STANDARD XEROX 1385 ~~& 1318~~ EQUIPMENT

DESCRIPTION

INSTALLATION

~~MAINTENANCE~~

RANK XEROX LIMITED

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PART 1
PRINCIPLES OF XEROGRAPHY

Section A - The Xerographic Process

Section B - The 1385/1318 Standard Equipment.

PART 1 is divided into two sections. SECTION A describes the principles of Xerography under two headings: "WHAT IS XEROGRAPHY?" provides the fundamental theory of Xerography and "THE STANDARD EQUIPMENT" shows how this theory is made practical. SECTION B outlines, in general terms, the units which comprise the two sizes of standard equipment and what an operator would do to obtain a stable image on a suitable transfer medium.

SECTION A
THE XEROGRAPHIC PROCESS

WHAT IS XEROGRAPHY?

Xerography is a quick dry image-production process based on well-known principles in electrostatics and photo-conductivity.

1. THE PHOTO-CONDUCTIVE SURFACE

Xerography differs from photography basically, in that for formation of an image, it uses light to produce an electrical change in an insulating photo-conductive surface; whereas photography uses light to produce a chemical change in a photo-sensitive surface. An insulating photo-conductive surface is capable of accepting an electrostatic charge and retaining it in darkness, and of releasing the charge when exposed to light.

When the photo-conductive surface is passed, in darkness, under a fine wire electrode energised with a high d.c. potential, it becomes charged with a uniform electrostatic charge. If the charged photo-conductive surface is then exposed to an illuminated black and white subject, it becomes discharged in the areas corresponding to the white areas on the subject and remains charged in the areas corresponding to the black areas. Thus, a reversed electrostatic image of the subject is formed on the photo-conductive surface.

2. THE IMAGE

The developer used in the Xerographic process is completely dry and consists of two components - toner and carrier. The developer makes use of the electrostatic principle that two bodies having unlike electrical charges (i.e. charges of opposite polarity) are attracted to one another and two bodies having like charges (i.e. of the same polarity) repel one another. Toner is a fine, black, thermostatic powder and is the image-forming ingredient of the developer. The other ingredient, the carrier, consists of comparitively larger, hard, sperical particles, which, by physical contact, induce in the tiny particles of toner powder an electrostatic charge opposite in polarity to their own, and, incidentally, of opposite polarity to the charge on the photo-conductive surface. Thus, the carrier provides two functions; it provides the mass for distribution of the toner over the photo-conductive surface and it ensures that the toner is correctly charged for development of the electrostatic image.

The image is developed by cascading the two-component developer over the photo-conductive surface. As the developer passes over the charged areas, toner is attracted away from the carrier particles by the higher potential of the charged areas to form a reversed image.

3. THE COPY

If the toner image is to be of any use, it must be transferred from the photo-conductive surface to some convenient and usable medium, such as paper.

Assuming paper as the medium used, the paper is brought into contact with the toner image and then given an electrostatic charge opposite in polarity to that of the toner forming the image. The toner image is attracted onto the surface of the paper to produce a black, right-reading image. The paper with the image is then treated in a heated or chemically-vapoured atmosphere to fuse the thermoplastic toner to the surface of the paper resulting in a finished permanent copy.

A residual image remains on the photo-conductive surface after the transfer operation, this is cleaned off before the photo-conductive surface is used again.

The Xerographic Process so far described is carried out by an operator using units of the Standard Equipment. The photo-conductive surface is SELENIUM, which is coated onto a flat highly-polished aluminium sheet. The treated sheet is known as the Xerox Plate.

THE STANDARD EQUIPMENT

1. BASIC STEPS

There are six basic steps in the production of a stable image; they are:-

a. CHARGING the photo-conductive surface of the Xerox plate.

b. EXPOSURE of the charged surface of the illuminated subject through a lens system.

c. DEVELOPING the electrostatic image on the Xerox plate.

d. TRANSFERRING the developed image to the medium (paper, fabric, plastic, etc.)

e. FUSING the image onto the medium.

f. CLEANING the residual image from the Xerox plate.

Four types of units are used to achieve these six steps:-

steps a and d are performed in a CHARGING UNIT
step b is performed in a CAMERA
step c is carried out with the aid of a DEVELOPING TRAY
step e is carried out with a FUSER

and
step f is performed manually.

2. CHARGING UNITS

These units employ a system whereby a Xerox plate is electrostatically charged by means of the corona discharge * surrounding a stainless steel wire grid at high voltage. The wire grid, called a scorotron (or charge bar) is suspended across the width of the Xerox plate, a short distance from it, and passed along its length. The high voltage is developed in a unit known as the E.H.T. Unit (extra-high tension) and this latter unit incorporates the control facilities necessary to adjust the output voltage and current, and to change the polarity of the charge in some models.

* Corona discharge is the ionization of the air (or other gas) surrounding a conductor, and occurs when the voltage applied to a conductor is sufficiently high to cause the ionization but insufficient to cause the breakdown of the insulation of the conductor from earth. Air (or other gas), although a non-conducting medium, will act as a conductor when ionized.

3. CAMERAS

These units are basically large copying cameras with facilities to accept the Standard Xerox plate, to mount and illuminate the subject and to control the shutter open time.

4. DEVELOPING TRAYS

Developing Trays are specially made to accept Standard Xerox plates and to provide means whereby the developer can be cascaded by rocking action over the surface ot the plate. The black toner powder is carried to the electro-static image by the carrier to which it initially adheres to prior to being attracted by the more highly charged image on the plate.

5. FUSERS

Fusers are of two types, the use of either being dependent on the medium on to which the image is transferred. Heat is normally used to fuse the toner powder image, but, if the medium used will be adversely affected by heat, chemical-vapour fusing is employed. Obviously, thermoplastic or other composition, having the same thermal and chemical reactions as the toner powder, forming the image, cannot be used as a transfer medium.

SECTION B
THE 1385/1318 STANDARD EQUIPMENT

GENERAL DESCRIPTION

The Standard Equipment is divided into two sizes, both related to standard writing paper sizes. The 1385 equipment will produce image sizes up to 13" x 8½", while the 1318 equipment will provide images up to 13" x 18" in size.

Early 1318 equipments were designed for use in darkrooms, a typical installation being depicted in Fig. 1B-1. In January, 1962, however, the

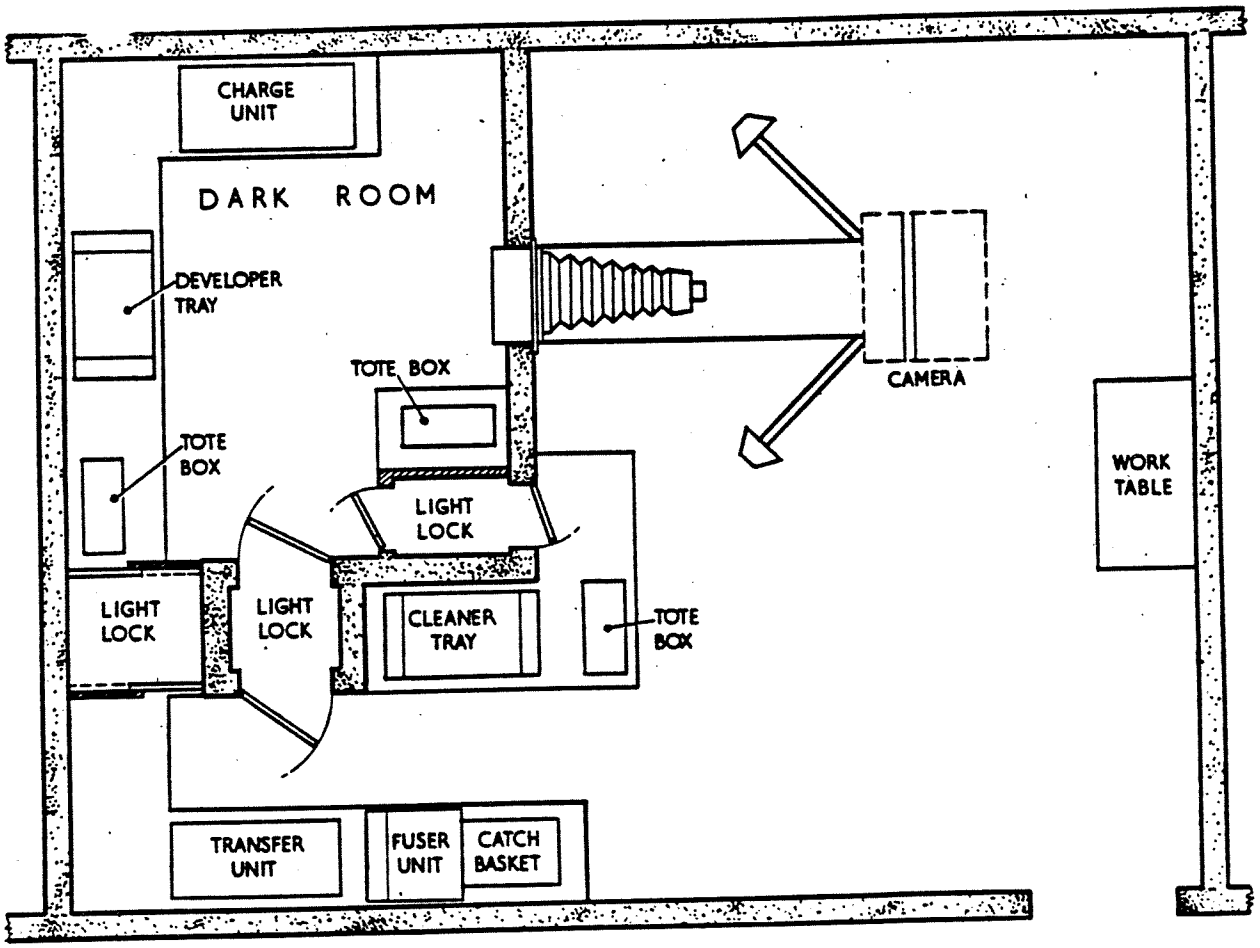


Fig 1B-1. Typical Darkroom Installation.

1318 equipment was re-designed for operation in daylight. Instructions for modification of existing darkroom equipments for daylight operation, if the customer desired it, were issued, but it must be borne in mind that quite a few customers still operate darkroom equipments. It is, therefore, proposed to describe equipments for daylight operation, only deviating to include darkroom units where these differ from the daylight counterparts.

1385 EQUIPMENT

The complete 1385 equipment comprises a Processor, a V.R. (Variable ratio) Camera, an S.S. (Same Size) Camera, a Heat Fuser, a Vapour Fuser and a Metal Master Unit.

Naturally, because the V.R. Camera is capable of enlargement, reduction and 1:1 copying, it is not expected that an S.S. Camera will be included in the same installation. Installations having restricted floor space usually employ the compact equipment, illustrated in Fig. 1B-2. Alternatively,

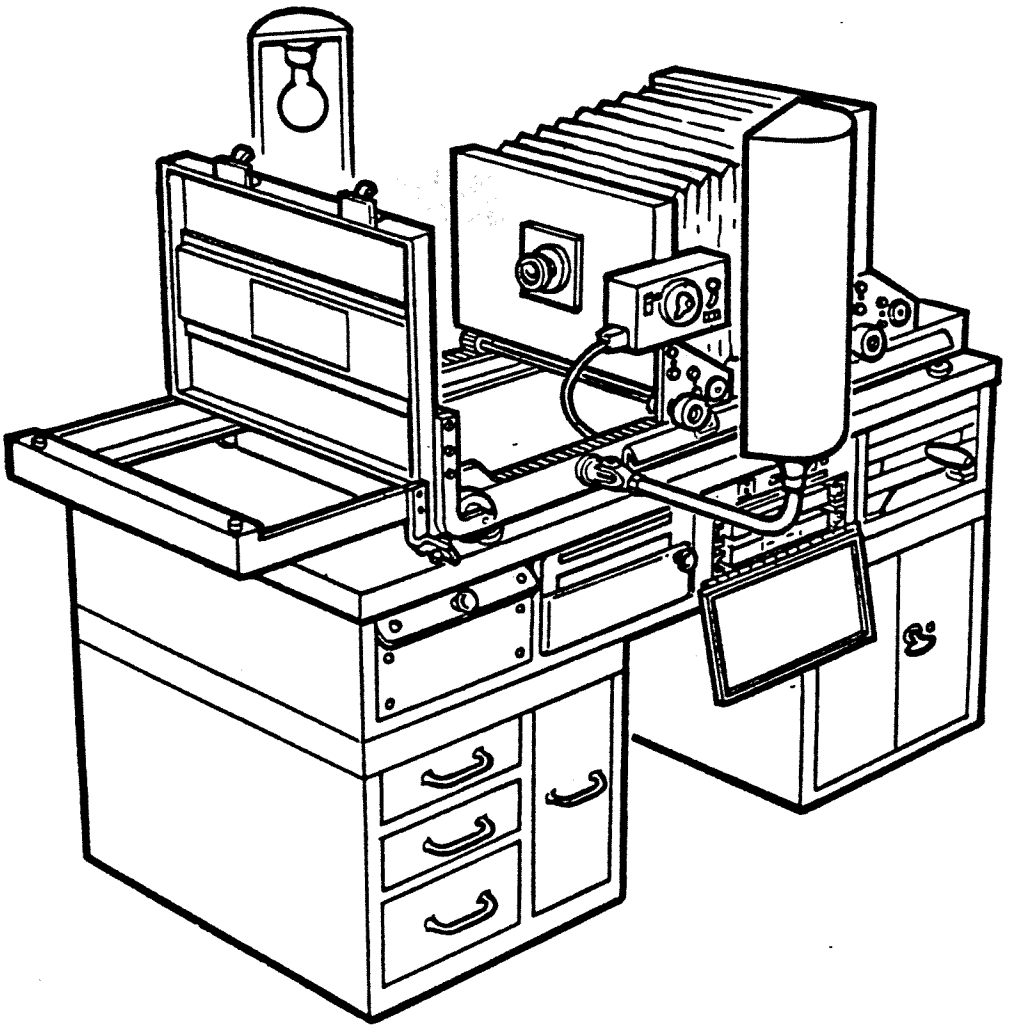


Fig 1B-2. Compact 1385 V.R. Equipment.

a "Same Size" installation is depicted in Fig. 1B-3.

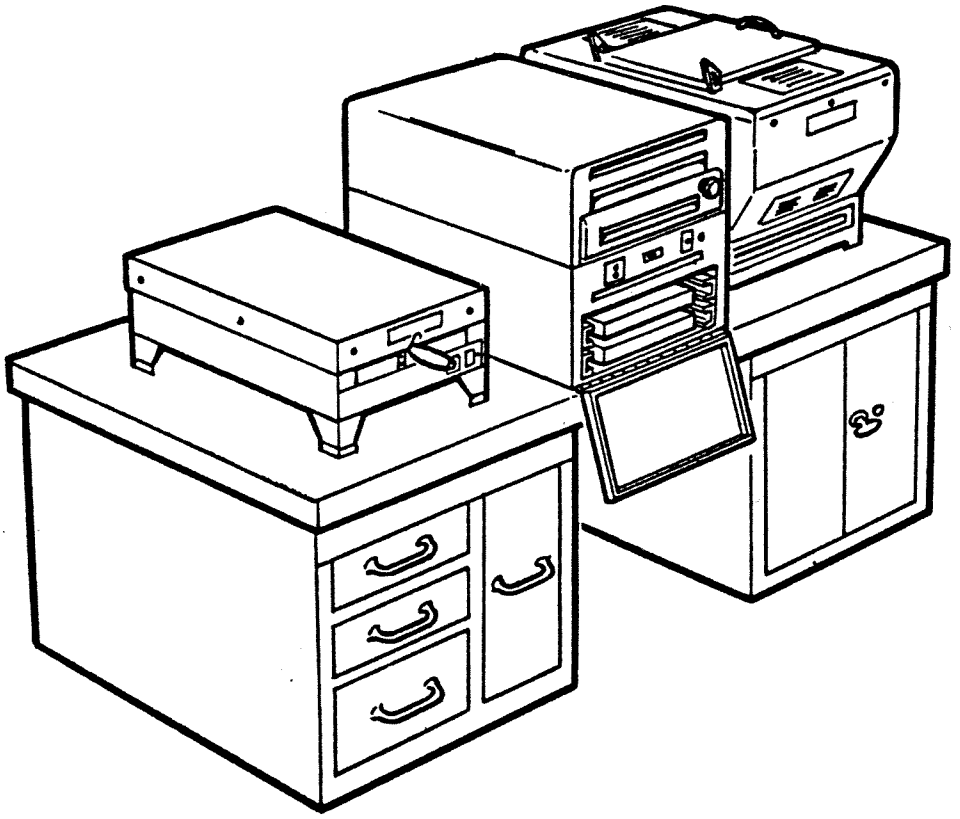


Fig 1-B 3. Compact 1385 S.S. Equipment.

The PROCESSOR is considered the main body of the 1385 equipment because this unit:-

a. has facility to hold six Xerox plates and to dispense these plates in strict rotation, without the need for a record being kept.

b. has a transfer medium dispenser which provides a single sheet at the pull of a knob.

c. charges the Xerox plate evenly and automatically with the push of a button.

d. has developing trays to develop the latent electrostatic image.

e. has positive and negative charge, transfer and clearing facilities under pushbutton control.

Compact equipment installations have the Processor divided into three parts; the plate storage and transfer medium dispenser sections, the charge and developer section and the E.H.T. Unit. These sections are each of

approximately the same height, as are the two fusers, and the five items are distributed in the space between the table top which supports the V.R. Camera and the two pedestal storage cabinets.

The V.R. CAMERA is a large copying camera with a 13" x 8½" image area. The camera is mounted on a rack and pinion mechanism for adjustment of image size and has the shutter controlled by an electromechanical timing unit. Two arms, one projecting either side of the rack bed of the camera, support the subject illuminating lamps and reflectors: the energisation of these lamps is also controlled by the timing unit previously mentioned. A hinged copyboard is mounted at the end of the camera bed; it is rotated to the horizontal position to allow convenient placing of the subject, and to the vertical position for exposure of the plate to the subject.

The S.S. CAMERA is a cabinet with the wide-angle lens focused and set for 1:1 ratio copying. The subject is placed face down on a clear glass platen at the top of the cabinet and the charged Xerox plate is inserted at the bottom. An electromechanical timing device, mounted on the cabinet side, controls the supply to four lamps within the cabinet which illuminate the subject. The camera has no shutter mechanism. Although capable of operation with an image area of 13" x 8½", because of the wide-angle lens used, a certain amount of fall-off of image density is experienced at the edges of this area, and therefore it is advisable to limit the subject area to 12" x 8½".

The HEAT FUSER is a shallow metal case with four electro-resistive heating elements mounted on a metal sheet. An asbestos slide is placed in the space between the insulated bottom of the case and the heated metal sheet. The transfer medium, with the powder image, is placed on the asbestos slide and, together, these are inserted into the heated space in the case. A thermostat is used to control the supply to the heated elements to keep the temperature of the heating chamber constant.

The VAPOUR FUSER is a sloping metal case enclosing a metal grille and a blanket in close proximity to each other. The medium with the transferred image is placed on the grille and the image fixed in the chemical vapour defused from the blanket. The chemical is fed to the blanket by capillary action from a reservoir placed at the base of the fuser case.

The METAL MASTER UNIT is a case with special location facilities for Xerox plate and offset metal master. The metal master is placed and clamped relative to index marks on a specially dimensioned shield, supplied with the unit. The shield, when withdrawn, allows the metal master into contact with the Xerox plate with the developed image. A special brush is provided to enable the transfer to be made with even contact between the metal master and the plate with the developer image. The image is then fused to the metal master surface in the Heat Fuser.

1318 EQUIPMENT

The complete daylight 1318 equipment comprises a Charge/Transfer Unit, a Developing Tray and Cassette, a Heat Fuser and a Vapour Fuser. The complete darkroom equipment includes an additional Charge Unit situated within the darkroom. In addition, the Developing Tray, which is also situated within the darkroom, lacks a Cassette, this not being necessary since it was only introduced to exclude light.

There is no camera included with the 1318 equipment because the customer can make his choice, dependent on the floor space available, and enlarging or reduction factors peculiar to his needs, from several large copying cameras on the market.

The CHARGE/TRANSFER UNIT, illustrated at Fig. 1B-4, is used to initially charge the Xerox plate, transfer the developer image to the medium. and subsequently to charge the used Xerox plate in opposition to

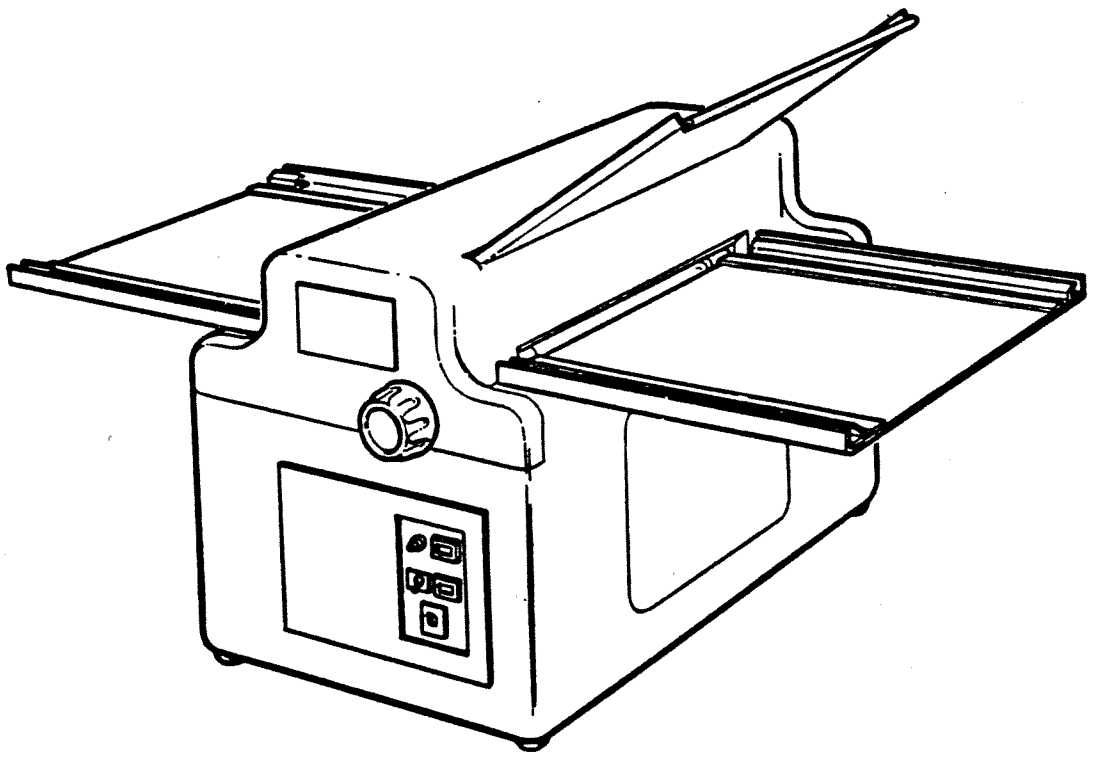


Fig 1B-4. 1318 Charge/Transfer Unit.

the polarity of the initial charge so that the residual image can be released and cleaned from the plate. The darkroom equipment Charge Unit is nearly the same as the Charge/Transfer Unit, but lacks the transfer facility and the means of reversing the polarity of the charge, these latter functions being performed with the aid of the Transfer Unit situated outside the

darkroom. The early Transfer Unit is identical in facility to the present Charge/Transfer Unit, only lacking the Cassette location brackets and catch necessary for daylight operation.

The DEVELOPING TRAY AND CASSETTE, depicted in Fig. 1B-5, provide a lightproof means of cascading the developer over an exposed plate so that the latent electrostatic image is covered with toner, the density of which is dependent on the potential of the charge remaining on the plate. The dark-room equipment does not have the Cassette, and the developing unit differs in as much as the cascading is performed openly, the lightproofing facilities being unnecessary.

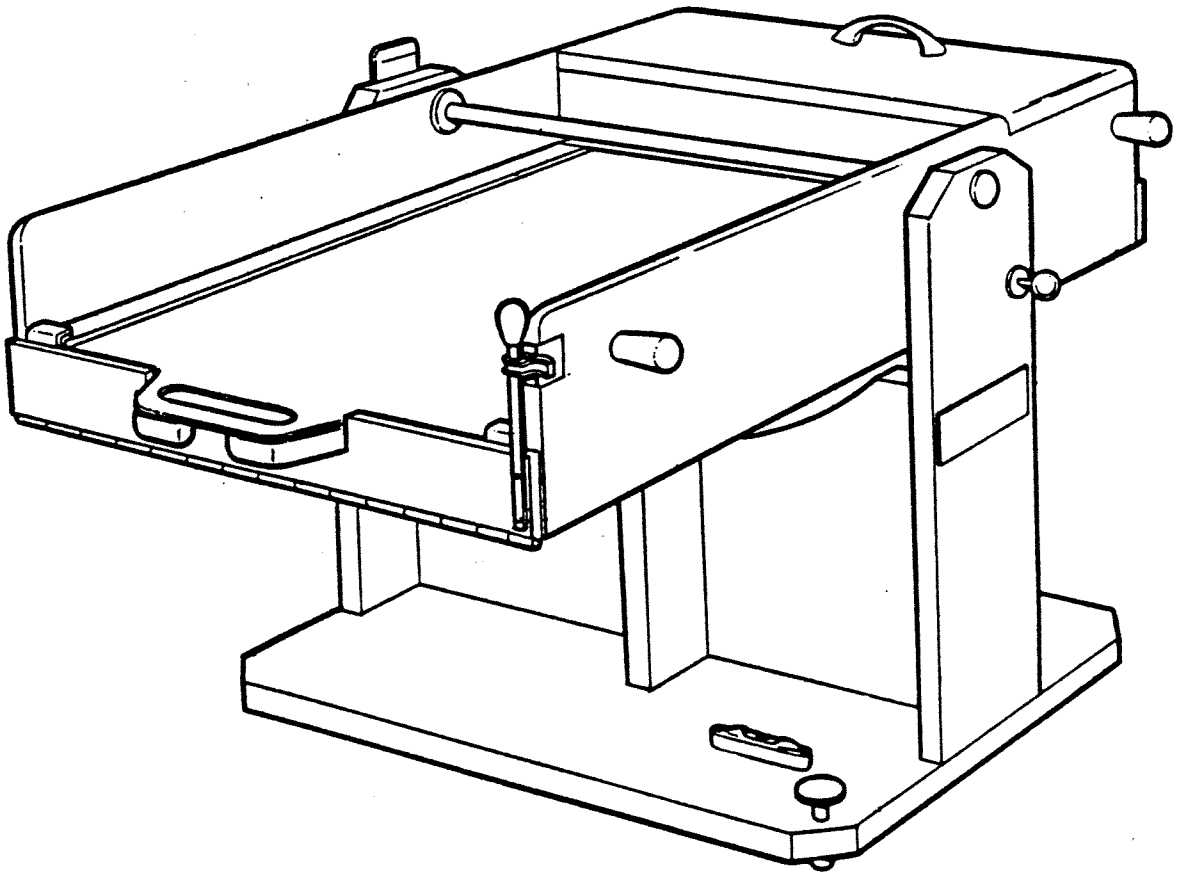


Fig 1B-5. 1318 Developing Tray & Cassette.

The HEAT FUSER, shown in Fig. 1B-6, is a cabinet enclosing an inclined chamber which passes between thermal insulation and thermostatically-controlled electro-resistive heating elements. Within the chamber the transferred image is fused to the surface of the medium, and the operation of a lever releases the transfer medium at the lower end of the chamber. Besides a heater control ON/OFF switch and indicator lamp, an electro-mechanical timer with control switch and indicator lamp are fitted to the fuser cabinet side. This timer may be used to time the camera exposure and the fusing period.

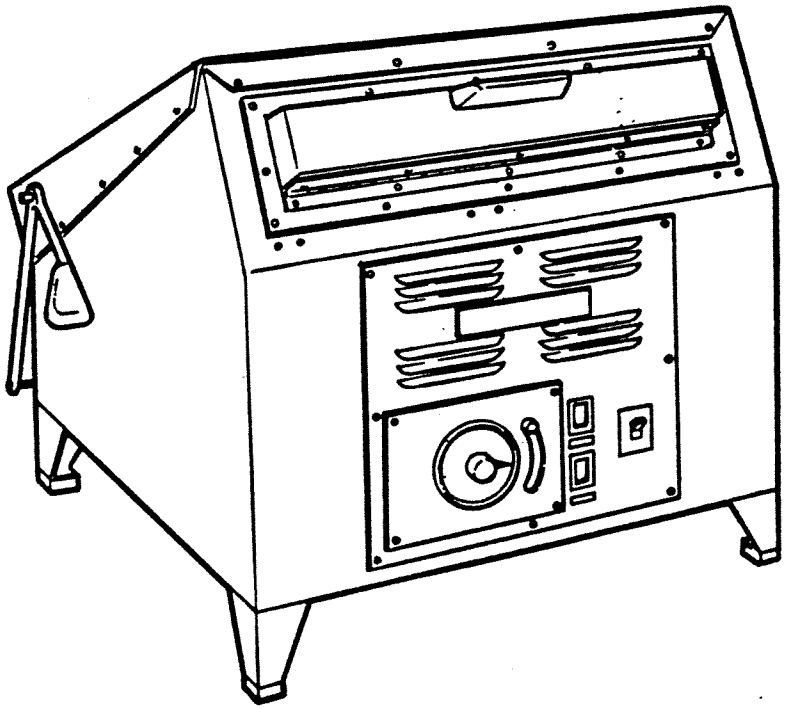


Fig 1B-6. 1318 Heat Fuser

The VAPOUR FUSER, as Fig. 1B-7 shows, is a sloping metal case. The case encloses a metal grille and a blanket in close proximity to each other. The medium with the transferred image is placed on the grille and the image fixed in the chemical vapour defused from the blanket. The chemical is fed to the blanket by capillary action from a reservoir in the base of the fuser case.

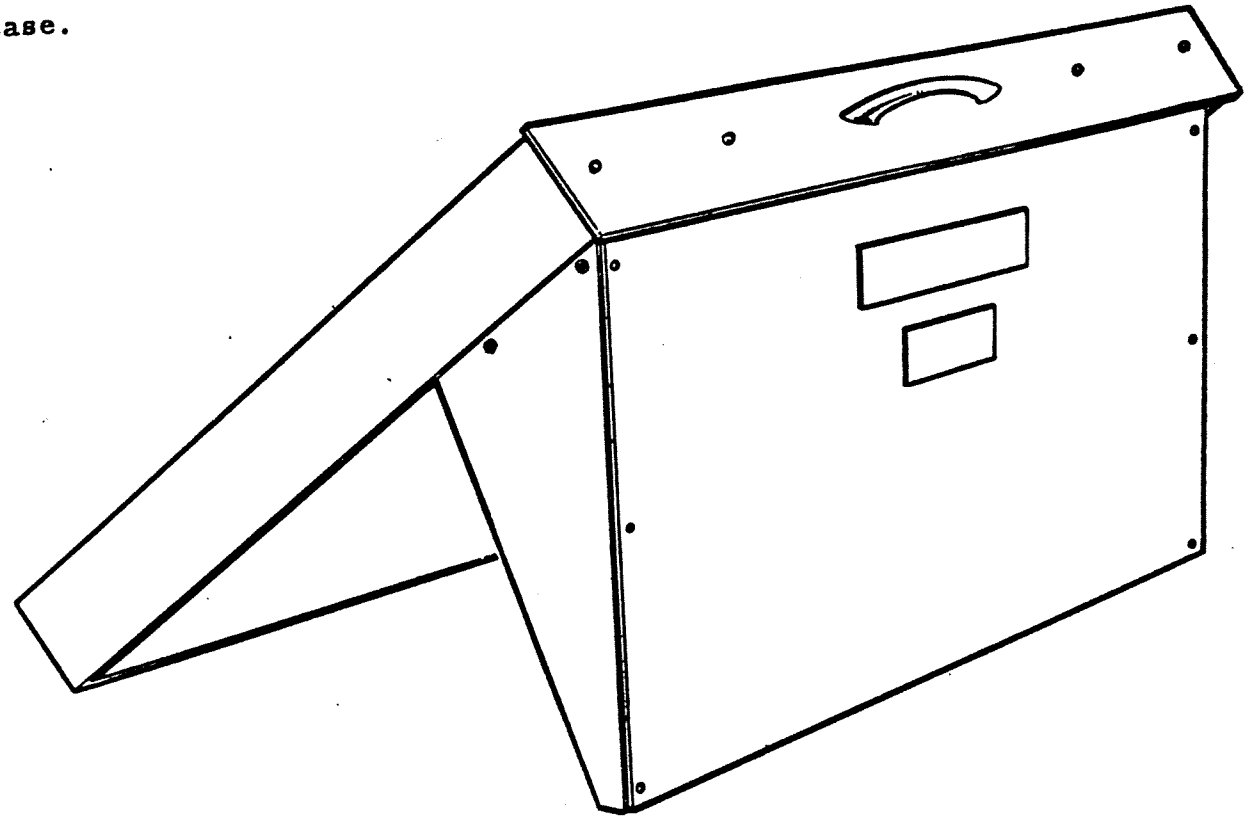


Fig 1B-7. 1318 Vapour Fuser.

GENERAL DESCRIPTION OF STANDARD XEROGRAPHY
(See the flow diagram Fig. 1B-8).

A Standard Xerox plate is placed in the charging unit where an electrode (the steel wire charging element) is at a potential of about 7.5kV The corona discharge which results is directed towards the selenium coating of the plate by a screen (or director grid) maintained at a lower potential (about 600V) than the electrode. The assembly, having the charging electrode only, by usage, is called a 'corotron' and a corotron fitted with a director screen, by usage, is called a 'scorotron'. The charged plate, protected from ambient light during the transit between the charger and camera, is placed in the camera and exposed to the illuminated subject through the lens system for a period of about five times that normally employed for photographic plates, assuming all other conditions as common (e.g., V.R. Camera, high-contrast black and white subject, lens aperture f.22, exposure time 30 sec.)

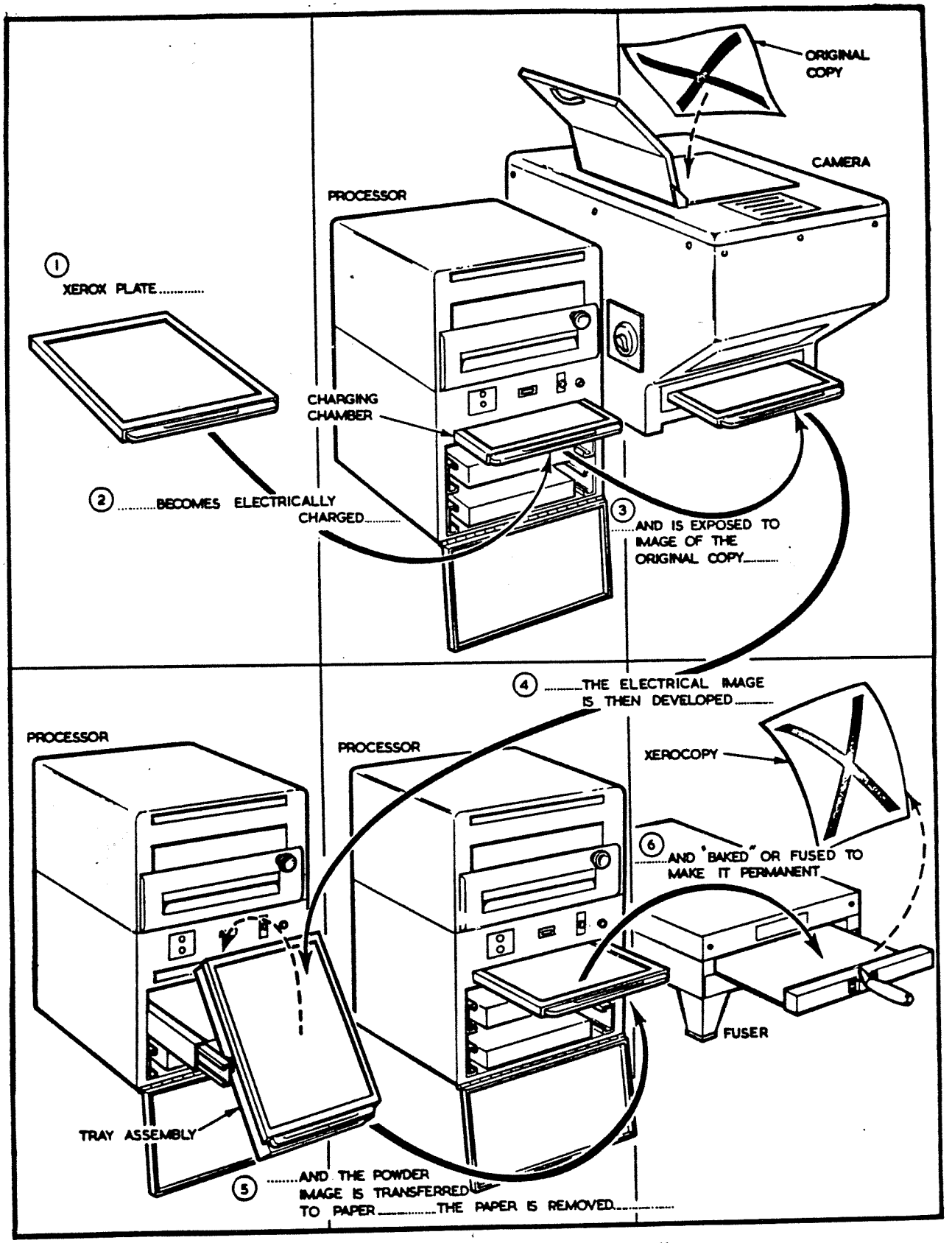


Fig 1B-8. Standard Xerography Flow diagram.

The plate, with the latent electrostatic image, again protected from ambient light during transit, is removed to a developing tray and the developer cascaded over the selenium so that the black toner powder adheres to the selenium surface in varying density dependent on the immediate spot potential of the charge remaining on the plate.

The plate, with the developed image, is next placed in the charging unit and the image transferred to the medium by electrostatic attraction caused by the scorotron. The transferred image is then hardened on the surface of the medium in a fuser, heat or vapour.

The plate with the residual image, after transfer, is then charged under the scorotron with a potential of opposite polarity to that used to obtain the initial image attraction, and the loosened residual image then wiped off

PART 2
INSTALLATION OF 1385 EQUIPMENT

Section A - Processor and E.H.T. Unit

Section B - V.R. Camera

Section C - S.S. Camera

Section D - Heat Fuser

Section E - Vapour Fuser

Section F - Compact Equipment

Section G - Metal Master Unit and Final Operational Tests

PART 2 is divided into seven sections and deals with the installation of units of the 1385 equipment. SECTION G concludes the subject by referring to the Metal Master Unit, the installation of which only amounts to unpacking, and providing functional checks for a completed installation.

SECTION A
PROCESSOR AND E.H.T. UNIT

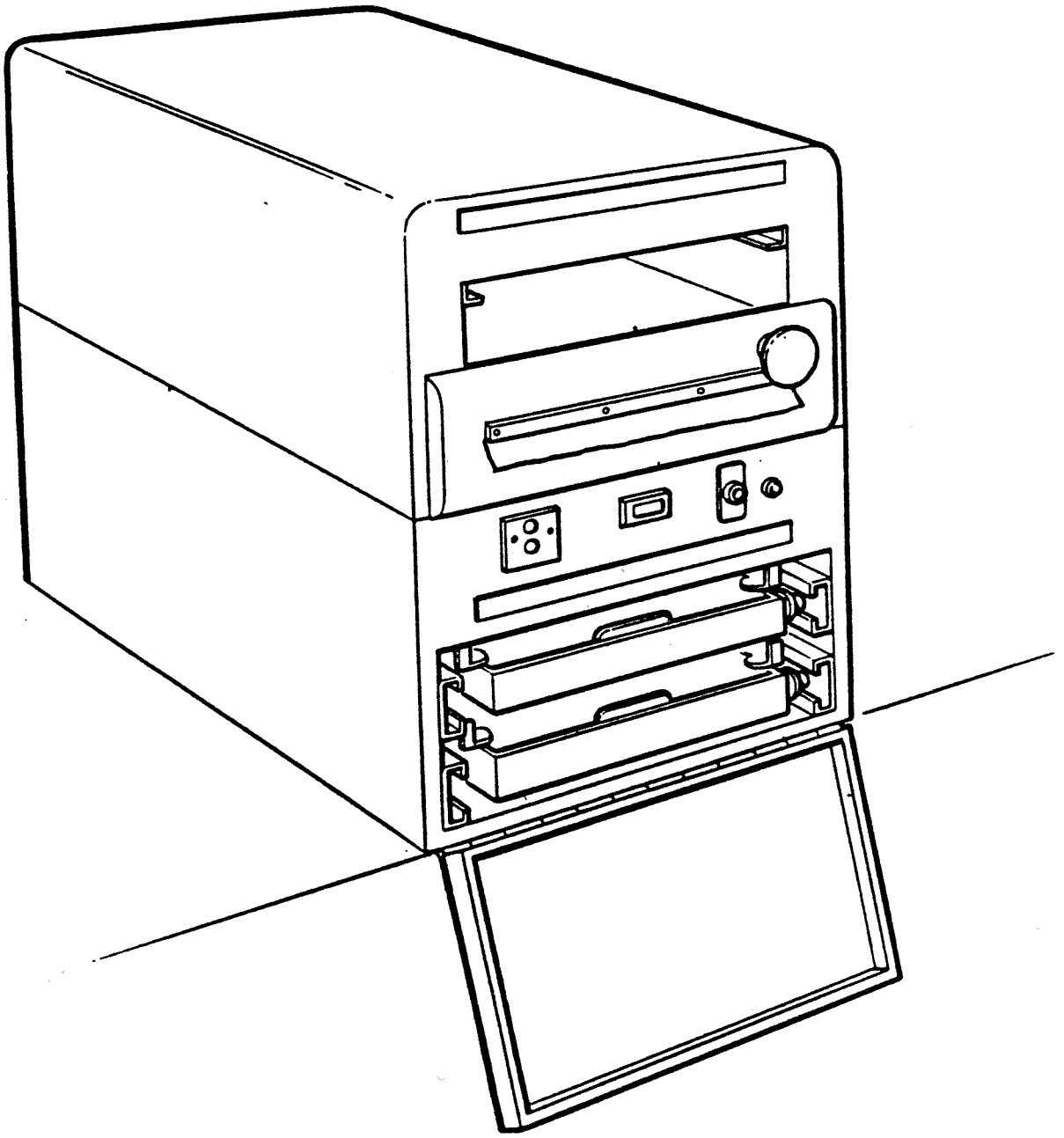


FIG. 2A-1. 1385 PROCESSOR UNIT

GENERAL DESCRIPTION

The Processor Unit, Fig. 2A-1, is designed as a composite piece of equipment which:

a. Stores six Xerox plates and dispenses each in strict rotation.

b. Has provision for the storage of the transfer medium and to dispense one sheet of the medium at a time.

c. Has a charging compartment where the Xerox plate can be given an initial charge, the developed image transferred to the medium and the residual image released from the attraction of the plate so that it can be wiped off.

d. Has positions for two developing trays for the developing of the latent electrostatic image.

There are two types of developing tray, one, the tone tray, is an extension of the ordinary line tray. The toner tray is used when developing the images of full- and half-tone pictures, or where any part of the image approaches $\frac{1}{4}$ sq. in. (approx. 1 sq. cm) in area. This tray has a metal plate, maintained at a small positive potential with respect to earth, placed so that large amounts of toner powder can be attracted away from the developer during cascading to fill in the large electrostatic areas of the image on the Xerox plate.

CIRCUIT DESCRIPTION
(See Fig. 2A-2)

The single-phase mains supply is applied to three terminals of terminal block TB1 through the double-pole ON/OFF switch S1. Line and neutral are taken for external connection to the two-pole socket SK1. The third terminal is the earth line connected to chassis; all potentials are determined with respect to earth.

Subject to control, which is described later, line and neutral are connected across the primary of transformer T1, the secondary circuit of which is designed as a constant voltage device with the aid of capacitor C1. The high voltage developed across the secondary of transformer T1 is controlled by the circuit R1, R2, S3 so that adjustment of S3 varies the output potential. C2 is a d.c. isolating capacitor which applies the stepped-up a.c. to half-wave voltage-doubling rectifier stack MR1 - MR4. The positive and negative terminals of the rectifier stack are connected by the contacts of the contactor RLA, when de-energised, so that the output the scorotron is positive with respect to earth. RV1 controls the current through the rectifier stack, C3 smoothes the rectification ripple and

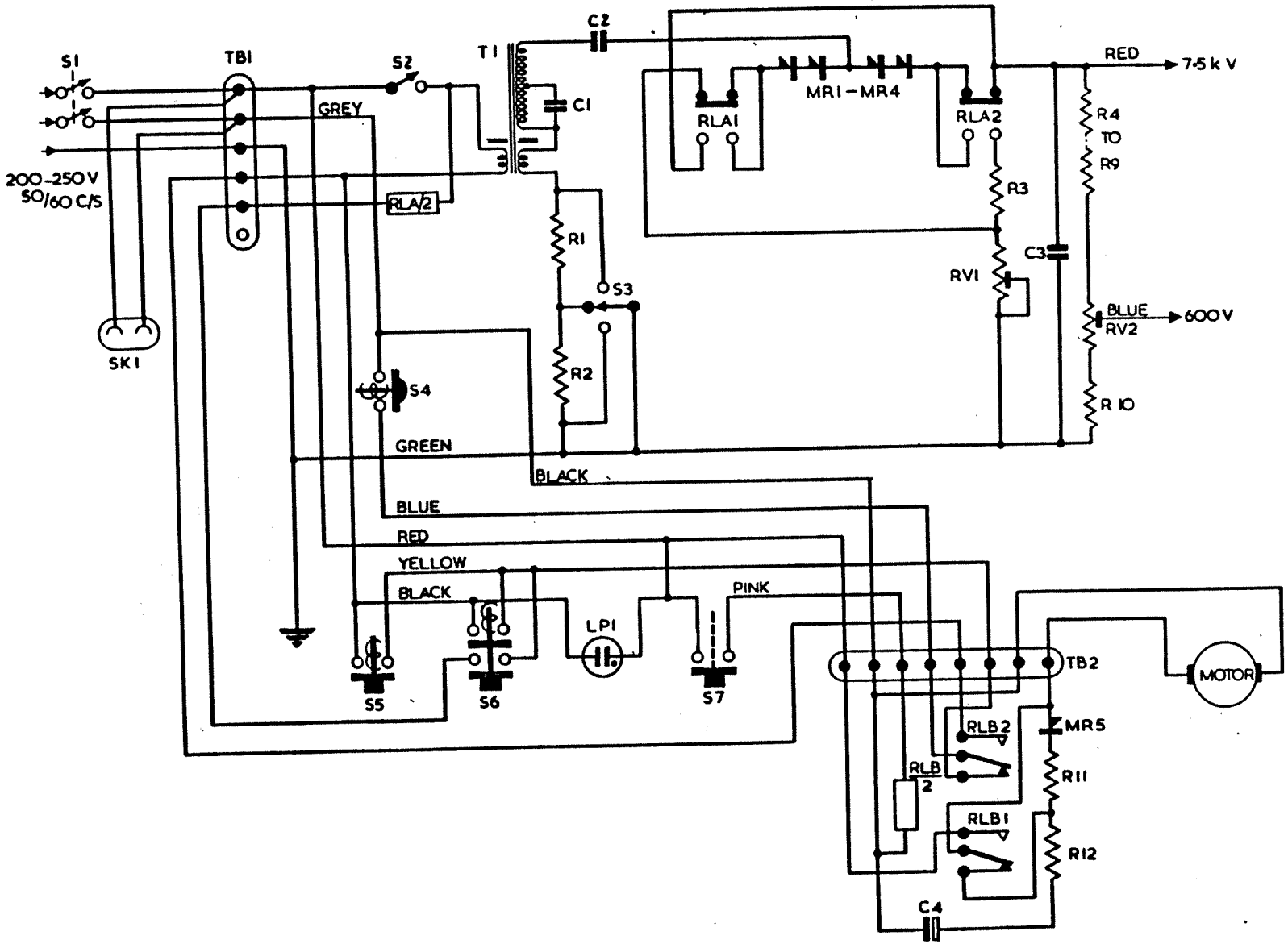


Fig 2A-2. 1385 Processor Unit Circuit Diagram.

potentiometer chain R4 - R9, RV2 and R10 drops the potential at the wiper of RV2 for the screen supply; RV2 is adjusted to provide about 600V to the scorotron screen.

The completion of the line connection to the power supply is only subject to the single-pole ON/ OFF switch S2. The completion of the neutral connection to the supply is primarily subject to safety switch S4 which is closed by the insertion of a Xerox plate in the charge chamber of the Processor. Provided relay RLB is de-energised, the closure of either the positive-charge pushbutton switch S5 or the negative charge pushbutton switch S6 will complete the neutral line to transformer T1. The closure of negative-charge switch S6 will also energise contactor RLA, and this reverses the connections of the power supply rectifier stack between the scorotron and earth, thereby causing the scorotron electrode and screen to be at negative potentials with respect to earth. The closure of the automatic charge switch S7 will cause relay RLB to be energised. Contacts RLB1 change over to connect the motor across the mains supply and contacts RLB2 change over to connect the mains neutral to transformer T1 primary. During the time that RLB is energised. C4 is charged through the circuit MR5, R11 and R12, and when the motor has run the scorotron back to open switch S7, relay RLB is again de-energised. Contacts RLB1 relax to apply the charge across C4 to the motor through R12 (d.c. injection braking) and contacts RLB2 disconnect the mains neutral line from transformer T1 primary.

Neon indicator lamp LP1 is connected in parallel with the primary of transformer T1. Whenever a circuit is completed by closure of one of the three controls S5, S6 and S7, provided S4 has been previously closed, LP1 will glow to indicate that the scorotron is being energised.

INSTALLATION

The following test plate will be required to assist in setting-up the Processor after unpacking:-

A test plate of uncoated aluminium mounted in a Xerox plate frame, and insulated from earth on the underside. If the special item is not available, reverse a discarded or new plate in its frame and completely protect and insulate the coated surface.

1. Unpack the unit and place it on the table or pedestal where it is to be used. Remove the dispenser assembly by lifting the assembly upwards and withdrawing it from the unit. In the dispenser assembly will be found the operating instructions and the leads with which the E.H.T. Unit shall be connected to the unit. The operating instructions should be handed to the key operator after the installation has been completed.

2. From inside the dispenser housing, remove the four nuts securing the top half of the Processor to the bottom half. Remove the top half of the Processor and lay it to one side. Unpack the E.H.T. Unit and associated fixings.

3. Remove any anti-vibration packing from the scorotron, but do not, as yet, insert the lead screw pawl. Move the lead screw coupling to the drive gear and tighten the two socket-head screws to secure the coupling to both shafts.

4. Carefully place the E.H.T. Unit on its side on top of the motor housing which extends from the back of the Processor case. It may be necessary to provide extra support for the unit to prevent the unit sliding off.

5. Connect the thick red-covered lead, coming from the procelain insulator, to the left-hand rail of the Processor, viewing the Processor from the front. See Fig. 2A-3.

6. Connect the blue-covered lead from the E.H.T. Unit to the right-hand rail of the Processor (viewing the Processor from the front). See Fig. 2A-3.

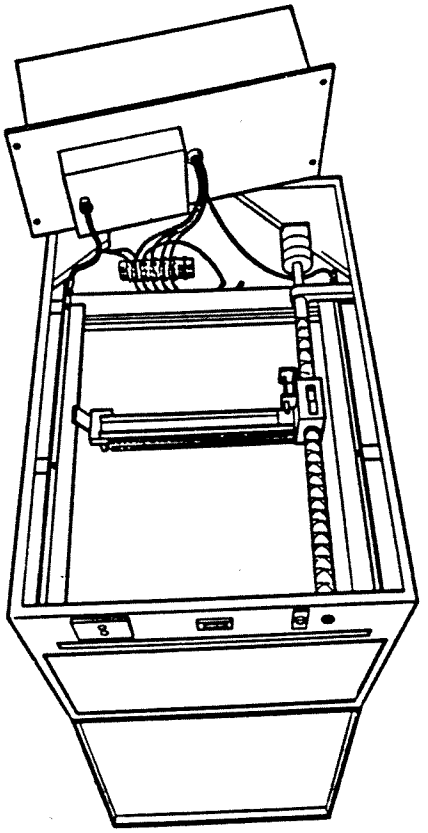


Fig 2A-3. 1385 Processor Unit - E.H.T. / Charge Area E.H.T. Interconnection.

7. Connect the remaining leads from the E.H.T. Unit, colour to colour, as illustrated in Fig. 2A-4, to the six-way terminal block TB1, on the back upright inside the Processor case.

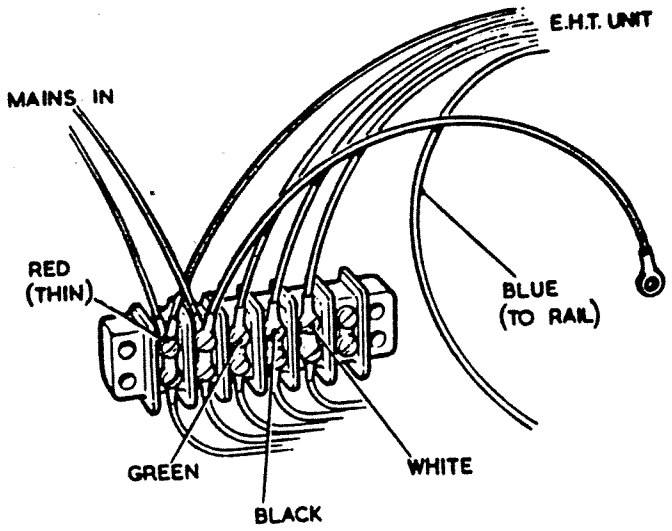


Fig 2A-4 1385 Processor Unit - E.H.T. Unit / Charge Area Supply Interconnections.

8. Slide the scorotron block to the rear end of the lead screw. Insert the test plate and check for $\frac{1}{4}$" (6.35mm) clearance between scorotron screen wires and the test plate surface with scorotron setting gauges No. XB.71-604. Adjust the levels of the e.h.t. rail and the level of the scorotron at the drive block so that the scorotron is horizontal above the test plate surface. Draw the scorotron to the front end of the lead screw and carry out the same levelling procedure. Finally check that the scorotron is level to the test plate surface and $\frac{1}{4}$" above it at the centre of the lead screw. Ensure that all fixings are tight and, particularly, that the scorotron fixings screws have shake-proof washers under the heads.

9. Manually move the scorotron back along the lead screw and check that the block nut assembly does not foul against the leads and tags on the underside of the E.H.T. Unit.

10. Position the scorotron at the centre of the lead screw. Set the switch on the E.H.T. Unit to ON. Set the mains switch at the rear of the Processor case to ON. Fit a suitable plug on the mains cable from the Processor BUT DO NOT, AS YET, CONNECT THE UNIT TO THE MAINS SUPPLY.

11. Connect the test meter, switched to the 1000V d.c. range, between a suitable earth and the 600V screen rail on the right-hand side of the Processor (KEEP WELL AWAY FROM THE LEFT-HAND RAIL), the negative pole of the meter should be at earth.

12. Connect the mains supply to the Processor. Depress the CHARGE pushbutton and adjust that control of the E.H.T. Unit most remote from the ON/OFF switch for a meter reading as near as possible to 600V; the control is either a 3-position switch or a 270° potentiometer.

13. Next adjust the E.H.T. Unit centre control so that the meter reading is as near as possible to 600V. The control is a 270° potentiometer.

14. Disconnect the mains supply to the Processor and transfer the meter connection from the right-hand rail to the surface of the test plate. Switch the meter to read in the 50 μA d.c. range. Reconnect the mains supply to the Processor and depress the CHARGE switch. Adjust the E.H.T. Unit control nearest the ON/OFF switch for a meter reading of 29 μA. The control is a 270° potentiometer. Switch off the CHARGE switch.

15. Repeat steps 13 and 14. Next reverse the leads to the meter terminals so that the lead that was to earth is now connected to the positive terminal of the meter and the lead to the right-hand rail is connected to the meter negative terminal. Reconnect the mains supply to the Processor and depress the - TRANSFER pushbutton. The meter reading should be approximately the same as that obtained in step 13. Release the - TRANSFER switch and disconnect the mains from the Processor.

16. Replace the scorotron block pawl, securing it with the spring and screw retaining fixing (see Note below). Reconnect the mains supply to the Processor. Press the CHARGE switch on the right-hand side of the Processor front panel. The scorotron will either advance along the lead screw, or move to the rear and then come forward. When the scorotron reaches the front end of the lead screw, the plunger assembly on the lead screw block should operate the CHARGE switch plunger so that the CHARGE switch is set automatically to OFF and the scorotron stops at the very forward end of the lead screw. If necessary adjust the plunger assembly on the lead screw block so that the scorotron stops in the correct position. Remove the mains supply to the Processor.

NOTE: When returning the scorotron block pawl into engagement with the lead screw, do not use force to effect the engagement otherwise the leadscrew will become bent and unserviceable.

17. Replace the top half of the Processor case, securing it to the bottom half with the four long nuts previously removed. Unpack the six Xerox plates and frames with light-shields. Remove the light-shields from the frames. Refer to Fig. 2A-5 and remove the end strips of the plate frames after first removing the two outside securing screws, and slackening off the two inner ones. Loosen the four registration clamps by slackening the clamp screws. Holding each plate at its edges, load into the frame and, ensuring that the plate is pushed over to one or other of the long sides of the frame, tighten the clamp screws. Next replace the frame end strips, securing these with the fixings previously mentioned.

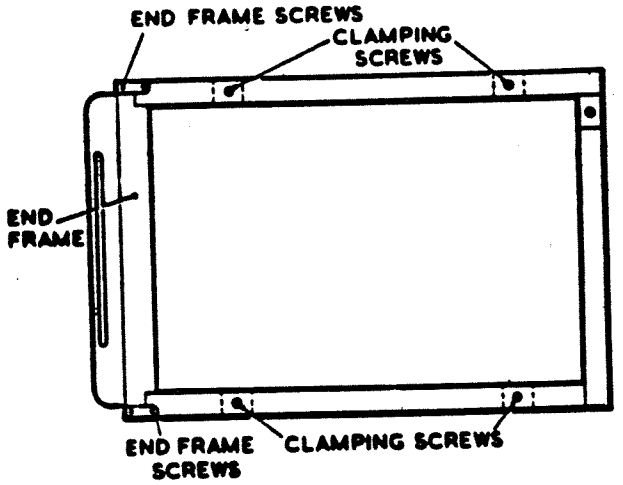


Fig 2A-5. Mounting of 1385 Xerox Plate in Frame

18. Place a stack (about 1" high) of the transfer medium to be used in the tray of the dispenser assembly. Adjust the left-hand guide assembly so that both guide assemblies retain the leaves of the stack in upright evenness. Test the efficiency of the dispenser by pulling the knob on the right-hand side of the front panel to obtain a single sheet of the transfer medium. Insert the dispenser in the top half of the Processor case. If the transfer medium is offset masters, the extra weights on the dispensing arms should be retained; if paper, these should be removed and stored under the rear cover.

19. Withdraw the developing trays, and empty into the line tray the contents of one tin of developer, and into the tone tray the contents of one and a half tins of developer. When the tone tray is withdrawn,

remove the electrode from the tray, see Fig. 2A-6. Next remove the battery case cover from the underside of the electrode. Using the service meter, switched to the 100V d.c. range and, with the correct polarity observed, check each battery of the three unpacked from the same package which contained the tone tray, for a minimum of 30V potential: the shelf-life of a battery may have expired and therefore the voltage low. Replace a battery with a voltage lower than 30V. Fit the batteries, observing the polarity indicated on the underside of the electrode. Replace the electrode in the tray, following the instructions in the Operating Manual, and check, with the service meter connected between earth (negative terminal) and the electrode, that the electrode is at a minimum potential of 65V. Level the developing trays; the general level of both trays together can be adjusted by means of the two front feet under the Processor case, and individual tray levels can be adjusted by means of the screws under the pivot sockets.

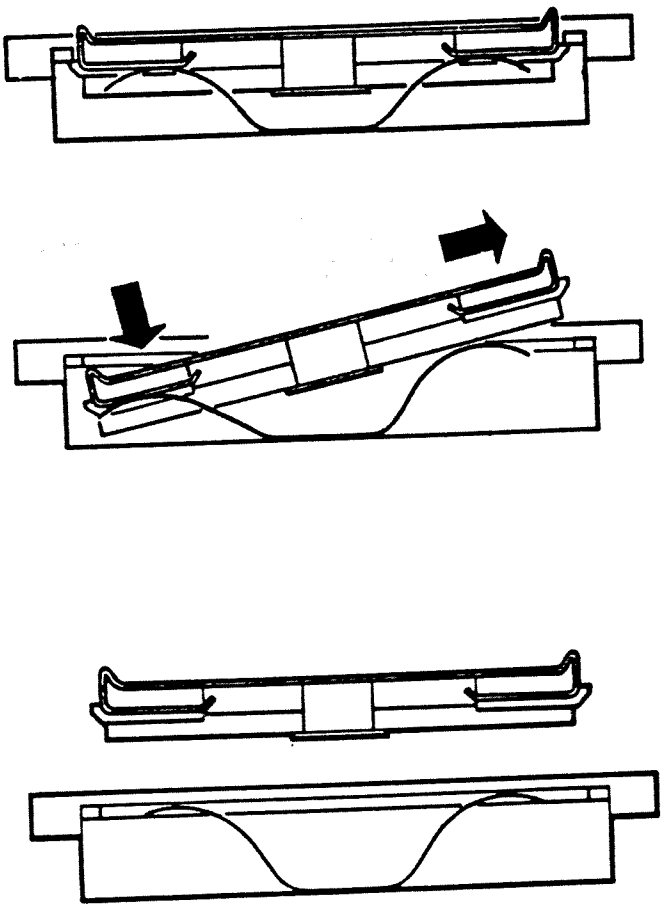


Fig 2A-6. Removal of 1385 Processor Unit Tone Tray Electrode.

20. Connect the Processor to the mains supply, and charge and develop (20 cascades for ordinary plates, 40 for 'E' type plates) in the line tray, without prior exposure, each of the six plates previously placed in the plate dispenser; this action 'breaks-in' the selenium surface. After developing, negatively charge these plates and dust off the toner powder with a 'dolly' of rayon wool. Replace the plates in the dispenser at the top of the Processor case.

SECTION B
V.R. CAMERA

GENERAL DESCRIPTION

The V.R. Camera, Fig. 2B-1, is a large copying camera having an image area of 13" x $8\frac{1}{2}$". The initials V.R. stand for "Variable Ratio" and the unit is capable of up to 50% enlargement or reduction of the subject placed in a copyboard, or greater reduction ratios when the subject is positioned at larged distances than the copyboard is from the lens. The camera is supported on rails with a rack and pinion mechanism which enables adjustment of the image size. An arm projects from each rail of the unit and this supports a reflector with two high-intensity photoflood lamps. The camera lens shutter is controlled by an electromechanical timing device and a relay unit is provided to break the supply to an external circuit when the subject-illuminating lamps are switched on.

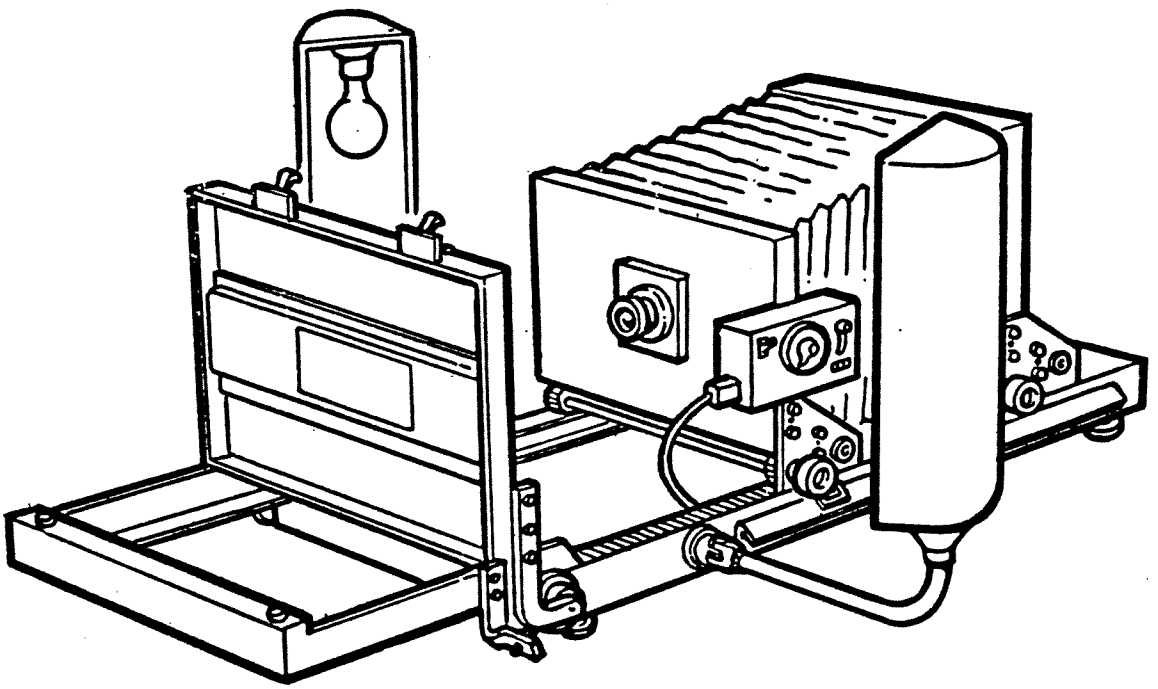


Fig 2B-1. 1385 V.R. Camera

CIRCUIT DESCRIPTION
(See Fig.2B-2)

There are usually two sources of mains supply, one direct from the mains socket used solely to supply the lamps or the external circuit according to the state of the relay, and the other from the external supply socket on the back of the Processor case, used to operate the changeover relay, timer and shutter mechanism. In most instances, the external circuit supplied by the V.R. Camera circuit is the Heat Fuser, because the current drawn from the mains by the V.R. Camera lamps is nearly 10A and, as usually happens, if the Heat Fuser is supplied from the same 13A mains supply socket, the combined current drawn by both units exceeds the mains fuse rating. One pole of the double-pole ON/OFF mains switch is used to control the direct mains line supply, the other pole switches the line supply from the Processor. Both neutral wires are connected directly to the respective circuits, and the mains earth wire is connected to the relay box and extended through the plugs and cables to include the Heat Fuser frame and the box enclosing the timing mechanism. A 250mA $1\frac{1}{4}$" glass-cartridge fuse link protects the circuit of the shutter mechanism.

The timer consists of a clockwork mechanism, the spring of which is tensioned by the movement of the front panel pointer and knob away from zero: this action also closes a pair of electrical contacts. The closure of these contacts, the supply for which is taken through the closed side of a changeover switch, energises the relay in the control box causing the supply to the Heat Fuser to be removed to the lamps. The timer contact closure also energises the shutter mechanism. The alternative contacts of the changeover switch in the timer box are wires in parallel with the timer contacts so that the lamps and shutter mechanism can be energised without timing control for setting-up purposes. The shutter mechanism consists of a rotary solenoid, the arc of rotation being about 15°, fed from a bridge-connected metal rectifier through a current-limiting resistor.

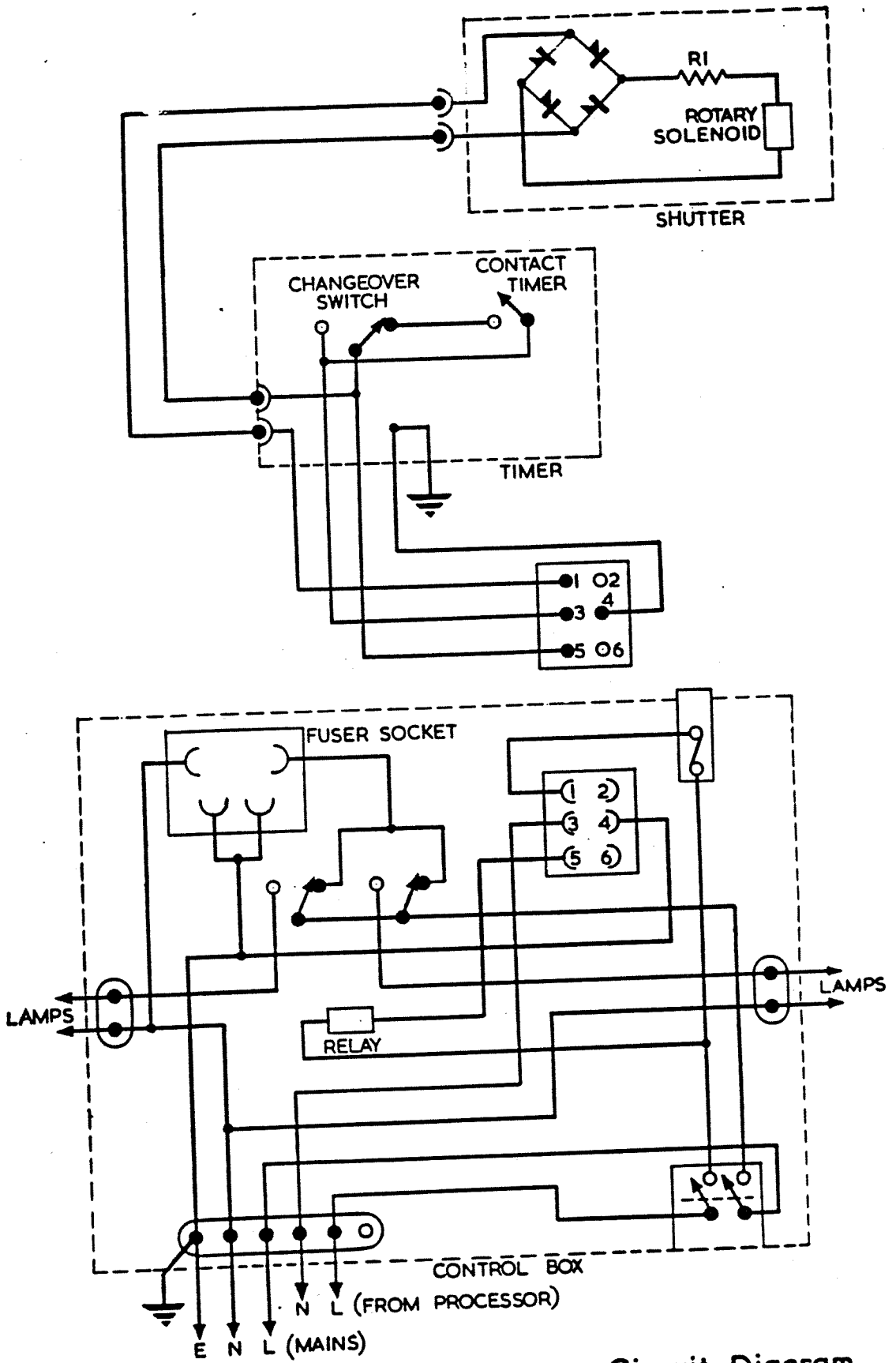


Fig 2B-2. 1385 V.R. Camera - Circuit Diagram.

INSTALLATION

1. Remove all packing material and set up the camera on a level table or bench approximately 5' (1.5m) long by 2'3" (70 cm) wide by 2'6" (76 cm) high. Ensuring that the base plate, Fig. 2B-3, is flat on the two small locating screws between the main bolt holes and screw home. Insert and tighten the four main bolts. Next mount the copyboard:-

   A. The ordinary copyboard has a single counterpoise weight on each side, and should be mounted to the upper leg of the hinge by means of four bolts on the underside of the platen area. The size of these fixing holes permits some latitude for adjustment which will be described later.

   The adjustable (in depth) copyboard has two counterpoise weights on each side and is mounted on an extension of the camera bed. The hinge assembly on the bed extension is adjustable to centre the copyboard in relation to the image area. This is described later.

Before the copyboard is mounted, the counterpoise weights and arms should be assembled to the platen frame each with three dome nuts provided.

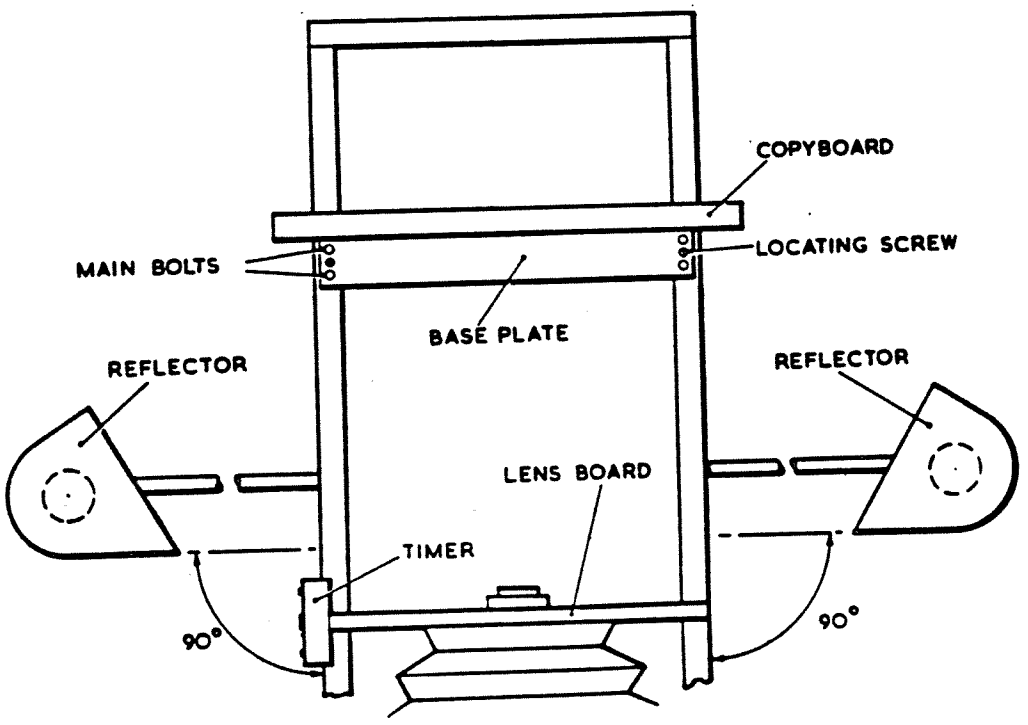
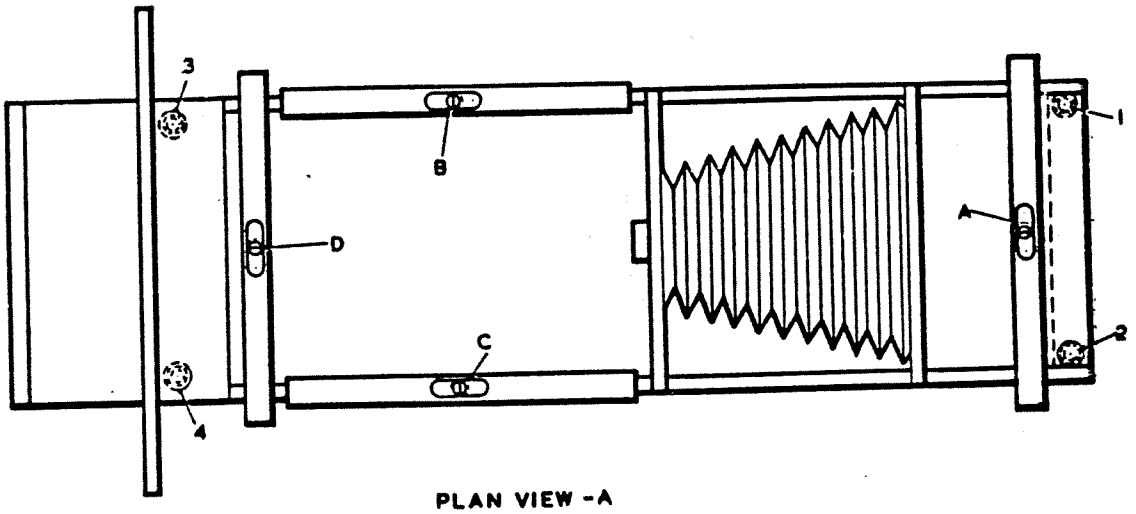


Fig 2B-3. 1385 V.R. Camera Mounting of Copyboard

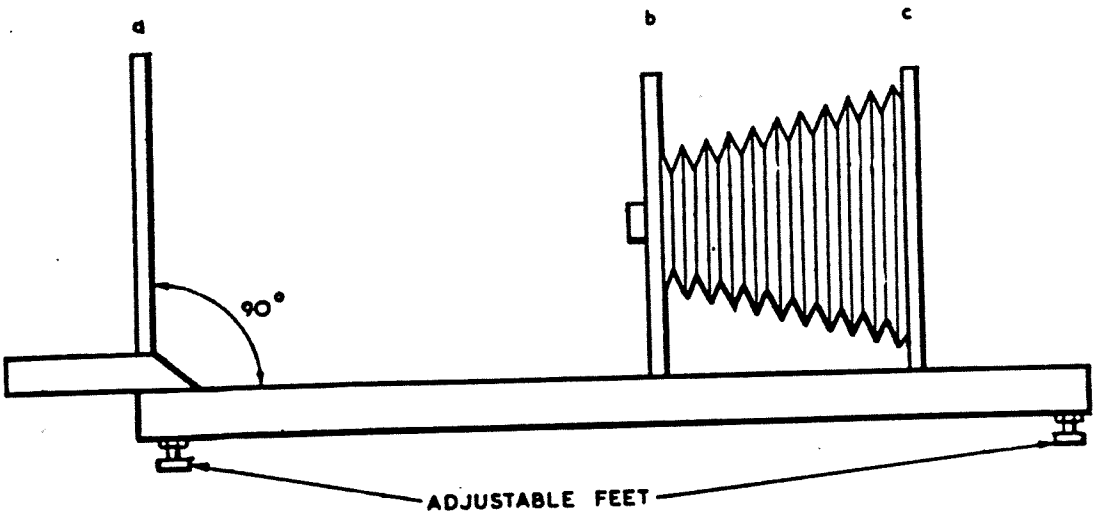
2. Level the main frame both lengthwise and across the width by setting the adjustable feet, Fig. 2B-4, A and B, in the following sequence:-

a. Place the level across the frame at the back end, point A Fig. 2B-4, A, and level by turning foot 1 or 2 as required.

b. Place level lengthwise on gear track, point B fig. 2B-4, A, and level the frame by adjusting foot 3. Place level at point C Fig. 2B-4, A, and level the frame by adjusting foot 4.



PLAN VIEW -A



SIDE VIEW - B

Fig 2B-4. 1385 V.R. Camera-Installation.

c. Place level across frame at point D Fig. 2B-4, A. It should be level. If this is not the case, carry out the procedure in steps a and b above again to obtain correct level in both directions. Finally, tighten the locknuts against the underside of the camera bed.

3. Adjust the copyboard until it is vertical by moving the stops against which the balance weights rest, Fig. 2B-5.

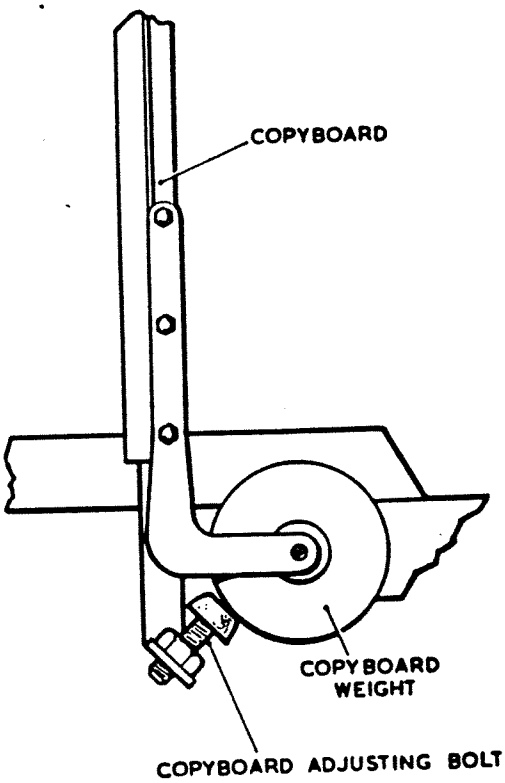


Fig 2B-5. 1385 V.R. Camera - Copyboard Counterpoise Weight Stop Adjustment.

4. Fit the reflector brackets by feeding the flexible cables through the large holes in the sides of the camera frame and securing the flanges to the frame by means of the three screws provided. Care should be taken to ensure that the right-hand and left-hand reflectors are correctly fitted so that the longer side of each reflector is nearest the camera lens, Fig. 2B-3.

5. Rotate the reflectors on their brackets until the longer sides are mutually in line and at right-angles to the frame of the camera. Finally tighten the large lock-nuts underneath each reflector to hold them in their correct positions.

6. Remove the lid of the control box in the centre of the camera frame, and pass the ends of the flexible conduits from the reflector brackets through the two clamps which are located one on either side of the box (Fig. 2B-6).

7. Tighten the screws in the clamps just enough to lock the conduit securely. Connect the two wires protruding from each conduit to the two terminal blocks A and B as shown in Fig. 2B-6. Finally, remove the foam plastic packing between the relay armature and the mercury phials.

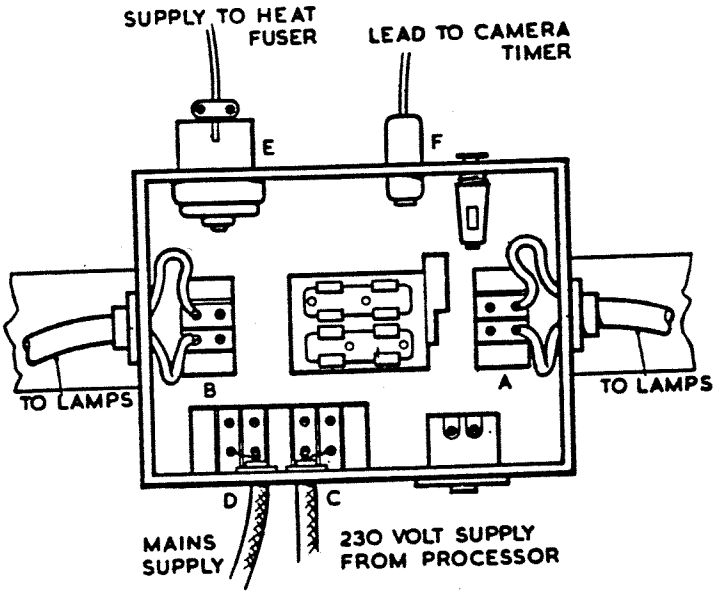


Fig 2B-6. 1385 VR Camera - Control Box Connections

8. Check that the lens board and camera back are secured to their bottom mounting brackets and that all bolts are tight. Should either of these members have become loose in transit, they should be set at 90° to the camera base with the aid of the service-issue spirit level (see Fig. 2B-4, B). Each fixture consists of two large nut and bolt fixings and a locating screw between them. To adjust for exact perpendicularity it is not necessary to release the central locating screw; slacken the two nut and bolt fixings, adjust for perpendicularity and finally re-tighten the two large fixings.

9. Screw the four 500W photoflood lamps into the ceramic holders in the reflectors, having first checked that the holder base contacts have been bent towards the centre of the base and will not short-circuit with the side contacts when the bulbs are inserted.

10. Make the various connections from the control box, Fig. 2B-6, as follows:-

a. The long 2-core lead terminating in the 3-pin plug must connected into the special socket in the back of the Processor case (C, Fig. 2B-6).

b. The free end of the 3-core mains lead extending from the same side of the control box must be fitted with a suitable plug for the mains supply socket (D, Fig. 2B-6).

c. The heavy 3-core lead from the Heat Fuser, terminated in the square 5-pin plug, must be connected to the socket in the opposite side (rear) of the control box (E, Fig. 2B-6).

d. Check that the lead from the timer box on the side of the camera is plugged into the 6-pin socket (F, Fig. 2B-6) at the control box end and into the side of the timer box at the other end.

11. Set the camera lens iris to the largest aperture obtainable and remove the lens cap, if this is already in situ. Switch the lights on by means the toggle switch on the timer box, and with the ground glass screen removed, check that the shutter is fully opened and light can be seen through the lens.

12. Check that the inner and outer lens faces are clean. If necessary, wipe these carefully with lens tissue or clean chamois leather. Replace the ground glass screen and check that the axial intersection of the copyboard is central in the ground glass screen; it may be necessary to place a small circular dark object (e.g. a small copper coin) at the centre of the copyboard and check that the image is central on the ground glass screen. The ordinary copyboard may be moved about 1/16" (1·6 mm) in any direction by slackening off the four large bolts under the platen area, moving the board and then re-tightening these bolts. The adjustable copyboard can be adjusted vertically only by the insertion of washers under the top or bottom halves of the hinge brackets. Although highly unlikely, it may prove necessary to move the lens mount on the front of the camera to centralise the image. The lens mount is fixed to the lens board by eight screws which should be slackened off, the lens mount moved and the screws re-tightened.

13. Set the camera to size for size reproduction (100%) and make a test copy for a line original. Check the reproduction for size and focus accuracy. If necessary, using the ground glass screen, set the camera for focus and size and, slackening the front and rear cursor fixings, adjust the cursor positions so that the hair lines coincide with the 100 marks on the scales. Secure the cursor fixings.

14. Set the timer dial to 30 seconds, and depress and hold down the operating handle. Check the time taken for the timer to switch off the lights from the moment of release of the operating handle; this should be 30 sec ± 3 sec.

15. Replace the lens cap and the ground glass screen when the installation is completed.

Note: Except for 20 cameras, all V.R. Cameras from and including No. 3271 are designed for the additional purpose of charging rental on the number of copies produced. In all such cameras, there is a mechanical counter mounted in the top rail of the plate frame operated by the passage of the plate holder into the frame. The counter is sealed-in and the actuating mechanism is similar to a clock escapement so that a plate may not be inserted in the frame without the counter registering. The frame of the ground glass screen has been designed so that the counter is not actuated by the insertion of the screen for focussing. After installation, the number of copies registered on the counter should be credited to the customer on the record card.

SECTION C
S.S. CAMERA

GENERAL DESCRIPTION

The S.S. Camera, Fig. 2C-1, is a large copying camera having an image area of 13" x $8\frac{1}{2}$". The initials S.S. stand for "Same Size" and the unit has a wide-angle lens preset for 1:1 copying. The subject is placed face downwards on a clear glass platen at the top of the camera and is weighted with a white background board. On either side of the lens board are light reflectors which cast the light from four high-intensity photoflood lamps suspended from the underside of the subject platen surround. The supply to the subject-illuminating lamps is controlled by a relay in the same way as in the V. R. Camera circuit, the Heat Fuser being the alternative load on the particular supply. The control circuit, similarly, is supplied from the Processor external socket: there is no shutter mechanism, however, and there is no switch on the timer box. The Circuit Diagram of the S.S. Camera is given at Fig. 2C-2.

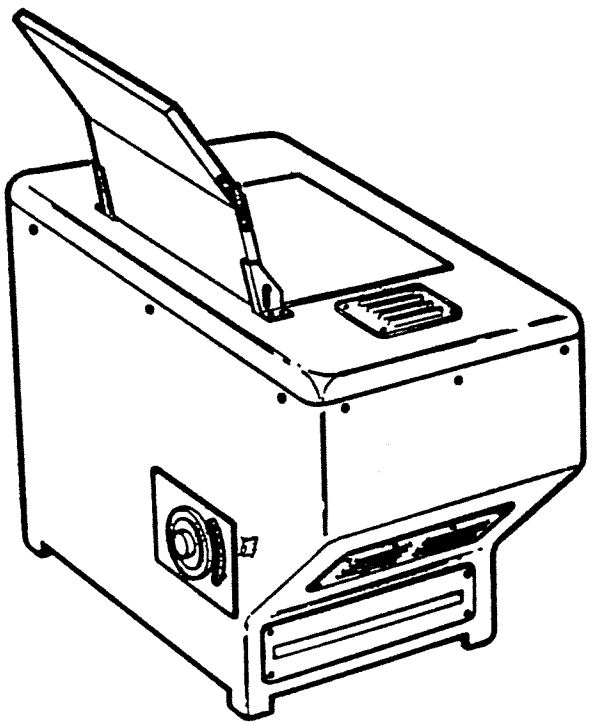


Fig 2C-1. 1385 S.S. Camera.

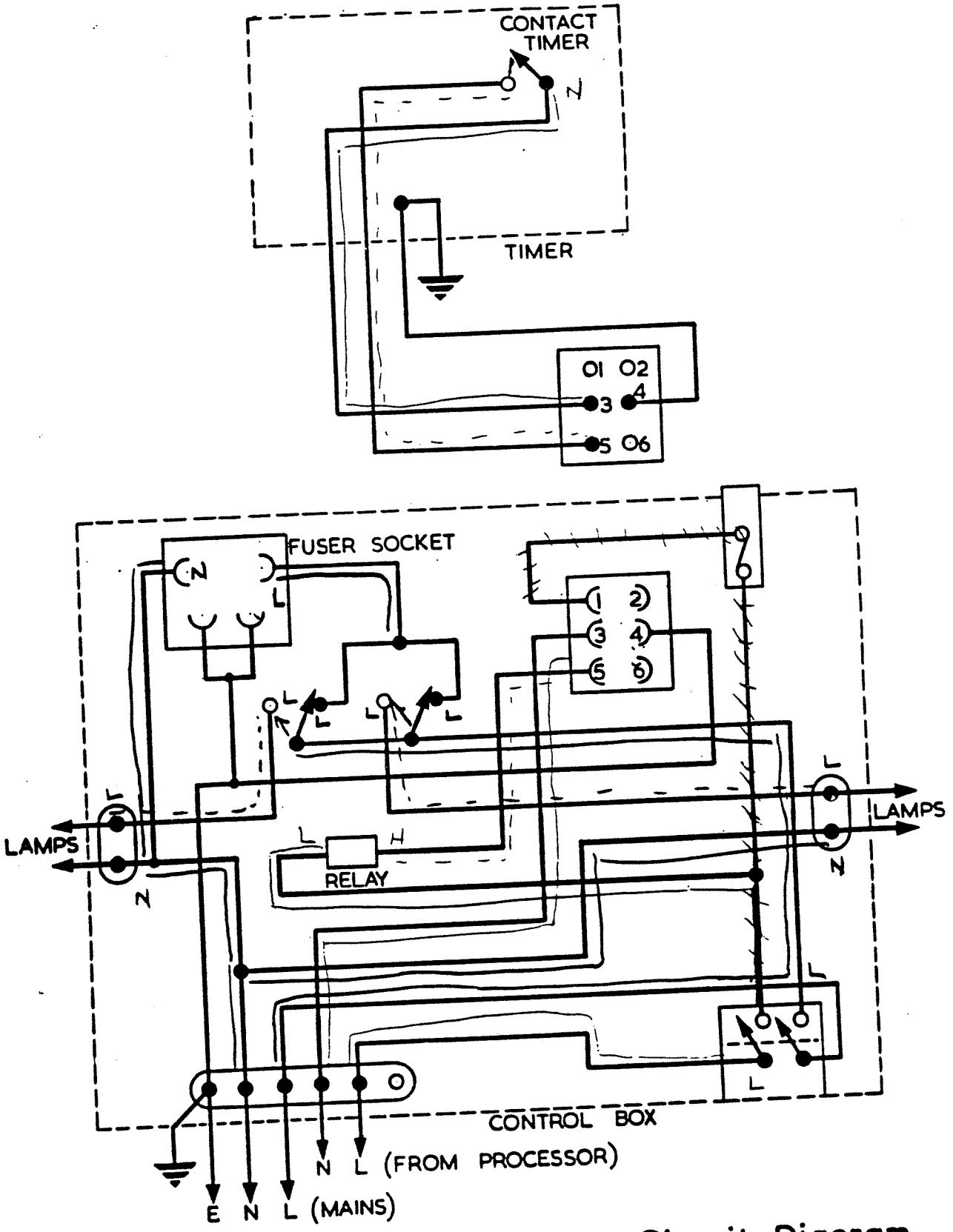


Fig 2C-2. 1385 S.S. Camera Circuit Diagram

INSTALLATION

1. Unpack the camera and place it on a firm and level table.

2. Lift the hinged platen on top of the camera and check that the camera glass is properly in position between the registration scales and is clean and free from greasy smears. A soft cloth moistened with Inhibisol can be used to clean the glass.

3. Open the hinged door at the right-hand side of the camera and check that the compartment is clean and free from packing material.

4. Install the four 275W photoflood lamps by screwing each into a holder in the corner of the lens compartment behind the reflector plates. Ensure good contact between lamp cap and holder contacts by screwing each bulb in tight.

5. At the rear of the camera cabinet will be found two rubber-covered cables protruding from a small panel which also carries a 5-pin socket. One of the cables has a 3-pin plug connected to the free end and this plug should be inserted into the mating socket on the rear of the Processor case. The other cable should be fitted with a plug to suit the mains supply socket. The heavy cable from the Heat Fuser, with the square 5-pin plug attached, should be connected to the socket on the camera rear panel.

6. Make a test print to check the camera for focus and size-for-size reproduction. A limited adjustment may be made by slackening the knurled locking ring on the lens barrel and turning the lens until the camera is reproducing images size-for-size. Screwing anti-clockwise causes the lens to be raised, thereby increasing print size; clockwise screwing will decrease print size. Only small adjustments should be made between checks until the desired setting is obtained. Finally tighten the locking ring while holding the lens barrel against the tendency to turn.

7. Set the timer dial to 30 seconds, and depress and hold down the operating handle. Check the time taken for the timer to extinguish the internal lights of the camera from the moment of release of the operating handle: this should be 30 sec ± 3 sec.

SECTION D
HEAT FUSER

GENERAL DESCRIPTION

The Heat Fuser is designed as a shallow metal case with a horizontal slot situated in it and the slide handle includes a front panel to close the slot against heat loss; see Fig.2D-1. The bottom of the unit case is filled with fibre glass insulation while the top of the slot comprises a metal sheet with four electro-resistive elements fixed to it. The space behind the heating elements is occupied by the probe of a thermostat which can be set to the

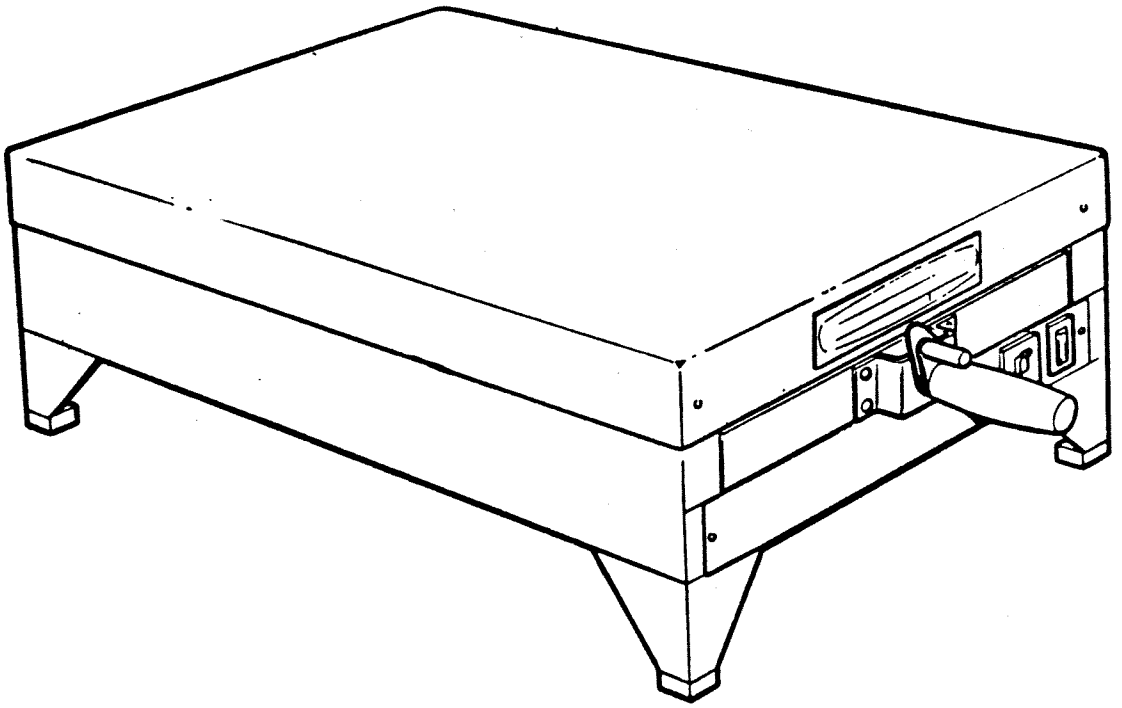


Fig 2D-1 1385 Heat Fuser.

required fusing temperature; the thermostat dial is mounted on the front of the fuser on the left-hand side. At the rear of the fuser, under a cover plate, is situated a connection block so that the pairs of heating elements can be connected in series or parallel depending on the potential of the mains supply; if the mains supply voltage is 200 - 250V, the elements are connected in series and, if the mains supply voltage is 100 - 150V the element pairs are connected in parallel. The circuit diagram is given at Fig. 2D-2.

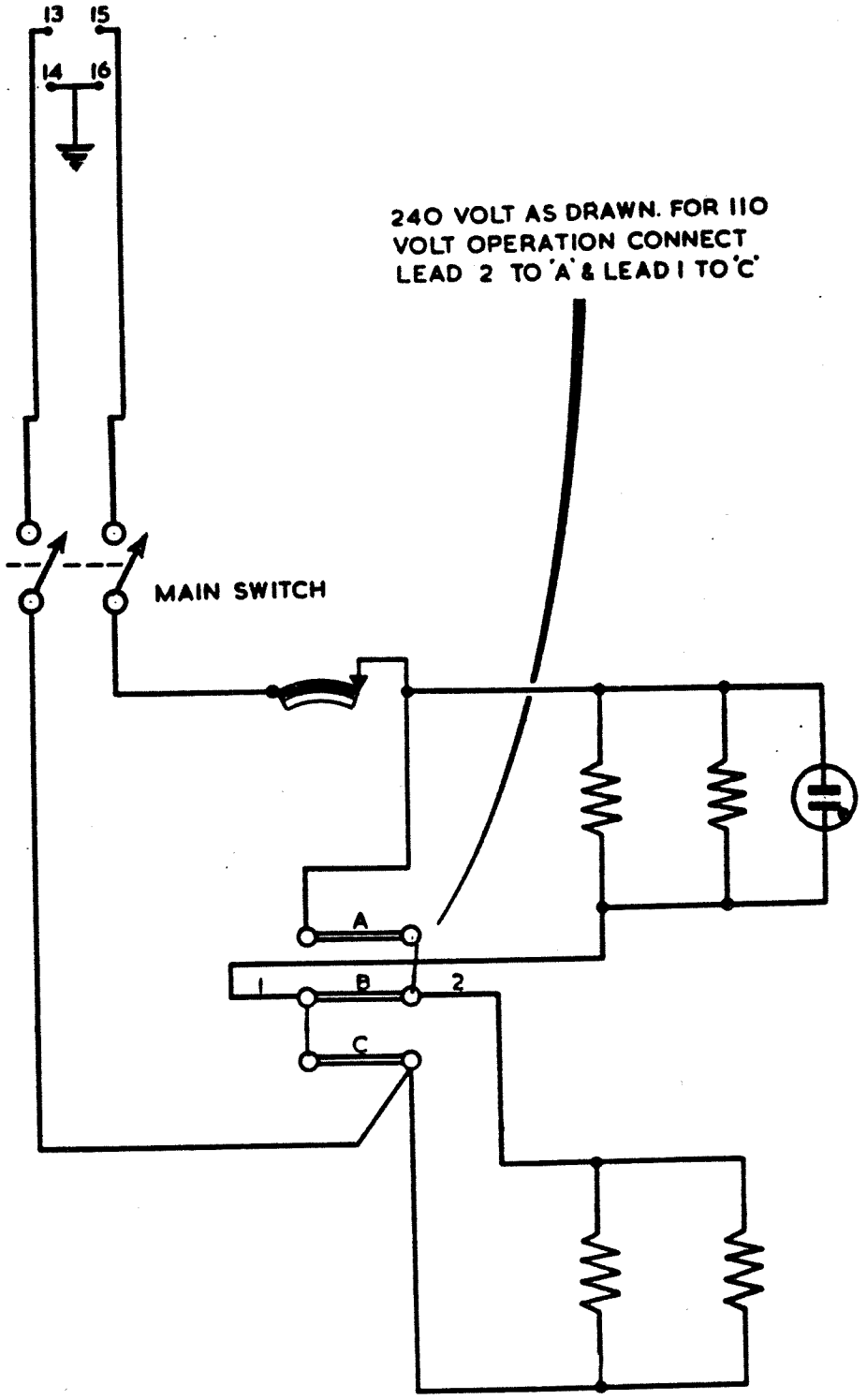
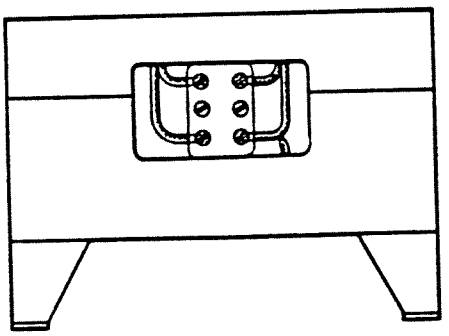


Fig 2D-2. 1385 Heat Fuser - Circuit Diagram.

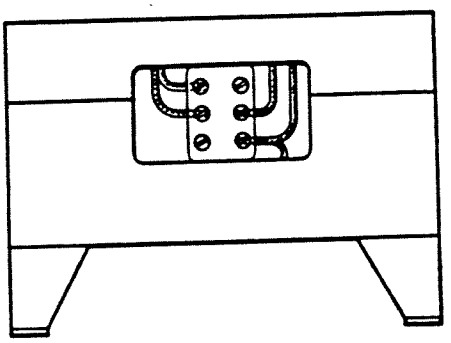
INSTALLATION

The Heat Fuser will be received fully assembled. All that is necessary for its installation is to remove any packing from within the slot, insert the slide, undo the rear cover plate and check that the connections suit the mains supply voltage (see Fig. 2D-3) and plug the supply cable, with the free-end terminated in the 5-pin plug, into the relevant socket of the camera. Set the switch on the front panel to ON.

It should be noted that the pilot light on the front panel of the fuser will come on as soon as the fuser is connected to the camera, provided the camera has already been connected to the mains supply and switched on.



A. HEAT FUSER ARRANGED FOR OPERATION ON 100/130 VOLT MAINS SUPPLY



B. HEAT FUSER ARRANGED FOR OPERATION ON 200/260 VOLT MAINS SUPPLY

Fig 2D-3. 1385 Heat Fuser Mains Supply Connections.

The pilot light will extinguish when the thermostat records that the desired temperature, set on the dial, has been reached by opening it contacts. The functioning of the thermostat and pilot light is indicative of the correct operation of the fuser.

Allow the fuser to heat-up for about half-an-hour, and then withdraw the slide and insert the service-issue thermometer diagonally in one corner so that the bulb is central in the slide and at least 6" from the front. Close the tray as far as possible and pack the opening between the front of the slide and the slot with rayon wool in order to prevent loss of heat. Allow the fuser to operate for a further half-hour having first set the thermostat dial to 149. After this time has elapsed, check the temperature of the fuser as recorded on the thermometer. This should be within 10^{o} of $300^{o}F$ (5^{o} of $149^{o}C$).

SECTION E
VAPOUR FUSER

GENERAL DESCRIPTION

The Vapour Fuser, Fig. 2E-1, is a shallow metal case supported at an angle of about 60° to the horizontal and containing two metal grilles in close proximity to one another. One metal grille supports a sheet of absorbent padding which is saturated with Xerox Floset solution and the other grille has facility to hold a sheet of the transfer material so that the vapour from the padding fuses the image to its surface. The Floset is soaked into the absorbent padding from the bottom end of the fuser by dripping through a dispenser which screws on to the Floset bottle in place of the usual cap.

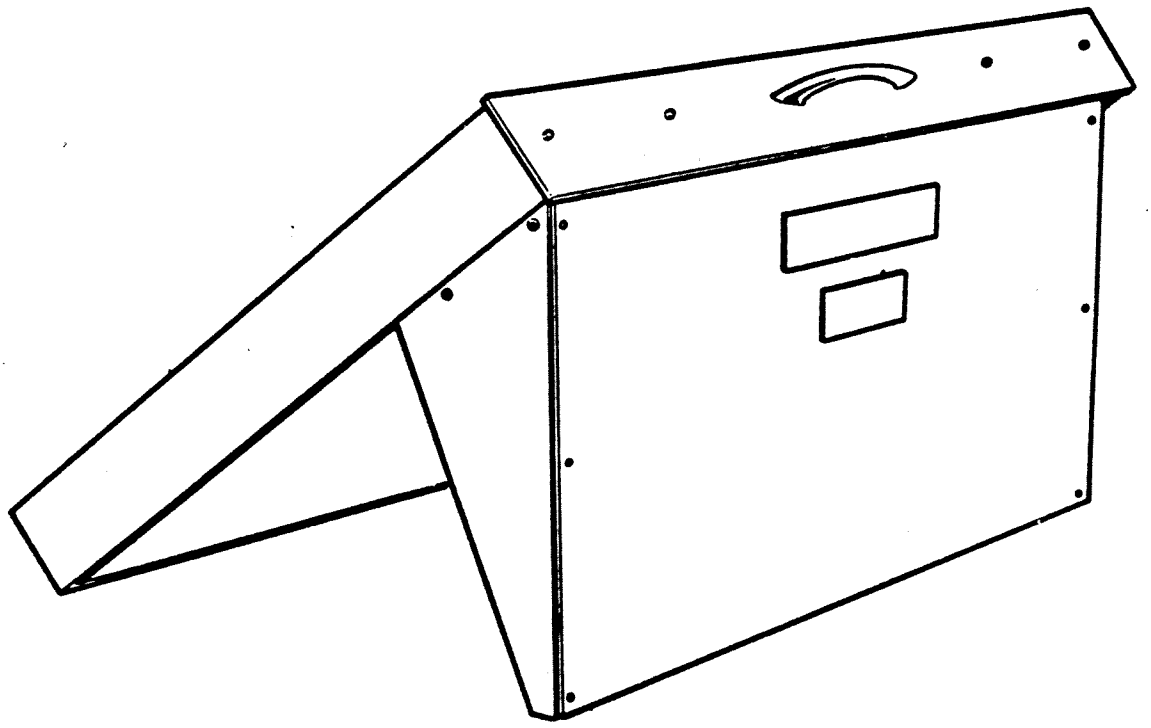


Fig 2E-1. 1385 Vapour Fuser.

INSTALLATION

The Vapour Fuser will be received with the legs and the front panel packed separately. Using the fixings provided, the legs and front panel should be secured to the fuser case and the Floset dispenser and washer placed in position ready for use when required. Check the inside of the fuser case for packing, which should be removed, and see that the absorbent padding is secured along its top edge to the support grille.

SECTION F
COMPACT EQUIPMENT

GENERAL DESCRIPTION

The Compact Equipment consists of a bench specially designed to accomodate a complete set of V.R. 1385 equipment in half the floor space formerly required. The V.R. Camera stands on top of the bench and the Processor, Heat Fuser and Vapour Fuser stand in compartments just below the bench top. The bench top stands on two pedestals; one is the dry storage cabinet for offset masters and copy-paper, and the other houses a drawer for consumables, two general-purpose drawers and a large drawer containing a waste bin, as illustrated in Fig. 2F-1.

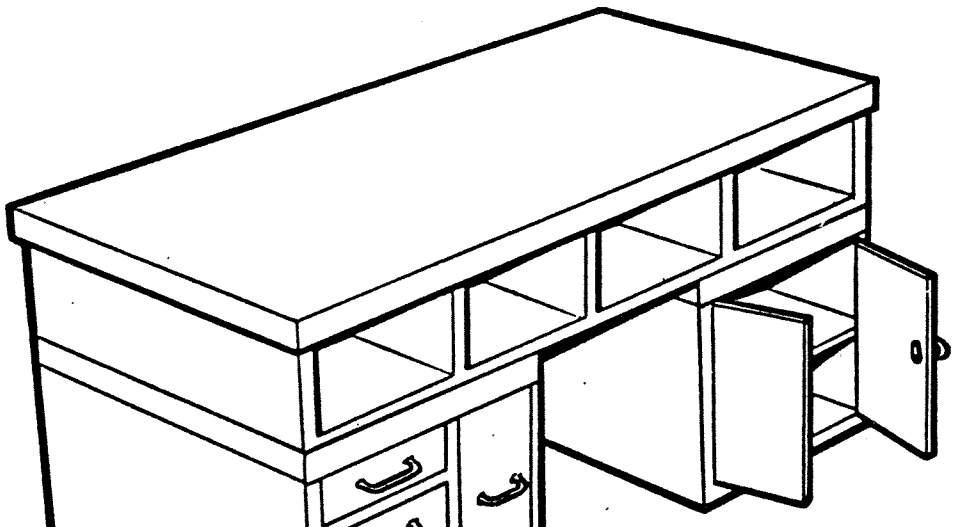


Fig 2F-1. 1385 Compact Equipment Bench.

INSTALLATION

1. The compact bench will be supplied with a sheet metal plate to cover the bottom half of the Processor, an asbestos sheet to shield the Processor from the Heat Fuser, an E.H.T. cable and a cableform to connect the E.H.T. Unit to the bottom half of the Processor.

2. Assemble the centre section of the bench to the brackets on the sides of the two pedestals by six screws. The rear panel should next be secured between the two pedestals by means of six screws. All fixings will be found in a muslin bag secured to the inner arm of the lock mechanism of the dry storage pedestal door. Leave the bench top off until instructed to position and fix it to the centre section.

3. Connect one end of the cableform and E.H.T. lead to the E.H.T. Unit and mount the E.H.T. Unit over the four studs on the mounting bracket in the second compartment from the left-hand side (when facing the front of the bench). Feed the other end of the wires through the square hole into the next compartment on the right-hand side.

NOTE: The E.H.T. Unit should be mounted with the switch and variable controls facing the front of the bench and the dispenser unit should NOT be placed in the bench (see step 4 below) until after the electrical adjustments in step 9 have been made.

4. Remove the top half from the Processor (secured by four long nuts). Partially insert the lower half of the Processor in the second compartment from the right-hand side, then connect the cableform and E.H.T. lead from the E.H.T. Unit to the terminal block at the rear of the Processor (see Figs. 2A-3 and 2A-4)

5. Check that the junction box connections at the rear of the Heat Fuser suit the mains supply voltage. Insert the Heat Fuser in the extreme right-hand compartment. Pass the supply cables for the Heat Fuser and Processor through the back or base of the bench, as required. Insert the asbestos sheet between the Fuser and Processor, and secure this in position with the retaining clip and fixings provided.

NOTE: Normally, the fuser takes the electrical supply from the fuser outlet in the control box of the V.R. Camera. By this arrangement the fuser is disconnected from the electrical supply when the lamps of the camera are switched on: thus both camera and fuser can be supplied from one 13A mains socket. However, the fuser may be supplied direct from a separate 13A socket, if available. In such an event, the 5-pin plug should be removed from the free end of the Heat Fuser supply cable and a suitable mains supply plug fitted instead.

6. Assemble the Vapour Fuser and insert it in the extreme left-hand compartment.

7. Carry out the electrical adjustments on the Processor and E.H.T. Unit as directed in Section A of this Part. Secure the sheet metal

plate over the Processor, if necessary having first slotted it to accept the wiring from the E.H.T. Unit. Insert the Processor fully into the compartment. Insert the dispenser section of the Processor in the second compartment from the left-hand side, in front of the E.H.T. Unit.

8. Position the bench top over the centre section and secure it at the rear by means of the three angle brackets provided. Install the V.R. Camera (see Section B of this Part) on the top of the bench.

9. Connect the Processor to the electrical supply and to the control box of the V.R. Camera. Connect the V.R. Camera to the mains supply.

10. Make several Xerocopies of standard test sheets to test for quality and size of reproductions, and use both fusers to fix the images. Demonstrate the serviceability of the equipment to the key operator but, unless instructed to the contrary, leave the training of the operator to the C.R.O.

SECTION G
METAL MASTER UNIT
AND FINAL OPERATIONAL TESTS

METAL MASTER UNIT

The Metal Master Unit is a shallow hinged case designed specially to locate a Xerox 1385 plate with a developed image in correct relation to the metal offset master plate.

The developed inverse image is produced in the usual way on the surface of the Xerox plate. The image is then protected with a shield, supplied with the unit, of the same proportions as the standard light shield and specially marked with outlines of various sizes of metal masters. The protected Xerox plate, with the image, is placed in the unit case and a metal master is clamped in position in relation to the appropriate marks on the shield. The shield is then withdrawn to allow the metal master to come into contact with the Xerox plate. The image is transferred to the master with a few long strokes of a special brush provided for the purpose; the brush ensures even contact between the metal master and the plate, and this causes optimum transfer of the image. The image is then made permanent on the surface of the metal master by fusing in the Heat Fuser. Only chemically-etched metal plates may be used in Xerography.

FINAL OPERATIONAL TESTS

After installation of 1385 units, make Xerocopies of suitable subjects on samples of all transfer media to be used, and involve the use of all the units of the installation in the making of these Xerocopies.

During these serviceability checks, determine the most suitable exposure times to obtain good images, and the shortest times in which the images are properly fused. Leave this information with the operator for use by the C.R.O. or the person who will train the operator.

The engineer installing this equipment must remove any test chart and any copies made from such a test chart after the installation is completed.