

MITSUBISHI SILVER MASTER

CP-404 II (CP-550)

SERVICE MANUAL

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* For further details, refer to the CP-404 II Operation Manual, Technical Guide and other documents.

For consultation or parts ordering, let us know the model (CP-404 II) and the serial number of the machine.

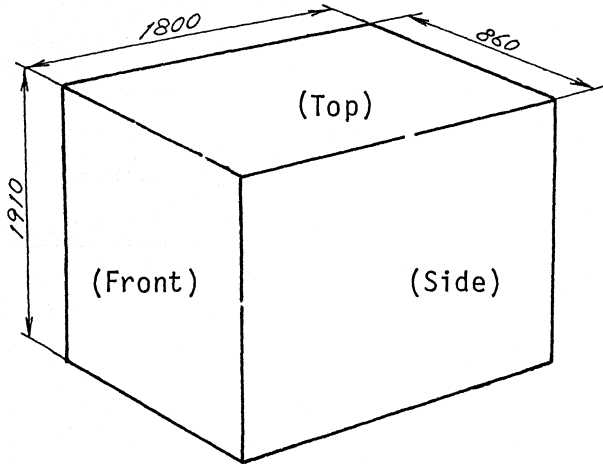
When ordering parts, let us know descriptions, reference numbers and required quantities of parts according to the parts list, and date of delivery.

* Please avoid duplication or publication of this manual.

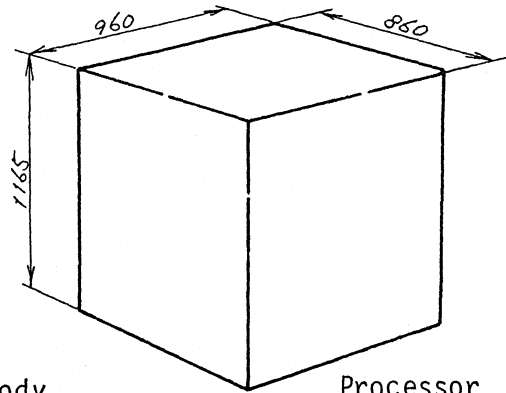
1. UNPACKING, INSTALLATION AND ADJUSTMENT

[Unpacking]

The main body and the processor are packed in wooden crates separately. The package sizes are as follows:



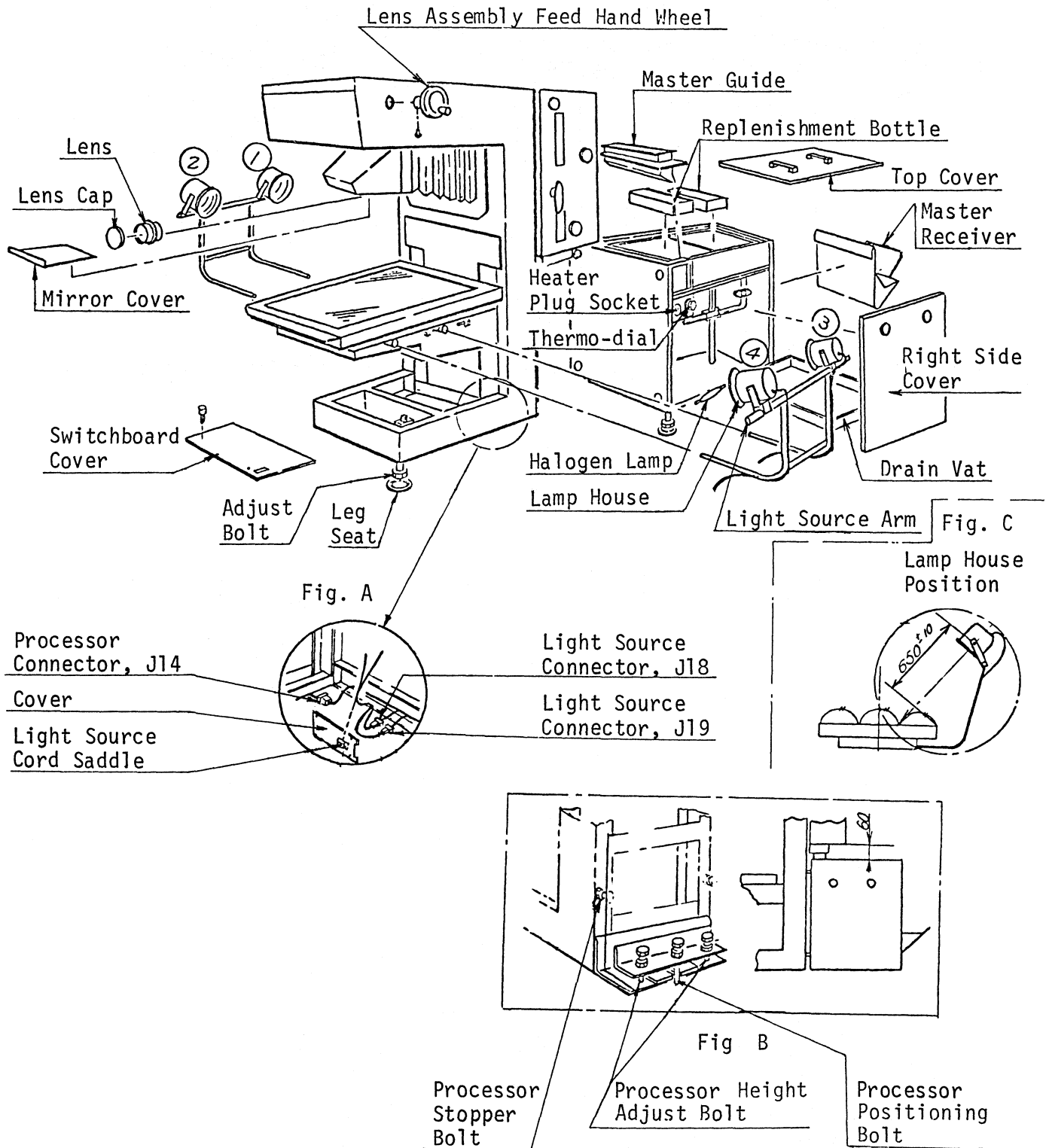
Main Body
(approx. 400 kg)



Processor
(approx. 100 kg)

For unpacking, disassemble both sides, the top and the front/rear of each crate in order.

[Installation Procedure]



Packing List

(1) Main Body	1	(14) Leg Seat	8
(2) Processor	1	(15) Tool Box	1 set
(3) Right Lamp Arm	1	(16) Metal Polishing Compound	1
(4) Left Lamp Arm	1	(17) Operation Manual	1
(5) Lamp House	4	(18) Sample Original	1
(6) Lens	1	(19) Wall Operation Manual	1
(7) Lens Assembly Feed Hand Wheel	1	(20) (Spare Parts)	
(8) Spool	2	Fuse 3A	8
(9) Master Guide	1	10A	4
(10) Replenishment Bottle	2	Spring Belt	2
(11) Master Receiver	1	Catch (bearing)	2
(12) Drain Vat	1	Retouching Paint	2
(13) Measuring Cup	1	Retouching Brush	2
		Cord Band	14

[Assembling and Preparations]

- (1) Put the leg seats in place and the main body on them.
- (2) Hang a thread from the main body and adjust its perpendicularity with four adjust bolts. Adjust so that the four bolts are equally weighted
- (3) Connect the processor with the main body. (See Fig B.)

Fit the processor horizontal positioning bolt into the positioning bracket and make the height adjust bolts in contact with the main body. Then adjust the processor adjust bolts so that the processor touches the four processor stopper bolts.

- (4) Remove the covers from the frame legs and connect the connector (J14) to the processor
- (5) Mount the lamp arms and the four lamp houses at positions (1), (2), (3) and (4) as shown, respectively. Then, secure them at the red points of the respective lamp arms and bind their cords around the arms. (cut off excessive cord if any.)

Position the lamp houses as shown in Fig. C so that the optical axis of the lamp is directed toward a point one-third of the original frame width away from the edge of the frame

- (6) Connect the connectors for the lamp houses (J16, J17, J18 and J19).
Then, put them in the legs of the frame, attach the covers and secure their cords with the saddles.
- (7) Install the halogen lamps.
Hold the lamp glass tubes with paper or the like on your hand instead of holding them with bare hands.
- (8) Remove the mirror cover and attach the lens.
Take care not to stain the lens with fingerprint marks.
- (9) Install the lens assembly feed hand wheels, master receiver, drain vat and other parts.
- (10) Remove the processing units and tanks from the processor and clean the insides of both the units and tanks.
At first, the rollers may not rotate smoothly So, rotate the rollers with your hand before test running.

[Power Input]

- (1) Turn off all the switches.
- (2) Connect the input line with the power source. (single-phase 100 V
3.0 kVA)
- (3) Be sure to earth the green grounding wire.

[Adjustment]

(1) Master length

Set the master length set timer on the control panel to the master length which is expected to be most frequently used.
Then measure the length fed actually.

If the desired length is not obtained, adjust with timer T2 in the switchboard.

(Master feed rate: 30 mm/sec T2: 9.6 sec)

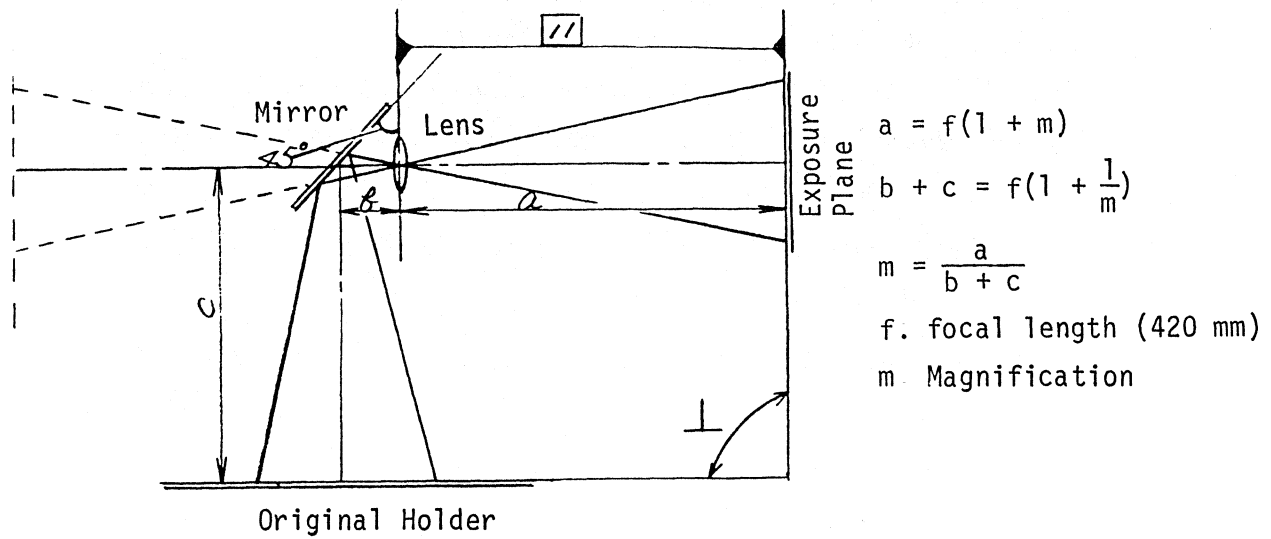
(2) Temperature of processing solutions

Before turning on the heater switch, make sure that the thermo-dial is set to 30°C (red mark) and that the heater is plugged in. The optimum developing temperature is 28 ~ 30°C when the HEATER pilot lamp is off. If not so, adjust the temperature with the thermo-dial.

(3) Set the cycle changeover knob for the exposure timer to the local service power frequency.

(4) Check the operation of the machine according to the operation manual.

2. SLANT & FOCUS/SCALE ADJUSTMENT

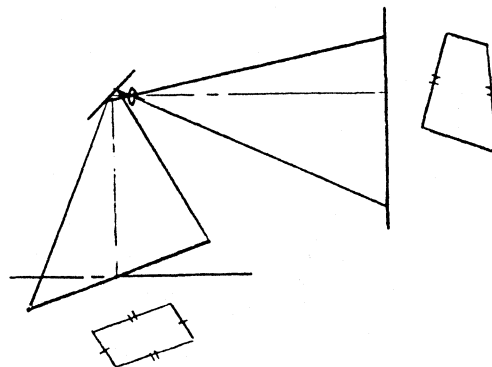


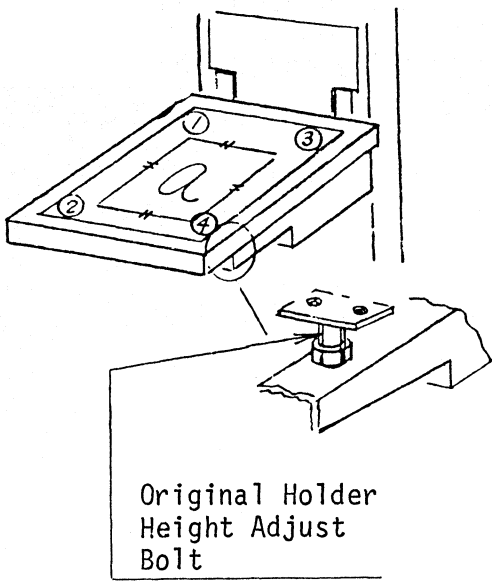
At least the following conditions should exist to produce quality prints:






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

[Slant Adjustment]

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





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

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

[Focus/Scale Adjustment]

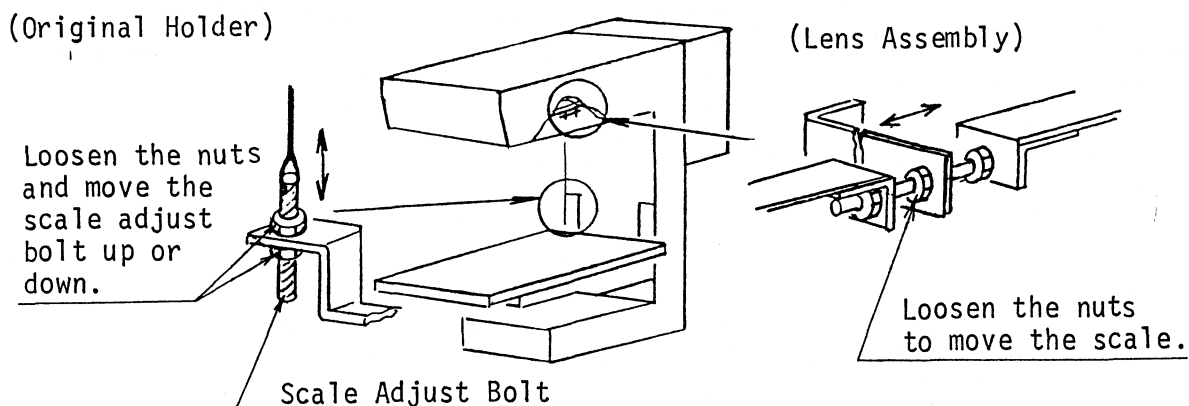
- (1) Make the slant adjustment as stated above.
- (2) Set the lens assembly or the original holder to 100%. (Assume that the lens assembly is set to 100%.)
- (3) Move the original holder up and down bit by bit and make an exposure each time. Then compare the exposure results with one another and find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

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

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

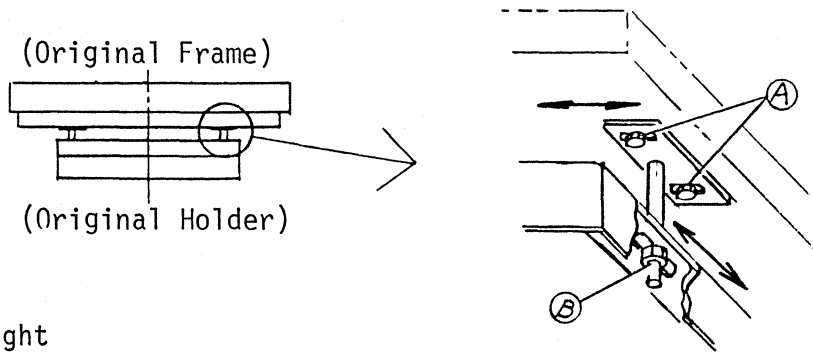
- (5) Adjust the respective scales to the calculated magnification (ex. 101%) without moving the lens assembly and the original holder.
- (6) Set the stop value to 22 and set the lens assembly and the original holder to 100% on the scales. Make an exposure and check the focus and size of the image obtained.
- Resolution accuracy: 10 lines/mm
 Size accuracy: ± 0.5 mm/300 mm
- (7) If size or resolution accuracy is not within the above allowable range, repeat above steps 2 through 6.

(Scale adjustment points)



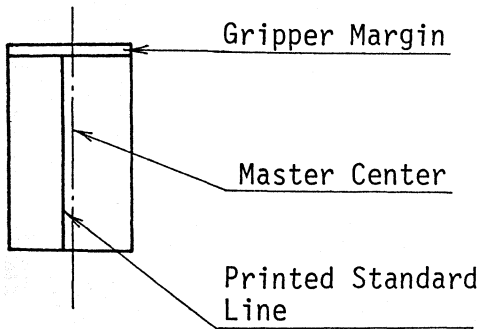
3. ADJUSTMENT OF OPTICAL AXIS

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



(1) Left/Right

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

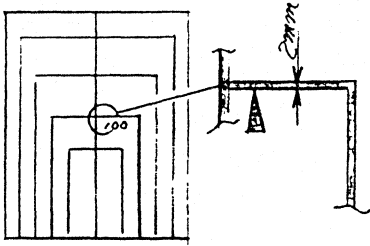


(Print)

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

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

(2) Front/Back

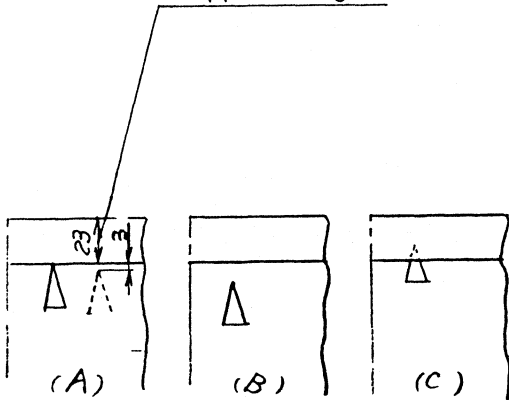


1) Set the master paper short of the standard size so that the master gripper margin is not exposed.

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

Then check the result

Gripper margin



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

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

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

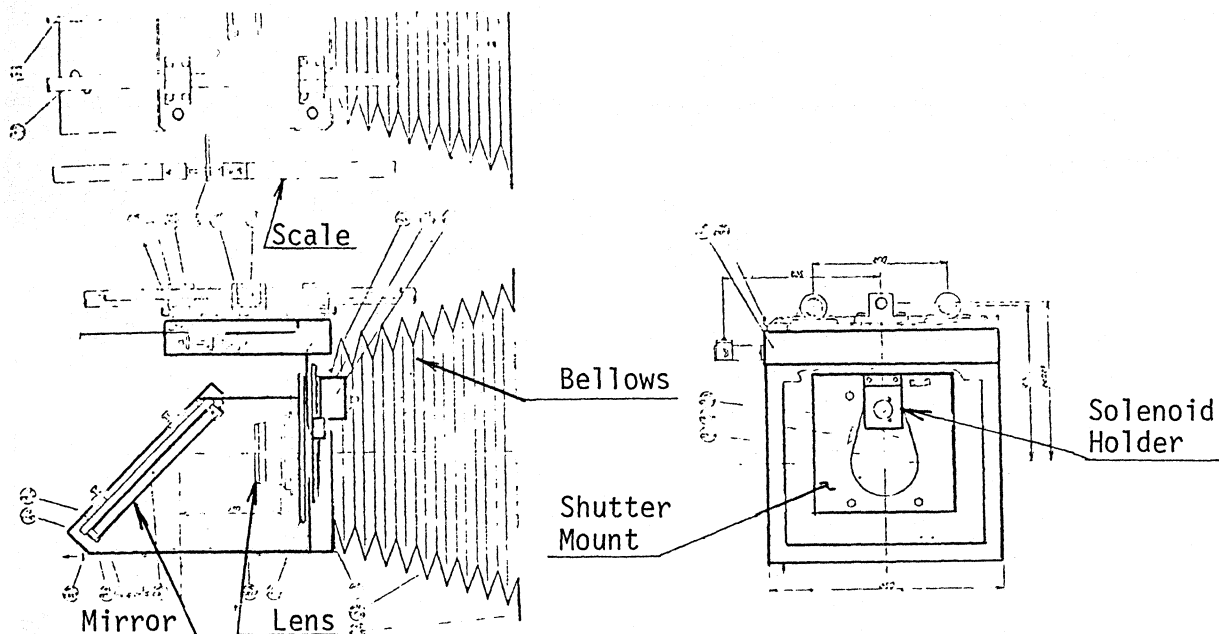
(C) Not good . The vertex appears in the gripper margin.

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

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

4. LENS ASSEMBLY

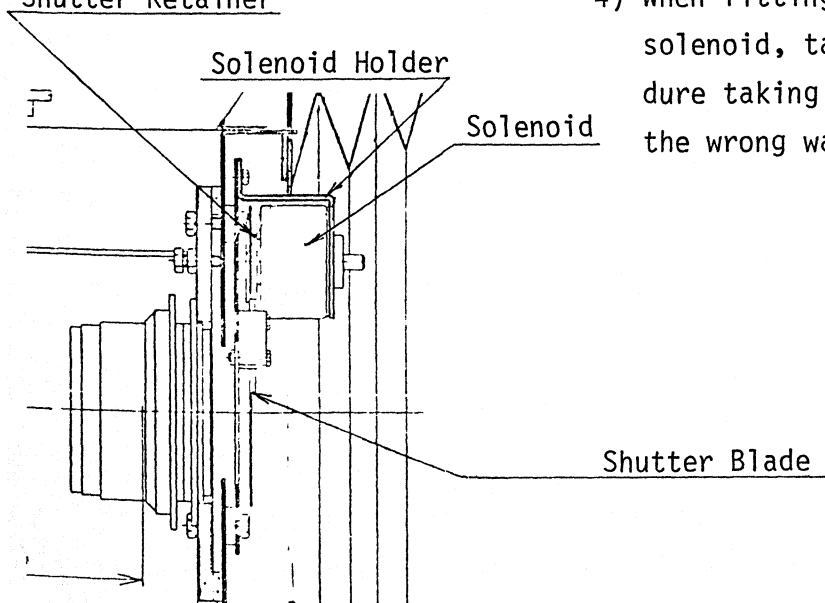
[General Drawing]



(1) Replacement of Shutter Solenoid

- 1) Remove the screws securing the bellows on the lens assembly.
- 2) Remove three shutter mount bolts (M6) and solenoid cord connector J4 from the bellows side of the lens assembly to remove the shutter mount.
- 3) Remove the solenoid holder from the shutter mount and remove the solenoid fitting screws to separate the solenoid from the shutter.

Shutter Retainer



- 4) When fitting the shutter to a new solenoid, take the reverse procedure taking care not to place it the wrong way.

(2) Replacement and Adjustment of the Mirror

[Checkup before Replacement]

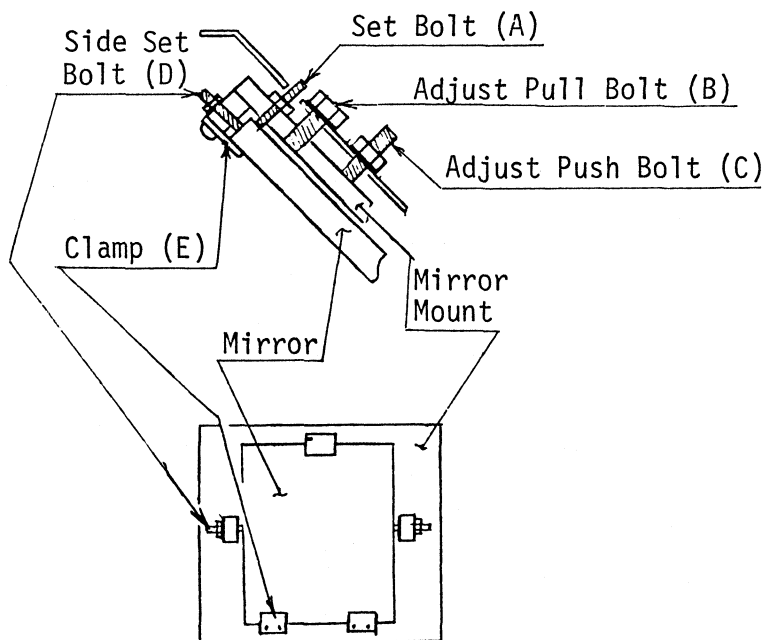
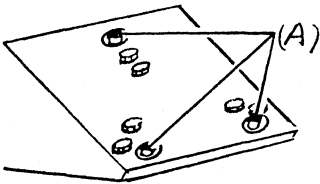
Prior to the replacement, be sure to make the following adjustment and check the result:

Set the magnification to 100% and measure the slant (see P. 6).

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

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

[Replacement Procedure]



(1) Detachment

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

- 1) Loosen three mirror set bolts (A) (M4 hollow).
- 2) Loosen mirror side set bolts (D).
- 3) Loosen three mirror clamps (E) and the mirror will come off.

(2) Attachment

- 1) Prepare cotton gloves, clean soft cloth or paper in order not to leave fingerprint marks.
- 2) With the reflection surface of the mirror downward, put the mirror on the mirror mount and attach the mirror clamps (E).

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

Then, tighten the lock nuts.

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

[Checkup and Adjustment]

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

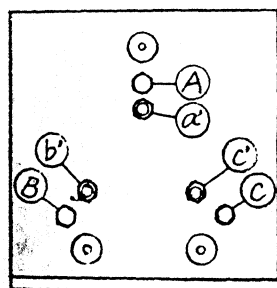
(2) If the slant exceeds 0.5 mm/300 mm, the adjustment stated next is necessary

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

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

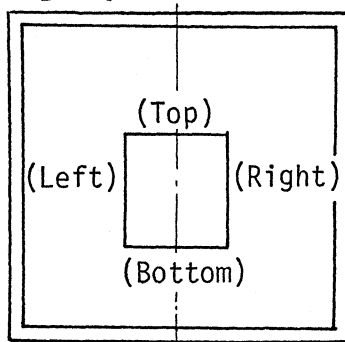
Adjustment

[Lens Assembly]







A B C Mirror Pull Bolt
 a' b' c' Mirror Push Bolt

[Original Holder]



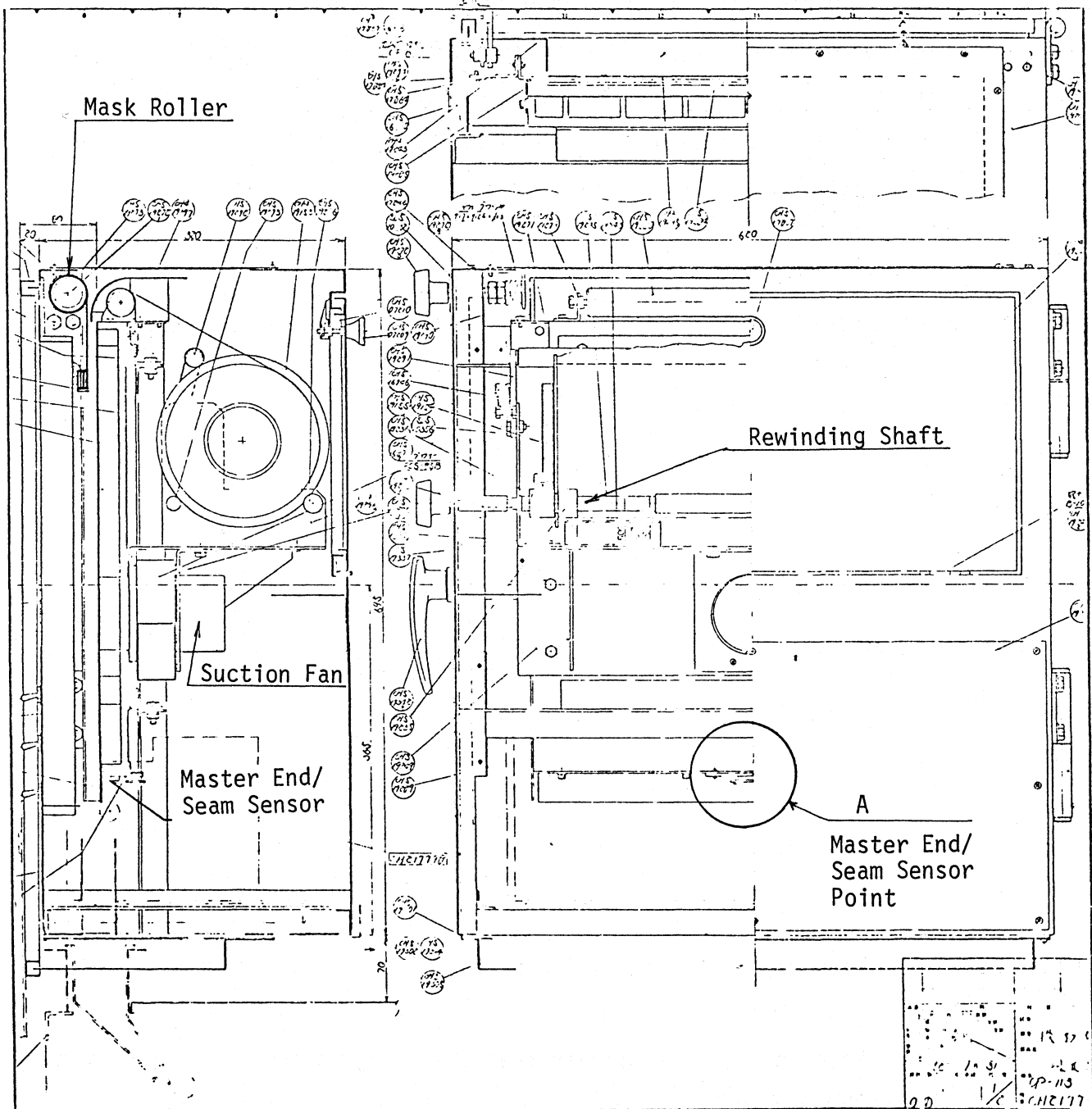
[Operator Side]

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

Mirror replacement and slant adjustment may influence the focus/scale system. If focus and scale readjustment is necessary, see P. 7.

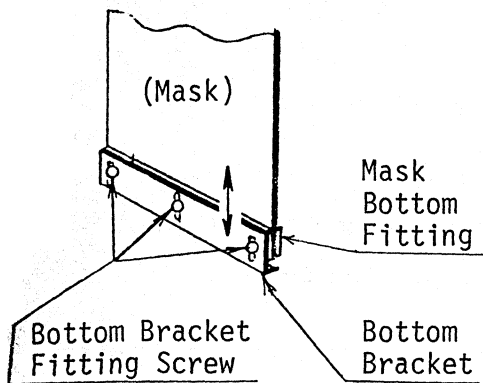
5. EXPOSURE SECTION

[General Drawing]



(1) Adjustment of Shading Mask

1) If the shading mask is inclined, proceed as follows.



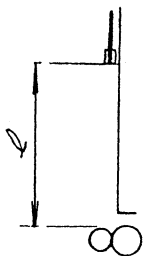
A. In case the inclination is 2 ~ 3 mm:

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

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

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

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



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

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

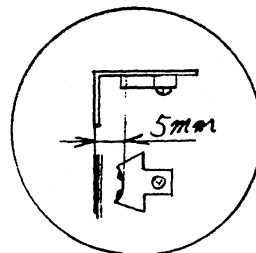
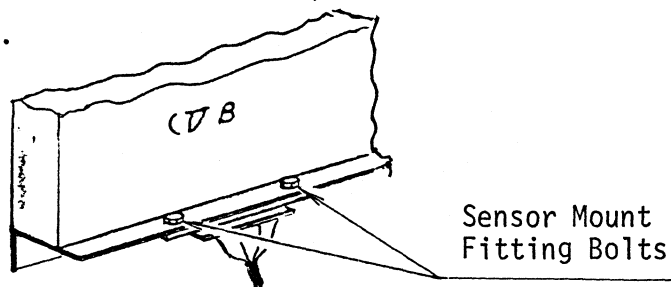
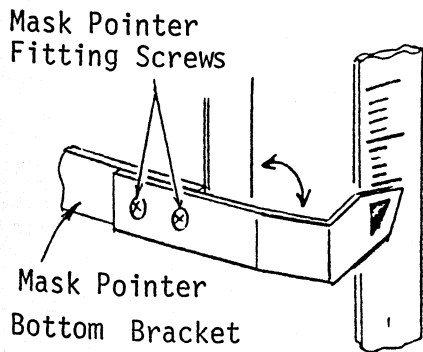
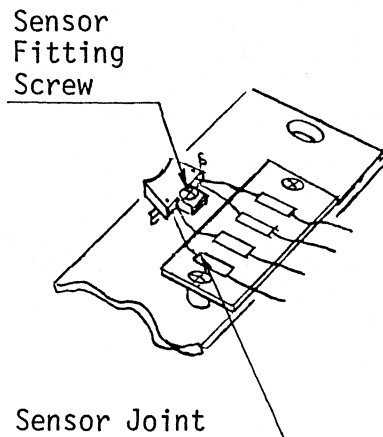


Fig. B

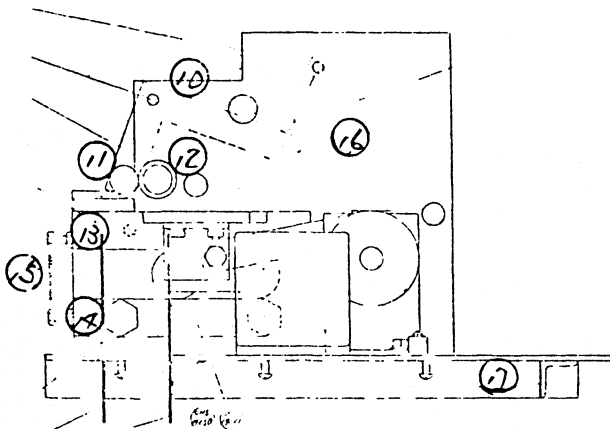
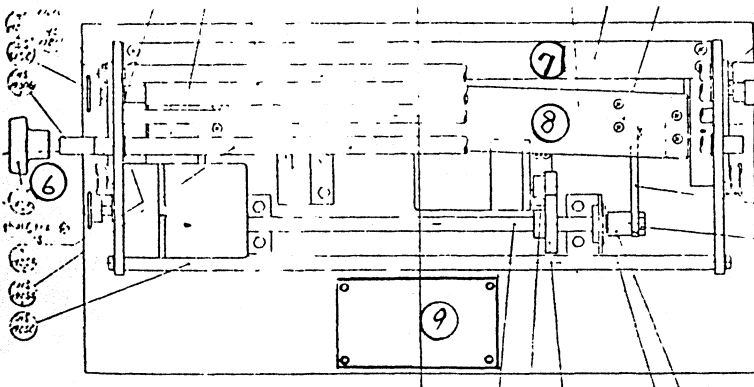
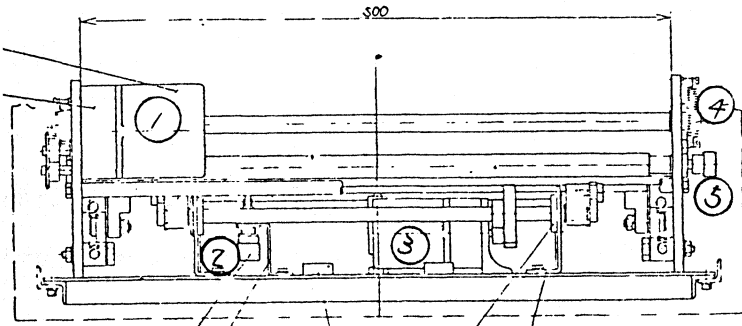
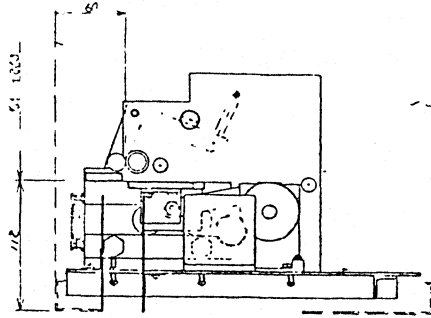
(2) Replacement of Master End/Seam Sensor



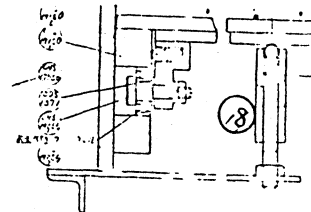
- (1) Loosen sensor mount fitting bolts at A point shown in the general drawing (p.14) to remove the sensor mount.
- (2) Remove the sensor fitting screw. Then, fuse the solder at the sensor joints to remove the sensor.
- (3) Install a new sensor with the reverse procedure, taking care not to connect the wires wrongly.

For sensor fitting position, refer to Fig. B.

6. CUTTER

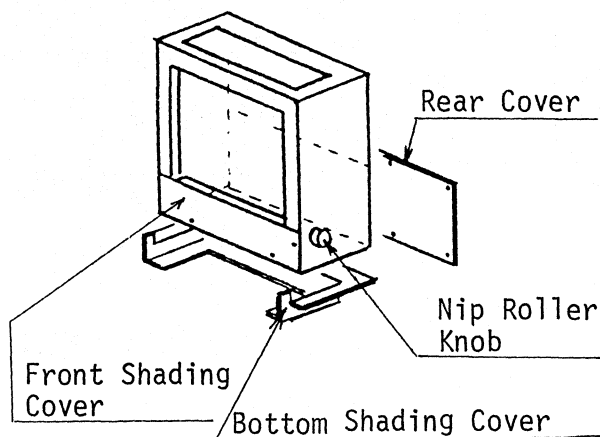


1. Master Feed Motor
2. Limiter for Cutter
3. Cutter Motor
4. Nip Pressure Spring
5. Master Feed Nip Roller Gear
6. Nip Open/Close Knob
7. Fixed Blade
8. Mobile Blade
9. Master Detection Board
10. Nip Lever
11. Nip Roller
12. Master Feed Roller
13. Fixed Rail
14. Mobile Rail
15. Rail Spring
16. Side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



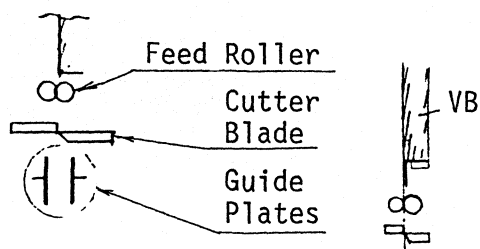
(1) Replacement and Adjustment of Cutter Blade

[How to remove the cutter assembly]



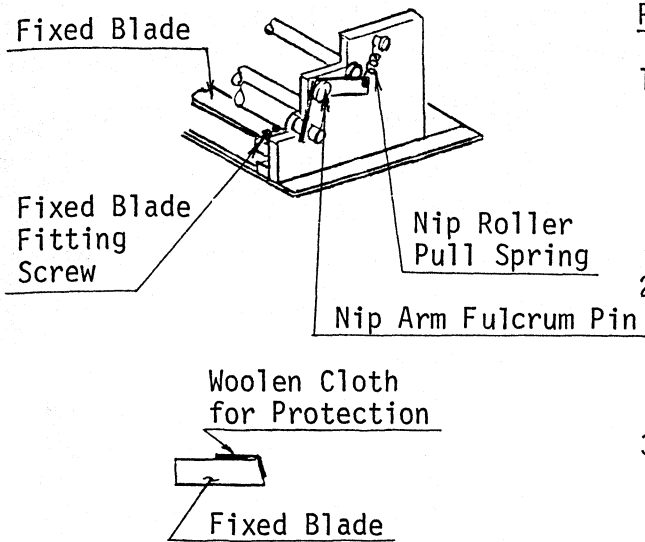
- 1) Remove the covers (rear cover, front shading cover and bottom shading cover).
- 2) Remove two guide plates from under the cutter assembly.
- 3) Loosen the set screw (M4, hollow) on the connecting rod for the nip roller knob and pull out the knob. (The set screw is located in the rear part of the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

[Installation of the cutter assembly]



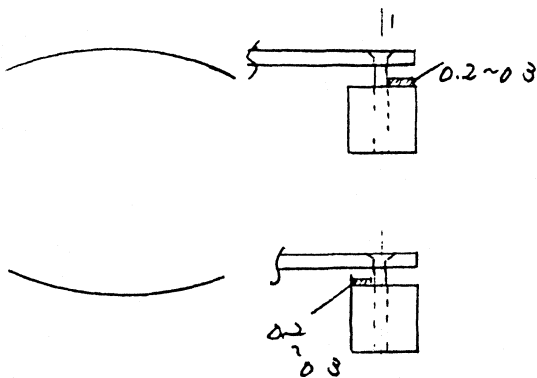
- 1) Install the cutter assembly with the reverse procedure to the above one for removal. When installing, remember that a height adjust spacer may be provided on either of the cutter assembly mount rails.
- 2) Make sure that the nip roller is parallel to the vacuum back.

[Replacement of the fixed blade and mobile blade]



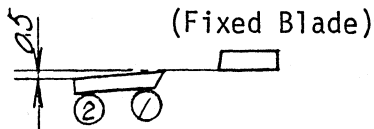
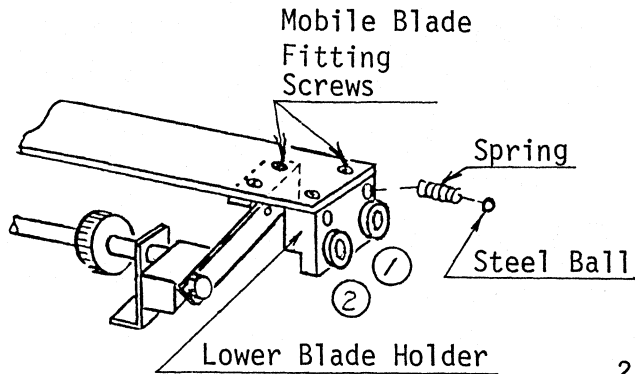
Replacement of the fixed blade

- 1) Pull out the cutter assembly and remove the nip roller springs and nip arm fulcrum pins on both sides.
- 2) Remove the four fixed blade fitting screws (M4 flat head machine screws) and remove the fixed blade.
- 3) Attach the woolen cloth for master protection to the new blade with double-faced tape or the like.
- 4) The blade may be distorted during installation. A distorted blade causes defective cutting. If some distortion is found, proceed as follows to compensate for it:

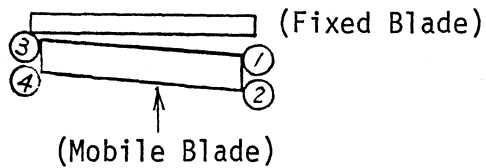


- i) If the blade is warped upward, it can't cut the center of the master.
- ii) Put 0.2 ~ 0.3 mm thick spacer outside the fitting screws on only one side.
- iii) If the blade is warped downward, it can't cut the ends of the master.
- iv) Put 0.2 ~ 0.3 mm thick spacer inside the fitting screws on only one side.

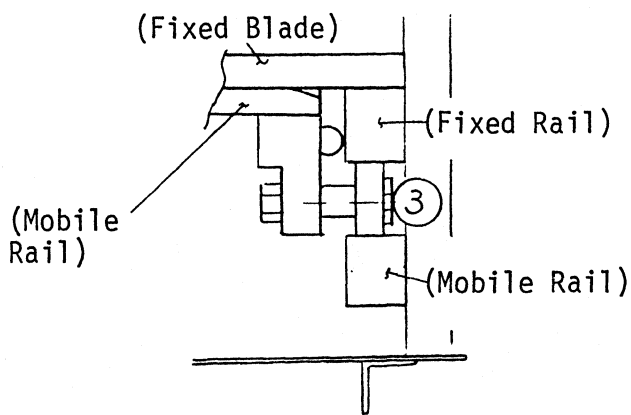
[Replacement and adjustment of the mobile blade]



(Fig. A)



(Fig. B)



(Fig. C)

- 1) Put the mobile blade backward fully, and remove the left and right blade fitting screws to remove the blade. Take enough care to remove it since a guide spring and a steel ball are contained in each lower blade holder.
- 2) Install the new mobile blade and tighten the flat-head screws until their heads are below the upper surface of the blade.
- 3) Adjustment

The four wheel shafts attached to the right and left lower blade holders are all eccentric. The basic adjustment of the shafts is as follows:

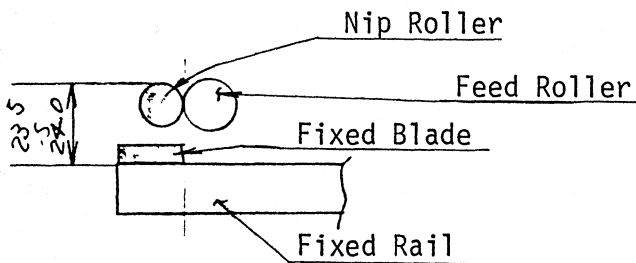
 - i) Lower wheel shaft (1) down to the limit. (The blade will go up to the limit.)
 - ii) Lower wheel shaft (2) by a quarter of the whole stroke from the upper limit so that an inclination of approx. 0.5 mm is made as shown in Fig. A.
 - iii) Bring the mobile blade close to the fixed blade and adjust wheel shaft (3) so that there is no space between them (or the mobile blade lightly hits

the fixed blade) when the mobile blade touches the fixed blade.
(See Fig. C.)

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

[Positional Relation Between the Fixed Blade and the Nip Roller]

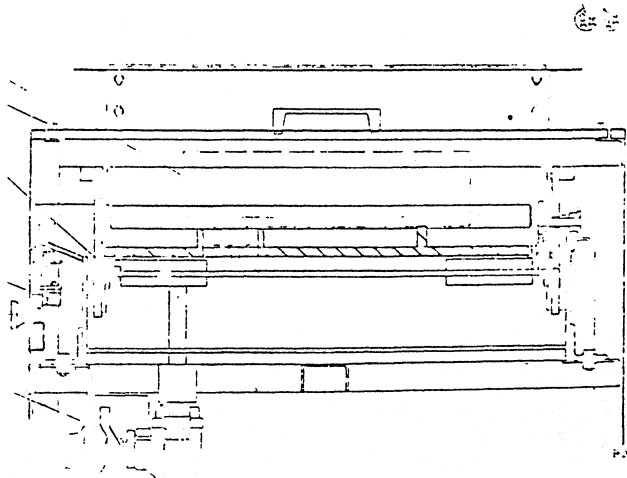
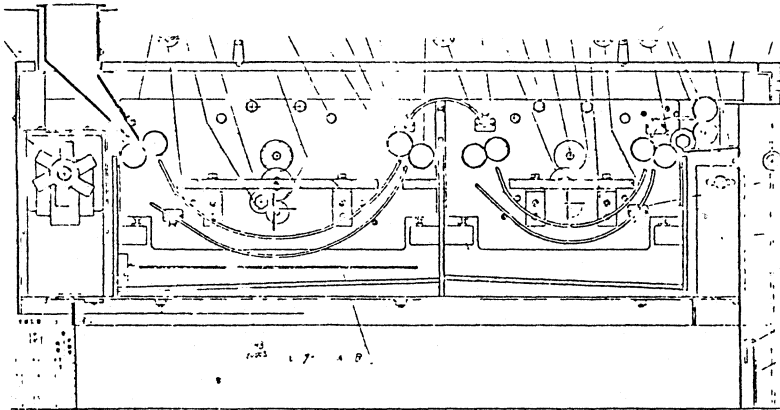
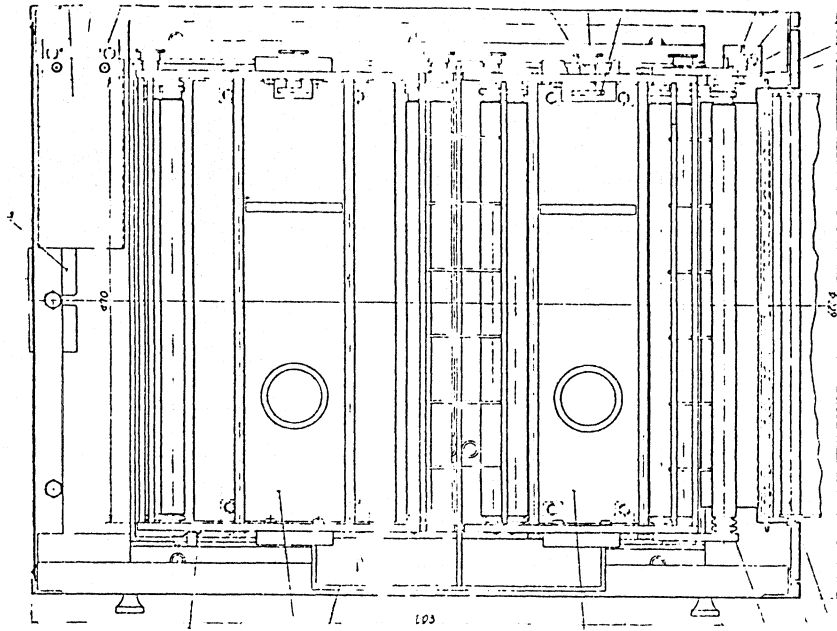
The following positional relation is necessary to keep the gripper margin (multi-exposed area) of the exposed master less than 23 mm.



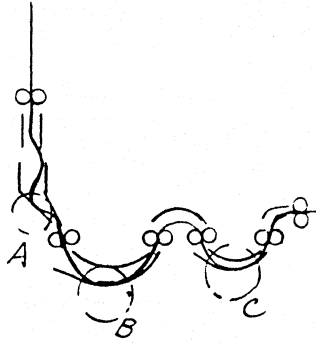
Adjust the position of the fixed rail so that the distance between the top of the nip roller and the bottom of the fixed blade is 23.5 ~ 24 mm.

7. PROCESSOR

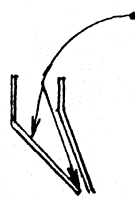
[General Drawing]



(1) Prevention Against Scratches in Master



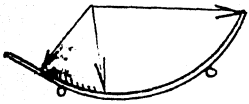
A..... Master guide



Keep the surface
clean and smooth.
(Finish with
sand paper)

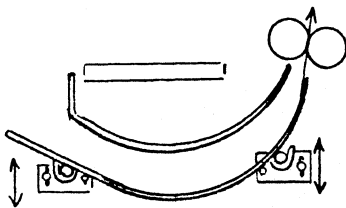
B.C. ... Developing and stabilizing lower guide surfaces.

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



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

(2) Prevention Against Streaks due to Uneven Development

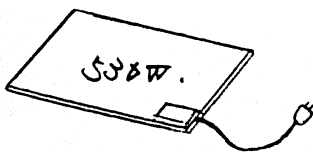


At present, it is impossible to completely eliminate streaks in developed master caused by uneven development. Uneven development occurs mainly because the developing solution frets when the master passes through the solution.

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

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

(3) Replacement of the Heater

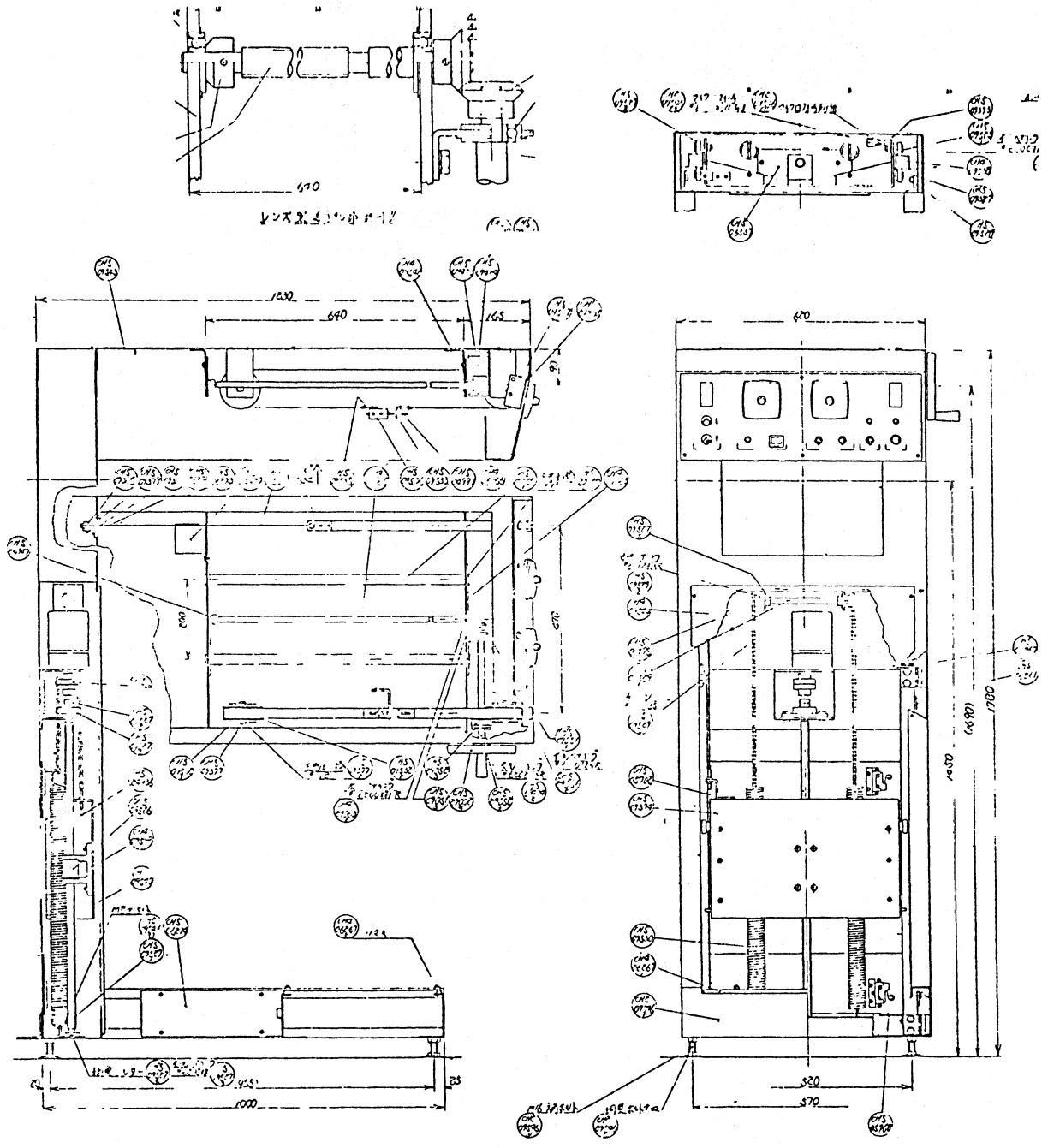


The heater is of the panel heater type (530 W) which is easy to replace.

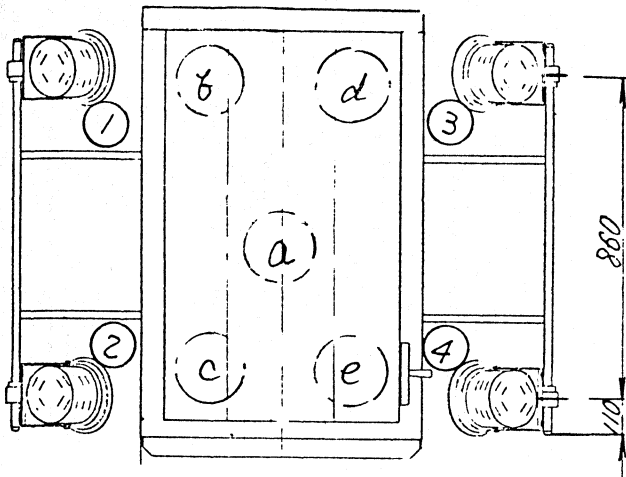
Pull out the heater cord connector from the heater plug socket and remove the cord from the cord saddle. Then, the heater will be removed easily.

8. FRAME AND DRIVING SECTION

[General Drawing]



9 LIGHT SOURCE

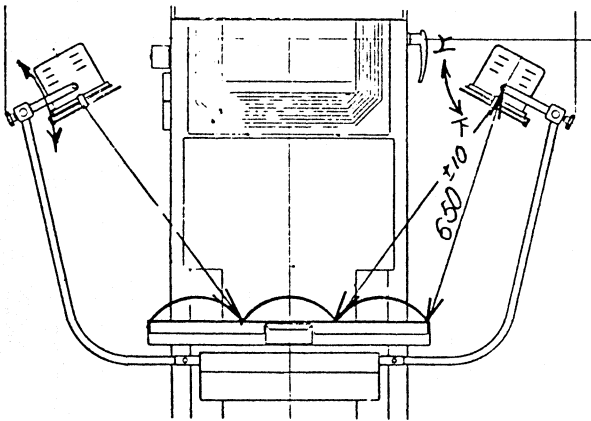


[Distribution of illuminance]

The standard positions of the lamps are as shown in the left figure.

The angle of each lamp house should be adjusted so that the lamp optical axis is directed toward a point one-third of the original frame width away from the frame edge.

[Adjustment of distribution]



1) The illuminance is increased in the center area and decreased in the circumferential area by directing the lamp house upward.

2) The illuminance is increased in the circumferential area and decreased in the center area by directing the lamp house downward.

Accordingly, for example, if the illuminance is the same in parts (a) (b) (c) and (d), but lower only in part (e) shown in the upper left figure, direct lamp (4) downward.

3) If the illuminance differs between the left and right areas, put either lamp arm nearer or farther.

- ° The overall illuminance is closely concerned with the power voltage as the voltage decreases, the illuminance decreases proportionally.
- ° Also the illuminance is affected by the reflector. If either of the reflectors is stained, it may cause uneven distribution.

10. TROUBLE AND CAUSES

Trouble	Causes															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Out-of-focus	Partially out-of-focus	Distorted image	No appearance of image	Incorrect size of image	Slanted image (misset optical axis)	Appearance of unexpected image	Unevenness in image density	Scratched master	Faulty master paper feed	Appearance of silver on gripper margin	Too much multi-exposed area	Hastened fatigue of processing solution	Master stained by development	Foggy image	Master paper not cut
Missetting of lens assembly and original holder	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>										<input type="radio"/>	
Slant (See P 6)		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>											
Imperfect scale adjustment (See P 7)	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>										<input type="radio"/>	
Insecure original		<input type="radio"/>	<input type="radio"/>					<input type="radio"/>							<input type="radio"/>	
Original base sheet not in place (See P 9)						<input type="radio"/>										
Stained and scratched original frame glass		<input type="radio"/>					<input type="radio"/>	<input type="radio"/>							<input type="radio"/>	
Uneven distribution of illumination		<input type="radio"/>					<input type="radio"/>	<input type="radio"/>								
Defective original								<input type="radio"/>							<input type="radio"/>	
Blurred or dirty lens	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>							<input type="radio"/>	
Blurred, dirty or defective mirror				<input type="radio"/>			<input type="radio"/>	<input type="radio"/>								
Improper mirror angle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>										
Deformed or damaged bellows				<input type="radio"/>												
Master paper not in place (exposure section)						<input type="radio"/>				<input type="radio"/>						
Incorrect master feed length (missetting)											<input type="radio"/>	<input type="radio"/>				
Poor master suction force	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>													
Mask improperly set (defective sliding)											<input type="radio"/>	<input type="radio"/>				
Dull cutter blade (misadjustment)																<input type="radio"/>
Imperfect shading of exposure section															<input type="radio"/>	

Causes \ Trouble	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Stains and scratches inside master guide									○					○		
Processor unit wrongly set									○	○						
Processor unit lower guide set wrongly									○	○						
Stains and scratches in processor unit lower guide									○	○						
Dirty developing unit roller							○							○		
Processor main frame installed improperly									○	○			○			
Inadequate level of processing solution (inadequate replenishment, defective valve)													○			
Inadequate processor drive chain tension										○						
Defective shutter operation				○			○									
Lens diaphragm missetting															○	
Exposure time missetting															○	
Halasion															○	
Vibration	○	○														

11. ELECTRICAL TROUBLE AND CHECK POINTS

* Before inspection, make sure that the main switch is off.

Checkpoint		Trouble																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Switch-board	Control circuit fuse F1, 2 (3 A)				<input type="radio"/>										<input type="radio"/>				<input type="radio"/>
	Processor motor fuse F3, 4 (3 A)	<input type="radio"/>																	
	Processor heater fuse F5, 6 (10 A)		<input type="radio"/>																
	Relay RY1					<input type="radio"/>	<input type="radio"/>		<input type="radio"/>										
	Relay RY2					<input type="radio"/>	<input type="radio"/>		<input type="radio"/>										
	Relay RY3					<input type="radio"/>			<input type="radio"/>					<input type="radio"/>					
	Relay RY4										<input type="radio"/>	<input type="radio"/>					<input type="radio"/>		
	Relay RY5										<input type="radio"/>						<input type="radio"/>		
	Timer T2										<input type="radio"/>								
Rectifier SiRel							<input type="radio"/>												
Main Control Panel	Start SW PB1				<input type="radio"/>														
	Heater SW TS1		<input type="radio"/>																
	Exposure SW TS2									<input type="radio"/>									

Checkpoint		Trouble																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Main Control Panel	Light source SW TS3						○												
	Exposure timer T1, RT1				○	○			○	○									
	Master feed timer T3									○		○	○						
	Counter C0														○				
	Original feed SW PB2, PB3																		○
	Master alarm buzzer BZ																	○	
L	Shutter solenoid SOL						○												
Frame	Original feed motor RM1																		○
	Original holder upper and lower limiters LS1, LS2																		○
Exposure Section	Master feed SW FEED TS5									○	○			○					
	Master cut SW TS6											○	○						
	Focus SW TS4					○													
	Fan SW TS7				○							○		○			○	○	
	Fan motor FM1													○					
	Master feed motor RM2									○									
	Cutter motor RM3											○							
	Cutter limiter LS1				○							○	○		○		○		
	Master sensor				○												○	○	○
	Master detecting PCB (RY6, RY7)				○												○	○	○
Processor	Processor heater (530 W)		○	○															
	Heater plug socket		○																
	Thermostat		○	○															
	Processor drive motor IM1	○																	

