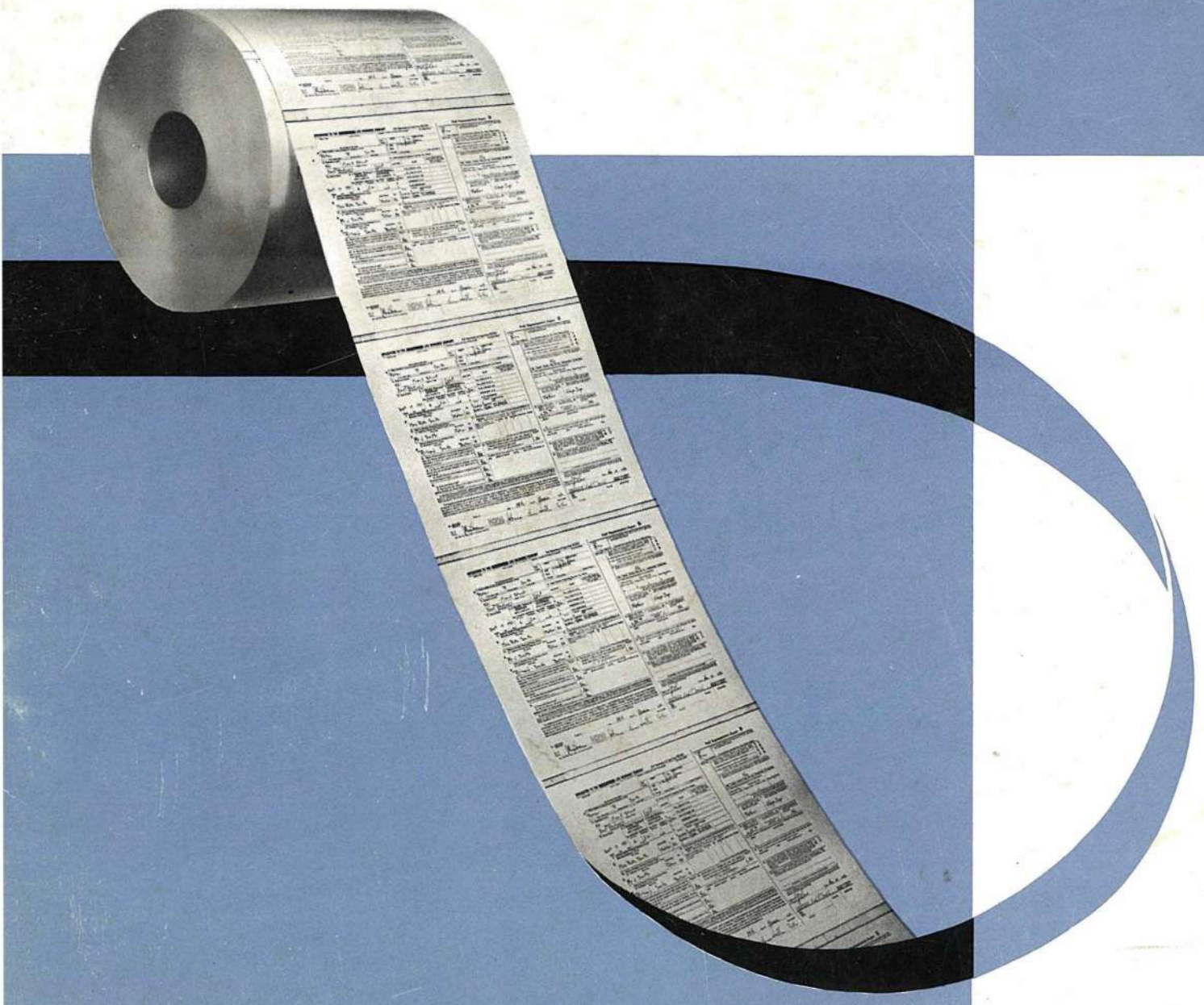
OPERATING MANUAL FOR

XEROX® COPYFLO® 11

CONTINUOUS PRINTER



Specifications

Over-all Dimensions	
Model No. 1:	74 in. by 33 in. by 90 in. high
Model No. 2:	86 in. by 40 in. by 77 in. high
Model No. 3:	86 in. by 40 in. by 90 in. high
Recommended Space	10 ft by 15 ft plus work handling area (36 in. minimum access for rear and right side)
Approximate Weight	
Model No. 1:	1800 lb
Model No. 2:	2000 lb
Model No. 3:	2200 lb
Power Requirements	
Line service:	240-volt, 60-cycle, single-phase (three-wire)
Power consumption:	4800 watts maximum on start-up 4000 watts maximum during operation
Current rating:	25 amperes each leg for Model No. 1 28 amperes each leg for Models No. 2 and No. 3
Inputs	
Microfilm head:	16- or 35-mm roll microfilm, positive or negative (not intermixed), perforated or unperforated. 100-ft maximum reel size.
Opaque head:	Opaque or translucent originals, from 5 to 24 in. wide, 0.002 to 0.010 in. thick. 3½ in. minimum length.
Output	Continuous single copies at 20 ft/minute. 11 in. maximum copy width on paper stock from 4½ in. to 12 in. (Paper width limited to a maximum of 11 in. on cutter models.)
Printing Papers	
Types:	XeroX Copyflo Classes A-100% Sulphite 0.005 in., B-100% Linen Ledger 0.005 in., C-20 lb Sulphite 0.0035 in., K-19 lb Sulphite, or equivalent; XeroX Copyflo Vellum or equivalent; Offset master stock.*
Form:	Rolls up to 12 in. diameter, and from 4½ in. to 12 in. wide.
Magnifications	
Microfilm head:	7, 7.5, 8.5, 9, 9.5, 11, 12, 13, 14, 15, 17, 18, 19, 22, and 24 diameters.
Opaque head:	45.8, 50, 55, 60, 65, 70, 75, 80, 90, 100, 120, 140, 160, 180, and 200%.
Cutter Data	
Paper size limits:	0.0025 to 0.012 in. thick, 4½ to 12 in. wide.
Minimum cut interval:	3 in.
Variation from selected position of cut:	⅛ in.
Type:	Solenoid-activated guillotine and stationary bed knife.

* Offset master stock is not available through Haloid Xerox Inc. but can be obtained directly from the various manufacturers of offset materials.

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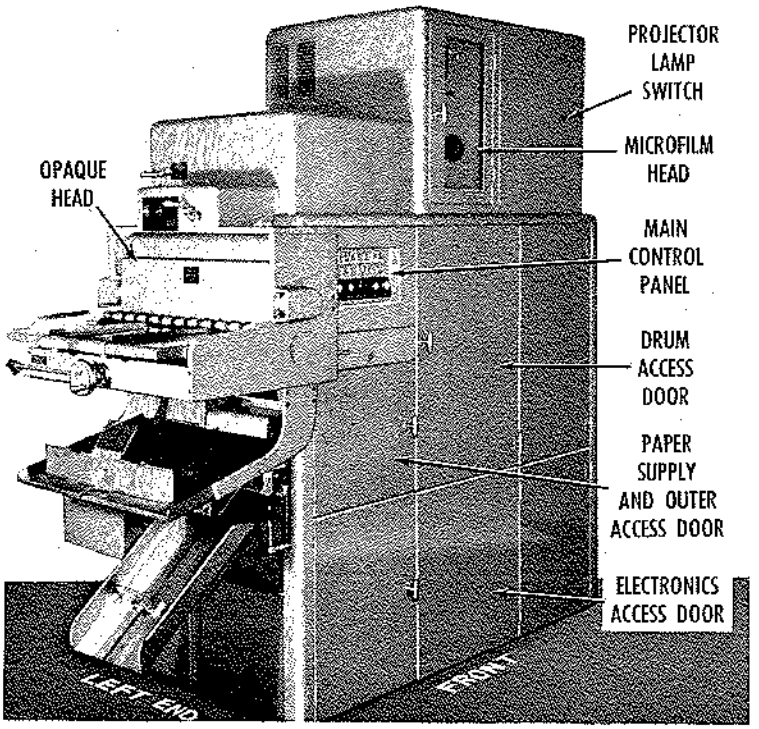
Introduction

This manual has been prepared to provide operation and routine service instructions for operators of the Copyflo 11 Continuous Printer.

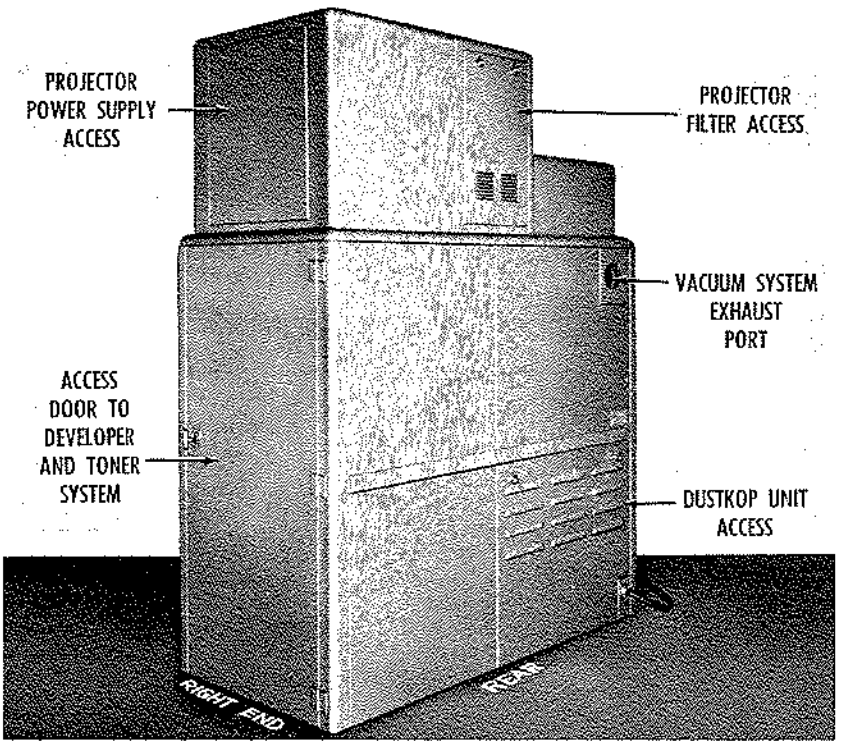
To aid in the understanding of the machine's function, brief discussions of its design and principles of operation are included.

To insure optimum performance, it is recommended that this manual be thoroughly read and understood before operating the machine, and that the instructions contained be followed carefully.

These instructions apply, as indicated, to all models (1, 1C, 2, 2C, 3, and 3C) of the Copyflo 11 Continuous Printer, including early production models requiring slightly different operating procedures.



Left-Front View



Right-Rear View

Figure 1. Model No. 3C Copyflo 11 Continuous Printer

Description and Data

GENERAL

The Haloid XeroX Copyflo Continuous Printer is designed to reproduce positive single copies continuously from original documents or from roll microfilm, by xerography.

This process provides dry, positive prints at the rate of 20 feet per minute on a continuous roll of plain unsensitized paper. Copy can also be produced on translucent or offset material for use with other reproduction methods.

The machine consists essentially of two major components (see figure 1); the projection head (microfilm, opaque copy, or both), and the processor.

The processor forms the body of the machine and houses the xerographic system and associated equipment. The selenium plated xerographic drum is centered in the upper portion of the processor to receive the projected image from either head. The drum is independently driven at a constant speed and the projection speed is then synchronized accordingly for each magnification.

The toner and developer system is contained in the right end of the processor, with the developer conveyor running vertically from top to bottom. The paper supply roll is located below the drum so that the web contacts the lower left quadrant of the drum and passes through the fuser and out the left end of the processor to the take-up roll or print cutter.

Electronic components are housed in the base of the processor below the drum and paper drive system.

The removable Dustkop unit is housed in the lower rear of the processor and is accessible for removal and service through a panel door.

MODEL NO. 1

The XeroX Copyflo Model No. 1 is equipped with the microfilm projection head as shown in figure 2. This model reproduces from 35-mm or 16-mm roll microfilm. The film can be positive or negative, perforated or unperforated. Positive and negative film cannot be intermixed on the same roll, however, as reproduction from each type requires different developers as discussed under "Operator Maintenance." The Model No. 1 has an enlargement range of 7 to 24 diameters in the 15 steps listed in the "Specifications" table.

The projection head is mounted on top of the processor so that the optical path is direct from the film through the lens system to the xerographic drum. The 24-mm, 35-mm and 50-mm lenses are turret-mounted so that the lens required for the desired magnification can be rotated into the optical path. The microfilm is mounted on a removable carriage which incorporates an adjustment for centering. A separate film carriage is required for each film size.

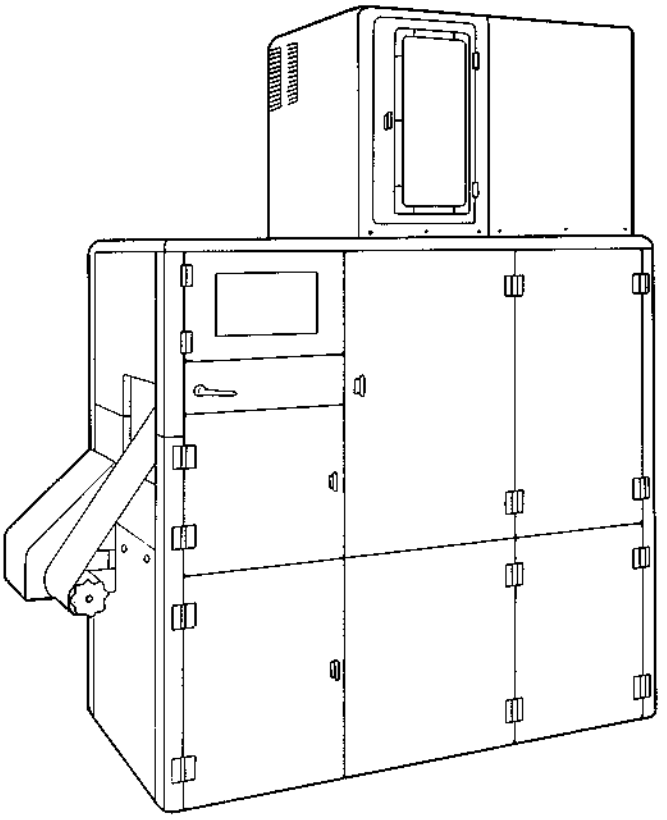
MODEL NO. 2

The XeroX Copyflo Model No. 2 has the opaque copy head and is used for the reproduction of opaque or translucent originals. The opaque head is mounted on the left end of the machine as shown in figure 2. Documents are fed horizontally with the copy up, thus the optical system requires two mirrors to direct the optical path to the drum.

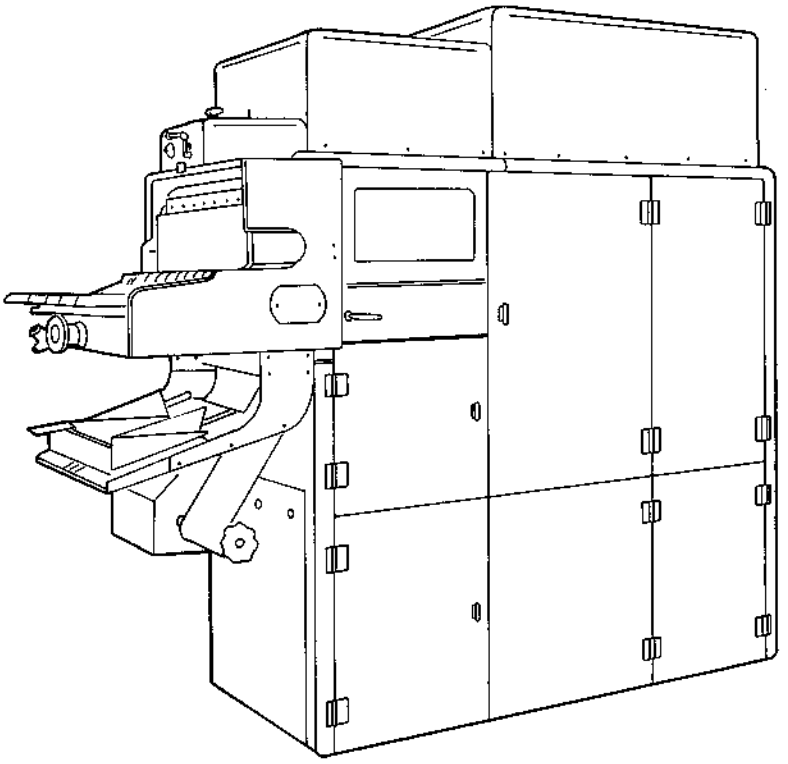
The opaque head consists essentially of an endless belt that carries the copy under an illuminating lamp and mirror, which reflects the image to the objective lens. These enclosed components comprise the copy box that can be moved in and out, as a unit, with respect to the processor. This adjustment, plus the variable lens position and belt speed, allows magnifications of from 45.8 to 200 per cent in the 15 steps shown in the "Specifications" table. Documents may vary from 5 to 24 inches in width and from 3½ inches up in length.

MODEL NO. 3

The XeroX Copyflo Model No. 3 (see figure 1) combines all of the features of Models No. 1 and No. 2 and can be conveniently changed from microfilm operation to opaque copy operation and vice versa. For opaque head operation, a first surface



Model No. 1



Model No. 2

Figure 2. Model No. 1 and No. 2 Copyflo 11 Printers

mirror is positioned above the drum to direct the optical path from this head to the drum. For microfilm operation this mirror is pivoted out of the way so that the microfilm image falls on the drum.

CUTTER MODELS

All of the Copyflo 11 models described above are available with an automatic print cutter. These models are then designated No. 1C, 2C, or 3C. The print cutter is installed to the right of the web take-up roll on the left end of the machine as shown in figure 1. A solenoid-operated guillotine-type blade cuts the web between prints and stacks them in the cutter tray. The cutter is photoelectrically controlled by a signal marking and pick-up system as described in "Principles of Operation."

EARLY PRODUCTION MODELS

A number of early production models of the Copyflo 11 are of a slightly different design than the current models illustrated in this manual. The differences are chiefly in certain controls and instrumentation.

On early models the running time meter is located on the left end of the machine and the main control panel comprises the following items:

(a) Standby, Run, Developer, and Toner toggle switches
(b) Toner adjustment (rate) control
(c) Electrometer switch
(d) Plate voltage gain control and voltmeter

Early opaque head models incorporate an auxiliary "RUN"/"OFF" switch adjacent to the running time meter, and have a slightly different arrangement of the head controls.

Precleaning corotron switch for early Model No. 2 and No. 3 printers is located on the corotron power supply which is mounted at the rear of the machine.

Other minor design differences are indicated where pertinent in this manual.

CAPABILITIES

The photoexact xerographic process enables the Copyflo 11 to reproduce anything that is written, printed, typed, or drawn. The positive (black or white) single prints are made at the rate of 20 linear feet a minute from either positive or negative originals (not mixed).

Colored originals can be reproduced as black and white, however, the machine is not recommended for the reproduction of continuous tone illustrations or large (greater than ⅛ inch) solid areas.

Original and copy size limitations, magnifications, and other leading particulars are presented in the table of "Specifications."

ORIENTATION

In this manual, reference is made to the front, back, right-hand, and left-hand sides of the printer. These are defined with respect to an operator facing the control panel, or front of the machine. Thus, the side opposite the control panel is the back, the left-hand side is that where the paper emerges on the take-up roll, and the right-hand side opposite this. Figure 1 shows various views of the printer with the four sides labeled to clarify orientation.

Operating Instructions

The following paragraphs contain step-by-step procedures for starting, running, and stopping the Copyflo 11 printer during normal operation. Instructions for setting up the machine and other techniques related to operation are covered in subsequent sections of the manual.

All controls and instruments referred to in the various instructions are listed in the following table and illustrated in figures 1 through 12.

CONTROLS AND INSTRUMENTS

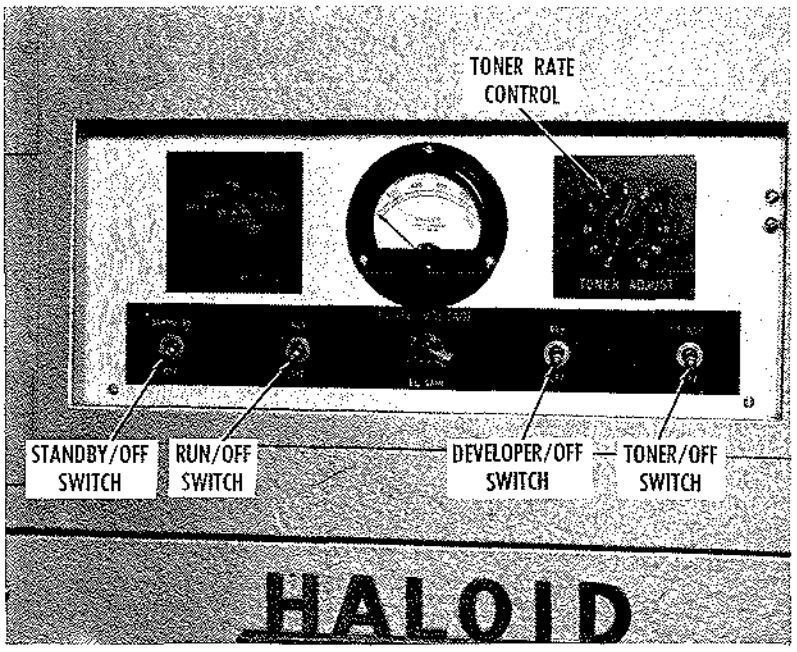
Item	Nomenclature	Function	Illustration
	Microfilm Head (Models 1, 1C, 3, and 3C)		
1.	Microfilm Projector Lamp Starting Switch	Energizes projector lamp	1
2.	Lens Turret Detent Lever	Locks turret	5
3.	Lens Turret	Pivots desired lens into light path	5
4.	Lens Barrel	Transfers film images to drum	5
5.	Film Thickness Focusing Lever	Fine focus compensation for film thickness	5
6.	Focusing Handwheel	Sets lens-to-image distance	5
7.	Focusing Handwheel Lock	Locks handwheel	5
8.	Film Speed Shifting Lever	Synchronizes film speed with drum for each magnification	5
9.	Projector Drive Switch	Energizes projector drive system	5
10.	Film Centering Adjustment Knob	Shifts film laterally to center image on drum (and web)	5
	Opaque Head (Models 2, 2C, 3, and 3C)		
11.	Exposure "LIGHT" Switch	Energizes copy box lamp	6
12.	Lens Setting Control	Sets lens-to-image distance	6
13.	"LENS SETTING" Counter	Indicates lens position	6
14.	Copy Box Position Control	Sets object-to-lens distance	6
15.	Copy Box Position Counter	Indicates copy box position	6
16.	Belt Speed Control	Sets copy belt speed	6
17.	"BELT SPEED" Counter	Indicates belt speed	6
18.	Document Guides	Guide copy into copy box	6
19.	Belt Transmission Control Switch	Engages belt drive	6

CONTROLS AND INSTRUMENTS (Continued)

Item	Nomenclature	Function	Illustration
	Opaque Head Models (2, 2C, 3, and 3C)		
††20.	Auxiliary "RUN"/"OFF" Switch	Stops machine (for emergency use only)	6
21.	Lens Stop Control	Sets lens aperture	12
	Processor (all models except as noted)		
*22.	Pivoting Mirror Lever	Positions mirror to reflect image from either head to drum	4
23.	Exposure Aperture Control	Sets width of exposure slit	4
†24.	Cutter Marker Lamp Control	Laterally positions cutter marker lamps	4
‡25.	"OFF" Push button	Immediately shuts down machine	3
‡26.	"STANDBY" Push button	Sets up circuits for running	3
‡27.	"RUN" Push button	Starts machine	3
‡28.	"STOP" Push button	Stops running (after time delay)	3
‡29.	"PROJECTOR" Selector Switch	Energizes power supply to desired projector head	3
30.	Paper Drive Rolls Pressure Handle	Engages paper drive rolls	9
**31.	Cutter Drive Rolls Pressure Handle	Engages cutter drive rolls	9
32.	Fuser Variac	Controls fuser voltage	10
33.	Running Time Meter	Records running time	6 or 10
34.	Toner Rate Control	Controls rate of toner dispensation	3 or 10
‡35.	"TRANSFER" Grid Polarity Switch	Controls polarity of transfer grid	10
††36.	"H. V. REVERSING" Switch	Controls polarity of transfer grid	10
‡37.	"PRECLEAN" Corotron Switch	Energizes precleaning corotron	10
38.	Toner Inspection Lamp	Illuminates toner supply jar and well	7
39.	Toner Orifice Plate Lever	Opens toner supply orifice	7
‡40.	Developer Conveyor Switch	Energizes conveyer for automatic or independent operation	8
41.	Chute Access Door	Filling and inspection access to developer system	8
42.	Chute Emptying Door	Developer system drain	8
43.	Conveyor Sump Door	Conveyor sump drain	8
44.	Dustkop Shaker Crank	Agitates Dustkop filter to remove loose dust	11
45.	Vacuum Manometer	Indicates vacuum system pressure	11
††46.	"STANDBY"/"OFF" Switch	Sets up circuits for running	3
††47.	"RUN"/"OFF" Switch	Starts machine	3
††48.	"DEV"/"OFF" Switch	Starts developer conveyor	3
††49.	"TONER"/"OFF" Switch	Starts toner feeding	3

*Used on Models 3 and 3C only.
**Used on Models 1C, 2C, and 3C only.
†Used on Models 2C and 3C only.
‡Used on late model Copyflo machines only (see "EARLY PRODUCTION MODELS," page 7).
††Used on early model Copyflo machines only (see "EARLY PRODUCTION MODELS," page 7).

Current Models



Early Models

Figure 3. Main Control Panel

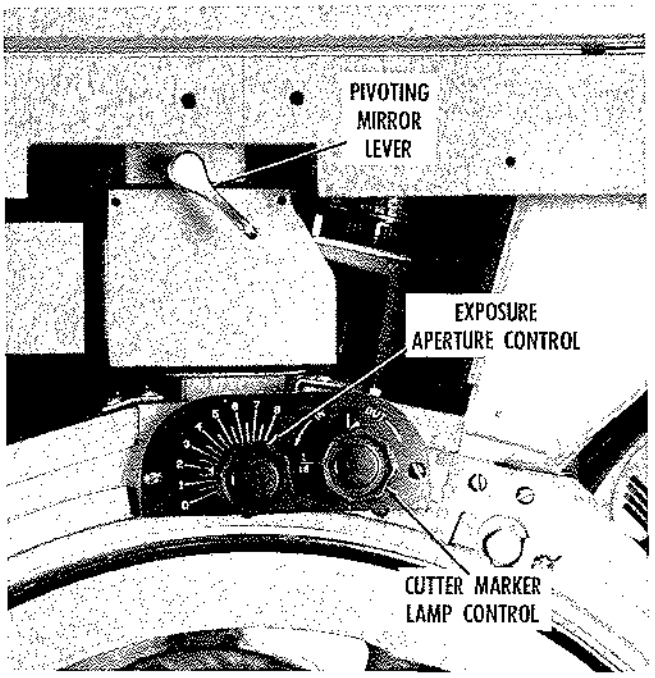


Figure 4. Mirror, Exposure, and Cutter Marker Controls

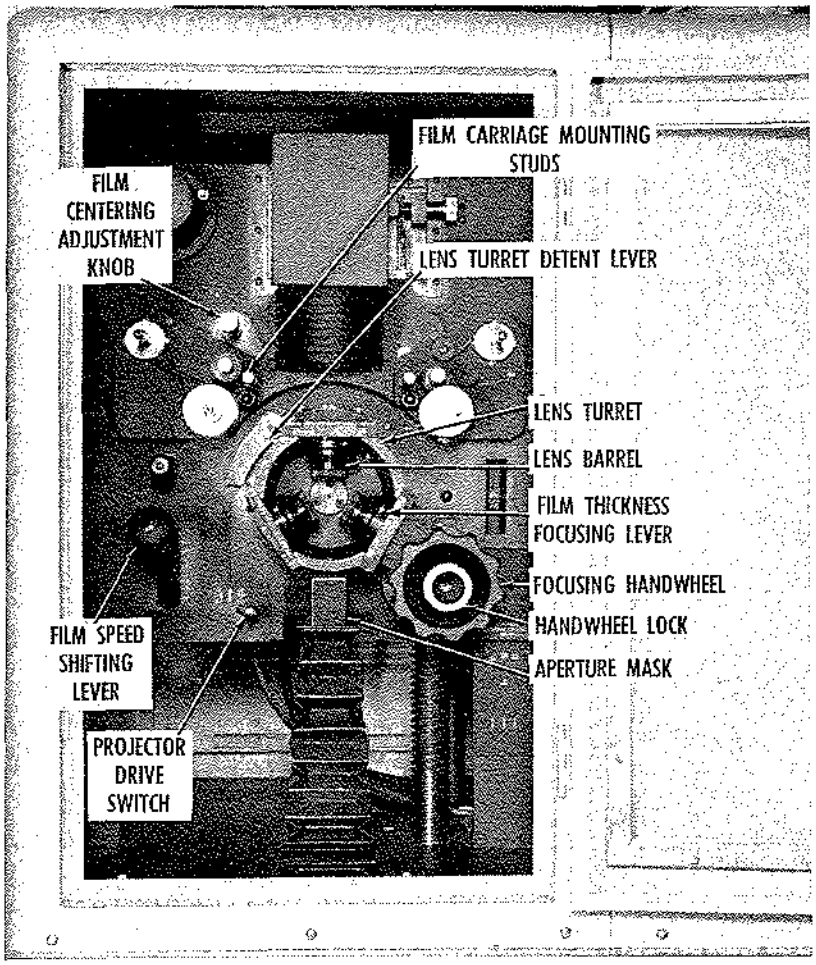
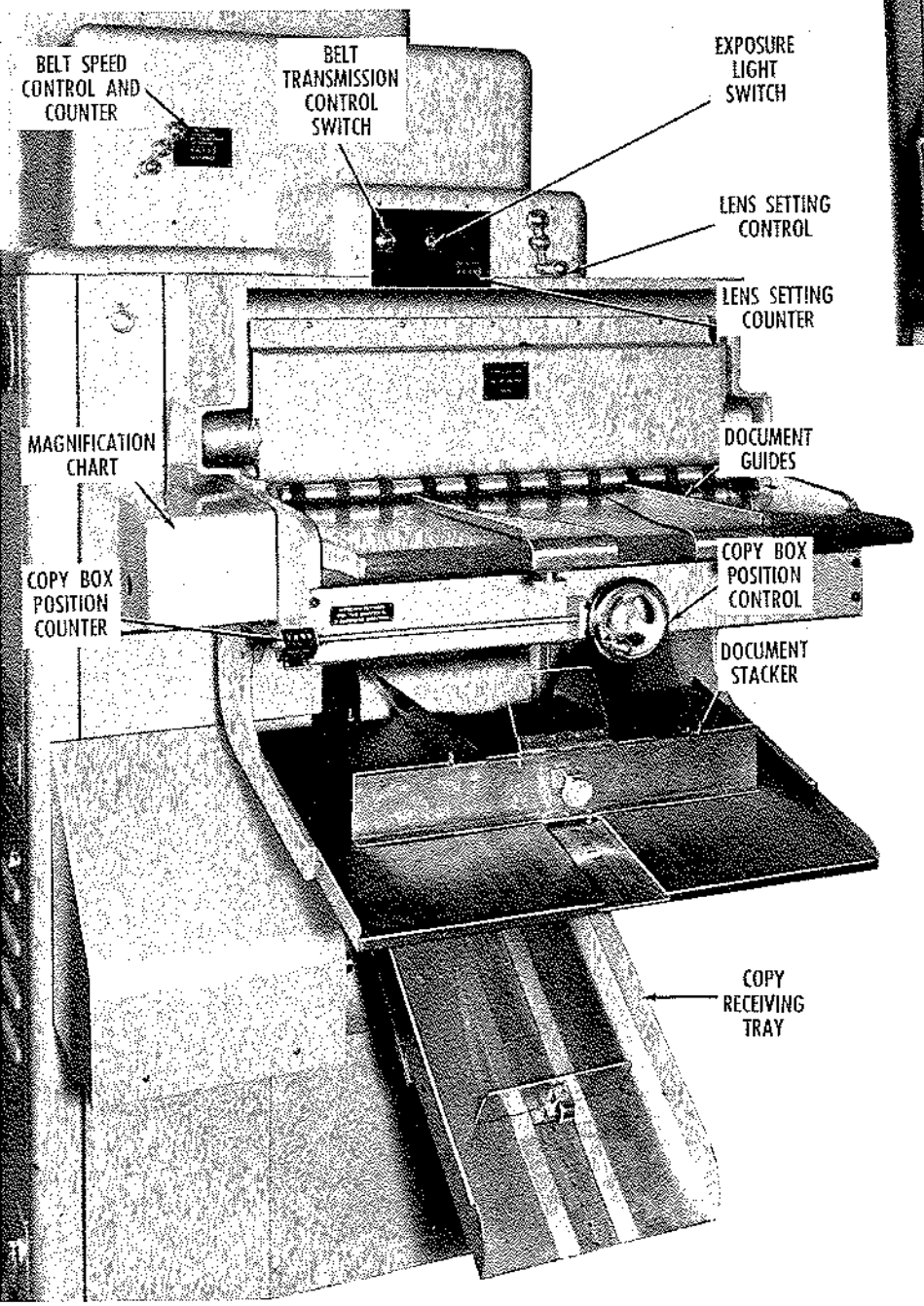
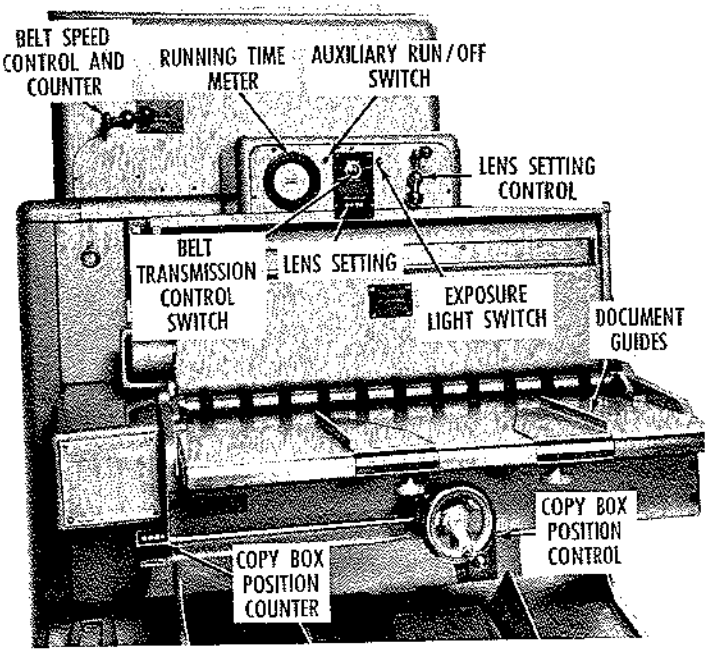


Figure 5. Microfilm Head Controls





Early Models

Figure 6. Left End of Printer Showing Opaque Head Controls

Figure 7. Upper-Right End of Processor

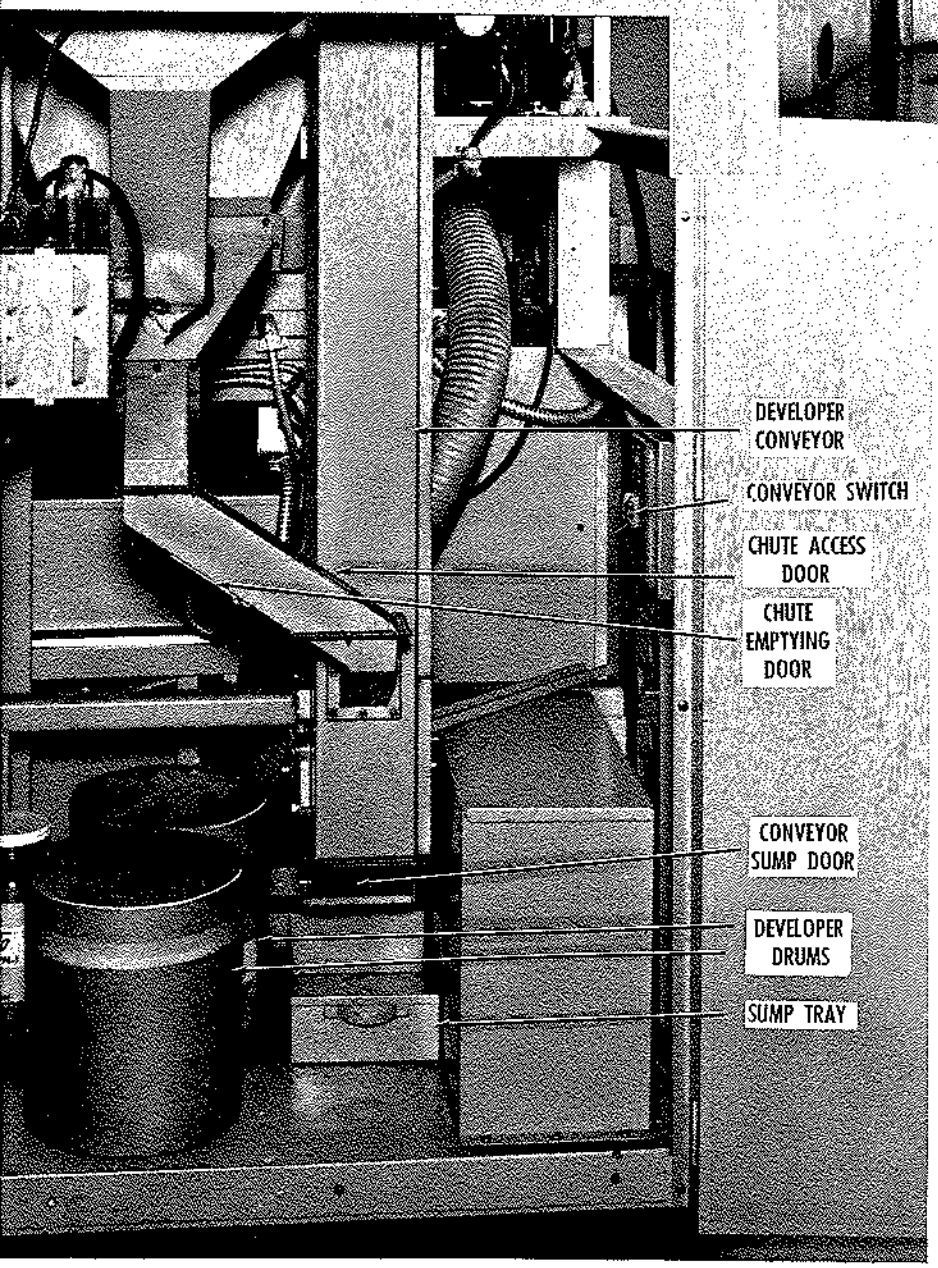


Figure 8. Right End of Printer Showing Developer System

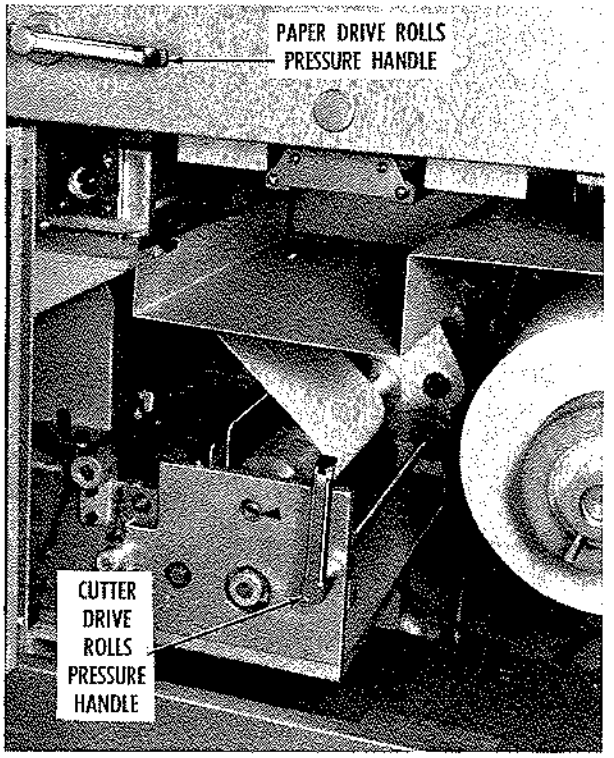
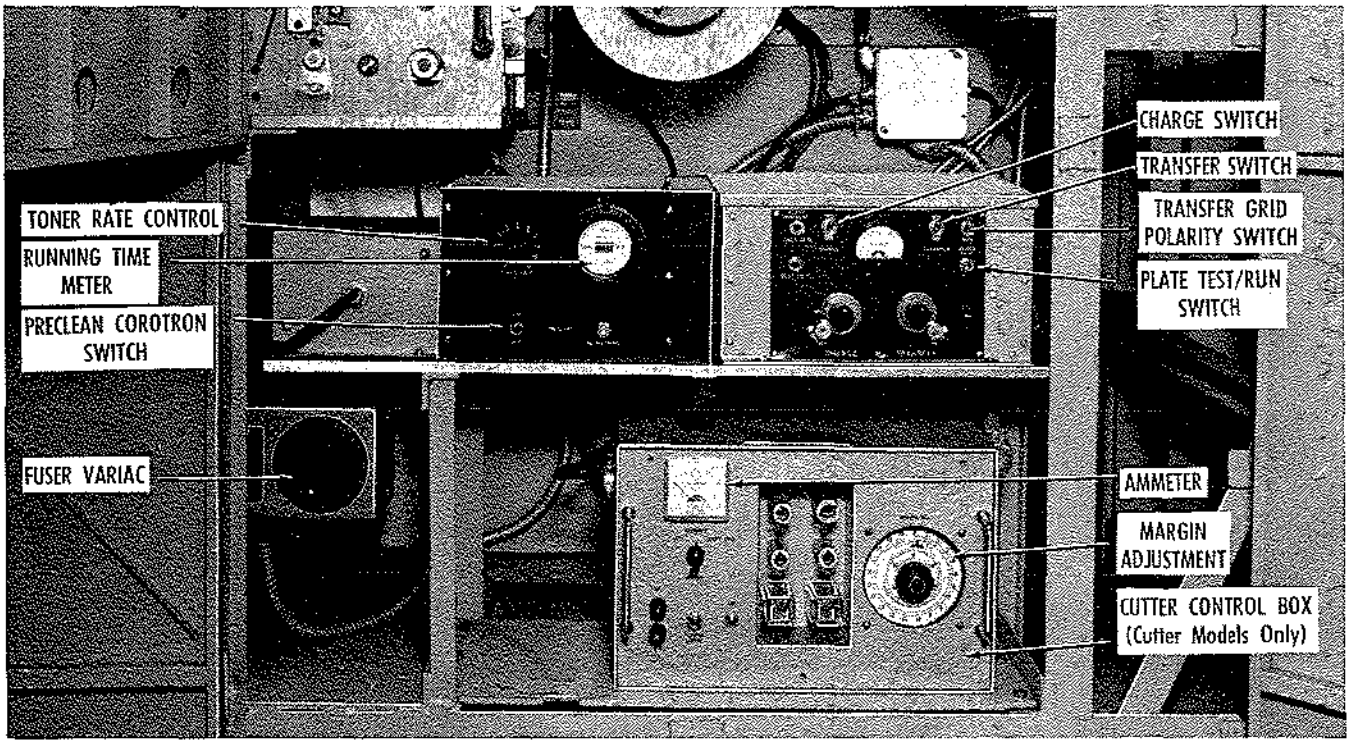
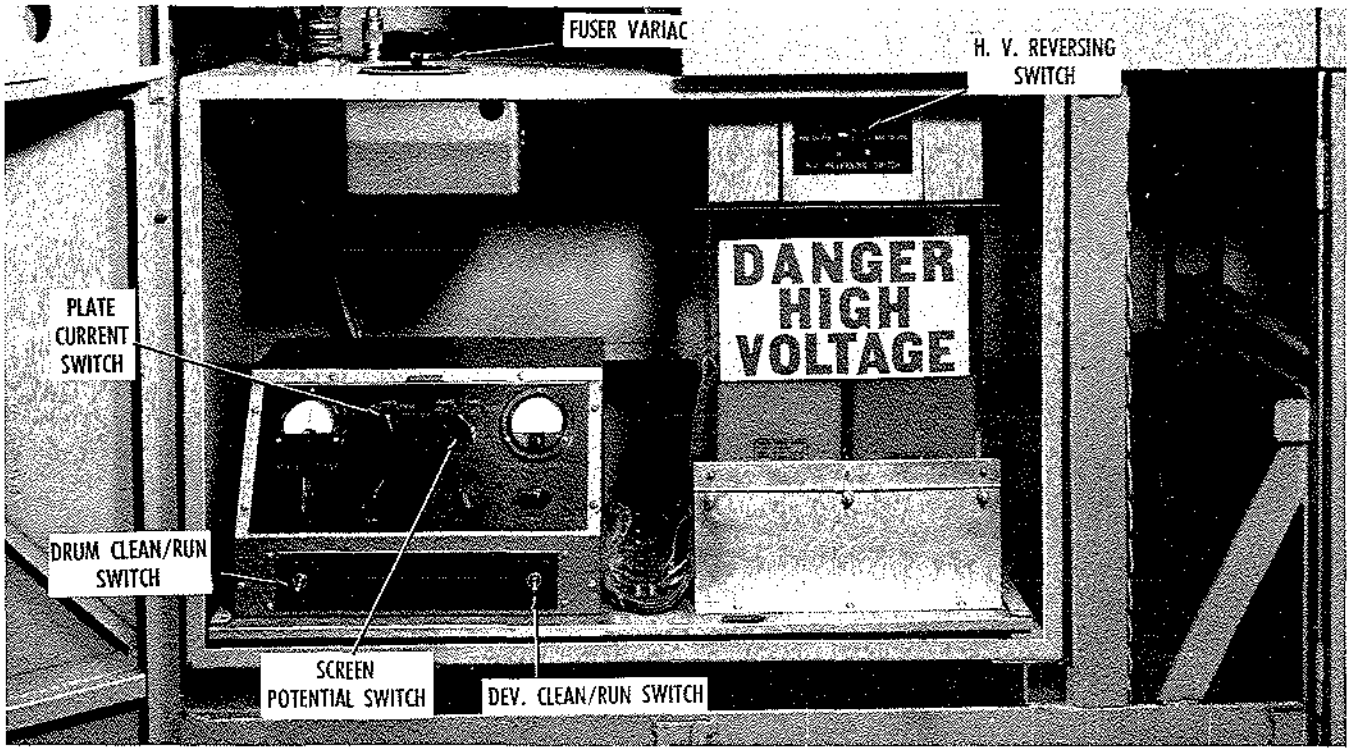


Figure 9. Processor and Cutter Drive Roll Controls



Current Models



Early Models

Figure 10. Electronics Section

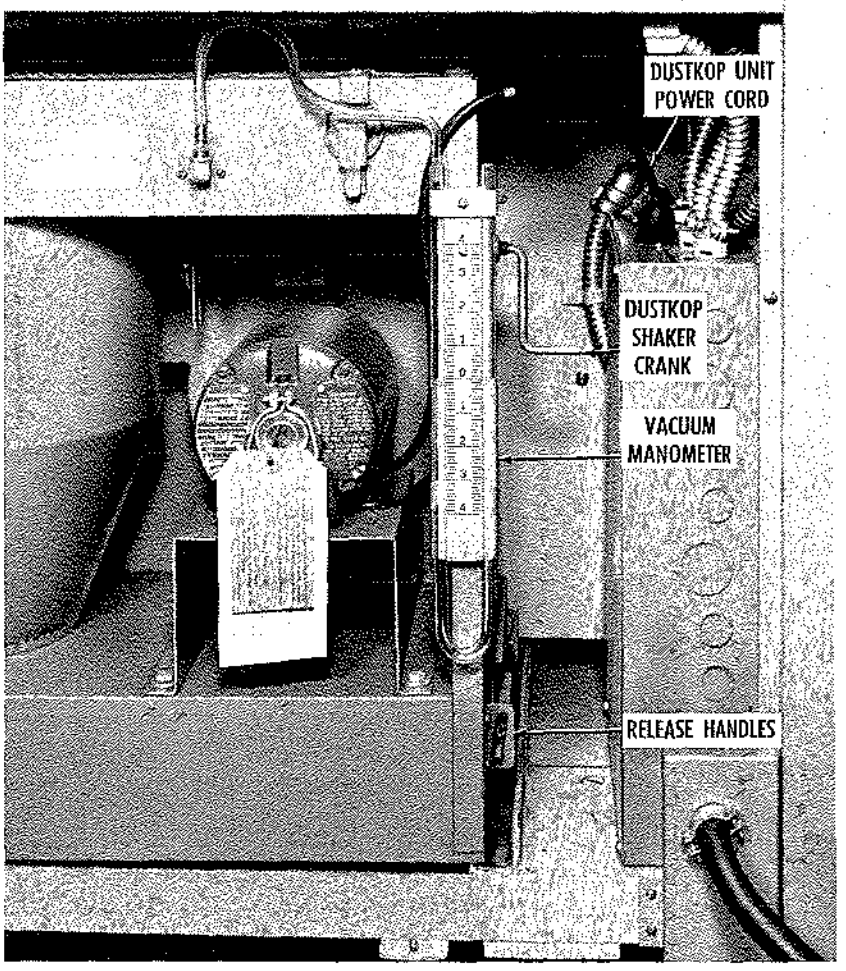


Figure 11. Dustkop Unit

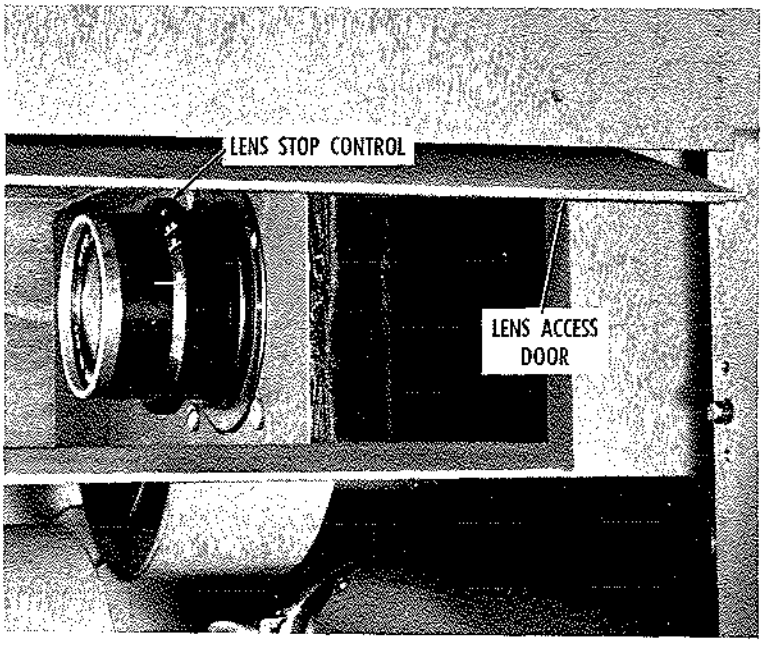


Figure 12. Opaque Head Lens

STARTING PROCEDURE

Listed below are the steps to be followed when starting the printer. The list includes both pre-operational checks and control settings for starting. It is not necessary, of course, to make all of these checks when the machine is started after short, temporary stops. All checks must be made when initially starting the machine with a new set-up, and it is recommended that all checks be made at the initial start of each day of a long term set-up.

In the following list, attention is called to differences in operating controls or procedures for early models of the Copyflo 11. Parenthetical numerical references are to item numbers in the table of "Controls and Instruments" on page 8.

	Model Applicability					
	1	1C	2	2C	3	3C
1. Check that wall power supply switch is on.	X	X	X	X	X	X
2. Check pivoting mirror lever (22) position. (Handle should be vertical for microfilm or at "4-o'clock" position for opaque head.)					X	X
3. Check that projector selector switch (29) is set for desired projector head ("MICROFILM" or "OPAQUE").	X	X	X	X	X	X
4. Depress "STANDBY" button (26). (On early machines turn on "STANDBY" toggle switch (46) at main control panel.)	X	X	X	X	X	X
5. For microfilm operation:						
a. Check that film is properly loaded (see page 21).	X	X			X	X
b. Turn on lamp switch (1) by holding the switch in its full clockwise position until the lamp lights.	X	X			X	X
c. Check that projector magnification and speed settings are correct (see page 22).	X	X			X	X
6. For opaque head operation:						
CAUTION: Before proceeding be sure that the lamp head is lowered, that the lead in roller is in place, and that there are no loose objects on the feeding tray or belts.						
a. Set belt transmission switch (19) at "FWD".			X	X	X	X
b. Turn on lamp switch (11) and allow a 5-minute warm-up.			X	X	X	X
c. Check that the belt speed, copy box, and lens settings are set properly in accordance with the magnification chart (see page 22). Note that when these settings are altered, the final setting is always approached by a clockwise rotation of the respective control.			X	X	X	X
d. Check that the feed guides and stacker tray are adjusted to the document size.			X	X	X	X

	Model Applicability					
	1	1C	2	2C	3	3C
e. Check that the lens aperture setting (21) is correct and that any filter required is in place (see page 23).			X	X	X	X
f. On cutter models, check that marker lamp control (24) is set properly (see page 20).				X		X
7. Check that exposure aperture control (23) is set properly (see page 23).	X	X	X	X	X	X
8. Check that paper is installed and correctly threaded, and that the paper size is compatible with the magnification (see page 19).	X	X	X	X	X	X
9. Check that grid polarity switch (35) is set properly. ("Pos" when reproducing from positive film or documents, and "NEG" when reproducing from negatives.) On early machines this setting is made at "H. V. REVERSING SWITCH" (36).	X	X	X	X	X	X
10. Check that the Dustkop is properly installed, crank shaker (44), and check manometer (45) fluid level (see page 26).	X	X	X	X	X	X
11. On models having conveyor switch (40), check that it is in the down position for automatic conveyor control.	X	X	X	X	X	X
12. Check that chute doors (41 and 42) are closed.	X	X	X	X	X	X
13. Check that toner orifice lever (39) is open and that toner supply is adequate (see page 25).	X	X	X	X	X	X
14. Check that developer supply is adequate and the type correct (see page 32).	X	X	X	X	X	X
15. Check that preclean corotron switch (37) is set properly for the film type. "ON" for positive originals, "OFF" for negative.	X	X	X	X	X	X
16. Check that toner rate control (34) setting is nominal (1½-2½) or at correct predetermined setting (see page 25).	X	X	X	X	X	X

17. When above checks are satisfactorily completed, the machine is ready to operate and is started by depressing the "RUN" button (27), and holding it depressed for two or three seconds.

As the "RUN" button is depressed, the processor starts immediately. For opaque head operation a 15-second delay is required before feeding documents. On the microfilm head this delay is timed automatically before the projector drive starts. In either case the first print is completed 15 seconds after exposure.

NOTE

Early machines are started by turning on the "DEV," "TONER," and "RUN" switches (48, 49, and 47).

COPY MONITORING

As a run is started the operator should observe the first prints completed to see that the image is properly centered and that exposure and toning is as desired.

To center prints made from microfilm, turn adjustment knob (10) clockwise to move the image toward the front edge of the web, or counterclockwise to move it toward the back edge. Prints made from opaque copy are centered by repositioning the document guides (18). Moving the guides to the right moves the image to the left.

If corrections to the toner, fuser, exposure, or cutter settings are required, refer to the applicable operating techniques (see page 19). The print quality trouble-shooting chart on page 27 will aid in the determination of the corrections required.

STOPPING PROCEDURE

The machine can be stopped temporarily without complete shutdown to allow the operator to leave the machine, or to remove prints, reload film, restore paper supply, etc.

This procedure, described below as "Normal" stopping, is a partial shutdown which stops the processing but leaves the microfilm head lamp or the opaque head lamp and belts energized.

Complete shutdown, as would be required overnight or for maintenance procedures is described below as "Shutdown."

The "Emergency" stopping procedure should only be used to prevent impending damage to the machine or personal injury.

Parenthetical numerical references in the procedures below are to item numbers in the table of "Controls and Instruments" on page 8.

Normal Stopping

On current models normal stopping is accomplished simply by pushing the yellow "STOP" button (28). After the "STOP" button is pushed the various processing operations cease automatically in the proper sequence. The microfilm projector (if being used) stops the film drive immediately and the xerographic system completes any prints in process before stopping.

If, after opaque head operation, it is desired to turn off the lamp and belts, turn light switch (11) to "OFF" and belt control switch (19) to off (centered). On relighting, the lamp will require a 5-minute warm-up.

NOTE

To stop early machines proceed as follows:

1. Stop feeding documents or (for microfilm) turn projector drive switch (9) to "STOP."
2. Turn "DEV" switch (48) to "OFF."
3. Turn "TONER" switch (49) to "OFF."
4. Allow last print to emerge from machine, then turn "RUN" switch (47) to "OFF."

Shutdown

To shut down the printer completely proceed as follows:

1. Stop the printer as in "Normal Stopping" above (turning off lamp and belt after opaque head operation).
2. Set projector selector switch (29) to "OFF."
3. Depress red "OFF" button (25) (or set standby switch (46) to "OFF").
4. Turn off the main disconnect switch in the power supply line to the machine.

Emergency Stopping

In an emergency the machine can be completely stopped immediately by depressing the red "OFF" button (25) or, on early machines, setting standby switch (46) to "OFF."

NOTE

On early opaque head machines an emergency stop can be made using auxiliary "RUN"/"OFF" switch (20).

CAUTION

Emergency stopping by means of the main disconnect switch should be avoided as this results in a developer jam which must be cleared before re-starting (see page 33).

Since an emergency stop shuts down the xerographic process immediately, prints in process will not be completed, leaving untransferred images on the drum and unfused images on the paper. Hence, when re-starting, it will be necessary to discard the unfinished prints and re-feed the documents or back up the microfilm.

Operating Techniques

This section contains instructions for the various techniques required for the operator to set up the printer for running and to control print quality.

THREADING PAPER WEB

Prior to threading, the operator must determine the paper type and web width to be used. The threading technique is the same for all types of paper except as noted. If the paper width is less than 11 inches, then one or more sets of spacers (see Appendix B) will be required to center the supply roll on its arbor.

The paper and spacers, if used, are placed on the arbor so that the web feeds clockwise off the top of the roll. These are secured firmly, with the end plate and retaining nut. The lead edge is then folded as shown in figure 13 to facilitate threading.

NOTE

Master stock should roll off the supply spindle with its coated side down, regardless of direction of rotation.

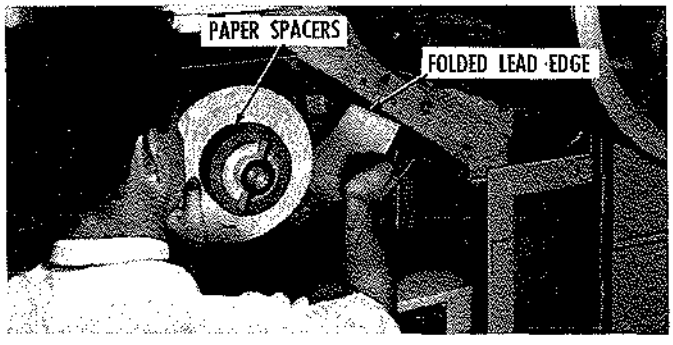


Figure 13. Paper Threading Technique

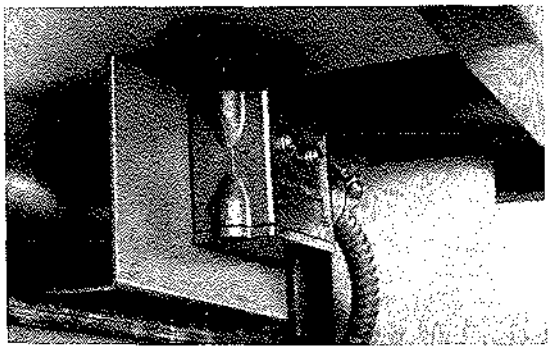


Figure 15. Paper Break Switch

With the drum withdrawn on its extension shaft (see steps 1 and 2, page 30), insert the folded edge of the web between the lower transfer grid roller and guide plate into the drum cavity (see figure 14). It is drawn over the transfer grid and fed out of the drum cavity over the upper transfer grid roller and through the adjacent snuff-out box. From the snuff-out box the web passes through the fuser (over the fuser pan rods), over the paper break switch (figure 15), and out between the drive rolls. The pressure on the drive rolls must be released by turning the pressure handle (see figure 9) counterclockwise to its vertical position and the paper break switch held depressed, as the web is fed out between the rollers. Enough paper should be pulled through to reach the take-up spindle, then with some tension on the web, the drive rolls are re-engaged by returning the release handle to its horizontal position.

With the web slackened and held down between the transfer grid and its upper roller, as shown in figure 16, reinstall the drum (see "Drum Cleaning," page 30).

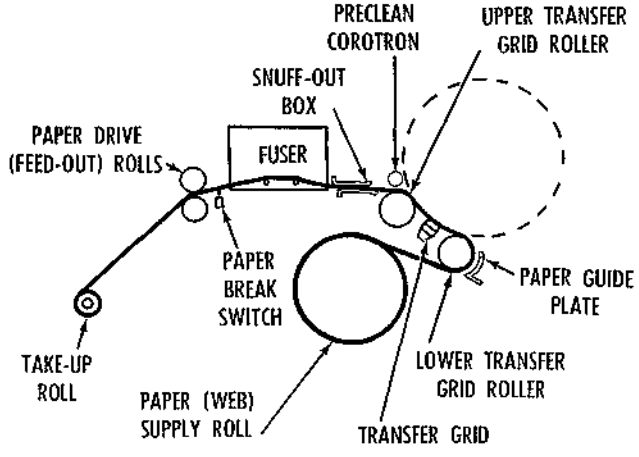


Figure 14. Paper Threading Diagram

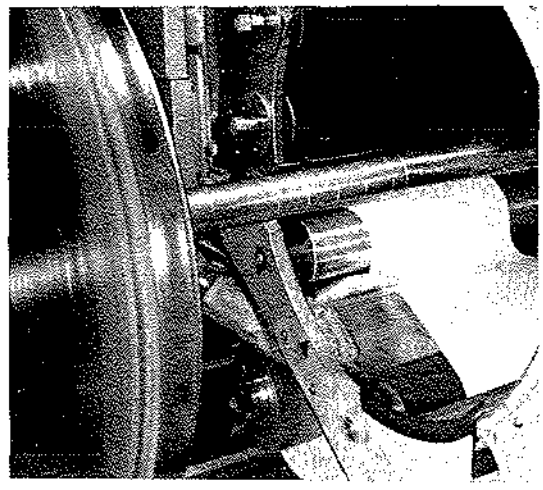


Figure 16. Web Slack for Drum Installation

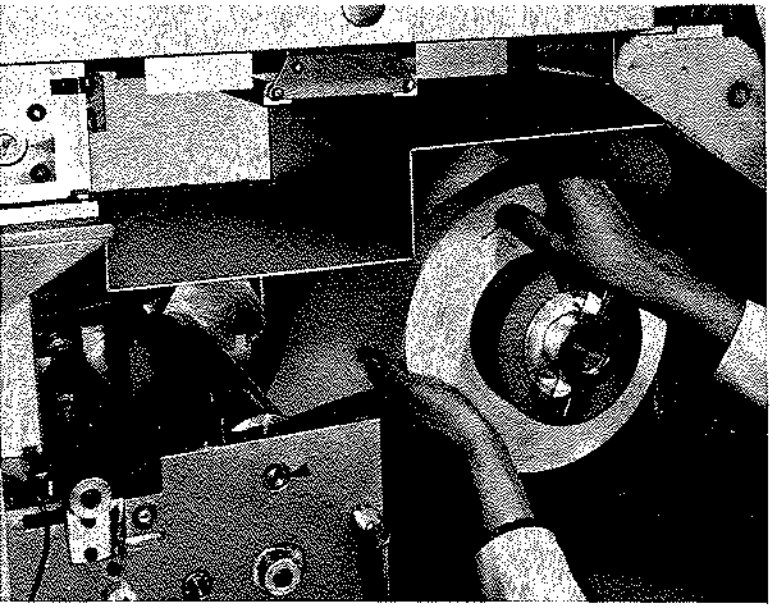


Figure 17. Cutter Threading Technique

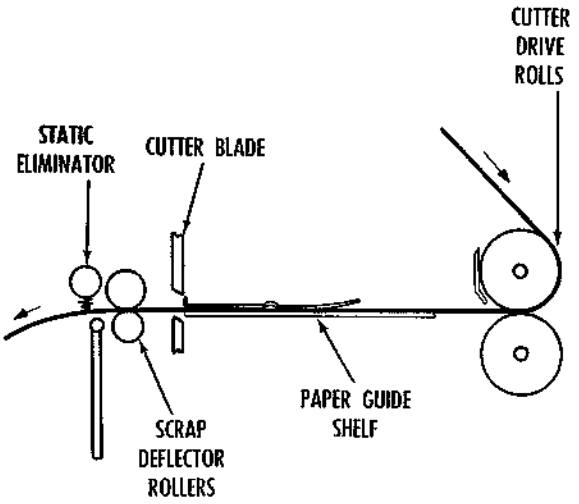


Figure 18. Cutter Threading Diagram

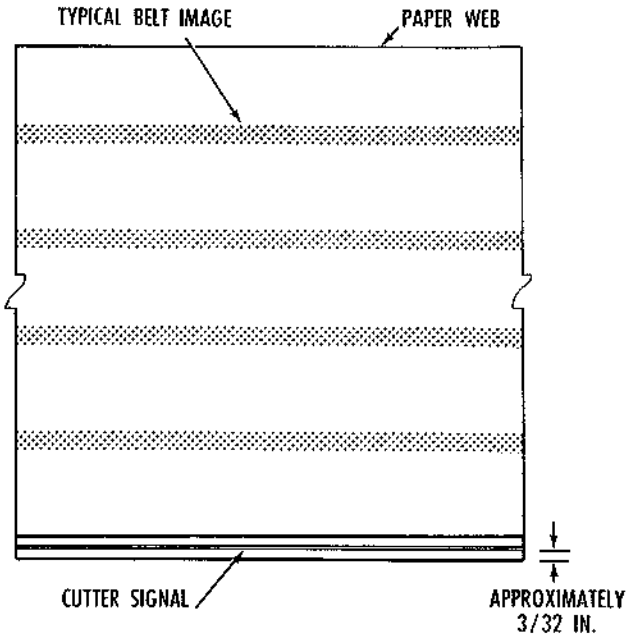


Figure 19. Cutter Marker Signal Position

When threading is complete rewind web slack onto the supply roll and tape the lead edge squarely to a take-up core installed on the take-up shaft spindle.

NOTE

The take-up core retaining knob should be only finger-tight to prevent its becoming over-tightened during operation. To feed out extra leader, set "PLATE TEST"/"RUN" switch (figure 10) to "PLATE TEST" (on early machines set "DRUM CLEAN"/"RUN" switch to "DRUM CLEAN").

Cutter Threading and Adjustment

Threading of cutter models is the same as instructed above up to the feed-out drive rolls. At this point the rolls are left open, however, and the web inserted back into the processor around the lower roller. With an ample loop of slack web, and the lead edge cut to form a "V", as shown in figure 17, the web is then inserted between the open cutter drive rolls. The paper passes through the cutter on its paper guide shelf as shown in figure 18, and out between the blade and bed knife. The scrap deflection rollers can be slightly separated manually to pull the web out between them and under the static eliminator. With slight tension on the web the cutter drive rolls are then engaged by turning their pressure handle (see figure 9) to its vertical position.

Adjustment of the cutter signal marker and cutter scanner is accomplished with the printer running (see page 16).

Models 2C and 3C are equipped with a marker lamp adjustment knob as shown in figure 4. During opaque head and cutter operation, this knob is used to position the signal on the paper edge as shown in figure 19. Clockwise rotation of the knob moves the signal mark toward the operator, and vice versa. One turn of the knob represents approximately ¼ inch on the web.

During microfilm operation on Model 3C the signal should be positioned off the paper edge, as the cutter is controlled by a filmed signal mark.

To adjust the cutter scanner, proceed as follows (see figure 20):

1. Loosen the scanner thumbscrew.
2. Position the scanner assembly along the mounting bar so that its centerline is over the center of the signal mark. The correct position is indicated by a maximum deflection to the left on the cutter control box ammeter (see figure 10), with the selector switch at "SCANNER."

3. Tighten the thumbscrew and observe cutter operation while feeding documents (or microfilm).

4. If necessary repeat step 2 to obtain proper cutter operation.

5. To vary the position of the cut with respect to the lead edge of the print, adjust the "MARGIN ADJUSTMENT" dial on the control box (see figure 10). If the cut occurs too far ahead of the print, increase the time setting; if the cut is in print area decrease the time. A one-second change on the "MARGIN ADJUSTMENT" moves the cut approximately 4 inches on the web.

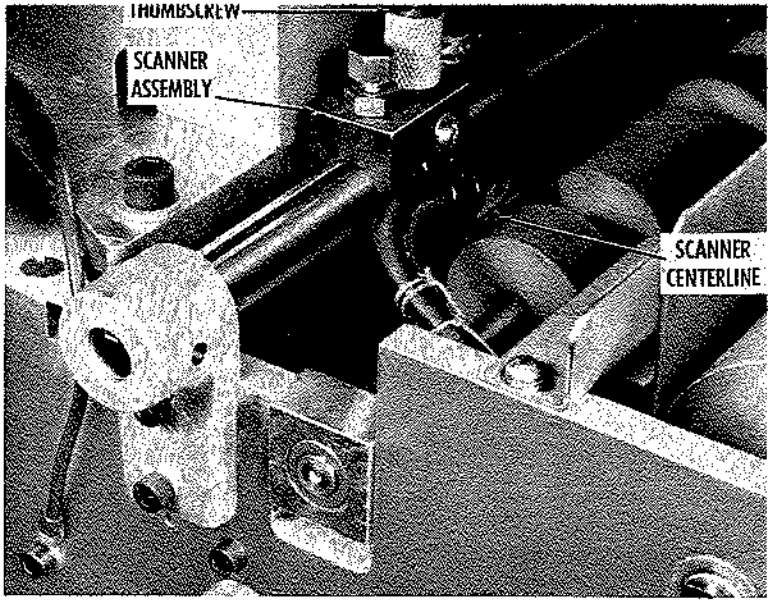


Figure 20. Cutter Scanner Adjustment

FILM PREPARATION AND LOADING (Microfilm Models)

Before setting up for microfilm operation check that the film carriage and take-up reel are the correct size (16-mm or 35-mm) for the film, and that both reels are compatible with the reel spindles. The reel recommended has a center hole which is round on one side and square on the other.

With the reel's square centerhole away from the viewer, the film should be oriented on the supply reel so that it turns counterclockwise from the top with the images right-reading from the underside (see figure 21).

If necessary, rewind the film to obtain the correct orientation as follows:

In general, wind film onto a supply reel so that it turns counterclockwise with emulsion side out for negative film and emulsion side in for positive film.

NOTE

When rewinding, it is recommended that the film be reeled against the back (projector) side of the reel.

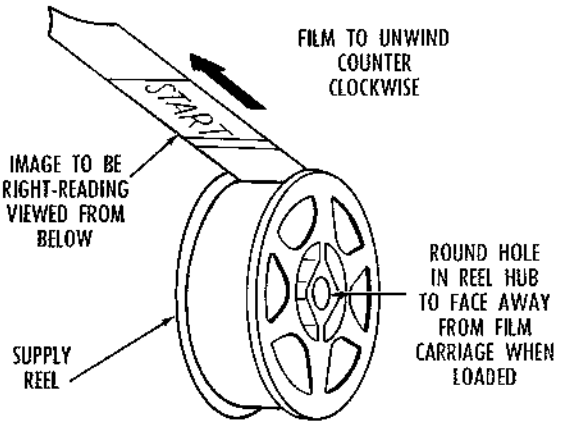


Figure 21. Film Orientation on Reel

The film carriage may be removed from the projector or left in place for threading. To remove the carriage, unscrew the film carriage mounting studs shown in figure 5. The take-up end of the carriage must be turned slightly toward the operator as it is taken from the projector housing (see figure 22).

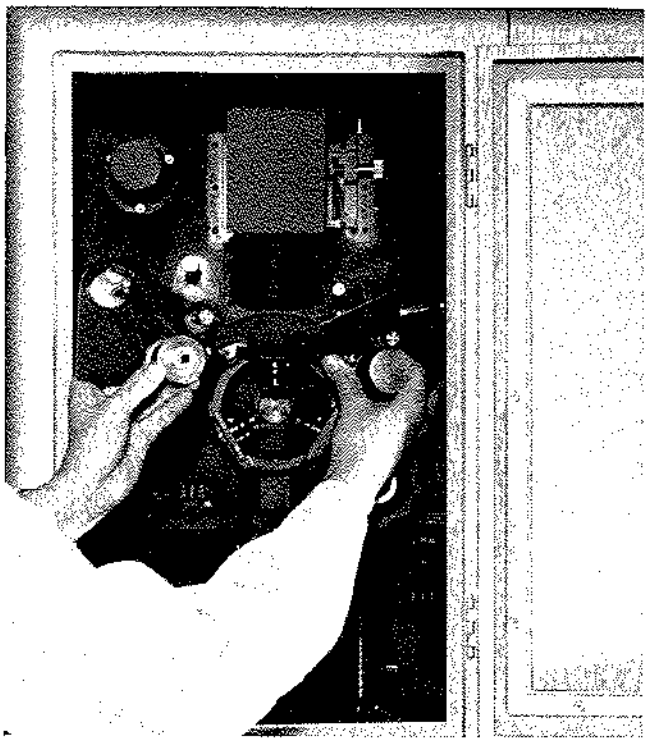


Figure 22. Film Carriage Removal

Load the film as follows (see figure 23):

1. Draw about a 2-foot leader from the supply reel and place the reel on its spindle.

2. Lift the pressure rollers away from the idler and drive rollers.

3. Thread the film through the four rollers as shown in figure 23.

4. Wind the leader slack counterclockwise onto the take-up reel.

5. Move the pressure rollers down against the drive and idler rollers.

If the carriage has been removed for loading, the reinstallation procedure is the reverse of removal. As the carriage is installed the drive roller keyway must be aligned with its shaft key, the film must be guided over the lens turret (see figure 23), and the film carriage mounting studs reinstalled.

MAGNIFICATION

Microfilm Head

If a film has a known reduction ratio, the same enlargement ratio will bring the copy to original size. In general, when using 11-inch paper, a magnification ratio of at least 19X is used for 16-mm film and at least 8½X for 35-mm film. These magnifications will usually provide maximum size copy if the image on the film is full width.

The required magnification can be calculated, if desired, by measuring the image width and dividing this into the desired copy width. The next lower standard magnification setting must be used if the calculation results in an in-between value.

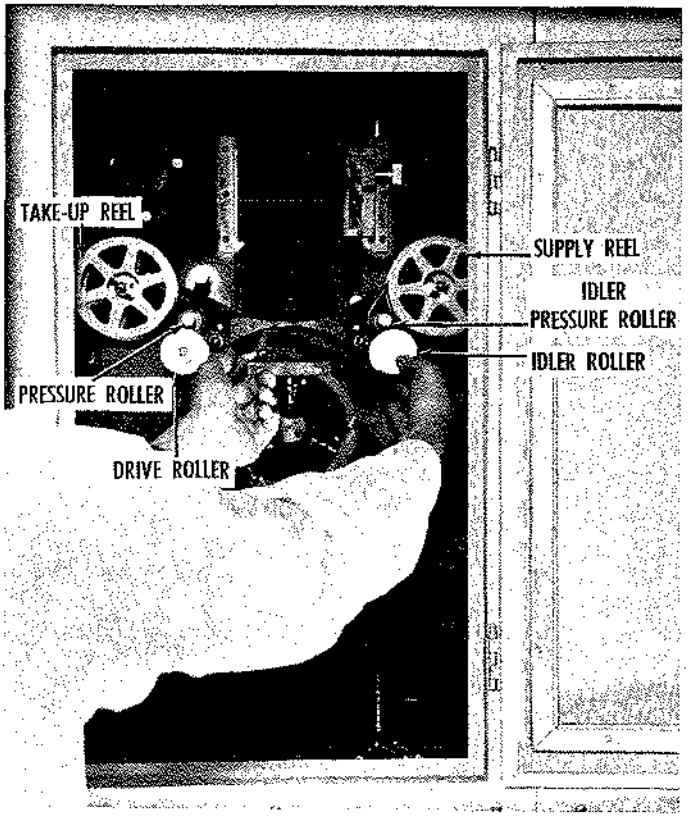


Figure 23. Film Threading

To set up the projector for the magnification determined, refer to the table of "CONTROLS AND INSTRUMENTS" on page 8 and figure 5, and proceed as follows:

1. Depress the lens turret detent lever (2) and rotate the turret to position the proper lens barrel (4) for the selected magnification at the "12-o'clock" position. (It will be necessary to temporarily remove the aperture mask to turn the turret.)
2. Turn the lens barrel to the selected magnification.
3. Observe whether the microfilm emulsion side is up or down and set the film thickness focusing lever (5) at "U" or "D" accordingly.
4. Set projector drive switch (9) to the proper speed range and shifting lever (8) to the selected magnification.
5. Loosen focusing handwheel lock (7) and turn the handwheel (6) until the index mark on the indicator is opposite the selected magnification. Lock the handwheel.

Opaque Head

Calculate the magnification (or reduction) for opaque copy using the following relationship:

$$\text{Magnification } (\%) = \frac{\text{Desired width of copy}}{\text{Width of original document}}$$

Locate the nearest standard value listed on the magnification chart on the opaque head.

NOTE

If the standard value selected would produce copy greater than 11 inches wide then select the next lower value.

When the proper magnification (or reduction value) has been selected, refer to the table of "CONTROLS AND INSTRUMENTS" on page 8 and figure 6 and proceed as follows:

1. Turn the lens setting control (12) and copy box control (14) until their respective counters agree with the settings indicated on the chart for the selected magnification.
2. With the belts running (see page 16) set the belt speed control (16) similarly.

NOTE

It is required that the final setting of the opaque head controls be approached in a clockwise direction to eliminate backlash errors.

FEEDING METHODS (Opaque Head)

The most satisfactory feeding method for a given operator will become apparent only after sufficient practice, and will depend largely on the nature (size and shape) of the original documents.

For feeding page or legal size documents that are all of equal dimensions, a suggested method is to stack them on the left side of the tray so that the operator can pick them up singly with his left hand as he feeds them with his right hand, as shown in figure 24. The document being fed is pushed squarely to the belt and roller with its right edge against the right document guide. As soon as it is drawn in by the belt the next document is transferred to the right hand.

When several copies of one or more originals are desired, a length of the paper web can be spliced into a continuous belt as shown in figure 25. The documents are then taped at regular intervals on the belt. The web belt is also useful as a means of backing translucent originals to prevent belt images on the prints.

NOTE

When a web belt is used on cutter models the space between documents must be darkened to actuate the cutter properly.

EXPOSURE

Exposure settings will depend to some extent on the characteristics desired on the final prints and on the condition of the original document or film.

In general, the following settings have proven to give the best results when printing from good quality originals or film and at original size.

Control	*Average Setting*
Exposure aperture control (figure 4)	1 to 2 (for negatives) 2 to 3 (for positives)
Lens stop (opaque head) (figure 12)	f:11

As conditions vary from the average, corresponding changes in exposure will be required. For a greater magnification the exposure slit setting must also be higher, and vice versa. The exposure of opaque copy can also be controlled roughly at the lens by changing the lens stop setting. Each "f" stop setting passes twice the light that the next numerically higher setting will.

Certain characteristic effects of underexposure or overexposure on the prints that will aid in corrections are as follows:

1. Underexposure (setting too low) of positive documents or film will produce objectionable background.

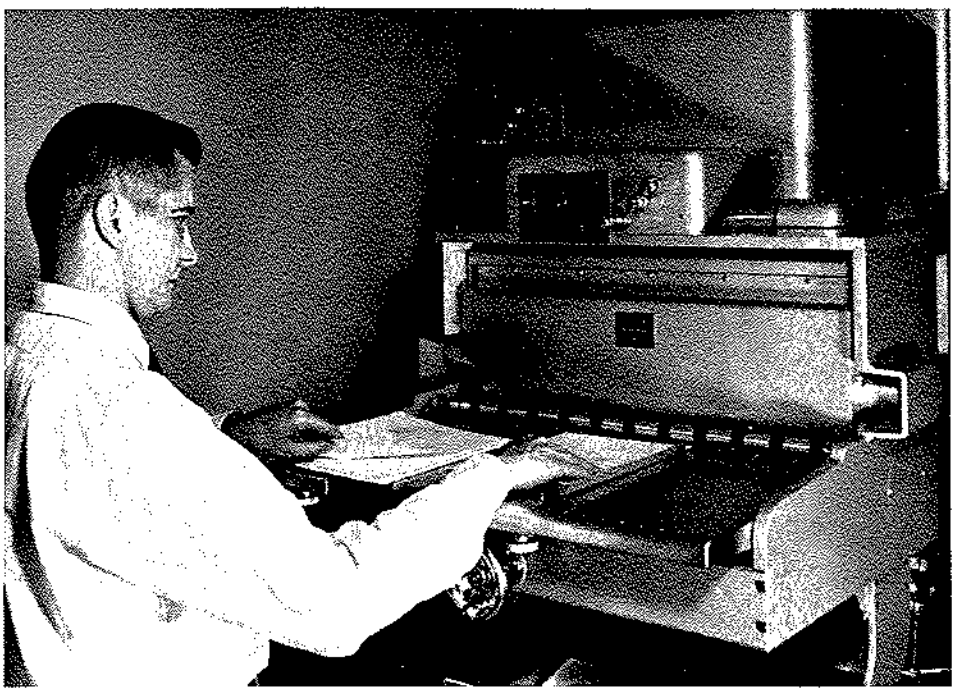


Figure 24. Feeding Opaque Documents

2. Overexposure (setting too high) of positive originals will cause "burning" or "dropping-out" of copy, especially fine lines.

3. Underexposure of negative originals causes "burning-out" of copy, especially fine lines.

4. Overexposure of negative originals causes background.

Various light filters are available either as standard or optional accessories (see Appendix B), and can be used in extreme cases to aid in exposure control.

For Microfilm operation a No. 2 or No. 4 neutral density filter can be installed as shown in figure 26. The No. 2 filter reduces the light by 50 per cent and the No. 4 reduces it 75 per cent, thus extending the adjustment latitude of the exposure slit control.

A K2 filter is furnished with opaque head machines and, normally, is used only to enable better reproduction of diazo, analine, or spirit blues and purples, or light signatures. Use of this filter usually necessitates a high setting of the exposure slit control and a low lens stop setting.

A 2D+6 filter is also available for the opaque head and may be used to extend the exposure range and improve reproduction from blue images. Use of this filter usually necessitates a lens stop setting two stops lower than without the filter.

Installation of opaque head lens filters is illustrated in figure 27 and requires screwing the tightening studs against the lens barrel.

It should be noted that exposures requiring a relatively low exposure aperture setting (narrow exposure slit of less than 1) may result in a stroboscopic effect on the prints. This effect is indicated by fine parallel white lines running uniformly through the entire print (see figure 28). To eliminate this effect, the lens stop setting can be increased or the exposure aperture setting increased.

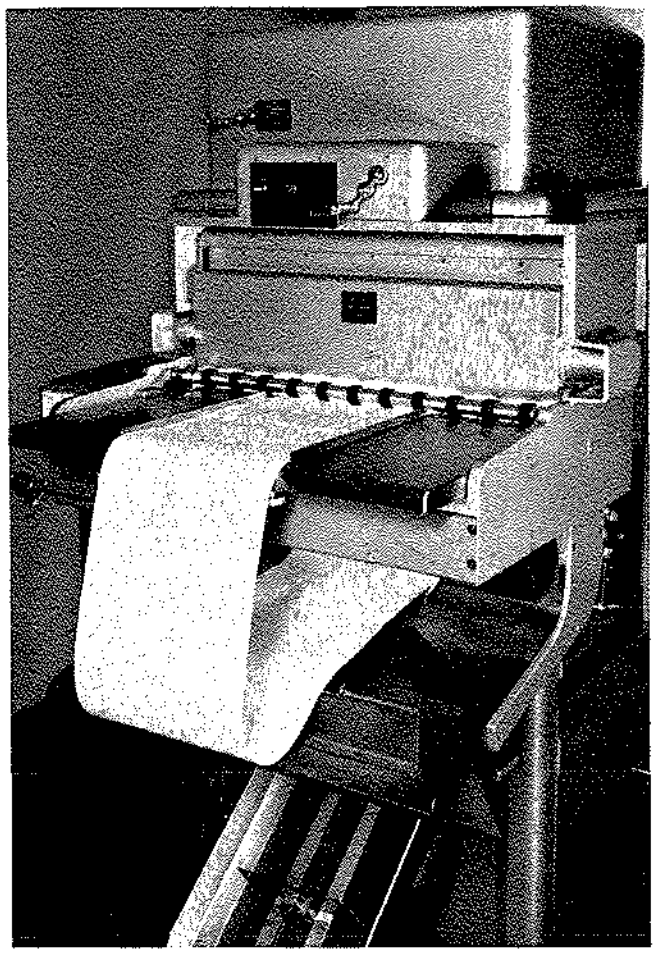


Figure 25. Web Belt Feeding

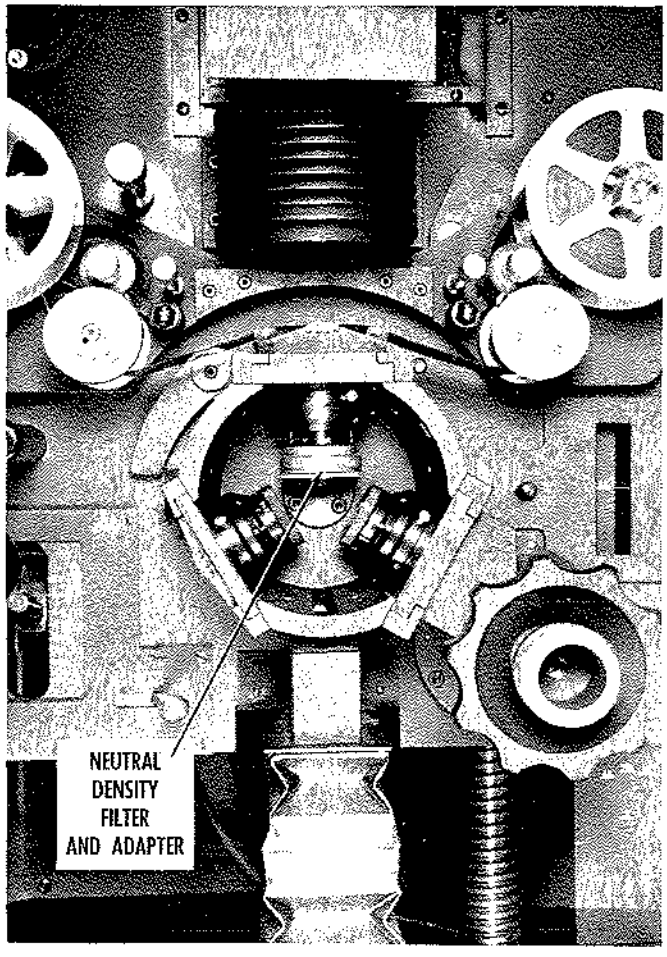


Figure 26. Microfilm Lens Filter Installed

TONER CONTROL

The toner dispensing system automatically adds toner to the developer at a rate established by the setting of the toner rate control (see figure 3 or 10). The rate at which toner is consumed depends primarily on the nature of the original copy (or film image). The average toner rate setting for typical printed pages is "3". If the concentration of image area increases or decreases appreciably then the toner rate control setting must be changed accordingly, with the optimum setting determined by the print quality.

If prints have heavy deposits of toner in image areas with good contrast and non-image areas have a gray veiling, the toner concentration is probably too high. Since underexposure can produce similar results, it is advisable to increase exposure (see page 23) before changing the toner rate.

To decrease toner concentration the toner rate control should be turned to zero until the desired concentration is reached, then turned to the new setting.

If the prints are undertoned due to a poor original, or because toner supply has run out, it is likely that the toner rate setting is correct but that a temporary increase is necessary. This is accomplished by setting the control at "10" for five minutes or by manually adding a few teaspoonsful of toner at the chute access door (see figure 8). For a permanent increase in toner rate the printer should be run for 45 minutes to stabilize the new rate.

Some situations which might require a toner increase or "overtoning" are listed below.

During opaque head operation:

1. When using filters.
2. When reproducing low contrast originals.
3. When originals contain semi-solid image areas (broad lines up to $\frac{3}{16}$ inch).
4. When reproducing screened halftones.

During microfilm operation:

1. When film density or contrast is low.
2. When reproducing semi-solid image areas.

To check the toner supply, light the toner inspection lamp (see figure 7), grasp the toner jar while tapping it, then move the orifice plate lever to the left to close it. Tilt the toner jar to check toner depth in the dispenser well under it. If the dispensing system needs refilling, remove the jar with the orifice plate closed. Grasp the cap and unscrew the toner jar. Check that the threads of the cap and new jar are clean, stir toner in the new jar to uncake it, and install the cap. Reseat the jar on the dispenser well and open the orifice plate.

FUSER CONTROL

Normally a setting of about "65," for light papers, or "195," for heavy papers, on the fuser variac (see figure 10) will result in proper fusing. This setting may require change, however, to compensate for paper thickness, the age of the reflector, or overheating.

If prints show scorching or brownish image areas, the variac setting should be decreased. If toner can be wiped off the print, setting should be increased.

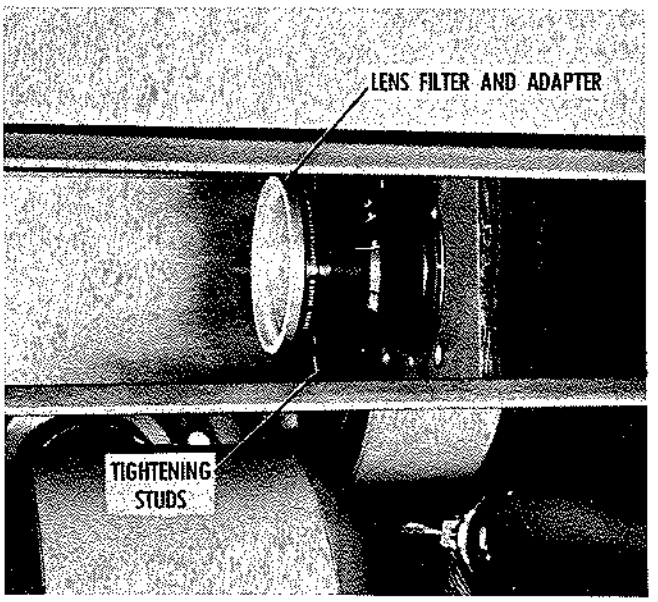


Figure 27. Opaque Head Lens Filter Installed

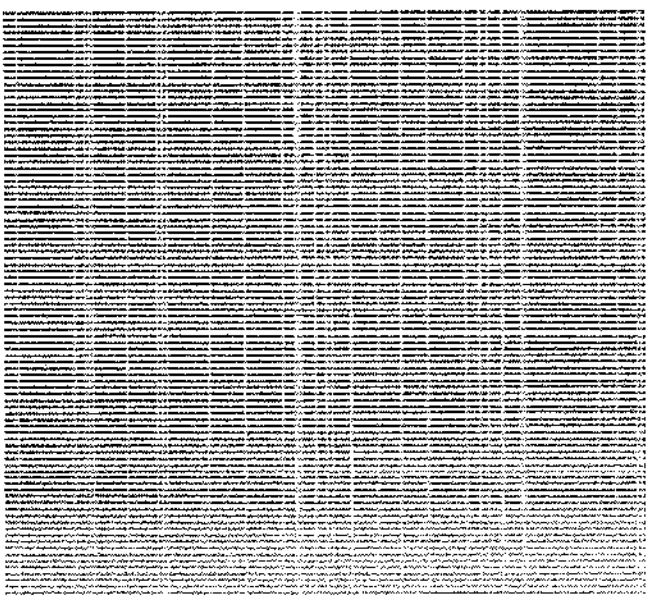


Figure 28. Strobe Effect on Copy

CHECKING AND SHAKING DUSTKOP FILTER

The Dustkop filter should be shaken at regular intervals (once or twice a day). This is done by turning the shaker crank (see figure 11) approximately 25 times, to shake accumulated toner dust from the filter.

CAUTION

Never shake the Dustkop while the printer is in operation. This would drive the dust more tightly into the filter, reducing its life and effectiveness.

The operator should also check to see that the manometer fluid level is at "0" in both tubes when the printer is stopped and that when running, the difference between the two levels is less than 2 inches. When these conditions do not exist, further servicing of the Dustkop is indicated (see page 29).

WORK ORGANIZATION RECOMMENDATIONS

Since one of the outstanding features of the Copyflo printer is its speed and the resulting savings, it is important, when using the opaque head, for the operator to organize his work for maximum feeding efficiency.

When original documents do not vary much in size or image concentration and quality, organization presents no problem. When a variety of document types is to be fed, however, it is recommended that they be segregated with respect to required magnification, size, exposure, toning, filtering, etc., in order to minimize machine set-up time and allow optimum feeding speed.

Work organization presents less of a problem for microfilm operation, where changes in controls are seldom required during a run of a film roll. If a number of films having different characteristics are to be run, however, they should be grouped as for opaque copy.

QUALITY OF PRINTS

In general, the quality of prints depends mainly on four factors: (1) the quality of original documents or film; (2) the amount of exposure of the drum; (3) the toner concentration and dispensing rate; and (4) the fusing temperature. The operator, of course, has no control over the first of these, but can control the latter three, as discussed in previous paragraphs, to obtain optimum copy. To aid the operator in making adjustments, the relationship of these factors to print quality is discussed below with reference to the various sections of the manual covering the control of each. The trouble-shooting chart provides a quick reference for analyzing poor prints.

Exposure

The effects of underexposure or overexposure will usually be fairly apparent to an operator, especially when severe. For example, overexposure of positive originals (filmed or opaque) will result in prints with poor contrast and loss or "drop-out" of small or fine characters, whereas underexposure will produce an excessive (gray) background and poorly defined images.

The specific criteria for optimum copy will depend on the print characteristics desired, and can best be determined by experience. For exposure adjustment procedures see "EXPOSURE," page 23.

Toner Concentration

The toning of the prints is chiefly a function of the toner dispensing rate and the toner consumption rate due to image density (or concentration). When these two factors are unbalanced, then overtoning or undertoning will result. Unless severe, the effects of poor toner concentration resemble those caused by poor exposure. An undertoned print will have a very white background, light or gray image areas, and poor contrast; whereas an overtoned print will have a gray, very dark or dense image area, and high contrast. On severely overtoned prints excessive toner deposits which stand out on the paper can often be seen and felt. For toner adjustment procedures see "TONER CONTROL," page 25.

Fusing Temperature

The fusing temperature is determined by the setting of the fuser variac. When the fusing temperature is too high, prints will appear brownish or scorched and the variac setting should be lowered. When the fusing temperature is too low, toner can be wiped from the prints by hand, smudging them. In this case the variac setting should be raised. (See "FUSER CONTROL," page 25.)

PRINT QUALITY TROUBLE SHOOTING CHART

Trouble	*Probable Cause*	*Remedy (and reference)*
No image	Exposure lamp off or burned out	Energize or replace lamp (page 32).
	Exposure aperture closed	Adjust aperture control (page 23).
	No film or blank leader (microfilm models)	Load or shift film as necessary (page 21).
	No developer in machine	Fill developer system (page 32).
	Conveyor off or jammed	Check switch setting (see page 17) or unjam developer (page 33).
	No charge or transfer current	On current models check that "CHARGE" and "TRANSFER" switches (figure 10) are on. On early models "PLATE CURRENT" and "SCREEN POTENTIAL" switches (figure 10) should be off.
	Drum not seated properly	Seat drum (page 30).
Low contrast images	Low contrast film or document	Decrease exposure (page 23) and/or increase toning (page 25).
	Dirty film or document	Clean originals.
	Underexposure and/or undertoning	Increase exposure (page 23) and/or toning (page 25).
	Weak or poorly adjusted exposure lamp (microfilm head)	Replace or readjust projector lamp (page 32).
	Projector optics dirty	Clean lenses (page 31).
	Dirty or expended drum	Solvent clean or replace drum (page 30).
	Exhausted developer	Replace developer (page 32).
	Dirty transfer grid	Wipe gently with clean, dry cotton.
Fuzzy Copy	Poor or dirty film or documents	Clean originals.
	Drum still wet from recent cleaning	Reclean drum and dry thoroughly (page 30).
	Incorrect magnification settings	Correct settings (page 22).
	Dirty optics	Clean lenses (page 31).
	Overexposure	Decrease exposure (page 23).
	Expired or dirty drum	Replace or clean drum (page 30).
	Overtoning	Decrease toner rate (page 25).
	Exhausted or contaminated developer	Replace developer (page 32).
	Paper drive rolls not engaged	Engage drive rolls.
	Paper supply core binding	Reinstall supply core with proper clearance (page 19).

PRINT QUALITY TROUBLE SHOOTING CHART (cont)

Trouble	*Probable Cause*	*Remedy (and reference)*
Occasional double images	Improper film transport (microfilm models)	Check film threading (page 21) and cleanliness of film and carriage.
	Drum not seated	Seat drum (page 30).
Excessive background	Low density film or overexposure	Decrease exposure (page 23).
	Overtoning	Decrease toner rate (page 25).
	Poor brush cleaning due to dirty filter or inoperative Dustkop	Shake or replace Dustkop filter (page 26 or 29). Check that Dustkop unit is plugged in.
	Worn brushes	Replace brushes (page 33).
	Dirty drum	Clean drum (page 30).
Scorched or brownish prints	Excessive fuser temperature	Reduce variac setting.
Image smudges or wipes off	Insufficient fusing	Increase variac setting.
Dark, fuzzy lines through copy	Drum abraded by rough brush	Replace drum and brush (pages 30 and 33).
Copies off center	Originals off center	Center film or document guides.
Paper creases through rolls	Paper taped off center on take-up core	Retape squarely.

Operator Maintenance

This section contains those routine maintenance procedures which can be performed by an operator. For maintenance and service beyond the scope of this manual, a qualified Haloid XeroX service representative must be consulted.

MAINTENANCE SCHEDULE

The recommended frequencies of operator maintenance procedures are listed below. Instructions for these procedures are contained in the paragraphs which follow.

Maintenance	*Frequency (for normal volume operation)*
Shake down Dustkop (25 rev)	Daily
Check manometer	Daily
Vacuuming and general cleaning	Daily
Replace Dustkop filter	Weekly
Replace microfilm projector dust filter	Weekly
Wash drum	Daily (6000 ft)
Replace brushes	Every two weeks (50,000 ft)
Clean lenses (and projection lamp)	Weekly or as required

DUSTKOP SERVICING

The Dustkop is a vacuum unit that draws toner laden air from the area about the brushes. As the Dustkop filter becomes clogged, the vacuum within the unit decreases and the differential pressure across the filter increases. When the differential approaches 2 inches as indicated on the manometer, the Dustkop unit should be removed and its filter replaced as follows:

1. Disconnect the Dustkop power cord, and carefully remove the unit from the processor (see figure 11).

2. Release the four toggle fasteners and remove the filter frame from the unit (see figure 29).

3. Sweep accumulated dust in the filter compartment into the dust bin and empty the bin.

4. Place the filter frame upside down on a flat surface, and remove the inner (bottom) section of the frame and discard the old filter element.

5. Clean the frame assembly and spread a new Dustkop filter into the upside-down top frame. Be sure the filter is spread evenly and fills the entire frame.

6. Replace the inner frame. The flange on the bottom frame section should squeeze the filter against the top section to affect a seal. Do not tuck down the filter edges.

7. Reassemble and reinstall the Dustkop unit.

8. If the fluid level in the manometer tubes is not at "0," add fluid (distilled water) as required.

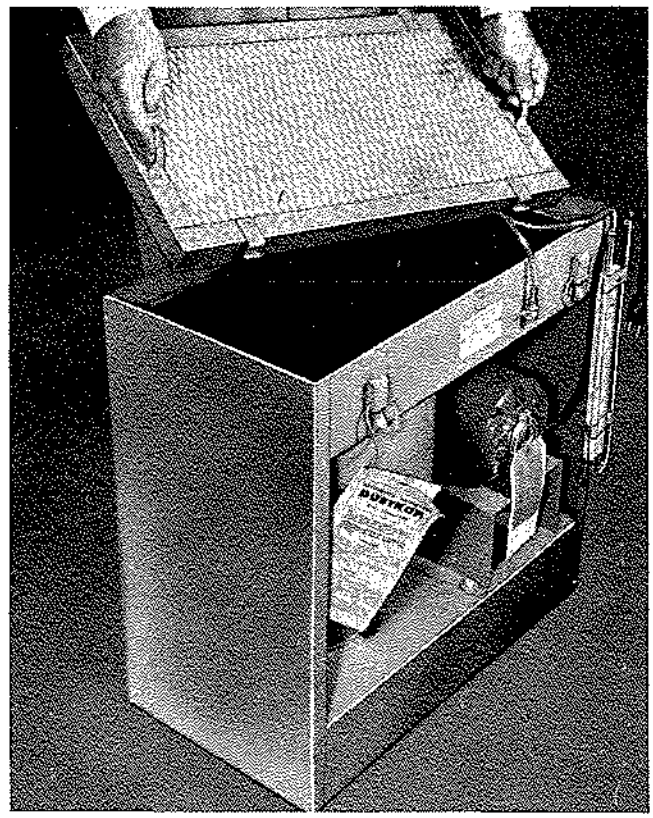


Figure 29. Dustkop and Filter Removed

PROJECTOR DUST FILTER REPLACEMENT (Microfilm Heads)

When inspection shows that the microfilm projector dust filter is excessively laden, it should be removed and replaced as follows:

1. Withdraw the filter frame assembly from its compartment as shown in figure 30.
2. Separate the two frame sections and discard filter.

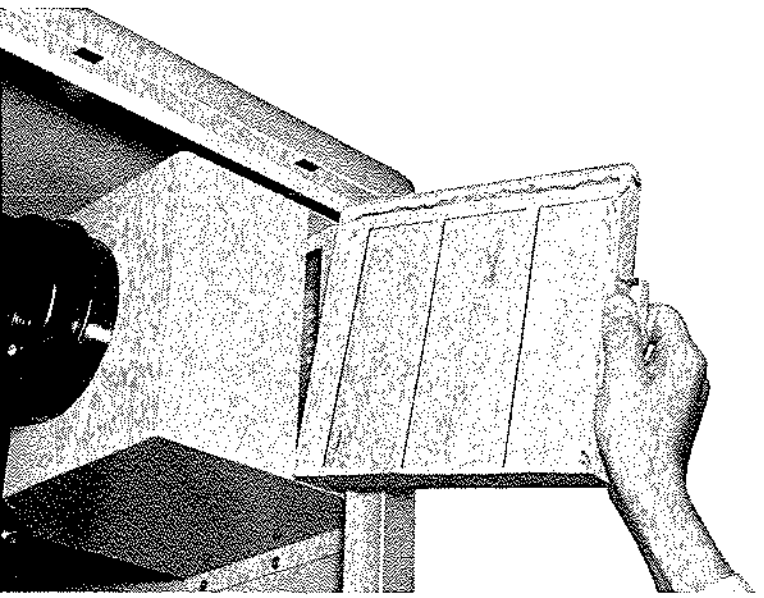


Figure 30. Projector Dust Filter Replacement

3. Clean the frame assembly and spread a new filter in the outer portion of the frame.
4. Install the inner frame so that its flanges squeeze the filter edges against the outer frame, affecting a seal.
5. Replace the filter frame assembly.

DRUM SERVICING

To undertake any of the following drum service procedures; first cut the web at the supply roll and run out the threaded leader, then stop the machine.

Drum Cleaning

1. Remove the wing nut and washer that secure the drum and install the drum extension shaft.
2. Carefully slide the drum out on the extension shaft, slightly beyond the shaft end.
3. Remove the setscrew that is stowed on the drum arbor and install it in the hole provided in the shaft behind the drum.

CAUTION

When transferring the setscrew be careful not to drop it against the inner or outer surface of the drum as this will chip the selenium plating on the drum.

4. Seat the drum back against the setscrew so that the screw engages the slot in the drum arbor, then reinstall the wing nut and washer to secure the drum on the extension shaft (see figure 31).

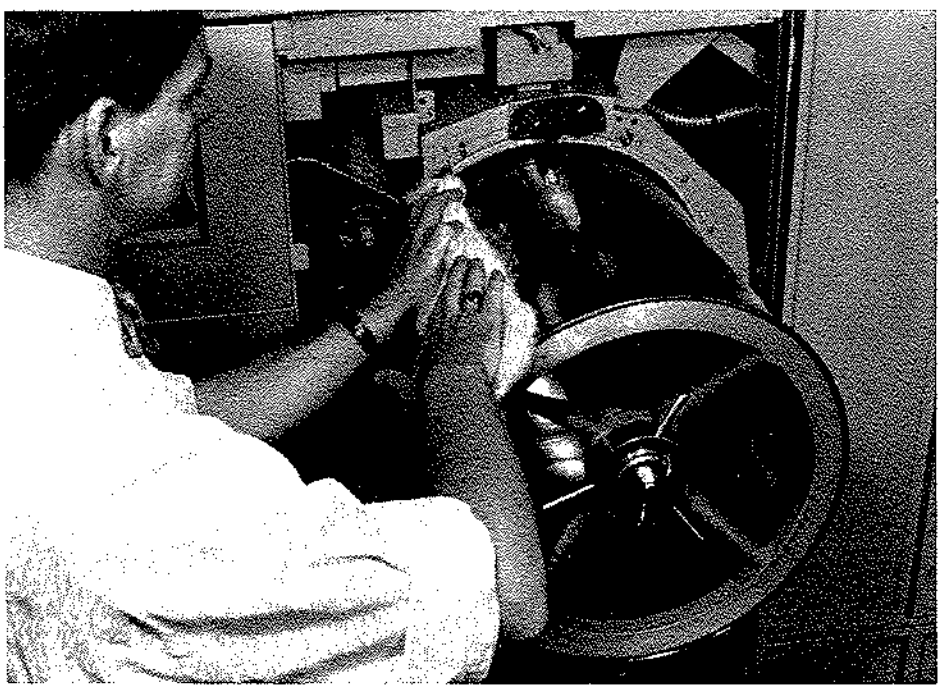


Figure 31. Drum Cleaning

5. With the "STANDBY" button (or switch) on, start the drum rotating. On current models this is done by setting the "PLATE TEST"/"RUN" switch (see figure 10) to "PLATE TEST"; on early machines by setting the "DRUM CLEAN"/"RUN" switch to "DRUM CLEAN."

6. With a small piece of the cleaning absorbent furnished for drum cleaning (see Appendix A), wipe the drum edges being careful not to let the hands touch the drum surface.

7. Tear (do not cut) a clean sheet of cleaning absorbent as long as the drum width and fold it in half along the left palm and forearm.

8. Thoroughly dampen the absorbent with the Film Remover provided for drum cleaning (see Appendix A) and lay it against the rotating drum as shown in figure 31. The fold should be in the direction of drum rotation.

9. Apply, evenly, enough pressure to cover and clean the drum and allow several drum revolutions.

10. With the fold in the cleaning absorbent reversed, repeat steps 8 and 9.

11. Check the drum for cleanliness and repeat cleaning if necessary.

12. Allow the drum to rotate and dry for at least 3 minutes. Overnight drying is preferred, when possible. A drum should be allowed to stand for 12 hours after cleaning, if it is to be packaged or stored.

13. The procedure for reinstalling the drum is the reverse of the withdrawal procedure.

Drum Removal and Reinstallation

To completely remove the drum, install the extension shaft as for cleaning, but leave the wing nut and washer off. Grasp the spokes of the drum web (end plate) and withdraw the drum clear of the extension shaft. To reinstall the drum, reverse this procedure.

Drum Replacement

To replace a drum remove it as instructed above, set it web-end-up on a clean sheet of paper, and proceed as follows:

1. Remove the drum nut and lift out the drum web (see figure 32).

CAUTION

Hold the drum edge firmly as the web is removed to prevent raising and dropping the drum.

2. Lift the drum clear of its arbor and set the new drum in place. Handle drums only at edges.

3. Reinstall the drum web and nut.

Drum Storage

New, unused drums and unexpended drums should be stored in the drum shipping containers away from sunlight, moisture, and radiators. The storage area should have a constant temperature of about 75°F. With proper care, the life expectancy of a new drum is about 100,000 linear feet of copy.

CLEANING LENSES

Periodic cleaning of optical components is required to keep these items free from dust and finger marks which would cause background and poor image sharpness and contrast.

To remove dust, use a soft camel's hair or badger's hair brush. Use photographic lens tissue to remove finger marks.

Figure 32. Drum Replacement

Opaque Head

The opaque head lens can be cleaned in place by opening the lens access door (see figure 12). Lens filters should also be cleaned whenever used.

NOTE

To facilitate cleaning, move lens setting control to shift lens position.

Microfilm Head

Clean all accessible surfaces of the microfilm projector lenses, including the condenser lens below the lamp. Also clean the lamp bulb and any filters used.

REPLACEMENT AND ADJUSTMENT OF MICROFILM PROJECTOR LAMP

Remove and replace projector lamp as follows:

1. Loosen the two thumbscrews which secure the lamp socket behind the projector face plate.
2. Swing up the lamp shield and withdraw the lamp with its socket and cord and unplug it (see figure 33).
3. Insert a new lamp in the socket with the index marks on the socket and lamp base aligned.
4. Reinstall lamp and socket with the mounting thumbscrews. Orient the lamp with its arc down and the two electrodes in a horizontal plane.
5. Rotate the lens turret to the detent position which puts the 35-mm lens at the "6-o'clock" position and slide the lens mount assembly out of the turret.
6. Install the lamp focusing post as shown in figure 34.
7. With the projector lamp on, reorient the lamp to roughly position the bright spot on the top of the focusing post. Tighten the thumbscrews.
8. Using the axial adjustment ring, and the lateral and vertical adjustment knobs (see figure 33), focus the light spot on the post so that it is centered and slightly larger than the hole in the top of the post.
9. Lower the lamp shield, remove focusing post, and replace the 35-mm lens and mount assembly.

DEVELOPER CHANGING

For developer changing procedures, the machine is stopped, the "STANDBY" button or switch is on, and the "TONER RATE" control is at "0".

Proceed as follows to change developer (see figure 8):

1. Wipe out the sump tray and the empty developer drum. Check that the empty drum is the correct one for the type of developer to be removed

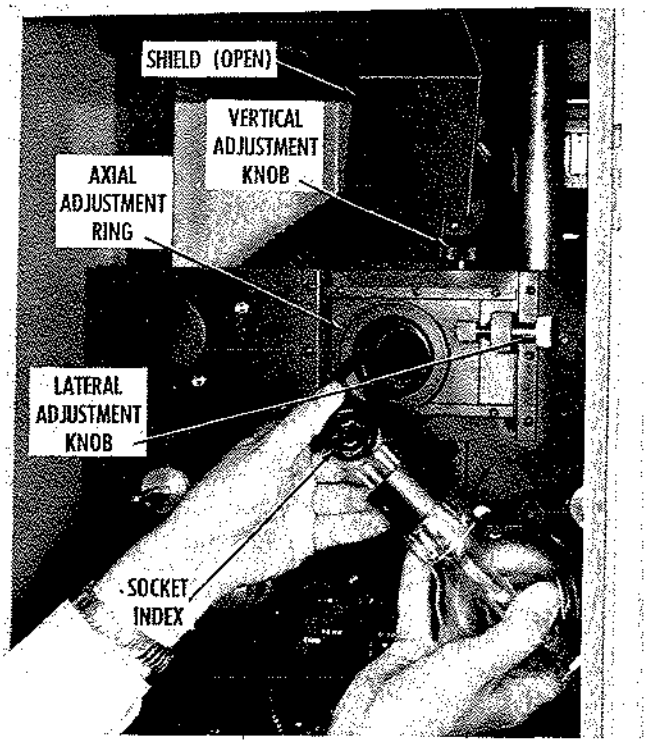


Figure 33. Projector Lamp Replacement

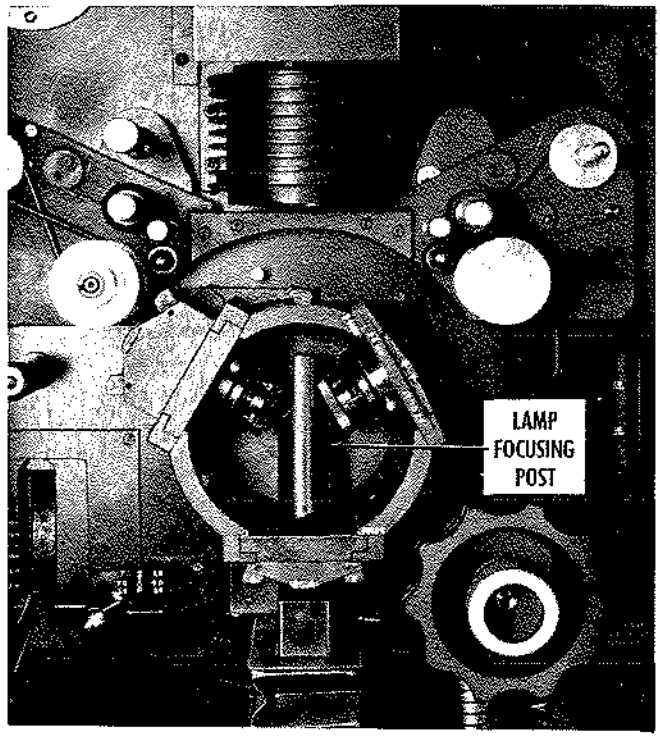


Figure 34. Lamp Focusing Post Installed

and that the developer to be added is correct. Type P-1 developer is used when reproducing from positive film or documents and type N-1 for negatives.

NOTE

A good check as to developer type is to take a few beads in the hand and rub off any toner coating. P-1 developer is yellow in color, N-1 is purple, and developer cleaner beads are white.

2. Break or cut the paper web at the supply roll and set "PLATE TEST"/"RUN" switch (see figure 10) to "PLATE TEST" (or "DRUM CLEAN"/"RUN" switch to "DRUM CLEAN") to run out threaded web.

3. Place a suitable clean funnel in the empty drum and place the drum under the chute emptying door.

4. Open the chute emptying door and set the conveyor switch in its up position. On early machines set "DEV CLEAN"/"RUN" switch (see figure 10) to "DEV CLEAN" and "DEV"/"OFF" switch (see figure 3) to "DEV". As the developer is emptying, slap the conveyor and chute surfaces to help dislodge all developer.

5. Open the conveyor sump door to empty the sump into the tray and empty the tray into the funnel.

6. When there is no further sign of developer leaving the emptying door, dump the conveyor sump again, close the chute emptying door, and open the filling door.

7. Remove and wipe the funnel, and cover the developer just removed.

8. Place the funnel in the chute access door and slowly pour in the full charge of developer cleaner (see "NOTE" in step 1).

NOTE

Only use developer cleaner when changing from "NEG" to "POS" or vice versa. It is not necessary when replacing the same type developer.

9. Allow the cleaner to circulate for 15 minutes.

10. Repeat steps 3 through 7 to remove the cleaner.

11. Again place the cleaned funnel in the filling door and slowly add the new developer. Note that a new drum of developer contains more than a full charge. About one inch should be left in the drum.

12. Check that the following control settings are correct for the developer installed.

Control	*Setting*	
	With P-1 Developer	With N-1 Developer
Current Models (figure 10)		
"TRANSFER" grid polarity switch	"POS"	"NEG"
"PRECLEAN" corotron switch	"ON"	"OFF"
Early Models		
"H. V. REVERSING SWITCH"	"POS to POS"	"NEG to POS"

Before resetting toner rate (see page 25), it is recommended that several trial prints be run after changing developer to eliminate any overtoning which may result from residual toner.

Freeing Developer Jams

If a developer jam should occur as noted under "EMERGENCY STOPPING," page 18, it can be freed by dumping the conveyor sump into the sump tray and replacing this developer in the chute access door after the jam has been cleared and the machine is turned back on.

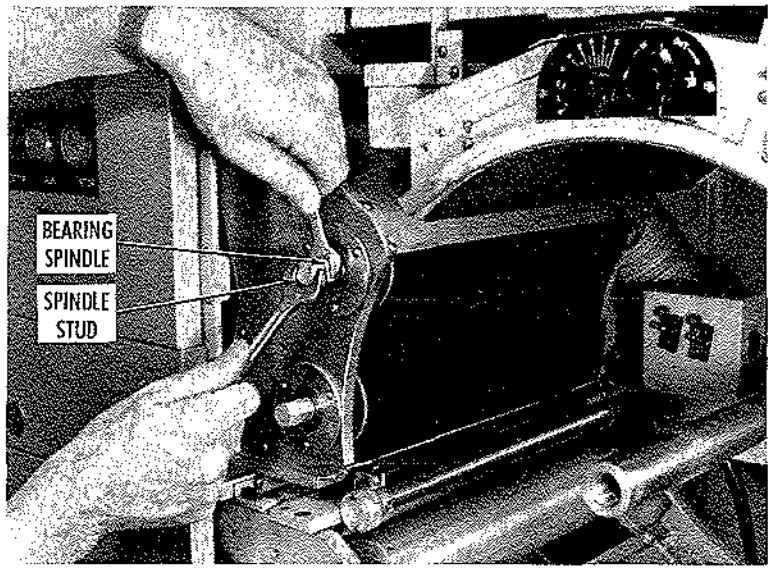
BRUSH SERVICING

The brushes should be removed and replaced whenever they become matted or rough, so that they will not scratch the drum and decrease its life. The brushes can be removed and disassembled as follows:

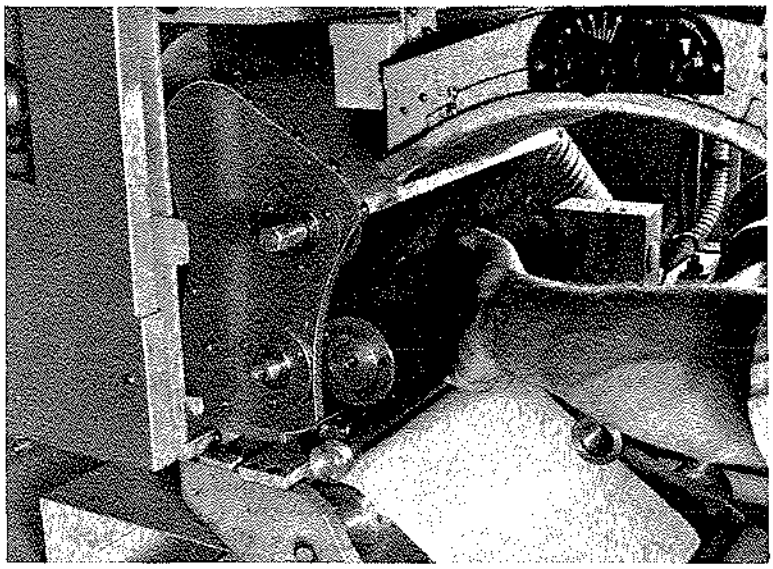
1. Using a ½-inch open end wrench on the bearing spindle and a ⅝-inch open end wrench on the short spindle stud (see figure 35), loosen the stud on the front of the machine.

2. Repeat the above step for the lower brush.

Stud Removal



Withdrawing Brushes



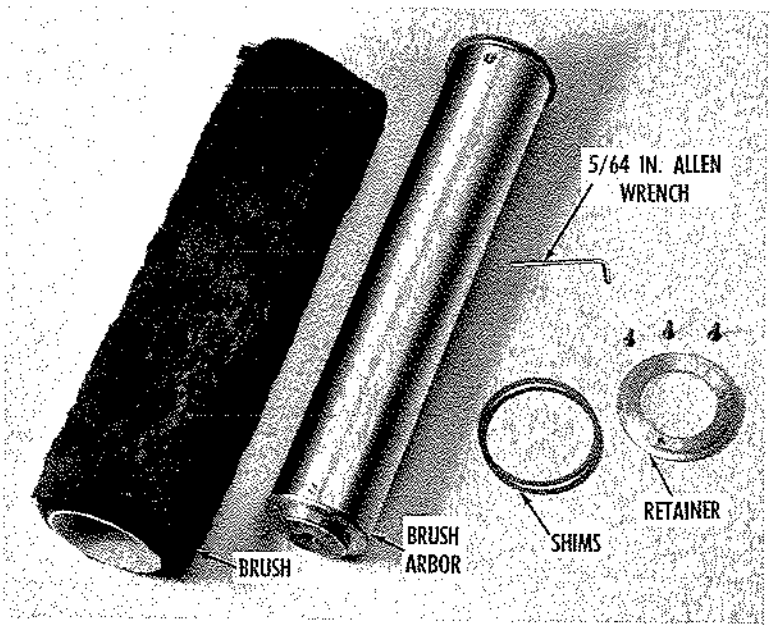


Figure 35. Brush Removal

Figure 36. Brush Disassembled

NOTE

Do not remove the studs completely.

3. From the back of the Copyflo, repeat step 1, but remove the stud completely from the upper brush.

4. As in step 3, remove the lower brush stud. Note that this stud has a left-hand thread.

5. After the two long studs have been removed from the rear, the two short studs may be removed from the front.

6. Remove the old brushes from the brush housing as shown (see figure 35).

7. Using a 5/64-inch Allen wrench, remove the retainer ring (3 screws) and remove the old brush from the brush arbor (see figure 36).

8. Repeat step 7 to remove the other brush.

NOTE

The upper and lower brush arbors are not interchangeable because there is a left-hand thread in the lower arbor.

New brushes are wrapped with heavy manila paper when supplied. To keep a brush as clean as possible during installation, do not remove all the paper. Tear off about two or three inches on each end, and leave the rest for handling. Remove the remainder of the paper only after the brushes have been installed. The brushes can be assembled on the spindles and installed in the printer as follows:

1. Slip the new brush onto the brush arbor and install the retainer, making sure the three Allen screws are tight.

NOTE

In some cases the brush is shorter than the arbor and it is necessary to use shims (see figure 36) to prevent the brush from turning on the arbor. These shims should be placed over the end of the brush prior to installing the retainer.

2. Repeat step 1 for the second brush.

3. Hold the brush in the right hand, replace the brush in the housing, and align the brush with the bearing spindle. With the left hand, start the stud into the brush arbor. DO NOT TIGHTEN IT.

4. Repeat step 3 for the other brush.

5. From the back of the machine, replace the two long studs. Make sure the bottom stud has the left-hand thread. Tighten the studs with a ½-inch and a ⅝-inch open end wrench.

6. Return to the front of the machine and tighten the two short front studs.

NOTE

The rear or back studs (long) should be tightened first to secure them to the bearing spindle. A flat bearing of the bearing spindle to the brush arbor is important at this point as this is the driving end.

Principles of Operation

For those operators and others whose interest in reproduction methods extends beyond operating procedures, this section briefly describes the principles of xerography and their application in the Copyflo 11, to permit a continuous, automatic copying process.

XEROGRAPHY

Xerography is based upon two principles long known to scientists. One is the principle of photoconductivity, or the ability of certain insulating materials to become electrically conductive when exposed to light. The other is the triboelectric effect, or the electrical attraction which exists between two dissimilar materials in contact.

The xerographic copying process comprises four basic steps. In the first step, a photoconductive selenium surface is given a uniform positive electrical charge (see figure 37). In the second step, the charged surface is exposed to the light rays reflected through an optical system containing the image being copied (see figure 38).

When the light rays fall on the charged surface, they delete that part of the charge distribution. That is, areas of the surface lose electrical charge, depending on the amount of light that strikes them. The net result of the exposure is to leave an invisible electrostatic image, so to speak, on the photoconductive surface. In one type of exposure (positive originals), the image area has a higher charge than the background area. In another type of exposure (negative originals), the image area has a lower charge than the background area.

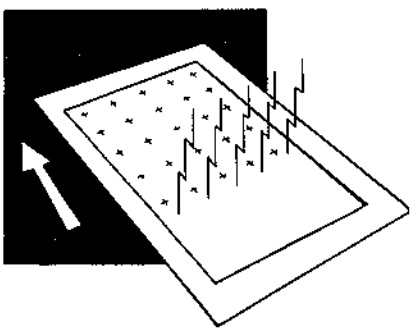


Figure 37. Step 1 — Charging

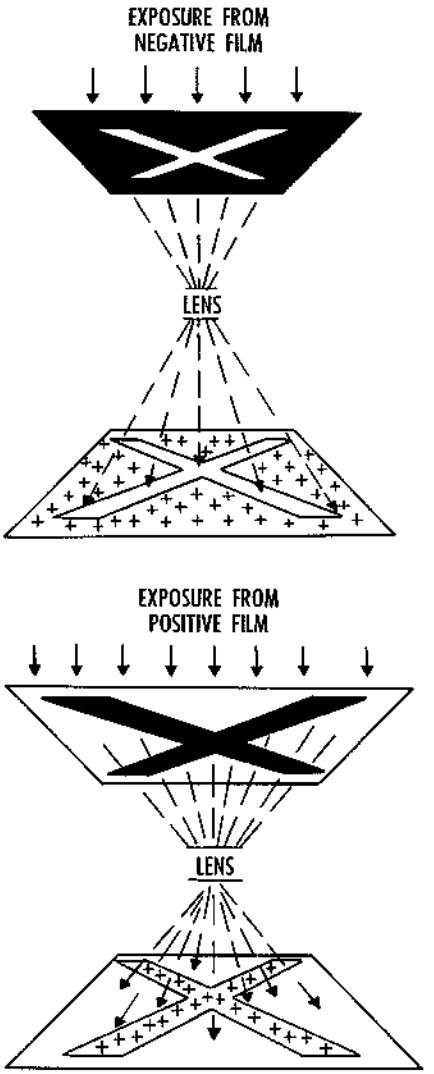
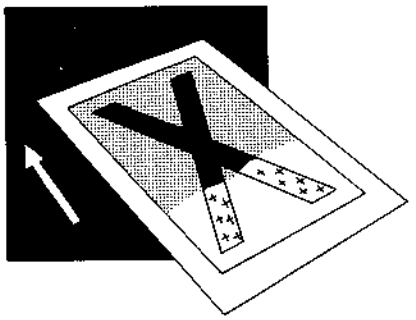


Figure 38. Step 2 — Exposing



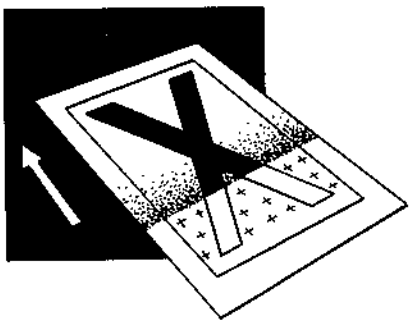


Figure 39. Step 3 — Developing

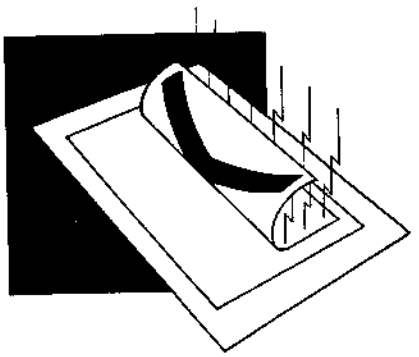


Figure 40. Step 4 — Image Transfer

The third step of the process consists of developing or making visible the image on the charged surface. This is done by cascading a developer over the charged surface (see figure 39). The developer is a powder consisting of two parts: a carrier and a toner, the carrier being used to impart the proper electrical charge to the toner. For the first type of exposure noted above, the toner is given a negative charge. For the second type of exposure, the toner is given a positive charge. In either case, when the developer is cascaded over the charged surface, the toner is attracted to and collects on the latent image area, thereby making the image visible.

The final basic step in the copying process consists of transferring the toner image on the charged surface to the printing paper (see figure 40). This is done by first charging the paper (with a polarity opposite to that of the toner) and then placing the paper against the charged surface. In this way, the toner image is attracted and transferred to the paper. A following step in the process, called fusing, consists of melting the powder so that it permanently adheres to the paper.

FUNCTIONAL DESCRIPTION (Copyflo 11 Printer)

General

Figure 41 illustrates diagrammatically the function of the printer. This diagram of the printer is simplified to picture only those features which are directly related to the xerographic process and their interrelationships.

Drum and Xerographic System

The heart of the printer is the xerographic drum. The cylindrical surface of the drum is coated with a thin layer of selenium to produce a photoconductive surface. When the printer is operating, the drum continuously rotates at a constant speed while the web of paper continuously passes through the printer. The paper comes in contact with the drum between the transfer rollers. At this point, the paper is also charged by the transfer grid, which has a high d-c voltage of the proper polarity. The speed of the drum and web are synchronized so that they are traveling at the same speed.

Consider now a short length of the drum's photoconductive surface, just before the charge grid, and follow it as it makes one revolution. At its start, the surface is uncharged. When it passes beneath the charge grid, which has a high d-c voltage, the surface receives a positive charge (step 1). The surface rotates further and then passes beneath the exposure

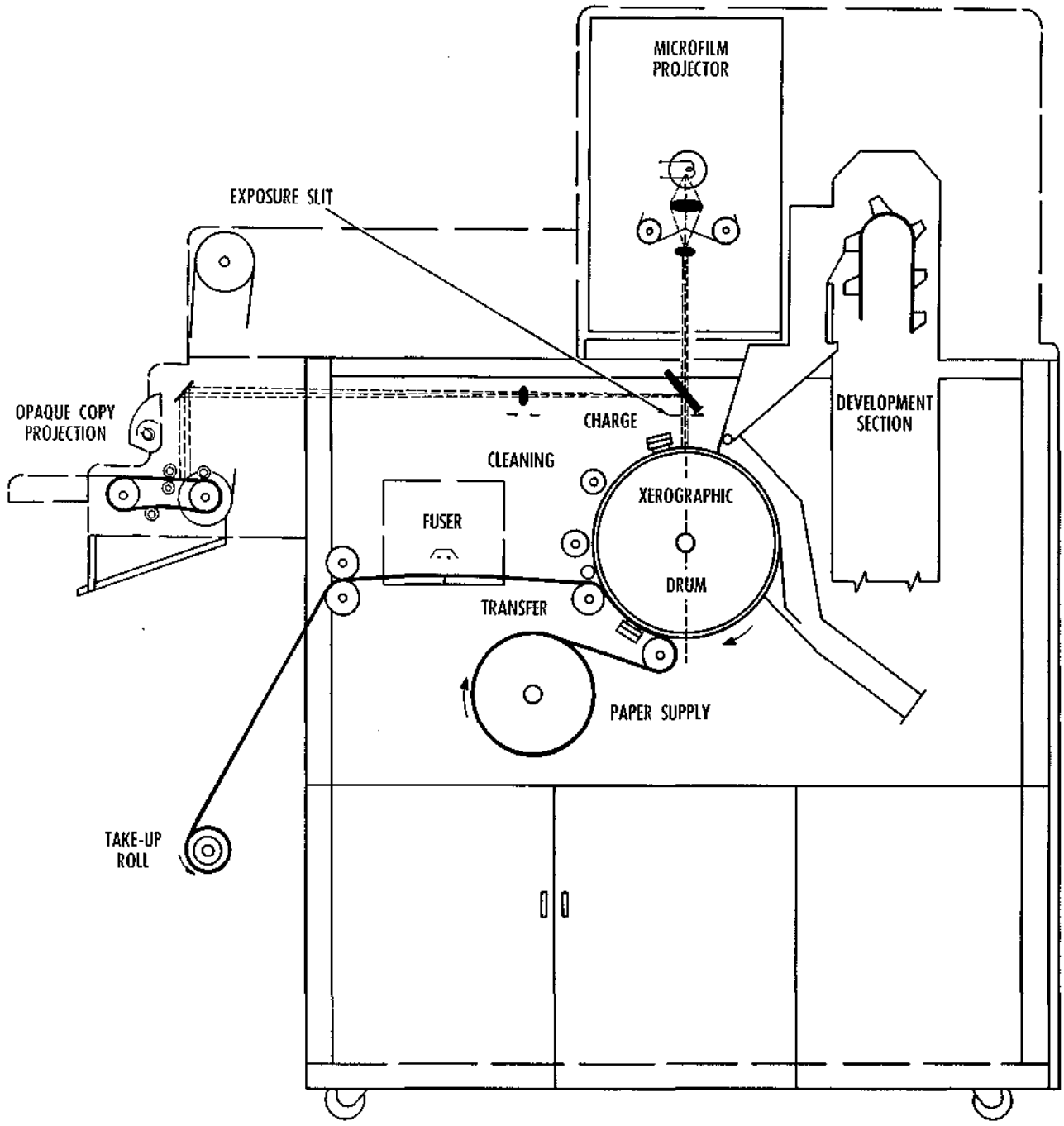


Figure 41. Functional Diagram of Copyflo II Continuous Printer

slit. Here, the surface is exposed to the light of the optical system, which contains the image projected from the microfilm head or opaque head (step 2). Shortly after being exposed, the surface passes by the developer chamber where the conveyor cascades developer over the surface (step 3). Finally, the surface, now having a toner image, rotates to the point where it comes in contact with the paper. At this point, the image is transferred to the paper (step 4).

To complete the rotation of the drum, the surface under discussion passes by the brushes that wipe off excess, loose toner. Still later, the surface passes under a dicharge lamp that dissipates the charge, thereby preparing the surface for another revolution or cycle in the copying process.

To return to the toner image, transferred to the paper, this portion of the paper web first passes through the fuser. The fuser consists of heating coils, which fuse or melt the toner into the paper fabric to produce a permanent print. After passing through the fuser, the print is conveyed out to the cutter or take-up roll.

Paper Drive System

The paper drive system transports the paper web through the printer as shown in figures 14 and 41. The drive system is electrically controlled so that the speed of the web is synchronized with the rotation of the drum. A safety feature of the system is the paper break switch. If the supply is depleted, if excessive tension should break the web, or if excessive slack occurs, the paper break switch will automatically stop the printer.

Microfilm and Opaque Copy Projection Systems

Figure 41 illustrates both projection heads. The Copyflo 11 will incorporate one or both of these projection systems depending on the model. Model No. 1 or 1C — microfilm, Model No. 2 or 2C — opaque, Model No. 3 — both microfilm and opaque.

In either head, the basic features are a transport system to move the copy (or film) under a light source, and an optical system to transmit the image to the drum, and to control image magnification and exposure. The transport system in either head is controlled so that the image motion is synchronized with the drum rotation; hence, the image is stationary with respect to the drum surface.

In the opaque head, the belts transport the documents under the lamp and the image is reflected from a first surface mirror, through the lens, to the second first surface mirror, and to the drum. In the microfilm head the film drive system passes the film between the lamp and optical system, and the resulting image falls directly on the drum.

In either case the length of time that the projected image is allowed to strike the drum is limited by the exposure aperture.

Toner and Developer System

The toner and developer system consists essentially of a chute and conveyor arranged to continuously cascade toner and developer over a portion of the drum. As toner is consumed from the surface of the developer beads, it is replaced by new toner added to the system by the toner dispenser. The rate of toner dispensing can be controlled to keep the system balanced (see "TONER CONTROL," page 25).

Cutter

On models having the cutter, the paper passes under a cutting blade which is automatically controlled to cut the web at the lead edge of each printed copy.

The cutter blade is solenoid-actuated and is triggered by a signal mark on the web which is picked up photoelectrically by the cutter scanner. When operating the microfilm head, the signal mark is produced by a filmed image mark. When operating the opaque head, the signal mark is produced by a marker lamp photoelectrically controlled by a scanner in the head.

Appendix A

EXPENDABLE SUPPLIES

Listed below are supplies for the XeroX Copyflo 11 Continuous Printer that may be purchased through Haloid Xerox Inc. The list includes the unit packaging of each item. These supplies are illustrated in figure 42.

	Item	*Catalog Number*	*Unit*	*Index Number Figure 42*
1.	XeroX Copyflo Rotary Drum, Type DA	31-001	each	1
2.	XeroX Copyflo Developer, Type P-1 (25-lb drum) for positive-to-positive processing.	32-011	drum	2
3.	XeroX Copyflo Developer, Type N-1 (25-lb drum) for negative-to-positive processing.	32-001	drum	3
4.	XeroX Copyflo Toner, Type PN-1 (1½-lb bottle, 6 per carton)	32-101	carton	4
5.	XeroX Copyflo Developer Cleaner (25-lb drum)	32-201	drum	5
6.	XeroX Copyflo Film Remover (1-qt can, 6 per carton)	36-004	carton	6
7.	XeroX Cleaning Absorbent (1-lb roll, 4 per carton)	36-005	carton	7
8.	XeroX Copyflo Print Rewind Cores (84 per carton) for machines with maximum paper width of 11 in.).	X22P48	carton	8-9
9.	XeroX Copyflo Print Rewind Cores (72 per carton) for machines with maximum paper width of 12 in.).	X22P195	carton	8-9
10.	XeroX Copyflo Paper, Class C (2000-ft roll), width: 4½ to 12 in. (in ½-in. increments)	36-006	roll	10
11.	XeroX Copyflo Paper, Class K (2000-ft roll), width: 4½ to 12 in. (4 rolls per case)	36-024	case lot only	11
12.	XeroX Copyflo Vellum (2000-ft roll), width: 11 or 12 in.	36-022	roll	12
13.	Cleaning Brushes (2 per set)	X52S33	set	13
14.	Dustkop Filter (6 per carton)	53H12	carton	14
15.	Projector Dust Filter (25 per carton)	X53P10	carton	15
16.	Fuser Reflector Assembly	X62S13	each	16
17.	Fuser Element	X126P4	each	17
18.	Microfilm Projector Exposure Lamp	122H6	each	18
19.	Opaque Copy Exposure Lamp, 2500-Watt	122H15	each	19
20.	Bulb, 40-Watt — Toner inspection bulb	122H7	each	20
21.	Bulb, F14712/W — Transfer positive	122H3	each	Not Shown
22.	Bulb, F8T5 — Discharge bulb	122H4	each	21

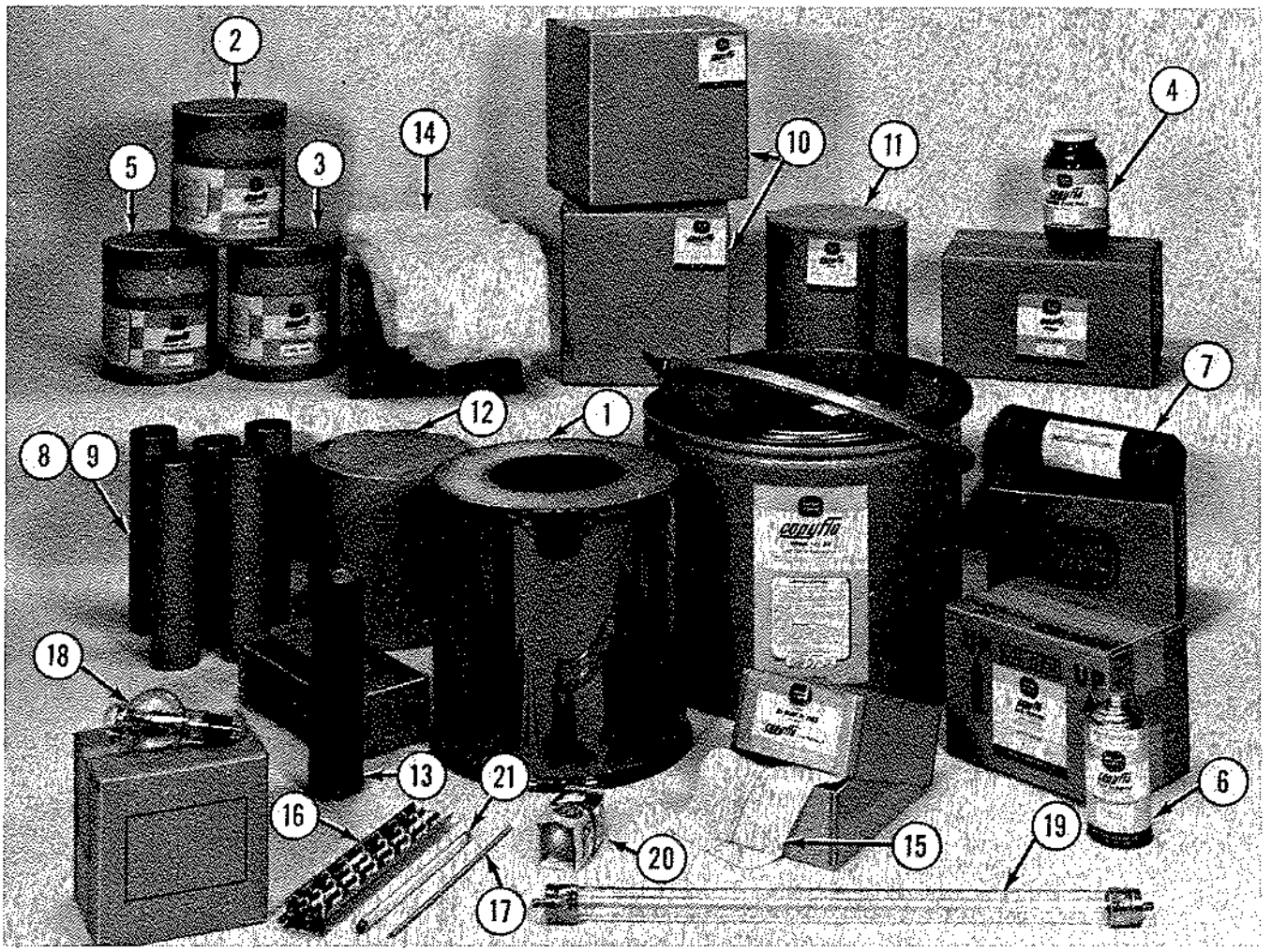


Figure 42. Expendable Supplies

Appendix B

STANDARD AND OPTIONAL ACCESSORIES

Item	*Catalog No.*	*Unit*
Standard Accessories Furnished with Printer		
1. Neutral Density Filter 2X	62H4	each
2. Neutral Density Filter 4X	62H5	each
3. Neutral Density Filter Adapter Ring	5H13	each
4. Dustkop Exhaust Assembly	X54S48	each
5. K2 Filter (for use on opaque head only)		each
Optional Accessories		
6. 2D+6 Filter (for use on opaque head only)	62H19	each
7. Radius Gauge	X18S18	each
8. Paper Spacers (required for paper widths less than 12 in., sizes: ½, ¾, 1 and 2 in.)	X14P95	set (2)
9. Document Feeder	34-088	each

Notes

HALOID XEROX INC., ROCHESTER 3, N.Y.

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2M-260

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