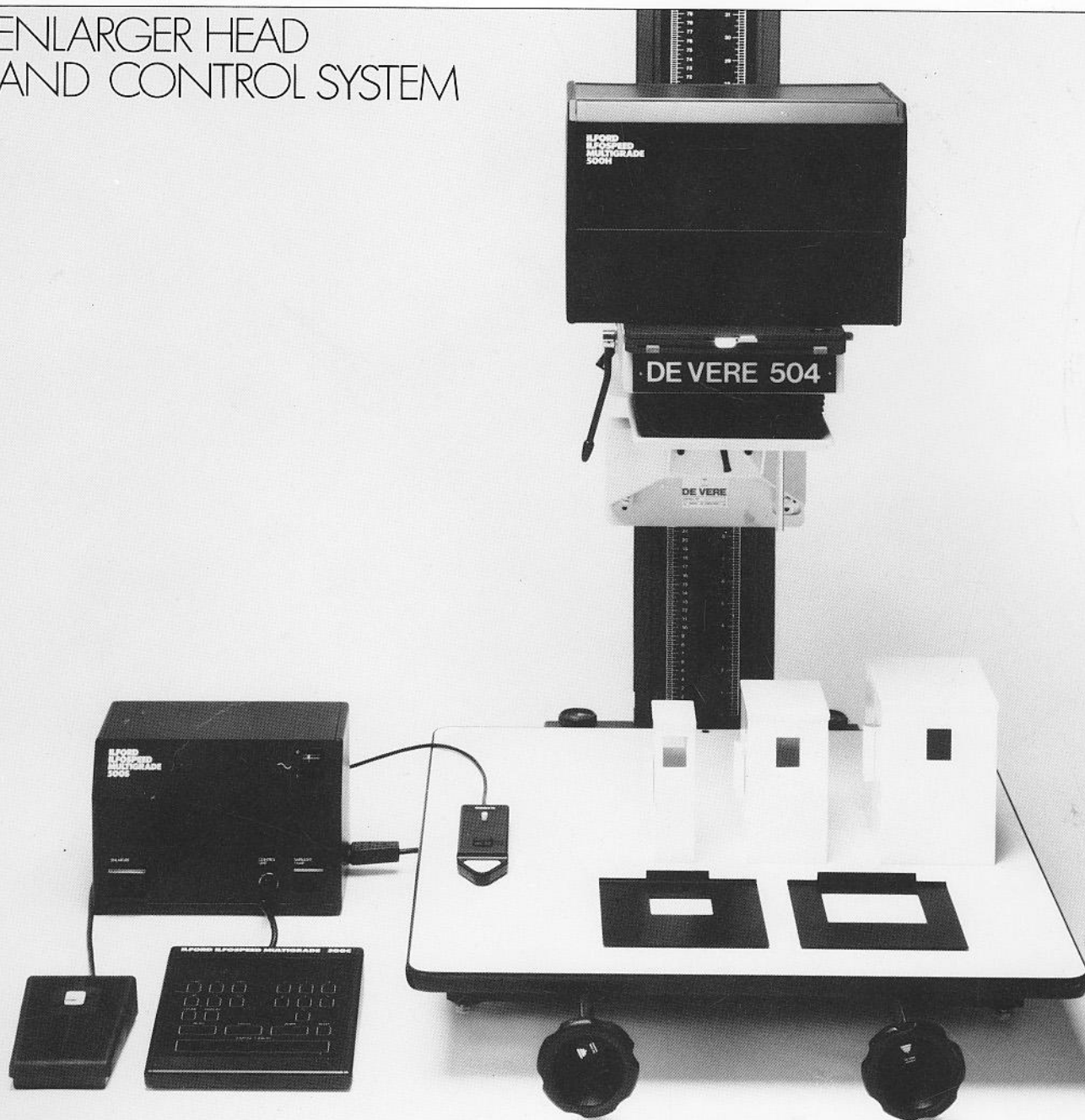


ILFOSPEED MULTIGRADE 500

ENLARGER HEAD
AND CONTROL SYSTEM



SAFETY PRECAUTIONS

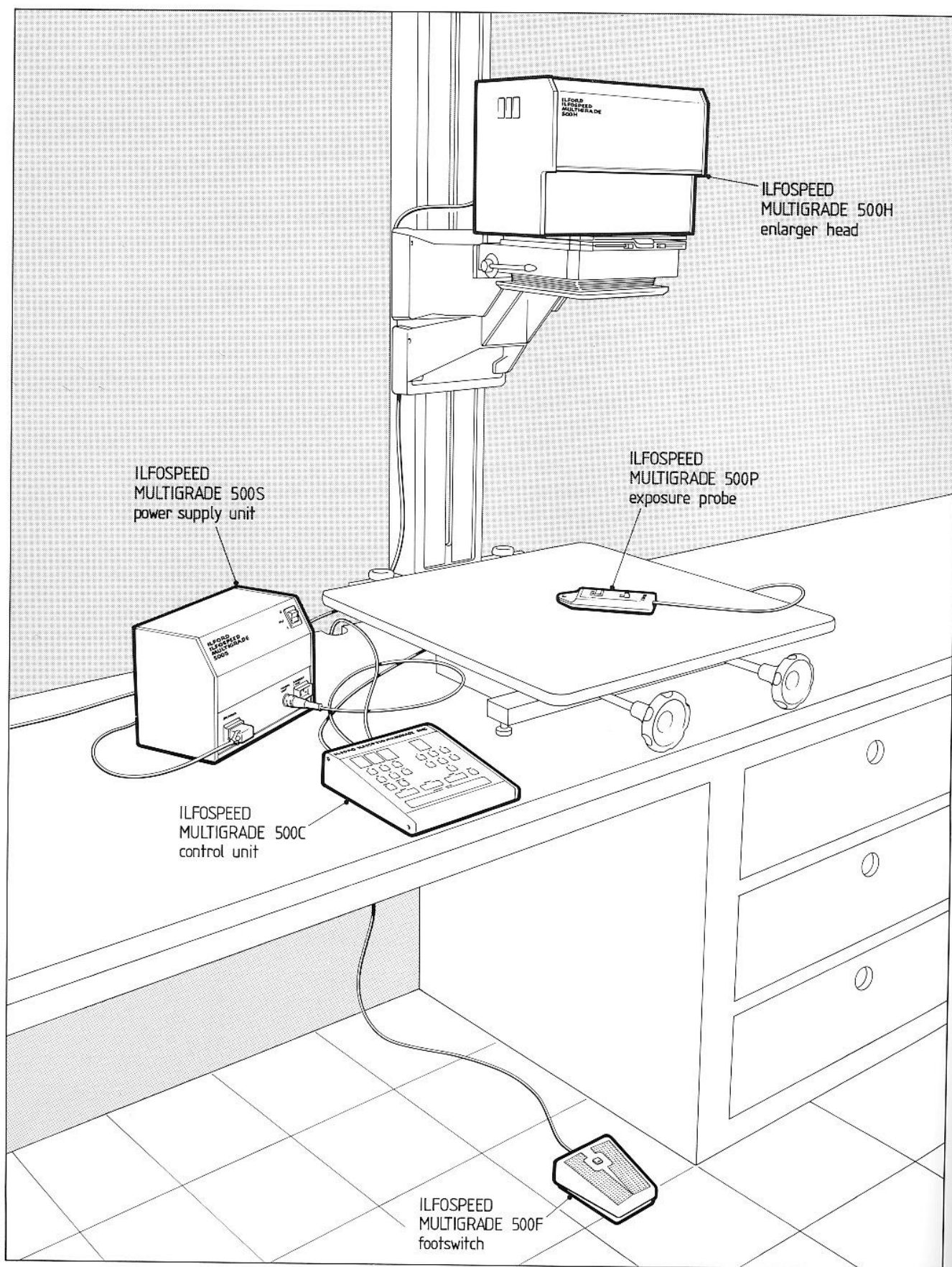
Your photographic equipment runs off mains electricity. Basic safety precautions must always be followed when operating the equipment, including the following:

- 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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The ILFOSPEED MULTIGRADE 500 diffuser 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.

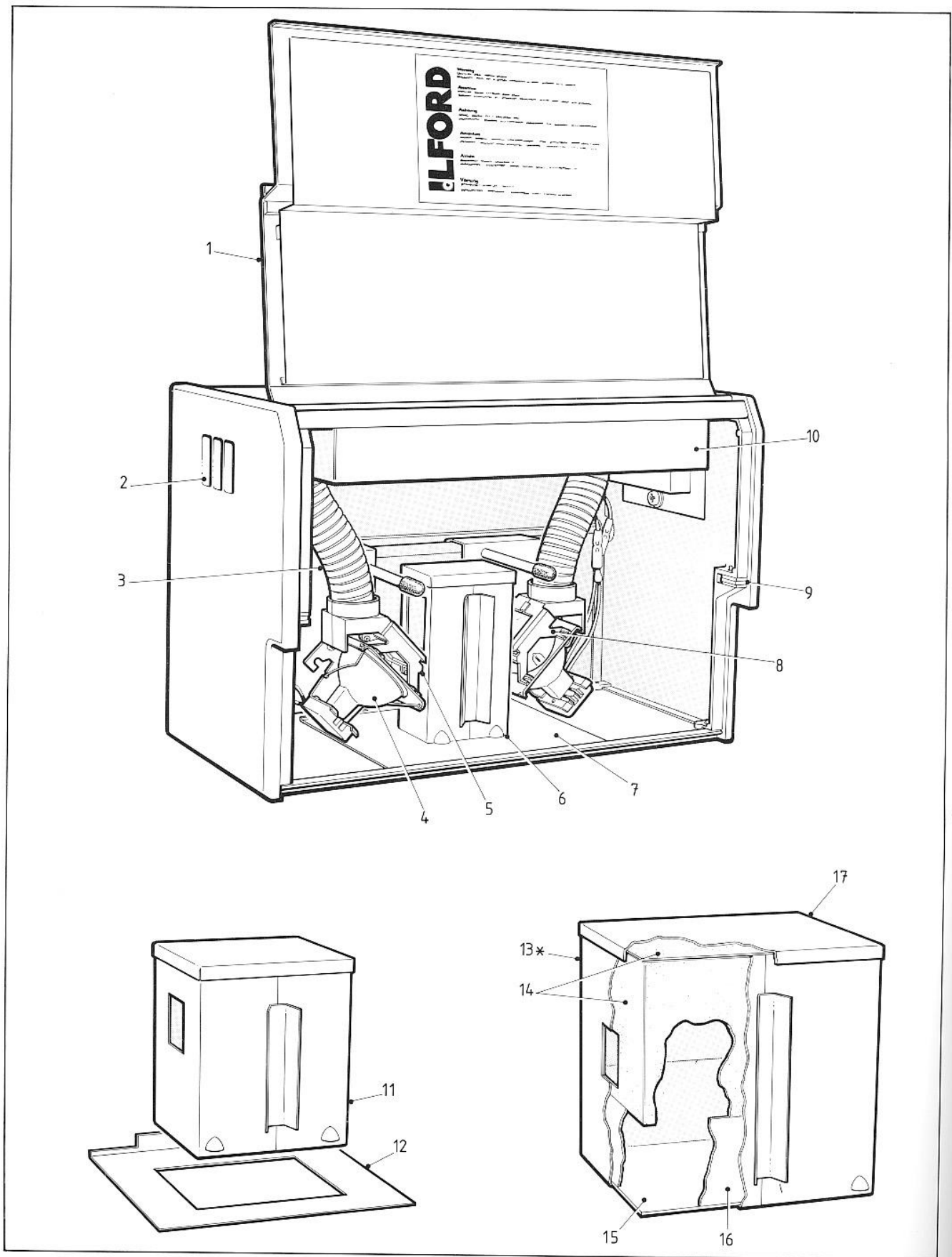
The light output of the ILFOSPEED MULTIGRADE 500 enlarger head is, on average, 25% better than that of the ILFOSPEED MULTIGRADE 400 enlarger head. This figure can only be an average since direct comparison depends on the enlarger type and negative format used. The design of the new enlarger head, combined with the new exposing filters fitted inside it, has reduced the possibility of negative popping.

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

* Item 13 may not be supplied with your adaptor kit

See figure 2.1.

A noticeable 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 produced by 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.

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.

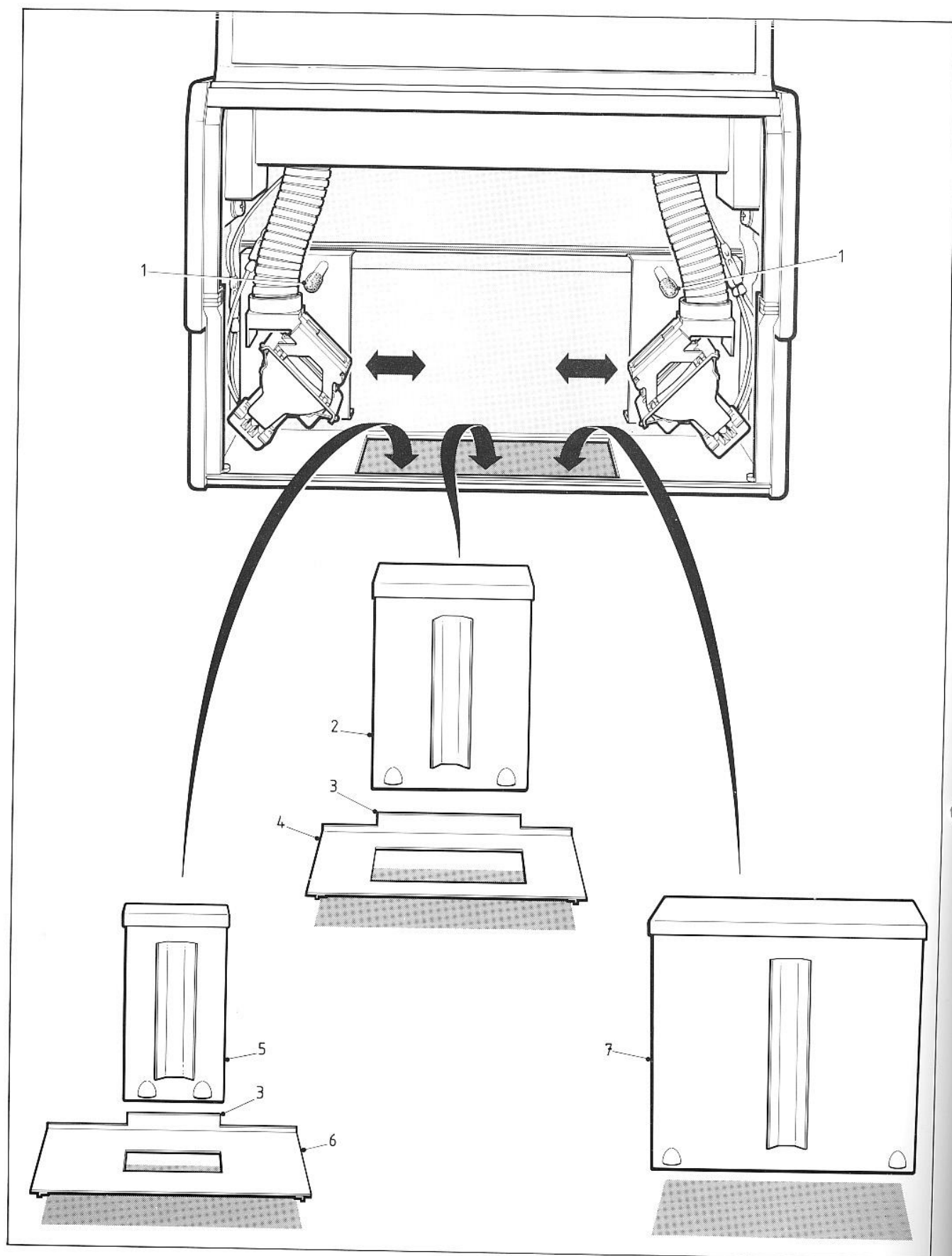
The ILFOSPEED MULTIGRADE 500H enlarger head replaces the standard condenser, diffuser or cold cathode lamphouse used with most professional enlargers. It fits into position on the enlarger using a specially designed adaptor kit which makes installation quick and relatively simple. Full instructions are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

2.1 Operation

WARNING

Operate the ILFOSPEED MULTIGRADE 500H enlarger head in the upright position at all times.

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



- 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)

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 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 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.

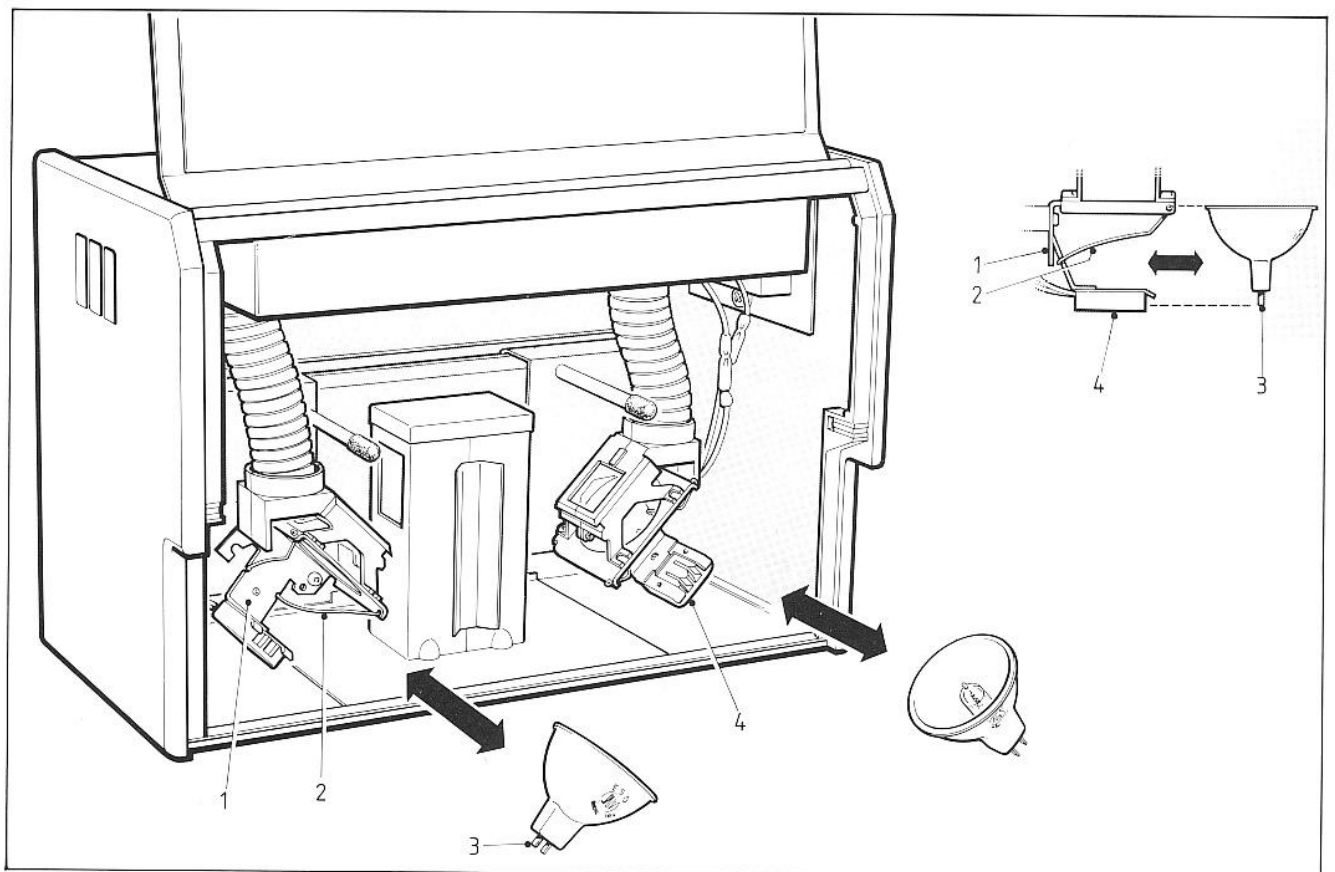


Figure 2.3

- 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 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.

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

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.

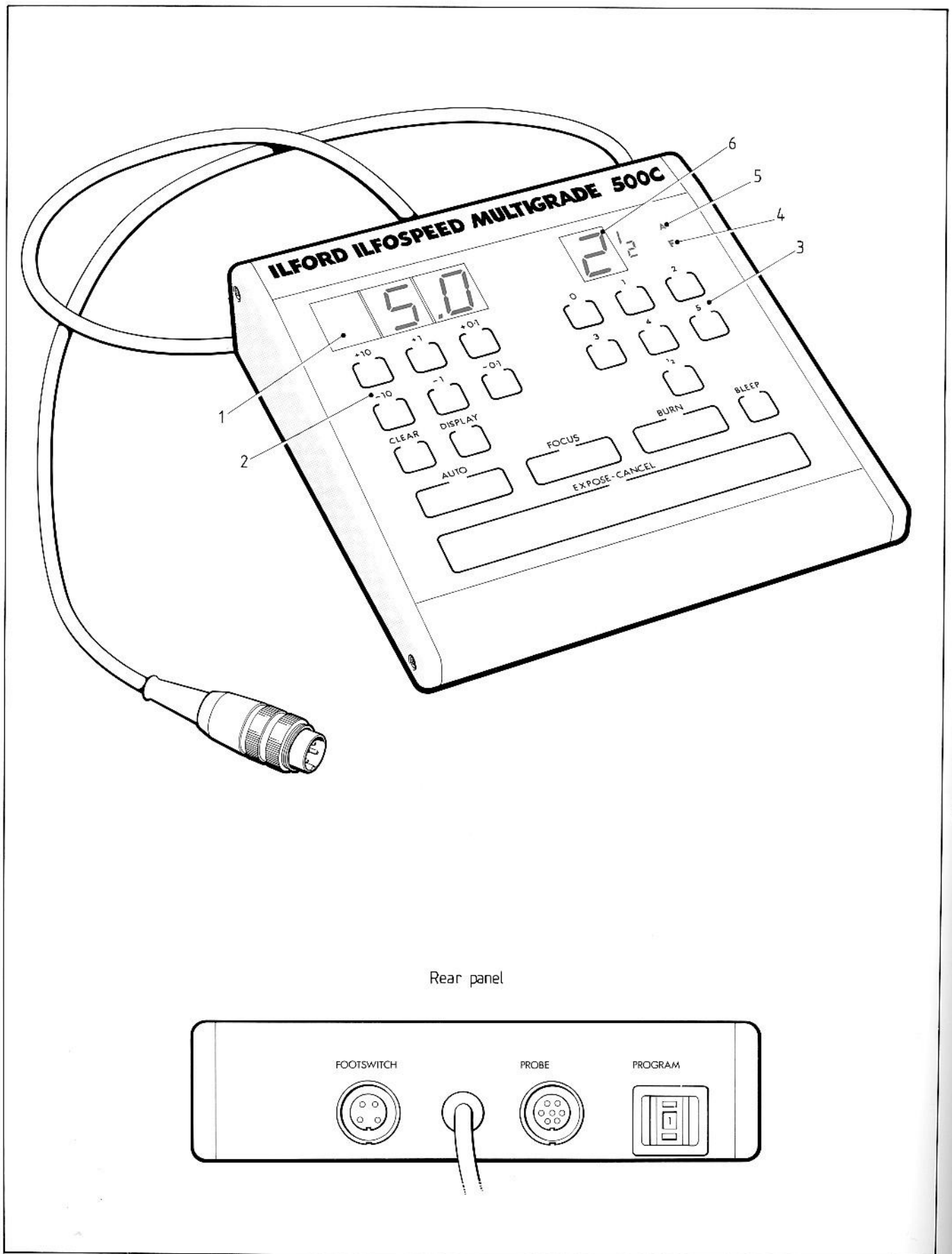
To replace a lamp proceed as follows:

- 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 completion of any operation involving the enlarger lamps, or when the equipment is first switched on.

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

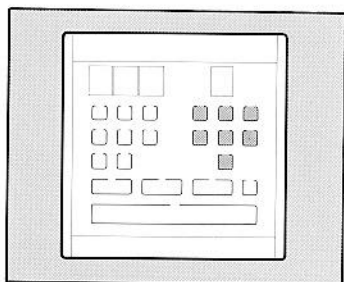
See figure 3.1.

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 when exposed by a diffuser enlarger head system. The half grade selection switch pad is for use with negatives requiring finer contrast control between the full 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'.

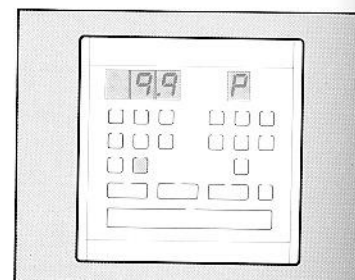
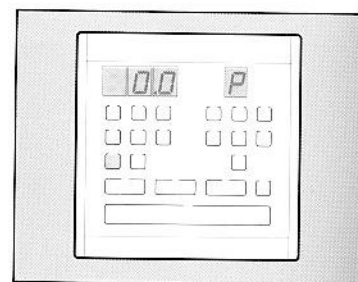
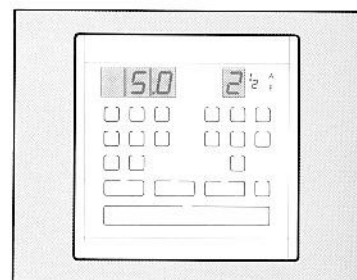
The brightness of the display is optimised to be seen easily in normal room lighting. Under normal operating conditions, the display will not fog ILFOSPEED, ILFOSPEED MULTIGRADE or other black and white papers of similar sensitivity.

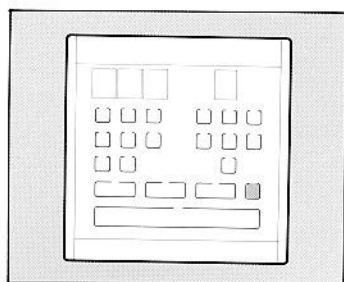
WARNING

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 two seconds. 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.





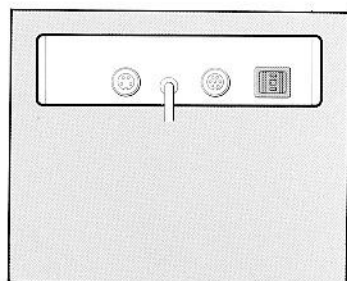
3.5 Bleeper

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

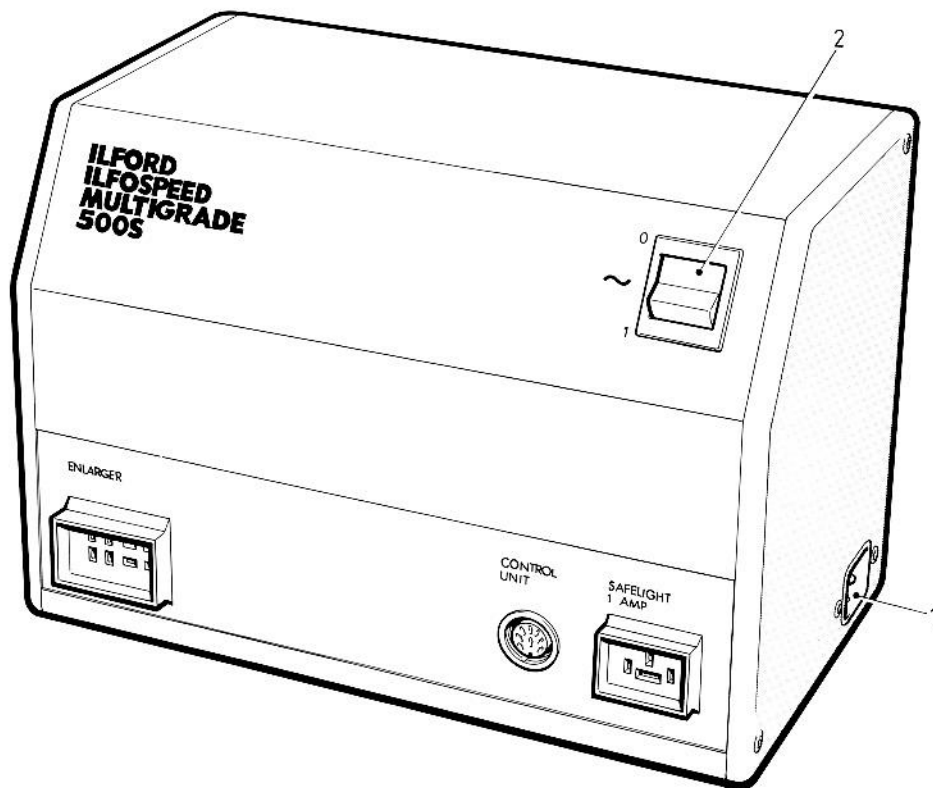
Switch position	Lamp type	Program
1	ESD 120V 150W	Balanced lamps
2	ESD 120V 150W	Increases green light by 10%
3	ESD 120V 150W	Increases green light by 20%
4	ESD 120V 150W	Increases green light by 30%
5	ESD 120V 150W	Increases green light by 40%

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,

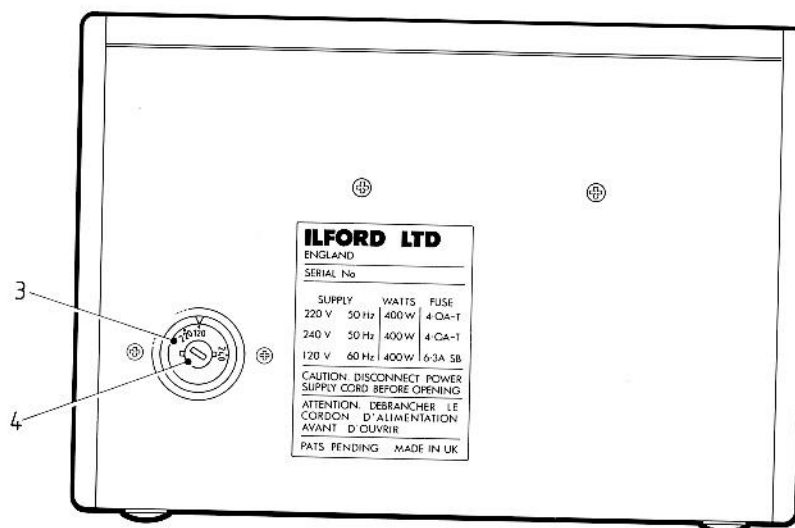
giving a biased output on one of the colours and producing a notable change in print density as prints are made through the contrast range. The variation can be minimised as follows:

- 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

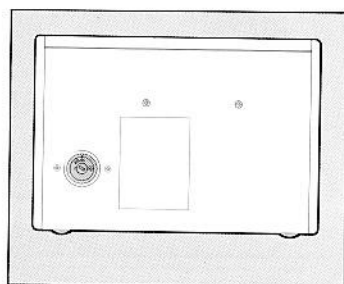
POWER SUPPLY UNIT

- 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 set to 240V and a 4A fuse fitted. Before replacing a fuse or altering the voltage selection, switch off the mains supply.

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.

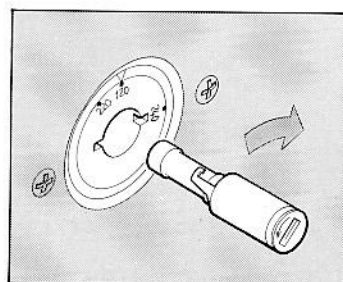
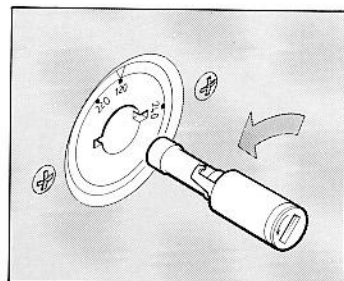
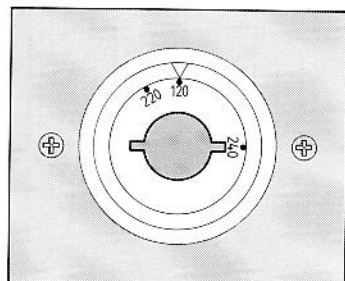


Table 4.1. Replacement fuses

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. A suitable plug is 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

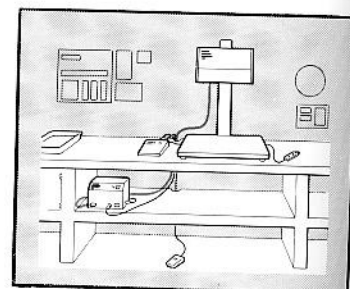
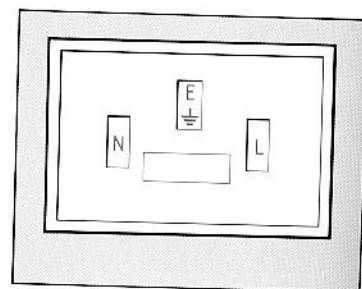
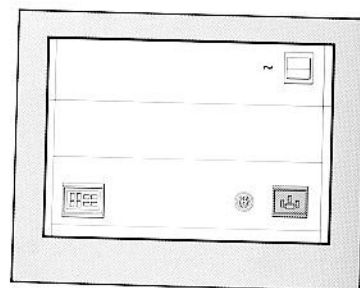
Certain installations may be subject to large variations in mains voltage or interference on the mains supply. To ensure correct operation of the equipment in these installations, it is necessary to connect the equipment to the mains supply via a voltage stabilizer that has a pure sine-wave output.

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. An extension lead for use between the control unit and the power supply unit is available from ILFORD Limited on request.



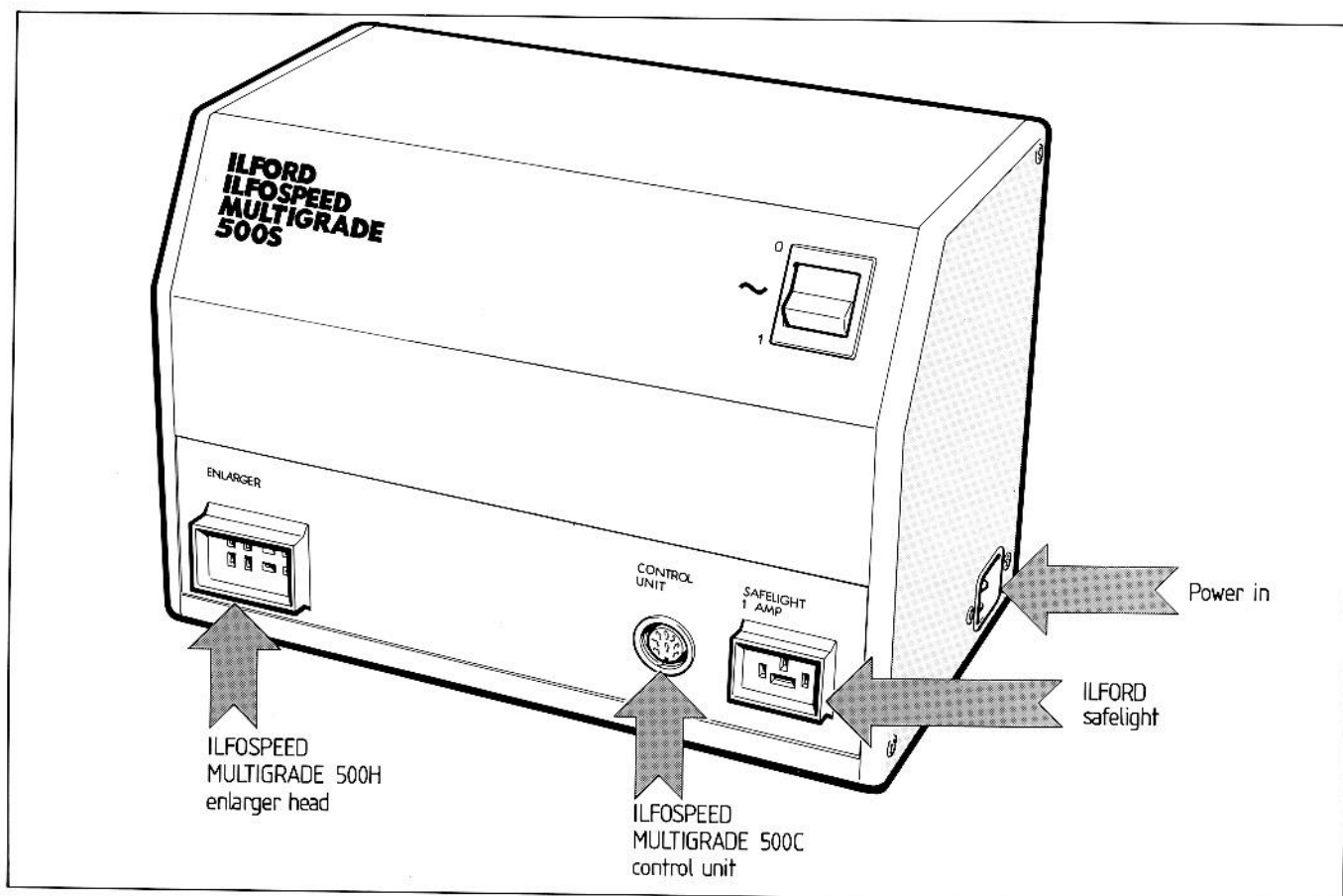


Figure 4.2

CAUTION

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

**ILFOSPEED
MULTIGRADE
500F**

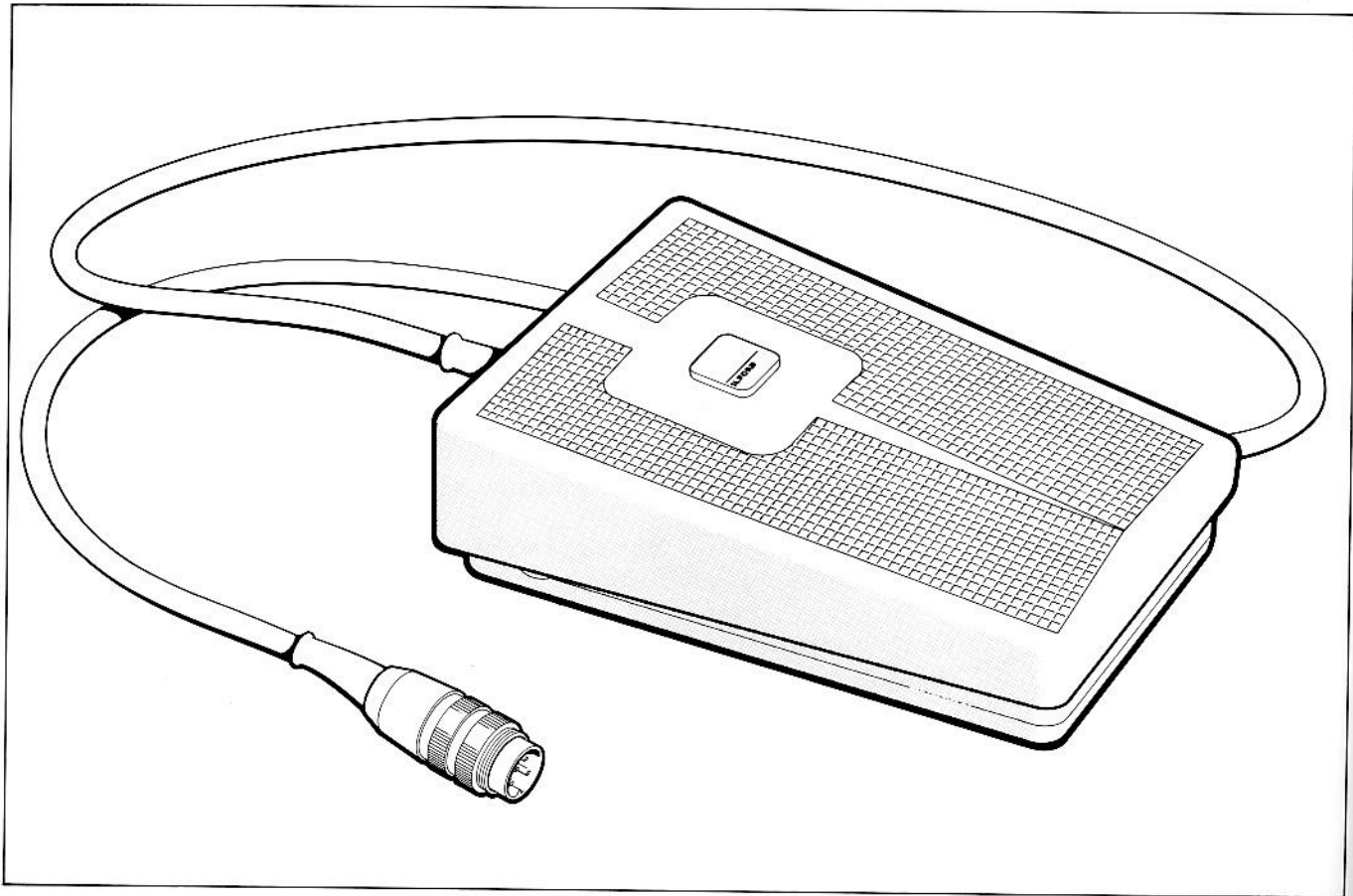
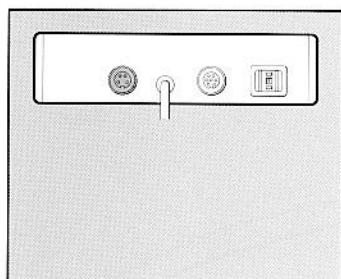


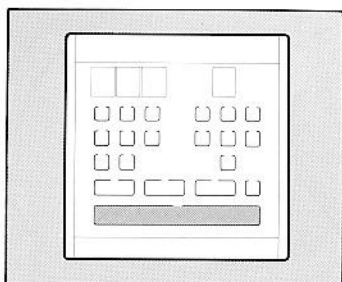
Figure 5.1

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

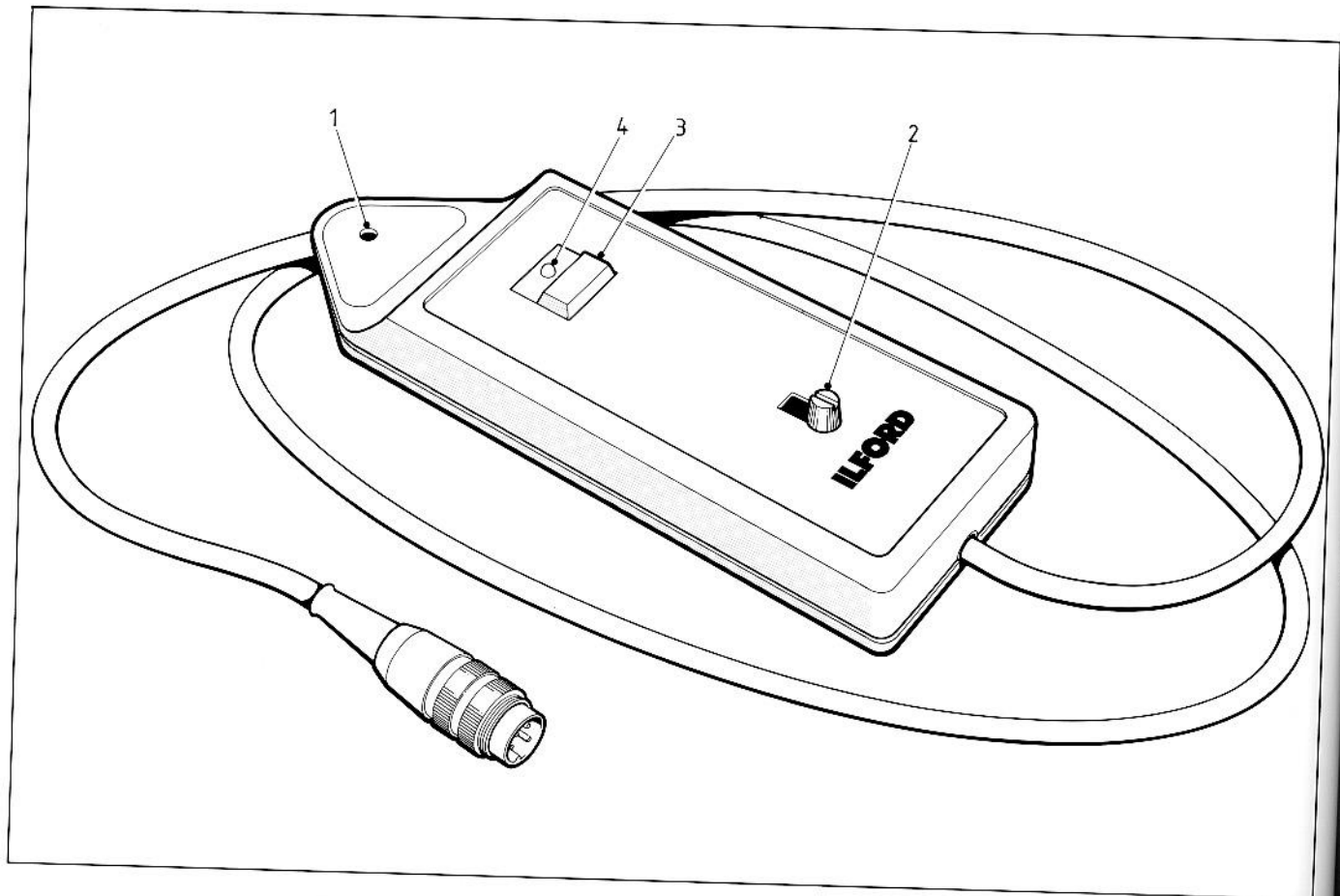


Figure 6.1

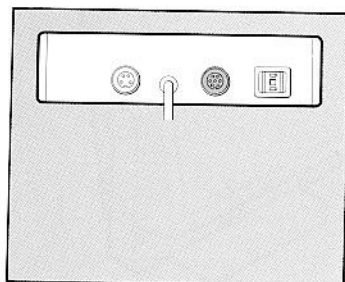
6

EXPOSURE PROBE

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

See figure 6.1.

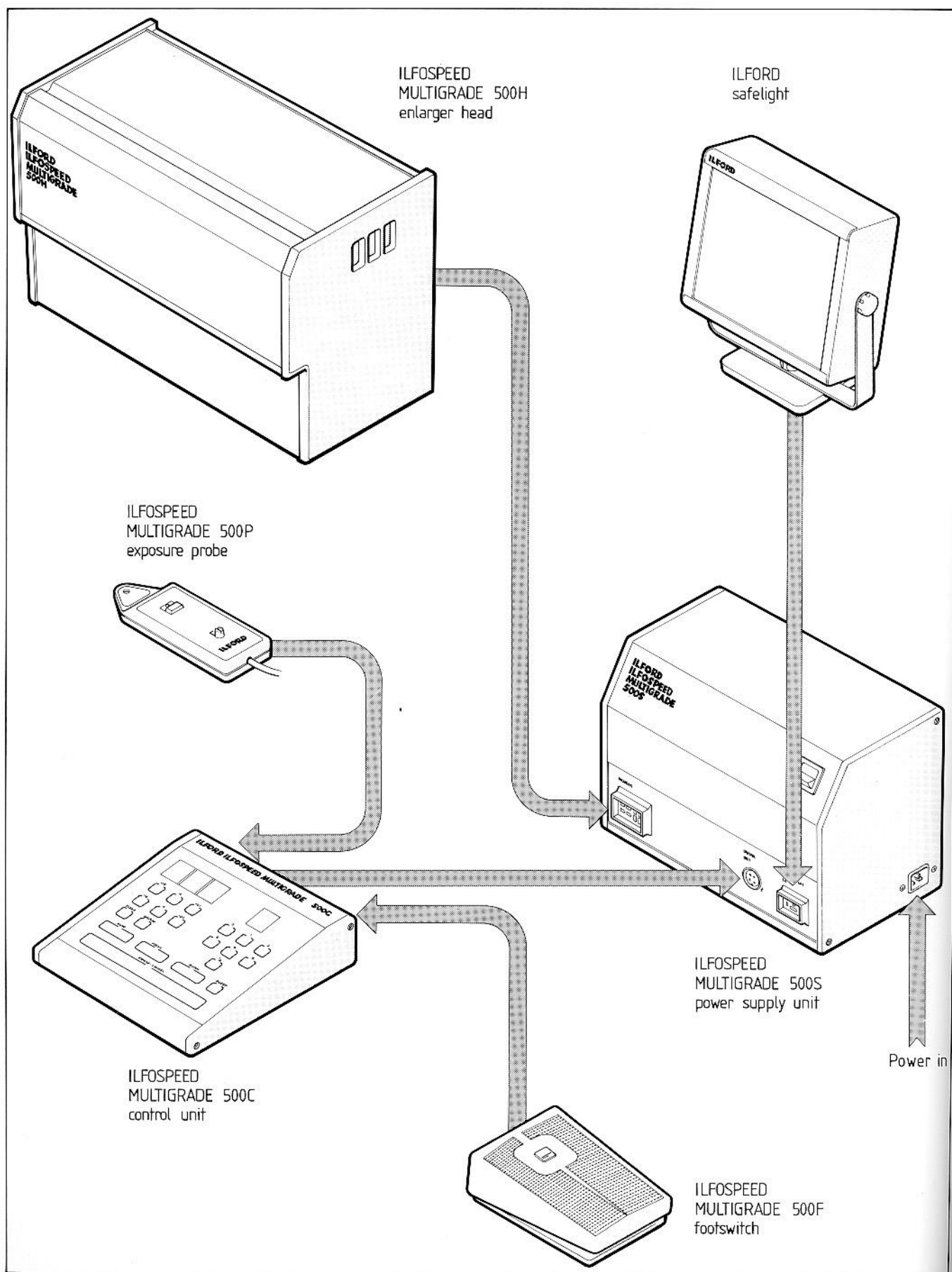
The ILFOSPEED MULTIGRADE 500P exposure probe is available as an optional extra, and is plugged into the 'probe' socket located on the control unit rear panel. Briefly, the exposure probe operates as follows:



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 normal background illumination, in darkroom conditions, 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.

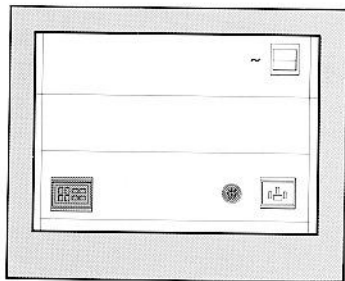
Installation of the ILFOSPEED MULTIGRADE 500 equipment is very straightforward.

- 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 \perp).

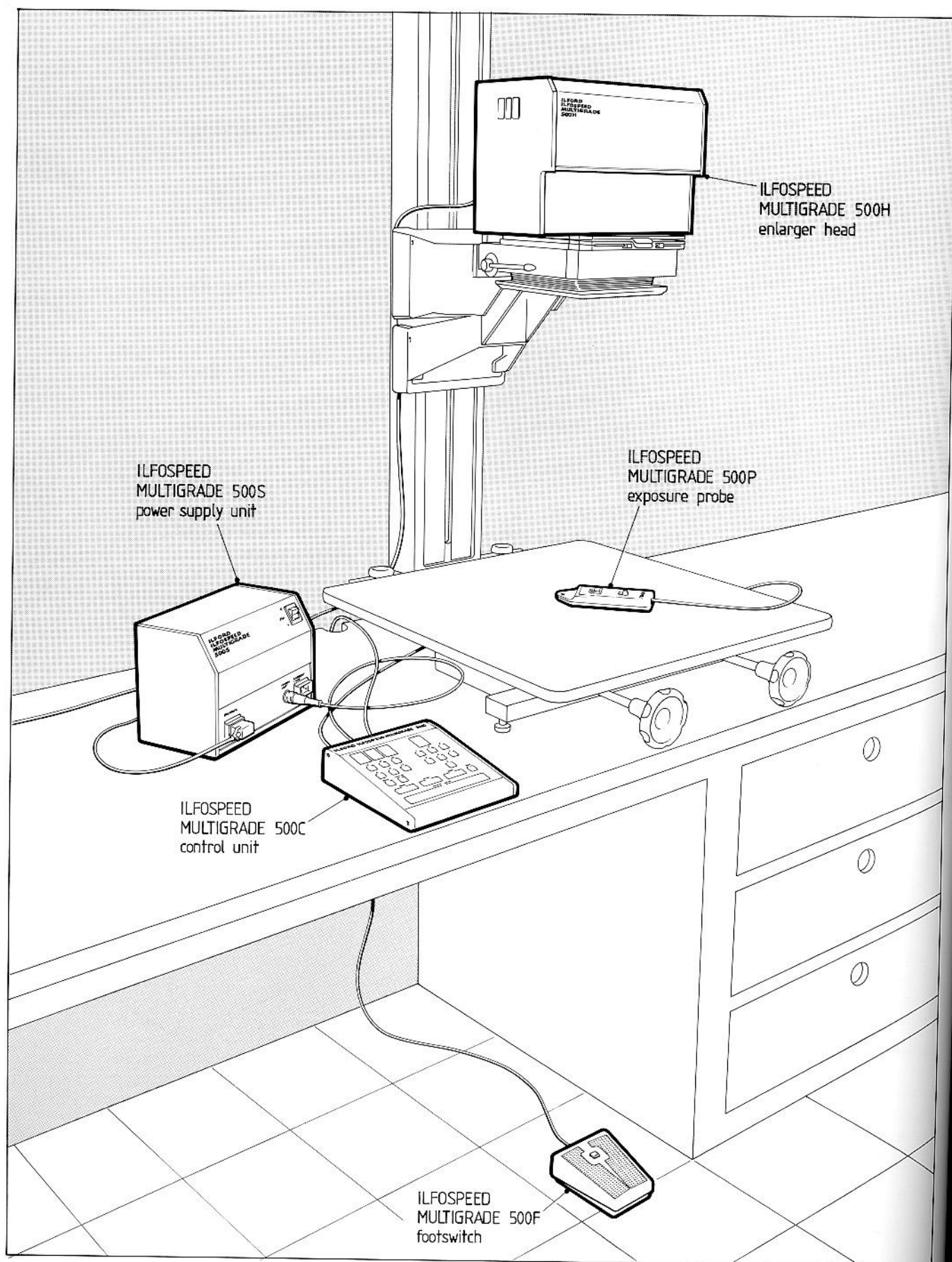
If a fused plug is used, fit a 5A fuse.

CAUTION

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



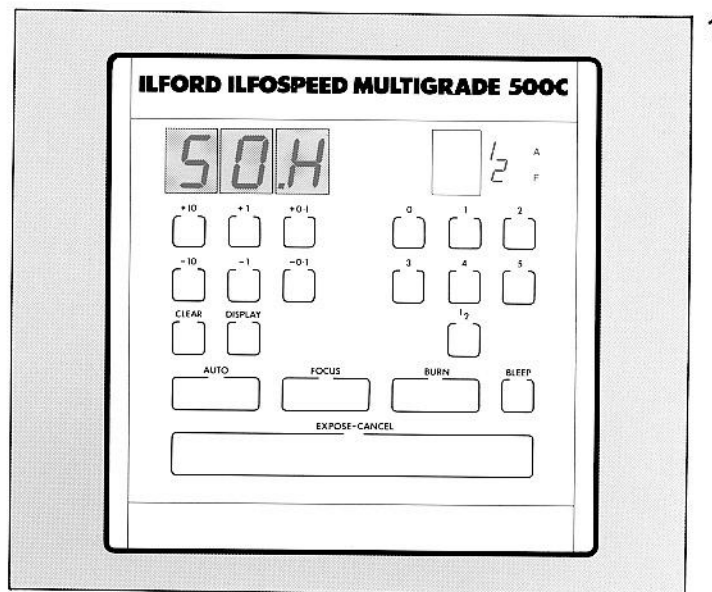
- 3 Plug the electrical lead from the enlarger head into the 'enlarger' socket located on the power supply unit. An extension lead is available as an optional extra (see section 4.5).
- 4 Connect the electrical lead fitted with the multipin plug from the control unit to the 'control unit' socket located 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

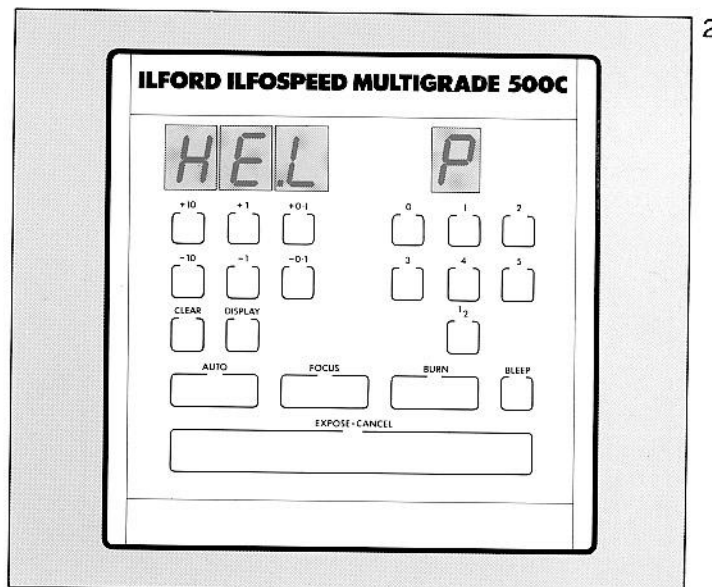
Connect the mains supply and switch on by moving the mains switch (symbol ~), located on the power supply unit, to the '1' position. Check that the control unit briefly displays '50.H' or '60.H' to indicate the frequency (50 or 60Hz) of the incoming mains supply. Check that the mode LEDs 'A' and 'F'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



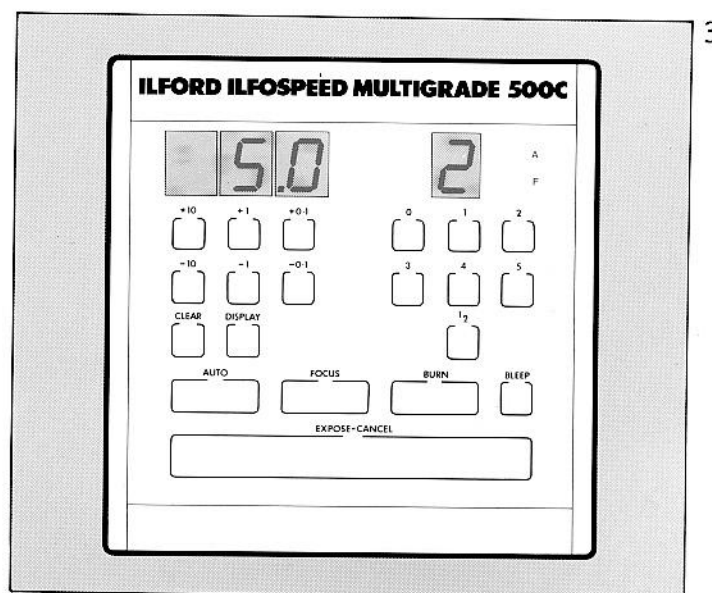
If the frequency of the available mains supply is lower than 45Hz or higher than 65Hz, the control unit displays 'HELP'. To cancel 'HELP', switch off at the power supply unit.

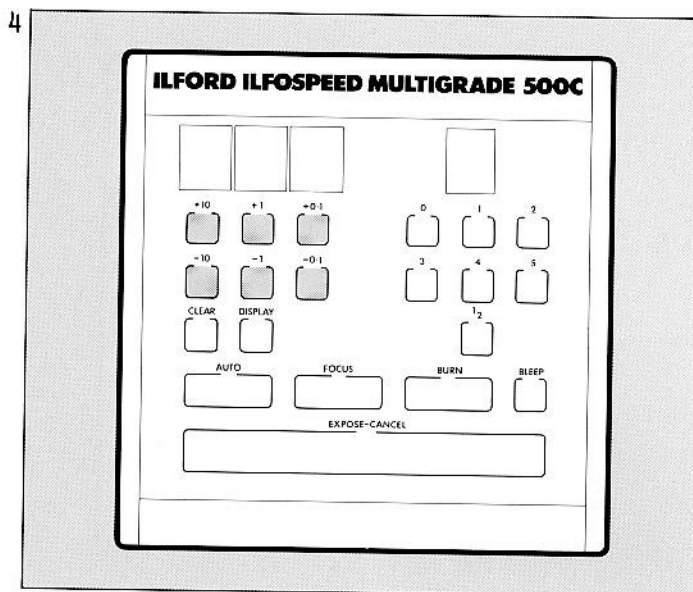
Note

If the displays fail to illuminate, see section 12.2.

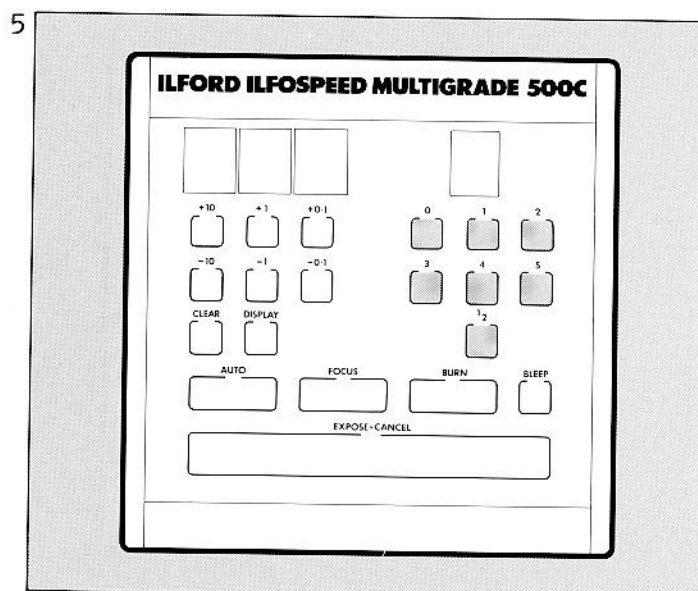


The information in operation 1 is displayed for approximately one second. The display then changes to '5.0' and '2' indicating five seconds at grade two. The 'A' and 'F' LEDs remain illuminated until the control unit is selected to carry out a specific function.





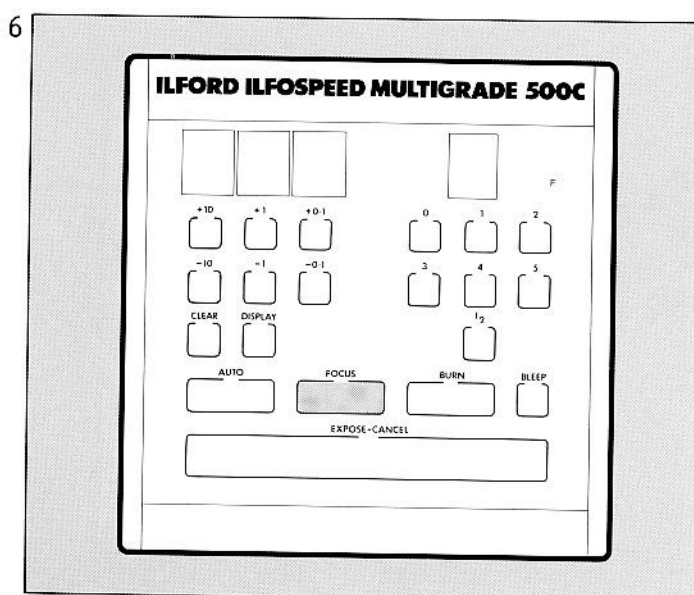
Operate the timer switch pads in turn and observe that the timer display reads correctly.



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.

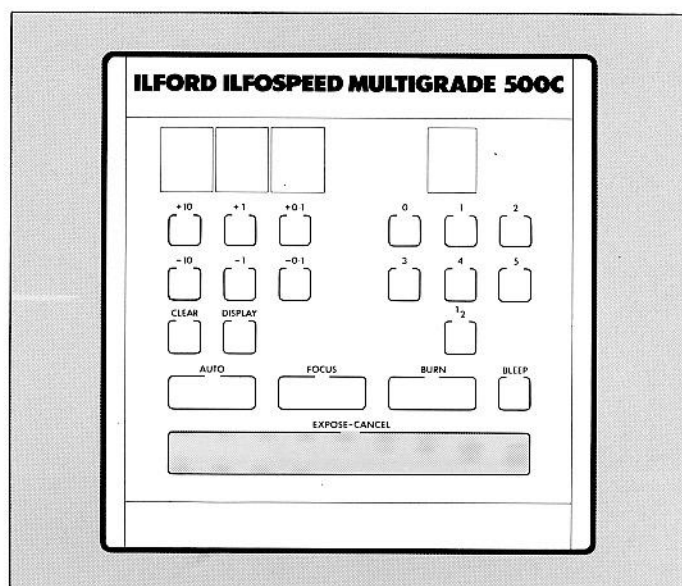
WARNING

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

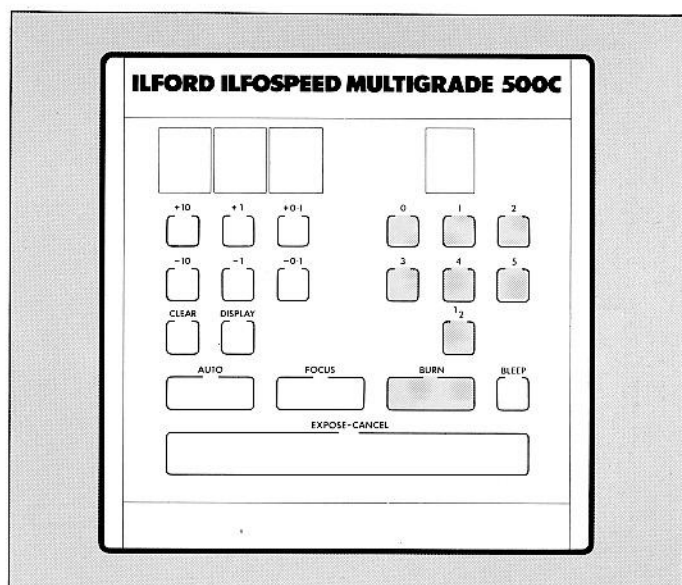


Touch the 'focus' switch pad. Observe both enlarger lamps are illuminated, and the mode display reads 'F' only.

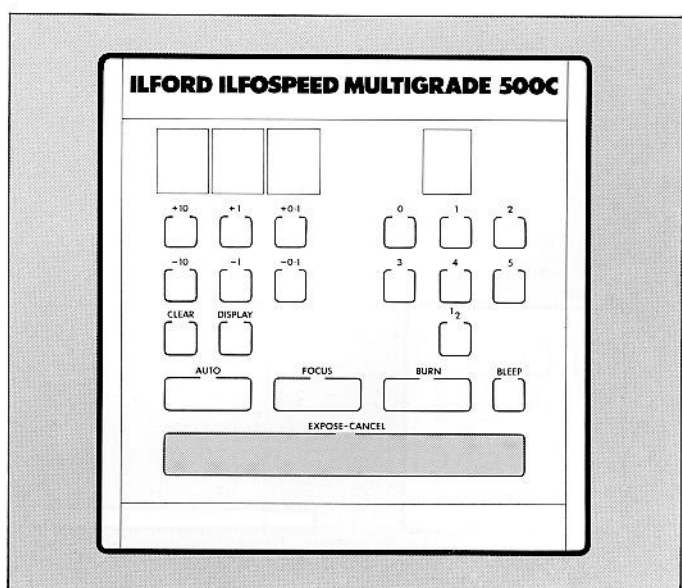
Touch the
'expose/cancel' switch
pad. Observe both 'A'
and 'F' mode
indicators switch off.



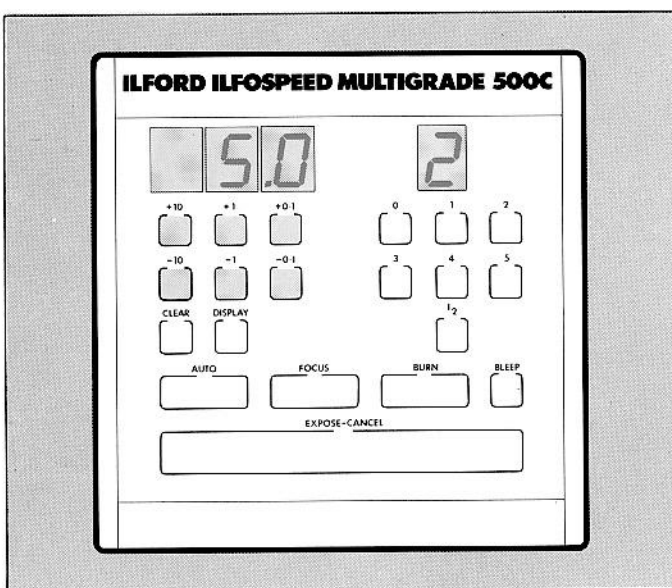
Touch the 'burn'
switch pad and select
each grade 0-5. Check
the lamps operate
correctly:
Press grade 0 - green
lamp only.
Press grade 5 - blue
lamp only.
Press any other grade
- proportional amounts
of green and blue
light.



Touch the
'expose/cancel' switch
pad.



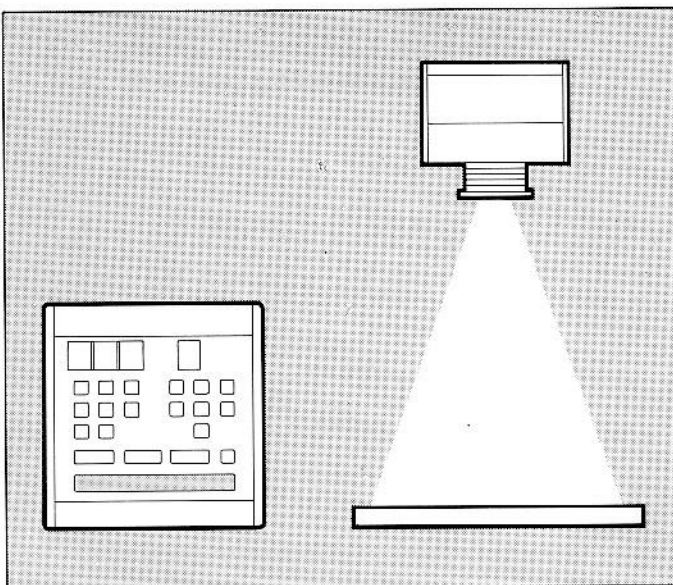
10



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.

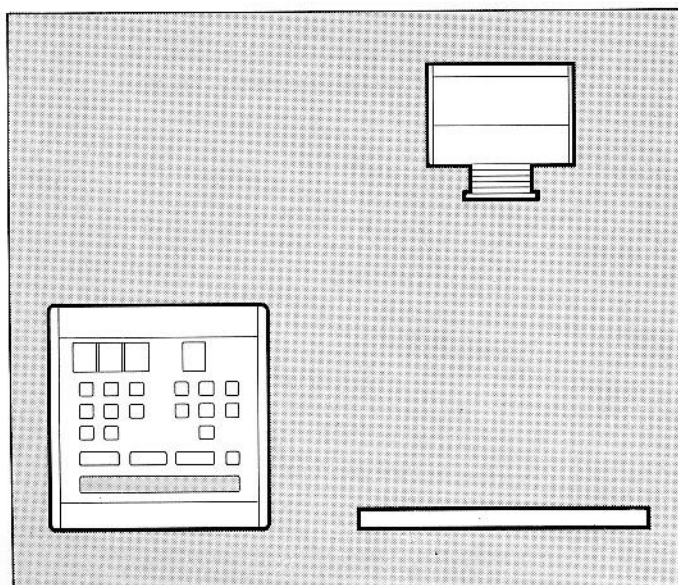
Alternatively, retaining pressure on the switch pad causes the numbers to roll over in sequence.

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



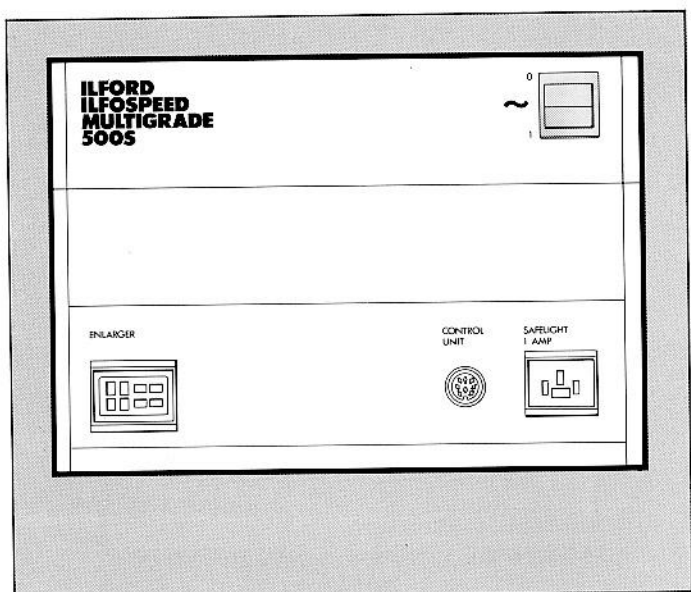
Repeat operation 11. At any time during timer countdown, touch the 'expose/cancel' switch pad again. Observe the enlarger lamps are extinguished.

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

Standard print

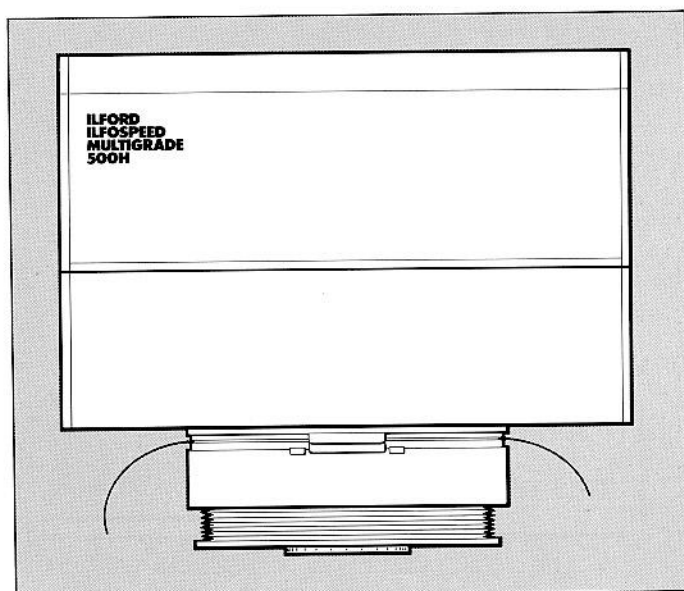
Ensure the correct light mixing box is in position in the enlarger head (see section 2.2). Set the mains switch (symbol ~) on the power supply unit to the '1' position.

9.1



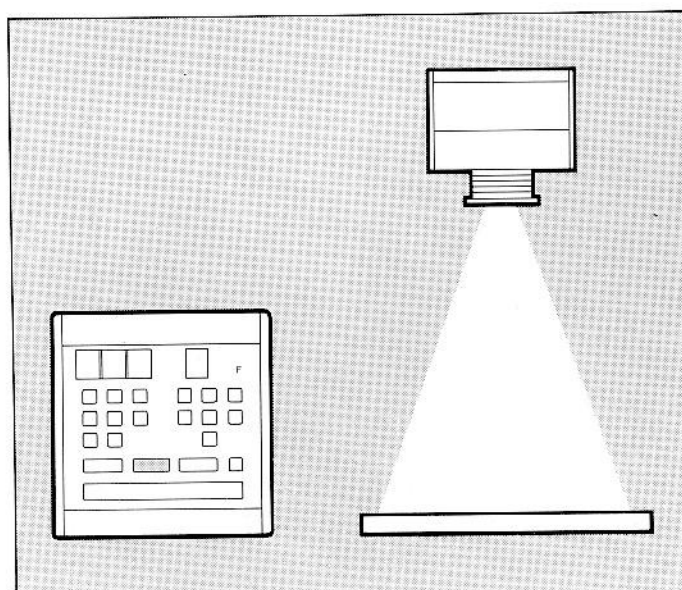
Position the negative in the enlarger negative carrier.

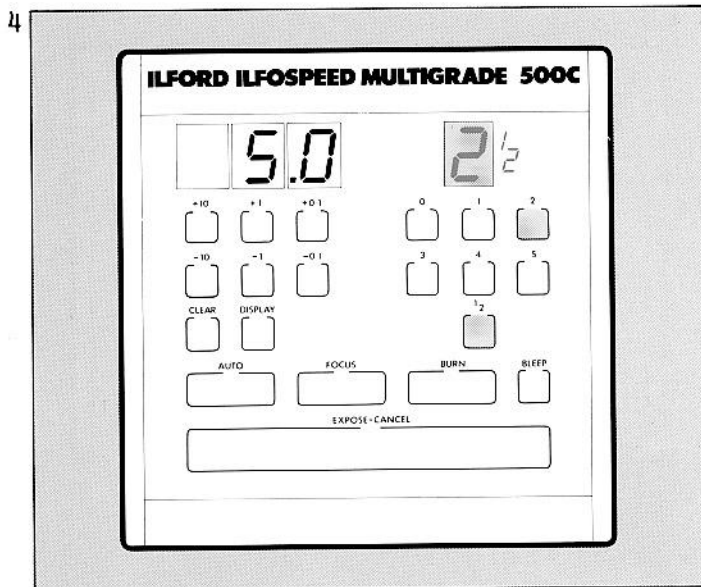
2



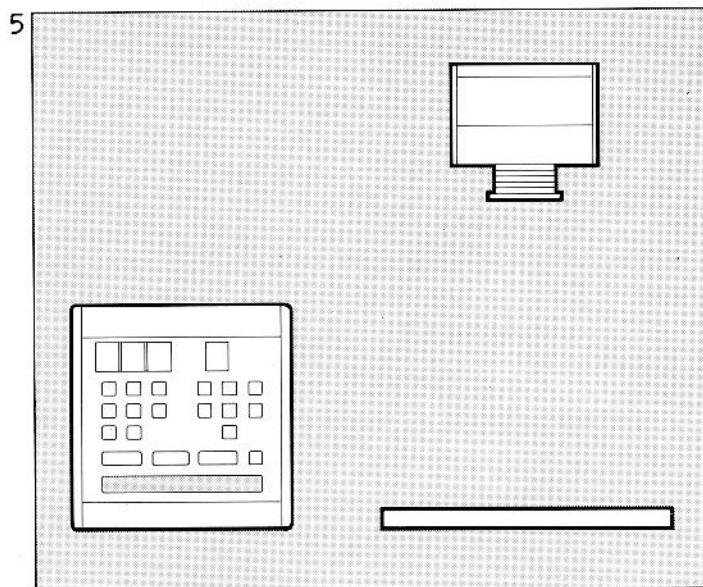
Touch the 'focus' switch pad. Light suitable for focusing, composition and assessment of exposure and contrast is produced by the enlarger head.

3

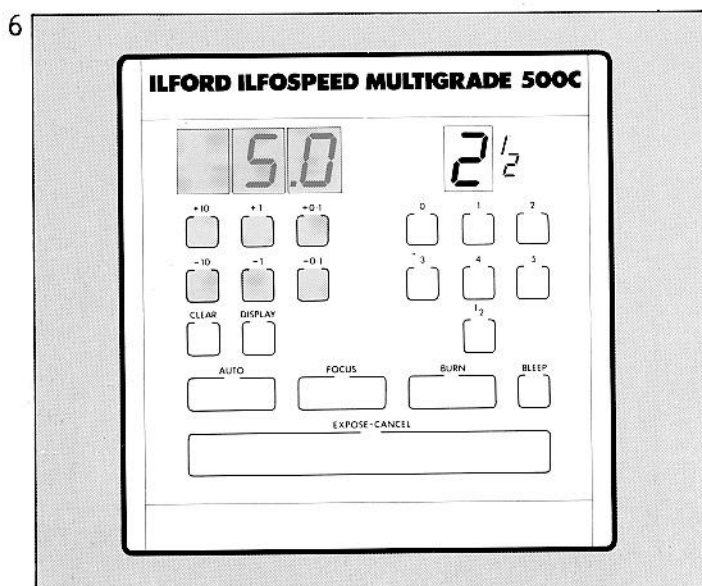




Select the contrast required. For example, to make prints from negatives normally requiring grade 2 ILFOBROM or ILFOSPEED paper, touch contrast switch pad 2. For negatives requiring finer contrast control between the usual grades, use the half grade switch pad.

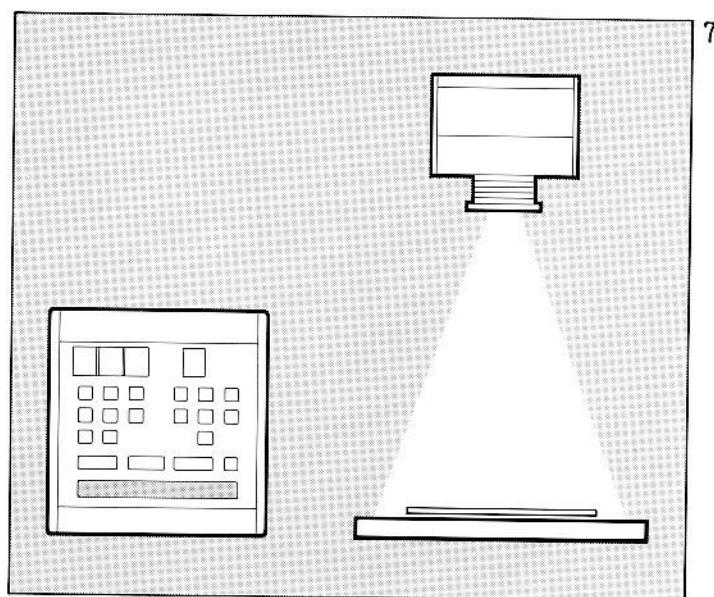


Touch the 'expose/cancel' switch pad to switch off the enlarger lamps.



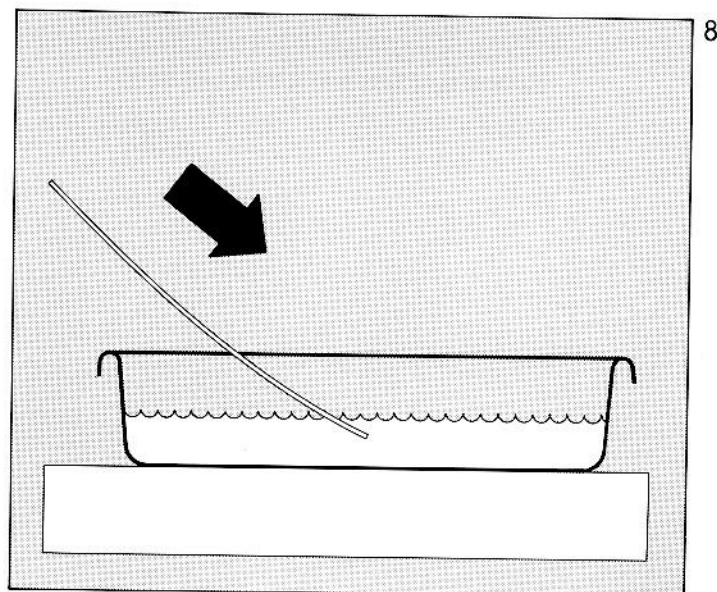
Set the estimated exposure time (see section 8, operation 10).

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.

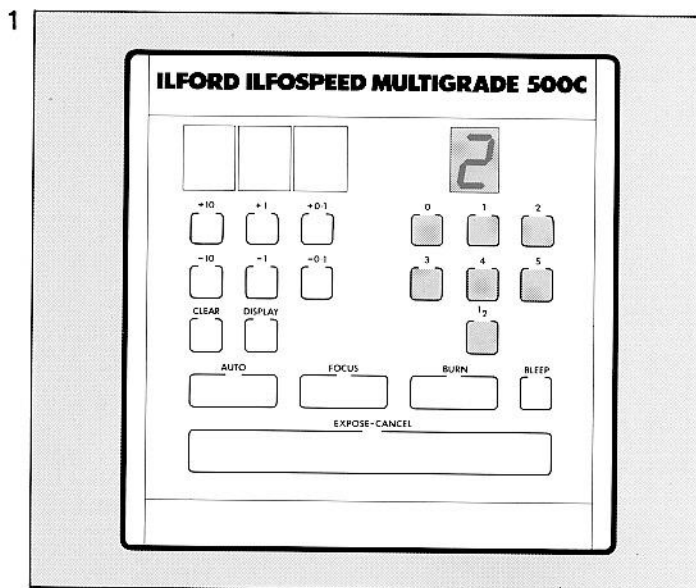
Check the print for
density. If necessary,
correct the exposure
time on the control
unit and make another
print.



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.



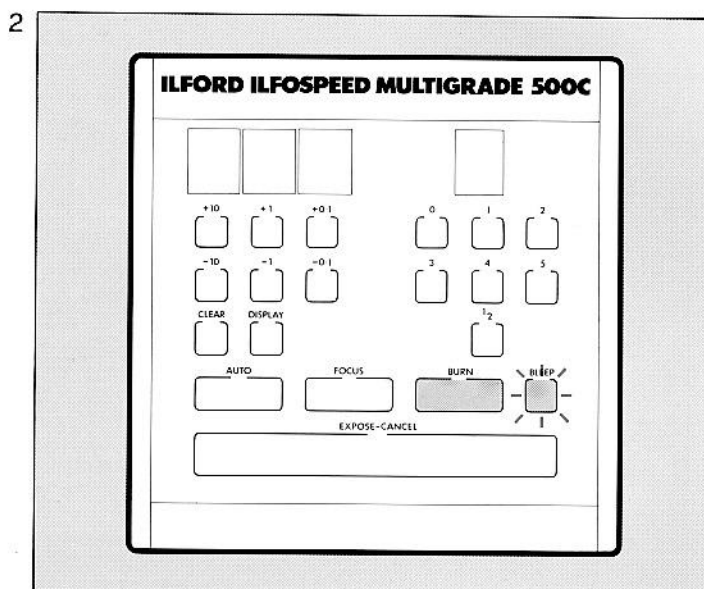


9.2 Burning in

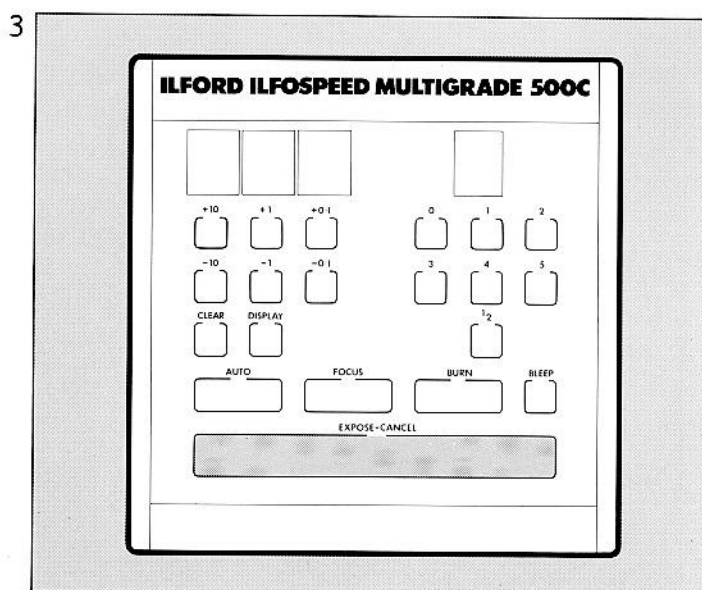
Select the required grade.

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

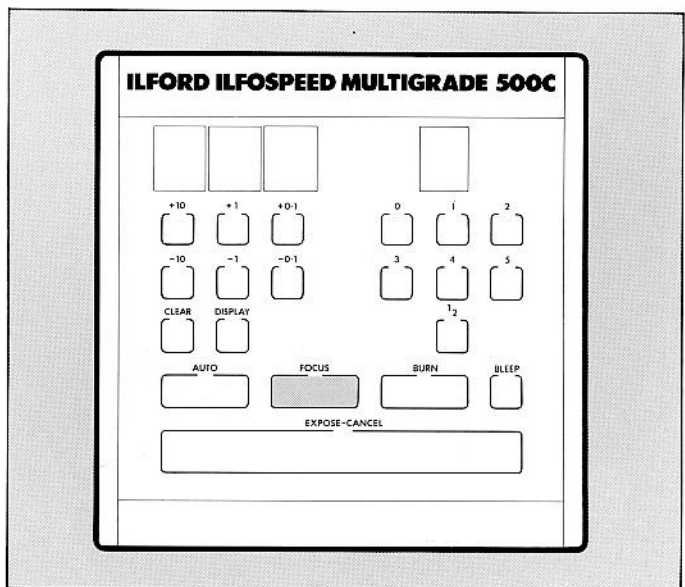
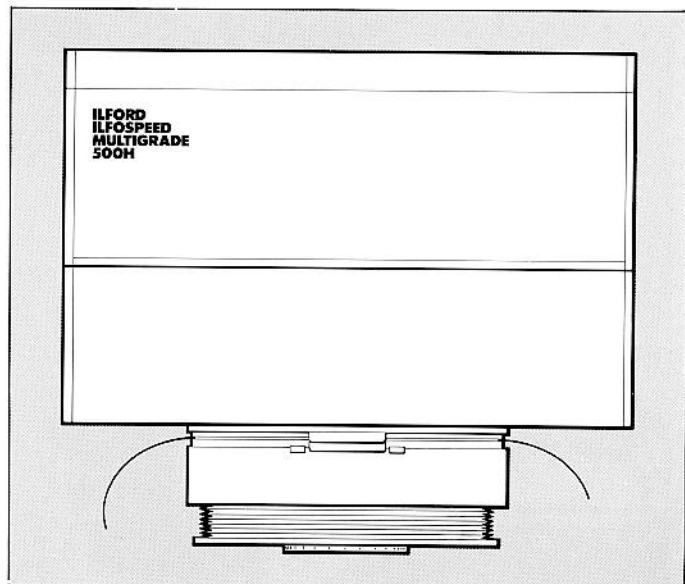
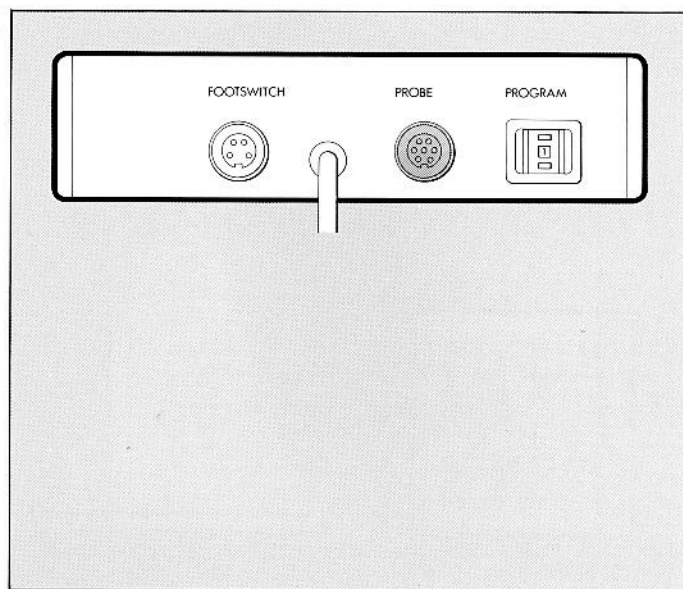
Automatic assessment of exposure is made using the ILFOSPEED MULTIGRADE 500P exposure probe.

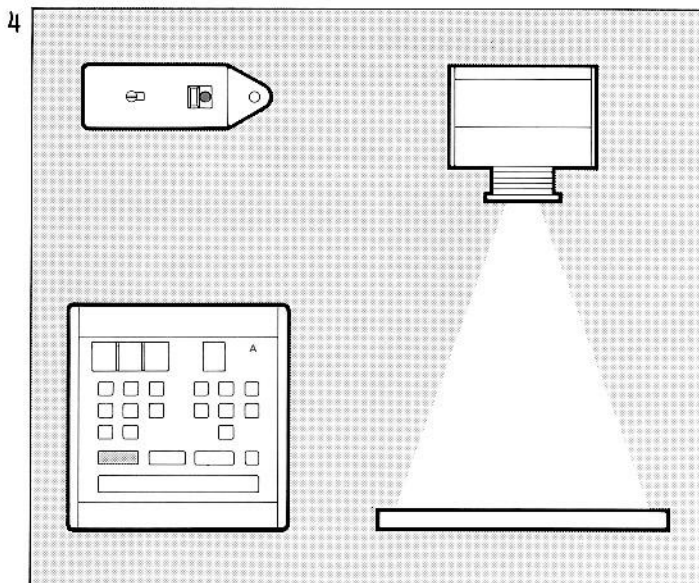
Connect the exposure probe multipin plug to the 'probe' socket located on the control unit rear panel and tighten the securing ring.

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

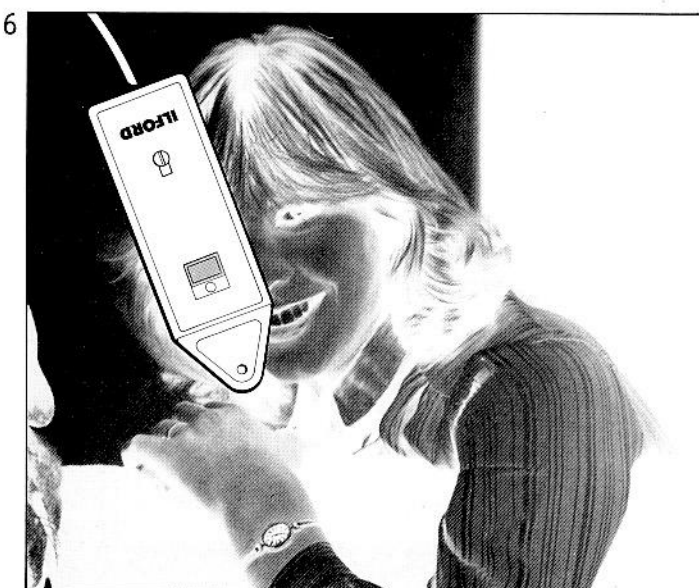




Touch the 'auto' switch pad on the control unit. The enlarger lamps and the red LED on the probe switch on automatically, and 'A' is indicated on the control unit mode display.

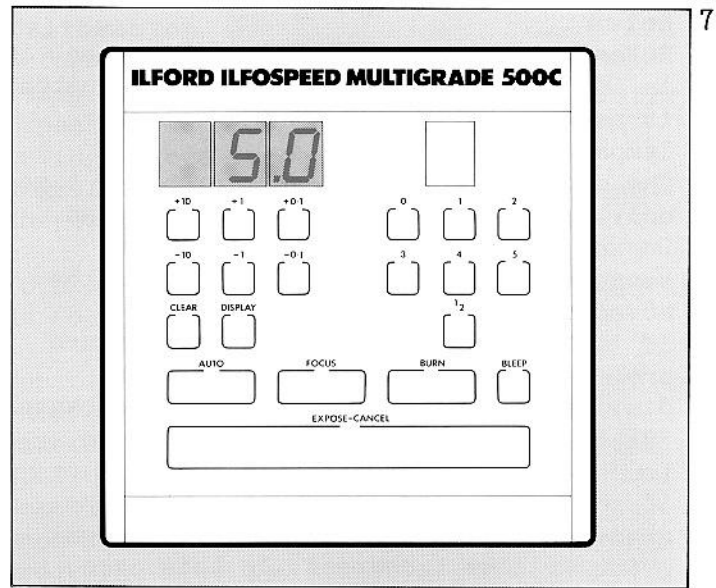


Position the probe photocell in a shadow area where you wish to retain detail on the final print. For accurate measurements, position the exposure probe in the centre of the projected image whenever possible.

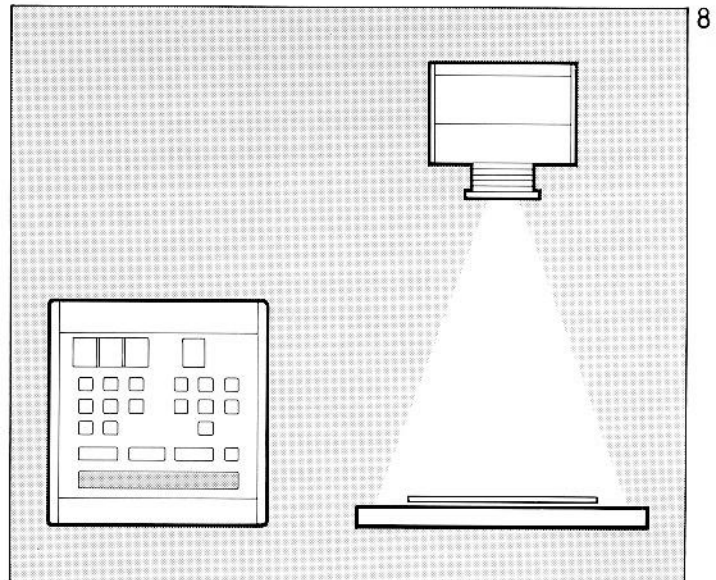


Press the probe black button and release to start the measurement cycle.

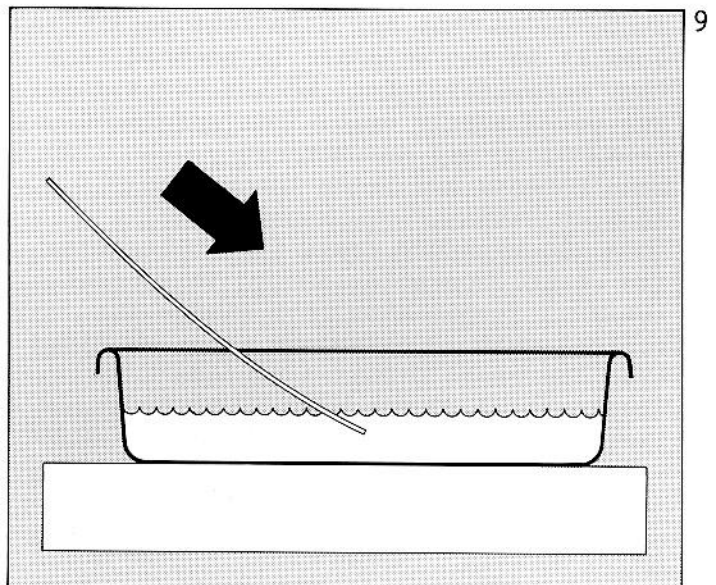
The calculated exposure time is displayed on the control unit after about 5 seconds. 'A' switches off on the control unit mode display, and print making can begin.



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.



Process the exposed paper.



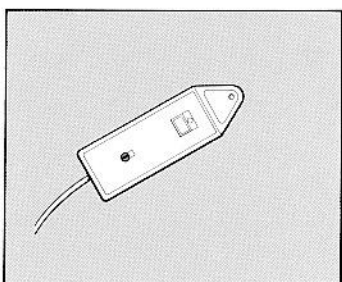
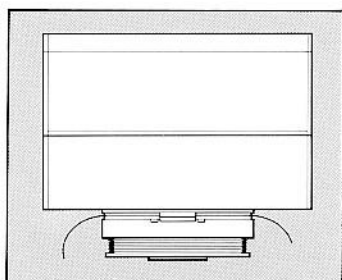
Notes

- 1 Before working with the exposure probe, it is important to ensure the program switch is set correctly to suit the enlarger lamps (see section 3.7).
- 2 The exposure probe assesses exposure time only. The grade selected is unaffected.
- 3 During the measurement cycle of five seconds, the exposure probe must not be moved.
- 4 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.
- 5 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.
- 6 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.
- 7 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).
- 8 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 4 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 3-9.
- 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 Calibration may require adjustment if any of the external processes are altered, for example, a change from machine to dish processing.
- 2 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.

Note

The five seconds taken by the exposure probe to carry out measurements is a mean value, obtained with the probe calibration knob set to position 5. The actual measurement time varies between 3.6 and 6 seconds corresponding to the probe calibration knob extreme positions 0 and 9 respectively.

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.

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 should there be any problems with the equipment; 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

13.1 Enlarger head

Dimensions	Height 216mm Width 316mm Depth 173mm
Weight	3kg excluding light mixing 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	4 30x15x2mm thick heat absorbing glass
Colour filters	2 25x25x1mm thick. One a blue and one a green dichroic interference filter coating on glass substrate. Tempered for maximum stability. Cut-off frequencies are selected for optimum grade range with 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 2°C
Light mixing boxes	Three sizes available for negative sizes: up to 35mm (small), from 35mm to 6x7cm (medium) and from 6x7cm to 4x5 inches (large)
	Note Light mixing boxes are supplied as part of the adaptor kit to suit each enlarger

13.2 Control unit

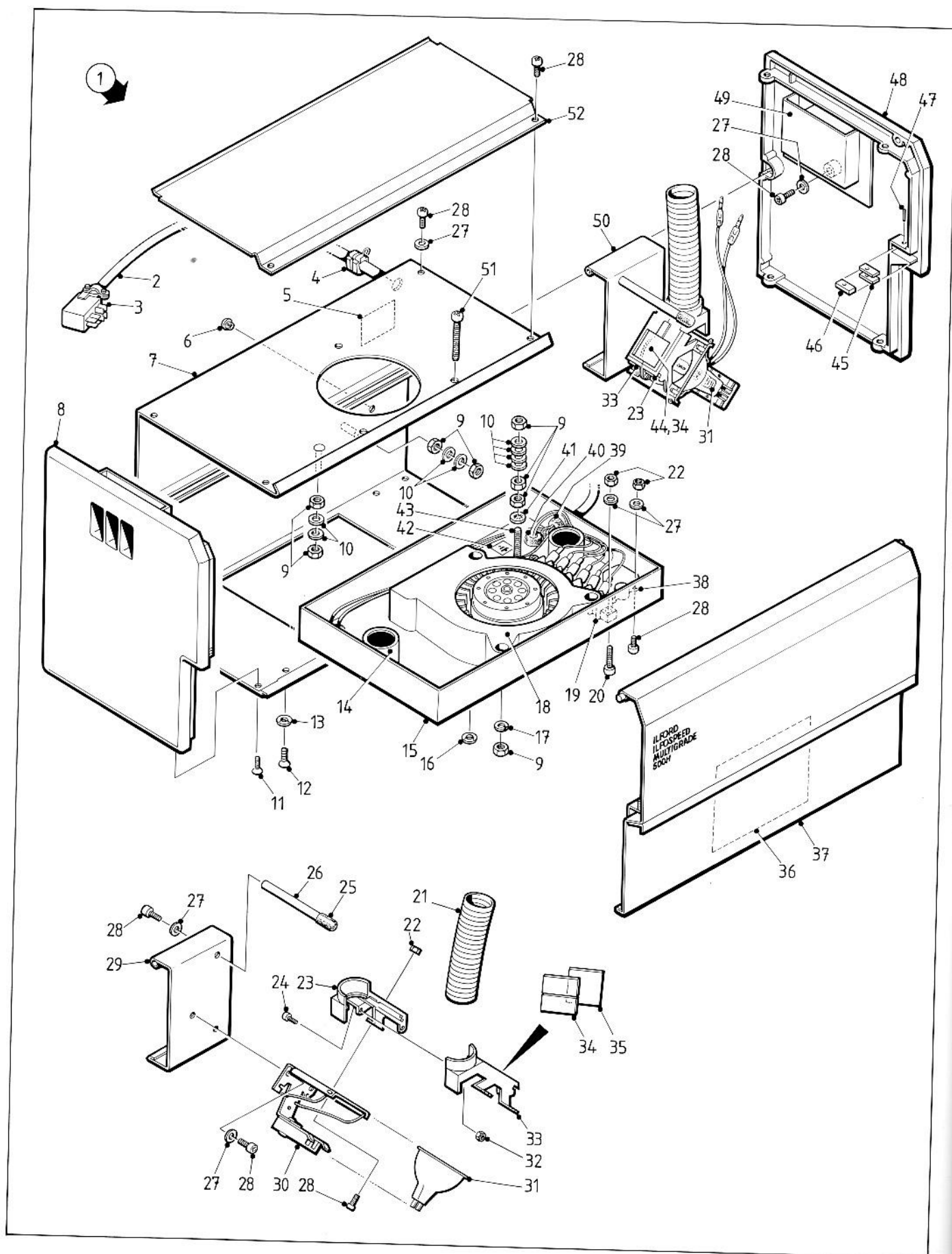
Dimensions	Height	46mm
	Width	186mm
	Depth	192mm
Weight	1.2kg	
Construction	Black stoved aluminium alloy extrusion with zinc die-cast end plates	
Electrical cable	Multicore	
	Length	1.2m
Controls	<p>Listed below. Operation of each is by an illuminated switch pad. There is bleep confirmation of switch pad operation at all times</p> <p>Exposure time - 0-99.9 seconds in steps of 0.1 seconds</p> <p>Grade - 0-5 in half grade steps</p> <p>Note</p> <p>With auto not selected, exposure times remain the same right through the grades</p> <p>Auto - selects the operating mode for using the exposure probe</p> <p>Focus - switches on both lamps in the enlarger head for focusing, assessment and composition</p> <p>Burn - extends the exposure time for burning in</p> <p>Bleep - selects the optional audible signal to operate once every second during exposure time countdown or when burning in</p> <p>Expose/cancel - starts or cancels exposure, focus and burn</p>	
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 Fuse rating (supply voltage selector) is 4A (for 220V and 240V) and 6.3A (for 120V). All fuses are slow blow	
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 $\pm 4\%$	

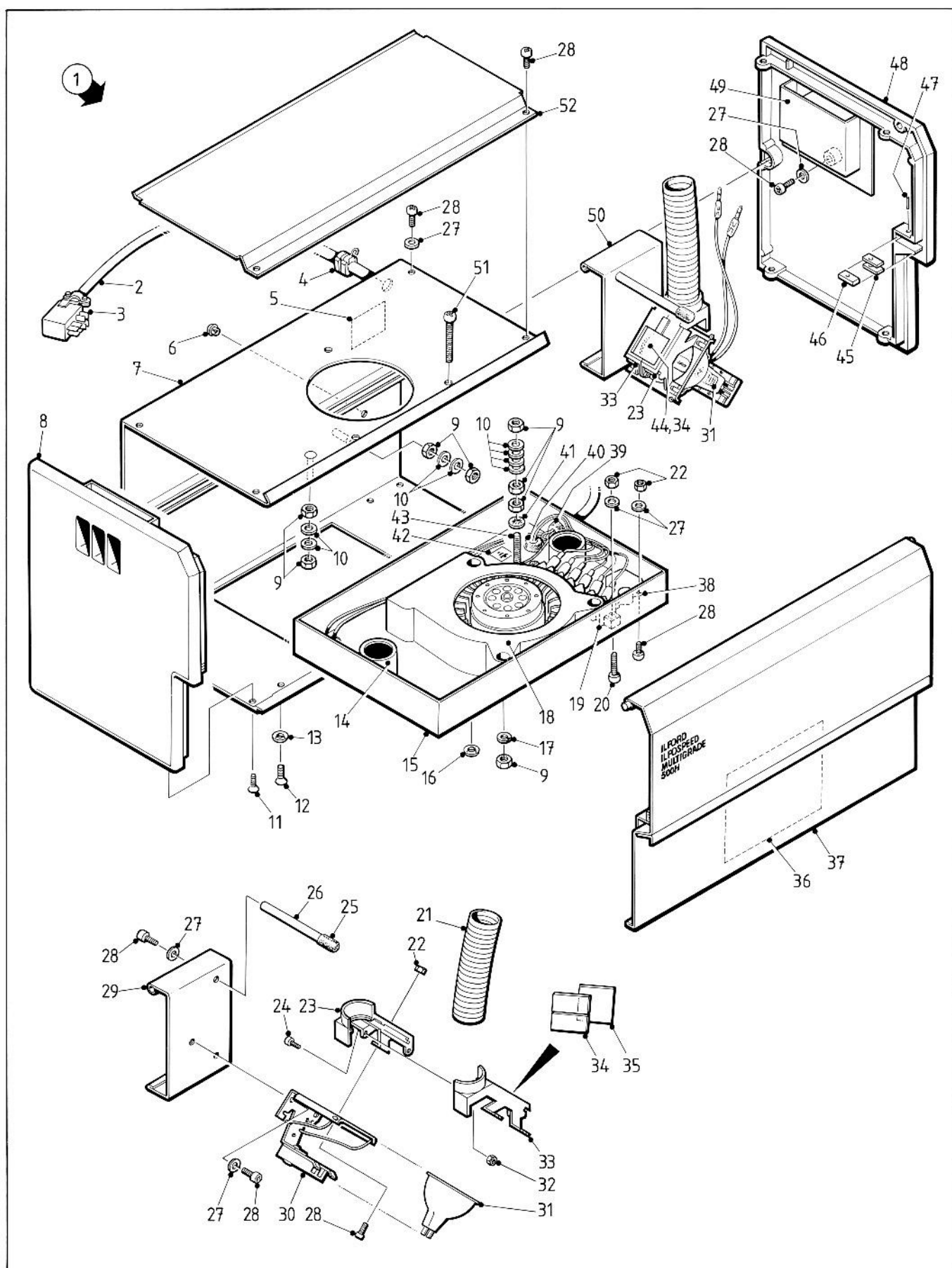


Tables 14.1 to 14.3, along with their associated figures, detail all spare parts that are available. When ordering spare parts, please quote both part number and GIN number, in order that ILFORD Limited may process your order quickly and efficiently.

14.1 Enlarger head

Ref no. on fig.	Part no.	GIN no.	Description	Quantity
14.1				
1	6068-0-001	1470677	ILFOSPEED MULTIGRADE 500H enlarger head	1
2	81335312	1471238	Cable	1
3	86618520	1471397	10A plug	1
4	81334709	1471227	Strain relief bush	1
5	6065-4-112	1471667	Serial number label	1
6	83425602	1471269	Plug (blanking)	2
7	6068-1-141	1471546	Top section	1
8	6068-2-143	1471601	End cap, left hand	1
9	86203904	1471379	Hex nut, M4	10
10	89730454	1471489	Washer, plain, M4	8
11	87990402	1471403	Screw, countersunk head, M3x6mm	4
12	87990447	1482140	Screw, countersunk head, M4x6mm	4
13	89730666	1483767	Washer, cup, no.8 screw gauge	4
14	6068-4-145	1471690	Tube retainer	2

Continued overleaf



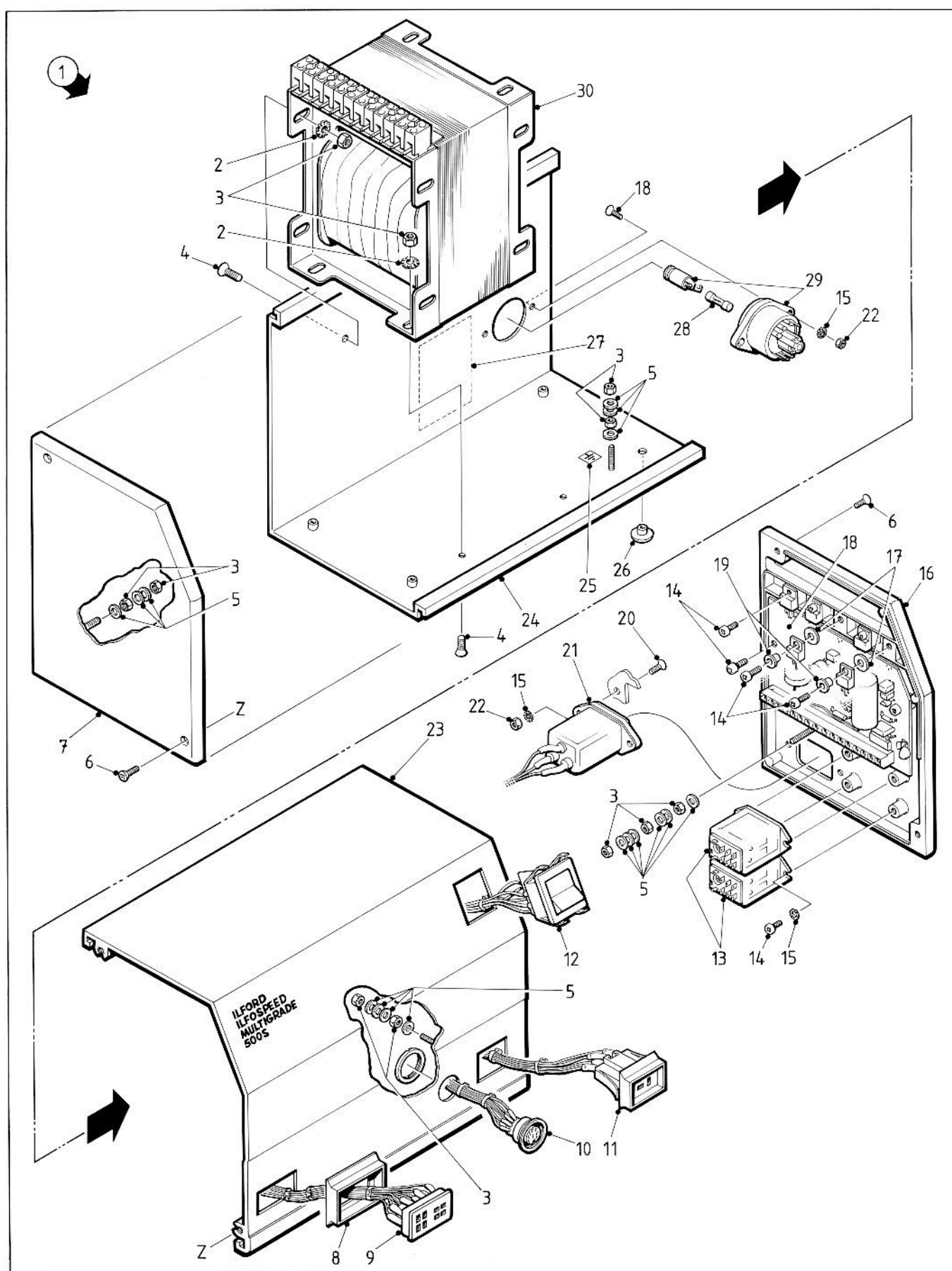
14.1 Enlarger head (continued)

Ref no. on fig. 14.1	Part no.	GIN no.	Description	Quantity
15	6068-2-144	1471612	Fan tray	1
16	89730665	1471513	Washer, cup, no.6 screw gauge	6
17	89730474	1471502	Washer, spring, M4	3
18	83419205	1471250	Fan	1
19	89013013	1471469	Terminal strip	1
20	87992726	1471436	Screw, pan head, M3x16mm	2
21	81339300	1471249	Flexible steel conduit	2
22	86203903	1471360	Hex nut, M3	8
23	6068-2-114	1471580	Filter holder, right hand	2
24	87992714	1471425	Screw, pan head, M2.5x6mm	4
25	83425603	1471278	Ferrule, PVC	2
26	6068-4-134	1471678	Slide post	2
27	89730453	1471205	Washer, plain, M3	14
28	87992722	1471216	Screw, pan head, M3x6mm	18
29	6068-3-146	1471634	Lamp slide, left hand	1
30	6068-4-005	1471656	Lampholder assembly	2
31	84677111	1471337	Lamp, 120V 150W	2
32	86203902	1471359	Hex nut, M2.5	4
33	6068-1-115	1471535	Filter holder, left hand	2
34	83425803	1471304	Filter, heat	4
35	83425802	1471296	Filter, green (left hand side)	1
36	6068-4-135	1471689	Warning label	1
37	6068-2-004	1471579	Door assembly	1
38	89014402	1471470	Thermal cut out	1
39	83883504	1471315	Grommet (reference no. A453)	1
40	83883505	1471326	Grommet (reference no. A2313)	2
41	89730576	1473386	Washer, shakeproof, M4	1
42	85268401	1471348	Earth label	1
43	87989775	1471414	Screw, pan head, M4x20mm	1
44	83425801	1471287	Filter, blue (right hand side)	1
45	6068-4-150	1471711	Magnet side plate	4
46	6068-4-149	1471700	Magnet	2
47	87997604	1471458	Pin, spring, 2mmx12mm	2
48	6068-1-142	1471557	End cap, right hand	1
49	6068-3-126	1471623	Light trap	2
50	6068-3-147	1471645	Lamp slide, right hand	1
51	87992756	1471447	Screw, pan head, M4x30mm	3
52	6068-2-133	1471599	Fan cover	1
53+	6068-2-002	1471568	Wiring loom	1

Note

All screws, nuts and washers are zinc plated steel.

+ items not illustrated



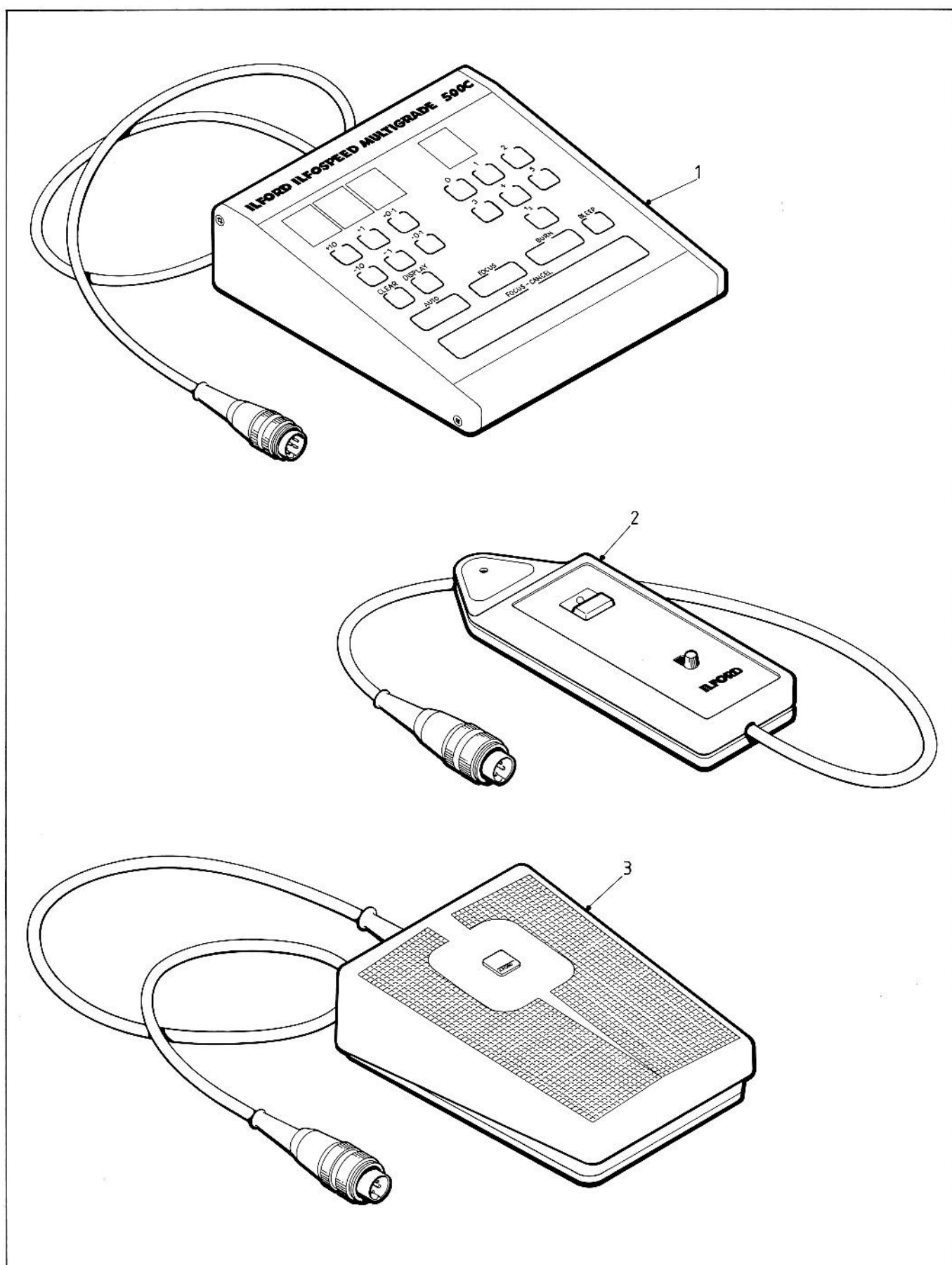
14.2 Power supply unit

Ref no. on fig. 14.2	Part no.	GIN no.	Description	Quantity
1	6066-0-001	1470688	ILFOSPEED MULTIGRADE 500S power supply unit	1
2	89730576	1473386	Washer, shakeproof, M4	4
3	86203904	1471379	Hex nut, M4	13
4	87990905	1473317	Screw, countersunk head, M4x10mm	4
5	89730454	1471489	Washer, plain, M4	16
6	87992724	1473339	Screw, pan head, M3x10mm	4
7	6066-2-103	1473193	End cap, left hand	1
8	6066-3-109	1473207	Socket shroud	1
9	86618521	1473267	10A socket	1
10	86618514	1473249	8-pin socket	1
11	86618526	1473276	3-pin socket	1
12	87998610	1473340	Rocker switch	1
13	87560611	1473285	Relay	2
14	87992721	1473328	Screw, pan head, M3x5mm	11
15	89730575	1473377	Washer, shakeproof, M3	8
16	6066-1-104	1473175	End cap, right hand	1
17	82956902	1478299	Insulation washer	2
18	6066-2-002	1473184	Printed circuit board	1
19	82956901	1478280	Insulation bush	2
20	87990879	1473306	Screw, countersunk head, M3x12mm	4
21	86618519	1473258	Power inlet filter	1
22	86203903	1471360	Hex nut, M3	4
23	6066-1-102	1473166	Facia extrusion	1
24	6066-1-101	1473157	Base extrusion	1
25	85268401	1471348	Earth label	4
26	83425601	1473230	Foot	4
27	6066-4-106	1473218	Mains label	1
28	83421212	1473229	Fuse, 4A	1
29	89569101	1473368	Supply voltage selector	1
30	6066-P-005	1473416	Transformer subassembly	1
31+	6066-2-003	1478244	Wiring loom	1

Note

All screws, nuts and washers are zinc plated steel

+ items not illustrated



14.3 General

Ref no. on fig. 14.3	Part no.	GIN no.	Description	Quantity
1	6065-1-001	1470666	ILFOSPEED MULTIGRADE 500C control unit	1
2	6067-1-001	1474459	ILFOSPEED MULTIGRADE 500P exposure probe	1
3	6115-3-001	1470709	ILFOSPEED MULTIGRADE 500F footswitch	1
4+	6071-P-004	1471744	Mains lead kit, North America	1
5+	6071-P-003	1471733	Mains lead kit, Europe	1
6+	6071-P-001	1471722	Mains lead kit, UK	1
7+	6071-P-005	1471755	Mains lead kit, free	1
8+	6071-3-002	1470699	Extension lead, enlarger head to power supply unit	1
9+	6106-1-001	1474367	Adaptor kit, Omega Super C	1
10+	6111-1-001	1474417	Adaptor kit, Omega C760	1
11+	6096-1-001	1474266	Adaptor kit, Omega D	1
12+	6098-1-001	1474284	Adaptor kit, Leitz IIC	1
13+	6108-1-001	1474385	Adaptor kit, Durst DA900	1
14+	6097-1-001	1474275	Adaptor kit, Durst L900	1
15+	6105-1-001	1474358	Adaptor kit, Durst M800	1
16+	6107-1-001	1474376	Adaptor kit, Durst M805	1
17+	6103-1-001	1474330	Adaptor kit, Durst 138S	1
18+	6101-1-001	1474318	Adaptor kit, Durst L1000	1
19+	6104-1-001	1474349	Adaptor kit, Durst L1200	1
20+	6113-1-001	1474439	Adaptor kit, Durst PRO	1
21+	6109-1-001	1474394	Adaptor kit, LPL 7700	1
22+	6110-1-001	1474406	Adaptor kit, Beseler 23C	1
23+	6094-1-001	1474248	Adaptor kit, Beseler 45C	1
24+	6095-1-001	1474257	Adaptor kit, Agfa Gevaert 60	1
25+	6099-1-001	1474293	Adaptor kit, De Vere 203	1
26+	6100-1-001	1474307	Adaptor kit, De Vere 504	1
27+	6102-1-001	1474329	Adaptor kit, De Vere 54	1

Notes

- 1 Items 4,5 and 6 comprise: mains lead complete with plugs, spare fuse of the correct rating for the supply voltage selector and a safelight plug.
- 2 Item 7 comprises all items detailed in note 1 except a mains plug.

+ items not illustrated