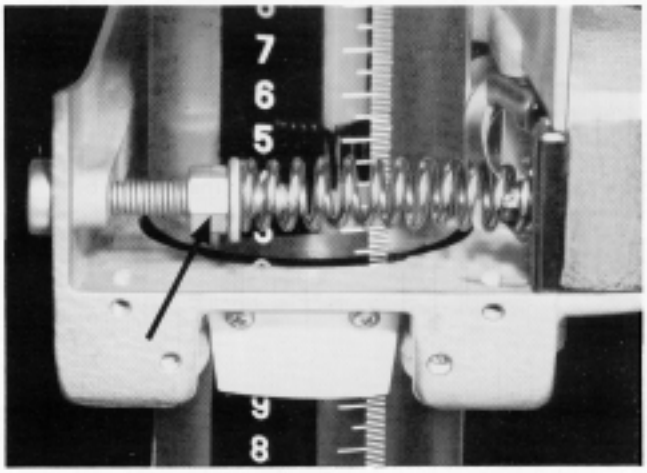
8.0.0. Maintenance

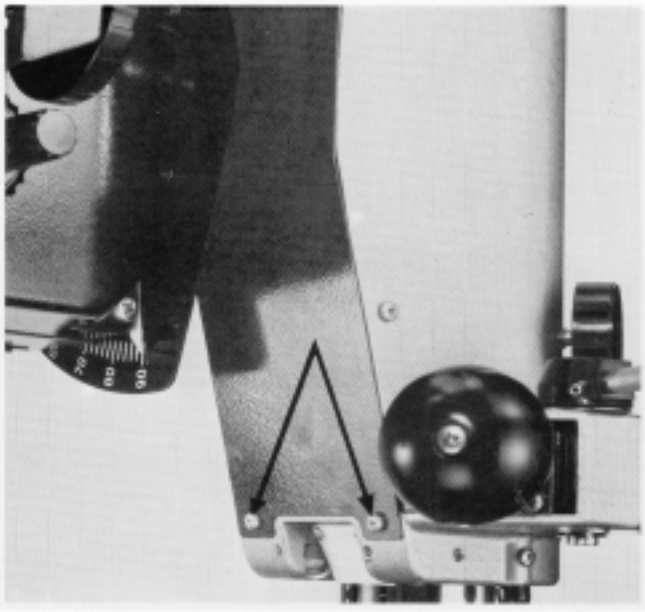
The Durst Laborator 138 S is designed for heavy-duty use with minimum maintenance; it keeps its high efficiency even in less-than-ideal working conditions. Periodically clean off the dusty grease film from the columns and guide rails, and relubricate. Also oil the following parts: above the hexagonal nut at the right of the column head, at the baseboard carrying arm (left), along the red ring at the top of the carrying arm, at the knob for adjusting the enlarger head and at the red lubricating points (73) on the lens carrier.

Never use lubricant containing acid. If in time the enlarger head tends to slip on turning the knob (51), unscrew the three screws to remove the black cover plate (74) and turn the square nut behind to retension the spiral spring.

When the enlarger is not in use, fully raise the enlarger head. Dust the negative carrier glasses, condensers and mirror with a chamois leather or a soft brush. The use of an anti-static medium is recommended. Do not leave the lamp burning unnecessarily.
Remember also to keep the lower column clean and to oil the servo-release of the baseboard.







9.0.0. Accessories

The tungsten-halogen diffused light unit
Where a high light intensity is needed for black-and-white enlargements (for instance with horizontal projection) we recommend the BLAWIKIT 138 diffused light unit.

The light source consists of a pair of 1000 watt tungsten-halogen lamps whose light is distributed over the negative area via interchangeable mixing boxes.

The Durst LACOLI 138
The cold cathode light source (Order Code: LACOLI 138) is suitable for black-and-white enlarging. It permits short exposure times even with slower papers and suppresses scratches and flaws in the negative, thus largely eliminating the need for retouching. This light source replaces the condensers in the condenser compartment. The transformer required (Order Code: LACOTRA 138) is available for 125/160/220 volt (to order also for 125/220/240 volts), 45-60 Hz supplies.

The microfilm negative carrier
This negative carrier (Order Code: NEGA MC) is designed for enlarging aperture cards holding unperforated 32 x 45 mm microfilm negatives. The NEGA MC consists of a frame with a hinged-on spring-mounted top section. The aperture cards are enlarged in the NEGA MC without glass.

Special negative carrier for roll film on reels
This special carrier (Order Code: NEGAROLL 70), for enlarging from 16, 35 and 70 mm wide recording film and from 70 mm aerial film on reels holding up to 100 feet (30 metres), replaces the normal negative carrier. It also takes plate and roll film masks (Order Code: LAPFE and LADANE 138). The spool cores are adjustable to the different film widths.

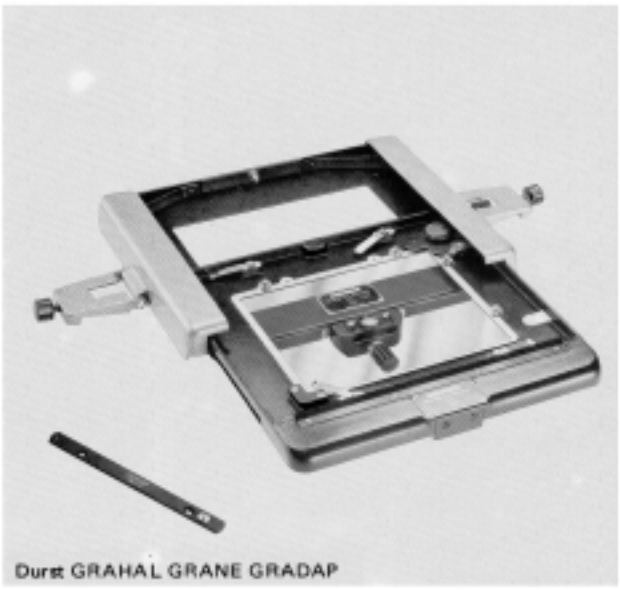
Register accessories
The register accessories (Order Codes: GRAHAL, GRANE 138, GRADAP 138, MIVALO and MIGRAFI) permit easy and precise working in all photographic jobs requiring exact register. They can be used with a punch register or a register mark system.

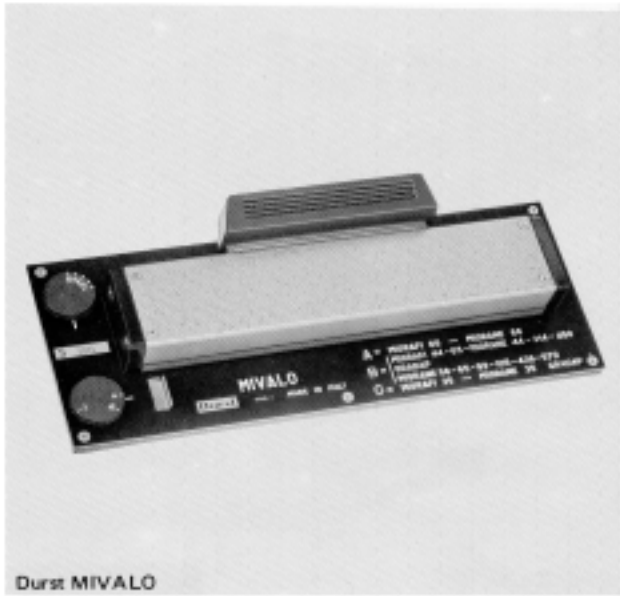
The all-metal outfit consists of the GRAHAL locating frame, the GRANE 138 negative carrier for film sizes up to 5 x 7 inches or 13 x 18 cm, the GRADAP 138 register pin bar and the MIVALO precision punch (for punching holes with 1 - 5 mm edge separation). The GRAHAL locating frame fits into the enlarger in place of the standard NEGA 138 negative carrier and is firmly locked in position. It has guides for automatic centering of the GRANE 138 negative carrier. The GRADAP 138 register pin bar carries two micro-register pins to hold the punched films between two glass plates. The upper of these plates is also available in a special version with anti-Newton coating. Inserts with micro-register pins (Order Code: MIGRAFI) also fit into the GRANE 138 negative carrier for 24 x 36 mm, $1^1/_4$ x $1^1/_2$ inch (4 x 4 cm), $2^1/_4$ x $2^1/_4$ inch (6 x 6 cm) and $2^1/_2$ x $3^1/_2$ inch (6.5 x 9 cm) negatives. The films are punched with the MIVALO punch.

The copying film holder
The copying film holder (Order Code: LARKA 138) consists of a self-contained frame with a ground glass screen. Plate and sheet film holders of standard sizes are available separately. The ground glass screen carries format frame markings from 24 x 36 mm up to 13 x 18 cm.

A guide bar pushes in the plate holder and opens the drawslide. The holder can be securely fixed in the unit.

Durst BWL 300


Durst GRAHAL GRANE GRADAP



Durst MIVALO

Durst LAWIN

The angle bracket
This angle bracket (Order Code: LAWIN) for wall projection allows the projection of any negative in horizontal format. The LAWIN bracket is mounted between the lens carriage and the enlarger head.

The filter turret
The filter turret (Order Code: LATIRAD), for colour enlargements by the additive exposure system with three primary filters, is also suitable for colour separation work in graphic arts applications and for enlargements on variable contrast papers.

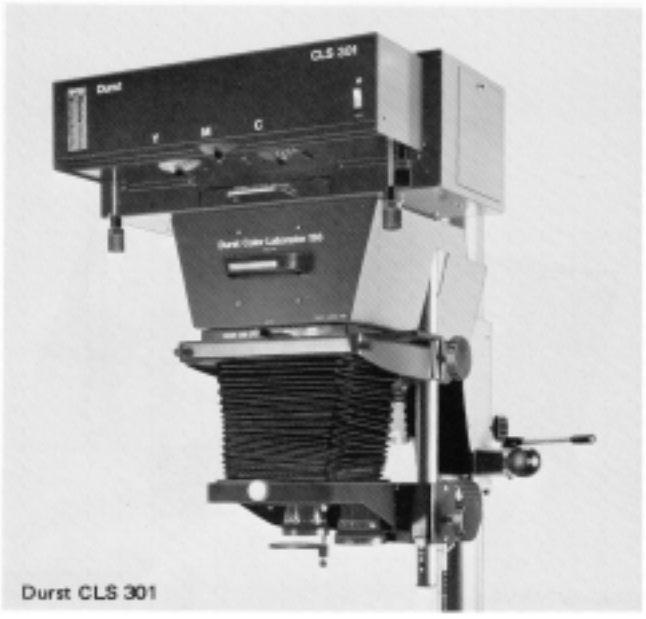
The LATIRAD consists of a rotating plastic panel with four apertures, each taking 70 mm diameter filters up to 4.2 mm thick. It is mounted in place of the red filter on the shaft of the latter. Up to two supplementary LAZURAD filter wheels may be fitted where more than three filters are needed.

The protective cover
The handy LACUF cover in tough plastic protects the enlarger against dust and dampness.

Focusing negatives
Test the quality of your lens with our focusing negatives which at the same time serve as a check on sharp focus. They are available in all sizes up to 5 x 7 inches or 13 x 18 cm.

The CLS 300 colour mixing head
The CLS 300 colour mixing head is recommended for colour enlarging with the Laborator 138 S. Two 1000 watt tungsten-halogen lamps provide maximum light intensity for vertical and horizontal projection. Three knobs provide infinite adjustment of all filter values. The dichroic filters of the CLS 300 colour mixing head do not fade even after prolonged use. Interchangeable mixing boxes provide uniform diffused illumination for all negative sizes.

The CLS 301 colour mixing head
This colour mixing head provides infinitely variable filter adjustment from 0 - 130 (equivalent to CC values up to 190) and highly convenient operation. Two 300 watt tungsten-halogen lamps with built-in reflector and interchangeable mixing boxes ensure short exposure times. For full details on the CLS 301 see the special leaflet "The Durst CLS 301 with the Laborator 138 S".



Durst CLS 301

The Durst 243 masking frame
This simplifies adjustment and figuring when setting up different print sizes. The cast metal frame is stove enamelled and chemical-proof; it carries independently adjustable masking strips. A milled knob adjusts the paper stops for margin widths from 4 to 35 mm. The frame takes paper sizes up to 10 x 12 inches and 24 x 30 cm. The scales are reversible to switch from inch to metric print sizes. At extra cost this frame is also available with a laminated Formica baseboard.

The RILU copying lighting unit
This is an ideal system for glare-free illumination. Two chrome-plated arms with two reflectors each are mounted on the enlarger with the aid of powerful clamping cheeks. Sockets are also supplied to screw to the baseboard.

The support arms are adjustable in height and can be locked in position with clamping screws, or swing back when not required to be out of the way during enlarging.

The reflectors take opal lamps up to 150 watts and incorporate graduated diffusers for even illumination of the original. The lamps are individually switchable and can be adjusted

laterally as well as tilted vertically. Special RILAR extension arms are available separately for uniform illumination of originals larger than 12 x 16 inches or 30 x 40 cm, and fit between the two clamping sockets on the baseboard and the lamp arms.

The SAFIL darkroom lamp
The SAFIL darkroom lamp has a filter turret for five safelight filters — white, orange, light red, olive green and brown — for ideal darkroom illumination with most commercial black-and-white and colour materials. The light source is a clear 40 watt bulb. The SAFIL lamp can stand on the bench or be mounted on the wall.

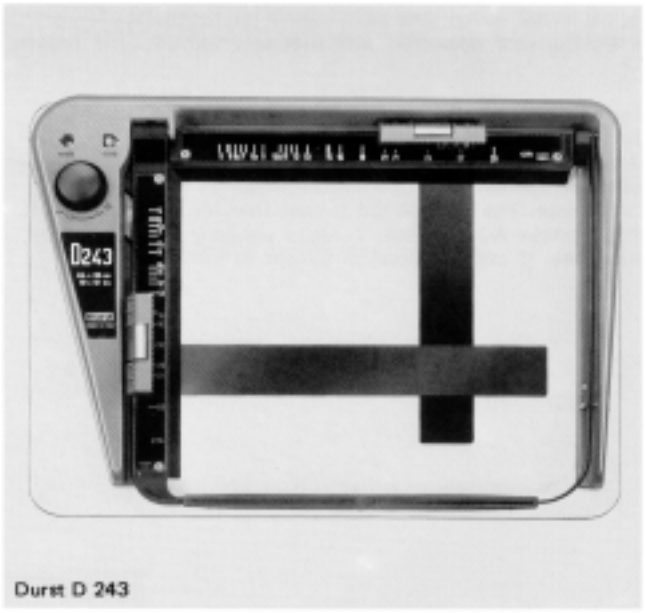
The SANAT sodium vapour darkroom lamp
The high light intensity and narrow spectral emission of the sodium vapour lamp for the first time provide optimum illumination in a colour darkroom. This permits more efficient and convenient working with colour papers, without increased risk of fogging. The light source is a 15 watt sodium vapour lamp whose emission band coincides with the sensitisation gap of colour papers. A dichroic filter accurately limits the emission spectrum to this sensitisation gap. The SANAT, too, can stand on the bench or be mounted on the wall.

The Durst STABI voltage stabilisers
Where the electrical supply is subject to frequent voltage fluctuations, the Durst STABI voltage stabilisers — available in versions for 500, 1000 and 2000 watts — are essential to avoid incorrect colour exposures. The Durst STABI voltage stabilisers compensate fluctuations from + 10% to — 20% and keep the voltage constant within ± 2%. They are designed for input voltages of 110, 160 or 220 volts; the output voltage is 220 volts/50 Hz or 110 volts/60 Hz.

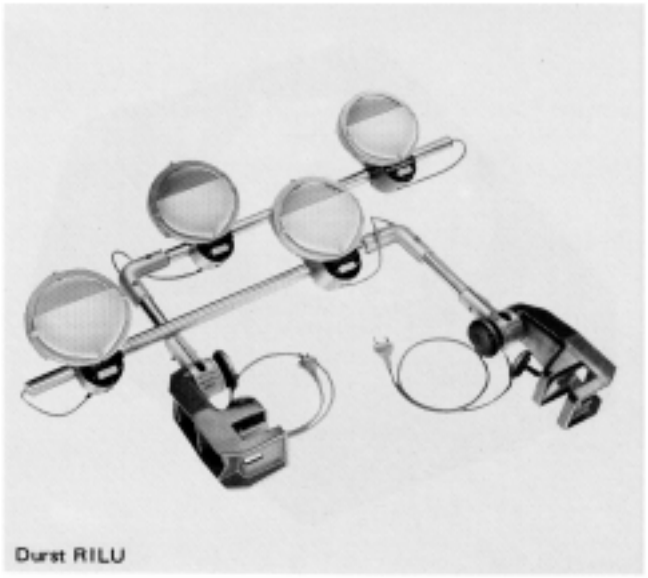
The programmable processing timer
This mechanical precision timer (Order Code: COLTIM) is an indispensible aid to all colour film and paper processing in the darkroom. The total running time of 30 minutes can be split up into selected programmed time intervals.

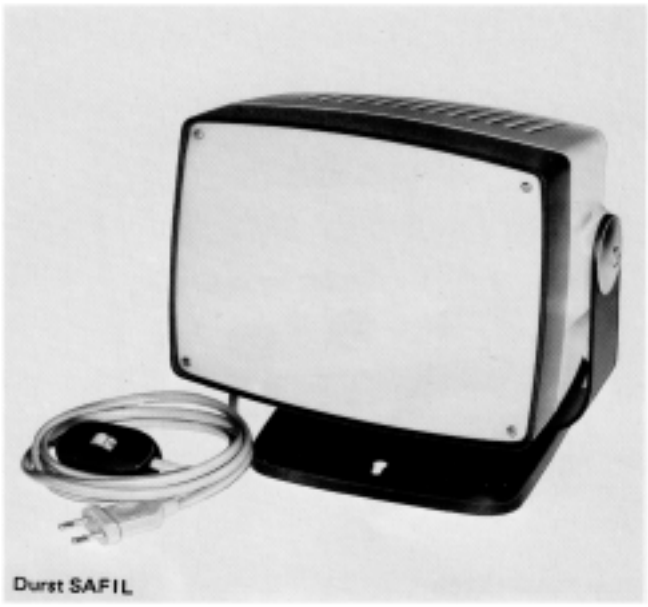
The Minolta/Durst NEGA colour analyser 101 and 201
A single measuring sequence establishes the filter values and exposure time required for an enlargement and shows them on a scale. The models 101 and 201 differ in their reading method:
Model 201 uses spot readings (probe diameter 3 mm);
Model 101 uses full-area integrated readings.
Both models can be used for negative sizes from 35 mm up to 4 x 5 inches (10 x 12.5 cm). Selective integrated readings are possible with reducing masks. Interchangeable memory modules with three channels each can store data of different negative types and paper emulsions. The unit is ideal for setting up a central measuring station in the darkroom.

The Minolta/Durst colour translator
This colour analyser establishes exact filtration and exposure values when enlarging colour negatives or making duplicate transparencies in a colour enlarger. The Minolta/Durst colour translator yields full-area integrated readings of the projected colour negative image or transparency on the enlarger baseboard. Four photo diodes in the colour translator measuring probe ensure exceptionally uniform sensitivity over the whole spectral range. This permits exact measurement of filter values for every type of colour negative and original transparency. The Minolta/Durst colour translator is suitable for departments primarily working with colour analysers matched to each enlarger. The unit can store data of a number of emulsions and provides rapid exposure time and filter value readings. Its



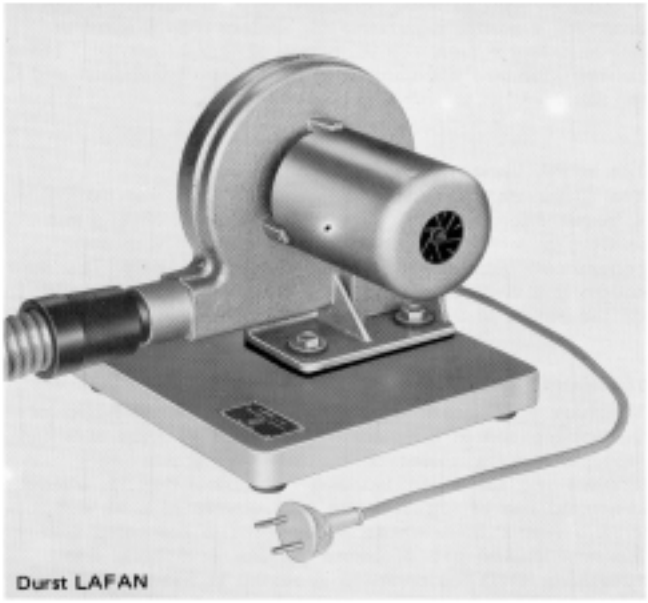
Durst D 243


Durst RILU


Durst SAFIL

robust construction and semi-conductor technology ensure straightforward operation with precisely reproducible results.

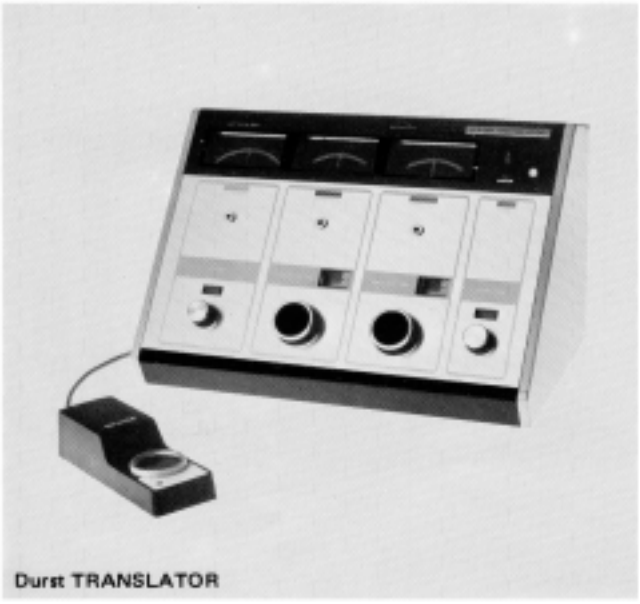
The LAFAN 138 blower unit
This should always be used with lamps of 300 watts or over. A reinforced flexible hose is supplied to link the blower with the special vent opening provided in the side of the lamphouse. The LAFAN 138 is available for 220 volts/50 Hz single-phase AC supplies. It has a capacity of approx. 70 cubic feet (2 cubic metres) of air per minute.



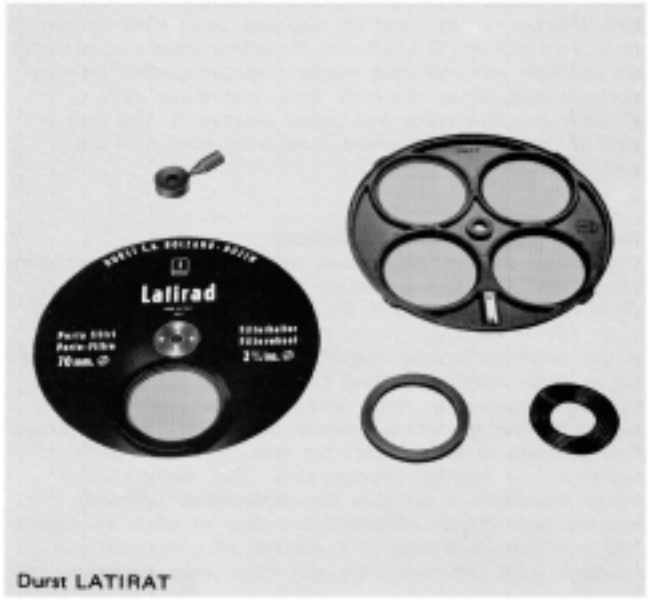
Durst LAFAN

Durst COLTIM

Durst MINOLTA



Durst TRANSLATOR



Durst LATIRAT