



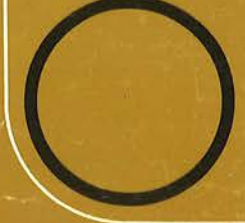
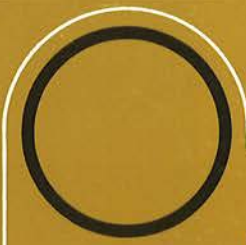
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SERVICE MANUAL

KODAK
INDUSTRIAL
X-OMAT
PROCESSOR
MODEL B



SERVICE MANUAL
KODAK INDUSTRIAL X-OMAT PROCESSOR

MODEL B

The following trademarks are used throughout this service manual. The manufacturers are listed in parentheses.

Pliobond (Goodyear Tire & Rubber Co., Inc.)
Scotch-Brite (Minnesota Mining & Mfg. Co.)



TYPICAL INSTALLATION OF KODAK INDUSTRIAL X-OMAT PROCESSOR, MODEL B

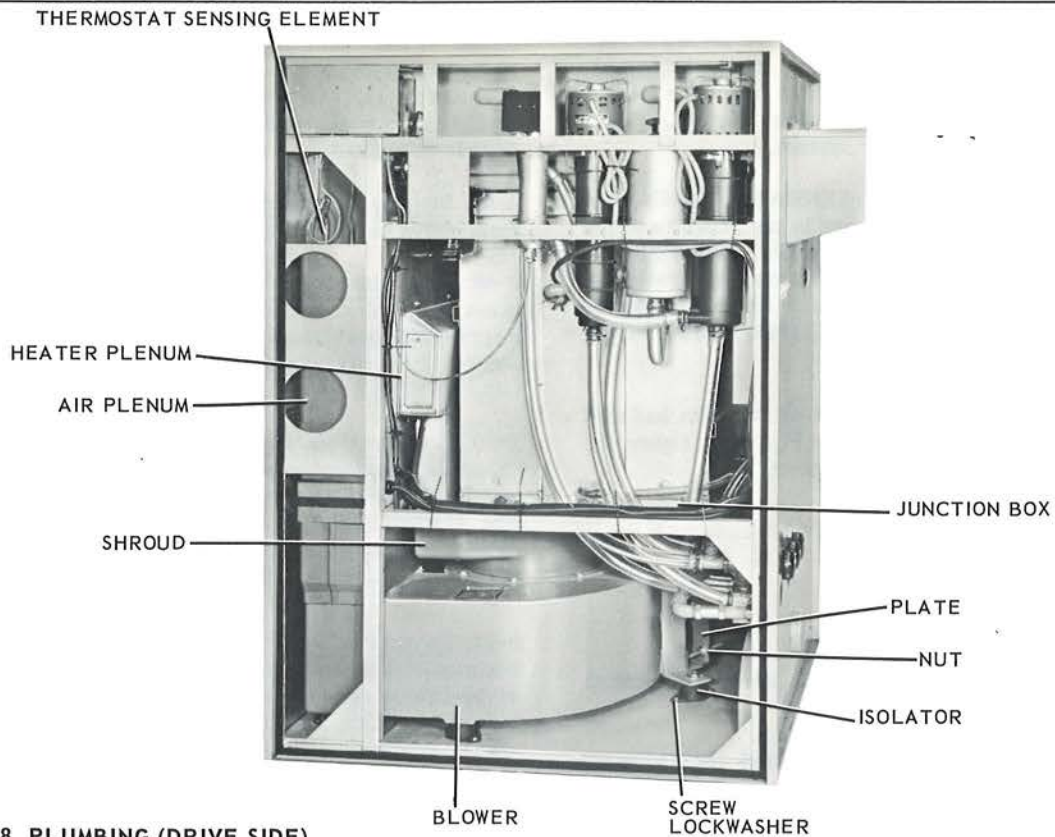


FIGURE 18 PLUMBING (DRIVE SIDE)

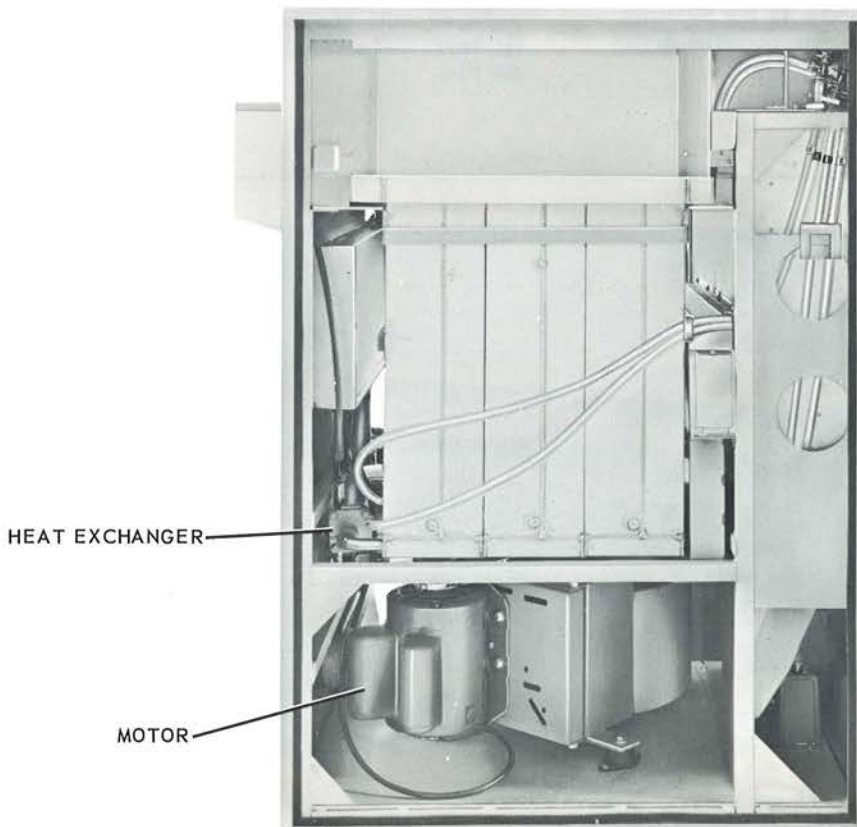


FIGURE 19 PLUMBING (UNDRIVEN SIDE)

2-41. A BLOWER, figure 18, is driven by a 1-horsepower MOTOR, figure 19. The blower draws air and forces it over the dryer HEATERS, figure 20, into the dryer AIR PLENUM, figure 18, and into the slotted air tubes. The tubes are located so that warm air is directed at both sides of the film as it is transported by the dryer roller system.

2-42. The dryer THERMOSTAT SENSING ELEMENT is located in the air plenum. A change in temperature of the circulating air activates the dryer heaters. The THERMOSTAT, figure 14, should be set to maintain a temperature of 120 to 140 F. (See table in paragraph 3-130 for suggested temperatures.) The dryer thermostat PILOT LIGHT is on when the thermostat is calling for heat.

2-43. Moisture-laden air at the rate of 200 cfm and at a maximum of 150 F is bled from the AIR PLENUM, figure 16, and is carried by duct from the processor.

2-44. ELECTRICAL SYSTEM

2-45. The processor meets all of the normal electrical code requirements.

2-46. The processor is normally supplied for 230-volt, 3-wire, single-phase, 60-cycle service. On special order, the processor can be supplied for a 230-volt, 3-wire, single-phase, 50-cycle service.

NOTE: The parenthetical symbols in the following paragraphs refer to the drawing symbols used on the wiring diagram on page 49.

2-47. When the wall-mounted main electric control switch is turned to the "ON" position, all components are energized up to their individual control stations. That is, FUSES F1 and F2, figure 11, are active, the lines to each switch are energized, and the line side of the heater contactor relay (HR) is energized.

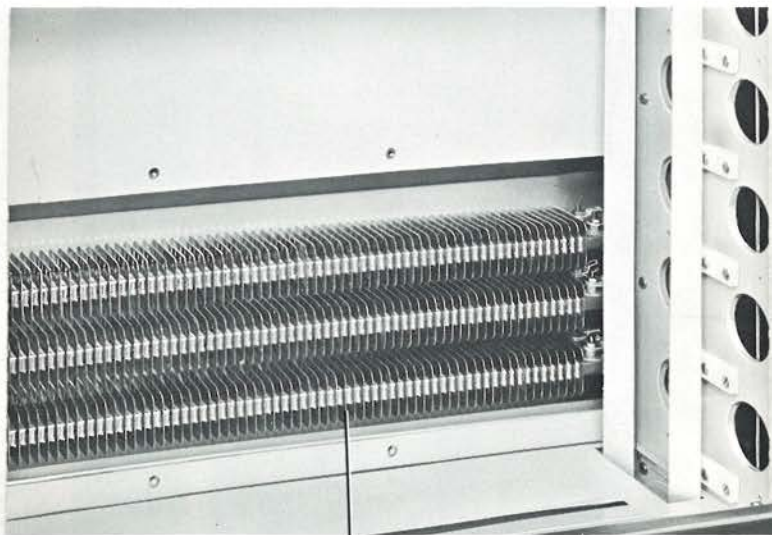
2-48. Main-Drive Switch. This switch (SW1) energizes the main-drive motor (M3).

2-49. Replenisher Pump Switch. This switch (SW2) energizes the center detector roller microswitch (MS1). This microswitch operates the replenisher pump (M5), the single-stroke bell (film-feed alarm) (BL), and the accessory outlet (RECP).

2-50. Developer and Fixer Pump Switch. This switch (SW3) energizes the developer (M1) and the fixer (M2) recirculation pumps, the developer solution heater (D-HTR), and thermostat (THS1). A pilot light (PL1) located at the top of the developer thermostat indicates that heat is not being called for when the light is on.

2-51. Dryer Fan Switch. This switch (SW4) energizes the fan motor (M4) and the dryer-heater relay (HR). When the dryer-heater relay is energized, the dryer thermostat pilot light (PL2) is on, showing that the dryer is calling for heat.

2-52. Double-Thickness Detector Mechanism. When the replenisher pump switch (SW2) is on, the two microswitches (MS2 and MS3) are energized. If two thicknesses of film or a damaged film enters the detector rollers, these microswitches will become energized and sound the double-thickness alarm (BZ), thus signaling the operator to retract the film.



HEATER

FIGURE 20 DRYER HEATERS

SECTION III – MAINTENANCE AND REPAIR OF INDIVIDUAL COMPONENTS

WARNING: Before repairing or replacing any electrical components, TURN OFF THE MAIN POWER.

3-1. FEED TRAY

3-2. Check the alignment and centering of the FEEDTRAY, figure 12. To do this, proceed as follows:

- a. Remove the entrance crossover.
- b. Place a 14 by 17-inch film against a SIDE GUIDE of the feed tray and feed approximately 1 inch of the film into the processor. Pull the leading edge of the film to, and square with, the tie rod of the first rack.
- c. If the film is not square with the feed tray, loosen the wing nuts located under the feed tray and square the tray to the edge of the film. Retighten the wing nuts.
- d. Replace the entrance crossover.

3-3. If a static problem exists, be sure that the bottom of the feed tray and the top of the feed stand are free from corrosion or dirt which might insulate the feed tray from the processor.

CAUTION: To prevent damage to the detector rollers, keep all objects off the feed tray.

3-4. DETECTOR ROLL ASSEMBLY

3-5. Detector Rollers. Cleanliness of the DETECTOR ROLLERS, figure 10, is very important. They should be

wiped daily with a damp cloth. The areas under the micro-switch rollers are especially important. Be sure, however, that no attempt is made to feed film while the rollers are still damp.

3-6. Worm Gears, Sprocket, Worm. If there is any hesitation of the detector rollers, examine the nylon WORM GEARS, figure 21, for signs of wear, and replace them if necessary. These nylon gears should be lubricated occasionally. (See the Lubrication Chart, Section VI.)

3-7. Check the SPROCKET and WORM for signs of wear and worn or broken teeth.

3-8. Microswitches. To insure proper operation of the DOUBLE-THICKNESS DETECTOR MICROSWITCHES, figure 10, they must be set evenly. Pay particular attention to these microswitches because they could be inoperative without giving any outward sign.

3-9. To adjust the microswitches, proceed as follows:
a. Remove the MICROSWITCH COVER, figure 6. DO NOT remove the plastic GUARD, figure 10.

b. With a one-inch-wide strip of film between the detector rollers at one end (below the microswitch), lower the microswitch roller on the detector roller until the buzzer sounds. Then raise the microswitch roller until the buzzer stops. Tighten the NUT on the barrel of the microswitch

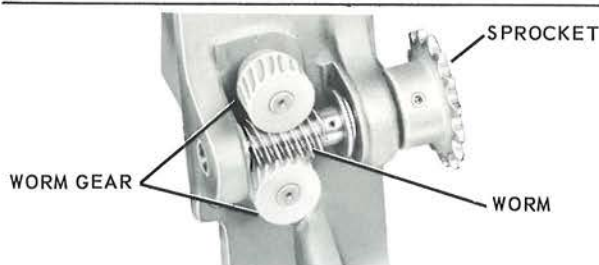


FIGURE 21 DETECTOR ROLL ASSEMBLY (DRIVE END)



FIGURE 22 FILM-FEED ALARM

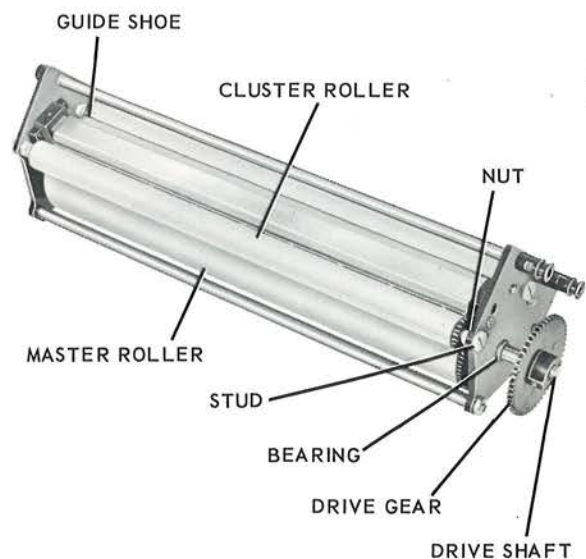


FIGURE 23 CROSSOVER ASSEMBLY



FIGURE 24 CROSSOVER ASSEMBLY



FIGURE 25 ENTRANCE CROSSOVER ASSEMBLY

plunger by means of the ADJUSTING DEVICE. Adjust the double-thickness detector microswitch at the other end in the same manner.

c. With no film between the detector rollers, adjust the SINGLE-SHEET DETECTOR MICROSWITCH which operates the replenisher pumps. To do this, lower the center microswitch roller on the detector roller until the replenisher pumps operate. Then raise the microswitch roller until the pumps stop. Tighten the nut on the barrel of the microswitch plunger by means of the adjusting device. The replenisher pumps should operate when a one-inch-wide single-thickness of film is fed at any point between the detector rollers.

3-10. The microswitches should be kept operating freely by the application of a light machine oil to the plunger and roller mechanisms. To prevent oil from dropping on the detector rollers or the microswitch rollers, avoid excessive lubrication. If replacement of a microswitch is necessary, first remove the nut and the adjusting device from the plunger barrel; next, replace the microswitch, adjusting device, and nut; and then adjust as outlined in paragraph 3-9.

3-11. TIME-DELAY RELAY

3-12. To check the operation of the time-delay relay, energize momentarily the single-sheet detector microswitch. The film-feed alarm should sound approximately eight seconds after the microswitch is de-energized.

3-13. To adjust the time-delay, move the slider on the variable resistor (RES on wiring diagram) located below the relay. Move the slider to the left to increase the time delay. If no delay is observed, replace the time-delay relay.

3-14. FILM-FEED ALARM

3-15. If the FILM-FEED ALARM, figure 11, fails to sound or sounds with a thud instead of a ring, the cover is probably mounted incorrectly. When the alarm is mounted with the PLUNGER down as shown in figure 22, the cover must be mounted with the hole down, or vice versa.

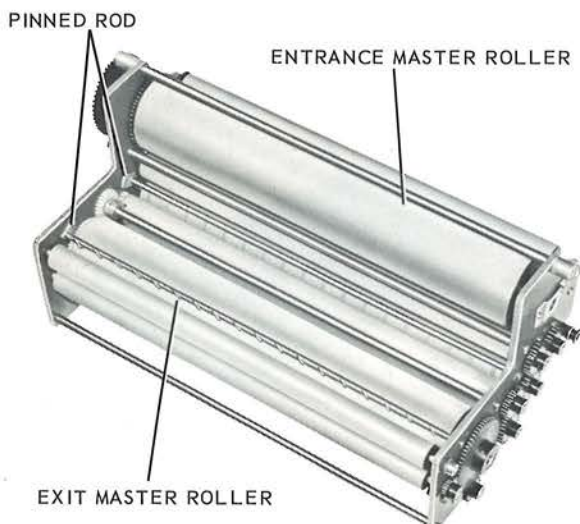


FIGURE 26 SQUEEGEE CROSSOVER ASSEMBLY

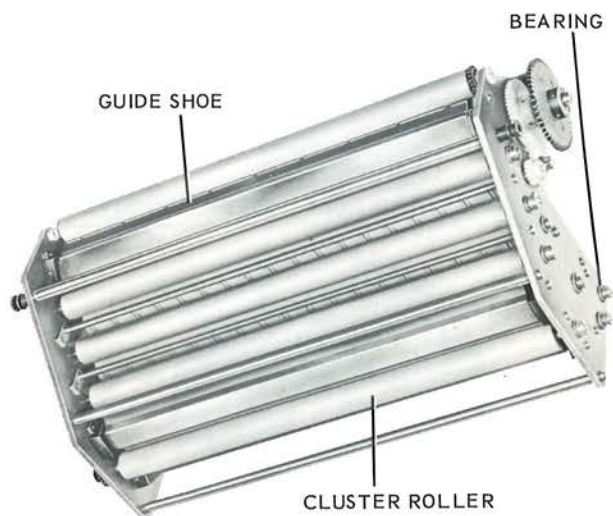
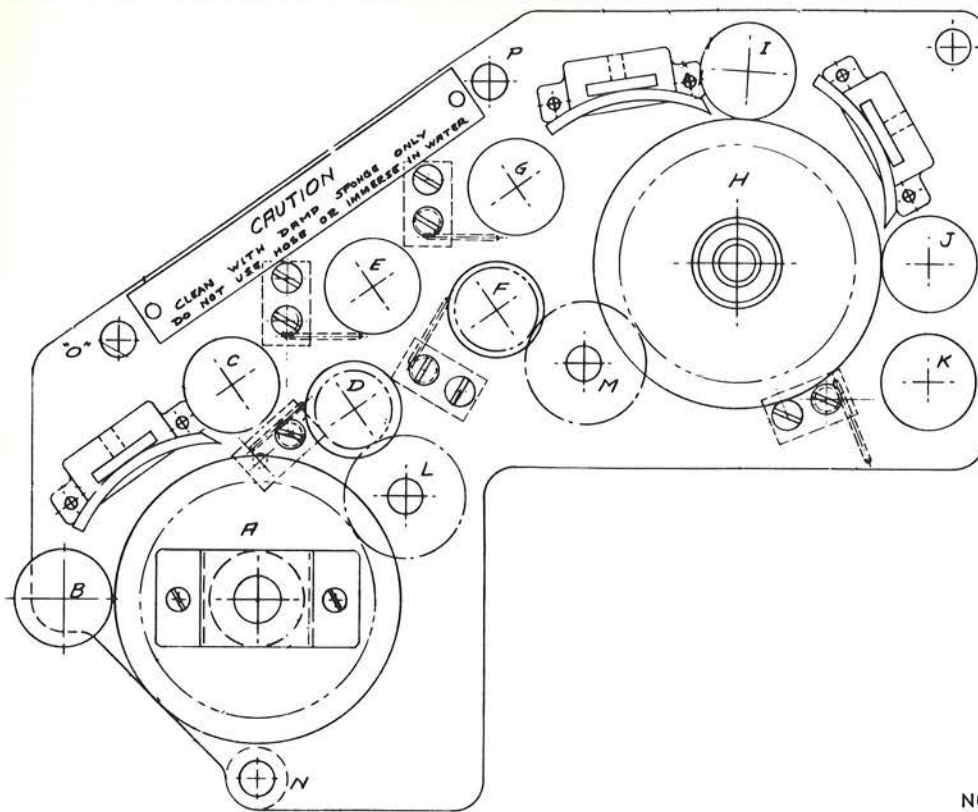


FIGURE 27 SQUEEGEE CROSSOVER ASSEMBLY



ROLLER	GEAR TEETH
A	49
	52
C	21
D	21
	16
E	21
F	21
	17
G	21
H	60
	50
I	20
J	20
L	26
M	26

NOTE: Refer to Parts List No. 769032, Figures 16 through 26, for exploded views of the Squeegee Crossover.

FIGURE 28 ROLLER ARRANGEMENT OF SQUEEGEE CROSSOVER

3-16. CROSSOVER ASSEMBLIES

3-17. All Crossovers. Be sure the rollers are kept clean. Wipe them with a damp vinyl sponge or cloth. If necessary, use a plastic abrasive material, such as Scotch-Brite, except on the MASTER ROLLERS, figure 23. (See paragraph 3-22.) If deposits have been allowed to accumulate, a household detergent can be used. Be sure to rinse the assemblies thoroughly to remove any traces of detergent after washing.

3-18. Examine the CLUSTER ROLLERS for signs of undue warping, broken teeth, or loose gudgeons. If the roller gudgeons are loose, the rollers should be replaced or the gudgeons secured with a cement, such as Pliobond, or an epoxy resin. Be sure that the gears of the cluster rollers are properly engaged with the master roller gears.

3-19. Examine the ribs and tips of the GUIDE SHOES for burrs. Use fine wet sandpaper to remove any roughness.

3-20. The spacing between the tips of the guide shoes and the master roller should be between .040 and .060 inch. The spacing across the entire width of the shoe should be as even as possible. Adjustment can be made by loosening the guide shoe mounting screws on the exit side of the guide shoe (the screws with the washers).

3-21. Spacing between the driven cluster rollers and the master roller should be .020 inch. Slight adjustments can be

made by loosening the NUTS securing the roller STUDS to the side plates. If additional movement is needed, the holes in the side plates can be elongated slightly.

3-22. Care must be taken to preserve the roughened surface of the master rollers. Do not use abrasives when cleaning the rollers; instead, use a soft-bristle brush and warm water, brushing in the direction of the fine grooves.

3-23. Examine the master rollers for broken teeth or loose gudgeons. If the gudgeons are loose, the rollers should be replaced or the gudgeons secured with a cement, such as Pliobond, or an epoxy resin. Appreciable vertical play of the drive shaft indicates BEARING wear, and replacement is indicated.

3-24. Check the assembly for squareness by turning it upside down on a flat surface.

CAUTION: Do not install roller rack studs on the crossovers or turnarounds. Although the rack studs are similar in appearance to the crossover studs, they are not interchangeable, because their dimensions are different. The short studs are used on the crossovers and the turnarounds; the longer studs, on the racks.

3-25. To replace a master roller or a shaft, proceed as follows:

a. Remove the two screws, and the RETAINER PLATE, figure 24.

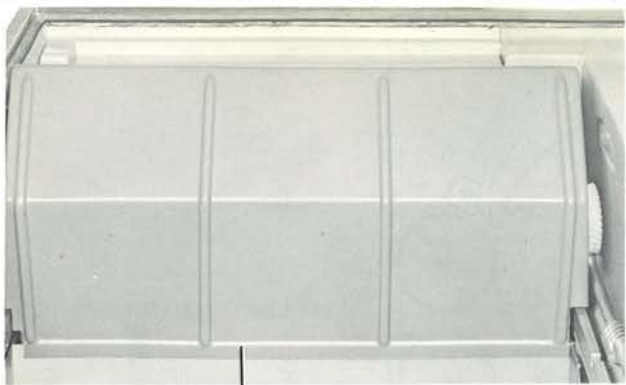


FIGURE 29 SPLASH GUARD

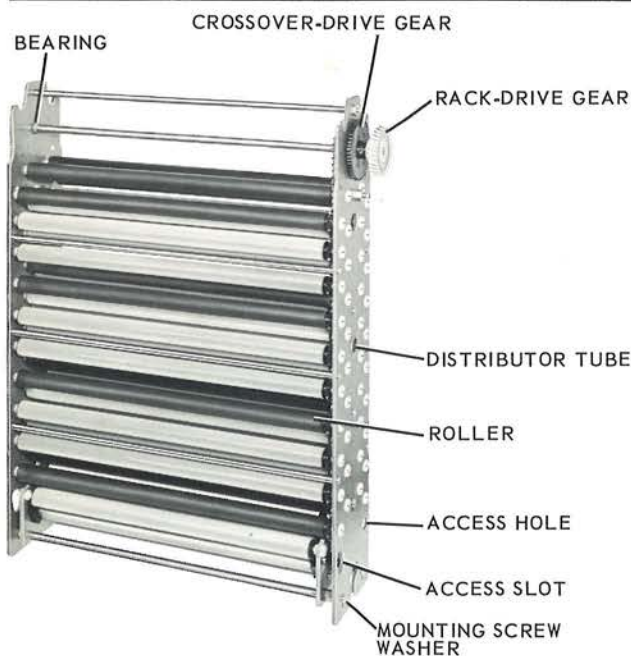


FIGURE 30 ROLLER RACK (DEVELOPER)

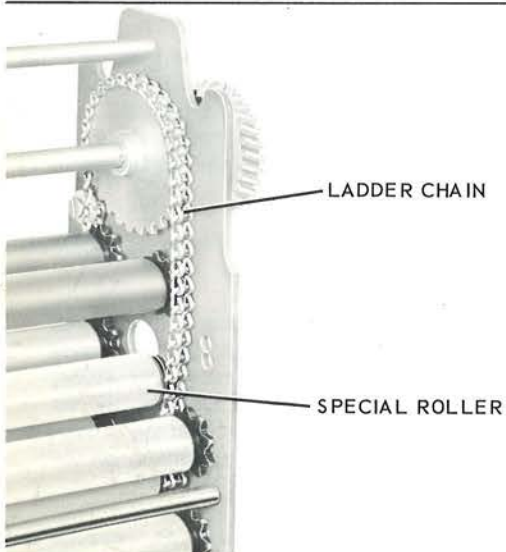


FIGURE 31 DEVELOPER RACK
SHOWING SPECIAL ROLLER

b. Remove the bearing from the side plate.
c. Loosen the two setscrews and remove the DRIVE GEAR, figure 23.

d. With a soft-face mallet, tap the DRIVE SHAFT from the driven side of the crossover and withdraw it from the master roller. In order to clear the slot in the undriven gudgeon with the locating pin in the drive shaft, it will be necessary to rotate the master roller.

e. If the master roller is to be removed, it will be necessary to remove the stud at the geared end of the cluster roller. Remove two screws and tilt the adjacent guide shoe out of the way.

f. Reassemble in reverse order, making sure that the pin is engaged in the slot in the geared gudgeon of the master roller. Align the drive gear with the mating gear on the rack and tighten the setscrews.

g. With the cluster rollers removed, check the adjustment of the guide shoes. Maintain a .040- to .060-inch clearance between the tips of the guide shoes and the master roller.

h. When replacing the cluster rollers, maintain a .020-inch clearance between the master roller and the cluster roller.

3-26. Entrance Crossover. Film cocking may be caused by improper setting of the IDLER ROLLER (pinch roller assembly), figure 25. Using a leaf-type thickness gauge, adjust the space between the idler roller and the master roller to .008 inch. Slight adjustment can be made by loosening the nuts which secure the roller mounting studs to the side plates. Be sure that the idler roller is square with the master roller.

3-27. To prevent static marks on the film, be sure that the GROUND STRAP, figure 6, is attached to the adjusting screw on the tinsel assembly of the entrance crossover.

3-28. SQUEEGEE CROSSOVER ASSEMBLY

3-29. Be sure that the SQUEEGEE CROSSOVER ASSEMBLY, figure 26, is square and seated properly.

3-30. Examine the squeegee crossover to see that the rollers turn freely. Be sure that the CLUSTER ROLLERS, figure 27, and the gears are secured to their shafts. The EXIT MASTER ROLLER, figure 26, must be free to turn independently of the cluster rollers.

3-31. A clearance of .020 inch should be maintained between the cluster rollers and the master rollers. If undue warping of any of the cluster rollers causes it to come into contact with the master rollers, the cluster roller should be replaced.

3-32. Examine all cluster-roller and master-roller BEARINGS, figure 27, for signs of wear. Any appreciable up-and-down play indicates that the bearing should be replaced.

3-33. Be sure that all of the rollers are kept clean. Wipe them with a damp vinyl sponge or cloth. If necessary, use a plastic abrasive material, such as Scotch-Brite, except on the ENTRANCE MASTER ROLLER, figure 26. Take care to preserve the roughened surface of the entrance master roller. Do not use

abrasives, instead, use a soft-bristle brush and warm water, brushing in the direction of the fine grooves. When deposits have been allowed to accumulate, a household detergent can be used. Using a damp sponge, be sure to remove all traces of detergent from the assembly.

CAUTION: Because of the construction of the squeegee crossover assembly, it should never be immersed in water.

3-34. Examine the ribs and the tips of the GUIDE SHOES, figure 27, for burrs. Use fine wet sandpaper to remove any roughness. The spacing between the tips on the exit side of the guide shoes and the exit master roller should be between .040 and .060 inch. The spacing across the entire width of the shoe should be as even as possible. Adjustment can be made by loosening the guide shoe mounting screws on the exit side of the guide shoe. The guide shoe at the entrance of the squeegee crossover should be in its uppermost position.

3-35. Examine the entrance master roller for broken teeth or loose gudgeons. If the gudgeons are loose, the roller should be replaced or the gudgeon secured with a cement, such as Pliobond, or an epoxy resin.

3-36. Check all of the gears for worn or broken teeth, and replace them if necessary. See figure 28 for the proper location of the gears.

3-37. The squeegee crossover assembly is equipped with PINNED RODS, figure 26, to properly direct the film through the squeegee.

3-38. ROLLER RACKS

CAUTION: To prevent contamination of the developer with fixer, when removing the fixer rack, place the SPLASH GUARD, figure 29, on the partition between the developer and fixer tanks.

3-39. Remove the roller racks from the processor and rinse the rollers with warm water. The water temperature should not exceed 100 F or the polyethylene-covered rollers may be damaged. If deposits have been allowed to accumulate, wash the rollers with a household detergent. Using a damp sponge, be sure to remove all traces of the detergent.

3-40. Discoloration of the rollers is not harmful, but built-up deposits should be removed. Pay particular attention to the four nonsubmerged rollers at the top of the rack. In case of extreme encrustation, a plastic abrasive material, such as Scotch-Brite, can be used. Do not use abrasives on the polyethylene-covered rollers; instead, use a rough towel or cloth.

NOTE: Because of the possibility of contamination, KODAK Developer System Cleaner should not be used to clean the roller racks.

3-41. A slippery condition of the rollers of the wash rack is usually caused by bacterial growth. Periodic use (deter-

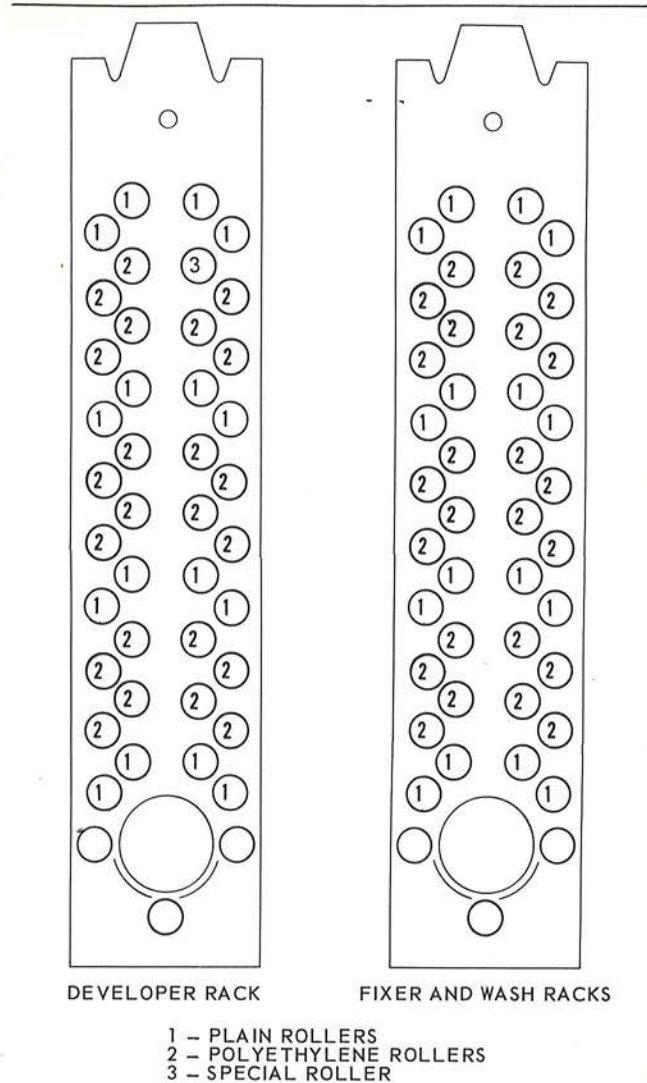


FIGURE 32 RACK ROLLER ARRANGEMENT

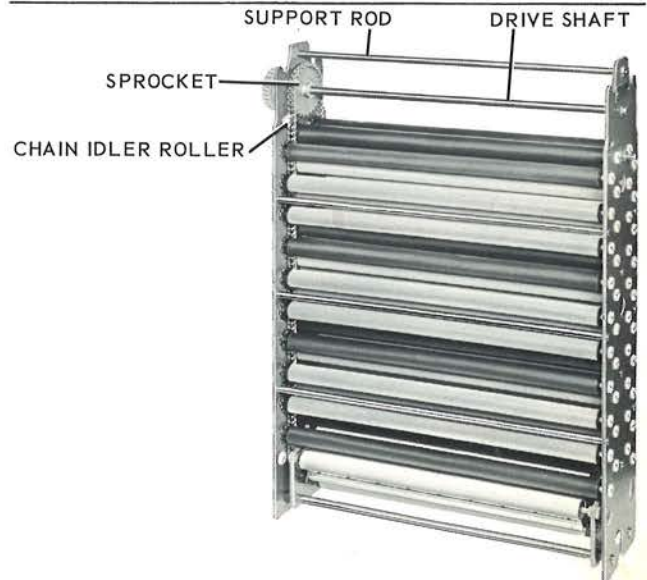


FIGURE 33 RACK ASSEMBLY (INSIDE DRIVEN SIDE)

mined by experience) of an algae eliminator, such as Algex or Dovicide G, can prevent this condition. (Algex can be obtained from the L. B. Russell Company, 14-33 31st Avenue, Long Island City, New York, and Dovicide G, from the Dow Chemical Company of Midland, Michigan.) The most effective method of using an algae eliminator is to add it to the wash tank and allow the rack to remain in the solution overnight. To do this, close the wash drain valve, remove the rack, drop in the pill or pellets, and reinstall the rack. Before starting the processor, drain the wash tank, rinse the rack, and refill the tank.

3-42. If the processor is used on a 24-hour-a-day basis, add the algae eliminator to the wash tank during operation and proceed as normally.

3-43. To minimize bacterial growth on the wash rack rollers, it is helpful to drain the wash tank when the processor is not in use. Be sure to close the drain valve before resuming operation.

3-44. The DISTRIBUTOR TUBE, figure 30, is positioned so that the 19 holes point downward in the developer rack and upward in the fixer rack. Since the tube is not utilized in the wash rack, it can point in either direction.

3-45. Inspect all vertical-path ROLLERS to be sure that they are free from bind. They should have at least 1/16 inch of end play. Inspect the gudgeons for broken teeth. If the gudgeons are loose, cement them with methyl ethyl ketone. Be sure that the rollers are all properly engaged in the LADDER CHAIN, figure 31, paying particular attention to the two bottom rollers on each side of the vertical paths. Check all rollers visually for unusual warping and bow, and at the same time be sure that the rack itself is properly squared.

3-46. When replacing rollers, be sure that the polyethylene-covered rollers and the plain rollers are in their proper locations. (See figure 32.)

3-47. When replacing rollers in the developer rack, be sure that the uppermost roller in the outer upward path is in the lowest position. This serves to keep the roller wet while the processor is operating, preventing buildup of chemical deposits. Also, be sure that the non-driven SPECIAL ROLLER, figure 31, is in the proper position.

3-48. Examine the RACK-DRIVE and CROSSOVER-DRIVE GEARS, figure 30, and the chain SPROCKET, figure 33, for signs of wear. This is indicated by pit marks in the sides of the teeth or by irregularly worn teeth.

3-49. Inspect the upper drive-shaft BEARINGS, figure 30, for wear. To do this, grasp the DRIVE SHAFT, figure 33, and the upper SUPPORT ROD in one hand. If appreciable vertical play is observed, replace the bearing. Check the bearings at both ends of the drive shaft in this manner.

3-50. If it is necessary to replace a chain sprocket or a drive-shaft bearing, proceed as follows:

- a. Loosen the setscrews and remove the gears from the shaft.
- b. Slide the shaft to the undriven side.
- c. Remove the sprocket from the shaft.
- d. Replace the sprocket or bearing as needed. Leave a .015-inch clearance between the sprocket and the bearing on the driven side.
- e. Be sure that the shoulders of the rack bearings are positively seated against the rack sides.
- f. Reassemble in reverse order of disassembly.

3-51. Be sure that the CHAIN IDLER ROLLER turns freely. Also, that the assembly is free from encrustation.

3-52. Check the ladder chain for any sign of spread or distorted links. Rotate the rack by hand so that the entire length of the chain has passed over the chain sprocket. If it is necessary to replace a chain, the splicing link must be shaped the same as the other links. It will be helpful in replacing a chain to hook the end of the new chain to the old one and draw it through the rack.

NOTE: The crossbar of the link must be in the direction of the travel and with the link opening outward. (See figure 31.)

3-53. Chain tension is important. Too tight a chain will cause the rack to turn with difficulty and cause bearing wear. Too loose a chain will cause the rollers to hesitate.

3-54. Chain tension can be adjusted slightly by loosening the chain idler stud and moving the assembly inward. If greater adjustment is necessary, tension of the chain is increased or decreased by lowering or raising the turnaround in the slots on the rack sides. If proper chain tension cannot be achieved by lowering the turnaround, one chain link must be removed. If roller hesitation persists after a link has been removed, the chain should be replaced.

3-55. The cluster rollers of the turnaround assembly must be parallel with the bottom vertical-path rollers on both sides of the rack. A piece of 1/4-inch flat stock can be used as a feeler gauge in determining this spacing. For normal use with a new chain, this gauge should slip easily in and out between the rollers on both ends and at each side of the vertical path. Thicknesses of tape can be wrapped around one end of the gauge to increase its thickness as the space between the rollers is increased. If the spacing is greater than 1/2 inch, a link must be removed.

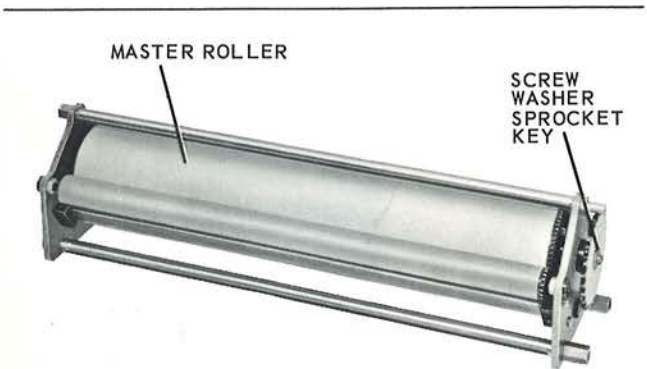


FIGURE 34 TURNAROUND ASSEMBLY

3-56. TURNAROUND ASSEMBLIES

3-57. Wear may be encountered in the bearing supporting the master roller shaft. To determine this, remove the outside turnaround cluster rollers. The cluster-roller studs can be reached through the ACCESS HOLES and/or SLOTS, figure 30, in the rack. Relieve the chain tension by moving the turnaround as close as possible to the bottom set of vertical-path rollers. Appreciable vertical play of the master roller indicates bearing wear, and the bearing should be replaced. This necessitates the removal of the turnaround assembly from the rack. To do this:

- a. Loosen the chain idler assembly.
- b. Remove the three turnaround MOUNTING SCREWS and WASHERS from each side of the rack.
- c. Work the chain off of the rack drive sprocket.
- d. Pull the undriven side of the turnaround slightly away from the vertical-path rollers to disengage the turnaround drive sprocket from the chain and remove the turnaround.

3-58. Examine the MASTER ROLLER, figure 34, for broken teeth or loose gudgeons. If the gudgeons are loose, the rollers should be replaced or the gudgeons secured with a cement, such as Pliobond, or an epoxy resin.

3-59. To replace a master roller or a shaft, proceed as follows:

- a. Remove the two screws and RETAINER PLATE, figure 35.
- b. Remove the bearing from the side plate.
- c. Remove the SCREW, WASHER, SPROCKET, and KEY, figure 34.
- d. With a soft-face mallet, tap the drive shaft from the driven side of the turnaround and withdraw it from the master roller. In order to clear the slot in the undriven gudgeon with the locating pin in the drive shaft, it will be necessary to rotate the master roller.
- e. If the master roller is to be removed, it will be necessary to remove the stud at the geared end of the cluster roller. Remove two screws and tilt the adjacent guide shoe out of the way.
- f. Reassemble in reverse order, making sure that the pin is engaged in the slot in the geared gudgeon of the master roller.

3-60. Take care to preserve the roughened surface of the master rollers. Do not use abrasives when cleaning the rollers; instead, use a soft-bristle brush and warm water, brushing in the direction of the fine grooves.

3-61. Reinstall the turnaround in the rack, first engaging the chain with the turnaround drive sprocket. Next engage the chain with the teeth of the rack drive sprocket. Then replace the turnaround mounting screws, paying particular attention to the proper spacing and the chain tension previously mentioned. (See paragraphs 3-53 and 3-54.)

3-62. Adjust the chain idler assembly by making sure that the inner rack roller turns when rotating the rack by hand.

3-63. DRIVE SYSTEM

3-64. If the MAIN-DRIVE MOTOR, figure 36, fails to operate, first check FUSE F7, figure 11. Then check FUSE F1.

3-65. Drive Chains. If it is necessary to adjust the MAIN-DRIVE CHAIN, figure 36, be sure the DRIVE-MOTOR SPROCKET is kept square with the MAIN-DRIVE SHAFT SPROCKET.

3-66. The main-drive chain, the DETECTOR-DRIVE CHAIN, figure 10, and the drive-shaft BEARINGS, figure 36, should be well lubricated. (See the Lubrication Chart, Section VI.)

3-67. PLUMBING CONNECTIONS

3-68. Visually check all pump, valve, hose, and tank connections for any signs of leaks.

CAUTION: When removing or installing the spring-type clamps, be sure to use special pliers, such as Corbin Hose-Clamp Pliers. (The use of safety glasses is recommended.) Do not open the clamp more than necessary to slip it off or over the hose; otherwise, spring tension will be lost.

3-69. DEVELOPER RECIRCULATION SYSTEM

3-70. Proper delivery of the developer into the inlet in the developer tank is important. It should be checked as follows both periodically and whenever the solutions in the processor are changed:

- a. Remove the developer rack, turn on the pumps, and observe the surface of the solution in the tank. If no turbulence occurs at initial start-up, it may be necessary to remove an air lock in the pump by unfastening the bail and lifting the pump slightly.



FIGURE 35 TURNAROUND ASSEMBLY

b. A stream of solution from the inlet of the tank should create a vigorous surface agitation. To create as little foam as possible, turn off the pumps as soon as the stream has been observed.

c. If the rate of flow seems inadequate, check the filter. (The filter should be changed every three months or after 50,000 films.) An obstruction in the recirculation system is another probable cause of low solution flow.

d. If there is no circulation, check to see that the pump motor is operating. If it is not, check the FUSE F5, figure 11, and then the FUSE F2. (See the Electrical Check List, Section VIII.)

3-71. Developer Recirculation Pump. Before removing the pump column from the housing, turn off the main power. To replace the IMPELLER, figure 37, insert a screwdriver through the top of the pump, to prevent the motor from turning, and unscrew the impeller counterclockwise from the motor.

3-72. If the impeller blade scrapes on the surface of the COLUMN, or the outer housing, adjust the COUPLING up or down, as necessary, by means of the SETSCREW. This can be reached through the ACCESS HOLE in the column.

3-73. Check the BEARING and the O-RING at the bottom of the column for signs of wear, and replace them if necessary. To replace the bearing, remove the impeller, take out the four screws holding the shaft housing to the motor and insert a 3/8- or 7/16-inch rod through the motor end of the housing and force out the bearing.

3-74. Replace with a new bearing and retaining ring. Using a 5/16-inch drill as a hand reamer, ream the bearing to .312 inch.

3-75. Be sure that the HOLE in the base of the column is clean.

3-76. If the motor becomes overheated, clean or replace the FILTER ASSEMBLIES, figure 36. These filters can be washed with water.

3-77. HEAT EXCHANGER

3-78. Leakage of water into the developer system may be evidenced by a continuous flow of solution into the developer tank. To check this, lower the developer level one inch and turn on the water supply and the recirculation pumps for several hours. If the solution level rises, a leak is indicated. This probably would be caused by a water leak from the HEAT EXCHANGER, figure 19, which must then be replaced.

3-79. If the heat exchanger is clogged, as evidenced by lower developer recirculation, proceed as follows:

a. Drain both the developer and wash tanks and remove the heat exchanger.

b. Remove the HEAT EXCHANGER BONNET, figure 38, from the intake side and inspect the heat exchanger for obstruction. If the tubes are clogged, remove the other bonnet and use a wire or rod to remove the obstruction.

3-80. DEVELOPER THERMOMETER

3-81. Check the developer solution with a long-stemmed thermometer of known accuracy. Place the thermometer between the undriven side of the rack and the tank. If the reading of the DEVELOPER THERMOMETER, figure 14, is incorrect, the pointer should be reset. To do this, pry off the BEZEL AND GLASS. Then, while holding a finger against the dial to keep the pointer from moving, with a screwdriver turn the SLOTTED SCREW counterclockwise to move the pointer clockwise, and vice versa. Replace the bezel and glass.

3-82. DEVELOPER THERMOSTAT

3-83. The developer heater thermostat has been set at the factory to heat the developer to the proper temperature of 81 ± 1 F. If adjustments are necessary, proceed as follows:

a. Remove the processor cover and the pump section GUARD, figure 6.

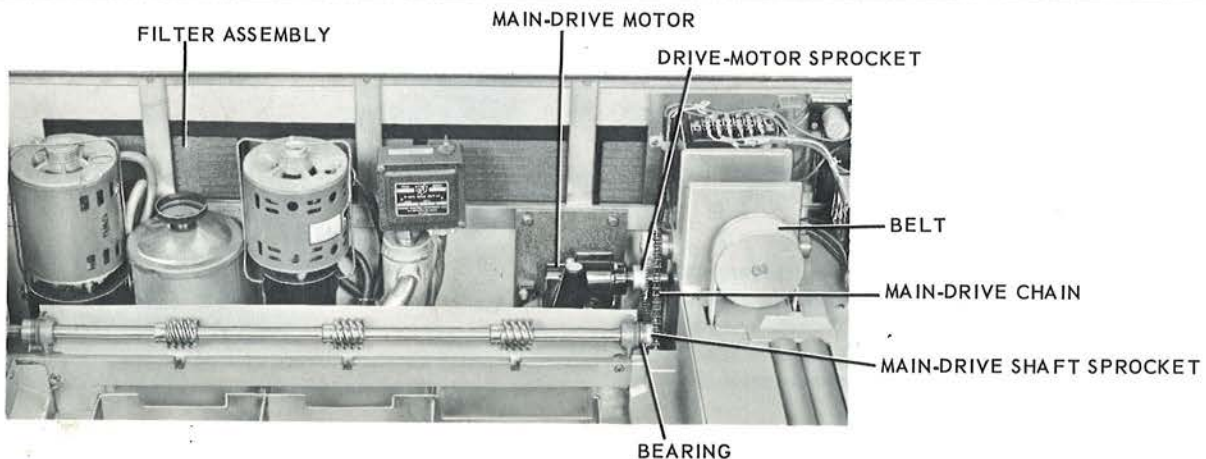


FIGURE 36 DRIVE SIDE OF PROCESSOR (GUARDS REMOVED)

b. Loosen the SCREW, figure 39, and swing the cover upward.

c. The thermostat should be set to turn the heater on at 80 F and off at 82 F. Turn the HEX NUT clockwise if more heat is required; counterclockwise, for less heat. The PILOT LIGHT on the top of the thermostat turns off when heat is called for and turns on when the correct temperature has been reached. The heater turns on and off automatically to maintain a constant solution temperature.

WARNING: To prevent shock, be sure the plastic safety SHIELD is over the microswitch before making any adjustments.

3-84. If an accurate developer temperature cannot be maintained, first check the incoming water supply to be sure that it is adequate. A minimum pressure of 45 psi on each line is recommended, and a constant flow must be maintained. (Refer to paragraph 3-95.)

3-85. If the temperature continues to fluctuate, even though the incoming water is maintained at 73 ± 1 F, the developer recirculation system should be checked. (Refer to paragraph 3-69.) If both the incoming water supply and the developer recirculation are correct, it can be assumed that the thermostat is not operating properly. This may be due to a loose microswitch MOUNTING SCREW within the thermostat housing. Remove the plastic safety shield and tighten the screws. Also check to be sure that the PLUNGER operates freely. If it does not, apply a light oil to the plunger shaft and activate it by hand a few times. Replace the shield. If this does not correct the situation, replace the thermostat.

3-86. DEVELOPER HEATER

3-87. If the correct developer temperature cannot be maintained, check the operation of the developer heater at the bottom of the developer tank.

3-88. With the power on, and using a clamp-around ammeter, such as a Weston, Model 749, at the electrical connection leading into the JUNCTION BOX, figure 18, check the oper-

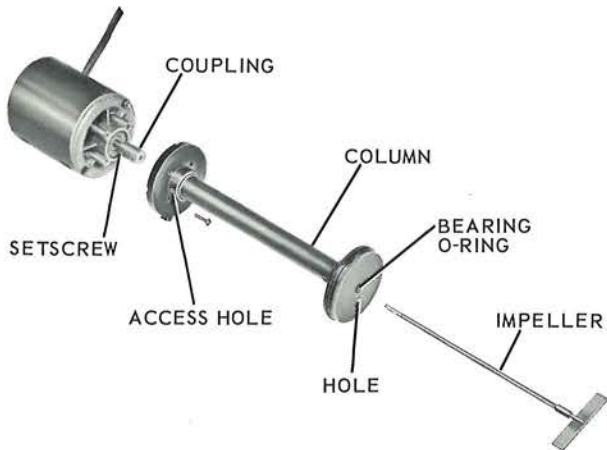


FIGURE 37 DEVELOPER RECIRCULATION PUMP

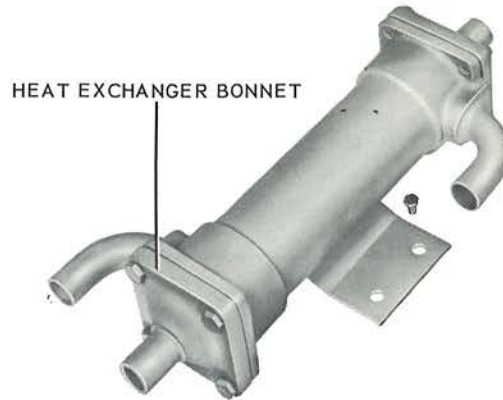


FIGURE 38 HEAT EXCHANGER

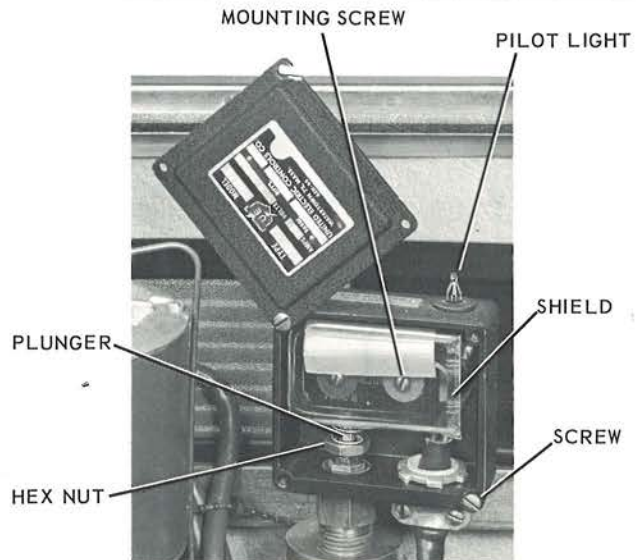


FIGURE 39 DEVELOPER THERMOSTAT

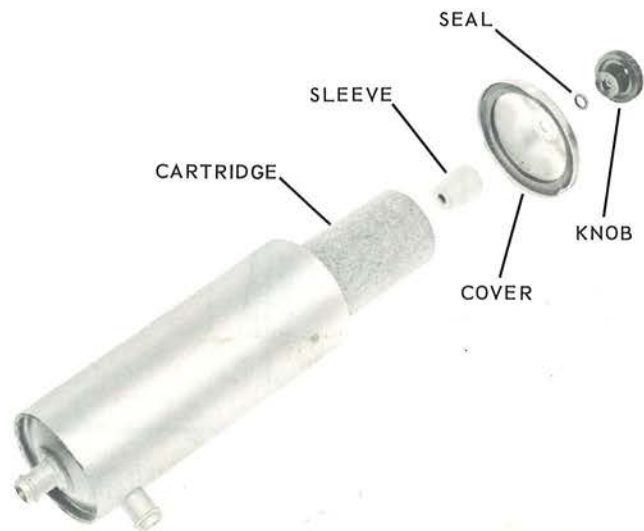
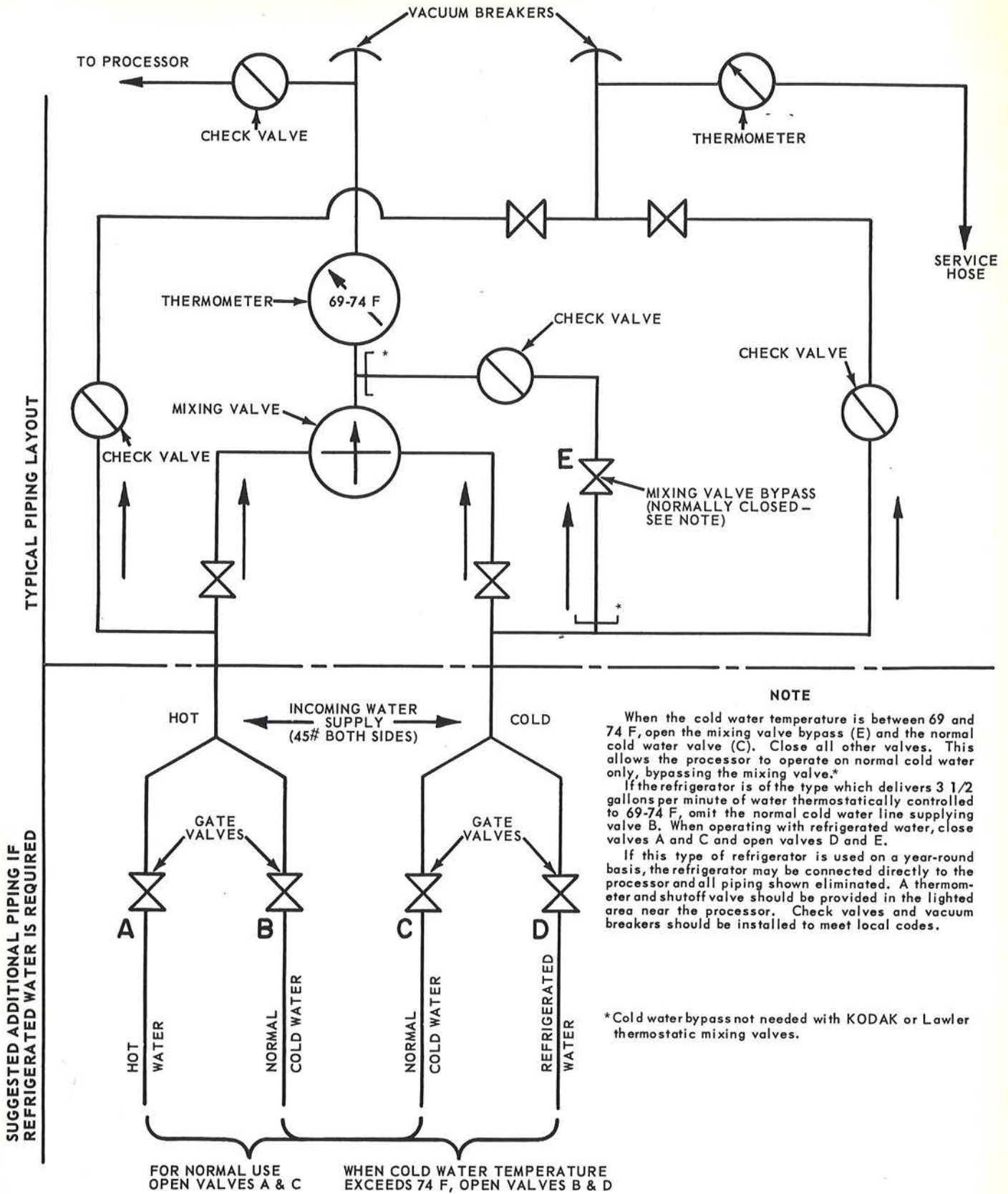


FIGURE 40 DEVELOPER FILTER ASSEMBLY



**SUGGESTED PLUMBING LAYOUT FOR X-OMAT PROCESSOR
WHEN COLD WATER SUPPLY EXCEEDS 74 F**

FIGURE 41

ation of the heater. Disconnect lead No. 10A at the terminal strip. With the power off, and using an ohmmeter, check between 10A and neutral. The reading should be approximately 13 ohms. (See the Electrical Check List, Section VIII.)

3-89. To remove the heater, disconnect the wires and nuts inside the junction box.

3-90. DEVELOPER FILTER

3-91. Observe the surface agitation of the developer when a new cartridge is installed in the filter housing. When the recirculation appears substantially less, replace the filter cartridge as follows:

- a. Turn off the pump.
- b. Unscrew the cover KNOB, figure 40, and remove the SEAL, COVER, and SLEEVE.
- c. Replace the filter CARTRIDGE.
- d. Replace the sleeve, cover, seal, and knob. Be sure to seat the cover squarely and replace the knob firmly.
- e. Turn on the pump momentarily to make sure the cover does not leak.

3-92. FIXER RECIRCULATION SYSTEM

3-93. The fixer recirculation rate should be checked in the same manner as the developer. If the stream emitting from the tank is insufficient, pay particular attention to the hose connection at the tank inlet.

3-94. Fixer Recirculation Pump. To replace the impeller, insert a screwdriver through the top of the pump, to prevent the motor from turning, and unscrew the impeller counter-clockwise from the motor. Replace and ream the bearing with a 5/16-inch drill in the same manner as in the developer pump.

3-95. INCOMING WATER SUPPLY (Refer to figure 41.)

3-96. The external hot and cold water supplies should have at least 45 pounds of pressure and be capable of delivering a constant flow of 3 1/2 gallons per minute of water tempered to 73 F. If the cold water supply exceeds 69 F, it will be necessary to bypass the mixing valve. In this case, the hot and cold water supply valves are closed and the bypass valve is opened. This allows cold water only to be supplied directly to the processor. If the temperature of this water exceeds 74 F, refrigerated water must be used. For advice as to refrigeration requirements, it is suggested that a local refrigeration contractor be contacted.

3-97. Measure the flow of the incoming water supply as follows:

- a. With the wash rack in place, drain the wash tank completely.
- b. Close the wash tank drain valve.
- c. Turn on fully the hot and cold water valves.
- d. The time necessary to fill the tank to overflowing should be approximately three minutes. (The capacity of the tank with the rack installed is approximately ten gallons.)

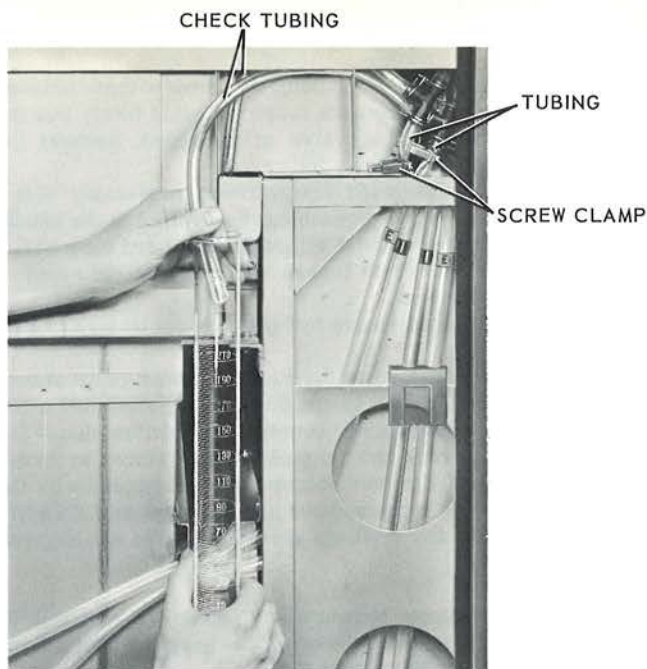


FIGURE 42 CHECKING REPLENISHMENT RATES

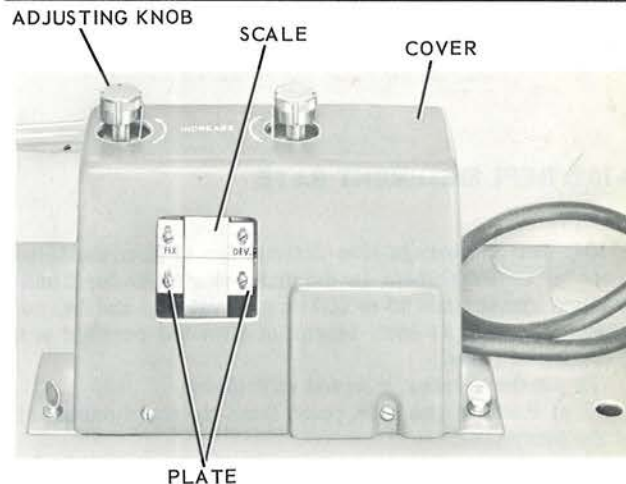


FIGURE 43 REPLENISHER PUMP ASSEMBLY

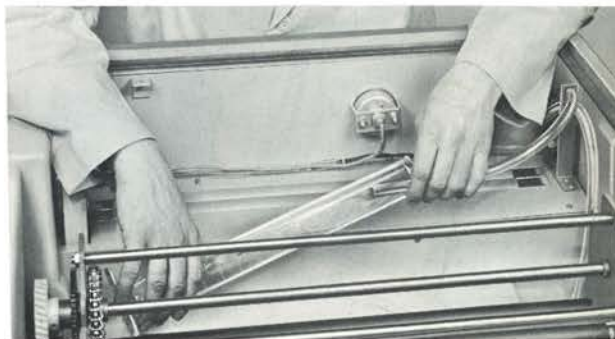


FIGURE 44 CHECKING REPLENISHMENT RATES (AGAINST WALL INSTALLATION)

3-98. MIXING VALVE (Not supplied with processor)

3-99. If insufficient water is being delivered to the processor even though the line pressure is normal, it is likely that the strainers in the mixing valve are clogged. Remove the strainers and clean them as follows:

a. Use a wide-blade screwdriver, preferably with a square shank so that a wrench can be applied to the handle if the screws do not come off easily. A sharp blow with a hammer should serve to loosen the screw if the strainer cover resists removal.

b. Clean the strainers by back-flushing under a faucet.

3-100. The temperature on the external water gauge should be 73 ± 1 F. To check the gauge, place a long-stemmed thermometer of known accuracy between the undriven side of the processor wash rack and the tank. Temperatures recorded on the gauge and the thermometer are not necessarily the same, because the temperatures are being taken at different points. However, the readings should be within two degrees of each other.

3-101. If the proper temperature cannot be maintained, check the temperature of the hot water supplying the mixing valve to see that it is at least 89 F.

3-102. If water of sufficiently low temperature cannot be obtained from the mixing valve, check the incoming cold water supply to see that it is no higher than 74 F.

3-103. REPLENISHMENT RATE

3-104. For an average size-distribution of film, the desired rates of replenishment in the processor tanks for films of medium density are 95 to 100 cc of developer and 140 cc of fixer for each 14-inch length of film fed parallel to the direction of travel.

To set these rates, proceed as follows:

a. Remove the side panel from the nonplumbing side of the processor.

b. Using the SCREW CLAMPS, figure 42, close off the replenisher pump TUBING. Center the tubing in the clamps and tighten them firmly so that no solution will bypass them.

c. Hold the CHECK TUBING in a small graduate as shown. Operate the pumps until the solution has reached the top of the tubing. Empty the graduate. Feed a 14 by 17-inch test film into the processor and measure the solution ejected.

NOTE: To insure the correct measurement, the check tubing must be filled completely.

d. Each notch on the ADJUSTING KNOBS, figure 43, equals approximately 3 cc. For more replenishment, turn the knob counterclockwise.

e. After establishing the desired rate, loosen the two screws and slide the developer or fixer PLATE up or down as necessary to align it with the long line on the SCALE.

f. After adjusting the pump, feed another film into the processor to be sure that the rates are correct. Return the check tubings to the drain trough, open the screw clamps fully, and replace the side panel.

NOTE: Do not clamp off the check tubings.

3-105. If the nonplumbing side of the processor is installed against the wall, proceed as follows to check the replenishment rates:

a. Remove the processor cover, the squeegee crossover assembly, and the guard at the exit end of the processor.

b. Clamp off the tubing as outlined in step 3-104b.

c. Hold the check tubing in a small graduate as shown in figure 44 and proceed as outlined in steps 3-104c through f.

d. Replace the guard, squeegee crossover assembly, and the processor cover.

3-106. TUBING

3-107. Check all tubing to be sure that it is free from kinks or any foreign matter. Any whitish deposits in the replenisher system tubing indicates improper solution mixing and may lead to film transport difficulties.

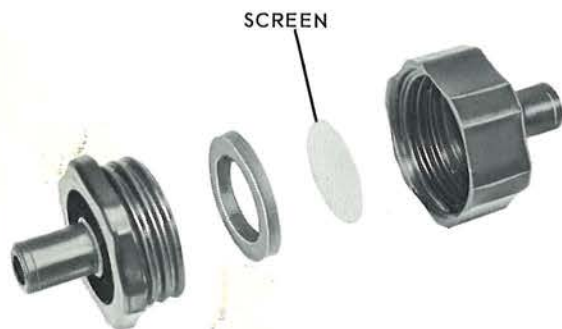


FIGURE 45 FIXER STRAINER ASSEMBLY (EXPLODED VIEW)

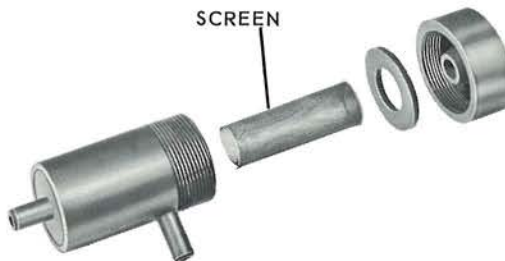


FIGURE 45A DEVELOPER STRAINER ASSEMBLY

3-108. STRAINERS

3-109. The SCREENS, figures 45 and 45A, of the STRAINER ASSEMBLIES must be free from foreign matter and chemical deposits. Clean them with a small brush and warm water. Solid deposits can be removed from the fixer screen, figure 45, by flexing the screen while cleaning.

3-110. REPLENISHER PUMP ASSEMBLY

3-111. The replenisher pump assembly can be repaired easily in the field by replacement of its various parts. For correct part numbers, refer to the parts list for the KODAK Industrial X-OMAT Processor, Model B.

3-112. Life of the CAM, figure 46, can be greatly extended by lubrication. (See the Lubrication Chart, Section VI.)

3-113. CHECK VALVES, which are an integral part of the REPLENISHER PUMPS, prevent solutions from draining from the processor to the replenisher tanks. If at any time the tubes in the FLOW INDICATOR, figure 14, are not completely filled with solution or if bubbles are observed, the check valves are not operating properly. If this occurs, clean the pumps by flushing with warm water. This is done by attaching a length of hose to the pump INLETS, figure 46.

3-114. Solid deposits may be removed from the PUMP BODY, figure 47, with a ten percent solution of acid, such as sulfuric or hydrochloric. To do this, proceed as follows:

- Remove the REPLENISHER PUMP ASSEMBLY, figure 43, from the processor.
- Take off the pump COVER.
- Remove the SCREWS, figure 46, which hold the pump body assembly to the bracket.
- Disassemble the pump body assembly as shown in figure 47.
- After cleaning, reassemble in the reverse order of disassembly.

WARNING: When diluting acid, wear suitable eye protection and rubber gloves. Also, be sure to add the acid to the water.

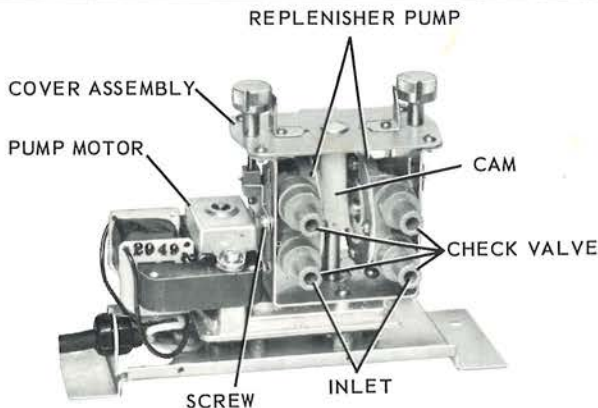


FIGURE 46 REPLENISHER PUMP ASSEMBLY (COVER REMOVED)

3-115. If replenishment rates drop and do not respond to the normal adjustment of the adjusting knobs, check the cam for signs of wear. A groove in the area of the diaphragm-actuating BUTTON indicates wear and the cam should be replaced. To do this, proceed as follows:

- Remove the pump body assemblies as outlined in paragraph 3-114 a through c.
- Remove the four screws and lift off the bracket COVER ASSEMBLY, figure 46.
- While supporting the cam to avoid bending the shaft, remove the pin with a 1/16-inch-point drift punch.
- Reassemble in reverse order of disassembly.

3-116. FLOW INDICATOR

3-117. If the tubes in the flow indicator become encrusted with chemical deposits, they should be cleaned by flushing with warm water or a ten percent solution of acid, such as sulfuric or hydrochloric. To do this, proceed as follows:

- Remove the guard at the exit end of the processor.
- Disconnect the tubing from the flow indicator tubes.
- Remove the two SCREWS, figure 48, from the BRACKET ASSEMBLY.
- Flush the tubes and reinstall the assembly in the processor. Replace the guard.

3-118. DRYER DRIVE BELT

3-119. Examine the dryer drive BELT, figure 36, for signs of wear. If it is necessary to replace a belt, proceed as follows:

- Remove the transparent access panel at the exit end of the processor.
- Remove the processor cover and the squeegee crossover assembly.
- From the exit end of the processor, remove all air tubes and transport rollers.

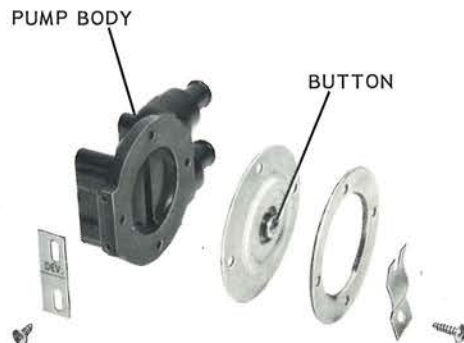


FIGURE 47 PUMP BODY ASSEMBLY (EXPLODED VIEW)

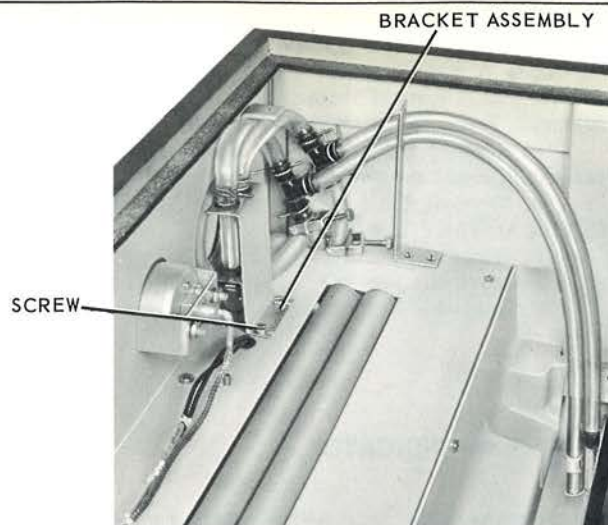


FIGURE 48 REPLENISHER LINES AND RELATED PARTS

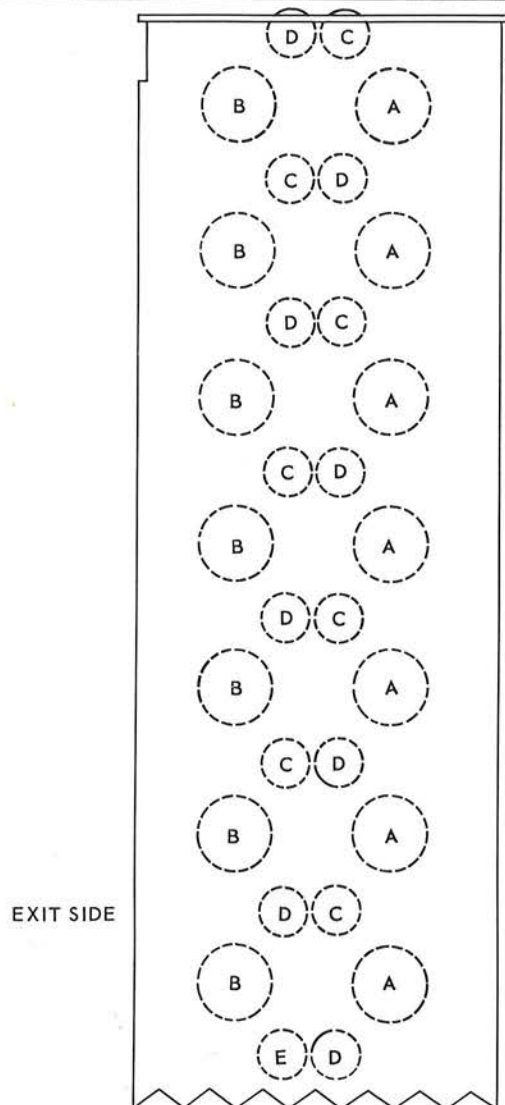


FIGURE 49 ARRANGEMENT OF AIR TUBES AND TRANSPORT ROLLERS IN THE DRYER

d. Force the IDLER ASSEMBLY, figure 16, upward and disengage the belt.

e. After installing a new belt, replace the air tubes and transport rollers in their proper positions. (See figure 49.)

3-120. IDLER ASSEMBLY

3-121. Figure 50 is an exploded view of the spring-loaded idler assembly. Check the BEARINGS for signs of wear.

3-122. AIR INTAKE FILTER ASSEMBLY

3-123. The purpose of the air intake FILTER ASSEMBLY, figure 36, is to prevent the formation of dust deposits inside the dryer air tubes, which results in streaking of the film. Inspect the filters weekly and clean, if necessary, by rinsing in warm water.

3-124. AIR TUBES

3-125. Check the inside of the air tubes for dust. Be sure there is no blockage of the AIR SLITS, figure 51. Interference in the airstream will cause drying streaks. To clean the air tubes, agitate them vigorously in a tray of warm water. DO NOT SOAK in water for long periods of time, since swelling of the slits could result. Also check to see that the proper .078-inch slit width at the ADJUSTING SCREWS is maintained.

3-126. Check and straighten, if necessary, the GUIDE PINS on the air tubes. If the guide pins are loose, use an epoxy resin to secure them. Be sure that the joint between the pin and the tube is smooth.

3-127. DRYER TRANSPORT ROLLERS

3-128. The dryer TRANSPORT ROLLERS should be clean and free from excessive bowing. They may be cleaned with a damp cloth or a plastic abrasive material, such as Scotch-Brite. Replace the O-RINGS if they are worn.

NOTE: Be sure the O-rings on the pulleys of the dryer transport rollers are positioned as shown in figure 52.

3-129. Before replacing the transport rollers in the dryer, be sure the HOLDERS, figure 51, are free from foreign matter. To clean them, use a cotton swab moistened with water. Also be sure the transport rollers are seated firmly in the holders.

3-130. DRYER TEMPERATURES

3-131. The dryer temperature may range from 120 to 140 F, depending upon ambient conditions and types of film used. To minimize dryer marks, the dryer thermostat should be set to operate at the lowest possible temperature consistent with good drying.

3-132. If the dryer does not come up to the proper temperature within 10 or 15 minutes or does not maintain a fairly constant temperature while processing a full load of film, it is possible that a heater element is not functioning. (See paragraph 3-139.)

3-133. DRYER THERMOMETER

3-134. First check the setting of the dryer THERMOSTAT, figure 14. If the setting is normal (120 to 140 F) and drying is not satisfactory, check the temperature without films in the dryer. To do this, place a thermometer of known accuracy (with the bulb up) in the left-hand corner of the dryer. Be sure the bulb of the thermometer does not touch any surface.

3-135. To change the reading of the DRYER THERMOMETER, pry off the BEZEL AND GLASS. Then, while holding a finger against the dial to keep the pointer from moving, with a screwdriver turn the slotted screw counterclockwise to move the pointer clockwise, and vice versa. Replace the bezel and glass. If the thermometer fails to register temperature changes, it must be replaced.

3-136. DRYER THERMOSTAT

3-137. Check the setting of the dryer thermostat against the dryer thermometer. Reset the position of the thermostat setting if necessary. To do this, pull the knob from the shaft and turn the adjusting screw (located in the center of the shaft) counterclockwise to obtain a higher temperature for a given setting. A defective thermostat is indicated by erratic readings on the thermometer, in which case the thermostat should be replaced.

3-138. DRYER HEATERS

3-139. Each heater element under full load will draw approximately 10 amps at 230 volts. This may be checked with an ammeter in the electrical control box at the feed station. Wire 11A should read approximately 30 amps. Any large deviation is an indication that one or more of the heating elements is defective and should be replaced.



FIGURE 50 SPRING-LOADED IDLER ASSEMBLY

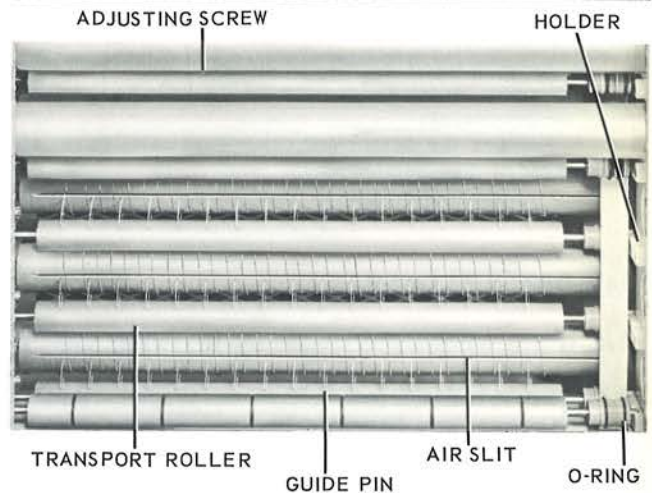


FIGURE 51 AIR TUBES AND TRANSPORT ROLLERS



FIGURE 52 DRYER TRANSPORT ROLLERS

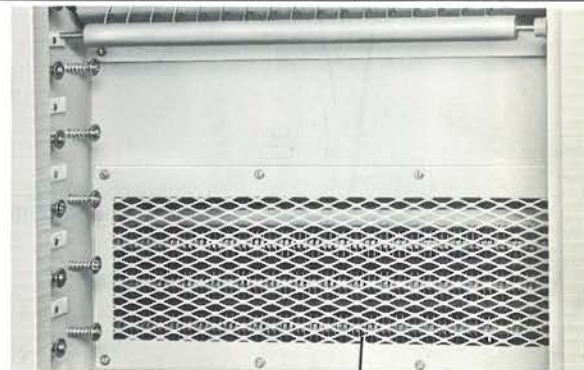


FIGURE 53 DRYER HEATER SCREEN

3-140. To replace a defective HEATER, figure 20, proceed as follows:

- a. Remove the dryer door assembly and the four lower rows of air tubes and transport rollers.
- b. Remove the screws and washers from the SCREEN, figure 53. It will be necessary to turn the drive belt toward the side of the processor to remove the screen.
- c. Lift off the side panels.
- d. Remove the right and left access doors of the HEATER PLENUM, figure 18.
- e. Disconnect the necessary TERMINALS, figure 54, to electrically isolate the heaters from each other.
- f. With an ohmmeter, measure the resistance of each heater separately. A good heater should read approximately 24 ohms.
- g. Remove the SCREWS and WASHERS from both sides of the defective heater and remove the heater from the dryer end of the processor.
- h. Replace the heater and component parts in the reverse order of disassembly.

3-141. DRYER BLOWER

3-142. If it is necessary to remove the BLOWER, figure 18, proceed as follows:

- a. Remove both side panels. If one side is against the wall, it will be necessary to disconnect the services to the processor and slide the processor from the wall opening. Before doing this, drain the wash tank and remove the roller racks to lighten the processor as much as possible, and to prevent splashing of solutions from one tank to another.
- b. Remove the SCREWS and LOCK WASHERS from the ISOLATORS.
- c. Pry the plastic SHROUD from the top of the blower.
- d. Slide the blower out of the processor.
- e. Replace the blower in the reverse order of disassembly.

3-143. BLOWER MOTOR

3-144. Access to the blower motor is from the nonplumbing side of the processor. If that side of the processor is against the wall, it will be necessary to remove the processor as outlined in paragraph 3-142. The blower motor can be removed from the blower without removing the blower from the processor.

3-145. The blower motor bearings are factory-lubricated for the normal life of the bearings.

3-146. The blower motor is protected by a 10-amp FUSE F3, figure 11.

3-147. BLOWER BELTS

3-148. The blower belts are adjusted by a pivoted motor-mounting PLATE, figure 18. To adjust the belt tension, move the NUTS on each side of the mounting plate in the desired direction. Since the belts are matched, they must be replaced in pairs.

3-149. AIR EXHAUST

3-150. A possible cause of improper drying could be inadequate venting of the dryer exhaust. The venting system should be capable of dispelling 200 cfm at all times. In the summertime, it may be advisable to check the exhaust system to be sure that the addition of air-conditioning equipment does not cause a serious back pressure to reduce the exhaust. If runs of over 25 feet with three or four elbows are employed, a six-inch duct is recommended.

3-151. SILVER RECOVERY

3-152. An ACCESSORY OUTLET, figure 12, is provided on the processor to conduct spent fixer to a silver-recovery device. Tubing leading to the recovery device may be connected directly to the overflow nipple. Remove the tubing from the fitting at the drain header and insert a rubber stopper. In running the solution into the recovery tank, be sure to provide for a broken connection so that no electrolytic action can follow through the solution lines and cause plating of silver in the processor. Allowing the fixer line to terminate at the top of the recovery tank so that the solution drips into the tank will provide this broken connection.

CAUTION: It is recommended that silver recovery devices be located as far as possible from the processor, particularly if a KODAK X-OMAT Film Feeder is used.

3-153. If an electrolytic recovery cell is used, set the amperage as low as possible and gradually increase the current until the color of the plate on the negative electrode is creamy white or light brown. A metallic-silver color indicates too low a current; a dark brown, too high a current.

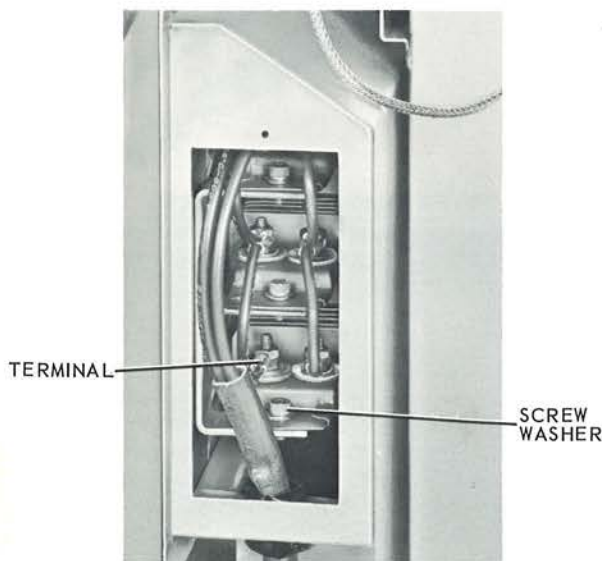


FIGURE 54 AIR HEATER CONNECTIONS

SECTION IV – RECOMMENDED PROCEDURE FOR OPERATING PERSONNEL

4-1. Experience indicates that proper operation of the X-OMAT Processor with minimum service problems depends on well-established work habits and good housekeeping. It is suggested that the operating personnel be trained to follow the recommended daily check before start-up, the nightly cleanup, and the weekly inspection outlined below.

4-2. It cannot be emphasized too strongly that the flow indicators should be checked periodically throughout the day and that the replenishment rate should be measured accurately on a periodic basis as described in paragraph 3-103. Any sign of air bubbles or leaking back in the flow indicator signifies improper replenishment, and the cause should be corrected immediately.

4-3. It may be necessary to increase or decrease the replenishment rates where film size-distribution or average density is other than normal.

4-4. DAILY CHECK

4-5. Start-Up. Proceed as follows:

- a. Close the wash tank drain valve.
- b. Start the water flow (73 ± 1 F).
- c. Turn on the main disconnect switch on the wall and the four switches on the electrical control panel of the processor.
- d. Wipe down the entrance rollers and crossovers (if needed).
- e. Feed test film and check the replenishment at the flow indicators.
- f. Check the operation of the racks and crossovers.
- g. Check the seating and operation of the squeegee crossover assembly.
- h. Check the developer temperature (81 ± 1 F).
- i. Check the dryer temperature (120 to 140 F).

NOTE: The first few films through the processor may have somewhat dirty surfaces as they come out. This is dirt pickup from the rollers and disappears as more films are fed. In daily use, it is recommended that two or three test films be fed each morning when the processor is first turned on. This will clean off any foreign matter which may have accumulated during the shutdown period.

4-6. Shutdown. Proceed as follows:

- a. Remove all crossover assemblies and rinse with warm water. Using a soft brush in the direction of the fine grooves, remove any deposits that may have formed. Handle these assemblies carefully so as not to twist them.

CAUTION: Be very careful not to catch fingers, neckties, cleaning materials, etc, in moving gears.

- b. Without removing the racks, wipe off all rack rollers above the solution level.
- c. Wipe off the feed rollers at the entrance roller assembly.
- d. Before turning off the power, be sure that the processor has been cleared of film.

- e. Turn off all switches on the electrical panel of the processor and the power disconnect switch on the wall.
- f. Turn off the water supply to the processor.

g. To minimize the formation of bacterial growth, open the wash tank drain valve when the processor is not in use.

h. Open the processing cover slightly so that chemical fumes from the processing tanks can escape.

NOTE: If the processor is operated on a 24-hour-per-day basis, steps a through c should be carried out once in every 24-hour period. To prolong the life of the processor and other moving parts, turn off the main power switch.

4-7. FILM SALVAGE

4-8. If trouble occurs, DO NOT TURN OFF POWER. Proceed as follows:

- a. Pull a crossover ahead of the malfunction.
- b. Remove the films at this point to avoid further pile-up. Collect these films in a tray of water or fixer to avoid their sticking to each other.
- c. Carefully remove the racks and correct any possible cause of failure in the racks or tanks.
- d. Reintroduce the collected film lengthwise into the processor at the point of interruption.

4-9. WEEKLY PROCEDURE

- a. Remove the crossover assemblies and wipe the rollers with a damp vinyl sponge or cloth.
- b. Check the rack chains. Any sign of roller hesitation may indicate a loose chain.

CAUTION: To prevent contamination of the developer with fixer solution, place the splash guard on the partition between the developer and fixer tanks whenever removing the fixer rack. Also, to prevent overflow, lower the solution level in the tank slightly before replacing the rack.

c. Remove the roller racks, rinse them with running water, and wipe them with a damp vinyl sponge or cloth. Water temperature should not exceed 100 F. Be sure to clean off all removable chemical deposits on the sides of the racks around the gears, chain tightener, etc. Stubborn deposits can be removed with a household detergent.

d. Rotate the rack by hand to be sure that all of the rollers turn freely. Adjust the chain, if necessary. (See paragraph 3-54.)

e. Check the turnaround assembly at the bottom of the rack to be sure its rollers are parallel with the vertical-path rollers of the rack. Be sure overall rack is not twisted out of square. This can be determined by sight.

f. With the pumps turned on, observe the surface of the solution tanks in order to check the recirculation. (See paragraph 3-69.)

g. While the racks are out, examine the solution tanks for the presence of any foreign matter and for clarity of solutions.

h. Reinstall the racks and crossovers. Check all crossover and rack gears to be sure that they are engaged properly.

i. Check the squeegee crossover assembly to be sure that it is seated properly.

j. Clean the air intake filter assembly by rinsing in warm water.

k. Inspect the dryer air tubes. If the slits contain any dust or lint, see paragraph 3-125 for cleaning instructions.

drain the solutions and clean and check the processor. When doing this, it is advisable to follow the procedure outlined in Section V.

4-10. FREQUENCY OF SOLUTION CHANGE

4-11. Experience indicates that, with proper replenishment, the recommended Kodak processing solutions can last indefinitely. However, on a periodic basis, probably it will be desirable to

4-12. MANUAL FILM-FEEDING PROCEDURE

4-13. Wherever possible, it is advisable to feed all smaller-width films side by side to avoid overreplenishment of solutions. This will aid in balanced replenishment and will result in maximum economy of solutions.

4-14. Take care to feed films into the processor square with the edges of the feed tray side guide and start multiple films at the same time.

4-15. Figure 55 shows the proper film-feeding procedure. The arrows indicate the direction in which the films are to be fed into the processor. Notice that under no circumstances are films less than 7 inches long fed into the processor.

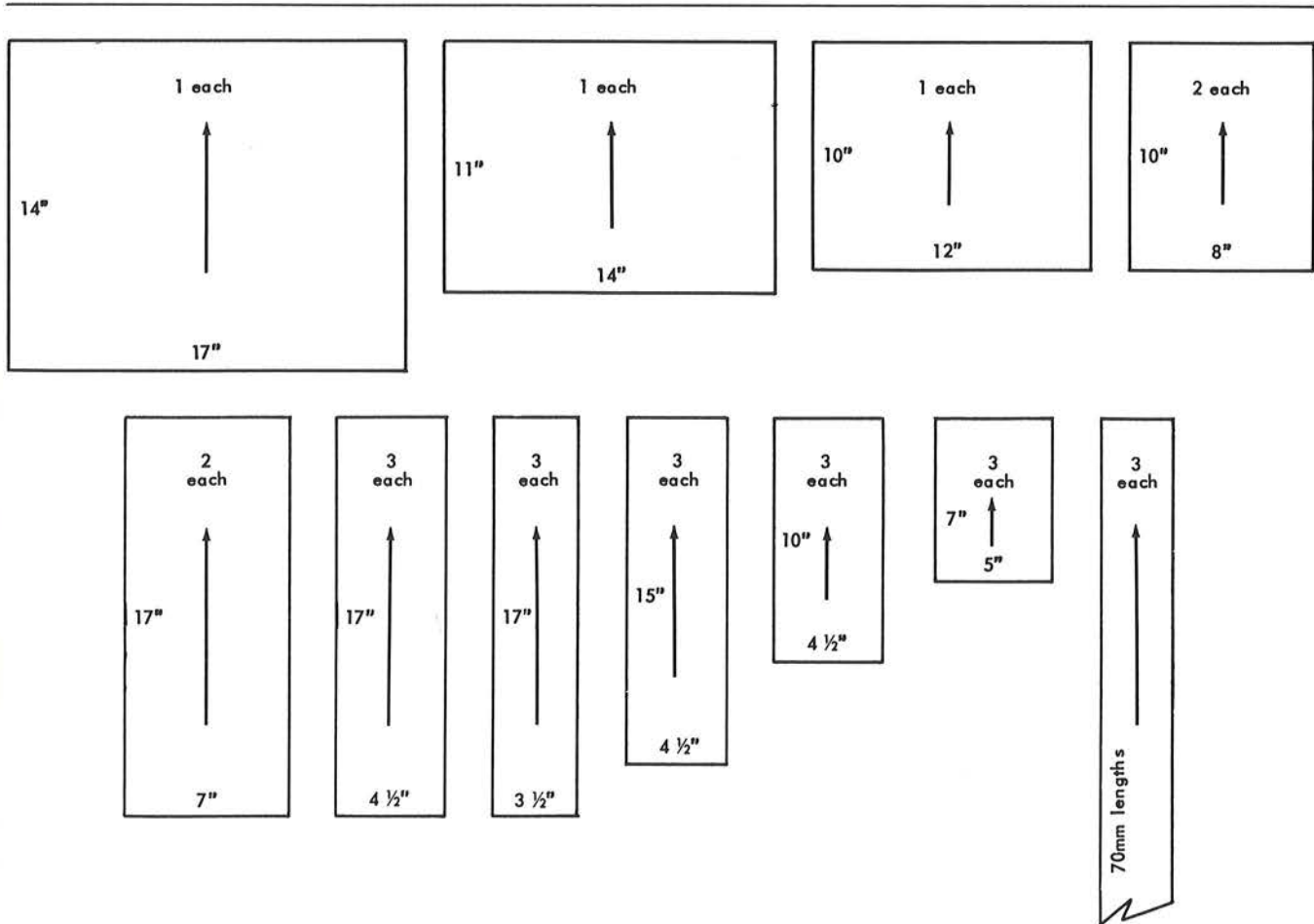


FIGURE 55 MANUAL FILM-FEEDING PROCEDURE

SECTION V – PERIODIC PREVENTIVE MAINTENANCE CHECK LIST

5-1. In order to minimize service problems on the KODAK Industrial X-OMAT Processor, it is advisable to inspect the various components periodically (on a three- to six-month basis, depending upon usage) for signs of wear and/or maladjustment, and to apply lubricants where necessary. (See Lubrication Chart, Section VI.) The following check points are suggested as a guide for a routine inspection. We strongly recommend that the procedures outlined be used by dealer servicemen.

5-2. First, question the operators in order to determine the performance of the processor throughout the previous period.

5-3. Then, inspect the processor for general cleanliness. Make notes so that the customer can be advised as to the effectiveness of his daily and weekly routine-maintenance program.

5-4. Insert several 14 by 17-inch test films and observe them as they progress through the processing and dryer sections. If cocking of film occurs, note at which point it first takes place, so that the defective section can be adjusted.

5-5. CHECK POINTS AT FEED STATION

Component	Check	Paragraph Reference
FEED TRAY	alignment - square with developer rack tie rod	3-1

5-6. CHECK POINTS IN PROCESSING SECTION

Component	Check	Paragraph Reference
DETECTOR ROLL ASSEMBLY		3-4
a. Detector Roller	cleanliness - freedom from dirt and dust	3-5
b. Worm Gear	for signs of wear	3-6
c. Sprocket	for broken or worn teeth	3-7
d. Worm	for burrs	3-7
e. Bearing	for signs of wear	
f. Microswitches	adjustment - loosen nut to raise plunger roller; tighten to lower it	3-8
1. Double Thickness	adjustment	3-9b
2. Replenisher Pump	adjustment	3-9c
g. Time-Delay Relay	8-second delay from time replenishment stops until film-feed signal sounds	3-11
CROSSOVER ASSEMBLIES		3-17
	a. cleanliness - freedom from chemical deposits	
	b. freedom in operation - must turn freely by hand	
	c. squareness	3-24
a. Drive Gear	for broken teeth	

Component	Check	Paragraph Reference
b. Cluster Rollers	a. for warping, broken teeth, or loose gudgeons	3-18
	b. *spacing between driven cluster roller and master roller - .020 inch \pm .005	3-21
1. Entrance Crossover	*spacing between idler roller and master roller - .006 - .008 inch	3-26
c. Studs	for signs of wear	
d. Guide Shoes	a. tips for burrs	3-19
	b. ribs for any roughness (must be smooth)	3-19
	c. *spacing between ribs on exit side and master roller - between .040 and .060 inch	3-20
e. Master Roller	a. for broken teeth, loose gudgeons	3-23
	b. to be sure roughened surface is not worn off	3-22
f. Master Roller Bearings	for signs of wear - no appreciable vertical play of drive shaft	3-23
SQUEEGEE CROSSOVER		
	a. cleanliness - freedom from dirt	3-33
	b. freedom in operation - rollers must turn freely	3-30
a. Gears	a. for signs of wear	3-36
	b. setscrews - must be tight	
b. Cluster Rollers	a. warping - freedom from bind	3-30, 3-31
	b. *spacing - .020-inch \pm .005 clearance between exit rollers	3-31
c. Guide Shoes	a. ribs and tips - burrs	3-34
	b. *spacing between tips on exit side and exit master roller - between .040 and .060 inch	3-34
	c. guide shoe at entrance - at uppermost position	3-34
d. Master Rollers	a. broken teeth, loose gudgeons	3-35
1. Entrance	to be sure roughened surface (entrance) is not worn off	3-33
2. Exit	freedom in operation - must turn freely	3-30
e. Bearings	no appreciable up and down play	3-32
f. Pinned Rods	pins - must be straight	
ROLLER RACKS		
	a. cleanliness - freedom from chemical deposits	3-39, 3-40
	b. freedom from bacterial growth (algae) on wash rack	3-41, 3-43
	c. freedom in operation - must turn freely by hand	3-45
a. Chain	tension and wear	3-52 to 3-54
b. Gears and Sprockets	for broken or worn teeth	3-48

*Spacing must be even across entire width of rollers.

Component	Check	Paragraph Reference
c. Bearings	no appreciable vertical play of drive shaft	3-49
d. Rollers	a. for warping - particularly at top and bottom of vertical path	3-45
	b. must be in mesh with ladder chain	3-45
	c. for end play - at least 1/16 inch	3-45
e. Idler Assembly	for wear and freedom in operation	3-51
f. Studs	for signs of wear	
g. Turnaround	adjustment - square with rack rollers	3-55
1. Cluster Rollers	a. for warping, broken teeth, or loose gudgeons	
2. Guide Shoe	*proper spacing between exit side and master roller - .040 inch minimum and .060 inch maximum	
3. Master Roller	a. for broken teeth or loose gudgeons	3-58
	b. to be sure roughened surface is not worn off	3-60
4. Master Roller Bearings	for signs of wear - no appreciable vertical play of drive shaft	3-57
AIR INTAKE FILTER ASSEMBLY	for cleanliness	3-123
DRIVE SYSTEM		
a. Drive chain	tension, wear, and lubrication	3-65, 3-66
b. Sprockets	alignment and wear	3-65
c. Bearings	wear and lubrication	3-66
PLUMBING		
a. Connections	for external leaks - anywhere behind plumbing panel	3-68
b. Solution Recirculation Systems	solution surface in developer and fixer tanks for agitation	3-70 3-93
c. Solution Temperatures (In Tanks)	developer - 81 ± 1 F wash - 73 ± 1 F	
d. Wash Tank	filling time - approximately 3 minutes to overflowing	3-97d
e. Developer Filter	surface agitation of developer	3-91

5-7. CHECK POINTS IN REPLENISHER SYSTEM

Component	Check	Paragraph Reference
FLOW INDICATORS	air bubbles or draining back of solution - indicates improper operation of check valve in pump	3-113

*Spacing must be even across entire width of rollers.

Component	Check	Paragraph Reference
STRAINER ASSEMBLIES	for cleanliness	3-109
REPLENISHER TUBING	for kinks, fatigue, and leaks	3-107
REPLENISHER TANKS	solutions - free from encrustations or contamination. Should be clear, not cloudy	
REPLENISHER PUMP ASSEMBLY	a. for leaks b. flow c. cam - for signs of wear	3-115

5-8. CHECK POINTS IN DRYER SYSTEM

Component	Check	Paragraph Reference
DRIVE BELT	for signs of wear - a slight amount of fraying is normal	3-119
DRIVE SYSTEM		
a. Bearings	for signs of wear	
b. Chain	for signs of wear	
c. Sprocket	for signs of wear, broken or worn teeth	
d. Idler Assembly Bearings	for signs of wear	3-121
DRYER TRANSPORT ROLLERS	a. cleanliness	3-128
	b. to be sure rollers are seated properly	3-129
	c. location - see figure 49	3-119e
	d. O rings for signs of wear	3-128
TRANSPORT ROLLER HOLDERS	cleanliness - freedom from foreign matter	3-129
AIR TUBES	a. cleanliness - freedom from dust and lint	3-125
	b. width of slit - .078 inch at area of adjusting screws	3-125
	c. guide pins - straight and tight	3-126
	d. location - see figure 49	3-119e
DRYER THERMOMETER	temperature 120 to 140 F (check with thermometer of known accuracy)	3-131
BLOWER BELTS	wear - must be replaced in pairs	3-148

5-9. After the above inspection has been completed, feed several test films to be sure that the processor is in good working order.

SECTION VI – LUBRICATION CHART

CAUTION: When lubricating parts, take extreme care not to get any oil on the crossovers and racks or in the solution tanks.

Component	Type of Lubrication	Frequency	Technique
Worm Drive Gears: a. Detector Roller Drive b. Rack Drive c. Dryer Drive	*NLGI - No. 2 Lithium Ball and Roller Bearing Grease	Every 6 months	Apply a small amount on the surface of the gear teeth
Drive Chains: a. Detector Roller b. Main Drive	Same grease as used for Worm Drive Gears	As necessary. Check monthly to establish periodic need	Apply to the surface of the chain. Be careful not to catch fingers in moving chains or sprockets
Rack Studs Not in Solution	Equal parts of glycerin and water	When needed	Place several drops on squeaking part
Main Drive Motor	Factory-lubricated for normal life of bearings		
Main Drive Shaft Bearings	Light oil, such as SAE No. 10 Motor Oil	Every 6 months	Four-to-five drops of oil in oil cups on top of bearing housings
Developer and Fixer Recirculation Pump Motors	Light oil, such as SAE No. 10 Motor Oil	Every 6 months	Several drops of oil in top and bottom motor bearings
Dryer Blower Motor Bearings	Factory-lubricated for normal life of bearings		
Replenisher Pump Motor	Factory-lubricated for normal life of bearings		
Replenisher Pump Cam	Same grease as used for Worm Drive Gears	Every 3 months	Apply small amount on the surface of the cam in the area of the diaphragm-actuating button

*Twelve-ounce tubes, part number 760614, can be ordered from Central Parts Service, Eastman Kodak Company, Rochester, New York 14650.

SECTION VII – TROUBLES AND REMEDIES

7-1. GENERAL SERVICE NOTES

7-2. As a general rule, a difficulty in the processing system can cause failure of film to transport not only at the location of that difficulty but at any point beyond it. For example, too high a developer temperature can cause failure of film to transport in the fixer rack, and improperly compounded or replenished fixer can cause transport failure in the dryer.

7-3. If several films are involved in a transport failure covering a fairly large area of the processor, it can normally be assumed that the failure began at the point nearest the exit end. Thus, if film fails to transport in the dryer, in the

squeegee crossover assembly, and in the wash rack, the trouble most likely started at the point farthest along in the dryer, and the films following piled up in a chain reaction. It should be kept in mind, however, that the underlying causes of the trouble might well precede the failure.

7-4. It must also be emphasized that some of the reasons for trouble may not be readily apparent, because they may not cause transport difficulty until after several hundreds or thousands of films have been fed. Thus, an improperly compounded or improperly replenished solution may process several hundred films with no apparent trouble, only to cause failure of film to transport thereafter.

TROUBLE CHART

TROUBLE 1. COCKING OR TWISTING OF FILM IN PROCESSING SECTION

Possible Cause	Probable Remedy
1. Feed tray out of alignment	Using a 14 by 17-inch sheet of film, adjust feed tray so that it is square with the tie rod of the developer rack
2. Double-thickness detector microswitches on detector roll assembly unevenly set	Using a one-inch-wide strip of film, adjust the microswitch at each end of the detector roll assembly. (See paragraph 3-9b)
3. Damaged detector roller drive gears	Lubricate as a preventive measure. (See Lubrication Chart, Section VI.) Replace gears if they show wear
4. Idler roller at top of entrance crossover improperly set	Spacing between idler roller and master roller should be .006 - .008 inch. Idler roller must be parallel to master roller. If badly warped, replace
5. Crossover or squeegee crossover assembly twisted or not seated properly	Be sure all assemblies are square and seated properly
6. Burrs on crossover or turnaround guide shoes	Remove burrs with No. 400 wet sandpaper
7. Worn crossover, rack, or turnaround studs	If studs are worn slightly or if they appear to be bent downward, their life may be prolonged by tightening one-half turn. If wear is excessive, replace
8. Rack turnaround assemblies out of adjustment	Turnarounds must be parallel with master rollers. Spacing between bottom rack rollers and nearest cluster roller of turnaround must be no less than 1/4 inch and no more than 1/2 inch
9. Algae or bacterial growth in wash rack (slimy condition on rollers accompanied by failure of films to transport at proper speed)	a. Wash with warm water and clean as recommended in paragraph 3-39 b. Use an algae eliminator, such as Algex or Dovicide G to correct slimy condition of rollers c. Open wash tank drain valve when processor is not in use. Be sure to close drain valve when resuming operation

NOTE: Any of the causes of film cocking or twisting in Trouble 1 may be a reason for failure of film to transport in any section of the processor.

TROUBLE 2. FAILURE OF FILM TO TRANSPORT AT ENTRANCE

Possible Cause	Probable Remedy
1. Improper type of film fed	Feed only films such as those industrial-type x-ray films recommended for this machine. See your x-ray dealer or x-ray sales representative
2. Damaged film fed	Avoid feeding damaged film, particularly if leading edge is torn or folded
3. Improper length of film (less than 7 inches) fed	To feed films less than 7 inches long, tape them to 10-inch lengths of KODAK X-OMAT Processor Test Film at least 4 inches wide. Use 1-inch-wide tape, such as SCOTCH Brand Electrical Tape No. 57. Most other types of tape are not suitable, due to the solubility of their bases in processing solutions
4. Double thickness of film fed (indicated by green, undeveloped edges of films)	a. Double-thickness detector microswitches not properly set. (See paragraph 3-8) b. Take care in feeding film. Double thicknesses may be drawn into processor if lead film has reached entrance crossover
5. Overlapped films (caused by failure of time-delay relay to provide proper spacing between films)	If points of relay are dirty, clean. Adjust the variable resistor to give 8 seconds' delay. Replace relay if necessary.

TROUBLE 3. FAILURE OF FILM TO TRANSPORT IN CROSSOVERS

Possible Cause	Probable Remedy
1. Crossover roller out of place	Gear teeth must mesh with teeth of master roller
2. Binding in crossover. Unit hard to turn by hand	Be sure all rollers have sufficient end play to turn freely
3. Broken gear teeth on master roller or cluster roller of crossovers	Replace
4. Crossover dirty	Rinse and wipe daily with damp vinyl sponge or cloth
5. Smooth crossover master roller	When cleaning, be sure to preserve roughened surface of master rollers. Do not use abrasives; instead, use a soft-bristle brush and warm water and brush lightly in the direction of the fine grooves
6. Master roller bearing worn	Replace master roller bearing. Wear most common on drive side
7. Crossover rollers encrusted with heavy layer of chemical deposits	a. Observe good housekeeping practices. (See daily and weekly cleaning suggestions in Section IV) b. Remove deposits as recommended. (See paragraphs 3-17, 3-22, and 3-33)
8. Fixer-wash crossover rollers coated with yellowish white chemical deposits (sulfurization)	Clean rollers as recommended. (See paragraphs 3-17, 3-22, and 3-33)
9. Crossover guide shoe out of adjustment	Check spacing of guide shoes. (See paragraph 3-20)
10. Crossover drive gear not in mesh with rack gear	Align gears properly. If gear worn, damaged, or badly warped, replace
11. Warped roller on crossover	Replace warped roller

TROUBLE 4. FAILURE OF FILM TO TRANSPORT IN ROLLER RACK (INCLUDING TURNAROUND)

Possible Cause	Probable Remedy
1. Binding in rack (indicated by rack jumping up and down in tank). Unit hard to turn by hand	a. Check squareness of unit b. Be sure unit is seated properly c. Check chain for proper tension (too tight a chain will cause binding) d. Be sure all rollers have sufficient end play to turn freely. (See paragraph 3-45) e. If rack drive shaft or master roller drive shaft of turnaround is tight, replace bearing affected
2. Rack main drive gear (worm) worn (indicated by a jumping or hesitating rack)	Replace gear. Check rack for bind. Be sure rack is seated properly so that worm gear is fully engaged with worm on drive shaft
3. Rack chain loose (indicated by hesitating rack rollers)	Lower turnaround assembly in rack, remove one chain link, or replace chain. (See paragraphs 3-52 and 3-54)
4. Vertical path roller sprocket not in mesh with chain	All of these rollers must be driven. Pay particular attention to the rollers immediately preceding and following the crossovers and turnarounds
5. Excessive wear in rack drive shaft bearings	Replace bearings. (See paragraph 3-49)
6. Rack rollers encrusted with heavy layer of chemical deposits	a. Observe good housekeeping practices. (See daily and weekly cleaning suggestions in Section IV) b. Remove deposits as recommended. (See paragraphs 3-39 and 3-40)
7. Warped roller on rack or turnaround	Replace warped roller. Pay particular attention to the top and bottom sets of vertical-path rollers
8. Fixer rack rollers coated with yellowish-white chemical deposits (sulfurization)	a. Clean rollers as recommended. (See paragraphs 3-39 and 3-40) b. If fixer solution is murky in processor tank, change it. Cloudiness of fixer replenisher indicates improper mixing. Change solution. Check for air leak or obstruction in fixer recirculation system
9. Binding in rack. Unit hard to turn by hand	Be sure all rollers have sufficient end play to turn freely and that the chain is not too tight
10. Turnaround drive sprocket worn — chain clinging to sprocket teeth	If sprocket has irregularly shaped teeth, has deep pits at sides of teeth, or is badly warped, replace. Upper sprocket of racks most commonly affected. (See paragraph 3-48)
11. Turnaround roller out of place	Gear teeth must mesh with teeth of master roller
12. Master roller bearing worn	Replace master roller bearing. Wear most common on drive side
13. Turnaround guide shoe out of adjustment	Check spacing of guide shoes. (See paragraph 3-20)
14. Wash water muddy	After water clears, thoroughly scrub the rack and tank. If this condition occurs frequently, consider the use of water filters on both hot and cold incoming water lines

TROUBLE 5. FAILURE OF FILM TO TRANSPORT IN PROCESSING SECTION — (SOLUTIONS)

Possible Cause	Probable Remedy
1. Improperly mixed solutions	Mix solutions according to directions on package. Temperature of mixing water for developer should be 120 F
2. Improperly replenished solutions	See Trouble 16 of this chart

TRUBLE 5. (Contd)

Possible Cause	Probable Remedy
3. Solutions diluted with water or improperly mixed (If film densities are lower than normal, gross over-dilution of the developer is indicated)	Check for possible leak in heat exchanger. Change developer or fixer as indicated
4. Solution temperature too high (may be accompanied by tacky film) a. Freshly mixed solutions not given time to cool b. Incoming water supply not turned on or has insufficient flow (contamination of the dryer rollers can result) c. Incoming water temperature too high d. Developer thermostat set too high e. Developer thermostat microswitch loose f. Developer thermostat faulty g. Developer and/or wash thermometer faulty	a. Solutions may be cooled by removing racks and inserting a plastic bag of ice b. Be sure water supply to processor is adequate and all valves are turned on. (See paragraph 3-96) c. Maintain water temperature no higher than 74 F. This will result in approximately 77 F water in the wash tank d. Reset thermostat to maintain developer solution at 81 ± 1 F. (See paragraph 3-83) e. Remove plastic safety shield and tighten mounting screws of microswitch f. Free thermostat plunger if stuck. If necessary, replace thermostat g. Check developer solution and wash water in tanks with long-stemmed thermometer of known accuracy. Place thermometer between undriven side of rack and tank
5. Low solution level	a. Check solution level in tanks to determine if there is a leak at any of the plumbing joints b. Check to see that drain valve is completely closed c. Check to see that solution is being properly replenished (See Trouble 16 of this chart)

TRUBLE 6. FAILURE OF FILM TO TRANSPORT IN PROCESSING SECTION - (PLUMBING)

Possible Cause	Probable Remedy
1. Foam in solution tanks	a. Check for film or other obstruction covering intake to pump b. Check for solution leak on intake side of pump. Turn off pump to detect solution dripping on intake side. Before start-up, check solution level in tanks c. Check for obstruction or kinking of tubing in recirculation system d. Check recirculation pump impeller bearings for signs of wear
2. Developer and/or fixer recirculation pump not operating properly a. Pump motor not operating b. Solutions not up to level (see Trouble 2, Possible Cause 16 in this chart)	a. Make sure pump switch on control panel is on. If trouble is indicated, see Electrical Check List, Section VIII b. Be sure solutions are above the level of the top outlet in the processing tank in order for the pump to operate
3. Foam in wash tank due to excessive air in water supply	a. Avoid wash water that is pumped by means of high-pressure air b. Avoid extremes of hot or cold incoming water. This can produce effervescent condition leading to foam

TRUBLE 7. FAILURE OF FILM TO TRANSPORT IN SQUEEGEE CROSSOVER

Possible Cause	Probable Remedy
1. Squeegee crossover not properly seated	Make sure gears are engaged with the rack drive gear. Square assembly on a flat surface

TROUBLE 7. (Contd)

Possible Cause	Probable Remedy
2. Squeegee crossover rollers dirty (with black, sticky, over-all deposit) or contaminated	Clean as recommended in paragraph 3-33
3. Squeegee crossover rollers binding	Reduce thickness of flange of plastic bearings
4. Squeegee crossover gears slipping	Tighten setscrews on all gears
5. Squeegee crossover rollers excessively warped	Replace
6. Improper clearance between cluster roller and master roller	Clearance should be .020 inch
7. Improper setting of guide shoes on squeegee crossover	Spacing between tips of guide shoe and master roller should be between .040 and .060 inch
8. Exit master roller in squeegee crossover not turning freely	Be sure roller turns freely
9. Worn master roller bearings	Replace as required

TROUBLE 8. FAILURE OF FILM TO TRANSPORT IN DRYER

Possible Cause	Probable Remedy
1. Tacky films caused by many of the conditions noted in previous troubles (Most commonly caused by too high a developer or wash-water temperature, improperly mixed or compounded solutions, or over-diluted solutions)	a. Check processor thermometers and water thermometer (on wall) with thermometer of known accuracy. (See paragraphs 3-81, 3-100, and 3-134) b. Carefully follow mixing instructions packaged with the chemicals. Temperature of mixing water for developer should be 120 F
2. Lack of hardness of films due to improper fixing	If improper fixing is suspected, change fixer. (See Trouble 16 on replenishment)
3. Failure of overlapped films from processing section to transport	Check feeding procedure. If trouble is chronic, check operation of time-delay relay. (See paragraph 3-11 and Electrical Check List, Section VIII)
4. Ambient conditions unfavorable, resulting in tacky films	Turn up dryer temperature in five-degree increments. If 140 F dryer temperature is insufficient, the need for air conditioning is indicated
5. Dryer temperature incorrect	Set thermostat to 120 to 140 F. Check with thermometer of known accuracy
6. Dryer not able to reach proper temperature (may be indicated by damp films)	a. Check dryer heater. (See Electrical Check List, Section VIII) b. Check dryer thermostat. (See Electrical Check List, Section VIII)
7. Air-exhaust piping insufficient, resulting in back pressure	Make provision for 200 cfm. If back pressure on outlet exists, or if run is longer than normal or has too many elbows, install a larger size pipe. Six-inch duct will cover any situation.
8. Dryer transport rollers hesitating	a. If O-rings have flat spots, replace them b. Check seating of transport rollers c. Replace belt d. Check for sufficient end play e. Clean holders f. Be sure air baffles or squeegee crossover guide pins do not interfere with the top dryer transport rollers
9. Transport rollers (particularly near entrance end) dirty or contaminated with fixer solution	Wipe with damp cloth

TROUBLE 8. (Contd)

Possible Cause	Probable Remedy
10. Badly warped transport rollers adjacent to each other	If warping is apparent, interchange several of the rollers so that no two badly warped rollers are together. Replace if warping is extreme
11. Transport rollers not seated in holders	Be sure roller shafts are seated properly in holders
12. Transport rollers improperly located	See figure 49
13. Dryer air tubes improperly positioned or located	Be sure to snap tubes into locking position when they are installed
14. Bent guide pin	Be sure all pins on air tubes are straight

TROUBLE 9. LACK OF DEVELOPER CIRCULATION

Possible Cause	Probable Remedy
1. Filter clogged	Change developer filter cartridge
2. Foreign particle in solution pump	Remove obstruction
3. Heat exchanger clogged	Clean, following instructions in paragraph 3-79
4. Tubing in recirculation system clogged	a. If foreign particle is lodged in tubing, remove it. Pay particular attention to the tubing connection at the pump outlet in the side of the tank b. If tubing is badly clogged with solid deposits, replace it
5. Leaks in recirculation pumps, tubing, or connections	Overhaul recirculation pump and check hoses, hose connections, and entire recirculation system

TROUBLE 10. POWER LOSS

Possible Cause	Probable Remedy
1. Switches not on or fuse blown	Turn on switches and/or replace blown fuse. (See Electrical Check List, Section VIII)

TROUBLE 11. LENGTHWISE SCRATCHES ON FILM

Possible Cause	Probable Remedy
1. Any roller in processing section held stationary (indicated by many fine dark random lines)	Eliminate any hesitation in the drive system. Pay particular attention to detector rollers, entrance crossover, and first two rollers of developer rack
2. Guide shoes burred or not adjusted properly	Remove any burrs from tips of guide shoes. Be sure spacing between tips of guide shoe and master roller is between .040 and .060 inch. Spacing should be even across entire width of roller

TROUBLE 11. (Contd)

Possible Cause	Probable Remedy
3. Dryer air-tube guide pins out of line or loose	Remove dryer air tubes and check guide pins visually for straightness. Straighten any that may be bent. Tighten loose pins with a drop of epoxy cement. Wide lines generally indicate scratching nearest to the entrance of the dryer; thin lines, scratching toward exit of dryer
4. Dryer air tubes out of position	Be sure to snap tubes into locking position when they are installed

TROUBLE 12. DRYING STREAKS ON FILM

Possible Cause	Probable Remedy
1. Too high a dryer temperature	Set dryer thermostat to operate at lowest temperature consistent with good drying
2. Dirty air-tube slits	Clean interior of air tubes by immersing them in warm water and agitating vigorously. DO NOT SOAK tubes
3. Slit width not maintained properly	Using the screws on the side of the air tubes, readjust air slits to .078 inch at the area of the screws
4. Air intake filter dirty	Clean by rinsing with warm water

TROUBLE 13. DOUBLE-THICKNESS ALARM FAILS TO OPERATE

Possible Cause	Probable Remedy
1. Microswitch plunger out of adjustment or roller clogged with dirt	Adjust double-thickness detector microswitches with a one-inch-wide strip of film. (See paragraph 3-9b.) Clean detector rollers and microswitch rollers. Lubricate microswitch rollers, taking care not to spill oil on the detector rollers

TROUBLE 14. FAILURE OF REPLENISHER PUMP TO OPERATE

Possible Cause	Probable Remedy
1. Switch not turned on or fuse blown	See Electrical Check List, Section VIII
2. Microswitch plunger out of adjustment or roller clogged with dirt. (This will also affect operation of safelight outlet on electrical control panel)	Adjust center microswitch. See paragraph 3-9c for adjustment procedure. Clean detector rollers and microswitch roller. Lubricate microswitch rollers, taking care not to spill oil on the detector rollers

TROUBLE 15. THUMPING SOUND

Possible Cause	Probable Remedy
1. Drive sprocket or chain worn or out of line	Replace sprocket and/or chain
2. Drive-motor chain not at proper tension	Adjust tension

TRouble 16. IMPROPER REPLENISHMENT RATE (Determined by measurement — See paragraph 3-103)

Possible Cause	Probable Remedy
1. Clogged screen in strainer assembly	Remove and clean screen. (See paragraph 3-109)
2. Replenisher tubing kinked or cracked	Trace tubing and replace as necessary
3. Check valves in replenisher pump not operating (indicated by presence of air bubbles and solution draining back in flow indicator)	Flush pump body with warm water. (See paragraph 3-113)
4. Obstruction in tubing in processor or replenisher lines	Locate obstruction and flush out affected area. If white deposits occur in fixer replenisher system, improper mixing of fixer is indicated
5. Center microswitch not functioning properly	See paragraph 3-9c
6. Air lock in replenisher line	Be sure there is no sag in tubing from replenisher pump to flow indicators
7. Inner tube of flow indicator encrusted with chemical deposits	Flush flow indicator with water, or remove assembly and immerse it in a 10 percent solution of hydrochloric acid

TRouble 17. DECREASE IN FILM DENSITY

Possible Cause	Probable Remedy
1. Developer temperature low	Adjust developer thermostat. 81 ± 1 F is normal
2. Developer solution diluted with water or improperly mixed	Be sure to follow chemical mixing instructions. Mixing water temperature should be 120 F. Check for possible leak in heat exchanger. Change developer
3. Developer reaching exhaustion (gross underreplenishment)	Check replenishment rate and/or mix fresh solution

TRouble 18. INCREASE IN FILM DENSITY

Possible Cause	Probable Remedy
1. Developer replenisher improperly mixed	Mix replenisher according to directions. Mixing water temperature should be 120 F
2. Developer temperature too high	Adjust thermostat. 81 ± 1 F is normal
3. Contamination of developer with fixer	Drain and rinse tanks and mix fresh solutions. To avoid contamination, always use the splash guard when removing the fixer rack

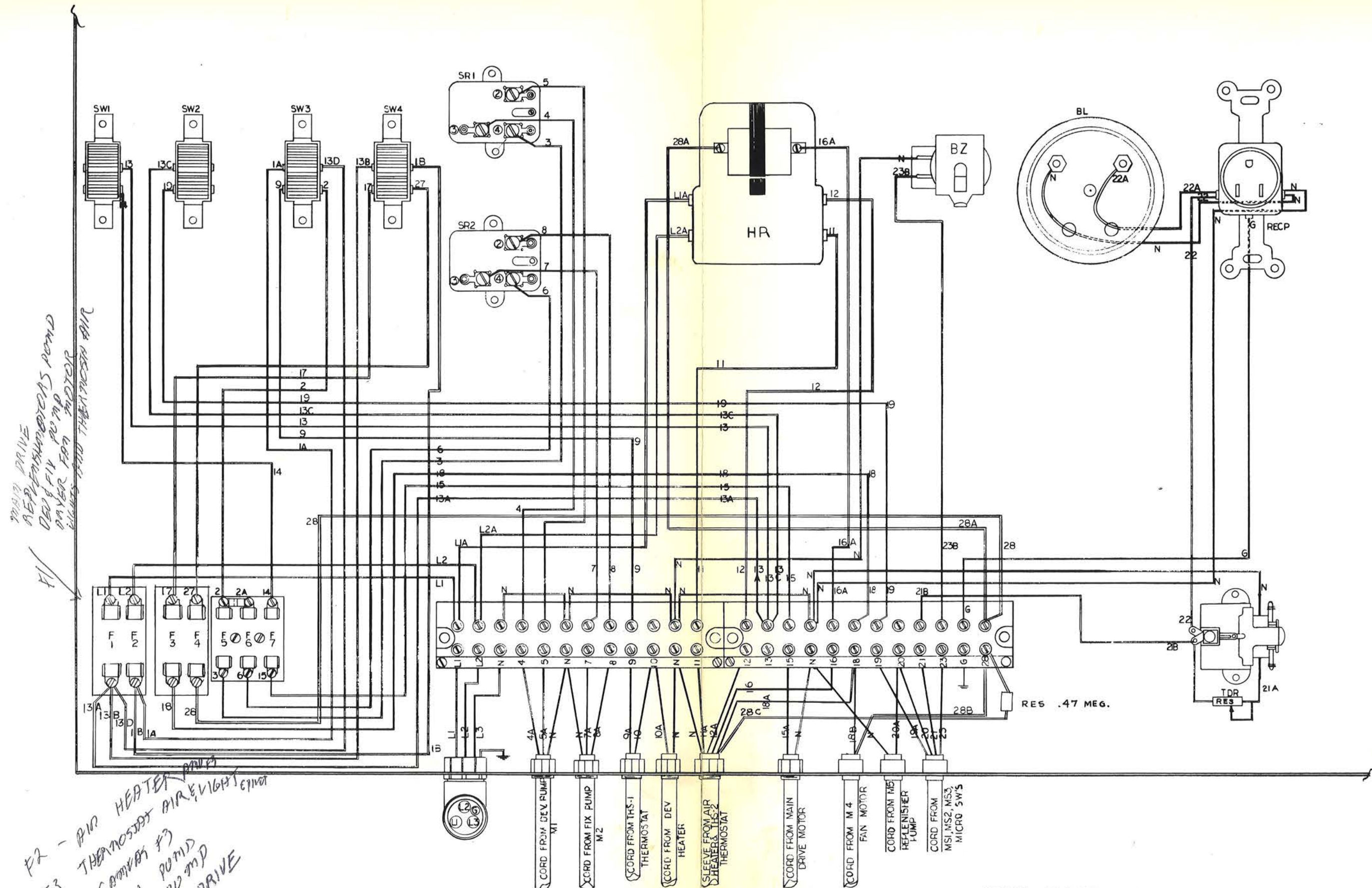
TRouble 19. FOGGED FILM

Possible Cause	Probable Remedy
1. Improper bulb in safelight over feed tray	Use a 7 1/2-watt frosted bulb in a safelight lamp with a KODAK Safelight Filter, No. 6B (brown), mounted no closer than 4 feet from feed tray
2. Cover not tight on processing section or processor not sealed against wall	Seat the cover firmly and check for light leaks at wall
3. Developer contaminated by fixer	Drain and rinse tank and mix fresh developer. To prevent contamination, always use splash guard when removing the fixer rack

SECTION VIII – ELECTRICAL CHECK LIST

(FOR AUTHORIZED PERSONNEL ONLY)

Part	Purpose	Wire Numbers	Drawing Symbol	Should Read	Remarks
Microswitch	With film between detector rollers, actuates replenisher pump	19B to neu. 20 to neu. 21 to neu.	MS1	115v ac 115v ac 0v ac	Check switch for proper adjustment and contact actuation
	Without film between detector rollers, energizes time-delay relay, receptacle and bell	19B to neu. 20 to neu. 21 to neu.		115v ac 0v ac 115v ac	Same as above
Replenisher Pump Motor, .325A, no load	Replenishes solution from storage tanks to processor	20A to neu.	RPM	115v ac	MS1 must be activated. Check with SW2 on
SW2	Actuates replenisher pump motor, time-delay relay, and double-thickness alarm	19 to neu.	SW2	115v ac	Check SW2 closed
Feed Alarm	Audible signal that film may be fed into unit	22A to neu.	BL	115v ac	Should sound approximately eight seconds after film leaves feed rollers with SW2 on
Receptacle	Outlet for safelight	22 to neu.	RECP	115v ac	Check with SW2 on (approximately eight seconds after film leaves feed rollers)
Time-Delay Relay	Sets time interval for bell alarm and outlet for safelight	21A to neu.	TDR-	115v ac	Check with SW2 on. Take this reading at timer coil. On later model processors, take the reading at the line side of the resistor (RES)
		21A to neu.	RES	115v ac	
Double-Thickness Alarm	Signals double thickness of film	23B to neu.	BZ	115v ac	Feed a narrow strip of film of double thickness into the detector rolls at each edge to check microswitches individually for continuity. Check with SW2 on
Motor Starting Relay, 1/8 HP	Starting relay for developer pump motor	3 to neu. 4 to neu. 5 to neu.	SR1	115v ac 115v ac 115 v ac for short period of time after SW3 is turned on	Reading from 3 to neutral indicates power to relay No reading from 4 to neutral, relay inoperative. Check with SW3 on No reading from 5 to neutral when SW3 is turned on, relay inoperative
Developer Pump Motor, 1/8 HP, 2.2 amps	To recirculate developer solution	4A to neu.	DPM	115v ac	Take reading at terminal strip with SW3 on
Fuse, 5A FUSETRON	Overload protection for developer pump motor (DPM)	3 to neu. with SW3 closed	F5	115v ac with SW3 on	A dead short in DPM or running too long overloaded would blow F5

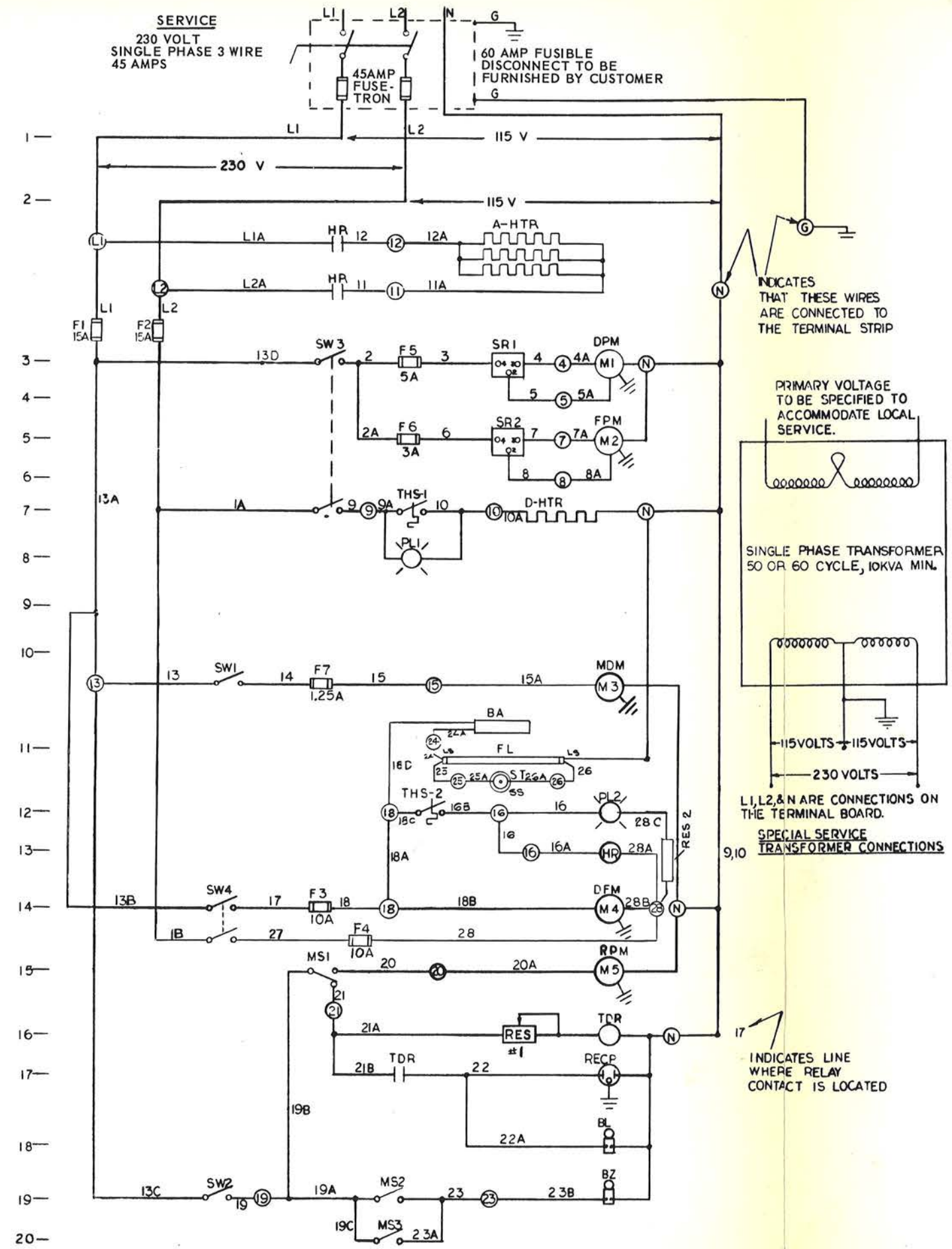


CONTROL PANEL WIRING LAYOUT FOR KODAK INDUSTRIAL X-OMAT PROCESSOR, MODEL B (May 1963)

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DRAWING SYMBOL	NOMENCLATURE	PART NUMBER
A-HTR	Heater - Air	454652
BA	Ballast	456666
BL	Bell - Film feed alarm	452967
BZ	Buzzer - Double-thickness alarm	455680
D-HTR	Heater - Developer	452490
F1, F2	FUSETRON - 15 amp	454767
F3, F4	FUSETRON - 10 amp	454768
F5	FUSETRON - 5 amp	454769
F6	FUSETRON - 3 amp	454770
F7	FUSETRON - 1.25 amp	454771
FL	Lamp - Fluorescent	456682
HR	Relay - Air heater	457446
LS	Socket - Lamp	456681
M1	Motor - Developer pump	452223
M2	Motor - Fixer pump	452048
M3	Motor - Main drive (60-cycle)	454448
	(50-cycle)	454621
M4	Motor - Dryer fan (60-cycle)	457611
	(50-cycle)	457616
M5	Motor - Replenisher pump	454860
MS1 } MS2 } MS3 }	Microswitch	452156
PL1	Light - Pilot (developer heater)	See THS1
PL2	Light - Pilot (dryer air thermostat)	See THS2
RECP	Receptacle - Grounding	453076
RES-1	Resistor - Adjustable (time delay-60-cycle)	456751
	(50-cycle)	457618
RES-2	Resistor - Fixed	457769
SR1	Relay - Motor starting (developer pump)	452224
SR2	Relay - Motor starting (fixer pump)	452969
SS	Socket - Starter	456665
ST	Starter - Fluorescent lamp	456664
SW1 } SW2 } SW3 } SW4 }	Switch - Rocker	454717
TDR	Relay - Time-delay	454720
THS1	Thermostat - Developer heater	452986
THS2	Thermostat - Dryer air	454642

WIRING DIAGRAM FOR KODAK INDUSTRIAL X-RAY AT PROCESSOR, MODEL B (May 1963)



Supplement No. 769033-1
1/76

SE/G-RG

SERVICE MANUAL SUPPLEMENT KODAK INDUSTRIAL X-OMAT PROCESSOR MODEL B

Serial No. 5810 and up.

Delete:

All reference to the BUZZER P/N 455680 and the DOUBLE THICKNESS DETECTOR *MICRO SWITCH*.

Paragraph 2-52, 3-8, 3-9a, 3-9b, 3-11, 3-12, 3-13, 3-112 through 3-115

Trouble 2, item 4a, page 39

Trouble 13 page 44

On page 10:

Change the two DOUBLE THICKNESS DETECTOR *MICRO SWITCHES* to two SINGLE SHEET DETECTOR *MICRO SWITCHES*.

NOTE

The REPLENISHER PUMP is operated by either of the two SINGLE SHEET DETECTOR *MICRO SWITCHES*.

Delete the center SINGLE SHEET DETECTOR *MICRO SWITCH*.

On trouble 14, item 2, page 44

Change: Adjust center Micro Switch.

To: Adjust the two Micro Switches.

Substitute:

Figure 13A for figure 13

Figure 18A for figure 18

Figure 39A for figure 39

Paragraph 3-104A for 3-104

Figure 42A for figure 42

Figure 43A for figure 43

Figure 46A for figure 46

Figure 47A for figure 47

Figure 48A for figure 48

Page 49A for 49

Page 50A for 50

Add: Page 51

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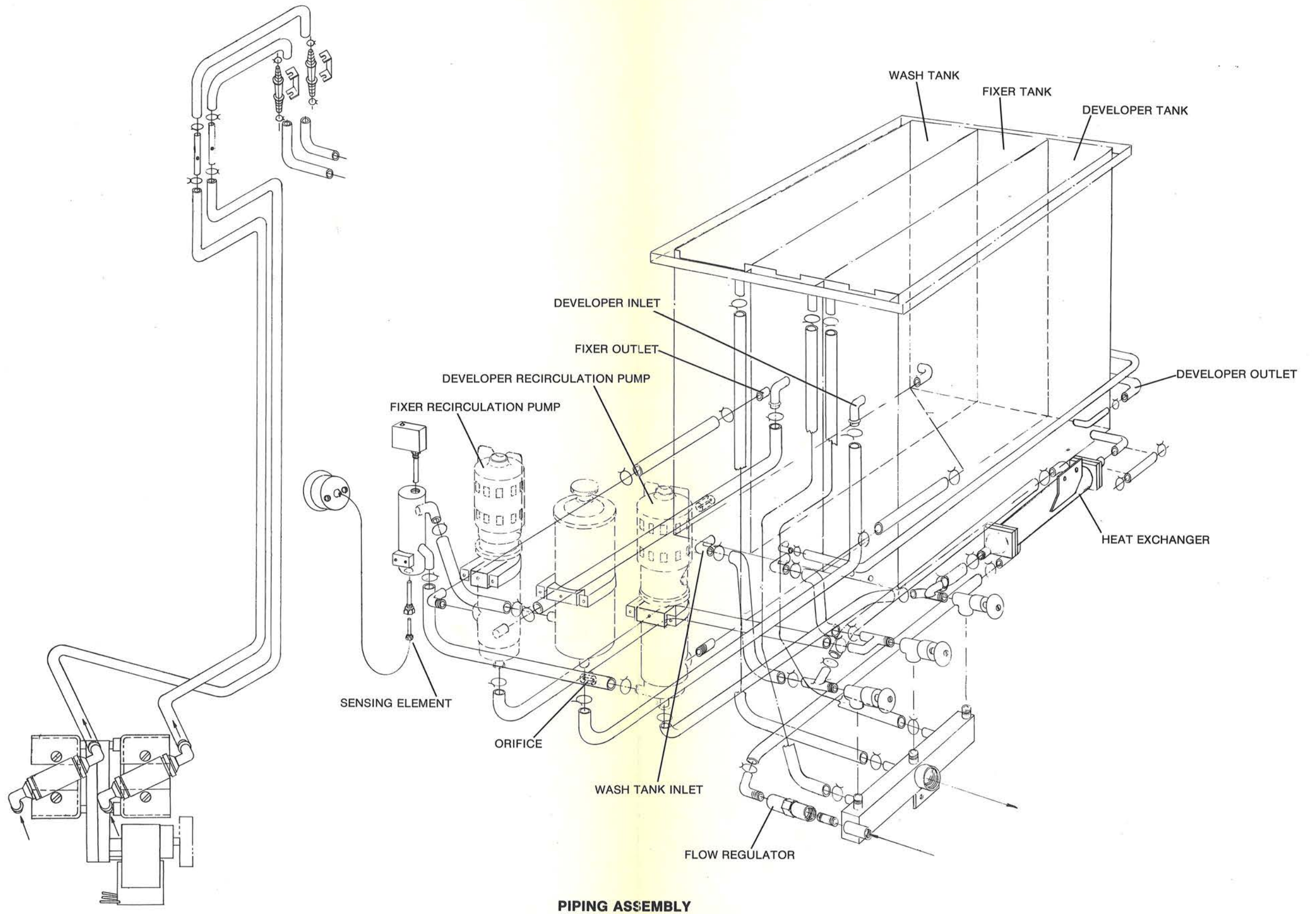


FIGURE 13A