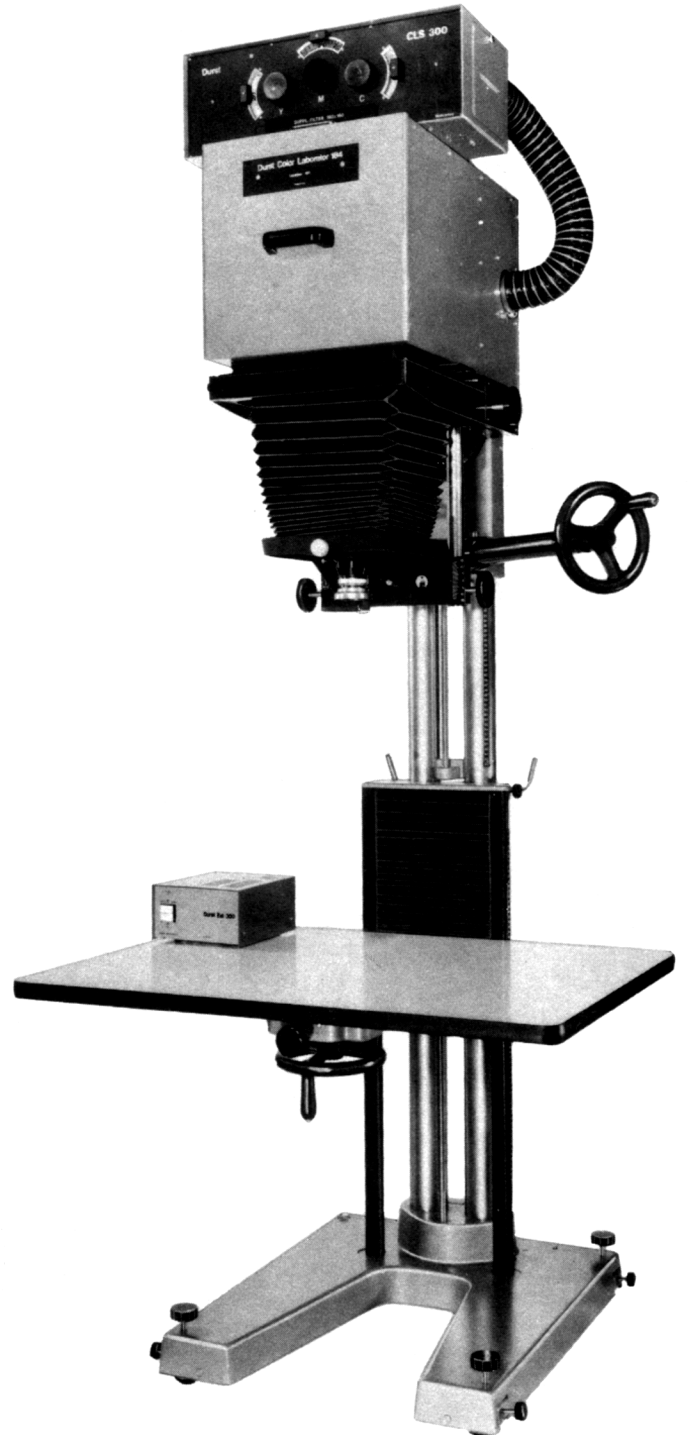


Durst Laborator 184 + Durst Color Laborator 184



Operating Instructions

 **Durst**

Operating manual Durst Laborator 184

With the Durst Laborator 184 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 enlarger. 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.

Durst Inc., Bolzano/Italy

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1.0.0. General note

The Durst Laborator 184 is a universal enlarger for all negative sizes up to 10 x 10 inches (25 x 25 cm). The Laborator 184 is supplied equipped either with a condenser lamphouse as a black-and-white enlarger or with the CLS 300 colour mixing head as a colour enlarger. The Durst Laborator 184 is suitable for use as a vertical or a horizontal colour and black-and-white enlarger.

2.0.0. The outfit

2.1.0. Technical data

Magnification and reduction ranges

Focal length of lens	Linear magnification Maximum	Minimum
50 mm	33.5 x lin.	7.5 x lin.
75 mm	21.0 x lin.	3.8 x lin.
100 mm	16.0 x lin.	0.11 x lin.
135 mm	11.5 x lin.	0.15 x lin.
150 mm	9.5 x lin.	0.25 x lin.
180 mm	7.5 x lin.	0.32 x lin.
210 mm	6.2 x lin.	0.37 x lin.
240 mm	5.0 x lin.	0.45 x lin.
300 mm	4.0 x lin.	0.65 x lin.
360 mm	2.5 x lin.	0.9 x lin.

Depending on the precise actual focal length of the lens, these factors may vary slightly upwards or downwards.

Dimensions and weight

Overall height (fully raised enlarger head):	108 ¹ / ₄ inches (2750 mm)
Height of stand:	90 ¹ / ₂ inches (2300 mm)
Highest position of negative carrier:	82 inches (2085 mm)
Highest position of optical axis for horizontal projection:	81 ³ / ₄ inches (2075 mm)
Floor space:	approx. 38 ¹ / ₂ x 39 ¹ / ₂ inches (980 x 1000 mm)
Baseboard size:	27 ¹ / ₂ x 39 ¹ / ₂ inches (700 x 1000 mm)
Net weight of baseboard:	approx. 353 lbs (160 kg)
Optical axis/column distance:	18 ¹ / ₂ inches (470 mm)

2.2.0. Packing

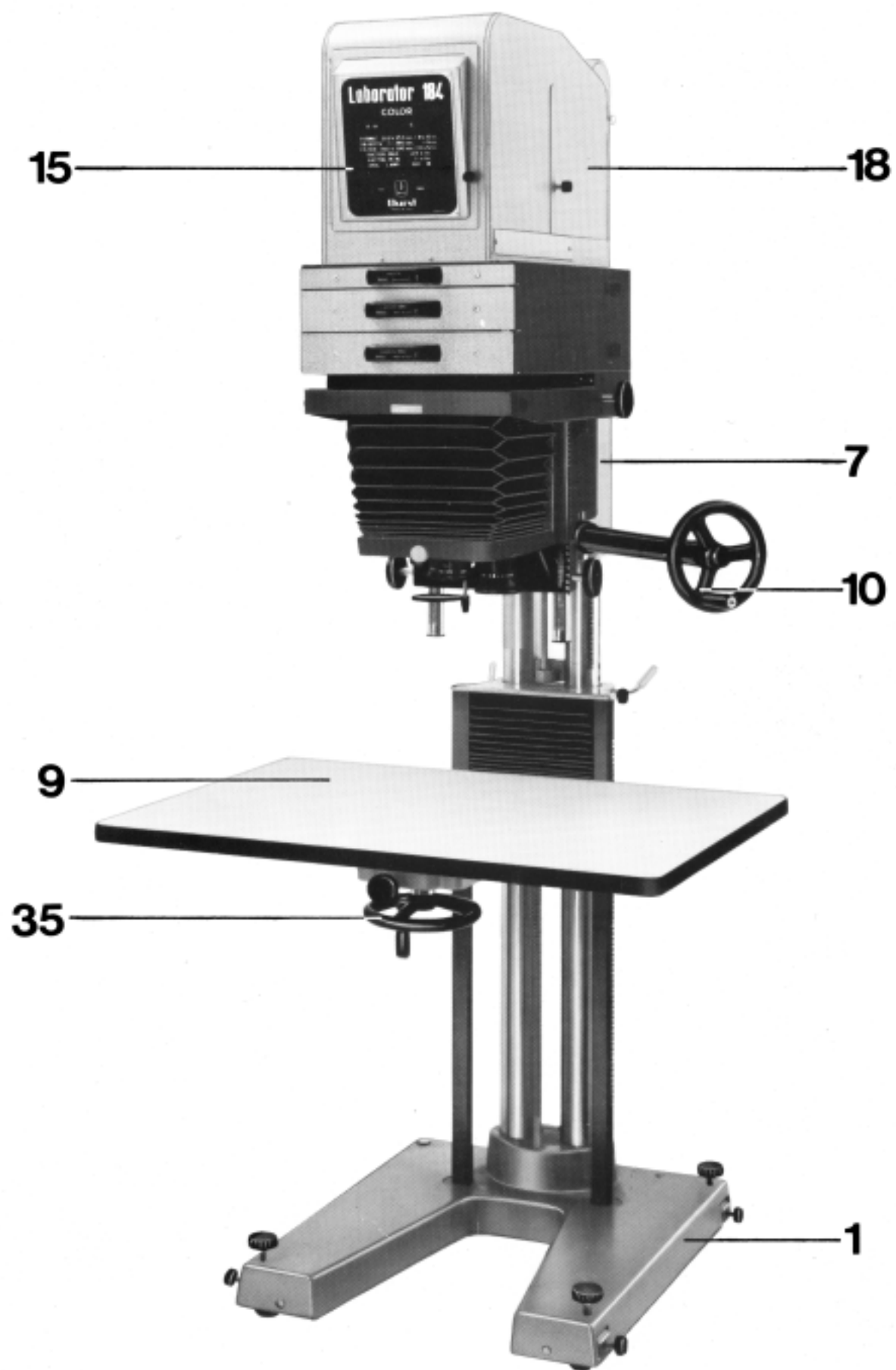
The basic unit of the Laborator 184 is packed in two wooden crates. One contains the U-shaped base, the bottom section of the twin column and the baseboard carrying arm. The second crate contains the upper pair of columns with the enlarger head and the baseboard.

2.3.0. Checking out

After unpacking all parts and before assembly clean everything carefully with a cloth. First check that all components are there. To make the assembly instructions clearer, all components of the enlarger are numbered. The operating manual for the CLS 300 contains precise assembly instructions and a numbered list of components for the CLS 300 colour mixing head.

2.3.1. Components and controls

1. Base
2. Twin column
3. Baseboard carrying arm
4. Locking screws
5. Adjustment screws
6. Clamping knobs
7. Upper enlarger section
8. Screw bolts on the column top
9. Baseboard
10. Gear shaft with crank
11. Stop ring
12. Nut
13. Clamping bolt
14. Lamphouse securing bolts
15. Front flap
16. Filter drawer guide frame
17. Condenser guide frame
18. Side flap
19. Springs of the NEGA 205 negative carrier
20. Hairline cross
21. Focusing negative of the NEGA 205 negative carrier
22. Milled knob
23. Milled knob
24. Clamping cheeks of the GRAHALON locating frame
25. Mask adjustment knob
26. Clamping screw of GRAHALON 205
27. Securing screw of GRAHALON 205
28. Release knob for the GRANE 205
29. Blower vent openings
30. Mirror adjustment lever
31. Lamp centering knob
32. Lamp centering knob
33. Locking ring
34. Locking knob for enlarger head
35. Hand wheel for raising and lowering the baseboard
36. Baseboard locking knob
37. Focusing knobs
38. Bellows adjustment knob
39. Locking screws for focusing adjustment
40. Locking lever for coarse adjustment
41. Enlarger head tilt scale
42. Vertical adjustment scale of enlarger head
43. Lens tilt scale
44. Lateral displacement scale of optical axis
45. Focusing scale
46. Vertical adjustment scale of baseboard
47. Enlarger head tilt knob
48. Lens tilt knob



2.4.0. Assembly

2.4.1. The twin column with base

Place the base (1) with the twin column (2) and the carrying arm (3) on the floor. Check that it stands firmly without vibration. The U-base on the Laborator 184 has built-in wheels for rolling the unit about. The locking screws (4) at the side lock these wheels. Turning the three adjustment screws (5) raises or lowers the wheels individually for perfect levelling of the enlarger on an uneven floor. If the Laborator 184 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.

2.4.2. The top section

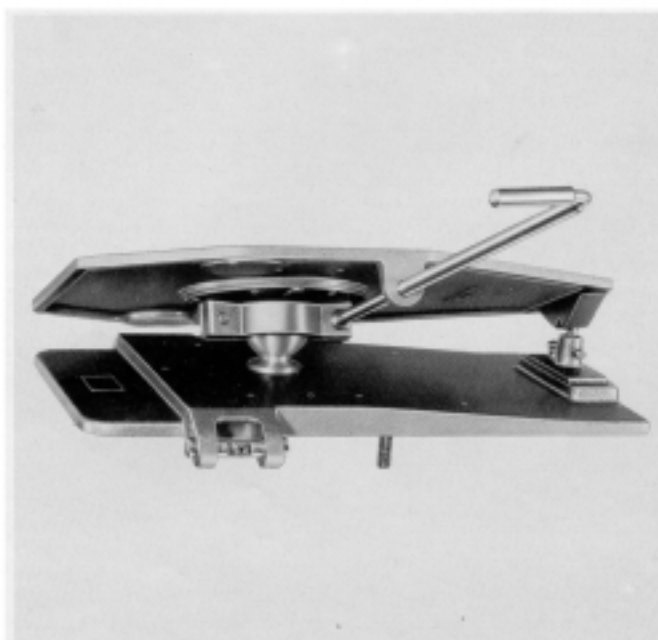
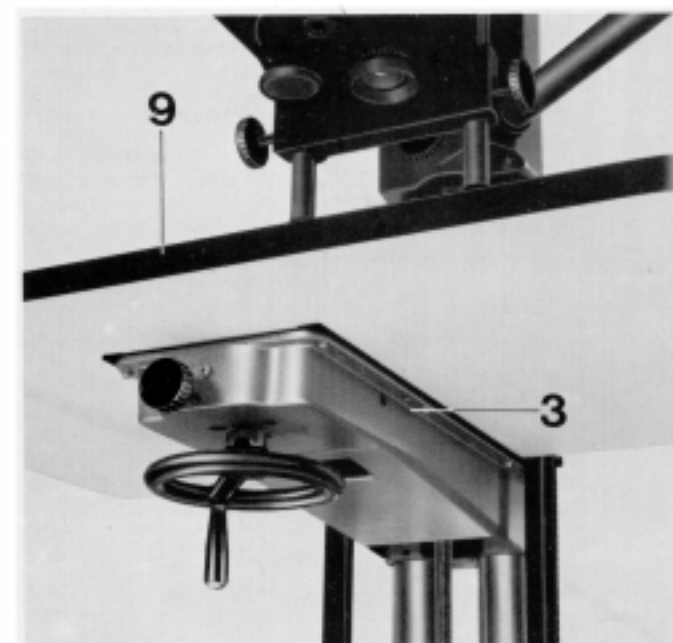
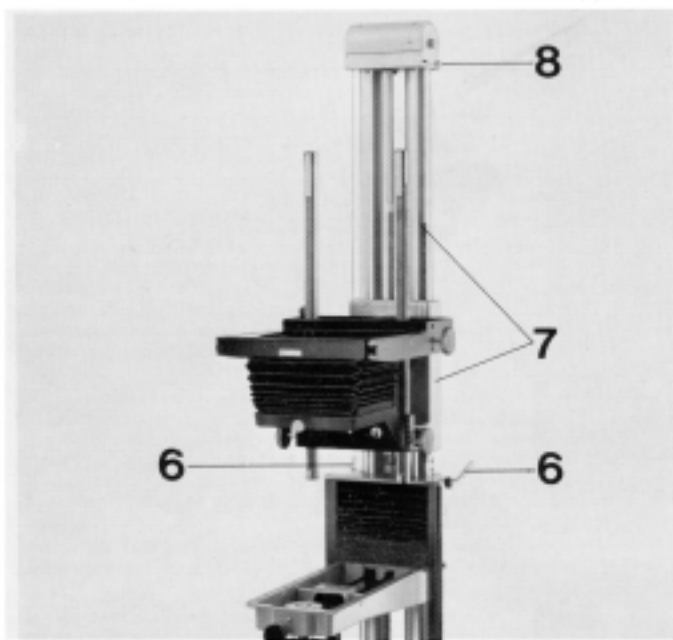
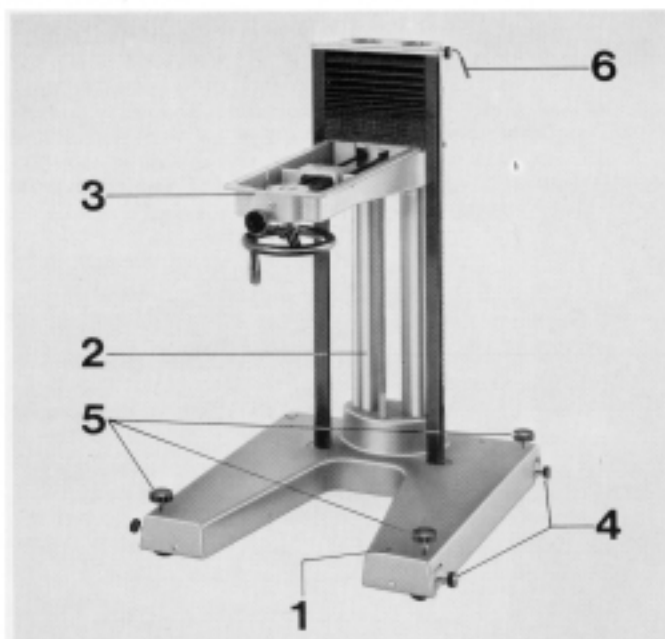
Slack off the two clamping knobs (6), and insert the upper section (7) of the enlarger with its twin column into the column stand. Tighten the clamping knobs (6) again. Where the Laborator 184 is exclusively used for vertical projection, it can in addition be attached to the darkroom wall with wall hooks. The column top of the Laborator 184 has two small screw bolts (8) for fixing the wall hooks.

2.4.3. The enlarger head

The enlarger head attached to the upper section is supplied without lamphouse. Depending on the lighting system ordered, mount the condenser lamphouse, the BWL 300 diffused lighting unit or the CLS 300 colour mixing head. See also section 2.4.6.

2.4.4. The baseboard

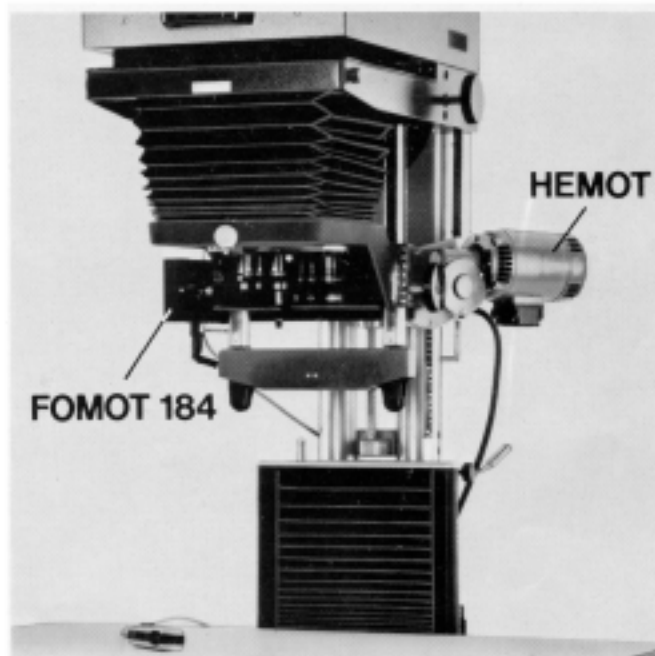
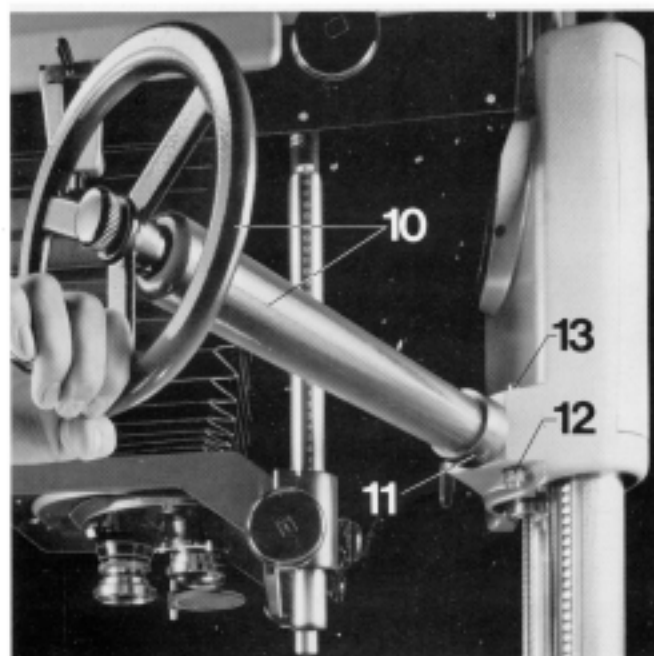
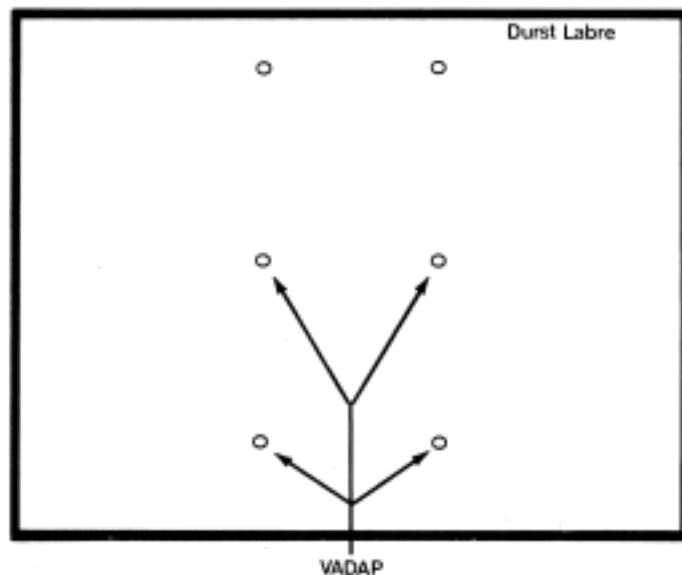
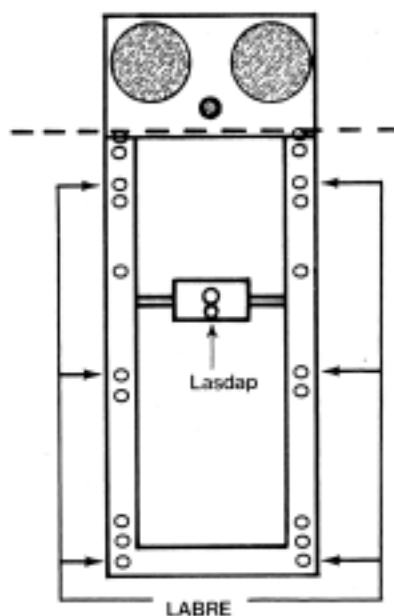
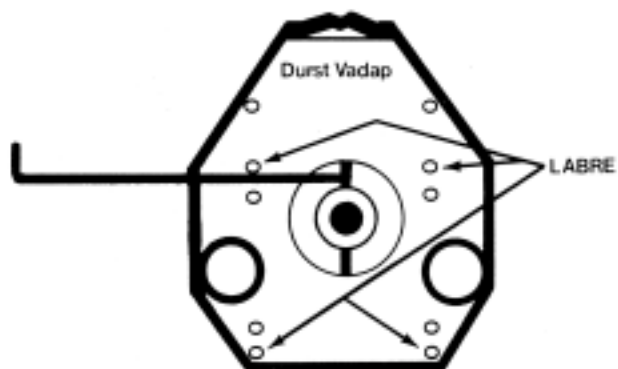
Mount the baseboard (9) on the arm (3) and secure on both sides with three bolts and washers. Follow the assembly diagrams below in mounting the baseboard to ensure that its centre is lined up with the optical axis.



For normal photographic work the baseboard is mounted rigidly on the arm. The baseboard can also be mounted via the VADAP and LASDAP mounting plates (available

separately) to permit tilting for correcting converging verticals.

ASSEMBLY DIAGRAMS





2.4.5. The vertical adjustment crank or electric motor drive

Push the crank with the gear shaft (10) into the sleeve as far as the stop ring (11), slightly turning the crank to and fro. Then turn the shaft to bring the red lubrication point to the top and finally tighten the nut (12) of the clamping bolt (13). The Laborator 184 can also be supplied with a motorised vertical adjustment in place of the standard gear shaft with crank. The electric motor drive for the vertical adjustment is mounted on the enlarger head in the same way as the crank and shaft.

2.4.6. Fitting the lamphouse

2.4.7. The CLS 300 colour mixing head

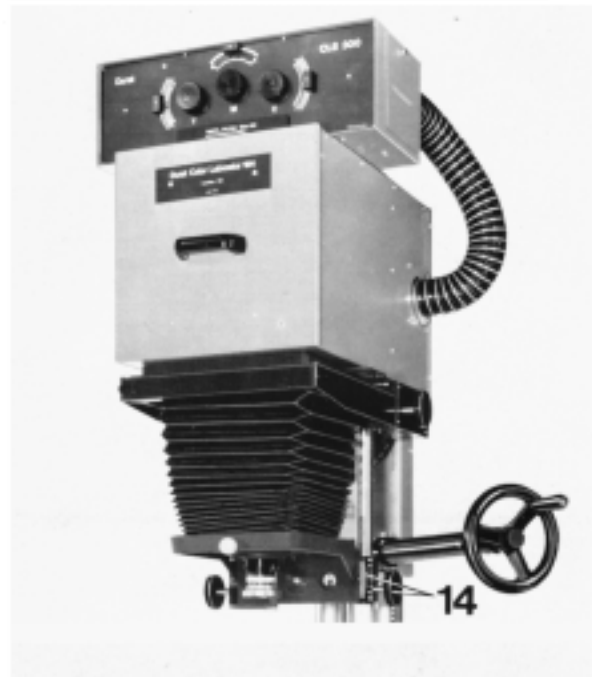
Where the Laborator 184 is supplied with the CLS 300 colour mixing head note the instructions enclosed with the colour head. Use the four bolts (14) to mount the CLS 300 colour mixing head and LACAP 184 spacer.

2.4.8. The BLAWIKIT 184

Where the Laborator 184 is used with the BLAWIS diffused lighting system, mount the lamphouse in the same way as the CLS 300 colour mixing head.

2.4.9. The condenser lamphouse

Where the Laborator 184 is supplied with the condenser lamphouse, the latter is again mounted with the four bolts (14). Open the front flap (15) and insert the front mirror into the guides. Insert the filter drawer guide (16) marked with a white dot into the upper guides of the condenser lamphouse so that the locating dots on the frame are at the front. Push the condenser guide frame (17) marked with two dots into the central guides, again checking that the locating dots are lined up. Push the FILCA filter drawer into the upper compartment. Push the two appropriate LACON single condensers (to match the lens fitted) into the enlarger head below the filter drawer, with the curved sides facing each other. Open the side flap (18) of the lamphouse and push the supplementary LAZUCO 181 condenser into the front guides, with the curved side facing forward.

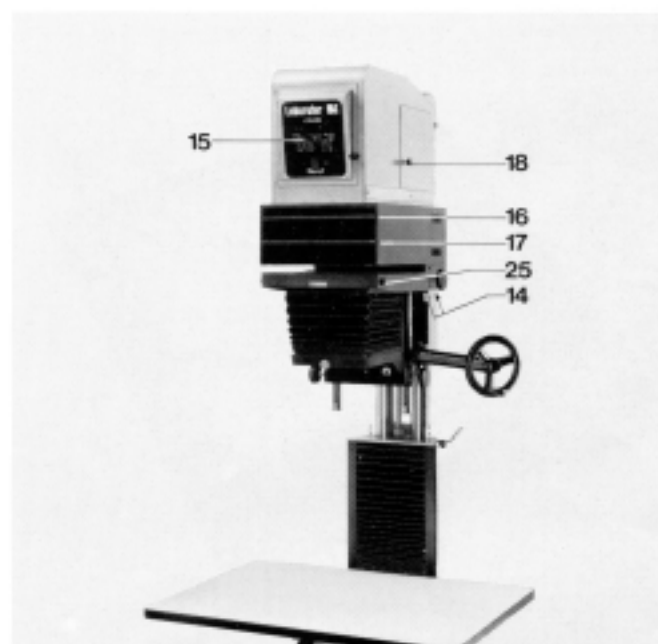
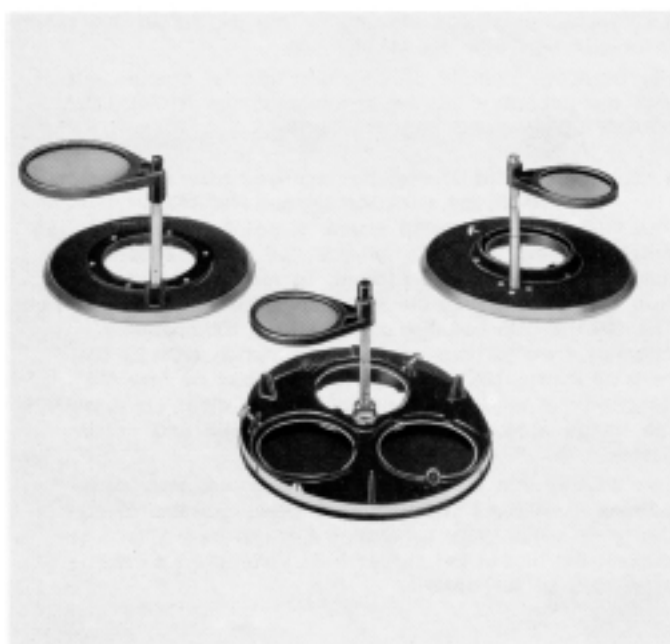


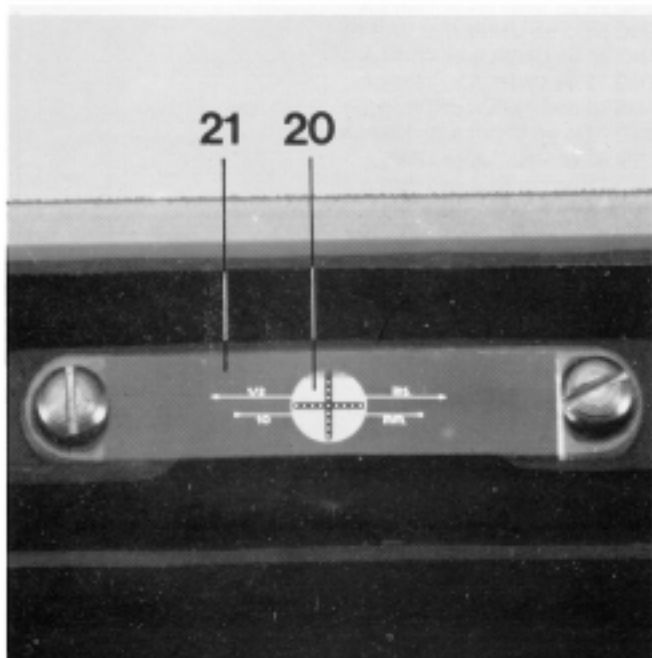
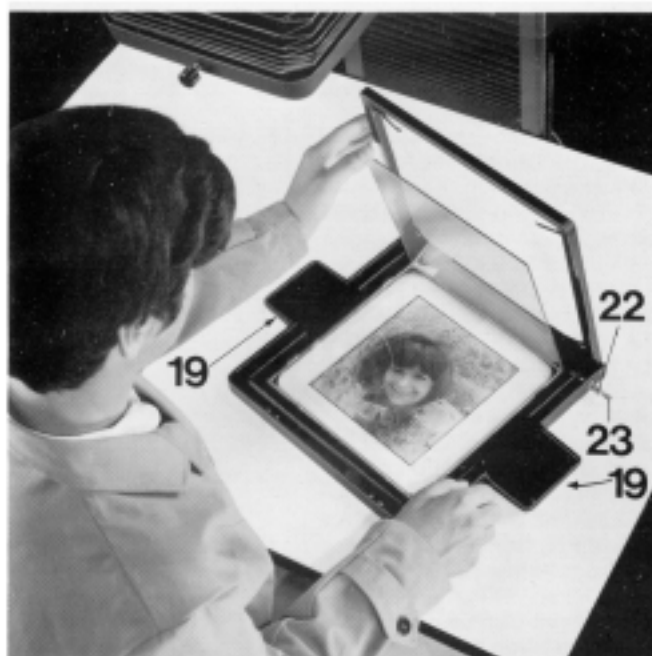
3.0.0. Lenses and lens mounting

The Laborator 184 takes all lenses of focal lengths of 50 to 360 mm. The lenses are fitted either on the single LAPLA or UNIPLA panels or on the TRIPLA turret. When mounting the lens, note the following table of lens panels. 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 + FLARING on UNIPLA/SEIMAR + FLARING on TRIPLA
Rodar 50	24 x 36 mm	LATUB on TRIPLA or UNIPLA
Rodon 50	24 x 36 mm	LATUB K on UNIPLA
Comon 60	1 ¹ / ₂ x 1 ¹ / ₂ in. (4 x 4 cm)	LATUB + IXODAP on TRIPLA or UNIPLA
Rodar 60	1 ¹ / ₂ x 1 ¹ / ₂ in. (4 x 4 cm)	LATUB on TRIPLA or UNIPLA
Rodon 60	1 ¹ / ₂ x 1 ¹ / ₂ in. (4 x 4 cm)	LATUB K on TRIPLA or UNIPLA
Rodar 75	2 ¹ / ₄ x 2 ¹ / ₄ in. (6 x 6 cm)	SEIPLA 7539 on UNIPLA or TRIPLA
Comon 80	2 ¹ / ₄ x 2 ¹ / ₄ in. (6 x 6 cm)	SEIPLA 7525 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
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
Comon 135	3 ¹ / ₈ x 4 in. (8.5 x 10 cm)	LAPLA 42 on UNIPLA or TRIPLA
Rodar 135	3 ¹ / ₈ x 4 in. (8.5 x 10 cm)	RODING 5071 on UNIPLA or TRIPLA
Rodon 135	3 ¹ / ₈ x 4 in. (8.5 x 10 cm)	RODING 3917 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
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
Apodon 240	5 x 7 in. (13 x 18 cm)	on VAPLA
Apodon 300	8 x 10 in. (20 x 25 cm)	on VAPLA
Aron 300	8 x 10 in. (20 x 25 cm)	SORING 5375 on UNIPLA or TRIPLA
Comon 300	8 x 10 in. (20 x 25 cm)	on VAPLA
Rodon 300	8 x 10 in. (20 x 25 cm)	on VAPLA
Apodon 360	10 x 10 in. (25 x 25 cm)	on VAPLA
Aron 360	10 x 10 in. (25 x 25 cm)	SORING 6075 on UNIPLA or TRIPLA
Comon 360	10 x 10 in. (25 x 25 cm)	on VAPLA
Rodon 360	10 x 10 in. (25 x 25 cm)	on VAPLA





4.0.0. The negative carrier system

4.1.0. The NEGA 205 negative carrier

The basic outfit of the Laborator 184 includes a NEGA 205 negative carrier.

This negative carrier contains two matched plane-parallel carrier glasses (NEGLA 205) which take all films from 35 mm up to 8 x 10 inches (20 x 25 cm) or 9 x 9 inches (24 x 24 cm) in horizontal or upright orientation. The negative carrier has a hinged top section whose four leaf springs press down the glasses. The hinged top is itself spring mounted and pressed down against the bottom frame on inserting the carrier in the enlarger head. To facilitate rapid centering of the carrier above the lens and to hold it firmly in position when the enlarger is swung horizontally, the enlarger head carries appropriate engagement holes. When pushing the carrier into the enlarger, push the negative carrier springs (19) gently upwards, let go and push the carrier towards the centre of the enlarger until the two pegs, running along the guiding grooves, engage the rear engagement holes of the guide plate.

To centre the focusing negative (with hairline cross (20), built into the negative carrier) above the optical axis, push the carrier into the enlarger head only far enough to engage the pegs in the front engagement holes. A once-and-for-all adjustment of the milled knob (22) brings the focusing negative (21) into the focal plane of the lower glass or insert. Lock it in this position with the milled securing knob (23). As long as the same glass plate or insert is used, the image can then be focused with the focusing negative alone. This also has scales for calculating the magnification.

A top glass treated to prevent Newton's rings (NEGLAS 205 AN) is available to order and replaces the regular upper negative carrier glass.

Glassless MAPEL metal inserts are available for enlarging 8 x 10 inch, 9 x 9 inch, 18 x 24 cm, 6 1/2 x 8 1/2 inch and 13 x 18 cm (5 x 7 inch) sheet films and plates without cover glasses. The MAPEL unit consists of a format mask and counter mask, and is placed in the NEGA 205 carrier in place of the glasses. MAVET inserts are also available in suitable sizes for 9 x 9 inch, 18 x 24 cm, 6 1/2 x 8 1/2 inch and 13 x 18 cm (5 x 7 inch) films. The MAVET inserts consist of a metal frame with small clamping springs to secure the two glass plates and are inserted in the NEGA 205 negative carrier in place of the glasses. A coated cover glass to prevent Newton's rings (MAGLA AN) is also available to order in suitable sizes for the MAVET and replaces the upper glass plate of the latter.

Glassless LAPFE reducing inserts are also available in all standard sizes for plates and sheet films smaller than 5 x 7 inches or 13 x 18 cm and fit into the NEGA 205 carrier in conjunction with the MAVET 139.

For masking, multiple printing and special graphic effects with the Laborator 184 we recommend the GRAHALON/GRANE 205 register negative carrier.

4.2.0. The GRAHALON register negative carrier system with the GRANE 205, GRADAP 205 and MIGRANE

The GRAHALON locating frame is rigidly mounted in the enlarger head. Push the GRANE 205 negative carrier fully into the GRAHALON frame. To remove the carrier, turn the knob (28) of the locating frame to the left or right. The GRANE 205 negative carrier takes transparency originals from 35 mm up to 8 x 10 inches (20 x 25 cm) or 9 x 9 inches (24 x 24 cm). The film can be inserted upright or in landscape orientation. The clear areas outside the image area accommodate step wedges and colour scales.

The GRANE 205 is equipped with two matched plane-parallel GRAGLAS 205 pressure plate glasses. Secure the lower glass plate by turning the red milled knob to prevent the film in the carrier from shifting on abrupt movement of the carrier.

A special GRAGLAS 205 AN cover glass treated against Newton's rings is also available to order and replaces the upper glass in the negative carrier. MIGRANE metal inserts with micro-register pins and a MIVALO punch are available for smaller formats (see accessories).

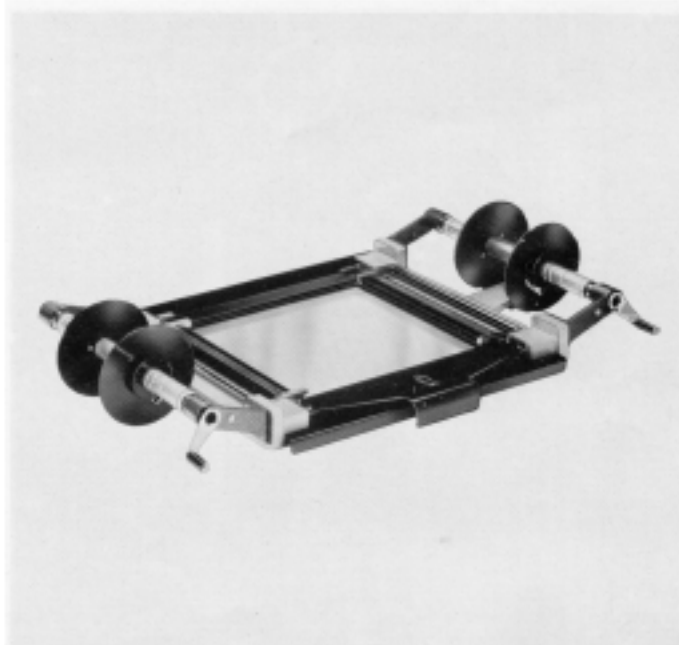
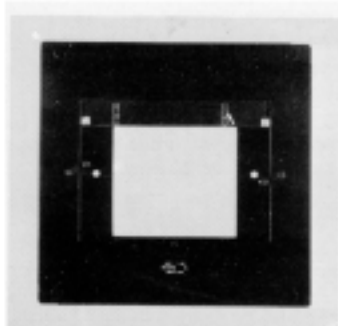
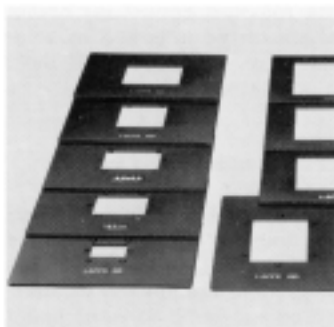
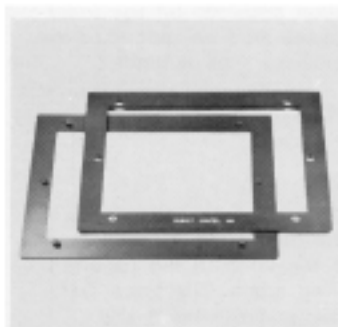
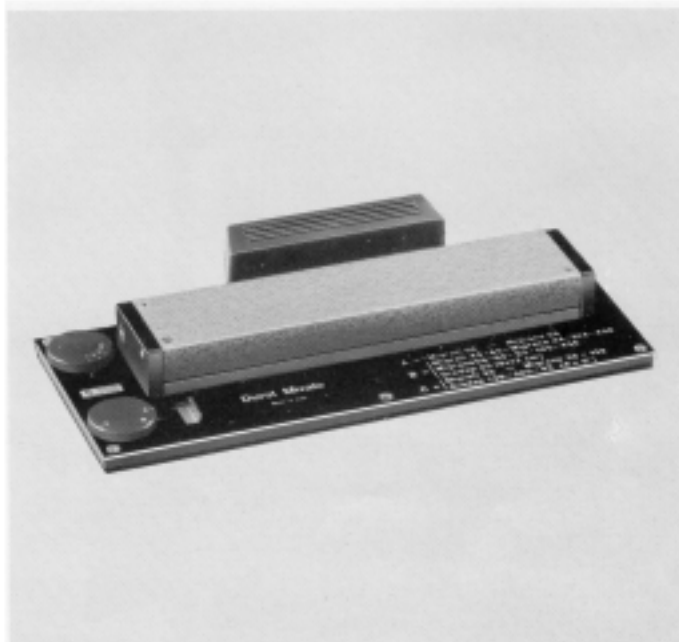
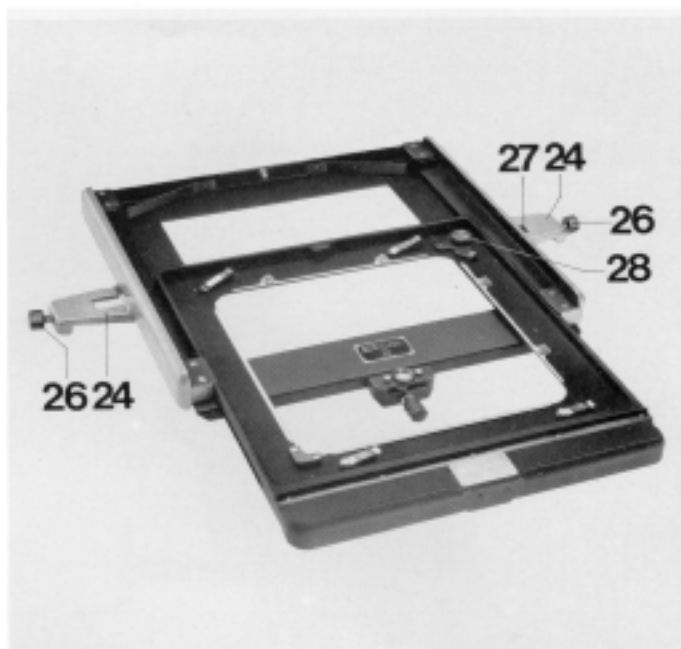
The GRAHALON locating frame (17) is fully pushed into the enlarger head. To do this, hold the frame by the movable clamping cheeks (24) so that these slide freely past the right-hand mask adjustment knob (25). The two cheeks each carry a clamping screw (26) underneath, while the right-hand cheek further has a securing screw (27) to eliminate lateral play between the frame and the guide plate of the enlarger head. To permit correct positioning of the frame, the clamping and securing screws must be slack before pushing the locating frame into the enlarger. Once the frame is pushed in, swing down the clamping cheeks (24) to engage below the bracing ribs of the enlarger head. Then tighten first the securing screw (27) followed by the clamping screws (26).

The GRADAP 205 register pin bar with its register pins can be mounted either vertically or horizontally in the GRANE 205 frame. The films, punched with the MIVALO punch, are then fitted with the punched holes over the GRADAP 205 pins.

Separate MIGRANE inserts are available for 5 x 7 inch (13 x 18 cm) and smaller originals. The MIGRANE inserts fit in the GRANE 205 in place of the pressure plates.

4.3.0. The NEGAROLL 205 aerial film carrier

The NEGAROLL 205 aerial film carrier is available from Durst (see accessories) for enlarging 9 1/2 inch, 5 inch or 70 mm wide aerial film.



5.0.0. The lighting system

5.1.0. The CLS 300 colour mixing head

When equipped with the CLS 300 colour mixing head, the Laborator 184 is the ideal professional enlarger for all colour work including vertical and horizontal projection. This high-power mixing head with its two 1000 watt tungsten-halogen lamps carries infinitely variable dichroic filters which do not fade. 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 300 colour mixing head is described in detail in the appropriate instruction manual.

5.1.1. Condenser lighting

When using the black-and-white condenser lamphouse, note the following points for fitting the lamp and condensers: Open the lamphouse side flap (18) and screw the lamp into its fitting. Then connect the lead of the lamphouse to the mains supply. A timer can be connected between the two.

To ensure even illumination over the whole of larger negative areas, use the large opal bulbs available from Durst (Order Code OPAL for 200/300/500 and 1000 watts). Before use hold each opal lamp against a powerful light source to check it 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. Therefore check the lamps regularly. Use the WAHAL heat filter (see accessories) to protect the colour filters and the lenses and condensers. The LAFAN 138 blower (available separately — see accessories) must be used with lamps of 300 watts or over. Connect the LAFAN 138 with its hose to the vents (29) at the left or right of the lamphouse. To ensure even illumination of large negative areas at high magnifications, move the mirror in the lamphouse by adjusting the lever (30) so that the light rays first reach the front mirror for more even light distribution (see table of condenser combinations).

5.2.1. Condenser combinations

The required condenser combination depends on the focal length of the lens and in some cases also on magnification with a given lens. Select the condensers as indicated in the table.

5.2.2. Centering the lamp

Centre the lamp by the knobs (31) and (32) underneath the housing. To raise or lower the opal lamp, slightly slack off the clamping ring (33), adjust the lamp to the required height and tighten the clamping ring again. The knob (31) moves the lamp forward and back, and the knob (32) adjusts it laterally. To facilitate lamp adjustment 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.

The full lens aperture is used only for lens centering; for all enlarging exposures stop down the lens by at least two stops. This is essential for even definition and illumination over the whole projected image.

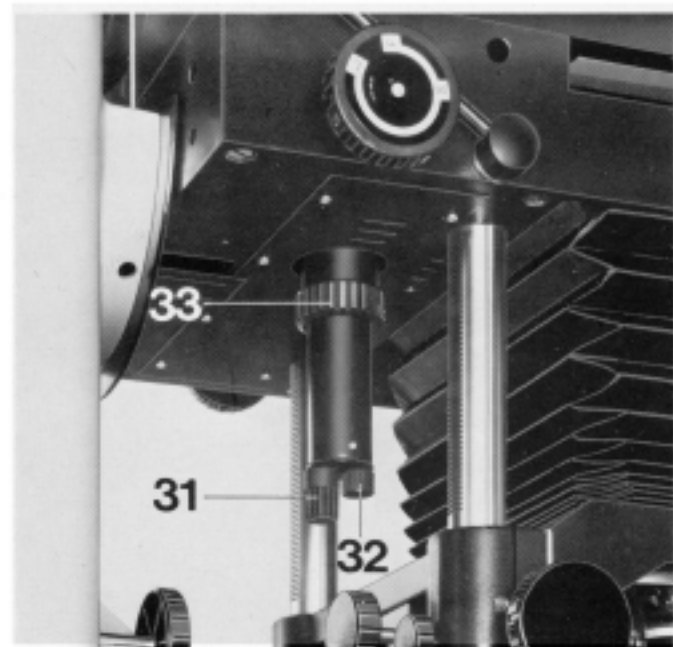
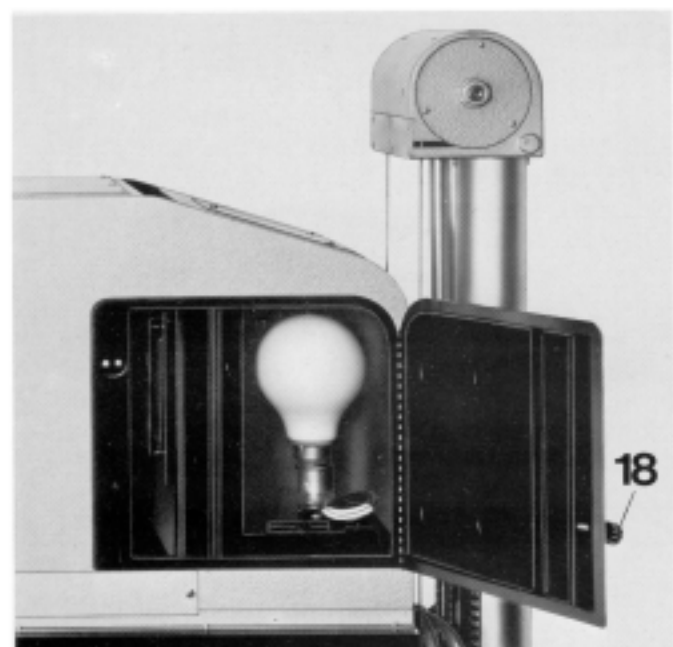
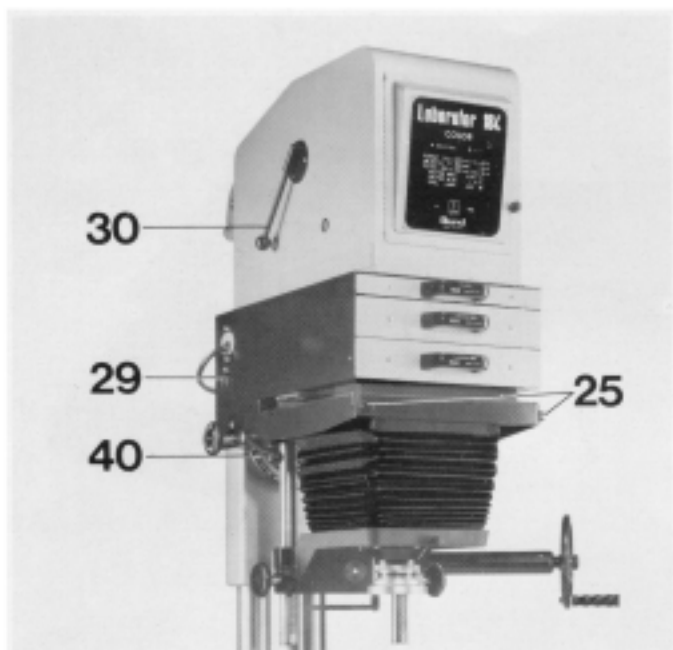


Table of condenser combinations for the Durst Laborator 184 with opal lamps and Componon, or Rodagon lenses

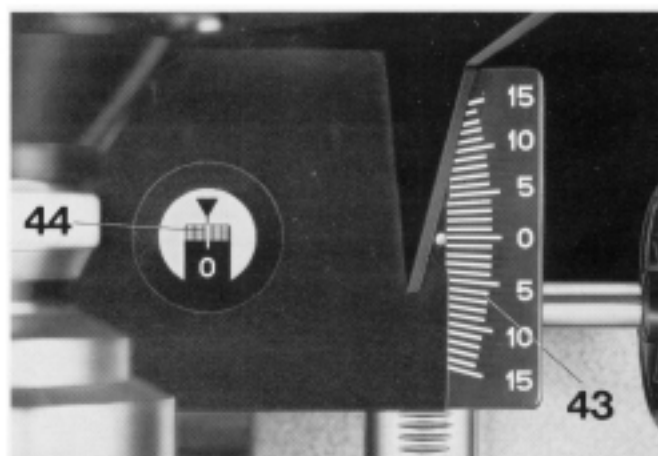
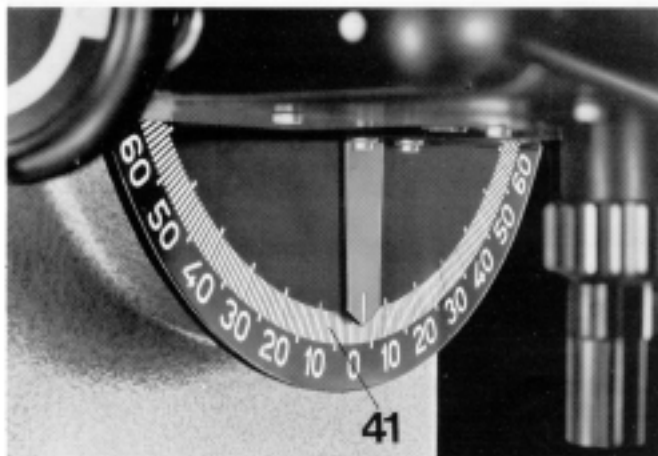
VERTICAL PROJECTION

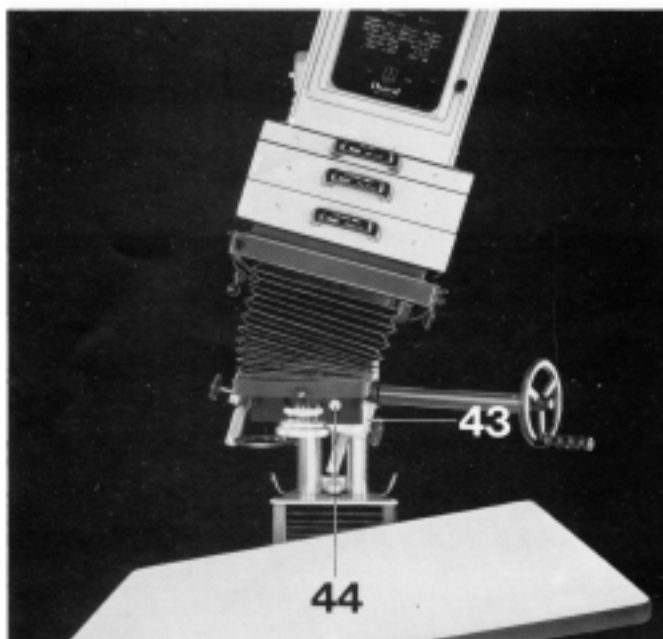
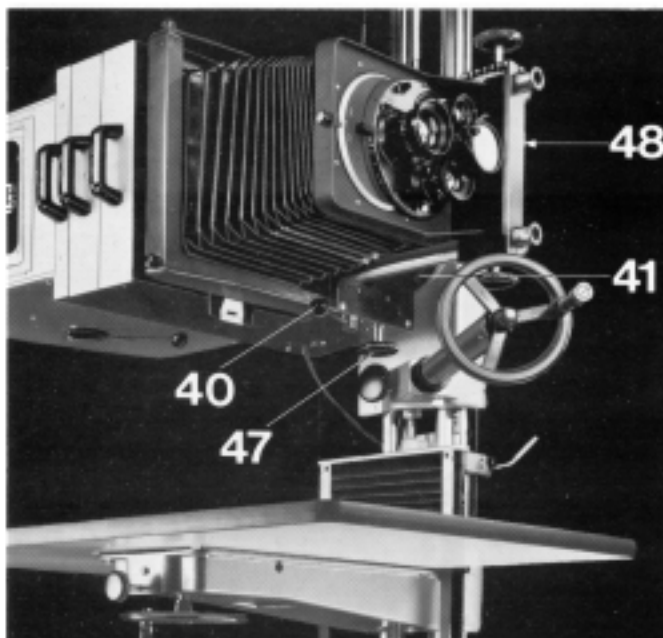
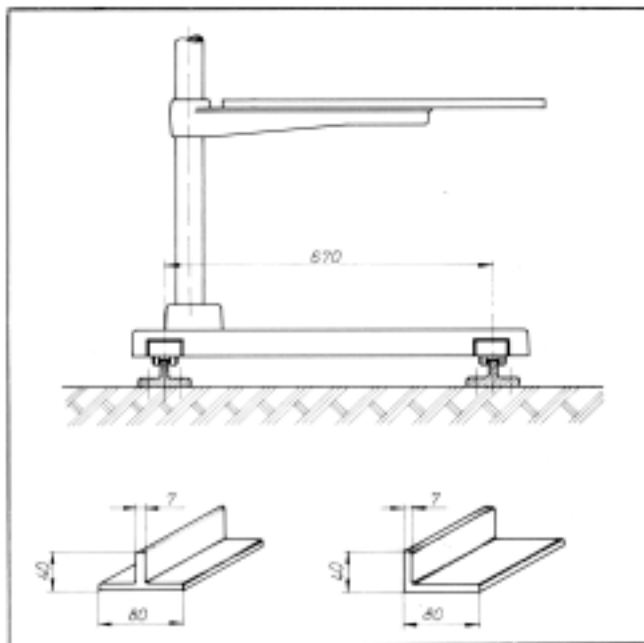
Lens mm $f = \frac{\text{mm}}{\text{inches}}$	Negative size mm $f = \frac{\text{mm}}{\text{inches}}$	Linear magnification minimum maximum	Condenser combination + LAZUCO 181	Position of mirror lever
360 14	200 x 250 8 x 10	0,9 x 2,5 x	380 380	H V
300 12	200 x 250 8 x 10 180 x 240 6 1/2 x 8 1/2	0,6 x 1,3 x	380 380	H
		1,3 x 2,8 x	382 380	H
		2,8 x 4,0 x	380 380	V
240 9 1/2	130 x 180 5 x 7	0,4 x 1,3 x	380 380	V
		1,3 x 5,0 x	380 250	H
210 8 1/2	130 x 180 5 x 7	0,3 x 1,1 x	380 380	H
		1,1 x 3,0 x	380 250	H
		3,0 x 6,2 x	380 252	H
180 7 1/8	100 x 150 4 1/4 x 6 1/2	0,3 x 0,9 x	380 380	H
		0,9 x 6,0 x	380 252	H
		6,0 x 7,5 x	250 252	H
150 6	100 x 125 4 x 5	0,25 x 0,7 x	380 380	H
		0,7 x 2,5 x	250 380	H
		2,5 x 9,5 x	250 180	H
135 5 1/4	85 x 100 3 1/4 x 4 1/4	0,25 x 0,9	250 380	H
		0,9 x 11,0 x	250 180	H
105 4 1/8	65 x 90 2 1/2 x 3 1/2	0,2 x 0,7 x	380 380	H
		0,7 x 4,0 x	252 180	H
		4,0 x 14,0 x	180 160	H
80 3 3/8	60 x 60 2 3/4 x 2 1/4	3,8 x 21,0 x	180 130	H
60 2 3/8	40 x 40 1 1/2 x 1 1/2	5,0 x 26,5 x	160 130	H
50 2	24 x 36 35 mm	6,7 x 33,0 x	160 130	H

Table of condenser combinations for the Durst Laborator 184 with opal lamps and Componon, or Rodagon lenses

HORIZONTAL PROJECTION

Lens mm $f = \frac{\text{mm}}{\text{inches}}$	Negative size mm $f = \frac{\text{mm}}{\text{inches}}$	Linear magnification minimum maximum	Condenser combination + LAZUCO 181	Position of mirror lever
360 14	200 x 250 8 x 10	2,5 x 9,0 x	382 380	H V
		9,0 x 21,0 x	380 380	V
300 12	200 x 250 8 x 10	4,0 x 5,3 x	380 380	V
	180 x 240 6 1/2 x 8 1/2	5,3 x 23,0 x	380 380	V
240 9 1/2	130 x 180 5 x 7	5,0 x 6,5 x	380 250	H
		6,5 x 33,0 x	380 252	H
210 8 1/2	130 x 180 5 x 7	6,2 x 33,0 x	380 252	H
180 7 1/8	100 x 150 4 1/4 x 6 1/2	7,5 x 43,0 x	250 252	H
150 6	100 x 125 4 x 5	9,5 x 20,0 x	250 180	H
		20,0 x 43,0 x	252 180	H
135 5 1/4	85 x 100 3 3/4 x 4 1/4	11,0 x 47,0 x	250 180	H
105 4 1/8	65 x 90 2 1/2 x 3 1/2	14,0 67,0 x	180 160	H
80 3 1/8	60 x 60 2 1/4 x 2 1/4	21,0 x 73,0 x	180 130	H
60 2 3/8	40 x 40 1 1/2 x 1 1/2	23,0 x 84,5 x	180 130	H
50 2	24 x 36 35 mm	33,0 x 170,0 x	160 130	H





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 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 184 by four different procedures, all of which yield equally good results.

- Turn the knob (47) anti-clockwise from «F» to «L», tilt the enlarger head and lock by turning the knob (47) back to «F». The large tilt scale (41) shows the tilt of the enlarger head. Slack off the knob (48) to re-align the lens standard horizontally, and move it sideways to recentre the optical axis. The scales (43) and (44) show the tilt and lateral displacement of the lens standard.
- Keep the enlarger head vertical and incline only the lens standard and the easel towards each other.
- Keep the easel horizontal and tilt only the enlarger head and lens standard.
- Incline the enlarger head with the lens standard and easel towards each other.

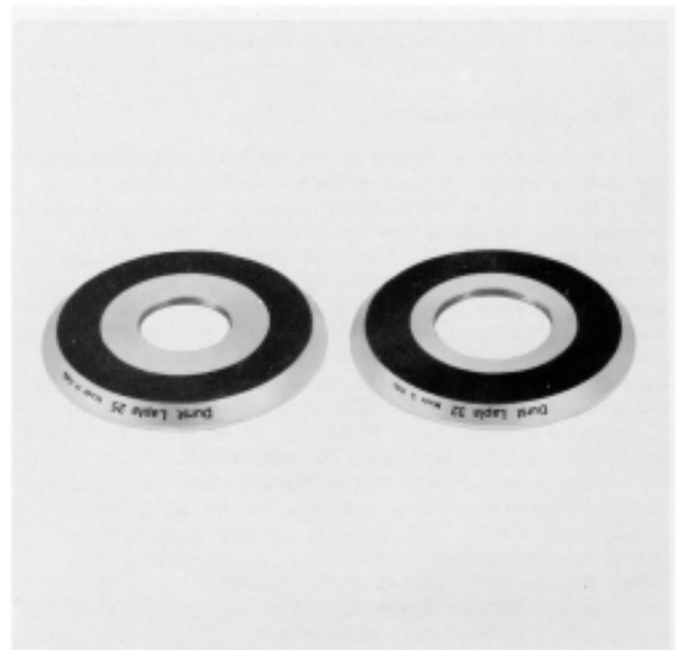
To return the enlarger head to its precise vertical position, first turn the knob (47) to «90°» and tilt the enlarger head back until it engages. Then lock by turning the knob (47) back to «F». Reset the lens standard until it engages at the zero point of its scales, and lock by the knob (48).

For complete correction of converging verticals (by the Scheimpflug or intersecting planes principle) the easel must also be tilted. This is possible when the easel is fitted via the VADAP and LASDAP mounting plates (see accessories).

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 an 8 x 10 inch or 18 x 24 cm original down to 2 1/2 x 3 1/2 inches (6.5 x 9 cm) the required focal length is 105 mm.

For reductions with a 50 mm lens — which is normally mounted recessed in the LATUB 2 — mount the lens on the flat LAPLA 25 or LAPLA 32 panel, depending on the lens thread. Otherwise you cannot get the lens near enough to the baseboard. The same applies to the 75-80 mm lenses.



6.0.0. Operation

6.1.0. Adjusting the magnification

Adjust the magnification on the Laborator 184 by moving the enlarger head and the baseboard. The vertical movement of the enlarger head is controlled by the hand crank (10). On releasing the crank, the enlarger head automatically stays in any position. In addition, the knob (34) locks the enlarger head at the required height. To adjust the baseboard (9), turn the hand wheel (35). Once the baseboard is at the required height, the arm together with the baseboard can be locked against lateral displacement by the knob (36).

On request, the Laborator 184 can also be fitted with the HEMOT electric motor drive for the enlarger head and the BREMOT motor drive for the baseboard. The operation and fitting of the HEMOT and BREMOT motors with the HEDES and STADES control units required for them is described in the separate instruction manual for these accessories.

6.2.0. Focusing

The Laborator 184 is focused by the two knobs (37) on the lens carriage and the knob (38) for the coarse adjustment of the bellows extension on the lens carrier rails. Use the two knobs (37) for fine focusing. During this operation the locking screws behind the knobs (37) must be slack. These two locking screws (39) serve to lock the lens carriage when making a series of enlargements at fixed settings. The coarse adjustment can also be locked with the lever (40).

The Laborator 184 can also be fitted with the FOMOT 184 motor drive and the FODES control unit (see separate instruction manual). The maximum magnifications available on vertical projection with the Laborator 184 are shown in the table on page 11.

6.3.0. Scales

The six scales of the Laborator 184 indicate the different settings for easier adjustment. If you note the data of the various pointer settings, it is easier to reset the enlarger to specific working conditions.

The Laborator 184 has the following scales:

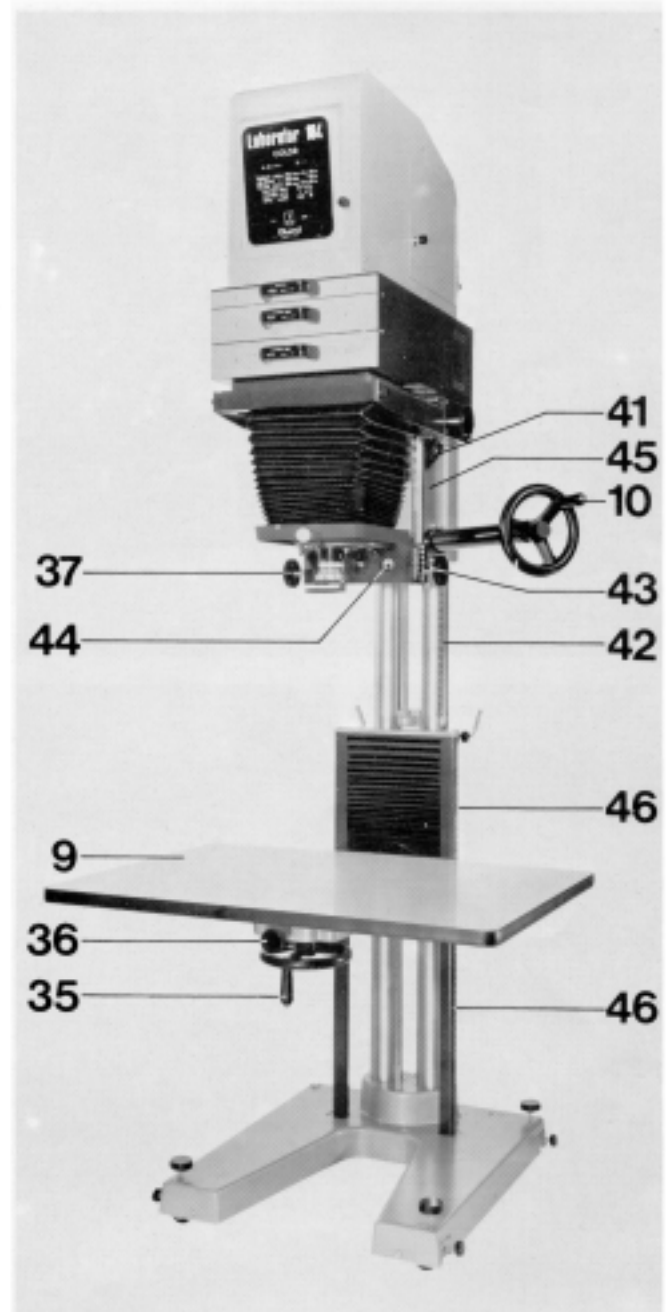
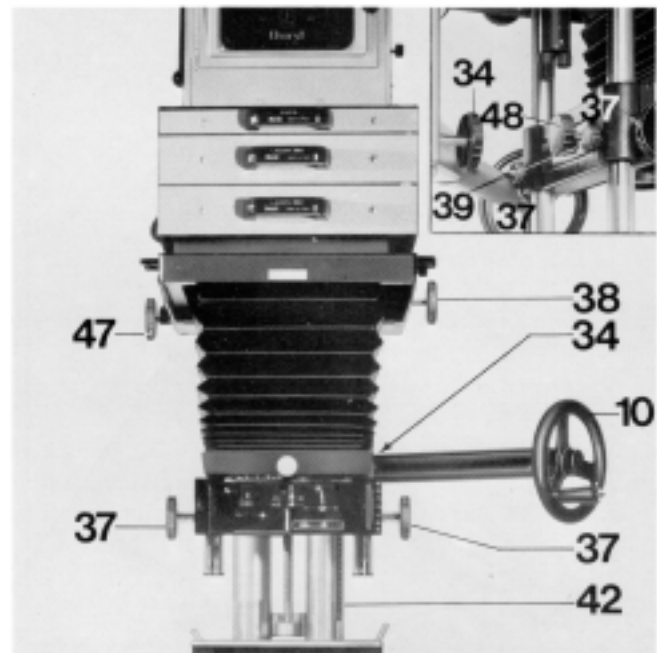
- Scale (41): Enlarger head tilt for distortion control
- Scale (42): Vertical movement of the enlarger head (cm)
- Scale (43): Lateral lens tilt for distortion control
- Scale (44): Lateral displacement of optical axis
- Scale (45): Vertical movement of lens standard carriage
- Scale (46): Vertical movement of baseboard

6.4.0. Horizontal projection

The Laborator 184 is ideally suited for horizontal projection for making colour or black-and-white enlargements. For this purpose swing the enlarger head to the left or right through 90°. To swing the head, turn the knob (47) to the left to set it to «L». Start swinging the enlarger head to the left or right, then turn the knob (47) to «90°» and continue swinging the head until it engages exactly in the horizontal position. Lock the head in this position by turning the knob to «F». To return the enlarger head to vertical projection, turn the knob (47) to «L» again, start inclining the enlarger head and turn the knob to «90°». Continue turning the enlarger head to engage in its vertical position, then lock the knob (47) again by turning it to «F».

To ensure accurate alignment of the Laborator 184 squarely to the projection surface, it should run on rails. We recommend T-rails. The dimensions and specifications are shown in the diagram below.

When the electric motor drive is installed for raising and lowering the enlarger head, the head can only be inclined to the right for horizontal projection.



7.0.0. Copying

To use the Laborator 184 for copying, you need the RILU copying lighting unit. The RILU has clamping cheeks to clamp to the rear edge of the baseboard. The lighting unit then evenly illuminates the original to be copied.

The RILU lighting unit consists of two chrome-plated lamp support arms of adjustable height. The arms can each carry two separately switched lamp reflectors which are adjustable laterally and can tilt vertically. The lamp reflectors take opal lamps up to 150 watts. Each reflector has a graduated diffuser for even illumination of the original. When not required for copying, the lamp arms can swing to the back to be out of the way during enlarging. For uniform illumination of originals larger than 12 x 16 inches or 30 x 40 cm, RILAR extension arms (available separately) fit between the two clamp-on sockets on the baseboard and support arms of the RILU.

The NEGA 205 and GRANE 205 negative carriers also serve as copying film holders. In this case place black opaque paper between the upper glass plate and the copying film to eliminate scattered light reflections.

8.0.0. Maintenance

The Durst Laborator 184 is designed for heavy duty use with minimum maintenance; it keeps its high efficiency even in less than ideal working conditions.

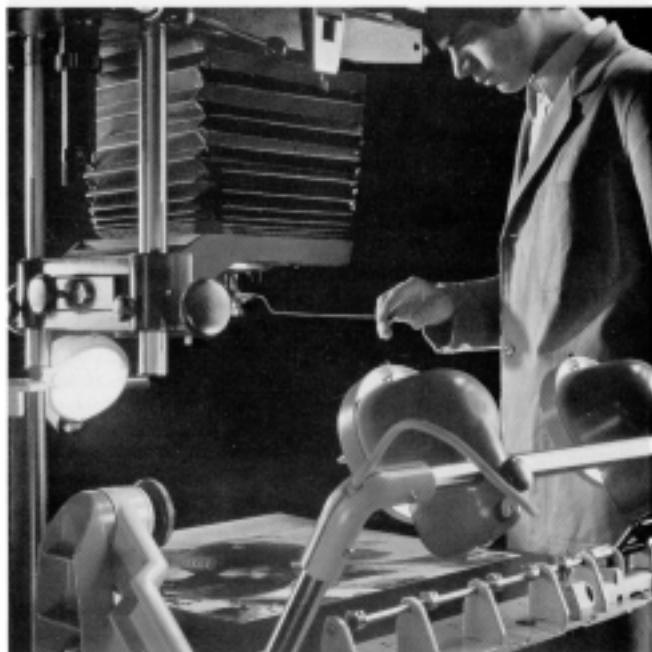
Periodically clean off the dusty grease film from the columns with petrol and re-grease.

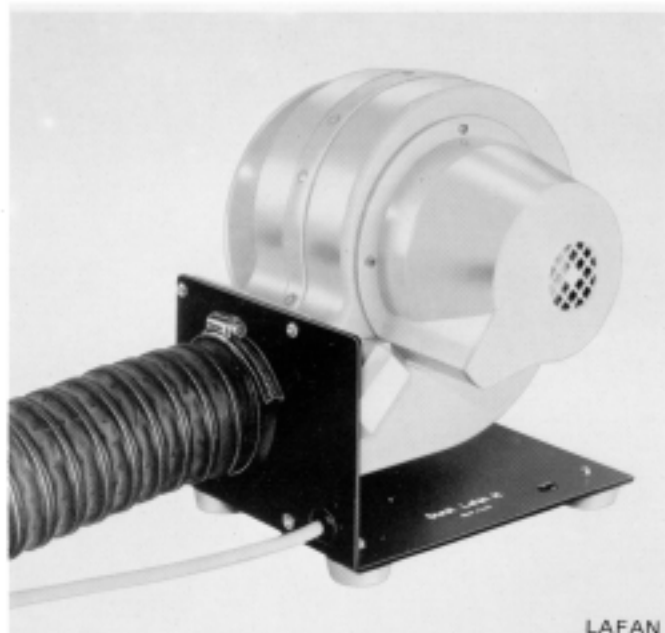
Periodically also clean the vertical adjustment shafts of the enlarger head and of the baseboard and re-grease. Never use lubricants containing acid.

The gear shaft for the vertical adjustment of the enlarger head and the counterweight spring housing carry one and two lubricating points respectively. From time to time apply there a few drops of oil.

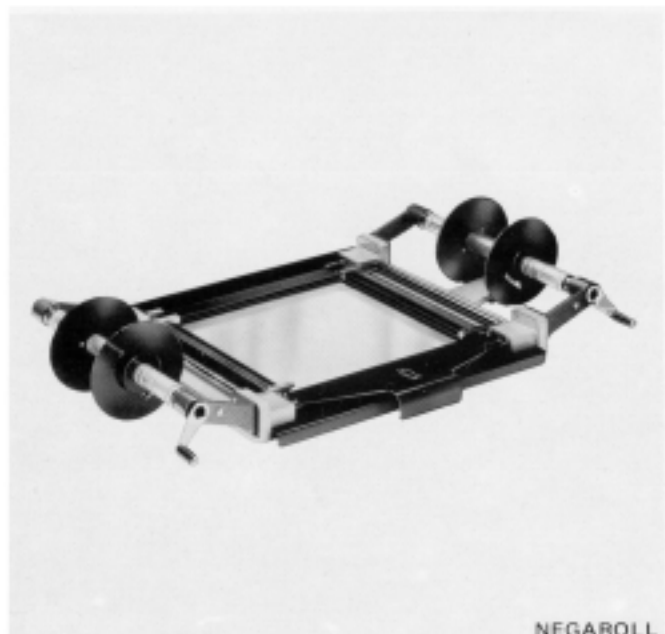
When the enlarger is not in use, fully raise the enlarger head.

Regularly clean the negative carrier glasses, condensers and mirror with a chamois leather or a soft brush, or better still with an anti-static cleaner.

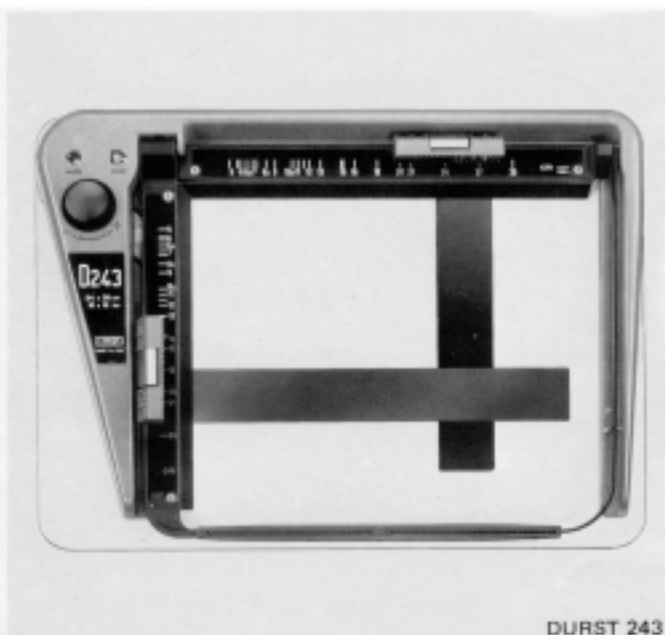




LAFAN



NEGAROLL



DURST 243

ACCESSORIES

The WAHAL heat filter

To fit the WAHAL, open the lamphouse flap and insert the filter in the guides on the lamp side of the dividing wall. The WAHAL protects the colour filters, lenses and condensers; it is essential with lamps of 300 watts or over. When centering the lamp take care not to bring this into contact with the heat filter, as the latter may crack.

The LAFAN 138 blower unit

This is needed with lamps of 300 watts or over. The LAFAN 138 is connected to the lamphouse of the Laborator 184 via a flexible hose. Appropriate vent openings are provided on both sides of the lamphouse.

The NEGAROLL 205 aerial film carrier

This special negative carrier is intended for enlarging 9 1/2 inch (24 cm), 5 inch (13 cm), 3 1/2 inch (9 cm) and 70 mm wide aerial films. It fits into the enlarger head in place of the standard NEGA 205 negative carrier.

Register accessories

The GRANE 205, GRAHALON, GRADAP 205, MIVALO and MIGRANE accessories permit easy and precise working in all photographic jobs requiring exact register.

The GRAHALON locating frame fits into the enlarger head in place of the standard NEGA 205 negative carrier.

The GRAHALON has an automatic centering system for the GRANE 205 negative carrier to re-locate the latter exactly every time the carrier is removed and replaced. The GRADAP 205 register pin bar carries two micro-register pins to take the punched films. The films are punched with the MIVALO precision punch and held flat between two glass plates in the GRANE 205 negative carrier. For smaller film sizes from 35 mm up to 5 x 7 inches or 13 x 18 cm the GRANE 205 negative carrier also takes separately available MIGRANE inserts in place of the two glass plates. The MIGRANE reducing inserts also carry micro-register pins similar to those of the GRADAP 205.

The Durst STABIN voltage stabiliser

Where the electrical supply is subject to appreciable voltage fluctuations, a voltage stabiliser is essential for consistent colour enlarging exposures. The Durst voltage stabilisers are available in versions for 500, 1000 and 2000 watts, and keep the voltage constant within $\pm 2\%$ to compensate fluctuations up to $\pm 20\%$. They are designed for a 220 volts input; the output voltage is 110 volts/60 Hz or 220 volts/50 Hz.

The COLTIM programming processing timer

The programming dial of this mechanical timer can be preset to the processing intervals required for different paper types or makes. During breaks in the processing sequence (for instance while filling or emptying the processing drum) the timer stops; after the bell signal the next timing interval starts on pressing a button.

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 stop 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 the frame is also available with a laminated Formica baseboard.

The Minolta/Durst NEGA colour analyser 101 and 201

A single measuring sequence establishes the filter values and exposure times 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 with a 3 mm diameter measuring probe;

model 101 uses full-area readings.

Both models can be used for negative sizes from 35 mm up to 4 x 5 inches (10 x 12.5 cm). Selective full-area 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 SANAT sodium vapour darkroom lamp

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

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 black-and-white and colour materials in general use. The light source is a clear 40 watt bulb. The SAFIL lamp can stand on the bench or be mounted on the wall.

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 provides 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 printing departments primarily working with colour analysers matched to the enlarger. This unit can store data of a number of emulsions and provides rapid exposure times and filter value readings. Its robust construction and semi-conductor technology ensure straightforward operation with highly reproducible results.

The BLAWIKIT 184 diffused tungsten-halogen light unit

Where high light intensities are needed for black-and-white enlargements (for instance with horizontal projection) the BLAWIKIT 184 diffused light unit is recommended. 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 protective dust cover

The LAGUM cover in tough plastic protects the enlarger against dust and dampness.

The FILCA filter drawer

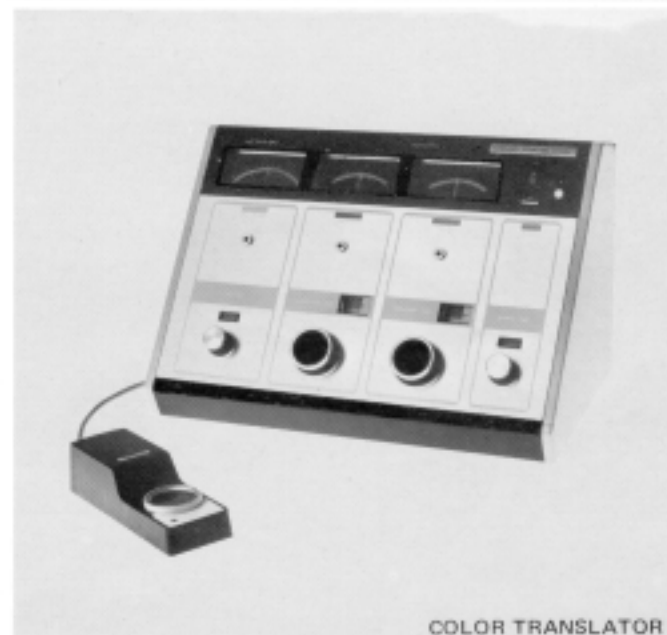
The FILCA filter drawer is located above the condenser compartment and takes 12 x 12 inch (30 x 30 cm) colour filter films. The drawer is removable for easier insertion of the filters. Above the FILCA filter drawer the lamp housing carries two recesses at the left and right. On removing the blanking plates, these recesses take a slide-in fitting for 23 x 23 cm (9 x 9 inch) filters.



COLOR ANALYZER



SAFIL/SANAT



COLOR TRANSLATOR



The filter holder and filter turret

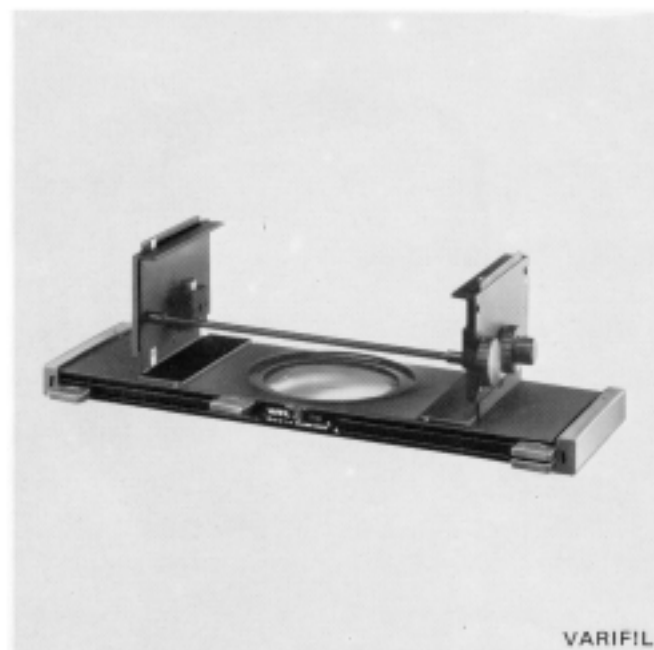
The VARIFIL filter holder and LATIRAD filter turret are intended for colour enlargements by the additive exposure system. The VARIFIL filter holder is used for longer focus lenses (300 and 360 mm) mounted on the VAPLA panel. The LATIRAD filter turret is used with lenses on the UNIPLA or TRIPLA panels. The LATIRAD has four apertures, each taking filters of 70 mm diameter. The filter turret is mounted in place of the red filter on the shaft of the latter. Where more than three colour filters are needed, up to two supplementary LAZURAD filter wheels may be fitted. LARING rings hold the gelatine filters in place.

The TRIPLA lens turret

This permits instant lens changing. It takes up to three lenses of focal lengths from 50 to 240 mm.

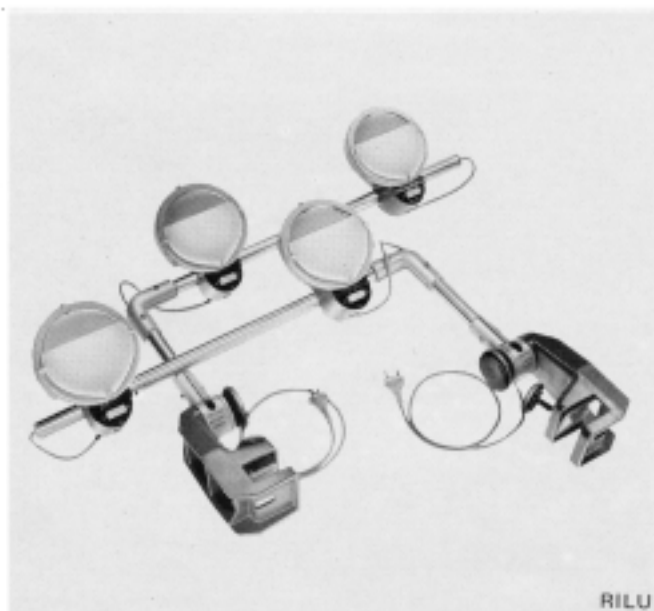
Accessories for distortion control

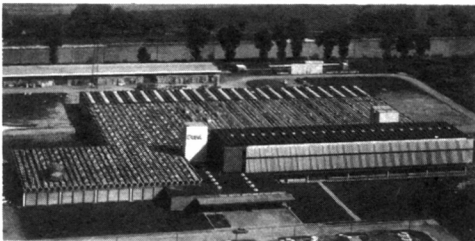
The LASDAP and VADAP mounting plates permit complete distortion control by tilting the baseboard in any direction. The LASDAP plate is mounted on the carrying arm in place of the baseboard and has a precisely adjustable three-point locating system, consisting of two levelling stays and a spigot plus an adjustable support to take the movable VADAP mounting plate with its ball and socket head. The baseboard is mounted on the VADAP. When horizontal, the VADAP plate rests on the three-point support of the LASDAP. To tilt the baseboard, swing down the two levelling stays. An easily accessible locking lever locks the VADAP in any tilted position.



The RILU copying lighting unit

This is an ideal lighting system for glare-free illumination. Two chrome plated support arms with two reflectors each are mounted on the enlarger with the aid of powerful clamping cheeks. Sockets are supplied for the purpose 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. For uniform illumination of originals larger than 12 x 16 inches or 30 x 40 cm, special RILAR extension arms are available separately and fit between the two clamping sockets on the baseboard and the lamp arms.





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