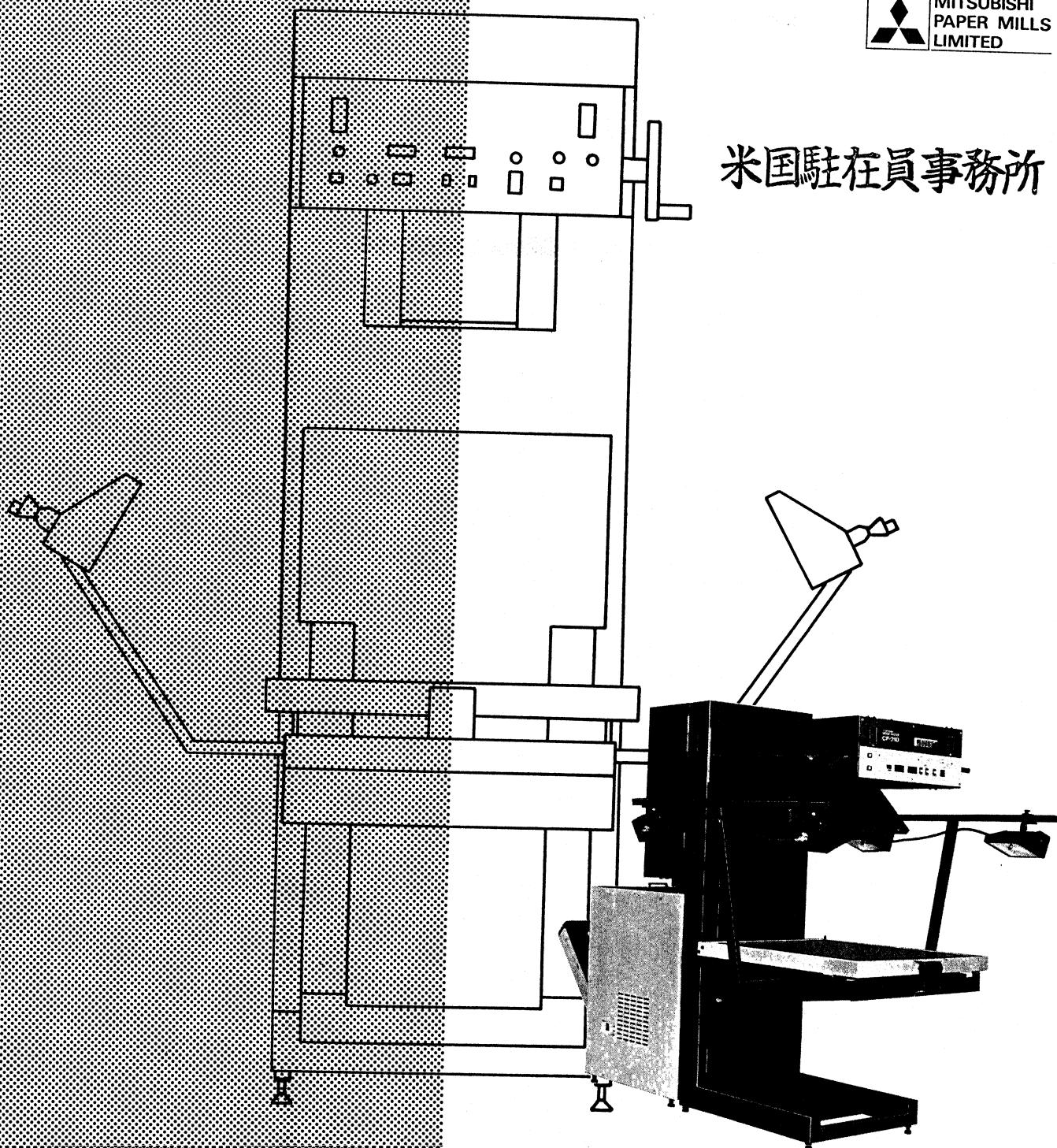


米国駐在員事務所



# MITSUBISHI GRAPHIC ARTS SYSTEM

# CP-310

SILVER MASTER SYSTEM  
OPERATION MANUAL

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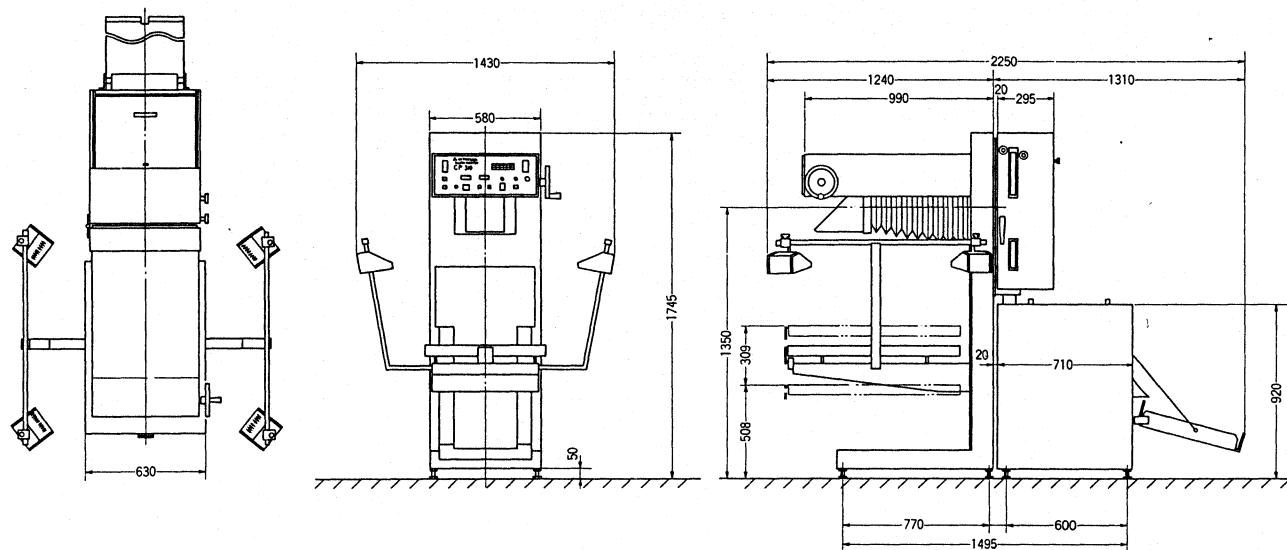
# CHAPTER 1. OUTLINE

## 1. Introduction

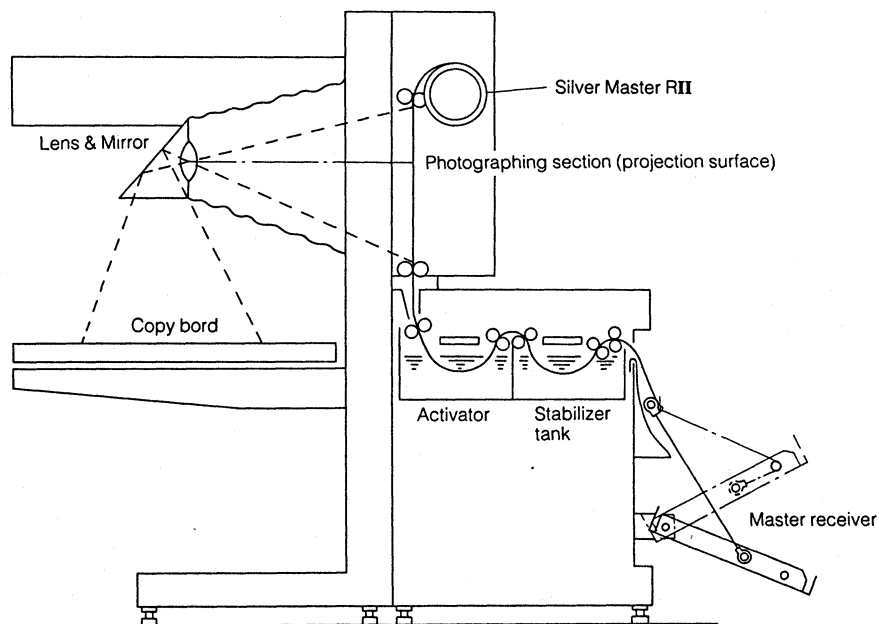
We at Mitsubishi are very grateful to you for selecting the Silver Master Platemaker CP-310. The Silver Master Platemaker CP-310 is a completely new multi-functional platemaking system which, in combination with Silver Master RII, produces offset masters directly from the copy with a simple operation, eliminating the need for any intermediate film process.

This operation manual provides information for continued satisfactory operation of the system. For information on printing methods, please refer to our separate booklet, "Silver Master Technical Guide."

### GENERAL DRAWINGS



### SYSTEM PROCESS



## 2. Specifications

Item	Specifications
Master width	229mm(9"), 254mm(10"), 279mm(11"), 305mm(12"), 310mm(12 1/4")
Master length	370mm to 480mm (digital setting)
Max. image size	310mm × 430mm (blank exposure: 310mm × 480mm)
Max. copy size	520 × 840mm
Lens	focal length 360mm
Magnification	60% — 125%
Focusing	Auto-focusing with magnification scales
Exposure time	0 to 99.9 sec (digital setting) and integrating light-meter provided (switching)
Light source	Halogen lamps: 500W × 4 (rectangular)
Cutter	motor-driven rotary cutter
Processor tank capacity	Activator tank: 12 liters Stabilizer tank: 12 liters
Replenishing bottles	Activator and stabilizer: 2 liters each (constant liquid level system)
Temperature regulating system	Activator tank: 500W panel heater with thermo-control
Separate switches	Switches for feeding and cutting paper
Platemaking speed	(Master length 470mm 10 sec exposure) First plate: 95 to 112 sec Continuous: 30 to 35 sec
Machine dimensions	1,430 (W) × 2250 (D) × 1,745 (H) mm
Weight	300 kg
Electricity	1ø, 100V, 3KW, 50 or 60 Hz
Dryer	(optional) 700W finned heater & thermo-control
Back-light copy holder	(optional) 85% — 125% 15 fluorescent lamps (15W), built-in box type

## 1. General Construction

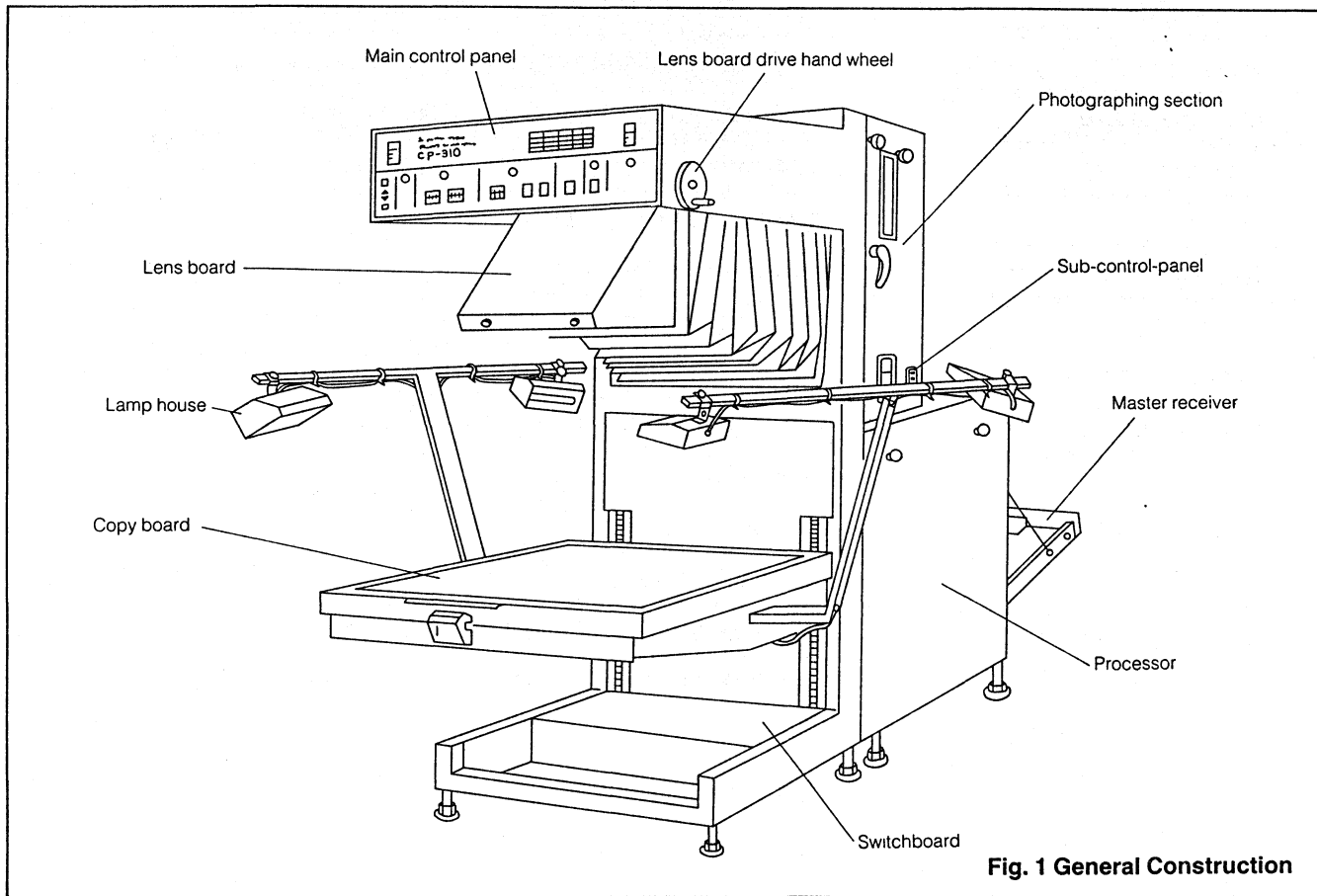


Fig. 1 General Construction

## 2. Processor; Preparation of Processing Solutions

### 1. Structure of the Processor

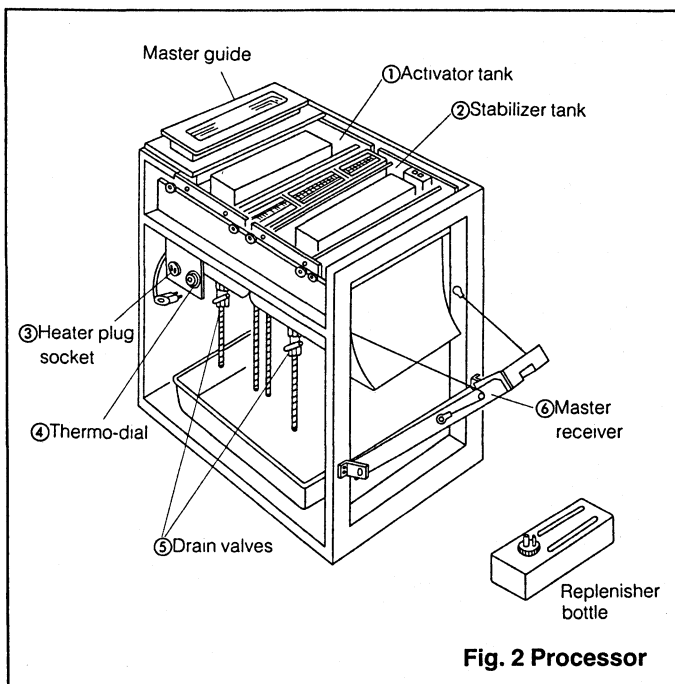


Fig. 2 Processor

#### ① Activator tank

The activator tank is equipped with a 500W panel heater, thermo-switch, sensor and conveyor unit. Its capacity is 12 liters. The temperature of the activator in use is kept constant by the heater and thermo-switch.

#### ② Stabilizer tank

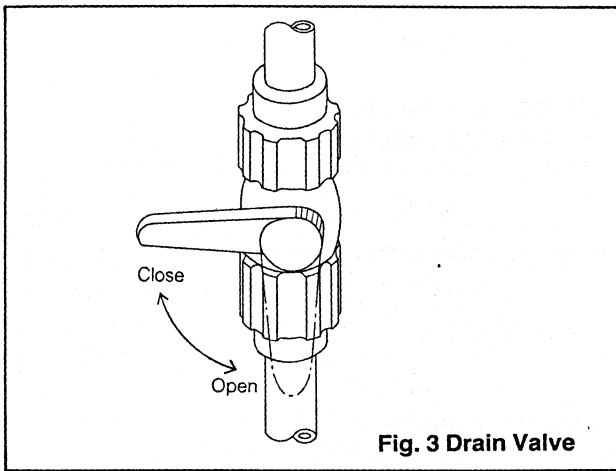
The stabilizer tank is equipped with a conveyor unit. Its capacity is 12 liters.

#### ③ Heater plug socket

This is a plug socket for the heater mounted on the activator tank. When changing the solutions or cleaning, be careful not to splash it with water.

#### ④ Thermo-dial

This thermo-dial controls the temperature of the activator in the activator tank. Align the dial division 30 (or  $\Delta$  mark) with the  $\Delta$ -marked index point. The dial divisions represent the temperatures to which activator is to be set. If the solution temperature is low (the heater pilot lamp is out) at start-up, the dial should be set to an appropriate temperature higher than the currently set one. If the solution temperature is high, the dial should be set to an appropriate temperature lower than the currently set one.

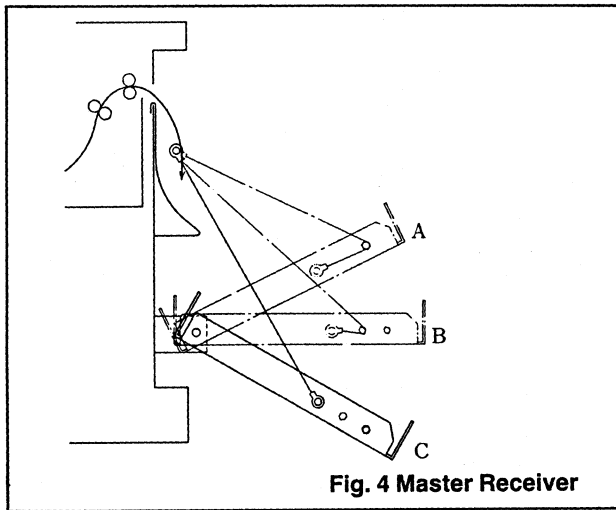


A drain valve is provided on the bottom of each of the activator and stabilizer tanks. When the valve lever is parallel to the pipe, the valve is open. When the lever is at right angles to the pipe, the valve is closed. If the lever is in a neutral position, liquid leaks occur. Normally, be sure to set the lever in its horizontal position.

**⑥ Master receiver**

One master receiver position can be selected from among three depending on the master material (SLM-R<sup>II</sup>, SLP-F) and the installation space.

- A: Suitable for intermittent operation where only a small space is available.
- B: Suitable for such cases that master roll is about to be used up and master is fairly curly.
- C: Normally this position should be selected.



**2. Preparation of Activator (SLM-AC) (mixture ratio 1:1)**

- \* For mixing, use the exclusive measuring cup.
- ① Put 6 liters of water and 6 liters of SLM-AC (undiluted) in the measuring cup and stir thoroughly. Then, pour the mixture into the activator tank through the pouring port.
- ② Pour 2 liters of the activator prepared in the ratio of 1:1 into the activator replenishing bottle and set the bottle on the replenisher pouring port on the top of the activator tank conveyor unit properly.
- \* Use 30 to 35°C hot water when tap water temperature is low in winter.

**3. Preparation of Stabilizer (SLM-ST) (mixture ratio 1:3)**

- ① Put 9 liters of water and 3 liters of SLM-ST (undiluted) in the measuring cup and stir thoroughly. then, pour the mixture into the stabilizer tank through the pouring port.

- ② Pour 2 liters of the stabilizer prepared in the ratio of 1:3 into the stabilizer replenishing bottle and set the bottle on the replenisher pouring port on the top of the stabilizer conveyor unit properly.
- \* Use 30 to 35°C hot water when tap water temperature is low in winter.

**4. Adding Processing Solutions**

- ① The replenishing bottle should always contain a sufficient amount of processing solution properly mixed. Make sure that the replenishing bottle cap is tight enough and the bottle is in place.
- ② As the replenishing bottle is exhausted, the liquid level in the processing tank is lowered, resulting in accelerated fatigue of the liquid and deterioration of its quality.
- ③ Change of the processing solution. Refer to the paragraph of "General Care" (P. 13).

**Caution in handling chemicals**

- ① Be careful never to drink or get into eyes processing chemicals. (In case of such accidents check with a doctor.)
- ② When chemicals splash onto skin or cloths immediately wash with running water.
- ③ Use chemicals properly according to instruction.
- ④ Keep chemicals out of reach of children.

**3. Switchboards 1 & 2**

Switchboard 1 is located at the left side of the processor and switchboard 2 at the bottom of the main frame, each of which is composed of a board and electrical parts.

**① POWER (camera switch NFB)**

When this switch is turned on, the operation circuit and the processor are energized and the system is ready for operation.

- \* Before turning on the switch be sure to confirm there is a sufficient amount of solution in each processor tank.

**② BUZZER (master buzzer)**

A roll of Silver Master R<sup>II</sup> may have a seam. If this seam passes the seam sensor, the buzzer is sounded. If the seam is in the middle of the master length, the system can continue to run, but the master including the seam can not be used as a master plate. If the seam has stopped at the sensor, the system is stopped and the buzzer sounds continuously. If such happens, feed the paper with the FEED switch in the photographing section until the seam holes are released from the sensor located above the projection surface.

The buzzer is also sounded continuously when the paper roll is used up. The volume of the buzzer is adjustable. Adjust the volume to a desired level. Rolls containing a seam are 2 meters longer than ones containing no seam.

**③ Activator Heater fuses F1, F2**

Two 10 A fuses are provided to protect the heating circuit.

**④ Processor Motor fuses F3, F4**

Two 2 A fuses are provided to protect the processor drive motor circuit.

**⑤ Operation Circuit fuses F5, F6**

Two 3 A fuses are provided to protect the operation circuit.

**⑥ Transformer**

The transformer is built only in the machines for export to North America.

**⑦ Vacuum Back Fan fuse F7**

One 0.5 A fuse is provided to protect the circuit for the vacuum

in the photographing section:

⑧ **Control PCB fuse F8**

One 0.3 A fuse is provided to protect the control printed-circuit board.

⑨ **24 V DC circuit fuse F9**

One 1 A fuse is provided to protect the 24 V DC circuit.

CAUTION: DON'T USE FUSES WITH CAPACITY NOT AS SPECIFIED.

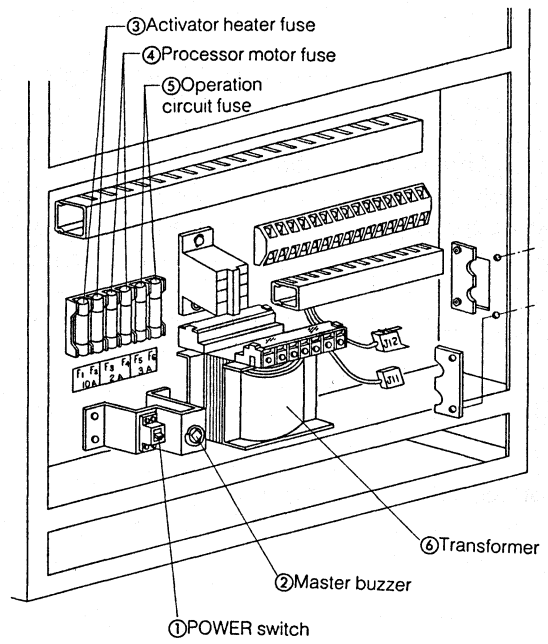


Fig. 5 Switchboard (1)

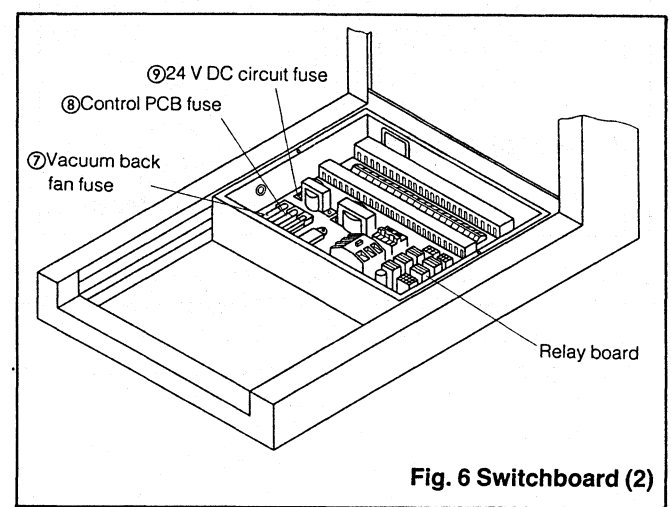


Fig. 6 Switchboard (2)

4. **Main Control Panel**

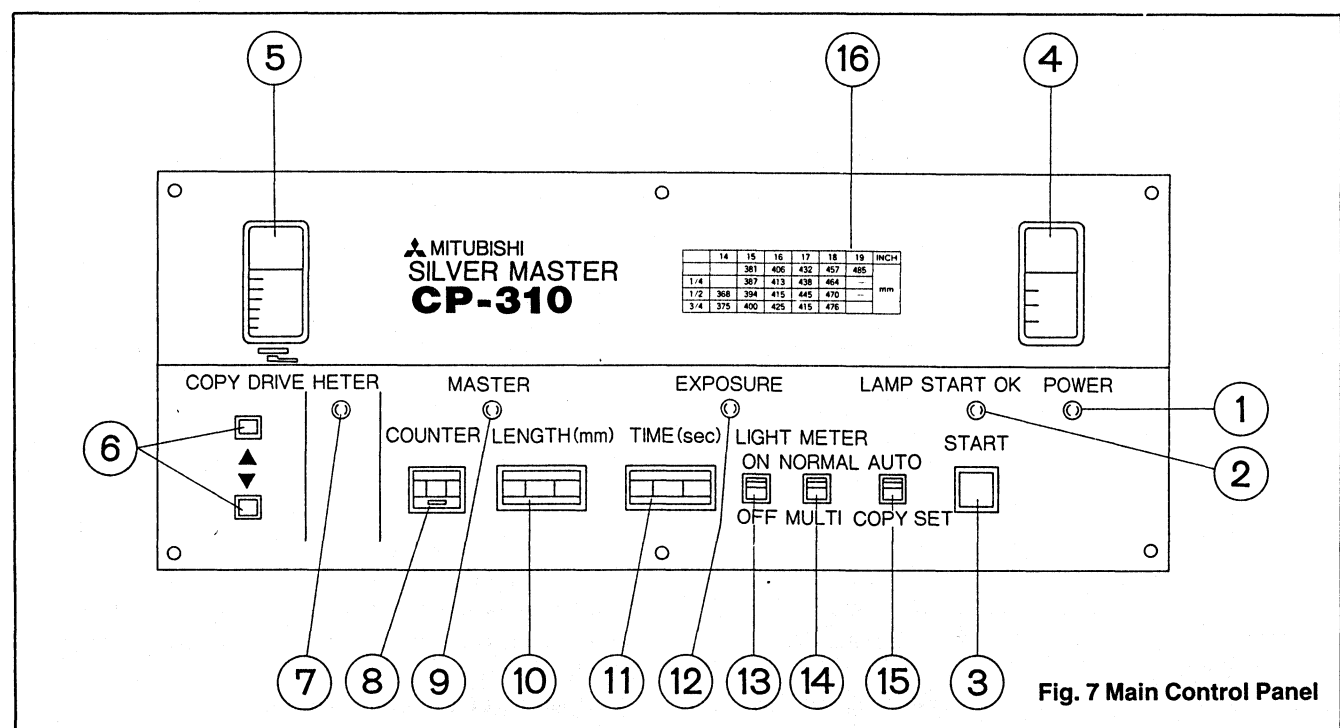


Fig. 7 Main Control Panel

When the POWER (camera) switch on the switchboard 1 is turned on, this lamp is lit to indicate the system is ready for operation.

② **START OK** (start OK pilot lamp, green)

This lamp is out during the photographing process. When the lamp is lit, the system is ready for making a next exposure.

③ **START** (start button)

Depression of this button initiates a series of operations — exposure, feeding, cutting, developing, stabilizing and output. The button is ineffective when the START OK lamp (green) is out, or when the MASTER END lamp (red) is on and the buzzer is sounding.

④ **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. (See Fig. 9 on P.8)

⑤ **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. (See Fig. 9 on P. 8.)

⑥ **COPY BOARD** (copy board drive buttons)

When the button marked with ▲ is depressed, the copy board moves up (toward the enlargement side). When the button marked with ▼ is depressed, the copy board moves down (toward the reduction side).

⑦ **HEATER** (activator temperature lamp, yellow)

This lamp goes out when the activator temperature has risen to the prescribed level (30°C or 86°F), or when the system becomes ready for operation. The lamp comes on as its temperature drops from the prescribed level, and goes out as it rises. Since the thermostat is working to maintain its temperature constant, the system can be operated once the temperature has reached the prescribed level, whether the lamp is on or out.

⑧ **COUNTER**

This counter indicates the number of masters produced. After loading a new master roll or renewing the processing solutions, depress the reset button to reset the counter to zero.

⑨ **MASTER END** (master end pilot lamp, red)

As the paper roll is exhausted, this pilot lamp is lit and the buzzer is sounded. It also comes on and the buzzer sounds when the master is not loaded properly. In such a case, reload the master properly. The START button is ineffective when this lamp is on and the buzzer is sounding.

⑩ **MASTER LENGTH** (paper feed length set digital switches)

Paper is automatically fed by the length set on the MASTER LENGTH, and then cut. The master length can be set steplessly within the range of 370 to 480 mm.

\*1 If the setting is below 299 mm or above 500 mm, the START lamp will light, but the system will not start.

\*2 If the setting is between 300 mm and 369 mm or between 481 mm and 499mm, the master is stretched, which may cause master jam or scratch the master. Avoid setting the MASTER LENGTH to those ranges.

⑪ **EXPOSURE TIME** (exposure timer, digital)

This timer is used to set the exposure time. The light sources are lit and the shutter is open for the duration as set on the timer.

⑫ **EXPOSURE** (pilot lamp, orange)

This lamp flashes during exposure to indicate that exposure is under way.

⑬ **LIGHT METER** (integrating light-meter ON/OFF switch)

When this switch is at ON, the photo-sensor senses, on the focal plane, the light reflected from the copy which has passed

Thus, automatic exposure control is performed to assure the optimum light exposure, in spite of changes in magnification, variations in copy base density or voltage fluctuations. For copies with colored background or colored mechanicals (reddish, yellowish, etc.), set the switch to OFF. When the switch is at OFF, exposure is performed for the duration as set on the EXPOSURE timer.

\* This light-meter is suitable for copies with similar base colors. If the base colors of copies are different or the measured part of a copy is stained, the optimum light exposure cannot be provided.

⑭ **MULTI EXPOSURE** (NORMAL/MULTI switch)

For normal exposures, set the switch to NORMAL. When the switch is at NORMAL, a series of operations (start → exposure → master feed → cut) are automatically performed.

When the switch is at MULTI, the master just exposed is not fed but stands by to be further exposed. This position of the switch is used for special multi-exposure purpose. After multi-exposure is over, never forget to return the switch to NORMAL.

⑮ **LAMP AUTO/COPY SET changeover switch**

When the start button is depressed with this switch at AUTO, the light sources are lit, and they go out automatically when the exposure is over. For photographing, the switch should be set to AUTO. When the switch is set to COPY SET, only one light source is lit but the shutter remains closed, so no exposure is made. This switch is used in cleaning the copy board glass or examining the copy.

⑯ **INCH/mm List** (inch-millimeter conversion table)

This system uses a metric system of units for data entry. In countries where English system of units is used, use this table.

## 5. Copy Board

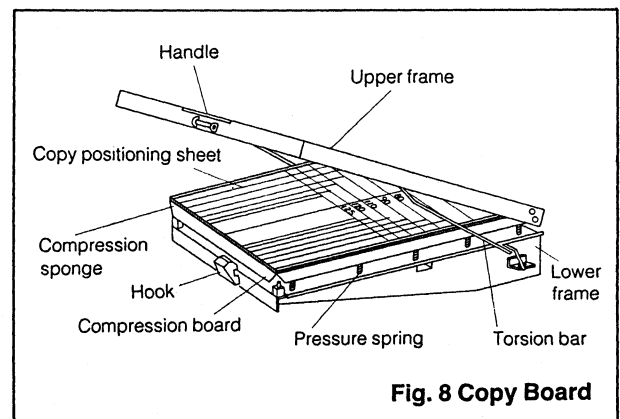


Fig. 8 Copy Board

### 1. Positioning the copy

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 1% steps. The edge of the effective image projected is about 20 mm (equivalent to the gripping margin) from the master edge. Place the copy so that the upper side of the copy is inside the reference line corresponding to the magnification. (See 3.2.)



## 2. Mounting the copy on the copy board

- ① Pull the hook and the upper frame will be opened. When opening the upper frame, hold the handle and gently move up; never handle it abruptly.
- ② Put the copy and position it.
- ③ Close the upper frame gently and hold until it is hooked.

## 3. 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.

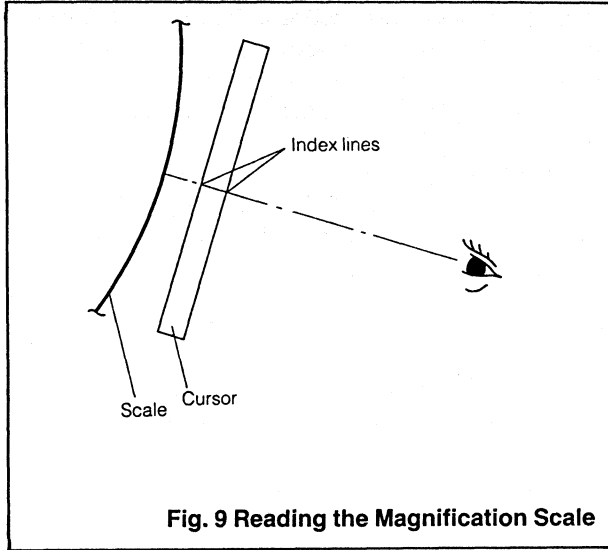


Fig. 9 Reading the Magnification Scale

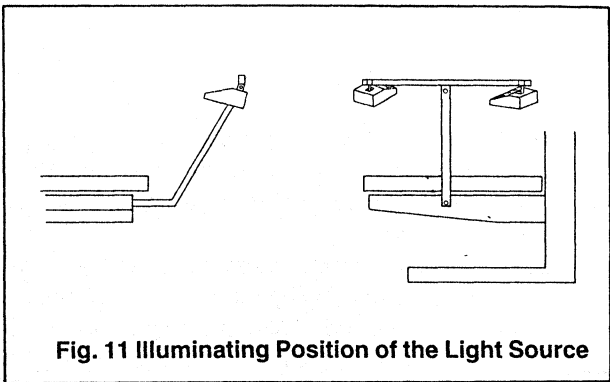


Fig. 11 Illuminating Position of the Light Source

## 7. Lens Board

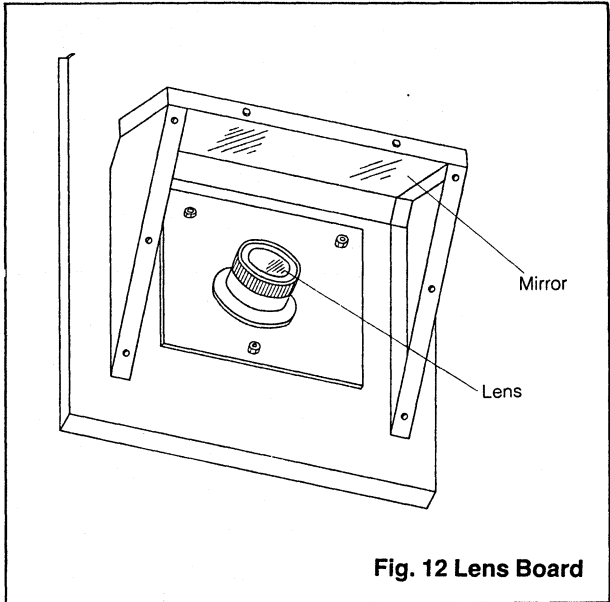


Fig. 12 Lens Board

## 6. Light Source Unit

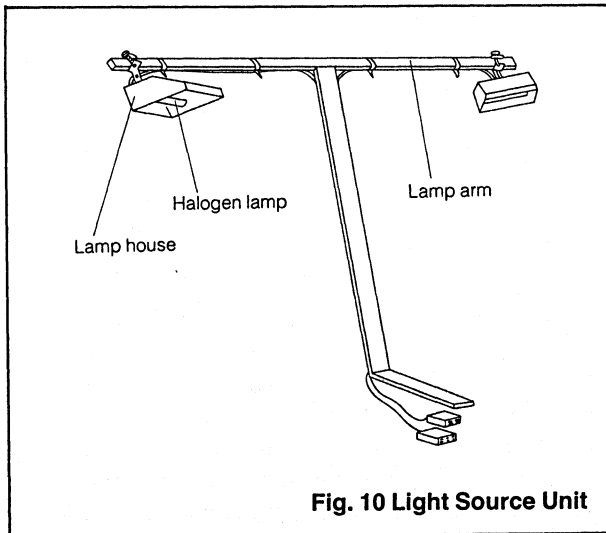


Fig. 10 Light Source Unit

### Moving the lens board

The lens board is moved using the hand wheel 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 (Fig. 13).

Don't turn it too much in either direction (over 125% or below 60%). Otherwise the lens board drive mechanism may fail. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

\* Don't touch the mirror and lens except when necessary.

- Adjust the lamp house and arm to the ▲ mark, tallying the numbers.
- The lamp house is turned notch by notch. Set it to the ▲ marked position.
- The lamp house position is fixed in the magnification range of 125% to 60%.

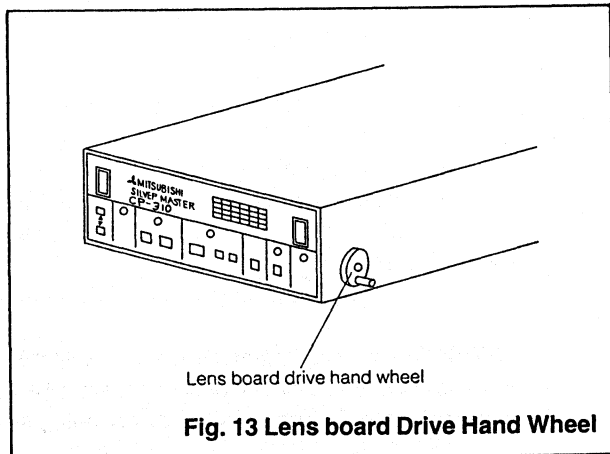
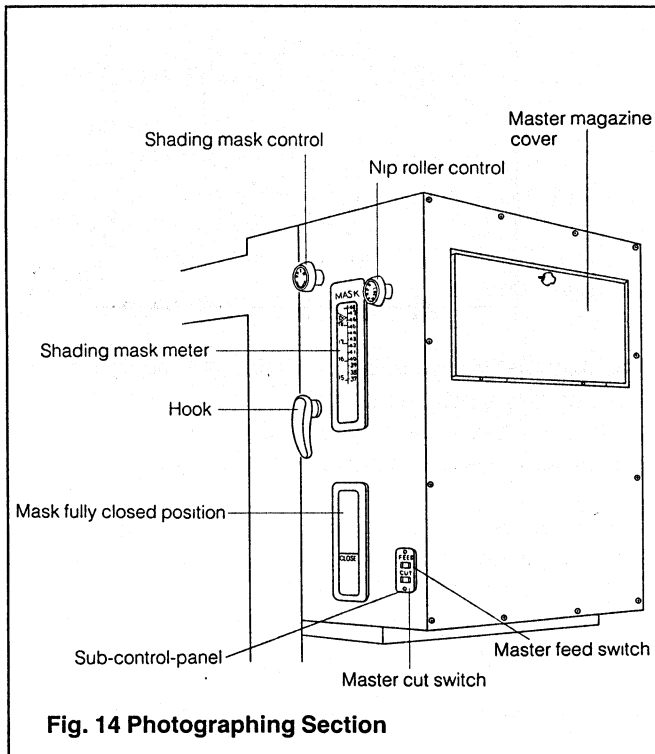
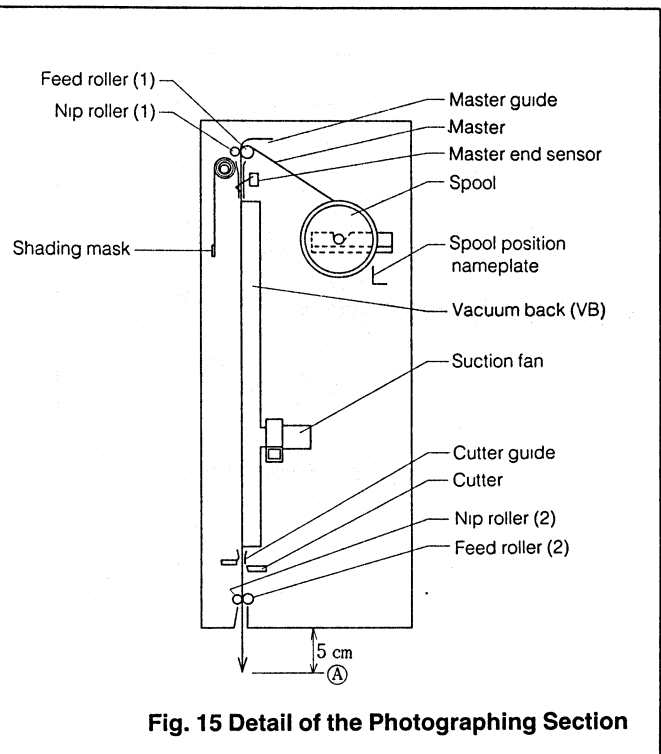


Fig. 13 Lens board Drive Hand Wheel

## 8. Photographing Section



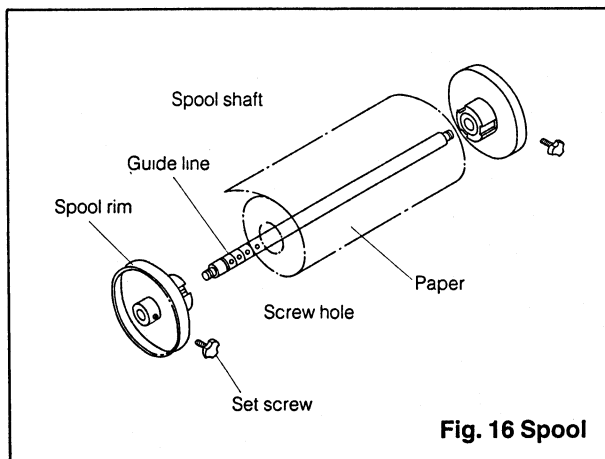
**Fig. 14 Photographing Section**



**Fig. 15 Detail of the Photographing Section**

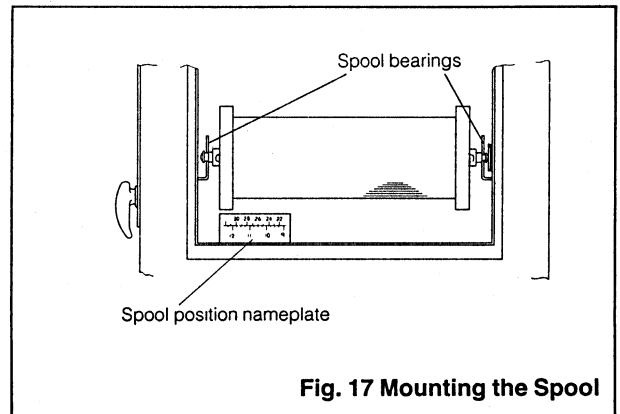
### 1. Loading master paper

- ① Turn the shading mask control fully clockwise to open the master magazine cover.
- ② Unfasten the hook and gently open the photographing section.
- ③ Fit the spool rim to the spool shaft guide line depending on the width of master (229, 254, 279, 305 or 310 mm) and secure it with screw.  
Screw holes are provided at the reference side of the spool shaft.
- ④ Pass the spool shaft through the master roll core hole.
- ⑤ Fit the other spool rim to the spool shaft and secure it with screw.



**Fig. 16 Spool**

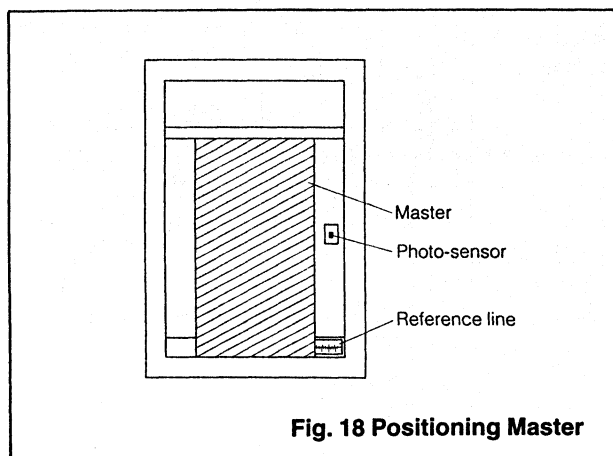
- ⑥ Using the master position nameplate, put the spool loaded with master in place on the spool bearings. (Fig. 17)



**Fig. 17 Mounting the Spool**

- ⑦ Turn the nip roller control counterclockwise to set the nip roller to its free position.
- ⑧ Feed the master along the master guide onto the vacuum back and close the master magazine.
- ⑨ Pull the master from the vacuum back side and let it pass between the cutter and the guide until it reaches point (A). (Fig. 15)

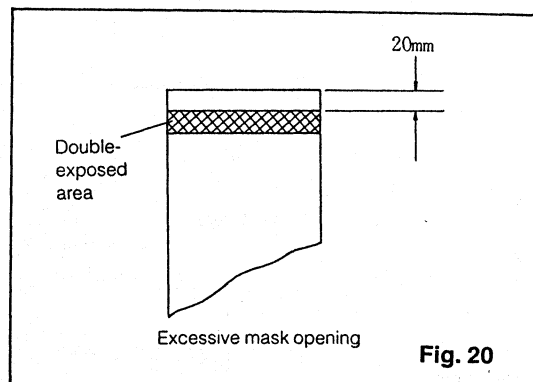
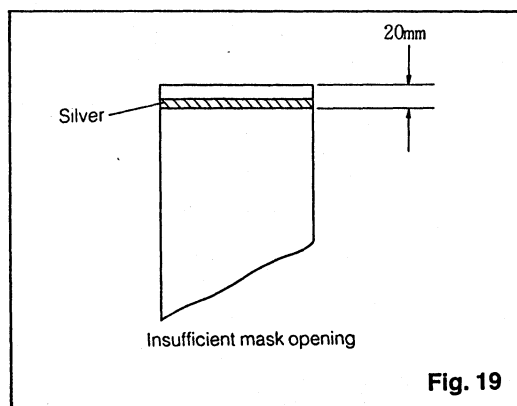
- ⑩ Hold the paper at point (A) and align the right side of the master with the reference line at the bottom right corner of the vacuum back. (Fig. 18)



- ⑪ Turn the nip roller control clockwise to lock the nip roller.
- ⑫ Turn the shading mask control counterclockwise to lock the nip roller.
- ⑬ Push the master feed switch until the fogged part of the master leaves the projection surface or vacuum back.
- ⑭ Push the master cut switch and cut off the fogged part of the master. Pull down the cut master out.
- ⑮ Now the master magazine has been loaded.

## 2. Handling the shading mask

- ① The shading mask is opened and closed by turning the shading mask control (dial) clockwise and counterclockwise respectively.
- ② The opening length of the shading mask should be set to a value equivalent to or about 5 mm longer than the set master feed length.
- ③ If the opening length is shorter than the set master length, a belt of silver appears at the gripping (leading) end of the master (unexposed state). See Fig. 19.
- ④ If the opening length is longer than the set master length, a belt of doubling appears at the gripping (leading) end of the master, where part of the image is lost. See Fig. 20.



## 3. Automatic exposure control (integrating light-meter)

The correct exposure time largely depends on the magnification and copy background density and power supply voltage. A photo-sensor is built in the vacuum back to cope with these variables.

The photo-sensor senses the light coming through the lens from the copy and automatically controls the exposure time according to the quantity of light. See Fig. 18.

Put a sheet with the same density as the mechanical or copy background at part (B) of the copy positioning sheet. If the sheet is higher in density than the mechanical, the actual exposure time will be longer than the time set on the exposure timer. See Fig. 21.

# CHAPTER 3. PHOTOGRAPHING

## 1. Photographing Procedure

### 1. Normal Exposure

- ① Set the MASTER LENGTH to the required value.
- ② Set the shading mask control to the required length (a little longer than the master length).
- ③ Set the NORMUL/MALTI switch to NORMUL and set the correct exposure time on the exposure timer. Once the above steps ① through ③ are taken, it is unnecessary to repeat the same procedure for making exposures under the same conditions.
- ④ Set the master receiver in the appropriate position depending on the master and other condition.
- ⑤ Mount the copy.
- ⑥ Put a sheet with the same density as the mechanical at part (B) on the copy positioning sheet.
- ⑦ Set the lens and copy board magnification scales to 100% and make sure the following conditions exist before pushing the start button:
  - The LAMP switch is at AUTO.
  - The NORMAL/MULTI switch is at NORMAL.
  - The MASTER END lamp is out.
  - The HEATER (activator heater) lamp is out.
  - The START OK lamp is on.
  - The LIGHT METER switch is at ON.

- \* As far as the LIGHT METER switch is at ON, the exposure time is automatically controlled according to the magnification.
- \* When the LIGHT METER switch is at OFF, the exposure ratios among magnifications are as follows when the exposure at 100% is taken as a base.

Magnification	60	70	80	90	100	110	120	125
Exposure ratio	0.64	0.72	0.81	0.9	1.0	1.10	1.21	1.27

### 2. Multiple Exposure (E.g. double exposure)

- ① Place the copy in position A.
- ② Mask part B of the copy board with black paper with low reflectance larger than the copy.
- ③ Set the NORMAL/MALTI switch to MULTI and set the exposure time.
- ④ Push the START button to make the first exposure.
- ⑤ Move the copy to position B and mask position A. If the area previously masked should be masked again, the corresponding area of master will not be exposed (silver deposit). So, pay attention to the masking position.
- ⑥ Turn the NORMAL/MALTI switch to NORMAL and push the START button.

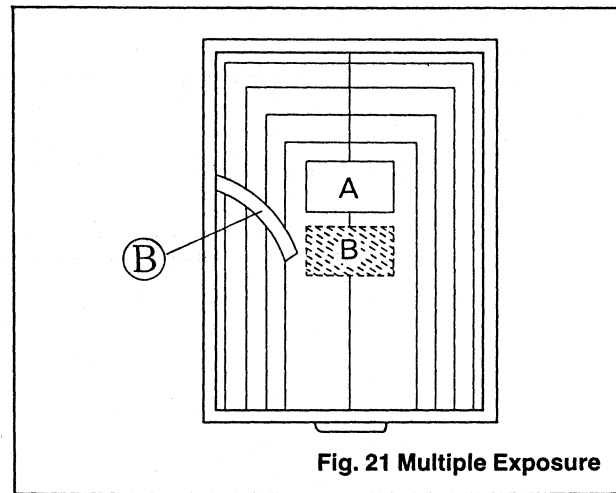


Fig. 21 Multiple Exposure

## 2. Centering the Copy

The copy positioning base 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 area, 23 mm from the edge of the projected image, 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 does not bear horizontal centerlines.

### 1. How to determine the horizontal centerline at 100%

The vertical centerline and right and left sidelines are graduated not in percentage but at 2 mm intervals. The horizontal centerline corresponds to the half point of the master length. These are scales inscribed on the centerline of the transparent copy positioning sheet. These do not represent magnification. The scale on the left of the centerline is graduated in 10 mm divisions, and that on its right in 0.5 inch divisions. When determining the horizontal centerline, use the base line which is 20 mm above the reference line for 100% and a little longer than the other lines. The horizontal centerline for the copy should be located by the distance equivalent to half the master length below the base line (inside the base line). The graduations of the vertical centerline correspond to those of the sidelines. When drawing the horizontal centerline actually, use these graduations.

### 2. How to determine the horizontal centerline at a magnification other than 100%.

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

$$x = \left| f(1 - m) \right| + \left| 215 - \frac{\ell}{2} \right| \cdot \left| \frac{1}{m} - 1 \right|$$

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

f: focal length (360 mm)

m: magnification

ℓ: master length

For instance, if the magnification is 80% and the master length is 420 mm:

$$\begin{aligned} x &= \left| 360(1 - 0.8) \right| + \left| 215 - \frac{420}{2} \right| \cdot \left| \frac{1}{0.8} - 1 \right| \\ &= 72 + 5 \times 0.43 \\ &= 74.15 \end{aligned}$$

Thus, the horizontal centerline at 80% should be 74.15 mm above or outside that at 100%.

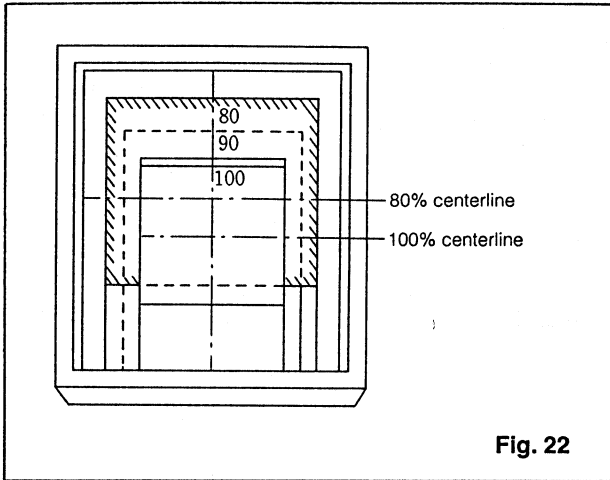


Fig. 22

### 3. 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.

A2 → A3	70.7	A2 → B4	61.2
B3 → A3	81.6	B3 → B4	70.7
A3 → B4	86.6	A3 → A4	70.7
B4 → B5	70.7	B4 → A4	81.6

(in %)

## 3. How to Determine Standard Exposure

Since the Silver Master RII is coated with silver-halide emulsion, its sensitivity may somewhat vary among lots. Each carton bears a lot number. Before using a new lot, check its sensitivity. Under-exposure may cause thickened images or toning on backgrounds. Over-exposure may cause too thin images or lost images. Correct exposure is essential for Silver Master RII to deliver the best performance.

### 2. How to determine standard exposure time

- The CP-310 is supplied with test charts and standard print samples. Make an exposure of a test chart and compare it with the standard sample to determine optimum exposure.
- Make the image same size (100%) exactly.
- Adjust the exposure time so that silver deposit starts with the step marked with a circle in the test chart.
- The corresponding exposure time is referred to as standard exposure time for the test chart.
- Using this standard exposure time for the test chart as a guide, determine the optimum exposure time for each copy. For such copies as clean proof (typed) and phototyped matter, increase the exposure time by 10% to 15%. For line work, decrease the exposure time.

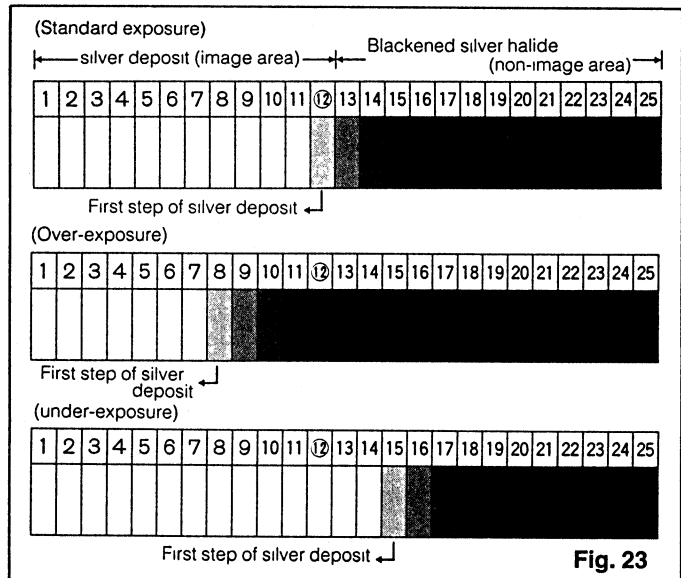


Fig. 23

### 2. Focus

- The focus is thoroughly factory checked before shipment. However, recheck it, when necessary, in accordance with the following procedure.
  - Make an exposure of the resolving power chart in the test chart.
  - Make the exposure time a little longer than the correct one.
  - The resolving power should be 10 lines/mm. (This resolving power chart is a reproduction and does not indicate absolute values.)
- \* The standard print samples may fade with time. Keep them in a dark place such as a table drawer.

# CHAPTER 4. MAINTENANCE

This chapter provides necessary information for maintaining satisfactory operation of the system. Use the routine procedure stated below.

## 1. Inspection at Start-up

1. Turn on the POWER switch.
2. Make sure that there is a sufficient amount of solution in each of the activator and stabilizer tanks and in each of the replenishing bottles.
3. Confirm that the processor runs normally.
4. Set the heater switch to ON and be sure that the heater pilot lamp is lit.
5. Remove the lens and mirror cover and check them for dust or scratches.
6. Check the copy board glass for dust, stains or scratches.
7. Make sure that the copy board moves smoothly.
8. Make sure that the nip roller control is set to LOCK.
9. Set the shading mask control to the required opening length.

## 2. Inspection at Shut-down

1. Turn off the POWER switch.
2. Close the shading mask fully.
3. For long shut-down, cover the lens, mirror and copy board and cover the main body with a vinyl sheet or the like to protect them from dust.

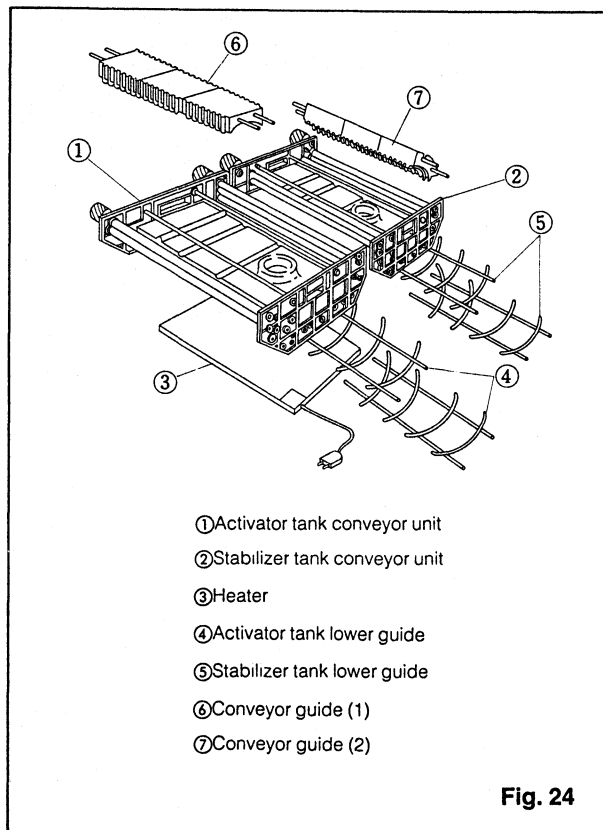
## 3. General Care

### 1. Changing the processing solutions and cleaning the processing tanks.

One fill of activator or stabilizer is capable of processing 900 plates of B4 size or 600 plates of A3 size. In four weeks after preparation of the solutions, change the solutions regardless of the number of plates processed so far. The processing tanks are located inside the machine. Keep them clean.

- ① Turn off the POWER switch.
- ② Remove the processor top cover and remove the replenishing bottle from the pouring port.
- ③ Remove the processor side cover and put the drain hose end in a bucket or polyethylene tank. Open the drain valve.
- ④ Remove the conveyor units, heater and guides from the processing tanks and wash thoroughly with water. Wipe off solution grouts with a damp cloth or sponge.
- ⑤ Since the synthetic rubber used in the conveyor unit rollers is not heat-resistant, wash it with water of less than 40 °C temperature. Any detergent or polishing sand must not be used.
- ⑥ Clean the inside of the activator and stabilizer tanks with water.
- ⑦ If the conveyor guides are so dirty that masters may be scratched, wash them with water and wipe dry, and polish with a soft cloth using metal polishing powder until their surfaces are clean like a mirror. Finally, wash them with a liquid detergent (for kitchen use) thoroughly and replace as they were.

- \* The procedure described above is basic for producing plates of high quality. Carry it out scrupulously.
- ⑧ After draining the tanks completely, close the drain valve and pour fresh processing solutions into the respective tanks. See 2.2.
- \* Don't mix activator with stabilizer since they have an antipathy to each other.
- ⑨ For the method of disposing of used solutions, refer to the separate brochure "The Silver Master System and Environmental Issues."



### 2. Handling and care of the lens and mirror

The lens and mirror surfaces, being soft, should be handled with the utmost care not to cause scratches or stains. Do not wipe them often.

If the lens and mirror are stained with fingerprint marks, saliva, oil or chemical, the finished quality may be unfavorably affected. When it is 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 small amount of 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 system is not in use for long, the lens cap and mirror cover should be on.

### 3. Replacement of the halogen lamp

- ① Hold the lamp with a dry cloth or gloves on your hand. Do not hold it with bare hands.
- ② The contact is of the spring type. When replacing, push the lamp in one direction. A perfect contact should be made.

- ③ The lamp, if stained with finger marks or smeared, will become opaque: Gently wipe the stained lamp with lens paper (available at general camera stores) moistened with a small quantity of industrial ethyl alcohol.
- ④ Hold the lamp as horizontal as possible. Otherwise, the life of the lamp may be shortened.

#### 4. Care of the copy board compression glass

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

## 4. Lubrication

The required frequency of lubrication depends on the frequency of use, but generally it is recommended that the following points be lubricated every month.

- |                                |                                 |
|--------------------------------|---------------------------------|
| 1. Photographing section hinge | every month                     |
| 2. Processor drive chain       | every month (Remove the cover.) |
| 3. Lens board slide rail       | every month (Remove the cover.) |
| 4. Copy board drive chain      | every month (Remove the cover.) |

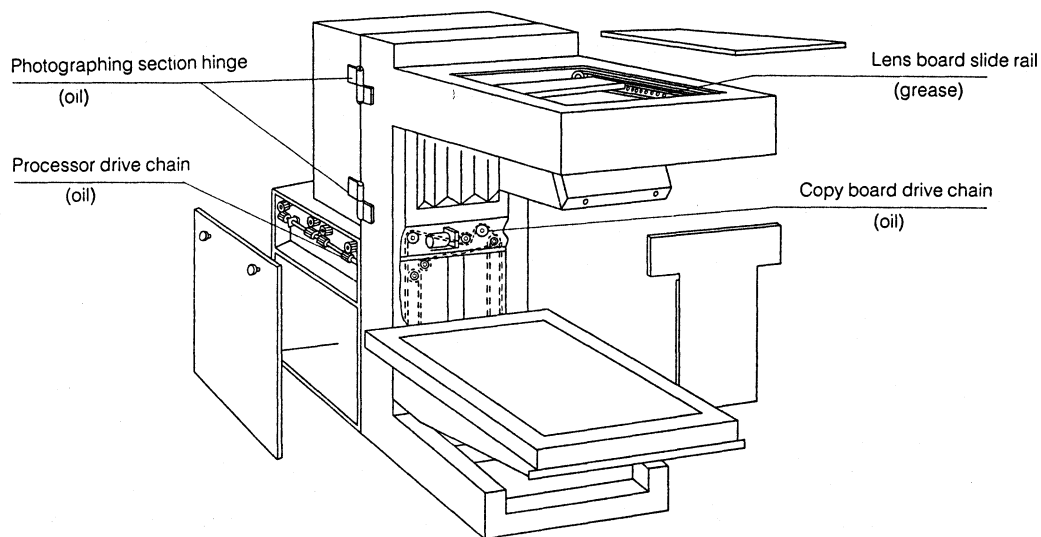


Fig. 25 Lubrication

\* Use SHELL THERUS 27 or equivalent

## 5. Ordering and Replacement of Parts

There are various constituent parts; some of them can be replaced by customers while others must be replaced by trained service personnel. When ordering parts, let us know the following information:

1. Whether only parts are required or both parts and installation (replacement) service are required.
2. The information given in the certificate or the nameplate of your machine.

◎ TYPE    ◎ MFG. NO.

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

#### CAUTION:

1. The specifications are subject to change without notice.
2. We assume no responsibility for troubles caused by any modifications made by the users or the use of another maker's equipment or parts with the system without our approval.

## 6. Troubleshooting

With a correct understanding of the normal running conditions of the machine, find the exact cause of trouble. The basic remedies for typical troubles are listed below. Check the parts concerned according to the list. If the trouble is not corrected by the remedy stated here, contact our distributor.

[NB] Before replacing fuses or checking the electric circuit, be sure to turn off the power switch (camera switch) on the processor sub-control-panel.

	Trouble	Probable Cause	Remedy
1.	Power lamp won't light.	<ol style="list-style-type: none"> <li>1. Power switch for camera off.</li> <li>2. Processor top cover is out of place and limit switch LS2 is not on.</li> <li>3. Defective contact of relay RY5.</li> <li>4. Blown fuses.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn on power switch [NFB].</li> <li>2. Install the processor top cover or check limit switch LS2.</li> <li>3. Remake contact or replace it (G2J-44 12T).</li> <li>4. Replace control circuit fuses F5 and F6 (3A).</li> </ol>
2.	Machine won't start with start button on.	<ol style="list-style-type: none"> <li>1. Wrong master length setting (master feed length).</li> <li>2. Master not in place.</li> <li>3. Fuses F5 and F6 blown.</li> <li>4. Fuse F8 blown.</li> <li>5. Fuse F9 blown.</li> <li>6. Control PCB defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set it between 370-480 mm.</li> <li>2. Reload paper.</li> <li>3. Replace control circuit fuses F5 and F6 (3A).</li> <li>4. Replace control PCB fuse F8 (0.3A).</li> <li>5. Replace fuse F9 (1A) for 24 VDC.</li> <li>6. Replace control PCB.</li> </ol>
3.	Exposure won't start. (Light source won't light.)	<ol style="list-style-type: none"> <li>1. Defective contact of relay RY1.</li> <li>2. Defective contact of magnetic switch MG1 for exposure.</li> <li>3. Defective contact of relay RY6 for exposure.</li> <li>4. Fuse F8 blown.</li> <li>5. Fuse F9 blown.</li> <li>6. Defective control PCB.</li> <li>7. Lamp burnt out.</li> <li>8. Defective contact of lamp socket.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remake contact or replace it. (MY-2, 24VDC).</li> <li>2. Replace it. (SA-11, 100VAC).</li> <li>3. Remake contact or replace it. (G2J-2212T).</li> <li>4. Replace control PCB fuse F8 (0.3A).</li> <li>5. Replace fuse F9 (1A) for 24VDC.</li> <li>6. Replace control PCB.</li> <li>7. Replace halogen lamp (500W).</li> <li>8. Reinstall it.</li> </ol>
4.	Cutter malfunctions.	<ol style="list-style-type: none"> <li>1. Fuse F9 blown.</li> <li>2. Defective contact of relay RY3 for cutter.</li> <li>3. Control PCB defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuse F9 (1A) for 24VDC.</li> <li>2. Remake contact or replace it. (MY-2, 24VDC).</li> <li>3. Replace control PCB.</li> </ol>
5.	Processor won't run.	<ol style="list-style-type: none"> <li>1. Fuses F3 and F4 blown.</li> <li>2. Defective contact of connector J25.</li> <li>3. Processing unit out of place.</li> <li>4. Defective contact of connectors J11 and J12.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuses F3 and F4 (2A) for processor motor.</li> <li>2. Reconnect processor motor connector J25 or check it.</li> <li>3. Reload the unit.</li> <li>4. Reconnect or check.</li> </ol>
6.	Paper won't be fed.	<ol style="list-style-type: none"> <li>1. Fuse F9 blown.</li> <li>2. Defective contact of relay RY2 for master feed.</li> <li>3. Defective control PCB.</li> <li>4. MULTI/NORMAL switch at MULTI.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuse F9 (1A) for 24VDC.</li> <li>2. Remake contact or replace it. (MY-2, 24VDC).</li> <li>3. Replace control PCB.</li> <li>4. Turn it to NORMAL.</li> </ol>
7.	Fuzzy images.	<ol style="list-style-type: none"> <li>1. Lens board or copy board magnification scale missetting.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the scale so that the two cursor lines coincide, or adjust the focus.</li> </ol>
8.	Partially lost image.	<ol style="list-style-type: none"> <li>1. Copy density insufficient.</li> <li>2. Dirty copy board glass.</li> <li>3. Mirror stained.</li> <li>4. Copy surface illuminated by light from outside camera (ceiling or window).</li> <li>5. Exposure plane illuminated by leaked light in the camera due to damaged bellows or a loose screw, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the copy.</li> <li>2. Clean it.</li> <li>3. Clean it.</li> <li>4. Shield the external light and check.</li> <li>5. Shield the leaked light and check by test exposure.</li> </ol>

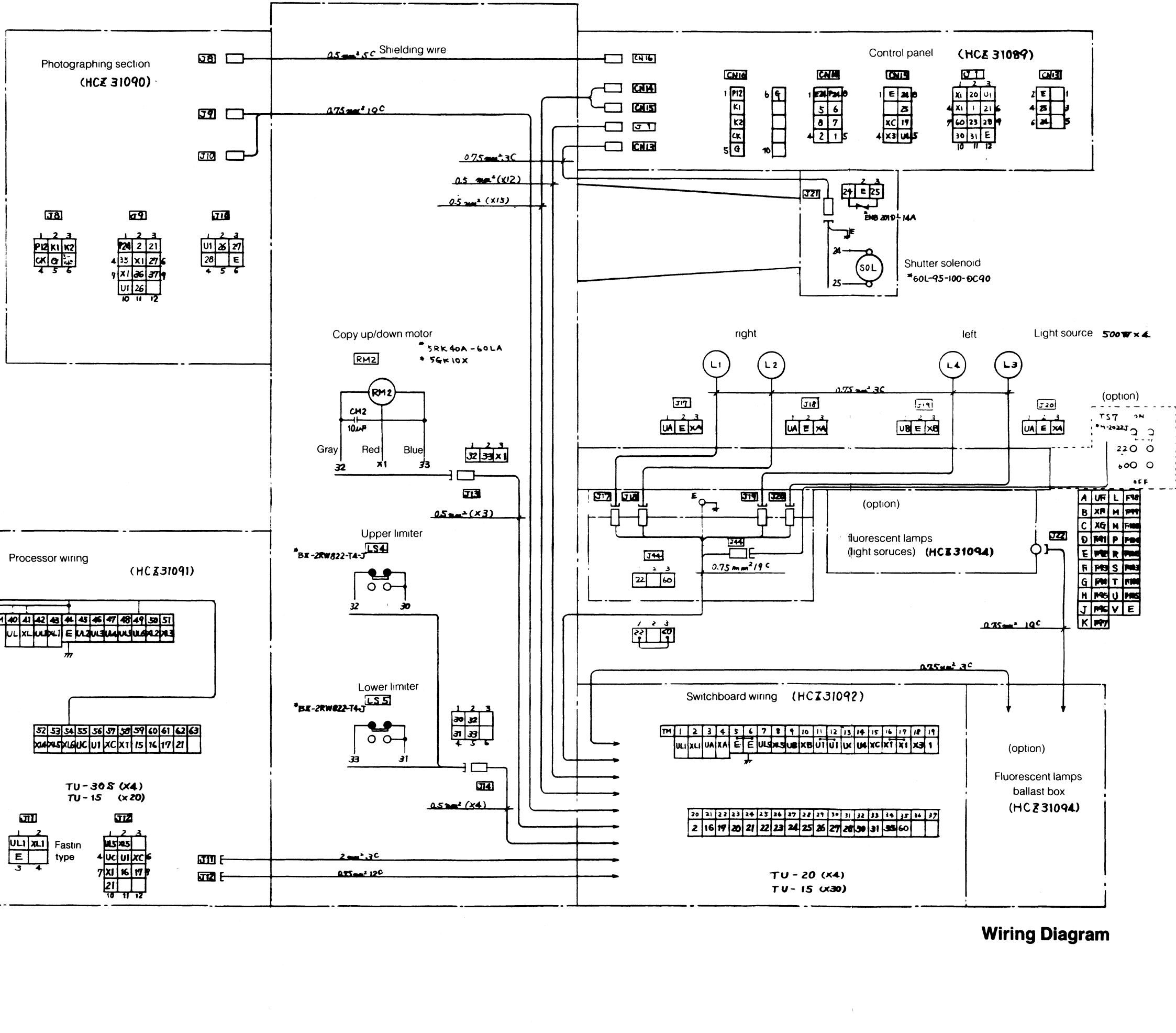


	Problem	Probable Cause	Remedy
9.	Silver deposit on plate.	<ol style="list-style-type: none"> <li>1. Stained primary developing roller in processor.</li> <li>2. Shielding mask not set properly.</li> <li>3. Master feed length not correct.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the roller.</li> <li>2. Check the position of the mask.</li> <li>3. Make a measurement and adjust DIP switches in control PCB until the error is within 0- +4mm.</li> </ol>
10.	Partially scratched plate.	<ol style="list-style-type: none"> <li>1. Dirty master guides or foreign matter on them.</li> <li>2. Lower guides of processor unit dirty or foreign matter on them.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the master path with a compound.</li> <li>2. Clean the lower guides of the unit with a compound.</li> </ol>
11.	Hastened fatigue of developer.	<ol style="list-style-type: none"> <li>1. The amount of activator in tank is insufficient.</li> <li>2. Too high activator temperature.</li> </ol>	<ol style="list-style-type: none"> <li>1. Add replenisher to fill the tank.</li> <li>2. Adjust the thermo dial so that its temperature is 28°C-31°C.</li> </ol>
12.	Activator temperature won't rise to 28°C-31°C.	<ol style="list-style-type: none"> <li>1. Disconnected heater plug.</li> <li>2. Fuses F1 and F2 blown.</li> <li>3. Defective heater.</li> <li>4. Defective thermostat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Connect the plug to the plug socket.</li> <li>2. Replace heater fuses F1 and F2 (10A).</li> <li>3. Replace the heater.</li> <li>4. Repair or replace the thermostat, or adjust the thermo dial.</li> </ol>

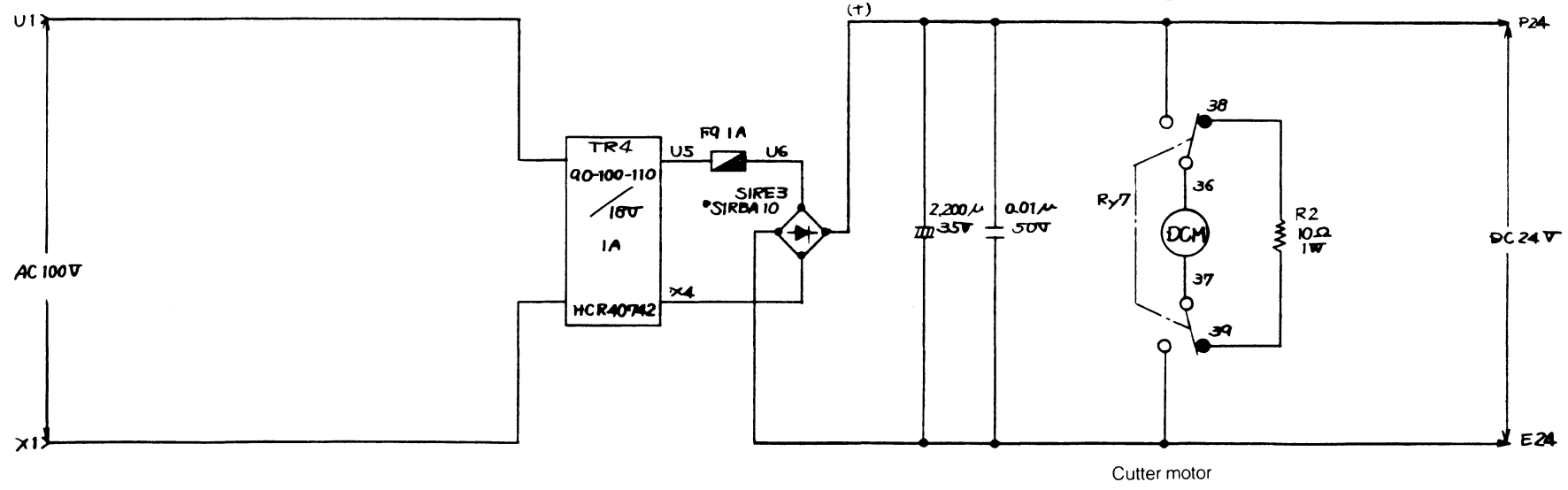
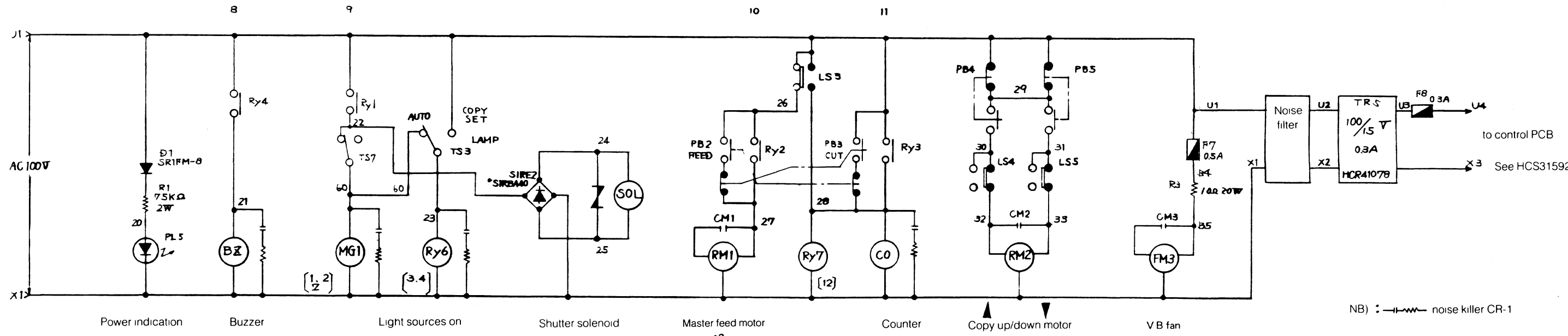
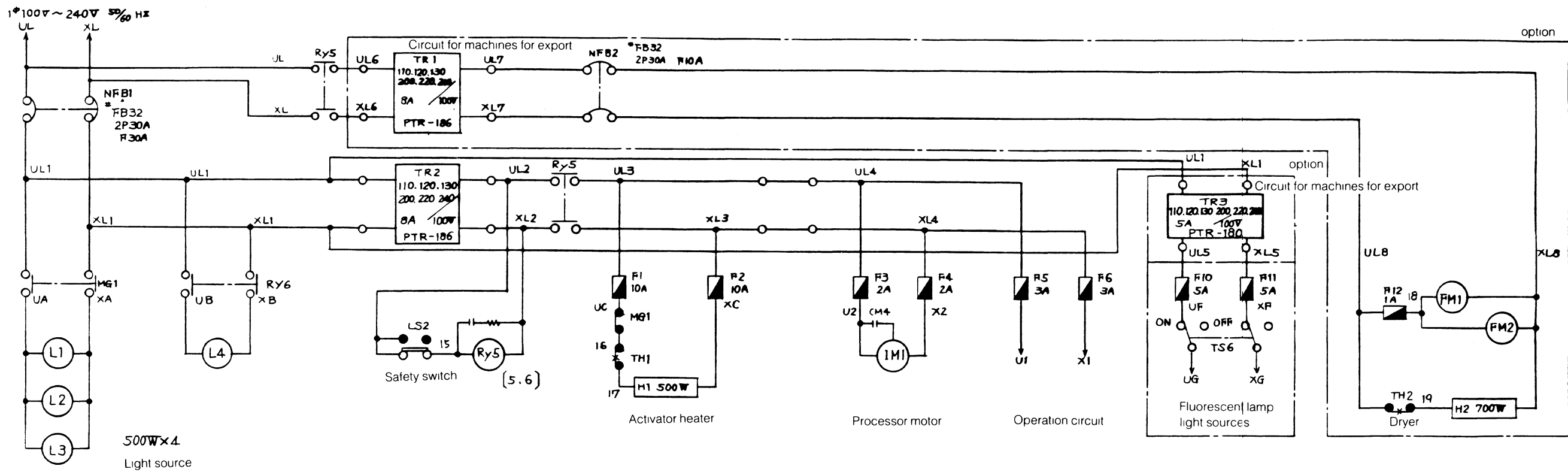
# 7. Wiring Diagrams

Drawings for Reference

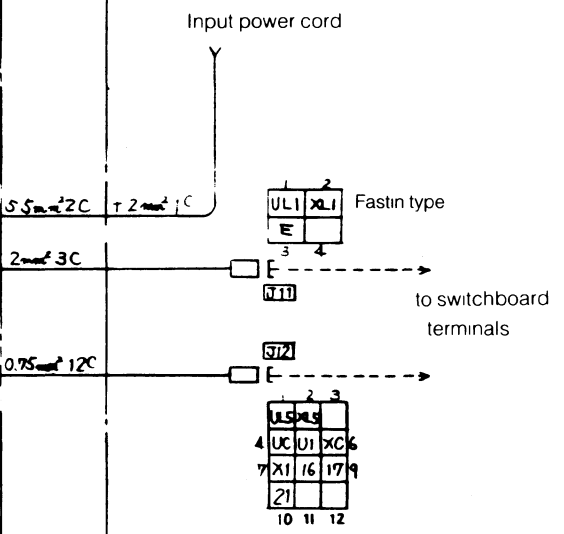
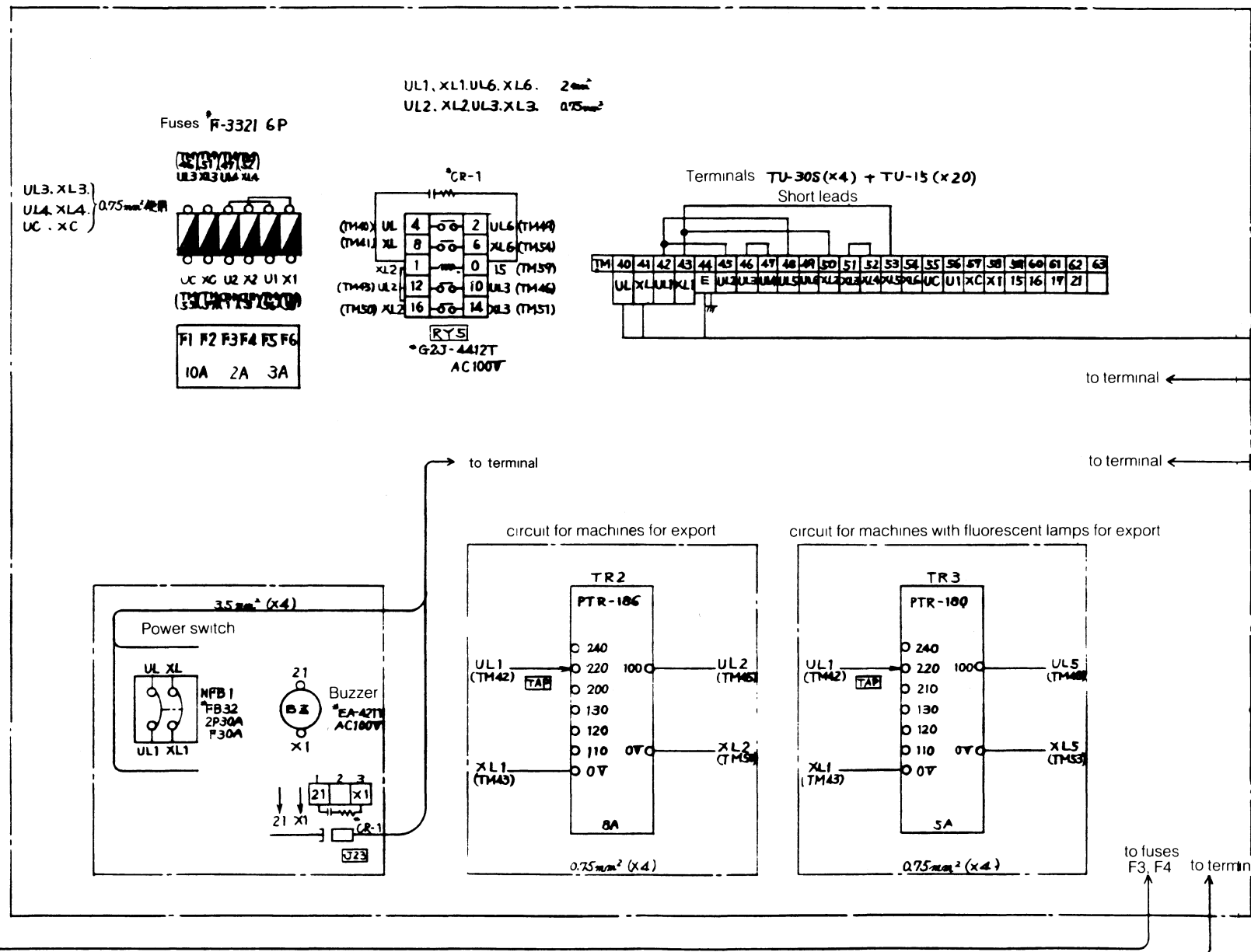
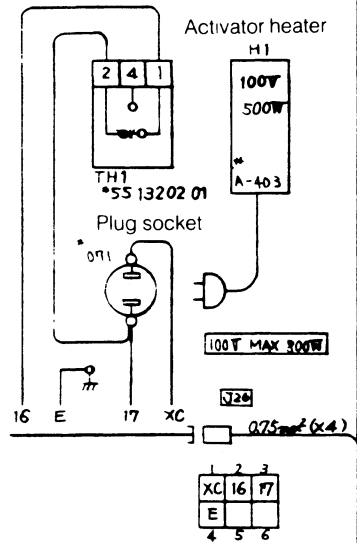
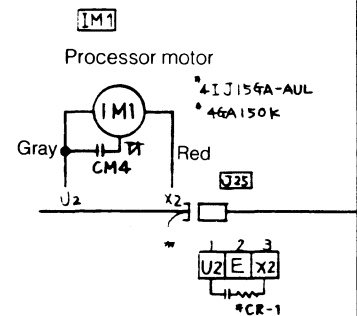
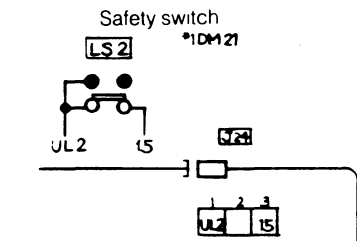
- 1. Circuit diagram (heavy current) HCS 31591
  - 2. Circuit diagram (weak current) HCS 31592
  - 3. Circuit diagram (light-meter) HCS 41593
  - 4. Control panel connection diagram HCZ 31089
  - 5. Photographing section diagram HCZ 31090
  - 6. Processor connection diagram HCZ 31091
  - HCZ 31092
- (option)
- 1. Dryer connection diagram HCZ 31093
  - 2. Light box connection diagram HCZ 31094



Wiring Diagram

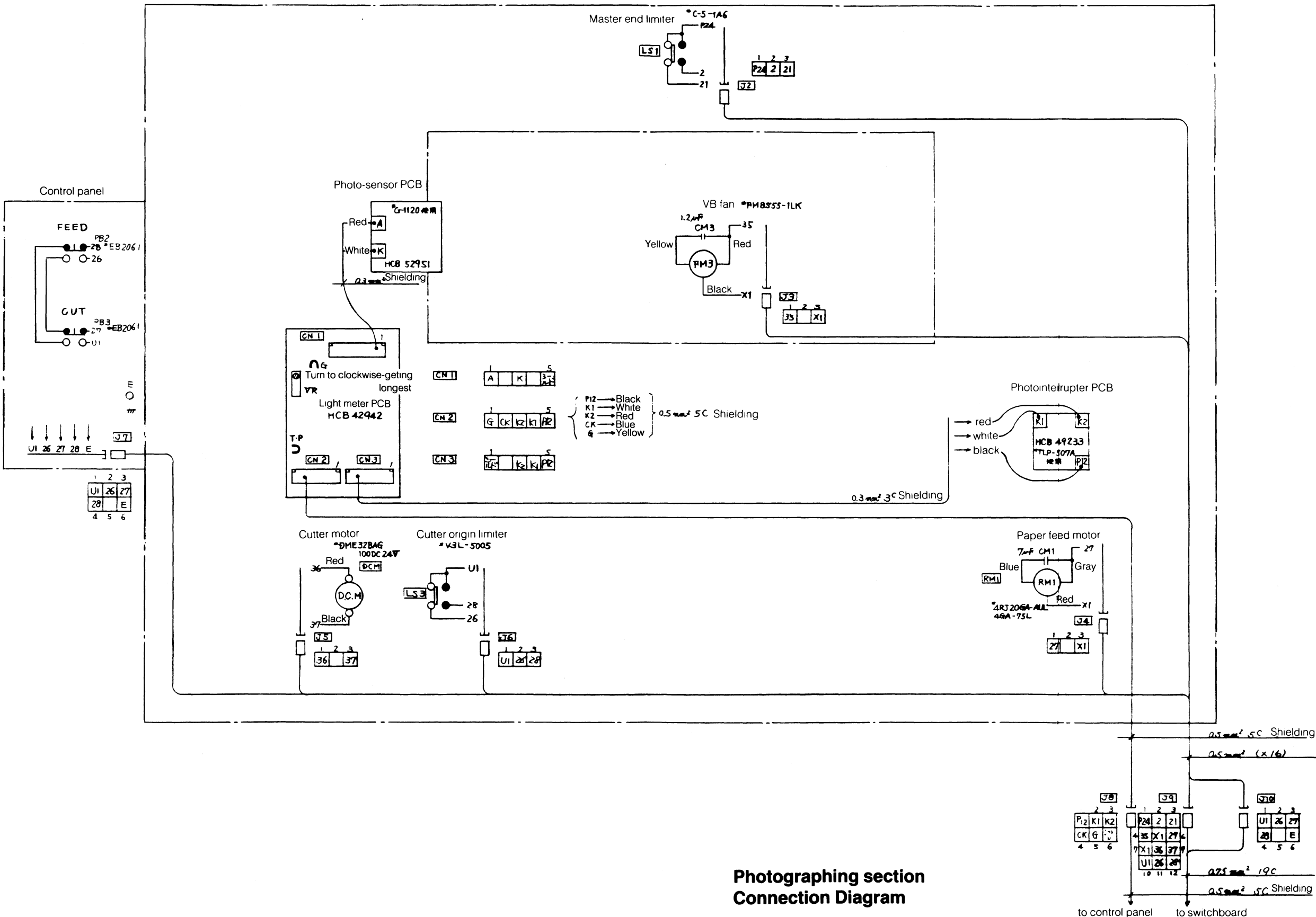


**Circuit Diagram (heavy current)**



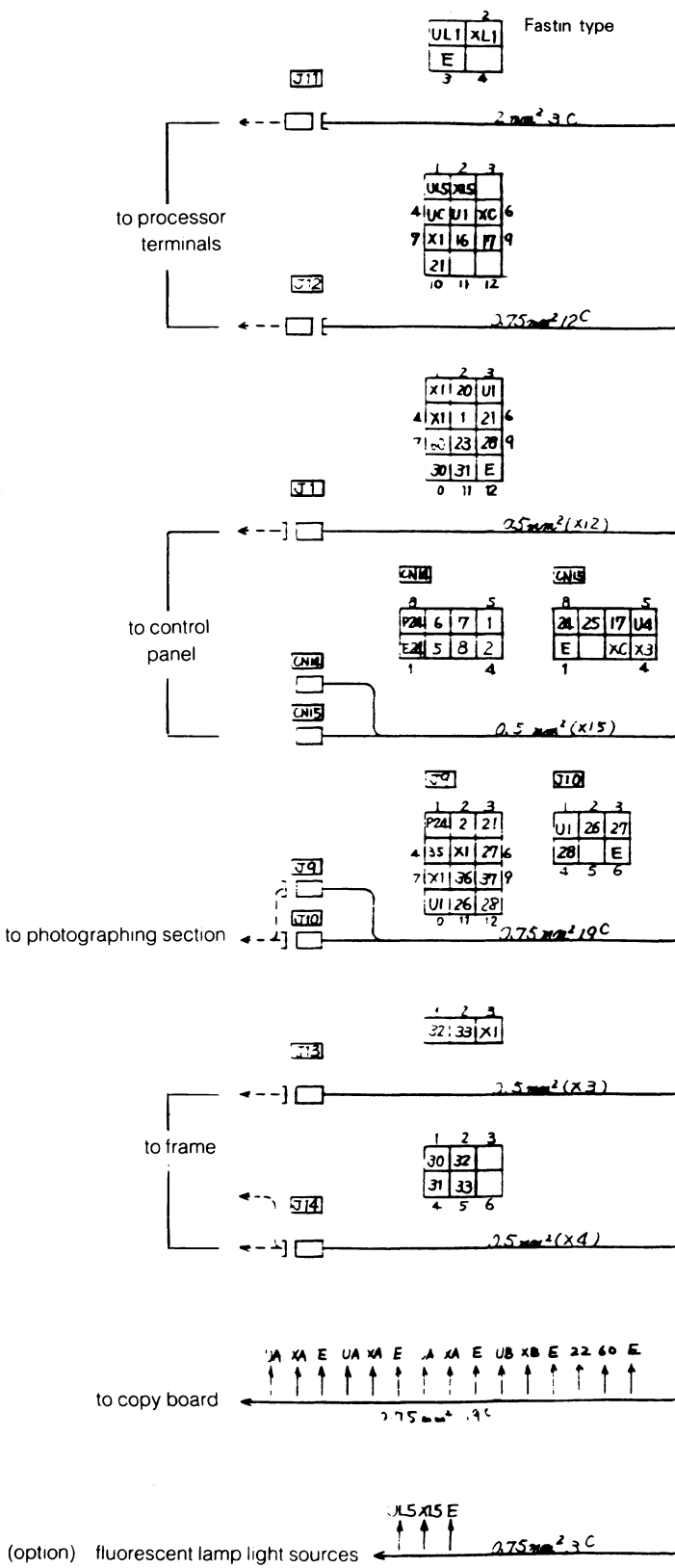
●Use leads of 0.5 mm<sup>2</sup> unless otherwise specified  
●Short with short leads in machines for use in Japan

Processor Connection Diagram



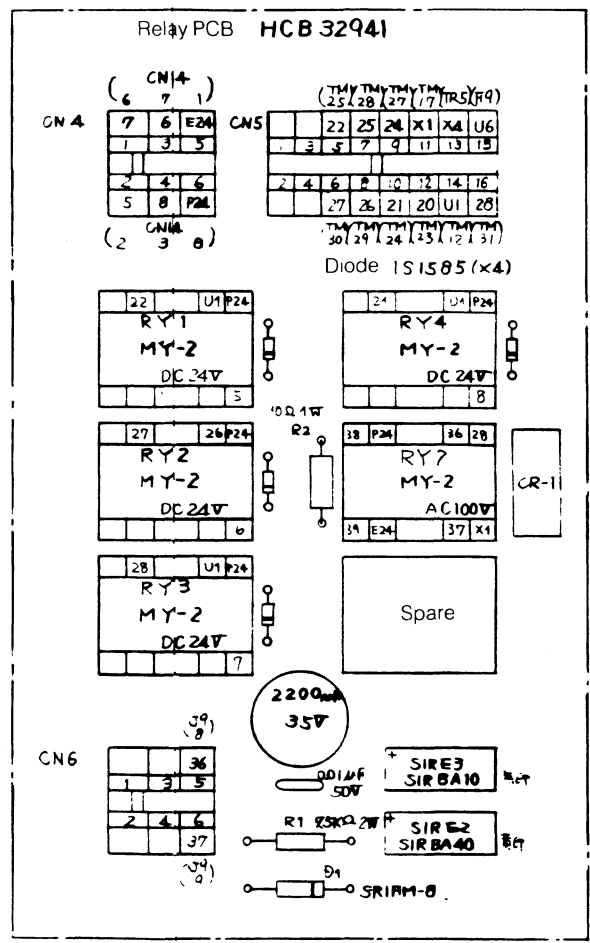
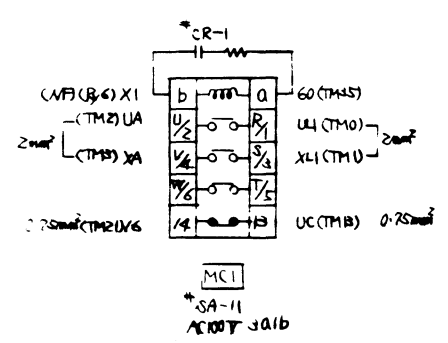
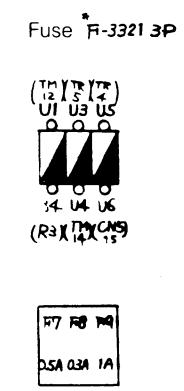
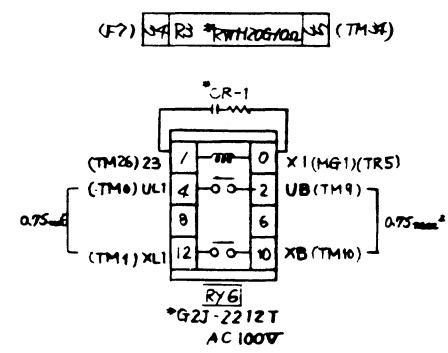
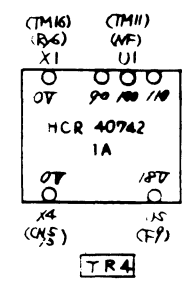
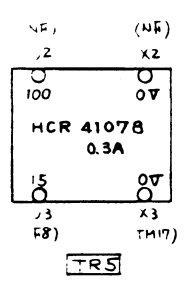
**Photographing section  
 Connection Diagram**

to control panel      to switchboard



Terminals TU-21 (x5) + TU-15 (x33)

TU	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	60	
	UL	XL	UA	XA	E	E	ULS	XL5	UB	XB	UI	UI	UC	ULC	XC	XI	XI	X3	1	2	16	17	20	21	22	23	24	25	26	27	28	30	31	32	33	34	35	60



Use leads of 0.5 mm<sup>2</sup> unless otherwise specified

Switchboard Connection Diagram