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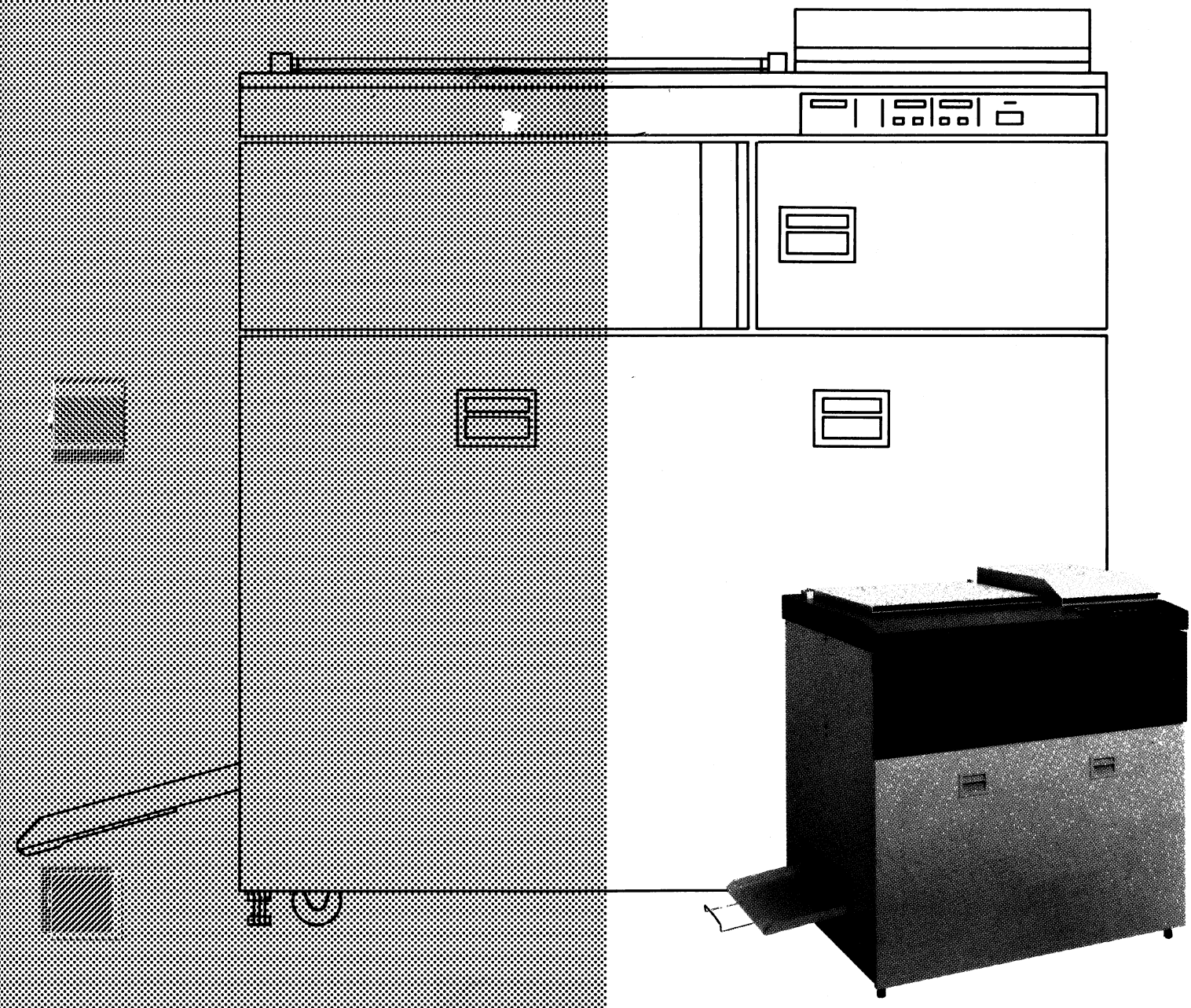

# MITSUBISHI GRAPHIC ARTS SYSTEM

# EP-31V

# MITSUBISHI

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# 1. INTRODUCTION

We at Mitsubishi are very grateful to you for selecting the Diafax Master Platemaker EP-31V. The Diafax Master Platemaker EP-31V deals with a wide size range of plates from B4 to A3, using the Diafax Master LOM-IIB as plate material.

This platemaker EP-31V produces offset master plates directly from the original copy with greatly simplified operation, eliminating the need for any intermediate process.

This operation manual provides information for ensuring continued satisfactory operation of the machine. Please read it before using the machine.

For information on printing methods, please refer to our booklet, "Diafax Master LOM-IIB Technical Guide."

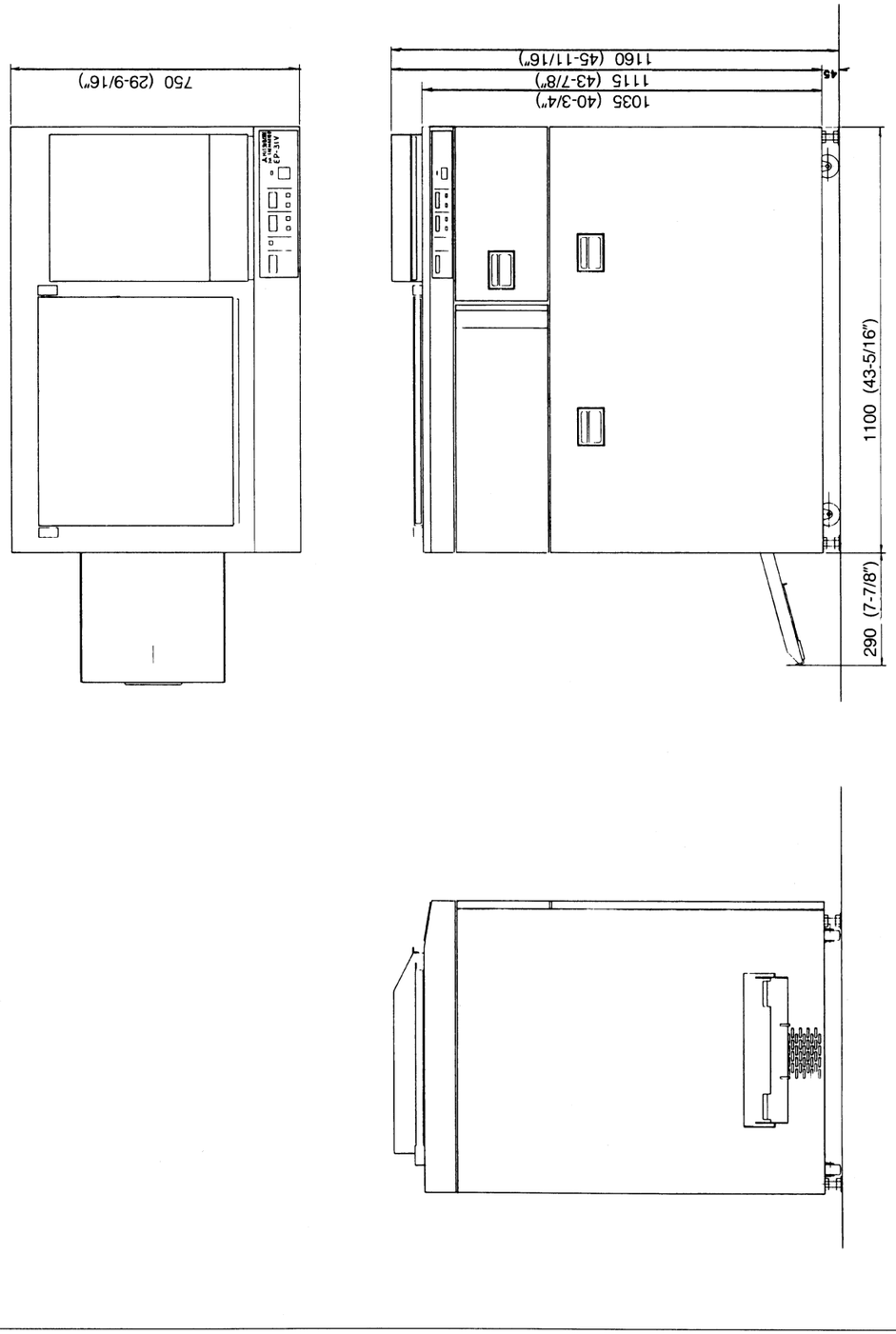


# 2. SPECIFICATIONS

| | |
|---|---|
| Master width: | 229mm (9 in.), 254mm (10 in.), 279mm (11 in.), 305mm (12 in.), 310mm (12 3/16 in.), (available in 80m (262ft) and 100m (328ft) rolls) |
| Master length: | 300 ~ 480 (mm), 11.8 ~ 18.9 (in.) |
| Effective image area: | 310 × 430 (mm) 12 3/16 × 16.9 (in.) |
| Blank exposure area: | 310 × 480 (mm) 12 3/16 × 18.9 (in.) |
| Max. copy size: | 310 × 430 (mm) 12 3/16 × 16.9 (in.) |
| Magnification: | 100%/95% changeover |
| Lens: | f = 210mm (8.3 in.) F: 14.6, diaphragm fixed |
| Projection surface: (vacuum back) | Vacuum belt conveyor |
| Cutter: | Rotary cutter |
| Exposure control: | 0 ~ 99.9 sec |
| Light sources: | Four halogen lamps, (100V, 120V, 240V), 500W |
| Copy positioning light: | One tungsten lamp, 100W |
| Platemaking speed: | 30 sec/60Hz, 36 sec/50Hz (exposure: 10″, length: 480mm) |
| Cyclic platemaking speed: | 25 sec/60Hz, 30 sec/50Hz |
| Developing system: | Wet type, top-side jet spray development |
| Tank capacity: | 3.5 liters (0.92 gal) (at the time of platemaking) |
| Developer replenishment: | Automatic replenishment to maintain constant liquid level by developer cartridge (with a level sensor) |
| Cleaner: | 0.6 liter (0.16 gal) bottle (with a level sensor) |
| Fixing system: | (Upper) Heater, 750W<br>(Lower) 1 KW panel heater with electronic thermo-control |
| Safety system: | Safety thermo-sensor, jam sensor switch and reset switch are provided. |
| Dimensions: | 1100 (W) × 750 (D) × 1160 (H) mm,<br>43 5/16 (W) × 29 9/16 (D) × 45 11/16 (H) in. |
| Weight: | 190kg (419 Lb) |
| Electricity: | 100V, 2.5KW, single-phase, 50/60Hz |

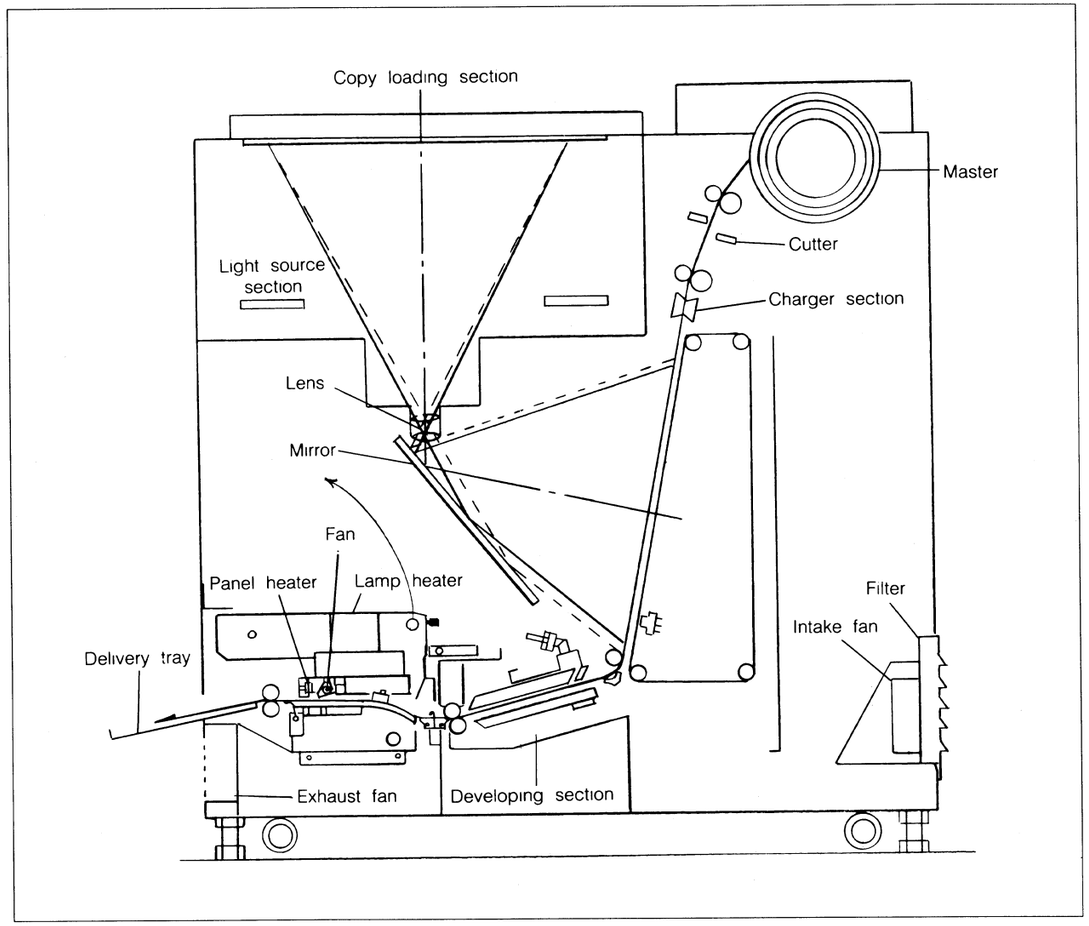
# 3. GENERAL DRAWINGS

**General Drawings**






# 4. PROCESS CHART



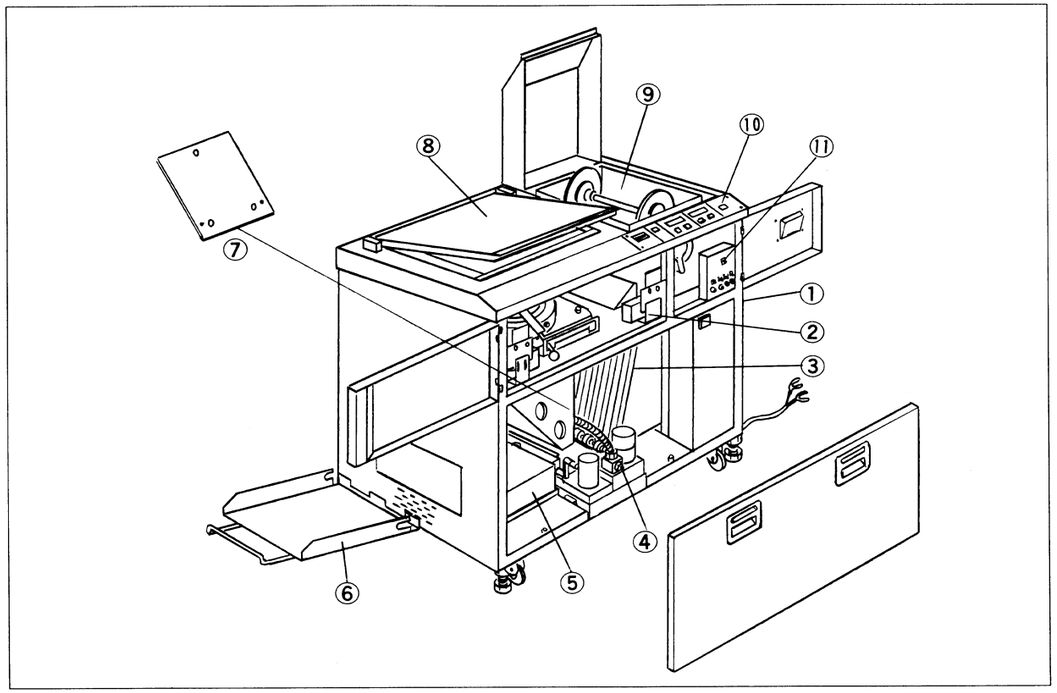

# 5. ENVIRONMENTAL CONDITIONS AND PRECAUTIONS

① The wiring should have a sufficient capacity to handle electric power of 100V, 2.5KW, single-phase.
In particular, since the machine incorporates a microcomputer, it may malfunction due to low voltage if the power supply capacity is insuffcient.
In areas where service voltage is unstable, it is recommended that a constant-voltage unit be used.

② The room where the machine is installed should meet the following conditions.
1) Room temperature: 18 ~ 28°C (64 ~ 82°F)
2) Room humidity: 45 ~ 75%
3) No vibration
4) Even floor surface
5) The floor is solid enough to withstand the machine weight (200kg when loaded).
6) No possibility of exposure to direct sunlight.

# 6. MACHINE DESCRIPTION

## 6-1. General Structure




① **POWER (power switch)**
When this switch is turned on, the control circuit and fixing section are energized. If the fixing temperature is below the pre-set level, [CLd] appears on the M. LENGTH display and the machine will not start. As temperature rises to the pre-set level, [CLd] disappears and the set master length appears, which means the machine is ready for operation.

② **Light source section:**
Houses the lamps, lens, and magnification switching lever (95%/100%).

③ **Vacuum back:**
Includes the vacuum device for holding the master, and conveyor belt.

④ **Developing section:**
Houses the developing boards (upper and lower), pump, developing tank and cleaner tank.

⑤ **Fixing section:**
Houses the panel heater, lamp heater and fixing fan.

⑥ **Master delivery tray**

⑦ **Mirror**

⑧ **Copy loading section:**
Includes the copy positioning sheet, copy compression glass and copy compression board.

⑨ **Master magazine**

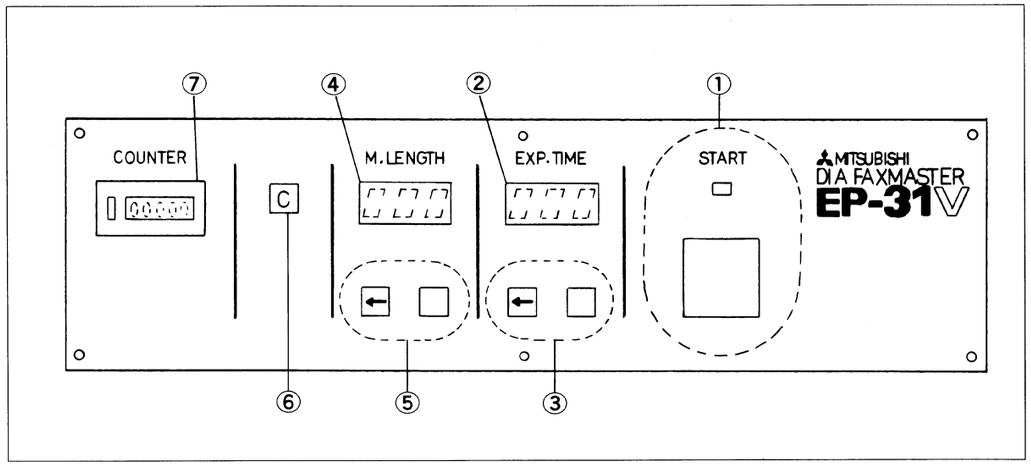
⑩ **Main control panel:**
On the main control panel are controls such as the start button, exposure-time set keys, master length set keys, clear key and counter.

⑪ **Sub control panel:**
On the sub control panel are controls such as the AUTO/MANU switch, pump switch, drive (VB) switch, lamp switch and exhaust fan switch.



## 6-2. Main Components

### 6-2-1. Main Control Panel




① **START (exposure start lamp and button)**
Press this button to start exposure. The button is ineffective when the start lamp above the button is out.
The start lamp does not light in the following cases:
- o Exposure is under way.
- o Master end message is on being displayed. ([End] appears.)
- o Warming up is under way. ([CLd] appears.)
- o There is trouble in the preceding plate. ([CHd], [CHC] or [CHF] appears.)
- o The sqeegee roller is free. ([n,P] appears.)
- o The AUTO/MANU switch on the sub control panel is at the MANU position ([CHS] appears.)
- o The developer or cleaner is insufficient ([CHL] appears.)
- o The set master feed length is not sufficient. ([Err] appears.)
- o The master feed length or exposure time is being set.
- o One of the doors is open. ([dor] appears.)

② **EXP. TIME (exposure time display)**
This is the display for indicating the exposure time. The display counts down while exposure is under way. After the exposure, the previously set figures (exposure time) appear on the display again. After the exposure is completed, the exposure time can be altered even while the master is being fed. [Err] appears on the display when the set master feed length is out of the specified range.

③ **EXP. TIME (exposure time set buttons)**
These buttons are used to set exposure time (0 ~ 99.9 sec). Each press of the left-hand button (◀) shifts the EXP. TIME display by one digit, and the place in which the figure can now be set flashes.
The figure in that flashing place is increased by one by each press of the right-hand button (□). After entry of all the necessary figures for the exposure time, press the left-hand button once again. There will be no further flashing.

④ **M. LENGTH (master feed length display)**
This is the display for indicating the master feed length.
The master feed length should be set within 300 ~ 480mm in 1mm increments. If a value out of this range is set, [Err] appears on the EXP. TIME display (②) and no exposure can be made.

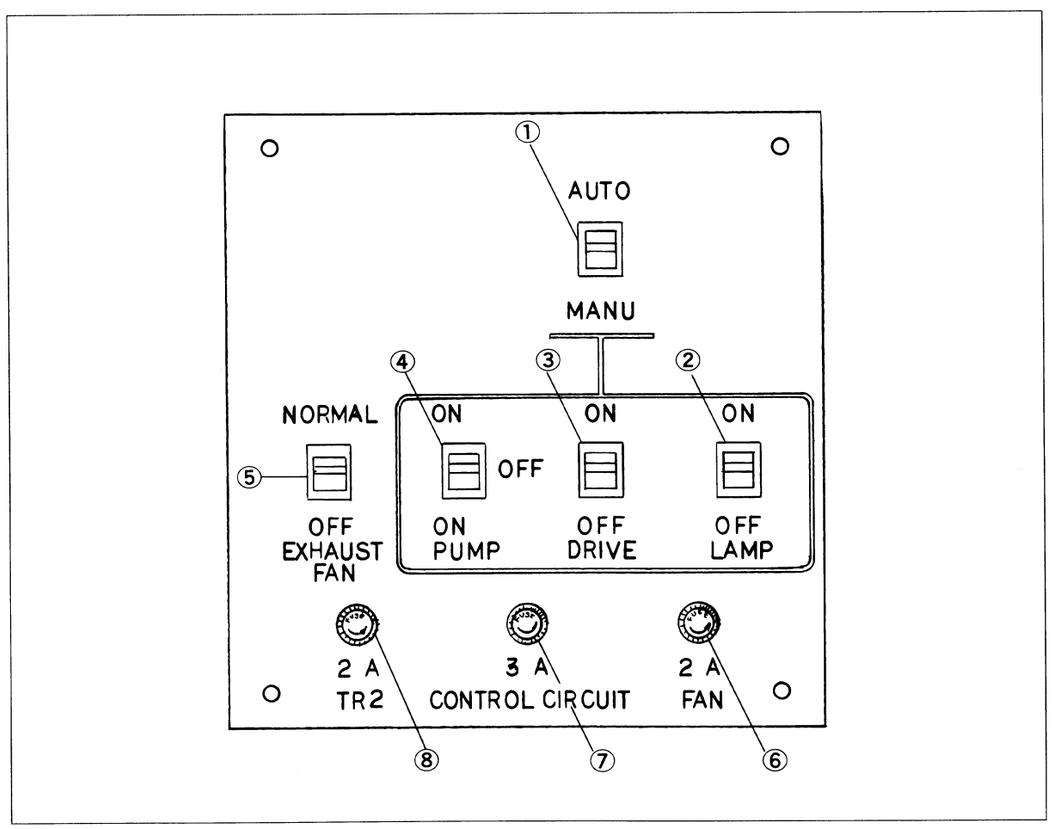
The figures on the display flash during master feeding.
Error messages also appear on this display. Refer to p.31.

⑤ **M. LENGTH (master feed length set buttons)**
These buttons are used to set the master feed length (300 ~ 480mm). The method of use is the same as for the EXP. TIME buttons (③).

⑥ **Clear key**
This cancellation key is used for the following purposes.
1) To clear [CLd] on the display to start exposure.
In this case, the set fixing temperature has not yet been reached, so if exposure is started at this point, plate quality will not be satisfactory. Turn off the POWER switch and turn it back on after at least 5 sec. interval.
2) To clear [CHL] on the display to start exposure.
In this case, the amount of developer or cleaner is not sufficient, so if exposure is started at this point, plate quality will not be satisfactory. Add the developer or cleaner.
3) To stop the alarm buzzer.
(The message will remain on the display.)
4) To stop the exposure under way.
A master of a length indicated on the display will be transported to the next stage.

⑦ **COUNTER**
This counter indicates the number of masters (plates) produced. After renewing the processing solutions or loading a new master roll, unlock the counter and press the reset switch to reset the counter to zero. During operation, the reset switch should be at the lock position.

### 6-2-2. Sub Control Panel






① **AUTO/MANU switch**
This switch is used for auto/manual operation mode switching. The switches ②, ③ and ④ are used for manual operation.
Turn the switch to AUTO for normal operation. If it is at MANU, [CHS] appears on the display, i.e., platemaking operation cannot be started.

② **LAMP (lamp switch)**
When this switch is on, the four exposure lamps light.
Use this switch when checking the lamps, or cleaning the copy glass, etc.

③ **DRIVE (vacuum back drive switch)**
When this switch is ON, the vacuum back belt conveyor is driven.

④ **PUMP switch**

| | |
|---|---|
| ON-1 | The pump runs.<br>This position is used for warming up. (When starting the processor after a long shutdown, warm it up for about three minutes to agitate the processing solution.) |
| Neutral | The pump stops. |
| ON-2 | The pump runs while the switch is held down. This position is used to operate the pump for liquid draining. |

* When the squeegee roller is free, [noP] appears on the display, i.e., the pump and vacuum back belt drive will not function.

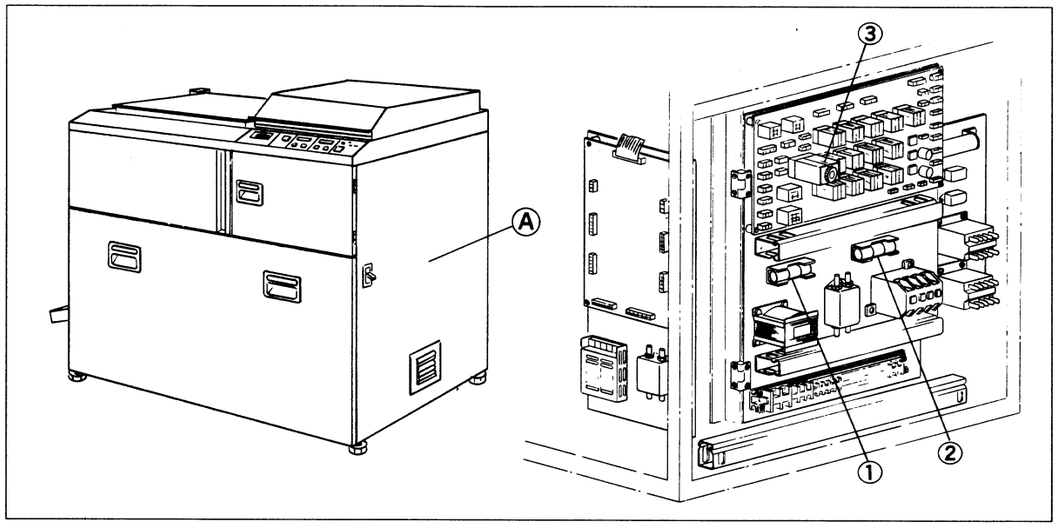
⑤ **EXHAUST (exhaust fan)**
This switch activates the exhaust fan. The exhaust fan is used to prevent abnormal temperature rise in the machine, and to ventilate the compartment containing the lens, mirror, etc. It should be set at the NORMAL position under normal conditions.

⑥ **FAN (Fan fuse 2A)**
A glass tube fuse (2A) for each fan is housed in this fuse holder. If any fan does not run, uncap the holder and check the fuse. Be sure to use a fuse with the specified ampacity.

⑦ **CONTROL CIRCUIT (Control circuit fuse 3A)**
A glass tube fuse (3A) for protection of the control circuit is housed in this fuse holder.
If the control circuit does not function when the power is on, uncap the holder and check the fuse. Be sure to use only a fuse with the specified ampacity.

⑧ **TR2 (Weak current 24VDC circuit transformer protection fuse)**
A transformer fuse (2A) for the protection of weak current 24 VDC circuit is housed in this fuse holder. This fuse protects the weak current 24 VDC circuit.

## 6-2-3. Control Box Section




The control box, located inside the right side cover Ⓐ of the main body, houses various electric parts.

**CAUTION:**

1) When replacing the fuse, be sure to turn off the POWER switch and the main power source.
2) Never use fuses other than those with the specified ampacity.

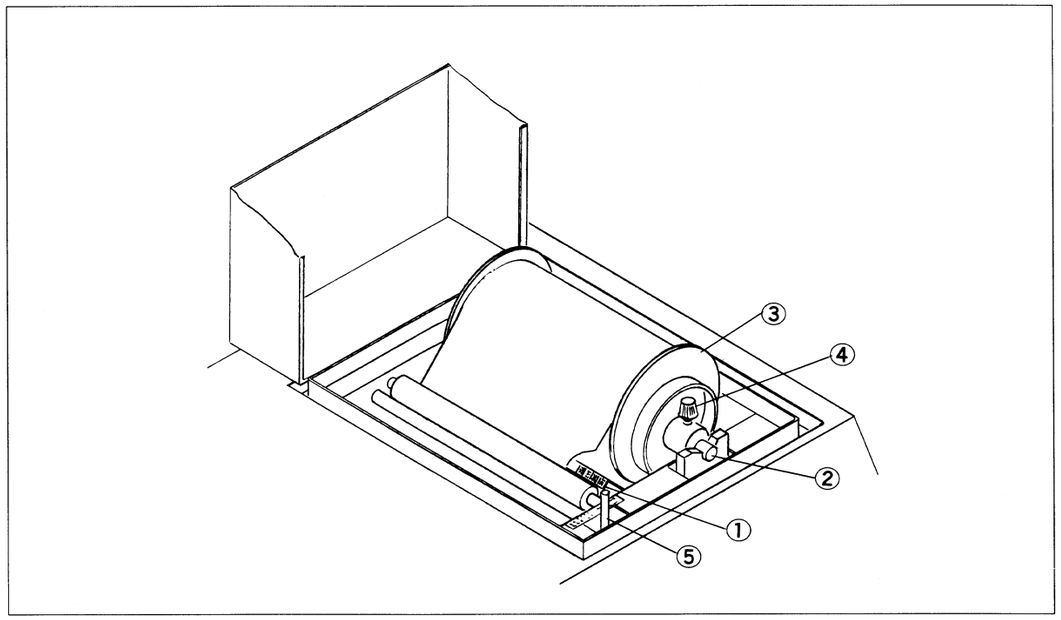
① **F1 fuse (EXP. LIGHT)**
An enclosed fuse (30A for use in Japan, 20A for 120V areas, or 10A for 220V areas) for the lamps for exposure is housed here.

② **F2 fuses (HEATER)**
An enclosed fuse (20A) for the panel heater is housed here to protect the panel heater circuit.

③ **Heater control unit**
To prevent trouble in fixing, the built-in electronic thermo-controller controls the internal temperature of the machine by automatically switching on and off the panel heater as long as the power is on (standard setting: 140°C (284°F).

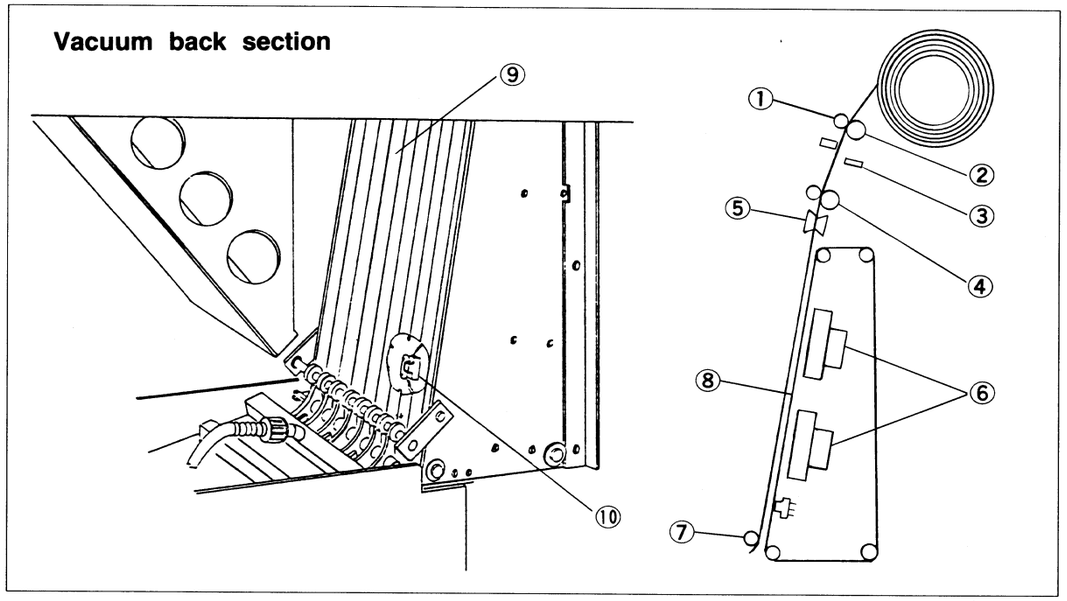


## 6-2-4. Master Magazine




① **Master positioning guide plate**
② **Master positioning shaft**
Notches and spool setscrew holes corresponding to the standard master widths are provided on the shaft.
③ **Spool**
④ **Spool setscrew**
⑤ **Master nip lever**

## 6-2-5. Vacuum Back Section




① **Nip roller**
This roller holds the top side of unrolled master in position.
The roller is locked or released with the nip roller in the master magazine.

② **Upper conveyor roller**

③ **Rotary cutter**

④ **Lower conveyor roller**

⑤ **Charger**

⑥ **Vacuum fan**

⑦ **Master pressure roller**

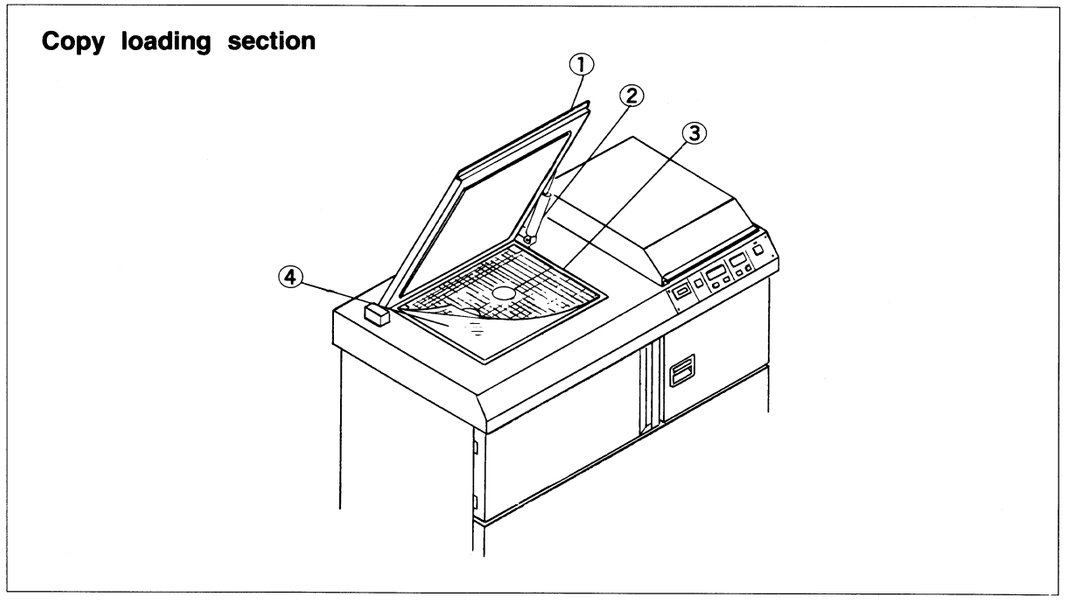
⑧ **Vacuum back**

⑨ **Conveyor belt**

⑩ **Sensor**
As the leading edge of the master, which has been cut off to the preset length, passes the sensor on the bottom of the vacuum back, the master will stop and be exposed for a pre-set time period.
The master, after being cut, is electrically charged for a certain period of time.



## 6-2-6. Copy Loading Section



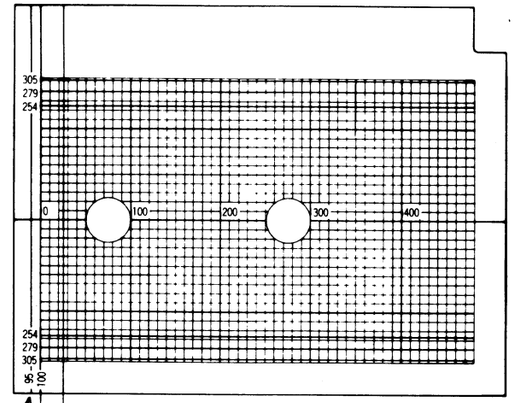

① **Copy compression frame**
This frame presses and holds the copy in position on the copy glass.
The frame can stand still in the specific open position by the effect of gas spring.
When the frame is opened, a lamp for copy positioning lights. (When closed, it goes out.)

② **Gas spring**

③ **Positioning sheet**
This sheet is used for determining the position of the copy. The sheet bears a guide line for 100%, a guide line for 95% and a centerline, and is ruled into 5mm squares. These rules represent the effective areas of images to be projected on the master. There are round holes in the sheet, which permits easy and accurate positioning of the copy.

④ **Copy glass**
The copy is placed between this glass and the copy positioning sheet with its image side down.

**NOTE:** Open and close the copy compression frame gently; if it is handled roughly, machine trouble can occur.

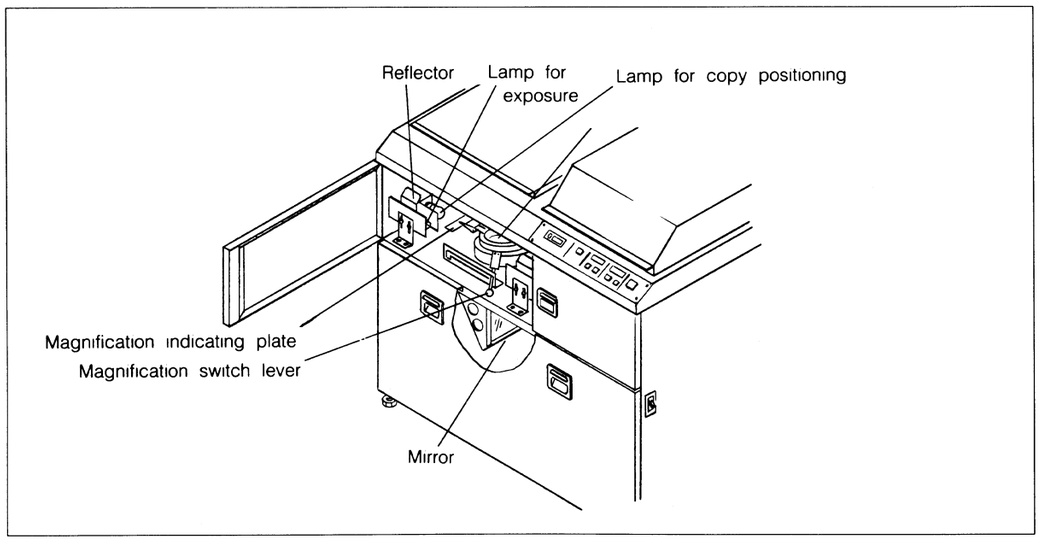



100% guide line (corresponds to the position of the master leading edge for effective 100% exposure)

95% guide line (corresponds to the position of the master leading edge for effective 95% exposure)

The copy positioning sheet bears a 100% guide line, a 95% guide line, a centerline and lines indicating the effective image areas for different roll sizes. In the vertical direction, lines are ruled at 5mm intervals, indicating the master feed length.
The center of the copy should be placed vertically on the centerline and horizontally, at a distance of half the output image size plus the gripper margin, from the guide line concerned using the scale of the centerline.
The maximum gripper margin is 25mm.

### 6-2-7. Optical Section (lamps, lens and mirror)




① **Lamps for Exposure**
500W halogen lamps are provided.

② **Lamp for copy positioning**
A 100W tungsten lamp is provided to help position the copy.



③ **Magnification switch lever**
100%/95% changeover can be done, using the lever located in the optical section, to move the lens vertically.
When the lever is in the right-hand notch, a 100%-sized image is produced; when it is in the left-hand notch, a 95%-sized image is produced.

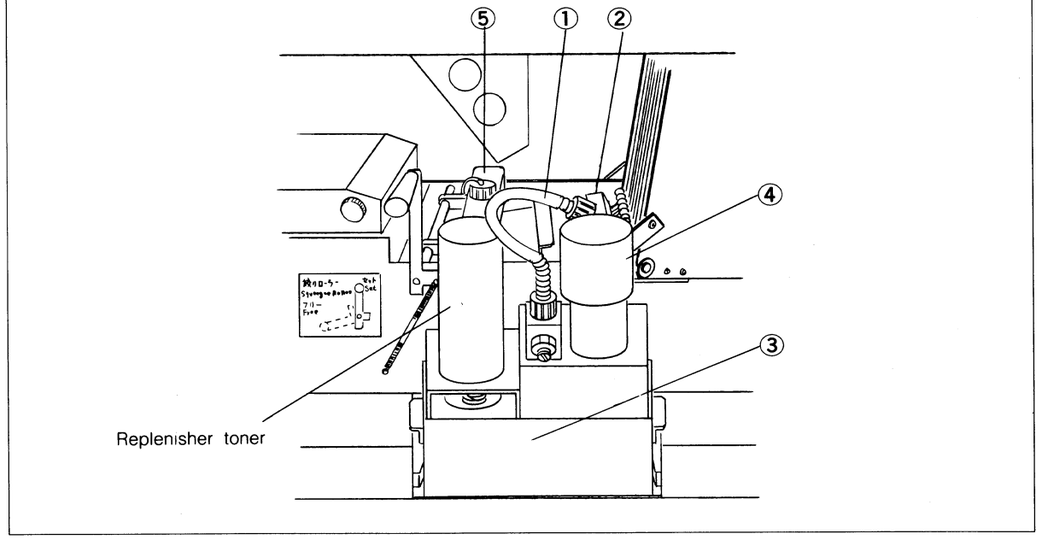
④ **Mirror**

⑤ **Lens**
The focal length is 210mm, and the diaphragm is fixed.

**CAUTION:**

1) The lens and mirror surfaces are very soft and easily scratched; handle them very carefully.
2) When the machine is to be out of operation for many hours, cap the lens and cover the mirror. Never touch the lens and mirror with bare hands.

### 6-2-8. Developing Section




① **Hose**

② **Developing board**

③ **Developing tank**
The capacity of the tank is 3.5 liters.
When the level of the developer gets low, the float sensor incorporated in this tank detects this, and [CHL] is displayed on the M. LENGTH display on the main control panel. If this occurs, replenish the developing tank. Development can be continued by pushing the [C] key even without replenishing the tank. In that case, however, the circulation of the developer will deteriorate, which may result in poor quality reproduction, and, in some cases, pump trouble.

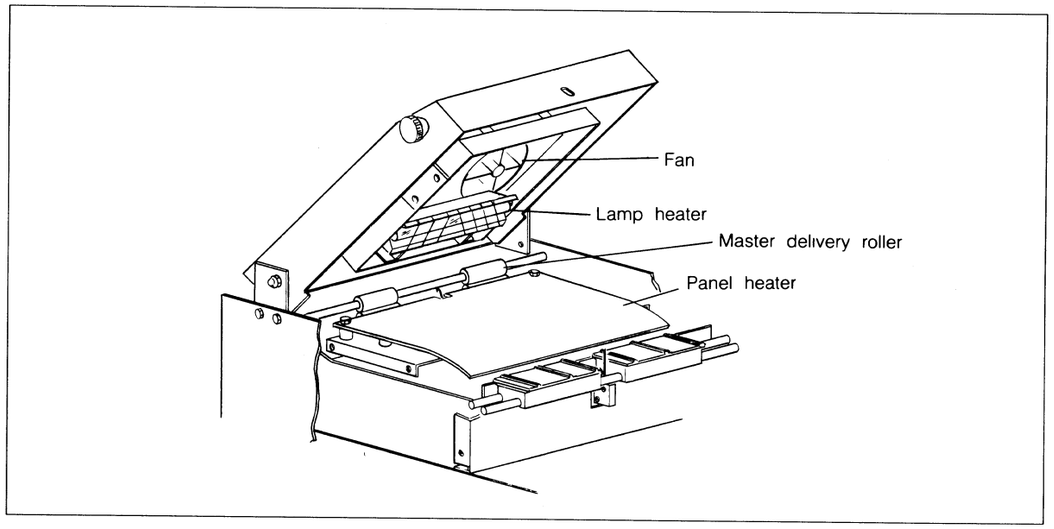
④ **Pump**

⑤ **Cleaner tank**

The capacity of the tank is 0.6 liter.

When the level of the cleaner gets low, the float sensor incorporated in this tank detects this, and [CHL] is displayed on the M. LENGTH display on the main control panel. If this occurs, add cleaner. Development can be continued by pushing the [C] key even without replenishing the tank. In that case, however, the squeegee roller will be stained by the toner or scratched, which may result in poor quality reproduction.

### 6-2-9. Heater Section




The heater section includes the lamp heater and panel heater; to ensure stable fixing performance, the electronic thermo-controller controls the internal temperature by switching on and off the heaters. The fan in the upper heater section starts working from the time when exposure is completed, until the master is delivered, which also contributes to uniform temperature distribution for stable fixing results.

If the atmospheric temperature is lower than 10°C (50°F), stop the exhaust fan in the heater section to improve the fixing performance. (Switch off the EXHAUST switch on the sub control panel.) When the temperature comes back up, turn the fan back on.

If the inside of the machine becomes extremely hot, the thermo-fuse will detect it and automatically turn off the heater for safety.



# 7. FILLING THE DEVELOPING TANK

## 7-1. Procedure Before Filling the Developing Tank

① Pour 2.0 liters of cleaner (CL) fluid in the developing tank. Turn the AUTO/MANU switch on the sub control panel to MANU. Then, turn on the PUMP switch to circulate the cleaner fluid for 3 to 5 minutes to clean the developing boards and the tank inside.

② Drain the cleaner fluid after cleaning.
Disconnect the hose from the hose joint connected to the developing board, and pull the developing tank out forward. Raise the front side of the tank slightly while pulling it out.

③ Wipe the developing boards and tank with a cloth. The developing boards are fixed with two thumb screws at the front and rear sides.

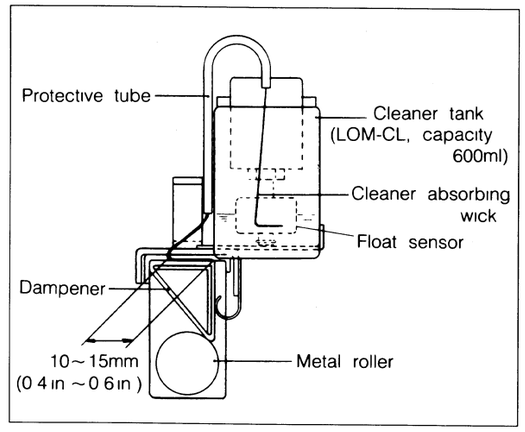
## 7-2. Filling the Developing Tank

The capacity of the developing tank is 3.5 liters.

① Developer (LOM-EDIII) is used undiluted.

② Fill the developing tank with 3 bottles of developer (LOM-EDIII) and put another one in the replenisher bottle holder.

## 7-3. Automatic Replenishing Device for Squeegee Roller Cleaner




* The consumption of cleaner and the required frequency of dampener repositioning or replacement depend somewhat on the environment, but the criterion is as follows.

| | | Standard |
|---|---|---|
| Consumption of the cleaner | Summer | Approx. 60 ml/day |
| | Winter | Approx. 30 ml/day |
| Dampener | Repositioning | every 2 weeks |
| | Replacement | every 3 months |

This automatic replenishing device is provided to prevent plate stains which often occur due to toner adhesion on the metal nip roller. The device uses the cleaner (LOM-CL) to keep the dampener (cloth) wet and soft to maintain a good cleaning effect on the metal roller.

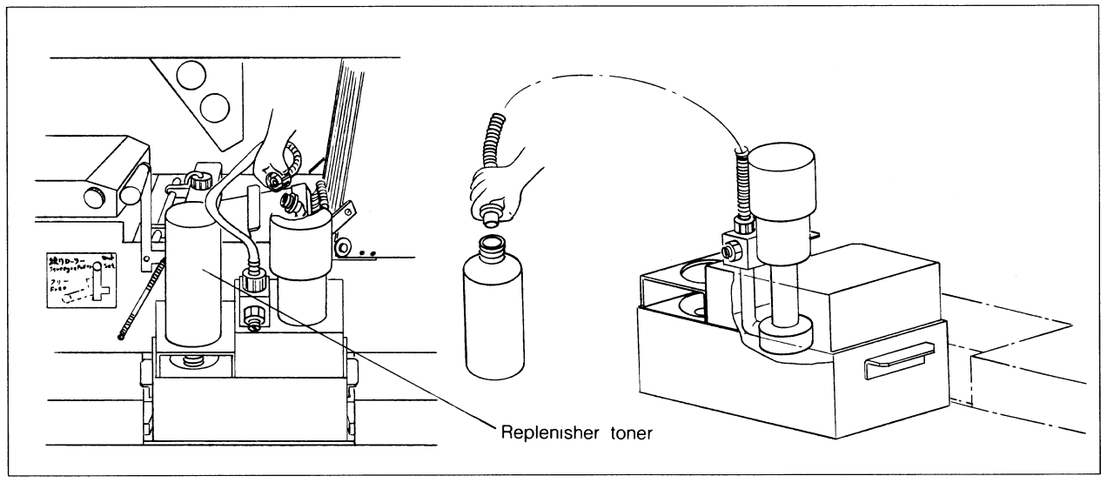
① Uncap the cleaner tank, pour the cleaner into it (capacity: 600 ml) and recap the tank.

② The dampener is supplied with the cleaner through the wick.

**CAUTION:**

1) It takes a considerable time to moisten a new dampener completely with cleaner through the wick. Therefore, moisten it with cleaner manually before mounting it.
2) When the cleaner in the tank is low, the float sensor detects it, causing [CHL] to appear on the M. LENGTH display of the main control panel. When this happens, add cleaner.

## 7-4. Removing Developer Contaminations




**Draining:**

① Remove the supply pipe mounted above the developing boards from the joint.
② Insert the end of the pipe into an empty container.
③ Turn the AUTO/MANU switch on the sub control panel to MANU.
④ Turn the PUMP switch on the sub control panel to ON-2 to draw off the developer from the developing tank.
NOTE: The developer will overflow as a result of continuous draining if the PUMP switch is turned to ON-1.
⑤ Pull the tank out forward, raising it slightly, and then, wipe the inside of the tank with a cloth.

**Cleaning:**

① Return the developing tank to its original place, and mount the hose above the developing board.
② Pour 2 liters of cleaner (CL) into the tank.
③ Turn the AUTO/MANU switch on the sub control panel to MANU.
④ Turn the PUMP switch to ON-2 to circulate the cleaner for 2 to 3 minutes.
⑤ Drain the cleaner in the same way as for the developer and wipe the inside of the tank with a cloth.
⑥ Loosen the two fixing screws on both the upper and lower developing boards, and lift out the boards.
⑦ Wipe the upper and lower developing boards before returning them to their original place.
⑧ Replace the developing tank and hose as they were.
⑨ Pour developer into the tank according to "7-2 Filling the Developing Tank".



## 7-5. Frequency of Developer Change

The table below shows the processing capacity of one fill of developer.
Change the developer when the nominal useful life of the fluid has expired or when the number of plates processed has reached the prescribed limit of processing capacity. In other words, when one of these two limits is exceeded (life span, or processing capacity), developer must be changed regardless of whether the other limit has been exceeded or not.

| Nominal useful life | Processing capacity | Note |
|---|---|---|
| 1 month | B4 W size, 1500 plates | The replenisher bottles should always be filled with replenisher to ensure proper replenishment. |

* When any size other than the above plate is used, calculate the max. number of plates one fill of fluid can process, from its area ratio to B4 W size.

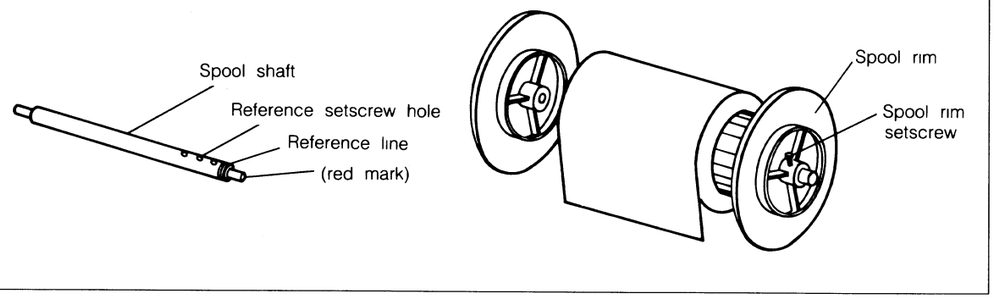
## 7-6. Precautions in Handling Processing Chemicals

① Never swallow or allow chemicals to make contact with eyes. Should this happen, see a doctor.
② If cloths or skin is exposed, immediately wash in running water.
③ Strictly observe the handling instructions.
④ Keep the chemicals out of reach of children.

# 8. LOADING A MASTER ROLL

## 8-1. Setting the Spool Rims on the Shaft

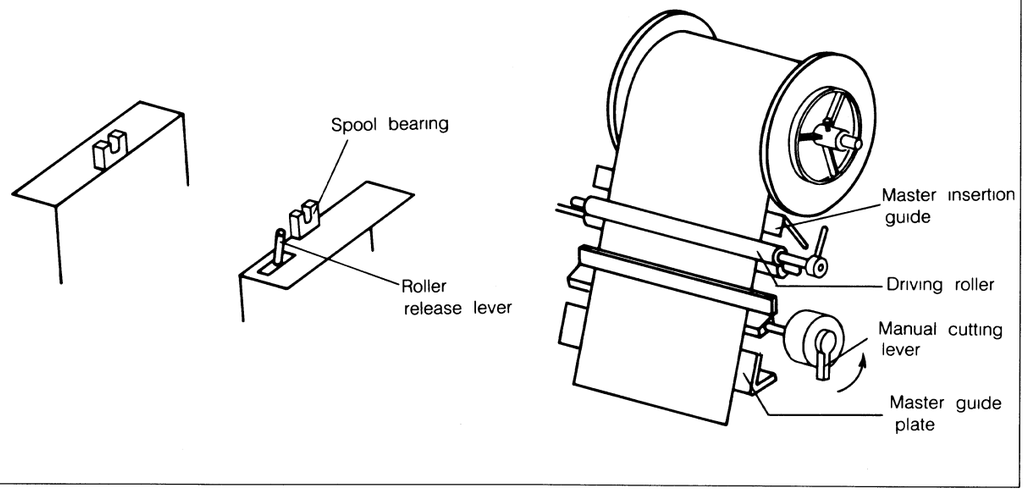
**Setting the spool rims on the shaft**




① Align the reference spool rim (indicated with a red mark) with the reference line of the spool shaft (indicated with a red mark) depending on the master width to be used, and fix it with the setscrew into the setscrew hole.
When mounting a master roll of 310mm (12 3/16″) width, align the reference spool rim with the edge of the spool shaft instead of with one of the reference lines and fix it using the setscrew hole on the reverse side of the shaft.
② Insert the spool shaft into the master roll core hole.
**NOTE:** The winding of the master roll should be counterclockwise as viewed from the reference line.
③ Put the other spool rim onto the spool shaft and fix it with the setscrew.

## 8-2. Loading the Master into Magazine

**Loading the master into Magazine**




① Open the magazine cover.
② Place the spool shaft loaded with a master roll on the spool bearings.
Align the reference spool rim with the reference side spool bearing (indicated with a red mark).

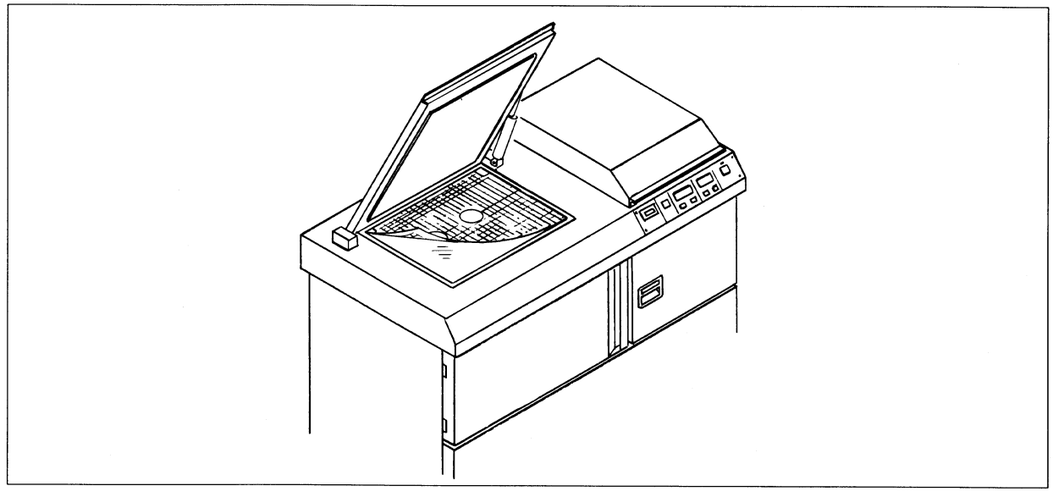


③ Turn the roller nip lever to the position for roller release.
④ Insert the master between the two rollers along the master insertion guide until the edge of the master reaches the surface of the guide plate.
⑤ Turn the roller nip lever to the position for roller lock.
⑥ Open the sub control panel cover and turn the manual cutting lever toward the direction of the arrow in the figure to cut the master.
**NOTE:** The lever does not always snap back smoothly. After cutting the master using the manual cutting lever, make sure that the lever has returned to its initial position.
⑦ Remove the master scraps remaining on the master guide plate.
Close the sub control panel cover.
⑧ Close the master magazine cover.

# 9. MASTER END DETECTION

After depression of the START switch, when the end of the master is detected, [End] appears of the M. LENGTH desplay on the main control panel and the buzzer sounds to warn of master exhaustion. The last sheet of master will remain on the vacuum back.
Before loading a new master roll, remove the remaing sheet on the vacuum back.

# 10. SETTING THE COPY



① **Open the copy compression frame.**
Hold and lift the copy compression frame handle gently, until the frame is stopped in the specified position.
② **Position the copy.**
Position the copy between the copy positioning sheet and the copy glass with its image side down, using the centerline and the scale horizontally and vertically graduated in 5mm divisions of the copy positioning sheet.
③ **Close the copy compression frame.**
Lower the frame gently, holding its handle.
Don't release the hold on the handle until the frame is closed completely.

# 11. PLATEMAKING (PHOTOGRAPHING)

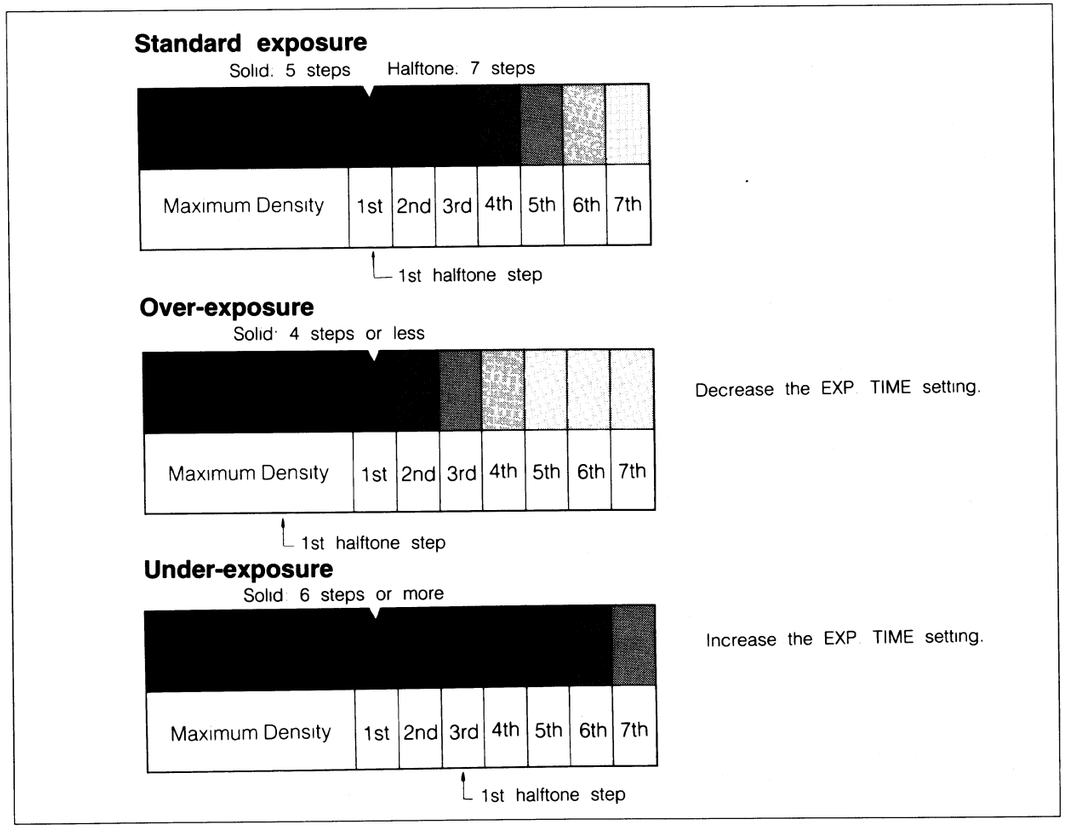
Magnification ratios of 100% and 95% (reduction) are available. 100%/95% switching is done by moving the lens vertically through operation of the lever in the optical section.
When the lever is in the right-hand notch, a 100%-sized image is produced; when it is in the left-hand notch, a 95%-sized is produced.

## 11-1. Platemaking Procedure

① Switch on the POWER on the sub control panel. Exposure can not be started until the machine is warmed up and ready for fixing.
② Just after the warming-up of the machine, the previously set master feed length and exposure time values are displayed respectively on the M. LENGTH and EXP. TIME displays on the main control panel, which means that the machine is ready for exposure.
③ Open the copy compression frame gently, position the copy, and close the frame gently.
④ Set the required master feed length to the M. LENGTH display on the main control panel.
⑤ Push the START button.
⑥ Exposure, developing, fixing and delivery of the master, now proceed automatically.

## 11-2. How to Determine Standard Exposure

Standard exposure is the exposure where the minimum noticeable halftone is seen in step 1 of the test chart gray scale as in the supplied sample.
Since standard exposure is the base for determining the optimum exposure for each copy, determine it accurately.






① Make an exposure of the test chart according to the procedure in 11-1.
② Evaluate the gray scale of the exposure thus made. Compare it with the supplied sample gray scale to find the exposure level with which the test chart step 1 in the exposure is the step where noticeable halftone begins (the first step of halftone).
1) Over-exposure
If there are 8 or more halftone steps, the exposure is over-exposed. Decrease the EXP. TIME setting.
2) Under-exposure
If there are 6 or less halftone steps, the exposure is under-exposed. Increase the EXP. TIME setting.

**CAUTION:**
1) The Diafax Master LOM-IIB is coated with zinc oxide emulsion; its sensitivity may vary somewhat among lots. Before using a new lot, check its sensitivity.
2) The standard print sample may fade with time. Store it in a drawer or dark place.

## 11-3. How to Determine the Optimum Exposure Setting

The optimum exposure setting varies according to the type of the original copy being used. Also the optimum exposure setting differs according to the user's printing conditions (press, printing paper, ink, etc.).
Under-exposure may cause a thickened image or stains on the background of the plate. Over-exposure may cause a too thin image or a lost image. Correct exposure is essential for the Diafax Master LOM-IIB to deliver the best performance.
Refer to the Diafax Master Technical Guide for further information. The table below shows the suggested exposure settings for various types of copies. The users should find the best suited exposure setting for each copy depending on their own printing conditions.

**Suggested Exposure Settings For Various Copies**

| Copy | | Increase/Decrease from Standard Setting |
|---|---|---|
| State | Type | |
| Letters or lines are too thin or blurred. | Written with pencil | 0 ~ −20% Decrease to the extent that non-image area will not become whitish. |
| | Duplication | |
| | Photocomposition | −10 ~ +20% |
| Letters are too thick and rough, or darkish background | Typewritten | 0 ~ +30% (Increase) |
| | Halftone | +20 ~ +30% (Increase) |

# 12. MAINTENANCE

For ensuring high plate quality, practice of simple routine inspections and maintenance procedures are essential. Such practice will not only assure long service life but also prevent serious machine trouble.

## 12-1. Daily Inspection and Maintenance

① Cleaning the exposure glass
Clean the exposure glass occasionally, for example, before starting operation and when the master roll is exhausted.

② Cleaning the copy glass.
Clean the copy glass occasionally, for example, when starting operation and when changing the copy.

* If the exposure glass or copy glass is very dirty, wipe with a commercially available glass cleaner. Then wipe thoroughly with a dry cloth so as not to leave any cleaner liquid.

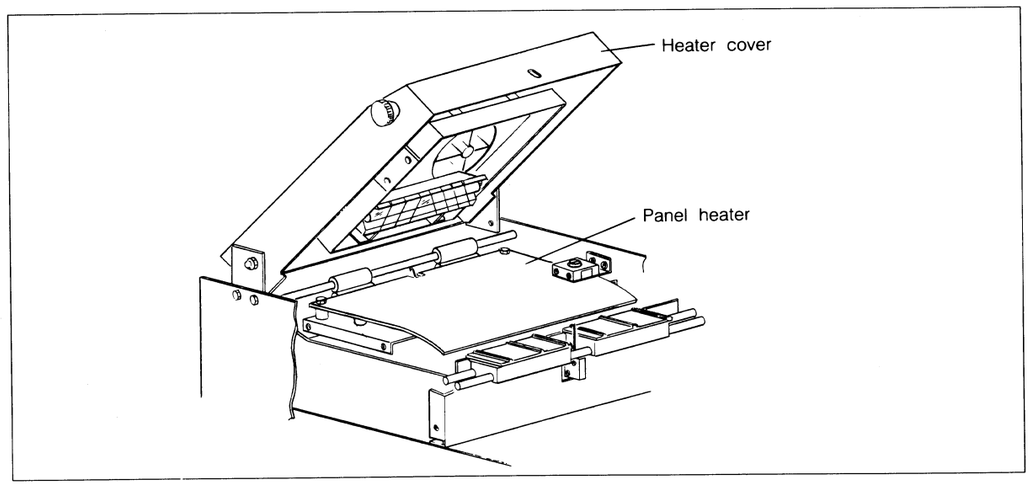
## 12-2. Periodic Inspection and Maintenance

### 12-2-1. Care of the Components

**① Cleaning the intake fan filter (every 6 months)**
Wash the filter with running water, and dry it completely, and replace it as it was.
**CAUTION:**
1). If the filter is mounted wet, water may splash over the machine, causing the distributing board to short, or damaging other electric parts.
2) Don't use a dryer or any high temperature source to dry the filter.

**② Cleaning the developing boards (when the developer is changed)**
If toner sticks to the developing boards, the master may be stained or damaged. Therefore the developing boards should be washed when the developer is changed. (See section 7-2.)

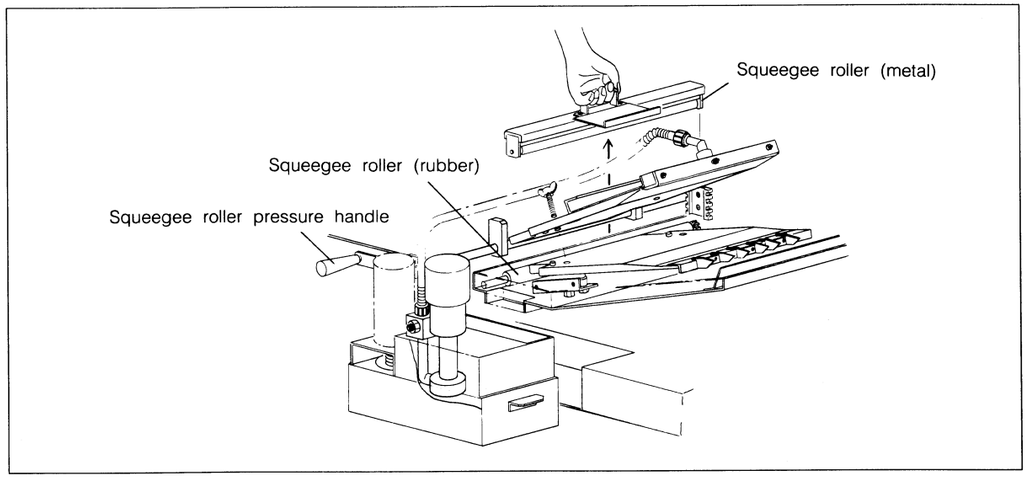
**③ Cleaning the fixing section (every 500 plates)**
If toner sticks to the fixing panel heater, poor fixing, stain on the reverse side of the master, and damage to the panel heater can result. Therefore the panel heater should be cleaned after every 500 plates.






**Cleaning method:**
1. Turn off the POWER switch.
2. Open the heater cover.
3. Wipe the heater with a rag. If it is difficult to remove a stain, soak the rag in some cleaning fluid.
   **NOTE:** Cleaning should be done after the panel heater has cooled.

**④ Cleaning the squeegee roller**
With extended use, or when toning or poor fixing occurs, the squeegee roller should be cleaned.




**Cleaning method:**
1. Turn off the POWER switch.
2. Gently push the squeegee roller pressure handle 90° to the left, freeing the roller.
3. Lift up the metal squeegee roller to remove it.
4. Remove the rubber squeegee roller likewise.
5. Clean the roller with a rag soaked in cleaning fluid (or, if difficult to remove, industrial alcohol).
   **NOTE:**
   1) If the squeegee roller is scratched or dented, its effectiveness will be reduced.
   2) When setting the roller, be careful of the direction of the drive gear.
   3) When the roller pressure handle is in the "free" position, the pump will not work.

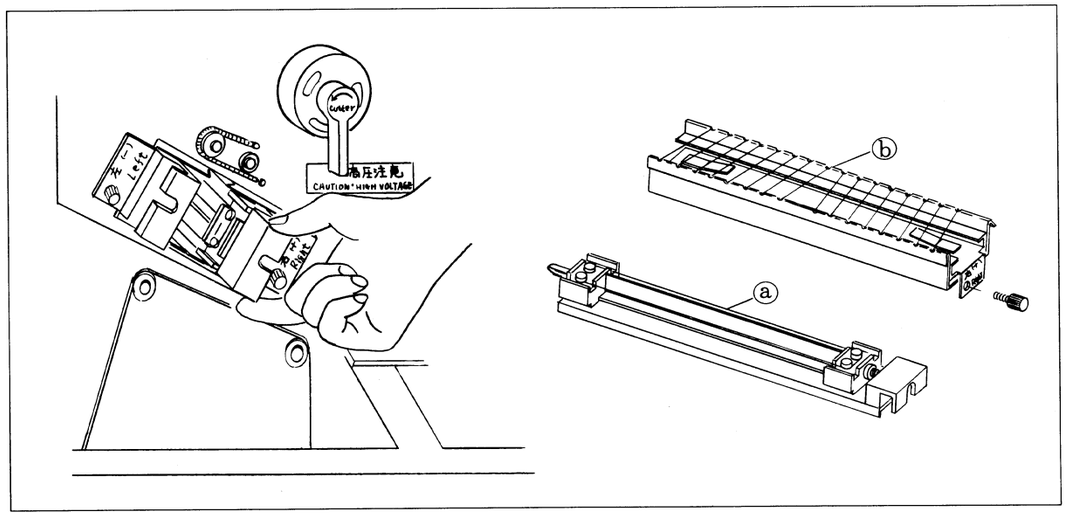
**⑤ Cleaning the lens and mirror (every month)**
Over time the mirror becomes dirty due to dust and other matter. This results in reduced performance of the optical system, poor focusing, insufficient exposure. Silver Master property deterioration, and other adverse effects on the plate quality. Therefore, regular cleaning should be carried out.

**NOTE:** Take sufficient care to avoid getting finger prints, saliva, chemical splash, or other damaging materials on the lens or mirror.
When it becomes necessary to clean them, use the following procedure:

1) Lightly brush the surfaces with a soft brush, e.g. a blower brush (available at general camera stores).
2) Wipe gently with lens paper (available at general camera stores) moistened with a very little industrial ethyl alcohol (available on the market). Avoid strong rubbing or forcible removal of foreign matter so as not to cause scratches.
3) When the machine is to be out of operation for long, the lens cap and mirror cover should be on.

⑥ **Cleaning the charger unit (every 500 plates)**

The charger unit uses special tungsten wires (DIA. 0.07mm). After long use, the wire may oxidize due to the high voltage discharge, and become dirty. As this may result in an electric discontinuity, or a charge irregularity, regular cleaning of the charger unit should be carried out using the following procedure.




1) Turn off the POWER switch.
2) Pull the left (−) and right (+) charger sections forward, out of the charger unit. Only these two sections, on which tungsten wires are stretched, can be pulled out.
3) The left and right sections can be pulled out after their respective fixing screws (one for each) have been removed.
4) Clean the charger wires of the two sections, and also their bodies, gently with a brush.

⑦ **Cleaning the vacuum back conveyor belt surface (every month)**

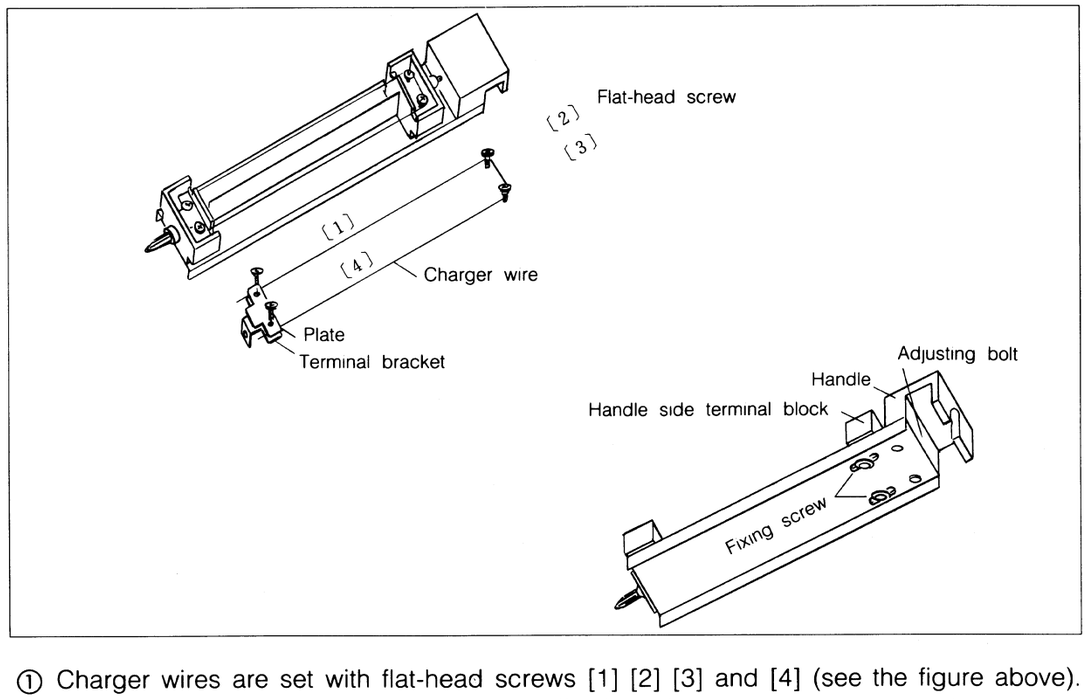
If a position error or tilt in the image edge is noticeable in the finished plate, or if a noise is heard during master feed, clean the vacuum back conveyor belt surface, using the following procedure:

1) Lift up the rubber belt and clean its surface with car wax.
2) Remove any remaining wax with a dry cloth.



### 12-2-2. Charger Wire Replacement

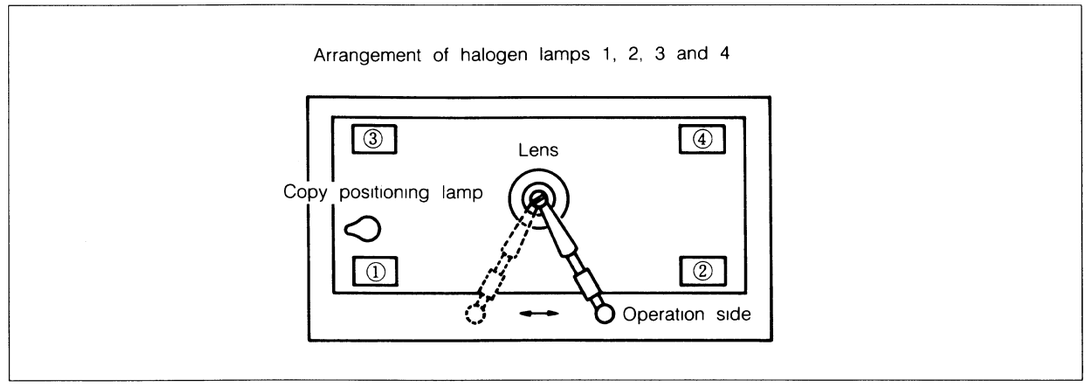
After long use, the charger wire oxidizes, due to the high voltage discharge, and becomes dirty. This may result in an electric discontinuity or a charge irregularity. If, after cleaning the charger wires, charge irregularity still occurs, the wire should be replaced using the following procedure:




① Charger wires are set with flat-head screws [1] [2] [3] and [4] (see the figure above). Loosen the two screws on the tension adjusting plate (on the back adjusting bolt to the left. The wire tension will slacken.
② On the socket side, fasten the wire between the terminal bracket and the plate with flat-head screws at points [1] and [4].
③ Pass the wire around the screws at points [2] and [3].
④ After the wire has been fixed, adjust the tension by turning the adjusting bolt to the right. Take care not to break the wire by over-tightening it.
⑤ Tighten the two screws on the tension adjusting plate.

### 12-2-3. Replacing the Halogen Lamp

Replacement should be done after the lamp and reflector have cooled.



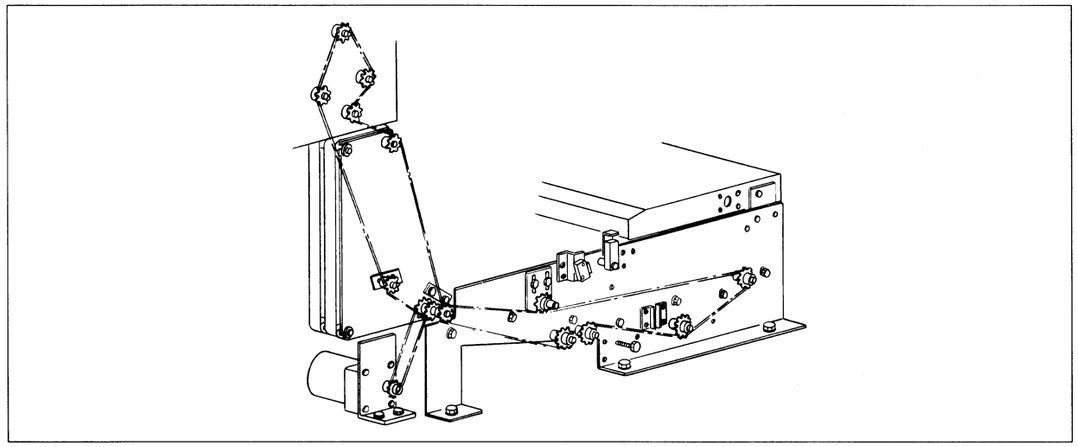
① Halogen lamp arrangement is shown in the above figure. Opening the lamp cover and removing the copy glass make lamp replacement easier.
② To avoid damaging the lens, always put on the lens cap before replacing the lamp.
③ Do not handle the halogen lamp with bare hands; use a clean, dry cloth, or gloves.
④ The contact is of the socket-type. When replacing the lamp straight to remove it. Be careful not to move the reflector, since a change in the position of the reflector affects the distribution of illumination.
⑤ If the halogen lamp is used with finger prints or oil stains left on it, it will become clouded. Remove stains by wiping with lens paper soaked in a little commercial alcohol.

### 12-2-4. Lubrication

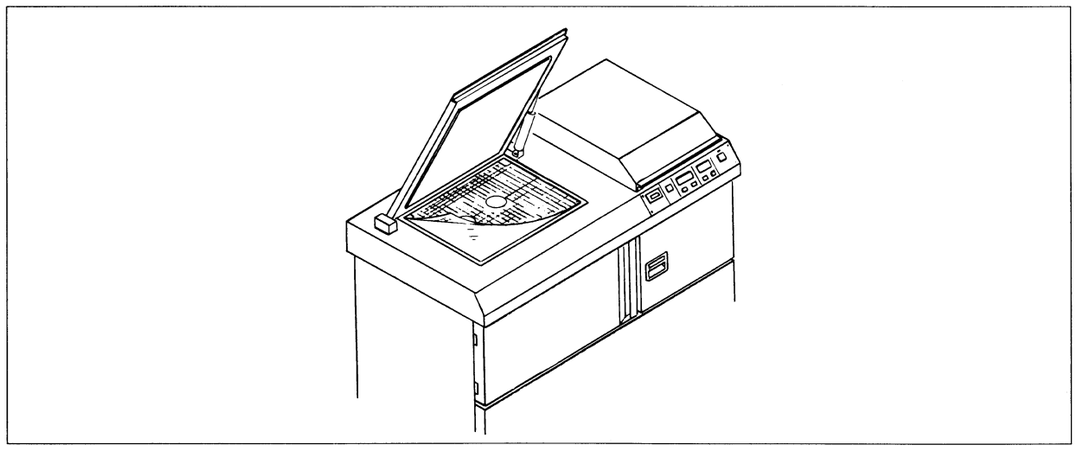
Required frequency of lubrication will depend on frequency of use. However, to guarantee satisfactory operation and long life, lubricate the machine at least once month.

**(1) Drive chain**

Turn off the power, remove the back cover and lubricate the chains.



**(2) Copy compression frame hinges**



- Use SHELL THERUS or an equivalent lubricating oil.
- Use silicon grease or the equivalent.



### 12-2-5. Order and Replacement of Parts

The machine incorporates various types of parts. Some of them can be installed easily by the customers and others should be installed only by trained service personnel.
When ordering, please let us know the following:

① Whether parts only are needed or whether both parts and installation (replacement) service are needed.
② The information given in the certificate or the nameplate of your machine.
   1) MODEL
   2) MFG. NO.
③ Descriptions of parts and quantities required, date of delivery, etc.

**NOTE:**

1) Specifications are subject to change without notice.
2) We assume no responsibility for any trouble caused by any modification made by the user or by the use of another company's equipment or parts with the machine without our approval.

# 13. TROUBLES AND REMEDIES

With a correct knowledge of the normal operation of the machine, it will be possible to diagnose the origin of troubles which arise. Basic remedies are listed ,below. Carry out regular checks, and if the machine ever fails to return to normal operating condition, consult your distributor.

* When carrying out fuse or circuit checks, turn off the POWER switch.

| | Trouble | Probable Cause | Remedy |
|---|---|---|---|
| 1 | Machine not powered. | 1. Power is not being supplied to the the EP-31V.<br>2. The power switch on the machine is off. | 1. Turn on the power source.<br>2. Turn on the power switch. |
| 2 | Machine fails to start. | 1. Master is not loaded. ( [End] displayed)<br>2. Cleaner or developer is low. ( [CHL] displayed)<br>3. One of the doors is open. ( [dor] displayed)<br>4. Sub control panel AUTO/MANU switch is set at MANU. ( [CHS] displayed)<br>5. Squeegee roller is "free". ( [n,P] displayed)<br>6. Master feed length is not within the limits. ( [Err] displayed) | 1. Load a master roll.<br>2. Refill the fluid.<br>3. Shut the door.<br>4. Switch it to AUTO.<br>5. Put it to the "lock" side.<br>6. Set it between 300 ~ 480mm. |
| 3 | Exposure lamp will not light. | 1. Lamp burned out.<br>2. Lamp not mounted properly.<br>3. Fuse is blown. | 1. Replace the halogen lamp.<br>2. Remount it.<br>3. Replace the fuse. |
| 4 | Image is incorrectly positioned or tilted in the exposure. | 1. Too much contact resistance on the suction surface (metal) of the conveyor belt. | 1. Clean the vacuum back suction surface.<br>2. Replace the vacuum back conveyor belt. |
| 5 | Developing unevenness. | 1. Toner is sticking on the developing board spray nozzle.<br>2. There is a charge irregularity.<br>3. The inlet roller is getting wet while the master is passing through the developing section. | 1. Clean the developing board.<br>2. Clean or replace the charger wires.<br>3. Adjust the flow rate of developer. |
| 6 | Image will not appear. | 1. Discontinuity in the charger wires.<br>2. Light is leaking in from outside. | 1. Replace the wires.<br>2. Block out the leak. |
| 7 | Cutter will not operate and the master will not be properly cut. | 1. Supply voltage is low.<br>2. Cutter is damaged. | 1. Check the supply voltage.<br>2. Check to see if the cutter can be manually operated, then call the service personnel. |
| 8 | Poor drying. | 1. Thermo-fuse is blown.<br>2. Heater circuit fuse is blown. (F2, 20A) | 1. Replace the thermo-fuse.<br>2. Replace the fuse. |
| 9 | Pump will not operate. | 1. Squeegee roller is "free".<br>2. Pump outlet is defective. | 1. Lock the roller.<br>2. Replace the outlet. |



# 14. MESSAGES AND PROBLEM SOLUTIONS

Various messages regarding operation status and problem situation are displayed on the M. LENGTH and EXP. TIME displays of the main control panel, depending on the situation. When a message appears, note the following points before attempting solution.

1. To "reset" the power, once turn off the POWER switch and allow at least 5 seconds before turning it back on.
2. Before opening the cover, be sure to turn off the POWER switch and the main power source.

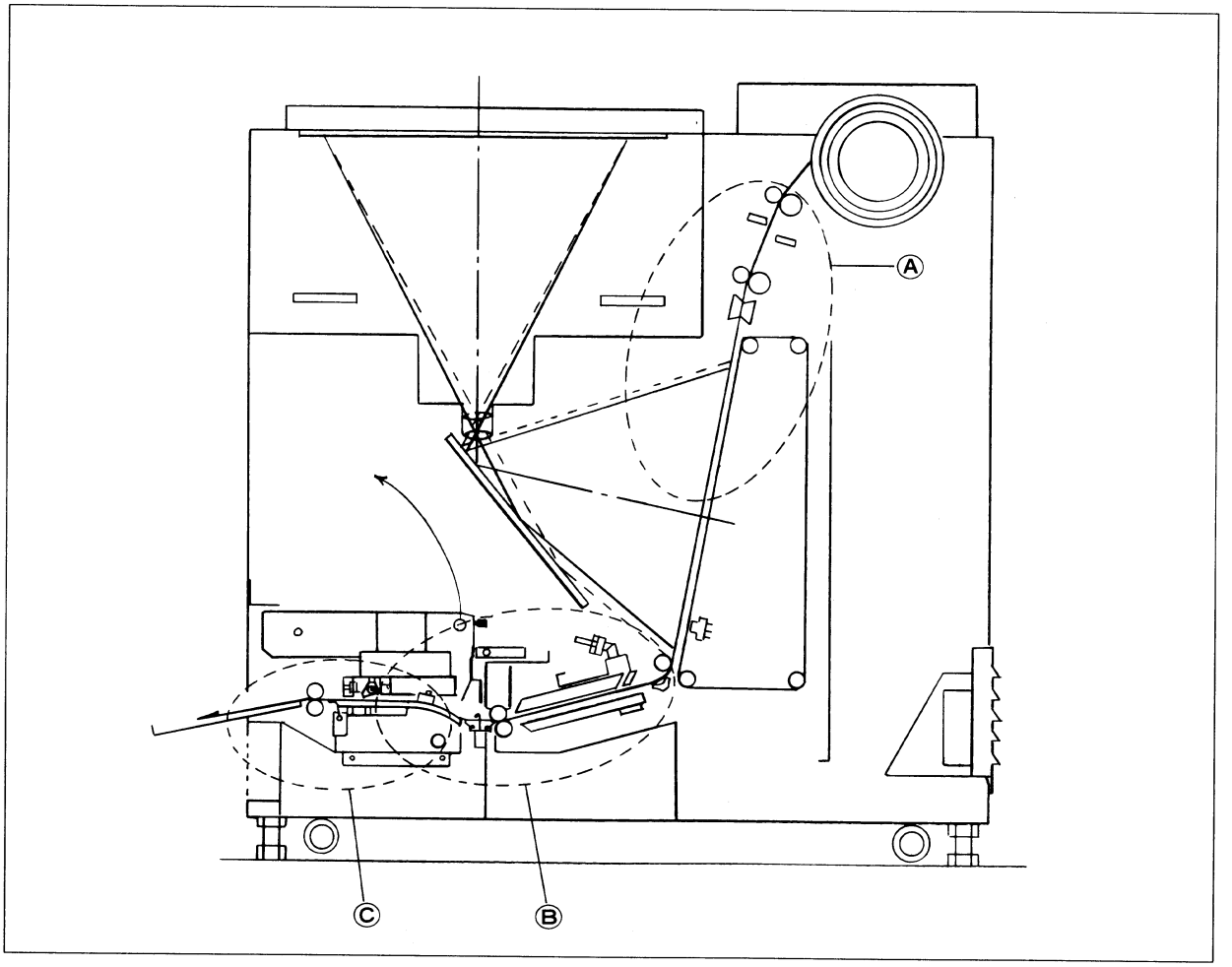
* M: M. LENGTH display E: EXP. TIME display

| *Display | Message | Buzzer | Abbreviation for | Content | Remedy |
|---|---|---|---|---|---|
| E | End | "peee-" | End | The master roll is exhausted or improperly loaded. | Load a new roll or reload the roll properly. |
| M | n,P | | Nip | The nip lever is free. | Turn the nip lever to the lock position. |
| M | CHS | | Check switch | The AUTO/MANU switch on the sub control panel is at MANU. | Turn it to AUTO. |
| M | dor | | Door | One of the doors is open. | Close it. |
| M | CHL | | Check switch | Developer or cleaner is insufficient. | Add developer or cleaner. |
| M | CLd | | Cold | Warming-up is under way. | Wait until the warming-up is completed (approx. 1 min.) |
| M | CUT | | Cut | Master cutting is under way. | This is only a process indication. |
| E | Err | | Error | The set master length is out of the specified range. | Reset the master length within the range. |

If any of the following messages appears, remove the cause of the trouble and then be sure to push the reset switch.

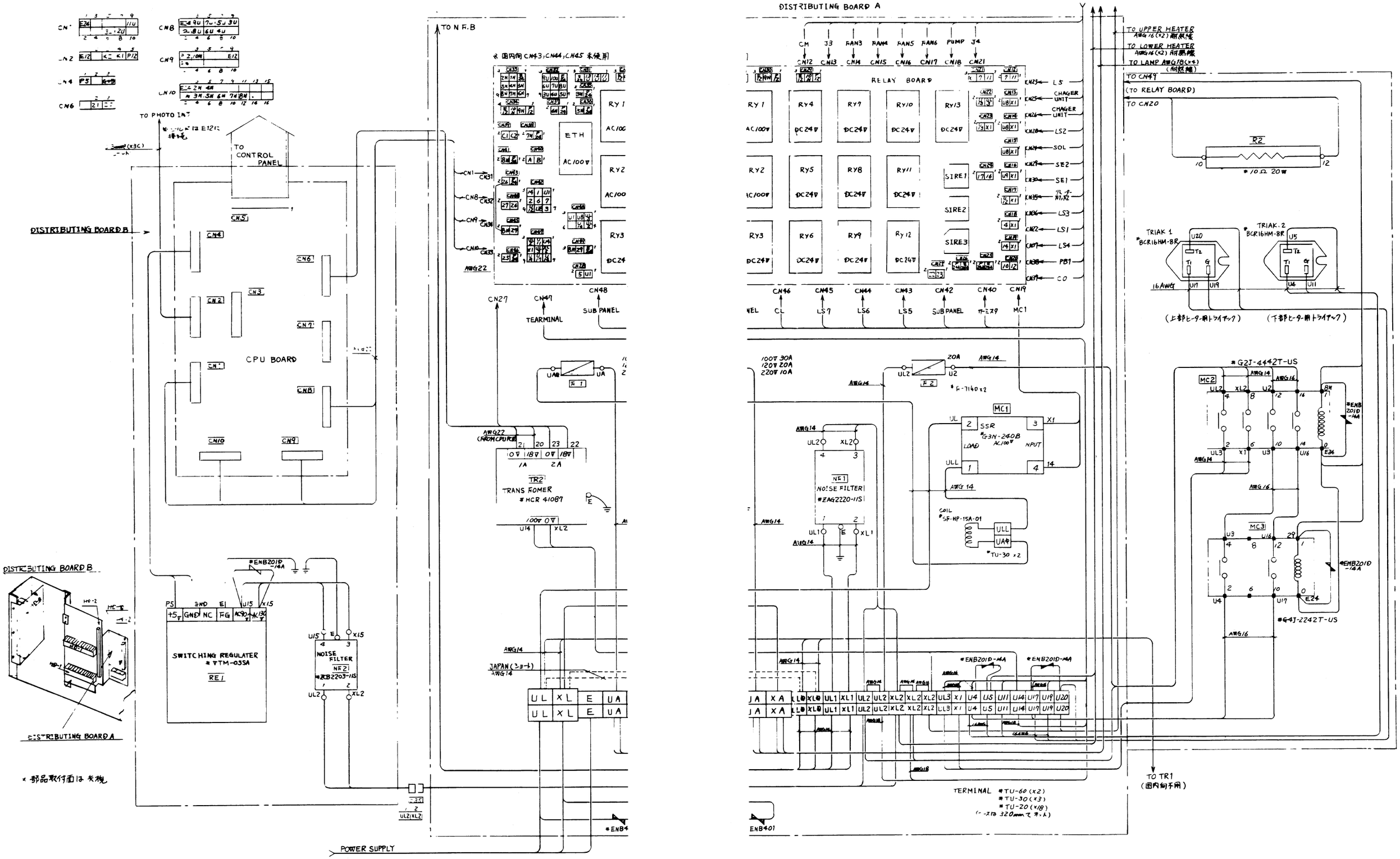
| | Display | Message | Content | Remedy |
|---|---|---|---|---|
| 1* | M | CHC | The master is jammed in section A. | Open the photographing section door, remove the jammed master and press the reset button located above to the right. Then close the door. |
| 2* | M | CHd | The master is jammed in section B. | Open the photographing section door, remove the jammed master and press the reset button located above to the right. Then close the door. |
| 3* | M | CHF | The master is jammed in section C. | Open the photographing section door, remove the jammed master and press the reset button located above to the right. Then close the door. |

* When the message appears, the buzzer also sounds.




- Note that if jamming occurs in the heater section C, failure to remove the jammed master may result in overheating.

# 15. WIRING DIAGRAMS




DISTRIBUTING BOARD B

DISTRIBUTING BOARD A

* 部品取付面は矢視

1. 指定なき線は AWG20とする。
2. アース部には、面付ワッシャーを使用し [⏚] マークを
3. /次側の線は 他の線と 結束しないこと。
4. NF1, NF2の入力線は ツイストすること。

ールと 貼ること。

TERMINAL #TU-60 (x2)
#TU-30 (x3)
#TU-20 (x18)
(ターミナル 320mm てカット)

POWER SUPPLY

100V ~ 240V 50/60 Hz

EXPOSURE LAMPS (光源)

AUTO/MANU CHANGE OVER SW (自動/手動切換え)

PUMP (ポンプ)

FEED MOTOR (フィードモーター)

MC FOR EXPOSURE LAMPS (光源用マグネット)

CUTTER (カッター)

HEATER CONTROL UNIT (ヒーターコントロール)

NOISE FILTER (ノイズフィルタ)

SWITCHING REGURATER (5V 電源)

TRANSFORMER TR2

TO COMPUTER PCB

CLUTCH

LOWER HEATER

UPPER HEATER

V B FAN (撮影部ファン)

IN TAKE FAN (吸気ファン)

EXHAUST FAN (排熱ファン)

HEATER FAN (ヒーターファン)

MASTER EJECT FAN (排気ファン)

COPY SET (原稿セットランプ)

FROM COMPUTER PCB

END <UPPER> (マスターエンド)

OPTICAL AXIS <LOWER> (光軸検出)

AUTO (自動)

HEATER UP (ヒーター)

FLOAT SW (フロートSW)

SQUEEGEE ROLLER (ローラ検出)

HEATER LS (ヒータ入口)

EJECT LS (排紙)

JAM ALARM CLEAR (ジャム解除)

MOTOR (モーター用)

BRAKE (ブレーキ用)

LAMP (光源用)

PUMP (ポンプ用)

CUTTER (カッター用)

CHARGER (チャージャ)

HEATER <LOWER> (下部ヒーター用)

HEATER CONTROL (ヒーター制御用)

HEATER <UPPER> (上部ヒーター用)

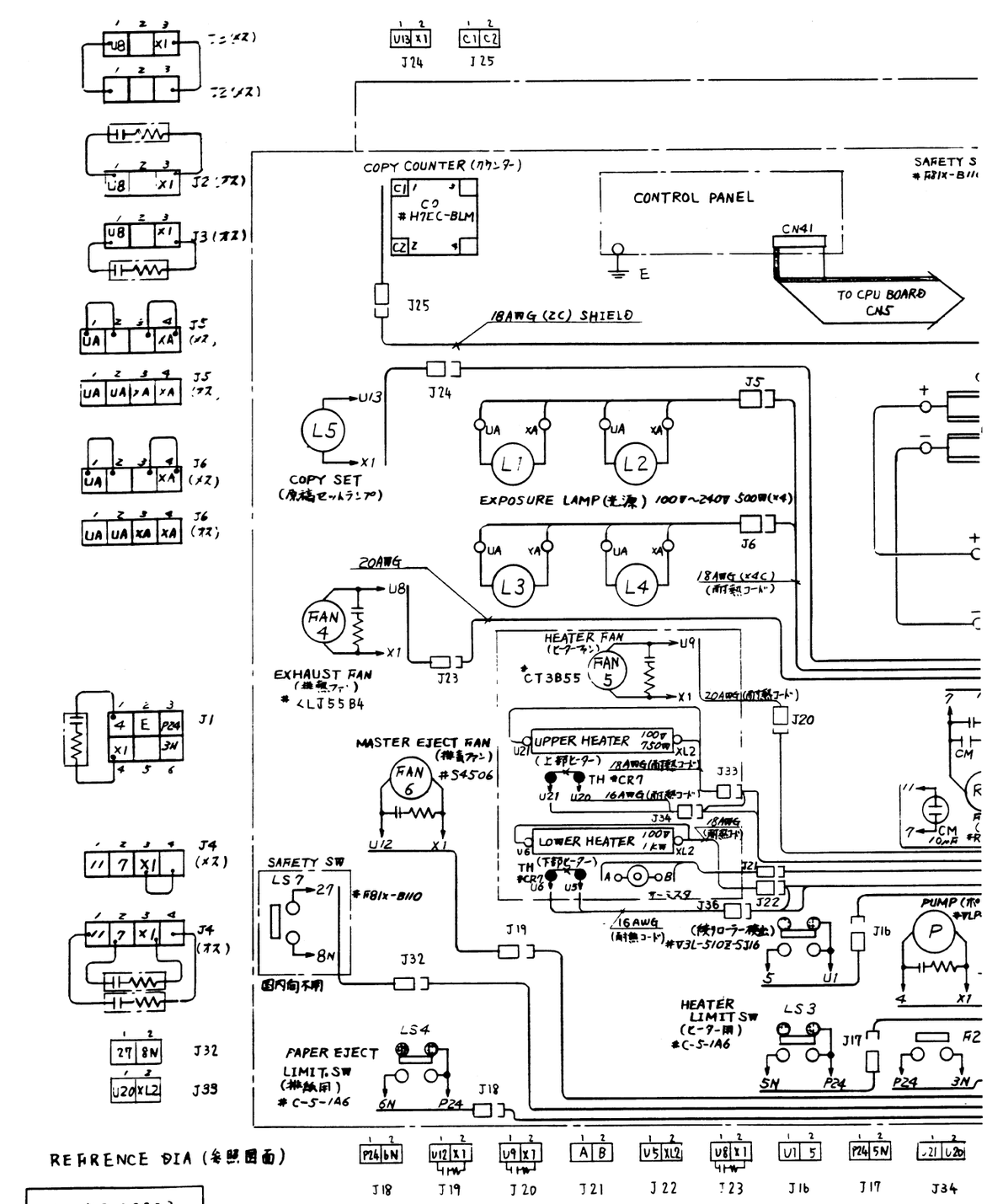
ALARM (ジャム用)

SAFTY DOOR SW (ドアースイッチ)

HEATER CUT (ヒーター停止用)

CHARGER TRANS (チャージャ)

COPY COUNTER (カウンタ)




REFRENCE DIA (参照図面)

| | |
|---|---|
| 1. | HCS 32203 |
| 2 | HCM 21217 ~~HCM 21201~~ △ |
| 3 | HCR 42614 |
| 4 | HCR 31940 |
| 5 | HCR 42264 |

1) 電線は指示以外は 20AWG とする

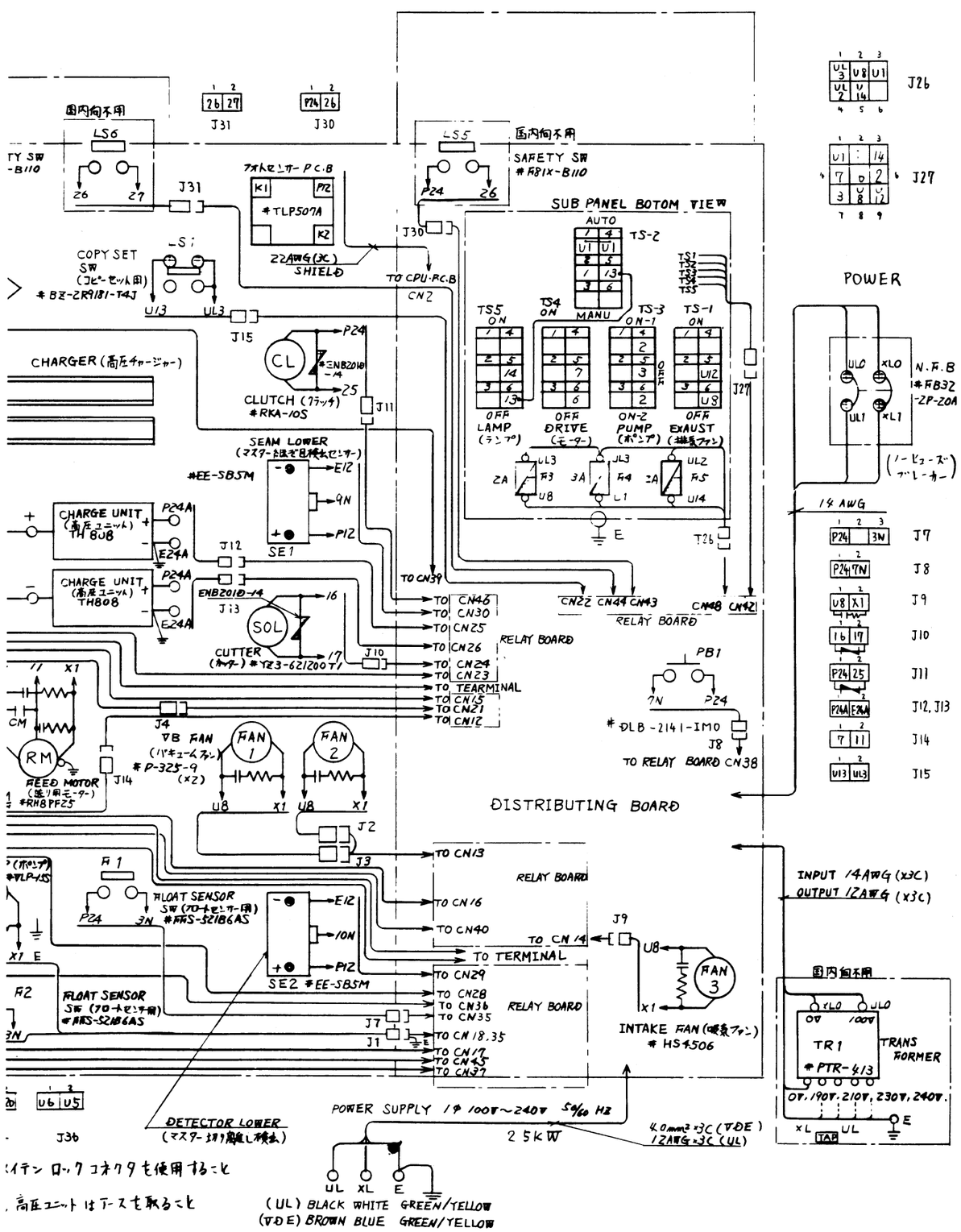
2) 弱電，強電の配線は区別して行なうこと。

* ⊣⊢/\/\/\/\/ は CR-1 とする

3) ケースは最短距離に取り回すことはしない

4) コネクターはユニバーサルメイテ

5) メイン・サブパネル，モーター，高圧ユニット




4) コネクターはユニバーサルメイテンロックコネクタを使用すること

5) メイン・サブパネル，モーター，高圧ユニットはケースを取ること

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