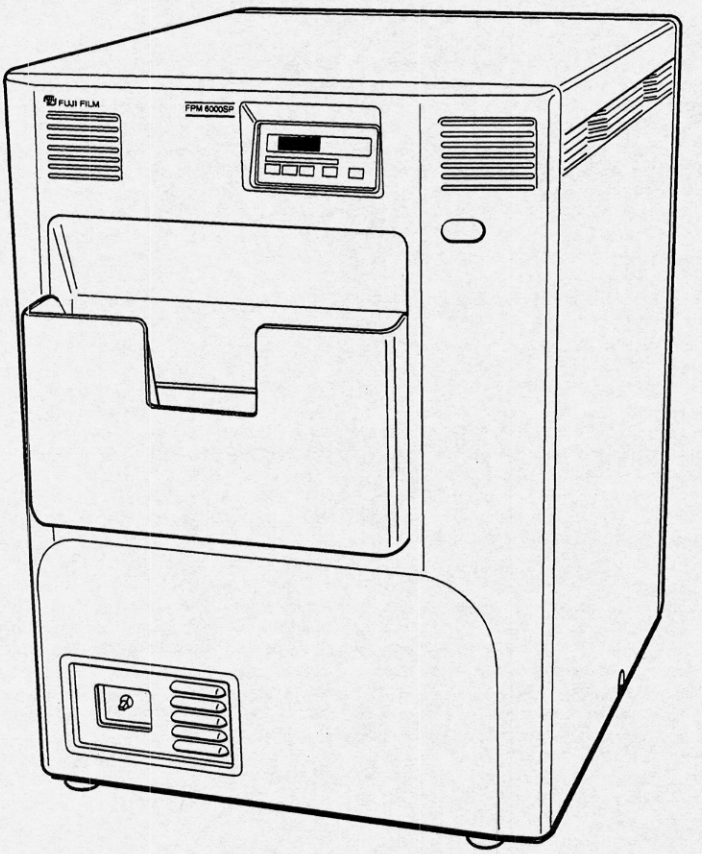
FUJIFILM

SERVICE MANUAL

FUJI INDUSTRIAL
FILM PROCESSOR
FPM 6000SP



First Edition

IX-60SAE

FOREWORD

This manual contains all the information essential to proper servicing of the FUJI INDUSTRIAL FILM PROCESSOR FPM6000SP. When instituting FPM6000SP maintenance, inspection, and service procedures, observe the orientations outlined in this manual. In particular, it is essential to comply with all WARNING, CAUTION, and NOTE designations.

This manual is a professional publication provided for qualified service personnel or persons fully trained in equipment service procedures. All other personnel and operators are restricted from servicing the FPM6000SP.
When maintenance service is needed, be sure to contact qualified service personnel.

This information was accurate at the time of printing, but is subject to modification without prior notice.

CONTENTS

INTRODUCTION

1. INTRODUCTION

The FPM6000SP, Fuji Industrial Film Processor, features:

- Computer-control user friendly built-in programs including self-diagnosis.
- Multi processing cycle, 7'50"(100sec Developer Immersion Time)/11'45"(150sec Developer Immersion Time)
- Integrated frame and tanks
- Low noise, low exhaust system

SAFETY

2. SAFETY

This section describes the precautions to be observed in assuring safe FPM6000SP servicing. Before servicing FPM6000SP, carefully read and thoroughly understand the precautions set forth in this section. The safety precautions are classified into WARNING and CAUTION categories. These two categories are defined as follows.

⚠WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor of moderate injury. It may also be used to alert against unsafe practices and property-damage-only accidents.

2.1 Basic Servicing Precautions

⚠WARNING

DANGEROUS VOLTAGE

Some parts in the power supply box and other sections operate on 200V-240V. When checking parts of making voltage measurements with the power ON, use utmost caution not to touch any high-voltage line.

⚠WARNING

DISCONNECT THE MAIN POWER

When replacing internal parts or making adjustments, be sure to turn OFF the MAIN switch (circuit breaker).

⚠CAUTION

ELECTROSTATIC DISCHARGE

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

⚠WARNING

PERSONAL INJURY

Do not wear a necktie, a necklace, or other accessories that may get caught in movable sections.

⚠CAUTION

PERSONAL INJURY

Do not attempt to lift heavy unit alone.
To avoid straining your back, lift with an assistant.

SPECIFICATIONS

3. SPECIFICATIONS

3.1 FPM6000SP Specifications

Film Transport ..... Continuous roller transport system

Processing Time ..... SP:7min.49sec. (100sec. Developer Immersion Time)
RP:11min.43sec. (150sec. Developer Immersion Time)

Film Size ..... Sheet film : 8.5×15.2 cm ~ 35×43 cm (14×17 in.)

Processing Capacity ..... 35×43 cm (14×17 in.) film
7min.49sec.(469 sec.) processing cycle : 41 sheets/hour
11min.43sec.(703 sec.) processing cycle : 28 sheets/hour

System Control ..... Microprocessor controlled

Control Display ..... Back-light liquid crystal display

Tank Capacity ..... Developer : 12.7 Lit. (3.4 US gal.)
Fixer : 12.4 Lit. (3.3 US gal.)
Washer : 10.9 Lit. (2.9 US gal.)

Solution Temperature Control .... Developer and Fixer temperature thermistor controlled
Control precision : Dev. ± 0.3 °C (0.5 °F)

Solution Recirculation ..... Continuous solution recirculation and agitation by recirculation pumps

Film Detection ..... Infrared sensors at entrance

Replenishment System ..... Automatic replenishment based on the area of film processed

Wash Water Requirement ..... Water temperature : constant-temperature water at a temperature that is at least 15°C and 5°C lower than the developing set temperature
Flow rate : 3 Lit. (0.8 US gal.) / min. during processing

Dimensions (W × D × H) ..... 780×793 (1121*)×1076 mm
$30^{11}/_{16}\times31^{1}/_{4}(44^{1}/_{8}*)\times42^{3}/_{8}$ in
* Including feed tray and film receiver

Electrical Requirements .....

208/240 VAC	60 Hz Single phase (UL)	30A
220/230/240 VAC	50 Hz Single phase (T Ü V GS)	30A
380/400/415 VAC	50 Hz 3 phase Y + N (T Ü V GS)	10A

Weight ..... 221 kg (487 lb.) without solutions 257 kg (567 lb.) with solutions

Standard Accessories ..... Manual handle, hoses, tool box, splash guards, flexible hose

Optional Accessories ..... Partition panels, Automatic drain valve, MOL - 7 connection kit

Safety Specifications ..... Comply with UL and TÜVGS safety regulation;
CE Mark.
The non-return water connection complies with the DIN standard for connection to drinking water systems of the DVGW.

Acoustic Noise ..... Specifications 58 dB (A) or lower during operation and stand-by

Schallemission ..... Bereitschaft Mode : Kleiner als 58 dB (A)
Handlung Mode : Kleiner als 58 dB (A)
nach DIN 45 635 Teil 19

NOTE: *Specifications are subject to change without notice.*

3.2 Additional Machine Data

1. Temperature Accuracy

Developer : Within ± 0.3 °C
Fixer : (Note: Fixer Initial setting temperature –1.0°C ~ Developer Initial setting temperature)

2. Temperature Rise Rate

Developer : 0.50 °C / min.
Fixer : 0.38 °C / min.
* Environmental Test Conditions
Outside Temperature : 22 °C
Humidity : 30 % RH

3. Processing Speed (Line Speed)

469-Second Cycle (SP) : 4.72 mm/sec.
703-Second Cycle (RP) : 3.15 mm/sec.

4. Total Processing Time (Dry to Dry)

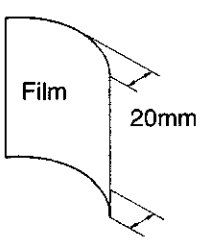
Film Size	25.4×30.5 cm (10×12 in.)	35×43 cm (14×17 in.)
SP	523 (sec)	544 (sec)
RP	784	816

5. Processing Capacity

	Mechanical Processing Capacity (sheets/hr)		**Real Processing Capacity (sheets/hr)**		**Feed Interval (sec)**
	25.4×30.5 cm (10×12 in.)	35×43 cm (14×17 in.)	25.4×30.5 cm (10×12 in.)	35×43 cm (14×17 in.)	
SP	54	48	68	41	14
RP	45	32	99	28	18

6. Film Transport/Permissible Curl

• Curling upward relative to feed direction : 20 mm max. for 20.3×25.4 cm (8×10 in.)/25.4×30.5 cm (10×12 in.)



7. Rack Stating Torque and Weight

	Starting Torque (kg-cm)	Weight (kg)
Developer Rack	1.8	10
D-F Crossover		3.5
Fixer Rack	1.0	8
F-W Crossover		3
Wash Rack	1.2	6
Squeeze Rack		7

8. Sound-power Level

below 58 dB (A)

In both the 50 and 60 Hz areas

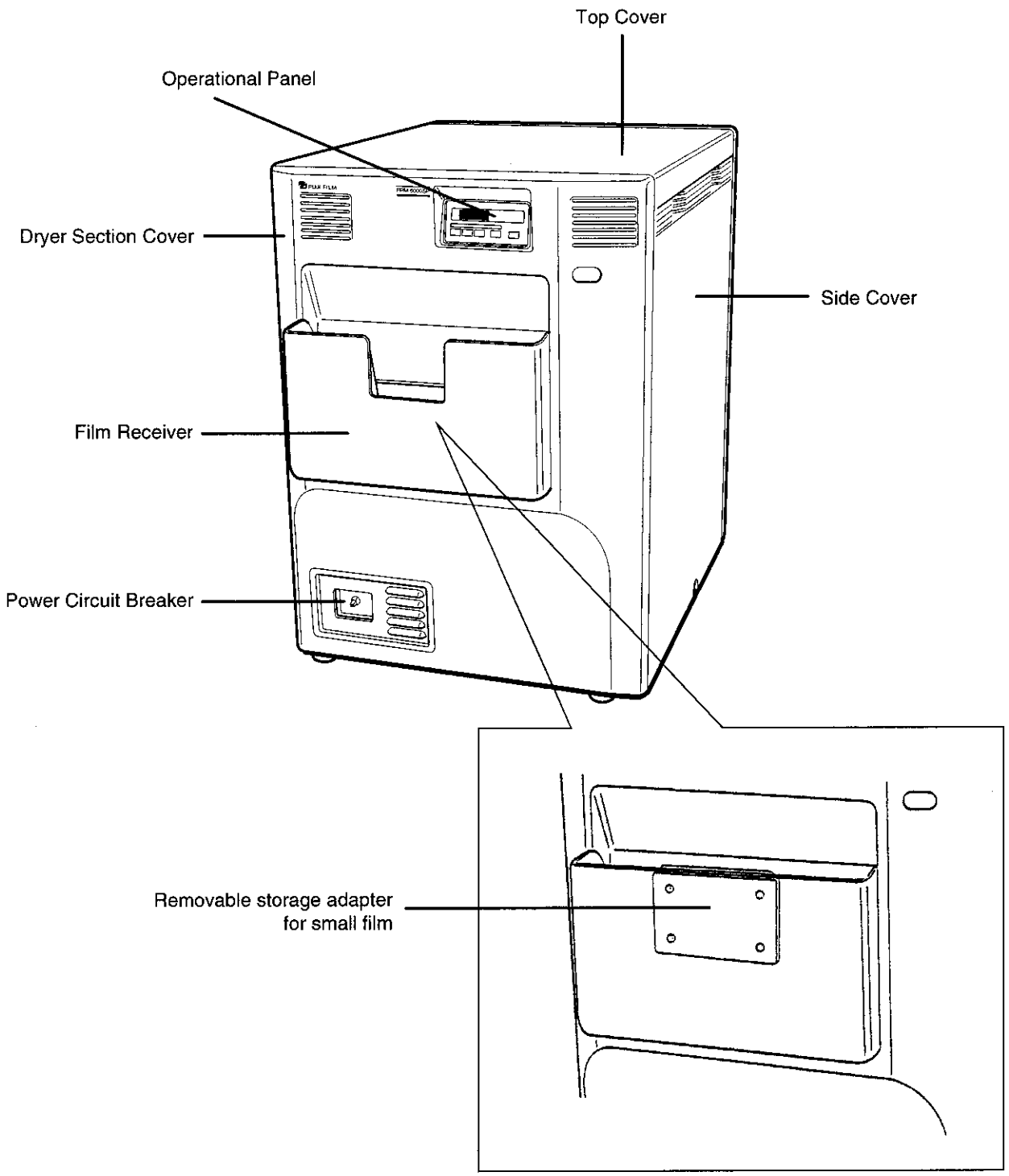
9. Supplied Water Input Volume

Acceptable flow rate : 3 Lit/min (water pressure : 5 kg/cm^2)

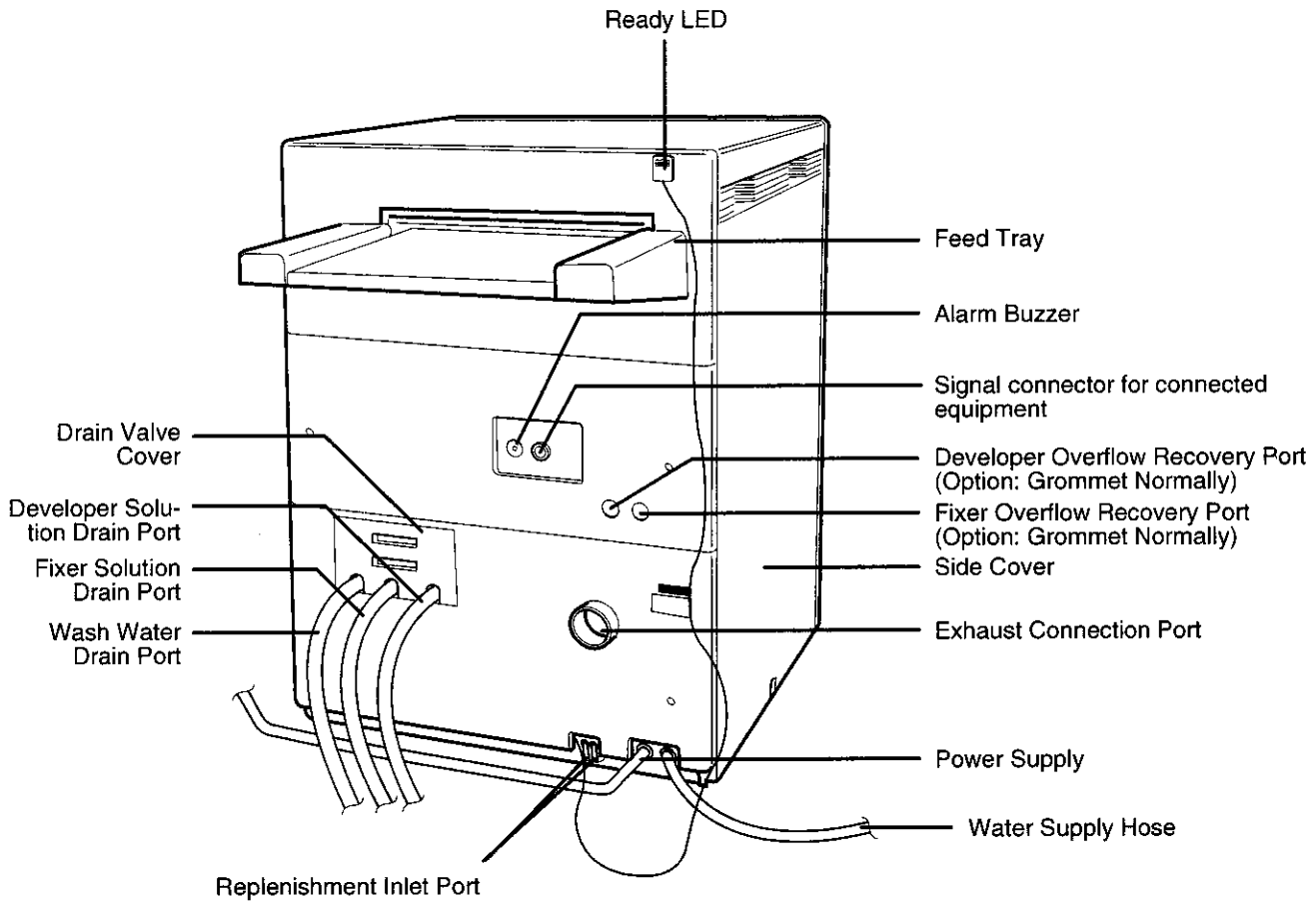
COMPONENT NAMES

4. COMPONENT NAMES

4.1 Film Receiving End



4.2 Film Feeding End



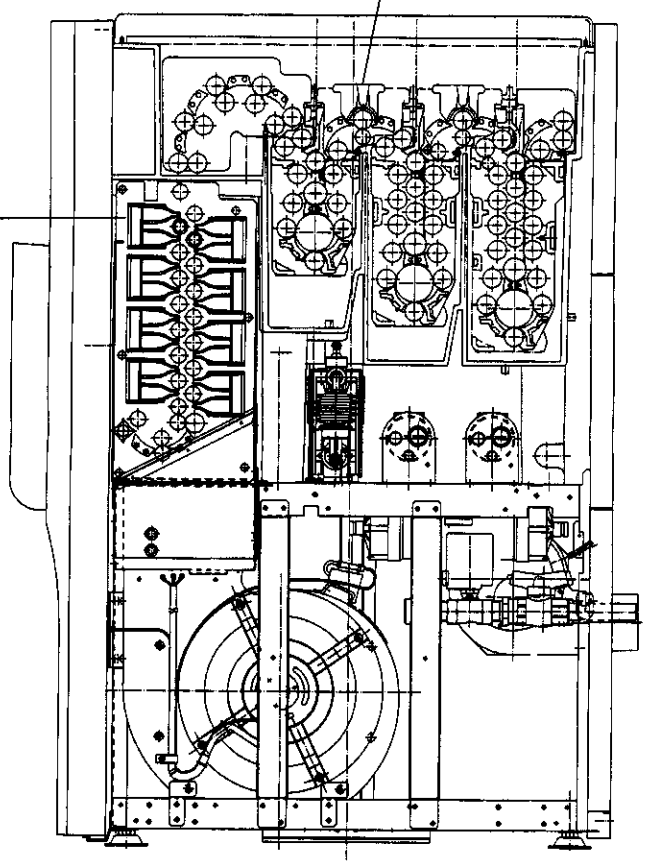
4.3 Main Specifications and Features

Crossover Rack Section (F-W Crossover Rack Cleaning System)

A roller cleaning mechanism is employed for the prevention of chemical buildup on the rollers and guides. Also, a movable guide system is employed to facilitate guide cleaning.

Dryer Section

A heat roller drying system is combined with a hot air drying system to eliminate the possibility of uneven drying.

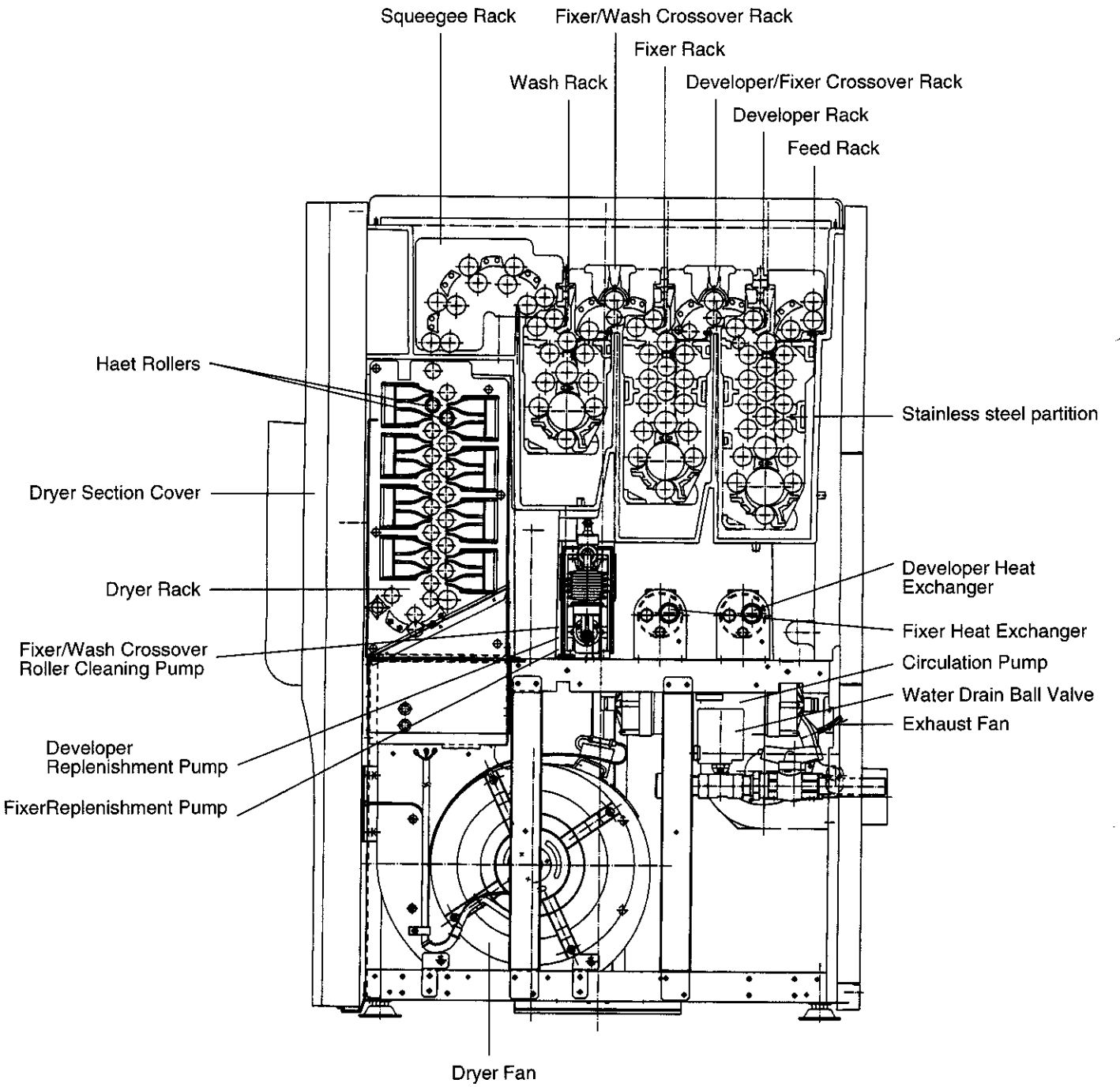


FPM6000 Main Body

1. Processing time
   SP: 469 sec. (Leading edge to Leading edge)
   RP: 703 sec.
2. Actual processing capacity
   SP: 41 sheets (35×43 cm)/hour
   RP: 28 sheets (35×43 cm)/hour
3. Mechanical processing capacity
   SP: 48 sheets (35×43 cm)/hour
   RP: 32 sheets (35×43 cm)/hour
4. Feed intervals
   SP: 14 seconds
   RP: 18 seconds
5. Drying capacity
   Continuous drying of 30 sheets (35×43 cm)
6. Temperature accuracy
   Dev : ± 0.3 °C
   Fix : Fixer Initial setting temperature -1.0 °C ~ Developer Initial setting temperature
   Dry : ± 5.0 °C
7. Temperature rise
   Dev : 0.5 °C/min
   Fix : 0.38 °C/min
   at an ambient temperature of 10°C
8. Tank capacity
   Dev : 12.7 Lit.
   Fix : 12.4 Lit.
   Wash : 11 Lit.
9. Wash water flow rate
   3 Lit./min
10. Sound level
    58 dB (A-weighted) or lower
11. Outside dimensions
    Width 780 mm
    Height 1076 mm
    Depth 793 mm
12. Main body weight
    221kg (without processing solutions)
    257 kg (with processing solutions)
13. Power supply capacity

208/240 VAC	60 Hz	Single phase (UL)
220/230/240 VAC	50 Hz	Single phase (T Ü V GS)
380/400/415 VAC	50 Hz	3 phase Y + N (T Ü V GS)

4.4 Parts Arrangement Diagram

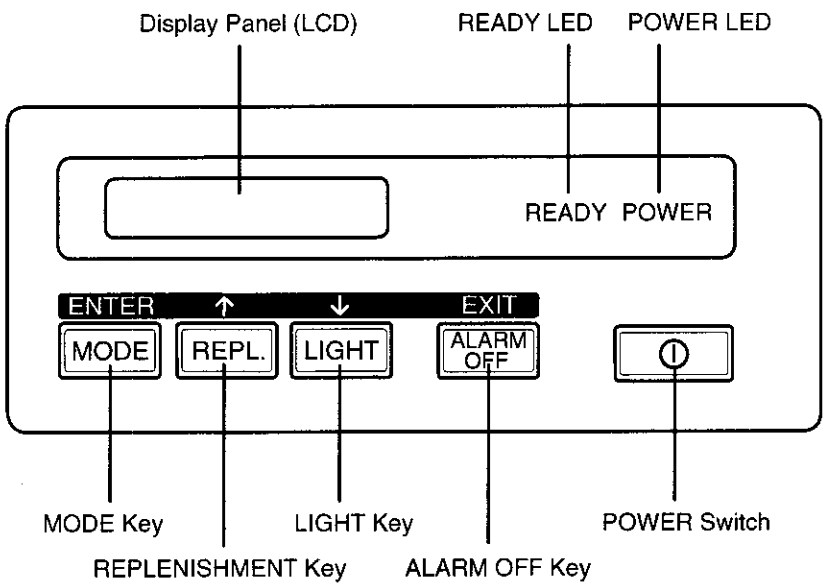


OPERATIONAL PANEL DESCRIPTIONS

5. OPERATIONAL PANEL DESCRIPTIONS

The switches and keys on the operational panel control the equipment functions. The key functions vary with the selected operation mode.

Note: *The following two different operational modes are used.*
•Regular Mode: For film processing operations.
•Setup Mode: For setting up processing conditions.



POWER Switch	POWER LED	Processor Status
POWER ON	Steady glow	The processor is operating
POWER OFF	Blinking	The LED blinks during the time interval between POWER switch OFF activation and function processor termination.
POWER OFF	Extinguished	The processor is deactivated

DISPLAY PANEL

This panel indicates the operational modes or error message.
When a message is displayed, the backlight LCD becomes green.
When the processor is ready for film processing in the regular mode, the READY message developer solution temperature and operational cycle indication appear on the display panel.

READY	
DEV . = 30.0°C	SP

NOTE:
SP 469 second processing cycle.
RP 703 second processing cycle.

READY LED (green Color)

This is a backlight LED indicator which indicates the Ready condition for processing.
This green light LED goes out when film is fed, and comes on again when the processor is ready to accept the next film.

MODE Key

This key changes the operational mode.
To select from one operation mode to another, press this key 3 seconds or longer.

In the stepup mode, this key works as ENTER key.

The ENTER key confirms any changes or information.

REPL. Key

When this key is activated in the regular mode with the developer and fixer tanks emptied, said tanks are simultaneously charged with processing solutions.
Solution charging takes about 25 minutes.
If the key is pressed once while processing solutions remain in the tanks, 250P of developer and fixer replenisher solutions are simultaneously added to the tanks.

In the setup mode, this key works as ↑ Key

This key changes the message or setting indicated on the display panel.
↑ key function is not provided by an independent key.

LIGHT Key

This key controls the ON/OFF of the back-light during regular mode.

In the setup mode, this key works as ↓ Key

This key changes the message or setting indicated on the display panel.
↓ key function is not provided by an independent key.

ALARM OFF Key

This key stops error alarms.
When the key is pressed, alarms are silenced.
When the ALARM OFF key is pressed a second time, the error message is erased from the display.
(In the case of more than one error, press the ALARM OFF key the number of time coinciding with the number of errors.)

In the setup mode, this key works as EXIT Key

This key finalizes the setting indicated on the display panel at any time.
This EXIT key function is not provided by an independent key.

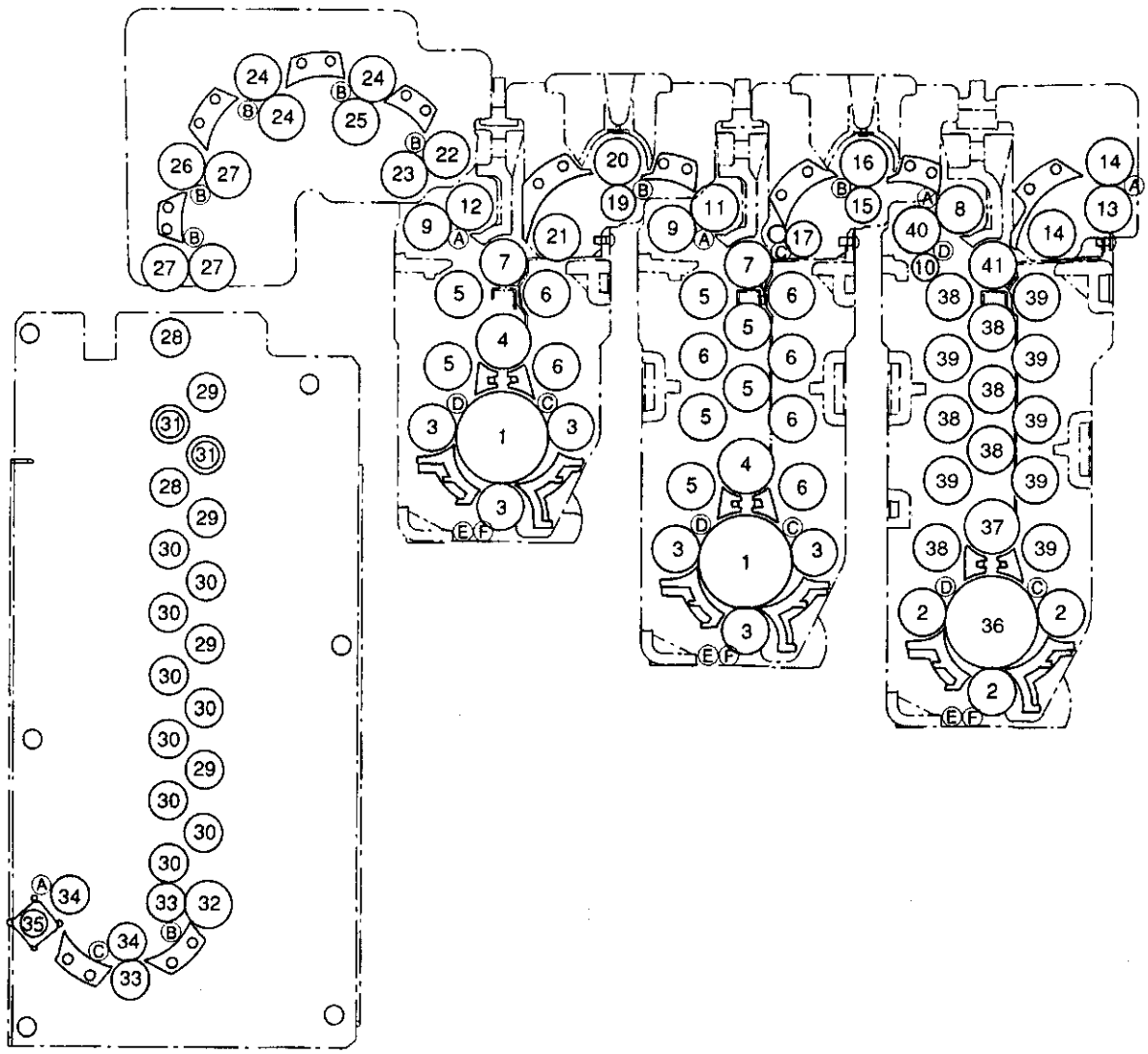
List of Parameter Changes Invoked by Processing Speed Changes

	SP		RP	
Temperature setup				
Developer temperature	30.0°C		27.0°C	
Fixer temperature	31.0°C		31.0°C	
Dryer temperature	Main	Standby	Main	Standby
	35°C	30°C	30°C	30°C
Heat rollers	Main	Standby	Main	Standby
Heat roller 1	30°C	30.0°C	30°C	30°C
Heat roller 2	30°C	30.0°C	30°C	30°C
Dryer temperature calibration according to film processing volume	See sections 8.2.5 and 8.2.6.			
Processing speed				
Processing time	469 sec (100sec Developer Immersion Time)		703 sec (150sec Developer Immersion Time)	
Drive time Time interval between the moment the film-trailing end is detected by the entry sensor system and the moment the drive is stopped.	540 sec		806 sec	
Line speed	4.72 mm/s		3.15 mm/s	
Film delay time	14 sec		18 sec	
Wash water solenoid valve control during film processing	See section 8.2.9.			
Crossover roller cleaning pump control Fixer/wash pump	See section 8.4.4.			

RACK CONFIGURATION

6. RACK CONFIGURATION

6.1 Rack Types and Roller Arrangement



Roller List

No.	Roller Material	Color	Part Number	Qty.	Roller Diameter	Roller Shaft End E-ring
1	Extrusion phenol	Black	334F2698B	2	Φ50	E8
2	Rubber (EPT)	Black	334F3418	3	Φ25	E5
3	Paper phenol	Brown	334F2782	6	Φ25	E5
4	Extrusion phenol	Black	334F2699B	2	Φ30.2	E5
5	Extrusion phenol	Black	334F2711B	7	Φ25	E5
6	Extrusion phenol	Black	334F2712B	7	Φ25	E5
7	Extrusion phenol	Black	334F2713B	2	Φ25	E5
8	Rubber (EPT)	Black	334F3652	1	Φ25	E8
9	Extrusion phenol	Black	334F2710B	2	Φ25	E5
10	Rubber (EPT)	Black	334F3562	1	Φ16	E4
11	Rubber (SP)	Black	334F3527B	1	Φ25	E8
12	Silicone rubber (RTV)	Blue	334F3528A	1	Φ25	E8
13	Rubber (EPT)	Black	334F3525A	1	Φ25	E8
14	Extrusion phenol	Black	334F2694B	2	Φ25	E5
15	Rubber (EPT)	Black	334F3651	1	Φ20	E8
16	Paper phenol	Brown	334F2736	1	Φ25	E5
17	Rubber (EPT)	Black	334F3563	1	Φ20	E5
18	Stainless	Silver	334F1155B	1	Φ10	E3
19	Rubber (SP)	Black	334F3529	1	Φ20	E8
20	Paper phenol	Brown	334F2736	1	Φ25	E5
21	Rubber (SP)	Black	334F3407	1	Φ25	E8
22	Rubber (EPT)	Black	334F3354B	1	Φ25	E5
23	Felt	Gray	334F4019B	1	Φ25	E5
24	Paper phenol	Brown	334F2696B	3	Φ25	E5
25	Rubber (EPT)	Black	334F3355B	1	Φ25	E5
26	Paper phenol	Brown	334F2816A	3	Φ25	E5
27	Felt	Gray	334F4023B	3	Φ25	E5
28	Extrusion phenol	Black	334F2848B	2	Φ20	E5
29	Extrusion phenol	Black	334F2847A	4	Φ20	E5
30	Extrusion phenol	Black	334F2844A	9	Φ20	—
31	Aluminum	Gray	334F1228A	9	Φ20	—
32	Extrusion phenol	Black	334F2844A	1	Φ25.25	—
33	Extrusion phenol	Black	334F2845B	2	Φ20	—
34	Extrusion phenol	Black	334F2849A	2	Φ20	—
35	Aluminum	Silver	334F0076B	1	Φ15	—
36	Paper Phenol	Brown	334F2959	1	Φ50	E8
37	Paper Phenol	Brown	334F2958	1	Φ30.2	E5
38	Paper Phenol	Brown	334F2962	6	Φ25	E5
39	Paper Phenol	Brown	334F2960	7	Φ25	E5
40	Paper Phenol	Brown	334F2957	1	Φ25	E5
41	Paper Phenol	Brown	334F2961	1	Φ25	E5
42	Extrusion Phenol	Black	334F2736	1	Φ25	E5

Spring List

Symbol	Length	Qty.	Part number
Ⓐ	85mm	14	388F2147A
Ⓑ	80mm	16	388F2148A
Ⓒ	65mm	10	388F2146A
Ⓓ	105mm	8	388F2150A
Ⓔ	—	3	388F3084
Ⓕ	—	3	388F3085

E-ring

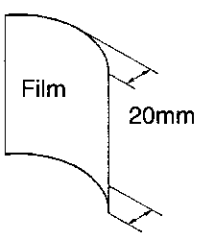
Roller Shaft End E-ring	Part number
E3	315S3050030
E4	315S3050040
E5	315S3050050
E6	315S3050080

Rack Weight and Startup Torque

Rack name	Weight	Startup torque
Entry rack	2kg	—
Developer rack	10kg	1.8kgcm
Developer/fixer crossover rack	3.5kg	—
Fixer rack	8kg	1.0kgcm
Fixer/wash crossover rack	3kg	—
Wash rack	6kg	1.2kgcm
Squeegee rack	7kg	—
Dryer rack	16kg	2.0kgcm

Film Transport/Permissible Curl

- Curling upward relative to feed direction : 20 mm max. for 20.3×25.4 cm (8×10 in.) / 25.4×30.5cm (10×12 in.)

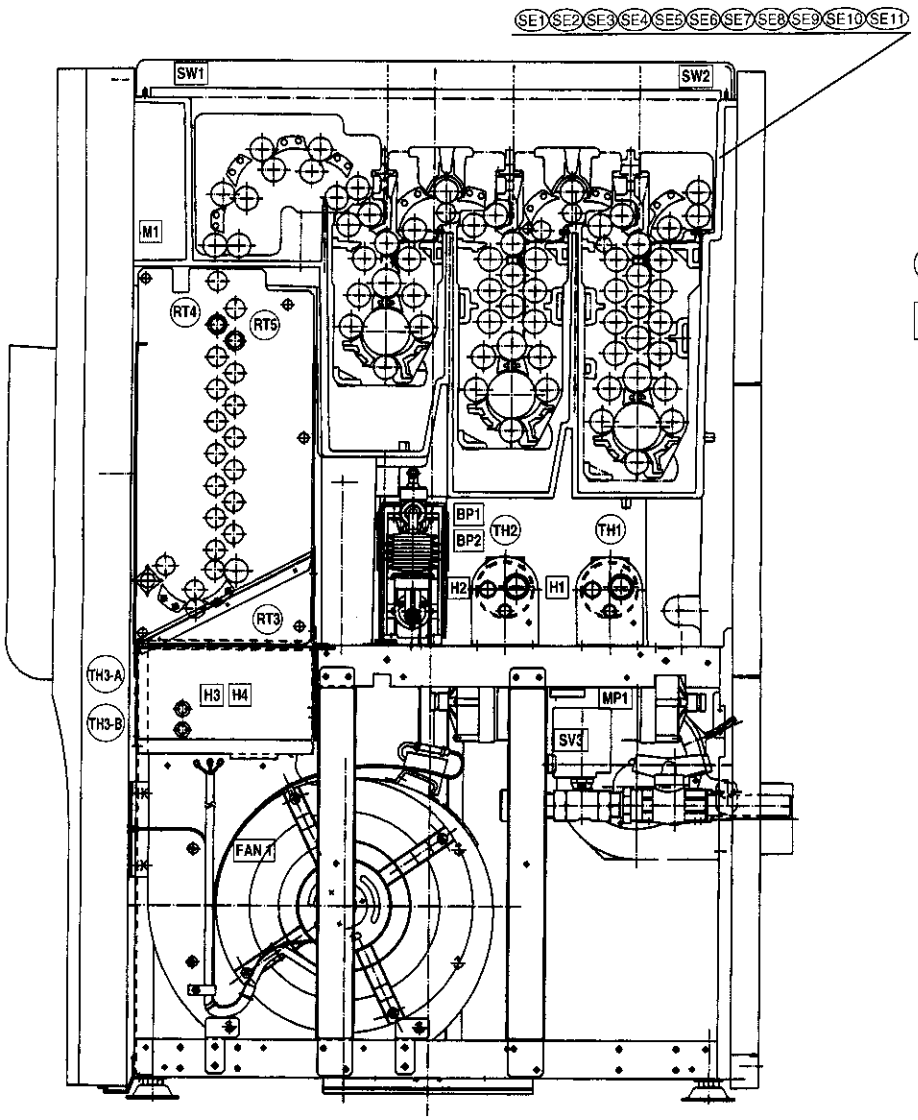


I/O NAMES AND LOCATIONS

7. I/O NAMES AND LOCATIONS

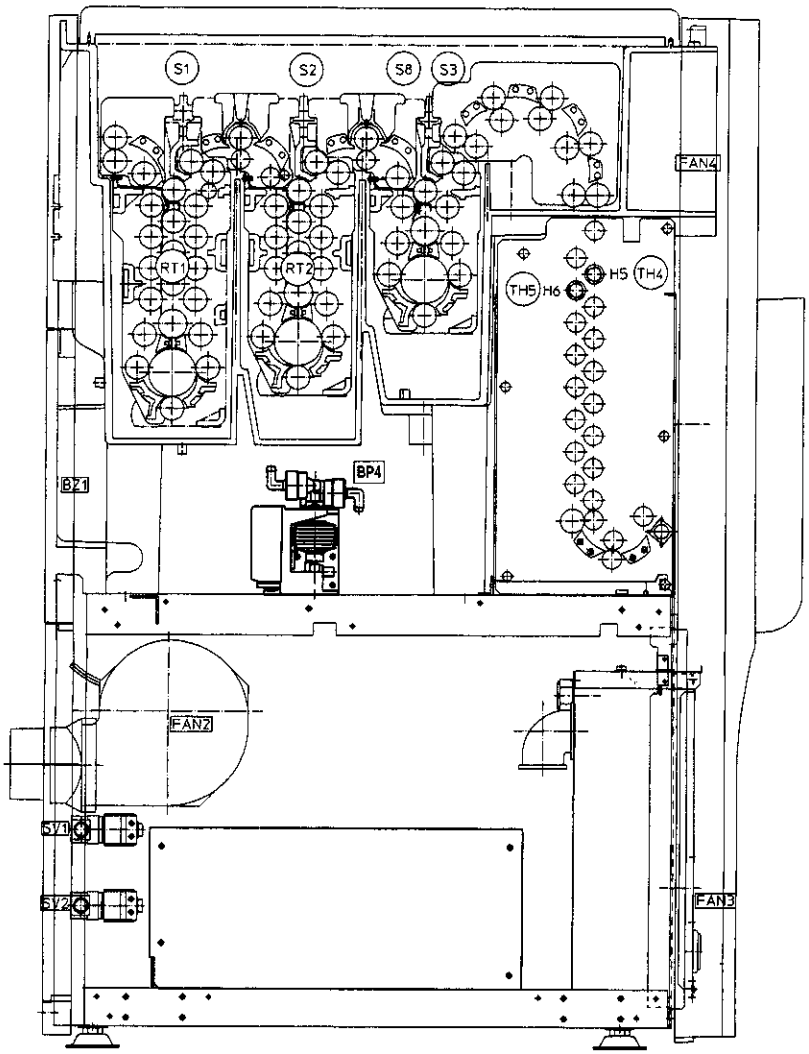
7.1 Left-hand Side

(The rightmost sensor is SE1 as viewed from the feed end.)



FAN1 : Dryer Fan
H1 : Developer Heater
H2 : Fixer Heater
H3 : Dryer Heater A
H4 : Dryer Heater B
M1 : Drive Motor
MP1 : Circulation Pump
SV3 : Water Drain Ball Valve
SE1 : Entry Sensor 1
SE2 : Entry Sensor 2
SE3 : Entry Sensor 3
SE4 : Entry Sensor 4
SE5 : Entry Sensor 5
SE6 : Entry Sensor 6
SE7 : Entry Sensor 7
SE8 : Entry Sensor 8
SE9 : Entry Sensor 9
SE10 : Entry Sensor 10
SE11 : Entry Sensor 11
SW1 : Top Cover Sensor 1
SW2 : Top Cover Sensor 2
RT3 : Dryer Thermistor
RT4 : Heat Roller Thermistor 1
RT5 : Heat Roller Thermistor 2
TH1 : Developer Safety Thermostat
TH2 : Fixer Safety Thermostat
TH3 : Dryer Safety Thermostat (A, B)
BP1 : Developer Replenishment Pump
BP2 : Fixer Replenishment Pump

7.2 Right-hand Side



○ .....Signal

□ .....Load

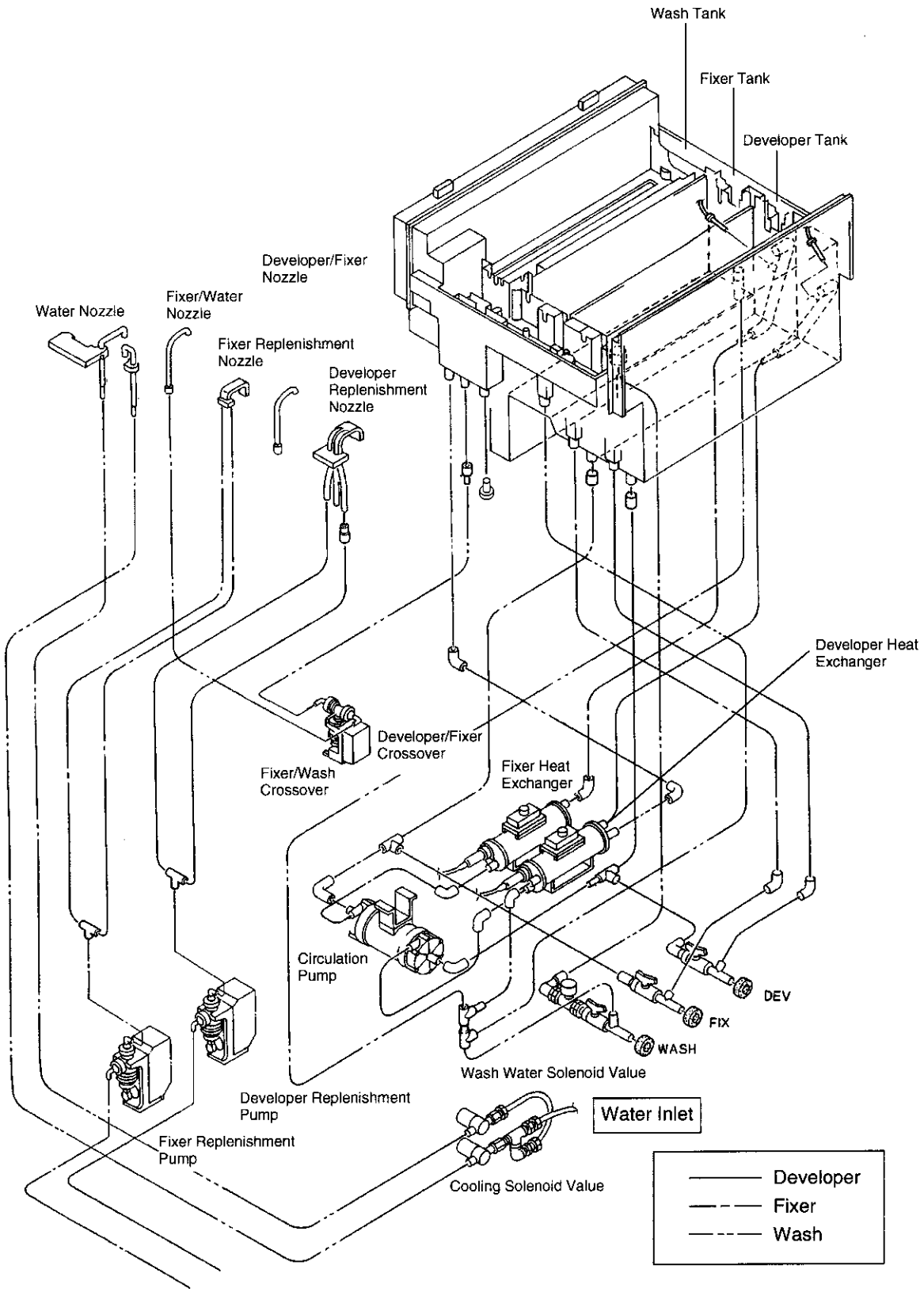
SV1 : Wash Water Solenoid Valve
SV2 : Cooling Solenoid Valve
FAN2 : Exhaust Fan
FAN3 : Electrical Box Ventilation Fan
FAN4 : Operational Panel Section Ventilation Fan
H5 : Heat Roller 1
H6 : Heat Roller 2
BP4 : Fixer/Wash Crossover Roller Cleaning Pump
BZ1 : Feed Buzzer

RT1 : Developer Thermistor
RT2 : Fixer Thermistor
S1 : Developer Tank Solution Level Sensor
S2 : Fixer Tank Solution Level Sensor
S3 : Wash Tank Water Level Sensor
S8 : Water Supply Level Sensor
TH4 : HR1 Thermal Protector
TH5 : HR2 Thermal Protector

DESCRIPTIONS OF OPERATIONS

8. DESCRIPTIONS OF OPERATIONS

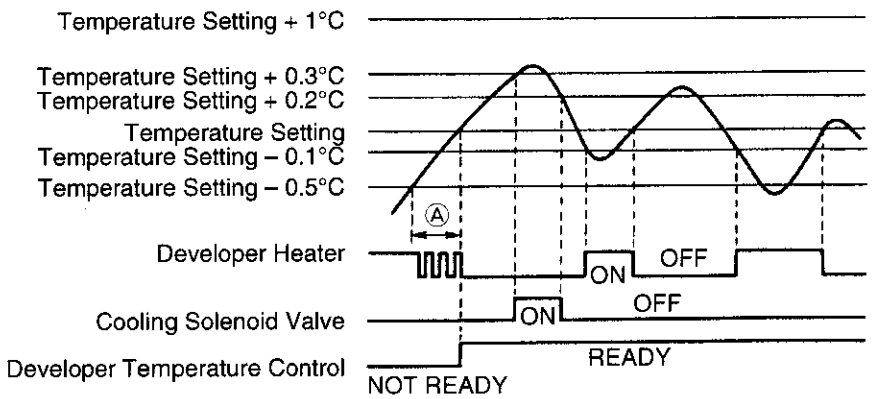
8.1 Flow Chart



8.2 Load Control Descriptions

8.2.1 Developer Temperature Control

(1) The diagram below shows how the developer temperature is controlled during standby operation, film processing, selftest bypass processing, maintenance mode, and service mode periods.



(a) During temperature increase

The developer heater (H1) turns OFF when the temperature setting≦developer temperature. However, when the developer temperature control is not ready and (temperature setting – 0.5°C) ≦ developer temperature, the developer heater is controlled at an ON-OFF ratio of 6:4 (0.6-second-ON and 0.4-second-OFF) (Ⓐ).

The cooling solenoid valve turns ON when the (temperature setting + 0.3°C) ≦ developer temperature.

(b) During temperature decrease

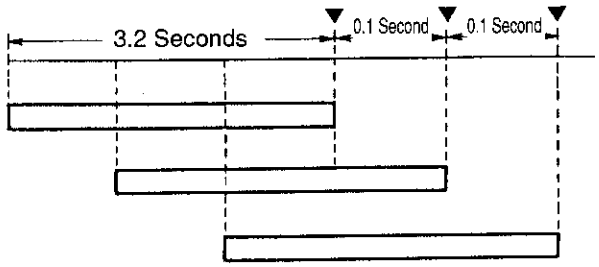
The developer heater (H1) turns ON when the (temperature setting – 0.1°C) ≧ developer temperature.

The cooling solenoid valve turns OFF when the (temperature setting + 0.2°C) ≧ developer temperature.

(2) The control temperature is explained below.

(a) Sampled thermistor data is acquired at 0.1 second intervals. The first data acquisition occurs 3.2 seconds after power ON, and the subsequent data acquisitions occur at 0.1 second intervals. The 32 latest data acquired in this manner are then averaged and converted to a temperature value for control temperature determination. The control temperature consists of a measured temperature and a calibration value.

Control temperature = measured temperature + calibration value

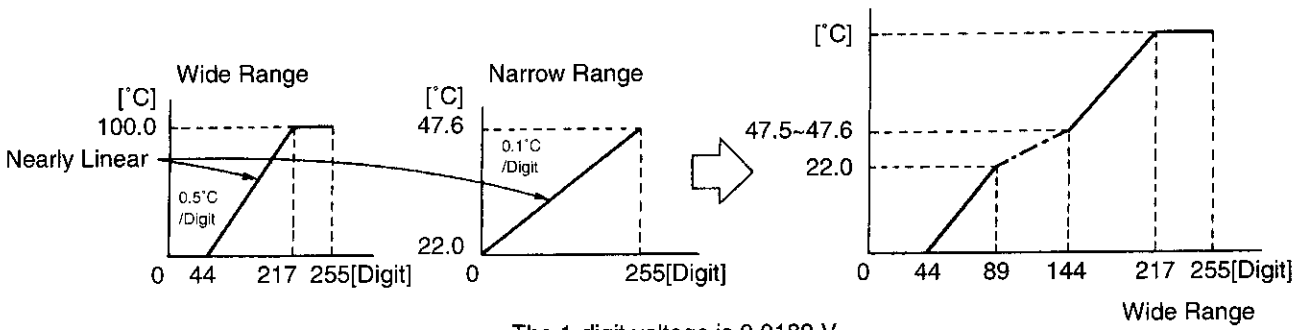


▼··· Timing with which data are averaged and converted to a temperature value

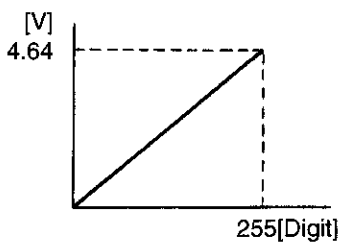
(b) The control temperature conversion method is explained below with reference to the developer temperature.

When the data sampled as shown below consists of 89 to 144 digits, the narrow range (temperature table) is used for temperature conversion and high-precision control is exercised.

When the sampled data is other than mentioned above, the wide range (temperature table) is used for temperature conversion. The narrow range provides about 0.1°C/digit, whereas the wide range provides about 0.5°C/digit.



The 1-digit voltage is 0.0182 V.



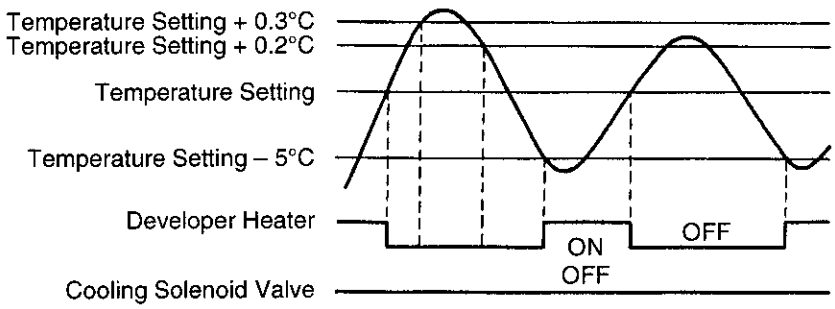
(3) Displayed temperature

NOT READY state .....The read control temperature is displayed at 1-second intervals.

READY state .....The average control temperature for a 32-second period is displayed at 1-second intervals.

However, the temperature to be displayed is limited within the range from temperature setting minus 0.3°C to temperature setting plus 0.3°C.

(4) Preheat operation descriptions (the developer temperature control is NOT READY) are given below.

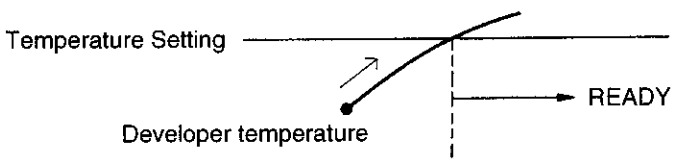


(a) During temperature increase
The developer heater (H1) turns OFF when the temperature setting ≦ developer temperature.

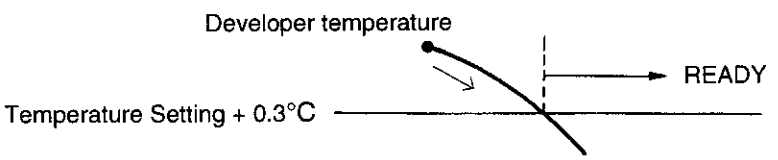
(b) During temperature decrease
The developer heater (H1) turns ON when the (temperature setting – 5°C) ≧ developer temperature.

(5) Developer temperature control READY
When the film processor begins to start up, the setup data are changed, or a developer temperature control error has occurred, the READY condition occurs under the following conditions.

(a) During temperature increase: Developer temperature ≧ temperature setting
The curve shows the trend of developer temperature increase.



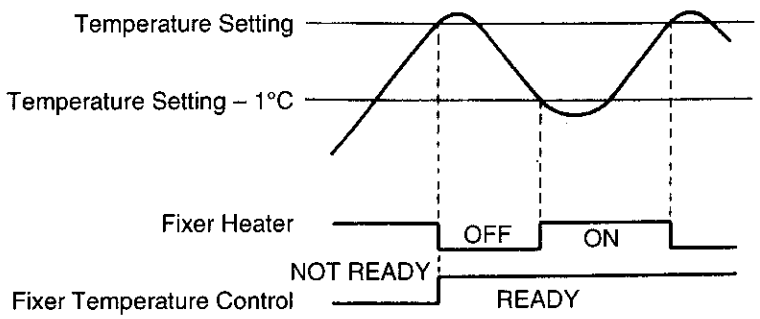
(b) During temperature decrease: Developer temperature ≦ (temperature setting + 0.3°C)
The curve shows the trend of developer temperature decrease.



(c) During operation: Temperature setting – 1.0°C ≦ Developer temperature ≦ Temperature setting +1.0°C

8.2.2 Fixer Temperature Control

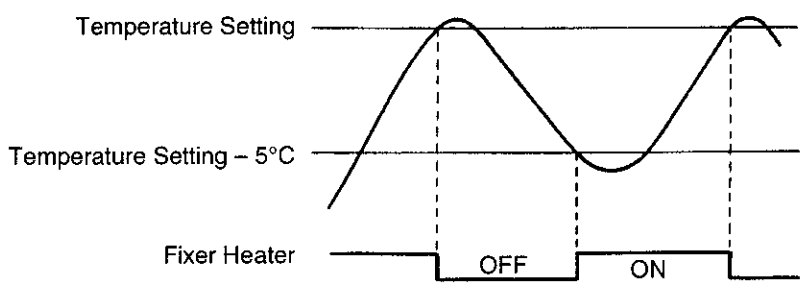
(1) The diagram below shows how temperature control is exercised during standby operation, film processing, selftest bypass processing, maintenance mode, and service mode periods.



(a) During temperature increase
The fixer heater (H2) turns OFF when the temperature setting ≦ fixer temperature.

(b) During temperature decrease
The fixer heater (H2) turns ON when the (temperature setting – 1.0°C) ≧ fixer temperature.

(2) Preheat operation descriptions (the fixer temperature control is NOT READY) are given below.



(a) During temperature increase
The fixer heater (H2) turns OFF when the temperature setting ≦ fixer temperature.

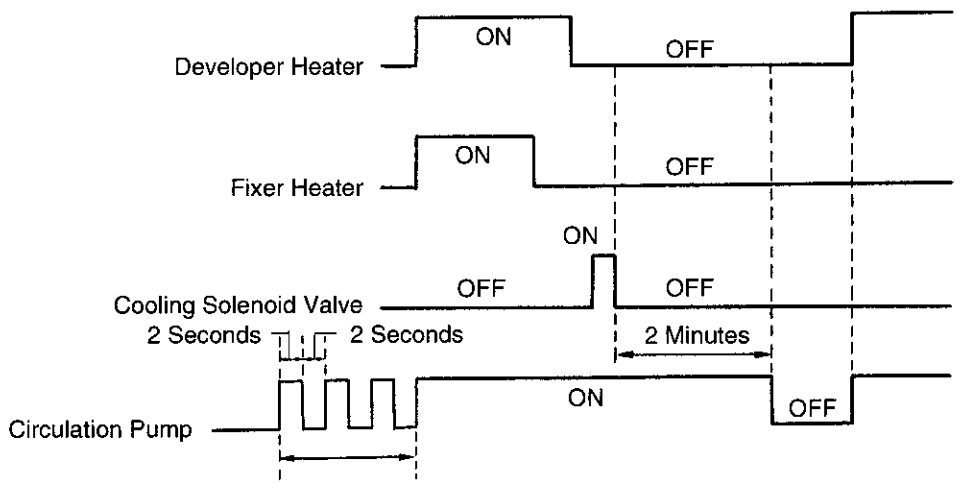
(b) During temperature decrease
The fixer heater (H2) turns ON when the (temperature setting – 5.0°C) ≧ fixer temperature.

(3) Fixer temperature control READY
In situations where the film processor begins to start up, the setup data are changed, or a fixer temperature control error has occurred, the READY condition occurs when the fixer temperature ≧ temperature setting.

8.2.3 Circulation Pump

(1) Circulation pump (MP1) operations performed during developer/fixer temperature control are described below.

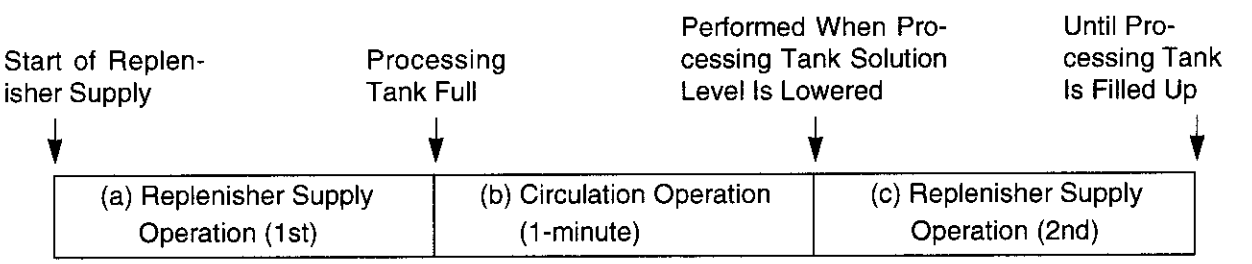
The circulation pump is always ON during film processing or selftest bypass processing. When any other processing operation is performed, the circulation pump repeats a 2-second-ON and 2-second-OFF cycle three times before the start of developer/fixer temperature control and then begins to exercise temperature control. While temperature control being exercised, the circulation pump is OFF if the developer and fixer heaters and cooling solenoid valve remain OFF for 2 minutes. In the other situations, the circulation pump is ON.



Intermittent Operation before Temperature Control Initiation

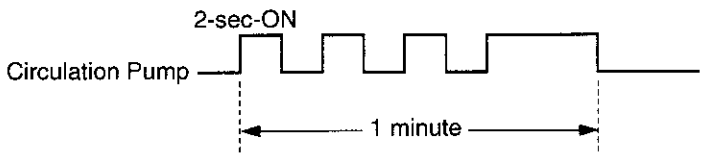
(2) Circulation pump (MP1) operations performed in the replenisher supply sequence are described below.

While the replenisher is supplied, the following control is provided.

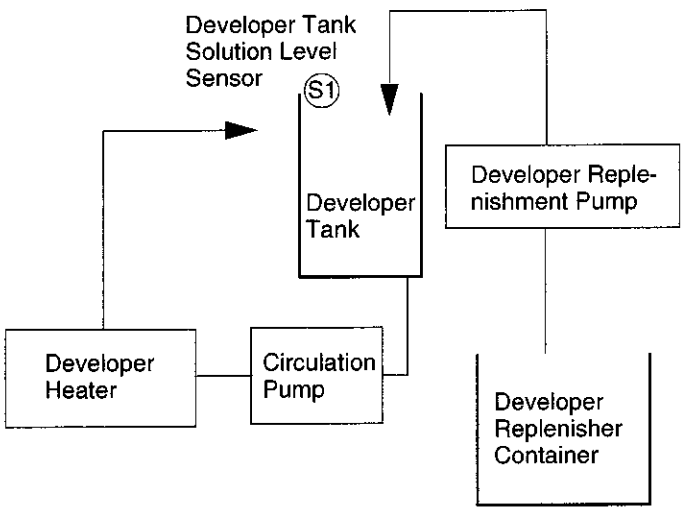


(a) The circulation pump is OFF until the end of replenishment.

(b) Remains ON for 1 minute.



(c) Stays OFF until the tank is filled up.



8.2.4 Cooling Solenoid Valve

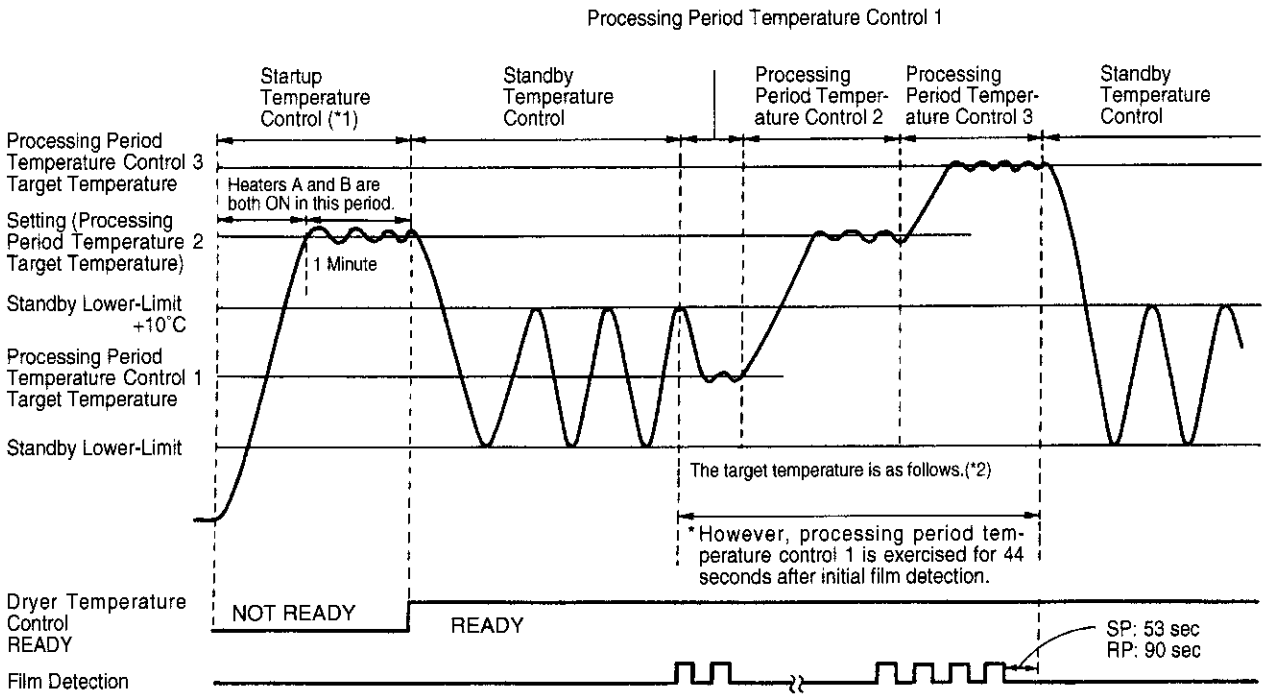
(1) During developer temperature control (except for the preheating process)
  (a) ON when the (temperature setting + 0.3°C) ≦ developer temperature.
  (b) OFF when the (temperature setting + 0.2°C) ≧ developer temperature.

(2) Water supply tank level retention
  The cooling solenoid valve always remains ON for a 15 second period at the beginning of operation. If the full level of water is not detected by the tank water level sensors after the water has been supplied for 15 seconds, the cooling solenoid valve remains ON for a period up to 1 minute.
  If the full level of water is not detected during operation, the cooling solenoid valve remains ON for a 20 second period.

(3) During crossover roller cleaning — The cooling solenoid valve turns ON when D-F or F-W crossover rack roller cleaning pump operation is performed.

8.2.5 Dryer Temperature Control

(1) The dryer temperature control system can be divided into four categories: startup, standby, processing period, and maintenance mode temperature control operations.
  When DIP switch SW1-3 is OFF, the diagram below shows the startup, standby, and processing period dryer temperature control patterns.



*1 When the dryer main setting is increased, the READY signal is turned OFF and then this temperature control is exercised again.

*2 The target temperatures are as follows.

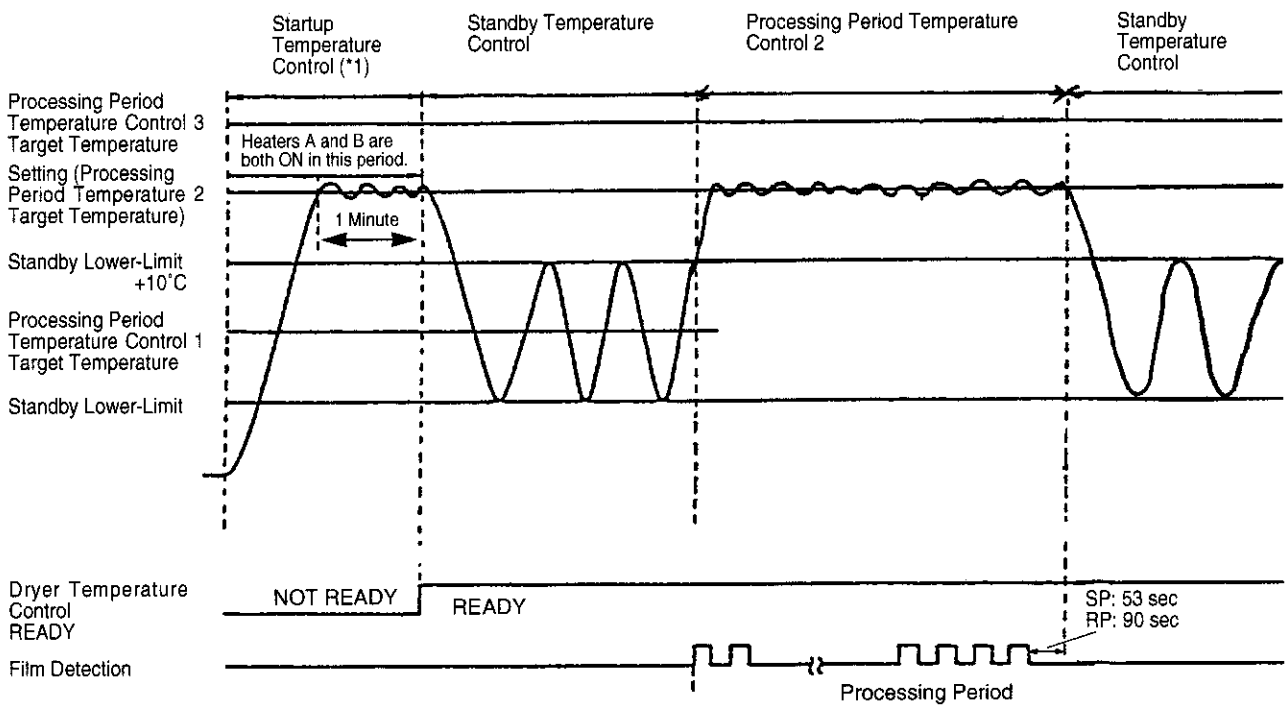
Target temperature

Temperature control category	Target temperature
Processing period temperature control 1	Temperature setting – 11°C
Processing period temperature control 2	Temperature setting
Processing period temperature control 3	Temperature setting + 3°C

Processing temperature control category	Last 3-minute processing volume M (calculated in terms of 25.4×30.5 cm (10×12 in.) film sheets)
Processing period temperature control 1	M < 2
Processing period temperature control 2	2 ≦ M < 9
Processing period temperature control 3	9 ≦ M

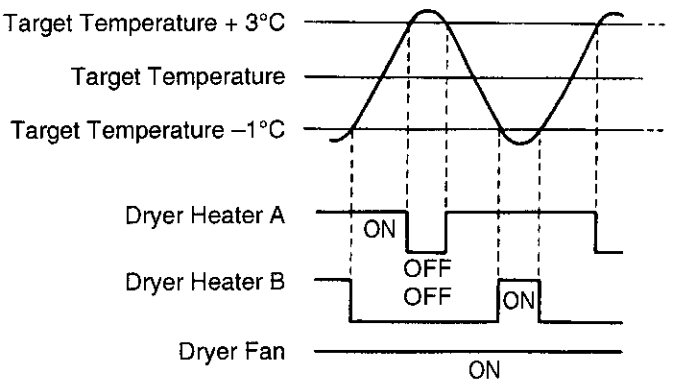
The processing volume (number of film sheets) data is updated at 20-second intervals for the first 2-minute period and then at 1-minute intervals for the subsequent period.

(2) When DIP switch SW1-3 is ON, processing period control 2 is exercised.



(3) Dryer heater dual control

(a) To narrow down the processing period temperature hunting range, two systems are used for dryer heater control purposes.



The following results when the target temperature –1°C ≧ dryer temperature.

Dryer heater A — ON
Dryer heater B — ON
Dryer fan — ON

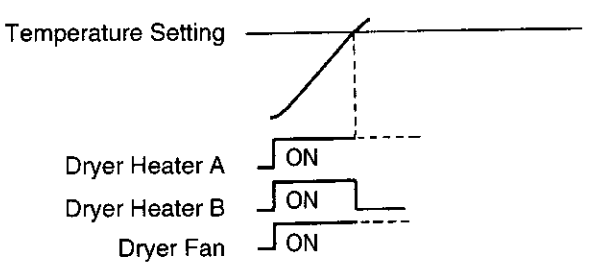
The following results when the target temperature –1°C < dryertemperature < the target temperature +3°C.

Dryer heater A — ON
Dryer heater B — OFF
Dryer fan — ON

The following results when the target temperature +3°C ≦ dryer temperature.

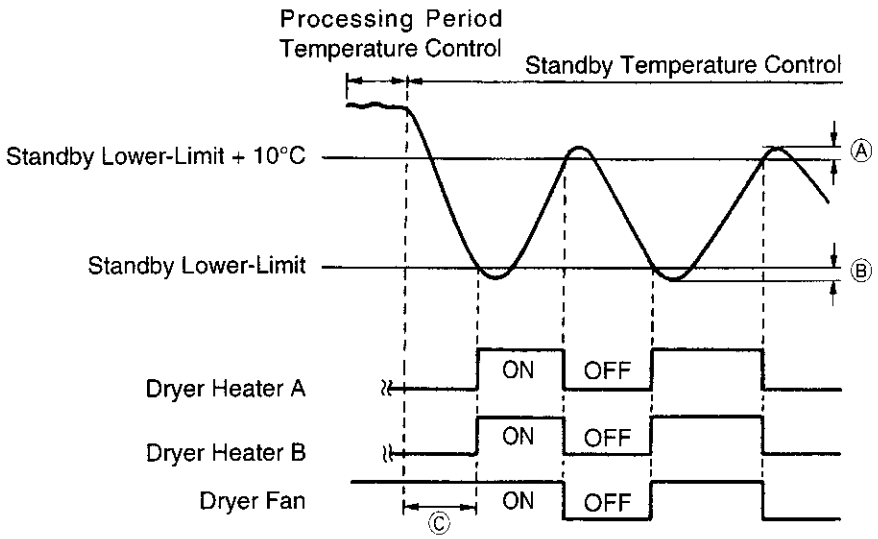
Dryer heater A — OFF
Dryer heater B — OFF
Dryer fan — ON

(b) At an initial stage of dryer temperature control, processing period temperature control 2 is exercised so that heaters A and B are both kept ON until the preselected temperature is reached.



(4) Standby temperature control

When the film processor begins to operate or remains in standby without processing film, standby temperature control is exercised so that the dryer zone temperature is controlled within a certain large range.



(a) During temperature increase

The following results when the standby lower-limit + 10°C ≦ dryer temperature Ⓐ.

Dryer heater A — OFF
Dryer heater B — OFF
Dryer fan — OFF

During temperature decrease

The following results when the standby lower-limit ≧ dryer temperature Ⓑ.

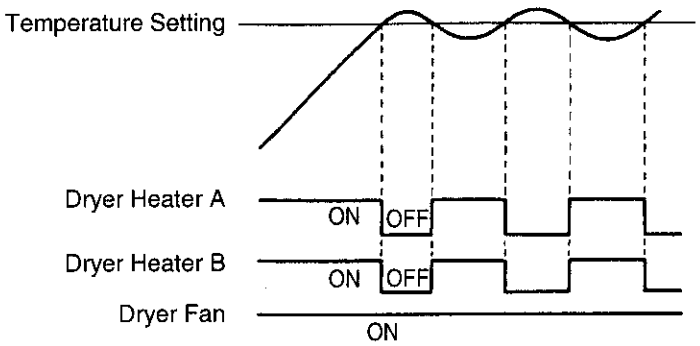
Dryer heater A — ON
Dryer heater B — ON
Dryer fan — ON

(b) When the film processor switches from processing period temperature control to standby temperature control, the following conditions prevail until the standby lower-limit ≧ dryer temperature Ⓒ.

Dryer heater A — OFF
Dryer heater B — OFF
Dryer fan — ON

(5) Maintenance mode temperature control

Maintenance mode temperature control is needed for dryer temperature calibrations (to be provided after thermistor replacement). It is exercised so as to minimize the range of hunting at a preselected temperature.



(a) During temperature increase

Dryer temperature setting ≦ dryer temperature

Dryer heater A — OFF

Dryer heater B — OFF

Dryer fan — ON

During temperature decrease

Dryer temperature setting > dryer temperature

Dryer heater A — ON

Dryer heater B — ON

Dryer fan — ON

(6) Other temperature control

For drying operations in selftest bypass processing mode, processing period temperature control 2 is exercised.

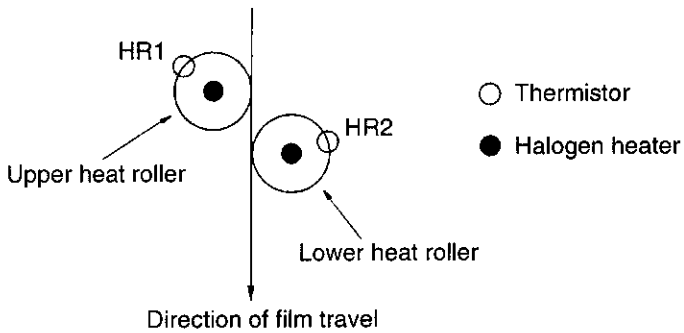
(7) Dryer temperature control READY

The READY condition occurs when processing period temperature control 2 is exercised for 1 minute to stabilize the dryer zone temperature after temperature buildup completion subsequent to film processor startup, temperature setting increase, or dryer temperature control error occurrence.

8.2.6 Heat Roller Temperature Control

(1) Heat roller arrangement

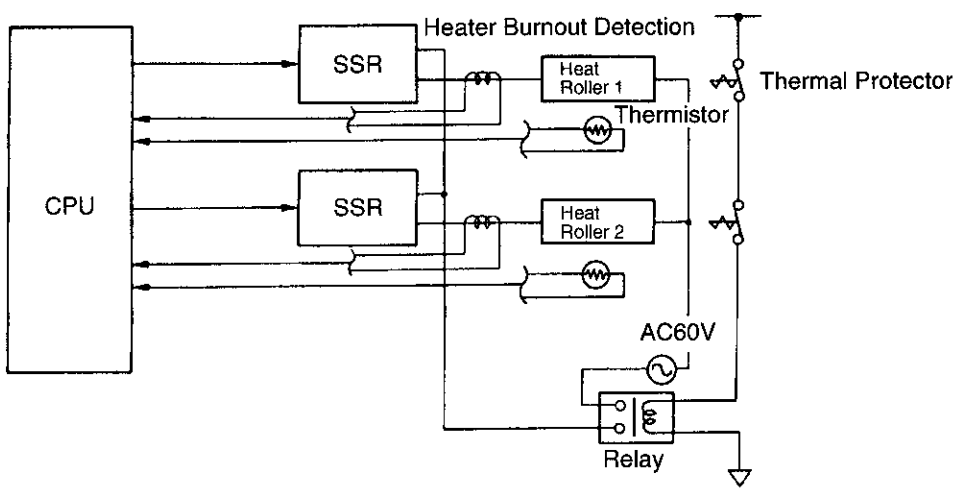
Two heat rollers are positioned rearward of the squeegee rack. The heat rollers have the same construction, but provide temperature control independently..



(2) Heat roller circuit overview

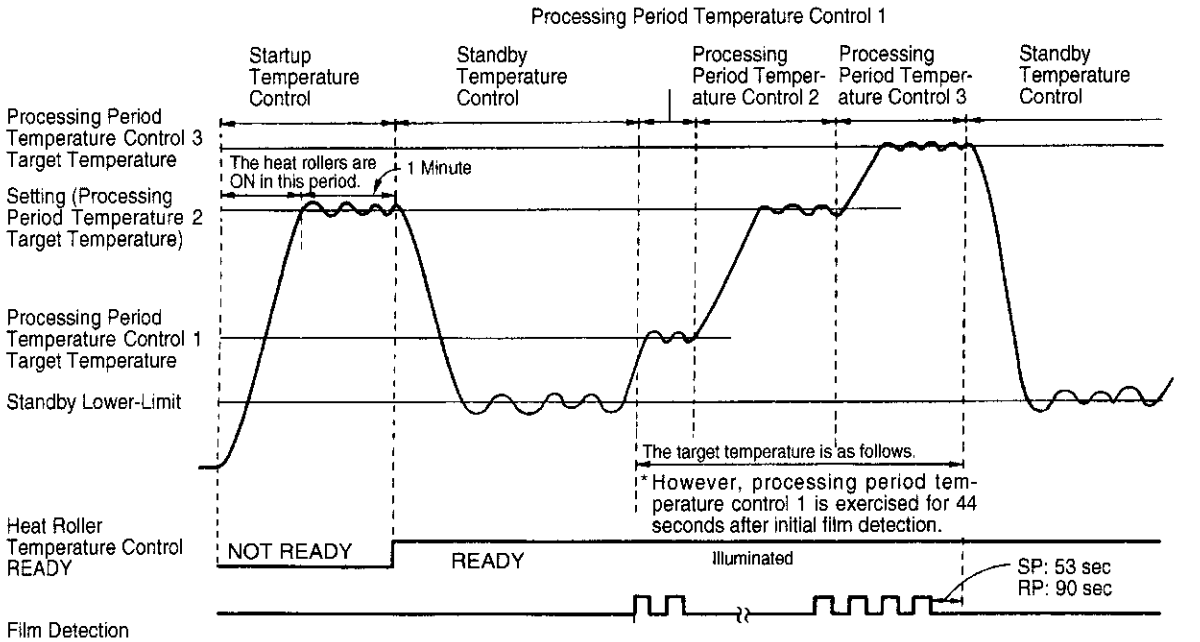
(a) A thermal protector is provided so that the circuit turns OFF when the temperature is unduly high. This information is set at the I/O port as the thermostat OFF signal.

(b) Thanks to the current detection function of the SSR, any heater burnout is detected by software.

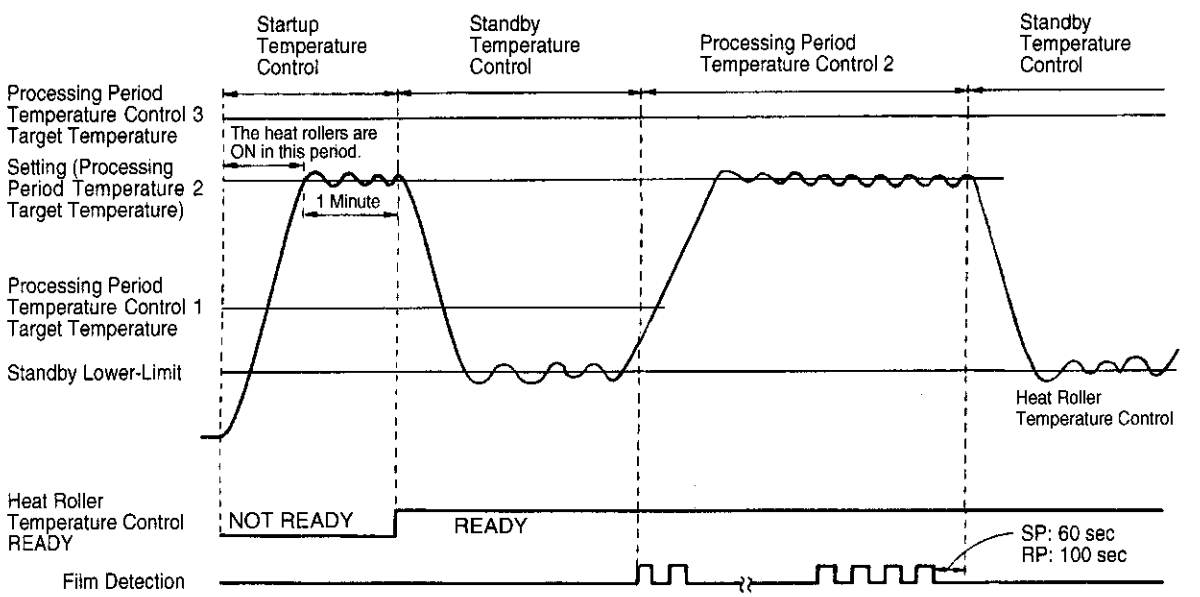


(3) The heat roller temperature control patterns.

(a) The heat roller temperature control system can be divided into four categories: startup, standby, processing period, and maintenance mode temperature control operations. When DIP switch SW1-3 is OFF, the diagram below shows the startup, standby, and processing period heat roller temperature control patterns.

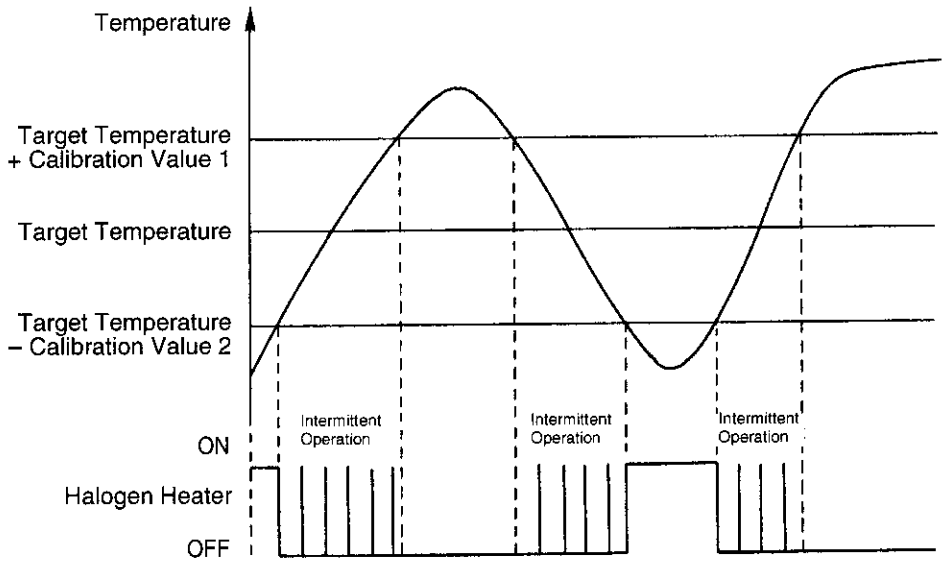


(b) When DIP switch1-3 is ON, processing period control 2 is exercised.

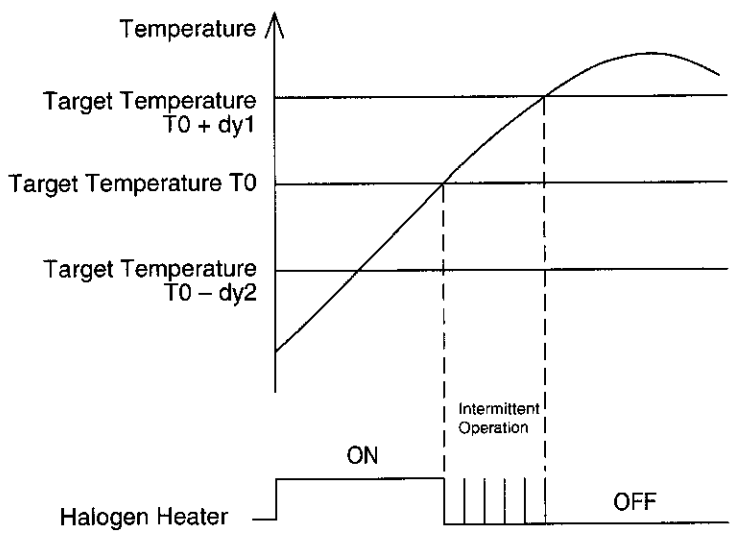


(4) Processing period temperature control is exercised variously by the heat rollers while the target temperature is automatically varied according to the processing volume.

Target temperature = temperature setting
+ processing period temperature control n (n = 1, 2, 3)



However, when the Unit starts, the halogen heater are ON until the heat roller temperature reaches the target temperature.



(a) To assure uniform film drying, processing period temperature control is exercised while the target temperature is automatically varied according to the processing volume.
{When DIP switch SW1-3 is OFF}

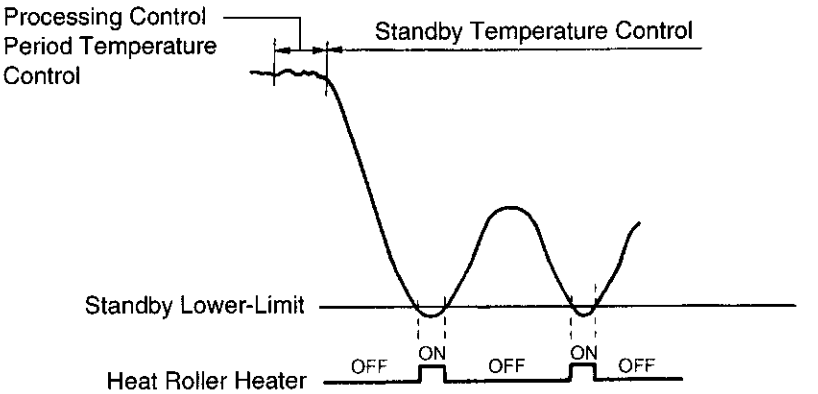
NOTE: *When DIP switch SW1-3 is ON, processing period control pattern 2 is exercised.*

Processing temperature control category	Last 3-minute procesing volume M(calculated in terms of 25.4 × 30.5cm(10×12 in.) film sheets)	Target temperature
Processing period temperature control 1	$M < 2$	Temperature setting – 3°C
Processing period temperature control 2	$2 \leqq M < 9$	Temperature setting
Processing period temperature control 3	$9 \leqq M$	Temperature setting + 2°C

The processing volume (number of film sheets) data is updated at 20-second intervals for the first 2-minute period and then at 1-minute intervals for the subsequent period.

(5) Standby temperature control

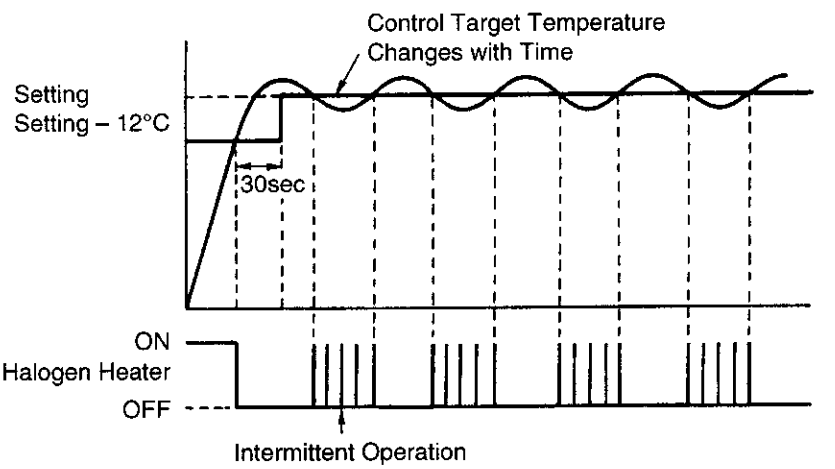
When the heat roller temperature falls below the standby lower-limit temperature, the halogen heater turns ON.



(6) Maintenance mode temperature control

Maintenance mode temperature control is needed for heat roller thermistor temperature calibrations. It does not involve dry fan operation.

To prevent any overshoot at startup, the target temperature is set at the setting minus 12°C for the first 30-second period after the setting minus 12°C is reached, and then reverted to the setting for the subsequent period.



(7) Heat roller temperature control READY

The READY condition occurs when processing period temperature control 2 is exercised for 1 minute after temperature buildup completion subsequent to film processor startup, temperature setting increase, or heat roller temperature control error occurrence.

8.2.7 Dryer Fan

The dryer fan is controlled as indicated below.

For the dryer temperature control process, see section 8.2.5, Dryer Temperature Control.

The dryer fan turns OFF when the dryer temperature ≦ 50°C and the temperatures of heat rollers 1 and 2 are not higher than 60°C.

The dryer fan turns ON when the dryer temperature is not lower than 55°C or the temperature of heat roller 1 or 2 is not lower than 65°C.

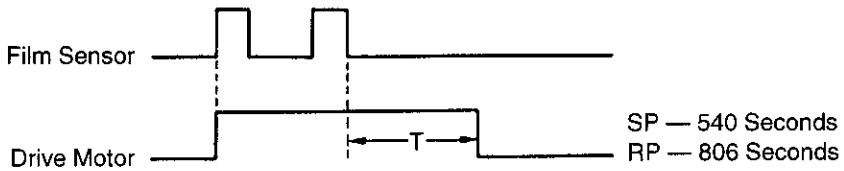
In case of maintenance mode, the dryer fan is controlled by the drying temperature which is not related to the heat roller temperature.

8.2.8 Drive Motor

(1) During film processing

The drive motor turns ON when film is detected by the feed sensor.

For the SP process, the drive motor turns OFF 540 seconds after film trailing end detection. As for the RP process, however, the drive motor turns OFF 806 seconds after film trailing end detection.



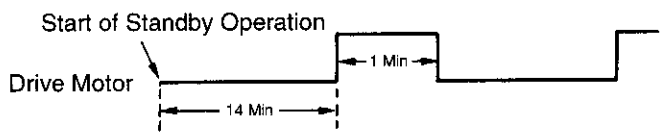
(2) Power-failure sequence

The drive motor turns OFF after 540-second-ON in the SP process or 806-second-ON in the RP process. → Energized

(3) Selftest bypass processing — ON

(4) Standby operation

In the standby state where no film processing is being conducted, the drive motor performs 15-minute-OFF and 1-minute-ON intermittent operations to prevent condensed chemical buildup or crystallization on rollers and gears.



The rotating speeds in various states are indicated below.

Table 1 Drive Motor Rotating Speed

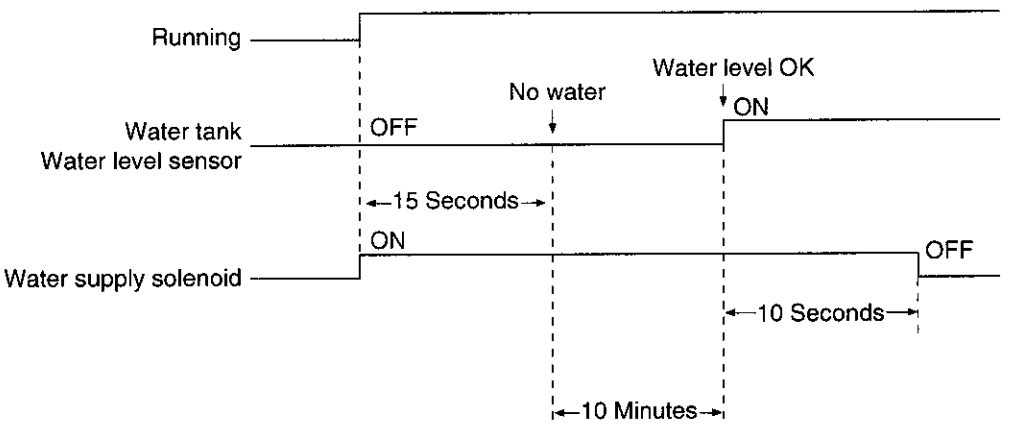
Purpose of drive motor rotation	Rotating speed		
	Preselected speed	SP	RP
Normal film processing	○		
Film discharge sequence	○		
Selftest bypass processing	○		
Standby operation intermittent drive			○
Crossover roller cleaning			○
Service mode "Drive Motor" "C/O RACK CLEANING"	○		

8.2.9 Water Supply Solenoid Valve

(1) Water tank water level retention

When operation starts (switched from OFF to ON), the water supply solenoid automatically turns ON for 15 seconds (the water level is first checked after 15 seconds).

If the water tank water level sensor does not activate after 15 seconds, the water supply solenoid remains ON for a period of up to 10 minutes. When the water tank water level sensor is activated during this period after the water has been supplied for 10 seconds the water supply solenoid is set to OFF.

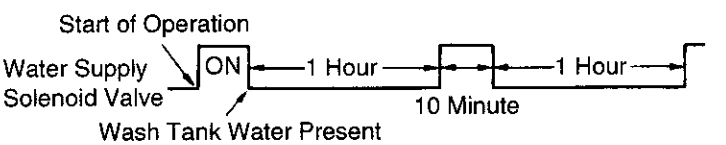


Purpose of Supplying Water to The Water Tank

- When the water level is detected above the water level mark, while the unit is ON, after the water has been supplied for 15 seconds the solenoid is set to OFF.
- If after 10 minutes have elapsed, the water level is still not detected above the water level mark, an error signal is sent and the water supply solenoid is set to OFF.

(2) During standby operation

To inhibit alga generation within the wash tank after completion of wash tank charging at the beginning of operation (1), the water supply solenoid valve repeats a 1-hour-OFF and 10-minute-ON cycle during standby operation.



When DIP switch SW1-6 is ON, the water supply solenoid valve also turns ON with the following timing. When the drive motor is turned ON at 15-minute intervals (as indicated in section 8.2.8-(4), the water supply solenoid valve turns ON.

(3) Water washing during film processing

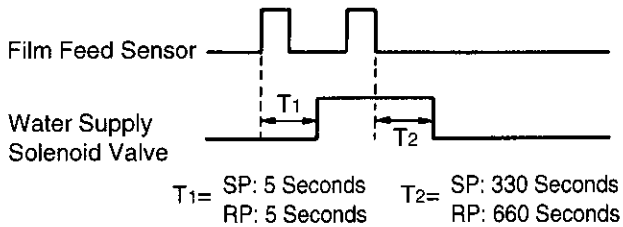
(a) When DIP switch SW1-6 is OFF

After film feed

The water supply solenoid valve turns ON 5 seconds after film feed (for both SP and RP).

After film trailing end detection

The water supply solenoid valve turns ON 330 seconds (for SP) or 660 seconds (for RP) after film trailing end detection.



(b) When DIP switch SW1-6 is ON

The water supply solenoid valve is always ON.

(4) During selftest bypass processing, the water supply solenoid valve is ON.

(5) While the "water supply" function is executed in the service mode, the water supply solenoid valve is ON.

(6) For the water supply solenoid valve operation during water drainage, see section 8.2.10, Water Drain Solenoid Valve.

8.2.10 Water Drain Solenoid Valve

(1) In water drainage sequence

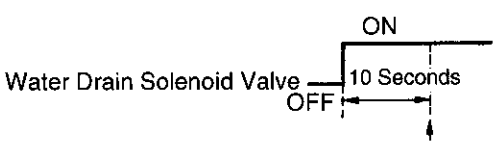
The water drain solenoid valve operates in the following processes.

Stop process

Preheat operation

(a) When DIP switch SW1-4 is OFF (one water drainage operation)

However, the water drainage operation starts 10 seconds after completion of the stop process or the preheat operation.



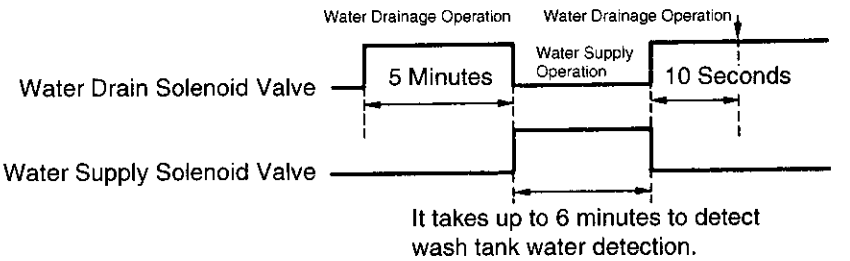
The power can be turned OFF

(The water drainage operation continues even after power OFF).

(b) When DIP switch SW1-4 is ON (water drainage → water supply → water drainage)

Switch 1-4 should normally be placed in the ON position.

The power can be turned OFF (The water drainage operation continues even after power OFF).



(If wash tank water detection does not take place within 6 minutes, the system aborts this water supply operation and switches to the next water drainage operation.)

(2) While the film processor is energized, the water drain solenoid valve is open. However, if the water drainage process is interrupted by an error or other problem and then the film processor is energized again, the water drain solenoid valve closes.

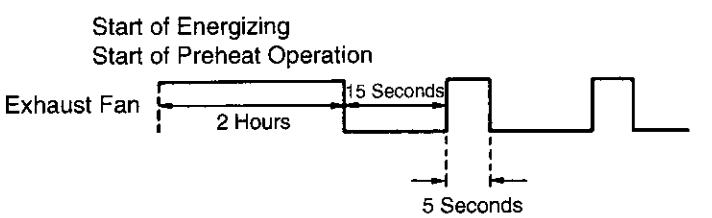
(3) While water drainage is not being implemented during preheat operation, the water drain solenoid valve is open.

(4) In maintenance or service mode
When the film processor enters the maintenance or service mode, the water drain solenoid valve opens.
The valve opens and closes in accordance with the "water drain" setup.
When the film processor exits the maintenance or service mode, the valve opens.

8.2.11 Exhaust Fan

(1) During power-failure sequence, standby operation, film processing, stop process, or selftest bypass processing, the exhaust fan is ON.

(2) When the film processor is energized and the preheat operation started, the exhaust fan is ON for the first 2 hours. Subsequently, however, the exhaust fan repeats 15-second-OFF and 5-second-ON intermittent operations.



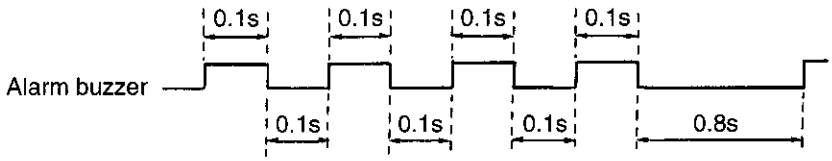
(3) In the maintenance mode and service mode, the exhaust fan is OFF.

8.2.12 ALARM Buzzers

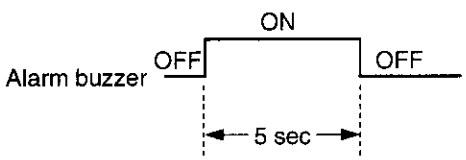
Two alarm buzzers are used. One is for the feed end and the other for the dryer side (Option).

(1) Alarm buzzer operation performed upon error occurrence
When an error occurs, an alarm buzzer continuously sounds. It stops sounding at the press of the alarm OFF key.

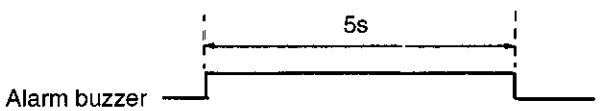
(a) Alarm buzzer operation performed upon "serious" or "minor" level error (error codes beginning with the letter E) occurrence



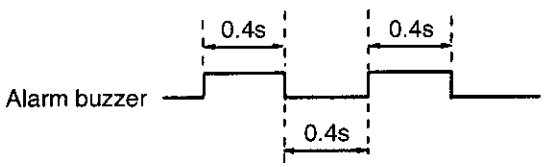
(b) Alarm buzzer operation performed upon "warning" level error (error codes beginning with the letter W) occurrence



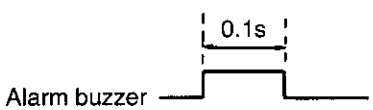
(2) Alarm buzzer operation performed when the Power switch is pressed during film processing



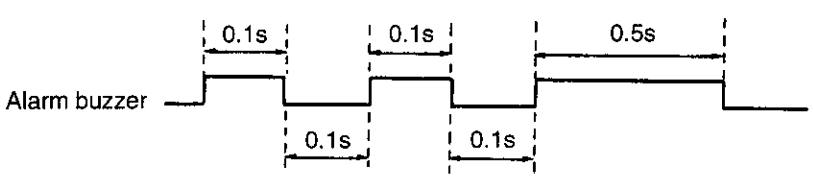
(3) Alarm buzzer sounding to indicate the readiness to accept film input during film processing



(4) Alarm buzzer operation performed upon key activation (including the situations where service, or maintenance mode entry signal input is accepted)
The alarm buzzer sounds for 0.1 second.



(5) Alarm buzzer operation performed when the cumulative replenishment amount and error log clear signal input is accepted



8.2.13 READY Conditions

READY Conditions

		Standby operation Film processing	Selftest bypass processing	Other
READY conditions	No film is detected by the film feed sensor. Also, the specified delay time has passed after film trailing end detection.	★ (— for I/F OUT3)	—	—
	The POWER LED is lit. • No "serious" level error has occurred. • The POWER switch is not OFF.	★		
	The READY condition is indicated by the developer temperature control system.	★		
	The READY condition is indicated by the fixer temperature control system.	★		
	The READY condition is indicated by the dryer temperature control system.	★		
	The READY condition is indicated by the heat roller 1 temperature control system.	★		
	The READY condition is indicated by the heat roller 2 temperature control system.	★		
	The wash tank is ready.	★		
READY state output	READY lamp	○ (OFF upon E350 occurrence)	Always ON (OFF upon E350 occurrence)	Always OFF
	I/F OUT2	○ (OFF upon E350 occurrence)		
	I/F OUT3	○ (OFF upon E350 occurrence)		

[Legend]

★ Considered as a readiness judgment criterion.

— Not considered as a readiness judgment criterion.

○ ON when the READY condition is considered to be established (OFF upon E350 occurrence).

[Other] The stop process, the electrically charged, the power-failure process.

8.3 LED Indication Descriptions

LED type	LED control	
POWER LED	Steady glowing	Standby operation, film processing, selftest bypass processing, preheat operation
	Blinking	During the interval between POWER switch OFF and stop process completion. Power-failure process. Upon "serious"level error occurrence.
READY LED	Steady glowing	When the READY condition is established (see the section on READY).

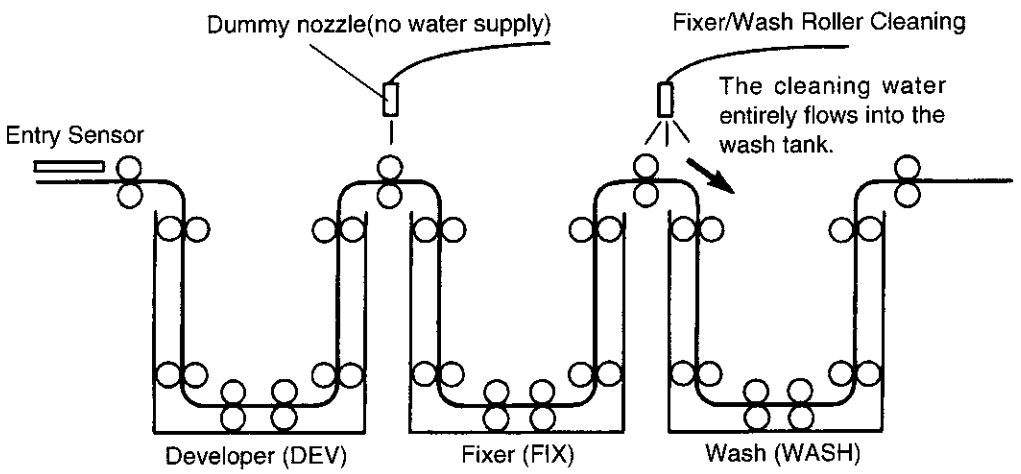
8.4 Crossover Roller Cleaning Function Descriptions

8.4.1 Objective

When film is transported, the developer and fixer solutions remaining on the film deposit on crossover rollers. In the fixer/wash crossover section, the fixer solution precipitate on rollers may transfer to film. The crossover roller cleaning function is exercised to remove such chemical deposits from the crossover rollers with a view toward preventing smudged or irregular film image outputs from being generated.

8.4.2 Fixer/Wash Crossover Rack Roller Cleaning Positions

The fixer/wash crossover rack roller mounting positions and cleaning pump and cleaning water injection positions are shown below.



8.4.3 Fixer/Wash Crossover Roller Cleaning Method

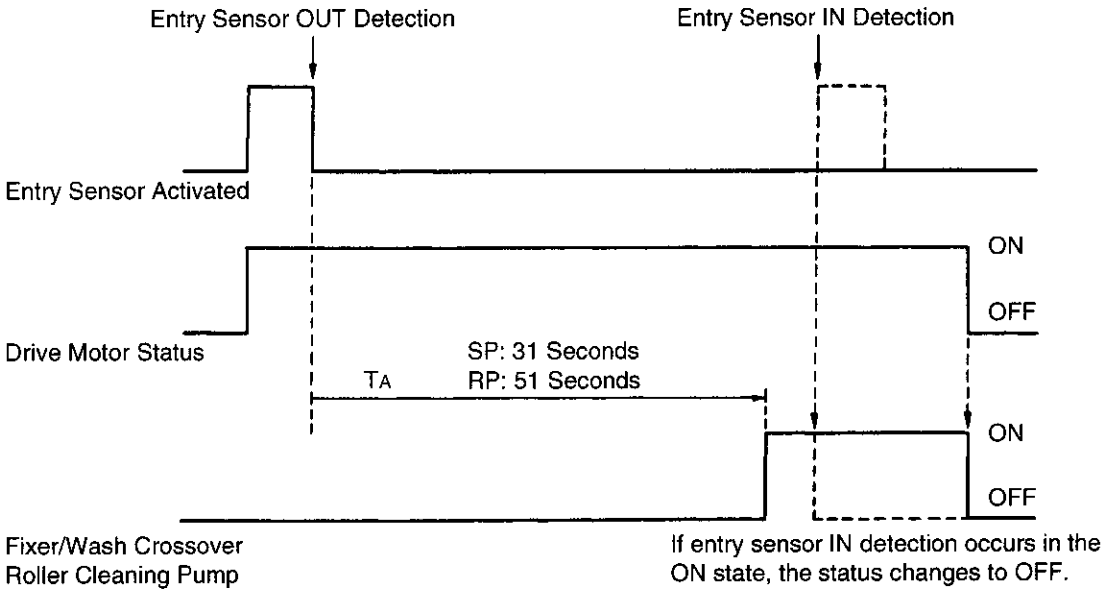
Fixer/wash crossover roller cleaning begins immediately after film passage completion to wash the fixer solution away from the fixer/wash rollers. This cleaning operation is also performed at about 15-minute intervals during standby so as to prevent fixer solution precipitate buildup on the next processed film. The conditions for fixer/wash crossover roller cleaning function execution are detailed below.

(1) Start conditions
- This cleaning function is executed for normal standby and film processing operations only. (It is not executed for selftest bypass processing or maintenance mode film processing operations.)
- While film processing is being conducted, cleaning starts when no film IN (film input) is detected at the entry for a period of TA after film OUT (film output) detection at the entry.
- While a standby operation is being conducted, cleaning takes place at the beginning of drive motor idling (the drive motor performs a 1-minute operation at 14-minute intervals during standby operation).

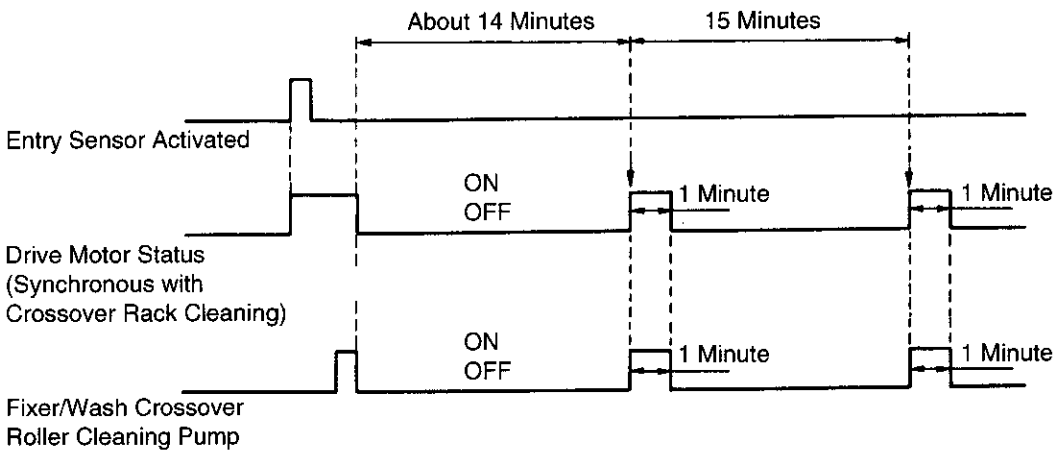
(2) Termination conditions
- While a film processing is being conducted, cleaning terminates upon entry sensor IN detection or drive motor stoppage.
- While a standby operation is being performed, cleaning terminates upon drive motor stoppage.

(3) Cleaning operation descriptions
- The fixer/wash crossover roller cleaning pump intermittently operates during the above indicated periods to carry out cleaning.

<Intermittent Operation>



Fixer/Wash Crossover Roller Cleaning Sequence (during Film Processing)



Fixer/Wash Crossover Roller Cleaning Sequence (during Standby Process)

NOTE: *When developer/fixer crossover roller cleaning pump turns ON in synchronism with fixer/wash crossover roller cleaning pump ON during the standby process, fixer/wash crossover roller cleaning is performed subsequently to developer/fixer crossover roller cleaning. If the top cover is open at the beginning of developer/wash crossover roller cleaning, the system does not start cleaning until the top cover is closed. If the top cover is opened when the fixer/wash crossover roller cleaning pump is already ON, the cleaning process pauses and then restarts upon top cover closure.*

8.5 Replenishment Specification

8.5.1 Scope of the Specification

This specification establishes the replenishment and replenishment pump control procedures.

8.5.2 Function of Replenishment

(1) Working solution supply

The processing tanks are filled with working solutions when the processor is installed or when processing solutions are replaced.

(2) Morning replenishment

The tank solution level falls because of solution loss by evaporation during the stopping of operation. It may fall below the position of the tank solution level sensor installed in the processing tank. If the operation is resumed in this condition, film is processed unevenly. Morning replenishment prevents such uneven film processing and heater operation at no load.

(3) Topping-up

During standby or prolonged preheating the tank solution level may fall below the position of the tank solution level sensor installed in the processing tank because of solution loss by evaporation. Film is processed unevenly in this condition. The tank solution is topped up to prevent such uneven film processing.

(4) Working Solution Replenishment

When processing is continued with the same working solutions, they become exhausted so that the photographic properties of film and the quality of fixation are impaired. When the working solutions are exhausted beyond certain limits, film can no longer be developed. To prevent this condition, the working solutions are replenished after processing of a given film area.

(5) Fixed-time Replenishment

At the time of shipment from the factory or after the replacement of replenishment pumps at labs, the pumps need calibration for errors in pump delivery. To make this calibration, each replenishment pump is operated for a fixed time.

(6) Checking Replenishment (Manual Replenishment)

During film processing the working solutions are replenished at a rate related to the area of film processed. The need of emergency film processing may arise when the film insertion sensor which is needed to calculate the area of film processed is at fault. This operation is called selftest bypass processing. Since selftest bypass processing is performed on the premise that the film insertion sensor is out of order, the working solutions are not replenished. During selftest bypass processing, therefore, the working solutions need to be replenished manually at a rate of one cycle of replenishment per ten 10"×12" (25.4×30.5 cm) films.

8.5.3 Specification of the Hardware (Including the Processing Chemicals)

(1) The working solutions should be replenished with chemical solutions prepared according to the chemical solution formulas.

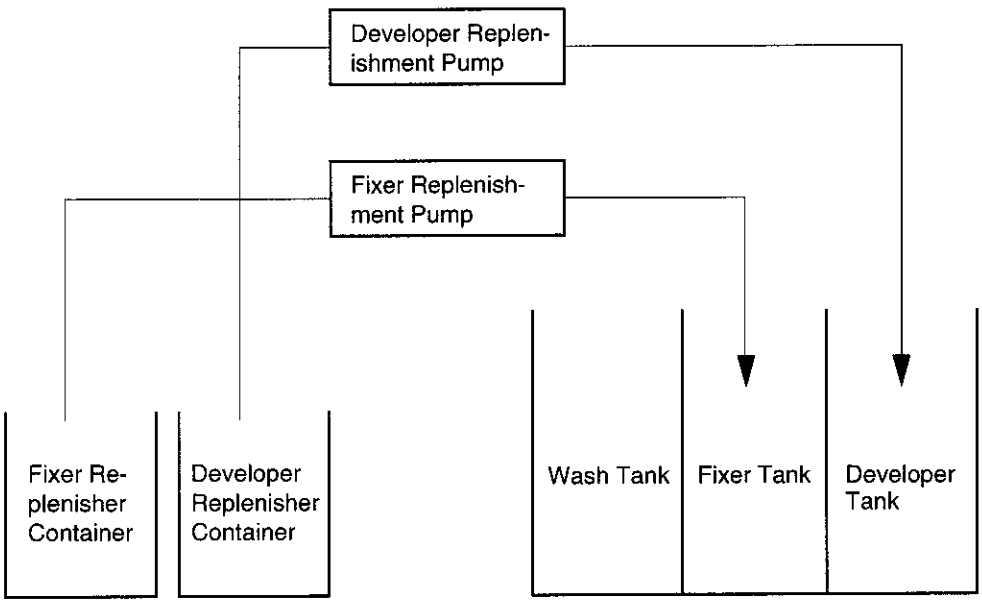


Fig. 1. Replenishment System

(2) Each tank is provided with one tank solution level sensor. It is located near the level of overflow which is determined such that uneven processing is avoided. It is actually positioned slightly below the level of overflow, however, to avoid sensor actuation variability that would result if the sensor should be located at the level of overflow.

8.5.4 Premises and Limitations

(1) The operation of the replenishment pumps is controlled such that they are timed at the start of each cycle of operation.

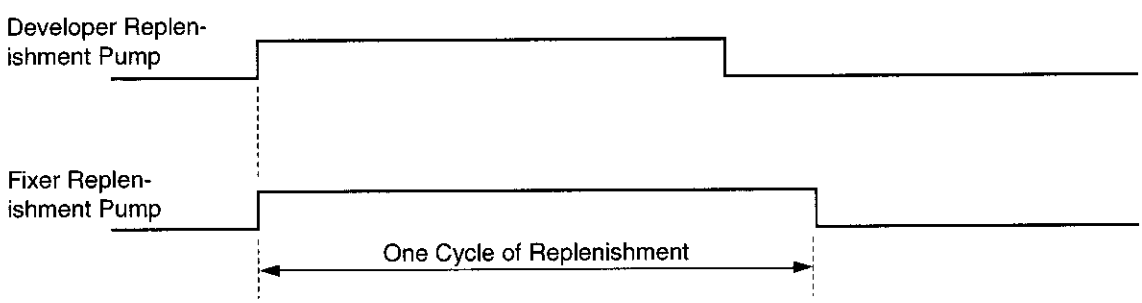


Fig. 2. Control of Replenishment Pump Operation on One Cycle of Replenishment

Table 1. Rate of Replenishment in Topping-up

USA EUROPE
Ordinary film
One cycle of replenishment per four 25.4×30.5 cm (10×12 in.) films

NOTE: *On models destined for the U.S. the rate of replenishment is set at one cycle of replenishment per one 35.6×43.2 cm (14×17 in.) film, and on models destined for Europe it is set at one cycle of replenishment per five 25.4×30.5 cm (10×12 in.) films. On both models, however, the working solutions are topped up at a rate of one cycle of replenishment per four 25.4×30.5 cm (10×12 in.) films.*

(3) The lengths of operation of the replenishment pumps have been determined, as shown in Table 2.

Table 2. Initial Lengths and Amounts of Replenishment

Replenishment Pump	USA		EUROPE	
	Lenghs of Replenishment (Fixed-time replenishment	Amount of Replenishment (initial calibration value)	Lenghs of Replenishment (Fixed-time replenishment	Amount of Replenishment (initial calibration value)
Developer	13.6 sec	180.0 m ℓ	13.6 sec	180.0 m ℓ
Fixer	18.1 sec	240.0 m ℓ	18.1 sec	240.0 m ℓ

- When the rate of replenishment is corrected to compensate for a difference in individual pump capacity, the length of replenishment is varied so that the amounts of replenishment shown in Table 2 may be obtained.

(4) The amounts of replenishment per cycle of replenishment pump operation have been determined, as shown in Table 3.

Table 3. Amounts of Replenishment per Cycle of Replenishment Pump Operation in Relation to Type of Replenishment

Type of Replenishment	Amount of Replenishment per Cycle of Replenishment Pump Operation	
	USA	EUROPE
Morning replenishment	250m ℓ	250m ℓ
Topping-up	Setting (m ℓ) × 2	Setting (m ℓ) × 4/5
Solution Level Upkeep Replenishment	250mÎ	250m ℓ
Working Solution Replenishment	Setting (m ℓ) × 2	Setting (m ℓ) × 4/5
Working Solution Supply	250m ℓ	250m ℓ
Fixed-time Replenishment	The replenishment pump is operated for the time (fixed) shown in Table 2.	The replenishment pump is operated for the time (fixed) shown in Table 2.
Checking Replenishment	The working solution is replenished by the amount of replenishment shown in Table 2.	The working solution is replenished by the amount of replenishment shown in Table 2.

(5) When a demand for stopping (error or other cause) has arrived, replenishment is stopped upon completion of one cycle of replenishment.

(6) When the operation is stopped for the day before the time of replenishment, the throughput for the day is recorded and is added to the next day's when checking the timing of replenishment the following day.

8.5.5 Control Specification

(1) Morning Replenishment

When no developer or fixer is detected when the power switch is turned ON, one cycle of replenishment (see Table 4) is performed. Replenishment is continued until developer or fixer is detected by the tank solution level sensor, provided that the maximum replenishment amount of 750 m ℓ is not exceeded. If no tank solution is detected after replenishment of 750 m ℓ , then a demand for an error signal (empty tank) is issued and the operation is stopped.

(2) Topping-up

- When the film area (Table 1) is detected by the film insertion sensor, then one cycle of replenishment (Table 3) is performed for both developer and fixer.
- This type of replenishment is performed during standby or film processing, but not during selftest bypass processing.

(3) Solution Level Upkeep Replenishment

- This type of replenishment is performed during standby, film processing or preheating.
- When developer or fixer is not detected by the tank solution level sensor before the lapse of 3 hours after replenishment (topping-up, solution level upkeep replenishment or working solution replenishment), then a demand for an error signal (empty tank) is issued and the operation is stopped. When developer or fixer is not detected by the tank solution level sensor after the lapse of 3 hours or no topping-up or solution level upkeep replenishment is performed after warm-up, one cycle of replenishment (Table 3) is performed. Replenishment is continued until developer or fixer is detected by the tank solution level sensor, provided that the maximum replenishment amount of 750 m ℓ is not exceeded. If no tank solution is detected after replenishment of 750 m ℓ , then a demand for an error signal (empty tank) is issued and the operation is stopped.

- An excess amount of 250 m ℓ is replenished after tank solution is detected by the tank solution level sensor during solution level upkeep replenishment.

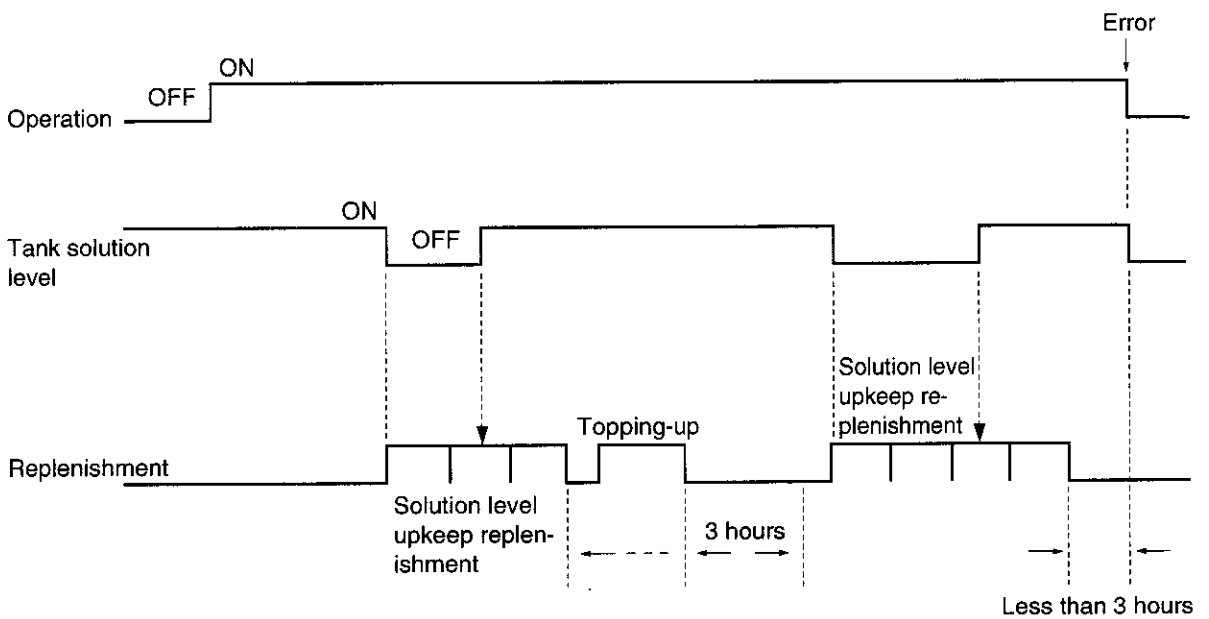


Fig. 3. Solution Level Upkeep Replenishment

(4) Working Solution Replenishment

- When REPL key is turned on for 1 second during operation, one cycle of replenishment is performed.
- If the developer and fixer tank solutions are detected by the tank solution level sensors, when REPL key is turned on for 1 second during the operation is stopped one cycle replenishment is performed.
- If the developer or fixer tank solution is not detected by the tank solution level sensor, when REPL key is turned on for 1 second during the operation is stopped the replenishment is performed until the tank solution is detected by the tank solution level sensor (see (5) Working Solution Supply).

(5) Working Solution Supply

- Either developer or fixer tank solutions is not detected by the tank solution level sensors, when REPL. key is turned on for 1 second during operation, working solution supply is started.
- One cycle of replenishment (Table 3) is performed in the developer and fixer tanks, and replenishment is stopped when tank solution is detected by the tank solution level sensor. The circulation pumps are then operated for 1 minute to agitate the solutions. If tank solution is not detected, then another cycle of replenishment is performed. Working solution supply is completed when tank solution is detected after the second cycle of replenishment (see 8.2.3 Circulation Pump).

(6) Fixed-time Replenishment

- When the fixed-time replenishment timer is turned ON, the replenishment pump operates for one cycle of replenishment. (The replenishment pump is corrected according to the amount of replenishment.)
- When the fixed-time replenishment timer is turned OFF during replenishment, it is stopped upon completion of one cycle of replenishment following the turn-off of the fixed-time replenishment timer.

(7) Checking Replenishment

- When the checking replenishment timer is turned ON, the replenishment pump operates for one cycle of replenishment. (The correction value is checked for correctness based on the amount of replenishment.)
- When the checking replenishment timer is turned OFF during replenishment, it is stopped upon completion of one cycle of replenishment following the turn-off of the checking replenishment timer.

(8) Replenishment Rate Calculation

The types of replenishment that need replenishment rate calculation are shown in Table 4.

Table 4. Types of Replenishment Needing Replenishment Rate Calculation

Type of Replenishment	Replenishment Rate Calculation
Morning replenishment	○
Topping-up	○
Solution level upkeep replenishment	○
Working solution replenishment	○
Working solution supply	○
Fixed-time replenishment	×
Checking replenishment	×

○ : Replenishment rate is calculated.
× : Replenishment rate is not calculated.

<Timing of replenishment rate clearing>

- RAM clearing
- Clearing by mode selection

(9) Number of Films for Area-related Replenishment

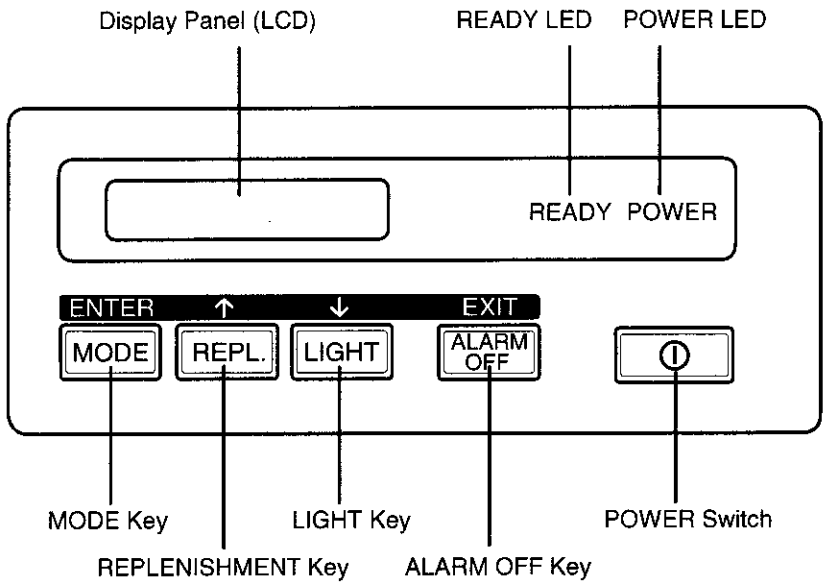
- When the working solutions cannot be topped up for one reason or the other, 10 cycles of replenishment are set on the machine. When the normal topping-up operation is resumed, the pre-set cycles of replenishment is performed one by one (counting down the number of pre-set cycles of replenishment except in fixed-time replenishment and checking replenishment).
- The number of cycles of replenishment set on the machine is cleared in the following conditions.
  - RAM clearing
    (RAM should be backed up to prevent clearing after turn-off of the power.)
  - Clearing by mode selection

OPERATION MODE DESCRIPTIONS

9. OPERATION MODE DESCRIPTIONS

9.1 Hardware Structure

9.1.1 Operational Panel External View



9.1.2 Component Functions

- Display panel (backlight [yellowish-green]) [16 characters x 2 lines]
  Displays the film processor status, error information, individual mode operating steps, and other relevant instructions.
  * Backlight operations
    Extinguished : The film processor is in the "Power ON" period.
    Illuminated : The film processor is engaged in operation, error handling, or particular mode function execution.

- POWER (green LED)
  Indicates the film processor status.
    Steady glowing : The film processor is operating.
    Blinking : The system is trying to stop the film processor.
    Extinguished : The film processor is in the "Power ON" period, service mode, or maintenance mode.

- READY (green LED)
  Indicates whether the film processor is ready.
    Steady glowing : The film processor is ready for film processing.
    Extinguished : The film processor not ready for film processing.

• POWER switch
Effects operation ON/OFF changeover.

• [ALARM OFF] key (refer to the [EXIT] key)
1. Silences the Alarm buzzer when it sounds.
2. Clears existing errors (beginning with the latest error).
3. While the setup mode operation is being conducted, this key functions as the EXIT key.

• [LIGHT] key (refer to the [↓] key)
1. Turns OFF the LCD backlight.
2. While the setup mode operation is being conducted, this key functions as the [↓] key. (When held down in an input value editing sequence, this key continuously varies the value.)

• [REPL] key (refer to the [↑] key)
1. When held down for a period of longer than 1 second in the "Power ON" period, the replenishment solution supply sequence starts. (When the key is held down again for a period of longer than 1 second, the replenishment solution supply sequence is aborted.)
2. When held down for a period of longer than 1 second during operation, the replenishment solution supply sequence starts. The preselected amounts of replenishment solutions (developer and fixer) are replenished in this sequence.
3. While the setup mode operation is being conducted, this key functions as the [↑] key. (When held down in an input value editing sequence, this key continuously varies the value.)

• [MODE] key (refer to the [ENTER] key)
1. Used to effect setup mode switching.
2. While the setup mode operation is being conducted, this key functions as the [ENTER] key.

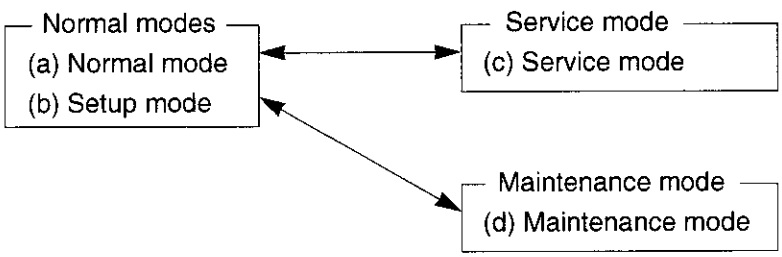
9.2 Operation Mode Structure

9.2.1 Panel Modes

The panel modes are roughly classified into the following three categories.

1. Normal modes
   Used to effect film processor operation changeover or confirm or edit setup data.
2. Service mode
   Used to clean the film processor.
3. Maintenance mode
   Used for film processor tuning and functional testing.

The mode structure is schematized below.



(a) Normal mode
- Operation ON/OFF changeover at the press of the POWER switch
- Developer/Fixer replenishment and supply
- Alarm buzzer stop and error clearing
- Display Panel (LCD) backlight ON/OFF

(b) Setup mode
- Processing speed change
- Temperature setup change and measured temperature display
- Replenishment amount setting change
- Weekly timer setup change
- Selftest bypass processing
- Preheat operation
- Accounting of film/clearing data
- Accounting of replenishment/clearing data
- Calender/Clock Setting
- READY status display

(c) Service mode (service mode entry is achievable in the "Power ON" period only)
- Water drainage
- Water charging
- Circulation
- Drive
- Roller cleaning

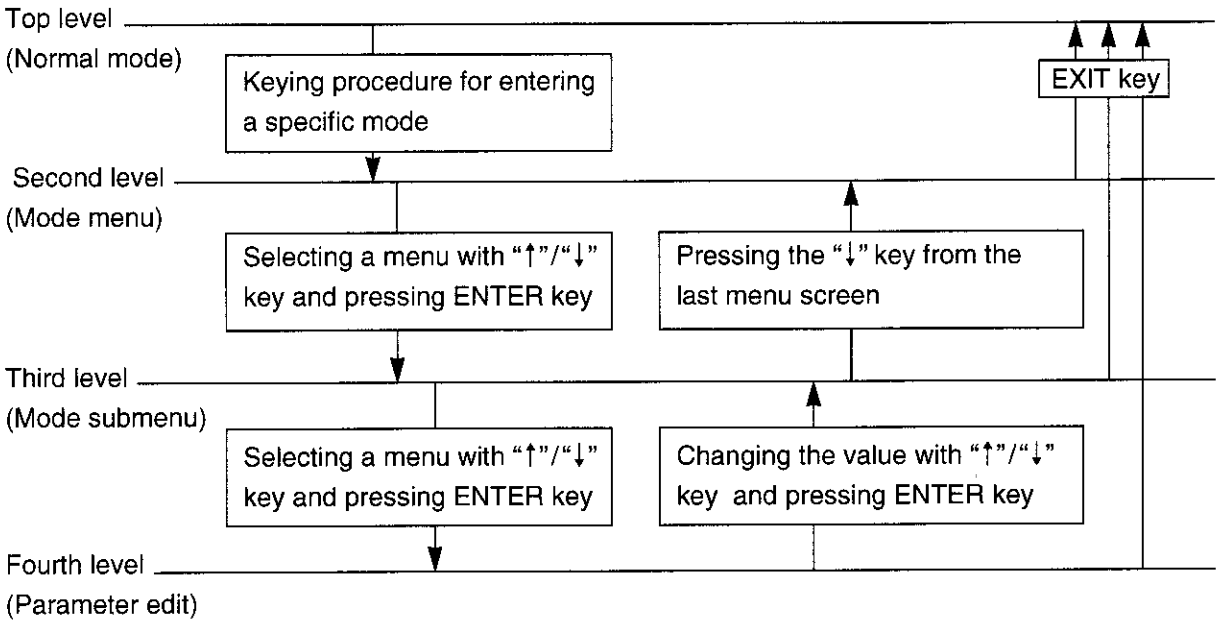
(d) Maintenance mode (maintenance mode entry is unachievable during film processing)

- Error log display
- Feed sensor voltage display
- Sensor OFF setup
- Sensor status information
- I/O display
- Load independent drive
- Dryer section temperature information
- Temperature correction
- Replenishment pump correction
- LCD backlight setup
- Operating time display/clear
- ROM version display

9.3 Screen Hierarchy

Multiple levels of screens are provided. Top-level screen transitions take place in accordance with the film processor internal process.

9.3.1 Switching from One Screen Level to Another



Supplementary explanation of individual levels

- Top level
  Normal mode screen.
  Indicates the film processor operating status.

- Second level
  Mode menu selection screen.
  Shows function menus of individual modes.
  Example: Temperature setup, replenishment correction, etc.

- Third level
  Mode submenu selection screen.
  Shows subdivided function menus.
  (In the case of some functions, the fourth level appears subsequently to the second level.)
  Example: Processing speed setup.

- Fourth level
  Parameter edit screen.
  Used to edit the parameter values displayed by second or third level screens.

9.3.2 Mode Switching Procedures

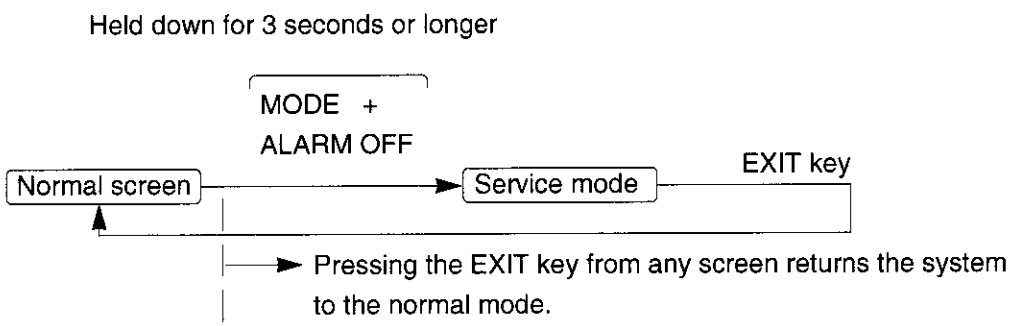
9.3.2.1 Switching to a Mode Accessible to Users [Setup Mode]

When the MODE key is held down for a period of 3 seconds or longer from a normal screen, the system switches to the setup mode.

* Pressing EXIT key from any screen returns the system to the normal mode.

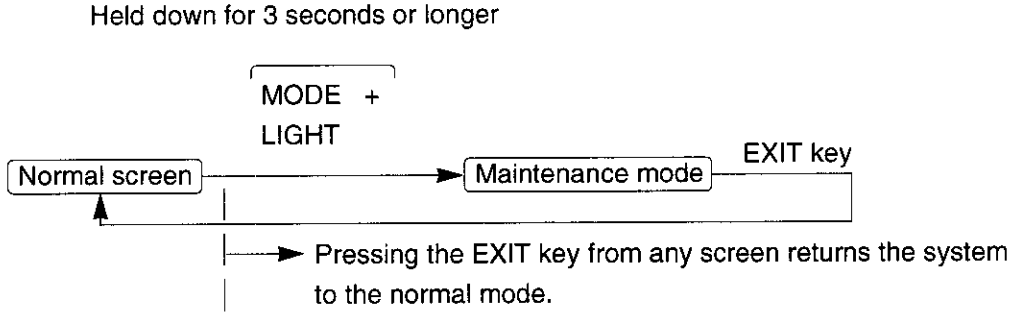
9.3.2.2 Switching to a Mode Inaccessible to Users 1 [Service Mode]

When the ALARM OFF key is held down for a period of 3 seconds or longer with the MODE key held down from a normal screen, the system switches to the service mode.



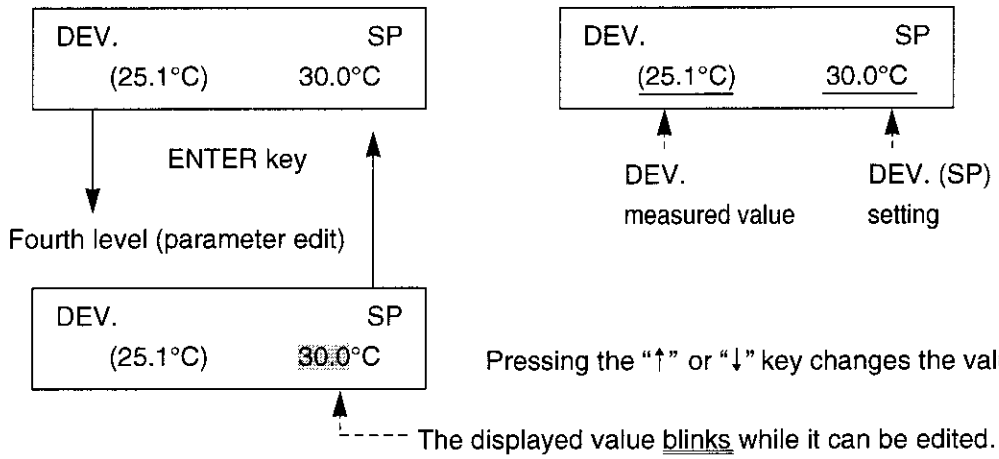
9.3.2.3 Switching to a Mode Inaccessible to Users 2 [Maintenance Mode]

When the LIGHT key is held down for a period of 3 seconds or longer with the MODE key held down from a normal screen, the system switches to the maintenance mode.



9.3.3 Setting Change Procedure Example (Developer Temperature Setup in Setup Mode)

Third level (submenu)Supplement



(a) Key definitions

"↑" key :

Increments the blinking data value. When the key is pressed after the upper-limit value is reached, the setting changes to the lower-limit value and is incremented at the press of the "↑" key.

"↓" key :

Decrements the blinking data value. When the key is pressed after the lower-limit value is reached, the setting changes to the upper-limit value and is decremented at the press of the "↓" key.

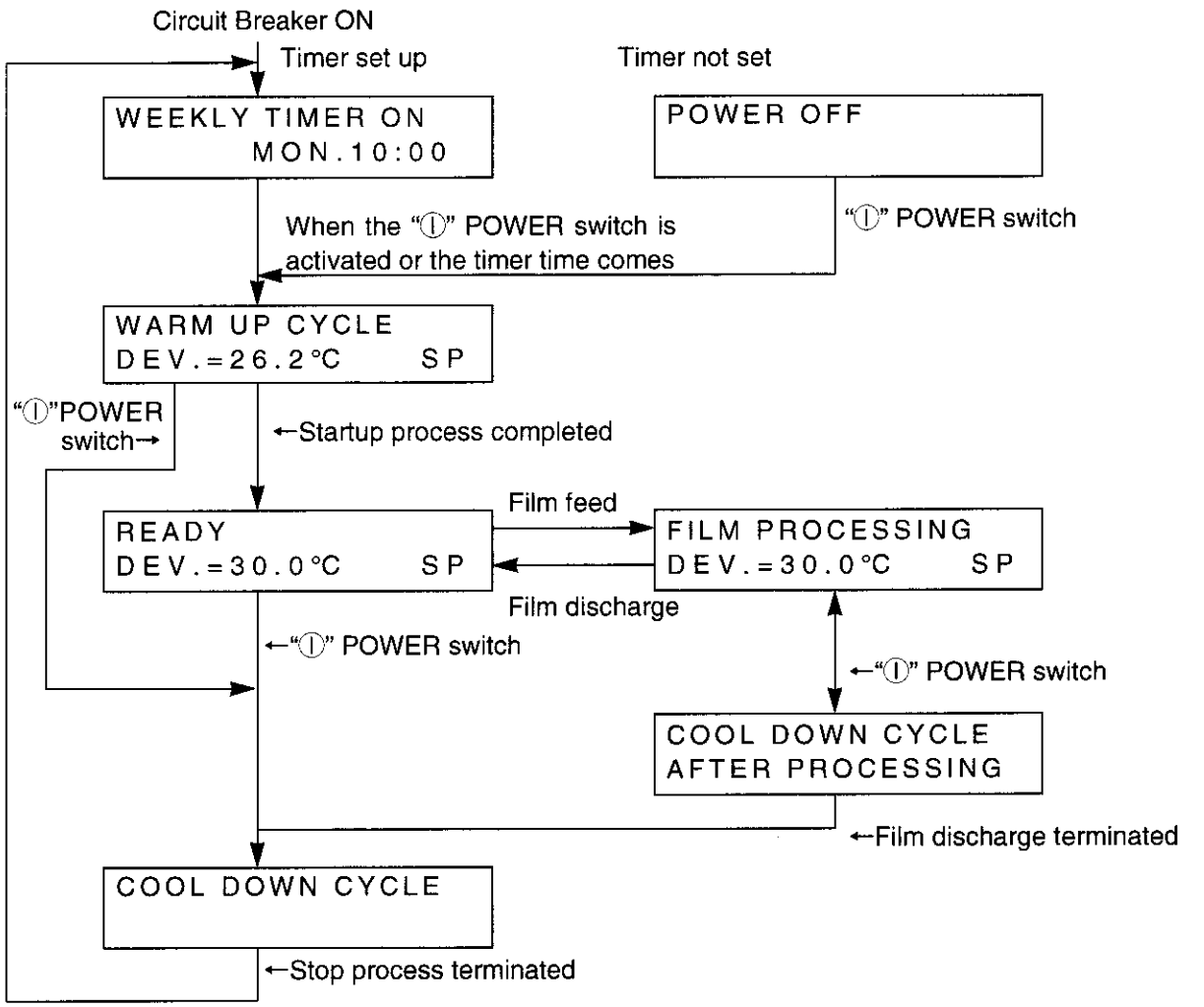
ENTER key :

Finalizes the value entry or effects screen level changeover.

9.4 Normal Mode

In the normal mode, the display panel shows the film processor status and displays the weekly timer setup, developer solution temperature, and processing speed.

9.4.1 Screen Transition



* When the REPL. key is held down for a period of 1 second or longer while a normal mode screen displayed, the system initiates developer/fixer replenishment or supply. When replenishment starts, the system switches to the following screen. When the REPL. key is held down again for a period of 1 second or longer or the replenishment sequence is terminated, the system returns to the film processor status display screen.

Developer/ Fixer replenishment period screen

REPLENISHING

Developer/ Fixer supply period screen

TANK(S) FILLING

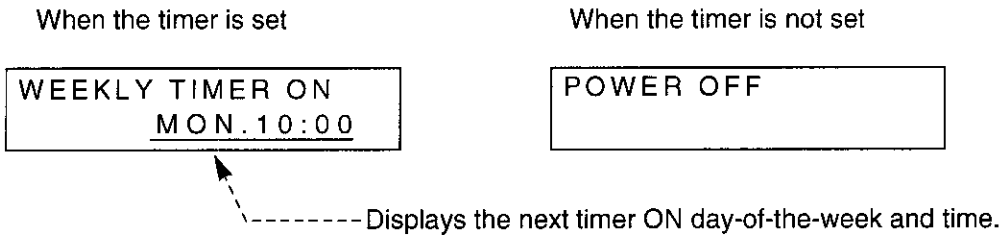
The developer/fixer solution supply function is executed only when the processing tank solution level is too low at the time of "Power ON." In the other situations, the developer/fixer replenishment process is performed instead.

9.4.2 On-screen Information

(1) "Power ON" period screen

While the film processor is inactive, the following is displayed.

Pressing the "Ⓘ" POWER switch causes the system to switch to the "Startup process screen."

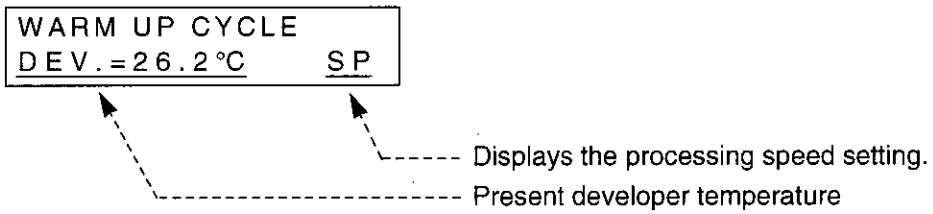


(2) Startup process screen

While the film processor is starting up, the following is displayed.

When the film processor is ready for film processing, the system switches to the "Film processing readiness screen."

Pressing the "Ⓘ" POWER switch causes the system to switch to the "Stop process screen."

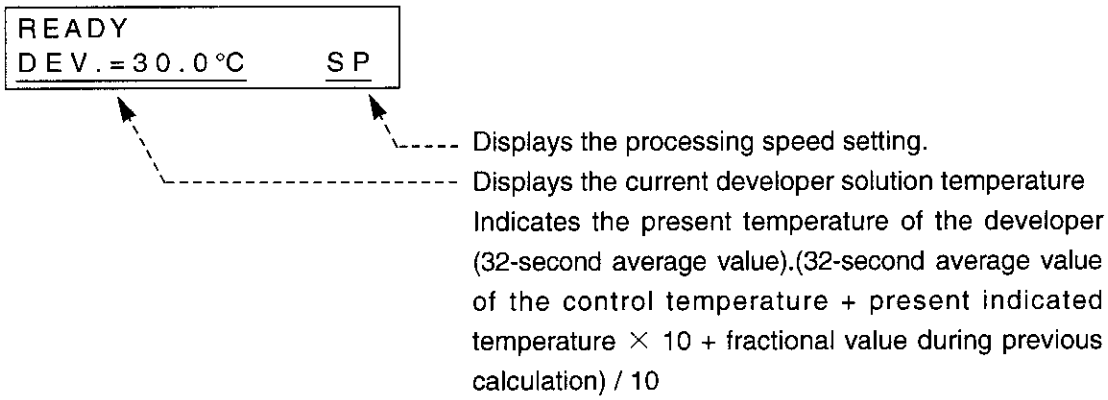


(3) Film processing readiness screen

While the film processor is ready for film processing, the following is displayed.

When film is fed, the system switches to the "Film processing screen."

Pressing the "Ⓘ" POWER switch causes the system to switch to the "Stop process screen."

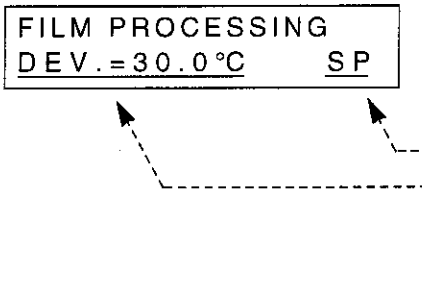


(4) Film processing screen

While the film processor is engaged in film processing, the following is displayed.

When the film discharge drive comes to a stop, the system switches to the "Film processing readiness screen."

Pressing the "Ⓘ" POWER switch causes the system to switch to the "Film discharge completion wait screen."



Displays the processing speed setting.
Displays the current developer solution temperature
Indicates the present temperature of the developer (32-second average value).

(5) Film discharge completion wait screen

While the film processor is waiting for film discharge completion, the following screen is displayed. (While the following screen is displayed, the system continuously exercises film processing control.) When the film discharge drive comes to a stop, the system switches to the "Stop process screen." Pressing the "Ⓘ" POWER switch causes the system to switch to the "Film processing screen."

* Waiting for film discharge completion → Waiting for film discharge completion due to operation OFF during film processing

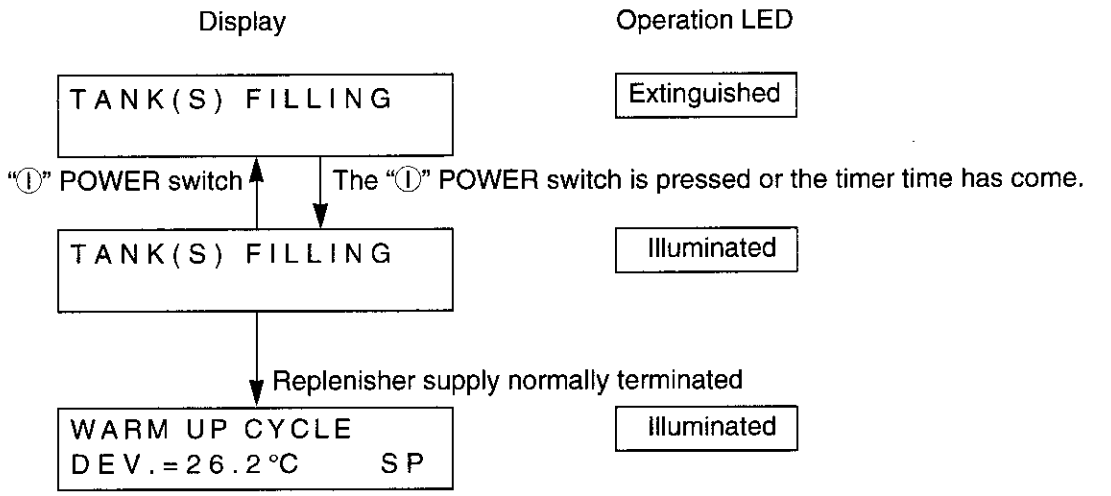
(6) Stop process screen

While the film processor is in the stop process, the following screen is displayed.
When a sequence of stop process operations is completed, the system switches to the "Power ON period screen."
Pressing the "Ⓘ" POWER switch causes the system to switch to the "Startup process screen."

Remarks

When the "Ⓘ" POWER switch is pressed or the timer time comes, an operation starts after completion of replenisher supply.

<Screen transition caused by the press of the POWER switch during replenisher supply>

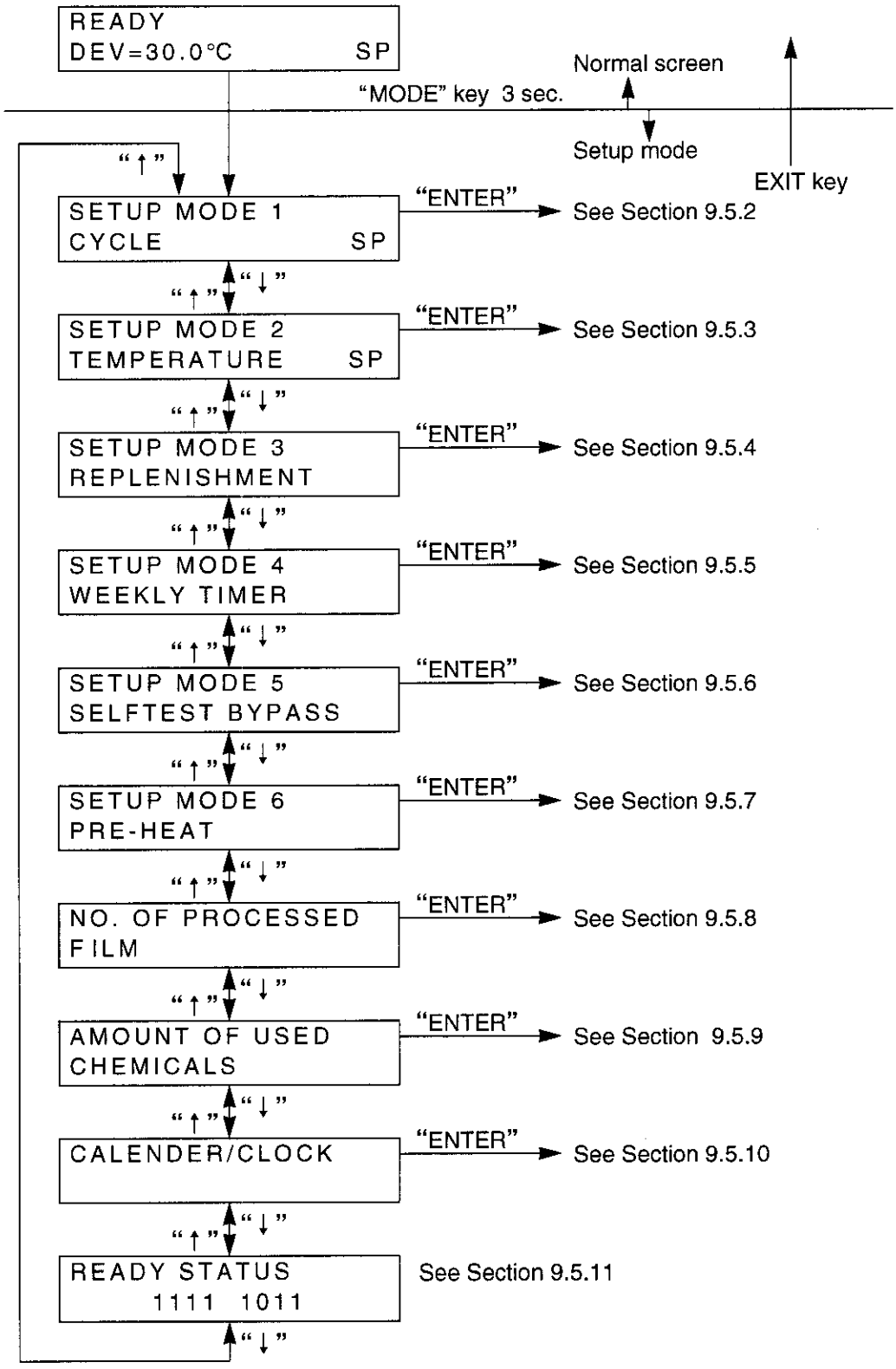


9.5 Setup Mode

In the setup mode, the settings can be edited or confirmed.
Pressing the EXIT key in the setup mode returns the system to a normal screen.

9.5.1 Setup Mode Screen Transition

9.5.1.1 Setup Mode Screen Transition



* 1. The SETUP MODE 5 screen does not appear during selftest bypass processing.
2. The SETUP MODE 6 screen does not appear during film processing, preheat operation, or selftest bypass processing.

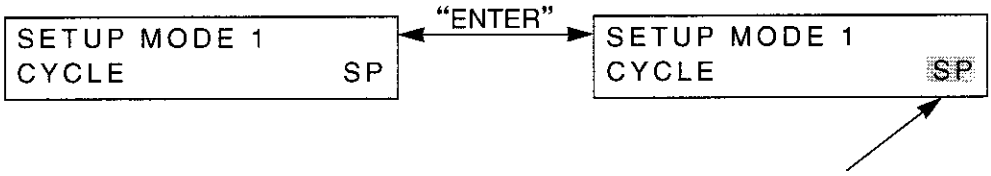
9.5.1.2 Setting Adjustment Ranges for Setup Mode (Tentative)

Item			Processing speed	Adjustment range		Resolution	Intial value	Unit
Speed				SP, RP			SP	
Temperature	Developer		SP	26.0~40.0		0.1	30.0	°C
			RP				27.0	
	Fixer		SP	26.0~38.0		1.0	31.0	
			RP				31.0	
	Dryer	Main	SP	30.0~58.0		1.0	35.0	
			RP				30.0	
		Standby lower limit	SP	25.0~43.0		1.0	30.0	
			RP				30.0	
Replenishment Rate*1	1 × (14 ×17 inch) Film			DEV.	0,50 ~ 200		100	m ℓ
				FIX.	0,100 ~ 180		180	
	5 × (10 ×12 inch) Films			DEV.	0,150 ~ 500		250	m ℓ
				FIX.	0,250 ~ 450		450	
Weekly timer				0:00 ~ 23:59 --:-- --:--			OFF (NOT USED) NOT SET	
DATE & TIME *2				1994 ~ 2093 1/1 ~ 12/31 0:00 ~ 23:59				
Heat roller	Heat roller 1		SP / RP	30.0 ~ 65.0		0.1	30.0	°C
	Heat roller 2		SP / RP				30.0	

* 1. UL model is set 35.6 × 43.2 cm (14 × 17 in.) Replenishment rate prior to shipment.
Other models are set 25.4 × 30.5 cm (10 × 12 in.) rate.
* 2. UL model is set the order of date "Month/Day/Year" prior to shipment.
Other models are set "Day/Month/Year".

9.5.2 Speed Setup

The film processing speed (SP/RP) can be set up.

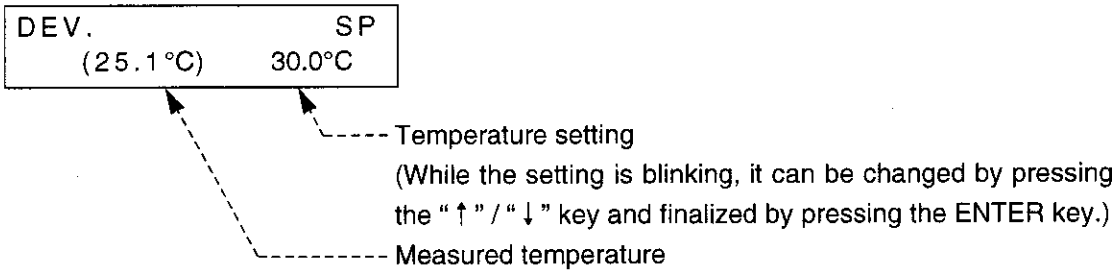


The processing speed selection toggles between SP and RP at each press of the "↑" / "↓" key. The selection is finalized at the press of the ENTER key. However, if the processing speed selection is changed during film processing, selftest bypass processing, or transport start signal ON period, the speed change takes effect after the motor stops.

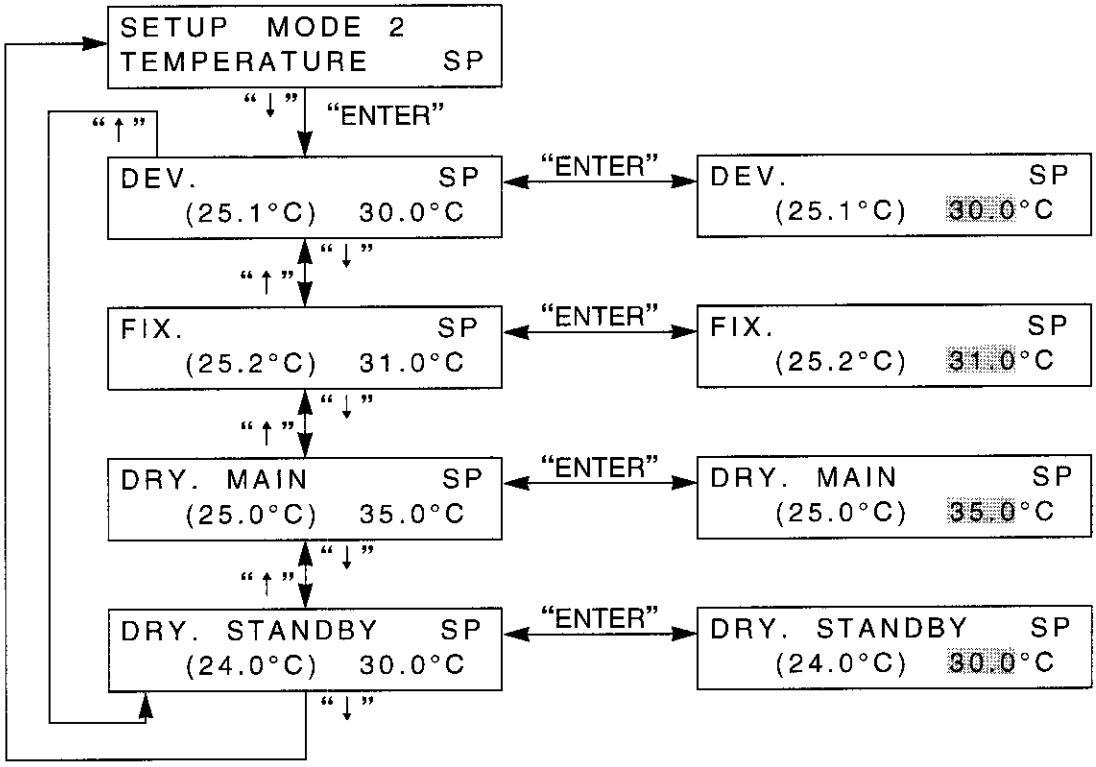
9.5.3 Temperature Setup

The developer, fixer, and dryer temperature settings for the selected processing speed can be set up.

* The menu changes as needed to match the processing speed selection. (When SP is selected, only the SP temperatures can be set up.)

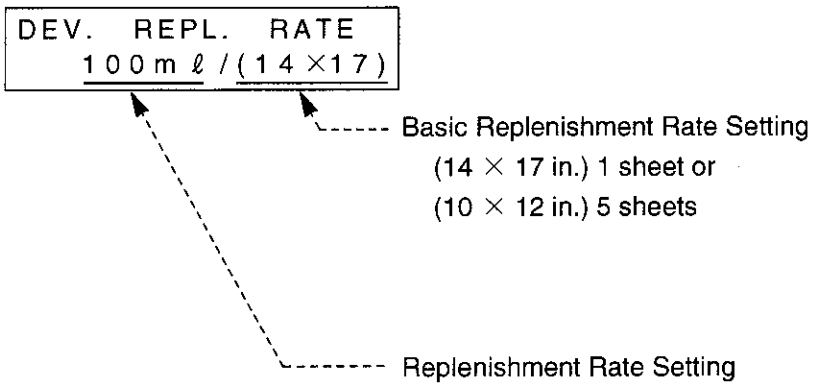


When the processing speed is SP

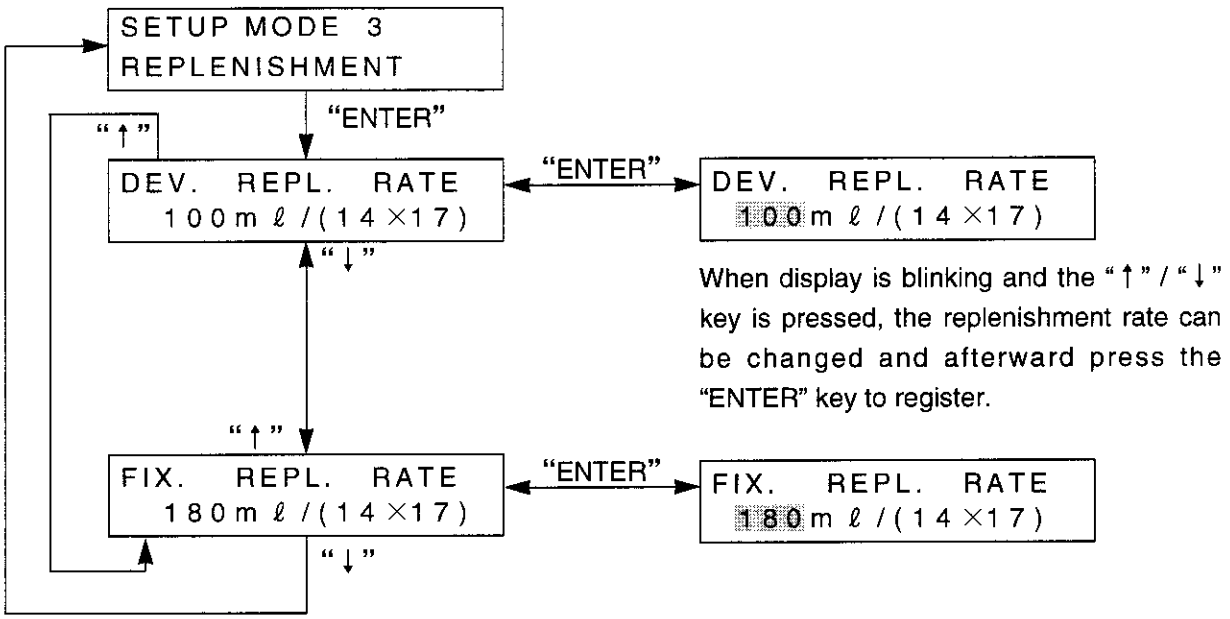


9.5.4 Replenishment Rate Setting

Replenishment rate for 1 sheet of 14 × 17 inches or 5 sheets of 10 × 12 inches can be registered.



(In the case of 14 × 17 in)



*The replenishment rate setting basis varies with the DIP switch SW1-2 setup.

DIP switch SW1-2 OFF → (14 × 17 inch)

DIP switch SW1-2 ON → 5 × (10 × 12 inch)

For 14 × 17 in 1 sheets

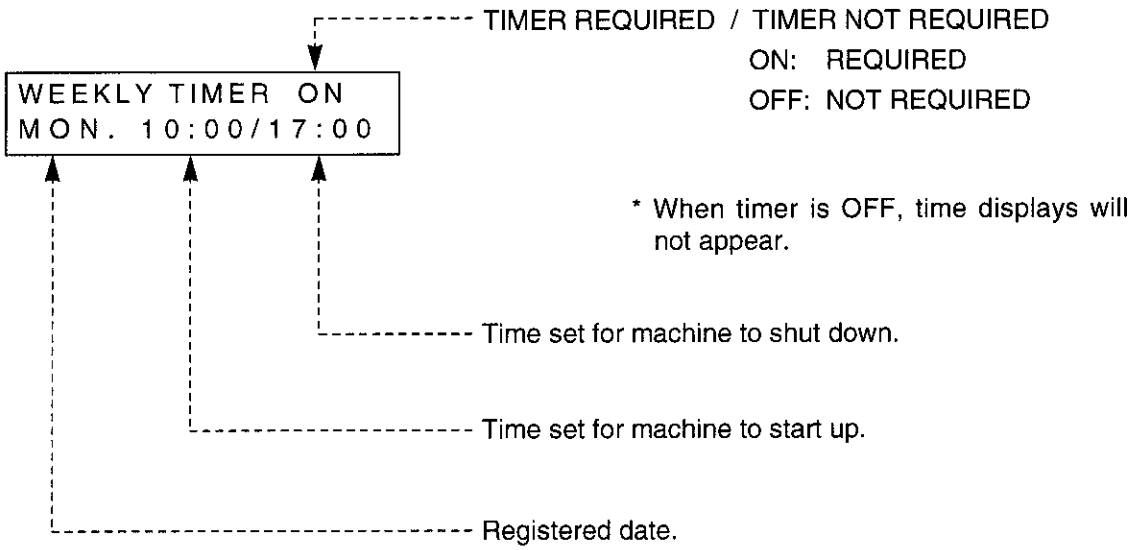
Present Item	Initial Setting	Adjustable Range	Increment
DEV.	100mℓ	0. and 50 ~ 200mℓ	5mℓ
FIX.	180mℓ	0. and 100 ~ 180mℓ	5mℓ

For 10 × 12 in 5 sheets

Present Item	Initial Setting	Adjustable Range	Increment
DEV.	250mℓ	0. and 150 ~ 500mℓ	5mℓ
FIX.	450mℓ	0. and 250 ~ 450mℓ	5mℓ

9.5.5 Weekly Timer Setting

When the weekly timer has been set up, the FPM6000SP starts up and shuts down automatically at the preset time. (One ON/OFF cycle per day)

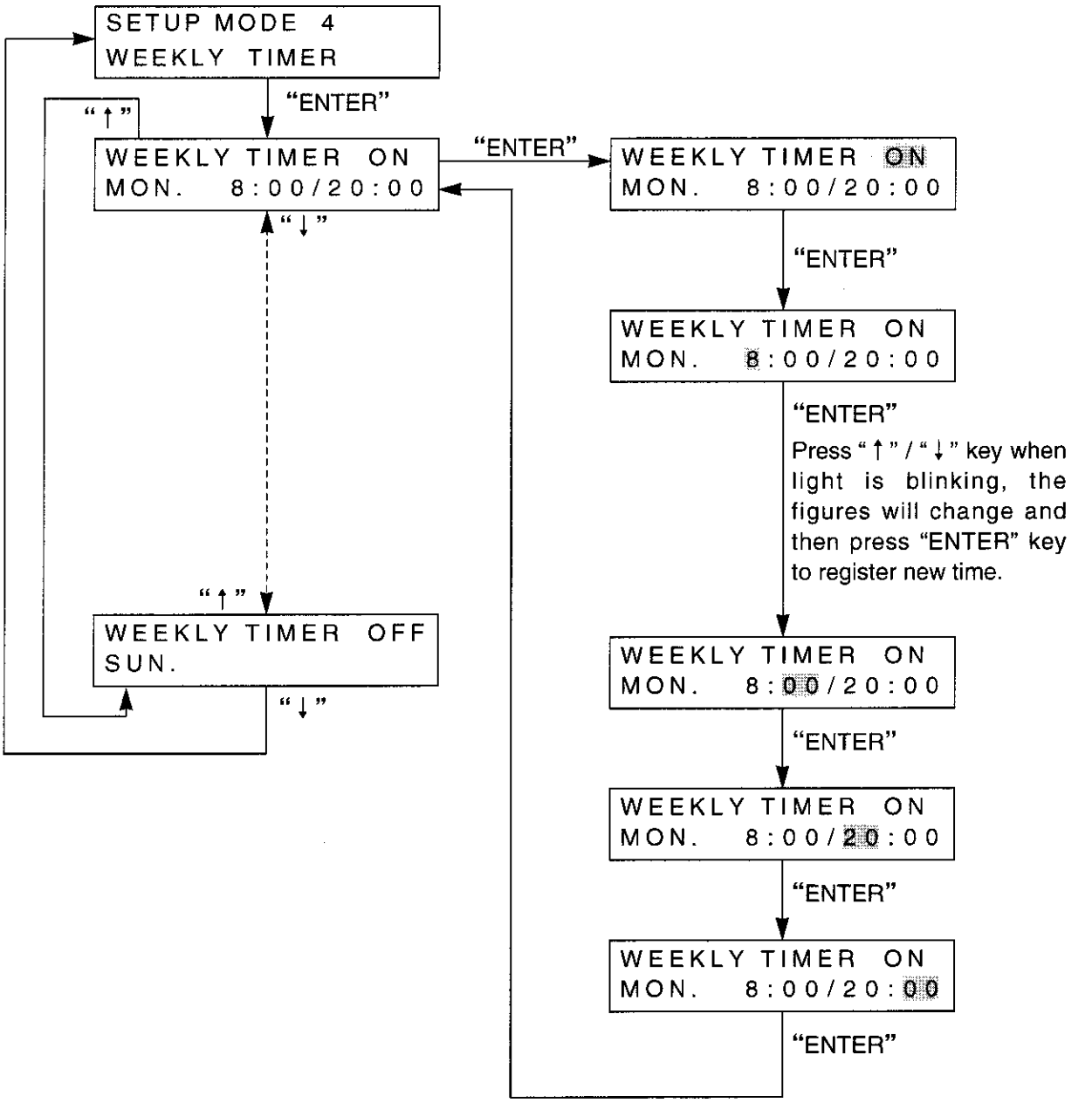


NOTE 1: *When the "– –:– –," registers, machine will not function.*

NOTE 2: *When timer for functioning and to stop is set for the same time, machine will not function.*
When the "ENTER" key is pressed, the following setup sequence will appear:

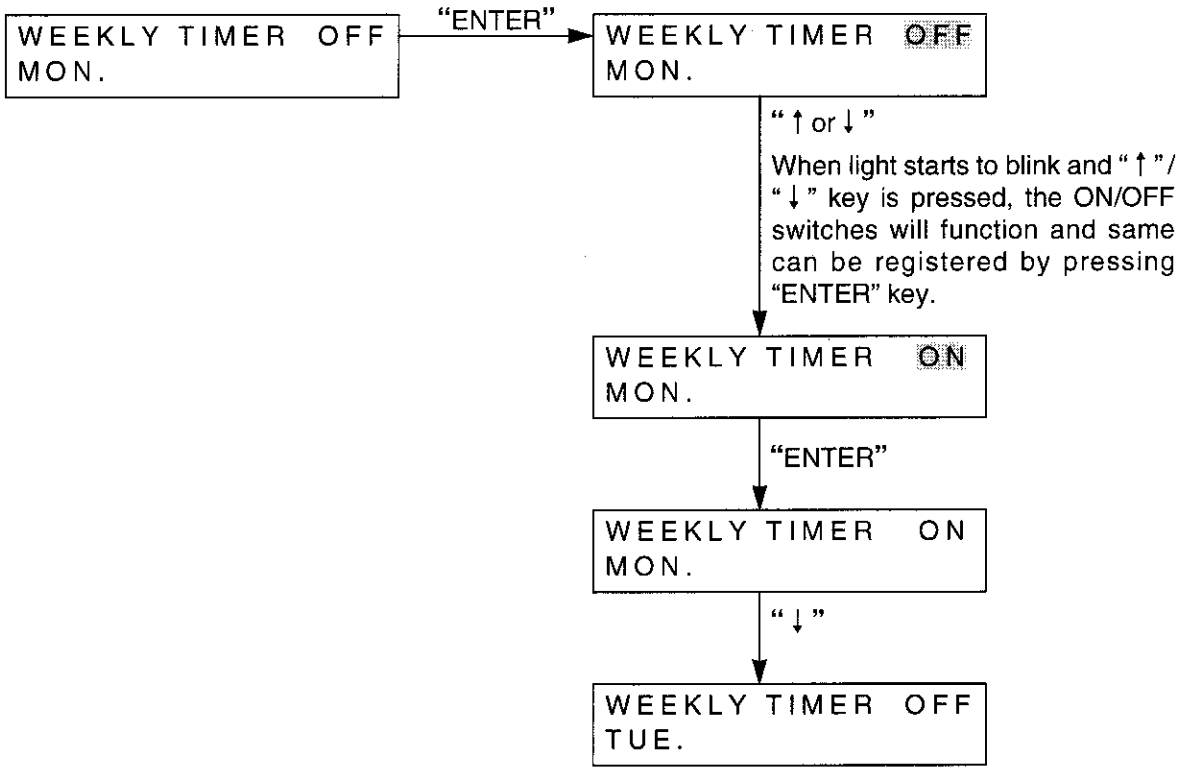
① *TIMER ON/OFF*
② *ON TIME SETTING*
③ *ON MINUTE SETTING*
④ *OFF TIME SETTING*
⑤ *OFF MINUTE SETTING*

9.5.5.1 Change of Time ON Timer



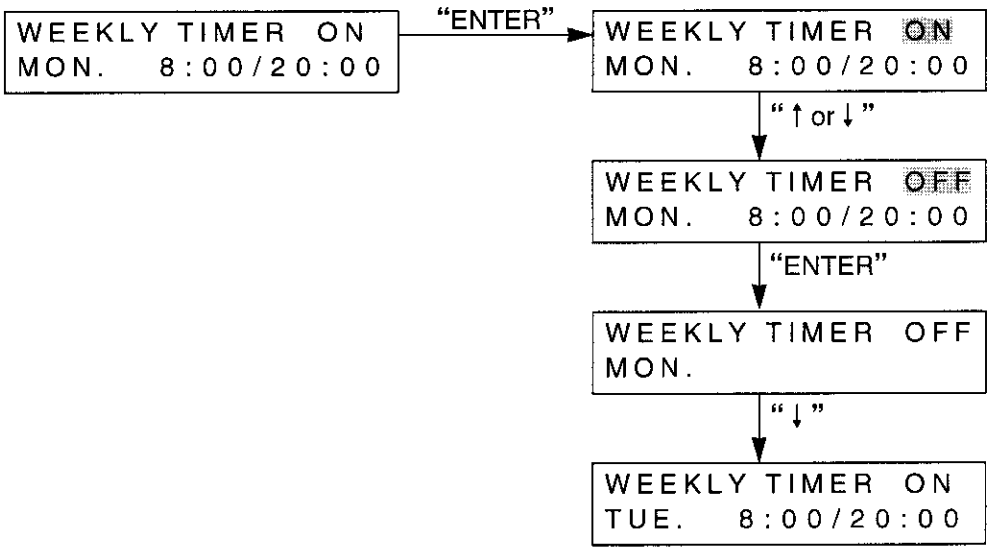
9.5.5.2 Changing from OFF to ON

Nothing will be registered when the machine is OFF.
When the machine is switched from OFF to ON, the weekly time registered previously will appear on display.



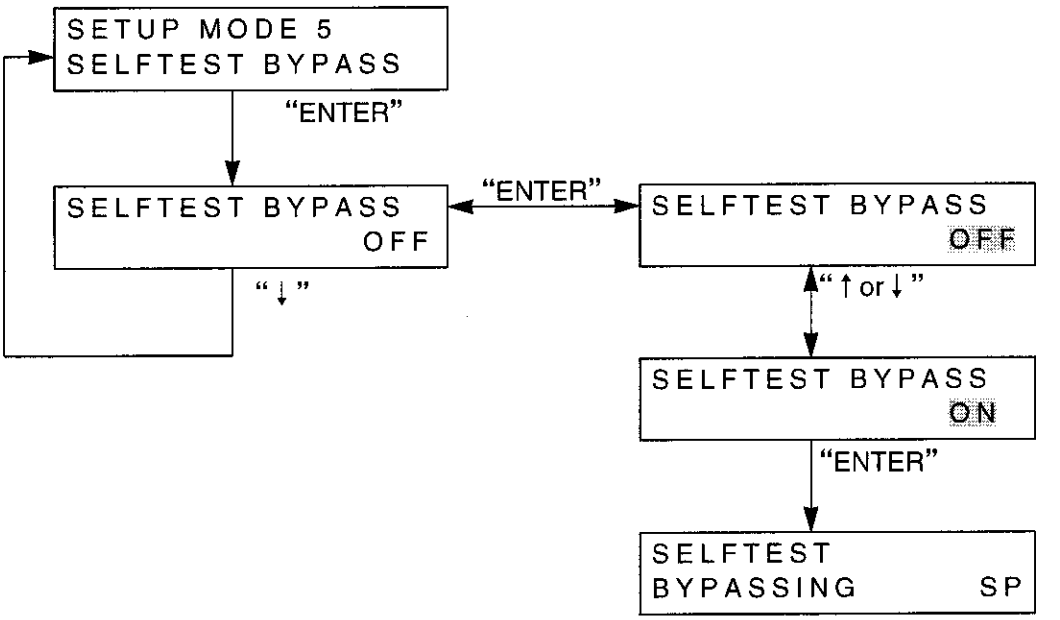
9.5.5.3 Changing from ON to OFF

Nothing will be registered when the machine is OFF. When the machine is switched from ON to OFF, the set time for weekly timer will not be appeared on display.



9.5.6 Selftest Bypass Setting

If emergency film processing is necessary in the event of processor trouble, the film can be processed by selftest bypass processing.



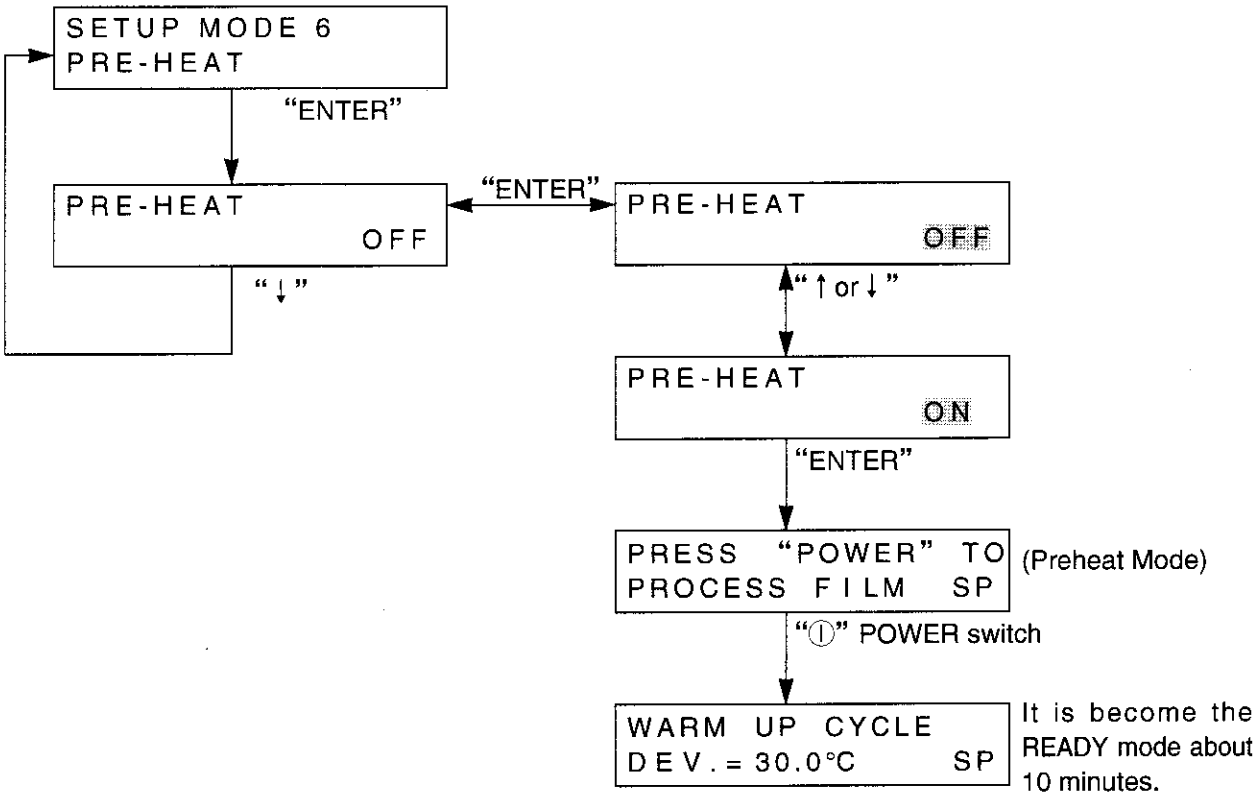
NOTE: *This mode cannot be used automatically if the content of the error would be operationally dangerous, such as high-temperature abnormality, temperature sensor failure, etc.*

IMPORTANT: *In this processing it is impossible to do automatic replenishment, crossover rack washing, etc. Also, sometimes photo performance finishing is insufficient. Unless unavoidable, do not use the processor.*

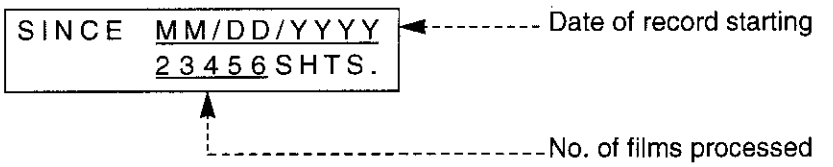
NOTE: *The film insertion buzzer will not sound, so in processing film leave an ample film insertion interval. Automatic replenishment does not function, so when 4 sheets of 25.4 × 30.5 cm (10 × 12 in.) film have been processed, press the REPL key once. This will carry out replenishment.*

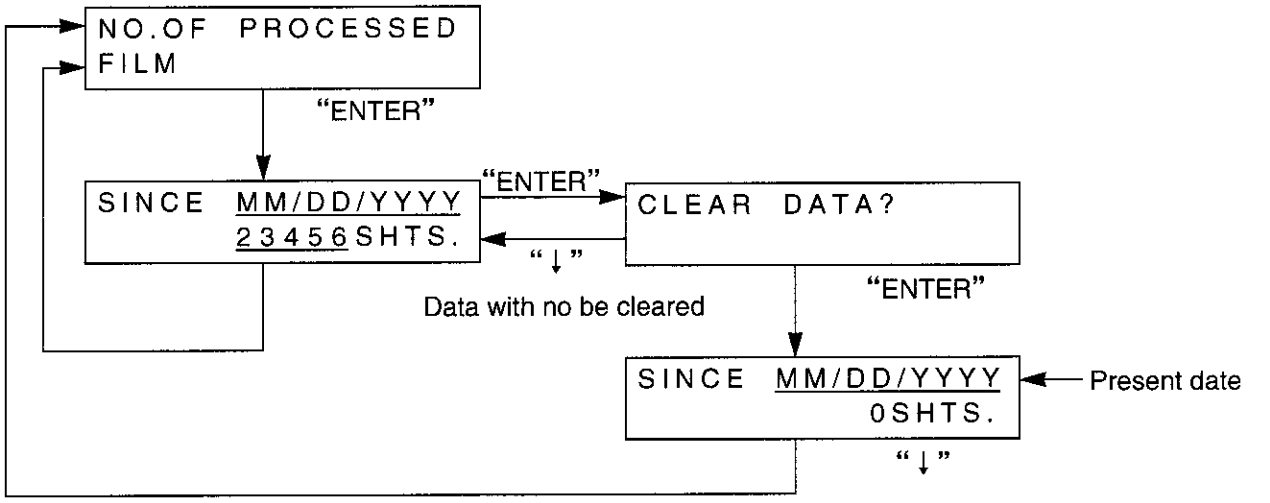
9.5.7 Preheat Mode Setting

When the preheat mode is selected, the FPM6000SP will maintain only developer and fixer temperatures within certain ranges while saving energy. This mode is ideal for emergency use.
Press the power switch to enter the regular cycle.
When the PREHEAT mode is selected and the weekly timer is set, the FPM6000SP will automatically turn on to the regular mode.
If the PREHEAT mode is selected and the weekly timer OFF is set, the FPM6000SP will ignore the weekly timer OFF.



9.5.8 Accounting of Films/Clearing Data





Number of films used can be accounted for and used data can also be cleared.

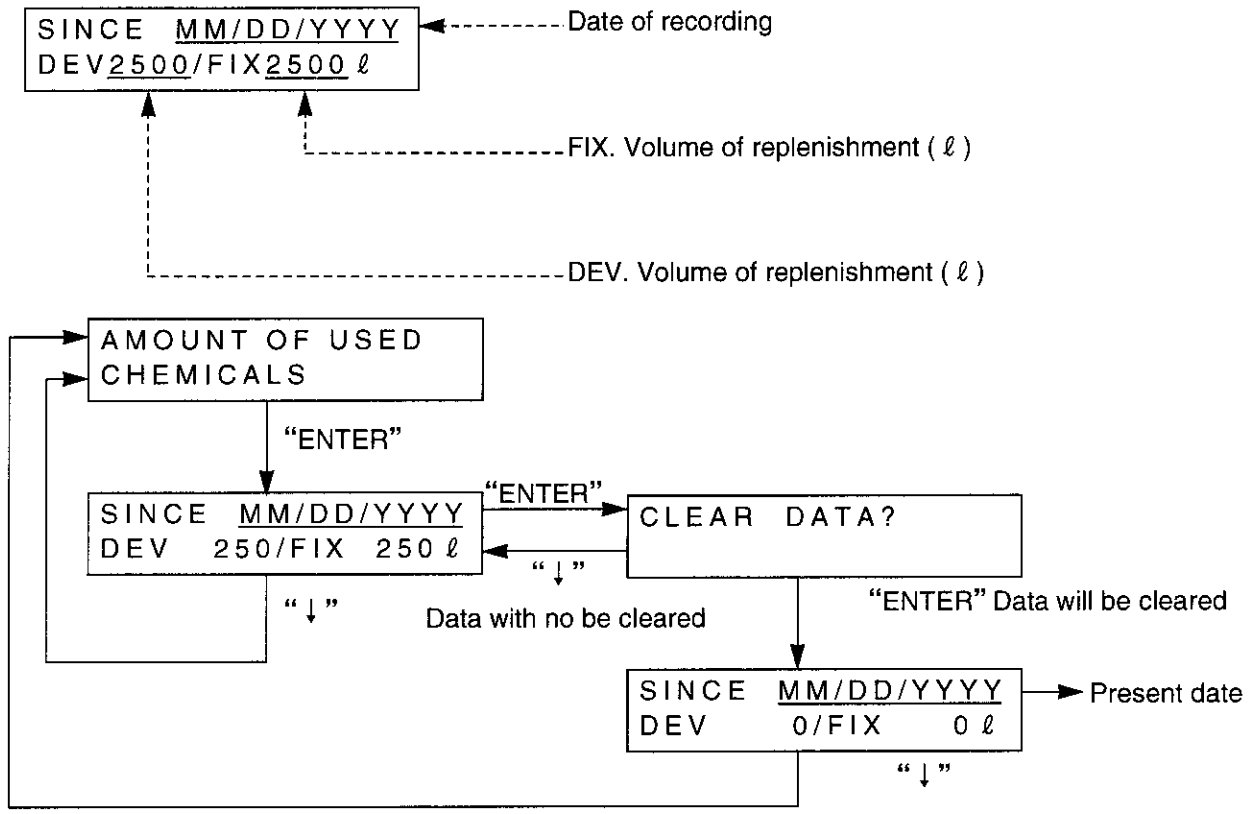
NOTE 1: *Maximum number of films can be accounted up to 99999.*
When accounting exceeds 99999, the next count will begin from "0".

NOTE 2: *When the display shows "CLEAR DATA" and then "ENTER" key is pressed, the number of films processed so far are cleared and the display shows the present date.*

NOTE 3: *Data display has two different way, MM/DD/YYYY or DD/MM/YYYY.*

9.5.9 Accounting of Replenishment/Clearing Data

Volume of replenishment can be accounted for and used data can also be cleared.



NOTE 1: *Maximum accounting of replenishment will be 9999 ℓ . When accounting exceeds 9999, the next count will begin from "0".*

NOTE 2: *When amount of replenishment is more than 500 ℓ display will register this as 1 litter. ex. (If replenishment is 500 ℓ , display will register this as 1 ℓ)*

NOTE 3: *When the display shows "CLEAR DATA" and then "ENTER" key is pressed, the volume of accounted replenishment so far are cleared and the display shows the present date.*

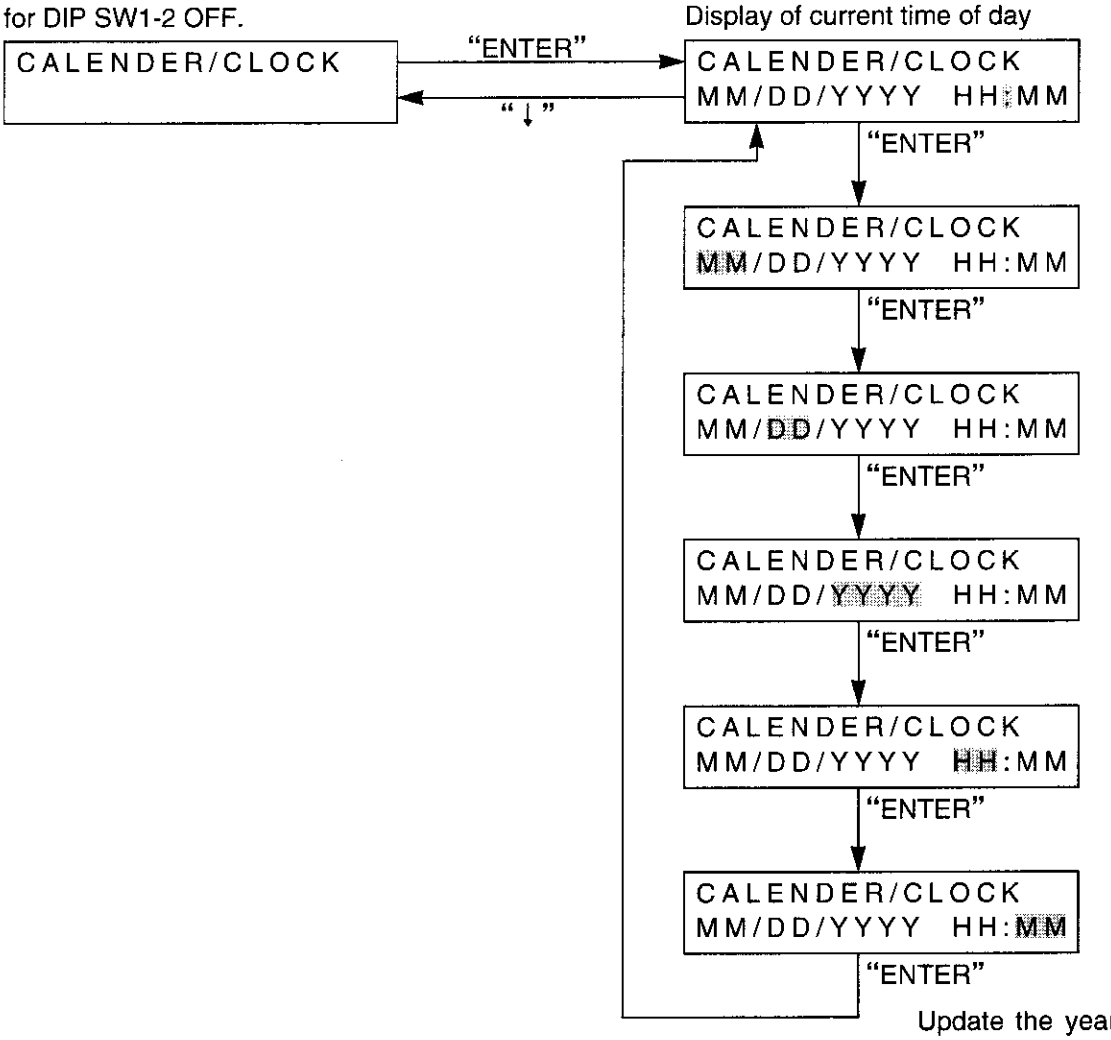
9.5.10 Calendar/Clock Setting

The current date and time of day can be set (or modified) by this setting. The CALENDAR display varies depending on the state of DIP SW1-2.

DIP SW1-2 OFF: MM/DD/YYYY

DIP SW1-2 ON: DD/MM/YYYY

The following is an explanation for DIP SW1-2 OFF.



* If the day (DD) goes beyond the allowed range at the time the year (YYYY) is confirmed, the maximum day of the month is used.
(Example) 2/31/1995 → 2/28/1995

9.5.11 Ready Status

Checking can be made to see if all conditions of machine are in a ready position.

```
READY STATUS
      1001  1100
```

READY STATUS (from the left)

① Film interval [When the film is feeding, this is change to 0]
② Error [When the error is occurred, this status is changed to 0]
③ Temperature of Developer
④ Temperature of Fixer
⑤ Temperature of Dryer
⑥ Temperature of Heat roller 1
⑦ Temperature of Heat roller 2
⑧ Water tank level

* Display

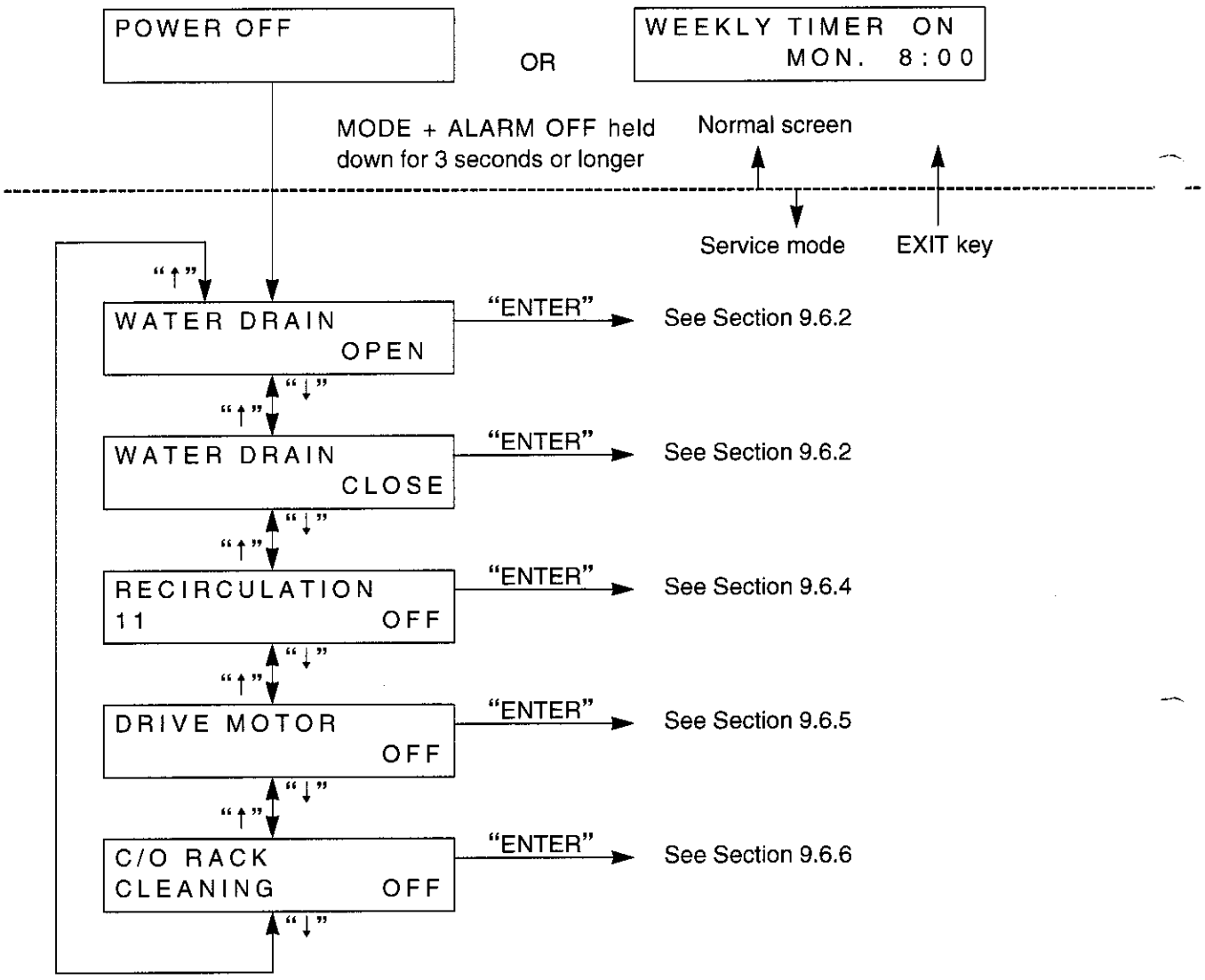
1: READY STATUS
0: NOT READY STATUS

9.6 Service Mode

In the service mode, various loads can be operated on an individual basis for film processing cleaning purposes.

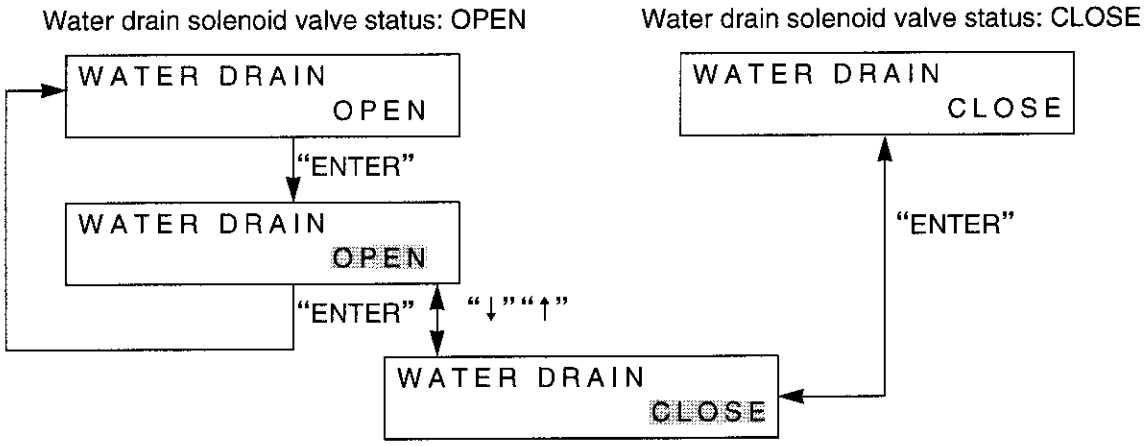
Pressing the EXIT key in the service mode causes the system to bring all the currently executed functions to an automatic stop and return to a normal screen.

9.6.1 Service Mode Screen Transition



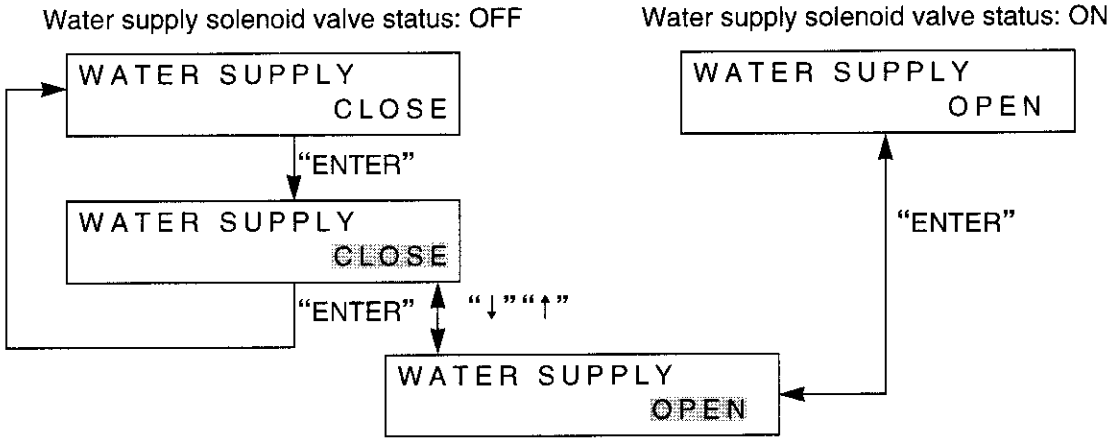
9.6.2 Water Drain

This function is used to open and close the water drain solenoid valve.



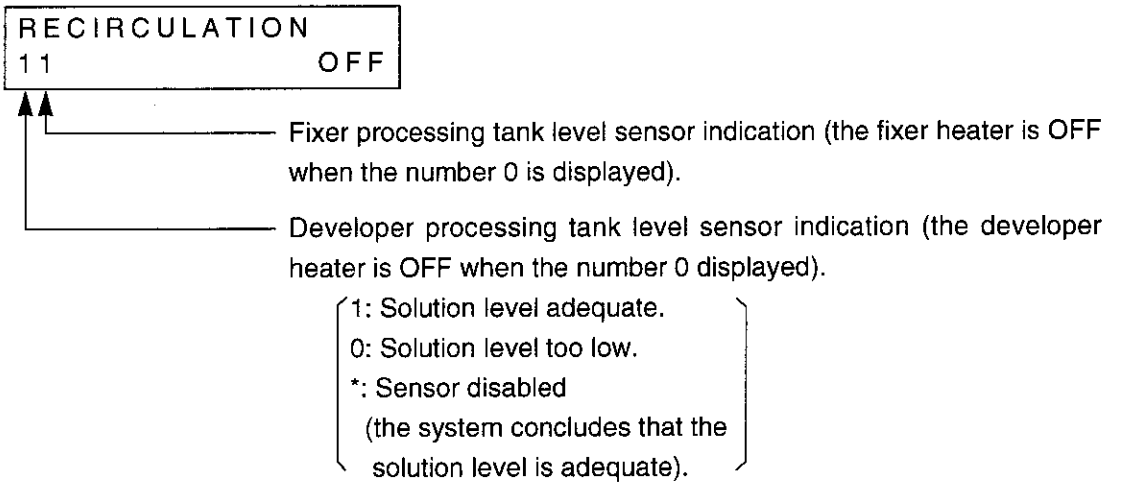
9.6.3 Water Supply

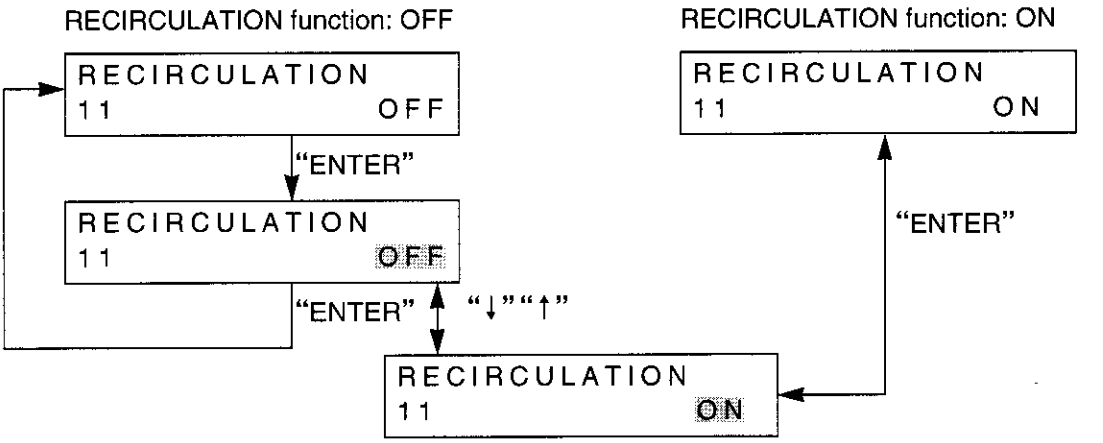
This function is used to turn ON and OFF the water supply solenoid valve.



9.6.4 Recirculation

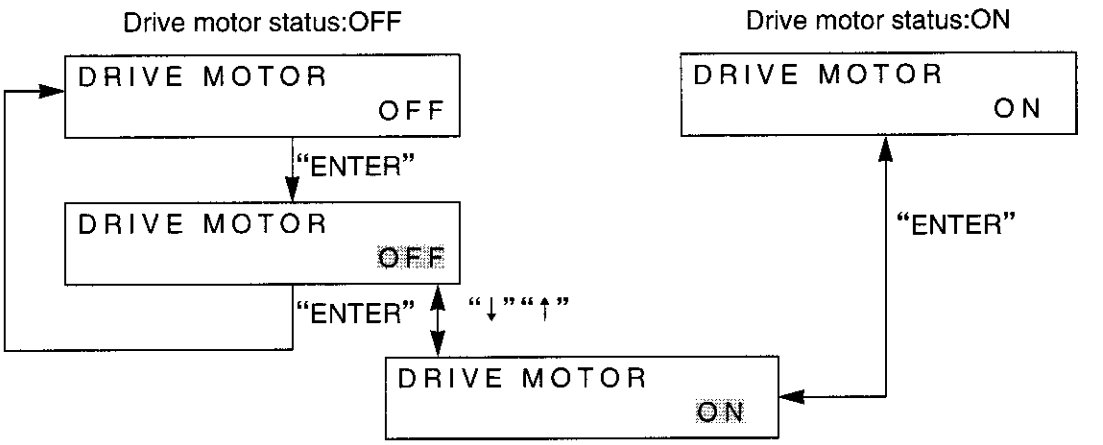
This function is used to turn ON and OFF the circulation pump. Note that the developer and fixer temperature control systems turn ON and OFF in synchronism with this circulation pump ON/OFF operation.





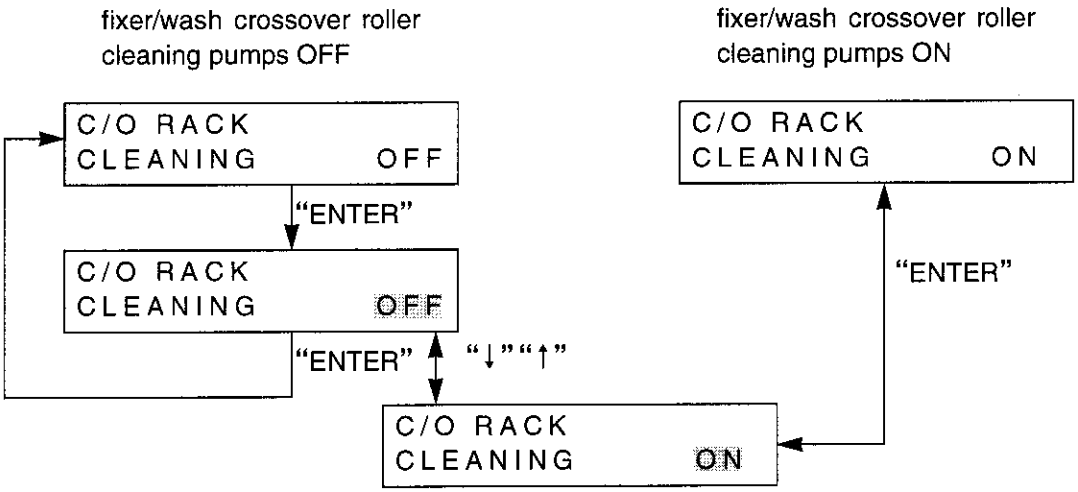
9.6.5 Drive Motor

This function is used to turn ON and OFF the drive motor.

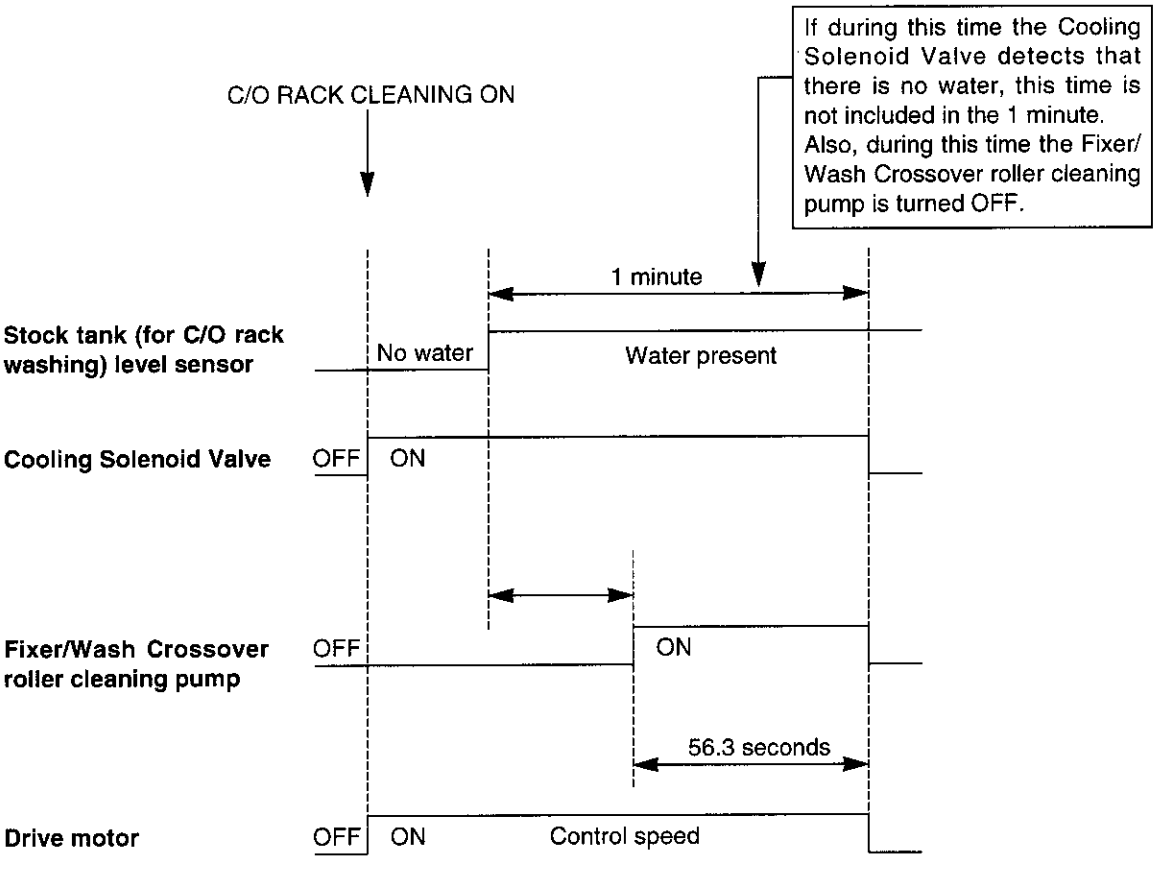


9.6.6 C/O Rack Cleaning

This function is used to turn ON and OFF the fixer/wash crossover roller cleaning pumps.



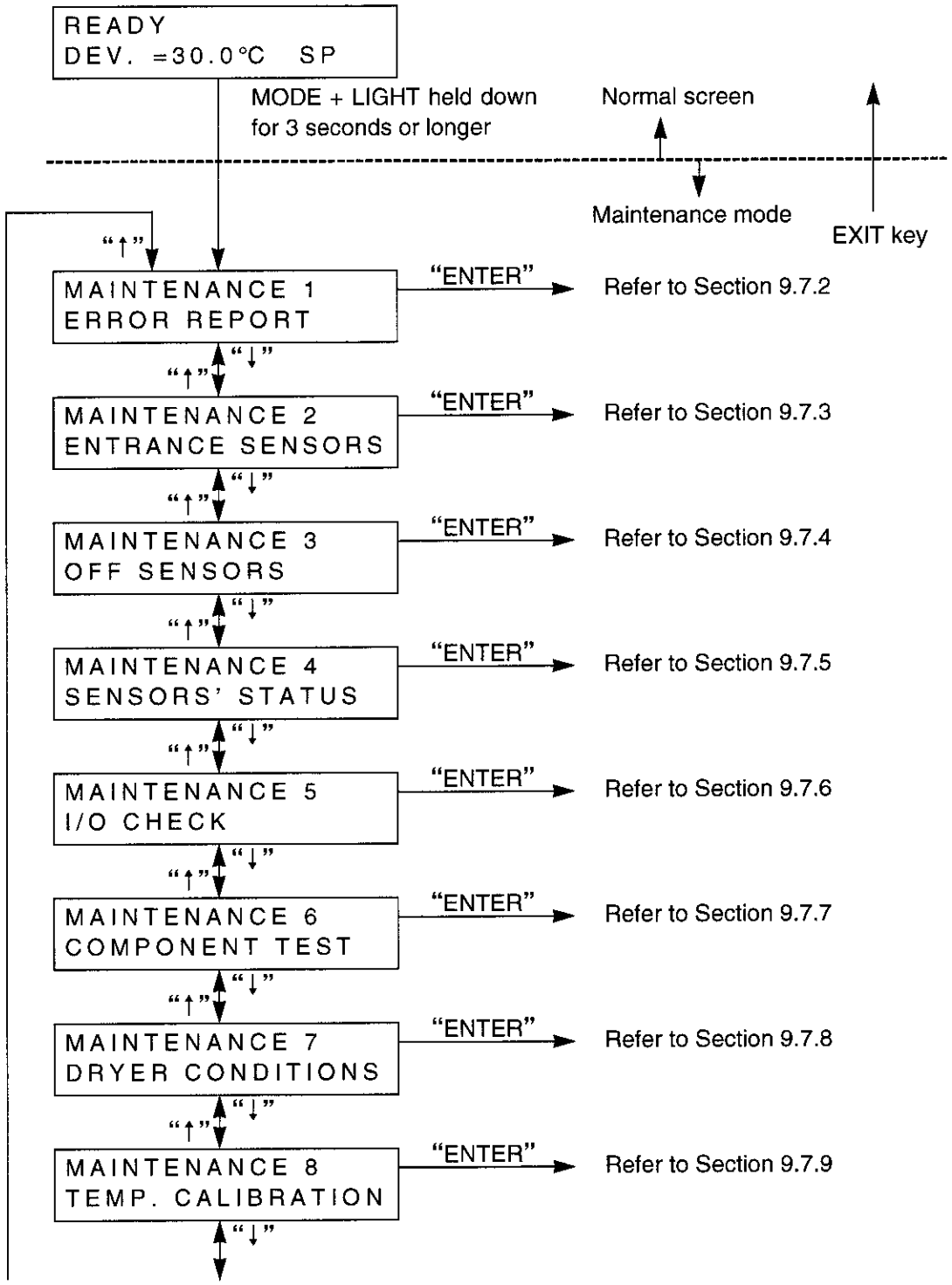
* When ON is chosen, the drive motor and cooling solenoid valve also turn ON at the same time.



9.7 Maintenance Mode

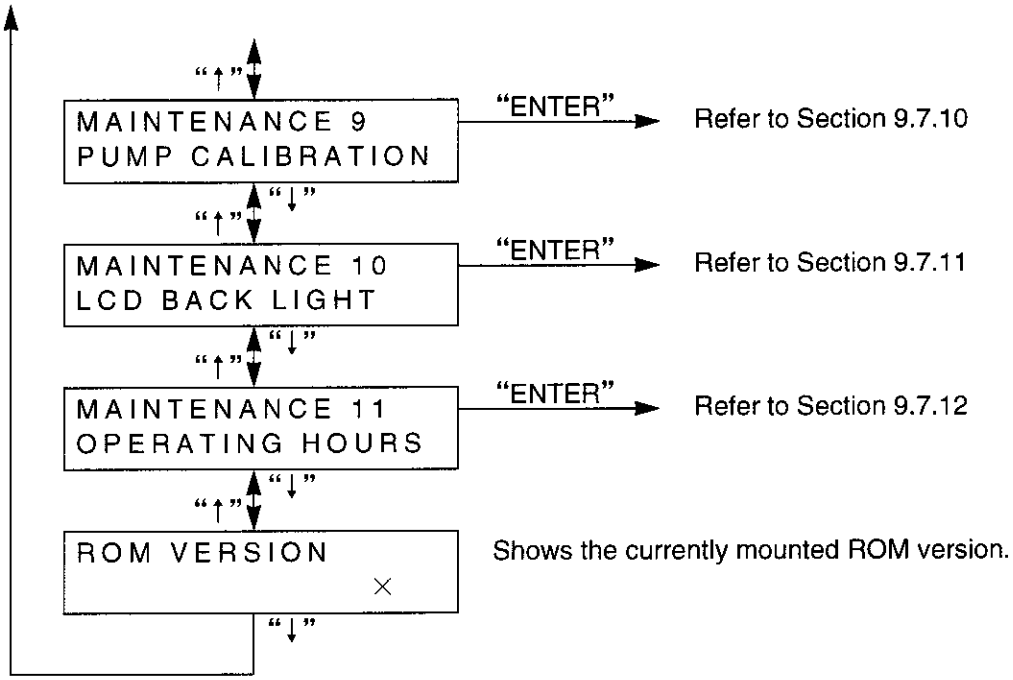
In the maintenance mode, it is possible to check the setup performed at installation or the internal operating status of the film processor.
When the EXIT key is pressed in the maintenance mode, the system automatically stops the currently executed loads and returns to a Normal Screen.

9.7.1 Maintenance Mode Screen Transition



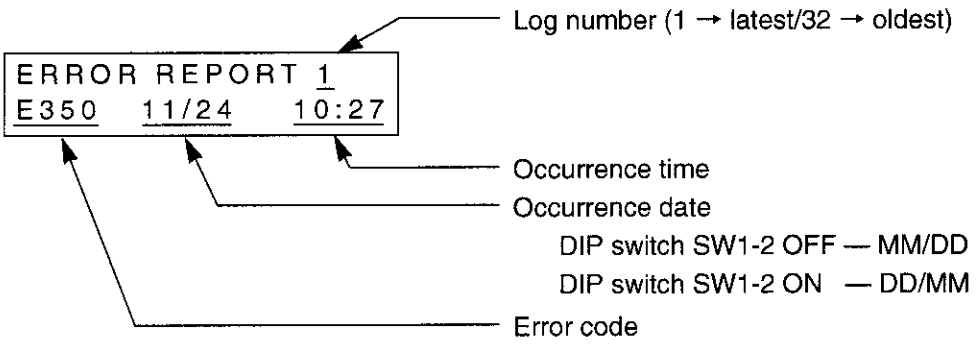
(To be continued on the following page)

(continued from the previous page)

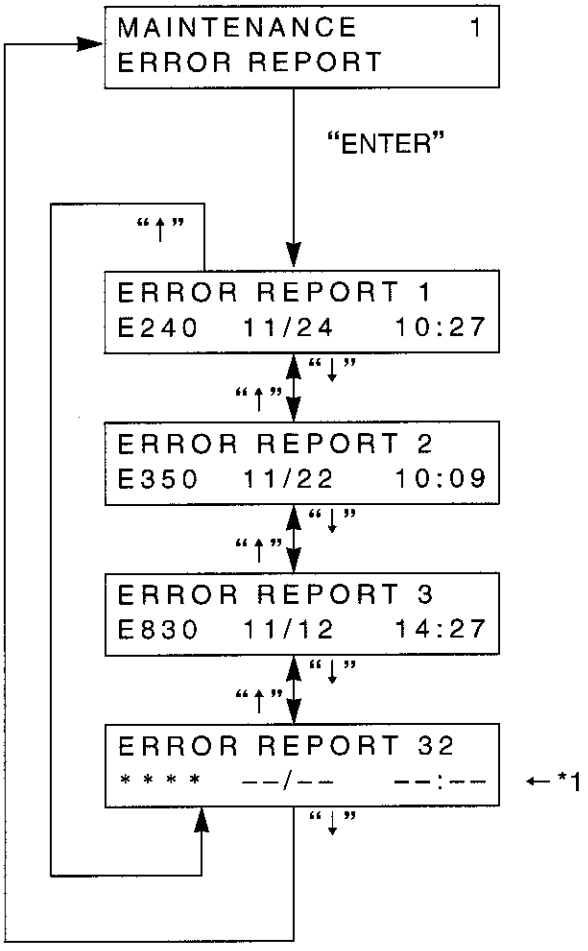


9.7.2 Error Log Display

This function is used to display the 32 latest error event information (error number and occurrence date/time).



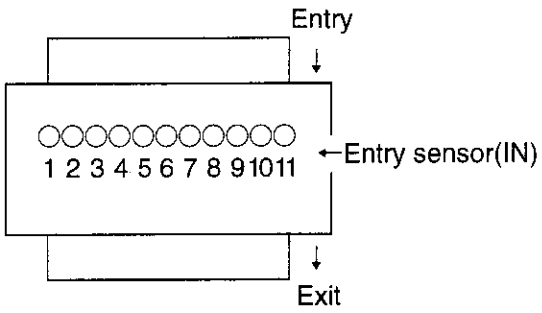
When DIP switch SW1-2 is OFF



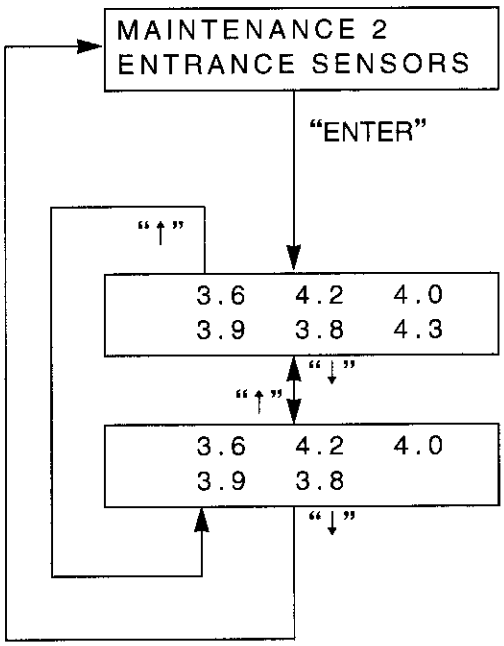
*1 When no data exists, the error number field reads * * * *, the date field reads – –/– –, and the time field reads – –:– –.

9.7.3 Feed Sensor Voltage Display

This function is used to check the voltage of each feed sensor.



Film processor top view



Displays the voltages of feed sensors 1 through 6. (In the upper line from left to right, sensors are designated 1, 2, and 3, and in the lower line, sensors are designated 4, 5, and 6.)

Displays the voltages of feed sensors 7 through 11. (In the upper line from left to right, sensors are designated 7, 8, and 9, and in the lower line, sensors are designated 10 and 11.)

[Determining the voltage]

The feed sensor voltage value is considered to be "V."

Feed sensor AD value:V = 255:4.64

Thus

$V = (4.64/255) \times$ feed sensor AD value

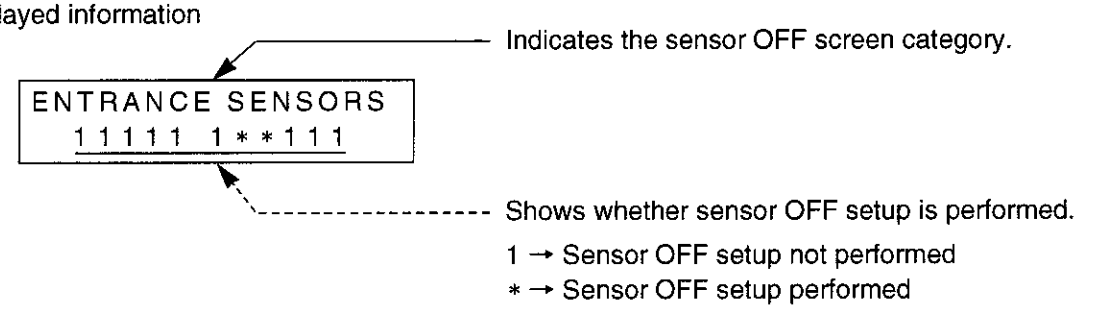
= (feed sensor AD value)/51

* The value is updated at 1.2 to 2.0 second intervals.
1 V or higher — Film present.
Lower than 1 V — No film present.

9.7.4 Sensor OFF Setup

This function is used to perform sensor OFF setup for various input sensors.

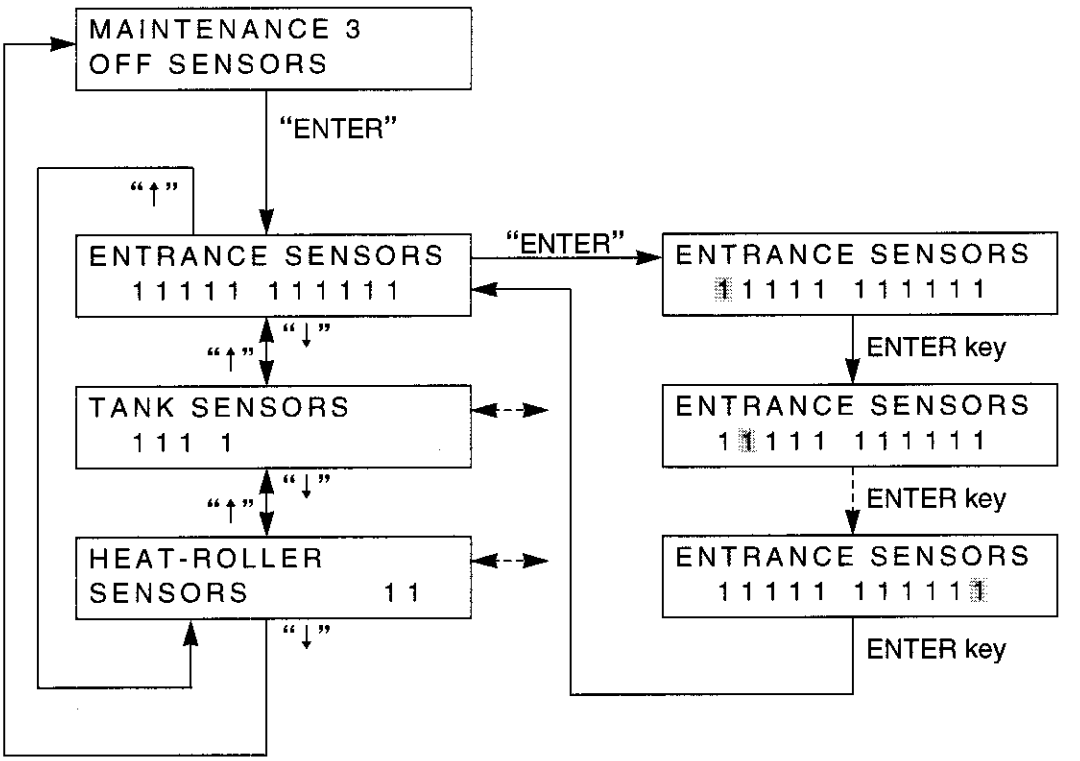
Displayed information



Sensor OFF setup menu

① Edit target → Blinking/Other → Steadily glowing

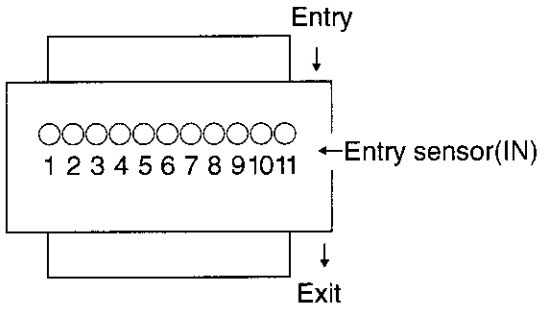
Pressing the ENTER key moves the target one position to the right. Use the "↑"/"↓" key to change the setting.



* The above rules apply to the TANK SENSORS and HEAT-ROLLER SENSORS as well as the ENTRANCE SENSORS (feed sensors).
* When the "↑" or "↓" key is pressed while the value 1 is blinking, the "*" mark appears to replace "1."
* When the ENTER key is pressed, the system finalizes the target sensor setting and switches to the next sensor.

The target sensors are:

ENTRANCE SENSORS (feed sensors)	1 through 11 (from left to right)
TANK SENSORS	Developer tank, fixer tank, wash tank, and stock tank (for crossover roller cleaning) (from left to right)
HEAT-ROLLER SENSORS	HR1 and HR2 (from left to right)

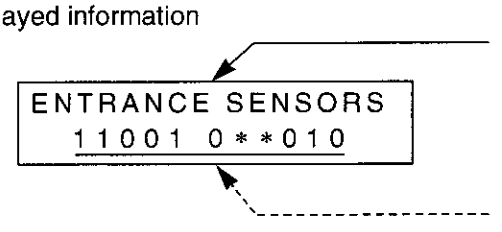


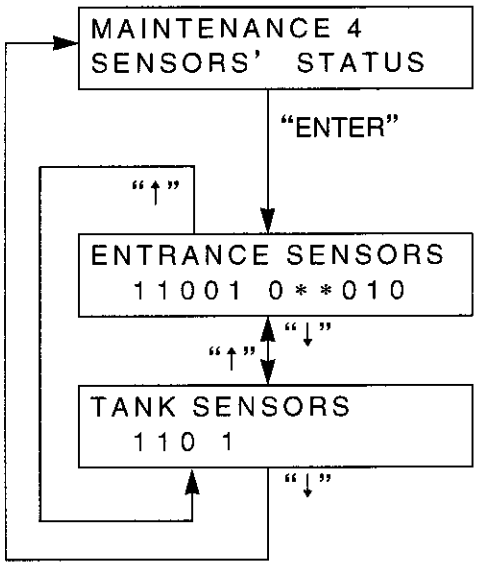
Film processor top view

9.7.5 Sensor Status Information

With this function, it is possible to view the feed sensor and solution level sensor detection information in real time.

Displayed information

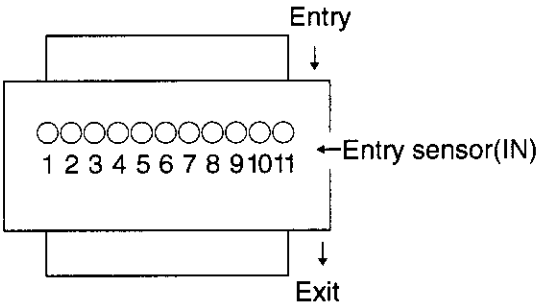




1 → Film present.
0 → No film present.
* → Sensor for which sensor OFF setup has been performed (the control system concludes that no film is present at this sensor section).

1 → Solution adequate.
0 → Solution level too low.
* → Sensor for which sensor OFF setup has been performed (the control system concludes that an adequate solution level is detected by this sensor).

From left to right, the sensors are numbered 1 through 11.



Film processor top view

From left to right, the mounted TANK SENSORS are as follows.

- Developer processing tank solution level
- Fixer processing tank solution level
- Wash tank water level
- Stock tank solution level (for crossover roller cleaning)

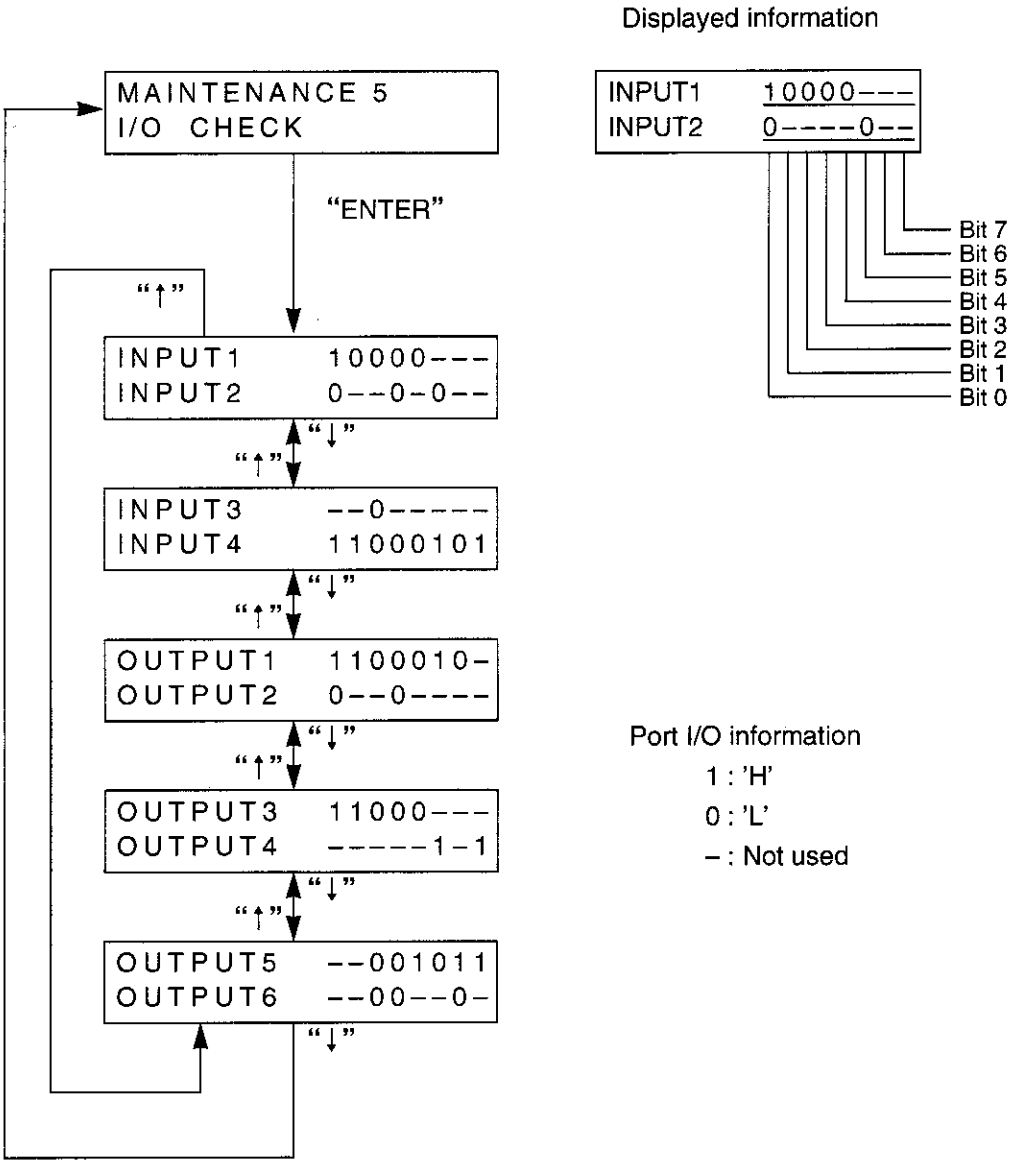
Sensor status determination time (chattering filter)

① ENTRANCE SENSORS: 100 ms × 2 times for determination
② TANK SENSORS: OFF → ON, 2 sec × 2 times for determination
ON → OFF, 2 sec × 5 times for determination

9.7.6 I/O Display

This function is used to view the I/O (PPI input/output) status in real time.

9.7.6.1 Screen Transition



* For the relationship between ports and I/Os, see section 9.7.6.2.
The values are updated at about 1-second intervals.

9.7.6.2 Relationship between I/O Display Menus and I/O Devices

Screen	Bit	1	0
INPUT 1	0	The MODE key is pressed.	The MODE key is not pressed.
	1	The REPL. key is pressed.	The REPL. key is not pressed.
	2	The ALARM OFF key is pressed.	The ALARM OFF key is not pressed.
	3	The LIGHT key is pressed.	The LIGHT key is not pressed.
	4	The "⏻" POWER switch is pressed.	The "⏻" POWER switch is not pressed.
	5	—	—
	6	—	—
	7	—	—

Screen	Bit	1	0
INPUT 2	0	The heat roller thermostat is normal.	The heat roller thermostat is open.
	1	—	—
	2	—	—
	3	I/F IN1 ON state (Film transportation start signal)	I/F IN1 OFF state (Film transportation start signal)
	4	—	—
	5	The load signal cable is broken.	The load signal cable is normal.
	6	—	—
	7	—	—

Screen	Bit	1	0
INPUT 3	0	—	—
	1	—	—
	2	The top cover is closed.	The top cover is open.
	3	—	—
	4	—	—
	5	—	—
	6	—	—
	7	—	—

Screen	Bit	1	0
INPUT 4	0	DIPSW1–1 OFF	DIPSW1–1 ON
	1	DIPSW1–2 OFF	DIPSW1–2 ON
	2	DIPSW1–3 OFF	DIPSW1–3 ON
	3	DIPSW1–4 OFF	DIPSW1–4 ON
	4	DIPSW1–5 OFF	DIPSW1–5 ON
	5	DIPSW1–6 OFF	DIPSW1–6 ON
	6	DIPSW1–7 OFF	DIPSW1–7 ON
	7	DIPSW1–8 OFF	DIPSW1–8 ON

Screen	Bit	1	0
OUTPUT 1	0	The developer heater is ON.	The developer heater is OFF.
	1	The fixer heater is ON.	The fixer heater is OFF.
	2	Dryer heater A is ON.	Dryer heater A is OFF.
	3	Dryer heater B is ON.	Dryer heater B is OFF.
	4	The dryer fan is ON.	The dryer fan is OFF.
	5	Heat roller 1 is ON.	Heat roller 1 is OFF.
	6	Heat roller 2 is ON.	Heat roller 2 is OFF.
	7	—	—

Screen	Bit	1	0
OUTPUT 2	0	The developer pump is rotating.	The developer pump is stopped.
	1	—	—
	2	—	—
	3	The fixer pump is rotating.	The fixer pump is stopped.
	4	—	—
	5	—	—
	6	—	—
	7	—	—

Screen	Bit	1	0
OUTPUT 3	0	The feed side ALARM buzzer is sounding.	The feed side ALARM buzzer is not sounding.
	1	The dryer side ALARM buzzer is sounding.	The dryer side ALARM buzzer is not sounding.
	2	The feed end READY lamp is illuminated.	The feed end READY lamp is extinguished.
	3	The display panel (LCD) backlight is ON.	The display panel (LCD) backlight is OFF.
	4	The circulation pump is rotating.	The circulation pump is stopped.
	5	—	—
	6	—	—
	7	—	—

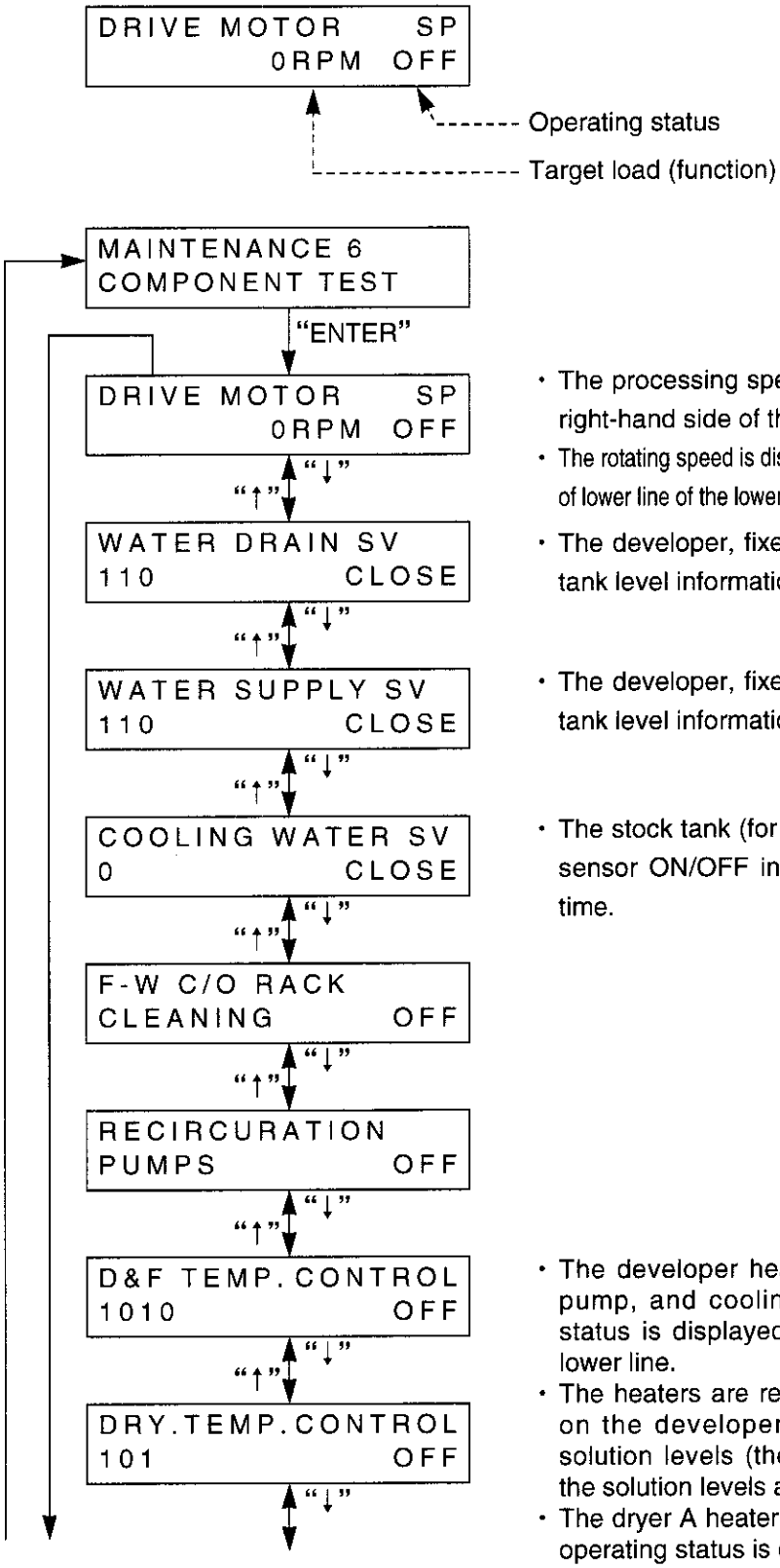
Screen	Bit	1	0
OUTPUT 4	0	—	—
	1	—	—
	2	—	—
	3	—	—
	4	—	—
	5	The READY LED is illuminated.	The READY LED is extinguished.
	6	—	—
	7	The POWER LED is illuminated.	The POWER LED is extinguished.

Screen	Bit	1	0
OUTPUT 5	0	—	—
	1	—	—
	2	The developer/fixer crossover rack cleaning pump is rotating.	The developer/fixer crossover rack cleaning pump is stopped.
	3	The fixer/wash crossover rack cleaning pump is rotating.	The fixer/wash crossover rack cleaning pump is stopped.
	4	The water drain solenoid valve is open.	The water drain solenoid valve is closed.
	5	The cooling solenoid valve is open.	The cooling solenoid valve is closed.
	6	The wash water solenoid valve is open.	The wash water solenoid valve is closed.
	7	The exhaust fan is rotating.	The exhaust fan is stopped.

Screen	Bit	1	0
OUTPUT 6	0	—	—
	1	—	—
	2	I/F OUT2 ON state (film may be inserted).	I/F OUT2 OFF state (film may be inserted).
	3	I/F OUT3 ON state (processing enabled).	I/F OUT3 OFF state (processing enabled).
	4	—	—
	5	—	—
	6	I/F OUT6 ON state (operation in progress).	I/F OUT6 OFF state (operation in progress).
	7	—	—

9.7.7 Independent Load Drive

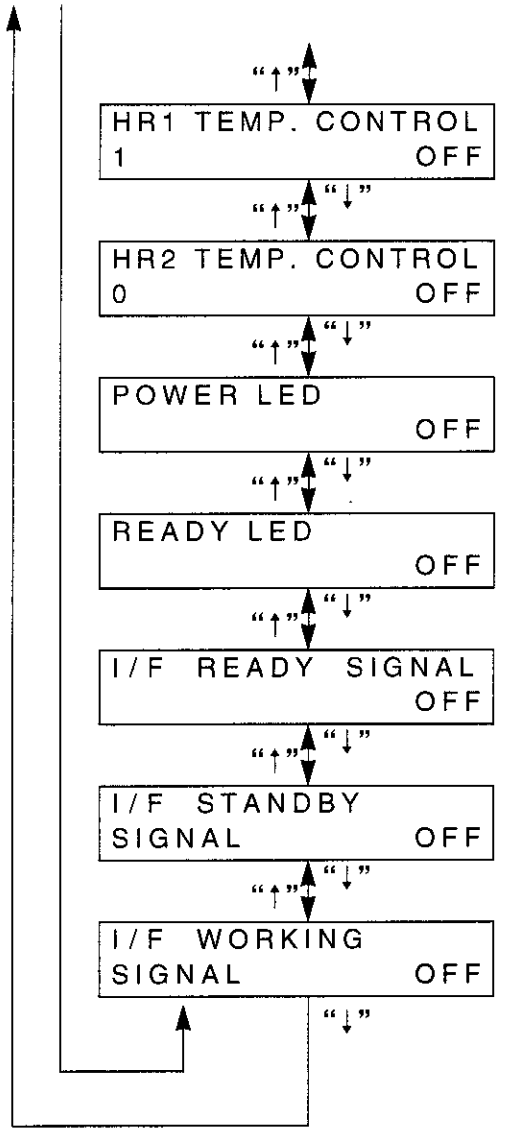
This function is used to drive the loads on an individual basis.



- The processing speed setting is displayed on the right-hand side of the upper line.
- The rotating speed is displayed from middle to right-hand side of lower line of the lower line (average of 10 sampled data).
- The developer, fixer, and wash water processing tank level information is displayed in real time.
- The developer, fixer, and wash water processing tank level information is displayed in real time.
- The stock tank (for crossover rack cleaning) level sensor ON/OFF information is displayed in real time.
- The developer heater, fixer heater, circulation pump, and cooling solenoid valve operating status is displayed on the left-hand side of the lower line.
- The heaters are rendered inoperative depending on the developer and fixer processing tank solution levels (the heaters operate only when the solution levels are adequate).
- The dryer A heater, dryer B heater, and dryer fan operating status is displayed on the left-hand side of the lower line.

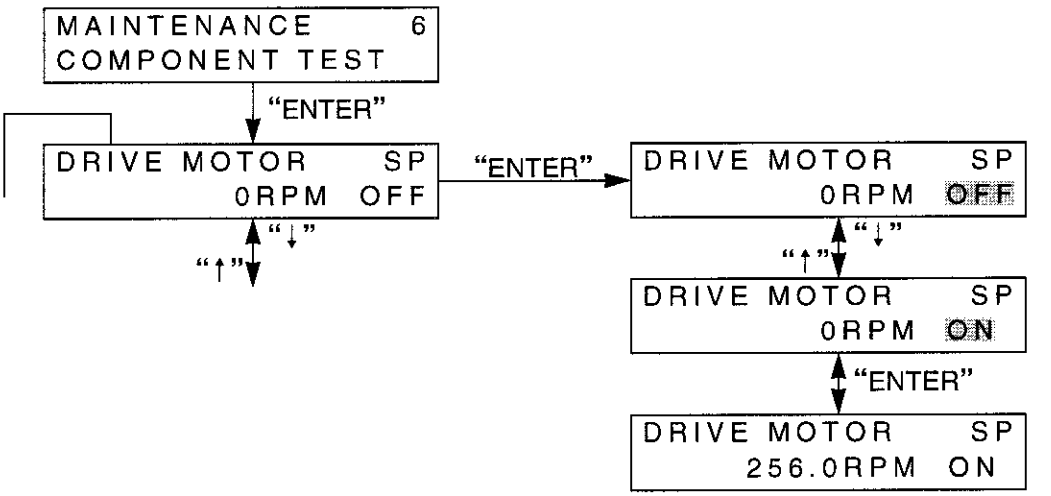
(To be continued on the following page)

(Continued from the previous page)



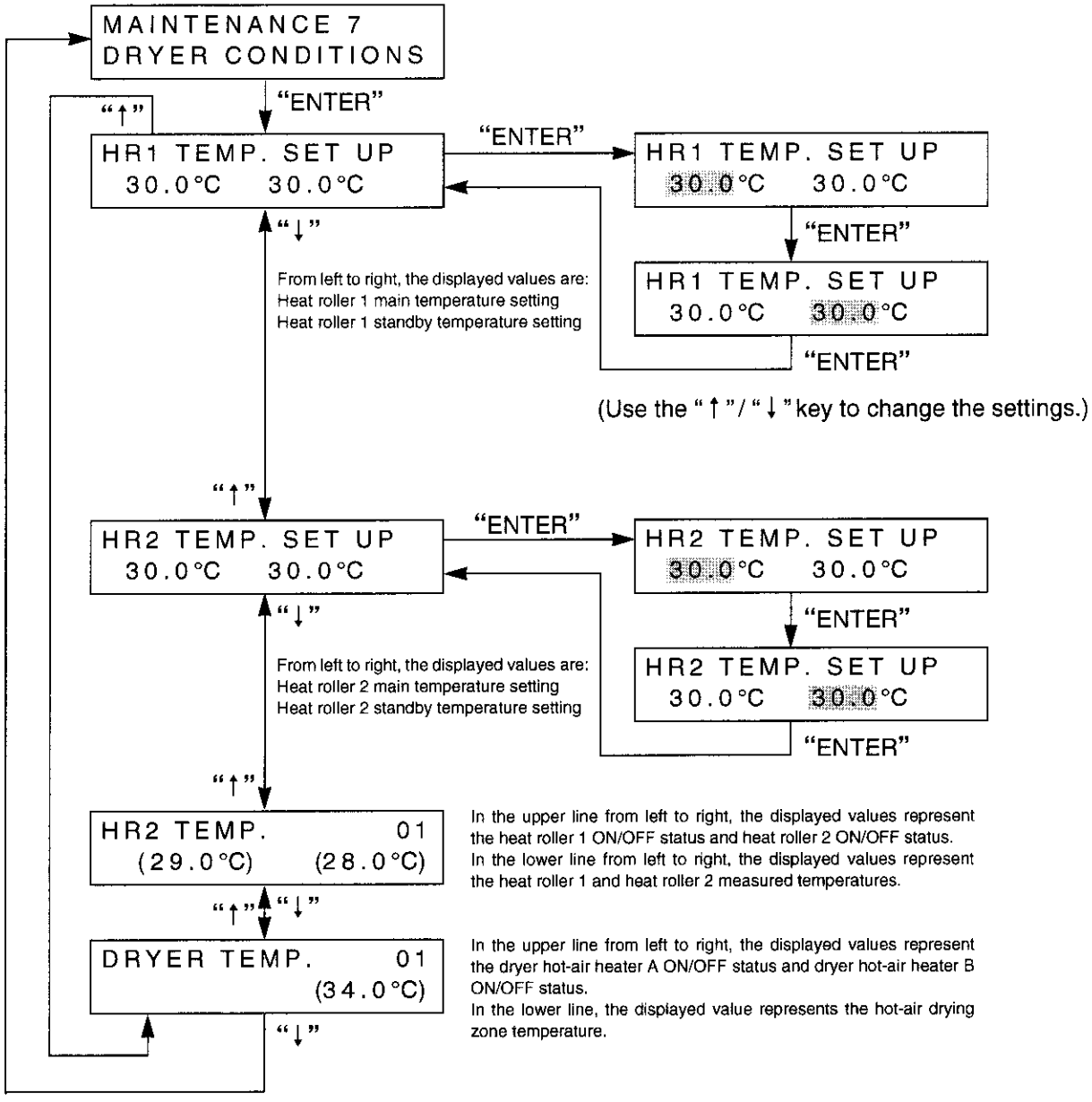
- The heat roller 1 operating status is displayed on the left-hand of the lower line.
- The heat roller 2 operating status is displayed on the left-hand of the lower line.

[Operating example]



9.7.8 Dryer Section Temperature Information

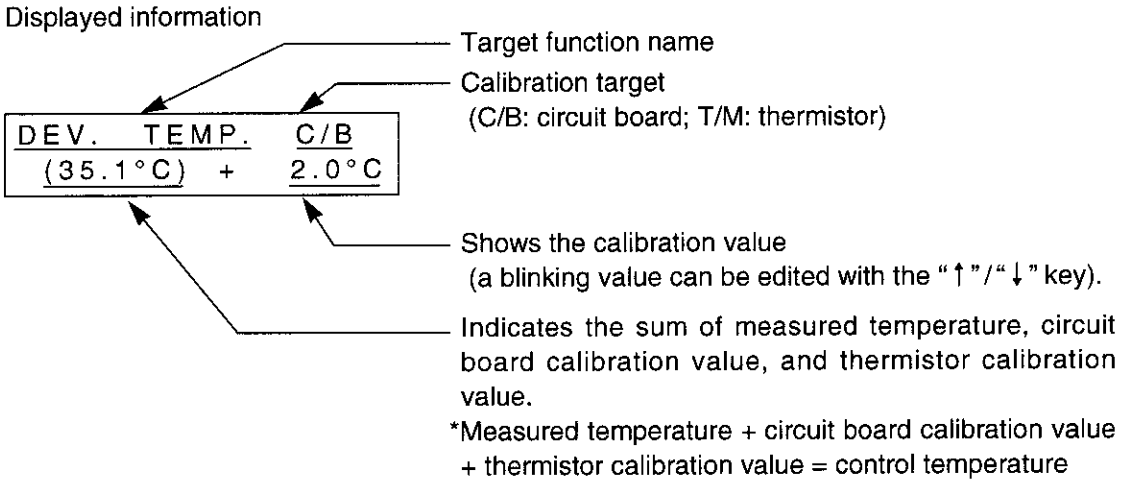
This function is used to view the heat roller setup and measurements in real time.

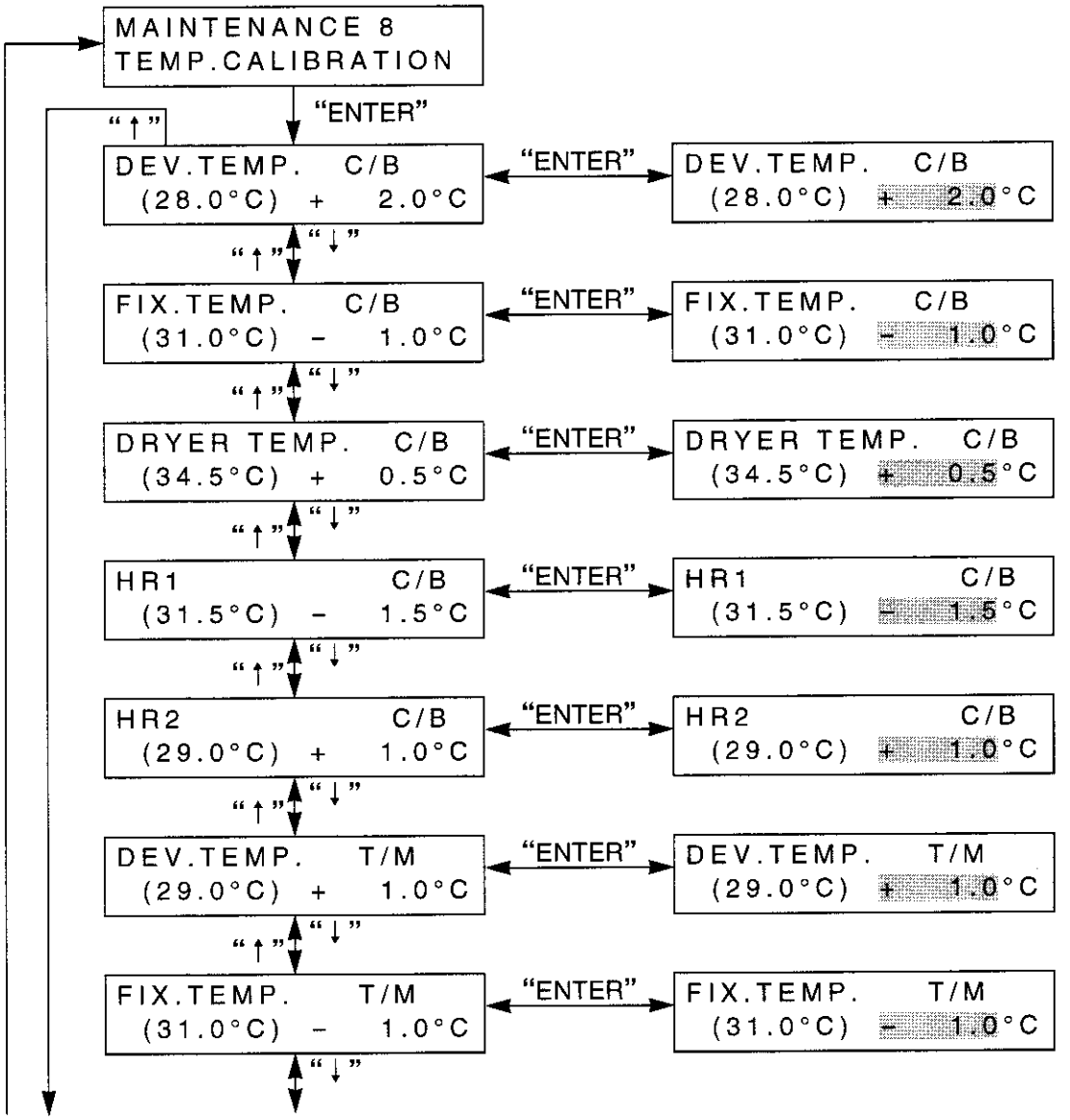


Load ON/OFF status [1 : ON / 0 : OFF]

9.7.9 Temperature Calibration

This function provides developer, fixer, drying zone, and heat roller calibrations.





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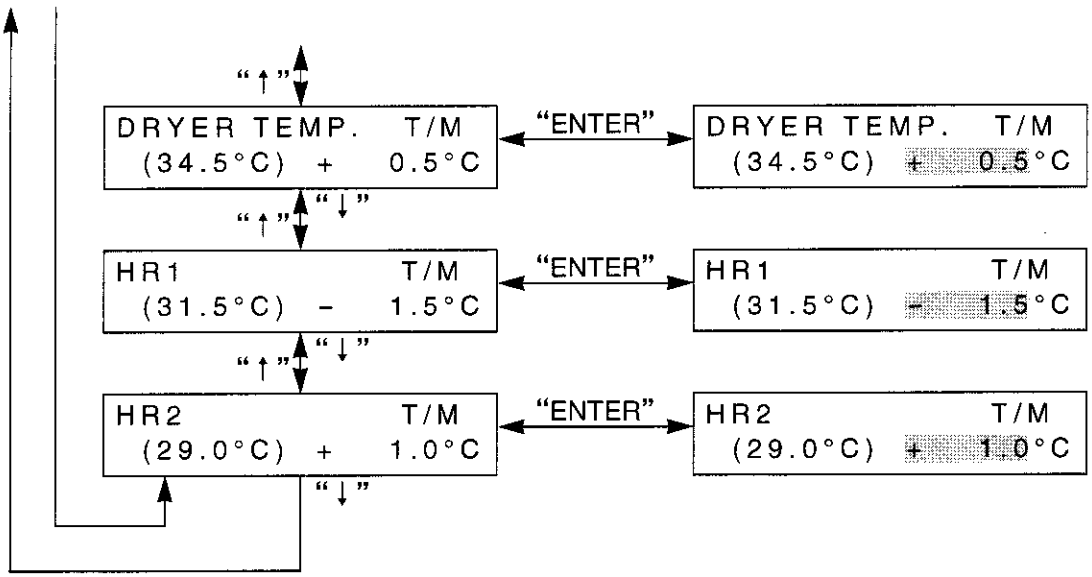
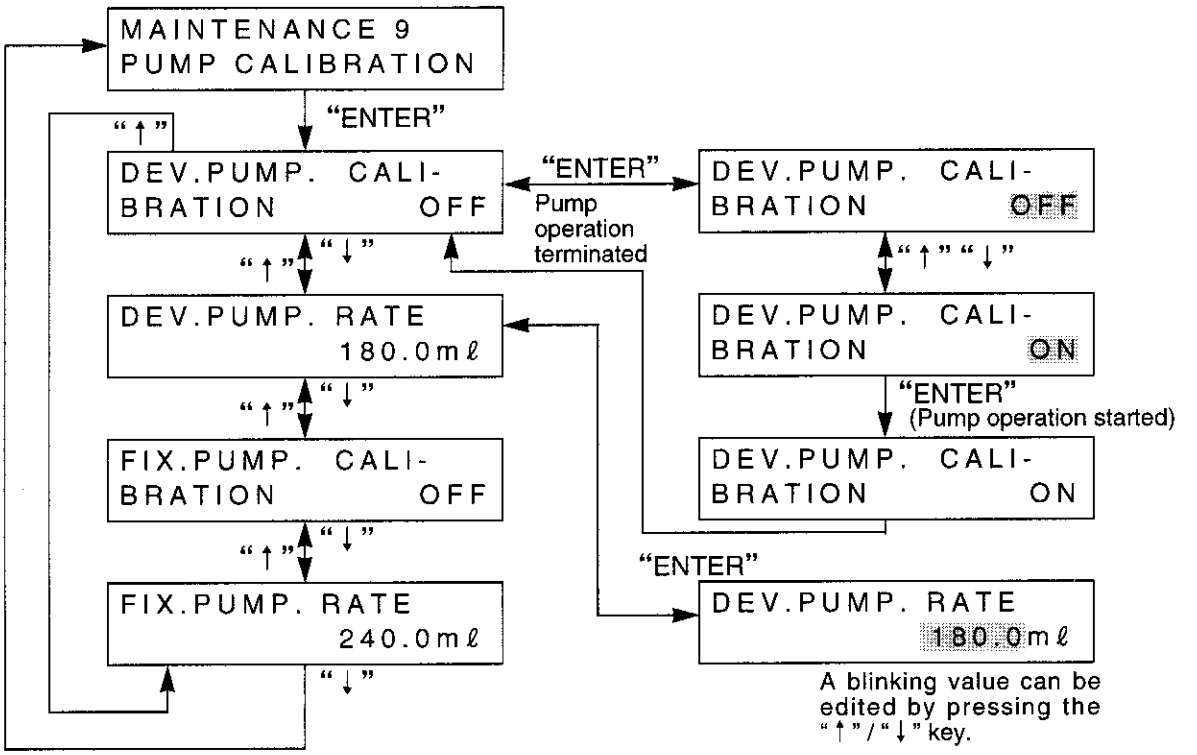


9.7.10 Replenishment Pump Calibration

This function provides replenishment pump calibrations.

9.7.10.1 Screen Transition

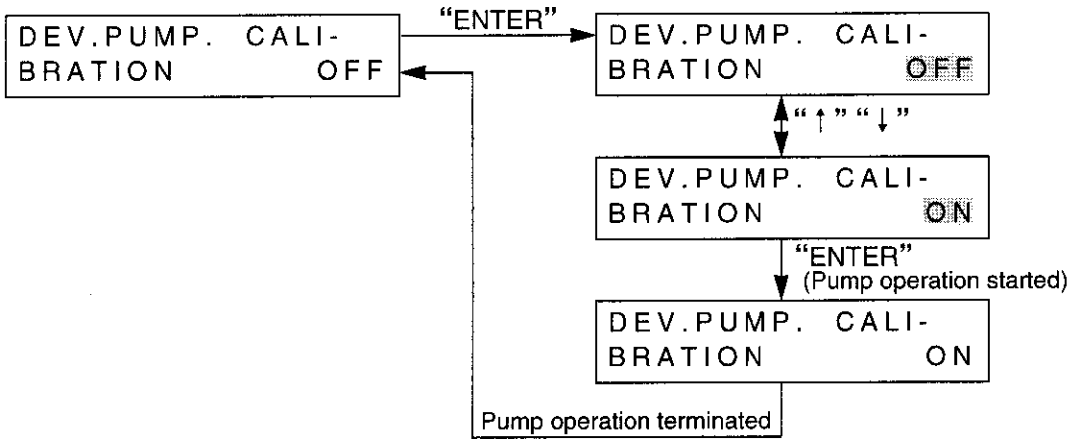


* • The pump operation terminates upon completion of one unit of replenishment.
  • Status switching from ON to OFF cannot be effected.

9.7.10.2 Calibration Procedure

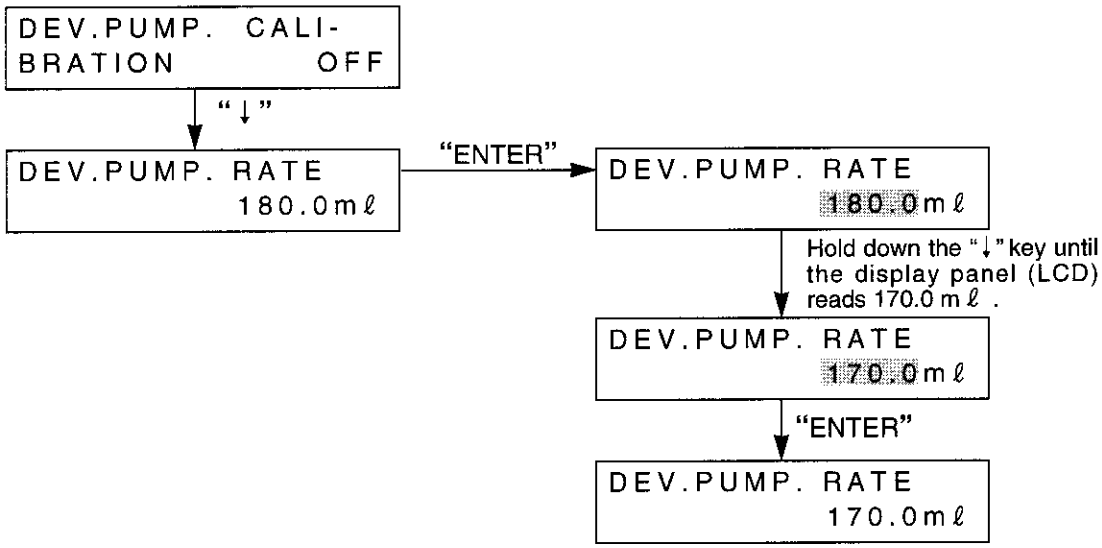
(Although the developer replenishment pump is cited as an example below, the same procedure applies to the developer and fixer replenishment pumps.)

(1) With a graduated cylinder, measure the amounts of five cycles of replenishment.
(Repeat the following step five times.)



(2) Average the five replenishment amount measurements made in step ①,enter the obtained average value as the DEV. PUMP RATE.

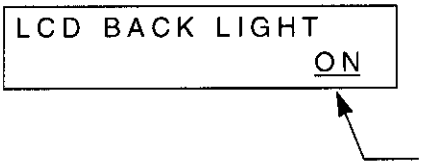
(Example) When the average of five replenishment cycles is 170.0 m ℓ



9.7.11 Display Panel (LCD) Backlight Setup

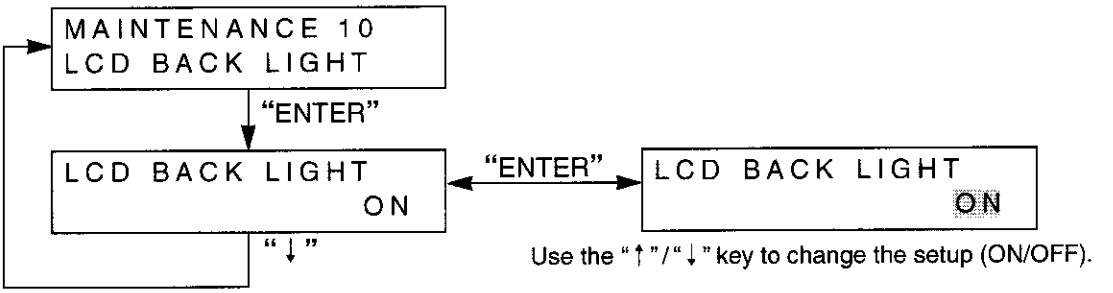
This function is used to change the display panel (LCD) backlight ON/OFF conditions.

Displayed information



display panel (LCD) backlight condition setup
ON : Normal
OFF : The LCD backlight does not turn ON.
(Even when OFF is chosen here, the display panel (LCD) backlight turns ON at the press of the LIGHT key.)

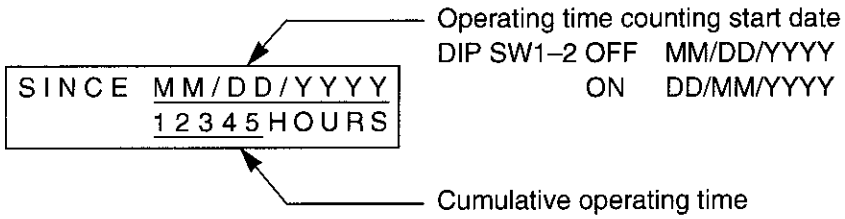
* The display panel (LCD) backlight does not turn ON even at the time of mode switching or error occurrence.



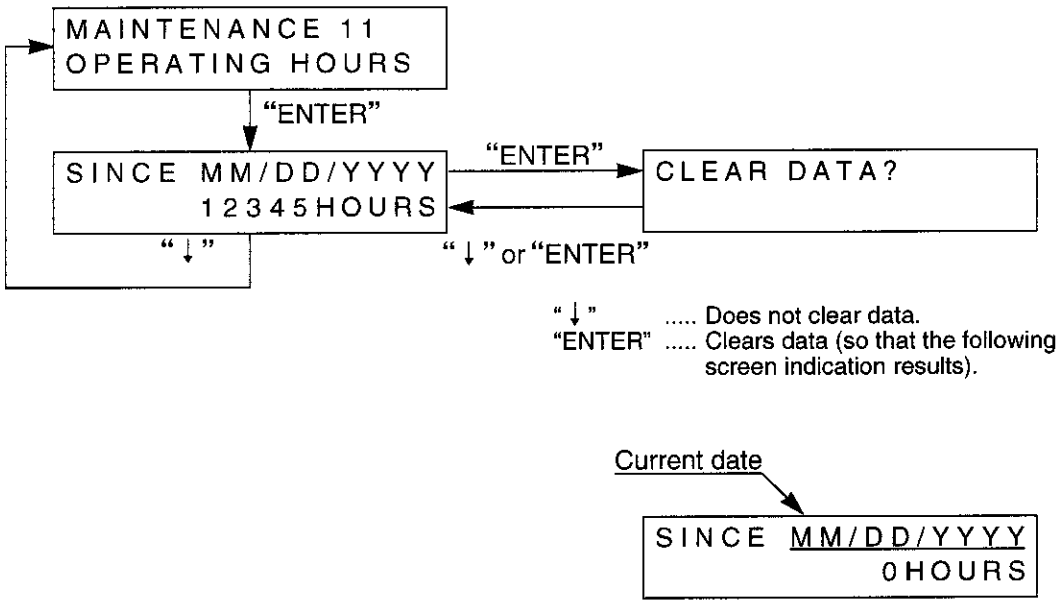
9.7.12 Operating Time Display/Clear

This function is used to display the cumulative operating time or enter relevant data.

Displayed information



When DIP switch SW1-2 is OFF



* When the cumulative operating time exceeds a maximum of 99999 hours, the displayed value resets itself back to 0 (zero).
* The date displayed upon memory clearing is "– –/– –/– – – –."
* Cumulative operating time fractions not smaller than 30 minutes are counted as one hour. (Example: If the cumulative operating time is 30 minutes, the display panel (LCD) reads 1 h.)
* When the ENTER key is pressed from the "CLEAR DATA?" screen, the system clears the cumulative operating time and selects the current date as the operating time counting start date.
* The cumulative operating time is counted during the following processes.
    1. Standby process
    2. Film processing
    3. Selftest bypass processing
    4. Preheat process
    5. Startup process

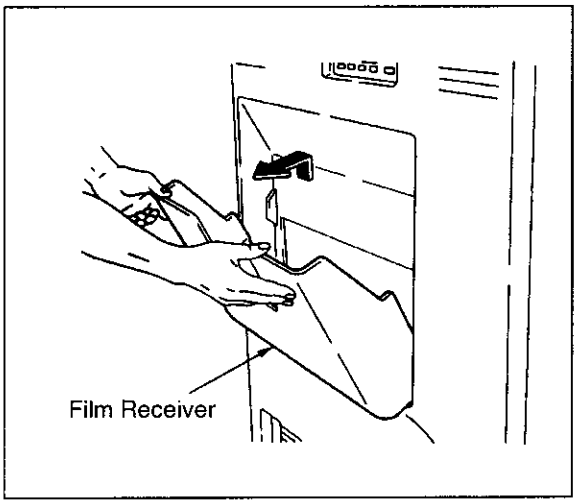
9.7.13 Ranges (Tentative) of Adjustments Provided by Maintenance Mode

Item				Processing speed	Adjustment range	Resolution	Initial value	Unit
Temperature calibration	Circuit board	Developer temperature		—	–4.0 ~ +4.0	0.1	0.0	°C
		Fixer temperature		—	–4.0 ~ +4.0	0.1	0.0	
		Dryer temperature		—	–6.0 ~ +6.0	0.1	0.0	
		Heat roller 1 temperature		—	–10.0 ~ +10.0	0.1	0.0	
		Heat roller 2 temperature		—	–10.0 ~ +10.0	0.1	0.0	
	Thermistor	Developer temperature		—	–4.0 ~ +4.0	0.1	0.0	
		Fixer temperature		—	–4.0 ~ +4.0	0.1	0.0	
		Dryer temperature		—	–6.0 ~ +6.0	0.1	0.0	
		Heat roller 1 temperature		—	–10.0 ~ +10.0	0.1	0.0	
		Heat roller 2 temperature		—	–10.0 ~ +10.0	0.1	0.0	
Replen-ishment correction		Developer pump		—	120.0 ~ 315.0	0.1	180.0	mℓ
		Fixer pump		—	160.0 ~ 420.0	0.1	240.0	
Heat roller temperature setup	Heat roller 1 temperature setting		Main	SP	30.0 ~ 65.0	0.1	52.0	°C
	Heat roller 1 temperature setting			RP	30.0 ~ 65.0	0.1	50.0	
	Heat roller 1 temperature setting		Standby	SP	25.0 ~ 43.0	0.1	30.0	
	Heat roller 1 temperature setting			RP	25.0 ~ 43.0	0.1	30.0	
	Heat roller 2 temperature setting		Main	SP	30.0 ~ 65.0	0.1	52.0	
	Heat roller 2 temperature setting			RP	30.0 ~ 65.0	0.1	50.0	
	Heat roller 2 temperature setting		Standby	SP	25.0 ~ 43.0	0.1	30.0	
	Heat roller 2 temperature setting			RP	25.0 ~ 43.0	0.1	30.0	

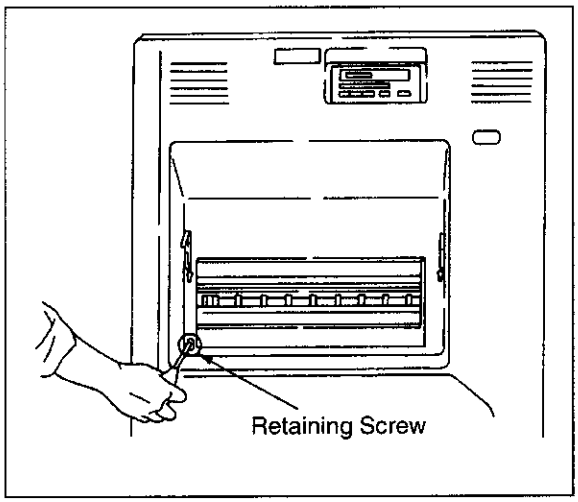
COMPONENT DISASSEMBLY PROCEDURES

10. COMPONENT DISASSEMBLY PROCEDURES

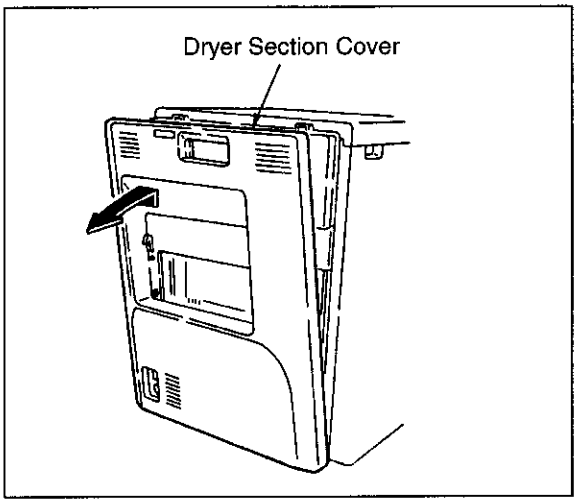
10.1 Dryer Rack Removal



Lift up the film receiver and pull it forward and out.



Remove the retaining screw from the left-hand dryer cover dent section (1 place).

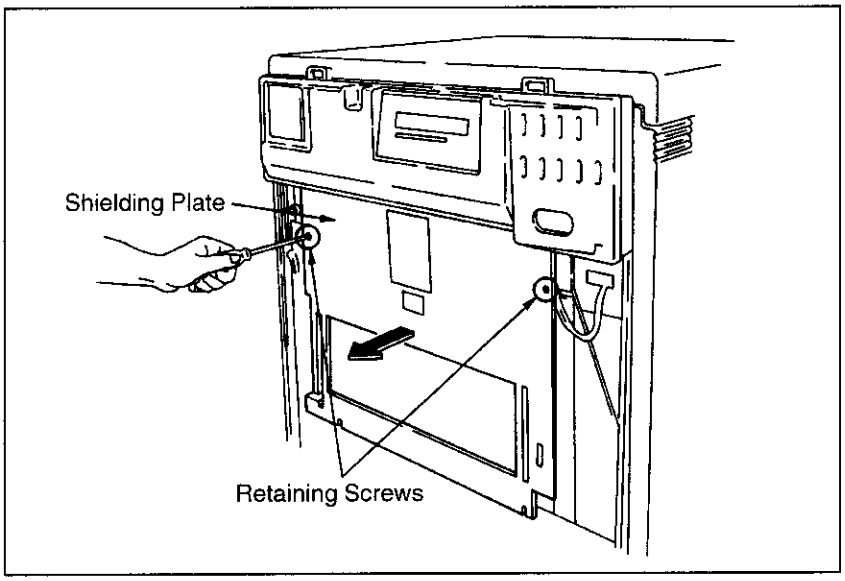


Lift up the dryer section cover and pull it forward and out.

(1) Remove the dryer section cover.

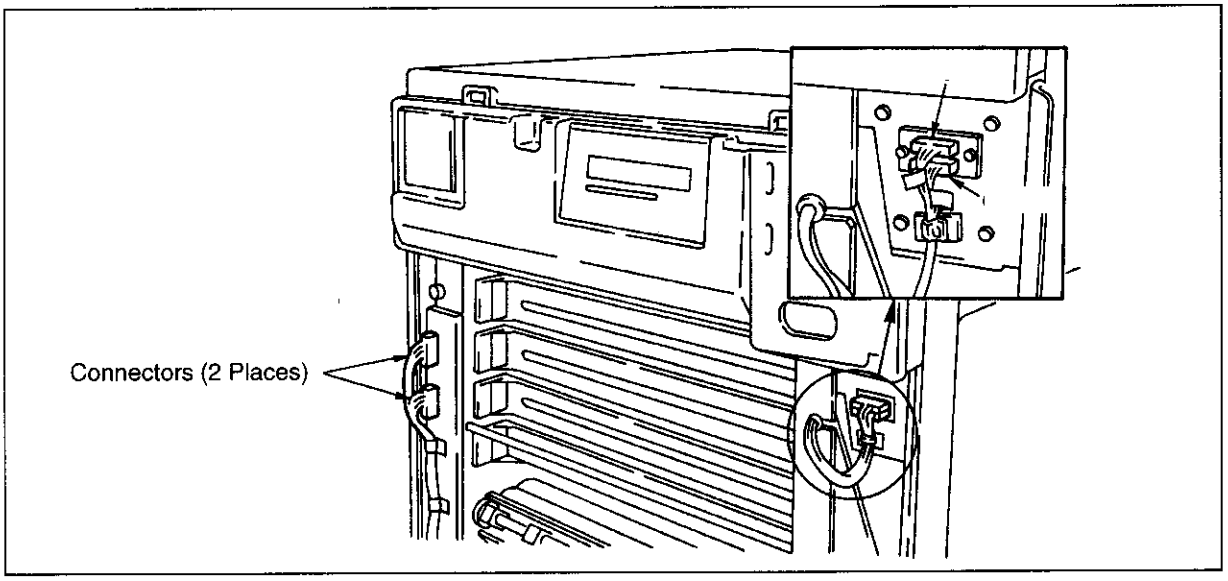
(2) Remove the shielding plate.

- Loosen the retaining screws (one each on the right- and left-hand sides), and then take out the shielding plate.



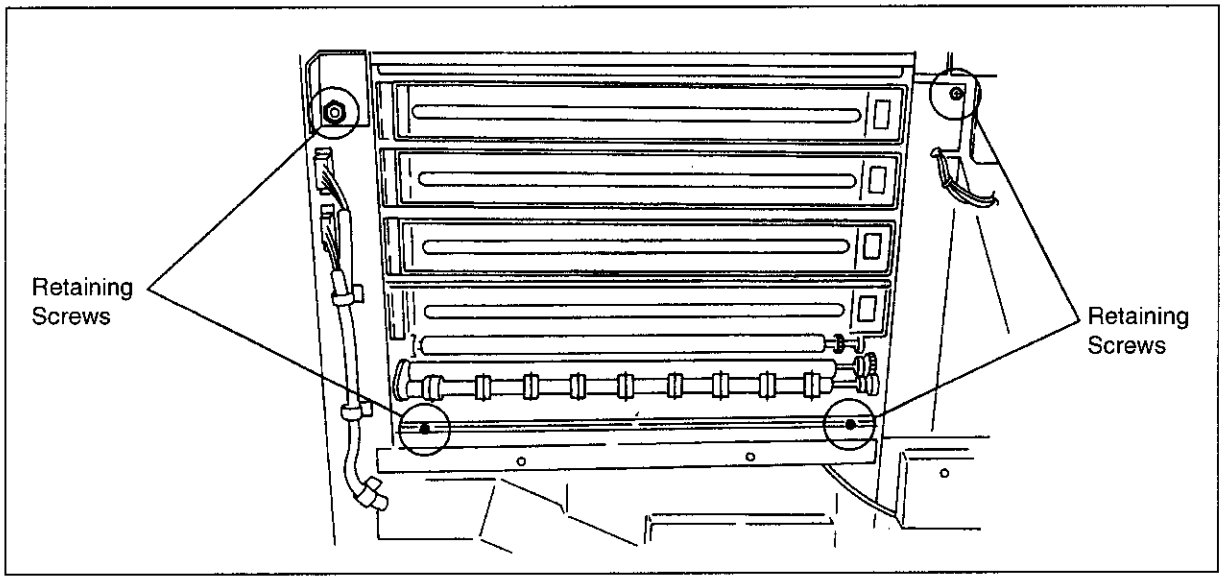
(3) Disconnect the connectors.

- Disconnect the two connectors each from the right- and left-hand sides.



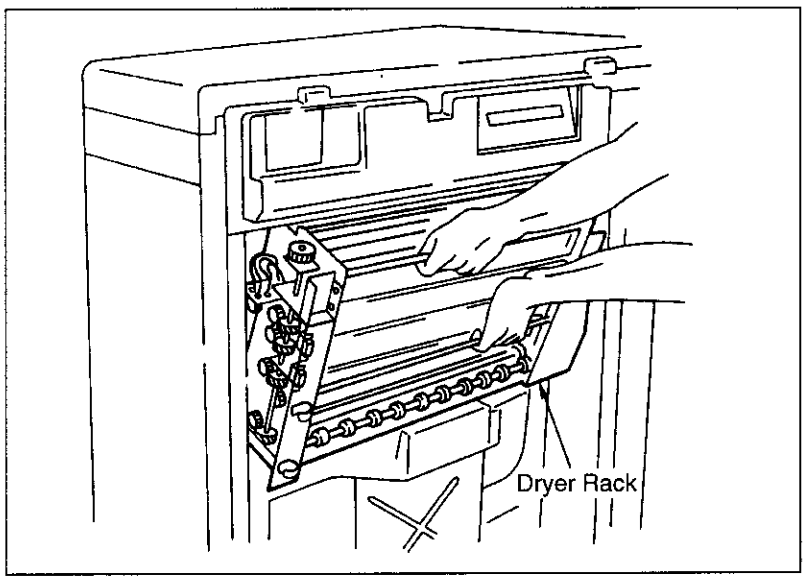
(4) Remove the dryer rack retaining screws.

Remove the four retaining screws.



(5) Remove the dryer rack.

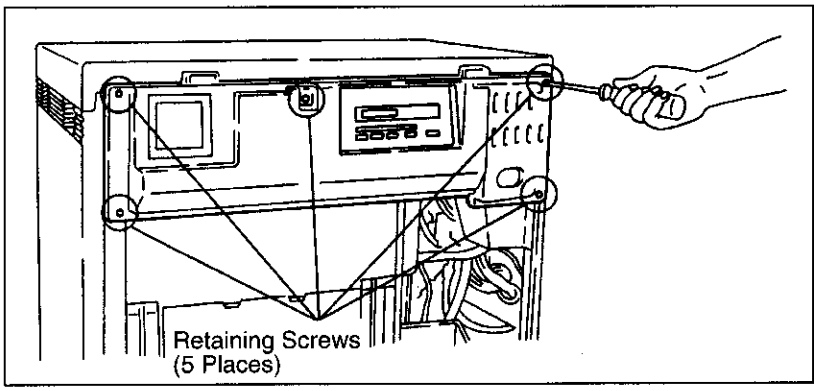
- As shown below, hold the two dryer rack stays and pull the dryer rack out.



10.2 Operational Panel Removal

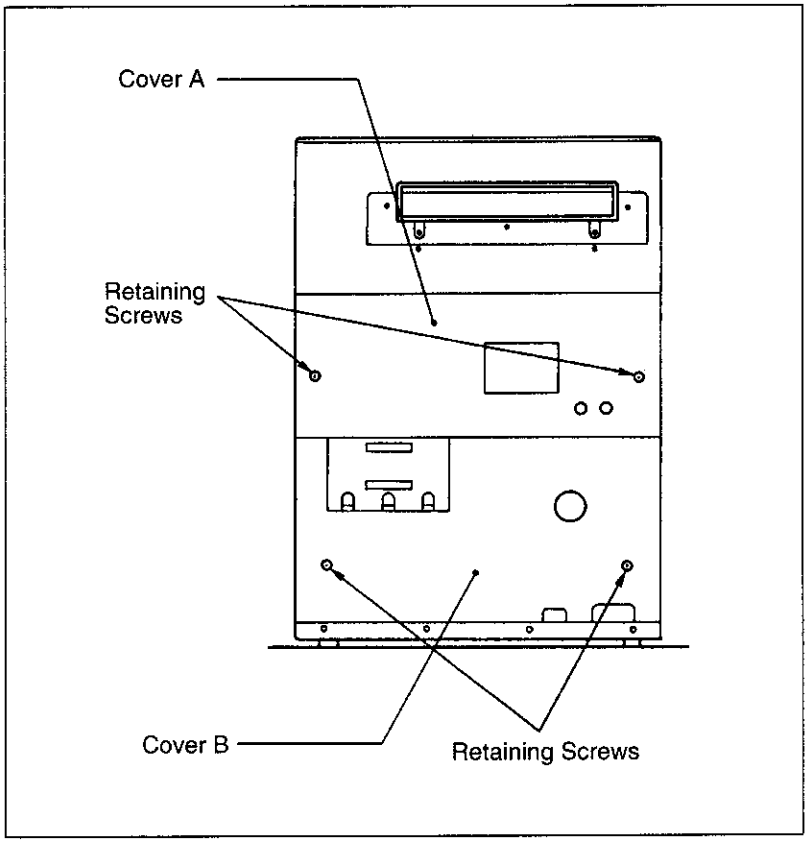
(1) Remove the dryer section cover.
- For the removal procedure, see section 10.1.

(2) Take off the cover.
- Remove the retaining screws (5 places).



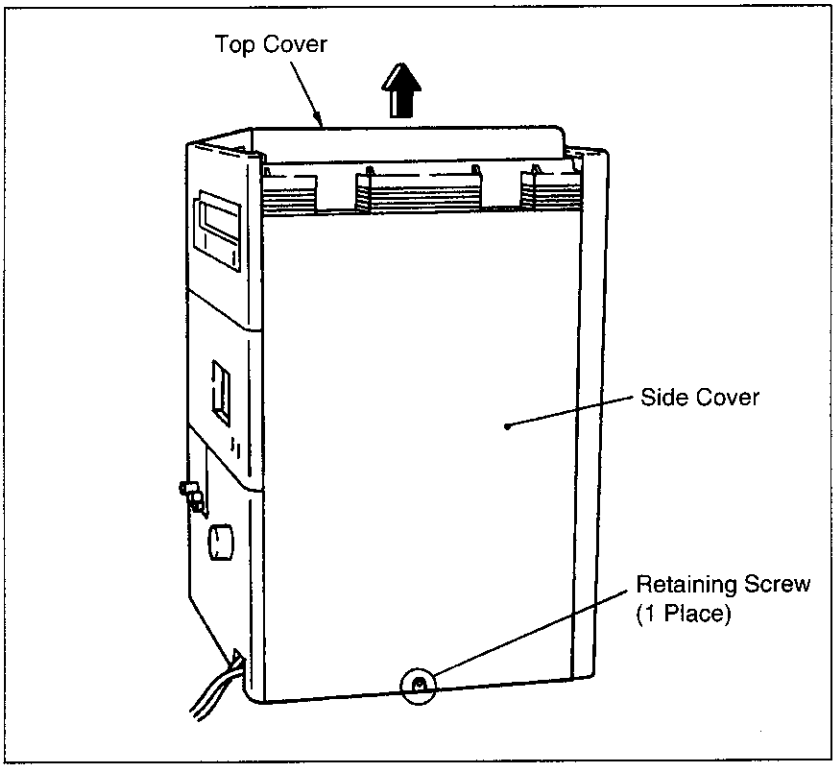
10.3 Feed End Cover Removal

Remove the retaining screws and take off cover A and cover B.



10.4 Side Cover Removal

Take off the side cover after removing its retaining screws (one each on the right- and left-hand sides).

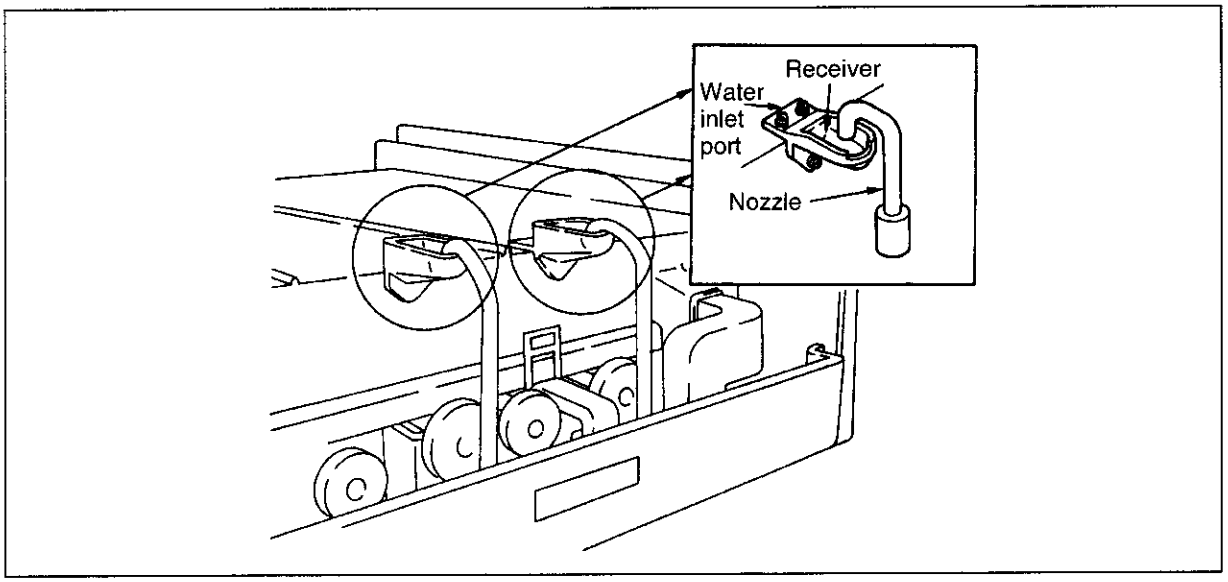


10.5 Processing Section Cover Installation and Removal

(1) Installation

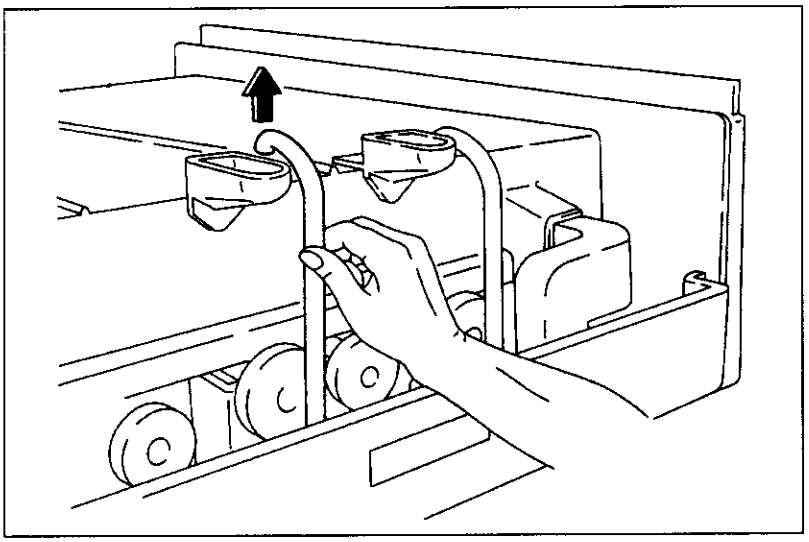
When installing the cover, ensure that the nozzles are properly lodged in the receiver water inlet ports (2 places).

NOTE: *If the nozzles are displaced from their receivers, crossover rack cleaning cannot be performed.*



(2) Removal

- Before removing the cover, separate the nozzle ends from the receivers (2 places).
- Lift the cover up and out.

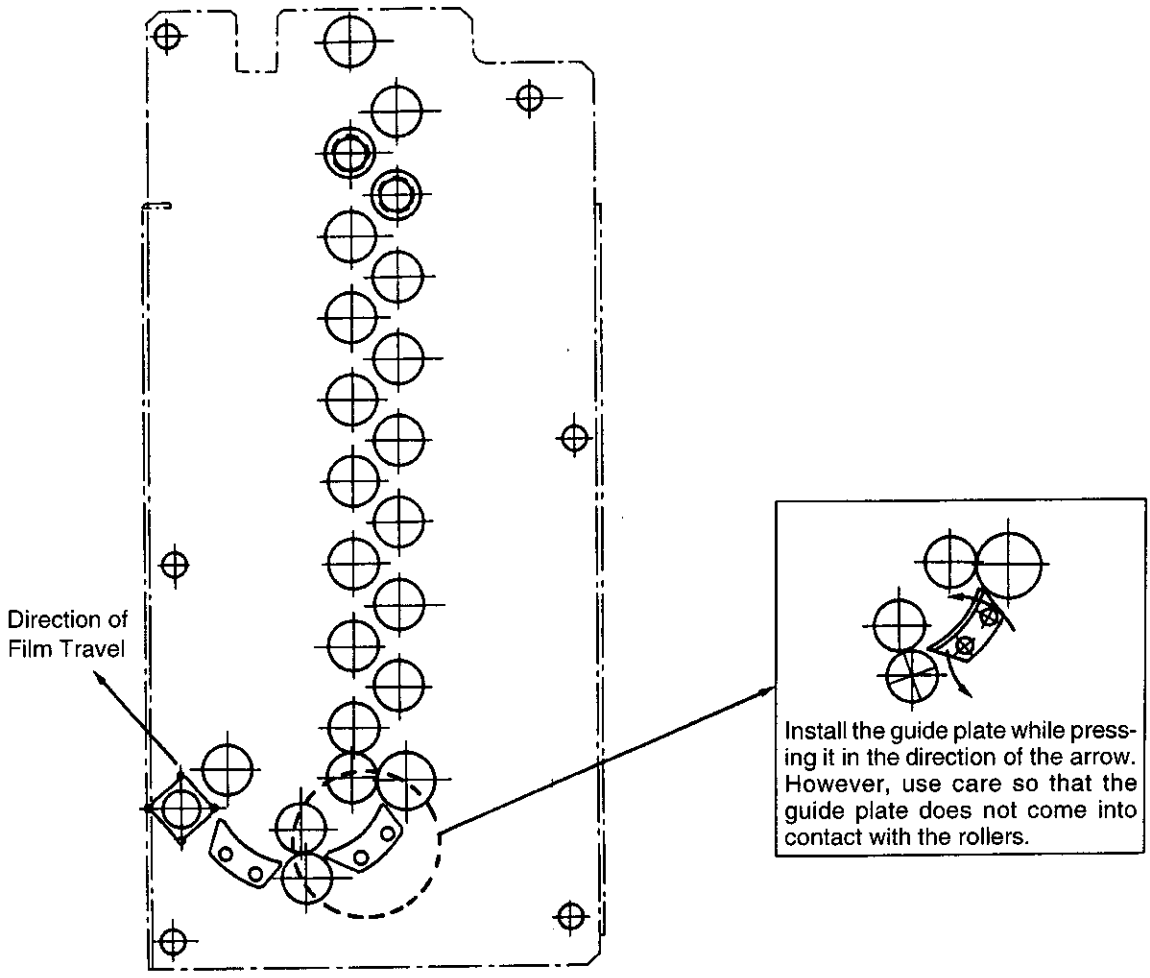


COMPONENT ADJUSTMENT PROCEDURES (STANDARD MOUNTING DIMENSIONS)

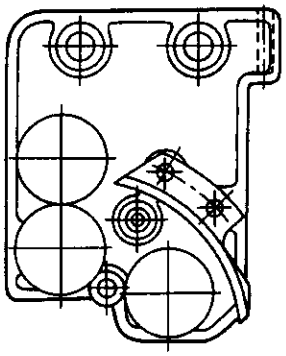
11. COMPONENT ADJUSTMENT PROCEDURES (STANDARD MOUNTING DIMENSIONS)

11.1 Rack Guide Plate Adjustment Dimensions

11.1.1 Dryer Rack Guide Plate Adjustment

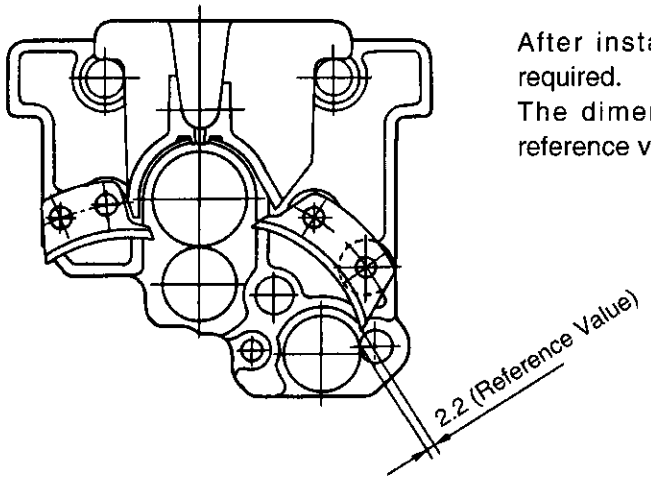


11.1.2 Entry Rack Guide Plate Adjustment



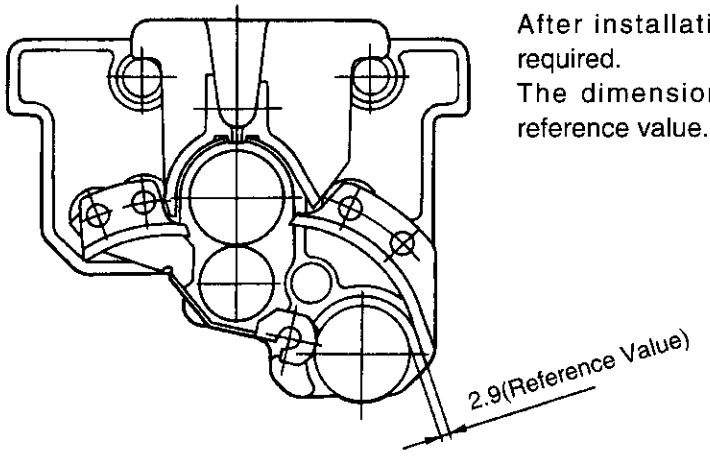
After installation, no further adjustments are required.

11.1.3 Developer/Fixer Crossover Rack Guide Plate Adjustment



After installation, no further adjustments are required.
The dimension indicated in the figure is the reference value.

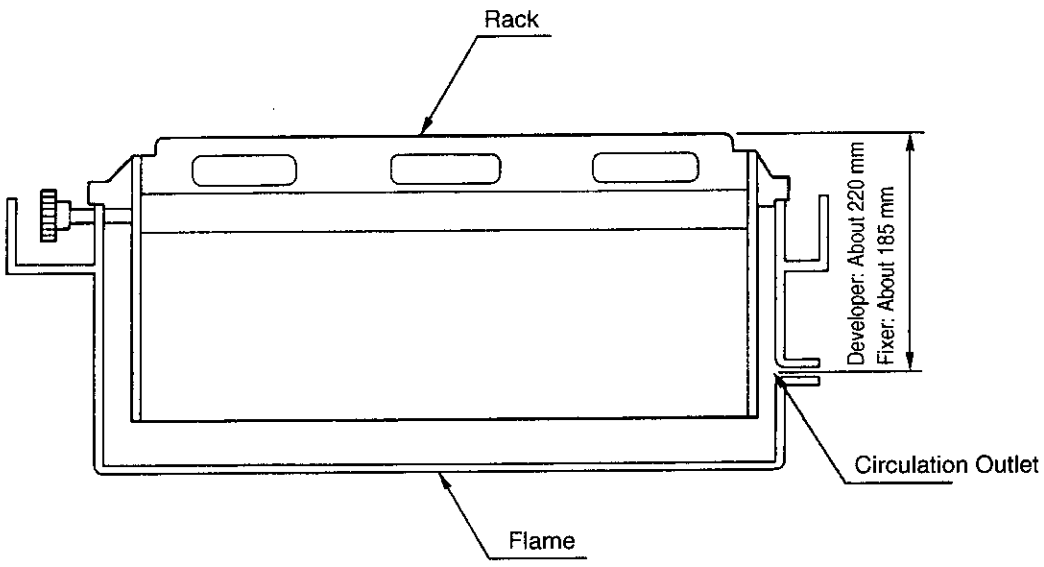
11.1.4 Fixer/Wash Crossover Rack Guide Plate Adjustment



After installation, no further adjustments are required.
The dimension indicated in the figure is the reference value.

11.2 Solution Temperature Calibration Value Measurement Position

After thermistor replacement, measure the solution temperature at the following position to provide temperature calibrations.



The solution temperature must be measured near the circulation outlet on the slave drive side.

11.3 Temperature Calibration Method

When replacing the circuit board

(1) Press the "MODE" + "LIGHT" keys for three seconds or longer, to enter maintenance mode.
(2) Select temperature calibration (see 9.7.9).
(3) Input the numerical value in the table attached to the circuit board in temperature calibration value DEV. TEMP. C/B, FIX. TEMP. C/B, DRYER. TEMP. C/B, HRI. C/B, HR2. C/B (see 9.7.9).
(4) Input the thermistor calibration value in the table attached to the processor in temperature calibration value DEV. TEMP. T/M, FIX. TEMP. T/M, DRYER. TEMP. T/M, HRI. T/M and HR2. T/M (see 9.7.9). Also, copy the numerical value in the table attached to the circuit board and affix it to the processor.

When replacing the thermistor (possible only for development and fixing; no calibration can be made for drying and heat roller)

(1) Press the "MODE" + "LIGHT" keys for three seconds or longer, to enter maintenance mode.
(2) Select maintenance D/F TEMP control as an indepent load drive (see 9.7.7).
(3) Confirm that the developer and fixer tanks are full, and execute the command.
(4) Measure the solution temperature at the solution temperature measurement position (see 11.2).
(5) Select the thermistor value corresponding to temperature calibration (see 9.7.9).
(6) The correction value is input to the measured temperature to be equated with the display temperature.

11.4 Replenishment Pump Calibration

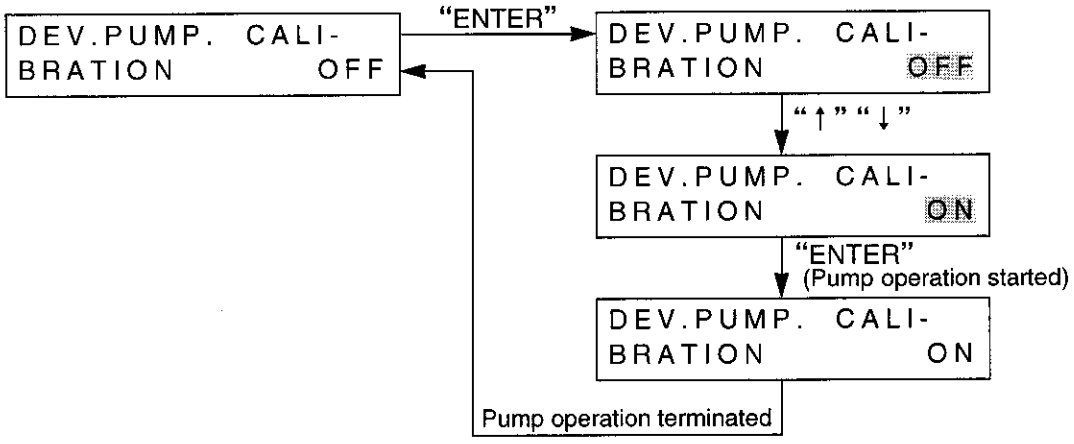
(1) Enter the maintenance mode.
(2) Select the fixed-time replenishment function.
(3) Execute the fixed-time replenishment function for the associated replenishment pump and then measure the pump output volume.
(4) Repeat the measurement sequence the specified number of times (see the table below) and average the results.

Pump	Number of repetitions
Dev.	5
Fix.	5

(5) Select the replenishment pump calibration function.
(6) With the value obtained in step (4) entered, execute the pump calibration function.

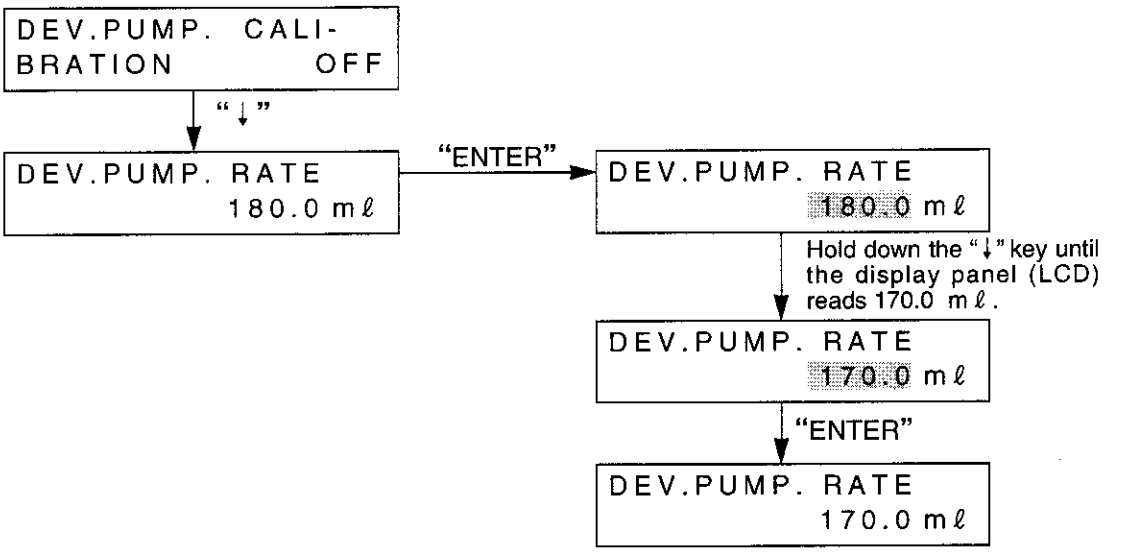
(Although the developer replenishment pump is cited as an example below, the same procedure applies to the developer and fixer replenishment pumps.)

(1) With a graduated cylinder, measure the amounts of five cycles of replenishment.
(Repeat the following step five times.)



(2) Average the five replenishment amount measurements made in step ①, enter the obtained average value as the DEV. PUMP RATE.

(Example) When the average of five replenishment cycles is 170.0 m ℓ

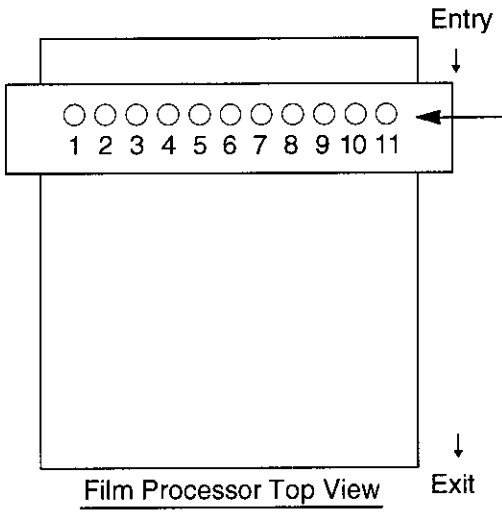


11.5 Film Sensor Sensitivity Adjustment

(1) Enter the maintenance mode and call up the feed entrance sensor screen.

MAINTENANCE 2
ENTRANCE SENSORS

With this function, it is possible to check the voltage of each feed sensor.



Film Processor Top View

(2) Adjustment procedure

Make adjustments so that conditions ① and ② below are met.

① Place all the eleven sensors in the "no film" condition.

Adjust the NMC circuit board trimmer VR1 so that all sensor voltages are 2.5 V or lower.

0.1	0.2	0.1
0.3	0.1	0.1

Displays the voltages of feed sensors 1 through 6. (In the upper line from left to right, sensors are designated 1, 2, and 3, and in the lower line, sensors are designated 4, 5, and 6.)

↑ ↓

0.2	0.2	0.1
0.3	0.3	

Displays the voltages of feed sensors 7 through 11. (In the upper line from left to right, sensors are designated 7, 8, and 9, and in the lower line, sensors are designated 10 and 11.)

(When no film is present)

② Allow all the eleven sensors to detect film.
Adjust the NMC circuit board trimmer VR1 so that all sensor voltages are 3.5 V or higher.

4.3	4.2	4.3
4.3	4.4	4.1

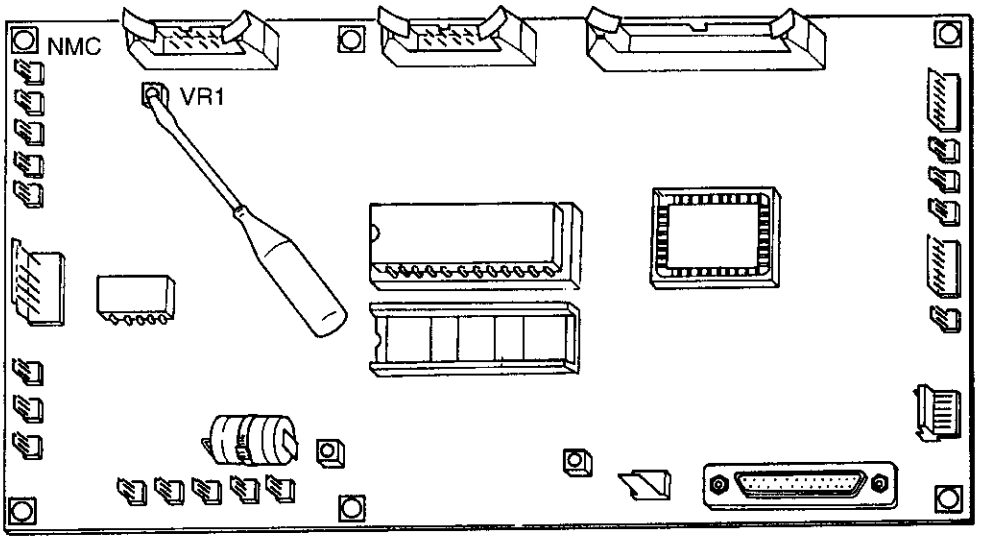
↑ ↓

4.2	4.3	4.3
4.3	4.3	

(When film is present)

Displays the voltages of feed sensors 1 through 6.
(In the upper line from left to right, sensors are designated 1, 2, and 3, and in the lower line, sensors are designated 4, 5, and 6.)

Displays the voltages of feed sensors 7 through 11.
(In the upper line from left to right, sensors are designated 7, 8, and 9, and in the lower line, sensors are designated 10 and 11.)



NMK Circuit Board

(3) In the maintenance mode, call up the feed sensor status screen for verification purposes.

ENTRANCE SENSORS
11001 0**110

• With this function, it is possible to check the feed sensor detection information in real time.

0 → No film present.
1 → Film present.
* → Sensor for which sensor OFF setup has been performed
(the control system concludes that no film is present at this sensor section).

(4) Verification procedure

① Allow all the eleven sensors to detect film.
Make sure that the display panel (LCD) reads as follows.

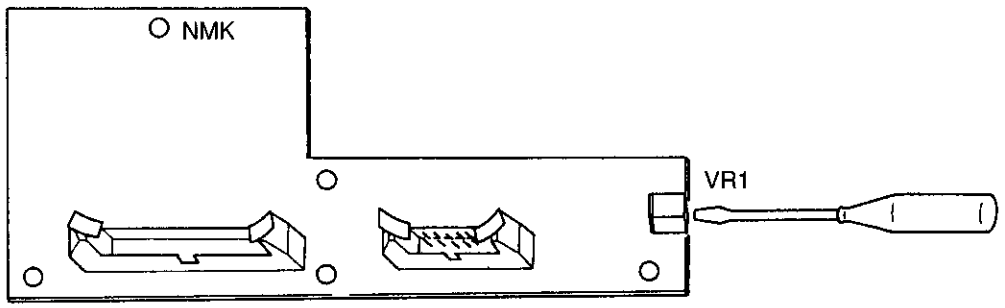
```
ENTRANCE SENSORS
  11111  111111
```

② Place all the eleven sensors in the "no film" condition.
Make sure that the display panel (LCD) reads as follows.

```
ENTRANCE SENSORS
  00000  000000
```

11.6 Display Panel (LCD) Contrast Adjustment

Adjust the display panel (LCD) contrast so as to optimize the display panel (LCD) screen viewability. For this adjustment, use trimmer VR1 on the operational panel circuit board (NMK circuit board).



NMK Circuit Board (Operational Panel Section)

ERROR CODES

12. ERROR CODES

12.1 Error Code System

It is presumed that the FPM6000SP error code system is based on the CEPROS 30 error code system.

- E * * *

Error subcategory: Details of an error (locations, etc.)

Error category: Error Code Standard

Table 1 Error Code Standard

Error code (*: number between 0 and 9)	Error description
E0*	Developer temperature control errors.
E1*	Fixer temperature control errors.
E2*	Dryer temperature control errors.
E3*	Sensor errors.
E4*	Sensor (fuse related) errors.
E5*	Hookup equipment errors.
E6*	Replenishment errors.
E7*	Replenisher tank errors.
E8*	Processing tank errors.
E9*	Circulation system errors.

12.2 Error Levels and Processing Descriptions

For the FPM6000SP, errors may occur in the following situations.

(1) A certain function is exercised in the maintenance or service mode.
(2) An operation is invoked during standby or film processing.

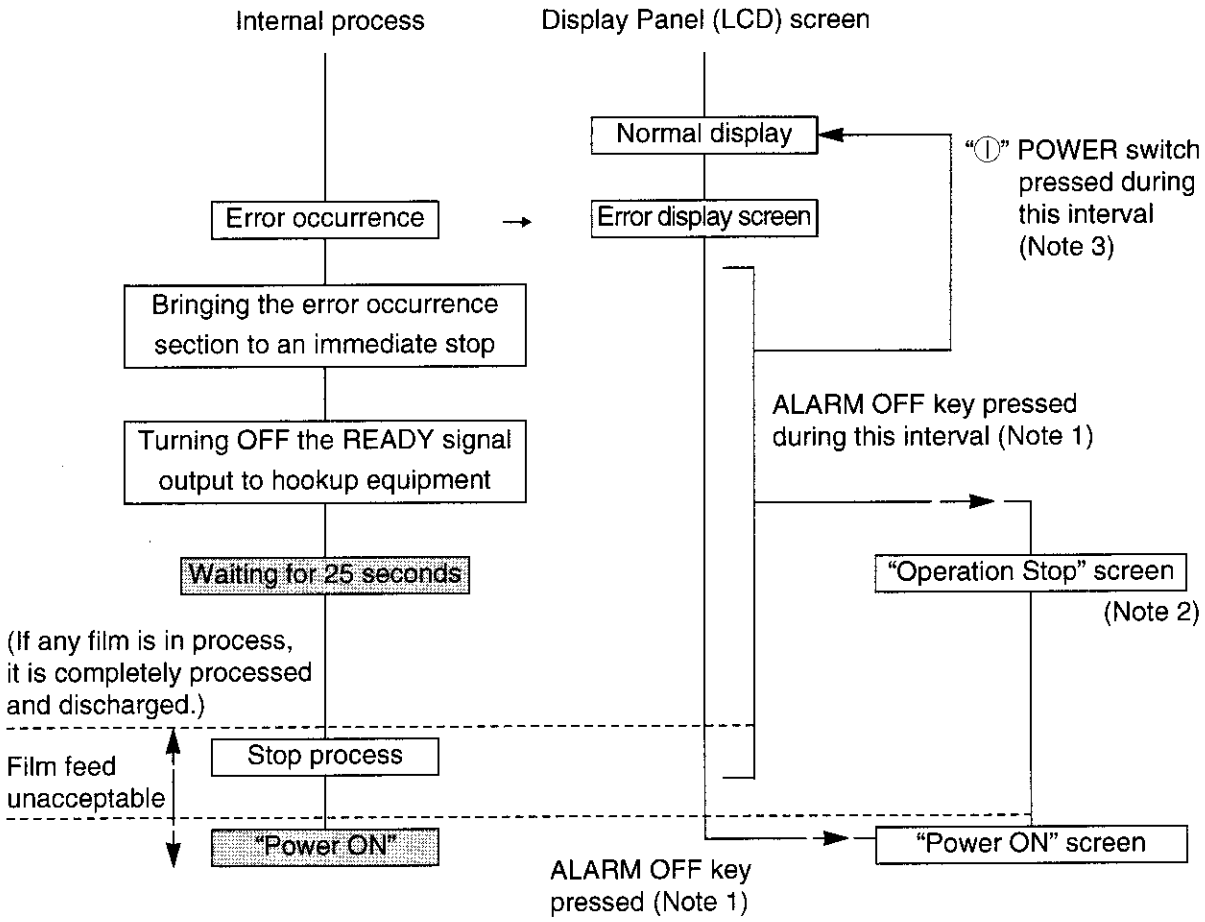
Errors occurring in case 2) above are classified into the following three categories depending on the severity of error. Errors occurring in case 1) above simply stop the ongoing process and are not classified into categories at all.

(1) Serious-level errors
Stop the ongoing operation.
(2) Minor-level errors
Allows the system to continue with its operation.

12.2.1 Serious-level Errors

If this type of error occurs, the system executes the following process.

(1) Gives an error indication.
(2) Immediately stops the error occurrence section.
(3) Turns OFF the READY signal output to the hookup equipment.
(4) Performs the stop process 25 seconds after completion of step 3) (because no more film will possibly be fed into the film processor).
(5) When the stop process is completed, the film processor automatically goes into the "Power ON" state to return to the state prevailing before startup.
In this instance, the film processor can be started up again, but the same error occurs again because the error cause does not automatically clear.
As far as the error cause is not eliminated, such an error recurrence pattern is repeated and the film processor is not able to perform normal operations.
In some cases, however, the selftest bypass processing function can be executed upon error occurrence to carry out an alternative emergency process.



NOTE 1: *If two or more errors have occurred, the error screens go off one by one at each press of the ALARM OFF key. When all error screens have disappeared, the "Operation Stop" or "Power ON" screen appears.*

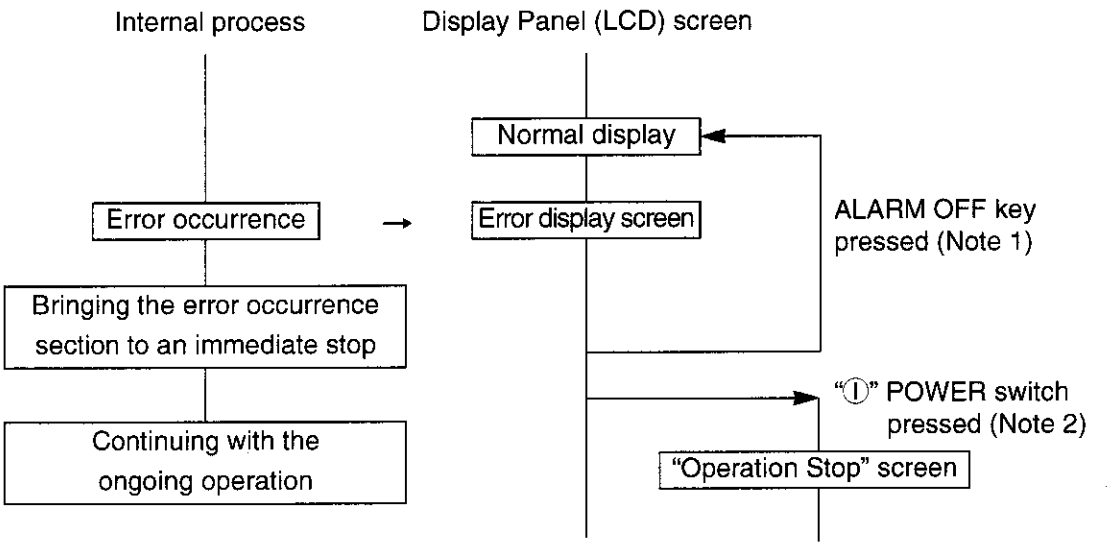
NOTE 2: *When a serious-level error occurs, it may be detected again from the "Operation Stop" screen, causing the system to display the error screen again.*

NOTE 3: *Even if two or more errors have occurred, a single press of the POWER switch key causes the system to clear all errors and return to a normal screen. However, if a serious-level error has occurred, the system may detect the same error again after above POWER switch activation, displaying the same error screen. If the POWER switch is pressed once while an error screen is displayed in the "Power ON" state, the system performs the same process.*

Fig.1 Serious-level Error Process

12.2.2 Minor-level Errors

Minor-level errors do not seriously affect film processing. They notify the user of an ancillary function error or alert the user to conditions which require attention. When this type of error occurs, the film processor internally disables the associated function and continues with the ongoing operation.



NOTE 1: *If two or more errors have occurred, the error screens go off one by one at each press of the ALARM OFF key. When all error screens have disappeared, the system returns to a normal screen.*

NOTE 2: *If the POWER switch is pressed once, the system clears all the existing errors and returns to the "Operation Stop" screen.*

Fig. 2 Minor-level Error Process

12.3 Selftest Bypass Operation

The selftest bypass operation function is exercised, if normal processing function execution is interrupted by an error occurrence, to carry out an urgent operation or continue with operations until the service personnel arrives. The selftest bypass operation function permits the continuation of operations after the occurrence of an error as far as the error does not expose operating personnel to hazardous conditions. The features of the selftest bypass operation function are summarized below.

- High-temperature abnormality, thermistor abnormality (open circuit or short circuit), or other error that endangers the operating personnel engaged in a selftest bypass operation will be detected even during selftest bypass operation function execution to stop the ongoing operation.

- If any hazardous error occurs during a selftest bypass operation, the system performs the same process as for a serious-level error occurrence during a normal operation.

- If a nonhazardous error occurs during a selftest bypass operation, the system performs the same process as for a minor-level error occurrence during a normal operation and does not detect such a nonhazardous error. However, the system simply disables the function related to the error encountered.

- Some errors do not occur during selftest bypass processing (these errors are marked " – " in Table 1/12.4.4 Error Codes).

12.4 Error Codes and Process Descriptions

12.4.1 Display Panel (LCD) Indications

Error indications appearing on the display panel (LCD) consist of 2 lines of 16 one-byte (alphanumeric characters) characters.

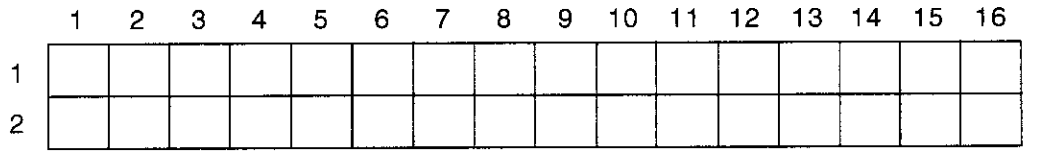


Fig. 3 Display Panel (LCD) Error Indication Character String Limitation

12.4.2 Error Logging

Errors whose codes begin with the letter E are all logged.

12.4.3 Selftest Bypass Processing

When an error to be detected during selftest bypass processing has occurred, the system is not able to enter the selftest bypass processing mode.

12.4.4 Error Codes

Error codes and error processing operations to be performed are summarized in Table 1.

Table 1 Error Indications and Processing Operations (1/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E000	Undefined	SETUP DATA ERROR	–	This error occurs if the NG result is obtained from the save data area check conducted upon power ON.	The save data area is initialized to continue with the ongoing process. (After the occurrence of this error, it is necessary to enter temperature and replenishment calibration data.)
E001	Undefined	PROCESSING AFTER POWER FAILURE	–	The power turned OFF while the previously fed film was in process.	No particular process is performed.

Table 1 Error Indications and Processing Operations (2/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E010	Serious	DEV. TEMPERATURE TOO HIGH	Detected	A developer solution temperature of 42°C was exceeded.	• The developer temperature control system is brought to an immediate stop. • The stop process is performed.
			Not detected	The preselected temperature was exceeded by more than 2°C after the developer temperature control READY condition was established.	
E020	Serious	DEV. TEMPERATURE TOO LOW	Not detected	The temperature was more than 2°C below the setting continuously for a period of 10 minutes or longer after the developer temperature control READY condition was established.	• The developer temperature control system is brought to an immediate stop. • The stop process is performed.
E030	Serious	DEV. HEATER MALFUNCTION	Not detected	Before developer temperature control READY condition establishment, the solution temperature did not rise by 1°C or more within 10 minutes after the start of developer temperature control (*1).	• The developer temperature control system is brought to an immediate stop. • The stop process is performed.
E040	Serious	DEV. THERMISTOR MALFUNCTION	Detected	The indicated thermistor temperature coincides with the open thermistor value (AD value: 20 or smaller).	• The developer temperature control system is brought to an immediate stop. • The stop process is performed.
E050	Serious	DEV. THERMISTOR SHORT CIRCUITED	Detected	The indicated thermistor temperature coincides with the shorted thermistor value (AD value: 208 or greater).	• The developer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (3/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E110	Serious	FIX. TEMPERATURE TOO HIGH	Detected	A fixer solution temperature of 40°C was exceeded.	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed.
E120	Serious	FIX. TEMPERATURE TOO LOW	Not detected	The fixer solution temperature fell below 20°C after fixer temperature control READY condition establishment.	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed.
E130	Serious	FIX. HEATER MALFUNCTION	Not detected	The fixer solution temperature did not rise by 1°C or more within 15 minutes after the start of fixer temperature control. However, this check is to be discontinued if the solution temperature reaches 20°C or higher during this period (*2).	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed.
E140	Serious	FIX THERMISTOR MALFUNCTION	Detected	The indicated thermistor temperature coincides with the open thermistor value (AD value: 20 or smaller).	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed.
E150	Serious	FIX. THERMISTOR SHORT CIRCUITED	Detected	The indicated thermistor temperature coincides with the shorted thermistor value (AD value: 208 or greater).	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (4/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E210	Serious	DRY. TEMPERATURE TOO HIGH	Detected	The hot-air dryer temperature was above 73°C (*3).	• The hot-air dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E211	Serious	HR1 TEMPERATURE TOO HIGH	Detected	The heat roller 1 temperature was above 118°C (*4).	• The heat roller 1 dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E212	Serious	HR2 TEMPERATURE TOO HIGH	Detected	The heat roller 2 temperature was above 118°C (*4).	• The heat roller 2 dryer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (5/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E220	Serious	DRY TEMPERATURE TOO LOW	Not detected	After hot-air dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature (or decreased to 47°C if the calculated value is greater than 47°C) during processes other than standby temperature control.	• The hot-air dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E221	Serious	HR1. TEMPERATURE TOO LOW	Not detected	After heat roller dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature during processes other than standby temperature control. --- The temperature did not rise by 3°C or more within 10 minutes after startup.	• The heat roller 1 dryer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (6/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E222	Serious	HR2. TEMPERATURE TOO LOW	Not detected	After heat roller dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature during processes other than standby temperature control. --- The temperature did not rise by 3°C or more within 10 minutes after startup.	• The heat roller 2 dryer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (7/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E230	Serious	DRY. HEATER MALFUNCTION	Not detected	The temperature did not rise by 3°C or more within 10 minutes after startup.(*5)	• The hot-air dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E231	Serious	HR1 HEATER MALFUNCTION	Not detected	Although the software issued the ON instruction, the SSR current sensor detected no current flow (2-second monitoring).	• The heat roller 1 dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E232	Serious	HR2 HEATER MALFUNCTION	Not detected	Although the software issued the ON instruction, the SSR current sensor detected no current flow (2-second monitoring).	• The heat roller 2 dryer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (8/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E240	Serious	DRY THERMISTOR MALFUNCTION	Detected	The indicated thermistor temperature coincides with the open thermistor value (AD value: 20 or smaller).	• The hot-air dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E241	Serious	HR1 THERMISTOR MALFUNCTION	Detected	The indicated thermistor temperature coincides with the open thermistor value (AD value: 10 or smaller).	• The heat roller 1 dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E242	Serious	HR2 THERMISTOR MALFUNCTION	Detected	The indicated thermistor temperature coincides with the open thermistor value (AD value: 10 or smaller).	• The heat roller 2 dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E250	Serious	DRY. THERMISTOR SHORT CIRCUITED	Detected	The indicated thermistor temperature coincides with the shorted thermistor value (AD value: 208 or greater).	• The hot-air dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E251	Serious	HR1 THERMISTOR SHORT CIRCUITED	Detected	The indicated thermistor temperature coincides with the shorted thermistor value (AD value: 240 or greater).	• The heat roller 1 dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E252	Serious	HR2 THERMISTOR SHORT CIRCUITED	Detected	The indicated thermistor temperature coincides with the shorted thermistor value (AD value: 240 or greater).	• The heat roller 2 dryer temperature control system is brought to an immediate stop. • The stop process is performed.

Table 1 Error Indications and Processing Operations (9/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E260	Serious	HR. SAFETY THERMOSTAT ACTIVATED	Not detected	The heat roller safety thermostat is activated.	• The heat roller dryer temperature control system is brought to an immediate stop. • The stop process is performed.
E310	Serious	ENTRANCE SENSORS MALFUNCTION	–	Film was detected by the film feed sensor at the beginning of operation.	The startup process is stopped.
E340	Serious	DRIVE MOTOR MALFUNCTION	Detected	The drive motor rotating speed dropped to 30% or less of the specified level.	• The motor is stopped. • The stop process is performed.
E350	Minor	TOP COVER OPEN	Detected	In condition of power outage processing, standby, film processing, stop processing, selftest bypass processing, preheat operation, startup processing, an open top cover is detected.	• The motor is stopped (interlock). • Motor stop (interlock) • D-F, F-W crossover roller cleaning pumps stops. • When a closed top cover sensor is detected top cover, error message is cleared.
E360	Minor	PLEASE WAIT! NOT READY YET	Not detected	An attempt was made to feed film while the film processor was in standby and not ready to accept film input.	The drive motor does not turn ON. When the film is removed, the system returns to the normal display screen.
				The READY conditions other than the film processing period and film detection period READY conditions were lost.	The drive motor remains ON, and the associated error indication appears to notify the user of the error.

Table 1 Error Indications and Processing Operations (10/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E361	Minor	NO WATER IN WASH TANK	Not detected	After start of normal operation, film was inserted while there was no water in the wash tank.	• Film is not processed (drive motor does not turn ON). • Error message is cleared when the wash tank is detected to be full of water or when the film is removed.
E362	Minor	WATER LEVEL OF WASH TANK LOW	Not detected	Film was inserted when the wash tank was empty after a full of tank was detected. (This condition does not occur while E331 is present, however.	• Film is not processed (drive motor does not turn ON). • Error message is cleared when the wash tank is detected to be full of water or when the film is removed.
E780	Minor	NO WATER IN STOCK TANK	Not detected	The "full of water"condition was not detected within 20 seconds after the cooling solenoid valve was opened upon water supply tank water insufficiency detection.	• Cooling valve is closed. • Replenishment stopped. • D-F Rack water supply tank pumps stopped. (However, the current processing job is completed.) • F-W Rack water supply tank pumps stopped. • Error message is cleared when the stock tank is detected to be full.
E781	Minor	WATER LEVEL OF STOCK TANK LOW	Not detected	The "full of water" condition was not detected at startup or within 1 minute after E780 occurrence (*6).	• Cooling valve is closed. • Replenishment stopped. • The stop process is performed. • D-F Rack water supply tank pumps stopped. (However, the current processing job is completed.) • F-W Rack water supply tank pumps stopped. • The error message is cleared when the stock tank is detected to be full.
E800	Minor	FAILURE IN TANKS FILLING	–	The "full processing tank" condition was not established even when 18,750mℓ of stock solution was replenished.	The stock solution supply function is disabled.
E810	Serious	NO DEV. IN TANK	–	The developer processing tank did not become full when 750mℓ of solution was added for morning replenishment.	• Morning replenishment is stopped. • The startup process is stopped.

Table 1 Error Indications and Processing Operations (11/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E811	Serious	DEV. LEVEL LOW	Not detected	Before 3 hours elapsed after the start of operation or replenishment, the low developer processing tank solution level was detected during film processing, standby, or preheating. --- The developer processing tank did not become full when 750mℓ of solution was added for solution level retention replenishment.	• The developer temperature control system is brought to an immediate stop. • The stop process is performed. • If solution level retention replenishment is being effected, it is stopped.
E820	Serious	NO FIX. IN TANK	–	The fixer processing tank did not become full when 750mℓ of solution was added for morning replenishment.	• Morning replenishment is stopped. • The startup process is stopped.
E821	Serious	FIX. LEVEL LOW	Not detected	After the replenishment and before 3 hours elapsed after the start of operation, the low developer processing tank solution level was detected during film processing, standby, or preheating. --- The developer processing tank did not become full when 750mℓ of solution was added for solution level retention replenishment.	• The fixer temperature control system is brought to an immediate stop. • The stop process is performed. • If solution level retention replenishment is being effected, it is stopped.

Table 1 Error Indications and Processing Operations (12/12)

Error code	Error level	On-screen message	Selftest Bypass processing period	Error cause	Processing performed after error occurrence
E830	Minor	NO WATER IN WASH TANK	Not detected	The wash tank did not become full within 10 minutes after the start of a normal operation (*7).	• The wash water valve is closed. • Even if the error is cleared, it is detected again 10 minutes later. • The error message is cleared when the stock tank is detected to be full.
E831	Serious	WATER LEVEL OF WASH TANK LOW	Not detected	After the wash tank was filled up once, the "low water level" was continuously detected for a period of 10 seconds or longer during standby.	• The wash water valve is closed. • The stop process is performed.
W003	Serious	CONNECTED EQUIPMENT WORKING	Detected	While the connected equipment was in operation, the "ⓘ" POWER switch was pressed to stop its operation.	If the "in operation" signal is turned OFF, the display is cleared and the standby or processing state is displayed.

* Notes on the stop process
The READY OFF condition prevails so that no film feed is acceptable.

<*1>
Developer temperature rise rate: 0.35°C/min or higher
Therefore, the maximum time required for 1°C temperature increase is as follows.

$1/0.35 \fallingdotseq 2.9$ min

When a margin is added and the resulting value is multiplied by 3, the following is obtained.

$2.9 \times 3 = 8.7$ min $\fallingdotseq 9$ min

The margin should be liberally provided in consideration of circulation.
Therefore, the system checks for a temperature rise rate of higher than 1°C/10 minutes.

<*2>
Fixer temperature rise rate: 0.28°C/min or higher
Therefore, the maximum time required for 1°C temperature increase is as follows.

$1/0.28 \fallingdotseq 3.6$ min

When a margin is added and the resulting value is multiplied by 3, the following is obtained.

$3.6 \times 3 + 10.8$ min $\fallingdotseq 11$ min

The margin should be liberally provided in consideration of circulation.
Therefore, the system checks for a temperature rise rate of higher than 1°C/15 minutes.
This check is discontinued after a fixer solution temperature of 20°C is reached because processing can be conducted at a certain fixer temperature which may be lower than the preselected point.

<*3>

The dryer temperature setting upper limit is 60°C.
The temperature at the thermistor mounting section is about 10°C higher than in the dryer.
Therefore, a temperature of 73°C is chosen with an appropriate margin provided.

<*4>

For the FPM6000SP, the maximum heat roller temperature is 90°C.
When a film traveling within the heat roller section comes out of it, the temperature overshoots by a maximum of about 10°C.
When such an overshoot is considered, the heat roller maximum temperature is calculated as follows.

90 + 10 = 100°C

When a margin is added to the above value, the following is obtained.

100 + 18 (margin) = 118°C

<*5>

The dryer heater capacity is as follows.

FPM6000SP : 2.6 kW

Check by checking whether the temperature rise over a period of 10 minutes is more than 3°C.

<*6>

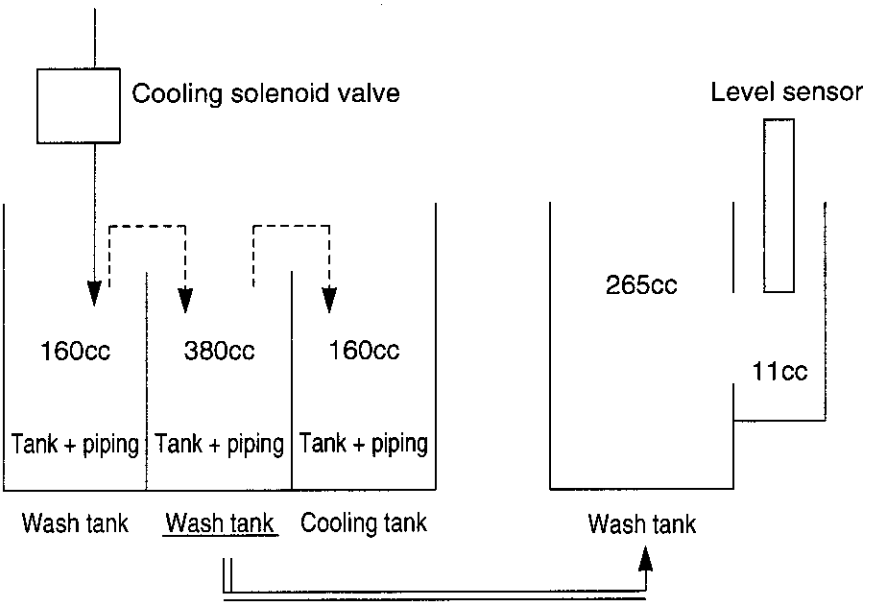


Fig. 4 Water Supply Tank Structure

Figure 4 indicates that the capacity required for level sensor ON is calculated as follows.

Water supply tank capacity = 540 cc

Since the cooling solenoid valve flow rate is 1.5 Lit/min, the time required for water supply is calculated as follows.

Required capacity/cooling solenoid valve flow rate $\times 60$ = 540/1500 $\times 60 \fallingdotseq$ 22 sec

It takes 10 seconds for the software to read level sensor status changes.
Therefore, the minimum solution level monitoring time is as follows.

22 + 10 = 32 sec

When a margin is added and the resulting value is multiplied by 2, the following is obtained.

$32 \times 2 = 64$ sec $\fallingdotseq$ 60 sec = 1 min

<*7>

Wash tank capacity: 12 L
Water supply solenoid valve flow rate: 3 L/min
Thus, the time required for water supply to the wash tank is calculated as follows.

12/3 = 4 min

When a margin is added, the following is obtained.

10 min

TROUBLESHOOTING GUIDE
(ERROR INDICATIONS, CHECKS, AND REMEDIES)

13. TROUBLESHOOTING GUIDE (ERROR INDICATIONS, CHECKS, AND REMEDIES)

Error indication	Error occurrence conditions/checks	Remedy
E 010 DEV.TEMPERATURE TOO HIGH **<Operations performed upon error occurrence>** 1. The developer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 010 • The developer temperature is above 40°C. • After the film processor is ready, this error also occurs if the developer temperature is more than 2°C higher than the setting. Turn OFF the NFB and disconnect the developer heater from the TB2. Is the developer temperature correction value correct? NO → ☆ Was the correction value greatly changed after thermistor or other component replacement? → Enter the proper correction value. YES Is the circulation pump running? NO → ☆ Execute the "circulation pump" independent load drive function in the maintenance mode to check. → See under "Circulation pump check - When it does not turn ON." YES Is the cooling water temperature proper? NO → ☆ For proper developer temperature maintenance, the cooling water temperature must be at least 5°C lower than the developer temperature setting. → Lower the cooling water temperature. YES Is the cooling water flowing? NO → ☆ Execute the "cooling solenoid valve" independent load drive function in the maintenance mode to check. → See under "Cooling solenoid valve check - When it does not turn ON." YES Execute the "circulation pump" independent load drive function in the maintenance mode. Is the difference between the maintenance mode developer temperature indication and thermometer reading within ±5°C? YES → See under "Developer heater check - When it does not turn OFF." NO Execute the "circulation pump" independent load drive function in the maintenance mode. Measure the resistance between developer thermistor CN21 connector pins 1 and 2 and convert it to a temperature equivalent. Is the difference between the obtained temperature value plus correction value and thermometer reading within ±5°C? ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. YES → Replace the NMC circuit board.
E 020 DEV.TEMPERATURE TOO LOW	E 020 • After developer temperature control READY condition establishment, the developer temperature remained more than 2°C below the setting for 10 minutes.	
E 030 DEV.HEATER MALFUNCTION **<Operations performed upon error occurrence>** 1. The developer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 030 • Before developer temperature control READY condition establishment, the solution temperature did not rise by 1.0°C or more within 10 minutes after the start of developer temperature control. Is the circulation pump running? NO → See under "Circulation pump check - When it does not turn ON." YES Is the cooling water left flowing? YES → See under "Cooling solenoid valve check - When it does not turn OFF." NO → See under "Developer heater check - When it does not turn ON."
E 040 DEV.THERMISTOR MALFUNCTION **<Operations performed upon error occurrence>** 1. The developer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	The indicated thermistor AD converted value coincides with the open thermistor value (AD value of 20 or smaller). • The displayed developer temperature is not higher than (0°C + correction value). (However, the value 0°C is displayed if the temperature is below 0°C.) * Correction value = developer temperature circuit board + developer temperature thermistor • The voltage between NMC circuit board terminals TP6 and TP4 is 20 × VREF1/255 VDC or lower. (When VREF1 = 4.64 V, 20 × 4.64/255 = 0.36 V or lower.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between developer thermistor CN21 connector pins 1 and 2 about 45 kΩ or greater at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. NO → Replace the NMC circuit board.

Error indication	Error occurrence conditions/checks	Remedy
E 050 DEV.THERMISTOR SHORT CIRCUITED **<Operations performed upon error occurrence>** 1. The developer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 050 • The indicated thermistor AD converted value coincides with the shorted thermistor value (AD value of 208 or greater). • The displayed developer temperature is not lower than (89.5°C + correction value). (However, the value 99.9°C is displayed if the temperature is 100°C or higher.) * Correction value = developer temperature circuit board + developer temperature thermistor • The voltage between NMC circuit board terminals TP6 and TP4 is 208 × VREF1/255 VDC or higher. (When VREF1 = 4.64 V, 208 × 4.64/255 = 3.78 V or higher.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Same as E010.	
E 110 FIX.TEMPERATURE TOO HIGH **<Operations performed upon error occurrence>** 1. The fixer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 110 • The fixer temperature is above 40°C. Turn OFF the NFB and disconnect the fixer heater from the TB2. Is the fixer temperature correction value correct? — NO → ☆ Was the correction value greatly changed after thermistor or other component replacement? → Enter the proper correction value. YES Is the circulation pump running? — NO → ☆ Execute the "circulation pump" independent load drive function in the maintenance mode to check. → See under "Circulation pump check - When it does not turn ON." YES Execute the "circulation pump" independent load drive function in the maintenance mode. Is the difference between the maintenance mode fixer temperature indication and thermometer reading within ±5°C? — YES → See under "Fixer heater check - When it does not turn OFF." NO Execute the "circulation pump" independent load drive function in the maintenance mode. Measure the resistance between fixer thermistor CN22 connector pins 1 and 2 and convert it to a temperature equivalent. Is the difference between the obtained temperature value plus correction value and thermometer reading within ±5°C? — YES → ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. NO → Replace the NMC circuit board.	
E 120 FIX.TEMPERATURE TOO LOW E 130 FIX.HEATER MALFUNCTION **<Operations performed upon error occurrence>** 1. The fixer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 120 • After fixer temperature control READY condition establishment, the fixer temperature was lower than 20°C. E 130 • The fixer temperature did not rise by 1.0°C or more within 15 minutes after the start of temperature control. Is the circulation pump running? — NO → See under "Circulation pump check - When it does not turn ON." YES → See under "Fixer heater check - When it does not turn ON."	
E 140 FIX.THERMISTOR MALFUNCTION **<Operations performed upon error occurrence>** 1. The fixer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 140 The indicated thermistor AD converted value coincides with the open thermistor value (AD value of 20 or smaller). • The displayed fixer temperature is not higher than (0°C + correction value). (However, the value 0°C is displayed if the temperature is below 0°C.) * Correction value = fixer temperature circuit board + fixer temperature thermistor • The voltage between NMC circuit board terminals TP7 and TP4 is 20 × VREF1/255 VDC or lower. (When VREF1 = 4.64 V, 20 × 4.64/255 = 0.36 V or lower.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between fixer thermistor CN22 connector pins 1 and 2 about 45 kΩ or greater at normal temperature? — YES → ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. NO → Replace the NMC circuit board.	

Error indication	Error occurrence conditions/checks	Remedy
E 150 FIX.THERMISTOR SHORT CIRCUITED **<Operations performed upon error occurrence>** 1. The fixer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 150 The indicated thermistor AD converted value coincides with the shorted thermistor value (AD value of 208 or greater). • The displayed fixer temperature is not lower than (89.5°C + correction value). (However, the value 99.9°C is displayed if the temperature is 100°C or higher.) * Correction value = fixer temperature circuit board + fixer temperature thermistor • The voltage between NMC circuit board terminals TP7 and TP4 is 208 × VREF1/255 VDC or higher. (When VREF1 = 4.64 V, 208 × 4.64/255 = 3.78 V or higher.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Same as E110.	
E 210 DRY TEMPERATURE TOO HIGH **<Operations performed upon error occurrence>** 1. The hot air dryer temperature control system is brought to an immediate stop(but a standby operation is conducted). If the error occurs during service mode dryer temperature control function execution, however, the temperature control systems for heat rollers 1 and 2 are also brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 210 • The hot-air dryer temperature is above 83°C (the LCD temperature reading is above 73°C). (Cables ⓐ, ⓑ, and ⓒ in the dryer heater A/B control hardware drawing) Is the dryer temperature correction value correct? — NO → ☆ Was the correction value greatly changed after thermistor or other component replacement? → Enter the proper correction value. YES Is the dryer fan running? — NO → ☆ Execute the "Dry" independent load drive function in the maintenance mode to check. → See under "Dryer fan check - When it does not turn ON." YES Is the difference between the maintenance mode dryer temperature indication and thermometer reading within ±5°C? — YES → See under "Dryer heater A check - When it does not turn OFF." See under "Dryer heater B check - When it does not turn OFF." NO Measure the resistance between hot-air dryer thermistor CN23 connector pins 1 and 2 and convert it to a temperature equivalent. Is the difference between the obtained temperature value plus correction value and thermometer reading within ±5°C? — NO → ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. YES → Replace the NMC circuit board.	
E 211 HR1 TEMPERATURE TOO HIGH **<Operations performed upon error occurrence>** 1. The heat roller 1 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 211 • The heat roller 1 temperature is above 118°C. Disconnect dryer rack connector CN130. Is the heat roller 1 dryer temperature correction value correct? — NO → ☆ Was the correction value greatly changed after thermistor or other component replacement? → Enter the proper correction value. YES Is the dryer fan running? — NO → ☆ Execute the "Dry" independent load drive function in the maintenance mode to check. → See under "Dryer fan check - When it does not turn ON." YES Is the difference between the maintenance mode heat roller 1 dryer temperature indication and thermometer reading within ±5°C? — YES → See under "Heat roller 1 check - When it does not turn OFF." NO Measure the resistance between heat roller 1 dryer thermistor CN26 connector pins 1 and 2 (on the NMC circuit board) and convert it to a temperature equivalent. Is the difference between the obtained temperature value plus correction value and thermometer reading within ±5°C? — NO → ☆ Measure the resistance with the connector disconnected from the circuit board. → Replace the thermistor. YES → Replace the NMC circuit board.	

Error indication	Error occurrence conditions/checks	Remedy
E 212 HR2 TEMPERATURE TOO HIGH **<Operations performed upon error occurrence>** 1. The heat roller 2 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 212 • The heat roller 2 temperature is above 118°C. Disconnect dryer rack connector CN130. Is the heat roller 2 dryer temperature correction value correct? — NO → ☆ Was the correction value greatly changed after thermistor or other component replacement? YES Is the dryer fan running? — NO → ☆ Execute the "Dry" independent load drive function in the maintenance mode to check. YES Is the difference between the maintenance mode heat roller 1 dryer temperature indication and thermometer reading within ±5°C? — YES NO Measure the resistance between heat roller 1 dryer thermistor CN27 connector pins 1 and 2 (on the NMC circuit board) and convert it to a temperature equivalent. Is the difference between the obtained temperature value plus correction value and thermometer reading within ±5°C? — NO → ☆ Measure the resistance with the connector disconnected from the circuit board. YES	Enter the proper correction value. See under "Dryer fan check - When it does not turn ON." See under "Heat roller 2 check - When it does not turn OFF." Replace the thermistor. Replace the NMC circuit board.
E 220 DRY TEMPERATURE TOO LOW **<Operations performed upon error occurrence>** 1. The hot-air dryer temperature control system is brought to an immediate stop(but a standby operation is conducted). If the error occurs during service mode dryer temperature control function execution, however, the temperature control systems for heat rollers 1 and 2 are also brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 220 After hot-air dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature (or decreased to 47°C if the calculated value is greater than 47°C) during processes other than standby temperature control.	Perform troubleshooting as directed under "Dryer heater A check - When it does not turn ON" and "Dryer heater B check - When it does not turn ON."
E 221 HR1 TEMPERATURE TOO LOW **<Operations performed upon error occurrence>** 1. The heat roller 1 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 221 After heat roller dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature (or decreased to 47°C if the calculated value is greater than 47°C) during processes other than standby temperature control.	Perform troubleshooting as directed under "Heat roller 1 check - When it does not turn ON."
E 222 HR2 TEMPERATURE TOO LOW **<Operations performed upon error occurrence>** 1. The heat roller 2 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 222 After heat roller dryer temperature control READY condition establishment, the temperature decreased as follows. • The temperature decreased to 10°C lower than the standby lower limit during standby temperature control. • The temperature decreased to 11°C lower than the target temperature (or decreased to 47°C if the calculated value is greater than 47°C) during processes other than standby temperature control.	Perform troubleshooting as directed under "Heat roller 2 check - When it does not turn ON."

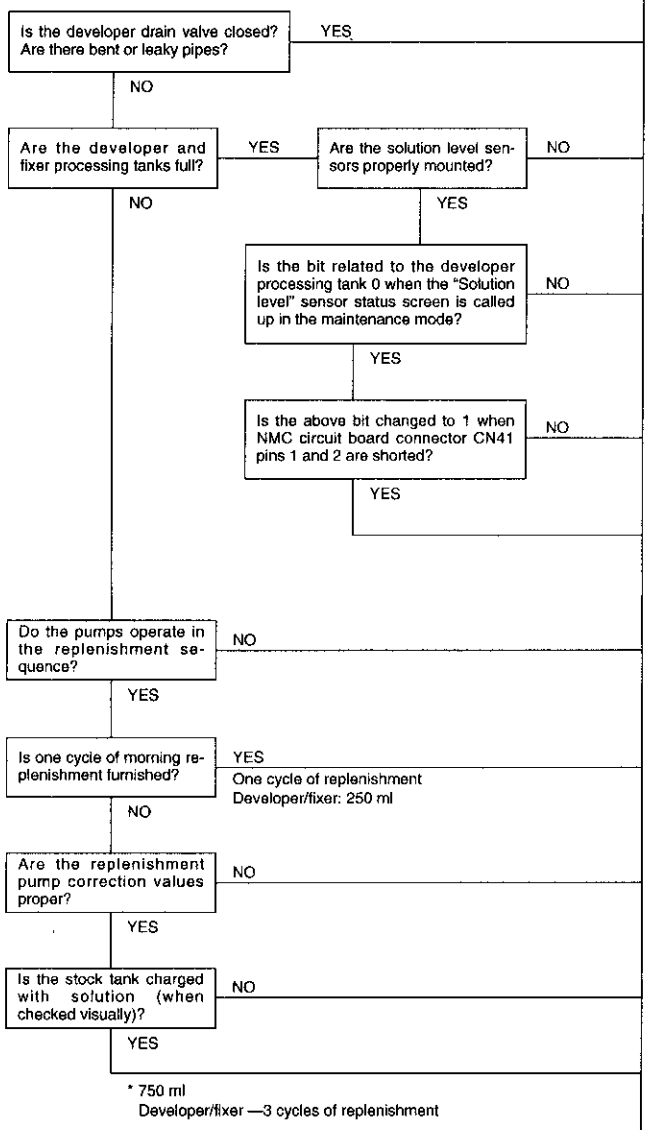
Error indication	Error occurrence conditions/checks	Remedy
E 230 DRY HEATER MALFUNCTION **<Operations performed upon error occurrence>** 1. The hot-air dryer temperature control system is brought to an immediate stop (but a standby operation is conducted). If the error occurs during maintenance mode dryer temperature control function execution, however, the temperature control systems for heat rollers 1 and 2 are also brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 230 The temperature did not rise by 3.0°C or more within 10 minutes after startup.	Perform troubleshooting as directed under "Dryer heater A check - When it does not turn ON" and "Dryer heater B check - When it does not turn ON."
E 231 HR1 HEATER MALFUNCTION **<Operations performed upon error occurrence>** 1. The heat roller 1 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 231 Although the software issued the ON instruction, the halogen heater (heat roller 1) current sensor detected no current flow (2-second monitoring).	Perform troubleshooting as directed under "Heat roller 1 check - When it does not turn ON."
E 232 HR2 HEATER MALFUNCTION **<Operations performed upon error occurrence>** 1. The heat roller 2 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 232 Although the software issued the ON instruction, the halogen heater (heat roller 2) current sensor detected no current flow (2-second monitoring).	Perform troubleshooting as directed under "Heat roller 2 check - When it does not turn ON."
E 240 DRY THERMISTOR MALFUNCTION **<Operations performed upon error occurrence>** 1. The hot-air dryer temperature control system is brought to an immediate stop (but a standby operation is conducted). If the error occurs during maintenance mode dryer temperature control function execution, however, the temperature control systems for heat rollers 1 and 2 are also brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	The indicated thermistor AD converted value coincides with the open thermistor value (AD value of 20 or smaller). • The displayed hot-air dryer temperature is not higher than (0°C + correction value). (However, the value 0°C is displayed if the temperature is below 0°C.) * Correction value = hot-air circuit board + hot-air thermistor • The voltage between NMC circuit board terminals TP8 and TP4 is 20 × VREF1/255 VDC or lower. (When VREF1 = 4.64 V, 20 × 4.64/255 = 0.36 V or lower.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between hot-air dryer thermistor CN23 connector pins 1 and 2 about 45 kΩ or greater at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. NO	Replace the thermistor. Replace the NMC circuit board.
E 241 HR1 THERMISTOR MALFUNCTION **<Operations performed upon error occurrence>** 1. The heat roller 1 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	The indicated thermistor AD converted value coincides with the open thermistor value (AD value of 10 or smaller). • The displayed heat roller 1 dryer temperature is not higher than (0°C + correction value). (However, the value 0°C is displayed if the temperature is below 0°C.) * Correction value = heat roller 1 temperature circuit board + heat roller 1 temperature thermistor • The voltage between NMC circuit board terminals TP12 and TP4 is 10 × VREF1/255 VDC or lower. (When VREF1 = 4.64 V, 10 × 4.64/255 = 0.18 V or lower.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between heat roller 1 dryer thermistor CN26 connector pins 1 and 2 (on the NMC circuit board) about 45 kΩ or greater at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. NO	Replace the thermistor. Replace the NMC circuit board.

Error indication	Error occurrence conditions/checks	Remedy
E 242 HR2 THERMISTOR MALFUNCTION **<Operations performed upon error occurrence>** 1. The heat roller 2 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	The indicated thermistor AD converted value coincides with the open thermistor value (AD value of 10 or smaller). • The displayed heat roller 2 dryer temperature is not higher than (0°C + correction value). (However, the value 0°C is displayed if the temperature is below 0°C.) * Correction value = heat roller 2 temperature circuit board + heat roller 2 temperature thermistor • The voltage between NMC circuit board terminals TP13 and TP4 is 10 × VREF1/255 VDC or lower. (When VREF1 = 4.64 V, 10 × 4.64/255 = 0.18 V or lower.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between hot-air dryer thermistor CN27 connector pins 1 and 2 about 45 kΩ or greater at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. NO	Replace the thermistor. Replace the NMC circuit board.
E 250 DRY THERMISTOR SHORT CIRCUITED **<Operations performed upon error occurrence>** 1. The hot-air dryer temperature control system is brought to an immediate stop (but a standby operation is conducted). If the error occurs during maintenance mode dryer temperature control function execution, however, the temperature control systems for heat rollers 1 and 2 are also brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 250 The indicated thermistor AD converted value coincides with the shorted thermistor value (AD value of 208 or greater). • The displayed hot-air dryer temperature is not lower than (89.5°C + correction value). * Correction value = hot-air circuit board + hot-air thermistor • The voltage between NMC circuit board terminals TP8 and TP4 is 208 × VREF1/255 VDC or higher. (When VREF1 = 4.64 V, 208 × 4.64/255 = 3.78 V or higher.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Same as E210.	
E 251 HR1 THERMISTOR SHORT CIRCUITED **<Operations performed upon error occurrence>** 1. The heat roller 1 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 251 The indicated thermistor AD converted value coincides with the shorted thermistor value (AD value of 240 or greater). • The displayed heat roller 1 dryer temperature is not lower than (120°C + correction value). * Correction value = heat roller 1 temperature circuit board + heat roller 1 temperature thermistor • The voltage between NMC circuit board terminals TP12 and TP4 is 240 × VREF1/255 VDC or higher. (When VREF1 = 4.64 V, 240 × 4.64/255 = 4.36 V or higher.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between heat roller 1 dryer thermistor CN26 connector pins 1 and 2 (on the NMC circuit board) about 1.2 kΩ or smaller at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. NO	Replace the thermistor. Replace the NMC circuit board.
E 252 HR2 THERMISTOR SHORT CIRCUITED **<Operations performed upon error occurrence>** 1. The heat roller 2 dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	E 252 The indicated thermistor AD converted value coincides with the shorted thermistor value (AD value of 240 or greater). • The displayed heat roller 1 dryer temperature is not lower than (120°C + correction value). * Correction value = heat roller 2 temperature circuit board + heat roller 2 temperature thermistor • The voltage between NMC circuit board terminals TP13 and TP4 is 240 × VREF1/255 VDC or higher. (When VREF1 = 4.64 V, 240 × 4.64/255 = 4.36 V or higher.) * VREF1 — Voltage between NMC circuit board terminals TP14 and TP2 Is the resistance between heat roller 2 dryer thermistor CN27 connector pins 1 and 2 (on the NMC circuit board) about 1.2 kΩ or smaller at normal temperature? YES → ☆ Measure the resistance with the connector disconnected from the circuit board. NO	Replace the thermistor. Replace the NMC circuit board.

Error indication	Error occurrence conditions/checks	Remedy
E 260 HR SAFETY THERMOSTAT ACTIVATED **<Operations performed upon error occurrence>** 1. The heat roller dryer temperature control system is brought to an immediate stop. 2. The stop process is performed. (READY OFF) (Film feed prohibited)	The heat roller safety thermostat is activated. * If the error occurs when the safety thermostat section temperature is not raised, perform troubleshooting as directed below. Turn OFF the circuit breaker. Disconnect dryer rack connector CN150. Is the path between dryer rack side CN150 connector pins 1 and 3 conducting? — NO → Replace the thermal protector. YES Connect the dryer rack CN150 connector. Turn ON the circuit breaker. Is +12 VDC present between MUD circuit board CN15 connector pins 5 and 6? NO YES Is +5 V present between the MUD circuit board PC7-4 and TP7? — YES → Replace the MUD circuit board. NO Is +5 V present between the NMC circuit board U41-6 and P2? — NO → Check the cable (that connects NMC circuit board connector CN2 to MUD circuit board connector CN5). If the cable is normal, replace the NMC circuit board. YES Replace the NMC circuit board. Check the K1 section in the lower electrical system section. * If the heat roller safety thermostat connector (CN150) is disconnected while the power is ON, the error does not clear even when the connector is reconnected. Turn the circuit breaker OFF and then back ON. (Since the safety thermostat "open" state is retained by relay K1 and MUD circuit board internal circuitry in the lower electrical system section, it is necessary to perform the reset procedure (by turning the circuit breaker OFF and then back ON).	
E 310 ENTRANCE SENSORS MALFUNCTION **<Operations performed upon error occurrence>** 1. The startup process is stopped. To "Power ON" state	Film was detected by the entry sensor system at the beginning of an operation. Is film present at the entry sensor section? — YES → Remove the film. NO Is there any dirt or other foreign matter in the entry sensor section? — YES → Remove any dirt or other foreign matter. ☆ Execute the "Feed sensor" sensor status check function in the maintenance mode to check. 0 : No film present 1 : Film present NO Is the hookup equipment guide plate position improper? — YES → Adjust the hookup equipment guide plate position. NO Replace any bad entry sensor or NMC circuit board. ☆ The following stopgap measures may be taken to prevent error recurrence. ① Disable any problem sensor. ② Adjust the film sensor sensitivity.	

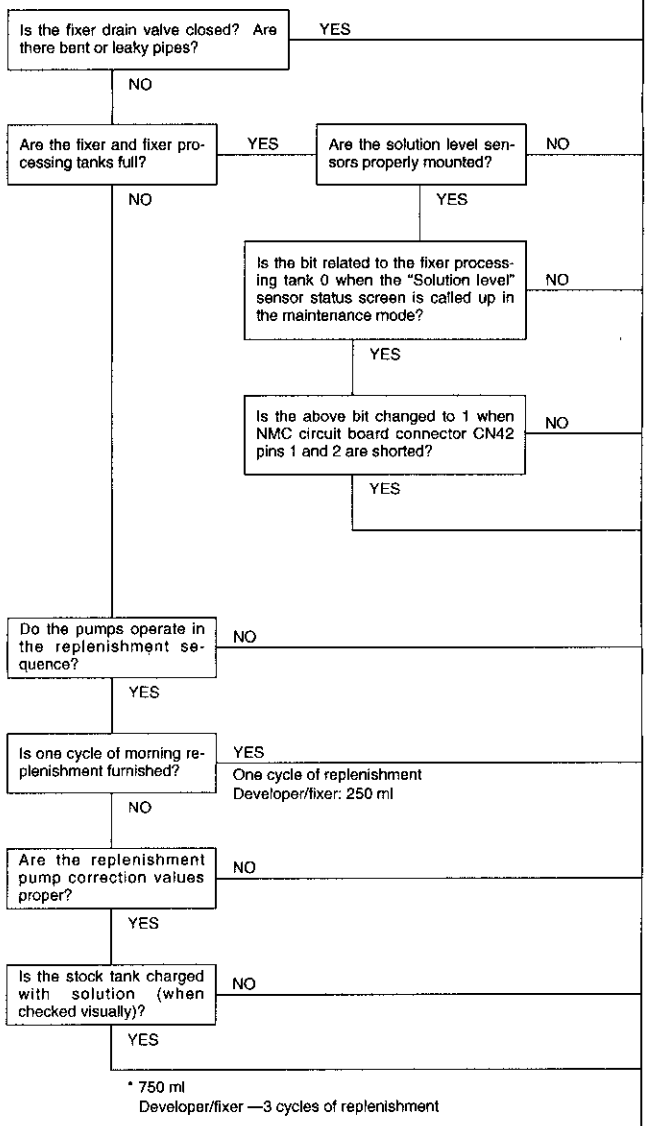
Error indication	Error occurrence conditions/checks	Remedy
E 780 NO WATER IN STOCK TANK **<Operations performed upon error occurrence>** The operation continues. 1. The startup process is stopped. To "Power ON" state • The cooling solenoid valve closes. • The replenishment, crossover roller cleaning functions are disabled. E 781 WATER LEVEL OFF STOCK TANK LOW **<Operations performed upon error occurrence>** • The cooling solenoid valve closes. • The stop process is performed.	E780 The "full of water" condition was not detected within 20 seconds after the cooling solenoid valve was opened upon water supply tank water insufficiency detection. E781 The water supply tank water level was too low at startup or the "full of water" condition was not detected within 1 minute after the cooling solenoid valve was opened upon E780 occurrence. Is the external valve open? — NO → Open the valve. YES Is the water supply tank charged with water? — YES → Is the water level sensor properly mounted? — NO → Properly mount the water level sensor. NO YES Is the water supply tank related bit 0 when the "Solution level" sensor status screen is called up in the maintenance mode? — NO → Normal. YES Is the above bit changed to 1 when NMC circuit board CN48 connector pins 1 and 2 are shorted? — NO → Replace the NMC circuit board. YES Check the cable between the water level detection bar and connector CN48 for continuity. Properly level the film processor. Are there any bent or leaky pipes? — YES → Restore the piping to normal. NO See under "Cooling solenoid valve check - When it does not turn ON."
E 800 FAILURE IN TANKS FILLING **<Operations performed upon error occurrence>** • The stock solution supply is shut off.	The "full processing tank" condition was not established even when 18,750 ml of stock solution was supplied (75 cycles of replenishment). Are the developer and fixer drain valve closed? Are there bent or leaky pipes? — YES → Close the drain valve and restore the piping to normal. NO Are the developer and fixer processing tanks full? — YES → Are the solution level sensors properly mounted? — NO → Properly mount the solution level sensors. NO YES Are the bits related to the developer and fixer processing tanks 0 when the "Solution level" sensor status screen is called up in the maintenance mode? — NO → Normal. YES Are the above bits changed to 1 when pins 1 and 2 of NMC circuit board connectors CN41 and CN42 are shorted? — NO → Replace the NMC circuit board. YES Check the cables between the solution level detection bars and connectors CN41 and CN42 for continuity. Properly level the film processor. Do the pumps operate in the replenishment sequence? — NO → If the pumps do no operate, see under "Pump check - When it does not turn ON." YES Do the pumps operate in the replenishment sequence? — YES → Normal. One cycle of supply Developer/fixer: 250 ml NO Are the replenishment pump correction values proper? — NO → Enter the proper correction values. YES Are the stock tanks charged with solutions (when checked visually)? — NO → Charge the external stock tanks with solutions. YES Update the correction values.	

Error indication	Error occurrence conditions/checks	Remedy
E 810 NO DEV. IN TANK **<Operations performed upon error occurrence>** The morning replenishment sequence is stopped and the system enters the "Power ON" state.	E810 The developer processing tank did not become full when 750 ml of morning replenishment was effected.	
E 811 DEV. LEVEL LOW **<Operations performed upon error occurrence>** The replenishment pump operation and developer temperature control systems are brought to an immediate stop. • The stop process is performed. (READY OFF) (Film feed prohibited)	E811 The low developer processing tank solution level was detected when 750 ml of solution level retention replenishment was effected during standby operation, film processing, or preheat operation.	

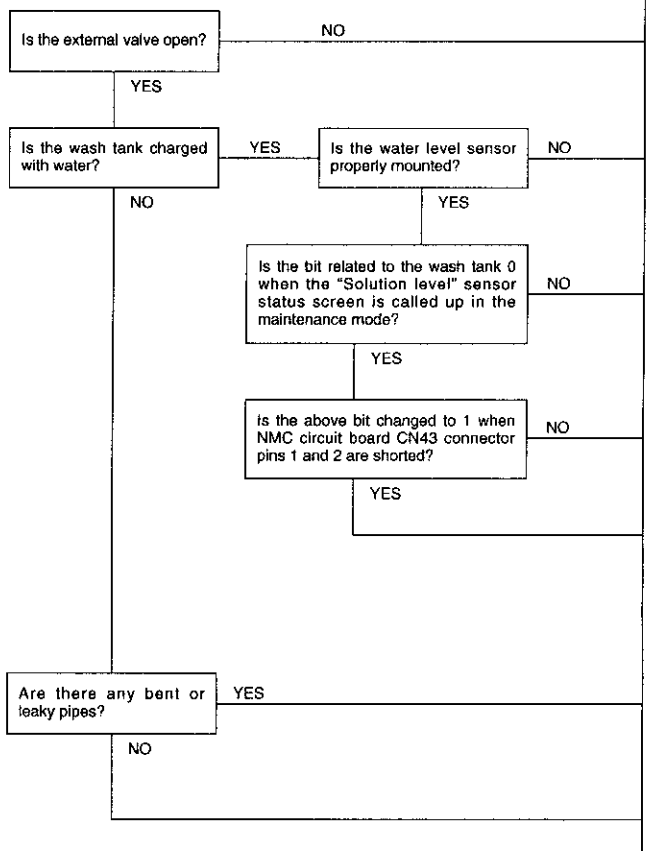


* 750 ml
Developer/fixer —3 cycles of replenishment

Error indication	Error occurrence conditions/checks	Remedy
E 820 NO FIX. IN TANK **<Operations performed upon error occurrence>** The morning replenishment sequence is stopped and the system enters the "Power ON" state.	E820 The fixer processing tank did not become full when 750 ml of morning replenishment was effected.	
E 821 (Fix.) FIX. LEVEL LOW **<Operations performed upon error occurrence>** The replenishment pump operation and Fixer temperature control systems are brought to an immediate stop. • The stop process is performed. (READY OFF) (Film feed prohibited)	E821 The low fixer processing tank solution level was detected when 750 ml of solution level retention replenishment was effected during standby operation, film processing, or preheat operation.	

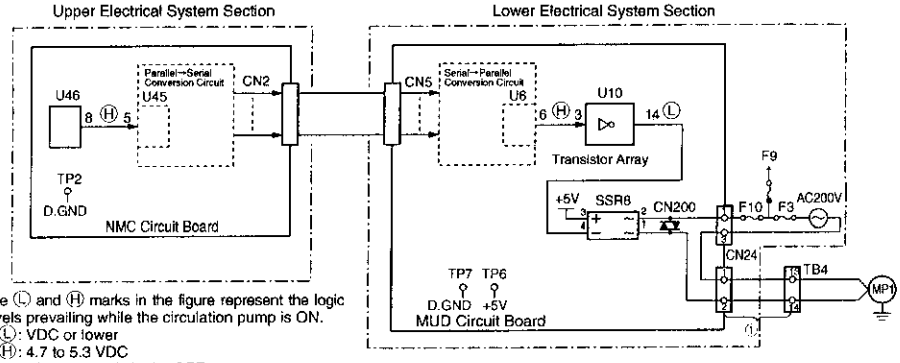


Error indication	Error occurrence conditions/checks	Remedy
E 830 NO WATER IN WASH TANK **<Operations performed upon error occurrence>** • The operation continues. • The wash water solenoid valve closes.	E830 The "full of water" condition was not detected within 10 minutes after the wash water solenoid valve was opened due to wash tank water insufficiency at startup.	
E 831 WATER LEVEL OFF WASH TANK LOW **<Operations performed upon error occurrence>** • The wash water solenoid valve closes. • The stop process is performed.	E831 The "full of water" condition was not detected within 10 seconds after the wash water solenoid valve was opened due to wash tank water insufficiency detection which followed "full wash tank"detection.	



Check Item	Check procedure	Remedy
Circulation pump (MP1) check When it does not turn ON	Is lower electrical system section fuse F10 blown? — YES	After completion of lower electrical system section fuse F10-CN200 (MUD circuit board) cable, CN24/CN25/CN26 (MUD circuit board)-TB3 cable, circulation pump, developer replenishment pump, and fixer replenishment pump checks, replace fuse F10.
	NO → Is lower electrical system section fuse F3 blown? — YES → Is lower electrical system section fuse F9 blown? — YES	After completion of lower electrical system section fuse F3-fixer heater cable check, replace fuses F3 and F9 (refer to the fixer heater check listings).
	NO → Is MUD circuit board connector CN24 properly connected? — NO	After completion of lower electrical system section fuse F3-fuse F10 cable and lower electrical system section fuse F3-fuse F9 cable checks, replace fuse F3.
	YES → Is 200 VAC developed between MUD circuit board CN24 connector pins 1 and 2 when the "Circulation pump" independent load drive function is executed in the maintenance mode? — YES * Measure the voltage with the CN24 connected to the MUD circuit board.	Ensure that the CN24 (MUD circuit board) is properly connected. When cable connection ① is normal, replace the circulation pump.
	NO → Is 4.7 to 5.3 VDC developed between the MUD circuit board U6-6 and TP7 when the "Circulation pump" independent load drive function is executed in the maintenance mode? — YES	Replace the MUD circuit board.
	NO → Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the LED1 on the MUD circuit board comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U45-5 and TP2 when the "Circulation pump" independent load drive function is executed in the maintenance mode? — NO / YES	Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF	Is 200 VAC developed between MUD circuit board CN24 connector pins 1 and 2 in the "Power ON" state? — NO * Measure the voltage with connector CN21 connected to the MUD circuit board.	Check cable connection ①.
	YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U6-6 and TP7 in the "Power ON" state? — NO	Replace the MUD circuit board.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U45-5 and TP2 in the "Power ON" state? — YES	Replace the NMC circuit board.
	NO * "Power ON" state State in which only circuit breaker NFB is ON	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

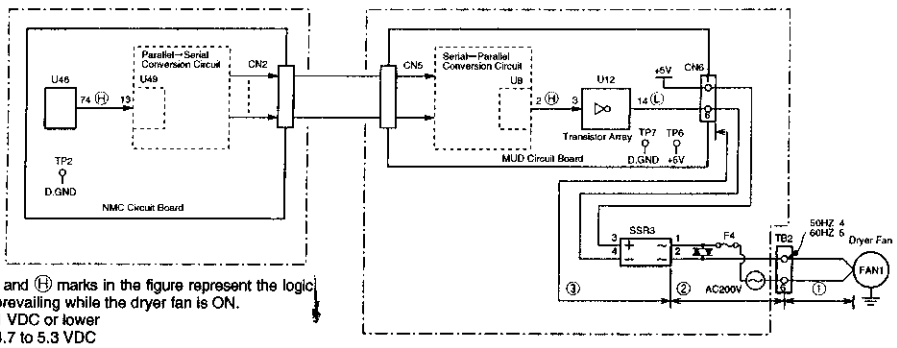
Circulation Pump (MP1) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the circulation pump is ON.
Ⓛ: VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Dryer fan (FAN1) check When it does not turn ON	Is 200 VAC developed between TB2 terminals 4 and 6 (at a power frequency of 50 Hz) or TB2 terminals 5 and 6 (at a power frequency of 60 Hz) while the dryer fan is ON? YES * Measure the voltage with the dryer fan connected. NO Is fuse F4 in the lower electrical system section blown? YES NO Is 200 VAC developed between lower electrical system section SSR3 terminals 1 and 2 in the "Power ON" state? YES NO Is 4.0 to 5.3 VDC developed between lower electrical system section SSR3 terminals 3 and 4 while the dyer fan is ON? YES NO Is MUD circuit board connector CN6 properly connected? NO YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-2 and TP7 while the dyer fan is ON? YES NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? NO * If the connector connections are not properly made, the MUD circuit board LED1 comes on. YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-13 and TP2 (D GND) while the dryer fan is ON? NO YES	Replace the dryer fan. Check cables ① and ② and dryer fan, and then replace fuse F4. Check cable ②. Replace the SSR3. Ensure that the CN6 (MUD circuit board) is properly connected. When cable connection ③ is normal, replace the MUD circuit board. Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect the developer heater from the TB2.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR3 terminals 3 and 4 in the "Power ON" state? NO YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-2 and TP7 in the "Power ON" state? NO YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-13 and TP2 in the "Power ON" state? YES NO * Dryer fan ON This is accomplished by executing the "Dry temperature control" independent load drive function in the maintenance mode. * "Power ON" state State in which only circuit breaker NFB is ON.	When cable connections ① and ② are normal, replace the SSR3. When cable connection ③ is normal, replace the MUD circuit board. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

Dryer Fan (FAN1) Control Hardware

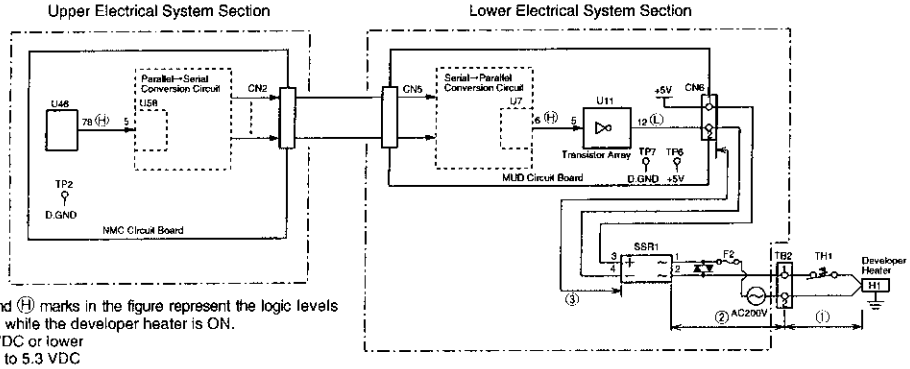


The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the dryer fan is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Developer heater (H1) check When it does not turn ON	Is 200 VAC developed between TB2 terminals ① and ② while the developer heater is ON? — YES → Is the developer safety thermostat (TH1) activated? — YES * Measure the voltage with the developer heater connected. NO / NO	Manually reset the developer safety thermostat. Check the cable for breaks and examine the developer heater, and then replace portion ①. * The resistance between TB2 terminals 1 and 3 should be about 53 Ω. If there is a break in the path, the resistance is infinite.
	Is fuse F2 in the lower electrical system section blown? — YES	Check cables ① and ② and developer heater, and then replace fuse F2.
	NO Is 200 VAC developed between lower electrical system section SSR1 terminals 1 and 2 in the "energized" state? — YES	Check cable ②.
	NO Is 4.0 to 5.3 VDC developed between lower electrical system section SSR1 terminals 3 and 4 while the developer heater is ON? — YES	Replace the SSR1.
	NO Is MUD circuit board connector CN6 properly connected? — NO	Properly connect the CN6 (MUD circuit board).
	YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U7-6 and TP7 while the developer heater is ON? — YES	When cable connection ③ is normal, replace the MUD circuit board.
	NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the MUD circuit board LED1 comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U58-5 and TP2 (D GND) while the developer heater is ON? — NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect the developer heater from the TB2.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR1 terminals 3 and 4 in the "energized" state? — NO	When cable connections ① and ② are normal, replace the SSR1.
	YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U7-6 and TP7 in the "energized" state? — NO	When cable connection ③ is normal, replace the MUD circuit board.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U58-5 and TP2 in the "energized" state? — YES	Replace the NMC circuit board.
	NO	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

* Developer heater ON
  This is accomplished by executing the "D/F temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for the developer heater.
* "Energized" state
  State in which only circuit breaker NFB is ON.

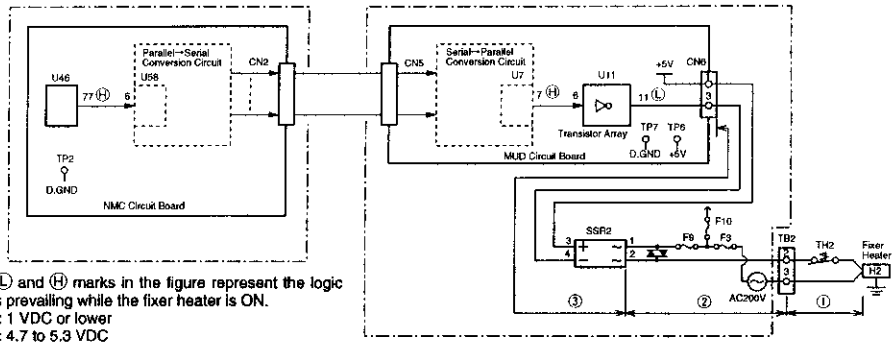
Developer Heater (H1) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the developer heater is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Fixer heater (H2) check When it does not turn ON	Is 200 VAC developed between TB2 terminals 2 and 3 while the fixer heater is ON? YES → * Measure the voltage with the fixer heater connected. → Is the fixer safety thermostat (TH2) activated? YES / NO NO → Is fuse F9 in the lower electrical system section blown? YES / NO Is fuse F3 in the lower electrical system section blown? YES → Is fuse F10 in the lower electrical system section blown? YES / NO NO → Is 200 VAC developed between lower electrical system section SSR2 terminals 1 and 2 in the "energized" state? YES / NO Is 4.0 to 5.3 VDC developed between lower electrical system section SSR2 terminals 3 and 4 while the fixer heater is ON? YES / NO Is MUD circuit board connector CN6 properly connected? NO / YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U7-7 and TP7 while the fixer heater is ON? YES / NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? NO → * If the connector connections are not properly made, the MUD circuit board LED1 comes on. / YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U58-6 and TP2 (D GND) while the fixer heater is ON? NO / YES	Manually reset the fixer safety thermostat. Check the cable for breaks and examine the fixer heater, and then replace portion ①. * The resistance between TB2 terminals 2 and 3 should be about 70 Ω. If there is a break in the path, the resistance is infinite. Check cables ① and ② and fixer heater, and then replace fuse F9. After completion of lower electrical system section fuse F10-MUD circuit board cable, developer replenishment pump-MUD circuit board cable, fixer replenishment pump-MUD circuit board cable, and circulation pump-MUD circuit board cable checks, replace fuses F3 and F10. After completion of lower electrical system section fuse F3-fuse F10 cable and lower electrical system section fuse F3-fuse F9 cable checks, replace fuse F3. Check cable ①. Replace the SSR2. Properly connect the CN6 (MUD circuit board). When cable connection ③ is normal, replace the MUD circuit board. Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect the fixer heater from the TB2.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR2 terminals 3 and 4 in the "energized" state? NO / YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U7-7 and TP7 in the "energized" state? NO / YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U58-6 and TP2 in the "energized" state? YES / NO * Fixer heater ON This is accomplished by executing the "D/F temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for the FIX heater. * "Energized" state State in which only circuit breaker NFB is ON.	When cable connections ① and ② are normal, replace the SSR2. When cable connection ③ is normal, replace the MUD circuit board. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

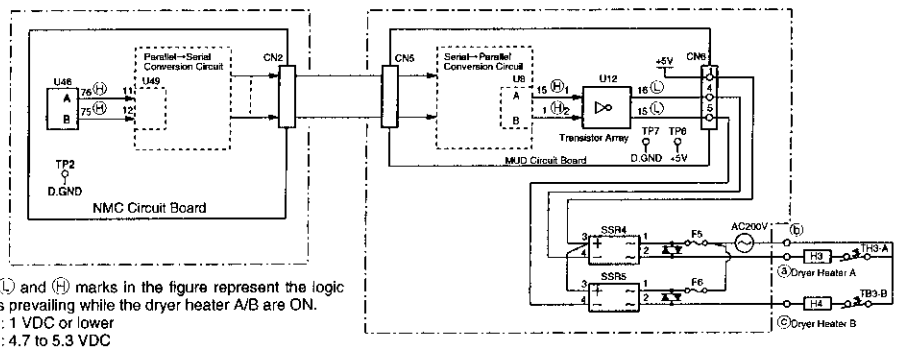
Fixer Heater (H2) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the fixer heater is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Dryer heater (H3) check When it does not turn ON	Is 200 VAC developed between dryer heater section points ⓐ and ⓑ while dryer heater A is ON? — YES → Is the dryer safety thermostat (TH3-A) activated? — YES * Measure the voltage with the dryer fan connected. NO	Manually reset the dryer safety thermostat. Replace the dryer heater. * The resistance between dryer heater section points ⓐ and ⓑ should be about 29 Ω.
	Is fuse F5 in the lower electrical system section blown? — YES	Check the cable between the SSR4 terminals 1 and 2 and dryer heater A, inspect dryer heater A, and then replace fuse F5.
	NO → Is 200 VAC developed between lower electrical system section SSR4 terminals 1 and 2 in the "energized" state? — YES	Check the SSR4-to-dryer heater cable.
	NO → Is 4.0 to 5.3 VDC developed between lower electrical system section SSR4 terminals 3 and 4 while the dryer heater A is ON? — YES	Replace the SSR4.
	NO → Is MUD circuit board connector CN6 properly connected? — NO	Properly connect the CN6 (MUD circuit board).
	YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-15 and TP7 while the dryer heater A is ON? — YES	When the cable connection between MUD circuit board connector CN6 and SSR4 is normal, replace the MUD circuit board.
	NO → Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the MUD circuit board LED1 comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-11 and TP2 (D GND) while the dryer heater A is ON? — NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect dryer heater cables ⓐ, ⓑ, and ⓒ.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR4 terminals 3 and 4 in the "energized" state? — NO	When the SSR4-to-dryer heater cable connection is normal, replace the SSR4.
	YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-15 and TP7 in the "energized" state? — NO	When the cable connection between MUD circuit board connector CN6 SSR4 is nomal, replace the MUD circuit board.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-11 and TP2 in the "energized" state? — YES	Replace the NMC circuit board.
	NO * Dryer heater A ON This is accomplished by executing the "Dry temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for dryer heater A. * "Energized" state State in which only circuit breaker NFB is ON.	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

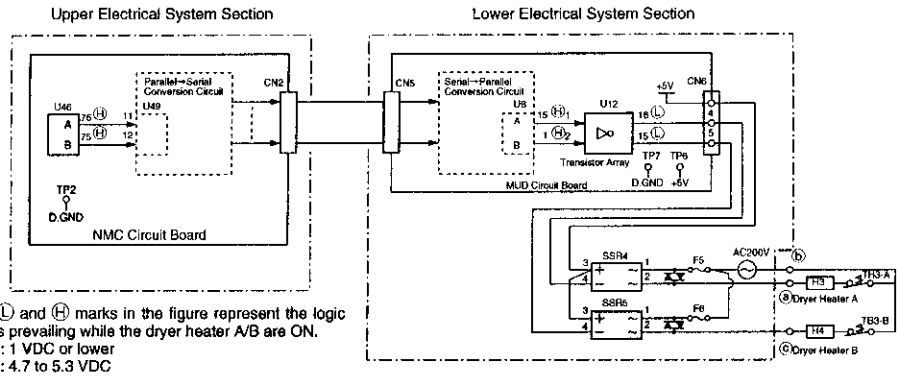
Dryer Heater A/B Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the dryer heater A/B are ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Dryer heater (H4) check When it does not turn ON	Is 200 VAC developed between dryer heater section points ⓑ and ⓒ while dryer heater B is ON? — YES → Is the dryer safety thermostat (TH3-B) activated? — YES * Measure the voltage with the dryer fan connected. NO / NO	Manually reset the dryer safety thermostat. Replace the dryer heater. * The resistance between dryer heater section points ⓑ and ⓒ should be about 29 Ω.
	Is fuse F6 in the lower electrical system section blown? — YES	Check the cable between the SSR5 terminals 1 and 2 and dryer heater B, inspect dryer heater B, and then replace fuse F6.
	NO Is 200 VAC developed between lower electrical system section SSR5 terminals 1 and 2 in the "energized" state? — YES	Check the SSR5-to-dryer heater cable.
	NO Is 4.0 to 5.3 VDC developed between lower electrical system section SSR5 terminals 3 and 4 while the dryer heater B is ON? — YES	Replace the SSR5.
	NO Is MUD circuit board connector CN6 properly connected? — NO	Properly connect the CN6 (MUD circuit board).
	YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-1 and TP7 while the dryer heater B is ON? — YES	When the cable connection between MUD circuit board connector CN6 and SSR5 is normal, replace the MUD circuit board.
	NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the MUD circuit board LED1 comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-12 and TP2 (D GND) while the dryer heater B is ON? — NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect dryer heater cables ⓐ, ⓑ, and ⓒ	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR5 terminals 3 and 4 in the "energized" state? — NO	When the SSR5-to-dryer heater cable connection is normal, replace the SSR5.
	YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-1 and TP7 in the "energized" state? — NO	When the cable connection between MUD circuit board connector CN6 and SSR5 is normal, replace the MUD circuit board.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-12 and TP2 in the "energized" state? — YES	Replace the NMC circuit board.
	NO	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
	* Dryer heater B ON This is accomplished by executing the "Dry temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for dryer heater B. * "Energized" state State in which only circuit breaker NFB is ON.	

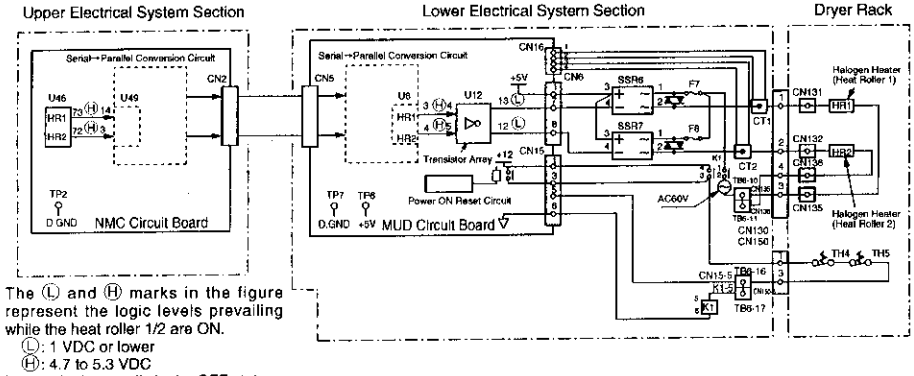
Dryer Heater A/B Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the dryer heater A/B are ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Heat roller 1 (HR1) check When it does not turn ON	Is 60 VAC developed between dryer rack section CN130 connector pins 1 and 3 while heat roller 1 is ON? — YES → * Measure the voltage with dryer rack connector CN130 connected. Turn OFF the circuit breaker. Disconnect dryer rack connector CN130. Is the path between dryer rack side CN130 connector pins 1 and 3 conducting? — YES → Are dryer rack connectors CN131, CN132, CN135, and CN136 properly connected? — YES / NO NO Is fuse F7 in the lower electrical system section blown? — YES / NO Is 60 VAC developed between lower electrical system section SSR6 terminals 1 and 2 in the "energized" state? — YES / NO Is 4.0 to 5.3 VDC developed between lower electrical system section SSR6 terminals 3 and 4 while heat roller 1 is ON? — YES / NO Is MUD circuit board connector CN6 properly connected? — NO / YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-3 and TP7 while heat roller 1 is ON? — YES / NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO / * If the connector connections are not properly made, the MUD circuit board LED1 comes on. / YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-14 and TP2 (D GND) while heat roller 1 is ON? — NO / YES	The NMC circuit board, MUD circuit board, CT1, cable between NMC circuit board connector CN2 and MUD circuit board connector CN5, and/or cable between the CT1 and MUD circuit board connector CN16 are faulty. Replace the SSR5. Ensure that dryer rack connectors CN130, CN131, CN132, CN135, and CN136 properly connected. Check the cable between the SSR6 terminals 1 and 2 and heat roller 1, inspect heat roller 1, and then replace fuse F7. Check the cable between SSR6 terminals 1 and 2 and heat roller 1. Replace the SSR6. Properly connect the CN6 (MUD circuit board). When the cable connection between MUD circuit board connector CN6 and SSR6 is normal, replace the MUD circuit board. Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect dryer rack connector CN130.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR6 terminals 3 and 4 in the "energized" state? — NO / YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-3 and TP7 in the "energized" state? — NO / YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-14 and TP2 in the "energized" state? — YES / NO * Heat roller 1 ON This is accomplished by executing the "HR1 temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for heat roller 1. * "Energized" state State in which only circuit breaker NFB is ON.	When the SSR6-to-heat roller 1 cable connection is normal, replace the SSR6. When the cable connection between MUD circuit board connector CN6 and SSR6 is normal, replace the MUD circuit board. Replace the NMC circuit board. The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

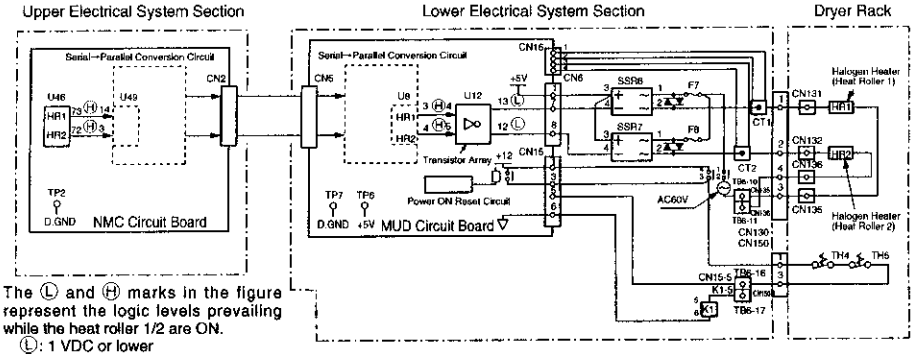
Heat Roller 1/2 Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the heat roller 1/2 are ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Heat roller 2 (HR2) check When it does not turn ON	Is 60 VAC developed between dryer rack section CN130 connector pins 2 and 4 while heat roller 2 is ON? YES → * Measure the voltage with dryer rack connector CN130 connected. → Turn OFF the circuit breaker. Disconnect dryer rack connector CN130. Is the path between dryer rack side CN130 connector pins 2 and 4 conducting? YES → The NMC circuit board, MUD circuit board, CT2, cable between NMC circuit board connector CN2 and MUD circuit board connector CN5, and/or cable between the CT2 and MUD circuit board connector CN16 are faulty. NO → Are dryer rack connectors CN131, CN132, CN135, and CN136 properly connected? YES → Replace the halogen heater. NO → Ensure that dryer rack connectors CN130, CN131, CN132, CN135, and CN136 properly connected. NO → Is fuse F8 in the lower electrical system section blown? YES → Check the cable between the SSR7 terminals 1 and 2 and heat roller 2, inspect heat roller 2, and then replace fuse F7. NO → Is 60 VAC developed between lower electrical system section SSR7 terminals 1 and 2 in the "energized" state? YES → Check the cable between SSR7 terminals 1 and 2 and heat roller 2. NO → Is 4.0 to 5.3 VDC developed between lower electrical system section SSR7 terminals 3 and 4 while heat roller 2 is ON? YES → Replace the SSR7. NO → Is MUD circuit board connector CN6 properly connected? NO → Properly connect the CN6 (MUD circuit board). YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-4 and TP7 while heat roller 2 is ON? YES → When the cable connection between MUD circuit board connector CN6 and SSR7 is normal, replace the MUD circuit board. NO → Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? NO → * If the connector connections are not properly made, the MUD circuit board LED1 comes on. Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected. YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-3 and TP2 (D GND) while heat roller 2 is ON? NO → Replace the NMC circuit board. YES → The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF To avoid a safety hazard, disconnect dryer rack connector CN130.	Is 4.0 to 5.3 VDC developed between lower electrical system section SSR7 terminals 3 and 4 in the "energized" state? NO → When the SSR7-to-heat roller 2 cable connection is normal, replace the SSR7. YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U8-4 and TP7 in the "energized" state? NO → When the cable connection between MUD circuit board connector CN6 and SSR7 is normal, replace the MUD circuit board. YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U49-3 and TP2 in the "energized" state? YES → Replace the NMC circuit board. NO → The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty. * Heat roller 2 ON This is accomplished by executing the "HR2 temperature control" independent load drive function in the maintenance mode. The display panel (LCD) then reads 1 for heat roller 2. * "Energized" state State in which only circuit breaker NFB is ON.	

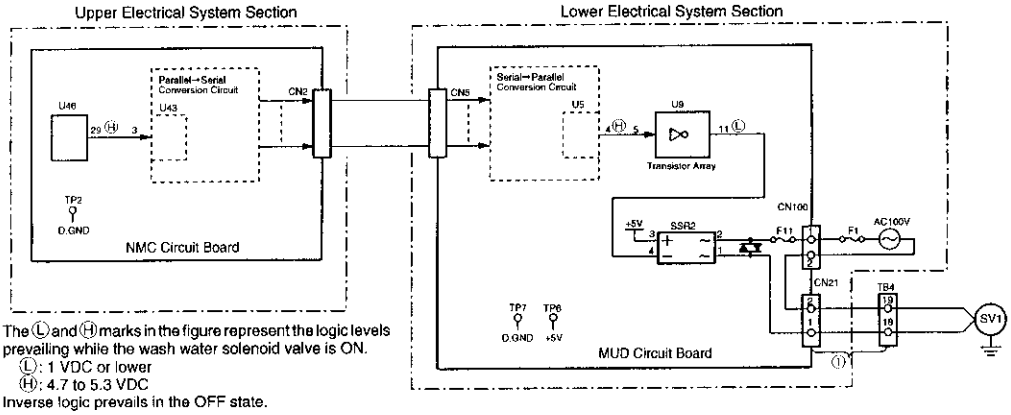
Heat Roller 1/2 Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the heat roller 1/2 are ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Wash water solenoid valve (SV1) check When it does not turn ON	Does the wash water solenoid valve operate when the "Water supply SV" independent load drive function is executed in the maintenance mode?	
	YES * Visually check for a wash water flow when the "Water supply SV" independent load drive function is executed in the maintenance mode.	Check for bent, collapsed, or otherwise abnormal hoses.
	NO Is fuse F1 in the lower electrical system section blown?	
	YES	After completion of lower electrical system section fuse F1-MUD circuit board cable check (NF1 and B1 included) and MUD circuit board-water drain solenoid valve, MUD circuit board-cooling solenoid valve, MUD circuit board-wash water solenoid valve, MUD circuit board-exhaust fan, MUD circuit board-developer/fixer crossover roller cleaning pump, MUD circuit board-fixer/wash crossover roller cleaning pump, MUD circuit board-lower electrical system section cooling fan, and MUD circuit board-upper electrical system section cooling fan line checks (cables and loads), replace lower electrical system section fuse F1.
	NO Is MUD circuit board fuse F11 blown?	
	YES	After completion of lower electrical system section fuse F1-MUD circuit board cable check (NF1 and B1 included) and MUD circuit board-water drain solenoid valve, MUD circuit board-cooling solenoid valve, MUD circuit board-wash water solenoid valve, MUD circuit board-exhaust fan, MUD circuit board-developer/fixer crossover roller cleaning pump, MUD circuit board-fixer/wash crossover roller cleaning pump, MUD circuit board-lower electrical system section cooling fan, and MUD circuit board-upper electrical system section cooling fan line checks (cables and loads), replace lower electrical system section fuse F11.
	NO Is MUD circuit board connector CN21 properly connected?	
	NO	Ensure that connector CN21 (MUD circuit board) is properly connected.
	YES Is 100 VAC developed between MUD circuit board CN21 connector pins 1 and 2 when the "Water supply SV" independent load drive function is executed in the maintenance mode?	
	YES * Measure the voltage with connector CN21 connected to the MUD circuit board.	When cable connection ① is normal, replace the wash water solenoid valve.
	NO Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-4 and TP7 when the "Water supply SV" independent load drive function is executed in the maintenance mode?	
	YES	Replace the MUD circuit board.
	NO Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected?	
	NO * If the connector connections are not properly made, the LED1 on the MUD circuit board comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-3 and TP2 when the "Water supply SV" independent load drive function is executed in the maintenance mode?	
	NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF	Does the wash water flow while the circuit breaker is OFF?	
	YES * Open the external valve to check.	Replace the wash water solenoid valve.
	NO Is 100 VAC developed between MUD circuit board CN21 connector pins 1 and 2 in the "energized" state?	
	NO * Measure the voltage with connector CN21 connected to the MUD circuit board.	When cable connection ① is normal, replace the wash water solenoid valve.
	YES Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-4 and TP7 in the "energized" state?	
	NO	Replace the MUD circuit board.
	YES Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-3 and TP2 in the "energized" state?	
	YES	Replace the NMC circuit board.
	NO * "Energized" state State in which only circuit breaker NFB is ON.	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

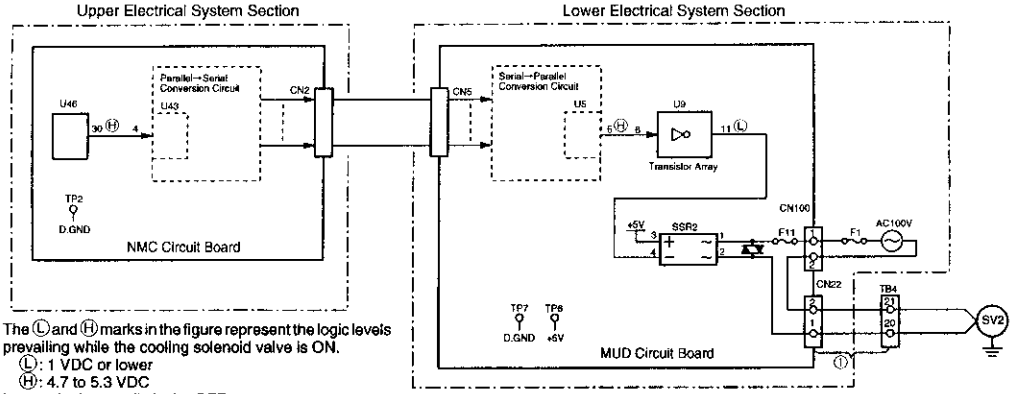
Wash Water Solenoid Valve (SV1) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the wash water solenoid valve is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Cooling solenoid valve (SV2) check When it does not turn ON	Does the wash water solenoid valve operate when the "Cooling SV" independent load drive function is executed in the maintenance mode?	
	YES: * Visually check for a wash water flow when the "Cooling SV" independent load drive function is executed in the maintenance mode.	Check for bent, collapsed, or otherwise abnormal hoses.
	NO: Is fuse F1 in the lower electrical system section blown?	
	YES	After completion of lower electrical system section fuse F1-MUD circuit board cable check (NF1 and B1 included) and MUD circuit board-water drain solenoid valve, MUD circuit board-cooling solenoid valve, MUD circuit board-wash water solenoid valve, MUD circuit board-exhaust fan, MUD circuit board-developer/fixer crossover roller cleaning pump, MUD circuit board-fixer/wash crossover roller cleaning pump, MUD circuit board-lower electrical system section cooling fan, and MUD circuit board-upper electrical system section cooling fan line checks (cables and loads), replace lower electrical system section fuse F1.
	NO: Is MUD circuit board fuse F11 blown?	
	YES	After completion of lower electrical system section fuse F1-MUD circuit board cable check (NF1 and B1 included) and MUD circuit board-water drain solenoid valve, MUD circuit board-cooling solenoid valve, MUD circuit board-wash water solenoid valve, MUD circuit board-exhaust fan, MUD circuit board-developer/fixer crossover roller cleaning pump, MUD circuit board-fixer/wash crossover roller cleaning pump, MUD circuit board-lower electrical system section cooling fan, and MUD circuit board-upper electrical system section cooling fan line checks (cables and loads), replace lower electrical system section fuse F11.
	NO: Is MUD circuit board connector CN21 properly connected?	
	NO	Ensure that connector CN22 (MUD circuit board) is properly connected.
	YES: Is 100 VAC developed between MUD circuit board CN22 connector pins 1 and 2 when the "Cooling SV" independent load drive function is executed in the maintenance mode?	
	YES: * Measure the voltage with connector CN22 connected to the MUD circuit board.	When cable connection ① is normal, replace the Cooling solenoid valve.
	NO: Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-5 and TP7 when the "Cooling SV" independent load drive function is executed in the maintenance mode?	
	YES	Replace the MUD circuit board.
	NO: Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected?	
	NO: * If the connector connections are not properly made, the LED1 on the MUD circuit board comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES: Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-4 and TP2 when the "Cooling SV" independent load drive function is executed in the maintenance mode?	
	NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF	Does the wash water flow while the circuit breaker is OFF?	
	YES: * Open the external valve to check.	Replace the wash water solenoid valve.
	NO: Is 100 VAC developed between MUD circuit board CN22 connector pins 1 and 2 in the "energized" state?	
	NO: * Measure the voltage with connector CN21 connected to the MUD circuit board.	When cable connection ① is normal, replace the wash water solenoid valve.
	YES: Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-5 and TP7 in the "energized" state?	
	NO	Replace the MUD circuit board.
	YES: Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-4 and TP2 in the "energized" state?	
	YES	Replace the NMC circuit board.
	NO	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
	* "Energized" state State in which only circuit breaker NFB is ON.	

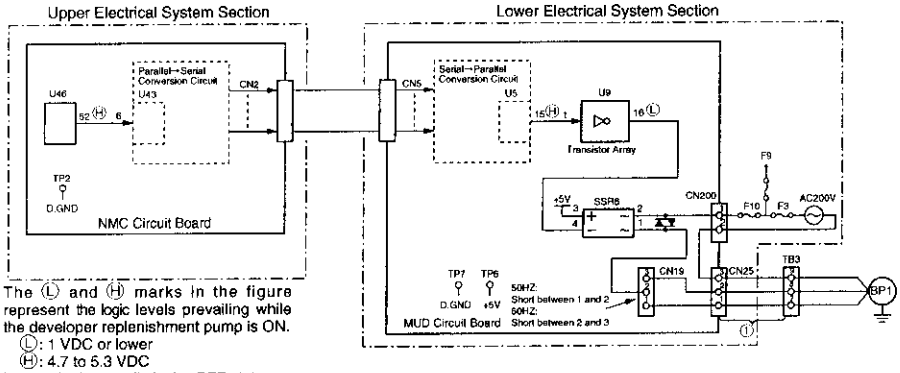
Cooling Solenoid Valve (SV2) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the cooling solenoid valve is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Developer replenishment pump (BP1) check When it does not turn ON	Is lower electrical system section fuse F10 blown? — YES	After completion of lower electrical system section fuse F10-CN200 (MUD circuit board) cable, CN24/CN25/CN26 (MUD circuit board)-TB3 cable, circulation pump, developer replenishment pump, and fixer replenishment pump checks, replace fuse F10.
	NO → Is lower electrical system section fuse F3 blown? — YES → Is lower electrical system section fuse F9 blown? — YES	After completion of lower electrical system section fuse F3-fixer heater cable check, replace fuses F3 and F9 (refer to the fixer heater check listings).
	NO → NO	After completion of lower electrical system section fuse F3-fuse F10 cable and lower electrical system section fuse F3-fuse F9 cable checks, replace fuse F3.
	Is MUD circuit board connector CN25 properly connected? — NO	Ensure that the CN25 (MUD circuit board) is properly connected.
	YES → Is 200 VAC developed between MUD circuit board CN25 connector pins 1 and 3 (at a power frequency of 50 Hz) or CN25 connector pins 2 and 3 (at a power frequency of 60 Hz) while the REPL. function is executed? — YES * Measure the voltage with the CN25 connected to the MUD circuit board.	When cable connection ① is normal, replace the developer replenishment pump.
	NO → Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-15 and TP7 while the REPL. function is executed? — YES	Replace the MUD circuit board.
	NO → Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the LED1 on the MUD circuit board comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-11 and TP2 while the REPL. function is executed? — NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF	Is 200 VAC developed between MUD circuit board CN25 connector pins 1 and 3 (at a power frequency of 50 Hz) or CN25 connector pins 2 and 3 (at a power frequency of 60 Hz) while the REPL. function is executed? — NO * Measure the voltage with connector CN25 connected to the MUD circuit board.	Check the cable connection ①.
	YES → Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-15 and TP7 in the "energized" state? — NO	Replace the MUD circuit board.
	YES → Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-11 and TP2 in the "energized" state? — YES	Replace the NMC circuit board.
	NO	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

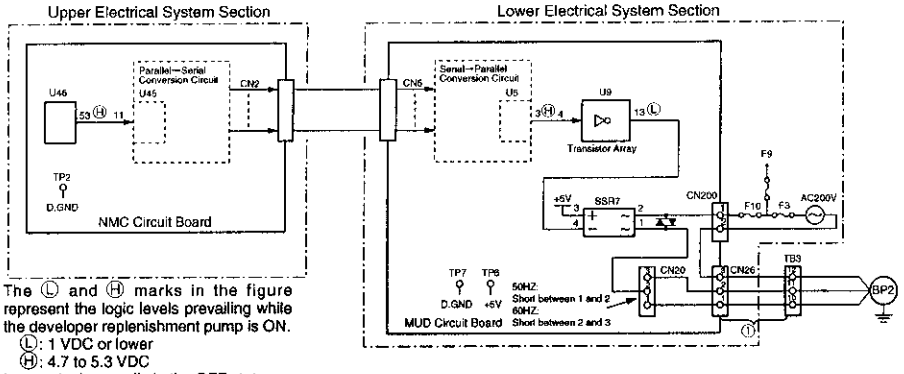
Dev. Replenish Pump (BP1) Control Hardware



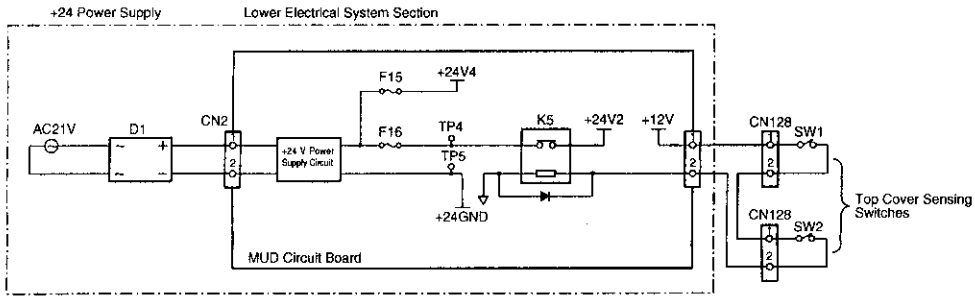
The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the developer replenishment pump is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.

Check item	Check procedure	Remedy
Fixer replenishment pump (BP2) check When it does not turn ON	Is lower electrical system section fuse F10 blown? — YES	After completion of lower electrical system section fuse F10-CN200 (MUD circuit board) cable, CN24/CN25/CN26 (MUD circuit board)-TB3 cable, circulation pump, developer replenishment pump, and fixer replenishment pump checks, replace fuse F10.
	NO	
	Is lower electrical system section fuse F3 blown? — YES → Is lower electrical system section fuse F9 blown? — YES	After completion of lower electrical system section fuse F3-fixer heater cable check, replace fuses F3 and F9 (refer to the fixer heater check listings).
	NO → NO	After completion of lower electrical system section fuse F3-fuse F10 cable and lower electrical system section fuse F3-fuse F9 cable checks, replace fuse F3.
	Is MUD circuit board connector CN26 properly connected? — NO	Ensure that the CN26 (MUD circuit board) is properly connected.
	YES	
	Is 200 VAC developed between MUD circuit board CN26 connector pins 1 and 3 (at a power frequency of 50 Hz) or CN26 connector pins 2 and 3 (at a power frequency of 60 Hz) while the REPL. function is executed? — YES * Measure the voltage with the CN26 connected to the MUD circuit board.	When cable connection ① is normal, replace the fixer replenishment pump.
	NO	
	Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-3 and TP7 while the REPL. function is executed? — NO	Replace the MUD circuit board.
	YES	
	Are NMC circuit board connector CN2 and MUD circuit board connector CN5 properly connected? — NO * If the connector connections are not properly made, the LED1 on the MUD circuit board comes on.	Ensure that the CN2 (NMC circuit board) and CN5 (MUD circuit board) are properly connected.
	YES	
	Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-14 and TP2 while the REPL. function is executed? — NO	Replace the NMC circuit board.
	YES	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.
When it does not turn OFF	Is 200 VAC developed between MUD circuit board CN26 connector pins 1 and 3 (at a power frequency of 50 Hz) or CN26 connector pins 2 and 3 (at a power frequency of 60 Hz) while the REPL. function is executed? — NO * Measure the voltage with connector CN21 connected to the MUD circuit board.	Check the cable connection ①.
	YES	
	Is 4.7 to 5.3 VDC developed between the MUD circuit board U5-3 and TP7 in the "energized" state? — NO	Replace the MUD circuit board.
	YES	
	Is 4.7 to 5.3 VDC developed between the NMC circuit board U43-14 and TP2 in the "energized" state? — YES	Replace the NMC circuit board.
	NO	The NMC circuit board, MUD circuit board, and/or cable (between NMC circuit board connector CN2 and MUD circuit board connector CN5) are faulty.

Fix. Replenish Pump (BP2) Control Hardware



The Ⓛ and Ⓗ marks in the figure represent the logic levels prevailing while the developer replenishment pump is ON.
Ⓛ: 1 VDC or lower
Ⓗ: 4.7 to 5.3 VDC
Inverse logic prevails in the OFF state.



Abbreviation	Load	Current limiter	Remarks
+24V2	Drive motor power supply	Fuse F16 (MUD circuit board)	When top cover sensing switch SW1 or SW2 opens, the K5 opens to turn OFF the +24V2 power supply (interlock).
	Top cover status signal generation power supply	Top cover sensing switches SW1 and SW2	
+24V4	Interface processibility (OUT3) output power supply	Fuse F15 (MUD circuit board)	

INTERFACE AND DIP SWITCH SETUP

14. INTERFACE AND DIP SWITCH SETUP

14.1 Interface

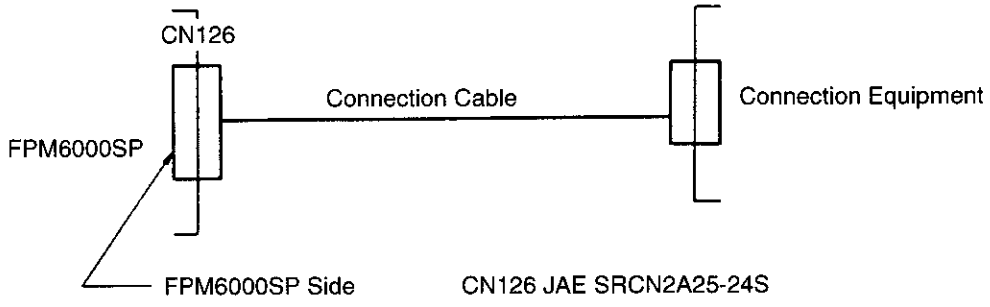
14.1.1 Signal Map

Although there is no connectable equipment to the FPM6000SP, however, the FPM6000SP furnishes a total of 4 signals: CN126 OUT2, OUT3, and OUT6 and IN1.
For interfacing purposes, the connected equipment uses the signals listed in the table below.

FPM6000SP Interface Signals

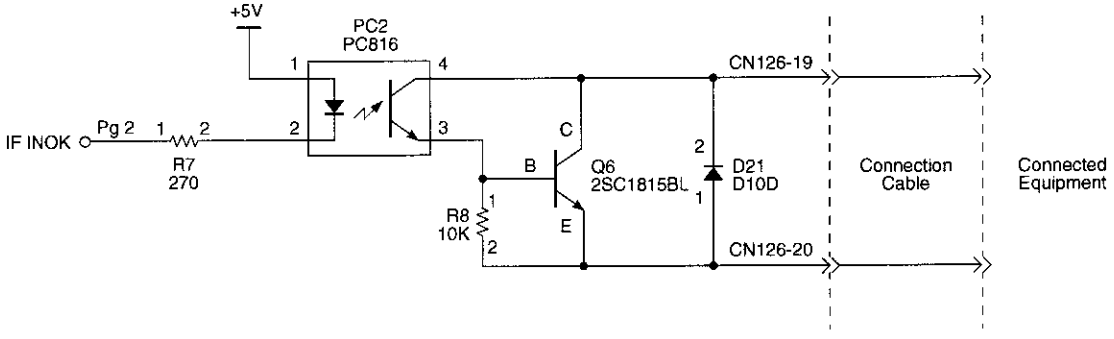
	Signal name	Pin	Meaning
C N 126	OUT2	19 20	Film feed acceptability

14.1.2 Connector



14.1.3 Electrical Interface

OUT2: Film feed acceptability



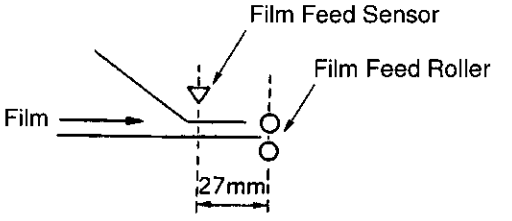
OUT2 FILM FEED ACCEPTABILITY. I/F CIRCUIT

14.1.4 Interface Control

The control specifications for each signal are set forth below.
It is well to remember that the control scheme for each signal may vary with the type of the equipment connected to the FPM6000SP.

Film Feed Acceptability (OUT2)

- This signal notifies the connected equipment that the FPM6000SP is ready for film processing.
- The signal goes ON when the "full wash tank" condition is detected after completion of temperature control.
- The signal goes OFF upon error occurrence or POWER switch OFF.
- The signal turns OFF 200 ms (minimum) to 300 ms (maximum) after feed sensor film detection.



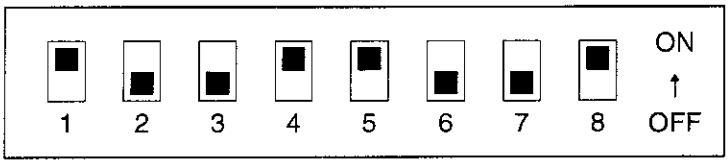
FPM6000SP Film Feed Section Film Sensor and Roller Locations

- The time interval (film delay time) between the instant at which the film trailing end is detected by the feed sensor and the instant at which the signal is turned ON is variously determined as follows.

14.2 DIP Switch Functions

14.2.1 DIP Switch SW1

(1) DIP Switch SW1 Initial Setup



(2) DIP Switch SW1 Functions

NO	Description	ON	OFF
1	Model changeover. * Initially set to ON.	Fixed to ON.	———
2	Country changeover. (FPM6000SP only) Replenishment and Calendar Display Setup	EUROPE Replenishment Rate Setup Standard Rate : Every 5 Sheets of 10 × 12 in. Calendar Setup DD / MM / YYYY	U.S.A. Replenishment Rate Setup Standard Rate : Every 1 Sheet of 14 × 17 in. Calendar Setup MM / DD / YYYY
3	Dryer temperature control setup.	Dryer temperature calibration is not based on processing volume.	Dryer temperature calibration is based on processing volume.
4	Water drainage setup.	The stock tank is cleaned during film processing inactivity. (Water drainage → Water supply → Water drainage).	The stock tank is not cleaned during film processing inactivity. (Water drainage only.)
*5	Mode Change Industrial/Medical	Industrial	Medical
6	Water SV setup.	Supplies more water then normal to control water impurities. (Includes water supply ON mode synchronized with the drive motor intermittent during standby.)	Normal water supply mode.
7	Circuit board inspection.	———	Normal control.
8	Saved data handling on power ON.	The saved data is used.	The saved data is cleared.

*** Note :** *Turn on the DIP-SW5 for Industrial use, otherwise the FPM6000SP might not work correctly in processing speed, temperature, replenishment and so on.*

14.3 Operating Condition SETUP

Operating condition setup can be performed with DIP switch SW1 on the NMC circuit board.
DIP switches SW1-1 to SW1-8 must always be setup for proper film processor use.

SW1-8 RAM Clear Setup (The ON position should normally be selected)
(ON) Deactivates the RAM clear feature.
(OFF) Activates the RAM clear feature.
NOTE : *The ON position should normally be selected. When you turn ON the circuit breaker with the OFF position selected, various stored correction values and setup values are cleared. If the stored values are inadvertently cleared, turns this switch to the ON position, and reenter the correction values recorded on the back surface of the dryer section cover.*

SW1-7 (OFF) For normal use. (The OFF position should be selected)

SW1-6 (ON) Water is supplied according to the drive motor intermittent or ON timing during film processing.
(OFF) Water is supplied according to the normal SV intermittent movement or the SVON timing during film processing.

SW1-5 (ON) For normal use. (The ON position should be selected)

SW1-4 Water Drainage Setup during Cooldown Cycle (The ON position should normally be selected)
(ON) Drain → Supply → Drain.
(OFF) Drain (Once only).

SW1-3 Dryer Temperature Setup (The OFF position should normally be selected)
(ON) Disable the dryer temperature adjustment parameter settings according to processed film quantity.
(OFF) For normal use.

SW1-2 Replenishment and Calendar Display Setup
Replenishment Rate Setup
(ON) Standard Rate : Every 5 Sheets of 10 × 12 in.
(OFF) Standard Rate : Every 1 Sheet of 14 × 17 in.
Calendar Setup
(ON) DD / MM / YYYY
(DD : Day, MM : Month, YYYYY : Year)
(OFF) MM / DD / YYYY
NOTE : *The default setting of 50Hz in the ON position and 60Hz in the OFF position.*

SW1-1 (ON) For normal use. (The ON position should be selected)

ELECTRICAL CIRCUIT DIAGRAMS

15. ELECTRICAL CIRCUIT DIAGRAMS

15.1 Check Pin List NMC Circuit Board

TP1	+5V
TP2	D.GND
TP3	+12V
TP4	A.GND
TP5	Developer temperature (narrow range)
TP6	Developer temperature (wide range)
TP7	Fixer temperature
TP8	Dryer air temperature
TP9	Feed sensor
TP12	Heat roller 1 temperature
TP13	Heat roller 2 temperature
TP14	+4.64V (VREF 1)
TP15	+2.32V (VREF 2)

* Between TP1 and TP2: +5 V check
Between TP3 and TP4: +12 V check

MUD Circuit Board	
TP1	PWM clock (drive motor clock)
TP2	+12V
TP3	A.GND
TP4	+24V
TP5	+24VGND
TP6	+5V
TP7	D.GND A.GND
TP8	Drive motor current monitor voltage

* Between TP1 and TP7: PWM clock check
Between TP2 and TP3: +12 V check
Between TP4 and TP5: +24 V check
Between TP6 and TP7: +5 V check
Between TP8 and TP9: Drive motor current check

15.2 Temperature Check Location (Voltage) List

No.	Check temperature	Check location
1	Developer temperature (narrow range)	Between TP5 and TP4
2	Developer temperature (wide range)	Between TP6 and TP4
3	Fixer temperature	Between TP7 and TP4
4	Dryer air temperature	Between TP8 and TP4
6	Heat roller 1 temperature	Between TP12 and TP4
7	Heat roller 2 temperature	Between TP13 and TP4

* The check locations are on the NMC circuit board.

[Developer Temperature]

Temperature	Voltage (wide range)	Voltage (narrow range)	Temperature	Voltage (wide range)	Voltage (narrow range)
0	0-0.801	—	24.6	—	0.473
0.5	0.819	—	24.7	—	0.449
1	0.837	—	24.8	—	0.509
1.5	0.855	—	24.9	—	0.528
2	0.873	—	25	—	0.546
2.5	0.892	—	25.1	—	0.564
3.5	0.91	—	25.2	—	0.582
4	0.928	—	25.3	—	0.6
4.5	0.946	—	25.4	—	0.619
5	0.964	—	25.5	—	0.637
5.5	0.983	—	25.6	—	0.655
6	1.001	—	25.7	—	0.673
6.5	1.019	—	25.8	—	0.691
7	1.037	—	25.9	—	0.71
7.5	1.055	—	26	—	0.728
8	1.074	—	26.1	—	0.746
8.5	1.092	—	26.2	—	0.764
9	1.11	—	26.3	—	0.782
9.5	1.128	—	26.4	—	0.801
10	1.146	—	26.5	—	0.819
10.5	1.165	—	26.6	—	0.837
11	1.183	—	26.7	—	0.855
11.5	1.201	—	26.8	—	0.873
12	1.219	—	26.9	—	0.892
12.5	1.237	—	27	—	0.91
13	1.256	—	27.1	—	0.928
13.5	1.274	—	27.2	—	0.946
14	1.292	—	27.3	—	0.964
14.5	1.310	—	27.4	—	0.983
15	1.328	—	27.5	—	1.001
15.5	1.347	—	27.6	—	1.019
16	1.365	—	27.7	—	1.037
16.5	1.383	—	27.8	—	1.055
17	1.401	—	27.9	—	1.074
17.5	1.419	—	28	—	1.092-1.11
18	1.437	—	28.1	—	1.128
18.5	1.456-1.474	—	28.2	—	1.146
19	1.492	—	28.3	—	1.165
19.5	1.51	—	28.4	—	1.183
20	1.528	—	28.5	—	1.201
20.5	1.547	—	28.6	—	1.219
21	1.565	—	28.7	—	1.237
21.5	1.583	—	28.8	—	1.256
22	—	0	28.9	—	1.274
22.1	—	0.018	29	—	1.292
22.2	—	0.036	29.1	—	1.31
22.3	—	0.055	29.2	—	1.328
22.4	—	0.073	29.3	—	1.347
22.5	—	0.091	29.4	—	1.365
22.6	—	0.109	29.5	—	1.383
22.7	—	0.127	29.6	—	1.401
22.8	—	0.146	29.7	—	1.419
22.9	—	0.164	29.8	—	1.437
23	—	0.182	29.9	—	1.456
23.1	—	0.2	30	—	1.474
23.2	—	0.218	30.1	—	1.492
23.3	—	0.273	30.2	—	1.51
23.4	—	0.255	30.3	—	1.528
23.5	—	0.273	30.4	—	1.547
23.6	—	0.291	30.5	—	1.565
23.7	—	0.309	30.6	—	1.583
23.8	—	0.328	30.7	—	1.601
23.9	—	0.346	30.8	—	1.619
24	—	0.364	30.9	—	1.638
24.1	—	0.382	31	—	1.656
24.2	—	0.4	31.1	—	1.674
24.3	—	0.419	31.2	—	1.692
24.4	—	0.437	31.3	—	1.71
24.5	—	0.455	31.4	—	1.729

Temperature	Voltage (wide range)	Voltage (narrow range)	Temperature	Voltage (wide range)	Voltage (narrow range)
31.5	—	1.747	38.4	—	3.021
31.6	—	1.765	38.5	—	3.039
31.7	—	1.783	38.6	—	3.057
31.8	—	1.801	38.7	—	3.075
31.9	—	1.82	38.8	—	3.093
32	—	1.838	38.9	—	3.112
32.1	—	1.856	39	—	3.13
32.2	—	1.874	39.1	—	3.148
32.3	—	1.892	39.2	—	3.166
32.4	—	1.911	39.3	—	3.184
32.5	—	1.929-1.947	39.4	—	3.203
32.6	—	1.965	39.5	—	3.221
32.7	—	1.983	39.6	—	3.239
32.8	—	2.002	39.7	—	3.257
32.9	—	2.02	39.8	—	3.275
33	—	2.038	39.9	—	3.293
33.1	—	2.056	40	—	3.312
33.2	—	2.074	40.1	—	3.33
33.3	—	2.093	40.2	—	3.348
33.4	—	2.111	40.3	—	3.366
33.5	—	2.129	40.4	—	3.384
33.6	—	2.147	40.5	—	3.403
33.7	—	2.165	40.6	—	3.421
33.8	—	2.184	40.7	—	3.439
33.9	—	2.202	40.8	—	3.457
34	—	2.22	40.9	—	3.475
34.1	—	2.238	41	—	3.494
34.2	—	2.256	41.1	—	3.512
34.3	—	2.275	41.2	—	3.53
34.4	—	2.293	41.3	—	3.548
34.5	—	2.311	41.4	—	3.566
34.6	—	2.329	41.5	—	3.585
34.7	—	2.347	41.6	—	3.603
34.8	—	2.365	41.7	—	3.621
34.9	—	2.384	41.8	—	3.639
35	—	2.402	41.9	—	3.657
35.1	—	2.42	42	—	3.676
35.2	—	2.438	42.1	—	3.694
35.3	—	2.456	42.3	—	3.712
35.4	—	2.475	42.4	—	3.73
35.5	—	2.493	42.5	—	3.748
35.6	—	2.511	42.6	—	3.767
35.7	—	2.529	42.7	—	3.785
35.8	—	2.547	42.8	—	3.803
35.9	—	2.566	42.9	—	3.821
36	—	2.584	43	—	3.839
36.1	—	2.602	43.1	—	3.858
36.2	—	2.62	43.2	—	3.876
36.3	—	2.638	43.3	—	3.894
36.4	—	2.657	43.4	—	3.912
36.5	—	2.675	43.5	—	3.93
36.6	—	2.693	43.6	—	3.949
36.7	—	2.711	43.7	—	3.967
36.8	—	2.729	43.8	—	3.985
36.9	—	2.748	43.9	—	4.003
37	—	2.766	44	—	4.021
37.1	—	2.784	44.1	—	4.04
37.2	—	2.802	44.2	—	4.058
37.3	—	2.82	44.3	—	4.076
37.4	—	2.839	44.4	—	4.094
37.5	—	2.857	44.5	—	4.112
37.6	—	2.875	44.6	—	4.131
37.7	—	2.893	44.8	—	4.149
37.8	—	2.911	44.9	—	4.167
37.9	—	2.93	45	—	4.185
38	—	2.948	45.1	—	4.203
38.1	—	2.96	45.2	—	4.221
38.2	—	2.984	45.3	—	4.24
38.3	—	3.002	45.4	—	4.258

Temperature	Voltage (wide range)	Voltage (narrow range)	Temperature	Voltage (wide range)	Voltage (narrow range)
45.5	—	4.276	77	3.53	—
45.6	—	4.294	77.5	3.548	—
45.7	—	4.312	78.5	3.566	—
45.8	—	4.331	79.5	3.585	—
45.9	—	4.349	80	3.603	—
46	—	4.367	81	3.621	—
46.1	—	4.385	82	3.639	—
46.2	—	4.403	83	3.657	—
46.3	—	4.422	84	3.676	—
46.5	—	4.44	84.5	3.694	—
46.6	—	4.458	85.5	3.712	—
46.7	—	4.476	86.5	3.73	—
46.8	—	4.494	87.5	3.748	—
46.9	—	4.513	88.5	3.767	—
47	—	4.531	89.5	3.785	—
47.1	—	4.549	90	3.803	—
47.2	—	4.567	91	3.821	—
47.3	—	4.585	93	3.839	—
47.4	—	4.604	94.5	3.858	—
47.5	—	4.622	95.5	3.876	—
47.6	—	4.64	97	3.894	—
48	2.657	—	98	3.912	—
48.5	2.675	—	99.5	3.93	—
49	2.693	—	100	3.949-4.64	—
49.5	2.711	—			
50	2.729	—			
50.5	2.748	—			
51	2.766	—			
51.5	2.784	—			
52	2.802	—			
52.5	2.82	—			
53	2.839	—			
53.5	2.857	—			
54	2.875	—			
54.5	2.893	—			
55	2.911	—			
55.5	2.93	—			
56	2.948	—			
56.5	2.96	—			
57	2.984	—			
57.5	3.002	—			
58.5	3.021	—			
59	3.039	—			
59.5	3.057	—			
60	3.075	—			
60.5	3.093	—			
61	3.112	—			
61.5	3.13	—			
62.5	3.148	—			
63	3.166	—			
63.5	3.184	—			
64	3.203	—			
65	3.221	—			
65.5	3.239	—			
66	3.257	—			
66.5	3.275	—			
67.5	3.293	—			
68	3.312	—			
68.5	3.33	—			
69.5	3.348	—			
70	3.366	—			
71	3.384	—			
71.5	3.403	—			
72	3.421	—			
73	3.439	—			
73.5	3.457	—			
74.5	3.475	—			
75	3.494	—			
76	3.512	—			

[Fixer Temperature, Dryer Temperature, and Ambient Temperature]

Temperature	Voltage	Temperature	Voltage	Temperature	Voltage
0	0-0.801	30.5	1.965	61	3.112
0.5	0.819	31	1.983	61.5	3.13
1	0.837	31.5	2.002	62.5	3.148
1.5	0.855	32	2.02	63	3.166
2	0.873	32.5	2.038	63.5	3.184
2.5	0.892	33	2.056	64	3.203
3.5	0.91	33.5	2.074-2.093	65	3.221
4	0.928	34	2.111	65.5	3.239
4.5	0.946	34.5	2.129	66	3.257
5	0.964	35	2.147	66.5	3.275
5.5	0.983	35.5	2.165	67.5	3.293
6	1.001	36	2.184	68	3.312
6.5	1.019	36.5	2.202	68.5	3.33
7	1.037	37	2.22-2.238	69.5	3.348
7.5	1.055	37.5	2.256	70	3.366
8	1.074	38	2.275	71	3.384
8.5	1.092	38.5	2.293	71.5	3.403
9	1.11	39	2.311	72	3.421
9.5	1.128	39.5	2.329	73	3.439
10	1.146	40	2.347	73.5	3.457
10.5	1.165	40.5	2.365	74.5	3.475
11	1.183	41	2.384	75	3.494
11.5	1.201	41.5	2.402-2.42	76	3.512
12	1.219	42	2.438	77	3.53
12.5	1.237	42.5	2.456	77.5	3.548
13	1.256	43	2.475	78.5	3.566
13.5	1.274	43.5	2.493	79.5	3.585
14	1.292	44	2.511	80	3.603
14.5	1.31	44.5	2.529	81	3.621
15	1.328	45	2.547	82	3.639
15.5	1.347	45.5	2.566	83	3.657
16	1.365	46	2.584	84	3.676
16.5	1.383	46.5	2.602	84.5	3.694
17	1.401	47	2.62	85.8	3.712
17.5	1.419	47.5	2.638	86.5	3.73
18	1.437	48	2.657	87.5	3.748
18.5	1.456-1.474	48.5	2.675	88.5	3.767
19	1.492	49	2.693	89.5	3.785
19.5	1.51	49.5	2.711	90	3.803
20	1.529	50	2.729	91	3.821
20.5	1.547	50.5	2.748	93	3.839
21	1.565	51	2.766	94.5	3.858
21.5	1.583	51.5	2.784	95.5	3.876
22	1.601	52	2.802	97	3.894
22.5	1.619	52.5	2.82	98	3.912
23	1.638-1.656	53	2.839	99.5	3.93
23.5	1.674	53.5	2.857	100	3.949-4.64
24	1.692	54	2.875		
24.5	1.71	54.5	2.893		
25	1.729	55	2.911		
25.5	1.747	55.5	2.93		
26	1.765	56	2.948		
26.5	1.783-1.801	56.5	2.96		
27	1.82	57	2.984		
27.5	1.838	57.5	3.002		
28	1.856	58.5	3.021		
28.5	1.874	59	3.039		
29	1.892	59.5	3.057		
29.5	1.911	60	3.075		
30	1.929-1.947	60.5	3.093		

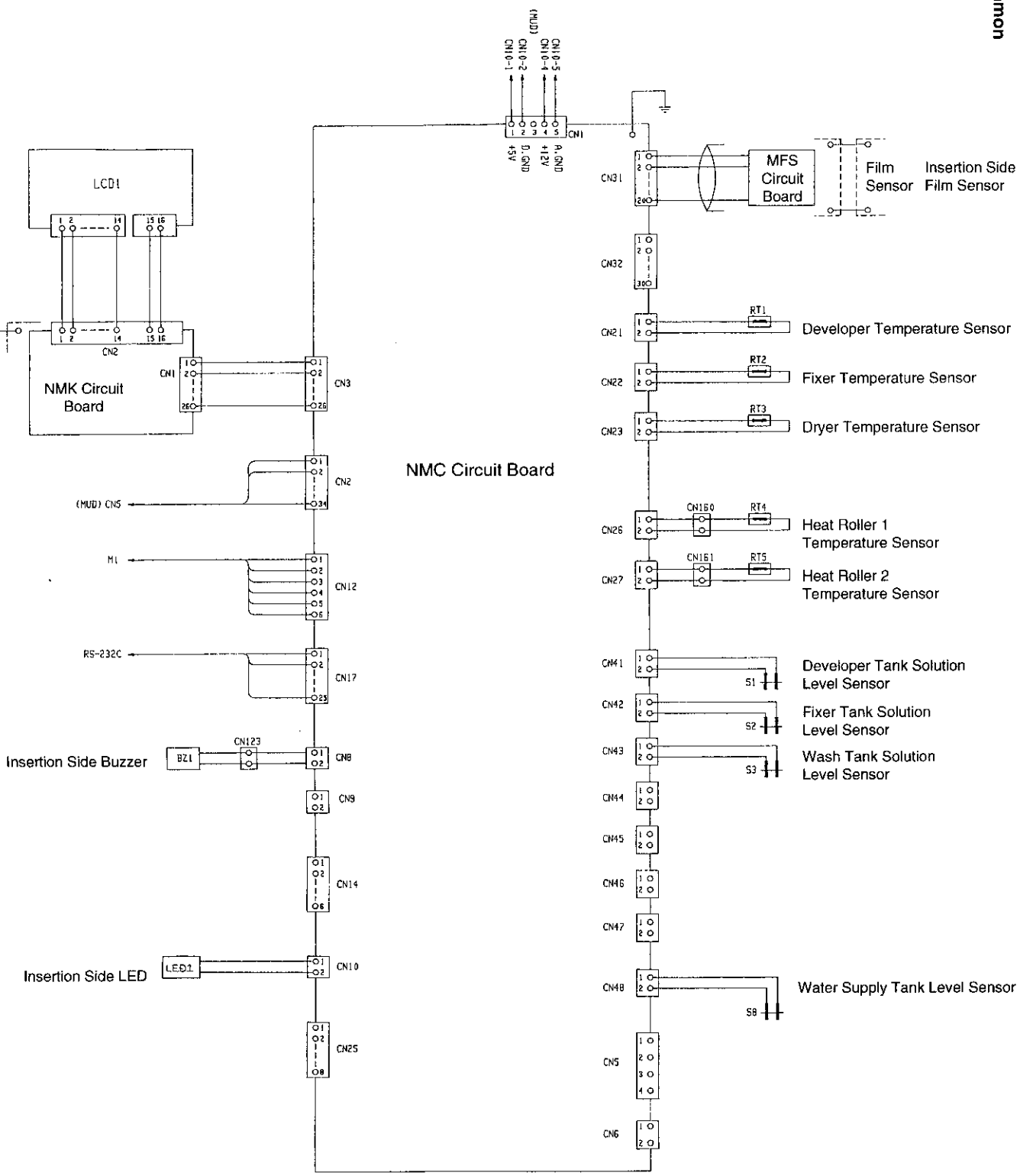
[Heat Roller Temperature]Vref=4.64v

Temperature	Voltage	Temperature	Voltage	Temperature	Voltage
0	0~0.364	50	1.856-1.874	85	3.257
1	0.382	50.5	1.892	85.5	3.275
2	0.4	51	1.911	86	3.293
3	0.419	51.5	1.929	86.5	3.312
4	0.437	52	1.947	87	3.33
5	0.455	52.5	1.965	87.5	3.348
6	0.473	53	1.983	88	3.366
7	0.449	53.5	2.002	88.5	3.384
8	0.509	54	2.02-2.038	89	3.403
9	0.528	54.5	2.056	89.5	3.421
10	0.546-0.564	55	2.074	90	3.439
11	0.582	55.5	2.093	91	3.457
12	0.6	56	2.111	91.5	3.475
13	0.619	56.5	2.129	92	3.494
14	0.637-0.655	57	2.147	92.5	3.512
15	0.673	57.5	2.165-2.184	93	3.53
16	0.691	58	2.202	93.5	3.548
17	0.71-0.728	58.5	2.22	94	3.566
18	0.746	59	2.238	95	3.585
19	0.764-0.782	59.5	2.256	95.5	3.603
20	0.801	60	2.275	96	3.621
21	0.819-0.837	60.5	2.293	96.5	3.639
22	0.855-0.873	61	2.311-2.329	97	3.657
23	0.892	61.5	2.347	98	3.676
24	0.91-0.928	62	2.365	98.5	3.694
25	0.946-0.964	62.5	2.384	99	3.712
26	0.983	63	2.402	99.5	3.73
27	1.001-1.019	63.5	2.42	100	3.748
28	1.037-1.055	64	2.438	101	3.767
29	1.074-1.092	64.5	2.456-2.475	101.5	3.785
30	1.11	65	2.493	102	3.803
30.5	1.128	65.5	2.511	103	3.821
31	1.146	66	2.529	103.5	3.839
31.5	1.165	66.5	2.547	104	3.858
32	1.183	67	2.566	104.5	3.876
32.5	1.201	67.5	2.584	105	3.894
33	1.219	68	2.602	106	3.912
33.5	1.237	68.5	2.62	107	3.93
34	1.256	69	2.638-2.657	107.5	3.949
34.5	1.274	69.5	2.675	108	3.967
35	1.292	70	2.693	109	3.985
35.5	1.31	70.5	2.711	110	4.003
36	1.328	71	2.729	110.5	4.021
36.5	1.347	71.5	2.748	111	4.04
37	1.365	72	2.766	112	4.058
37.5	1.383	72.5	2.784	113	4.076
38	1.401	73	2.802	114	4.094
38.5	1.419	73.5	2.82	114.5	4.112
39	1.437	74	2.839	115	4.131
39.5	1.456	74.5	2.587-2.875	116	4.149
40	1.474	75	2.893	117	4.167
40.5	1.492	75.5	2.911	118	4.185
41	1.51	76	2.93	118.5	4.203
41.5	1.528	76.5	2.948	119	4.221
42	1.547	77	2.96	120	4.24-4.64
42.5	1.565	77.5	2.984		
43	1.583-1.601	78	3.002		
43.5	1.619	78.5	3.021		
44	1.638	79	3.039		
44.5	1.656	79.5	3.057		
45	1.674	80	3.075		
45.5	1.692	80.5	3.093		
46	1.71	81	3.112		
46.5	1.729	81.5	3.13		
47	1.747	82	3.148		
47.5	1.765	82.5	3.166		
48	1.783	83	3.184		
48.5	1.801	83.5	3.203		
49	1.82	84	3.221		
49.5	1.838	84.5	3.239		

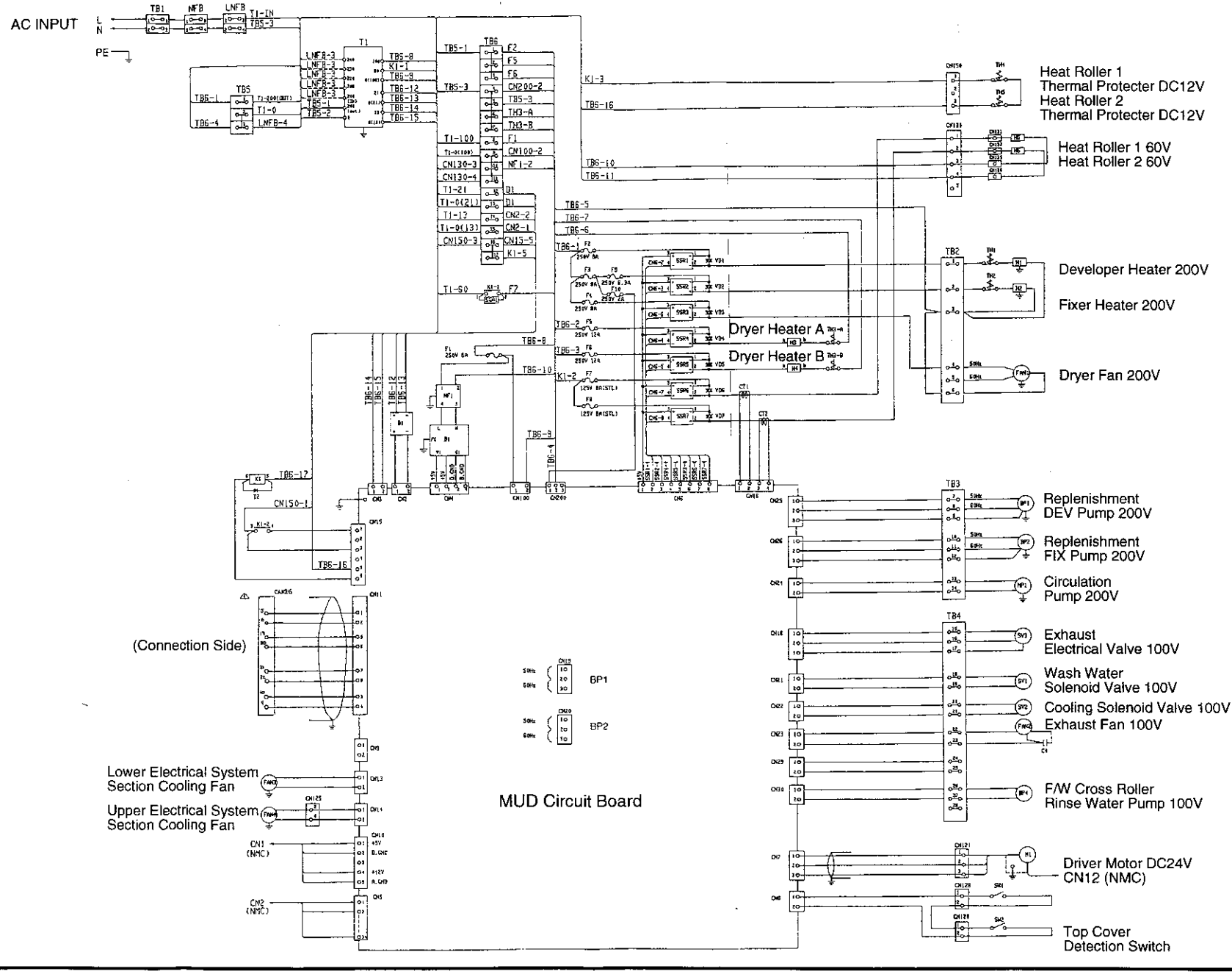
15.3 Relationship between Loads and Fuses

Load	Symbol	Rating	Part number
Developer heater	Control section F2	250V 8A	137F1059
Fixer heater	Control section F3 Control section F9	250V 8A 250V 6.3A	137F1059 137F1139
Dryer heater A	Control section F5	250V 12A	137F1119
Dryer heater B	Control section F6	250V 12A	137F1119
Dryer fan	Control section F4	250V 8A	137F1059
Circulation pump	Control section F3 Control section F10	250V 8A 250V 2A	137F1059 137F1140
Developer replenishment pump	Control section F3 Control section F10	250V 8A 250V 2A	137F1059 137F1140
Fixer replenishment pump	Control section F3 Control section F10	250V 8A 250V 2A	137F1059 137F1140
Heat roller 1	Control section F7	125V 8A (STL)	137F1039
Heat roller 2	Control section F8	125V 8A (STL)	137F1039
Switching power supply	Control section F1	250V 8A	137F1059
Cooling solenoid valve	Control section F1 MUD circuit board F11	250V 8A 250V 5A	137F1059 137S1040
Wash water solenoid valve	Control section F1 MUD circuit board F11	250V 8A 250V 5A	137F1059 137S1040
Exhaust fan	Control section F1 MUD circuit board F11	250V 8A 250V 5A	137F1059 137S1040
Water drain solenoid valve	Control section F1 MUD circuit board F11	250V 8A 250V 5A	137F1059 137S1040
Upper electrical system section cooling fan	Control section F1 MUD circuit board F12	250V 8A 125V 2A	137F1059 137S1063
Lower electrical system section cooling fan	Control section F1 MUD circuit board F12	250V 8A 125V 2A	137F1059 137S1063
Processibility signal	MUD circuit board F15	250V 0.315A	137F1145
Drive motor	MUD circuit board F16	250V 8A	137F1143
Top cover detection signal (for software)	MUD circuit board F16	250V 8A	137F1143

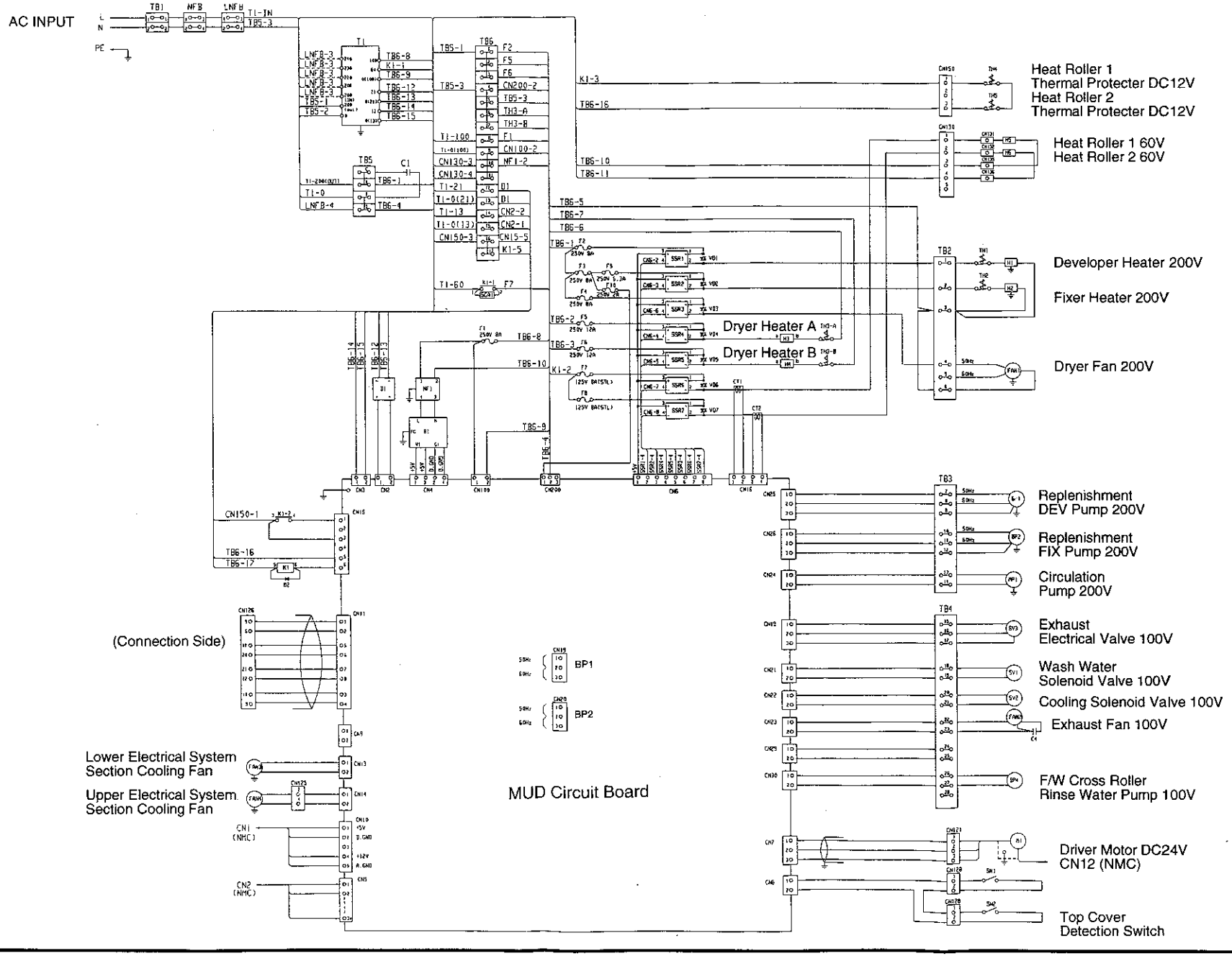
* If MUD circuit board fuse F16 is blown, the "top cover open" error occurs.


LCD1
CN2
NMK Circuit Board
CN1
CN3
NMC Circuit Board
CN10-1
CN10-2
CN10-3 (MUD)
CN10-4
CN10-5
CN1
+5V
D.GND
+12V
A.GND
CN31
MFS Circuit Board
Film Sensor
Insertion Side Film Sensor
CN32
CN21
RT1
Developer Temperature Sensor
CN22
RT2
Fixer Temperature Sensor
CN23
RT3
Dryer Temperature Sensor
CN2
(MUD) CN5
CN26
CN160
RT4
Heat Roller 1 Temperature Sensor
M1
CN12
CN27
CN161
RT5
Heat Roller 2 Temperature Sensor
RS-232C
CN17
CN41
S1
Developer Tank Solution Level Sensor
CN42
S2
Fixer Tank Solution Level Sensor
CN123
Insertion Side Buzzer
BZ1
CN8
CN43
S3
Wash Tank Solution Level Sensor
CN9
CN44
CN45
CN14
CN46
CN47
Insertion Side LED
LED1
CN10
CN48
S8
Water Supply Tank Level Sensor
CN25
CN5
CN6

Circuit Diagram 2/2 for Single Phase (UL)



Circuit Diagram 2/2 for Single Phase (TÜV)



Circuit Diagram 2/2 for Triple Phase