TWO-COLOR
SMALL OFFSET PRESS

Itek Graphix 3985

ELECTRICAL SERVICE MANUAL

CONTENTS

inventor cost about

~~$3M~~

208 V.A.C.
Need a Buck/Boost

1. Outline

(1) Hardware

This machine's hardware is structured as shown in the illustration below.
The direction of the arrow shows the direction of the signal being sent.
Also the arrow with the solid line means that the wire or the pattern on the
printed circuit board is directly connected. The arrow with the dotted line
means that it is connected to go through the relay or the transistor.

4 board in the Control Panel

in control box

The first unit inching panel

Main control panel circuit board (BZ2)

The second unit inching panel

Sub control panel

Inverter control board — *208 Volts*

Inverter

Solenoid Magnet switch Buzzer (BZ1)

Micro switch Proximity switch Capacitance sensor — *Del. pile Haufils*

4 Photo sensor

Sensor amplifier circuit board

Connector board

FC9, MC9, FC8, FC6 Matrix input, FC7, FC5 Interrupting input, MC1

Display control board — FC13, MC21, FC12

CPU board — FC1, FC4 Output, FC3, FC2

DC12V DC24V

Power source circuit board

Transformer

DC5V

Switches / Sensor imputs
Lamps Motors Selenoids / outputs
also has Voltage
Matrix ... Signals

The hardware of this machine is made up of seven printed circuit boards. We will briefly explain how each functions.

a) CPU board

The CPU board (Central Processing Unit) is the printed circuit board that collects all information such as each switches signal, and the signals from the sensor. The CPU follows the program on the P-ROM and issues the output signals based on the input signal, which controls the solenoid and the LEDs.

b) Display control printed circuit board *Next to CPU Board*

With the signal from the CPU board, this is the printed circuit board that controls the lighting of the LEDs on the main control panel, the push button switches lamp lighting on each inching control panel and the push button switches lamp lighting on the sub control panel.

c) Inverter control printed circuit board *on top of connector*

With the signal from the CPU board, this is the printed circuit board that sends the signal for normal rotation, reverse rotation, stop, inching, and the speed setting to the inverter.

d) Sensor amplifier printed circuit board *Sensor Board*

This is the amplifier printed circuit board for the four photo sensors.

e) Main control panel printed circuit board

The indication LEDs, the LED limit resistors and the buzzer (BZ2) are on this board. The inching control panel push button switches on the first and the second units are routed through this printed circuit board and connected to the connector board and the display control board.

f) Connector board *(Relay Board)*

This is used to connect the CPU board and the switches, the solenoids and the other parts.

g) Power source printed circuit board *(Power Supply Board)*

This is the direct current power source for the controller and sends the power to each printed circuit board.

5 UDC
12 UDC
24 UDC

2/C power Supply bd. will work in Perfector.

Perfector Supply bd. will not work in 2/C.

(2) Input using the matrix system and the interrupting system

There are two ways to input to the CPU board in this machine, the matrix system and the interrupting system. This machine's program includes the procedure to check the input (switch) condition at certain times (actually every 5/1000 of a second). At this time, the signal that is interrupted from the matrix system is checked. This input can only be checked at certain times, so the CPU will not respond for a second to the input change that occurs at that time. Therefore when the CPU has to know the time of the signal input, this matrix input does not work. For example, before you go to work in the morning, you check the sky and see that it is clear. You work inside all morning then going out for lunch it is raining outside. You did not know when it started to rain. Because you only checked the weather in the morning before coming to work and at lunch time you may not have known that it rained in the morning. The input using the matrix system is the same as this example, the CPU can only check the input at certain times. Therefore you cannot know when the input is changed or when a short signal is inputted. In other words the matrix system does not work when inputting immediate signals or signals that the microcomputer must know when the signal is changed. On the other hand, the good point of the matrix input system is that it allows you to input a lot of information using only a few signals.

The other type of inputting is the interrupting system. When inputting using the interrupting system, the CPU stops its procedure and then the CPU starts to follow the new input. For example, you have a telephone on your desk in your company. You can answer the telephone as soon as the phone rings while you are working without always watching your phone. Please refer to the 7. input circuit of the connector board illustration item (page 38) for more explanation about the two types of input.

(3) Input using the matrix system

Input to the CPU board

$D2$ ------ $D1$ $D0$

LS3 · LS2 · LS1 ·

LS23 · LS22 · LS21 ·

$DSI(2^2)$ · $DSI(2^1)$ · $DSI(2^0)$ ·

L 1

L 2

L 3

Output from the CPU board
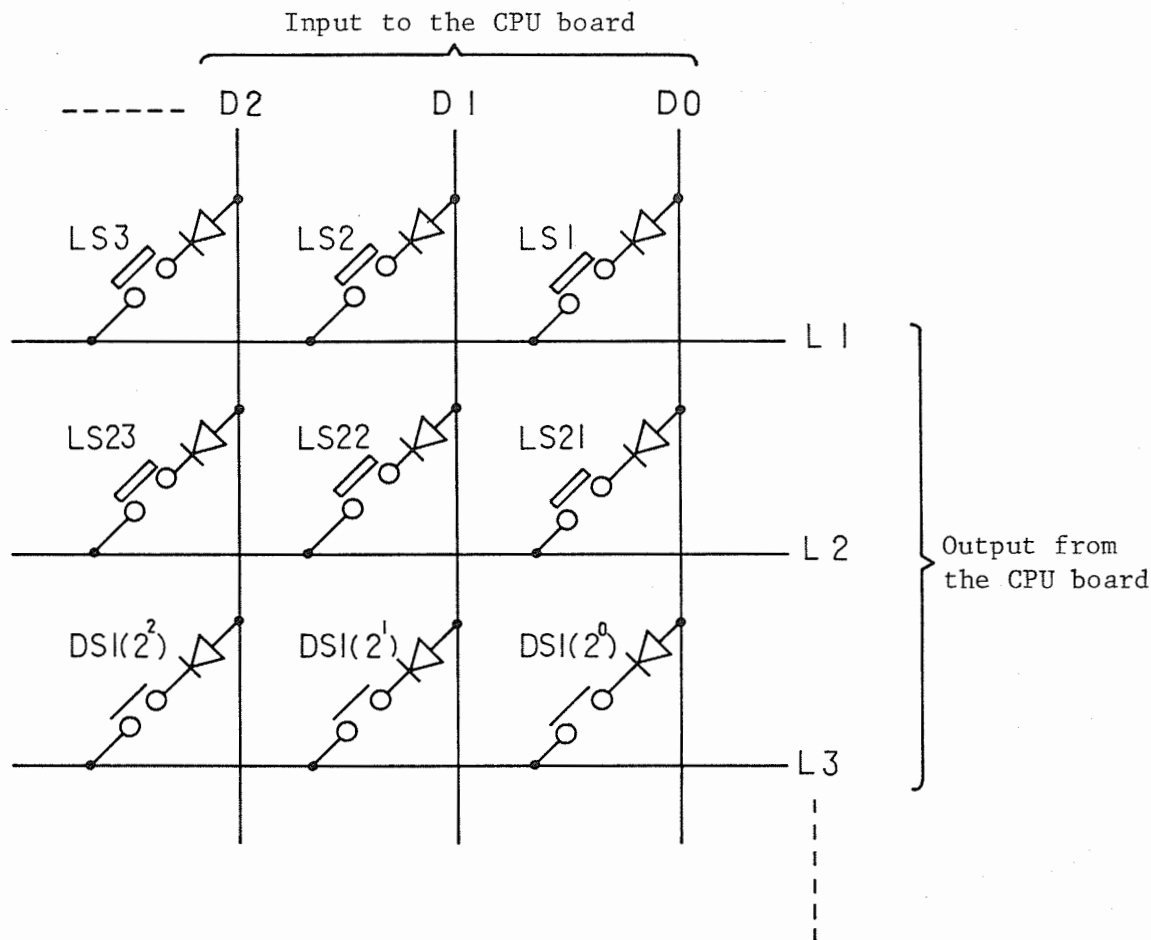
This indicates a part of the input circuit using the matrix system. The input using the matrix system is the circuit that uses the output wire from the CPU board and the input wire to the CPU board to input a lot of input information with fewer signal wires. This machine's matrix system is sometimes called the diode matrix system because diodes are used in the circuit. The horizontal lines shown above are the output wire from the CPU board and the CPU determines which switch condition is inputted by using these lines. This machine has eleven of these lines and they are called the select lines (L1 ~ L11). The vertical lines shown above are the input lines to the CPU board and the CPU inputs the actual switch condition by using these lines. This machine has eight of these lines and they are called the data lines (D0 ~ D7).

The CPU output is set so that only the select line of L1 through L11 that is used is LOW while the others are HIGH. In other words, when wanting to input the LS1 as shown in the previous illustration, the CPU sets the L1 select line to be LOW and sets all the other select lines after L2 to be HIGH.
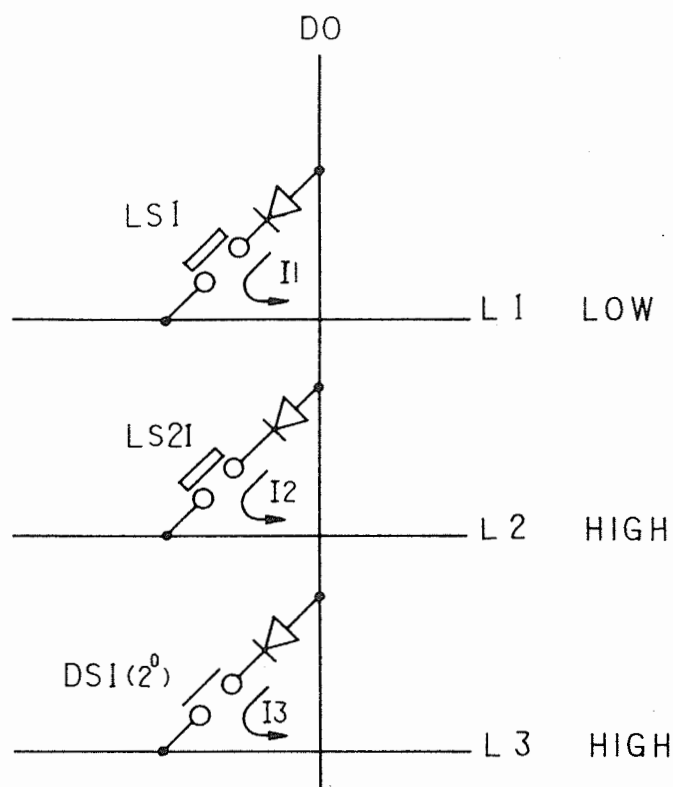
At this time, the electric current that goes to the L1 through the L3 lines from the DO data line are called the I1 through the I3. At this time, the I2 and the I3 will not go on without the LS21 or the DS1 (2°) signal issued because the L2 and the L3 select lines are HIGH. When the LS1 is ON the I1 goes on, and when the LS1 is OFF the I1 will not go on because the L1 line is LOW. Therefore the CPU judges that the LS1 is ON when the electric current comes from the DO, and judges that the LS1 is OFF when the electric current does not come from the DO. The CPU judges the ON/OFF of the switches other than the LS1 in the same way as the explanation above of the LS1.

(4) The flat cable connector

   a) Connector terminal number

      At the flat cable connector, the terminal number is not indicated. The
      connector has a triangle mark, and based on the triangle mark the
      terminal number can be determined. As shown in the illustration
      below, the terminal with the triangle mark is No. 1 and the opposite side
      of the terminal is No. 2, so then the side of the No. 1 terminal is No. 3
      and the rest of them are the same as shown below.

Triangle mark

Triangle mark

Cable

Cable No.　　Socket

Reverse insertion
prevention tab

Triangle mark

Header
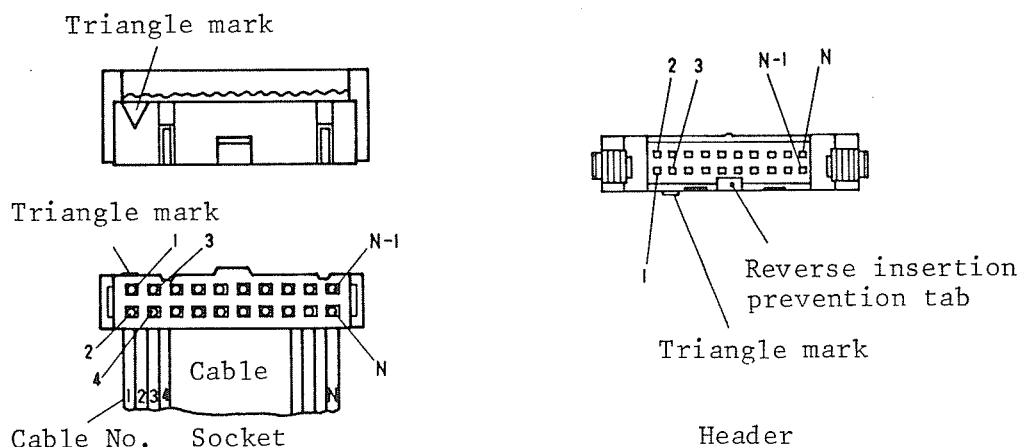
   b) Connector removal and mounting procedures

     ° Removal procedures

       Push out the fasteners in the direction of the arrow at the same time
       as shown in the illustration (b), and then it can be removed as shown
       in the illustration (c) easily.

     ° Mounting procedure

       Open the fasteners as shown by the dotted line in the illustration (b)
       and mount it straight from the top. This connector cannot be mounted
       backwards. After mounting, push in the fasteners to lock the connector
       and check that the socket is correctly connected on the fasteners.

     (a)   (b)   (c)
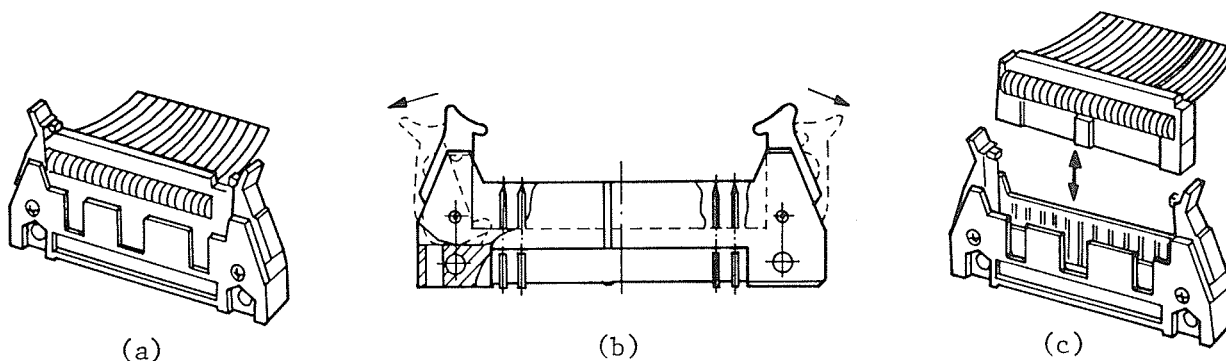
2. CPU board

This CPU board is mounted on the rear side of the middle board in the control box, and it judges and processes the inputted information and issues the output signal. On the CPU board, there are the parts and circuits as shown below.

° CPU (Z80) .... The control parts that process the information for the operation of the machine.

° P-ROM .... The memory that has the program and the data for operating the machine is inputted on.

° RAM .... The memory that allows the CPU to process the information.

° Oscillator circuit ..... The circuit that generates the clock pulse to run the CPU.

° Interface circuit ...... The circuit that connects the input and the output system with the CPU.

° Back up circuit .... The circuit that provides the electric source back up on the RAM.

(1) Replacement of the parts

When the output from the CPU board is not correct even though the input to the CPU board is correct, replace the CPU board with a new one. When replacing parts, please be careful of the following points listed below.

a) P-ROM   [Part No.]

CPU board with P-ROM 5340 61 640-2
⎧ CPU board (without the P-ROM) 5330 61 641-1
⎨
⎩ P-ROM 5340 61 801-1

There are two replacement part Nos. for the CPU board, one that includes the P-ROM and the one that does not include the P-ROM. The part number 5340 61 640 is the exclusive basic board for this machine because it includes the P-ROM. 5330 61 641 can also be used for Ryobi 3200PFA and Itek 975PFA. When doing the service using the printed circuit board without the P-ROM, pull off only the P-ROM from the old printed circuit board before replacing it, and mount the P-ROM on the new printed circuit board. At this time, please be careful not to bend the P-ROM pins when removing and mounting the P-ROM. Using the P-ROM removing tool for this is convenient. Also when mounting the P-ROM, be careful of the P-ROM mounting direction. Mount the P-ROM socket notch part in the same direction as the P-ROM notch.

P-ROM socket notch

P-ROM notch

5340
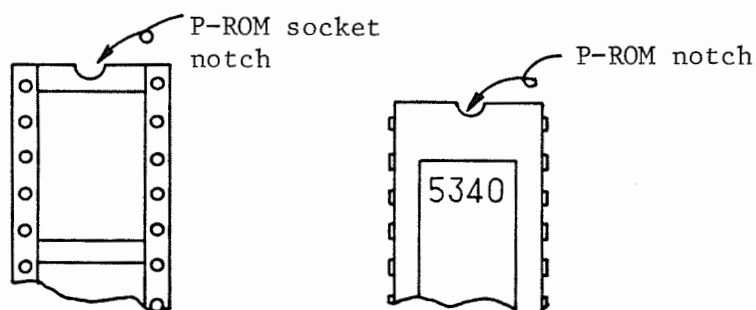
b) Jumper wire

   This machine's CPU board can be also used on the Ryobi 3200PFA and the
   Itek 975PFA so the jumper wire is used to change the circuits to match
   the machine. If the jumper wire is not mounted correctly, the CPU board
   will not work, so when replacing the CPU board with a new one, please
   check the jumper wire connection position. Refer to the illustration
   below for the CPU board jumper wire position for this machine.

Check Jumper b/4 installing board

[For the Ryobi 3200PFA and Itek 975PFA]　[For the Ryobi 3302M and Itek 3985]

Set to 64　　　　　　　Set to 128

J3 256　　　　J3 256
256 128 64　128　J4 64
J5 256 64 128

256 128 64　128　J4 64
J5 256 64 128

FC 1

INT　NM
J1 J2

Do not short circuit
the Ryobi 3200PFA,
Itek 975PFA,
Ryobi 3302M and
Itek 3985.

J12　NM

Short circuit the lower
side of the Ryobi 3200PFA,
Itek 975PFA, Ryobi 3302M
and Itek 3985.

J3 256
256 128 64　128　J4 64
J5 256 64 128

IC10
P-ROM

FC 4

J15 J16 J17

FC 2　　FC 3

J15 J16 J17

J15 J16 J17

[For the Ryobi 3200PFA and Itek 975PFA]

Short circuit
two upper sides.

[For the Ryobi 3302M and Itek 3985]

Short circuit
two lower sides.

c) The interchangeability of the Ryobi 3302M and the Itek 3985 CPU board and the Ryobi 3200PFA and the Itek 975PFA CPU board

The CPU board that is used on the Ryobi 3200PFA and the Itek 975PFA shipped from the factory does not have all the functions that the Ryobi 3302M and Itek 3985 CPU board has. Therefore the CPU board that is mounted on the Ryobi 3200PFA and the Itek 975PFA cannot be used on this machine. The CPU board for this machine can be used on the Ryobi 3200PFA and the Itek 975PFA. The CPU board replacement part can be used on this machine and the Ryobi 3200PFA and the Itek 975PFA.

(2) Explanation of the battery replacement *Will last 6 years*

There is a battery on the CPU board used as a back up power source for the memory (RAM) if there is a power failure. If the battery dies, a lamp will light on the main control panel to indicate that the battery is dead. When this occurs, replace the dead battery with a new battery as soon as possible.

The part number for the battery assembly ... 5330 61 646

On this machine, when the battery is dead, the problems listed below will occur.

a) The lubrication warning lamp and the pump filter cleaning warning lamp will not operate normally.

b) The preset number of sheets and the number of actual printed sheets on the sheet counter will be reset to 0 when the main power switch is turned OFF.

c) The speed setting position will always be reset to 3000 rph when the main power switch is turned OFF.

Copies
1,500,000 *lubrication*
Filter Cleaning
Warning Lamp

1,000,000

When battery drop to 3.6 Volts, Replace

(3) The power resetting circuit

On the CPU board, there is a circuit to reset the CPU board if there is a voltage drop to the CPU board. A variable resistor VR1 is used on the CPU board to adjust the reset voltage. Please do not touch the variable resistor VR1 because it has already been adjusted in the factory so it resets the CPU board at 4.8V.

3. Power source circuit board

Handwritten annotations on figure:
- can be used in perfector but not vice versa
- 5 UDC output
- operating for the CPU 4.8 - 5.1U don't touch untill after 1 year
- Input AC
- Back Board
- for softy but don't work
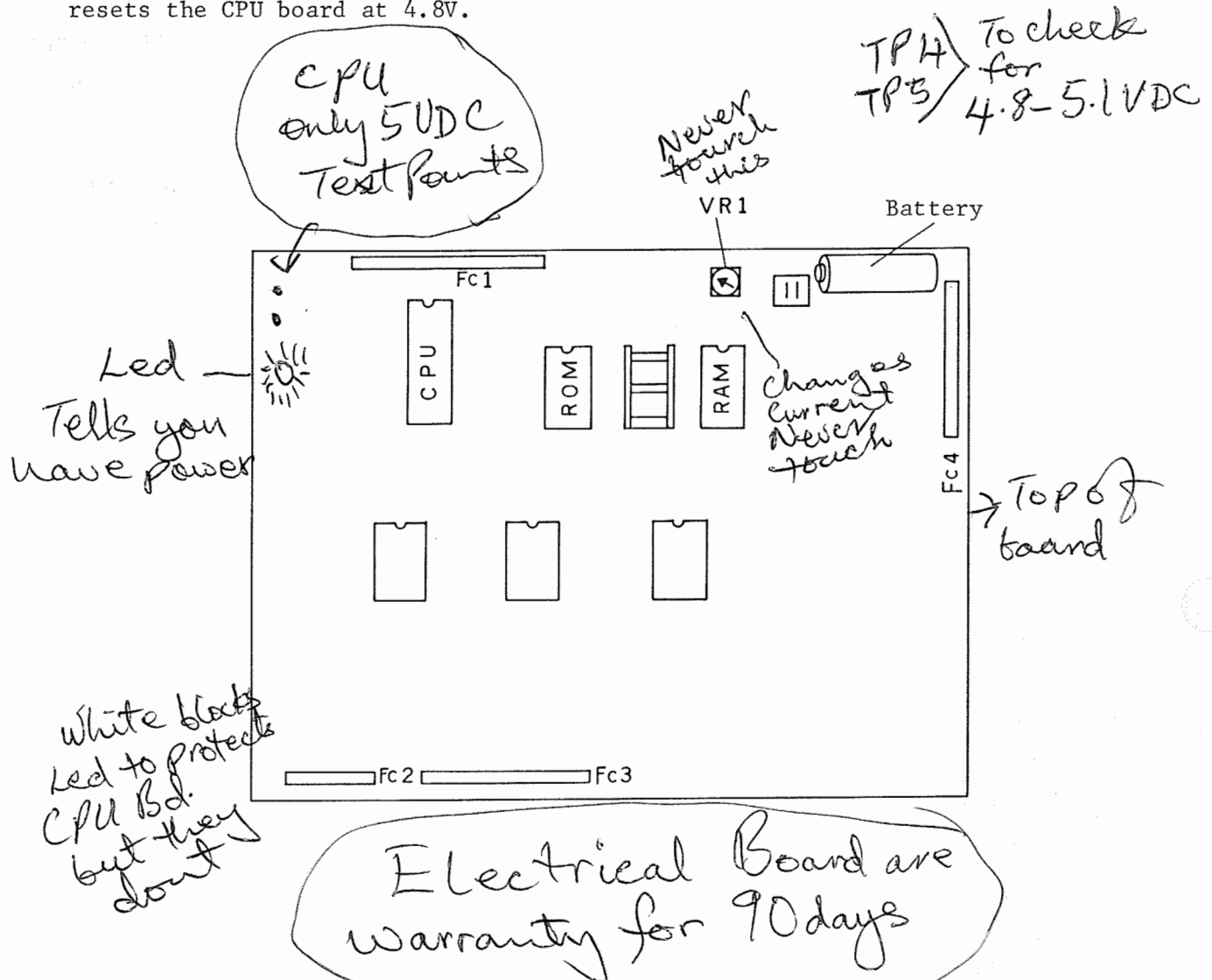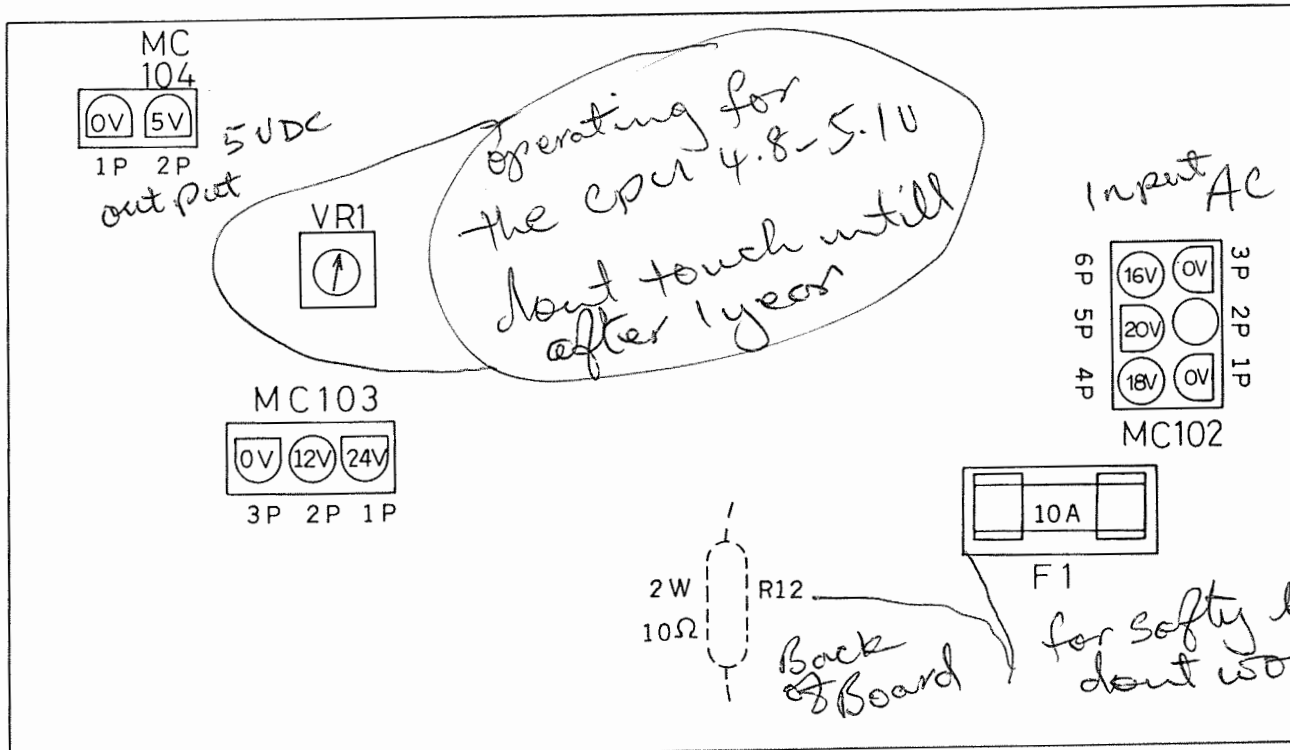
The power source circuit board supplies DC12V and DC24V to be the power source for all of the control circuits other than the CPU and supplies DC5V to be the power of the CPU board.

a) MC102

   AC16V and AC18V is supplied from the transformer at the back of the control box.

   ° No. 1 pin and No. 4 pin, or No. 1 pin and No. 5 pin
     They supply the AC power source for DC24V and DC12V. Usually use the AC18V (No. 1 pin and No. 4 pin), but if the DC24V voltage is low, change the line from the AC18V (the No. 4 pin) to the AC20V (the No. 5 pin).

   ° No. 3 pin and No. 6 pin
     These supply the AC16V for DC5V.

b) MC103

   It supplies the DC12V and the DC24V to the connector board.

   ° No. 1 pin ..... +24V
   ° No. 2 pin ..... +12V
   ° No. 3 pin 0V

c) MC104

It supplies the DC5V to the CPU board.

° No. 1 pin 0V

° No. 2 pin ..... +5V

d) VR1

This variable resistor is for the DC5V output voltage adjustment. It has been adjusted to 5.1V for the output voltage in the factory, so do not touch this variable resistor.

e) F1

This is the fuse for the short circuit protecting the DC24V circuit. When the fuse blows, replace it with a 10A fuse.

10A fuse part No. 97 722

f) R12

This limited resistor for the DC12V circuit is mounted at the back of the circuit board. If the DC12V circuit is short circuited, this resistor will heat up and break down. When this resistor breaks down, mount a new 2W10Ω resistor on the back surface of the circuit board.

Resistor mounting position

Pattern side
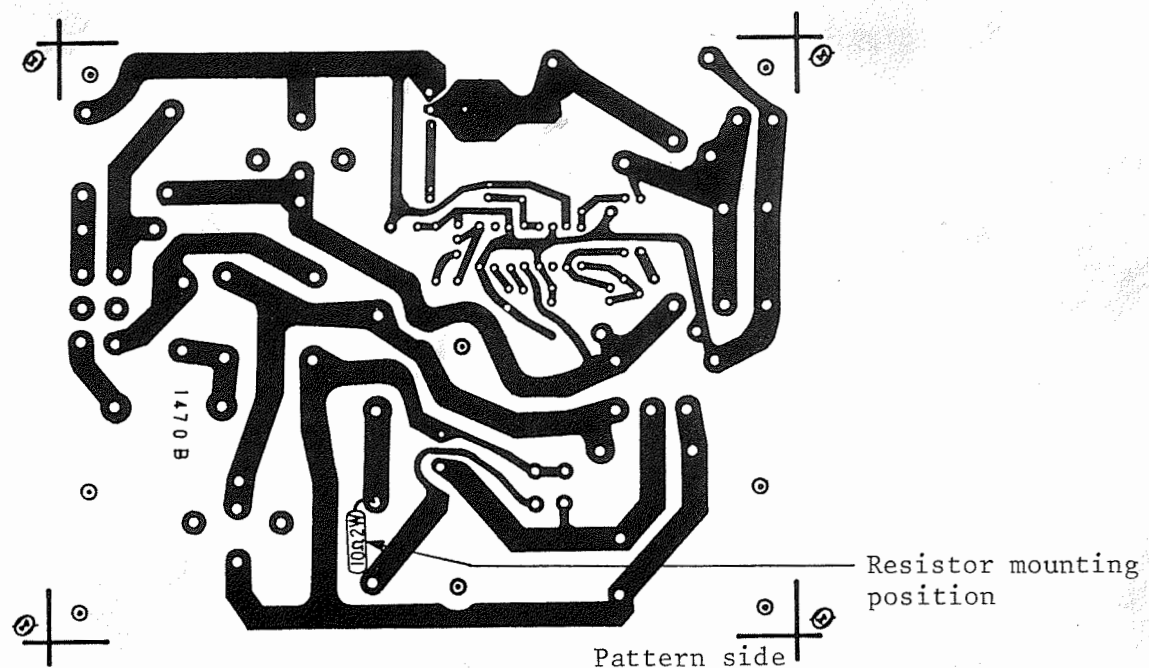
check the jumpers on next page

4. Sensor circuit board

This circuit board holds the four photo sensors amplifiers on it.

(1) How to connect the photo sensor

VR6

Receiver (Gray) Sealed

Sealed

Projector (Red)

LD4

Paper feed drum photo sensor (PH4)
(Cylinder ON sensor)

Back of Drum

Micro adjustment VR5

Receiver (Yellow) Sealed

Sealed

Projector (Brown)

First unit blanket jam sensor (PH3)

Rough adjustment VR4

LD3

Micro adjustment VR3

Receiver (Yellow) Sealed

Sealed

Projector (Brown)

Second unit blanket jam sensor (PH2)

Rough adjustment VR2

LD2

VR1

Receiver (Gray) Sealed

Sealed

Projector (Red)

Feeder board photo sensor (PH1)
(Count sensor)

Conveyor

LD1

about 5/8 3/4 margin to activate latching sensor

(2) How to adjust the sensor circuit board sensitivity

    a) Paper feed drum photo sensor (PH4)

        1) Stop the machine at 130 degrees on the timing plate.

        2) Turn the VR6 fully in the clockwise direction and check that the LD4 light goes off.

        3) If the LD4 light does not go off, turn the VR6 in the counter-clockwise direction until the LD4 light goes off.

on with paper

    b) The first unit blanket jam sensor (PH3)

        -- Rough adjustment --

        1) Set the VR5 for the micro adjustment at the center.

        2) Turn the VR4 for the rough adjustment in the clockwise direction until the LD3 lights.

        -- Micro adjustment --

        1) Turn the VR5 for the micro adjustment slowly in the counterclockwise direction until the LD3 light goes off.

        2) After the LD3 light goes off, turn the VR5 in the counterclockwise direction approximately half a scale length.

        (Note) When adjusting the sensitivity, check that the blanket is positioned over the sensor. After the adjustment, run the machine and check that the blanket jam detector does not actuate.

    c) The second unit blanket jam sensor (PH2)

        The sensitivity adjustment is the same as the first unit blanket jam sensor.

    d) Feeder board photo sensor (PH1)

        1) Check that no retainers or paper is over the feeder board photo sensor.

        2) Turn the VR1 fully in the clockwise direction and check that the LD1 light goes off.

        3) If the LD1 light does not go off, turn the VR1 in the counterclockwise direction until the LD1 light goes off.

(3) The interchangeability of the Ryobi 3302M and the Itek 3985 sensor printed circuit board and the Ryobi 3200PFA and the Itek 975PFA sensor printed circuit board

These machines printed circuit boards have 2 jumper wires mounted so it can be used on both the Ryobi 3200PFA and the Itek 975PFA. When replacing it with a new one, check that the 2 jumper wires are properly connected the same way as shown in the illustration below.
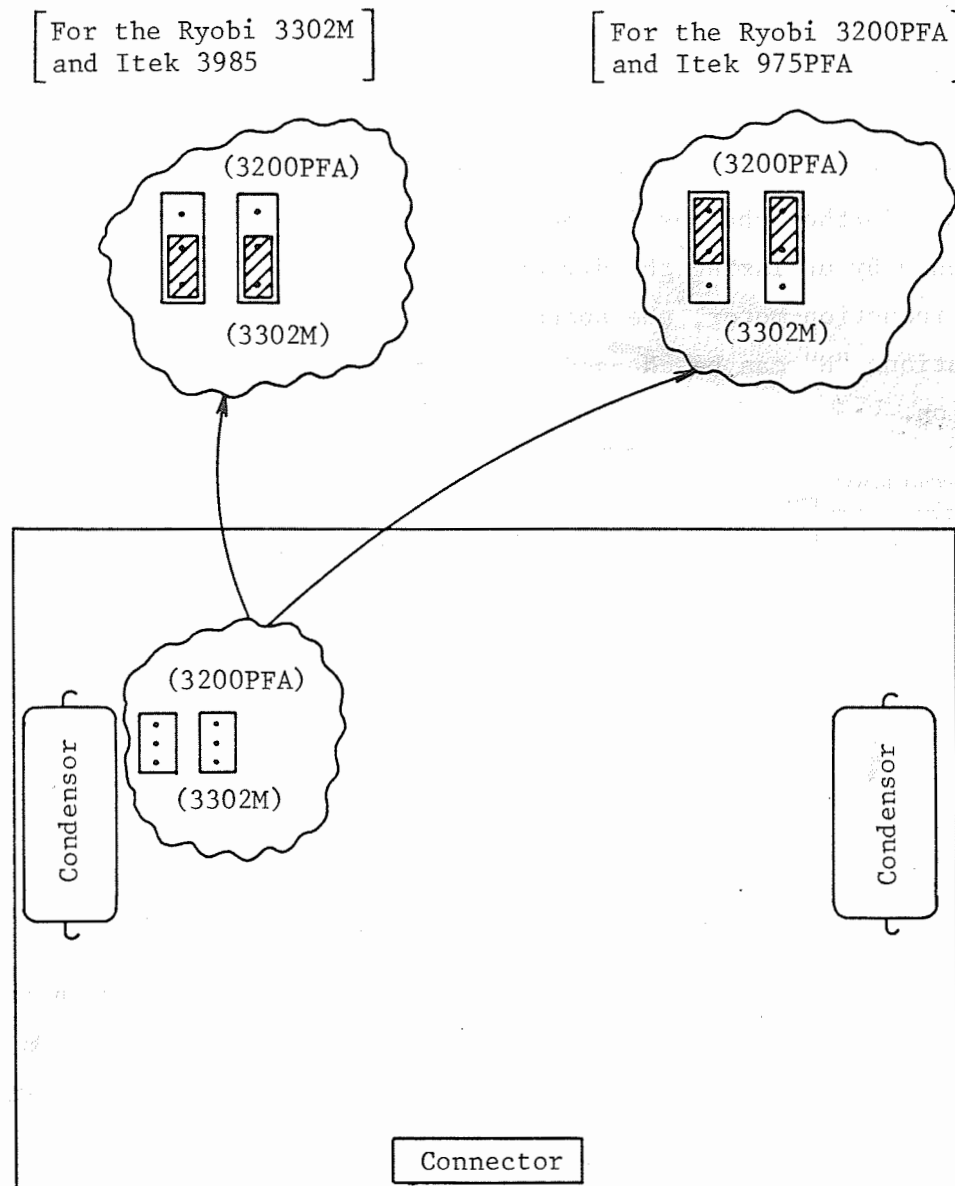
5. Inverter

(1) What's an inverter?

The drive motor of this machine is driven by an inverter. Normally, the relation among the revolution speed and voltage, frequency and torque of an induction motor is as below;

$$N = \frac{120f}{P} (1 - s) \quad \dots\dots\dots\dots\dots \quad (1)$$

$$T \fallingdotseq K \left(\frac{V}{f} \right)^2 \quad \dots\dots\dots\dots\dots \quad (2)$$

N: Revolution (rpm)   f: Frequency (Hz)

P: Poles of motor   s: Slip

T: Torque   K: Constant

V: Terminal voltage

An inverter is used to change the alternate current to make direct current and then further changes it back to the alternate current of optional frequency by utilizing the direct current. Then, by changing the frequency of an induction motor, the speed can be controlled. That is the number of revolutions "N" can be changed by changing the value "f" in the above equation.
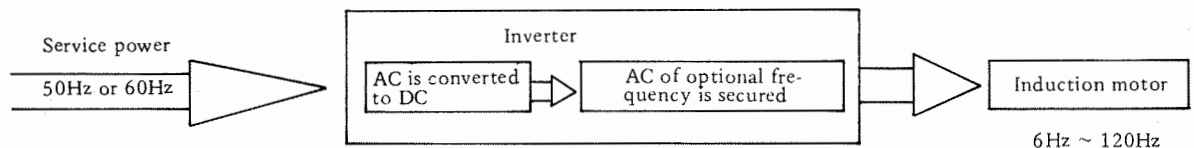
Therefore, provided the slip of "0", this machine can change the revolution speed of the drive motor from 180 rpm to 3600 rpm.

$$Nmin = \frac{120 \times 6}{4} = 180 \ (rpm)$$

$$Nmax = \frac{120 \times 120}{4} = 3600 \ (rpm)$$

From the above equation (2), however, a constant output torque of the drive motor cannot be obtained only by changing the frequency "f". An inverter is used to keep the V/f constant by changing the voltage "V" applied to the motor simultaneously with the change of frequency "f". This means that the voltage applied to the drive motor of this machine is not always 3 phase 200V, but a voltage corresponding to the frequency is applied to the motor. Shown on the next page is the relation (V/f pattern) between frequency and voltage.

<V/f pattern>
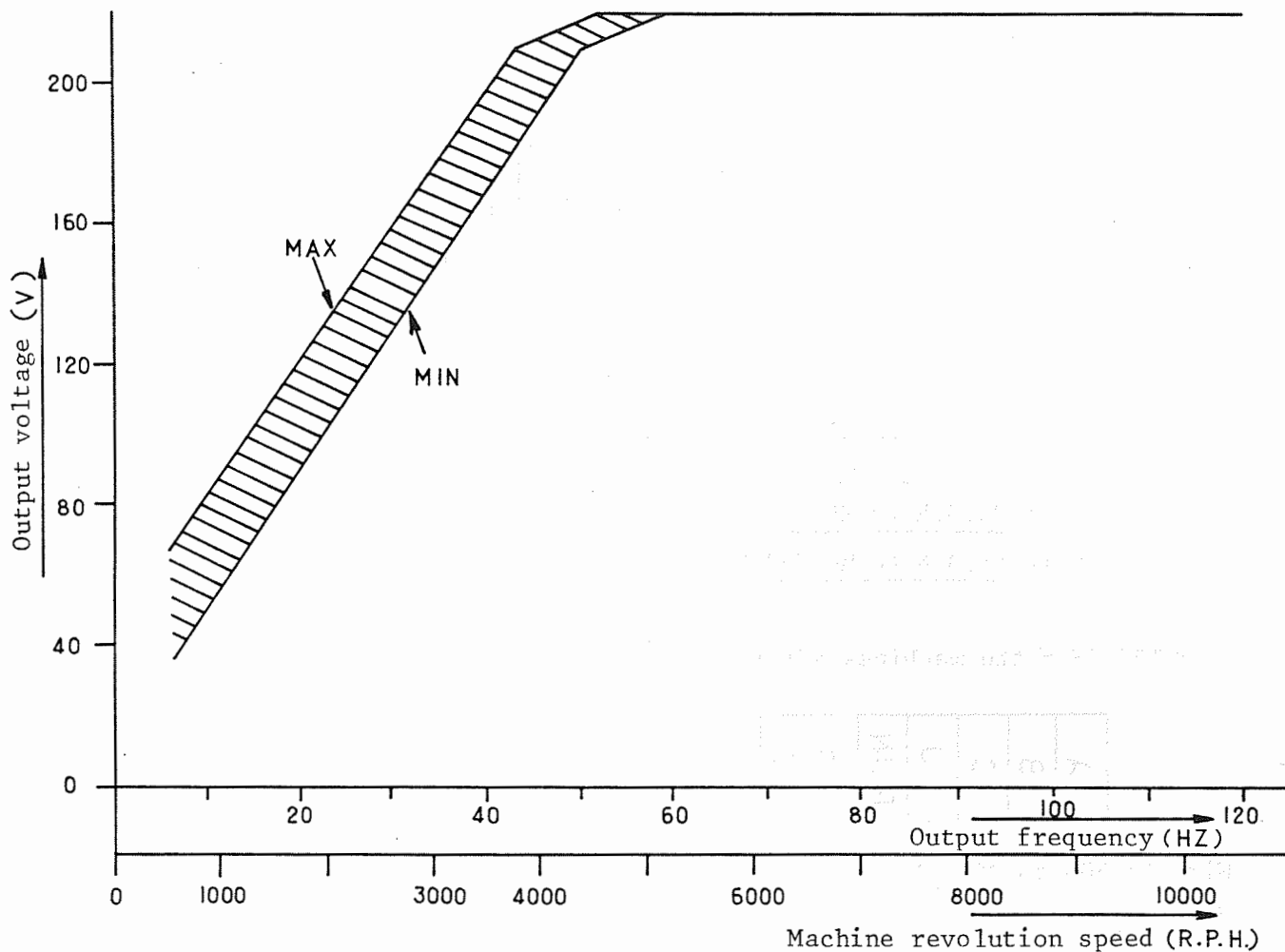
(Note) The horizontal axis shows the output frequency of the inverter and the machine revolution speed, while the vertical axis shows the output voltage of the inverter.

(2) Explanation of the input and output terminals of the inverter

° The wiring method to the terminal block of inverter is shown below.

<TB2 (For the machines before #1131)>

B	C	P12	SU	RUN	SE	10	2	5	STF	STR	SD	RES	SD	FM

Wire No.300 to MC10-1 Brown line
Wire No.301 to MC10-2 Red line
Wire No.302 to MC10-3 Orange line
Wire No.303 to MC10-4 Yellow line
Wire No.304 to MC10-5 Light blue line
Wire No.305 to MC10-6 Blue line
Wire No.306 to MC10-7 Violet line

<TB2 (For the machines after #1132)>

A	B	C	SU	RUN	SE	10	2	5	1	STF	STR	SD	RH	RM	RL/JOG	RT	RES	MRS	SD	FM

Wire No.300 to MC10-1 Brown line
Wire No.301 to MC10-2 Red line
Wire No.302 to MC10-3 Orange line
Wire No.303 to MC10-4 Yellow line
Wire No.304 to MC10-5 Light Blue line
Wire No.305 to MC10-6 Blue line
Wire No.306 to MC10-7 Violet line

<TB1 (for a 3 phase machine)>

		R	S	T	U	V	W	N	P

To the sub control box {
To the drive motor }

<TB1 (for a single phase machine)>

| | R | S | | T | U | V | W | N | P |

To the sub control box DC°
out DC.200
To the drive motor

Noise filter is also connected to R, S, and T of the terminal block (TB1) above.

a) Power source ..... R.S.T

3 phase 200V or single phase 200V is supplied to the inverter. In the case of a single phase machine, T-line input terminal is not used.

b) Output terminal ..... U.V.W

Connected to the drive motor.

c) Drive signal ..... STF (Wire No.302), STR (Wire No.303), SD (Wire No.304)

When the relay is connecting the STF and the SD, the drive motor will rotate in the normal direction, and when it is connecting the STR and the SD', the drive motor will rotate in the reverse direction.

d) Reset signal ..... RES (Wire No.305), SD (Wire No.306)

This circuit resets the inverter.

When the relay is connecting the RES and the SD, the inverter will be reset to stop the drive motor quickly.

e) Speed setting terminal ..... 2 (Wire No.300), 5 (Wire No.301)

2 ..... Speed set voltage supplied

5 ..... 0V

By increasing or reducing the DC voltage to the terminals 2 and 5, the drive motor speed is controlled.

The relationship of the drive motor speed and the voltage is shown in the list below.

Machine speed	Voltage between the terminals 2 and 5
1000rph	about 0.5V
3000rph	about 1.4V
7000rph	about 3.3V
10000rph	about 4.7V

(3) Inverter adjustment (For the machines before #1131)
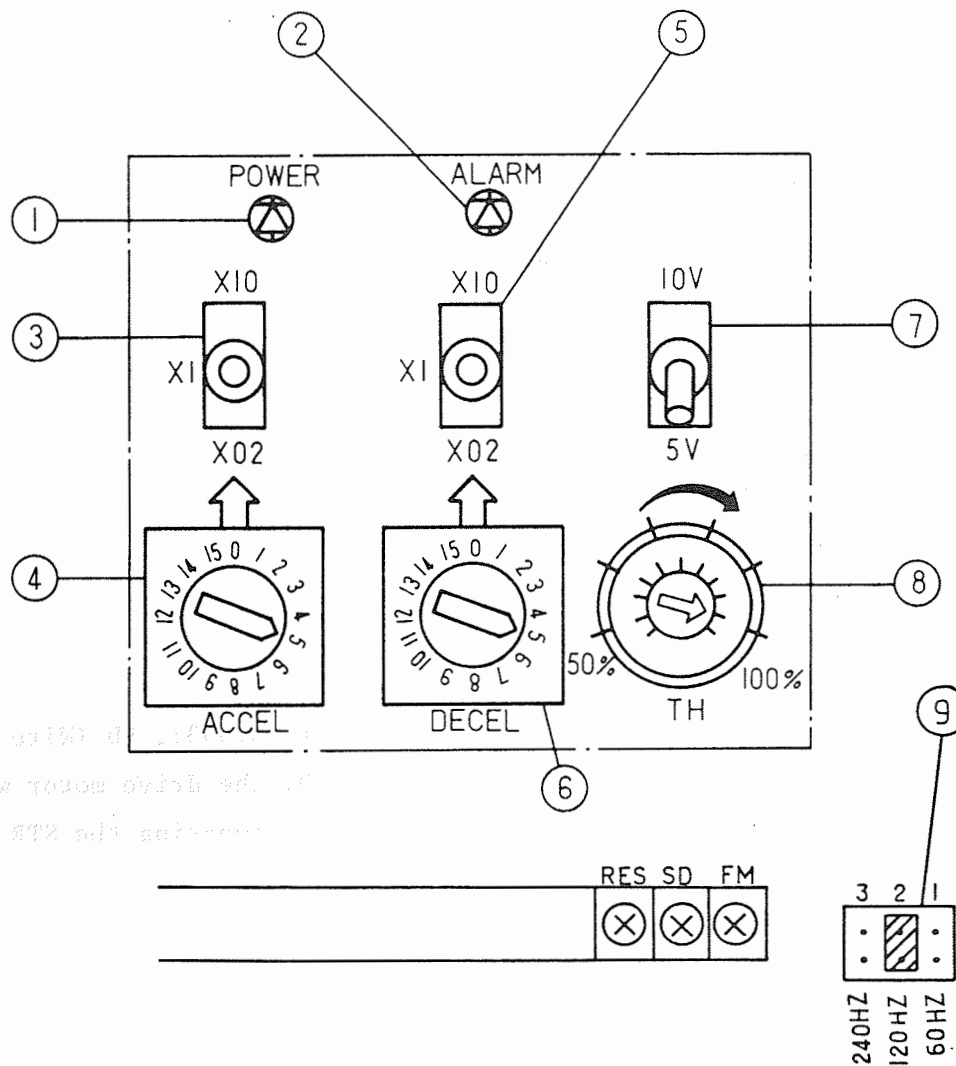
(1) Power ..... Power lamp

When a 3 phase or a single phase power source is supplied to the
inverter, this LED lights up.

(2) Alarm ..... Warning lamp

When the following troubles occur, this LED lights up and the drive
motor stops. In this case, first fix the cause of the trouble.
Then, push the machine stop button or turn OFF the power, which will
reset the inverter allowing re-operation.

	Problem and cause	Actions to be taken
Overcurrent cutoff	Protective circuit actuates against overcurrent exceeding 200% of the rated output current of the inverter.	° Check the supply voltage to the inverter. ° Check for a proper load on the drive motor. ° Check for a proper acceleration/deceleration time. (Refer to (3), (4) and (5), (6)) ° Check for a short on the output side of the inverter.
Regenerative overcurrent cutoff	When the output voltage of the inverter is excessive due to regenerative energy, the protective circuit actuates.	° Check if the deceleration time is too short. (Refer to (5) and (6))
Instantaneous power failure protection	The protective circuit actuates against an instantaneous power failure of more than 15 micro seconds to prevent malfunction.	
Overcurrent cutoff (Electrothermal)	This inverter has a built-in electrothermal relay. An overload on the drive motor actuates the protective circuit.	° Check the current in the drive motor and examine the cause of the overload, if any. ° Check for a proper setting of the electrothermal relay in the inverter. (Refer to (8))
Fan overheat protection	When the cooling fans overheat due to the decrease of the cooling effect of the semiconductors in the inverter, the thermal sensor actuates the protective circuit.	° Check the cooling fan of the inverter, the ambient temperature, etc.

(3),(4) ACCEL ..... Acceleration time setting

A switch is used to set the acceleration time of the drive motor. The multiplying factor is set with the switch (3) and the time with the dial (4).

When the switch (3) is shifted upward (x10), any time from 0 sec. to 150 sec. can be set with the dial (4).

When the switch (3) is shifted downward (x0.2), any time from 0 sec. to 3 sec. can be set with the dial (4).

Set the acceleration time of this machine to 5 seconds. With the switch (3) at the neutral (x1), set the dial (4) to "5".

(5),(6) DECEL ..... Deceleration time setting

A switch is used to set the deceleration time of the drive motor. The setting method is the same as that of the acceleration time setting. Set the deceleration time of this machine to 5 seconds. With the switch (5) at the neutral (x1), set the dial (4) to "5".

(7) Speed control voltage change-over switch

Be sure to set this switch downward (5V) on this machine. If it is set upward (10V), the drive motor speed will be reduced by one half the normal speed.

(8) TH ..... Variable resistor for the electrothermal relay setting

This inverter contains an electrothermal relay. The setting value is adjusted with this variable resistor.
Be sure to set the variable resistor to its 100% position as the motor (1.5kW) for this machine is driven by a 1.5kW inverter.
Never turn the variable resistor fully clockwise as the electrothermal relay will malfunction.

(9) Changing the maximum output frequency

A frequency from 6Hz to 120Hz can be used on this machine by connecting the jumper wire at the center. For the Ryobi 500K and the 500K-NP the frequency is from 6Hz to 60Hz. When replacing the part, please be sure that the jumper wires are correctly mounted.

```
⎡ For the Ryobi 3302M ⎤        ⎡ For the Ryobi 500K ⎤
⎣ and Itek 3985       ⎦        ⎣ and 500K-NP        ⎦

     3     2     1                3     2     1
   ┌──────────────┐             ┌──────────────┐
   │  •   ▨   •   │             │  •   •   ▨   │
   │  •   ▨   •   │             │  •   •   ▨   │
   └──────────────┘             └──────────────┘
   240HZ 120HZ 60HZ             240HZ 120HZ 60HZ
```
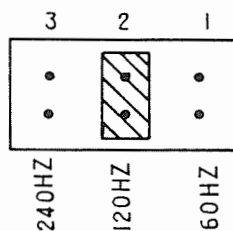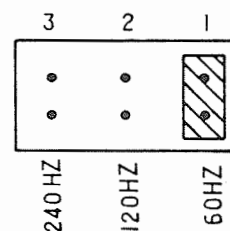
(10) The adjustment of the automatic torque boost

This functions to automatically correct the output voltage depending on the load to improve the motor torque. The correction volume of the output voltage can be adjusted by the torque boost adjustment volume (VR2). The location of this VR2 is almost in the center of the printed circuit board and can be adjusted after removing the inverter cover (fixed with two screws). The relationship between the VR2 adjustment position and the VR2 voltage correction volume is shown in the list below.

VR2
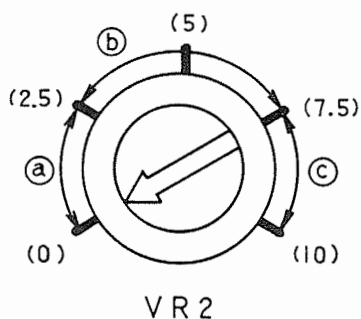
° Length (a)

When the automatic torque boost does not actuate. Therefore, the output voltage will remain fixed regardless of the load.

° Length (b),(c)

The automatic torque boost actuates. When the more the VR2 is turned in the clockwise direction, the output voltage will be increased. However, at the length (c), despite the adjustment position, the output voltage will stay the same as the "7.5" position on the scale.

When the automatic torque boost is greatly increased, it may cause too high a voltage to be supplied, which will actuate the protective circuit to protect the inverter, so please be careful.

The VR2 has been adjusted to the position shown in the illustration at the factory.
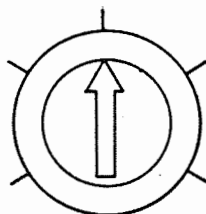
(4) Inverter adjustment (For the machines after #1132)

   1) Setting panel
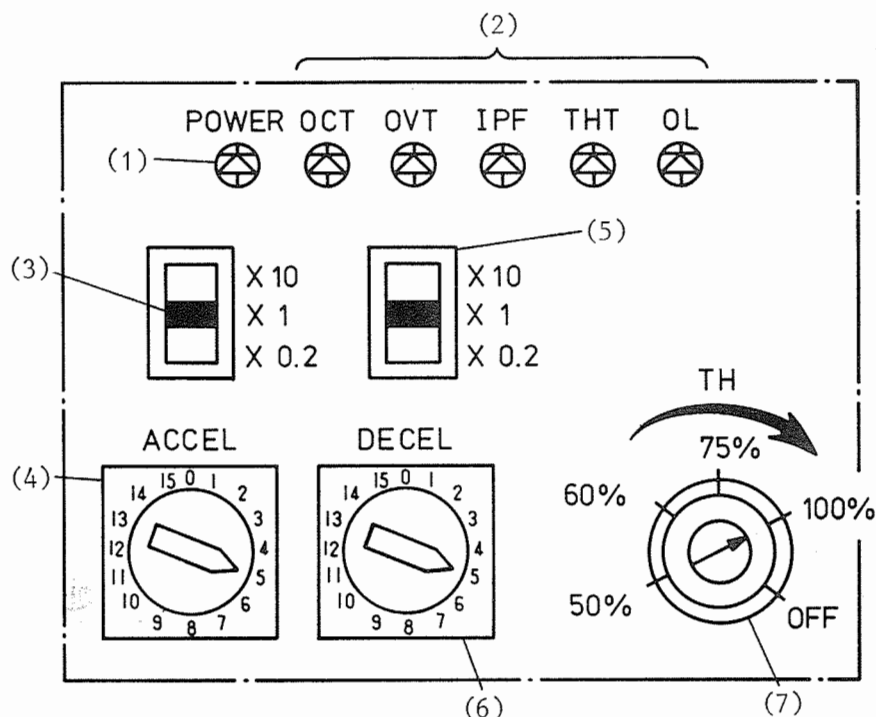
● Power ..... (1) Power lamp

  When a 3 phase or a single phase power source is supplied to the
  inverter, this LED lights up.

● OCT, OVT, IPF, THT, OL ..... (2) Warning lamps

  The inverter incorporates the self-protection function against
  the overcurrent and the overvoltage. When it actuates, the lamp
  lights and the drive motor stops. For more information of the
  OCT, OVT, IPF, THT, OL, please see the pages 27, 28 and 29.

● ACCEL ..... (3), (4) Acceleration time setting

  A switch is used to set the acceleration time of the drive motor.
  The multiplying factor is set with the switch (3) and the time
  with the dial (4). Set the acceleration time to 5 seconds. With
  the switch (3) at the neutral (x1), set the dial (4) to "5".

● DECEL ..... (5), (6) Deceleration time setting

  A switch is used to set the deceleration time of the drive motor.
  The multiplying factor is set with the switch (5) and the time
  with the dial (6). Set the deceleration time to 5 seconds. With
  the switch (5) at the neutral (x1), set the dial (6) to "5".

● TH ..... (7) Variable resistor for the electrothermal relay
setting

This inverter contains an electrothermal relay. The setting
value is adjusted with this variable resistor.

Be sure to set the variable resistor to its 100% position. Never
turn the variable resistor fully clockwise as the electrothermal
relay will malfunction.

2) Frequency setting

The frequency setting switch is
used to set the maximum frequency.
(Maximum frequency (f max) is
120Hz) when the inverter is ship-
ped as a replacement part, the
switch is set at 60Hz, so be sure
that the switch is set to match
the machine it is mounted on.

NB: Do not touch the other switches (2-10).

SW 1-1 ... ON
SW 1-2 ... OFF
SW1

ON
1 2 3 4 5 6 7 8 9 10

120Hz 240Hz | D.V. | D.C.B. | 50Hz 120Hz 240Hz | SF | L/F

f max   V/F bend
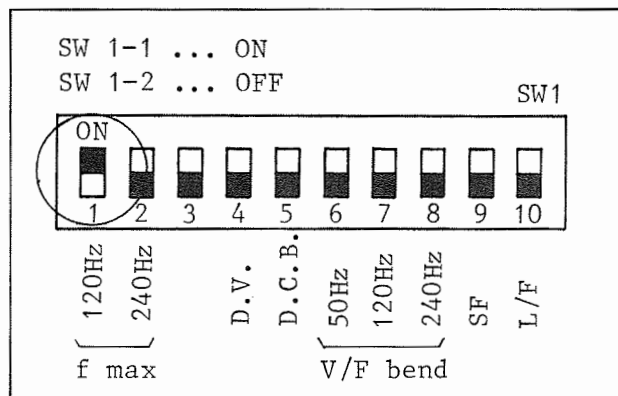
3) Other setting volumes.

● Automatic torque boost adjust-
ment volume (A/BST) ..... (1)
This functions to automatically
correct the output voltage de-
pending on the load to improve
the motor torque. The volume
is set at the 12 o'clock posi-
tion.

Do not touch this volume.

A/BST M/BST VRT
VRH VRM VRL
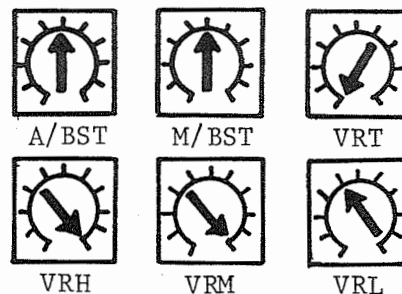
● Manual torque boost adjustment volume (M/BST) ..... (2)

A clockwise turn increases the motor torque. When the volume is greatly increased, vibration and noise may increase and the electric thermal relay (THT) or overcurrent trip (OCT) may be activated during the low-frequency operation. The volume is set at the 12 o'clock position when adjusted at the factory. Adjust this volume only when the motor torque is insufficient.

NB: The other volumes are set as shown in the illustration. Do not touch the other volumes.

4) PWM mode selection dial
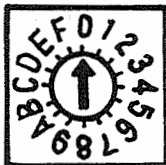
This dial can change the motor noise and sound, and the resonant point of the vibration. This volume is usually set at "0". Adjust this dial when the gear noise problem occurs.

NB: The "0" position is the standard setting position.

[Reference]

OCT, OVT, IPF, THT, OL ..... (2), (7) Warning lamps

Protective functions are incorporated to protect the inverter from overcurrent and overvoltage. When the protective function is activated, the motor comes to a stop after free running. To restart the motor, it is necessary to push the machine stop button or to perform reset by putting on the input power source after shutting it off.

	Problem and cause	Actions to be taken
Overcurrent stall prevention	When current of 150% or more of inverter rated current flows in the motor during the acceleration of motor by the inverter, this function stops the rise of frequency until load current reduces to prevent the inverter from resulting in overcurrent trip. Also, when overcurrent of 150% or more of rated current flows during steady (constant-speed) operation, this function reduces frequency until load current reduces to prevent the inverter from resulting in overcurrent trip. When load current has reduced below 150%, this function increases frequency again and permit acceleration to be continued up to preset frequency.	OL lamp flickers.
Regenerative overvoltage stall	When the output voltage of converter rises to over the predetermined value by regenerative energy during deceleration of the motor, this function stops the fall of frequency until the voltage of the capacitor (across terminals P and N) reduces to less than the predetermined value in order to prevent the inverter from resulting in overvoltage trip. As soon as regenerative energy has reduced, this function decreases frequency again to allow deceleration to be continued.	OL lamp flickers.

	Problem and cause	Actions to be taken
Overcurrent shut off (OCT)	This function detects the DC current of converter. When overcurrent of 200% or more of inverter rated output current occurs, protective circuit is activated to stop the inverter.	OCT lamp is lit. (Possible causes of OCT are short on the inverter output side, ground fault, excessive load, extremely short setting of acceleration time, start during free running of motor, motor larger than inverter rating, start of special motor, etc. Therefore, restore the circuit after fully examining the cause of trouble.)
Regenerative overvoltage shut off (OVT)	When converter output overvoltage is caused by regenerative energy from the motor, protective circuit is activated to stop the output of transistor and keep it stopped.	OVT lamp is lit. (Cause of OVT include short setting of deceleration time.)
Instantaneous power failure protection (IPF)	When instantaneous power failure occurs for 15m sec or longer (this applies also to the shut off inverter input power source), instantaneous power failure protective function is activated to stop the output of inverter and keep it stopped. In the case of light load, normal operation can be continued up to approximately 100m sec, although it depends on loads. When power failure continues about 10-20 sec, the error alarm is restored to reset state due to the loss of power. When the power is restored 100m sec or later, the protective function is automatically reset. (When the power failure has occurred within 15m sec, or in the case of light load, when the power failure has occurred for about 100m sec, normal operation is performed.)	IPF lamp is lit.
Power source under-voltage protection (IPF)	When the line voltage of inverter is reduced, the control circuit cannot provide normal functions and malfunctions result, such as heat generation of the motor and insufficient torque. Therefore, when the line voltage is reduced to less than 150V, the protective circuit is activated to stop the output of transistor and keep it stopped.	IPF lamp is lit. (Line voltage tends to reduce when the capacity of power source is insufficient or another machine with a large-capacity motor connected to the same circuit is started. Check the power source system.)

	Problem and cause	Actions to be taken
Overload shut off (Electronic thermal relay) (THT)	Electronic thermal relay detects overload of motor during operation in rated conditions or motor overheating in low-speed operation and protective circuit is activated to stop and protect the inverter output. When a special motor or 2 or more motors are operated, the motor cannot be protected by the electronic thermal relay. Provide a thermal relay on the output side of inverter. In this case, if the electronic thermal relay is set to OFF position, only the transistor protection is activated.	THT lamp is lit. (Examine the cause or overload, and lighten load, change operation pattern, or reconsider inverter and motor capacities.)
Overload alarm (OL)	When motor is overloaded and inverter output current exceed 150% of rated current, the overload alarm (OL) lamp is lit. When the current is reduced to less than 150%, the lamp is turned off. Since the OL lamp detects and indicates an overload state before tripping occurs by overcurrent or overvoltage, it acts as an error alarm.	OL lamp flickers. (If the OL lamp flickers during acceleration or deceleration, set the acceleration or deceleration time longer. If it is activated during constant-speed operation, lighten load or reconsider inverter and motor capacities.)
Fin overheat protection (OVT/THT)	The inverter performs forced cooling with built-in fan. When the cooling fin of semi-conductor is overheated due to the failure of fan, temperature sensor is activated to stop the inverter output and keep it stopped.	OVT and THT lamps are lit at the same time. (Check cooling fin and ambient temperature and also check for obstacle in the way of air.)
Self-diagnosis trip (OCT/THT)	This function monitors if the CPU for control inside the inverter is always operating normally. Since control error results in motor overcurrent and insufficient torque, the protective circuit is activated to protect the inverter. This function is also activated when misoperation, such as the setting change of the maximum output frequency, occurs during operation.	OCT and THT lamps are lit at the same time. (The control circuit may have malfunctioned due to external noise, from another machine etc. Perform reset and check conditions. If this occurs frequently, fully check if noise has entered peripheral circuit.)

6. Inverter control board

The inverter control board sends the normal rotation, reverse rotation, stop, inching, and the speed setting signals to the inverter based on the signal from the CPU board.

(1) Normal rotation and reverse rotation signals

When the R10 turns ON, the drive motor will rotate normally and when the R11 turns ON, the drive motor will rotate reversely. Check the movement of the R10 and the R11 by using the LD5 and the LD6.
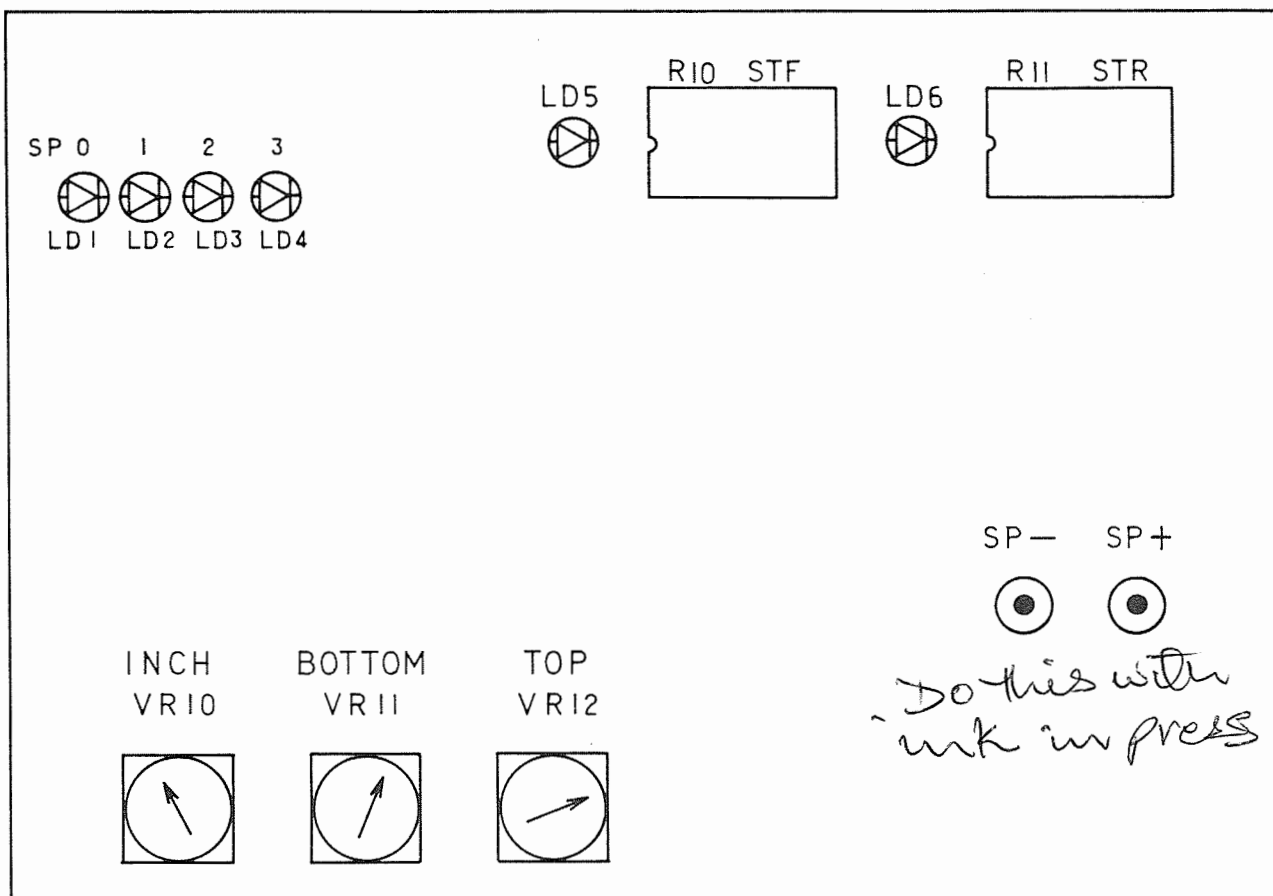
(2) Speed adjustment

    a) 1,000rph and inching speed

       The 1,000rph speed and the inching speed adjustment is done by using the VR10. When turning the VR10 in the clockwise direction, the speed will be increased and when turning it in the counterclockwise direction, the speed will be reduced.

    b) 3,000rph

       The 3,000rph speed adjustment is done by using the VR11. When turning the VR11 in the clockwise direction, the speed will be increased and when turning it in the counterclockwise direction, the speed will be reduced.

c) 10,000rph

The 10,000rph speed adjustment is done by using the VR12. When turning the VR12 in the clockwise direction, the speed will be increased and when turning it in the counterclockwise direction, the speed will be reduced.

(3) The speed setting circuit checking procedures

The inverter control board converts the 4 bit digital signal from the CPU to the voltage signal, and sends this voltage signal to the inverter as the speed setting signal. The digital signal from the CPU is checked by the LD1 through the LD4. The voltage signal to the inverter can be measured by the direct circuit voltage range tester by using the check pins SP- and SP+. It shows the relationship between the machine rotation speed and the digital signal from the CPU board and the voltage signal to the inverter below.

Machine rotation speed	Digital signal from the CPU board				Voltage between SP- and SP+
	LD1	LD2	LD3	LD4	
1000rph and when the machine is stopped	x	x	x	x	0.5V
3000rph	o	x	x	x	1.4V
3500rph	x	o	x	x	1.7V
4000rph	o	o	x	x	1.9V
4500rph	x	x	o	x	2.1V
5000rph	o	x	o	x	2.4V
5500rph	x	o	o	x	2.6V
6000rph	o	o	o	x	2.8V
6500rph	x	x	x	o	3.1V
7000rph	o	x	x	o	3.3V
7500rph	x	o	x	o	3.5V
8000rph	o	o	x	o	3.8V
8500rph	x	x	o	o	4.0V
9000rph	o	x	o	o	4.2V
9500rph	x	o	o	o	4.5V
10000rph	o	o	o	o	4.7V

(Note) x ..... Light off   o ..... Light up

7. Input circuit of the connector board illustration

(1) The interrupting input system

For this machine, there are 6 types of interrupting input system signals as shown below.

a) IR0 ... PH3

Connected to the first unit blanket jam sensor (PH3)

b) IR1 ... CS3 OFF

Connected to the timing switch (CS3). When the CS3 turns OFF, the IR1 actuates.

c) IR2, IR4 ... CS4

Connected to the timing switch (CS4). When the CS4 turns OFF, the IR2 actuates and when the CS4 turns ON the IR4 actuates.

d) IR3

Connected to the output line from the CPU board. This signal is used to set the preset number of sheets on the sheet counter. When continuously pushing the set button on the sheet counter the IR3 actuates.

e) IR5 ... PH2

Connected to the second unit blanket jam sensor (PH2).

The CPU board receives these interrupting input signals from the photo coupler. The photo coupler converts the electro signal to the photo signal and also changes the photo signal to the electro signal.

(2) The matrix system input

When picking up only the parts that are related to the select line L1 from the input circuit diagram (Page 135), it will look like the illustration on the left. The CPU board outputs the signal that selects each line from the photo coupler. In the illustration on the left, when the photo coupler that selected the L1 on the CPU board turns ON, the base to the transistor TR14 will be HIGH and the electric current will flow from the TR14 collector and the emitter and the checking LED LD6 will light up. When shifting the SW1 to the TEST side and turning the DS4-1 ON, the same thing will occur.

The connection of this part show by using another method below.
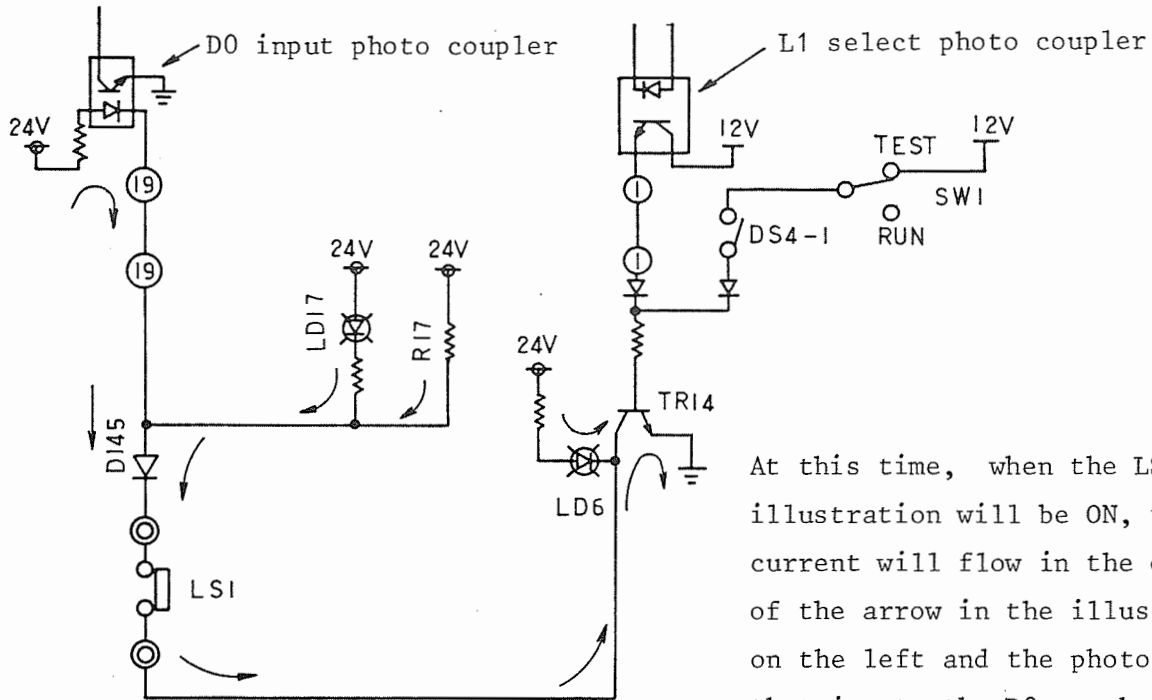
At this time, when the LS1 in the illustration will be ON, the current will flow in the direction of the arrow in the illustration on the left and the photo coupler that inputs the D0 on the CPU board turn ON. Then the CPU is confirmed that LS1 turns ON. At this time, the checking LED LD17 will light up. The L2 through the L11 function the same as the L1. However, the L5 through the L8 are part of the matrix circuit in the main control panel circuit board, therefore see the main control panel circuit board diagram (Page 147).

8. The input circuit checking procedure

(1) The interrupting input system checking procedure

For checking the interrupting input system, the LD1 through the LD5 and the LD35 on the right side of the connector board are used.
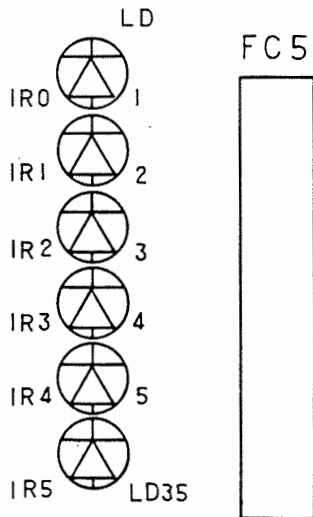
a) IR0 ... LD1

When the first unit blanket jam sensor (PH3) detects a sheet of paper, the LD1 will light.

b) IR1 ... LD2

When the timing switch CS3 turns OFF, the LD2 lights and when the CS3 turns ON, the LD2 light goes off.

c) IR2 ... LD3

When the timing switch CS4 turns OFF, the LD3 lights and when the CS4 turns ON, the LD3 light goes off.

d) IR3 ... LD4

The IR3 is the signal connected to the output of the CPU board that is used to set the preset number of sheets on the sheet counter by pushing the sheet counter set buttons continuously. Usually the LD4 lights, but when pushing the sheet counter set buttons, the light will go off.

e) IR4 ... LD5

When the timing switch CS4 turns ON, the LD5 will light, and when the CS4 turns OFF, the LD5 will go off. (The opposite of the IR2)

f) IR5 ... LD35

When the second unit blanket jam sensor (PH2) detects a sheet of paper, the LD35 will light. This LD35 is not mounted on the machines with the serial numbers from 1001 to 1005.

(Note) The interrupting input system, can be checked by the input checking program too. Please see the input checking program (Page 44).

(2) Matrix system input checking procedure

The input by the matrix system cannot be checked during the machine operation because the one input line is connected to several switches. The input checking by the matrix system is done by following the procedures. Please refer to the matrix chart (on the back of the control box cover and Page 153).

FC6

DS4

L1
2
3
4
5
6
L7
OFF

TEST

SW1

RUN

L8
1
2
3
4
L11
OFF

DS5

D7 D6 D5 D4 D3 D2 D1 D0 L11 L10 L9 L8 L7 L6 L5 L4 L3 L2 L1

24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 LD
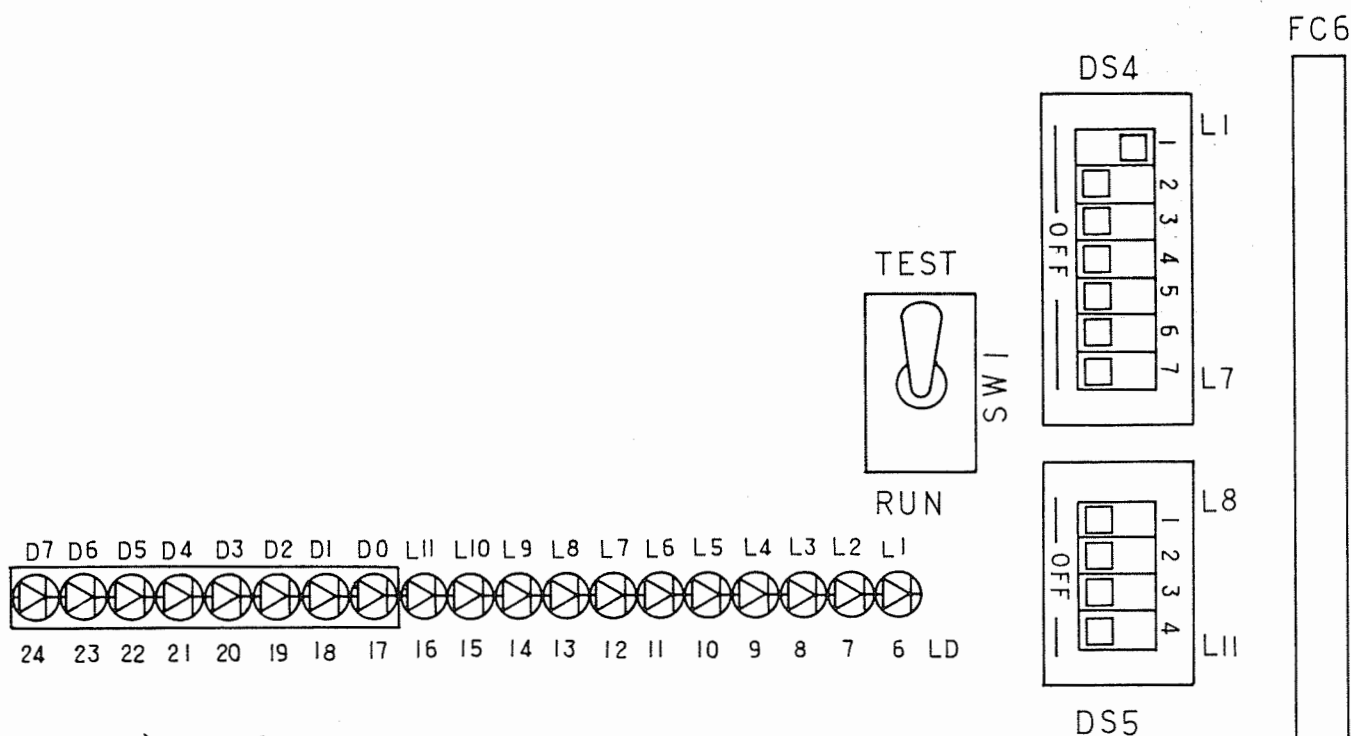
a) Procedure

1) Set the machine power OFF and remove the flat cable connector FC6.

2) Shift the switch SW1 to the TEST side.

3) Select the select line of the switch to be checked by the DS4 and the DS5. When the DS4 or the DS5 switch for the select line to be checked is ON, that line will be checked. Only one select line can be checked at a time.

4) Turn on the machine.

b) Checking

1) The select line that is selected is shown by the LD6 through the LD16.

2) The ON and OFF condition of the switch which is connected to the select line and the data line (D0 ~ D7) is shown by the LD17 through the LD24.

c) Examples of the checking procedure

The checking of the LS1 through the LS5 operation that inputs the first unit operating lever position.

1) By following the procedures given on the previous page, select the select line (L1).

2) Check that only the LD6 lights up from the LD6 through the LD16.

3) The checking of the LS1 through the LS5 operation is done by using the LD17 through the LD24.

```
Lever position I ...... LS1    ON ..... LD17 lights up
Lever position II ..... LS2    ON ..... LD18 lights up
Lever position III .... LS3    ON ..... LD19 lights up
Lever position IV ..... LS4    ON ..... LD20 lights up
Lever position V ...... LS5    ON ..... LD21 lights up
```

Usually when each input switch is ON, the LD17 through LD21 light up, but please be careful because there are some exceptions.

° SS5 ~ SS8 (Jam ON/OFF switch)

When the switch is set at the OFF position, the LED lights.

° PH1, PH4 (Photo sensor)

When there is a sheet of paper over the sensor, the LED lights.

° PB50, LS52 ~ LS66 (Safety switch)

The switch turns ON, when a safety cover is opened, the LED goes off. Therefore when the input checking is done, if the LED is not lit, the machine cannot be run.

d) When operating the machine after the checking procedure

After checking, mount the FC6 after the power is OFF and turn off all the DS4 and the DS5 switches, then set the SW1 to the RUN side.

(Note) The matrix input system, can be checked by the input checking program too. Please see the input checking program (Page 44).

If switch is good you get signal
If bad no signal

(3) The input checking program

This machine has input checking programs. Using this program, each input condition to the CPU can be checked easily.

a) Procedures

To enter the input checking program, keep pushing the second unit normal rotation inching button and turn on the main power, and C-P-I (Checking Program for the Input) will appear on the sheet counter display as shown the illustration below.

```
 _____
|  __    __                 |
| |     |__|         |      |
| |__   |            |      |
|_____|
```

```
 _____
|                           |
|                           |
|                           |
|_____|
```
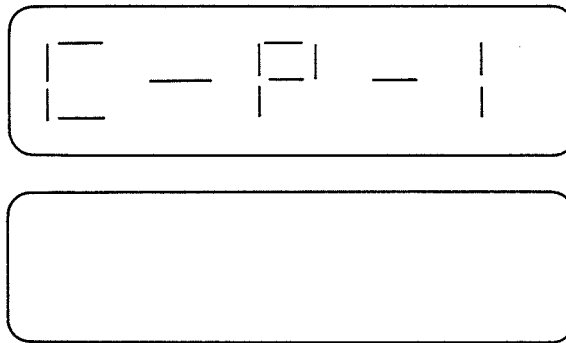
b) Confirmation

Turn ON/OFF the switch that you want to check. The ON or OFF switch line number and the data number are indicated and the buzzer sounds. When the line number and the data number are indicated and the buzzer sounds, that switch input to the CPU is OK.

° Example of the matrix system input

When turning the first unit emergency stop button (L5, D0) ON or OFF, it will appear on the sheet counter display as shown the illustration below.

Input Matrix Chart

```
 _____
|  __    __                 |
| |     |__|         |      |
| |__   |            |      |
|_____|
```
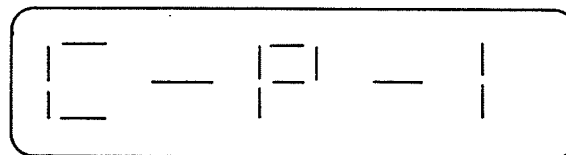
Vertical lines

```
 _____
|  |    __          __   __ |
| |    |__       . |__| |  ||
| |___ |__|        |__| |__||
|_____|
```
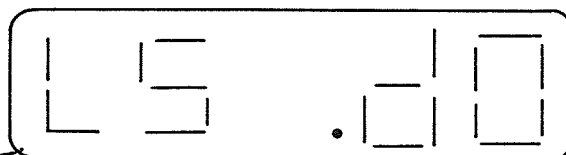
↑ Horizontal lines

° Example of the interrupting input system

When turning the second unit blanket jam sensor (IR5) ON, it will appear on the sheet counter display as shown the illustration below.
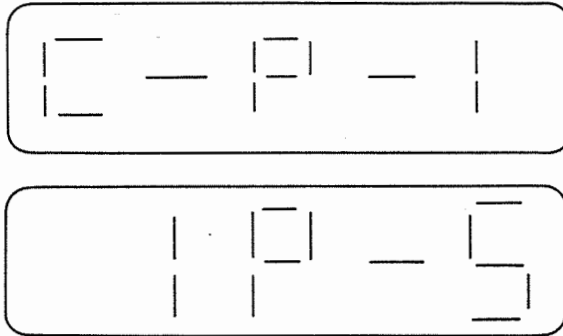
c) After the input checking, when wanting to operate the machine

After the input checking, turn the main power switch OFF once and then turn the power ON, and the machine will return to the normal program.

9. Error indication

This machine has a program that gives an error code when something unusual occurs. The error code E-1 through E-5 will appear on the sheet counter display as shown the illustration below.

```
 _____
|                           |
|              |‾‾ ‾‾      | |
|              |         —   |
|              |__         | |
|_____|
```
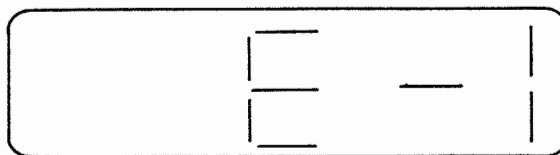
(1) E-1 code ..... The first unit operating lever

When something unusual occurs on the switches (LS1 ~ LS5) that inputs the first unit operating lever position, E-1 code will appear.

The list below shows the problems:

a) All the LS1 through LS5 switches are OFF when the main power switch is turned ON.

b) More than two of the LS1 through LS5 switches are ON when the main power switch is turned ON.

c) When more than two of every other switch are turned ON.

(Example) The LS1 and the LS3 switches are ON.

d) When the lever is shifted, the lever skips the next position and it is detected.

(Example) The lever shifts from the I position to the III position and it is detected.

In the case of a) and b), if the LS1 through the LS5 switches become normal, the E-1 code disappears.

In the case of c) and d), the E-1 code will not disappear until the power is turned OFF.

(2) E-2 code ..... The second unit operating lever

When something unusual occurs on the switches (LS21 ~ LS25) that inputs the second unit operating lever position, the E-2 code will appear. Please refer to the E-1 code list above as the E-2 code is the same as the E-1 code.

(3) E-3 code CS3

When the timing switch CS3 input does not change after the drive motor starts to rotate, the E-3 code will appear. This code will disappear if the CS3 input returns to normal.

(Note) When something unusual occurs on the drive motor output circuit and
         the drive motor does not rotate, the E-3 code will appear.

(4) E-4 code CS4

When the timing switch CS4 input does not change after the drive motor
starts to rotate, the E-4 code will appear. This code will disappear if the
CS4 input returns to normal.

(5) E-5 code ..... Matrix input

When something unusual occurs in the input circuit by the matrix, the E-5
code will appear. In the input by the matrix, when all of the select lines
(L1 ~ L11) are not selected, the E-5 code will appear even if there is only
one input on the data line (D0 ~ D7). When the E-5 code appears, the drive
motor cannot be rotated. So when the E-5 code appears, search for the cause
by following the next procedures.

(Note) If trouble occurs when turning on the power, the C-P-I or C-P-O may
         be indicated instead of the E-5 code.

a) When trouble occurs at the data line side on the CPU board
    Pull off the flat cable connector FC6 from the connector board and turn
    the power ON. At this time if the E-1 code appears, the CPU board is
    normal. At this time if the E-5 code appears, the trouble is with the
    CPU board, so replace it with a new CPU board.

b) When trouble occurs at the select line side on the CPU board
    With the output checking program group 8 (See the output checking
    program, page 57), check that there is no trouble with the select lines.
    If any one of the LD6 through LD16 are always lit, it is unusual.
    If they are always lit up, pull off the flat cable connector FC6. Then
    if all those LED lights go off, the trouble is on the CPU board, so
    replace it with a new CPU board.
    If the LED lights do not go off even after pulling off the FC6, the
    trouble is on the connector board or the cord to any outside switch.

c) When trouble occurs on the connector board or the cord to any outside switch

When the trouble falls under a) and b), either the connector has trouble or the cord to any outside switch is contacting the machine frame. In this case, check by following the next procedures.

Pull off the flat cable connector FC6 on the connector board and turn the power ON. At this time, check that either the select line checking LEDs (LD6 ~ LD16) or the data line checking LEDs (LD17 ~ LD24) do not light. If any one or all of them is lit, it is unusual. In this case, pull off all of the connectors except the MC1 and the MC12 on the connector board. When pulling off the connectors, if the light goes off on the LED that was lit, this cord is contacting the machine frame.

If the LED is still lit even with only the MC1 and the MC12 connected, pull off the MC12. At this time if the light goes off on the LED that was lit, the feeder safety cover switch cord that connects the MC12 is contacting the machine frame. If only the MC1 connected and the LED is still lit, the trouble is on the connector board. Replace it with a new connector board. The E-5 code will not disappear until the power is turned OFF.

(Reference) The capacitance sensor for lowering the delivery table dolly negative side wire (Wire No. 52) is contacting the sensor body with resistance. Therefore if the switch input line is contacting the machine frame, any one or all of the checking LEDs (LD6 ~ LD24) will light up.

10. Output circuit of the connector board illustration

The output signal to the connector board from the CPU board is sent to the connector board through the flat cable connector (FC8).

(1) How to read the output circuit illustration

a) Solenoid circuit
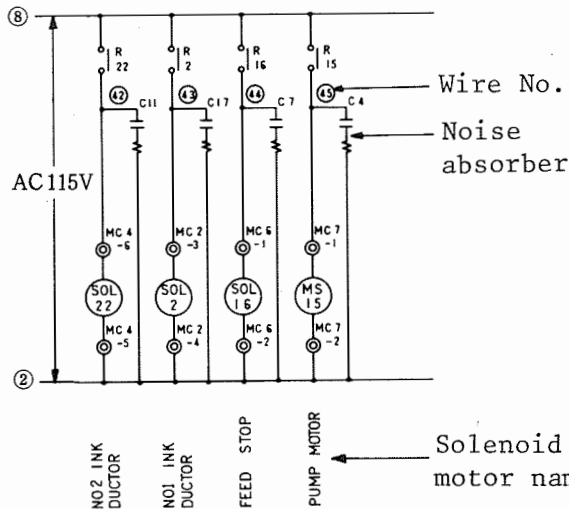
The magnet switch and the solenoid voltage are all AC115V. Noise absorbers are mounted on all of these circuits.

b) Relay circuit
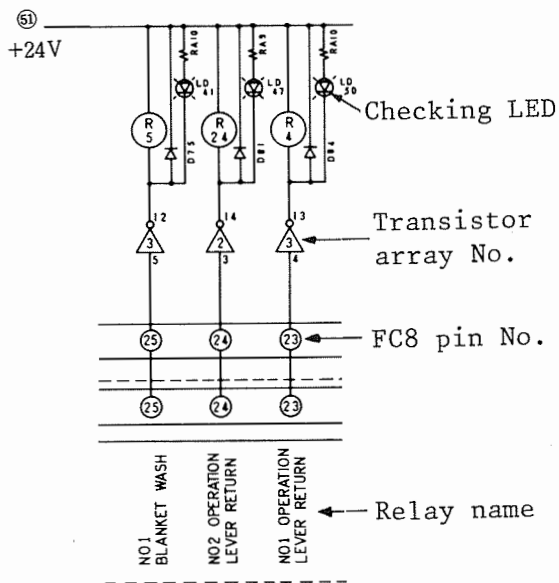
The signal that is outputted from the CPU board photo coupler passes through the FC8 and is inputted into the connector board, and actuates the transistor array to operate the relay. The transistor array is the one that has several transistors on one IC. Therefore when using the transistor and changing the R5 circuit, it will look like the illustration below.

As shown in the diagram on the right, when the HIGH signal is sent to the number 1 pin on the flat cable connector (FC8) from the CPU board, the relay R5 starts to actuate.

<Relay operation checking procedure>
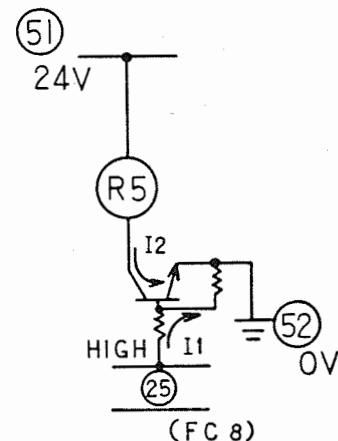
The operation checking LEDs are mounted on all the relays. Check the relay operation using these LEDs.

Checking LED
When the LED lights, the relay is ON
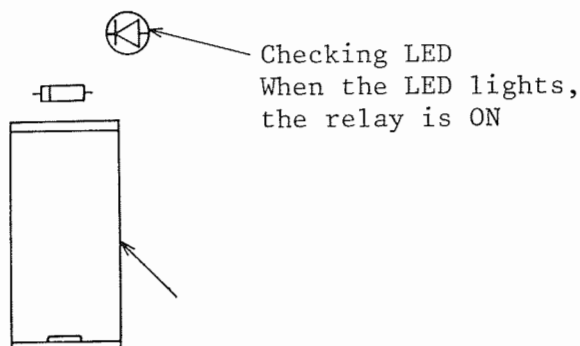
c) Transistor output
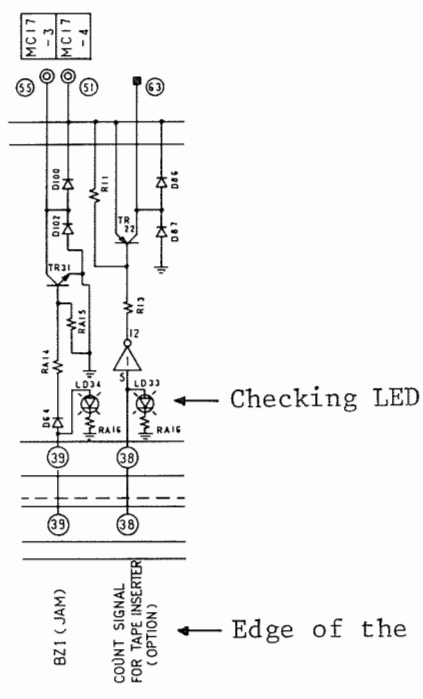
The following output signals are outputted by the transistor from the connector board. For these output signals, the checking LEDs are mounted on the connector board. The output signal from the CPU is checked by these LEDs.

Checking LED

Edge of the connection

LD 32 26 25 27 28 29 30 34 33 31

BZ2   SP-V   SPRAY   W-M1   W-M2   PRINT   MACHINE   BZ1   COUNT   TAPE

BZ1 (JAM)

COUNT SIGNAL FOR TAPE INSERTER (OPTION)
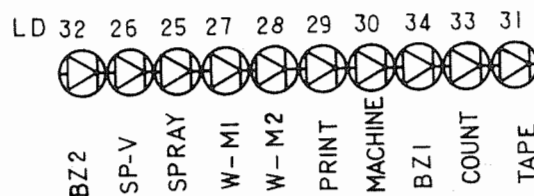
° LD32 (BZ2)

When the LD32 lights up, the main control panel buzzer BZ2 sounds.

° LD26 (Spray valve)

When the LD26 lights up, the spray valve turns ON.

° LD25 (Spray pump)

When the LD25 lights up, the spray device motor turns ON.

° LD27, LD28

The LD27 and the LD28 will not light up on this machine.

° LD29 (Print counter)

When the LD29 lights up, the print counter will add one.

° LD30 (Machine counter)

When the LD30 lights up, the machine counter will add one.

° LD34 (BZ1)

When the LD34 lights up, the buzzer BZ1 on the delivery control panel will sound.

° LD33 (Count)

When the LD33 lights up, the tape inserter count signal will be outputted.

° LD31 (Tape inserter)

When the LD31 lights up, the tape inserter output signal will be outputted.

(2) The machine counter and the print counter

The machine counter and the print counter are powered by a battery. Therefore even when the main power is turned off, the indicator is continuously ON. The life of this battery is approximately seven years but the battery itself cannot be replaced. When the battery is dead, the whole counter must be replaced.
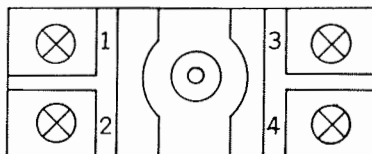
These counters can work by connecting the No.1 and the No.2 terminals together without supplying voltage from an outside source. If connecting the No.3 and the No.4 terminals together, the counter will be reset to 0.

11. Display control circuit

With the signal from the CPU board, the display control circuit controls the main control panel LED indication, all of the inching panel push button switch lamps indication and all of the sub control panel push button switch lamps indication. For the LED lighting system, there are two types, the static lighting system and the dynamic lighting system.

° Static lighting system

  The static lighting system is an ordinary lighting system and this system is continuously lights up the LEDs.
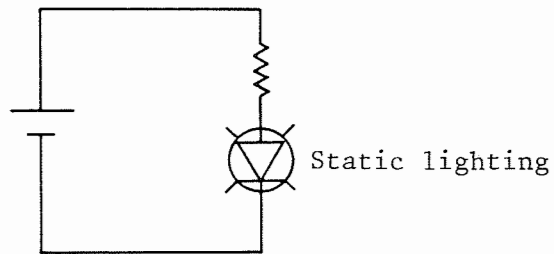
Static lighting

° Dynamic lighting system

  To the human eye, there is a flicker response characteristic. When the flickering frequency reaches a fixed rate, the human eye cannot see the flickering and it seems that the light is continuously lit.
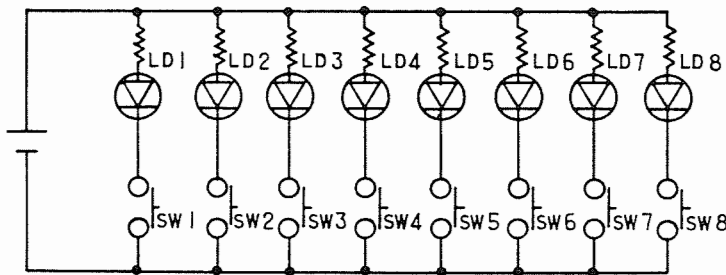
The SW1 through SW8 go on in order rapidly. As each switch goes on, it lights its LED. As the switches go on rapidly, to the human eye it seems that all the LEDs light at once.

On this machine, the 8 LEDs light up in order and is done using dynamic lighting. The human eye, can see all the 8 LEDs light up at the same time, however they light up one at a time in order. This machine's display control circuit uses the 8 static lighting circuits and the 16 x 8 dynamic lighting circuits.

(1) Static lighting circuit

The static lighting circuits are the TR1 through TR8 in the display control circuit output section diagram (Page 145). When the TR1 through TR8 turn on, the PL1 through the LD4 light up at the same time.

On the static lighting circuit, the checking LEDs (LD1 ~ LD8) are mounted on the display control circuit board, therefore please check this circuit board using these LEDs.

° LD1 ... PL1

When the LD1 lights up, the first unit emergency stop button lights up.

° LD2 ... PL2

When the LD2 lights up, the first unit ON/OFF lamp lights up.

° LD3

On this machine, the LD3 does not light up.

° LD4 ... LD2, PL5

When the checking LD4 lights up, the lubrication warning lamp on the main control panel and the lubrication warning reset button lamp on the sub control panel light up.

° LD5 ... PL21

When the LD5 lights up, the second unit emergency stop button lamp lights up.

° LD6 ... PL22

When the LD6 lights up, the second unit ON/OFF lamp lights up.

° LD7

On this machine, the LD7 does not light up.

° LD8 ... LD3, PL4

When the checking LD8 lights up, the pump filter cleaning warning lamp on the main control panel and the pump filter cleaning warning reset button lamp on the sub control panel light up.

(2) Dynamic lighting circuit

The TR9 through the TR24 in the display control circuit output section
diagram (Page 145) are the transistors for the dynamic lighting data output.
Also, the TR25 through the TR32 are the transistors for the dynamic lighting
line output. The TR25 through the TR32 turn on one at a time from the TR25
very rapidly.

The TR25 (Wire No. 351) is connected to the LD33 and the LD41 on the main
control panel (See the main control panel circuit board diagram, Page 128).
When the TR25 is ON, at the same time the LD33 and the LD41 data is sent
from the TR9 through the TR24 (Wire No. 360 ~ 377). At this moment, only
the LD33 and the LD41 light up. The next moment, the TR26 will go on.
The TR26 (Wire No. 352) is connected to the LD34 and the LD42 on the main
control panel. When the TR26 is ON, at the same time the LD34 and the LD42
data is sent from the TR9 through the TR24 (Wire No. 360 ~ 377). At this
moment, only the LD34 and the LD42 light up.
The TR27 through the TR32 function the same way. Therefore, when the
dynamic lighting circuit on the display control circuit board is damaged,
all of the LEDs that are connected to that data or line will be affected.
If all of the LEDs connected to the data and/or line do not light, replace
the display control circuit board.

12. Main control panel circuit board

The main control panel circuit board is connected to the connector board and the CPU board. For more details, please refer to the connector board input circuit diagram (page 135) and the display control circuit output section diagram (page 145).
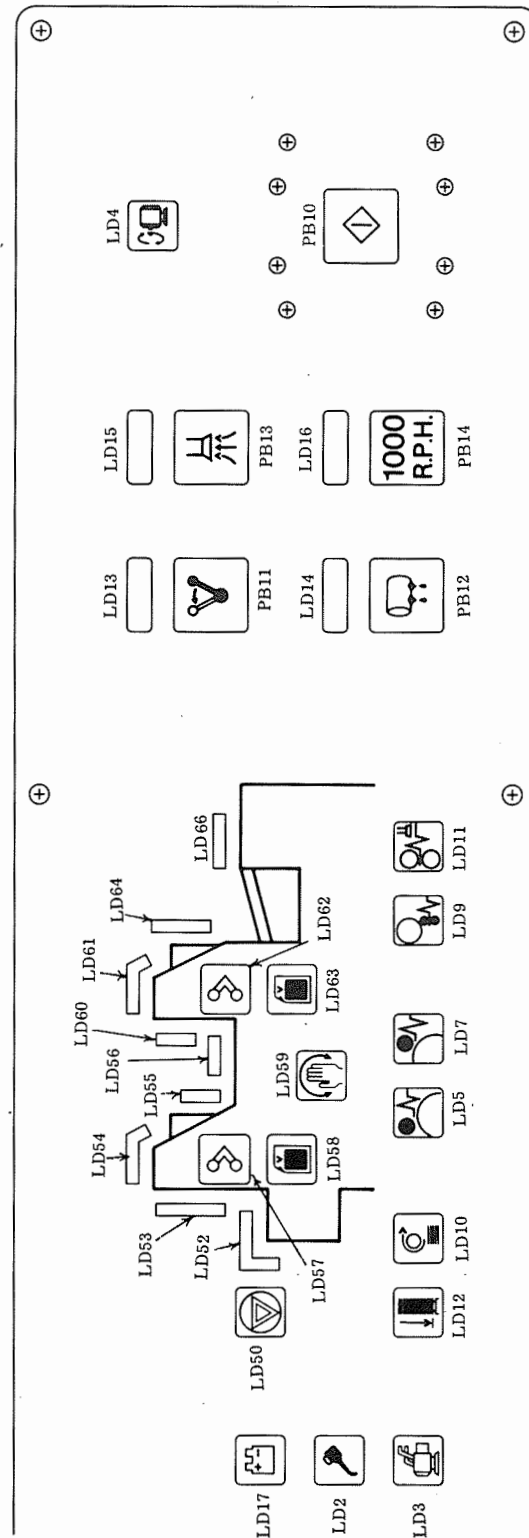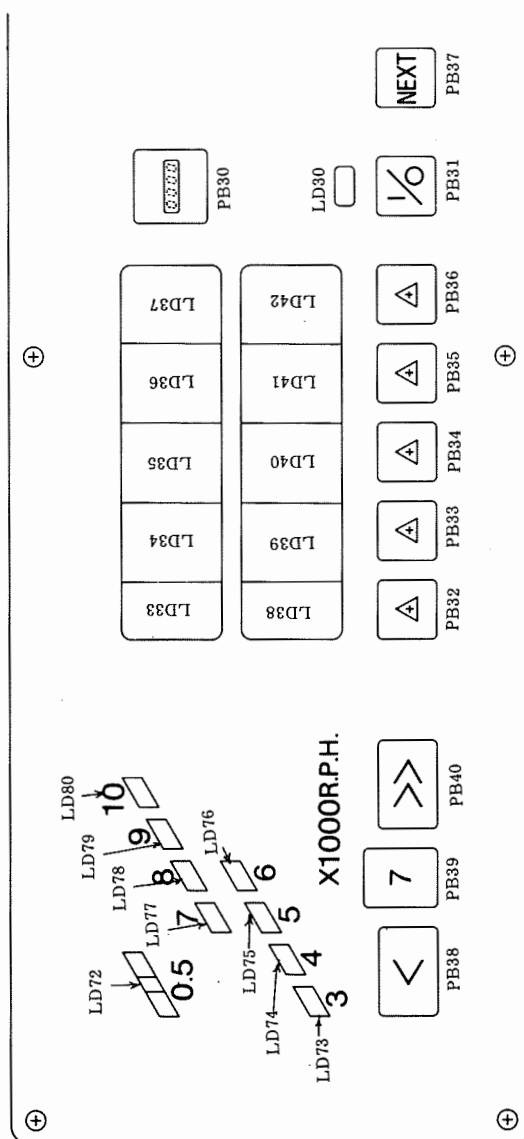
13. Output checking program

This machine has output checking programs. It is used to check the circuits, for example the solenoid and the motor. The output checking program on this machine is divided into 8 groups, the group 1 through group 8. So each section listed below can be checked individually.

Group 1 ~ 4 ... Used for checking each indication on the main control panel.

Group 5 .... Used for checking the solenoids, the pump motor, and the spray device on the operation side.

Group 6 .... Used for checking the solenoids on the non operation side.

Group 7 .... Used for checking the inverter control circuit board.

Group 8 .... Used for checking the input matrix select lines and the tape inserter.

(1) Output checking program procedures

a) When inputting the output checking program
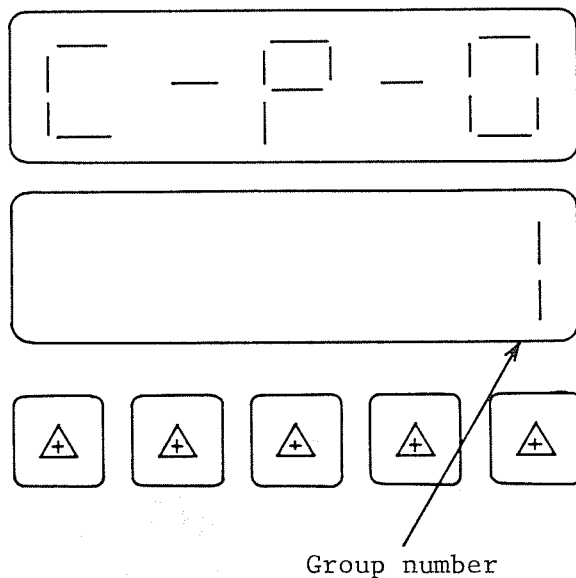
To enter the output checking program, keep pushing the second unit reverse inching button and turn on the main power and the C-P-O (Check Program for Output) will appear on the sheet counter upper display and the group number will be shown on the sheet counter lower display. With the power ON, the group number 1 is indicated and the group 1 output checking will be done.

Group number

b) To change the group number
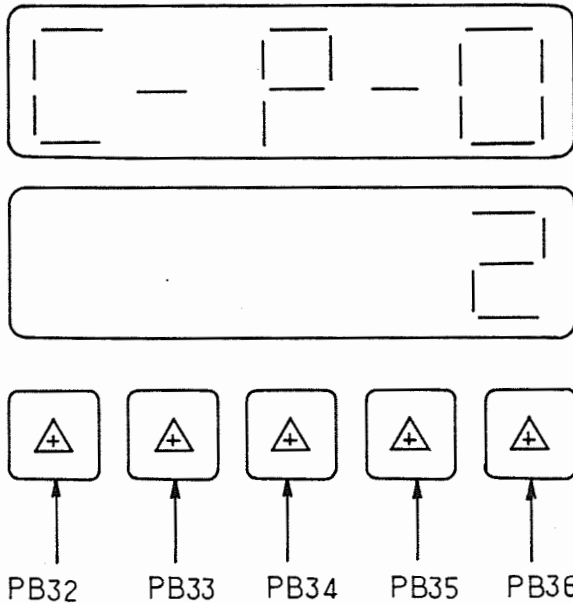
When pushing any one of the set buttons (PB32 ~ PB36) on the sheet counter, the group number for the output checking program will be advanced. However depending on the timing when pushing any one of the PB32 through PB36, the group number may not change at first, therefore keep pushing the button until the group number changes.

PB32   PB33   PB34   PB35   PB36

c) Output checking procedure

First select the solenoid or LED group number that needs to be checked. The output checking program will be on the LED or the solenoid and check each one in order. If the LED or the solenoid do not go on, check the circuit by using the output circuit diagram.

d) When finishing the output checking program

When finishing the output checking program, turn the main power switch OFF.

(2) Group 1
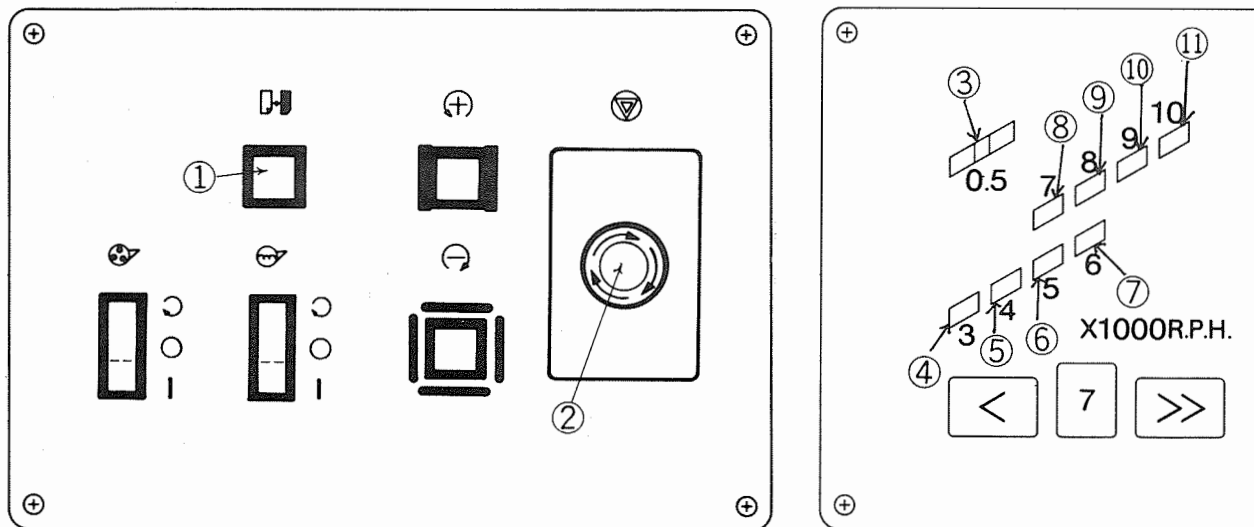
The second unit inching control panel and the speed indicator section on the main control panel light up one at a time.

(3) Group 2
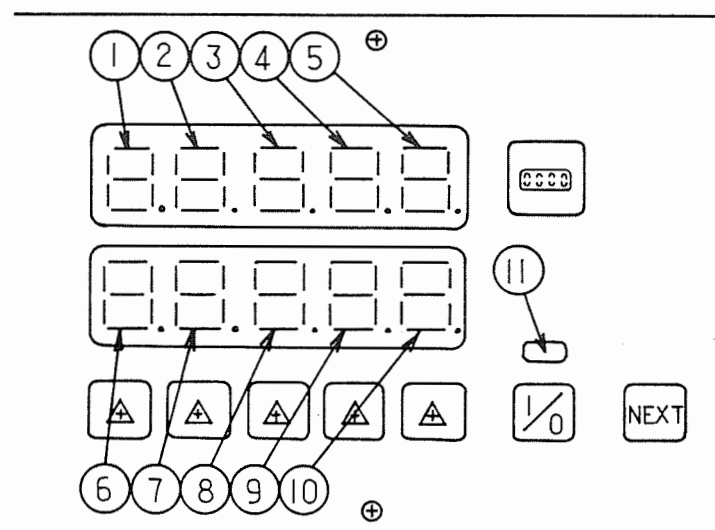
The sheet counter section on the main control panel lights up in order shown in the illustration on the left.

(4) Group 3
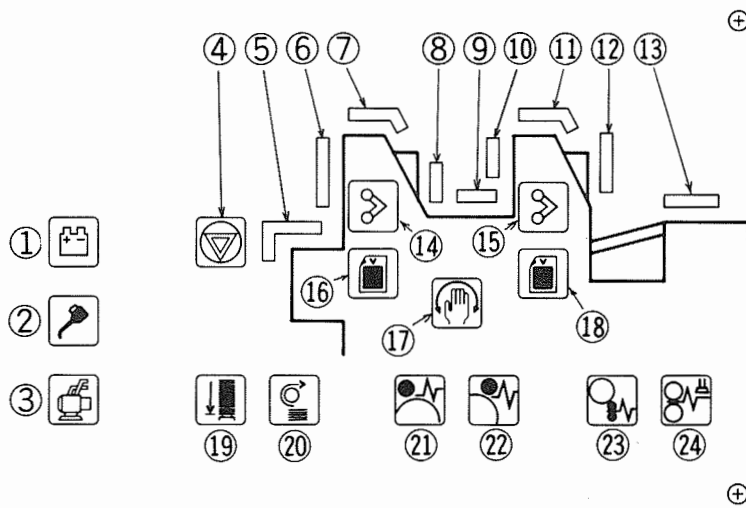
The OK monitor section on the main control panel lights up in order shown in the illustration on the left.

(Note)

Each reset button lamp on the sub control panel lights up at the same time when (2) and (3) above are checked.

(5) Group 4
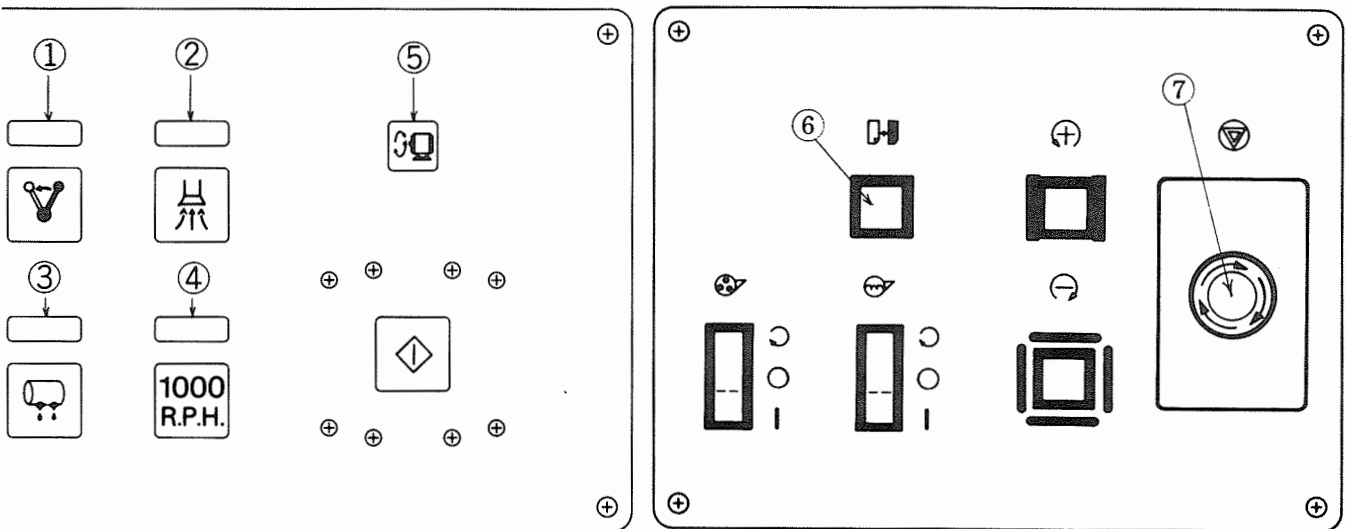
The upper indication section on the main control panel and the indication section on the first unit inching control panel light up one at a time.

(6) Group 5
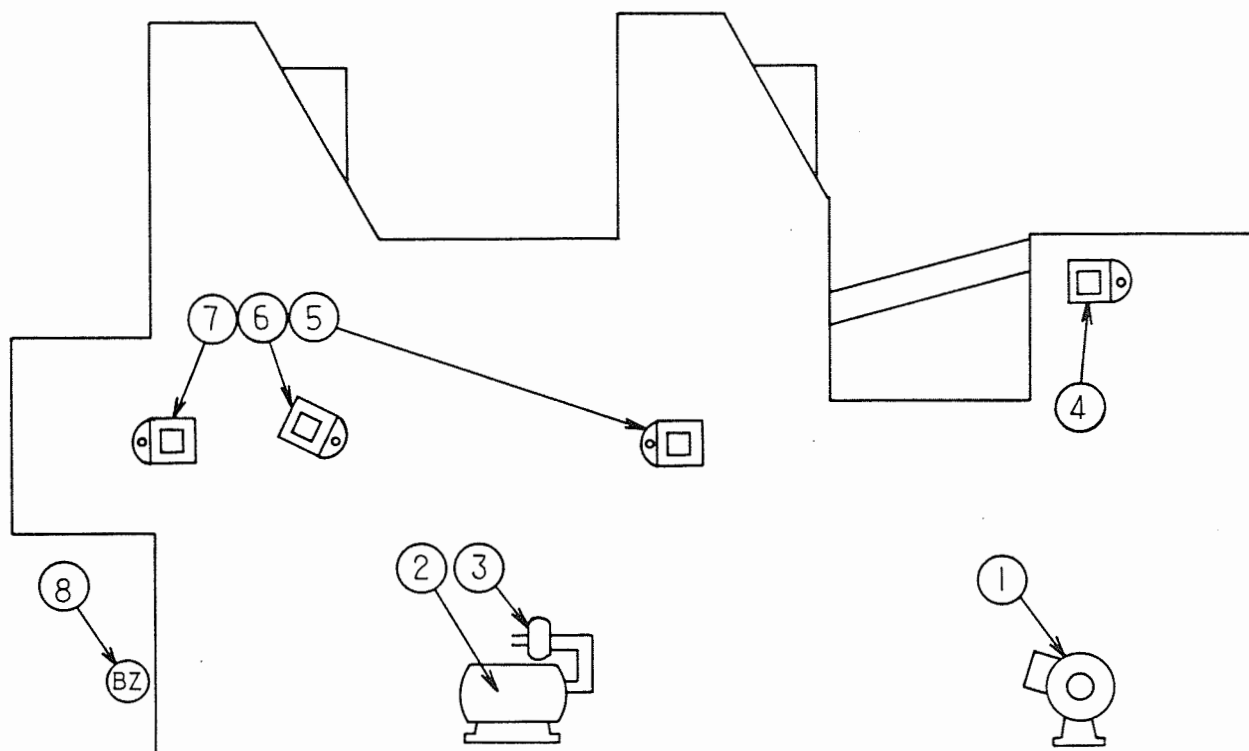
1) The pump motor will turn ON.

2) The spray device motor will turn ON.

3) The spray valve will turn ON.

4) The feed OFF solenoid will turn ON.

5) The first unit cylinder ON solenoid will turn ON.

6) The second unit cylinder ON solenoid will turn ON.

7) The delivery table dolly lowering solenoid will turn ON.

8) The paper jam buzzer will sound.

(7) Group 6
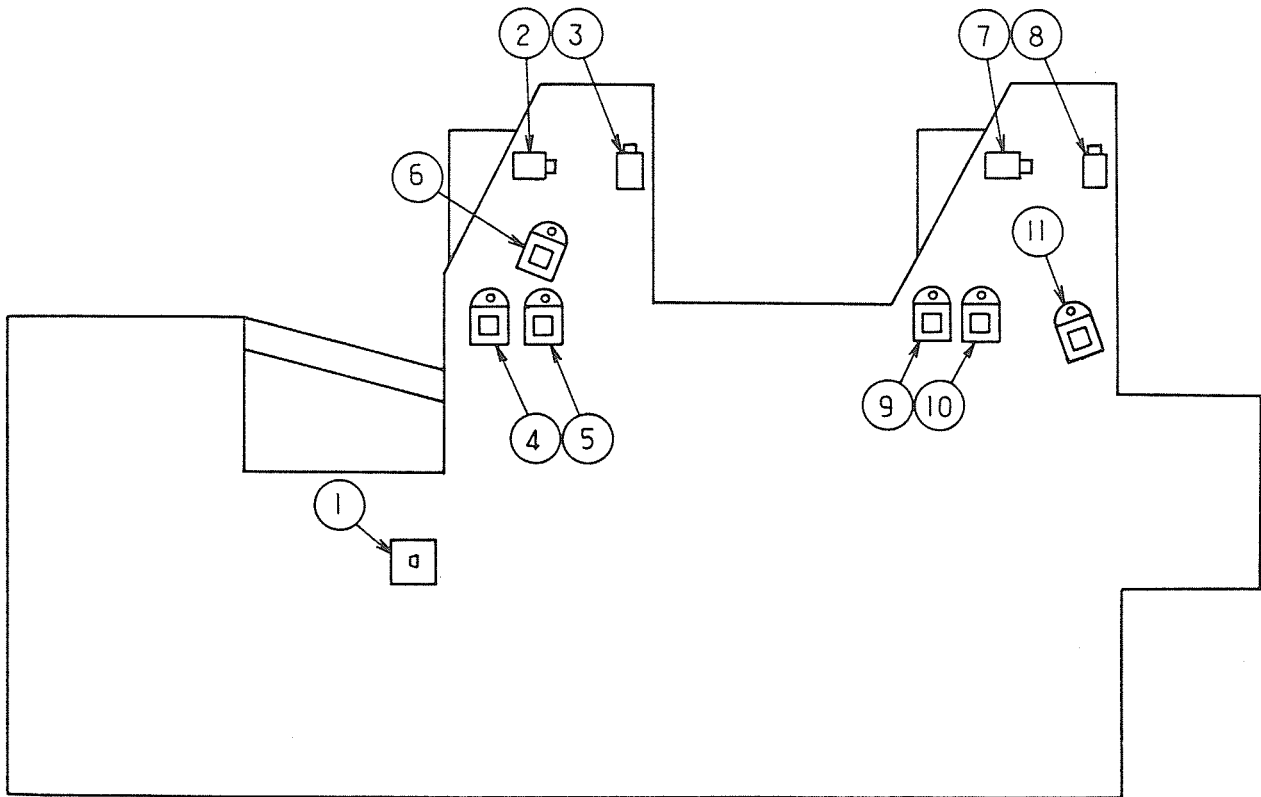
The solenoids on the non operation side will turn ON in order shown in the illustration above.

(8) Group 7 (Inverter control circuit)
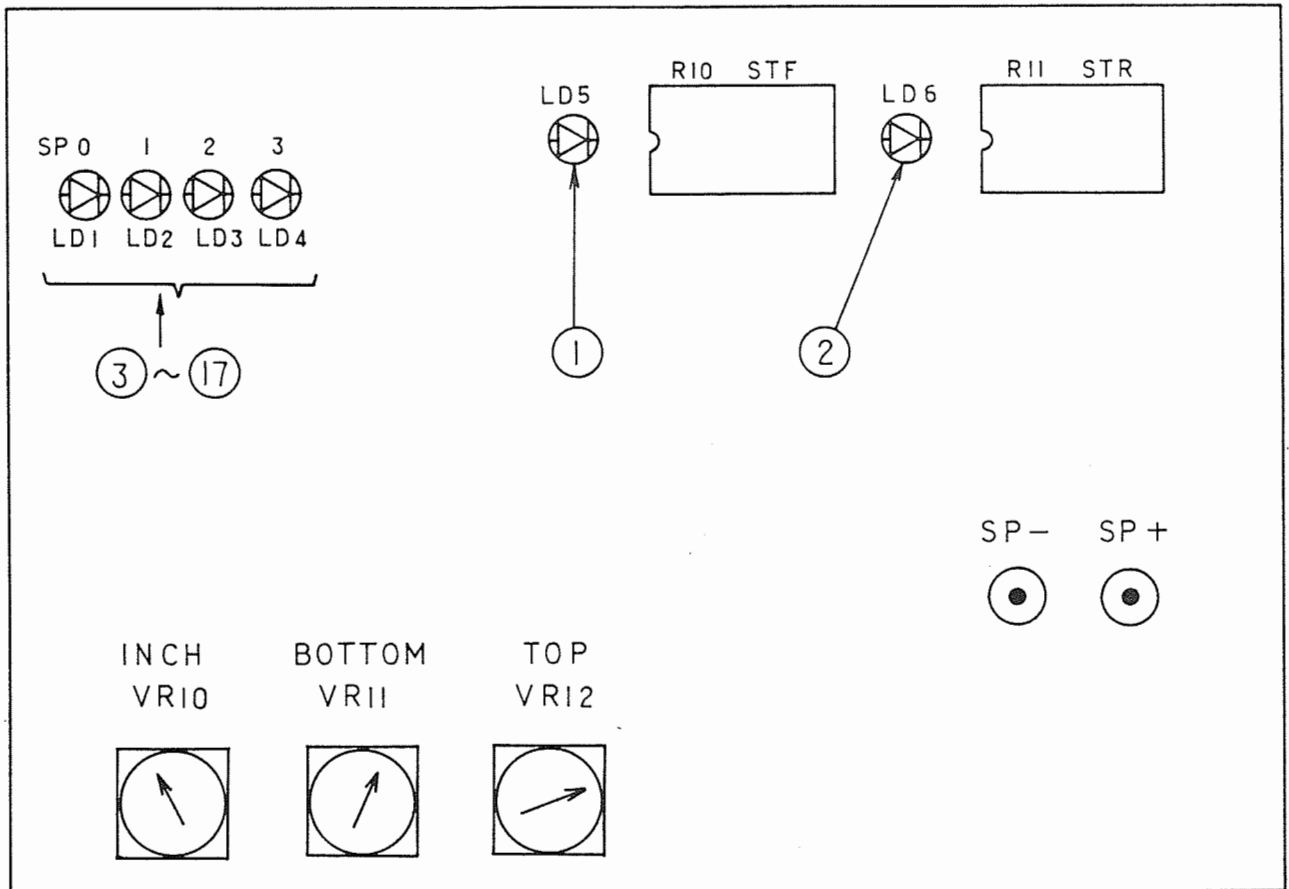
1) The R10 (STF) will turn ON for a moment. The drive motor will not rotate because the time that it is ON is too short.

2) The R11 (STR) will turn ON for a moment. The drive motor will not rotate because the time that it is ON is too short.

3) ~ 17)

The 3,000rph through the 10,000rph speed setting increases gradually. For the speed setting signal checking procedures, see 6. The inverter control board, (3) The speed setting circuit checking procedure (page 37).

(9) Group 8
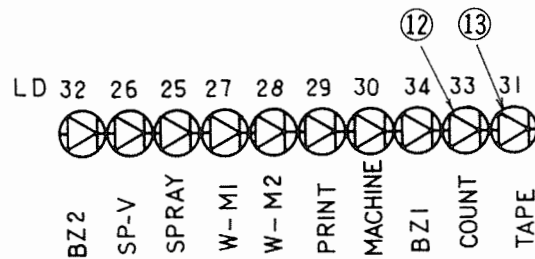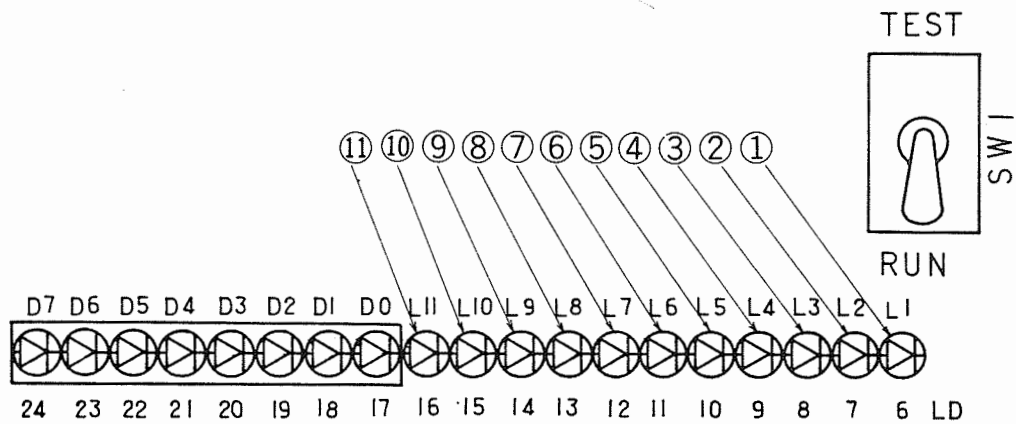
1) ~ 11)

   Each input matrix select line from L1 to L11 go on one at a time. At
   this time, the data line checking LED D0 through D7 corresponds with the
   select line.

12) The output of the tape inserter count signal.

13) The output of the output signal to the tape inserter.

14. The terminals for optional accessories and DS2

(1) Tape inserter
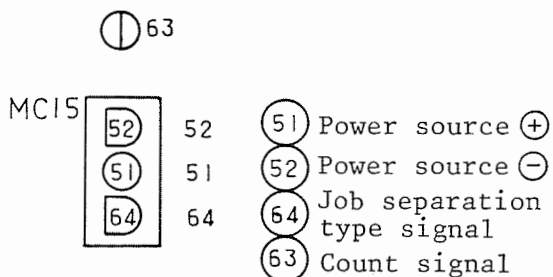
a) The job separation type
Connect the connector from the tape inserter to the MC15 connector only.

b) The preset number of copies type
Connect the connector from the tape inserter to the MC15 connector and connect the line (63) to the count signal terminal.

(2) Feeder safety cover
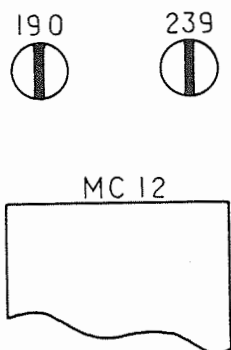
For the machines that the safety cover is mounted on the feeder section, do not connect anything to the wire no.190 and no.239 tabs.
For the machines that the safety cover is not mounted on the feeder section, the wire no.190 and no.239 tabs are connected by a jumper wire to each other. If there is not a jumper line, the machine cannot be rotated.

(3) 24V terminal base
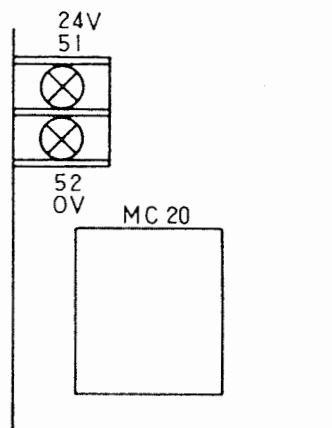
The output of this terminal base is DC24V. When needing a DC24V power source, use it. But do not use it over the maximum electric current of 1A.

(4) CIS3

```
        | P
        ┌─────┐
        │ □ ─── |92
        │ □ ─── |93
        │ □ ─── |94
        │ □ ─── |95
        │ □
        │ □ ─── 239
        │ □ ─── 239
  CIS3  │ □ ─── 239
        │ □ ─── 239
        │ □
        └─────┘
        |OP
```
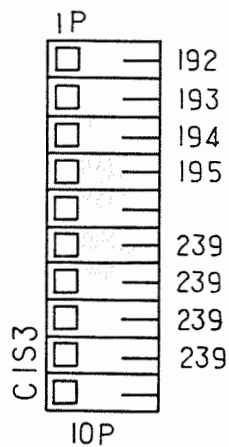
The CIS3 is an extra input terminal. When connecting the switch point of contact between the wires no.192 through no.195 and the wire no.239, they are inputted to each L9, D2 through D5. However, there is no program for these input now. If the specifications change and increase the input points, these will be used.

(5) DS2

When the blanket cleaning device is not mounted

```
      DS2
  ┌──────────┐
O │ ■■■ │ ─ |
F │          │
F │          │ ─ N
  └──────────┘
```

When the blanket cleaning device is mounted

```
      DS2
  ┌──────────┐
O │    ■■ │ ─ |
F │          │
F │          │ ─ N
  └──────────┘
```
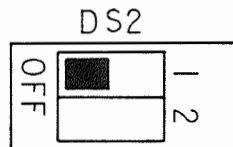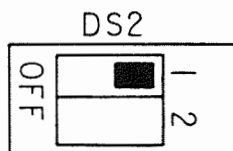
a) DS2-1

This is the switch for the blanket cleaning device (option) input if it is mounted. If there is no blanket cleaning device on the machine, turn the DS2-1 OFF. And if there is a blanket cleaning device on the machine, turn the DS2-1 ON. Therefore if the blanket cleaning device is mounted later, turn this DS2-1 ON.

b) DS2-2

This switch is an extra one. Although it does not have any effect when moving it to either side.

15. The CS3 and CS4 timing switches

(1) The CS3 and CS4 setting procedures
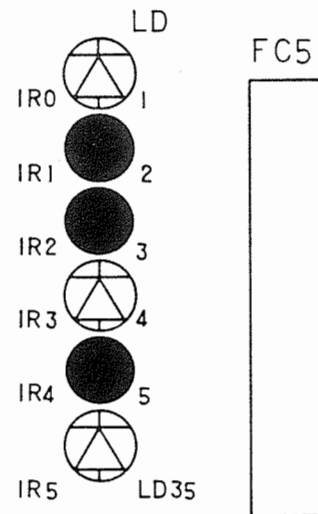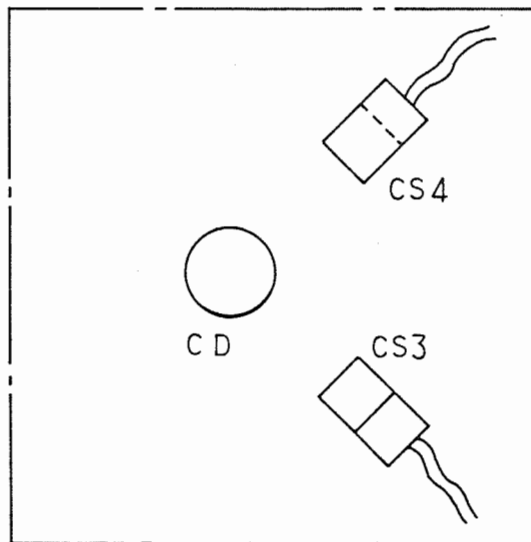
The CS3 and CS4 actuation confirmation is checked by the LD2, LD3, and the LD5 on the connector board.

   ° With the CS3 ON ..... LD2 is OFF

   ° With the CS4 ON ..... LD3 is OFF

                      ... LD5 is ON

The timing on the timing plate that turns the CS3 and CS4 ON/OFF is as shown below.
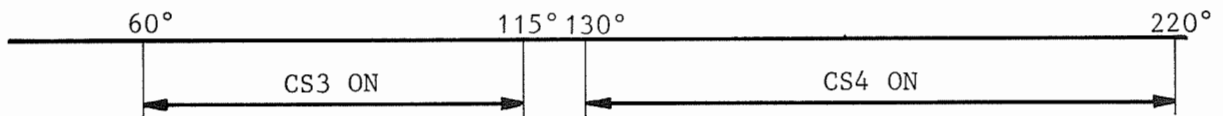
   ° CS3 ..... ON in the 60° to 115° section

   ° CS4 ..... ON in the 130° to 220° section

The timing that turns the CS3 and the CS4 ON/OFF has to be adjusted at only one point, then the other 3 points will be set automatically. Therefore when adjusting, adjust the timing so that the CS3 turns ON on 60°.

(2) Paper feed delayed timing detection

The paper feed delayed timing detection is done by using the timing switch (CS3) and the photo sensor (PH1) on the feeder board. When the sheet of paper reaches the PH1, if the CS3 is OFF, it will be judged that the paper feed timing is delayed. Therefore, the sheet of paper has to reach the PH1 between 60° and 115° on the timing plate.

(Reference) If you think that the paper feed timing is not delayed, the reaching timing should be 68°.

(3) Sheet count

The sheet count is done by the timing switch CS3 and the photo sensor (PH1) on the feeder board. When the CS3 turns OFF (115°), the sheet counter adds one if the PH1 detects the sheet of paper and outputs the count signal (For the tape inserter).

(4) Feed jam

The feed jam detection is done by the timing switches CS3, CS4, the photo sensor (PH1) on the feeder board and the paper feed drum photo sensor (PH4). When the CS3 turns OFF (115°), there is a sheet of paper over the PH1, and when the CS4 turns ON after one rotation (130°) and the sheet of paper has not reached the PH4, this will be detected as a feed jam.

(5) The first unit cylinder ON

The first unit cylinder ON detection is done by the timing switch CS4 and the paper feed drum photo sensor (PH4). When the CS4 turns ON (130°), it judges whether there is a sheet of paper over the PH4. Then turns the first unit cylinder ON solenoid ON or OFF.

(6) The second unit cylinder ON

The second unit cylinder ON detection is done by the timing switch CS4 and the paper feed drum photo sensor (PH4). When the CS4 turns ON (130°), it judges whether there is a sheet of paper over the PH4. Then turns the second unit cylinder ON solenoid ON or OFF when the CS4 turns OFF (220°).

16. Lowering the delivery table dolly

This machine uses an capacitance sensor to lower the delivery table dolly.
The sensitivity should be adjusted in the following procedure:

a) With no paper piled on the delivery table
   dolly, turn the adjustment screw (2) in
   the clockwise direction until the LED (1)
   just lights up.

LED ①

b) Turn the adjustment screw (2) in the coun-
   terclockwise direction by approximately 90
   degrees from the position where the LED
   (1) just lights up.

Adjustment screw ②
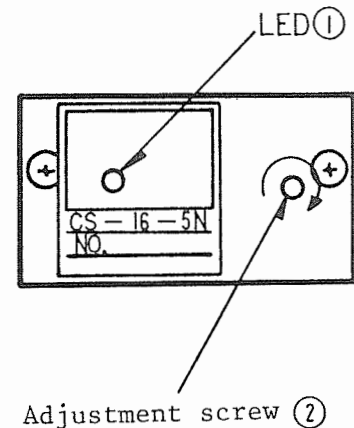
This is merely a basic adjustment. Be sure to check the following after
the sensitivity adjustment is finished.

(Checking) Run the machine and feed sheets of paper. Then check that the
           capacitance sensor detects a sheet of paper consistantly and the
           delivery table dolly lowers.
           If the delivery table dolly does not lower, turn the adjustment
           screw (2) in the clockwise direction to increase the
           sensitivity. If the delivery table lowers irrespective of the
           paper feed or delivery, turn the adjustment screw (2) in the
           counterclockwise direction to reduce the sensitivity.

(Note)   If the surface of the delivery table dolly lowering switch is
           dirty with foreign particles (spray powder and paper dust), the
           switch may malfunction. Be sure to always clean the surface
           of the switch.

17. Flow charts

The flow charts explain this machines control program, and explain every function sequence of the machine at each stage. Use these to learn the basic functioning and sequencing of the machine operation and to check the input and the output for after sales service. On the right side of the flow chart the explanation of the parts is given.

[Page]

(1) Turn on the power

This is the program used only when turning on the main power.

```
      ┌──────────────┐
      │  Turn on     │
      │  the power   │
      └──────┬───────┘
             ↓
      ┌──────────────┐
      │ Total output OFF │
      └──────┬───────┘
             ↓
          ◇ Battery ◇
   OK ←──◇ for the ◇
          ◇ backup? ◇
             │ NG
             ↓
      ┌──────────────┐
      │  LD17 ON     │
      └──────┬───────┘
             ↓
          ◇ PB22 ◇ ──── ON ──────┐
             │                    │
             ↓                    │
          ◇ PB23 ◇ ── ON ──┐      │
             │             ↓      ↓
             │      ┌──────────┐ ┌──────────┐
             │      │ Output   │ │ Input    │
             │      │ checking │ │ checking │
             │      │ program  │ │ program  │
             │      └──────────┘ └──────────┘
             ↓
      ┌──────────────┐
      │  PL2 Set     │
      └──────┬───────┘
             ↓
      ┌──────────────┐
      │  PL22 Set    │
      └──────┬───────┘
             ↓
      ┌──────────────┐
      │  LD30 Set    │
      └──────┬───────┘
             ↓
      ┌──────────────┐
      │  R16 ON      │
      └──────┬───────┘
             ↓
      ┌──────────────┐
      │ Main program │
      └──────────────┘
```

Sign	LD17	Name	Battery warning lamp
Remarks	When the battery on the CPU board is weak, the LD17 will light.		

Sign	PB22	Name	The second unit normal rotation inching button
Check line	L6	Check data	D1
Remarks			

Sign	PB23	Name	The second unit reverse rotation inching button
Check line	L6	Check data	D2
Remarks			

Sign	PL2	Name	The first unit ON/OFF lamp
Memorizes the power OFF condition and indicates that condition.			

Sign	PL22	Name	The second unit ON/OFF lamp
Memorizes the power OFF condition and indicates that condition.			

Sign	LD30	Name	Count ON/OFF lamp
Memorizes the power OFF condition and indicates that condition.			

Sign	R16	Name	Feed OFF relay
Remarks			

(2) Green lamp
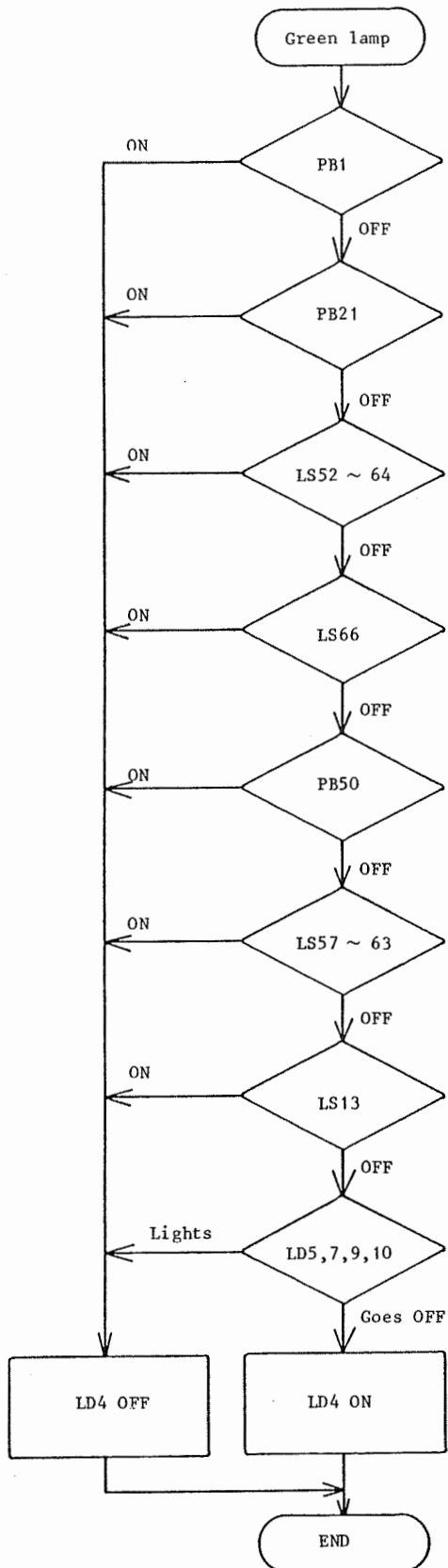
This is the program that lights the ON or OFF green lamp.

```
        Green lamp
            │
       ON   ▼
    ◄────◄ PB1
            │ OFF
       ON   ▼
    ◄────◄ PB21
            │ OFF
       ON   ▼
    ◄────◄ LS52 ~ 64
            │ OFF
       ON   ▼
    ◄────◄ LS66
            │ OFF
       ON   ▼
    ◄────◄ PB50
            │ OFF
       ON   ▼
    ◄────◄ LS57 ~ 63
            │ OFF
       ON   ▼
    ◄────◄ LS13
            │ OFF
     Lights ▼
    ◄────◄ LD5,7,9,10
            │ Goes OFF
            ▼
 ┌─────────┐  ┌─────────┐
 │ LD4 OFF │  │ LD4 ON  │
 └─────────┘  └─────────┘
       │           │
       └─────┬─────┘
             ▼
           END
```

Sign	PB1	Name	The first unit emergency stop button
Check line	L5	Check data	D0
Remarks			

Sign	PB21	Name	The second unit emergency stop button
Check line	L6	Check data	D0
Remarks			

Sign	LS52~64	Name	Safety cover switch
Check line	L10	Check data	D0 ~ D7
Sign	LS66	Name	Safety cover switch(Option)
Check line	L9	Check data	D0
Remarks	The cover switches are all N.C. Therefore the checking LEDs usually light and when the cover is opened, the light goes off.		

Sign	PB50	Name	Delivery section emergency stop button
Check line	L11	Check data	D0
Sign	LS57~63	Name	Safety switch
Check line	L11	Check data	D2 ~ D6
Remarks	The emergency stop button and the safety switches are all N.C. Therefore the checking LEDs usually light and when the switch operates, the light goes off.		

Sign	LS13	Name	Delivery jam switch
Check line	L2	Check data	D7
Remarks			

Sign	LD5	Name	The second unit blanket jam lamp
Sign	LD7	Name	The first unit blanket jam lamp
Sign	LD9	Name	Feed jam lamp
Sign	LD10	Name	Delivery jam lamp

Sign	LD4	Name	Green lamp
Remarks			

72

(3) Drive motor operation

```
        ┌──────────────────┐
        │  Drive motor     │
        │  operation       │
        └────────┬─────────┘
                 │
                 ▼
              ╱PB10╲──── OFF ──────────────┐
              ╲    ╱                        │
                │ ON                        │
                ▼                           │
     ON ──────╱R10, R11╲                   │
     │        ╲        ╱                    │
     │           │ OFF                      │
     │           ▼                          │
     │  ON ──╱Safety switch╲                │
     │  │    ╲            ╱                  │
     │  │       │ OFF                        │
     ▼  ▼       ▼                           │
  ┌─────────┐ ┌─────────────┐               │
  │Buzzer   │ │Buzzer sounds│               │
  │sounds   │ │(0.1 sec)    │               │
  │(1 sec)  │ └──────┬──────┘               │
  └────┬────┘        ▼                      │
       │     ┌─────────────┐                │
       │     │ LD5,7,9,10  │                │
       │     │    OFF      │                │
       │     └──────┬──────┘                │
       │            ▼                       │
       │     ┌─────────────┐                │
       │     │  R10 ON     │                │
       │     └──────┬──────┘                │
       └────────────┤                       │
                    ▼                       │
                  ┌────────┐◄───────────────┘
                  │  END   │
                  └────────┘
```
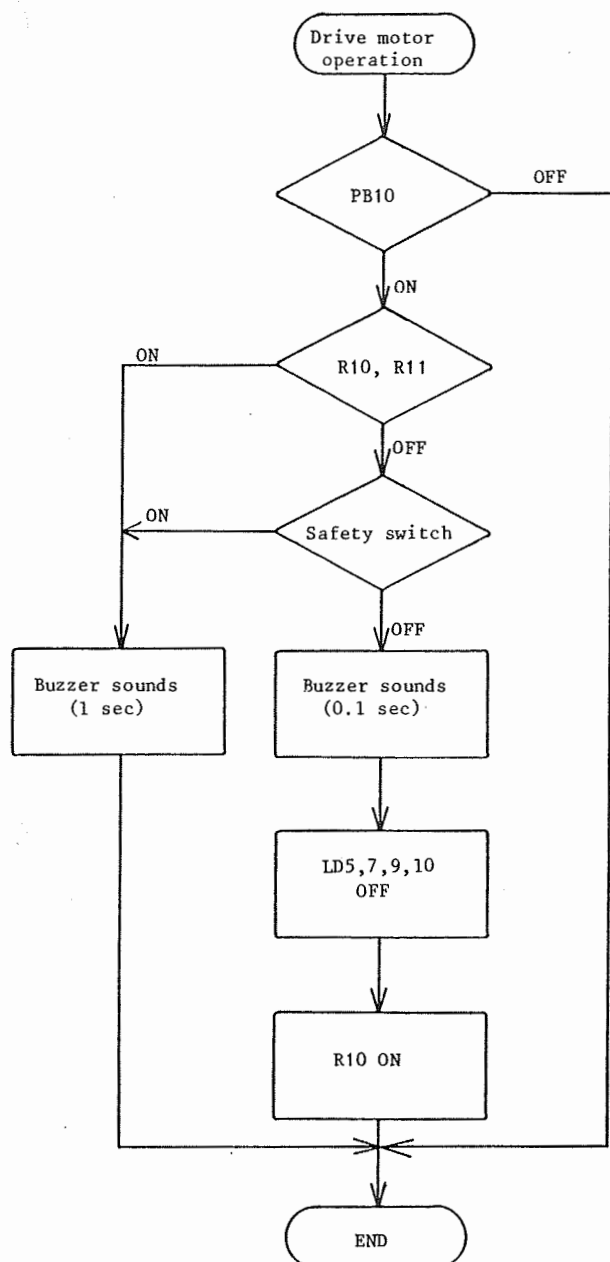
Sign	PB10	Name	Start Button
Check line	L8		Check data	D3
Remarks			

Sign	R10	Name	Motor normal rotation relay
Sign	R11	Name	Motor reverse rotation relay
Remarks			

Sign		Name	Safety switch
Remarks	If even one safety switch actuates, the machine will stop.		

Sign	LD5	Name	The second unit blanket jam lamp
Sign	LD7	Name	The first unit blanket jam lamp
Sign	LD9	Name	Feed jam lamp
Sign	LD10	Name	Delivery jam lamp
Remarks			

Sign	R10	Name	Motor normal rotation relay
Remarks			

For the safety switches shown below if even only one actuates, the machine will stop.

Sign	Name	Sign	Name
PB1	The first unit emergency stop button	LS60	The first unit back safety cover switch
PB21	The second unit emergency stop button	LS61	The first unit top safety cover switch
LS13	Delivery unit jam switch	LS64	The first unit front safety cover switch
LS66	Feeder safety cover switch (Option)	PB50	Delivery section emergency stop button
LS52	Delivery section safety cover switch	LS57	The second unit safety bar switch
LS53	The second unit back safety cover switch	LS58	The second unit vertical image adjustment safety switch
LS54	The second unit top safety cover switch	LS59	Handwheel safety switch
LS55	The second unit front safety cover switch	LS62	The first unit safety bar switch
LS56	Impression cylinder safety cover switch	LS63	The first unit vertical image adjustment safety switch

(4) Drive motor stop

```
        ┌─────────────┐
        │ Drive motor │
        │    stop     │
        └──────┬──────┘
               │
               ▼
          ◇ LS13 ◇ ──ON──┐
               │          │
              OFF         ▼
               │    ┌──────────┐
               │    │ LD10 ON  │
               ▼    └────┬─────┘
     ◇ When both    YES  │
       operating ──────► │
       levers return     │
       to the position I │
               │         │
              NO         │
               ▼         │
       ◇ Paper jam? ─YES─►│
               │         │
              NO         │
               ▼         │
       ◇ LS52 ~ 64 ─ON──►│
               │         │
              OFF        │
               ▼         │
        ◇ LS66 ◇ ──ON───►│
               │         │
              OFF        │
               ▼         │
        ◇ PB50 ◇ ──ON───►│
               │         │
              OFF        │
               ▼         │
      ◇ LS57 ~ 63 ─ON───►│
               │         │
              OFF        │
               │   ┌───────────┐
               │   │ R10, R11  │
               │   │   OFF     │
               │   └─────┬─────┘
               └────┬────┘
                    ▼
               ┌─────────┐
               │   END   │
               └─────────┘
```
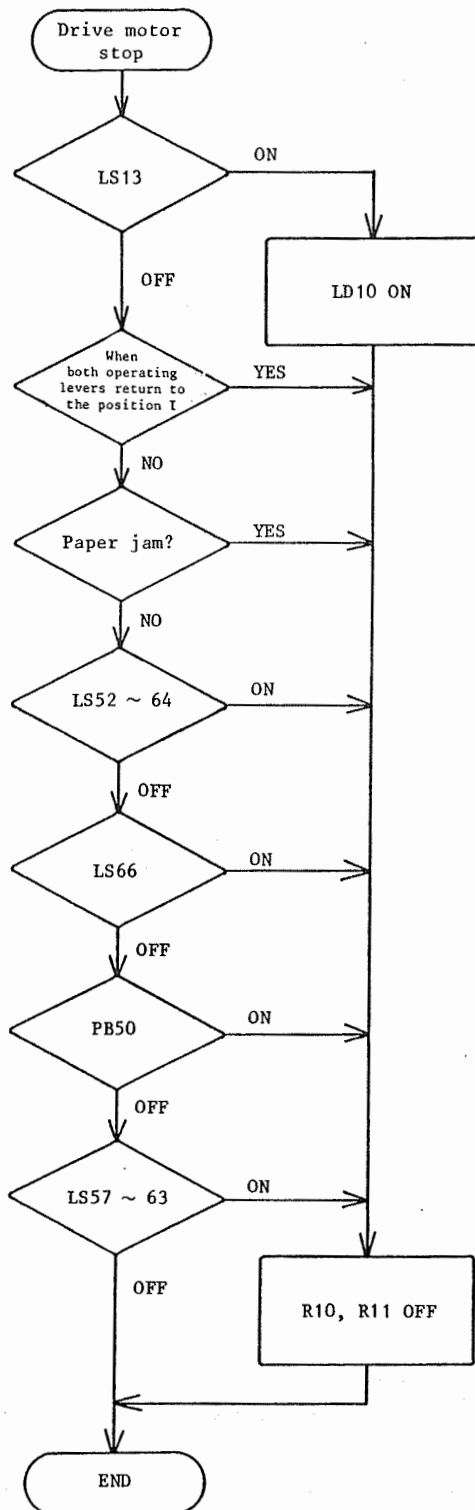
Sign	LS13	Name	Delivery jam switch	
Check line	L2		Check data	D7
Remarks				

Sign	LD10	Name	Delivery jam lamp
Remarks			

Sign	LS52~64	Name	Safety cover switch	
Check line	L10		Check data	D0 ~ D7
Sign	LS66	Name	Safety cover switch (Option)	
Check line	L9		Check data	D0
Remarks				

Sign	PB50	Name	Delivery section emergency stop button	
Check line	L11		Check data	D0
Sign	LS57~63	Name	Safety switch	
Check line	L11		Check data	D2~D6
Remarks				

Sign	R10	Name	Motor normal rotation relay
Sign	R11	Name	Motor reverse rotation relay
Remarks			

(5) The first unit inching
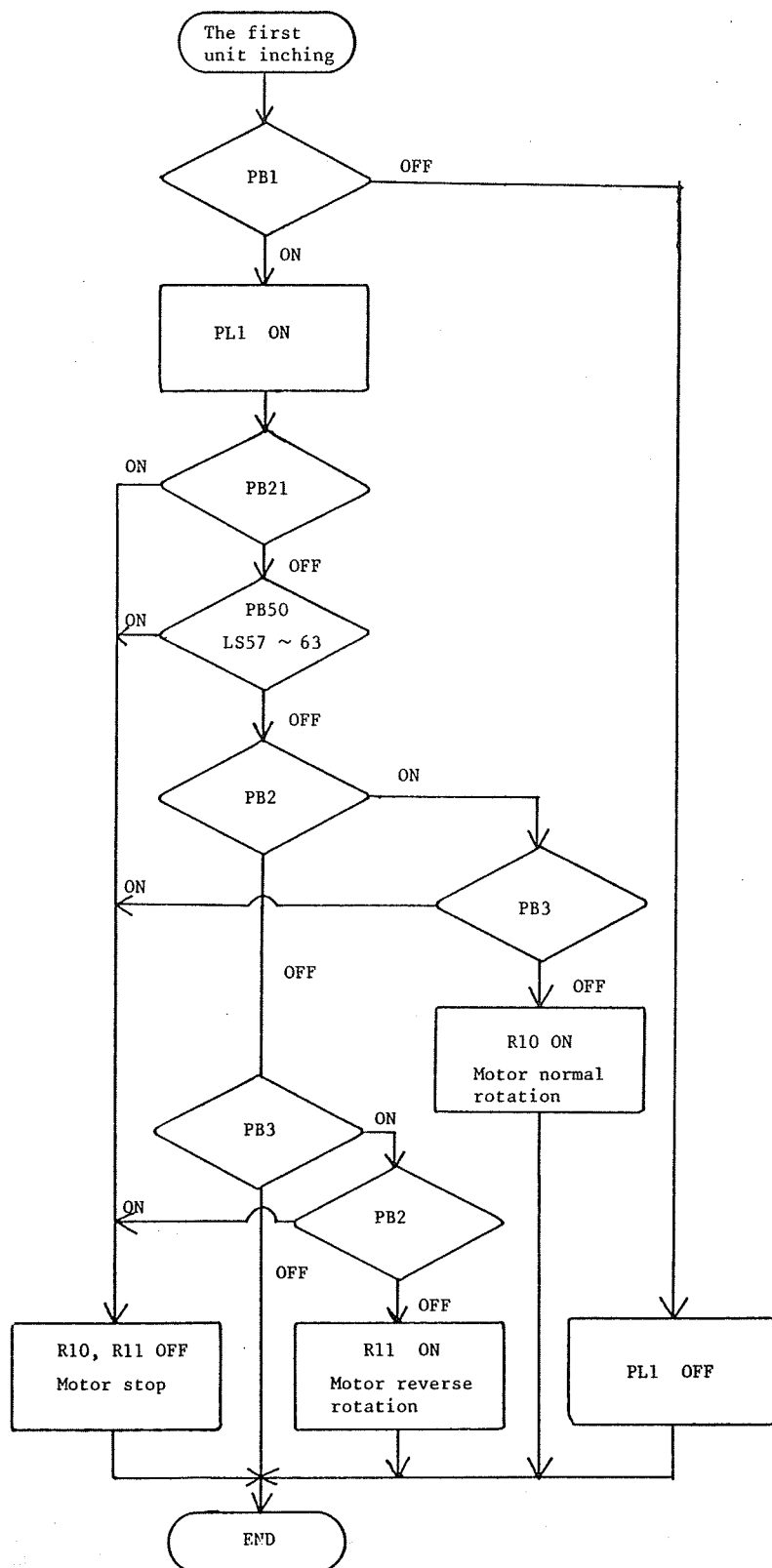
Sign	PB1		Name	The first unit emergency stop button
Check line	L5		Data line	D0
Remarks				

Sign	PL1		Name	The first unit emergency stop lamp
Remarks				

Sign	PB21		Name	The second unit emergency stop button
Check line	L6		Data line	D0
Remarks				

Sign	PB50		Name	Delivery section emergency stop button
Check line	L11		Data line	D0
Sign	LS57~63		Name	Safety switch
Check line	L11		Data line	D2~D6
Remarks				

Sign	PB2		Name	The first unit normal rotation inching button
Check line	L5		Data line	D1
Remarks				

Sign	PB3		Name	The second unit reverse rotation inching button
Check line	L5		Data line	D2
Remarks				

Sign	R10		Name	Motor normal rotation relay
Sign	R11		Name	Motor reverse rotation relay
Remarks				

(Note)

The inching movement time period from start to stop has been set to 0.6 seconds on the software.

(6) The second unit inching

The second unit inching

```
      ┌──────────────┐
      │  The second  │
      │ unit inching │
      └──────────────┘
             │
            PB21 ──── OFF ─────────────────┐
             │ ON                          │
      ┌──────────────┐                     │
      │   PL21  ON   │                     │
      └──────────────┘                     │
             │                             │
   ON ────  PB1                            │
             │ OFF                         │
   ON ──── PB50                            │
          LS57~63                          │
             │ OFF                         │
            PB22 ──── ON ──── PB23         │
             │ OFF            │ OFF        │
             │          ┌──────────┐       │
             │          │  R10  ON │       │
             │          │  Motor   │       │
             │          │  normal  │       │
             │          │ rotation │       │
   ON ────  PB23 ── ON ── PB22            │
             │ OFF        │ OFF            │
  ┌────────────┐  ┌──────────┐  ┌──────────┐
  │ R10,R11 OFF│  │  R11  ON │  │ PL21 OFF │
  │ Motor stop │  │  Motor   │  │          │
  │            │  │ reverse  │  │          │
  │            │  │ rotation │  │          │
  └────────────┘  └──────────┘  └──────────┘
             │
          ┌───────┐
          │  END  │
          └───────┘
```

Sign	PB21	Name	The second unit emergency stop button
Check line	L6	Data line	DO
Remarks			

Sign	PL21	Name	The second unit emergency stop lamp
Remarks			

Sign	PB1	Name	The first unit emergency stop button
Check line	L5	Data line	DO
Remarks			

Sign	PB50	Name	Delivery section emergency stop button
Check line	L11	Data line	DO
Sign	LS57~63	Name	Safety switch
Check line	L11	Data line	D2 ~ D6
Remarks			
Sign	PB22	Name	The second unit normal rotation inching button
Check line	L6	Data line	D1
Remarks			

Sign	PB23	Name	The second unit reverse rotation inching button
Check line	L6	Data line	D2
Remarks			

Sign	R10	Name	Motor normal rotation relay
Sign	R11	Name	Motor reverse rotation relay
Remarks			

(Note)

The inching movement time period from start to stop has been set to 0.6 seconds on the software.

(7) Plate clamp positioning

Flowchart:

- Plate clamp positioning
- Safety switch — ON → (loop back)
- OFF → During the machine rotation — YES → (loop)
- NO → PB2 — ON → R10 ON Motor normal rotation
- OFF → PB22 — ON → R10 ON Motor normal rotation
- OFF → PB3 — ON → R11 ON Motor reverse rotation
- OFF → PB23 — ON → R11 ON Motor reverse rotation
- OFF

Left branch:
- R10 ON Motor normal rotation → When CS1 turns OFF — NO (loop) / YES → R10 ON Motor normal rotation → When CS21 turns OFF — NO (loop) / YES → R10 OFF Motor normal rotation

Right branch:
- R11 ON Motor reverse rotation → When CS1 turns OFF — NO (loop) / YES → R11 ON Motor reverse rotation → When CS21 turns OFF — NO (loop) / YES → R11 OFF Motor reverse rotation

END

Sign		Name	Safety switch
Remarks	See (3) Drive motor operation (Page 73).		

Sign	PB2	Name	The first unit normal rotation inching button
Check line	L5	Check data	D1
Remarks			

Sign	PB22	Name	The second unit normal rotation inching button
Check line	L6	Check data	D1
Remarks			

Sign	PB3	Name	The first unit reverse rotation inching button
Check line	L5	Check data	D2
Remarks			

Sign	PB23	Name	The second unit reverse rotation inching button
Check line	L6	Check data	D2
Remarks			

Sign	CS1	Name	The first unit plate mounting position
Check line	L1	Check data	D5
Remarks			

Sign	R10	Name	Motor normal rotation relay
Sign	R11	Name	Motor reverse rotation relay
Remarks			

Sign	CS21	Name	The second unit plate mounting position
Check line	L2	Check data	D5
Remarks			

(8) Speed
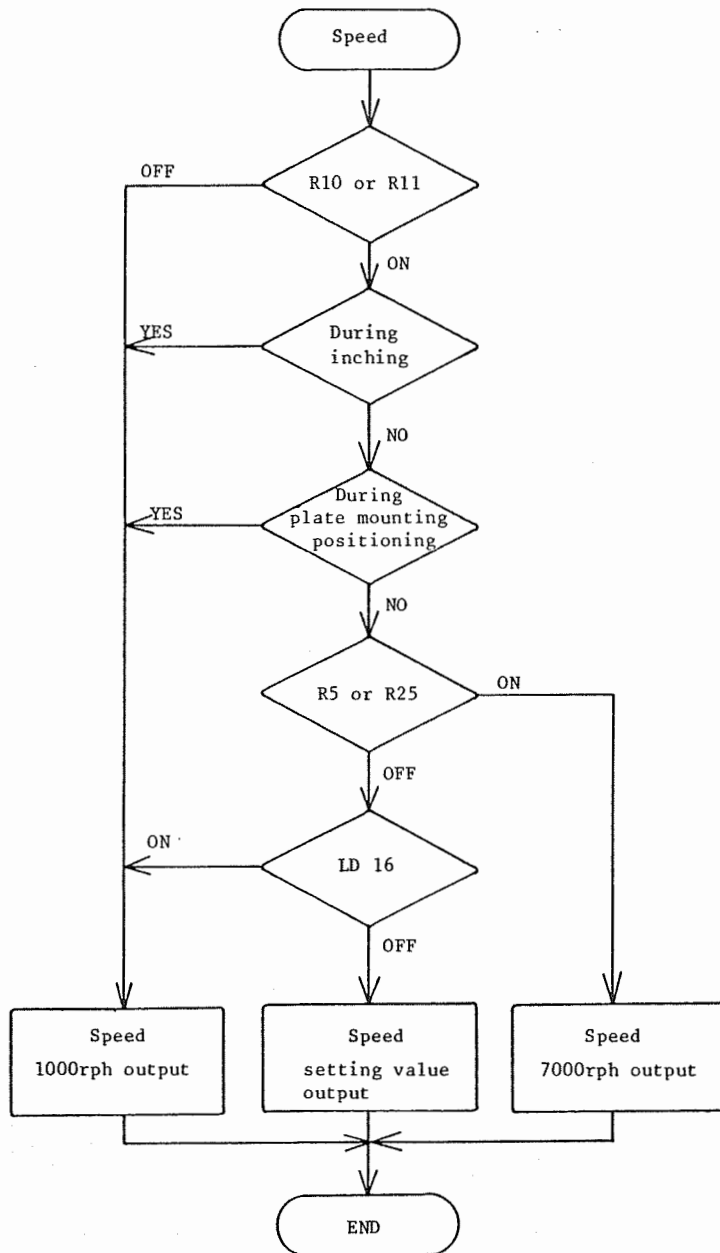
This is the program that sends the speed setting digital signal to the inverter control circuit.

Sign	R10	Name	Motor normal rotation relay
Sign	R11	Name	Motor reverse rotation relay
Remarks			

During the plate mounting means during the rotation to set the plate cylinder at the plate mounting position.

Sign	R5	Name	The first unit blanket cleaning relay
Sign	R25	Name	The second unit blanket cleaning relay
Remarks			

Sign	LD16	Name	1000rph button
Remarks			

The speed setting value is the speed that is set by using the PB38 through PB40.

```
              ┌─────────┐
              │  Speed  │
              └────┬────┘
                   │
                   ▼
        OFF    ◇ R10 or R11 ◇
      ◄────────────┤
                   │ ON
                   ▼
        YES    ◇ During ◇
      ◄──────── inching
                   │ NO
                   ▼
        YES    ◇ During
      ◄──────── plate mounting
               positioning ◇
                   │ NO
                   ▼
                ◇ R5 or R25 ◇ ──ON──┐
                   │ OFF            │
                   ▼                │
        ON     ◇ LD 16 ◇           │
      ◄────────────┤                │
                   │ OFF           │
                   ▼                ▼
  ┌──────────┐ ┌──────────┐ ┌──────────┐
  │  Speed   │ │  Speed   │ │  Speed   │
  │1000rph   │ │setting   │ │7000rph   │
  │output    │ │value     │ │output    │
  │          │ │output    │ │          │
  └────┬─────┘ └────┬─────┘ └────┬─────┘
       └───────────►│◄───────────┘
                    ▼
               ┌─────────┐
               │   END   │
               └─────────┘
```

(9) Pump motor
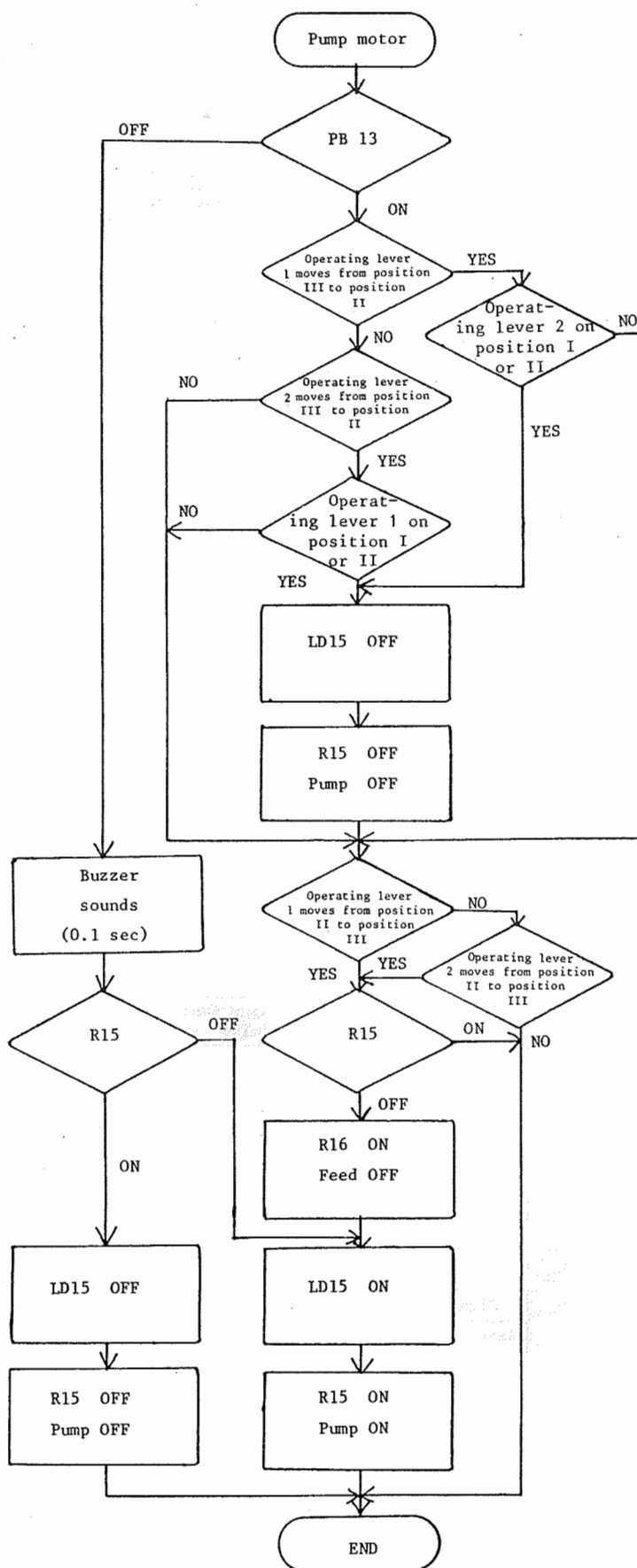
Sign	PB13	Name	Pump button
Check line	L8	Check data	D4
Remarks			

Sign	LS2, 3	Name	Operating lever 1
Check line	L1	Check data	D1, D2
Sign	LS21, 22	Name	Operating lever 2
Check line	L2	Check data	D0, D1
Sign	LS22, 23	Name	Operating lever 2
Check line	L2	Check data	D1, D2
Sign	LS1, 2	Name	Operating lever 1
Check line	L1	Check data	D0, D1
Remarks			

Sign	LD15	Name	Pump lamp
Remarks			

Sign	R15	Name	Pump relay
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

(10) Feed ON
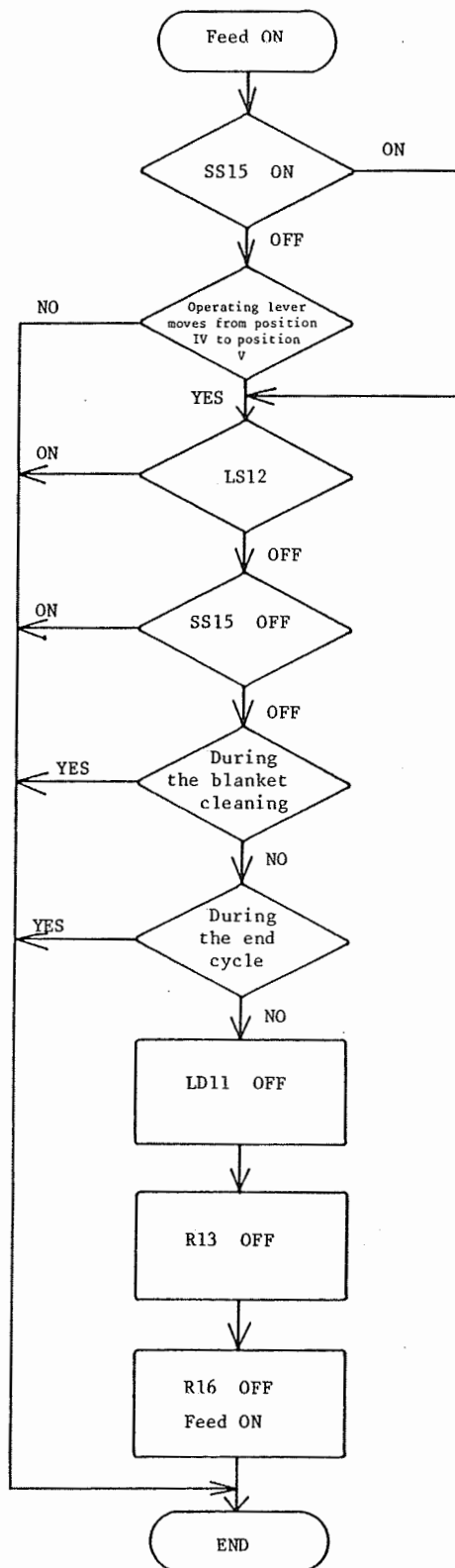
Sign	SS15 ON	Name	Feed ON switch
Check line	L1	Check data	D6
Remarks			

Sign	LS4, 5	Name	Operating lever 1
Check line	L1	Check data	D3, D4
Sign	LS24, 25	Name	Operating lever 2
Check line	L2	Check data	D3, D4
Remarks			

Sign	LS12	Name	Delivery table dolly lower limit switch
Check line	L2	Check data	D6
Remarks			

Sign	SS15 OFF	Name	Feed OFF switch
Check line	L1	Check data	D7
Remarks			

Sign	LD11	Name	Paper feed delayed timing lamp
Remarks			

Sign	R13	Name	Paper feed delayed timing relay
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

(11) Feed OFF

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	LS4, 5	Name	Operating lever 1
Check line	L1	Check data	D3, D4
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS24, 25	Name	Operating lever 2
Check line	L2	Check data	D3, D4
Remarks			

Sign	LS12	Name	Delivery table dolly lower limit switch
Check line	L2	Check data	D6
Remarks			

Sign	SS15 OFF	Name	Feed OFF switch
Check line	L1	Check data	D7
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

(12)   Starting the end cycle
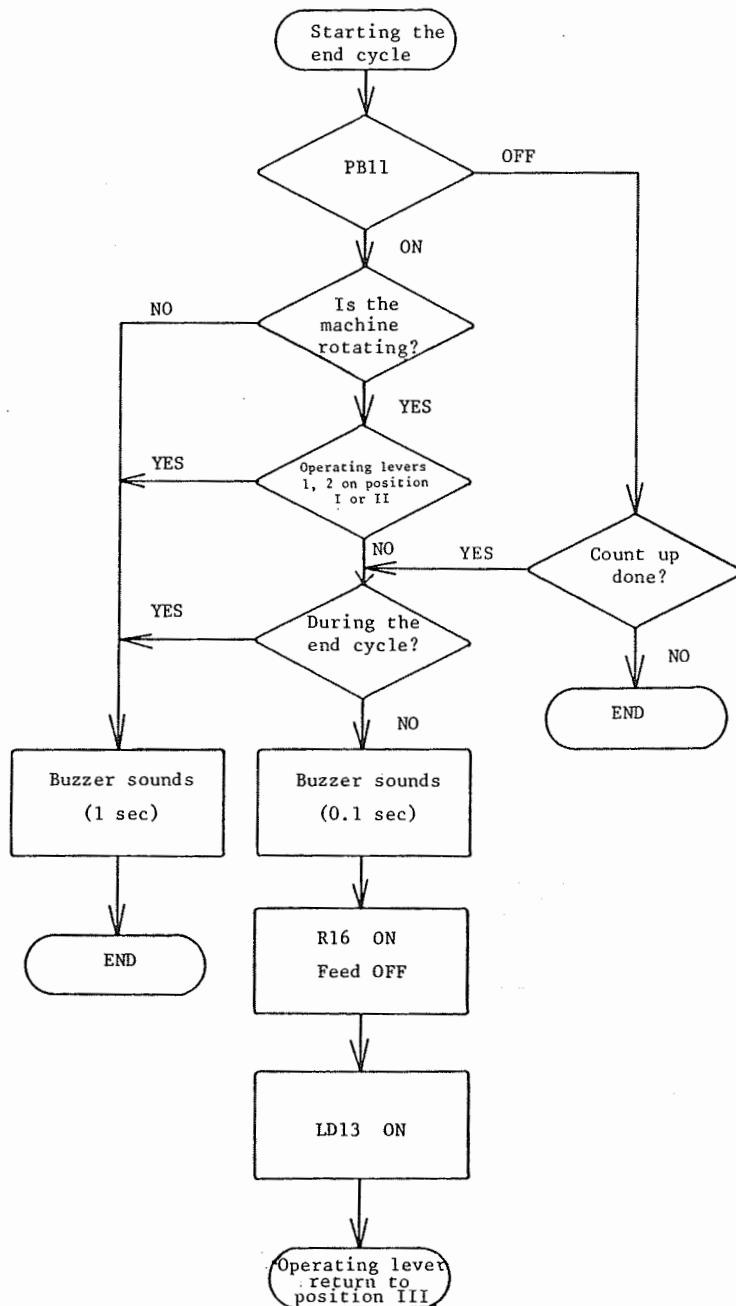
Sign	PB11	Name	End cycle button
Check line	L8	Check data	D0
Remarks			

Sign	LS1, 2	Name	Operating lever 1
Check line	L1	Check data	D0, D1
Sign	LS21, 22	Name	Operating lever 2
Check line	L2	Check data	D0, D1
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

Sign	LD13	Name	End cycle lamp
Remarks			

(13) Operating lever return to position III
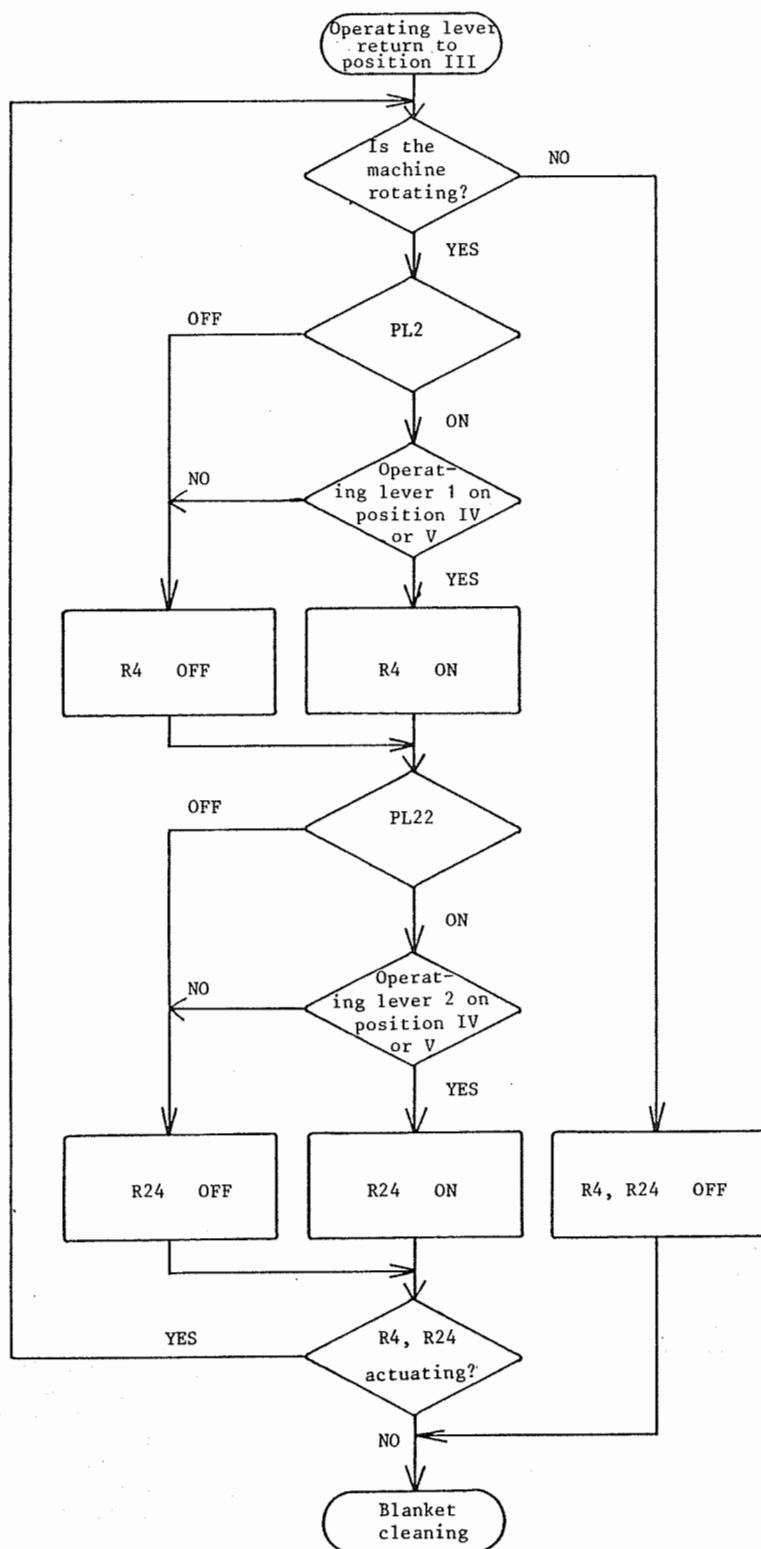
This is the program that returns the operating lever to position III during the end cycle.

```
        ┌─────────────────┐
        │ Operating lever │
        │   return to     │
        │  position III   │
        └────────┬────────┘
                 │
            ╱────┴────╲
           ╱  Is the   ╲      NO
          ╱   machine    ╲───────────────┐
          ╲  rotating?   ╱                │
           ╲            ╱                 │
            ╲────┬─────╱                  │
               YES                        │
                 │                        │
     OFF    ╱────┴────╲                   │
   ┌────────╲   PL2   ╱                   │
   │         ╲       ╱                    │
   │          ╲─────╱                     │
   │             │                        │
   │            ON                        │
   │        ╱────┴────╲                   │
   │   NO  ╱ Operating ╲                  │
   │ ┌────╱  lever 1 on ╲                 │
   │ │    ╲ position IV  ╱                │
   │ │     ╲   or V     ╱                 │
   │ │      ╲──────────╱                  │
   │ │          YES                       │
   │ │           │                        │
   │ ▼           ▼                        │
 ┌─┴─────┐   ┌───────┐                    │
 │ R4 OFF│   │ R4 ON │                    │
 └───┬───┘   └───┬───┘                    │
     │           │                        │
     └─────►─────┤                        │
                 │                        │
     OFF    ╱────┴────╲                   │
   ┌────────╲  PL22   ╱                   │
   │         ╲       ╱                    │
   │          ╲─────╱                     │
   │             │                        │
   │            ON                        │
   │        ╱────┴────╲                   │
   │   NO  ╱ Operating ╲                  │
   │ ┌────╱  lever 2 on ╲                 │
   │ │    ╲ position IV  ╱                │
   │ │     ╲   or V     ╱                 │
   │ │      ╲──────────╱                  │
   │ │          YES                       │
   │ ▼           ▼                     ▼  │
 ┌─┴─────┐   ┌───────┐         ┌──────────┐
 │R24 OFF│   │R24 ON │         │R4, R24 OFF│
 └───┬───┘   └───┬───┘         └─────┬────┘
     │           │                   │
     └─────►─────┤                   │
                 │                   │
       YES  ╱────┴────╲              │
   ┌────────╲ R4, R24 ╱              │
   │         ╲        ╱              │
   │          ╲actuating?╱           │
   │           ╲───┬────╱            │
   │              NO ◄───────────────┘
   │               │
   │          ┌────┴────┐
   │          │ Blanket │
   │          │cleaning │
   │          └─────────┘
```

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	LS4, 5	Name	Operating lever 1
Check line	L1	Check data	D3, D4
Remarks			

Sign	R4	Name	Operating lever 1 return relay
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS24, 25	Name	Operating lever 2
Check line	L2	Check data	D3, D4
Remarks			

Sign	R24	Name	Operating lever 2 return relay
Remarks			

(Note)
The R4 and the R24 keep actuating until the operating levers return to the position III.

(14) Automatic blanket cleaning
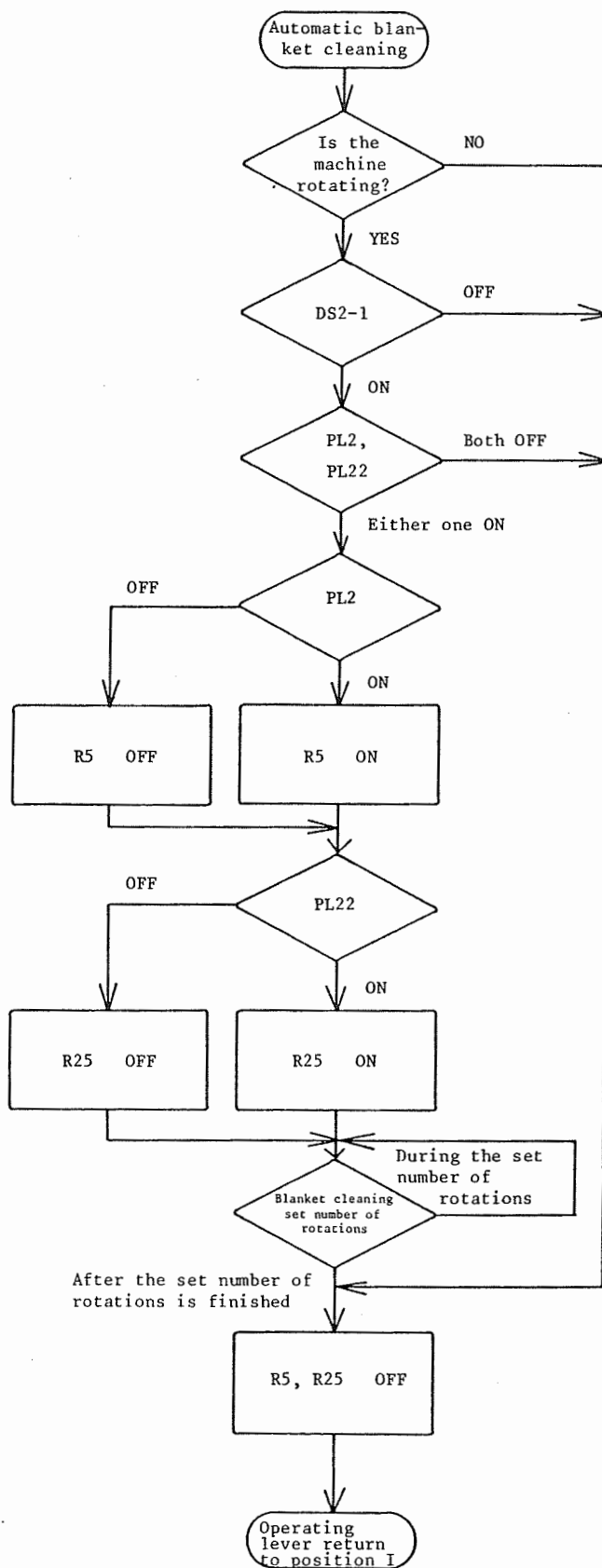
This is the blanket cleaning program during the end cycle.

```
        ┌─────────────────┐
        │ Automatic blan- │
        │ ket cleaning    │
        └────────┬────────┘
                 │
          ╱─────────────╲      NO
         ╱  Is the       ╲────────────┐
         ╲  machine      ╱            │
          ╲ rotating?   ╱             │
           ╲───────────╱              │
              │ YES                   │
          ╱─────────╲       OFF       │
         ╱  DS2-1    ╲─────────────→  │
          ╲─────────╱                 │
              │ ON                    │
          ╱─────────╲    Both OFF     │
         ╱  PL2,      ╲────────────→  │
         ╲  PL22      ╱               │
          ╲─────────╱                 │
              │ Either one ON         │
   OFF    ╱─────────╲                 │
  ┌──────╱   PL2     ╲                │
  │       ╲─────────╱                 │
  │           │ ON                    │
  │           │                       │
┌────────┐ ┌────────┐                 │
│ R5 OFF │ │ R5 ON  │                 │
└───┬────┘ └───┬────┘                 │
    │          │                      │
   OFF    ╱─────────╲                 │
  ┌──────╱  PL22     ╲                │
  │       ╲─────────╱                 │
  │           │ ON                    │
┌────────┐ ┌────────┐                 │
│R25 OFF │ │R25 ON  │                 │
└───┬────┘ └───┬────┘                 │
    │          │                      │
          ╱─────────────╲  During the │
         ╱ Blanket cleaning╲ set number│
         ╲ set number of   ╱ of        │
         ╲ rotations      ╱ rotations ─┘
          ╲─────────────╱
              │ After the set number of
              │ rotations is finished
        ┌─────────────┐
        │ R5, R25 OFF │
        └──────┬──────┘
               │
        ┌──────────────┐
        │ Operating    │
        │ lever return │
        │ to position I│
        └──────────────┘
```

Sign	DS2-1	Name	Blanket cleaning ON/OFF switch
Check line	L9	Check data	D6
Remarks			

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	R5	Name	The first unit blanket cleaning relay
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	R25	Name	The second unit blanket cleaning relay
Remarks			

Sign	CS4 OFF	Name	Timing switch
Check line	IR2	Check data	
Sign	DS1	Name	Blanket cleaning rotation number preset switch
Check line	L3	Check data	D0 ~ D3
Remarks	One rotation is counted when the CS4 timing switch turns OFF. When the total number of rotations equals the preset number of rotations, the blanket cleaning cycle is finished. The number of blanket cleaning cycle rotations = (DS1) x 4 + 20 times.		

(15) Operating lever return to position I
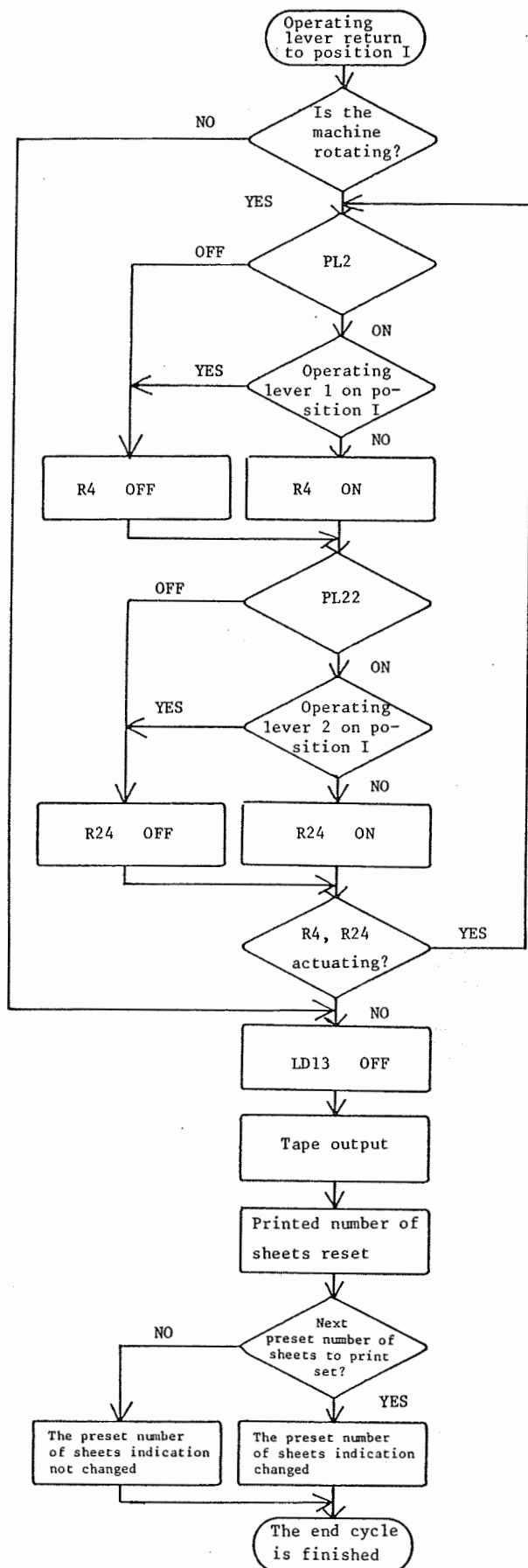
This is the program that returns the operating lever from position III to position I during the end cycle.

```
        ┌──────────────┐
        │  Operating   │
        │ lever return │
        │ to position I│
        └──────┬───────┘
               │
   NO     ╱──────────╲
  ◄───────  Is the
           machine
           rotating?
            ╲──────╱
      YES     │
            ╱─────╲
  OFF      ╱  PL2  ╲
  ◄────────╲       ╱
            ╲─────╱
        ON    │
           ╱──────────╲
  YES     ╱ Operating  ╲
  ◄───────  lever 1 on po-
            ╲  sition I ╱
             ╲────────╱
       NO      │
  ┌─────────┐  ┌─────────┐
  │ R4  OFF │  │ R4  ON  │
  └─────────┘  └─────────┘

            ╱─────╲
  OFF      ╱ PL22  ╲
  ◄────────╲       ╱
            ╲─────╱
        ON    │
           ╱──────────╲
  YES     ╱ Operating  ╲
  ◄───────  lever 2 on po-
            ╲  sition I ╱
             ╲────────╱
       NO      │
  ┌─────────┐  ┌─────────┐
  │ R24 OFF │  │ R24 ON  │
  └─────────┘  └─────────┘

            ╱──────────╲     YES
           ╱  R4, R24   ╲───────►
           ╲  actuating?╱
            ╲──────────╱
       NO     │
        ┌──────────┐
        │ LD13 OFF │
        └──────────┘
              │
        ┌──────────┐
        │Tape output│
        └──────────┘
              │
        ┌──────────────┐
        │Printed number │
        │of sheets reset│
        └──────────────┘
              │
           ╱──────────╲
  NO      ╱   Next     ╲
  ◄──────── │preset number│
           ╲of sheets to  ╱
            ╲print set? ╱
             ╲────────╱
              │ YES
  ┌──────────────┐  ┌──────────────┐
  │The preset num-│  │The preset num-│
  │ber of sheets  │  │ber of sheets  │
  │indication not │  │indication     │
  │changed        │  │changed        │
  └──────────────┘  └──────────────┘
              │
        ┌──────────────┐
        │ The end cycle │
        │  is finished  │
        └──────────────┘
```

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	LS1	Name	Operating lever 1
Check line	L1	Check data	D0
Remarks			

Sign	R4	Name	Operating lever 1 return relay
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS21	Name	Operating lever 2
Check line	L2	Check data	D0
Remarks			

Sign	R24	Name	Operating lever 2 return relay
Remarks			

Sign	LD13	Name	End cycle lamp
Remarks			

(16) Pushing the button to start blanket cleaning
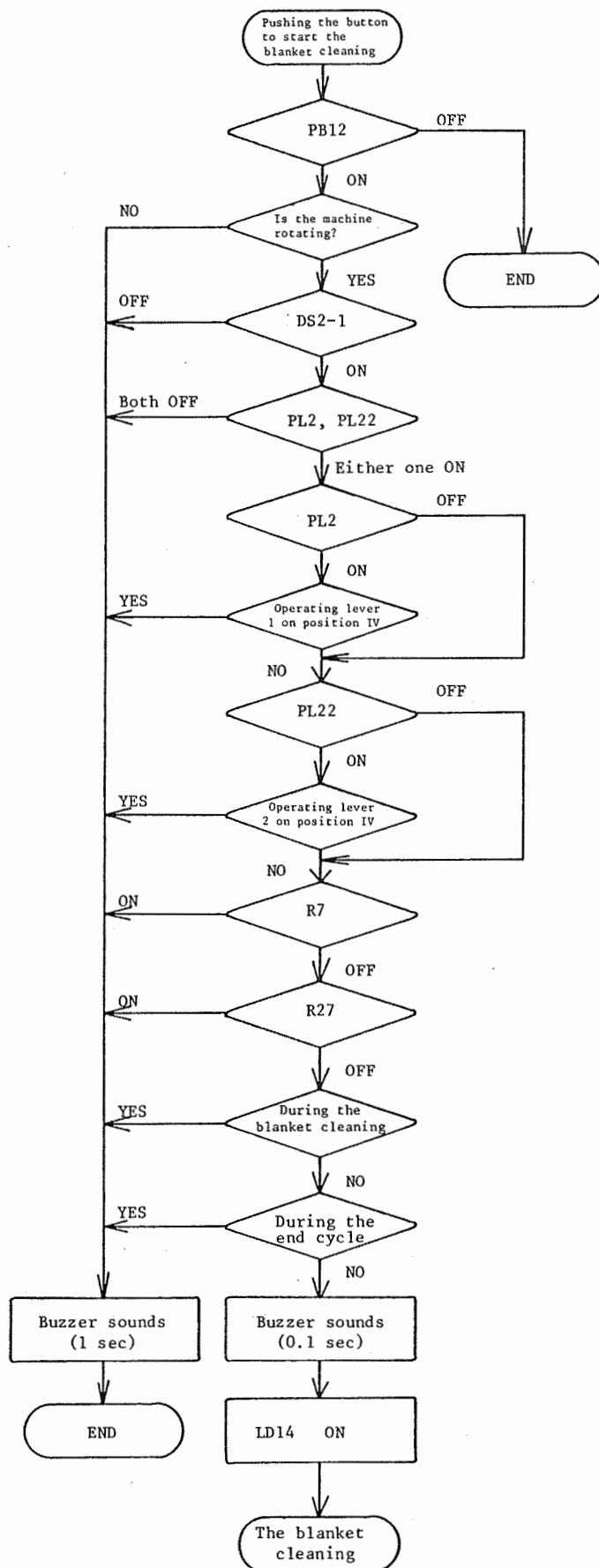
This is the program started when pushing the blanket cleaning button.

Sign	PB12	Name	Blanket cleaning button
Remarks			

Sign	DS2-1	Name	Blanket cleaning ON/OFF switch
Check line	L9	Check data	D6
Remarks			

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	LS4	Name	Operating lever 1
Check line	L1	Check data	D3
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS24	Name	Operating lever 2
Check line	L2	Check data	D3
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Remarks			

Sign	R27	Name	The second unit cylinder ON relay
Remarks			

Sign	LD14	Name	Blanket cleaning lamp
Remarks			

Flow chart:

- Pushing the button to start the blanket cleaning
- PB12 → OFF → END
- PB12 ON → Is the machine rotating? → NO
- Is the machine rotating? YES → DS2-1 → OFF
- DS2-1 ON → PL2, PL22 → Both OFF
- PL2, PL22 Either one ON → PL2 → OFF
- PL2 ON → Operating lever 1 on position IV → YES
- Operating lever 1 on position IV NO → PL22 → OFF
- PL22 ON → Operating lever 2 on position IV → YES
- Operating lever 2 on position IV NO → R7 → ON
- R7 OFF → R27 → ON
- R27 OFF → During the blanket cleaning → YES
- During the blanket cleaning NO → During the end cycle → YES
- During the end cycle NO → Buzzer sounds (0.1 sec) → LD14 ON → The blanket cleaning
- (NO/YES branches) → Buzzer sounds (1 sec) → END

(17) The blanket cleaning

This is the blanket cleaning program when pushing the blanket cleaning button.

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	LS4	Name	Operating lever 1
Check line	L1	Check data	D3
Remarks			

Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS24	Name	Operating lever 2
Check line	L2	Check data	D3
Remarks			

Sign	R5	Name	The first unit blanket cleaning relay
Remarks			

Sign	R25	Name	The second unit blanket cleaning relay
Remarks			

Sign	CS4 OFF	Name	Timing switch
Check line	IR2	Check data	
Sign	DS1	Name	Blanket cleaning rotation number preset switch
Check line	L3	Check data	D0 ~ D3
Remarks	One rotation is counted when the CS4 timing switch turns OFF. When the total number of rotations equals the preset number of rotations, the blanket cleaning cycle is finished. The number of blanket cleaning cycle rotations = (DS1) x 4 + 20 times.		

Sign	LD14	Name	Blanket cleaning lamp
Remarks			

(18) Lever synchronizing

This is the program for synchronizing both units operating levers.

Flow chart:

- Lever synchronizing
- Is the machine rotating? — NO → END
- YES
- PL2, PL22 — Either one OFF → END
- Both ON
- Operating lever 1 moves in advance direction? — YES
- NO
- Operating lever 1 moves in the return direction? — YES
- NO
- R23 OFF / R24 ON
- R23 ON / R24 OFF
- Operating lever 2 moves in the advance direction? — YES
- NO
- Operating lever 2 moves in the return direction? — NO → END
- YES
- R3 OFF / R4 ON
- R3 ON / R4 OFF
- Are the operating levers 1 and 2 synchronized? — NO
- YES
- R3, R4 R23, R24 OFF
- END

Sign	PL2	Name	The first unit ON/OFF lamp
Sign	PL22	Name	The second unit ON/OFF lamp
Remarks			

Sign	LS1~5	Name	Operating lever 1
Check line	L1	Check data	D0 ~ D4
Remarks	For the operating lever advance direction movement, the operating lever moves in the position I to the position V direction, and for the return direction movement, the operating lever moves in the position V to the position I direction.		

Sign	R23	Name	Operating lever 2 advance relay
Sign	R24	Name	Operating lever 2 return relay
Remarks			

Sign	LS21 ~ 25	Name	Operating lever 2
Check line	L2	Check data	D0 ~ D4
Remarks	For the operating lever advance direction movement, the operating lever moves in the position I to the position V direction, and for the return direction movement, the operating lever moves in the position V to the position I direction.		

Sign	R3	Name	Operating lever 1 advance relay
Sign	R4	Name	Operating lever 1 return relay
Remarks			

(19) No. 1 ink ductor

```
        ┌─────────────────┐
        │ No.1 ink ductor │
        └─────────────────┘
                 │
                 ▼
ON             ╱◇╲
◄────────────◇ SS2 MANU ◇
              ╲◇╱
               │ OFF
               ▼
              ╱◇╲            OFF
            ◇ SS2 AUTO ◇──────────┐
              ╲◇╱                  │
               │ ON                │
               ▼                   │
   ON         ╱◇╲                  │
◄───────────◇  R7  ◇               │
             ╲◇╱                   │
              │ OFF  ◄─────────────┘
              ▼
┌──────────────┐   ┌──────────────┐
│ R2 OFF       │   │ R2 ON        │
│ The first unit│  │ The first unit│
│ ink ductor ON│   │ ink ductor OFF│
└──────────────┘   └──────────────┘
       │                  │
       └──────────►───────┤
                          ▼
                   ┌────────────┐
                   │    END     │
                   └────────────┘
```
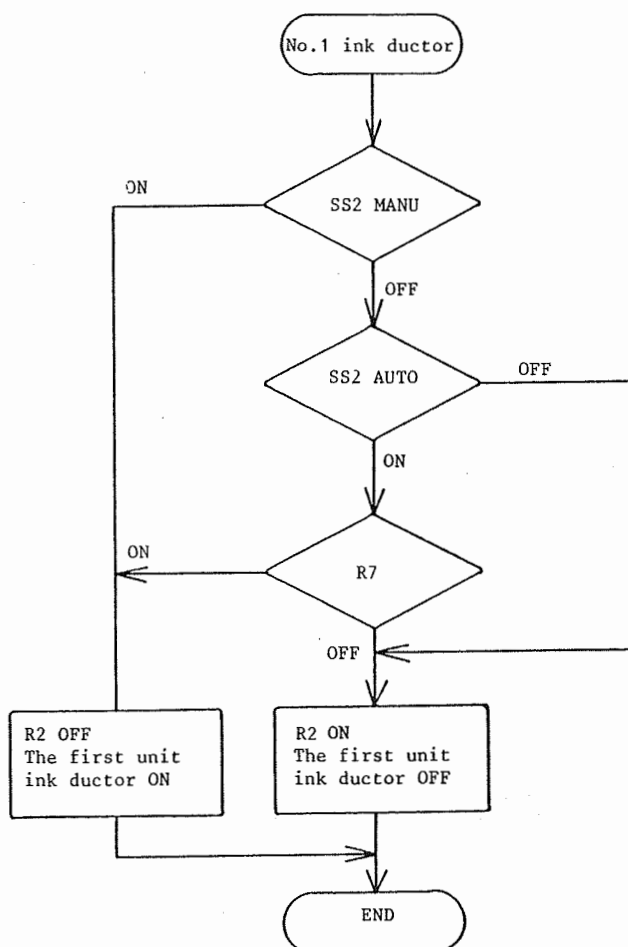
Sign	SS2 MANU	Name	The first unit ink ductor manual switch
Check line	L5	Check data	D6
Remarks			

Sign	SS2 AUTO	Name	The first unit ink ductor automatic switch
Check line	L5	Check data	D7
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Remarks			

Sign	R2	Name	The first unit ink ductor stop relay
Remarks			

(20) No. 2 ink ductor

```
            ┌────────────────┐
            │ No.2 ink ductor│
            └────────────────┘
                    │
                    ▼
         ON        ╱╲
       ◄───────── ╱SS22╲
                  ╲MANU ╱
                   ╲  ╱
                    ▼ OFF
                   ╱╲
                  ╱SS22╲      OFF
                 ╱ AUTO╲ ─────────►
                 ╲     ╱
                   ╲  ╱
                    ▼ ON
          ON       ╱╲
       ◄───────── ╱   ╲
                  ╲R27╱
                   ╲ ╱
                    ▼ OFF
  ┌──────────────┐    ┌──────────────┐
  │ R22 OFF      │    │ R22 ON       │
  │ The second   │    │ The second   │
  │ unit ink     │    │ unit ink     │
  │ ductor ON    │    │ ductor OFF   │
  └──────────────┘    └──────────────┘
         │                   │
         └──────────►  ◄─────┘
                    ▼
               (  END  )
```
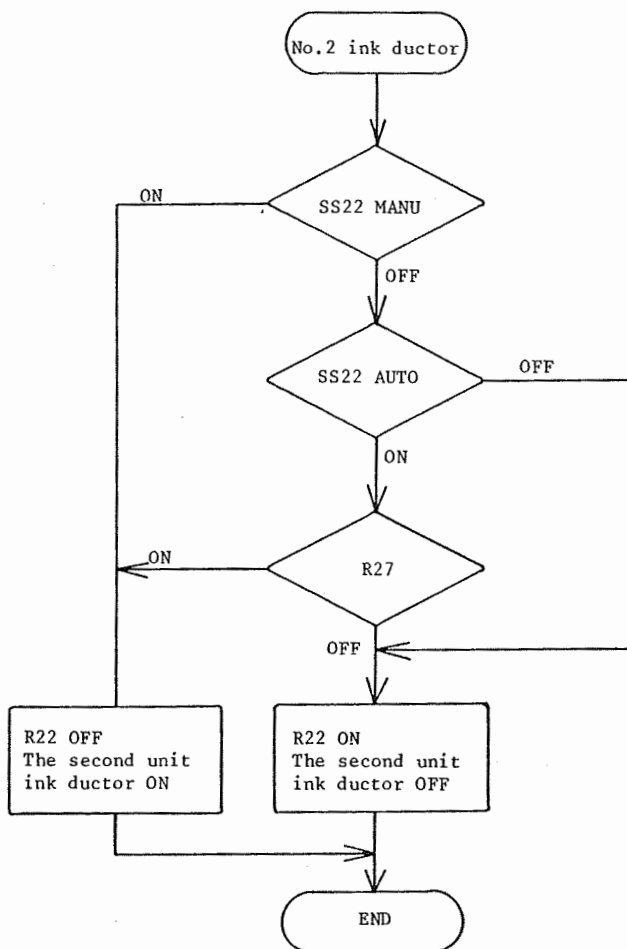
Sign	SS22 MANU	Name	The second unit ink ductor manual switch
Check line	L6	Check data	D6
Remarks			

Sign	SS22 AUTO	Name	The second unit ink ductor automatic switch
Check line	L6	Check data	D7
Remarks			

Sign	R27	Name	The second unit cylinder ON relay
Remarks			

Sign	R22	Name	The second unit ink ductor stop relay
Remarks			

(21) No. 1 water ductor

```
                    ┌─────────────┐
                    │  No.1 water │
                    │   ductor    │
                    └──────┬──────┘
                           │
                           ▼
              ON      ╱─────────╲
        ┌────────────╱ SS1 MANU  ╲
        │            ╲           ╱
        │             ╲─────────╱
        │                  │ OFF
        │                  ▼
        │             ╱─────────╲      OFF
        │            ╱ SS1 AUTO  ╲──────────┐
        │            ╲           ╱          │
        │             ╲─────────╱           │
        │                  │ ON             │
        │                  ▼                │
        │    ON       ╱─────────╲           │
        │  ◄─────────╱    R7     ╲          │
        │            ╲           ╱          │
        │             ╲─────────╱           │
        │                  │ OFF ◄──────────┘
        │                  ▼
  ┌──────────┐       ┌──────────┐
  │ R8 OFF   │       │ R8 ON    │
  │The first │       │The first │
  │unit      │       │unit      │
  │water     │       │water     │
  │ductor ON │       │ductor OFF│
  └────┬─────┘       └────┬─────┘
       │                  │
       └──────────────►───┤
                          ▼
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
```
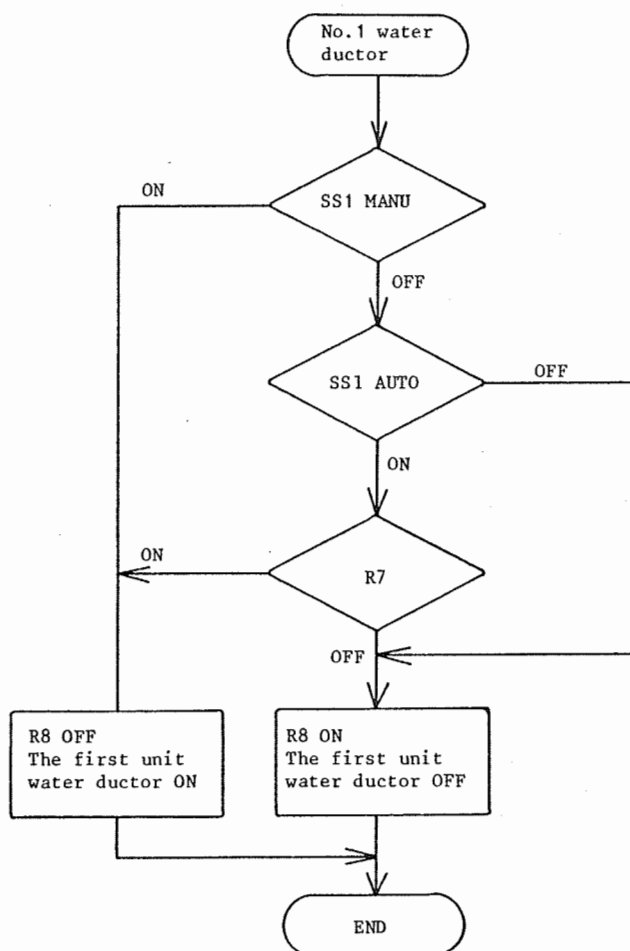
Sign	SS1 MANU	Name	The first unit water ductor manual switch
Check line	L5	Check data	D4
Remarks			

Sign	SS1 AUTO	Name	The first unit water ductor automatic switch
Check line	L5	Check data	D5
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Remarks			

Sign	R8	Name	The first unit water ductor stop relay
Remarks			

(22) No. 2 water ductor

```
        ┌──────────────┐
        │  No.2 water  │
        │   ductor     │
        └──────┬───────┘
               │
               ▼
  ON      ╱◇╲
◀─────── SS21 MANU
         ╲◇╱
           │ OFF
           ▼
         ╱◇╲         OFF
       SS21 AUTO ──────────┐
         ╲◇╱               │
           │ ON            │
  ON       ▼               │
◀────── ╱◇╲  R27           │
        ╲◇╱                │
          │ OFF ◀──────────┘
          ▼
┌──────────────┐   ┌──────────────┐
│ R28 OFF      │   │ R28 ON       │
│ The second   │   │ The second   │
│ unit water   │   │ unit water   │
│ ductor ON    │   │ ductor OFF   │
└──────┬───────┘   └──────┬───────┘
       │                  │
       └────────►  ◀──────┘
               ▼
        ┌──────────────┐
        │     END      │
        └──────────────┘
```
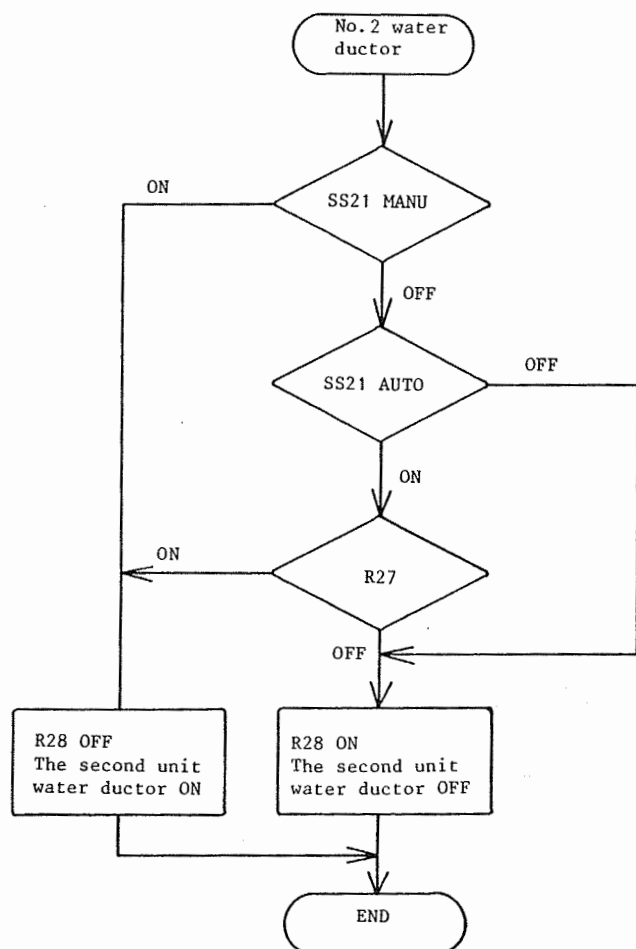
Sign	SS21 MANU	Name	The second unit water ductor manual switch
Check line	L6	Check data	D4
Remarks			

Sign	SS21 AUTO	Name	The second unit water ductor automatic switch
Check line	L6	Check data	D5
Remarks			

Sign	R27	Name	The second unit cylinder ON relay
Remarks			

Sign	R28	Name	The second unit water ductor stop relay
Remarks			

(23) Spray device

```
        ┌─────────────────┐
        │   Spray device  │
        └─────────────────┘
                 │
                 ▼
OFF          ╱────────╲
◄───────────     SS4
             ╲────────╱
                 │ ON
                 ▼
OFF          ╱────────╲
◄───────────     R15
             ╲────────╱
                 │ ON
                 ▼
┌──────────┐  ┌──────────┐
│ R14 OFF  │  │ R14 ON   │
└──────────┘  └──────────┘
     │             │
     │             ▼
     │   OFF   ╱──────────╲
     │  ◄──────  R7 or R27
     │         ╲──────────╱
     │             │ Either one ON
     ▼             ▼
┌──────────┐  ┌──────────┐
│ R17 OFF  │  │ R17 ON   │
└──────────┘  └──────────┘
     │             │
     └──────┬──────┘
            ▼
       ┌─────────┐
       │   END   │
       └─────────┘
```
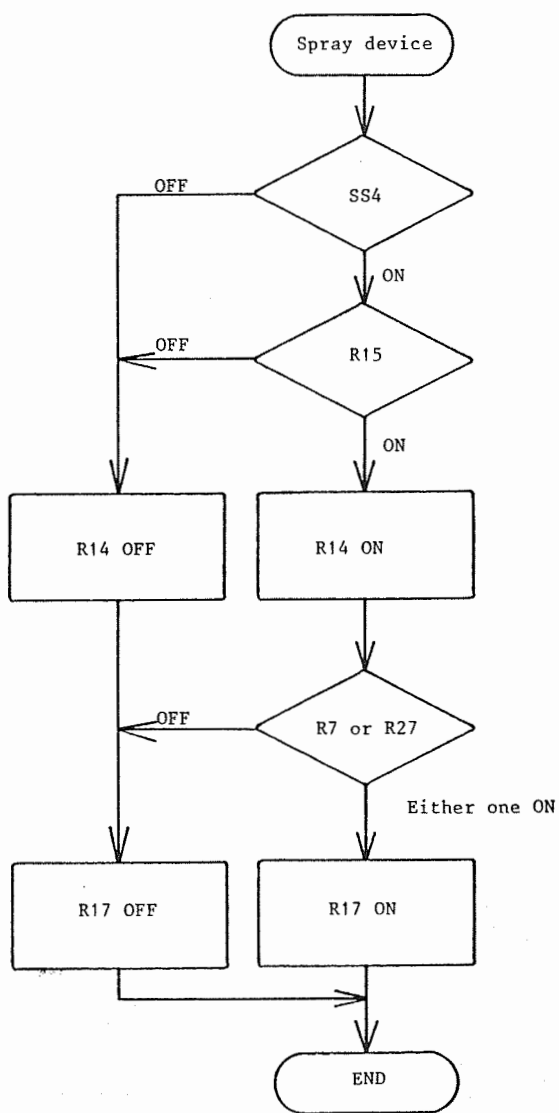
Sign	SS4	Name	Spray switch	
Check line	L4		Check data	D3
Remarks				

Sign	R15	Name	Pump motor relay
Remarks			

Sign	R14	Name	Spray pump relay
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Sign	R27	Name	The second unit cylinder ON relay
Remarks			

Sign	R17	Name	Spray valve relay
Remarks			

(24) Lowering the delivery table dolly
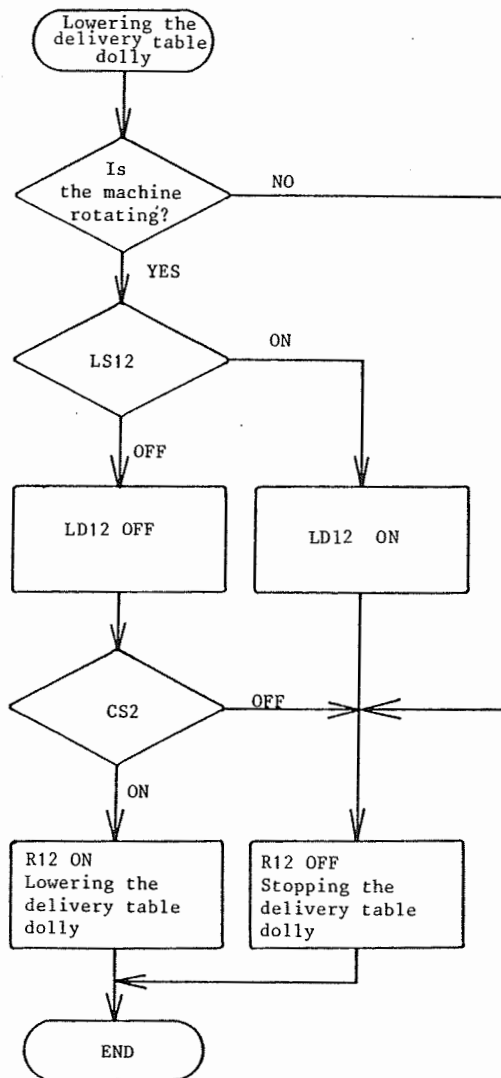
```
        ┌──────────────┐
        │ Lowering the │
        │delivery table│
        │    dolly     │
        └──────┬───────┘
               │
               ▼
           ╱───────╲
          ╱   Is    ╲        NO
         ╱ the machine╲──────────────────────┐
         ╲  rotating? ╱                       │
          ╲         ╱                         │
           ╲───┬───╱                          │
               │ YES                          │
               ▼                              │
           ╱───────╲     ON                   │
          ╱  LS12   ╲──────────┐              │
          ╲         ╱          │              │
           ╲───┬───╱           │              │
               │ OFF           ▼              │
               ▼        ┌─────────────┐       │
        ┌─────────────┐ │  LD12  ON   │       │
        │  LD12 OFF   │ │             │       │
        │             │ └──────┬──────┘       │
        └──────┬──────┘        │              │
               │               │              │
               ▼               │              │
           ╱───────╲   OFF     │              │
          ╱  CS2    ╲──────────┼──╳───────────┘
          ╲         ╱          │
           ╲───┬───╱           │
               │ ON            │
               ▼               ▼
        ┌─────────────┐ ┌─────────────┐
        │  R12 ON     │ │  R12 OFF    │
        │ Lowering the│ │ Stopping the│
        │delivery table│ │delivery table│
        │   dolly     │ │   dolly     │
        └──────┬──────┘ └──────┬──────┘
               │               │
               ▼◄──────────────┘
          ┌─────────┐
          │   END   │
          └─────────┘
```

Sign	LS12		Name	Delivery table dolly lower limit switch
Check line	L2		Check data	D6
Remarks				

Sign	LD12		Name	Delivery table dolly lower limit lamp
Remarks				

Sign	CS2		Name	Delivery table dolly lowering sensor
Check line	L4		Check data	D6
Remarks				

Sign	R12		Name	Delivery table dolly lowering relay
Remarks				

When the CS2 delivery table dolly lowering sensor actuates ON once, the delivery table dolly lowering relay R12 will turn ON and stay ON for about 3 seconds as written in the softwate.

(25) The first unit cylinder ON
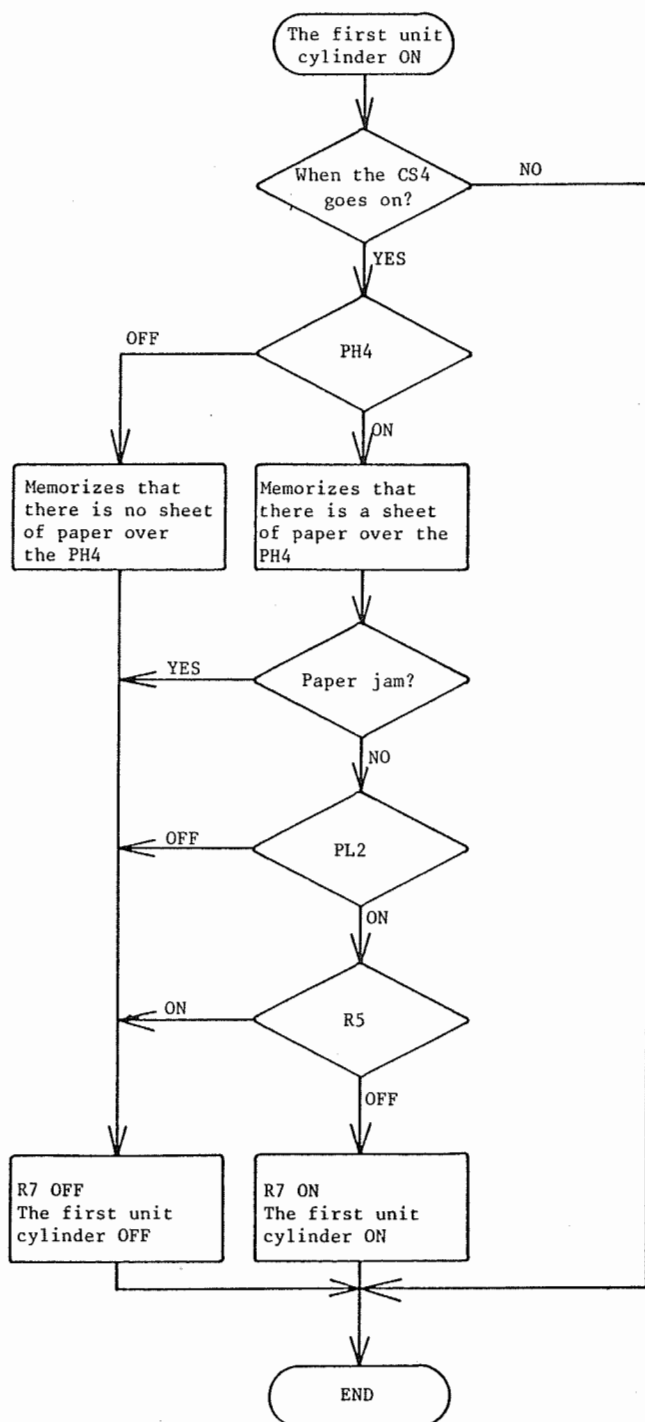
```
        ┌─────────────────┐
        │ The first unit  │
        │ cylinder ON     │
        └────────┬────────┘
                 │
                 ▼
          ╱────────────╲           NO
         ╱ When the CS4 ╲─────────────────┐
         ╲  goes on?    ╱                  │
          ╲────────────╱                   │
                 │ YES                      │
                 ▼                          │
      OFF  ╱──────────╲                     │
    ┌──────╱   PH4     ╲                    │
    │      ╲           ╱                    │
    │       ╲─────────╱                     │
    │           │ ON                        │
    │           ▼                           │
    ▼       ┌──────────────┐                │
┌──────────┐│ Memorizes that│               │
│Memorizes ││ there is a   │                │
│that there││ sheet of     │                │
│is no     ││ paper over   │                │
│sheet of  ││ the PH4      │                │
│paper over│└──────┬───────┘                │
│the PH4   │       │                        │
└──────────┘       ▼                        │
    │    YES  ╱──────────╲                  │
    │◄────────╱Paper jam? ╲                 │
    │         ╲           ╱                 │
    │          ╲─────────╱                  │
    │              │ NO                     │
    │              ▼                        │
    │    OFF  ╱──────────╲                  │
    │◄────────╱   PL2     ╲                 │
    │         ╲           ╱                 │
    │          ╲─────────╱                  │
    │              │ ON                     │
    │              ▼                        │
    │    ON   ╱──────────╲                  │
    │◄────────╱    R5     ╲                 │
    │         ╲           ╱                 │
    │          ╲─────────╱                  │
    │              │ OFF                    │
    ▼              ▼                        │
┌──────────┐  ┌──────────┐                  │
│R7 OFF    │  │R7 ON     │                  │
│The first │  │The first │                  │
│unit      │  │unit      │                  │
│cylinder  │  │cylinder  │                  │
│OFF       │  │ON        │                  │
└────┬─────┘  └────┬─────┘                  │
     │             │                        │
     └──────┬──────┴────────────────────────┘
            ▼
        ┌───────┐
        │  END  │
        └───────┘
```

Sign	CS4	Name	Timing switch
Check line	IR4	Check data	
Remarks			

Sign	PH4	Name	Impression control sensor
Check line	L4	Check data	L2
Remarks			

Memorizes whether there is a sheet of paper over the PH4 to judge when turning the second unit cylinder ON or OFF. See (26) The second unit cylinder ON (page 96).

Sign	PL2	Name	The first unit ON/OFF lamp
Remarks			

Sign	R5	Name	The first unit blanket cleaning relay
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Remarks			

(26)　The second unit cylinder ON

```
      ┌────────────────┐
      │ The second unit │
      │  cylinder ON    │
      └────────┬────────┘
               │
               ▼
         ╱ When the CS4 ╲ ─── NO ──────────┐
         ╲ goes off?    ╱                   │
               │ YES                        │
               ▼                            │
         ╱ Memo-      ╲                      │
  ┌── NO ─ rizes that there                 │
  │      ─ is a sheet of                    │
  │        paper over                       │
  │        the PH4? ╲                        │
  │            │ YES                         │
  │            ▼                             │
  │      ╱ Paper jam? ╲ ── YES ──┐           │
  │            │ NO              │           │
  │            ▼                 │           │
  │      ╱  PL22  ╲ ── OFF ──────┤           │
  │            │ ON              │           │
  │            ▼                 │           │
  │      ╱   R25   ╲ ── ON ──────┤           │
  │            │ OFF             │           │
  │            ▼                 ▼           │
  │     ┌──────────┐       ┌──────────┐      │
  └───▶ │ R27 OFF  │       │ R27 ON   │      │
        │ The second│       │ The second│     │
        │ unit      │       │ unit      │     │
        │ cylinder  │       │ cylinder  │     │
        │ OFF       │       │ ON        │     │
        └─────┬────┘       └─────┬────┘      │
              │                   │           │
              └─────────┬─────────┘───────────┘
                        ▼
                   ┌─────────┐
                   │   END   │
                   └─────────┘
```
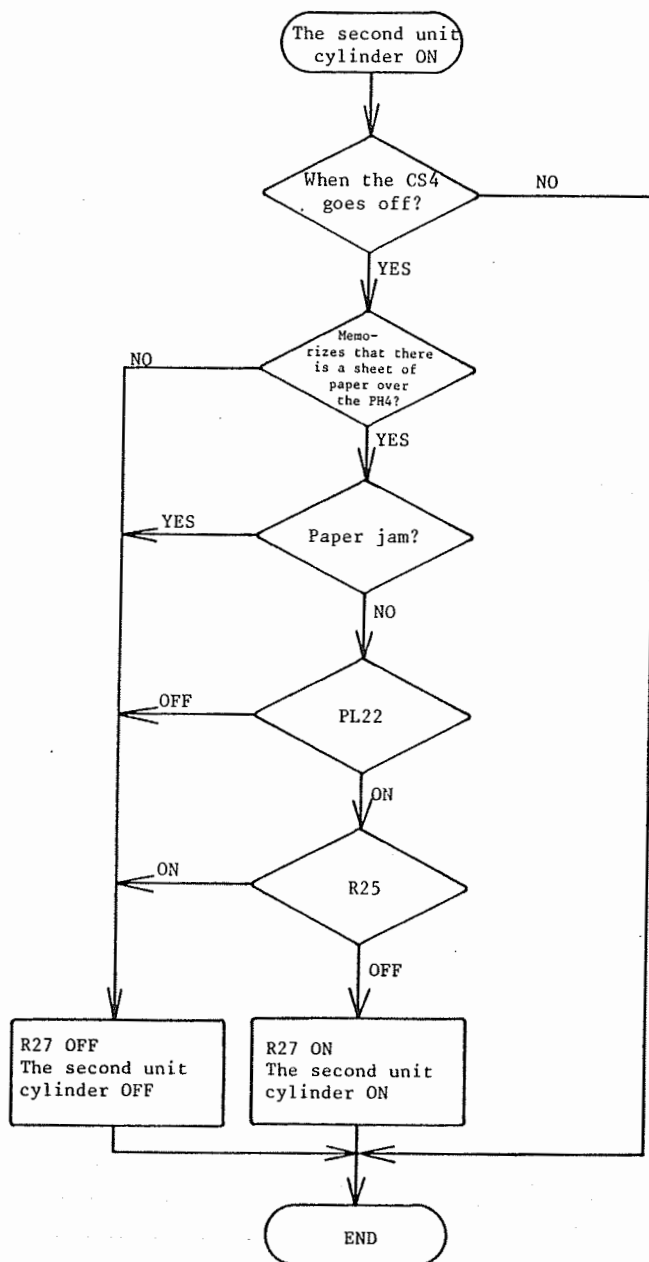
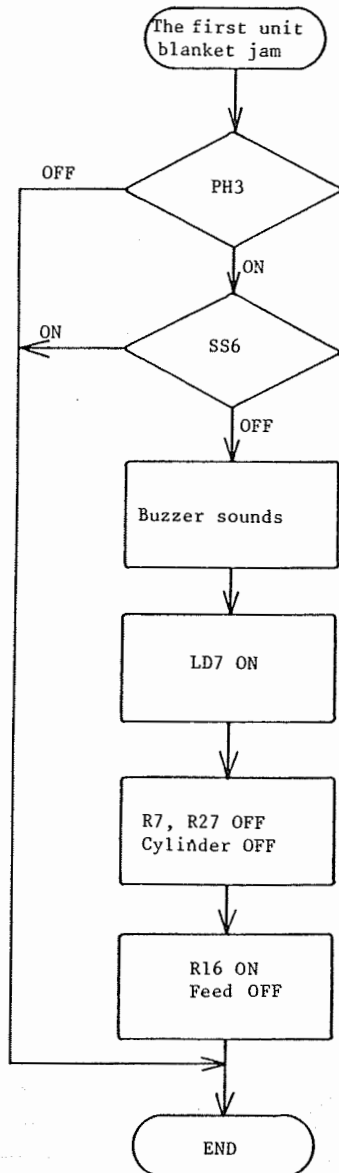| Sign	CS4		Name	Timing switch
Check line	IR2		Check data	
Remarks				

Judges based on the memory whether there is a sheet of paper over the PH4 that is explained on (25) The first unit cylinder ON flow chart (page 95).

Sign	PL22		Name	The second unit ON/OFF lamp
Remarks				

Sign	R25		Name	The second unit blanket cleaning relay
Remarks				

Sign	R27		Name	The second unit cylinder ON relay
Remarks				

(27) Sheet counter adding

```
        ┌─────────────────┐
        │  Sheet counter  │
        │     adding      │
        └─────────────────┘
                 │
          ◇ When the CS4 ───── NO ──────────────┐
            goes off?                            │
                 │ YES                           │
          ◇ Does the                             │
            base machine                         │
            rotate 10                            │
            times?                               │
                 │ Adds one for every 10         │
                 │           rotations           │
        ┌─────────────────┐                      │
        │ Machine counter │                      │
        │ adds            │                      │
        └─────────────────┘                      │
                 │                               │
          ◇ PH1 ───────── OFF ──────┐            │
                 │ ON               │            │
        ┌────────────────┐  ┌────────────────┐   │
        │ Memorizes there│  │ Memorizes there│   │
        │ is a sheet of  │  │ is no sheet of │   │
        │ paper over the │  │ paper over the │   │
        │ PH1            │  │ PH1            │   │
        └────────────────┘  └────────────────┘   │
                 │                               │
          ◇ Paper jam? ───── YES ────────────────┤
                 │ NO                            │
          ◇ Paper                               │
            feed delayed tim- ─── YES ──────────┤
            ing detec-                          │
            tor                                 │
                 │ NO                           │
          ◇ 10 sheets                           │
            printed?                            │
                 │ Adds one for every 10        │
                 │            sheets            │
        ┌────────────────┐                      │
        │ Print counter  │                      │
        │ adds           │                      │
        └────────────────┘                      │
                 │                              │
          ◇ LD30 ───────── OFF ────────────────┤
                 │ ON                          │
        ┌────────────────┐                     │
        │ Sheet counter  │                     │
        │ adds           │                     │
        └────────────────┘                     │
                 │                             │
                 ◄─────────────────────────────┘
                 │
        ┌─────────────────┐
        │      END        │
        └─────────────────┘
```

Sign	CS3		Name	Timing switch
Check line	IR1		Check data	
Remarks	When the CS3 turns OFF, each counter adds one.			

Sign	PH1		Name	Feeder photo sensor
Check line	L4		Check data	D0
Remarks				

Memorizes whether there is a sheet of paper over the PH1 to judge for the feeder jam detector.

Sign	LD30		Name	Count ON/OFF lamp
Remarks				

(28) Lubrication warning
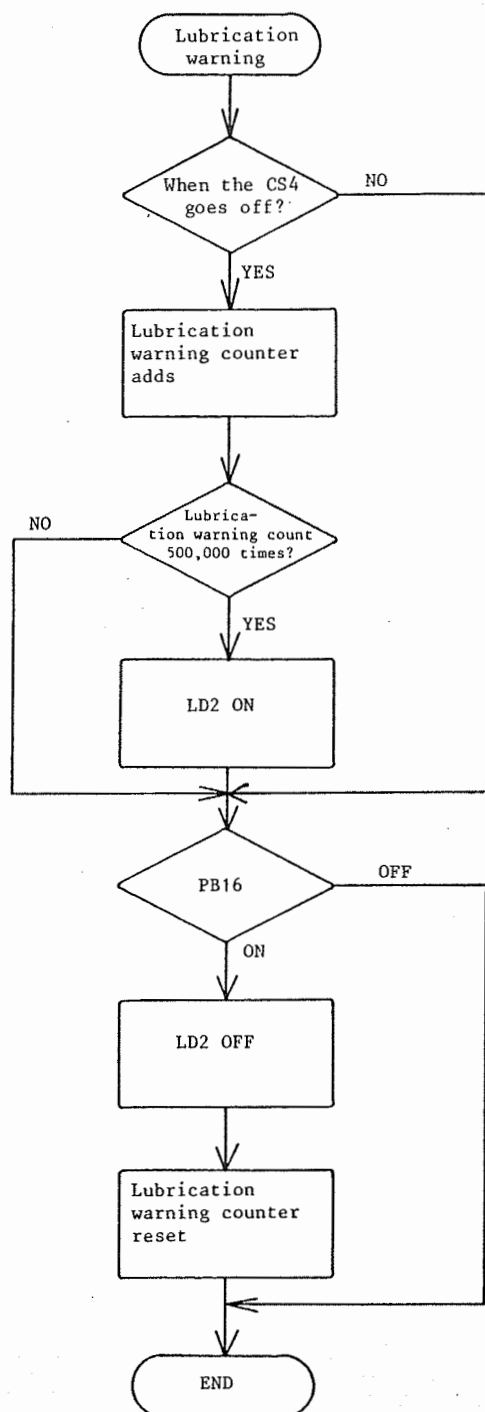
```
        ┌─────────────┐
        │ Lubrication │
        │  warning    │
        └─────────────┘
               │
               ▼
          ╱─────────╲           NO
         ╱ When the  ╲ ──────────────┐
         ╲ CS4 goes  ╱               │
          ╲  off?   ╱                │
           ╲───────╱                 │
               │ YES                 │
               ▼                     │
        ┌─────────────┐              │
        │ Lubrication │              │
        │warning      │              │
        │counter adds │              │
        └─────────────┘              │
               │                     │
               ▼                     │
    NO    ╱─────────╲                │
 ┌────────╲ Lubrica- ╱               │
 │         ╲tion warning             │
 │          ╲count   ╱               │
 │          ╲500,000╱                │
 │           ╲times?╱                │
 │               │ YES               │
 │               ▼                   │
 │        ┌─────────────┐            │
 │        │   LD2 ON    │            │
 │        └─────────────┘            │
 │               │                   │
 └───────────────┤                   │
                 ▼                   │
            ╱─────────╲     OFF      │
           ╱   PB16    ╲ ────────────┤
           ╲           ╱             │
            ╲─────────╱              │
                 │ ON                │
                 ▼                   │
          ┌─────────────┐            │
          │   LD2 OFF   │            │
          └─────────────┘            │
                 │                   │
                 ▼                   │
          ┌─────────────┐            │
          │ Lubrication │            │
          │warning      │            │
          │counter reset│            │
          └─────────────┘            │
                 │◄──────────────────┘
                 ▼
            ┌─────────┐
            │   END   │
            └─────────┘
```

Sign	CS4	Name	Timing switch
Check line	IR2	Check data	
Remarks			

When the CS4 timing switch turns OFF, the counter adds one. When the total number of rotations is over 500,000 rotations, the LD2 lubrication warning lamp lights to signal it is time to lubricate the machine.

Sign	LD2	Name	Lubrication warning lamp
Remarks			

Sign	PB16	Name	Lubrication warning reset button
Check line	L4	Check data	D5
Remarks	When pushing the PB16, the LD2 goes off and the counter is reset.		

(29) Pump filter cleaning warning
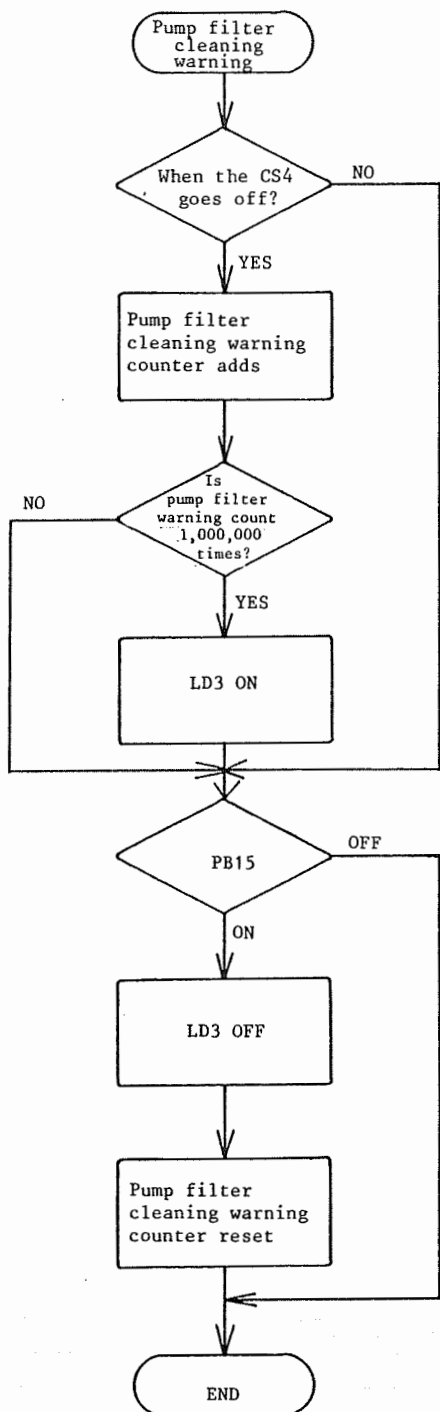
```
        ╭─────────────╮
        │ Pump filter │
        │  cleaning   │
        │  warning    │
        ╰─────────────╯
               │
               ▼
           ╱╲          NO
          ╱  ╲────────────────┐
    ╱ When the CS4 ╲           │
    ╲   goes off?  ╱           │
          ╲  ╱                 │
           ╲╱                  │
            │ YES              │
            ▼                  │
     ┌──────────────┐          │
     │ Pump filter  │          │
     │cleaning warning│        │
     │ counter adds │          │
     └──────────────┘          │
            │                  │
            ▼                  │
           ╱╲                  │
     NO   ╱  ╲                 │
   ┌─────╱ Is  ╲               │
   │     ╲pump filter╱         │
   │      ╲warning count╱      │
   │       ╲1,000,000╱         │
   │        ╲times?╱           │
   │           │ YES           │
   │           ▼               │
   │    ┌──────────────┐       │
   │    │   LD3 ON     │       │
   │    └──────────────┘       │
   │           │               │
   └───────────┤               │
               ▼               │
              ╱╲       OFF      │
             ╱  ╲──────────┐    │
            ╱ PB15 ╲       │    │
             ╲    ╱        │    │
              ╲  ╱         │    │
               ╲╱          │    │
               │ ON        │    │
               ▼           │    │
        ┌──────────────┐   │    │
        │   LD3 OFF    │   │    │
        └──────────────┘   │    │
               │           │    │
               ▼           │    │
        ┌──────────────┐   │    │
        │ Pump filter  │   │    │
        │cleaning warning│ │    │
        │ counter reset│   │    │
        └──────────────┘   │    │
               │◄──────────┘    │
               ▼                │
        ╭─────────────╮         │
        │     END     │◄────────┘
        ╰─────────────╯
```

Sign	CS4	Name	Timing switch
Check line	IR2	Check data	
Remarks			

When the CS4 timing switch turns OFF, the counter adds one. When the total number of rotations is over 1,000,000 rotations, the LD3 pump filter cleaning warning lamp lights to signal it is time to clean the pump filter

Sign	LD3	Name	Pump filter cleaning warning lamp
Remarks			

Sign	PB15	Name	Pump filter cleaning warning reset button
Check line	L4	Check data	D4
Remarks	When pushing the PB15, the LD3 goes off and the count is reset.		

(30)   Paper feed delayed timing detector
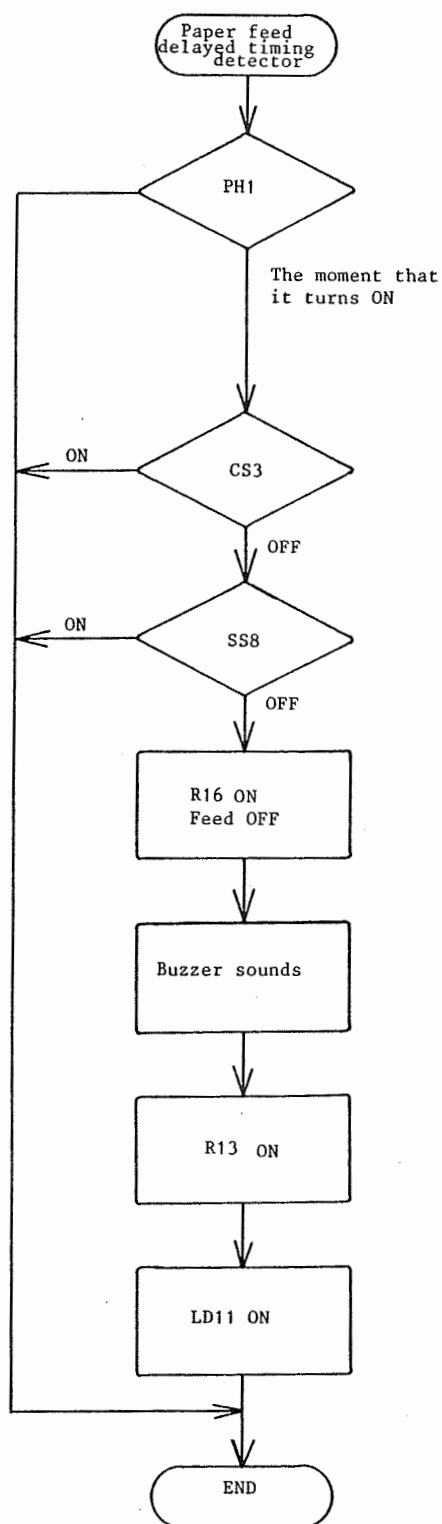
Sign	PH1		Name	Feeder photo sensor
Check line	L4		Check data	D0
Remarks	The paper feed delayed timing detector detects the moment that the PH1 turns ON.			

Sign	CS3		Name	Timing switch
Check line	L4		Check data	D7
Remarks				

Sign	SS8		Name	Delayed paper OFF switch
Check line	L3		Check data	D7
Remarks				

Sign	R16		Name	Feed OFF relay
Remarks				

Sign	R13		Name	Delayed paper relay
Remarks				

Sign	LD11		Name	Delayed paper lamp
Remarks				
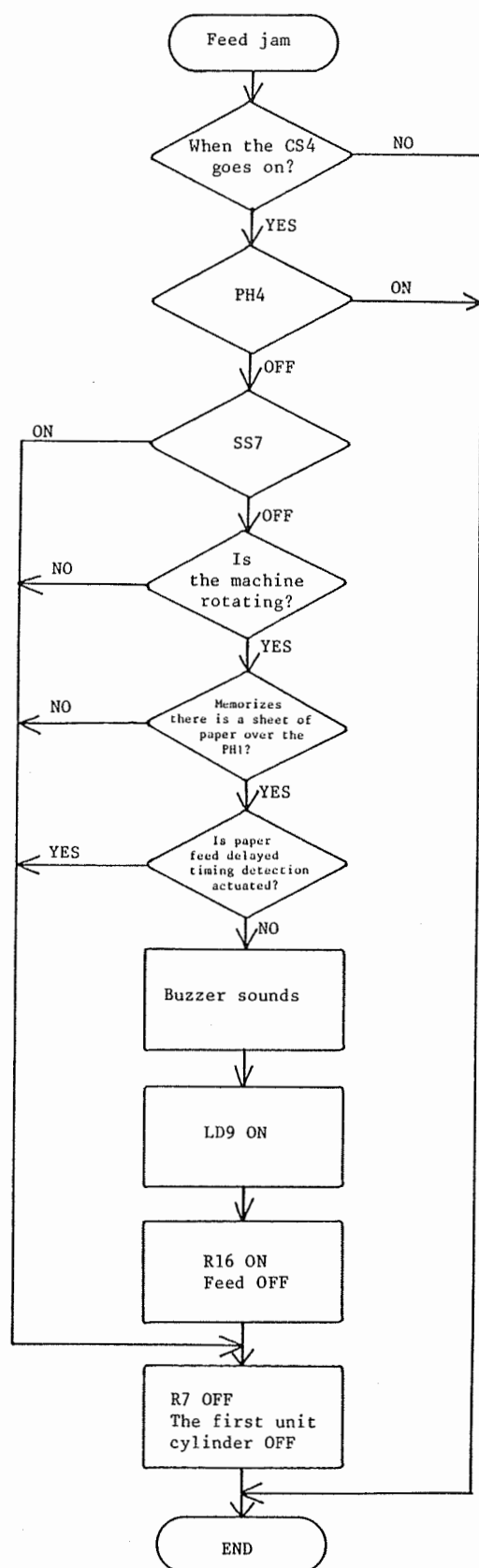
Flow chart:

Paper feed delayed timing detector

PH1 → The moment that it turns ON

CS3 — ON →

OFF

SS8 — ON →

OFF

R16 ON
Feed OFF

Buzzer sounds

R13 ON

LD11 ON

END

(31) Feed jam

```
        ┌──────────────┐
        │   Feed jam    │
        └──────────────┘
               │
               ▼
          ╱────────╲
         ╱ When the  ╲  ──── NO ────────────┐
         ╲ CS4 goes  ╱                       │
          ╲  on?    ╱                        │
           ╲──────╱                          │
              │ YES                          │
              ▼                              │
          ╱────────╲                         │
         ╱          ╲  ──── ON ──────────────┤
         ╲   PH4    ╱                        │
          ╲────────╱                         │
              │ OFF                          │
              ▼                              │
          ╱────────╲                         │
   ┌─ ON ─╱          ╲                       │
   │      ╲   SS7    ╱                        │
   │       ╲────────╱                        │
   │          │ OFF                          │
   │          ▼                              │
   │      ╱────────╲                         │
   │─ NO ─╱   Is     ╲                        │
   │      ╲ the machine╱                      │
   │       ╲ rotating? ╱                      │
   │        ╲────────╱                        │
   │           │ YES                          │
   │           ▼                              │
   │      ╱────────╲                          │
   │─ NO ─╱ Memorizes ╲                       │
   │      ╲there is a   ╱                      │
   │       ╲sheet of paper╱                   │
   │        ╲over the PH1?╱                    │
   │          │ YES                           │
   │          ▼                               │
   │      ╱────────╲                          │
   │─ YES─╱ Is paper  ╲                        │
   │      ╲feed delayed ╱                      │
   │       ╲timing detect╱                     │
   │        ╲ actuated? ╱                      │
   │           │ NO                            │
   │           ▼                               │
   │    ┌──────────────┐                       │
   │    │ Buzzer sounds │                      │
   │    └──────────────┘                       │
   │           │                               │
   │           ▼                               │
   │    ┌──────────────┐                       │
   │    │   LD9 ON      │                       │
   │    └──────────────┘                       │
   │           │                               │
   │           ▼                               │
   │    ┌──────────────┐                       │
   │    │   R16 ON      │                       │
   │    │   Feed OFF    │                       │
   │    └──────────────┘                       │
   │           │                               │
   └───────────┤                               │
               ▼                               │
        ┌──────────────┐                       │
        │   R7 OFF      │                       │
        │ The first unit│                       │
        │ cylinder OFF  │                       │
        └──────────────┘                       │
               │◄──────────────────────────────┘
               ▼
        ┌──────────────┐
        │     END       │
        └──────────────┘
```

Sign	CS4	Name	Timing switch
Check line	IR4	Check data	
Remarks			

Sign	PH4	Name	Impression control sensor
Check line	L4	Check data	D2
Remarks	When a sheet of paper is detected, it turns ON.		

Sign	SS7	Name	Feed jam detector OFF switch
Check line	L3	Check data	D6
Remarks			

Judges based on the memory whether there is a sheet of paper over the PH1 that is explained on (27) sheet counter adding flow chart (page 97).

Sign	LD9	Name	Feed jam lamp
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Remarks			

(32) The first unit blanket jam

```
        ┌──────────────┐
        │ The first unit│
        │ blanket jam  │
        └──────┬───────┘
               │
               ▼
OFF       ◇ PH3 ◇
◄─────────      
               │ ON
               ▼
ON        ◇ SS6 ◇
◄─────────
               │ OFF
               ▼
        ┌──────────────┐
        │ Buzzer sounds│
        └──────┬───────┘
               ▼
        ┌──────────────┐
        │   LD7 ON     │
        └──────┬───────┘
               ▼
        ┌──────────────┐
        │ R7, R27 OFF  │
        │ Cylinder OFF │
        └──────┬───────┘
               ▼
        ┌──────────────┐
        │  R16 ON      │
        │  Feed OFF    │
        └──────┬───────┘
               ▼
        ┌──────────────┐
        │    END       │
        └──────────────┘
```

Sign	PH3	Name	The first unit blanket photo sensor
Check line	IR1	Check data	
Remarks			

Sign	SS6	Name	The first unit blanket jam detector OFF switch
Check line	L3	Check data	D5
Remarks			

Sign	LD7	Name	The first unit blanket jam lamp
Remarks			

Sign	R7	Name	The first unit cylinder ON relay
Sign	R27	Name	The second unit cylinder ON relay
Remarks			

Sign	R16	Name	Feed OFF relay
Remarks			

(33) The second unit blanket jam

```
        ┌─────────────────┐
        │ The second unit │
        │  blanket jam    │
        └─────────────────┘
                │
                ▼
OFF           ╱   ╲
◄────────────╱ PH2 ╲
             ╲     ╱
              ╲   ╱
                │ ON
                ▼
ON            ╱   ╲
◄────────────╱ SS5 ╲
             ╲     ╱
              ╲   ╱
                │ OFF
                ▼
        ┌─────────────────┐
        │  Buzzer sounds  │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │    LD5 ON       │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │  R7, R27 OFF    │
        │  Cylinder OFF   │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │   R16 ON        │
        │   Feed OFF      │
        └─────────────────┘
                │
                ▼
        ┌─────────────────┐
        │      End        │
        └─────────────────┘
```
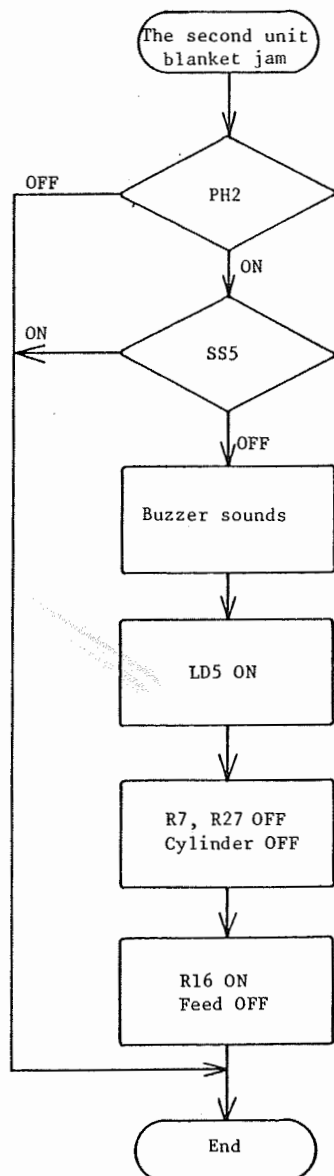
Sign	PH2		Name	The second unit blanket photo sensor
Check line	IR5		Check data	
Remarks				

Sign	SS5		Name	The second unit blanket jam detector OFF switch
Check line	L3		Check data	D4
Remarks				

Sign	LD5	Name	The second unit blanket jam lamp
Remarks			
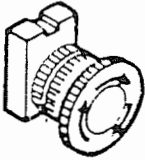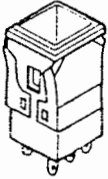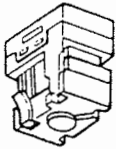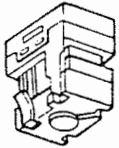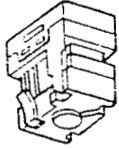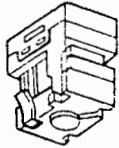
Sign	R7	Name	The first unit cylinder ON relay
Sign	R27	Name	The second unit cylinder ON relay
Remarks			
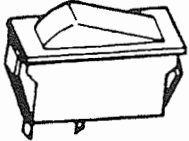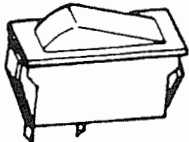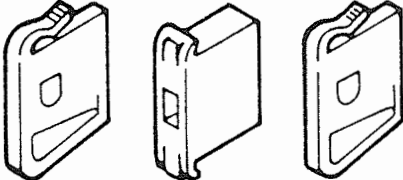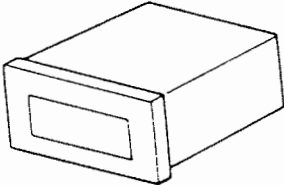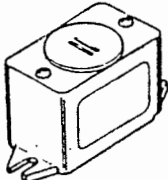
Sign	R16	Name	Feed OFF relay
Remarks			
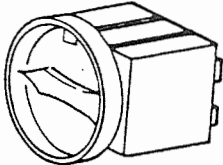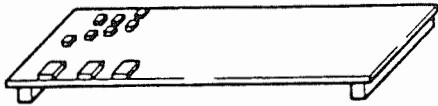
18. List of replacement parts

When ordering replacement parts, please use the specified parts number indicated in (   ).
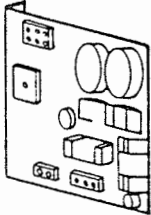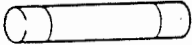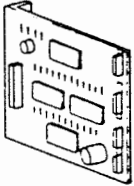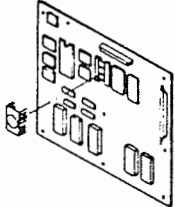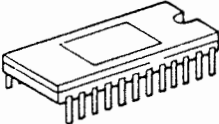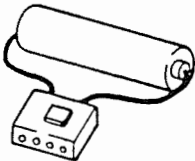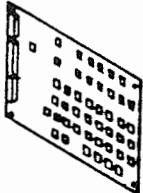
(1)   Operation panel
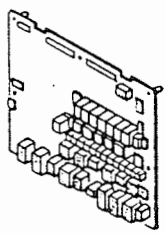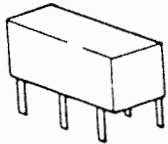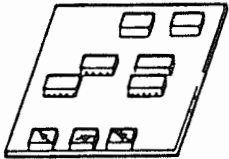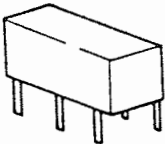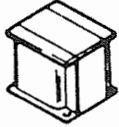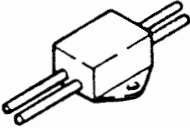
(IZUMI) AVLW322T20D-R(96 606)	LED LSHD-28R (98 930)	PB1, PL1 PB21, PL21
(OMRON) A3SA-7050-T(96 564)		PB2, PB3, PB4 PB22, PB23, PB24 PB15, PB16
(OMRON) A3SA-5801-N(White)	(96 591)	PB4 PB24 Unit ON-OFF

(OMRON)
 	
A3SA-5802-N(Red)
	(96 592)	PB3
		PB23
		   Inching reverse
		   rotation

(OMRON)
 	
A3SA-5803-N(Green)
	(96 593)	PB2
		PB22
		   Inching normal
		   rotation

(OMRON) A3SA-5805-N(Yellow)	(96 594)	PB15, PB16 Warning lamp reset button

(OMRON) SLL-24EY(98 926)	PL2, PL22 PL4, PL5
(IZUMI) C-1420F-B(96 559)	SS1, SS2 SS21, SS22 Ductor control
(IZUMI) C-1400F-B(96 560)	SS4 Spray switch
(IZUMI) Switch DGAN-031-B(96 561), End plate DGNW-1-B(96 562)	DS1 Blanket cleaning cycle set
(OMRON) H7EC-BLM(97 864)	Print counter Machine counter
(NIKKAI) Switch M-2012J-2G(96 549), Bezel AT-207G(96 550)	SS5, SS6, SS7, SS8 Jam ON-OFF switch
(NATIONAL) (99 938) Buzzer E.B 2124	BZ1 Buzzer for jam
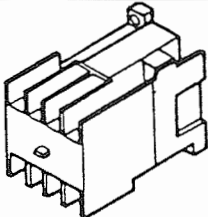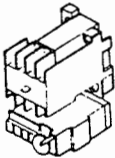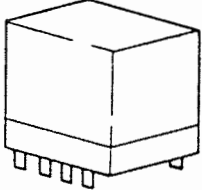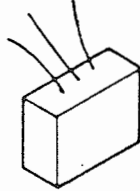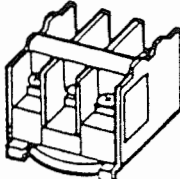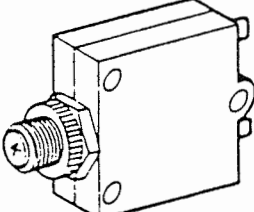
(KLOCKNER-MOELLER) P1-25/Svb(97 729)	Main switch
Main operation panel board(5340 61 648)	
	Main switch
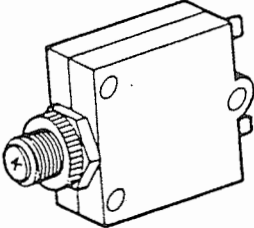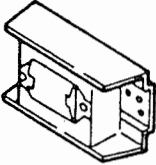
(2) Control box

Power source circuit board (5330 61 643-1)	
Fuse 6.4 X 30 10A(97 722)	
Sensor printed circuit board(5330 61 644-2)	
CPU board With P-ROM (5340 61 640-2) Without P-ROM (5330 61 641)	
P-ROM (5340 61 801-1)	
Battery ASSY (5330 61 646)	
Display controller (5340 61 645)	

Connector board (5340 61 642-1)	
(NATIONAL) DSP1-DC24V(97 190)	
Inverter controller (5340 61 647)	
(OMRON) G6A-274P-DC24V(97 192)	
PT-19 (97 976)	
(TDK) ZGB2203-01(99 779)	
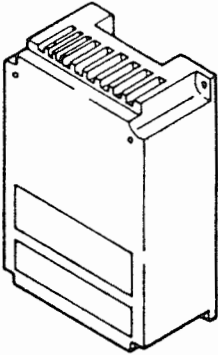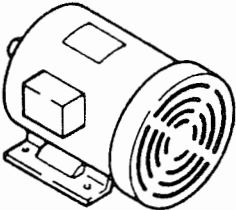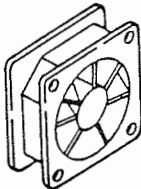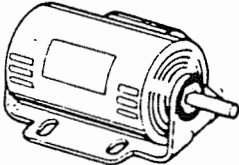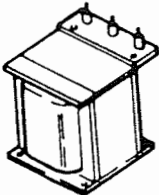
(3) Sub control box
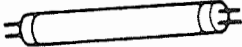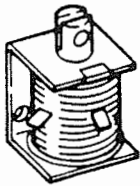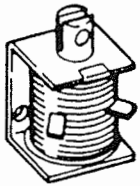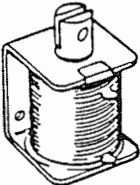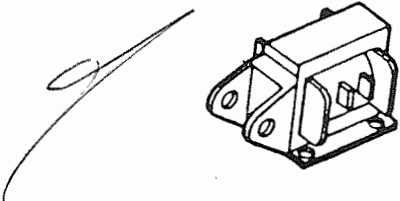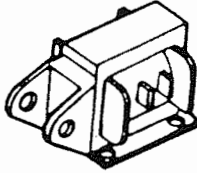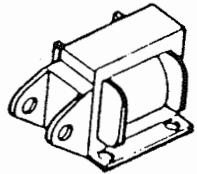
(MITSUBISHI) S-K11 AC120V (97 165)	Single phase machine

(MITSUBISHI) MSO-K11 (97 166)
(OMRON)
 	
  Contactor LC1-D093A60 (97 201)
  Thermal   LR1-D09 310 (97 202)
	Three phase machine
	UL machine

(OMRON) LY-2N DC24V (97 125)	
(MARUKON) DCR2-20D50 (99 772)	
(MARUKON) RFM2H664KPD (99 771)	
(IZUMI) Terminal base BA211T (98 982) Separator BNL5(98 984)	
(AMP) Circuit protector4A (97 703)	For Europe machine only
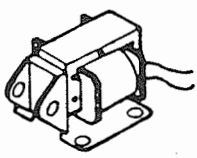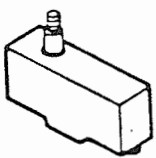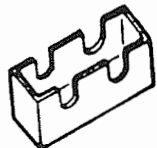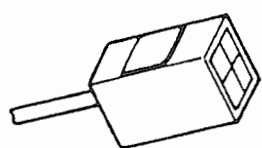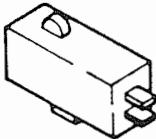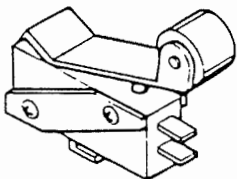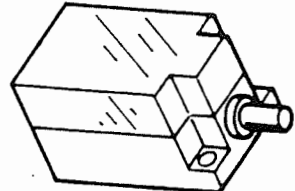
(AMP) Circuit protector 7A (97 702)	For Europe machine only
(NATIONAL) Glow lamp FG-1E(99 928)	
(NATIONAL) Fluorescent lamp stabilizer 50Hz ..... FZ15111-349 (99 963) 60Hz ..... FZ15111-249 (99 962) UL type... GX15112MA-svb (955 11 001)	
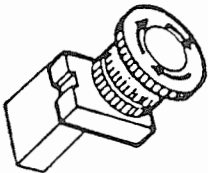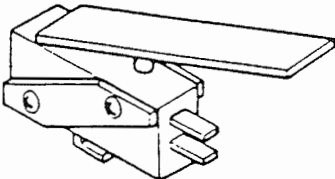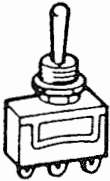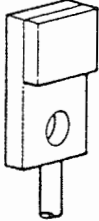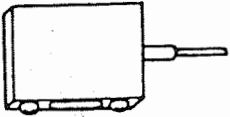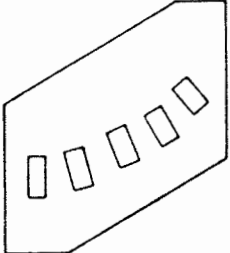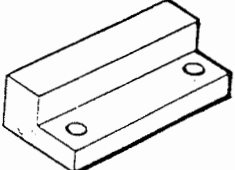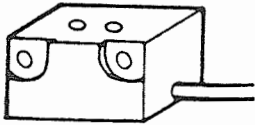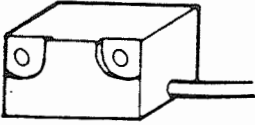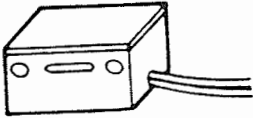
(4) Parts outside the panel

(MITSUBISHI)	Inverter
	
	FRZ120 1.5kW
	  (96 051)
	
	UL type
	  (951 03 002)	

(MITSUBISHI)	SB-JR 1.5kW
	  (97 038)
	UL type
	  (951 01 001)
		Drive motor

(MITSUBISHI)	Noise absorber BKO-C1947H01 (99 776)	
(TOUBISHI)	U12CB9(UL)+A-40 (99 953)	

(MITSUBISHI)	Single phase
	SCL-KR550W 210V
	  (97 054)
	Three phase
	SB-JR 0.75kW
	  (97 034)
		Pump motor

	Auto-transformer
	SRB 12UL
	  (97 975)
	Compound transformer
	DRB 12UL
	  (97 974)	

	Fluorescent lamp 15W (99 960)	
(CKD)	MS-10J811-145 (97 628)	Ink ductor stop
(CKD)	MS-10J811-111 (97 602)	Water ductor stop
(CKD)	MS-35J803-123 (97 603)	Shutter
(CKD)	AS-03A 721-152 (97 606-1)	Lever advance Lever return Delayed paper
(CKD)	AS-05N 703-188 (97 632)	The first unit cylinder ON Lowering the delivery table dolly
(CKD)	AS-05N 703-177 (97 630)	Feed stop The second unit cylinder ON

(CKD)	AS-20N 708-015 (97 657)	Blanket cleaning
(OMRON)	Z-15GS-B (95 119)	Double sheet detector
(OMRON)	AP-B (95 117)	
(OMRON)	TL-Q3 (97 812)	Plate cylinder setting position stop
(OMRON)	V-1C2 (97 303)	Safety cover
(OMRON)	V-1C244 (97 313) VAM22 (97 381)	Delivery table dolly lower limit
(FUJI)	WK244XP-2μ (95 338)	Safety bar

(IZUMI)	AVW401-R (96 519)	Emergency stop (Delivery side)
(OMRON)	D2MV-5L111-1C2 (97 332)	Delivery jam
(NATIONAL)	AJ4534 (96 589)	Feed switch
(SUNX)	GXL-12F+MS-GXL-12 (97 837)	Timing switch
(KOYO)	CS-16-5N (96 531)	Delivery table dolly lower switch
	(5330 61 321)	Operation lever switch
(NIPPON AUTOMATION)	RS-9M (97 501)	

(OMRON)	ORE-S5 (97 805) Sensor assy (5340 61 612)	Impression control sensor (PH4)
(OMRON)	OAS-61LD-2 (97 823) Sensor assy 534097823 (5340 61 611)	Feeder board photo sensor (PH1)
	(5330 61 614)	Blanket jam sensor (PH2),(PH3) od 624830

(5) Parts for connecting

(AMP)
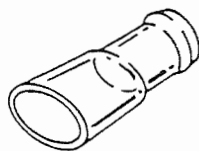
Faston cover 170823-1 (110 series) (98 682)

(AMP)
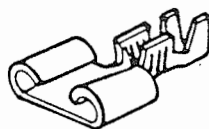
Faston terminal 42470-1 (For 110 series) (98 681)

(AMP)
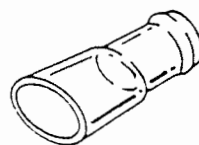
Faston cover 170892-1 (187 series) (98 514)

(AMP)
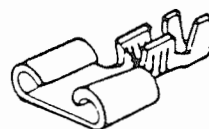
Faston terminal 170038-1 (For 187 series) (98 500)

(AMP)
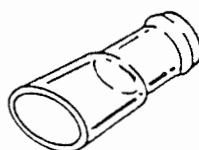
Faston cover 1-170823-5 (250 series) (98 536)

(AMP)
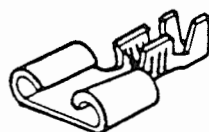
Faston terminal 42731-2 (For 250 series) (98 647)

(AMP)

Share plug (Receptacle) 170021-1 (98 538)

(AMP)
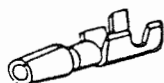
Share plug (Plug) 170020-1 (98 540)

(AMP)

Insulation sleeve (For receptacle) 170889-1 (98 539)

(AMP)

Insulation sleeve (For plug) 170887-1 (98 541)

(AMP)
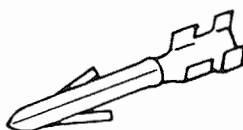
Pin for universal mate-n-lock 350690-3 (98 787)

(AMP)
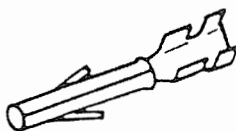
Socket for universal mate-n-lock 350689-3 (98 788)

(AMP)
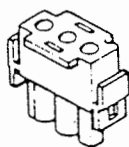
Universal mate-n-lock connector (3P) 1-480700-0 (98 728)

(AMP)
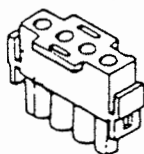
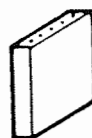Universal mate-n-lock connector (4P) 1-480702-0 (98 680)

(AMP)
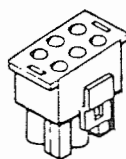
Universal mate-n-lock connector (6P) 1-480704-0 (98 679)

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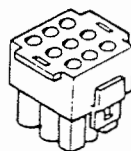
Universal mate-n-lock connector (9P) 1-480706-0 (98 639)

(AMP)
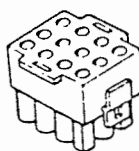
Universal mate-n-lock connector (12P) 1-480708-0 (98 793)

(AMP)
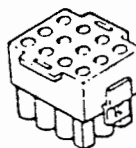
Universal mate-n-lock connector (15P) 1-480710-0 (98 640)

(AMP)
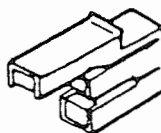
Faston socket 360010-1 (For V-shaped switch) (98 501)
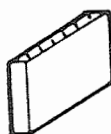
(AMP)

Pin for CIS 163691-1 (98 560)

(AMP)

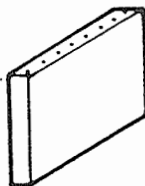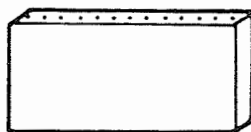CIS male connector Housing 6P 163690-4 (98 795)

(AMP)

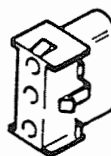CIS male connector Housing 8P 163690-6 (98 550)

(AMP)

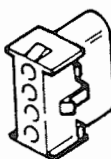CIS male connector Housing 10P 163690-8 (98 551)

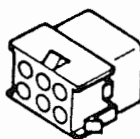(AMP)

CIS male connector Housing 16P 1-163690-5

(AMP)

Universal mate-n-lock connector cap 3P 1-480701-0(98 876)

(AMP)

Universal mate-n-lock connector cap 4P 1-480703-0 (98 737)

(AMP)

Universal mate-n-lock connector cap 6P 1-480705-0(98 784)

(AMP)
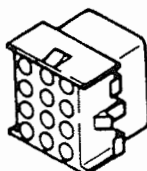
Universal mate-n-lock connector cap 12P 1-480709-0 (98 799)
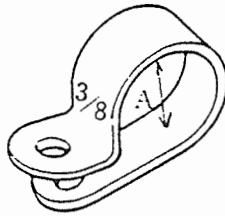
(HEYCO)		A = 9.1mm Nylon clamp 3306 (98 806)
(HEYCO)		A = 5.9mm Nylon clamp 3304 (95 150)
(HEYCO)		A = 15.9mm Nylon clamp 3330 (98 809)
(HEYCO)		A = 21.9mm Nylon clamp 3334 (95 151)
(HEYCO)		A = 2.9mm Nylon clamp 3302 (98 805)
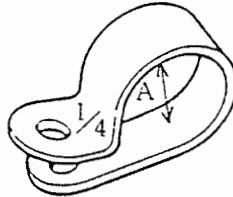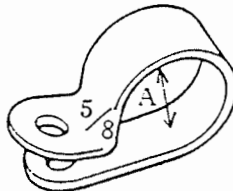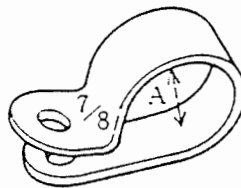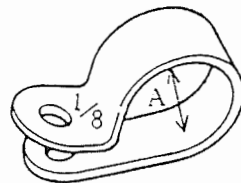
19. Electrical circuit diagrams

(1) Sub control box circuit diagram
   a) Single phase except for Europe
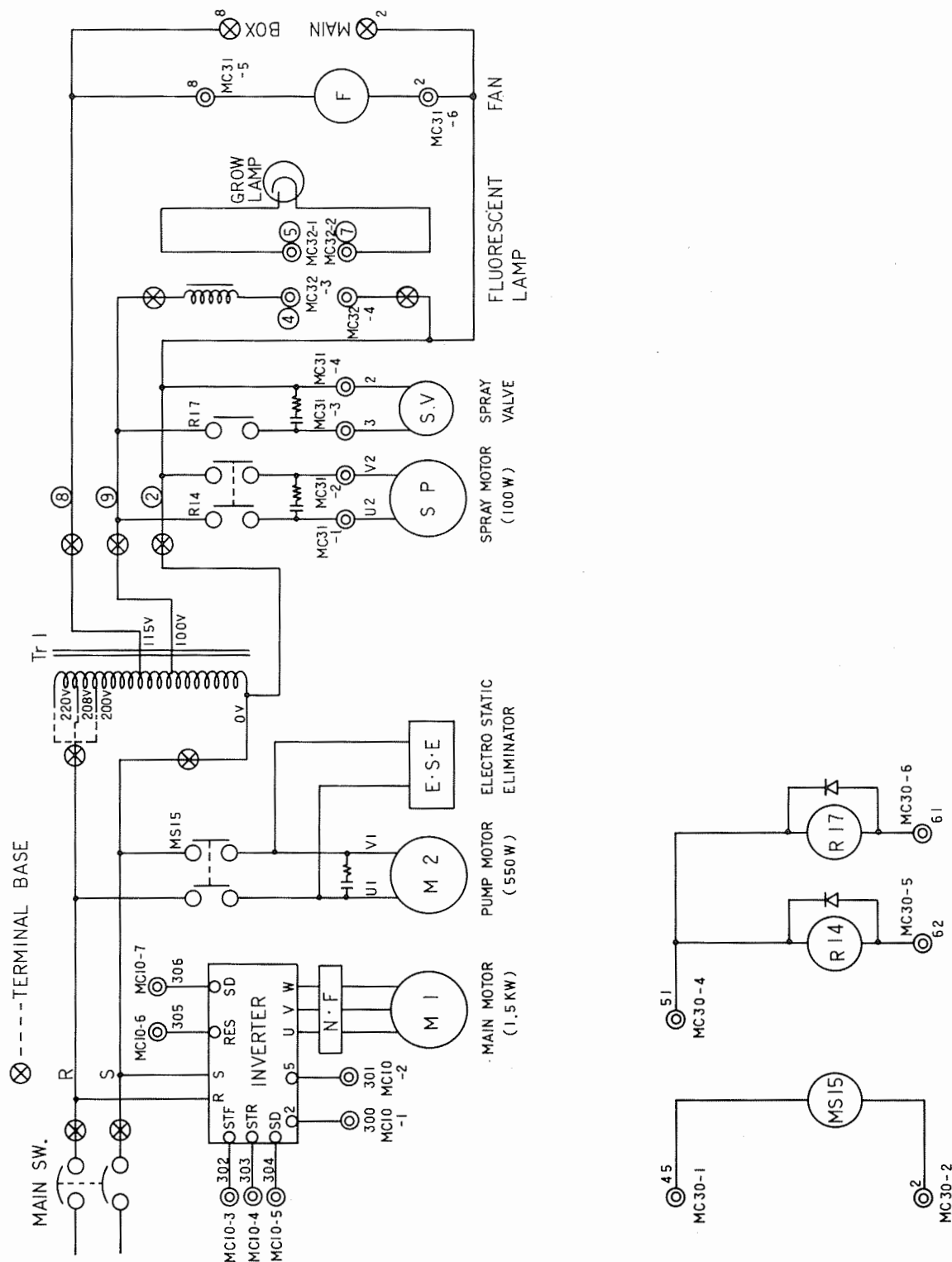
b) Single phase for Europe

MAIN BOX

MC31-5

F

MC31-6

FAN

GROW LAMP

MC32-1   MC32-2

FLUORESCENT LAMP

MC32-3   MC32-4

R17   MC31-4   MC31-3

S.V   SPRAY VALVE

R14   MC31-2   MC31-1

S P   SPRAY MOTOR (100 W)

V2   U2

F1 4A   F2 4A   F3 7A

Tr1   115V   100V   0V

220V   208V   200V   0V

E·S·E   ELECTRO STATIC ELIMINATOR

MS15

M2   PUMP MOTOR (550 W)

U1   V1

TERMINAL BASE

MC10-7   306   SD

MC10-6   305   RES

R   STF   S   STR   SD   U V W

INVERTER

N·F

M1   MAIN MOTOR (1.5 KW)

301   MC10-2

300   MC10-1

MAIN SW.

MC10-3   302

MC10-4   303

MC10-5   304

R17   MC30-6   61

R14   MC30-5   62

51   MC30-4

MS15

45   MC30-1

2   MC30-2

c) Three phase except for Europe

d) Three phase for Europe
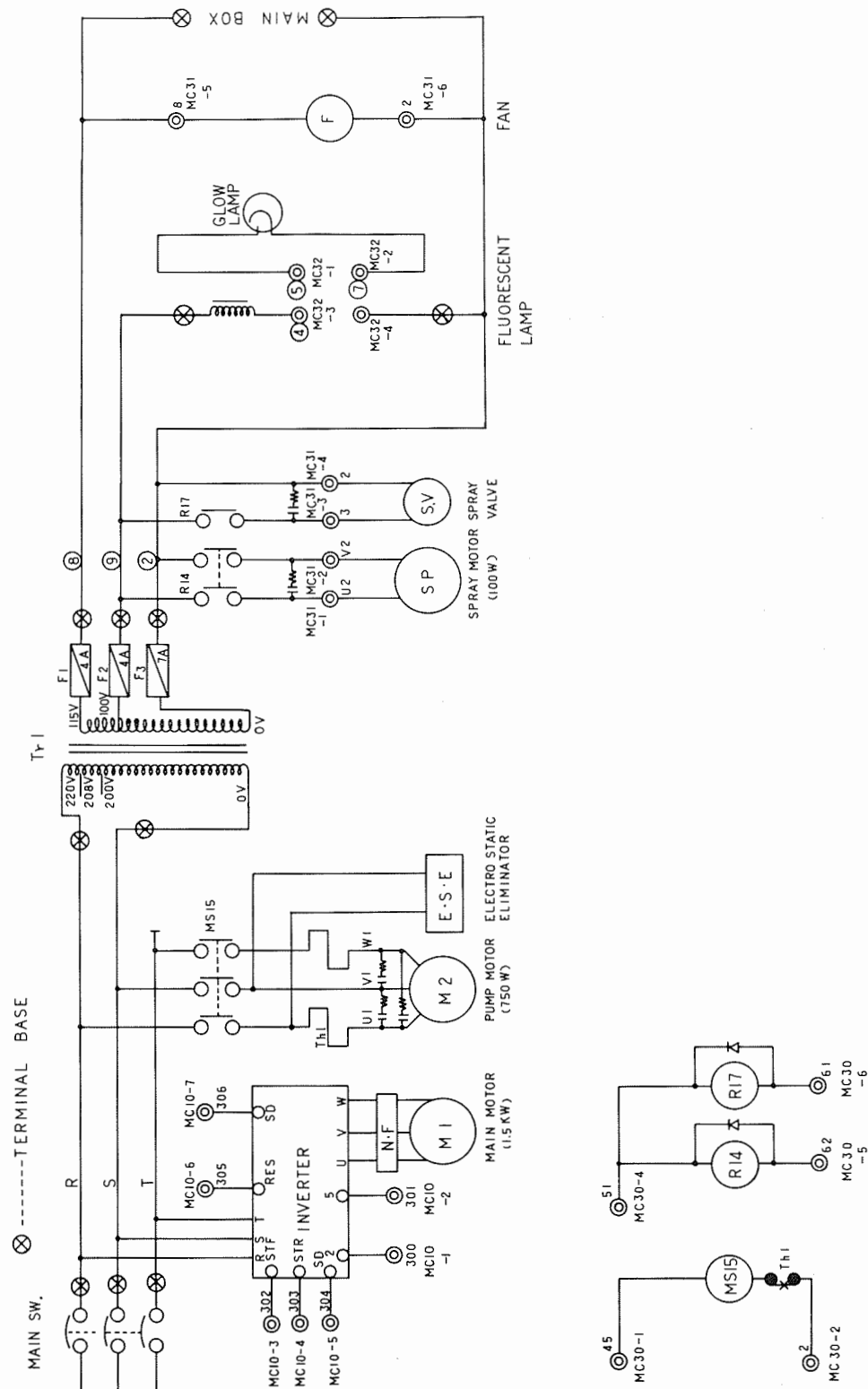
e) Three phase for the domestic
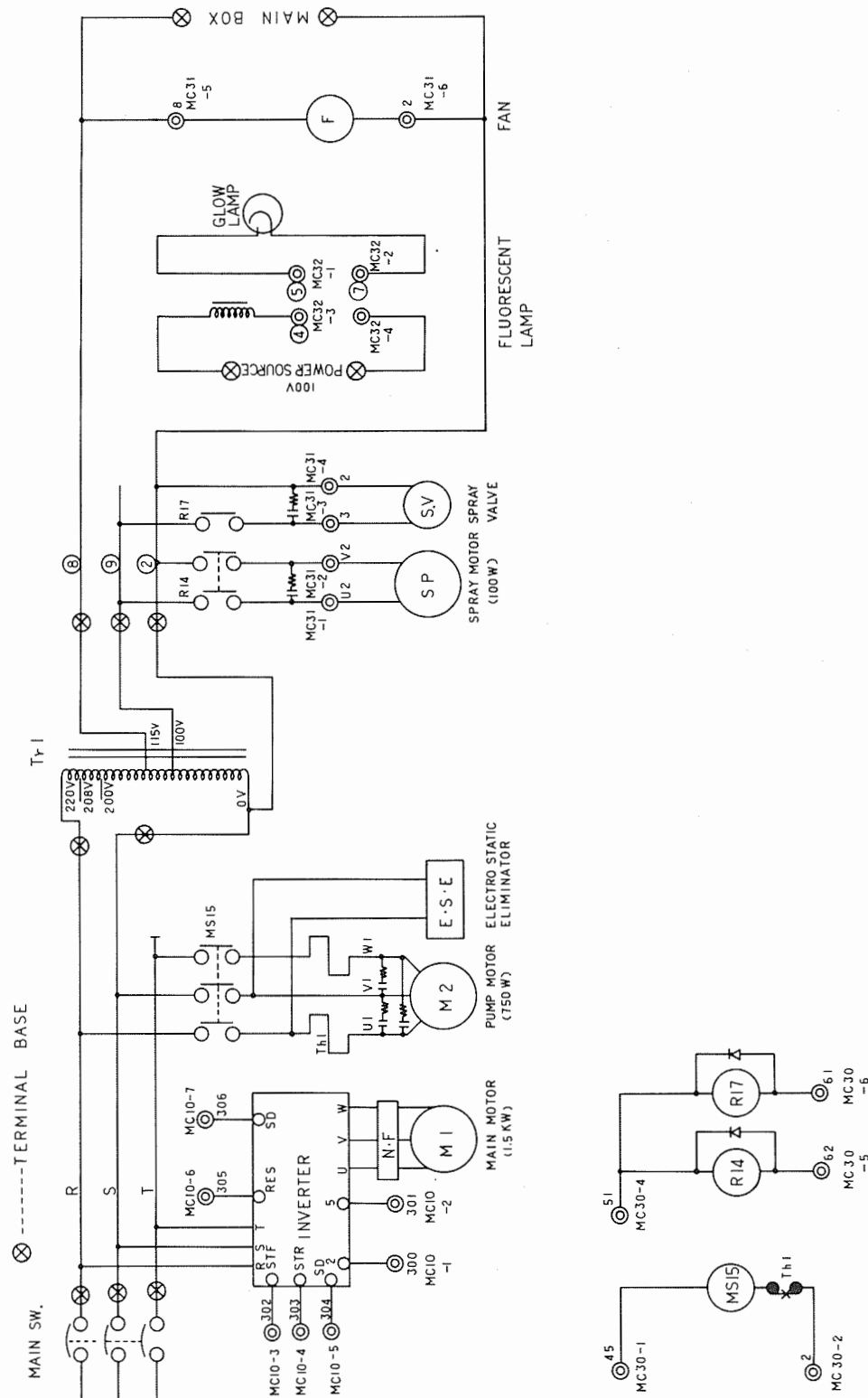
(2) Power source circuit board
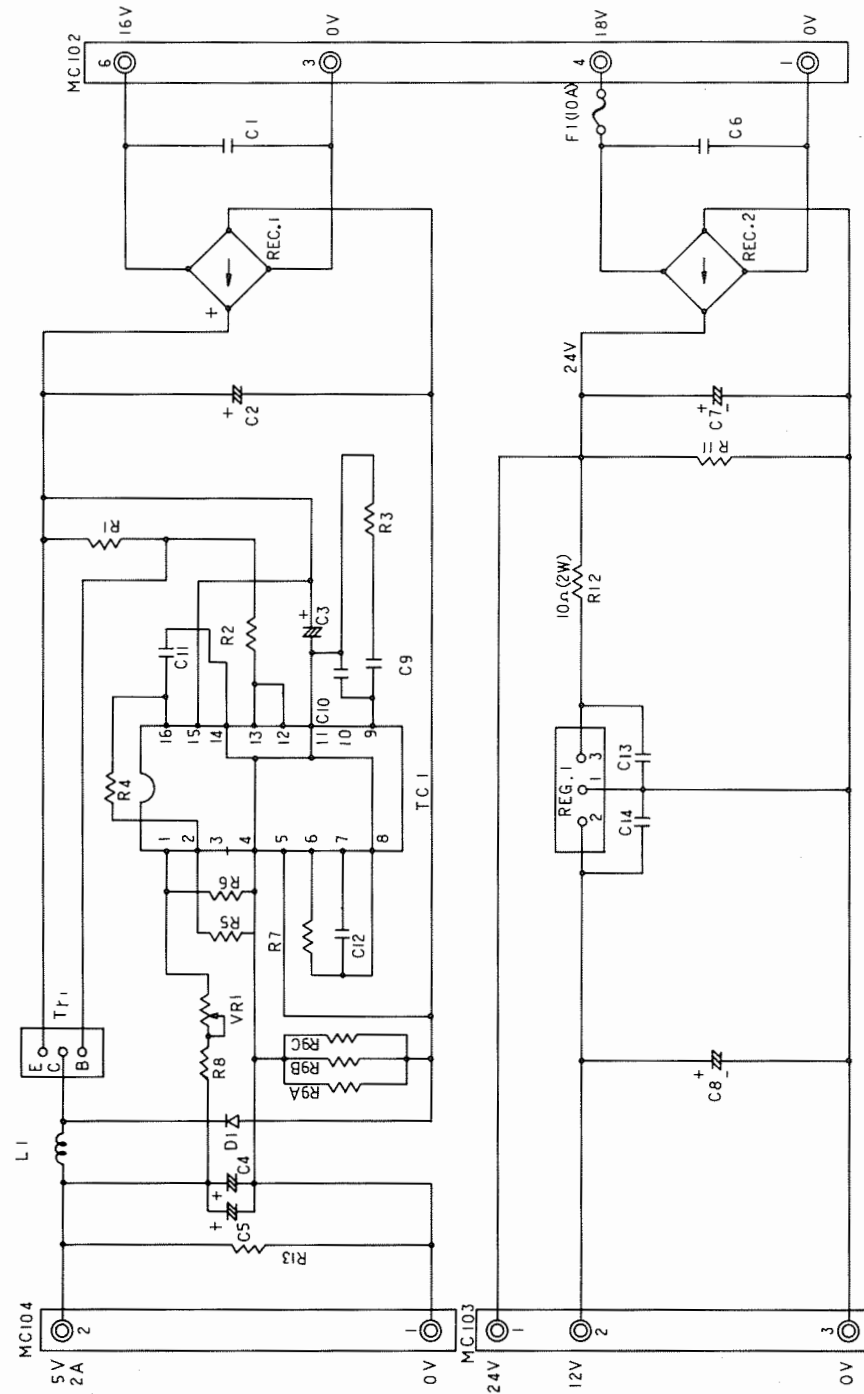
(3) Inverter control circuit
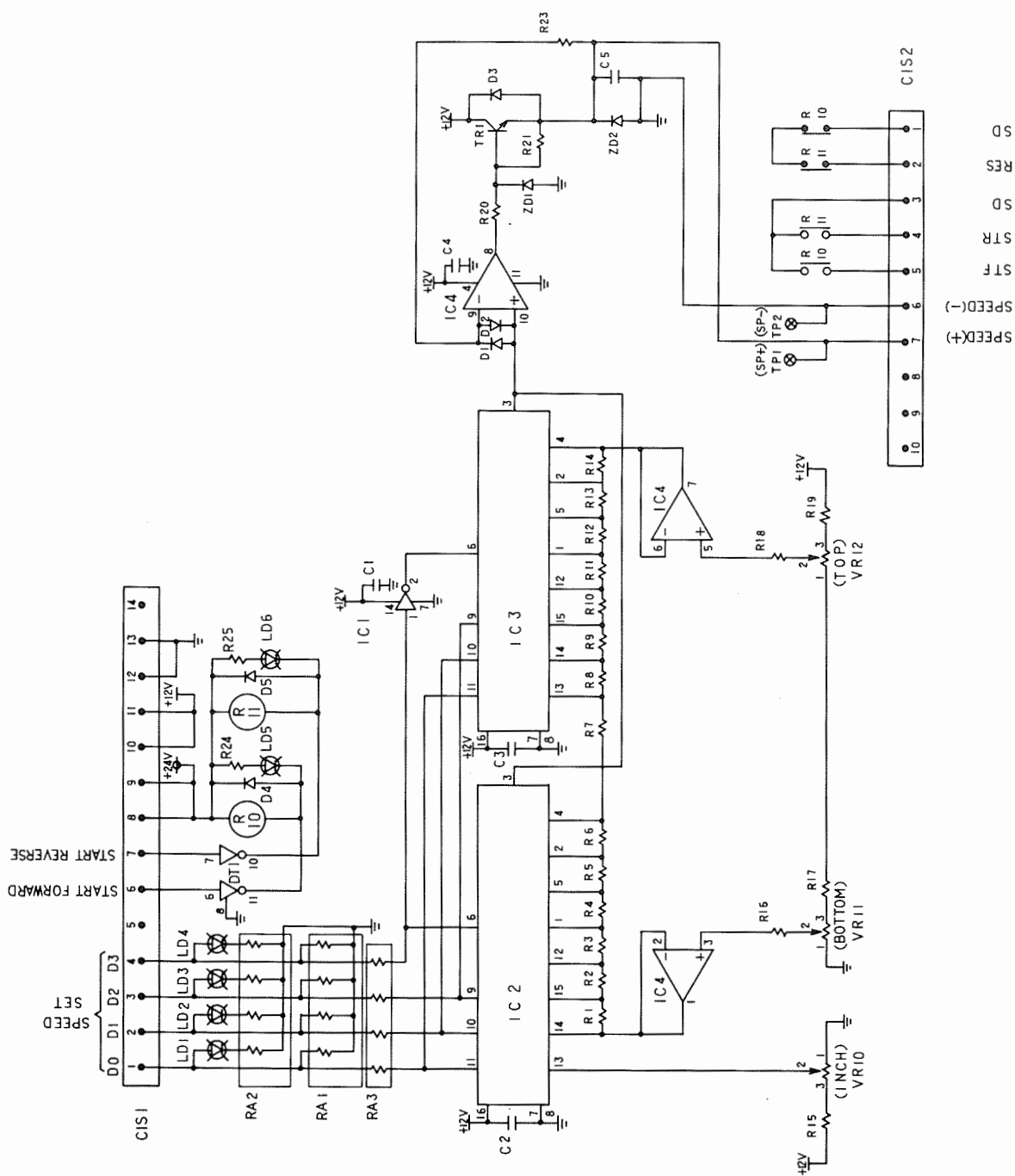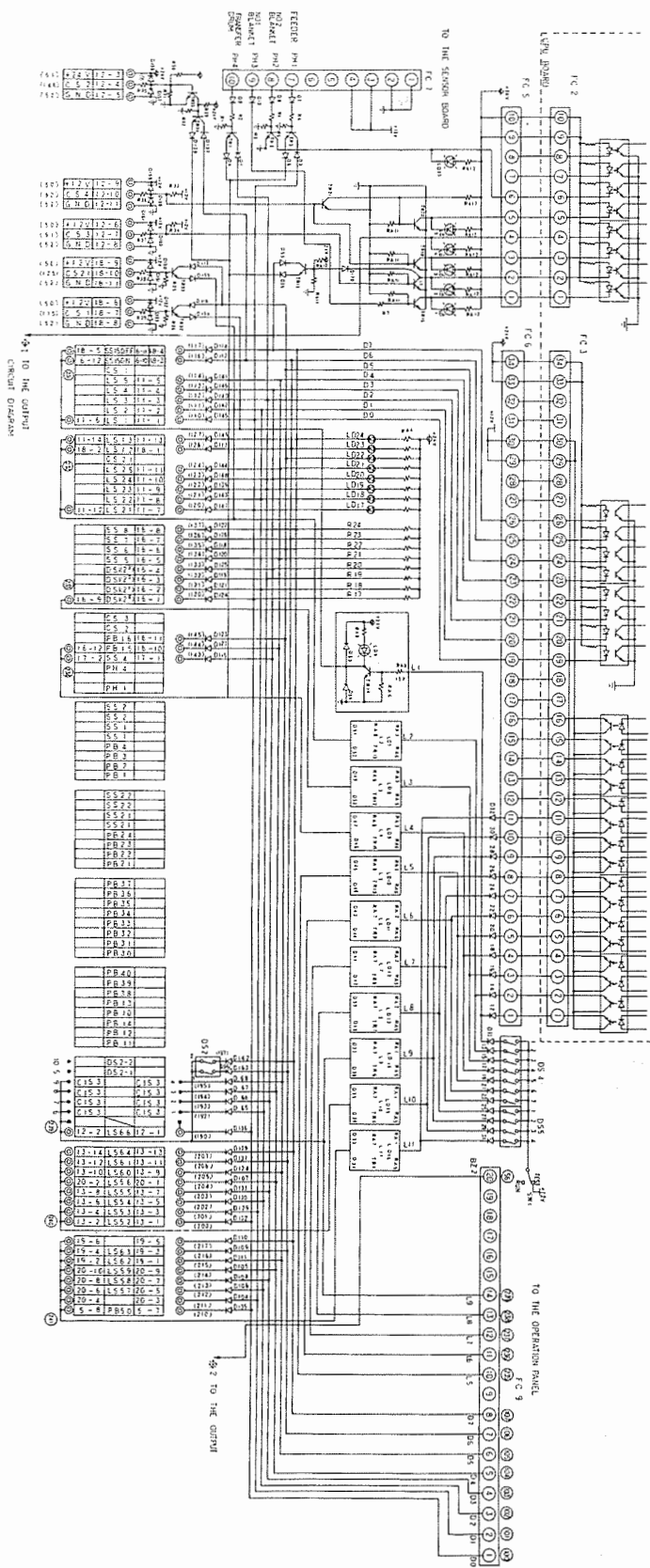
b) output circuit diagram

115VDC
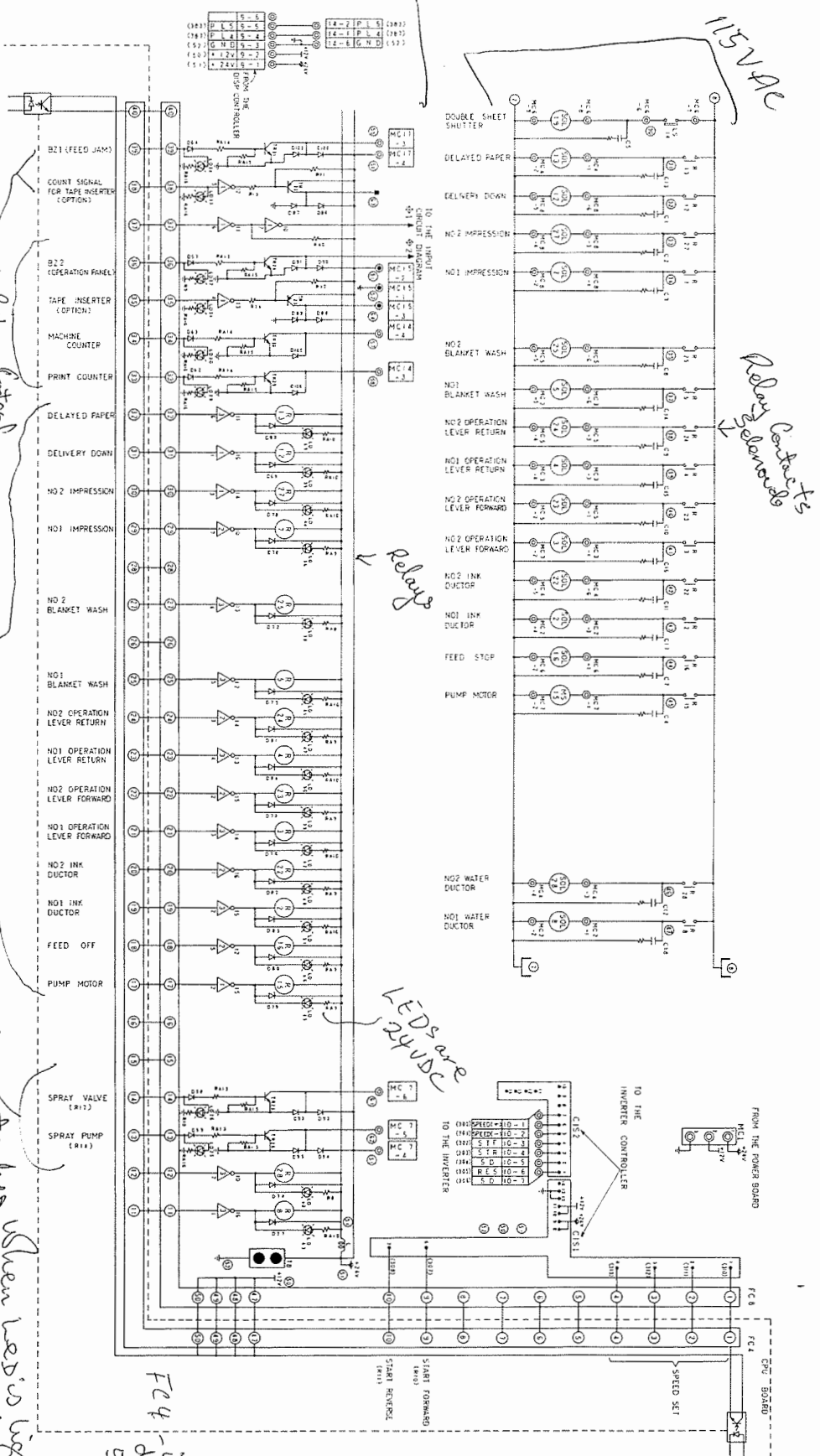
All Relays are the Same

Relay Contacts & Solenoids

DOUBLE SHEET SHUTTER
DELAYED PAPER
DELIVERY DOWN
NO2 IMPRESSION
NO1 IMPRESSION
NO2 BLANKET WASH
NO1 BLANKET WASH
NO2 OPERATION LEVER RETURN
NO1 OPERATION LEVER RETURN
NO2 OPERATION LEVER FORWARD
NO2 OPERATION LEVER FORWARD
NO2 INK DUCTOR
NO1 INK DUCTOR
FEED STOP
PUMP MOTOR
NO2 WATER DUCTOR
NO1 WATER DUCTOR

FROM THE POWER BOARD

TO THE INVERTER CONTROLLER

5 to 24VDC

No Relay Control this Circuit Transistors

BZ1 (FEED JAM)
COUNT SIGNAL FOR TAPE INSERTER (OPTION)
BZ2 (OPERATION PANEL)
TAPE INSERTER (OPTION)
MACHINE COUNTER
PRINT COUNTER
DELAYED PAPER
DELIVERY DOWN
NO2 IMPRESSION
NO1 IMPRESSION
NO2 BLANKET WASH
NO1 BLANKET WASH
NO2 OPERATION LEVER RETURN
NO1 OPERATION LEVER RETURN
NO2 OPERATION LEVER FORWARD
NO1 OPERATION LEVER FORWARD
NO2 INK DUCTOR
NO1 INK DUCTOR
FEED OFF
PUMP MOTOR
SPRAY VALVE [R13]
SPRAY PUMP [R14]

FROM THE DISP CONTROLLER

TO THE INPUT CIRCUIT DIAGRAM

Control by 24VDC relays

LEDs are 24VDC

Relays

Separate for means Relay

Separate this means was sent Relay

When LED's light only means signals was sent, does not mean Relay is good.

FC4 - Whole dotted lines 50 pin contact

TO THE INVERTER

SPEED+ 10-1
SPEED- 10-2
S.T.F 10-3
S.T.R 10-4
S.D 10-5
R.E.S 10-6
S.D 10-7

START REVERSE [R12]
START FORWARD [R11]
SPEED SET

CPU BOARD
FC0
FC4

Pull out Jumper
Machine won't work
Won't come on

5) Parts arrangement diagram
a) Operation side

FLUORESCENT LAMP
(5) <BRN> MC32-1 (4)<ORN> <ORN>
(7) <RED> MC32-2 (6)<YEL> <YEL>

CS21 NO2 PLATE POSITION
(50)<WHT> MC18-9 (125X BLK) MC18-10
(52)<BRN> MC18-11

SOL27 NO2 IMPRESSION
(33) <ORN> MC8-3
(2) <YEL> MC8-4

SS15 FEED ON-OFF SW.
(116) <ORN> MC18-3
(17) <YEL> MC18-4
(231) <LI-BU> MC18-5

LS12 DELIVERY BOTTOM SW.
(126) <BRN> MC18-1
(232) <RED> MC18-2

SOL12 DELIVERY DOWN
(32) <BLU> MC8-6
(2) <LI-BU> MC8-5

SS4 SPRAY ON-OFF SW.
(143) <BRN> MC17-1
(234) <RED> MC17-2

BZ1 JAM
(55) <ORN> MC17-3
(51) <YEL> MC17-4

LS58 NO2 VERTICAL ADJUSTMENT SW.
(213) <VIO> MC20-7
(241) <GRY> MC20-8

LS56 NO1 BACK SAFETY COVER
(20A)<BRN>MC20-1(240)<RED>MC20-2

SOL7 NO1 IMPRESSION
(34) <BRN> MC8-1
(2) <RED> MC8-2

LS63 NO1 VERTICAL ADJUSTMENT SW.
(216)<ORN> MC19-3
(241) <YEL>MC19-4

LS59 HANDWHEEL SAFETY SW.
(214) <WHT> MC 20-9
(241) <BLK> MC 20-10

PH2 PHOTO SENSOR

LS57 NO2 SAFETY BAR
(212) <LI-BU> MC20-5
(241) <BLU> MC20-6

PH3 PHOTO SENSOR

CS1 NO1 PLATE POSITION
(50) <BLU> MC18-6
(115) <VIO> MC18-7
(52) <GRY> MC18-8

LS62 NO1 SAFETY BAR
(215)<BRN> MC19-1
(241)<RED> MC19-2

PH4 PHOTO SENSOR

PH1 PHOTO SENSOR

SOL9 DOUBLE SHEET SHUTTER
(30)<GRY> MC 6-8
(2) <WHT> MC 6-9

LS14 DOUBLE SHEET DETECTOR
(8) <VIO> MC6-7
(30) < BLU> MC6-6

SOL16 FEED STOP
(44) <BRN> MC 6-1
(2) < RED > MC 6-2

SS15 FEED ON-OFF SW.
(116) <BLK> MC 6-10
(17) <BRN> MC 6-11
(231) <RED> MC 6-12

※ NOTICE
THE NUMBER IN < ( ) IS WIRE NUMBER
COLOR IN < > IS WIRE COLOR

<BRN> : BROWN WIRE   <BLU> : BLUE WIRE
<RED> : RED WIRE   <VIO> : VIOLET WIRE
<ORN> : ORANGE WIRE   <GRY> : GRAY WIRE
<YEL> : YELLOW WIRE   <WHT> : WHITE WIRE
<LI-BU> : LIGHT BLUE WIRE <BLK> : BLACK WIRE

WIRE COLOR OF CONNECTOR

ORANGE 3	RED 2	BROWN 1
WHITE 6	BLUE 5	VIOLET 4
GRAY 9	BROWN 8	YELLOW 7
LIGHT BLUE 12	LIGHT BLUE 11	BLACK 10
ORANGE 15	YELLOW 14	YELLOW/ORANGE 13

b) Non operation side

WIRE COLOR OF CONNECTOR

ORANGE 3	RED 6	BLUE 9	WHITE 12	LIGHT BLUE 15
RED 2	LIGHT BLUE 5	GRAY 8	BROWN 11	YELLOW/ORANGE 14
BROWN 1	YELLOW 4	BLACK 7	BLACK 10	13

※NOTICE

THE NUMBER IN ( ) IS WIRE NUMBER
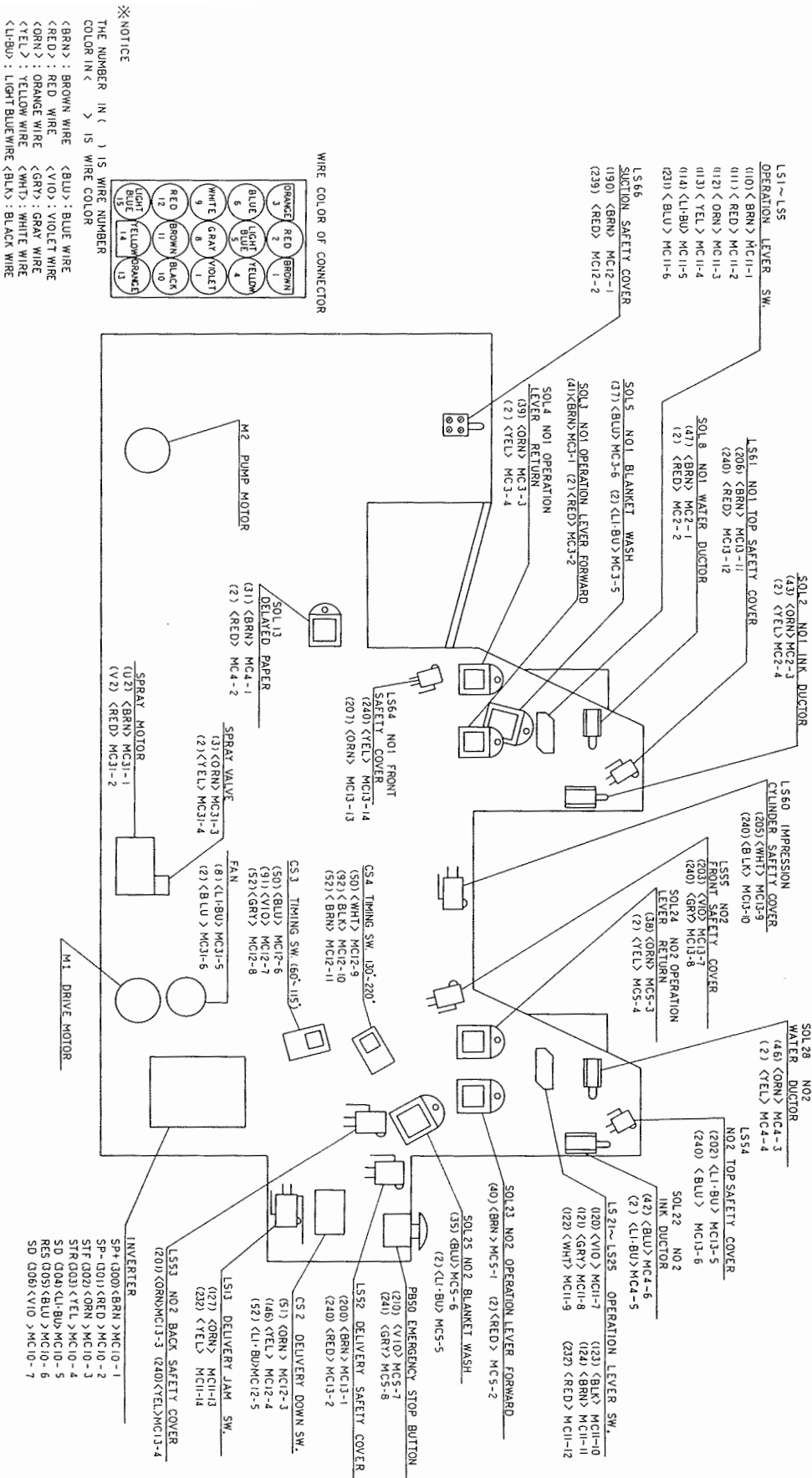COLOR IN < > IS WIRE COLOR

<BRN> : BROWN WIRE   <BLU> : BLUE WIRE
<RED> : RED WIRE   <VIO> : VIOLET WIRE
<ORN> : ORANGE WIRE   <GRY> : GRAY WIRE
<YEL> : YELLOW WIRE   <WHT> : WHITE WIRE
<LI-BU> : LIGHT BLUE WIRE   <BLK> : BLACK WIRE

LS1~LS5
OPERATION LEVER SW.
(10) <BRN> MC11-1
(11) <RED> MC11-2
(12) <ORN> MC11-3
(13) <YEL> MC11-4
(14) <LI-BU> MC11-5
(21) <BLU> MC11-6

LS66
SUCTION SAFETY COVER
(19) <BRN> MC12-1
(239) <RED> MC12-2

M2 PUMP MOTOR

SOL5 NO1 BLANKET WASH
(37) <BLU> MC3-6   (2) <LI-BU> MC3-5

SOL4 NO1 OPERATION LEVER RETURN
(39) <ORN> MC3-3
(2) <YEL> MC3-4

SOL3 NO1 OPERATION LEVER FORWARD
(41) <BRN> MC3-1   (2) <RED> MC3-2

SOL8 NO1 WATER DUCTOR
(47) <BRN> MC2-1
(2) <RED> MC2-2

LS61 NO1 TOP SAFETY COVER
(206) <BRN> MC13-11
(240) <RED> MC13-12

SOL2 NO1 INK DUCTOR
(43) <ORN> MC2-3
(2) <YEL> MC2-4

SOL13 DELAYED PAPER
(31) <BRN> MC4-1
(2) <RED> MC4-2

SPRAY MOTOR
(3) <ORN> MC31-3
(2) <YEL> MC31-4

SPRAY VALVE
(U2) <BRN> MC31-1
(V2) <RED> MC31-2

LS64 NO1 FRONT SAFETY COVER
(240) <YEL> MC13-14
(201) <ORN> MC13-13

LS60 IMPRESSION CYLINDER SAFETY COVER
(205) <WHT> MC13-9
(240) <BLK> MC13-10

LS55 NO2 FRONT SAFETY COVER
(203) <VIO> MC13-7
(240) <GRY> MC13-8

SOL24 NO2 OPERATION LEVER RETURN
(38) <ORN> MC5-3
(2) <YEL> MC5-4

FAN
(81) <LI-BU> MC31-5
(2) <BLU > MC31-6

CS3 TIMING SW. (160~115)
(50) <BLU> MC12-6
(91) <VIO> MC12-7
(52) <GRY> MC12-8

CS4 TIMING SW. 130~220°
(50) <WHT> MC12-9
(92) <BLK> MC12-10
(52) <BRN> MC12-11

M1 DRIVE MOTOR

SOL28 NO2 WATER DUCTOR
(46) <ORN> MC4-3
(2) <YEL> MC4-4

LS54 NO2 TOP SAFETY COVER
(202) <LI-BU> MC13-5
(240) <BLU> MC13-6

SOL22 NO2 INK DUCTOR
(42) <BLU> MC4-5
(2) <BLU> MC4-6

LS21~LS25 OPERATION LEVER SW.
(20) <VIO> MC11-7
(12) <GRY> MC11-8
(22) <WHT> MC11-9
(123) <BLK> MC11-10
(124) <BRN> MC11-11
(232) <RED> MC11-12

SOL23 NO2 OPERATION LEVER FORWARD
(40) <BRN> MC5-1   (2) <RED> MC5-2

SOL25 NO2 BLANKET WASH
(35) <BLU> MC5-6   (2) <LI-BU> MC5-5

PB50 EMERGENCY STOP BUTTON
(210) <VIO> MC5-7
(241) <GRY> MC5-8

CS2 DELIVERY SAFETY COVER
(200) <BRN> MC13-1
(240) <RED> MC13-2

LS52 DELIVERY SAFETY COVER
(200) <BRN> MC13-1
(240) <RED> MC13-2

LS13 DELIVERY JAM SW.
(127) <ORN> MC11-13
(232) <YEL> MC11-14

CS2 DELIVERY DOWN SW.
(51) <ORN> MC12-3
(146) <YEL> MC12-4
(52) <LI-BU> MC12-5

LS53 NO2 BACK SAFETY COVER
(201) <ORN> MC13-3   (240) <YEL> MC13-4

INVERTER
SP+ (300) <BRN> MC10-1
SP- (301) <RED> MC10-2
STF (302) <ORN> MC10-3
STR (303) <YEL> MC10-4
SD (304) <LI-BU> MC10-5
RES (305) <BLU > MC10-6
SD (306) <VIO > MC10-7

(6) Display control circuit output section

8 STATIC OUTPUTS

PIN	LINE NO.
1	360 (PL1)
2	381 (PL2)
3	382
4	383 (LD2)
5	384 (PL21)
6	385 (PL22)
7	386
8	387 (LD3)

(TR1–TR8, LD1–LD8)

16 DATA OUTPUTS OF THE DYNAMIC LIGHT

PIN	LINE NO.
9	360
10	361
11	362
12	363
13	364
14	365
15	366
16	367
17	370
18	371
19	372
20	373
21	374
22	375
23	376
24	377

(TR9–TR24)

8 LINE OUTPUTS OF DYNAMIC LIGHT

PIN	LINE NO.
25	351
26	352
27	353
28	354
29	355
30	356
31	357
32	358

(TR25–TR32)

TO THE MAIN PANEL — LINE NO. / PIN NO.

TO THE CONNECTOR BOARD

MC21-5	383 (PL5)
MC21-4	387 (PL4)
MC21-3	S2 (0V)
MC21-2	S0 12V
MC21-1	S1 (24V)

24V

Pins: 33 34 35 36 37 38 39 40

7-segment display reference (segments a, b, c, d, e, f, g, DP)

STATIC LIGHT

MARK	PART NAME
PL1	NO1 EMERGENCY STOP BUTTON
PL2	NO1 ON-OFF BUTTON
LD2	OK MONITOR
PL5	SUB PANEL OIL WARNING LAMP
LD1	OIL WARNING LAMP RESET SW
PL21	NO2 EMERGENCY STOP BUTTON
PL22	NO2 ON-OFF BUTTON
LD3	OK MONITOR
LD3	PUMP WARNING LAMP
PL4	SUB PANEL PUMP WARNING LAMP RESET SW

DYNAMIC LIGHT

DYNAMIC LIGHT	COUNT 10^4	COUNT 10^5	COUNT 10^3	COUNT 10^2	COUNT 10^1	COUNT 10^0	SET 10^3	SET 10^2
LINE 360	LD33 a	LD34 a	LD35 a	LD36 a	LD37 a	LD38 a	LD39 a	LD40 a
LINE 361	LD33 b	LD34 b	LD35 b	LD36 b	LD37 b	LD38 b	LD39 b	LD40 b
LINE 362	LD33 c	LD34 c	LD35 c	LD36 c	LD37 c	LD38 c	LD39 c	LD40 c
LINE 363	LD33 d	LD34 d	LD35 d	LD36 d	LD37 d	LD38 d	LD39 d	LD40 d
LINE 364	LD33 e	LD34 e	LD35 e	LD36 e	LD37 e	LD38 e	LD39 e	LD40 e
LINE 365	LD33 f	LD34 f	LD35 f	LD36 f	LD37 f	LD38 f	LD39 f	LD40 f
LINE 366	LD33 g	LD34 g	LD35 g	LD36 g	LD37 g	LD38 g	LD39 g	LD40 g
LINE 367	LD33 DP	LD34 DP	LD35 DP	LD36 DP	LD37 DP	LD38 DP	LD39 DP	LD40 DP

DYNAMIC LIGHT	SET 10^1	SET 10^0						
LINE 370	LD41 a	LD42 a	LD4 GREEN	LD12 DELIVERY BOTTOM	LD73 3000 r.p.h	LD50 EMERGENCY STOP	LD52 DELIVERY COVER	LD53 NO2 BACK COVER
LINE 371	LD41 b	LD42 b	LD10 DELIVERY JAM	LD13 END CYCLE	LD74 4000 r.p.h	LD66 SUCTION COVER		
LINE 372	LD41 c	LD42 c	LD9 FEED JAM	LD14 BLANKET WASH	LD75 5000 r.p.h	LD57 NO2 SAFETY BAR VERTICAL ADJUSTMENT	LD54 NO2 SAFETY BAR	
LINE 373	LD41 d	LD42 d	LD7 NO1 JAM	LD15 NO1 JAM PUMP	LD76 6000 r.p.h	LD58 NO2 VERTICAL ADJUSTMENT	LD55 NO2 TOP COVER	
LINE 374	LD41 e	LD42 e	LD5 NO2 JAM	LD16 NO2 JAM	LD77 7000 r.p.h	LD59 NO2 HANDWHEEL	LD56 IMPRESSION CYLINDER COVER	
LINE 375	LD41 f	LD42 f		LD17 BATTERY	LD72 500 r.p.h	LD62 NO1 SAFETY BAR	LD60 NO1 SAFETY BAR	
LINE 376	LD41 g	LD42 g		LD30 COUNT ON-OFF	LD78 8000 r.p.h	LD63 NO1 VERTICAL ADJUSTMENT		
LINE 377	LD41 DP	LD42 DP		LD11 GELATED PAPER	LD79 9000 r.p.h / LD80 10000 r.p.h	LD61 NO1 TOP COVER	LD64 NO1 FRONT COVER	

LINE 358	LINE 357	LINE 356	LINE 355	LINE 354	LINE 353	LINE 352	LINE 351

c) Inching panel wiring diagram

CIS5 (NO2 UNIT)

PIN NO.	LINE NO.	WIRE COLOR
1		
2		
3	236	BRN
4	167	RED
5	166	ORN
6	165	YEL
7	164	LI·BU
8	163	BLU
9	162	VIO
10	161	GRY
11	160	WHT
12		
13	385	BLK
14	384	BRN
15		
16	52	RED
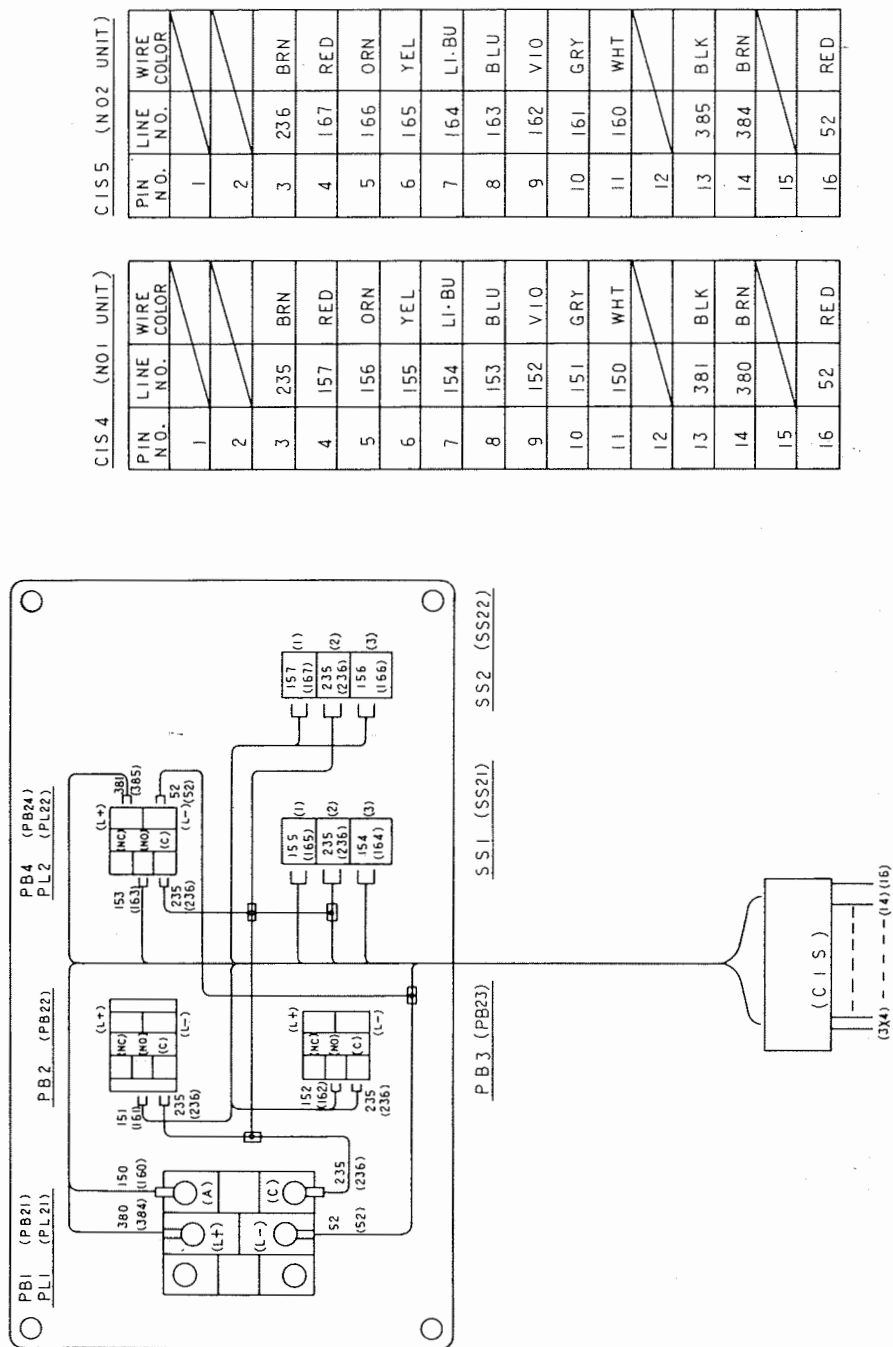
CIS4 (NO1 UNIT)

PIN NO.	LINE NO.	WIRE COLOR
1		
2		
3	235	BRN
4	157	RED
5	156	ORN
6	155	YEL
7	154	LI·BU
8	153	BLU
9	152	VIO
10	151	GRY
11	150	WHT
12		
13	381	BLK
14	380	BRN
15		
16	52	RED

b) Sub control panel wiring diagram

MC 36
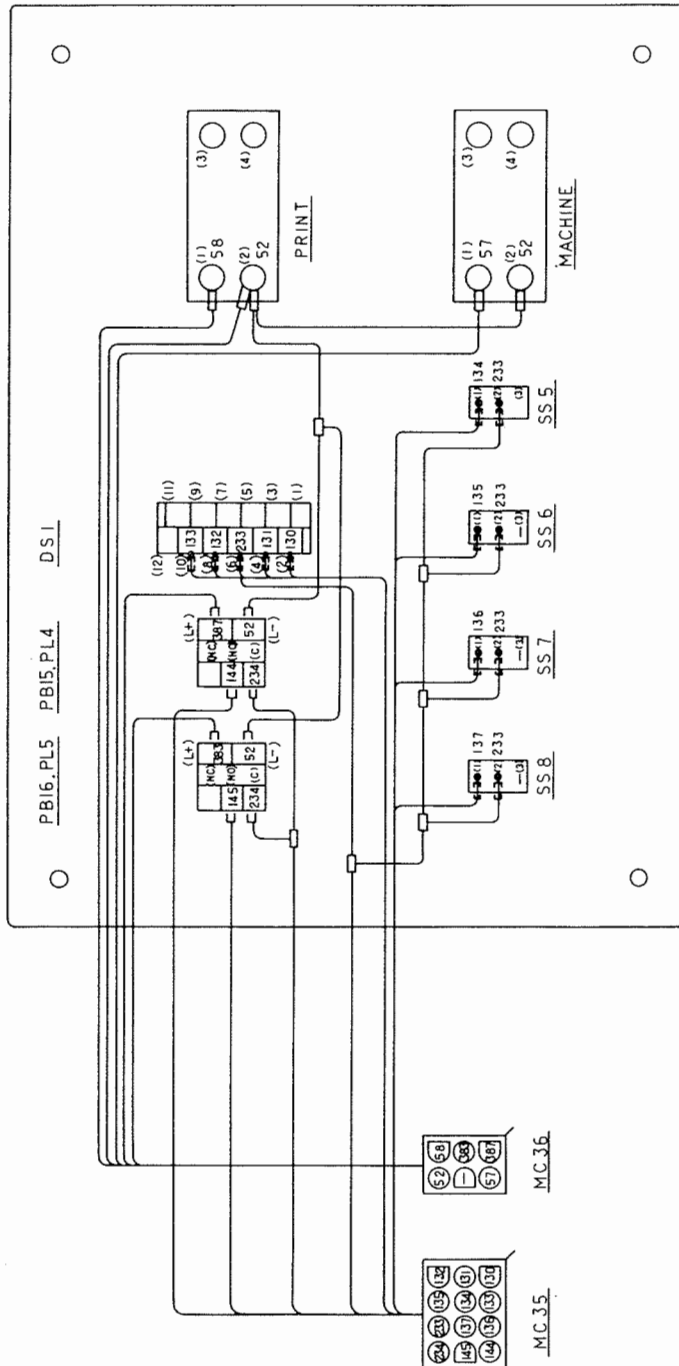
PIN NO.	LINE NO.	WIRE COLOR
1	387	BRN
2	383	RED
3	58	ORN
4	57	YEL
5		
6	52	BLU

MC 35

PIN NO.	LINE NO.	WIRE COLOR	PIN NO.	LINH NO.	WIRE COLOR
1	130	BRN	7	136	VIO
2	131	RED	8	137	GRY
3	132	ORN	9	233	WHT
4	133	YEL	10	144	BLK
5	134	LI·BU	11	145	BRN
6	135	BLU	12	234	RED

Handwritten notes:
- ① input = (+) button ② output = (−) button
- High Voltage is present AC when switch is closed. CPU Reads current Here
- 115VAC
- Question (8)
- CS3 .5 ~ .7 VDC Between Ground & Center — CS4 — Timing Switches
- Tommy Switches

INPUT MATRIX

	D7	D6	D5	D4	D3	D2	D1	D0
L1	SS15 OFF(FEEDER DELIVERY) FEED OFF SW.	SS15 ON(FEEDER DELIVERY) FEED ON SW. 115VAC	CS1 (OP-SIDE) NO.1 PLATE POSITION	LS5 (NON-OP~SIDE) NO.1 LEVER POSITION Ⅴ	LS4 (NON-OP~SIDE) NO.1 LEVER POSITION Ⅳ	LS3 (NON-OP~SIDE) NO.1 LEVER POSITION Ⅲ	LS2 (NON-OP~SIDE) NO.1 LEVER POSITION Ⅱ	LS1 (NON-OP~SIDE) NO.1 LEVER POSITION Ⅰ
L2	LS13 (DELIVERY) CD BOTTOM JAM SW.	LS12 (DELIVERY) CD BOTTOM SW. 115VAC	CS21 (OP-SIDE) NO.2 PLATE POSITION	LS25 (NON-OP-SIDE) NO.2 LEVER POSITION Ⅴ	LS24 (NON-OP-SIDE) NO.2 LEVER POSITION Ⅳ	LS23 (NON-OP-SIDE) NO.2 LEVER POSITION Ⅲ	LS22 (NON-OP-SIDE) NO.2 LEVER POSITION Ⅱ	LS21 (NON-OP-SIDE) NO.2 LEVER POSITION Ⅰ
L3	SS8 (SUB-PANEL) DELAYED PAPER OFF SW	SS7 (SUB-PANEL) FEED JAM OFF SW.	SS6 (SUB-PANEL) NO.1 JAM OFF SW	SS5 (SUB-PANEL) NO.2 JAM OFF SW.	DS1 BLANKET WASH CYCLE (SUB-PANEL) 2^3 (8)	2^2 (4)	2^1 (2)	2^0 (1)
L4	CS3 (NON-OP-SIDE) TIMING SW.	CS2 (NON-OP-SIDE) DELIVERY DOWN SW.	PB16 (SUB-PANEL) OIL RESET BUTTON	PB15 (SUB-PANEL) PUMP RESET BUTTON	SS4 (DELIVERY PANEL) SPRAY SW.	PH4 (TRANSFER DRUM) PHOTO SENSOR		PH1 (FEEDER) PHOTO SENSOR
L5	SS2 AUTO (NO.1 PANEL) NO.1 INK AUTO	SS2 MANU (NO.1 PANEL) NO.1 INK MANU	SS1 AUTO (NO.1 PANEL) NO.1 WATER AUTO	SS1 MANU (NO.1 PANEL) NO.1 WATER MANU	PB4 (NO.1 PANEL) NO.1 UNIT ON-OFF BUTTON	PB3 (NO.1 PANEL) NO.1 REVERSE INCHING BUTTON	PB2 (NO.1 PANEL) NO.1 NORMAL INCHING BUTTON	PB1 (NO.1 PANEL) NO.1 EMERGENCY STOP BUTTON
L6	SS22 AUTO(NO.2 PANEL) NO.2 INK AUTO	SS22 MANU(NO.2 PANEL) NO.2 INK MANU	SS21 AUTO(NO.2 PANEL) NO.2 WATER AUTO	SS21 MANU(NO.2 PANEL) NO.2 WATER MANU	PB24 (NO.2 PANEL) NO.2 UNIT ON-OFF BUTTON	PB23 (NO.2 PANEL) NO.2 REVERSE INCHING BUTTON	PB22 (NO.2 PANEL) NO.2 NORMAL INCHING BUTTON	PB21 (NO.2 PANEL) NO.2 EMERGENCY STOP BUTTON
L7	PB37 (MAIN PANEL) NEXT BUTTON	PB36 (MAIN PANEL) 10^0 BUTTON	PB35 (MAIN PANEL) 10^1 BUTTON	PB34 (MAIN PANEL) 10^2 BUTTON	PB33 (MAIN PANEL) 10^3 BUTTON	PB32 (MAIN PANEL) 10^4 BUTTON	PB31 (MAIN PANEL) COUNT ON-OFF BUTTON	PB30 (MAIN PANEL) COUNT RESET BUTTON
L8	PB40 (MAIN PANEL) SPEED UP BUTTON	PB39 (MAIN PANEL) 7000 R.P.H BUTTON	PB38 (MAIN PANEL) SPEED DOWN BUTTON	PB13 (MAIN PANEL) PUMP BUTTON	PB14 (MAIN PANEL) 1000R.P.H BUTTON	PB12 (MAIN PANEL) BLANKET WASH BUTTON	PB11 (MAIN PANEL) END CYCLE BUTTON	PB10 (MAIN PANEL) START BUTTON
L9	DS2-2(CONNECTOR BOARD) SPARE	DS2-1(CONNECTOR BOARD) BLANKET WASH				LS56 (OP-SIDE) NO.1 BACK COVER	LS66 (FEEDER)(OPTION) SUCTION SAFETY COVER	
L10	LS64 (NON-OP-SIDE) NO.1 FRONT COVER	LS61 (NON-OP-SIDE) NO.1 TOP COVER	LS60 (NON-OP-SIDE) IMPRESSION CYLINDER COVER	LS55 (NON-OP-SIDE) NO.2 FRONT COVER	LS54 (NON-OP-SIDE) NO.2 TOP COVER	LS53 (NON-OP-SIDE) NO.2 BACK COVER	LS52 (DELIVERY) DELIVERY COVER	LS52 (DELIVERY) DELIVERY COVER
L11	LS63 (OP-SIDE) NO.1 VERTICAL ADJUSTMENT SW	LS62 (OP-SIDE) NO.1 SAFETY BAR	LS59 (OP-SIDE) HAND WHEEL SW.	LS58 (OP-SIDE) NO.2 VERTICAL ADJUSTMENT SW	LS57 (OP-SIDE) NO.2 SAFETY BAR			PB50 (DELIVERY) EMERGENCY STOP BUTTON

INPUT INTERRUPT

IR0	PH3 (NO.1 BLANKET) PHOTO SENSOR
IR1	CS3 (NON-OP-SIDE) TIMING SW.
IR2	CS4 (NON-OP-SIDE) TIMING SW.
IR3	INTERNAL CIRCUIT
IR4	CS4 (NON-OP-SIDE) TIMING SW.
IR5	PH2 (NO.2 BLANKET) PHOTO SENSOR

OUTPUT RELAY

R2	NO.1 INK STOP SOL.	R27	NO.2 IMPRESSION SOL.
R22	NO.2 INK STOP SOL.	R8	NO.1 WATER STOP SOL.
R3	NO.1 LEVER FORWARD SOL.	R28	NO.2 WATER STOP SOL.
R23	NO.2 LEVER FORWARD SOL.	R10	INVERTER START FORWARD
R4	NO.1 LEVER RETURN SOL.	R11	INVERTER START REVERSE
R24	NO.2 LEVER RETURN SOL.	R12	DELIVERY DOWN SOL.
R5	NO.1 BLANKET WASH SOL.	R13	DELAYED PAPER SOL.
R25	NO.2 BLANKET WASH SOL.	R15	PUMP MOTOR
R7	NO.1 IMPRESSION SOL.	R16	FEED OFF SOL.

CHECK PROGRAM OF OUTPUT

GROUP1~4	LED ON THE MAIN PANEL
GROUP5	SPRAY PUMP, BZ SOLENOID AT OP-SIDE
GROUP6	SOLENOID AT NON-OP-SIDE
GROUP7	INVERTER CONTROLLER
GROUP8	TAPE INSERTER, LINE FOR INPUT MATRIX

NOTE

SS5~SS8 : LED LIGHTS AT OFF POSITION.

PH1~PH4 : LED LIGHTS WHEN SOMETHING IS ON THE SENSOR.

SAFETY SW. PB50, LS52~LS66 : LED LIGHTS WHEN MACHINE CAN RUN.