

MITSUBISHI SILVER MASTER

CP-404 III

SERVICE MANUAL

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1. INTRODUCTION

This Manual is intended to be used for after-sale service on the CP-404III. For information on operation of the machine and master processing, refer to "CP-404III OPERATION MANUAL," "TECHNICAL GUIDE" and other related documents.

The specifications are subject to change without notice. For parts ordering or consultation, let us know the following information, referring to "CP-404III PARTS LIST".

- model (CP-404III)
- serial number
- descriptions and reference numbers of parts
- required quantities
- date of delivery

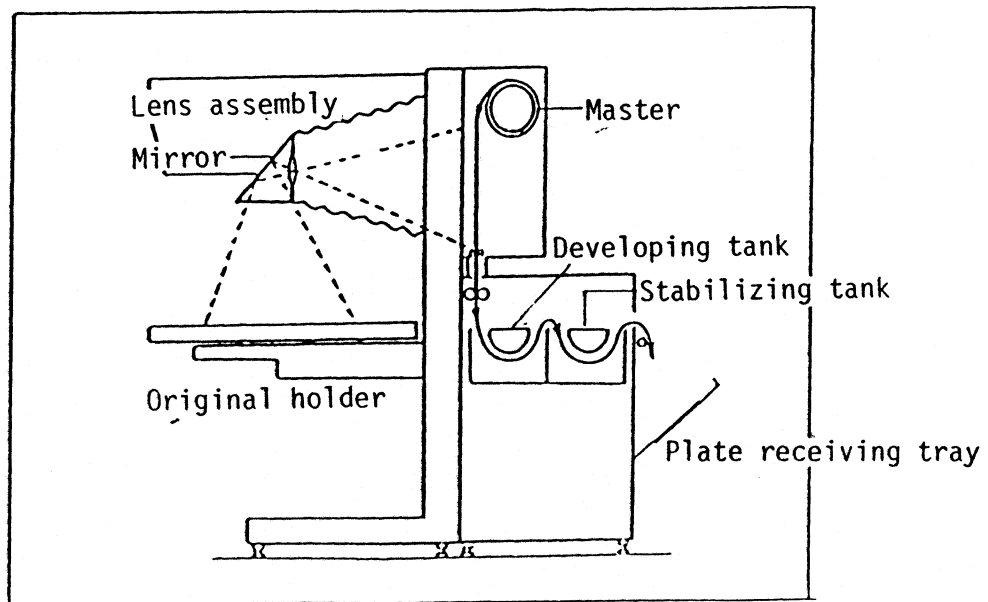
* Publication or duplication of this document is prohibited.

2. SPECIFICATIONS

° Master width:	254 mm, 279 mm, 305 mm, 310 mm, 404 mm, variable
° Master feed length:	370 - 510 mm
° Effective output size:	404 x 440 mm (70% -125%) 279 x 440 mm (50% - 60%)
° Double exposure:	(185 - 255 mm) x 2
° Light source:	Halogen lamps, 750 W x 4
° Lens:	f 480 mm
° Magnification:	50% - 125%
° Exposure control:	0 - 99.9 sec
° Effective copy size:	650 x 975 mm
° Focusing:	Auto-focus with magnification scales
° Processor capacity:	Developer tank 16 liters Stabilizer tank ... 12 liters
° Replenisher bottle capacity:	Developer, stabilizer ... each 2 liters (replenishment to maintain constant liquid level)
° Independent switches:	Vacuum fan, Master feed, Master cut, Focus switches

◦ Master rewind:	Manual
◦ Master seam detection:	Alarm buzzer, automatic over-cut
◦ Platemaking rate:	Initial/A3: 78 sec (60 Hz), 92 sec (50 Hz) Cyclic/A3: 24 sec (60 Hz), 26.5 sec (50 Hz)
◦ Machine dimensions:	1500 (W) x 2485 (D) x 1780 (H) mm
◦ Weight:	450 kg
◦ Electricity:	100 V 2.5 kW, single-phase 50/60 Hz
◦ Option	100 V 1 kW, single-phase

Process Chart

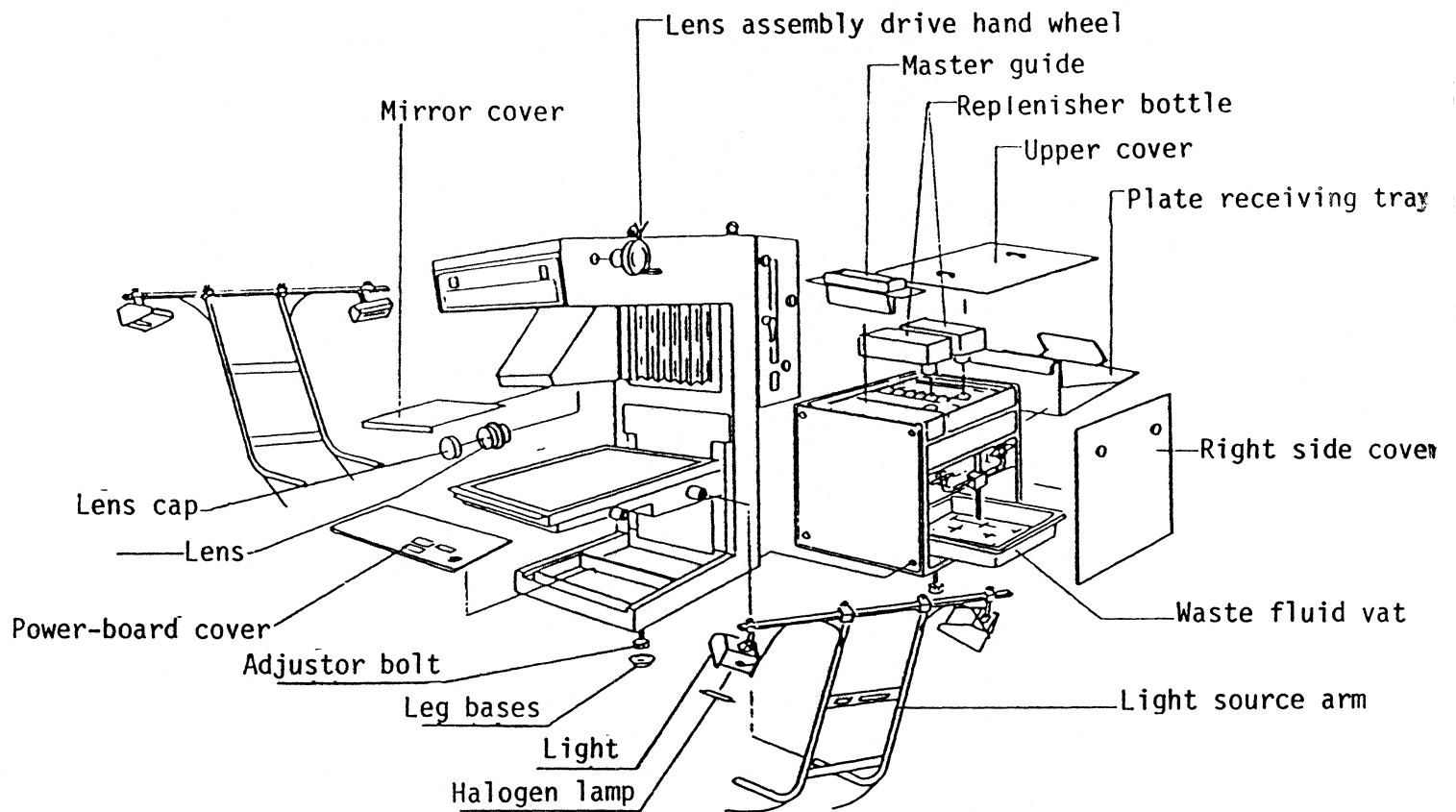


3. INSTALLATION PROCEDURES

3.1. Installation Conditions

- (1) The machine should be installed on a level floor sufficiently capable of withstanding its total weight of 450 kg.
- (2) Do not install the machine at places subject to vibrations. Also, select an installation area whose floor surface is completely even, free from bumps etc.
- (3) Do not install the machine in direct sunlight.
- (4) The power supply should be single-phase 100 V 2.5 kW. Use power cables that sufficiently withstand the voltage, and maintain the voltage fluctuations to within a tolerance of ± 10%.
- (5) Leave at least 40 cm around the periphery of the main body as a provision for a service area.
- (6) Select an installation area of constant humidity and temperature.

3.2. Packing List



	Item Name	Q'ty
1	Body	1
2	Processor	1
3	Light source arm and pole (right)	1 each
4	Light source arm and pole (left)	1 each
5	Light	4
6	Lens (export only)	1
7	Lens stand drive handle	1
8	Spool	2
9	Master guide	1
10	Replenisher bottles	2
11	Plate receiving tray	1
12	Processor waste fluid vat	1
13	Measurement cup	1
14	Leg bases	8
15	Tools	1 set
16	Metal polish	1
17	Instruction Manual	1
18	Photograph samples	1
19	Wall mounting Instruction Manual	1
20	Fuses	4
	Japan : 20A	
	N. America: 15A	
	Europe : 10A	
21	Glass fuse 10A	4
22	Glass fuse 3A	4
23	Glass fuse 1A	4
24	Spring belt	2
25	Stainless steel catch	2
26	Retouching paint	2
27	Retouching brush	2
28	Cord band	10
29	Halogen lamp	4
30	Cord cover	1

31	Technical guide	1
32	Waste Fluid Disposal Manual	1
33	Mirror (export only)	1
34	Safety key (export only)	1

3.3. Assembly & Preparation

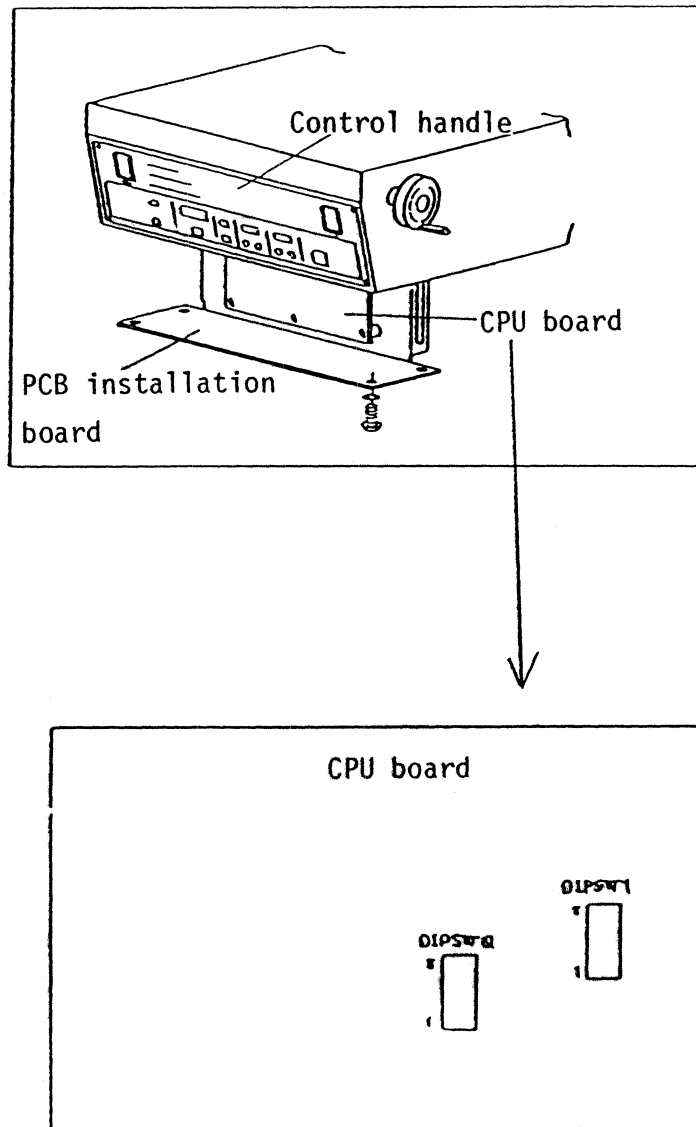
- (1) Place the leg bases at the desired locations, and install the frame body. Remove the exposure section lower part and frame securing fixtures.
- (2) Remove the securing fixtures holding the lens and mirror in place, and install the lens at its original position. (export models only)
- (3) Remove the protective paper laid on the original holder glass, and using a spirit level adjust the level by the adjustor bolts so that the machine body is leveled accurately. At this time, adjust the level so that the weight is distributed evenly over the four leg bases.
- (4) Connect the processor to the body. Insert the lateral positioning bolts into the positioning fixtures, place the positioning bolts onto the frame body, and adjust the processor adjusting bolts so that the processor comes into contact with the four processor contact bolts.
- (5) Connect the frame body and processor connector (J25-J26), and install the cover. (For export models use, connectors J22-J26.)

- (6) Insert the light source arm as far as possible and secure firmly in place with the bolts. Secure the light in place with screws according to the number of the light source arm (1 -- 4). When setting the position of the light which is set by notches, rotate as shown in the figure, align the triangular mark to set the light in position.
- (7) After connecting the connectors for the light (J2-J5), insert the connector cord into the frame legs, install the cover, and set the cord in place by the saddle.
- (8) When installing the halogen lamp, do not directly touch the surface of the lamp. Hold the lamp indirectly between your fingers using paper etc.
- (9) Remove the mirror cover and lens cap.
- (10) Install the parts for other components such as lens assembly drive hand wheel, waste paper receiving tray, waste fluid vat, etc.
- (11) Remove the unit located inside the processor, and clean the unit and the inside of the tank. When the machine is first operated, the rollers may stick, or rotation may be slow and heavy. Therefore, manually rotate each of the rollers before trial operation.
- (12) Following the instructions laid out in the Instruction Manual, mix the developer and stabilizer to the right ratios, and pour into the tank and replenisher bottles.
- (13) Install the processor top cover. As a safety switch is attached with this model, align the switch to the correct mark.

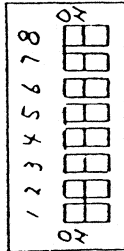
3.4. Power Supply Connection

- (1) Set the main power switch on the body to OFF.
- (2) Connect the input lead to the power supply.
Electrical capacity: single-phase 100 V 2.5 kW
- (3) Always ground the input lead connection.

3.5. Adjustment

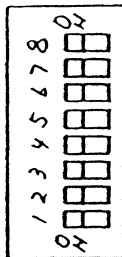


(0) Dip Switch



No.	Use
8	Master feed amount compensation coefficient (master cut coefficient)
7	
6	
5	
4	
3	
2	
1	

(1) Dip Switch



No.	Use
8	
7	Basic data set
6	
5	Basic data set
4	
3	50 Hz/60 Hz selection
2	Inch/millimeter selection
1	Data set

(1) Select the frequency to 50 Hz or 60 Hz to match that of the destination area. When dip switch (1)-3 located on the CPU board is set to ON, the frequency is set to 50 Hz, and when set to OFF, the frequency is set to 60 Hz.

(2) Inch/millimeter selection

Set dip switch (1)-2 to ON for the inch setting, and to OFF for the millimeter setting.

(3) Turn the power switch to ON.

(4) Set the master plate as described in the Instruction Manual.

(5) Inspect and adjust the master feed length.

1) Set the master plate length to either the length for a high frequency of use or to the maximum feed length.

2) Actually feed the master plate and measure the required feed length.

Input Method

1) Set dip switches (1)-1, 7 and (0)-8 located on the CPU board to ON.

2) Input the actual measured values by the master feed length input keys.

3) Set dip switch (1)-7 to OFF before setting dip switches (1)-1 and (0)-8 to OFF.

By the above operation, the master cut coefficient is automatically calculated by the CPU and stored into the CPU memory.

Confirmation

To check that data has been input correctly, set CPU board dip switches (1)-5 and (0)-8 to ON. These settings will display the master cut coefficient at the M.LENGTH feed length display on the control panel.

3.6. Final Assembly & Confirmation

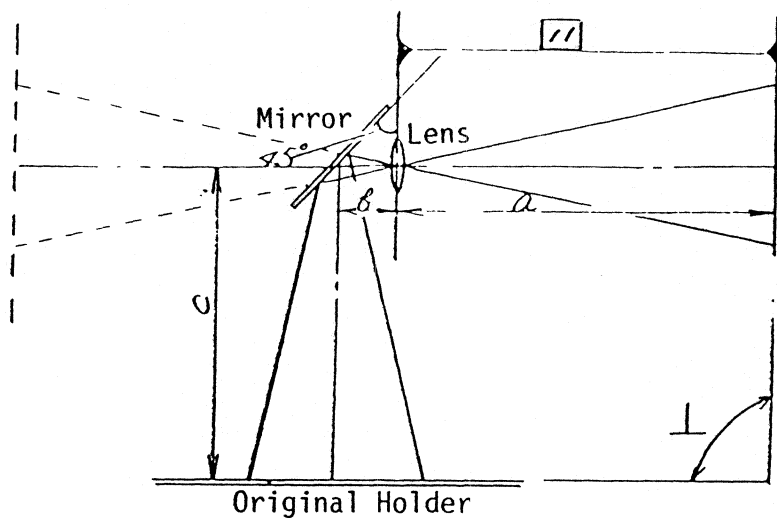
(1) Install the covers.

(2) Carry out continuous operations following the instructions laid out in the Instruction Manual.

* Also, conduct a photographic test according to the Test Chart

4. CHECK AND ADJUSTMENT OF THE OPTICAL SYSTEM

4.1. Slant & Focus/Scale Adjustment



$$a = f(1 + m)$$

$$b + c = f\left(1 + \frac{1}{m}\right)$$

$$m = \frac{a}{b + c}$$

f: focal length (420 mm)

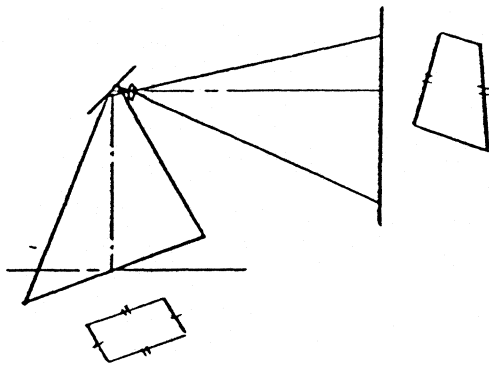
m: magnification


At least the following conditions should exist to product quality prints:


- (1) The exposure plane, lens plane and original plane are parallel to one another.
(Since the CP-404II employs a mirror, the angle between the lens plane and the mirror plane and the angle between the mirror plane and the original plane should be 45° respectively.)
- (2) The positional relation between the lens assembly and the original holder satisfies the above equations.


Slant Adjustment


For example, if the horizontality of the original plane is not within the allowable range, an incorrect or slanted image as shown is produced. In case a slanted image has appeared, set the magnification to 100% and proceed as follows to compensate for the slant according to the slant type.




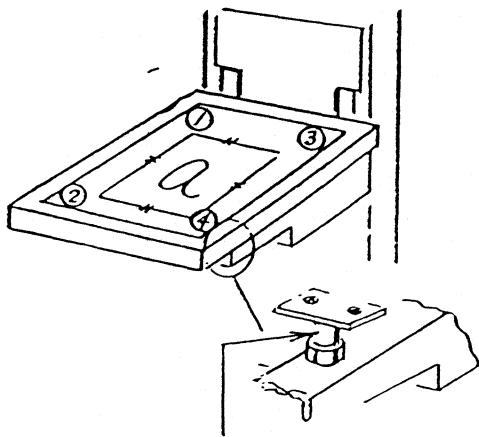
(1) Raise the height adjust bolts (1) and (3) or lower (2) and (4), evenly.

(2) Raise (2) and (4) or lower (1) and (3).

(3) Raise (3) and (4) or lower (1) and (2).

(4) Raise (1) and (2) or lower (3) and (4).

(5) Raise (2) and (3) or lower (1) and (4).



Original Holder
Height Adjust
Bolt

(The adjustment should be made with an accuracy of 0.5 mm/300 mm or less.)

Focus/Scale Adjustment

- (1) Make the slant adjustment as stated above.
- (2) Set the lens assembly or the original holder to 100%. (Assume that the lens assembly is set to 100%.)
- (3) Move the original holder up and down bit by bit and make an exposure each time. Then compare the exposure results with one another and find the original holder position corresponding to the best focused image.
* Although the stop value is normally set to 22, stop value 16 is conveniently used for this comparison since the depth of focus is decreased.
- (4) With the original holder at the best focus position, make an exposure of a sample and calculate the magnification from the following equation:

$$\text{Magnification (\%)} = \frac{\text{output image size}}{\text{sample size}} \times 100 (\%)$$

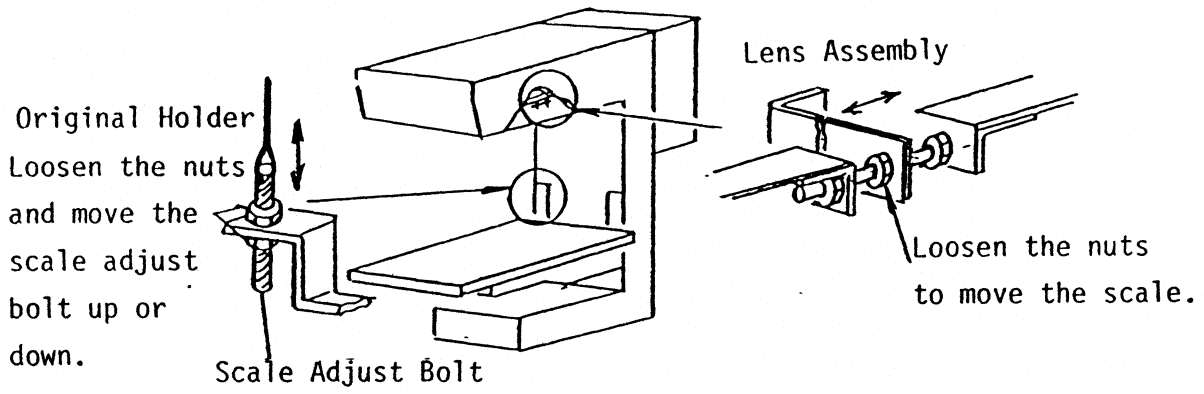
$$\text{ex.) } \frac{303}{300} \times 100 = 101(\%)$$

- (5) Adjust the respective scales to the calculated magnification (ex. 101%) without moving the lens assembly and the original holder.
- (6) Set the stop value to 22 and set the lens assembly and the original holder to 100% on the scales. Make an exposure and check the focus and size of the image obtained.

Resolution accuracy: 10 lines/mm
Size accuracy: + 0.5 mm/300 mm

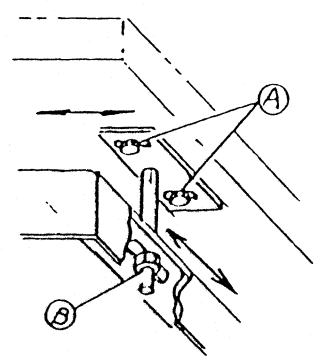
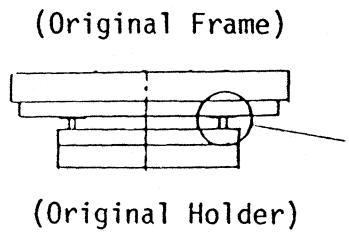
- (7) If size or resolution accuracy is not within the above allowable range, repeat above steps 2 through 6

(Scale adjustment points)



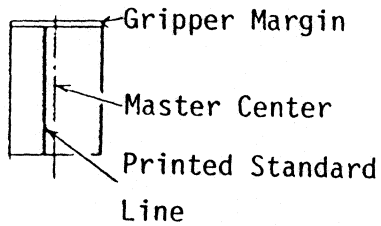
4.2. Adjustment of Optical Axis

Make sure that master paper doesn't lie in a zigzag line in the exposure section. Then make an exposure of the original base sheet, and check the position of the standard line printed in the exposed master paper to check the original frame position.



(1) Left/Right

For example, if the printed standard line is at the left side of the master center line, it means that the original frame is to the left



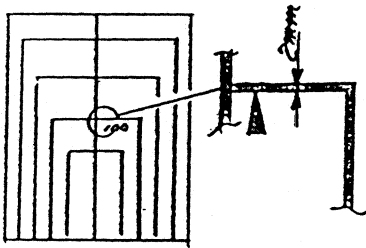
of the normal position.

Therefore, in case of 100% magnification, loosen eight bolts at the four points (A) and move the frame to the right by the distance between the master center line and standard line.

During the adjustment, the original frame may not move smoothly because the torsion bar is functioning. Therefore, tap the bar joint with a hammer or the like in advance to push away the bar for adjustment convenience.

(2) Front/Back

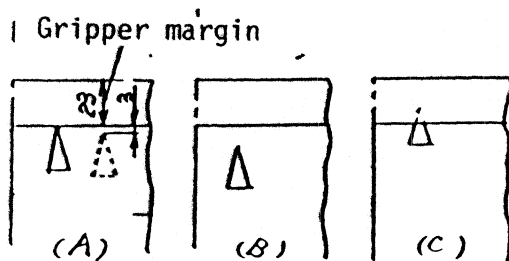
- 1) Set the master paper short of the standard size so that the master gripper margin is not exposed.



- 2) Place a black triangle on the X-axis 100% standard line on the base sheet and make an exposure of it. Then check the result.

(A) Good ... The vertex of the triangle appears within the area 2 mm from the gripper margin.

(B) Not good ... The vertex appears in a position more than 3 mm away from the gripper margin.



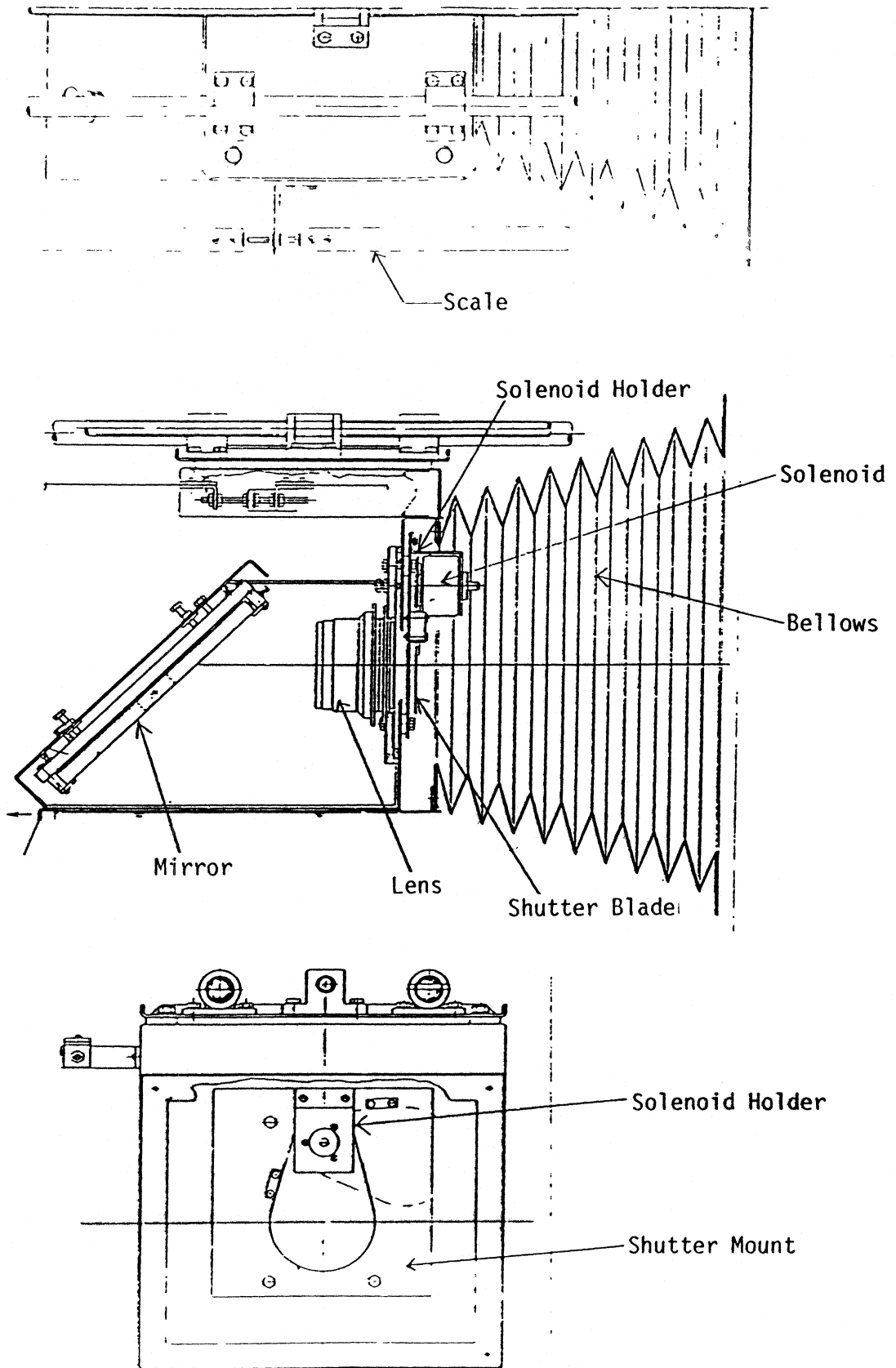
(Loosen nuts at four points (B) and push the original frame inwards.)

(C) Not good ...The vertex appears in the gripper margin.

(Loosen nuts at points(B) and pull the original frame toward the operator.)

* Take the same steps for optical axis adjustment on replacement of the original base sheet.

5. LENS ASSEMBLY



(1) Replacement of the Shutter Solenoid

- 1) Remove the screws securing the bellows on the lens assembly.
- 2) Remove three shutter mount bolts (M6) and solenoid cord connector J4 from the bellows side of the lens assembly to remove the shutter mount.
- 3) Remove the solenoid holder from the shutter mount and remove the solenoid fitting screws to separate the solenoid from the shutter.
- 4) When fitting the shutter to a new solenoid, take the reverse procedure taking care not to place it the wrong way.

(2) Replacement and Adjustment of the Mirror

Checkup before Replacement

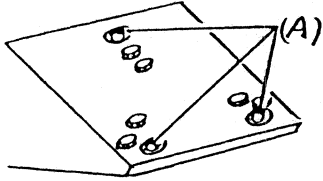
Prior to the replacement, be sure to make the following adjustment and check the result:

Set the magnification to 100% and measure the slant (see P.17).

The size accuracy should be within 0.3 mm/300 mm.

- * Make the adjustment with possible highest accuracy since on replacement of the mirror a new mirror is installed by reference to the original plane.

Replacement Procedure



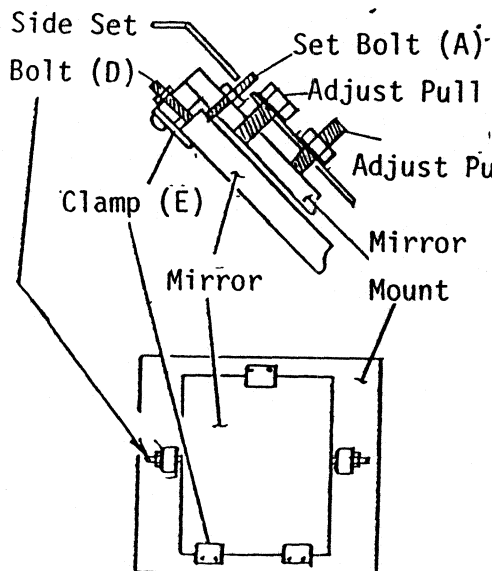
(1) Detachment

* Never touch mirror adjust push/pull bolts (B) and (C).

1) Loosen three mirror set bolts (A) (M4 hollow).

2) Loosen mirror side set bolts (D).

3) Loosen three mirror clamps (E) and the mirror will come off.



(2) Attachment

1) Prepare cotton gloves, clean soft cloth or paper in order not to leave fingerprint marks.

2) With the reflection surface of the mirror downward, put the mirror on the mirror mount and attach the mirror clamps (E).

3) Evenly tighten the three mirror set bolts (A) so that the mirror is secured by the clamps tightly.

Then, tighten the lock nuts.

4) Let mirror side set bolts (D) touch the side surface of the mirror and lock the bolts with the nuts.

Checkup and Adjustment

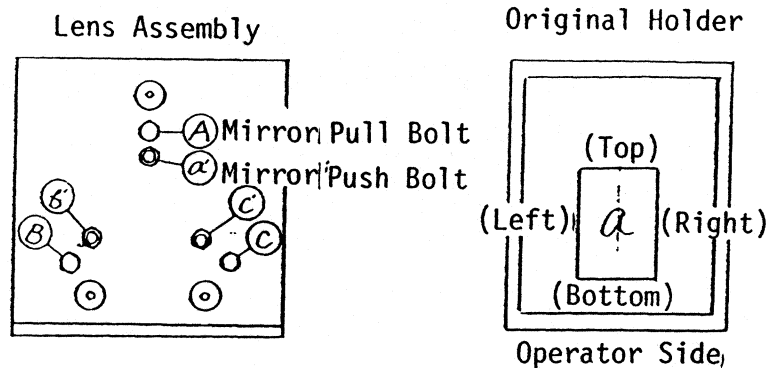
(1) Set the magnification to 100% and check the slant again.





(2) If the slant exceeds 0.5 mm/300 mm, the adjustment stated next is necessary.

* Also check the resolution (F22 10 lines/mm).

If the mirror set bolts (A) are not tightened evenly, partial resolution failure may arise.

(Adjustment)



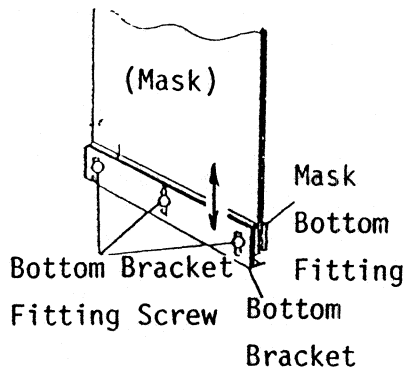
- 1)  When the bottom side is longer than the top, loosen (A), and loosen the lock nut at (a') and push the push bolt (a') a bit.
- 2)  When the top side is longer than the bottom, loosen (a'), and tighten (A) a bit.
- 3)  When the left side is longer than the right, loosen (b'), and tighten (B) a bit.
- 4)  When the right is longer than the left, loosen (c'), and tighten (C) a bit.

Mirror replacement and slant adjustment may influence the focus/scale system. If focus and scale readjustment is necessary, see P.17.

6. EXPOSURE SECTION

6.1. Adjustment of the Shading Mask

If the shading mask is inclined, proceed as follows:



A. In case the inclination is 2 - 3 mm:

Loosen three bottom bracket fitting screws (M4) at the bottom of the mask. Incline the bracket in the reverse way so as to compensate for the inclination of the mask.

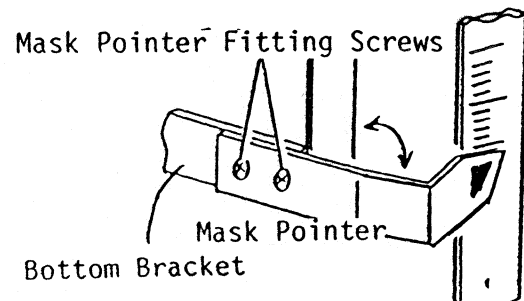
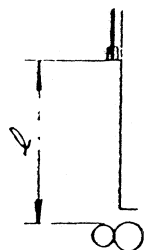
B. In case the inclination is more than 4 mm:

- (1) Once separate the mask from the mask bottom fitting, and reinstall the fitting so that it is parallel to the nip roller.
- (2) If a slight inclination is found after the reinstallation, take the same step as stated above in A.

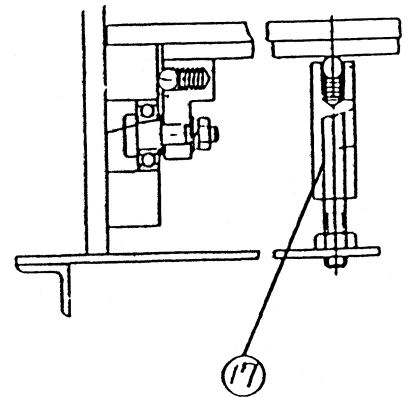
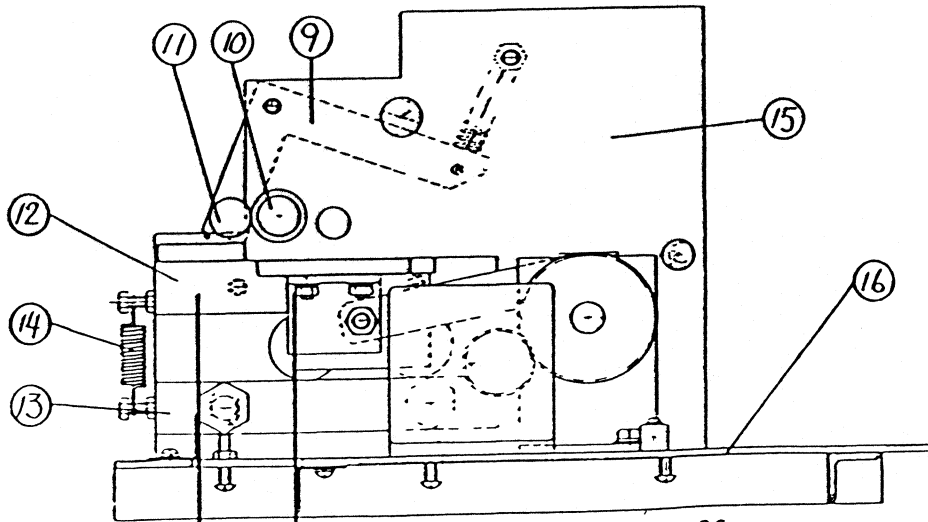
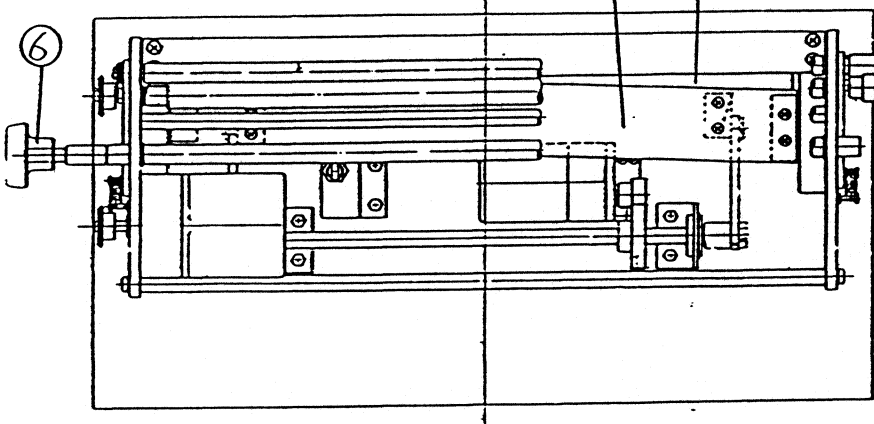
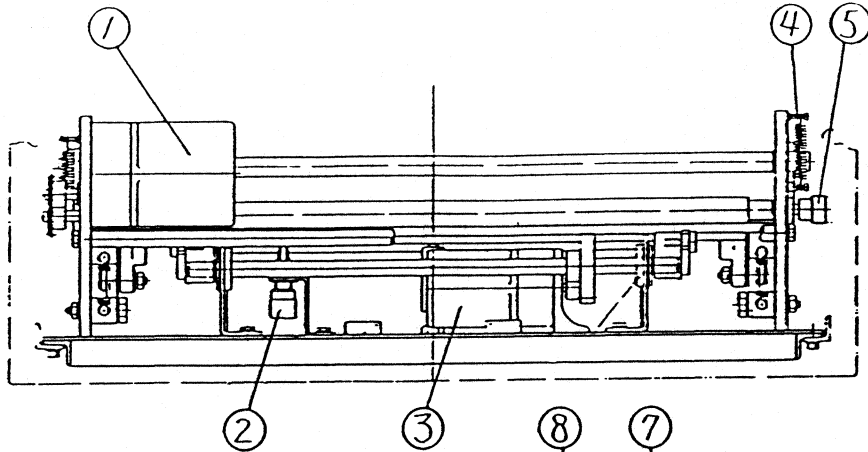
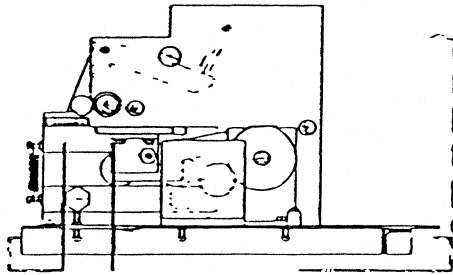
If the mask position does not correspond to the scale, proceed as follows:

Measure the distance (1) between the top of the nip roller and the shading mask bottom bracket.

Loosen the mask pointer fitting screws and adjust the mask pointer so that the pointer indicates the scale value equivalent to that distance.



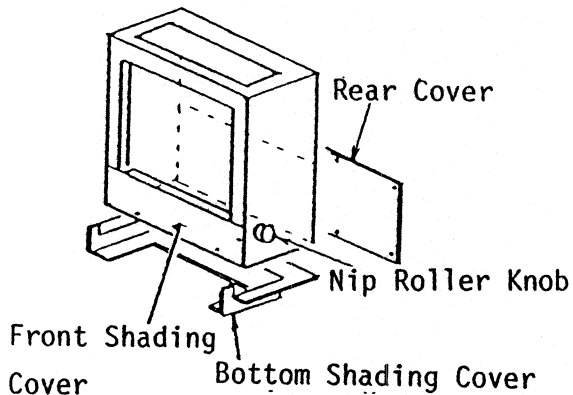
7. CUTTER



1. Master Feed Motor
2. Limiter for Cutter
3. Cutter Motor
4. Nip Pressure Spring
5. Master Feed Nip Roller Gear
6. Nip Open/Close Knob
7. Fixed Blade
8. Mobile Blade
9. Nip Lever
10. Master Feed Roller
11. Nip Roller
12. Fixed Rail
13. Mobile Rail
14. Rail Spring
15. Side Panel
16. Base
17. Mobile Blade Raise Shaft

7.1. Replacement and Adjustment of the Cutter Blade

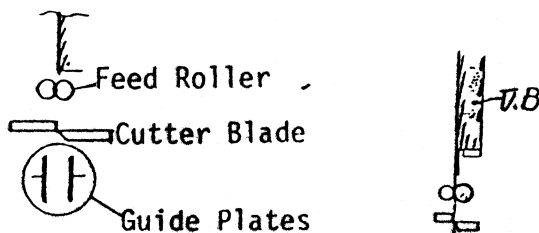
How to remove the cutter assembly



- (1) Remove the covers (rear cover, front shading cover and bottom shading cover).
- (2) Remove two guide plates from under the cutter assembly.
- (3) Loosen the set screw (M4, hollow) on the connecting rod for the nip roller knob and pull out the knob. (The set screw is located in the rear part of the exposure section.)

- (4) Remove the connectors, the board and the board connector from the back of the cutter assembly.
- (5) Remove the four bolts (M4, cap bolts) securing the cutter assembly from the bottom of the exposure section and pull out the cutter assembly.

Installation of the cutter assembly

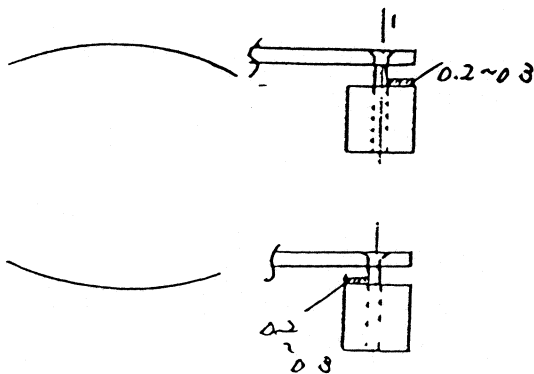
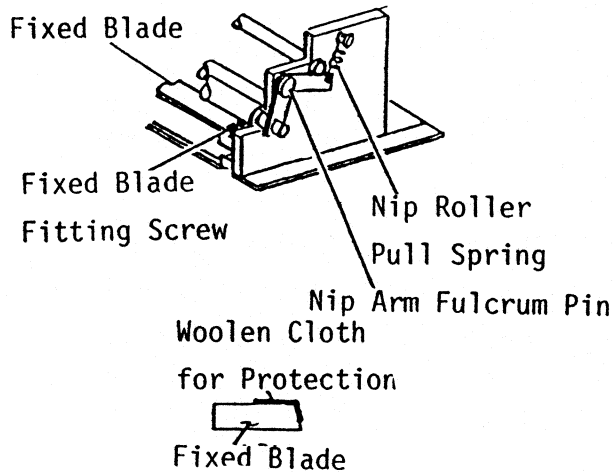


- (1) Install the cutter assembly with the reverse procedure to the above one for removal. When installing, remember that a height adjust spacer may be provided on either of the cutter assembly mount rails.

- (2) Make sure that the nip roller is parallel to the vacuum back.

Replacement of the fixed blade and mobile blade

-- Replacement of the fixed blade --



- (1) Pull out the cutter assembly and remove the nip roller springs and nip arm fulcrum pins on both sides.
- (2) Remove the four fixed blade fitting screws (M4 flat head machine screws) and remove the fixed blade.
- (3) Attach the woolen cloth for master protection to the new blade with double-faced tape or the like.

- (4) The blade may be distorted during installation. A distorted blade causes defective cutting. If some distortion is found, proceed as follows to compensate for it:

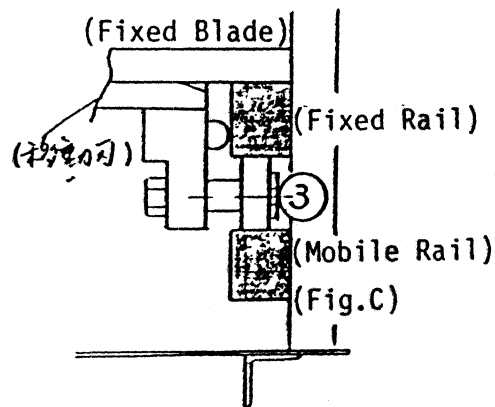
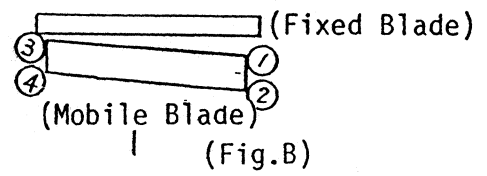
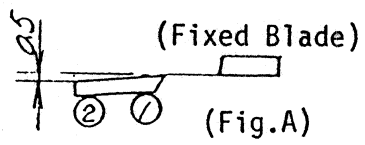
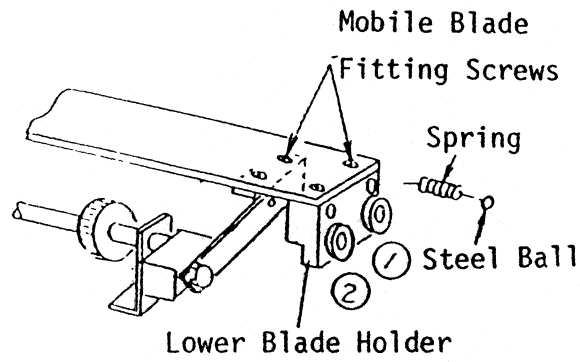
- 1) If the blade is warped upward, it can't cut the center of the master.

- 2) Put 0.2 - 0.3 mm thick spacer outside the fitting screws on only one side.

- 3) If the blade is warped downward, it can't cut the ends of the master.

- 4) Put 0.2 - 0.3 mm thick spacer inside the fitting screws on only one side.

-- Replacement and adjustment of the mobile blade --



- (1) Put the mobile blade backward fully, and remove the left and right blade fitting screws to remove the blade.

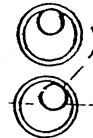
Take enough care to remove it since a guide spring and a steel ball are contained in each lower blade holder.

- (2) Install the new mobile blade and tighten the flat-head screws until their heads are below the upper surface of the blade.

(3) Adjustment

The four wheel shafts attached to the right and left lower blade holders are all eccentric.

The basic adjustment of the shafts is as follows:



- 1) Lower wheel shaft (1) down to the limit.

(The blade will go up to the limit.)

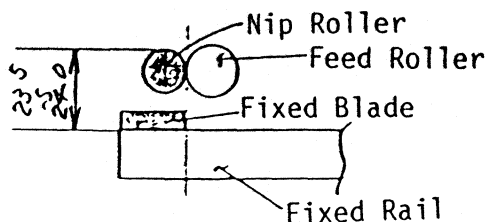
- 2) Lower wheel shaft (2) by a quarter of the whole stroke from the upper limit so that an inclination of approx. 0.5 mm is made as shown in Fig.A.

- 3) Bring the mobile blade close to the fixed blade and adjust wheel shaft (3) so that there is no space between them (or the mobile blade lightly hits the fixed blade) when the mobile blade touches the fixed blade. (See Fig.C.)

- 4) Adjust wheel (4) so that the four wheels touch the fixed rail just before the mobile blade touches the fixed blade.

Positional Relation Between the Fixed Blade and the Nip Roller

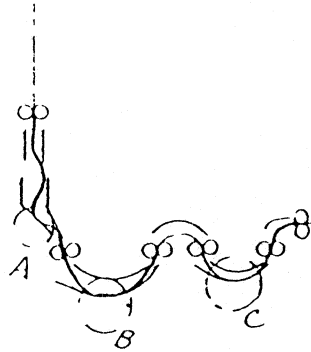
The following positional relation is necessary to keep the gripper margin (multi-exposed area) of the exposed master less than 23 mm.



Adjust the position of the fixed rail so that the distance between the top of the nip roller and the bottom of the fixed blade is 23.5 - 24 mm.

8. PROCESSOR

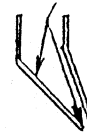
° Prevention Against Scratches in Master



A ... Master guide

Keep the surface clean and smooth.

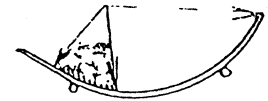
(Finish with sand paper.)



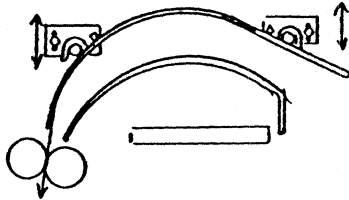
B.C. ... Developing and stabilizing lower guide surfaces

If scratches in the guides are found by a touch on your finger tips, finish the scratched surface with sand paper (No. 600 or more) and polish with metal polishing compound supplied.

For routine maintenance purpose, polish them with metal polishing compound.



° Prevention Against Streaks due to Uneven Development



At present, it is impossible to completely eliminate streaks in developed master caused by uneven development. Uneven development occurs mainly because the developing solution frets when the master passes through the solution.

In order to minimize such uneven development, the master should be more smoothly passed through the developing tank, or specifically the guide adjustment is necessary.

* Adjust the positions of the roller and the guide by raising or lowering the catches for fixing the lower guide.

° Replacement of the Heater



The heater is of the panel heater type which is easy to replace.

Pull out the heater cord connector from the heater plug socket and remove the cord from the cord saddle. Then, the heater will be removed easily.

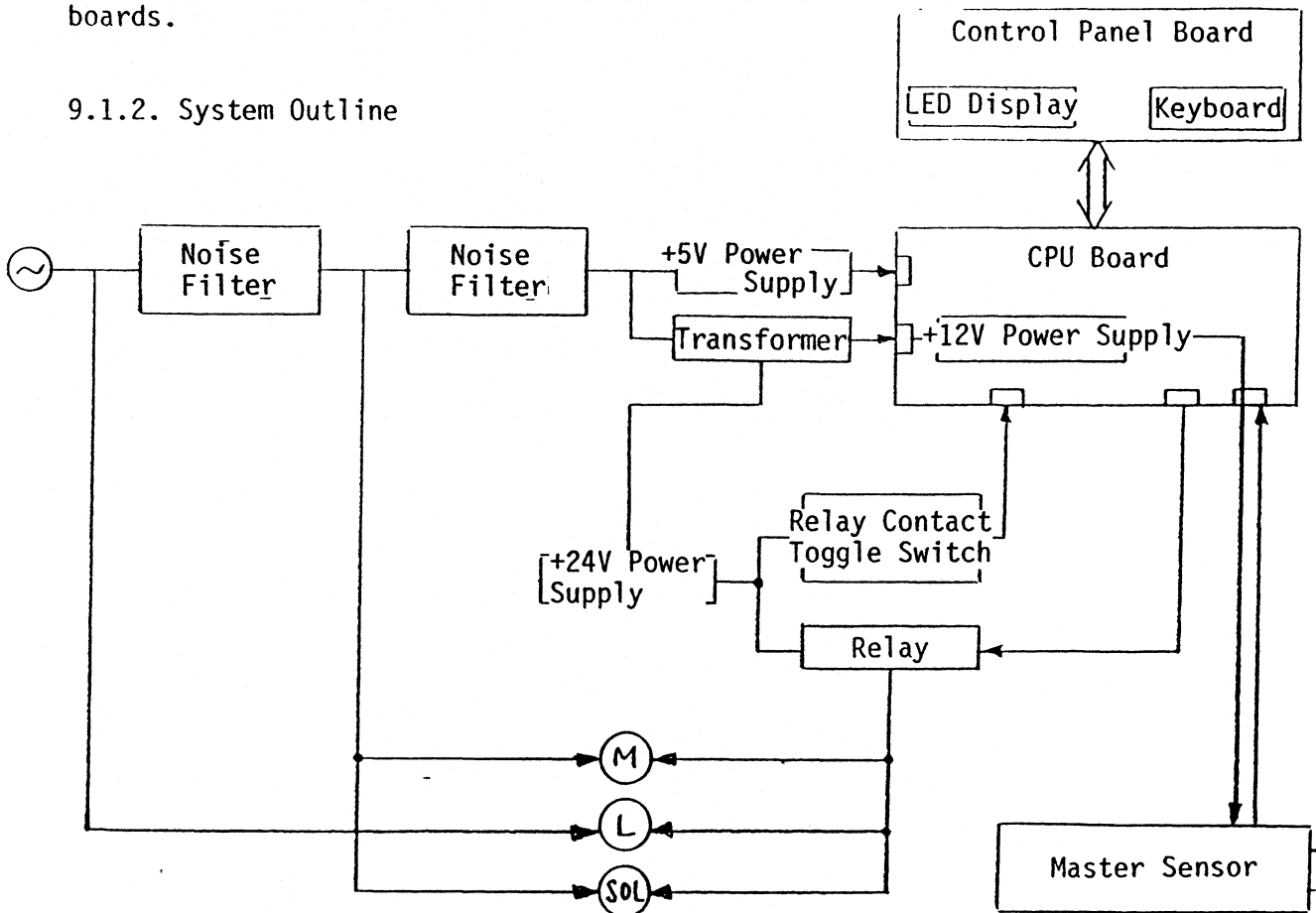
9. ELECTRICAL SYSTEM

9.1 General

9.1.1. Introduction

This chapter covers service including replacement of printed circuit boards.

9.1.2. System Outline



The machine uses a microprocessor (8085) for control so that input signals such as signals from various sensors, switches and contacts are fed to the controller (CPU board), and output signals from the controller actuate the relays whose contacts activate loads.

The operational flow is as follows: exposure -- paper feeding -- paper cutting -- paper transport -- developing -- stabilizing -- drying.

9.2. Check Items

9.2.1. Signal Check LEDs on the CPU board

The LEDs for checking signals, which are located on the CPU board, are described below.

The signals for input/output to the board are identified by these LEDs.

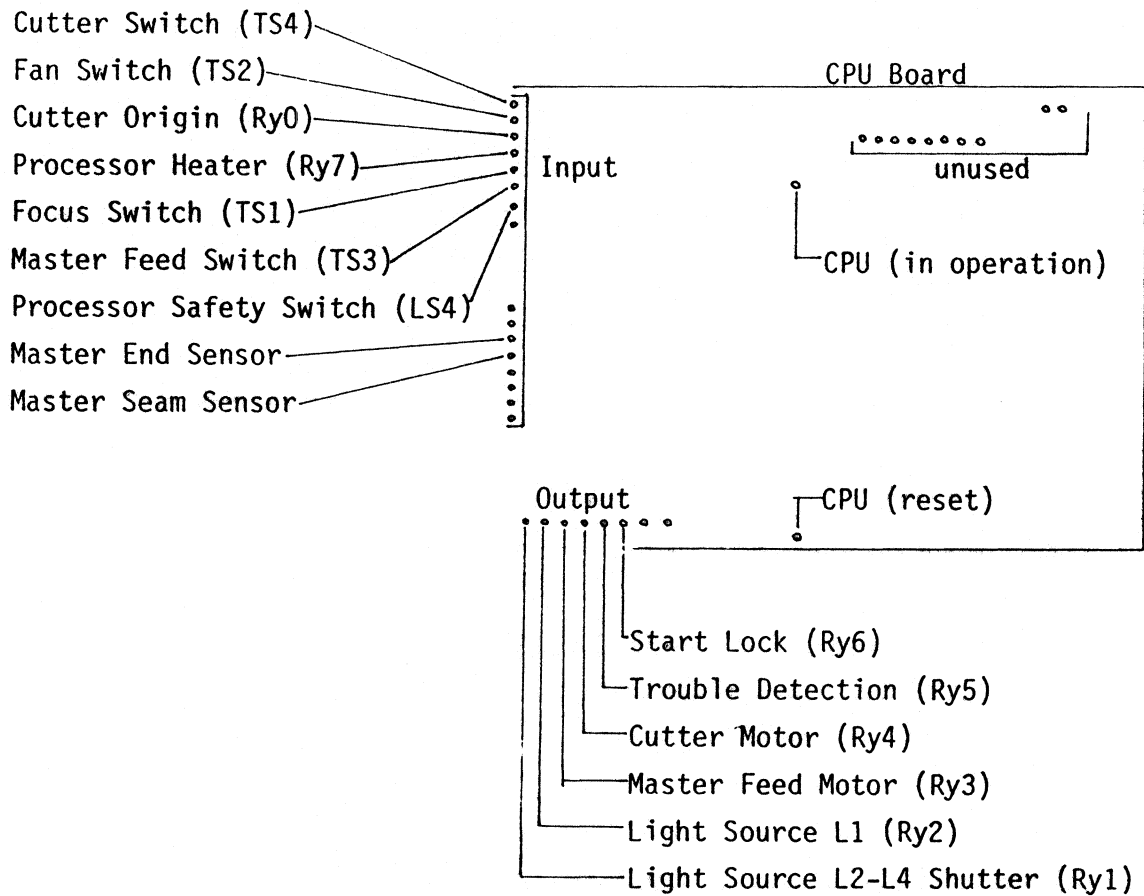


Fig.2 CPU Board
(Parts Mounting Side)

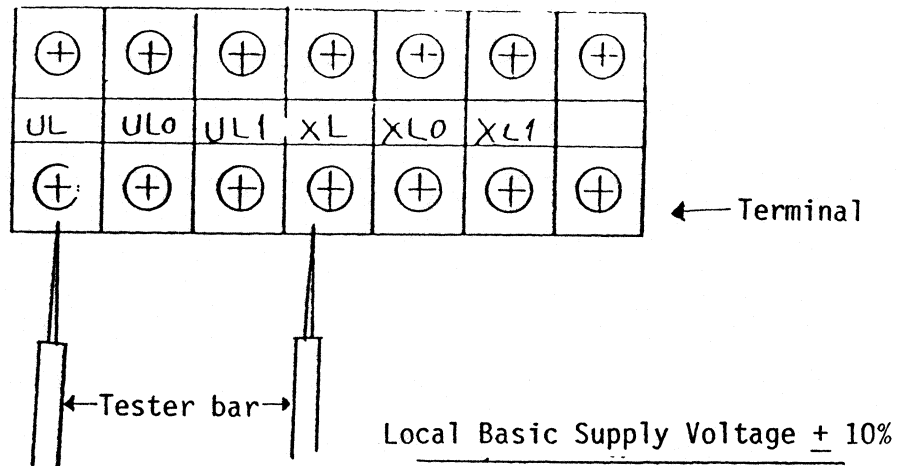
	LED Description	The LED should light when:
Input LEDs	Cutter Switch	Independent cut switch TS4 is off.
	Fan Switch	Master suction fan switch TS2 is on.
	Cutter Origin	Cutter block is at original position
	Processor Heater	Processor heater runs and Ry7 is on.
	Focus Switch	Focus switch TS1 is off.
	Master Feed Switch	Independent master feed switch TS3 is off
	Processor Safety Switch	Processor top cover is completely closed and LS4 is on.
	Master End Sensor	Master is detected (master is on sensor).
	Master Seam Sensor	Master is detected (master is on sensor).
Output LEDs	Light Sources L2-L4, Shutter	Light sources L2-L4 are on and shutter is open.
	Light Source L1	Light source L1 is on.
	Master Feed Motor	Master is being fed.
	Cutter Motor	Cutter starts to work.
	Trouble Detection	CHC appears on display.
	Start Lock	Exposure is under way.
Control LEDs	CPU in operation	CPU is in operation and program is run.
	CPU reset	CPU is reset.

Table 1 Signal Check LEDs

9.2.2. Power Supply Voltage Check Points

9.2.2.1. Local Power Supply Voltage

The voltage measured between distributing board terminals UL and XL should be "within the local basic supply voltage $\pm 10\%$ " (even at full load).



(i) 100 VAC Check

Measure the voltage across terminals UL1-XL1, U1-X1 and U10-X3 with the tester at 200-300 VAC range or more.

The measured value should be "within 100 VAC $\pm 10\%$," even at full load.

(ii) 5 VDC Check

The 5 VDC power supply (a thin cigarette-case size metal box) is inside the panel. Check to see if 90-132 VAC is present across 90-132 VAC input terminals.

With the tester at over 30 VDC range, check to see if $5V \pm 5\%$ is present across GND-P5 terminals.

Presence of such voltage is O.K.

(iii) 24 VDC Check

Check to see if 18-28 VDC is present across distributing board terminals P24-E24.

9.3. Trouble Shooting

If trouble occurs, first check the settings of the switches and also see if they have been used properly.

9.3.1. Power Supply Check

Any trouble in the machine is connected with the power supply. Therefore, check first the power supply related parts.

- (1) Check to see if the proper voltage tap of the transformer (when used) is selected.
- (2) Check to see if the voltage of the power supply to the input cord is normal.
- (3) Check to see if the fuses in the distributing board are not blown. If there is a blown fuse, replace it with a new one with specified capacity. If the new fuse is blown just after the replacement, investigate the cause, correct it, and replace the fuse again.
NB) Be sure to turn off the power for safety before checking the inside of the distributing board.
- (4) If the a.c. power supply is all right, check the d.c. power supply next. The d.c. power voltages should be checked referring to P.35.
- (5) Particularly, since the machine incorporates a microcomputer system, if it should be connected to an insufficient capacity power supply, any of the following troubles might be caused. Connect it to a sufficient capacity power supply.
 - i) Some seconds after lighting of the light sources, exposure stops and the camera completely stops its operation.
 - ii) When the light sources are on, the entire camera malfunctions.
 - iii) When the dryer is operated, the camera malfunctions.
The abovementioned trouble occurs when the computer program is not regularly run. Once turn off the POWER switch and allow five seconds or so. Then, turn it back on to reset the camera.
- (6) For troubleshooting, refer to the troubleshooting flow chart.
- (7) In replacing the CPU board, set data on the new board with the data set switches of the CPU board as set on the old one.

9.3.2. Special Considerations

- (1) Note that the following terminals in the distributing board are energized or live even when the POWER switch of the machine is off:
UL, XL, ULO, XLO
- (2) When replacing electric parts, be sure to turn off the power switch of the User's switchboard to which the power cord of the machine is connected, or disconnect the power supply cable.
- (3) When repairing a rotary part, cutter or chain mechanism, be very careful.

9.3.3. Method of Checking the Electric Circuit

9.3.3.1. The following measuring instruments are used for general servicing.

A. Circuit tester or digital tester

Function 1) A.C. voltage can be measured (0-1000 VAC).

2) D.C. voltage can be measured (0-500 VDC).

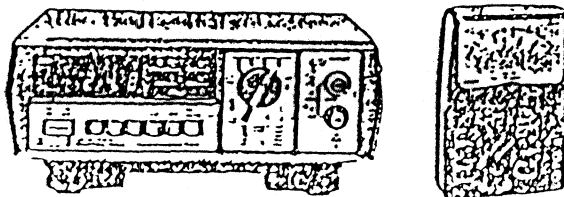
3) Resistance can be measured (0-10 Mohm).

B. Buzzer with built-in battery (ca. 3V) for continuity test or electronic buzzer.

(The resistance measuring function of the tester can be substituted for this instrument.)

Using a digital voltmeter or a tester, measure and check the terminals shown in the figure for specified voltages respectively.

Using a digital voltmeter or a tester, measure and check the terminals shown in the above figure for specified voltages respectively

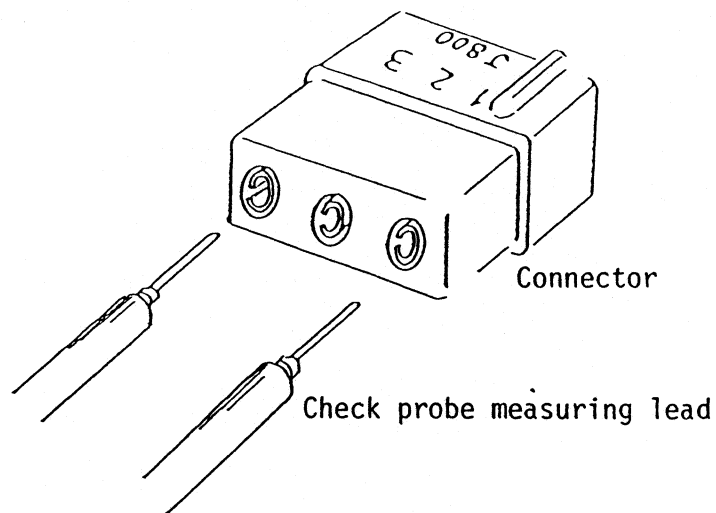


9.3.3.2. Voltage Measurement

(1) Measuring the Voltage between Connector Pins or Sockets

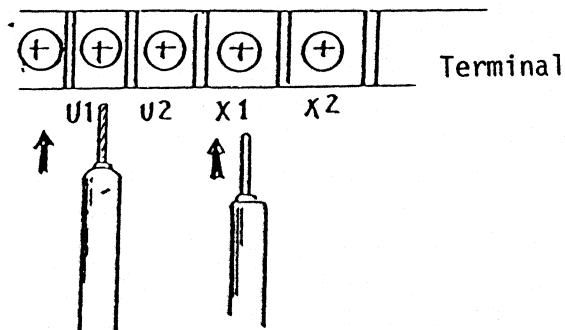
Put the measuring lead between the pins as shown below to measure the voltage.

- i) The end of the tester check probe is a live part. Carefully handle it not to cause an electric shock or short-circuit.
- ii) Before measurement, set the tester at the appropriate position (range).



(2) Measuring the Voltage Between Terminals

Make the tester lead touch the live conductor of the terminal board.



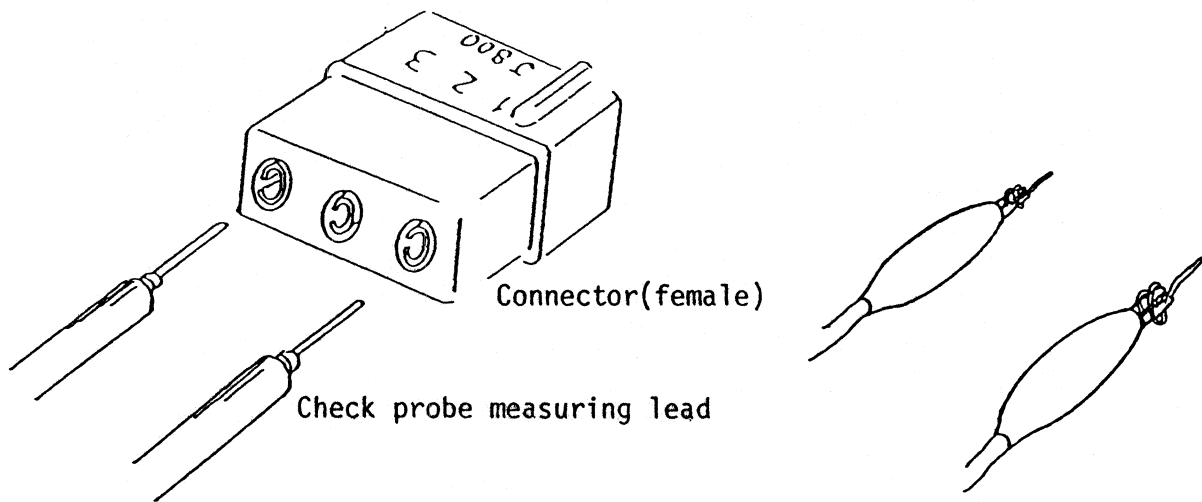
9.3.3.3. Checking the Continuity

(1) Checking the Continuity Between Connector Pins or Sockets

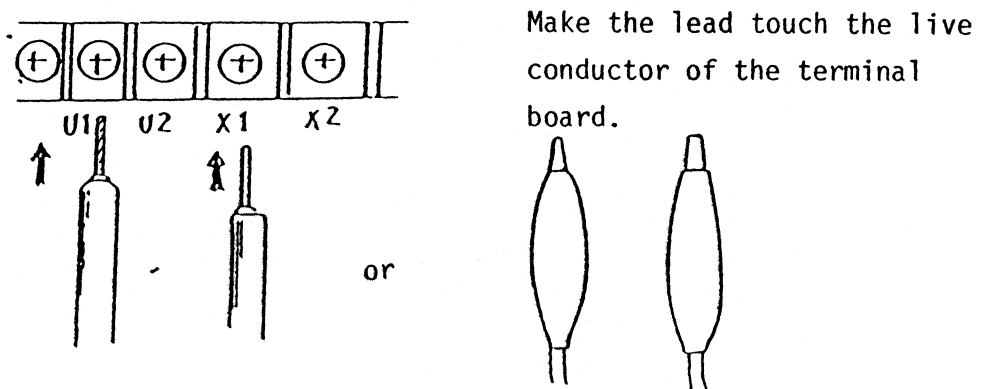
Measure, with the measuring lead between pins as shown below, using the tester (at the resistance range) or buzzer.

Cautions:

- i) Be careful of voltages from other circuits.
- ii) Measure with power off.
- iii) Measure with male and female connectors disconnected.



(2) Checking the Continuity Between Terminals



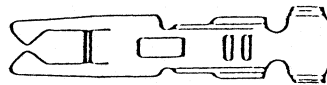
CAUTION· Never forget to turn off the power before conducting the test.

9.3.4. Connector Trouble

Check the connector for a poor connection as follows.

9.3.4.1. Check Point for the Loose Coupling of the Tuning Fork Connector

(1) New pin

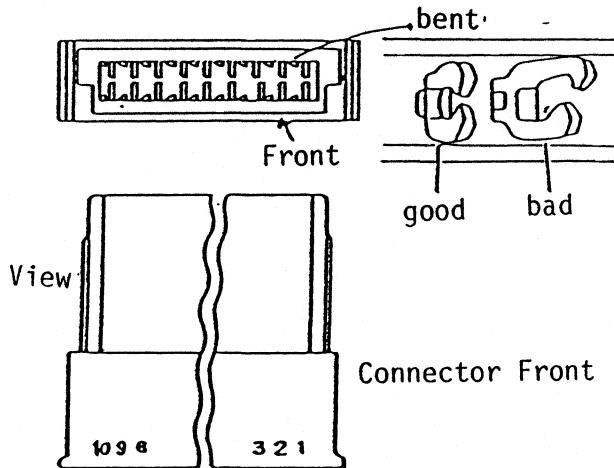


171309-1

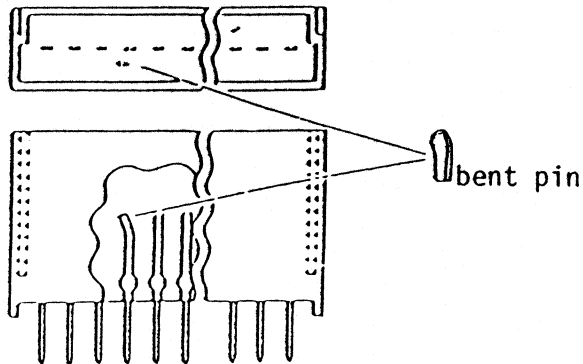


(2) Bad pin

If the connector is bent as shown when inspected from front, it causes a poor connection.

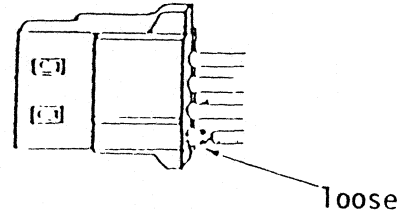


(3) Similarly, the connector pins on the PCB can be bent as shown. Check them.

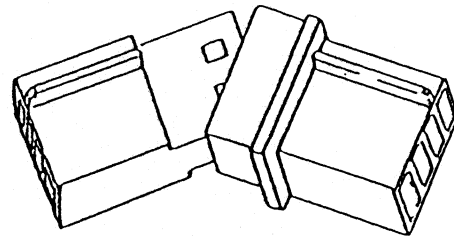


9.3.4.2. Check Point for the Loose Coupling of the Connector Housing

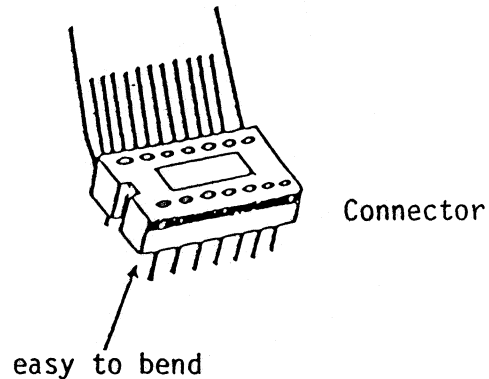
- (1) If the AMP type connector latch does not work satisfactorily, the pin can be loose out of the connector housing case. Check the status of the pins.



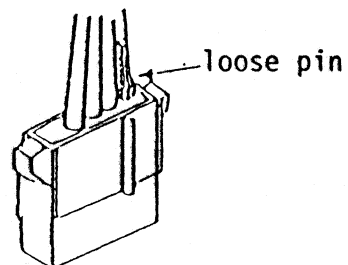
- (2) Connect the connectors straight and tightly. Don't connect them wrongly as shown below.



- (3) The connector pin of the flat cable is easy to bend. Carefully insert it not to bend it.

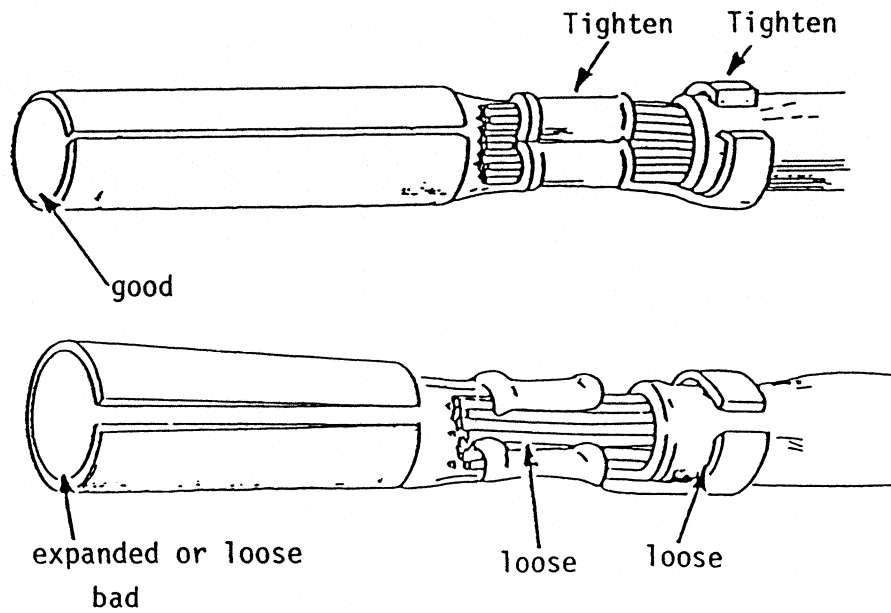


- (4) If the connector pin latch does not work satisfactorily, the pin and wire can be loose as shown below. Check the status of the pins.



9.3.4.3. Poor Connection in the AMP Type Connector

The figure below shows examples of the connector pin connection. The upper figure shows a good example. The lower figure shows a bad example where the socket is expanded, which can cause a poor connection. Correct it.



9.3.5. Electrical Trouble Shooting

Unlike conventional relay or IC system sequence circuits, the electric circuits of the machine incorporate a microcomputer. In this computerized sequence, before starting a next mechanical motion, the information loaded into the computer is judged by a computer program so that the motor is run according to the judgement.

Features

- (1) The machine requires inspection of not only the electric circuits but also the signal circuits for the information to be fed to the microcomputer.
For checking such information signal, LEDs are provided on the printed circuit board.
- (2) The information loaded into the microcomputer is judged by the program before proceeding to the next process. If this signal is not fed to the microcomputer, the microcomputer waits for the signal, so that the machine remains in stand-by status without starting the next process.
- (3) When the power switch is turned on, the machine starts mechanical motions. To put the components into their respective original positions, resetting signals are sent from the microcomputer.
- (4) When repairing the machine, find in which stage of operation in the program flow the machine stays.

9.3.5.1. Troubles with Blown Fuses

- (1) Fuse F1 is blown. (F1 (U2-UA))

Any of reflection lamps L2 - L4 will not light.

- (2) Fuse F2 is blown. (F2 (U3-U0))

Reflection lamp L1 (lamp for copy positioning) will not light.

- (3) Fuse F3 is blown. (F3 (UL3-U4))

The developer heater will not work.

- (4) Fuse F4 is blown. (F4 (UL4-U7))

The processor motor will not run.

- (5) Fuse F5 or F6 is blown. (F5 (UL4-U1), F6 (XL3-X1))

Though reflection lamp L1 is lit by the focus switch, the motor will not run and the other lamps will not light.

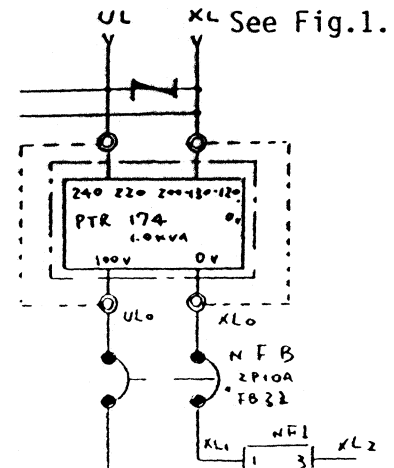
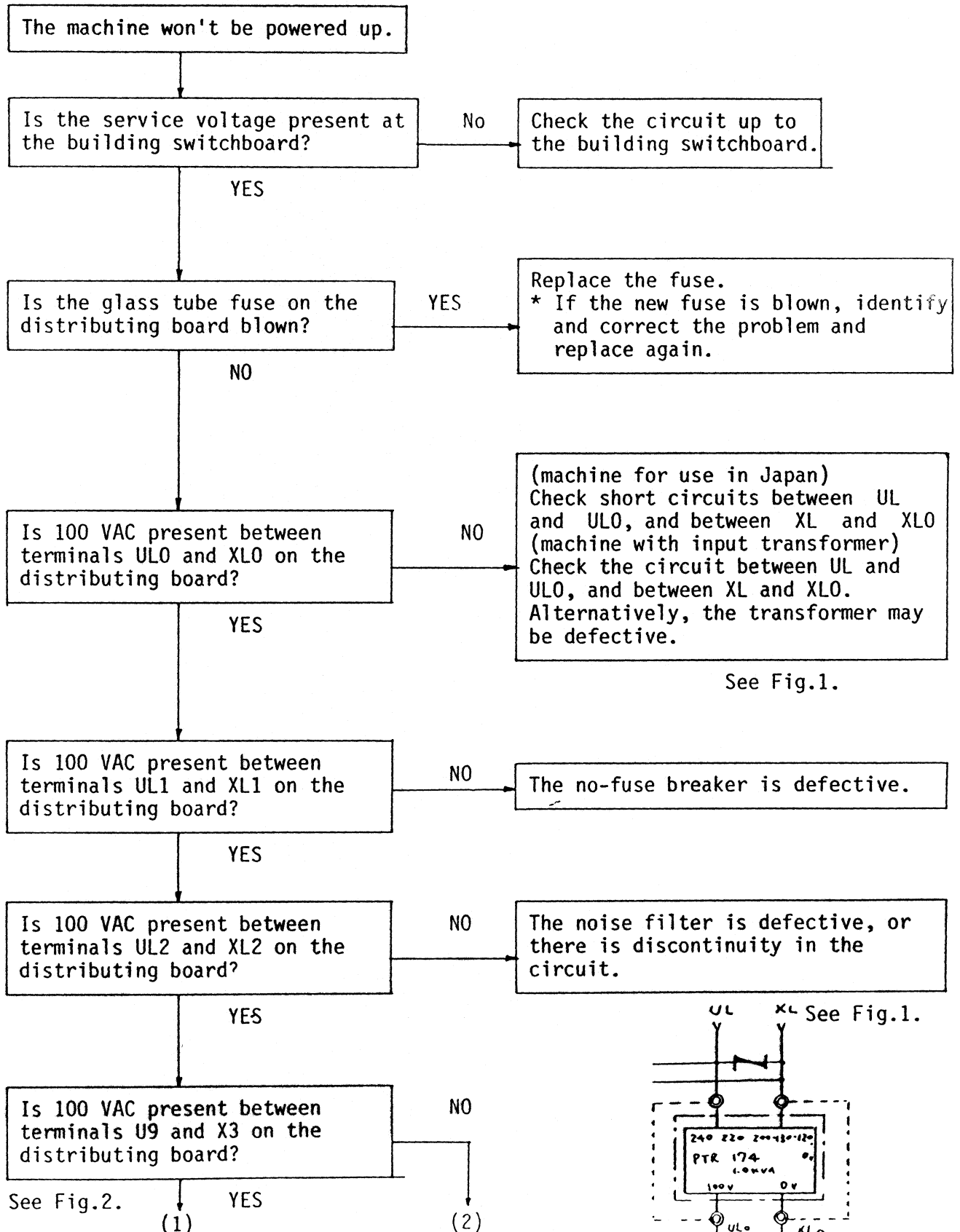
- (6) Fuse F7 is blown. (F7 (UL2-U8))

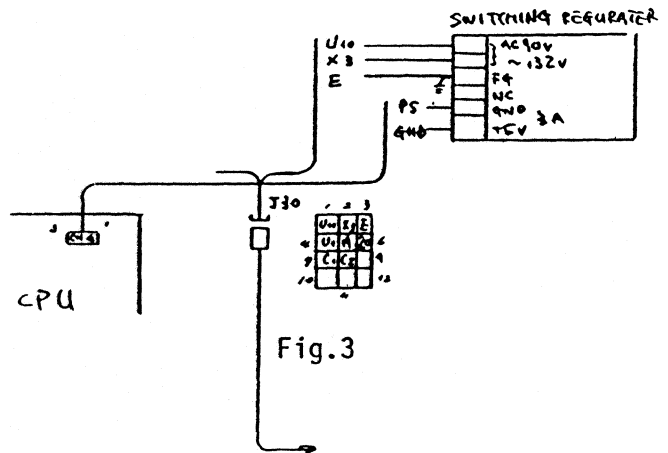
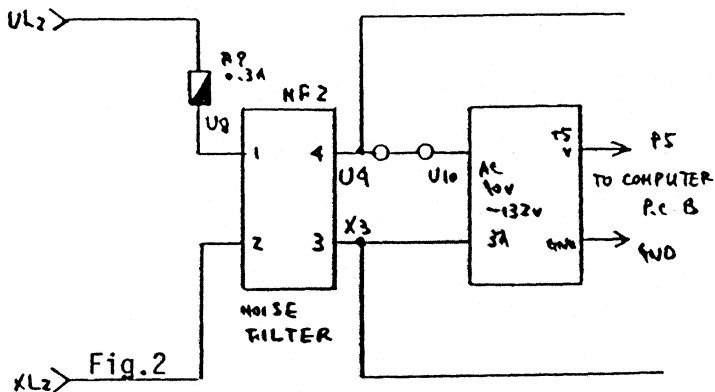
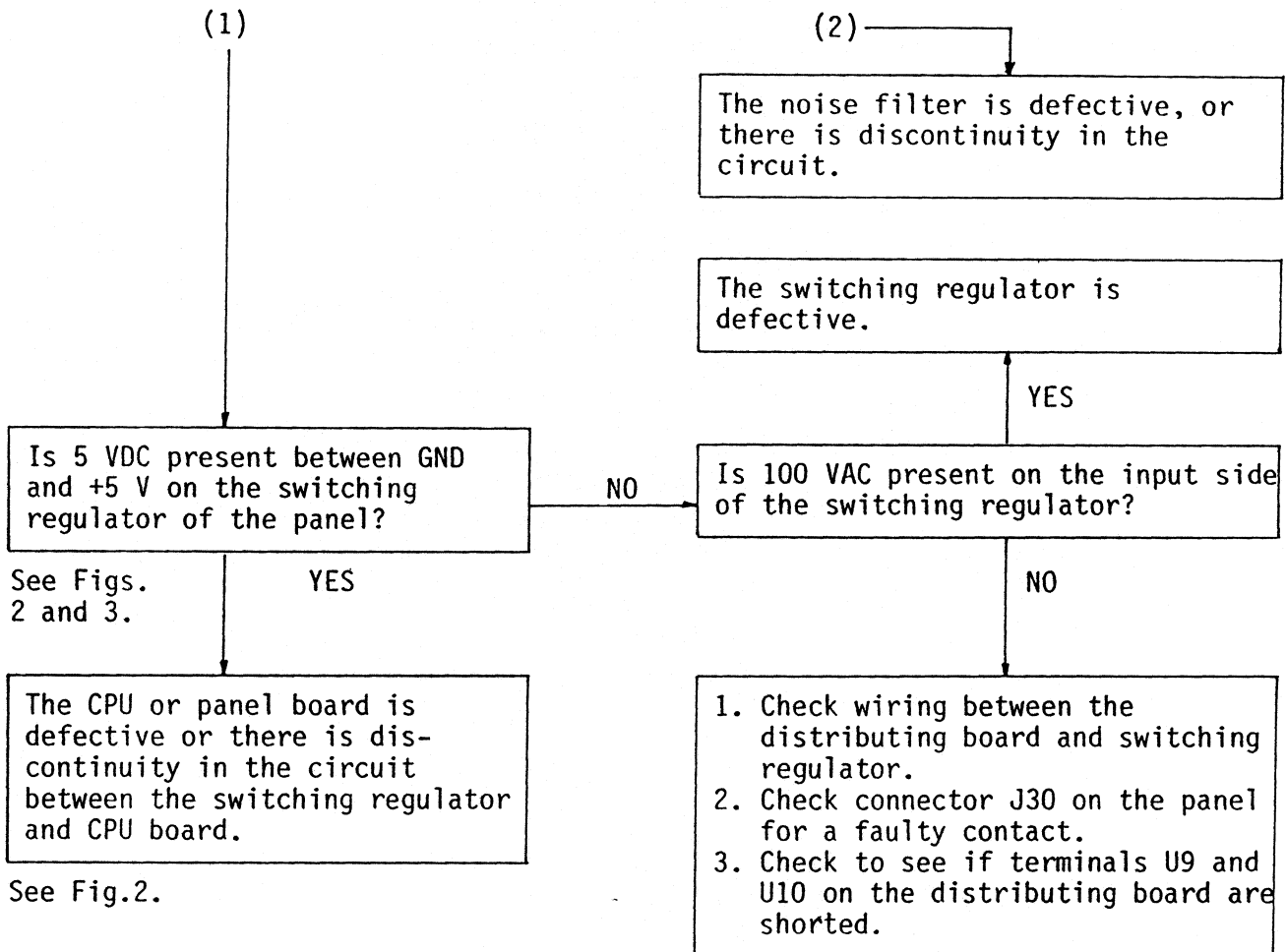
The control panel won't be powered up and will not work.
The display will not be lit.

NB1) Be sure to turn off the power switch before replacing a fuse.

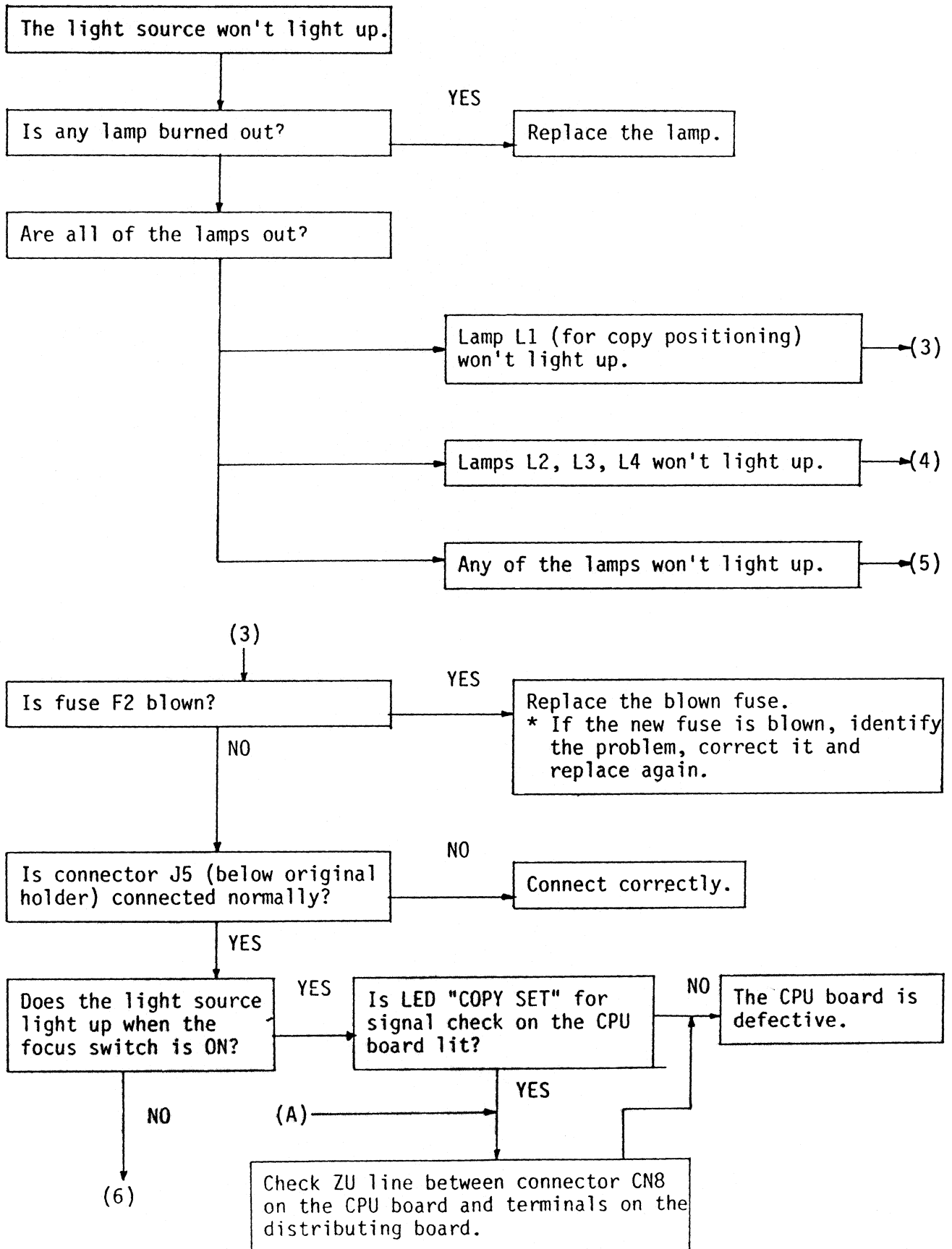
NB2) The replacement fuse should be as specified.

3.5.2. The machine won't be powered up.

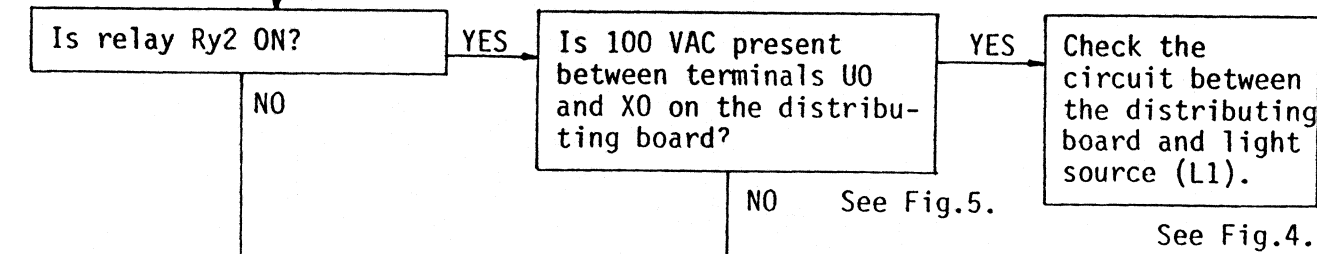




3.5.3. The light source won't light up.



(6)
* Focus switch ON



See Fig.4.

Relay Ry2 is defective. Replace.

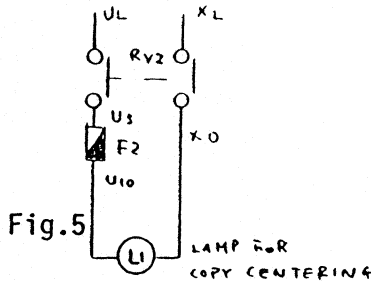


Fig.5

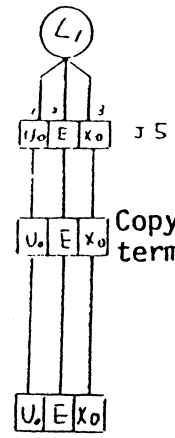


Fig.4

Copy terminals

(machine for use outside Japan)
Is there continuity between No.1 and NO.3 pins on J21 male connector (of the processor) when safety switch LS4 is pressed?

Safety switch LS4 is defective. Replace.

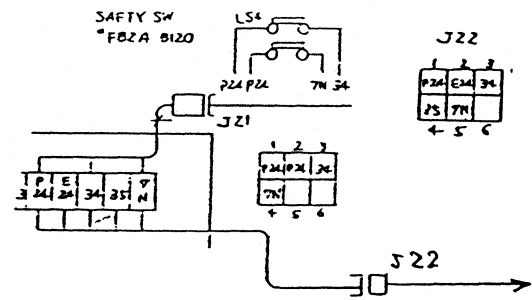


Fig.6

Check connectors J21 and J22 (processor) for a faulty contact or discontinuity in circuit.

See Fig.6.

(4)

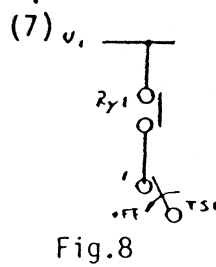
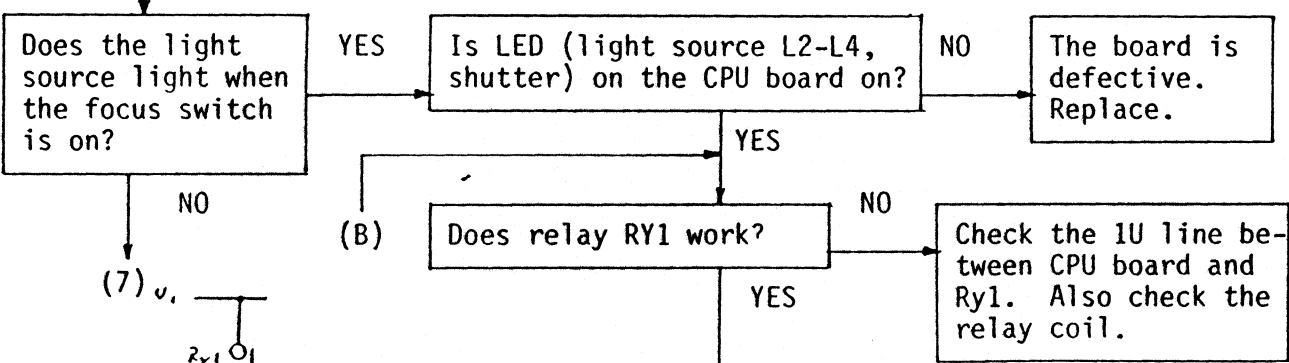


Fig.8

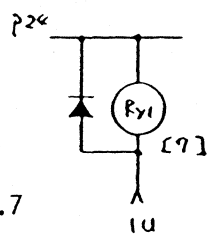
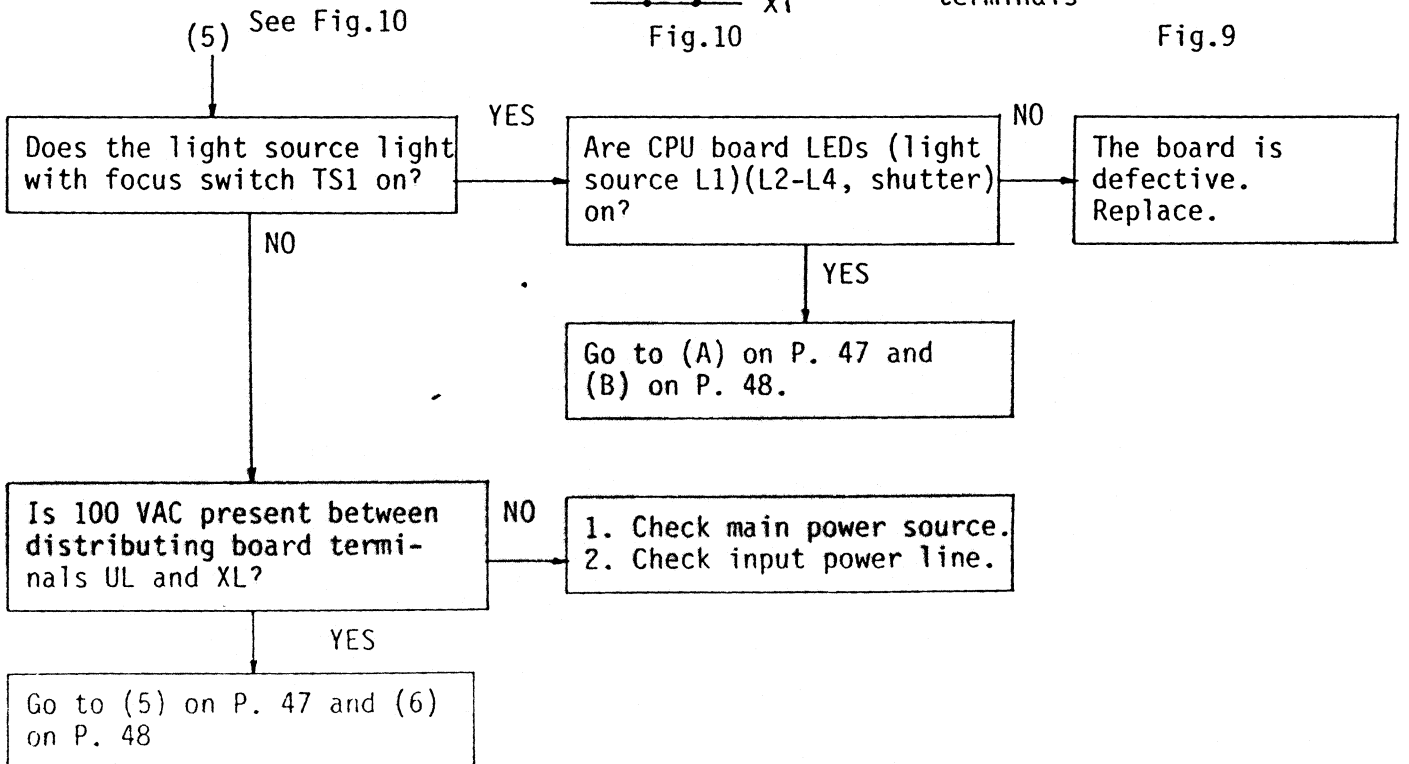
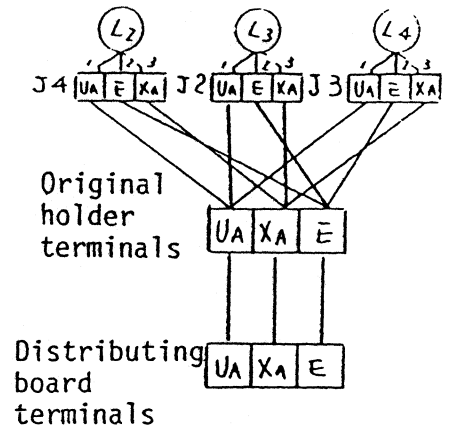
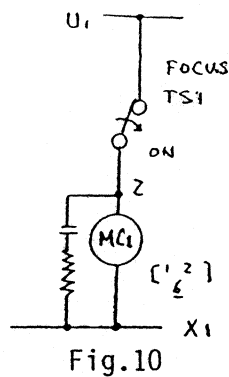
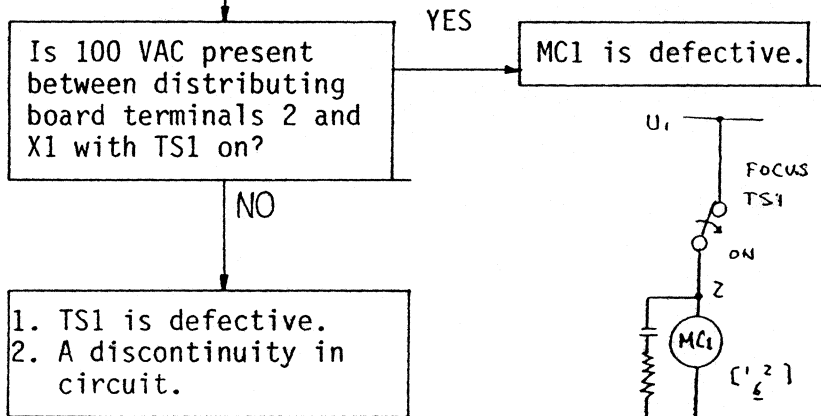
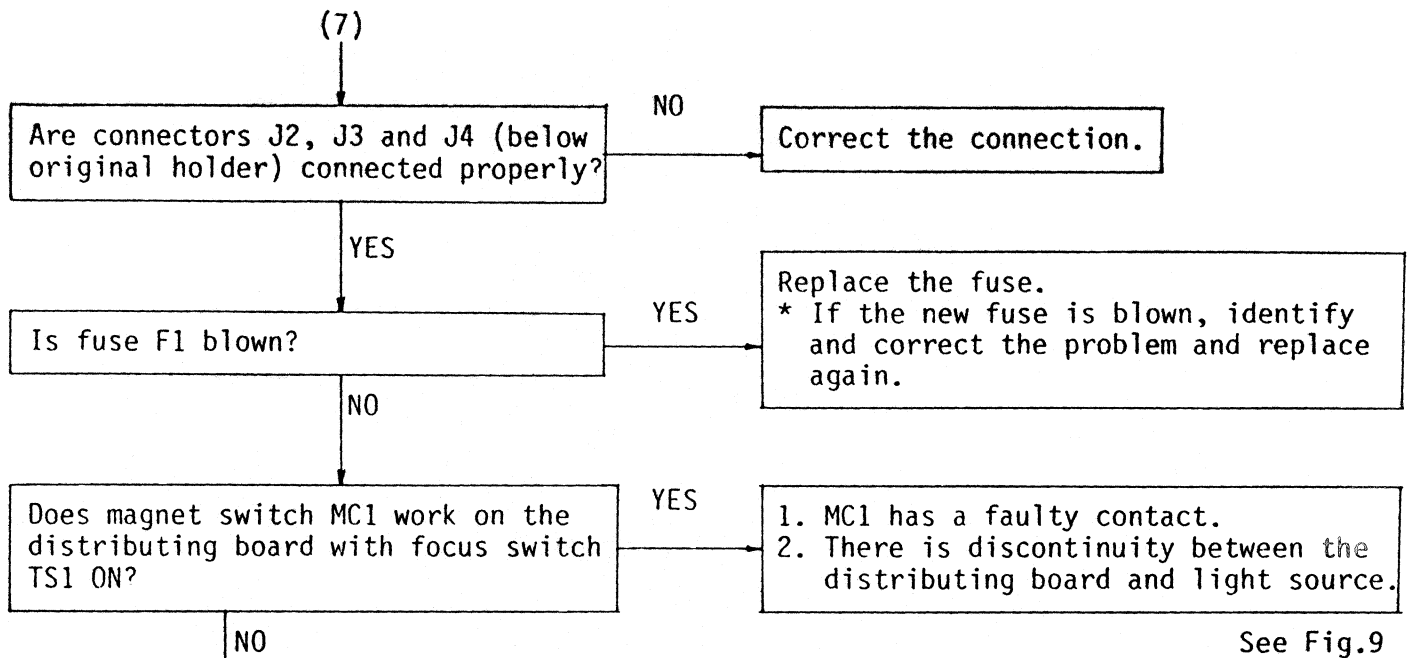
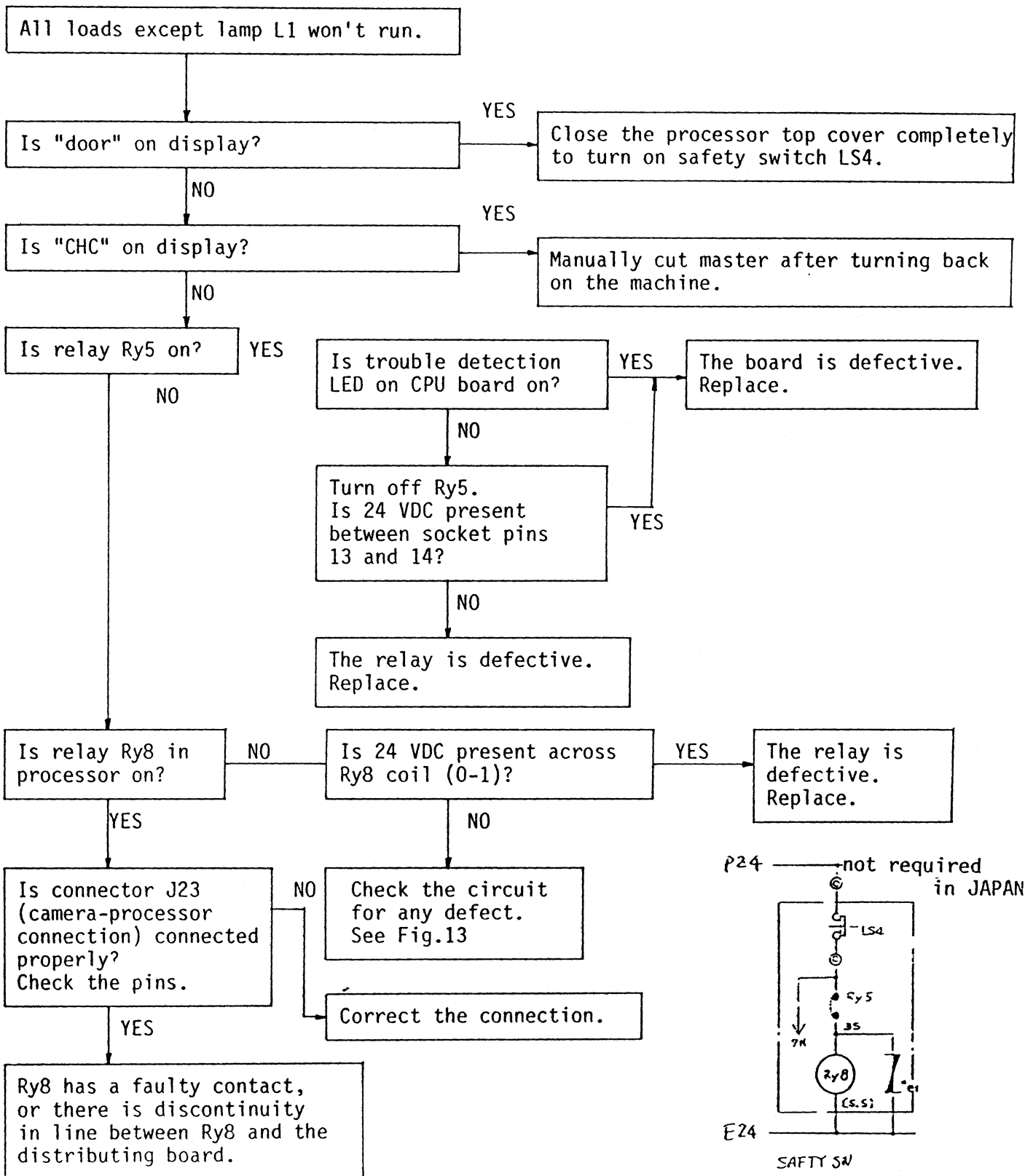


Fig.7

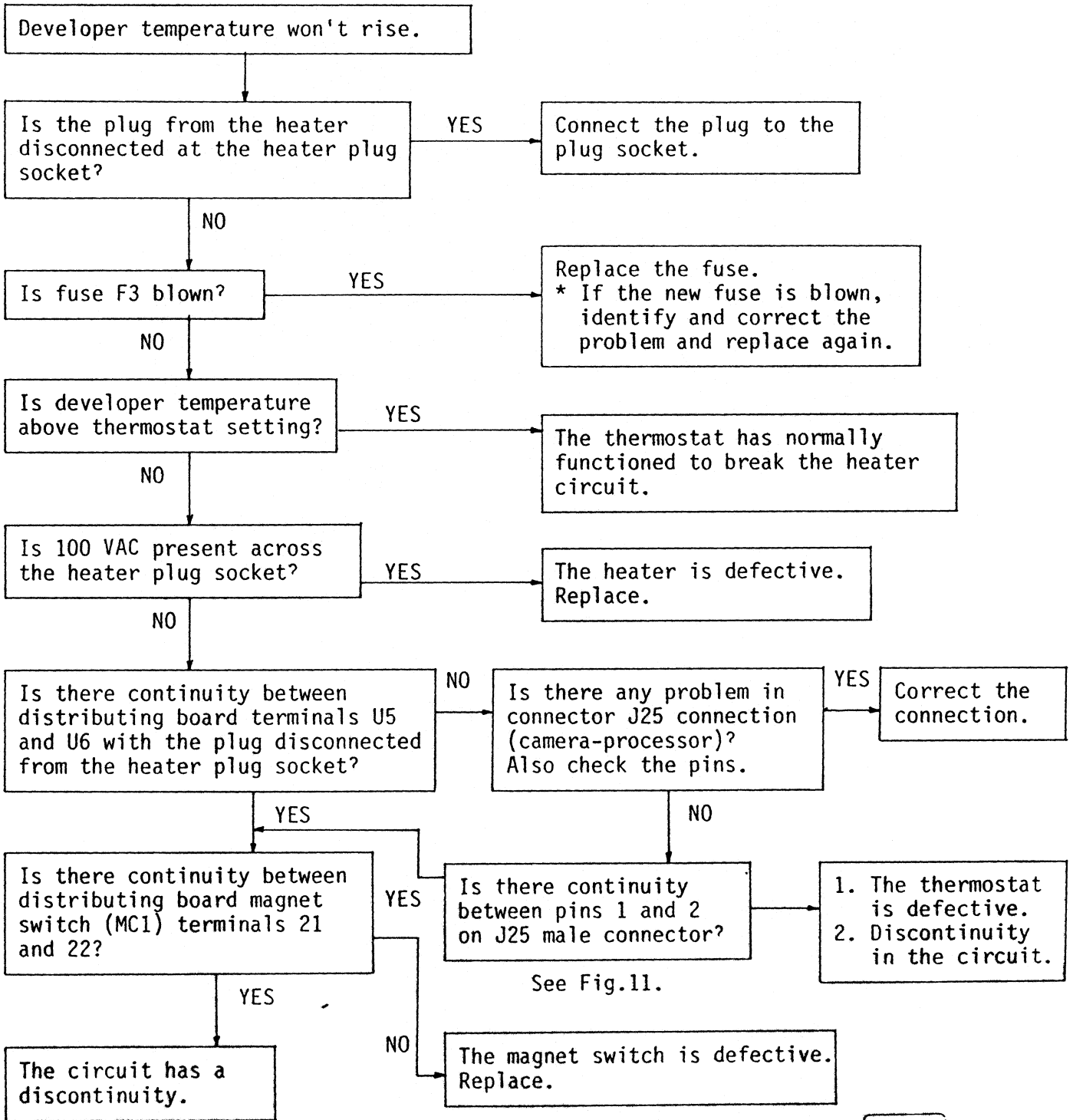


9.3.5.4. All loads except the lamp for copy positioning, L1, won't run.
 (machine for use outside Japan)



9.3.5.5. Developer temperature won't rise.

1. The heater should not work during exposure.
2. The heater should not work with the processor top cover open.



See Fig.10.

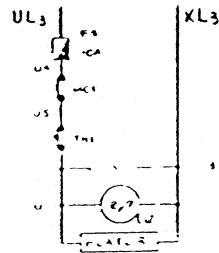


Fig.10.

DEV. HEATER

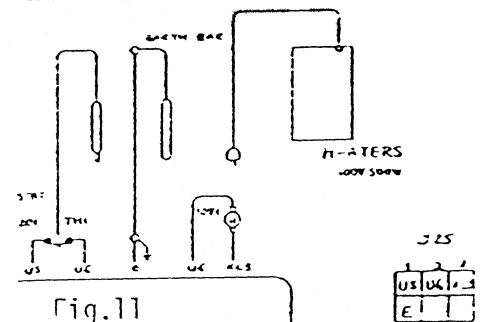
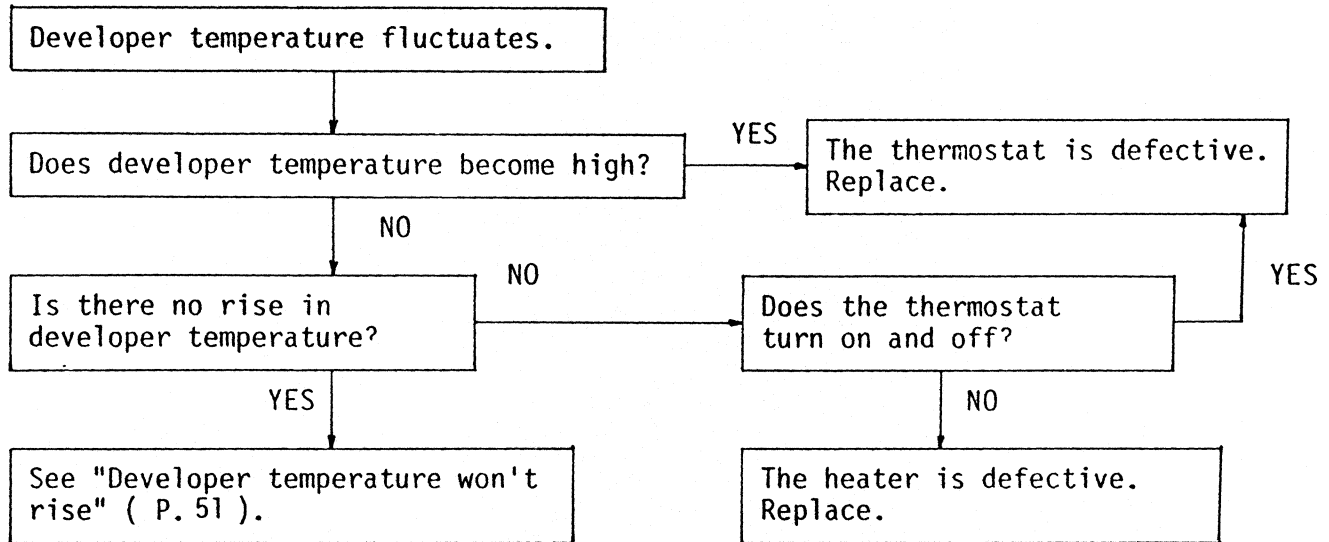


Fig.11



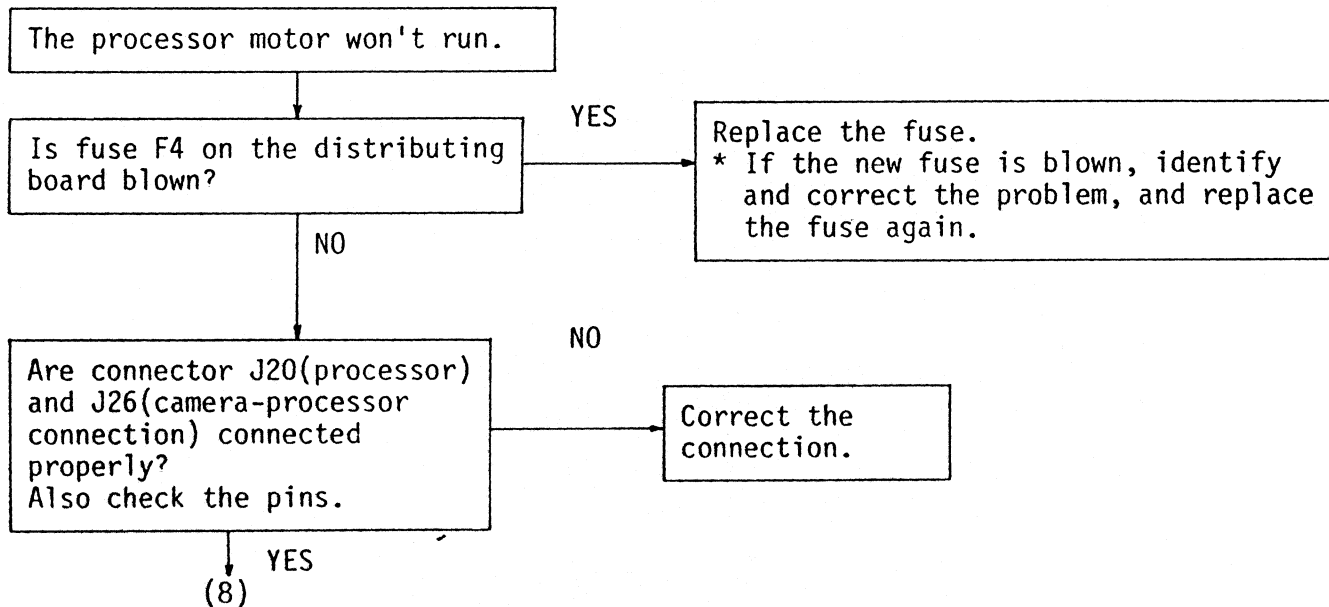
9.3.5.6. Developer temperature significantly fluctuates.

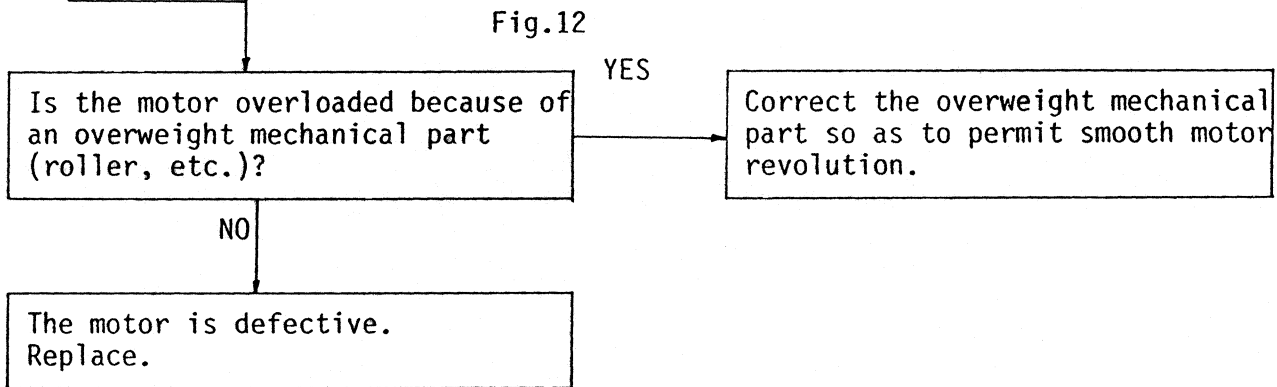
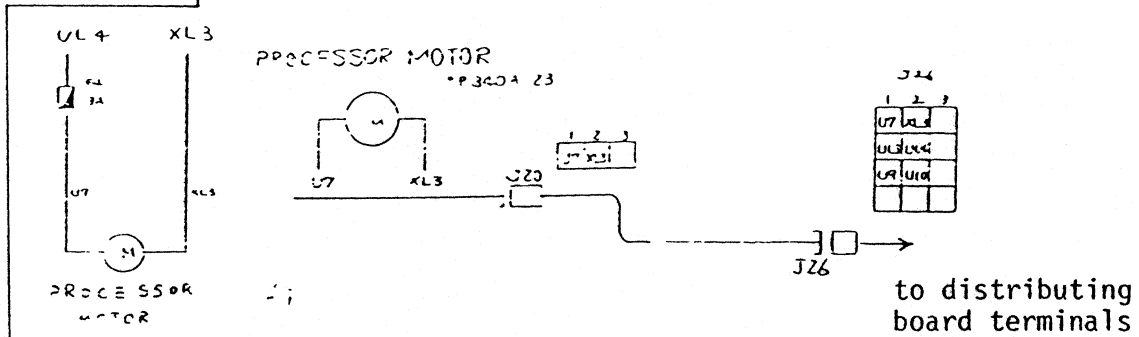
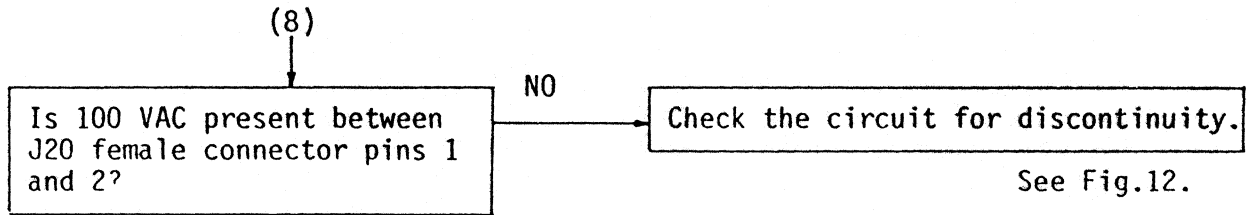


9.3.5.7. The processor motor won't run.

(Machines for use outside Japan)

1. The motor should not run with the processor top cover open.
2. The motor should stop running if master feed trouble occurs.

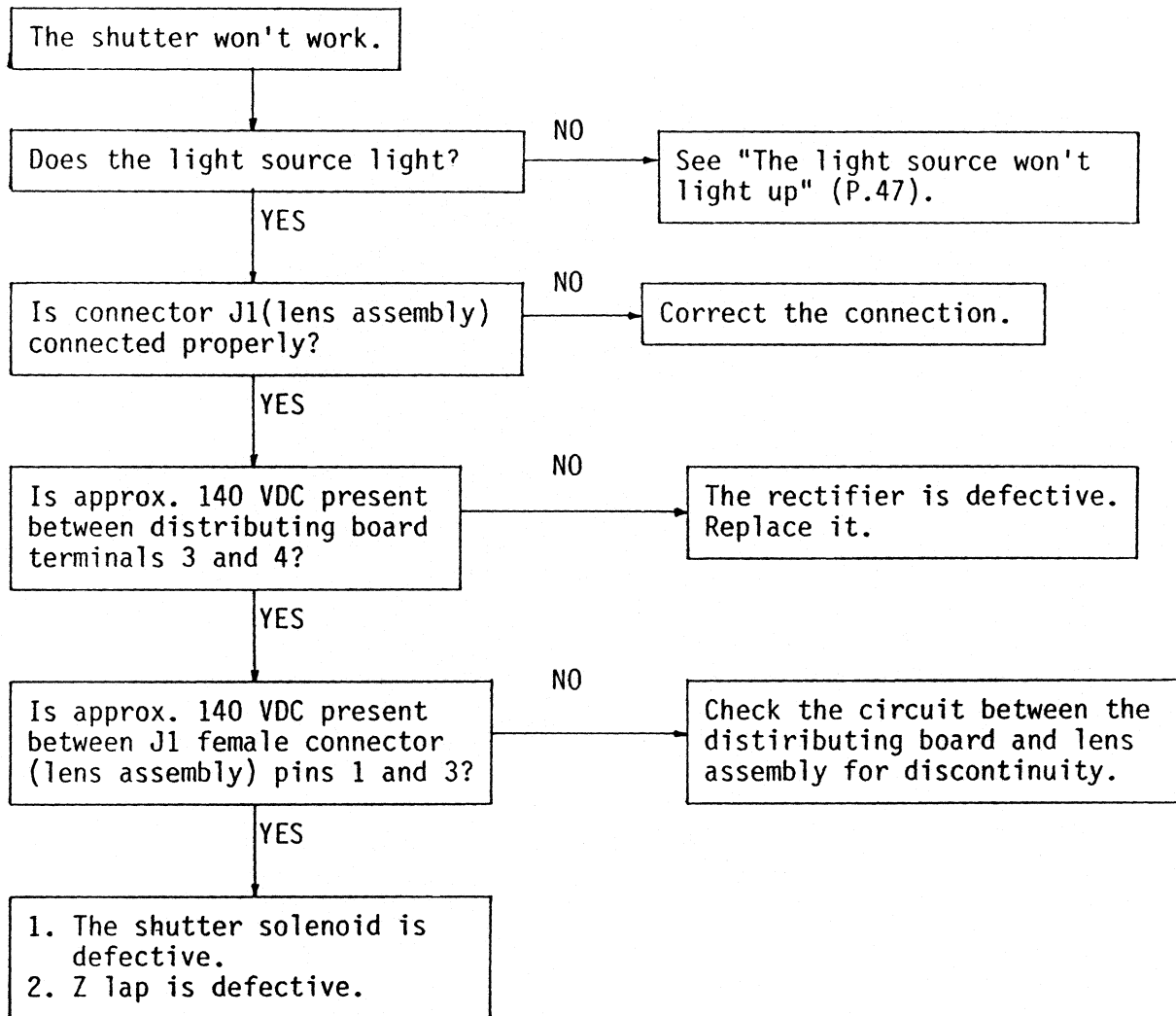




9.3.5.8. The shutter won't work.

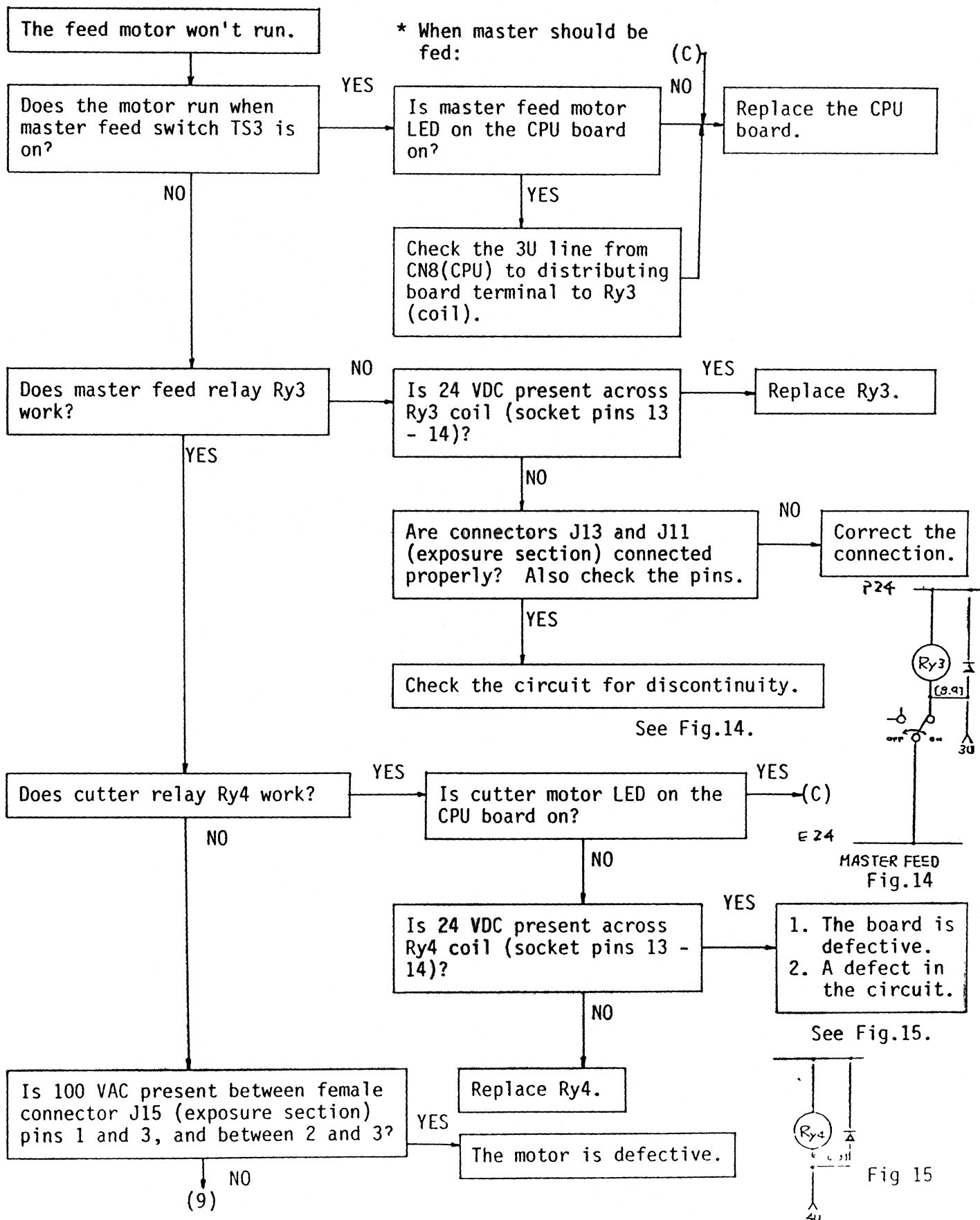
(Machine for use outside Japan)

1. The shutter should not work with the processor top cover open.
2. If master feed trouble occurs, the shutter should not work.



9.3.5.9. The master feed motor won't run.

1. The feed motor should not run during cutter motion.



(9)

There is discontinuity in the circuit (faulty contact of connector).

See Fig.16

9.3.5.10. The vacuum fan won't run.

1. The fan won't run during master feeding.

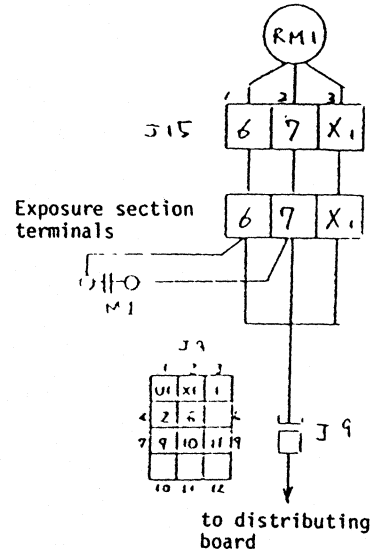
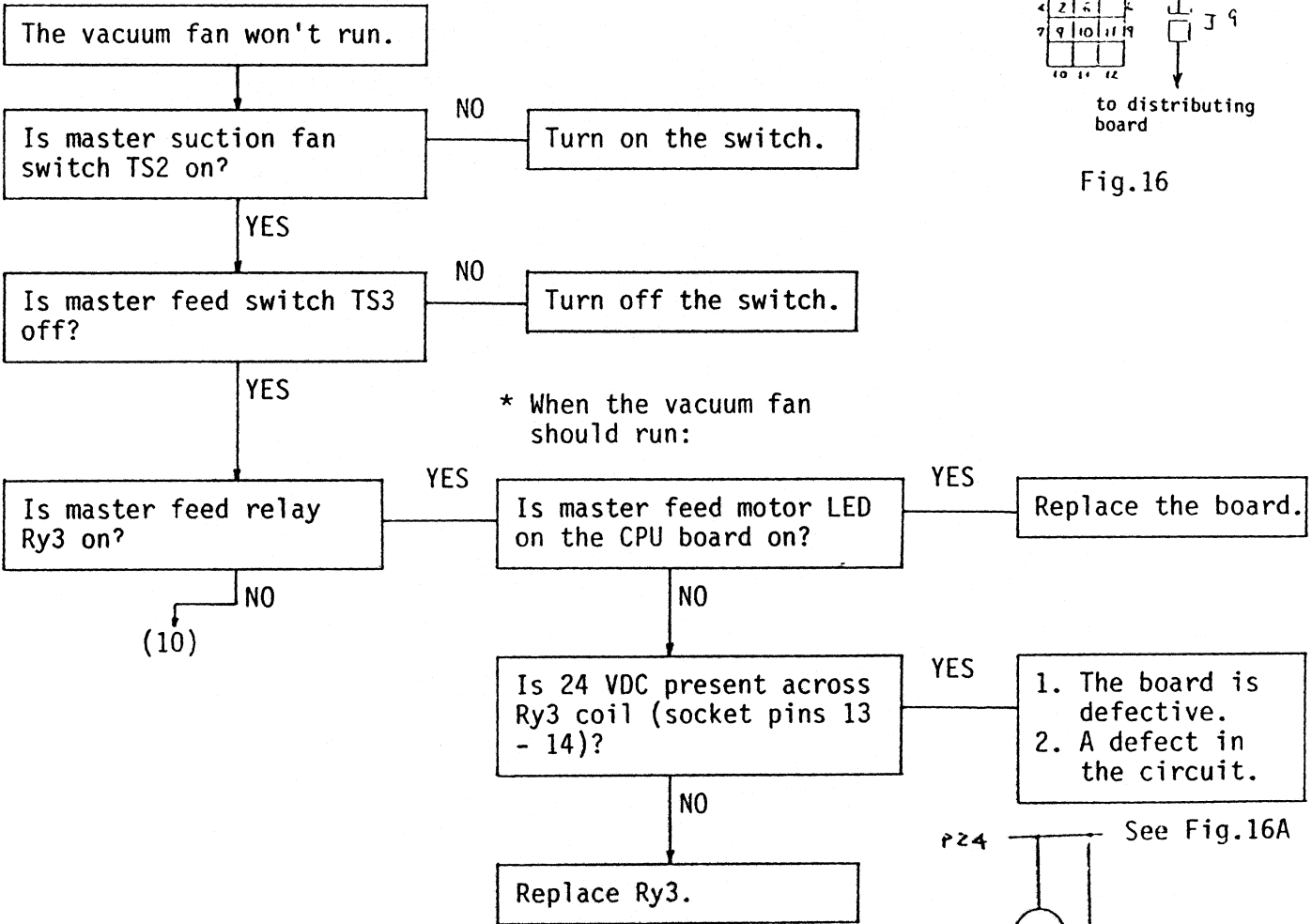


Fig.16

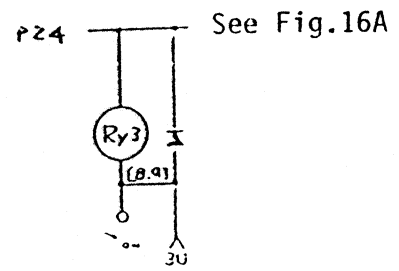


Fig.16A

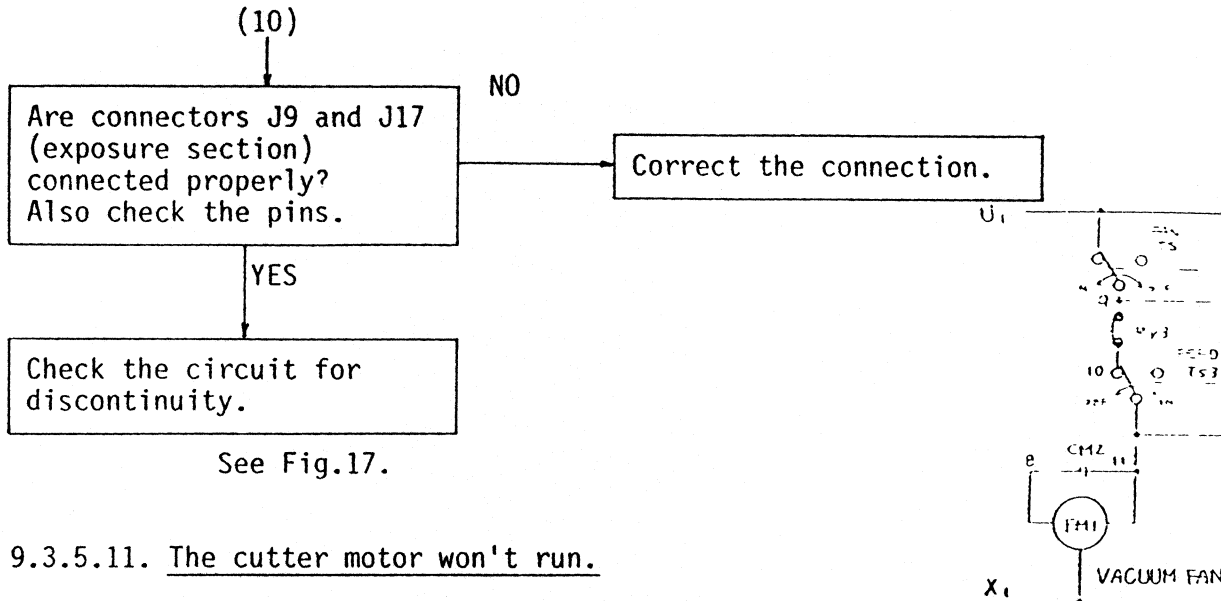
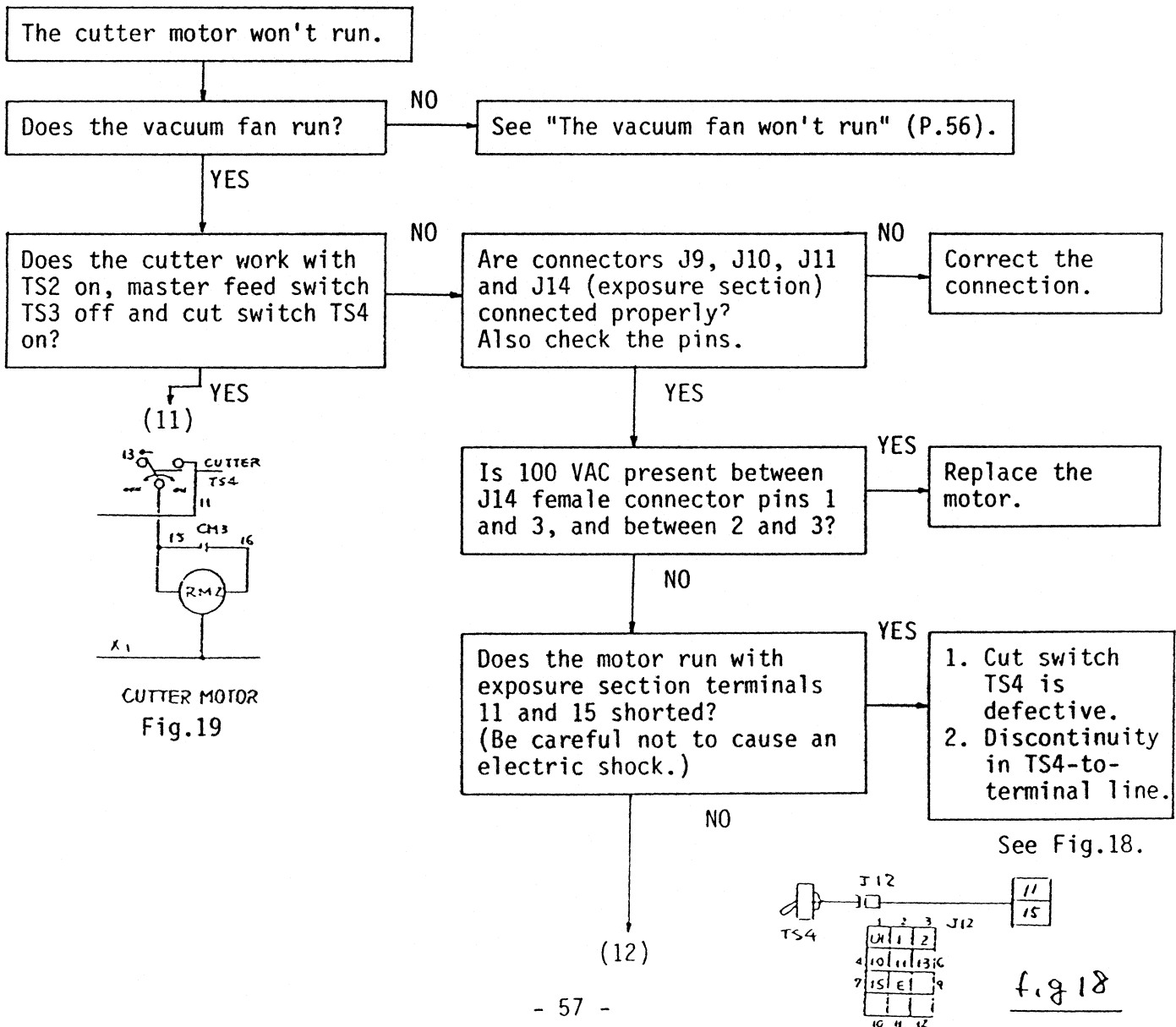


Fig.17.

9.3.5.11. The cutter motor won't run.

1. The motor should not run unless master suction fan switch TS2 is on.

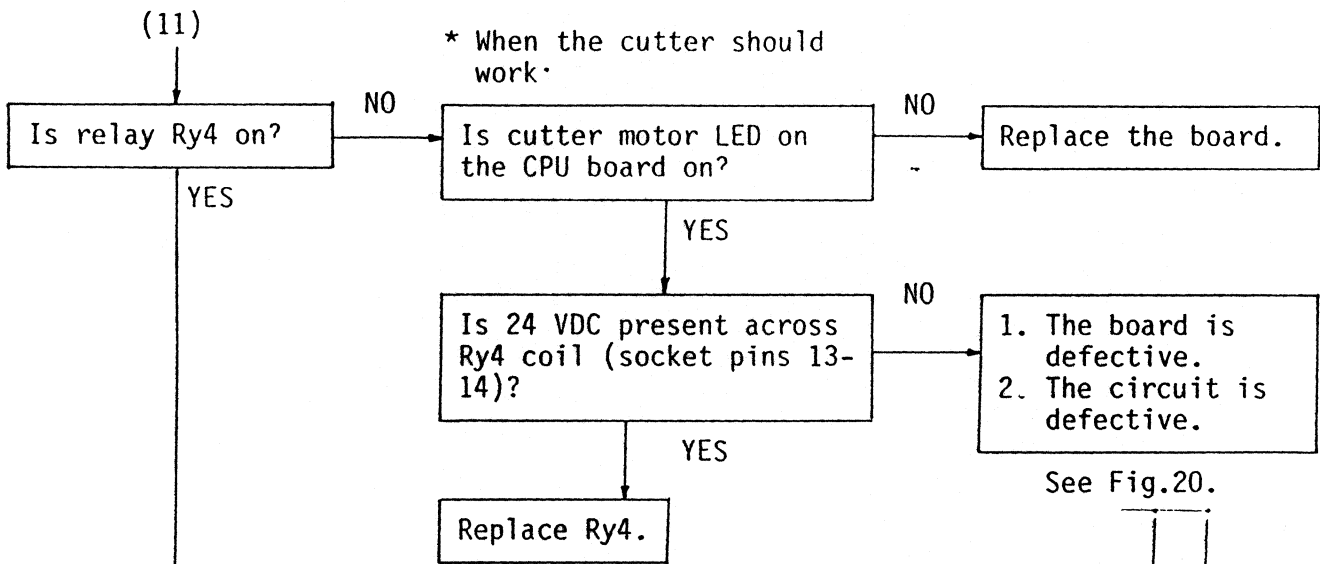


(12)

The circuit has a discontinuity.

See Fig.19.

(11)



See Fig.20.

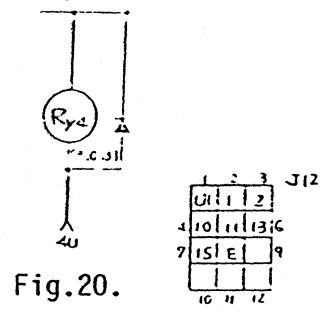


Fig.20.

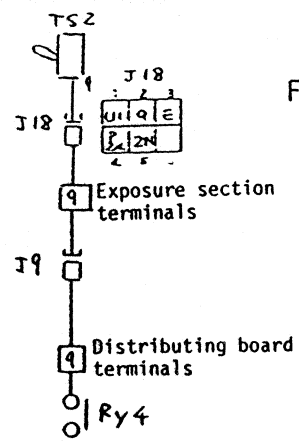
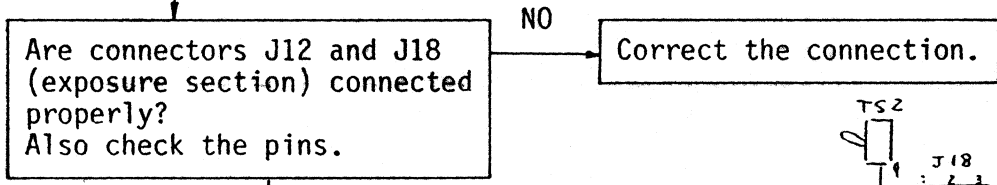


Fig.21.

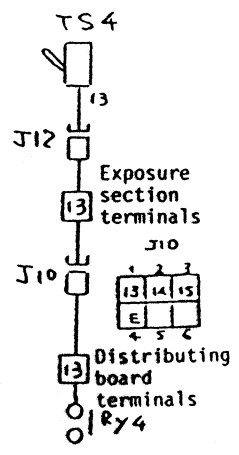


Fig.22.

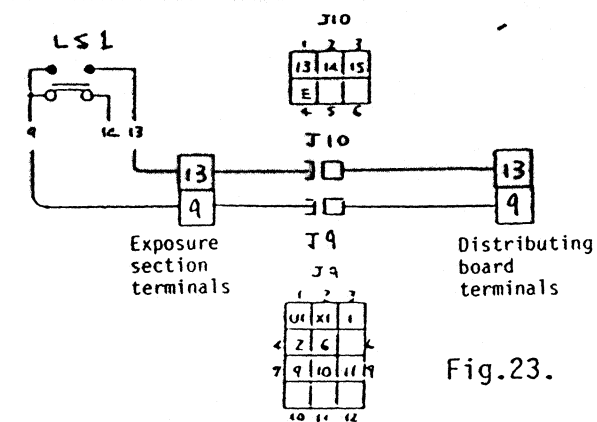
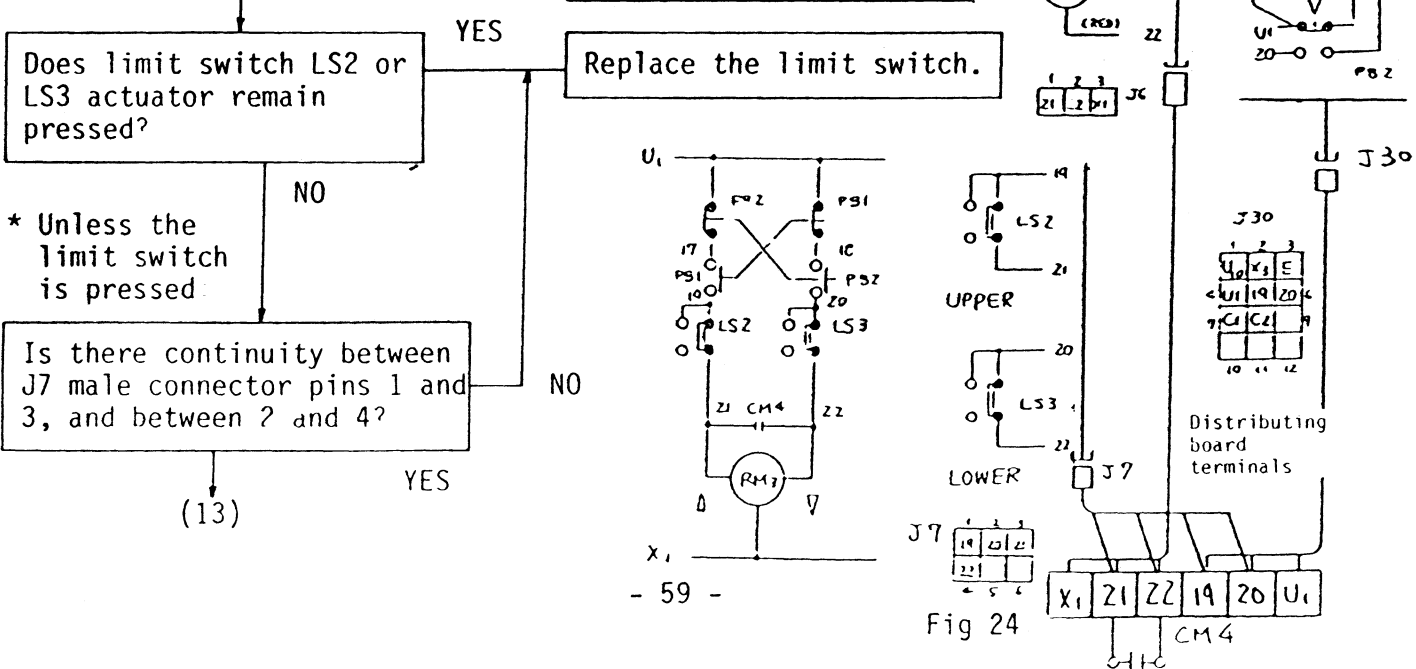
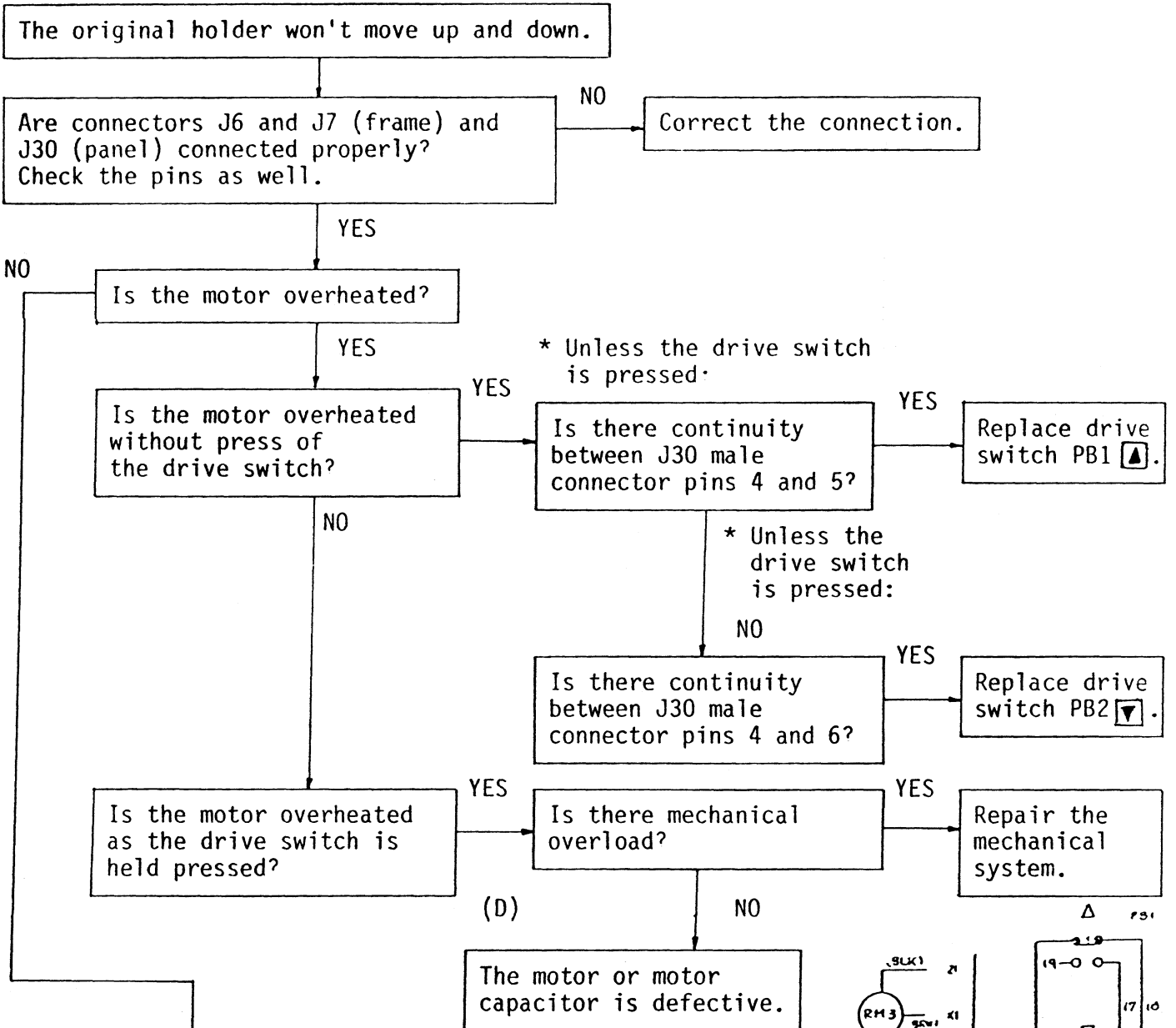
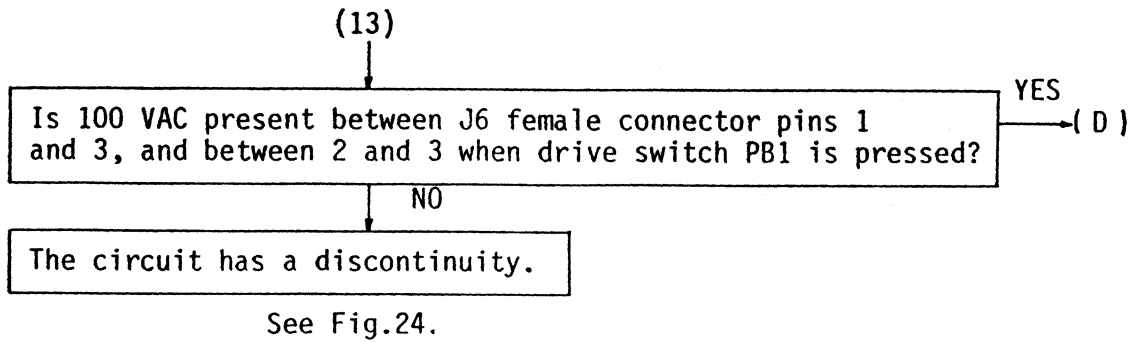


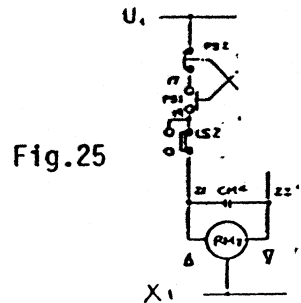
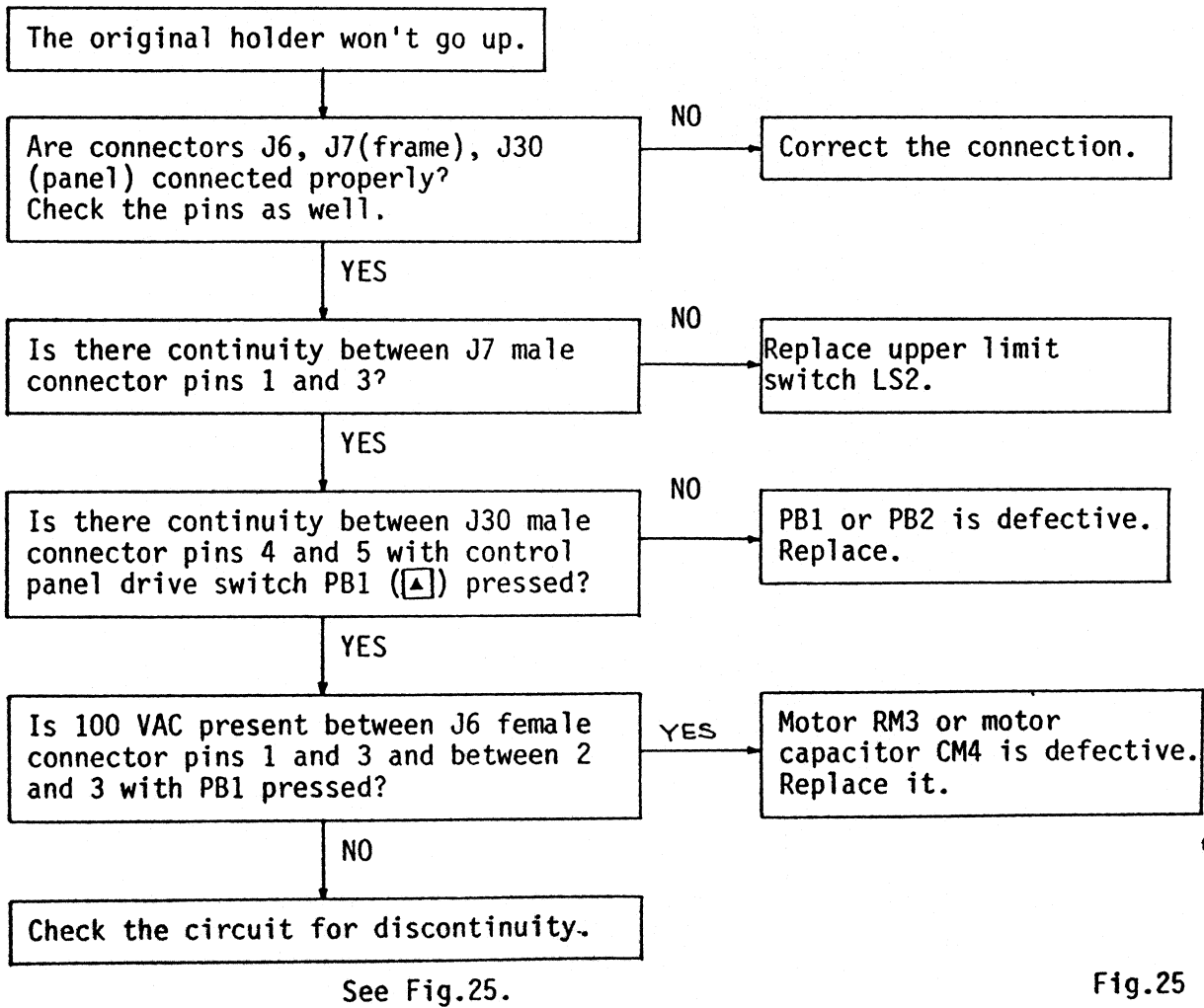
Fig.23.

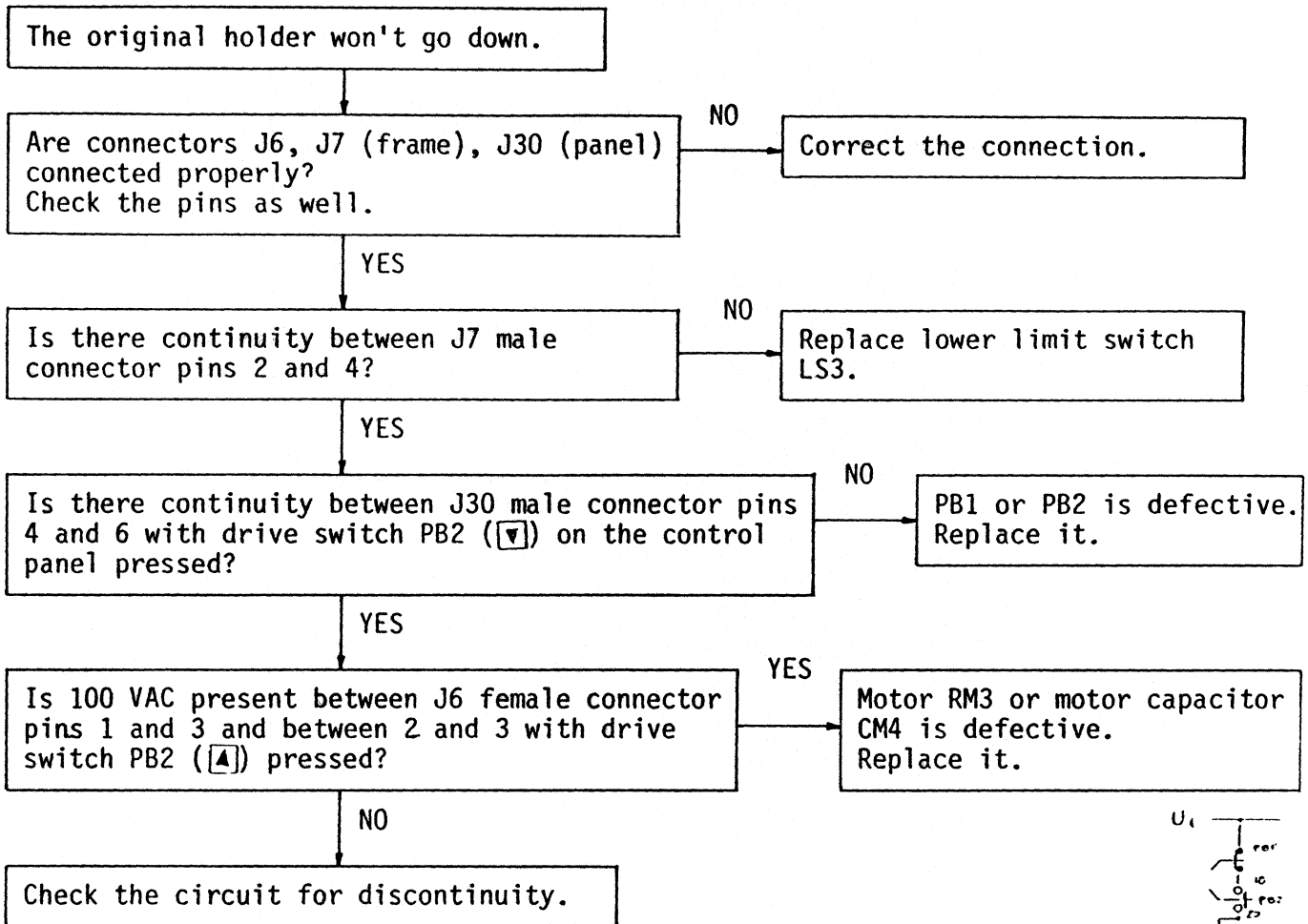
9.3.5.12. The original holder won't move up and down.





9.3.5.13. The original holder won't move in a direction.





See Fig.26

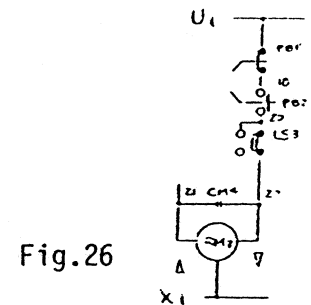


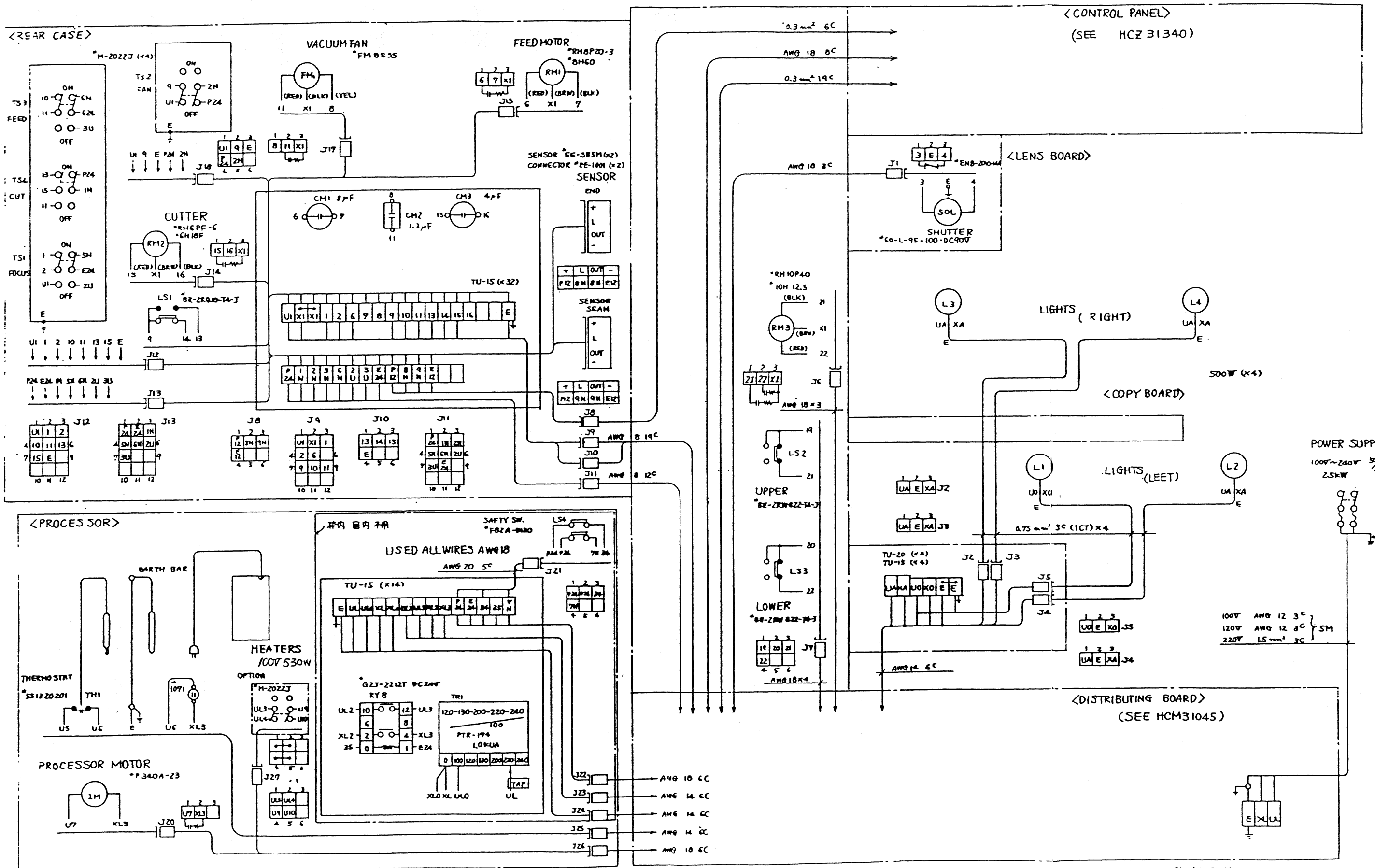
Fig.26

9.3.5.14. CPU or Panel Board Failure

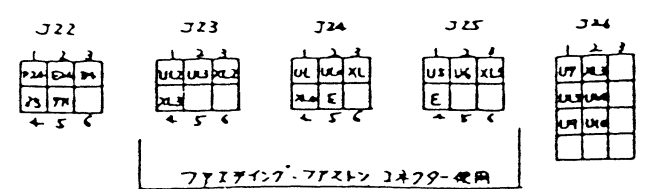
- (1) Failures of the machine should be classified into two groups: conventional control circuit failures and microcomputer-related failures.
- (2) The microcomputer is programmed so that the machine operates as specified. This program controls the relays, motors and heater. If input is impossible (the keyboard won't work), or it is impossible to proceed to the next step, the printed-circuit board should be suspected to be defective.
- (3) Input signals, which are judged by the microcomputer according to the program, are important. The signals from the sensors and microswitches are checked by the signal check LEDs (red) on the printed-circuit board. Be sure to make sure that these signals are all normal. See 9.2.1.
- (4) Depress the keys on the control panel to see if data input can be made normally. If data input through the keys is impossible, replace the panel board or CPU board.
- (5) The "CPU-in-operation" LED on the CPU board should be on.
- (6) Check the 5 V and 12 V power supplies to the CPU.

If the CPU fails, either of the following conditions exists:

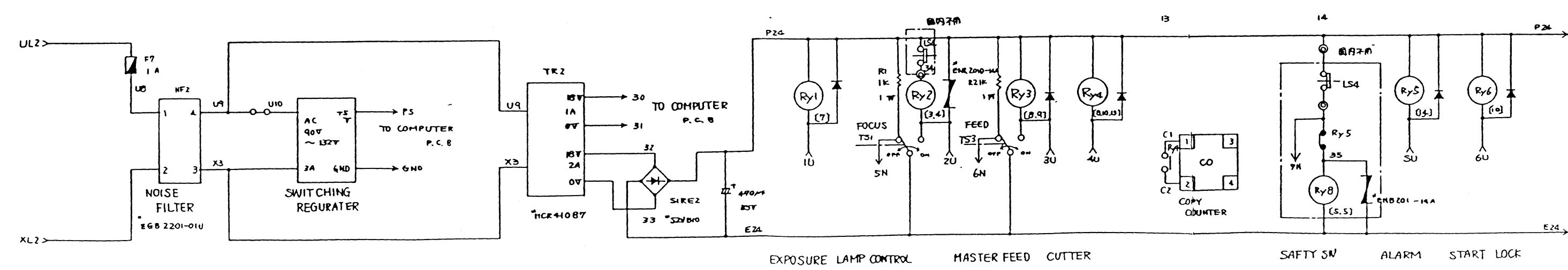
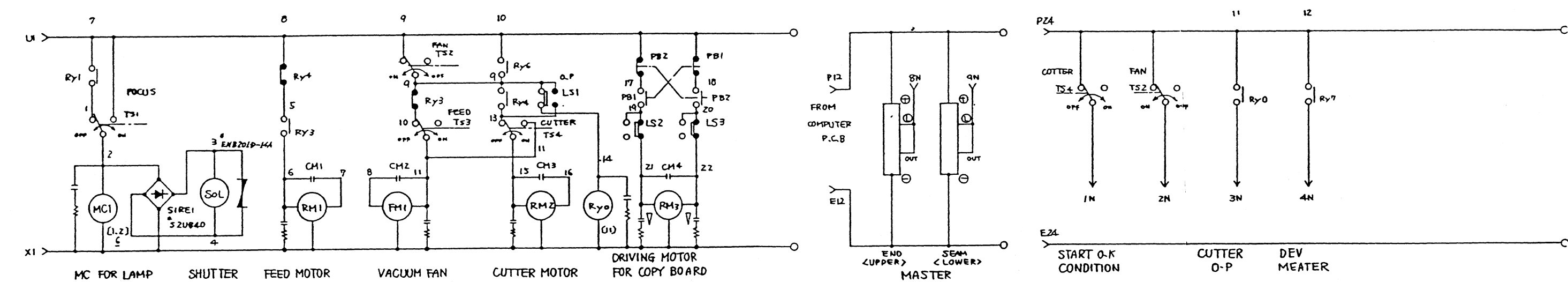
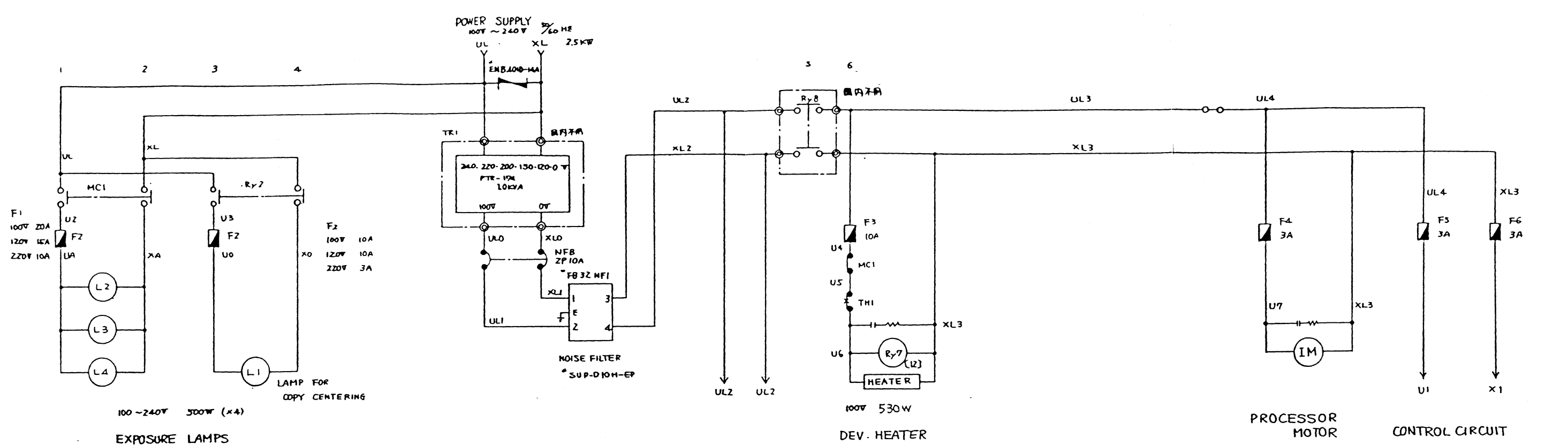
1. A meaningless display appears.
2. The display is ineffective.
3. Data input is impossible.
4. The light source, cutter, motor or other load device operates irregularly.



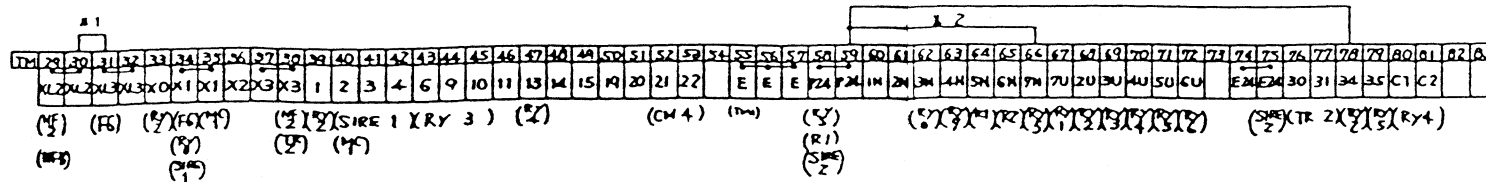
25030-2411 ~



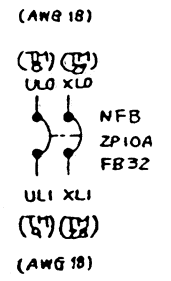
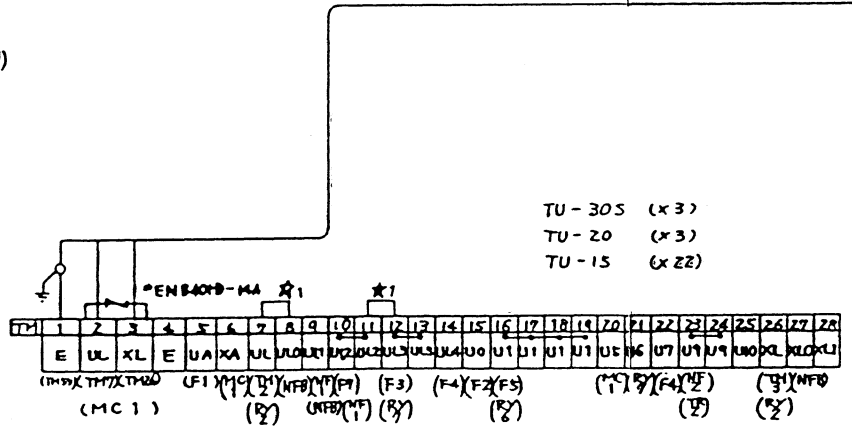
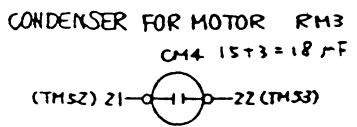
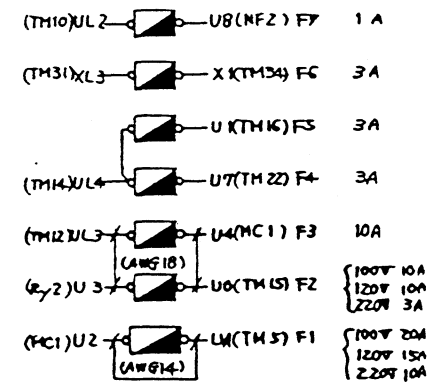
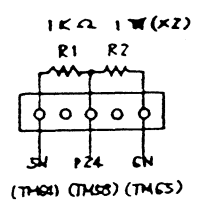
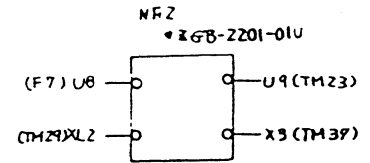
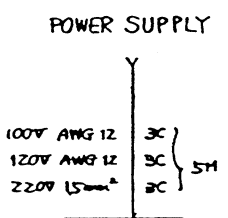
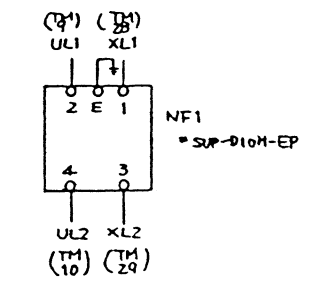
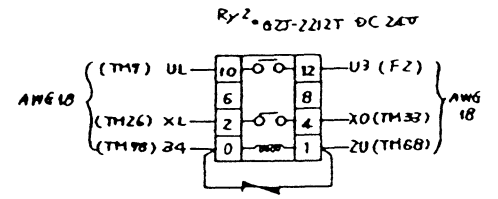
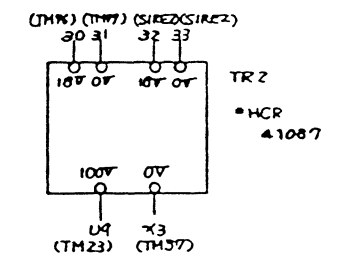
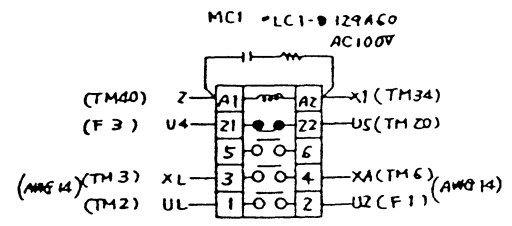
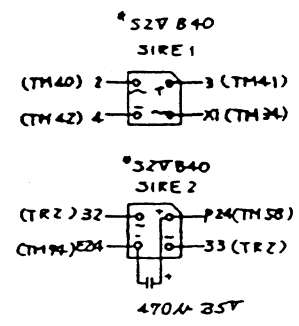
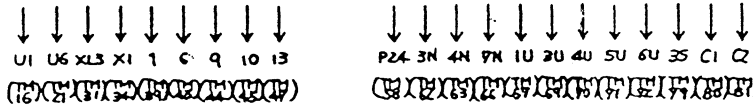
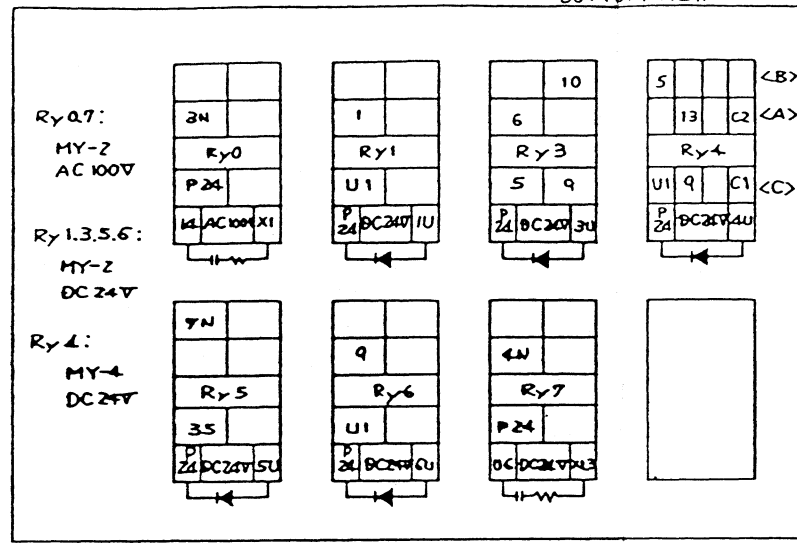
HCW 31588

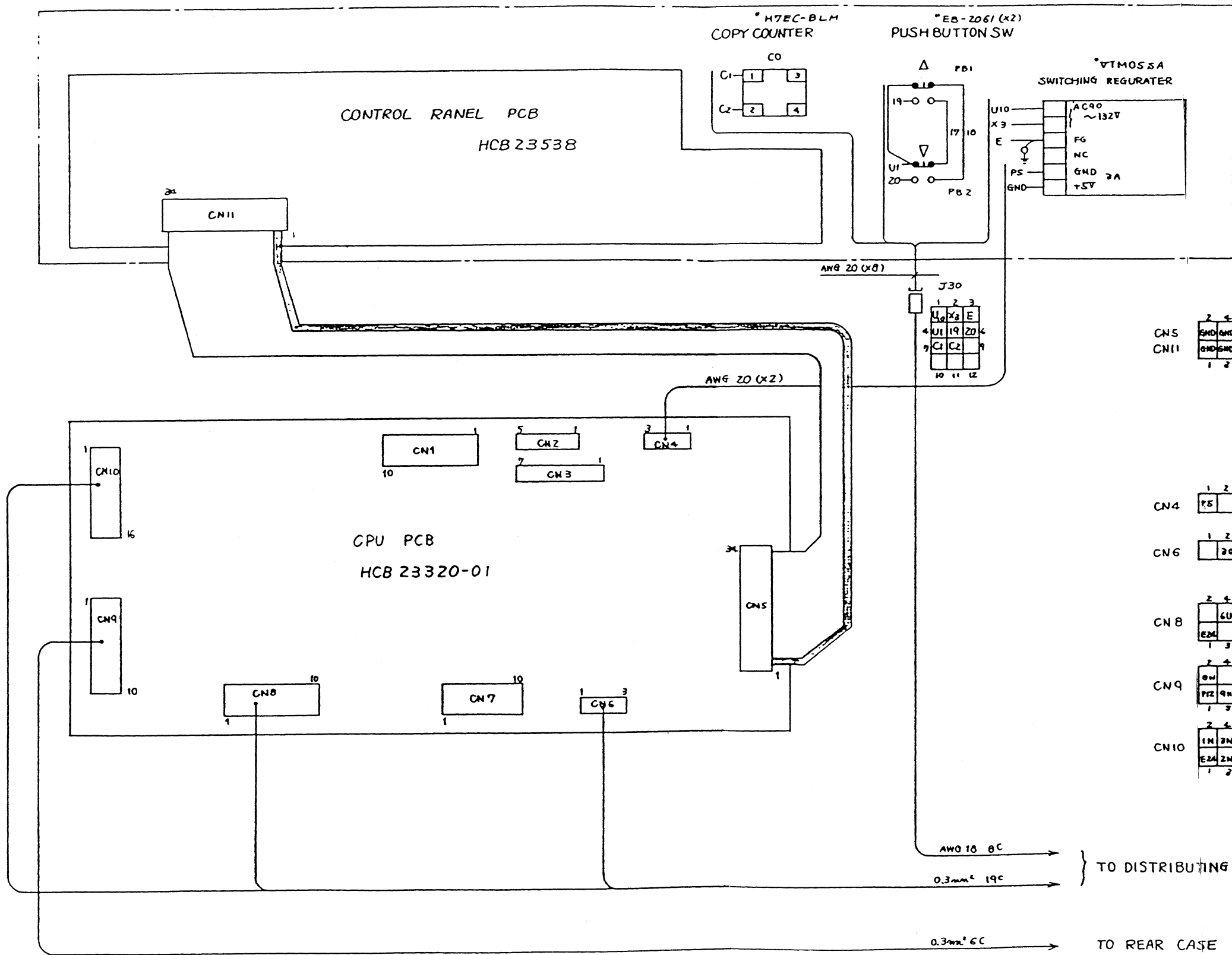


→ = 1S1S PS
 ← = CR-1



BOTTOM VIEW





CN5
CN11

2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34
GND	GND	BU	OA	OA	OB	OB	S2	S1	SH	PT	R7	R5	R3	R1	PS	PS
GND	GND	GND	OB	OA	OB	OB	S2	S0	CA	CL	RC	RC	AZ	RO	PS	PS
1	2	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33

CN4

1	2	3
PS		GND

CN6

1	2	3
	20	21

CN8

2	4	6	8	10
GU	GU	ZU		
E24	SU	ZU	IU	
1	3	5	7	9

CN9


2	4	6	8	10
OM				
PIZ	QM		EIZ	
1	3	5	7	9

CN10

2	4	6	8	10	12	14	16
1M	2M	3M	4M	7M			
E24	ZM	4M					
1	2	5	7	9	11	13	15

AWG 18 8C } TO DISTRIBUTING BOARD
 0.3mm² 19C }
 0.3mm² 6C } TO REAR CASE TERMINAL

製作上の注意

1. アース線の固定には歯付ワッシャーを使用する事。
 又、 マークの銅板を貼る事。