

MITSUBISHI GRAPHIC ARTS SYSTEM

CP-550 

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1. INTROCUCTION

We at Mitsubishi are very grateful to you for selecting the Silver Master Platemaker CP-550II. The Silver Master Platemaker CP-550II deals with a size range of plates from B4 to A2, in combination with Silver Master RII (SLM-II) or Silver Litho-plate F (SLP-F). It employs a microcomputer and provides the capability of double exposure with a single original copy. This platemaker CP-505II produces offset master plates with images enlarged or reduced directly from the original copy with a simple operation, eliminating the need for any intermediate film process.

This operation manual provides information for ensuring continued satisfactory operation of the machine.

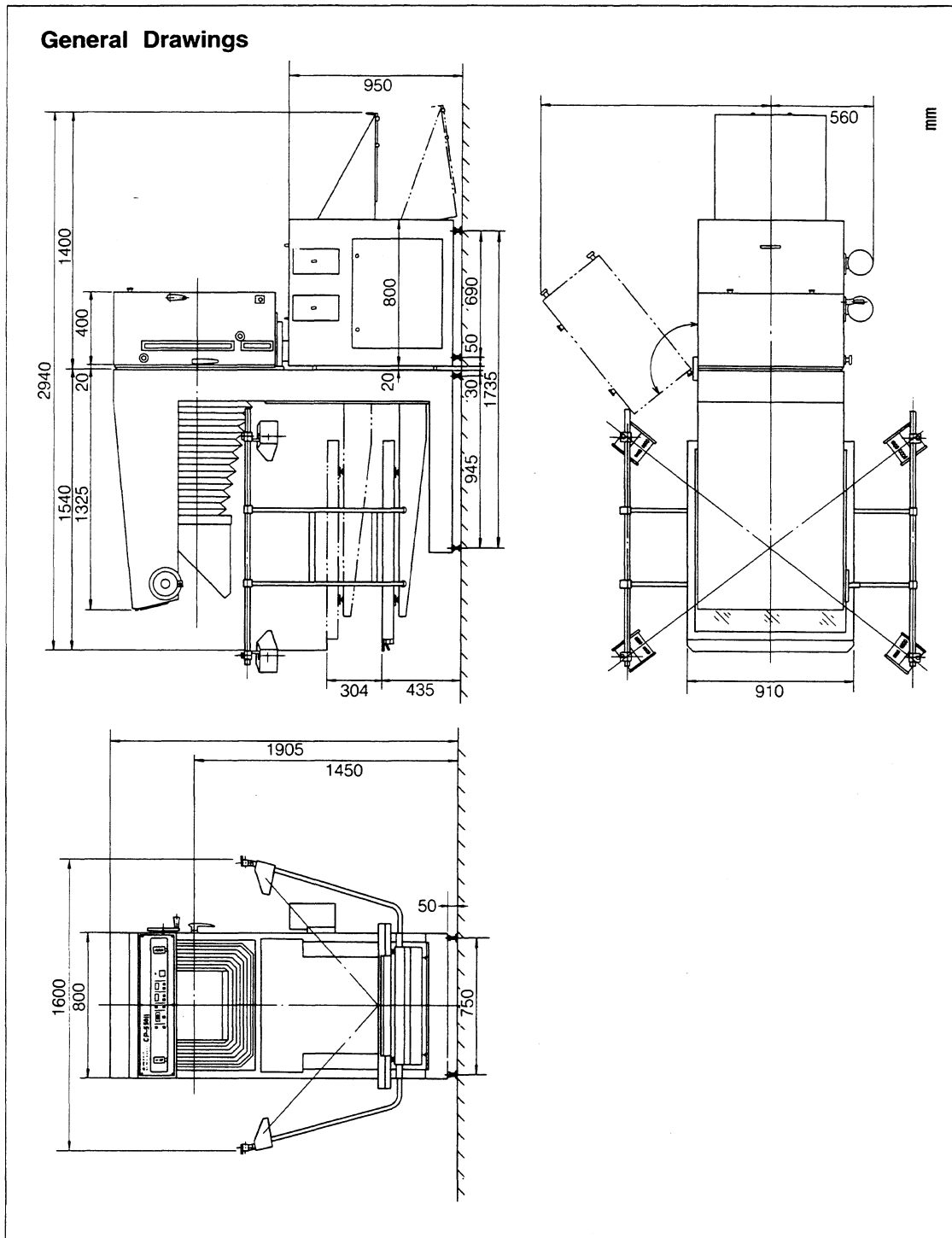
For information on printing methods, please refer to our booklet, "Silver Master Technical Guide".

2. SPECIFICATIONS

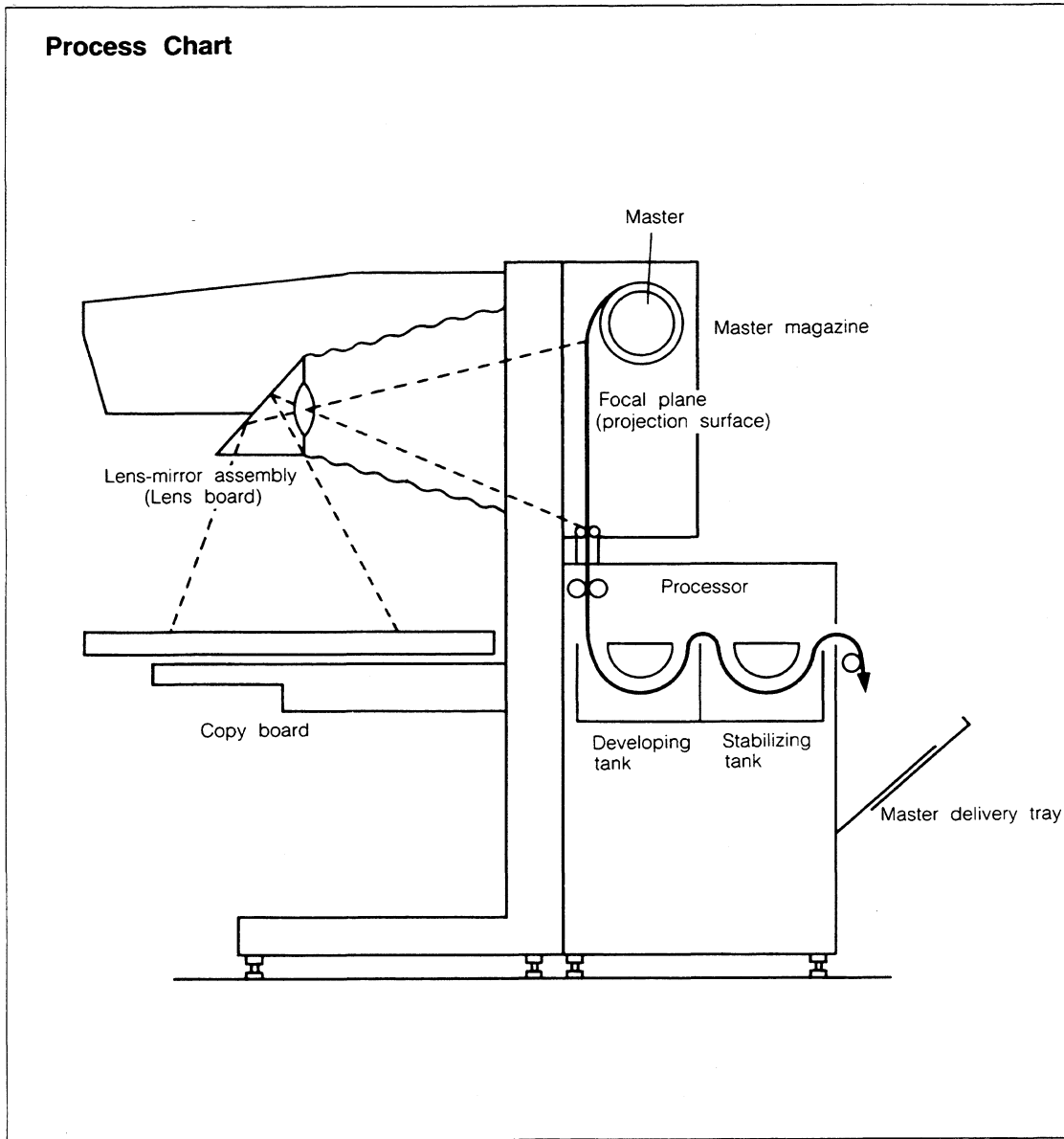
Master width	229, 254, 279, 305, 310, 404, 508, 550mm
Master feed length	370 ~ 700mm
Effective output size	550 × 615mm (100% ~ 125%) 550 × 590mm (90%) 550 × 560mm (80%) 508 ~ 550mm (70%)
Automatic double exposure	(185 ~ 350mm) × 2
Light source	Halogen lamps, 750W × 4
Lens	f: 480mm
Magnification	70 ~ 125%
Exposure control	0 ~ 99.9 sec
Effective copy size	820 × 1000mm
Focusing	Auto-focus with magnification scales
Processor capacity	Developing (activator) tank 22 liters Stabilizing tank 16 liters
Replenisher tank capacity	Activator, stabilizer each 2 liters (replenishment to maintain constant liquid level)
Independent switches	Vacuum FAN, Master FEED, Master CUT, and FOCUS switches
Master rewind	Manual
Master splice detection	Alarm buzzer, automatic over-cut
Platemaking rate	Initial/A3: 111/129 sec (60/50Hz) Cyclic/A3: 47/53 sec (60/50HZ)
Machine dimensions	1700 (W) × 2940 (D) × 1905 (H) mm
Weight	650kg (machine), 710kg (processing solutions and master roll included)
Electricity	100V 3.5KW single-phase, 50 or 60 Hz
Option	Dryer 100V 1.3KW, single-phase (weight 30Kg)

NOTE: The master widths are different in some local areas. For further information, contact our local distributor.

3. GENERAL DRAWINGS



4. PROCESS CHART

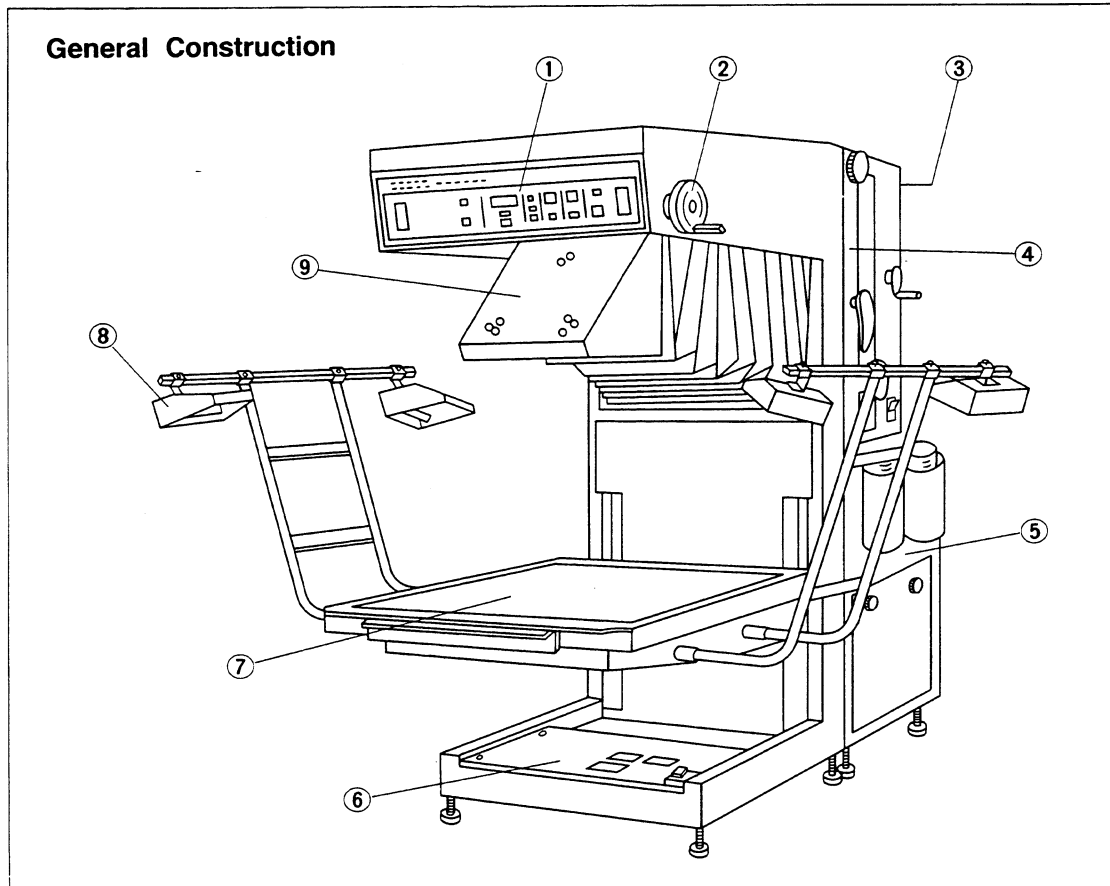


5. REQUIRED ELECTRICAL/ENVIRONMENTAL CONDITIONS

- ① The power supply should be 100V 3.5KW, single-phase. Use wiring which has a sufficient capacity to withstand that power.
Since the machine is provided with built-in microcomputer, if the power supply capacity should become insufficient, the voltage would drop, which could cause malfunction. In case the voltage may become unstable, it is advisable to install a constant-voltage device.
- ② The location where the machine is installed should meet the following conditions:
 - i) Room temperature: 10 ~ 30°C
 - ii) Room humidity: 40 ~ 70%
 - iii) Location with least amount of vibration.
 - iv) The floor surface is even.
 - v) The floor is solid enough to withstand the machine weight of 650kg (710kg when the machine is full with chemicals for operation).
 - vi) There is no possibility of exposure to direct sunlight.

6. DESCRIPTIONS AND FUNCTIONS OF THE COMPONENTS

6-1 General Construction



① **Main control panel**

On the main control panel are devices such as the copy board magnification scale, lens board magnification scale, start button, exposure-time set buttons, master length set buttons, multiple exposure button, clear key, copy set button, counter copy board drive buttons.

② **Lens board (mirror-lens assembly) drive handwheel**

③ **Master magazine**

④ **Photographing (exposure) section**

Houses the master suction device, cutter, sub-control panel and others.

⑤ **Processor:**

Houses the developing tank, stabilizing tank, master delivery tray and others.

⑥ **Control box**

Houses the power switch and others.

⑦ **Copy board**

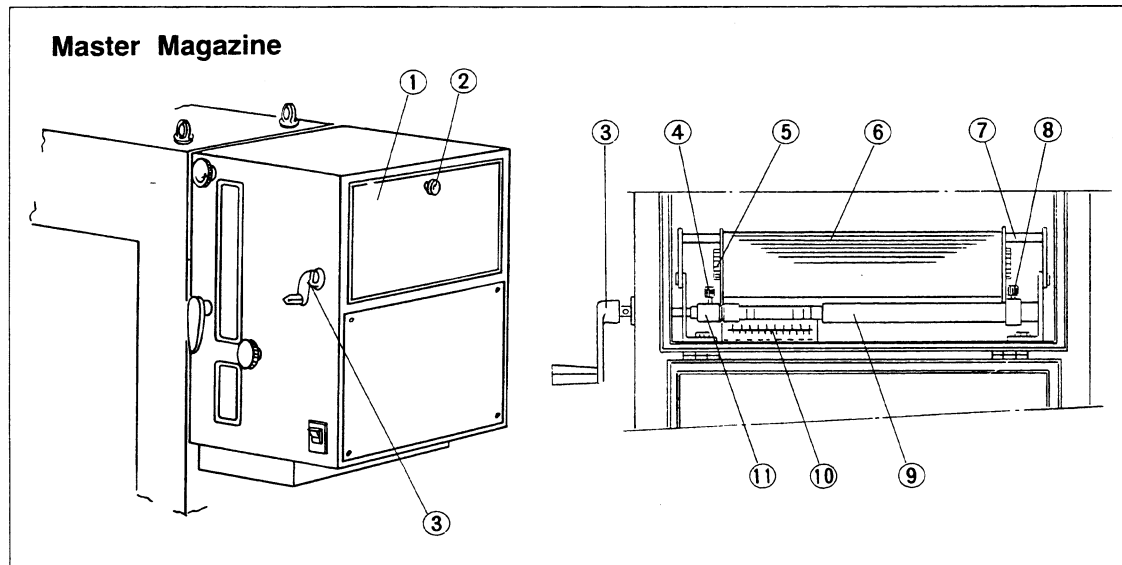
Includes the copy positioning sheet and copy compression glass.

⑧ **Light source**

⑨ **Mirror-lens assembly**

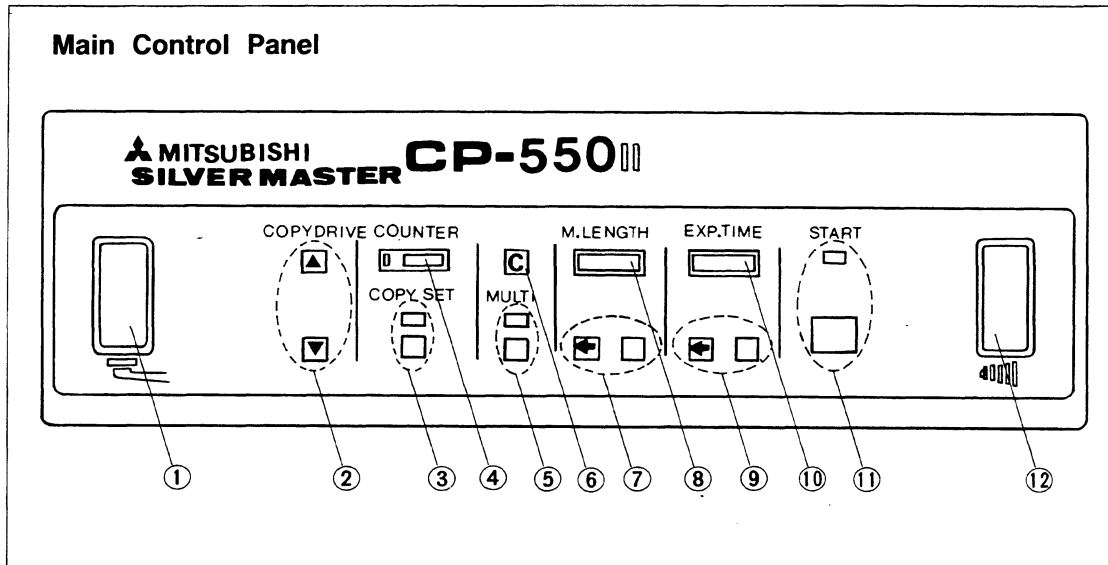
6-2 Detailed Descriptions of the Components

6-2-1 Master Magazine



- ① Master magazine cover
- ② Master magazine cover lock knob
- ③ Master rewind knob
(Master is rewound by turning this knob counterclockwise.)
- ④ Spool positioner and side retainer lock screw
- ⑤ Spool rim
- ⑥ Master
- ⑦ Anti-slip lever
- ⑧ Spool side retainer
- ⑨ Positioning shaft
- ⑩ Spool positioning scale
- ⑪ Spool positioner



6-2-2 Main Control Panel



① COPY BOARD (copy board magnification scale)

The scale is in percent. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

② COPY DRIVE (copy board drive buttons)

When  button is pressed, the copy board is moved up toward the enlargement side and  button is pressed, it is moved down toward the reduction side.

③ COPY SET (copy set button and lamp)

When this button is pressed, only one exposure lamp is lit. In this case, the shutter remains closed and the master is not exposed. Use this button, for example, when mounting a copy or when cleaning the copy board glass.

④ COUNTER (counter)

This counter indicates the number of masters (plates) produced. After renewing the processing solutions or loading a new master roll, set the reset switch at the unlocked position and press it to reset the counter to zero. During operation, the reset switch should be at the LOCK position.

⑤ MULTI (multiple exposure/automatic double exposure set button and lamp)

The multiple exposure function and the automatic double exposure function are distinguished by the master length set by the M. LENGTH buttons. To use either function, press the MULTI button to turn it on, and the lamp above it will be lit. When the button is pressed again, it turns off and the lamp goes out.

i) Multiple exposure (M. LENGTH: 370 ~ 700mm)

After the first exposure is completed, the master is not transported to the next stage, so multiple exposure can be made on a single master. This function is used when 2 or 3 exposures need to be made on the same master. Be sure to turn the button off before the last exposure is started (the lamp should be out).

ii) Double exposure (M. LENGTH: 185 ~ 350mm)

With this function, 2 exposures of one copy can be made on a single master. To use this function, press the START button after the copy is set.

Make sure that the MULTI button is on when the set master length is within the range of 185 ~ 350mm; otherwise the machine will not start exposure with on the display ⑩.

⑥ **Clear key**

This cancellation key is used for the following purposes.

- i) To clear **[CLd]** on the display to start exposure.

However, here the set activator temperature is not achieved, so high quality plates are not obtained. In this case, turn off the power switch once and turn it back on after 5 sec interval or more.

- ii) To stop the alarm buzzer.

(The message will remain on the display.)

- iii) To stop the exposure under way.

Master as long as indicated on the display will be transported to the next stage.

⑦ **M. LENGTH (master length set buttons)**

These buttons are used to set the master length.

Each press of the left-hand button **[◀]** allows shift by one place of digit in the display, and the place in which the figure can be now changed flashed.

The figure in that flashing place is increased one on each press of the right-hand button **[▶]**. After entry of all necessary figures for the exposure time, finally press the left-hand button once again. Then there is no further flashing.

⑧ **M. LENGTH (master feed length display)**

This is the display for indicating the master length. The master length should be 370 ~ 700mm for standard/multiple exposure and 185 ~ 350mm for automatic double exposure (MULTI ON). If a numerical value out of this range is set, **[Err]** appears on the display ⑩ and no exposure can be made.

The figures on the display flash during master feeding. Error messages also appear on this display. Refer to 10.6. (p.36).

⑨ **EXP. TIME (exposure time set buttons)**

These buttons are used to set the exposure time (0 ~99.9 sec). The method of use is the same as for the M. LENGTH buttons ⑦.

⑩ **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 once more. After 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.

For the error messages, refer to 10.6. (p.36).

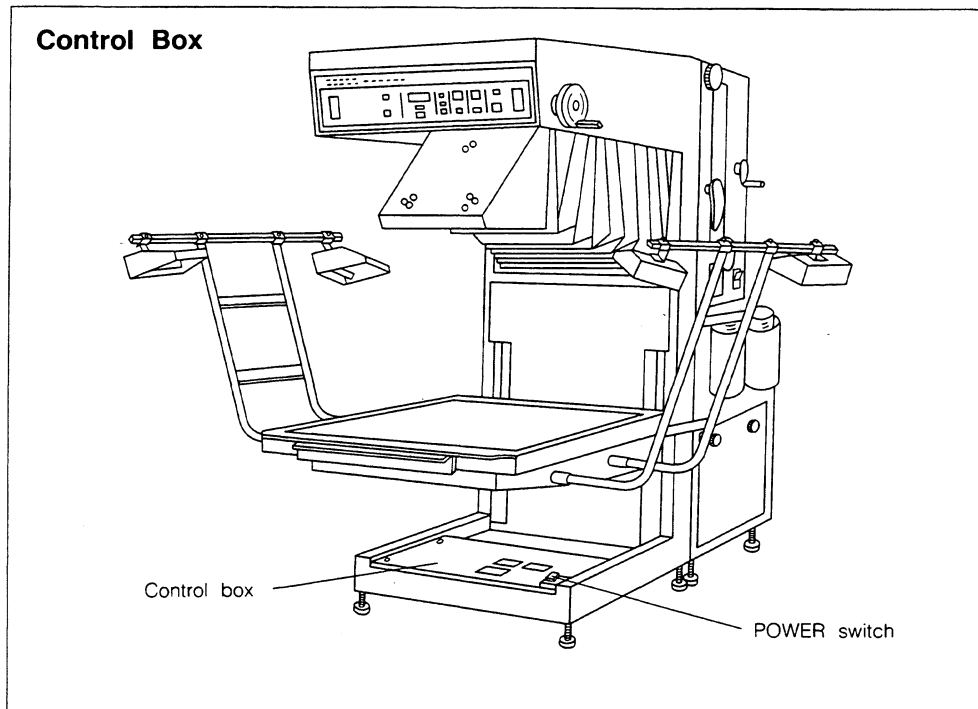
⑪ **START (exposure start button and lamp)**

Press this button to start exposure. This button is ineffective when the start lamp above the button is out.

⑫ **LENS BOARD (lens board magnification scale)**

The scale is in percent. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

6-2-3 Control Box

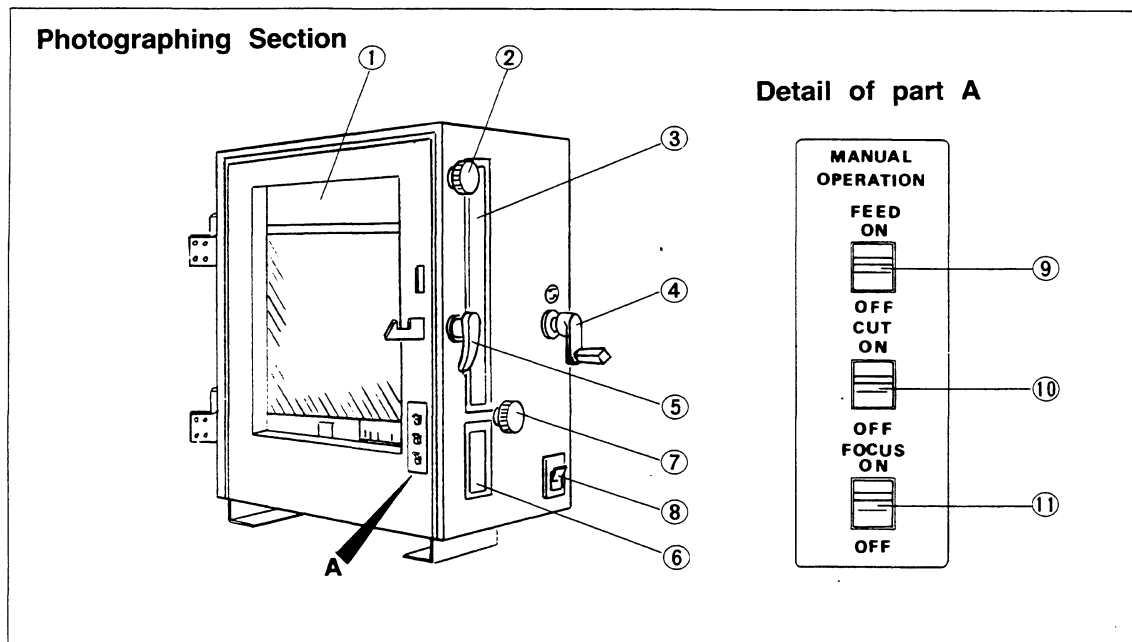


POWER (power switch)

When this switch is turned on, the control circuit and processor are energized and **CLD** appears on the M. LENGTH display when the activator temperature is low. As it rises to a preset level, **CLD** disappears and the machine is ready for operation.

CAUTION: Before turning on the POWER switch, make sure that there is a sufficient amount of processing solution in each tank of the processor.

6-2-4 Photographing (Exposure) Section



① **Lightproof mask**

② **Mask open/close handle**

As the handle is turned clockwise, the mask goes down and the effective area for exposure decreases. As it is turned counter-clockwise, the mask goes up and the effective area increases. If the mask is lowered too far, unexposed (silver deposit) part would be produced in the plate.

Further turning of the handle would cause machine trouble. On the other hand, if the mask is raised excessively, fogging would occur in the next plate. Set the mask scale at the division representing the amount equal to or larger than the set master length.

③ **Mask scale**

④ **Master rewind handle**

⑤ **Photographing section hook**

When the lever is turned to its horizontal position, the photographing section is unhooked and can be opened. During the process of photographing, the lever should be held in its vertical position to lock the photographing section.

⑥ **Mask scale (for fully-closed status check)**

⑦ **Nip roller handle**

When the LOCK mark is up, the nip roller pressure is applied on the master. When the FREE mark is up, the master is released and the machine is ready for master reloading or rewinding.

During the process of photographing, the LOCK mark should be up.

⑧ **FAN (suction fan switch)**

The suction fan can be turned on and off independently with this switch. Use this switch when you are going to load or rewind a master roll. While the switch is off,

appears on the M. LENGTH display and the machine can not be started and the buzzer alarm for master end will not sound. Usually set it on for machine operation.

⑨ **FEED (master feed switch)**

When this switch is ON, master can be fed to the desired length. The switch is used for removing the fogged leading part of a roll loaded. While the switch is ON, the M. LENGTH display shows **SEF** and the machine can not be started. Usually set it OFF for machine operation.

⑩ **CUT (cutter switch)**

With the FAN switch on, the cutter can be independently operated by turning on this switch. While the CUT switch is ON, the cutter continues to work and **SEF** is displayed on the M. LENGTH display, and the machine can not be started. Usually set it OFF for machine operation.

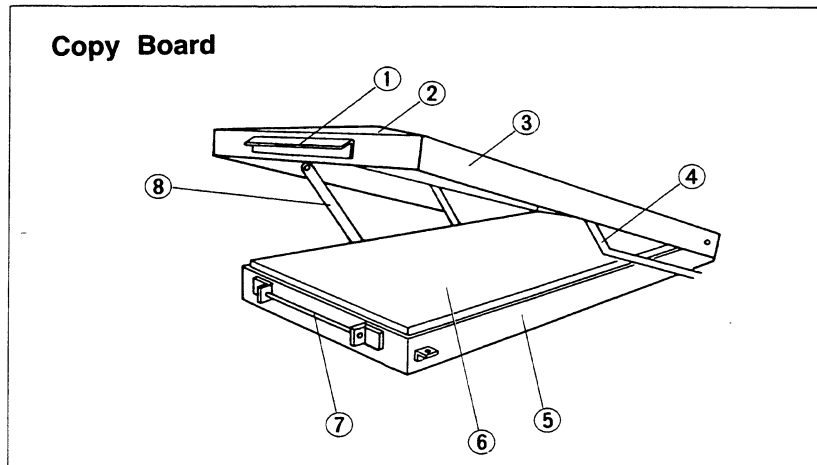
The CUT switch is inoperative when the FAN switch is off.

⑪ **FOCUS (focus switch)**

When this switch is turned ON, the light sources light and the shutter opens regardless of the exposure timer setting. When it is turned OFF, the light sources go out and the shutter closes. While it is ON, **SEF** is displayed on the M. LENGTH display and the machine can not be started. Usually set it OFF; it is used for servicing or readjustment.

NOTE: For the error messages to be displayed on the EXP. TIME and M. LENGTH displays, refer to 10.6. (p.36).

6-2-5 Copy Board



① Hook

② Handle

③ Upper frame

The copy compression glass is in the upper frame. Grip the hook, and the upper frame opens. Gently open the frame, holding it with hand. When closing it, push it until it is securely hooked. Never handle it abruptly.

④ Torsion bar

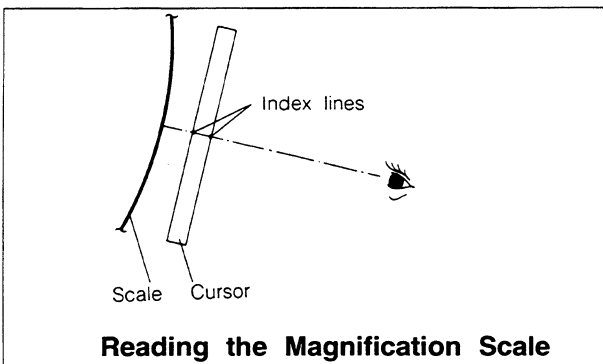
⑤ Copy compression frame

⑥ Positioning sheet

According to the magnification, the position of the lens changes, so the effective projection area changes. Therefore, the copy must be put in the position appropriate to the magnification. The copy positioning sheet bears such reference lines that represent the edge of the effective image projected on master, in 5% steps of magnification. The Edge of the effective image projected is about 26mm (equivalent to the gripping margin on the press) from the master edge. Place the copy so that the upper side of the copy image is inside the reference line corresponding to the magnification.

⑦ Hook holder

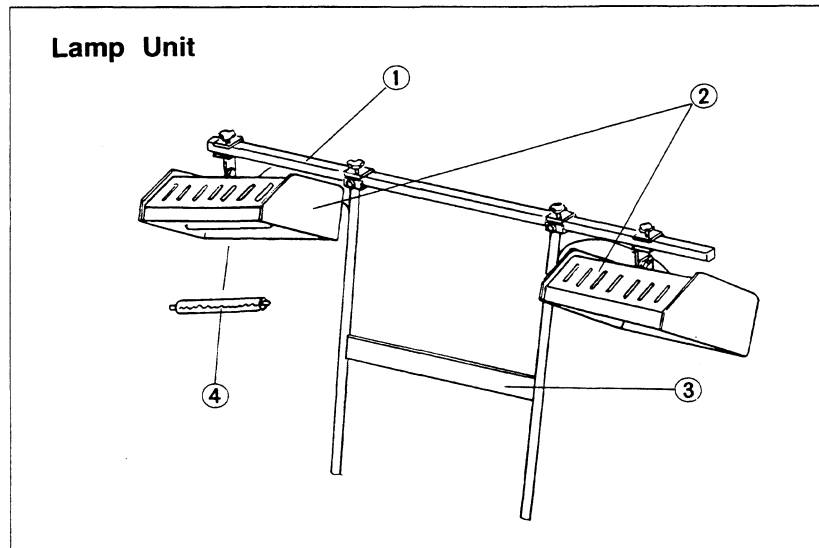
⑧ Upper frame gas spring



Moving the Copy Board

The copy board is moved using the drive buttons on the main control panel. Depression of the button marked with ▲ moves it toward the enlargement side and depression of the button marked with ▼ moves it toward the reduction side. The magnification scale for the copy board is located inside the scale window on the main control panel. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

6-2-6 Lamp Unit



① **Lamp mounting arm**

Align the mark of this arm with the mark of the lamp house arm and secure with screw.

② **Lamp house**

Adjust each lamp house to the mark of the lamp mounting arm, tallying by the number and secure with screw. The lamp house can be turned back and forth, and right and left notch by notch and held at the appropriate angle marked with . The lamp house position is fixed, covering the magnification range of 50% to 125%.

③ **Lamp house arm**

The right and left lamp house arms are fixed on the right and left sides of the machine respectively with their bolts in the specified bolt holes.

④ **Lamp**

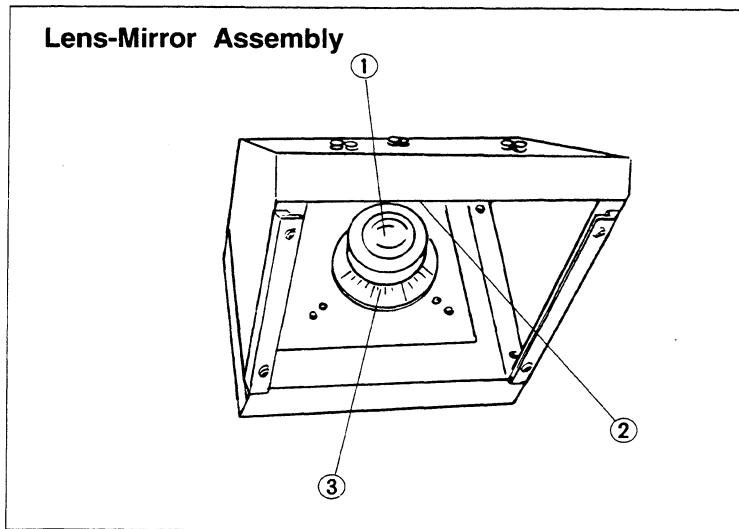
Four 500W halogen lamps are provided.

Exposure Ratio That Varies with Magnification

With respect to exposure at 100% as a base, the exposure ratio varies according to the magnification as follows:

Magnification	70%	80%	90%	100%	110%	120%	125%
Exposure ratio	0.72	0.81	0.90	1.00	1.10	1.21	1.27

6-2-7 Lens-Mirror Assembly

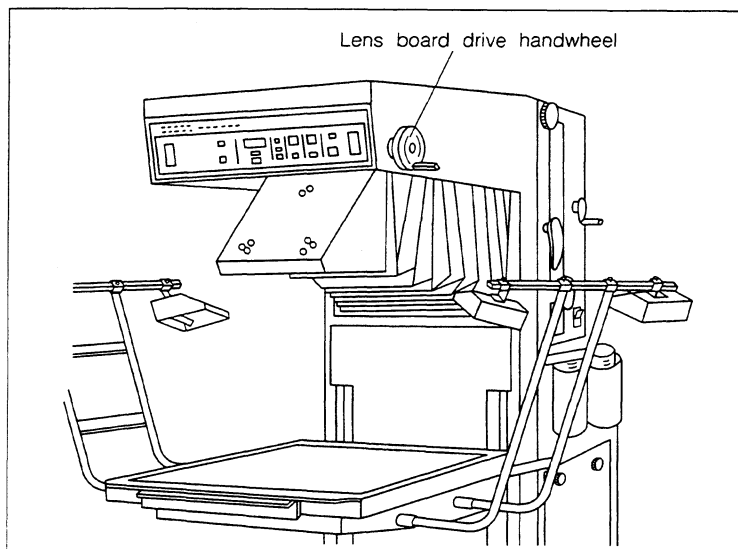


- ① Lens
- ② Mirror
- ③ Diaphragm

For standard photography, set the diaphragm to F22.

Turn the diaphragm ring until the required stop value division agrees with the lens diaphragm index.

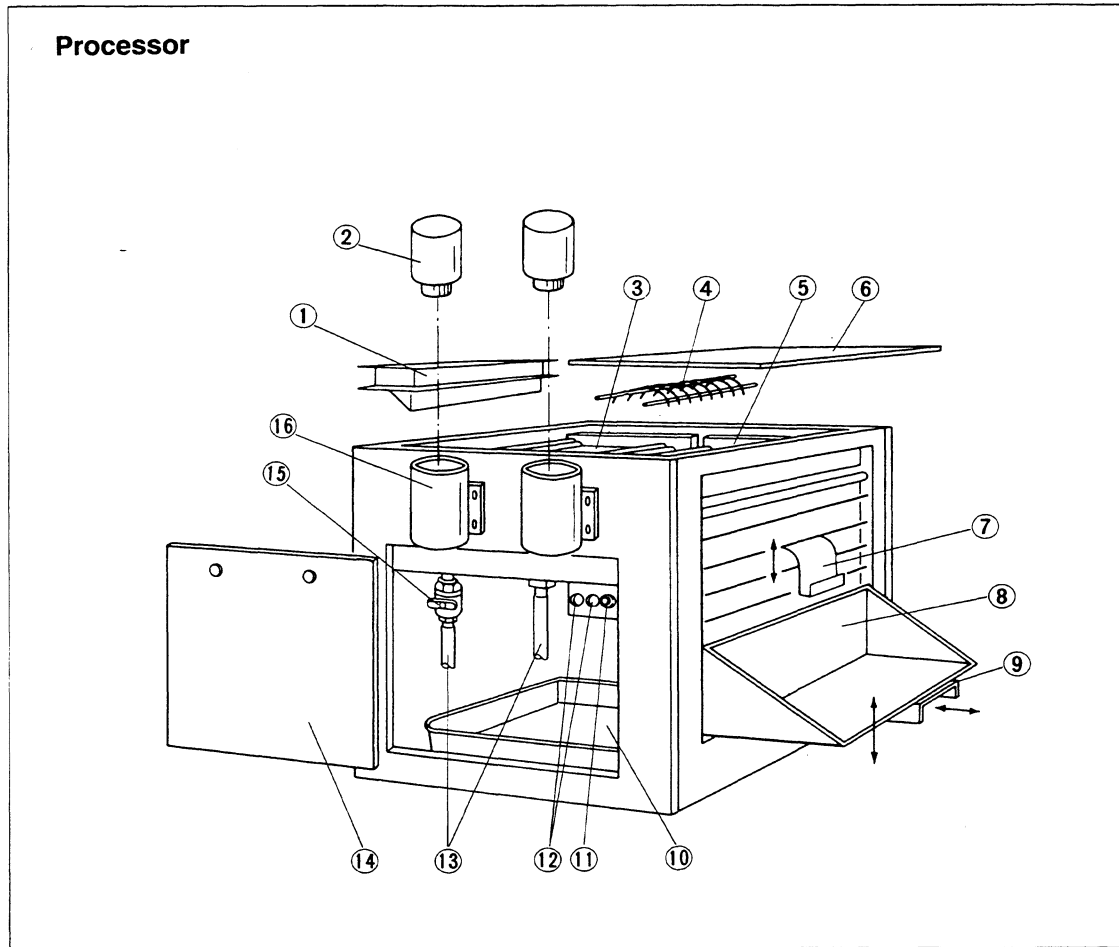
Moving the lens board



The lens board is moved using the handwheel on the side of the main control panel. Turning the wheel clockwise moves the lens board toward the enlargement side and counterclockwise turn toward the reduction side. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

CAUTION: Don't touch the mirror and lens often.

6-2-8 Processor



① **Master guide**

The master is conveyed from the photographing section to the processor along this guide.

② **Replenisher tanks**

These are an activator replenisher tank and a stabilizer replenisher tank respectively. Their capacity is 2 liters.

③ **Developing tank**

The capacity of the tank is 22 liters.

The developing tank is equipped with a 530W panel heater, thermostat and conveyor unit. The temperature of the activator is kept constant by the panel heater thermostat while the processor is under power.

④ **Top finger guide**

⑤ **Stabilizing tank**

The capacity of the tank is 16 liters. The stabilizing tank is equipped with a conveyor unit.

⑥ **Top cover**

⑦ **Output guide**

⑧ **Master delivery tray**

The tray is set in either of the five position depending on the length of the master to be delivered.

i) For shorter masters, the tray should be set in the upper position.

ii) For longer masters, it should be set in the lower position.

⑨ **Master delivery tray guide**

The guide is adjustable. For longer masters, slide it out according to the master length.

⑩ **Drain vat**

⑪ **Activator thermo-dial**

This thermo-dial is used for controlling the temperature of the activator in the developing tank.

Align the dial division 30 with the index mark of the dial. The dial divisions represent the temperatures to which activator is to be set. If the activator temperature is not high enough when `[Ld]` disappears on the display, the dial setting should be increased by the amount of the deficiency, and vice versa.

⑫ **Heater plug sockets**

These plug sockets are for the heater mounted on the developing tank. (each max. 100V 530W)

CAUTION: When changing the solution or cleaning, be careful not to splash them with water, etc.

Don't use any heater other than the specified one.

⑬ **Drain hose**

⑭ **Door for drainage**

⑮ **Drain valve**

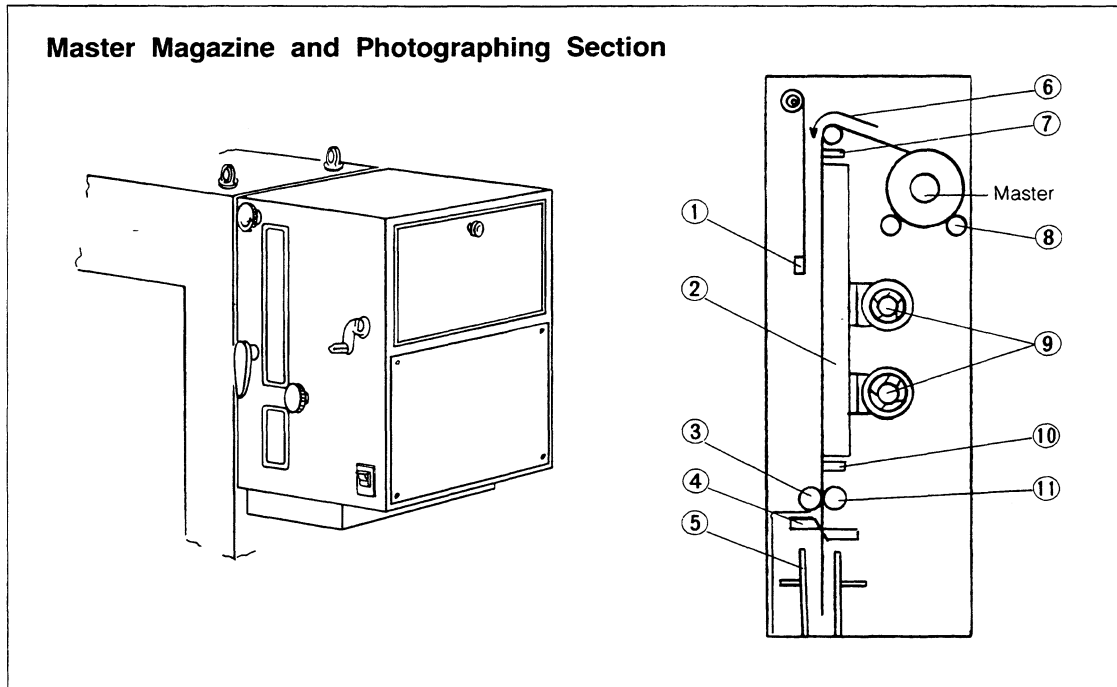
When the valve lever is parallel to the pipe, the valve is open. When the lever is at right angles to the pipe, the valve is closed.

CAUTION: If it is in some neutral position, liquid leakage will occur. Usually, be sure that the lever is in its horizontal (closed) position.

⑯ **Replenisher tank holders**

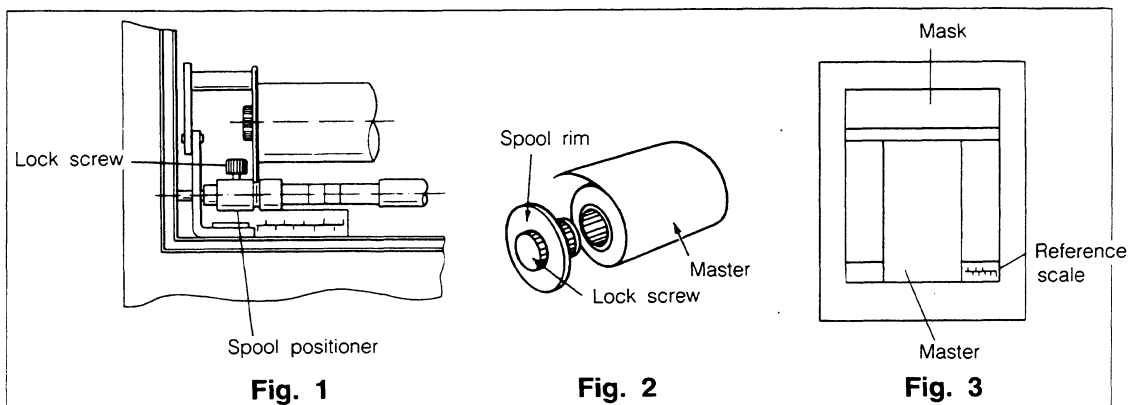
The replenisher tanks filled with replenisher are placed in these holders so that activator and stabilizer replenishers are automatically supplied as the liquid level in the developing and stabilizing tanks is lowered, respectively.

7. LOADING A MASTER ROLL



- ① **Mask**
 - ② **Vacuum back**
 - ③ **Nip roller**
- When the LOCK mark of the nip roller handle is up, the nip roller is pressed against the conveyor roller to hold the master in position. When the FREE mark of the handle is up, a clearance is made between the two rollers to free the master.
- ④ **Cutter**
 - ⑤ **Master conveying guide**
 - ⑥ **Master inlet guide**
 - ⑦ **Master inlet sensor**
 - ⑧ **Rewind shaft**
 - ⑨ **Suction fan**
 - ⑩ **Master splice sensor**
 - ⑪ **Master conveyor roller**

7-1 SLM-RII



- ① Turn off the FAN switch.
- ② Turn the mask handle fully counterclockwise and open the master magazine cover.
- ③ Unhook and gently open the photographing section.
- ④ Loosen the spool positioner lock screw and fit the spool rim into the spool shaft position appropriate to the width of master (229, 254, 279, 305, 310, 404, 508 or 550mm). (Fig. 1)
- ⑤ Pass the spool shaft through the master roll core hole, and tighten the lock screw. (Fig. 2)
- ⑥ Position the spool rim into the groove of the spool rim positioner.
- ⑦ Remove the tape from the master roll and lead the master along the guide to the vacuum back. Then close the magazine cover.
- ⑧ Turn the nip roller handle until the FREE mark is up. Pull the master from the vacuum back side and let it pass between the nip and conveyor rollers and between the upper and lower cutter blades until it reaches the box at the bottom of the photographing section.
- ⑨ Hold the master end by hand and align the right side of the master with the appropriate division of the reference scale at the bottom right of the vacuum back. (Fig. 3)
- ⑩ Turn the nip roller handle until the LOCK mark is up.
- ⑪ Turn the mask handle clockwise to fully close the mask.
- ⑫ Turn the FAN switch ON.
- ⑬ Turn and hold the FEED switch ON until the fogged part of the master leaves the projection surface or vacuum back. Then, turn it OFF.
- ⑭ Turn the CUT switch ON to cut off the fogged part. Then, turn the switch OFF. Now the magazine has been loaded.

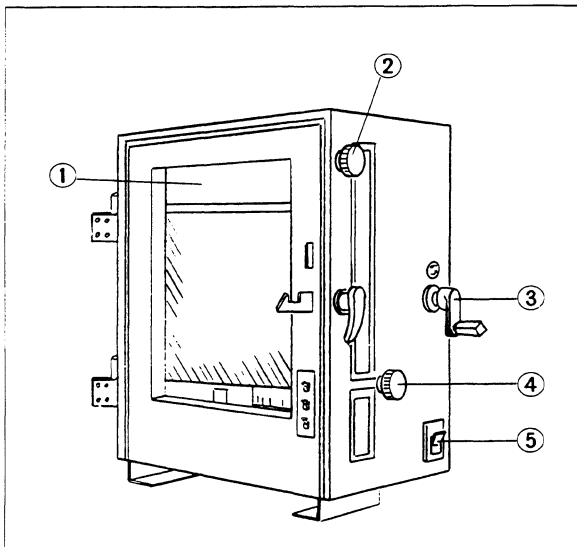
7-2 SLP-F

When the SLP-F roll is factory attached to the spool, directly load the roll together with the spool in the magazine.

If the spool should be removed, the SLP-F master edge part would be exposed or fogged by external light (room light). So, never remove the spool or loosen the spool rims.

When using the SLP-F roll factory attached to the spool, the above step 6.1. ⑤ is unnecessary. The SLP-F roll has about 2m long leader paper for lightproofing.

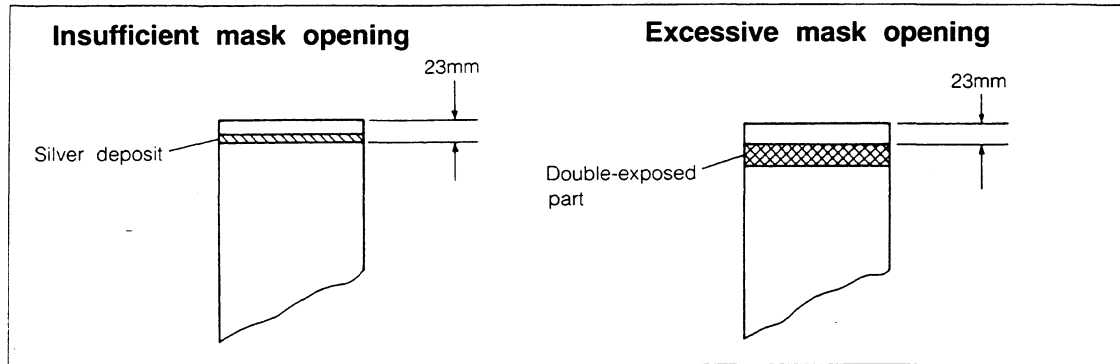
7-3 Rewinding Device



The master rewinding device is located on the right side of the photographing section. The rewinding procedure is as follows.

- ① Turn off the FAN switch ⑤.
- ② Bring the FREE mark of the nip roller handle ④ to the top position.
- ③ Turn the rewind handwheel ③ counterclockwise to rewind the master.

7-4 Handling the Mask



- ① The mask is opened and closed by turning the mask handle counterclockwise and clockwise respectively.
- ② The opening length of the mask should be set to a value equal to or about 5mm longer than the set master feed length, using the mask scale.
- ③ If the opening length is shorter than the set master length, a belt of silver appears in the leading (gripping) end of the exposed master (unexposed part).
- ④ If the opening length is longer than the set master length, a belt of double exposure appears in the leading (gripping) end of the exposed master, where that part of the image is lost.

CAUTION: For automatic double exposure, adjust the mask scale so that the mask opening length is equal to or a little longer than the set master length.

7-5 Master Splice Detection

When a master splice is detected during operation, a buzzer beeps (pip pip pip ...) and **SPL** appears on the M. LENGTH display.

In each of the following cases, the larger value for master length, whichever might be, is automatically selected so that the plate in question is cut to that length and delivered. However, this master length value will be applied only to the plate in question, but the plates following it will be cut to the set length.

① Standard/multiple exposure

- i) Set master length
- ii) Length fed before splice detection +280mm

② Double exposure

Machine will automatically feed 320(270)mm of plate after splice detection and then automatically cut and deliver at that length.

In the first master feed:

- i) Set master length
- ii) Length fed before splice detection +320mm

In the second master feed:

- i) Set master length
- ii) Length fed before splice detection +280mm

8. FILLING THE PROCESSING TANKS

Refer to the booklet "Silver Master Technical Guide."


- ① Take off the processor front and top cover.
- ② The processor is composed of a developing tank and a stabilizing tank, each of which is provided with a conveyor unit. After the machine has been long shut down, the conveyor unit rollers may stick to each other and not turn smoothly. If such is the case, turn the rollers by hand before starting the processor.
- ③ For preparing the processing solutions, use the exclusive measuring cup.
- ④ Use 30°C to 35°C hot water when tap water temperature is low in winter.
- ⑤ Be careful not to mix the activator and stabilizer when pouring them since they have an aversion to each other.

NOTE: The replenisher tanks should always each contain properly prepared replenisher above a lower limit of level. As the replenisher is exhausted, the liquid surface would be lowered and the liquid fatigue hastened, which could cause deterioration in the plate quality.

8-1 Developing Tank (Tank capacity: 22 liters)

Preparation of Activator (SLM-AC)

(Mixture ratio of SLM-AC to water 1:1)

- ① Add 11 liters of water to 11 liters of SLM-AC (undiluted), exclusive developing solution for the Silver Master and stir thoroughly. Then, pour the mixture into the developing tank.
- ② Pour 2 liters of the activator prepared in the same ratio (1:1) into the activator replenisher tank, cap the tank and mount it on the developing tank unit properly with its cap down.
- ③ The developing tank is equipped with a panel heater with a thermo-dial. Bring the dial division 30 to the mark . The dial divisions represent the temperatures to which activator is to be set. Adjust the activator temperature using this dial if the actual activator temperature is not adequate.
(The moment the HEATER lamp has gone out, the activator should be 28 ~ 31°C.)

8-2 Stabilizing Tank (Tank capacity: 16 liters)

Preparation of Stabilizer (SLM-ST)

(Mixture ratio of SLM-ST to water 1:3)

- ① Add 12 liters of water to 4 liters of SLM-ST (undiluted), exclusive stabilizer for the Silver Master and stir thoroughly. Then, pour the mixture into the stabilizing tank.
- ② Pour 2 liters of the stabilizer prepared in the same ratio of 1:3 into the stabilizer replenisher tank, cap and mount stabilizing unit properly with its cap down.

8-3 Precautions in Handling Chemicals

- ① Never swallow or get into eyes. Should such happen, see a doctor.
- ② If your skin or clothes are splashed, immediately wash in running water thoroughly.
- ③ Strictly observe the handling instructions.
- ④ Keep chemicals out of reach of children.

9. PHOTOGRAPHING

9-1 Inspection at Start-up

- ① Confirm that there is enough activator and stabilizer in the developing and stabilizing tanks and enough replenishers in the activator and stabilizer replenisher tanks, respectively.
- ② Turn on the POWER switch.
- ③ Make sure that the processor runs normally.
- ④ Uncover the lens and mirror and check the lens and mirror for dirt, scratches, etc.
- ⑤ Check the copy board glass for dirt, scratches, etc.
- ⑥ Make sure that the copy board moves normally.
- ⑦ Make sure that the FAN switch is ON.
- ⑧ Make sure that the LOCK mark of the nip roller handle is up.

9-2 Shut-down Procedure

- ① Turn off the POWER switch.
- ② Fully close the mask.
- ③ When the machine is to be shut down for many hours, put the covers on the lens, mirror and copy holder, and cover the machine main body with a vinyl sheet or the like.

9-3 Photographing Procedure

9-3-1 Standard Photography

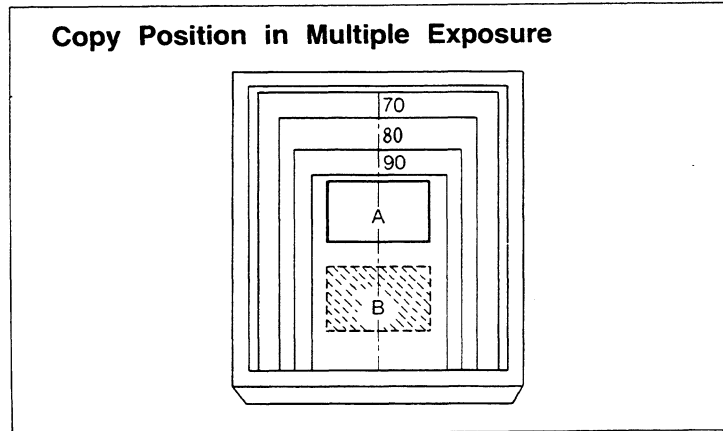
- ① Set the required master length value using the M. LENGTH buttons.
- ② Set the mask scale to the required mask opening length (which should be a little longer than the set master length).
- ③ Put the master delivery tray in the appropriate position depending on the set master length.
- ④ Set the required lens stop value (F22 for standard photography).
- ⑤ Set the required exposure time using the EXP. TIME buttons.
Once the above steps ① through ⑤ are taken, it is unnecessary to repeat the same steps for continuing exposure under the same conditions.
- ⑥ Mount the copy.
- ⑦ Set the lens and copy board magnification scales to the required magnification.
- ⑧ Make sure that the following conditions exist, before pushing the start button for automatic operation:
 - i) The COPY SET switch is off. (The lamp is out.)
 - ii) The MULTI switch is off. (The lamp is out.)
 - iii) The master length and exposure time are respectively set on the M. LENGTH and EXP. TIME displays, which are not flashing.
 - iv) The FAN switch is on.
 - v) The START lamp is on.

9-3-2 Multiple Exposure

(example: making two exposures, set master feed length 370 ~ 700mm)

- ① Take the above steps ① through ⑦ for standard photography. Place the copy in position A on the copy positioning sheet as shown below. Mask position B with such black paper which has 2.0 or higher density and low reflectance and is larger than the copy; for example, Mitsubishi LK color black.
- ② Push the MULTI button. (The MULTI lamp comes on.)
- ③ Push the START button to make the first exposure.

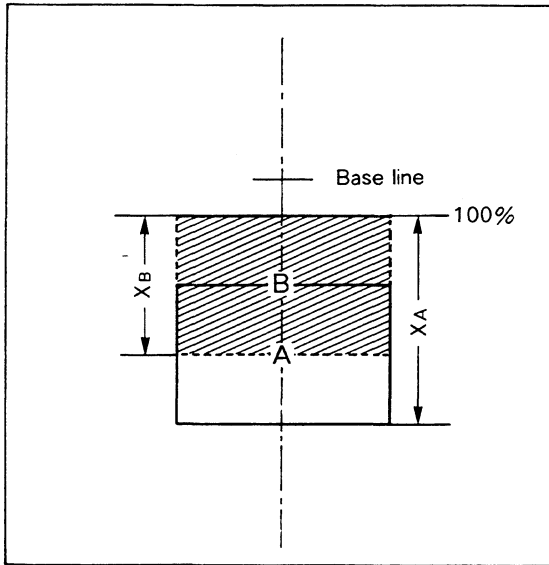
- ④ Move the copy to position B and mask position A with the black paper. If the area previously masked should be masked again, the corresponding area of master will remain unexposed (silver deposit). So, pay attention to the masking position.
- ⑤ Push the MULTI button before the last exposure. (The MULTI lamp goes out.)
- ⑥ Push the START button for the second (last) exposure. After the exposure, automatically the master (plate) is processed and delivered.



9-3-3 Double Exposure (set master feed length 185 ~ 350mm)

- ① Push the MULTI button. (The MULTI lamp comes on.)
- ② Set the master feed length using the M. LENGTH buttons.
NOTE: The master length should be within the range of 185 ~ 350mm. If the set master length is between 370 and 700mm, the START lamp lights but the machine is prepared for multiple exposure operation as stated in 9.3.2. and not for automatic double exposure.
- ③ Set the mask scale to the required length, which should be a little longer than the set master length.
- ④ Put the master delivery tray in the appropriate position depending on the set master length.
- ⑤ Set the required lens stop value (normally F22).
- ⑥ Set the required exposure time using the EXP. TIME buttons.
Once the above steps ① through ⑥ are taken, it is unnecessary to repeat the same steps for continuing exposure under the same conditions.
- ⑦ Set the lens and copy board magnification scales to the required magnification.
- ⑧ Put the copy in position A.
- ⑨ Push the START button.
The first exposure is made and master is fed by the amount equivalent to the set master length.
- ⑩ Shift the copy from position A to B.
- ⑪ Push the START button again.
The second exposure is made, then the exposed master sheet is transported to the processor for development and finally delivered.
NOTE: In double exposure, when the master feed length above 276mm is set,
 - i) During the second exposure, the processor drive is stopped.
 - ii) Exposure can not be started before the preceding plate is delivered.
 - iii) The plate made by double exposure is longer than normal by the equivalent of the part nipped by the nip roller; so the nipped part should be cut off before mounting the plate on the press.

Copy Position in Double Exposure



Position A:

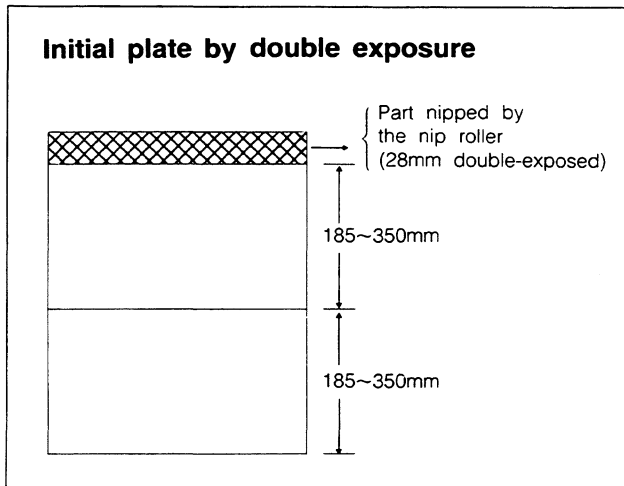
X_A = Master feed length

Position B:

X_B = Vertical length of copy

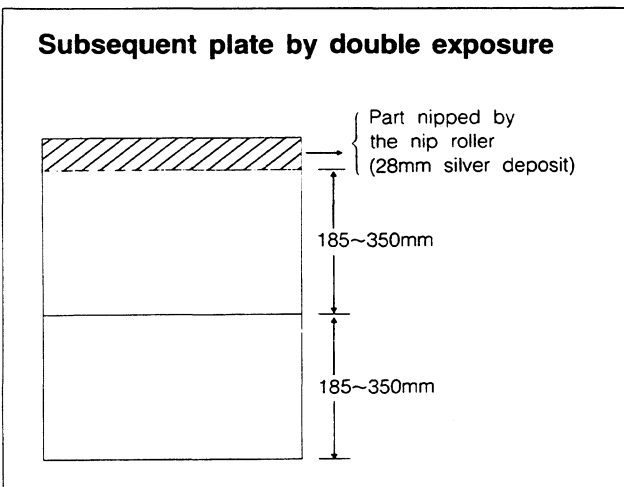
where X = Distance between 100% line and lower horizontal sideline of copy.

1) Initial plate by double exposure



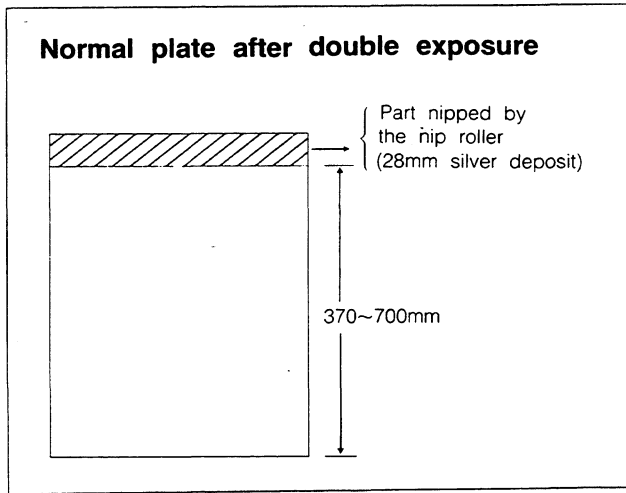
In the first plate produced after normal or multiple exposure, the part nipped by the nip roller (28mm) is double-exposed. The plate is longer than normal by the equivalent of that part. Therefore, cut it off.

2) Subsequent plates by double exposure



In a subsequent plate by double exposure, the nipped part (28mm) is silver deposit. The plate is longer than normal by the equivalent of the silver deposit part. Then cut it off.

3) Normal plate after double exposure



The plate by normal or multiple exposure after double exposure would have 28mm-long silver deposit part at its end. In this case, to obtain a normal size plate, take the following steps:

- Master feed length
Set the master feed length 28mm (equivalent of the nipped part) longer than required, however it should not be exceeding 700mm.
- Copy set position
Place the copy 28mm before the 100% line.
- Cut the 28mm-long nipped part (silver deposit) off the plate made.

9-4 How to Determine Standard Exposure

Since the Silver Master is coated with silver-halide emulsion, its sensitivity may somewhat vary among lots. Before using a new lot, check its sensitivity.

Under-exposure may cause a thickened image or scumming on the background of the plate. Over-exposure may cause a too thin image or lost image.

Correct exposure is essential for the high quality Silver Master RII and Silver Litho-plate f to deliver the best performance.

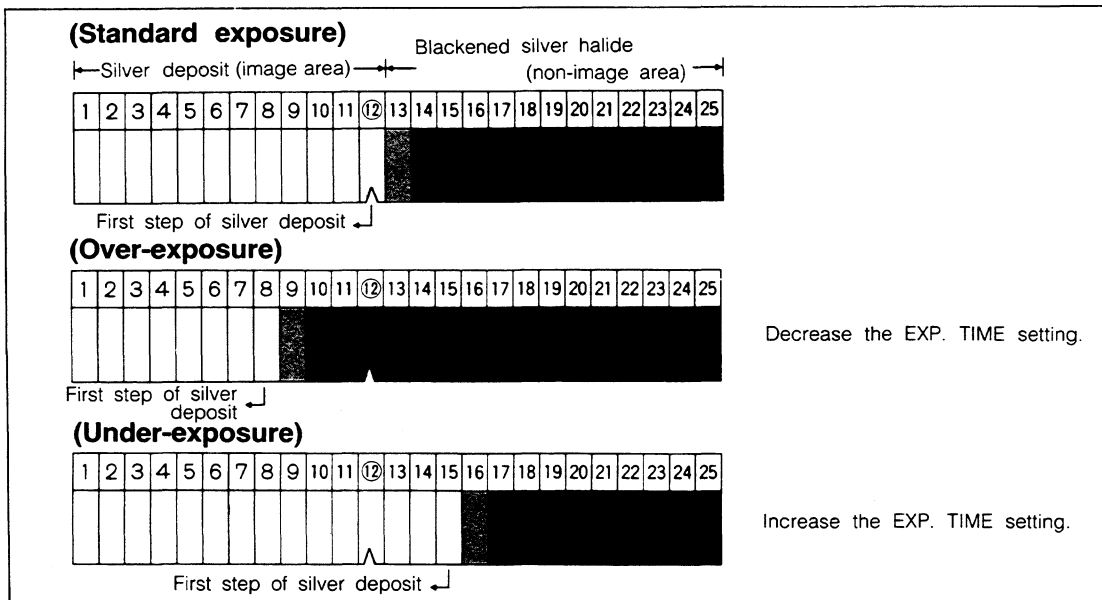
Refer to the Silver Master Technical Guide.

The CP-550II is supplied with test charts and standard print samples. Make an exposure of a test chart and compare it with the standard print sample to determine standard exposure.

① Make exact full-size (100%) exposure of the test chart with the stop value F22. Adjust the exposure time to obtain standard exposure.

② Check the exposure and adjust the exposure time to obtain standard exposure.

Standard exposure: the exposure where the minimum noticeable silver deposit is seen in the 12th step with a wedge as in the supplied sample.



NOTE: The standard print sample may fade with time. Store it in a drawer or dark place.

9-5 How to Determine the Optimum Exposure Time

- ① The optimum exposure time varies according to the type of original copy being used.
- ② The optimum exposure timer setting differs according to the user's printing conditions (press, printing paper, ink, etc.). The table below shows the suggested exposure timer settings for various types of copies with some defect. Individual users should find the best exposure timer setting for each copy under their own printing conditions.

Suggested Exposure Timer 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 battered, or dark background	Typewritten	0 ~ +30% (Increase)
	Halftone	+20 ~ +30% (Increase)

9-6 Centering the Copy

The copy positioning sheet bears a vertical centerline and graduations (on the center, right and left) and such reference lines that represent the upper limit of the effective image projection area at different magnifications (enlargement/reduction). Thus, when the copy is placed inside the reference line appropriate to the magnification concerned, the whole image will be reproduced. However, the horizontal centerline varies according to the master length and magnification, and the copy positioning sheet bears no horizontal centerline. Particularly, when A3 size master is positioned crosswise, the horizontal centerline is a necessity.

Determine the horizontal centerline from the formula shown next. Draw a horizontal centerline as thus determined according to the master size and magnification on the positioning sheet in order to facilitate copy positioning, as required.

9-6-1 How to Determine the Horizontal Centerline at 100%

The vertical centerline and the right and left sidelines are graduated not in percentage but in 2mm divisions. The horizontal centerline corresponds to the half point of the master length. When determining the horizontal centerline, use the base line which is 28mm above the reference line for 100% and a little longer than the other lines. The horizontal centerline for the copy should be below the base line (inside the base line) by the distance equivalent to half the master length. The graduations of the vertical centerline correspond to those of the sidelines. Accurately draw the horizontal centerline, using these graduations.

9-6-2 How to Determine the Horizontal Centerline at a Magnification Other Than 100%

The horizontal centerline, in case of a magnification higher than 100% (enlargement), must be below or inside the one at 100%, while in case of a magnification lower than 100% (reduction) it must be above or outside the one at 100%. The distance of the horizontal centerline from the one at 100% is calculated from the following formula:

$$X = \left| f(1 - m) \right| + \left(308 - \frac{P\ell}{2} \right) \cdot \left(\frac{1}{m} - 1 \right)$$

Where x: the distance from the horizontal centerline at 100%

f: focal length (480mm)

m: magnification

Pℓ: master length

For example, if the magnification is 80% and the master length is 660mm:

$$\begin{aligned} X &= \left| 480(1 - 0.80) \right| + \left(308 - \frac{660}{2} \right) \cdot \left(\frac{1}{0.80} - 1 \right) \\ &= 96 + (-22) \times (0.25) \\ &= 90.5 \end{aligned}$$

Thus, the horizontal centerline at 80% should be 90.5mm above or outside the one at 100%

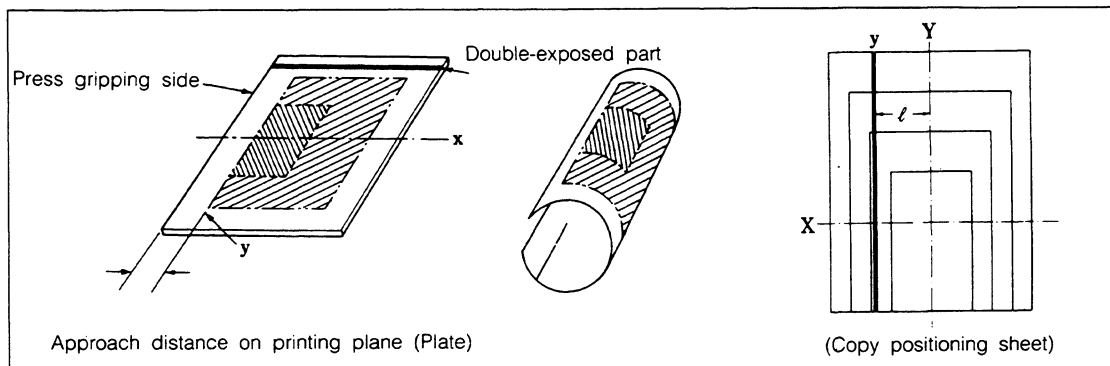
9-6-3 Changing the Centerline According to the Printing Condition

The vertical centerline may vary according to the printing condition such as gripping margin. If the gripping position on the press changes, the vertical centerline should also vary according to the magnification.

If such is the case, the base line for the copy edge at 100% is calculated as follows (here the position of the base line (y) is expressed as the distance from the original vertical centerline of the positioning sheet):

$$\begin{aligned} &\frac{\text{Master width (w)}}{2} - \text{Approch distance on printing plane (a)} \\ &= \text{Base line for copy edge (y)} \end{aligned}$$

In this case, the correct vertical centerline is half the printing paper size from this base line. When the magnification is no 100%, the base line for copy (along which the copy edge is positioned) is calculated from the following formula:



$$\ell = \frac{1}{m} \left(\frac{w}{2} - a \right)$$

where ℓ distance from positioning sheet original centerline Y to base line y
 w: master width
 a: distance from master edge to printing start point
 m: magnification

e.g.1) Printing conditions: $w = 550\text{mm}$, $a = 50\text{mm}$, $m = 100\%$

$$\ell = \frac{1}{m} \left(\frac{w}{2} - a \right) = \frac{1}{1.0} \left(\frac{550}{2} - 50 \right) = 225 \text{ mm}$$

e.g.2) printing conditions: $w = 550\text{mm}$, $a = 60\text{mm}$, $m = 80\%$

$$\ell = \frac{1}{m} \left(\frac{w}{2} - a \right) = \frac{1}{0.8} \left(\frac{550}{2} - 60 \right) = \frac{215}{0.8} = 269 \text{ mm}$$

9-6-4 Calculation of the Magnification

The magnification is calculated from the following formula:

$$\text{Magnification (\%)} = \frac{\text{Output size}}{\text{Input size}} \times 100$$

The table below shows commonly used magnifications (output/input ratios).

						(%)
A2 → A3	70.7	A2 → B4	61.2	A2 → A4	50.0	
B3 → A3	81.6	B3 → B4	70.7	B3 → A4	57.7	
A3 → B4	86.6	A3 → A4	70.7			
B4 → B5	70.7	B4 → A4	81.6			

9-6-5 Punching Position in Master

The cut master size slightly deviates from the exact specified size. Therefore, if the master plate is expected to be loaded crosswise as on the press for A3 format or larger impressions, the double-exposed edge of the plate should be punched to fit the positioning hardware on the press.

10. MAINTENANCE

10-1 Routine Maintenance

10-1-1 Copy Board

As the compression glass is liable to be stained by dust or fingermarks, inspect it daily. If stained, wipe it with a soft cloth using a glass cleaner (available on the market), taking care not to leave the cleaning agent behind.

10-1-2 Replacement of the Lamp

- ① Hold the lamp with a dry cloth or gloves on your hand. Do not hold it with bare hand.
- ② The lamp contact uses a spring. When replacing, push the lamp in one direction. A perfect contact should be made.
- ③ The lamp, if stained with fingermarks or smeared, will become opaque. Gently wipe the stained lamp with lens paper (available at general camera stores) moistened with a very little industrial ethyl alcohol.
- ④ Hold the lamp as horizontal as possible. If it is held in the vertical position, the life of the lamp might be shortened.

10-1-3 Lens-Mirror Assembly

The lens and mirror surfaces, being soft, should be handled with the utmost care not to scratch or stain them. Do not wipe them often. If the lens and mirror should be stained with fingermarks, saliva, oil or chemical, the finished quality would be unfavorably affected. When circumstances make it necessary to clean them, use the following procedure:

- ① Lightly brush the surfaces with an air 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 shut down for long, the lens cap and mirror cover should be on.

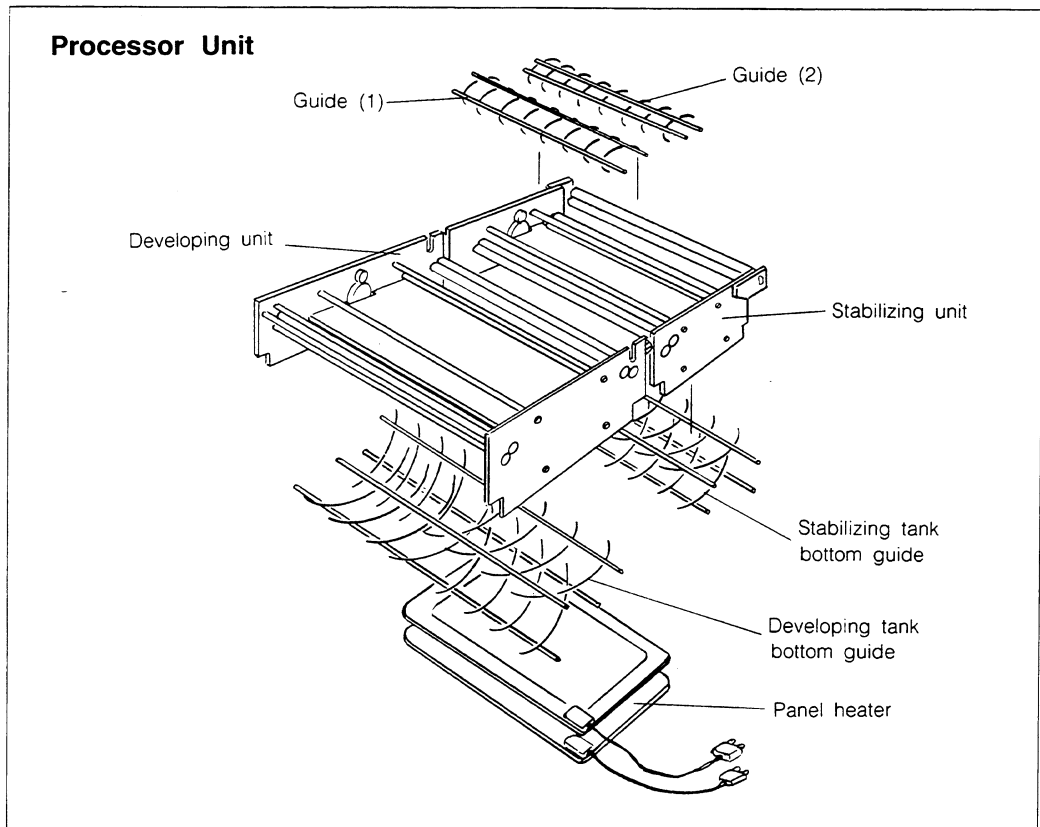
10-1-4 Processor

1) Frequency of change of processing solutions

One fill of activator or stabilizer is capable of processing 1,800 plates of B4 size or 450 plates of A2 size. Even when the number of plates processed thus far is within the prescribed range of processing capacity, change the processing solution for fresh one 4 weeks after mixing it.

2) Cleaning the processing tanks

Be sure to clean the tanks when changing the processing solution. Otherwise, silver, paper powder or chemicals from master can stick to the tanks, and scratch or stain master as many master sheets are processed.



- ① Turn off the POWER switch.
NOTE: If the switch remains ON, the developing tank will be heated even while it is empty, which will cause the tank to be damaged.
- ② Remove the front cover and top cover.
- ③ Take out the replenisher tanks.
- ④ Take out the drain vat and lay down the drain hose, and then open the drain valves.
- ⑤ After the processing tanks are drained completely, shut the valves and then put the drain hose back to the clamp.
- ⑥ Remove the developing unit, stabilizing unit and heater from the processing tanks and wash them.
- ⑦ Carefully wipe off any sediment with a damp cloth or sponge.
CAUTION: As the rollers of the developing and stabilizing units are not heat-resistant, use tepid water of less than 40°C. Any detergent or polishing compound must not be used for them.
- ⑧ Clean the inside of the developing and stabilizing tanks with water.
- ⑨ If the fingers of the master guides at the bottom of the developing and stabilizing units are very dirty, master may be scratched. If so, wash them with water and wipe dry. Then, polish them with a metal polishing compound on a soft cloth until their surfaces are shiny.
Note: This care is essential for high quality reproduction.
- ⑩ After draining the tanks completely, close the drain valves and pour fresh processing solutions into the respective tanks.

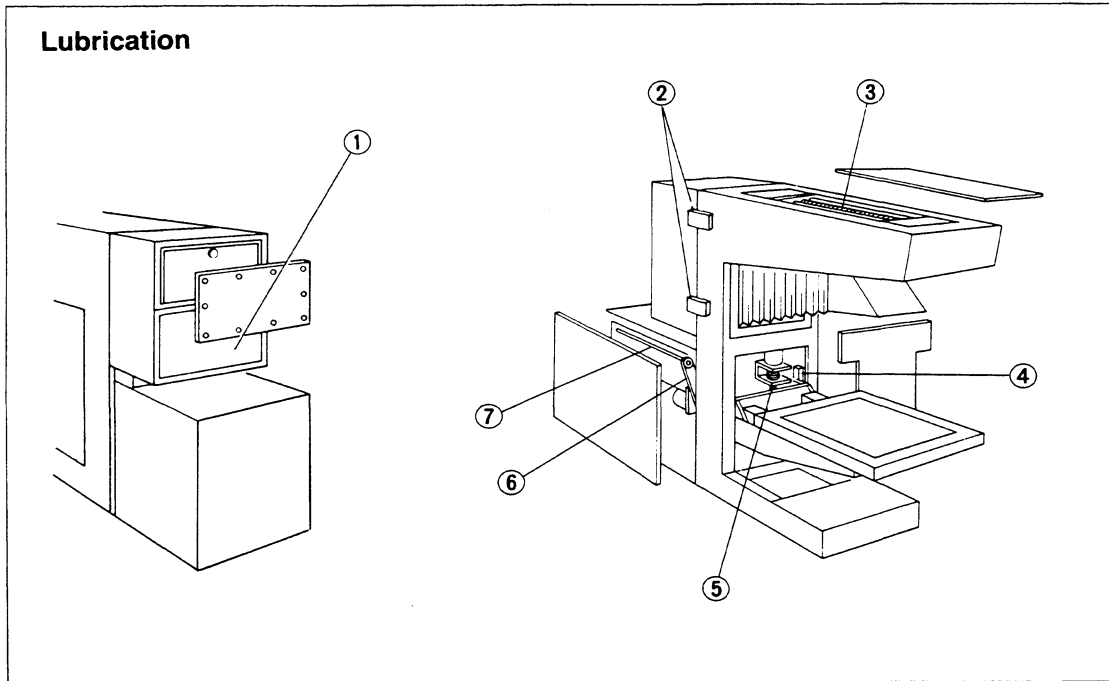
10-1-5 Focus

The focus is thoroughly inspected before shipment. However, recheck it when necessary by making an exposure of the resolving power chart (included in the test chart).

- ① For the test chart, use an exposure time a little longer than the standard one.
- ② When the resolution of the exposure is 8 lines/mm or more, the focus is satisfactory.
(This resolving power chart is a reproduction and does not indicate absolute values.)

10-2 Lubrication

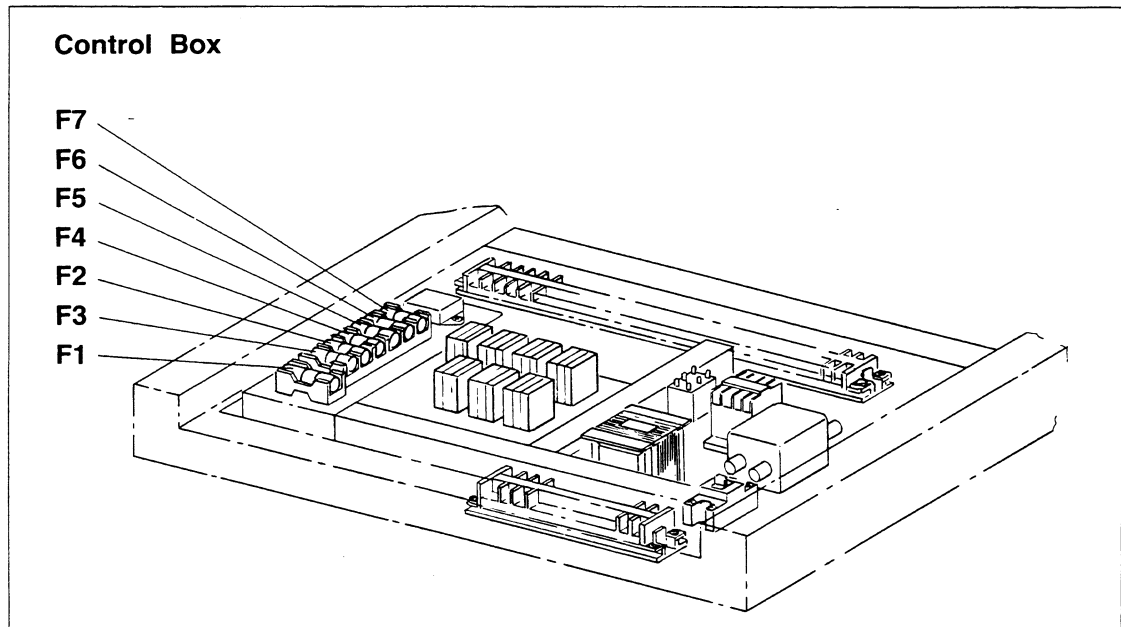
The required frequency of lubrication depends on the frequency of operation. The following frequencies are recommended for the parts to be lubricated.



- ① **Cutter clamp arm** (Remove the rear cover of the photographing section.)Every month (oil)
- ② **Hinges of the photographing section**Every month (oil)
- ③ **Lens board drive screw**
(Remove the cover.)Every month (grease)
- ④ **Copy board drive rail**
(Remove the front cover.)Every month (oil)
- ⑤ **Copy board drive screw**
(Remove the front cover.)Every month (grease)
- ⑥ **Processor drive chain**
(Remove the side cover.)Every month (oil)
- ⑦ **Processor drive gear**
(Remove the side cover.)Every month (grease)

10-3 Functions of the Fuses in the Control Box

The control box is located under the copy board. It incorporates various electric parts. CAUTION: When changing the fuse, never fail to turn off the POWER switch and also the user's power source. Do not use any fuse with a capacity not as specified.



- F1 REF. LIGHT (Lamp fuse)**
A 30A enclosed fuse (20A for North America, 15A for Europe) to protect the reflection light source circuit (for the three lamps except the one for COPY SET).
- F2 REF. LIGHT (Lamp fuse)**
A 10A glass fuse (10A for North America, 5A for Europe) to protect the reflection light source circuit (for the lamp for COPY SET).
- F3 DEV.HEATER (Developing tank heater fuse)**
A 15A glass fuse to protect the heater circuit in the developing tank of the processor.
- F4 PROCESSOR MOTOR (Processor motor fuse)**
A 3A glass fuse to protect the processor drive motor circuit.
- F5-F6 CONTROL CIRCUIT (Control circuit fuses)**
3A glass tube fuses to protect the control circuit.
- F7 100V AC Weak Current Circuit Transformer Fuse**
A 1A glass tube fuse to protect the 100V AC current circuit transformer.

10-4 Order and Replacement of Parts

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

- ① Whether parts only are needed or both parts and installation (replacement) service are needed.
- ② The information given in the certificate or the nameplate of your machine.
 - a) MODEL (CP-550II)
 - b) MFG NO.

③ Descriptions of parts and quantities required, date of delivery, etc.

NOTE: 1. Specifications are subject to change without notice.

2. The manufacturer assumes 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 the manufacturer's approval.

10-5 Troubles and Remedies

With a correct understanding of machine operation, clearly grasp the nature of the trouble which has arisen. Basic remedies are listed below. Carry out checks systematically.

NOTE: 1. When checking the electric circuit for fuse replacement or other purpose, turn off the POWER switch and the user's power source.

2. Allow at least 5 seconds before turning the power back on, after it has once turned off.

Trouble	Probable Cause	Remedy
1. Machine not powered up.	1. Power not supplied to machine. 2. POWER switch off. 3. Blown fuse.	1. Turn on the power source. 2. Turn on the POWER switch. 3. Check and replace glass fuse F5, F6, F7.
2. START lamp will not light.	1. FAN switch OFF (SEF on display) 2. Master length not set within 370 ~ 700. (Standard/multi exposure mode) 3. Master length not set within 185 ~ 350. (automatic double exposure mode) 4. FEED/CUT/FOCUS switch ON. (SEF on display) 5. Low activator temperature. (CLd on display) 6. No master available.	1. Turn on the FAN switch. 2. Set master length within 370 ~ 700. 3. Set master length within 185 ~ 350. 4. Turn off the switch. 5. Wait until activator reaches the preset temperature. 6. Load a master roll.
3. Master not fed.	1. Master out of position. 2. MULTI switch on.	1. Load a master roll properly. 2. Turn off the MULTI switch.
4. Light source will not light.	1. Lamp burned out. 2. Connector disconnected. 3. Blown fuse.	1. Replace the lamp. 2. Connect the connector. (J2 ~ J5) 3. Check and replace glass fuse. F1 for the 3 exposure lamps. F2 for the lamp for COPY SET.
5. Shutter will not open.	1. Mechanical problem or a defective part.	1. Check the mechanical problem.
6. Abnormal exposure time.	1. Incorrect set data or defective PCB.	1. Check the set data.
7. Master not cut sharp.	1. Dull cutter blade.	1. Replace the blade.
8. Development not made.	1. Incorrect activator temperature setting. 2. Blown fuse. 3. The amount of activator insufficient.	1. Reset the activator temperature. 2. Check and replace glass fuse F3. 3. Replenish the developing tank.

Trouble	Probable Cause	Remedy
9. Processor will not work.	<ol style="list-style-type: none"> 1. Blown fuse. 2. Poor Contact of connector. 	<ol style="list-style-type: none"> 1. Check and replace glass fuse F4. 2. Check the connector in question.
10. Copy board will not move.	<ol style="list-style-type: none"> 1. Blown fuse. 2. A defective part. 	<ol style="list-style-type: none"> 1. Check and replace glass fuses F5, F6. 2. Replace the part.
11. No image produced.	<ol style="list-style-type: none"> 1. Incorrect exposure time setting. 2. Lens cap/mirror cover on. 3. Mask fully closed. 4. Incorrect activator temperature setting. 5. Fatigue of activator. 6. Original copy density too low. 	<ol style="list-style-type: none"> 1. Correct the setting. 2. Remove the cap/cover. 3. Correct the mask status. 4. Correct it. 5. Change the activator. 6. Increase the original copy density.
12. Out of focus; Lost image	<ol style="list-style-type: none"> 1. Incorrect lens/copy board magnification scale setting. 2. Dirty copy board glass. 3. Copy board glass unhooked. 4. Dirty lens/mirror. 	<ol style="list-style-type: none"> 1. Correct the magnification setting. 2. Clean the glass. 3. Hook it securely. 4. Clean the lens/mirror.
13. Scratched master	<ol style="list-style-type: none"> 1. Dirty master (inlet) guide; dirty master guide(s) at developing/stabilizing unit bottom. 	<ol style="list-style-type: none"> 1. clean the dirty part.
14. Fatigue of activator	<ol style="list-style-type: none"> 1. The amount of activator insufficient. 2. Activator temperature high. 	<ol style="list-style-type: none"> 1. Replenish the developing tank and replenisher tank. 2. Adjust the temperature.
15. Low activator temperature.	<ol style="list-style-type: none"> 1. Blown fuse. 2. Missetting of thermostat. 3. Heater plug disconnected. 	<ol style="list-style-type: none"> 1. Check and replace glass fuse F2. 2. Adjust it. 3. Connect it.

10-6 Error Messages

If any of the following messages appears on either display on the main control panel, it means that the machine is in trouble. Remedy the trouble according to the procedure listed below.

Before taking the remedial steps, observe the following precautions:

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 user's power source.

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

*Display	Message	Buzzer	Abbreviation for	Error Content	Remedy
M	<i>CHC</i>	pee..p	Check cutter	The cutter does not work in 30 sec after start of master feed.	
M	<i>End</i>	pee..p	End	The master roll is exhausted or improperly loaded.	Load a new roll or reload the roll properly.
M	<i>SEF</i>		Set	The FAN switch is OFF or the FEED, CUT or FOCUS switch is ON.	Turn on the FAN switch, or, turn off the FEED, CUT or FOCUS switch.
M	<i>CLD</i>		Cold	The activator temperature is below the preset level.	<ol style="list-style-type: none"> 1. Wait until the message disappears. 2. Press the C key; however, in this case, the machine can be started but the plate produced may have a poor quality. When the C key has been pressed, reset the power.
M	<i>SPL</i>	pip pip pip...	Splice	A splice is detected.	Remake a plate.
E	<i>Err</i>		Error	The set master length is out of the specified range.	Reset the master length within the range.
M				Master is being fed. (The set master length display flashes.)	
E				Exposure is under way. (The set exposure time is counted down in 0.1 sec decrements.)	
M	<i>dar</i>		Door	The processor cover is open.	Close the cover securely.

11. APPENDIX

TABLE 1. CHART FOR CONVERSION OF CENTRELINE POSITIONS FOR DIFFERING MAGNIFICATIONS, CONTRASTED AGAINST 100% MAGNIFICATION CENTRELINE

$$\ell X = \left| f(1 - m) \right| + \left(308 - \frac{P\ell}{2} \right) \cdot \left(\frac{1}{m} - 1 \right)$$

f = 480 mm

magnification m (%)	f (1 - m) (mm)	$\left(\frac{1}{m} - 1 \right)$	magnification m (%)	f (1 - m) (mm)	$\left(\frac{1}{m} - 1 \right)$
70	144.0	0.43	100	0.0	0.00
72	134.4	0.39	102	9.6	-0.02
74	124.8	0.35	104	19.2	-0.04
76	115.2	0.32	106	28.8	-0.06
78	105.6	0.28	108	38.4	-0.07
80	96.0	0.25	110	48.0	-0.09
82	86.4	0.25	112	57.6	-0.11
84	76.8	0.19	114	67.2	-0.12
86	67.2	0.16	116	76.8	-0.14
88	57.6	0.14	118	86.4	-0.15
90	48.0	0.11	120	96.0	-0.17
92	38.4	0.09	122	105.6	-0.18
94	28.8	0.06	124	115.2	-0.19
96	19.2	0.04	125	120.0	-0.20
98	9.6	0.02			

f = 18.9 in

magnification	f (1 - m) (in)	$\left(\frac{1}{m} - 1 \right)$	magnification	f (1 - m) (in)	$\left(\frac{1}{m} - 1 \right)$
70	5.7	0.43	100	0.000	0.00
72	5.3	0.39	102	0.378	-0.02
74	4.9	0.35	104	0.756	-0.04
76	4.5	0.32	106	1.134	-0.06
78	4.2	0.28	108	1.512	-0.07
80	3.8	0.25	110	1.890	-0.09
82	3.4	0.25	112	2.268	-0.11
84	3.0	0.19	114	2.646	-0.12
86	2.6	0.16	116	3.024	-0.14
88	2.3	0.14	118	3.402	-0.15
90	1.9	0.11	120	3.780	-0.17
92	1.5	0.09	122	4.157	-0.18
94	1.1	0.06	124	4.535	-0.19
96	0.8	0.04	125	4.724	-0.20
98	0.4	0.02			

+ → Enlargement side

- → Reduction side

**TABLE 2. DISTANCE FROM 100% MAGNIFICATION
CENTRELINE FOR MAJOR MASTER SIZE LENGTHS
(mm)**

$P\ell$	467	483	520	564	570	625	638	641	645	650	660
magnification $\frac{P\ell}{2}$											
70	176.0	172.6	164.6	155.2	153.9	145.9	148.7	149.4	150.2	151.3	153.5
71	169.7	166.5	158.9	149.9	148.6	141.0	143.7	144.3	145.1	146.2	148.2
72	163.5	160.3	153.1	144.5	143.4	136.2	138.7	139.3	140.1	141.0	143.0
73	157.2	154.2	147.4	139.2	138.1	131.3	133.7	134.2	135.0	135.9	137.7
74	150.9	148.1	141.6	133.9	132.9	126.4	128.7	129.2	129.2	130.8	132.5
75	144.6	141.9	135.8	128.6	127.6	121.5	123.6	124.1	124.8	125.6	127.3
76	139.0	136.5	130.6	123.5	122.6	116.6	118.7	119.2	119.8	120.6	122.2
77	132.8	130.4	124.8	118.2	117.3	111.8	113.7	114.2	114.8	115.5	117.0
78	126.5	124.2	119.0	112.9	112.0	106.9	108.7	109.1	109.7	110.4	111.8
79	120.9	118.8	113.8	107.8	107.0	102.0	103.8	104.2	104.7	105.4	106.7
80	114.6	112.6	108.0	102.5	101.8	97.1	98.8	99.1	99.6	100.3	101.5
81	108.3	106.5	102.2	97.2	96.5	92.2	93.7	94.1	94.5	95.1	96.3
82	102.8	101.0	97.0	92.1	91.5	87.4	88.8	89.2	89.6	90.1	91.2
83	96.5	94.9	91.2	86.8	86.2	82.5	83.8	84.1	84.5	85.0	86.0
84	91.0	89.4	85.9	81.7	81.2	77.7	78.9	79.2	79.6	80.0	81.0
85	85.4	84.0	80.6	76.7	76.1	72.8	74.0	74.3	74.6	75.1	76.0
86	79.1	77.8	74.9	71.4	70.9	67.9	69.0	69.2	69.5	69.9	70.7
87	73.6	72.4	69.6	66.3	66.0	63.1	64.1	64.3	64.6	65.0	65.7
88	68.0	66.9	64.3	61.2	60.8	58.2	59.1	59.4	50.6	60.2	60.7
89	61.7	60.8	58.6	55.9	55.6	53.3	54.1	54.3	54.5	54.8	55.4
90	56.2	55.3	53.3	50.9	50.5	48.5	49.2	49.4	49.6	49.9	50.4
91	50.7	49.9	48.0	45.8	45.5	43.7	44.3	44.5	44.7	44.9	45.4
92	45.1	44.4	42.7	40.7	40.5	38.8	39.4	39.5	39.7	39.9	40.4
93	39.6	38.9	37.4	35.7	35.4	34.0	34.5	34.6	34.8	35.0	35.4
94	33.3	32.8	31.7	30.4	30.2	29.1	29.5	29.6	29.7	29.8	30.1
95	27.7	27.3	26.4	25.3	25.2	24.2	24.6	24.6	24.7	24.9	25.1
96	22.2	21.9	21.1	20.2	20.1	19.4	19.6	19.7	19.8	19.9	20.1
97	16.6	16.4	15.8	15.2	15.1	14.5	14.7	14.8	14.8	14.9	15.1
98	11.1	10.9	10.6	10.1	10.1	9.7	9.8	9.9	9.9	9.9	10.0
99	5.5	5.5	5.3	5.1	5.0	4.8	4.9	4.9	4.9	5.0	5.0
100	0	0	0	0	0	0	0	0	0	0	0

(mm)

Pf	467	483	520	564	570	625	638	641	645	650	660
$\frac{P\ell}{2}$ magnification	233.5	241.5	260	282	285	312.5	319	320.5	322.5	325	330
101	5.5	5.5	5.3	5.1	5.0	4.8	4.9	4.9	4.9	5.0	5.0
102	11.2	10.9	10.6	10.1	10.1	9.7	9.8	9.9	9.9	9.9	10.0
103	16.6	16.4	15.8	15.2	15.1	14.5	14.7	14.8	14.8	14.9	15.1
104	22.2	21.9	21.1	20.2	20.1	19.4	19.6	19.7	19.8	19.9	20.1
105	27.7	27.3	26.4	25.3	25.2	24.2	24.6	24.6	24.7	24.9	25.1
106	33.3	32.8	31.7	30.4	30.2	29.1	29.5	29.6	29.7	29.8	30.1
107	38.8	38.3	37.0	35.4	35.2	33.9	34.4	34.5	34.6	34.8	35.1
108	43.6	43.1	41.8	40.2	40.0	38.7	39.2	39.3	39.4	39.6	39.9
109	49.2	48.5	47.0	45.3	45.0	43.6	44.1	44.2	44.4	44.6	45.0
110	54.7	54.0	52.3	50.3	50.1	48.4	49.0	49.1	49.3	49.5	50.0
111	60.3	59.5	57.6	55.4	55.1	53.3	53.9	54.1	54.3	54.5	55.0
112	65.8	64.9	62.9	60.5	60.1	58.1	58.8	59.0	59.2	59.5	60.0
113	71.3	70.4	68.2	65.5	65.2	62.9	63.7	63.9	64.1	64.4	65.0
114	76.1	75.2	73.0	70.3	70.0	67.7	68.5	68.7	68.9	69.2	69.8
115	81.7	80.6	78.2	75.4	75.0	72.6	73.4	73.6	73.9	74.2	74.9
116	87.2	86.1	83.5	80.4	80.0	77.4	78.3	78.6	78.8	79.2	79.9
117	92.8	91.6	88.8	85.5	85.1	82.3	83.3	83.5	83.8	84.2	84.9
118	97.6	96.4	93.6	90.3	89.9	87.1	88.1	88.3	88.6	89.0	89.7
119	103.1	101.8	98.9	95.4	94.9	91.9	93.0	93.2	93.5	93.9	94.7
120	108.7	107.3	104.2	100.4	99.9	96.8	97.9	98.1	98.5	98.9	99.7
121	113.5	112.1	109.0	105.2	104.7	101.6	102.7	102.9	103.3	103.7	104.5
122	119.0	117.6	114.2	110.3	109.7	106.4	107.6	107.9	108.2	108.7	109.6
123	124.6	123.0	119.5	115.3	114.8	111.3	112.5	112.8	113.2	113.6	114.6
124	129.4	127.8	124.3	120.1	119.6	116.1	117.3	117.6	118.0	118.4	119.4
125	134.9	133.3	129.6	125.2	124.6	120.9	122.2	122.5	122.9	123.4	124.4

(in)

$P\ell$	18.4	19.0	20.5	22.2	22.4	24.6	25.1	25.2	25.4	25.6	26.0
magnification $\frac{P\ell}{2}$	9.25	9.5	10.2	11.1	11.2	12.3	12.6	12.6	12.7	12.8	13.0
70	6.9	6.8	6.5	6.1	6.1	5.7	5.9	5.9	5.9	6.0	6.0
71	6.7	6.6	6.3	5.9	5.9	5.6	5.7	5.7	5.7	5.8	5.8
72	6.4	6.3	6.0	5.7	5.6	5.4	5.5	5.5	5.5	5.6	5.6
73	6.2	6.1	5.8	5.5	5.4	5.2	5.3	5.3	5.3	5.4	5.4
74	5.9	5.8	5.6	5.3	5.2	5.0	5.1	5.1	5.1	5.1	5.2
75	5.7	5.6	5.3	5.1	5.0	4.8	4.9	4.9	4.9	4.9	5.0
76	5.5	5.4	5.1	4.9	4.8	4.6	4.7	4.7	4.7	4.7	4.8
77	5.2	5.1	4.9	4.7	4.6	4.4	4.5	4.5	4.5	4.5	4.6
78	5.0	4.9	4.7	4.4	4.4	4.2	4.3	4.3	4.3	4.3	4.4
79	4.8	4.7	4.5	4.2	4.2	4.0	4.1	4.1	4.1	4.1	4.2
80	4.5	4.4	4.3	4.0	4.0	3.8	3.9	3.9	3.9	3.9	4.0
81	4.3	4.2	4.0	3.8	3.8	3.6	3.7	3.7	3.7	3.7	3.8
82	4.0	4.0	3.8	3.6	3.6	3.4	3.5	3.5	3.5	3.5	3.6
83	3.8	3.7	3.6	3.4	3.4	3.2	3.3	3.3	3.3	3.3	3.4
84	3.6	3.5	3.3	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.2
85	3.4	3.3	3.2	3.0	3.0	2.9	2.9	2.9	2.9	3.0	3.0
86	3.1	3.1	2.9	2.8	2.8	2.7	2.7	2.7	2.7	2.8	2.8
87	2.9	2.9	2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.6
88	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4
89	2.4	2.4	2.3	2.2	2.4	2.1	2.1	2.1	2.1	2.2	2.2
90	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0
91	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.8	1.8	1.8	1.8
92	1.8	1.7	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6
93	1.6	1.5	1.5	1.4	1.4	1.3	1.4	1.4	1.4	1.4	1.4
94	1.3	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2
95	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
96	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
97	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
98	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
99	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
100	0	0	0	0	0	0	0	0	0	0	0

(in)

Pf	18.4	19.0	20.5	22.2	22.4	24.6	25.1	25.2	25.4	25.6	26.0
$\frac{P\ell}{2}$ magnification	9.2	9.5	10.2	11.1	11.2	12.3	12.6	12.6	12.7	12.8	13.0
101	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
102	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
103	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
104	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
105	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
106	1.3	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2
107	1.6	1.5	1.5	1.5	1.4	1.3	1.4	1.4	1.4	1.4	1.4
108	1.8	1.7	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6
109	2.0	2.0	1.9	1.8	1.8	1.7	1.7	1.8	1.8	1.8	1.8
110	2.2	2.2	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0
111	2.4	2.4	2.3	2.2	2.4	2.1	2.1	2.1	2.1	2.2	2.2
112	2.7	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4
113	2.9	2.9	2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.6
114	3.1	3.1	2.9	2.8	2.8	2.7	2.7	2.7	2.7	2.8	2.8
115	3.4	3.3	3.2	3.0	3.0	2.9	2.9	2.9	2.9	3.0	3.0
116	3.6	3.5	3.3	3.2	3.2	3.1	3.1	3.1	3.1	3.1	3.2
117	3.8	3.7	3.6	3.4	3.4	3.2	3.3	3.3	3.3	3.3	3.4
118	4.0	4.0	3.8	3.6	3.6	3.4	3.5	3.5	3.5	3.5	3.6
119	4.3	4.2	4.0	3.8	3.8	3.6	3.7	3.7	3.7	3.7	3.8
120	4.5	4.4	4.3	4.0	4.0	3.8	3.9	3.9	3.9	3.9	4.0
121	4.8	4.7	4.5	4.2	4.2	4.0	4.1	4.1	4.1	4.1	4.2
122	5.0	4.9	4.7	4.4	4.4	4.2	4.3	4.3	4.3	4.3	4.4
123	5.2	5.1	4.9	4.7	4.6	4.4	4.5	4.5	4.5	4.5	4.6
124	5.5	5.4	5.1	4.9	4.8	4.6	4.7	4.7	4.7	4.7	4.8
125	5.7	5.6	5.3	5.1	5.0	4.8	4.9	4.9	4.9	4.9	5.0

TABLE 3. DETERMINATION OF COPY POSITION-READY RECKONER

ℓ value

[404mm wide]

magnification (%)	distance between edge of copy and point at which printing is to commence (mm)					magnification (%)	distance between edge of copy and point at which printing is to commence (mm)				
	30	40	50	60	70		30	40	50	60	70
70	245.7	231.4	217.1	202.9	188.6	100	172.0	162.0	152.0	142.0	132.0
72	238.9	225.0	211.1	197.2	183.3	102	168.6	158.8	149.0	139.2	129.4
74	232.4	218.9	205.4	191.9	178.4	104	165.4	155.8	146.2	136.5	126.9
76	226.3	213.2	200.0	186.8	173.7	106	162.3	152.8	143.4	134.0	124.5
78	220.5	207.7	194.9	182.1	169.2	108	159.3	150.0	140.7	131.5	122.2
80	215.0	202.5	190.0	177.5	165.0	110	156.4	147.3	138.2	129.1	120.0
82	209.8	197.6	185.4	173.2	161.0	112	153.6	144.6	135.7	126.8	117.9
84	204.8	192.9	181.0	169.0	157.1	114	150.9	142.1	133.3	124.6	115.8
86	200.0	188.4	176.7	165.1	153.5	116	148.3	139.7	131.0	122.4	113.8
88	195.5	184.1	172.7	161.4	150.0	118	145.8	137.3	128.8	120.3	111.9
90	191.1	180.0	168.9	157.8	146.7	120	143.3	135.0	126.7	118.3	110.0
92	187.0	176.1	165.2	154.3	143.5	122	141.0	132.8	124.6	116.4	108.2
94	183.0	172.3	161.7	151.1	140.4	124	138.7	130.7	122.6	114.5	106.5
96	179.2	168.8	158.3	147.9	137.5	125	137.6	129.6	121.6	113.6	105.6
98	175.5	165.3	155.1	144.9	134.7						

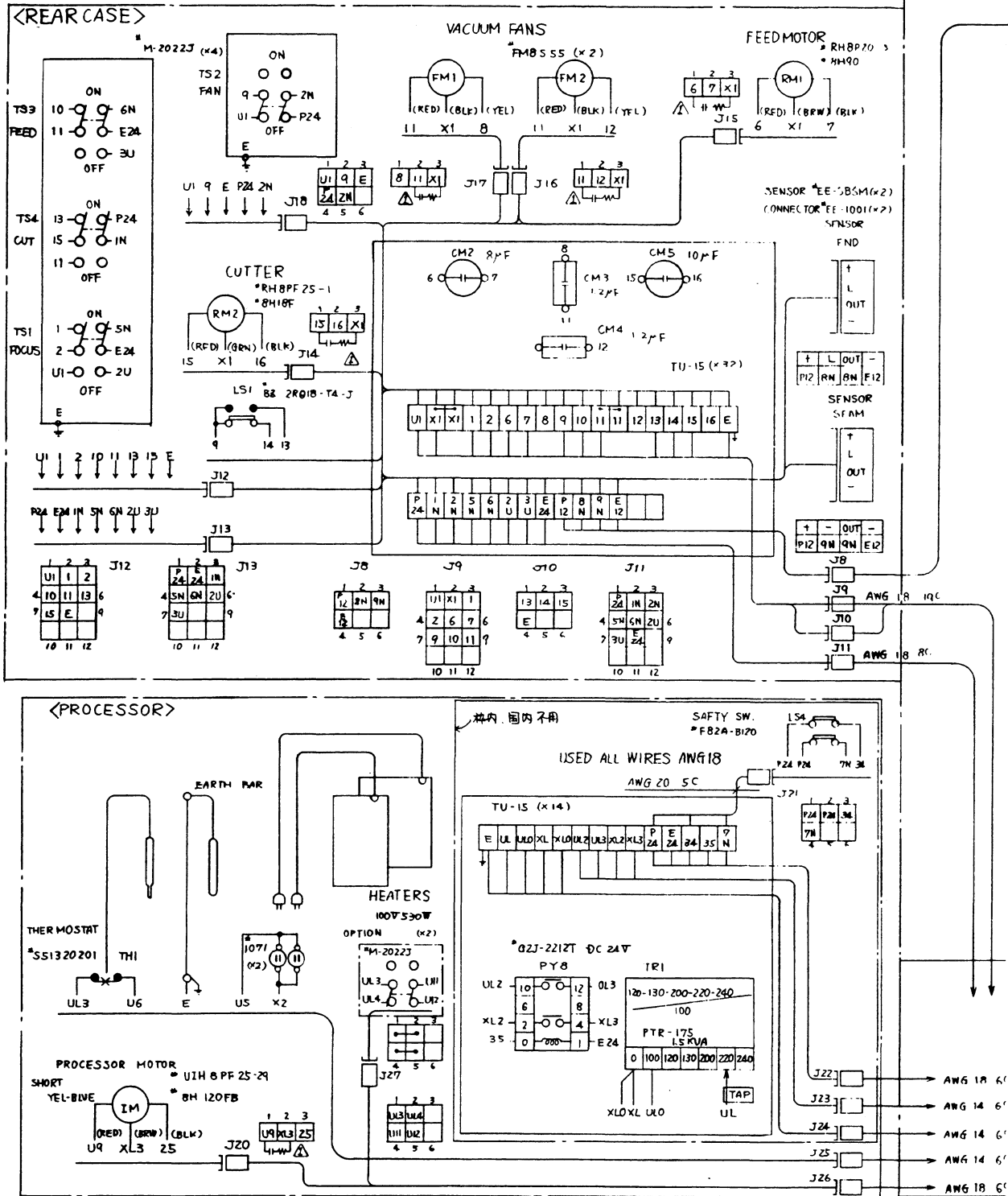
[508mm wide]

magnification (%)	distance between edge of copy and point at which printing is to commence (mm)					magnification (%)	distance between edge of copy and point at which printing is to commence (mm)				
	30	40	50	60	70		30	40	50	60	70
70	320.0	305.7	291.4	277.1	262.9	100	224.0	214.0	204.0	194.0	184.0
72	311.0	297.2	283.3	269.4	255.6	102	219.6	209.8	200.0	190.2	180.4
74	302.7	289.2	275.7	262.2	248.6	104	215.4	205.8	196.2	186.5	176.9
76	294.7	281.6	268.4	255.3	242.1	106	211.3	201.9	192.4	183.0	173.6
78	287.2	274.4	261.5	248.7	235.9	108	207.4	198.1	188.9	179.6	170.4
80	280.0	267.5	255.0	242.5	230.0	110	203.6	194.5	185.4	176.4	167.3
82	273.2	261.0	248.8	236.6	224.4	112	200.0	191.0	182.1	173.2	164.3
84	266.7	254.8	242.9	231.0	219.0	114	196.5	187.7	178.9	170.2	161.4
86	260.5	248.8	237.2	225.6	214.0	116	193.1	184.5	175.9	167.2	158.6
88	254.5	243.2	231.8	220.5	209.1	118	189.9	181.4	172.9	164.4	155.9
90	248.9	237.8	226.7	215.6	204.4	120	186.7	178.3	170.0	161.7	153.3
92	243.5	232.6	221.7	210.9	200.0	122	183.6	175.4	167.2	159.0	150.8
94	238.3	227.7	217.0	206.4	195.7	124	180.6	172.6	164.5	156.5	148.4
96	233.3	222.9	212.5	202.1	191.7	125	179.2	171.2	163.2	155.2	147.2
98	228.6	218.4	208.2	198.0	187.8						

[550mm wide]

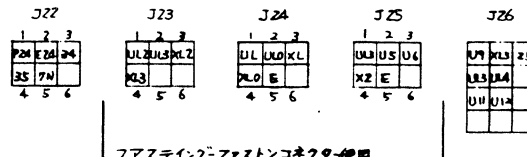
magnification (%)	distance between edge of copy and point at which printing is to commence (mm)					magnification (%)	distance between edge of copy and point at which printing is to commence (mm)				
	30	40	50	60	70		30	40	50	60	70
70	350.0	335.7	321.4	307.1	292.9	100	245.0	235.0	225.0	215.0	205.0
72	340.3	326.4	312.5	298.6	284.7	102	240.2	230.4	220.6	210.8	201.0
74	331.1	317.6	304.1	290.5	277.0	104	235.6	226.0	216.3	206.7	197.1
76	322.4	309.2	296.1	282.9	269.7	106	231.1	221.7	212.3	202.8	193.4
78	314.1	301.3	288.5	275.6	262.8	108	226.9	217.6	208.3	199.1	189.8
80	306.3	293.8	281.3	268.8	256.3	110	222.7	213.6	204.5	195.5	186.4
82	298.8	286.6	274.4	262.2	250.0	112	218.7	209.8	200.9	192.0	183.0
84	291.7	279.8	267.9	256.0	244.0	114	214.9	206.1	197.4	188.6	179.8
86	284.9	273.3	261.6	250.0	238.4	116	211.2	202.6	194.0	185.3	176.7
88	278.4	267.0	255.7	244.3	233.0	118	207.6	199.2	190.7	182.2	173.7
90	272.2	261.1	250.0	238.9	227.8	120	204.2	195.8	187.5	179.2	170.8
92	266.3	255.4	244.6	233.7	222.8	122	200.8	192.6	184.4	176.2	168.0
94	260.6	250.0	239.4	228.7	218.1	124	197.6	189.5	181.5	173.4	165.3
96	255.2	244.8	234.6	224.0	213.5	125	196.0	188.0	180.0	172.0	164.0
98	250.0	239.8	229.6	219.4	209.2						

12. WIRING DIAGRAMS



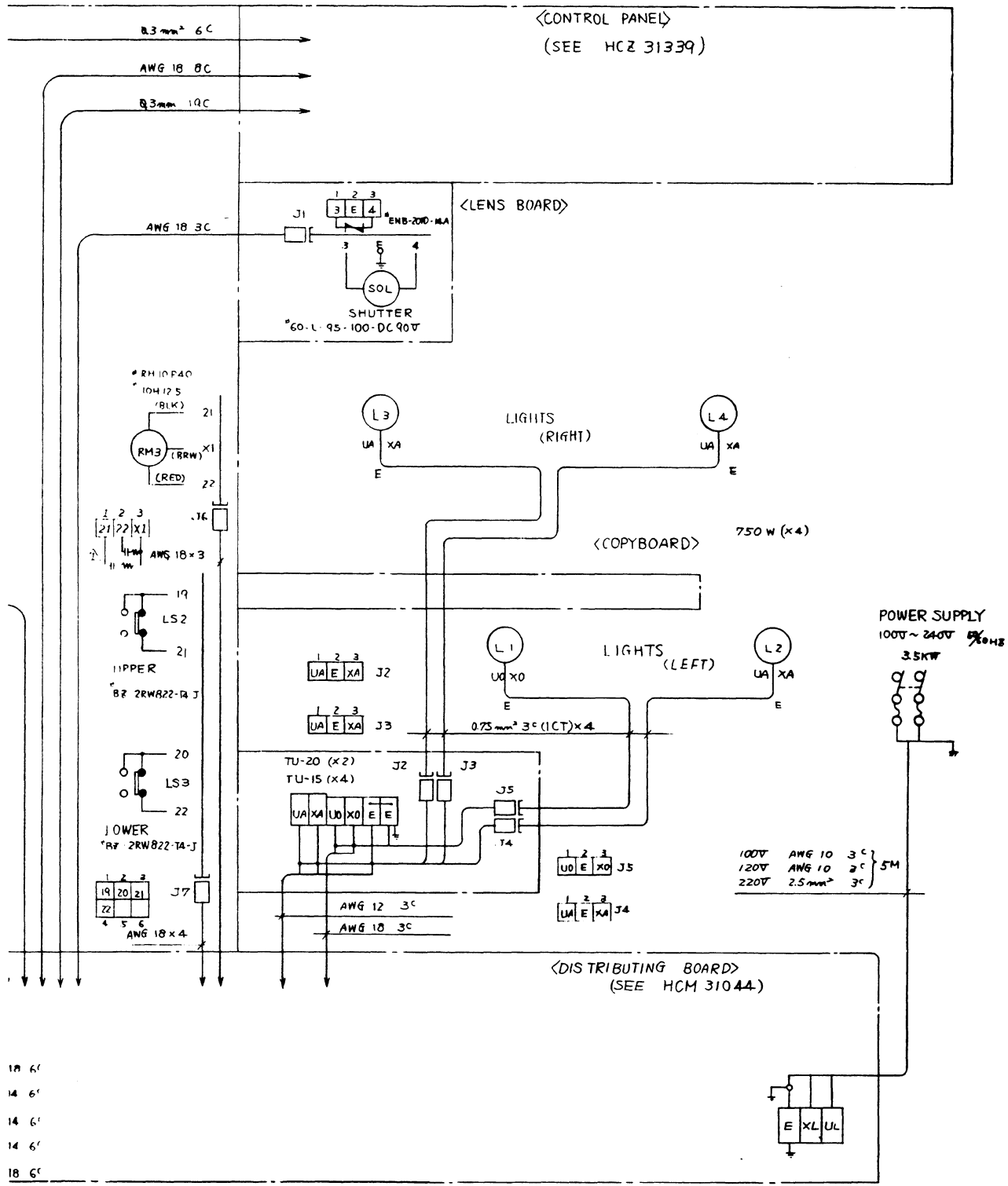
製作上の注意:

- 1 指定以外の電線はAWG20を使用の事。
- 2 図面ヒケのマークの箇所と塗装面への
 子入部分は曲付ワッシャーを使用する事。
 子入の箇所には印マークを貼る事。



REFERENCE	
1	HCS 3194
2	HCM 3104
3	HCE 313E
4	HCR 421

フラスティング・ファストコネクター使用

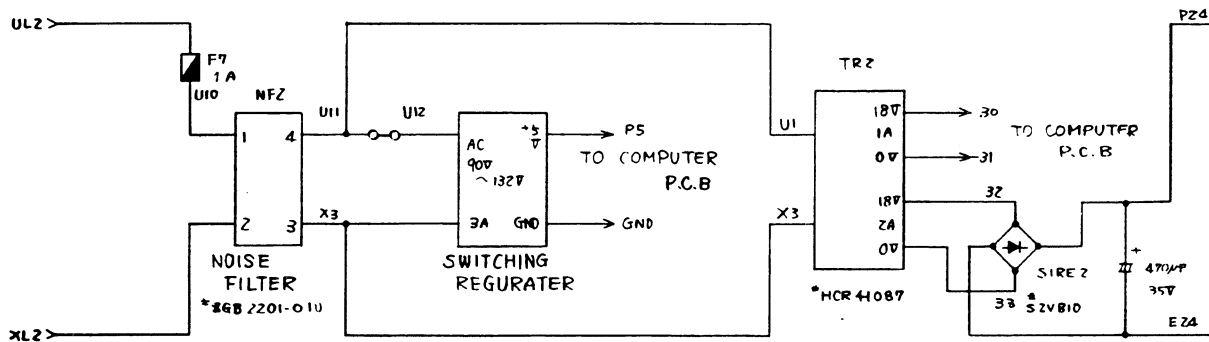
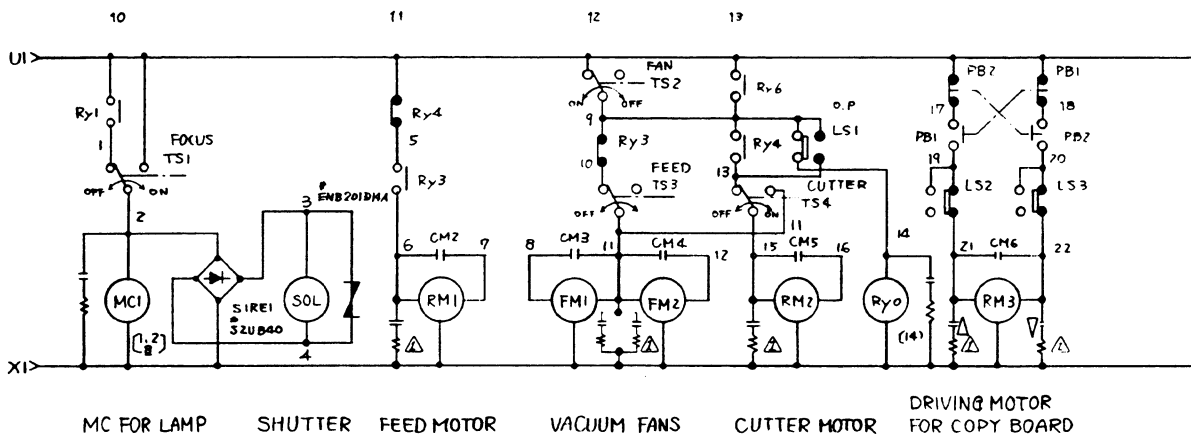
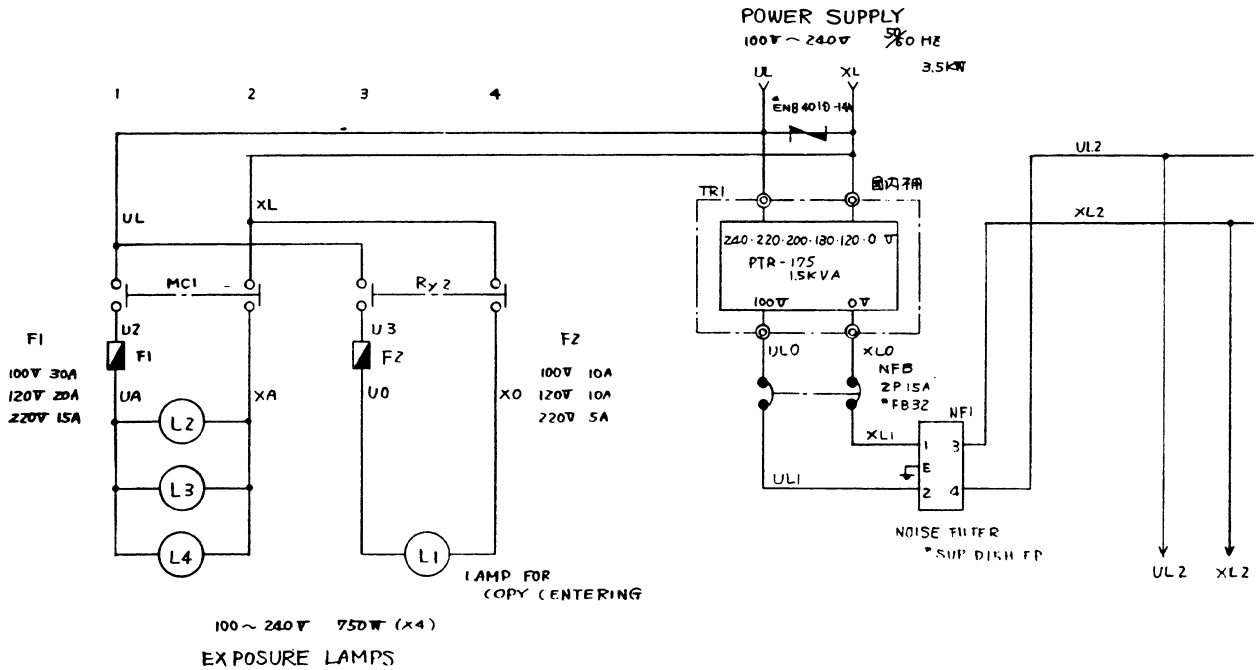


- 18 6'
- 14 6'
- 14 6'
- 14 6'
- 18 6'

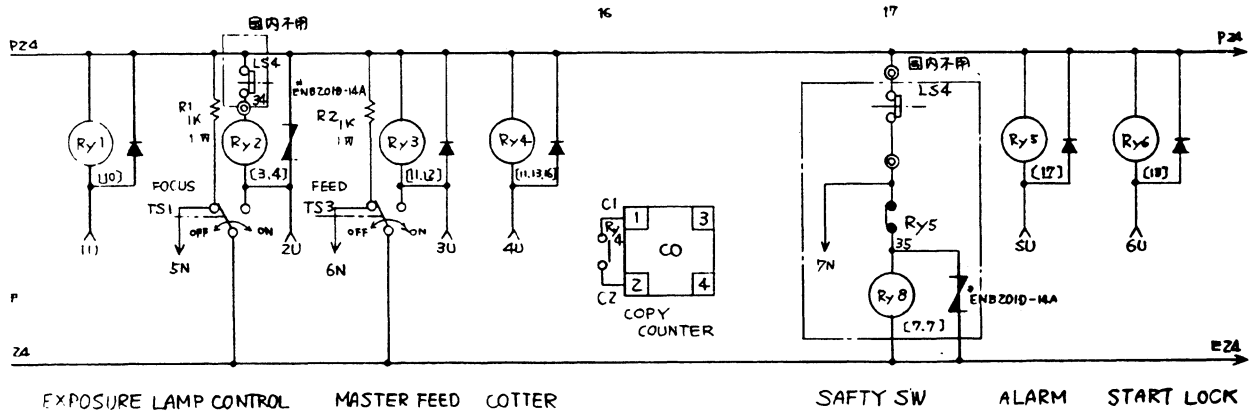
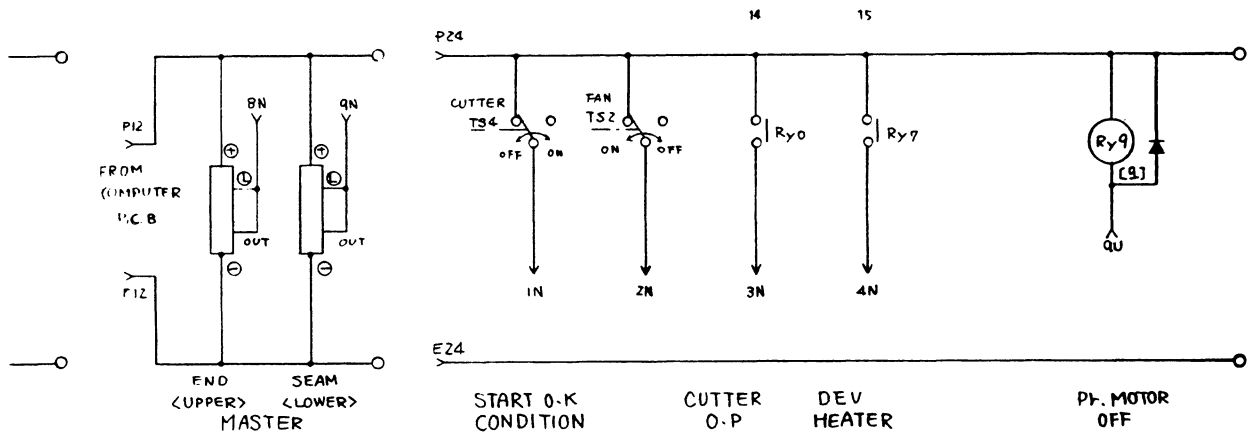
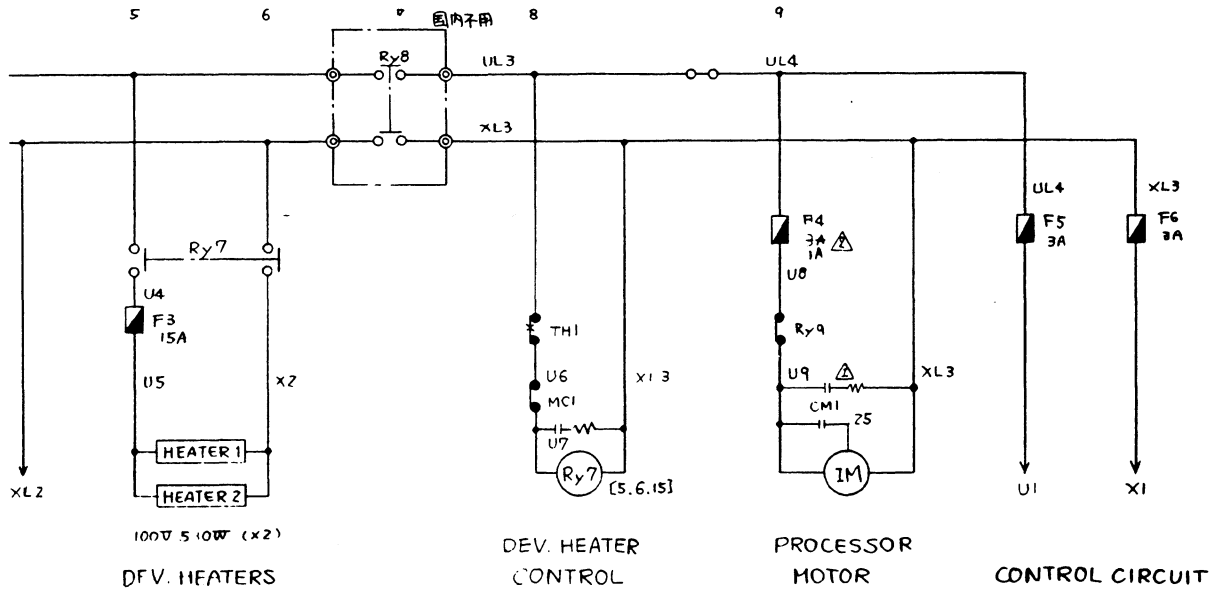
CE DIA

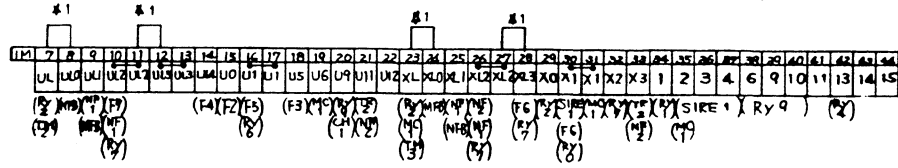
1947
1044
11339
2125

84030-6851~

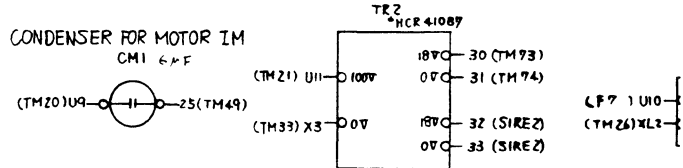
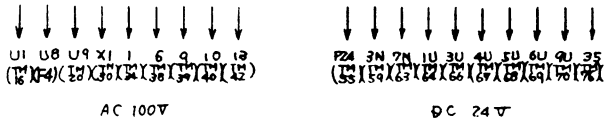
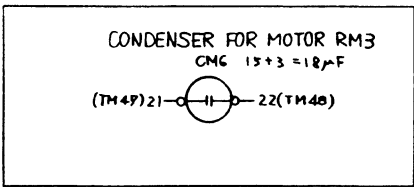
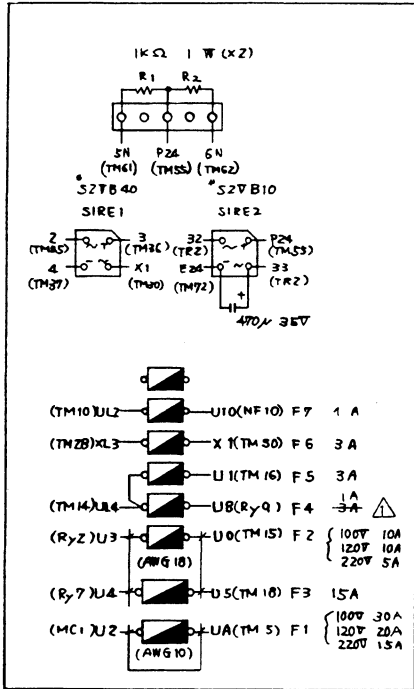
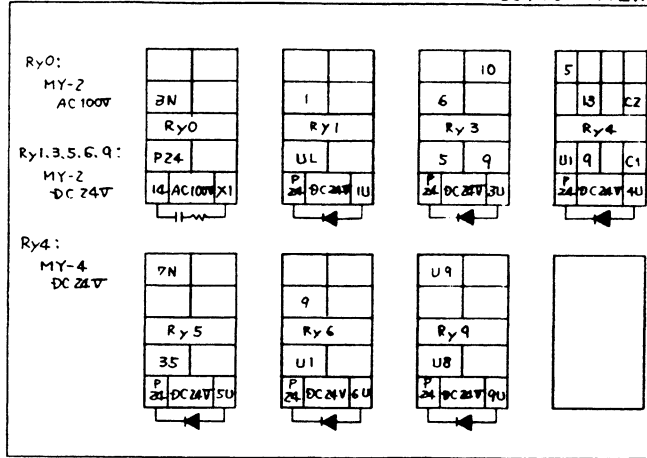


= 1S1Sas
 = CR-1



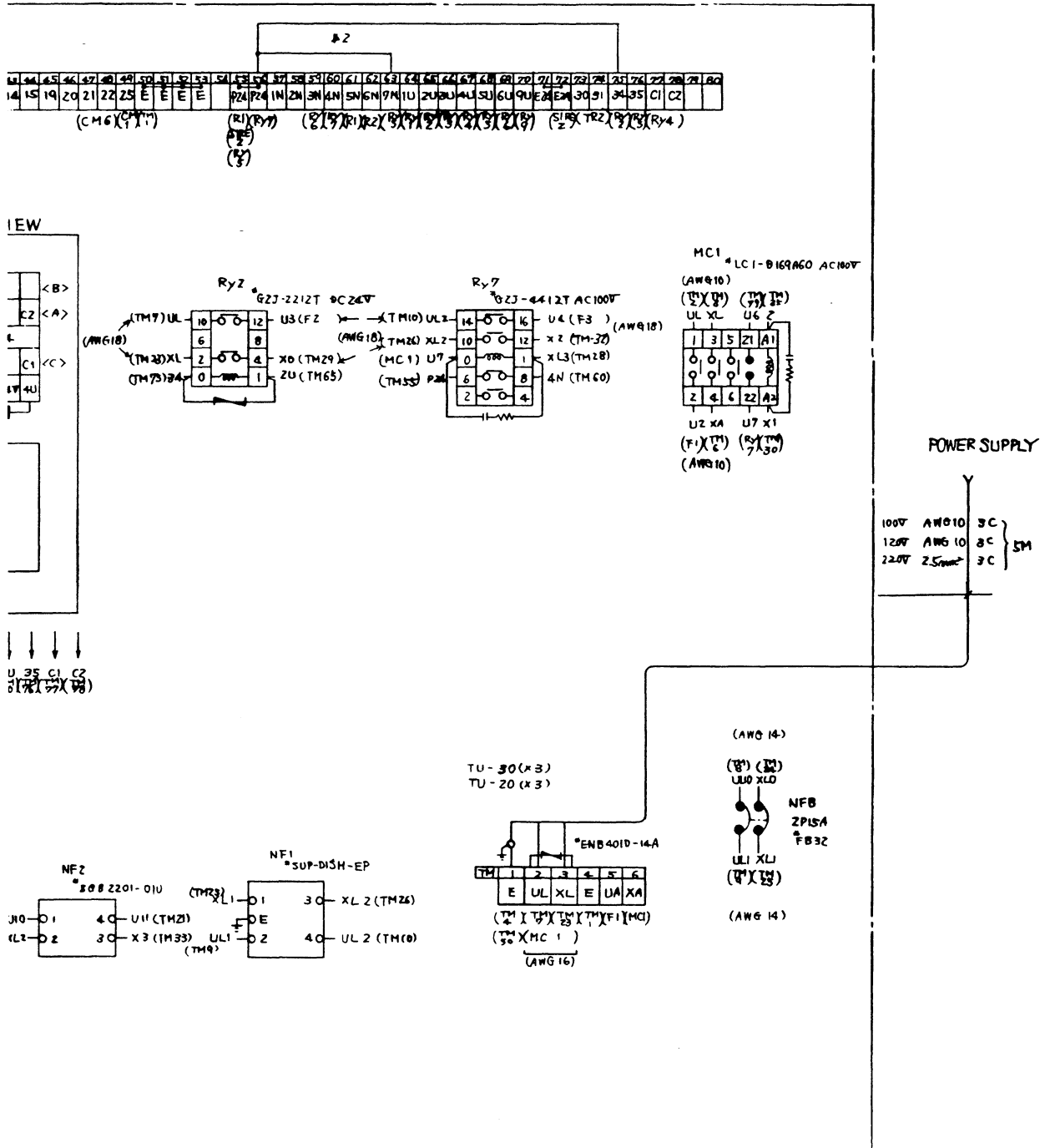


BOTTOM VIEW



製作上の注意

1. : IS1588 : CR-1 : ENB201D-14A 5. 図面上の+マ 使用する事。又
2. 指定以外の電線は AWG 20 を使用する事。
3. #1 の線は AWG 14 (赤色), #2 の線は AWG 20 (赤色) 使用で国内向け仕様時は+ 安全対策仕様時は取りはずす事。
4. UL, UL0, UL1, U0, U2, U3, UA, XL, XL0, XLI, XA, XO は ノイズフィルタ- NF1 の次側の線 15 ので他の線と 一緒に結束 する事 無しの様に処理する事。



ナマフの箇所を塗表面へのアース部分は塗付ワッシャーを
 貼。又全てのアース箇所には [±]マークを貼る事。

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