

MITSUBISHI  
SILVER MASTER

CP-500SII

SERVICE MANUAL

DAINIPPON SCREEN MFG. CO., LTD.

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## 1. INTRODUCTION

This Manual is intended to be used for after-sale service on CP-500SⅡ. For operation of the machine and other details, refer to "CP-500SⅡ OPERATION MANUAL", "TECHNICAL GUIDE" and other related documents. Bear in mind that the machine structure and specifications are subject to change without notice.

For parts ordering or consultation, let us know the following information, referring to "CP-500SⅡ PARTS LIST".

- ° model (CP-500SⅡ)
- ° serial number
- ° reference numbers and descriptions of parts
- ° required quantities
- ° date of delivery

\* Publication and duplication of this document are prohibited.



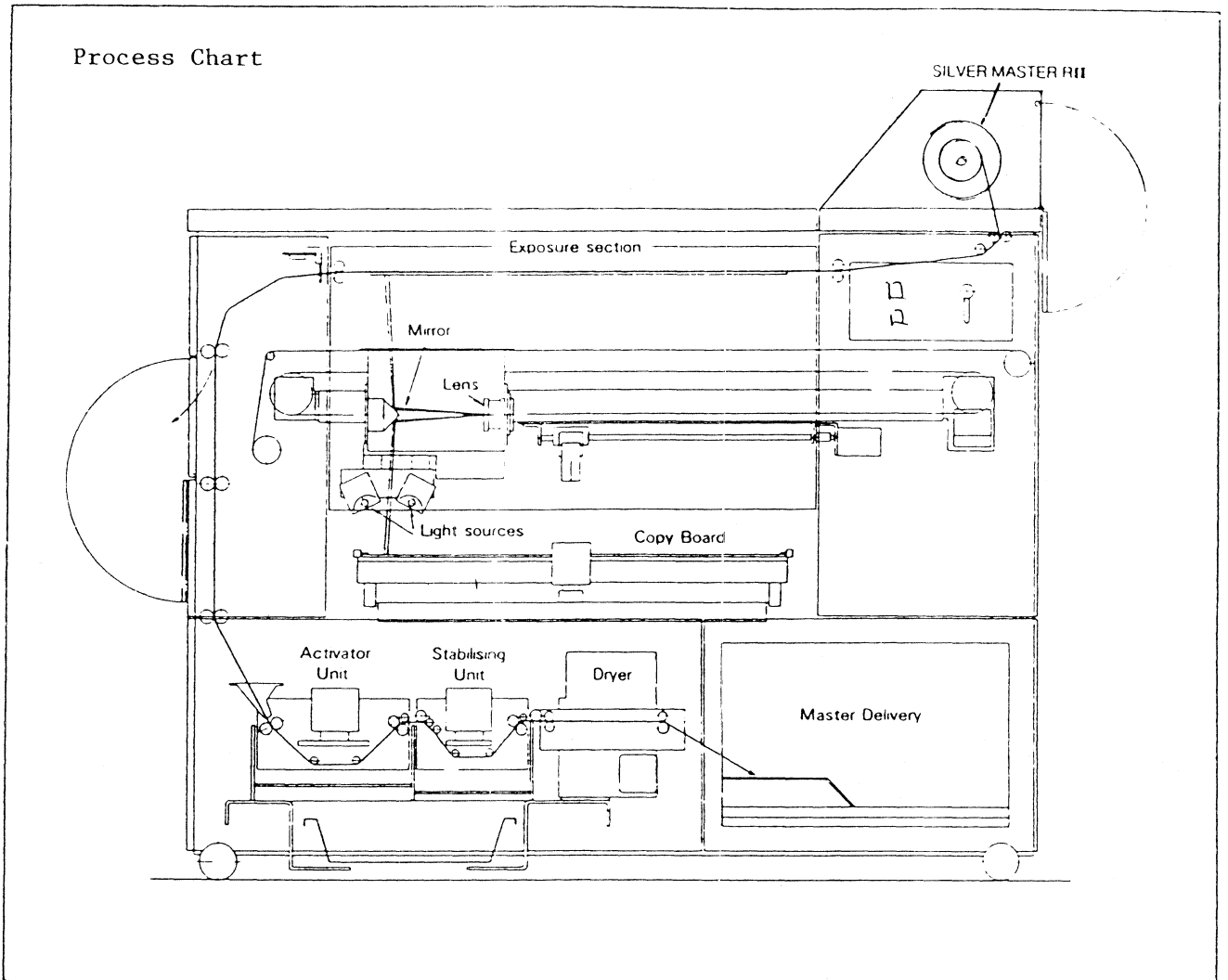
## 2. SPECIFICATIONS

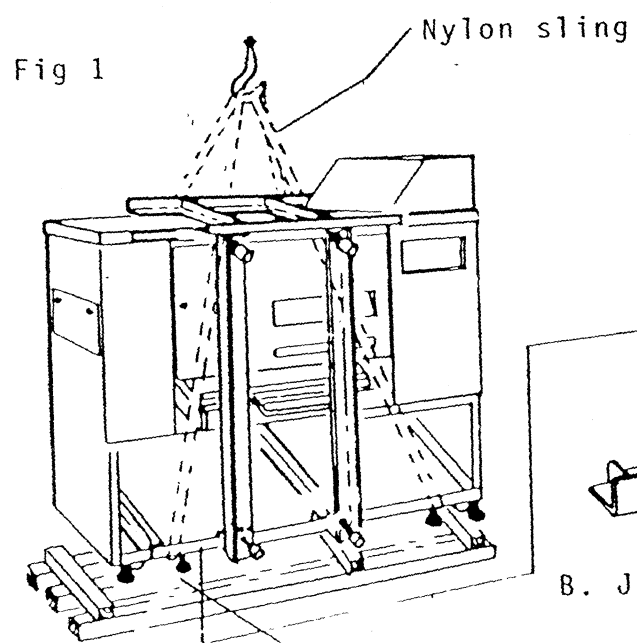
- ° Master width: 254 mm (10"), 279 mm (11"), 305 mm (12")  
404 mm (15.9"), 508 mm (20"), 550 mm  
(21.5/8"), 570 mm (22.4")  
Master roll is used with a size variable  
slide spool.  
(spool shaft diameter: 25)
- ° Master to be used: SLM-R11, SLP-F
- ° Master feed length: 370 mm - 820 mm
- ° Effective exposure size: 550 mm x 790 mm
- ° Blank exposure: 570 mm x 820 mm
- ° Max. copy size: 550 mm x 790 mm
- ° Copy setting: Drawer type copy board  
Copy loading with its image face up  
Copy positioning sheet available
- ° Processor capacity: Developing (activator) tank: 18 liters  
Stabilizing tank: 16 liters
- ° Replenisher tank capacity: Activator, stabilizer each 2 liters
- ° Temperature control: 800 W panel heater with
- ° Dryer: 1 kW heater with thermo control and  
high-low switch
- ° Double exposure mode: (185 - 410 mm ) x 2
- ° Lens: f: 260 mm, in-mirror type

- ° Magnification: 100 % (fixed)
- ° Exposure method: Slit system (scanning by lens & light sources.)
- ° Exposure control: Power thyristor (with light-level slide control)
- ° Light sources: Two halogen lamps, 130 V, 1.5 kW
- ° Independent switches:
  - Master SET button
  - Master REWIND button
  - DRYER HIGH/LOW changeover switch
  - Defogger fan/heater switch (for exposure section)
  - Defogger fan switch (for mirror)
  - Master takeout FEED switch
  - Master CUT switch
- ° Master rewind: Auto rewinding with a button
- ° Master splice detection: Alarm buzzer, automatic over-cut
- ° Dehumidifier: Defogger fan & heater (usually ON)
- ° Platemaking rate:
  - 660 mm/min
  - Initial: 120 sec (60 Hz)
  - 140 sec (50 Hz)
  - Cyclic: 58 sec (60 Hz)
  - 68 sec (50 Hz)
- ° Machine dimensions:
  - 1860 (W) x 920 (D) x 1660 (H) mm
  - (top cover open: height 1850 mm)
  - 2020 (W) x 1030 (D) x 2000 (H) at use
  - of miniature darkroom

- ° Weight: 650 kg (Main unit 550 kg; Processor 100 kg)  
700 kg (processing solutions and master roll included)
- ° Electricity: 100 V, 1.2 kW, single phase 50 or 60 Hz  
200 V, 6.1 kW, single phase
- ° Option: Total counter  
Miniature darkroom

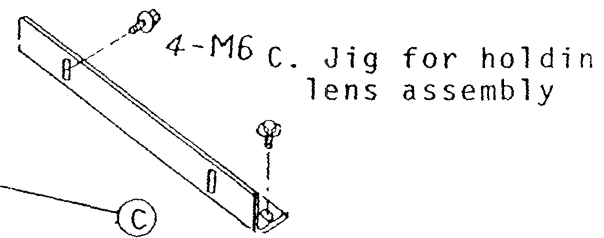
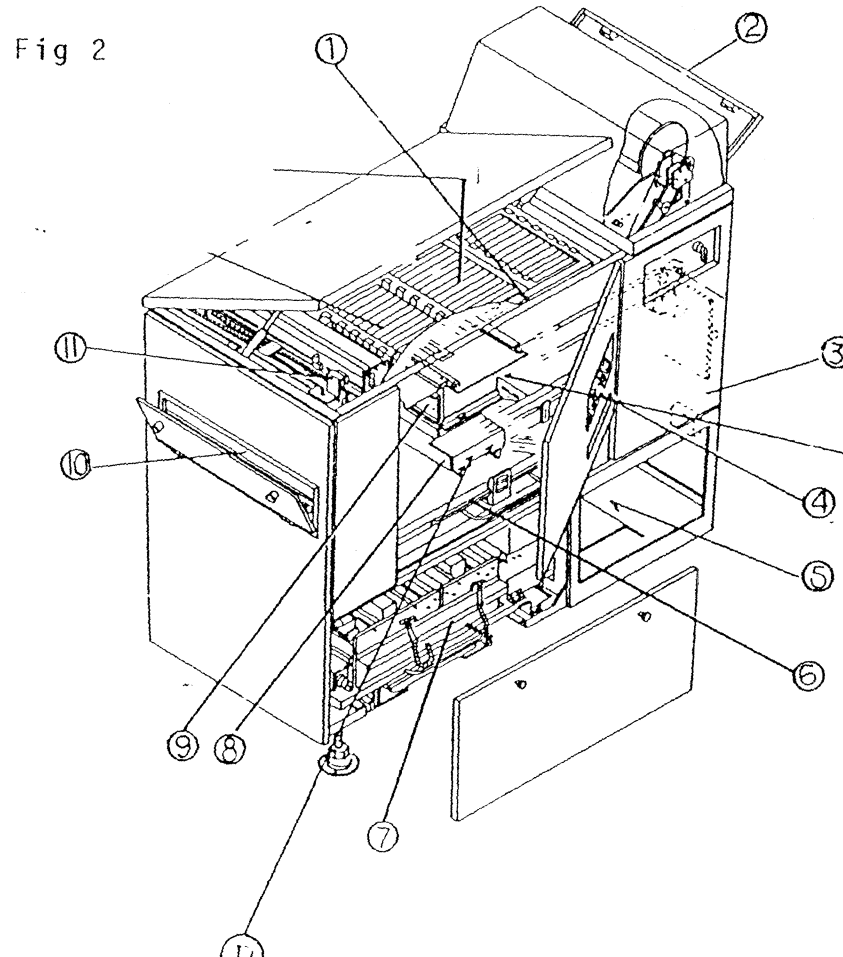
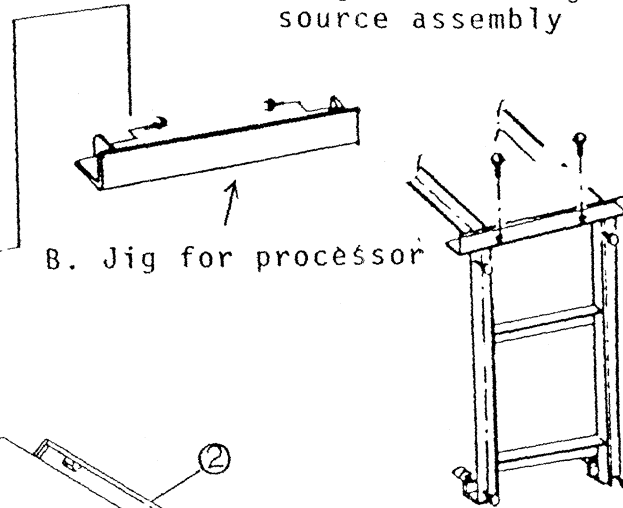
4. PROCESS CHART



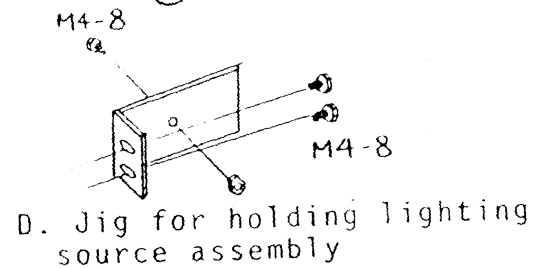


[Jigs]

- A. Jigs for lifting main unit (3 pcs). ... Send them back to the factory.
- B. Jig for processor
- C. Jig for holding lens assembly
- D. Jig for holding lighting source assembly



- (1) Exposure Section
- (2) Master Magazine
- (3) Switchboard
- (4) Main Control Panel
- (5) Master Receiver
- (6) Original Holder
- (7) Processor/Dryer
- (8) Light Source
- (9) Lens/Mirror Assembly
- (10) Carrier (intermediate paper outlet)
- (11) Cutter



## [Unpacking]

### A. Main Unit

- (1) Remove the crate except the crate bottom frame.
- (2) Hitch the nylon slings to the lifting bolts on the main unit bottom and lift the main unit to remove the crate bottom frame (fig.1)  
Remove the jig for lifting the main unit referring to Fig. (4-M10)
- (3) Casters on the bottom of the main unit can be used for carrying the unit.

### B. Processor

- (1) Remove the crate.
- (2) Lift the processor to remove the crate bottom frame.
- (3) Casters on the bottom of the processor can be used for carrying it.

## [Installation]

- (1) Carry the main unit to the installation site and put the leg seats under four adjust bolts.
- (2) Remove the middle and lower rear covers.
- (3) Open the top cover of the exposure section, cut the band for holding the compression plate and hook the handle to the top cover.
- (4) Put a sheet of clean paper on the exposure glass and put a level on it. Adjust with the adjust bolts until the main unit is held in the horizontal position. Keep the four casters free or off the floor.
- (5) Once remove the jig securing screws (2-M6) to take off the jig and reinsert them to secure the rails (after leveling the main unit, tighten the bolts on both sides of the processor a little.)
- (6) Carry the processor and lift its rear to put the wheels on the rails. Connect the processor and the main unit through connectors J5A, J22, J24, J25 and J74 and secure its cord with the cord retainer. Then push the processor into the main unit.

[Conditions for Installation]

- (1) Place the machine horizontally on a floor strong enough to withstand a machine weight of 650 Kg.
- (2) Avoid a place where there is vibration. The floor surface should not be rough.
- (3) Avoid a place exposed to direct rays of the sun.
- (4) Use wires which bear the supply power of 1ϕ 100V-1.2kw and 1ϕ 200v-6.4kw. Voltage fluctuation should be kept within ±10%.
- (5) Leave at least 40cm space around the main unit for servicing.

[Packing List]

When unpacking, be sure to check all parts against the packing list to make sure that no parts have been overlooked.

No	Parts Name	Qty	No	Parts Name	Qty
1	Main Unit	1	21	Cutter Blade	10
2	Processor	1	22	Blower Brush	1
3	Spool and Shaft	1 set	23	Mirror Cleaning Spray	1
4	Halogen Lamp	2	24	Metal Polishing Compound	1
5	Replenisher Bottle	2	25	Retouching Paints	1each
6	Master Guide	1	26	Brush for paints	1each
7	Vat	1	27	Spring Belt	3
8	Tunnel	1	28	Enclosed Fuse 30A	2
9	Measuring Cup	1	29	Glass Fuse 15A	2
10	Leg Seat	6	30	Glass Fuse 10A	2
11	Light Source Shield	1	31	Glass Fuse 5A	2
12	Master receiver cover	1	32	Glass Fuse 3A	2
13	Processor Cover	1	33	Glass Fuse 2A	4
14	Fluorescent Lamp	1	34	Glass Fuse 1A	2
15	Test Chart	1	35	Glass Fuse 0.5A	4
	Sample Original	1	36	Glass Fuse 0.1A	2
16	Original Manual	1	37		
17	Technical Guide	1	38		
18	Drain Disposal Manual	1	38		
19	Wall-stuck Operating Instruction	1	40		
20	Tool Set	1			

- (7) Put down the processor casters on both side of the processor until they touch the floor and tighten the caster lock bolts. (Fig.3)
- (8) Remove the jig for holding the lens assembly by removing 4-M6 bolts.  
Remove the jig for holding the light assembly by removing 4-M6 bolts. (Fig.2)
- (9) Take away the band binding the original holder. (The holder is bound on both its operation and non-operation side.)
- (10) Remove the lens cap; remove the screws (2-M4) securing the slit plate on the bottom of the lens assembly, and hold the plate handle to draw out the plate to the right.  
The lens cap is in the main unit.
- (11) Install the halogen lamps with their markings (130V,1500 W) facing the operator. (For the installing method and precautions, refer to "Operation Manual".)
- (12) Install the light source shield.
- (13) Install the master receiver cover with four knurled screws.
- (14) Install the master guide and the drain vat to the processor. Remove the developing unit and the stabilizing unit from the respective tanks and clean the tanks and units. If the rollers don't turn smoothly, turn them by hand.
- (15) Take the line cord out of the main unit and lay it on the floor.  
Then attach the lower rear cover.



[Mixing processing solutions]

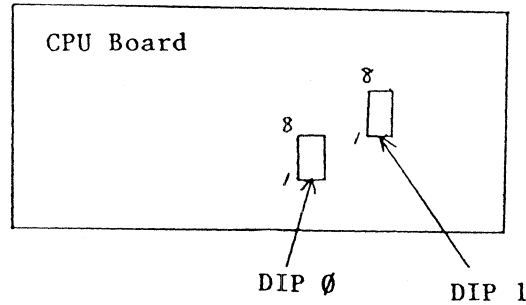
- (1) Prepare developing and stabilizing solutions according to "Operation Manual" and pour them into the respective tanks and replenisher bottles.
- (2) Load the replenisher bottles filled with replenisher on the respective unit.

[Connecting the Power Supply]

- (1) Set the 100V and 200V POWER switches on the sub-control panel to OFF.
- (2) After checking the power supplied in the building, connect the line cord.  
(Power requirement; 1 $\phi$  100V - 1.2 kw  
1 $\phi$  200V - 6.1 kw )
- (3) Be sure to earth the green grounding wires for 100V and 200V.

(Inspection and Adjustment)

1. The CPU board is located on the back of the front cover. (Open the front cover and remove the light shielding plate.) Adjustments are made using the DIPs 0 and 1 on this board.



DIP 0

No.	
8	Master feed length compensating coefficient
7	Compensation for master movement to optical axis (plus)
6	Compensation for master/lens movement to optical axis (minus)
5	
4	Coefficient for lens assembly movement
3	Compensation for lens assembly movement to optical axis
2	Double-exposure continuous/single mode changeover
1	

DIP 1

No.	
8	
7	Data input
6	
5	Data display
4	
3	Frequency changeover (ON: 50 Hz)
2	Inch/mm changeover (ON: inch--English--system)
1	Data input

2. Select the frequency to match the power supplied in the field.

50 Hz: Turn on switch 3 of DIP 1.

60 Hz: Turn off switch 3 of DIP 1.

3. Inch/millimeter selection

Inch: Turn on switch 2 of DIP 1.

Millimeter: Turn off switch 2 of DIP 1.

4. Turn on the POWER (100V and 200V) switches.

5. Load a master roll according to the Operation Manual.

6. Inspection and adjustment of the master feed length

(1) Set the M. LENGTH readout to the length which is most frequently used.  
(Example: 650 mm)

(2) Press the START button and then measure the length of the master thus delivered. (Example: measured length value 660 mm)

(3) Turn on switches 1 and 7 of DIP 1, and then turn on switch 8 of DIP 0.  
Enter the measured length value with the M.LENGTH input keys on the control panel. (Example: Enter 660.)

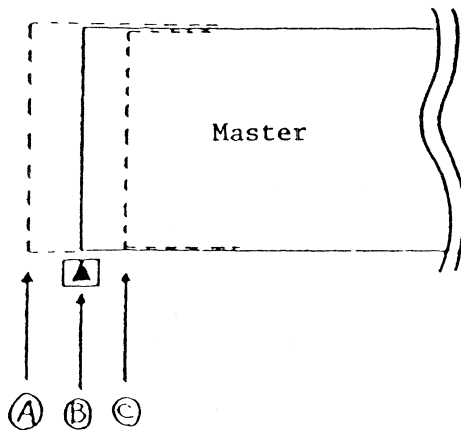
(4) Turn off switch 8 of DIP 0, and then turn off switches 1 and 7 of DIP 1.

(5) Confirmation of coefficient

Turn on switch 5 of DIP 1 and switch 8 of DIP 0, and the coefficient value appears on the DISPLAY on the control panel. Check it.

## 7. Master back distance

Make sure that the master leading end is on the extension of the mark scribed on the exposure glass when exposure is made. If not, make an adjustment with the following procedures.



- A: Insufficient master back distance
- B: Correct master back distance
- C: Excessive master back distance

### Case A:

- (1) Measure the difference or distance between the mark and the master end (A - B in the figure).
- (2) Turn on switches 1 and 7 of DIP 1 and then turn on switch 7 of DIP 0.
- (3) Enter the difference (A - B) with the M.LENGTH input keys (in 0.5 mm increments).
- (4) Turn off switch 7 of DIP 0 and then turn off switches 1 and 7 of DIP 1.
- (5) Confirmation.  
Turn on switch 5 of DIP 1 and switch 7 of DIP 0, and the value entered appears on the DISPLAY.

### Case C:

- (1) Measure the difference or distance between the mark and the master end (B - C in the figure.)
- (2) Turn on switches 1 and 7 of DIP 1 and then turn on switches 6 and 7 of DIP 0.

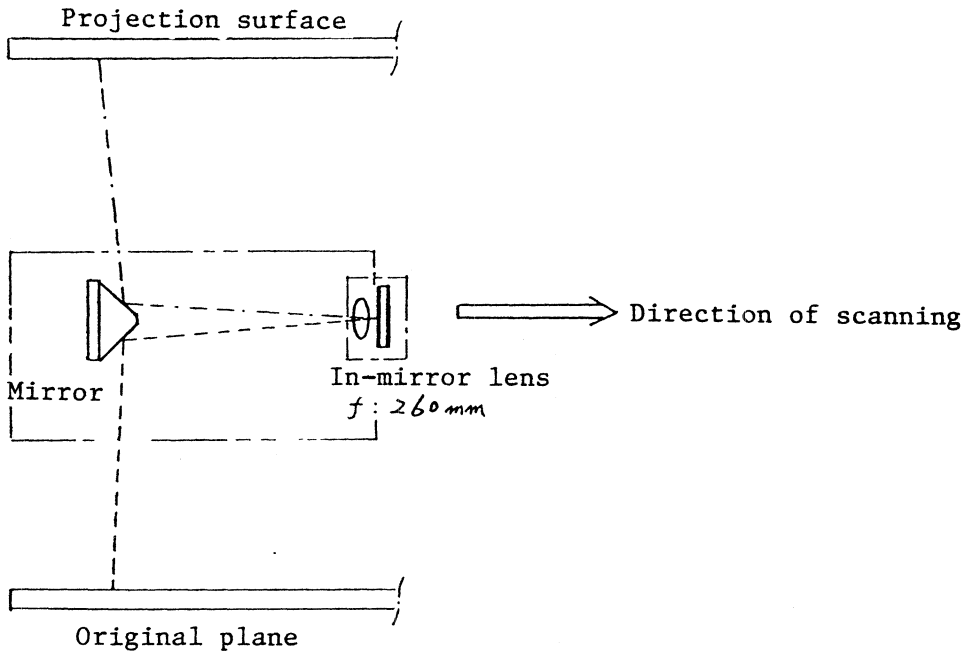
- (3) Enter the difference (B - C) with the M.LENGTH input keys (in 0.5 mm increments).
- (4) First, turn off switch 7 of DIP 0 , next switch 6 of DIP 0 and then switches 1 and 7 of DIP 1.
- (5) Confirmation  
Turn on switch 5 of DIP 1 and switches 6 and 7 of DIP 0, and the value entered, as preceded by minus sign, appears on the DISPLAY.

<<1>> INSPECTION AND ADJUSTMENT OF OPTICAL SYSTEM

The focusing and image sizing systems are sufficiently adjusted prior to shipment. However, if they are considered to be defective, check and carry out necessary adjustments following the procedure below.

[1] Checking and Adjustment Procedures

1. Image distortion adjustment ---- mirror
2. Image size adjustment ----- original
3. Focus adjustment ----- lens



Distance between the original plane (C) and lens (L)

$$A = f (1 + 1/m)$$

Distance between the lens (L) and projection surface (P)

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

where,  $f$ : focal length of the lens

$m$ : magnification

Theoretical positional relationship between the original, lens, and projection surface for ideal focus.

A=B (ex.) f: 260mm

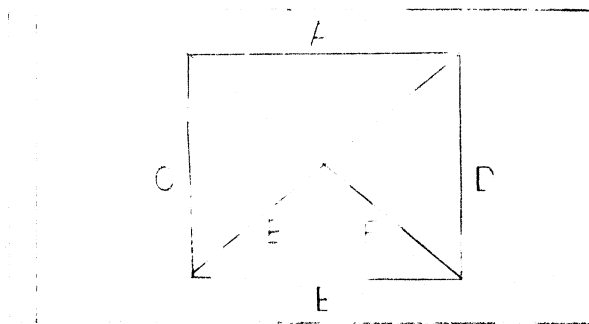
$f (1 + 1/m) = f (1 + m)$  m:100%

$260 (1 + 1/1) = 260 (1 + 1)$

therefore, A = B = 520

However, in practice, the focal length varies with individual lenses, and is not necessarily 520mm.

[2] Image Distortion Adjustment



Allowance

1. A = B = C = D = 450mm

within  $\pm 0.5$ mm

2. E - F

within  $\pm 0.5$ mm

Adjust the image distortion amount ( E - F ) if the error is above the permissible limit of 0.5mm.

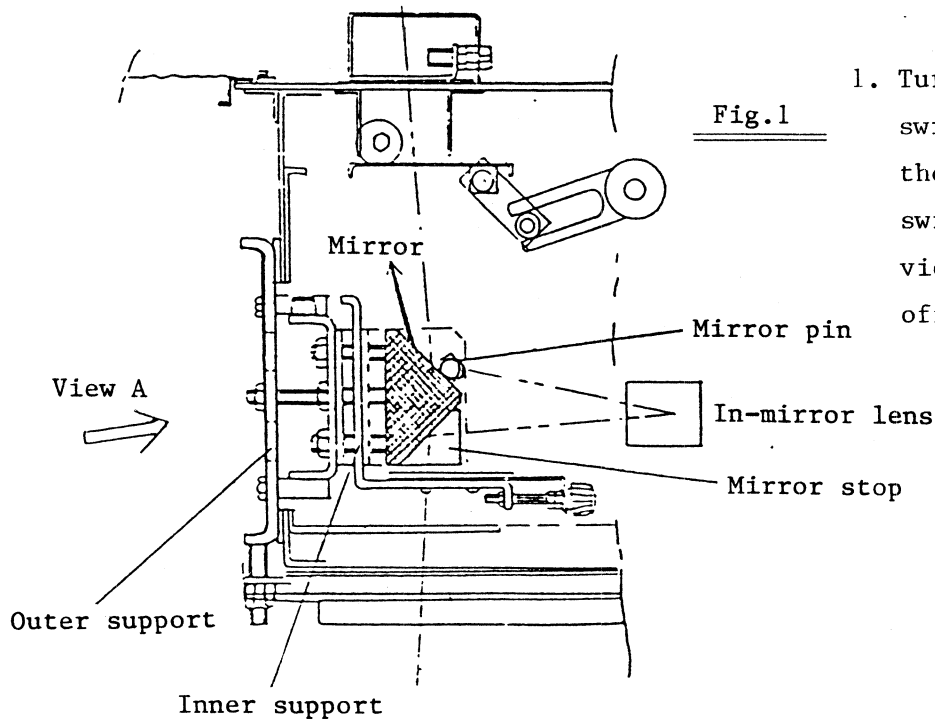
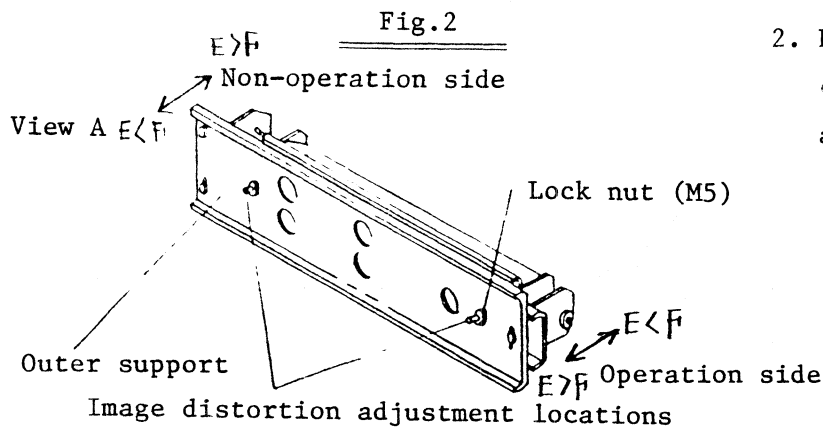


Fig.1

1. Turn the 100V power supply switch ON, move the lens to the center using the LENS switch as shown in Fig.1 at view A, and turn the switch off.



2. Referring to Fig.2 (view A) check the image distortion adjustment locations.

3. When E is greater than F

- (1) Loosen the M5 lock nut on the operation side, rotate CCW with a hexagon head spanner (2.5mm), and tighten.
- (2) Loosen the lock nut on the non-operation side, rotate CW, and tighten.

\* The image distortion will be altered by approximately 1.5mm for each quarter turn of the lock nut.

\* Note that the mirror will be twisted unless these two screws are rotated equal amounts in opposing directions.

- (3) Check the adjustment by making an exposure, and repeat the step as necessary.

4. When E is less than F

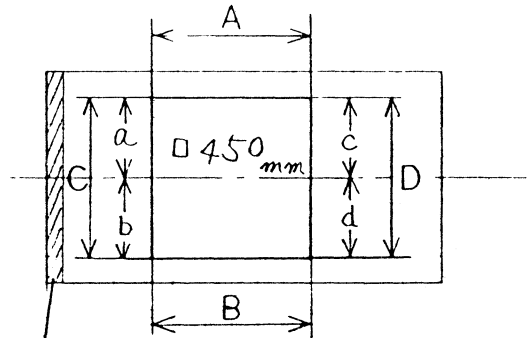
- (1) Loosen the M5 lock nut on the non-operation side, rotate CCW with a hexagon head spanner (2.5mm), and tighten.
- (2) Loosen the lock nut on the non-operation side, rotate CW, and tighten.
- (3) Check the adjustment by making an exposure, and repeat the step as necessary.



[3] Image Size Adjustment

1. Place the test chart (ruled) or a scale suitable for checking the image size on the original plane.
2. Make an exposure with the master feed length set at about 600mm. Measure sides A, B, C, and D of the image and calculate the differences between lengths a and b, and c and d. See the figure below.

Fig.3



Allowance

- (1) A, B, C, D (450mm square)  
within  $\pm 0.5\text{mm}$
- (2) a - b, c - d  
within  $\pm 0.4\text{mm}$

Fogged area (base sheet reference line (0) side)

<Adjustment Procedure>

Adjustment by vertical movement of the original frame base attached to the original frame.

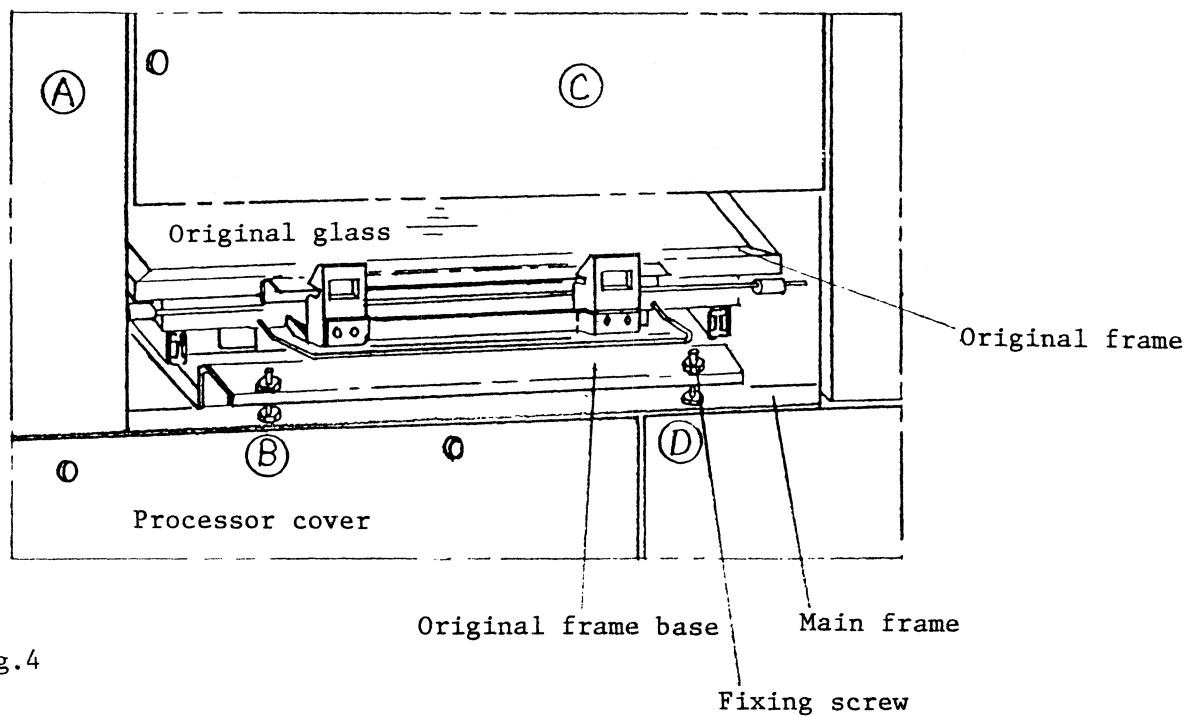


Fig.4

- \* The length of A or B in the direction of the master feed length cannot be adjusted. The mechanism of the machine retains image size accuracy in this direction.
- \* In consideration of the characteristics of the slit exposure method used in the CP-500S, first measure lengths C and D, and then lengths a, b, c and d.

- (1) Place the item for exposure on the original glass with it facing up, and its fogged end toward the reference line (O).
- (2) The original frame is attached to the lower frame base, and secured on the main frame with four setscrews A, B, C and D.
- (3) Adjust lengths a, b, c, and d with screws A, B, C and D, respectively.
- (4) If, for example, length B is longer, lower the frame base with screw B. If length d is shorter, raise the base with screw D.

Note: Turning the screw nut  $180^\circ$  alters the length by approximately 0.3mm.

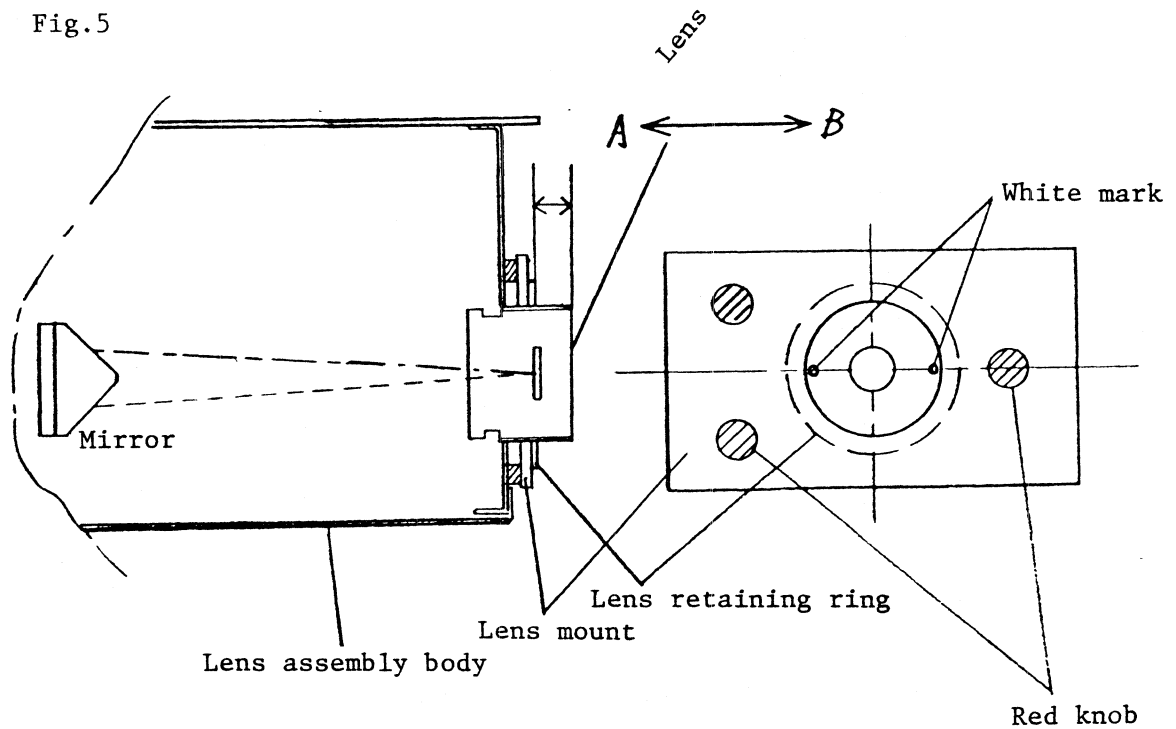
#### [4] Focus Adjustment

1. Make an exposure of the test chart (resolution chart) or Mitsubishi standard chart at 70% over the normal exposure.
2. The image is considered to be in focus if 8.3 lines/mm or higher resolution is obtained when the exposure is checked through a loupe.
3. Adjust the focus if such a resolution is not obtained.

#### <Adjustment Procedure>

Adjustment by horizontal movement of the lens.

Fig.5



- (1) Before adjusting the focus, be sure to measure the distance between the right end of the lens and the lens retaining ring with a scale to maintain its original position.
- (2) Holding the lens by hand to prevent it from turning, turn the lens retaining ring CCW to loosen.
- (3) When the ring is turned CW, the lens moves in direction A.  
\* There are two white marks on the lens. Turn the lens retaining ring  $180^\circ$  at a time so that it may be held in the horizontal position. (One rotation  $<360^\circ>$  of the lens retaining ring moves the lens by 1mm horizontally.)
- (4) Make an exposure of the test chart with the lens retaining ring tightened. If the exposure is less clear than the previously made exposure, return the lens to its original position, and turn it CCW to move it in direction B. Then make an exposure of the test chart again and compare it with the previous exposure.
- (5) Using the above steps (3) and (4), adjust it so as to obtain the best focal point (8.3 lines/mm or higher resolution)

The above steps should be taken accompanied with a check of the image size.

## <<2>> INSPECTION AND ADJUSTMENT OF ILLUMINATION DISTRIBUTION

Although the halogen lamps (130V, 1.5kW) are arranged so as to illuminate the projection surface uniformly, unevenness in distribution of illuminance may occur. If the lamp has been replaced, check the distribution of illuminance following the procedure below.

### [1] Checking Procedure

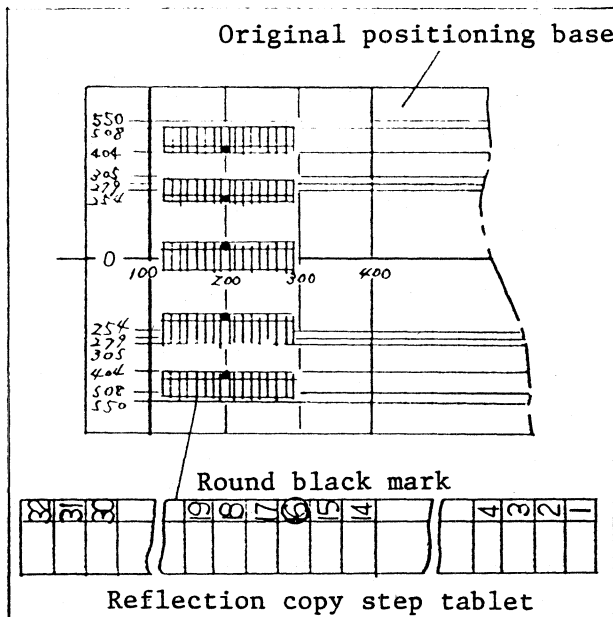


Fig.6

1. Set the master feed length to 400mm.
2. Draw out the original frame, and open the upper glass frame.
3. Place five reflection copy step tablets (or equivalents) so that their round black marks align with the 200mm line of the original positioning base sheet.
4. Make an exposure at the standard exposure setting.
5. Cut out the exposed center step tablet.
6. The round black mark of this cut out step tablet is the reference. Compare the marked steps of the other four printed step tablets with that of the cut out step tablet, and check for any density difference (with the step numbers of the step tablet).
7. If, as a result of this comparison, unevenness or density difference in the step numbers is found to be within 1.5 steps, it means that replacement of the lamp has not caused any significant change in the distribution of illuminance, and that a uniform distribution of over 80% is assured.

<Adjustment Procedure>

Adjust by the procedure below if the difference is found to be more than 1.5 steps.

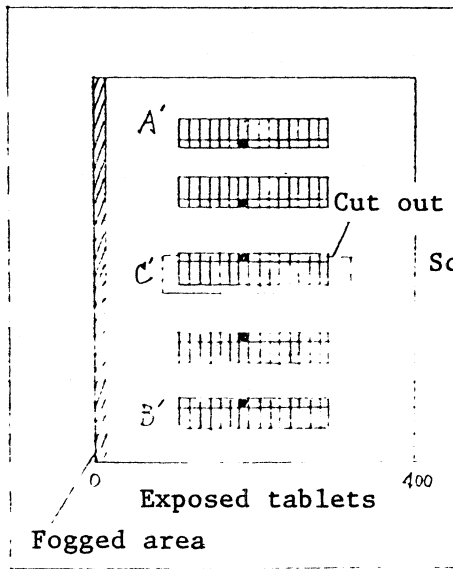


Fig. 7

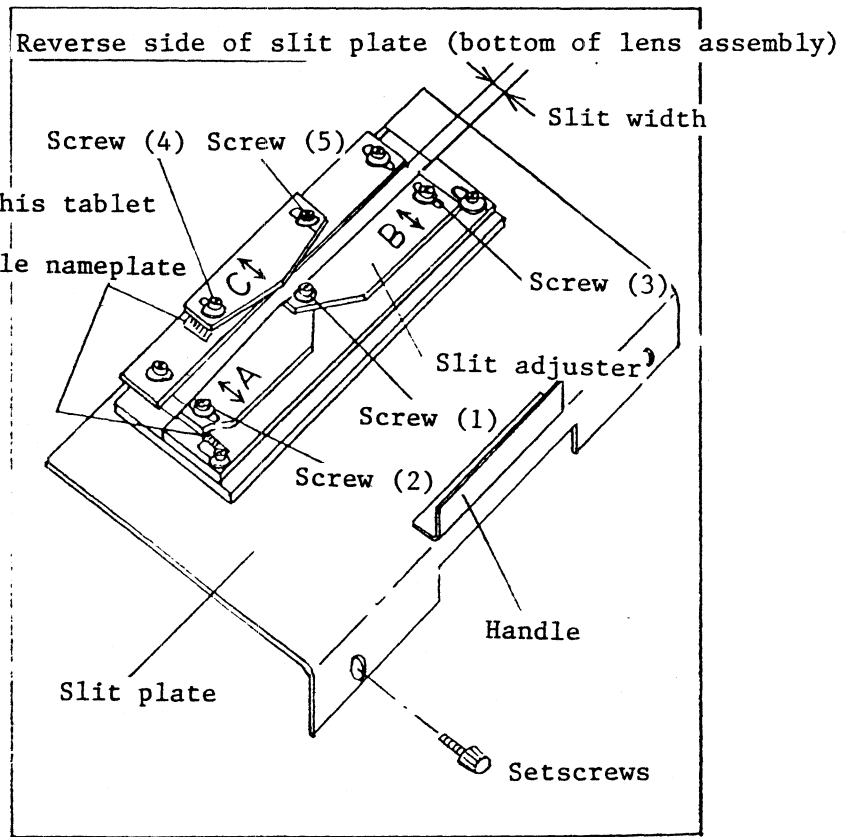


Fig. 8

1. Open the cover of the main control panel.
2. Remove the light source shield.
3. Remove the two slit plate setscrews on the bottom of the lens assembly, and draw out the slit plate by sliding its handle to the right. (Hold it firmly by hand as the plate is slightly heavy.)
- 4 Place the slit plate upside down. (See Fig. 8.)

See Figs. 7 and 8 for the relation between the slit plate and the exposed item.

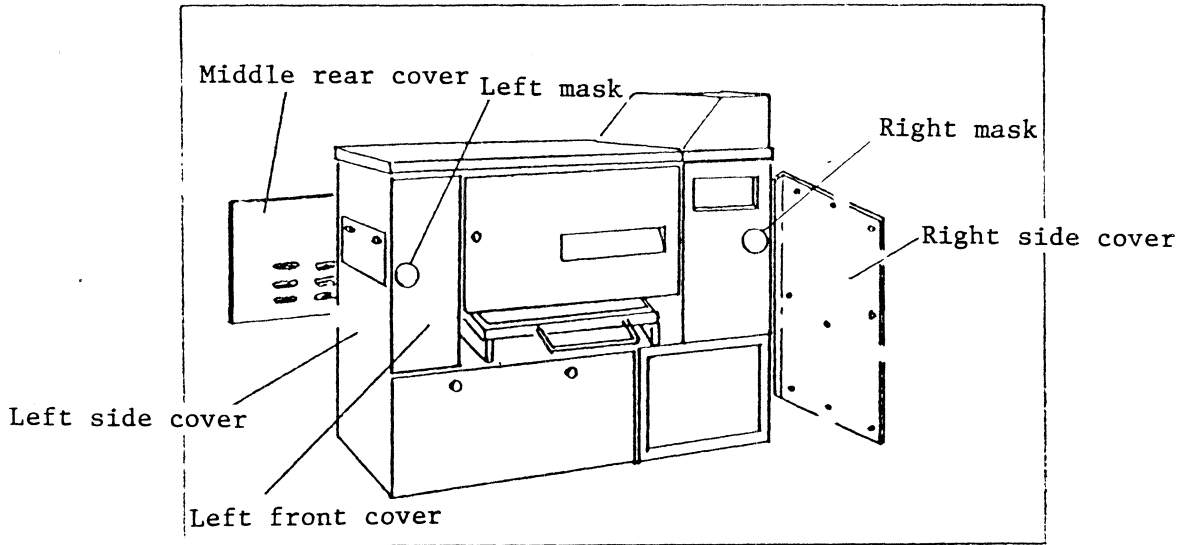
- \* A scale nameplate is provided at both ends of each slit adjuster (A, B and C) to facilitate the positioning of the adjusters to their original positions.

- (1) When exposed area A' is brighter than the center area:  
Loosen screws (1) and (2), move adjuster A 2mm so that the slit width decreases at the end edge of slit adjuster A, and fix it in position. After adjustment, make an exposure and check the result. If the result is not satisfactory, repeat the step.
  
- (2) When exposed area B' is brighter than the center area:  
Loosen screws (1) and (3), move adjuster A 2mm so that the slit width decreases at the end edge of slit adjuster B, and fix it in position. After adjustment, make an exposure and check the result. If the result is not satisfactory, repeat the step.
  
- (3) When exposed area C' is brighter than areas A' and B':  
Loosen screws (4) and (5), move adjuster A 2mm so that the slit width decreases at the end edge of adjuster A, and fix it in position. In the case of partial unevenness in the center area, the slit width may be decreased by adjusting the tilt of slit adjuster C. After adjustment, make an exposure and check the result.

Note: Although, the width of the slit can be decreased (i.e. by decreasing the quantity of light) for adjustment of the illumination distribution as mentioned above, the method of widening the slit width (i.e. by increasing the quantity of light) is limited, and is hardly applied.

<<3>> SHADING MASKS

Fig.9

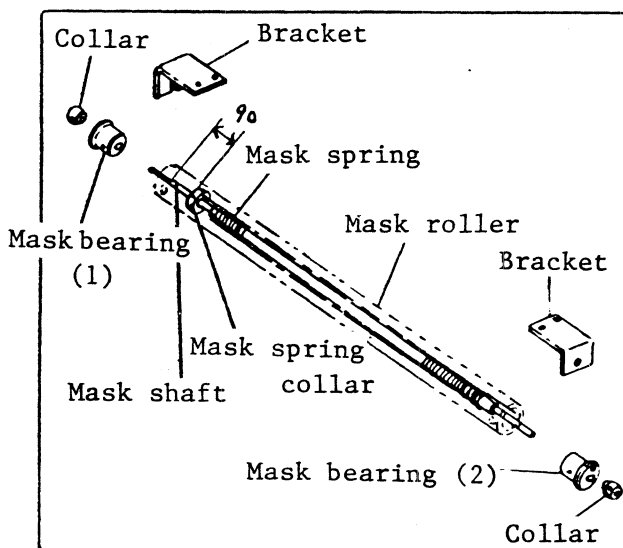


The masks slide as the lens assembly moves. In order to check the left mask, remove the following covers:

- (1) Middle rear cover
- (2) Left side cover
- (3) Left front cover

In order to check the right mask, remove the right side cover.

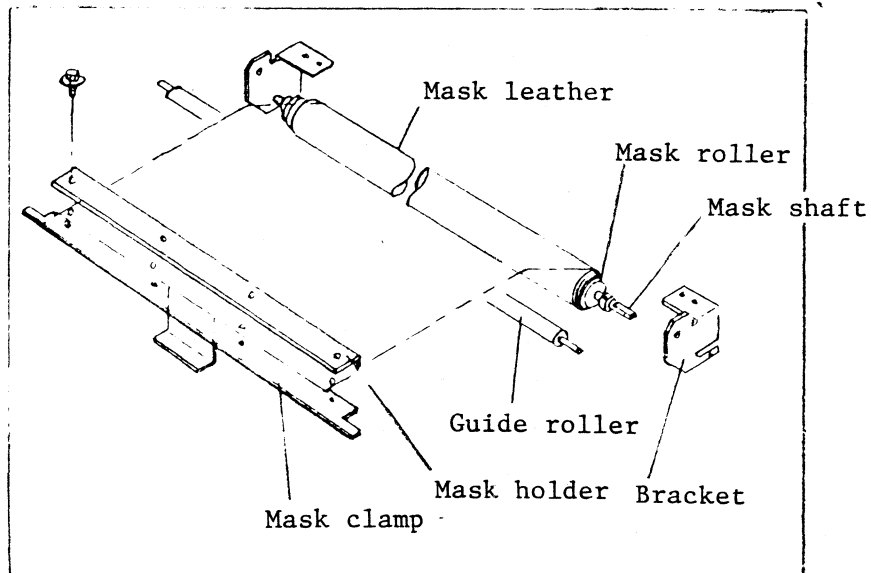
Fig.10



In the mask roller, the mask spring collar is fixed 90mm away from the notched end of the mask shaft, and the mask spring end is inserted into the collar. The mask bearing is fixed by screws at both ends of the mask roller. The mask spring end is fixed onto the mask bearing (2). The collars at both sides are fixed with a 1.0mm clearance provided from the mask bearing end.

<Adjusting the Number of Turns in the Mask Spring Coils>

Fig.11



Follow the procedure below to adjust the mask springs. This procedure should be carried out before installation onto the brackets to keep the mask roller in good working order and maintain even slidability of the lens assembly.

\* When adjusting the mask spring, be sure to move the lens assembly to the operation (mask) side using the lever for moving the lens assembly.

Right mask: 20 turns

Left mask: 25 turns



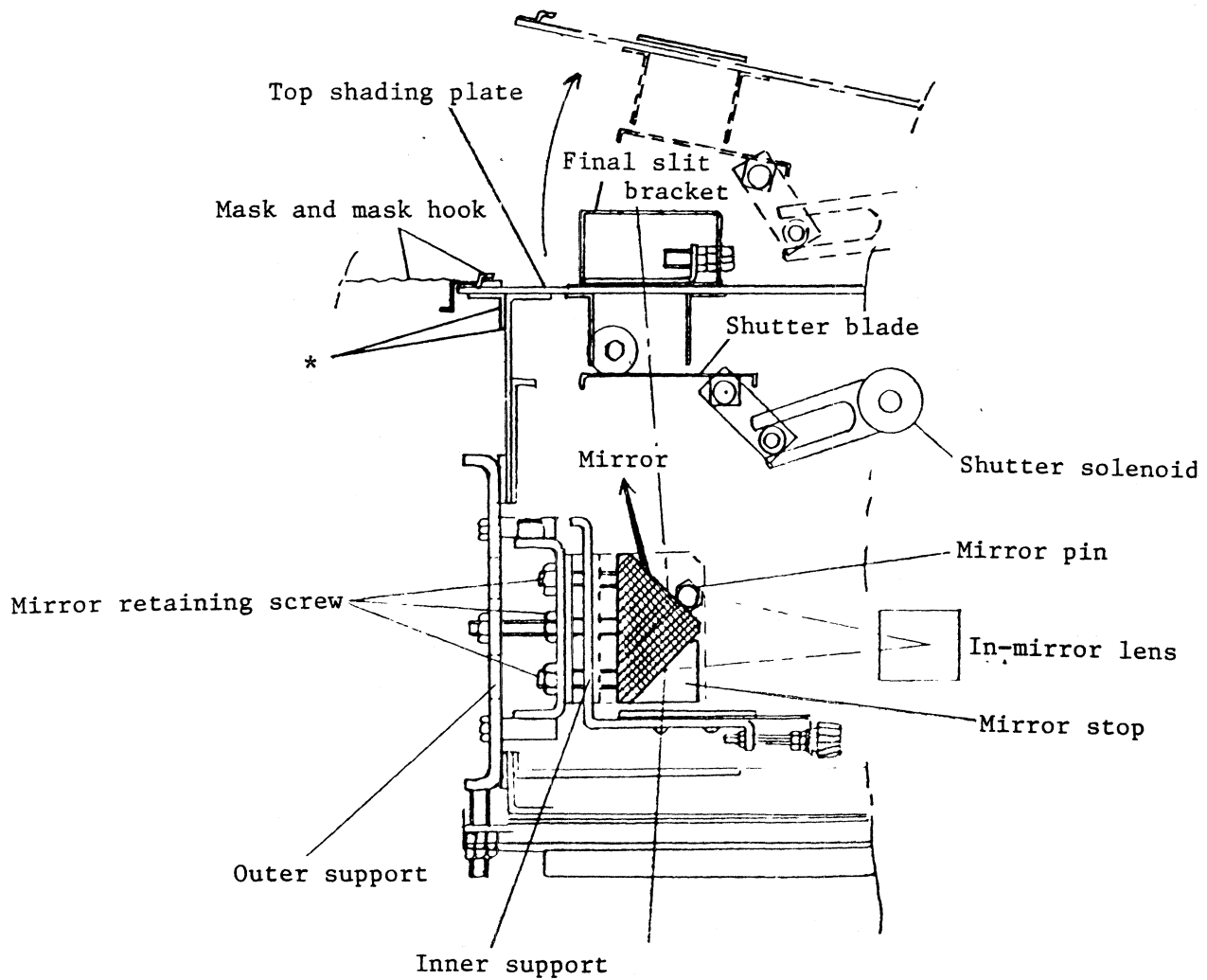
#### <<4>> REPLACEMENT OF THE MIRROR

The mirror is incorporated into the lens assembly and cannot be seen from the outside. Follow the procedure below for replacement. Make a careful inspection of the locations marked with an asterisk(s), and note down the results of the inspection. This is important for positioning during assembly.

##### [1] Preparations

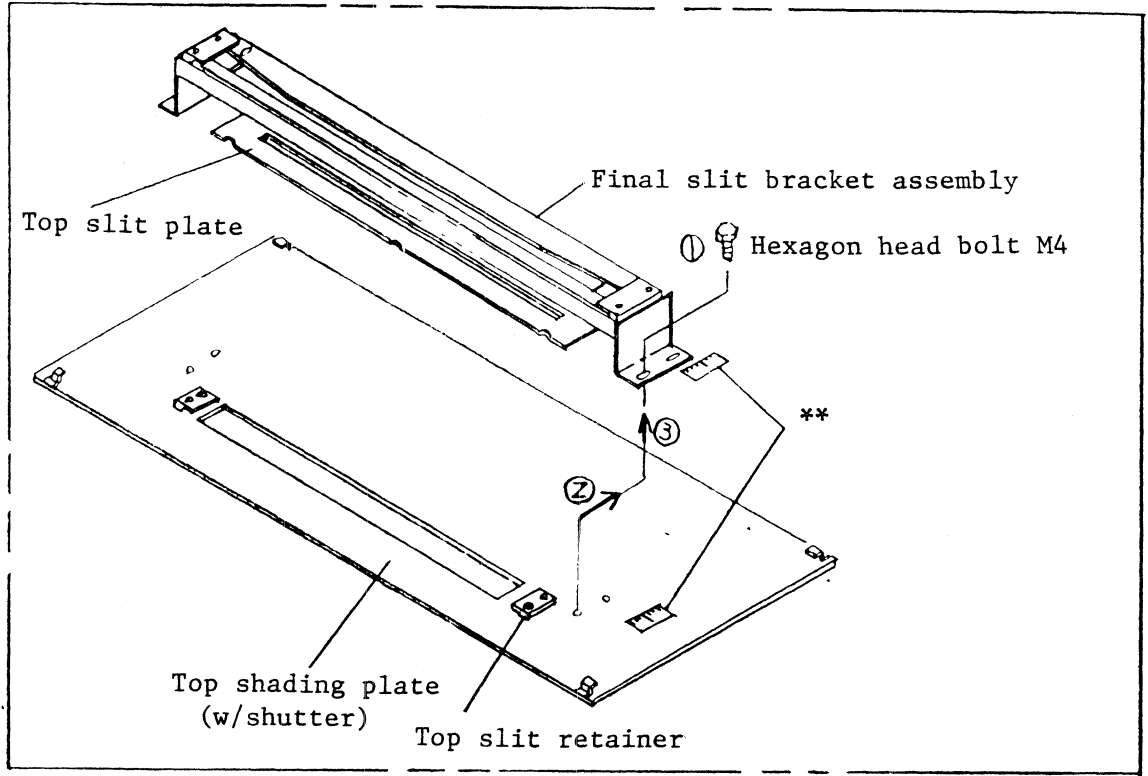
1. Open the main control panel cover, and remove the shading plate at the top front of the lens assembly.
2. Remove both the upper and middle rear covers.
3. Open the top cover, and hook the contact plate of the exposure section onto the top cover.
4. Turn the power ON (100V, no-fuse breaker), move the lens assembly to the center with the LENS switch, and unhook the mask from the right and left mask hooks. Then, turn off the power.
5. Make sure that the stopper of the top shading plate is completely in contact with the lens assembly. See Fig.11 and check location marked by \*. Never neglect this step as it is important for positioning during assembly.
6. Check if the end face of the final slit bracket aligns with the slit scale. See Fig.12 and check location marked by \*\*. Never neglect this step as it is important for positioning during assembly.

Fig.12 Replacement of Mirror (inside lens assembly)



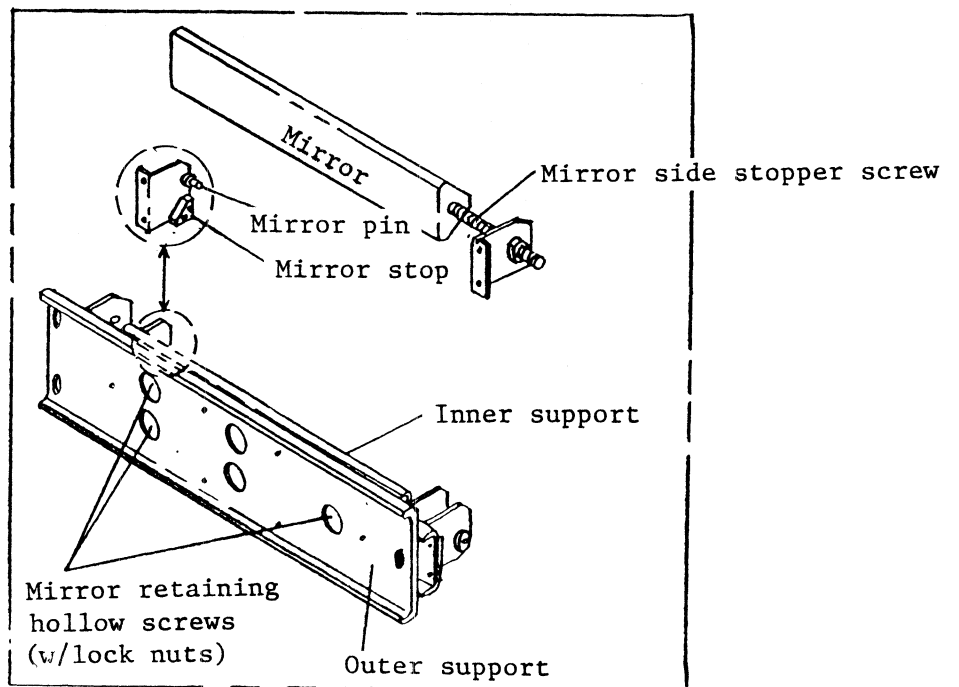
\* Check that stopper of top shading plate is in perfect contact with lens assembly.

Fig.13



\*\* For positioning accuracy during reinstallation of the slit positioning nameplate, check the end edge of the final slit bracket and the scale nameplate position.

Fig.14



[2] Removing the Mirror (See Figs.12, 13 and 14.)

1. After carrying out the check in step (6) (\*\*), remove the four hexagon head bolts (M4), and slide the top slit plate to the right until it comes away from the top slit retainers. Then, remove the final slit bracket assembly.
2. After carrying out the check in step (5) (\*), remove the four pan head screws (M4) to remove the top shading plate (w/shutter). Remove the connector from the shutter solenoid.

Note: The mirror is fixed with a pin and stop as references on its reflecting side, with three retaining screws on its rear side, and two side stopper screws.

3. Loosen the mirror side stopper screw on the operator side, and slightly loosen the screw (M4, hollow)
4. Loosen the three lock nuts (M4) inside the round holes of the outer support, and loosen the mirror retaining screws while holding the mirror with your hand.
5. The mirror can be taken out upward when the retaining screws are loosened until they are flush with the inner support surface.

[3] Installing the Mirror

Take sufficient care not to scratch or mark new mirrors during installation.

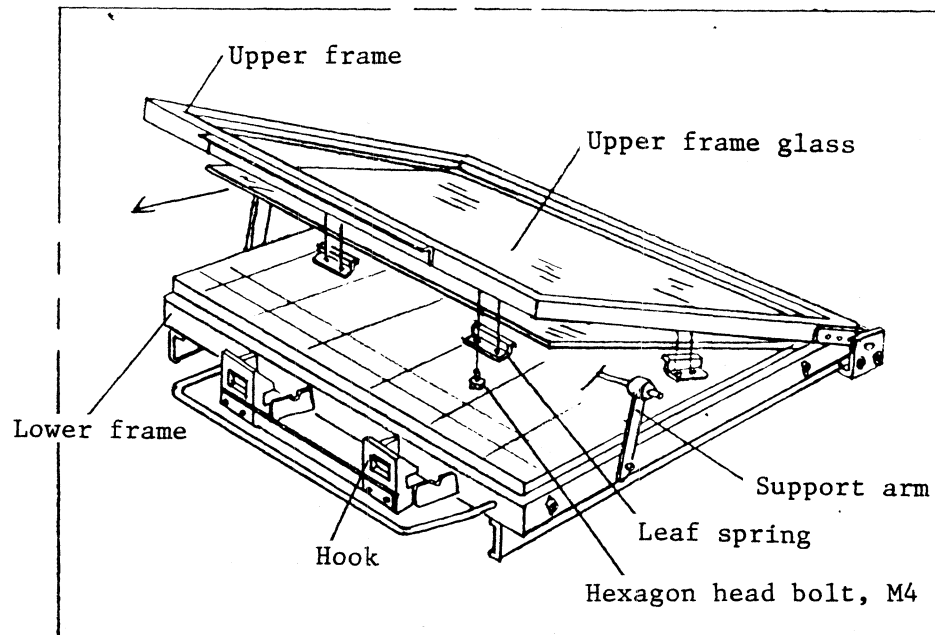
1. The procedure is the reverse to that of removal. Insert the mirror from above and hold it by hand with its reflecting surface in contact with both the mirror pin and stop.
2. Tighten the three mirror retaining screws on the rear side of the mirror evenly and tighten them with the nuts.
3. Tighten the mirror side stopper screws, and make sure that the mirror is fixed securely in place. Then tighten them with the nuts.

[4] Post-installation Work

1. Install the top shading plate on the lens assembly. Do not forget to connect the shutter solenoid connector. Make sure that the top shading plate is in contact with the lens assembly in the same manner as before (\*). Then tighten the plate in position.
2. Install the final slit bracket assembly. Also make sure that the positional relationship between the final slit bracket end face and the slit scale is the same as before (\*\*). Then tighten the bracket in position.
3. Hook the mask end onto the mask hooks on the left and right, and top shading plate.
4. Install the covers, turn the power ON (100V, no-fuse breaker) and return the lens assembly to its origin.
5. Check the image for distortion, image sizing, and focus.

<<5>> REPLACEMENT OF ORIGINAL HOLDER UPPER FRAME GLASS

Fig.15



\* Follow the procedure below when replacing the upper frame glass due to scratches etc.

\* The original holder upper glass is secured to the upper frame with eight leaf springs.

[1] Removal -- It is recommended that two persons carry out this work.

1. Remove the middle rear cover.
2. Loosen the three leaf springs located furthest away from the operator with an M4 spanner. (Do not completely remove the springs.)
3. Open the control panel cover, and holding the handle draw out the original holder to its maximum.
4. Remove the hook and get one person to lift the upper frame to above the specified position at which it is held by the support arm.
5. Supporting the upper frame glass remove by hand the five remaining leaf springs.
6. Carefully pull the upper frame glass in the direction of the arrow shown in Fig.15. Note that the glass may stick to the rubber skirt of the upper frame.

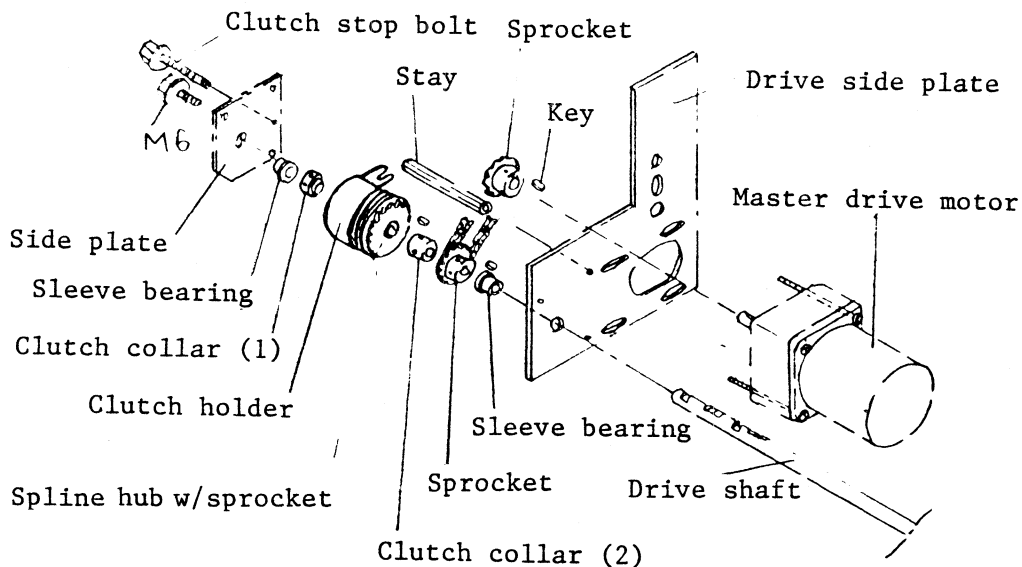
## [2] Installation

Note: Take sufficient care not to scratch or mark new upper glasses during installation.

1. The procedure is the reverse to that of removal.
2. Insert the new upper frame glass between the upper frame and the three innermost leaf springs.
3. After checking the positional relationship between the glass and the rubber skirt, install the five remaining springs.
4. Install the middle rear cover.
5. Check the image for distortion, image sizing, and focus.

<<6>> Drive Section - (Replacement of master feed clutch)

Fig.16



\* The master feed clutch located in the drive section can be seen when the upper rear cover is removed.

[i] Removal of the Clutch

1. Remove the upper rear cover.
2. Remove the side plate. (Unfasten the three M6 hexagon head bolts.)
3. Loosen the setscrews securing the clutch collar (1) and draw out the collar. (Two hollow screws, M4)
4. Draw out the clutch holder.
5. Loosen the set screws for the spline hub w/sprocket to draw out the hub and remove the key.



[2] Assembly and Adjustments:

1. Assemble the clutch in the reverse order to that of removal.
2. Firmly tighten the set screws.
3. Install the side plate firmly so that torsion may not occur in the drive shaft.

\* If there is extreme unevenness in the master length, check for looseness in the following locations:

- (1) the sprocket set screws at the master feed motor side,
- (2) the sprocket set screws at the innermost side or at the clutch side,  
and
- (3) the set screws for the spline hub w/sprocket in the clutch.

If any of the above screws are loose, this may cause unevenness in the master feed lengths. Also, silver may appear in the exposed master end for the same reason. If this should occur, check and tighten the screws.

# DESCRIPTION AND ADJUSTMENTS OF THE ELECTRICAL SYSTEM

## DESCRIPTION OF THE PRINTED CIRCUIT BOARDS

### 1. CPU Board

#### ◦ Description of dip switches and short pins

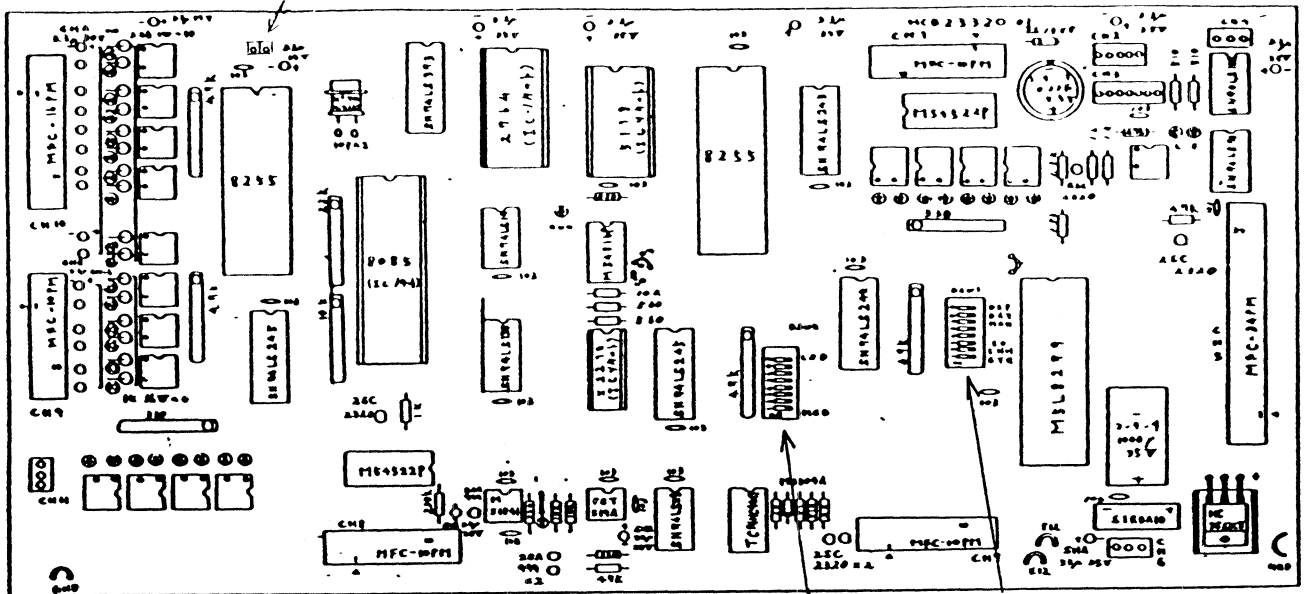


Fig.1 CPU Board

#### Dip Switch Package Ø (DSWØ)

SW No.	Description	Function	Normal Status
1	Running	Repeats a series of operations when ON	OFF
2	Double exposure continuous/separate	OFF: Makes double exposure without pause ON: Makes an exposure on each start	ON
3	Adjustment of lens assembly move to optical axis	Varies the exposure start position	OFF
4	lens assembly move coefficient adjustment	Compensates the difference between the set output size and actual output size	OFF
5	Unused		OFF

6	- (minus) value input	Used to make the adjustment with switch 3 or 7 in the negative direction	OFF
7	Adjustment of master feed to optical axis	Varies the amount of master backward movement from the cutting position	OFF
8	Master length coefficient adjustment	Compensates for the difference between the set and the actually fed length	OFF

Dip Switch Package 1 (DSW1)

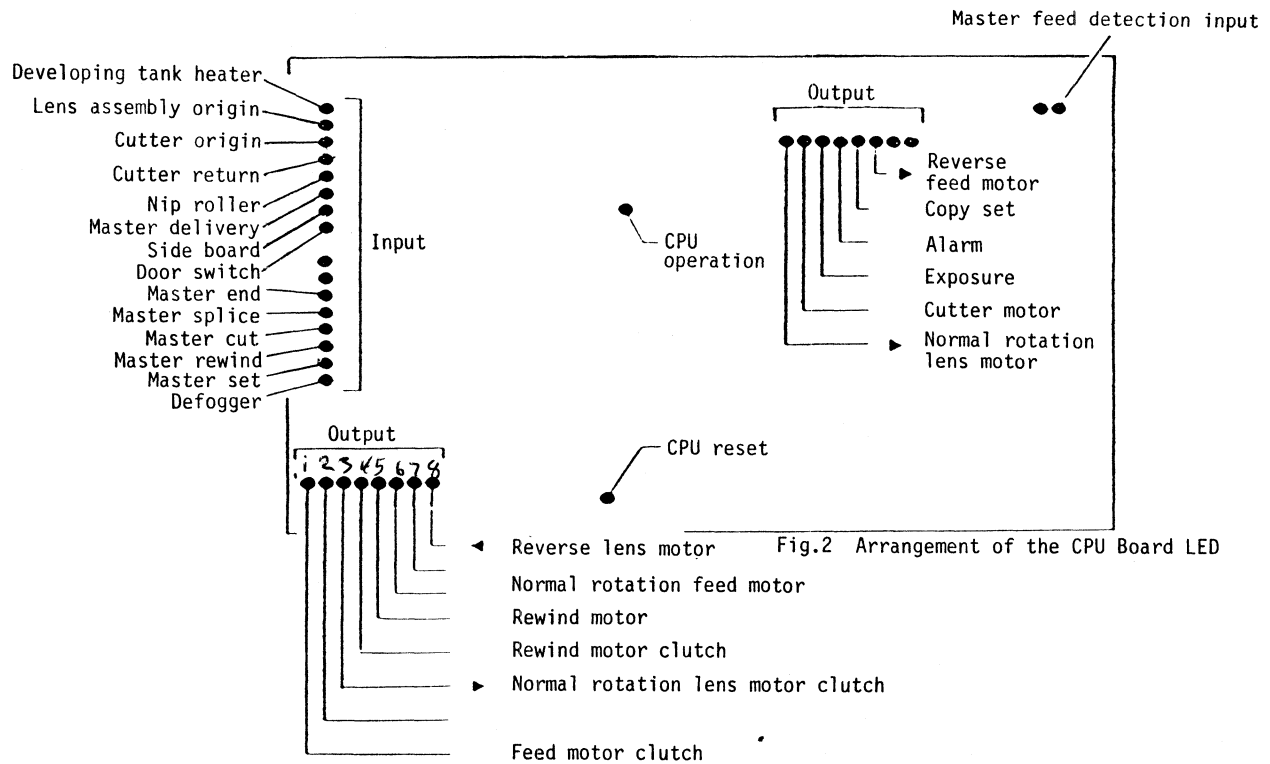
SW No.	Description	Function	Normal Status
1	Data input	Used with switch 7 for data input to memory	OFF
2	mm/inch changeover	Changes the measuring unit from metric (mm) to English (inch) system, or vice versa ON: inch      OFF: mm	ON/OFF
3	Frequency changeover	Changes the frequency from 60Hz to 50Hz, or vice versa ON: 50Hz      OFF: 60Hz	ON/OFF
4	Unused		OFF
5	Data display	Used, with DSWØ dip switch 8, 7, 4 and/or 3, for data display.	OFF
6	Unused		OFF
7	Data input	Used with switch 1 for data input to memory.	OFF
8	Unused		OFF

Short pin:

(purpose)                      Enables or disables reception of signals from the photointerrupter for lens assembly movement

(normal status)              Open circuit

° Signal Check LEDs



	LED Description	The LED should light when:
Input LEDs	Developing tank heater	The developer heater is on. (Ry1)
	Lens assembly origin	The lens assembly is at the origin and origin microswitch LS4 is on. (Ry2)
	Cutter origin	The cutter is at the origin and microswitch LS5 is on. (Ry3)
	Cutter return	The cutter is at the opposite travel end and microswitch LS6 is on. (Ry4)
	Nip roller	The nip roller is set and microswitch LS7 is on. (LS7)
	Master delivery	Delivery microswitch LS8 is on as master is passing. (LS8)
	Side board	The side board is set in its inner position and microswitch LS9 is on. (LS9)
	Door switch	(for use outside Japan) The top, front and processor doors are closed and microswitch LS10, 11 and 12 are on. (LS10, 11, 12) (for use in Japan) all the time

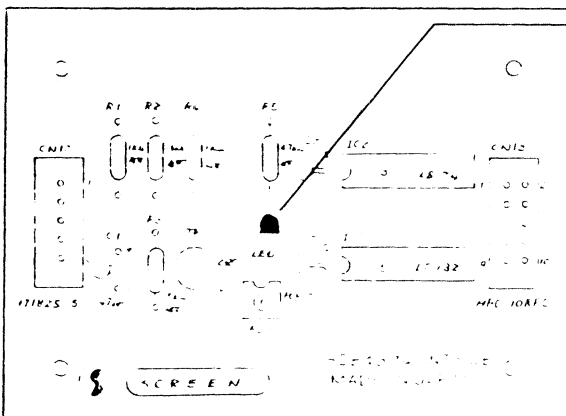
	LED Description	The LED should light when:
	Master end	There is no master on master end sensor SE1. (SE1)
	Master splice	There is master on master splice sensor SE2 (SE2)
	Master cut	Master cut switch PB2 is pushed. (PB2)
	Master rewind	Rewind button PB4 is pushed. (PB4)
	Master set	Set button PB3 is pushed. (PB3)
	Defogger	The defogger is on. (TS5)
	Master feed detection input	Flashes when the light shielding blade comes into the gap in the master feed detection photo-interrupter and rotates.
Output LEDs	Feed motor clutch	Master feed clutch is on. (CL1)
	Normal rotation lens motor clutch	Lens motor clutch CL2 is on. (Ry7)
	Rewind motor clutch	Master rewind clutch CL3 is on. (Ry8)
	Rewind motor	Rewind motor RM1 is on. (Ry9)
	Normal rotation feed motor	Master feed motor RM2 is running to feed master. (Ry10)
	Reverse lens motor	Lens assembly motor RM3 is reversing to return the lens assembly. (Ry12)
	Normal rotation lens motor	Lens assembly motor RM3 is rotating in normal direction to move the lens assembly in the direction for exposure. (Ry13)
	Cutter motor	The cutter is cutting master. (Ry14)
	Exposure	Light source relay Ry 15 is on.
	Alarm	Trouble occurs and alarm relay Ry16 is on.
	Copy set	Lamp for copy setting is on. (Ry17)
	Reverse feed motor	Master is being rewound. (Ry18)
Control LEDs	CPU operation	The CPU is in operation.
	CPU reset	The CPU is reset on power input or initialization.

° Cautions in Replacing the CPU Board:

- (1) The dip switch settings (DSW0, DSW1) on the old CPU board should be transferred to the new CPU board.
- (2) Check the short pin status and set it as before replacement.
- (3) Recall the various compensating values stored in the memory and set the same values on the new board.  
(For the method of recalling and data setting, see p. .)

## 2. Relay Board

° Signal Check LEDs



### Lens Assembly Move Detection LED

The LED lights when the light shielding blade comes into the gap of the lens assembly move detection photointerrupter. Flashing occurs as the blade turns.

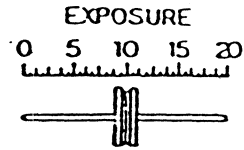
## 3. Adjustment of the Light Control PCB

- (1) Load and set master.
- (2) Set the master feed length to 600 mm or so.
- (3) Select the MULTI exposure mode.
- (4) Using an analog tester, connect the board to distributing board terminals V1 and V9.

Voltage Adjustment:

Adjust the voltages when the exposure slide control dial on the control panel is set at 1 and 20 respectively, using the two trimmers on the light control PCB.

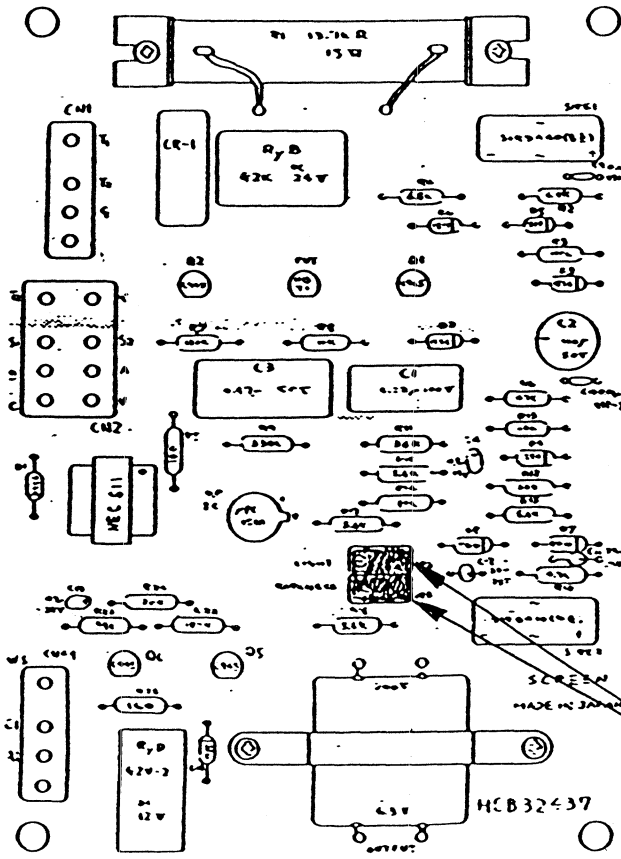
Exposure Control Dial on the Control Panel



\* When the dial is set at 1:  
adjust to 55V with the lower DARKNESS trimmer.

\* When the dial is set at 20:  
adjust to the range of 140V + 1.0V to  
140V - 0.5V with the upper LIGHT trimmer.

Trimmers:  
( Clockwise turn increases the voltage,  
or the intensity of light.



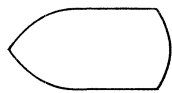
Light Control PCB

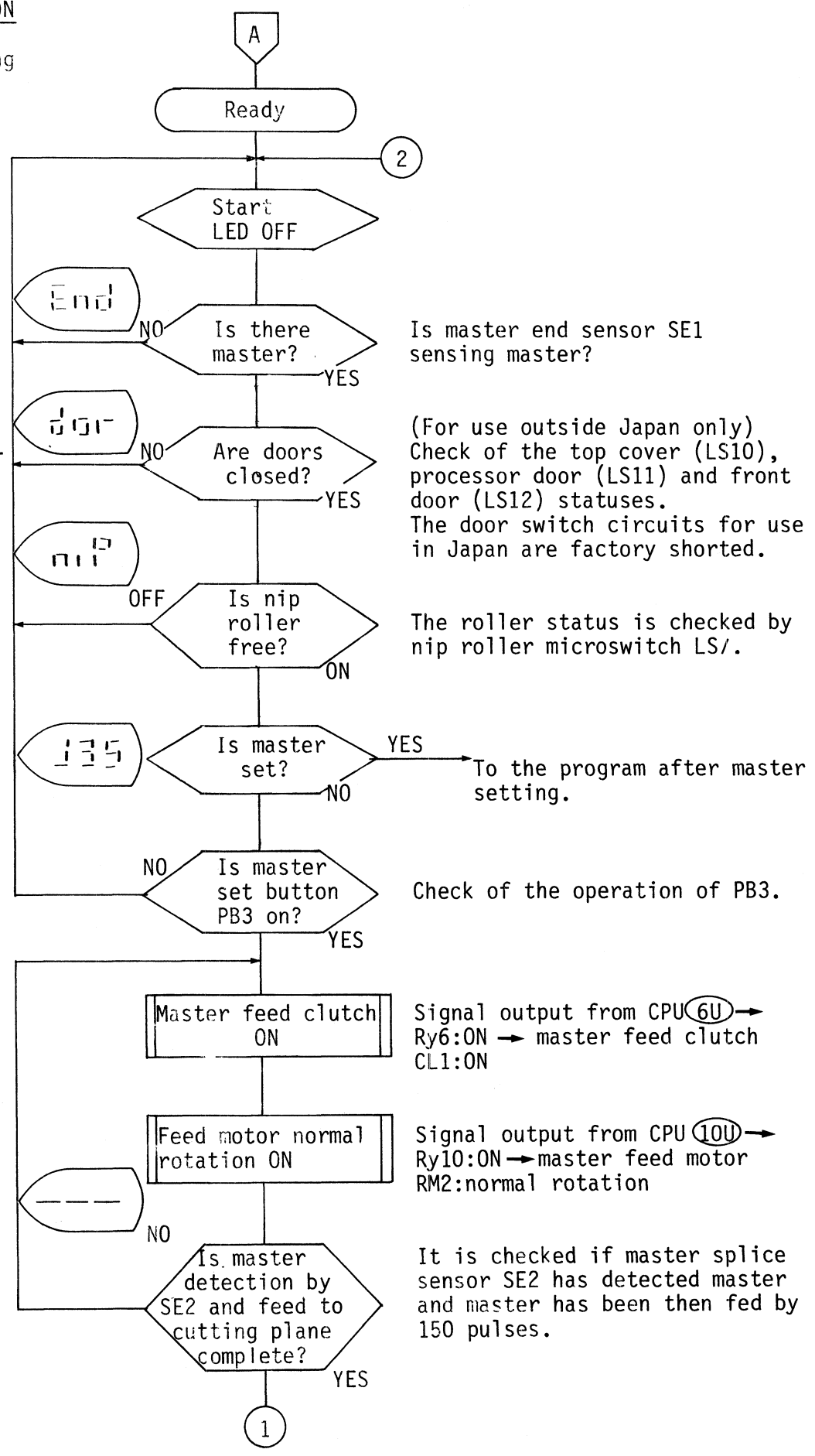
Repeat the above adjustment and check procedures in the MULTI exposure mode a few times by pressing the START button though a single sheet (master plate) is spoiled.

Last, lock the trimmers with screws or by taping.

FLOW OF OPERATION

1. Master Setting

\*  This mark means that the characters shown here appear on the display.



Is master end sensor SE1 sensing master?

(For use outside Japan only) Check of the top cover (LS10), processor door (LS11) and front door (LS12) statuses. The door switch circuits for use in Japan are factory shorted.

The roller status is checked by nip roller microswitch LS/.

To the program after master setting.

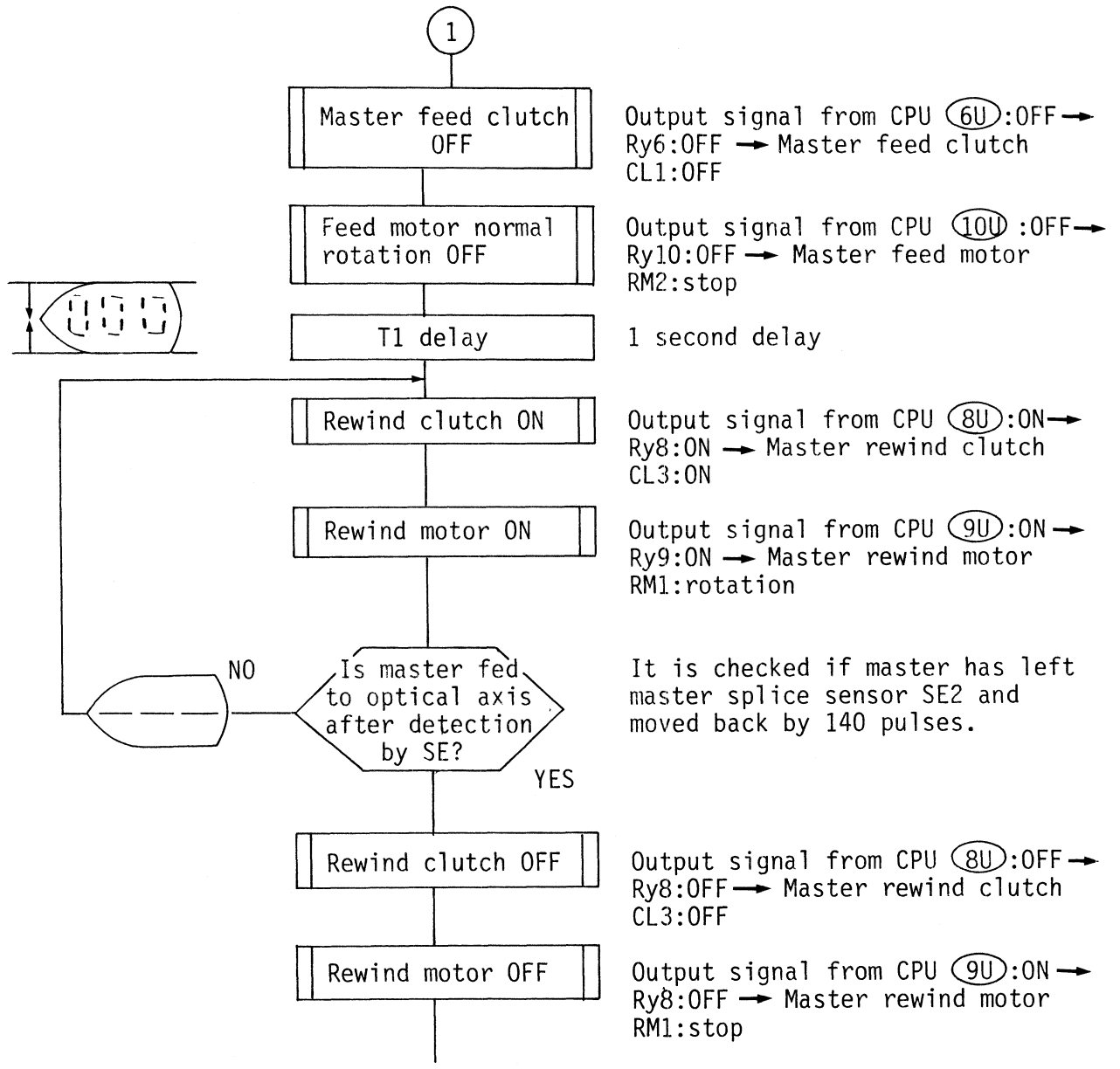
Check of the operation of PB3.

Signal output from CPU (6U) → Ry6:ON → master feed clutch CL1:ON

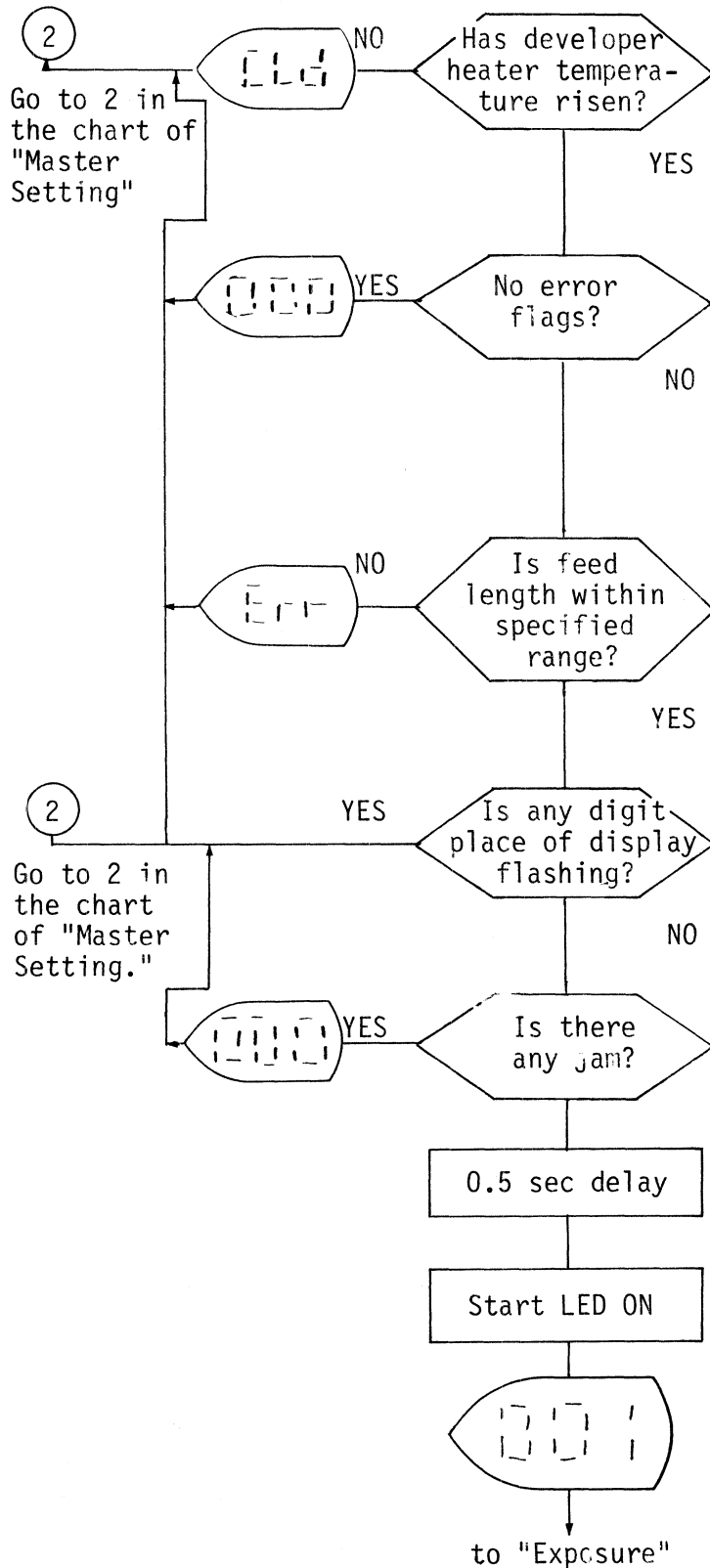
Signal output from CPU (10U) → Ry10:ON → master feed motor RM2:normal rotation

It is checked if master splice sensor SE2 has detected master and master has been then fed by 150 pulses.





## 2. Steps after Master Setting before Exposure Start



It is checked if heating developer to preset temperature is complete.

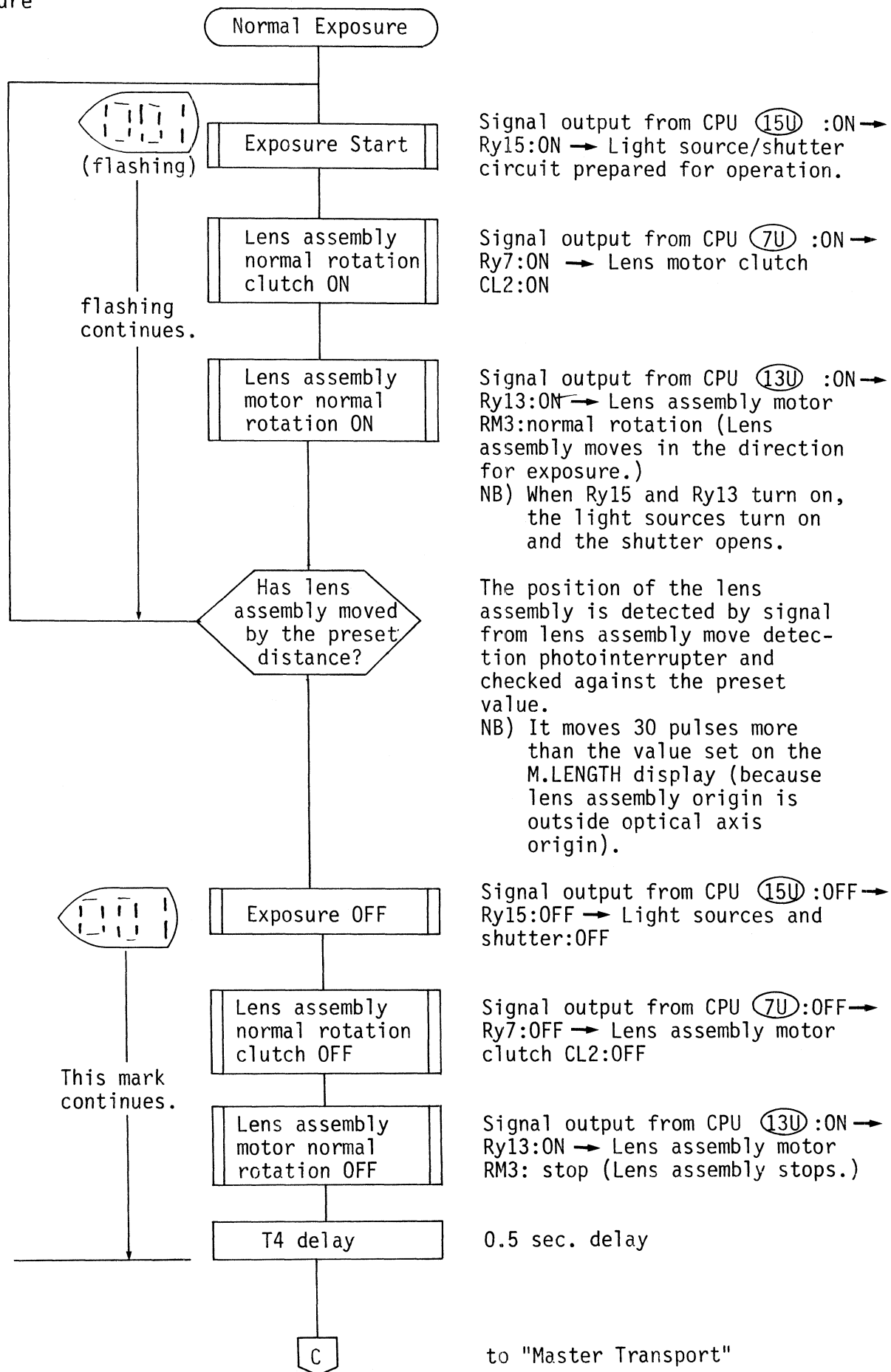
\* If the heater is running to raise the temperature, relay Ry1 is on and signal to CPU **IN** is output.

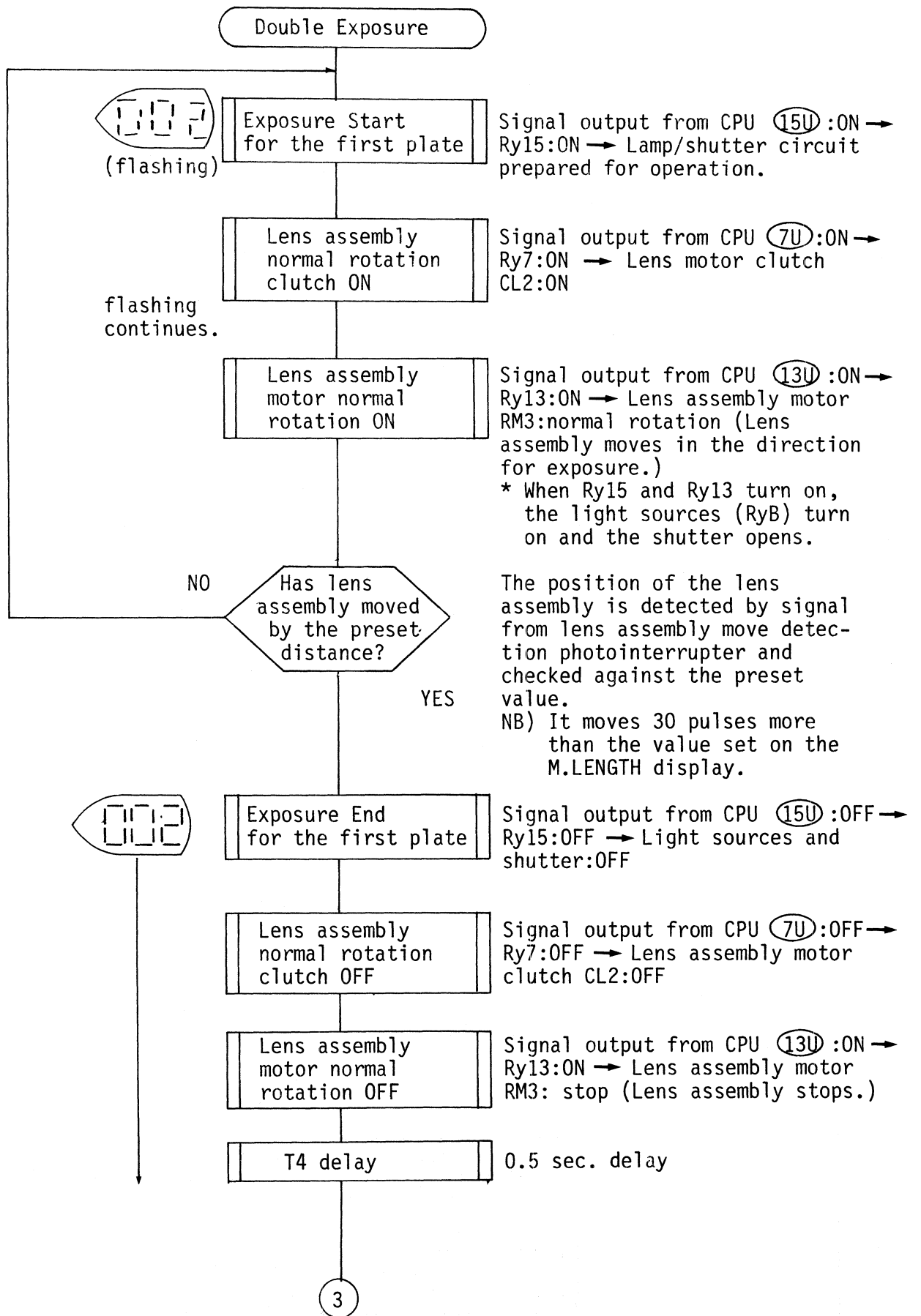
- 1) Is any dip switch which requires no ON/OFF switching turned on?
- 2) Is lens assembly at origin? (LS4) Ry2:ON
- 3) Is cutter at origin? (LS5) Ry3:ON
- 4) Is side board microswitch LS9 OFF?

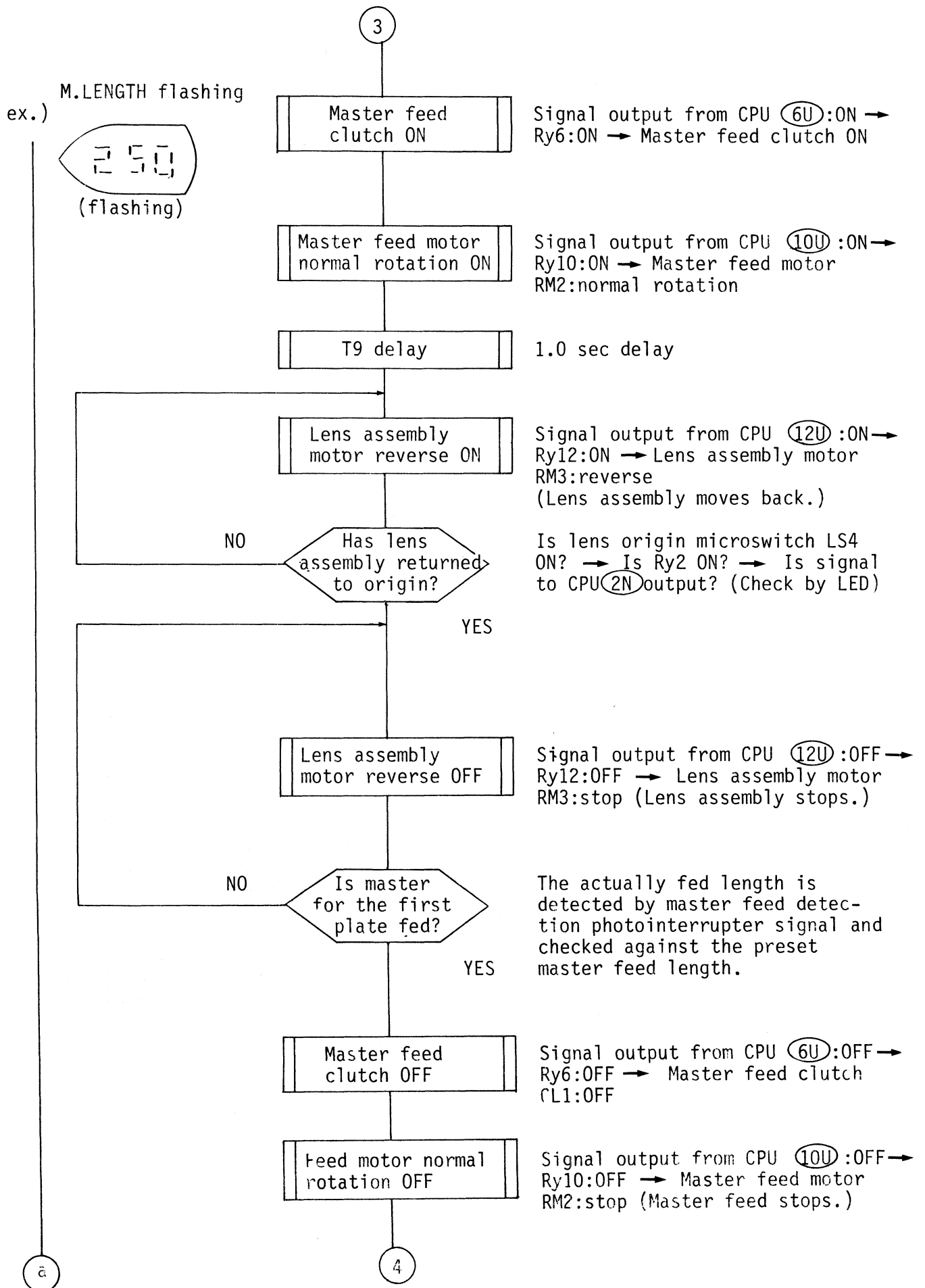
Normal exposure: 370 - 820 mm  
Double exposure: 185 - 410 mm

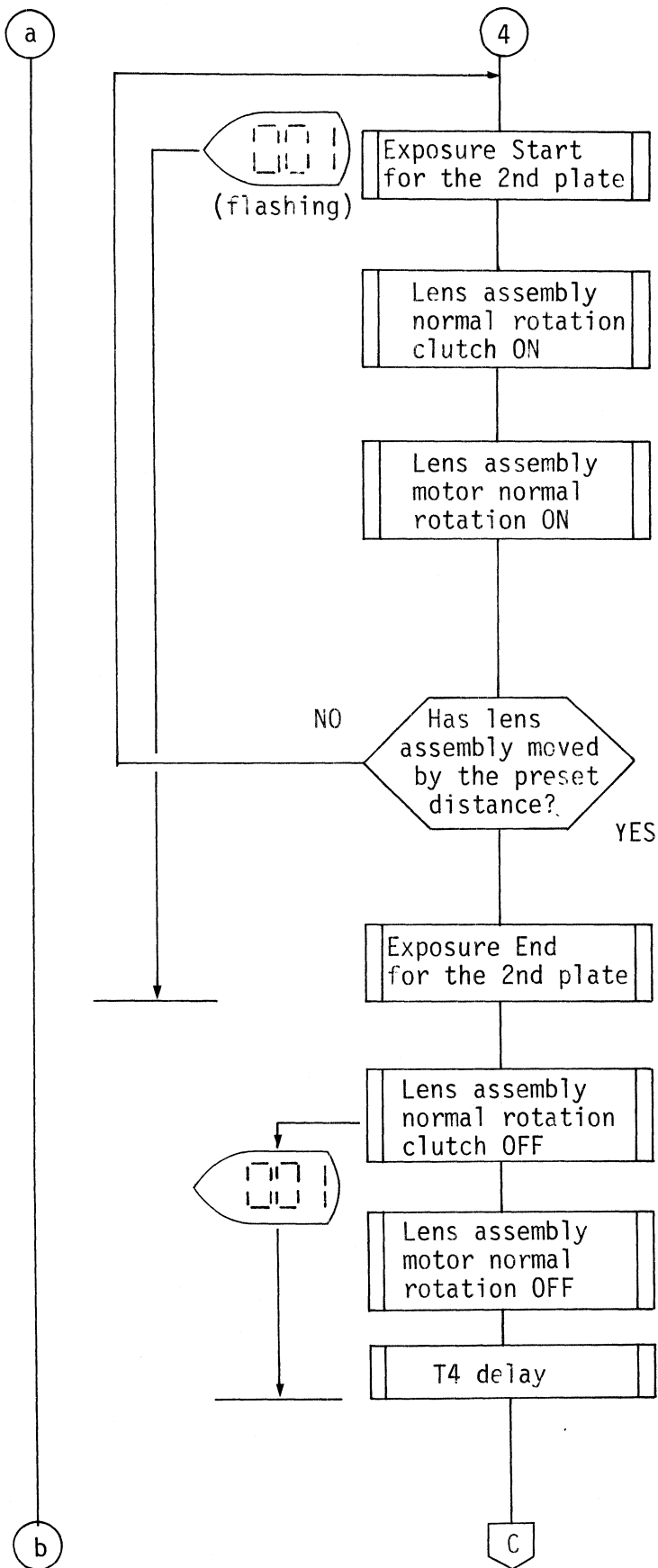
Is data entry under way?

### 3. Exposure









Signal output from CPU (15U):ON → Ry15:ON → Lamp/shutter circuit prepared for operation.

Signal output from CPU (7U):ON → Ry7:ON → Lens motor clutch CL2:ON

Signal output from CPU (13U):ON → Ry13:ON → Lens assembly motor RM3:normal rotation (Lens assembly moves in the direction for exposure.)  
 \* When Ry15 and Ry13 turn on, the light sources (RyB) turn on and the shutter opens.

The position of the lens assembly is detected by signal from lens assembly move detection photointerrupter and checked against the preset value.

Signal output from CPU (15U):OFF → Ry15:OFF → Light sources and shutter:OFF

Signal output from CPU (7U):OFF → Ry7:OFF → Lens motor clutch CL2:OFF

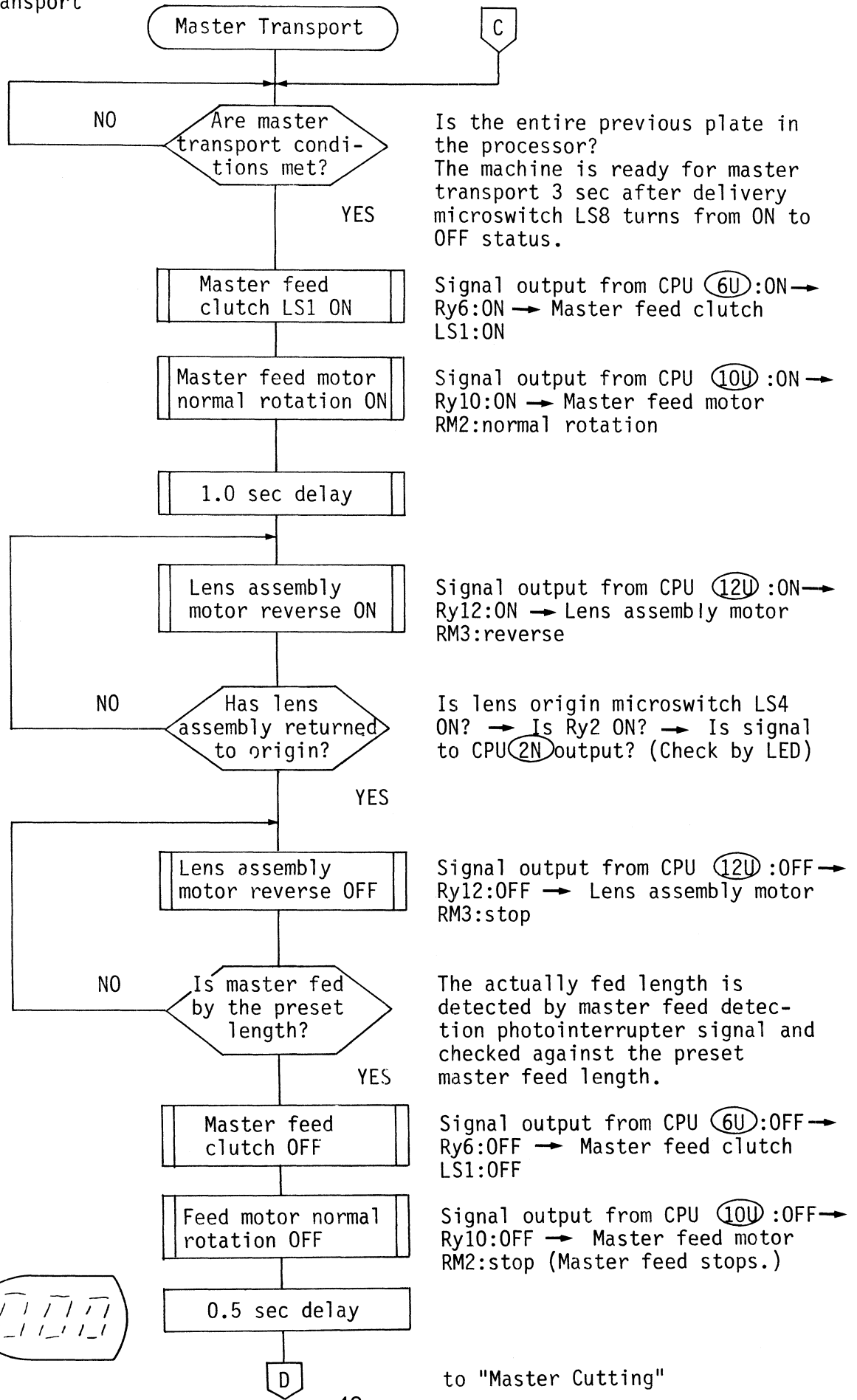
Signal output from CPU (13U):ON → Ry13:ON → Lens assembly motor RM3: stop (Lens assembly stops.)

0.5 sec. delay

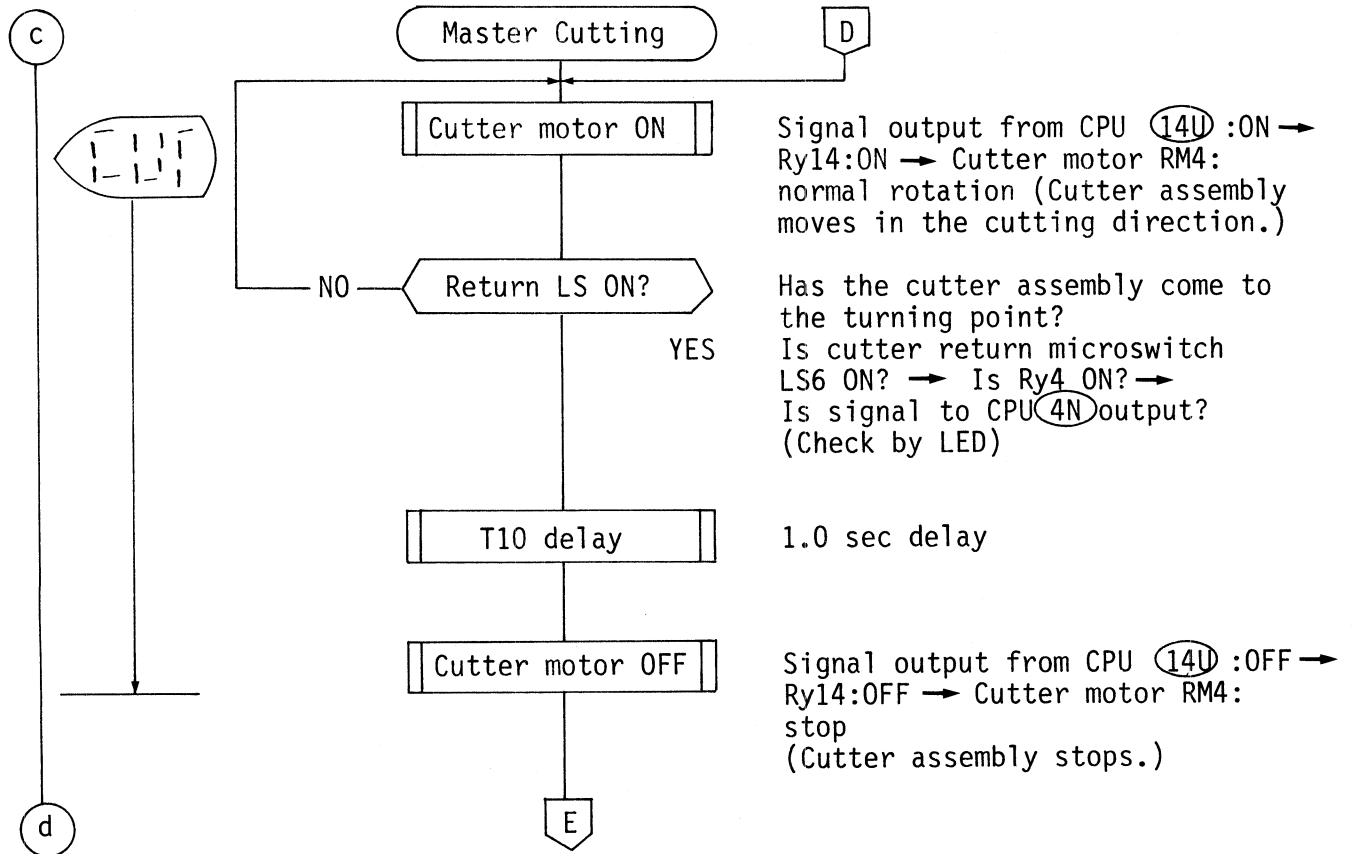
to "Master Transport"

#### 4. Master Transport

b

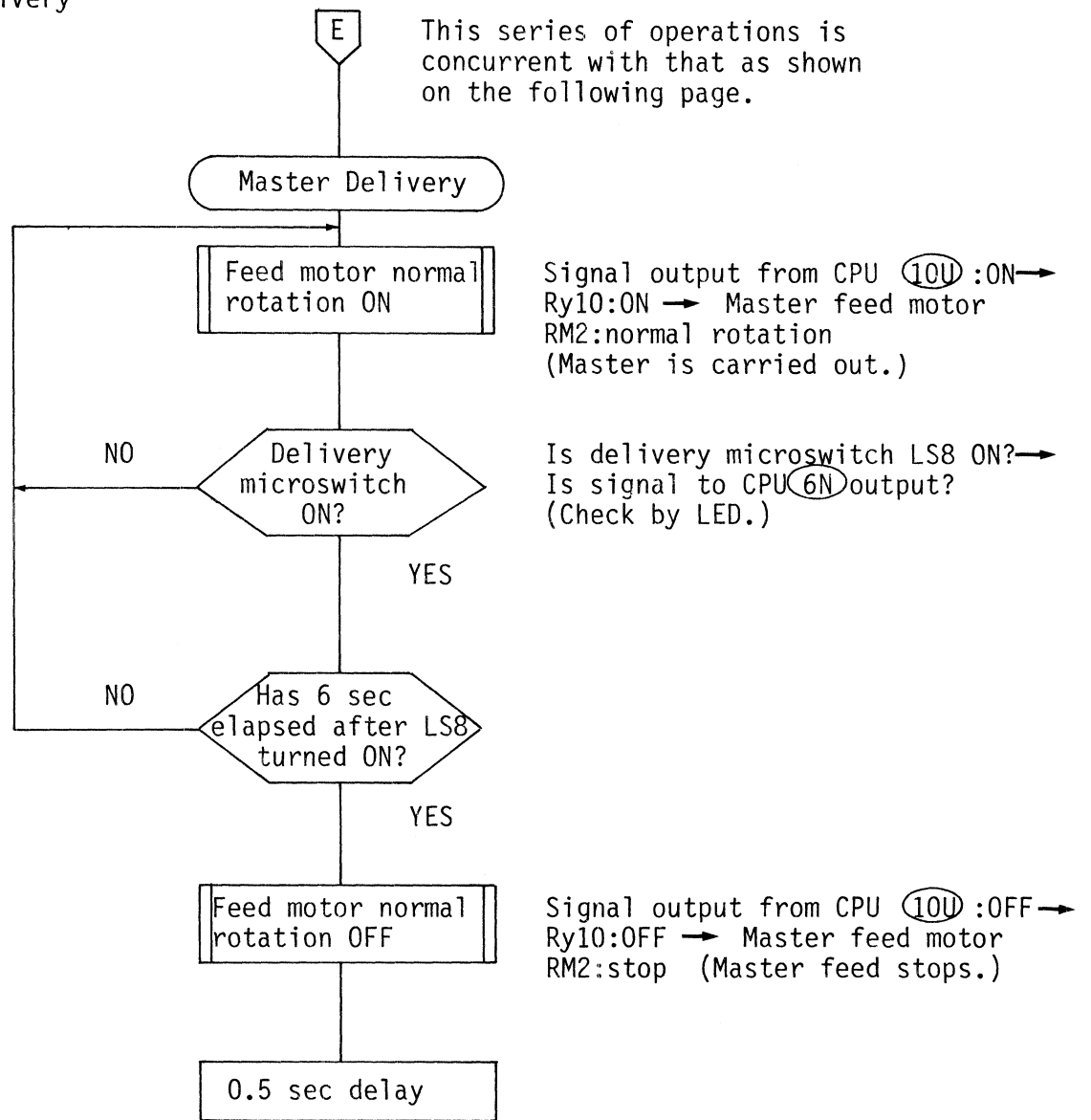


## 5. Master Cutting

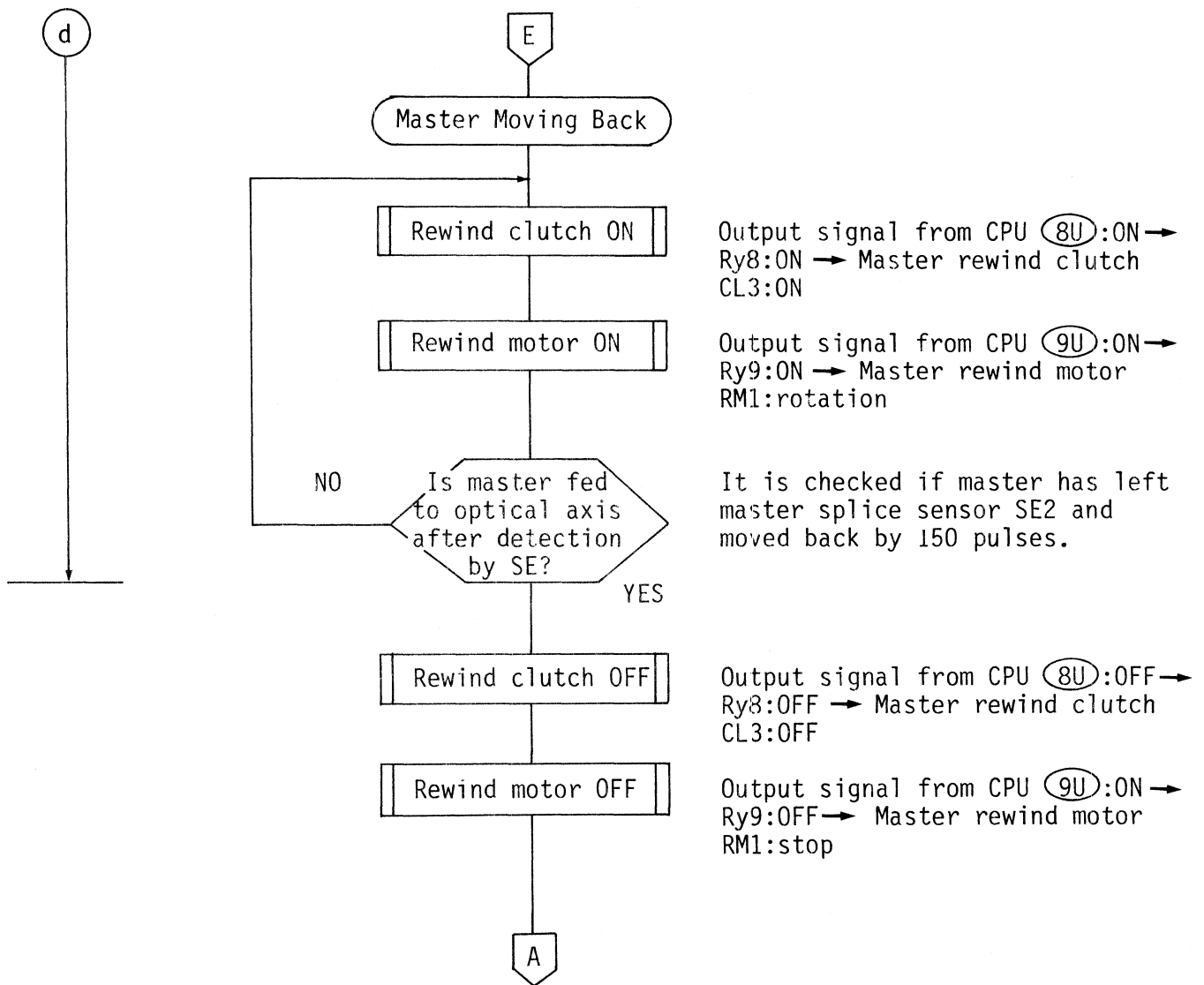




## 6. Master Delivery



7. Master Moving Back



ERROR MESSAGES

M.LENGTH	DISPLAY	Buzzer	Message appears when:	Remedy
	CLd (cold)		The developer temperature is below the pre-set level.	<ol style="list-style-type: none"> <li>1. Wait until the message disappears.</li> <li>2. Press the C key; However, in this case, the machine can be started but the plate produced may have a poor quality due to low developer temperature.</li> </ol>
	End (End)	pee..p	<ol style="list-style-type: none"> <li>1. Master is exhausted.</li> <li>2. No master is loaded.</li> <li>3. Master is improperly loaded.</li> </ol>	<ol style="list-style-type: none"> <li>1.2. Load a new roll.</li> <li>3. Reload the roll properly.</li> </ol>
	nip (Nip)		The nip roller is free.	Turn the nip roller lever to LOCK.
	dor (Door)		<ol style="list-style-type: none"> <li>1. The top cover is open.</li> <li>2. The front cover is open.</li> </ol>	<ol style="list-style-type: none"> <li>1. Close the top cover.</li> <li>2. Close the front cover.</li> </ol>
	SET (Set)		<ol style="list-style-type: none"> <li>1. No master is set in the exposure section.</li> <li>2. Reset button is pressed during machine operation.</li> </ol>	Press the SET button.
	Err (Error)		The set master feed length is out of the specified range.	Reset the master feed length within the range.

			<ol style="list-style-type: none"> <li>1. The lens assembly is not at the original position.</li> <li>2. The cutter is not at the start point (origin)</li> <li>3. The master takeout guide of the carrier is closed.</li> <li>4. M.LENGTH is being set.</li> </ol>	<ol style="list-style-type: none"> <li>1. Return the lens assembly to the original position using the LENS switch.</li> <li>2. Reset the 100V POWER switch and return the cutter to the start point.</li> <li>3. Open the master take-out guide.</li> <li>4. Set the M.LENGTH. (Enter data until all digit places stop flashing.)</li> </ol>
	CHC (Check)	pee..p	Within 30 seconds after pressing the SET button, master is not detected in the exposure section.	Reset the power and reset the master.
	CHP (Check paper)		Master is jamming in the carrier after master cutting.	Remove the jammed master. Reset the power and reset the master.
	SOS	pee	The lens assembly has slipped and stopped during exposure. The lamps are off.	Reset the power and return the lens assembly to the original position with the LENS switch (independent).

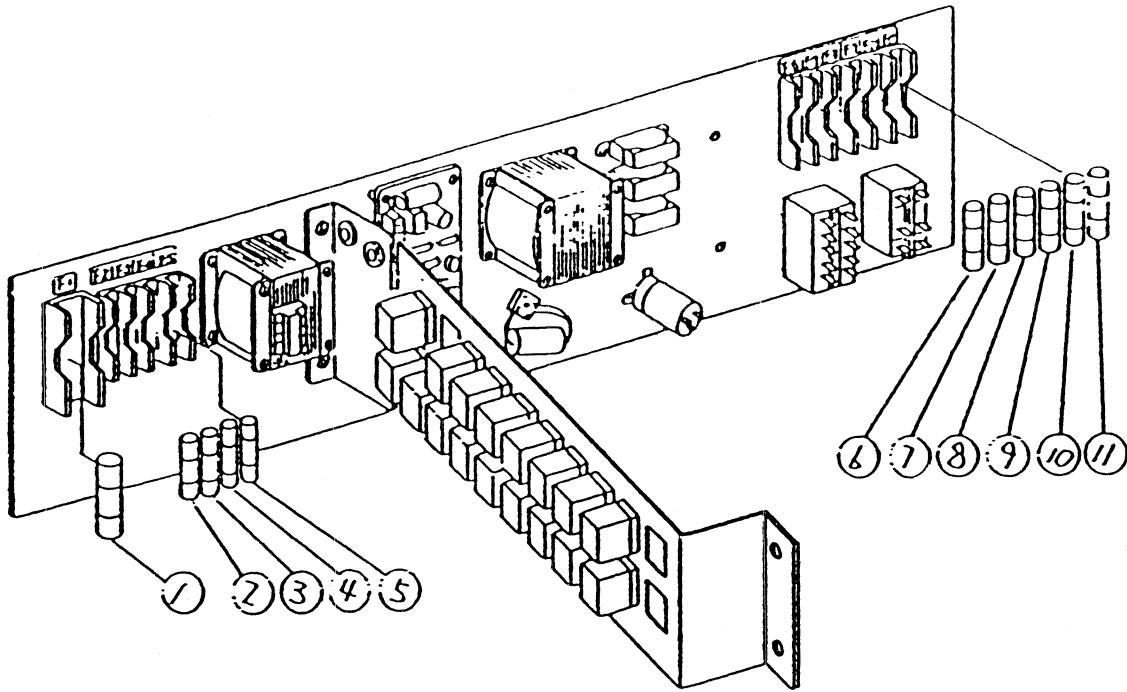
## FUSES

### CAUTIONS:

i) When changing the fuse, be sure to turn off the 100 V and 200 V switches and also the user's power source.

ii) Do not use any fuse with a capacity not as specified.

### Control Box



(1): EXP.LIGHT (F1) (Lamp fuse)

A 30A enclosed fuse to protect the light source circuit.

(2): DRYER HEATER (F2) (Dryer heater fuse)

A 10A glass tube fuse to protect the dryer heater circuit.

(3): DRYER FAN (F3) (Dryer fan fuse)

A 0.5A glass tube fuse to protect the dryer fan circuit.

(4): LIGHT CONTROL (F4) (Light control circuit fuse)

A 0.1A glass tube fuse to protect the light control circuit.

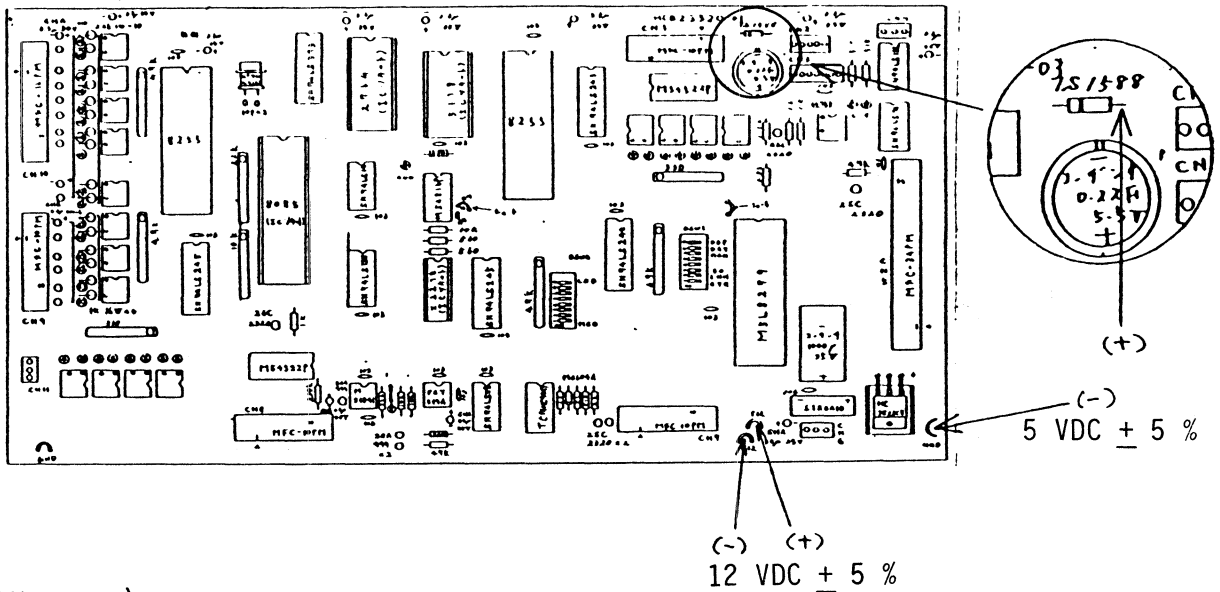
- (5): DEFOGGER HEATER (F5) (Defogger heater fuse)  
A 5A glass tube fuse to protect the main defogger circuit.
- (6): DEV. HEATER (F6) (Developer heater fuse)  
A 15A glass tube fuse to protect the developer heater circuit.
- (7): CONTROL CIRCUIT (F7) (Control circuit fuse)  
A 3A glass tube fuse to protect the control circuit.
- (8): FAN (F8) (Fan fuse)  
A fuse to protect the copy surface cooling fan, mirror defogger fan and exhaust fan.
- (9): 24 VDC CIRCUIT TRANS (F9) (Weak current circuit fuse)  
A 2A glass tube fuse to protect the 24 VDC weak current circuit transformer.
- (10): PROCESSOR MOTOR (F10) (Processor motor fuse)  
A 1A glass tube fuse to protect the processor drive motor circuit.
- (11): COPY SET (F11) (Copy set fuse)  
A 0.5A glass tube fuse to protect the COPY SET lamp circuit which is used when the copy is set.

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 through the input cord if the voltage of the power supply is adequate.
2. 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. (See p. .)
3. If the AC power supply is all right, check the DC power supply next. The DC power voltages should be checked at the points as shown in the figures below.

(CPU Board)



(+5V power)

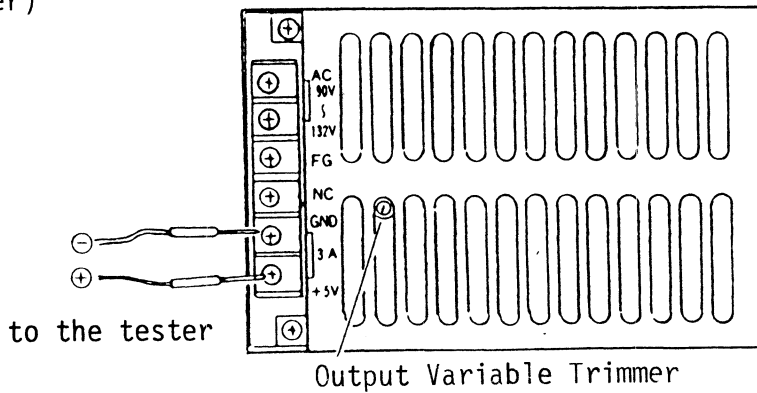


Fig.6 5VDC Switching Regulator

(24 VDC power)

Check between distributing board terminals P24 and E24.

## CPU BOARD AND PANEL BOARD TROUBLE

1. The machine incorporates microcomputer. In troubleshooting, the conventional heavy current control circuit and the microcomputer circuit should be considered separately.
2. The microcomputer incorporates a program designed for the operational routines of the machine. According to the program, the microcomputer sequentially controls the relays, motors, and light source lamps in a predetermined order. This is very important. Since the microcomputer proceeds from one step to the next only after receiving an input signal, it is necessary for such signals to arrive from limit switches, sensors and input signal switches for operation.
3. The microcomputer makes decisions according to the program. Input signals are essential. Input signals from master sensors and microswitches located in various sections can be checked by the input information check LED lamps (red) attached onto the CPU printed circuit board. It is necessary to ascertain whether such detection signals are entered. Refer to p.3.
4. The CPU operation indicating LED on the CPU board should be always lit. Refer to p.3.
5. There should be 5 VDC  $\pm 5\%$  and 12 VDC  $\pm 5\%$  at the 5 VDC and 12 VDC voltage check points. Refer to p.22.
6. 24 VDC should be present between distributing board terminals P24 and E24. Refer to p.22.

### ° Typical trouble in the CPU board

- 1) After the POWER switch is turned on, a meaningless display appears on the display.
- 2) No display appears at all.
- 3) A meaningless display appears at times.  
e.g.)



- 4) Though the display is normal, it doesn't respond to any pushbutton switch operation.
- 5) The light source lamps, cutter motor and other load devices operate irregularly.
- 6) The alarm buzzer keeps sounding unnecessarily.

## TROUBLE IN THE DISPLAY CIRCUIT

1. If trouble occurs in the display circuit, the following symptoms may appear.

- 1) None of numeral displays will appear but the other displays appear normally.
- 2) Only one figure in a numeral display will not appear while the other figures appear normally.
- 3) The figures in a numeral display are partially missing though the device works normally.
- 4) The indicator LED lamp below the key switch will not light at all when the switch is pressed, though the device works normally.
- 5) Only one of the channel indicator LED lamps is defective.

If any of the above symptoms appears, the display device (part) corresponding to the defective part is defective.

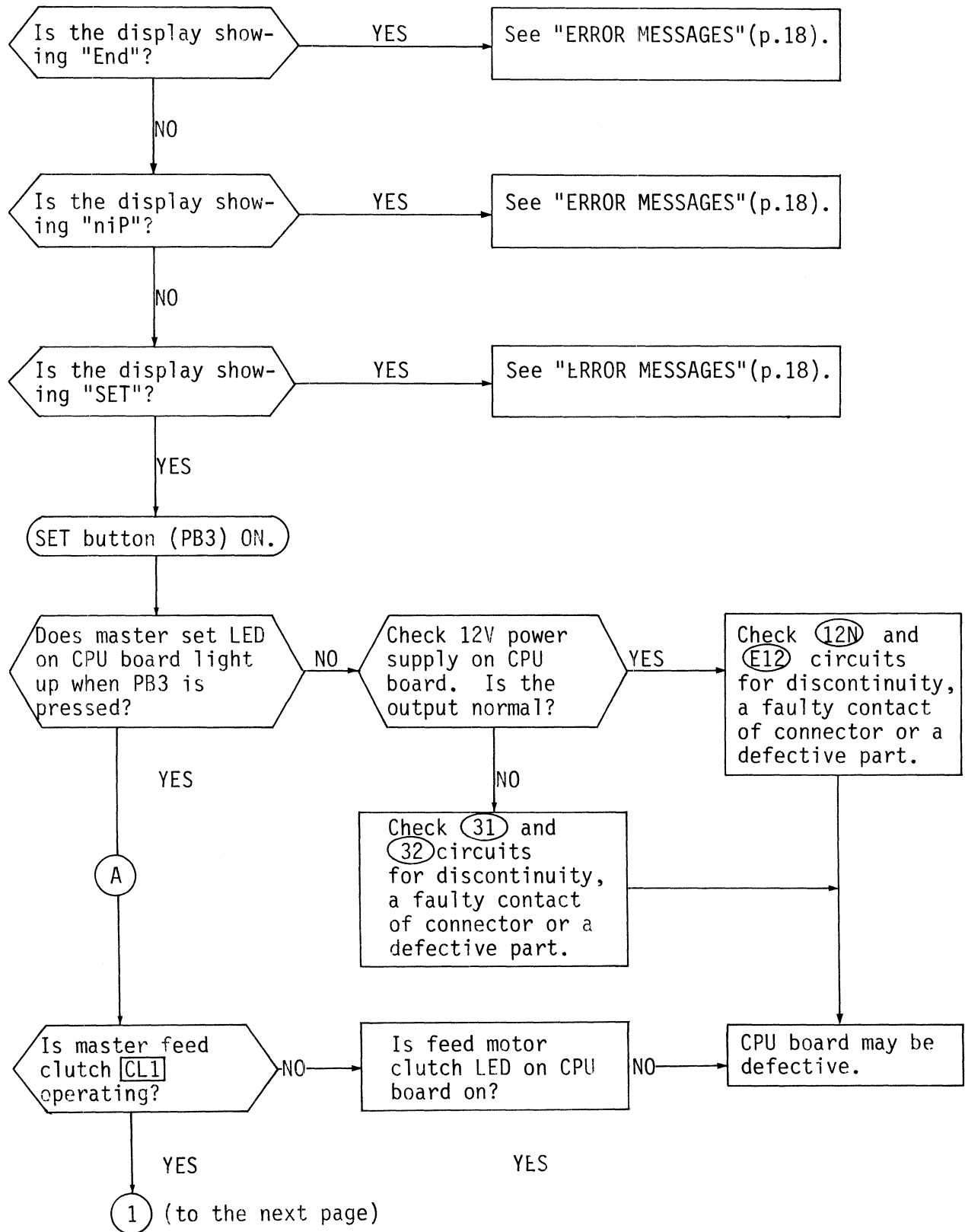
### 2. Remedy

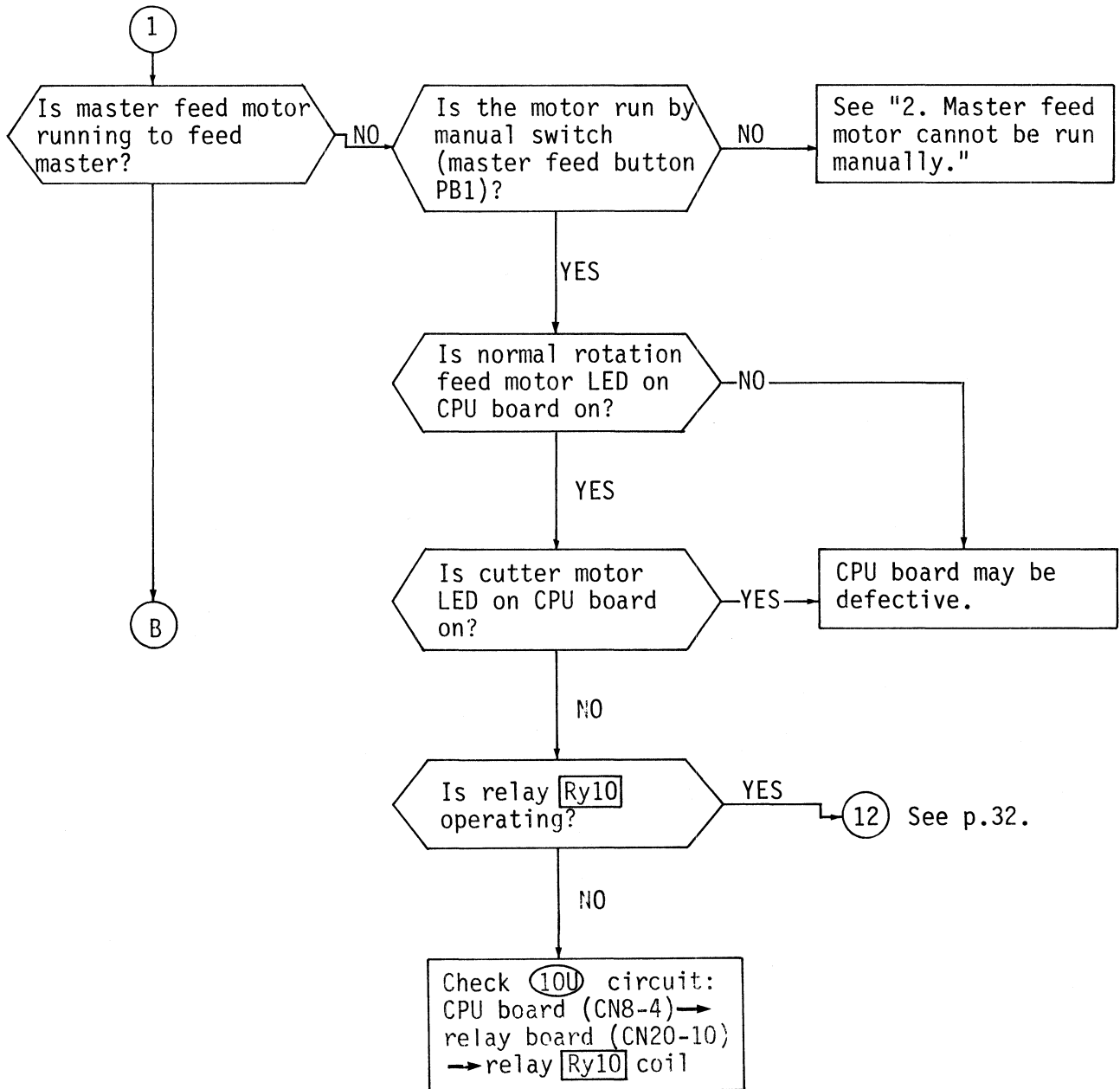
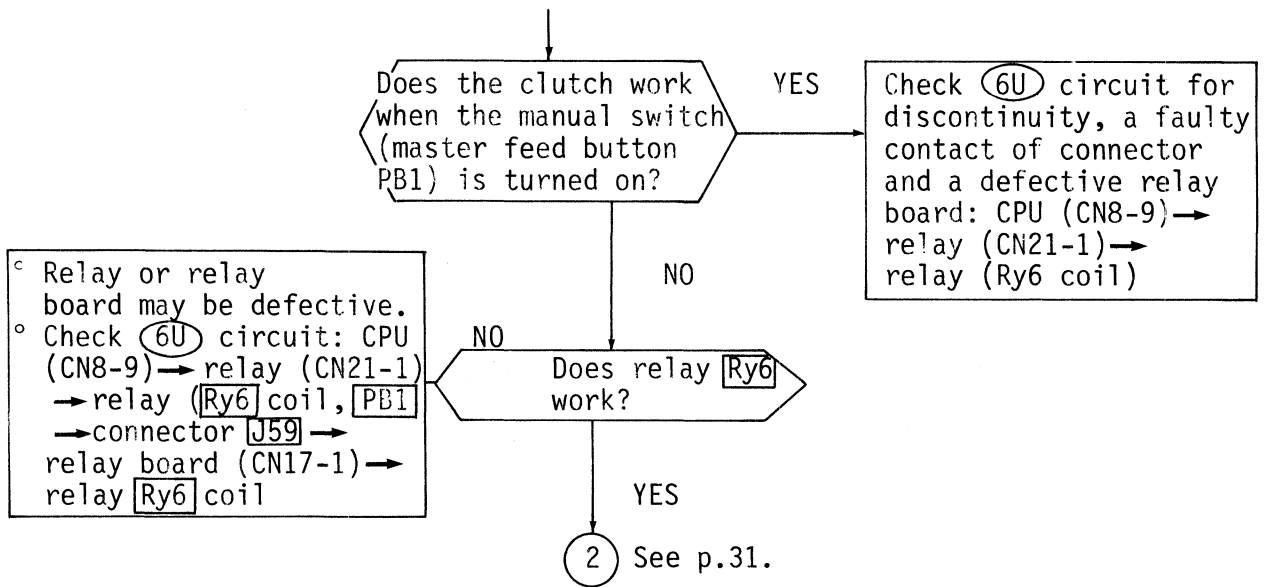
Replace the part concerned or the entire circuit board with a new one.

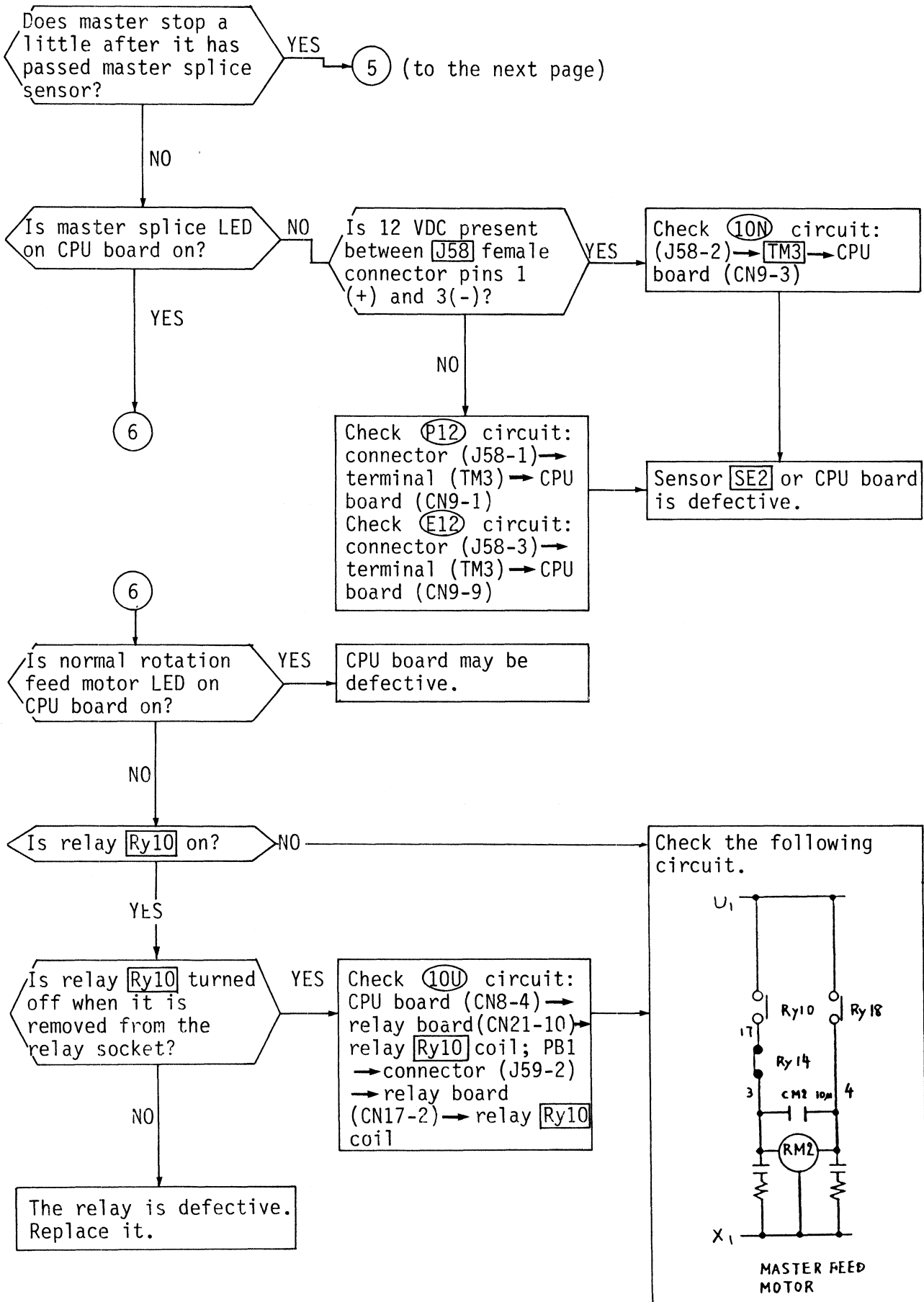
3. If the following symptoms appear, the CPU may be defective. It is most recommended that both the panel and CPU boards be changed.

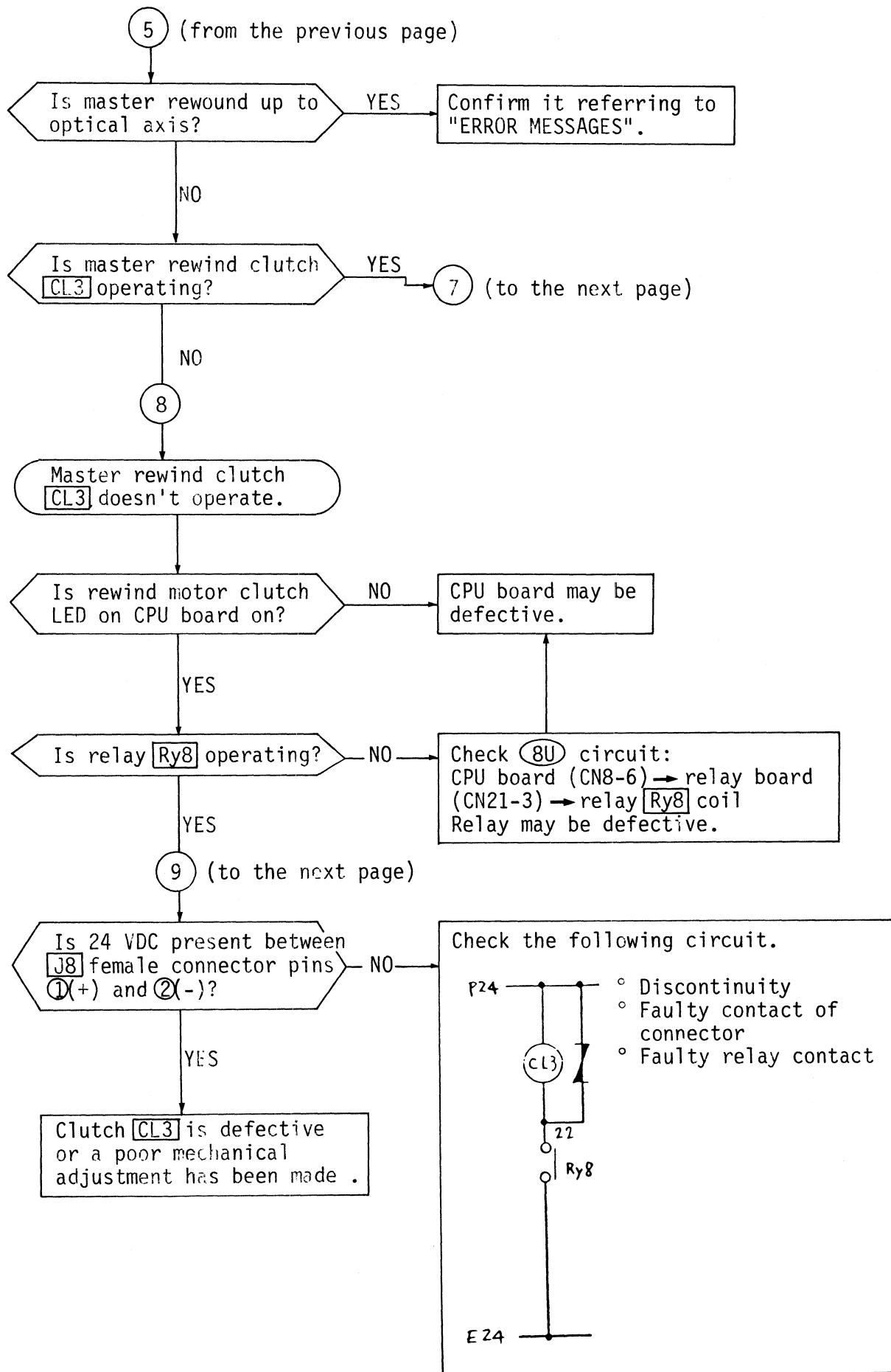
- 1) No display appears.
- 2) The display changes irregularly.
- 3) A meaningless display other than numerals and letters appears.

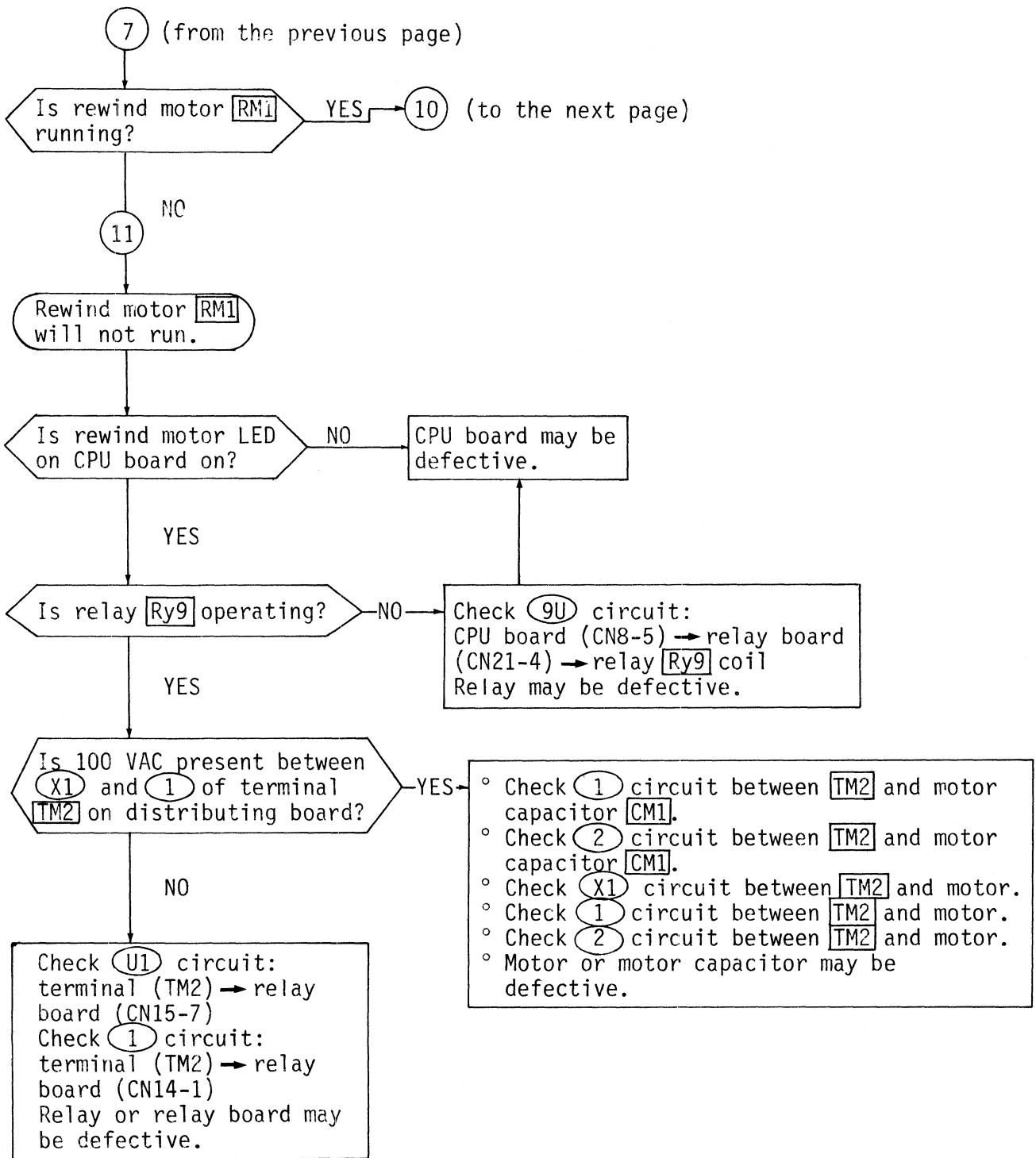
1. Master cannot be set in place.



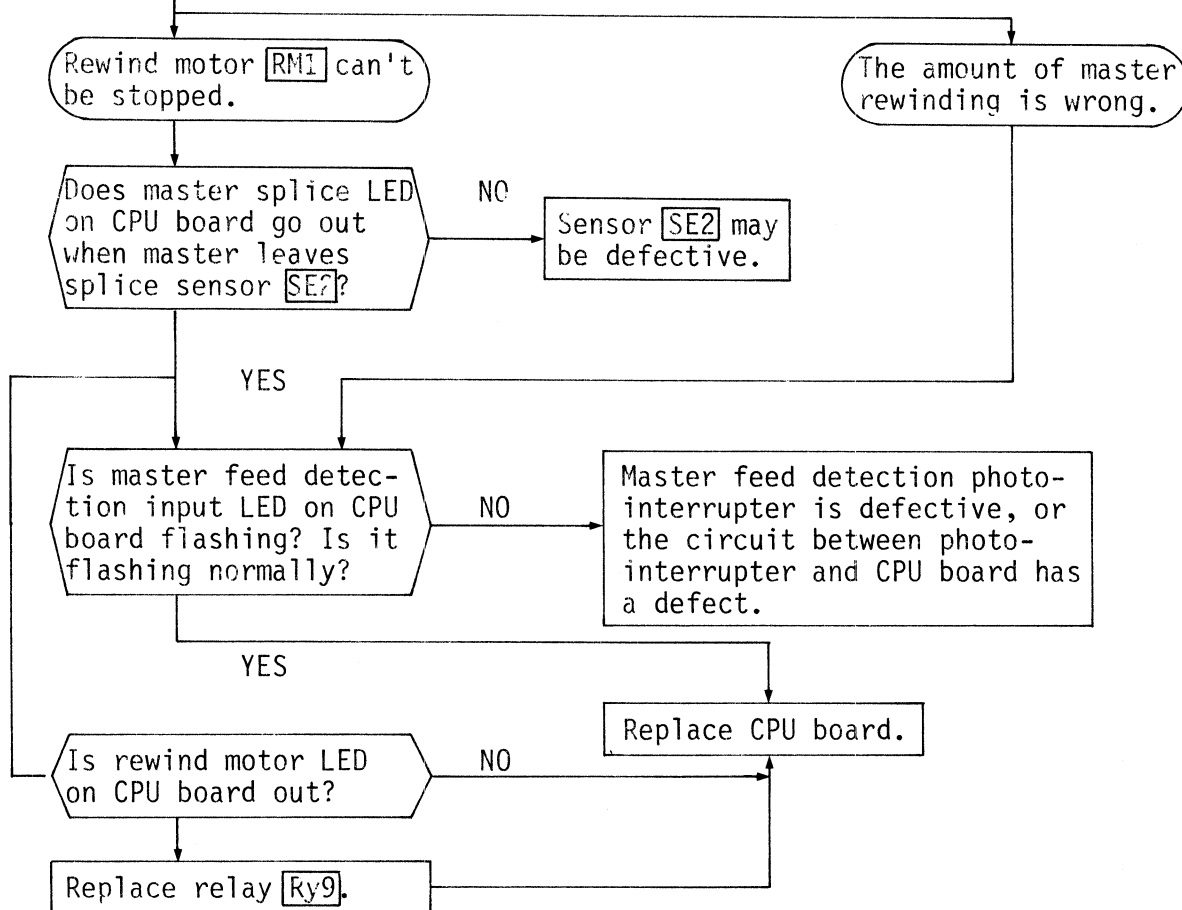




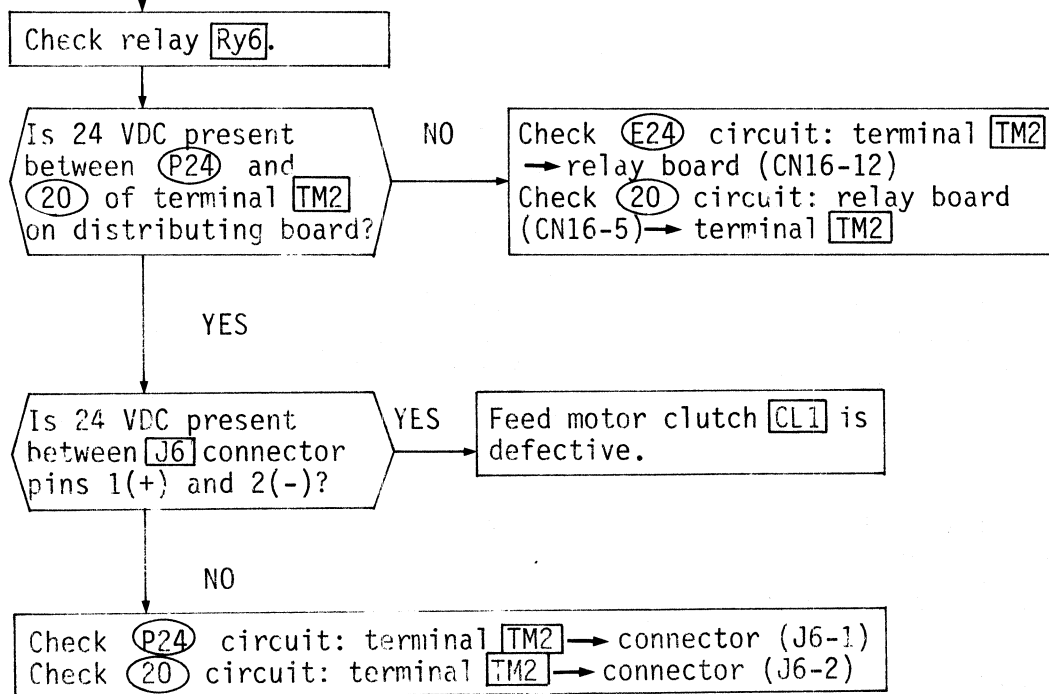




⑩ (from the previous page)

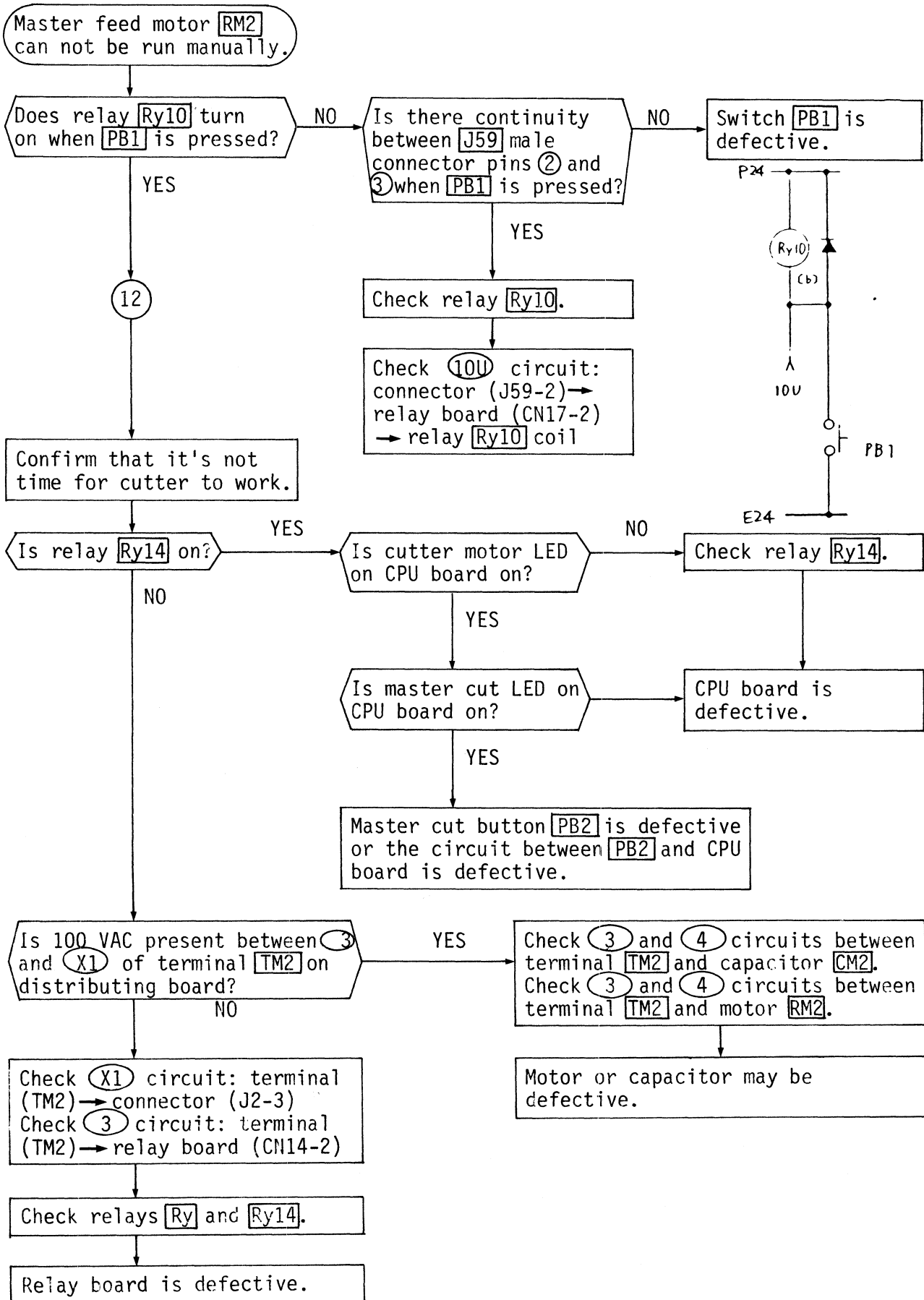


②





2. Master feed motor can not be run manually.



3. Lens assembly will not move on the press of the start button.

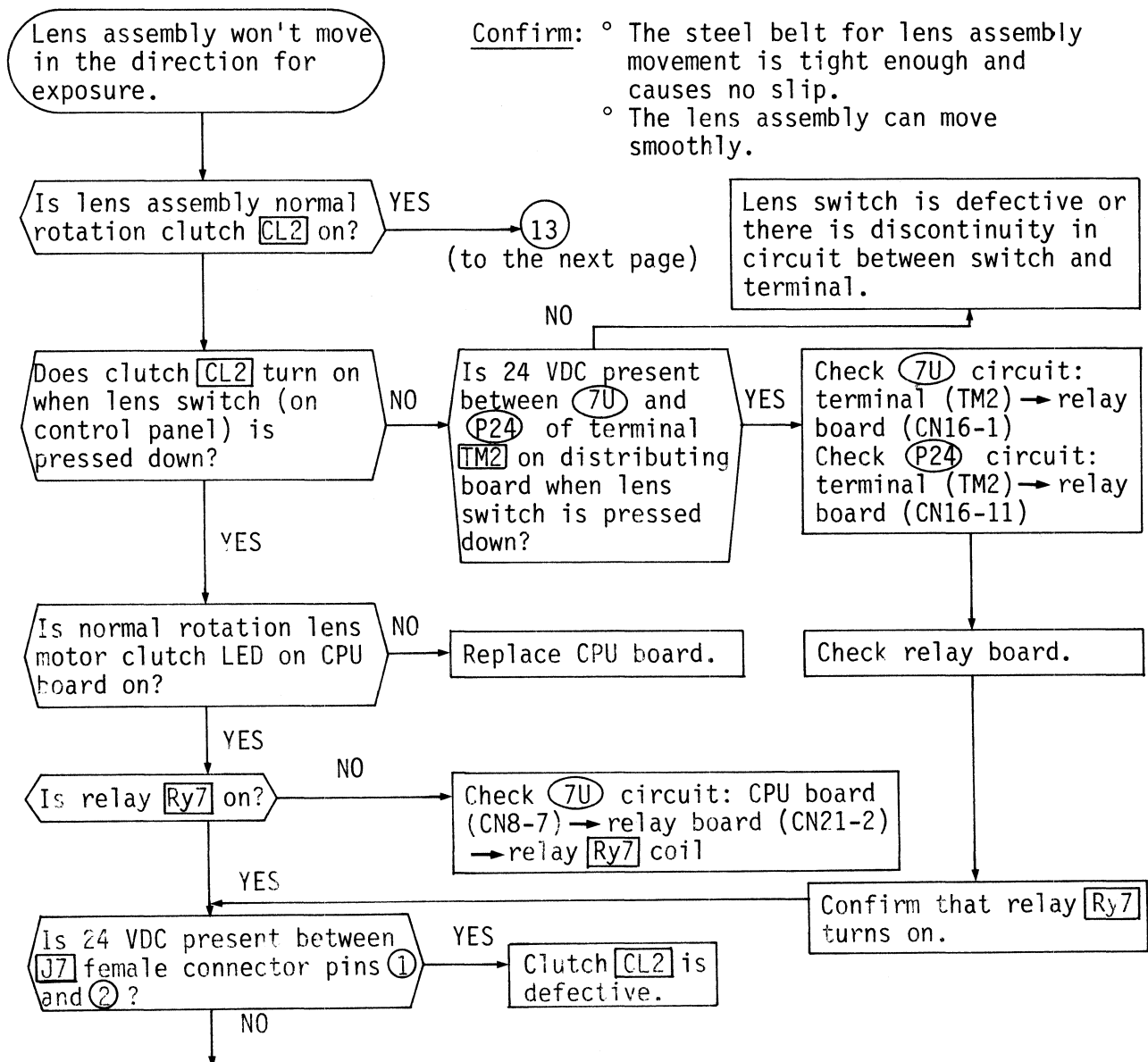
° Confirm that the Start OK lamp is on.

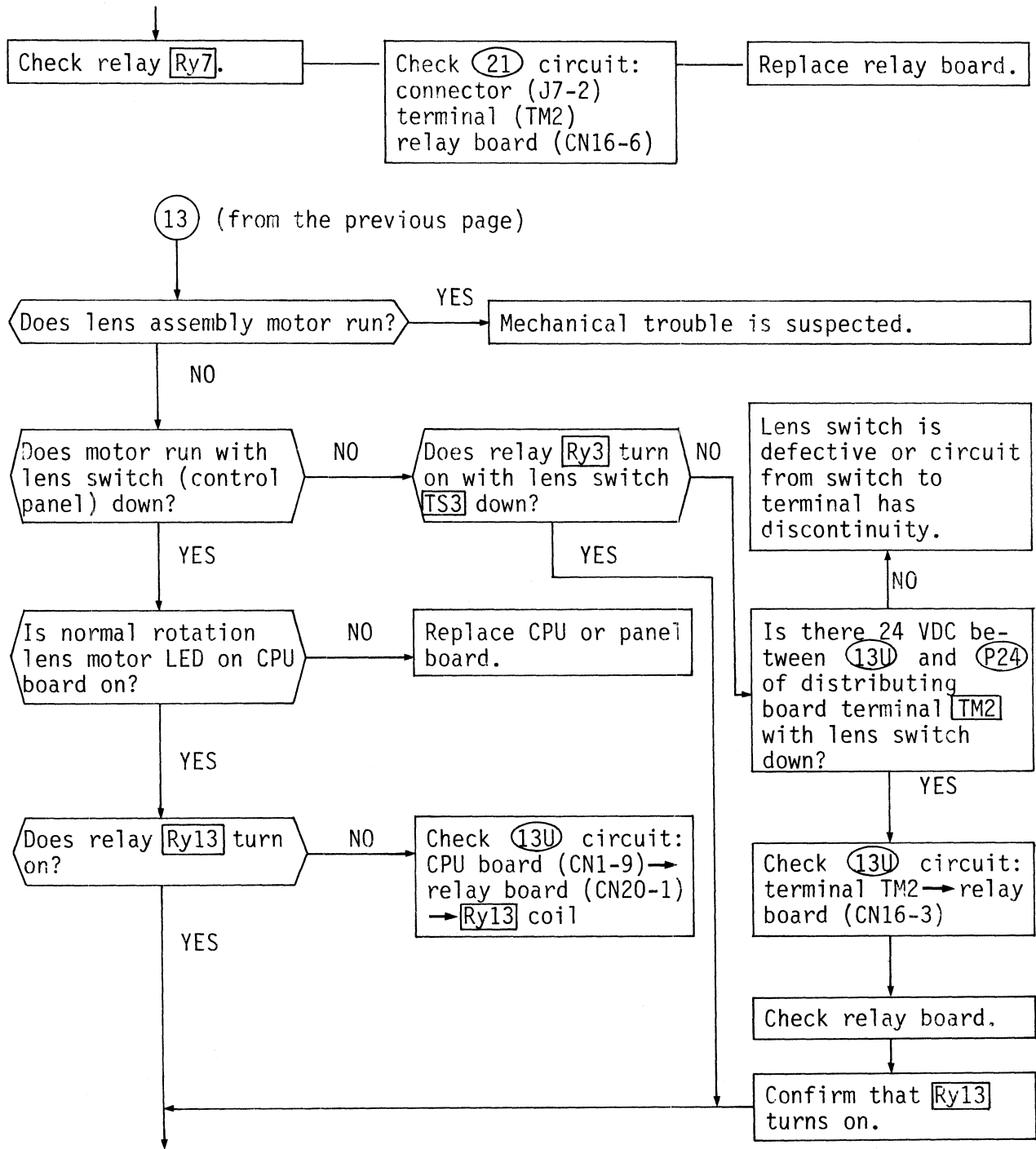
The following conditions should exist for lighting of the Start OK lamp:

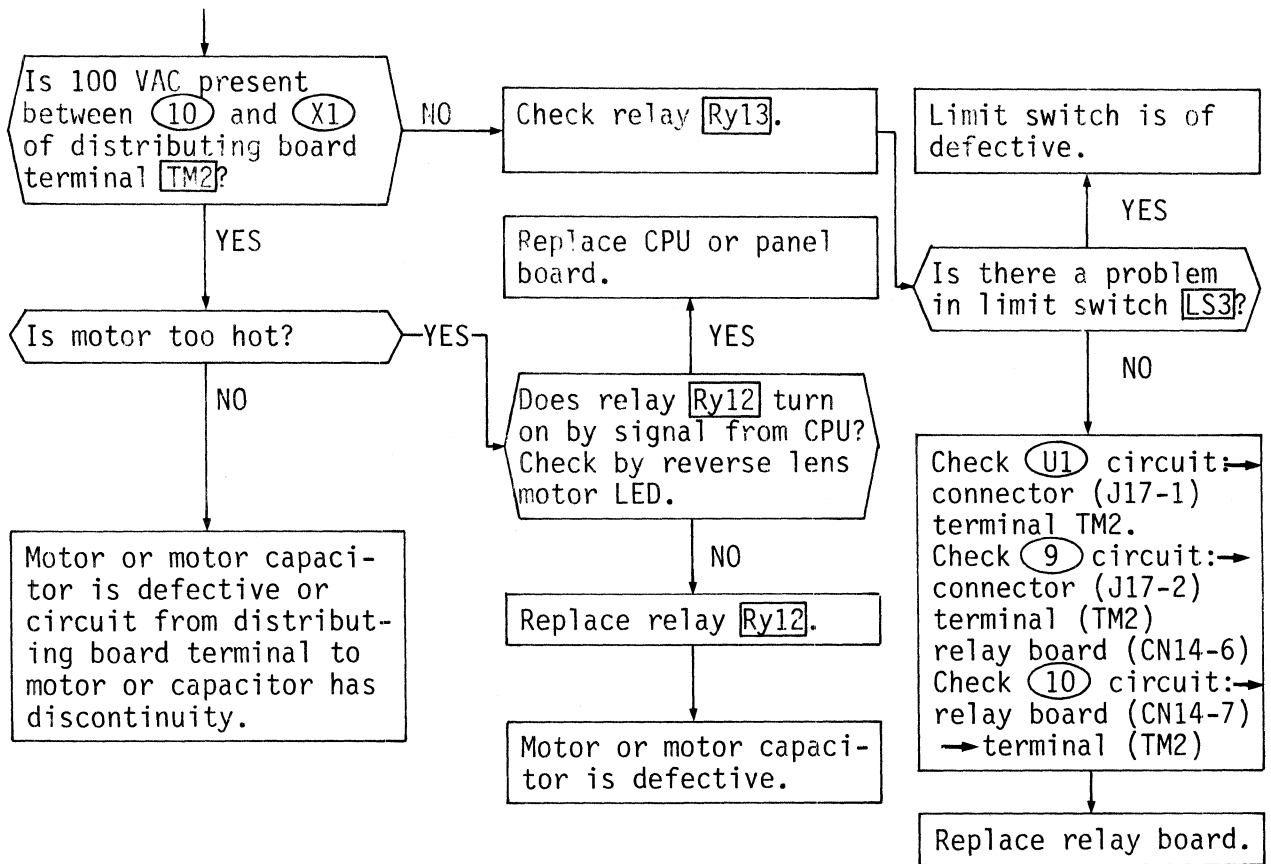
- 1) Master setting has been finished,
- 2) Developer temperature has reached the set temperature,
- 3) The CPU board dip switches which should be normally OFF are OFF,
- 4) The lens assembly is in the original position, (LS4-ON)
- 5) The cutter is in the original position, (LS5-ON)
- 6) The side board is in its outer position. (LS9-OFF)
- 7) The master feed length setting is within the specified range.

Normal exposure: 370 mm - 820 mm

Double exposure: 185 mm - 410 mm







4. Exposure will not be made

Confirm that:

1. 200 VAC POWER switch is on,

2. The halogen lamps are not burned out, and the fuses are not blown,

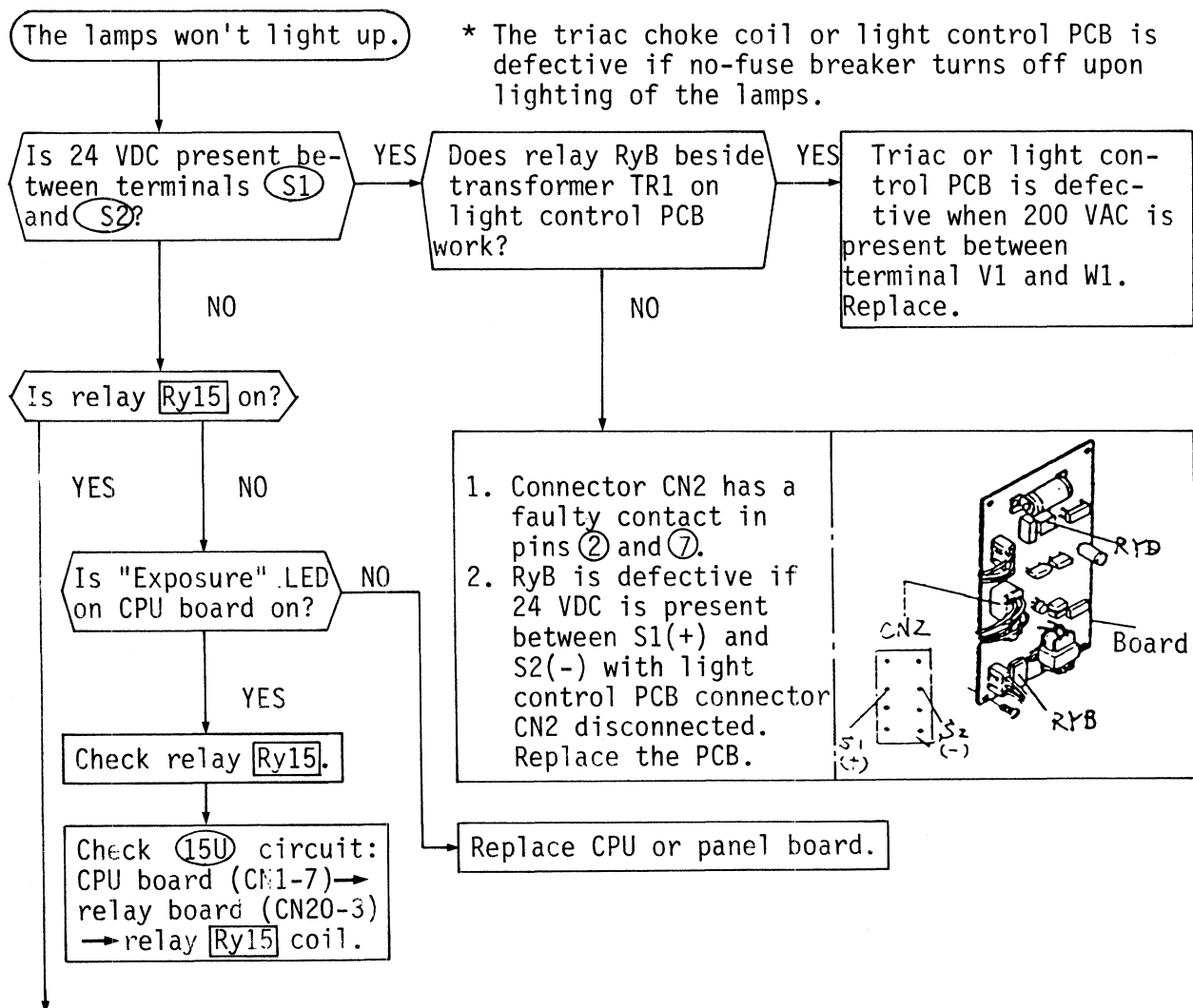
° Measure the contact at each end of the lamp with a tester set at resistance range; confirm that it does not read infinity ( $\infty$ ).

Whether the lamp filament is burned out or not is found by looking at the lamp carefully.

CAUTION: Handle the lamp with a dry cloth or gloves. Don't hold it with bare hands. If it is fingermarked or stained with oily substance, uneven distribution of illuminance or damage to that stained part may occur.

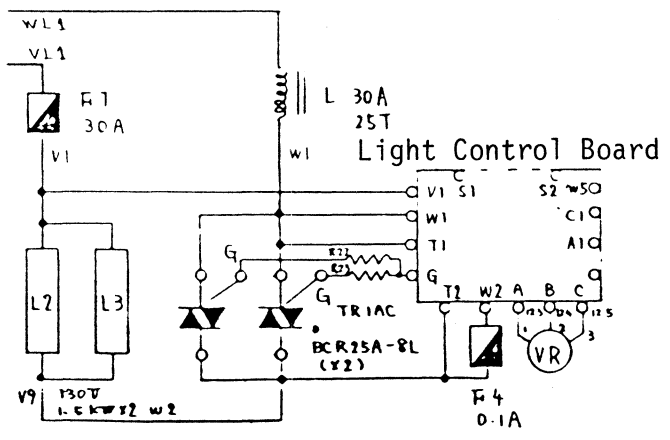
3. The EXPOSURE switch is not in the ZERO position.

4. The lens assembly moves in the direction for exposure.



↓  
 Check relay Ry15. → Replace relay board.

Check (30) circuit:  
 relay board (CN16-9)  
 → terminal (TM2) →  
 connector (J41-6) →  
 EXPOSURE switch (TS4)  
 Check (S1) circuit:  
 terminal (TM2) →  
 connector (J41-5) →  
 EXPOSURE switch (TS4)



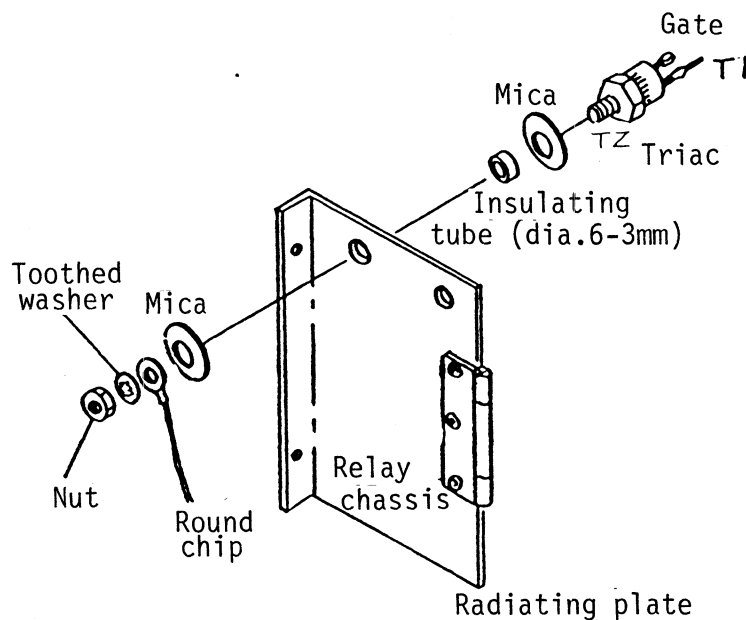
EXP LIGHT

## Light Control PCB

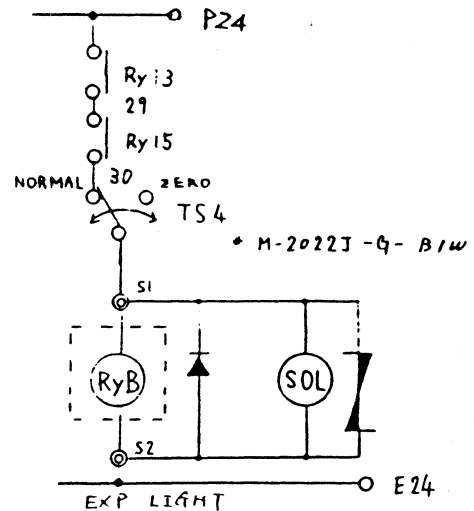
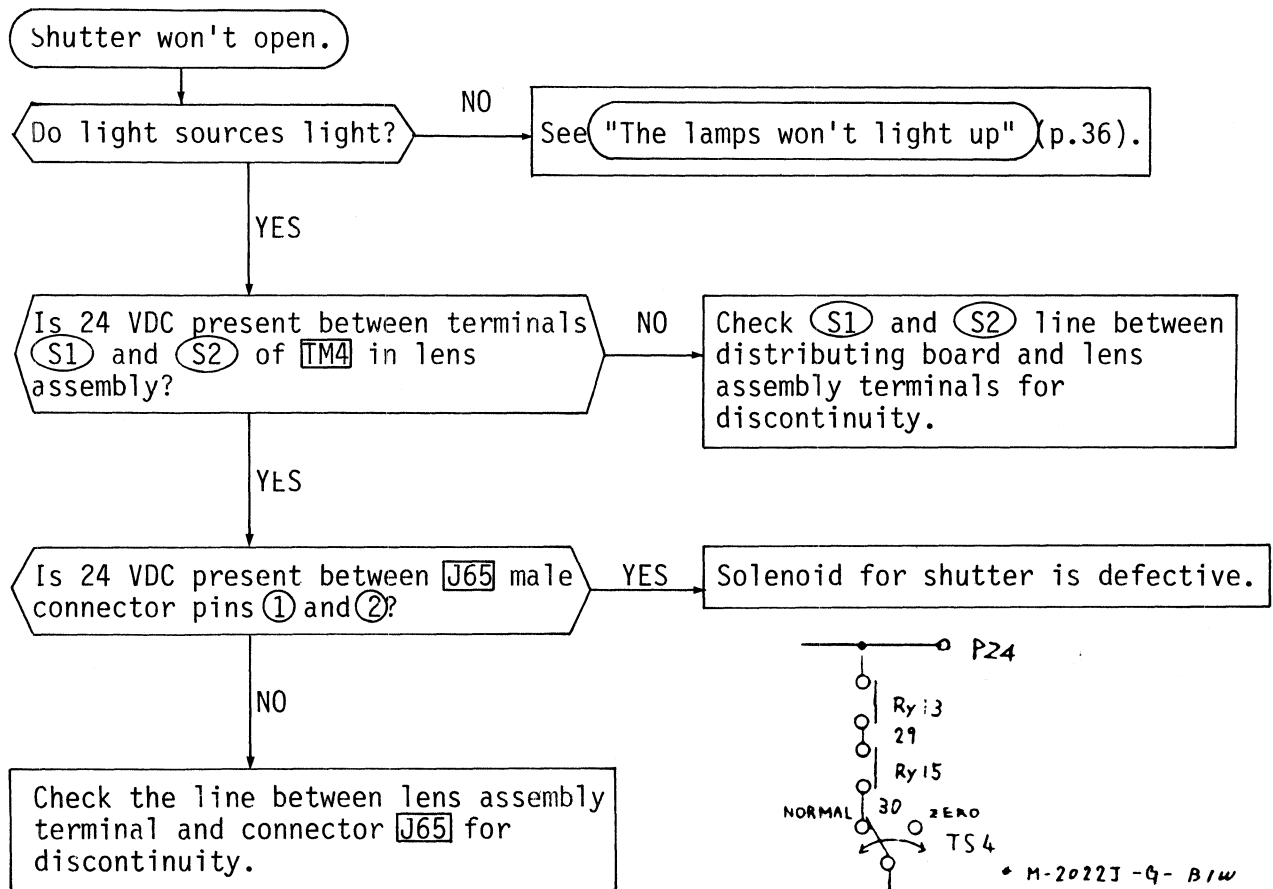
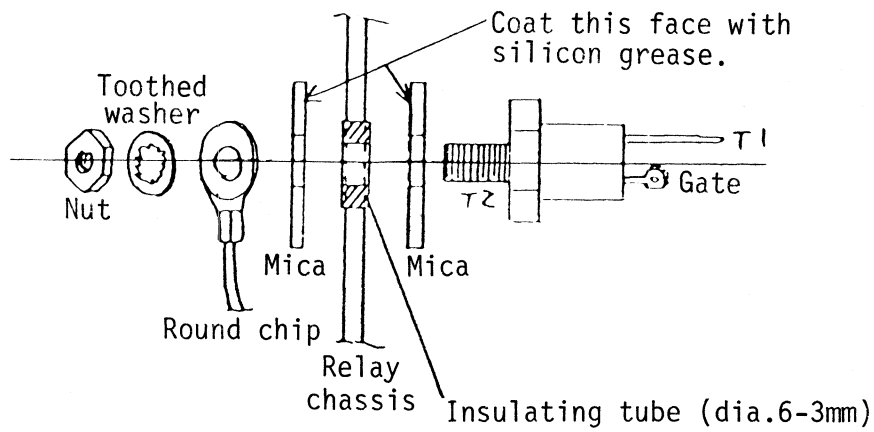
If the light control PCB fails, the input voltage is directly applied to the halogen lamp, so the lamp burns out in a short time (approx. 10 sec). This occurs because the halogen lamp rating is 130 V but the input voltage is 200 V.

To prevent the lamp from burning out, the machine is so designed that the power supply trip circuit is actuated (i.e. the POWER switch instantaneously turns off) when the triac or light control PCB fails.

1. Triac trouble is caused by a defective triac or improper installation of a triac. In either case, the triac must be replaced. Considerations necessary for the replacement are given next.



- (1) Insulation between the triac and relay chassis is necessary, so elastic insulating tubes (dia. 6 - 3 mm) should be used.
- (2) For better radiation, the mica on each side of the relay chassis should be coated with silicon grease.
- (3) Fit an elastic insulating tube to the triac gate and T1 and make it contract by heating.
- (4) Fit an elastic insulating tube to T2 side round chip and make it contract by heating.

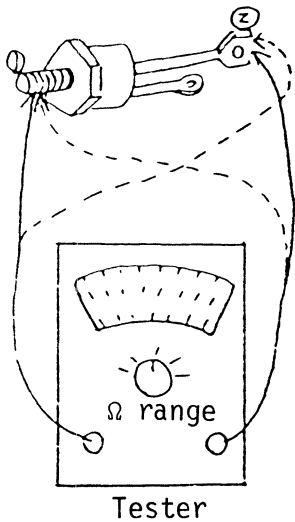




## Triac Trouble

To prevent the halogen lamp from burning out due to triac trouble, the 200V power (no-fuse breaker) is designed to turn off within 1 sec after triac trouble occurs. Therefore, if the 200V no-fuse breaker turns off the moment the light sources come on, check the triac as follows.

How to check the triac:



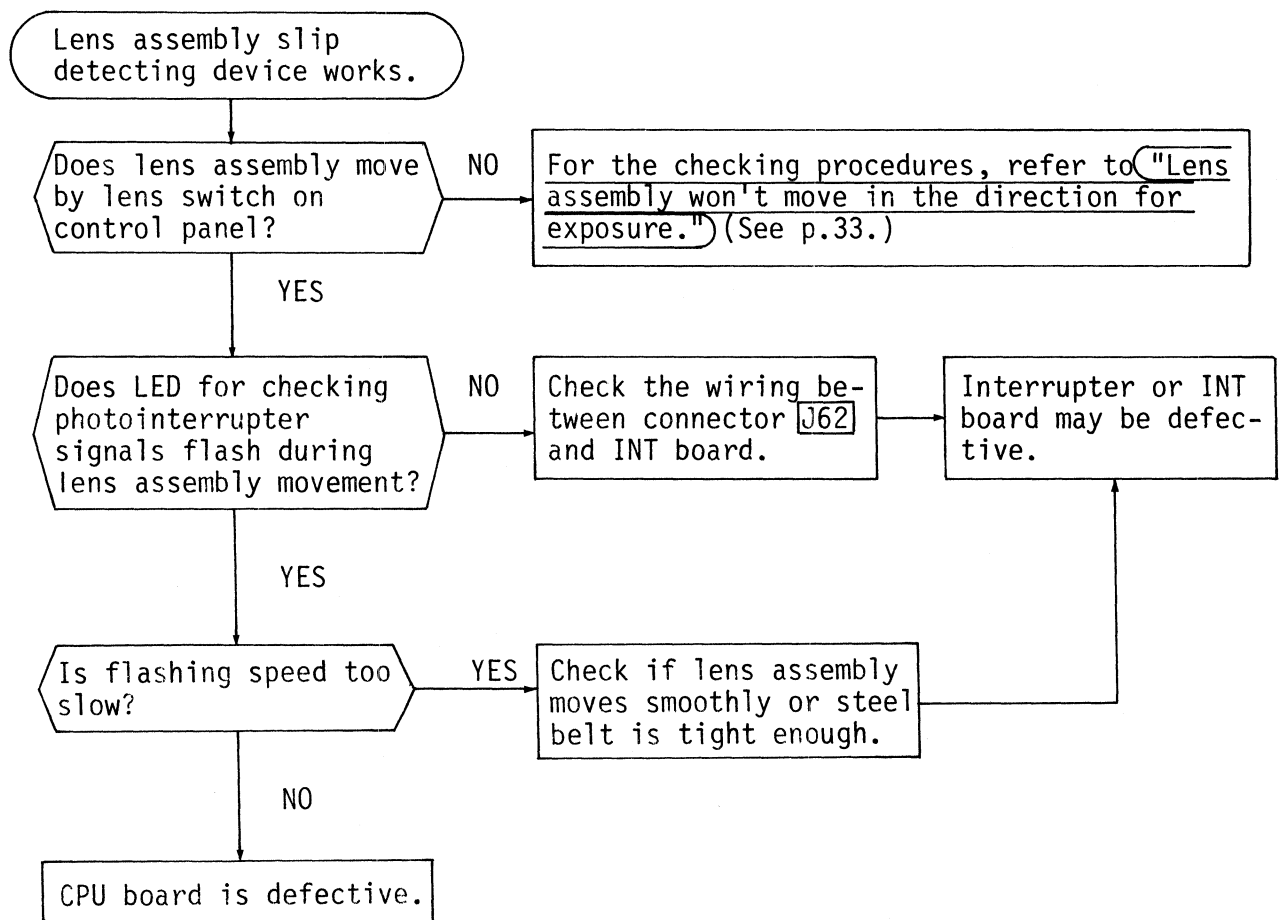
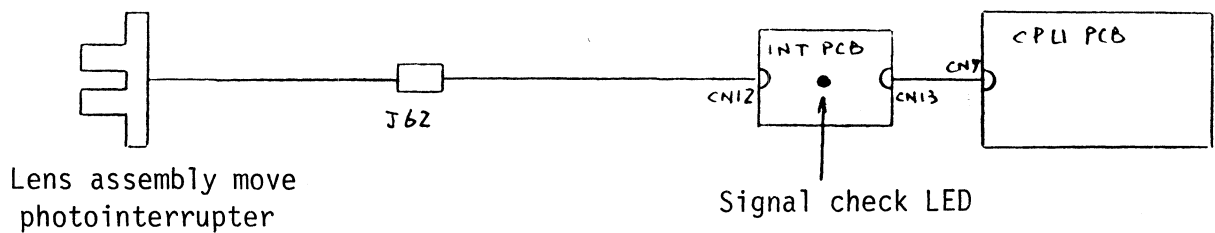
1. Set the tester to resistance range.
2. For measurement, let the tester leads touch (1) and (2) of the triac, and then change the lead positions each other.
3. If the tester doesn't read zero or infinity ( $\infty$ ) ohm, it is normal.

- During exposure, lens assembly stops moving, "SOS" appears on the display, buzzer sounds and halogen lamps go out.

When the lens assembly has stopped moving during slit exposure for some reason, the lens assembly slip detecting device works to turn off the light sources and notify the operator of the trouble with a buzzer sound to protect the copy board glass from being broken.

**Mechanism:**

During exposure, the lens assembly slip detecting device works when the (counting) interval between signals of the lens assembly move photointerrupter is found to be very long (the lens assembly moves very slowly) or counting (movement of the lens assembly) has stopped.



6. Master will not be carried after exposure.

Confirm that all the previously exposed plates are already in the processor.

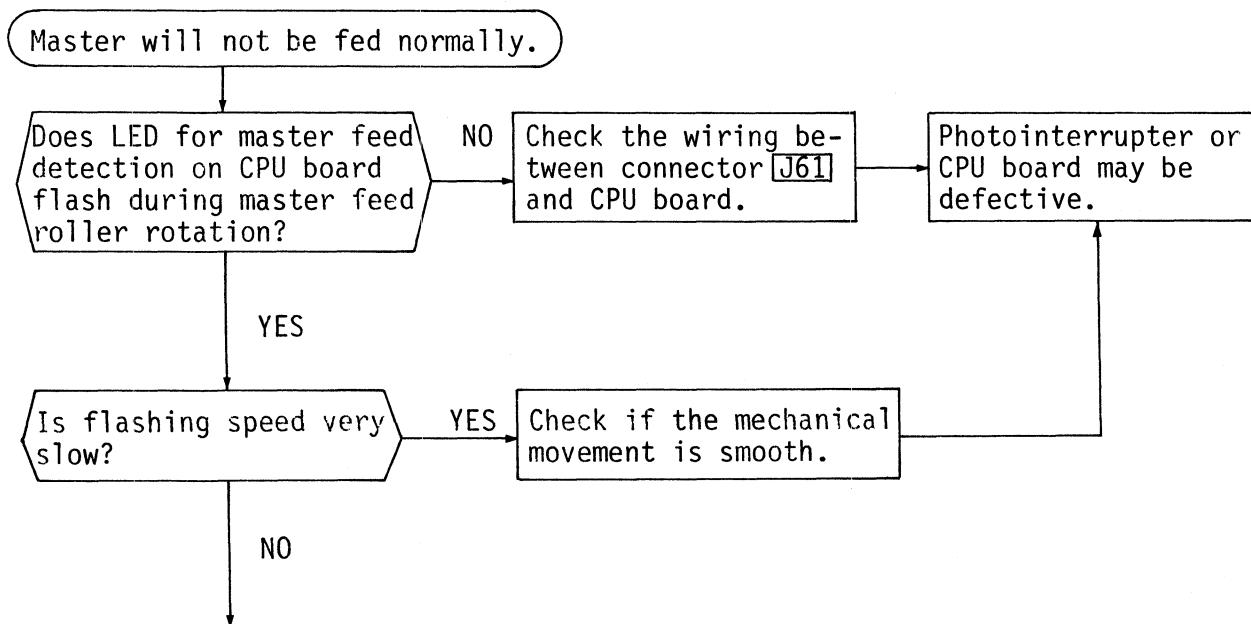
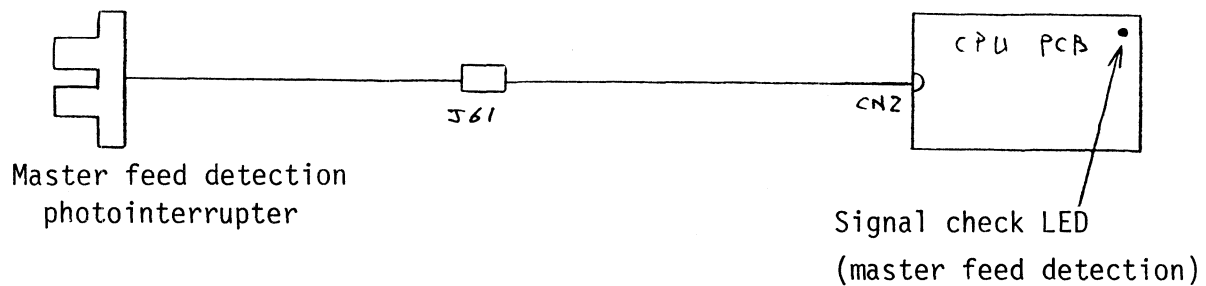
Master will not be carried after exposure.

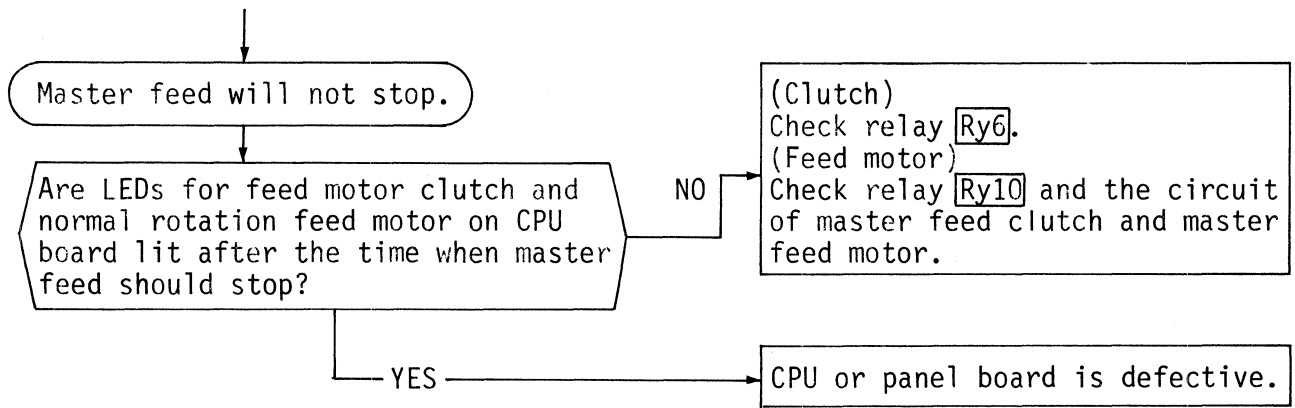
For the checking procedures, refer to the flow chart

7. Master feed will not stop or the master length is not as preset.

Master feed detection mechanism

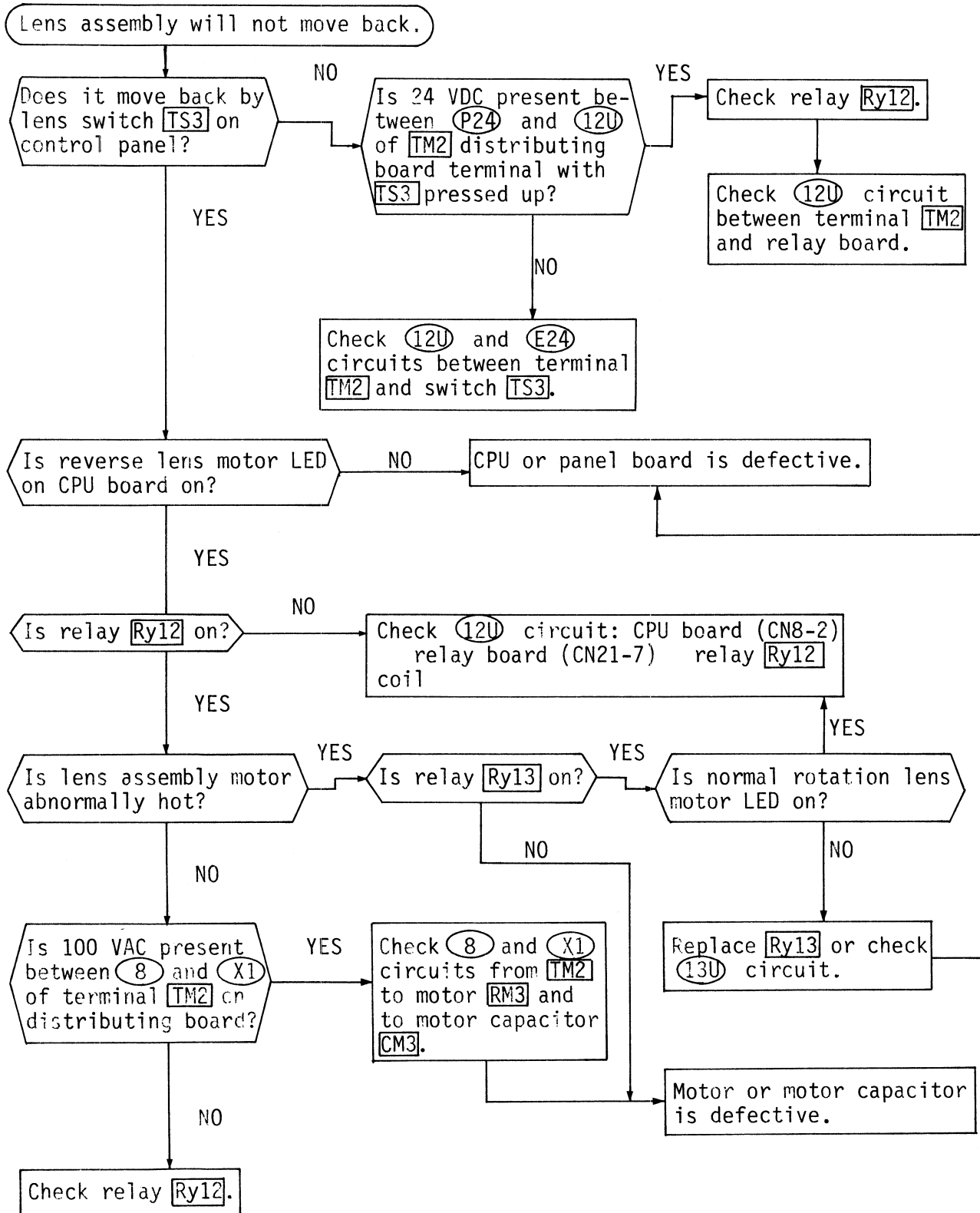
A disk with slits on its circumference is attached to the master feed roller. As the roller turns, signals are fed to the CPU board by means of the master feed detection photointerrupter which counts the number of slits of the disk. The CPU board counts these signals to detect the amount of master fed.

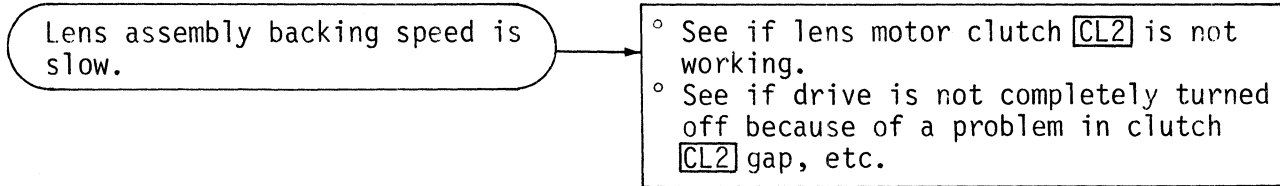
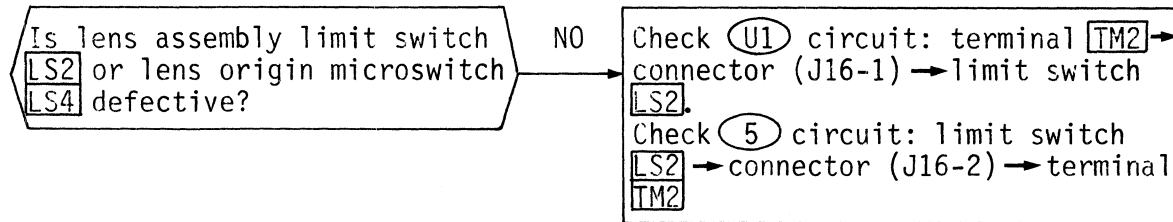




8. Lens assembly will not move back.

Confirm that master is carried after exposure.

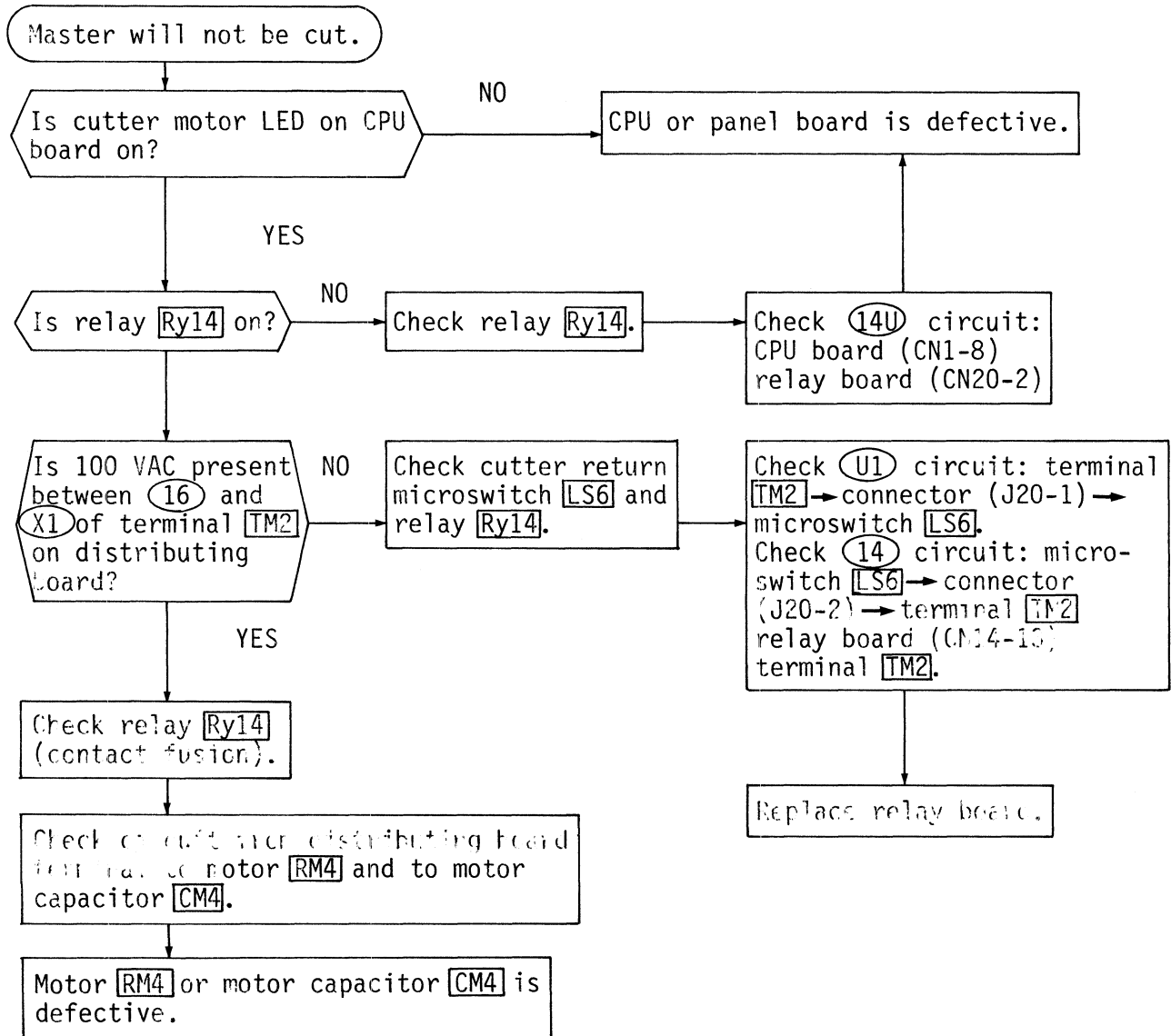




9. Master will not be cut.

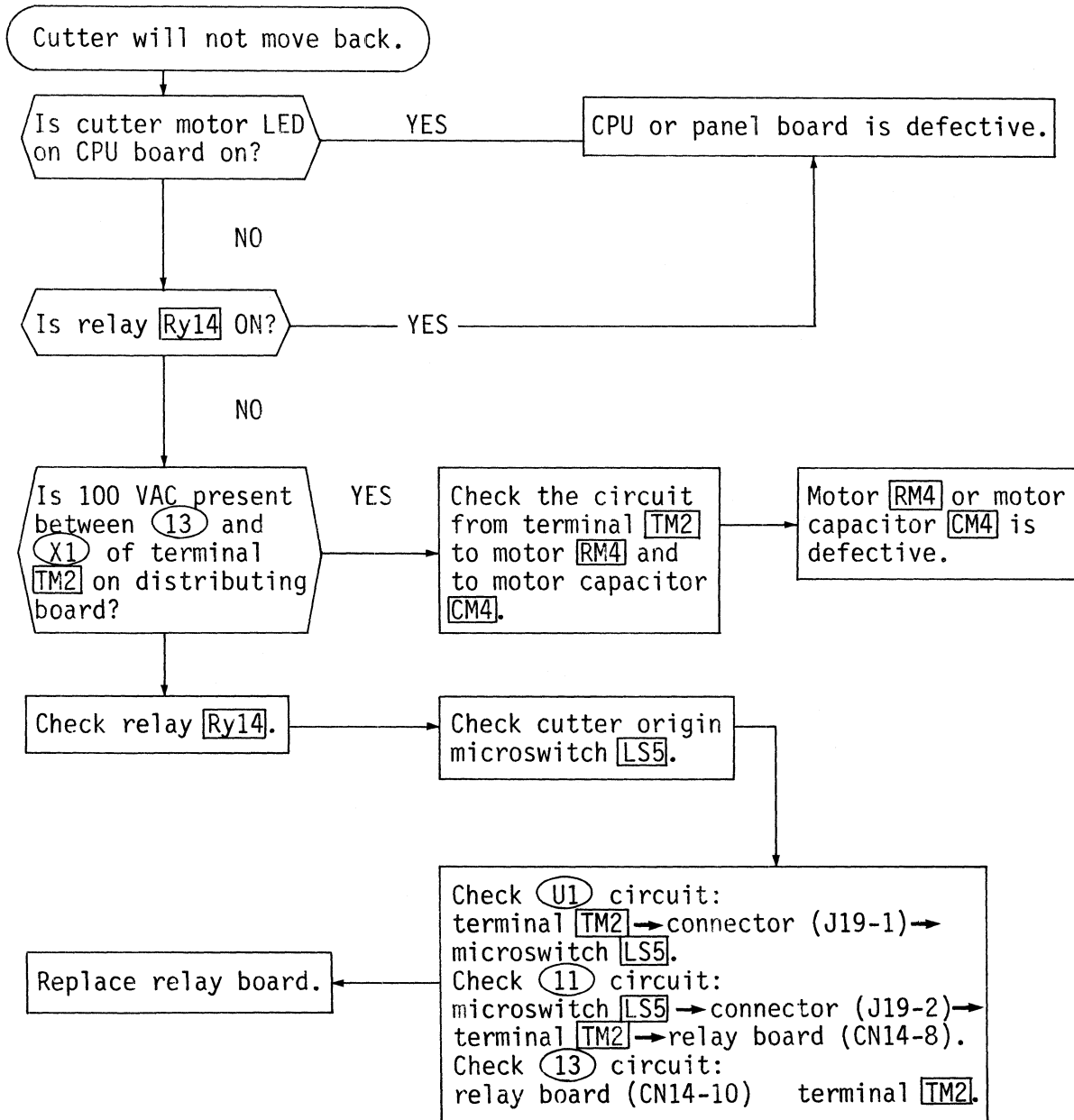
Confirm that:

1. A set length of master has been already fed.
2. The cutter blade is not dull.



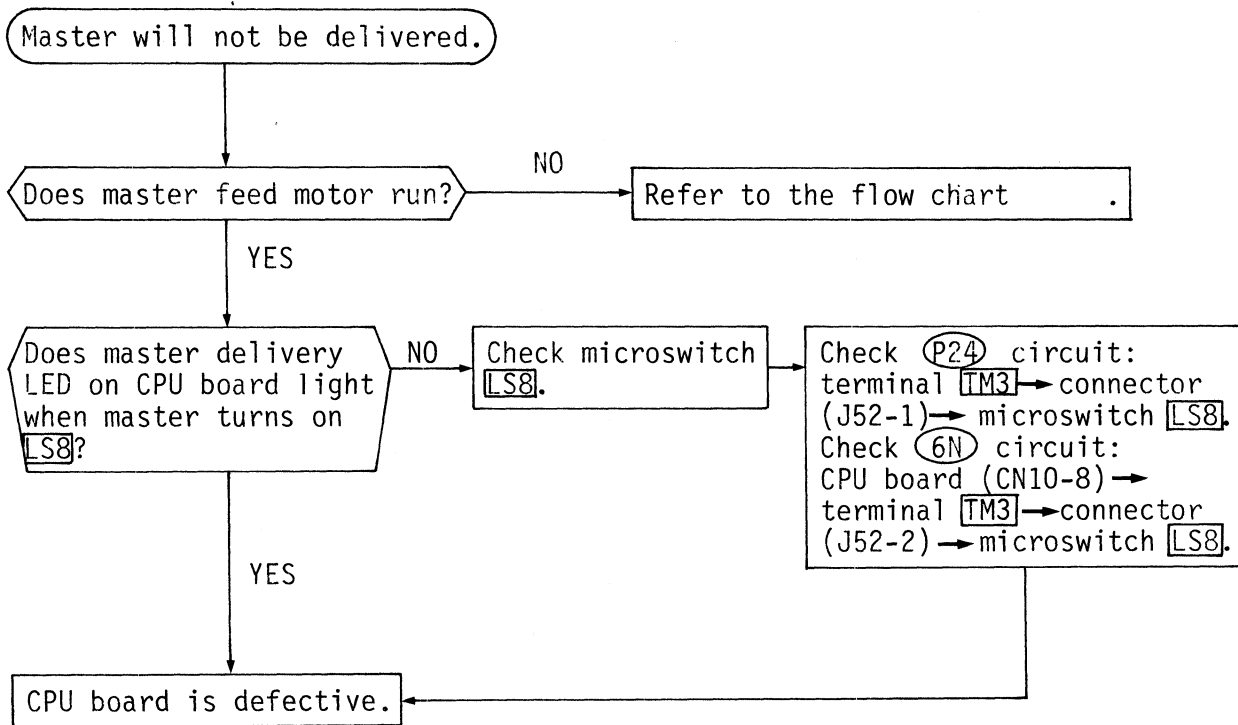
10. Cutter will not move back.

Confirm that the cutter moves up to the return microswitch on each cutting motion.





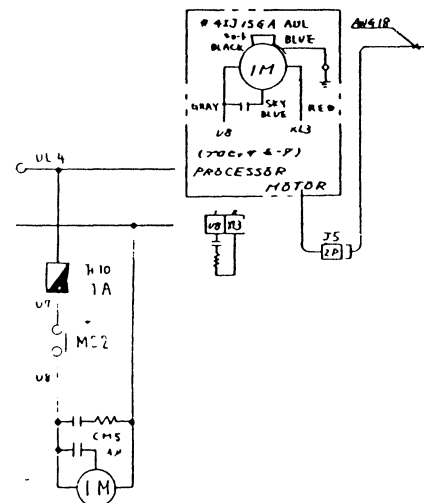
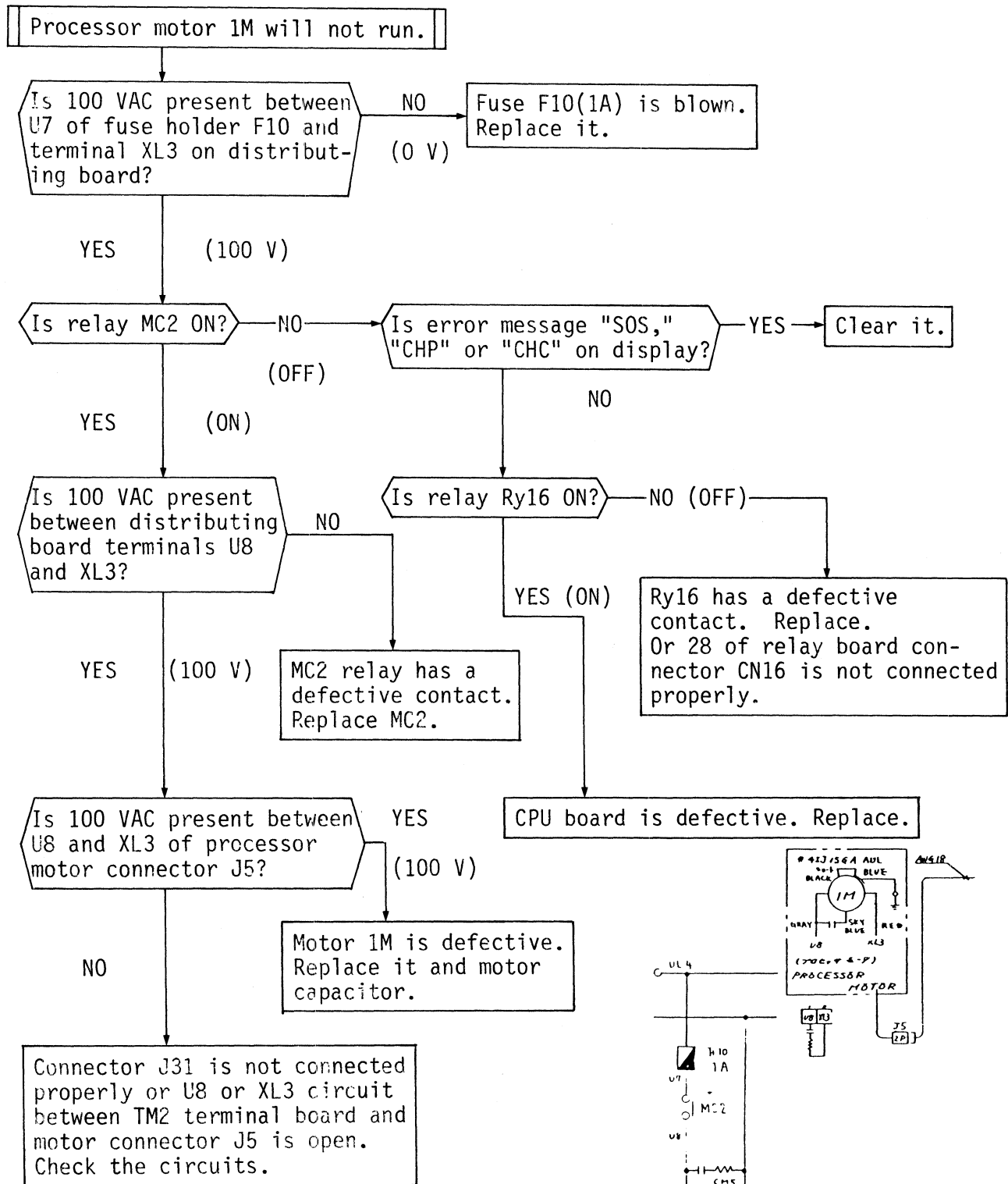
11. Master will not be delivered.



Processor motor will not run

Confirm that:

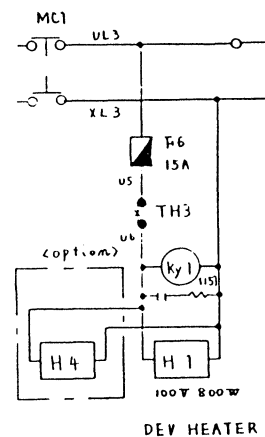
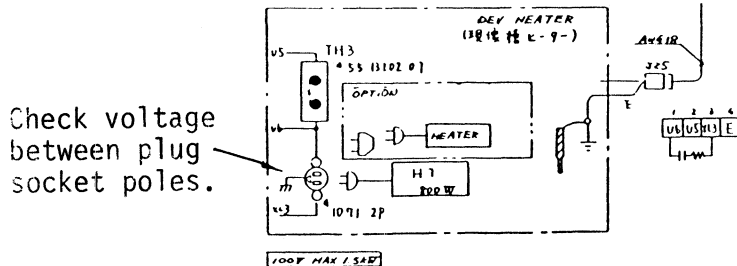
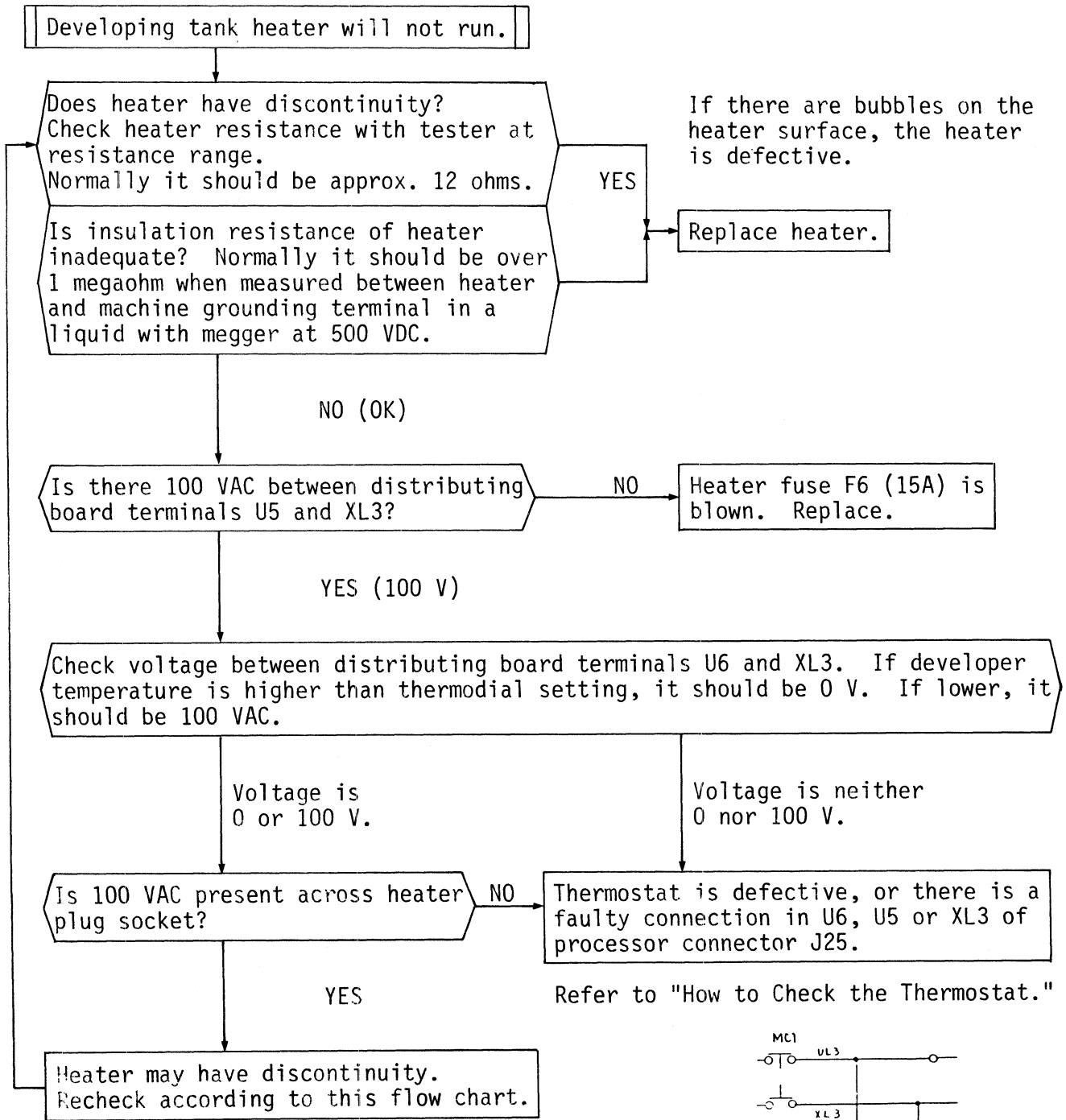
1. MC1 relay (magnet switch) is ON.
2. There is 100 VAC between distributing board terminals UL3 and XL3 .
3. Any of error messages "SOS", "CHP" and "CHC" is not on display.



PROCESSOR MOTOR

Developer temperature in developing tank will not rise.

Confirm that the voltage between terminals UL3 and XL3 is 100 VAC.

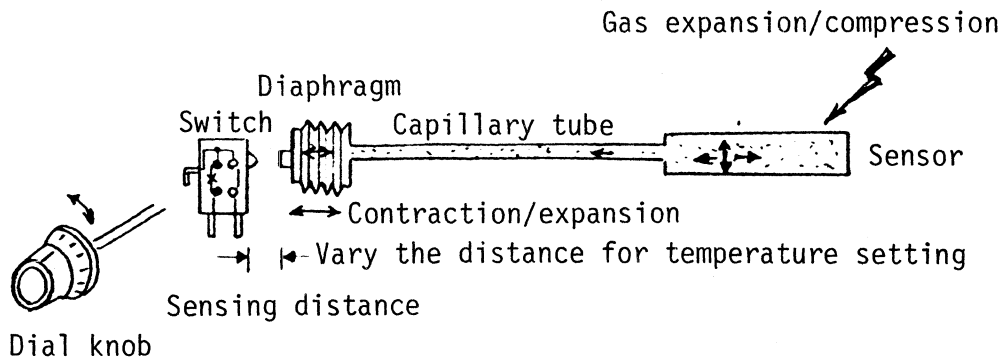


Developer temperature is too high.

The thermostat for developer temperature control is defective. Check the thermostat as follows.

### Structure

The structure is outlined below. It is based on the principle that the gas in the tube expands and compresses as the temperature changes.

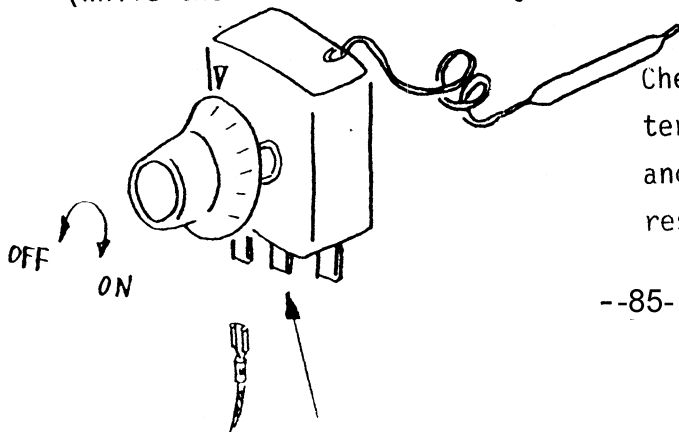


If there is a gas leak in the sensor, it malfunctions.

If any of the following cases arises, change the thermostat.

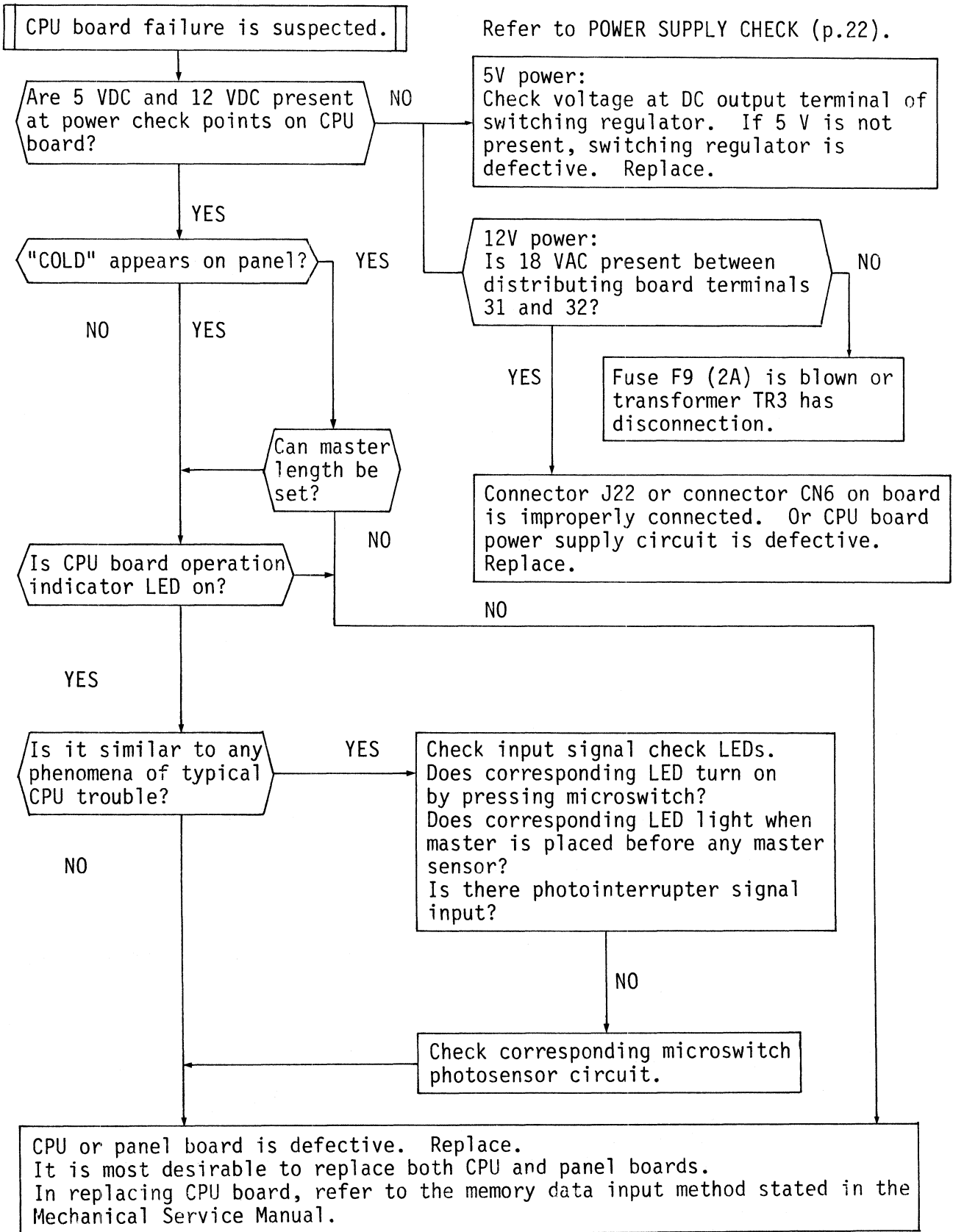
### How to Check the Thermostat

1. Though the dial reaches near the actual temperature of the developer in the tank while the knob is being turned, no click of the switch is heard nor the heater turns on and off.
2. As the dial knob is turned, the connection between the switch contacts does not turn on and off.
3. No switching-off sound is heard.  
(While the dial knob is being turned, clicking continues.)

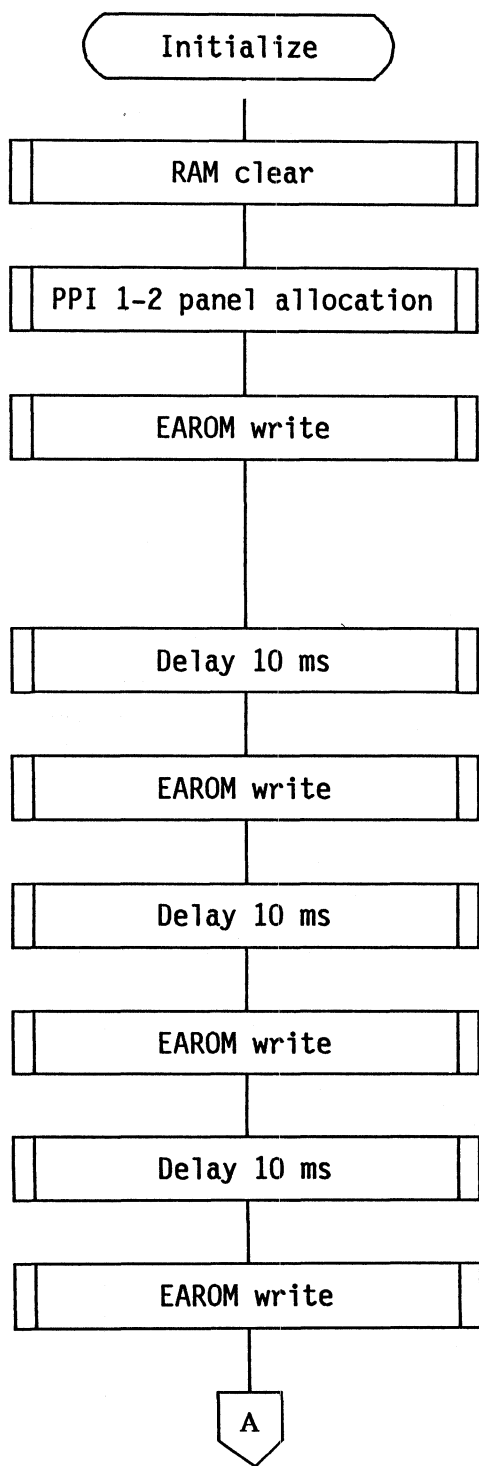


Check the continuity between these terminals. Disconnect the lead wire and check with the tester at the resistance range.

Troubleshooting the CPU and Panel Boards



Prior to replacing CPU board, be sure to check 5 VDC, 12 VDC and 24 VDC again.

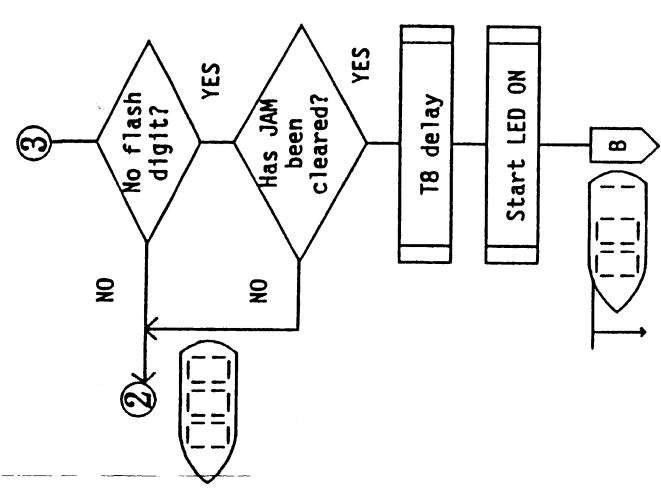


Feed compensating coefficient is normally 1,000.

Master optical axis feed correction  
Normally 0.0

Lens box  
Feed compensating coefficient

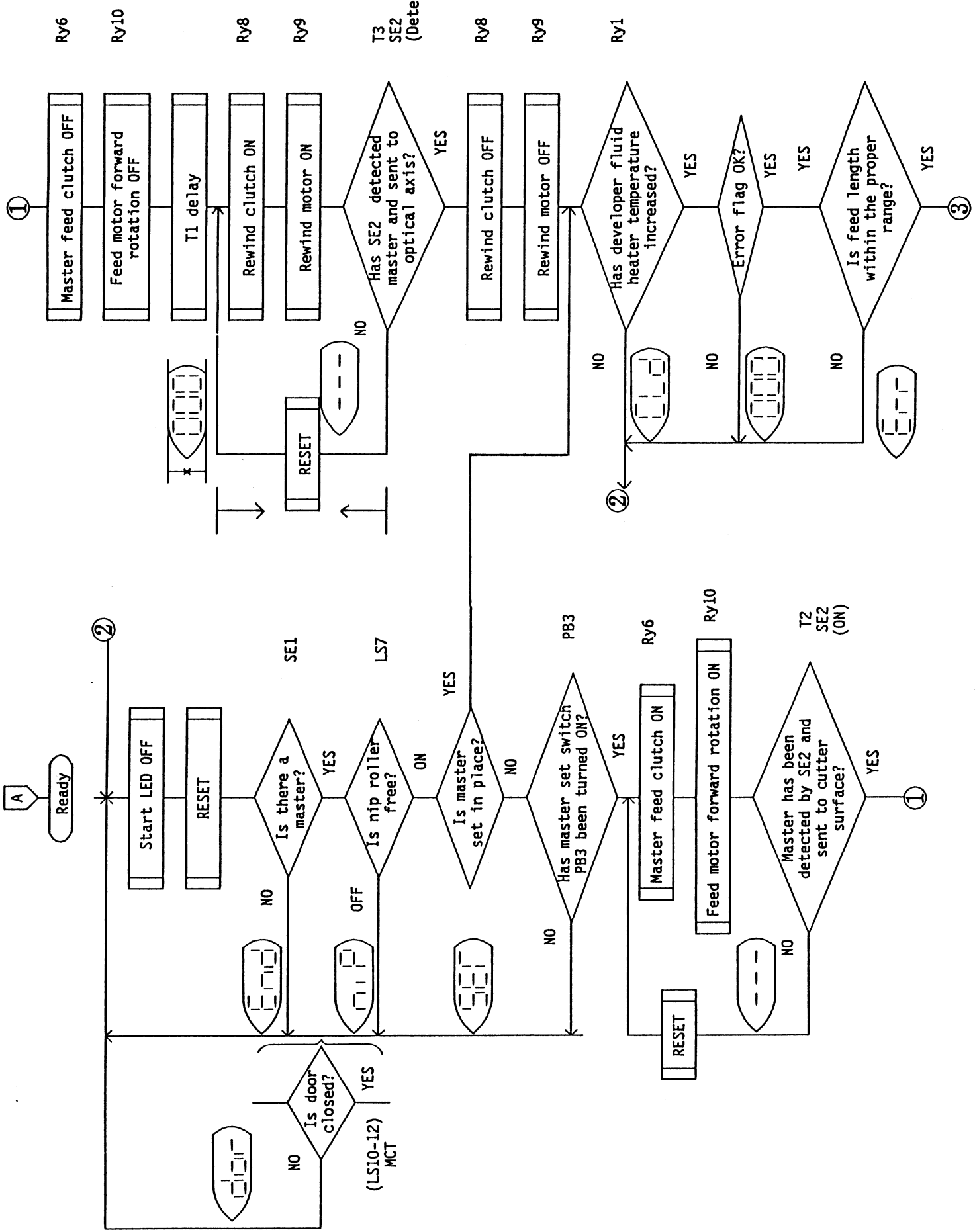
Correction of optical axis position



- (1) Are and unrelated dip switches in the CPU board ON?
- (2) Is master at lens board origin? (LS4) Ry2
- (3) Is master at cutter origin? (LS5) Ry3
- (4) Side board LS (LS9)
- (5) Other error flags

\* See reference 4 regarding values and number of pulses for each timer.

Normal exp. 370-820 ml  
 Double exp. 185-410 ml



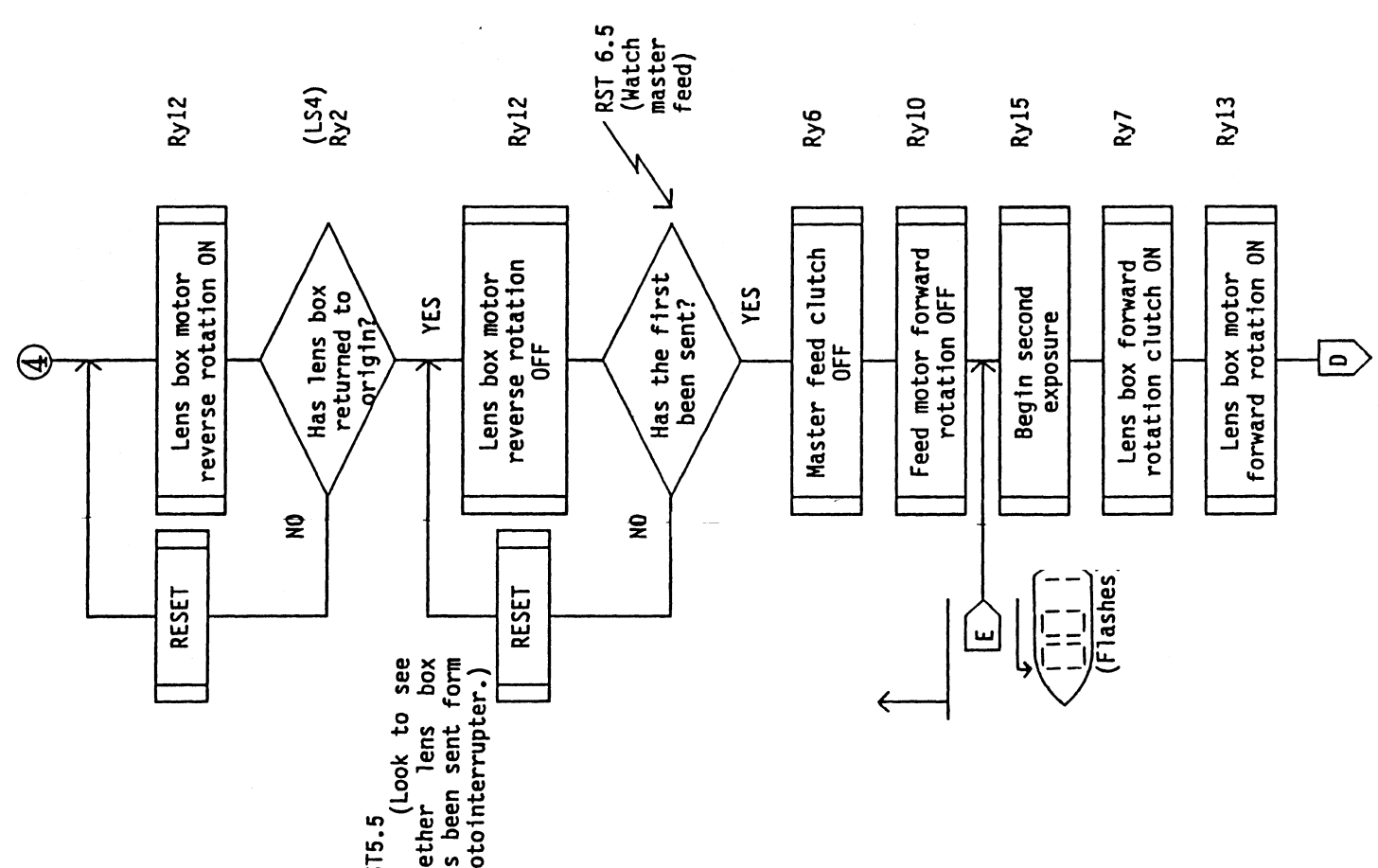
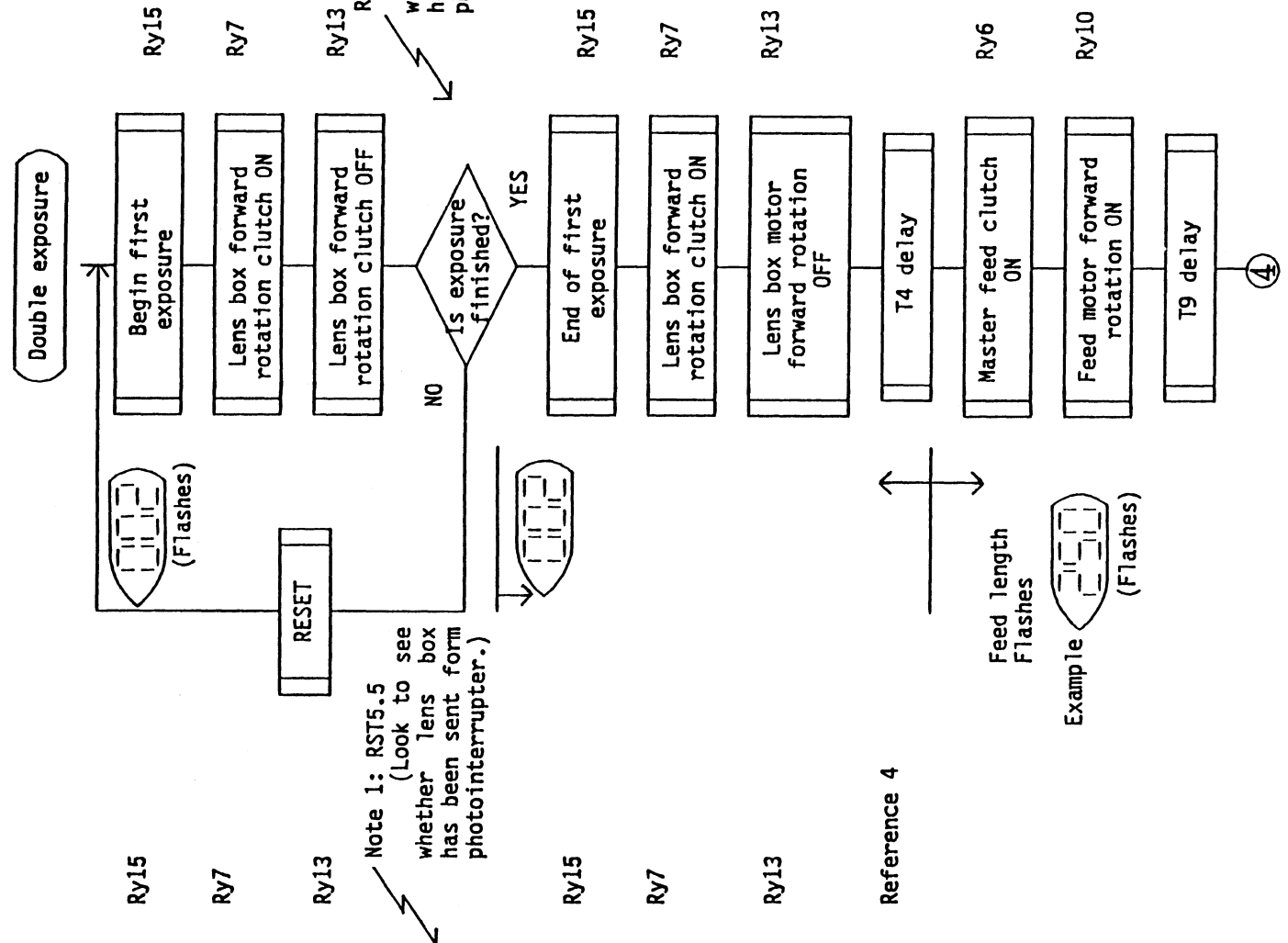
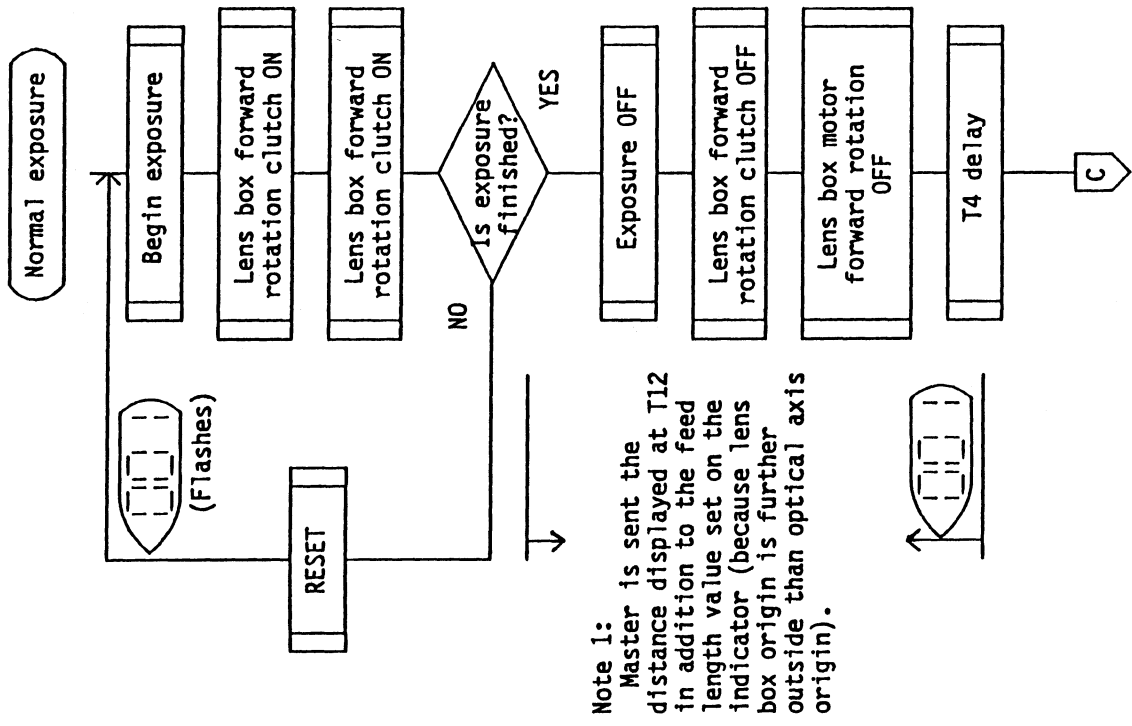
Ry6  
Ry10  
Ry8  
Ry9  
T3  
SE2 (Detects OFF)

Master feed clutch OFF  
 Feed motor forward rotation OFF  
 T1 delay  
 Rewind clutch ON  
 Rewind motor ON  
 Has SE2 detected master and sent to optical axis?  
 Rewind clutch OFF  
 Rewind motor OFF

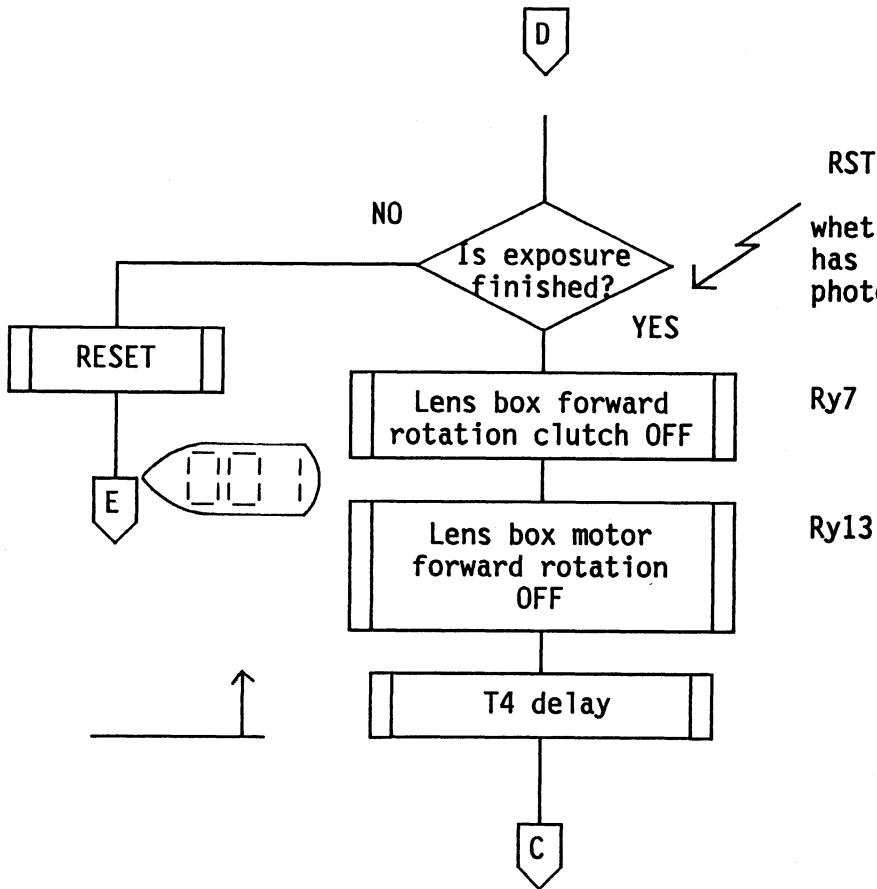
Has developer fluid heater temperature increased?  
 Error flag OK?  
 Is feed length within the proper range?

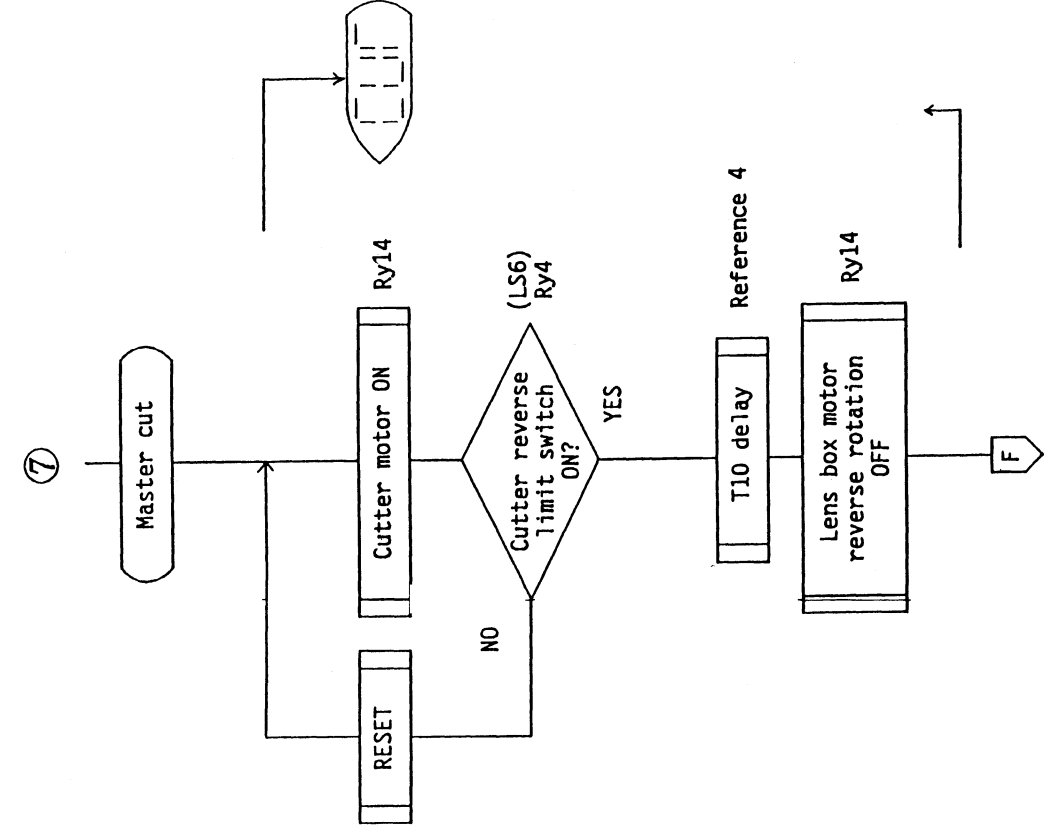
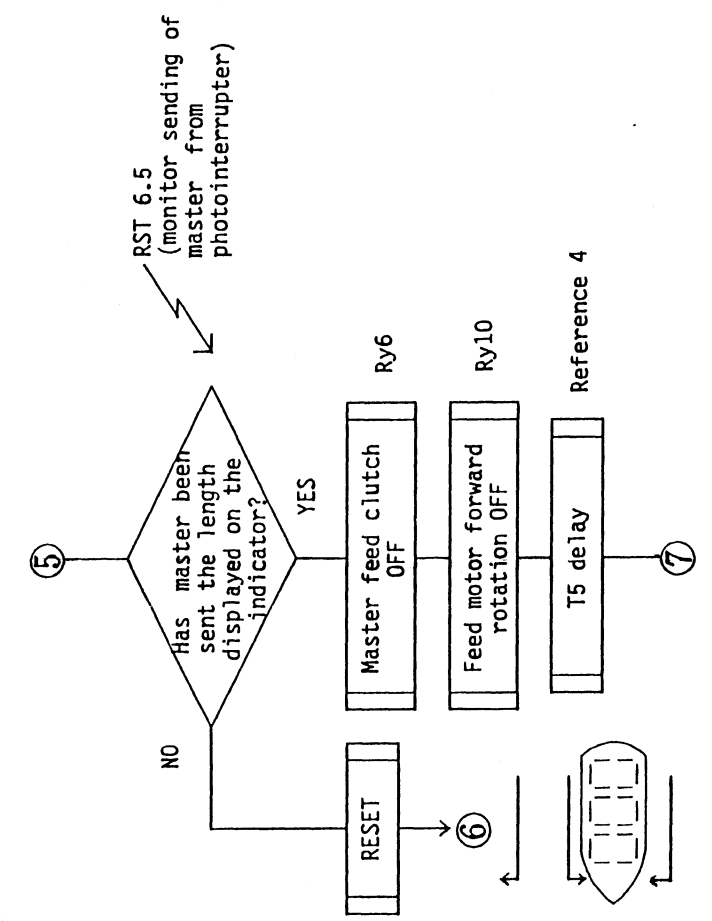
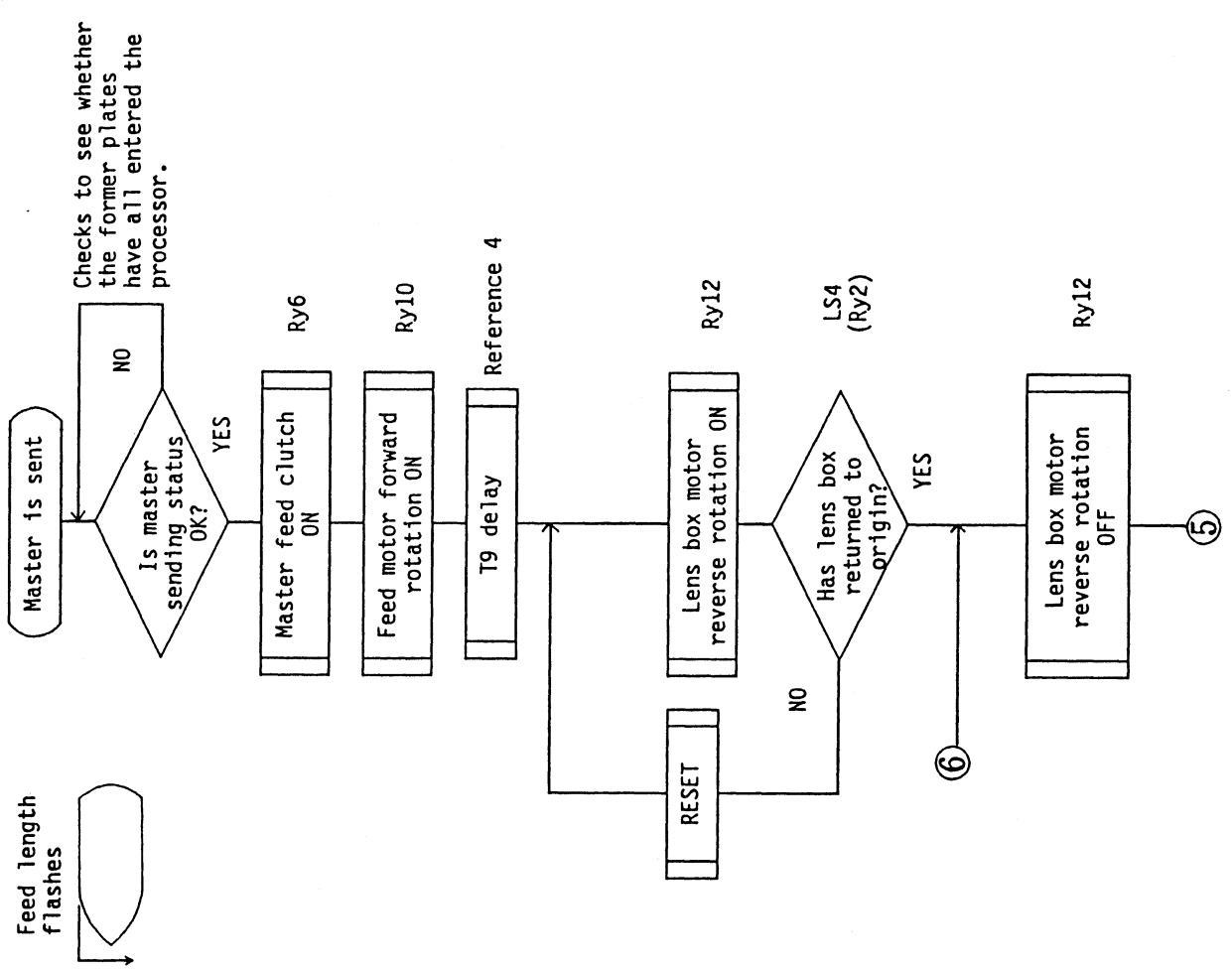
Is door closed? (LS10-12 MCT)  
 Is there a master? (SE1)  
 Is nip roller free? (LS7)  
 Is master set in place?  
 Has master set switch PB3 been turned ON? (PB3)  
 Master feed clutch ON (Ry6)  
 Feed motor forward rotation ON (Ry10)  
 Master has been detected by SE2 and sent to cutter surface? (T2 SE2 (ON))

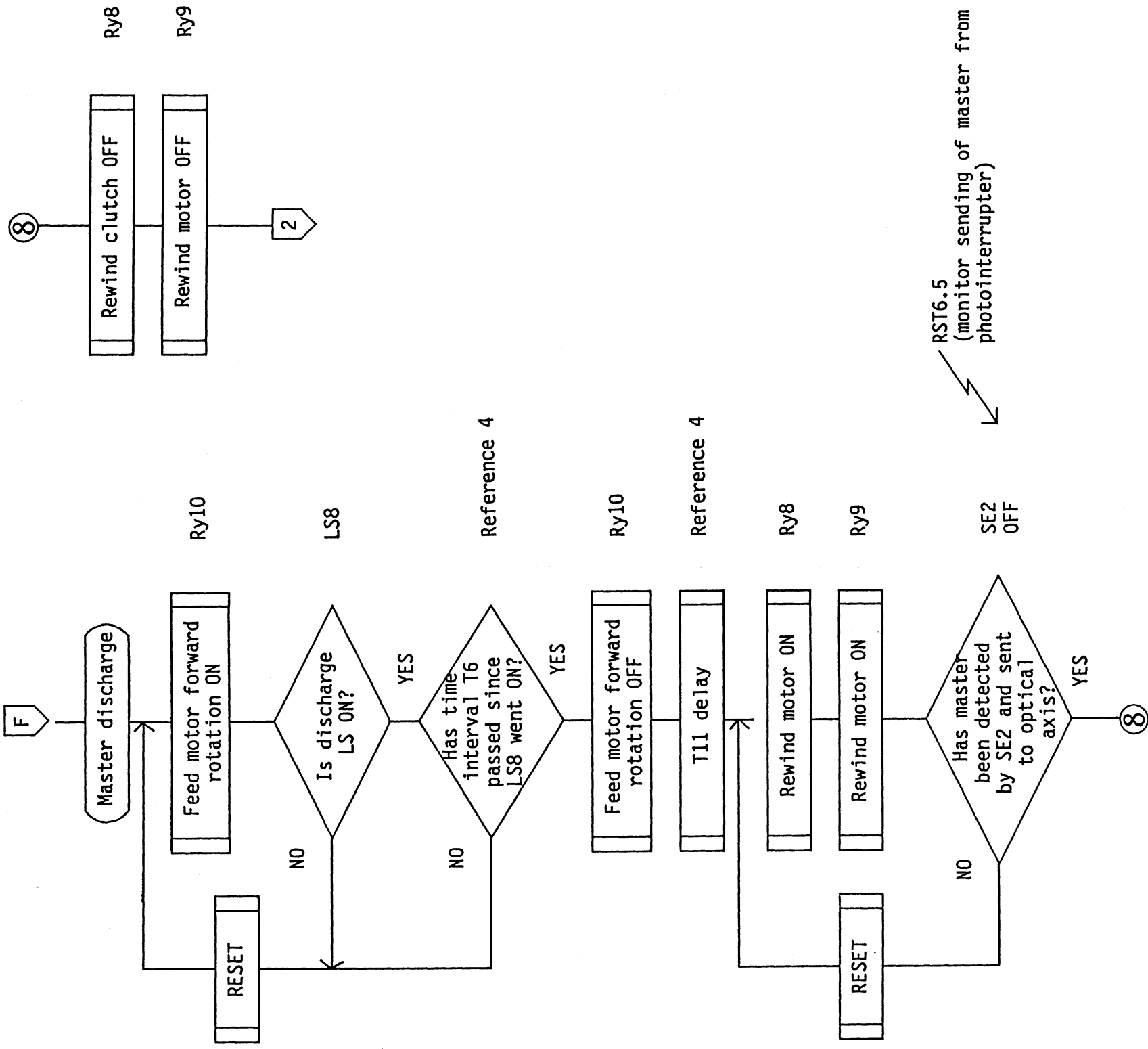
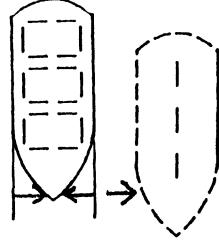
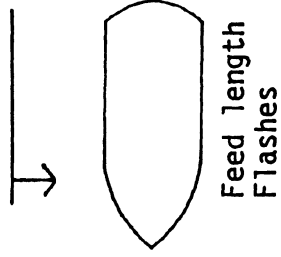
Start LED OFF  
 RESET  
 T1 delay  
 Rewind clutch ON  
 Rewind motor ON  
 Has SE2 detected master and sent to optical axis?  
 Rewind clutch OFF  
 Rewind motor OFF  
 Has developer fluid heater temperature increased?  
 Error flag OK?  
 Is feed length within the proper range?











8

2

8

Ry8

Ry9

Ry10

LS8

Reference 4

Ry10

Reference 4

Ry8

Ry9

SE2 OFF

Rewind clutch OFF

Rewind motor OFF

Feed motor forward rotation ON

Is discharge LS ON?

Has time interval T6 passed since LS8 went ON?

Feed motor forward rotation OFF

T11 delay

Rewind motor ON

Rewind motor ON

Has master been detected by SE2 and sent to optical axis?

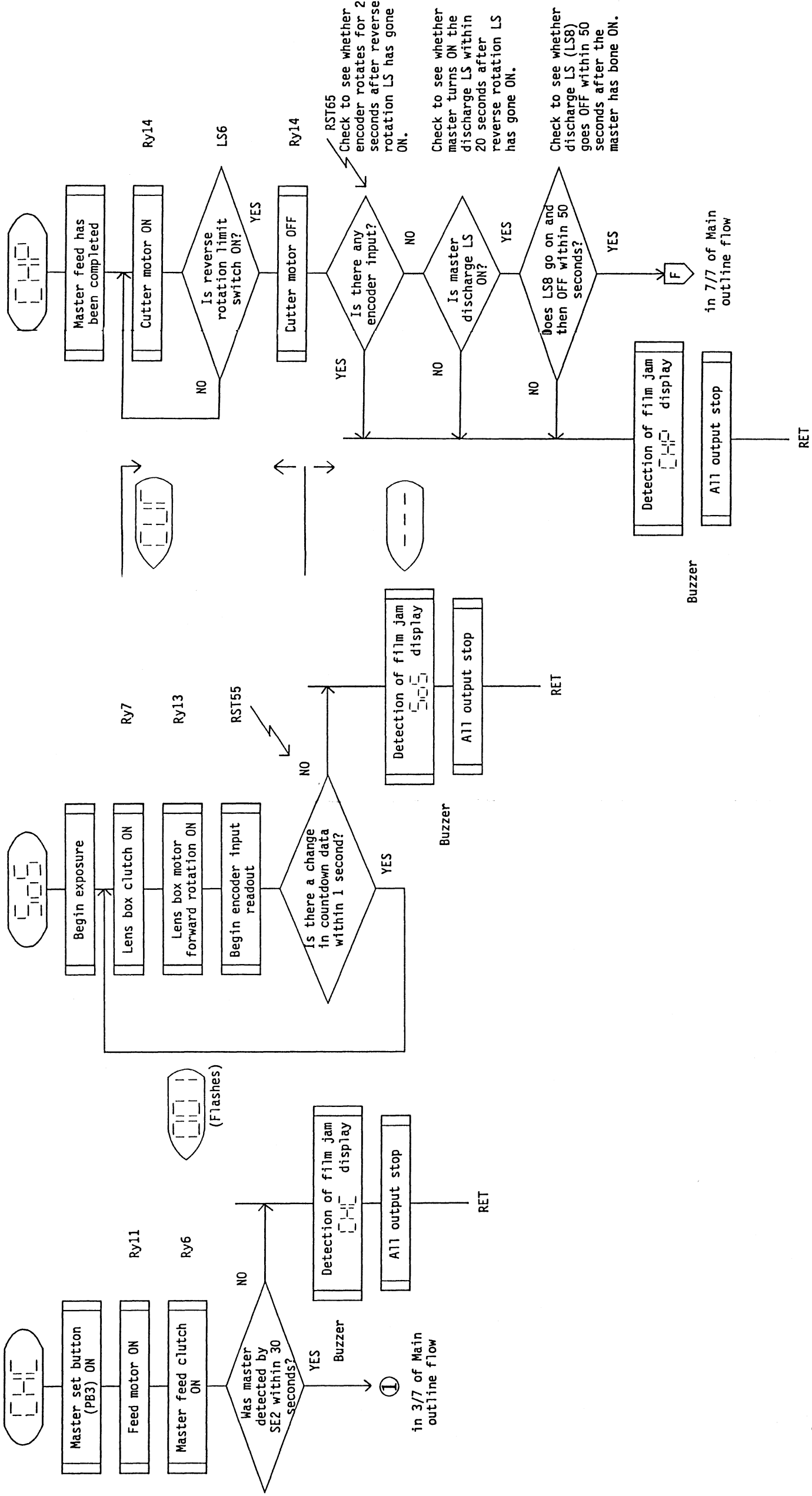
Master discharge

RESET

RESET

RST6.5  
(monitor sending of master from photointerrupter)

FILM JAMS

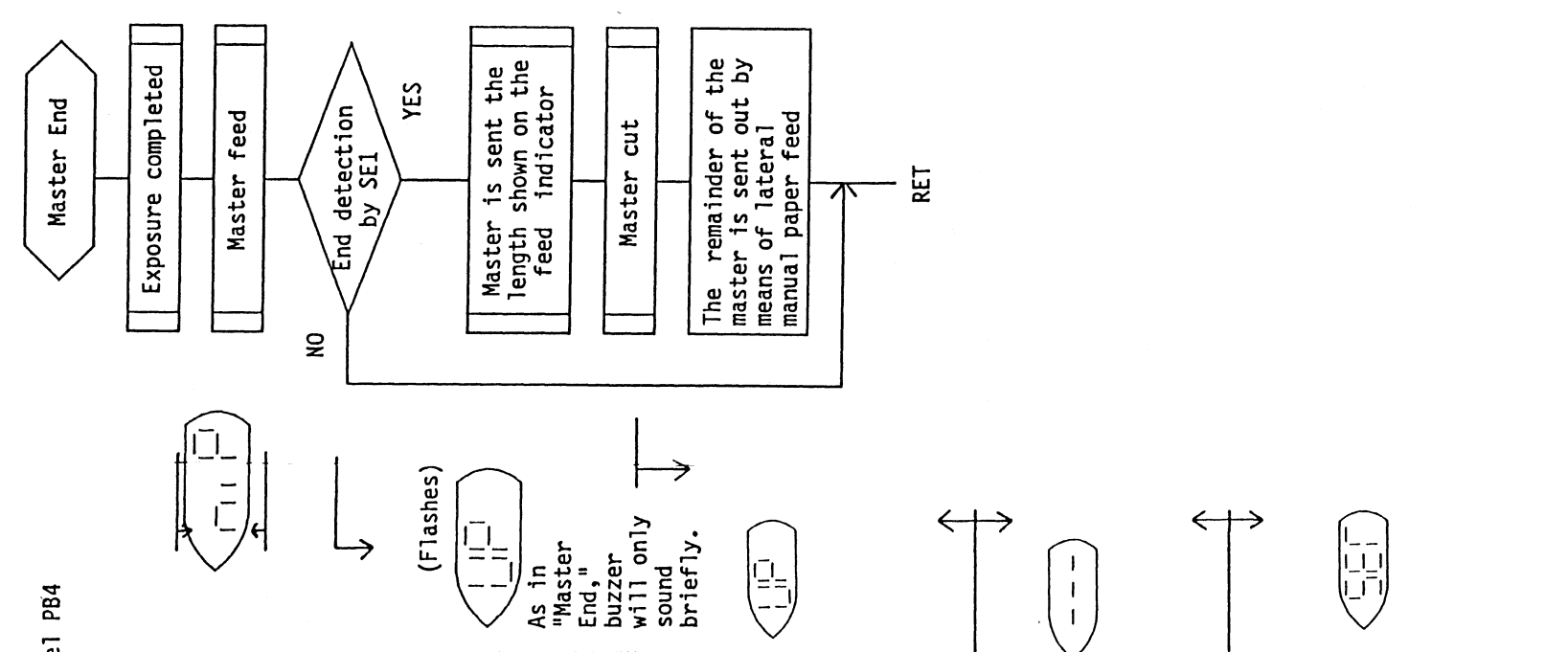
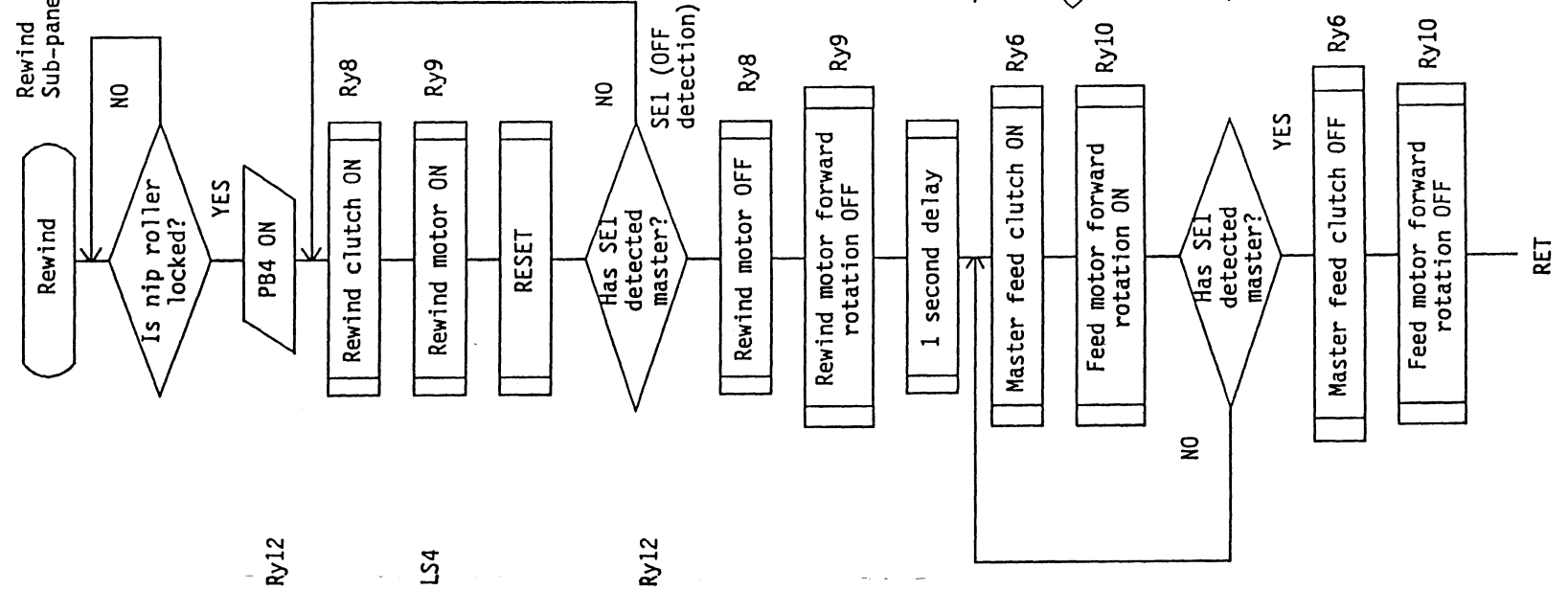
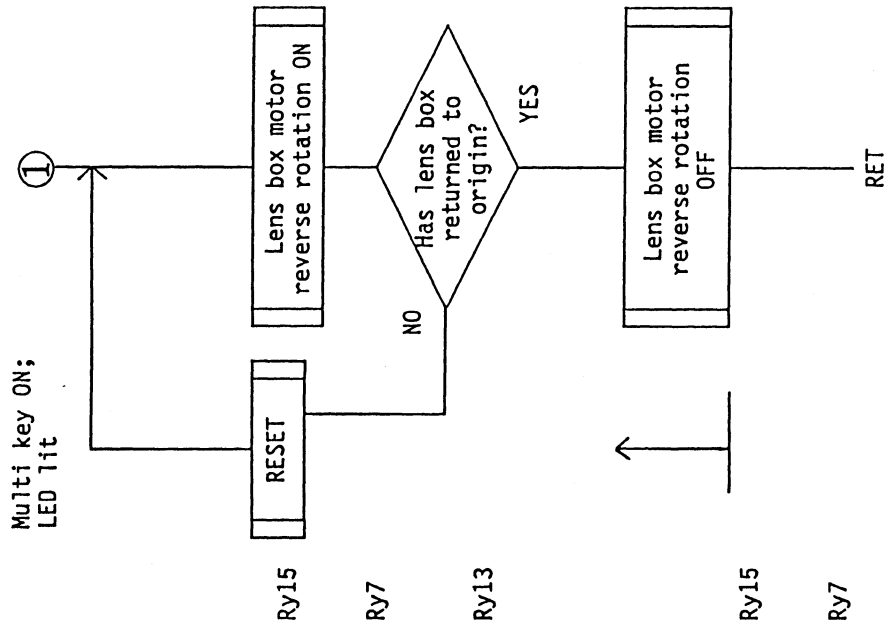
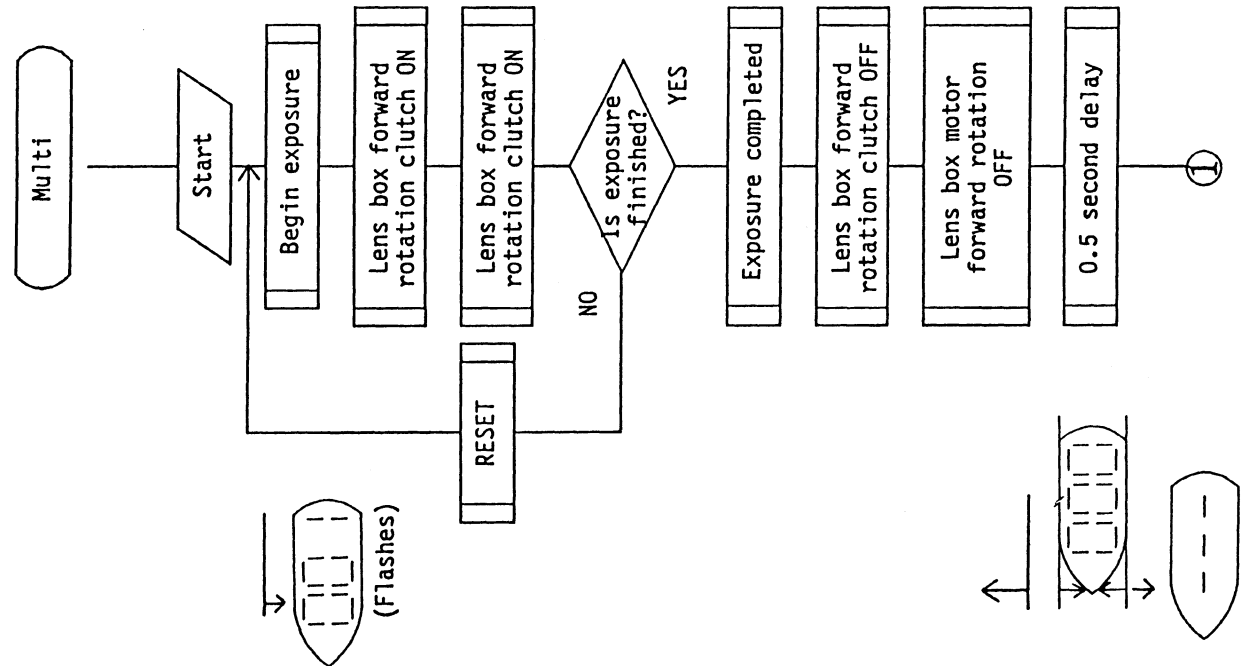


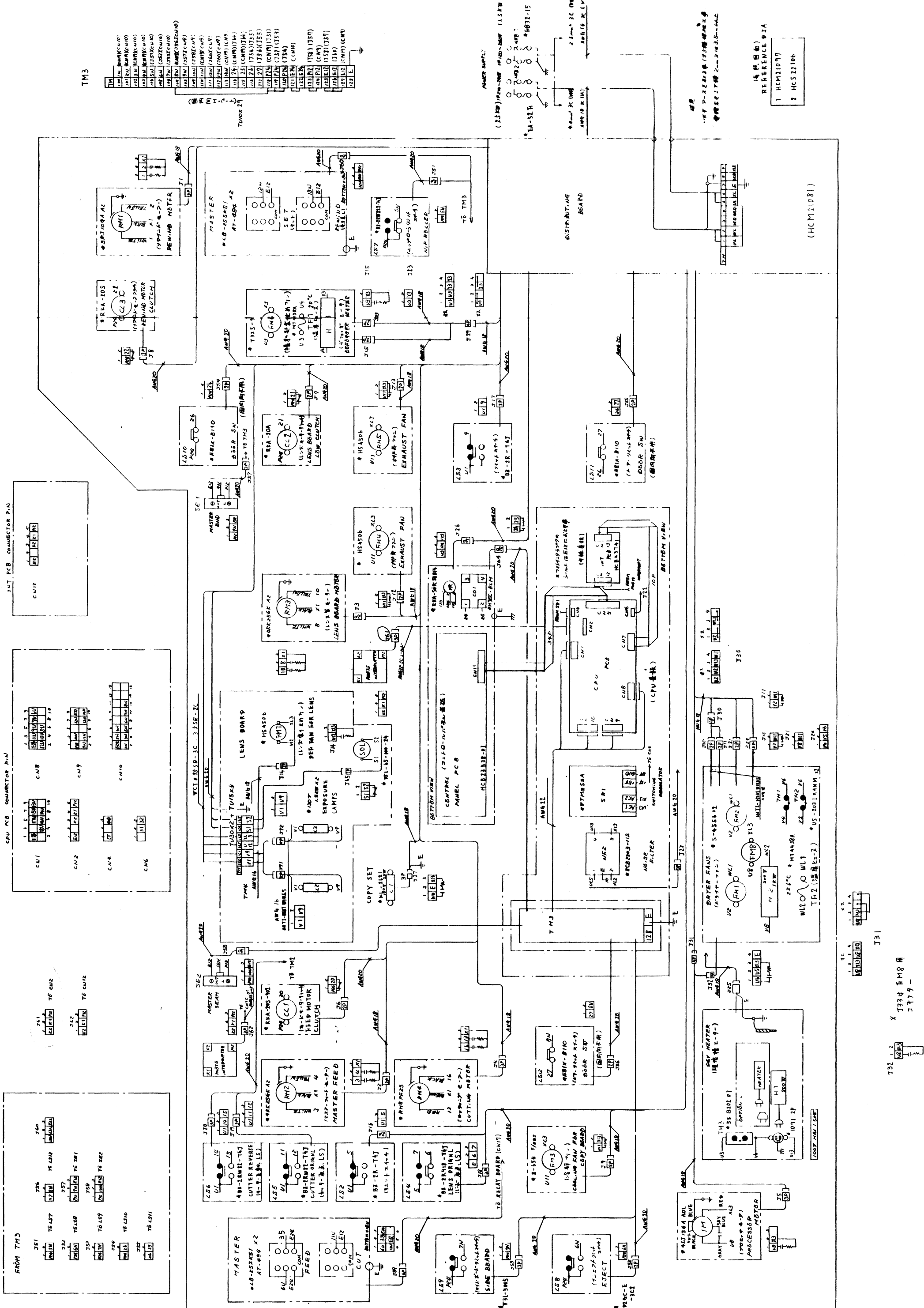
Causes

- Sensor (SE2) is defective
- Master cannot be sent

- There is no encoder input
- Lens box chain is broken
- Lens box has slipped

- Cutter teeth are not on or are broken
- Encoder has been mounted incorrectly
- Discharge LS (LS8) is defective





FROM TM3

351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

CPU PCB CONNECTOR PIN

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	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

INT PCB CONNECTOR PIN

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	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

TM3

341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390

REFERENCE DATA

1	HCM21097
2	HCS22106

(HCM21081)

TM3

391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440

X J334 4M8 用  
3779-







MITSUBISHI  
SILVER MASTER

CP-500SII

SERVICE MANUAL

DAINIPPON SCREEN MFG. CO., LTD.



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TROUBLE SHOOTING

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## 1. INTRODUCTION

This Manual is intended to be used for after-sale service on CP-500SⅡ. For operation of the machine and other details, refer to "CP-500SⅡ OPERATION MANUAL", "TECHNICAL GUIDE" and other related documents. Bear in mind that the machine structure and specifications are subject to change without notice.

For parts ordering or consultation, let us know the following information, referring to "CP-500SⅡ PARTS LIST".

- ° model (CP-500SⅡ)
- ° serial number
- ° reference numbers and descriptions of parts
- ° required quantities
- ° date of delivery

\* Publication and duplication of this document are prohibited.

## 2. SPECIFICATIONS

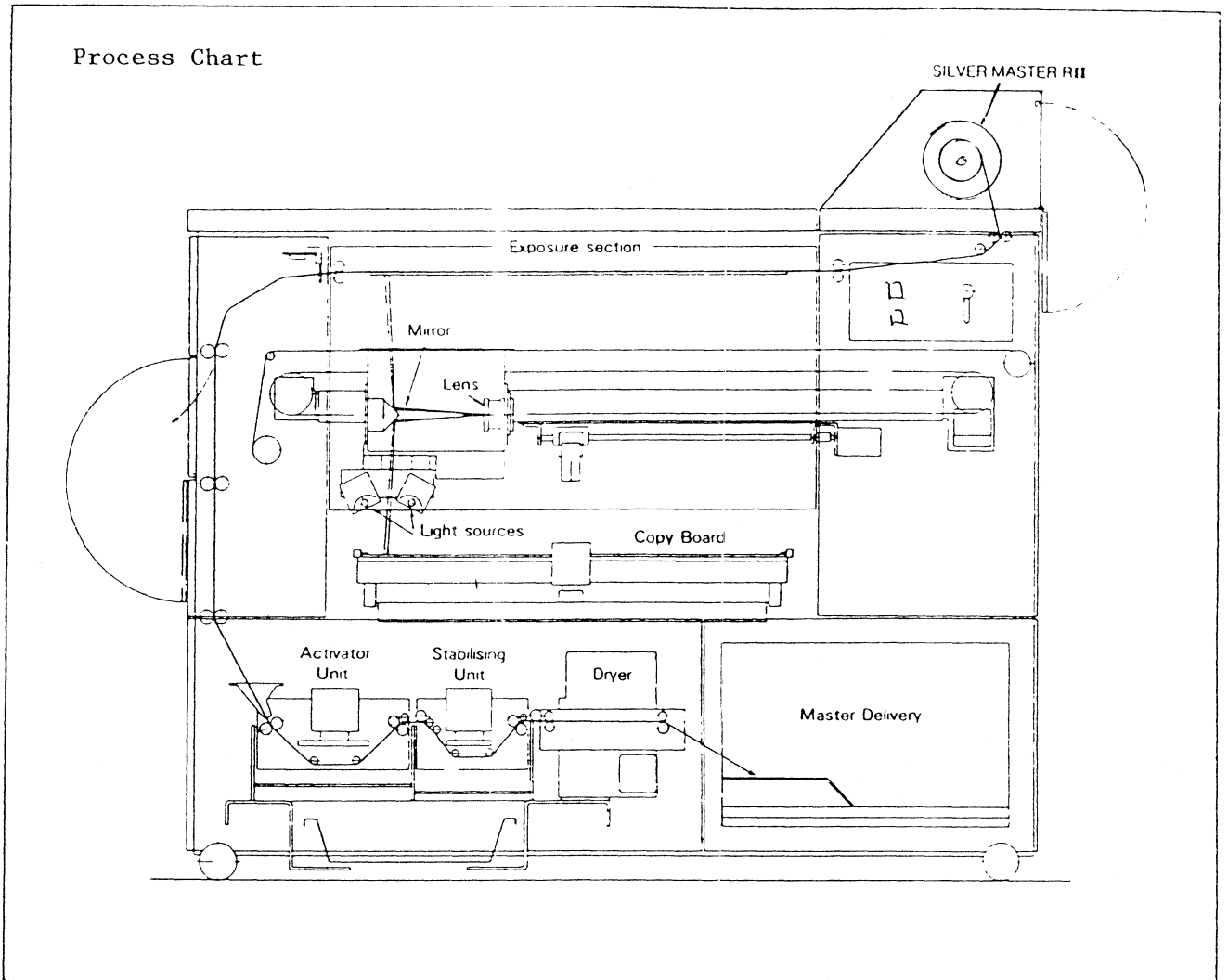
- ° Master width: 254 mm (10"), 279 mm (11"), 305 mm (12")  
404 mm (15.9"), 508 mm (20"), 550 mm  
(21.5/8"), 570 mm (22.4")  
Master roll is used with a size variable  
slide spool.  
(spool shaft diameter: 25)
- ° Master to be used: SLM-R11, SLP-F
- ° Master feed length: 370 mm - 820 mm
- ° Effective exposure size: 550 mm x 790 mm
- ° Blank exposure: 570 mm x 820 mm
- ° Max. copy size: 550 mm x 790 mm
- ° Copy setting: Drawer type copy board  
Copy loading with its image face up  
Copy positioning sheet available
- ° Processor capacity: Developing (activator) tank: 18 liters  
Stabilizing tank: 16 liters
- ° Replenisher tank capacity: Activator, stabilizer each 2 liters
- ° Temperature control: 800 W panel heater with
- ° Dryer: 1 kW heater with thermo control and  
high-low switch
- ° Double exposure mode: (185 - 410 mm ) x 2
- ° Lens: f: 260 mm, in-mirror type

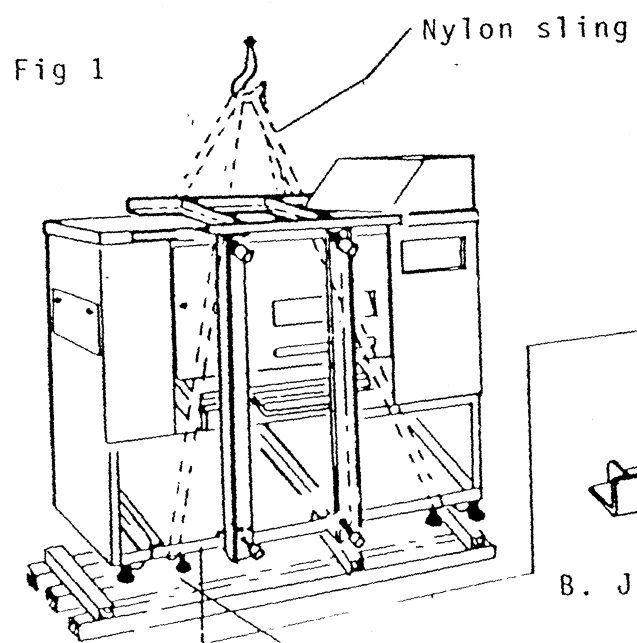
- ° Magnification: 100 % (fixed)
- ° Exposure method: Slit system (scanning by lens & light sources.)
- ° Exposure control: Power thyristor (with light-level slide control)
- ° Light sources: Two halogen lamps, 130 V, 1.5 kW
- ° Independent switches:
  - Master SET button
  - Master REWIND button
  - DRYER HIGH/LOW changeover switch
  - Defogger fan/heater switch (for exposure section)
  - Defogger fan switch (for mirror)
  - Master takeout FEED switch
  - Master CUT switch
- ° Master rewind: Auto rewinding with a button
- ° Master splice detection: Alarm buzzer, automatic over-cut
- ° Dehumidifier: Defogger fan & heater (usually ON)
- ° Platemaking rate:
  - 660 mm/min
  - Initial: 120 sec (60 Hz)
  - 140 sec (50 Hz)
  - Cyclic: 58 sec (60 Hz)
  - 68 sec (50 Hz)
- ° Machine dimensions:
  - 1860 (W) x 920 (D) x 1660 (H) mm
  - (top cover open: height 1850 mm)
  - 2020 (W) x 1030 (D) x 2000 (H) at use
  - of miniature darkroom

- ° Weight: 650 kg (Main unit 550 kg; Processor 100 kg)  
700 kg (processing solutions and master roll included)
- ° Electricity: 100 V, 1.2 kW, single phase 50 or 60 Hz  
200 V, 6.1 kW, single phase
- ° Option: Total counter  
Miniature darkroom



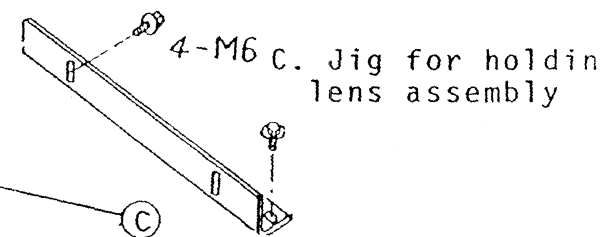
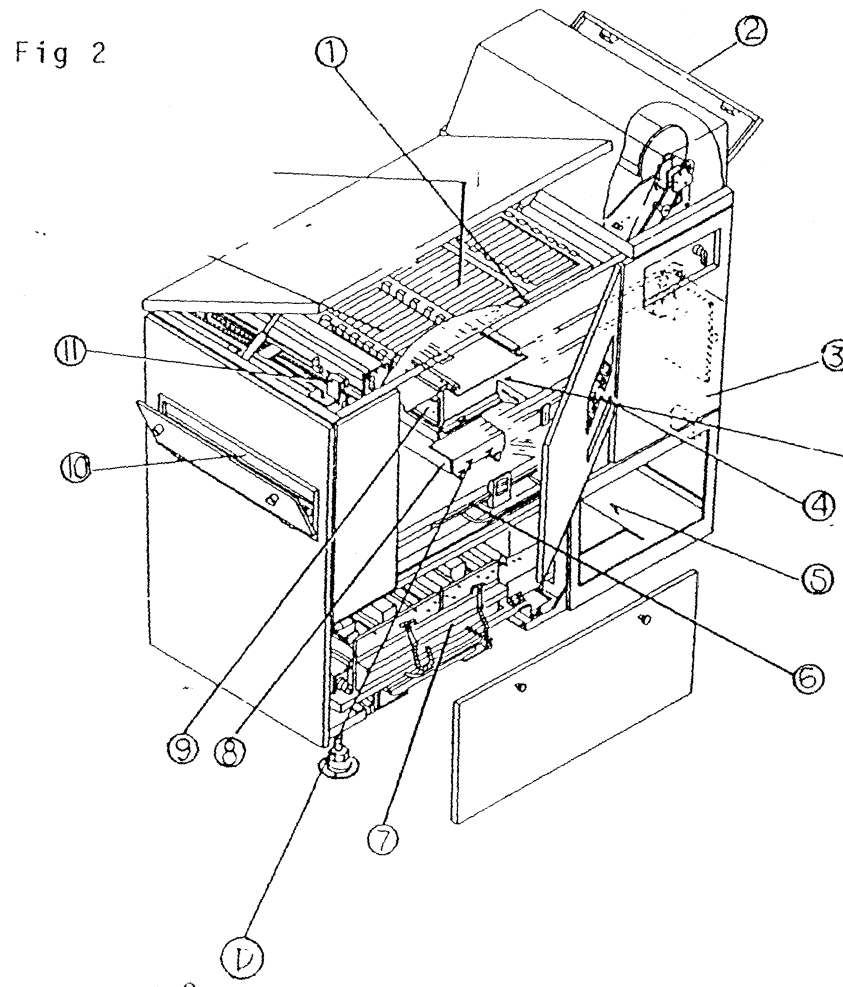
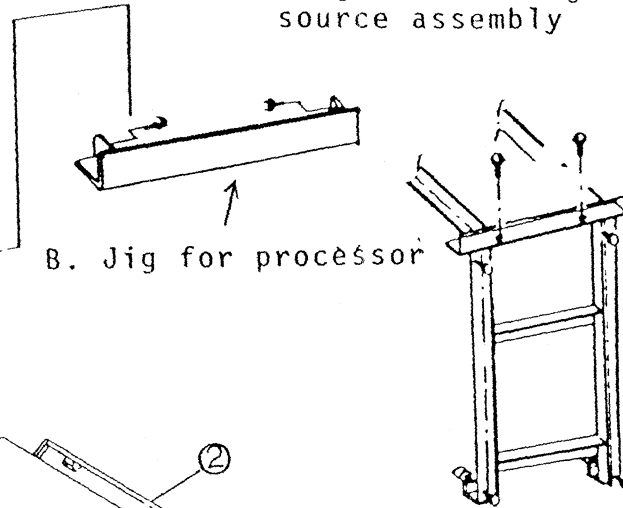
4. PROCESS CHART



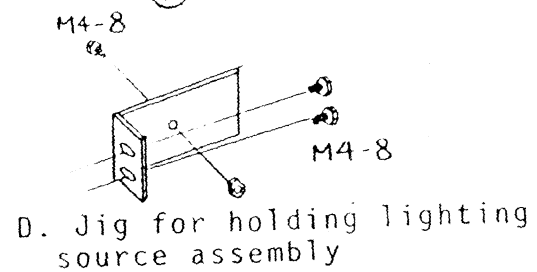


[Jigs]

- A. Jigs for lifting main unit (3 pcs). ... Send them back to the factory.
- B. Jig for processor
- C. Jig for holding lens assembly
- D. Jig for holding lighting source assembly



- (1) Exposure Section
- (2) Master Magazine
- (3) Switchboard
- (4) Main Control Panel
- (5) Master Receiver
- (6) Original Holder
- (7) Processor/Dryer
- (8) Light Source
- (9) Lens/Mirror Assembly
- (10) Carrier (intermediate paper outlet)
- (11) Cutter



## [Unpacking]

### A. Main Unit

- (1) Remove the crate except the crate bottom frame.
- (2) Hitch the nylon slings to the lifting bolts on the main unit bottom and lift the main unit to remove the crate bottom frame (fig.1)  
Remove the jig for lifting the main unit referring to Fig. (4-M10)
- (3) Casters on the bottom of the main unit can be used for carrying the unit.

### B. Processor

- (1) Remove the crate.
- (2) Lift the processor to remove the crate bottom frame.
- (3) Casters on the bottom of the processor can be used for carrying it.

## [Installation]

- (1) Carry the main unit to the installation site and put the leg seats under four adjust bolts.
- (2) Remove the middle and lower rear covers.
- (3) Open the top cover of the exposure section, cut the band for holding the compression plate and hook the handle to the top cover.
- (4) Put a sheet of clean paper on the exposure glass and put a level on it. Adjust with the adjust bolts until the main unit is held in the horizontal position. Keep the four casters free or off the floor.
- (5) Once remove the jig securing screws (2-M6) to take off the jig and reinsert them to secure the rails (after leveling the main unit, tighten the bolts on both sides of the processor a little.)
- (6) Carry the processor and lift its rear to put the wheels on the rails. Connect the processor and the main unit through connectors J5A, J22, J24, J25 and J74 and secure its cord with the cord retainer. Then push the processor into the main unit.

[Conditions for Installation]

- (1) Place the machine horizontally on a floor strong enough to withstand a machine weight of 650 Kg.
- (2) Avoid a place where there is vibration. The floor surface should not be rough.
- (3) Avoid a place exposed to direct rays of the sun.
- (4) Use wires which bear the supply power of 1ϕ 100V-1.2kw and 1ϕ 200v-6.4kw. Voltage fluctuation should be kept within ±10%.
- (5) Leave at least 40cm space around the main unit for servicing.

[Packing List]

When unpacking, be sure to check all parts against the packing list to make sure that no parts have been overlooked.

No	Parts Name	Qty	No	Parts Name	Qty
1	Main Unit	1	21	Cutter Blade	10
2	Processor	1	22	Blower Brush	1
3	Spool and Shaft	1 set	23	Mirror Cleaning Spray	1
4	Halogen Lamp	2	24	Metal Polishing Compound	1
5	Replenisher Bottle	2	25	Retouching Paints	1each
6	Master Guide	1	26	Brush for paints	1each
7	Vat	1	27	Spring Belt	3
8	Tunnel	1	28	Enclosed Fuse 30A	2
9	Measuring Cup	1	29	Glass Fuse 15A	2
10	Leg Seat	6	30	Glass Fuse 10A	2
11	Light Source Shield	1	31	Glass Fuse 5A	2
12	Master receiver cover	1	32	Glass Fuse 3A	2
13	Processor Cover	1	33	Glass Fuse 2A	4
14	Fluorescent Lamp	1	34	Glass Fuse 1A	2
15	Test Chart	1	35	Glass Fuse 0.5A	4
	Sample Original	1	36	Glass Fuse 0.1A	2
16	Original Manual	1	37		
17	Technical Guide	1	38		
18	Drain Disposal Manual	1	38		
19	Wall-stuck Operating Instruction	1	40		
20	Tool Set	1			

- (7) Put down the processor casters on both side of the processor until they touch the floor and tighten the caster lock bolts. (Fig.3)
- (8) Remove the jig for holding the lens assembly by removing 4-M6 bolts.  
Remove the jig for holding the light assembly by removing 4-M6 bolts. (Fig.2)
- (9) Take away the band binding the original holder. (The holder is bound on both its operation and non-operation side.)
- (10) Remove the lens cap; remove the screws (2-M4) securing the slit plate on the bottom of the lens assembly, and hold the plate handle to draw out the plate to the right.  
The lens cap is in the main unit.
- (11) Install the halogen lamps with their markings (130V,1500 W) facing the operator. (For the installing method and precautions, refer to "Operation Manual".)
- (12) Install the light source shield.
- (13) Install the master receiver cover with four knurled screws.
- (14) Install the master guide and the drain vat to the processor. Remove the developing unit and the stabilizing unit from the respective tanks and clean the tanks and units. If the rollers don't turn smoothly, turn them by hand.
- (15) Take the line cord out of the main unit and lay it on the floor.  
Then attach the lower rear cover.

[Mixing processing solutions]

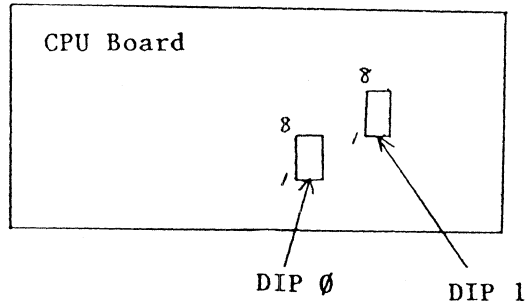
- (1) Prepare developing and stabilizing solutions according to "Operation Manual" and pour them into the respective tanks and replenisher bottles.
- (2) Load the replenisher bottles filled with replenisher on the respective unit.

[Connecting the Power Supply]

- (1) Set the 100V and 200V POWER switches on the sub-control panel to OFF.
- (2) After checking the power supplied in the building, connect the line cord.  
(Power requirement; 1 $\phi$  100V - 1.2 kw  
1 $\phi$  200V - 6.1 kw )
- (3) Be sure to earth the green grounding wires for 100V and 200V.

(Inspection and Adjustment)

1. The CPU board is located on the back of the front cover. (Open the front cover and remove the light shielding plate.) Adjustments are made using the DIPs 0 and 1 on this board.



DIP 0

No.	
8	Master feed length compensating coefficient
7	Compensation for master movement to optical axis (plus)
6	Compensation for master/lens movement to optical axis (minus)
5	
4	Coefficient for lens assembly movement
3	Compensation for lens assembly movement to optical axis
2	Double-exposure continuous/single mode changeover
1	

DIP 1

No.	
8	
7	Data input
6	
5	Data display
4	
3	Frequency changeover (ON: 50 Hz)
2	Inch/mm changeover (ON: inch--English--system)
1	Data input

2. Select the frequency to match the power supplied in the field.

50 Hz: Turn on switch 3 of DIP 1.

60 Hz: Turn off switch 3 of DIP 1.

3. Inch/millimeter selection

Inch: Turn on switch 2 of DIP 1.

Millimeter: Turn off switch 2 of DIP 1.

4. Turn on the POWER (100V and 200V) switches.

5. Load a master roll according to the Operation Manual.

6. Inspection and adjustment of the master feed length

(1) Set the M. LENGTH readout to the length which is most frequently used.  
(Example: 650 mm)

(2) Press the START button and then measure the length of the master thus delivered. (Example: measured length value 660 mm)

(3) Turn on switches 1 and 7 of DIP 1, and then turn on switch 8 of DIP 0.  
Enter the measured length value with the M.LENGTH input keys on the control panel. (Example: Enter 660.)

(4) Turn off switch 8 of DIP 0, and then turn off switches 1 and 7 of DIP 1.

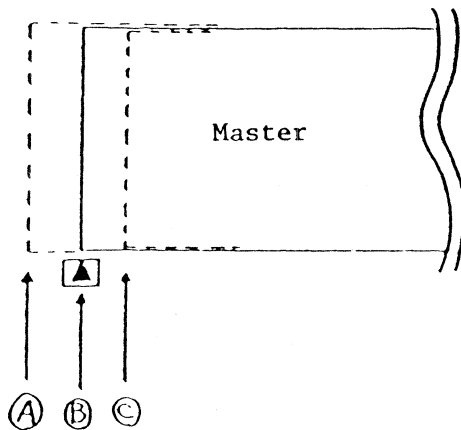
(5) Confirmation of coefficient

Turn on switch 5 of DIP 1 and switch 8 of DIP 0, and the coefficient value appears on the DISPLAY on the control panel. Check it.



## 7. Master back distance

Make sure that the master leading end is on the extension of the mark scribed on the exposure glass when exposure is made. If not, make an adjustment with the following procedures.



- A: Insufficient master back distance
- B: Correct master back distance
- C: Excessive master back distance

### Case A:

- (1) Measure the difference or distance between the mark and the master end (A - B in the figure).
- (2) Turn on switches 1 and 7 of DIP 1 and then turn on switch 7 of DIP 0.
- (3) Enter the difference (A - B) with the M.LENGTH input keys (in 0.5 mm increments).
- (4) Turn off switch 7 of DIP 0 and then turn off switches 1 and 7 of DIP 1.
- (5) Confirmation.  
Turn on switch 5 of DIP 1 and switch 7 of DIP 0, and the value entered appears on the DISPLAY.

### Case C:

- (1) Measure the difference or distance between the mark and the master end (B - C in the figure.)
- (2) Turn on switches 1 and 7 of DIP 1 and then turn on switches 6 and 7 of DIP 0.

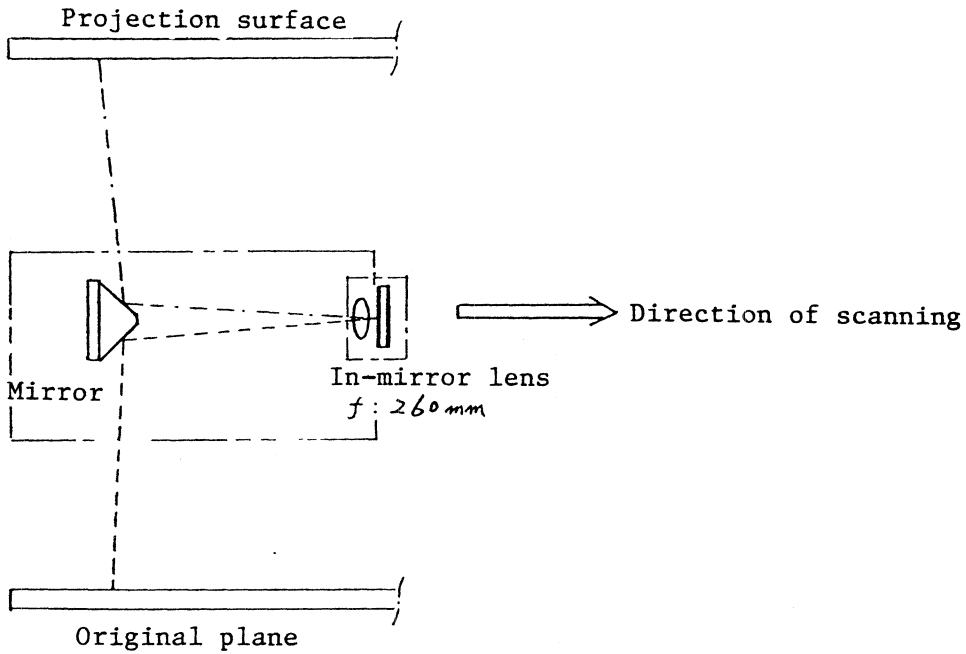
- (3) Enter the difference (B - C) with the M.LENGTH input keys (in 0.5 mm increments).
- (4) First, turn off switch 7 of DIP 0 , next switch 6 of DIP 0 and then switches 1 and 7 of DIP 1.
- (5) Confirmation  
Turn on switch 5 of DIP 1 and switches 6 and 7 of DIP 0, and the value entered, as preceded by minus sign, appears on the DISPLAY.

<<1>> INSPECTION AND ADJUSTMENT OF OPTICAL SYSTEM

The focusing and image sizing systems are sufficiently adjusted prior to shipment. However, if they are considered to be defective, check and carry out necessary adjustments following the procedure below.

[1] Checking and Adjustment Procedures

1. Image distortion adjustment ---- mirror
2. Image size adjustment ----- original
3. Focus adjustment ----- lens



Distance between the original plane (C) and lens (L)

$$A = f (1 + 1/m)$$

Distance between the lens (L) and projection surface (P)

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

where, f: focal length of the lens

m: magnification

Theoretical positional relationship between the original, lens, and projection surface for ideal focus.

A=B (ex.) f: 260mm

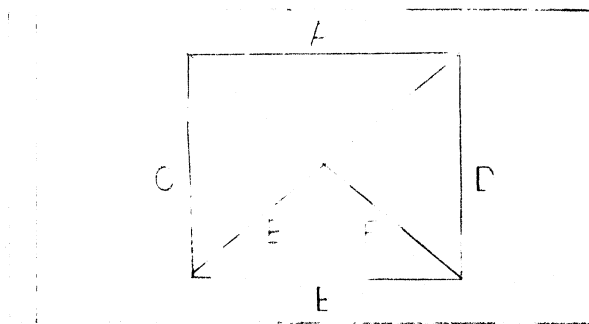
$f (1 + 1/m) = f (1 + m)$  m:100%

$260 (1 + 1/1) = 260 (1 + 1)$

therefore, A = B = 520

However, in practice, the focal length varies with individual lenses, and is not necessarily 520mm.

[2] Image Distortion Adjustment



Allowance

1. A = B = C = D = 450mm

within  $\pm 0.5$ mm

2. E - F

within  $\pm 0.5$ mm

Adjust the image distortion amount ( E - F ) if the error is above the permissible limit of 0.5mm.

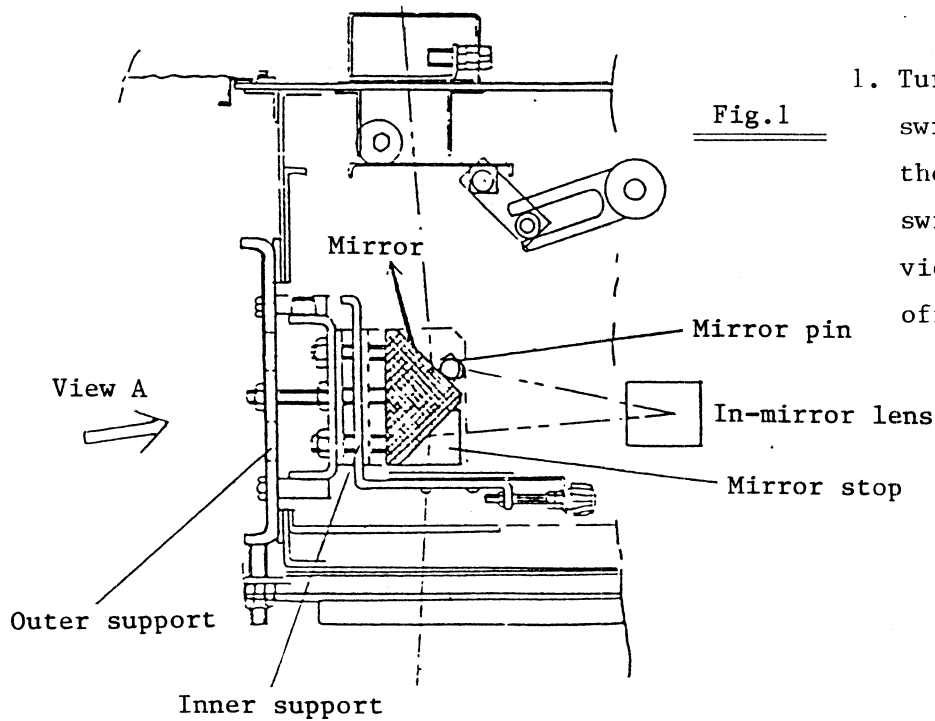
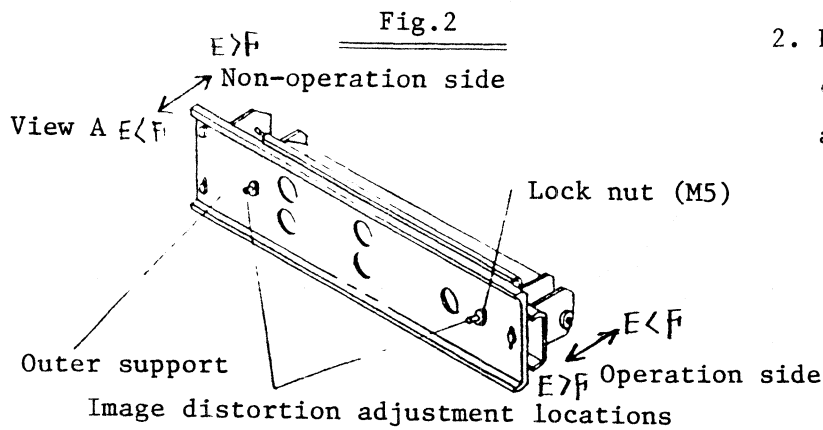


Fig.1

1. Turn the 100V power supply switch ON, move the lens to the center using the LENS switch as shown in Fig.1 at view A, and turn the switch off.



2. Referring to Fig.2 (view A) check the image distortion adjustment locations.

3. When E is greater than F

- (1) Loosen the M5 lock nut on the operation side, rotate CCW with a hexagon head spanner (2.5mm), and tighten.
- (2) Loosen the lock nut on the non-operation side, rotate CW, and tighten.

\* The image distortion will be altered by approximately 1.5mm for each quarter turn of the lock nut.

\* Note that the mirror will be twisted unless these two screws are rotated equal amounts in opposing directions.

- (3) Check the adjustment by making an exposure, and repeat the step as necessary.

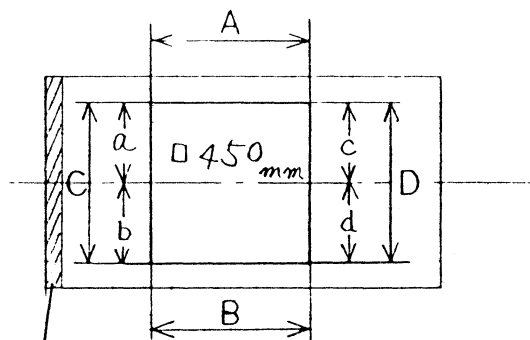
4. When E is less than F

- (1) Loosen the M5 lock nut on the non-operation side, rotate CCW with a hexagon head spanner (2.5mm), and tighten.
- (2) Loosen the lock nut on the non-operation side, rotate CW, and tighten.
- (3) Check the adjustment by making an exposure, and repeat the step as necessary.

[3] Image Size Adjustment

1. Place the test chart (ruled) or a scale suitable for checking the image size on the original plane.
2. Make an exposure with the master feed length set at about 600mm. Measure sides A, B, C, and D of the image and calculate the differences between lengths a and b, and c and d. See the figure below.

Fig.3



Allowance

- (1) A, B, C, D (450mm square)  
within  $\pm 0.5\text{mm}$
- (2) a - b, c - d  
within  $\pm 0.4\text{mm}$

Fogged area (base sheet reference line (0) side)

<Adjustment Procedure>

Adjustment by vertical movement of the original frame base attached to the original frame.

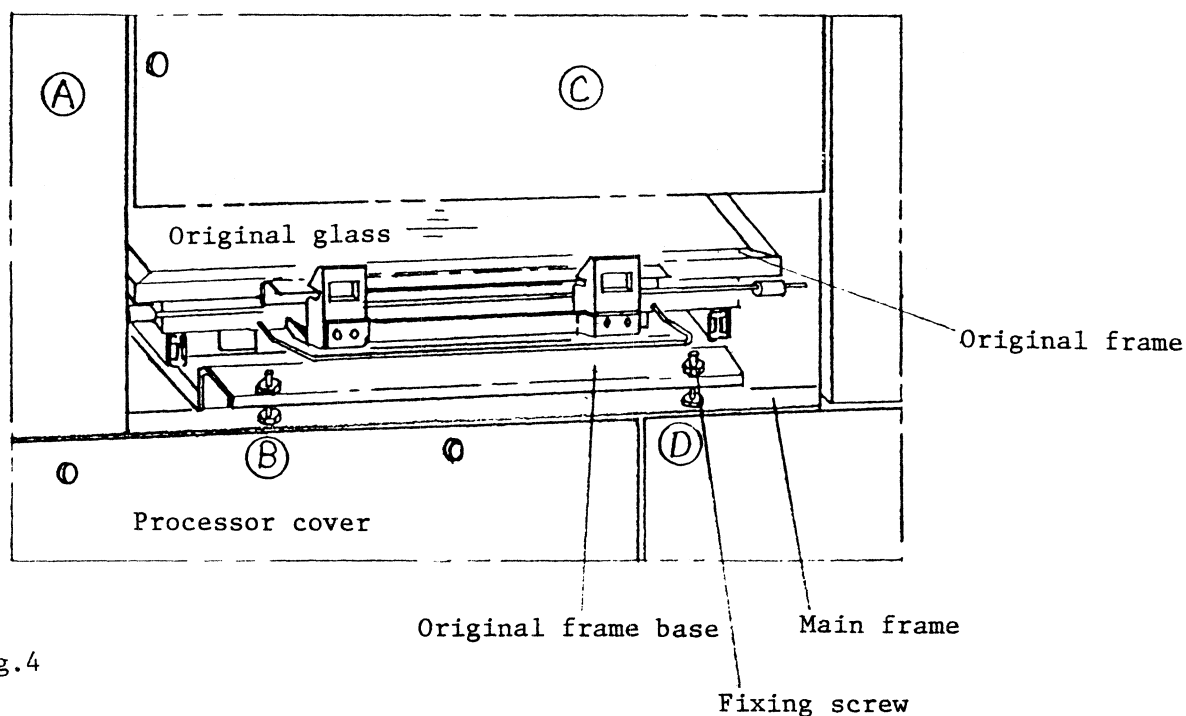


Fig.4

- \* The length of A or B in the direction of the master feed length cannot be adjusted. The mechanism of the machine retains image size accuracy in this direction.
- \* In consideration of the characteristics of the slit exposure method used in the CP-500S, first measure lengths C and D, and then lengths a, b, c and d.

- (1) Place the item for exposure on the original glass with it facing up, and its fogged end toward the reference line (O).
- (2) The original frame is attached to the lower frame base, and secured on the main frame with four setscrews A, B, C and D.
- (3) Adjust lengths a, b, c, and d with screws A, B, C and D, respectively.
- (4) If, for example, length B is longer, lower the frame base with screw B. If length d is shorter, raise the base with screw D.

Note: Turning the screw nut  $180^\circ$  alters the length by approximately 0.3mm.

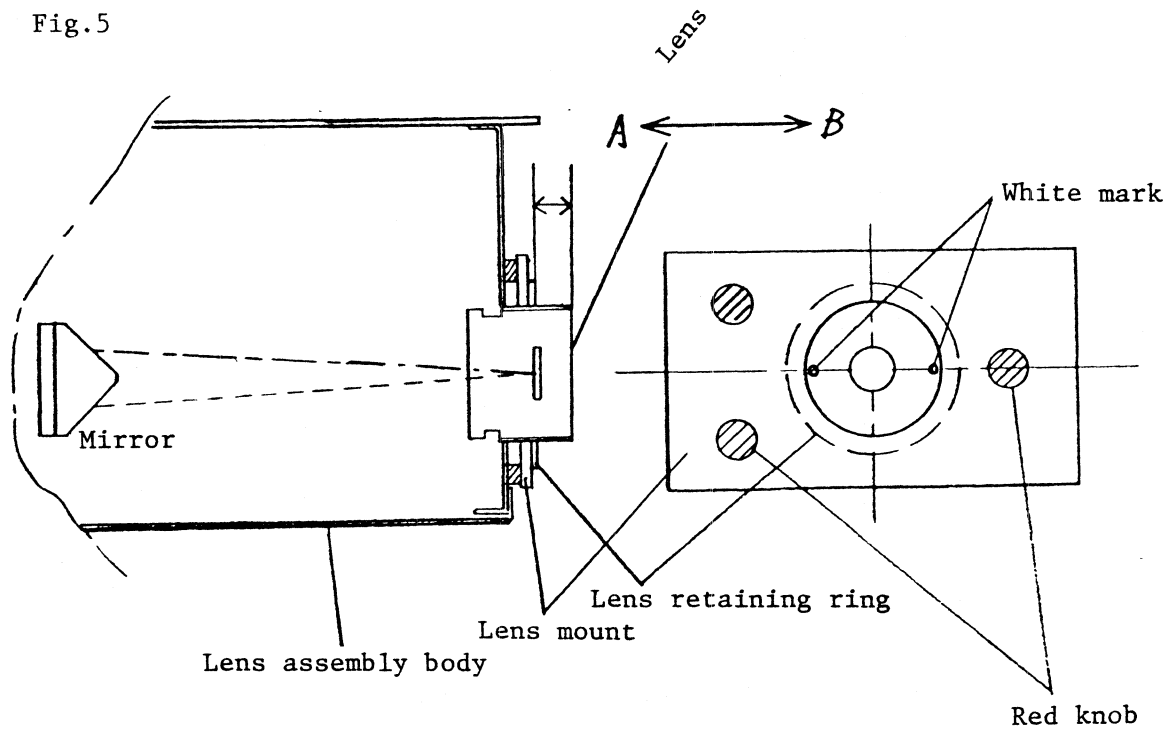
#### [4] Focus Adjustment

1. Make an exposure of the test chart (resolution chart) or Mitsubishi standard chart at 70% over the normal exposure.
2. The image is considered to be in focus if 8.3 lines/mm or higher resolution is obtained when the exposure is checked through a loupe.
3. Adjust the focus if such a resolution is not obtained.

#### <Adjustment Procedure>

Adjustment by horizontal movement of the lens.

Fig.5



- (1) Before adjusting the focus, be sure to measure the distance between the right end of the lens and the lens retaining ring with a scale to maintain its original position.
- (2) Holding the lens by hand to prevent it from turning, turn the lens retaining ring CCW to loosen.
- (3) When the ring is turned CW, the lens moves in direction A.  
\* There are two white marks on the lens. Turn the lens retaining ring  $180^\circ$  at a time so that it may be held in the horizontal position. (One rotation  $<360^\circ>$  of the lens retaining ring moves the lens by 1mm horizontally.)
- (4) Make an exposure of the test chart with the lens retaining ring tightened. If the exposure is less clear than the previously made exposure, return the lens to its original position, and turn it CCW to move it in direction B. Then make an exposure of the test chart again and compare it with the previous exposure.
- (5) Using the above steps (3) and (4), adjust it so as to obtain the best focal point (8.3 lines/mm or higher resolution)

The above steps should be taken accompanied with a check of the image size.



<<2>> INSPECTION AND ADJUSTMENT OF ILLUMINATION DISTRIBUTION

Although the halogen lamps (130V, 1.5kW) are arranged so as to illuminate the projection surface uniformly, unevenness in distribution of illuminance may occur. If the lamp has been replaced, check the distribution of illuminance following the procedure below.

[1] Checking Procedure

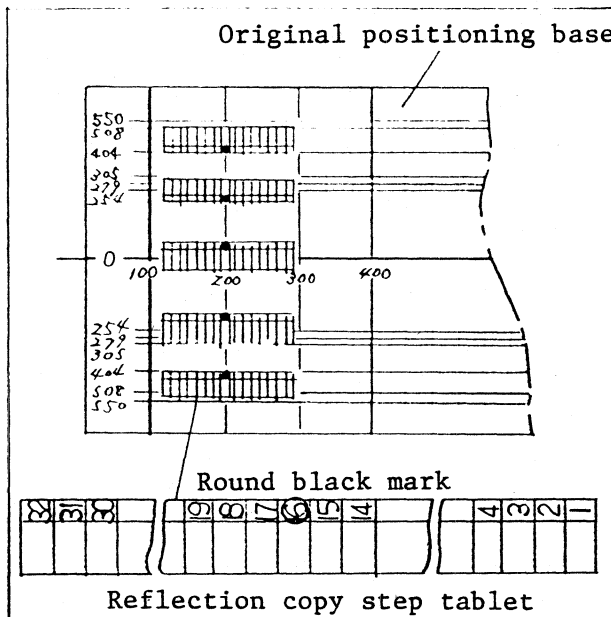


Fig.6

1. Set the master feed length to 400mm.
2. Draw out the original frame, and open the upper glass frame.
3. Place five reflection copy step tablets (or equivalents) so that their round black marks align with the 200mm line of the original positioning base sheet.
4. Make an exposure at the standard exposure setting.
5. Cut out the exposed center step tablet.

6. The round black mark of this cut out step tablet is the reference. Compare the marked steps of the other four printed step tablets with that of the cut out step tablet, and check for any density difference (with the step numbers of the step tablet).
7. If, as a result of this comparison, unevenness or density difference in the step numbers is found to be within 1.5 steps, it means that replacement of the lamp has not caused any significant change in the distribution of illuminance, and that a uniform distribution of over 80% is assured.

<Adjustment Procedure>

Adjust by the procedure below if the difference is found to be more than 1.5 steps.

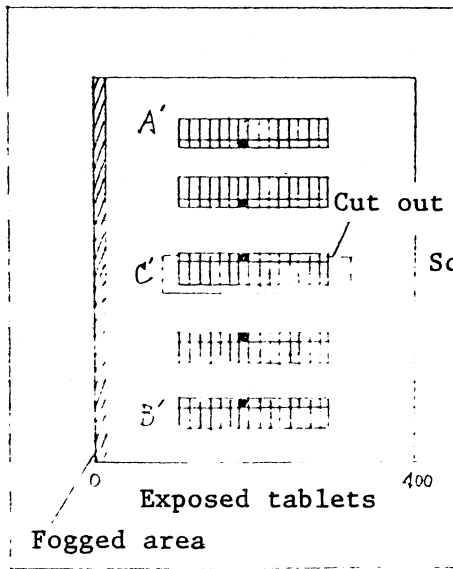


Fig. 7

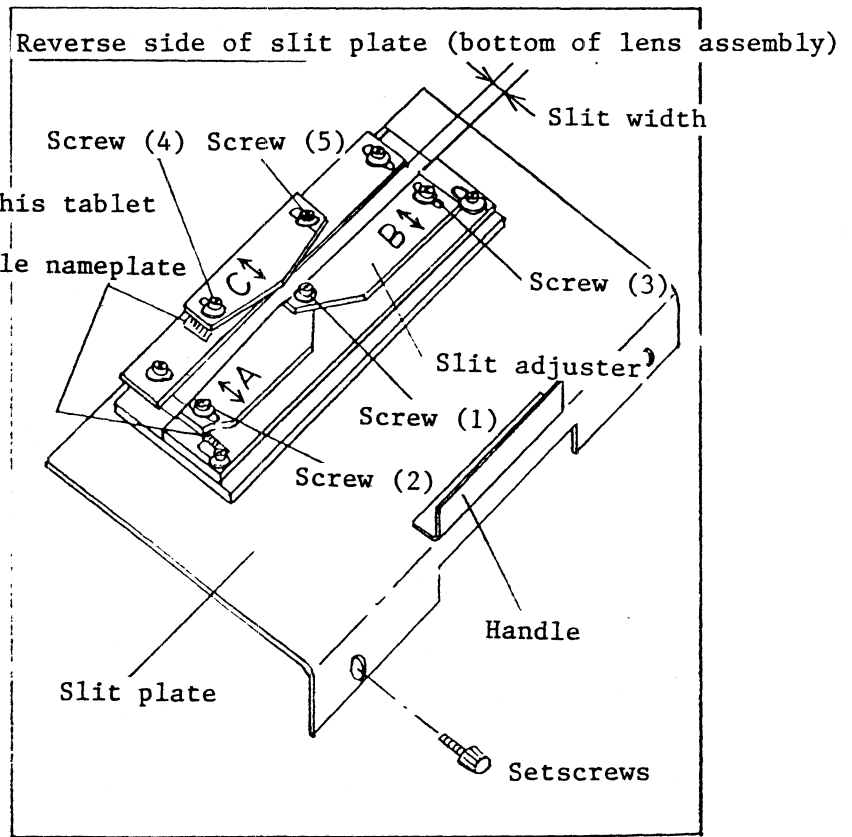


Fig. 8

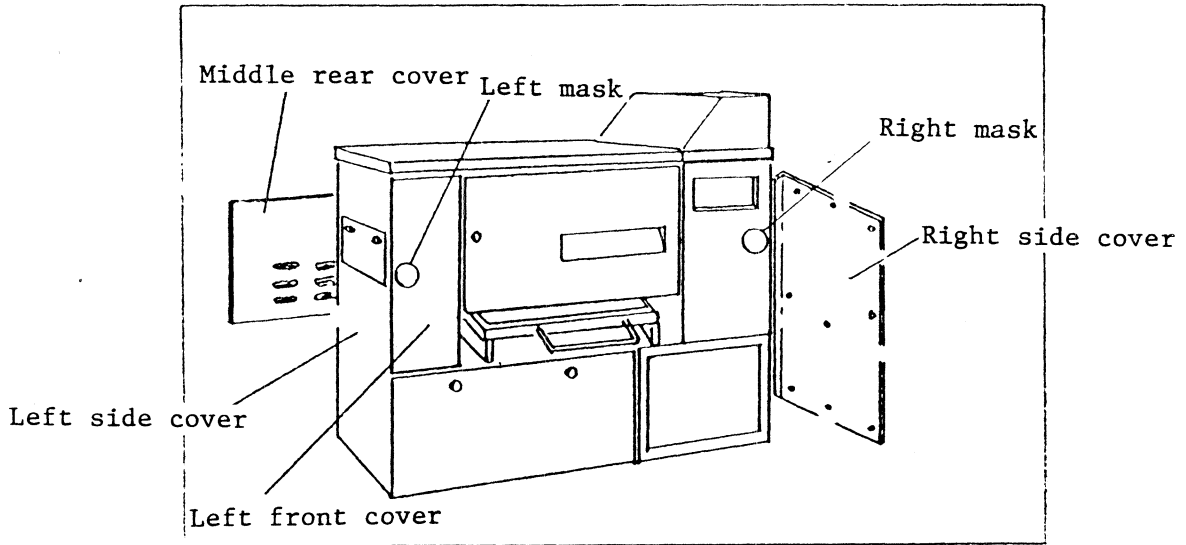
1. Open the cover of the main control panel.
  2. Remove the light source shield.
  3. Remove the two slit plate setscrews on the bottom of the lens assembly, and draw out the slit plate by sliding its handle to the right. (Hold it firmly by hand as the plate is slightly heavy.)
  4. Place the slit plate upside down. (See Fig. 8.)
- See Figs. 7 and 8 for the relation between the slit plate and the exposed item.
- \* A scale nameplate is provided at both ends of each slit adjuster (A, B and C) to facilitate the positioning of the adjusters to their original positions.

- (1) When exposed area A' is brighter than the center area:  
Loosen screws (1) and (2), move adjuster A 2mm so that the slit width decreases at the end edge of slit adjuster A, and fix it in position. After adjustment, make an exposure and check the result. If the result is not satisfactory, repeat the step.
  
- (2) When exposed area B' is brighter than the center area:  
Loosen screws (1) and (3), move adjuster A 2mm so that the slit width decreases at the end edge of slit adjuster B, and fix it in position. After adjustment, make an exposure and check the result. If the result is not satisfactory, repeat the step.
  
- (3) When exposed area C' is brighter than areas A' and B':  
Loosen screws (4) and (5), move adjuster A 2mm so that the slit width decreases at the end edge of adjuster A, and fix it in position. In the case of partial unevenness in the center area, the slit width may be decreased by adjusting the tilt of slit adjuster C. After adjustment, make an exposure and check the result.

Note: Although, the width of the slit can be decreased (i.e. by decreasing the quantity of light) for adjustment of the illumination distribution as mentioned above, the method of widening the slit width (i.e. by increasing the quantity of light) is limited, and is hardly applied.

<<3>> SHADING MASKS

Fig.9

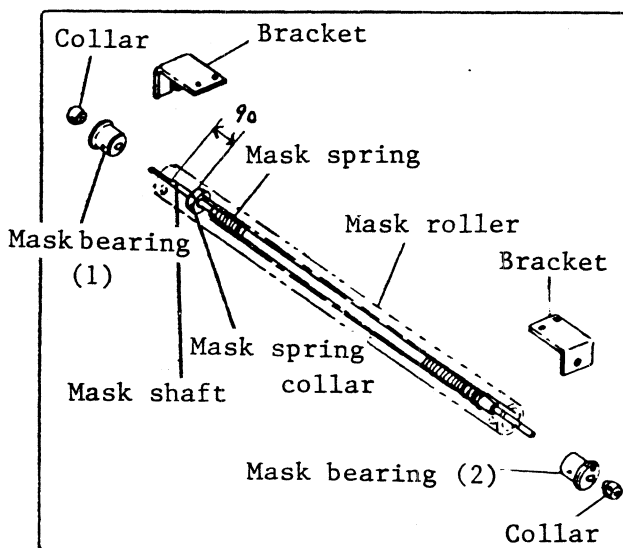


The masks slide as the lens assembly moves. In order to check the left mask, remove the following covers:

- (1) Middle rear cover
- (2) Left side cover
- (3) Left front cover

In order to check the right mask, remove the right side cover.

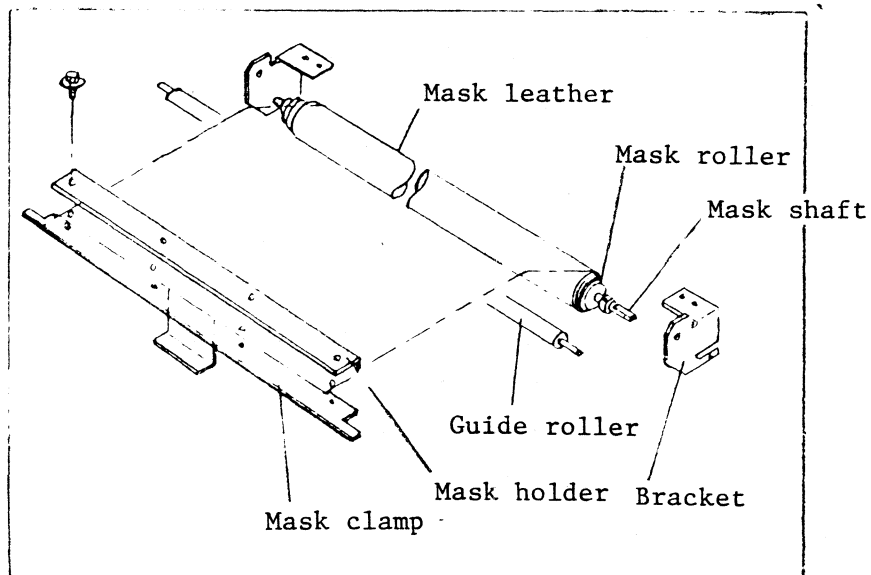
Fig.10



In the mask roller, the mask spring collar is fixed 90mm away from the notched end of the mask shaft, and the mask spring end is inserted into the collar. The mask bearing is fixed by screws at both ends of the mask roller. The mask spring end is fixed onto the mask bearing (2). The collars at both sides are fixed with a 1.0mm clearance provided from the mask bearing end.

<Adjusting the Number of Turns in the Mask Spring Coils>

Fig.11



Follow the procedure below to adjust the mask springs. This procedure should be carried out before installation onto the brackets to keep the mask roller in good working order and maintain even slidability of the lens assembly.

\* When adjusting the mask spring, be sure to move the lens assembly to the operation (mask) side using the lever for moving the lens assembly.

Right mask: 20 turns

Left mask: 25 turns

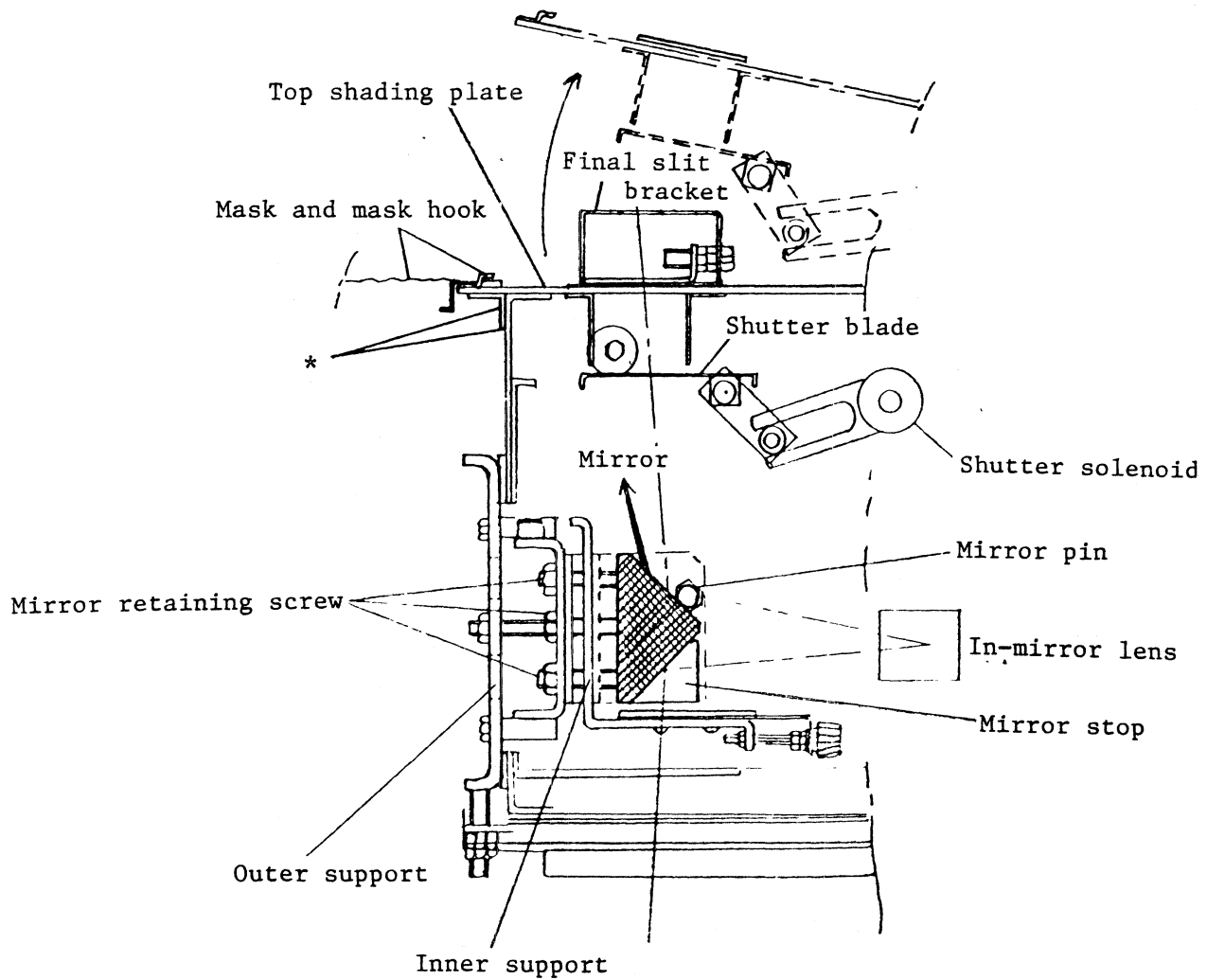
#### <<4>> REPLACEMENT OF THE MIRROR

The mirror is incorporated into the lens assembly and cannot be seen from the outside. Follow the procedure below for replacement. Make a careful inspection of the locations marked with an asterisk(s), and note down the results of the inspection. This is important for positioning during assembly.

##### [1] Preparations

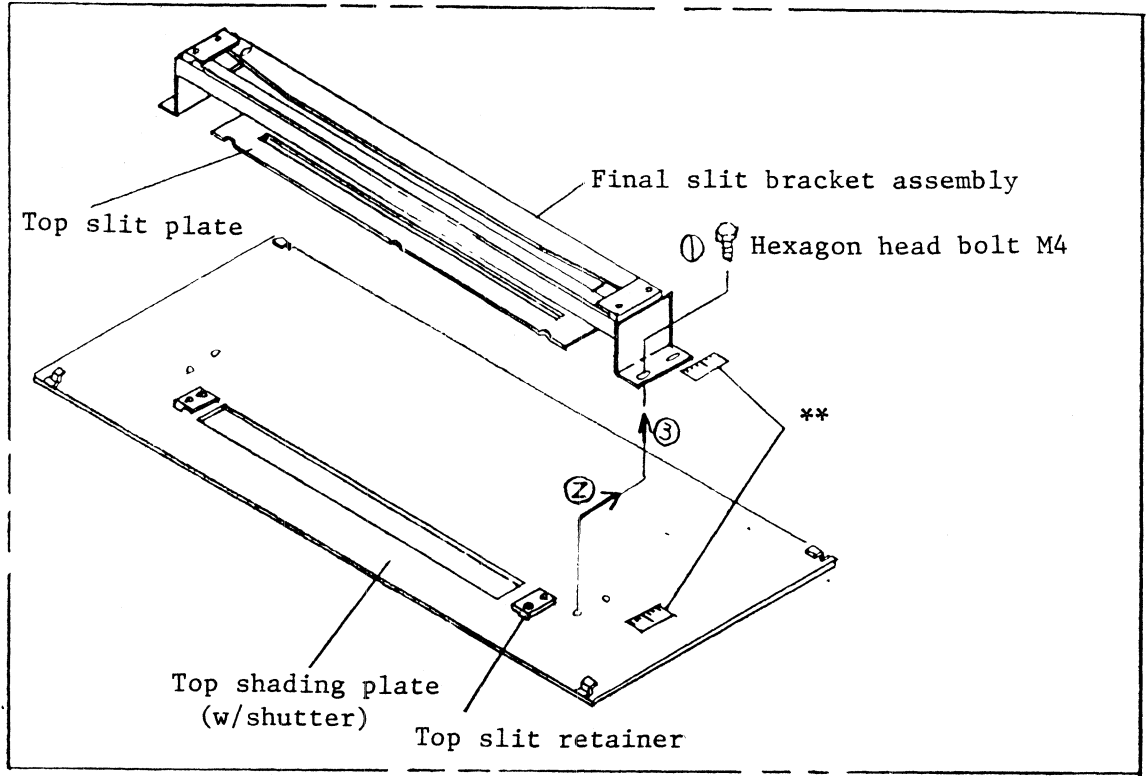
1. Open the main control panel cover, and remove the shading plate at the top front of the lens assembly.
2. Remove both the upper and middle rear covers.
3. Open the top cover, and hook the contact plate of the exposure section onto the top cover.
4. Turn the power ON (100V, no-fuse breaker), move the lens assembly to the center with the LENS switch, and unhook the mask from the right and left mask hooks. Then, turn off the power.
5. Make sure that the stopper of the top shading plate is completely in contact with the lens assembly. See Fig.11 and check location marked by \*. Never neglect this step as it is important for positioning during assembly.
6. Check if the end face of the final slit bracket aligns with the slit scale. See Fig.12 and check location marked by \*\*. Never neglect this step as it is important for positioning during assembly.

Fig.12 Replacement of Mirror (inside lens assembly)



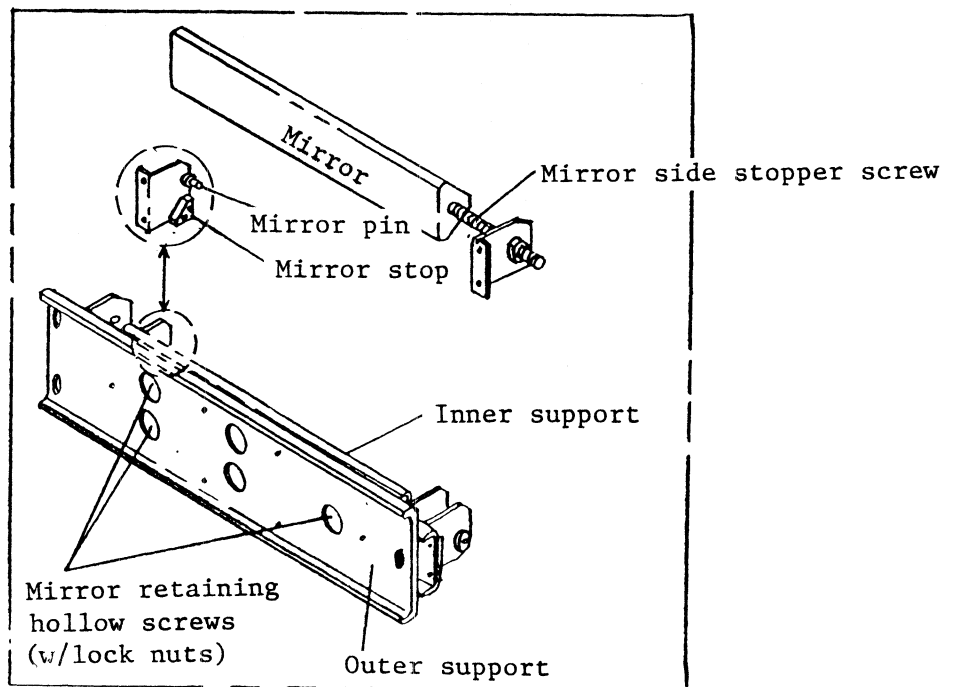
\* Check that stopper of top shading plate is in perfect contact with lens assembly.

Fig.13



\*\* For positioning accuracy during reinstallation of the slit positioning nameplate, check the end edge of the final slit bracket and the scale nameplate position.

Fig.14





[2] Removing the Mirror (See Figs.12, 13 and 14.)

1. After carrying out the check in step (6) (\*\*), remove the four hexagon head bolts (M4), and slide the top slit plate to the right until it comes away from the top slit retainers. Then, remove the final slit bracket assembly.
2. After carrying out the check in step (5) (\*), remove the four pan head screws (M4) to remove the top shading plate (w/shutter). Remove the connector from the shutter solenoid.

Note: The mirror is fixed with a pin and stop as references on its reflecting side, with three retaining screws on its rear side, and two side stopper screws.

3. Loosen the mirror side stopper screw on the operator side, and slightly loosen the screw (M4, hollow)
4. Loosen the three lock nuts (M4) inside the round holes of the outer support, and loosen the mirror retaining screws while holding the mirror with your hand.
5. The mirror can be taken out upward when the retaining screws are loosened until they are flush with the inner support surface.

[3] Installing the Mirror

Take sufficient care not to scratch or mark new mirrors during installation.

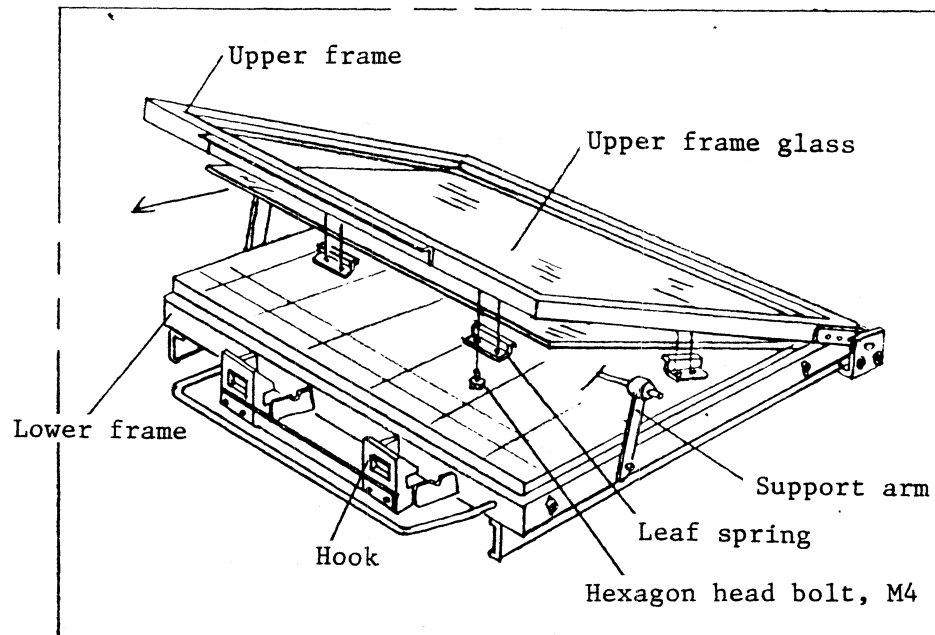
1. The procedure is the reverse to that of removal. Insert the mirror from above and hold it by hand with its reflecting surface in contact with both the mirror pin and stop.
2. Tighten the three mirror retaining screws on the rear side of the mirror evenly and tighten them with the nuts.
3. Tighten the mirror side stopper screws, and make sure that the mirror is fixed securely in place. Then tighten them with the nuts.

[4] Post-installation Work

1. Install the top shading plate on the lens assembly. Do not forget to connect the shutter solenoid connector. Make sure that the top shading plate is in contact with the lens assembly in the same manner as before (\*). Then tighten the plate in position.
2. Install the final slit bracket assembly. Also make sure that the positional relationship between the final slit bracket end face and the slit scale is the same as before (\*\*). Then tighten the bracket in position.
3. Hook the mask end onto the mask hooks on the left and right, and top shading plate.
4. Install the covers, turn the power ON (100V, no-fuse breaker) and return the lens assembly to its origin.
5. Check the image for distortion, image sizing, and focus.

<<5>> REPLACEMENT OF ORIGINAL HOLDER UPPER FRAME GLASS

Fig.15



\* Follow the procedure below when replacing the upper frame glass due to scratches etc.

\* The original holder upper glass is secured to the upper frame with eight leaf springs.

[1] Removal -- It is recommended that two persons carry out this work.

1. Remove the middle rear cover.
2. Loosen the three leaf springs located furthest away from the operator with an M4 spanner. (Do not completely remove the springs.)
3. Open the control panel cover, and holding the handle draw out the original holder to its maximum.
4. Remove the hook and get one person to lift the upper frame to above the specified position at which it is held by the support arm.
5. Supporting the upper frame glass remove by hand the five remaining leaf springs.
6. Carefully pull the upper frame glass in the direction of the arrow shown in Fig.15. Note that the glass may stick to the rubber skirt of the upper frame.

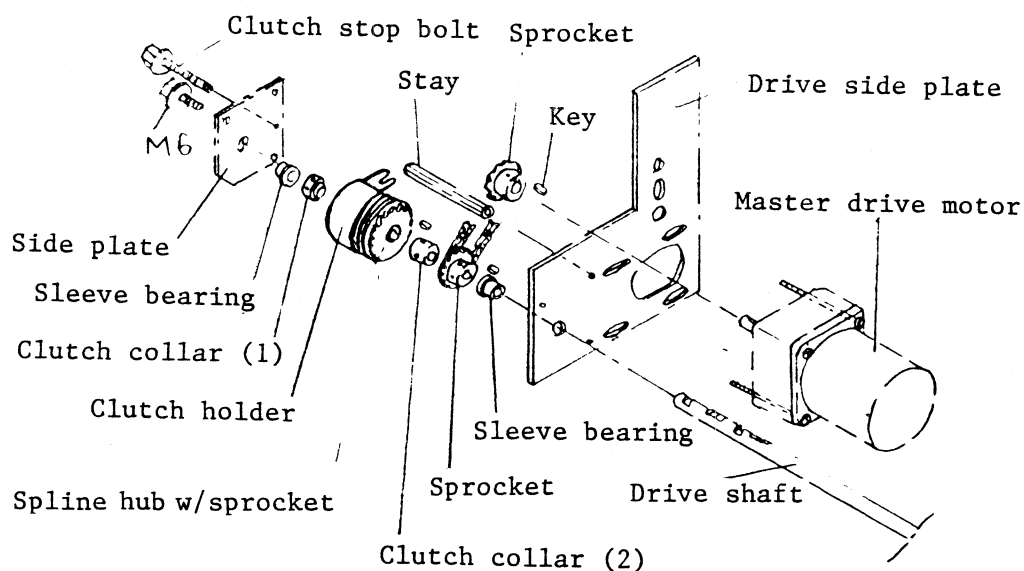
## [2] Installation

Note: Take sufficient care not to scratch or mark new upper glasses during installation.

1. The procedure is the reverse to that of removal.
2. Insert the new upper frame glass between the upper frame and the three innermost leaf springs.
3. After checking the positional relationship between the glass and the rubber skirt, install the five remaining springs.
4. Install the middle rear cover.
5. Check the image for distortion, image sizing, and focus.

<<6>> Drive Section - (Replacement of master feed clutch)

Fig.16



\* The master feed clutch located in the drive section can be seen when the upper rear cover is removed.

[i] Removal of the Clutch

1. Remove the upper rear cover.
2. Remove the side plate. (Unfasten the three M6 hexagon head bolts.)
3. Loosen the setscrews securing the clutch collar (1) and draw out the collar. (Two hollow screws, M4)
4. Draw out the clutch holder.
5. Loosen the set screws for the spline hub w/sprocket to draw out the hub and remove the key.

[2] Assembly and Adjustments:

1. Assemble the clutch in the reverse order to that of removal.
2. Firmly tighten the set screws.
3. Install the side plate firmly so that torsion may not occur in the drive shaft.

\* If there is extreme unevenness in the master length, check for looseness in the following locations:

- (1) the sprocket set screws at the master feed motor side,
- (2) the sprocket set screws at the innermost side or at the clutch side,  
and
- (3) the set screws for the spline hub w/sprocket in the clutch.

If any of the above screws are loose, this may cause unevenness in the master feed lengths. Also, silver may appear in the exposed master end for the same reason. If this should occur, check and tighten the screws.

# DESCRIPTION AND ADJUSTMENTS OF THE ELECTRICAL SYSTEM

## DESCRIPTION OF THE PRINTED CIRCUIT BOARDS

### 1. CPU Board

#### ◦ Description of dip switches and short pins

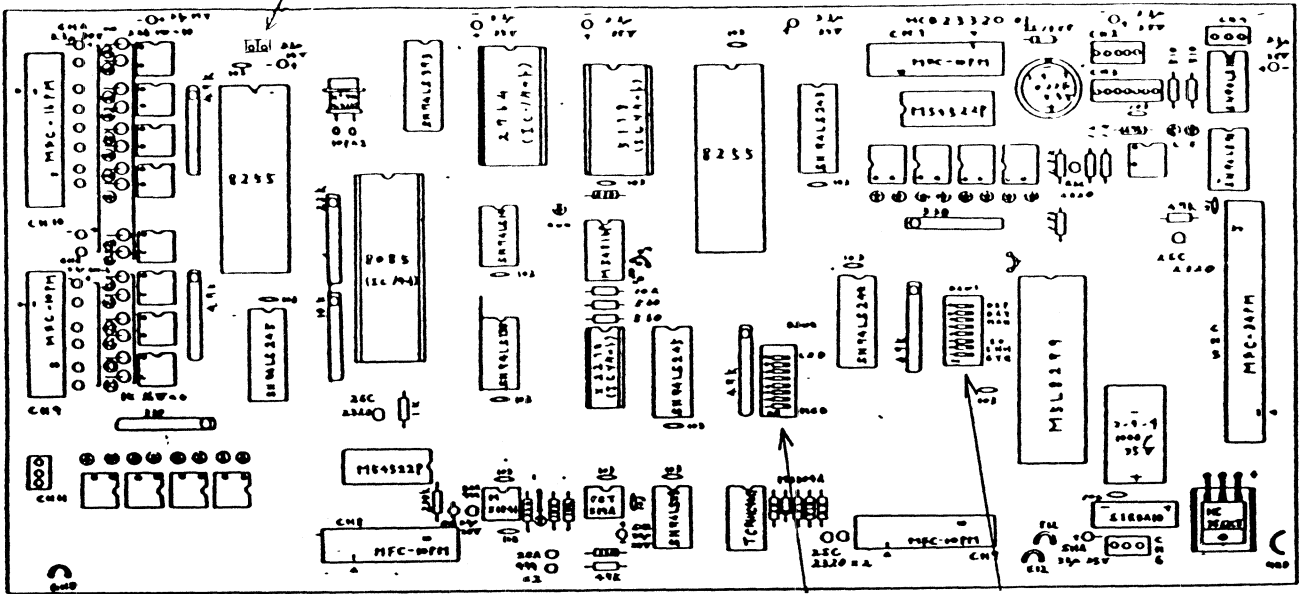


Fig.1 CPU Board

#### Dip Switch Package Ø (DSWØ)

SW No.	Description	Function	Normal Status
1	Running	Repeats a series of operations when ON	OFF
2	Double exposure continuous/separate	OFF: Makes double exposure without pause ON: Makes an exposure on each start	ON
3	Adjustment of lens assembly move to optical axis	Varies the exposure start position	OFF
4	lens assembly move coefficient adjustment	Compensates the difference between the set output size and actual output size	OFF
5	Unused		OFF

6	- (minus) value input	Used to make the adjustment with switch 3 or 7 in the negative direction	OFF
7	Adjustment of master feed to optical axis	Varies the amount of master backward movement from the cutting position	OFF
8	Master length coefficient adjustment	Compensates for the difference between the set and the actually fed length	OFF

Dip Switch Package 1 (DSW1)

SW No.	Description	Function	Normal Status
1	Data input	Used with switch 7 for data input to memory	OFF
2	mm/inch changeover	Changes the measuring unit from metric (mm) to English (inch) system, or vice versa ON: inch      OFF: mm	ON/OFF
3	Frequency changeover	Changes the frequency from 60Hz to 50Hz, or vice versa ON: 50Hz      OFF: 60Hz	ON/OFF
4	Unused		OFF
5	Data display	Used, with DSWØ dip switch 8, 7, 4 and/or 3, for data display.	OFF
6	Unused		OFF
7	Data input	Used with switch 1 for data input to memory.	OFF
8	Unused		OFF

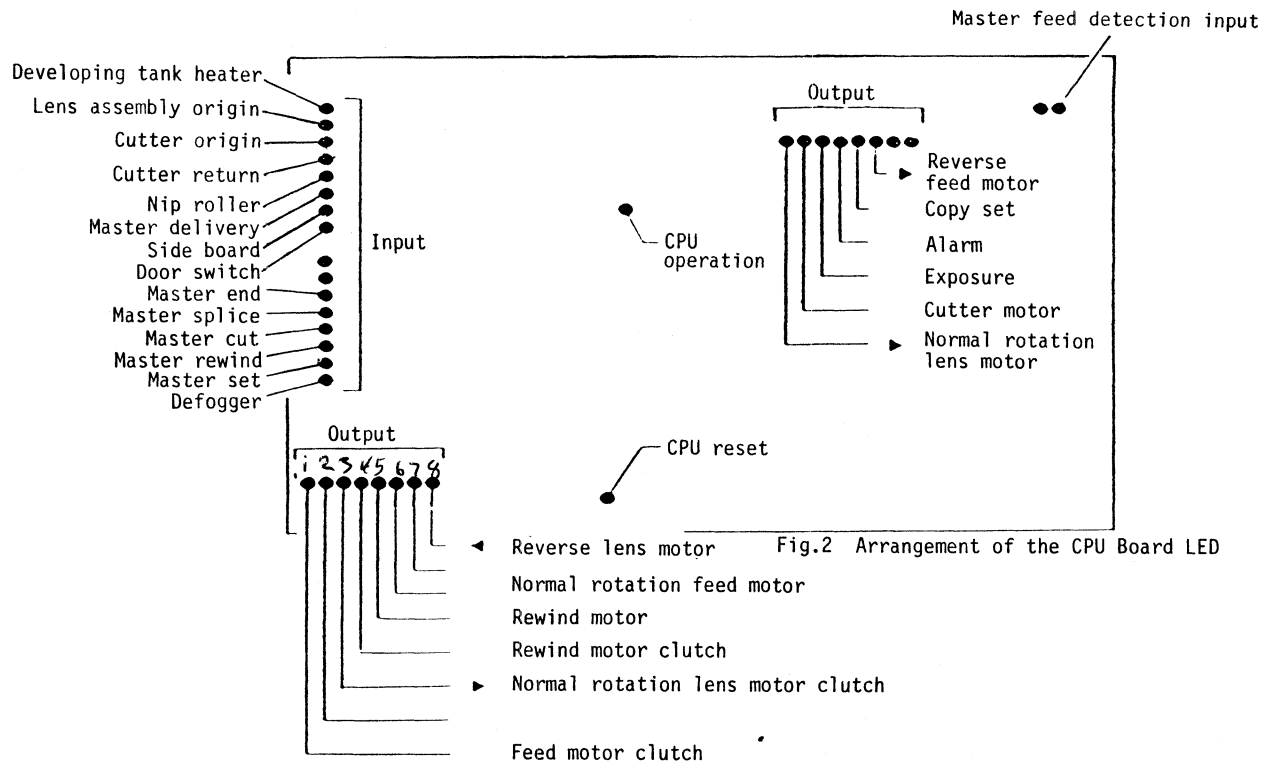
Short pin:

(purpose)                      Enables or disables reception of signals from the photointerrupter for lens assembly movement

(normal status)              Open circuit



° Signal Check LEDs



	LED Description	The LED should light when:
Input LEDs	Developing tank heater	The developer heater is on. (Ry1)
	Lens assembly origin	The lens assembly is at the origin and origin microswitch LS4 is on. (Ry2)
	Cutter origin	The cutter is at the origin and microswitch LS5 is on. (Ry3)
	Cutter return	The cutter is at the opposite travel end and microswitch LS6 is on. (Ry4)
	Nip roller	The nip roller is set and microswitch LS7 is on. (LS7)
	Master delivery	Delivery microswitch LS8 is on as master is passing. (LS8)
	Side board	The side board is set in its inner position and microswitch LS9 is on. (LS9)
	Door switch	(for use outside Japan) The top, front and processor doors are closed and microswitch LS10, 11 and 12 are on. (LS10, 11, 12) (for use in Japan) all the time

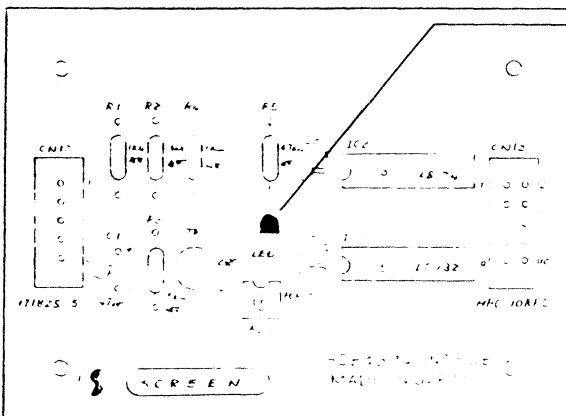
	LED Description	The LED should light when:
	Master end	There is no master on master end sensor SE1. (SE1)
	Master splice	There is master on master splice sensor SE2 (SE2)
	Master cut	Master cut switch PB2 is pushed. (PB2)
	Master rewind	Rewind button PB4 is pushed. (PB4)
	Master set	Set button PB3 is pushed. (PB3)
	Defogger	The defogger is on. (TS5)
	Master feed detection input	Flashes when the light shielding blade comes into the gap in the master feed detection photo-interrupter and rotates.
Output LEDs	Feed motor clutch	Master feed clutch is on. (CL1)
	Normal rotation lens motor clutch	Lens motor clutch CL2 is on. (Ry7)
	Rewind motor clutch	Master rewind clutch CL3 is on. (Ry8)
	Rewind motor	Rewind motor RM1 is on. (Ry9)
	Normal rotation feed motor	Master feed motor RM2 is running to feed master. (Ry10)
	Reverse lens motor	Lens assembly motor RM3 is reversing to return the lens assembly. (Ry12)
	Normal rotation lens motor	Lens assembly motor RM3 is rotating in normal direction to move the lens assembly in the direction for exposure. (Ry13)
	Cutter motor	The cutter is cutting master. (Ry14)
	Exposure	Light source relay Ry 15 is on.
	Alarm	Trouble occurs and alarm relay Ry16 is on.
	Copy set	Lamp for copy setting is on. (Ry17)
	Reverse feed motor	Master is being rewound. (Ry18)
Control LEDs	CPU operation	The CPU is in operation.
	CPU reset	The CPU is reset on power input or initialization.

° Cautions in Replacing the CPU Board:

- (1) The dip switch settings (DSW0, DSW1) on the old CPU board should be transferred to the new CPU board.
- (2) Check the short pin status and set it as before replacement.
- (3) Recall the various compensating values stored in the memory and set the same values on the new board.  
(For the method of recalling and data setting, see p. .)

## 2. Relay Board

° Signal Check LEDs



### Lens Assembly Move Detection LED

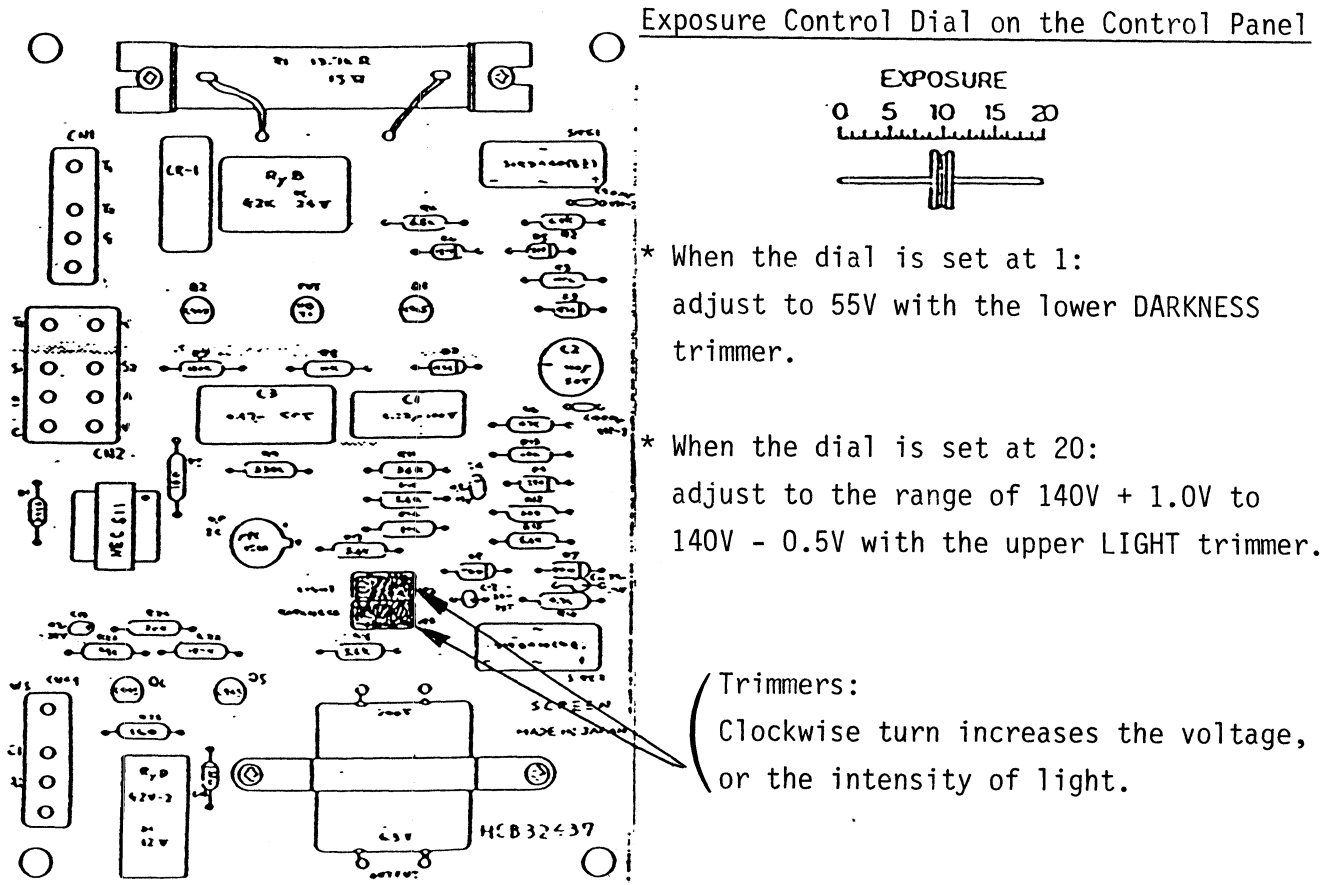
The LED lights when the light shielding blade comes into the gap of the lens assembly move detection photointerrupter. Flashing occurs as the blade turns.

## 3. Adjustment of the Light Control PCB

- (1) Load and set master.
- (2) Set the master feed length to 600 mm or so.
- (3) Select the MULTI exposure mode.
- (4) Using an analog tester, connect the board to distributing board terminals V1 and V9.

### Voltage Adjustment:

Adjust the voltages when the exposure slide control dial on the control panel is set at 1 and 20 respectively, using the two trimmers on the light control PCB.



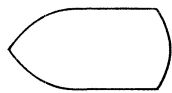
Light Control PCB

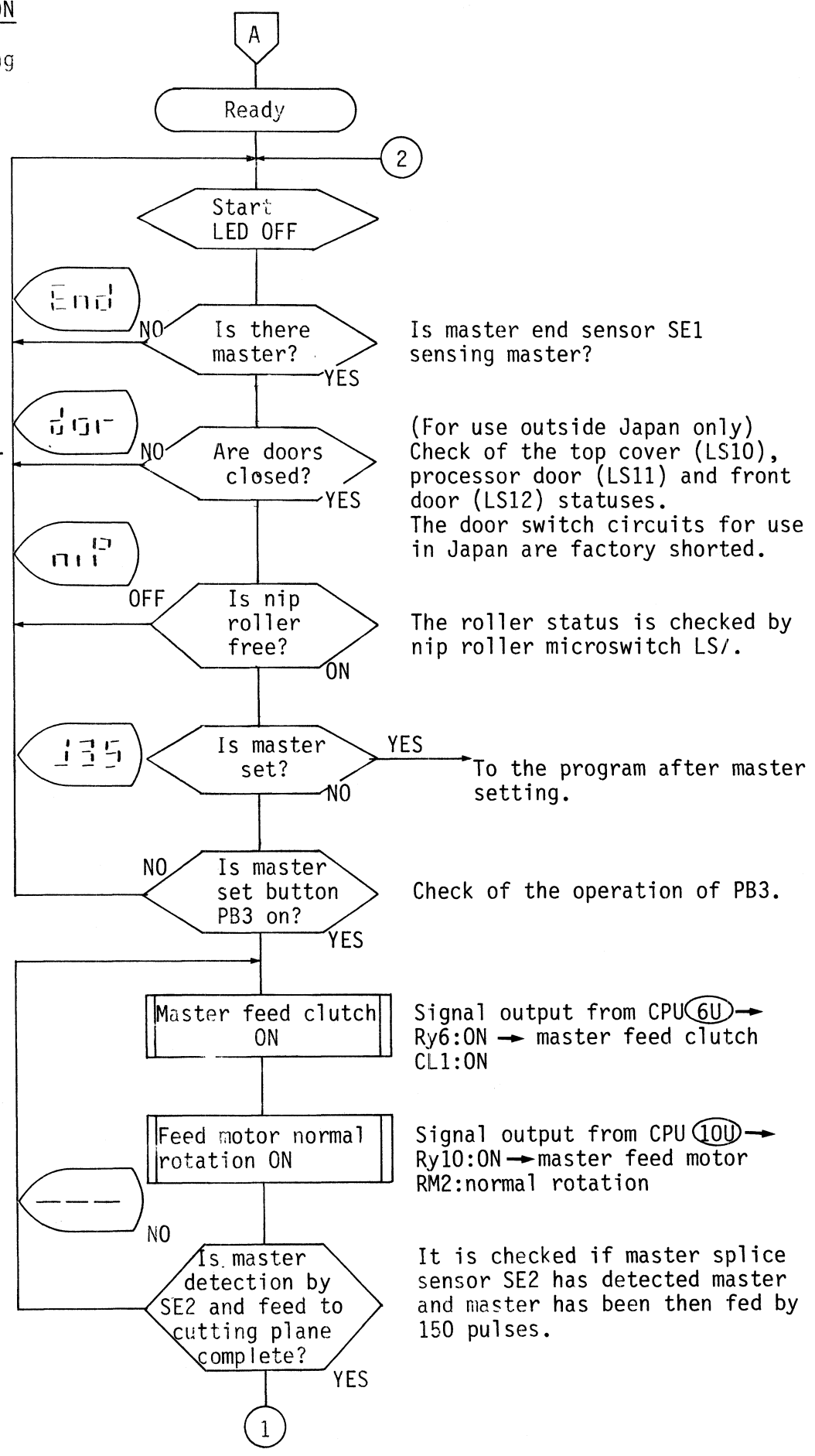
Repeat the above adjustment and check procedures in the MULTI exposure mode a few times by pressing the START button though a single sheet (master plate) is spoiled.

Last, lock the trimmers with screws or by taping.

FLOW OF OPERATION

1. Master Setting

\*  This mark means that the characters shown here appear on the display.



Is master end sensor SE1 sensing master?

(For use outside Japan only) Check of the top cover (LS10), processor door (LS11) and front door (LS12) statuses. The door switch circuits for use in Japan are factory shorted.

The roller status is checked by nip roller microswitch LS/.

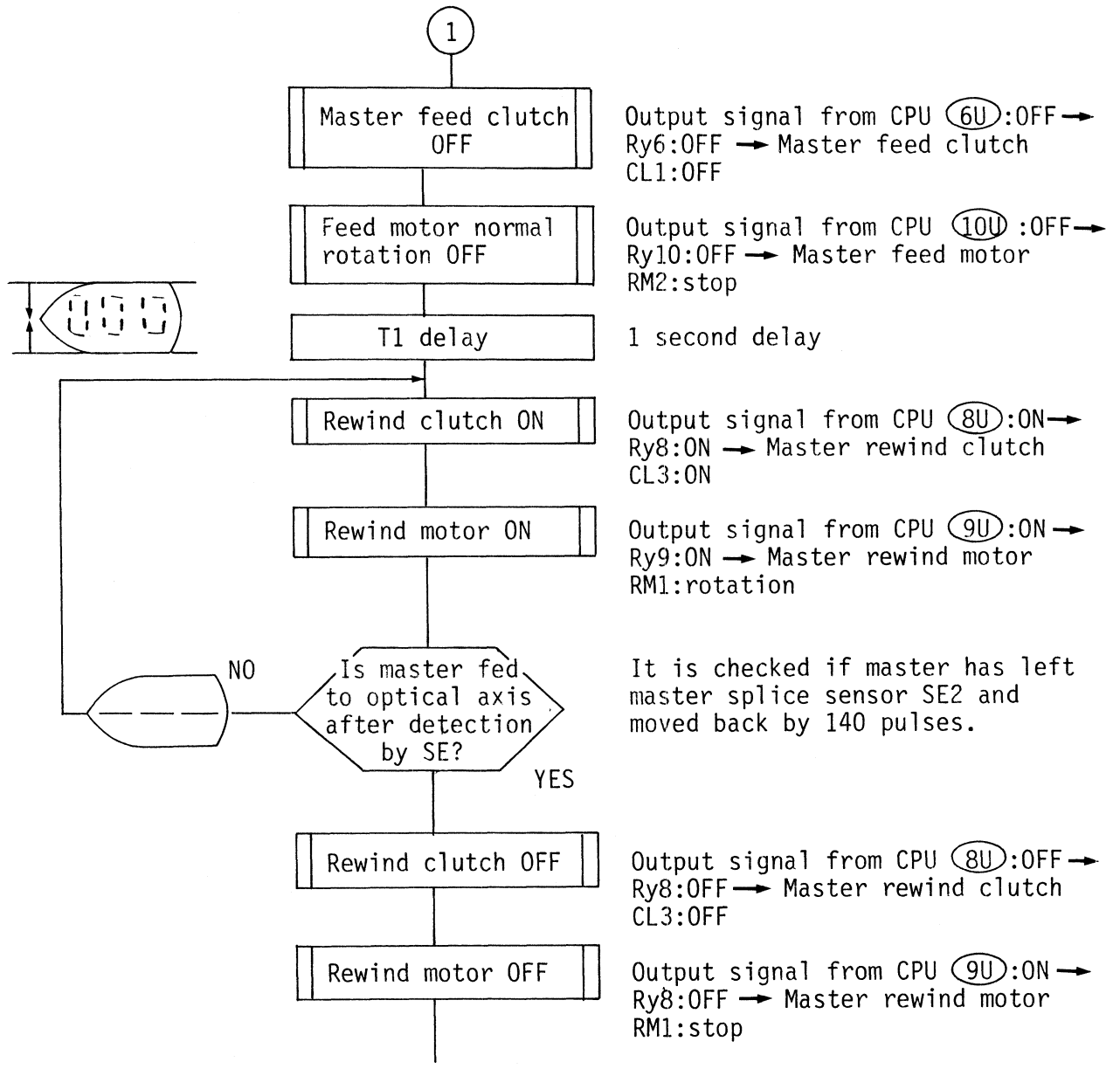
To the program after master setting.

Check of the operation of PB3.

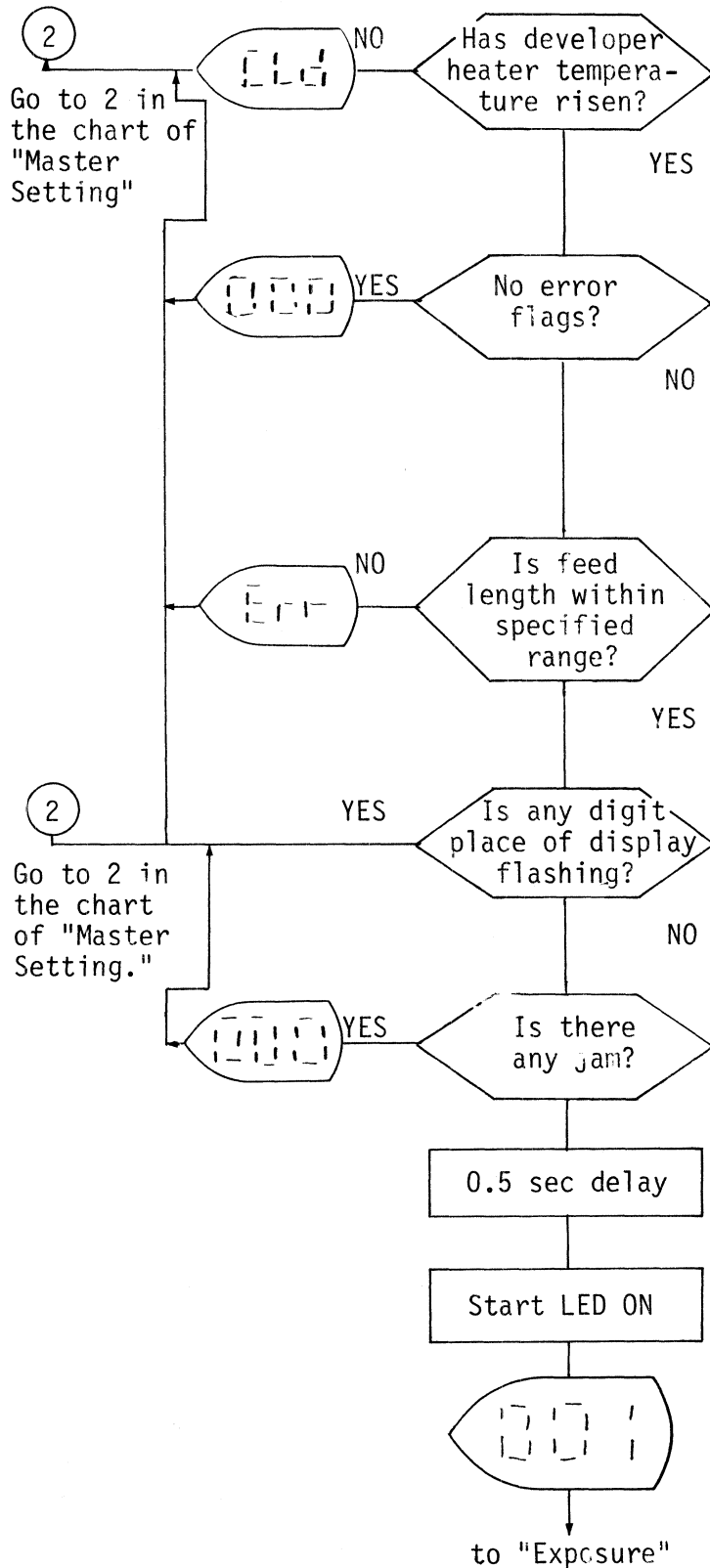
Signal output from CPU (6U) → Ry6:ON → master feed clutch CL1:ON

Signal output from CPU (10U) → Ry10:ON → master feed motor RM2:normal rotation

It is checked if master splice sensor SE2 has detected master and master has been then fed by 150 pulses.



## 2. Steps after Master Setting before Exposure Start



It is checked if heating developer to preset temperature is complete.

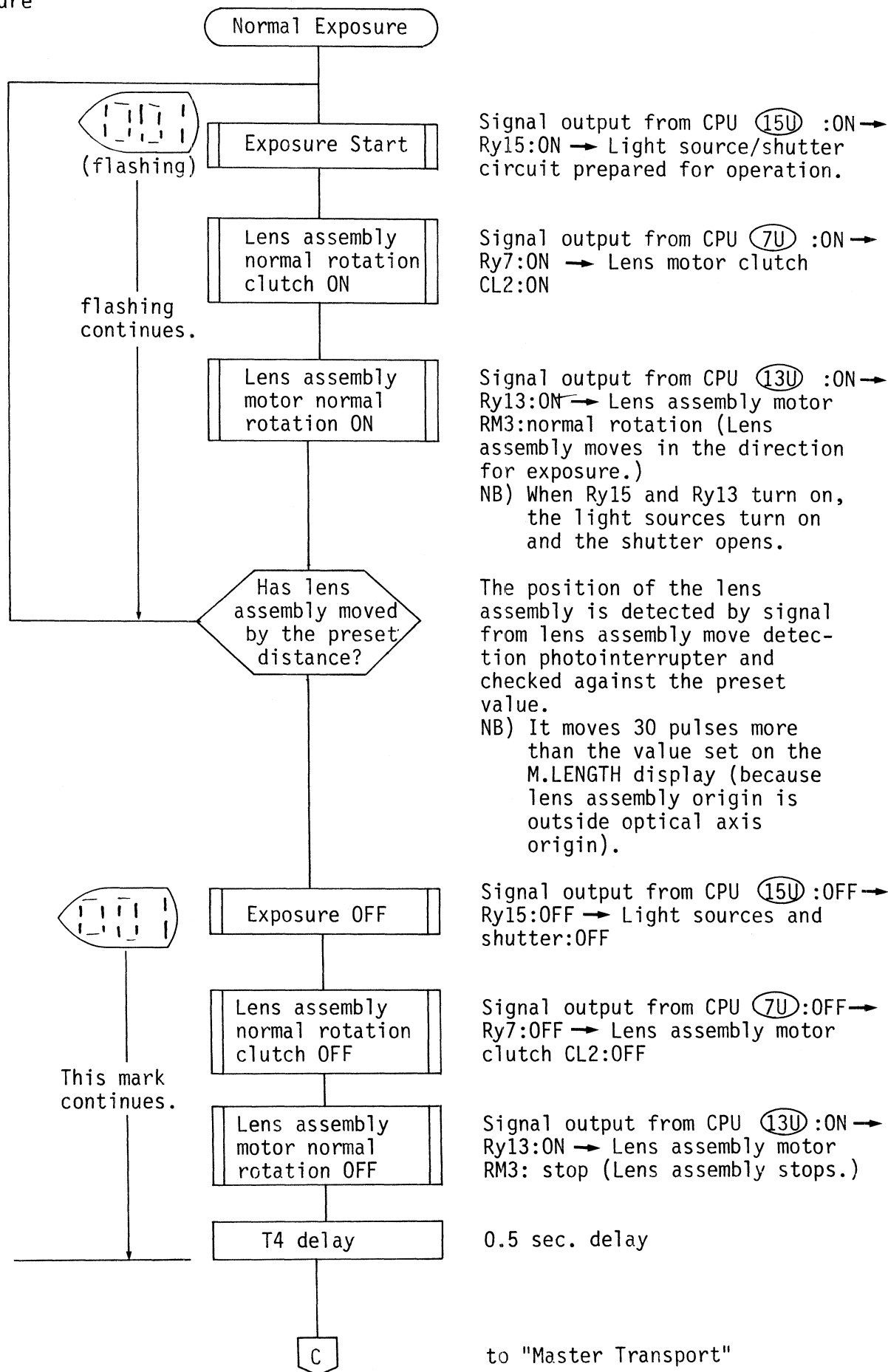
\* If the heater is running to raise the temperature, relay Ry1 is on and signal to CPU **IN** is output.

- 1) Is any dip switch which requires no ON/OFF switching turned on?
- 2) Is lens assembly at origin? (LS4) Ry2:ON
- 3) Is cutter at origin? (LS5) Ry3:ON
- 4) Is side board microswitch LS9 OFF?

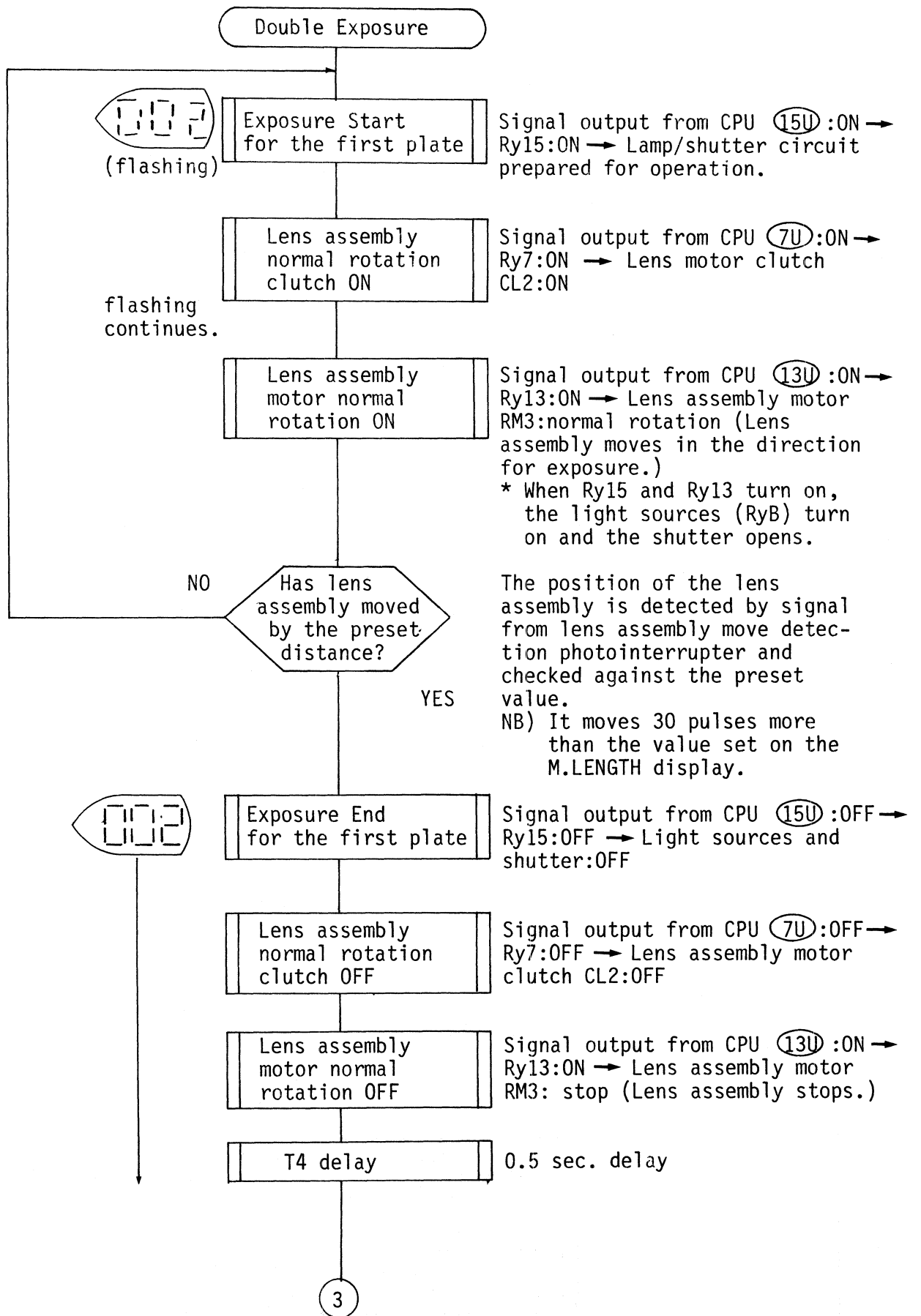
Normal exposure: 370 - 820 mm  
Double exposure: 185 - 410 mm

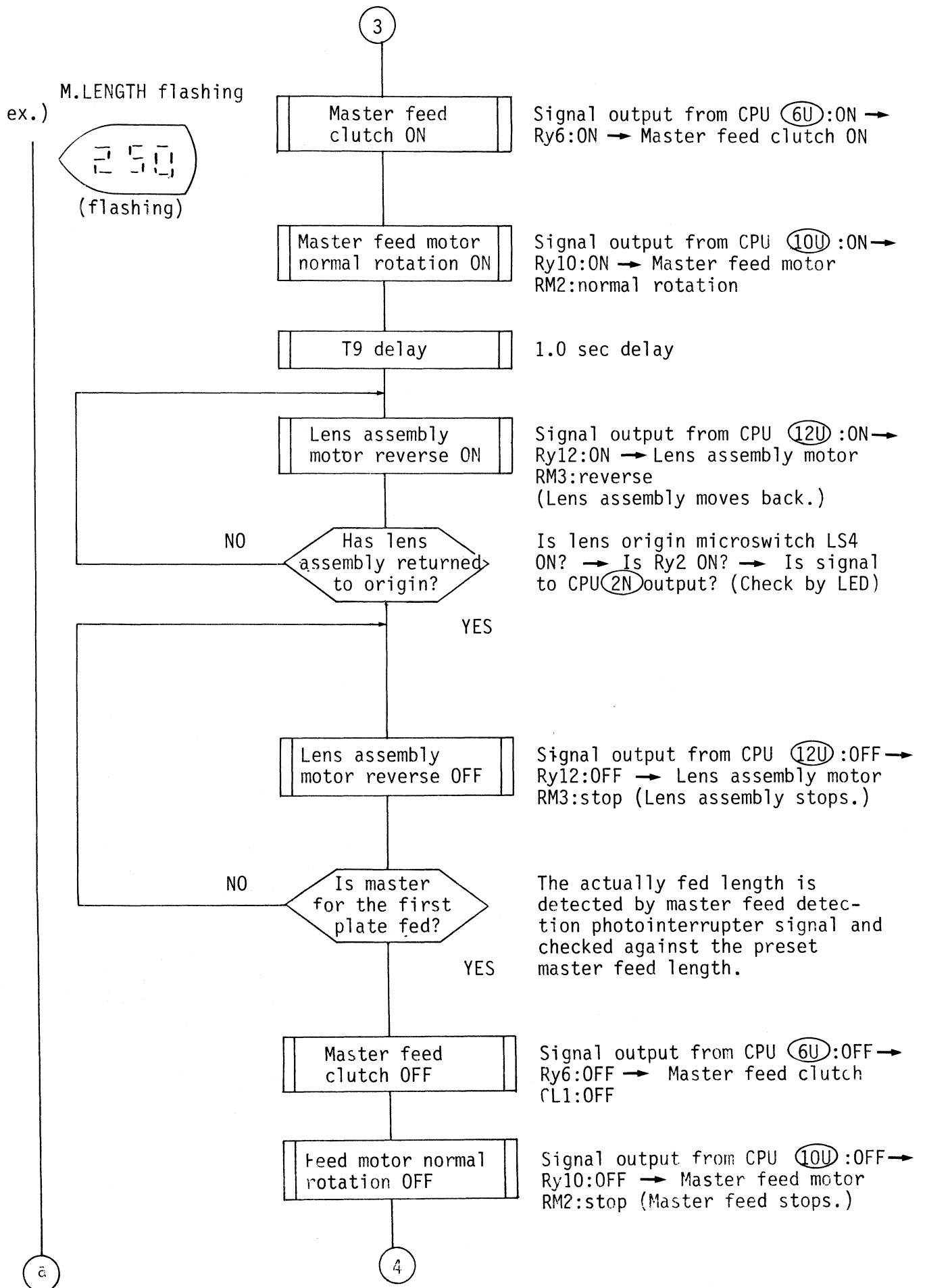
Is data entry under way?

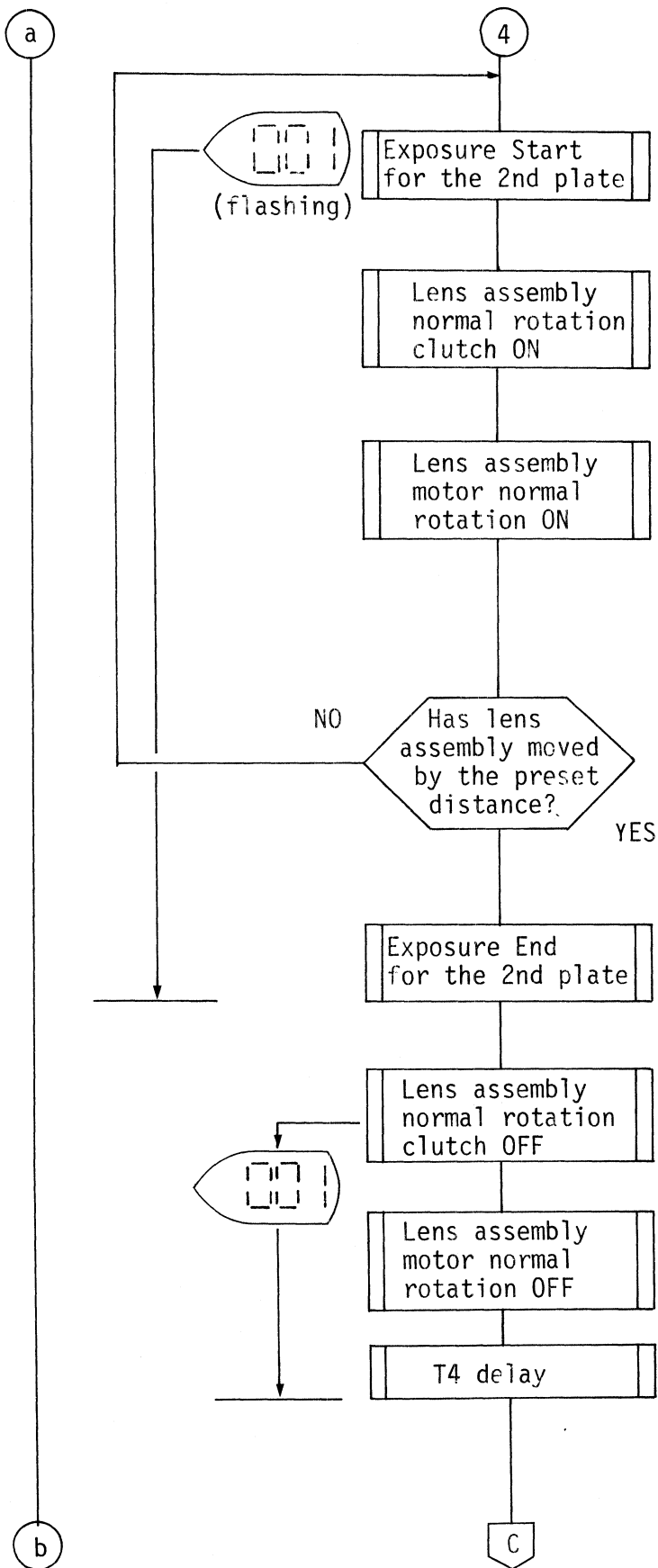
### 3. Exposure











Signal output from CPU (15U):ON → Ry15:ON → Lamp/shutter circuit prepared for operation.

Signal output from CPU (7U):ON → Ry7:ON → Lens motor clutch CL2:ON

Signal output from CPU (13U):ON → Ry13:ON → Lens assembly motor RM3:normal rotation (Lens assembly moves in the direction for exposure.)

\* When Ry15 and Ry13 turn on, the light sources (RyB) turn on and the shutter opens.

The position of the lens assembly is detected by signal from lens assembly move detection photointerrupter and checked against the preset value.

Signal output from CPU (15U):OFF → Ry15:OFF → Light sources and shutter:OFF

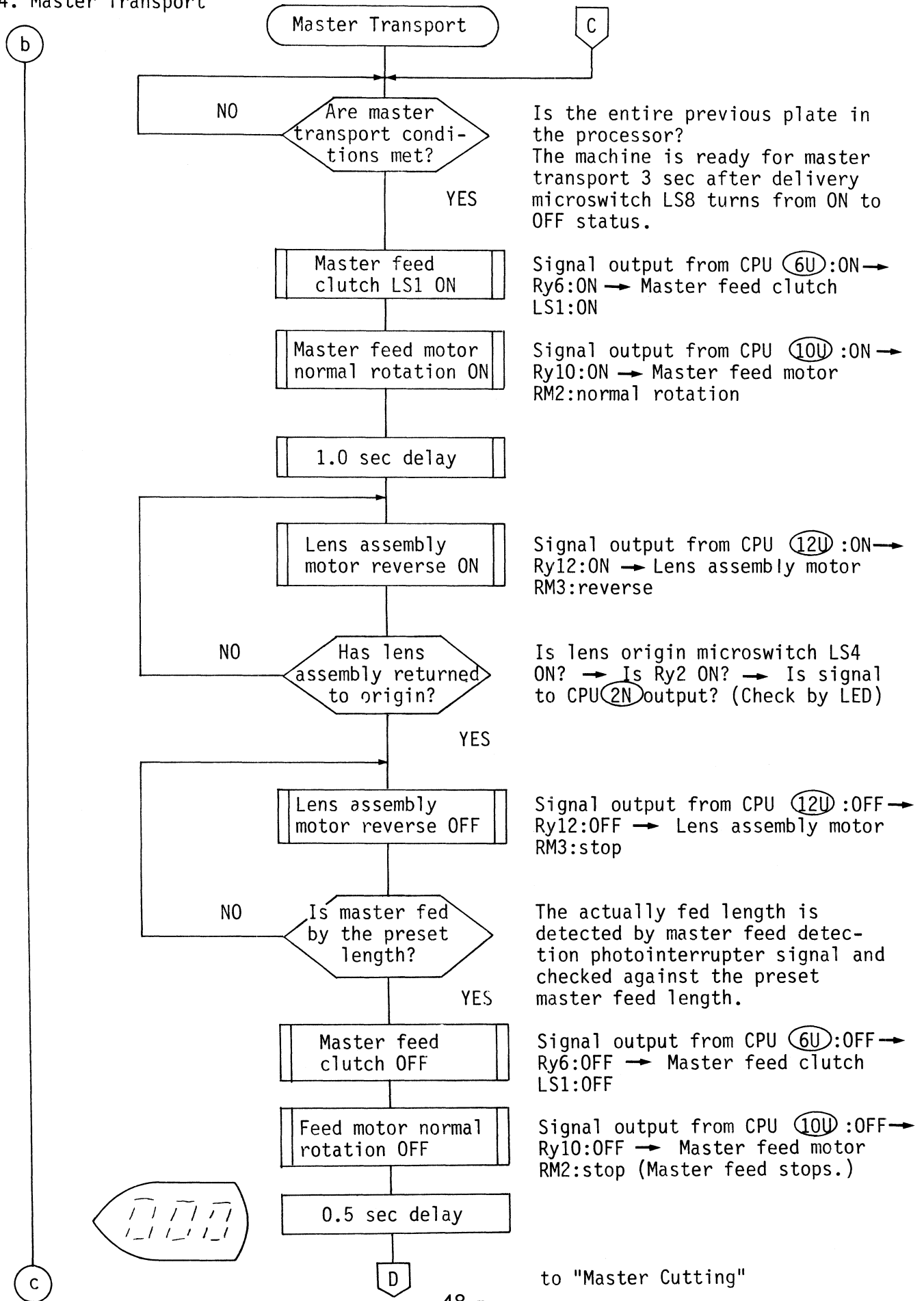
Signal output from CPU (7U):OFF → Ry7:OFF → Lens motor clutch CL2:OFF

Signal output from CPU (13U):ON → Ry13:ON → Lens assembly motor RM3: stop (Lens assembly stops.)

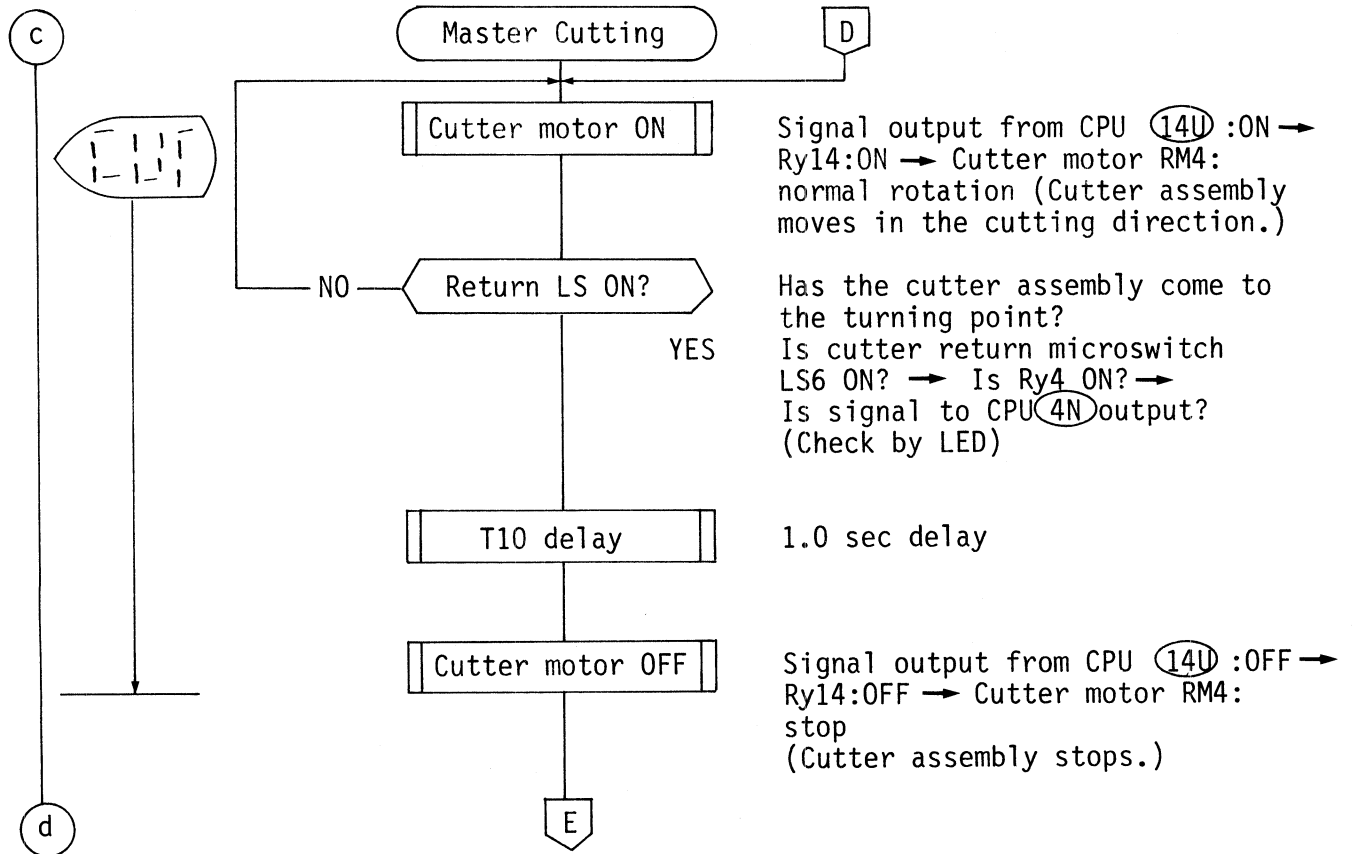
0.5 sec. delay

to "Master Transport"

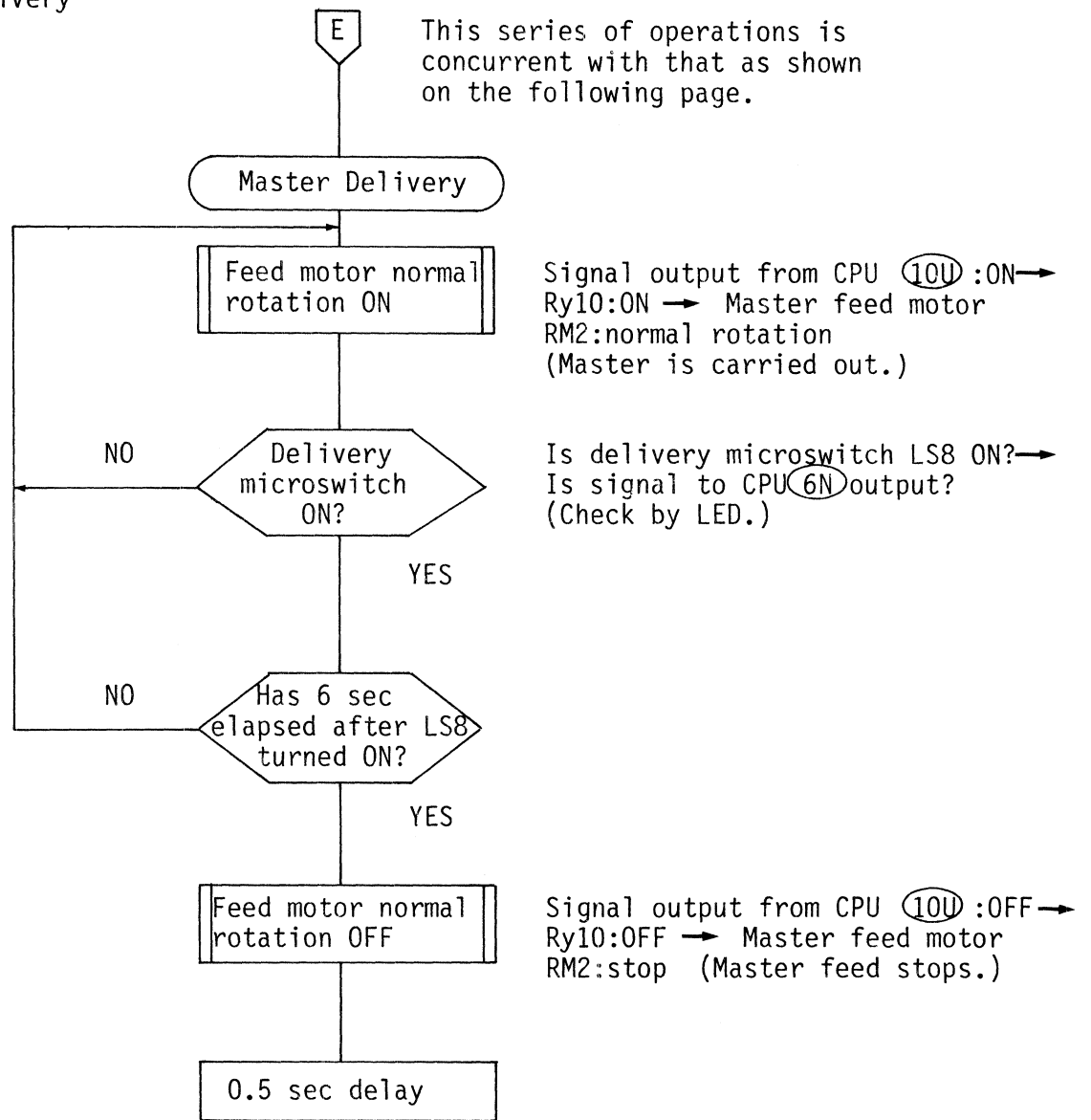
#### 4. Master Transport



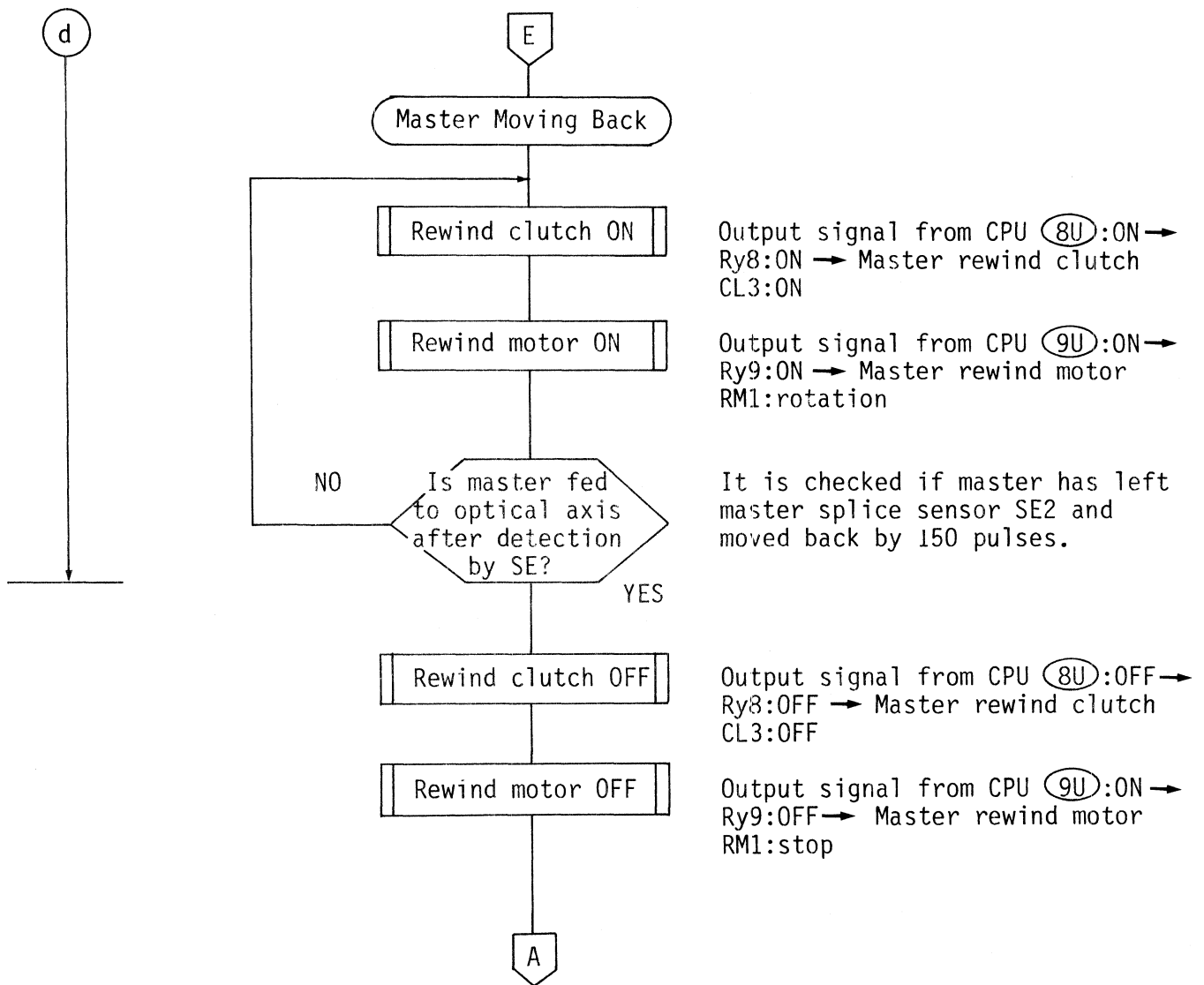
## 5. Master Cutting



## 6. Master Delivery



7. Master Moving Back



ERROR MESSAGES

M.LENGTH	DISPLAY	Buzzer	Message appears when:	Remedy
	CLd (cold)		The developer temperature is below the pre-set level.	<ol style="list-style-type: none"> <li>1. Wait until the message disappears.</li> <li>2. Press the C key; However, in this case, the machine can be started but the plate produced may have a poor quality due to low developer temperature.</li> </ol>
	End (End)	pee..p	<ol style="list-style-type: none"> <li>1. Master is exhausted.</li> <li>2. No master is loaded.</li> <li>3. Master is improperly loaded.</li> </ol>	<ol style="list-style-type: none"> <li>1.2. Load a new roll.</li> <li>3. Reload the roll properly.</li> </ol>
	nip (Nip)		The nip roller is free.	Turn the nip roller lever to LOCK.
	dor (Door)		<ol style="list-style-type: none"> <li>1. The top cover is open.</li> <li>2. The front cover is open.</li> </ol>	<ol style="list-style-type: none"> <li>1. Close the top cover.</li> <li>2. Close the front cover.</li> </ol>
	SET (Set)		<ol style="list-style-type: none"> <li>1. No master is set in the exposure section.</li> <li>2. Reset button is pressed during machine operation.</li> </ol>	Press the SET button.
	Err (Error)		The set master feed length is out of the specified range.	Reset the master feed length within the range.



			<ol style="list-style-type: none"> <li>1. The lens assembly is not at the original position.</li> <li>2. The cutter is not at the start point (origin)</li> <li>3. The master takeout guide of the carrier is closed.</li> <li>4. M.LENGTH is being set.</li> </ol>	<ol style="list-style-type: none"> <li>1. Return the lens assembly to the original position using the LENS switch.</li> <li>2. Reset the 100V POWER switch and return the cutter to the start point.</li> <li>3. Open the master take-out guide.</li> <li>4. Set the M.LENGTH. (Enter data until all digit places stop flashing.)</li> </ol>
	CHC (Check)	pee..p	Within 30 seconds after pressing the SET button, master is not detected in the exposure section.	Reset the power and reset the master.
	CHP (Check paper)		Master is jamming in the carrier after master cutting.	Remove the jammed master. Reset the power and reset the master.
	SOS	pee	The lens assembly has slipped and stopped during exposure. The lamps are off.	Reset the power and return the lens assembly to the original position with the LENS switch (independent).

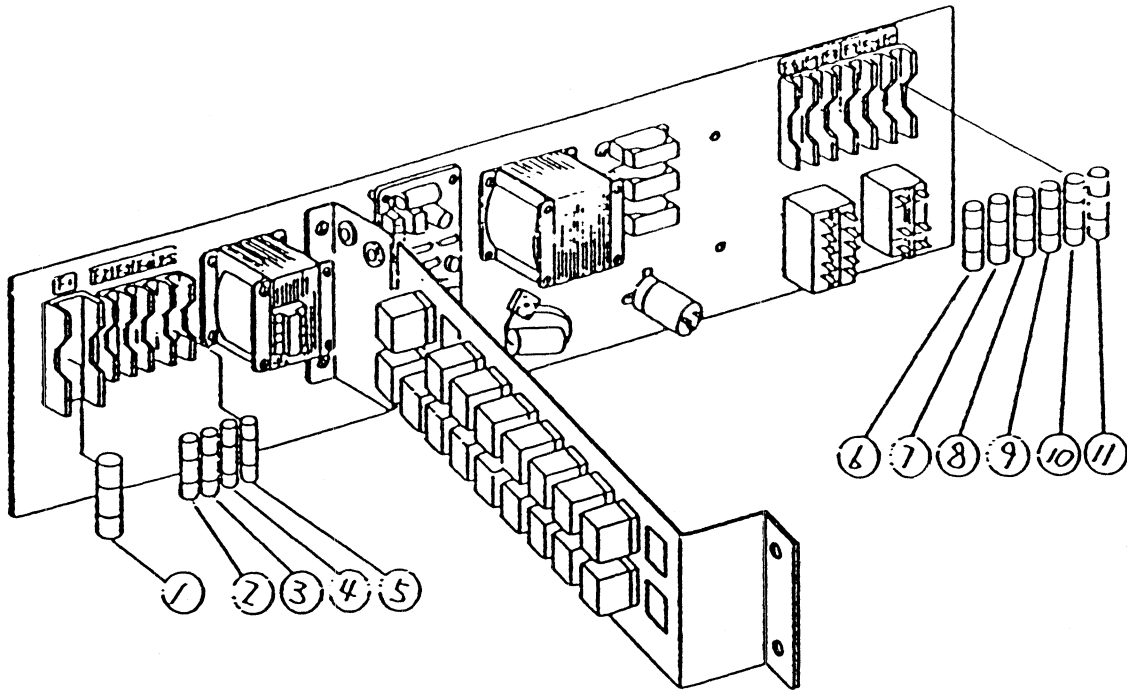
## FUSES

### CAUTIONS:

i) When changing the fuse, be sure to turn off the 100 V and 200 V switches and also the user's power source.

ii) Do not use any fuse with a capacity not as specified.

### Control Box



(1): EXP.LIGHT (F1) (Lamp fuse)

A 30A enclosed fuse to protect the light source circuit.

(2): DRYER HEATER (F2) (Dryer heater fuse)

A 10A glass tube fuse to protect the dryer heater circuit.

(3): DRYER FAN (F3) (Dryer fan fuse)

A 0.5A glass tube fuse to protect the dryer fan circuit.

(4): LIGHT CONTROL (F4) (Light control circuit fuse)

A 0.1A glass tube fuse to protect the light control circuit.

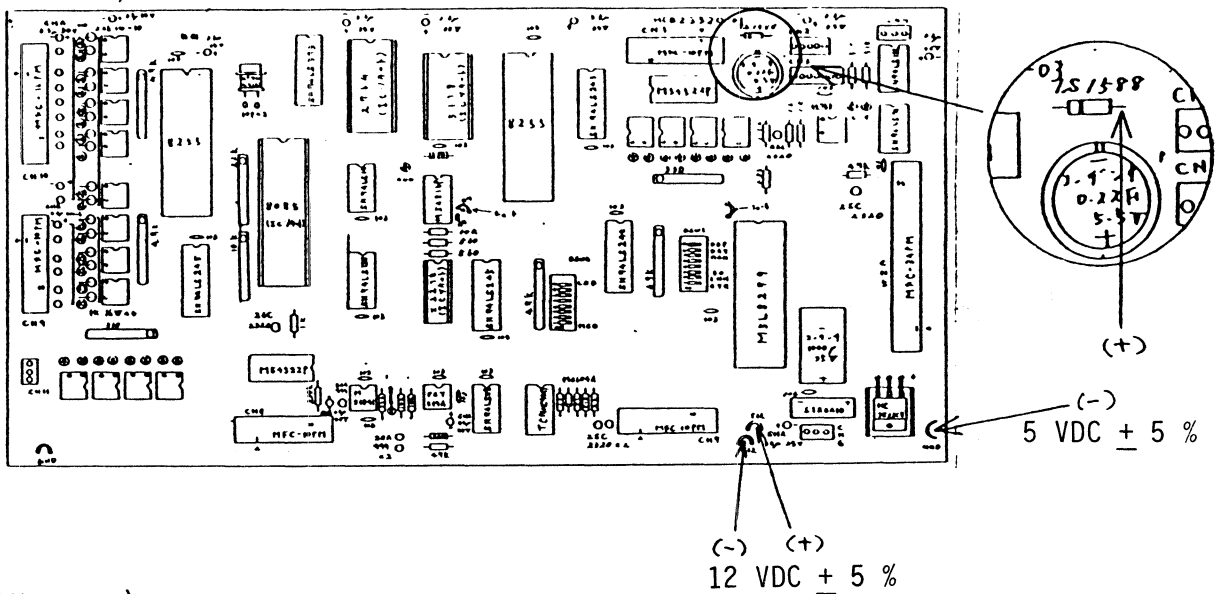
- (5): DEFOGGER HEATER (F5) (Defogger heater fuse)  
A 5A glass tube fuse to protect the main defogger circuit.
- (6): DEV. HEATER (F6) (Developer heater fuse)  
A 15A glass tube fuse to protect the developer heater circuit.
- (7): CONTROL CIRCUIT (F7) (Control circuit fuse)  
A 3A glass tube fuse to protect the control circuit.
- (8): FAN (F8) (Fan fuse)  
A fuse to protect the copy surface cooling fan, mirror defogger fan and exhaust fan.
- (9): 24 VDC CIRCUIT TRANS (F9) (Weak current circuit fuse)  
A 2A glass tube fuse to protect the 24 VDC weak current circuit transformer.
- (10): PROCESSOR MOTOR (F10) (Processor motor fuse)  
A 1A glass tube fuse to protect the processor drive motor circuit.
- (11): COPY SET (F11) (Copy set fuse)  
A 0.5A glass tube fuse to protect the COPY SET lamp circuit which is used when the copy is set.

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 through the input cord if the voltage of the power supply is adequate.
2. 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. (See p. .)
3. If the AC power supply is all right, check the DC power supply next. The DC power voltages should be checked at the points as shown in the figures below.

(CPU Board)



(+5V power)

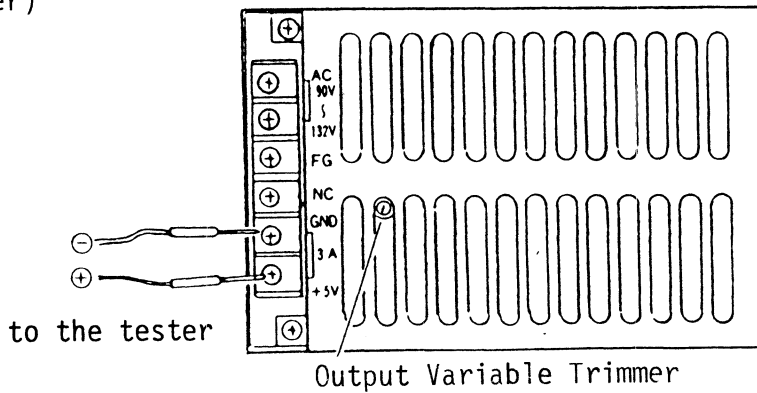


Fig.6 5VDC Switching Regulator

(24 VDC power)

Check between distributing board terminals P24 and E24.

## CPU BOARD AND PANEL BOARD TROUBLE

1. The machine incorporates microcomputer. In troubleshooting, the conventional heavy current control circuit and the microcomputer circuit should be considered separately.
2. The microcomputer incorporates a program designed for the operational routines of the machine. According to the program, the microcomputer sequentially controls the relays, motors, and light source lamps in a predetermined order. This is very important. Since the microcomputer proceeds from one step to the next only after receiving an input signal, it is necessary for such signals to arrive from limit switches, sensors and input signal switches for operation.
3. The microcomputer makes decisions according to the program. Input signals are essential. Input signals from master sensors and microswitches located in various sections can be checked by the input information check LED lamps (red) attached onto the CPU printed circuit board. It is necessary to ascertain whether such detection signals are entered. Refer to p.3.
4. The CPU operation indicating LED on the CPU board should be always lit. Refer to p.3.
5. There should be 5 VDC  $\pm 5\%$  and 12 VDC  $\pm 5\%$  at the 5 VDC and 12 VDC voltage check points. Refer to p.22.
6. 24 VDC should be present between distributing board terminals P24 and E24. Refer to p.22.

### ° Typical trouble in the CPU board

- 1) After the POWER switch is turned on, a meaningless display appears on the display.
- 2) No display appears at all.
- 3) A meaningless display appears at times.  
e.g.)

- 4) Though the display is normal, it doesn't respond to any pushbutton switch operation.
- 5) The light source lamps, cutter motor and other load devices operate irregularly.
- 6) The alarm buzzer keeps sounding unnecessarily.

## TROUBLE IN THE DISPLAY CIRCUIT

1. If trouble occurs in the display circuit, the following symptoms may appear.
  - 1) None of numeral displays will appear but the other displays appear normally.
  - 2) Only one figure in a numeral display will not appear while the other figures appear normally.
  - 3) The figures in a numeral display are partially missing though the device works normally.
  - 4) The indicator LED lamp below the key switch will not light at all when the switch is pressed, though the device works normally.
  - 5) Only one of the channel indicator LED lamps is defective.

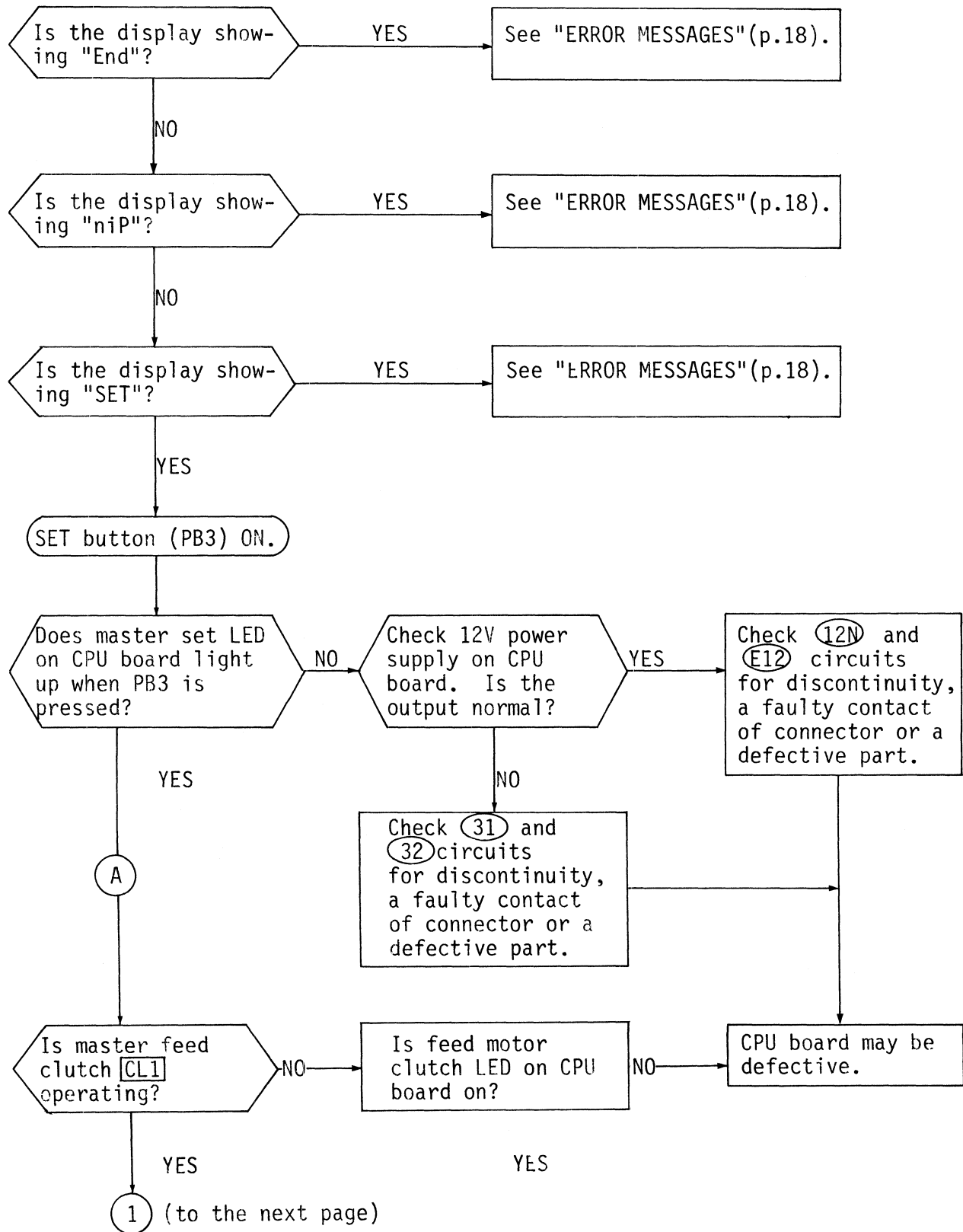
If any of the above symptoms appears, the display device (part) corresponding to the defective part is defective.

### 2. Remedy

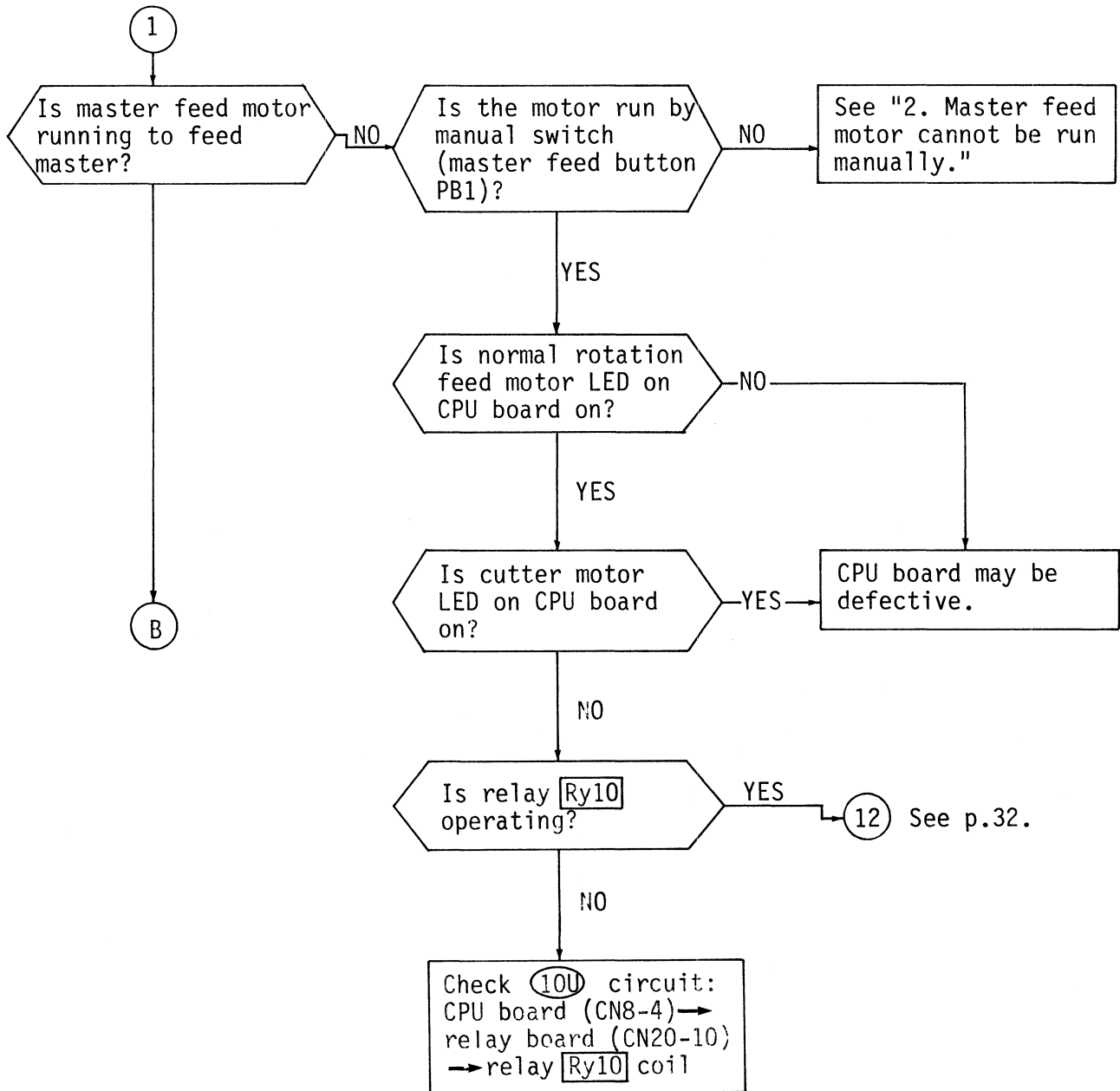
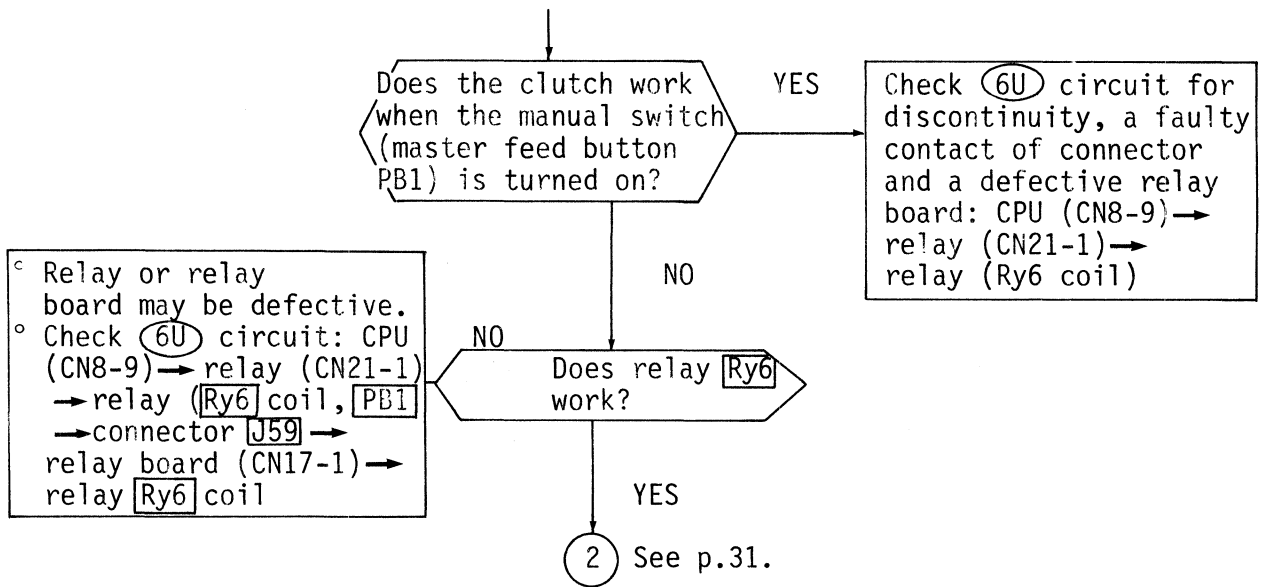
Replace the part concerned or the entire circuit board with a new one.

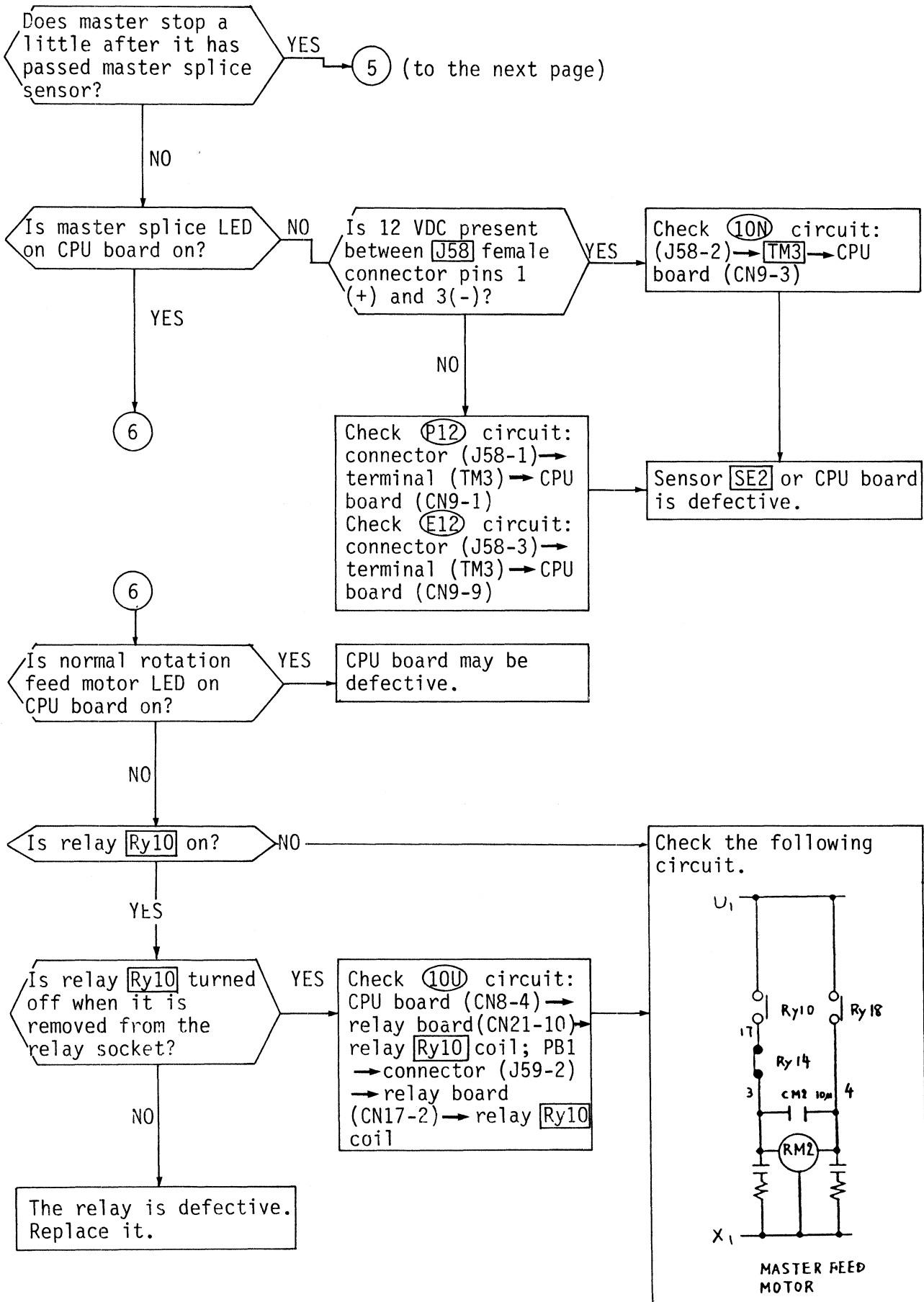
3. If the following symptoms appear, the CPU may be defective. It is most recommended that both the panel and CPU boards be changed.
  - 1) No display appears.
  - 2) The display changes irregularly.
  - 3) A meaningless display other than numerals and letters appears.

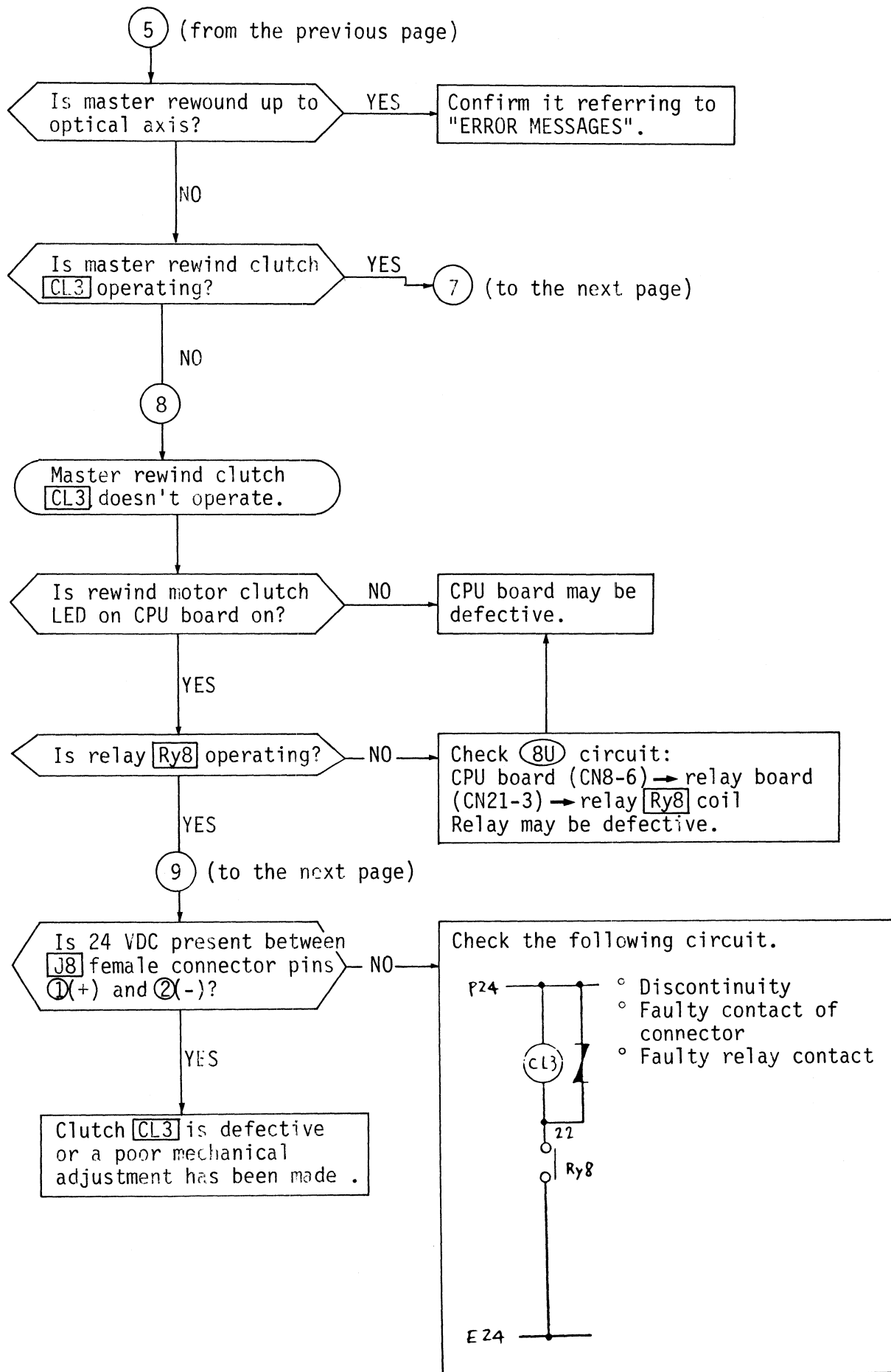
1. Master cannot be set in place.

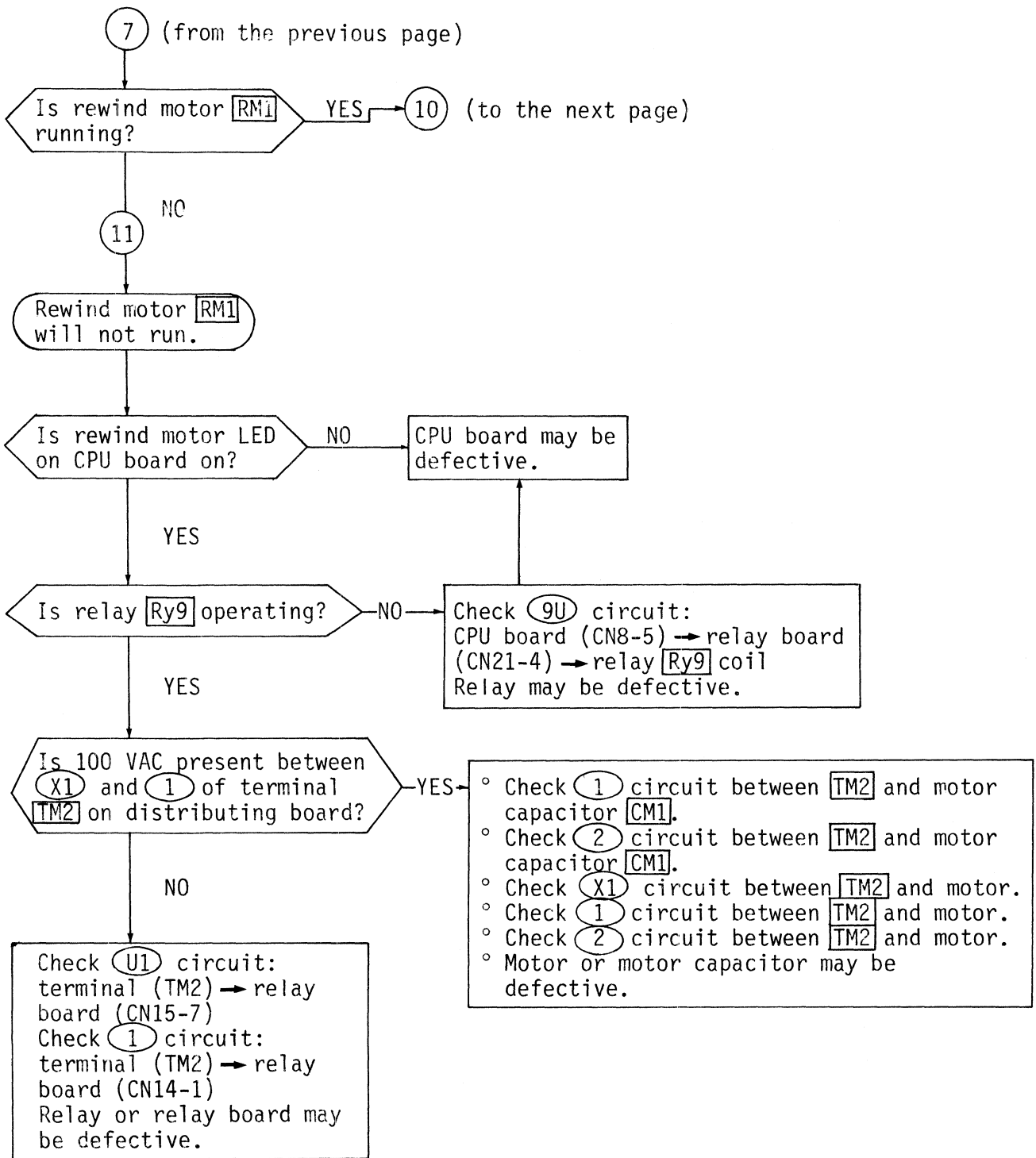




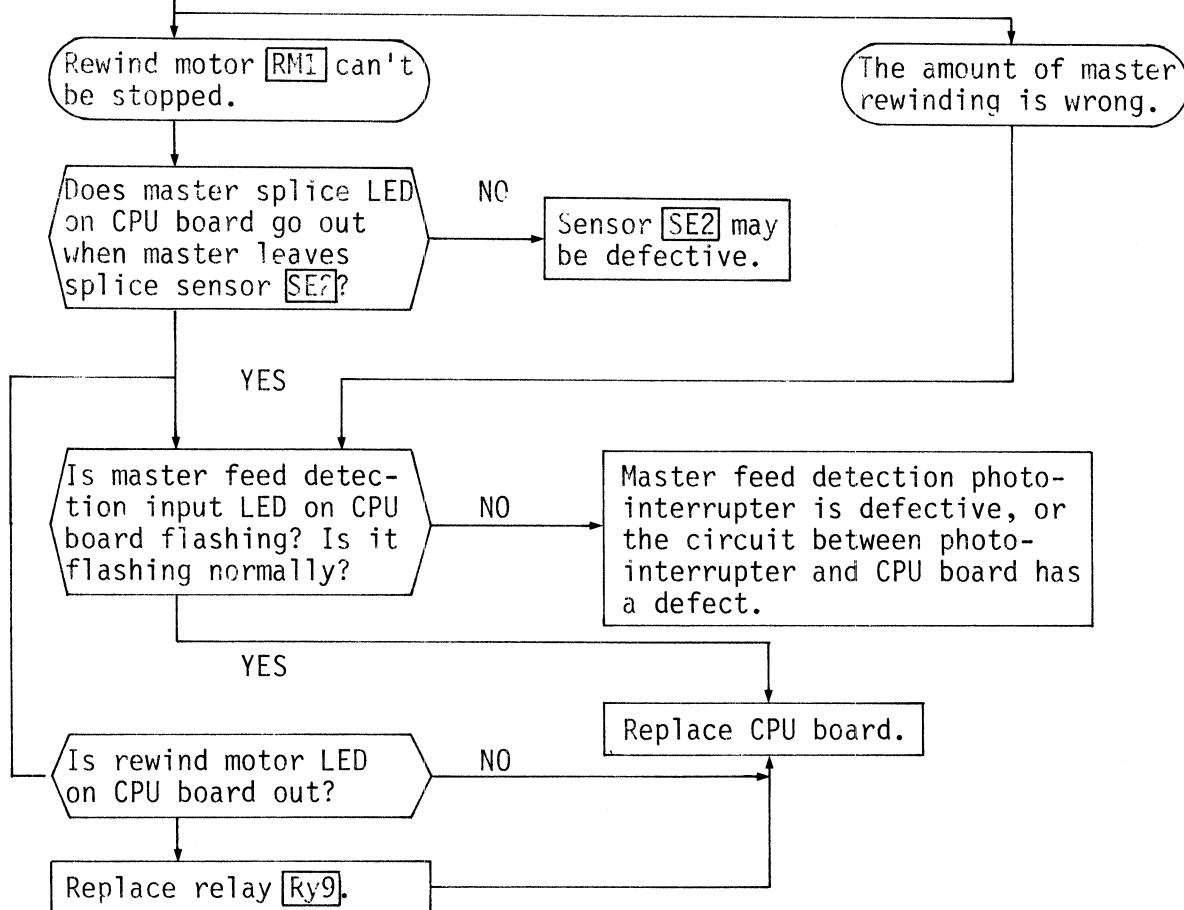




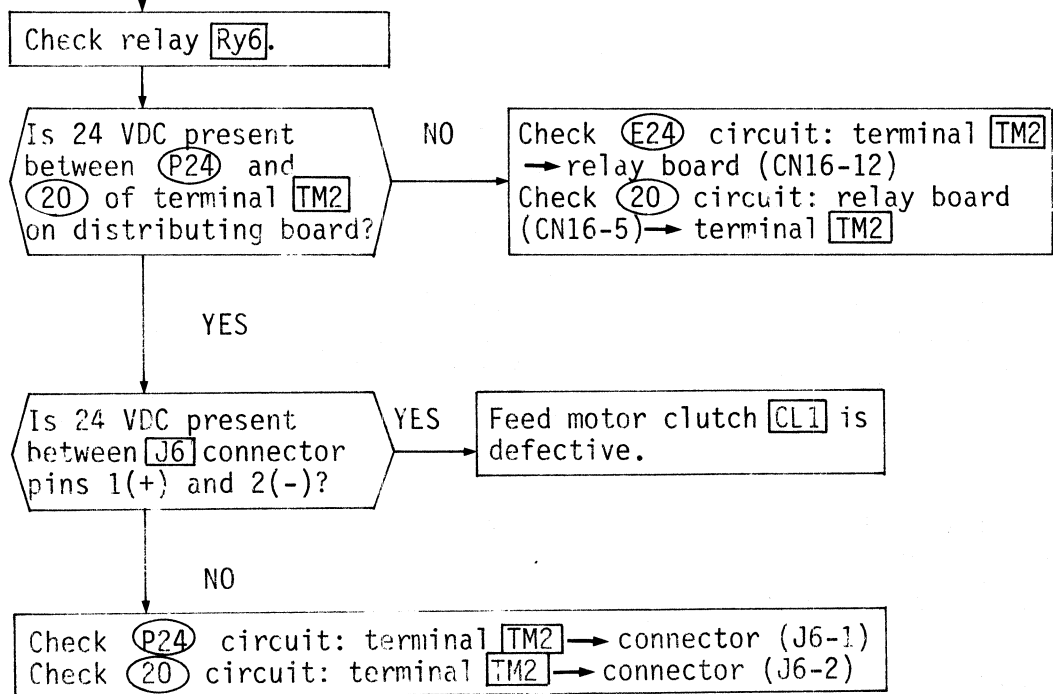




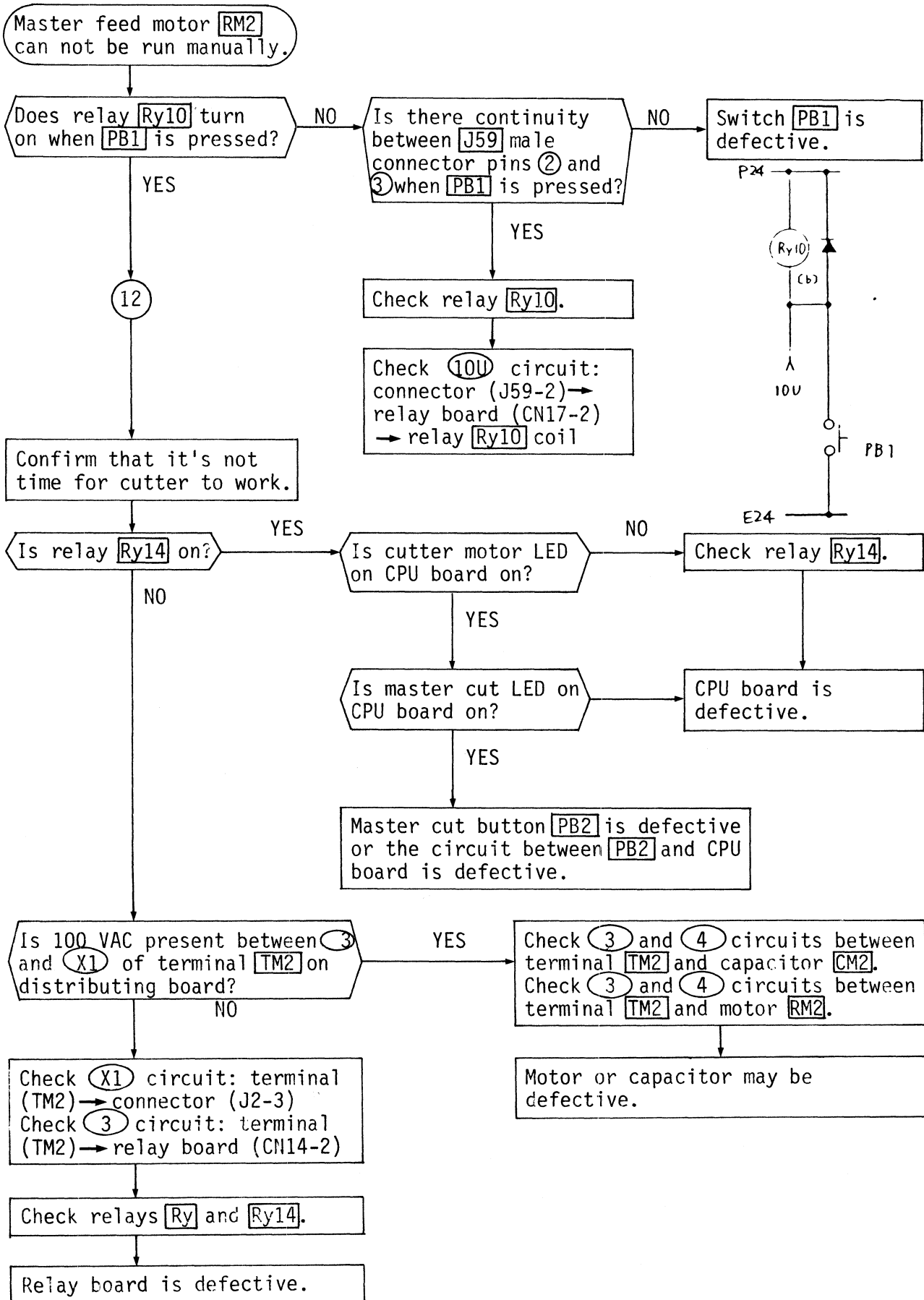
⑩ (from the previous page)



②



2. Master feed motor can not be run manually.



3. Lens assembly will not move on the press of the start button.

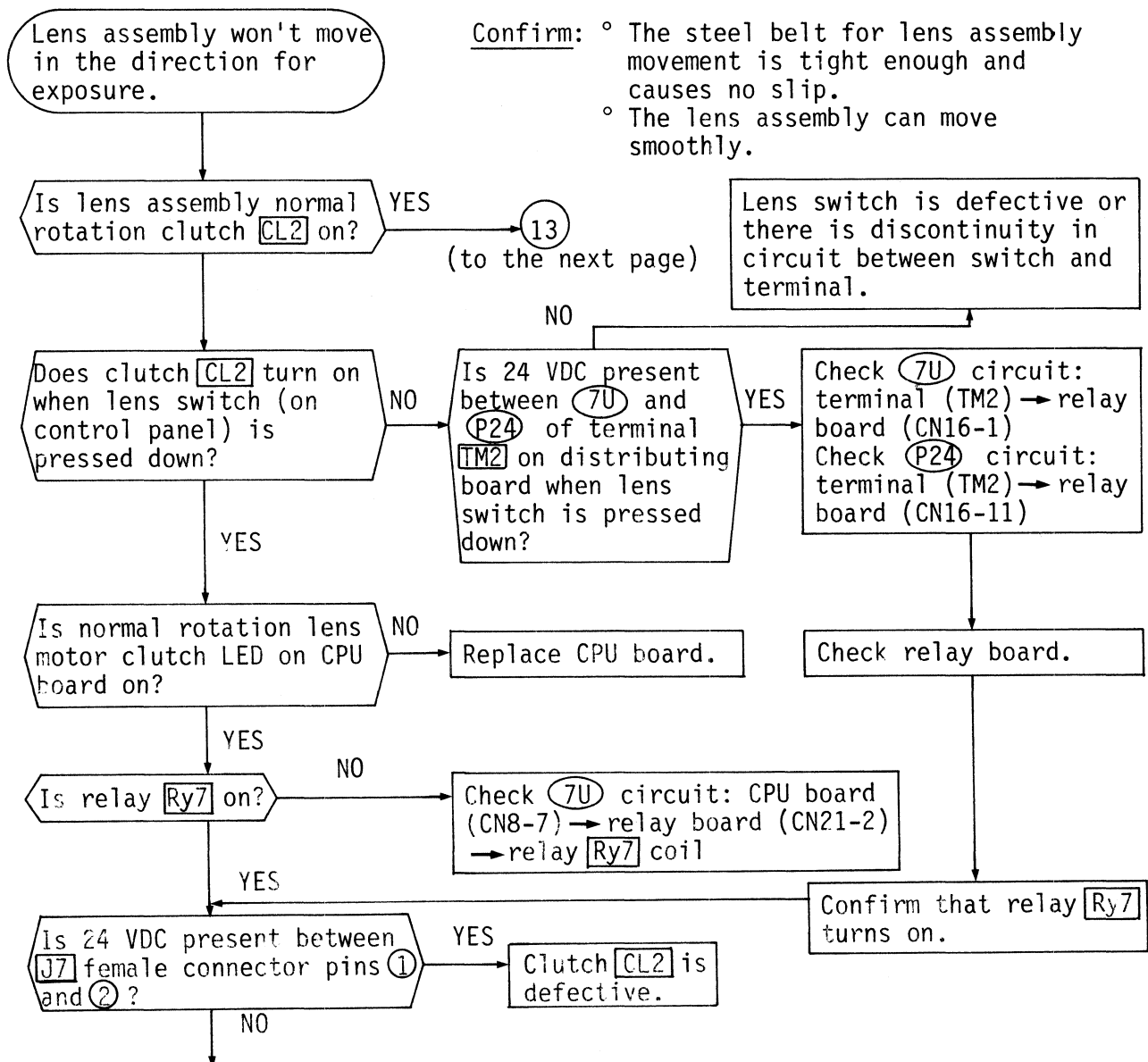
° Confirm that the Start OK lamp is on.

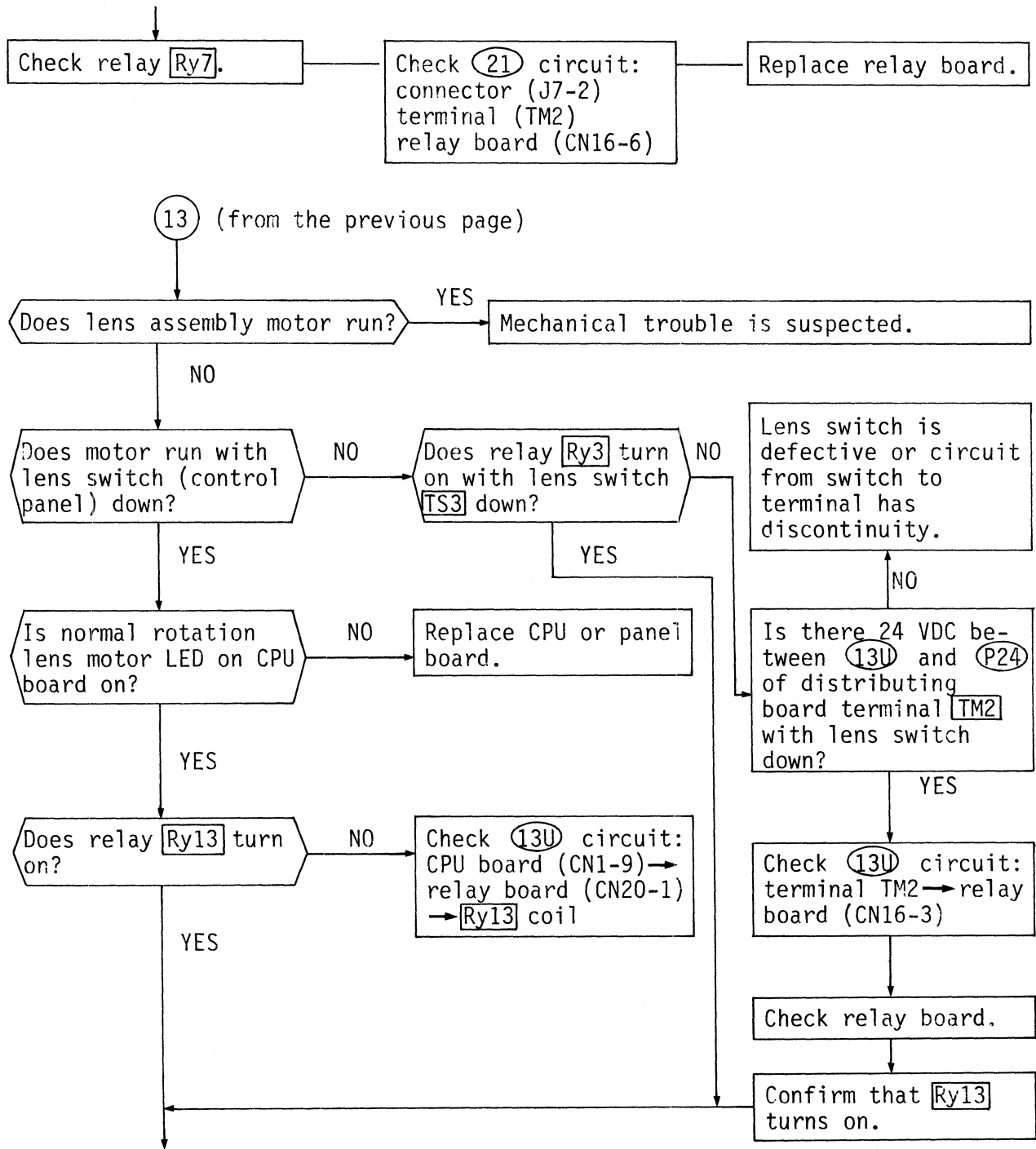
The following conditions should exist for lighting of the Start OK lamp:

- 1) Master setting has been finished,
- 2) Developer temperature has reached the set temperature,
- 3) The CPU board dip switches which should be normally OFF are OFF,
- 4) The lens assembly is in the original position, (LS4-ON)
- 5) The cutter is in the original position, (LS5-ON)
- 6) The side board is in its outer position. (LS9-OFF)
- 7) The master feed length setting is within the specified range.

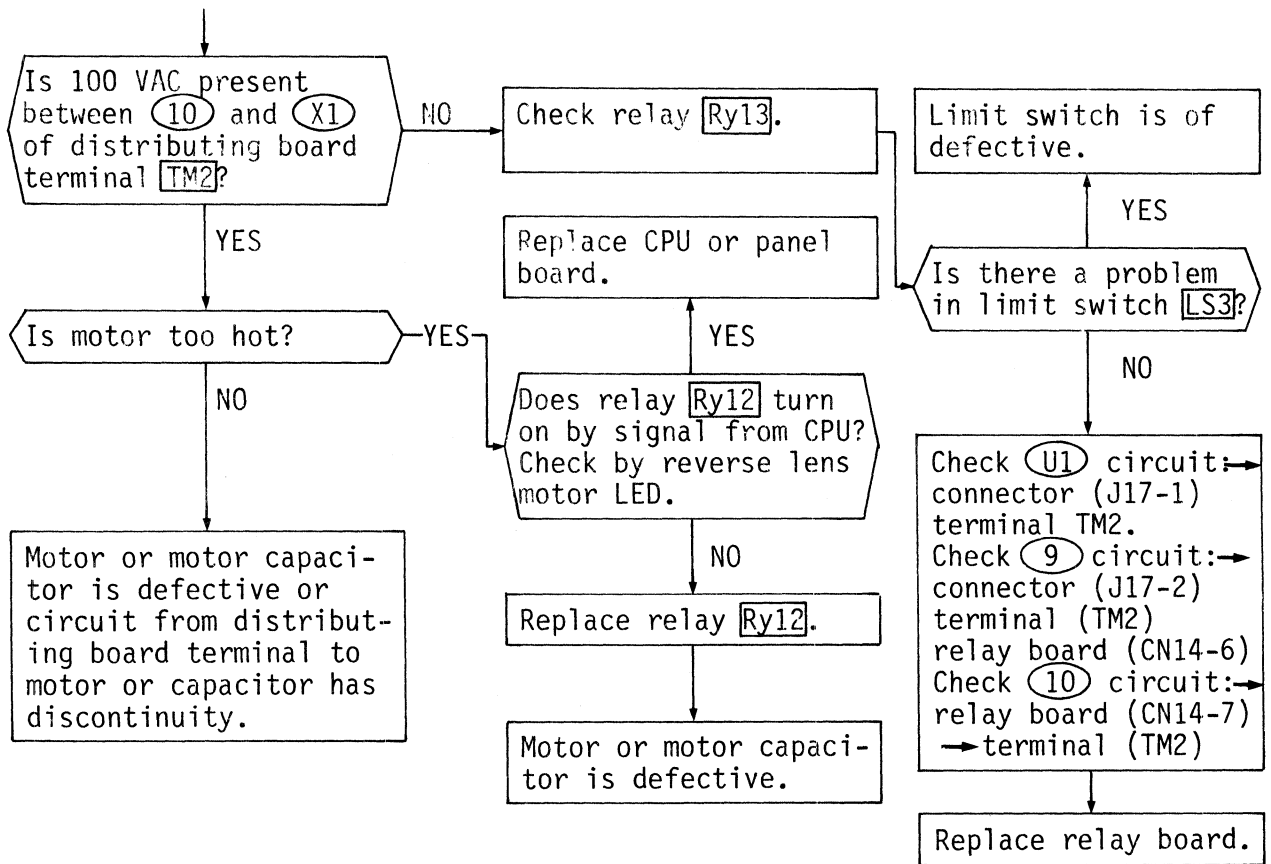
Normal exposure: 370 mm - 820 mm

Double exposure: 185 mm - 410 mm









4. Exposure will not be made

Confirm that:

1. 200 VAC POWER switch is on,

2. The halogen lamps are not burned out, and the fuses are not blown,

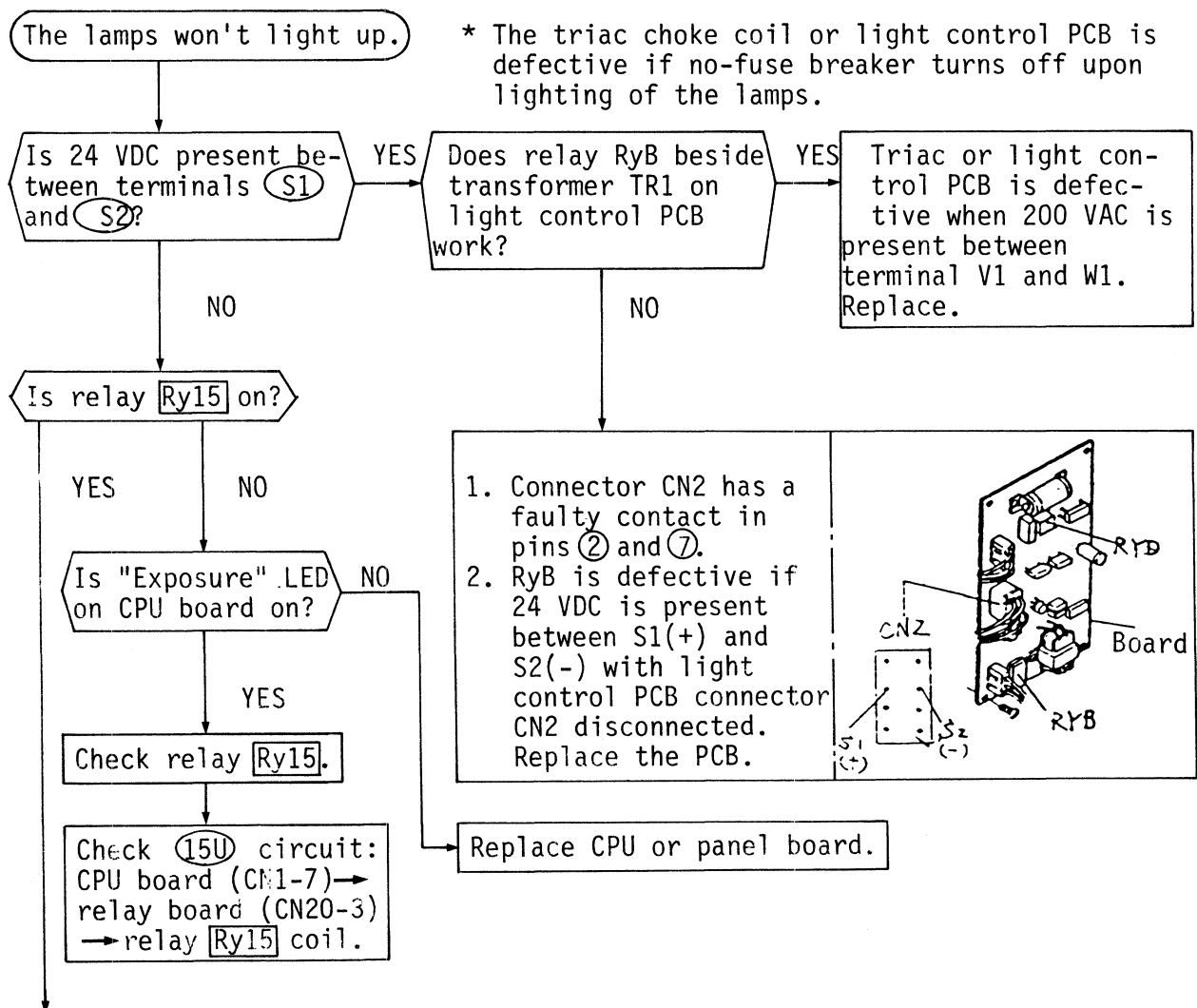
° Measure the contact at each end of the lamp with a tester set at resistance range; confirm that it does not read infinity ( $\infty$ ).

Whether the lamp filament is burned out or not is found by looking at the lamp carefully.

CAUTION: Handle the lamp with a dry cloth or gloves. Don't hold it with bare hands. If it is fingermarked or stained with oily substance, uneven distribution of illuminance or damage to that stained part may occur.

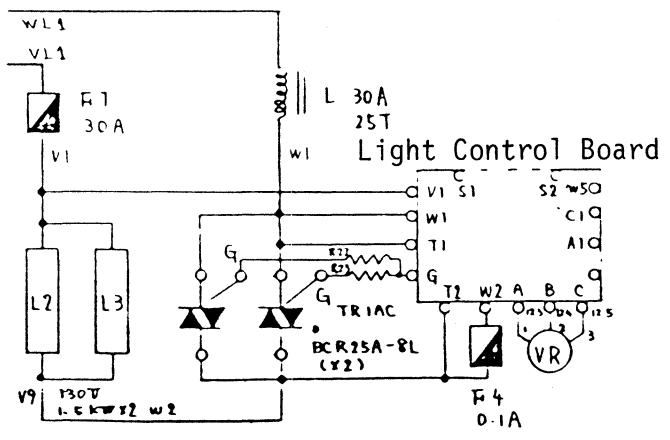
3. The EXPOSURE switch is not in the ZERO position.

4. The lens assembly moves in the direction for exposure.



↓  
 Check relay Ry15. → Replace relay board.

Check (30) circuit:  
 relay board (CN16-9)  
 → terminal (TM2) →  
 connector (J41-6) →  
 EXPOSURE switch (TS4)  
 Check (S1) circuit:  
 terminal (TM2) →  
 connector (J41-5) →  
 EXPOSURE switch (TS4)



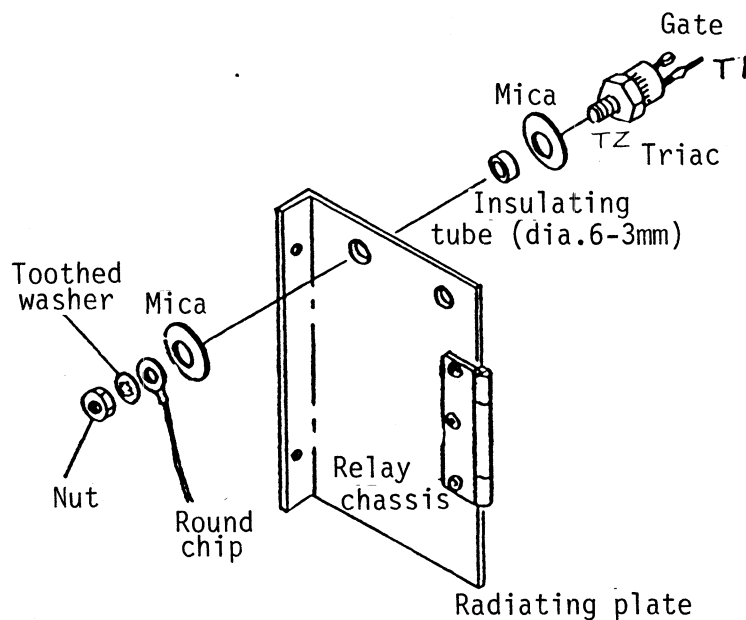
EXP LIGHT

## Light Control PCB

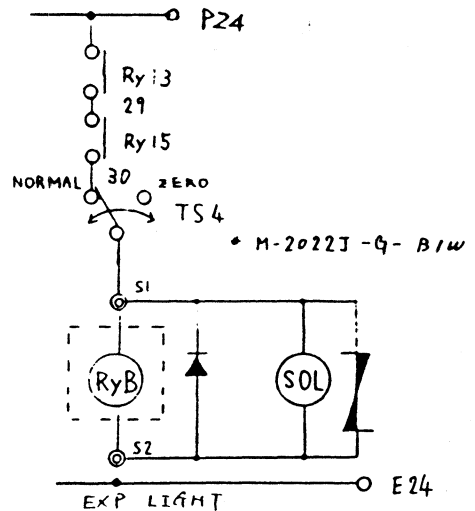
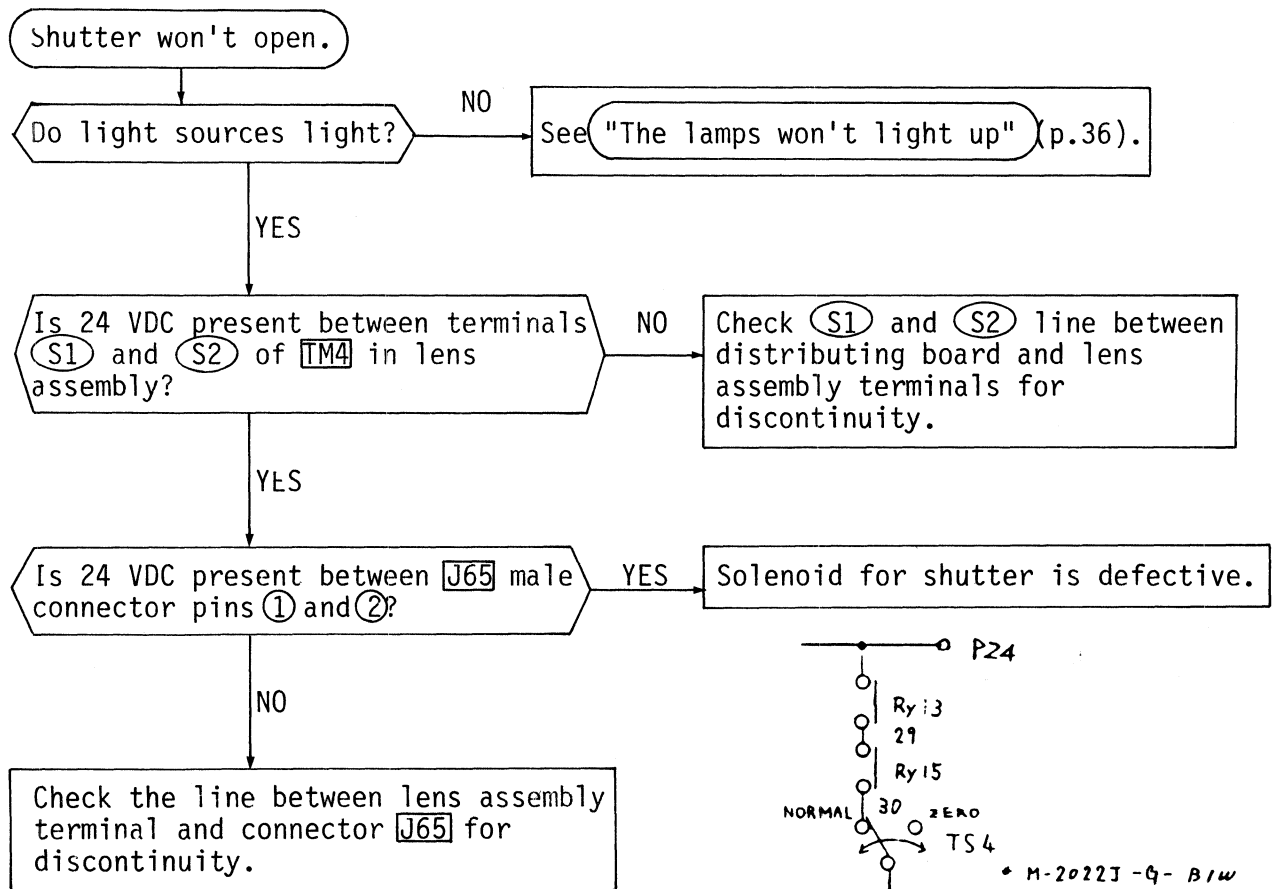
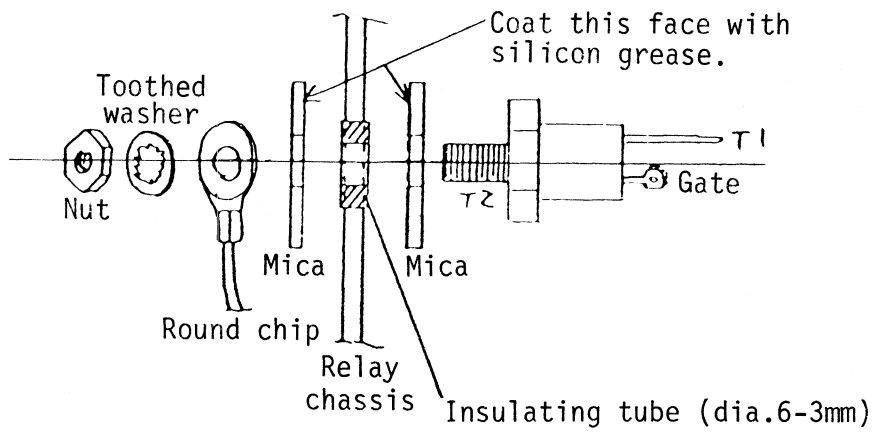
If the light control PCB fails, the input voltage is directly applied to the halogen lamp, so the lamp burns out in a short time (approx. 10 sec). This occurs because the halogen lamp rating is 130 V but the input voltage is 200 V.

To prevent the lamp from burning out, the machine is so designed that the power supply trip circuit is actuated (i.e. the POWER switch instantaneously turns off) when the triac or light control PCB fails.

1. Triac trouble is caused by a defective triac or improper installation of a triac. In either case, the triac must be replaced. Considerations necessary for the replacement are given next.



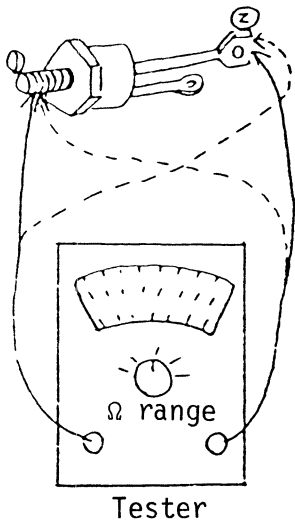
- (1) Insulation between the triac and relay chassis is necessary, so elastic insulating tubes (dia. 6 - 3 mm) should be used.
- (2) For better radiation, the mica on each side of the relay chassis should be coated with silicon grease.
- (3) Fit an elastic insulating tube to the triac gate and T1 and make it contract by heating.
- (4) Fit an elastic insulating tube to T2 side round chip and make it contract by heating.



## Triac Trouble

To prevent the halogen lamp from burning out due to triac trouble, the 200V power (no-fuse breaker) is designed to turn off within 1 sec after triac trouble occurs. Therefore, if the 200V no-fuse breaker turns off the moment the light sources come on, check the triac as follows.

How to check the triac:



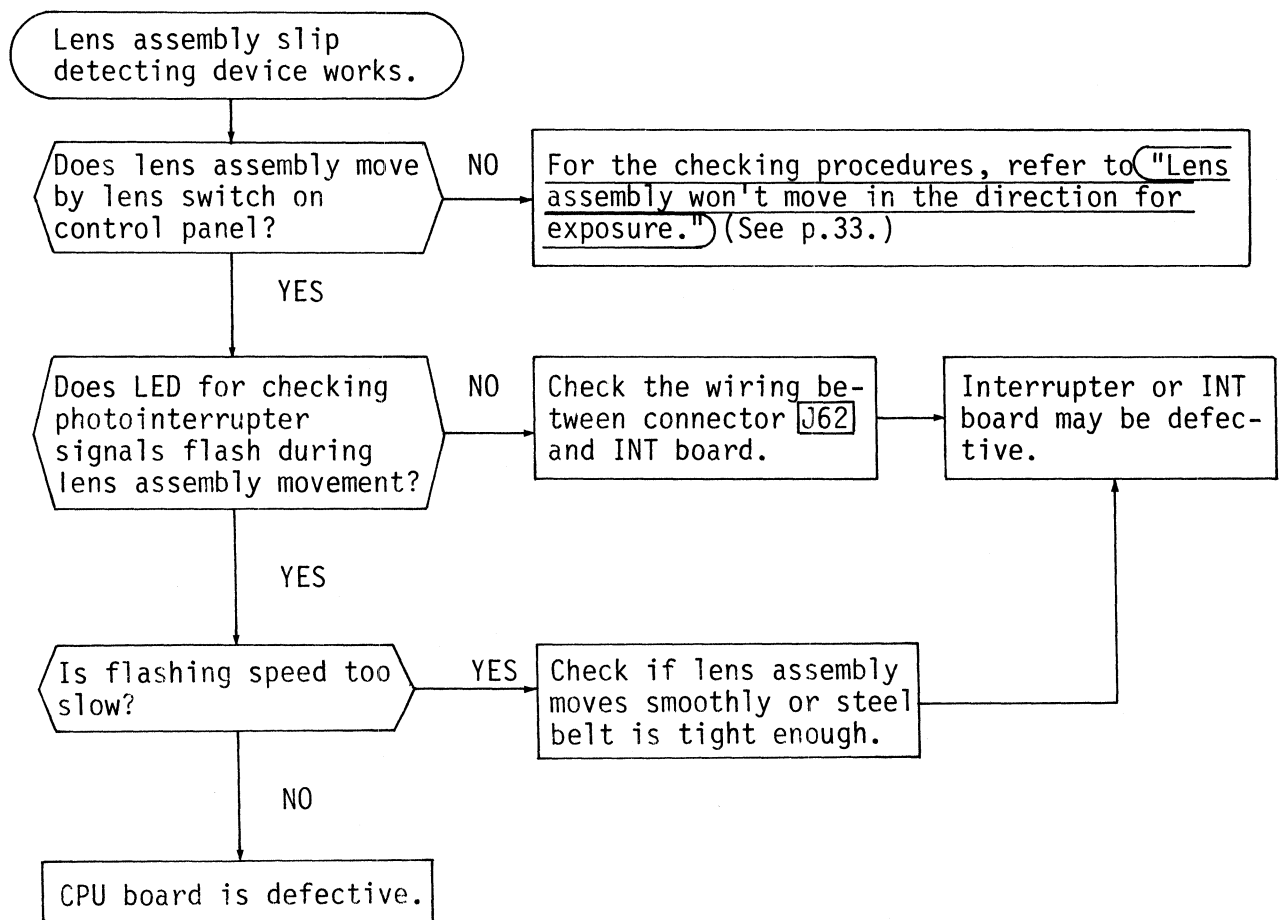
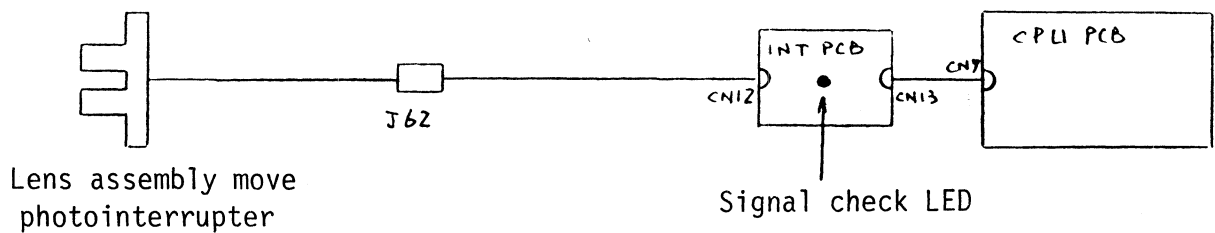
1. Set the tester to resistance range.
2. For measurement, let the tester leads touch (1) and (2) of the triac, and then change the lead positions each other.
3. If the tester doesn't read zero or infinity ( $\infty$ ) ohm, it is normal.

- During exposure, lens assembly stops moving, "SOS" appears on the display, buzzer sounds and halogen lamps go out.

When the lens assembly has stopped moving during slit exposure for some reason, the lens assembly slip detecting device works to turn off the light sources and notify the operator of the trouble with a buzzer sound to protect the copy board glass from being broken.

**Mechanism:**

During exposure, the lens assembly slip detecting device works when the (counting) interval between signals of the lens assembly move photointerrupter is found to be very long (the lens assembly moves very slowly) or counting (movement of the lens assembly) has stopped.



6. Master will not be carried after exposure.

Confirm that all the previously exposed plates are already in the processor.

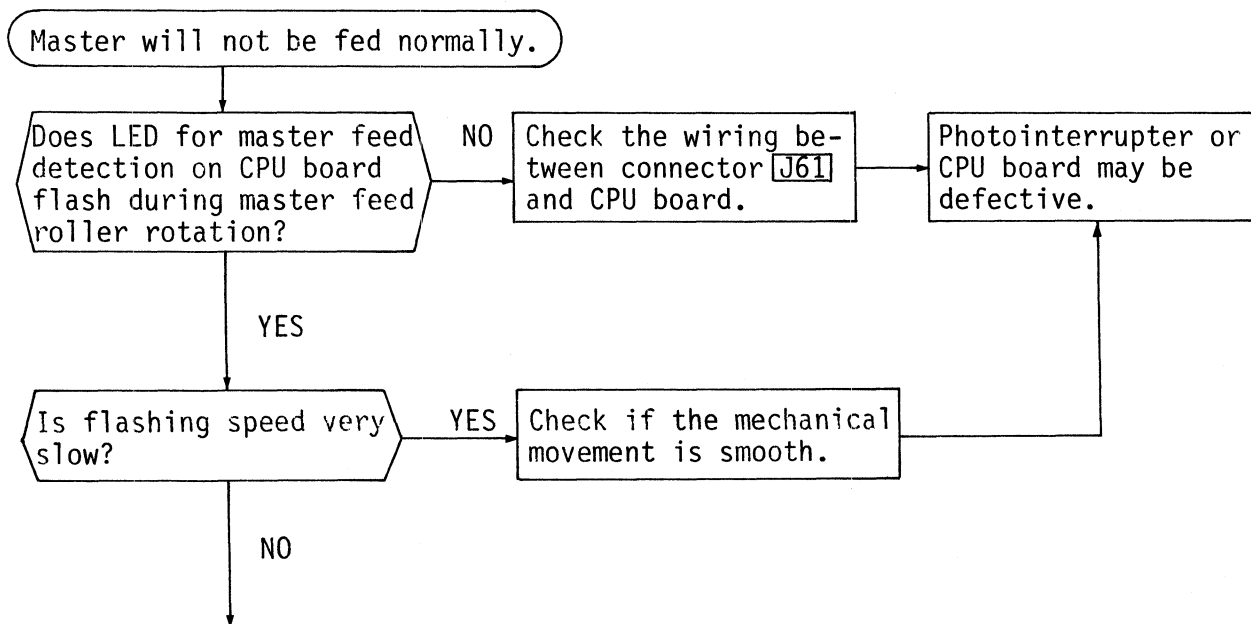
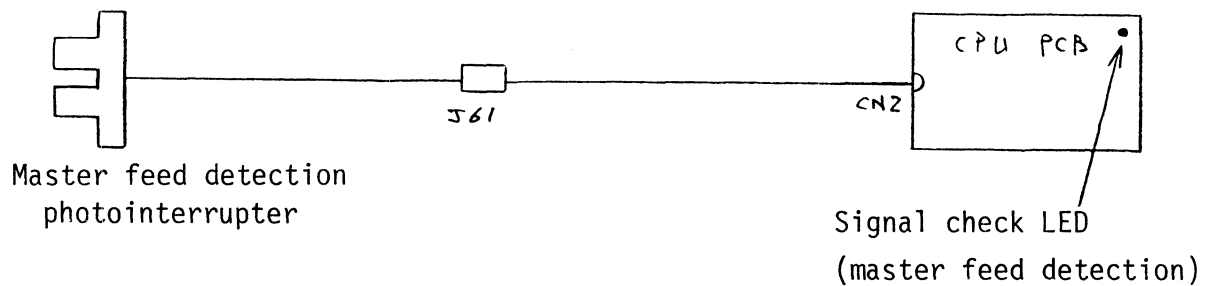
Master will not be carried after exposure.

For the checking procedures, refer to the flow chart

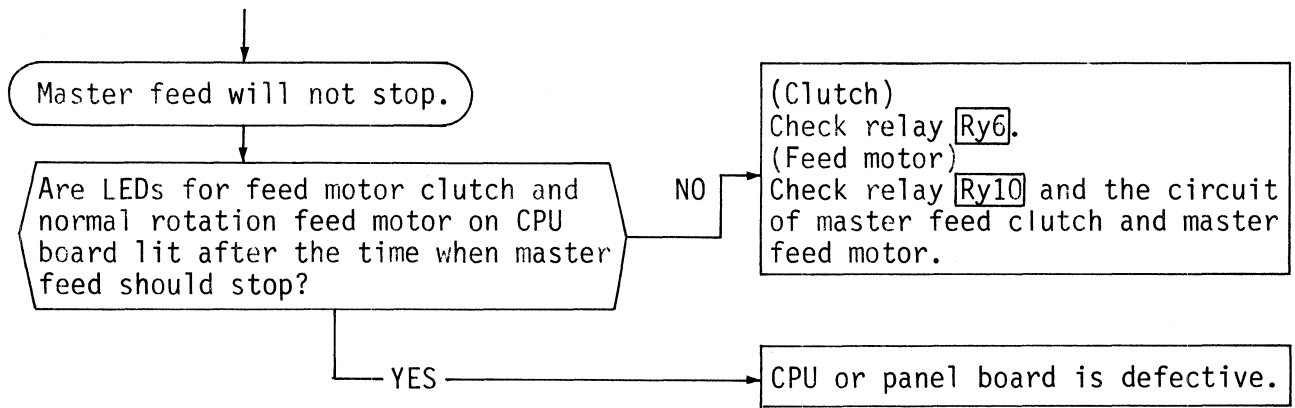
7. Master feed will not stop or the master length is not as preset.

Master feed detection mechanism

A disk with slits on its circumference is attached to the master feed roller. As the roller turns, signals are fed to the CPU board by means of the master feed detection photointerrupter which counts the number of slits of the disk. The CPU board counts these signals to detect the amount of master fed.

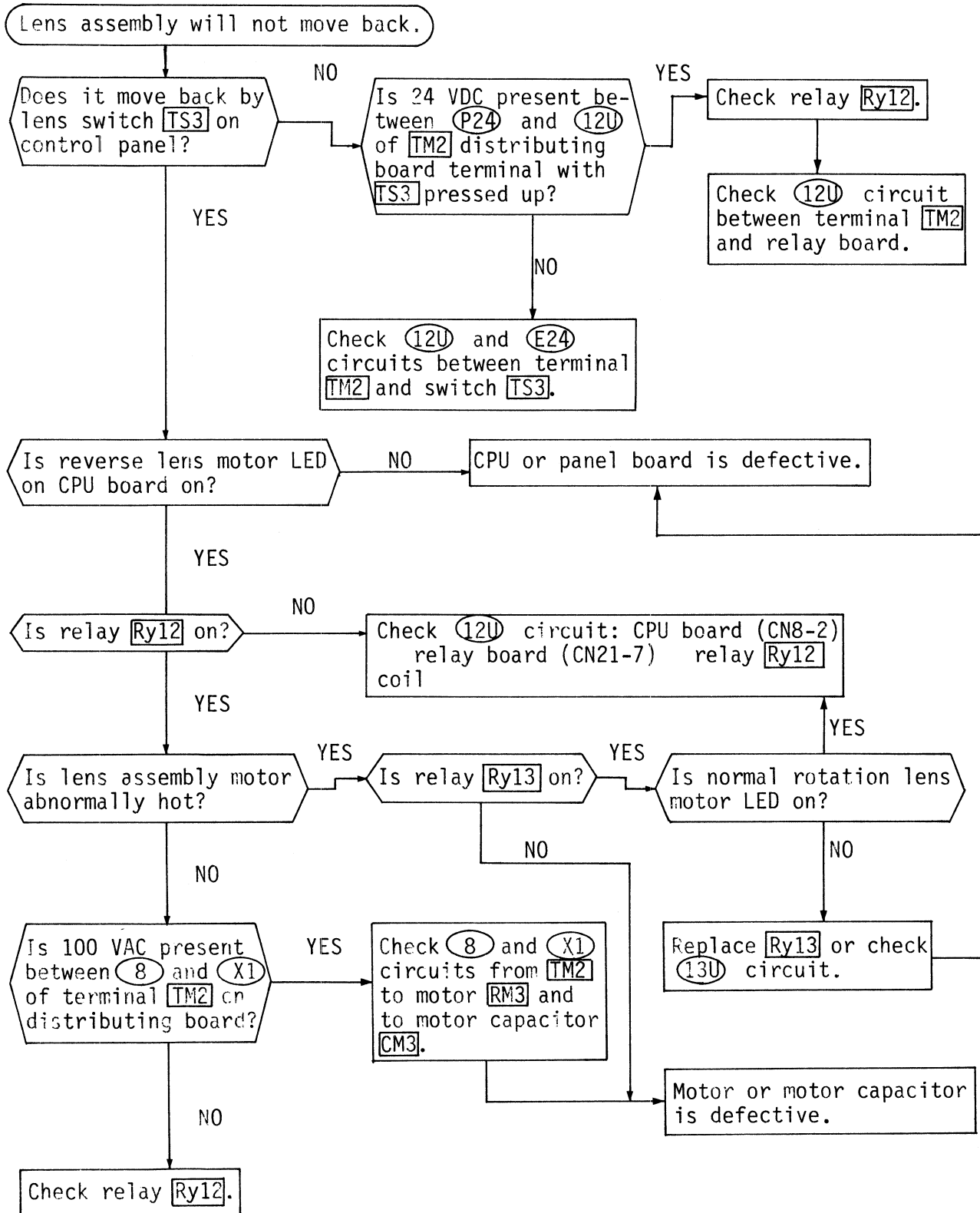


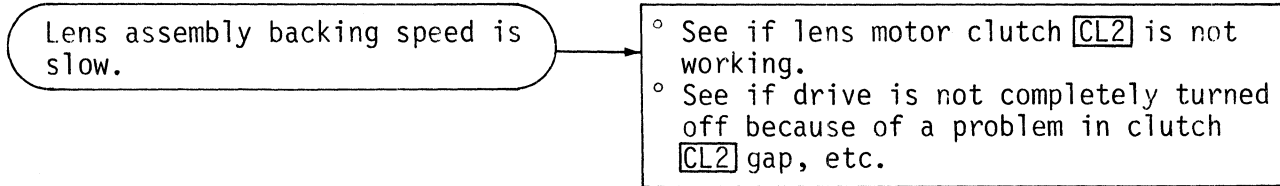
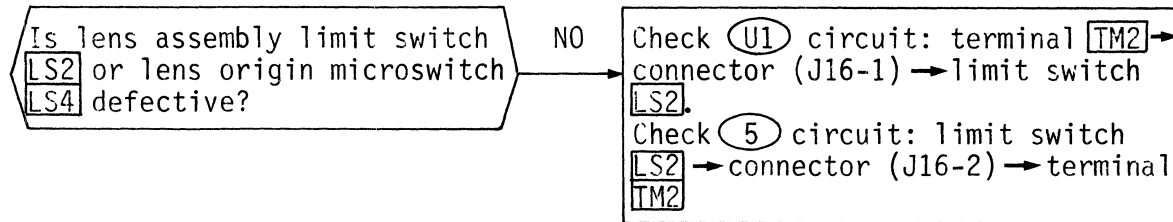




8. Lens assembly will not move back.

Confirm that master is carried after exposure.

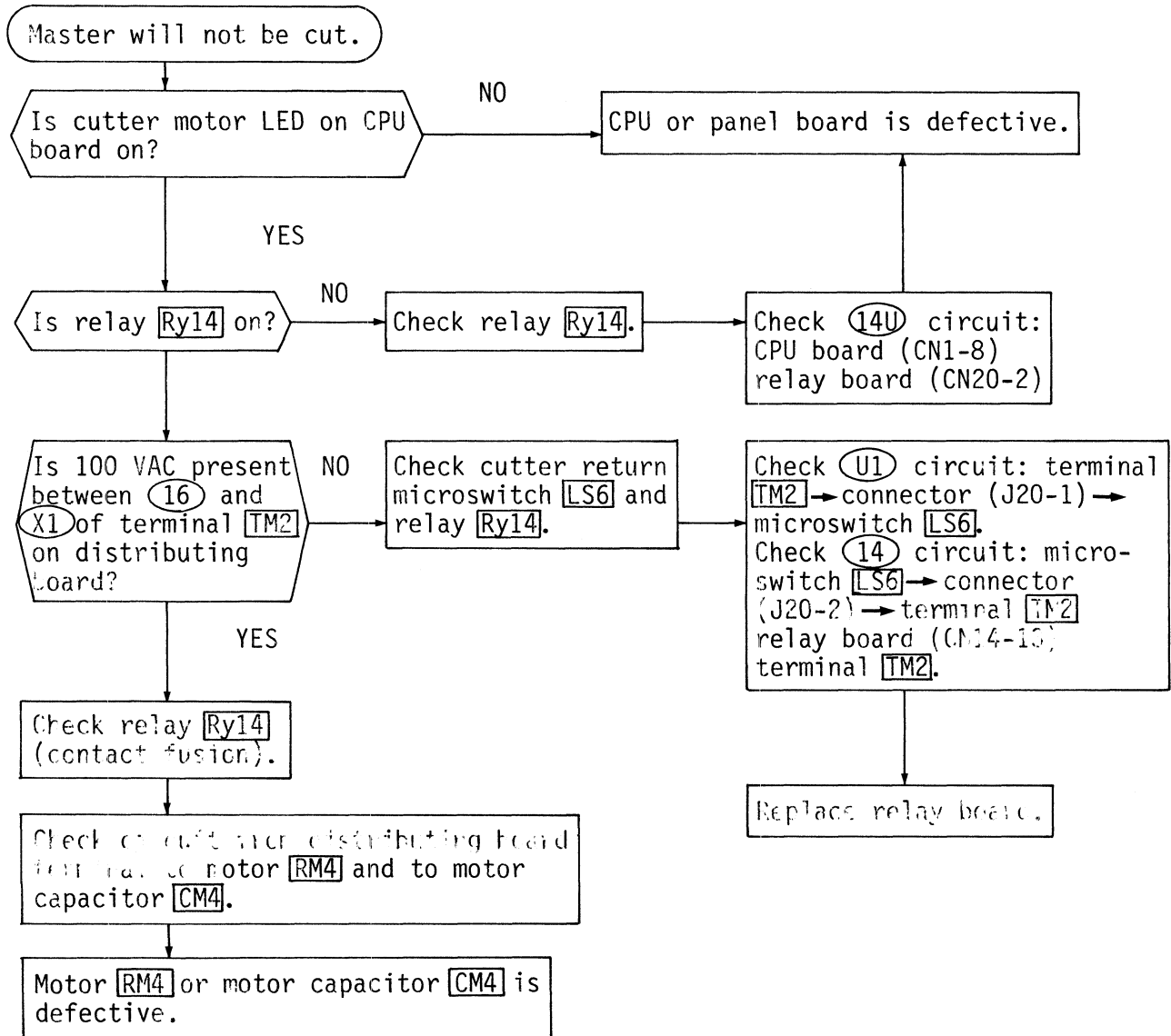




9. Master will not be cut.

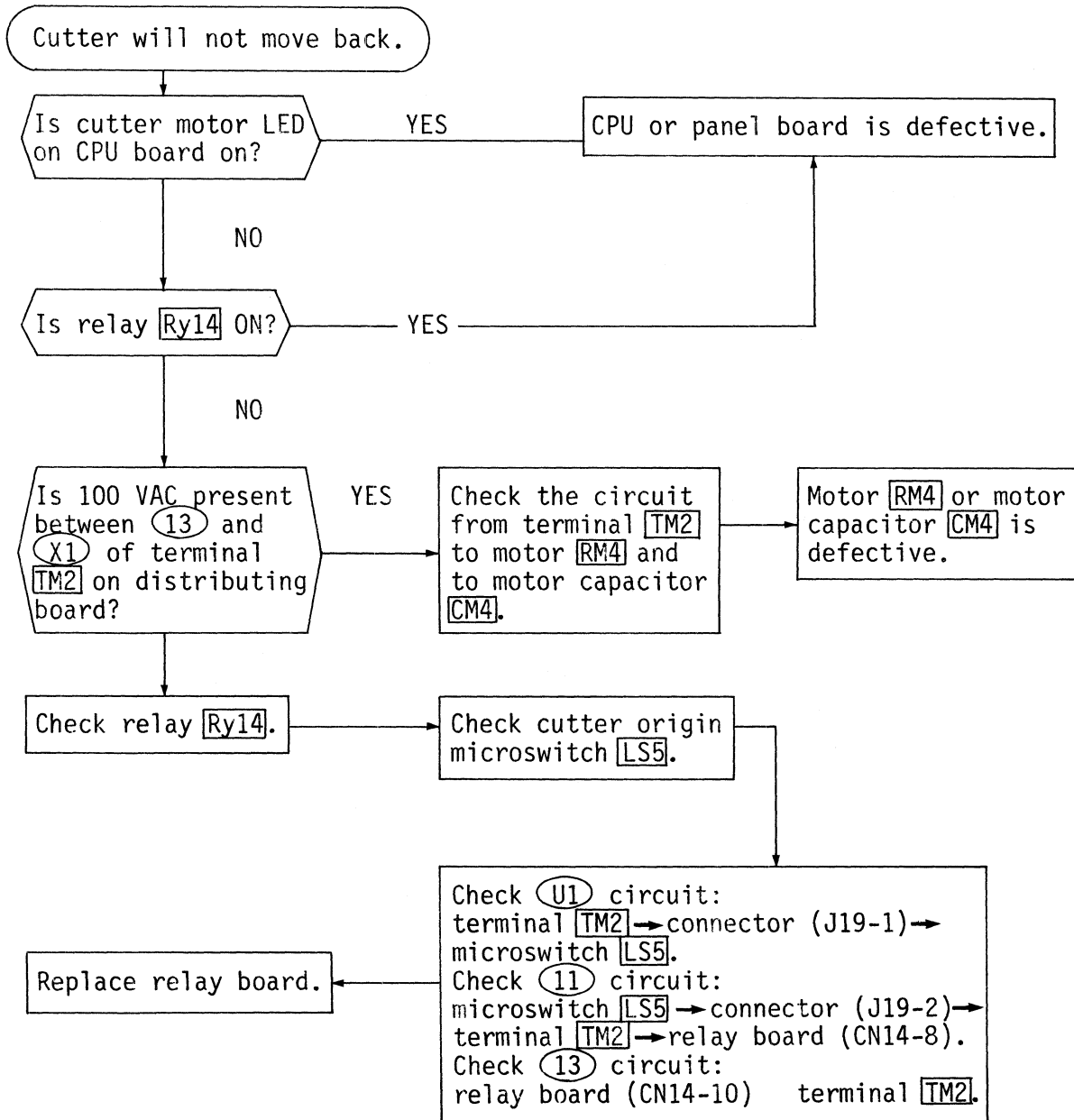
Confirm that:

1. A set length of master has been already fed.
2. The cutter blade is not dull.

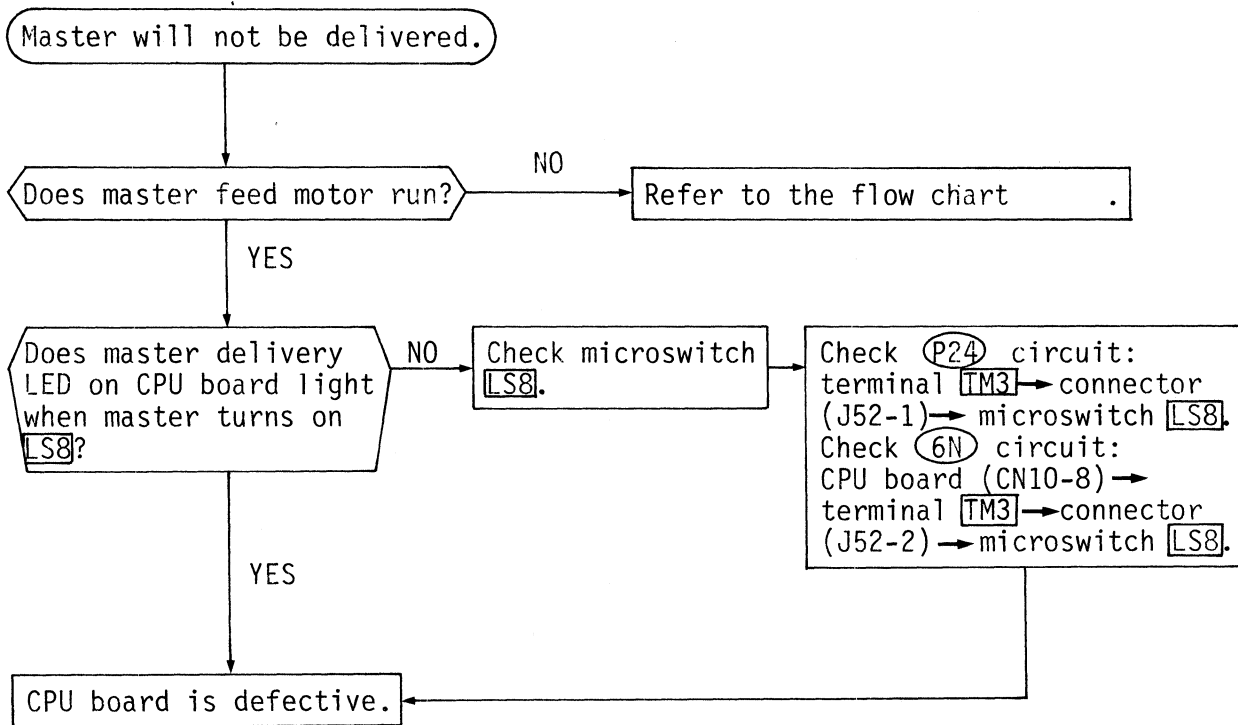


10. Cutter will not move back.

Confirm that the cutter moves up to the return microswitch on each cutting motion.



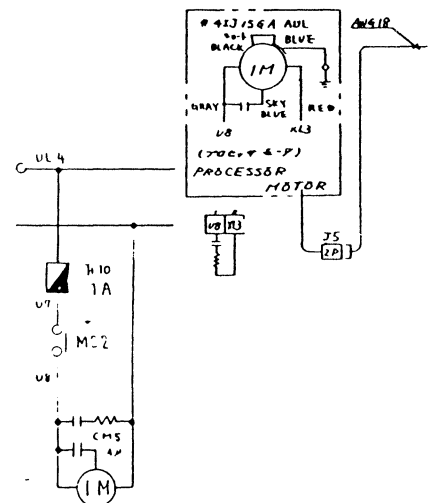
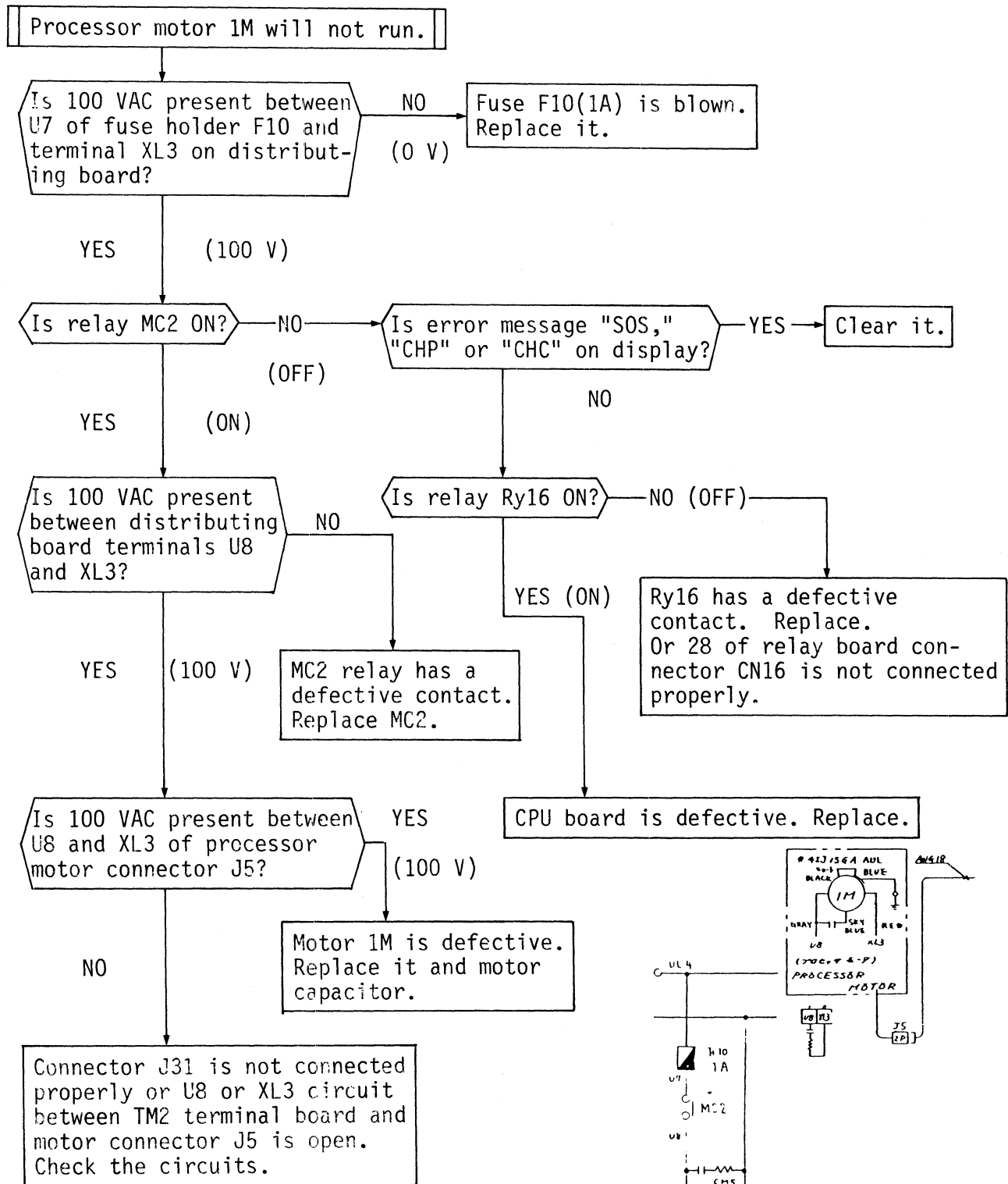
11. Master will not be delivered.



Processor motor will not run

Confirm that:

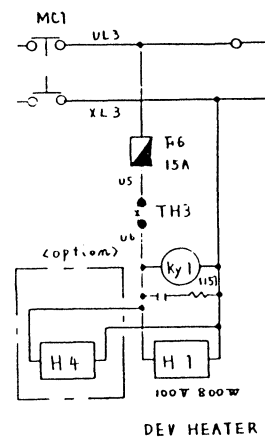
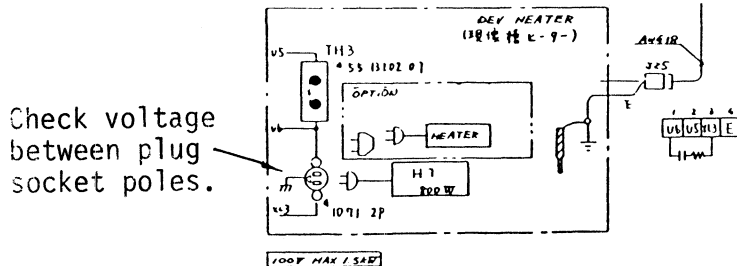
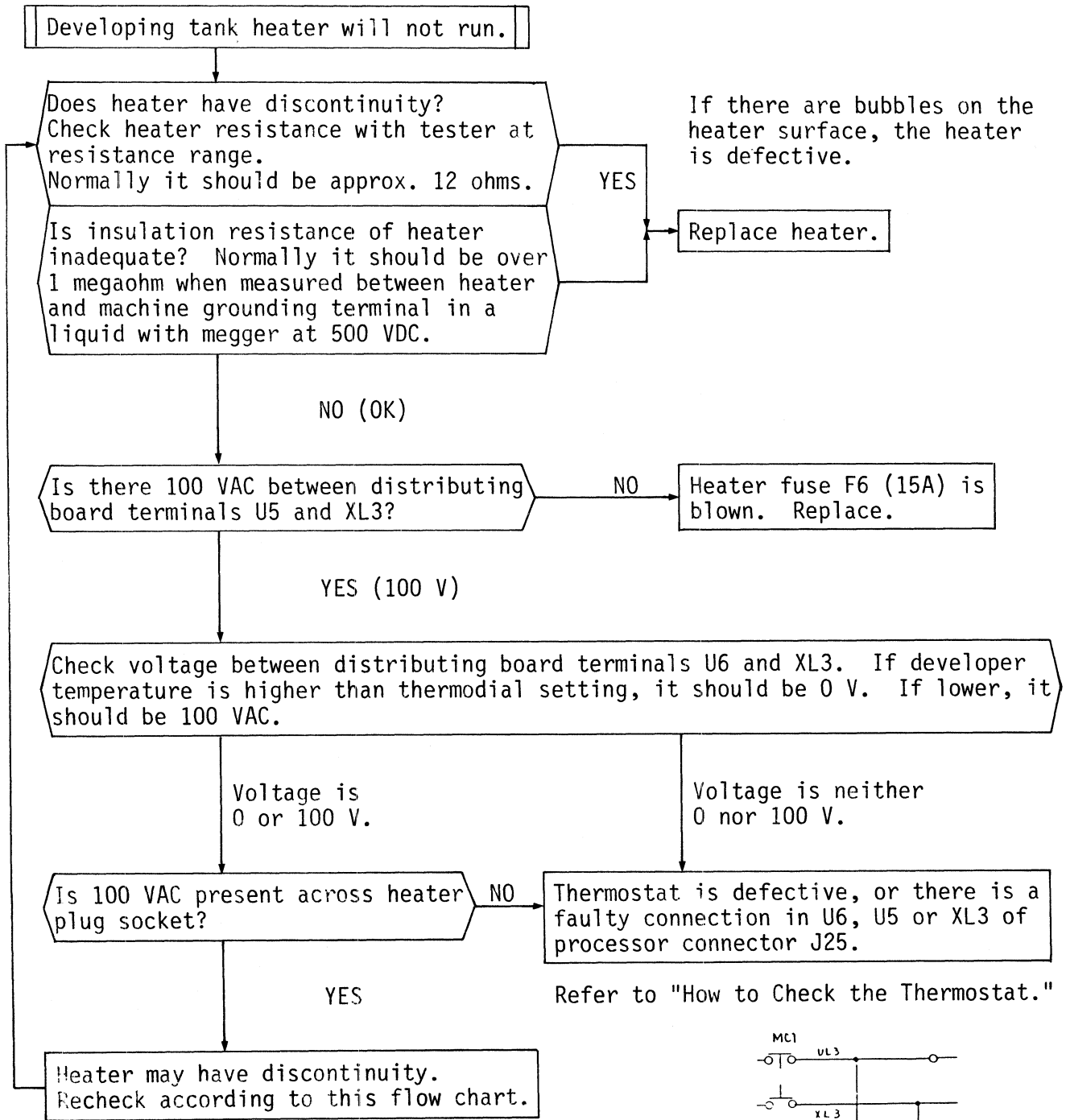
1. MC1 relay (magnet switch) is ON.
2. There is 100 VAC between distributing board terminals UL3 and XL3 .
3. Any of error messages "SOS", "CHP" and "CHC" is not on display.



PROCESSOR MOTOR

Developer temperature in developing tank will not rise.

Confirm that the voltage between terminals UL3 and XL3 is 100 VAC.



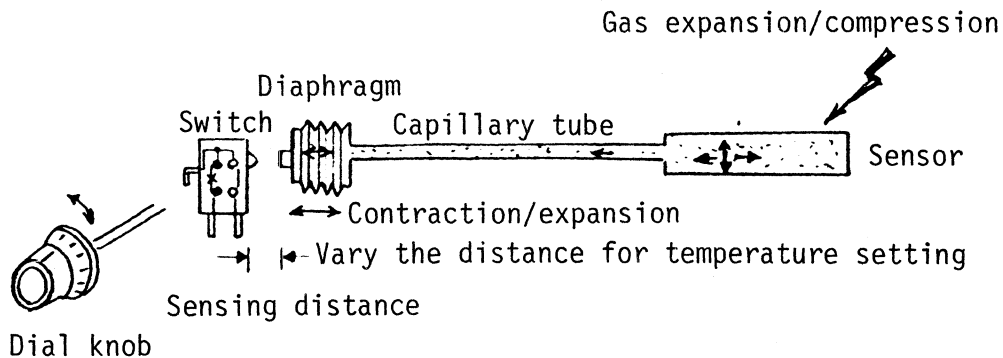


Developer temperature is too high.

The thermostat for developer temperature control is defective. Check the thermostat as follows.

### Structure

The structure is outlined below. It is based on the principle that the gas in the tube expands and compresses as the temperature changes.

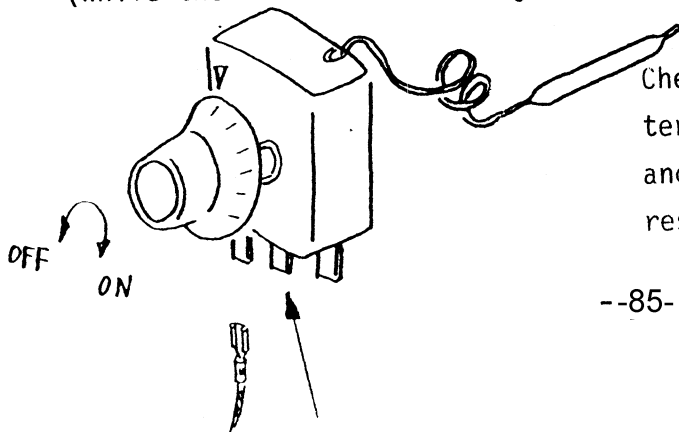


If there is a gas leak in the sensor, it malfunctions.

If any of the following cases arises, change the thermostat.

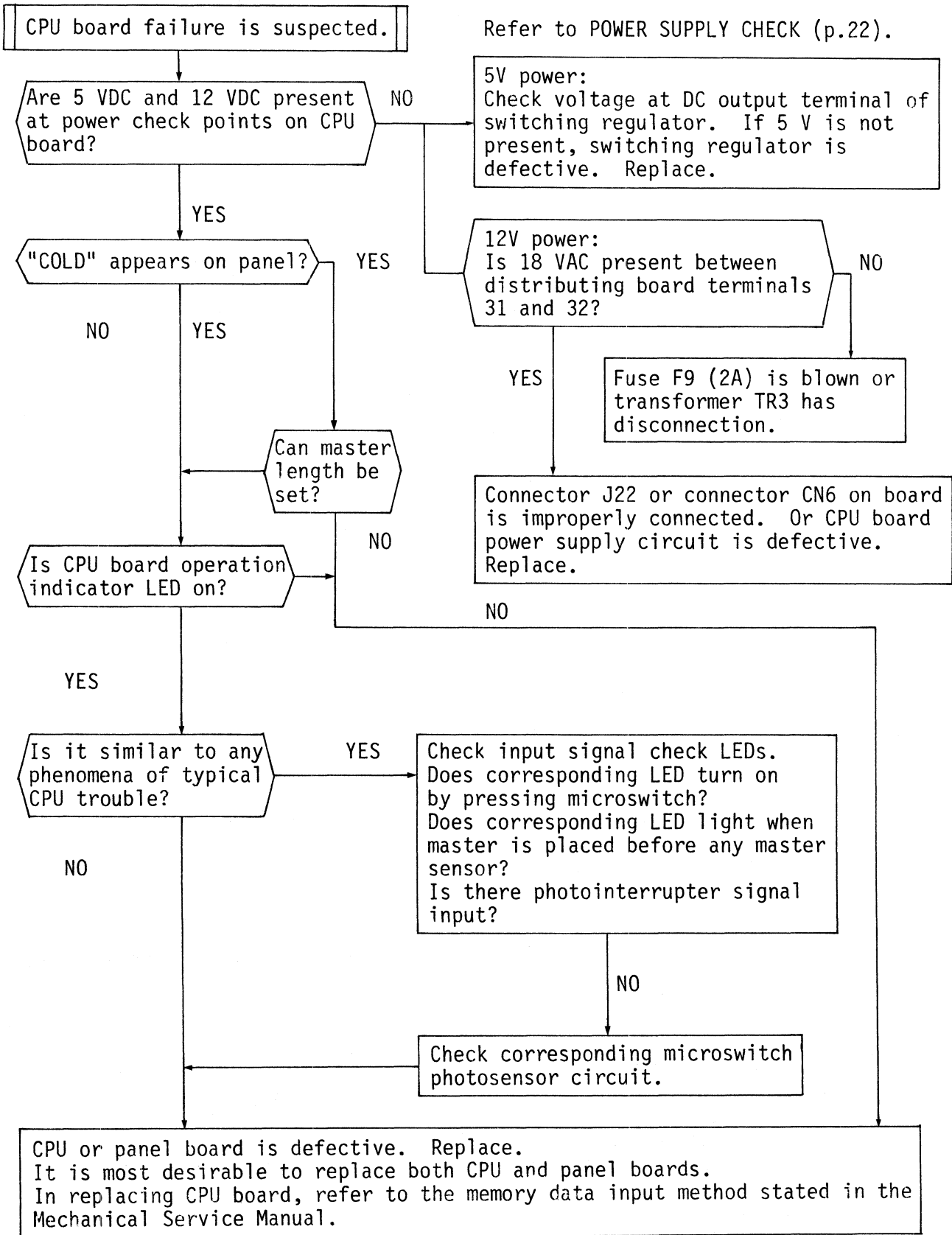
### How to Check the Thermostat

1. Though the dial reaches near the actual temperature of the developer in the tank while the knob is being turned, no click of the switch is heard nor the heater turns on and off.
2. As the dial knob is turned, the connection between the switch contacts does not turn on and off.
3. No switching-off sound is heard.  
(While the dial knob is being turned, clicking continues.)

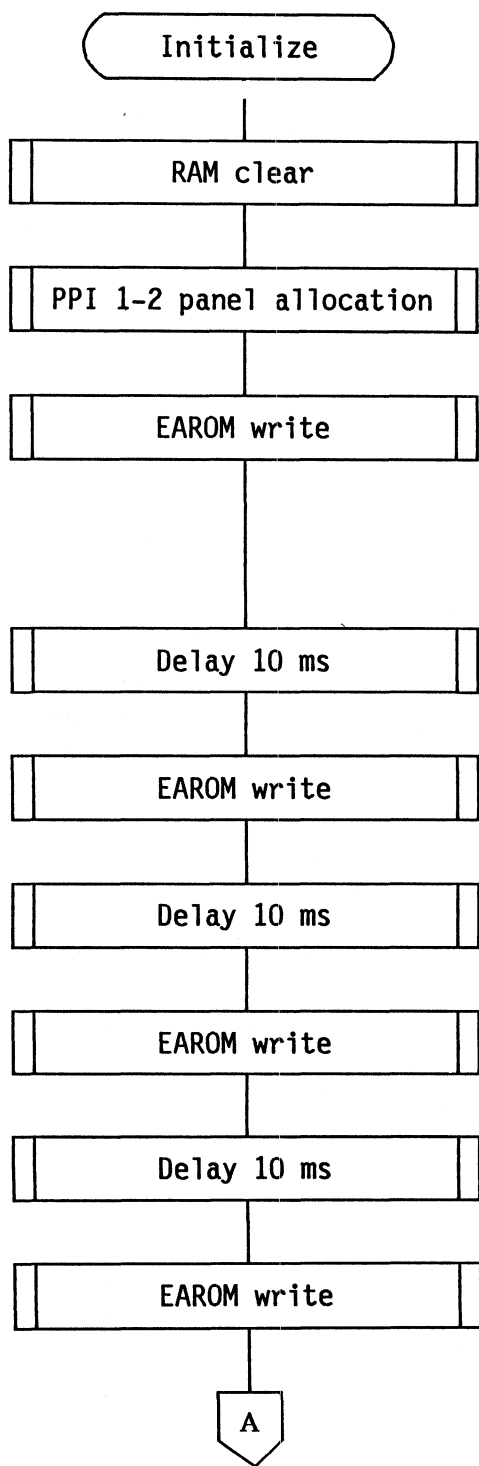


Check the continuity between these terminals. Disconnect the lead wire and check with the tester at the resistance range.

Troubleshooting the CPU and Panel Boards



Prior to replacing CPU board, be sure to check 5 VDC, 12 VDC and 24 VDC again.

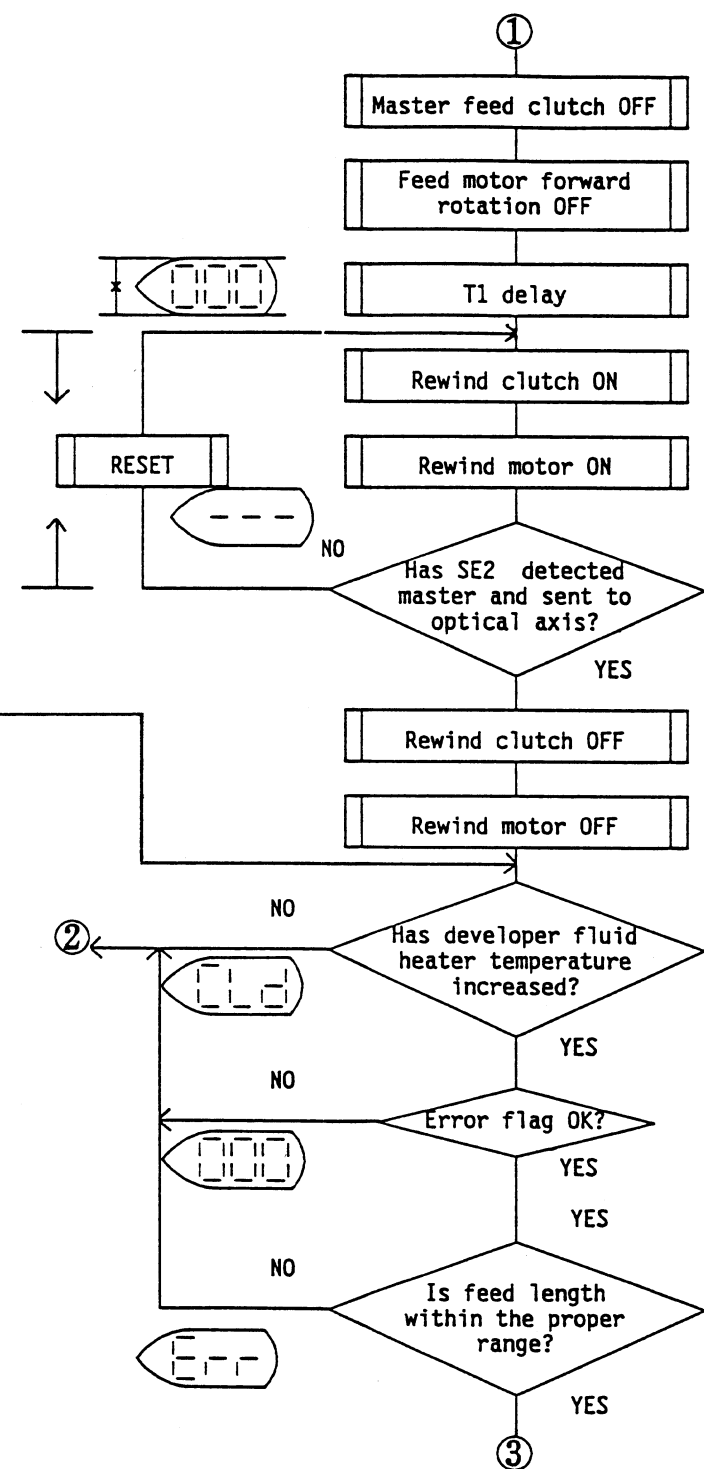
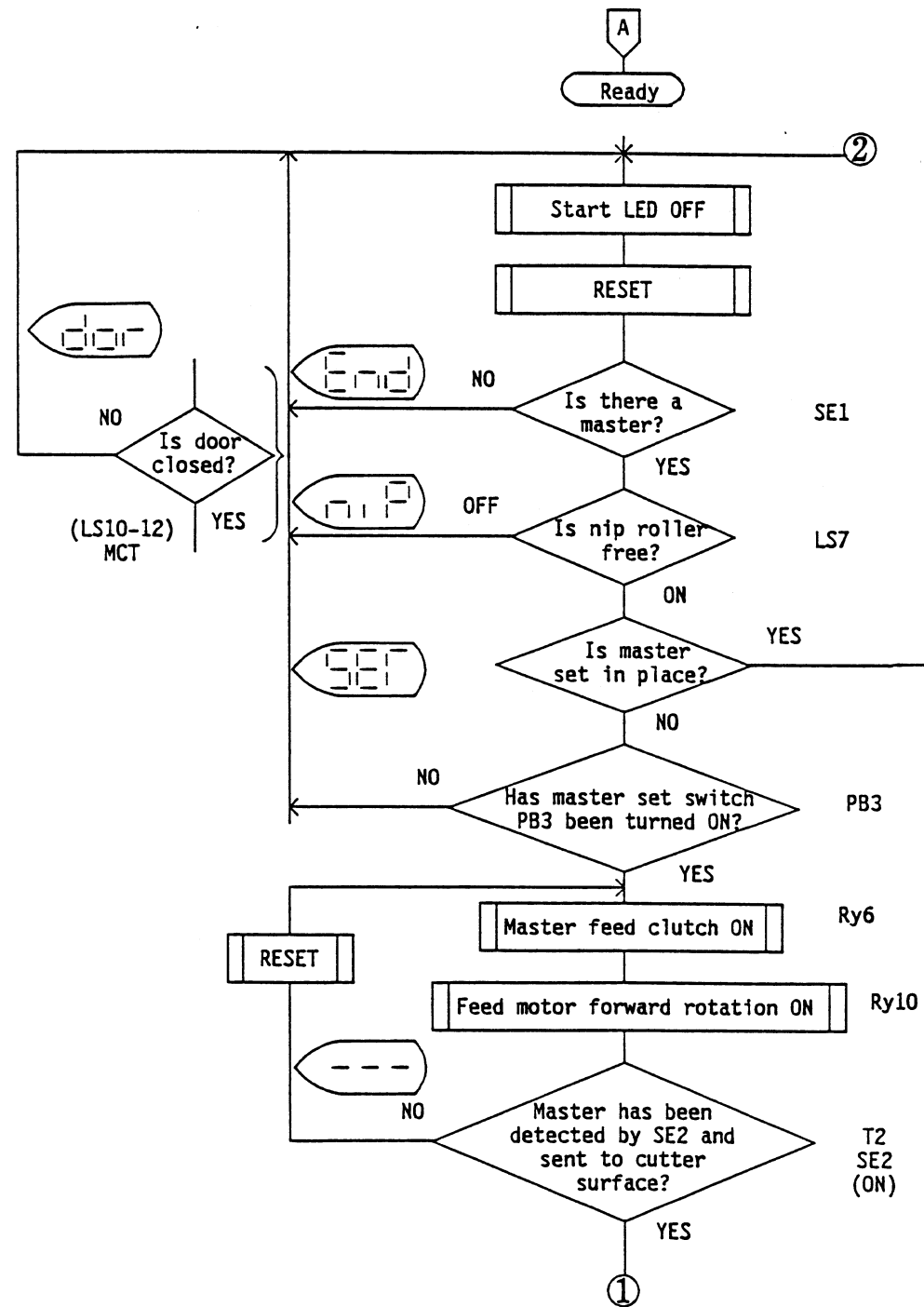


Feed compensating coefficient is normally 1,000.

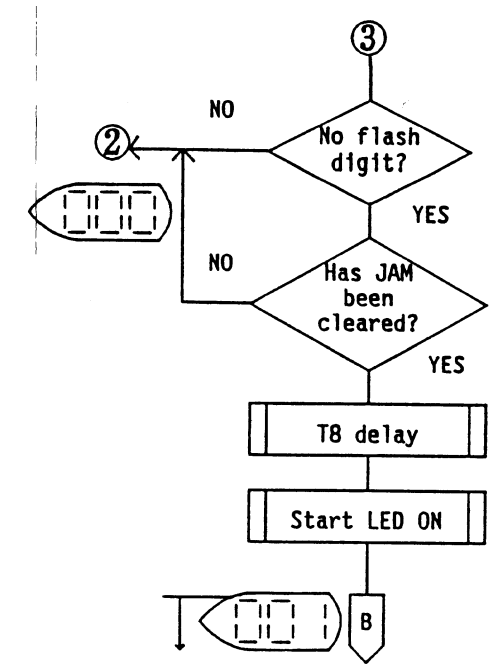
Master optical axis feed correction Normally 0.0

Lens box Feed compensating coefficient

Correction of optical axis position



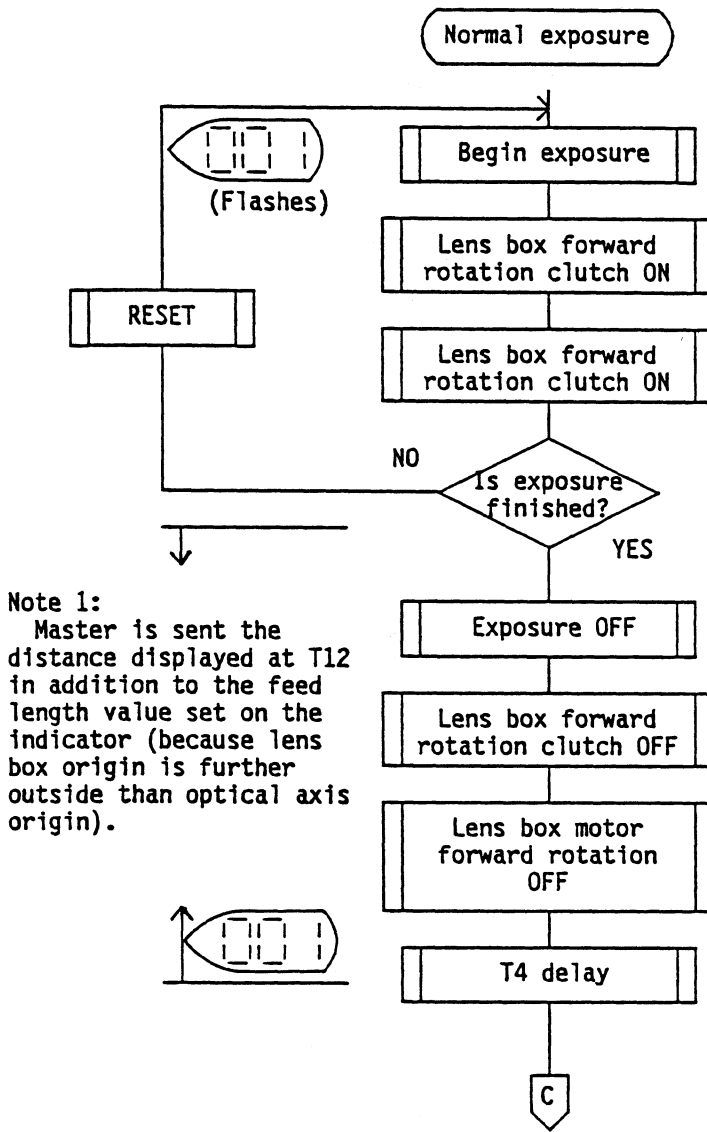
Ry6  
Ry10  
Ry8  
Ry9  
T3  
SE2  
(Detects OFF)  
Ry8  
Ry9  
Ry1



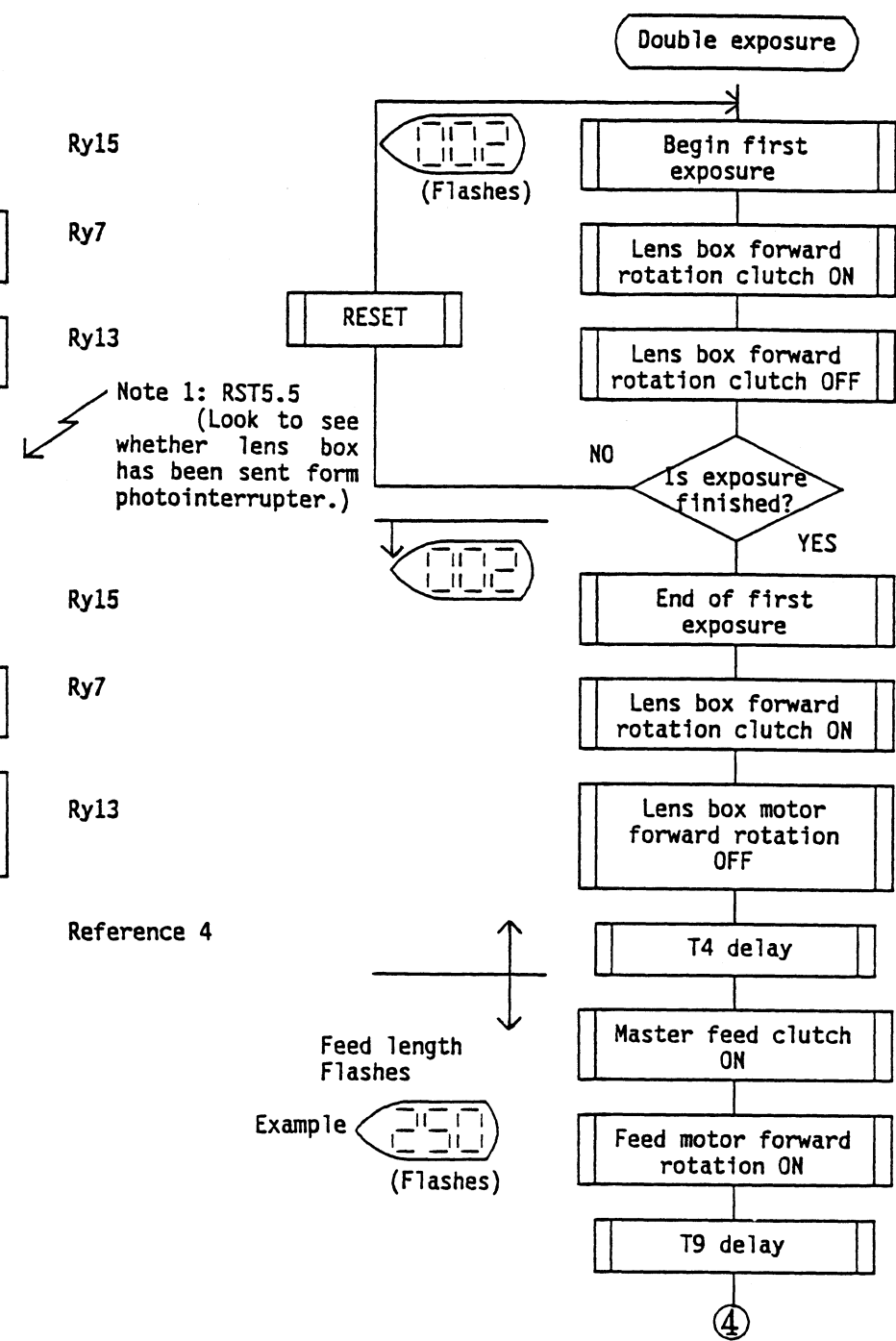
- (1) Are and unrelated dip switches in the CPU board ON?
- (2) Is master at lens board origin? (LS4) Ry2
- (3) Is master at cutter origin? (LS5) Ry3
- (4) Side board LS (LS9)
- (5) Other error flags

Normal exp. 370-820 ml  
Double exp. 185-410 ml

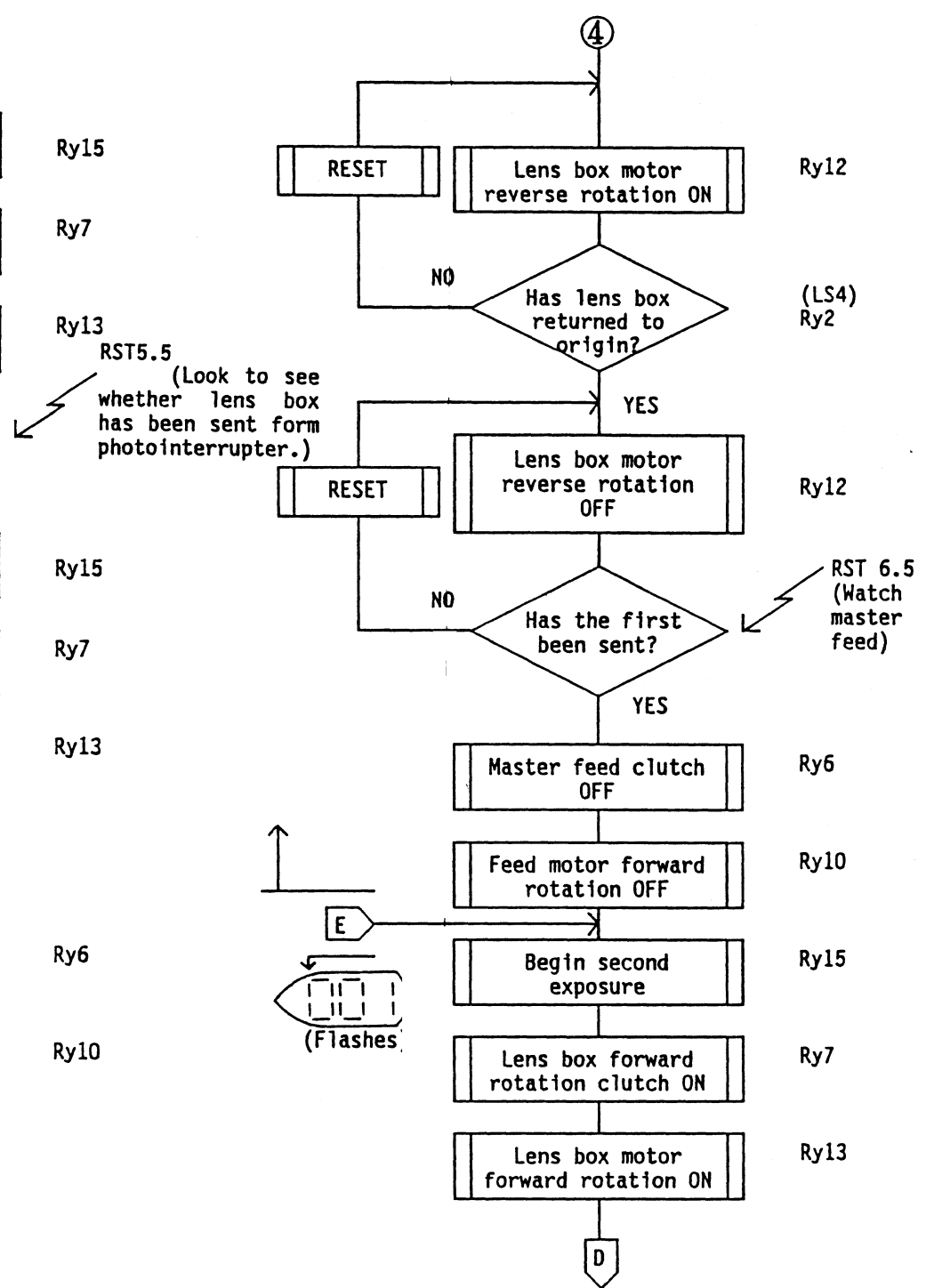
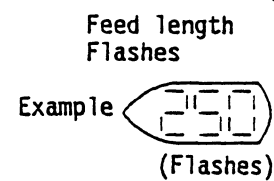
\* See reference 4 regarding values and number of pulses for each timer.



Note 1:  
Master is sent the distance displayed at T12 in addition to the feed length value set on the indicator (because lens box origin is further outside than optical axis origin).

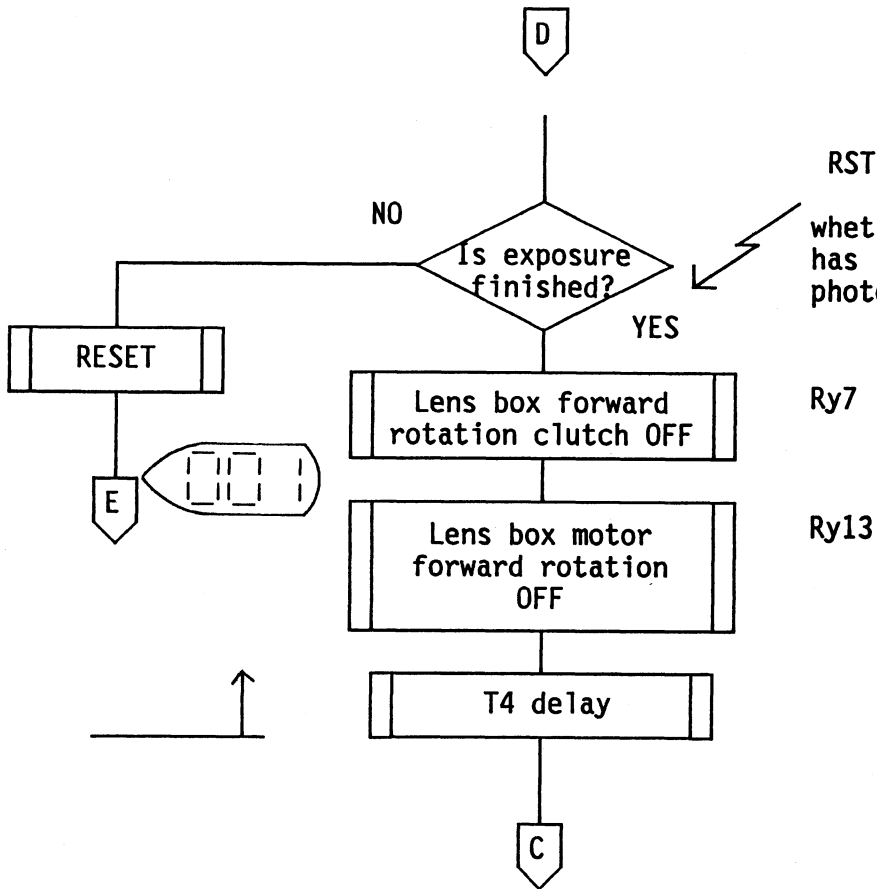


Note 1: RST5.5  
(Look to see whether lens box has been sent form photointerrupter.)



RST5.5  
(Look to see whether lens box has been sent form photointerrupter.)

RST 6.5  
(Watch master feed)

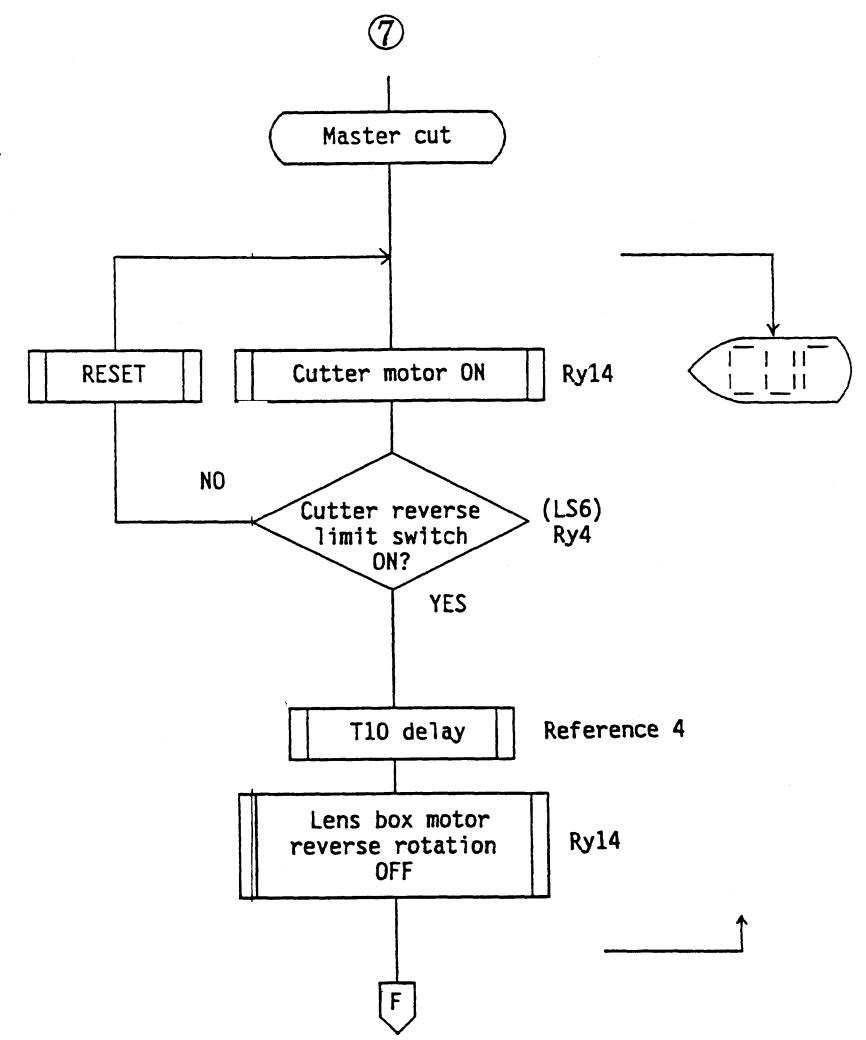
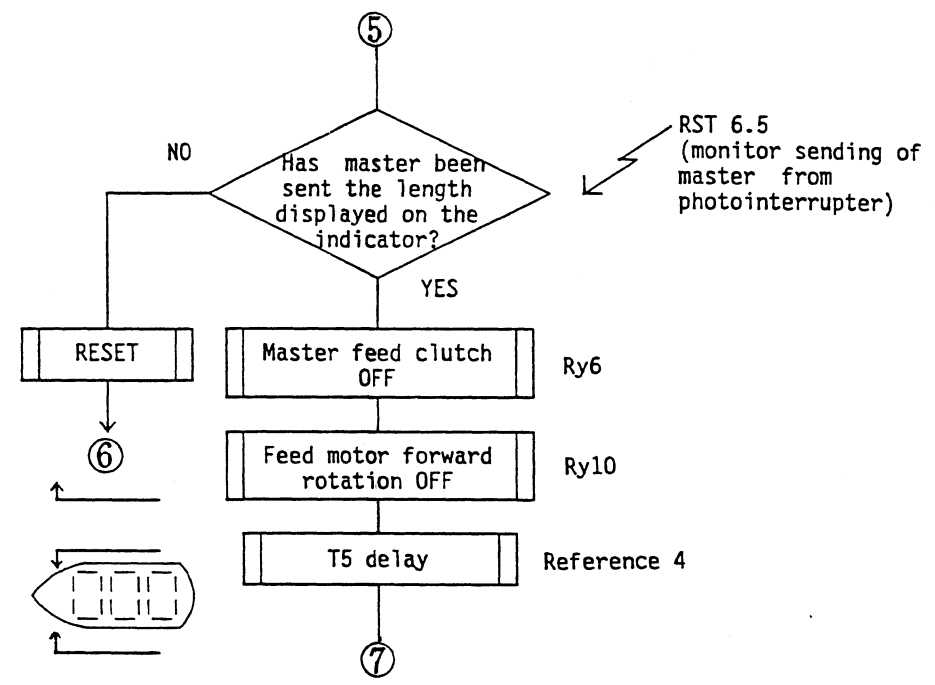
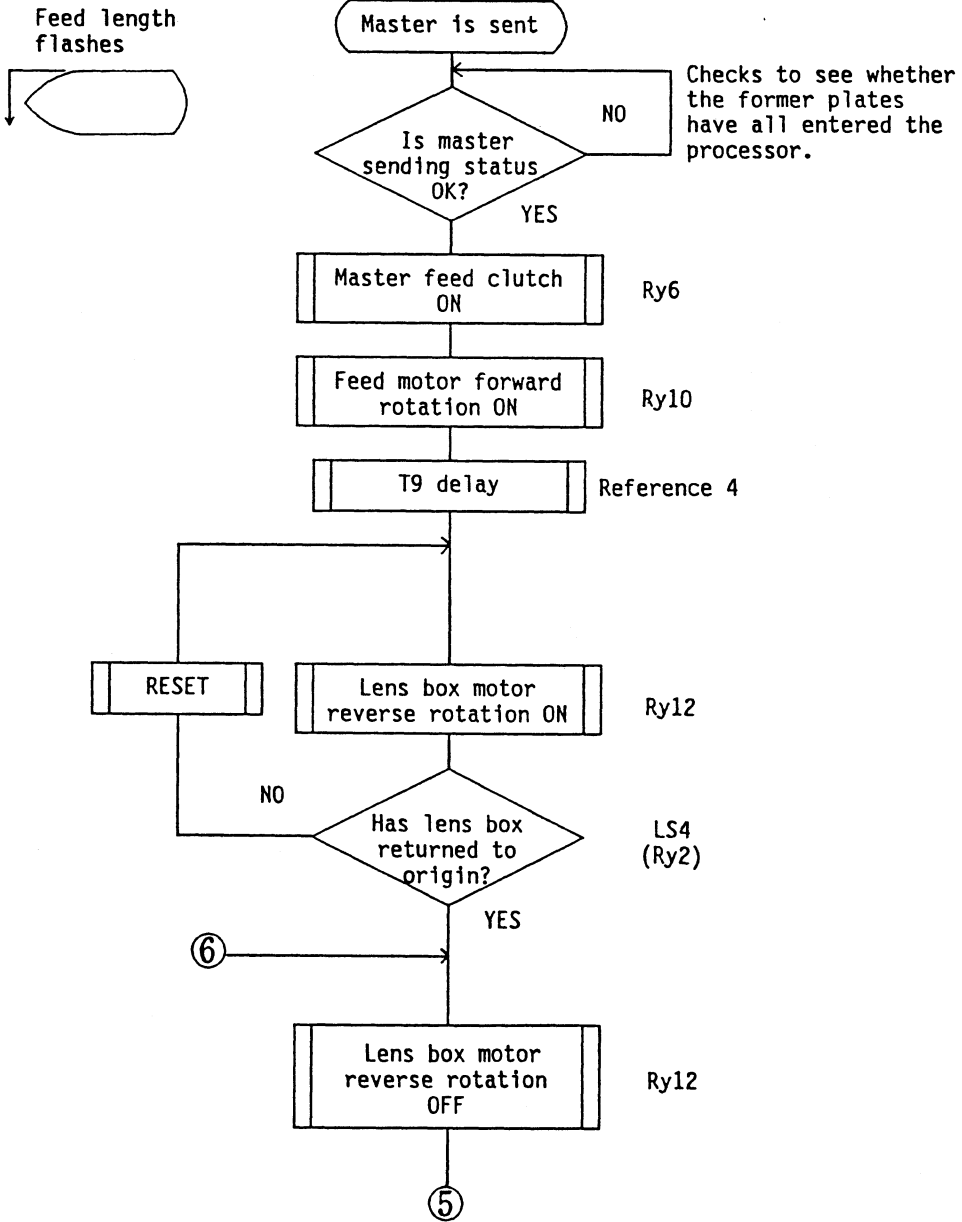


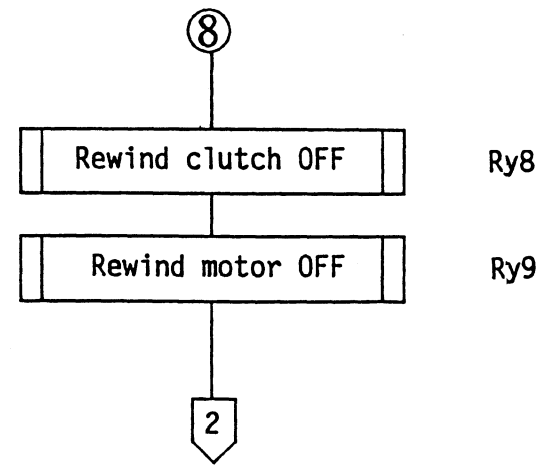
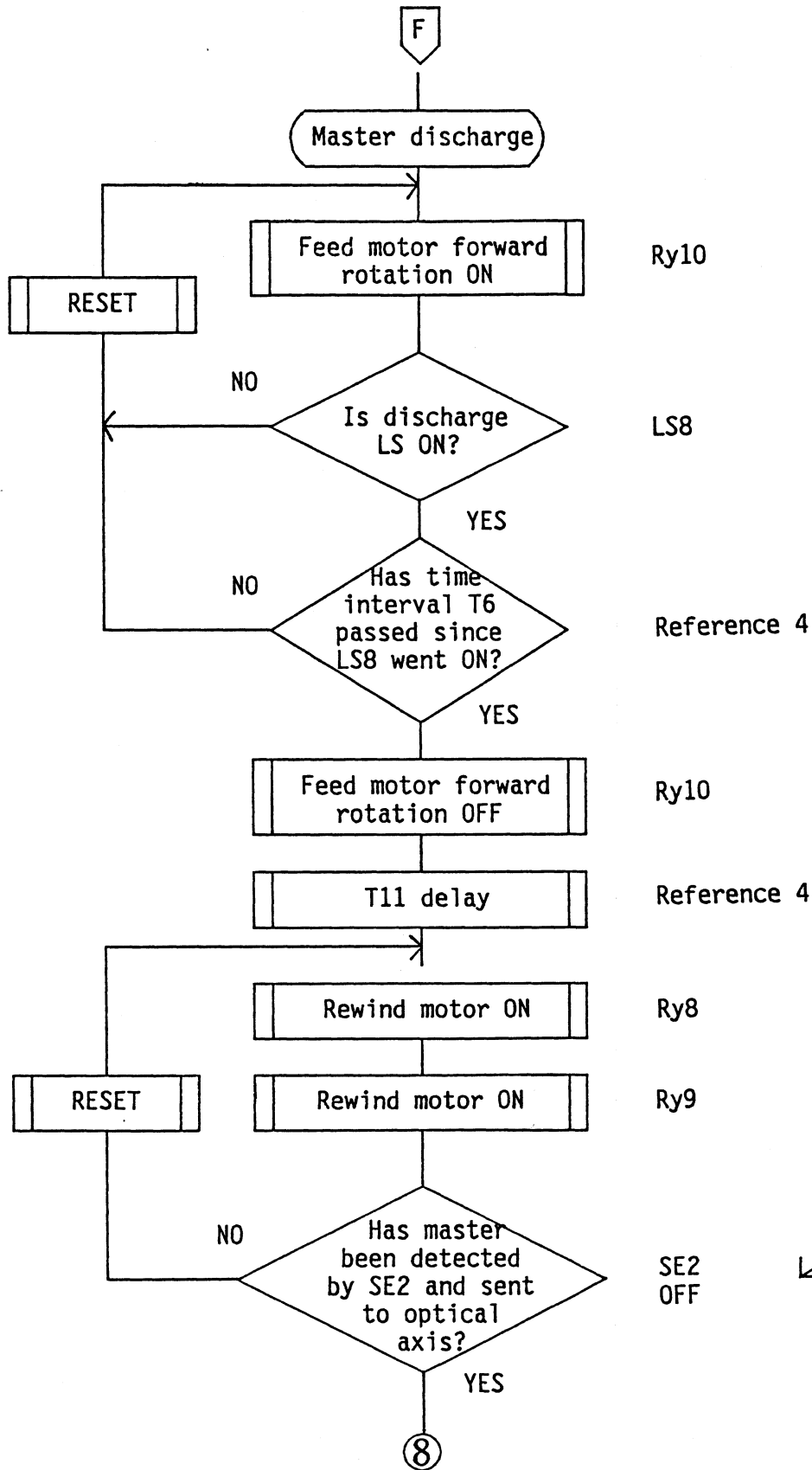
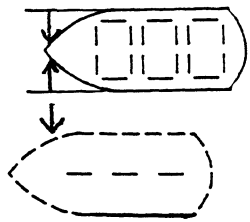
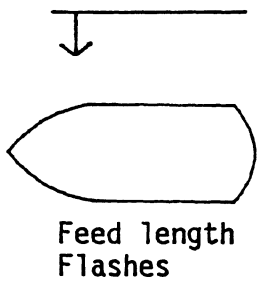
RST5.5  
(Look to see whether lens box has been sent from photointerrupter.)

Ry7

Ry13



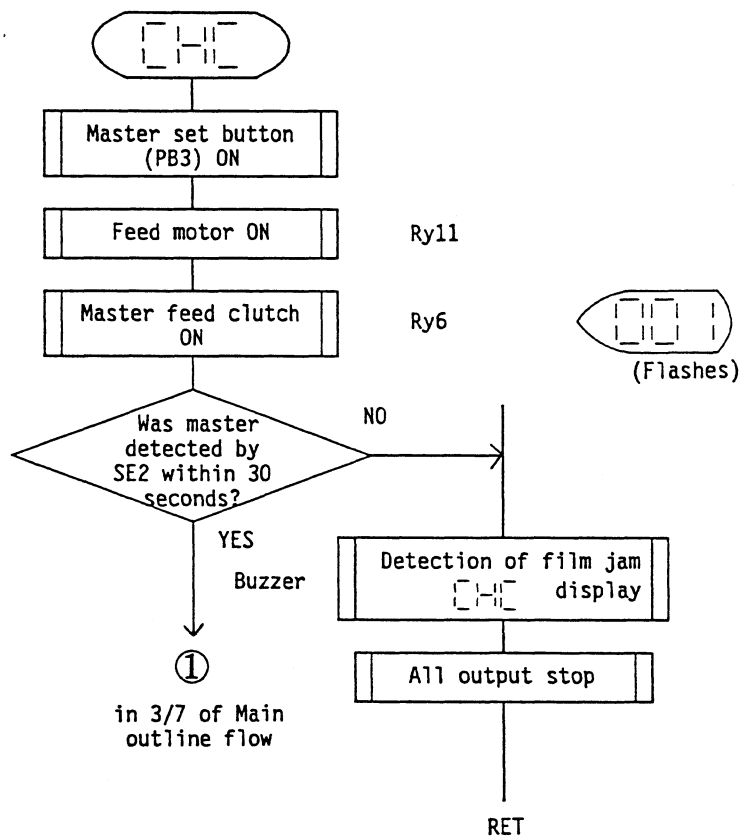




RST6.5  
(monitor sending of master from photointerrupter)

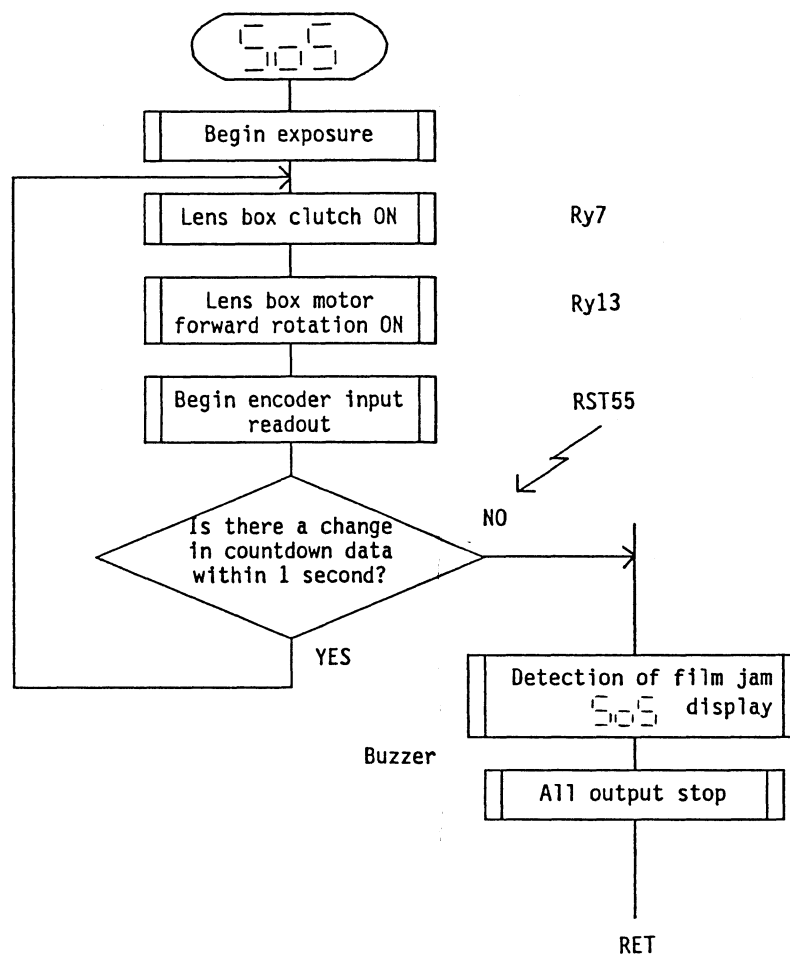


FILM JAMS

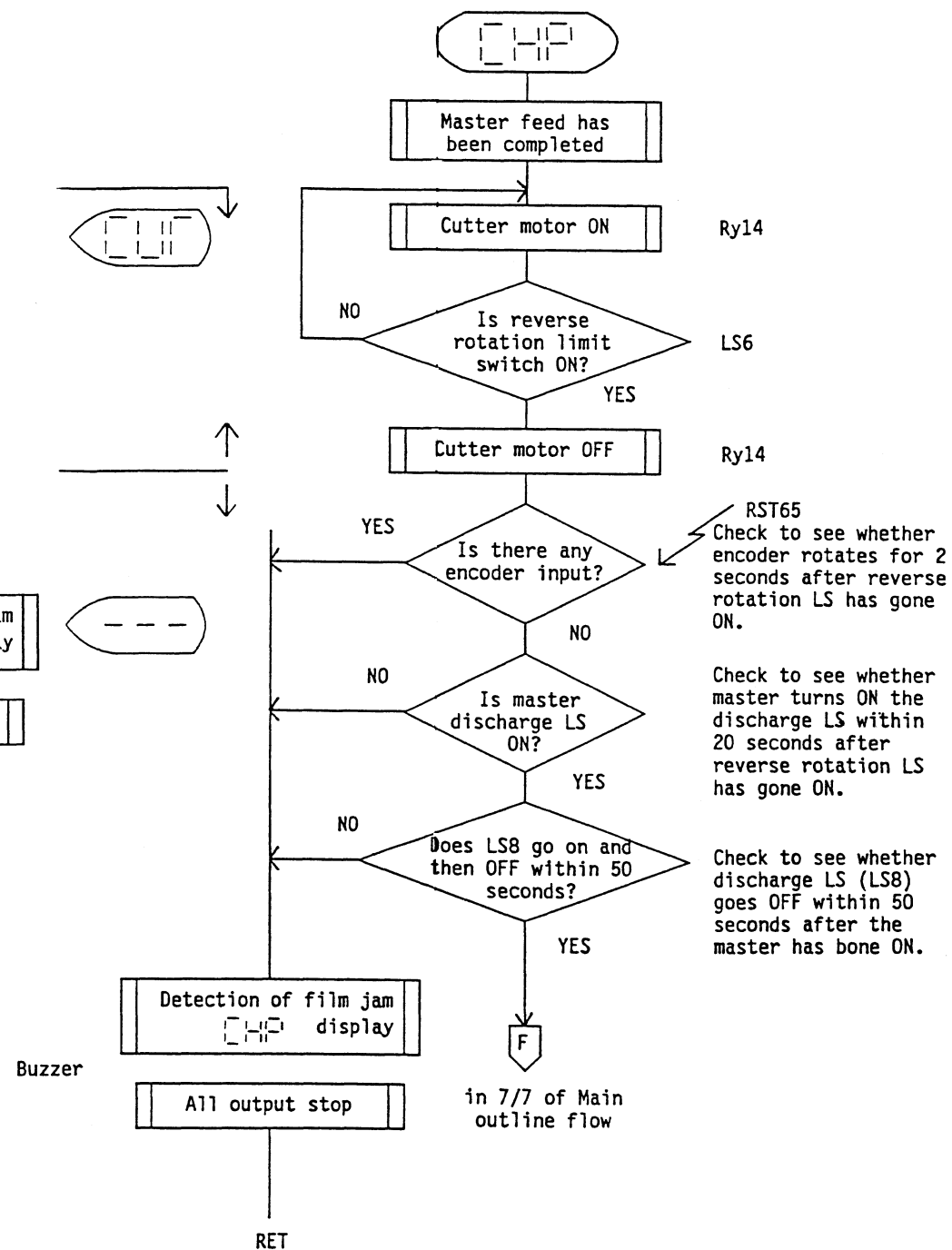


Causes

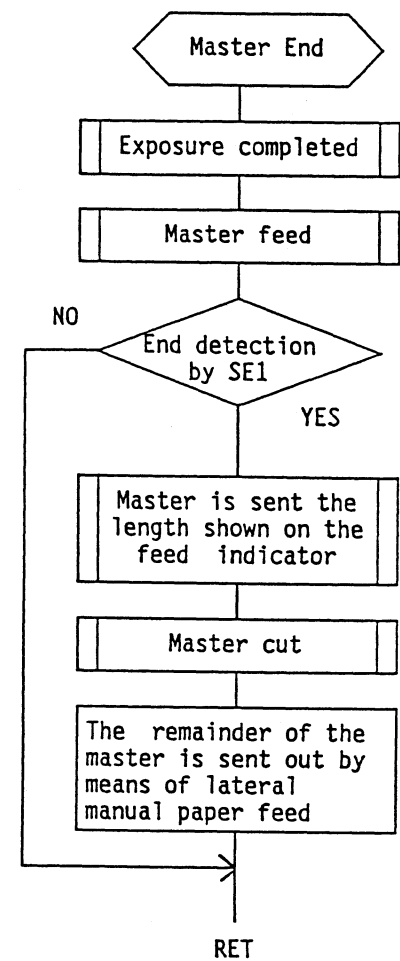
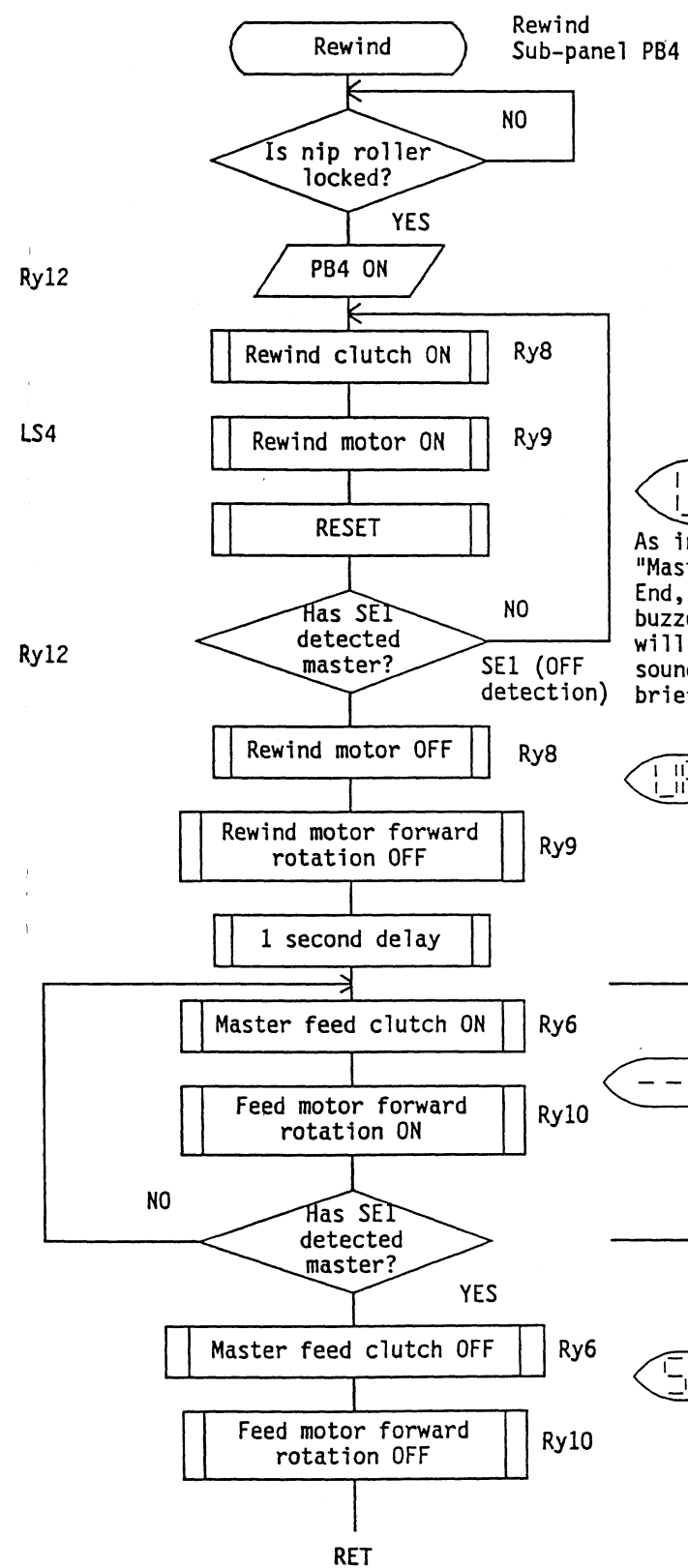
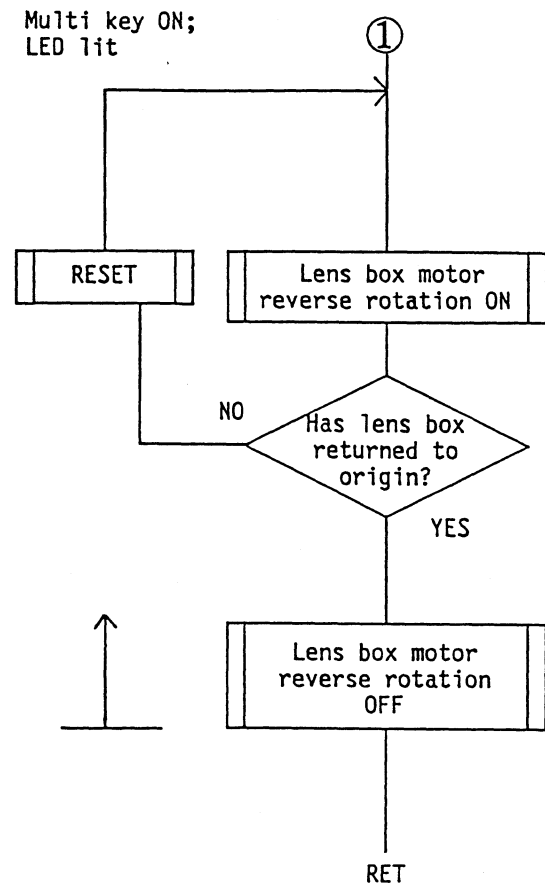
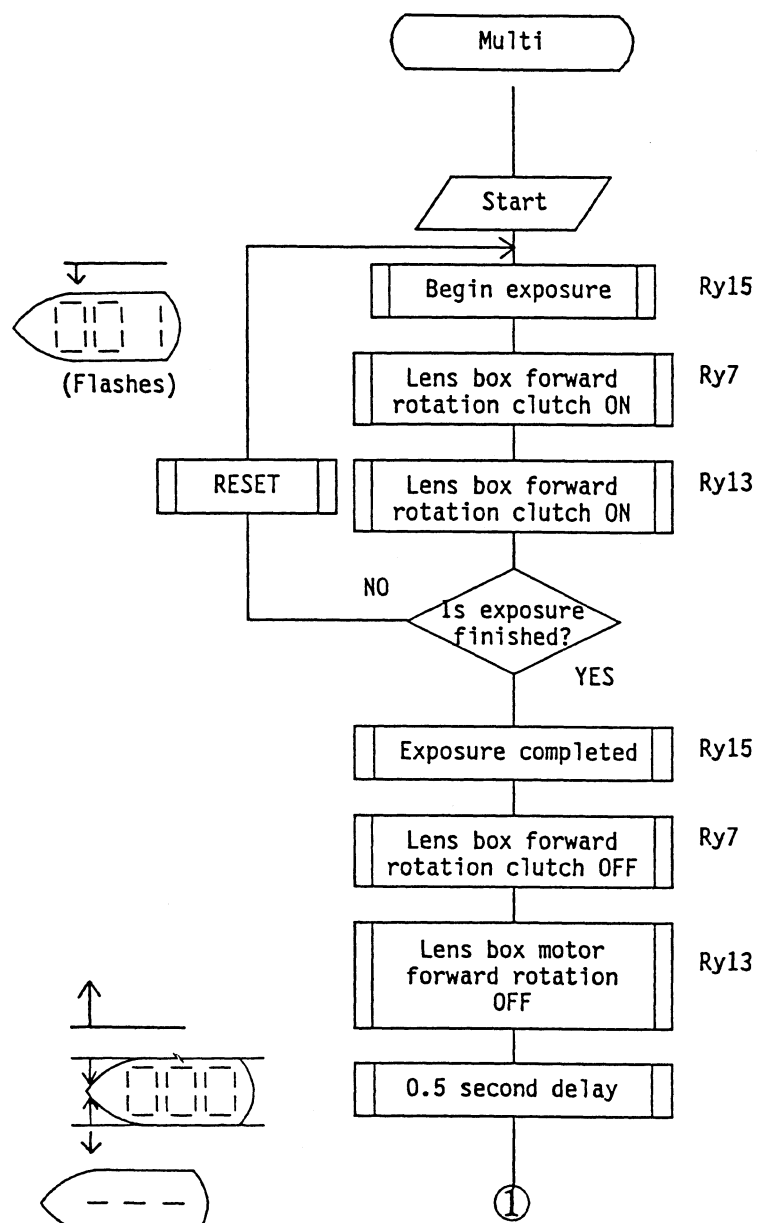
- Sensor (SE2) is defective
- Master cannot be sent

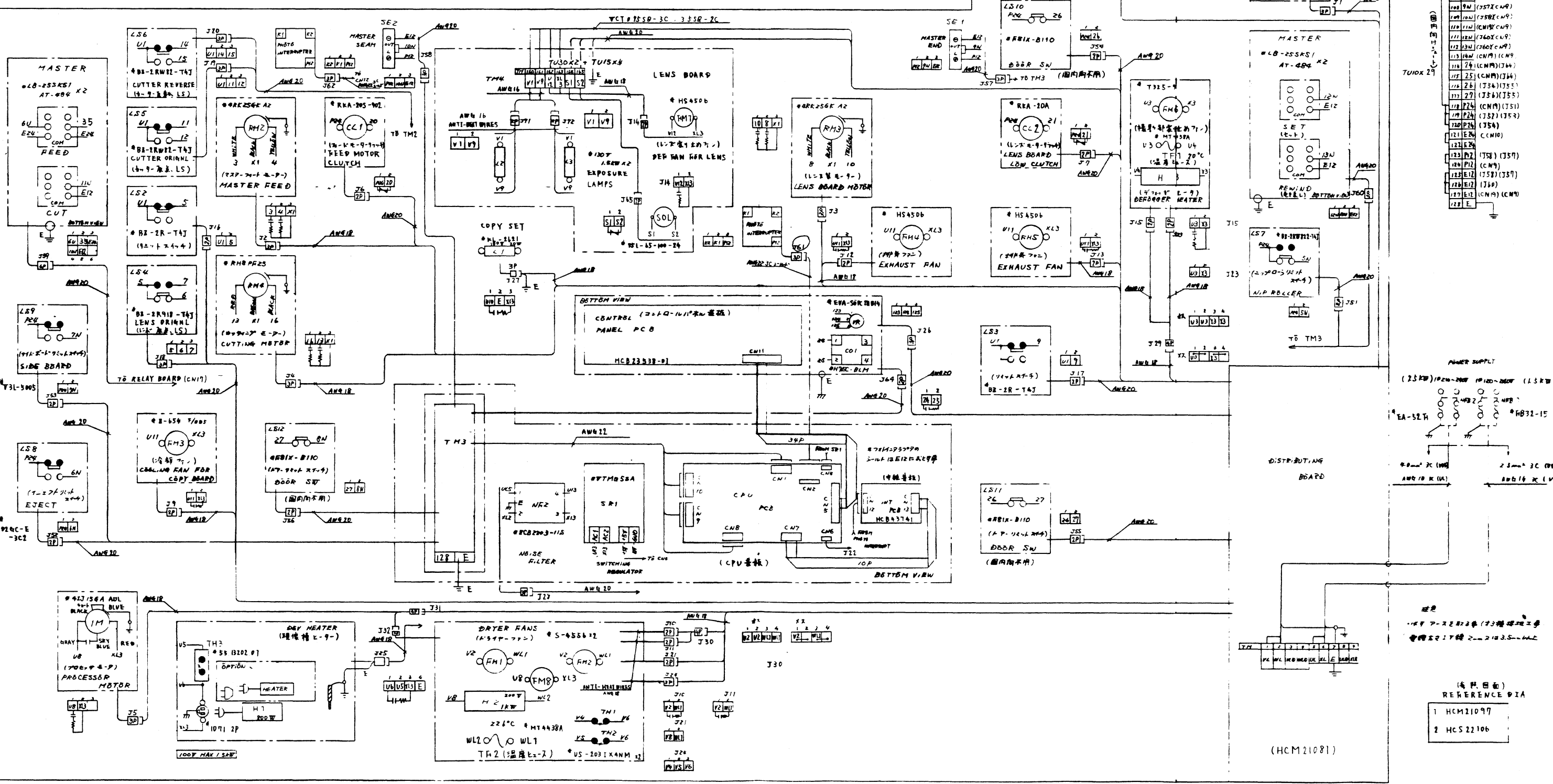
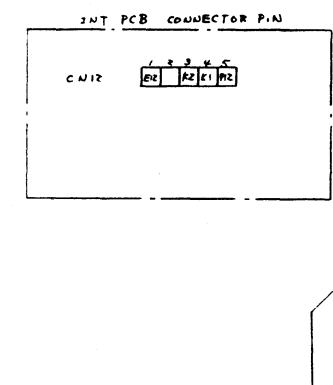
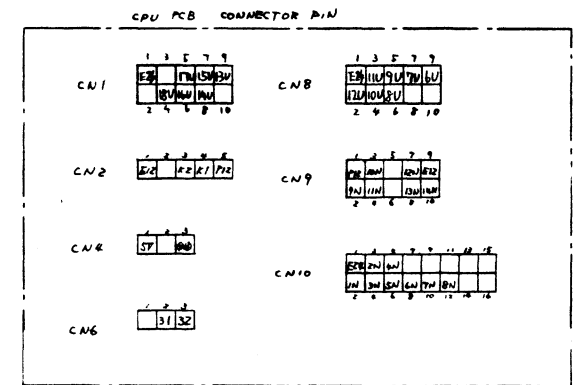
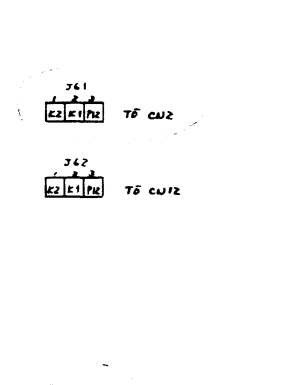
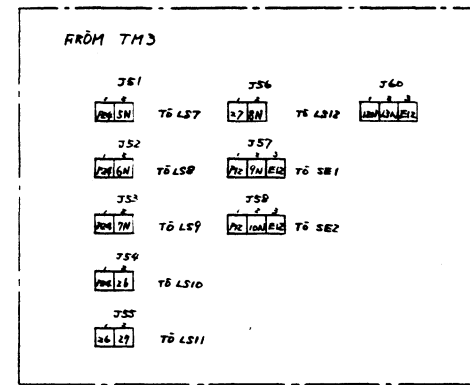


- There is no encoder input
- Lens box chain is broken
- Lens box has slipped



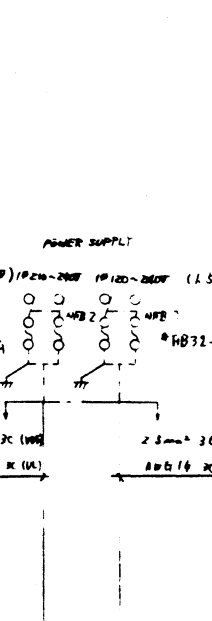
- Cutter teeth are not on or are broken
- Encoder has been mounted incorrectly
- Discharge LS (LS8) is defective





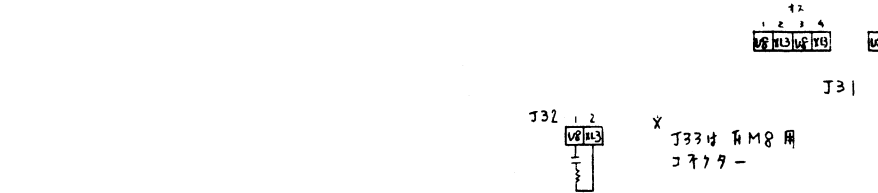
TM3

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160



REFERENCE P.I.A

1	HCM21097
2	HCS22106



J32

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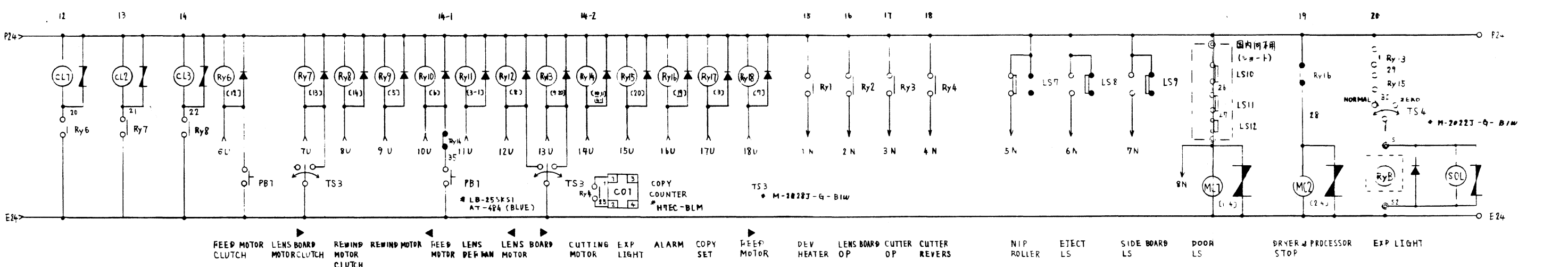
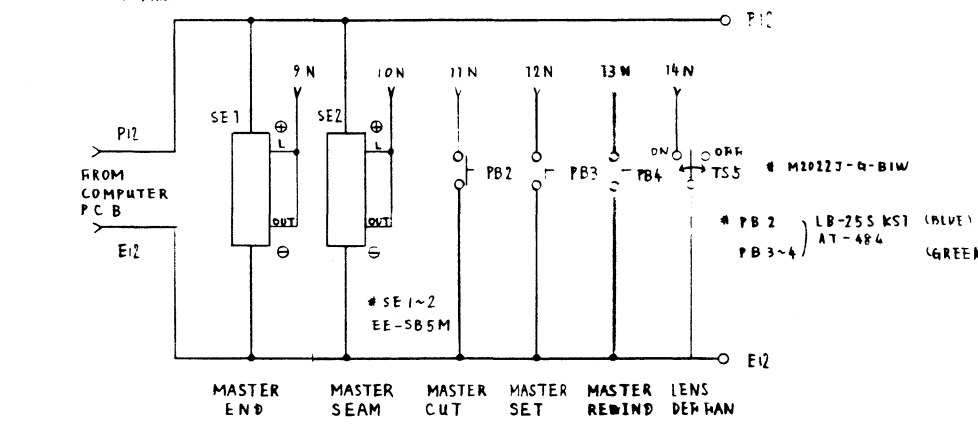
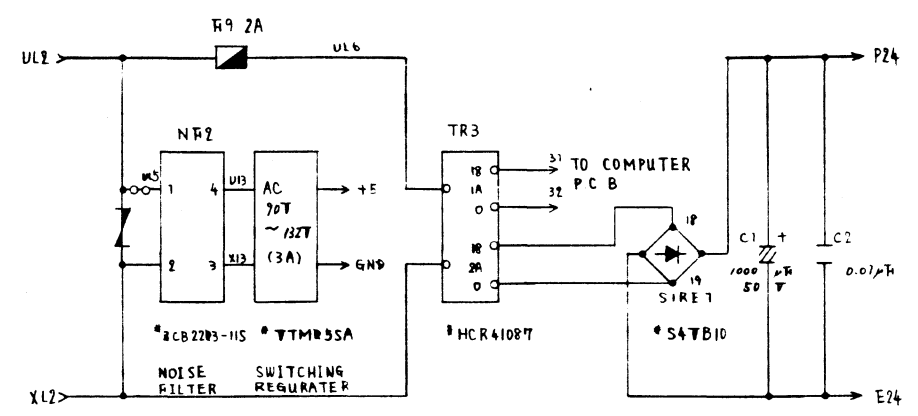
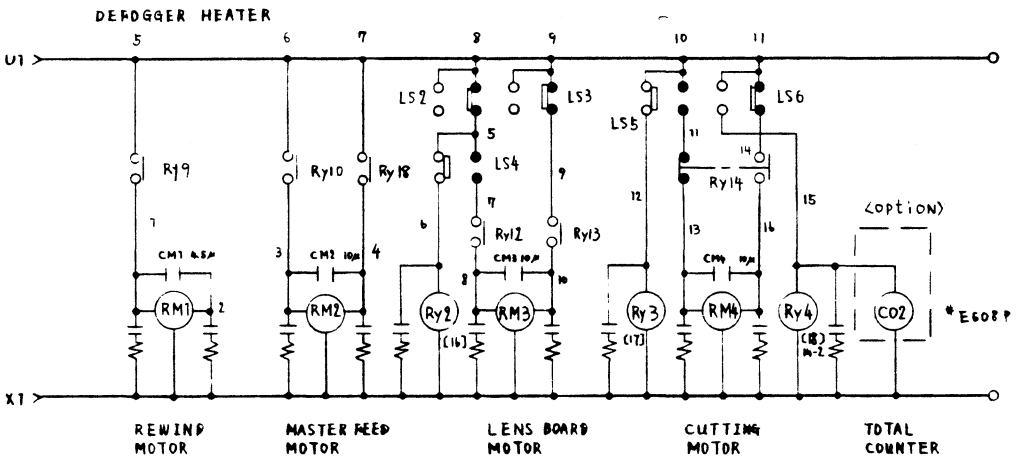
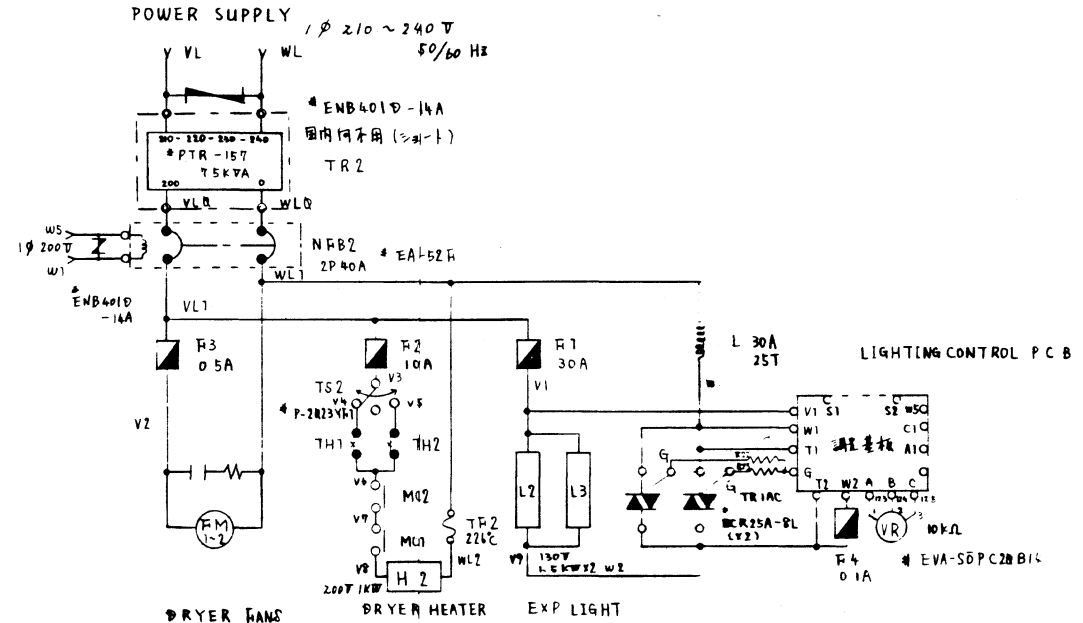
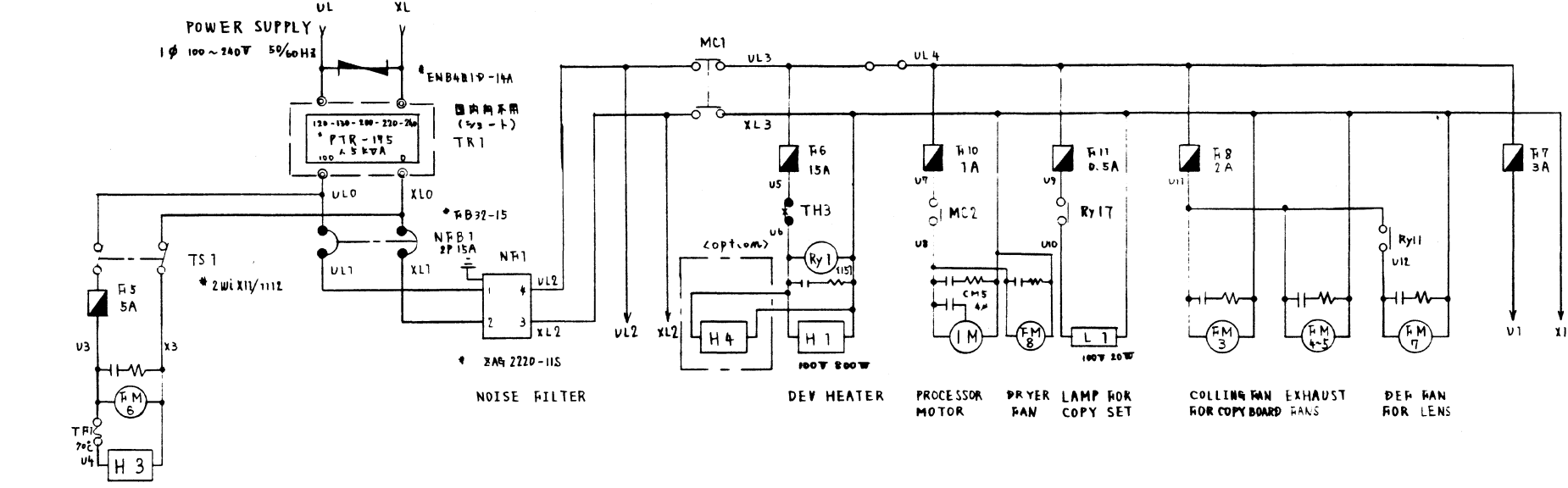
J96

J97

J98

J99

J100

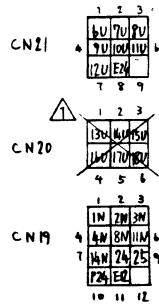


NOTE: \* 1S1585  
 \* CR-1  
 \* ENB201D-14A  
Ry1-4 \* MY-2 100V  
Ry6-M \* MY-2 24V

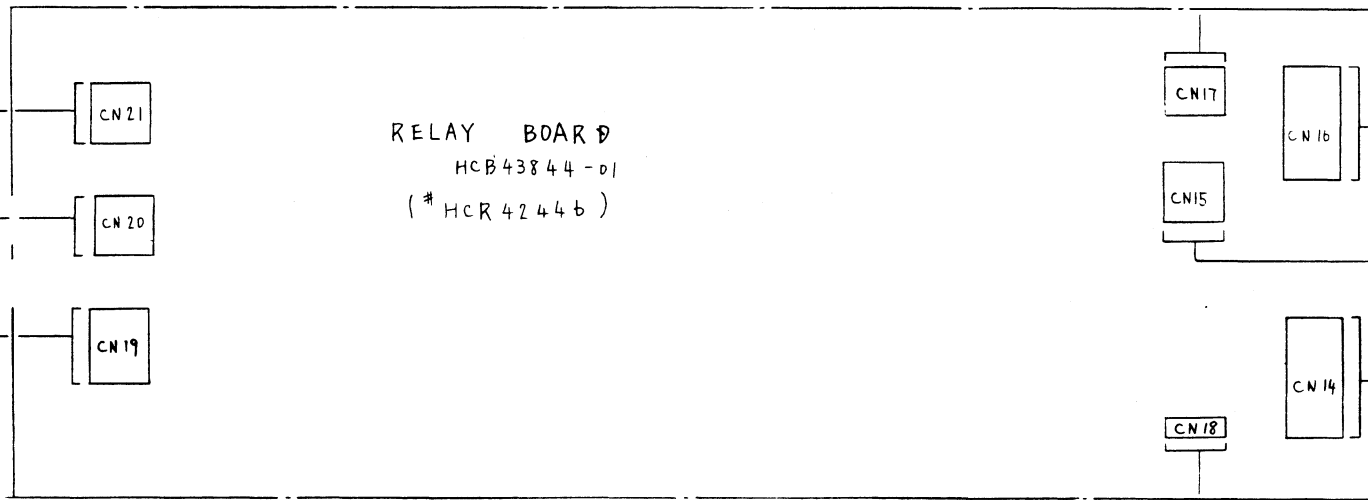
\* MC1 92J-4442T-US-3  
 MC2 64J-2242T-US

注意

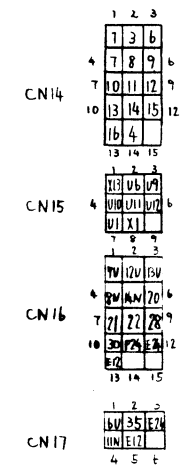
- RY1 ~ RY4 MY-2 AC100V
- RY6 ~ RY8 MY-2 DC24V
- RY14 MY-4 DC24V
- 12P77-A 1S1585
- 12P77-B CR-1



T0 CPU CN8  
T0 CPU CN1  
T0 TM3

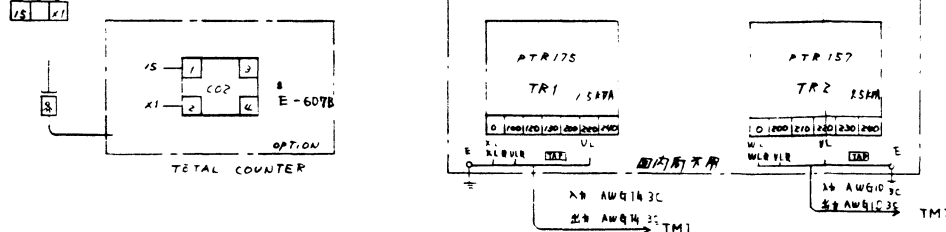
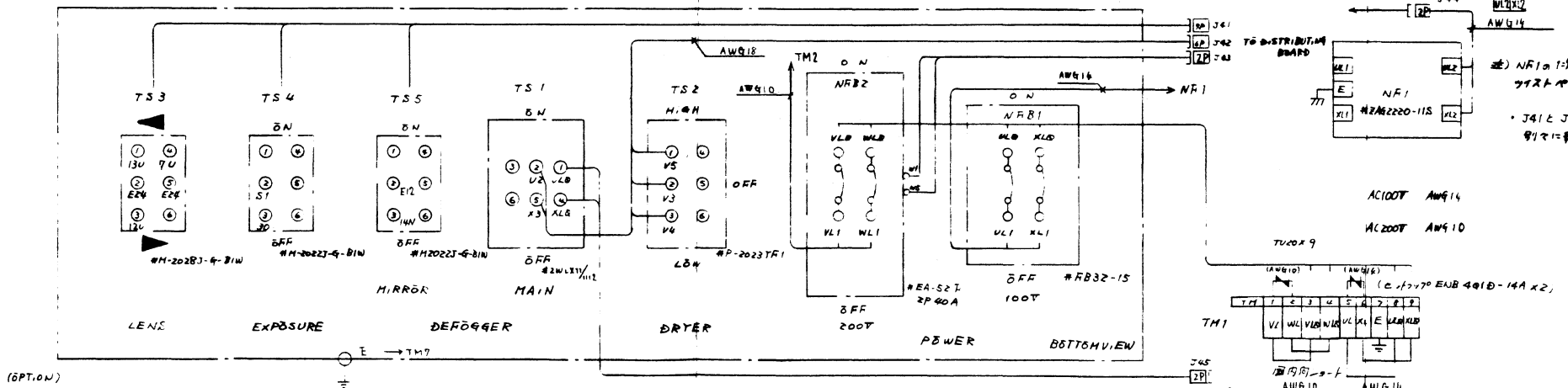
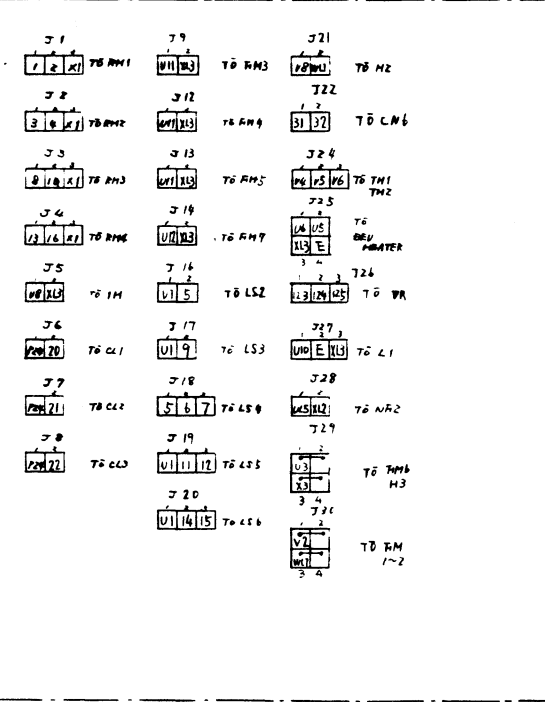
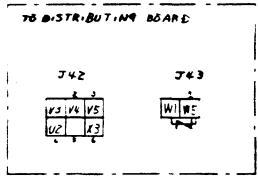
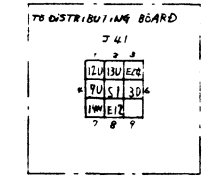
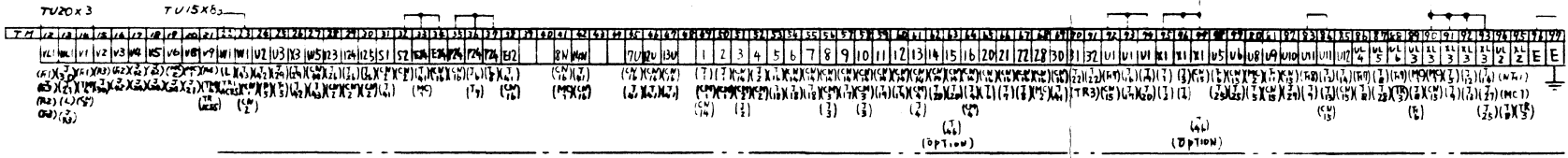
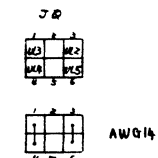
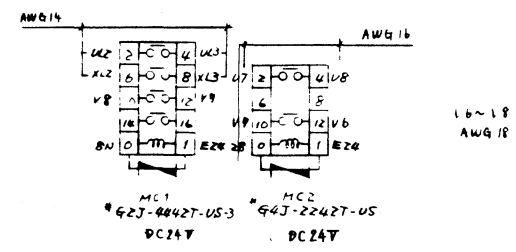
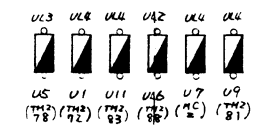
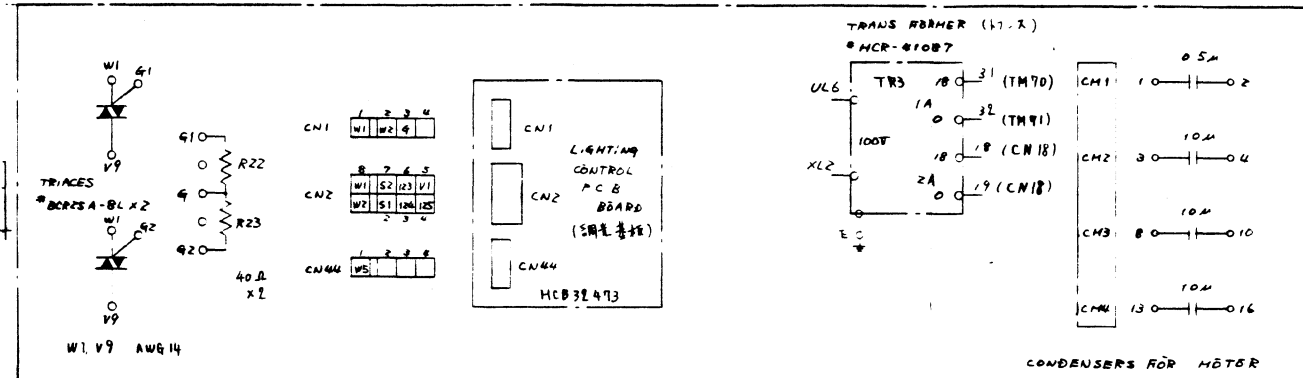
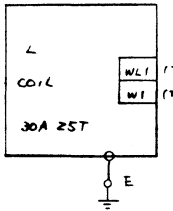
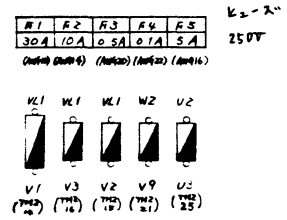


RELAY BOARD  
HCB43844-D1  
(# HCR4244b)



E6	F7	F8	F9	F10	F11
3A	2A	2A	1A	1A	1A

(AWG) (AWG) (AWG) (AWG) (AWG) (AWG)



- 注意事項
- 指定品番は AWG20 及び
  - 12P77-A, (ENB 2010-14A)
  - NF1 の電力は 200V 2P 20A 100V
  - 12P77-A の 7-14 端子は 2P 20A 100V

※ NF1 の 1 次側は 200V 2P 20A 100V  
※ J41 と J42, J43 は 1 周 - 1 組の端子  
※ 別々に 1 組の端子