Instruction Manual

Durst ELITE 2000

Computerized autofocus system
ELITE 2000 tim and ELITE 2000 mot version

CONTENTS

DESCRIPTIONS

Durst ELITE 2000 is a new microprocessor-controlled computerized autofocusing system for the Durst LABORATOR 1200 ELITE 2000 tim and LABORATOR 1200 ELITE 2000 mot enlargers.

Suffixes that you will meet repeatedly in this manual:

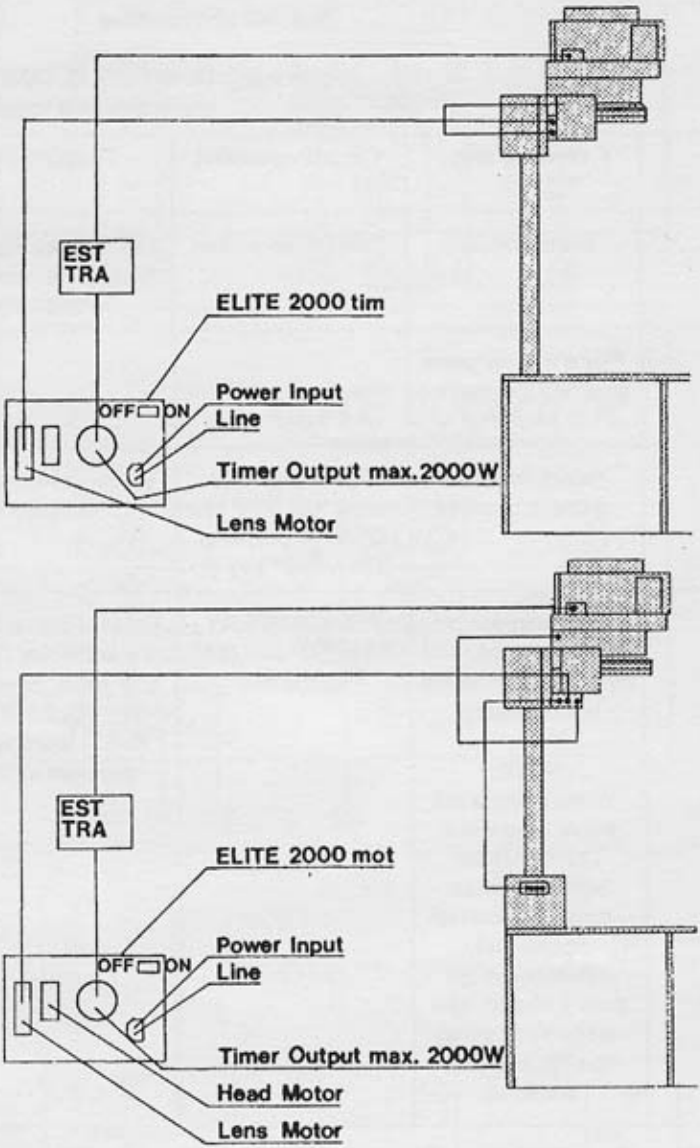
Suffix	Enlarger
tim	LABORATOR 1200 (version with manual head adjustment) ELITE 2000 tim
mot	LABORATOR1200 (version with motorised head adjustment) ELITE 2000 mot

Technical data

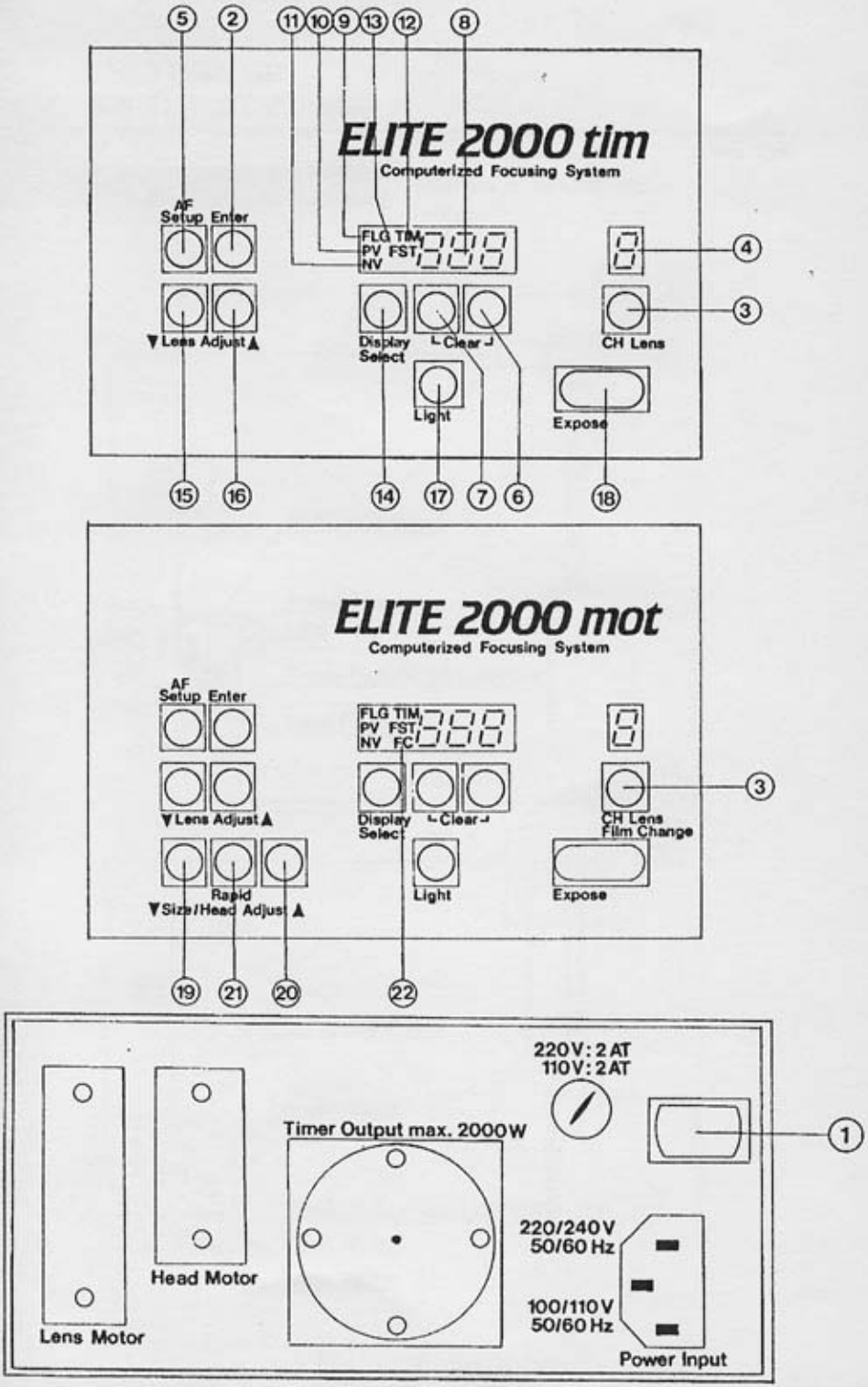
Lens carrier movement rate	:	fast = approx. 7.2 mm/sec. slow = ca. 1.2 mm/sec.
Programmable focal lenghts	:	28 to 250 mm
Positioning resolution	:	0.01 mm
Reproducibility of lens position	:	±0.02 mm
Environment conditions	:	RH 30 - 80 % Temperature 18 - 30 °C (65-86 °F)
Lens channels	:	10 (0 - 9)
Positive variator range	:	+ 999 / - 99 mm (each DIGIT = 1 mm)
Negative variator range	:	+ 99 / - 99 (each DIGIT = 0.05 mm)
Exposure timer range	:	0-99.9 and 100-999 sec
Aperture range	:	f/2.8 bis f/45

BEFORE SETTING UP
ELITE 2000 AUTOFOCUSING

Connections How the cables link up



5 - ELITE 2000 tim
ELITE 2000 mot


ELITE 2000 tim
Computerized Focusing System
AF Setup
Enter
FLG TIM
PV FST
NV
Lens Adjust
Display Select
Clear
CH Lens
Light
Expose
ELITE 2000 mot
Computerized Focusing System
AF Setup
Enter
FLG TIM
PV FST
NV FC
Lens Adjust
Display Select
Clear
CH Lens Film Change
Size/Head Adjust
Rapid
Light
Expose
220V: 2AT
110V: 2AT
Timer Output max. 2000W
220/240V 50/60 Hz
100/110V 50/60 Hz
Power Input
Head Motor
Lens Motor

Programming the autofocus system

Aids:

Basic outfit:
TEST 69 test negative

Accessory: Durst FOCUS TARGET
glass focusing target

Step No.	Working step	Control operation	Response of unit
A1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier moves to reference position
A2	Place test negative supplied in negative carrier		
A3	Select required memory channel	Press and hold down "ENTER" key (2) while pressing "CH LENS" key (3)	Channel No. appears in display (4)
A4	When programming for baseboard level clear any PV values from memory. NOTE: When using a roll paper magazine, Durst LABOM bench or when projecting on the floor (level difference more than ± 10 cm), see page 15 (Setting the PV positive variator)	Press "DISPLAY SELECT" key (14) four times	PV (10) signal lights up. If the display (8) shows any value, press both "+ and - CLEAR" keys (6 and 7) together. If not, proceed to step A5

A5	Switch on autofocus programming mode	Press "AF SETUP" key (5)	LED of "AF SETUP" key lights up and FLG (9) signal blinks NOTE: Any negative variator setting (NV≠0) blocks autofocus programming (NV LED blinks on pressing "AF SETUP" key). Remedy by setting NV to 0 (press both + and - CLEAR keys (6 and 7) together.
A6	Enter focal length of lens	Press"+" (6) oder "-" (7) key	Display (8) shows focal length
A7	Store focal length	Press " ENTER" key (2)	"FLG" signal (9) lights with steady light. Display shows "CLR".
A8	Clear autofocus reference points	Press "+ - CLEAR" keys (6,7) together	Lens carrier runs to reference position. Display: □□□ followed briefly by SFC (SETUP FOCUS).
A9	Set enlarger head position according to focal length used and sharply focus image	Set enlarger head to following positions: tim * Release quick adjustment knob (13) and set enlarger head to positions indicated below	

tim *
Fine focus by turning knob (14)

mot *
For rapid adjustment press and hold down "RAPID" key (21) while pressing one of the "SIZE/HEAD ADJUST" keys (19 or 20)

mot *
Fine focus by pressing one of the "SIZE/HEAD ADJUST" keys (19 or 20). Focus sharply at the positions listed in Table 1 (for procedure see steps A10 to A14)

Table 1

LABORATOR 1200 ELITE 2000 tim and LABORATOR 1200 ELITE 2000 mot enlargers
Focal lengths of lenses

28 mm 35 mm 50 mm 60 mm	80 mm	100 mm 105 mm	150 mm	150 mm with FEMO-TUB
Enlarger head positions on cm scale				
20 21 24 30 50 75 110	20 21 23 26 30 40 60 85 110	24 26 30 35 45 60 80 110	43.5 45 47 50 55 60 79 85 110	40.6 41 42 44 47 52 60 70 90 110

A10	Switch on enlarger lamp	Press "LIGHT" key (17)	
A11	Sharply focus image	Press " LENS ADJUST" keys (15,16) IMPORTANT: To eliminate mechanical deviations in programming always approach final position of sharpness from below.	
A12	Store enlarger head position	Press "ENTER" key (2)	Enlarger focuses automatically as a check
A13	Is the image sharp? Yes: Go to A14 No: Go to A11		
A14	Have you calibrated all the positions listed in Table 1 for the lens being used? Yes: Go to A15 No: Go to A 8		
A15	Switch off autofocus programming mode	Press "AF SETUP" key (5)	LED of "AF SETUP" key goes out. END

SUBSEQUENT CORRECTION OF AUTO-FOCUSING AT A GIVEN ENLARGER HEAD POSITION

Step No.	Working step	Control operation	Response of unit
B1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier runs to reference position. After about 2 sec. the enlarger focuses. AFC display appears during this adjustment.
B2	Insert test negative supplied in negative carrier		
B3	Select head position to be corrected	Set enlarger head to this position	Enlarger focuses automatically. AFC display appears during this adjustment.
B4	Switch on autofocus programming mode	Press "AF SETUP" key (5)	LED of "AF SETUP" key lights up and FLG signal (9) blinks. Display shows focal length of this channel.
B5	Store indicated focal length	Press "ENTER" key (2)	"FLG" signal (9) lights with steady light. Display shows "CLR".
B6	Do not clear autofocus reference points and skip this point	Press "ENTER" key (2)	Lens carrier runs to reference position. Display: SFC
B7	Sharply focus image	Press "LENS ADJUST" keys (15,16) IMPORTANT: To eliminate mechanical deviations in programming al-	

		ways approach final position of sharpness from below (key, 16).	
B8	Store enlarger head position	Press "ENTER" key (2)	Enlarger focuses automatically as a check. SFC displayed during this adjustment
B9	Is the image sharp? Yes: Go to B10 No: Go to B7		
B10	Switch off autofocus programming mode	Press "AF SETUP" key (5)	LED of "AF SETUP" key goes out. END

NOTE:
If a corrected enlarger head position is less than 5 mm from a reference position stored during calibration, then that reference position is overwritten. Otherwise the unit establishes a new reference position.

To correct a calibration point, this must be set again exactly within 5 mm. Preferably use the positions recommended in Table 1 on page 10.

PRACTICAL OPERATION OF ELITE 2000
AUTOFOCUSING

Step No.	Working step	Control operation	Response of unit
C1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier runs to reference position. After about 2 sec. the enlager focuses.
C2	Fit appropriate lense		
C3	Fit appropriate mixing box and format mask		
C4	Select programmed memory channel	Press and hold "ENTER" key (2) while pressing "CH LENS" (lens channel) key (3)	Channel appears in display (4). Enlarger focuses automatically. Display during focusing: AFC
C5	Switch on enlarger lamp	Press "LIGHT" (17) key	
C6	Insert negative in negative carrier	On mot model press "FILM CHANGE" key (3) and hold down for about 1 sec.	The enlarger head runs down to a convenient level for the seated user. The FC signal (22) blinks and the autofocus system is switched off. Pressing "FILM CHANGE" (3) once again runs the enlarger head back to its original position and switches the AF system on again

C7	Set required print size	tim * For rapid adjustment disengage knob (13) and move enlarger head to required position tim * Fine focus by turning knob (14) mot* For rapid adjustment press and hold down "RAPID" key (21) while pressing one of the "SIZE/HEAD ADJUST" keys (19 or 20) mot* Fine focus by pressing one of the "SIZE/HEAD ADJUST" keys (19 or 20).	
C8	Set lens aperture		
C9	Switch off enlarger lamp	Press "LIGHT" key (17)	
C10	Select aperture also on control panel	Repeatedly press "DISPLAY SELECT" key (14) until "FST" signal (13) lights	"FST" signal (13) lights

		Press "+" or "-" keys to select same aperture as set on lens. NOTE: Any aperture change automatically corrects the exposure time. This does not allow for reciprocity failure. To eliminate reciprocity problems adjust the aperture to keep the exposure time constant. NOTE: The exposure time set remains allocated to the lens channel in use.	Aperture appears in display (8) and unit computes new exposure time. NOTE: A blinking aperture display signals a time outside the timer range (0-999 sec). In that case enter a new time - see C11, C12
C11	Select timer function	Repeatedly press "DISPLAY SELECT" key (14) until "TIM" signal (12) lights	"TIM" signal (12) lights
C12	Set exposure time	Press and hold "ENTER" key (2) while pressing "+" (6) or "-" (7) keys	Display (8) shows exposure time
C13	Expose and process enlarging paper	Press "EXPOSE" key (18) END	

NOTE:
After a channel change the unit automatically focuses within 2 sec. The exposure time remains allocated to the channel, i. e. after a channel change the unit displays the exposure time last set in the channel concerned.

Setting the positive variator (PV)

Required when using:

- A masking frame
- The Durst LABOM bench
- Roll paper magazines etc.

NOTE:
If the level difference of the projected image plane (PV value) is greater than ±10 cm, reprogram the autofocus system for the new projection plane (paper magazine or floor):

Measure the difference in levels and enter in unit, then program the autofocus system (see page 6).

If the level adjustment of the projection plane (e.g. with a masking frame) is less than ±10 cm, enter the PV value as described below:

Step No.	Working step	Control operation	Response of unit
D1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier runs to reference position. After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment.

D2	Enter PV value	Press "DISPLAY SELECT" keys (14) four times Enter level difference of projection plane with "+" or "-" keys (6,7) Enter "+" value for floor projection or when using a roll paper magazine; enter "-" value with masking frame. Each DIGIT = 1 mm	Signal: PV After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment.
D3	Is the image sharp? Yes: Go to D5 No: Go to D4		
D4	Modify PV value until image is sharp	Press "+" or "-" keys (6 or 7)	After about 2 sec the enlarger focuses. "AFC" display appears during this adjustment.
D5	Return to normal operation	Press "DISPLAY SELECT" key (14) twice	Signal: "TIM" (12) display of exoposure time End

Setting the negative variator (NV)

Compensates thickness differences of original, e.g. internegatives with emulsion side up

Step No.	Working step	Control operation	Response of unit

E1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier runs to reference position. After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment.
E2	Enter NV value	Press "DISPLAY SELECT" key (14) five times With "+" or "-" keys (6,7) enter or adjust thickness deviation of original until image is sharp. Each DIGIT = 0.05 mm	"NV" display (11) appears. After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment
E3	Is the image sharp? Yes: Go to E5 No: Go to E4		
E4	Modify NV value until image appears sharp	Press "+" or "-" keys (6,7)	After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment.
E5	Return to normal operation	Press "DISPLAY SELECT" key (14) once	Signal: "TIM" (12) and display of exposure time END

Manual focusing Follow the steps listed below:

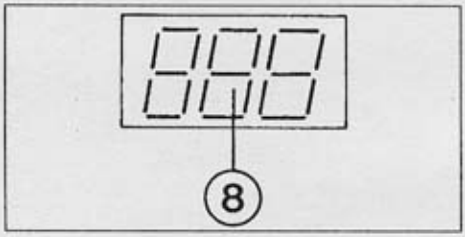
Step No.	Working step	Control operation	Response of unit
F1	Switch on unit	Press main switch (1)	LED signals light up and lens carrier runs

			to reference position. After about 2 sec. the enlarger focuses. "AFC" display appears during this adjustment.
F2	Fit appropriate lens in enlarger		
F3	Focus the image	Use " LENS ADJUST " keys (15,16). The lens carrier moves up or down at two speeds: initially at about 1.2 mm/sec, then - after 5 sec - at 7.2 mm/sec. NOTE: If the channel was previously programmed, the enlarger focuses automatically only after a further magnification change. END	

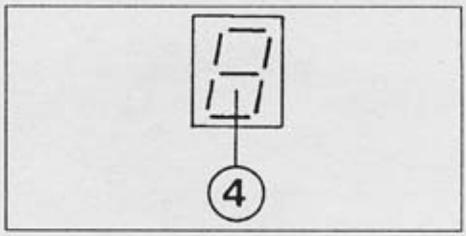
ERROR SIGNALS AND THEIR CAUSES

Model version	Display	Cause	Remedy
mot	ERR 5	Enlarger head movement locked	*Press "ENTER" key. NOTE: If this fault recurs, contact the customer service organisation of your local Durst agency.
tim mot	ERR 6	Attempt to use more than 30 reference points for autofocus programming	*Press "ENTER" key. Clear all reference points as follows: *Press "AF SETUP" key (5) twice *Press "ENTER" key (2) once *Press "+ - Clear" (6,7) together and reprogram autofocusing
tim mot	ERR 7	Lens carrier movement blocked	*Press "ENTER" key (2) NOTE: If this fault recurs, contact the customer service organisation of your local Durst agency.
tim mot	Exposure time or aperture display blinks	Permissible time range (0 to 999 sec) exceeded	Set different aperture or magnification
tim mot	"E" lights very brightly	Data in memory lost! Possibly faulty battery	Please contact the customer service organisation of your local Durst agency.

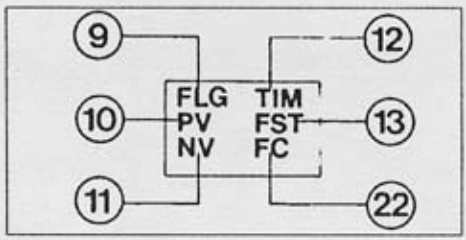
What the controls do



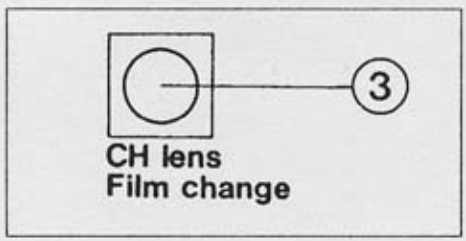
Digital display of
- Focal length
- Positive variator
- Negative variator
- Exposure time and aperture



- Digital display of lens channel



Signal	Description
FLG	FOCAL LENGTH of lens
PV	Positive variator (see DISPLAY SELECT description)
NV	Negative variator
TIM	Exposure time
FST	Aperture
FC	Film change position (for description see page 12)

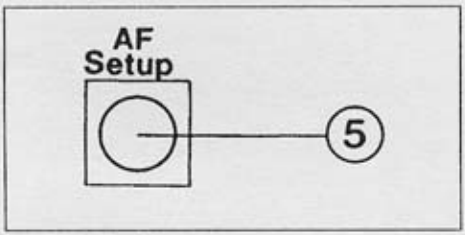


CH LENS / FILM CHANGE:

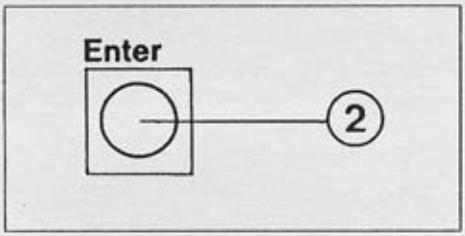
a) Quickly calls a given lens channel. E.g.for channel 4 press and hold down "ENTER" key (2) and keep pressing "CH-LENS" key (3) until display (4) shows channel 4

NOTE: If you keep the key depressed for longer than 1/2 sec., the unit runs through the lens channels backwards.

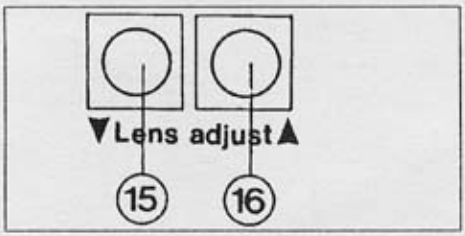
b) Serves for easy and rapid film changing. The enlarger head runs down to a convenient level for the seated operator and disengages automatic focusing. Pressing the key a second time returns the enlarger head to its previous position and refocuses the image.



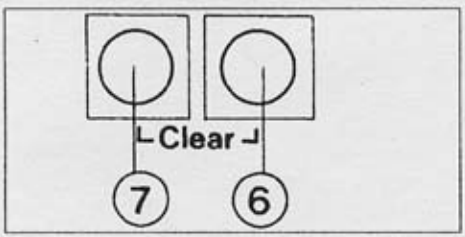
Switches autofocus programming ON or OFF



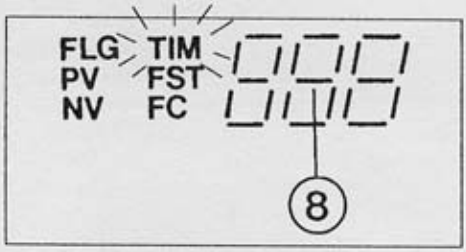
- Enters focal length, channel, exposure time
- Stores a sharply focused position



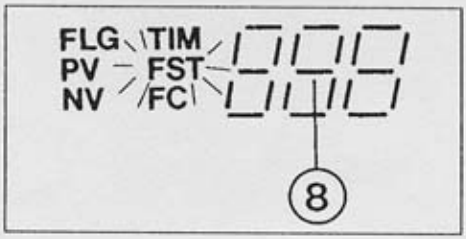
Move lens carrier up or down at two speeds:
- For first 5 sec. after pressing key: approx. 1.2 mm/sec.
- After 5 sec.: approx. 7.2 mm/sec.



- Enter indicated values in display
- Clear indicated values (press both keys together)
- Clear stored reference points

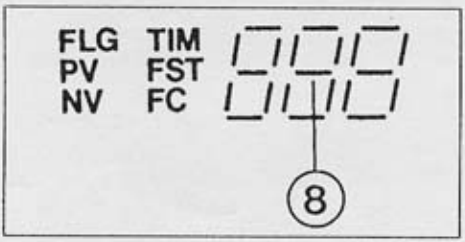


Signal:
"TIM"-TIMER exposure time (0 to 99.9 and 100 to 999 sec.)

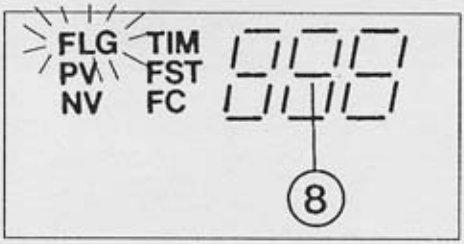


1. Press key (14) once:
   "FST" =Focal Stop (aperture) from f/2.8 to f/45
   Set required aperture with "+" and "-" keys.
   NOTE: The aperture set is stored in all lens channels.

NOTE:
Any aperture change automatically corrects the exposure time.This does not allow for reciprocity failure. To eliminate reciprocity problems adjust the aperture to keep the exposure time constant.

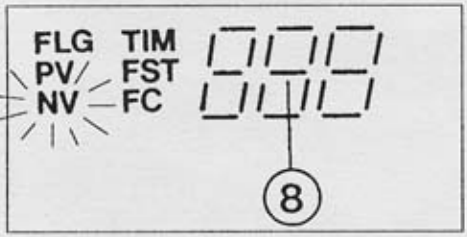


2. Press key (14) once: Signals go out to avoid fogging of sensitised papers.

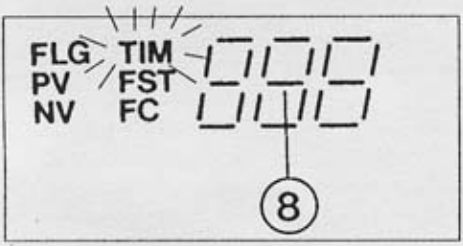


3. Press key (14) once: "FLG" = focal length of lens.

4. Press key (14) once: "PV" signal lights up, ready for entering a PV value. Compensates level differences in the projection plane (for instance of a masking frame, roll paper magazine etc).
Entry in mm, range from +999 to -99mm (each digit = 1 mm).



5. Press key (14) once:
"NV"signal lights up, ready for entering an NV value. Compensates thickness differences of original (e.g. internegatives inserted emulsion side up).
Range "±" 99 (each DIGIT = 0.05 mm).

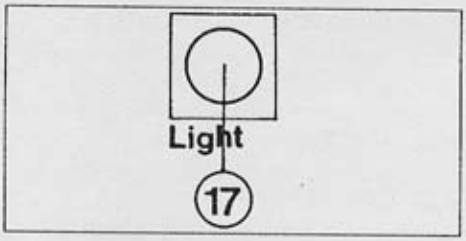


6. Press key (14) once:
"TIM" lights up and display (8) shows exposure time. (Range 0-99.9 and 100-999 sec.)

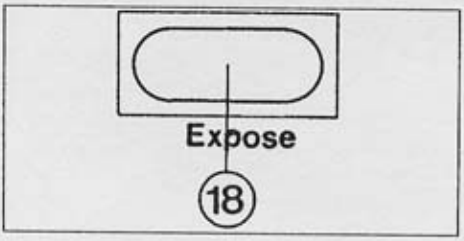
NOTE:
The display (8) blinks if the exposure time is outside the range (below 0.1 sec. or beyond 999 sec.).

REMEDY:
Set a different aperture or enter a new time.

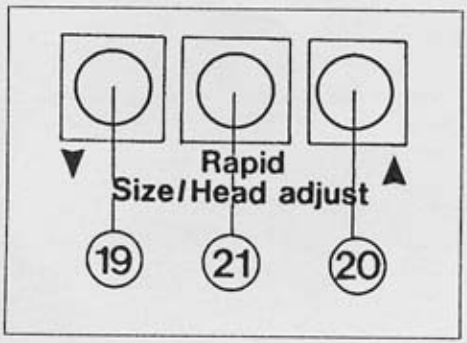
NOTE:
If you press the "DISPLAY SELECT" key (14) for longer than 1/2 sec., the unit runs through the above sequence backwards.



(17) Switches enlarger lamp on and off.



(18)Triggers an exposure.



Key (19, 20) moves the enlarger head and lens carrier up or down at low speed, while maintaining sharp focus.

Pressing key (21) together with "HEAD ADJUST" keys (19), (20) moves the enlarger head and lens carrier up or down at high speed, while maintaining sharp focus.

Durst products are being constantly improved to the latest state of the art. Descriptions and illustrations are therefore subject to modification.