

SILVER MASTER CP-50S

SERVICE MANUAL

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1. INTRODUCTION

This Manual is intended to be used for after-sale service on the CP-50S. For information on operation of the machine and materials, refer to the "CP-50S Operation Manual", "Technical Guide" and other related documents.

Bear in mind that the machine structure and specifications are subject to change without notice.

When ordering parts or consulting us, refer to the CP-50S Parts List and let us know the following information.

- model (CP-50S)
- serial number
- reference numbers and descriptions of parts
- required quantities
- date of delivery

* Publication and duplication of this document are prohibited.

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2. SPECIFICATIONS

- Applicable master width: 229 mm (9"), 254 mm (10"), 279 mm (11")
- Master cut length: 370 - 480 mm
- Effective output size: 279 - 430 mm
- Max. blank exposure size: 279 - 480 mm
- Exposure method: Slit type
- Lens: $f = 150 \text{ mm}$ $f/11$
- Magnification: 100% (same-size output)
- Cutter: NT cutter, slide type
- Exposure control: Thyristor-type, light-level adjust dial
- Effective copy size: 279 x 480 mm
- Light source: One halogen lamp 80 V, 600 W with constant-voltage circuit
- Copy loading method: Original image face down
- Processor tank capacity: Developer 3 ℓ
Stabilizer 2 ℓ
- Replenisher bottles: Developer, stabilizer 0.5 ℓ
constant liquid level system
- Processor heater: Developer tank 250 W panel heater
with thermo-control
- Initial master making time: 65 - 78 sec
- Cycle master making time: 48 - 58 sec
- Machine dimensions: 990 (W) x 590 (D) x 400 (H) mm
- Weight: 70 kg
- Electricity: 100 V AC, 1.2 kW

* Specifications are subject to change without notice

Process Diagram

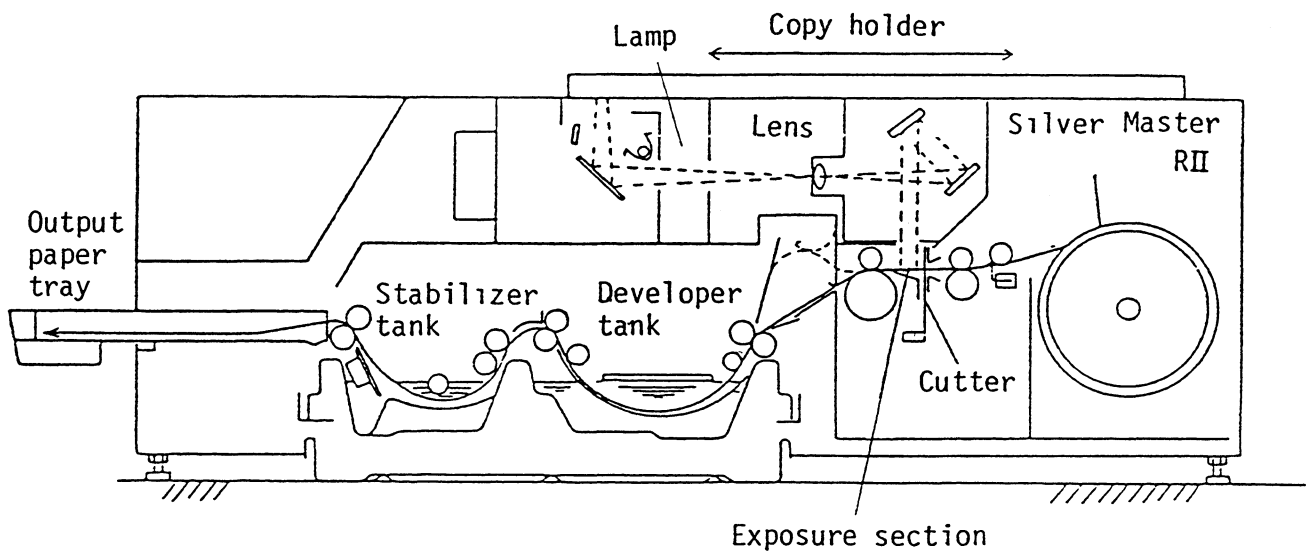


Fig.1

3. INSTALLATION

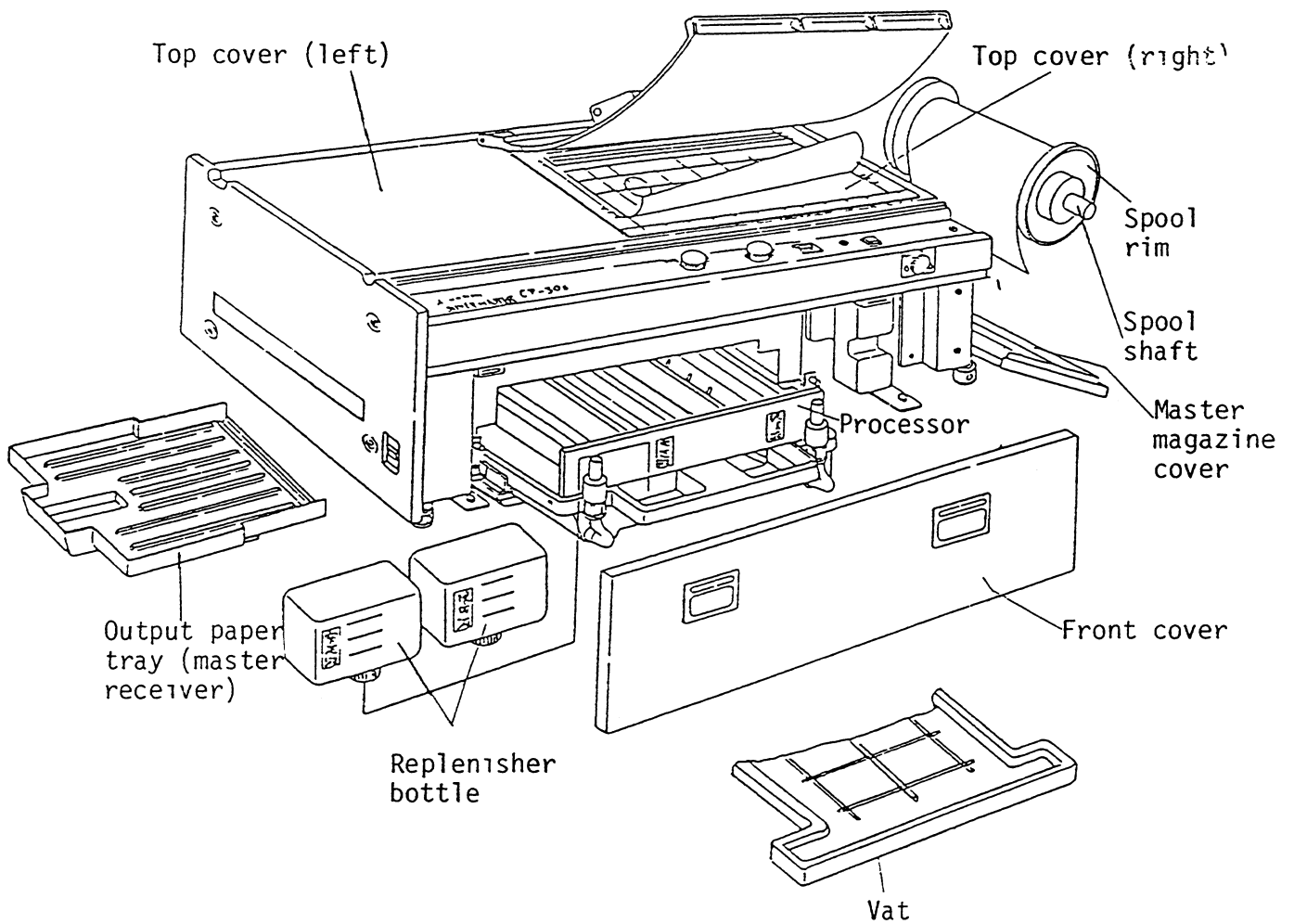


Fig.2

Packing List

No.	Description	Qty	No.	Description	Qty
1	Main body	1	9	Glass fuses (1 A, 5 A, 10 A)	each 4
2	Output paper tray	1	10	Blower brush	1
3	Spool rim	2	11	Spring belt	3
4	Spool shaft	1	12	Cutter blade (NT)	10
5	Replenisher bottle	2	13	Metal polishing compound	1
6	Vat	1	14	Retouching paints, brush	2 sets
7	Measuring cup (3 ℓ)	1	15	Tool box	1 set
8	Manuals	1 set			

Use the following procedure to install the CP-50S:

[Assembly]

1. Prepare a table or something like that.
It should measure approximately 1000 mm wide, 600 mm deep and 600 mm high and be sturdy enough.
2. Remove the nylon cover from the main body and place the main body on the table.
3. Turn the leveling bolts at the bottom until the main body bottom is about 30 mm above the table surface.
4. Put a level on the copy glass and level the main body.
Unless the main body is level, correct images can not be produced. Adjust the levelness with the copy holder both in its rightmost position and leftmost position.
(To move the copy holder to its leftmost position, turn on the power, set the master length to the maximum, and push the start button. Then turn off the power when the copy holder has reached its leftmost position. Turn on the limit switch at the inlet of the paper magazine.)
5. With the copy holder in its rightmost position (origin), remove the top cover (left), and move it to its leftmost position to remove the top cover (right).
The mirror is held with cushions (urethane foam, white) in transit. Remove all the cushions carefully, check the mirror position and replace the top covers as before.
6. Open the paper magazine cover.
The spool rims and spool shaft are held with cushions in transit. Remove them from the magazine.
7. Remove the front cover.
The processor and replenisher bottles held with cushions appear. Take them out.
8. After taking out the processor and conveyor units, clean the developer and stabilizer tanks

9. Put the vat under the processor.
10. Insert the output paper tray through the rectangular holes in the outlet cover.

[Mixing Processing Solutions]

1. Prepare the developer and stabilizer according to the Operation Manual and fill them into the respective tanks and replenisher bottles.
2. Mount the replenisher bottles full with replenisher on the respective units.

[Connecting the Power Supply]

1. Turn off the power switch (no-fuse breaker).
2. Connect the input power line to the power source.
The power requirement is 1 ϕ , 100 V, 1.2 kW (50 or 60 Hz).
Be sure to ground the machine.

[Adjustment]

1. Turn on the power switch and check a series of operations according to the Operation Manual.
2. Make test exposures and determine the standard exposure times (exposure dial settings) for different cases.

4. STRUCTURE AND OPERATION

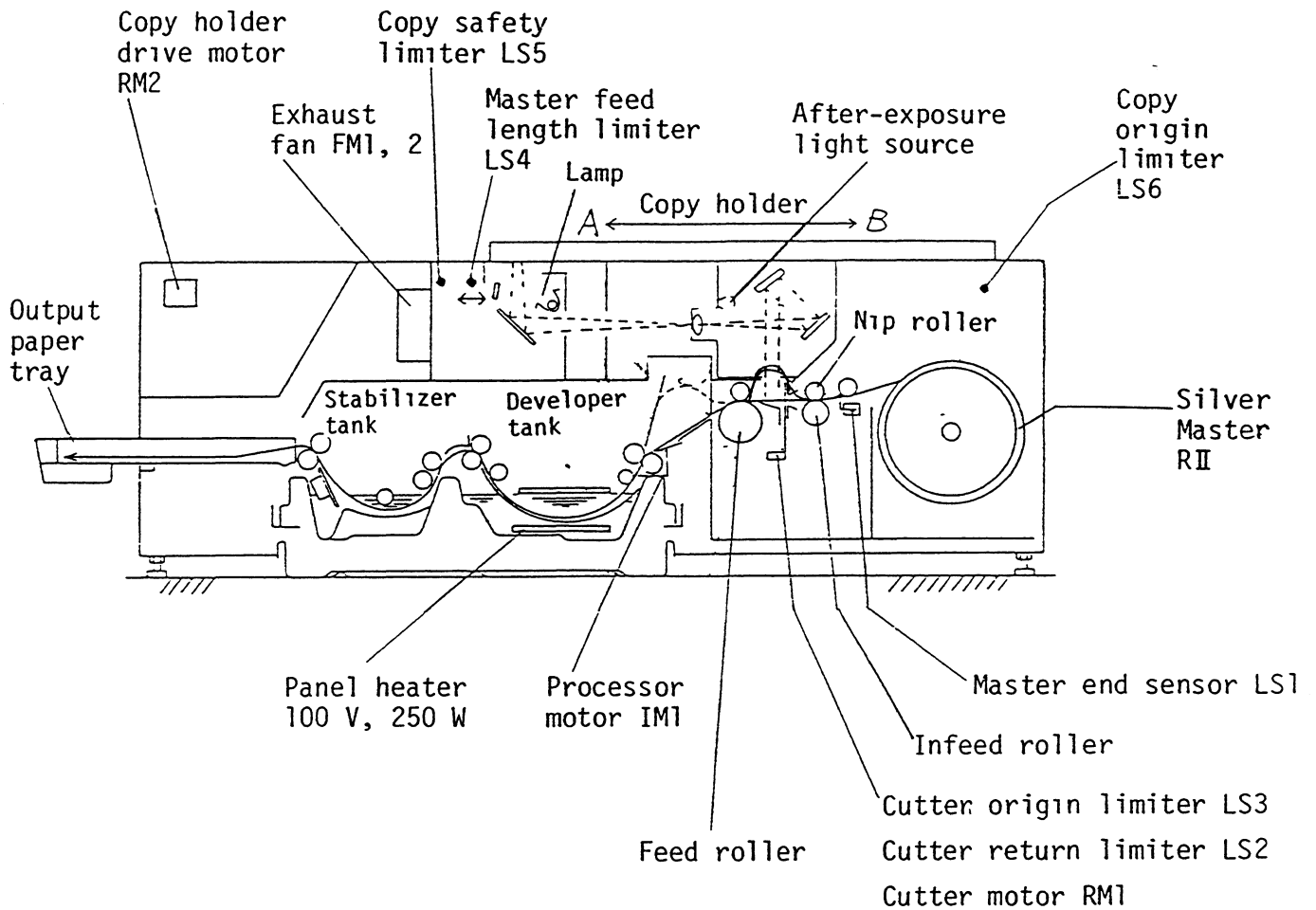


Fig.3

STEP	PROCEDURE	OPERATION AND REQUIREMENTS
Loading paper	Load paper.	<ol style="list-style-type: none"> 1. Select the master width (229, 254, 279 mm). 2. Set the nip roller to FREE (○), feed paper until its leading end touches the feed roller. Then, feed it back about 20 mm and set the nip roller to LOCK (●).

STEP	PROCEDURE	OPERATION AND REQUIREMENTS
Loading the copy	<ol style="list-style-type: none"> 1. Open the compression mat. 2. Place the copy with its image face down. 	Hold the central part of the compression mat and open it gently.
Setting MASTER LENGTH	Adjust the MASTER LENGTH dial on the control panel.	<p>When the dial is turned to specify the master length depending on the diameter of the press cylinder in use, limit switch LS4 for setting master length moves horizontally. The master length should be between 370 mm and 480 mm.</p> <p>(For the machines of serial numbers 8001 to 8050, a lock knob is provided to lock the master length dial in position.)</p> <p><u>Preliminary Conditions for Machine Start</u></p> <ol style="list-style-type: none"> (1) The cutter should be in its original position. (2) Paper is loaded, and end limiter LS1 is ON. (3) The copy holder is in its original position.
Starting	Push the start button PBI.	<ol style="list-style-type: none"> 1. Relay Ry1 turns on and holds its state. When Ry1 is turned on, start OK pilot lamp PL goes out.
Exposure/scanning	Set the exposure dial (standard settings 12 - 15).	<ol style="list-style-type: none"> 2. When Ry1 is turned on, copy holder drive motor RM2 turns on and the copy holder moves in the A direction (◀).
Feeding paper	Set master length (370 - 480 mm)	The pulleys on the drive motor shaft and paper feed roller shaft synchronize via the steel belt, so paper is fed as the copy holder moves

STEP	PROCEDURE	OPERATION AND REQUIREMENTS
		<p>Also when Ry1 turns on, relay for light source, Ry4, is energized to turn on the halogen lamp (80 V, 600 W).</p>
Cutting paper		<p>3. As the copy holder moves and touches master length set limiter LS4, the copy holder stops, relay Ry2 turns on and after-exposure lamp L2 lights up. When Ry2 turns on, paper cut motor RM1 is operated to cut paper in the direction of the ▲ mark and counter Co counts up by one.</p>
Return of the copy holder to origin		<p>4. When Ry2 turns on, Ry1 turns off, the copy holder moves in the B direction (▶) and relay for light source Ry4 turns off</p> <p>5. When the copy holder touches origin limit switch LS6, relay Ry3 turns on, relay Ry2 turns off and after-exposure lamp L2 turns off.</p>
Start OK indicator ON for another exposure		<p>6. When relay Ry2 turns off, the cutter moves to the origin (▼). When it touches cutter origin limit switch LS3, the start OK indicator turns on for another exposure.</p>
Development		<p>7. At the time of above steps 2 and 3, the leading end of the paper is in the processor developer tank where it is developed.</p>

STEP	PROCEDURE	OPERATION AND REQUIREMENTS
Stabilizing Paper output		<p>The developer tank incorporates a panel heater (250 W, with self control) and the developer is maintained at 28°C to 31°C.</p> <p>8. The paper is stabilized in the stabilizer tank.</p> <p>9. The paper (master) is put out in the output tray.</p>

5. INSPECTION AND ADJUSTMENT OF THE OPTICAL SYSTEM

The optical (focusing/sizing) system is adjusted thoroughly before shipment. However, if it is found to fail, make inspections and adjustments using the following procedure.

[Inspection and adjustment procedure]

- (1) Image distortion correction: Made by horizontally shifting Mirror 1 in the optical system.
- (2) Focus adjustment: Made by horizontally shifting Mirror 1.
- (3) Image size adjustment: Made by horizontally shifting the lens.

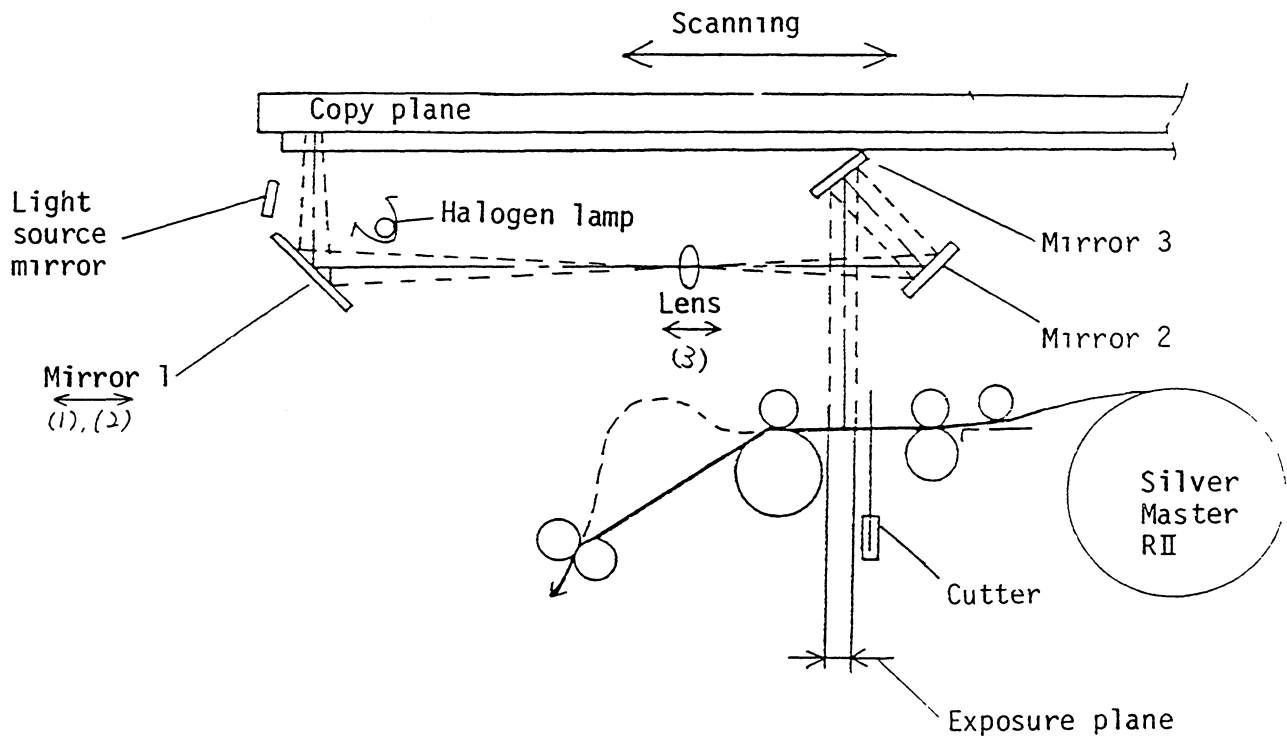


Fig.4

Distance between the copy plane (C) and the lens (L): $A = f(1 + \frac{1}{m})$

Distance between the lens (L) and the exposure plane (P): $B = f(1 + m)$

where f: focal length of the lens
m: magnification.

Best Focusing

Theoretical positional relationship among the copy, lens, and exposure planes for best focusing is as follows:

$$A = B$$
$$f(1 + \frac{1}{m}) = f(1 + m)$$

E.g.) f: 150 mm, m: 100%

$$150 (1 + \frac{1}{1}) = 150 (1 + 1)$$

$$A = B = 300$$

Practically, however, distances A and B are not always 300 mm because the actual focal length varies with individual lenses.

A. [Image Distortion Check]

(1) Load the test chart (ruled into squares) or a suitable scale to check for image distortion.

(2) Make an exposure of the chart or scale with the master length dial at about 470 mm. 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.) (Allowable error)

1 A, B, C, D (240 mm square)

The deviation from 240 mm should be within ± 0.5 mm.

2 a - b, c - d

The difference should be within ± 0.4 mm.

Reference
zero line

[Adjusting Procedure]

This adjustment is made by shifting mirror 1 in the optical system horizontally. (The mirror is not parallel to the lens.)

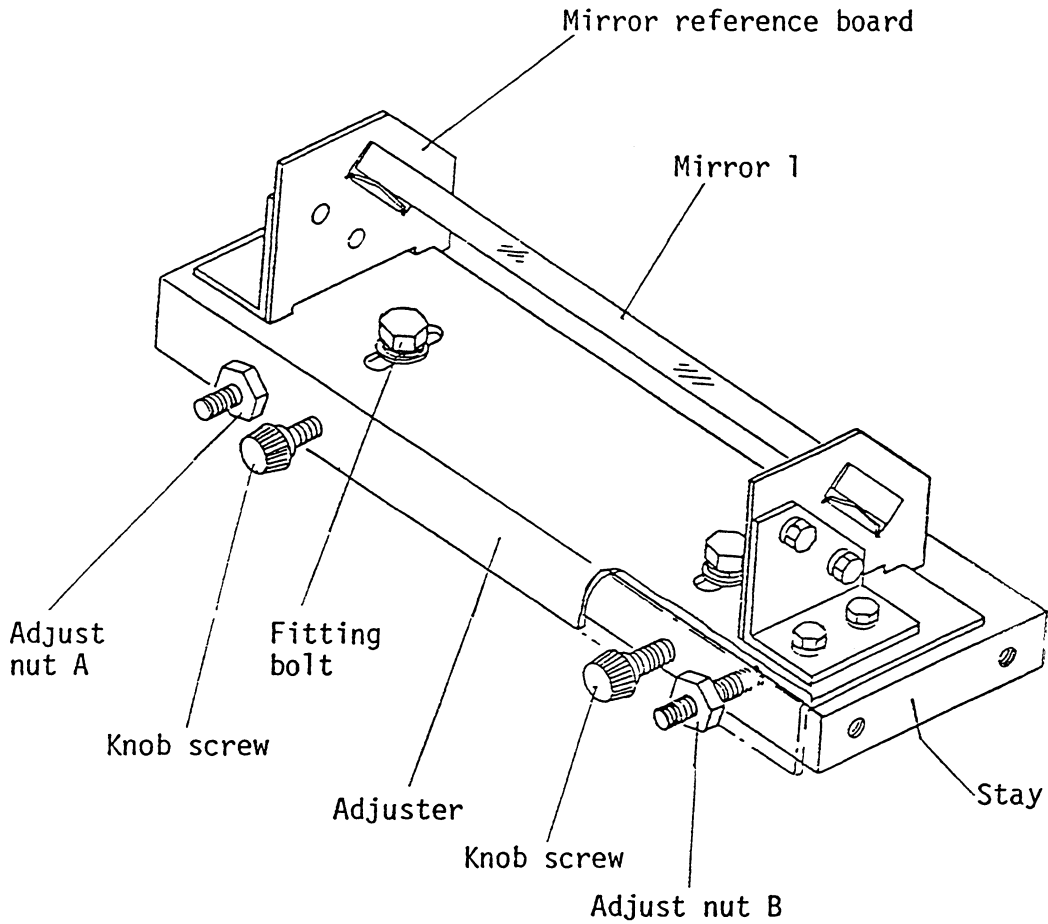
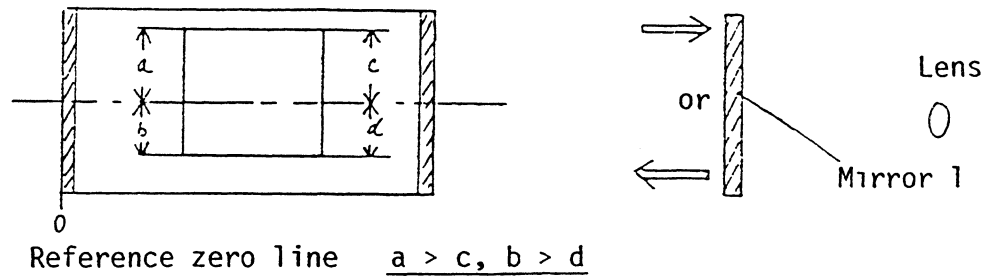


Fig.5

- * Remove the top cover (left).
- * Lengths A and B in the paper feeding direction are kept accurate as long as the mechanism of the machine retains sizing accuracy in this direction.
- * As the CP-50S utilizes a slit exposure method, first measure lengths C and D and then lengths a, b, c and d.

E.g.) The following procedure can be used when lengths a and c are longer than lengths b and d respectively.



- (1) The adjuster is fixed on the stay with the fitting bolts. Loosen the bolts.
- (2) Loosen the two knob screws.
- (3) According to the focus adjustment instructions, check in which direction Mirror 1 should be shifted. Adjust nut A should be turned clockwise and adjust nut B counterclockwise. (Before the adjustment, be sure to mark the nut position on the bolt side.)
(Amount of adjustment)
The exposure size changes approximately 0.5 mm as the adjust nut is turned by one revolution.
- (4) Tighten the knob screws.
- (5) Tighten the fitting bolts and then make an exposure.
- (6) Measure the exposure. If the error exceeds the allowed range, repeat the adjustment.

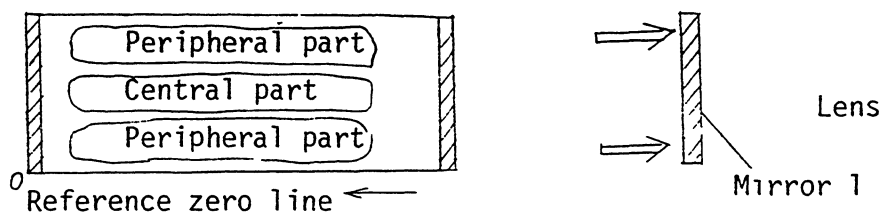
B. [Focus Check]

- (1) Make an exposure of the test chart (resolution chart) or Mitsubishi standard chart with 70% over the normal light exposure.
- (2) If 8.3 lines/mm or higher resolution is found when the exposure is checked through a magnifying glass, the image is regarded as in focus.

[Focus Adjustment]

This adjustment is made by horizontally shifting mirror 1.

E.g.) The peripheral parts are fuzzier than the central part. (See Fig.5.)



- (1) Loosen the bolts fitting the adjuster on the stay.
- (2) Loosen the two knob screws.
- (3) Turn adjust nuts A and B equivalently clockwise to bring mirror 1 closer to the lens. (Be sure to mark the nut position on the bolt side before the adjustment.)
- (4) Tighten the knob screws.
- (5) Tighten the fitting bolts and then make an exposure.
- (6) Measure the exposure. If the error exceeds the allowed range, repeat the adjustment.

C. [Image Size Check]

° See "A. [Image Distortion Check]."

[Adjustment Procedure]

This adjustment is made by horizontally shifting the lens.

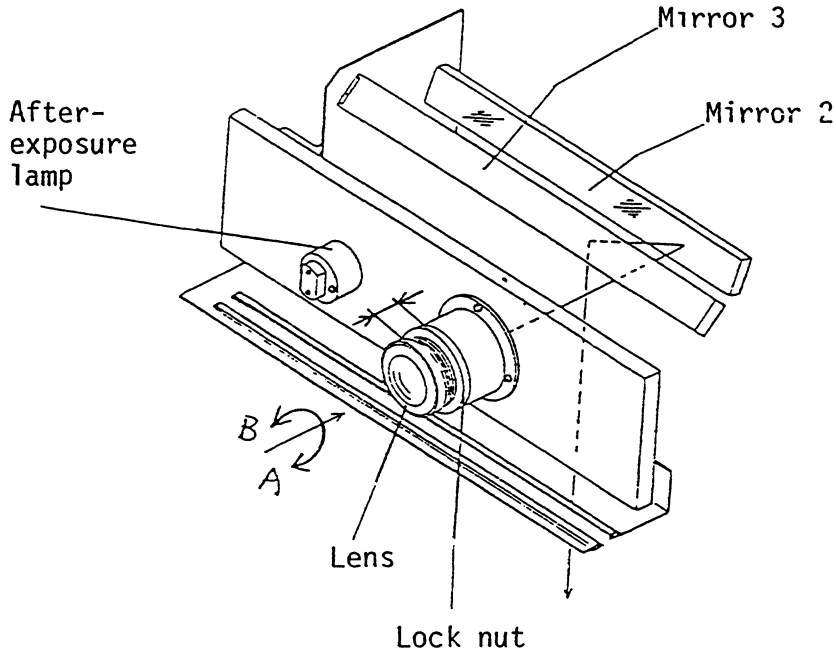


Fig.6

(1) Remove the top cover (right) under the copy holder.

(2) Before adjusting the sizing system, be sure to measure the distance between the outer surface of the lens and the lock nut with a scale to record the original position.

° The exposure is larger than the original:

(a) Hold the lens by hand to prevent it from turning, and turn the lens lock nut counterclockwise to loosen it.

(b) Turn the lens clockwise (in the A direction), tighten the lock nut, place the top cover (right), and then make an exposure. Never fail to replace the top cover (right) as it was before making an exposure

° The exposure is smaller than the original:

The above procedure is used, except that the lens should be turned counterclockwise (B direction).

[Amount of adjustment]

The exposure size changes approximately 1.0 mm as the lens is turned by one revolution.

6. ADJUSTMENT OF THE MASTER LENGTH

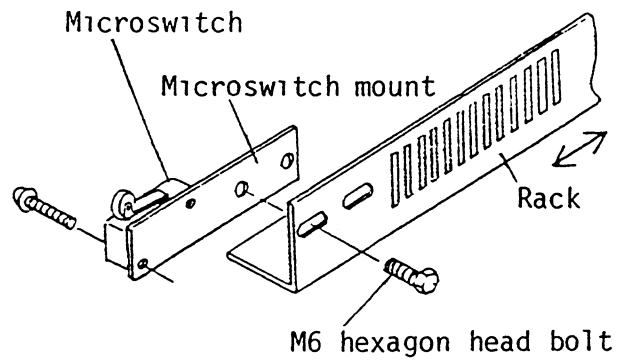


Fig.7

- * The master length is set by turning the MASTER LENGTH dial on the control panel. As the dial is turned, the rack as shown above moves horizontally.
Therefore, the master length is controlled by using the long hole for locking the microswitch mount at the left end of the rack.
- * When the processor front cover is open and the master feed length is set to 48 cm, the parts as shown in Fig.7 are seen.

[Adjusting Procedure]

- (1) Set the master length to 40 - 48 cm, and make an exposure.
- (2) Measure the length of the exposure (master) and compensate for the difference between the actual length and set length by adjusting the position of the microswitch mount in the long hole of the rack.

7. REPLACEMENT OF THE OPTICAL SYSTEM MIRROR

* The block where the optical system mirror is mounted has three cloth spotting pieces on the mirror reflecting side (two on one side and one on the other). See Fig.9.

* Mirrors 1, 2 and 3 are all positioned so that their reflecting sides face the lens.

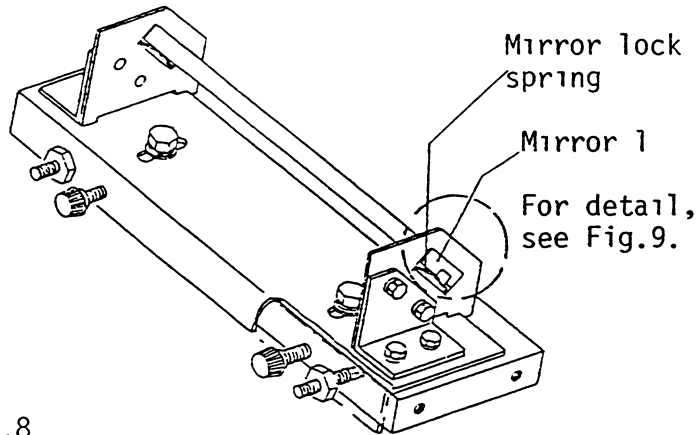


Fig.8

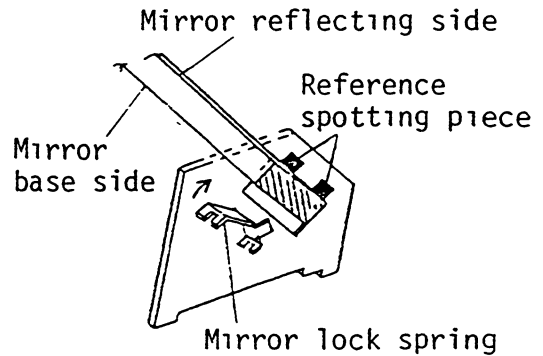


Fig.9

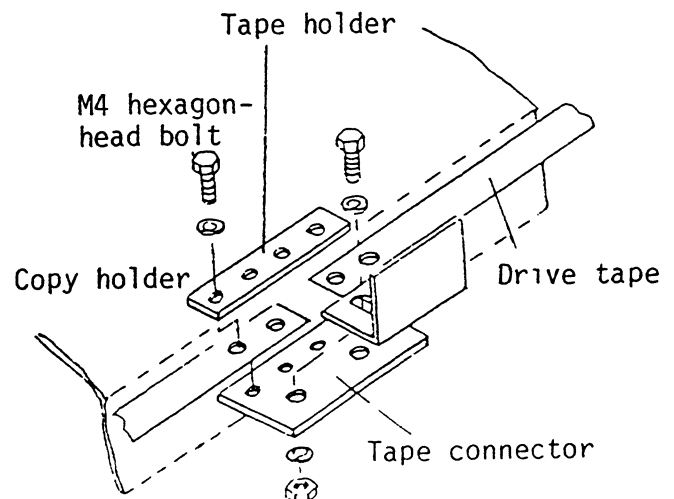
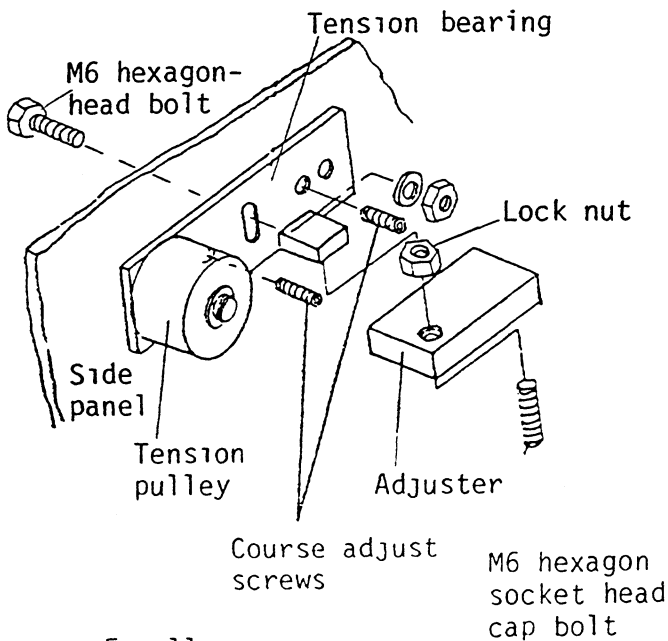
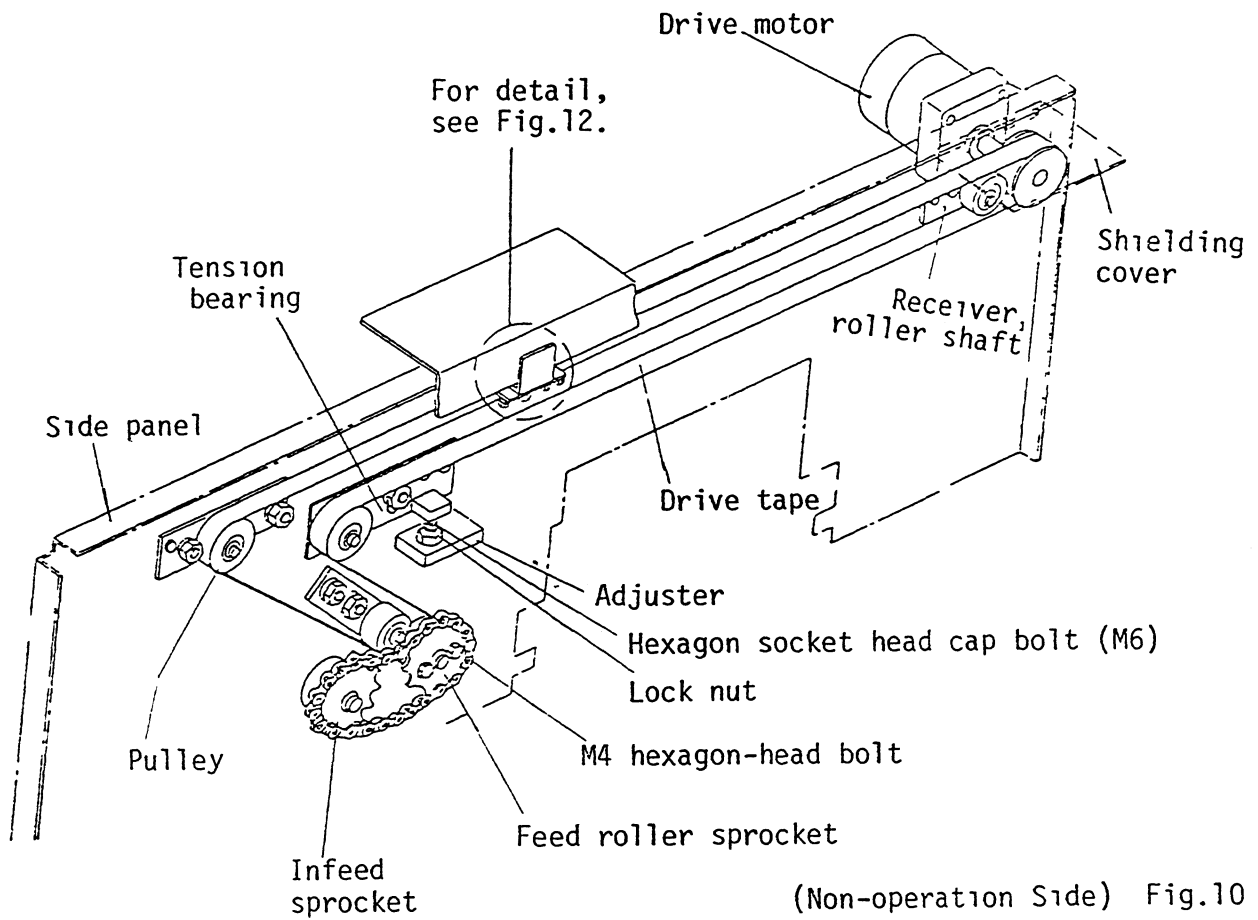
If the image is affected by a scratched mirror, replace the mirror concerned

[Replacement Procedure]

- (1) Remove the left-hand top cover (mirror 1) or right-hand top cover (mirror 2 or 3).
- (2) The mirror is secured with the mirror lock springs through rectangular holes on its base side.
- (3) Bend the mirror lock spring toward the arrow and shift it outward to remove it.
- (4) When installing a new mirror, wear gloves and reverse the removal procedure, taking care not to leave finger marks.
- (5) Replace the top cover as it was and make a test exposure and check it.

NB) The light source mirror is secured with the lock springs on its reflecting side

8. REPLACEMENT OF THE DRIVE TAPE (See Figs. 10, 11 and 12.)



* If the drive tape is broken or it does not work properly, replace it.

[Removal and Installation of the Drive Tape] See Figs. 10 and 11.

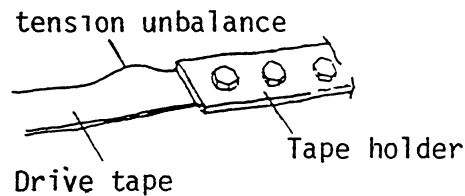
- (1) Turn on the power switch and turn it off when the copy holder has reached its leftmost position (set master length 48 cm).
Then remove the top cover (right).
- (2) Turn on the power switch again, and turn it off while the copy holder is moving to the original position.
The tension bearing is secured on the inside of the side panel with M6 hexagon-head bolts.
Stop the copy holder in such a position that the bolts can be loosened.
If the drive tape is broken, the copy holder moves lightly, so it should stop around the middle position.
- (3) Loosen the M6 hexagon-head bolts for the tension bearing.
- (4) Loosen the lock nut.
- (5) Loosen the hexagon socket head cap bolt (M6) on the adjuster with a hexagon bar spanner with 3 mm-sided hexagon.
- (6) Push down the tension bearing and the drive tape becomes less tense.
- (7) Remove the tape holder retaining the drive tape, referring to Fig.12 by loosening four M4 hexagon-head bolts.
- (8) Install a new drive tape.
Position the tape holder, tape itself and tape connector so that they are parallel to each other, and lock them temporarily. (Don't tighten so much.) If they are not parallel to each other, the tape may meander.

[Drive Tape Tension Adjustment] See Fig. 11.

- (1) Put the drive tape on the center of each pulley.
- (2) Tighten the hexagon socket head cap bolt (with a spanner with 3 mm-sided hexagon) to tighten the drive tape.
The tape should be tense enough

- (3) Tighten the M6 hexagon-head bolt securing the tension bearing.
- (4) Tighten the tape holder with four M4 hexagon-head bolts to hold the tape in position.
- (5) Turn on the power switch and the copy holder returns to its original position.

With the copy holder in its original position, check if one side of the tape is tenser than the other around either end of the tape holder. Such tension unbalance between both tape sides may result in meandering of the tape.



- (6) If any tension unbalance exists, loosen two M4 hexagon-head bolts on the tape holder, adjust the tape and retighten the bolts.
- (7) Turn on the power switch and push the start button to check a series of operations.
 - * If the copy holder seems to stop momentarily, increase the drive tape tension a little.
 - * Make sure the tape does not meander and is always on the pulleys. If it seems to be going to get out of the pulleys, some tape tension unbalance is suspected. Adjust the tape with the procedure stated in (5) and (6).
- (8) Replace the covers as before.

9. COPY HOLDER

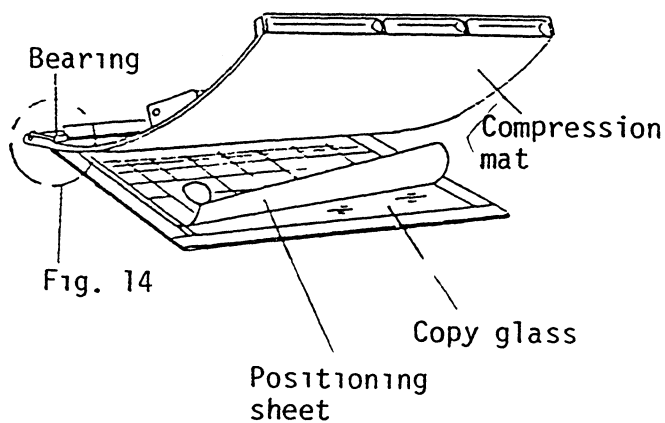


Fig. 14

Fig. 13

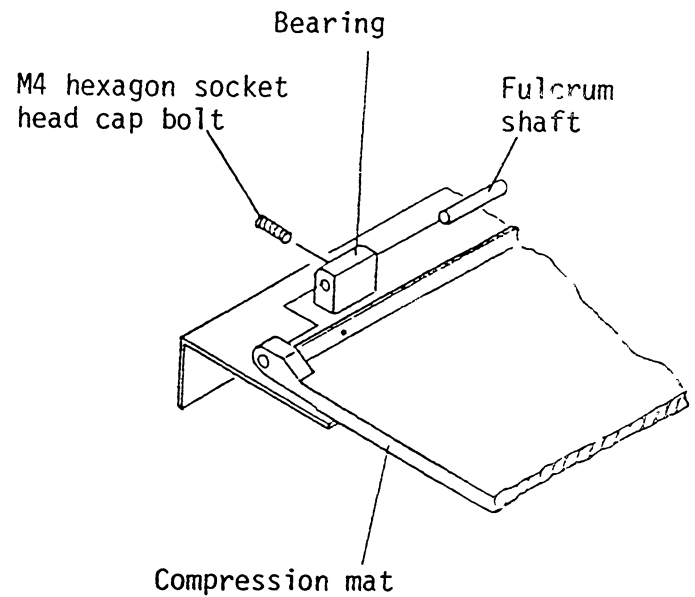


Fig. 14

[Replacement of the Compression Mat] See Fig.14.

- (1) Loosen the hexagon socket head cap bolt (M4) with a hexagon spanner with 2 mm-sided hexagon.
 - (2) Slide the fulcrum shaft inward.
 - (3) Take the pressure sponge up to remove it.
- For installation, reverse the removal procedure.

[Replacement of the Copy Positioning Sheet]

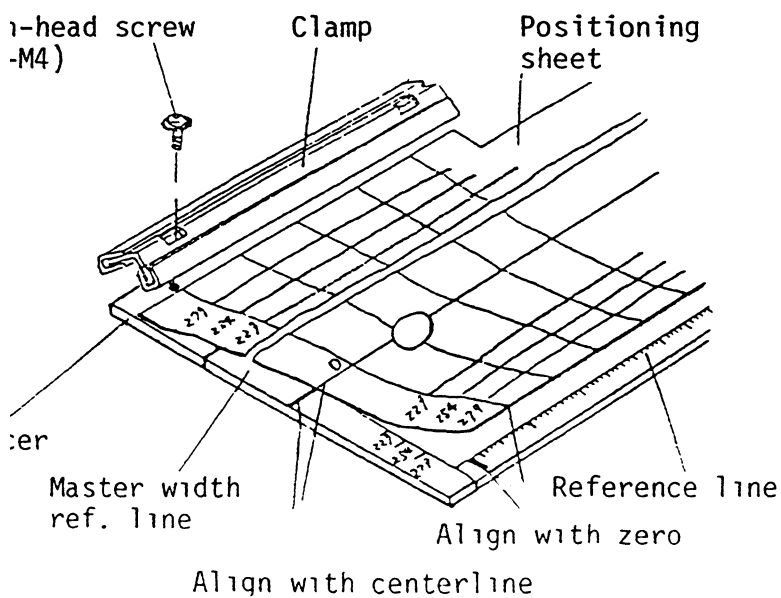


Fig. 15

- (1) Loosen four M4 pan-head screws.
- (2) Put a new positioning sheet between the spacer and clamp.
- (3) Align the centerline of the sheet with the master width reference line and align the end of the effective exposure area with the reference zero line.
- (4) Tighten the M4 pan-head screws

10. PROCESSOR

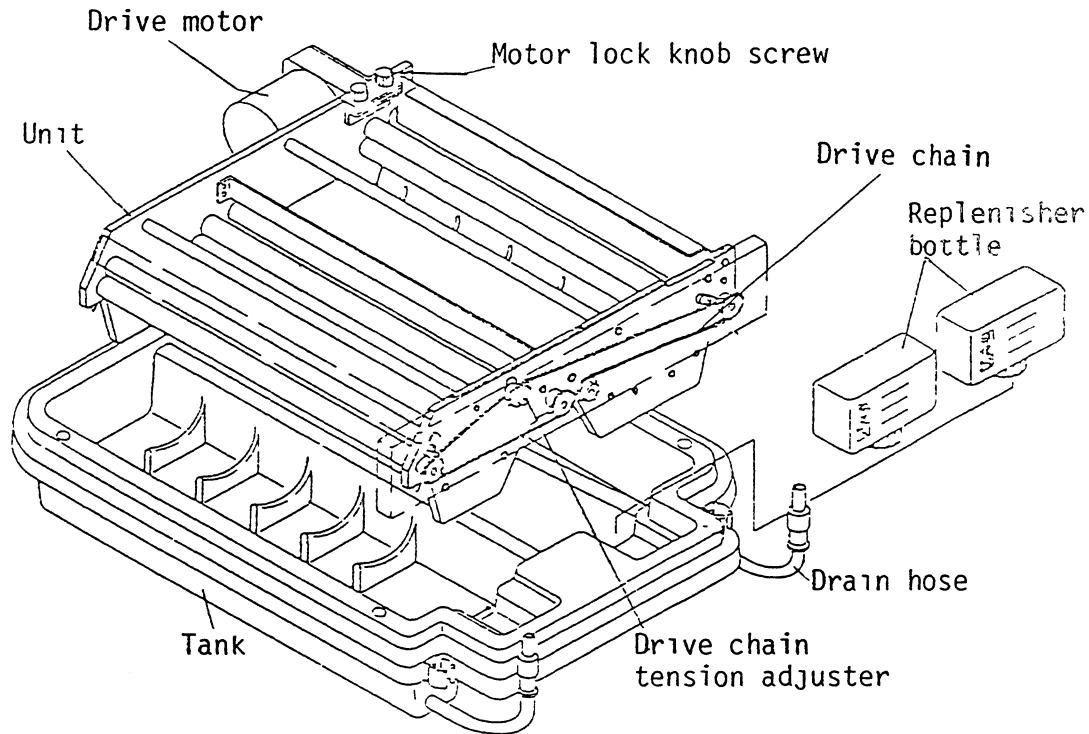


Fig. 16

- * The processor may be drawn out of the main body. While it is being drawn, it should be held by hand.
- * The drive chain tension is adjusted through the sprocket mounting hole (Fig. 16).
- * If a master is scratched, check if the free rollers rotate smoothly (1) and if their surfaces are not dirty (2). If dirty, clean them.
- * If a master is fed properly, the developer tank lower finger surfaces may not be smooth.
- * To remove the drive motor:
 - (1) remove the processor drive motor connector J3 and
 - (2) remove two motor lock knob screws.

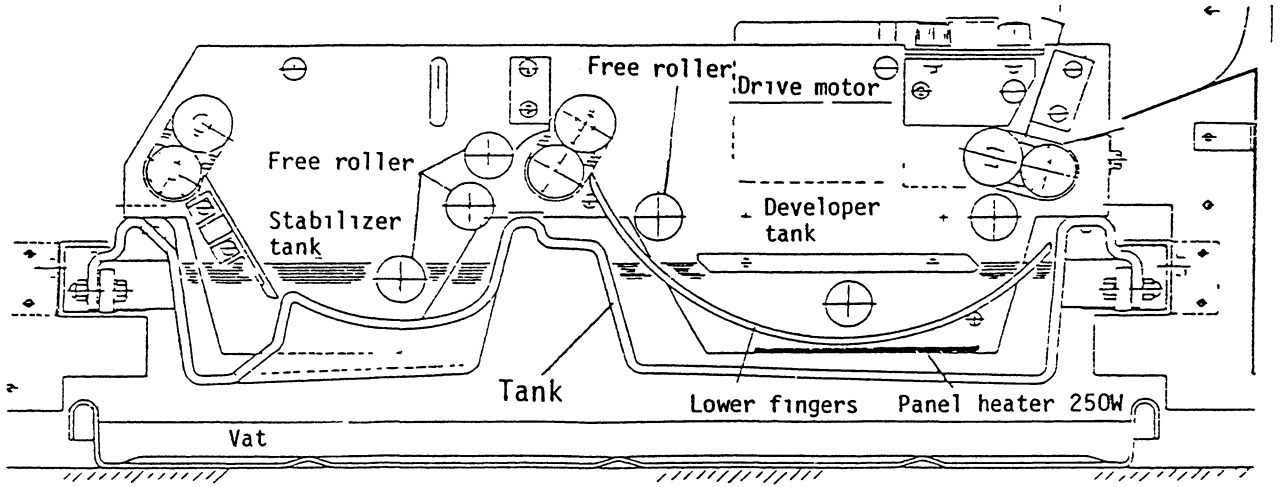


Fig. 17