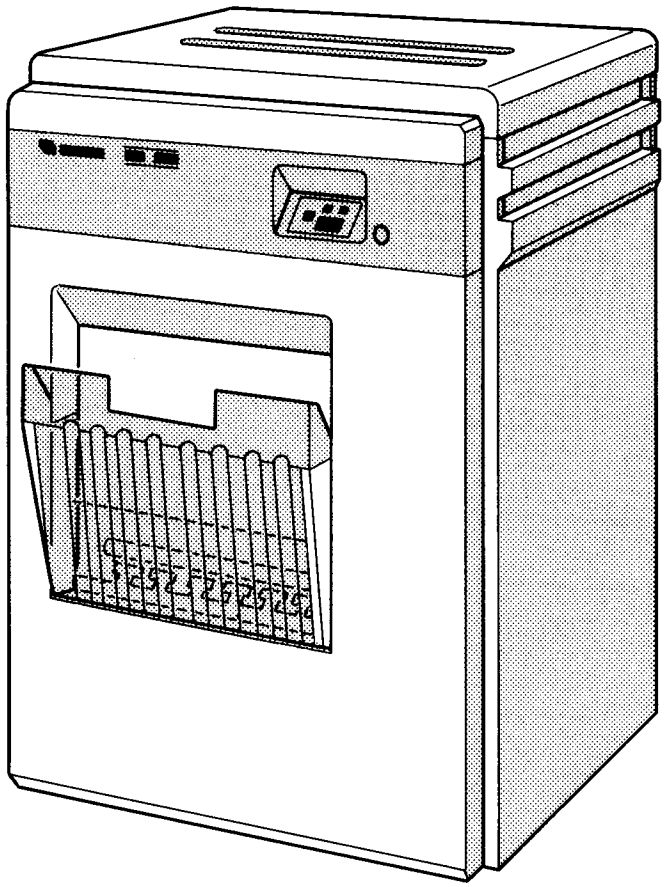
FUJI FILM INSTRUCTION MANUAL

FUJI NDT FILM PROCESSOR
FPM4200



XM3-288E3

INTRODUCTION

This manual provides instruction as to safe and efficient operation of the equipment described herein. Before commencing equipment use, thoroughly read this manual paying particular attention to all warnings, precautions, and notes.

The equipment described herein must be used in accordance with the procedures outlined and deviant uses must be avoided.

Equipment use should only be assigned to persons retaining recognized operator qualifications based, where relevant, upon adequate training in equipment use.

The equipment owner / operator retains the responsibility of ensuring that existing legal regulations and building codes are observed with respect to equipment installation and operation.

Incorrect operation and failure to observe manual outlined maintenance schedules relieves the manufacturer and related agents of all responsibility for any non-compliance, damage, injury, defects, and malfunctions.

1 SPECIFICATIONS

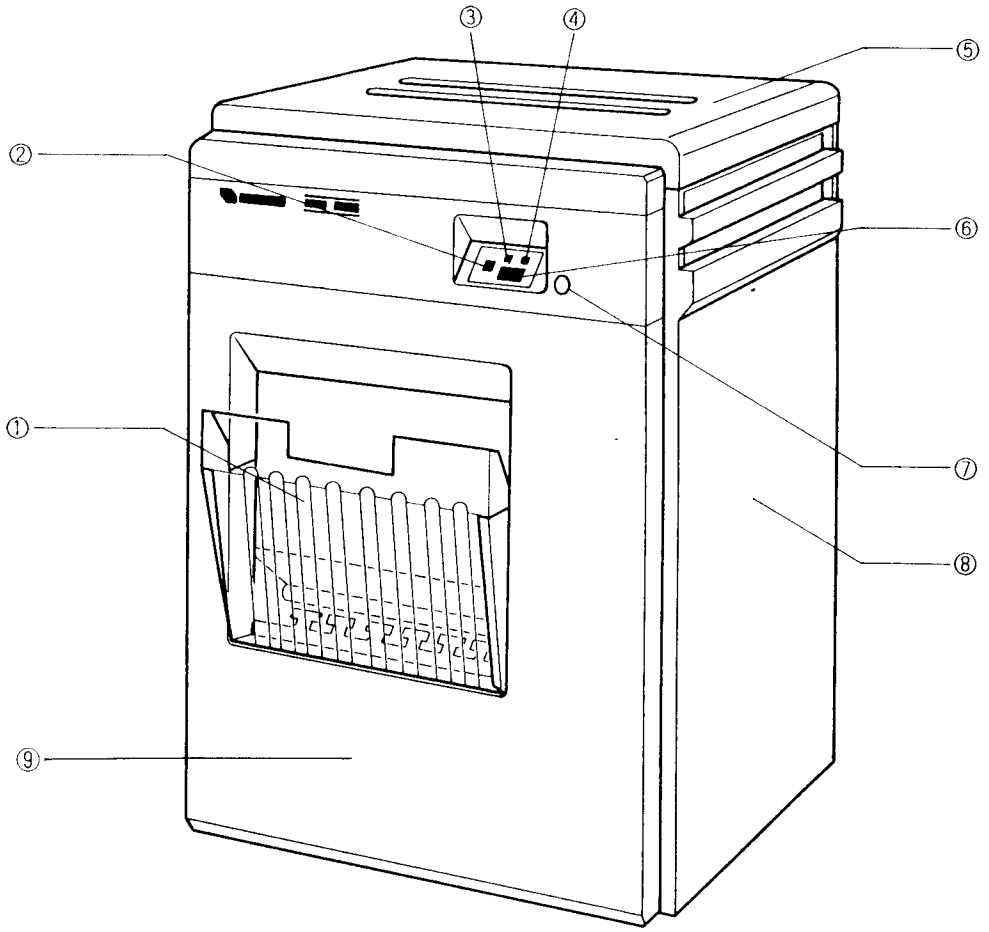
Type	Continuous roller transport system
Processing Time	(A) Fast cycle 8.5 minutes, (B) Long cycle 12.5 minutes, and (C) Variable from 5 minutes to 14 minutes from developing to drying
Film Processed	Sheet film : 100 x 100 mm to 35. 4 x 43. 0 cm (14 x 17 in.) .
Processing Capacity	55 sheets / HR. (14 x 17)
Tank Volumes	Developer : 14. 4 liters (3. 8 US Gal.) Fixer : 9. 1 liters (2. 4 US Gal.) Wash water : 10. 4 liters (2. 7 US Gal.)
Solution Temperature	Developer: 80° to 89°F. Dependant on cycle time Fixer same as developer
Wash Water Temperature	5°C / 41°F or higher
Wash Water Flow Rate	Adjustable to 2.25 Gal. / minute (only when processing films)
Temperature Control System	Developer : Automatic temperature control by means of a heat exchanger and a thermister Fixer : Temperature maintenance derived from the heat of the developer via a heat exchanger
Circulation Systems	Continuous circulation provided to both the developer and fixer through circulation pumps
Replenishment Systems	Automatic replenishment through solenoid valves and replenisher pumps – By changing the digital switches on the circuit board, adjustments are facilitated.
Power Requirements	200~240V AC single-phase. 26 A 50 / 60 Hz
Dimensions	Length, 734 mm (29 in) (1, 117 mm (44 in) including the input guide plate and the film receiver) ; width, 830 mm (33 in) ; height, 1, 091 mm (43 in)
Weight	About 200 kg (main body)

* Specifications are subject to change without prior notice.

CONTENTS

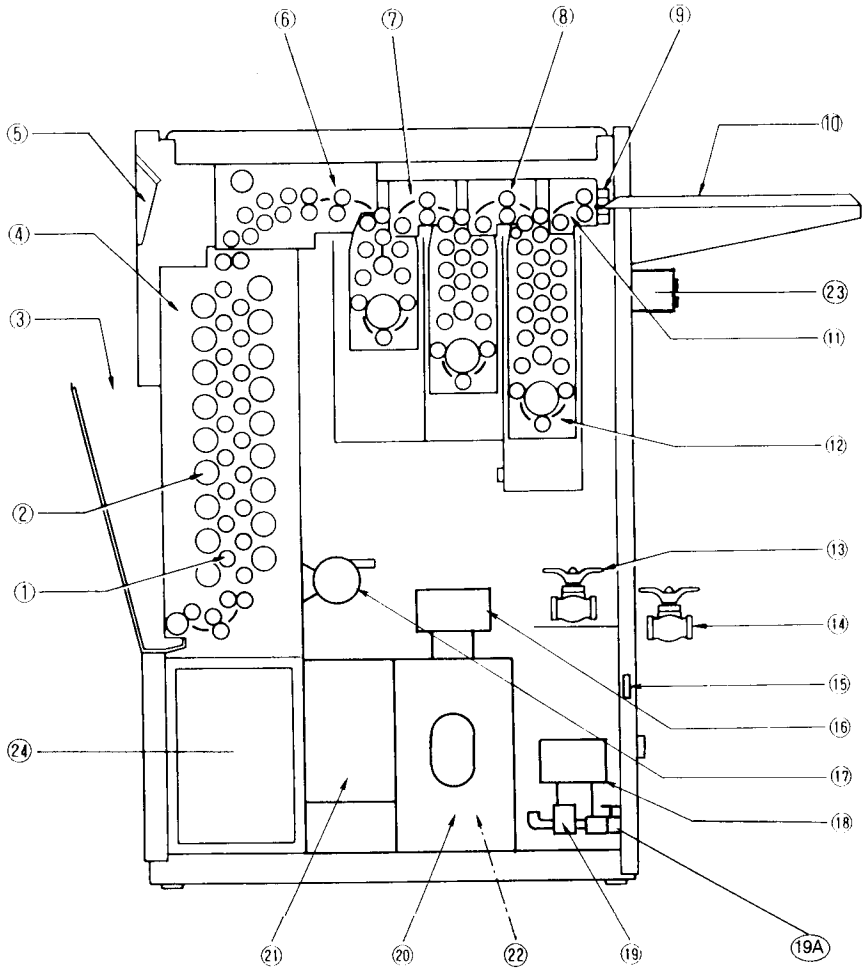
2 SECTIONAL NOMENCLATURE

Fig. 1



① Film Receiver
② Main Switch
③ READY Lamp
④ Replenishment Lamp
⑤ Upper Cover
⑥ Digital Display
⑦ Manual Drive Handle Opening
⑧ Side Cover (2 required)
⑨ Front Cover

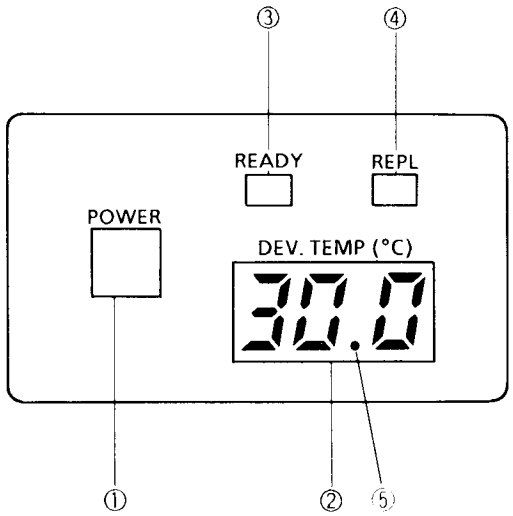
Fig. 2
(Numbering and contents are the same as the formerly used figure except for those designated below by [ ].)



① Dryer Rollers
② Air Flow Distribution Tubes
③ Film Receiver
④ Drying Section
⑤ Switch and Pilot Lamp Section
⑥ Squeegee Rack
⑦ Fixer Crossover Rack
⑧ Developer Crossover Rack
⑨ Film Detection Unit
⑩ Film Input Guide Plate
⑪ Developer Entrance Rack
⑫ Developer Rack
⑬ Drain Cock (Developer and Fixer)
⑭ Drain Cock (Wash Water)
⑮ Receptacle
⑯ Heat Exchanger
⑰ Circulation Pumps (Developer and Fixer)
⑱ Exhaust Fan
⑲ Wash and Cooling Water Solenoid Valve
⑲A Main Water Supply Throttling Valve
⑳ Dryer Fan
㉑ Heater Box
㉒ Replenishment pump (Behind the ⑳ Dryer Fan)
㉓ Speed Control (Variable Speed Model Only)
㉔ Electrical and Electronics Compartment (Accessable by Removing Front Cover - page 4, item ⑨)

■ OPERATIONAL PANEL

Fig. 3



① POWER Switch

When the POWER switch is turned ON the circulation pump, developer thermistor and heater, dryer thermistor and heater, and dryer fan are activated and the developer and fixer circulation and temperature adjustments take place along with the dryer section temperature stabilization. These systems may also be turned OFF by this button only after the machine enters the standby mode. When turned OFF by this method, only the illuminated red dot ⑤ will appear on the display panel. The illuminated red dot signifies that there is power to the processor, but all main functions are OFF.

② DEV. TEMP. Display

Displays the actual temperature of developer solution.

③ READY Lamp

When the developer has reached the designated temperature the red lamp lights. When the film is fed the lamp goes out. When the film has completed its course through the entry assembly this lamp comes back on, the alarm sounds, and another film can be introduced. However, the darkroom cannot be illuminated until ten seconds after this lamp and alarm have commenced to function.

(This guards against possible film fogging.)

④ REPL. Lamp

When the film is introduced and the replenisher pump is activated, this red lamp flashes on and off during the replenishment cycle.

3 OPERATIONAL PROCEDURES USING THE FPM4200

▸ START UP PROCEDURES

1	Turn ON the external circuit breaker .
2	Close the wash water drain cock.
3	Open the wash water valve .
4	Turn ON the MAIN switch and note the developer temperature digital display.
5	Check the READY lamp noting that this lamp goes ON when the developer and dryer temperatures have reached preset levels.
6	The developer temperature is displayed for temperature checking.
7	Throughput 4 to 6 cleaning films noting that the replenisher lamp lights.
8	Make the room dark.

▸ PROCESSING

1	Input a sheet of film so that it is taken-up by the rollers.
2	When the buzzer sounds input the next film.

▸ SHUTDOWN

1	Turn OFF the main switch.
2	Open the wash drain cock.
3	Close the water supply valve.
4	Turn OFF the external circuit breaker.

▸ SHUTDOWN PROCEDURES

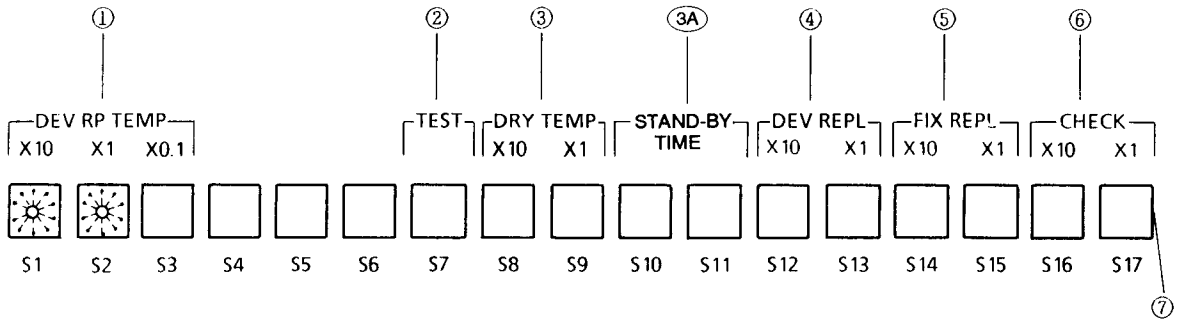
1	Clean all accumulations off the input rack. (Entry roller assembly)
2	Wash the crossover rack in running water.
3	Clean the splashings and other accumulations from all portions of the processor body.
4	Leave the top cover open slightly(condensation prevention).

4 OPERATIONAL CONDITIONS ADJUSTMENT

4. 1 ELECTRICAL CONTROL SECTION CONTAINED CONTROL PANEL (BELOW THE DRYER SECTION, BEHIND FRONT COVER)

(1) Temperature and Replenishment Adjustment

Fig. 4



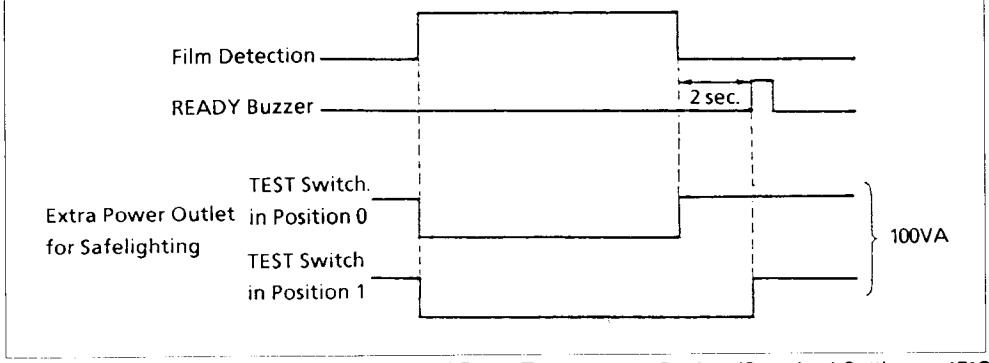
Developer Temperature Designation

① DEV RP TEMP: Standard Adjustment = 30°C for short cycle processing (8.5 minute).
In this case, Switch S1 - set to 3
Switch S2 - set to 0
Switch S3 - set to 0

② TEST: Maintenance Test Switch
(Keep at [0] or [1])

With the use of the TEST switch, 100V at 1 ampere is made available at the service outlet (Safelight Use). For more details, please see the Service Manual Section 4.

Fig. 5



③ DRY TEMP: Processing Related Dryer Temperature Setting (Standard Setting = 45°C in this case, set S8 TO 4 and S9 to 5.)

3A STAND BY: Set these switches to allow ample processing time until standby is activated (See page 19 of Service Manual)

④ DEV REPL: Developer Replenishment Pump Operating Time (sec.)

⑤ FIX REPL: Fixer Replenishment Pump Operating Time (sec.)

⑥ CHECK: Maintenace Check Switch (Set at [00])

⑦ DIGITAL SWITCH

4. 2 REPLENISHMENT RATE SETUP PROCEDURE

Description: When the processor is in operation, film feed time is counted by an internal timer. For each 30 seconds of film detection, the replenishment systgem effects one replenishment cycle. This replenishment cycle volume in ml. is adjustable by changing the pumping time of the developer and fixer. The developer pumping time in seconds is controlled by switches S12 and S13. The fixer pumping time in seconds is controlled by switches S14 and S15.

The replenishment pump output rate is factory adjusted to approximately 5 ml. per second of pumping time

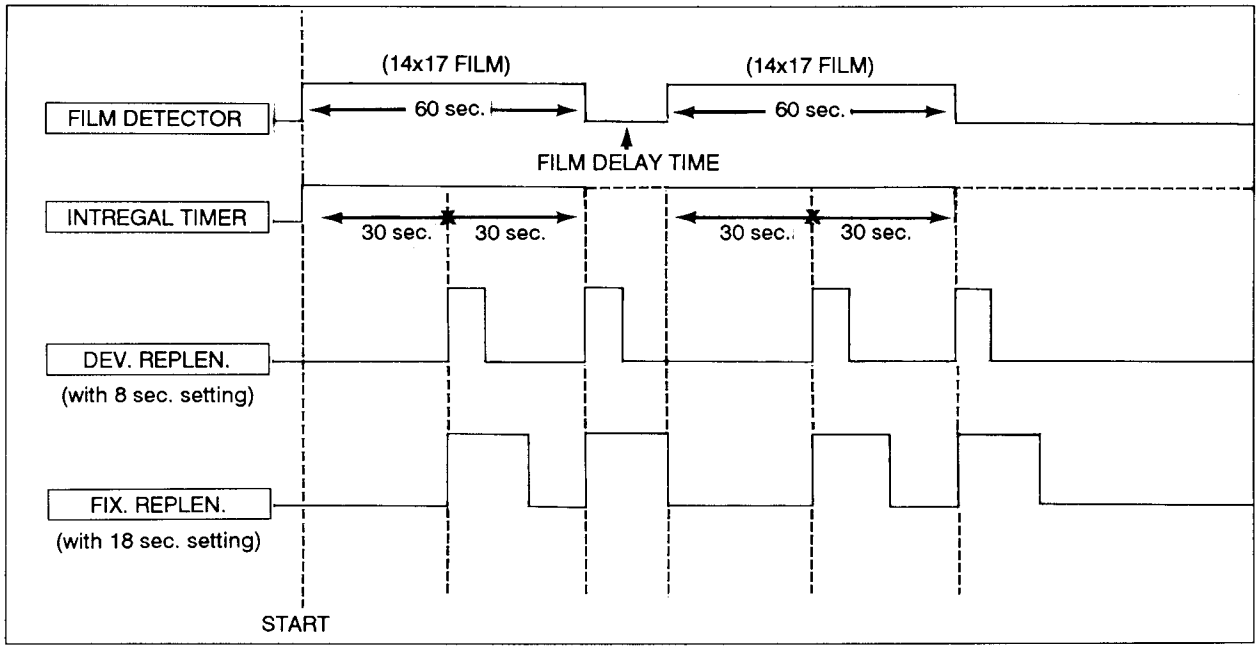
Recommended replenishment rates are 80 ml. for developer, and 180 ml. for fixer based on one 14"x17" size film. (±10ml.)

Refer to the below charts for setting the developer and fixer replenishment for short cycle or long cycle operation:

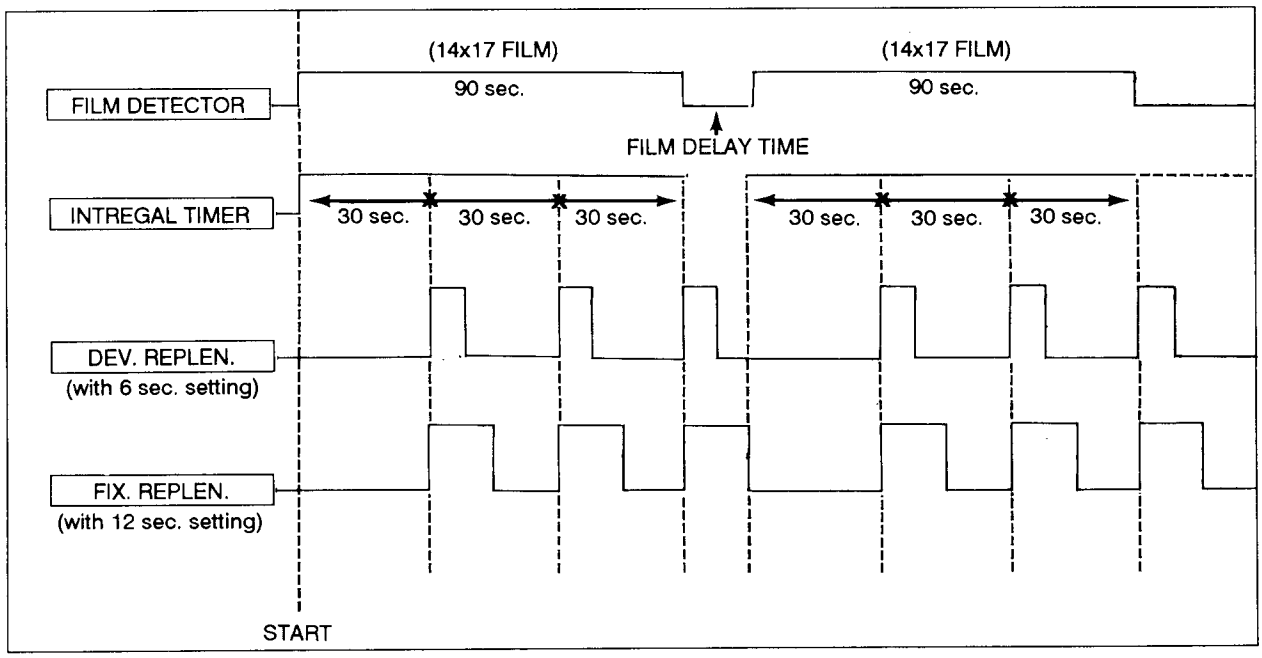
Parameters	**Short Cycle** **8.5 min. Dry/Dry**	**Long Cycle** **12.5 min. Dry/Dry**
Speed Control Setting	60%	40%
Feed Time	60 seconds	90 Seconds
Replenishment Pulses (per 14x17)	2	3
Switch Setting - DEV	S-12 [0] S-13 [8]	S-12 [0] S-13 [6]
Switch Setting - FIX	S14 [1] S-15 [8]	S-14 [1] S15 [2]

REPLENISHMENT SEQUENCE DIAGRAM

SHORT CYCLE



LONG CYCLE



TO CHECK REPLENISHER RATES:

1. Position the measurement beakers (supplied with processor) under the developer and fixer J-hooks. (These J-hooks lift up and swing away from tanks for easy measurement)
2. Process one 14"x17" film and verify that the correct number of replenishment pulses have occured. (2 pulses for short cycle, 3 pulses for long cycle)
3. Measure the total amount of each solution in the beakers and compare these numbers to the recommended amounts for the 14"x17" film. (80 ml. developer, 180 ml. fixer ±10ml.)
4. Make any necessary adjustments to raise or lower volumes using adjustment switches S12 and S13 for developer, and S14 and S15 for fixer. Each 1 second increment increase will raise output approximately 5 ml.. (see page 8, figure 4 for diagram of switches)
5. After verifying proper amounts and completing adjustments, replace J-hooks into replenishment tube inside developer and fixer tanks.

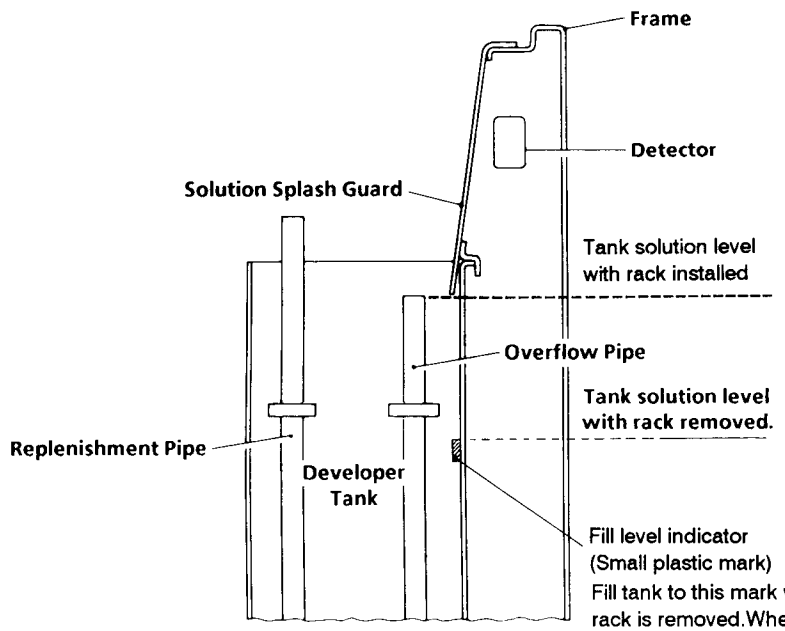
5 REPLACING PROCESSING SOLUTIONS

Processing solution preparation and handling should take place according to the requirements set forth for each one of the processing chemicals.

5. 1 CHANGING THE DEVELOPER

1. Turn OFF the main switch.
2. Open the developer drain cock.
   - Turn the cock handle 90° in a counterclockwise direction.
3. Remove the developer entrance rack, the developer crossover rack, and the developer rack.
   - Use care to insure that developer does not drip into any other tank.
4. Remove the developer filter.
5. Wash the developer filter and tank with water.
6. After all the wash water has been drained from the tank, close the cock.
   - Turn the cock handle 90° in a clockwise direction.
7. Introduce 14. 4 liters of new developer into the tank.
   - When introducing new solution into the developer tank, install a guard plate (supplied with processor) as indicated in the illustration below to prevent developer from splattering into the detector section.
   - As illustrated below, the liquid level with the rack removed is flush with the top of the level indicater.

Fig. 6



8. Install the cleaned or new developer filter and close the cover.
9. Turn on the main switch and check the circulation system for proper functioning. Bleed the filter section of all air, using the thumb screw on top of the filter cap and check to insure that there are no leaks.
   - Prior to turning on the processor main switch make sure that the fixer and wash tanks are filled to normal levels.
10. Turn OFF the main switch.
11. Carefully reinstall the developer rack in the tank in a manner that will not cause solution overflow.
12. Reinstall the developer entry rack and the crossover rack.

5. 2 CHANGING THE FIXER

1. Turn OFF the main switch.
2. Open the fixer drain cock.
   - If the fixer is to be recovered, be sure that the container to be used for such purposes has the capacity to contain at least 10.5 liters of liquid.

   After complete draining remove the developer crossover rack, the fixer crossover rack, and the fixer rack.
4. Remove the fixer filter.
5. Wash the fixer filter and tank with water.
6. After all the wash water has been drained from the tank, close the cock.
7. Introduce 9. 7 liters of new fixer into the tank.
   - The liquid level with the rack removed is flush with the top of the uppermost level indicator.
   - Use special care to insure that fixer solution does not in any way get into the developer tank.
8. Install the cleaned fixer filter and close the cover.
9. Turn on the main switch and check the circulation system for proper functioning. Bleed the filter section of all air using the thumb screw on top of the filter cap and check to insure that there are no leaks.
   - Prior to turning on the processor main switch make sure that the developer and wash tanks are filled to normal levels.
10. Turn OFF the main switch.
11. Carefully reinstall the fixer rack in the tank in a manner that will not cause solution overflow.
12. Reinstall the developer crossover rack and the fixer crossover rack. Insure that the racks are set in their proper locations by checking the labels.

5. 3 CHANGING THE WASH WATER

1. Open the wash water drain cock.
2. After all the water has been drained out, remove the wash rack.
3. Wash the wash tank with water.
4. After all the wash water in the tank has been drained out, close the cock.
5. Install the wash rack and supply the proper amount of water.

6 CLEANING

Location	Frequency	Method	Precautions
Developer Entrance Rack	Everyday	Wipe with damp soft cloth.	
Developer Crossover Rack Fixer Crossover Rack	Everyday	Clean with lukewarm water soaked sponge.	• Return to position after thoroughly dry.
Developer Rack Fixer Rack Wash Rack Squeegee Rack	Every Week	Clean with lukewarm water soaked sponge.	
Developer Rack	Once a Month	Follow procedures ① through ⑤ ① Rinse away solution with water. ② Apply tank cleaner (about 15 minutes). ③ Rinse away tank cleaner with water. ④ Wash rollers with sponge (or gauze) containing mild detergent. ⑤ Rinse with water.	• After applying tank cleaner turn the rollers every 2 to 3 minutes. Rinse away all the cleaner.
Fixer Rack	Once a Month	Follow Procedures ① and ② ① Wash rollers with sponge (or gauze) containing detergent. ② Rinse with water.	
Wash Rack	Once a Month	Follow procedures ① and ② ① Wash with household bleach solution as indicated at right (15 minutes). ② Rinse with water.	Household bleach solution: To one liter of water add one capful (20mℓ) of household bleach. After applying bleach turn the rollers every 2 to 3 minutes.
Dryer Rollers	Once a Month	Wipe with a soft damp cloth.	
Air Flow Distribution Tubes	Once a Month	Wash with mild detergent, rinse and dry.	

Location	Frequency	Method	Precautions
Developer Tank	When the Processing Solutions are Changed.	Follow procedures ① and ② ① Fill the tank with cleaner and circulate it with the circulation pump on for 15 minutes. ② Drain the tank cleaner and circulate water 2 or 3 times through the system rinsing out the tank cleaner.	Remove the filter. Completely rinse all tank cleaner away.
Fixer Tank	When the Processing Solutions are Changed.	Wash with lukewarm water.	
Wash Tank	Once a Month	Wash with sponge and lukewarm water.	
Developer Filter Fixer Filter	Every Two Weeks	Scrub with a brush and lukewarm water.	
Developer Replenisher Filter Fixer Replenisher Filter	When Needed	Scrub with a brush and lukewarm water.	Replace when badly clogged.
Wash Filter	When Needed		Replace when badly clogged.
Film Input Guide Plate	Everyday	Wipe with dry or alcohol dampened cloth	
Detection Section	Every Week	Wipe with damp cloth.	
All other Dirt and Soiling	Everyday	Wipe away with damp cloth.	

Precautionary Notes:

1. When removing the racks from tanks handle in such a manner as to prevent solution from entering and contaminating adjacent tanks.
2. With a brush remove all grime, dirt and dried solution from the drive gears.
3. When cleaning the racks, be sure that the lubricant on the gears does not get on the rollers by cleaning rollers after the lubricant has been removed from the gears.
4. When cleaning the rollers do not use sharp or rough instruments such as those made of nylon as these will harm the roller surfaces.

7 OTHER CONCERNS

7. 1 ELECTRICAL OUTAGE PROCESSING

In the event of a power failure, quickly insert the manual drive handle into its opening in the processor and turn it clockwise according to the conditions indicated below.

- For short cycle (8.5 min.) processing turn the handle one turn every 2.5 seconds and for long cycle (12.5 min.) processing turn the handle one turn every 3.5 seconds.
- Keep the handle turning at the specified rates until all of the film in process has been removed from the processor.
- When power has been recovered, all above-solution rollers, squeegees and all the dryer rollers should be wiped clean before processing operations are resumed.

7. 2 USING THE OUTLETS ON THE MAIN BODY

There is one outlet (100VA AC) on the panel near the processor film input section.
This 3-pin outlet near the film input section is to be used with a safelight.
When a safelight is plugged into this outlet, during the running of the FPM4200 when film is being detected the safelight is automatically switched OFF. The safelight is for necessary illumination when introducing film into the processor. All of these electrical outlets are controlled by the main switch on the FPM4200 processor body and are turned ON and OFF through the functioning of that switch. These outlets are rated at 100VA.
This service outlet provided for safe lighting can be converted to a 100VA capacity general purpose outlet. For said purposes the following wiring changes must be made.

Outlet Attached Wires	Safelight use	100V Use Change
Blue	CMP PCB TBI – 11 →	TB2 – 15
Brown	TBI – 8 →	TB2 – 16
Green / Yellow	TBI – 17 →	TB2 – 11

8 TROUBLESHOOTING GUIDE

Problem	Probable Cause	Check Point	Corrective Action
Image Density Insufficient	Mistake in developer mixing.	Has the developer been mixed according to instructions?	Replace with correctly mixed developer.
	Developer replenisher insufficient.	Is the developer replenisher tank empty?	After filling the developer replenisher tank, replace the solution in the developer tank with fresh developer.
		Is the developer being sufficiently replenished?	After adjusting for proper replenisher amounts, replace the solution in the developer tank with fresh developer.
	Fixer mixed with the developer.	Have the fixer and developer racks been reversed?	Replace the tank developer solution, wash the racks and then replace correctly.
		Did fixer get into developer tank with removal of the fixer rack?	Throw away the solution in the developer tank and after washing tank and rack, replace with new solution.
		Is there fixer in the developer replenisher tank?	Throw away the developer tank solution as well as the replenisher tank solution and replace with fresh solutions after washing tank and racks.
	Developer temperature low	Is the developer temperature at the proper level?	Set the developer at the proper temperature.
		Is the developer filter clogged?	Wash or replace the filter.
		Is the developer heater operating?	Reset developer safety thermostat reset. Button located on top of heat exchanger.
	Developer exhausted.	Has more than a month passed since the developer was mixed?	Replace the solution with new developer.
	Developer replenisher exhausted	Has more than a month passed since the replenisher was mixed?	Replace the solution with new replenisher
Image Density Excessive (Dark films)	Mistake in developer mixing (forgot the starter)	Has the developer been mixed according to instructions?	Replace with correctly mixed developer
	Excessive developer replenishment	Is the replenishment rate excessive?	Adjust for correct replenishment rate

Problem	Probable Cause	Check Point	Corrective Action
Image Density Excessive (Dark films)	Developer temperature too high	Is the developer temperature set properly?	Adjust for the correct temperature level
		Is the main wash water valve open?	Fully open the valve.
Insufficient Film Clarity	Mistake in fixer mixing	Has the fixer been mixed according to instructions?	Replace with correctly mixed fixer.
	Fixer replenisher insufficient.	Is the fixer being sufficiently replenished?	After adjusting for proper replenisher amounts, replace the solution in the fixer tank with fresh fixer.
		Is the fixer replenisher tank empty?	After filling the fixer replenisher tank, replace the solution in the fixer tank with fresh fixer.
Incomplete Film Drying	Low drying temperature	Is the drying temperature properly set?	Adjust for correct drying temperature.
	Developer exhaustion. See Sect.16 - Serv. Man.	Check developer replenishment, P.H., and specific gravity.	Replace with fresh developer solution if necessary. Adjust replenishment to proper amounts if necessary.
	Fixer exhaustion. See Sect.16 - Serv. Man.	Check fixer clearing time, P.H., and replenishment.	Replace with fresh fixer solution if necessary. Adjust replenishment to proper amounts if necessary.
	Wash water not flowing.	Is the wash water supply valve open? (Is the wash water drain cock open?)	After washing all the rollers beyond the wash rack open the main wash water supply valve. Close drain cock.
Dirty film	Dirty film feed tray	Is the film feed tray dirty?	Clean the film feed tray.
	Dirty rollers.	Are the development rollers dirty?	Clean the racks and the rollers.
	Dirty wash water.	Is the inside of the wash water tank dirty?	Wash the wash water tank and racks.
Scratched or Stuck Film	Foreign matter on rollers.	Is there foreign matter on the rollers?	Wash the rollers.
	Inadequate roller function.	Are the roller shaft retainers worn, or the springs broken?	Replace the retainers and / or springs.
	Rack improperly set.	Are the worm and helical gears meshing properly?	Reposition the racks.