

MITSUBISHI GRAPHIC ARTS SYSTEM

EP-18

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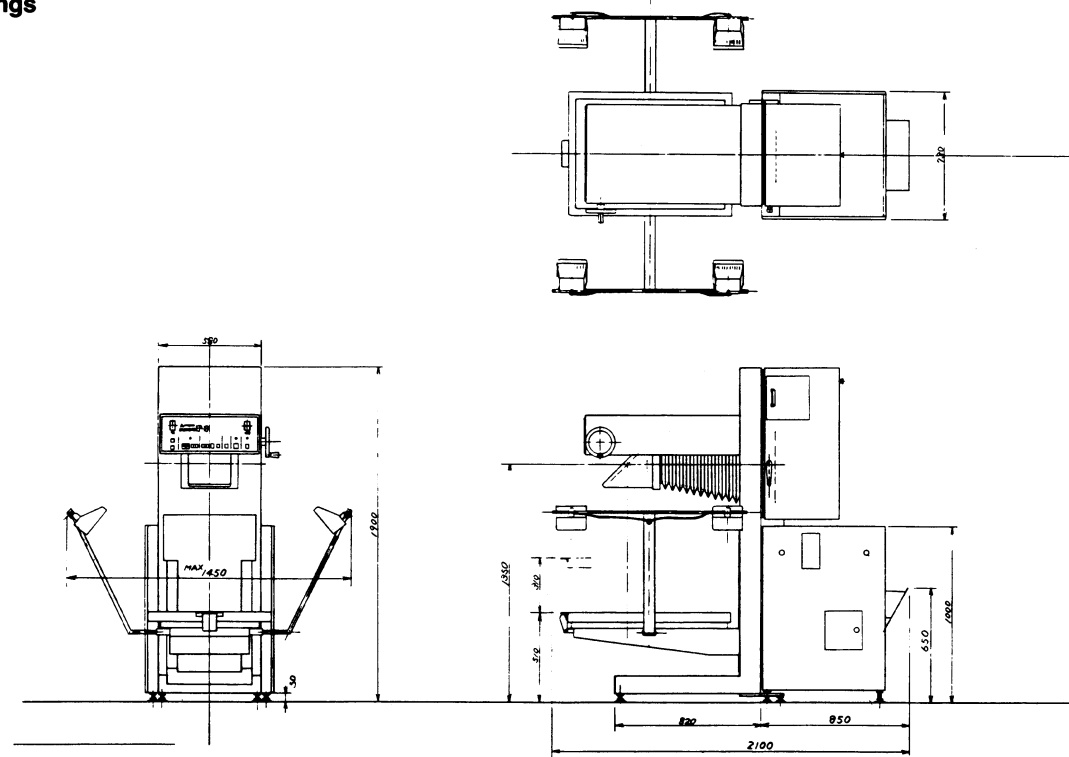
CHAPTER 1. OUTLINE

1. Introduction

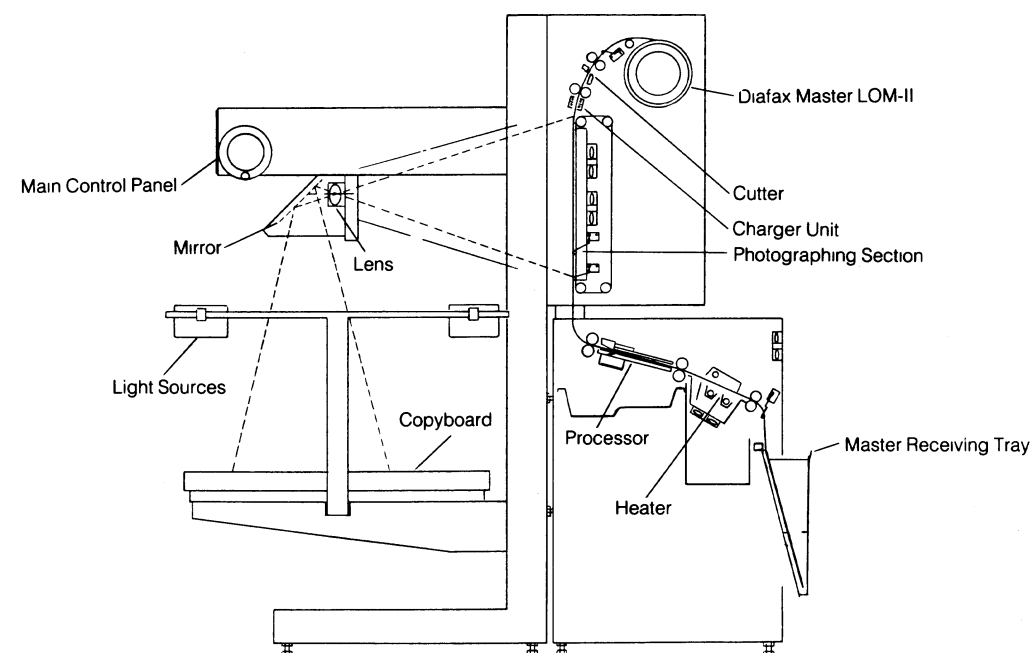
We at Mitsubishi are very grateful to you for selecting the Diafax Master EP-18. The Diafax Master EP-18 is a platemaking system which, in combination with Diafax Master LOM-II, produces offset master directly from the copy with a simple operation, covering up to A3 size.

This operation manual provides information for continued satisfactory operation of the system. For information on printing methods, please refer to our separate booklet, "Diafax Master Technical Guide."

General Drawings



System Process



2. Specifications

Item	Specifications
Master width	100m Roll 254mm(10"), 279mm(11"), 305mm(12"), 310mm(12 1/4") 130m Roll 229mm(9"), 254mm(10"), 279mm(11"), 286mm(11 1/4"), 305mm(12")
Master length	14" to 19.9" (digital setting)
Effective image area	310mm × 430mm (12.2" × 16.9")
Effective copy area	520mm × 720mm (20.5" × 28.3")
Lens	Focal length 360mm
Magnification	60% to 125%
Focusing	Auto focus with magnification scales
Exposure control	0 to 99.9 sec. (digital setting) with integrating light-meter provided (switch type)
Light sources	Halogen lamps: 500W × 4 (rectangle)
Cutter	Motor-driven rotary cutter
Developing method	Wet type, lower spray system
Developing tank capacity	4.5 liters
Replenishing bottle capacity	1 liter (automatic replenishment for constant liquid level)
Fixing method	Heat lamps 750W × 3 with thermo-sensor for safety
Platemaking speed	25 to 30 sec/plate
Separate switches	Toner pump and drive motor switches
Machine dimensions	1,450(W) × 2,100(D) × 1,900(H) mm
Weight	350kg
Electricity	1 ∅, 100 V, 3.0KW, 50 or 60 Hz

* The specifications are subject to change without notice.

Siting Conditions

- ① Select a room which is well ventilated throughout the year and kept at temperatures 18°C-28°C (64°F~82°F) and humidities 45%-70%
- ② Avoid a place which may be exposed to direct sunlight
- ③ Keep the supply voltage between 100V ± (10%) use the machine at 30A or more.

CHAPTER 2. OPERATION

1. General Construction

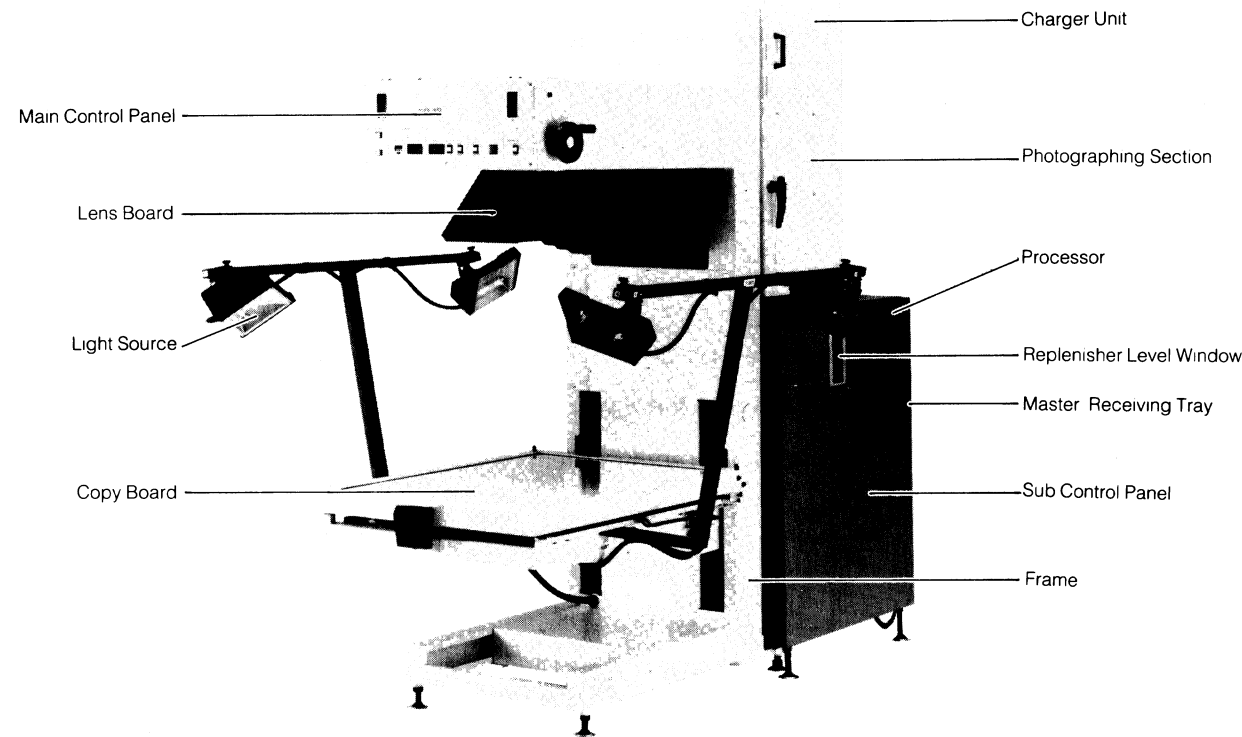


Fig. 1 General Construction

2. Processor; Preparation of Processing Solutions

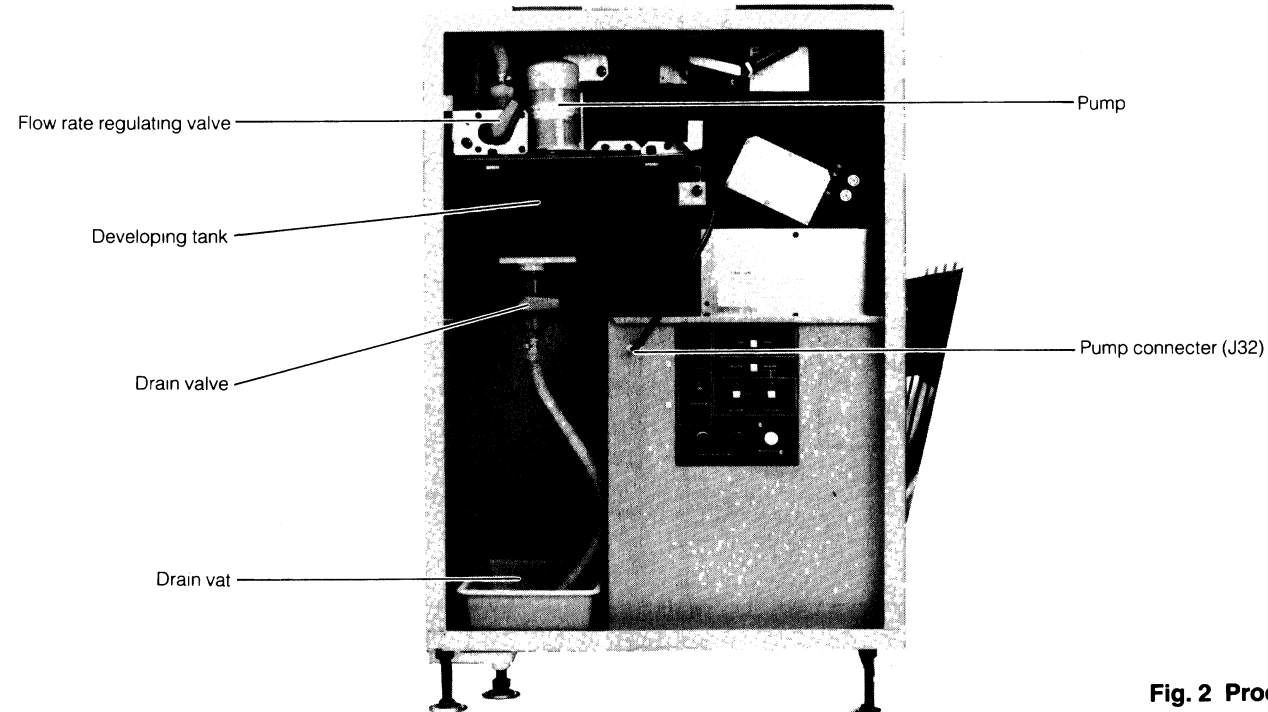


Fig. 2 Processor

1. Filling the processing solution.

- ① Unhook the photographing section body and open it wide.
- ② Remove the processor top cover and front cover
- ③ Close the drain valve.
- ④ Pour four bottles of toner in the developing tank. Break the aluminum seal on the pouring hole.
- ⑤ Set another toner bottle up on the replenisher bottle holder. The developing tank will be automatically replenished. For the method of changing the toner, refer to "General Care" in 4.3.

2. Regulating the toner flow rate.

- ① Align the flow rate regulating valve top end with the mark ▲
- ② After turning on the power, turn the AUTO/MANU switch on the sub control panel to MANU and the PUMP switch to ON-1 and the toner is circulated.

A. The flow rate is adequate.

When toner stays on the upper developing plate while trickles of toner are running from the front (inlet) side of the lower developing plate, it is unnecessary to adjust the flow rate with the valve.

B. The flow rate is too high.

Turn (close) the regulating valve clockwise to adjust the flow rate.

C. The flow rate is too low.

Turn (open) the valve counterclockwise.

NB 1) When checking the toner flow rate, allow 15-20 sec. after turning on the pump.

NB 2) Even when the alignment with the mark ▲ has been made, the flow rate somewhat varies and an adjustment may be necessary.

Unless the toner flow rate is adequate, trouble in paper feed or uneven development may occur.

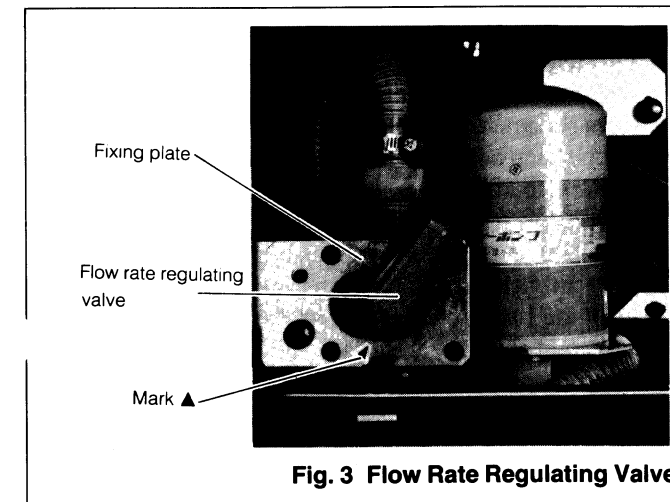


Fig. 3 Flow Rate Regulating Valve

3. Processing capacity of toner.

One fill of toner is capable of processing 1500 plates of A3 size. When 1500 plates have been processed or one month or more has passed after filling the toner in the tank, change the toner in the tank for fresh toner regardless of the number of plates processed.

Caution in handling chemicals

- ① Be careful never to drink or get into eyes processing chemicals (In case of such accidents check with a doctor.)
- ② When chemicals splash onto skin or cloths immediately wash with running water
- ③ Use chemicals properly according to instruction
- ④ Keep chemicals out of reach of children.

3. Sub Control Panel

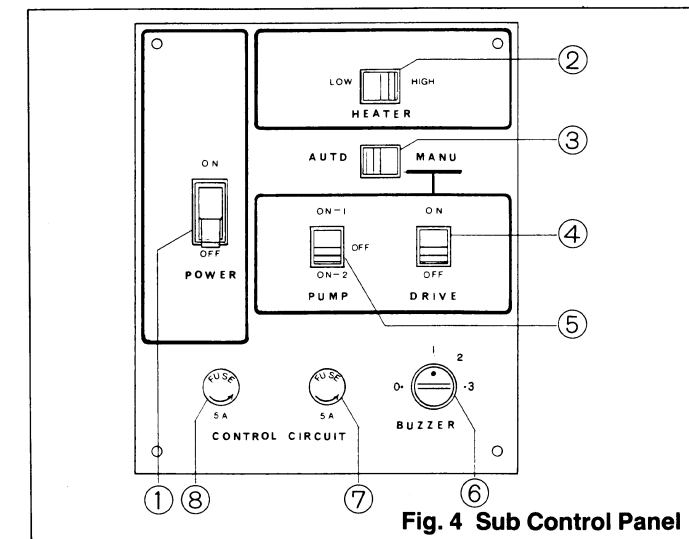


Fig. 4 Sub Control Panel

① POWER switch (camera switch)

When the NFB is turned on, the camera is energized

② HEATER switch

The heater switch should be turned to HIGH or LOW depending on the situation

	Heater running time	Select the switch position if:
HIGH	Start → feed to optical axis During developing and fixing	<ul style="list-style-type: none"> ● Room temperature is below 25°C ● Fixing is unthorough ● Operation is less frequent
LOW	During developing and fixing	<ul style="list-style-type: none"> ● Room temperature is above 25°C ● Fixing is excessive ● 50 plates or more should be processed continuously

Each time the POWER and CONTROL CIRCUIT switch are turned on, the heater is warmed up for about 60 seconds. At the same time, the drive runs while no photographing can be made.

NB 1) If the thermo-switch works due to overheat, the heater won't run. Reset the thermo-switch on the heater manually.

NB 2) Prior to resetting the thermo-switch, be sure to turn off the power

③ AUTO/MANU switch

Turn it to AUTO for normal photographing. When it is at MANU, the machine won't start. Use it for manual operation of the pump

④ or drive ⑤

④ DRIVE (vacuum back drive switch)

When this switch is turned on, the camera including the vacuum back belt is driven.

⑤ PUMP switch

This switch is effective only when the AUTO/MANU switch is at MANU.

NB) Unless the squeegee roller is set, the pump will not run.

ON-1	The pump runs. This position is used for warming up. When starting the processor after a long shut-down, warm it up about three minutes to agitate the processing solution.
neutral	The pump stops.
ON-2	The pump runs while the switch is held pushed

- ⑥ **BUZZER** (sound level control dial)
This dial is used to control the buzzer sound level
- ⑦⑧ **CONTROL CIRCUIT fuses**
(5A glass tube fuses for the control circuit)

Remove the cap and a 5A glass tube fuse appears in each fuse holder.
Check these fuses if the machine does not run by turning on the POWER and CONTROL CIRCUIT switches.

4. Main Control Panel

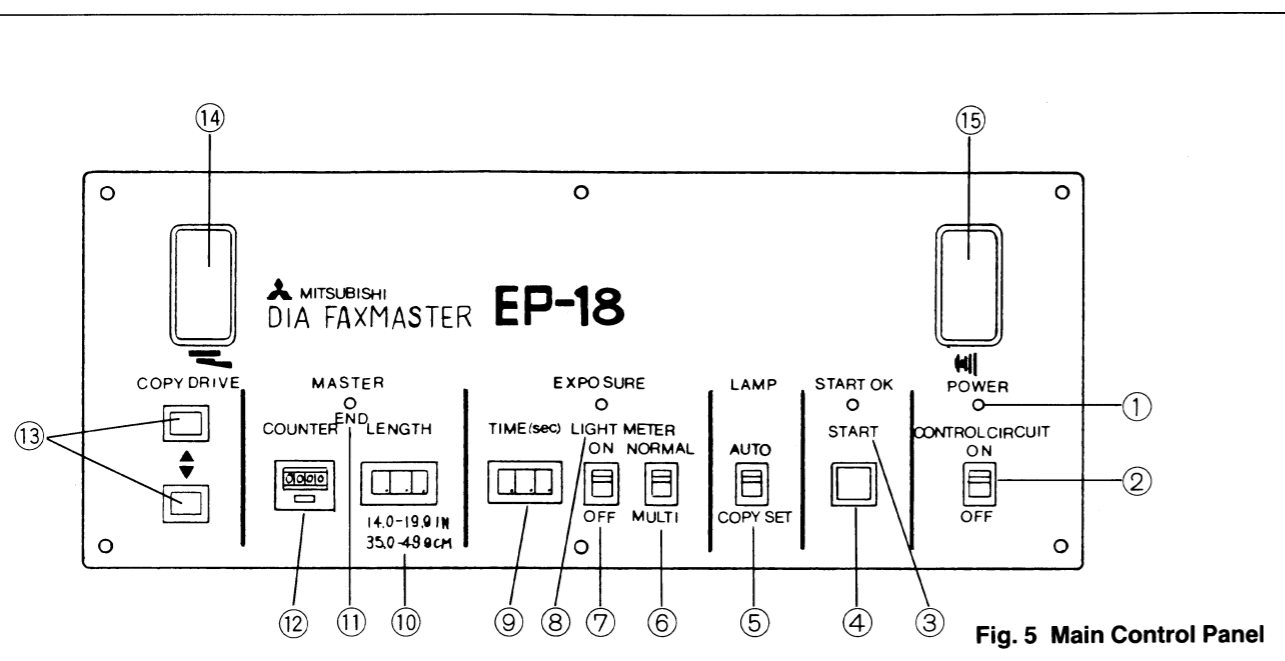


Fig. 5 Main Control Panel

- ① **POWER** (power pilot lamp, red)
When the POWER switch on the sub control panel is turned on, this lamp lights.
- ② **CONTROL CIRCUIT ON/OFF**
When this switch is turned on after the POWER switch on the sub control panel is turned on, the machine becomes ready for operation after warming up
- ③ **START OK** (pilot lamp, green)
This pilot lamp, when lit, indicates that the system is ready for photographing. The lamp is out during photographing
- ④ **START**
Depression of this button starts a series of operations (paper feed, charging, paper cutting, exposure, developing, fixing and delivery)
- ⑤ **LAMP** (light source switch)
When this switch is turned to AUTO and the START button is depressed, the light sources come on and then automatically go out after the exposure is over. The switch should be at AUTO during photographing. When it is at COPY SET, one light source lights continuously and the shutter remains closed, so no exposure is made on paper. Use this position of the switch to carefully check the copyboard when mounting the copy or cleaning the copyboard glass
- ⑥ **NORMAL/MULTI**
Turn this switch to NORMAL for normal exposure, and a series of operations will be performed (start → paper feed → charging → cutting → exposure)
With the switch at MULTI, the Master paper just exposed is not transported but waits for further exposure. This switch is used for multiple exposure. Be sure to turn the switch to NORMAL after the final exposure is made

- ⑦ **LIGHT METER** (integrating light-meter ON/OFF switch)
When this switch is at ON, the photo-sensor senses, on the focal plane, the light reflected from the copy which has passed through the lens so that the optimum exposure time is calculated. Thus, automatic exposure control is performed to assure the optimum light exposure, in spite of changes in magnification, variations in copy base density or voltage fluctuations. For copies with colored background or colored layout sheet (reddish, yellowish, etc.), set the switch to OFF. When the switch is at OFF, exposure is performed for the duration as set on the EXPOSURE timer.
NB) This light-meter is suitable for copies with similar base colors. If the base colors of copies are different or the measured part of a copy is stained, the optimum light exposure cannot be provided
- ⑧ **EXPOSURE** (pilot lamp, orange)
This lamp flashes during exposure to indicate that exposure is under way.
- ⑨ **EXPOSURE TIME** (digital switch)
This timer is used to set the exposure time. The light sources are lit and the shutter is open for the duration as set on the timer. The exposure time ranging from 00.0 to 99.9 sec can be set when the LIGHT METER switch is off.
- ⑩ **MASTER LENGTH** (digital switch)
Master just exposed is automatically fed by the length set on the MASTER LENGTH switch and cut. The master length can be set in the range from 14.0" to 19.9"

- ⑪ **MASTER END** (pilot lamp, red)
This MASTER END pilot lamp lights and the buzzer sounds when the MASTER paper roll runs out. The lamp also lights up if the Master paper roll is improperly loaded. The START button does not work while this pilot lamp is on.
NB) The Master paper stays in the photographing section after the Master roll is exhausted during feed, the MASTER END lamp lights and the buzzer sounds.
If so, remove the paper, once turn the CONTROL CIRCUIT switch off and then on, and load a new Master roll

- ⑫ **COUNTER**
The COUNTER indicates the number of master plates produced. Use it to know the timing to change the toner or replace the charger wire, the remaining amount of paper.
- ⑬ **COPY DRIVE** (copyboard drive buttons)
The copyboard moves toward the enlargement side (up) when the ▲ button is depressed. It moves toward the reduction side (down) when the ▼ button is depressed.
- ⑭ **COPY BOARD** (copyboard magnification scale)
The scale is in percent. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide. (See Fig. 8 on P. 8)
- ⑮ **LENS BOARD** (lensboard magnification scale)
The scale is in percent. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide. (See Fig. 8 on P. 8)

5. Jam detector

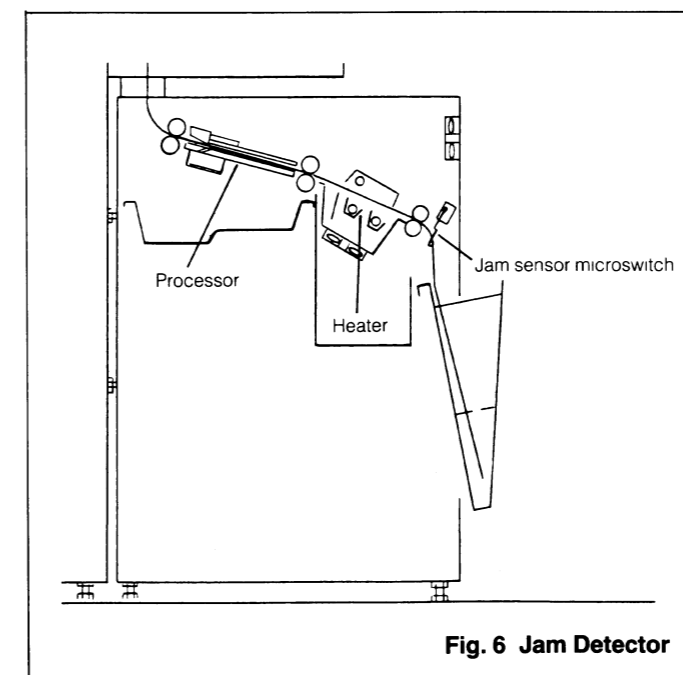


Fig. 6 Jam Detector

- If the Master paper jams in the machine, the buzzer is sounded. The buzzer is sounded in case that
- ① After master is fed and cut, no master is fed up to the photographing position within 5 seconds.
 - ② The output master sensor microswitch is not reached by master within 18 seconds after exposure is over.
(If a master is put out within 4 seconds though the buzzer has sounded, the machine continues running normally.)
- If the buzzer is sounded, inspect the components shown below and remove a jammed master if any before starting the machine.

- ① Master Paper Magazine
 - ② Cutter
 - ③ Photographing Section
 - ④ Processor
 - ⑤ Heater
 - ⑥ Delivery Tray
- NB) Be careful not to forget to remove a jammed paper in the heater, or it may overheat

6. Copy Board

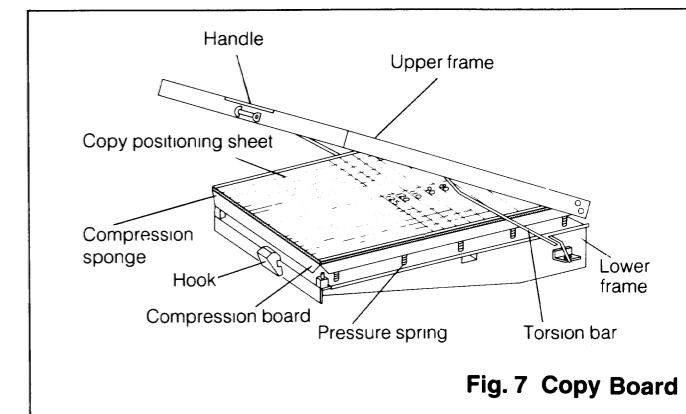


Fig. 7 Copy Board

1. Positioning the copy

According to the magnification, the position of the lens changes, so the effective projection area changes. Therefore, the copy must be put in the position appropriate to the magnification. The copy positioning sheet bears reference lines that represent the edge of the effective image projected on paper in 1% steps. Place the copy so that it is inside the reference line corresponding to the magnification to allow a space for gripping margin. (See 3.2)

2. Mounting the copy on the copy board

- ① Pull the hook and the upper frame will be opened. When opening the upper frame, hold the handle and gently move up, never handle it abruptly
- ② Put the copy and position it
- ③ Close the upper frame gently and hold until it is hooked.

3. Moving the copy board

The copy board is moved using the COPY DRIVE buttons on the main control panel. Depression of the button marked with ▲ moves it toward the enlargement side and depression of the button marked with ▼ moves it toward the reduction side. The magnification scale for the copy board is located inside the copy board scale window on the main control panel. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide

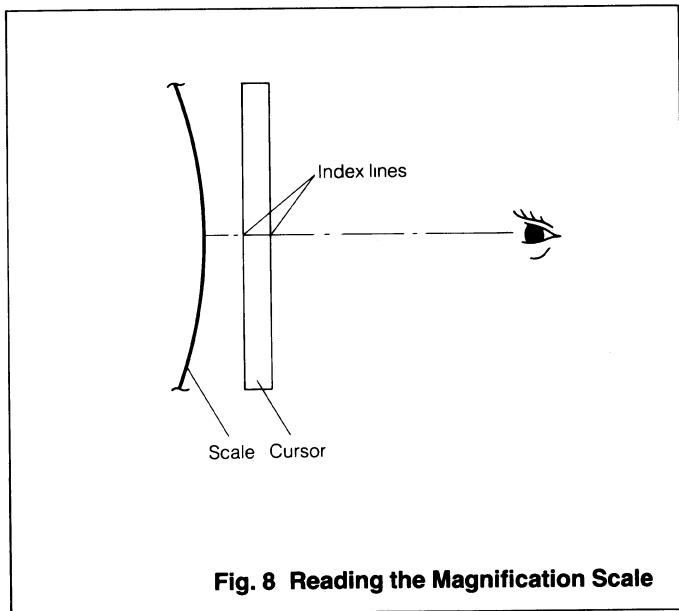


Fig. 8 Reading the Magnification Scale

7. Light Source Unit

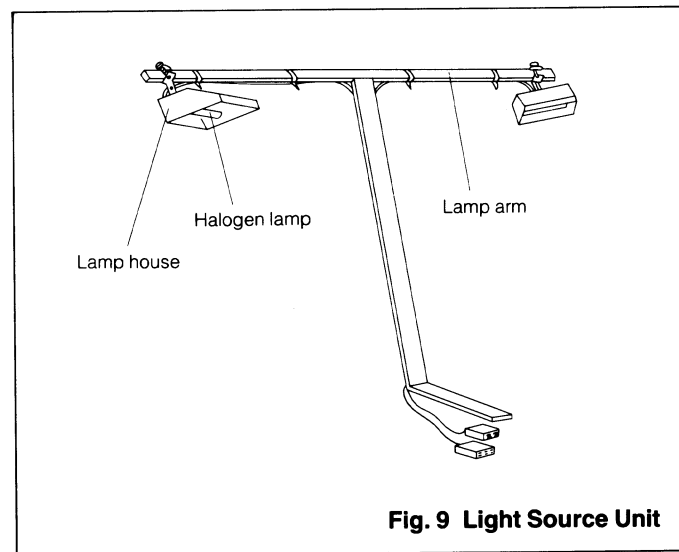


Fig. 9 Light Source Unit

Positioning the Light Sources

- ① Adjust the lamp house and arm to the ▲ mark, tallying the numbers.
 - ② The lamp house is turned notch by notch. Set it to the ▲ marked position.
- The lamp house position should be fixed when the magnification, exposure time may be reduced by approx. 15% by moving the farther lamp houses to the nearby ▲ mark.

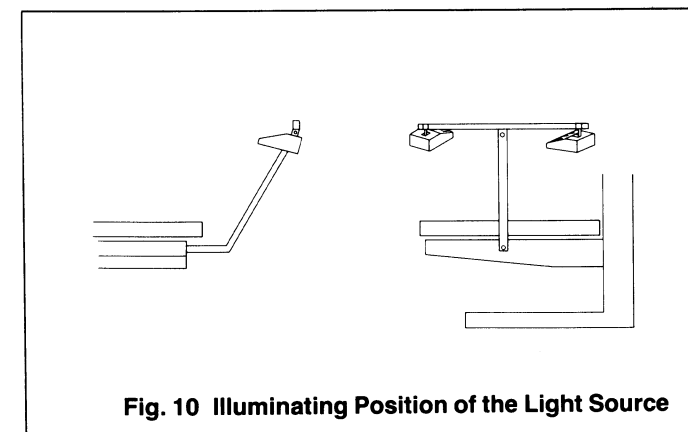


Fig. 10 Illuminating Position of the Light Source

8. Lens Board

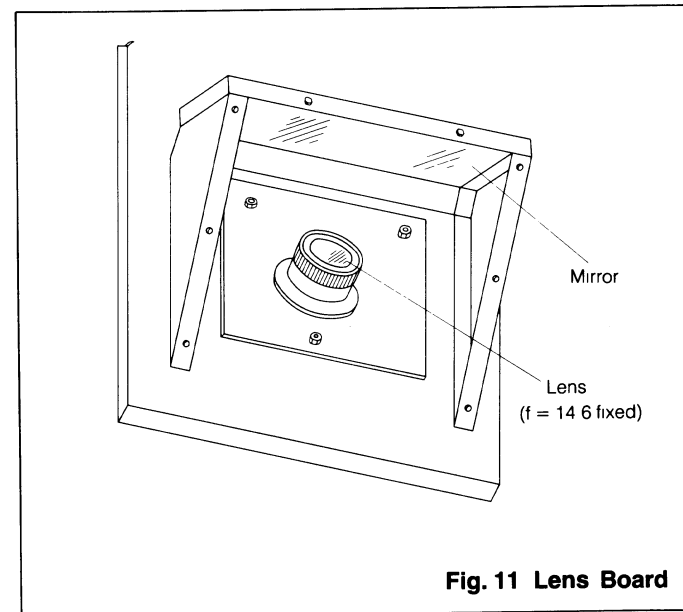


Fig. 11 Lens Board

Moving the Lens Board

The lens board is moved using the hand wheel on the side of the main control panel. turning the wheel clockwise moves the lens board toward the enlargement side and counterclockwise turn toward the reduction side. Don't turn it too much in either direction (over 125% or below 60%). Otherwise the lens board drive mechanism may fail. To minimize parallax, read the scale at such an angle that the two cursor index lines coincide.

CAUTION: Don't touch the mirror and lens except when necessary.

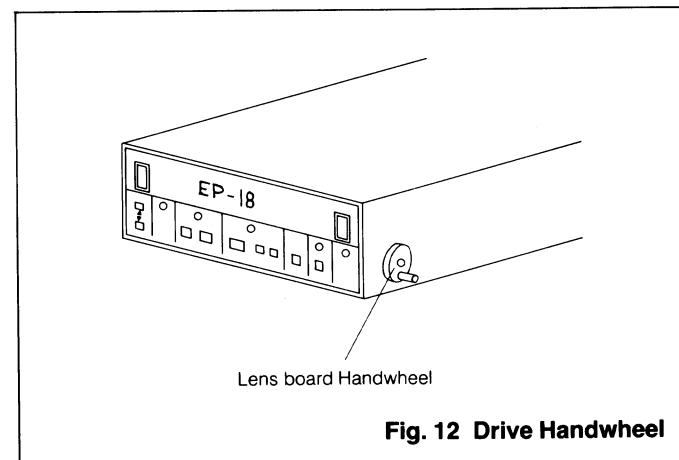


Fig. 12 Drive Handwheel

9. Photographing Section

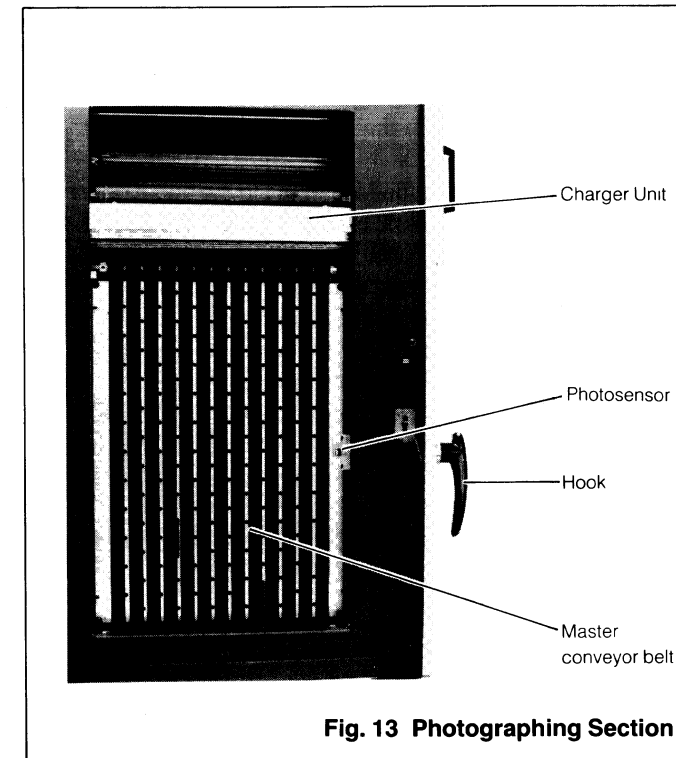


Fig. 13 Photographing Section

Photosensor (integrating light-meter)

The optimum exposure time varies according to the magnification and copy base sheet density and with fluctuation in voltage and illuminance of the light source.

The photosensor detects the quantity of the light which has passed through the lens and automatically controls the exposure time accordingly.

Therefore, this device ensures the optimum exposure time for each application regardless of the above mentioned variables.

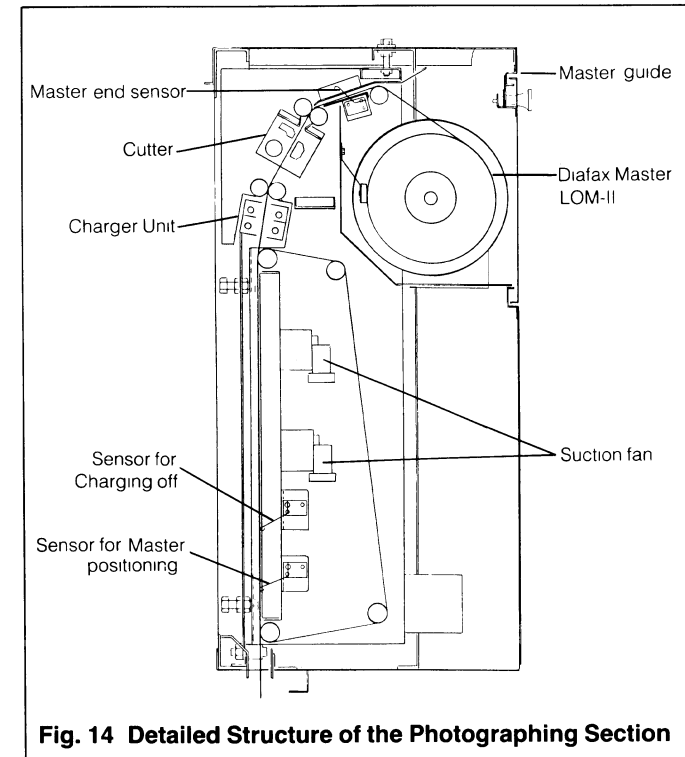


Fig. 14 Detailed Structure of the Photographing Section

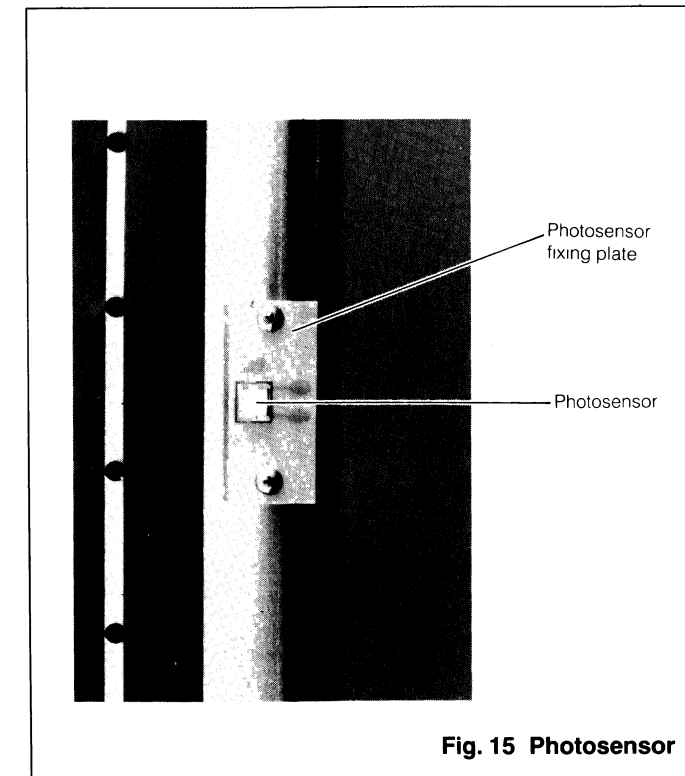


Fig. 15 Photosensor

10. Loading a Master Roll

Procedure of loading a Master roll

- ① Fit the spool rim to the spool shaft guide line depending on the width of the Master roll (310, 305, 279, 254 and 229 mm guide lines from outside to inside) and secure it with screw in screw hole.
 - ② Pass the spool shaft through the Master roll core.
 - ③ Fit the other spool rim to the spool shaft and secure it with screw.
 - ④ Fit the spool loaded with the Master roll to the spool bearings
 - ⑤ Turn the roller release lever to FREE and pass the Master paper along the master guide until the leading end of the Master paper reaches the feed roller just above the charger unit.
 - ⑥ Turn the roller release lever to LOCK the roller.
 - ⑦ Open the cover of the charger unit and turn the manual cut lever to the arrow direction to cut the Master paper.
- NB) After cutting the Master by manual operation, the lever may hardly return to its original position. If so, return it by hand.
- ⑧ Open the photographing section and remove the cut Master piece.
 - ⑨ Close the photographing section cover, charger unit cover and Master magazine cover.

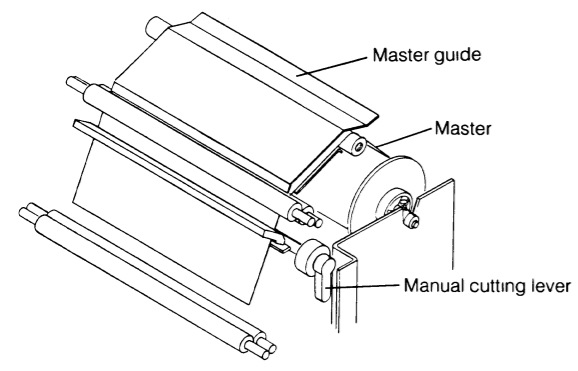
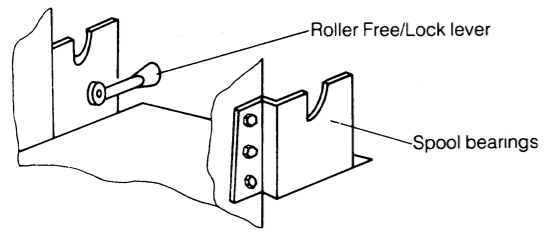
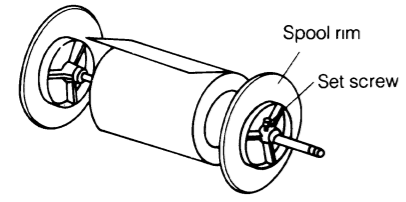
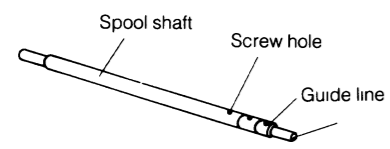


Fig. 16 Loading a Master Roll

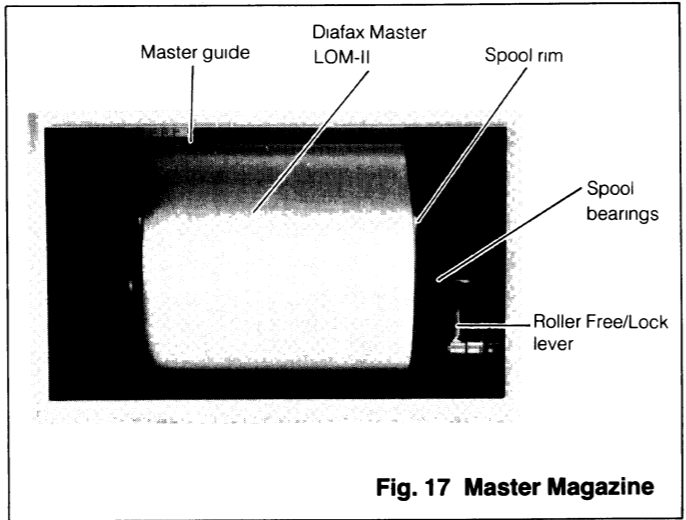


Fig. 17 Master Magazine

11. Safety Circuit

The EP-18 is equipped with a safety circuit in order to ensure the operator's safety. Therefore, it can not be powered up only when it is set completely ready for operation.

- The safety circuit detects
- ① Whether the cover of the photographing section is open or closed.
 - ② Whether the processor top cover is open or closed.
 - ③ Whether the cover of the charger unit is open or closed.
- The machine is energized when all three microswitches shown in Figs. 18, 19 and 20 are turned on, that is all the covers of the photographing section, processor and charger unit are closed.
 - Microswitch keys which enable the microswitches to be turned on with the cover of the photographing section open are supplied for inspection or servicing. (One key for each microswitch is available.)
- When inspecting or repairing the machine using these keys, enough care should be taken not to bring about an accident.
- When the machine has been turned off by this safety circuit and then reset, the machine may be started without being warmed up.

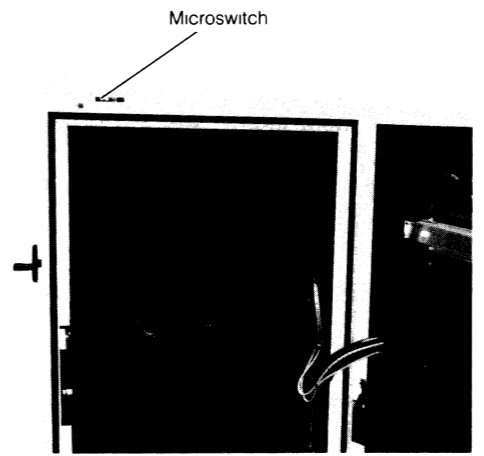


Fig. 18 Microswitch in the Photographing Section

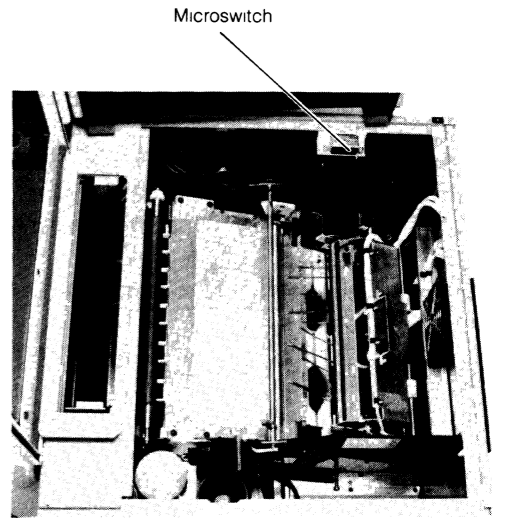


Fig. 19 Microswitch on the Processor Top

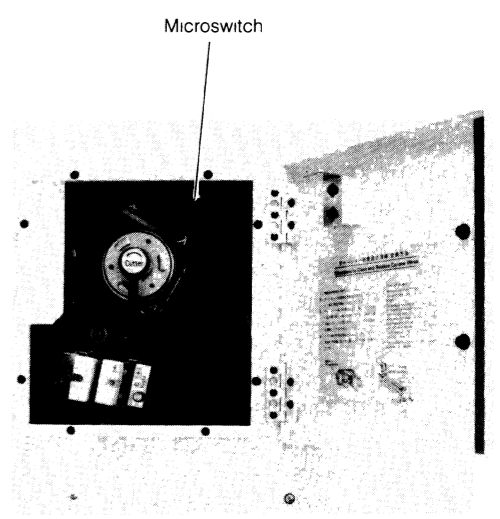


Fig. 20 Microswitch in the Charger Unit

1. Photographing Procedure

1. Usual photographing procedure

- ① Turn on the POWER switch on the sub control panel.
- ② Turn the CONTROL CIRCUIT switch on the main control panel to ON.
The machine can't be operated for 60 seconds, or until it is warmed up.
- ③ Set the lens board and copy board to the appropriate positions for the desired magnification.
- ④ Put the copy in the appropriate position according to the magnification. (Refer to "3.2. Centering the Copy.")
- ⑤ Set the MASTER LENGTH switch to the desired value
- ⑥ Set the exposure time. (Refer to "3.3. How to Determine Standard Exposure.")
- ⑦ Depress the START button.

Make sure the following conditions exist:

- The LAMP switch is at AUTO
- The NORMAL/MULTI switch is at NORMAL.
- The MASTER END lamp is out.
- The START OK lamp is on.
- LIGHT METER switch is at OFF

2. How to use the LIGHT METER

A. The LIGHT METER switch is at OFF:

Since the integrating light-meter is not used, set the exposure time appropriate to the magnification manually.

The required exposure ratios at different magnifications with regard to 100% magnification are as follows:

Magnification	60	70	80	90	100	110	120	125
Exposure ratio	0.60	0.72	0.81	0.9	1.0	1.10	1.21	1.27

B. The LIGHT METER switch is at ON:

When this switch is at ON, a change in magnification, voltage fluctuation and variation in the copy base density are measured by the integrating light-meter and the optimum exposure time is automatically calculated.

- ① Put a common copy base sheet on part C of the copy board (Fig 21).

The position of the sheet should be changed according to the magnification.

- ② Set the optimum exposure time for magnification 100%
- ③ Turn the LIGHT METER switch to ON and take the usual photographing procedure.

NB) The light-meter is well adjusted before shipment. However, if the image obtained with the LIGHT METER on is different from the image obtained with it off, a readjustment of the machine is required.

Also, do not move the light sources during the use of the light-meter.

3. How to make multiple exposure

Multi-exposure can be made by turning the NORMAL/MULTI switch to MULTI.

Example

(double exposure)

- ① Place the copy in position A.
- ② Mask part B of the copy board with black paper with low reflectance a little larger than the copy
- ③ Turn the NORMAL/MULTI switch to MULTI and set the exposure time
- ④ Push the START button to make the first exposure.
- ⑤ Move the copy to position B and mask position A. If the area previously masked should be masked again, the corresponding area of the master will not be exposed (solid black). So, pay attention to the masking position.
- ⑥ After completion of the first exposure, turn the NORMAL/MULTI switch to NORMAL and push the START button to make the second exposure.

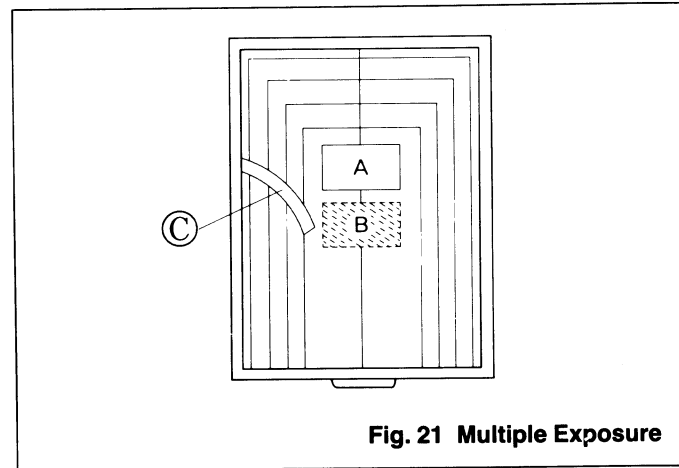


Fig. 21 Multiple Exposure

2. Centering the Copy

The copy positioning base sheet bears a vertical centerline and graduations (center, right and left) and such reference lines that represent the upper limit of the effective area at different magnifications (enlargement/reduction). Thus, when the copy is placed inside the reference line appropriate to the magnification concerned, the whole image will be reproduced. However, the horizontal centerline varies according to the master length and magnification, and the copy positioning sheet does not bear horizontal centerlines.

Draw reference lines on the base sheet to match the frequently used master size and magnification for convenience with the following procedure.

1. How to determine the horizontal centerline at 100%

$$\text{Gripper Margin of Press Machine} + \frac{\text{Size of Printing Paper}}{2} = \text{Horizontal Centerline}$$

In the other words, the horizontal centerline corresponds to the point when lowering the length calculated above from the upper limit of the effective area

2. How to determine the horizontal centerline at a magnification other than 100%

The horizontal centerline at a magnification higher than 100% (enlargement) must be below or inside that at 100% (reduction) above or outside that at 100%. The distance of the horizontal centerline from that at 100% is calculated from the following formula:

$$x = \left| f(1 - m) \right| + \left| 215 - \frac{\ell}{2} \right| \cdot \left| \frac{1}{m} - 1 \right|$$

Where x: the distance from the horizontal centerline at 100%

f: focal length (360mm)

m: magnification

ℓ: master length

For instance, if the magnification is 80% and the master length is 420mm:

$$\begin{aligned} x &= \left| 360(1 - 0.8) \right| + \left| 215 - \frac{420}{2} \right| \cdot \left| \frac{1}{0.8} - 1 \right| \\ &= 72 + 5 \times 0.25 \\ &= 73.25 \end{aligned}$$

Thus, the horizontal centerline at 80% should be 73.25mm above or outside that at 100%. (Fig 22)

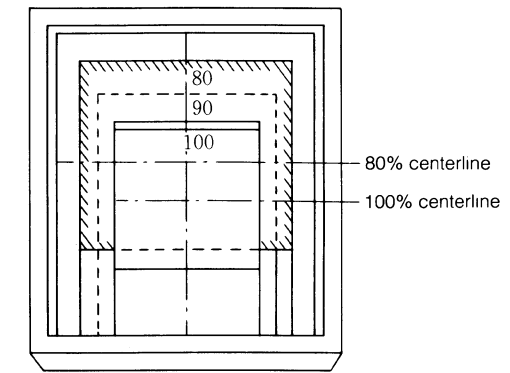


Fig. 22 Shifting the Horizontal Centerline for a Different Magnification

3. Calculation of the magnification

The magnification is calculated from the following formula:

$$\text{Magnification (\%)} = \frac{\text{Output size}}{\text{Copy size}} \times 100$$

The table below shows commonly used magnifications.

A2 → A3	70.7	A2 → B4	61.2
B3 → A3	81.6	B3 → B4	70.7
A3 → B4	86.6	A3 → A4	70.7
B4 → B5	70.7	B4 → A4	81.6

3. How to Determine Standard Exposure

Since the Diafax Master LOM-II is coated with zinc oxide emulsion, its sensitivity may somewhat vary among lots. Each carton bears a lot number. Before using a new lot, be sure to check its sensitivity.

Under-exposure may cause thickened images or toning on backgrounds. Over-exposure may cause too thin images or lost images. Optimum exposure is essential for Diafax Master LOM-II to deliver the best performance.

How to determine standard exposure

- The EP-18 is supplied with test charts. Determine the standard exposure using a test chart.
- The standard exposure of the test chart is an exposure which includes the halftone area (wedge) starting with the notched first step and covering seven steps together with the five solid steps (darker non-halftone area). The exposure time corresponding to the standard exposure is Standard Exposure Time.
- Using the above said standard exposure time as a guide, determine the optimum exposure time for each copy.
 - Clean proof (typed), phototyped matter: Increase the exposure time by 10% to 15%.
 - Half-tone copies: Increase the exposure time by 20% to 30%.
 - Linework, pencil-written matter: Decrease the exposure time by 10% to 20%.
 (The required amount of exposure varies depending on the line thickness or the kind of pencil.)
- The resolving power chart is included in the test chart. Use the resolving power chart for checking the focus. Make an exposure of the resolving power chart using a little longer exposure time than the standard one. The resolving power should be 8 lines/mm or more. (This resolving power chart is a reproduction and does not indicate absolute values. Use it as a guide for focus check.)

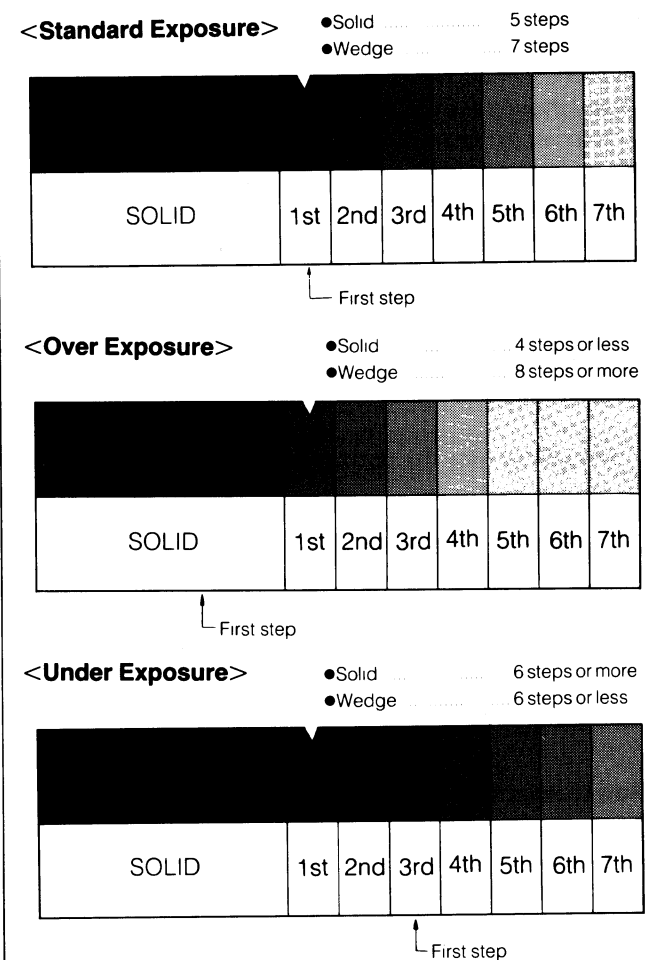


Fig. 23 How to Determine Standard Exposure

To maintain satisfactory operation of the Diafax Master EP-18, care should be always taken as follows.

1. Inspection at start-up

- Turn on the POWER switch on the sub control panel and the CONTROL CIRCUIT switch on the main control panel.
- Confirm that the lens cap and mirror cover are not on.
- Confirm that there is a sufficient amount of processing solution in the developing tank.
- Depress the start button on the main control panel to confirm that every part of the machine works normally.
- Confirm that there are no scratches or stains on the copy board glass.

2. Inspection at Shut-down

- Turn the CONTROL CIRCUIT switch on the main control panel to OFF. Turn the POWER switch on the sub control panel to OFF.
- If the machine is to be shut down for an extended time period, cover it with a vinyl cover or the like to protect it from dust.
- If the machine is to be shut down for an extended time period, turn the squeegee roller lever to free the roller and wipe the squeegee roller with rags moistened with a cleaner.

3. General Care

1. Care of the copy board compression glass

As the compression glass is easily dirtied and fingermarked, inspect it daily. When stained, wipe it with a soft cloth using a glass cleaner (available on the market), taking care not to leave the cleaning agent behind.

2. Care of the lens and mirror

As the machine is operated, the mirror and lens surfaces may be dirtied, which may cause the finished quality to be unfavorably affected. The lens and mirror surfaces, being soft, should be handled with the utmost care not to scratch or stain them. Do not wipe them so often.

- Since the mirror is easily dirtied, gently dust off the mirror once a week using the air brush supplied as a standard accessory.
- If it is extremely dirty, lightly wipe the mirror with lens paper (available at general camera shops) moistened with a small amount of industrial ethyl alcohol (available on the market).
- If the machine is to be shut down for an extended time period, cap the lens and cover the mirror.

3. Replacement of the halogen lamp

Replace the halogen lamp after the lamp and reflector have cooled down.

- Hold the lamp with a dry cloth or gloves on your hand. Do not hold it with bare hands.
- The contact is of the socket type. When replacing, hold the lamp holder by hand. Keep the lamp in the horizontal position.
- The lamp, when stained with finger marks or smeared, will become opaque. Clean the stained lamp with lens paper moistened with a small quantity of industrial ethyl alcohol.

- Cleaning the toner squeegee roller: every 500 plates or every two weeks
- Repositioning the toner squeegee dampener: every two weeks
- Replacing the toner squeegee dampener: every two months
- Cleaning the developing plates: every week
- Cleaning the developing vat: on all-liquid replacement
- Cleaning the charger wire: every 500 plates
- Replacing the charger wire: every 3,000 plates
- Cleaning the copy board glass: every day (at start of every work day)
- Cleaning the lens and mirror: every month
- Cleaning the master output roller: every month

4. How to clean or replace the charger unit

The charger unit uses a special metallic wire (tungsten wire $\phi 0.07\text{mm}$). When it has been used for a long time, an unstable charge or discontinuity may occur because of oxidation by high voltage discharge or because of exposure to dust, etc.

If an unstable charge occurs even after cleaning, replace the charger wire by a new one.

A. Disassembly and cleaning

- Open the charger unit cover. The power supply is turned off by the safety circuit.
- Pull the right charger block (+) and left charger block (-) toward you. Only the right and left blocks of body part (a) that holds a metallic wire can be pulled out.
- The left (-) and right (+) blocks of body part (b) that holds gut can be each pulled out by removing a fitting screw.
- Gently clean the charger wire with a brush. Both charger body parts (a) and (b) also become dirty as they are used. Be sure to clean them also when cleaning or replacing the charger wire.

B. Replacing the charger wire

- When replacing the charger wire, secure its points (1), (2), (3) and (4) as shown in Fig. 26 in this numerical order. Loosen a bit the two tension adjuster fitting screws on the rear of the handle-side terminal block and turn the adjust bolt counterclockwise to loosen the wire. Put the charger wire points (1) and (4) between the terminal bracket and the plate at the socket side and fix it with the flat head screws. Lead the charger wire points (2) and (3) around the flat head screws at the handle side.
- After fixing the charger wire, turn the adjust bolt clockwise to tighten the wire, taking care not to break it.
- Tighten the two fitting screws for the tension adjuster.

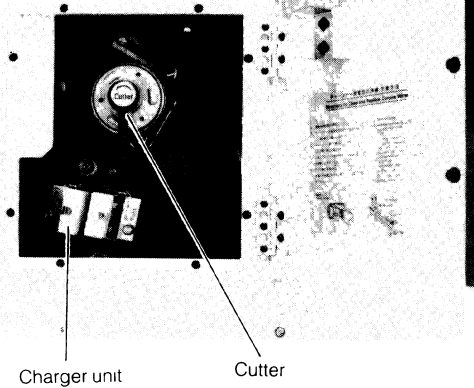


fig. 24 Charger Unit

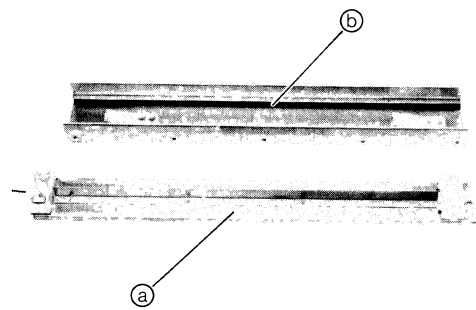


Fig. 25 Charger Main Body

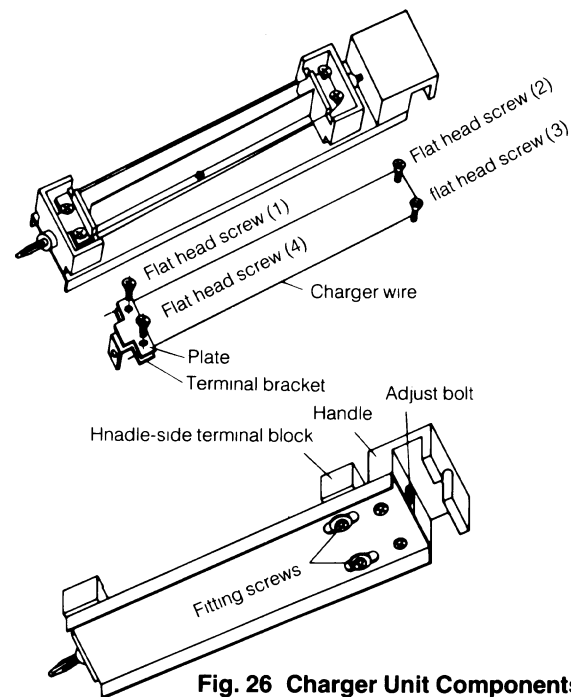


Fig. 26 Charger Unit Components

5. Cleaning the sliding surface of the photographing section belt

If the leading edge of the image is often shifted or slanted in exposures, or unusual sound is heard from the photographing section when master is being fed, clean the sliding surface of the photographing section belt (on the main body side).

Method of Cleaning

- ① Raise the rubber belt and clean its sliding surface with car wax.
- ② Remove completely the wax with a dry cloth.

6. Cleaning the developing tank

As the machine is used for long, dust or paper powder sticks to the developing tank, which may deteriorate the plate quality. Take the following steps to clean the tank.

A. Draining the toner

- ① Put the drain hose into an empty container
- ② Open the drain valve and drain the toner.

B. Cleaning the developing tank

- ① Disconnect the connector (J32) for the pump and remove the setscrew (1) for the pump holding bracket to remove the pump from the side plate.
- ② Detach the screwed hose joint (above the flow rate regulating valve) on the developing plate.
- ③ Remove the setscrew (2) on the flow rate regulating valve.
- ④ Remove the developing tank setscrew and pull out the developing tank toward you.
- ⑤ Wipe the inside of the developing tank with rags
- ⑥ Then, replace the developing tank, pump and flow rate regulating valve as they were.

NB) For the method of disposing of used solutions, refer to "4.4. Disposal of Used Liquids."

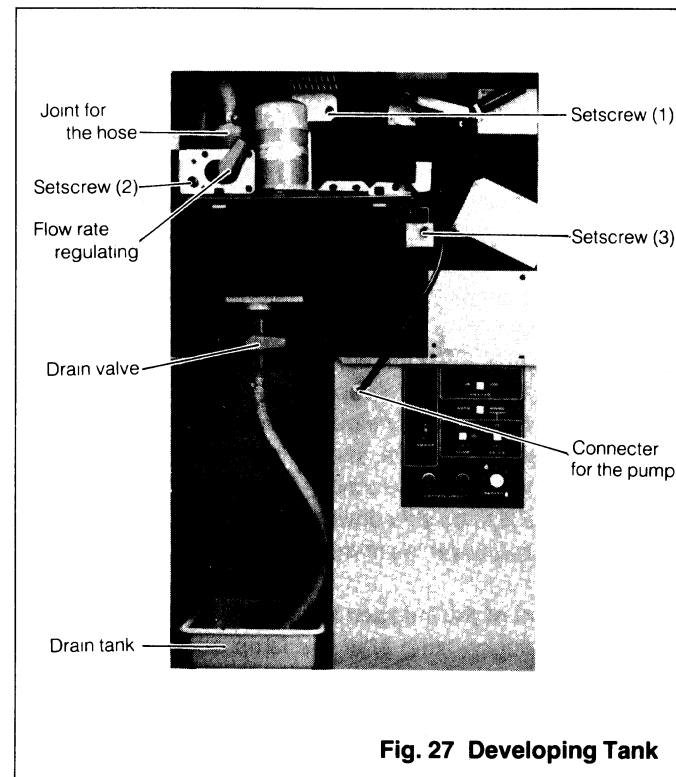


Fig. 27 Developing Tank

7. Cleaning the developing plates and squeegee rollers

After the machine has been long used or if toning or a poor fixing condition has occurred, clean the developing plates and squeegee rollers.

- ① Open the cover of the photographing section fully.
 - ② Remove the top cover of the processor.
 - ③ Gently turn the squeegee roller lever counterclockwise.
 - ④ Remove the processor inlet roller.
 - ⑤ Remove the squeegee roller (rubber).
 - ⑥ Remove the two screws securing the developing plates to remove the upper developing plate
 - ⑦ Remove the lower developing plate.
Though it is connected with the toner feed hose, it can be removed by lifting it up.
 - ⑧ Remove the two screws securing the dampener to remove the dampener.
 - ⑨ Remove the squeegee roller (metallic).
 - ⑩ Clean the developing plates and squeegee rollers with rags moistened with a cleaner (or ethyl alcohol if very dirty). Also, wipe off the dust or sludge on the dampener.
 - ⑪ After cleaning, reverse the removal procedure to replace the parts.
- NB 1) If the developing plate surface on which master passes is scratched, it may cause a master jam.
- NB 2) Take care not to scratch the squeegee roller. Scratching lowers the squeezing power.
- NB 3) When replacing the cleaned squeegee roller as it was, take care of the direction of the drive gear.
- NB 4) When the POWER switch is turned on with the squeegee roller lever free, the buzzer sounds. If it is the case, turn off the power and then reset the lever.
- NB 5) The pump won't work with the squeegee roller lever free.
- ⑫ Pour 2 liters of cleaner into the developing tank and circulate it.
 - ⑬ Drain the cleaner from the tank and supply fresh toner into the tank

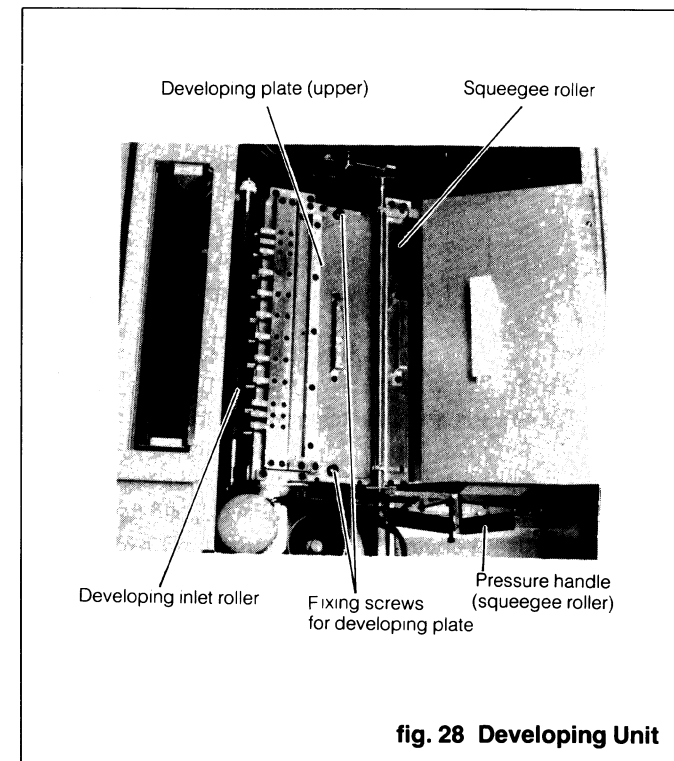


fig. 28 Developing Unit

8. Heaters

If the heaters do not run or the alarm buzzer sounds, check the heaters.

- ① Remove the heater unit cover.
 - ② Disconnect the connectors (J26, J27) and lift the upper heater to remove it
 - ③ Both the upper and lower heater lamps should be replaced with the socket bracket removed.
 - ④ If the heater lamp does not light though there is no trouble in it, depress the manual reset button (white) for the thermostat (which should be activated at 110°C)
- NB 1) The above said steps should be taken after turning off the POWER switch (camera switch).
- NB 2) Replace the heater after the surrounding parts have cooled down
- NB 3) Hold the halogen lamp with a dry cloth or gloves on your hand. Do not hold it with bare hands
- NB 4) Since the contact is of the socket type and the halogen lamp is replaced by a strong spring pressure, replacement should be made carefully. Also, confirm that the lamp is fit in the contact perfectly.

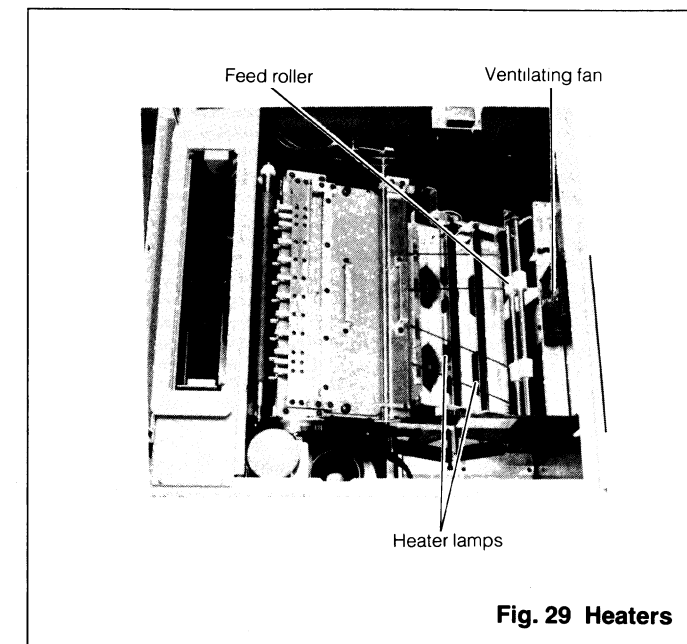


Fig. 29 Heaters

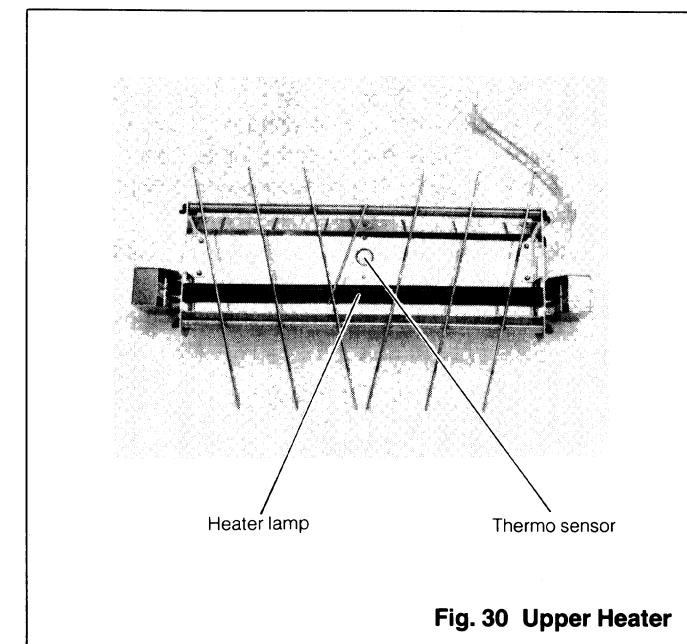


Fig. 30 Upper Heater

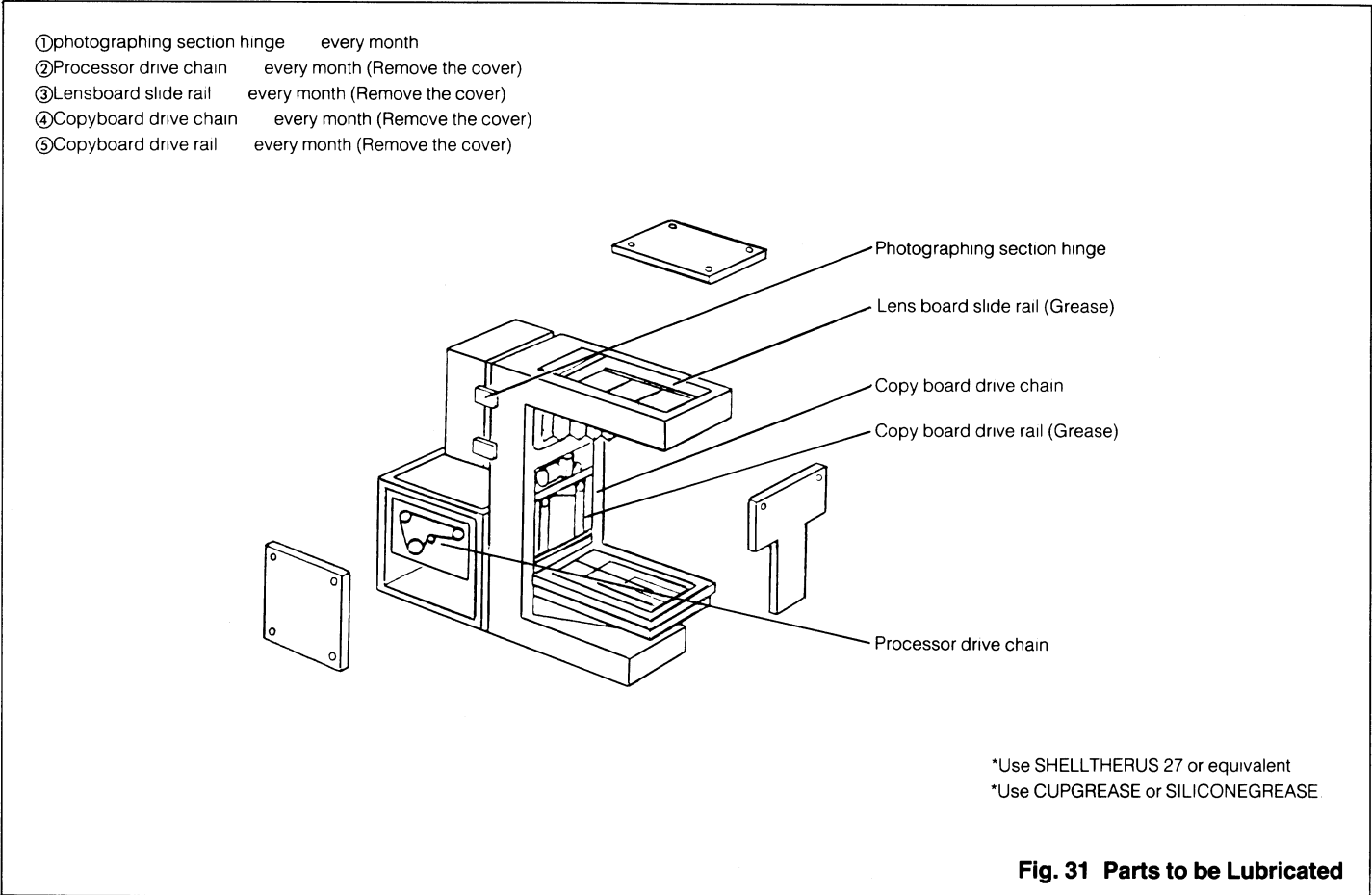
4. Disposal of Used Liquids

The toner LOM-ED and cleaner LOM-CL are petrolic solutions. The etching solution LOM-OH contains potassium ferrocyanide. Therefore, handle it with special care.

Used liquids should be consigned for disposal to a company licensed to dispose of industrial waste matter. (Ask our distributor for the list of licensed companies.)

5. Lubrication

The required frequency of lubrication depends on the frequency of use, but generally it is recommended that the following parts be lubricated every month.



6. Ordering and Replacement of Parts

There are various constituent parts: some of them can be replaced by customers while others must be replaced by a trained service man. When ordering parts, let us know the following information:

- ①Whether only parts are required or both parts and installation (replacement) service are required.
- ②The information given in the certificate or the nameplate of your machine

- TYPE
 - MFG. NO.
 - ③Descriptions of parts and quantities required, date of delivery.
- CAUTION:
- ①The specifications are subject to change without notice.
 - ②We assume no responsibility for troubles caused by the customers or the use of equipment or parts from another manufacturer with the system without our approval.

7. Troubleshooting

With a correct understanding of normal operation of the machine, clearly grasp the nature of the trouble. Typical cases of trouble and basic remedies for them are listed below. Check the parts concerned in order according to the table below. If the trouble can not be corrected by your remedial procedure, contact our

distributor.
 CAUTION:
 When checking the electric circuit for fuse replacement or other purposes, turn the POWER (camera switch) on the sub control panel of the processor to OFF.

	Trouble	Probable Cause	Remedy
1.	Machine not powered up	1. Power switch off. 2. Blown fuses 3. Safety circuit is working.	1. ●Turn on power switch on sub control panel ●Turn on control circuit switch on main control panel 2. Replace fuses F4 and F5 (5A) 3. ●Close photographing section cover. ●Close processor top cover. ●Close charger unit cover
2.	Machine will not start.	1. Master not loaded. (Master end) 2. AUTO-MANU switch on sub control panel at MANU 3. Wrong master length setting 4. Warming up unfinished 5. Blown fuses 6. Low supply voltage	1. Load a new Master roll 2. Turn it to AUTO. 3. Set it between 14.0" and 19.9" 4. Allow 60 sec for warming up before starting machine 5. Replace fuse F8 (0.3A) 6. Adjust it within 100V ± 10%
3.	Light source will not light.	1. Lamp burnt out 2. A faulty contact in lamp socket.	1. Replace the lamp 2. Reinstall the lamp properly
4.	The position of an exposure is wrong (shifted or slanted)	1. A strong contact resistance between master conveyor belt and vacuum surface (metal) 2. Optical axis alignment limit switch does not move smoothly	1. ●Clean photographing section vacuum surface ●Replace master conveyor belt 2. ●Adjust limit switch
5.	Uneven development	1. A shortage of toner. 2. Toner stuck on developing plate injection port 3. Uneven charge 4. While paper is passing through processor, inlet roller gets wet.	1. Replenish developing tank or adjust the flow rate. 2. Clean developing plate. 3. Clean or replace charger wire 4. Adjust toner flow rate.
6.	No image appears.	1. A broken charger wire. 2. Light leakage 3. Charge cut limit switch on in contact with vacuum back belt 4. Blown fuses	1. Replace the wire 2. Cover the light leak. 3. Adjust the position of limit switch on vacuum back 4. Replace fuse F9 (2A)
7.	Cutter malfunctions (Master is not cut perfectly)	1. Low supply voltage. 2. Cutter defective.	1. Check supply voltage (100V ± 10%) 2. Check if paper is cut manually.
8.	Heater will not work.	1. Heater lamp burnt out. 2. Heater lamp installed improperly. 3. Thermo fuse blown. 4. Blown fuses 5. Fan will not run.	1. Replace heater lamp 2. Reinstall heater lamp. 3. Depress thermo fuse reset button 4. Replace fuses F1 and F2 (30A) 5. Replace fuse F3 (1A).
9.	Pump will not work.	1. Squeegee roller lever not set. 2. Contact of pump connector defective 3. Blown fuses	1. Set it 2. Connect connector (J32) again 3. Replace fuse F6 (1A)
10.	Master will not be fed	1. NORMAL/MULTI switch at MULTI. 2. Blown fuses	1. Turn it to NORMAL 2. Replace fuse F9 (2A)
11.	Fuzzy images.	1. Lens board or copy board magnification scale misset.	1. Adjust scale so that two cursor lines coincide, or adjust the focus

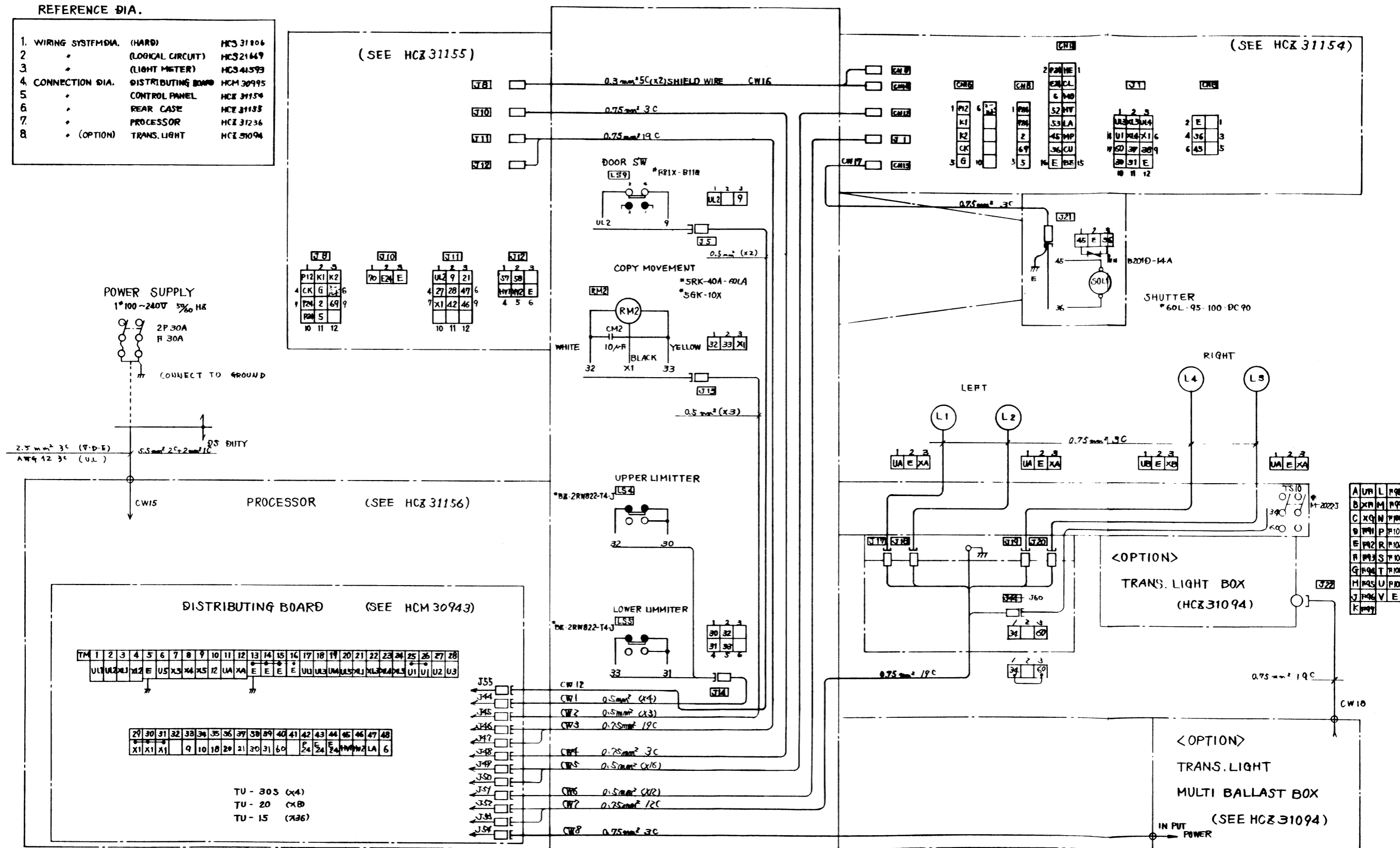
8. Wiring Diagram

REFERENCE DIA.

1.	WIRING SYSTEM DIA. (HARD)	HCS 31106
2.	" (LOGICAL CIRCUIT)	HCS 21149
3.	" (LIGHT METER)	HCS 41593
4.	CONNECTION DIA. DISTRIBUTING BOARD	HCM 30995
5.	" CONTROL PANEL	HCE 31154
6.	" REAR CASE	HCE 31155
7.	" PROCESSOR	HCE 31236
8.	" (OPTION) TRANS. LIGHT	HCE 31094

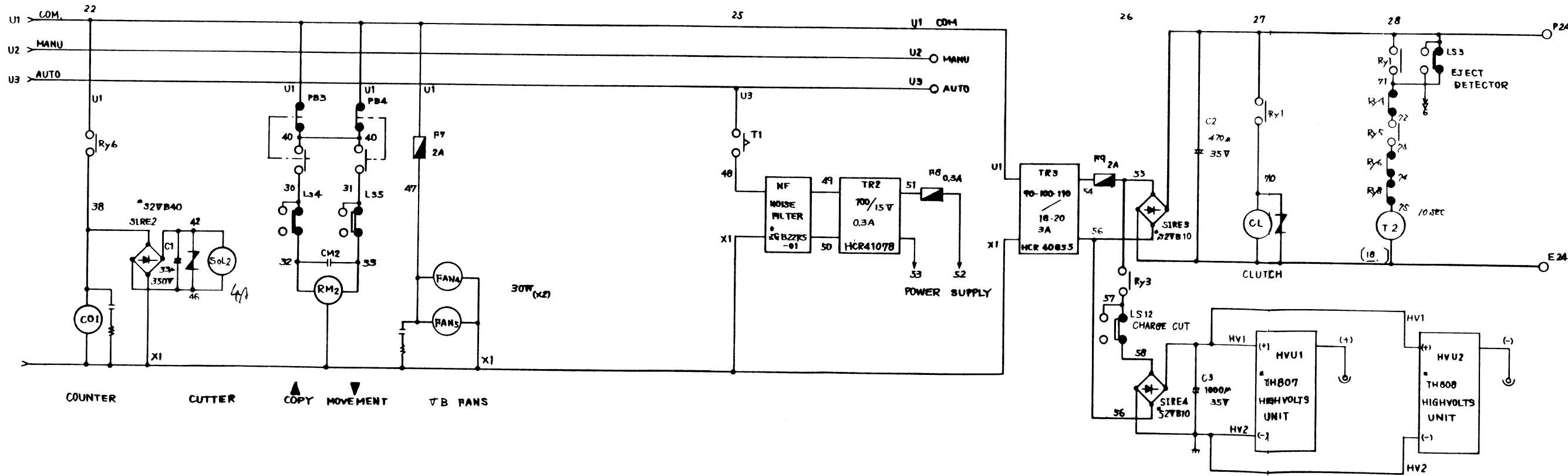
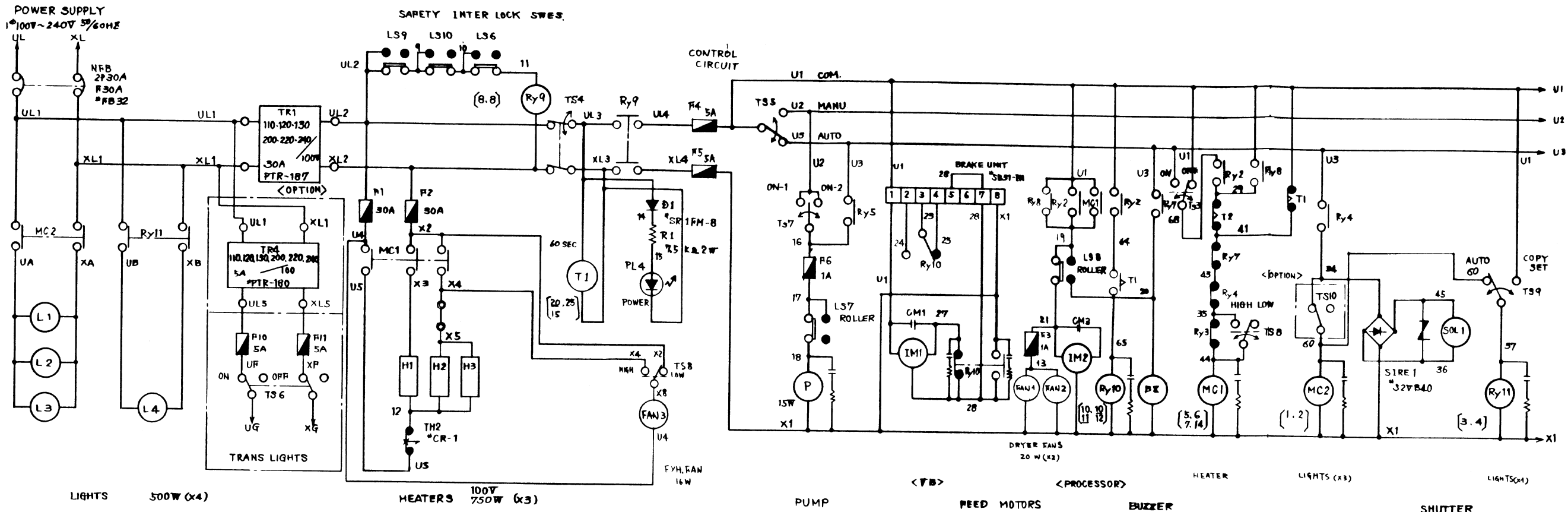
(SEE HCZ 31155)

(SEE HCZ 31154)



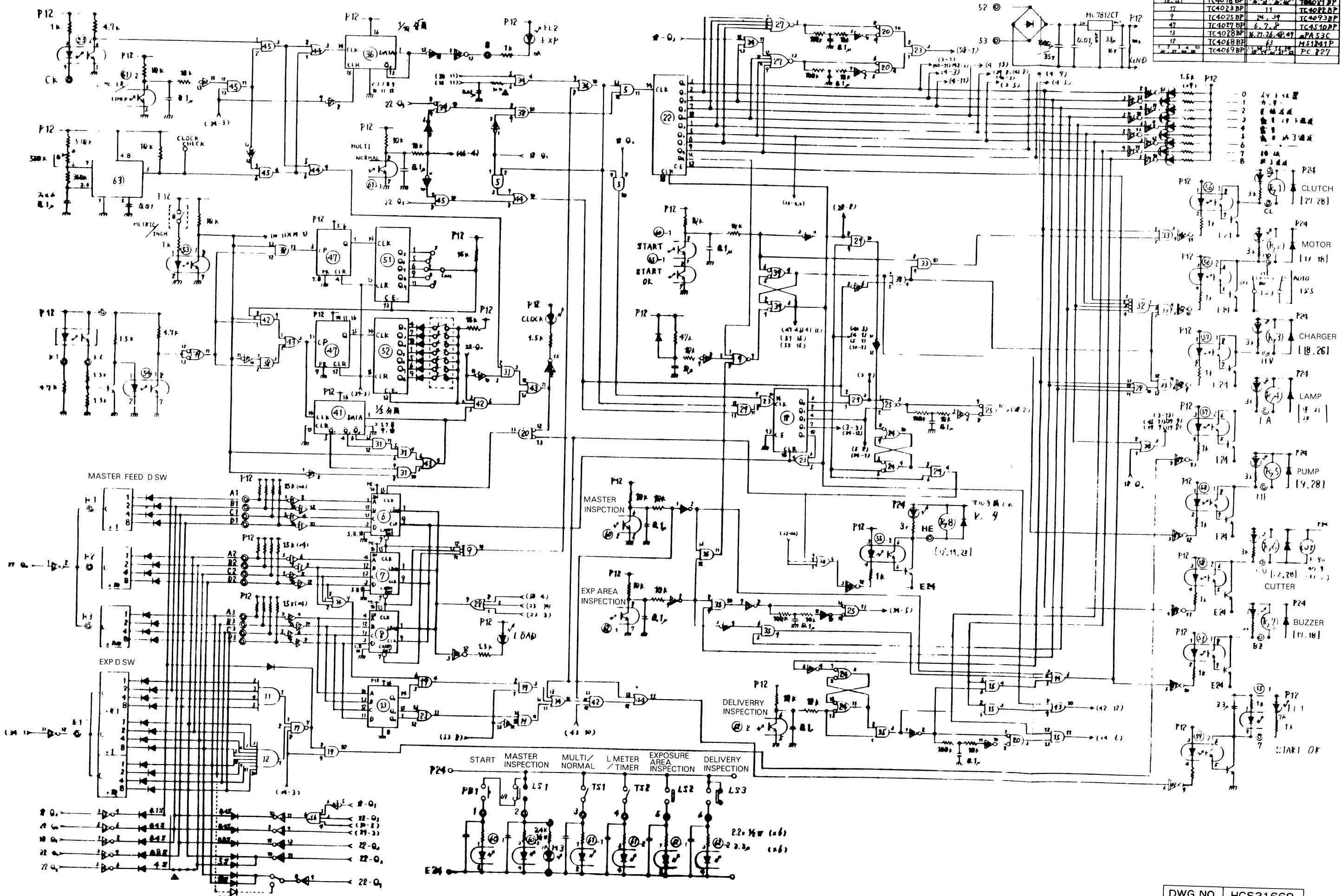
CROSS-REFERENCE TABLE FOR WIRE GAUGES

mm ²	AWG
3.5	12
2	14
1.25	16
0.75	18
0.5	20
0.3	22

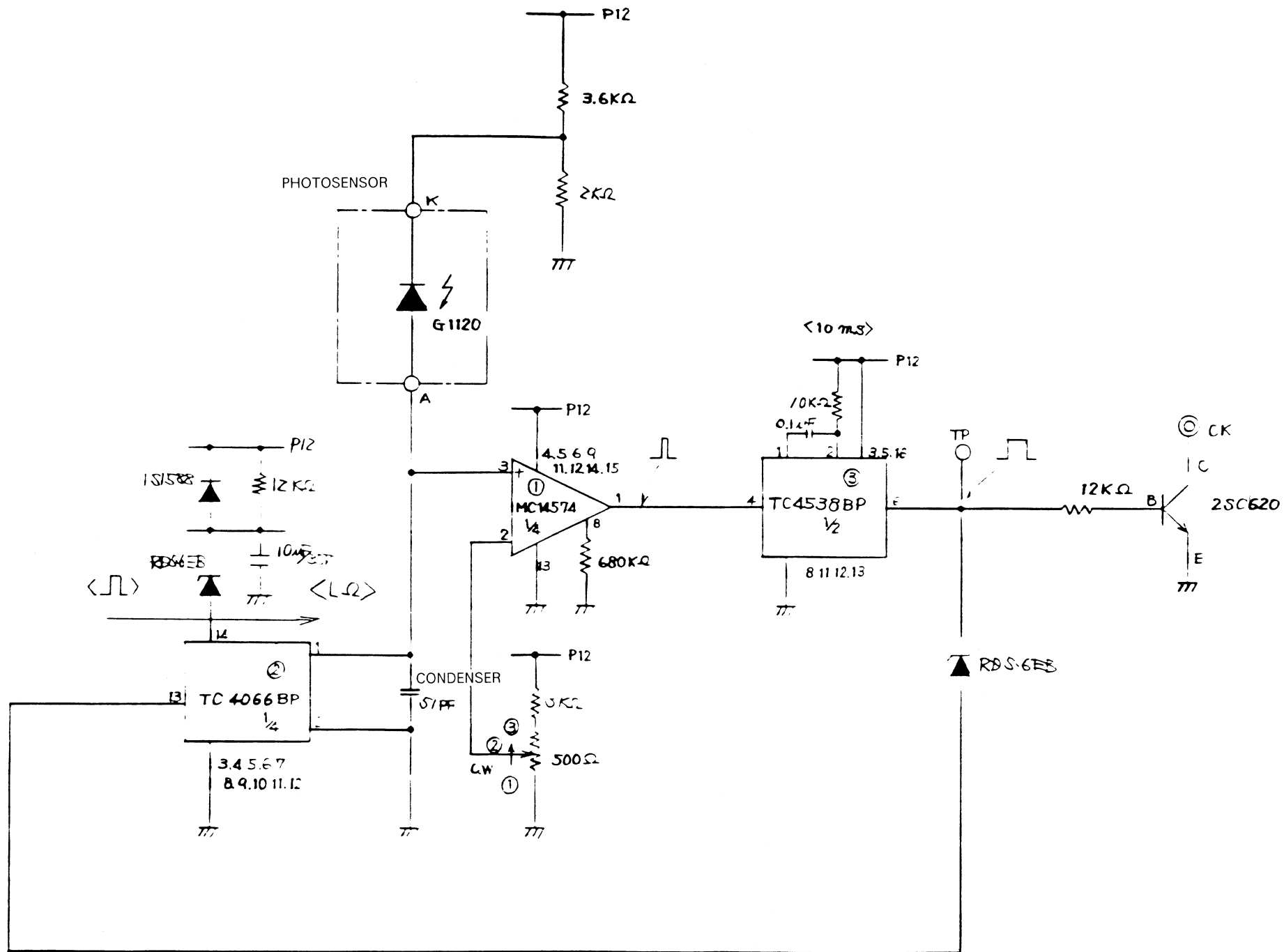


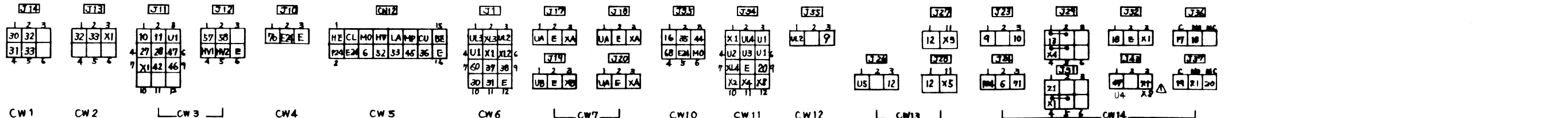
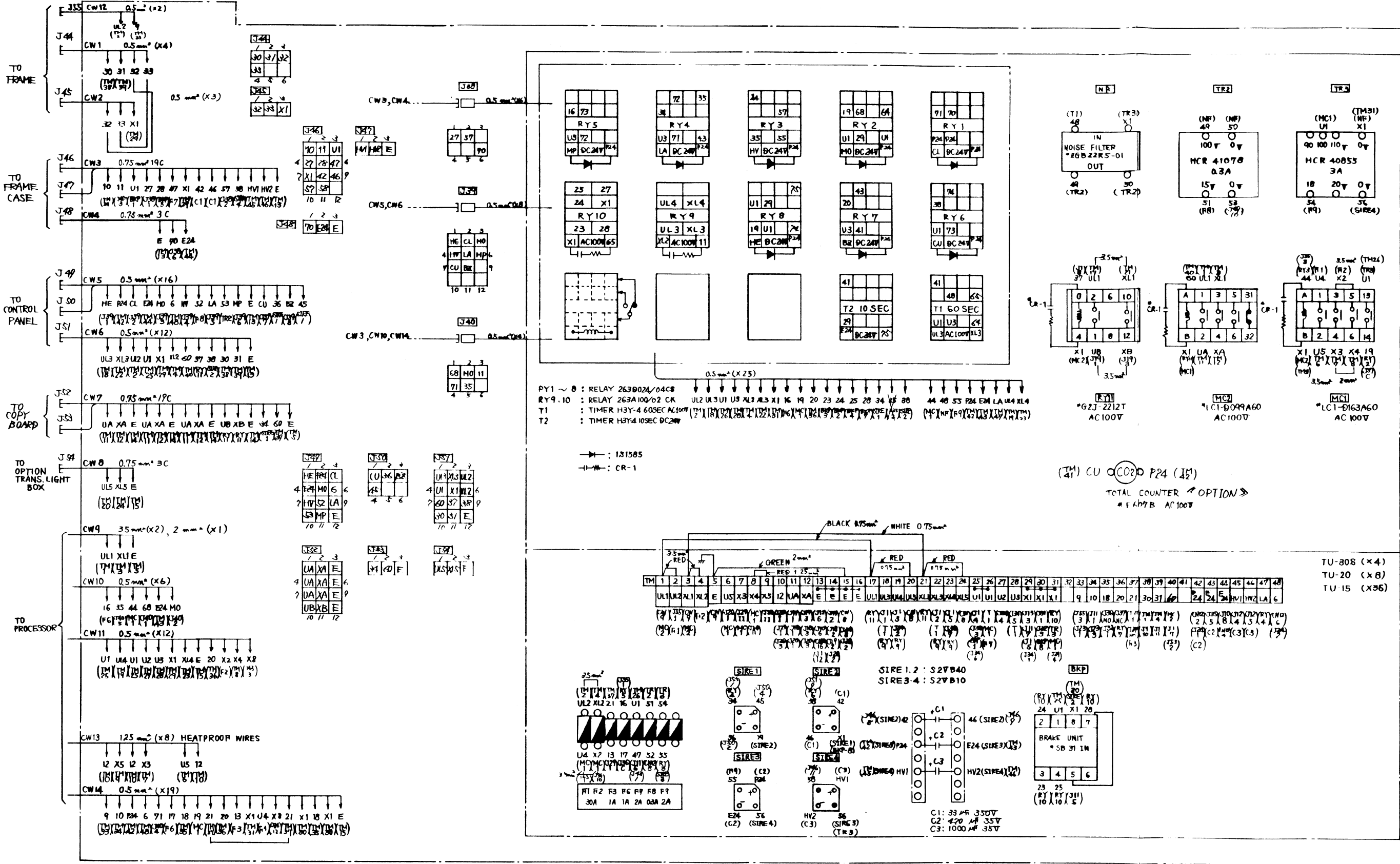
—|—|— : NOISE KILLER *CR-1

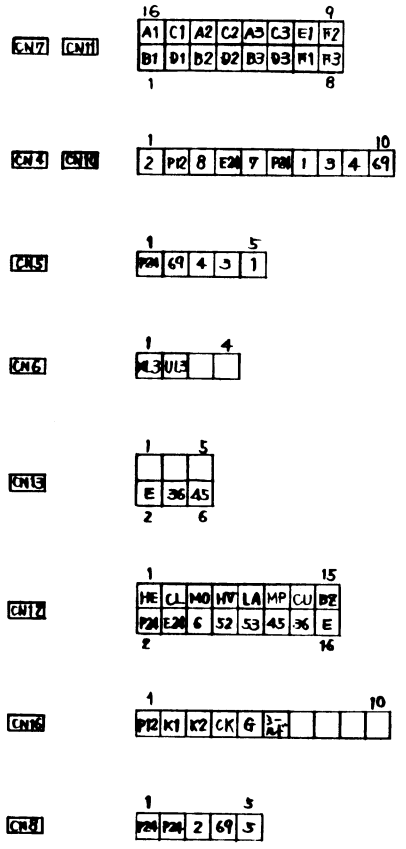
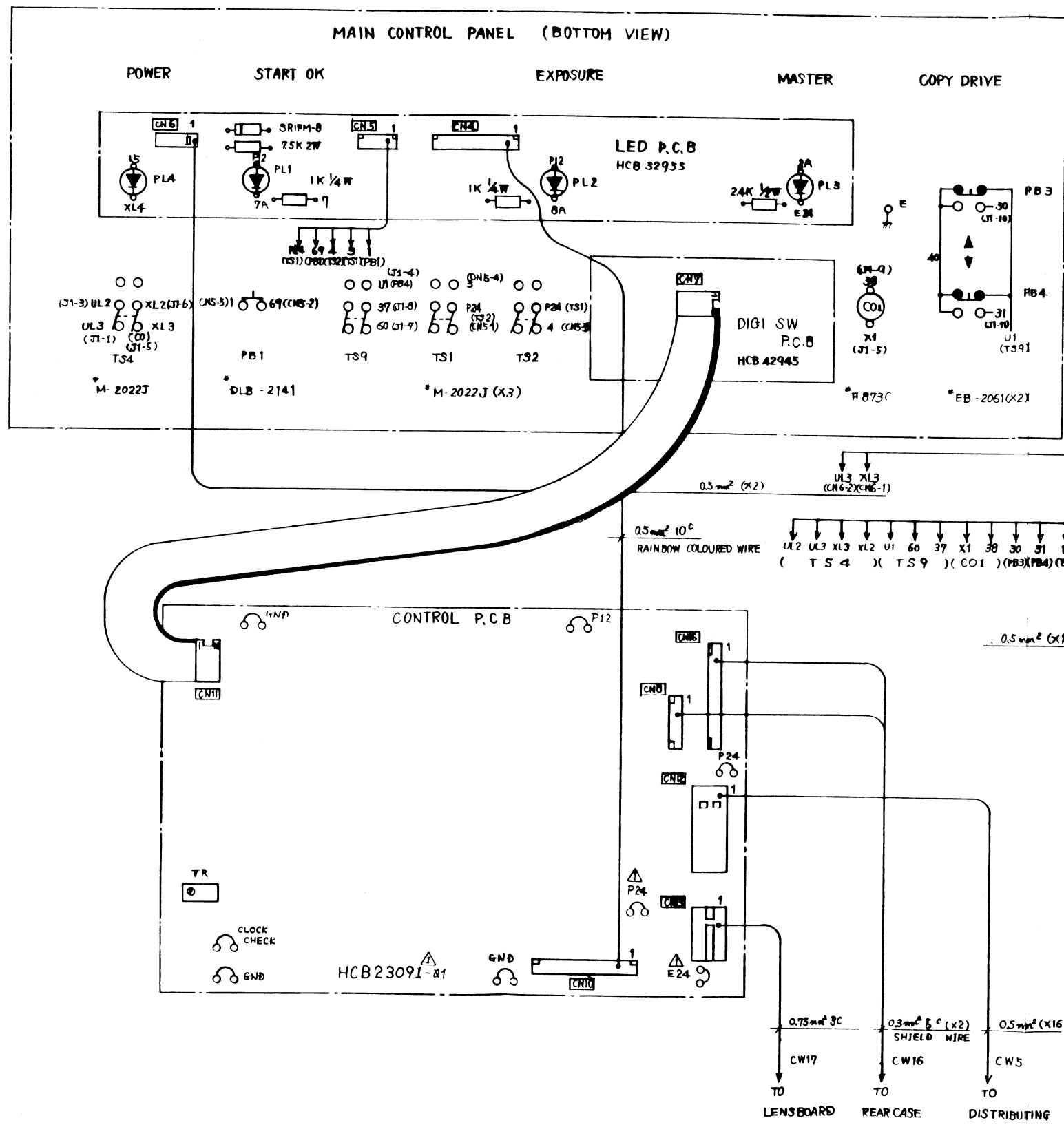
20, 25	TC4001BP	23, 34, 43, 44	TC4071BP
27, 32	TC4002BP	42, 46	TC4093BP
18, 27, 31, 32	TC4017BP	14, 28	TC4092BP
16, 41	TC4018BP	5, 13, 17, 21	TC4091BP
17	TC4023BP	11	TC4094BP
9	TC4025BP	24, 39	TC4093BP
47	TC4027BP	6, 7, 2	TC4510BP
13	TC4028BP	8, 21, 26, 40, 49	PCA53C
12	TC4048BP	43	MS1841P
1, 2, 3, 4, 10	TC4069BP	15, 16, 17, 18	PC P27



DWG NO. HCS21669

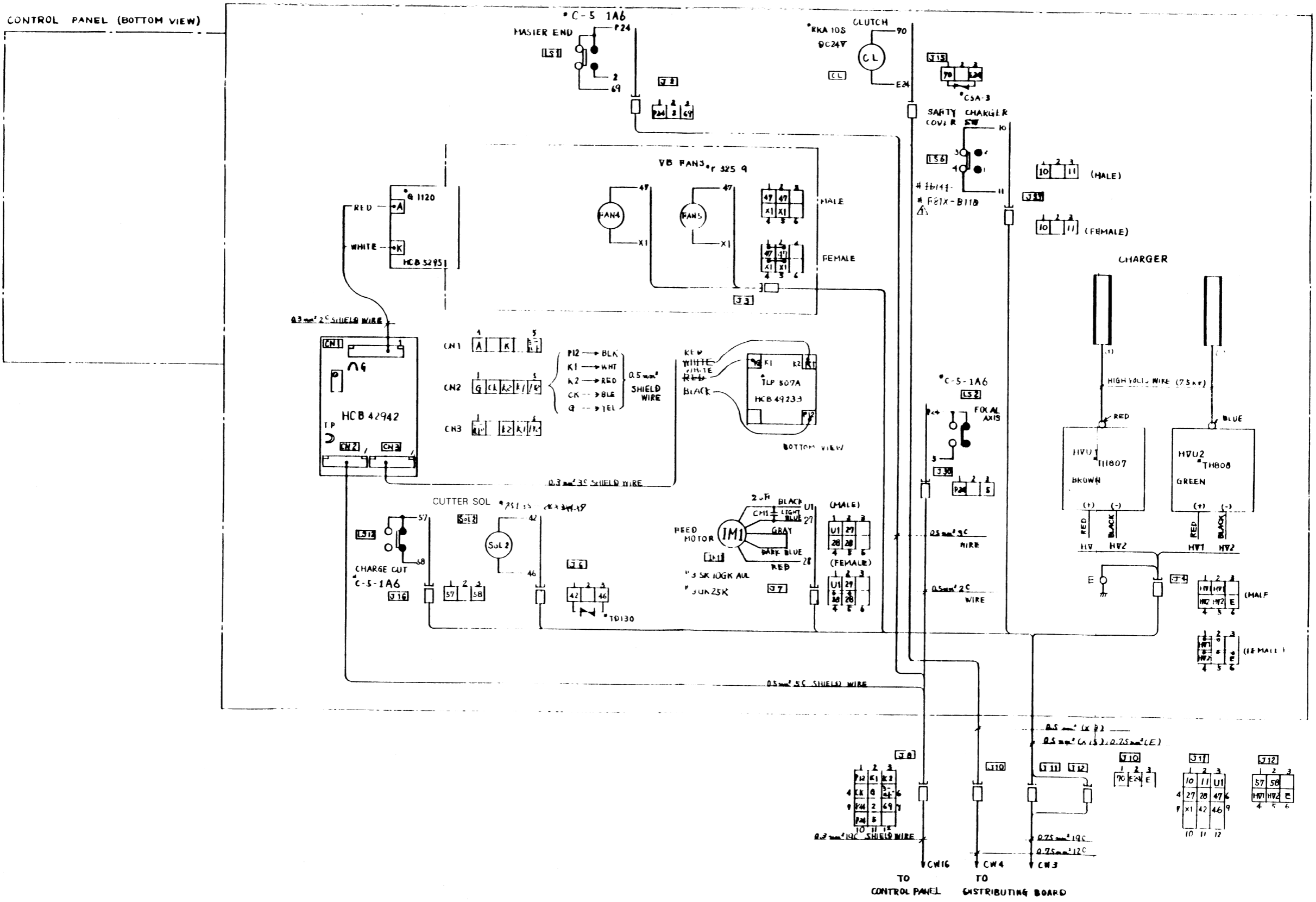




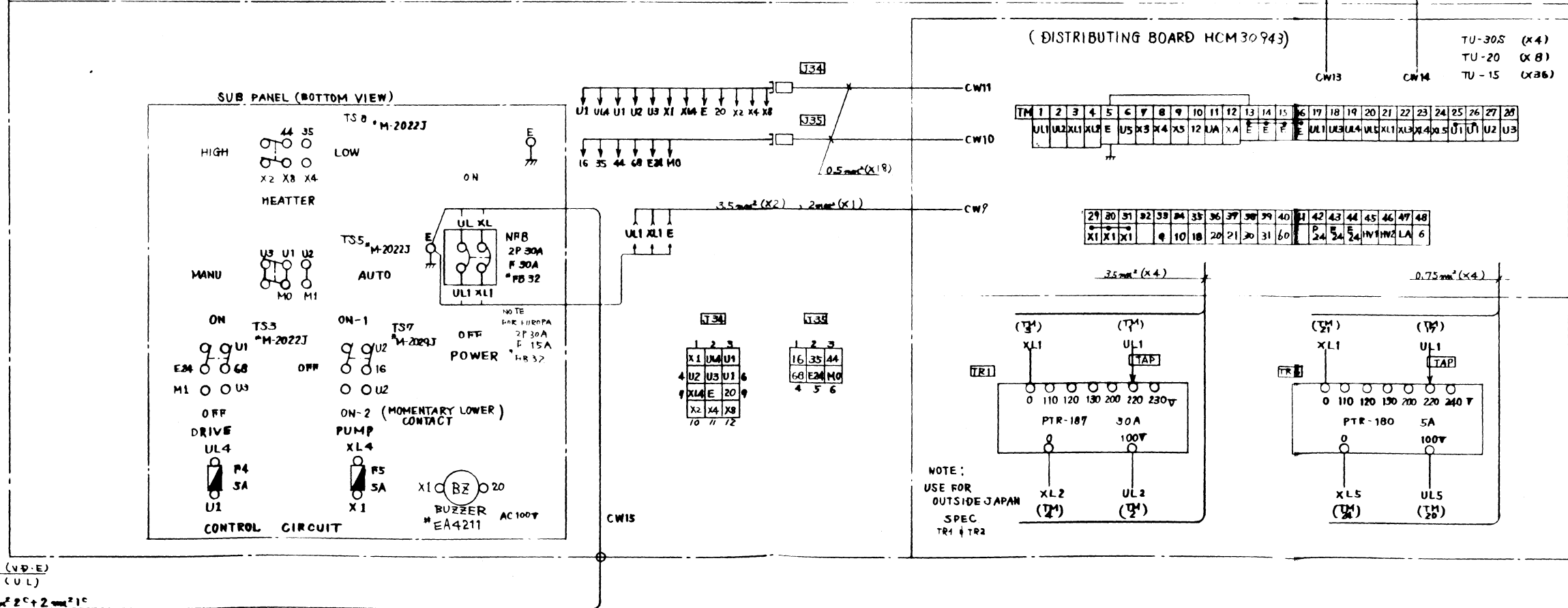
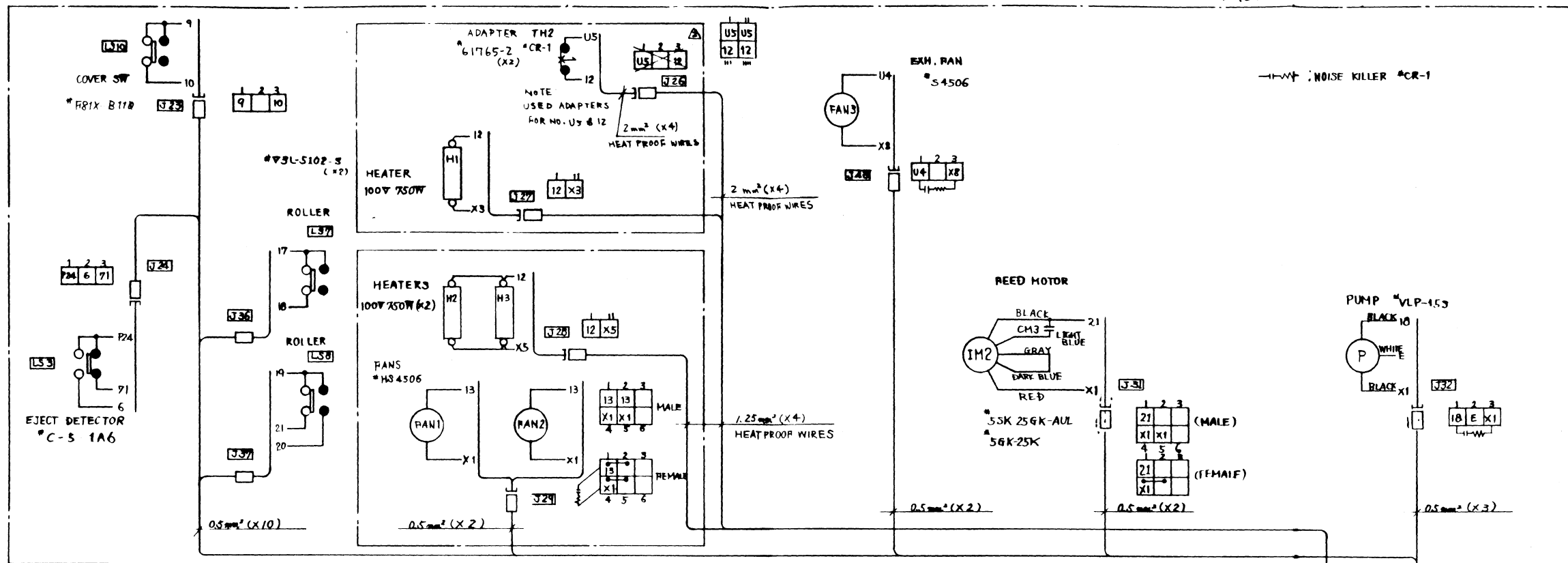


DWG NO. HCZ31154

CONTROL PANEL (BOTTOM VIEW)

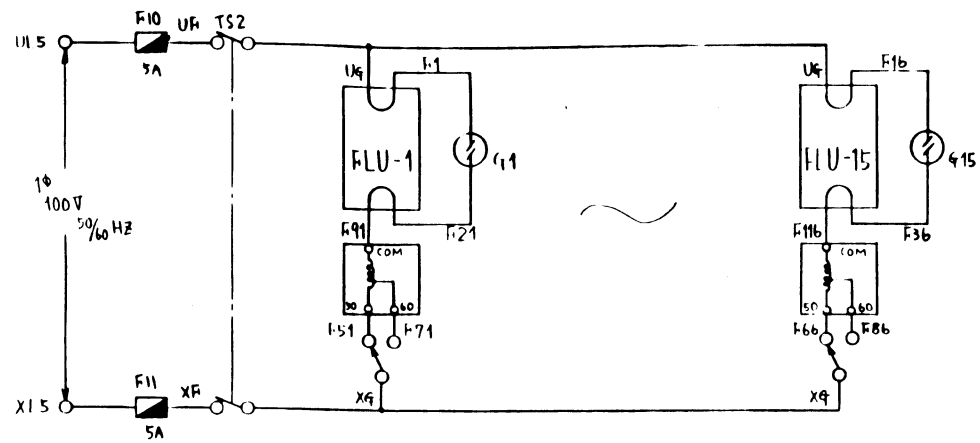


PROCESSOR

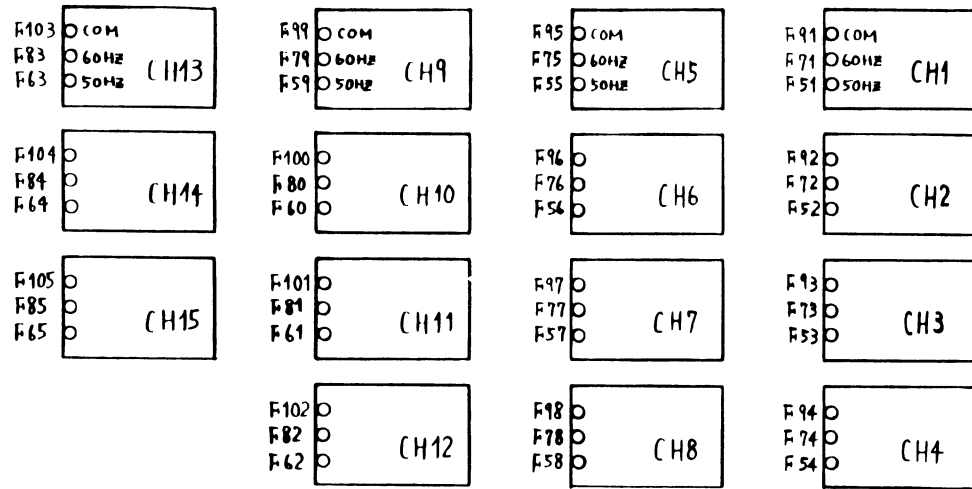


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 AWG 12 3C (U.L)
 5.5mm² 2C + 2mm² 1C

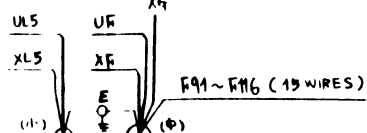
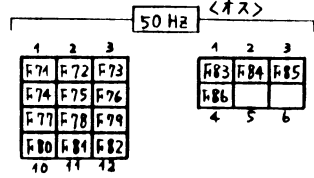
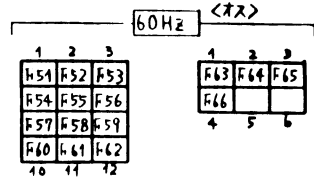
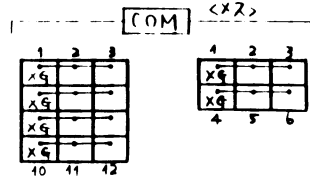
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安全器
MULTI BALLAST * FBAB-151L-US1



FUSE F-3321 2P

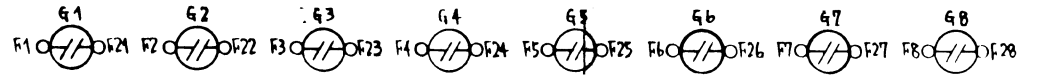


TO SWITCHBOARD
TERMINALS



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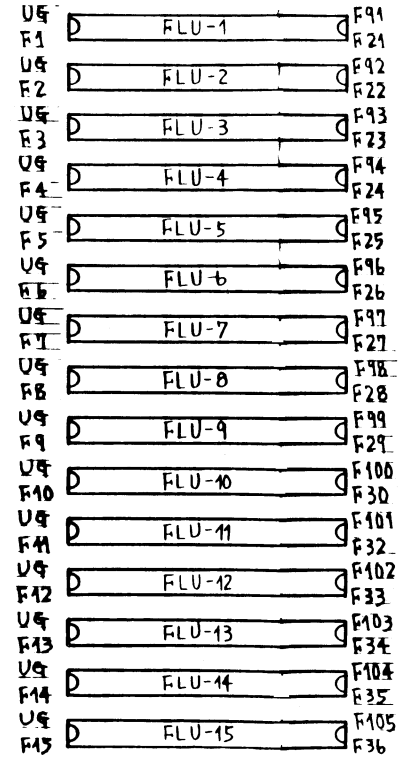
0.15 mm² 19C



* G1-1P
* G-084P (SOCKET)

荧光灯光源
FLUORESCENT LAMPS 15 W 15xT

DAY LIGHT TYPE
* FL15 W
* K-35-4 (SOCKET)



J46

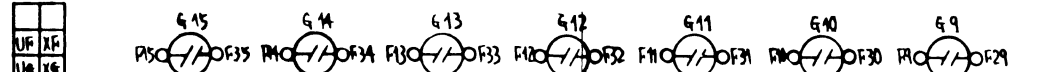
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B	XF	M	F99
C	XG	N	F100
D	F91	P	F101
E	F92	R	F102
F	F93	S	F103
G	F94	T	F104
H	F95	U	F105
J	F96	V	E
K	F97		

* MS3106B-22-M5
* MS3107A-22-M5P

J22

* MS3097 12A

ON TS2
* 1W-3122-1W0



OFF

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