MITSUBISHI SILVER MASTER

CP-TONE 310

SERVICE MANUAL

Contents

1. Introduction

This CP-TONE Service Manual was written as an after-sales service guide. Accordingly, please consult the "CP-TONE Operation Manual" and "Technical Manual" for information about camera operation, master, and processing liquids, etc.

Regarding the contents of this manual, changes in specifications and machine modifications may be made without notice and we ask for your kind understanding.

For parts orders and inquiries, please consult the "CP-TONE 310 Parts List" and contact Dainippon Screen with the following information.

- ◇ Machine name: CP-TONE 310
- ◇ Machine number:
- ◇ Part number/Part name:
- ◇ Quantity:
- ◇ Delivery:

Quality Warranty Section
Hikone Plant
Dainippon Screen Manufacturing Co., Ltd.

480-1 Takanomiyamachi, Hikone-shi,
Japan 522-02
Tel: 0749-24-1167

2. Specifications

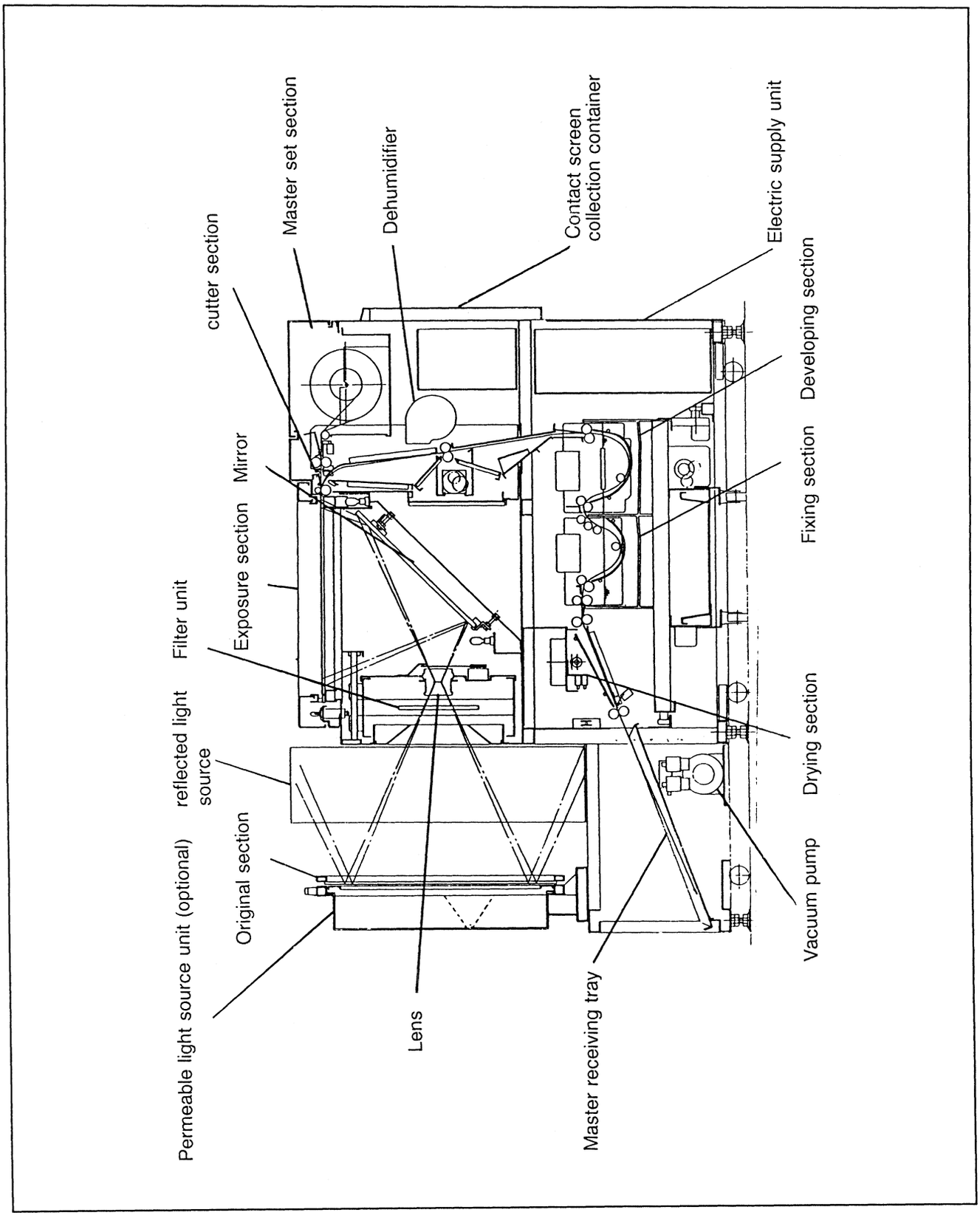
	Item	Specifications
1	Master	SLM-RII, SLM-F, SPP-R (75 m roll)
2	Master width (cm)	22.9 (9"), 25.4 (10"), 27.9 (11"), 30.5 (12"), 31.0 (12 1/5")
3	Master feed length (cm)	36.0 – 48.0 (1 mm increments)
4	Lens	HEXANON GRII f = 260 mm aperture F/16 and F/22
5	Magnification and copy size (95% – 100%)	Original size (cm) 95% ..... 32.6 × 50.5 (blank sheet exposure) 32.6 × 46.3 (available) 100% ..... 31,0 × 48.0 (blank sheet exposure) 31.0 × 44.0 (available) Exposure size (cm) 95 – 100% ..... 31.0 × 48.0 (available) 31.0 × 48.0 (exposure area)
6	Magnification change	Moveable lens type, manual scale adjustment
7	Copy surface	Glass bottom surface, vacuum suction top surface (air blow unit)
8	Master positioning	Back-edge nipping and automatic exposure of register marks
9	Original positioning	Lengthwise (far side) 270 mm pin bar unit
10	Exposure type	6 channel basic data input (computer controlled)
11	Optical control	Light integrator for reflection light source
12	Reflection light source	Halogen lamp 500 W × 4 (3000°K)
13	Auxiliary light source	Copy section internal flash lamp (5 W bulb)
14	Cut mark copy	Auxiliary exposure lamp (10 W bulb)
15	Contact screen	GDH (hard coat processing, negative type) 400 × 460 mm
16	C. S. Removal	C/S set before master feed, removed after exposure
17	C. S. Receiver	Receiving case installed (receives one)
18	Cutter	Cutter blade (NT) slide cut type
19	Processor	Drawer type, 400 W panel heater, thermo-control type
20	Processing fluid capacity	Developer: 8ℓ, fixer: 8ℓ, replenishment tanks: each 2ℓ
21	Dryer	500 W heater hot air dry type, HIGH/LOW switching
22	Dehumidifier	Fan, heater type (installed on master conveying section)
23	Electrical capacity	1Ø 200V 4.0 kW
24	Dimensions (cm)	163.0 × 78.0 × 116.0 (W × D × H)
25	Weight (without fluid)	260 kg

Options

	Item	Specifications
1	Contact screen	GPH (hard coat processing, positive type) 4 in one set (for 4 colors) 400 × 460 mm
2	Contact screen collecting container	Receives 4, includes 4 contact screen holders in 1 set
3	Contact screen installation fixture	Removable screw type in copy section
4	Filter holder	Manual turret type, with filter
5	Permeated light source unit	Halogen lamp 35W × 24
6	Punch stand (SFP-015)	Ø5 mm 270 mm pitch
7	Filter device	

3. Process Diagram

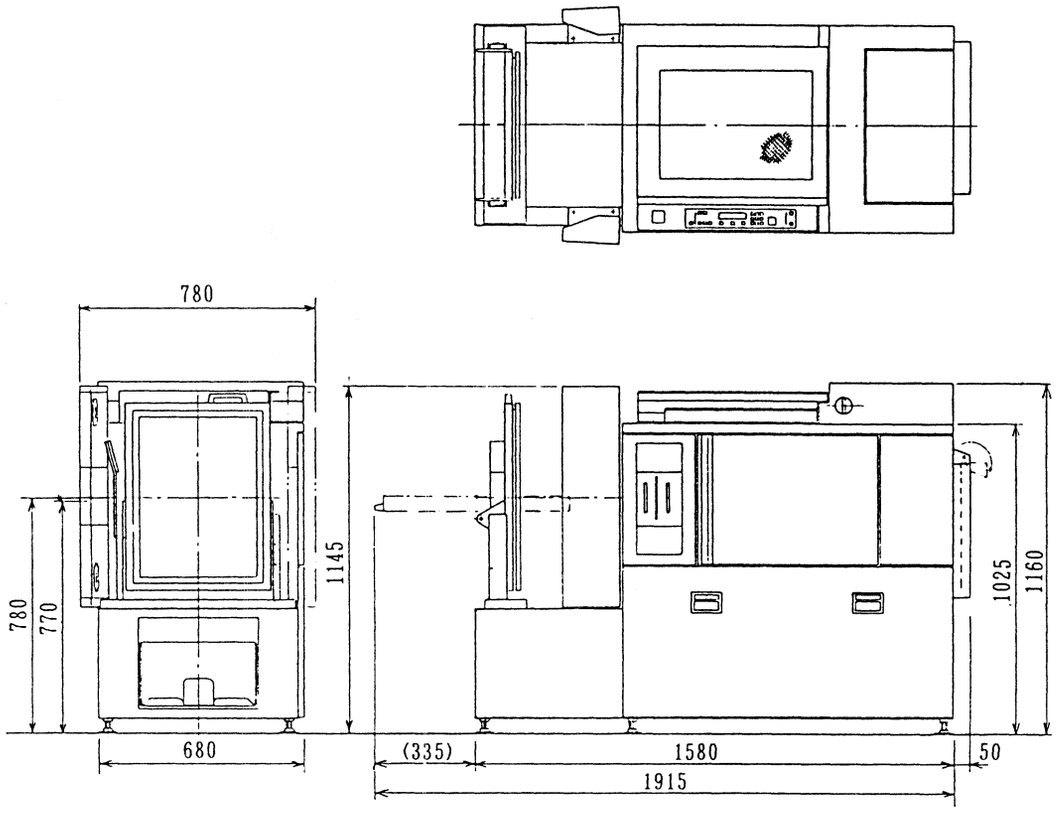
【 Process Diagram 】



4. Installation Procedure

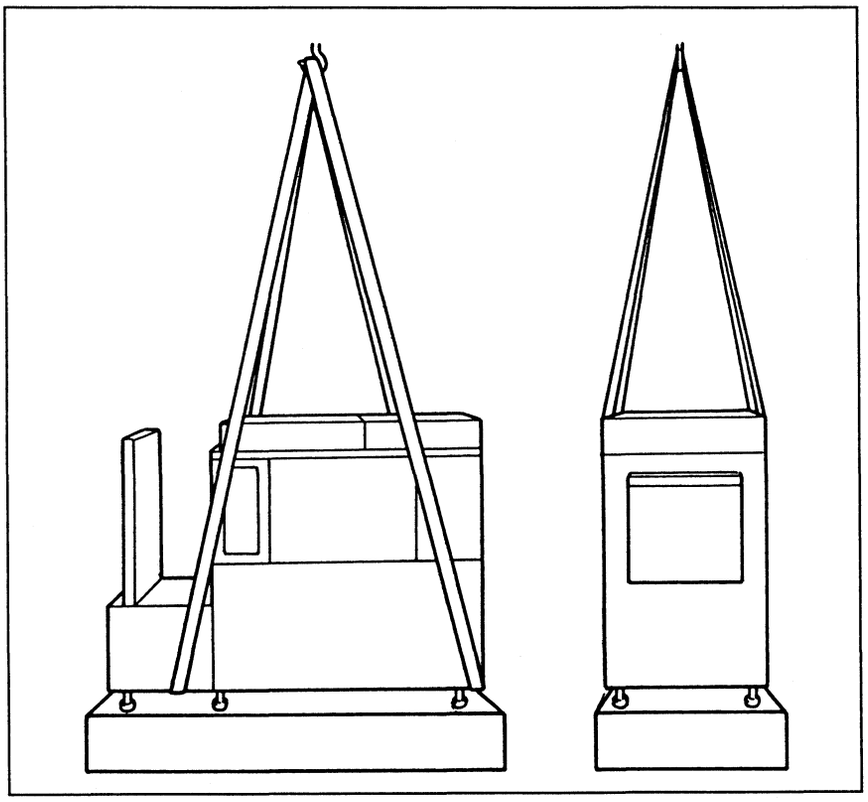
Options

- Choose a well-ventilated site having an ambient temperature of 10 – 30°C and humidity of 40 – 70%.
- Avoid installing in the direct sunlight.
- Choose a site with a foundation strong enough to withstand the machine weight of 260kg.
- Avoid sites subject to vibration.
- Ensure that at least 40cm is provided around the machine as maintenance space.
- Use a single-phase 200V, 4.0kW power supply.
  Use wiring that meets this rating and keep voltage fluctuations to within ± 10%.
  - *Earth the machine in accordance with safety standards as laid down in local bylaws and regulations.*



Overview

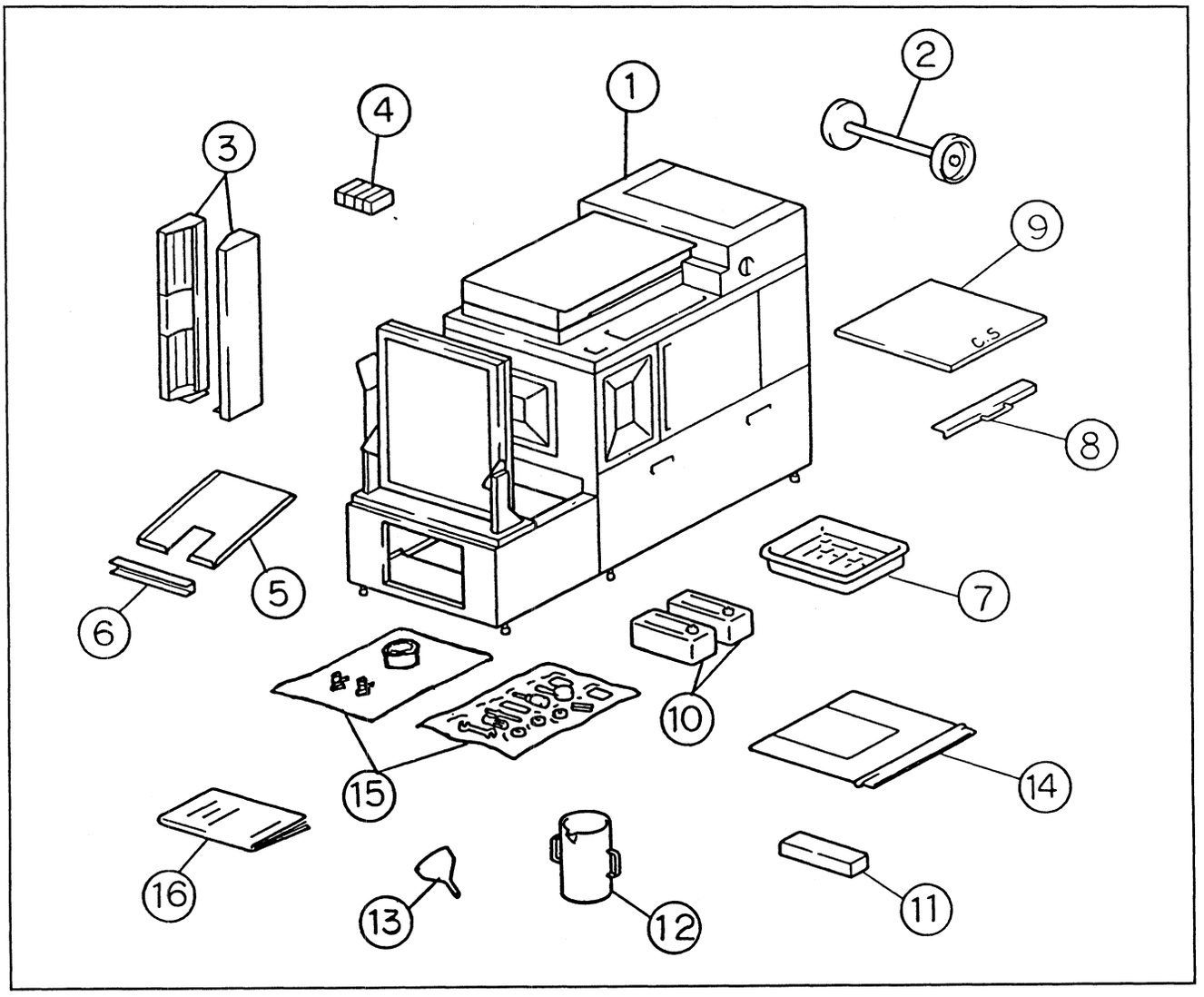
Unpacking



1. Remove the outer wooden packaging so that the machine is left on the wooden pallet.
2. Remove the securing bolts from the transportation fixtures (painted yellow)securing the body to the wooden pallet.
3. Pass nylon rope under the base of the machine and lift up to remove from the wooden pallet.
4. The machine is provided with casters at its base so that it can be transported easily.

Unpacking

Always check this packing list when unpacking.



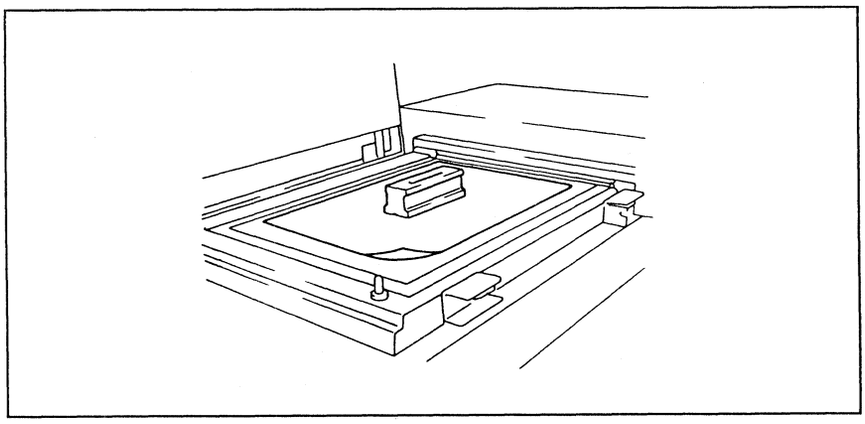
No.	Name	Q'ty
1	Body	1
2	Spool (2), spool shaft	1 set
3	Light unit (with stand)	2
4	Halogen lamp	4
5	Master receiving tray	1
6	Master stop	1
7	Drainage vat	1
8	Contact screen holder	1
9	Contact screen	1
10	Replenisher bottles	2
11	Squeegee roller	1
12	Measuring cup	1
13	Funnel	1

14	Photographic samples, test sheets	1 set
15	Standard spare parts (see next page)	1 set
16	Instruction Manual, Technical Guide	1 set

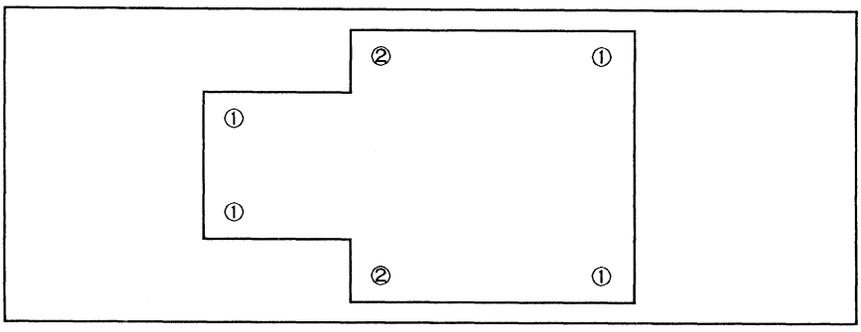
Unpacking

No.	Name	Q'ty
1	Screwdriver set	1 set
2	Leg bases	6
3	Spanner	1
4	Cutter blade	1
5	Oil can	1
6	Blower brush	1
7	Safety switch key	1
8	Screws, bolts	1 set
9	Glass fuses 20A – 250V 10A – 250V 5A – 125V, 3A 250V 2A – 125V, 1A 125V,	2 each
10	Spring belt	2
11	Metal polish	1
12	B cock	2

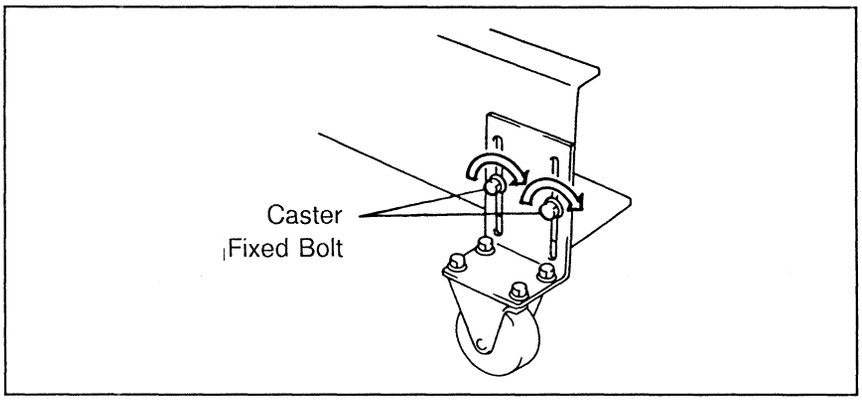
Installation Procedure



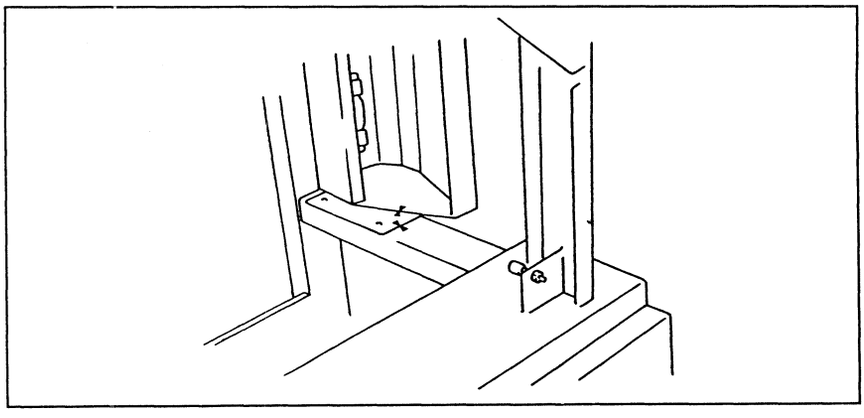
1. Move the machine to the predetermined position and place the six leg bases under the machine adjusting bolts.
2. Cut the string securing the copy table, upper cover and lens cover.
3. Open out the upper cover.
4. Place a sheet of protective paper on the copy glass and place a leveler on top.



5. Use the four adjusting bolts (two at right, two under copy table) to adjust the copy table so that it is level.
   ① in diagram
   ▸ At this time, raise the casters slightly off the floor.
6. Adjust the adjusting bolts at the left of the machine.
   ② in diagram.
   ▸ At this time, turn the adjusting bolts about one half turn (180) once they have come in contact with the floor.



7. Push the casters attached to both sides of the processor down until they come into contact with the floor. Loosen the caster securing bolts.
8. Remove the lens and mirror covers.
   ▸ Take care not to mark the lens or mirrors with fingerprints, etc.



9. Install the light unit (with stand) and connect each of connectors J28 and J29.
   - Match the (▲) marks.
10. Install the halogen lamp.
    - Do not hold the lamp with the bare hand as this will shorten the life of the lamp.
11. Install the master receiving tray, drainage vat, etc. in place.
12. Install the cutter blade. (See Instruction Manual.)
13. Set the master in place. (See Instruction Manual.)

Mixing Chemical Solutions

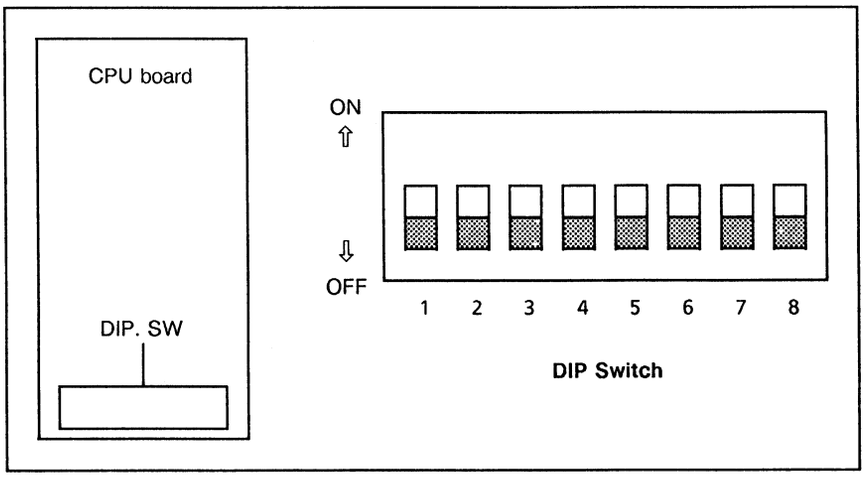
1. Remove the units inside the processor, and clean the units and the inside of the tanks. Turn the rollers before pouring in the chemical solutions as they sometimes stick to each other.
2. Pour the developer and fixer into the tanks and replenisher bottles following the instructions in the Instruction Manual.

Connecting the Power Supply

1. Turn the POWER switch located at the right of the process camera to OFF.
2. After checking the power supply, connect the input lines.
3. Always earth the input lines in accordance with local bylaws and regulations.

Inspection and Adjustment

1. The CPU board is located inside the right cover. Remove this cover to access the CPU board.
   Inspect the DIP switches in the CPU board and adjust if necessary.



DIP Switch F' ıctions

- All of the DIP switches have been factory set to OFF. Change their settings as necessary at the user side.
- Turn the power supply OFF before changing the settings.

No.	Item	Use	Normal State
1	Data input	Used together with DIP switch 7.	OFF
2	Inch/mm selection	Selects the master feed unit. ON: inch OFF: millimeter	ON/OFF
3	Frequency selection	Selects between 50 and 60Hz. ON: 50Hz OFF: 60Hz	ON/OFF
4	Main exposure time	Selects between the fixed clock and the light integrator. ON: fixed clock OFF: light integrator	ON/OFF
5	Air blower selection	Selects the air blower time. ON: 10sec OFF: 5sec	OFF
6	Unused		OFF
7	Data input	Used together with DIP switch 1.	OFF
8	Maintenance mode	Used together with the mode key. Used for manual drive and input together with DIP switches 1 and 7. (See next page.)	OFF

Maintenance Mode

Functions 1 – 6 are provided in the maintenance mode. The desired mode must be switched to before operation.
Turn the power supply OFF, turn DIP switch 8 ON and then turn the power supply ON again. Then select the desired mode by using the mode key.

Function	Mode Display Cursor	Use
1	BWL	Manual mode (operation check) MANUAL MODE
2	BW	Display and input of master cut coefficient MASTER CUT DATA
3	C	Display and input of optical axis feed length AXIS FEED DATA
4	M	Display and input of cut mark exposure time 1 (for BWL and BW) CUT MARK1 (OR) TIME
5	Y	Display and input of cut mark exposure time 2 (for C, M, Y and Bk) CUT MARK2 (PAN) TIME
6	Bk	Clears RAM and EAROM (reset to defaults). RAM CLEAR

Note:

When inputting (writing) numerical values in functions 1 – 5, turn DIP switches1 and 7 to ON in addition to DIP switch 8.

Explanation of Functions

Function 1

Manual Drive

Select "BWL" using the mode key and press all the keys on the control panel to enter the manual drive mode.

Key	Use
1	CUTTER ⇒ Cutter
2	DRYER HEATER ⇒ Dryer/heater
3	CLUTCH ⇒ Clutch
4	FEED MOTOR F ⇒ Feed mode (forward)
5	FEED MOTOR R ⇒ Feed mode (Reverse)
6	TRANS MOTOR ⇒ Transmotor
7	SHUTTER ⇒ Shutter
8	PUMP ⇒ Vacuum pump (suction contact only)
9	CUTMARK LAMP ⇒ Cutmark lamp
0	C·S SOLENOID ⇒ Contact screen solenoid
·	SOLENOID VALVE ⇒ Solenoid valve
C	FLASH LAMP ⇒ Flash lamp
FOCUS	MAIN LAMP ⇒ Main lamp (reflection/transmission)

Note:

- *Manual drive is operative only for the time that all of the keys are pressed.*
- ***Two operations** cannot be performed at the same time.*
- *Do not leave the dryer/heater and the main lamp ON for a long time.*

Function 2

Display and Input of the Master Cut length Coefficient

● Checks and Adjustments

1. Set the most frequently used length.

   Ex: set 480mm

2. Actually feed a master and measure the length of the master after is has been cut.
   - ▸ This feed length is the feed length from the register mark (cut mark). Its total length is about 30mm longer then the set value.
   - ▸ The first plate after setting the master in place will differ slightly in length. So always measure the length of the 2nd plate.

     Ex: let the measured value be 485mm

Function 6

RAM Clear, EAROM Clear (Resetting of Defaults)

◇ **RAM Clear** ◇

Initializes (resets standard values) data (exposure data, basic data, work area) that is normally backed up.

◇ **EAROM Clear** ◇

Clears and initializes the EAROM.

【 Default Data 】

- Master cut coefficient 1.0800
- Optical axis feed length 44.00mm
- Cut mask exposure time 1 (OR) 1.0sec
- Cut mask exposure time 2 (PAN) . . . 1.0sec

【 How to Clear the RAM and EAROM 】

1. Turn the power supply OFF. Set **DIP switches 1, 7** and **8** to ON and turn the power supply back ON again.
2. **Select "BK" with the mode key.**
3. Press the START key while pressing the INPUT key to sound the buzzer and display the **"POWER OFF"** message on the display.
4. Turn the power OFF. Set **DIP switches 1, 7** and **8** to OFF.
5. Turn the power supply ON.

Development Temperature Checks and Adjustment

A developing solution temperature of 28 – 31°C is ideal when the "COLD" display on the control panel has gone out.
If the temperature differs, adjust the motor dial located at the right of the processor. When the processor cover is opened after the POWER switch is turned ON, the display "COLD" goes out. To check, turn the POWER switch OFF, wait at least five minutes and then turn the POWER switch back ON again.

Final Assembly and Checks

1. Install the covers.
2. Carry out the various checks.
   Carry out a test run in accordance with the instructions laid down in the Instruction Manual.
   ▸ Carry out a test exposure using the test chart.

• Input Method

1. Turn the power supply OFF. Set **DIP switches 1, 7** and **8** to ON and turn the power supply back ON again.
2. **Select "C" with the mode key** to display the optical axis feed length on the display.
3. Using the numerical keypad, key in the desired optical axis feed length.
4. Press the START key while pressing the INPUT key.
5. Turn the power OFF. Set **DIP switches 1, 7** and **8** to OFF and turn the power supply back ON again.

Functions 4 and 5 Display and Input of the Cut Mask Exposure Time

Function 4 (cut mask exposure time 1) . . . . . for BWL, BW
Function 5 (cut mask exposure time 2) . . . . . for C, M, Y, Bk

A cut mask marked with registration marks for registering onto a printing press is exposed onto the master. However, the exposure times for ortho film (Silver Master – SLM-RII.F) and panchromatic film (Silver Panplate – SPP-R) vary owing to their differing sensitivities. Input the correct values for the type of film in order to obtain ideal exposure.

• Input Method for Ortho Film

1. Turn the power supply OFF. Set **DIP switches 1, 7** and **8** to ON and turn the power supply back ON again.
2. **Select "M" with the mode key** to display the setting.
3. Using the numerical keypad, key in the desired exposure time.
4. Press the START key while pressing the INPUT key.
5. Turn the power OFF. Set **DIP switches 1, 7** and **8** to OFF and turn the power supply back ON again.

• Input Method for Panchromatic Film

1. Turn the power supply OFF. Set DIP **switches 1, 7** and **8** to ON and turn the power supply back ON again.
2. **Select "Y" with the mode key** to display the setting.
3. Using the numerical keypad key in the desired exposure time.
4. Press the START key while pressing the INPUT key.
5. Turn the power OFF. Set DIP **switches 1, 7** and **8** to OFF and turn the power supply back ON again.

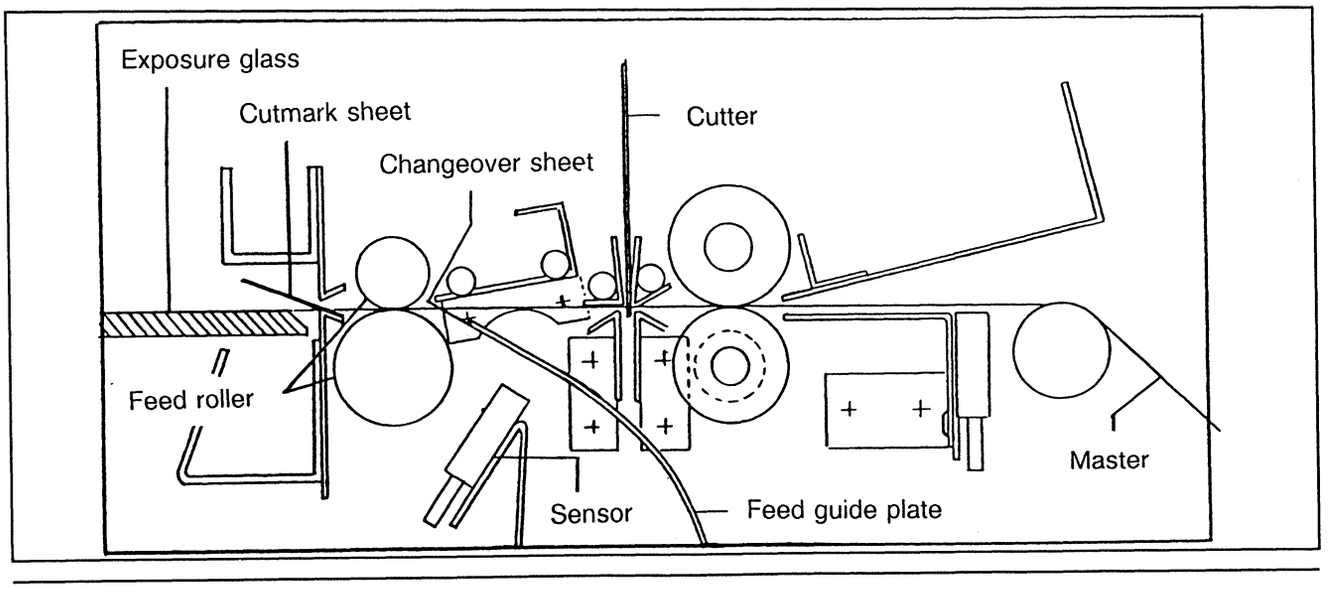
● **Input Method**

1. Turn the power supply OFF. Set **DIP switches 1, 7** and **8** to ON and turn the power supply back ON again.
2. **Select "BW" with the mode key** to display the coefficient.
3. Using the numerical keypad, key in the actual master feed length 485mm.
4. Press the START key while pressing the INPUT key to display the new master cut length coefficient.
   ▸ When keying in the data, select METRIC to input millimeters and INCH to input inches.
5. Turn the power OFF. Set **DIP switches 1, 7** and **8** to OFF and turn the power supply back ON again.

Function 3
Display and Input of the Optical Axis Feed Length

● **Checks and Adjustments**

The amount that the master is fed to the exposure position after it has been fed is called the "optical axis feed length."
At this time, an ideal state is where the end of the plate is gripped by the feed roller by a few millimeters at the point where the master has travelled past the changeover sheet to the conveyor section. This position is set 28 – 30mm from the end of the plate when a cut mask is exposed.
An insufficient optical axis feed amount leads to defective transport in the conveyor section. An excessive feed amount will result in the master coming away from the feed roller. In either case, adjust as required.
▸ Standard feed amount is 44mm. (Setting range is 42 – 46mm.)



5. Verifying and adjusting the optical system

Focus and magnification were thoroughly factory tested, however, if some fault should be found, verify and adjust according to the following.

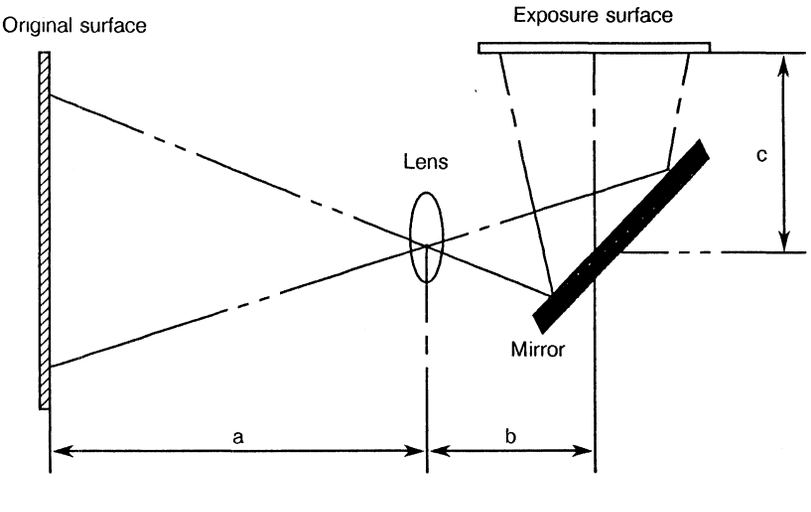
[Verification and adjustment procedure]

(1) Adjustment for distortion

- Front/back/left/right distortion ⇨ Adjust the original mount in left/right directions or slightly adjust the tilt of the mirror.
- Left/right distortion ⇨ Adjust the original mount vertically.

(2) Adjustment of focus and magnification

- Adjust the entire original mount in left/right directions or adjust the mirror slightly in the left and right directions.
- Adjust the lens magnification scale.



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

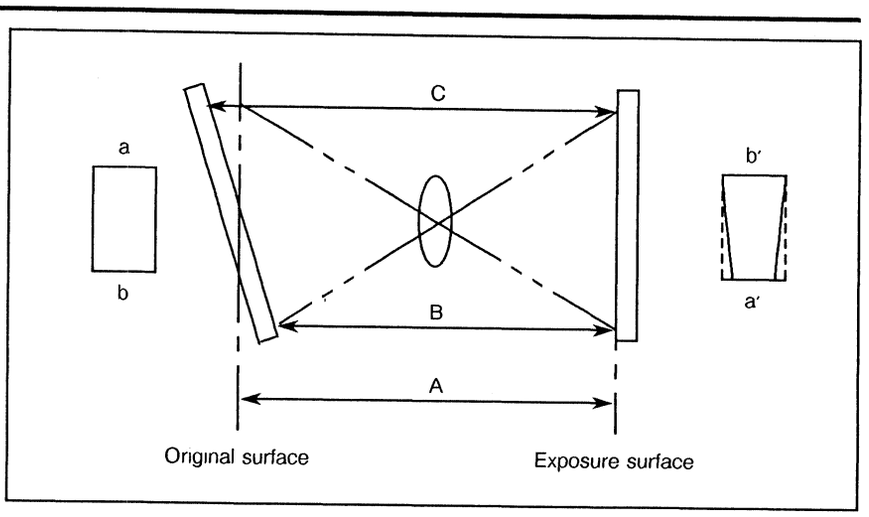
$$b + c = f(1 + m)$$

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

m : Magnification
f : Lens focal distance (260 mm)

5-1 Adjustment for distortion

【 Knowledge of distortion 】

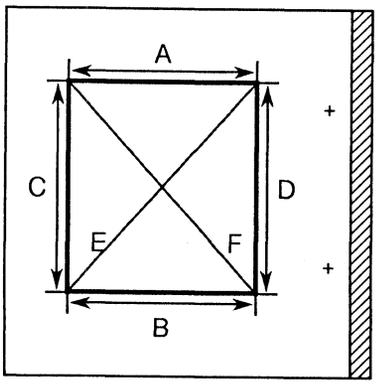


In order to copy square and rectangular originals as squares and rectangles, each of the original surface, the lens surface, and exposure surface must be parallel and flat with each other. If the original mount loses its parallelness as shown in the figure above (B < C), distortion will occur and a trapezoidal image will be produced where "a" is small and "b" is big.

【 Checking for distortion 】

Permissible amount of distortion

. . . . Verification at 100% magnification



≪Permissible values≫

1. A = B = C = D = 300 mm ± 0.5 mm
2. E – F = ± 0.5 mm

1. Insert a suitable chart to measure distortion (square or rectangular).
2. Measure the four sides of the copy. If the difference in measurements between opposite sides is within 0.5 mm then conditions are normal.

■ Adjustment for distortion

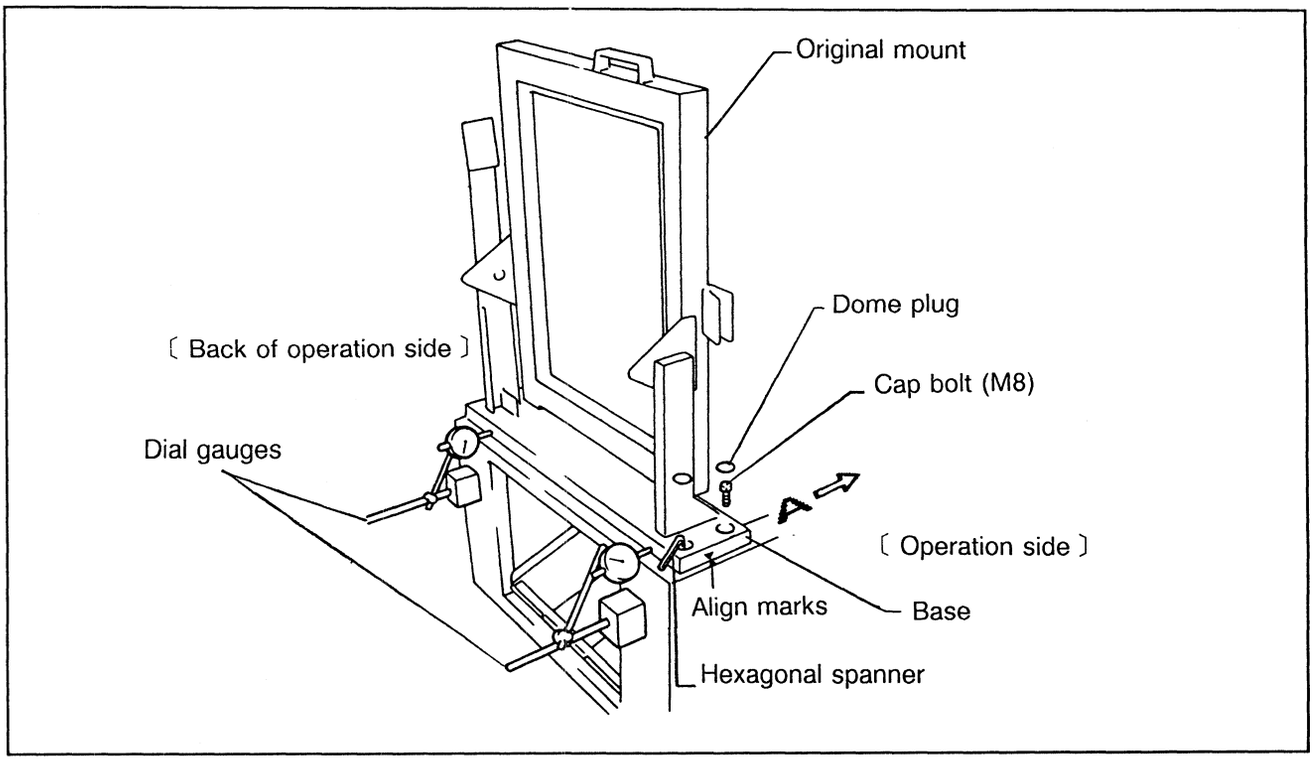
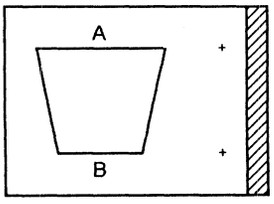


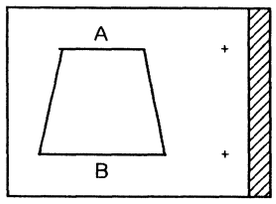
Image distortion in the front/rear directions (A,B)



When A > B

1. Align marks (▲) are placed on the base installation section to mark the original position for reconstruction, however, set the dial gauges respectively on the original mount for quick adjustment.
2. Remove the dome plug and loosen the base securing bolts (cap bolts M8) with the hexagonal spanner (operation side).
3. Move the original mount in direction A.
4. Tighten the cap bolts and verify by making a copy.
5. If outside the permissible values, repeat the above procedure.

   ▸ When moving the original mount slightly, the job can be done loosening the base securing bolts only on the operation side. When it is necessary to move the original mount longer distances, however, be sure to adjust with the dial gauge set on the back of the operation side as well.



When A < B

1. Adjust by moving the original mount at the back of the operation side in direction A, following the procedure for A > B in reverse.

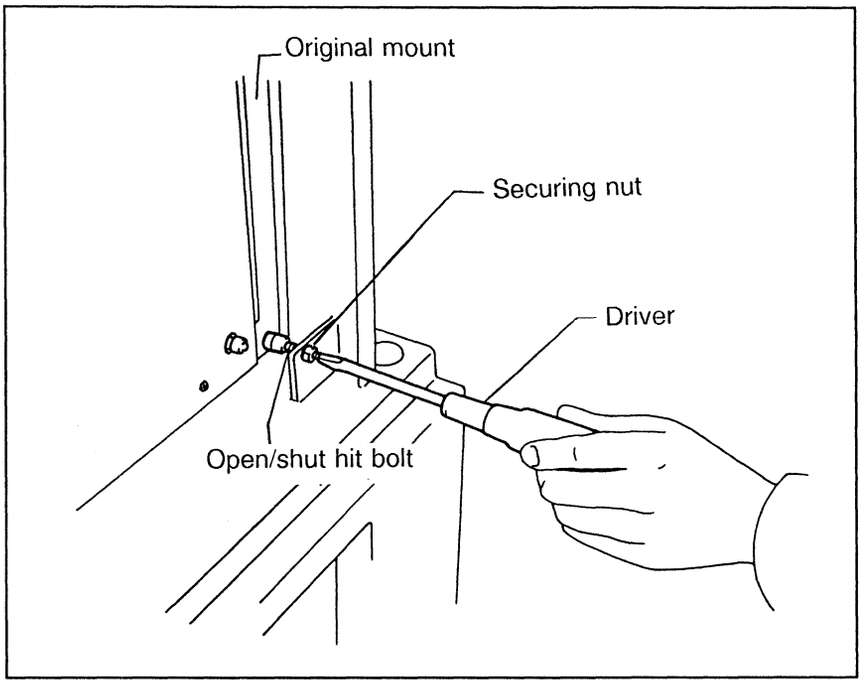
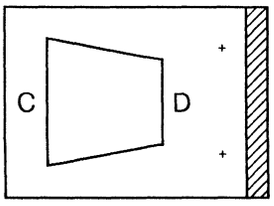
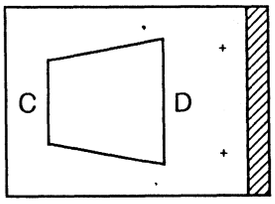


Image distortion in the left/right directions (C, D)



When C > D

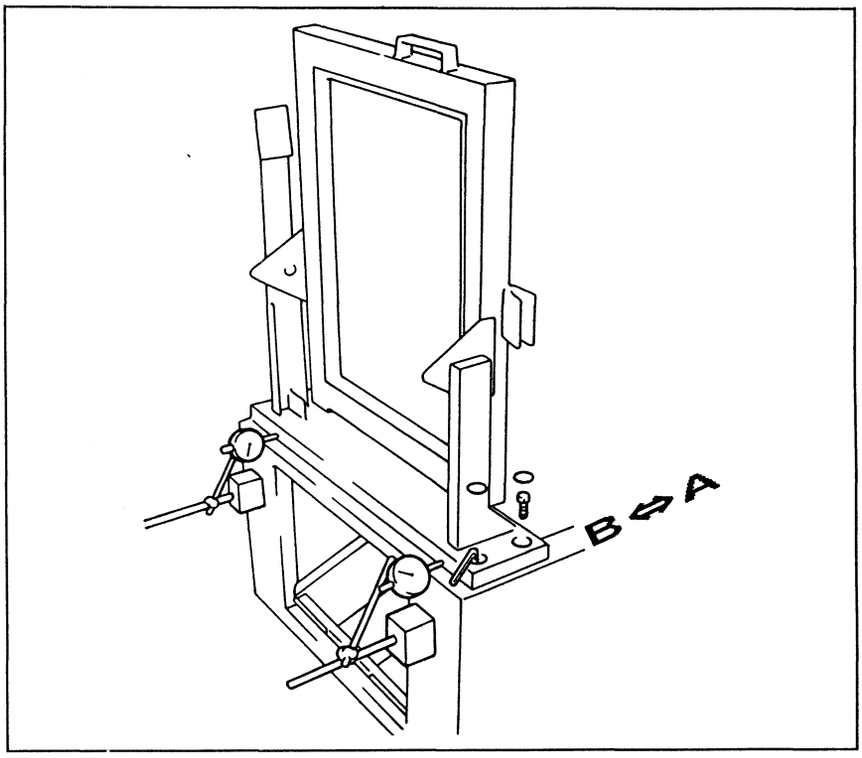
1. Set the dial gauges on the original mount, both on the operation side and on the back of the operation side.
2. Loosen the open/shut hit bolts (M6).
3. Rotate the open/shut hit bolts to the right in equal amounts. (One revolution equals an alteration of approximately 0.3 mm.)
4. Tighten the lock nuts and verify by making a copy.
5. If outside the permissible values, repeat the above procedure.



When C < D

1. Following the adjustment procedure for C > D in reverse, turn the open/shut hit bolts to the left.

5-2 Adjusting focus



【 Verifying focus 】

1. Set the resolution chart on the original mount and make a copy.

<Resolving power permissible values>

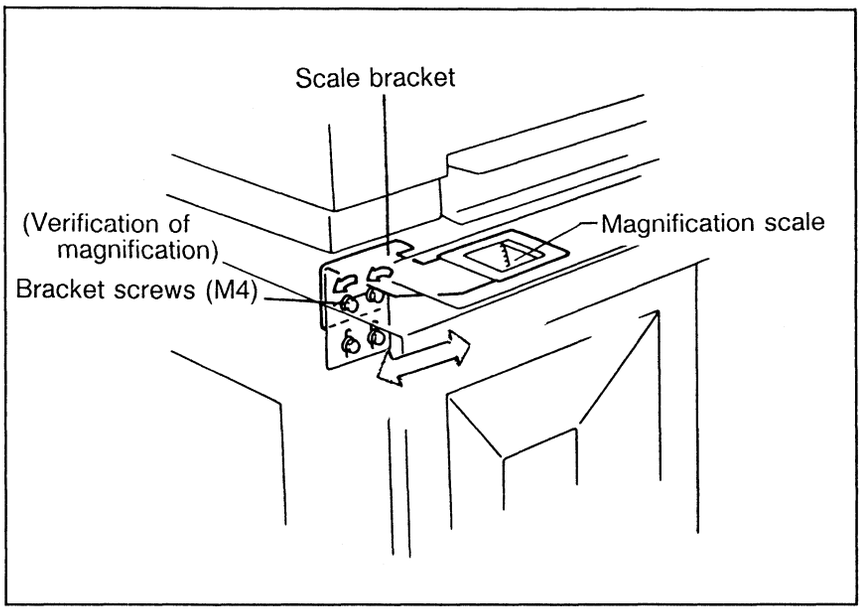
	100%	95%
Aperture F22	8.3 or more	7.1 or more

■ Adjusting the focus

Adjustment by moving the complete original mount in left and right directions

1. Set the lens to 100% with the lens mount handle.
2. Set the dial gauges on the original mount, on both the operation side and the back of the operation side.
3. Loosen the base securing bolts (cap bolts M8) on both the operation side and the back of the operation side.
4. Move the base slightly from the present position in direction A (move in same direction for both the operation side and the back of the operation side).
5. Tighten the base securing bolts and verify by making a copy.
6. If the focus is less clear than it was before, find the true focus by moving the base back towards the original position (direction B).
   - ▸ Adjustment for focus should be done within the permissible distortion values.

5-3 Adjustment of magnification



【 Verification of magnification 】

1. Place a suitable chart in the original mount to measure the magnification.

<Permissible value>	100% —— ±0.5 mm/300 mm

Adjusting magnification

1. Make a copy and measure the dimensions.

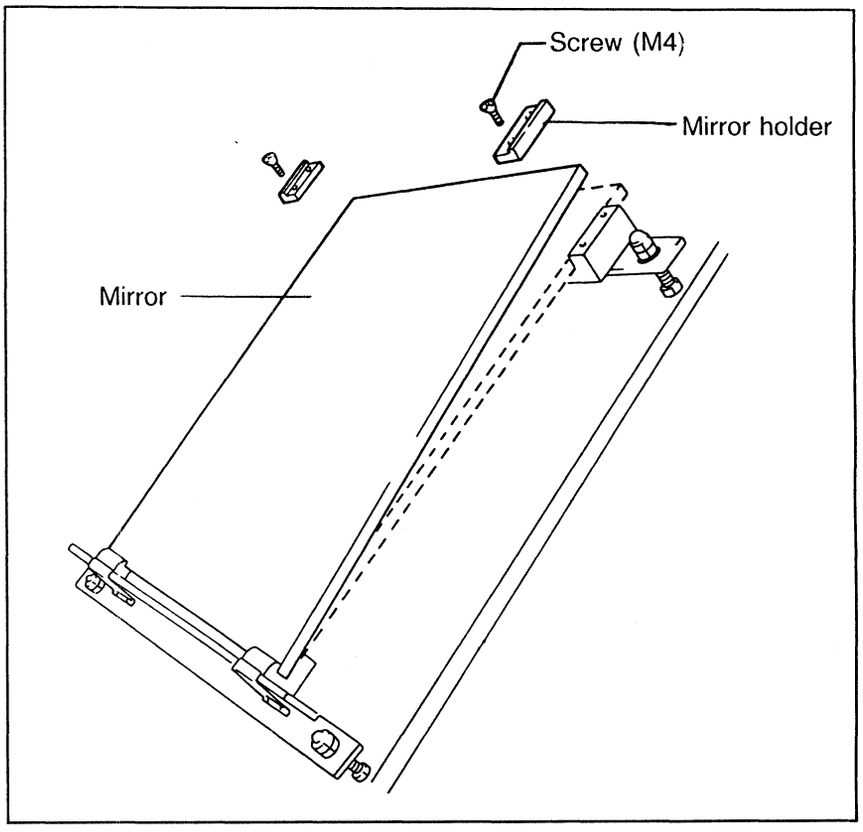
<Finding the magnification>

$$\text{Magnification} = \frac{\text{Dimensions of copy image}}{\text{Standard dimensions}} 100\ (\%)$$

[Ex.] $\frac{297}{300} \times 100 = 99\%$

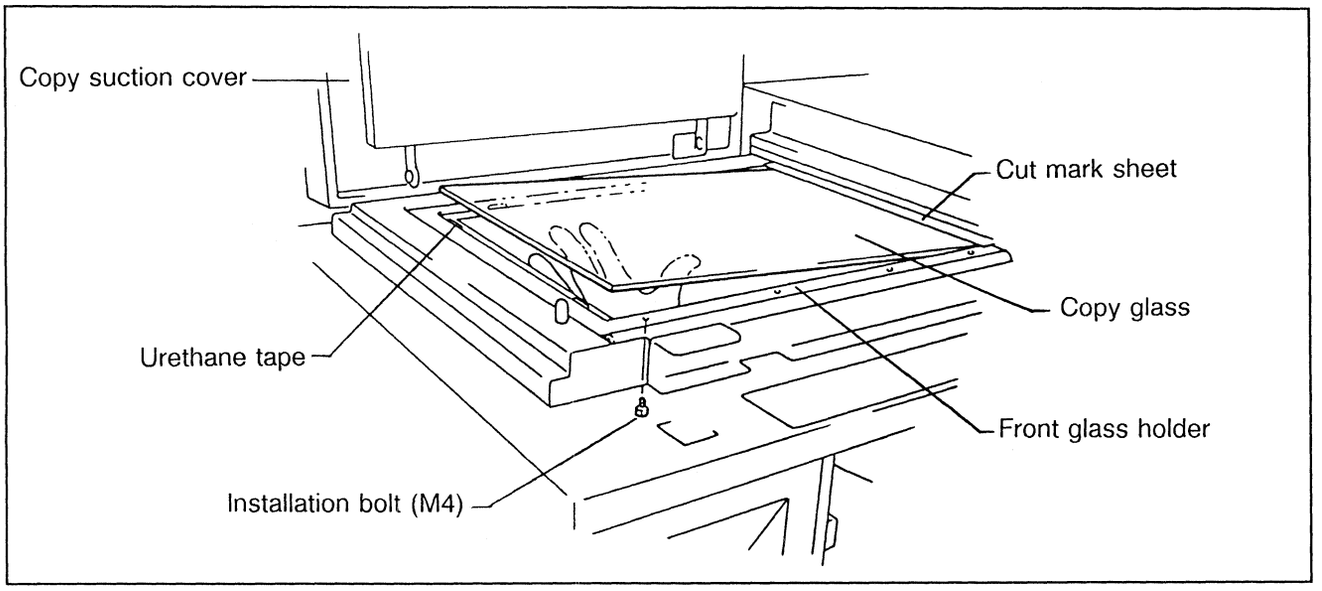
2. If the result is 99%, as shown in the example, loosen the bracket screws (M4) for the scale.
3. Move the scale bracket in the direction of the arrow so that the cursor line matches 99% on the scale. Secure the bracket.
4. Move the lens mount handle again and set to 100%. Make a copy.
5. If magnification is not within the permissible range, repeat the procedure above.

6. Replacing the mirror



1. Open the front cover.
2. Loosen the screws for the mirror holder and remove the mirror holder.
3. Hold the upper part of the mirror lightly and raise it. Bring it towards you and remove.
4. Set the new mirror correctly.
   - Be very careful not to scratch or dirty the new mirror during installation.
5. Install the mirror holders.
   - After replacing the mirror check for distortion, verify focus, and verify magnification.

7. Replacing the copy glass



- The copy surface is secured with suction power and about 2 mm urethane tape is attached on the far side and left side, in two locations against the glass, and is held down with the glass by suction power.
- When changing the glass, be very careful not to let the urethane tape slide or separate. Also, when placing the glass, be absolutely sure not to loosen the glass support (sponge gum).

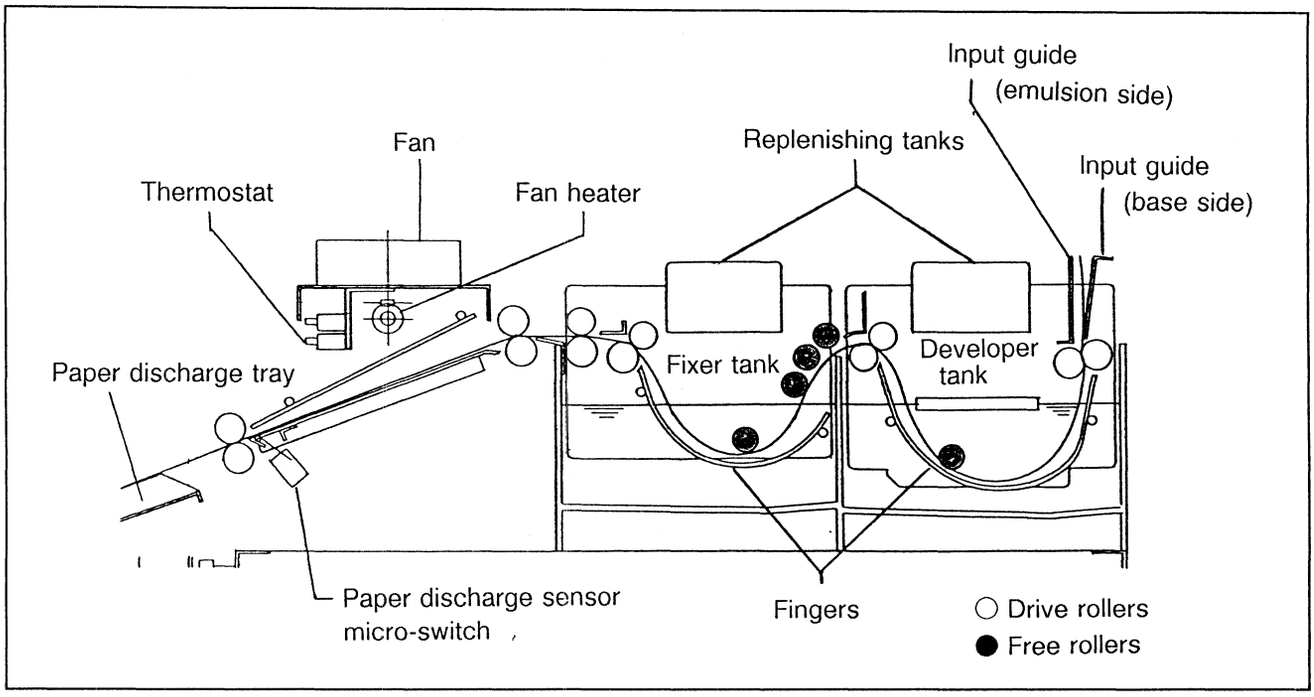
Removal

1. Open the copy vacuum frame.
2. Open the front cover and cover the mirror.
3. Raise from inside and remove the glass.
   ▸ Be careful not to scratch the cut mark sheet.

Installation

1. Since installation was made so that there are no spaces between each of the glass holders and the glass, loosen the installation screws (M 4 hexagonal bolts) of the front glass holder.
2. Pushing the far and right sides respectively, install the glass.
3. After confirming that the four pieces of urethane tape have not been damaged, install the front glass holder.
4. Close the vacuum frame and confirm suction and paper passage.

8. Processor and dryer



Scratching of the master in the processor and dryer

Check and adjust according to the following general items.

(1)	Dirt and foreign substances on the inside of the input guide (emulsion side).	⇨ Polish clean with a compound.
(2)	The surfaces of each roller are dirty and they do not rotate smoothly.	⇨ Rinse with water and clean.
(3)	The fan in the dryer does not rotate.	⇨ Check electrical system.

Wrinkling of the master in the processor and dryer

Check and adjust according to the following general items.

(1)	The master meanders from faulty setting.	⇨ Reset the master.
(2)	Poor cutting of the cutter.	⇨ Replace the cutter blade.
(3)	Glue from the tape for securing the master has stuck to parts of the processor and conveying section (rollers, etc.) causing the master to meander.	⇨ Clean.
(4)	Foreign matter and have stuck to the processor input guide.	⇨ Adjust and clean.

(5)	The wringer roller finger line and the roller line in the developer and fixer tanks are not matched left and right.	⇨ Adjust.
(6)	Each finger exhibits unevenness or foreign matter has stuck there.	⇨ Adjust and clean.
(7)	The dryer temperature setting is too high.	⇨ Lower the temperature by slightly turning the adjustor on the thermostat to the left.

☆ When scratches or wrinkles appear on the master, find the part in the process where it occurred before fixing.

Electrical System

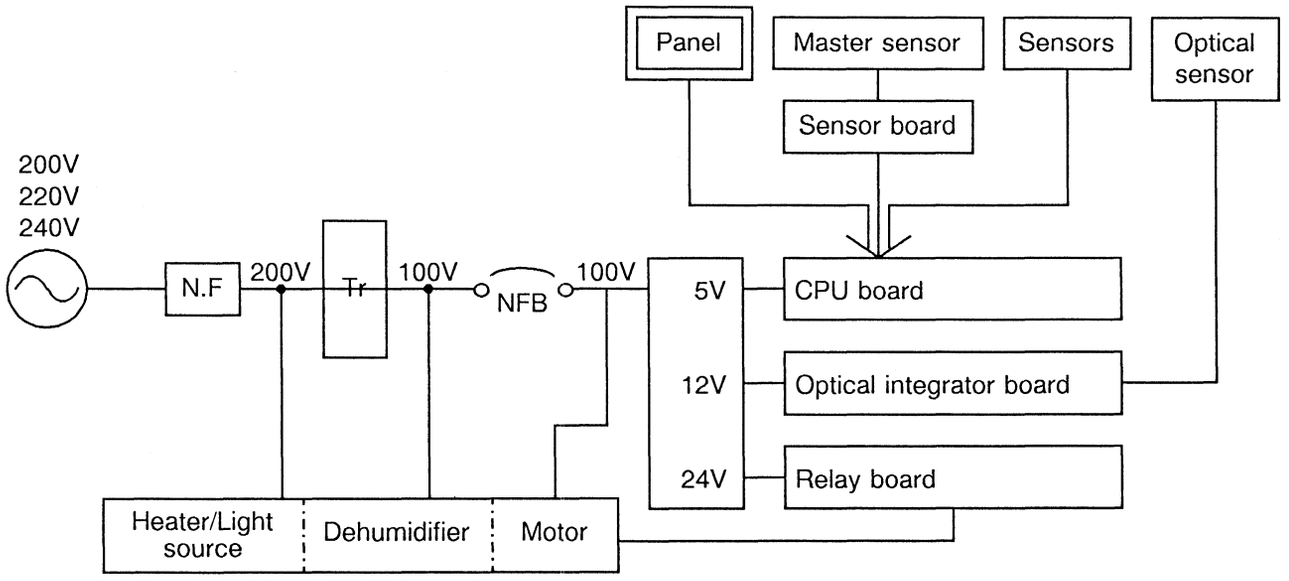
Contents

1. Outline

1-1 Introduction

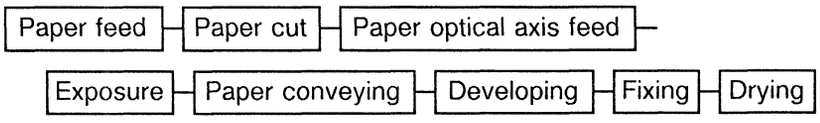
This service manual was written to cover repairs up to print board replacement.

1-2 System outline

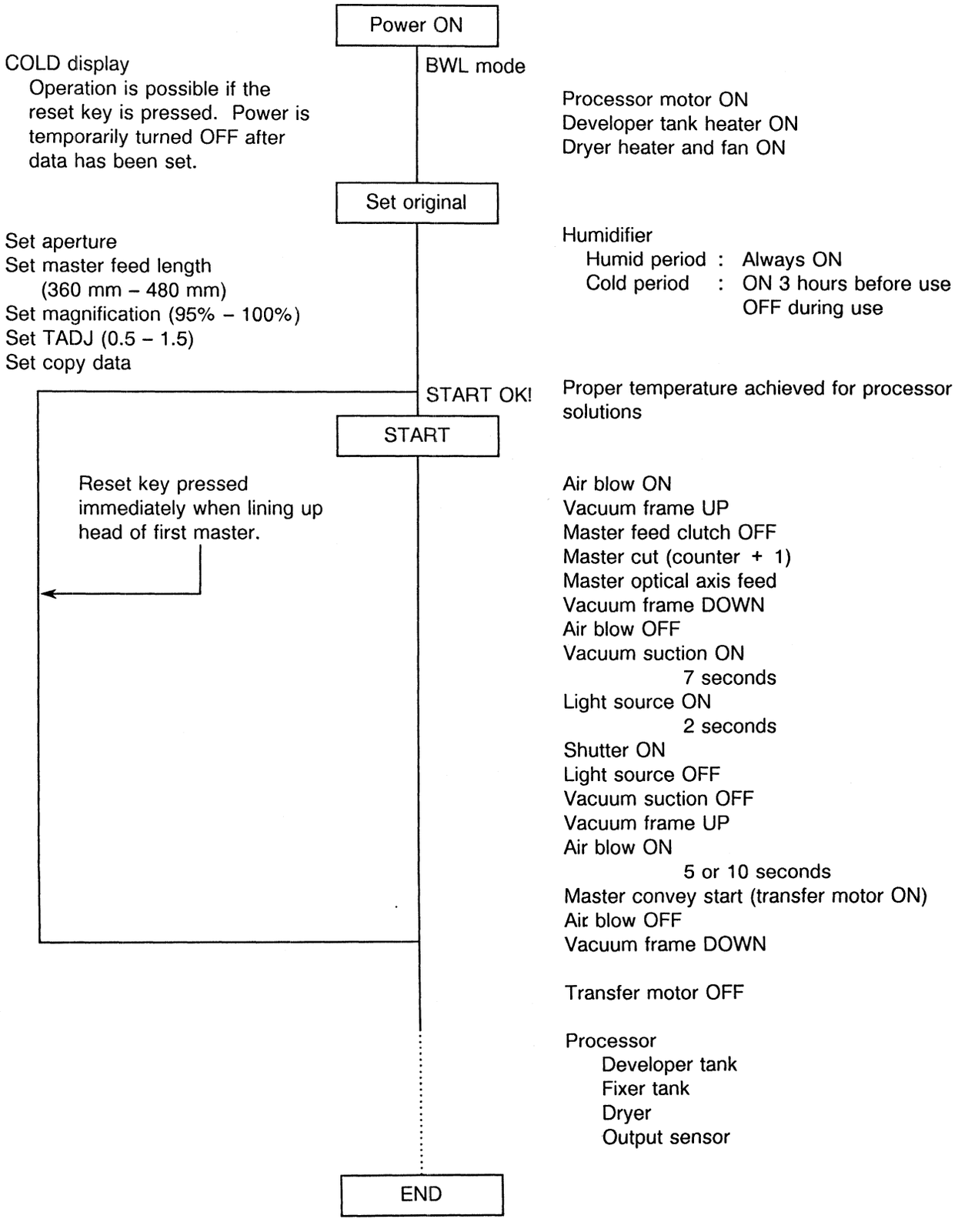


This unit uses an 8085 series microprocessor in the control section and all signals from each sensor switch are sent to the control section as input signals. Output signals from the control section operate the relays which operate each electrical device.

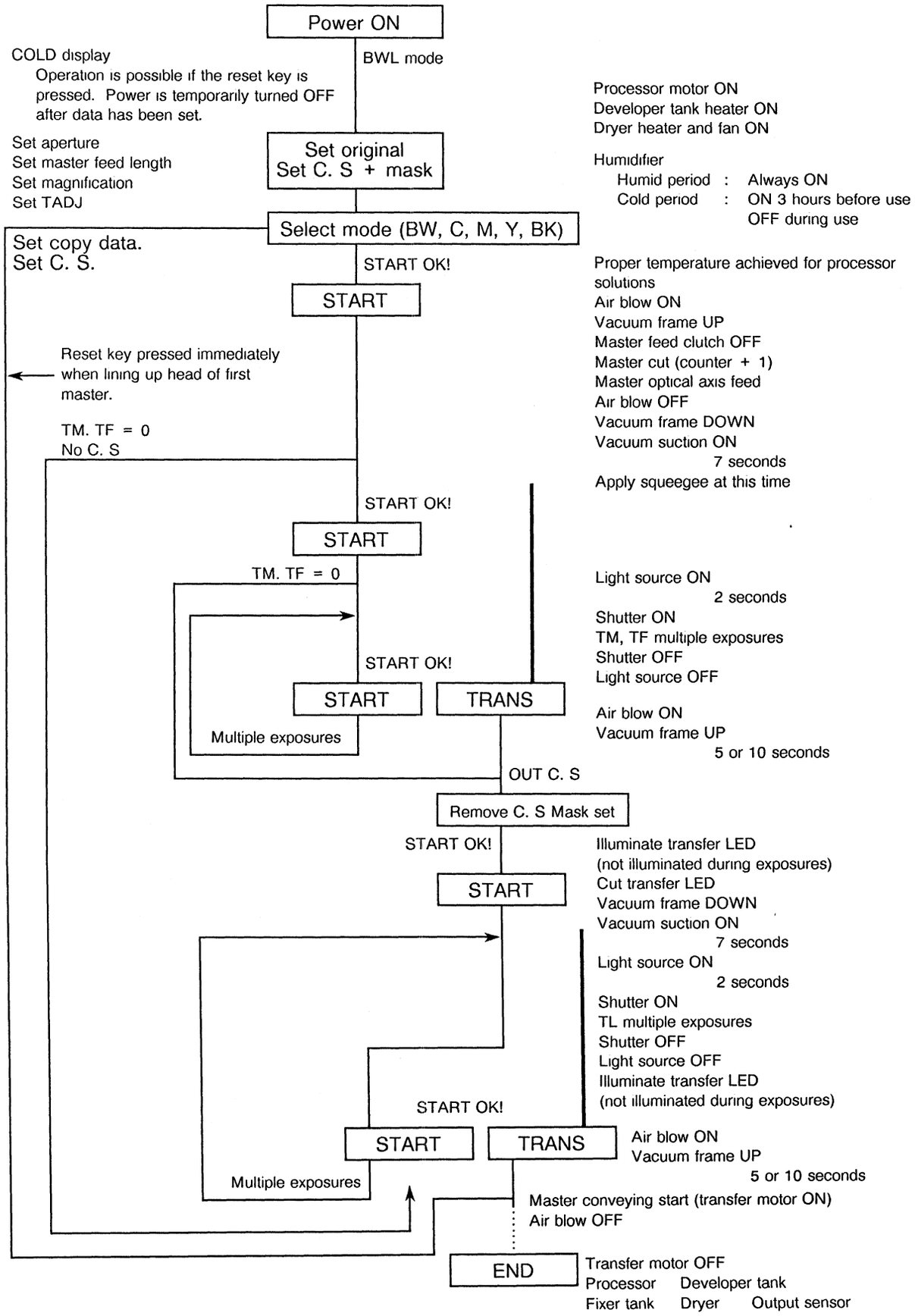
The process occurs in the following order:



1-3 Operation flo chart (BWL)



1-4 Operation flowchart (BW, C, M, Y, and BK)



2. Problems and Diagnosis

2-1 Special warnings

1. The terminals inside the electric supply unit with the following numbers are still alive even when the power switch is turned OFF. Observe caution. VL–WL, VL1–WL1, VL3–WL3, UL4–XL1, and UL1–XL1
2. When changing any of the electrical parts, be sure to ***turn the switch OFF in the electrical supply box from which power is supplied to this unit via the power cord***. Or, detach the power supply cable.
3. Be sure to cut the power before doing any repairs on the revolving parts, the cutter, and the chain mechanism.

2-2 Checking the power supply

The power supply relates to all troubles. Therefore, be sure to check the power supply first before engaging in further troubleshooting.

1. Check the suitablility of the **voltage discriminating tap** of the power supply transformer.
2. **Check that the input power supply voltage** to the input cord is normal.
3. **Check for blown fuses in the electric supply box**. Refer to 2-4. If a fuse is found to be blown, replace with a fuse of the correct standard. If the fuse blows again at this time, replace after finding the cause.

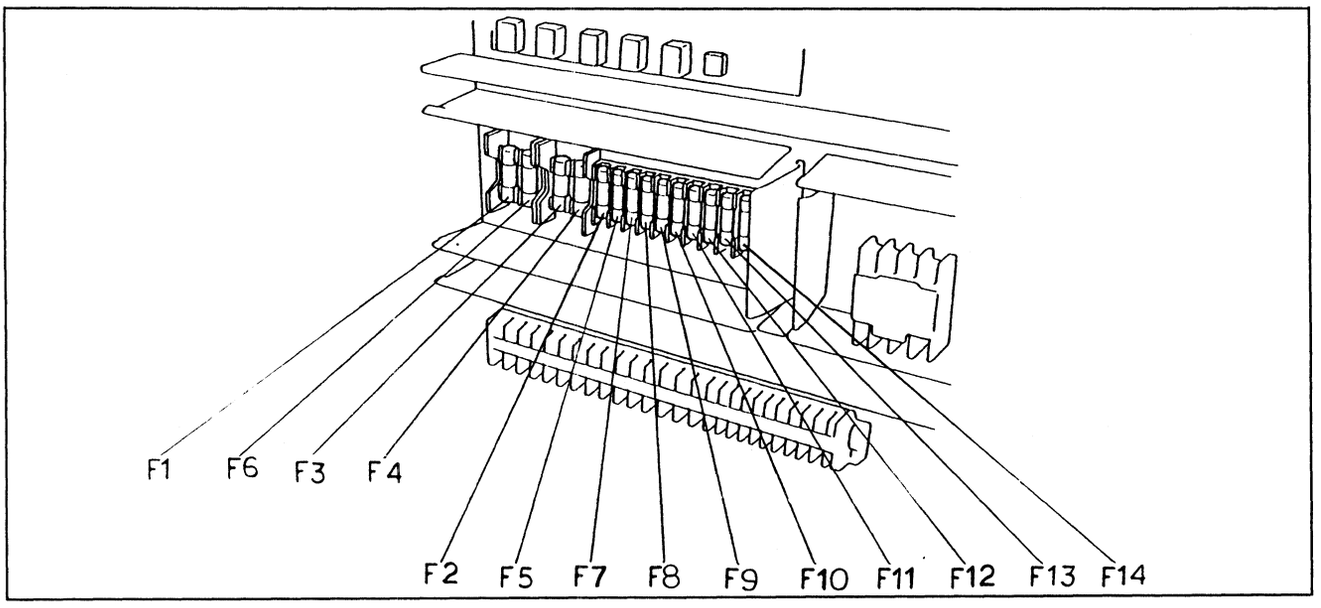
   【 ***Caution*** 】 *When checking the electric supply unit, proceed only* ***after turning the original power source OFF,*** *in order to prevent electric shock.*

4. If the AC power supply is okay, next check the DC power supply. Refer to 3-4 and 3-5 for checking the DC power supply.

2-3 Function of each fuse

The electric supply unit is found below the master loading section and is made up of various electrical parts. Turn the power switch and the original power source OFF before changing fuses or checking the circuit. Use fuses of same rated capacity and type. Do not install anything which differs. (Use of anything different will cause damage to the unit.)

This machine uses fast blow type fuses.



1 Reflection light source fuse (F1)
A 20A glass fuse protects the reflection light source circuit.

2 Transmission light source fuse (F6)
A 20A glass fuse protects the permeable source circuit.

3 Dryer heater source fuse (F2)
A 3A glass fuse protects the dryer heater circuit.

4 Transformer fuses for high power circuit (F3, F4)
10A glass fuses protect the transformer for the high power circuit.

5 Dehumidifier source fuse (F5)
A 5A glass fuse protects the dehumidifier circuit.

6 Vacuum pump fuse (F7)
A 2A glass fuse protects the vacuum pump circuit.

7 Fuses for low power circuit (F8, F9, F10, F14)
One 2A and three 1A glass fuses protect the low power circuit.

8 Developer heater fuse (F11)
A 5A glass fuse protects the heater circuit inside the developer tank.

9 Processor motor fuse (F12)
A 1A glass fuse protects the processor drive motor circuit.

10 Dryer fan fuse (F13)
A 3A glass fuse protects the dryer fan circuit.

2-4 When each fuse blows

1.	When F1 blows	**The reflection light source does not illuminate.**
2.	When F2, TF1 blow	**The dryer heater does not operate.**
3.	When F3, F4 blow	**All operations stop or no operations start.**
4.	When F5, TF2 blow	**The dehumidifier does not operate.**
5.	When F6 blows	**The transmission light source (optional) does not operate.**
6.	When F7 blows	**The vacuum pump does not operate.**
7.	When F8, F9 blow	**Devices other than the developer heater, processor motor, and the dryer fan do not operate.**
8.	When F10, F14 blow	**Devices other than the cutter motor, dehumidifier, developer heater, processor motor, and the dryer fan do not operate.**
9.	When F11 blows	**The developer heater does not operate.**
10.	When F12 blows	**The processor heater does not operate.**
11.	When F13 blows	**The dryer fan does not operate.**

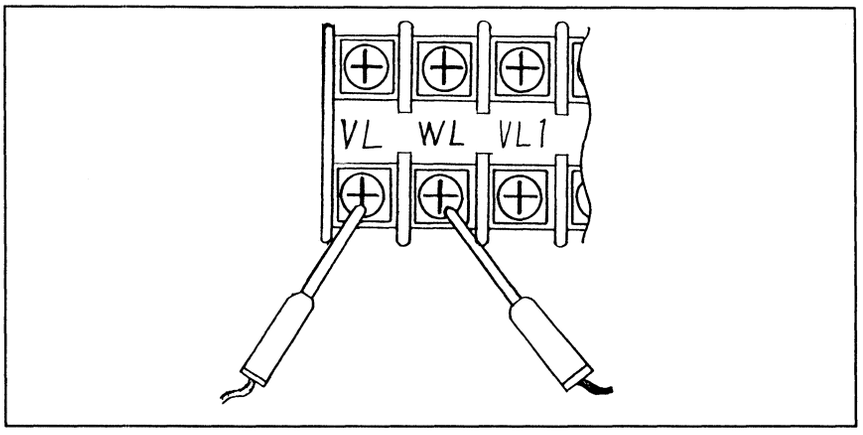
3. Power Supply Voltage Check

3-1 Verifying the power supply voltage at the place of installation

The voltage should read ± 10% of the basic voltage when measured with terminals 【 VL 】 and 【 WL 】 inside the electric supply unit (even when under full load).

The same applies for 【 VL1 】, 【 WL1 】 and 【 VA 】, 【 WA 】.

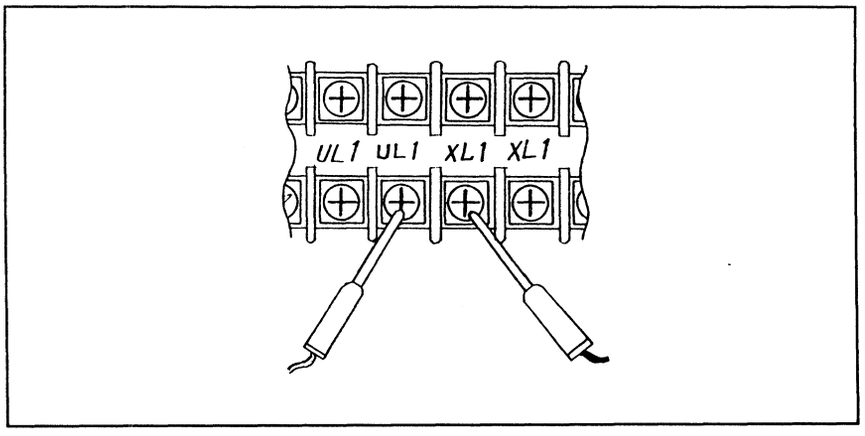
± 10% of basic voltage



3-2 Verifying the AC 100V power supply on the second side

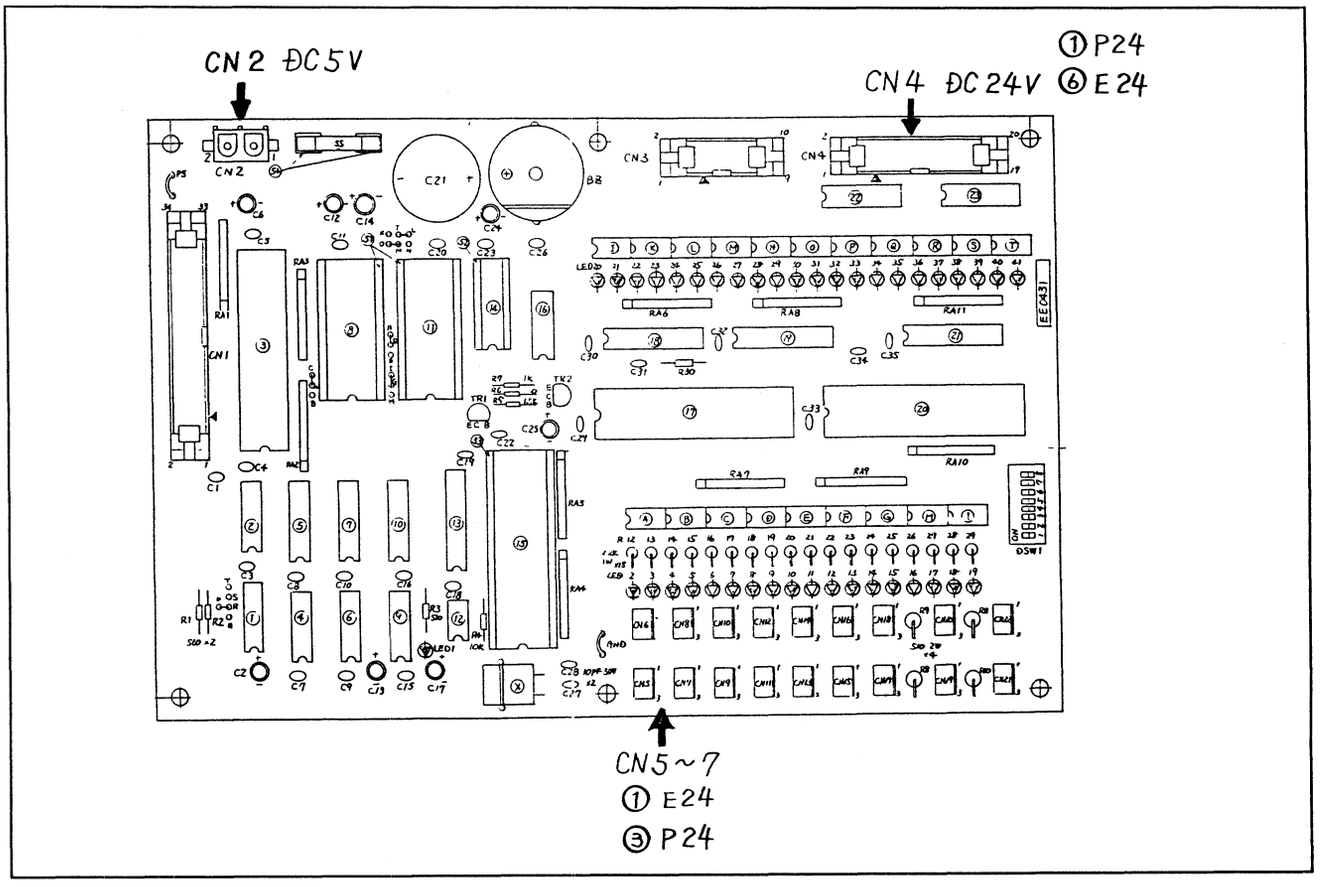
The voltage should read **AC 100 V ± 10%** of the basic voltage when measured with terminals 【 UL1 】 and 【 XL1 】 inside the electric supply unit (even when under full load).

ac 100V ± 10%



3-3 Verifying power supply voltage on the board

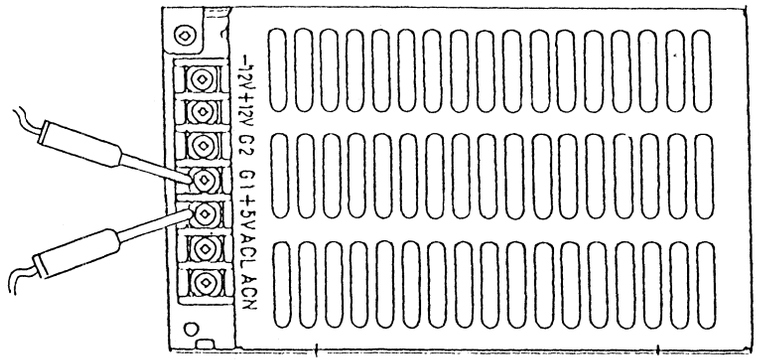
Measure in the check locations given below on the board.



【 **Caution** 】 *Use a digital type tester as your measuring device. When using an analog type tester, use one which gives an instantaneous response.*

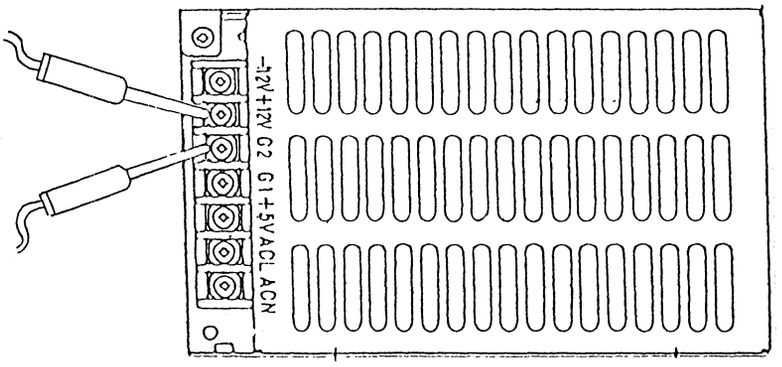
3-4 Verification of the regulator power supply voltage

+5 V power supply



RE1 switching regulator

+12 V power supply

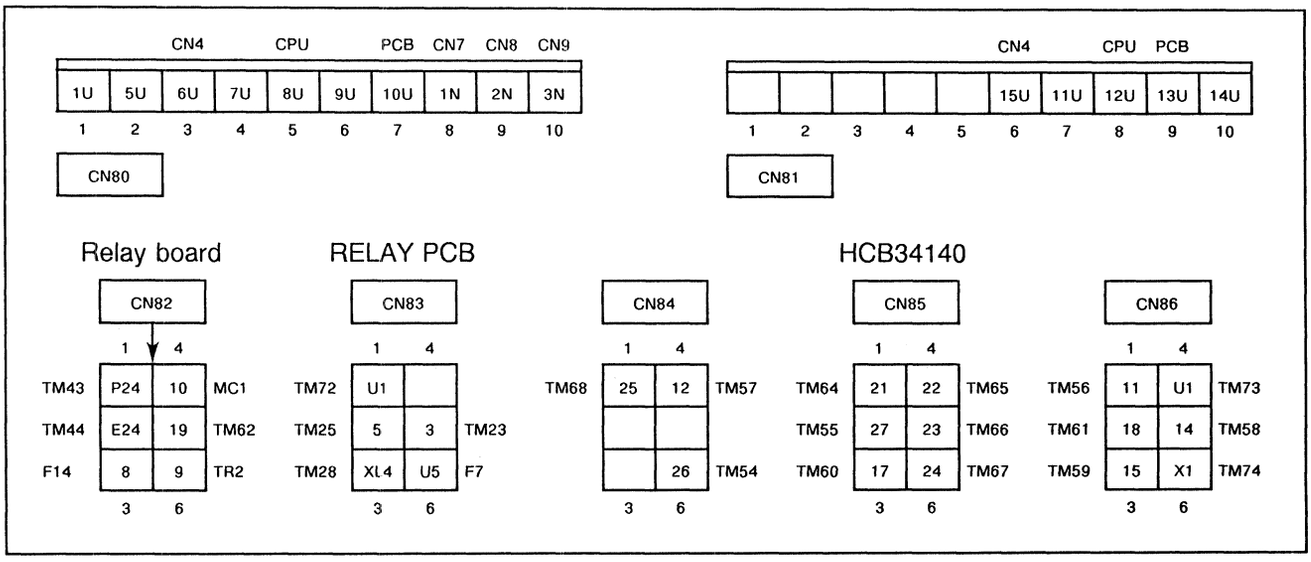


RE1 switching regulator

DC 5V : For CPU

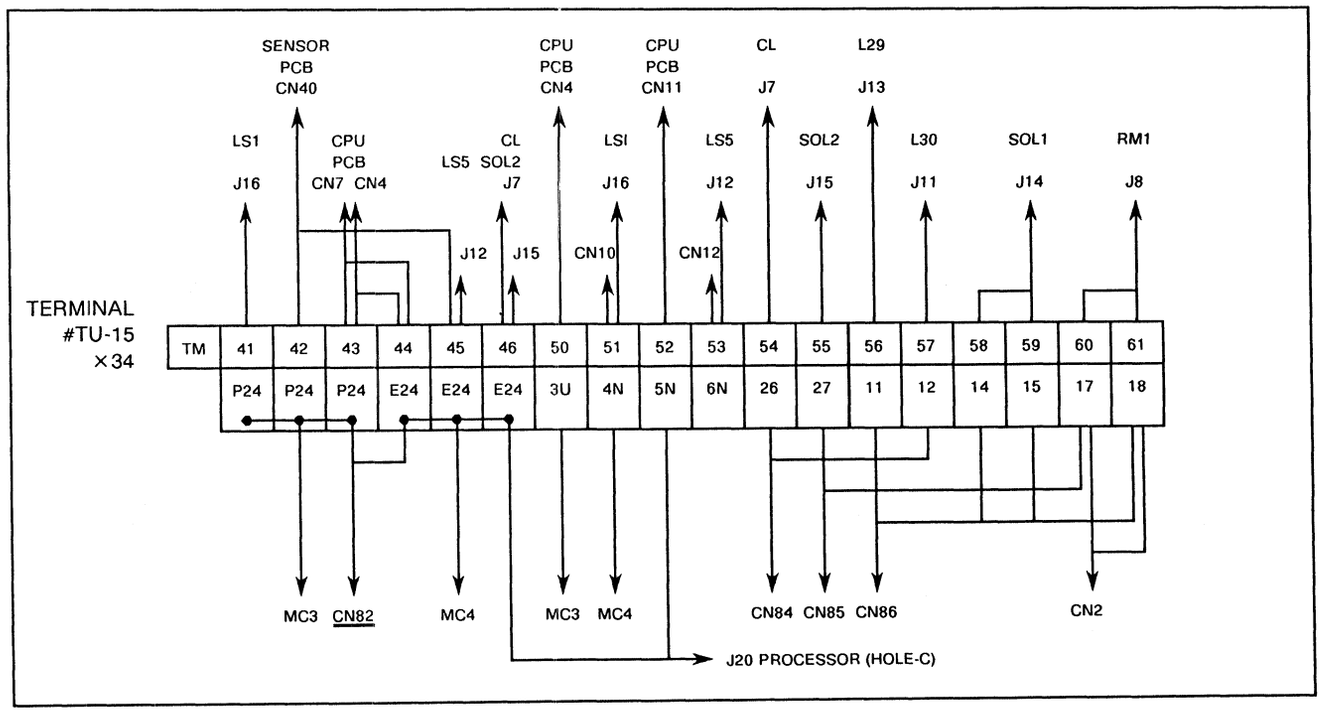
DC 12 V : For optical integrator

3-5 Verification of DC power supply voltage for relay



AC 18 V is supplied to the relay board from TR 2 to CN82 【 3 】【 8 】 - 【 6 】【 9 】.

On the relay board, AC 18 V is rectified to DC 24 V and goes from CN82 【 1 】【 P24 】 - 【 2 】【 E24 】 to terminals 【 TM41 - 43 】 【 P24 】 - 【 TM44 - 46 】【 E24 】, and is supplied to each fixture and board, etc.

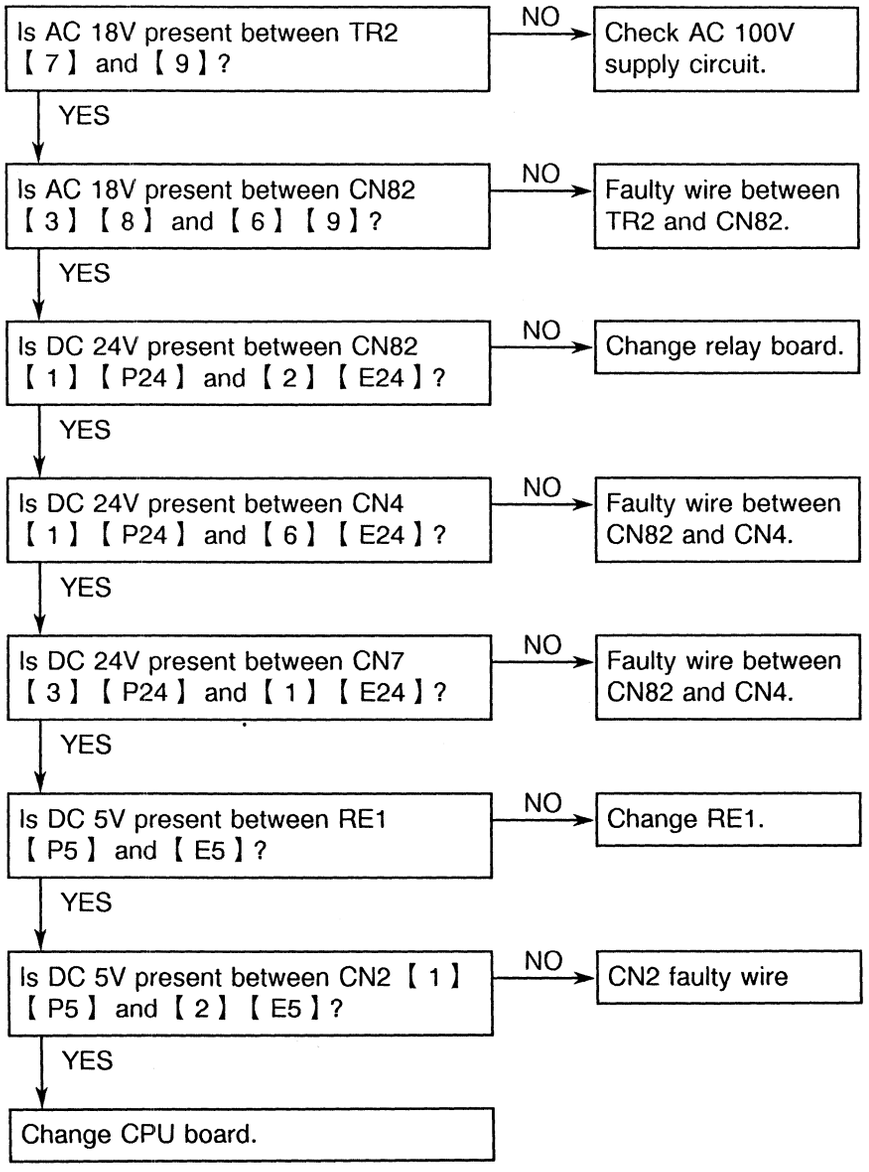


4. Troubleshooting

4-1 The CPU does not operate.

Verification fuses
F8, 9, 10, 14

DC 5V and DC 24V are necessary for the CPU.

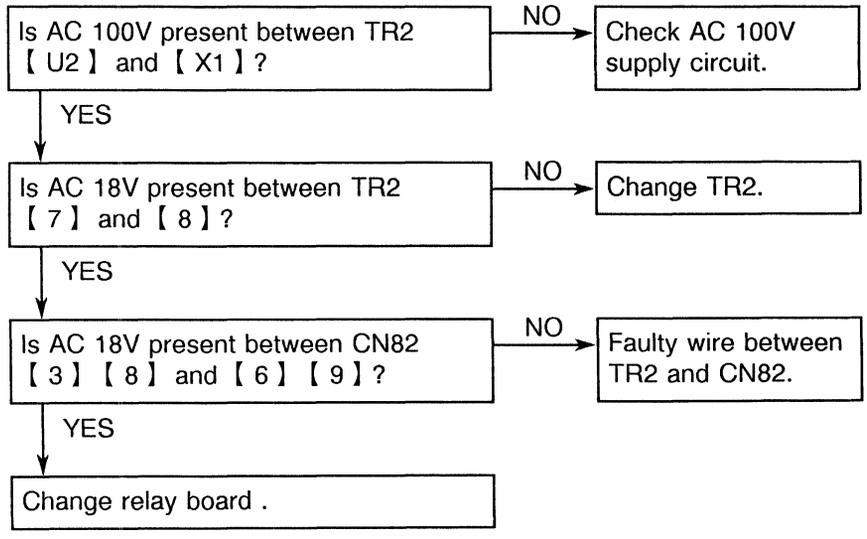


【 ***Caution*** 】 *For CPU board trouble, be sure to check the output voltage at the power supply unit output terminals on the CPU board.*

4-2 DC 24 does not output.

Verification fuses

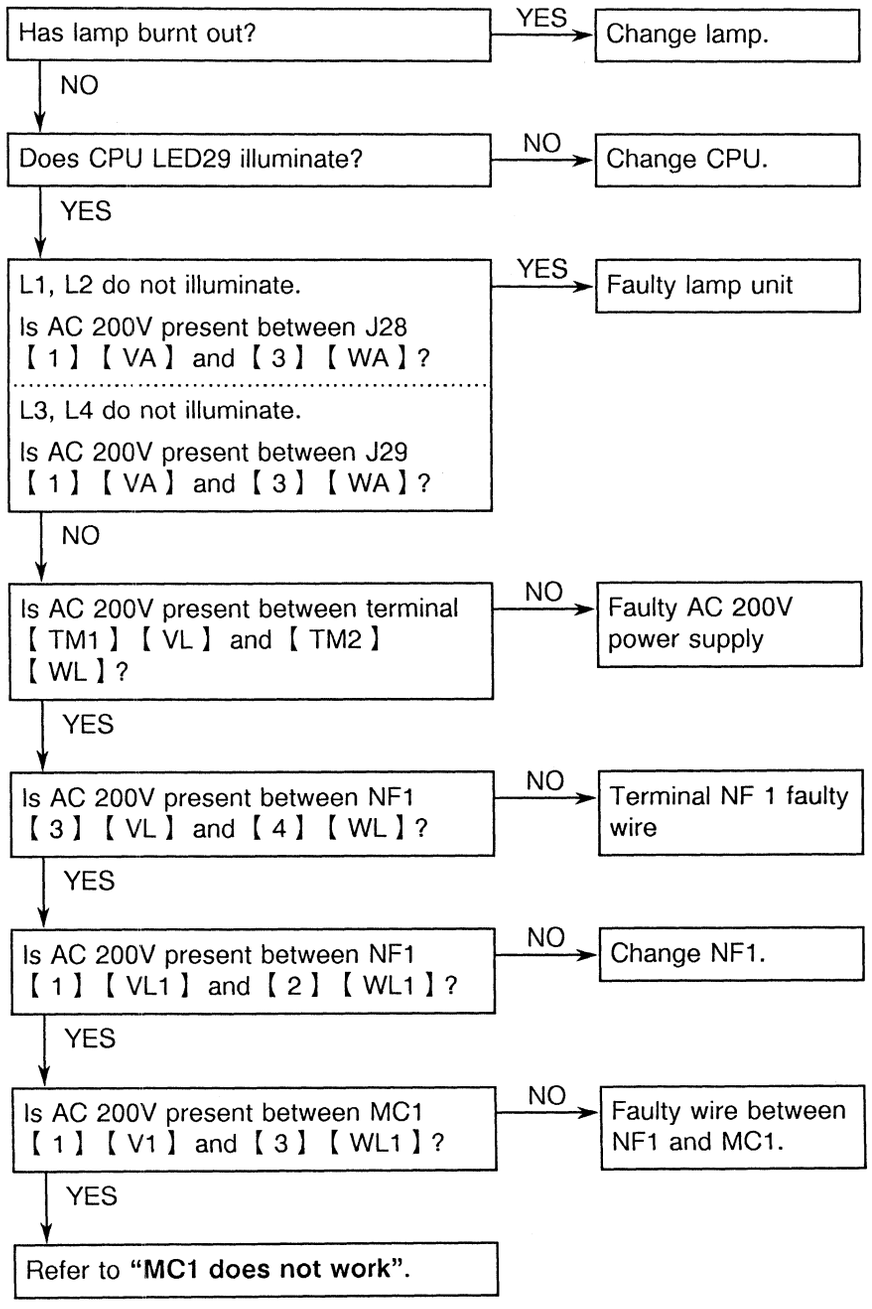
F9, 10, 14



4-3 Reflection light source does not illuminate.

Verification fuse

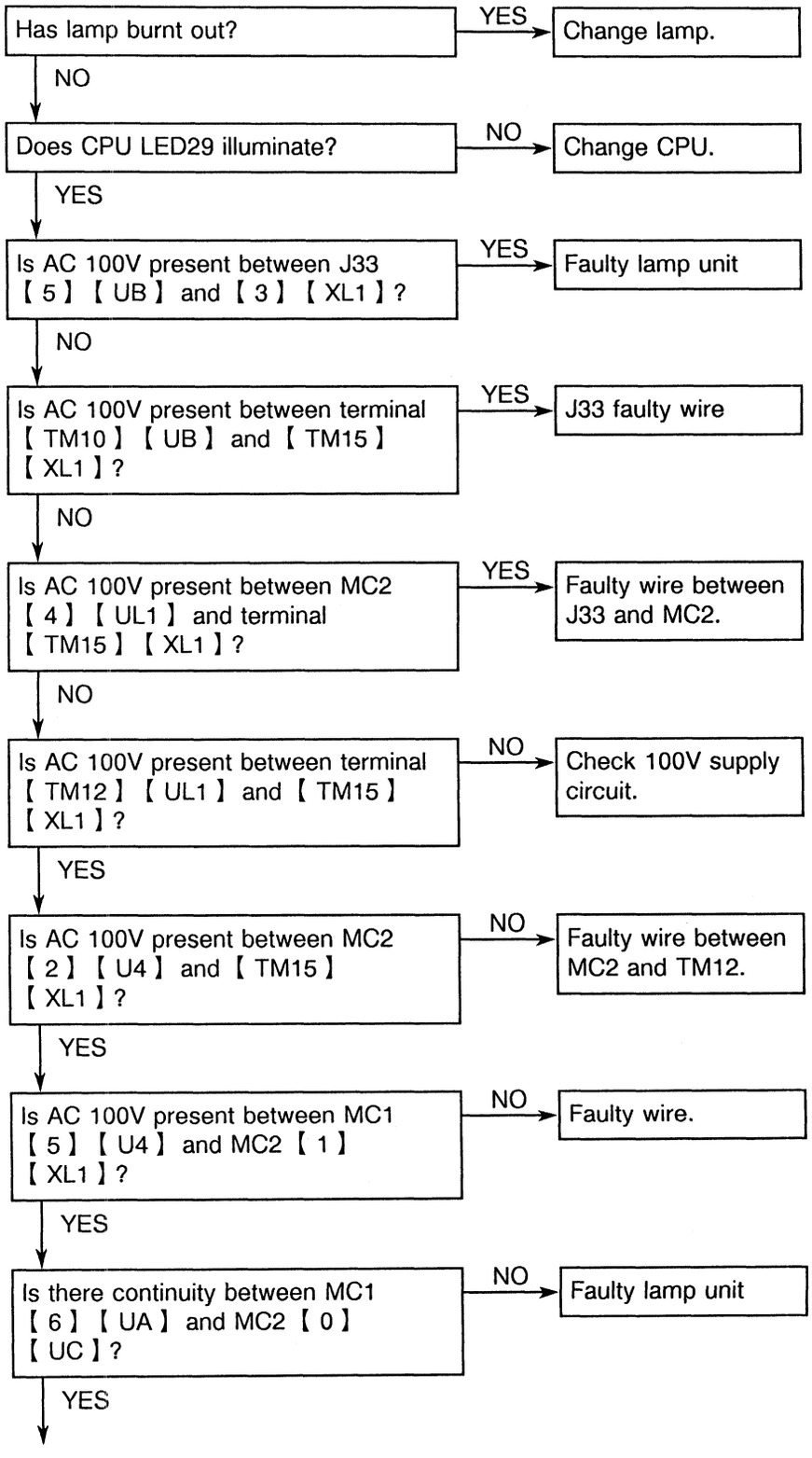
F1

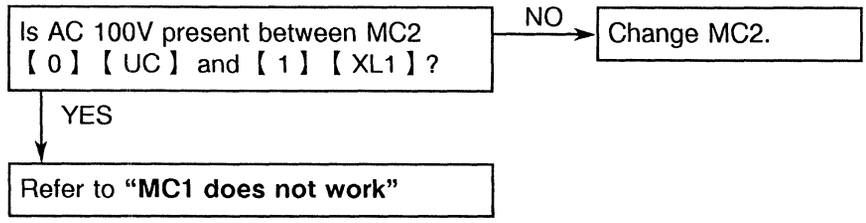


4-4 Transmissior light source (optional) does not illuminate.

Verification fuse

F6

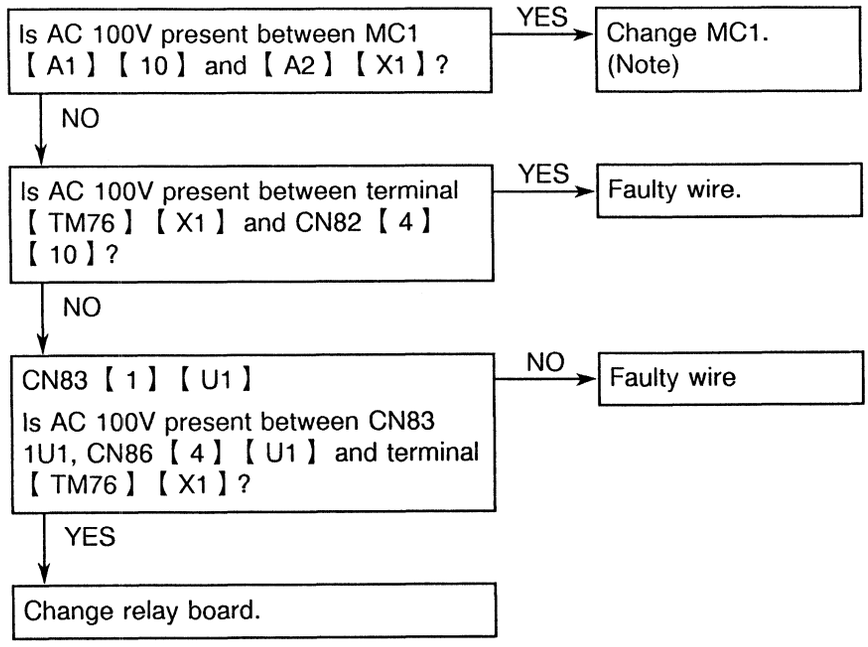



Is AC 100V present between MC2
【 0 】【 UC 】 and 【 1 】【 XL1 】?
NO
Change MC2.
YES
Refer to "MC1 does not work"

4-5 MC 1 does not work.

Verification fuses

F8, 9

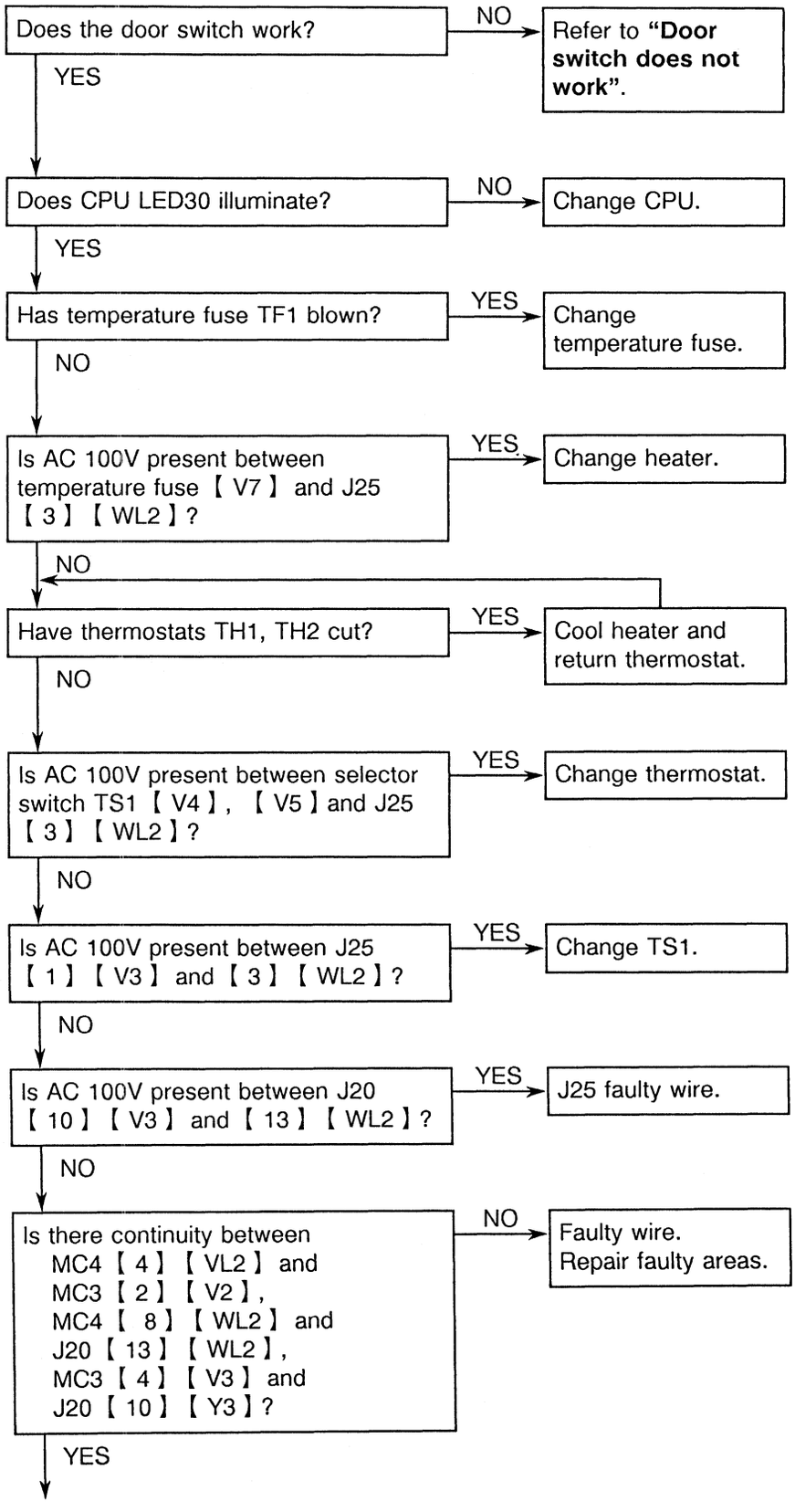


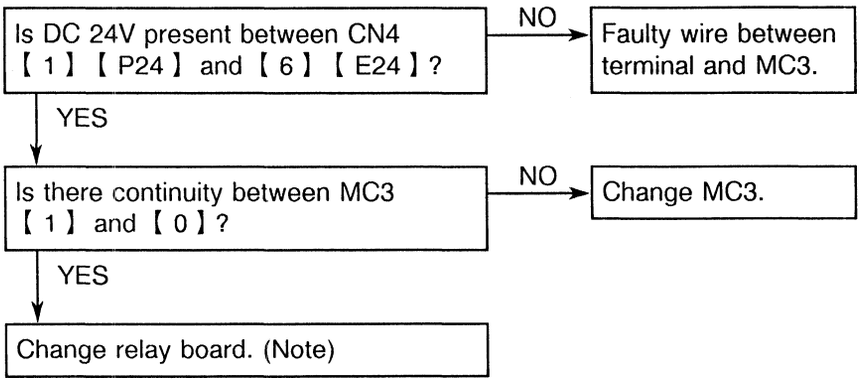
【 ***Note*** 】 *Faulty contact may be considered.*
If there is no continuity between MC1 【 A1 】 【 10 】 and 【 A2 】 【 X1 】, change MC1. If there is continuity, contact is faulty. If contact is faulty, change contact or change MC1.

4-6 Dryer heater does not operate.

Verification fuse

F2



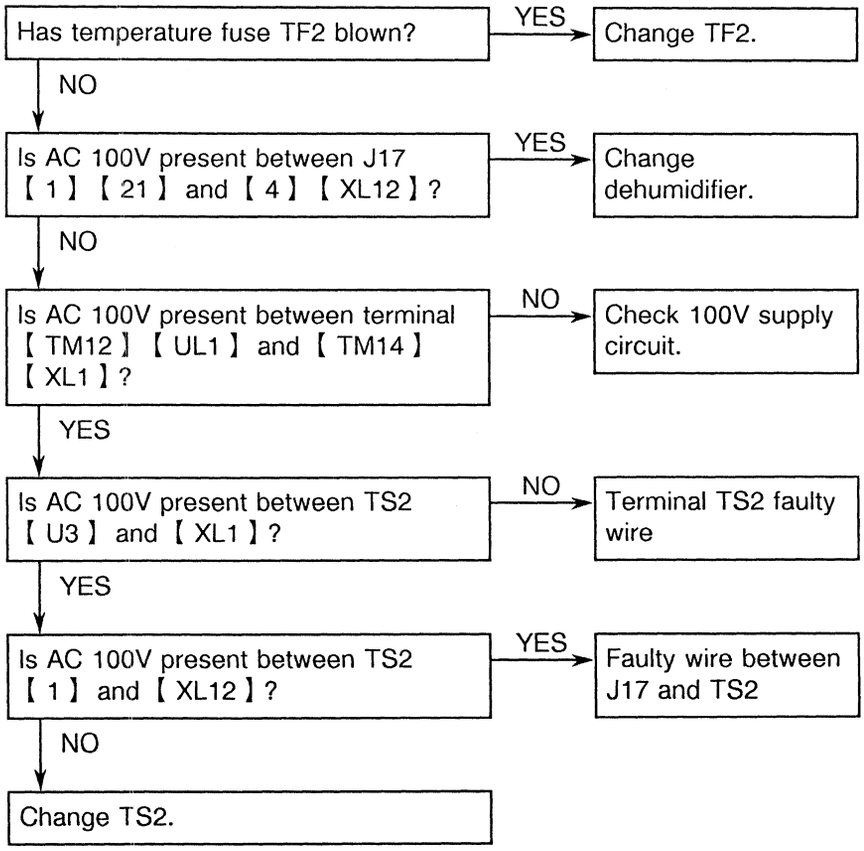


【 ***Note*** 】 *Check for faulty contact between MC3 【 2 】【 V2 】 and 【 4 】【 V3 】. If there is faulty contact, change contact or replace MC3.*

4-7 Dehumidifier does not operate.

Verification fuse

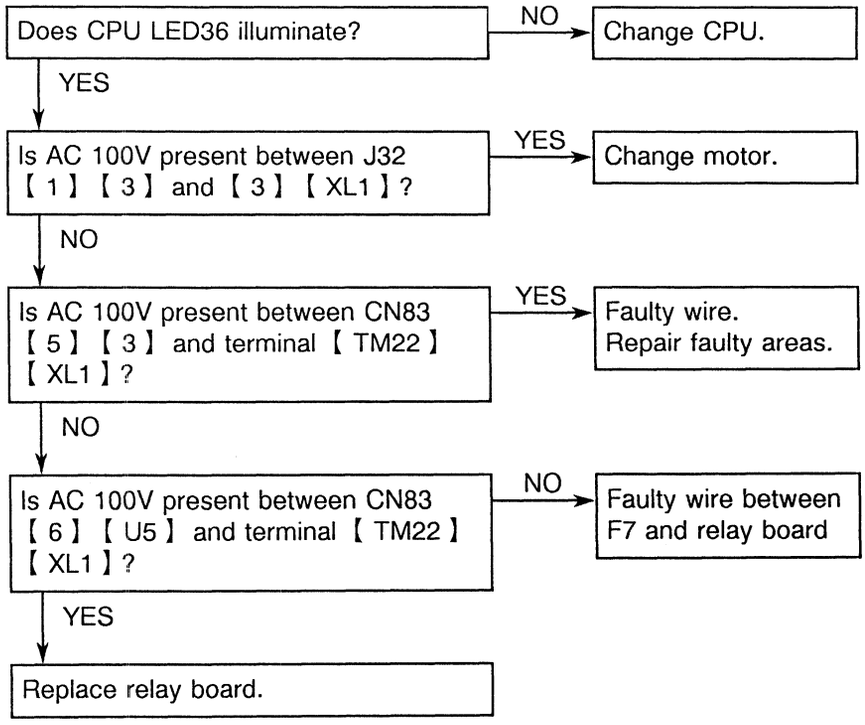
F5



4-8 Vacuum pump does not operate.

Verification fuse

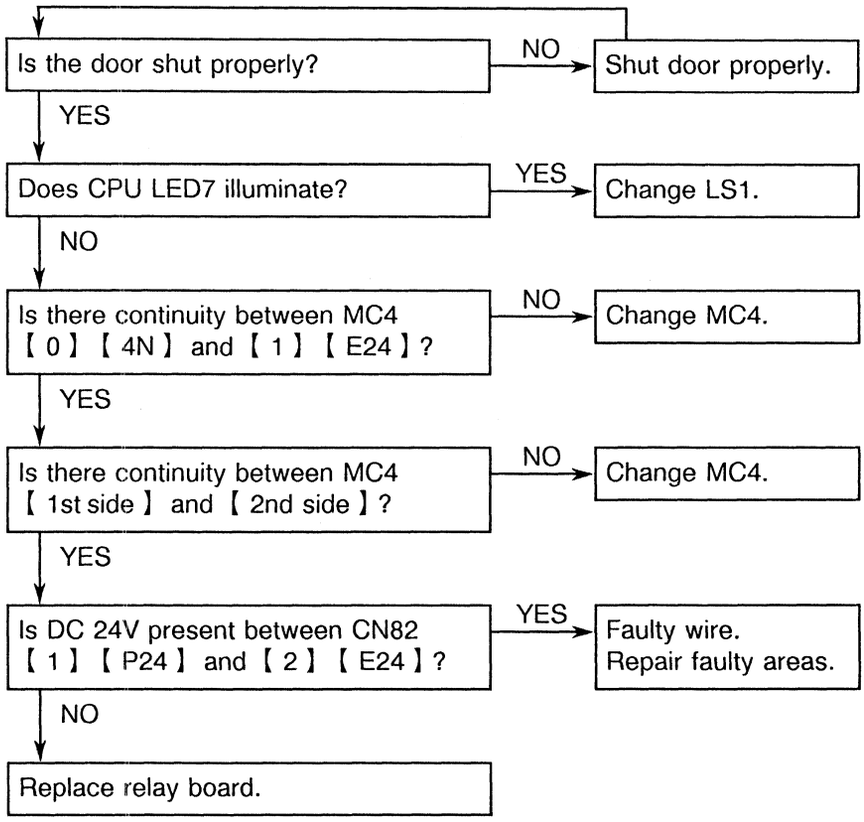
F7



4-9 Door switch does not operate.

Verification fuse

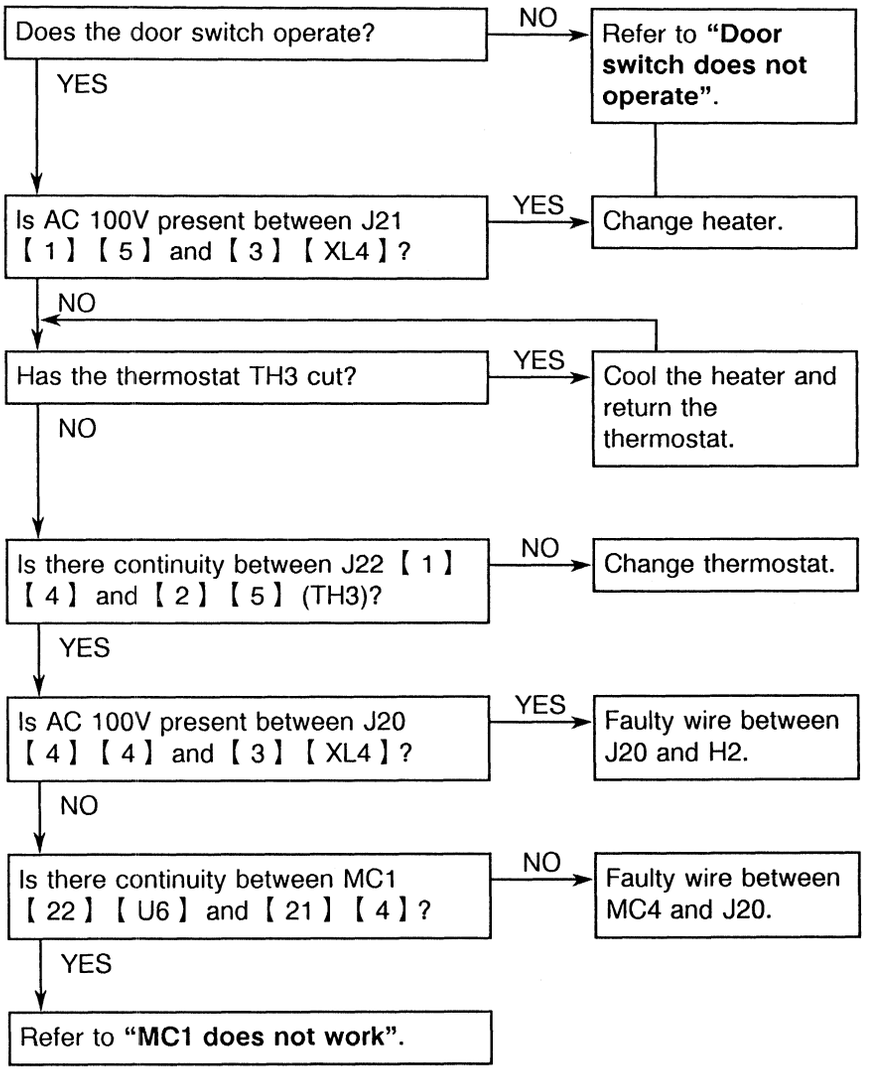
F14



4-10 Developer heater does not operate.

Verification fuse

F11

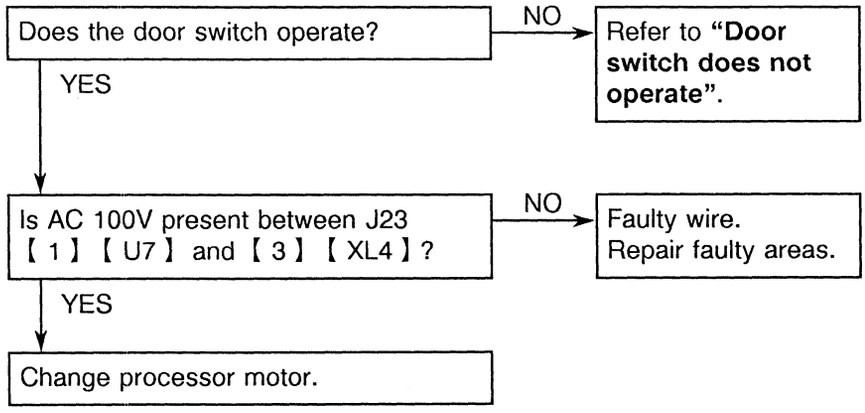


【 ***Note*** 】 *The developer heater is deliberately turned 〔 OFF 〕 when the main light source is on because of the limit on electrical capacity.*

4-11 The processor motor does not operate.

Verification fuse

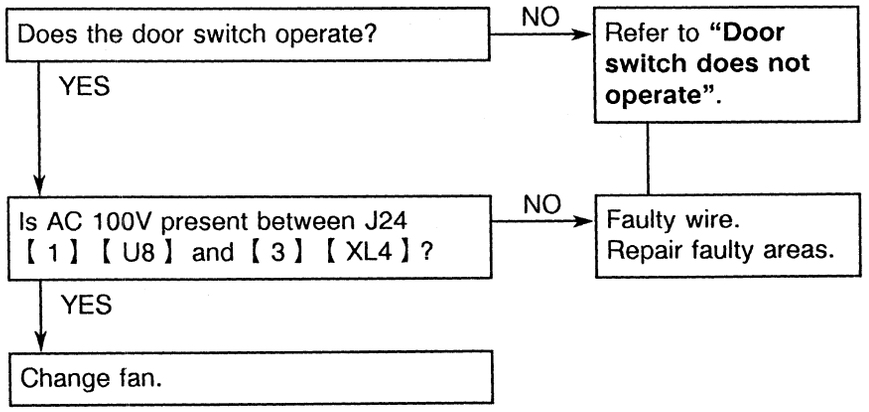
F12



4-12 Dryer fan does not operate.

Verification fuse

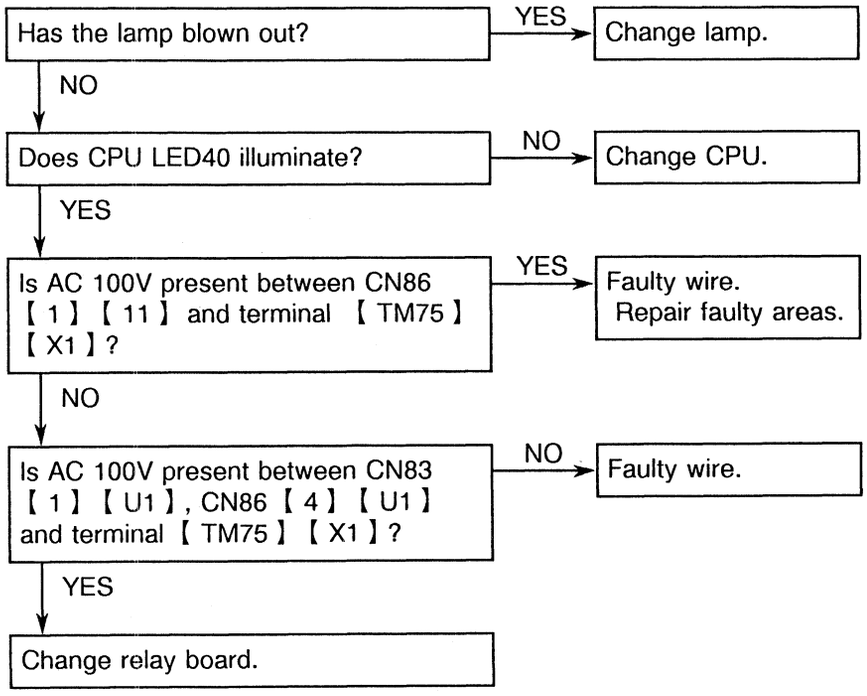
F13



4-13 Flash light source does not illuminate.

Verification fuses

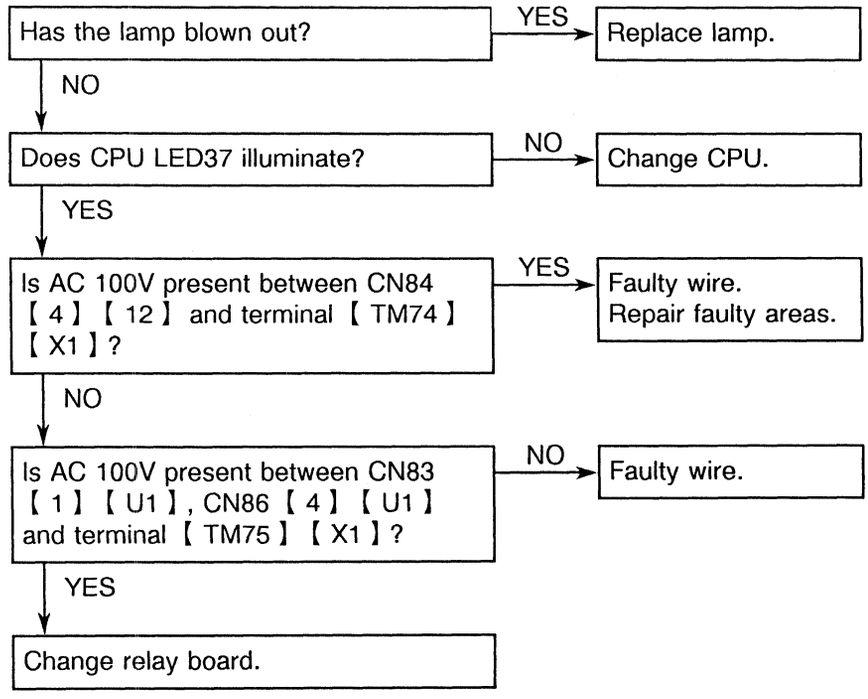
F8, 9



4-14 Cut mark lamp does not illuminate.

Verification fuses

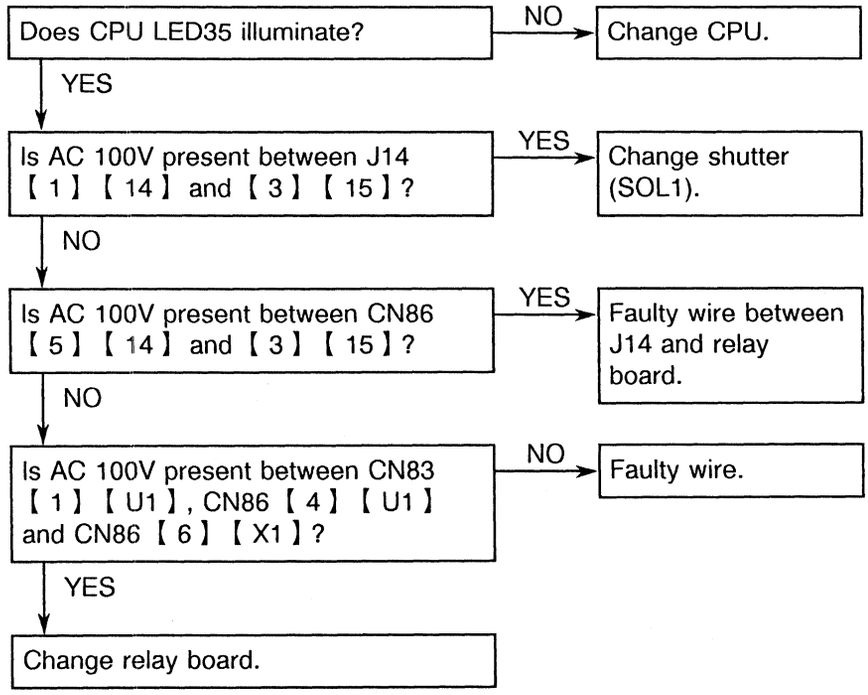
F8, 9



4-15 Shutter does not open.

Verification fuses

F8, 9

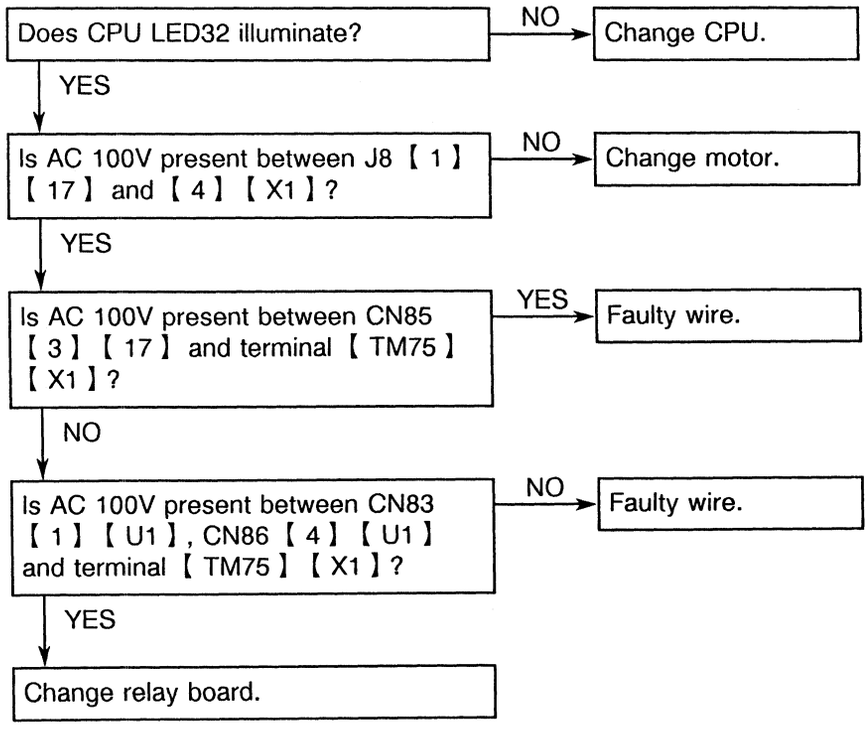


【 ***Note*** 】 *Check beforehand whether or not there is a machine related problem. In particular, the shutter may not open if the lens cap is on.*

4-16 Master does not feed (feed motor does not rotate forward).

Verification fuses

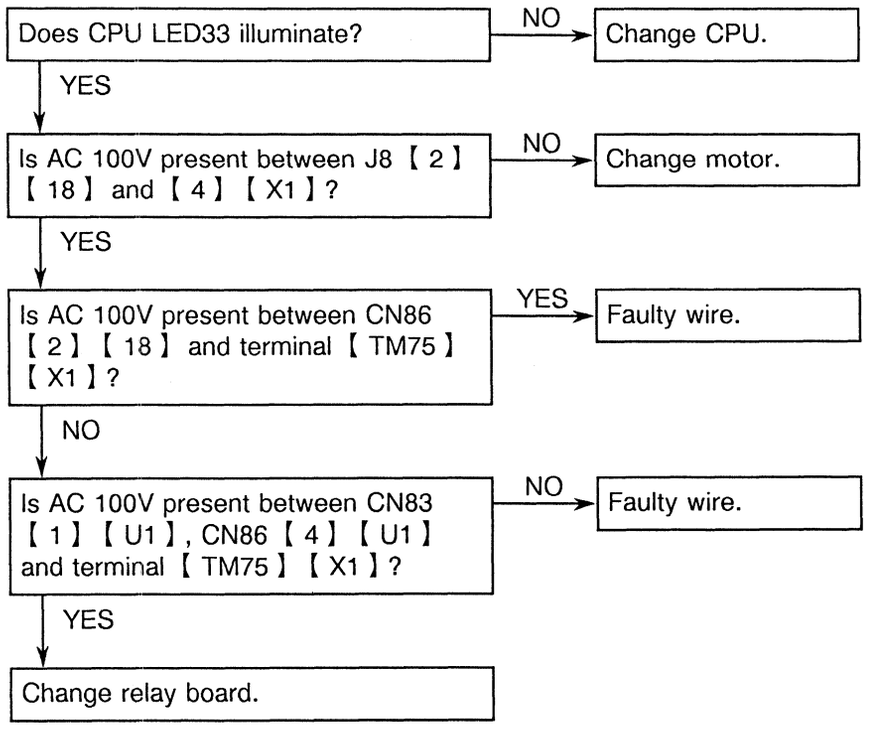
F8, 9



4-17 Master does not transfer (feed motor does not reverse).

Verification fuses

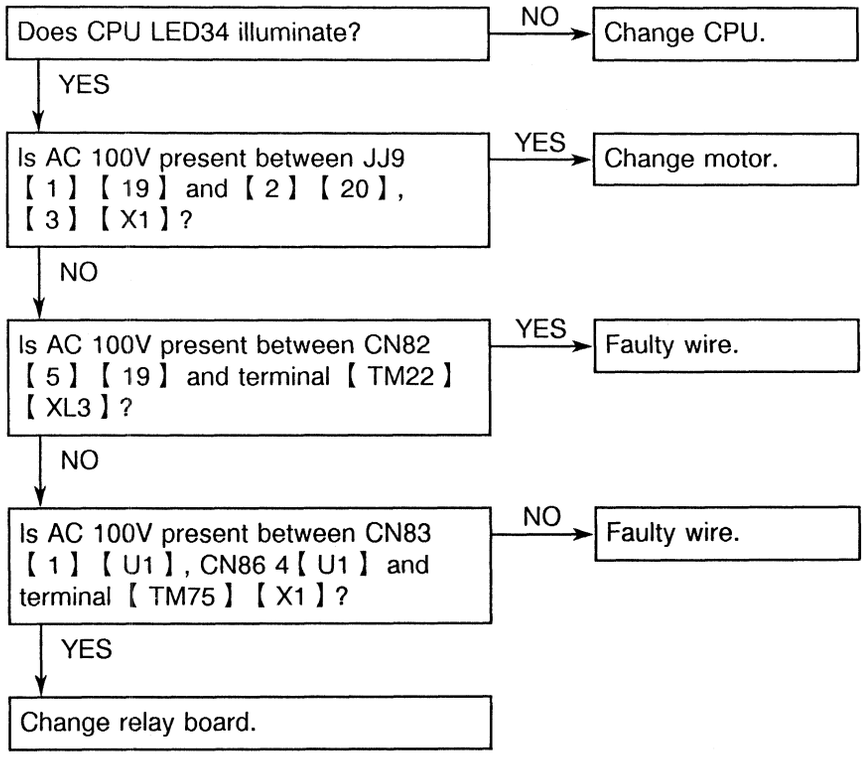
F8, 9



4-18 Master doe' not convey (co.iveying motor does not operate).

Verification fuses

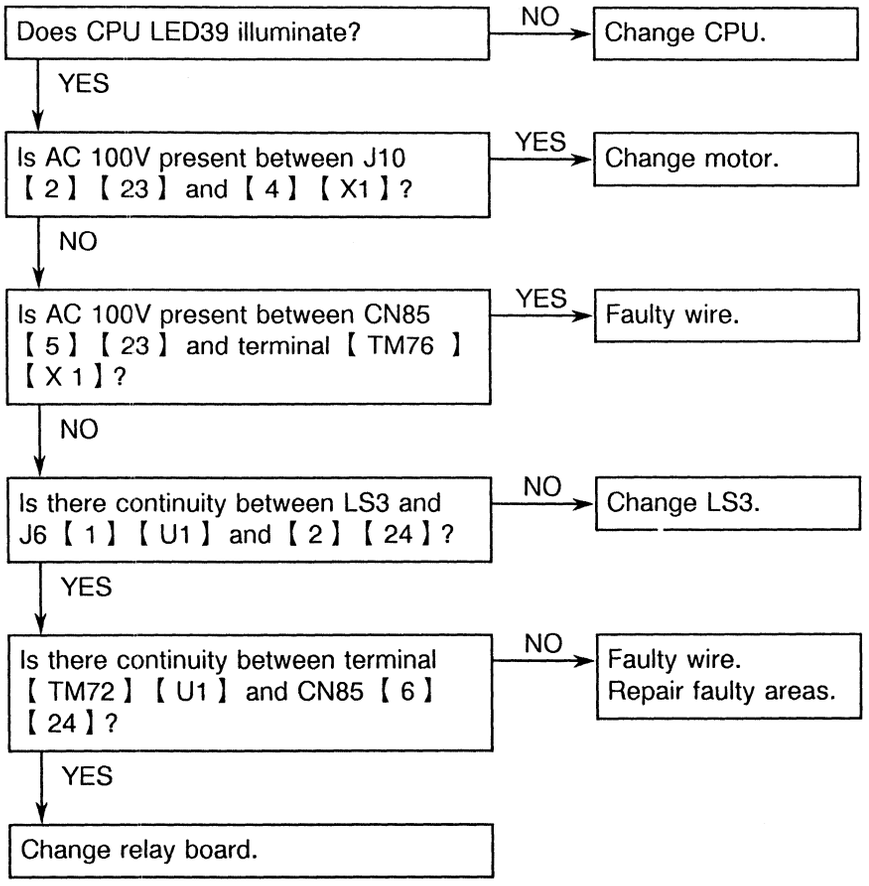
F8, 9



4-19 Cutter does not advance.

Verification fuses

F8, 9

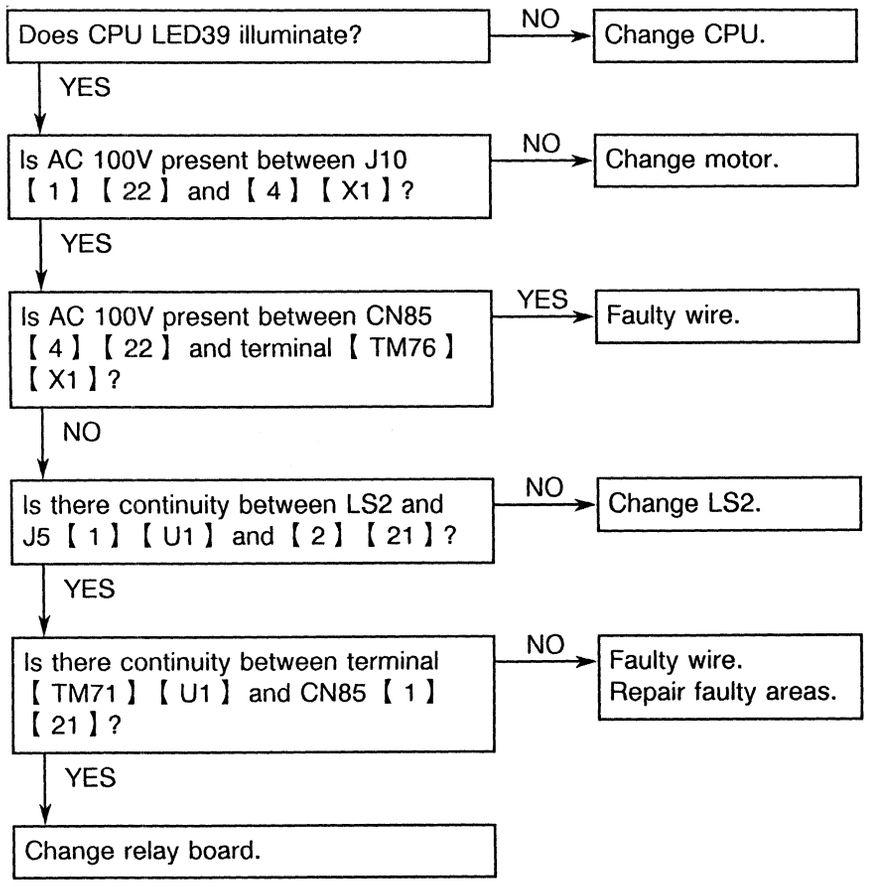


【 ***Note*** 】 *Turning the power 〔 ON 〕 when the cutter has not triggered the limit switch (when in the central position), automatically returns it to the starting point. Be very careful when this happens.*

4-20 Cutter does not retreat.

Verification fuses

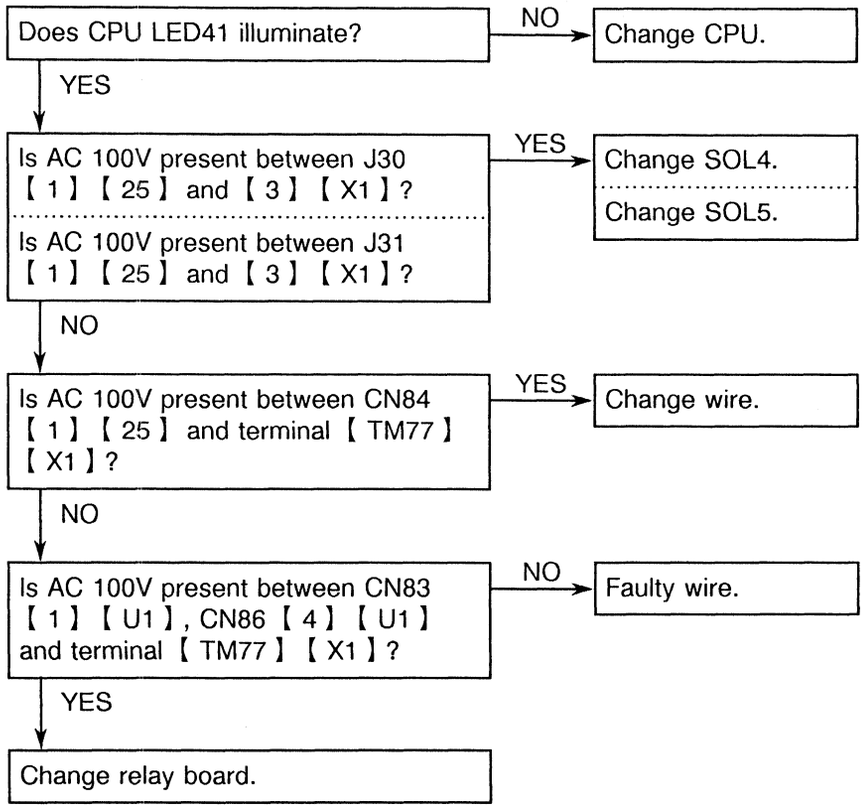
F8, 9



4-21 Solenoid valve air blow does not work.

Verification fuses

F8, 9

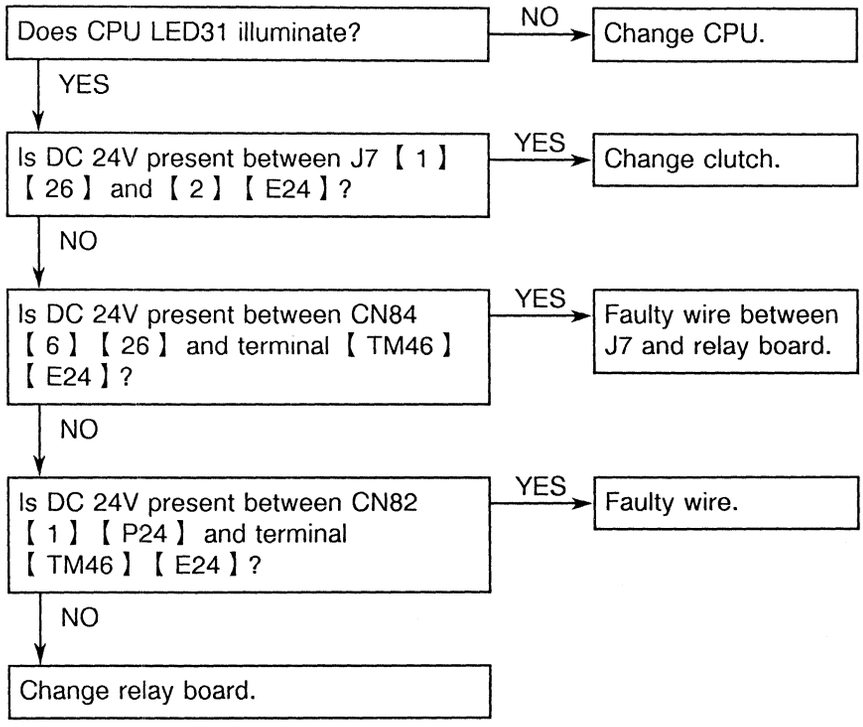


【 ***Note*** 】 *Check that the vacuum pump is working.*

4-22 Master feed clutch does not work.

Verification fuses

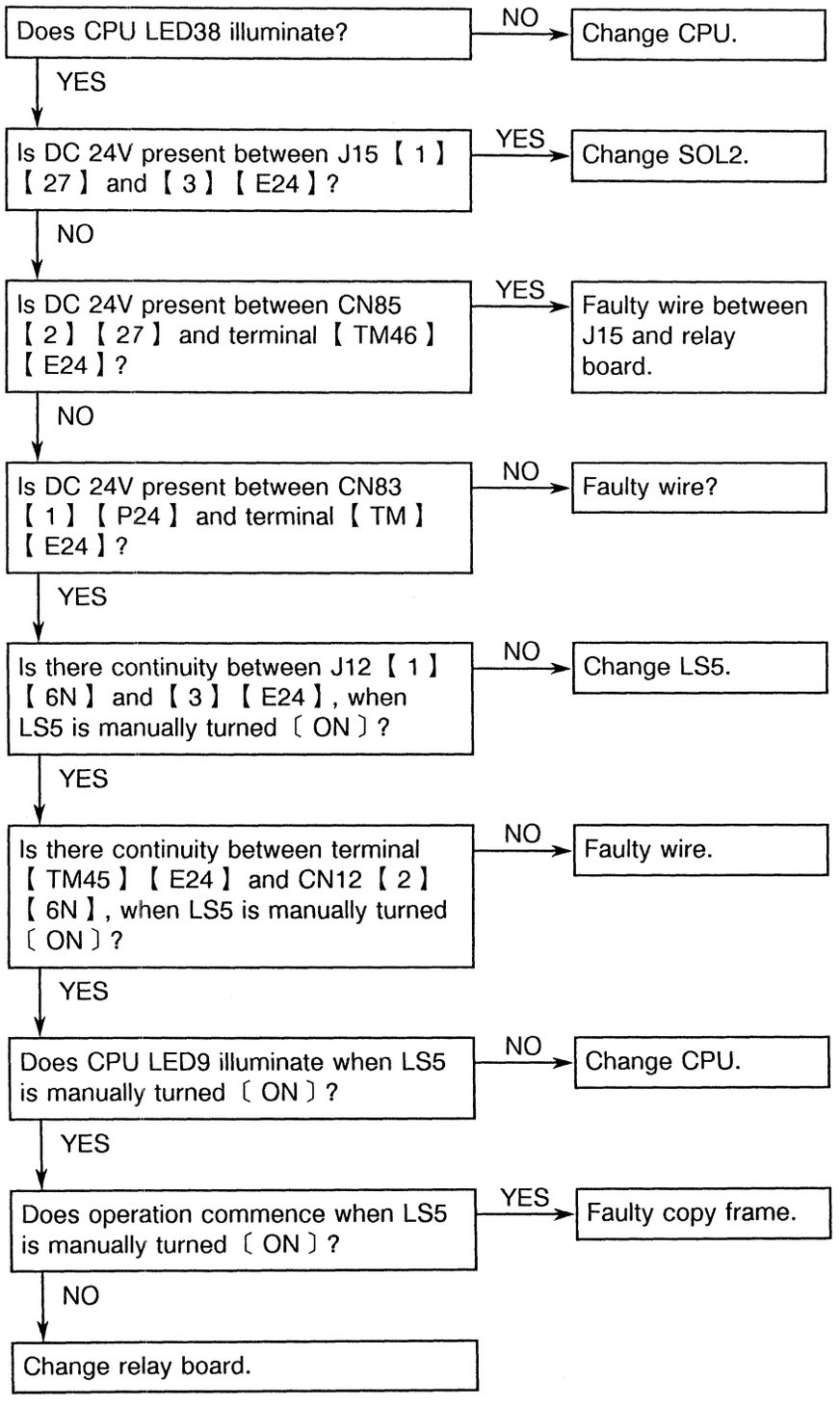
F9, 14



4-23 Contact screen frame does not move up and down.

Verification fuses

F9, 14



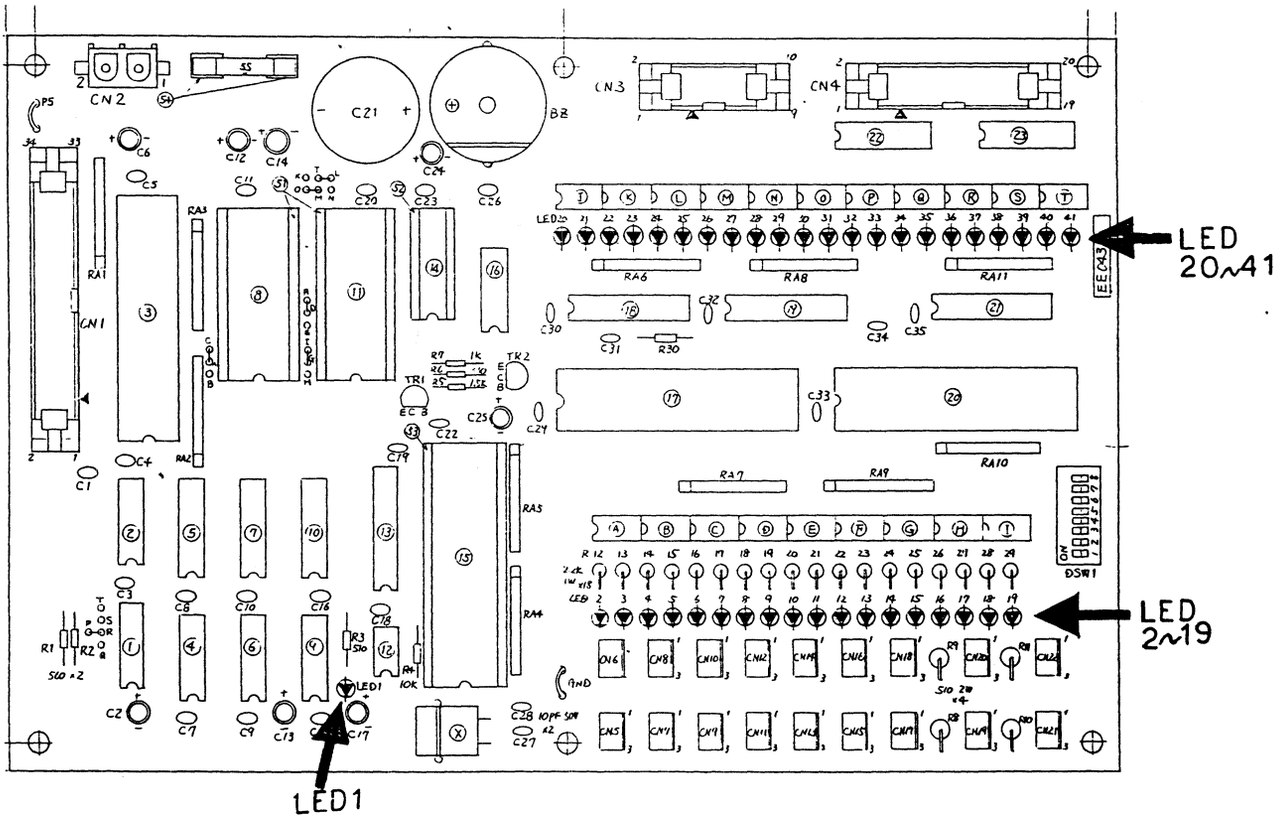
【 ***Note*** 】 *A faulty copy frame can also be considered. Check* ***with the copy frame open.***

5. Verification section (maintenance mode)

5-1 LEDs for CPU board signal verification

These LEDs allow status verification of the input/output signals to and from the board.

CPU board Parts installation side



5-2 CPU board LED chart

● **LEDs for input verification**

LED No.	Name	Times illuminated	PPI2 input
1	CPU	Illuminates when CPU leads.	
2	Light integrator	Flashes during pulse input.	PA 0
3	Photo interruptor	Flashes when the notch part of the sensor code board comes to the interruptor position (pulse IN).	PA 1
4	Developer heater	Illuminates when the developer tank heater is operating.	PA 2
5	Cutter starting point	Cutter block is not in the starting position. Illuminates when the starting point switch (LS2) is OFF.	PA 3

6	Cutter reversal position	Cutter block is not in the starting position. Illuminates when the starting point switch (LS3) is OFF.	PA 4
7	Door switch	Illuminates when operation panel is completely closed (LS1 is ON).	PA 5
8	Master out sensor	Illuminates when master discharges and master output switch (LS4) is ON.	PA 6
9	Contact screen sensor	Illuminates when contact screen is set (LS5 is ON).	PA 7
10~15	Not in use		
16	Master end sensor	Illuminates when master is not at the conveying input guide (not at sensor SE1).	PB 4
17	Master seam sensor	Illuminates when master senses the seam (not at sensor SE2).	PB 5
18	Master convey timing sensor	Illuminates when master is not at the conveying guide (not at sensor SE3).	PB 5
19	Not in use		

● **LEDs for output verification**

LED No.	Name	Times illuminated	PPI2 input
20~28	Not in use		
29	Light source	Illuminates when reflected/permeable (optional) light source illuminates.	PB 1
30	Dryer heater	Illuminates when the dryer heater operates.	PB 2
31	Clutch	Illuminates when the master feed clutch operates.	PB 3
32	Feed motor forward rotation	Illuminates when the master feed motor feeds the master.	PB 4
33	Feed motor reverse rotation	Illuminates when the master feed motor conveys the master to the developing section.	PB 5
34	Transfer motor	Illuminates when the conveying motor rotates.	PB 6

35	Shutter	Illuminates when the shutter is open.	PB 7
36	Vacuum pump	Illuminates when vacuum is operating.	PC 0
37	Cut mark lamp	Illuminates when lamp for cut mark copy illuminates.	PC 1
38	Contact screen	Illuminates when the solenoid (SOL2) for moving the vacuum sheet installation frame up and down is ON.	PC 2
39	Cutter	Illuminates when the cutter is operating.	PC 3
40	Flash lamp	Illuminates when the flash lamp is illuminated.	PC 4
41	Air blower	Illuminates when solenoids (SOL4, 5) for the air blower operate.	PC 5

5-3 Maintenance mode

Function

【 Function 1 】 Manual operation (manual check)
MANUAL MODE

【 Function 2 】 Master cut coefficient display and coefficient generation through input of actual measurements
MASTER CUT DATA

【 Function 3 】 Display and input of optical axis feed length
AXIS FEED DATA

【 Function 4 】 Display and input of cut mark exposure time 1 (for BWL, BW)
CUT MARK 1 (OR) TIME

【 Function 5 】 Display and input of cut mark exposure time 2 (for C, M, Y, BK)
CUT MARK 2 (PAN) TIME

【 Function 6 】 RAM clear/EAROM clear (initial value reset)
RAM CLEAR

Operation 1 Turn power supply 〔 ON 〕 after putting DIP switch 8 to 〔 ON 〕, in order to enter the maintenance mode.

【 ***Note*** 】 When inputting (writing) numerical values with functions 2 to 5, switch both DIP 1 and 7 to 〔 ON 〕, in addition to DIP 8. (EPROM input)

Operation 2 Select function with the mode key. BWL – BK of the normal mode correspond to functions 1 to 6.

Mode display cursor	Function 1	Function 2	Function 3	Function 4	Function 5	Function 6
	— BWL	BW	C	M	Y	BK

Operation 3 【 Function 1 】 Press corresponding key.

【 Function 2 – 5 】 Input → Press START key while holding down the INPUT key.

【 Function 6 】 Press START key while holding down the INPUT key.

【 **Function 1** 】 Manual operation

Select "BWL" with mode key.

Allocation of each key

Key- 1: Cutter
2: Dryer heater
3: Clutch
4: Feed motor (FORWARD)
5: Feed motor (REVERSE)
6: Transfer motor
7: Shutter
8: Vacuum pump (suction only)
9: Cut mark lamp
0: C. S. solenoid
·: Solenoid valve
C: Flash lamp
FOCUS: Main lamp (Reflected/permeable)

【 ***Note*** 】 1. 〔 ON 〕 only while key is pressed down.
2. Two or more operations cannot be done at the same time.
3. Do not keep the dryer heater and main lamp 〔 ON 〕 for long periods.

【 **Function 2** 】 Master cut coefficient display and coefficient generation through input of actual measurements

Select "BW" with mode key.

1. The master cut coefficient is displayed when entering this mode.
2. Input the actual measurements and generate the master cut coefficient.
   ① Enter, subtracting 30 mm from the actual master length which was sent. Accuracy improves by setting FEED at 480 mm.
   ② Input by pressing the START key while holding down the INPUT key.

【 **Function 3** 】 Display and input of the optical axis feed length

Select "C" with the mode key.

1. The optical axis feed length is displayed when entering this mode.
2. Enter the optical axis feed length. The standard is 44 mm. (42 mm – 46 mm)
3. Input by pressing the START key while holding down the INPUT key.

【 ***Note*** 】 The master cut coefficient is not multiplied by this value.

【 **Function 4** 】 Display and input of the cut mark exposure time 1 (for BWL, BW)

Select "M" with the mode key.

1. The cut mark exposure time 1 (for BWL, BW) is displayed when entering this mode.
2. Enter the exposure time.
3. Input by pressing the START key while holding down the INPUT key.

【 **Function 5** 】 Display and input of the cut mark exposure time 2 (for C,M, Y, BK)

Select "Y" with the mode key.

1. The cut mark exposure time 2 (for C,M, Y, BK) is displayed when entering this mode.
2. Enter the exposure time.
3. Input by pressing the START key while holding down the INPUT key.

【 **Function 6** 】 RAM clear/EAROM clear (initial value reset)

Select "BK" with the mode key.

1. When the START key is pressed while holding down the INPUT key after entering this mode, RAM and EAROM are cleared simultaneously (initial value reset).
2. The buzzer sounds and the POWER OFF message is displayed.
3. Turn power OFF.

RAM clear

Initializes exposure data, basic data, and work area, etc, and regular data which has been backed up (resets to default values).

Initialize data (reset values)

	BWL	BW	C	M	Y	BK
BMIN	—	0.6	0.6	0.5	0.4	0.6
BMAX	—	1.5	1.5	1.6	1.5	1.5
Tm (sec)	—	40.0	50.0	50.0	50.0	20.0
Tf (sec)	—	20.0	20.0	20.0	20.0	15.0
Tl (sec)	15.0	15.0	15.0	15.0	15.0	15.0
TADJ	1.00	1.00	1.00	1.00	1.00	1.00
DMIN	—	0.06	0.06	0.06	0.06	0.06
DMAX	—	1.70	1.70	1.70	1.70	1.70
FEED	480mm					
m%	100%					
COUNT	0					

EAROM clear

① If DIP switches 1 and 7 are both 〔 ON 〕 (writing possible), clear the contents of EAROM and initialize (reset to default values).

Initialize data

Master cut coefficient	:	1.0800
Optical axis feed length	:	44.00 mm
Cut mark exposure time 1 (OR)	:	1.0 sec
Cut mark exposure time 2 (PAN)	:	1.0 sec

② If DIP switches 1 and 7 are both OFF (writing impossible), EAROM will not initialize. However, the work area will be initialized and data is reset by reading the set values anew from EAROM.

Data backup check

Data may be damaged through expiration of the internal battery-operated backup function when the machine is not used for long periods. If this should happen, the machine will automatically judge this when power is turned on. After clearing RAM the machine will display DATA ERROR and POWER 〔 OFF 〕 messages while intermittently sounding a buzzer. The operator should turn 〔 OFF 〕 the power after pressing the reset key and canceling the error. To make copies, any necessary data should be reset over the standard data which was set when RAM was cleared. If error warnings appear every time the power is turned on, the problem may have its origin in the hardware.

5-4 DIP switch settings

	ON	OFF	Comments
1	EAROM input	Normal	Hard protect
2	Inch designation	Millimeter designation	Feed units
3	50 Hz	60 Hz	Jam time
4	Stationary clock	Light integrator	Main exposure time control
5	Air blow 10 seconds	Air blow 5 seconds	For cooling
6	Not in use.	Normal	
7	EAROM input	Normal	Soft protect
8	Maintenance mode	Normal	For servicemen

【 ***Note*** 】 *Be sure to turn power 〔 OFF 〕 before setting DIP switches.*

6. CPU Board and panel board

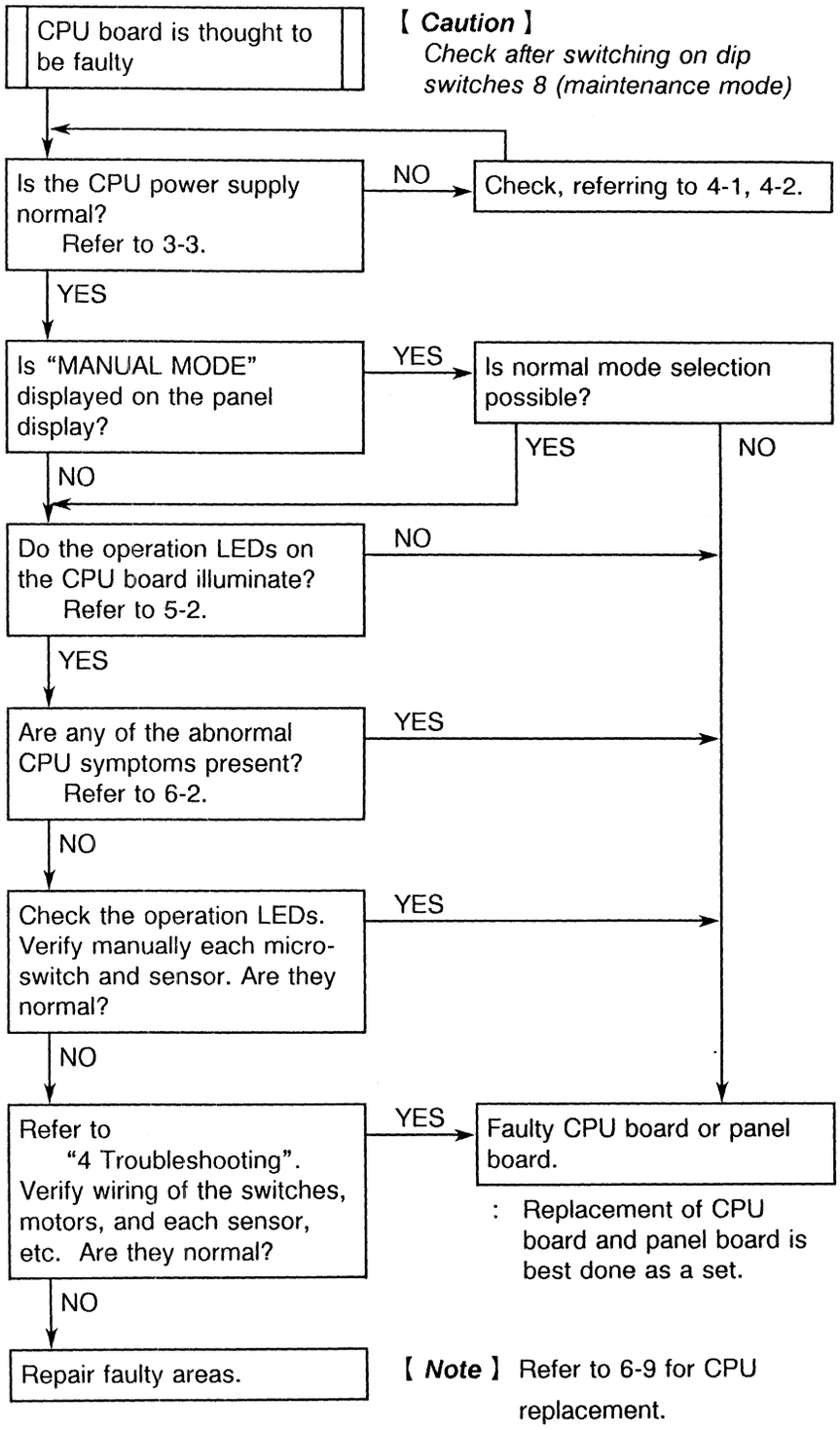
6-1 CPU board trouble

1. A microcomputer is included in the main unit. When trouble occurs, the origin should be seen as being in either the control circuit or the microcomputer, resulting from over voltage.
2. The microcomputer runs according to the program. Signals from the master sensors and micro-switches can be confirmed with the input/output verification LEDs (red), and verification should be made that these are running normally. Refer to 5-2.
3. After verification, press the panel keys and confirm that the entries appear on the display. If input is completely impossible, it will be necessary to replace the CPU board and panel board.
   Confirm also the power supply voltage of the CPU (5 V, 24 V). Refer to 3-3.

6-2 Symptoms when CPU behaves abnormally

1. Screen displays meaningless characters when the power is turned 〔ON〕.
2. Nothing is displayed.
3. Junk characters are occasionally displayed.
4. The display is normal, but it does not receive entered characters (key input impossible).
5. Basic data cannot be input.
6. When recalled, the contents of the data change.
7. Light source, cutter motor, heater, and other devices operate irregularly.
8. Mode selection cannot be made.

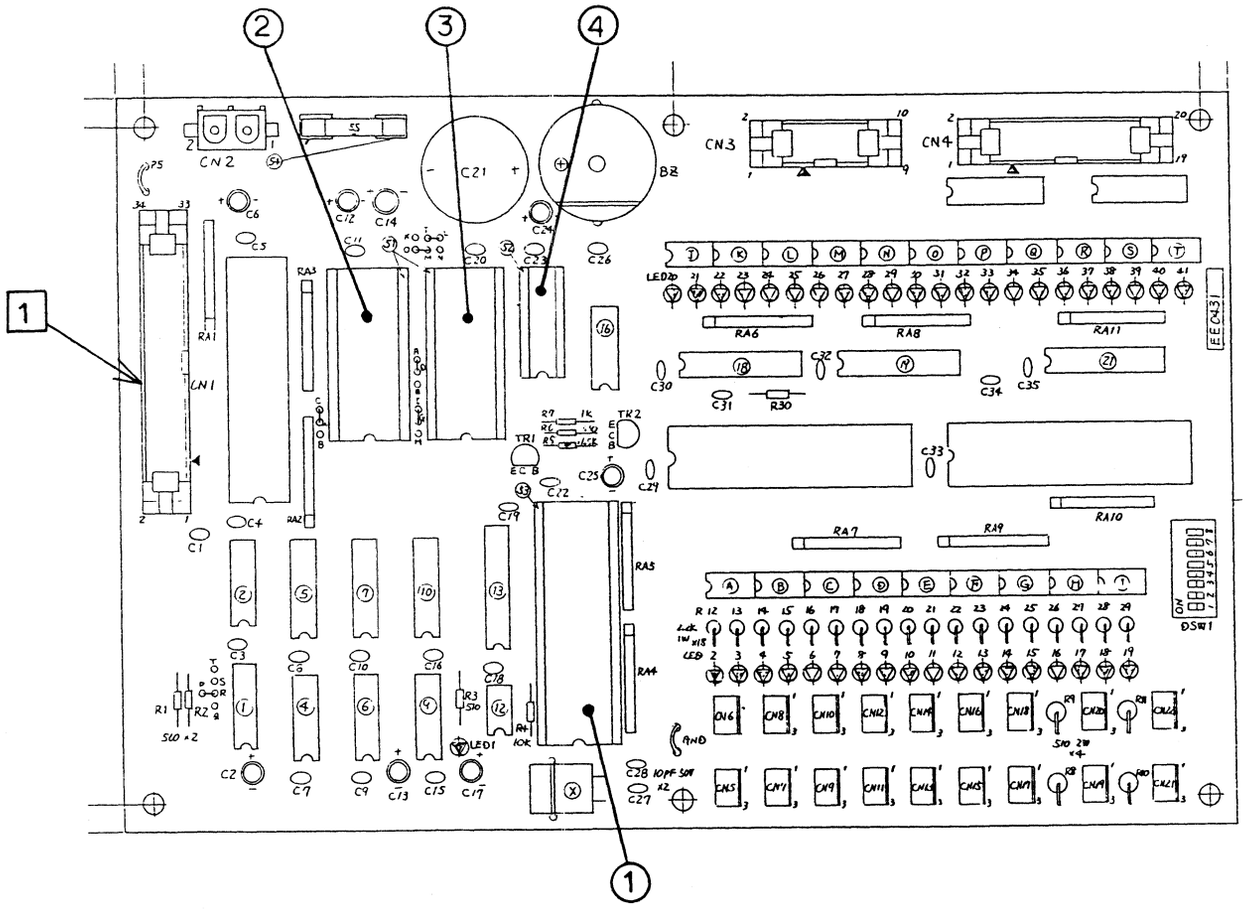
6-3 CPU board troubleshooting



6-4 Re-verification before changing CPU board

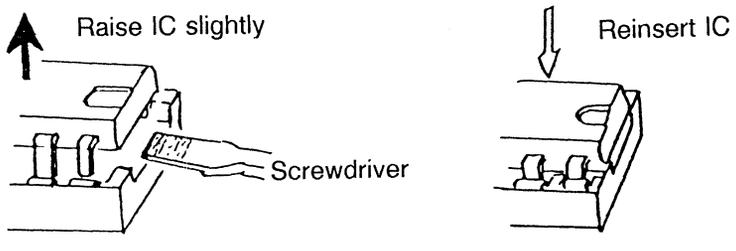
Changing the CPU is the ideal, however, the ICs listed below which use the sockets should be checked first as bad socket and connector contact could be the cause of failure. Test and make repairs according to the procedure below.

【 **Note** 】 *Do not proceed until at least three minutes after the power has been cut.*



(1) Slightly lift out the 8085 CPU ①, ROM ②, RAM ③, and EAROM ④ with a screwdriver or special tool, as shown below.

(2) Re-insert.



(3) Remove connectors [1] CN1 and [2] CN100. Re-install.

(4) Do the same for the other connectors.

(5) Turn 〔 ON 〕 the power and check for normal operation. If operation is still not normal there is a fault in the CPU. Change the board. Refer to 6-9.

6-5 Symptoms when panel board behaves abnormally

(1) Display has completely vanished or is black.

(2) Only one character is not displayed while the others are.

(3) Broken characters are displayed. Unit operates normally.

6-6 Countermeasures

(1) Check the flat cable connectors CN1 and CN100 to which the panel board and CPU board are connected.

(2) Replace parts or change panel board.

(3) CPU trouble is suspect with the following symptoms.
- Nothing is displayed
- Display changes irregularly
- Junk characters other than numbers and letters are displayed.

6-7 Erroneous operation caused by noise

(1) Results of calculation differ despite use of same data.

(2) Light source instantaneously goes out after illuminating. Or, result of calculation becomes "0".

(3) Light source cuts during exposure.

(4) Numerical values change during exposure.

(5) Exposure calculation speed changes.

(6) Irregular and faulty operation of dryer fan and heater.

(7) Others.

◆ Noise countermeasures ◆
- Ground machine separate to other devices.
- If unit appears to be influenced by other machines, do something about or take away the cause of noise.
- Check whether or not leaking in the terminal part of the camera light source (especially zeno super) is being recognized.

6-8 Other faulty operation

(1) After machine installation is completed, turn the processor heater and reflection light source 〔 ON 〕. Check for faulty CPU operation.

(2) If the above conditions appear when the AC 100 V 2nd power supply is 87 V or less, the capacity of the main power supply is insufficient. Have an electrician make the necessary alterations in the main power supply.

- When the power line itself is too narrow ··· AWG 14 power line is necessary for this machine.
- The electric supply unit, before connecting to the machine, had exceeded the capacity limit.

6-9 Caution to be taken when changing the CPU board

(1) Set the DIP switches on the replacement board to the same settings as the DIP switches on the original board.

(2) Replacing the memory data
Exchange the EPROM chip on the new board with the EPROM chip on the old board. The data is stored on the EPROM chip from the old board. After exchanging, recall the data and check that there are no errors.

◆ Changing EAROM chip ◆

ⓐ Cut the main power supply and wait for three minutes.

ⓑ Remove the EAROM chip with a screwdriver or special tool, as shown in Fig. 2.

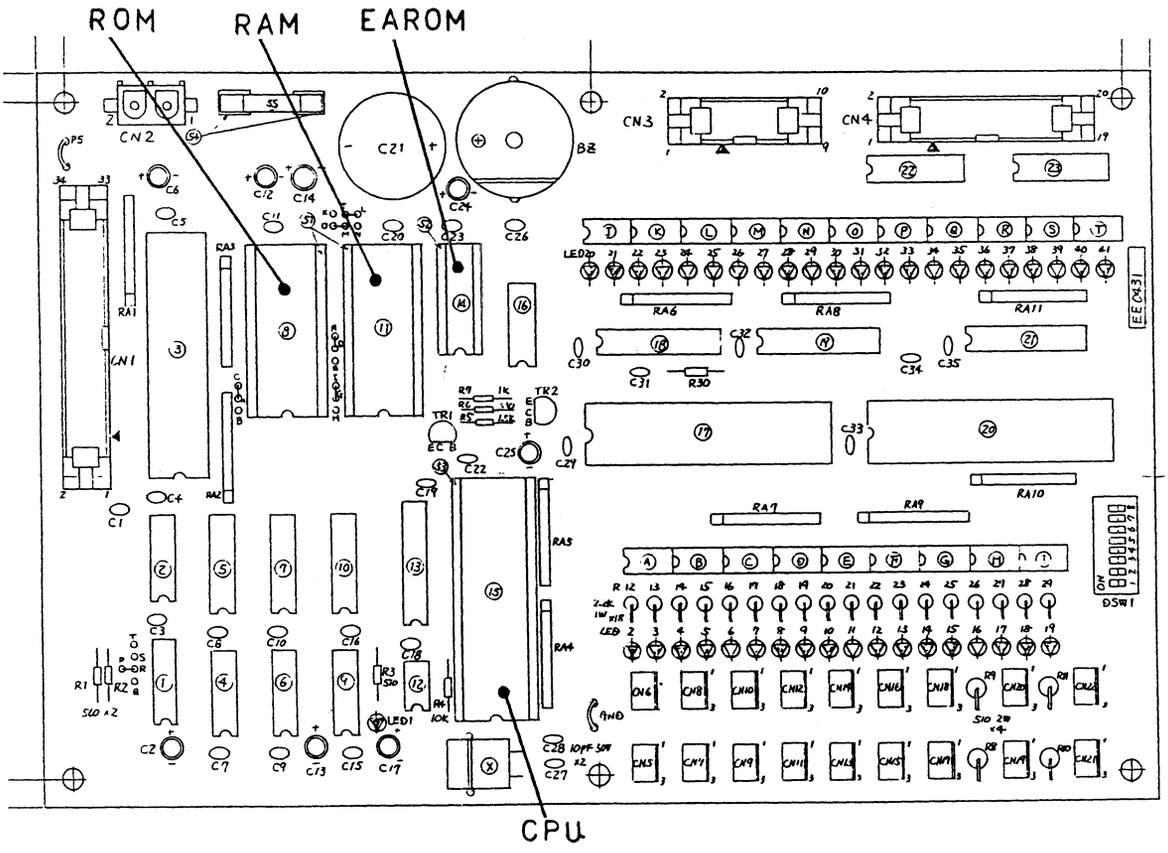
【 ***Note*** 】 Raise each side little by little when using a screwdriver.

ⓒ Following "ⓑ", above, also remove and replace the ROM chip of the new board.

ⓓ Turn DIP switch 8 〔 ON 〕, DIP switches 1 and 7 〔 OFF 〕, and clear RAM.

ⓔ Install the ROM chip removed from the new board onto the old board and return to the factory.

【 ***Note*** 】 Do not touch or allow any bodily contact with the legs of the IC. Place on an electro-conductive mat when not in use.

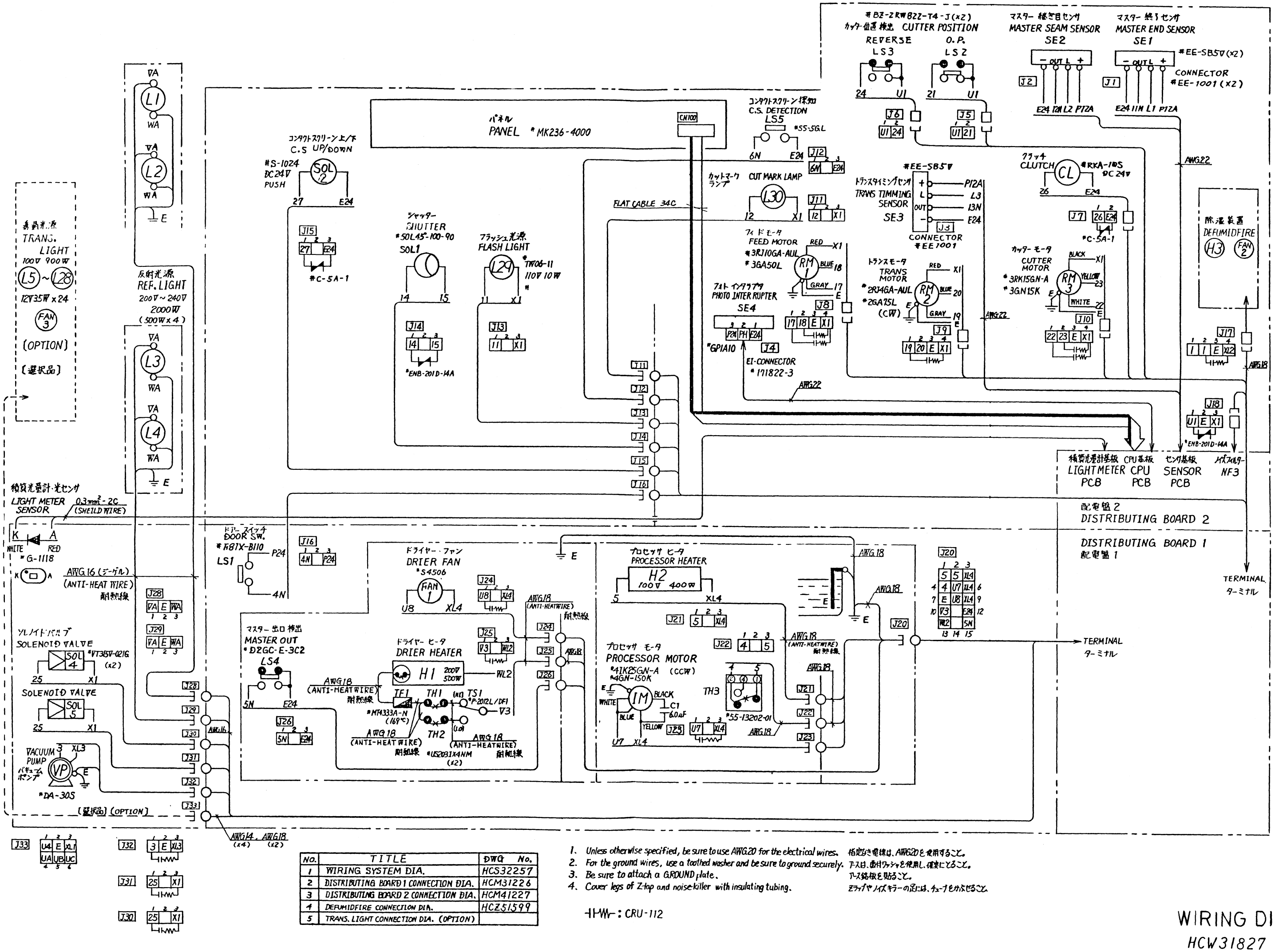


(3) Input the data by hand if errors were found in the data when checking after the replacement, or if data is faulty. Refer to 5-3 and 5-4.
If the old data is written down, the operation above is not necessary. Re-input the data directly into the panel.

6-10 ROM and CPU replacement

(1) Follow the procedure in 6-9 item 2.

(2) Return old parts to the factory.



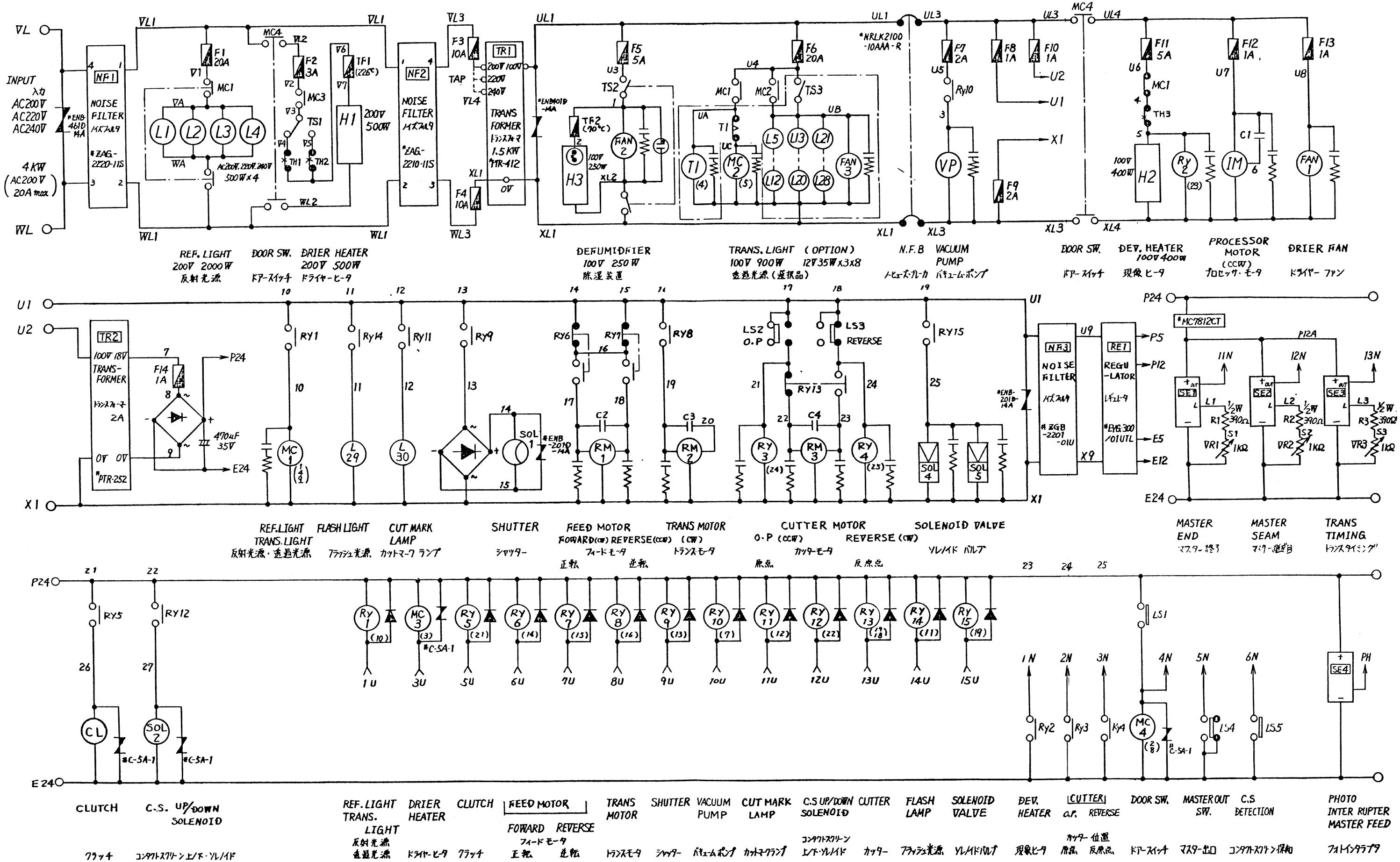
NO.	TITLE	DWG No.
1	WIRING SYSTEM DIA.	HCS32257
2	DISTRIBUTING BOARD 1 CONNECTION DIA.	HCM31226
3	DISTRIBUTING BOARD 2 CONNECTION DIA.	HCM41227
4	DEFUMIDFIRE CONNECTION DIA.	HCZ51599
5	TRANS. LIGHT CONNECTION DIA. (OPTION)	

1. Unless otherwise specified, be sure to use AWG20 for the electrical wires. 指定なき電線は、AWG20を使用すること。
2. For the ground wires, use a toothed washer and be sure to ground securely. アースは、歯付ワッシャを使用し、確実にとること。
3. Be sure to attach a GROUND plate. アース銘板を貼ること。
4. Cover legs of Z-tap and noise-killer with insulating tubing. Zタップやノイズキラーの足には、チューブをかぶせること。

HW: CRU-112

WIRING DIA.

HCW31827



WIRING SYSTEM DIA.

HCS32257

HOLE-A

AWG22 ×25c

HOLE-B

×36c

AWG18 ×5c

EARTH TERMINAL アース ターミナル

×10c

×32c

(HOLE-C)

NFB 10A *NRLK2100-10AAA-R

TM14 TM13 AWG18 XL1 UL1 LOAD LINE AWG18 XL3 UL3 TM21 F7

CN4 CPU PCB CN7 CN8 1U 5U 6U 7U 8U 9U 10U 1N 2N 3N CN80

CN4 CPU PCB 1SU 1RU 2RU 3RU 4RU CN81

リレー基板 RELAY PCB HCB34140

CN82 TM43 RP4 10 MC1 TM44 E24 19 TM62 F14 8 9 TR2

CN83 TM72 U1 TM73 5 3 TM23 TM25 UL4 U5 TM28 F7

CN84 TM68 25 12 TM57 26 TM54

CN85 TM64 21 22 TM65 TM55 27 23 TM66 TM60 17 24 TM67

CN86 TM56 11 U1 TM73 TM61 18 14 TM58 TM59 15 X1 TM74

9-ミナル TERMINAL *TU-15 ×34

LS1 SENSOR PCB J16 CN40 CPU PCB CN7 CN4 CL LS5 SOL2 PCB J7 CPU PCB CN4 LS1 CPU PCB J16 CN11 LS5 CL SOL2 PCB J12 J7 LS29 J15 L30 J13 SOL1 J11 J14 RM1 J8 RM2 J9 LS2 J5 RM3 J10 LS3 J6 SOL4 SOL5 J31 DEF. LS2 J17 J5 LS3 J6 NF3 J18 L29 J11 RM1 J8 RM2 J9 SOL4 J10 SOL5 J31 (HOLE-C) (HOLE-C)

TM 41 42 43 44 45 46 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77

P24 P24 P24 E24 E24 E24 3U 4N 5N 6N 26 27 11 12 14 15 17 18 19 20 21 22 23 24 25 1 XL2 U1 U1 U1 X1 X1 X1 X1

MC3 CN82 MC4 MC3 MC4 CN84 CN85 CN86 C2 CN82 C3 CN85 C4 CN84 TS2 F8 CN83 CN86 F9 MC1 TR2

J20 PROCESSOR (HOLE-C)

HOLE-C

×32c

TS2 *2Wi×11/1086 F5 TM14 AWG18 U3 XL1 AWG18 1 XL2 TM69 TM70

ヒューズホルダー FUSE HOLDER *F-1 2P×2

MC1 TM7 TR1 TR1 AWG14 V1 U4 VL4 XL1 F1 20A F6 20A F3 10A F4 10A VL1 UL1 VL3 WL3 AWG14 TM3 TM12 NF2 NF2

MC4 TS2 CN83 AWG18 VL2 U3 U5 U1 F2 3A F5 5A F7 2A F8 1A V2 UL1 UL3 XL3 TM3 TM12 NFB

ヒューズホルダー FUSE HOLDER *F-7111 10P

TM77 TM75 TR2 MC4 AWG18 X1 U2 UL4 F9 2A F10 1A F11 5A U6 F12 1A U7 F13 1A U8 TM22 MC4 MC1 TM26 TM27

CN82 8 F14 1A 7 TR2

F1 TM4 TM8 TM24 CN82 V1 WL1 U4 4 10 AWG18 AWG14 MC1 *LC1-D129A60 AC100V VA WA UA U6 X1 TM5 TM6 TM9 F1 TM76

TM10 UB TM15 XL1 AWG14 AWG18 MC2 *G2J-2212T AC100V *RU-112 U4 TM8 UC TM11

TM30 V3 TM42 P24 AWG18 MC3 *G2J-2212T DC24V *RU-112 *C-5A-1 V2 F2 3U TM50

F2 TM31 F11 TM29 TM45 VL2 WL2 UL4 X14 E24 AWG18 MC4 *G2J-4412T-US-3 DC24V *C-5A-1 VL1 WL1 UL3 XL3 4N TM3 TM4 F10 TM22 TM61

配線ダクト WIRING DUCT *HD-2EC

9-ミナル TERMINAL *TU-20 ×15 *TU-15 ×11

TM 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 21 22 23 24 25 26 27 28 29 30 31

VL WL VL1 WL1 VA WA U4 U4 UA UB UC UL1 UL1 XL1 XL1 XL3 XL3 3 4 5 U7 U8 XL4 XL4 V3 WL2

*EMB461D-14A AWG16 AWG14 AWG18 *EMB401D-14A AWG14

F1 MC4 AWG14 AWG18 MC1 F6 MC2 MC1 MC2 F6 F5 NFB TS2 MC2 F9 CN89 MC1 F12 F13 CN83 MC3 MC4 AWG18

AWG14 (HOLE-C) ×21c J20 PROCESSOR J32 VP J33 TRANS. LIGHT J28 J29 REF. LIGHT

AWG14 アースターミナル EARTH TERMINAL F4 F3 VL4 XL1 UL1 E 100V 240V 220V 200V 0V

TR1 TRANS FORMER *PTR-412 1.5KW トランス フォーマー

TR2 TRANS FORMER *PTR-252 トランスフォーマー 2A

TM77 F10 U2 X1 アースターミナル EARTH TERMINAL AWG18 E 100V 0V 18V 0V F14 CN82 7 9

TM60 17 C2 4.5uF 18 TM61

TM62 19 C3 3.4uF 20 TM63

TM65 22 C4 6.4uF 23 TM66

AWG14 AWG14 NF1 NOISE FILTER ノイズフィルタ *ZAG-2220-11S WL 3 VL 4 2 WL1 1 VL1 E

F3 F4 AWG14 NF2 NOISE FILTER ノイズフィルタ *ZAG-2210-11S WL3 3 VL3 4 2 WL1 1 VL1 E

AWG14-3C GROUND PLATE アース銘板 EARTH TERMINAL アースターミナル

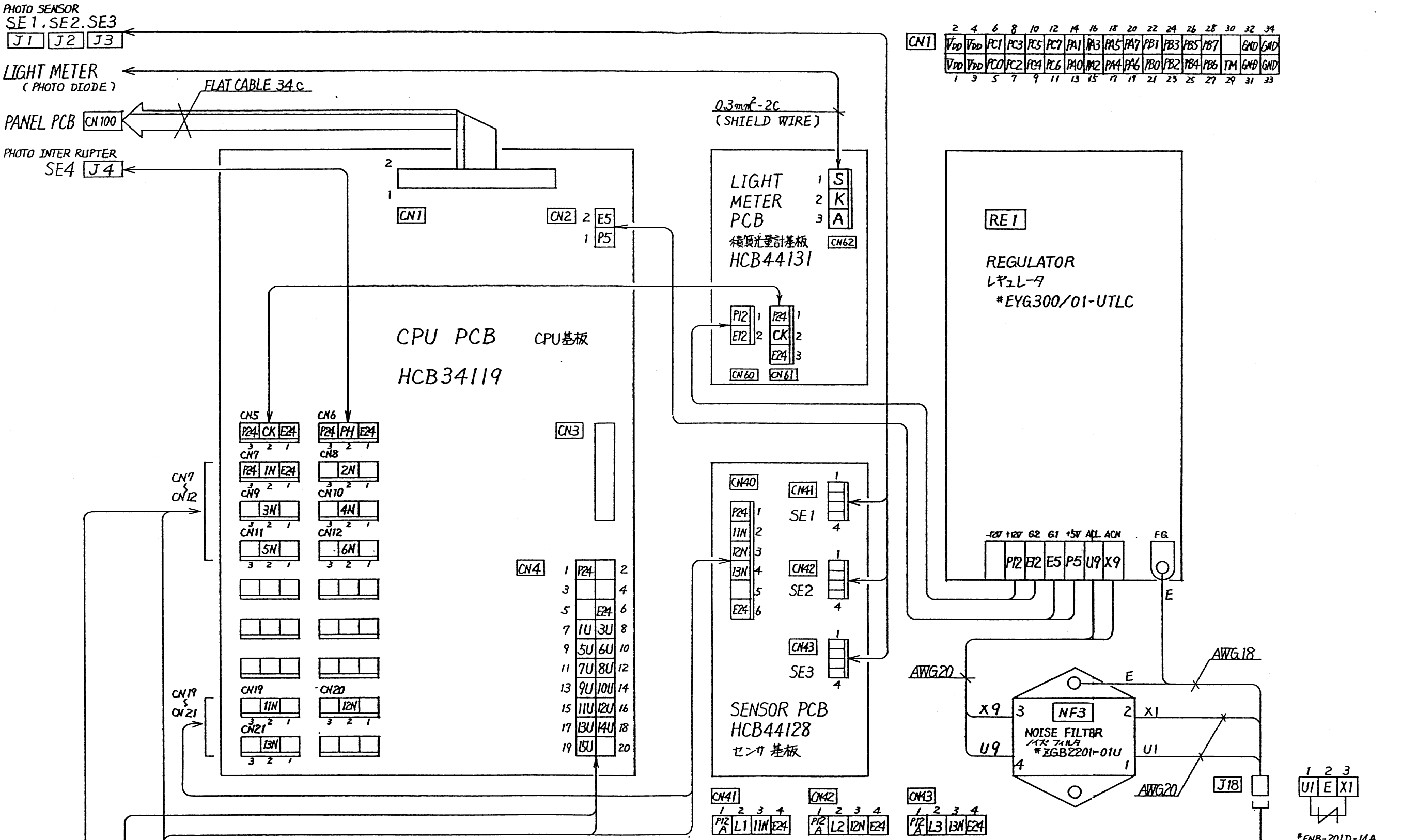
(HOLE-C) (HOLE-B) TR1 J28 J29 J33 J32 J20 J8 J9 J10 J18 J17 TR2 AWG14 AWG18

E GREEN/YELLOW 緑/黄 WL WHITE 白 VL BLACK 黒 電源 POWER SUPPLY 1φ 200V, 220V, 240V

1. Unless otherwise specified, be sure to use AWG20 for the electrical wires.
   指定なき電線は AWG20 を使用すること。
2. For the ground wires, use a toothed washer and be sure to groud securely.
   アースは、歯付ワッシャを用いて 確実にとること。
3. Be sure to attach a GROUND plate.
   アース銘板を貼ること。
4. Cover legs of Z-lap with insulating tubing.
   Zラップの足には、絶縁チューブをかぶせること。

DISTRIBUTING BOARD 1
CONNECTION DIA.

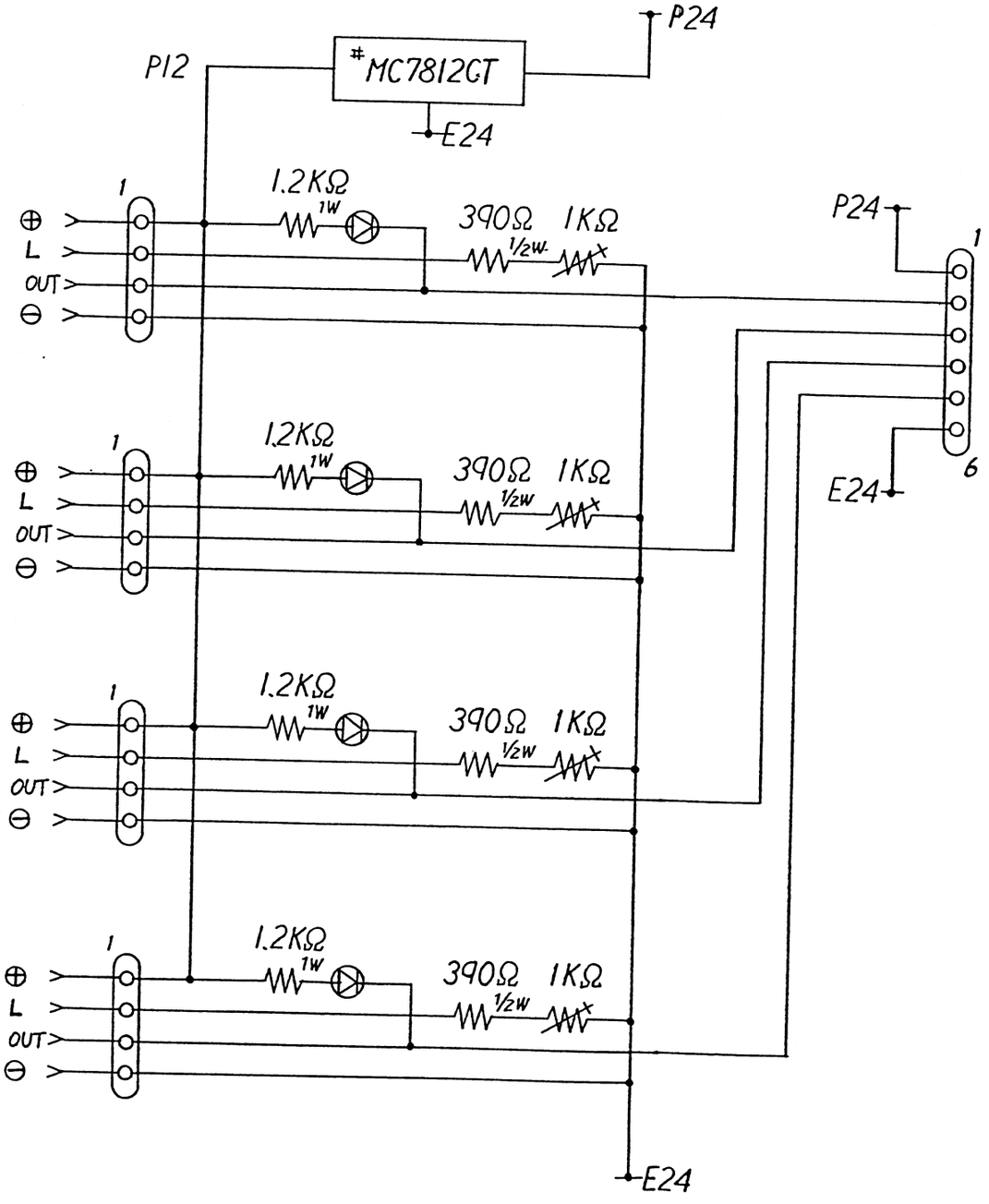
HCM31226



1. Unless otherwise specified, be sure to use AWG22 for the electrical wires.
   指定なき電線は、AWG 22 を使用すること。
2. For the ground wires, use a toothed washer and be sure to ground securely.
   アースは歯付ワッシャを用いて、確実にとること。
3. Cover legs of Z-lap with insulating tubing.
   Zラップの足には チューブをかぶせること。

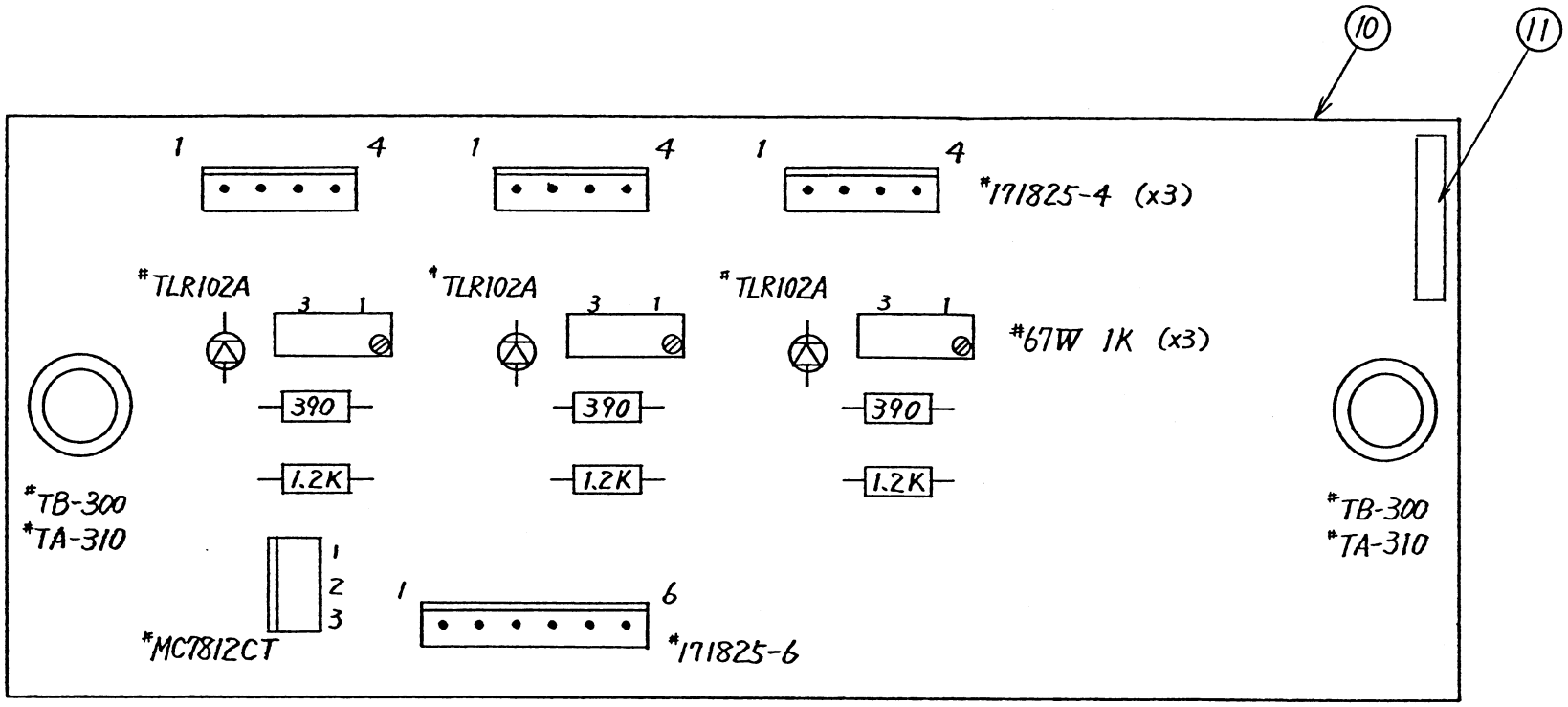
DISTRIBUTING BOARD 2
CONNECTION DIA.

HCM41227



SENSOR BOARD
ARRANGEMENT DIA.

HCS42251



No.	品　名	型　番　(メーカー)	個数
1	3端子レギュレータ	MC7812CT (モトローラ)	1
2	トリマー　サーメット	67W R1KΩ (ベックマン)	3
3	抵抗	390Ω 1/2W	3
4	抵抗	1.2KΩ 1W	3
5	LEDランプ	TLR102A (東芝)	3
6	EIシリーズ コネクター	171825-4 4P (AMP)	3
7	EIシリーズ コネクター	171825-6 6P (AMP)	1
8	ワンタッチブッシュ	TB-300 (名取)	2
9	ワンタッチカラー	TA-310 (名取)	2
10	センサ基板	HCB44128	1
11	OAブロックナンバーシール	HCC51336	(1)

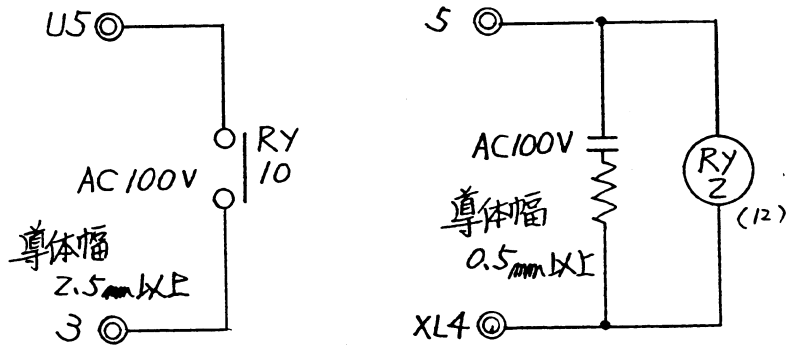
	OAブロックナンバー	DATE	APPROVED
○	EE0433		

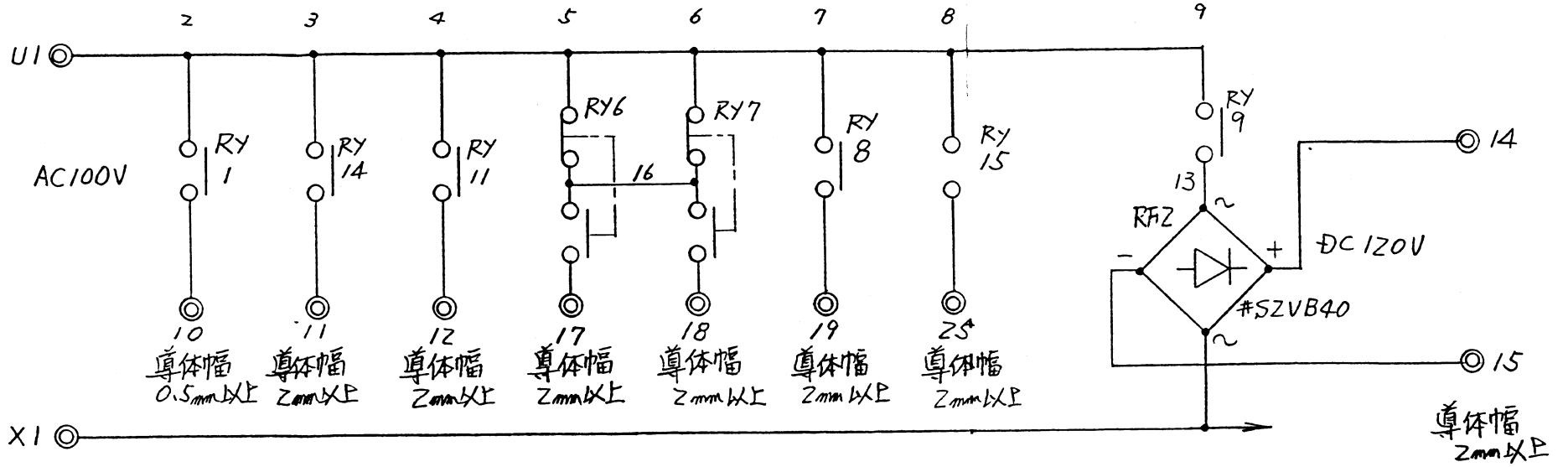
② トリマー 実装方法

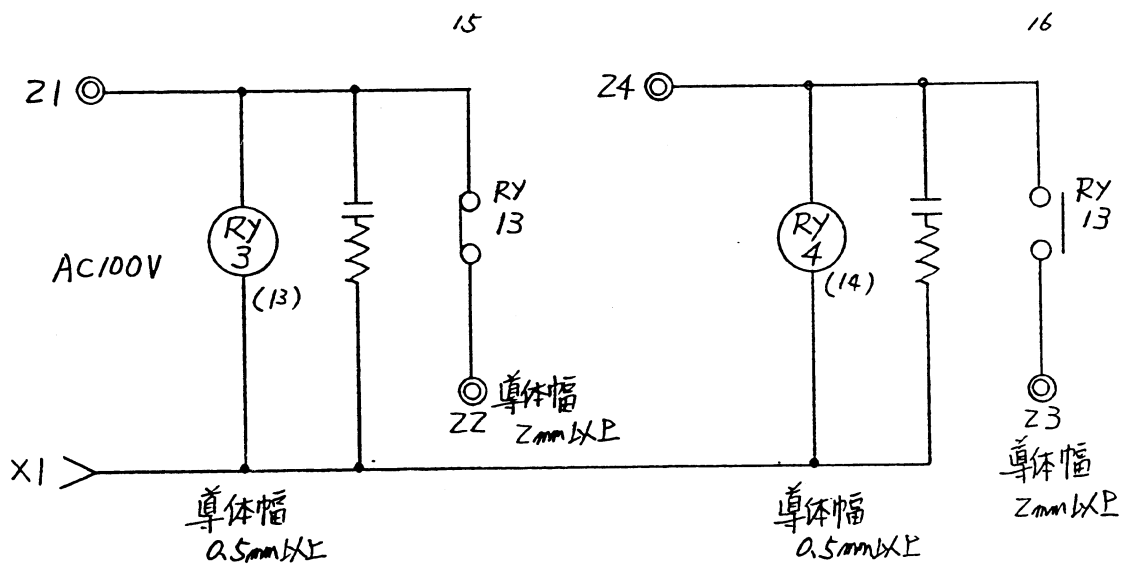
実装後、右 (CW) へ 18回以上回して、感度を最大にしておく。

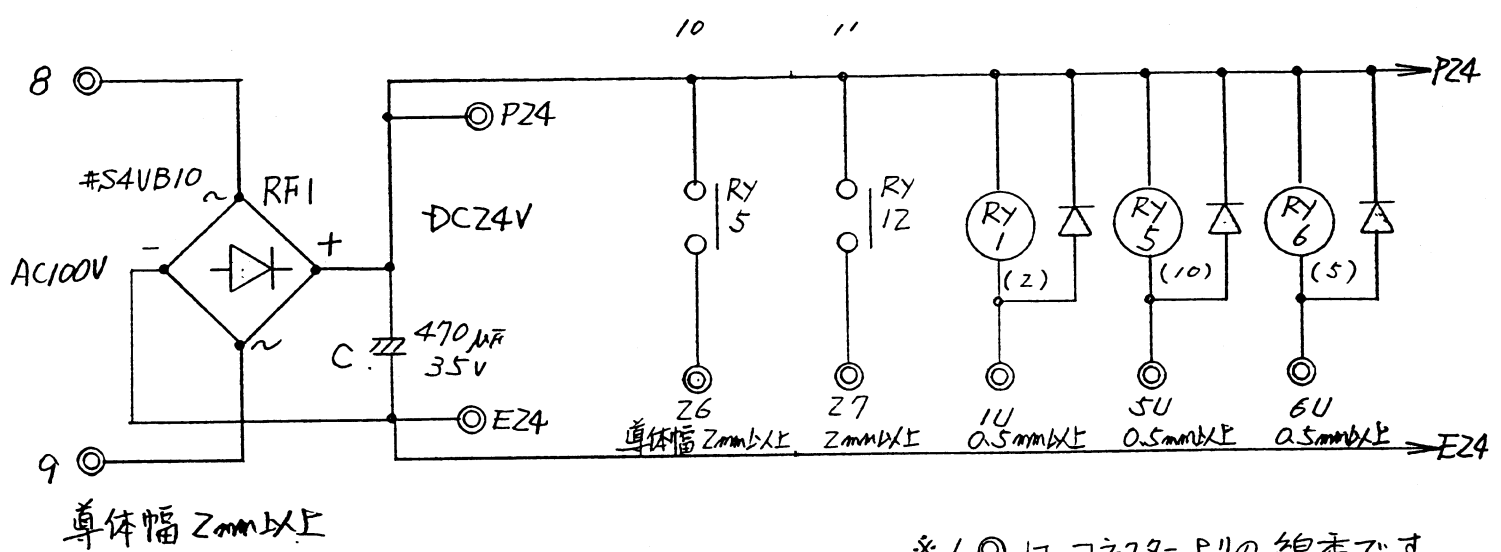
SENSOR PCB
ARRANGEMENT DIA.

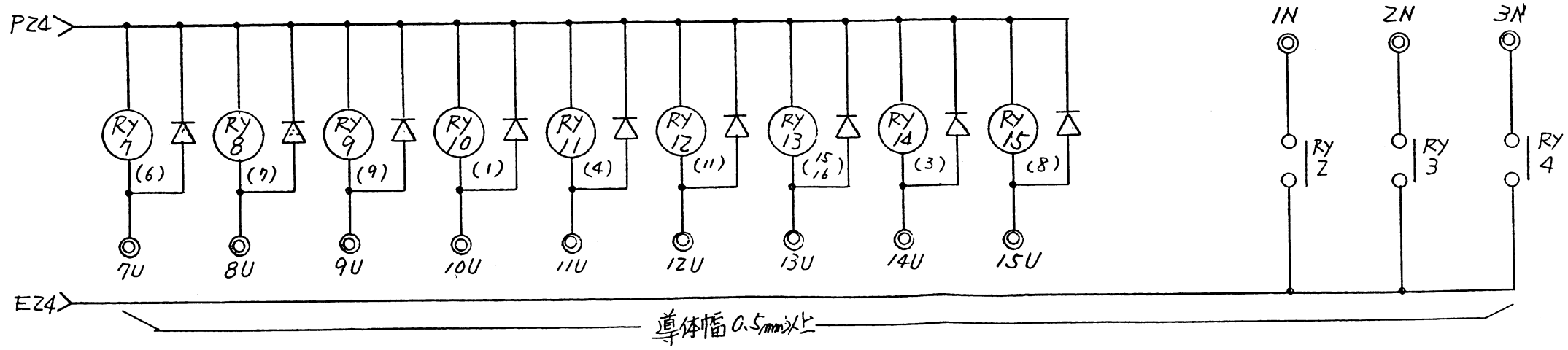
HCR42673











※1. ◎ は コネクターよりの 線番です.

2. AC100Vラインは. 導体間隔 2mm以上 厳守.
AC100ラインとDC24Vラインの間隔 も2mm以上とする

3. DC24Vラインの 導体間隔は 1.2mm以上とする.

4. U1. X1. P24. E24 は 分岐回路 ですので コネクターよりの 入力ラインは. 太くして下さい.

CN82

P24	10
E24	19
8	9

CN83

U1	
5	3
XL4	U5

CN84

25	12
	26

CN85

Z1	Z2
Z7	Z3
17	Z4

CN86

11	U1
18	14
15	X1

CN80

1	2	3	4	5	6	7	8	9	10
1U	5U	6U	7U	8U	9U	10U	1N	2N	3N

CN81

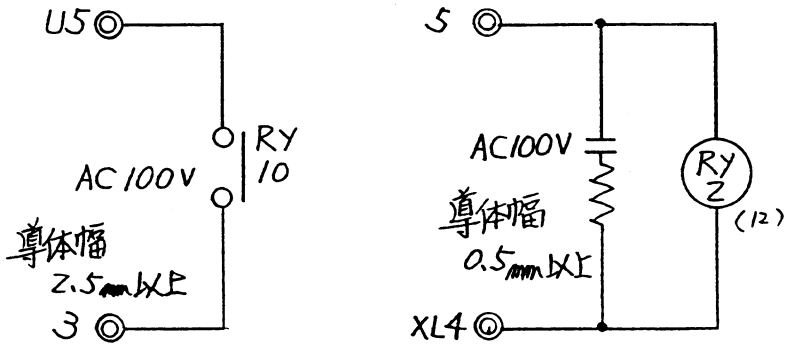
1	2	3	4	5	6	7	8	9	10
					15U	11U	12U	13U	14U

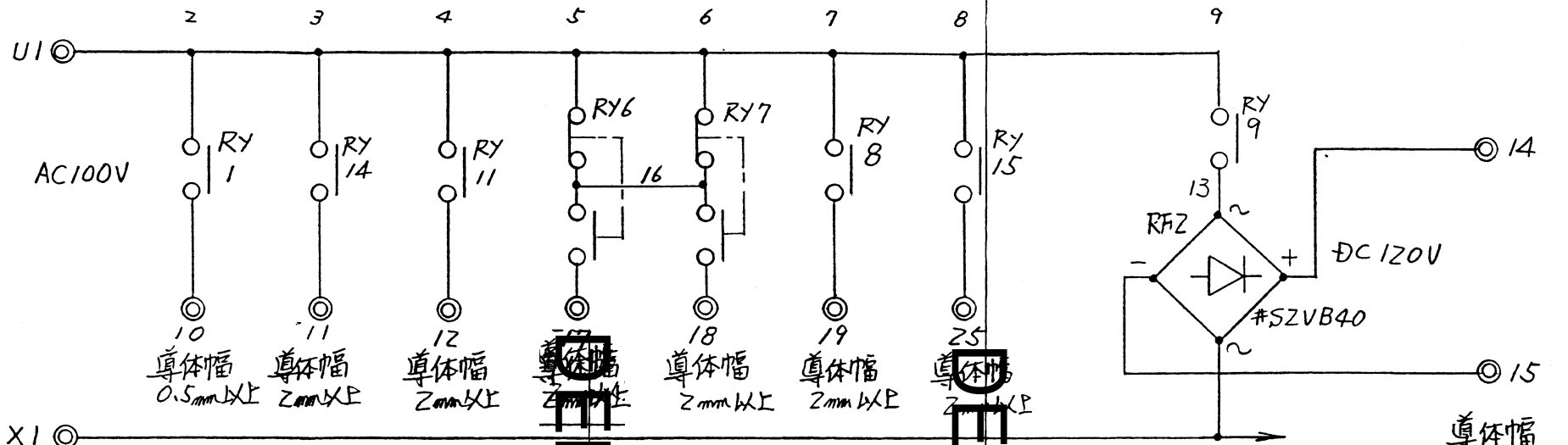
→ #CRU112 RY2~RY4 → MYZ AC100V

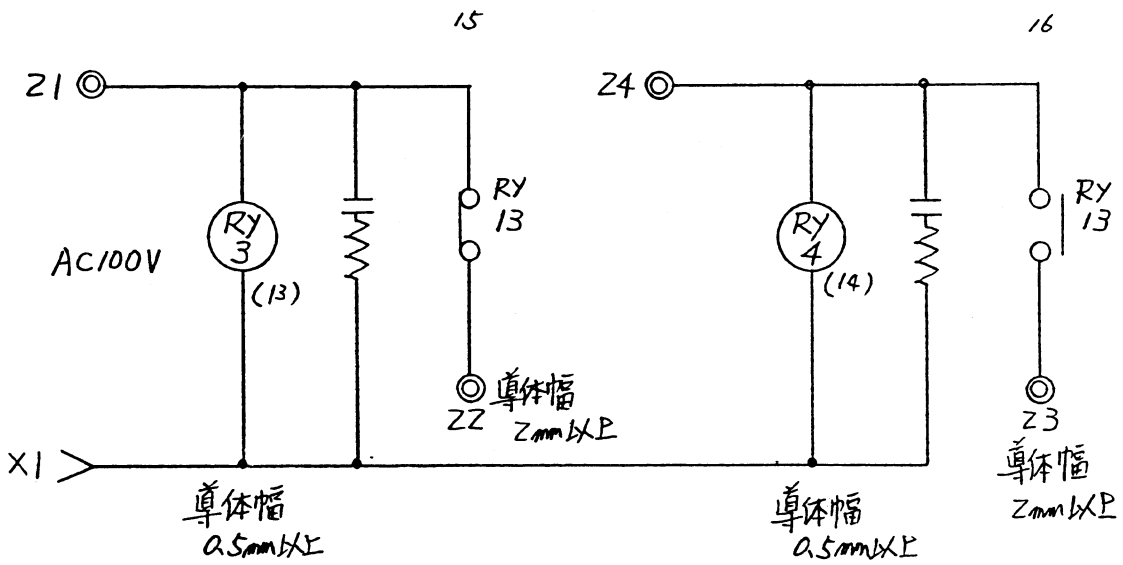
→ #1S1585 RY1, R5~R15 → MYZ DC24U

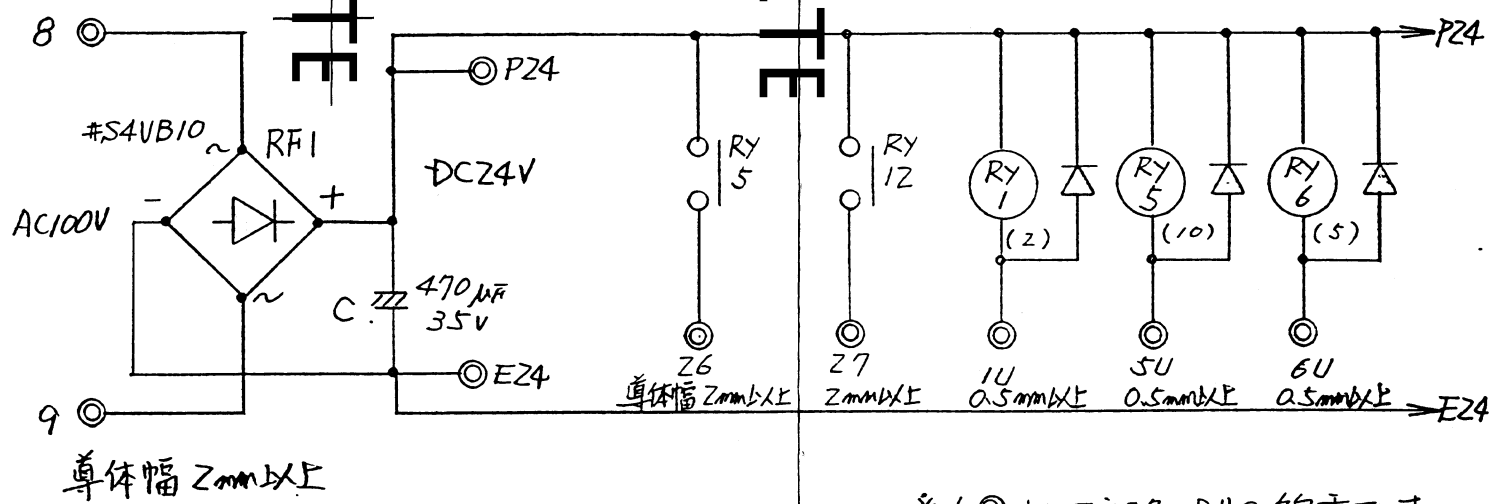
RELAY BOARD CIRCUIT

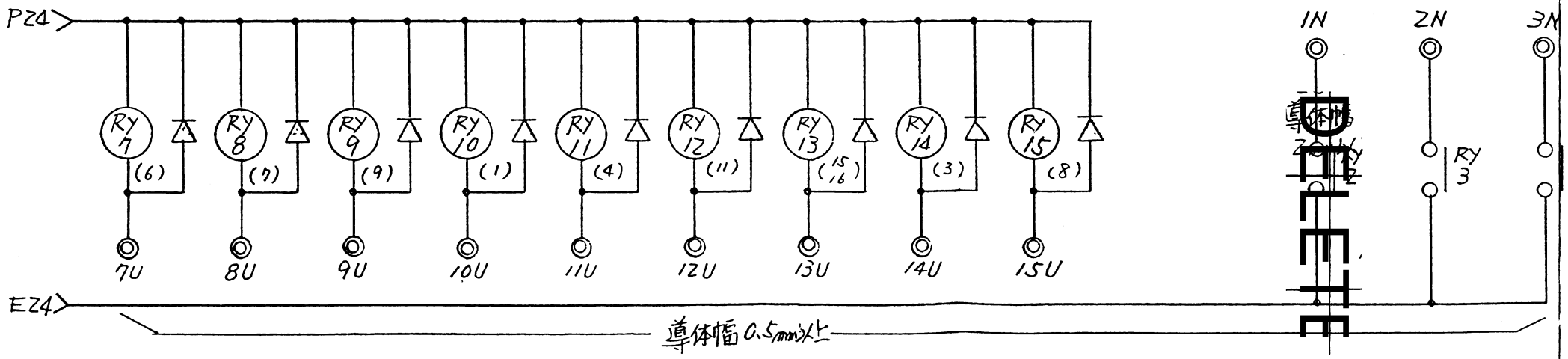
HCS42272











CN82

P24	10		
E24	19		
8	9		

CN83

U1			
5	3		
XL4	U5		

CN84

25	12		
	26		

CN85

Z1	Z2		
Z7	Z3		
17	Z4		

CN86

11	U1		
18	14		
15	X1		

CN80

1	2	3	4	5	6	7	8	9	10
1U	5U	6U	7U	8U	9U	10U	1N	2N	3N

CN81

1	2	3	4	5	6	7	8	9	10
					15U	11U	12U	13U	14U

→ #CRU112 RY2~RY4 → MYZ AC100V

→ #1S1585 RY1, R5~R15 → MYZ DC24V

※1. ◎ は コネクターよりの 線番です.

2. ACIOOVラインは. 導体間隔 2mm以上 厳守.
ACIOOラインとDC24Vラインの間隔 も2mm以上

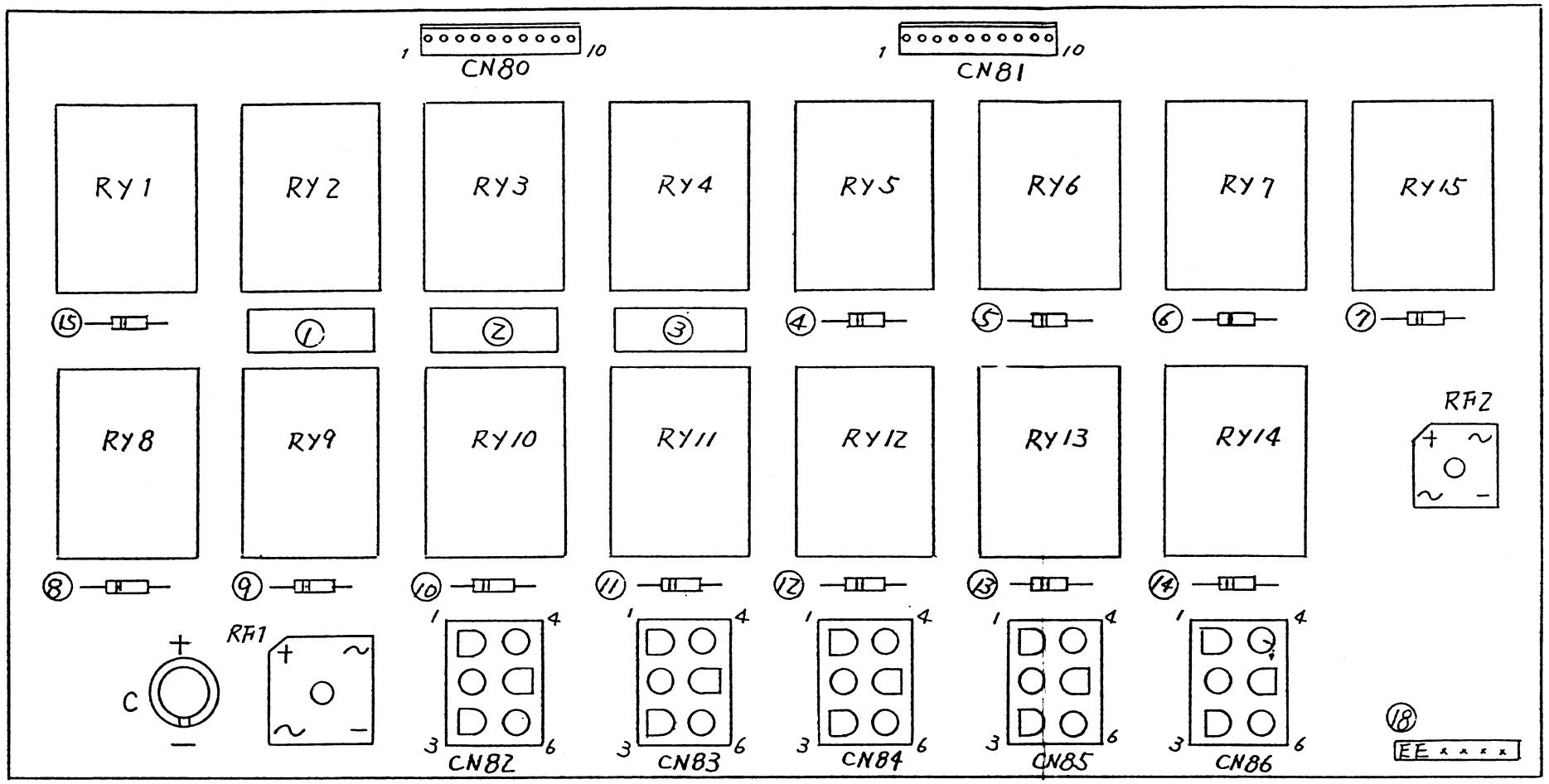
3. DC24Vラインの導体間隔は 1.2mm以上とする.

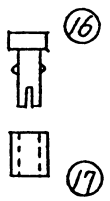
4. U1. X1. P24. E24 は 分岐回路 ですので コネクターよりの 入力ラインは. 太くして下さい.

DELETE

RELAY BOARD CIRCUIT

HCS42272

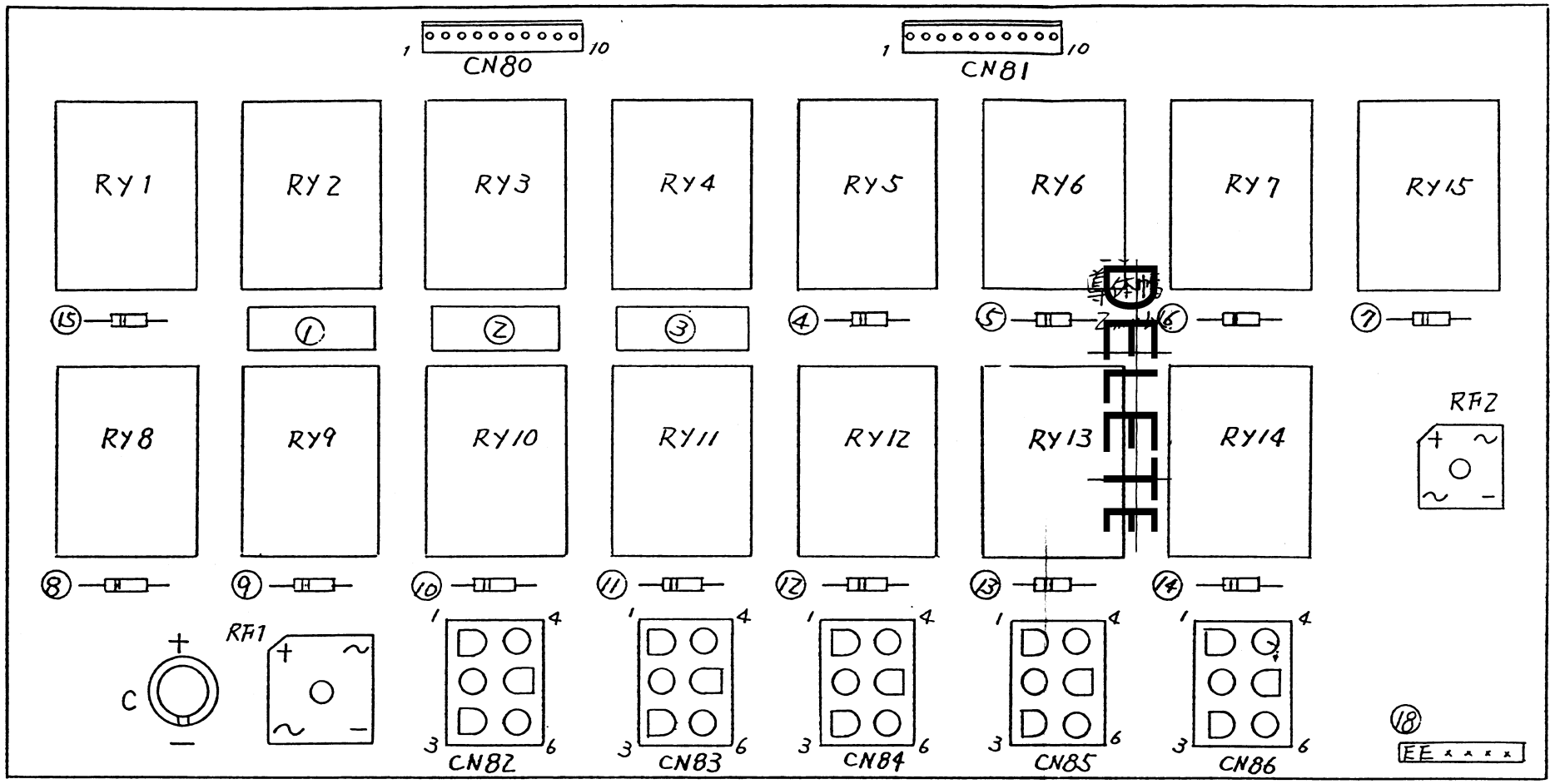




NO	品名	規格	メーカー	数量
	リレー基板	HCB34140-01		1
RY1,RY5~RY15	リレー	MYZ DC24V	立石	12
RY2~RY4	リレー	MYZ AC100V	立石	3
RY1~RY15	リレーソケット	PY08-02	立石	15
RY1~RY15	リレー止め金具	PYC-P	立石	15
RF1	整流スタック	S4VB10	新電元	1
RF2	整流スタック	S2VB40	新電元	1
C	アルミ電解コンデンサ	470μF 35V	松下	1
①~③	スパークキラー	CRU112	トーワ	3
④~⑮	ダイオード	1S1585	東芝	12
CN80~CN81	EIコネクター	1-171825-Q 10P	AMP	2
CN82~CN86	ユニバーサルメインロックコネクター	350431-1 6P	AMP	5
⑯	ワンタッチブッシュ	TB-300	ナトリ	4
⑰	ワンタッチカラー	TA-305	ナトリ	4
⑱	OAブロックNoシール	EE0444~		1

OA	BLOCK No. SEAL
	EE0444
○	EE0444-01
	EE0444-02
	EE0444-03
	EE0444-04

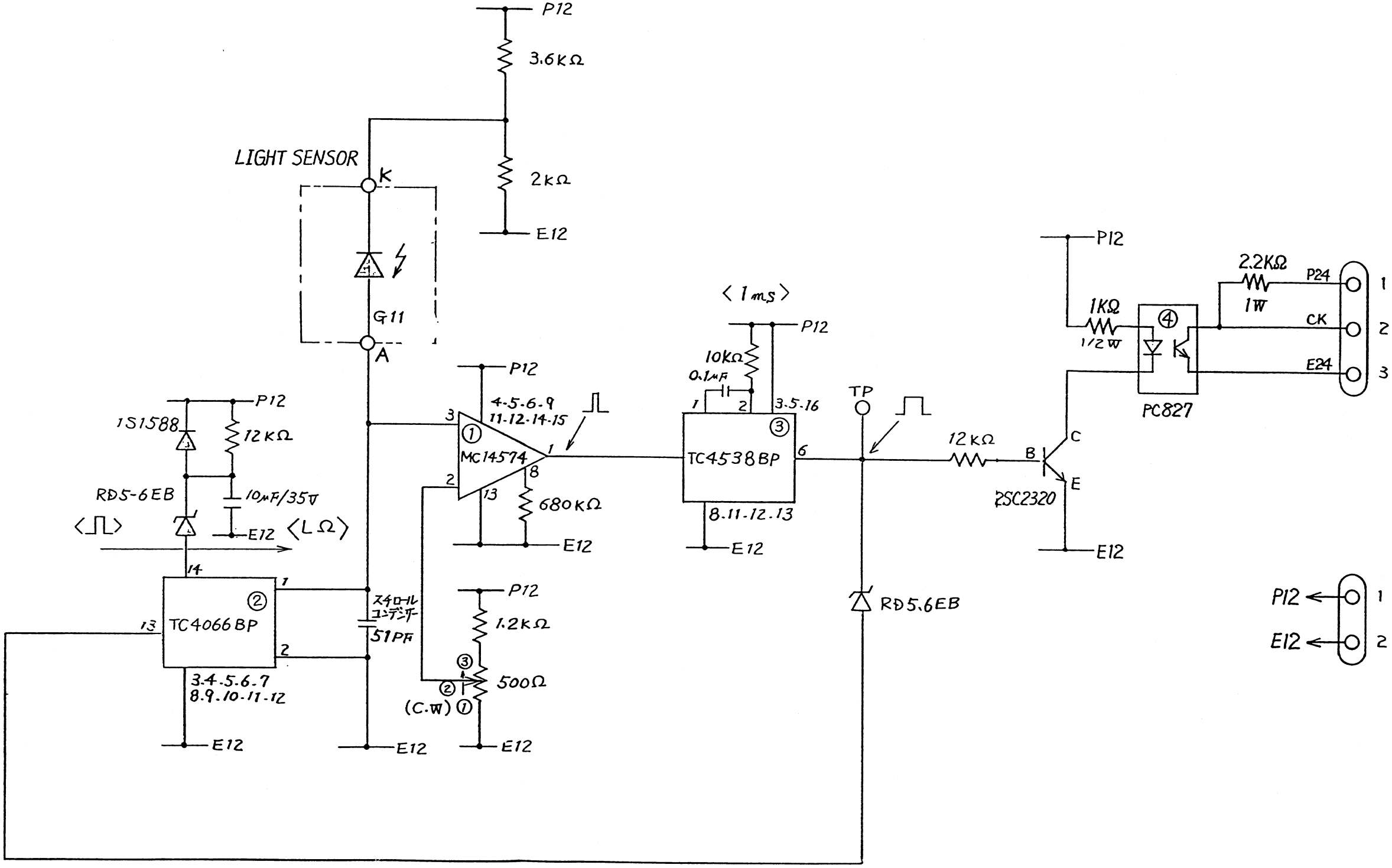
RELAY BOARD
ARRANGEMENT DIA
HCR42709



No	品名	規格	メーカー	数量
	リレー基板	HCB34140-01		1
RY1,RY5~RY15	リレー	MYZ DC24V	立石	12
RY2~RY4	リレー	MYZ AC100V	立石	3
RY1~RY15	リレーソケット	PY08-02	立石	15
RY1~RY15	落下防止金具	PYC-P	立石	15
RF1	整流スタック	S4VB10	新電元	1
RF2	整流スタック	S2VB40	新電元	1
C	アルミ電解コンデンサ	470μF 35V	松下	1
①~③	スパークキラー	CRU112	トーワ	3
④~⑮	ダイオード	1S1585	東芝	12
CN80~CN81	コネクター	1-171825-10P	AMP	2
CN82~CN86	ユニバーサルMTコネクター	350431-1 6P	AMP	5
⑯	ワンタッチブッシュ	TB-300	ナトリ	4
⑰	ワンタッチカラー	TA-305	ナトリ	4
⑱	OAブロックNoシール	EE0444~		1

OA BLOCK No. SEAL
EE0444
○ EE0444-01
EE0444-02
EE0444-03
EE0444-04

RELAY BOARD
ARRANGEMENT DIA
HCR42709

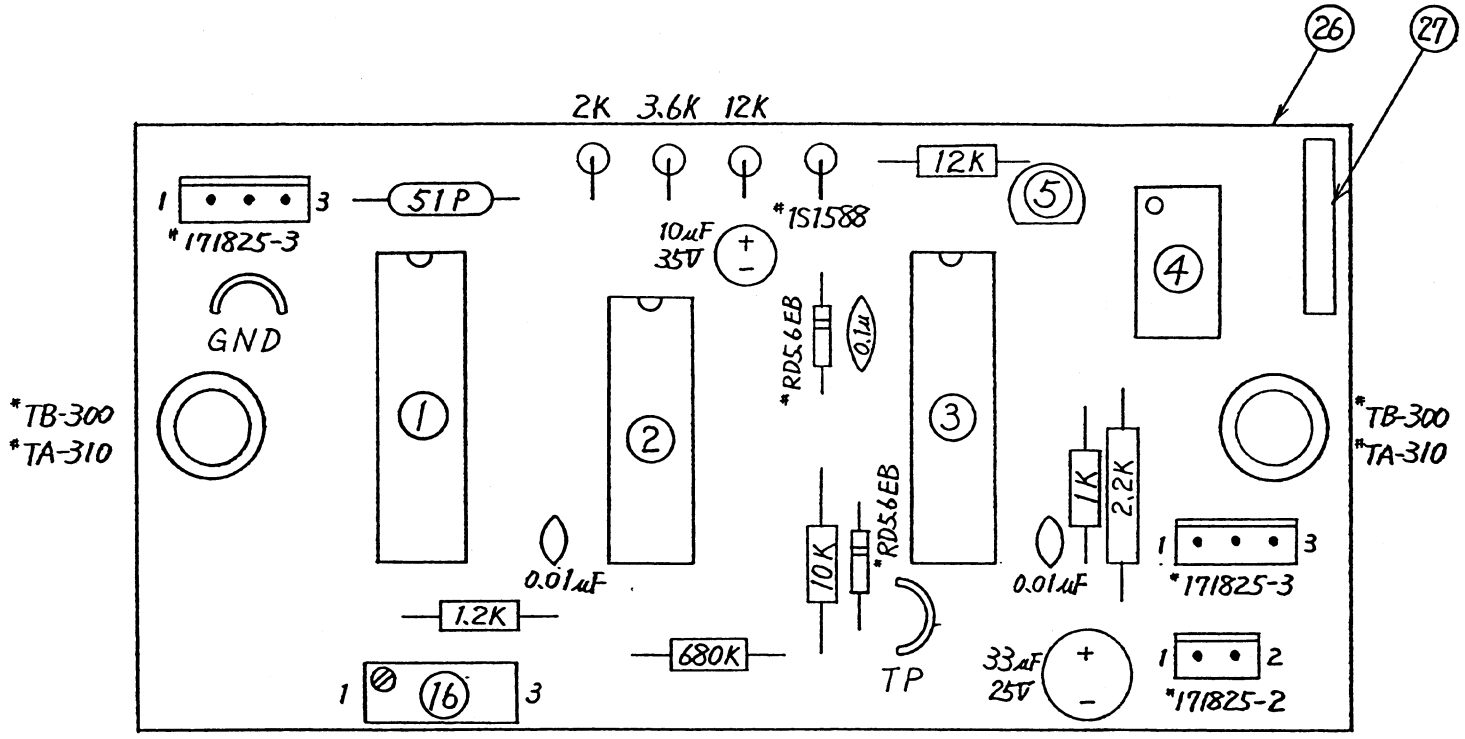


LIGHT METER CIRCUIT

積算光量計回路図

HCS42256

	OAブロックナンバー	DATE	APPROVED
0	EE0434		

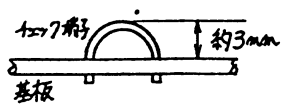


No	品名	型番（メーカー）	個数
1	OP. AMP	MC14574（モトローラ）	1
2	C² MOS	TC4066BP（東芝）	1
3	C² MOS	TC4538BP（東芝）	1
4	フォトカプラー	PC827（シャープ）	1
5	トランジスタ	2SC2320（三支）	1
6	ダイオード	1S1588（東芝）	1
7	ツェナダイオード	RD5.6EB（NEC）	2
8	抵抗	1.2K 1/4W	1
9	抵抗	2 K 1/4W	1
10	抵抗	3.6K 1/4W	1
11	抵抗	10 K 1/4W	1
12	抵抗	12 K 1/4W	2
13	抵抗	680K 1/4W	1
14	抵抗	1 K 1/2W	1
15	抵抗	2.2K 1W	1
16	トリマー抵抗	67W R500Ω（ベックマン）	1
17	スチロールコンデンサ	51PF CQ08S-2B-51R00-J02	1
18	SHA コンデンサ	33μF／25V	1
19	電解コンデンサ	10μF／35V	1
20	セラミックコンデンサ	0.1μF／50V	1
21	セラミックコンデンサ	0.01μF／50V	2
22	EIシリーズコネクター	171825-2 2P（AMP）	1
23	EIシリーズコネクター	171825-3 3P（AMP）	2
24	ワンタッチブッシュ	TB-300（名取）	2
25	ワンタッチカラー	TA-310（名取）	2
26	光量計基板	HCB44131	1
27	OAブロックナンバーシール	HCC51337	(1)

⑯ トリマー 調整方法

反射光源点灯時に、テストポイント〔TP〕の パルス周期を、
100msec に調整する。

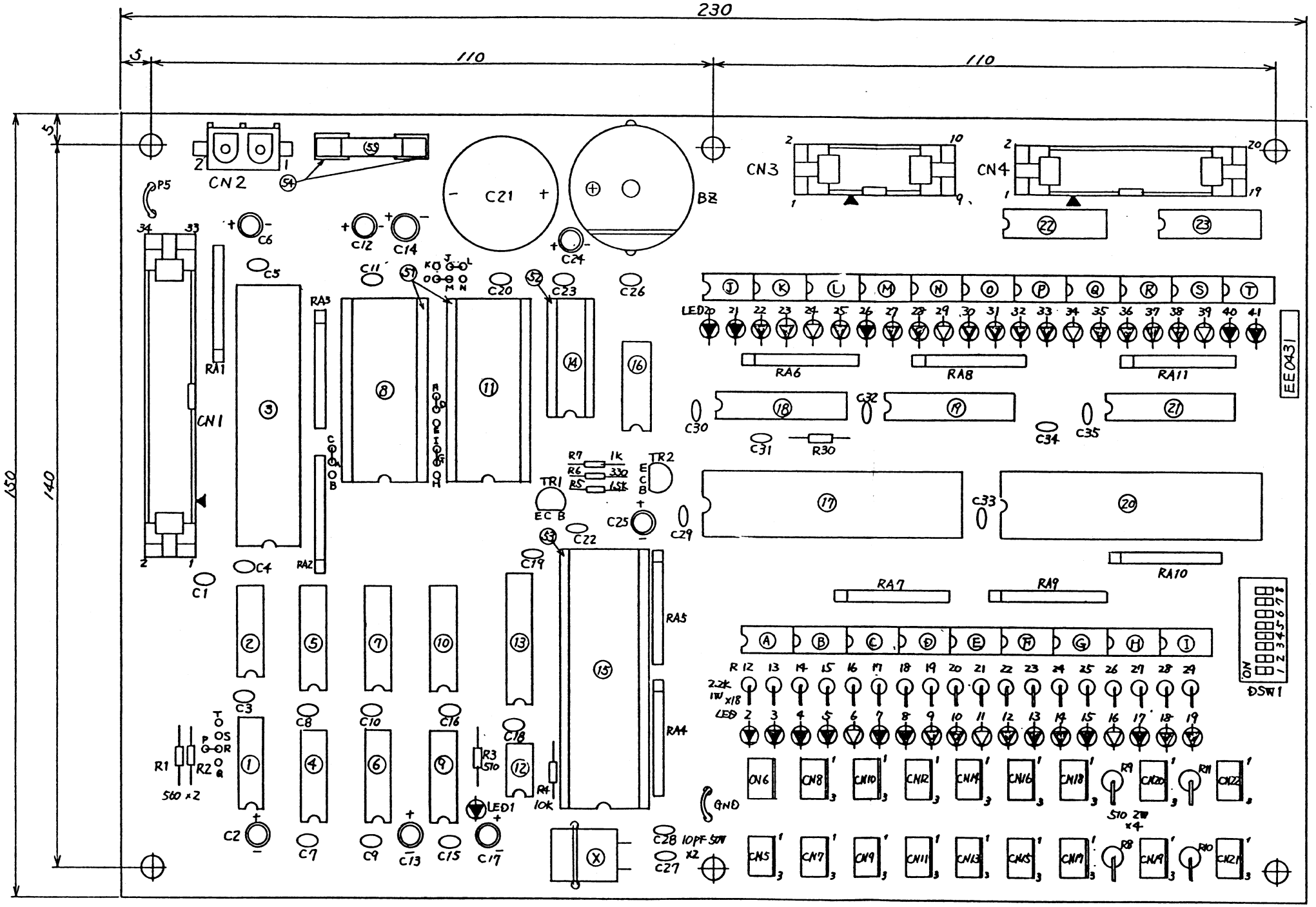
チェック 端子 取付方法 （GND, TP）



LIGHT METER PCB
ARRENGEMENT DIA.

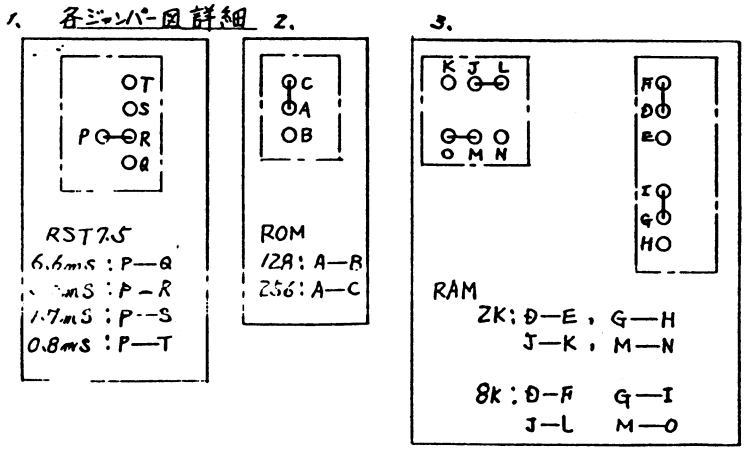
HCR42674

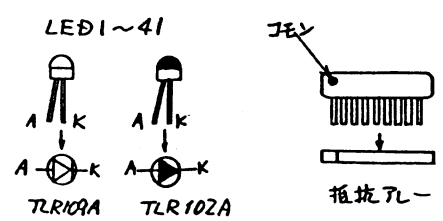
OA BLOCK SEAL		REVISION	DATE	APRV
○	EE0431		'88.3.18	H.MATSUKAWA
	〃 -01			
	〃 -02			
	〃 -03			
	〃 -04			



NO	名称	規格	メーカー	数
①	オシレーター	M54816P	三菱	1
②	TTL IC	SN74LS08		1
③ ⑰ ㉑	LSI PPI	P8255		3
④ ⑯	TTL IC	SN74LS32		2
⑤ ⑦	TTL IC	SN74LS138		2
⑥	TTL IC	SN74LS74		1
⑧	LSI ROM	P27256 32K		1
⑨	TTL IC	SN74LS14		1
⑩	IC CMOS	TC4009BP	東芝	1
⑪	LSI RAM	HM6264LP-15	日立	1
⑫	RESET IC	PST519A	ミツミ	1
⑬	TTL IC	SN74LS373		1
⑭	LSI EAROM	X2210	ゼイコー	1
⑮	LSI CPU	P8085A		1
⑱ ⑲ ㉑	TTL IC	SN74LS245		3
Ⓐ ～ Ⓣ	フォトカプラ	PC827	シャープ	20
Ⓧ	クリスタル	HC-18U4.915ZMHZ	日本電波	1
TR1	トランジスター	2SA999	三菱	1
TR2	トランジスター	2SC2320	〃	1
㉒ ㉓	トランジスタアレー	M54519P	〃	2
BZ	ブザー	PKB24SPC-3601	村田	1
R1, R2	抵抗	560Ω 1/4W		2
R3	〃	510Ω 1/4W		1
R4	〃	10KΩ 1/4W		1
R5	〃	1.5KΩ 1/4W		1
R6	〃	330Ω 1/4W		1
R7	〃	1KΩ 1/4W		1
R8～R11	〃	510Ω 2W		4
R12～R29	〃	2.2KΩ 1W		18
R30	〃	22KΩ 1/4W		1
LED1-5,7-10 12-15,17-23,25-28 30-33,35-38,40-41	LEDランプ	TLR102A	東芝	34
LED6,11,16,24,29,34,39	LEDランプ	TLR109A	東芝	7
C1,C3-C5,C7-C11 C15-C14,C18-C20 C22-C23,C26 C29-C35	セラミックコンデンサー	0.01μF 50V		24
C2,C4,C13, C12,C17,C24,C28	SHAアルミ電解コンデンサ	33μF 25V	日本ケミコン	7
C21	電気二重層コンデンサー	FZ0H474Z	NEC	1
C27, C28	セラミックコンデンサー	10PF 50V		2
RA7, RA8, RA9, RA10	抵抗アレー	4.7KΩ 1/8W ×8		5
RA2, RA3	〃	22KΩ 1/8W ×8		2
RA5	〃	10KΩ 1/8W ×8		1
RA6, RA8, RA11	〃	330Ω 1/8W ×8		3
DSW1	ディップSW	A6D-8103	立石	1
CN1	フラットケーブル用コネクター	MFC-34RPM	本多	1
CN2	ユニバーサルハイブリッドコネクター	3504284-1 2P	AMP	1
CN3	フラットケーブル用コネクター	MFC-10RPM	本多	1
CN4	〃	MFC-20RPM	本多	1
CN5～CN22	EI コネクター	171825-3 3P	AMP	18
㉔	ヒューズホルダー	FP-213A	ナガオカ	2
㉕	ヒューズ	ミゼット FGMA 2A UL	富士端子	1
C14	アルミ電解コンデンサー	100μF 16V		1
㉖	ICソケット	08-028-360T	ケル	2
㉗	ICソケット	08-040-360T	ケル	1
㉘	ICソケット	08-018-360T	ケル	1
	CPU基板	HCB34119		1

1. 各ジャンパー回詳細





CPU BOARD
ARRENGEMENT DIA

HCR32671

SILVER MASTER CP-TONE 310

Service Manual

No.4106A 8809 Printed in Japan