

OPERATING MANUAL

ILFOSPEED MULTIGRADE 500

ENLARGER HEAD AND CONTROL SYSTEM

ILFORD

Safety precautions

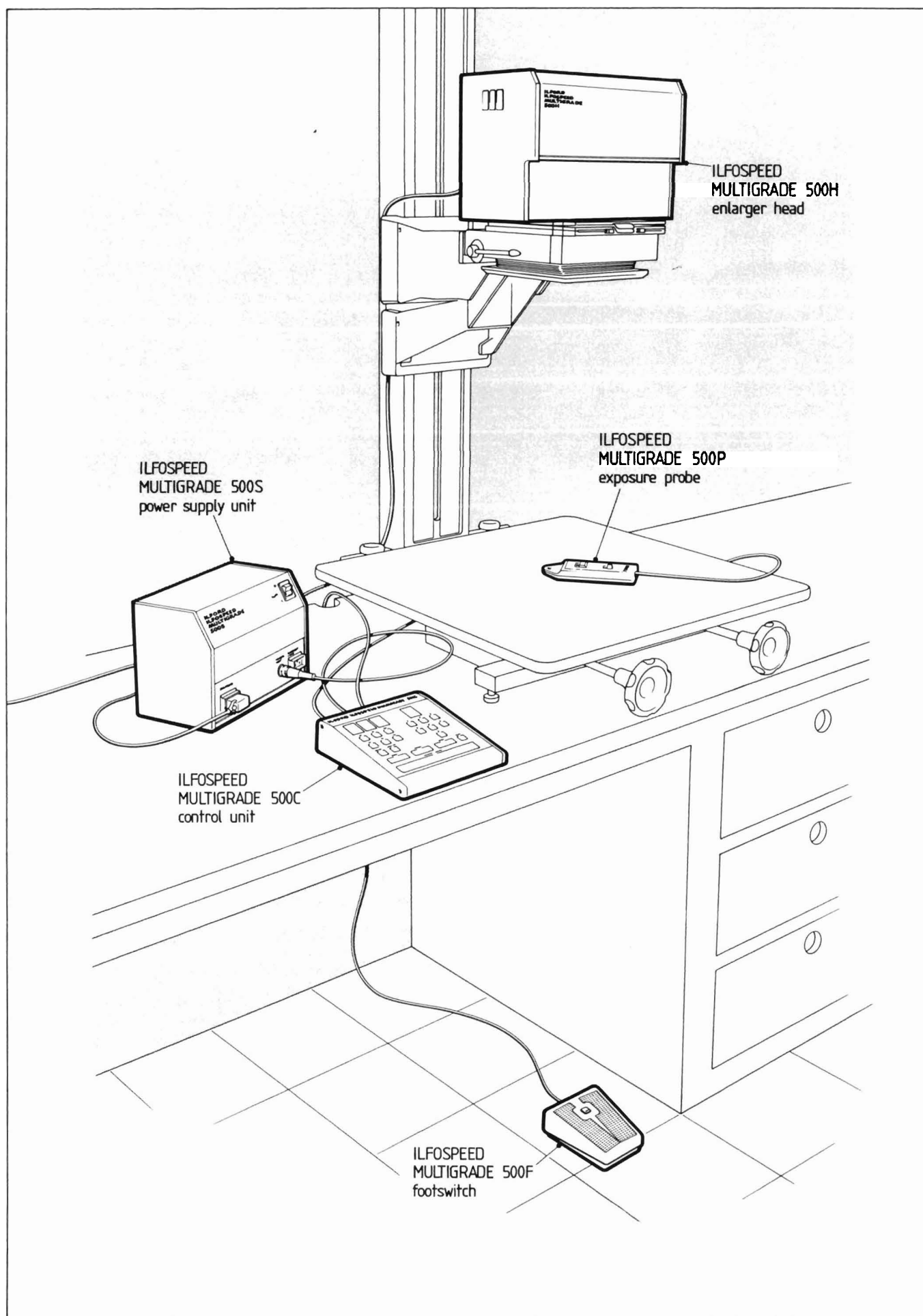
Your photographic equipment runs off mains electricity. Basic safety precautions must always be followed when operating the equipment, including the following:

- 1 Read and understand all instructions.
- 2 Close supervision is necessary when the equipment is being used by inexperienced personnel.
- 3 Certain parts of the equipment become very hot with continuous use. Exercise caution to prevent burns.
- 4 Do not operate equipment that has been dropped or damaged or has damaged electrical leads. Have it examined by qualified personnel.
- 5 Do not allow any electrical lead to hang over the edge of the working surface or allow it to touch hot surfaces.
- 6 Extension leads must be of a suitable current rating to avoid the possibility of the lead overheating. Ensure the extension lead is arranged such that it cannot be pulled or tripped over.
- 7 Always unplug the equipment from the electrical socket when not in use. Never pull the plug out using the lead.
- 8 Avoid contact with water and other liquids.
- 9 Do not dismantle the equipment unless you are qualified to do so. Incorrect assembly can cause hazards both to yourself and to the equipment.
- 10 Always obey local codes of practice particularly for installation requirements.

Do not destroy these instructions

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1 INTRODUCTION

The ILFOSPEED MULTIGRADE 500 enlarger head and control system is the latest in the unique range of ILFOSPEED MULTIGRADE products, and offers the black and white printer finger tip control of a wider contrast range than ever before. The use of high technology microprocessor electronics has produced a more sophisticated, yet simple to use, control unit featuring two digital displays - one for time and one for contrast.

The ILFOSPEED MULTIGRADE 500 equipment comprises the following elements: ILFOSPEED MULTIGRADE 500H enlarger head; 500C control unit and 500S power supply unit. The ILFOSPEED MULTIGRADE 500F footswitch and 500P exposure probe are available as optional extras.

The light output of the ILFOSPEED MULTIGRADE 500 enlarger head is, on average, 25% better than that of the ILFOSPEED MULTIGRADE 400 enlarger head. This figure can only be an average since direct comparison depends on the enlarger type and negative format used.

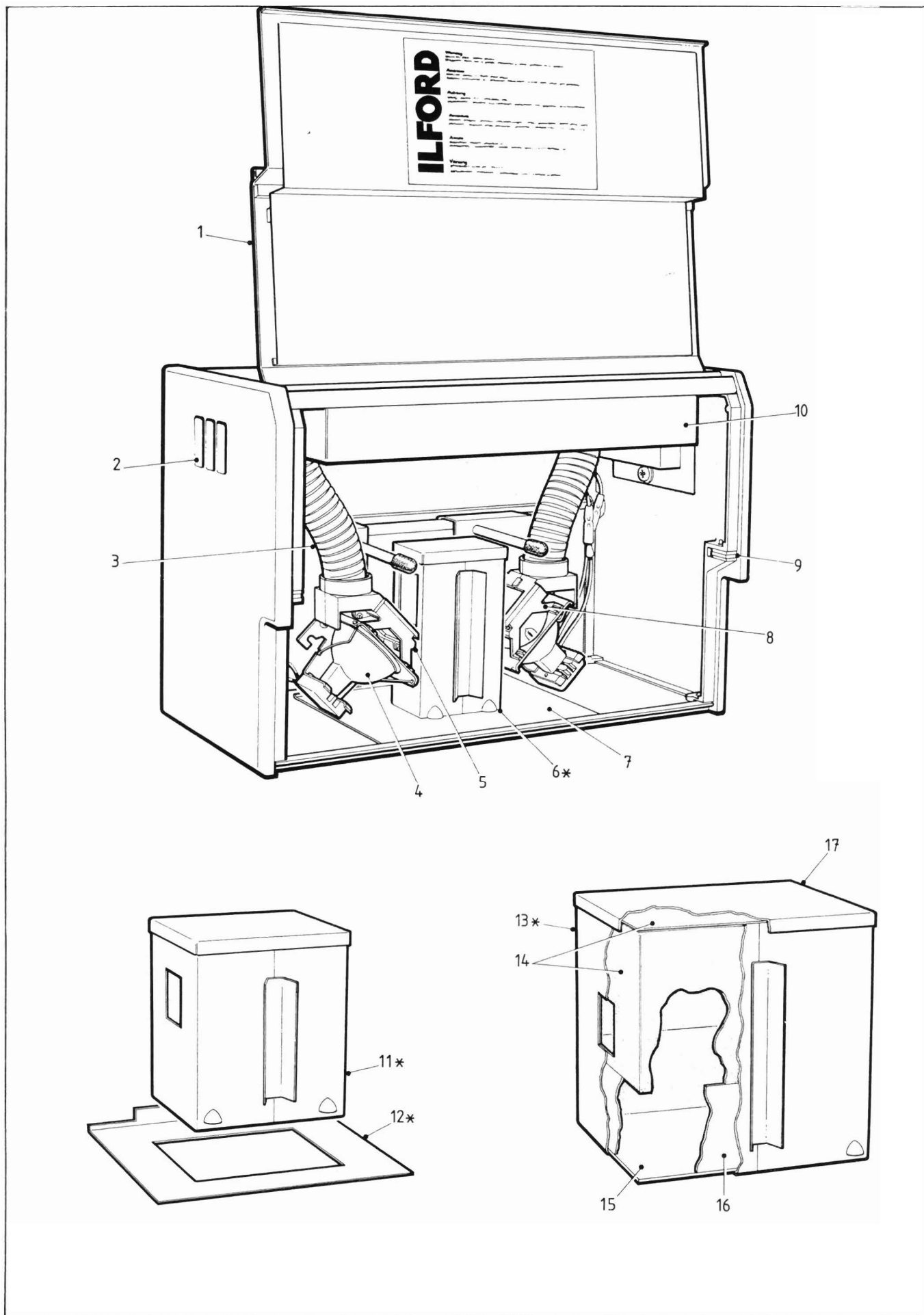
The design of the enlarger head, combined with the new filters, has almost eliminated negative popping (or movement). Dichroic filters, fitted inside the enlarger head, have improved temperature stability.

The ILFOSPEED MULTIGRADE 500 equipment is designed for use with the new generation ILFOSPEED MULTIGRADE II variable contrast paper; a paper providing six full grades, high image quality and excellent latent image stability. ILFOSPEED MULTIGRADE II variable contrast paper offers everything normally expected of graded papers - all in a single sheet of paper.

The ILFOSPEED MULTIGRADE 500 equipment is easy to install and simple and straightforward to use. By following the instructions given in this manual, quality ILFOSPEED MULTIGRADE II prints, together with continuous and reliable operation, are assured.

Overall, the ILFOSPEED MULTIGRADE 500 equipment offers the black and white printer not only the convenience of modern technology but, together with ILFOSPEED MULTIGRADE II variable contrast paper, the satisfaction of outstanding picture quality over a full six grade contrast range.

ILFOSPEED MULTIGRADE 500H



2 ENLARGER HEAD

- 1 Front cover
- 2 Light tight vent
- 3 Flexible duct
- 4 Lamp
- 5 Filter holder
(green filter)
- 6* Light mixing box
(35mm format)
- 7* Register plate
(35mm format)
- 8 Filter holder
(blue filter)
- 9 Magnetic catch
- 10 Fan housing
- 11* Light mixing box
(6x7cm format)
- 12* Register plate
(6x7cm format)
- 13* Light mixing box
(4x5 inch format)
- 14 Card liner
- 15 Acrylic diffuser
- 16 Plastic mirror
- 17 Lid

Items marked * may not all be supplied with your adaptor kit

See figure 2.1.

The most notable change when operating the new ILFOSPEED MULTIGRADE 500 equipment is the colour of the light produced by the ILFOSPEED MULTIGRADE 500H enlarger head, when compared with that of the ILFOSPEED MULTIGRADE 400 equipment. The magenta and yellow dichroic filters have been replaced by blue and green dichroic filters respectively, eliminating the red component of light produced by the enlarger head. This, combined with the introduction of separate heat absorbing filters, helps reduce focusing problems caused by negative popping (or movement).

The cut off frequencies of dichroic filters are affected by temperature, causing inconsistent results. To reduce this variation in transmission with temperature, the dichroic filters in the ILFOSPEED MULTIGRADE 500H enlarger head are tempered prior to use.

The ILFOSPEED MULTIGRADE 500H enlarger head replaces the standard condenser, diffuser or cold cathode lamphouse used with most professional enlargers. It fits into position on the enlarger using a specially designed adaptor kit which makes installation quick and relatively simple. Full instructions are supplied with each adaptor kit.

The solid construction of the enlarger head provides good handling characteristics with counterbalanced enlargers, ensuring that any vibrations are quickly damped.

2.1 Operation

Two high output quartz halogen lamps are fitted inside the enlarger head. Light from one lamp passes through a blue dichroic filter, and light from the other lamp passes through a green dichroic filter. Separate blue and green light beams are produced, and their intensities are varied independently by electronically controlling the voltage to each lamp. The two light beams are mixed, reflected and diffused in the light mixing box to provide even illumination of the negative. The colour variation produced provides a wide contrast range on ILFOSPEED MULTIGRADE II paper.

The ILFOSPEED MULTIGRADE 500H enlarger head is force-cooled by a centrifugal fan housed within the upper section of the lamphouse. For maximum effect, cooling air travels through two flexible ducts, one to each

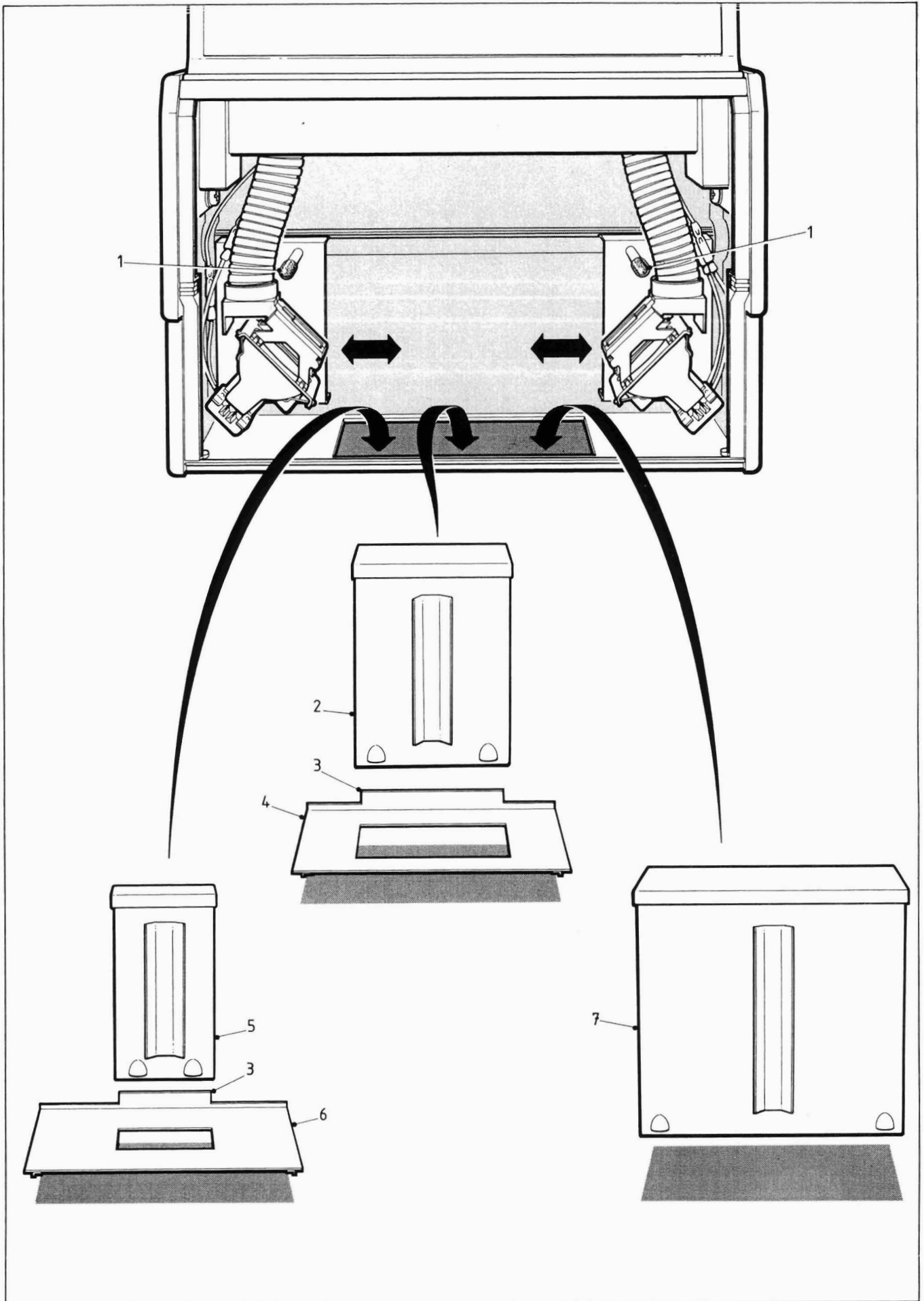


Figure 2.2

- 1 Lampholder
- 2 Light mixing box (6x7cm format)
- 3 Register plate stop
- 4 Register plate (6x7cm format)
- 5 Light mixing box (35mm format)
- 6 Register plate (35mm format)
- 7 Light mixing box (4x5 inch format)

lamp and dichroic filter. The air exits through light-tight vents fitted in the sides of the enlarger head.

2.2 Light mixing boxes

Up to three sizes of light mixing box are supplied to optimise the enlarger head light output for all negative sizes up to and including 4x5 inches (10x12.7cm). The correct mixing box or boxes for your enlarger are supplied as part of the adaptor kit.

The light mixing box is constructed as follows. The outer box and removeable lid are made from thin section sheet steel, and are fitted with a highly reflective card liner. An acrylic diffuser is fitted to the bottom of the box and is surrounded by a plastic mirror to provide even illumination of the diffuser. This type of construction provides a mixing box that is both shock resistant and lightweight.

Changing a light mixing box

See figure 2.2.

The light mixing boxes are easy to change. Select the correct size of box required for the negative format to be printed, then carry out the following procedure:

- 1 Switch off the enlarger lamps by touching the 'expose/cancel' switch pad.
- 2 Open the lamphouse front cover and raise it to the upright position.
- 3 Slide both lampholders sideways away from the light mixing box, using the posts (see figure 2.2, item 1) attached to the lampholder sliding mechanisms.
- 4 Lift the light mixing box vertically until it is clear of the register plate, and carefully remove the box from the enlarger head.
- 5 Remove the mixing box register plate.

Note

In the majority of cases, the large light mixing box fits directly into the lamphouse aperture. No register plate is required.

- 6 Fit the required light mixing box (complete with register plate, as necessary) by following operations 1 to 5 in reverse order.

Note

Stops on the two smaller register plates restrict movement of the lampholder sliding mechanisms to prevent the filter holders from inadvertently coming into contact with the light mixing box, and to position the lamps correctly relative to the light

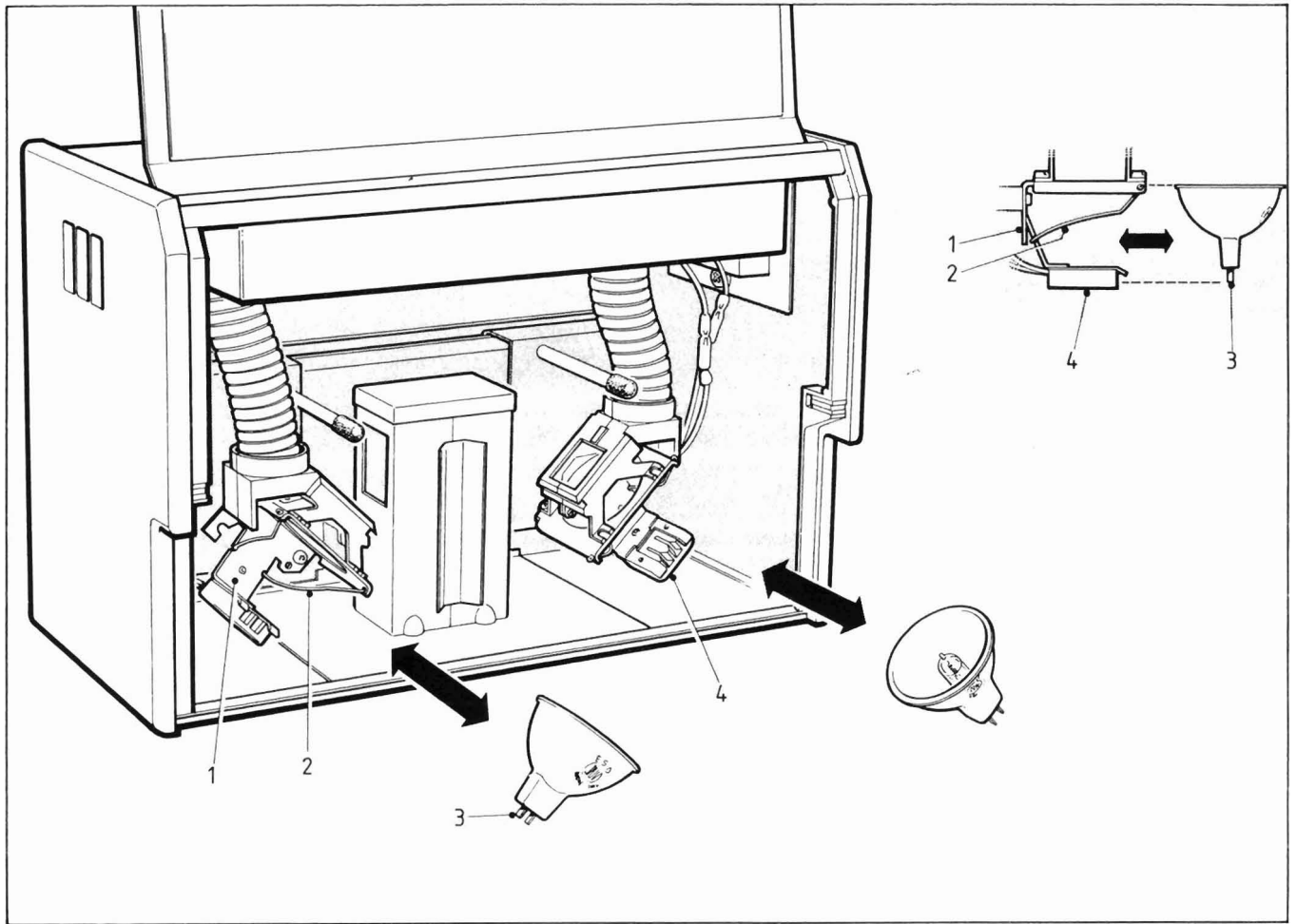


Figure 2.3

- 1 Lampholder
- 2 Retaining spring
- 3 Lamp pins
- 4 Electrical connector

mixing box fitted. The large register plate, when fitted, has no such stops. In this case, the lamps are in their correct working positions when they are at their maximum distance apart.

Cleaning

It is necessary to dust out the light mixing boxes at regular intervals. No other item of equipment should require cleaning.

Note

It is important not to touch the inside face of the liner or allow it to become contaminated in any way.

2.3 Replacing a lamp

See figure 2.3.

WARNING

Before starting the following operation, switch off the power supply and disconnect the power supply unit from the mains electrical supply. Allow the lamps to cool before handling them.

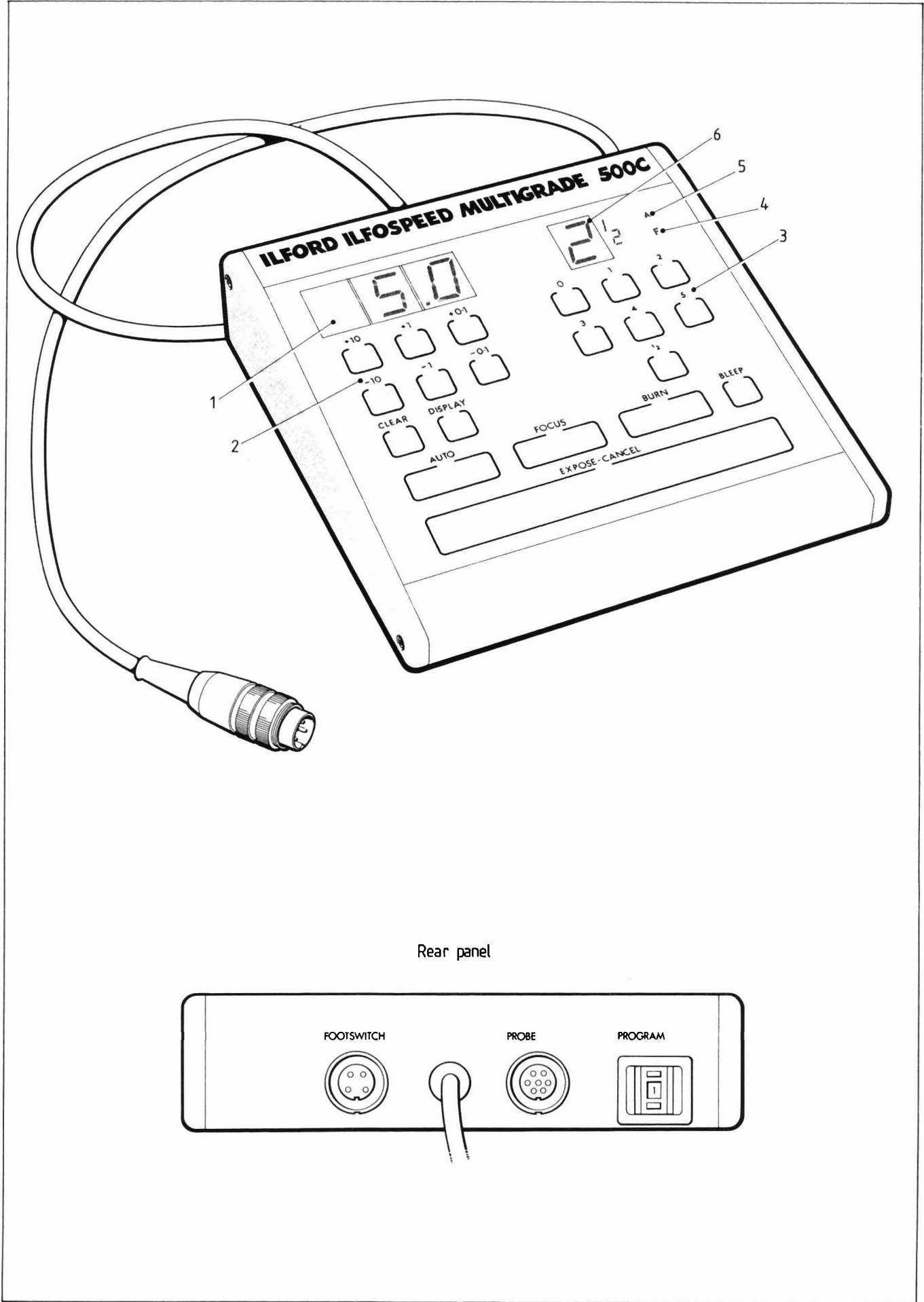
To replace a lamp proceed as follows:

- 1 Lift the lamphouse front cover to the upright position.
- 2 If necessary, slide the lampholders away from the mixing box.
- 3 Pull the lamp forwards away from the electrical connector and the retaining spring.
- 4 Fit the replacement lamp taking care not to handle the inner reflective surface and especially the bulb. The lamp may be fitted into the electrical connector either way round, but ensure the lamp pins are entering squarely into the connector before pushing the lamp fully into position.
- 5 When using the two smaller format mixing boxes, slide the lampholders back into position.
- 6 Close the lamphouse front cover.

2.4 Cooling fan

The cooling fan is timed to continue running for approximately two minutes at the initiation of any operation involving the enlarger lamps, or when the equipment is first switched on. Any number of operations can be made within the two minutes without extending each operating period of the fan.

ILFOSPEED MULTIGRADE 500C



3 CONTROL UNIT

- 1 Exposure time display
- 2 Exposure time switch pads
- 3 Contrast switch pads
- 4 Focus mode LED
- 5 Auto mode LED
- 6 Grade display

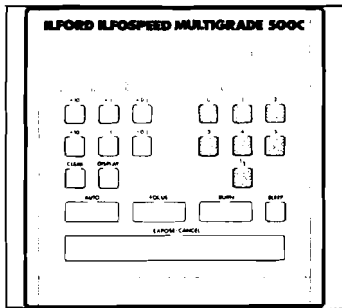
See figure 3.1.

The ILFOSPEED MULTIGRADE 500C control unit is compact and rugged and combines sophisticated electronics with touch panel simplicity. Operation is very easy. Once the exposure is established at a particular contrast level, the ILFOSPEED MULTIGRADE 500C control unit adjusts automatically the intensity of light to ensure exposure times remain the same right across the contrast range.

When the control unit is used with the ILFOSPEED MULTIGRADE 500P exposure probe, the correct exposure time is determined automatically (see section 10).

The control unit has seven contrast selection switch pads, an extremely accurate timer, 'auto', 'focus', 'burn' and 'expose/cancel' modes, a once-a-second bleeper (which can be switched on or off at the operator's discretion), a batch counter, safelight synchronisation, program selector and sockets for the exposure probe and footswitch.

To give maximum safety during operation, the control unit is supplied with low voltage from a remote power unit which, in turn, is plugged into the mains supply (see section 4). The introduction of a separate power supply unit allows the control unit to be very compact and easy to handle.



3.1 Contrast selection switch pads

The contrast selection switch pads provide eleven contrast levels in half unit steps up to and including contrast level 5. They are numbered 0 to 5 in unit steps. The whole numbers correspond closely to the contrast grades obtained with conventional ILFORD ILFOSPEED paper. The half grade selection switch pad is for use with negatives requiring finer contrast control between the usual grades.

Low contrast is obtained by touching switch pad 0 (green light is produced). High contrast is obtained by touching switch pad 5 (blue light is produced). The remaining contrast selection switch pads give a contrast range between these extremes by mixing proportional amounts of green and blue light.

3.2 Electronic timer

The electronic timer is extremely accurate and measures time in tenth-second increments over the range 0.1 to 99.9

seconds. During exposure, a three-digit LED display counts down from the preset exposure time to zero. During burning in, the LED display counts up from zero.

Note

If the control unit is inadvertently left in the focus mode, or in burn, it switches off automatically after 100 seconds.

3.3 Displays

There are two LED displays on the control unit. The left hand display shows the exposure time and the right hand display is a two part display showing the contrast selected and the control unit mode of operation - 'A' for 'auto' or 'F' for 'focus'.

The brightness of the display is optimised to be seen easily in normal room lighting. Under normal operating conditions, the display will not fog ILFOSPEED, ILFOSPEED MULTIGRADE or other black and white papers of similar sensitivity.

WARNING

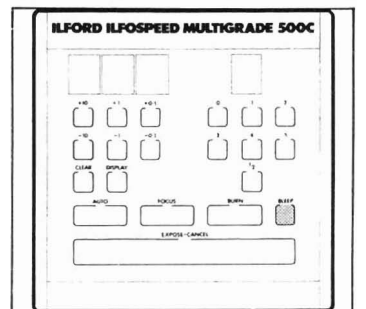
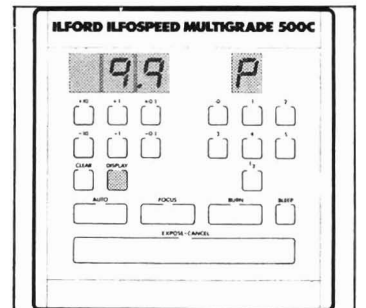
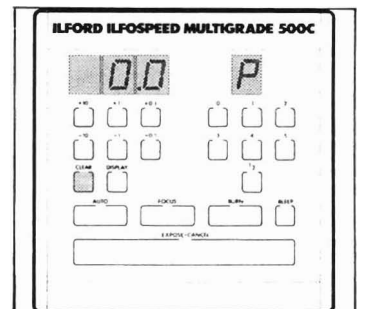
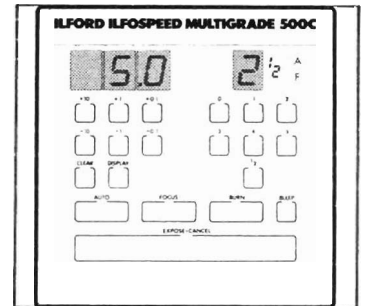
Switch off the control unit when it is near unprocessed film or unprocessed colour paper.

3.4 Batch counter

The timer can be used as a counter (for example, when printing a large number of prints from the same negative). To operate the counter, touch 'clear' before starting. The display should read '0.0P' for approximately one second. Then at any time during printing, touch 'display' to see the number of prints made so far up to a maximum number of 999. For example, ninety-nine prints is displayed '9.9P'. This figure is displayed for approximately two seconds and then the display returns automatically to the exposure time and grade selected.

3.5 Bleeper

An audible signal is fitted in the control unit which operates once every second as the timer counts down (exposure) or up (burn), and may be switched on or off at the operator's discretion. When the exposure countdown reaches the last second, the bleeper sounds continuously for that second. When the control unit is initially switched on the bleeper is inactive during

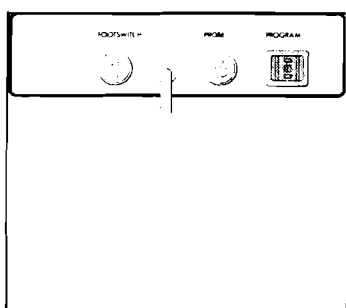


timer counts. To switch the bleeper on, touch the 'bleep' switch pad. To switch the bleeper off, touch the 'bleep' switch pad again.

The bleeper sounds, at all times, when a switch pad is touched confirming positive selection.

3.6 Safelight synchronisation

The control unit is designed to switch off safelighting during 'auto', 'focus' and 'burn' operations, and during an exposure. The safelight socket is located on the power supply unit (see section 4.3).



3.7 Program switch

The control unit has a ten position program switch positioned on the rear panel. The switch enables any one of ten lamp voltage programs (stored in the control unit memory) to be selected.

Only the first five programs, ie switch positions 1-5 (see table 3.1), will be of any concern to the user of the standard ILFOSPEED MULTIGRADE 500H enlarger head. The remaining five programs, ie switch positions 6-0, are for use in specialised applications.

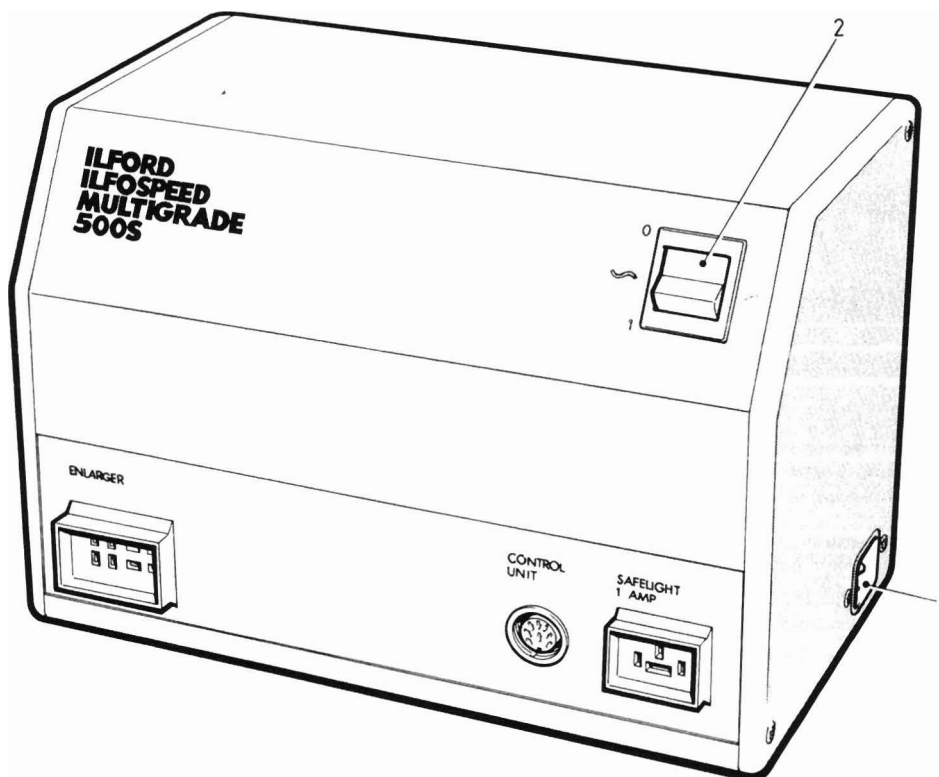
Table 3.1. Program switch

Switch position	Lamp type	Program
1	ESD 120V 150W	Balanced lamps
2	ESD 120V 150W	Increases green light by 10%
3	ESD 120V 150W	Increases green light by 20%
4	ESD 120V 150W	Increases green light by 30%
5	ESD 120V 150W	Increases green light by 40%

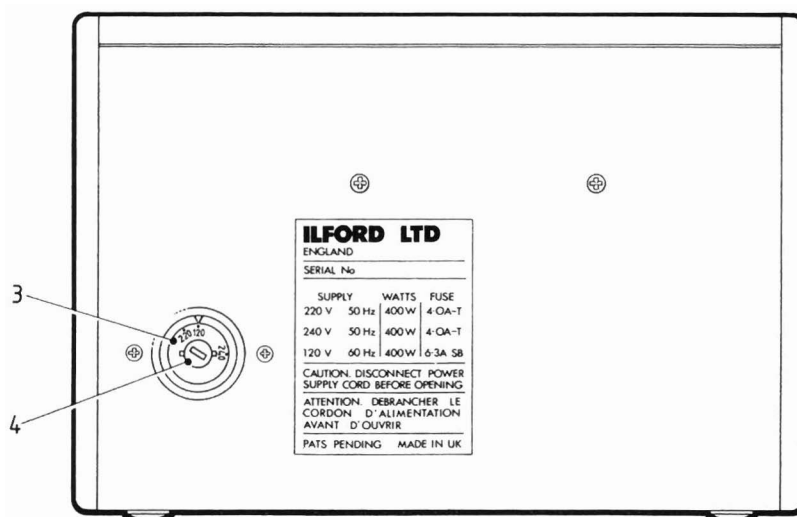
Under normal operating conditions, the control unit is used with the program switch set to position 1. However, the output from individual lamps can vary, giving a biased output on one of the colours and producing a notable change in print density as prints are made through the contrast range. The variation can be minimised as follows:

- 1 If the density is high at the low contrast end, interchange the lamps and proceed to 2 as necessary.
- 2 If the density is low at the low contrast end, optimum balance and density over the contrast range can be obtained by selecting a higher number in the range 2-5 on the program switch.

ILFOSPEED MULTIGRADE 500S



Rear panel



4 POWER SUPPLY UNIT

- 1 Power input
- 2 On/off switch
- 3 Supply voltage selector
- 4 Fuseholder

See figure 4.1.

The ILFOSPEED MULTIGRADE 500S power supply unit is connected directly to the mains electrical supply and supplies low voltage to the control unit. Sockets for connecting the enlarger lamphouse and the safelight are positioned on the front of the power supply unit for easy access.

The voltage supply to the ILFOSPEED MULTIGRADE 500C control unit is controlled by the 'on/off' switch positioned on the power supply unit and labelled '1/0'. The switch is combined with a neon indicator which illuminates when switched on.

4.1 Supply voltage selector

A supply voltage selector is located on the rear panel of the power supply unit enabling the appropriate input voltage (120V, 220V, or 240V) to be selected in accordance with the local mains supply available.

WARNING

In some cases it will be necessary to carry out the following operations. The power supply unit is supplied with the supply voltage selector switch set to 240V and a 4A fuse fitted. Before switching on, ensure all necessary alterations have been made.

If it is necessary to alter the voltage selection, proceed as follows:

- 1 Remove the fuse from the centre of the supply voltage selector by turning the fuseholder in the direction of the arrow until the fuseholder is released by spring action.
- 2 Remove the fuseholder complete with fuse.
- 3 Select the correct voltage by turning the supply voltage selector, using the edge of a coin in the slot.
- 4 Fit the correct fuse for the voltage selected in accordance with table 4.1.

Note

Fuses are supplied with the mains lead.

- 5 Refit the fuseholder, complete with correct fuse, by inserting it into the supply voltage selector and turning against the arrow.

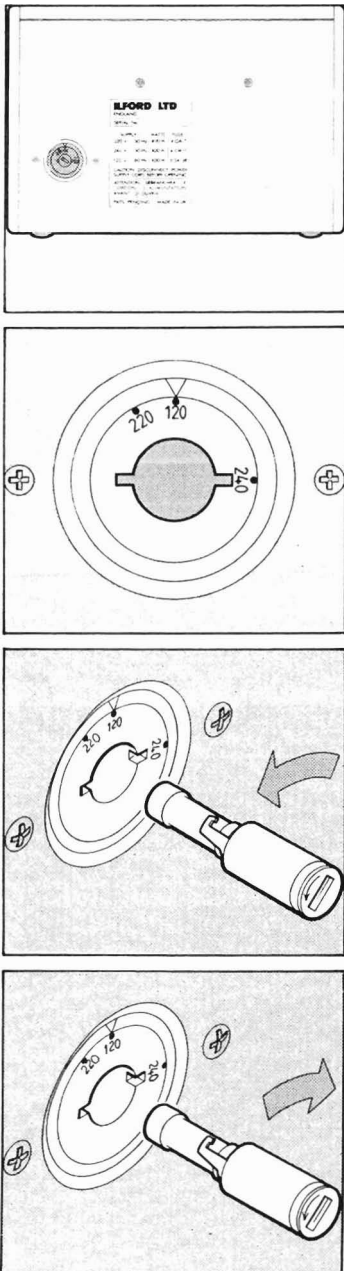


Table 4.1. Replacement fuses

Mains supply	Correct fuse
120V	6.3A SB
220V	4.0A T
240V	4.0A T

4.2 Automatic frequency setting

Once the correct voltage has been selected, the control unit measures the frequency of the incoming mains supply and sets the internal controls automatically. The measured frequency is displayed momentarily on the timer digital display when the control unit is switched on (see section 8).

4.3 Safelight synchronisation

Safelights requiring synchronisation (see section 3.6) are plugged into the 'safelight 1 amp' socket. Suitable plugs are supplied with the equipment for connecting to your safelight lead.

WARNING

The maximum recommended current of 1A must not be exceeded.

4.4 Voltage stabilization

Certain installations may be subject to large variations in mains voltage or interference on the mains supply. To ensure correct operation of the equipment in these installations, it is necessary to connect the equipment to the mains supply via a voltage stabilizer that has a pure sine-wave output.

ILFORD Limited will be pleased to recommend a suitable voltage stabilizer upon request.

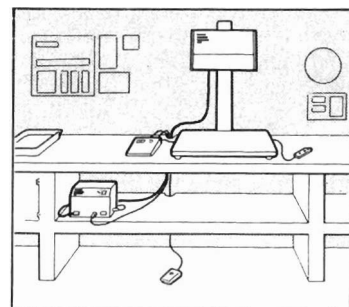
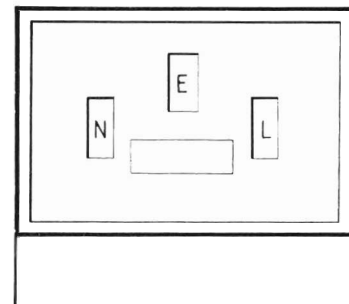
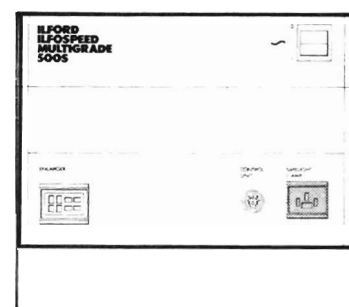
4.5 Working environment

The power supply unit is totally enclosed and becomes warm to the touch with extended use. It is advisable to position the unit such that adequate all round ventilation is provided at all times.

An extension lead 2m long is available as an optional extra. It extends the lead between the enlarger head and the power supply unit enabling the power supply unit to be positioned away from the working area.

CAUTION

For safety reasons, do not position the power supply unit on the floor.



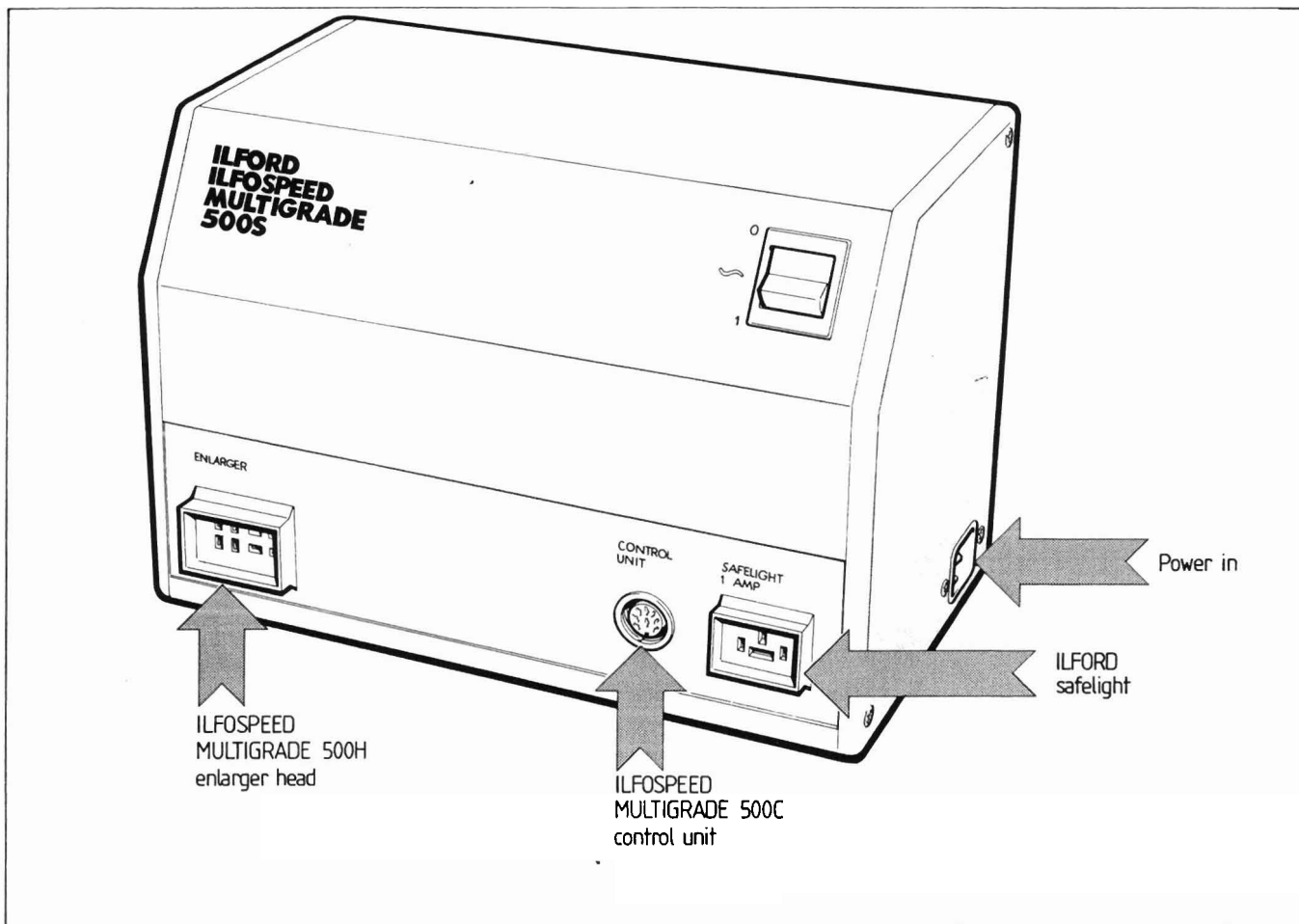


Figure 4.2

ILFOSPEED MULTIGRADE 500F

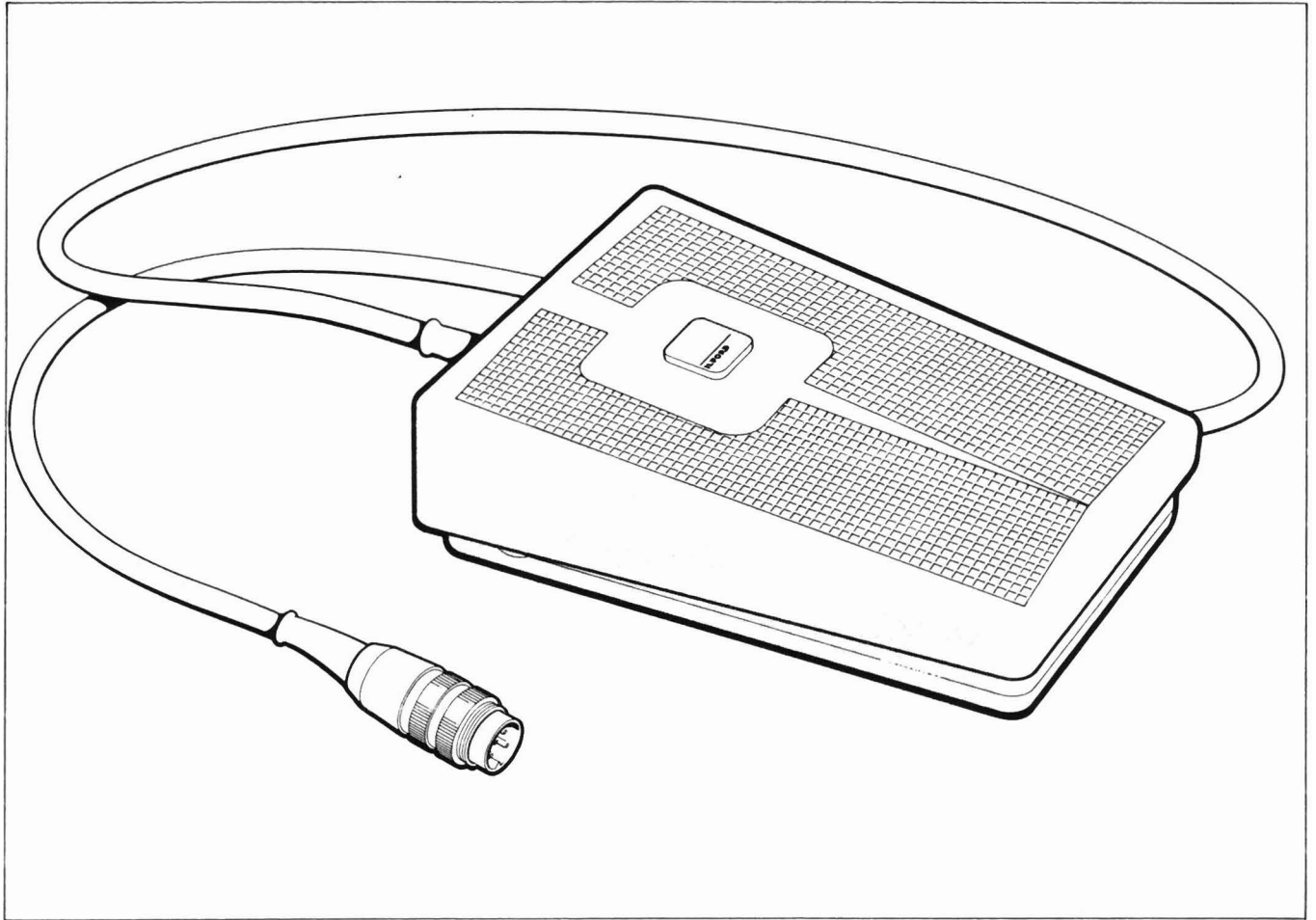
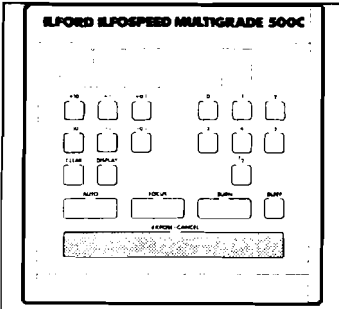
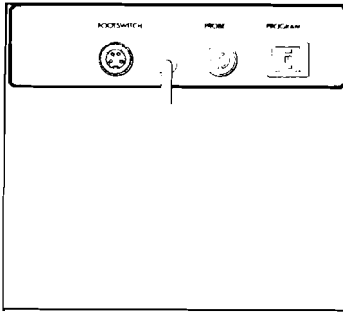


Figure 5.1

5 FOOTSWITCH



See figure 5.1.

To leave both hands free for better print control, the ILFOSPEED MULTIGRADE 500F footswitch is available as an optional extra. It is plugged into the 'footswitch' socket located on the control unit rear panel, and is used as follows:

- 1 Press and immediately release the footswitch to activate the electronic timer for main exposure operations. During timer countdown, the exposure cannot be stopped by the footswitch. To stop the exposure touch the 'expose/cancel' switch pad.
- 2 During timer countdown, if the footswitch is kept depressed or is pressed again and is kept depressed, the timer counts down to zero, as normal, then proceeds to count up again for burning in operations. Releasing the footswitch, after the timer has passed zero, switches off the enlarger.

ILFOSPEED MULTIGRADE 500P

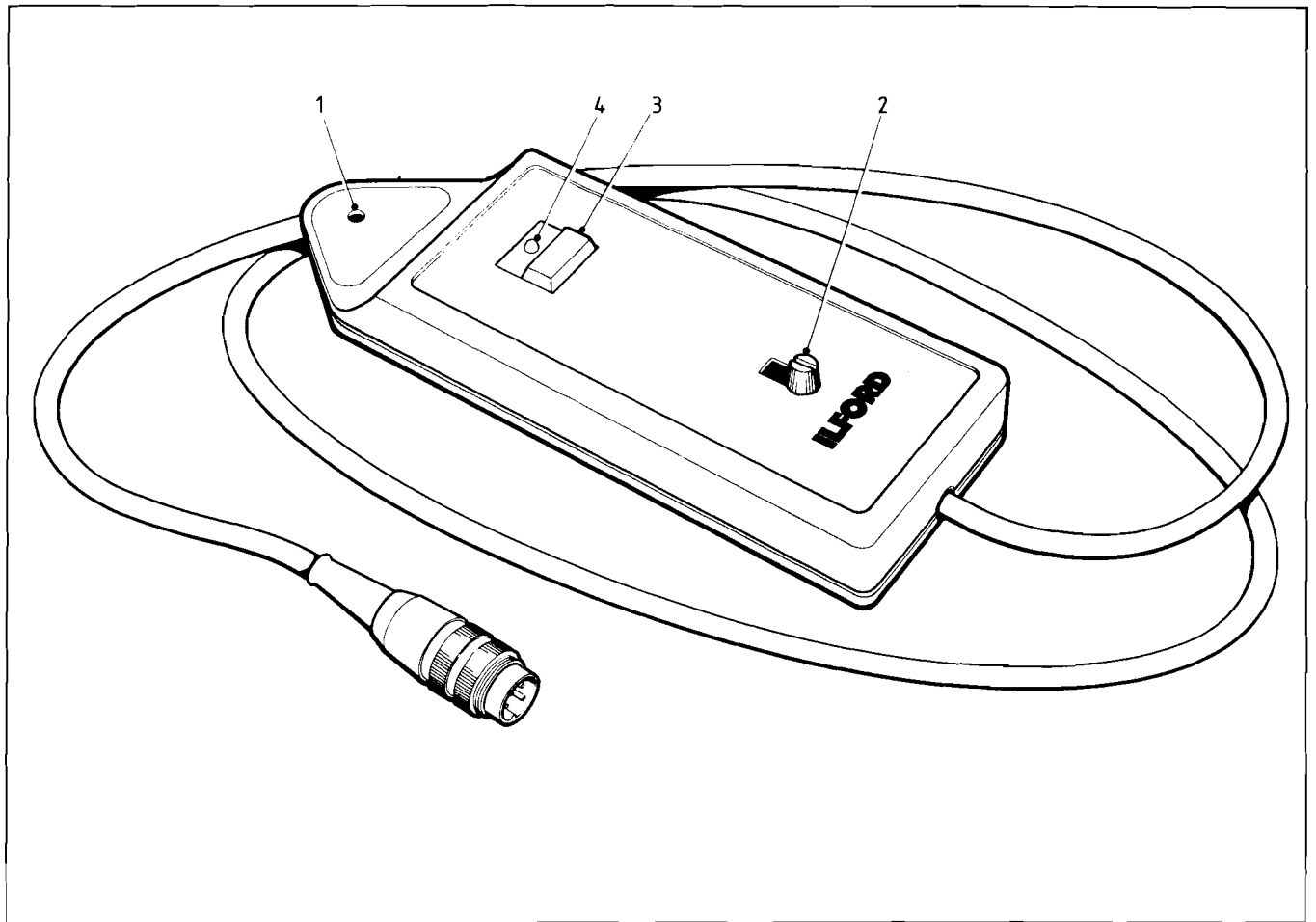


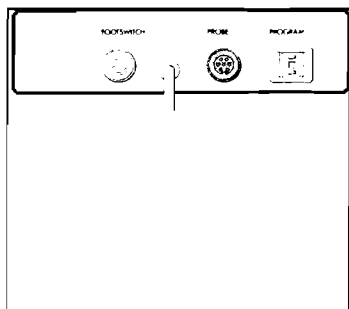
Figure 6.1

6 EXPOSURE PROBE

- 1 Photocell
- 2 Calibration knob
- 3 Push button
- 4 LED

See figure 6.1.

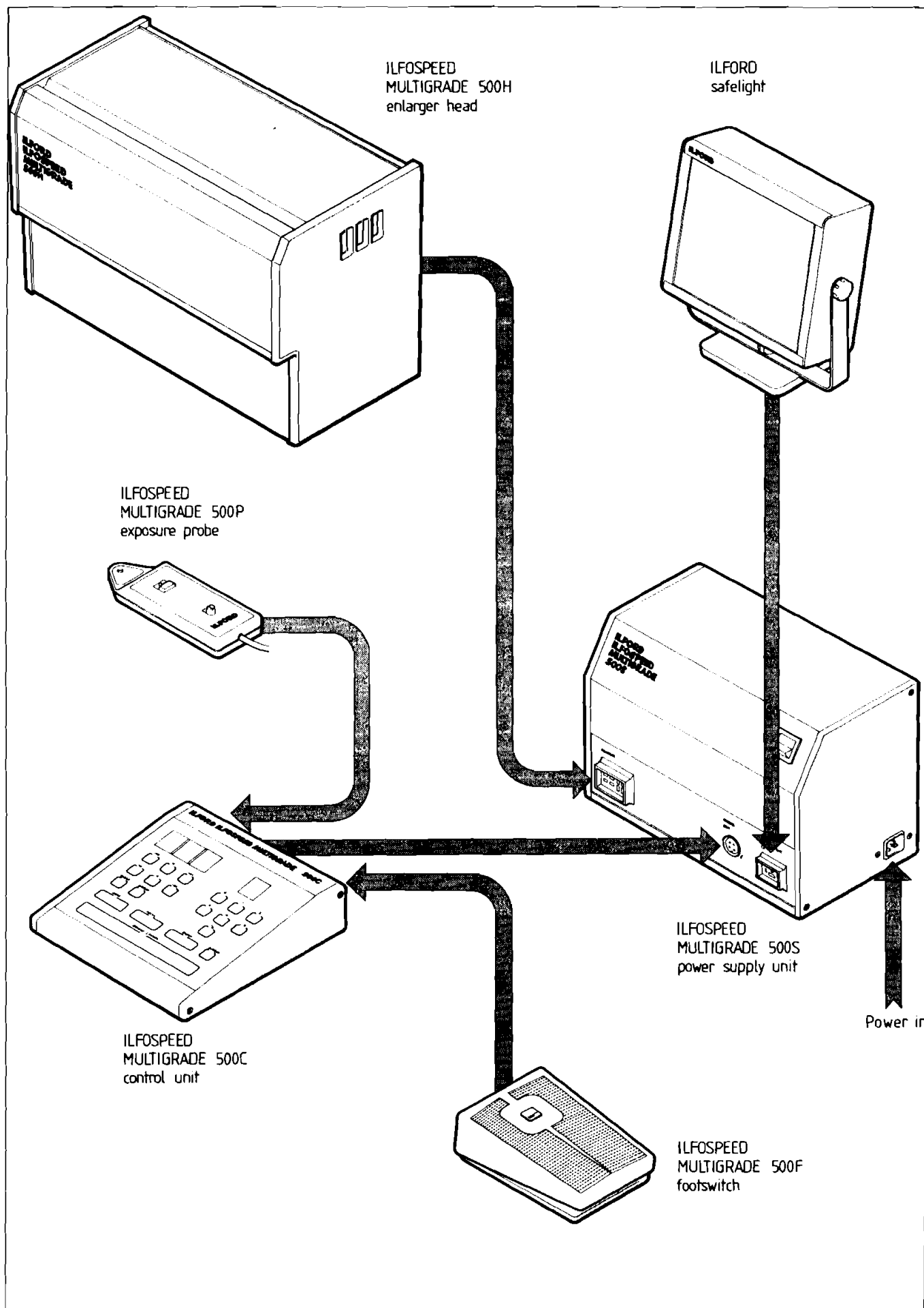
The ILFOSPEED MULTIGRADE 500P exposure probe is available as an optional extra, and is plugged into the 'probe' socket located on the control unit rear panel. Briefly, the exposure probe operates as follows:



Position the exposure probe on the enlarger baseboard or easel so that the photocell receives light from the brightest part of the projected negative (the shadow area). The control unit calculates and displays the exposure time required to ensure a good overall exposure, at the same time, retaining detail in the shadow areas.

There is no need to switch off any low level safelighting while taking measurements with the probe, as the control unit takes into account any background illumination when calculating the exposure time.

For a detailed description of how to use the exposure probe, see section 10.



7 INSTALLATION

See figure 7.1.

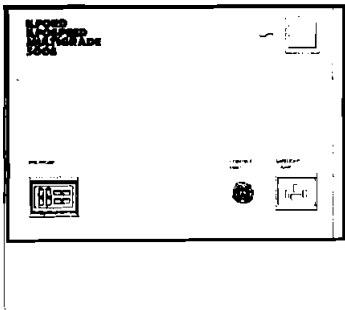
Installation of the ILFOSPEED MULTIGRADE 500 equipment is very straightforward.

- 1 Fit the ILFOSPEED MULTIGRADE 500H enlarger head by following the instructions supplied with each adaptor kit. These instructions should be kept for future reference.
- 2 If a moulded plug is not connected to the power supply unit mains input lead, connect a plug of at least 10A rating as follows:
 - a Brown wire to the live pin (marked L).
 - b Blue wire to the neutral pin (marked N).
 - c Green/yellow wire to the earth pin (marked E or).

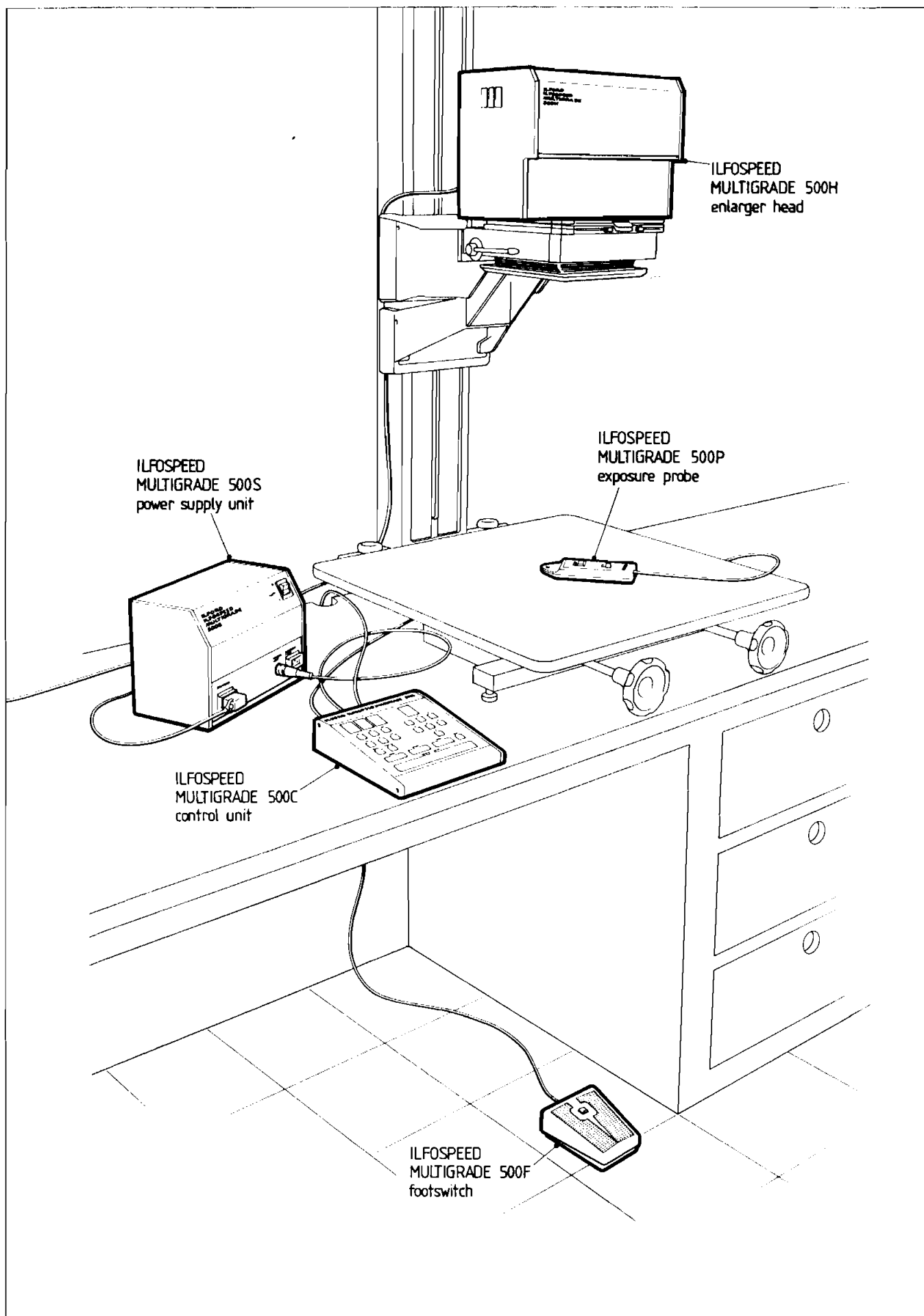
If a fused plug is used, fit a 5A fuse.

CAUTION

If in doubt about making the electrical connections, consult a competent electrician.

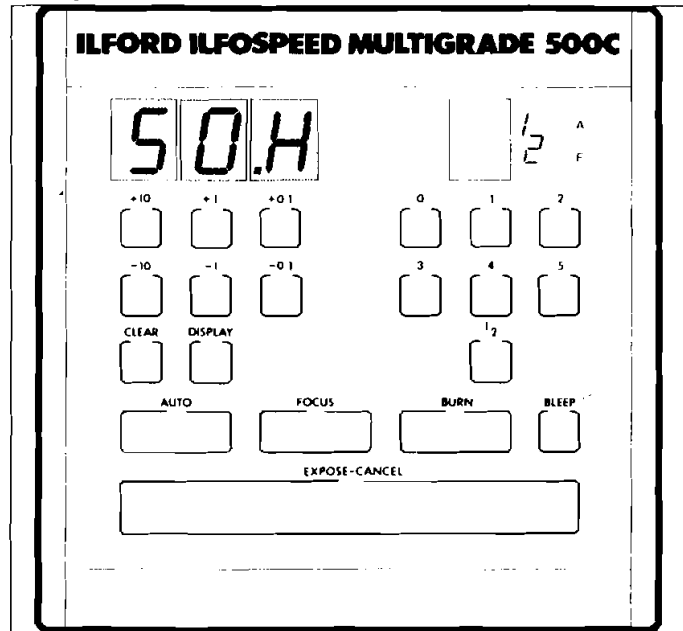


- 3 Plug the electrical lead from the enlarger head into the 'enlarger' socket located on the power supply unit. An extension lead is available as an optional extra (see section 4.5).
- 4 Connect the electrical lead fitted with the multipin plug from the control unit to the 'control unit' socket located on the power supply unit. Tighten the securing ring on the multipin plug.
- 5 Ensure the supply voltage selector is set at the correct voltage for the available mains supply, and that the correct fuse is fitted to the supply voltage selector fuseholder (see section 4.1).



8 UNDERSTANDING THE EQUIPMENT

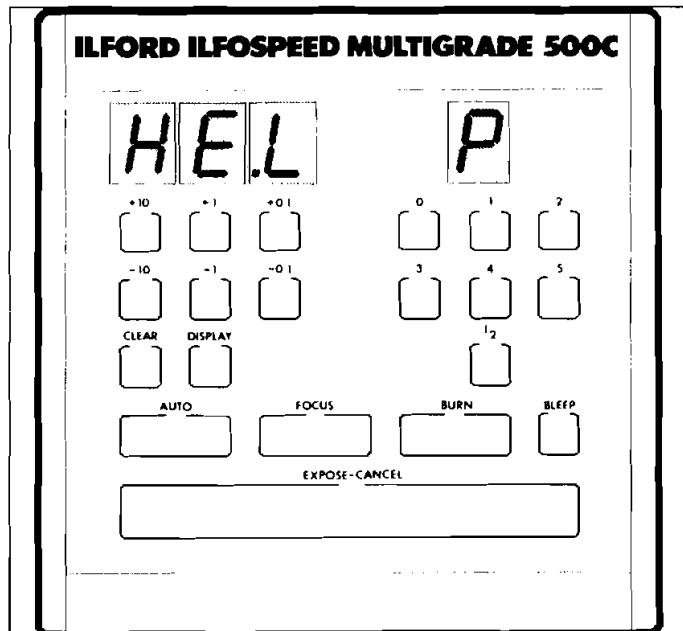
Connect the mains supply and switch on by moving the mains switch (symbol ) located on the power supply unit, to the '1' position. Check that the control unit briefly displays '50.H' or '60.H' to indicate the frequency (50 or 60Hz) of the incoming mains supply. Check that the mode LEDs 'A' and 'F' also



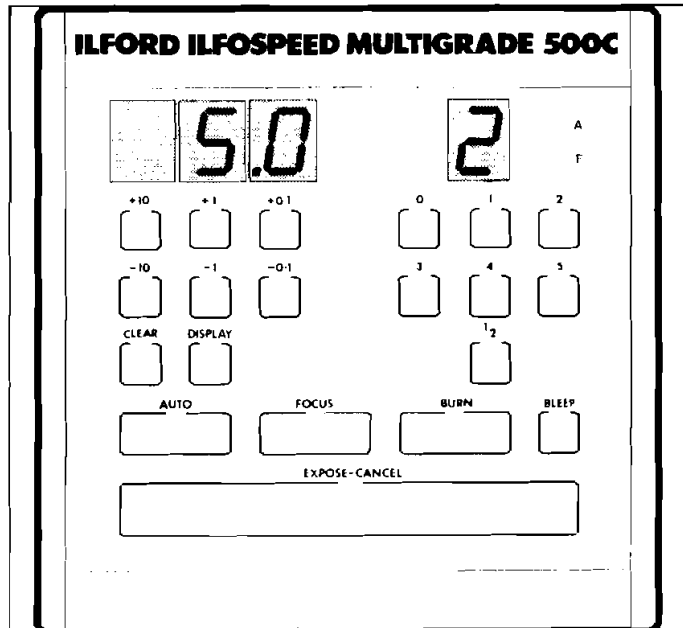
If the frequency of the available mains supply is lower than 45Hz or higher than 65Hz, the control unit displays 'HELP'. To cancel 'HELP', switch off at the power supply unit.

Note

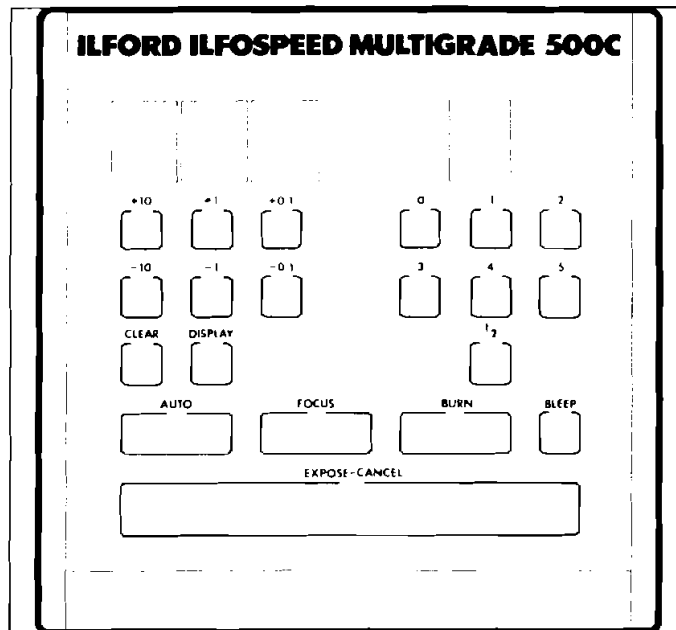
If the displays fail to illuminate, see section 12.2.



The information in operation 1 is displayed for approximately $\frac{1}{2}$ second. The display then changes to '5.0' and '2' indicating five seconds at grade two. The 'A' and 'F' LEDs remain illuminated until the control unit is selected to carry out a specific function.

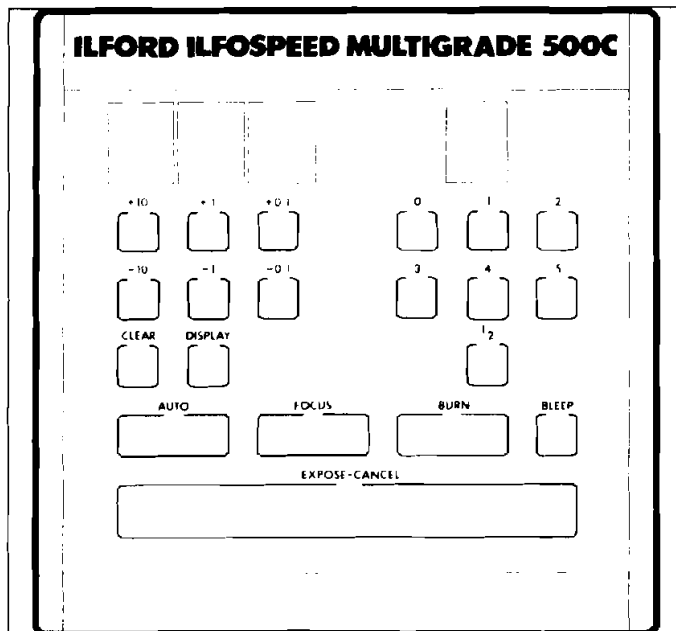


4



Operate the timer switch pads in turn and observe that the timer display reads correctly.

5

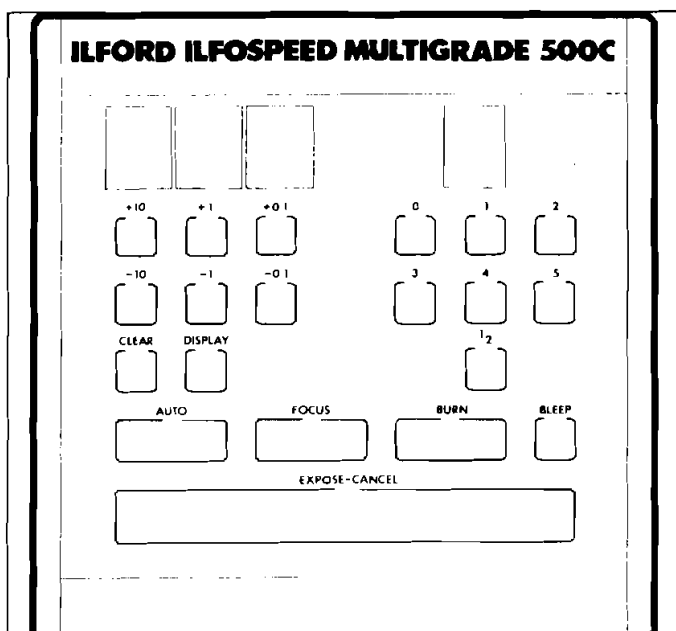


Operate the contrast selection switch pads in turn and observe that the contrast display reads correctly. Raise the front cover of the enlarger lamphouse to the upright position.

WARNING

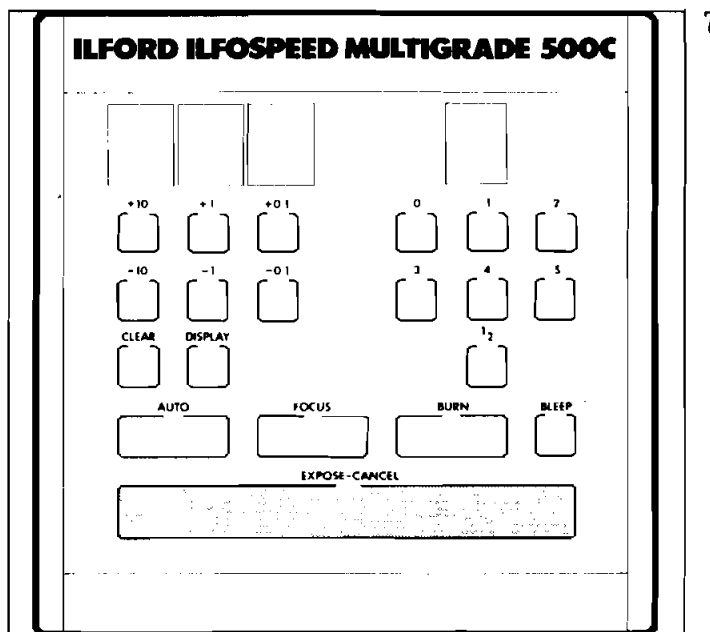
Care must be taken when viewing with the naked eye. The lamps are very bright when switched on.

6

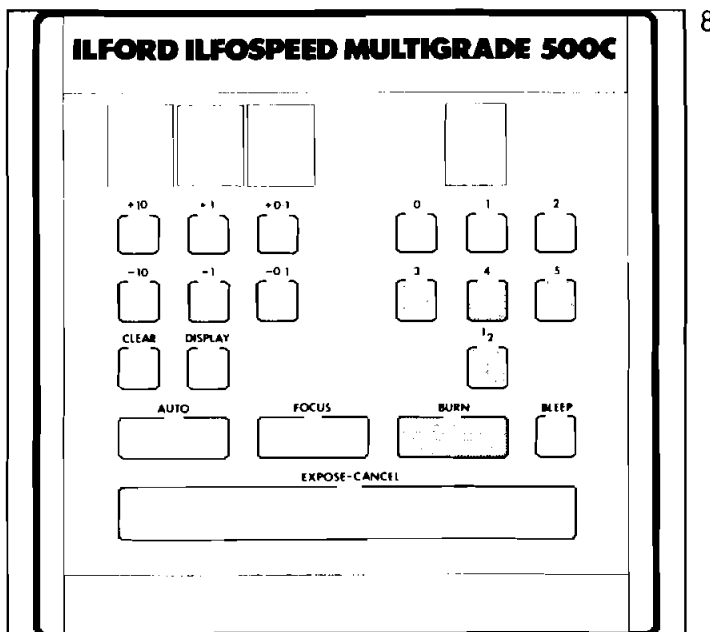


Touch the 'focus' switch pad. Observe both enlarger lamps are illuminated, and the mode display reads 'F' only.

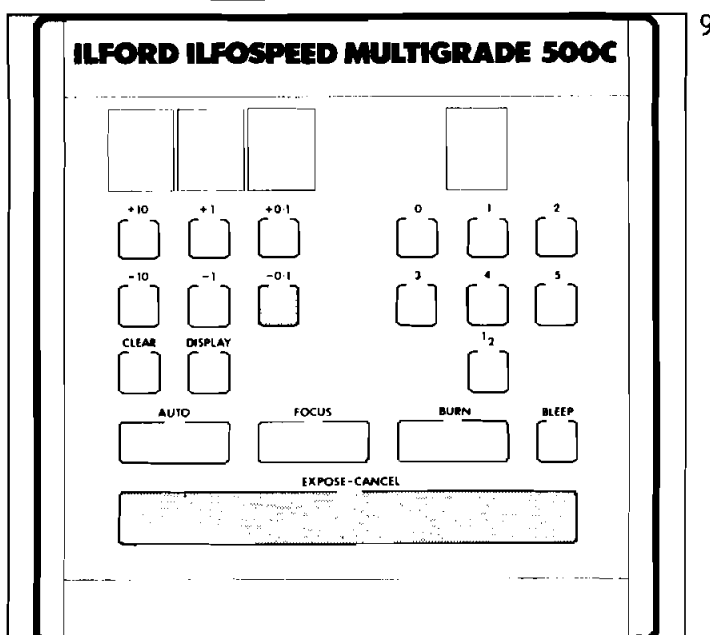
Touch the
'expose/cancel' switch
pad. Observe both 'A'
and 'F' mode
indicators switch off.



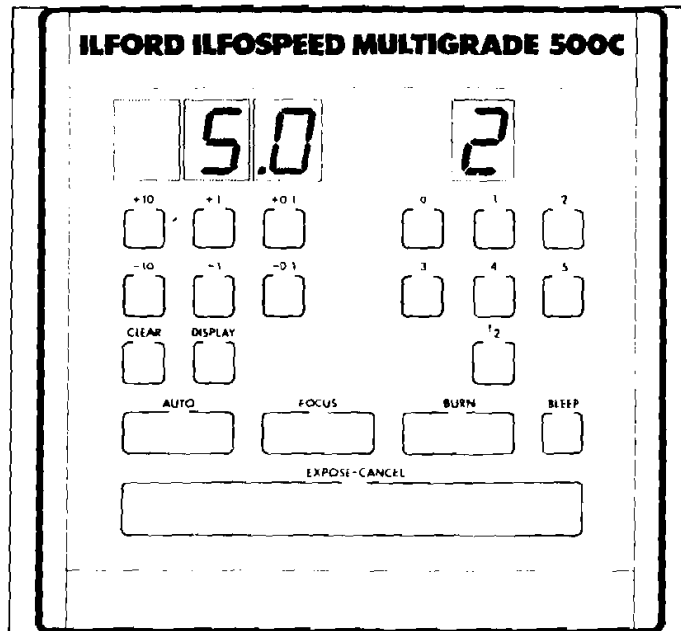
Touch the 'burn'
switch pad and select
each grade 0-5. Check
the lamps operate
correctly:
Press grade 0 - green
lamp only.
Press grade 5 - blue
lamp only.
Press any other grade
- proportional amounts
of green and blue
light.



Touch the
'expose/cancel' switch
pad.



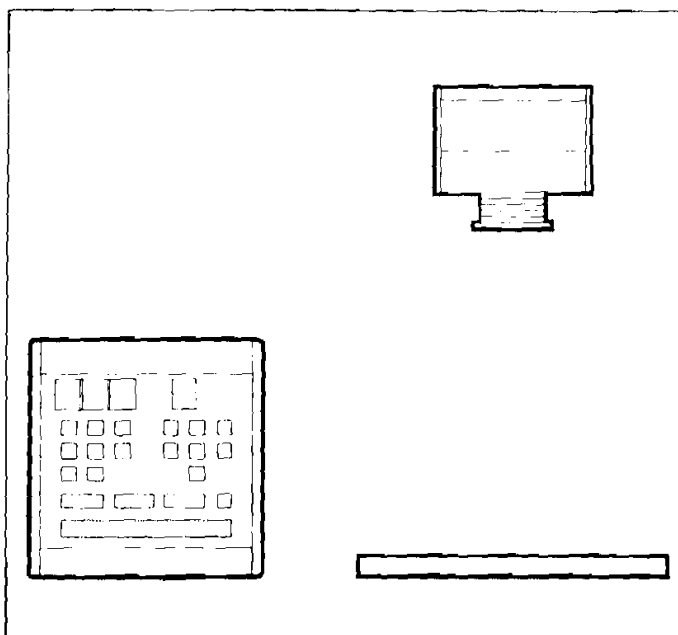
10



Set up any exposure time on the control unit. For example, to change the time from 5 to 12.5 seconds touch the +10 switch pad once, -1 three times and +0.1 five times.

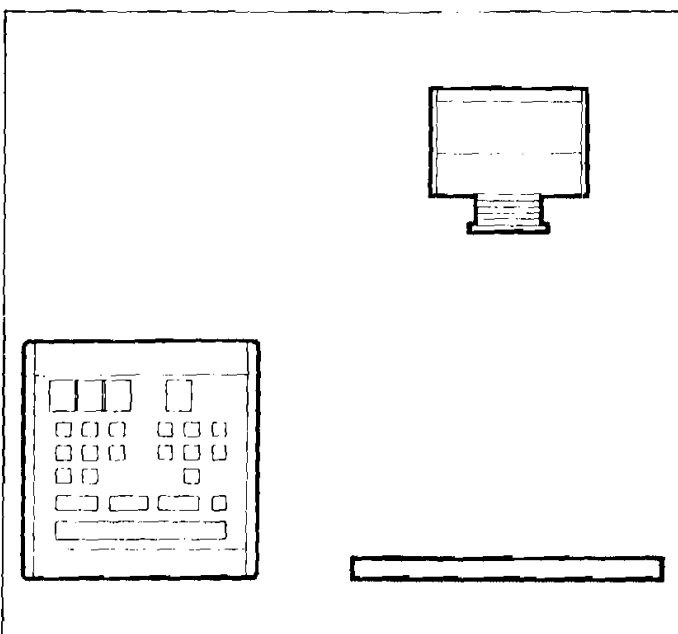
Alternatively, retaining pressure on the switch pad causes the numbers to roll over in sequence.

11



Touch the 'expose/cancel' switch pad. Observe the enlarger lamps are illuminated and remain illuminated for the selected exposure. Observe the enlarger lamps are extinguished when exposure is complete.

12



Repeat operation 11. At any time during timer countdown, touch the 'expose/cancel' switch pad again. Observe the enlarger lamps are extinguished.

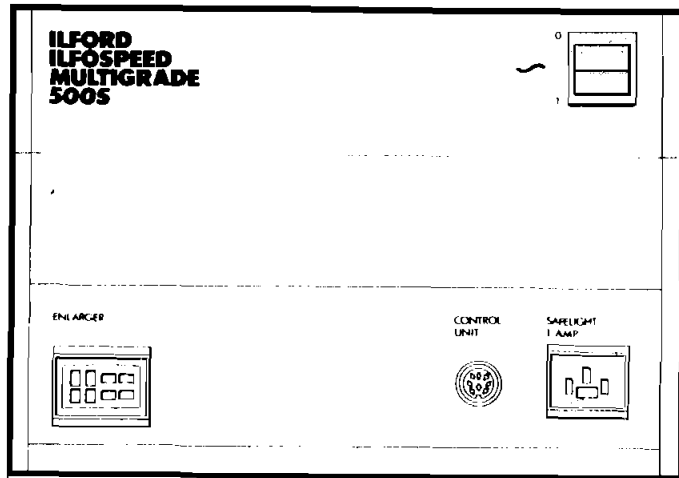
Close the enlarger lamphouse front cover. Switch off the equipment at the power supply unit by moving the mains switch to the '0' position.

9 PRINT MAKING

Standard print

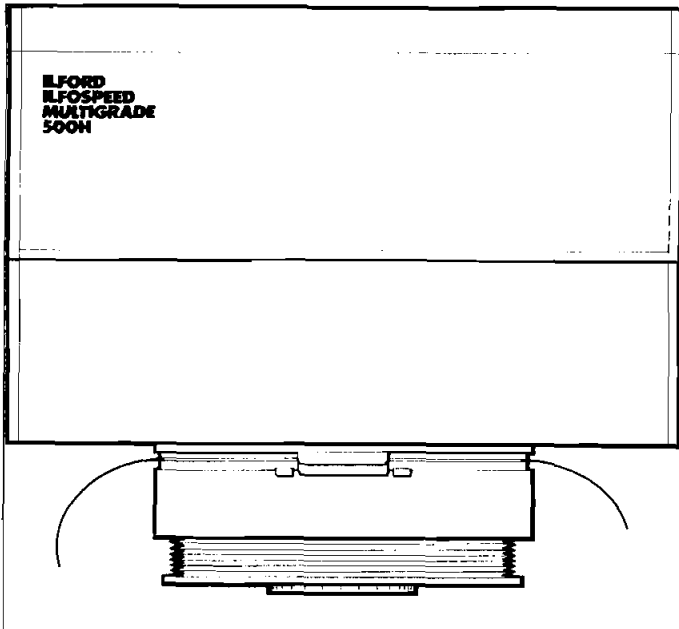
9.1

Ensure the correct light mixing box is in position in the enlarger head (see section 2.2). Set the mains switch (symbol ) on the power supply unit to the '1' position.



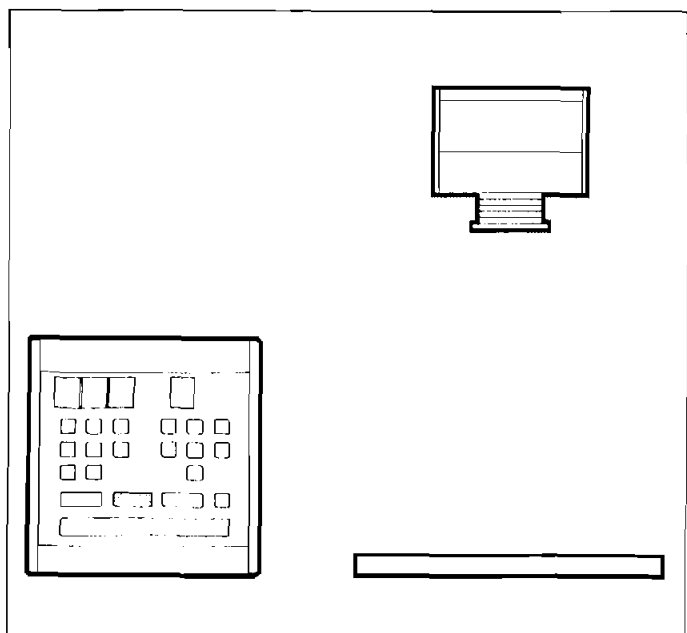
1

Position the negative in the enlarger negative carrier.

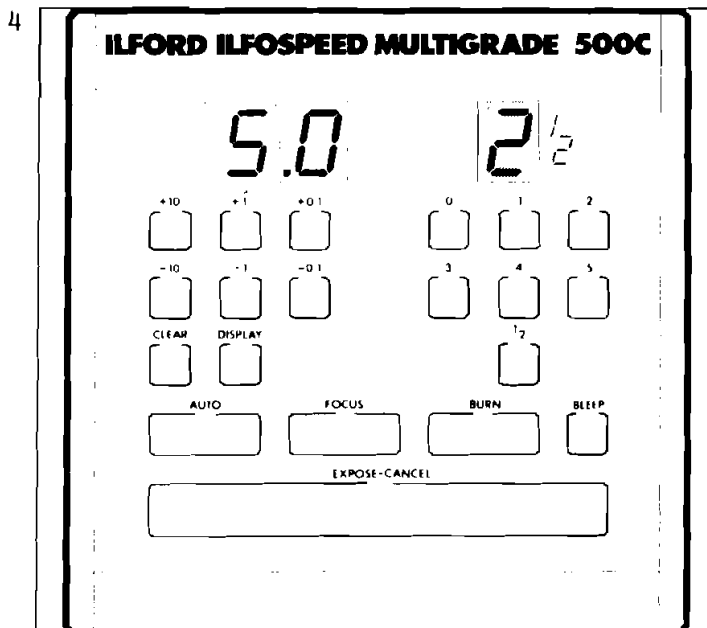


2

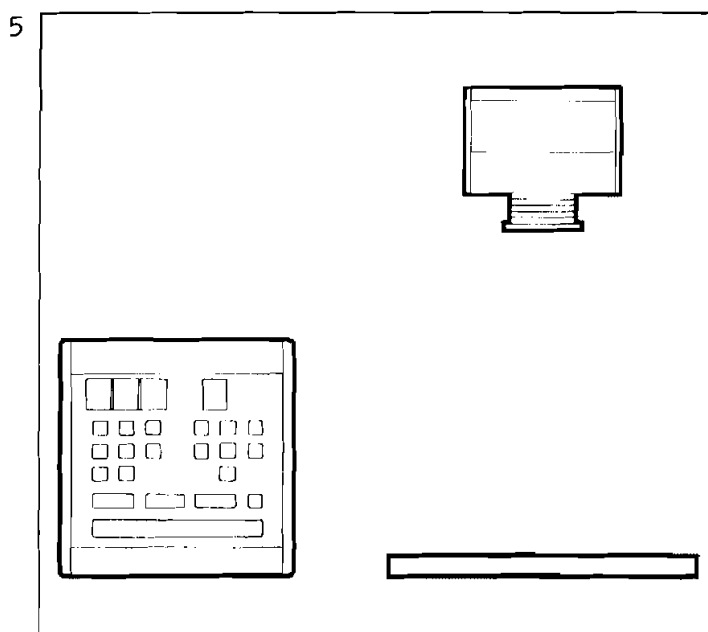
Touch the 'focus' switch pad. Light suitable for focusing, composition and assessment of exposure and contrast is produced by the enlarger head.



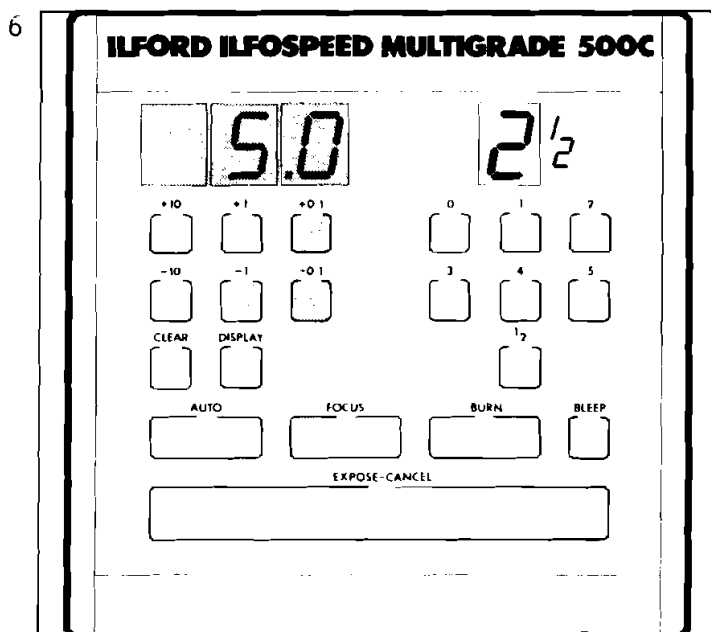
3



Select the contrast required. For example, to make prints from negatives normally requiring grade 2 ILFOBROM or ILFOSPEED paper, touch contrast switch pad 2. For negatives requiring finer contrast control between the usual grades, use the half grade switch pad.

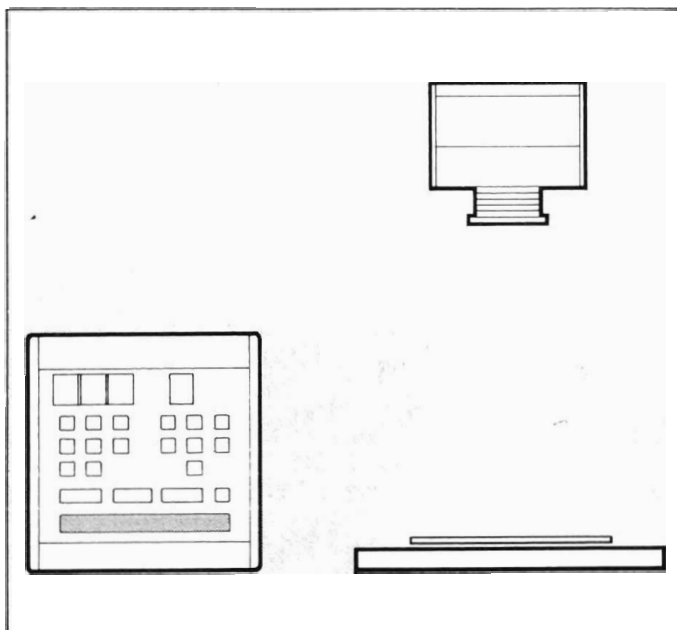


Touch the 'expose/cancel' switch pad to switch off the enlarger lamps.



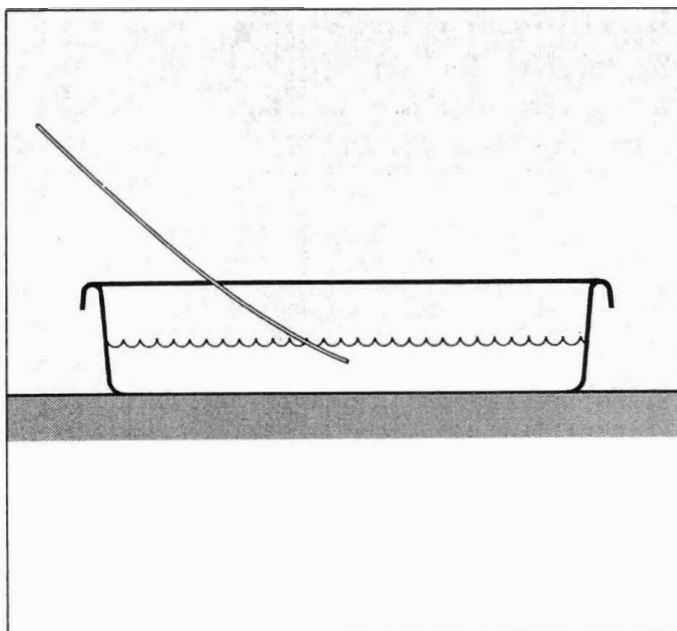
Set the estimated exposure time (see section 8, operation 10).

Position a sheet of
ILFOSPEED
MULTIGRADE II paper on
the enlarger easel.
Expose it by touching
the 'expose/cancel'
switch pad. When
exposure is complete,
the enlarger lamps
switch off
automatically.



Process the exposed
ILFOSPEED
MULTIGRADE II paper.

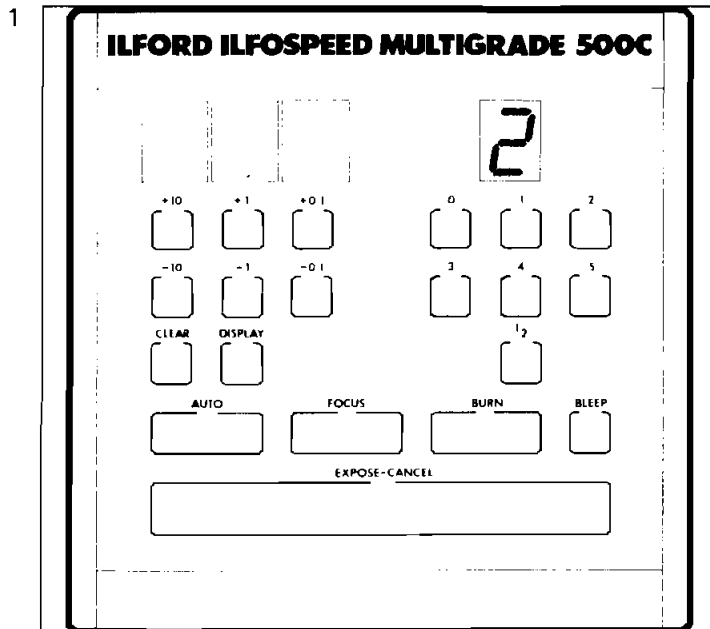
Check the print for
density. If necessary,
correct the exposure
time on the control
unit and make another
print.



Check the print
contrast. If
necessary, make
another print at a
different grade.

It is not necessary to
alter the exposure
time when changing
grades, since the
light intensity is
adjusted automatically
for each contrast
setting.

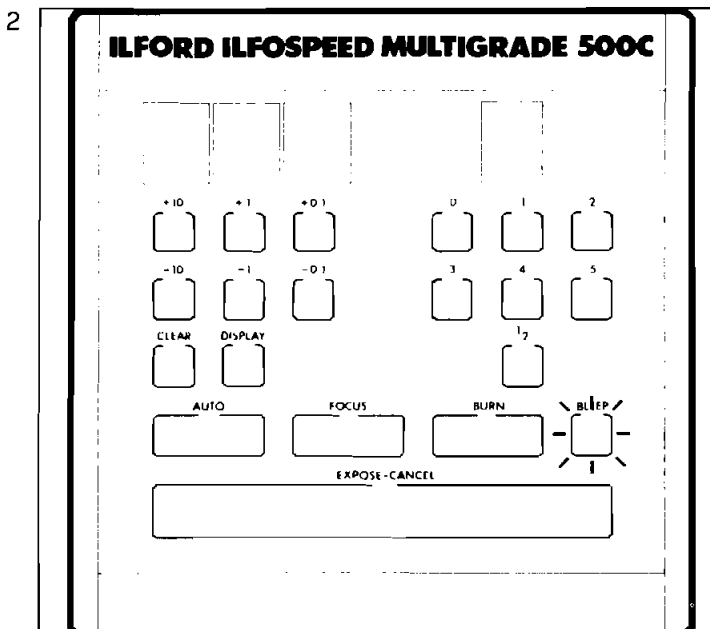




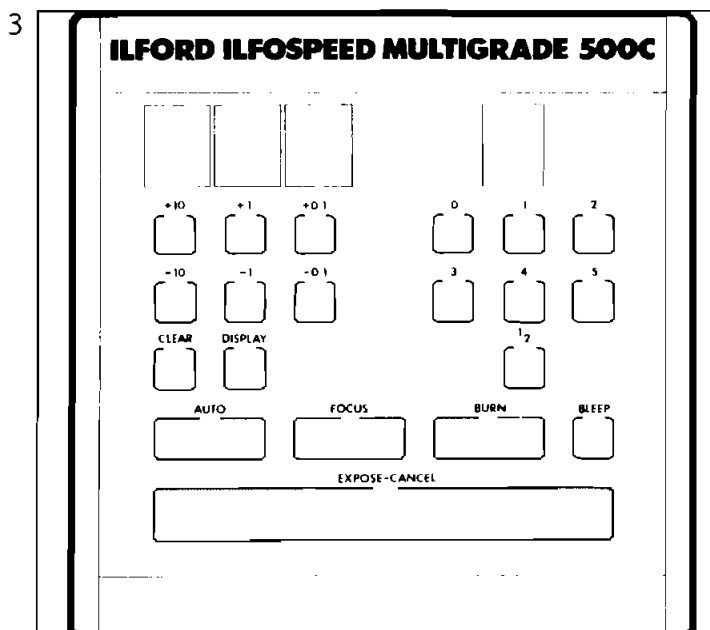
9.2 Burning in
Select the required grade.

Note

Any grade may be selected. This means that several different areas of the print can be exposed using different contrast levels to obtain the desired result.



Touch the 'burn' switch pad and time the extra exposure. The timer display counts up from zero. To aid timing, switch 'bleep' on and count the bleeps.



Stop the exposure by touching the 'expose/cancel' switch pad.

10 WORKING WITH THE EXPOSURE PROBE

Sequence of operations

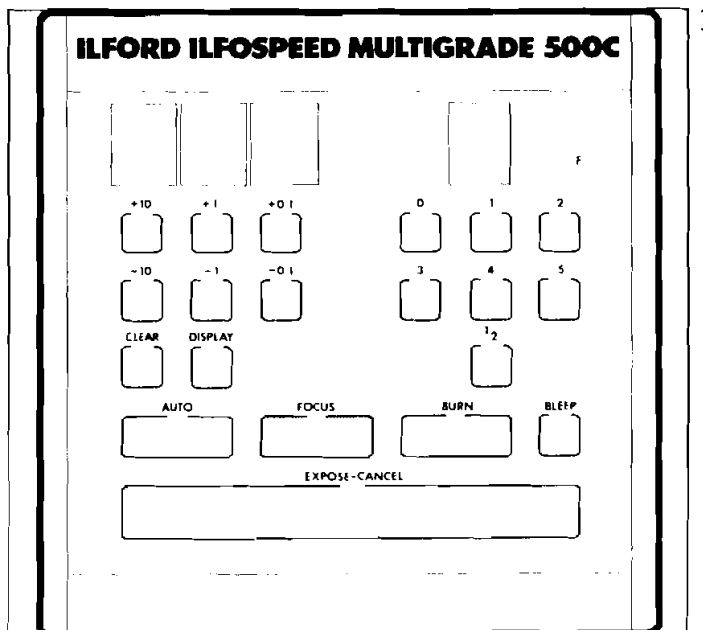
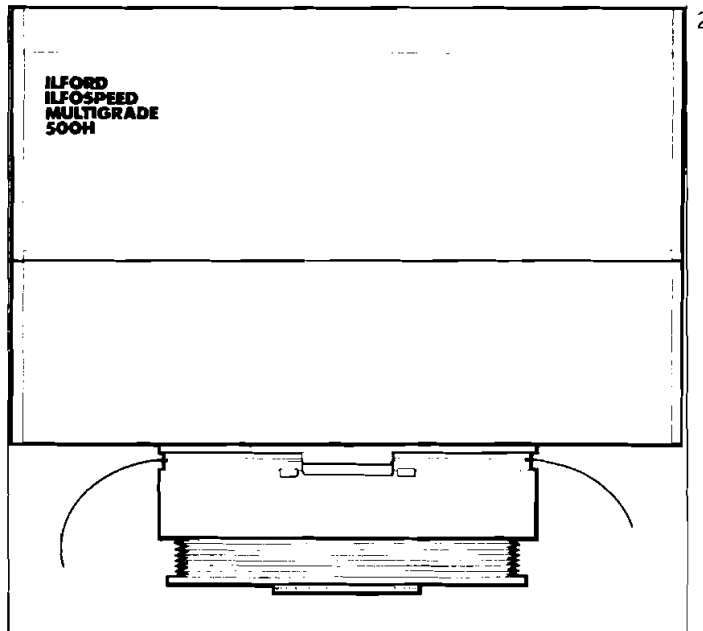
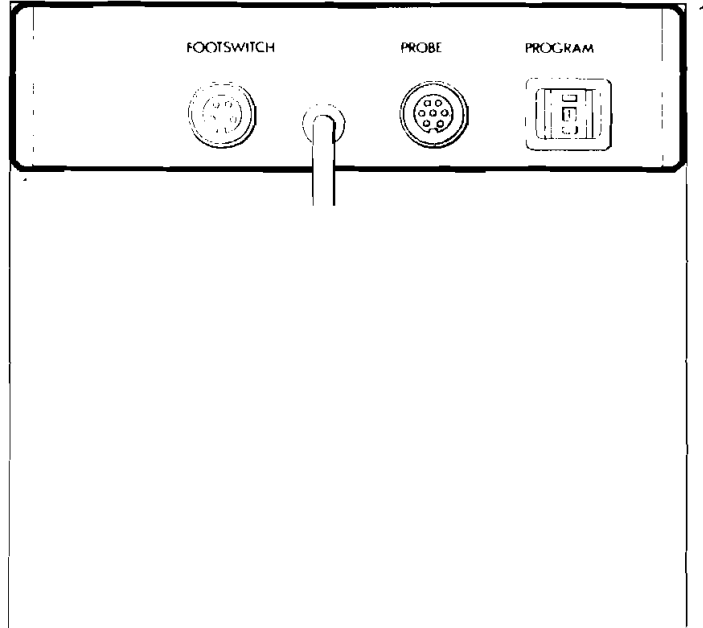
Automatic assessment of exposure is made using the ILFOSPEED MULTIGRADE 500P exposure probe.

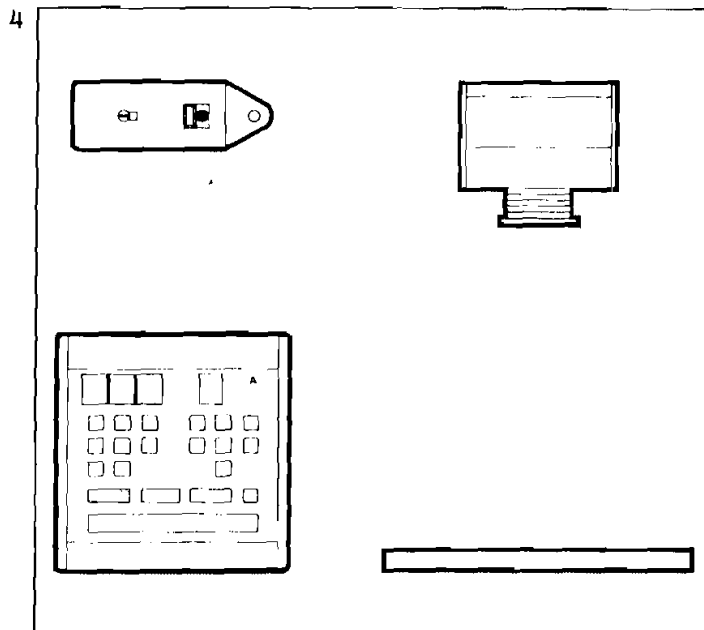
Connect the exposure probe multipin plug to the 'probe' socket located on the control unit rear panel and tighten the securing ring.

Position the negative in the enlarger negative carrier.

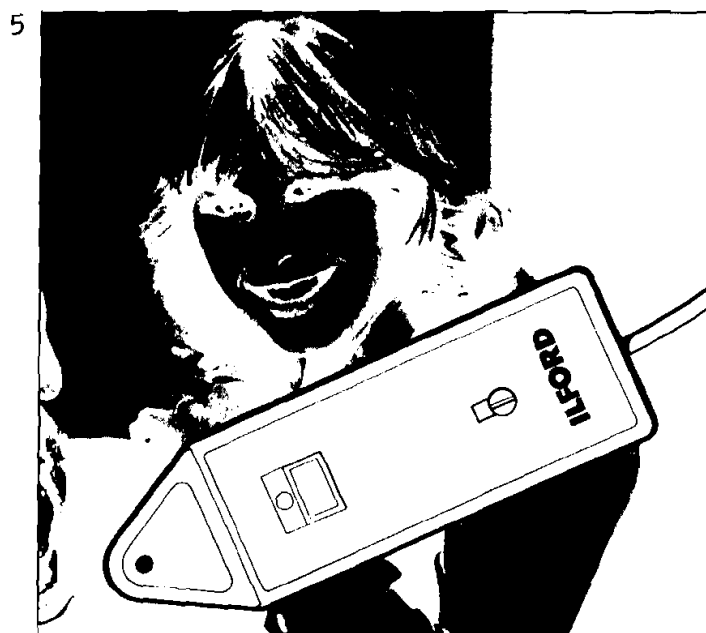
Touch the 'focus' switch pad. Focus, compose and set the grade (see section 9.1, operations 3-5).

10.1

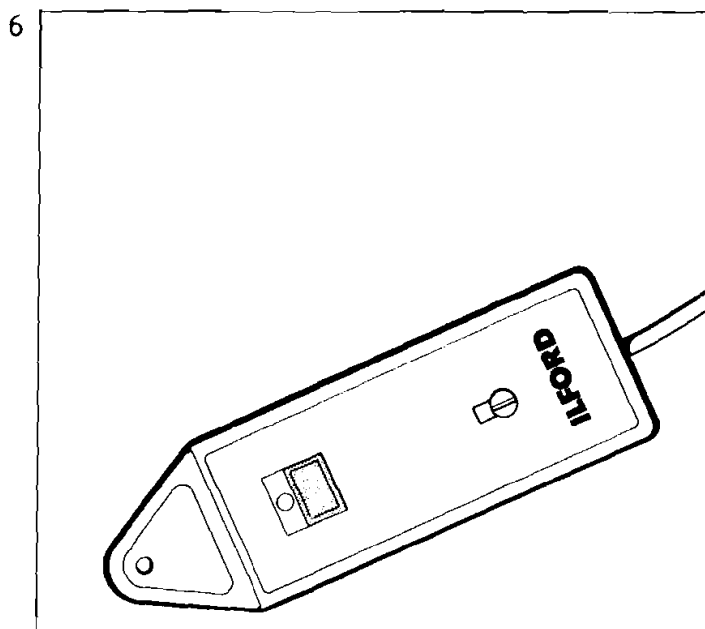




Touch the 'auto' switch pad on the control unit. The enlarger lamps and the red LED on the probe switch on automatically, and 'A' is indicated on the control unit mode display.

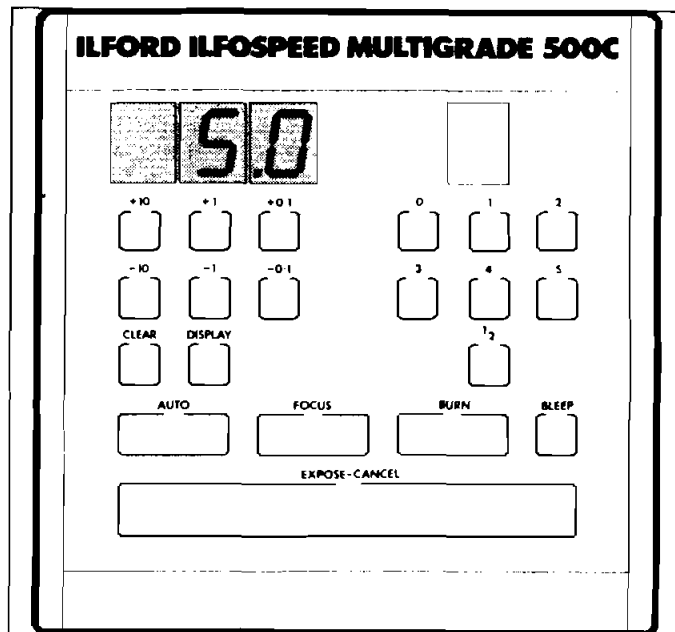


Position the probe photocell in a shadow area where you wish to retain detail on the final print.



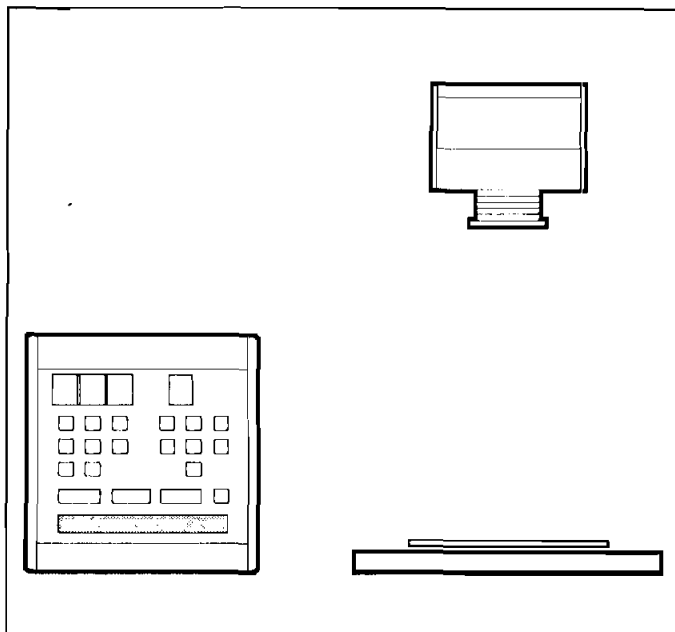
Press the probe black button and release to start the measurement cycle.

The calculated exposure time is displayed on the control unit after 5 seconds. 'A' switches off on the control unit mode display, and print making can begin.



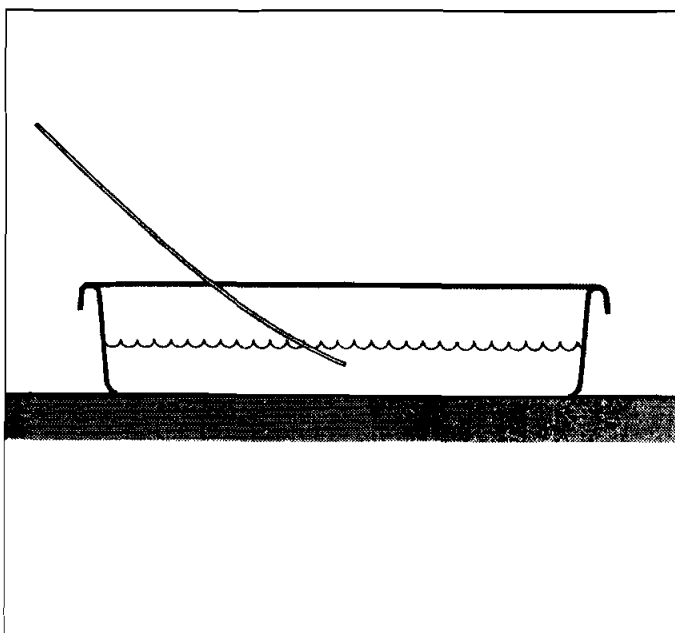
7

Position a sheet of ILFOSPEED MULTIGRADE II paper on the enlarger baseboard. Touch the 'expose/cancel' switch pad. The paper is exposed for the time set by the exposure probe.



8

Process the exposed paper.



9

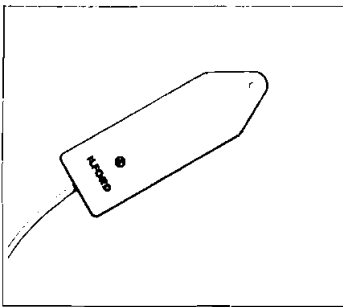
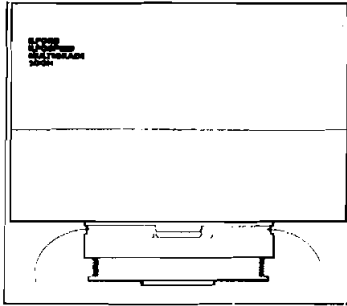
Notes

- 1 The exposure probe assesses exposure time only. The grade selected is unaffected.
- 2 During the measurement cycle of five seconds, the exposure probe must not be moved.
- 3 If 'auto' is selected with the exposure probe disconnected, the control unit displays 'HELP' (see section 8). To cancel 'HELP' while still in the 'auto' mode, touch the 'auto' switch pad again.
- 4 If the wrong grade is chosen, both the grade and density obtained on the final print will be incorrect. In this case, select a more appropriate grade and repeat operations 4-9 in section 10.1 to determine the correct exposure time.
- 5 The exposure probe is designed to calculate the exposure time required to retain detail in the shadow areas of the final print. To do this, exposure time must be determined every time the grade is changed. In standard print making (see section 9.1), the exposure probe is not used and, in this case, changes across the grades do not require changes in exposure time.
- 6 The exposure probe compares the light intensity reading of the projected negative to the light intensity reading of background illumination. The effects of darkroom safelights are, therefore, largely eliminated. However, for greater accuracy and repeatable results, it is recommended that any safelight positioned locally to the enlarger is powered from the 'safelight 1 amp' socket located on the power supply unit. This safelight will then switch off automatically when measurements are being taken (see section 3.6).
- 7 When the exposure probe is working over its normal operating range, it generates internal frequencies that enable the control unit to calculate exposure times over the range 0.9-51.1 seconds (nominally 1-50 seconds). Outside these limits, the control unit displays 'HELP' (see section 8). To cancel 'HELP', press 'auto' (see note 3 above). Adjust the enlarger lens aperture and remeasure the exposure time.

10.2 Calibration

Before calibrating the exposure probe, select a negative you know to be correctly exposed and processed, preferably one having a good tonal range. Make this negative your 'standard' for calibrating the exposure probe.

To calibrate the exposure probe, proceed as follows:



- 1 Position the 'standard' negative in the enlarger negative carrier.
- 2 Make a standard sized print on ILFOSPEED MULTIGRADE II paper using the method described in section 9.1, operations 4-9.
- 3 Once a satisfactory print has been produced, note the exposure time and grade used. Do not alter any enlarger settings.
- 4 Select the contrast noted in operation 3 above, and use the exposure probe to determine the exposure time automatically (see section 10.1, operations 1 and 4-6).
- 5 If the exposure time displayed does not agree with that noted in operation 3, adjust the probe calibration knob as follows. If too short an exposure time is indicated, turn the calibration knob to a lower setting. If too long an exposure time is indicated, turn the calibration knob to a higher setting.
- 6 Repeat operations 4 and 5 above until the displayed exposure time agrees with that noted in operation 3.

The quality of printing for all subsequent negatives will be relative to the 'standard' negative chosen.

Notes

- 1 The two seconds taken by the exposure probe to carry out measurements (see section 10.3) is a mean value, obtained with the probe calibration knob set to position 5. The actual measurement time is 1.3-2.5 seconds corresponding to the probe calibration knob extreme positions 0 and 9 respectively.
- 2 Calibration may require adjustment if any of the external processes are altered, for example, a change from machine to dish processing.
- 3 Due to small manufacturing variations, the exposure probe may require calibrating for each batch of paper used. Once a batch has been calibrated, it may be useful to make a note of the calibration knob setting.

10.3 The measurement period

This section explains, in greater detail, what happens during the five seconds the exposure probe is taking measurements. It is not essential reading to the user of the equipment.

When the exposure probe button is pressed and released (see section 10.1, operation 6) the probe LED switches off automatically for two seconds. During this time, the intensity of light falling on the probe photocell is being measured and stored by the computer memory in the control unit. At the end of the two second period, the enlarger lamps switch off automatically and the probe LED switches on automatically.

The probe LED remains switched on for one second while the probe output stabilizes to the background light level.

At the end of the one second period, the probe LED switches off automatically for a further period of two seconds. During this time, the probe is measuring the intensity of any background light. This information is again stored by the computer memory in the control unit.

At the end of this two second period, the computer calculates the recommended exposure time from the two readings taken. The bleeper sounds, and the calculated exposure time is displayed on the control unit. Normal print making can then begin.

11 USING OTHER PHOTOGRAPHIC PAPERS

The ILFOSPEED MULTIGRADE 500 system is designed for use with the new ILFOSPEED MULTIGRADE II paper. Earlier ILFOSPEED MULTIGRADE paper can be used quite successfully with the equipment.

Prints from graded paper such as ILFOSPEED can be made using the ILFOSPEED MULTIGRADE 500 equipment. ILFOSPEED paper is only sensitive to blue light, therefore select contrast grade 4 or $4\frac{1}{2}$ (suggested) on the control unit as a compromise between exposure time and image visibility.

12 FAULT FINDING

Microprocessor electronics are used extensively in the ILFOSPEED MULTIGRADE 500 equipment to give greater flexibility, improve reliability, and simplify maintenance.

Tables 12.1 to 12.4 provide a list of checks to make if the equipment appears to be malfunctioning; these checks can be carried out by any competent person. If the checks prove to be ineffective, contact your nearest ILFORD selling company, the addresses of which can be found on the back cover of this manual.

CAUTION

If in doubt about carrying out any of the following checks, consult a competent electrician. Any further repair work carried out by unqualified personnel will invalidate any guarantees applicable to the equipment.

12.1 Enlarger head

Symptom	Comment
One lamp not working	Check the lamp has not blown
Lamps and fan not working	Check the enlarger head lead plug is inserted correctly into the power supply unit
Both lamps extinguish during use	The temperature cut-out has operated at its trip temperature of 75°C. This occurs under abnormal conditions, for example, fan failure
Uneven illumination on the enlarger baseboard	Check the mixing box is positioned correctly and is not damaged (see section 2.2) Check the lamp slides are positioned correctly (see section 2.2)
Density change with alternative contrast selected	Check the lamp slides are positioned correctly (see section 2.2) Check the correct program is selected at the 'program' switch on the control unit (see section 3.7) The lamps may be unmatched. Select an alternative program on the 'program' switch (see section 3.7)
The lamps blow frequently or light output is low	Check the voltage selector is set correctly for the mains supply (see section 4.1) Check the 'program' switch is set correctly (see section 3.7)

12.2 Control unit

Symptom	Comment
The display and keyboard fail to illuminate	Check the power supply unit is working (see section 12.3) Check the control unit is plugged into the power supply unit
'HELP' is displayed when the control unit is switched on	Check the mains frequency is within the range 45-65Hz
'HELP' is displayed when 'Auto' is selected (this function is for use only with the exposure probe)	Check the exposure probe plug is inserted correctly and the locking ring is tightened
'HELP' is displayed when the exposure probe is in use	See section 12.4
The display becomes inoperative	This can be caused by severe interference of the mains supply. It is normally cured by switching power off and on again. If the fault persists, it is advisable to power the equipment via a stabilized supply (see section 4.4)
A continuous bleep when the control unit is switched on	Faulty keyboard. Return the control unit to your nearest ILFORD selling company

12.3 Power supply unit

Symptom	Comment
Neon indicator in the 'on/off' switch fails to illuminate	Check the mains supply is available
Neon indicator illuminates but the power supply unit is not supplying power to the control unit	Check the fuse in the centre of the supply voltage selector has not blown
Fuse blown	Check the supply voltage selector is set correctly (see section 4.1) Check the fuse rating is correct (see section 4.1)

12.4 Exposure probe

Symptom	Comment
'HELP' is displayed by the control unit when 'Auto' is selected	Check the exposure probe plug is inserted correctly at the control unit, and the locking ring is tight. If this does not solve the problem, the fault lies with the exposure probe. In this case, return the exposure probe to your nearest ILFORD selling company
'HELP' is displayed when the exposure probe button is released to start the measurement cycle	Check the exposure probe calibration knob is not set between two numbers
'HELP' is displayed during normal use of the exposure probe	The calculated exposure time is outside the range 1-50 seconds

13 SPECIFICATION

13.1 Enlarger head

Dimensions	Height	216mm
	Width	316mm
	Depth	173mm
Weight	3kg excluding mixer boxes and adaptor brackets	
Construction	Black stoved aluminium alloy sheet and extrusion with polycarbonate end plates	
Electrical cable	Multicore	
	Length	2m
	Maximum voltage	120V ac
Lamps	2 120V ac 150 watt ANSI code ESD Quartz halogen projection lamp with dichroic reflector	
Heat filters	2 30x15x2mm thick heat absorbing glass	
Colour filters	1 25x25x1mm thick. Blue and green dichroic interference filter coating on glass substrate. Tempered for maximum stability. Cut-off frequencies are selected for optimum grade range with ILFORD ILFOSPEED MULTIGRADE II paper	
Cooling fan	115V ac 21 watt dynamically balanced centrifugal type. The fan cools both lamps and filter assemblies	
Fan temperature cut-out	75°C $\pm$ 3%	
Light mixing boxes	Three sizes available for negative sizes: 35mm, 6x7cm and 4x5 inches Note Light mixing boxes and adaptor brackets are supplied separately as adaptor kits to suit a wide range of popular professional enlargers	

13.2 Control unit

Dimensions	Height	46mm
	Width	186mm
	Depth	192mm
Weight	1.2kg	
Construction	Black stoved aluminium alloy extrusion with zinc die-cast end plates	
Electrical cable	Multicore	
	Length	1.2m
Controls	Listed below. Operation of each is by an illuminated switch pad. There is bleep confirmation of switch pad operation at all times Exposure time - 0-99.9 seconds in steps of 0.1 seconds Grade - 0-5 in half grade steps Note With auto not selected, exposure times remain the same right through the grades Auto - selects the operating mode for using the exposure probe Focus - switches on both lamps in the enlarger head for focusing, assessment and composition Burn - extends the exposure time for burning in Bleep - selects the optional audible signal to operate once every second during exposure time countdown or when burning in Expose/cancel - starts or cancels exposure, focus and burn	
Display	Digital, 7-segment LED	
Control unit electronics	Microprocessor	INTEL 8035 HL
	Memory	EPROM 2716
Additional features	Input sockets for exposure probe and footswitch	

13.3 Power supply unit

Dimensions	Height	175mm
	Width	254mm
	Depth	140mm
Weight	10.3kg	
Construction	Totally enclosed using black stoved aluminium alloy extrusions with zinc die-cast end plates	
Electrical cable	3-core; live, neutral, earth Length 2m	
Mains input	Voltage 120, 220, 240V ac Frequency 50 or 60Hz Power consumption 400 watts	
Output sockets	Control unit Enlarger head 1A supply for local safelight	

13.4 Exposure probe

Dimensions	Height	19mm
	Width	50mm
	Depth	155mm
Construction	Black stoved zinc die casting	
Electrical cable	Multicore Length 1.2m	
Controls	Measurement cycle initiated by push button incorporating LED indication. Ten position calibration knob Note When operating the control unit in the 'auto' mode, a new exposure time must be determined when changing from grade to grade (see section 10.1)	
Exposure time range (nominal)	1-50 seconds (1 second at 20 lux baseboard illumination)	
Repeatability	Without safelights, better than $\pm 2\%$ With safelights, typically $\pm 4\%$	

Constant improvements in ILFORD products mean that changes in design or specification may occur from time to time. It will not always be possible to amend instructions at the same time, and the right to alter the design and specification of the equipment without prior notice is accordingly reserved.

ILFOSPEED MULTIGRADE 500 is covered by patents and patent applications.