TOSHIBA

MY-1004

SERVICE MANUAL 1550 **PLAIN PAPER COPIER PAPER FEEDING UNIT**

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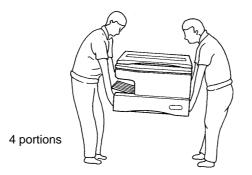


GENERAL PRECAUTIONS REGARDING THE INSTALLATION AND THE SERVICE OF THE 1550/MY-1004

1. Transportation/Installation

 When transporting/installing the copier, using two persons, be sure to use the positions as indicated below.

The copier is fairly heavy and weighs approximately 35 kg (76.8 lb), therefore pay full attention when handling it.



2. Installation

- Be sure to use a dedicated outlet with AC 115V/15A (220V, 240V/10A) or more for its power source.
- The copier must be grounded for safety.
 Never ground it to a gas pipe or a water pipe.
- Select a suitable place for installation.
 Avoid excessive heat, high humidity, dust, vibration and direct sunlight.
- To insure adequate working space for the copying operation, keep a minimum clearance of 80 cm (31.5") on the left, 80 cm (31.5") on the right and 10 cm (3.9") in the rear.

3. Service of Machines

- Basically, be sure to turn the main switch off and unplug the power cord during service.
- Be sure not to touch high temperature sections such as the exposure lamp, the fuser unit, the damp heater and their periphery.
- Be sure not to touch high-voltages sections such as the chargers and the high-voltage transformer.
- Be sure not to touch rotating/operating sections such as gears, belts, pulleys, etc.
- When servicing the machines with the main switch turned on, be sure not to touch live sections such as the lamp terminal etc.
- Use suitable measuring instruments and tools.

4. Main Service Parts for Safety

• The thermofuse, thermistor, fuse, breaker and door switch, etc. are particularly important for safety. Be sure to handle/install them properly.

5. Notice Labels

• Be sure to check the rating plate and the notice labels such as "Unplug the power cord during service", "Hot area" etc. to see if there is any dirt on their surface or if they are properly stuck to the copier during servicing.

6. Disposition of Consumable Parts/Packing Materials

- Regarding the recovery and disposal of the copier, consumable parts and packing materials, it is recommended to follow the relevant local regulations or rules.
- 7. When parts are disassembled, reassembly is basically the reverse of disassembly unless otherwise noted in this manual or other related documents. Be careful not to reassemble small parts such as screws, washers, pins, E-rings, toothed washers in the wrong places.
- 8. Basically, the machine should not be operated with any parts removed or disassembled.

1. SPECIFICATIONS, ACCESSORIES AND OPTIONS

1.1 Specifications

| Copy process | Indirect electrophotographic process (dry) |
|---------------|---|
| Туре | Desk top |
| Exposure type | Slit exposure with fixed table |
| Original size | Type: Sheets, books and three-dimensional objects |
| | Maximum size: A3 or Ledger |

Copy paper

| | Size | Thickness |
|----------|--------------------|-------------------------------------|
| Cassette | A3~A5-R | 64~80g/m ² |
| | Ledger~Statement-R | 16lb.~22lb. |
| Manual | A3~A5-R | 64~130g/m ² Sheet bypass |
| | Ledger~Statement-R | 16lb.~34lb. \int feeding only |

Special paper: Label paper (type recommended by Toshiba) and OHP film (80 μm or more in thickness,

type recommended by Toshiba)

- bypass feeding only

Copy speed (sheets/minute)

| | Actua | l size | Reduction/Enlargement |
|--------------|----------|--------|-----------------------|
| Paper size | Cassette | Manual | (Cassette/Manual) |
| A4, B5, A5-R | 15 | 1 | 8 |
| LT, ST-R | | | |
| A4-R, B5-R | 12 | 1 | 8 |
| LT-R | | | |
| B4, FOLIO | 10 | 1 | 8 |
| LG, COMPUTER | | | |
| A3 | 8 | 1 | 8 |
| LD | | | |

First copy time About 5.8 seconds (100%, A4/LT copier cassette feeding) About 8.3 seconds (100%, A3/LG/LD PFU cassette feeding) Warm-up time About 28 seconds (100V series), About 28 seconds (200 V series) Multiple copying Up to 999 sheets

Setting to adjustment mode allows selection of 9, 99, 500 and 999 copies.

Reproduction ratio Actual size 1:1

By setting to adjustment mode, vertical reproduction only can be altered to 1:1.01.

Reduction/Enlargement 3R3E

50, 65, 78, 129, 154, 200% (For U.S.A, Canada)

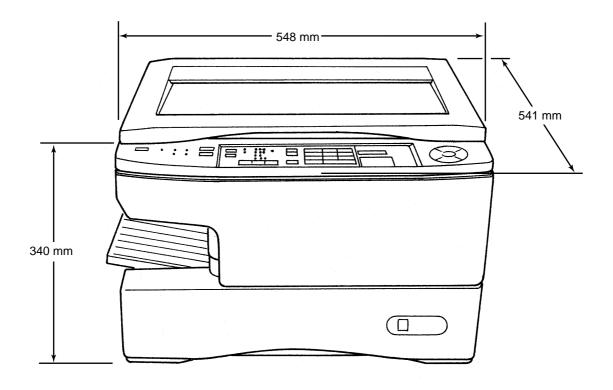
50, 71, 82, 122, 141, 200% (For Europe)

Paper feeding

| | Туре | Capacity | |
|----------|-----------------|----------------------------|--------------|
| Cassette | Front Loading | 500 sheets (50 mm or less) | |
| Manual | * Foldable tray | 1 sheet | * For Europe |

Manual start: At the time of shipping, the copying operation is started by the PRINT key. By inputting data for adjustment mode, it can be changed to auto-start.

| Toner supply | Automatic density detection and replenishment |
|--------------------|---|
| | Toner cartridge replacement method |
| Exposure | Automatic control and manual control |
| Weight | 35 kg |
| Power source | 110 V – 50/60 Hz |
| | 115V – 60 Hz |
| | 127 V – 60 Hz |
| | 220 V – 50/60 Hz |
| | 220~240 V – 50/60 Hz |
| Power consumption. | 1.5 kW or less |
| Total counter | Mechanical total counter (6 digits) |
| Machine size | See the next page. |
| | |



1.2 Accessories

| Copy receiving tray | 1 | рс |
|---------------------|---|-----|
| Operator's manual | 1 | рс |
| Drum | 1 | рс |
| Lever caps | 2 | pcs |
| Setup report | 1 | рс |

1.3 Options and Supplies

Options

| Automatic document feeder | MR-2004LT | 660 84890 | |
|----------------------------|------------|-----------|------------|
| | MR-2004A4 | 660 84891 | |
| Sorter | MG-1003 | 660 84838 | |
| Key copy counter (6 digit) | MU-8 | 660 02050 | |
| Key copy counter kit | MU-10 | 660 02051 | |
| Counter bracket kit | KN-1550K | 660 84840 | |
| Cassette | KC-1550AF | 660 84841 | |
| | KC-1550LF | 660 84842 | |
| | KC-1550AFE | 660 84914 | For Europe |
| Damp heater kit | MF-1550U | 660 84848 | |
| | MF-1550E | 660 84849 | |
| | | | |
| Paper feed unit | MY-1004L | 660 84835 | |
| | MY-1004AE | 660 84913 | For Europe |
| | MY-1004A | 660 84836 | |
| Sorter bracket kit | KN-1550S | 660 84839 | |
| (for MG-1003) | | | |

Supplies

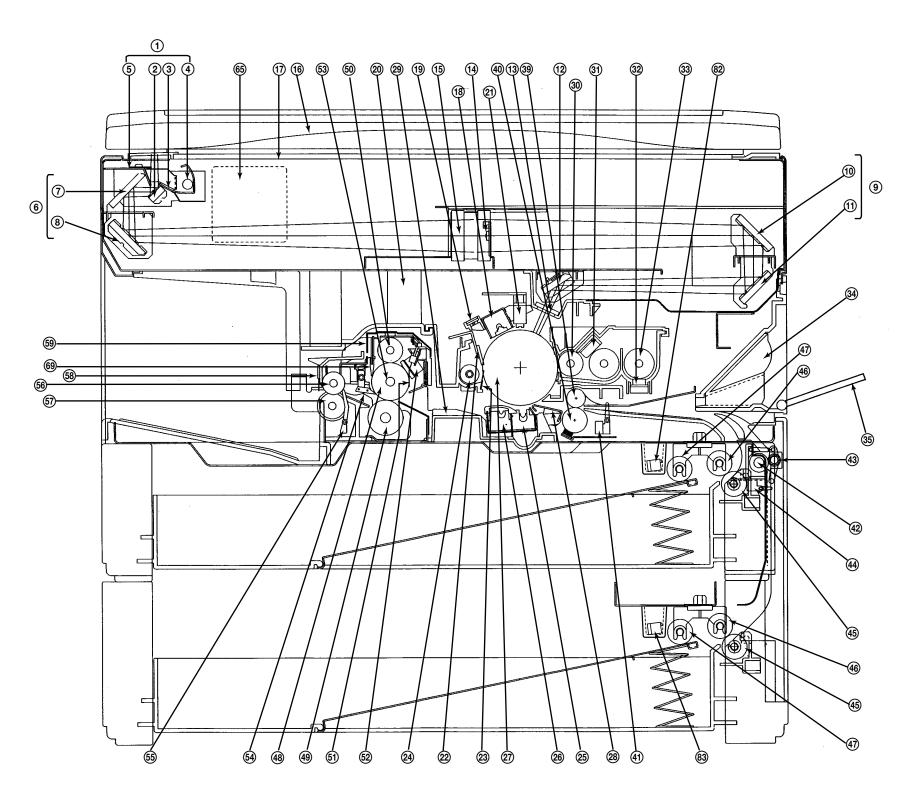
| Drum | PS-OD1550 | 66084854 |
|------------------------|------------|----------|
| Developer material | PS-ZD1550 | 66084853 |
| Toner | PS-ZT1550 | 66084851 |
| Toner (for Europe) | PS-ZT1550E | 66084852 |
| Toner bag | PS-TB1550 | 66084859 |
| Toner bag (for Europe) | PS-TB1550E | 66084860 |

2. OUTLINE OF THE MACHINE

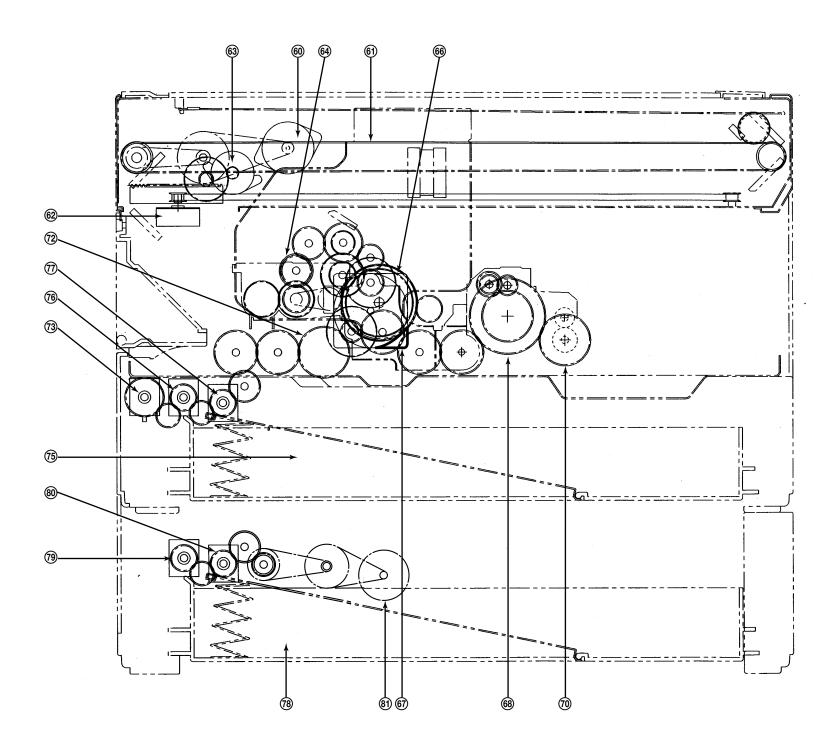
2.1 Sectional Views and Electrical Parts Location Diagram

2.1.1 Front and rear sectional views

| 1 | Carriage 1 | 30 | Magnetic roller |
|----|----------------------------|----|------------------------------------|
| 2 | Mirror 1 | 31 | Leveler (doctor) |
| 3 | Reflector | 32 | Auto toner sensor |
| 4 | Exposure lamp | 33 | Mixer |
| 5 | Exposure adjustment plates | 34 | Bypass feed guide |
| 6 | Carriage 2 | 35 | Bypass feed tray |
| 7 | Mirror 2 | 39 | Aligning roller (upper) |
| 8 | Mirror 3 | 40 | Aligning roller (lower) |
| 9 | Mirror unit | 41 | Aligning switch |
| 10 | Mirror 4 | 42 | Transport roller (left) (MY-1004) |
| 11 | Mirror 5 | 43 | Transport roller (right) (MY-1004) |
| 12 | Mirror 6 | 44 | Paper stop switch (MY-1004) |
| 13 | Slit glass | 45 | Separation roller |
| 14 | Auto exposure PC board | 46 | Feed roller |
| 15 | Lens | 47 | Pick-up roller |
| 16 | Original cover | 48 | Heat roller |
| 17 | Original glass | 49 | Heat roller (lower) |
| 18 | Main charger | 50 | Cleaning felt roller |
| 19 | Discharge lamp | 51 | Thermistor |
| 20 | Ozone filter | 52 | Thermostat |
| 21 | LED erasing array | 53 | Heater lamp |
| 22 | Main blade | 54 | Separation claws |
| 23 | Recovery blade | 55 | Exit switch |
| 24 | Toner recovery auger | 56 | Exit roller (upper) |
| 25 | Transfer charger | 57 | Exit roller (lower) |
| 26 | Separation charger | 58 | Discharge brush |
| 27 | Drum | 59 | Fuser guard |
| 28 | Pre-transfer bias guide | 65 | Air filter |
| 29 | Transport guide | 69 | Cleaning blade |
| | | 82 | Paper empty switch |
| | | 83 | Empty switch (MY-1004) |
| | | | |

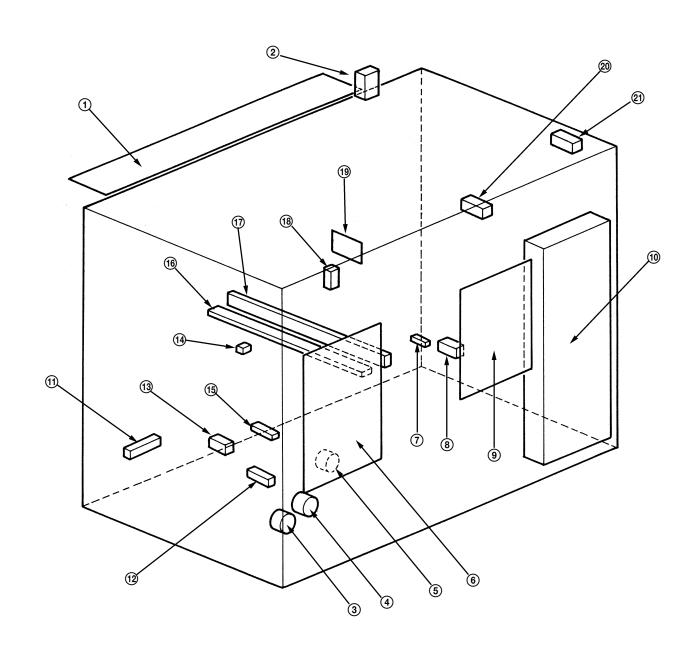


| 60 | Scanning motor |
|----|---------------------------------------|
| 61 | Carriage drive wire |
| 62 | Lens motor |
| 63 | Mirror motor |
| 64 | Developer-unit drive gear |
| 66 | Drum gear |
| 67 | Main motor |
| 68 | Heat roller gear |
| 70 | Exit roller gear |
| 72 | Aligning roller clutch |
| 73 | Transport roller clutch (MY-1004) |
| 75 | Cassette |
| 76 | Feed roller clutch |
| 77 | Pick-up roller clutch |
| 78 | (PFU) cassette (MY-1004) |
| 79 | (PFU) feed roller clutch (MY-1004) |
| 80 | (PFU) pick-up roller clutch (MY-1004) |
| 81 | (PFU) drive motor (MY-1004) |
| | |



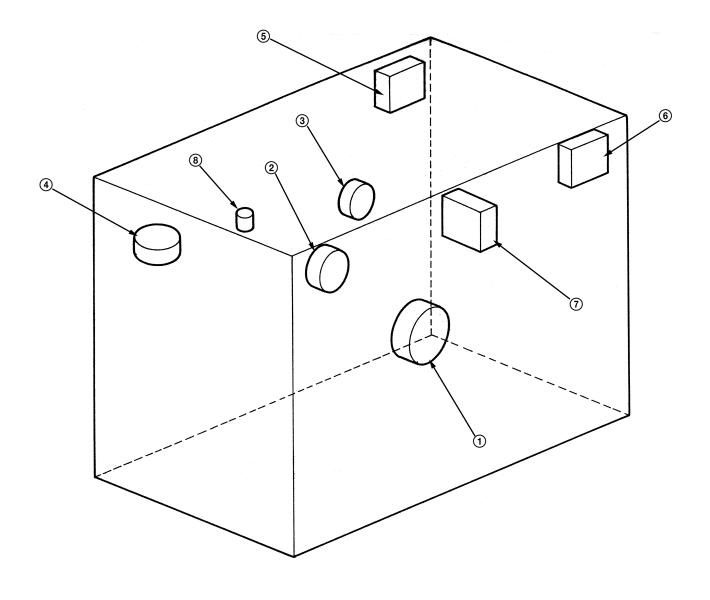
2.1.2 Electrical parts location diagram

[A] DC electrical parts excluding motors



| Symbol | ١ |
|--------|----|
| 1 | (|
| 2 | ٦ |
| 3 | F |
| 4 | F |
| 5 | A |
| 6 | ŀ |
| 7 | ŀ |
| 8 | E |
| 9 | L |
| 10 | F |
| 11 | 00 |
| 12 | F |
| 13 | A |
| 14 | ٦ |
| 15 | A |
| 16 | E |
| 17 | L |
| 18 | Ν |
| 19 | A |
| 20 | L |
| 21 | ŀ |
| | |

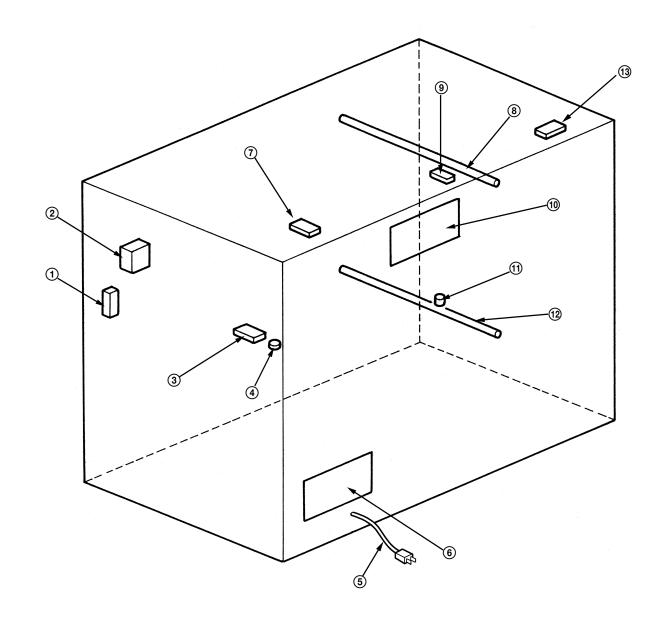
| Name | |
|--|--|
| Control panel PC board (PWA-F-PNL) | |
| Total counter (T-CTR) | |
| Feed roller clutch (FED-CLT) | |
| Pick-up roller clutch (PKUP-CLT) | |
| Aligning roller clutch (CLT-REG) | |
| High-voltage transformer (PS-HVT) | |
| Heat roller thermistor (THMS-HTR) | |
| Exit switch (EXT-SW) | |
| Logic PC board (PWA-F-LGC) | |
| Power supply unit (PS-ACC) | |
| Size switch (SIZE1-SW) | |
| Paper empty switch (EMP2-SW) | |
| Aligning switch (RGT-SW) | |
| Toner-full switch (T-FUL-SW) | |
| Auto-toner sensor (SNR-ATC) | |
| Eraser lamp PC board (ASM-F-ERS) | |
| LED discharge array PC board (ASM-DCH) | |
| Mirror switch (MRR-SW) | |
| Auto-exposure PC board (PWA-F-AES) | |
| Lens switch (LNS-SW) | |
| Home switch (HOME-SW) | |
| | |



| Symbol | |
|--------|--|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

| Name |
|------------------------------|
| Main motor (MAIN-MTR) |
| Scanning motor (SCN-MTR) |
| Mirror motor (MRR-MTR) |
| Lens motor (LNS-MTR) |
| Front optics fan (OPT-FAN-F) |
| Rear optics fan (OPT-FAN-R) |
| Exit fan (EXIT-FAN) |
| Toner motor (TNR-MTR) |

[C] AC electrical parts



| Symbol |
|--------|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |
| 9 |
| 10 |
| 11 |
| 12 |
| 13 |

| Name |
|----------------------------------|
| Door switch (DOOR-SW) |
| Main switch (MAIN-SW) |
| Damp heater L (D-HTR-L) |
| Thermostat |
| AC power cable |
| Fuse PC board (PWA-F-FUS) |
| Damp heater U1 (D-HTR-U1) |
| Exposure lamp (EXPO-LAMP) |
| Thermofuse (FU-EXPO) |
| Lamp regulator PC board (PS-LRG) |
| Heater thermostat (K-THMO) |
| Heater lamp (HTR-LAMP) |
| Damp heater U2 (D-HTR-U2) |

2.2 Symbol and Function of Electrical Parts

Go to DC Harness Connection Diagram

* Refer to SERVICE PARTS LIST ED-1550 Symbol Code name Function Remarks *Page/item No. MAIN-MTR (Main motor) P9, I1 M1 Drives the drum, developer IC motor and heat roller SCN-MTR (Scanning motor) M2 Scans the optical system Pulse motor P8, I14 M3 Drives the lens unit Pulse motor P8, I4 LNS-MTR (Lens motor) P8, I4 M4 MRR-MTR (Mirror motor) Drives the mirror unit Pulse motor **OPT-FAN-F** (Optics fan (front)) Cools the optical system IC motor P3, 18 M6 M7 OPT-FAN-R (Optics fan (rear)) □60 IC motor: 060 M8 EXIT-FAN (Exit-fan) Cools the drum and cleaner P3, I8 M9 TNR-MTR (Toner motor) Replenishes the toner Brush motor P17, I31

(1) Motors

(2) Electromagnetic spring clutches

| Symbol | Code name | Function | Remarks | *Page/item No. |
|--------|--------------------------|------------------------------|---------|----------------|
| CLT1 | RGT1-CLT | Transmits aligning roller | | P7, I4 |
| | (Aligning roller clutch) | drive. | | |
| CLT2 | FED1-CLT | Transmits feed roller drive. | | P7, I22 |
| | (Feed roller clutch) | | | |
| CLT3 | PKLP-CLT | Transmits pick-up roller | | P7, I22 |
| | (Pick-up roller clutch) | drive. | | |

(3) Counters

| Symbol | Code name | Function | Remarks |
|--------|--------------------------|--------------------|------------------|
| Т | T-CTR (Total counter) | Total counter | 6-digit |
| к | K-CTR (Key-copy counter) | Individual counter | 6-digit (option) |

Go to **DC Harness Connection Diagram**

(4) Switches

| Symbol | Code name | Function | Remarks | *Page/item No. |
|--------|--------------------------|-------------------------------|------------------|----------------|
| S1 | MAIN-SW (Main switch) | Power supply | Tumbler type | P4, I2 |
| S2 | DOOR-SW (Door switch) | For safety, cancels | Push switch | P4, I4 |
| | | abnormal condition | | |
| S3 | EMP1-SW | Detects lack of paper in the | Reflecting photo | P6, I20 |
| | (Paper-empty switch 1) | cassette | sensor | |
| S4 | SIZE1-SW (Size switch) | Detects cassette size | Push switch | P6, I26 |
| S5 | RGT-SW (Aligning switch) | Detects paper in front of the | Photointerruptor | P7, I15 |
| | | aligning roller | | |
| S6 | EXIT-SW (Exit switch) | Detects exiting paper | Photointerruptor | P20, I15 |
| S7 | HOME-SW (Home switch) | Detects home position of the | Photointerruptor | P12, l16 |
| | | optical system | | |
| S8 | LNS-SW (Lens switch) | Detects home position of the | Photointerruptor | P12, I16 |
| | | lens unit | | |
| S9 | MRR-SW (Mirror switch) | Detects home position of the | Photointerruptor | P8, I27 |
| | | mirror unit | | |
| S10 | T-FUL-SW | Detects when the used toner | Microswitch | P17, I22 |
| | (Toner-full switch) | bag is full | | |

(5) Heaters and lamps

| Symbol | Code name | Function | Remarks | *Page/item No. |
|--------|-------------------------|------------------------------|--------------|----------------|
| EXP | EXPO-LAMP | Exposes the original | Halogen lamp | P10, I14 |
| | (Exposure lamp) | | 300W | |
| HTR | HTR-LAMP (Heater lamp) | Fixing | Halogen lamp | P19, l6 |
| | | | 900W | |
| ERS | ERS-LAMP | Discharges the drum | LED type | P15, I14 |
| | (Discharge lamp) | | | |
| DCH | DCH-LED | To interrupt the charge | LED | P15, I15 |
| | (LED eraser array) | | | |
| DHU | D-HTR-U (Damp heater U) | Keeps optical system warm | PTC | P12, I33 |
| | | (option) | | |
| DHL | D-HTR-L (Damp heater L) | Keeps the drum and transfer/ | PTC | P6, I36 |
| | | separationcharger case | | |
| | | warm (option) | | |

Go to DC Harness Connection Diagram

(6) PC boards

| Symbol | Code name | Function | Remarks | *Page/item No. |
|--------|-----------------------------|----------------------------------|---------|----------------|
| LGC | PWA-F-LGC (Logic PC board) | Controls the entire copier | | P5, I14 |
| ACC | PS-ACC | Supplies electrical power to | | P5, I19 |
| | (Power supply PC board) | ICs, solenoids and motors | | |
| PNL | PWA-F-PNL | Controls condition displays | | P2, I22 |
| | (Control panel PC board) | and operation keys | | |
| LRG | PS-LRG | Controls exposure lamp | | P4, I35 |
| | (Lamp regulator PC board) | | | |
| DCH | ASM-DCH | Turns on and drives LED | | P15, I15 |
| | (LED eraser array PC board) | d) during reduction | | |
| ERS | ASM-ERS | Discharge lamp | | P15, I14 |
| | (Discharge lamp PC board) | board) | | |
| AES | PWA-F-AES | Reads dark/light of the original | | P8, I28 |
| FUS | PWA-F-FUS (Fuse PC board) | Fuse for the damp heater | Option | P5, I23 |
| | | circuit. | | |

(7) Transformers

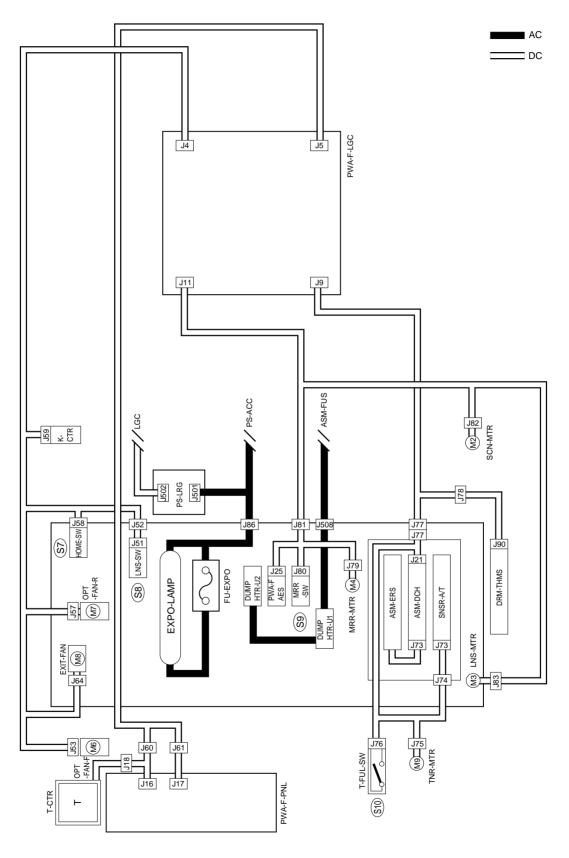
| Symbol | Code name | Function | Remarks | *Page/item No. |
|--------|-----------------------------------|---------------------------|---------|----------------|
| HVT | PS-HVT | Generates high voltage | | P5, I18 |
| | (Charging transformer) | electricity for charging | | |
| | | (negative voltage) | | |
| | (Transfer/separation transformer) | Generates high voltage | | |
| | | electricity for transfer/ | | |
| | | separation and developing | | |
| | | bias voltage | | |

(8) Others

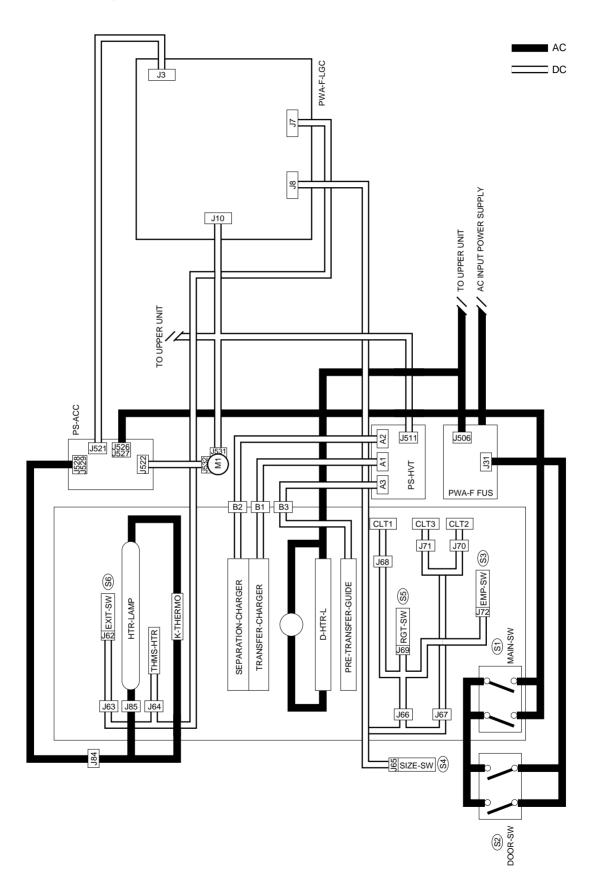
| Symbol | Code name | Function | Remarks | *Page/item No. |
|---------|---------------------------|----------------------------|---------|----------------|
| ATS | SNR-ATC | Reads toner density with a | | P18, I26 |
| | (Auto-toner sensor) | magnetic sensor | | |
| THMS | THMS-HTR | Detects temperature of the | | P20, I9 |
| | (Heat-roller thermistor) | heat roller | | |
| THERMO | K-THERMO | Prevents abnormal heating | | P20, I8 |
| | (Thermostat) | of heat roller | | |
| FU | FU-EXPO (Thermofuse) | Prevents abnormal heating | | P10, I5 |
| | | of the exposure lamp | | |
| TMS-DRM | TMS-DRM (Drum thermistor) | Detects the drum tempera- | | P3, I39 |
| | | ture roughly | | |

2.3 Wire-Harness Location Diagram

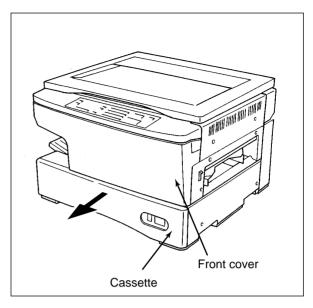
A. Location Diagram for Upper Unit



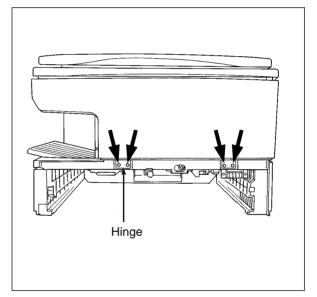
B. Location Diagram for Lower Unit



- 2.4 Removing Covers and Electrical Parts
- 2.4.1 Removing covers
- [A] Front cover
- (1) Remove the cassette (in the direction of the arrow).

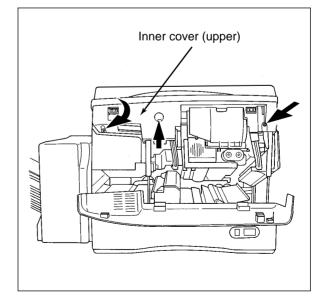


(2) Remove the screws fastening the hinge (4 pcs.).



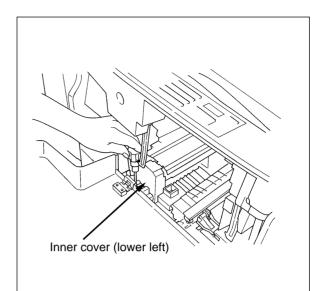
[B] Inner cover (upper)

- (1) Open the front cover.
- (2) Remove the toner cartridge.
- (3) Remove three screws.



[C] Inner cover (lower left)

(1) Remove one screw.



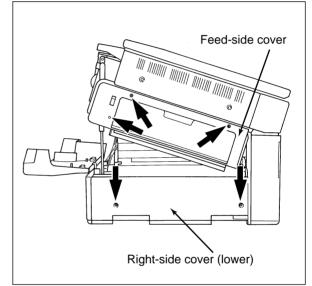
[D] Right-side covers (upper and lower) and feed-side cover

Feed-side cover

- Open the front cover.
- Raise the upper unit.
- Remove three screws.

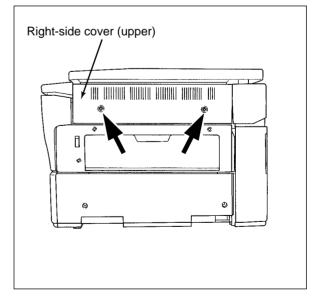
Right side cover (lower)

- Open the front cover.
- Raise the upper unit.
- Remove two screws.



Right-side cover (upper)

- Remove two screws.
- Remove the glass holder (see 2.4.1).



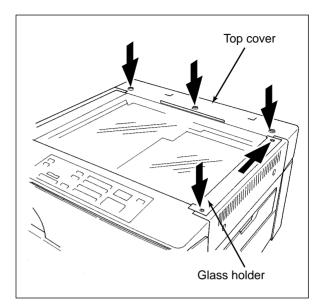
[E] Top cover and glass holder

Glass holder

- Open the original cover.
- Remove two screws.

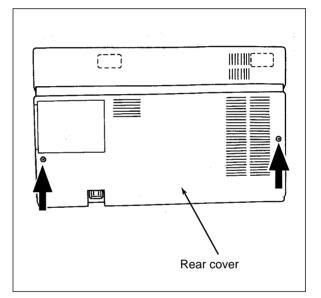
Top cover

- Remove the original cover.
- Remove three screws.



[F] Rear cover

• Remove two screws.



[G] Left-top cover, left-side cover (upper) and left-side cover (lower)

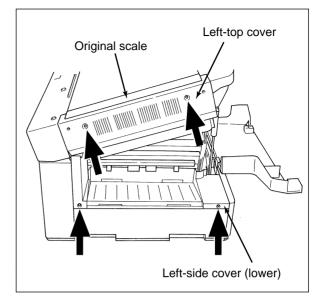
(1) Raise the upper unit.

Left-top cover

- Remove the original scale. (Two screws)
- Remove two screws.

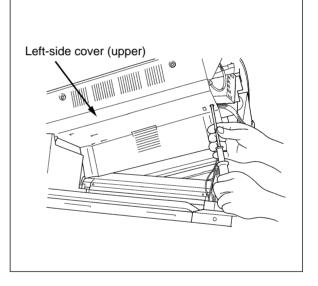
Left-side cover (lower)

• Remove two screws.



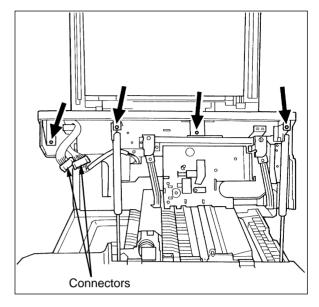
Left-side cover (upper)

• Remove one screw.



[H] Control panel cover

- (1) Raise the upper unit and remove the inner cover (upper).
- (2) Disconnect two connectors and remove four screws.



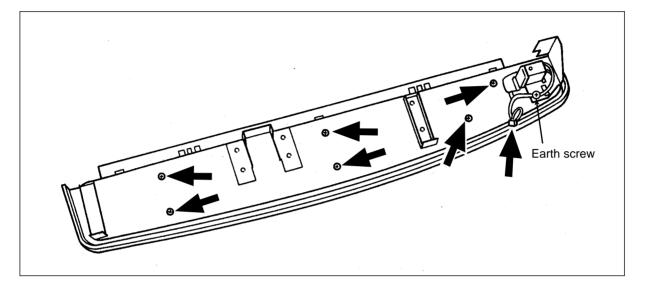
2.4.2 Removal and installation of electrical parts

[A] Remove the control-panel (PWA-F-PNL) PC board

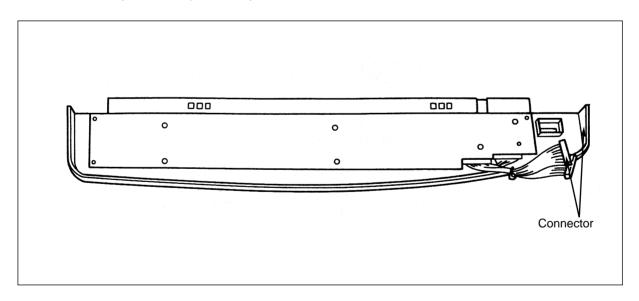
(1) Remove the control panel cover.

Refer to 2.4.1 [H].

(2) Place the control panel cover upside down and remove its metal cover (6 screws). Remove the earth screw of the shield. Remove the counter connector.



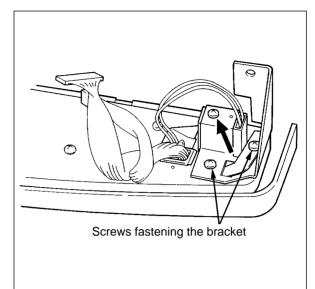
(3) When you remove nine (9) screws, the control-panel PC board can be taken out along with the harness. They can be separated if you disconnect two connectors.



Note: Be careful not to allow the ground wire of the shield to be cut.

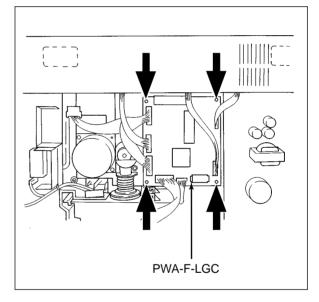
[B] Total counter

- (1) Remove the control panel cover.
- (2) Place the control panel cover upside down and remove the two screws fastening the bracket.
- (3) Remove one screw.
- (4) Disconnect one connector.
- **Note:** Be careful not to allow the ground wire of the shield to be cut.



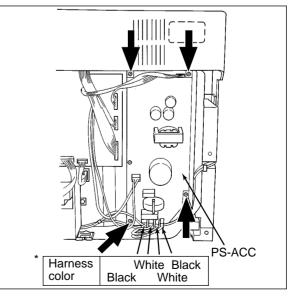
[C] Logic PC board (PWA-F-LGC)

- (1) Remove the rear cover.
- (2) Disconnect connectors (10 pcs. when no optional equipment is used and 11 pcs. when optional equipment are used) and take out the PC board from its four lock supports.



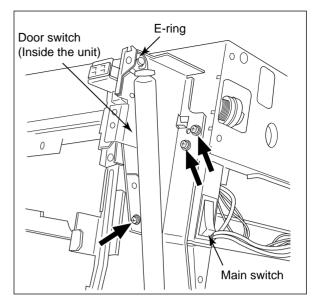
[D] Power supply unit

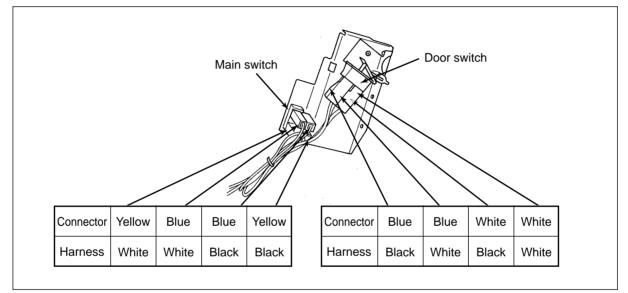
- (1) Remove the rear cover.
- (2) Disconnect connectors (9 pcs.).
- (3) Remove four screws.
 - * About bottom 4 connectors, black harness must be connected "L" terminal that is described on PC board and white must be "N".



[E] Door switch and Main switch (power switch)

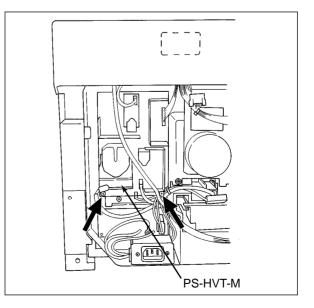
- (1) Remove the inner cover.
- (2) Remove the feed-side cover.
- (3) Remove the right side cover (upper).
- (4) Snap off an E-ring.
- (5) Take out the gas spring.
- (6) Remove three screws and tilt the unit toward you after having shifted it toward the right.
- (7) Removing the respective connectors and screws allows the door switch and the main switch to be removed and replaced. Before replacement, pay attention to the colors of the connectors and the harnesses.





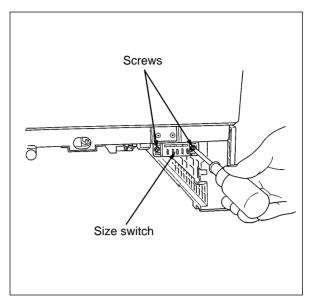
[F] High-voltage transformer for the main charger (PS-HVT-M)

- (1) Remove the rear cover.
- (2) Disconnect seven (7) connectors.
- (3) Remove two screws.
- (4) Remove two lock supports.



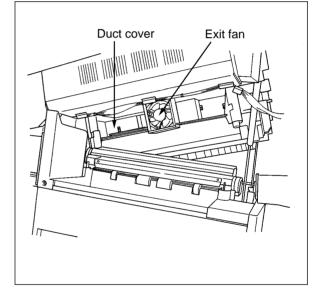
[G] Size switch

- (1) Pull out the cassette.
- (2) Remove two screws.
- (3) Disconnect one connector.
- **Note:** The left screw is tightened with the protective cover on the corner of the switch.



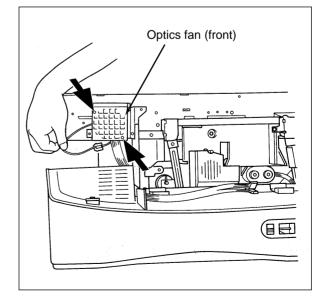
[H] Exit fan

- (1) Remove the left-side cover (upper) (1 screw).
- (2) Disconnect three connectors (front).
- (3) Remove the duct cover (1 screw).
- (4) Separate the exit fan from the cover (1 connector).

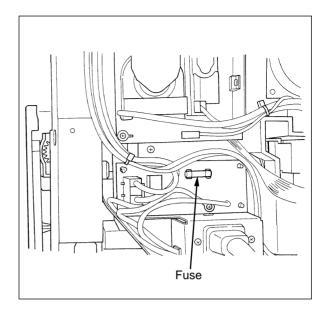


[I] Front optics fan (front)

- (1) Remove the inner cover.
- (2) Disconnect one connector.
- (3) Remove two screws.

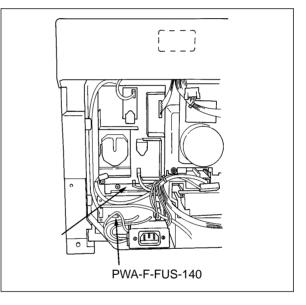


- [J] Fuse (PWA-F-FUS-140)
- (1) Remove the rear cover.
- (2) Replace the fuse.



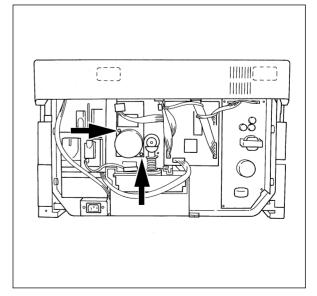
[K] Fuse PC board (PWA-F-FUS-140)

- (1) Disconnect one connector.
- (2) Remove one screw.
- (3) Remove the fuse PC board with the bracket.



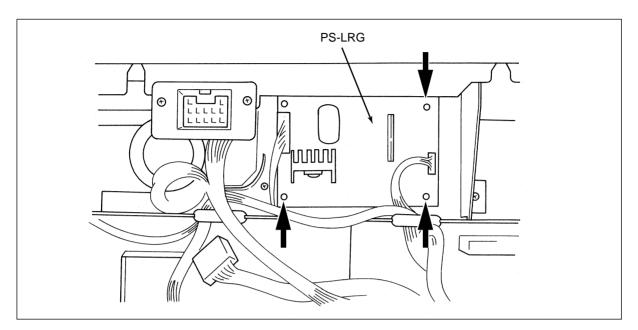
[L] Main motor

- (1) Disconnect two connectors.
- (2) Remove two screws.



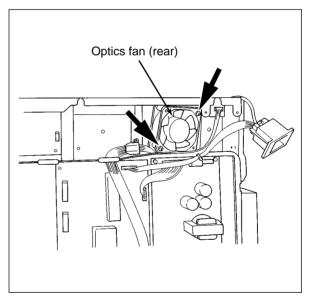
[M] Lamp regulator PC board (PS-LRG)

- (1) Remove the top cover.
- (2) Disconnect two connectors and remove the PC board from three lock supports.



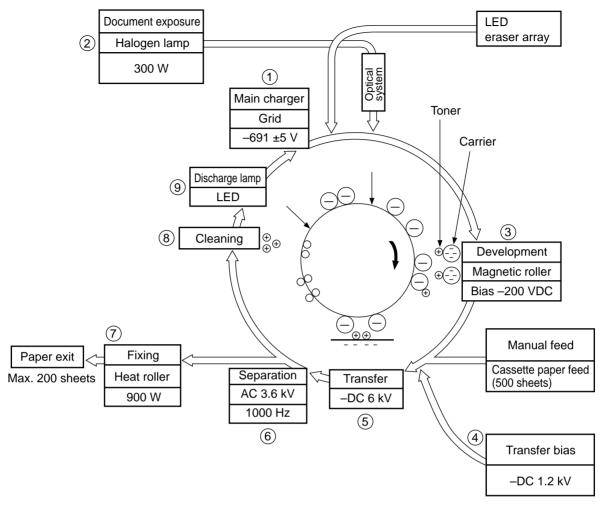
[N] Optics fan (rear)

- (1) Remove the top cover.Remove the connector from the sorter (two screws).
- (2) Disconnect one connector.
- (3) Remove two screws.



3. COPYING PROCESS

3.1 Copying Process



- Main charger : A negative electrostatic charge is placed on the photoconductive (photosensitive) surface of the drum.
- ② Exposure : Forms an electrostatic latent image on the photoconductive surface of the drum.
- ③ Development : Positively charged toner is attracted to the photoconductive surface of the drum to form a visible image.
- ④ Transfer bias : Raises transfer efficiency.
- (5) Transfer : Transfers the visible toner image from the surface of the drum to the copy paper.

- Separation : The copy paper is separated from the surface of the drum together with the toner image.
 - : The toner image is fixed to the copy paper by heat and pressure.
- (8) Cleaning : Any toner remaining on the photoconductive surface of the drum is mechanically removed by the cleaning blade.
- (9) Discharging : Erases the electrostatic charge remaining on the photoconductive surface of the drum.

(7) Fixing

3.2 ED-1550 Copying Process

| Process | 1550 |
|--------------------------|---|
| 1. Drum | OD-1550 (OPC ø60) |
| (1) Sensitivity | Highly sensitized drum |
| (2) Surface potential | DC-700V |
| | Scolotron system |
| 2. Charging | Variable output |
| 3. Exposure | |
| (1) Light control | Automatic exposure/manual step setting |
| (2) Light source | 300W halogen lamp stabilized with |
| | regulator (light intensity remains |
| | constant even when voltage varies) |
| 4. Development | |
| (1) Magnetic roller | One magnetic roller (with two shaft mixers) |
| (2) Auto-toner | Magnetic bridge-circuit system |
| (3) Toner replenishment | Toner cartridge system |
| (4) Toner-empty sensor | Intensity sensing system |
| (5) Toner | T-1550 or T-1550E |
| (6) Developing material | D-1550 |
| (7) Developer bias | DC-200V |
| 5. Transfer | Adjustable output (fixed current) |
| 6. Separation | Adjustable output |
| | (independently adjustable) |
| 7. Discharge | |
| (1) Discharging position | After cleaning |
| (2) Discharge lamp | LED type |
| 8. Cleaning | |
| (1) System | Blade system |
| (2) Recovery of toner | Non-reusable |

| Process | 1550 |
|------------------------|--|
| 9. Fixing | |
| (1) Type | Heat roller system |
| • Fixing | Fixing roller: Teflon coated roller |
| Pressure | Pressure roller: PFA tube silicon roller (ø28) |
| Lamp rating | • 900W (infrared heat) |
| (2) Cleaning | Cleaning with silicon impregnated roller |
| (3) Heater temperature | ON/OFF control by thermistor |
| control | |
| 10. Control | Microcomputer |

4. COPIER OPERATION

4.1 Operation Outline

Copier operation

Operation during warm up and standby

- Automatic-feed copying using Print key

Bypass-feed copying

- Interrupt copying

4.2 Description of Operation

4.2.1 During warm up

- (1) Copy quantity indicator shows "0" and print-key lights up "red" lamp.
 - Heater lamp comes ON.

Initial position setting for the optical system \sim moves the lens and the mirror to actual-size position.

Exit fan (M8) stops and optical fans (M6/M7) stop.

(2) When the heat-roller temperature is sufficient for fixing:

The heater lamp goes OFF.

The copy quantity indicator shows "1", and the print key changes to "green" lamp.

Copying operation -

(Paper jam release cover to be closed when there is paper in the cassette.)

Exit fan (M8) starts rotating at low speed and optical fans (M6/M7) stop.

4.2.2 Standby (ready) condition

All keys on the control panel are operable.

When there is no other key entry for a predetermined period, the machine is set automatically to a copy quantity of "1", a reproduction ratio of 100% and automatic exposure.

4.2.3 Cassette feed copying using the print key

(1) Print key ON

Print key display changes from "green" to "red".

Main charger, transfer charger, separation charger, transfer bias, discharge lamp and LED eraser array come ON and optical fans (M6/M7) rotate at high speed. Exit fan (M8) starts rotating at high speed.

Main motor (M1) comes ON.

- ~ Drum, developer, heat roller and paper-exit roller rotate.
- (2) Paper feeding from cassette

The feed roller clutch (CLT2) and the pick-up roller clutch (CLT3) come ON.

~ The pick-up roller and paper feed roller rotate.

After a pre-difined period the pick-up roller clutch (CLT3) goes OFF.

Aligning operation

Paper arrives at the aligning roller.

~ Aligning switch (S5) ON

After a pre-difined period feed roller clutch (CLT2) goes OFF.

Paper feeding complete.

- (3) Carriage operation
 - Exposure lamp ON

Carriage 1 and carriage 2 forward operation starts.

~ Scanning motor (M2) ON

At this time, if the toner density of the developer material is lower than the set value, toner replenishment is performed.

~ Toner motor (M9) is turned ON.

(4) When a fixed time has passed since the carriage operation

~ Paper is transported to transfer section, transport is promoted ~ aligning-roller clutch (CLT1) is turned ON, and the copy quantity counted.

(5) Carriage scanning complete

Scanning motor (M2) is turned OFF.

The main charger and the exposure lamp are turned OFF.

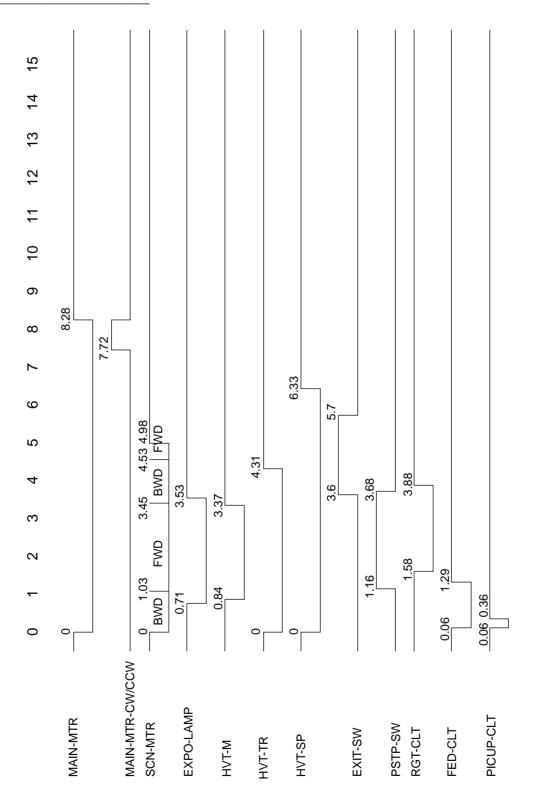
Aligning-roller clutch (CLT1) is turned OFF. (The timing varies according to paper used.)

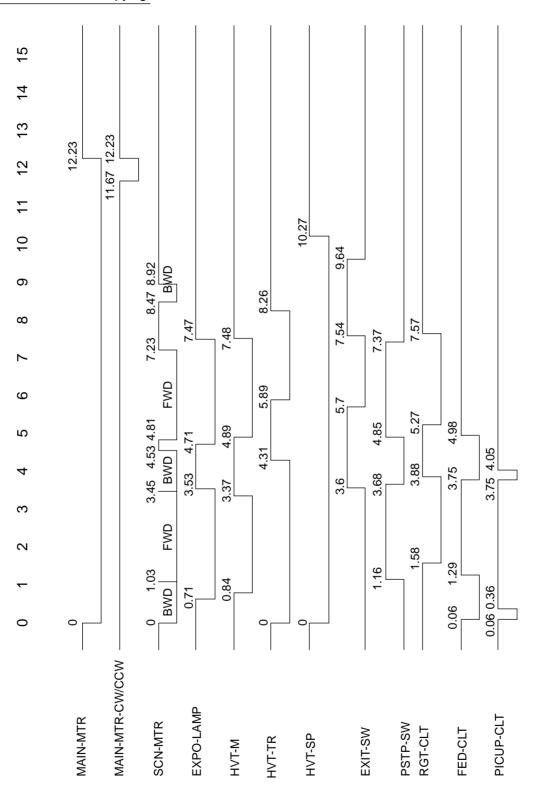
(6) Paper-exit operation

The exit switch (S6) detects the trailing end of the paper passing.

The main motor (M1), transfer charger, separation charger, transfer bias which is turned ON/OFF in accordance with paper feeding, discharge lamp and LED erase array are turned OFF. Optical fans (M6/M7) stop and exit fan (M8) starts rotating at low speed.

Print key: "Green" lamp is turned ON.





1550 OPERATION

4.2.4 Bypass-feed copying

(1) Insert paper in bypass feed guide.

Aligning switch (S5) is turned ON.

~ Bypass-feed indicator lights up

Carriage 1 and carriage 2 move to the home position.

(2) Print key ON

Main charger, transfer charger, separation charger, transfer bias, discharge lamp and LED eraser array are turned ON.

Optical fans (M6/M7) and exit fan (M8) start rotating at high speed.

Main motor (M1) ON

~ Drum, developer, heat roller and paper-exit roller rotate.

(3) Subsequently operations for automatic-feed copying (3) ~ (6) are continued by the use of the print key.

4.2.5 Interrupt copying

(1) Press interrupt key.

Interrupt lamp comes ON.

The copier temporarily interrupts the copying operation, and carriage 1 and carriage 2 return to their fixed position.

Automatic exposure goes into the reproduction ratio 100% copy mode. The copy quantity indicator remains unchanged.

- (2) Select desired copying conditions (single-sheet copying only is possible).
- (3) After interrupted mode copying has finished.

Press the interrupt key, then the interrupt lamp goes OFF and the conditions prior to interruption are resumed.

(4) Press print key.

Copying operations prior to interruption are resumed.

4.3 Fault Detection

If a fault occurs in the copier, a symbol corresponding to the type of fault will be displayed in order to draw the attention of the operator.

- Classification of faults
 - A) Faults which can be cleared without turning OFF the door switch (S2)(yellow flashing display on the display panel).
 - (1) Add paper
 - (2) Insert key-copy counter
 - (3) Replace toner bag (This is cleared by replacing the toner bag) (red flashing display)
 - B) Faults which can not be cleared without turning OFF the door switch (S2) (no display provided on the display panel).
 - (1) Clear paper
 - (2) Add toner (yellow flashing display)
 - C) Faults which can not be cleared without turning OFF the main switch (S1).
 - (1) Service call

Д

- A-1) Add paper (➡)
 - When cassette is inserted in the machine, the paper-empty switch (S3) or (S16) detects the existence of paper ~ When there is no paper, the switch goes OFF.
 - When cassette is not inserted in the machine, the paper size switch (S4) or (S18) detects the non-existence of cassettes ~ The paper-size switches all go OFF.

| \mathbf{v} | |
|--------------------------------------|------------------------------------|
| When cassette is not inserted in the | No-paper state |
| machine | \downarrow |
| When cassette is inserted in the | Signal is sent to control circuit. |
| machine but there is no paper. | \downarrow |
| | "Add Paper" display will flash. 崖 |
| | \downarrow |
| | * Print key will be inoperable. |

* Bypass-feed copying is possible if there is paper on the manual feed guide, even when there is no paper in the cassette.

- A-2) Bypass misfeed
- A-3) Insert key-copy counter.
 - If the key-copy counter (option) has been inserted in the machine and is withdrawn, "Insert
 - → Key Counter" is displayed.

Copying can not be started.

If the key counter is withdrawn during copying, the machine will stop after the paper being
 — copied has exited.

- B-1) Clear paper $(8\sqrt{})$
 - The leading-edge jam is detected by the exit switch (S6): (E01)
 - The aligning roller clutch (CLT1) is turned ON.

↓ 2.0 sec*

- The exit switch (S6) comes ON.
- When S6 has not come ON after 2.5 seconds have elapsed.
 - The "Clear Paper" (E01) symbol appears and copying will stop.
- The trailing-edge jam is detected by the exit switch (S6) : (E02). Aligning roller clutch (CLT1) is turned OFF.

↓ 2.0 sec*

- S6 OFF (detects paper)
- * When S6 has not come OFF after 2.5 seconds have elapsed.

 \downarrow

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The "Clear Paper" symbol (E02) appears and copying stops.

 Immediately after the power is turned ON.

The aligning switch (S5) and exit switch (S6) detect the paper (ON).

 \downarrow

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"Clear Paper" symbol (E03)

• The front cover is opened during copying.

 \downarrow

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"Clear Paper" symbol (no indication)

B-2) Add toner (

Toner density has become low.

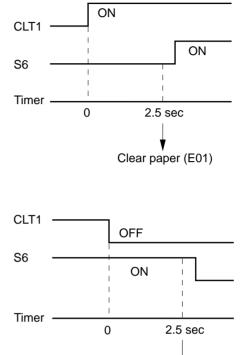
Toner empty signal detection: Auto-toner sensor

 \downarrow

Control circuit: "Add Toner" symbol appears: Copying is not possible.

Clearing method: Replace toner cartridge and close front cover.

Toner supply operation (toner density is resumed at the proper level): Copying is possible.



Clear paper (E02)

B-3) Replace toner bag ()

T

 \downarrow

 \downarrow

The toner bag becomes full of toner.

The toner-recovery auger moves towards the front of the machine: Toner-full switch (S10) will be turned ON.

"Replace Toner Bag" symbol is displayed.

• When the toner-full switch (S10) comes ON during copying.

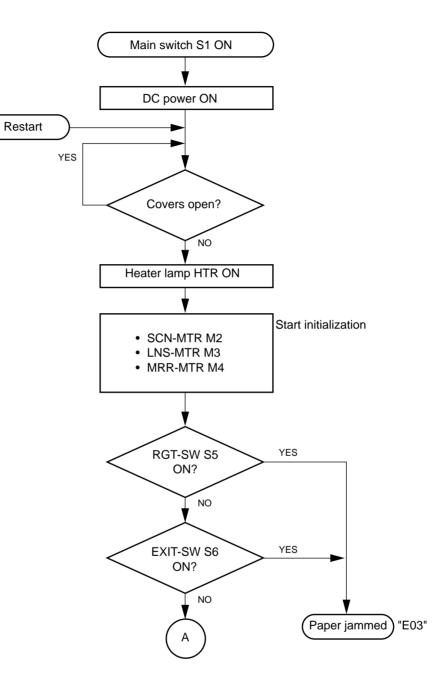
Copying will stop after the last sheet has been exited during copying. Clearing method: Replace with a new toner bag.

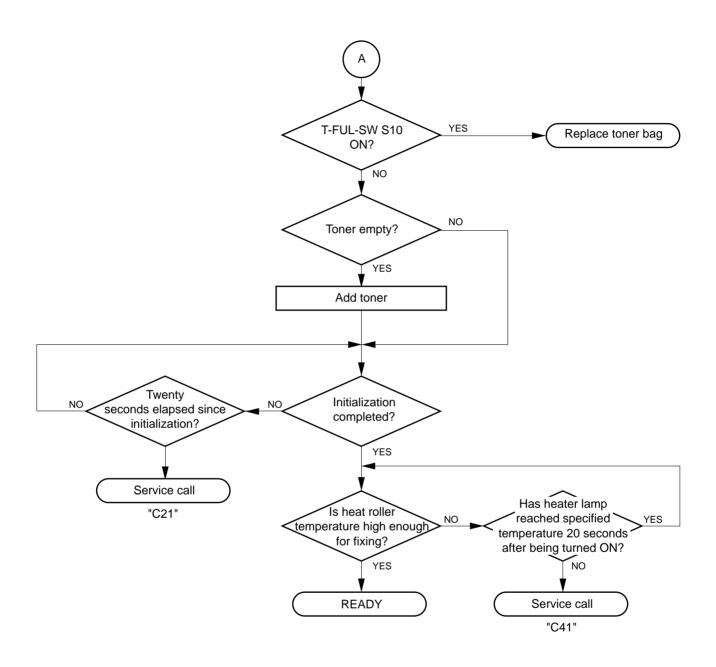
C-1) Service call

When the "CLEAR/STOP" key and the "8" key are pressed simultaneously while the "Service Call" symbol is flashing, an error code will be indicated in the copy quantity indicator. For the contents of the error codes, refer to the "SERVICE HANDBOOK".

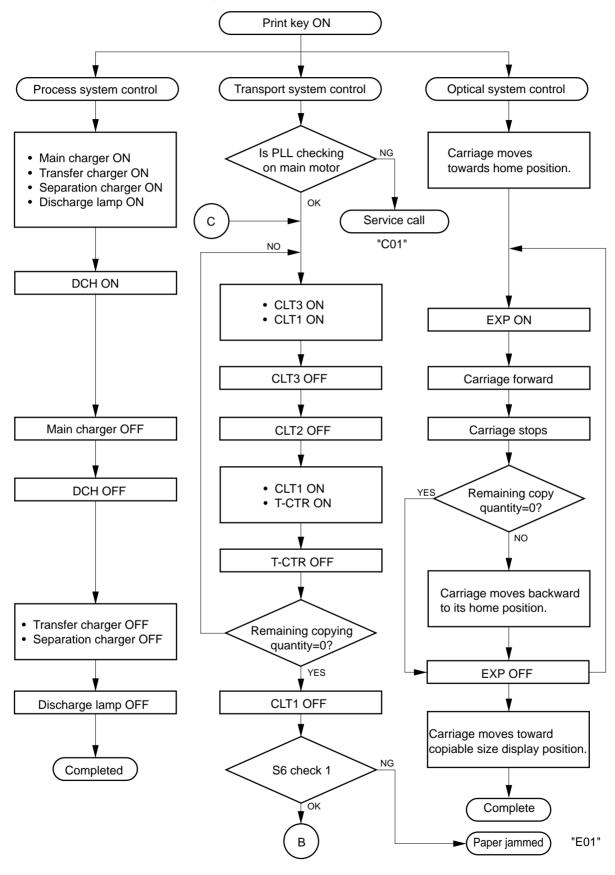
4.4 Flow Charts

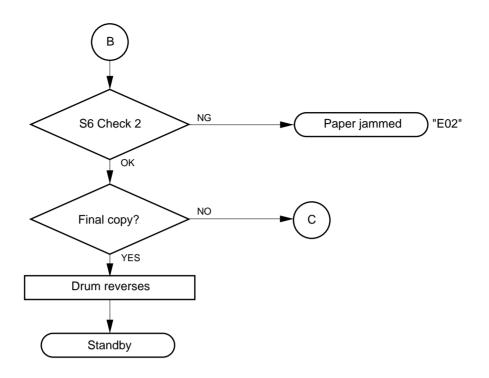
4.4.1 After power supply is turned ON.





4.4.2 Automatic feed copying



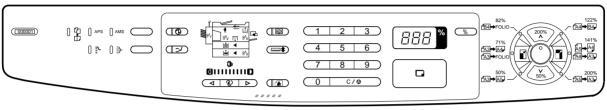


5. DISPLAY UNIT

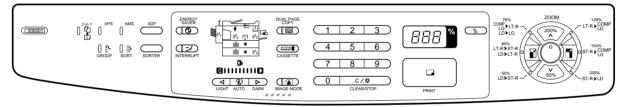
5.1 Control Panel and Indication Panel

The display unit consists of a key switch which operates copying and to select the mode, and an LED which displays machine condition and messages.

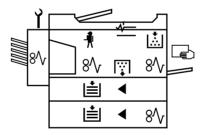
Signs and symbols are turned ON or flash when the attention of the operator needs to be drawn.



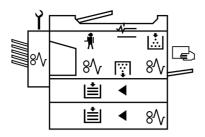




For the U.S.A. and Canada



5.2 Items Displayed on Control Panel



• During normal copying operation

| During warm up | When the power switch is turned ON the print key lights up red until capable of |
|-----------------|---|
| | copying. The copy quantity and reproduction ratio display show "0". |
| Ready condition | When the machine is capable of copying condition, the print key lights up green |
| | and the copy quantity and reproduction ratio show "1". |
| While copying | When the print key is pressed, the print key lights up red. The copy quantity |
| | display displays a countdown and finishes at "1". After completion of copying, |
| | the copy quantity indicator returns to the initially set number. |

• If a fault occurs (copying is not possible)

| " i ≝i" flashes | The symbol is displayed when the cassette selected has no paper (includ- ing "Insert Cassette"). Bypass feeding is possible. |
|-----------------------------|---|
| " [<u></u>]" flashes | The symbol is displayed when the toner in the toner cartridge runs out. |
| PRINT key flashes in red | The key flashes in red to indicate that the key-copy counter has been with- drawn when the optional key-copy counter is installed. |
| "😜" flashes | The symbol is displayed when the toner bag is full. |
| "8∕γ" flashes | When the paper is jammed, the position is indicated ① Paper feed, ② Exit-paper area, ③ Paper feeding unit (option) ④ Sorter (option), ⑤ DF (option) |
| "ץ" flashes | The symbol is displayed when a malfunction requiring service has occurred. |
| " 🕂 " flashes | The symbol is displayed at the periodic maintenance cycle. (When the PM counter has exceeded the PM set value.) (Capable of copying.) |

| Operation | PRINT key | CLEAR/ STOP key | Digital keys | REPRO- DUCTION- RATIO selection | AUTO EXPOSURE key (PHOTO key) | Manual exposure | Photo exposure | CASSETTE SELECTION key | INTER- RUPT key | ENERGY SAVER key | DUAL- PAGE COPY key | Sheet bypass |
|--|--------------|-----------------------|-----------------|--|--|--------------------|-------------------|------------------------------|-----------------------|------------------------|------------------------------|-----------------|
| Warming up | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ready | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reproduction-ratio changing | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Copying | I | 0 | I | I | 0 | 0 | I | 0 | 0 | I | I | × (4) |
| Add paper | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Add toner | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Key copy counter not inserted (optional) | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bypass misfeed | I | 0 | 0 | 0 | 0 | I | I | 0 | 0 | 0 | 0 | I |
| Replace toner bag | I | I | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Clear paper | I | I | I | I | I | I | I | I | I | I | I | I |
| Service call | I | I | I | I | I | I | I | I | I | I | I | I |
| Interrupt mode | 0 | I | I | 0 | 0 | 0 | 0 | 0 | 0 | I | I | 0 |
| Energy-saving mode | 0 | I | I | I | I | I | I | I | I | 0 | I | I |
| | | | | 14 - 14 | | | | | - | | | |

-: Operation is ignored. D: Machine operates or indicates in accordance with the operator's action.

- (1) By pressing the ENERGY SAVER key or the PRINT key, the energy-saving mode will be cancelled
- (2) During copying, avoid changing exposure as far as possible.
- The function of the CLEAR/STOP key changes in the following manner according to the machine status. 3

During copying Interruption of the copying (Stop function The copy quantity indicator will not change.) When not copying When pressed once, the copy quantity indicator returns to "1".

(4) During copying, avoid sheet bypass feeding because of possible paper jamming.

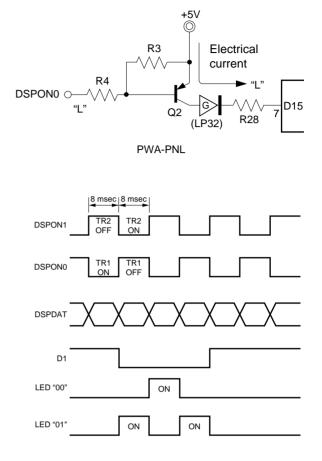
(Note) The interrupt mode will be automatically cancelled when the machine is not used for 45 seconds.

5.4 LED Display Circuit

(1) LED display method

Described here is the LED for "dual-page copying" display when "DP" comes ON. When the DSPON0 signal goes to "L" level, transistor Q2 is turned ON. When pin 7 of the IC (D15) goes to "L" level, electrical current flows through the transistor to the LED (DP) from +5V. In other words the LED (DP) comes ON.

- (2) The actual circuit is controlled as follows:
 - DSPON0 and DSPON1 signal goes to "L" level alternatively for 8 msec.
 - Q1 or Q2 goes to the ON condition when the DSPON0 or DSPON1 signal is at "L" level.
 - The LED ON/OFF signal from LGC is inputted to the IC SIN (pin 5) terminal via the DSPDAT signal (serial data).
 - LED ON/OFF signal is outputted in parallel to D1-D16 output terminal, after being inputted to IC in series.



Conditions for LED to come ON

- ① The transistor (Q1 or Q2) connected on the anode side of LED is ON.
- The output connected to the cathode side of the LED is at "L" level.
 When ①, ② above are fulfilled, the LED is turned ON.

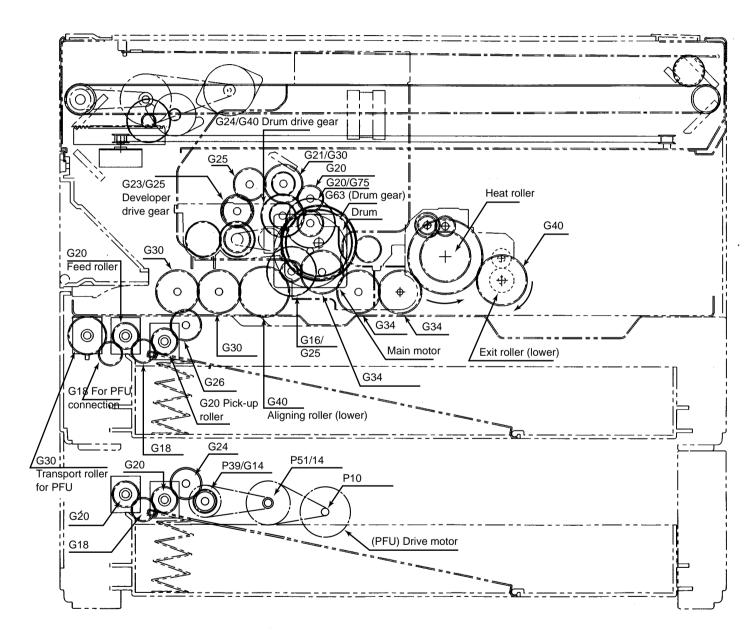
Listed below are the names of LEDs of which ON/OFF is controlled by the DSPON0 signal and the DSPON1 signal.

| | DSP-ON0 | DSP-ON1 |
|-------|---------|---------|
| DAT1 | 2 IN 1 | SRV |
| DAT2 | APS | ADFJ |
| DAT3 | AMS | SRTJ |
| DAT4 | GRP | PM |
| DAT5 | SRT | TE |
| DAT6 | PS | MFJ |
| DAT7 | INT | EXTJ |
| DAT8 | EXP1 | TF |
| DAT9 | EXP2 | FJ1 |
| DAT10 | EXP3 | PE1 |
| DAT11 | EXP4 | CS1 |
| DAT12 | EXP5 | PE2 |
| DAT13 | EXP6 | CS2 |
| DAT14 | EXP7 | FJ2 |
| DAT15 | EXP8 | AUTO |
| DAT16 | EXP9 | PHOT |
| DAT17 | MAG2-g | MAG1-g |
| DAT18 | MAG2-b | MAG1-b |
| DAT19 | MAG2-a | MAG1-a |
| DAT20 | MAG2-f | MAG1-f |
| DAT21 | MAG2-e | MAG1-e |
| DAT22 | MAG2-d | MAG1-d |
| DAT23 | MAG2-c | MAG1-c |
| DAT24 | ZM50 | MAG3-g |
| DAT25 | ZM71 | MAG3-b |
| DAT26 | ZM82 | MAG3-a |
| DAT27 | ZM100 | MAG3-f |
| DAT28 | ZM122 | MAG3-e |
| DAT29 | ZM144 | MAG3-d |
| DAT30 | ZM200 | MAG3-c |
| DAT31 | DPC | % |
| DAT32 | RDY | WAIT |

6 DRIVE MECHANISM

6.1 Construction

The drive mechanism is so constructed as to drive the drum, developer unit, heat rollers (including the cleaning felt roller), paper exit roller and paper feed rollers (copier's and PFU's transport rollers) by means of the main motor.



All parts except the main motor are located inside the frames.

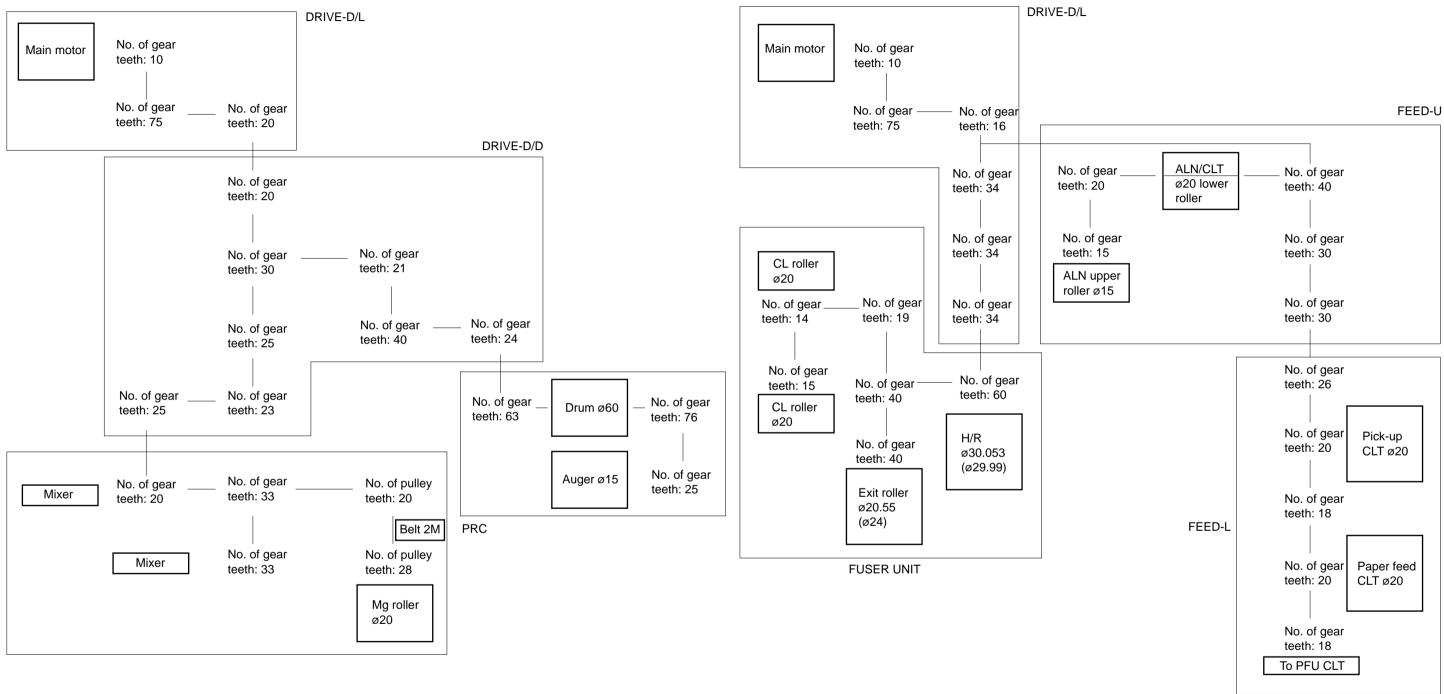
Dirve mechanism (as seen from the rear)

Upper Unit Drive

The horizontal bar (---) indicates the same shaft.

Lower Unit Drive

The horizontal bar (---) indicates the same shaft.



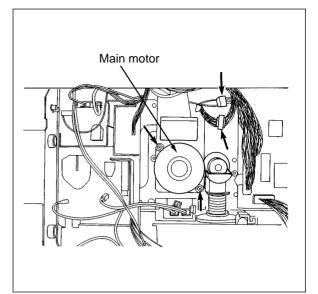
6.2 Explanation of Functions

- Drum drive Transmits the rotation of the main motor to the gears and drum drive gear to drive the drum.
- Developer unit drive Transmits the rotation of the main motor through gears to the developerunit drive gear to drive the developer unit.
- Heat roller drive Transmits the rotation of the main motor through gears to the heat roller
 gear to drive the heat roller.
- Exit roller drive Drives the exit roller gear through gears.
- Copier's aligning roller Drives the copier's aligning roller through gears.
- PFU transport roller Drivers the transport roller through the copier's paper feed unit.

6.3 Disassembly and Replacement

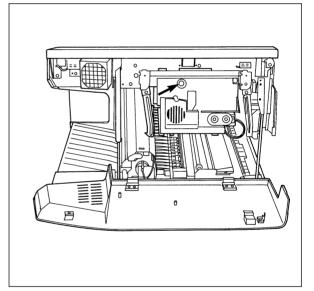
6.3.1 Main motor

- (1) Remove the rear cover.
- (2) Disconnect two connectors.
- (3) Remove two screws.

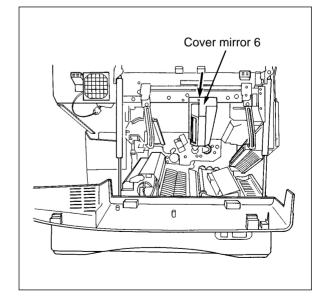


6.3.2 Drum drive gear and developer drive gear

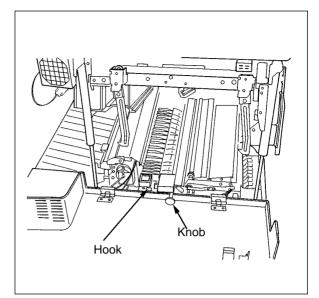
(1) Remove the process unit (2 screws).



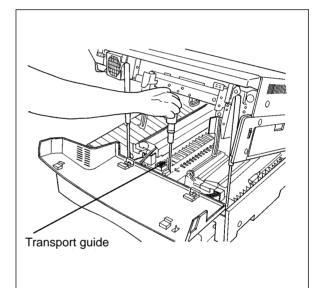
(2) Remove the cover mirror 6 (1 screw).



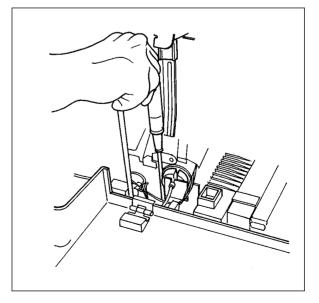
(3) Remove the transfer/separation charger (Refer to 9.3.6).



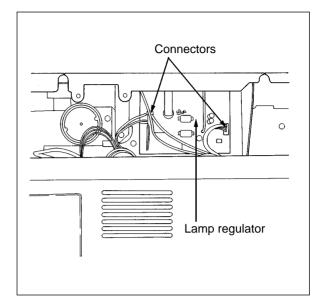
(4) Remove the transport guide (1 screw and 1 blue connector at the rear).



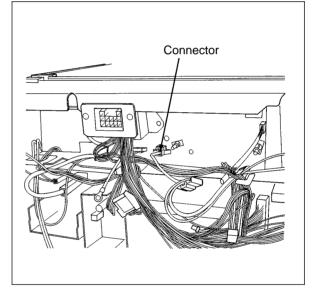
- (5) Remove the inner cover (lower left).
- (6) Remove the fuser unit (1 screw).



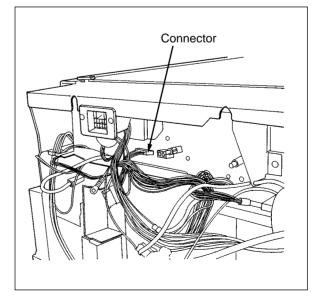
(7) Remove the lamp regulator (two connectors).



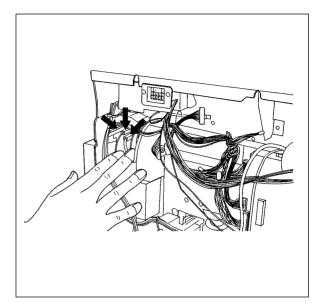
(8) Remove the exposure lamp and power supply connector.



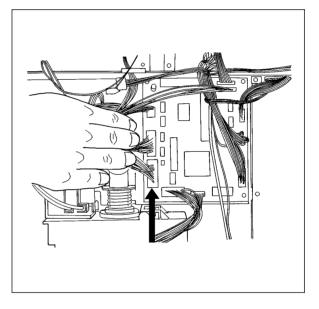
(9) Disconnect the connector for the auto exposure, lens switch and mirror motor.



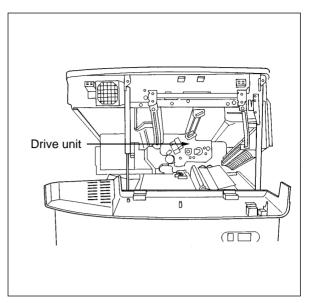
(10) Pull out the three connectors for the main charger and the bias wire from the high-volt-age transformer.



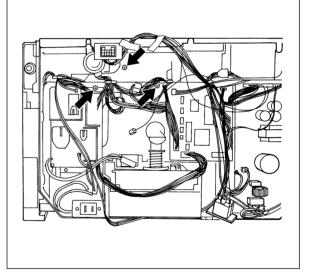
(11) Disconnect the connector for the process unit.



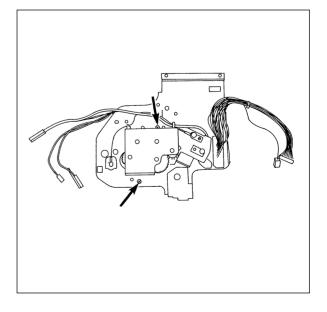
(12) Remove the drive unit from the rear inside of the machine (3 screws).



• Close the clamshell and remove 2 screws from each of the 2 screw holes on the rear frame.

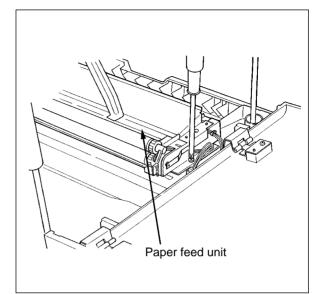


(13) Removing two screws, take out the bracket and the gear can be replaced.

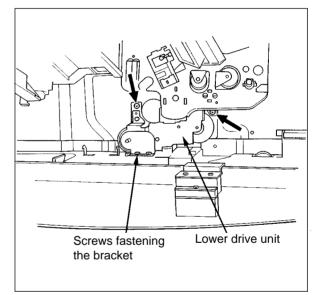


6.3.3 Lower drive unit

- (1) Remove the fuser unit.
- (2) Remove the transfer/separation charger.
- (3) Remove the transport guide.
- (4) Remove the connector cover of the feeder unit.
- (5) Remove the feeder unit (1 screw and connector).

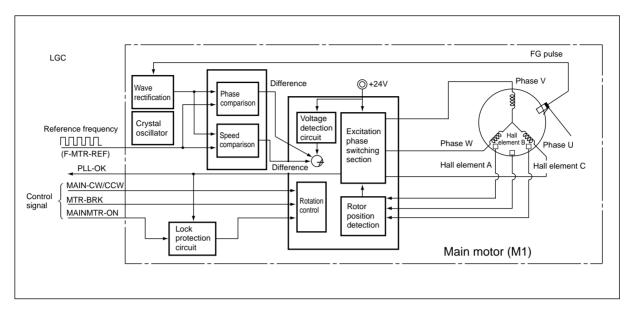


(6) Remove the lower drive unit bracket (1 screw) and separate the drive unit from the bracket (2 screws).



6.4 Main Motor

6.4.1 Main motor drive



- LGC outputs a control signal for main motor rotation. (MAIN-CW/CCW: Rotation direction, MAIN-MTR-ON: Motor rotation command)
- (2) The excitation phase switching section excites each phase of the main motor \rightarrow main motor rotates.
- (3) Hall elements A-C detects rotation position of motor (rotor).
- (4) The excitation phase switching section switches the excitation of each phase.(By repeating (2) through (4), the motor continues to turn.)
- (5) An FG pulse is generated by FG pattern attached to the main motor.
- (6) The FG pulse and the reference frequency are compared for their phase and speed, and their differences added to IC3.
- (7) Change the switch timing of the excitation phase switching section, according to the signal obtained at (6) above.
 - = Control so that the FG pulse and reference frequency are equal → main motor rotates at a fixed speed (lock-range condition).
- (8) As the main motor goes into the lock-range condition, the excitation phase switching section outputs a PLL-OK signal to LGC ("L" level).
- (9) When MTR-BRK from LGC goes to "L" level, the brake is applied to rotation of the main motor, and when the MAIN MTR-ON signal becomes "L" level, the main motor stops.

6.4.2 Control signal

(1) MAIN-CW/CCW (LGC \rightarrow MTR: Input)

This is a signal to change the direction of rotation of the main motor. When the CW/CCW signal is at "L" level, the main motor rotates counterclockwise when viewed from the rear, and drives the developer, drum and heat roller in the designated direction.

(2) PLL-OK signal (MTR \rightarrow LGC: Output)

When the FG pulse cycle difference against the reference frequency is within the range of +4.6% and -5.3%, it is defined as the lock range (normal state), and the signal becomes "L" and LED "ED1" comes ON.

(3) MTR-BRK signal (LGC \rightarrow MTR: Input)

This is the signal to control the speed of the main motor. The brake is applied to the main motor when the signal becomes "L" level.

- (4) MAINMTR-ON signal (LGC → MTR: Input)
 This is a signal to turn ON/OFF the main motor. The main motor turns when this signal becomes "H" level.
- (5) MOT-FG signal

This signal generates FG signals while the motor is rotating.

Signal level of motor circuit.

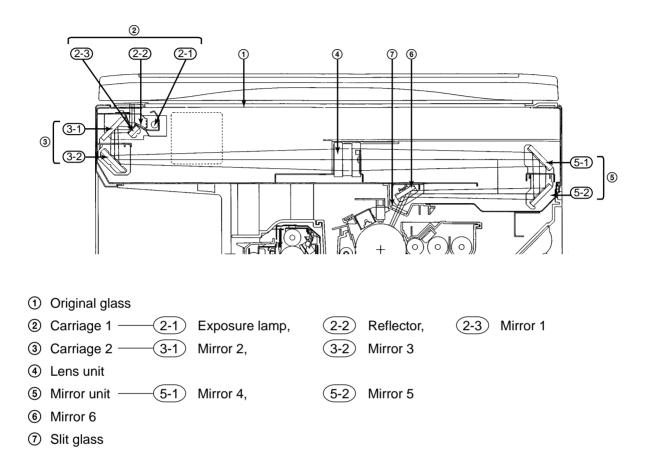
| Signal name | "H" level | "L" level |
|-------------|-----------------------|---------------|
| MAIN-CW/CCW | CW direction | CCW direction |
| PLL-OK | Control deficiency | Normal |
| MOT-FG | Rotation pulse signal | |
| MTR-BRK | Brake OFF | Brake ON |
| MAINMTR-ON | Motor ON | Motro OFF |

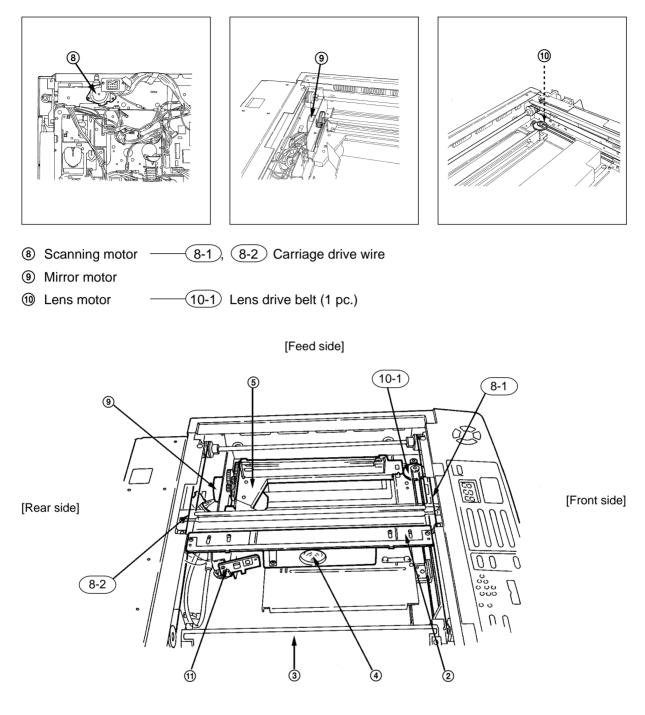
The signals are respectively the level on the input/output pins of IC1 and 3.

7. OPTICAL SYSTEM

7.1 Construction

The optical system consists mainly of the original glass, carriage 1, carriage 2, lens unit, mirror unit and drive motors.





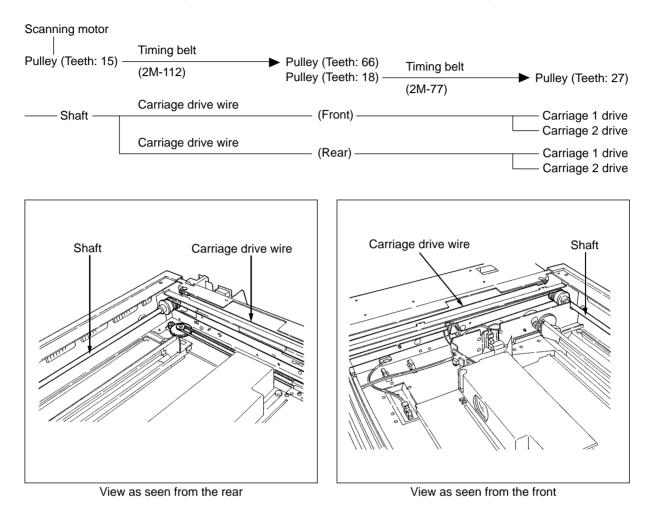
[Exit side]

① Auto exposure PC board

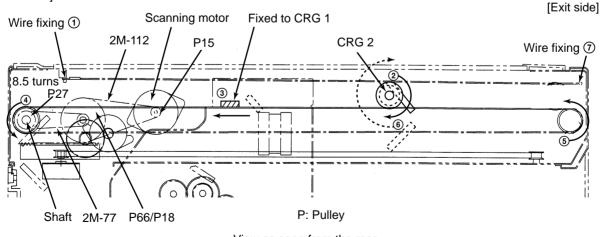
7.2 Explanation of Operation

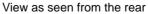
7.2.1 Scanning motor

The rotation of the scanning motor (located on the rear) is transmitted to carriage 1 and 2.



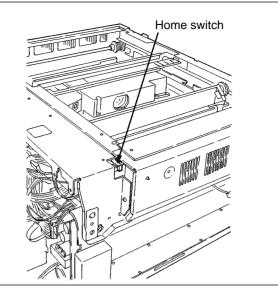
[Feed side]



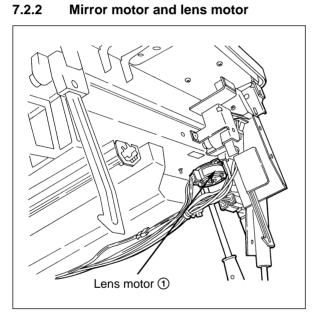


The scanning motor makes carriage 1 and 2 return to their home positions which are detected by carriage 1 passing the home switch.

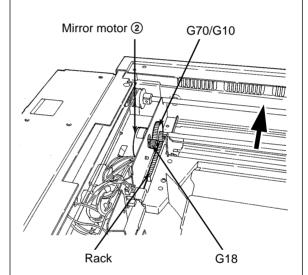
When the PRINT key is pressed, the scanning motor causes carriage 1 and 2 to scan the original.



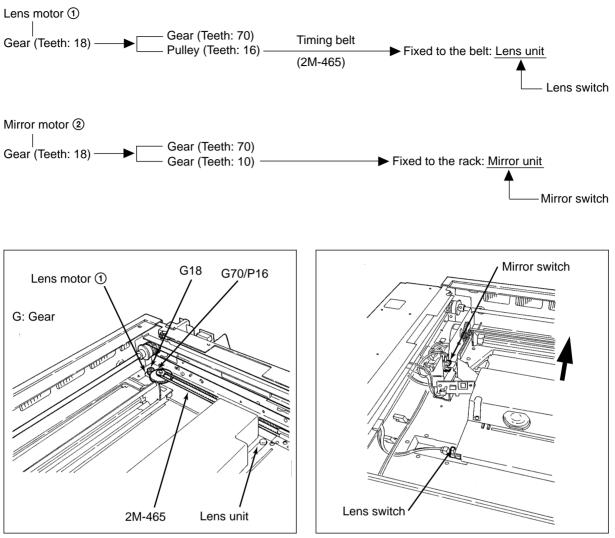
Rear side



View with the process unit and the stay removed and the upper unit raised



View as seen from the front



View as seen from the rear

View as seen form the exit side

Immediately after the power on:

Both the lens unit and the mirror unit move from the position where the switches (lens switch and mirror switch) are turned on toward the feed side (arrow direction), respectively.

If the lens and mirror units were in the off position, they first move toward exit side, then after turning on the switch, move a specified amount toward the feed side, and stop at the actual-size (100%) position.

When a reproduction ratio is selected:

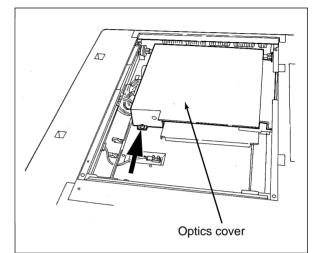
When a copy reproduction ratio is set, the lens unit and the mirror unit move to their respective positions for the specified reproduction ratio.

7.3 Disassembly and Replacement

At the time of disassembly or replacement, first remove the covers, process unit, original glass, etc., as required.

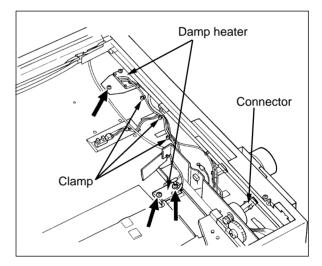
7.3.1 Auto exposure PC board and damp heater

- (1) Remove the original glass and move carriages1 and 2 to the exit side.
- (2) Remove the optics cover (1 screw).



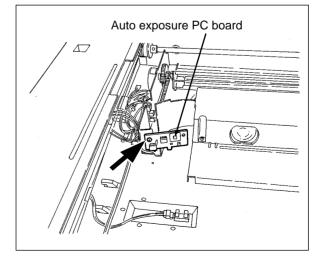
Damp heater: (Option)

• Remove three screws, three clamps and disconnect one connector.



Auto exposure PC board:

• Remove one screw, disconnect one connector and the PC board can be replaced.



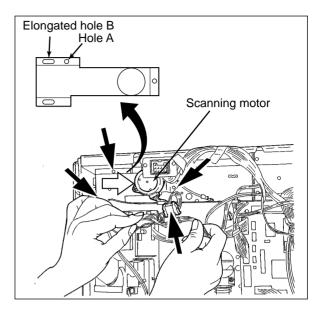
7.3.2 Scanning motor (and timing belt)

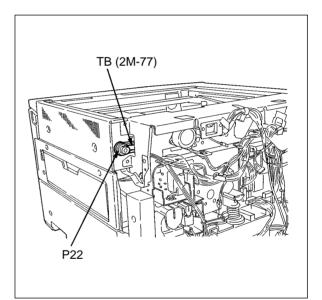
- (1) Remove the top cover.
- (2) Disconnect one connector.
- (3) After removing three screws, you can take out the whole unit. At this time, the timing belt (2M-77) is also removed.
- **Note:** 1. When reassembling the parts, make sure that the timing belt is securely placed on the pulleys (P66/P18) and the shaft drive pulley (P22).
 - 2. The scanning motor is screwed on in the position of the hole A at the time of shipping from the factory.

When the belt tension adjustment is necessary, reinstall the screw at the elongated hole B (not the hole A).

After having pushed the scanning motor in the direction of the arrow, install it.

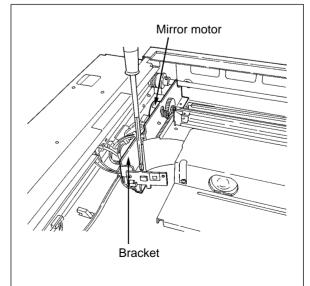
- (4) After taking out the unit, remove two screws and the motor is removed.
- **Note:** When reassembling the parts, make sure that the timing belt is securely placed on the pulleys (P66/P18) and the shaft drive pulley (P22).





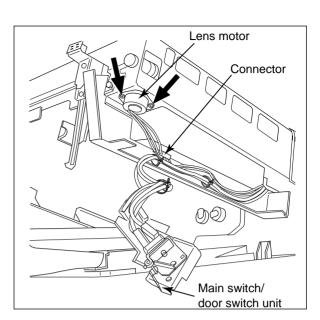
7.3.3 Mirror motor

- (1) Remove the original glass.
- (2) Remove the optics cover (1 screw).
- (3) After removing two screws, take out the bracket.
- (4) Remove two screws and disconnect one connector from the bracket and the mirror motor is removed.



7.3.4 Lens motor

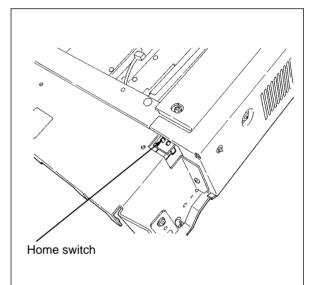
- (1) Remove the main switch, door and switch unit (see item 2.4.2 [E]).
- (2) Remove the connector of the lens motor.
- (3) Remove the lens motor (2 screws).
- Note: The shape of the mirror motor and the lens motor is same, but the output is different. Mirror motor : silver maker name
 - Lens motor : red maker name



7.3.5 Home switch, mirror switch and lens switch

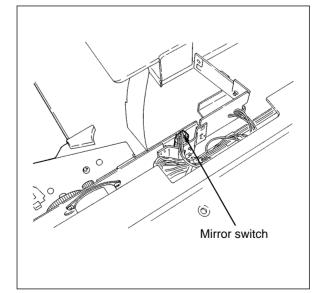
Home switch:

- (1) Remove the top cover.
- (2) Remove the switch by disengaging its claws.



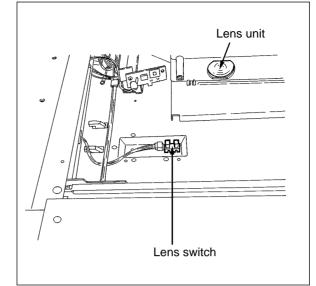
Mirror switch:

- (1) Remove the original glass.
- (2) Remove the optics cover (1 screw).
- (3) Move both carriages 1 and 2 to the exit side and the mirror unit to the feed side.
- (4) Remove the switch by disengaging its claws.



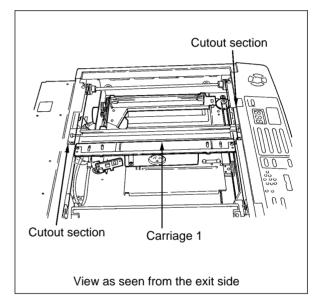
Lens switch:

- (1) Remove the original glass.
- (2) Move the lens unit to the feed side.
- (3) Raise the upper unit.
- (4) Remove the duct fan (1 screw).
- (5) Remove the switch by disengaging its claws.



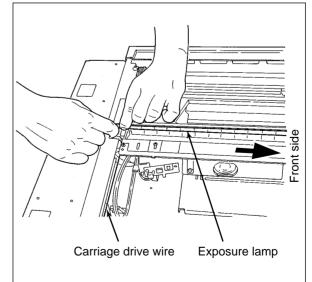
7.3.6 Exposure lamp and thermofuse

- (1) Remove the original glass.
- (2) Align carriage 1 with the cutout section of the frame.



Exposure lamp:

- While pushing the lamp toward the front (→), disengage it from the supply blade.
- **Notes:** 1. During replacement, don't touch the lamp surface with a bare hand.
 - 2. Be careful not to allow the lamp to get scratched by the wire.



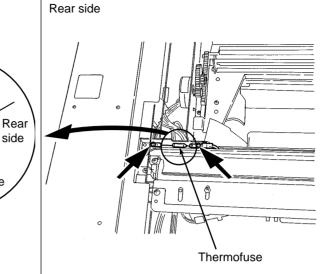
Thermofuse:

(1) Remove two screws.

Front

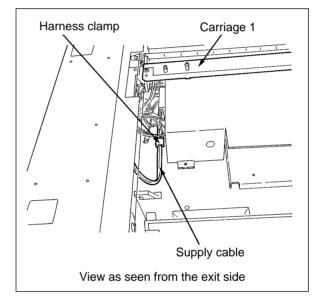
Teflon tube

side

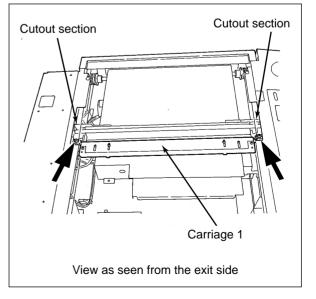


7.3.7 Carriage 1

 Remove the supply cable's harness clamp and disconnect one connector.

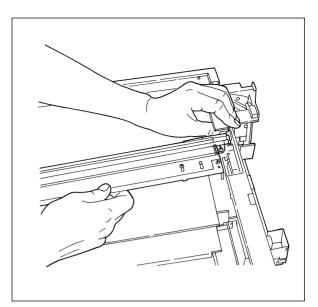


- (2) Move and align carriage 1 with the cutout section of the frame, then unhook the wire fixture (each screws for the front and rear).
- (3) Remove the power supply cable from the carriage 2's cable guide.



(4) Slanting the whole carriage 1 unit, take it out upwards.

Note: Be careful not allow the unit to get hitched by the wire.

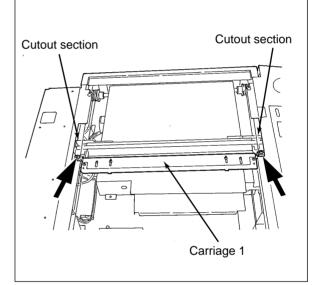


7.3.8 Carriage drive wire

The same procedure applies for removing the front and rear wires.

- Remove the original glass, top cover, rightside cover (upper), left-side cover (upper), inner cover, and control panel.
- (2) Remove carriage 1 and the wire fixture...... (each screw for the front and rear).

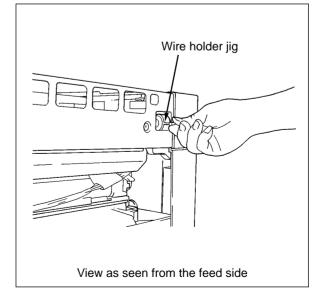
Note: Be careful not to get hitched by the wire.



- (3) Using the wire holder jig, fasten the wire on the shaft, so that it does not loosen at both front and rear.
- **Note:** The front side wire can be identified by its mark on the metal portion.

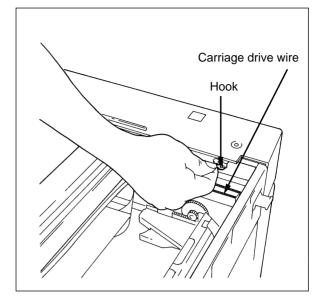
Front side wire : F

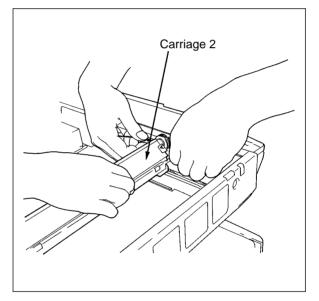
Rear side wire : R



 (4) After having loosened the wire tension adjustment screw, disengage the hook on the feed side

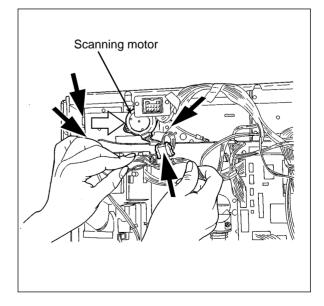
..... for both front and rear.



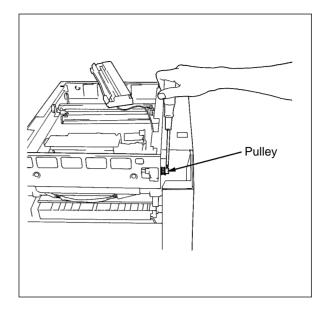


(5) Remove carriage 2.

(6) Remove the scanning motor (3 screws).

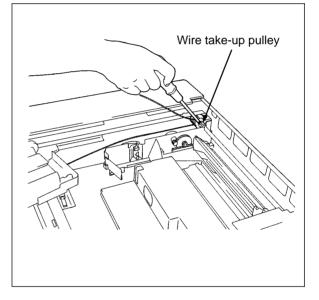


(7) Remove the pulley on the rear side (1 screw).

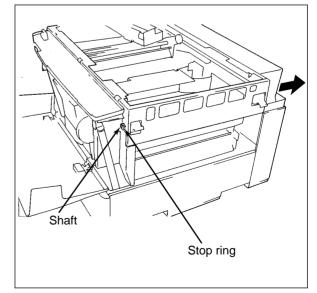


(8) Loosen the screw for the wire take-up pulley located inside the frame

..... for both front and rear.

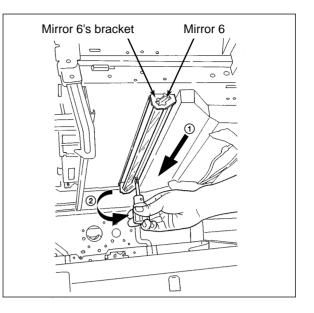


- (9) Remove the stop ring from the shaft (front).
- (10) Pull out the shaft from the rear.



7.3.9 Mirror 6

- (1) Remove the process unit.
- (2) Remove the mirror 6's cover (1 screw).
- (3) Remove the mirror 6's bracket (1 screw).
- (4) Move the mirror 6's bracket in the directions of arrows ① and ② and take out the bracket.

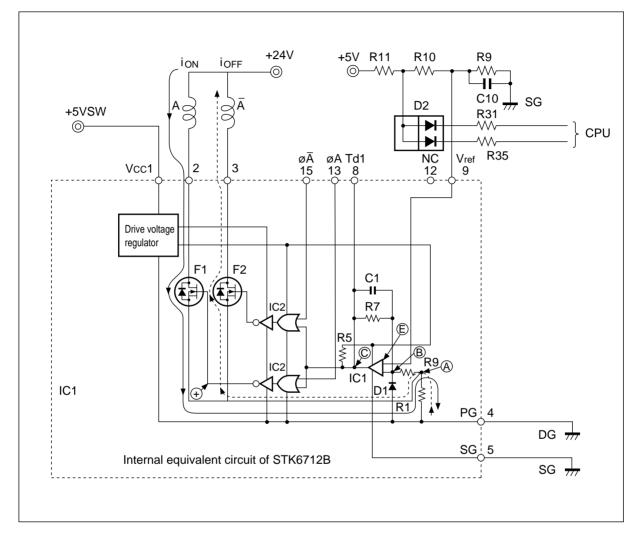


7.4 Pulse Motor

7.4.1 Pulse motor drive circuit (constant current type) (M2)

The scanning motor is driven by hybrid IC-STK6712BMK3 of the unipolar constant current chopper drive. The driving circuit for phase A and \overline{A} is shown below.

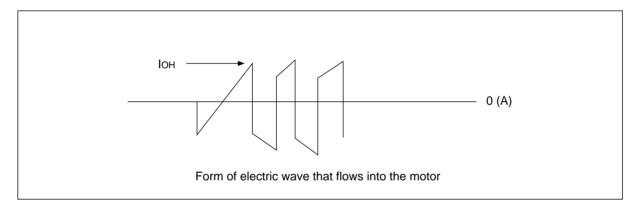
The same circuit is also used for the drive of phase B and phase \overline{B} .



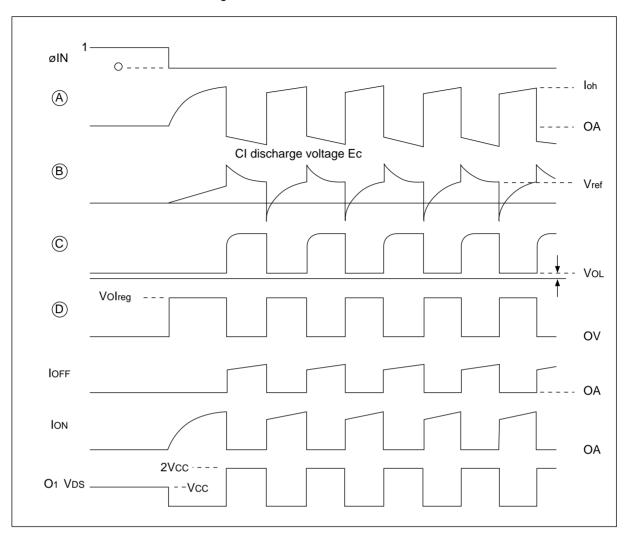
The circuit composition in the IC consists of each phase excitation switching section (IC2), a driver (F1, F2), a comparator (IC1) and an electric current detection resistance (R11). The circuit operation in the case of excitation of phase A is described below:

- Phase A excitation process -

- (1) $\emptyset A$ becomes "L" level ($\emptyset \overline{A}$ is "H" level).
- ② The reference voltage which is determined by a resistance type potential divider of R9, R10 and R11 is applied to reverse input (E) for comparator IC1 and non-reverse input (B) is "L". Therefore, IC1's output (C) becomes "L" level.
- ③ Due to ① and ② above, ③ of IC2 becomes "L" level and F1 becomes ON (conductive state).
- ④ Electric current flows to coil A from the +24 V power supply and increases gradually.
- (5) The terminal voltage of the electric current detection resistance R1 increases, and as the (B) voltage gets higher than (E) voltage, (C) becomes "H" level and F1 becomes OFF.
- (6) As coils A and A are bipolar wound, the energy accumulated in coil A is induced into coil A and discharged using coil A. In other words the electric current flows in the direction of DG → R9 → F2 diode → coil A.
- ⑦ The voltage accumulated in capacitor C1 decreases, and when it gets lower than (E) voltage, (C) goes to "L" level and F1 comes ON again to increase the phase A winding electric current.
- ③ The above ON/OFF operation (constant current chopping) of the electric current for the motor is repeated (refer to the diagram below).

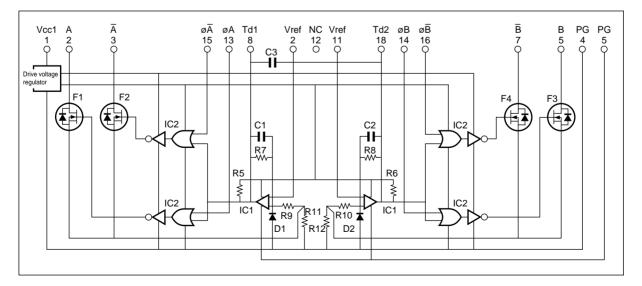


When exciting phase \overline{A} , phase \overline{A} becomes "L" level, while F2 becomes ON, and a similar operation is conducted.



Shown below is the waveform timing chart of each section:

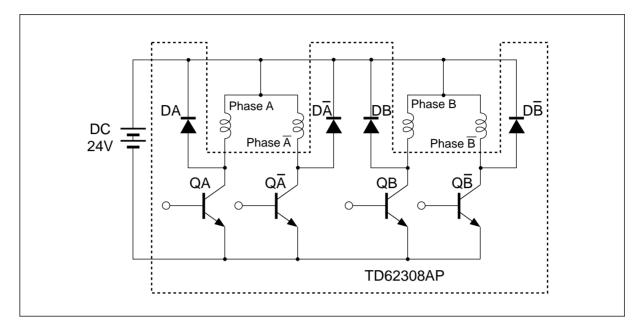
Equivalent circuit of STK6712B



7.4.2 Pulse motor dirve circuit (constant voltage type) (M3, M4)

Lens motor (M3) (LMS-MTR)

~Driven by IC5 (Logic PC board: TD62308F) ~Driven by IC4 (Logic PC board: TD62308F)



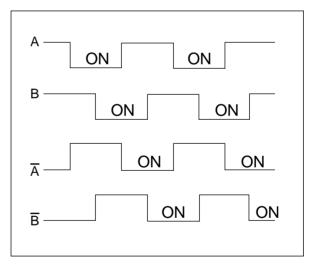
The diagram on the right shows signals impressed to QA, QB, \overline{QA} , and \overline{QB} bases in two-phase excitation.

The ON/OFF combination of the transistor is switched.

 \downarrow

The combination of phases to which the current flows is switched.

↓ Motor rotates

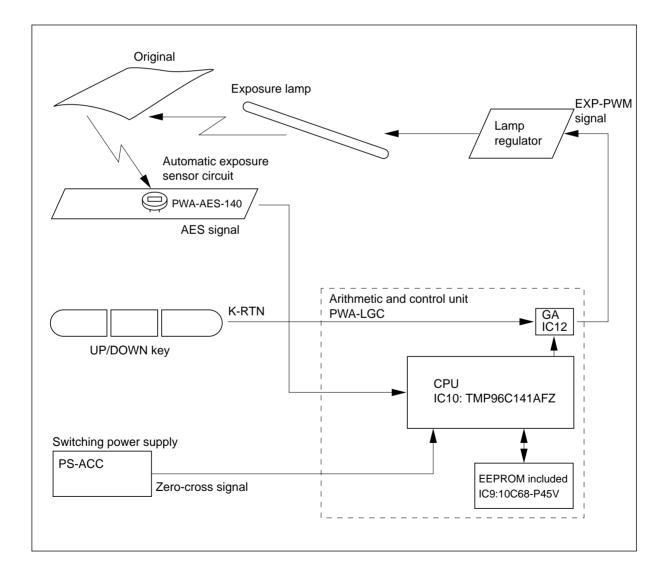


7.5 Exposure Control Circuit

- (1) Brief description
 - The exposure control circuit is composed of the following four blocks.

| ① Lamp regulator | Impresses a voltage corresponding to the duty ratio of | |
|-------------------------------------|---|--|
| | the EXP-PWM signal upon the exposure lamp. | |
| ② Automatic exposure sensor circuit | Generates an AES signal indicating the density of the | |
| | original by sensing the light reflected by the surface of | |
| | the document. | |
| ③ Arithmetic and control unit | Determines the lamp voltage by computation on the | |
| | basis of AES and K-RTN signals, etc., and outputs the | |
| | EXP-PWM signal to the lamp regulator. | |

*Note: The ON/OFF state of the exposure lamp is controlled by a special signal (EXPON), which is different from the EXP-PWM signal.

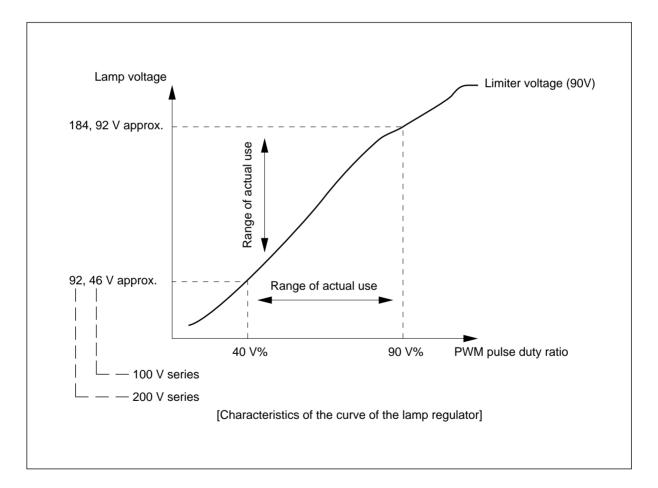


The exposure control circuit has the following two functions:

Manual exposure mode Impresses a constant lamp voltage corresponding to the setting by the UP/DOWN keys on the exposure lamp.
 Automatic exposure mode The quantity of light reflected by the surface of the original, which varies according to its lightness and darkness, is detected by the automatic exposure sensor circuit, and the voltage impressed on the exposure lamp is varied accordingly; a high lamp voltage being impressed when the original is dark and a low lamp voltage when it is light.

(2) Function of lamp regulator

A typical characteristic curve is shown below. By means of a phase-angle control system, it is controlled so that a lamp voltage corresponding to EXP-PWM pulse duty ratio input is generated even when some fluctuation occurs in the AC input voltage.



(3) Automatic exposure sensor circuit (PWA-F-AES-140)

Through the action of IC1, the incidence of light upon protocell PD1 generates an AES signal on J3-6.

Dim reflected light→ Small AES output Intense reflected light→ Large AES output

(4) Arithmetic and control unit

The arithmetic and control unit is composed of the following two blocks.

- (1) EEPROM built-in SRAM Consists of IC9 (STK10C68), which stores exposure ad-(NV-RAM) justment data to ensure that optimal exposure is performed for each reproduction ratio and for automatic exposure.
- ② CPU (IC10)..... Incorporates software which computes the voltage to be impressed on the lamp in accordance with such copying modes as photographic magnification, automatic exposure, and manual exposure, as well as adjustment data inside the SRAM.

7.6 Lamp Regulator Circuit

The lamp regulator performs control to maintain the amout of light of the exposure lamp at a constant value by monitoring the AC input voltage.

(Method) • Detects the AC input voltage.

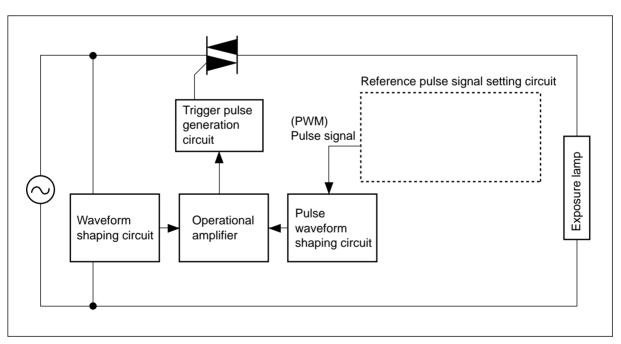
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- Changes the input voltage to a DC voltage approximate to its effective value by means of the waveform shaping circuit.
- This DC voltage is compared with the reference voltage made by shaping the pulse signal and is amplified.
- Based on the reference voltage and the input voltage, the trigger pulse generation circuit generates trigger pulses in synchronism with the frequency of the power supply.
- Controls the conduction angle of the triac.

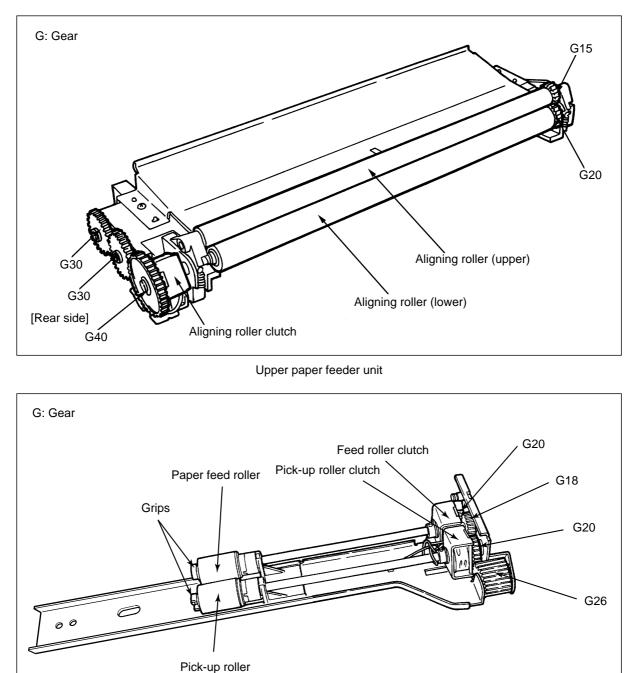


The voltage applied across the lamp is kept consistent.

8. FEEDER UNIT

8.1 Construction

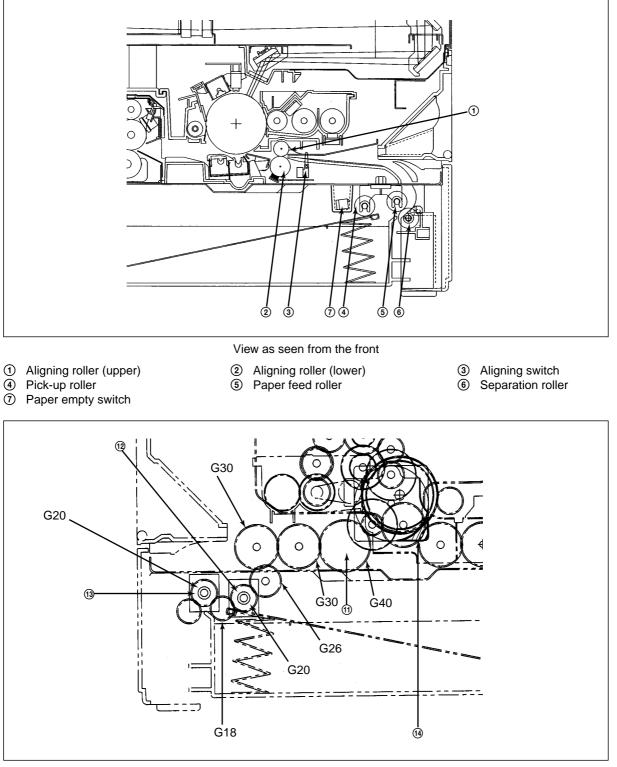
The paper feeder unit consists of upper and lower paper feeder units.



Lower paper feeder unit turned upside down

8.2 Explanation of Operation

8.2.1 Paper feeding operation



View as seen from the rear

- (1) Aligning roller clutch
- 12 Pick-up roller clutch
- Main motor

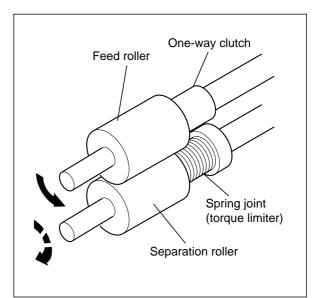
- (A) Manual feeding operation
 - Paper manually inserted pushes the aligning switch ③.
 - When the PRINT key is pressed, the main motor starts rotating and the aligning roller clutch (1) is energized, causing the paper to be sent to the transfer process.
- (B) Cassette feeding operation
 - Electromagnetic clutches (feed roller clutch and pick-up roller clutch) are energized to rotate the pick-up roller ④ and feed roller ⑤, starting paper feeding.
 - Electromagnetic clutch ⁽¹⁾ for the pick-up roller is de-energized, with the paper left pushing the aligning switch ⁽³⁾.
 - The paper is aligned by the aligning rollers ① and ②, the electromagnetic clutch ③ for the feed roller is de-energized, the aligning roller clutch ① comes ON, then the paper is sent to the transfer process.

8.2.2 Paper separation operation

Since no paper separation claws are used in the cassette, a paper separation roller is installed inside the machine. The separation roller section consists of a paper feed roller, one-way clutch, separation roller spring joint, etc., as shown.

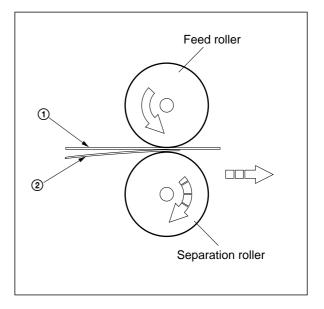
The feed roller is equipped with a weight and rotates in the direction of the arrow () at the same timing with the pick-up roller.

The separation roller shaft, equipped with a torque limiter based on a spring joint, is designed to rotate in the direction of the arrow () and transmits its rotation to the separation roller through the spring joint.



For example, when only one sheet of paper (1) is sent to the separation area, since the feed roller's transporting force is stronger, the separation roller is forced to rotate in the direction of the arrow ($\cancel{}$), causing the sheet to be sent toward the aligning roller.

If, as shown, two sheets are fed at the same time, since the friction between the sheets is smaller, the lower sheet is stopped being fed any further while the upper sheet is forced to be transported by the feed roller in the direction of the arrow (=>).

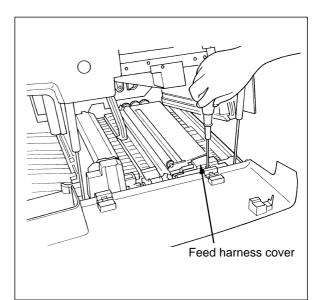


8.3 Disassembly and Replacement

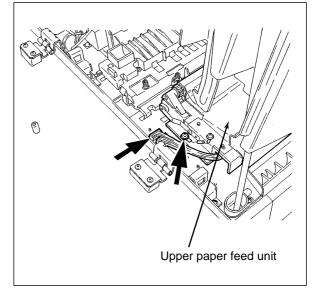
Depending upon the locations of the parts to be disassembled or replaced, covers should be removed or the upper unit should be opened as required.

8.3.1. Upper paper feed unit

- (1) Remove the transfer/separation charger unit.
- (2) Remove the feed harness cover (1 screw).

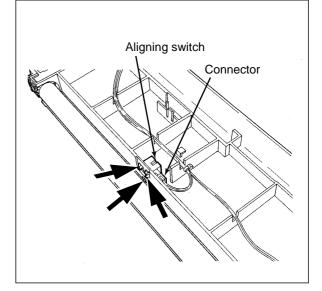


(3) After removing one screw and disconnecting one connector, pull the unit out to the front and lift it out.



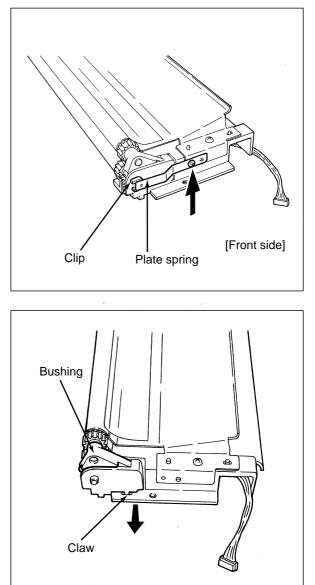
Aligning switch:

- (1) Place the upper paper feed unit upside down.
- (2) Remove the paper dust brush.
- (3) Disengage three claws and disconnect one connector.



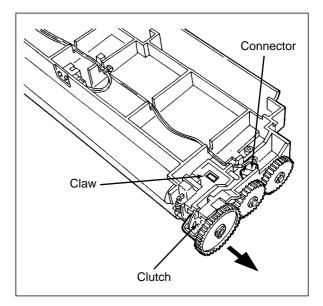
Clutch and aligning rollers (upper/lower):

- (1) Remove the plate spring (1 screw).
- (2) Snap off the clip.

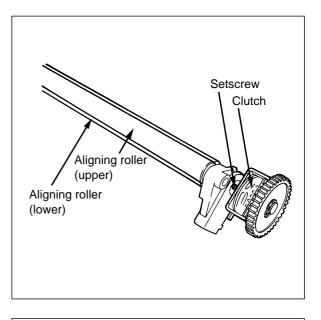


(3) While pushing down the claw, pull out the bushing toward the front.

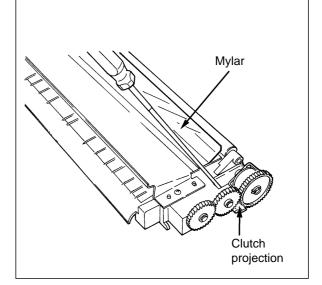
- (4) Disconnect one connector.
- (5) While pushing down the rear claw, pull out the bushing toward the rear.



(6) Removing one setscrew allows the clutch and the aligning roller (lower) to be disassembled, respectively. Also, the aligning roller (upper) can be removed.



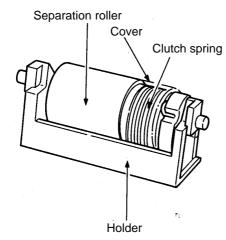
- Notes: 1. During disassembly, be careful not to damage the mylar.
 - 2. Pay attention to the orientation of the clutch projection.



8.3.2 Lower paper feed unit

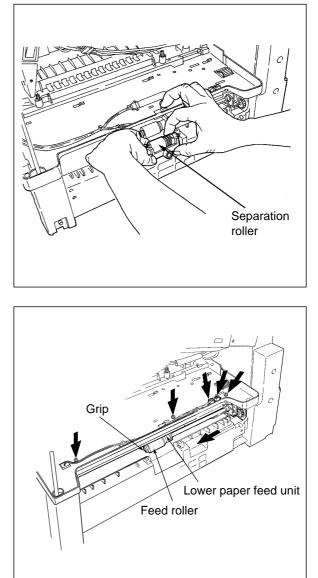
- (1) Pull out the cassette.
- (2) Remove the upper paper feed unit.
- (3) Remove the feed side cover and right side covers (lower, upper).
- (4) Remove the separation roller.

The roller unit can be removed by pulling it toward you.



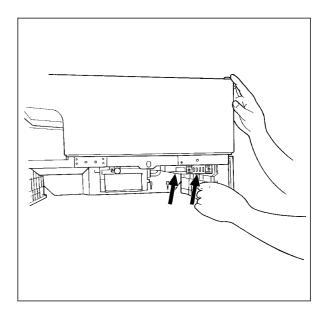


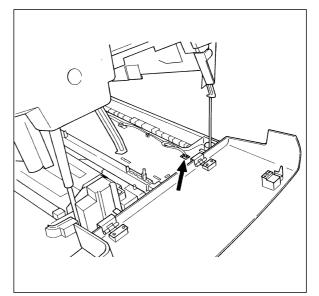
(5) Disconnect two connectors and remove three screws. Slide the whole unit toward the front, then lower it and pull it out toward you.
Note that the <u>feed roller</u> can be removed without taking out the whole unit. Just remove the grip and pull out the roller from its shaft.



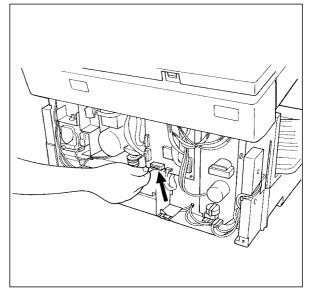
Empty switch:

• Remove the rail unit (2 screws and a connector).

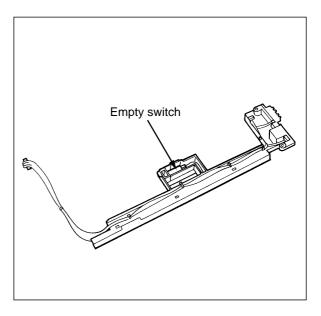




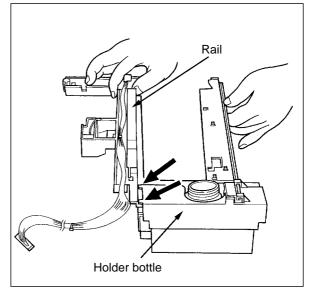
- Slide the rail unit toward the front and lower it to remove.
- Remove the rear cover and disconnect one connector from the logic PC board.
 Take the connector out through the window in the rear frame to the front side.

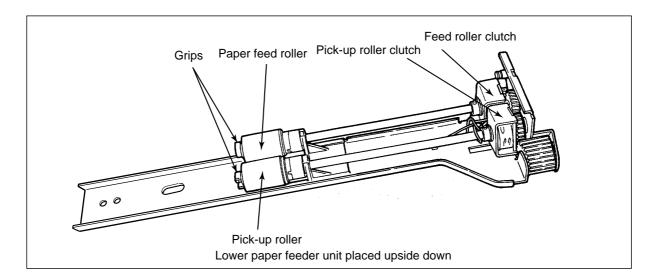


• After pulling out the whole unit to the front side, remove one claw and raising the switch, disconnect the connector.



Note: When reassembling the rail unit, make sure that the holder bottle is placed on the rail.



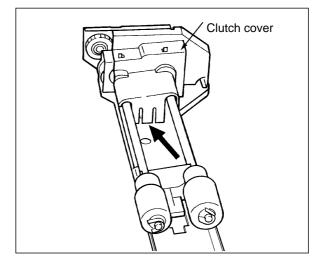


Pick-up roller and feed roller:

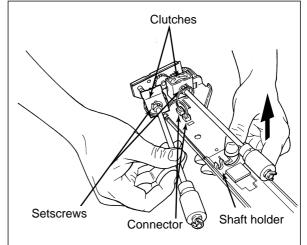
• Snap off the grips and pull out each roller from its shaft. Note that the pick-up roller and the feed roller are the same parts.

Pick-up roller clutch and feed roller clutch:

• Disengage one claw to remove the clutch cover.

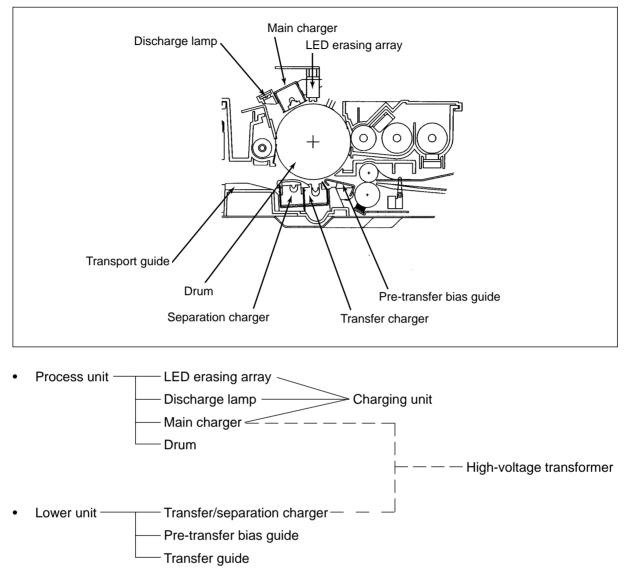


- While lifting each shaft in the direction of the arrow, remove each clutch from the shaft holder.
- Disconnect the connector from the bracket.
- Removing one setscrew allows the clutch and the shaft to be separated.
- The pick-up roller clutch and the feed roller clutch are the same parts.



9. DRUM-RELATED SECTION

9.1 Construction



9.2 Explanation of Functions

- 9.2.1 Main charger, discharge lamp and LED erasing array
- Main charger
 Places a negative charger on the drum (through a high-voltage transformer).
- Discharge lamp
 Eliminates the residual charge on the drum after cleaning.
- LED erasing array

Erases the unnecessary parts of the latent image formed on the drum.

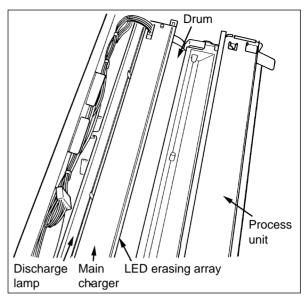
9.2.2 Transfer/separation chargers

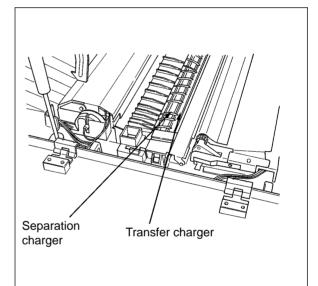
• Transfer charger

Helps transfer the toner image on the drum to the copy paper (through a DC high-voltage transformer).

• Separation charger

Strips the copy paper along with the toner image from the drum (through an AC high-voltage transformer).

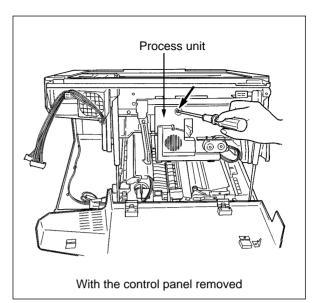




9.3 Disassembly and Replacement

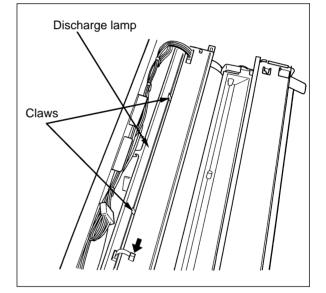
9.3.1 Process unit

- (1) Remove the toner cartridge.
- (2) After removing one screw, pull out the entire unit to the front and take it out.
- Notes: 1. When pulling out the unit, be careful not to touch the drum.
 - 2. In order not to damage the drum, place the unit on the flat surface of a stand.



9.3.2 Discharge lamp

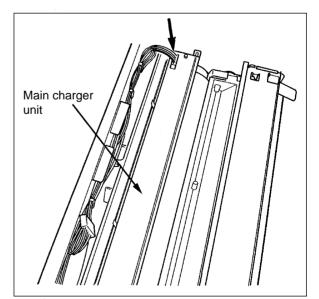
- (1) Remove the process unit.
- (2) Disconnect a connector.
- (3) Disengage two claws and take out the PC board.



9.3.3 Main charger unit

- (1) Remove the process unit.
- (2) Disconnect the one connector.
- (3) Move the entire unit toward the upper to have it disengaged for the rear lock and take it out.

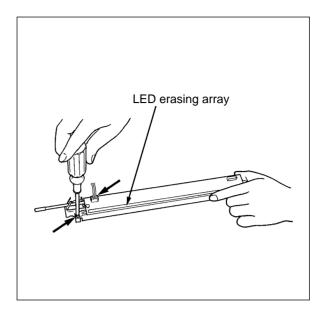
Note: Be careful not to damage the drum.



Front side

9.3.4 LED erasing array

- (1) Remove the main charger unit.
- (2) Remove a connector.
- (3) Remove a screw.

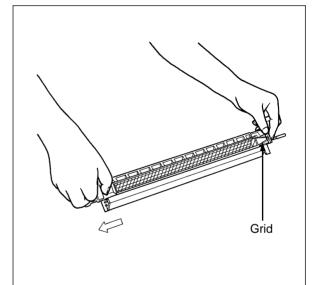


9.3.5 Main charger

(1) Remove the main charger unit.

Grid

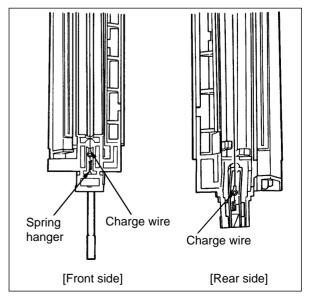
- Remove the grid by pulling it toward the rear.
- **Note:** Be careful not to touch the shaded area with a bare hand.



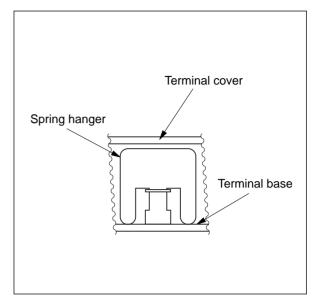
Charge wire

(Entire length: 353 mm; tungsten wire: 0.06 mm dia.)

- Remove the front and rear terminal covers.
- Pinching the hook of the rear terminal cover with cross pliers etc. will facilitate the removal.

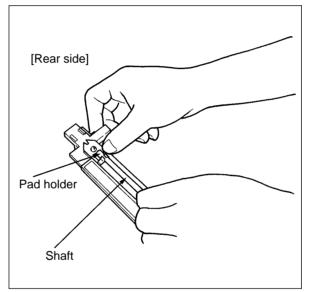


- **Notes:** 1. Pay attention to the direction in which the spring hanger on the front faces.
 - 2. The charge wire should be placed securely in the V-grooves on the front and rear sides.
 - 3. Don't allow the wire to kink.
 - 4. Don't touch the wire with a bare hand.

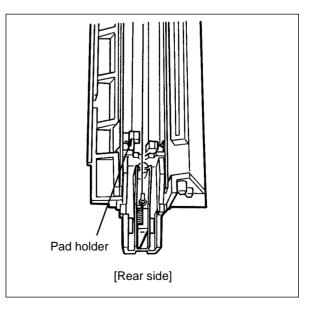


Replacing the cleaning pad:

- (1) Remove the charge wire.
- (2) Remove the LED erasing array.
- (3) Move the cleaning pad to the rear side.
- (4) Remove the pad holder snap from the shaft.

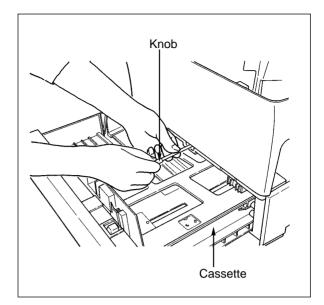


- Notes: 1. When reassembling, pay attention to the direction of the pad holder in which it faces.
 - When moved to the rear, the pads (2 pcs.) should be obviously away from the wires.

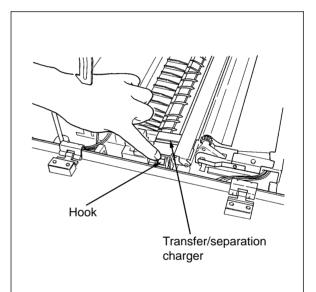


9.3.6 Transfer/separation chargers

- (1) Pull out the cassette.
- (2) Remove the knob for the cleaning-pad shaft.



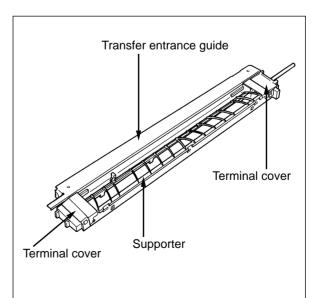
- (3) After opening the front cover, remove the hook and then take out the entire unit.
- **Note:** When reinstalling the transfer/separation charger, be sure to fit it into the rear terminal guide. Since the charger is pushed up by a spring, make sure that it moves up and down freely.



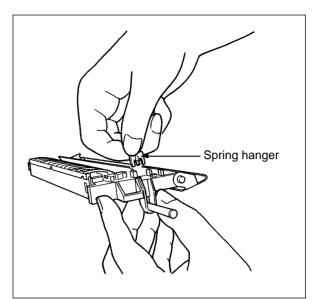
Replacing the charge wire:

(Entire length: 353 mm; tungsten wire: 0.06 mm dia.)

- Disengage the claw of the transfer entrance guide from the rear side.
- Remove the front and rear terminal covers.
 For the separation charger, remove the supporter in addition.
- **Note:** For replacing the cleaning pad, the same procedure as for the main charger applies.

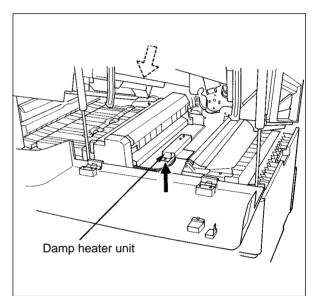


- **Notes:** 1. Pay attention to the direction in which the spring hanger on the front faces.
 - 2. The charge wire should be placed securely in the V-grooves on the front and rear sides.
 - 3. Don't allow the wire to kink.
 - 4. Don't touch the wire with a bare hand.
 - 5. The supporter should be fitted securely in the hook and groove.



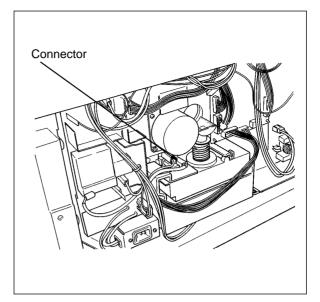
9.3.7 Damp heater unit (Option)

- (1) Remove the transfer/separation charger.
- (2) Remove the transport guide (one screw).
- (3) Remove one screw securing the damp heater.
- (4) Remove the inner cover (lower left) and leftside cover (lower).
- (5) Remove the rear cover.
- (6) Remove a connector.

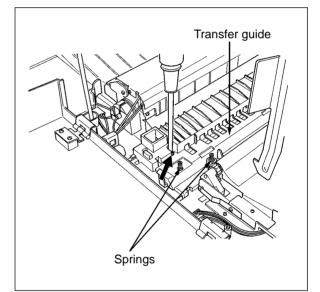


9.3.8 Transfer/separation terminal

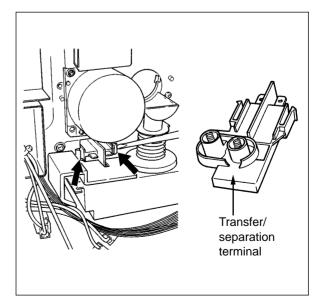
- (1) Remove the transfer/separation charger.
- (2) Remove the rear cover and disconnect three connectors.



- (3) Remove one screw.
- (4) Pull the transfer guide toward the front slightly and lift it out.
- **Note:** Be careful not lose the charger push-up spring.

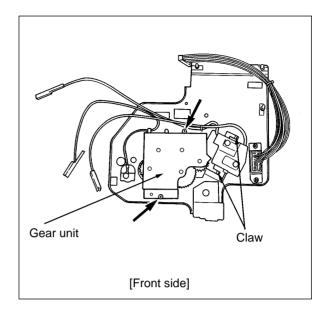


(5) Remove the two hooks and then take out the transfer/separation terminal from the front side.

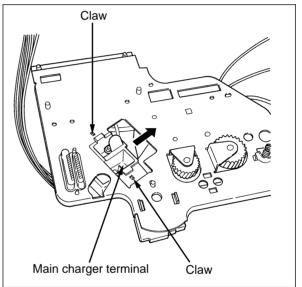


9.3.9 Main charger terminal

- (1) Remove the drive unit.
- (2) Remove the gear unit (2 screws).

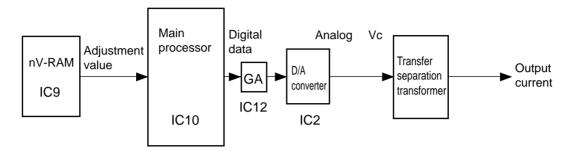


(3) After removing the two claws on the front side, slide out the main charger terminal to the right.



9.4 Transfer/Separation Electric Current Control Circuit

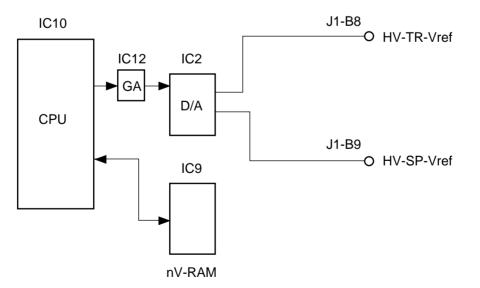
- (1) Brief description
 - The circuit generates voltage Vc for transfer and separation output current control.
 - Change $Vc \rightarrow$ changes output current to linear.
- (2) Description of operation



- Transfer/separation output adjustment value in nV-RAM is fed to main processor.
- The main processor outputs control voltage data through the GA to D/A converter.
- Analog conversion made by D/A converter.

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- Control voltage is fed to transfer/separation transformer.
- Transfer/separation transformer generates output current which is proportional to control voltage Vc.
 - * Adjustment of control voltage Vc (alteration of adjustment data) must be made in AJ mode.



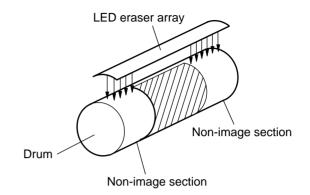
Transfer/separation control circuit diagram

9.5 LED Eraser Array

Brief description

- LED eraser array:
 - a) For reduction copying, the areas on the drum where the light from the exposure lamp does not fall are exposed.
 - b) Exposes the portion, which is out of the paper size and unnecessary charged, according to the cassette size signal.

The LEDs are turned on and the drum surface is irradiated \rightarrow the charge in the area hit by the light disappears from the drum surface \rightarrow the image of the section where the light has fallen is therefore erased.



Operation description

- The LED eraser array consists of 32 LEDs, and the LEDs are in the same position in the front/rear direction based on the image center, are connected to the same bit in parallel.
- Data (according to input coordinate for paper size, reproduction rate) from the logic PC board are fed to LED eraser array by 64 bits (effective data are the last 16 bits).
 Data "1": LED ON, Data "0": OFF (the level on the input pins of IC L7932 of the driver controller)
 Ex.) When one LED is turned ON at both ends of LED array:
- "1" is fed from logic PC board to the 64th (last) datum (16th effective datum), and "0" to data 1 63 (effective data 1 15).

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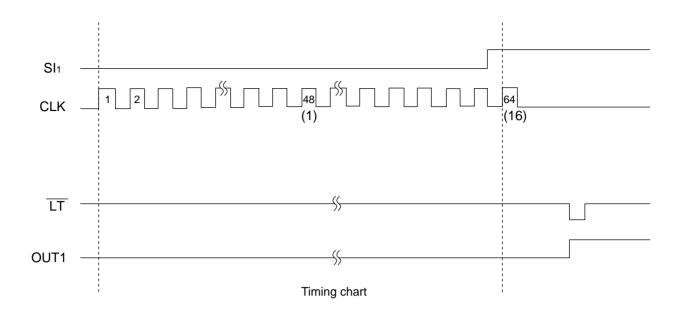
• "1" is set in shift register equivalent to ED1 and ED32, and "0" is set for the others.

• After setting is completed, it is transferred to latch.

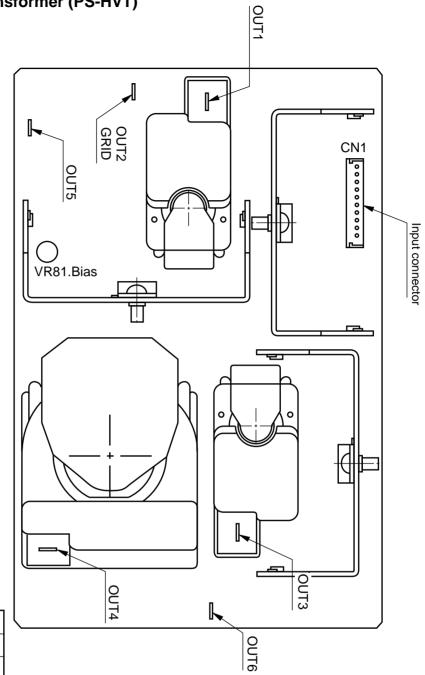
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 According to the driver, turn ON LED on both ends in accordance with data. A timing chart for the above is shown below.

[↓]



9.6 High-Voltage Transformer (PS-HVT)



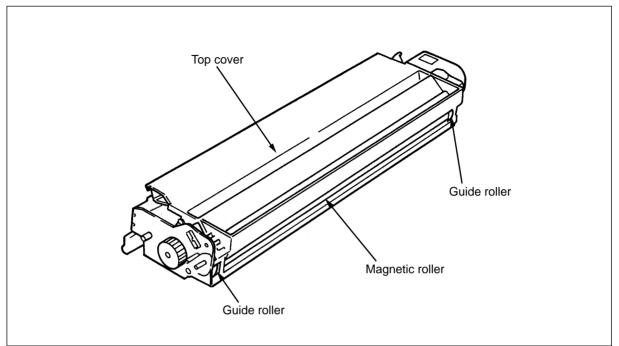
Input connector

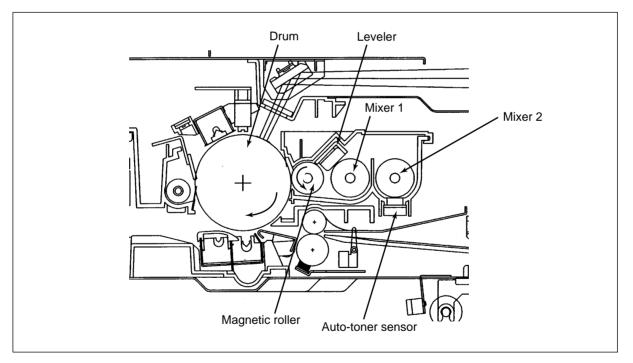
| Pin No. | Signal | |
|---------|-----------|--|
| 1 | M-VREF | |
| 2 | HVT-M-ON | |
| 3 | G-VREF | |
| 4 | +24V | |
| 5 | DG | |
| 6 | HVT-TR-ON | |
| 7 | TR-VREF | |
| 8 | HVT-GB-ON | |
| 9 | HVT-SP-ON | |
| 10 | SP-VREF | |

| Output 1 | Charge | –500 µA |
|----------|----------------|-----------|
| Output 2 | Grid | –692 V |
| Output 3 | Transfer | –400 μA |
| Output 4 | Separation | AC 3.6 kV |
| Output 5 | Developer bias | –200 V |
| Output 6 | Guide bias | –1200 V |

10. DEVELOPER UNIT

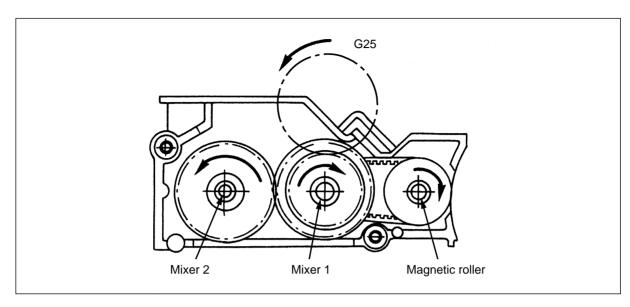
10.1 Construction





Front sectional view

10.2 Drive System



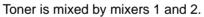
10.2.1 Magnetic roller, mixer 1 and mixer 2

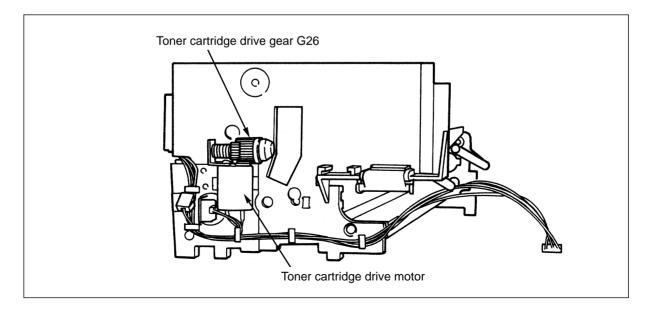


10.2.2 Toner cartridge

[Developer-unit front side]

Toner cartridge drive motor ↓ Drive gear (teeth: 26) ↓ Toner cartridge (adding toner) ↑

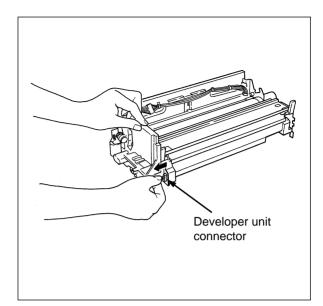




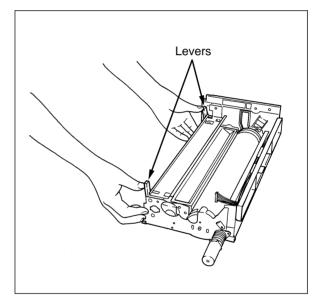
10.3 Disassembly and Replacement

10.3.1 Removal and installation of the developer unit

- (1) Remove the process unit.
- (2) Disconnect the developer unit connector.

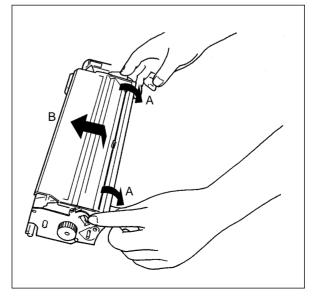


(3) Lifting the levers, take out the developer unit.

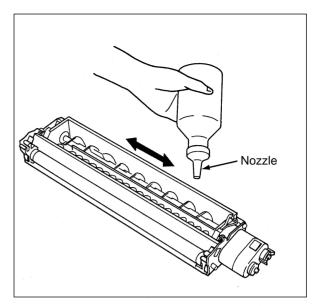


10.3.2 Installing the developer material

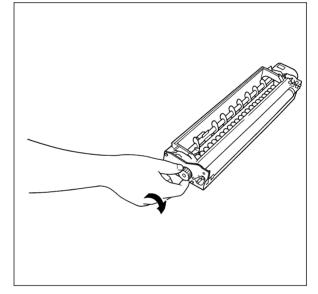
- Remove the top cover (by rotating the two plate spring hooks in the direction of "A" and moving the cover in the direction "B").
- **Note:** While doing the above, be careful not to damage the seal affixed to the back side of the top cover.



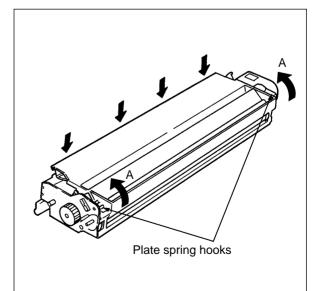
(2) Remove the cap from the developer bottle and install the nozzle (service jig) to the bottle.Pour the developer material into the developer unit.



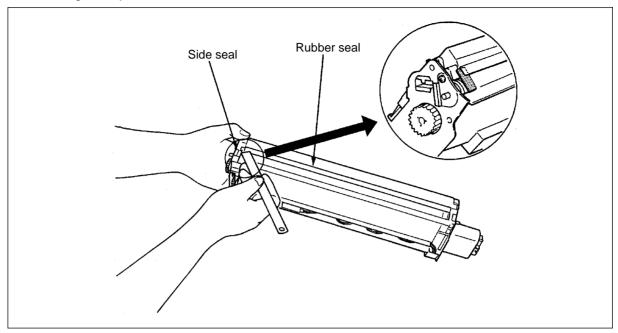
(3) After pouring in the developer material, rotate the gear in the direction of the arrow as shown to deliver the developer material onto the magnetic roller.



(4) Reinstall the top cover; after inserting the hooks(4 places) firmly, fix the plate spring hooks by rotating in the direction of arrow A securely.

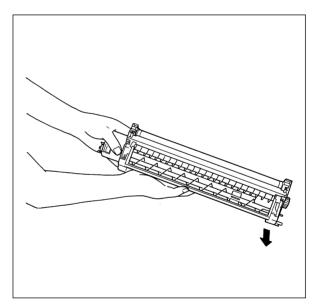


(5) Pay special attention to the overlapping of the side shields (front and rear) and the rubber seal when installing the top cover; the rubber seal should be over the side seals.



10.3.3 Removing the developer material

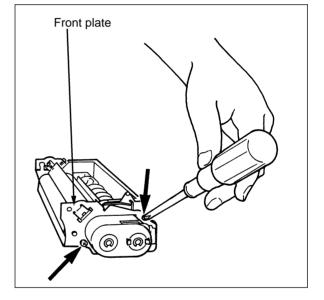
While tilting the developer unit, let the developer material drain out from the position shown with an arrow. Be careful not to allow gears and connectors nearby to get stained with developer material.

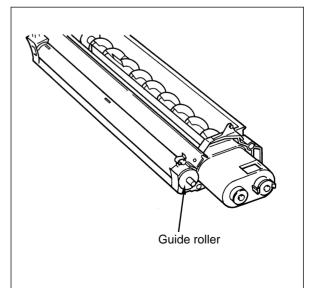


10.3.4 Guide rollers

Front side

- (1) Pour out the developer material from the developer unit.
- (2) Remove the leveler adjustment screw and the springs (a coil spring and plate spring) at the front.
- Plate spring Plate spring Coil spring
- (3) Remove the front plate (2 screws).

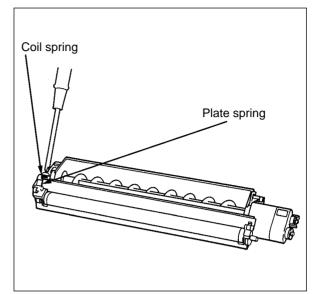




- (4) Replace the guide roller.
- **Note:** When reinstalling the front plate, be careful not to allow the harness to be pinched.

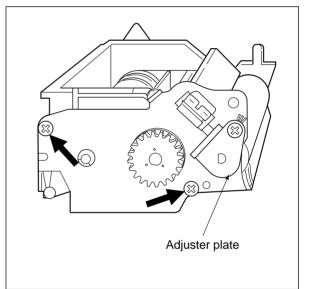
Rear side

- (1) Pour out the developer material (refer to para. 10.3.3).
- (2) Remove the leveler adjustment screw and the springs (a coil spring and plate spring) at the rear.

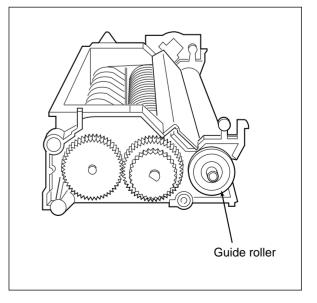


(3) Remove the adjuster plate (1 screw).(Before removing it, memorize its original position.)

Remove the rear plate (2 screws).

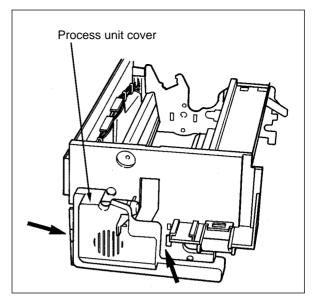


- (4) Replace the guide roller.
- **Notes:** 1. The guide roller is common for the front and rear sides.
 - After reassembly, the doctor-to-sleeve gap and the pole position should be adjusted.

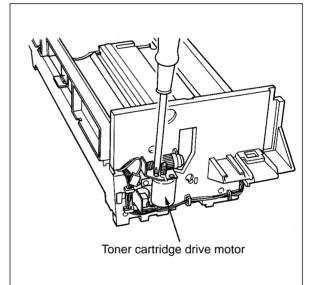


10.3.5 Toner cartridge drive motor

- (1) Remove the process unit.
- (2) Remove the process unit cover (2 claws).

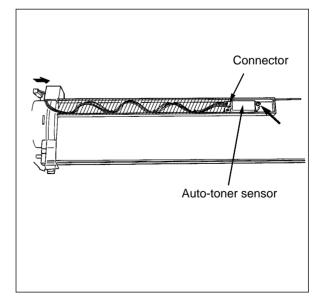


(3) Take out the toner-cartridge drive motor (1 screw and connector).



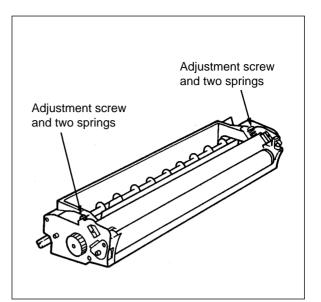
10.3.6 Auto-toner sensor

- (1) Pour out the developer material from the developer unit.
- (2) Place the developer unit upside down and remove the auto-toner sensor (1 screw and connector).

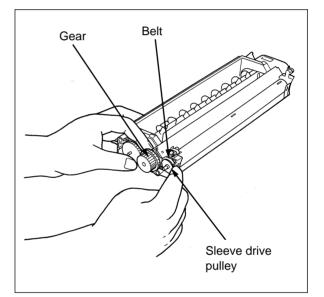


10.3.7 Magnetic roller

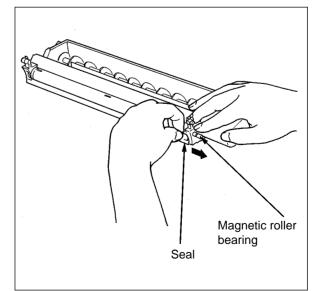
- Pour out the developer unit from the developer unit. (Refer to para. 10.3.3.)
- (2) Remove the front plate and the guide roller. (Refer to 10.3.4 Para. Front side.)
- (3) Remove the adjustment plate, rear plate and guide roller. (Refer to 10.3.4 Para. Rear side.)
- (4) Remove the leveler (2 adjustment screws, 2 coil springs and 2 plate springs).



(5) Remove the sleeve drive pulley, gear and belt.

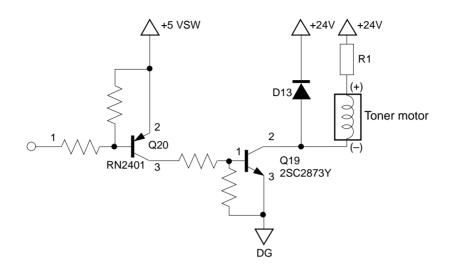


- (6) Peel off the seal on the front and take out the magnetic roller bearing. After removing the magnetic roller from the frame slit, move the magnetic roller in the direction of the arrow and take it out toward you.
- **Note:** After reassembly, the doctor-to-sleeve gap and the pole position should be adjusted.



10.4 Brush Motor Drive (M9)

The toner motor is provided to supply toner to the developer unit. The toner motor is driven by 2SC2873Y (Logic PC board: Q19).



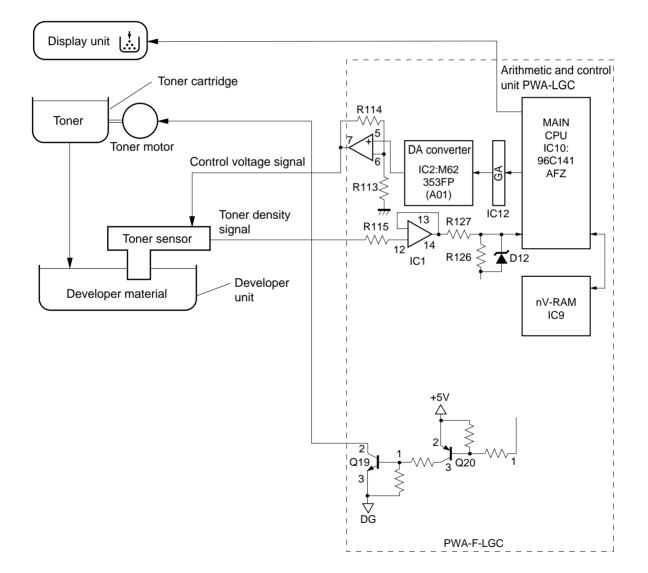
The (+) and (-) terminals of the motor winding is connected to +24V and pin 2 of Q19, respectively.

- When pin 1 of Q20 becomes "L", pin 2 of Q19 also becomes "L".
- A collector current flows from the +24V supply through the motor winding causing the motor to rotate.
- When pin 1 of Q20 becomes "H", pin 2 of Q19 also becomes "H", causing the current flowing through the motor winding to flow to the +24V supply through D13.→The current decreases with a time constant determined by the inductance and resistance of the winding→causing the motor to stop.

10.5 Auto-Toner Sensor Circuit

Brief description

- Functions of auto-toner circuit:
 - Detects density of toner in developer material.
 - ~ Density drops toner supply
 - Detects that toner in toner cartridge has been used up (toner empty).
- Configuration of auto-toner circuit
 - Auto-sensor: Detects toner density.
 - Control section: Control to maintain toner in developer at a constant specific density.
 - Toner motor: Replenishes the toner in the developer unit.
 - Display unit: Displays toner-empty status.



Operation of auto-toner sensor

- (1) Functions of auto-toner sensor
 - (A) Initialization adjustment function:
 - When new settings are entered or when developer is replaced. -

Automatic or semi-automatic adjustment is made so that the output of the auto-toner sensor will be 2.3 - 2.5 V (input of IC8) against the toner density of the new developer material.

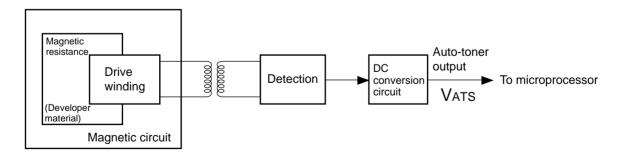
- (B) Toner density stabilization function:
 - During copying operation -
 - Toner consumption → toner density decreases → auto-toner sensor output changes are detected → toner motor is driven → toner is supplied to developer unit from toner cartridge.
 - ~ The toner density is maintained at a constant level.
- © Toner-empty detection and release function:
 - Detects toner-empty state inside toner cartridge
 - ~ Drives toner motor \rightarrow auto-toner sensor output is not changed \rightarrow toner density does not change \rightarrow judges that there is no toner (toner empty)
 - Release of toner-empty state
 - Toner cartridge replacement → drives toner motor → auto-toner sensor output changes → toner density returns to normal value → toner-empty state is released.

(2) Operation of auto-toner sensor

The auto-toner sensor is composed of the following circuits:

- Drive winding: Magnetic head which receives a high-frequency magnetic field (primary side). When placed in developer material, it forms magnetic circuit.
- Detection winding: Receives the changes in magnetic resistance of the developer material via a magnetic circuit (secondary side).
- DC conversion circuit: Converts the high-frequency output emitted from the detection winding to a DC signal.

Auto-toner output VATS



- When the toner density is low -

The toner amount in the developer material is less than the required level in comparison with the iron powder (carrier).

→ Magnetic reluctance: Small → detection output: Large → Auto-toner output VATS: Large

– When the toner density is high –

The toner amount in the developer material is more than the required level in comparison with the iron powder (carrier).

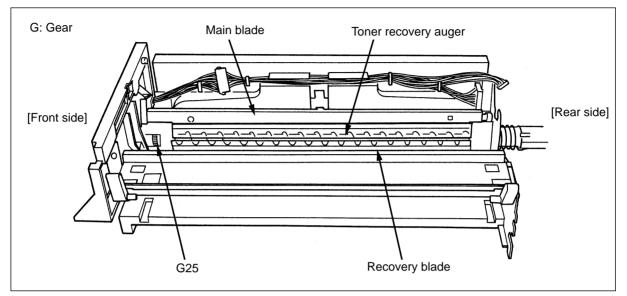
→ Magnetic reluctance: Large → detection output: Small → auto-toner output V: Small

 DC voltage corresponding to toner density in the developer material = auto-toner output VATS.

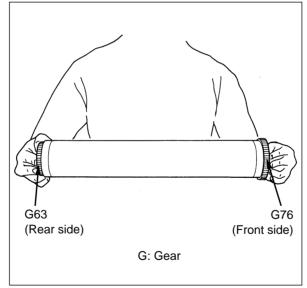
11. CLEANER UNIT (Shares Part of the Process Unit)

11.1 Construction

The cleaner unit consists of the main blade, recovery blade, toner recovery auger, toner bag, etc. (For the main charger, LED erasing array, discharge lamp, etc., refer to Chapter 9.)



View with the drum, main charger unit and developer unit removed



View with the drum removed

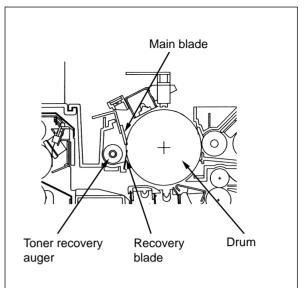
11.2 Explanation of Functions

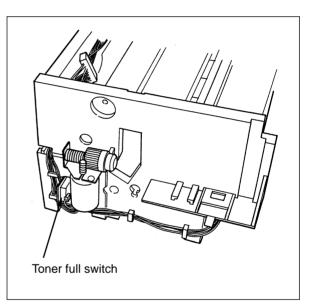
• Main blade

Scrapes the drum surface to remove the residual toner. The main blade is pressed on the drum with a fixed pressure by the pressure spring.

- Recovery blade
 Collects the toner scraped off by the main blade.
- Toner recovery auger
 Transports the toner scraped off to the toner bag on the rear side.
- Toner full switch

When the toner bag becomes full of recovered toner, the toner recovery auger is forced to the front, causing the toner full switch (S10) to be turned on.

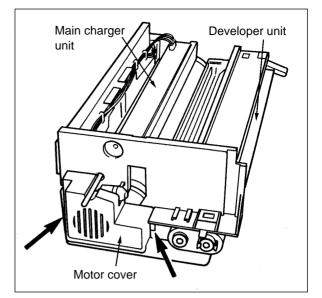




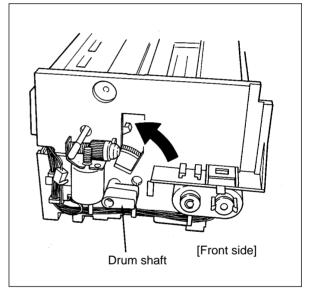
11.3 Disassembly and Replacement

11.3.1 Cleaner unit

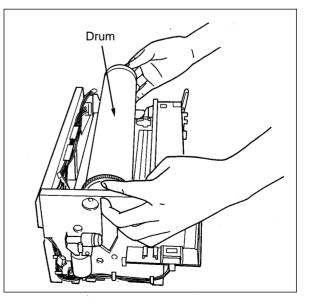
- (1) Remove the process unit. Refer to para. 9.3.1.
- (2) Remove the drum (when it is to be replaced).
 - Remove the developer unit.
 - Remove the main charger unit.
 - Disengage the two claws to remove the motor cover.



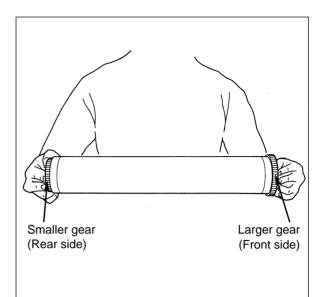
• Unlock the drum shaft lock (by rotating it in the direction of the arrow) and then pull the shaft out from the front.



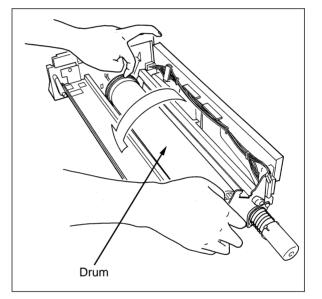
 When removing the drum, place your hands on the sides of the drum, as shown in the figure on the right and take it out carefully.



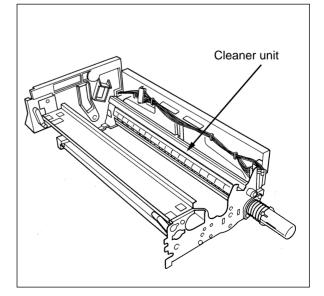
Notes: 1. When setting the drum in the process unit, its smaller drive gear should be on the rear side.



2. After inserting the drum shaft, apply patting powder on the entire surface of the drum and rotate the drum toward you.

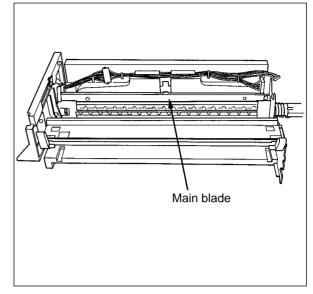


The figure on the right shows the cleaner unit after the developer unit, main charger unit and drum are removed from the process unit.

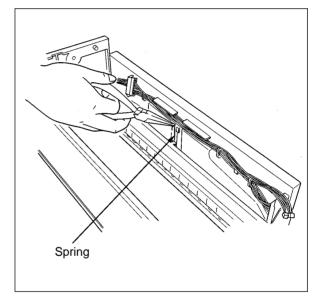


11.3.2 Main blade

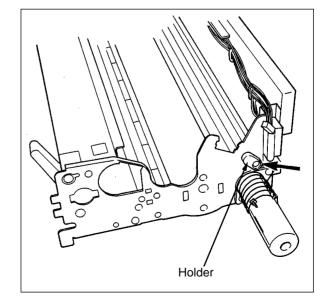
(1) Remove the developer unit, main charger unit and drum.



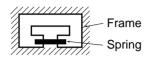
(2) Remove the spring.



- (3) Remove the holder on the rear (1 screw).
- (4) Remove the blade.



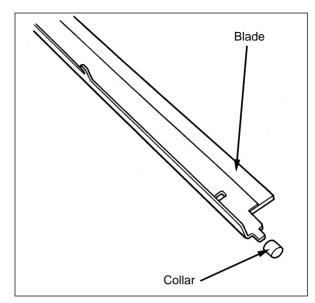
- (5) Remove the collar on each side of the blade and install them to the new blade.
- Notes: 1. During reassembly, attach the spring securely. (Make sure that the frame side should look as shown below.)

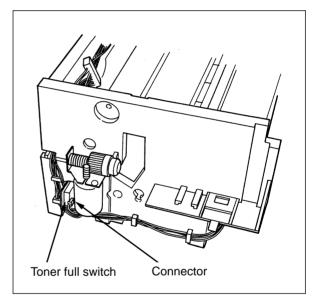


2. After installing the drum, apply patting power to the drum and rotate it. Refer to Sec. 11.3.1.



- (1) Disconnect a connector.
- (2) Remove the switch.

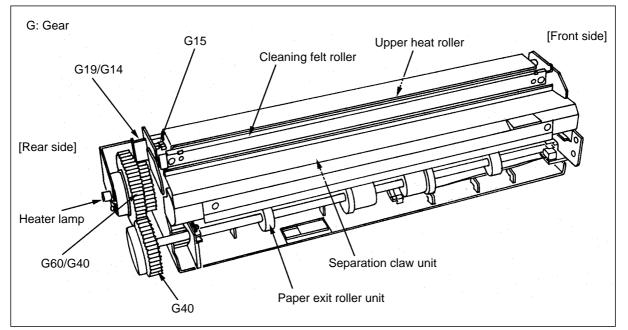




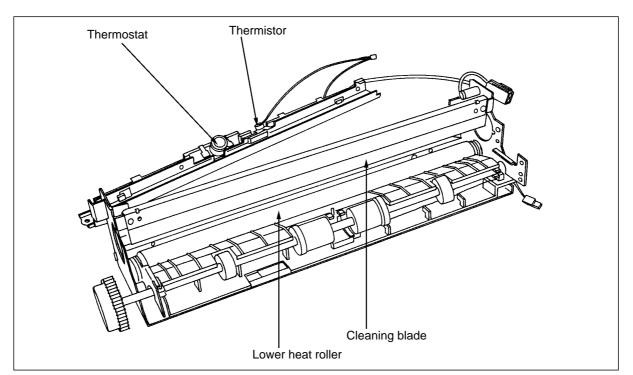
12. FUSER AND PAPER EXIT SECTION

12.1 Construction

This section consists of the uppet heat roller, cleaning felt roller, paper-exit roller unit, separation claw unit, thermistor, thermostat, lower heat roller, cleaning blade, heater lamp, etc.

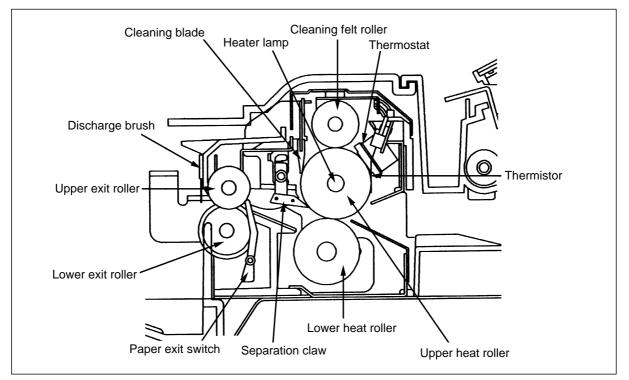


View with the fuser guard removed



View with the upper heat roller removed

12.2 Explanation of Operation



A. Fuser unit

This unit applies heat and pressure to the copy paper separated and transported from the drum to fix the toner image to the paper. The upper and lower rollers are rotated under a fixed pressure (provided by spring force) by the drive from the main motor. The upper roller has a heater lamp inside it and is rotated by the drive from the main motor but the heater lamp does not rotate.

Both the upper and lower rollers are always pressed against each other by spring force while the upper unit is closed. But when the upper unit is raised, they are released from the pressure.

The copy paper which has finished being fixed is separated smoothly from the upper heat roller with the aid of the separation claws. The temperature detection section functions to control the temperature of the upper roller (by means of a thermistor) and when it detects an abnormally high temperature, the power supply to the heater lamp is shut off (by means of a thermostat).

B. Paper exit section

The upper and lower exit rollers are rotated through gears by the drive from the fuser unit. The copy paper which has finished the fixing process is smoothly exited onto the copy tray through the upper and lower exit rollers.

The paper exit switch functions to detect whether or not the copy paper is properly exited onto the copy tray.

12.3 Disassembly and Replacement

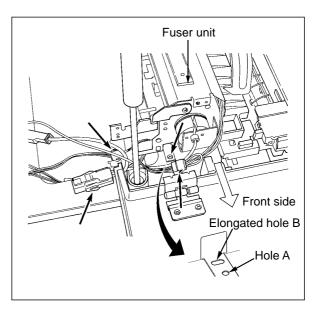
12.3.1 Fuser unit

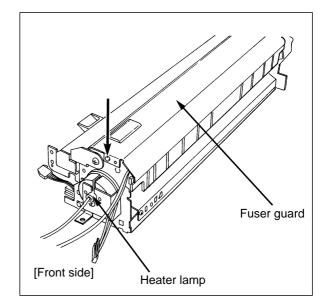
- (1) Remove the left side cover (lower) (2 screws).
- (2) Remove the inner cover (lower left) (1 screw).
- (3) Remove one screw and disconnect three connectors.
- (4) Pull out the fuser unit toward the front.
- Note: The screw holding the fuser unit is tightened at the hole A at the time of shipping from the factory.

However, when tilting the fuser unit in order to correct the inclination of the straight image, retighten the screw at the elongated hole B.

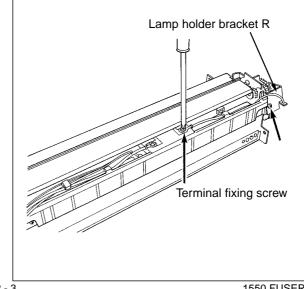
12.3.2 Heater lamp

- (1) Remove the fuser unit.
- (2) Remove the fuser guard (1 screw).



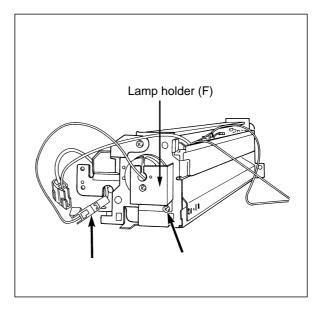


- (3) Remove the screw fastening the terminal on the rear.
- (4) Remove the lamp holder bracket (R) (1 screw).



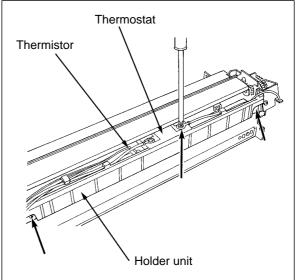
Oct. 1995 © TOSHIBA

- (5) Disconnect one connector and remove one screw to take out the lamp holder (F).
- **Notes:** 1. When replacing the lamp, don't touch it with a bare hand.
 - 2. Be careful so that the Toshiba mark is on the front side.



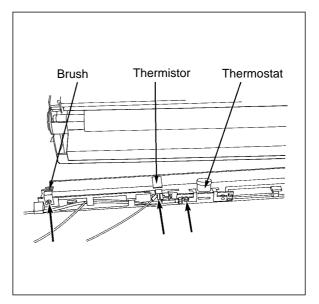
12.3.3 Thermostat, thermistor and brush

- (1) Remove the fuser unit.
- (2) Remove the fuser guard.
- (3) Remove the rear screw of the thermostat.
- (4) Remove the holder unit (2 screws).





- Remove one screw to take it out.
- Thermistor:
- Remove one screw to take it out. Brush:
- Remove one screw to take it out.



12.3.4 Cleaning felt roller and cleaning blade

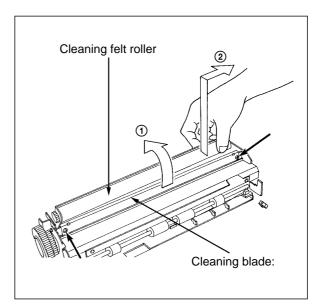
- (1) Remove the fuser unit.
- (2) Remove the fuser guard.

Cleaning felt roller:

 Lifting the front side, take out the whole roller unit upward (①→②).

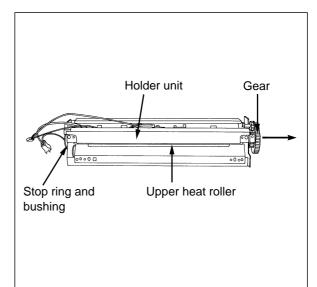
Cleaning blade:

• Remove two screws to take out the roller.



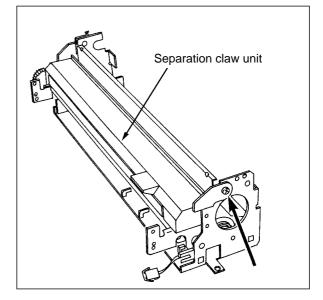
12.3.5 Upper heat roller

- (1) Take out the heater lamp.
- (2) Remove the holder unit (2 screws).
- (3) Remove the stop ring and bushing on the front and then pull out the roller along with its gear toward the rear.
- Note: While replacing the roller, be careful not to damage the roller surface with metal-plate edges or be careful not to deform or damage the separation claws.

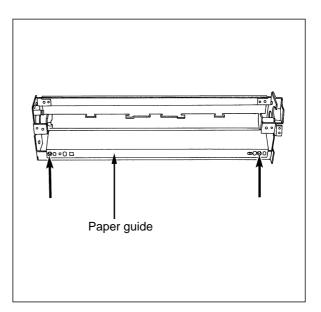


12.3.6 Lower heat roller

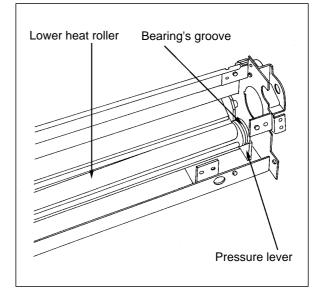
- (1) Remove the upper heat roller.
- (2) Remove the separation-claw unit (1 screw).



(3) Remove the paper guide (2 screws).

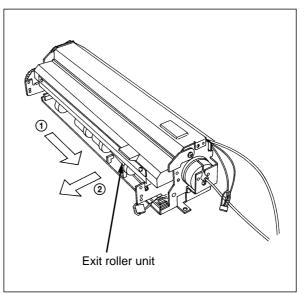


- (4) Placing your finger tip on each side of the roller, take out the roller along with the bearings upward.
- **Note:** After setting the lower heat roller in the machine, check to make sure that the pressure levers are fitted in the bearing grooves (at the front and rear).



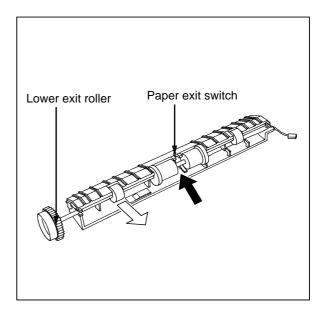
12.3.7 Lower exit roller and paper exit switch

- (1) Take out the fuser unit.
- (2) Slide the exit roller unit to the front and then take it out toward you (①→②).



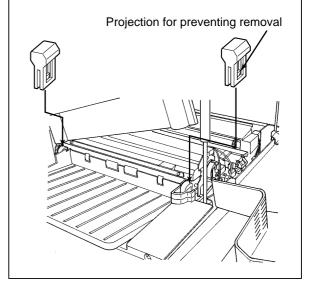
Lower exit roller:

- Take it out in the direction of the arrow. Paper exit switch:
- Remove one screw.



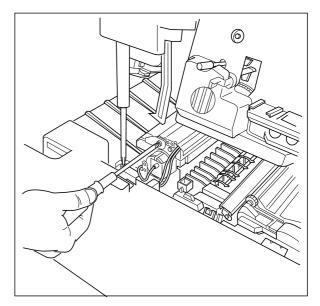
12.3.8 Lever caps

When installing the lever caps, pay attention to their orientations: The projection for preventing removal of each lever cap should face front side.

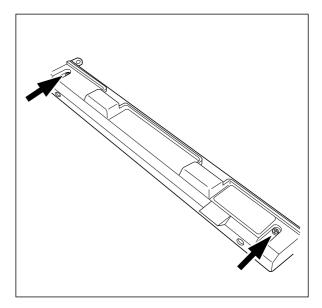


12.3.9 Separation claws (6)

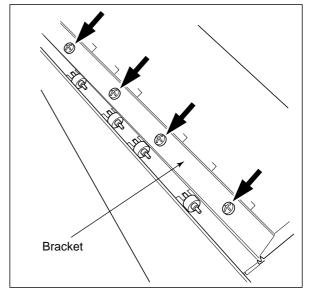
- (1) Remove the inner cover (lower left) (1 screw).
- (2) Remove the separation claw unit (1 screw).



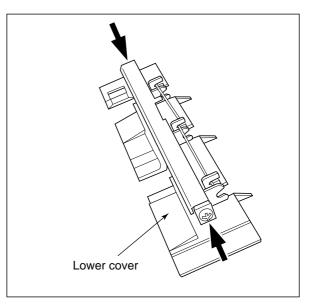
(3) Remove the upper cover of the separation claw unit (2 screws).



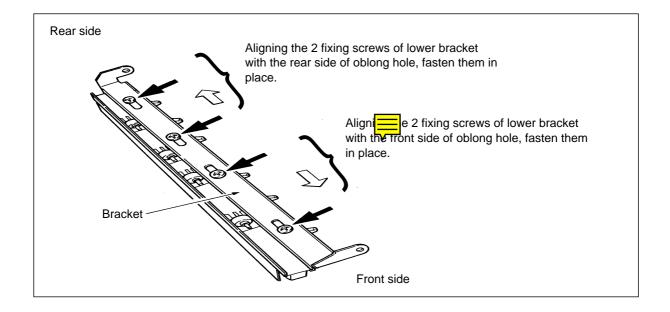
(4) Remove the bracket from the separation claw unit (4 screws).



(5) Remove the lower cover (4 screws). (1 unit : screws 2×2) Take off the six claws from the claw holder.



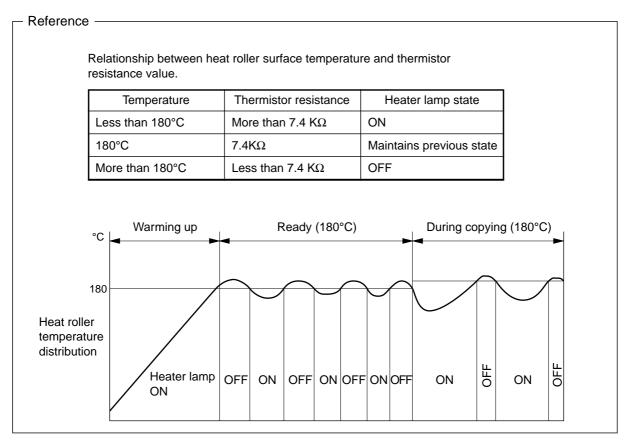
Note: When reinstalling the lower cover, refer to the lower figure.



12.4 Heater Control Circuit

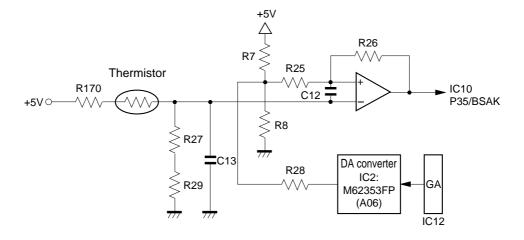
(1) Temperature detection unit

In order to control the temperature of the heat roller, the temperature detector unit detects the heatroller temperature with a thermistor and ON/OFF controls the heater lamp. Heat roller surface temperature 180°C (thermistor resistance value: 7.4 K Ω approx.)



(2) Thermistor disconnection detection

- Resistance value of thermistor changes→Input voltage changes
- Input voltage can be obtained by dividing the pressure of R170, thermistor, R27 and R29.
- The main CPU detects the changes and judges whether the thermistor is normal or not.

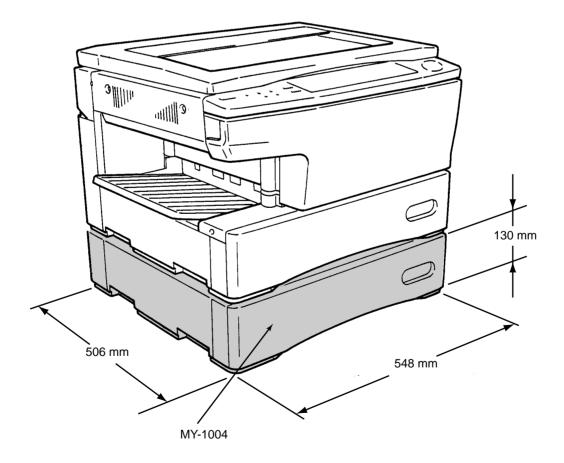


13. OPTIONAL PAPER FEEDING UNIT (MY-1004)

13.1 Specifications

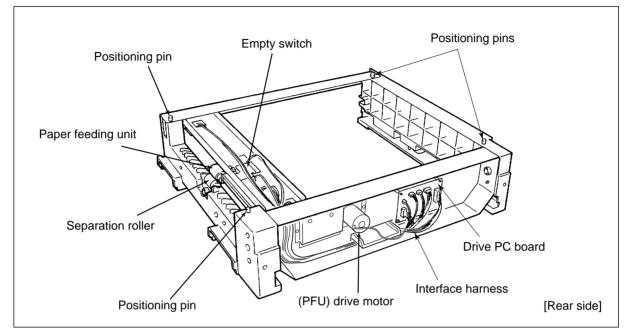
| Model Name | Paper feeding unit (PFU) MY-1004 | | |
|--------------------|---|--|--|
| Number of Cassette | One | | |
| Cassette Capacity | 500 sheets (50mm or less) | | |
| Paper Size | A3 – A5-R | | |
| | Ledger – Statement-R | | |
| Paper Weight | 64 – 80 g/m ² | | |
| | 17 – 22 lbs. | | |
| Dimensions | W 548 x D 506 x H 130 mm | | |
| | W 21.6" x D 19.9" x H 5.1" | | |
| Weight | 8 kg | | |
| | 18 lbs. | | |
| Power Source | Supplied from the copier | | |
| Factory-Set Size | A3 for Europe (User adjustable) | | |
| | Ledger for USA/Canada (Serviceman adjustable) | | |

Note: Specifications are subject to change without notice.

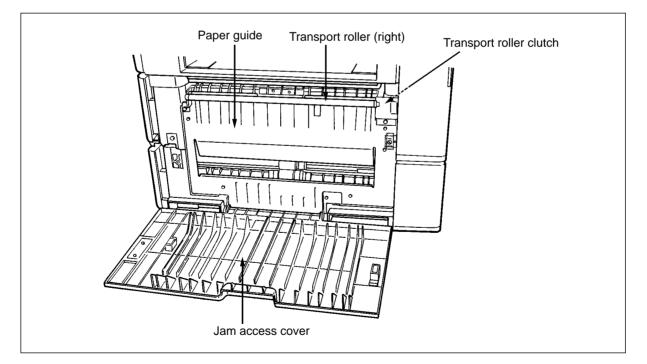


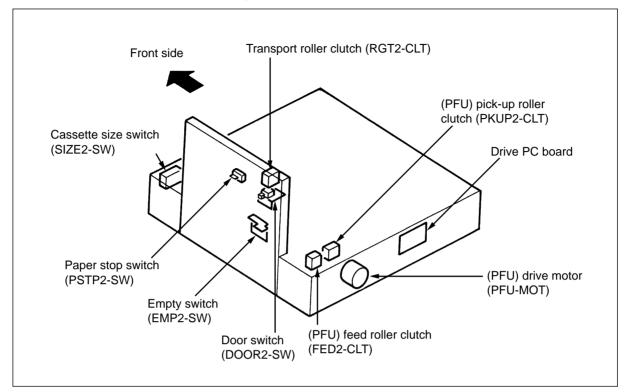
13.2 General Description

- 13.2.1 Front sectional view Refer to P2-1.
- 13.2.2 Rear side view Refer to P2-2.
- 13.2.3 Names of the main components



View with the rear cover and cassette removed





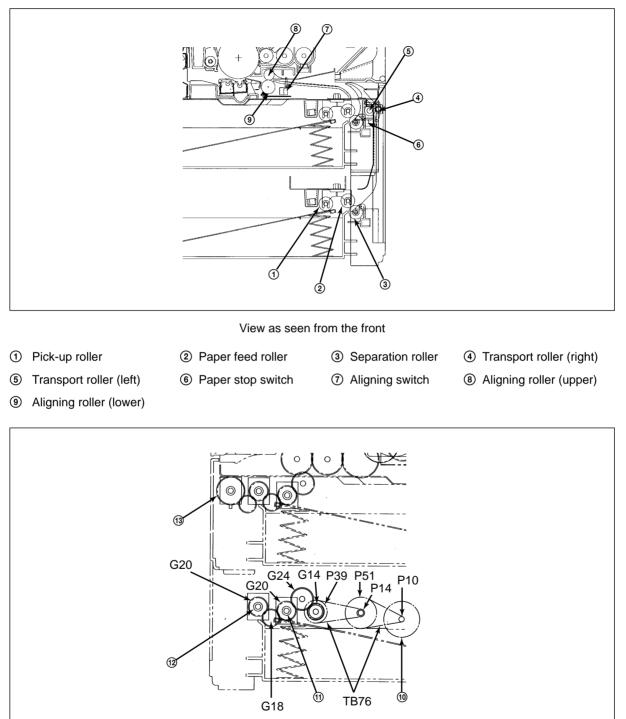
13.2.5 Symbols and functions of electrical parts

*Refer to SERVICE PARTS LIST MY-1004

| Symbol | Name | Function | Remarks | *Page/item No. | |
|------------|-------------------------------|---------------------------------------|-----------------|----------------|--|
| (M10) | PFU-MOT (Drive motor) | Drives the pick-up and feed | | P2, I18 | |
| | | rollers. | | | |
| CLT4 | RGT2-CLT | Controls the rotation of the | _ | P3, I5 | |
| | (Transport roller clutch) | transport roller. | | | |
| CLT6 | PKUP2-CLT | Controls the rotation of the | — | P2, I4 | |
| | (Pick-up roller clutch) | pick-up roller. | | | |
| CLT5 | FED2-CLT (Feed roller clutch) | Controls the rotation of feed roller. | _ | P2, I4 | |
| S15 | PSTP2-SW | Detects the paper fed from the | | P3, I7 | |
| | (Paper stop switch) | cassette. It also detects when | | | |
| | | the feed clutch is turned OFF. | | | |
| S16 | EMP2-SW (Empty switch) | Detects when the cassette runs | Reflective-type | P2, I16 | |
| | | out of paper. | photosensor | | |
| S17 | DOOR2-SW (Door switch) | Detects whether or not the | | P3, I13 | |
| | | cover is open. | | | |
| S18 | SIZE2-SW | Detects the cassette size or | | P2, I30 | |
| | (Cassette size switch) | whether the cassette is install- | | | |
| | | ed or removed. | | | |

13.3 Functions and Operation

13.3.1 Paper feeding operation



View as seen from the rear

1 Drive motor

① Pick-up roller clutch

12 Feed roller clutch

① Transport roller clutch

When the **PRINT** key is pressed, sheets of paper start being fed from the paper feeding unit (PFU) in the sequence described below:

(1) About 0.1 sec. later, the drive motor <u>M10</u> ⁽¹⁾ is energized, causing the pick-up roller ⁽¹⁾ and paper feed roller ⁽²⁾ to rotate. The pick-up roller is rotated through the pick-up roller clutch <u>CLT6</u> ⁽¹⁾. The paper feed roller is rotated through the feed roller clutch <u>CLT5</u> ⁽¹⁾ and the transport rollers are rotated through the transport roller clutch <u>CLT4</u> ⁽³⁾.

(The transport rollers are driven by copier's main motor).

- (2) The top sheet of paper in the cassette is fed out by the pick-up roller to the paper feed roller which separates the top sheet from other sheets if more than one sheet has been fed out and sends only the top sheet to the transport roller. When this sheet turns on the paper stop switch (a) located under the transport roller, the feed roller clutch (a), pick-up roller clutch (b) and drive motor are deenergized, causing the pick-up and paper feed rollers to stop.
- (3) At this time, if the copier's aligning switch ⑦ is off, the transport roller clutch maintains an on-status until this switch is turned on. But if the copier's aligning switch is on, the transport roller clutch is deenergized, csusing the rollers to stop.
- (4) When the copier's aligning roller is turned off, transport roller clutch is turned on, the rollers start rotating again. At this time, since the feed roller clutch (1) is off, only the transport roller is rotated, sending the sheet fed from the cassette into the copier.
- (5) After the sheet turns on the copier's aligning switch and is aligned by the copier's aligning rollers (and (a)), the transport roller clutch is deenergized, causing the rollers to stop.
- (6) After the first sheet's trailing edge has passed the paper stop switch (6) to turn it off, when the paper feeding unit (PFU) receives the next paper feed signal from the copier, the above sequence of operation will be repeated.

13.3.2 Detection and clearing of paper jams

 Within 1.238 sec. after a sheet of paper is fed, if its leading edge does not arrive at the paper stop switch (6), the jam detection device of the paper feeding unit (PFU) activates to turn off the drive motor (10), pick-up roller clutch (11) and feed roller clutch (12).

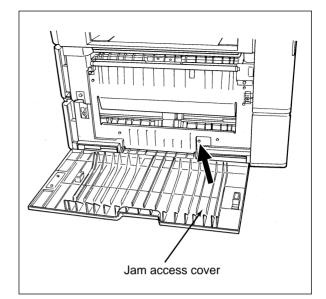
- (2) To clear the paper jam condition, you open the cover of the paper feeding unit (PFU), remove the jammed paper and close the cover. At this time, if the paper stop switch (6) continues to be turned on, PFU decides that paper still remains in it and does not clear the paper jam status.
- (3) During multicopying from the paper feeding unit (PFU), if a paper jam occurs inside the PFU, all the sheets of paper fed before the jammed sheet will be processed normally.

13.4 Disassembly and Replacement

13.4.1 Covers and paper guide

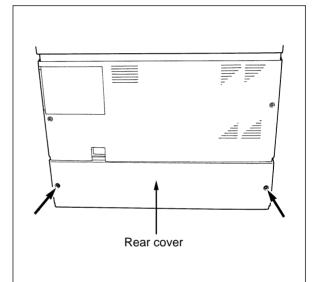
[A] Jam access cover

- (1) Open the jam access cover.
- (2) Loosen the screw and take out the cover.



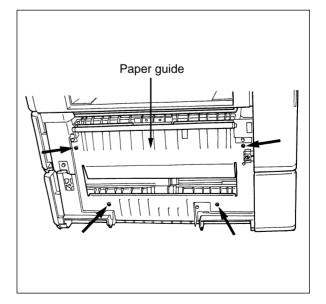
[B] Rear cover

(1) Remove two screws to take out the cover.

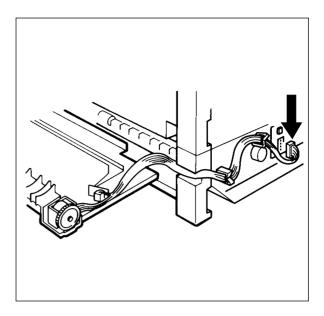


[C] Paper guide

- (1) Remove the jam access cover.
- (2) Remove four screws.

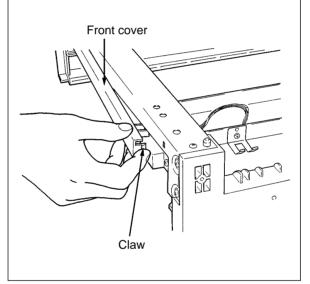


(3) Disconnect one connector to take out the guide.



[D] Front cover

- Remove the cassettes of both the copier and the paper feeding unit.
- (2) Unhook the right and left claws of the front cover.

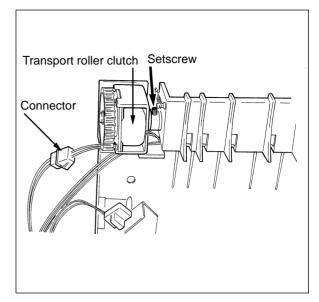


View with copier taken off

- 13.4.2 Transport rollers (right)/(left), paper stop switch, transport roller clutch and door switch
- (1) Remove the paper guide.

Transport roller clutch:

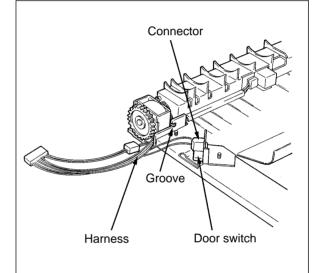
- (1) Disconnect one connector.
- (2) Loosen one setscrew.



- Notes: 1. When reassembling the clutch, fit the clutch's projection into the groove shown securely and fasten the set-screw.
 - 2. The clutch harness should be passed under the clutch as shown.

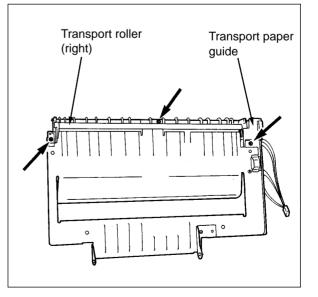
Door switch:

 Disconnect its connector, unhook its claws and the switch can be taken out.



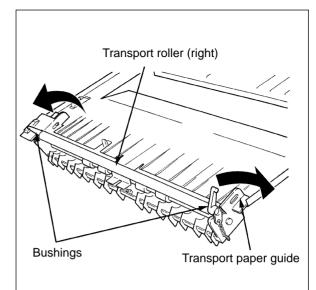
Transport rollers (right)/(left) and paper stop switch:

- (1) Remove the transport roller clutch.
- (2) Remove the transport paper guide (3 screws).

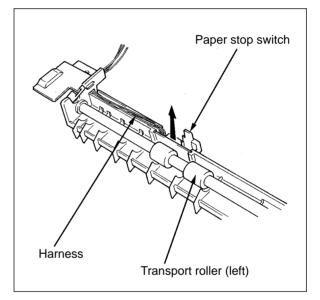


(3) While bending the transport guide in the direction of the arrow, remove the bushings from the frame

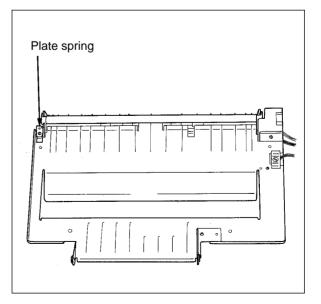
..... both front and rear, and the transport roller (right) can be taken out along with the bushings.



- (4) Take out the bushings and the <u>transport roller</u> (left).
- (5) Take out the <u>paper stop switch</u> along with the guide.
- **Notes:** 1. During reassembly, fit the switch harness into the groove securely.
 - 2. When reassembling the switch, pay attention to its orientation.



 When reinstalling the transport paper guide, make sure that the plate spring is in contact with the shaft of the transport roller (right) securely.

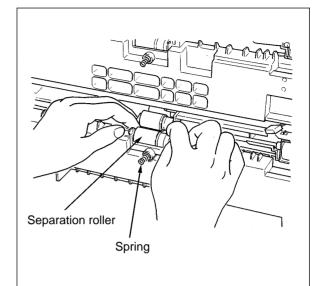


13.4.3 Separation, pick-up and feed rollers

- (1) Remove the cassette.
- (2) Remove the paper guide.

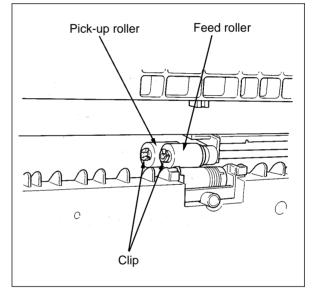
Separation roller:

(1) It can be taken out if you pull it toward you.



Pick-up and feed rollers:

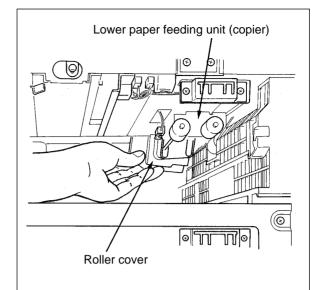
 Snap off the clips and slide out the pick-up roller from its shaft. The feed roller can be removed by the same procedure.



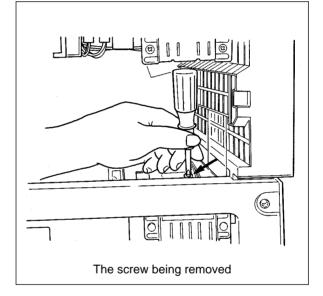
Note: The separation, pick-up and feed rollers are the same parts as used in the copier. Caution: During disassembly or reassembly, be careful not to lose the spring.

13.4.4 Lower paper feeding unit

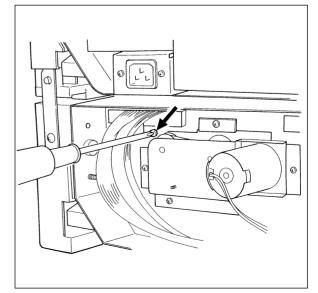
- (1) Remove the copier's cassette and the paper feeding unit's cassette.
- (2) Remove the roller cover (on the copier side) of the paper feeding unit.



(3) Remove one screw from the lower paper feeding unit.



- (4) Remove the feed roller.
- (5) Remove the rear cover.
- (6) Remove one screw and then take out the whole unit toward the front.
- **Note:** Since the disassembly and replacement procedures for the pick-up roller clutch, feed roller clutch and pick-up roller are the same as for those of the copier, refer to para. 8.3.2.

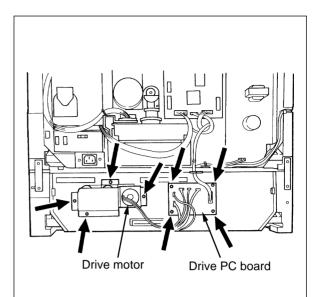


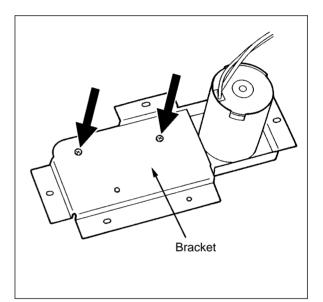
13.4.5 Drive motor and drive PC board

- (1) Remove the rear cover.
- Drive PC board:
- After disconnecting six connectors, remove the PC board from its four lock supports.

Drive motor:

- (1) Disconnect one connector from the drive PC board.
- (2) Remove four screws and take out the motor assembly.
- (3) Remove the bracket (2 screws).
- (4) Remove three screws.

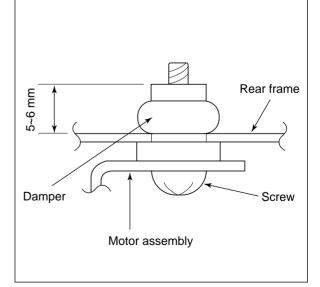




Note: When installing the motor assembly to the rear frame, take the following precaution.

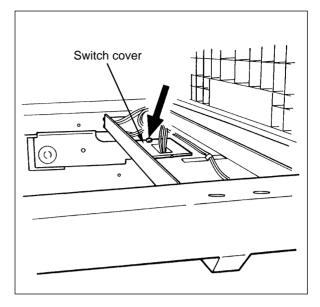
Tighten respective screws so that the front edge of the damper should be down by 5~6 mm from the frame surface.

(Overtightening can damage the damper.)

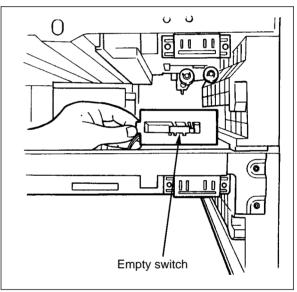


13.4.6 Empty switch

- Pull out the cassettes from both the copier and the paper feeding unit.
- (2) Remove one screw and take out the switch along with the cover.

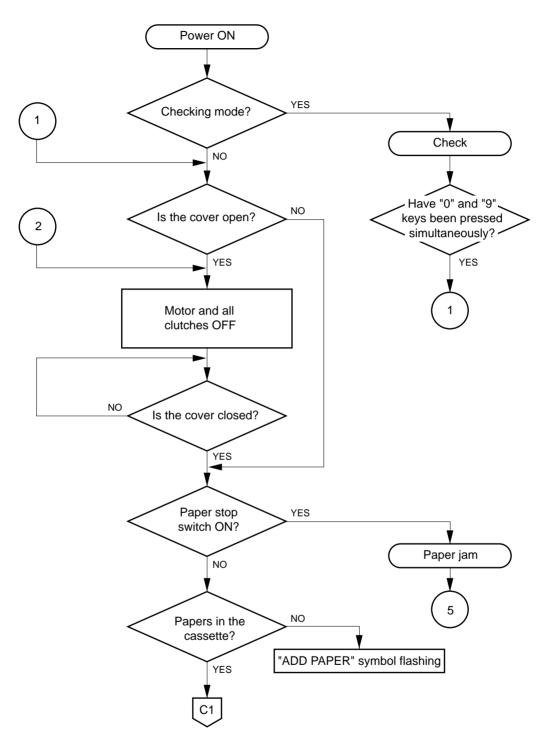


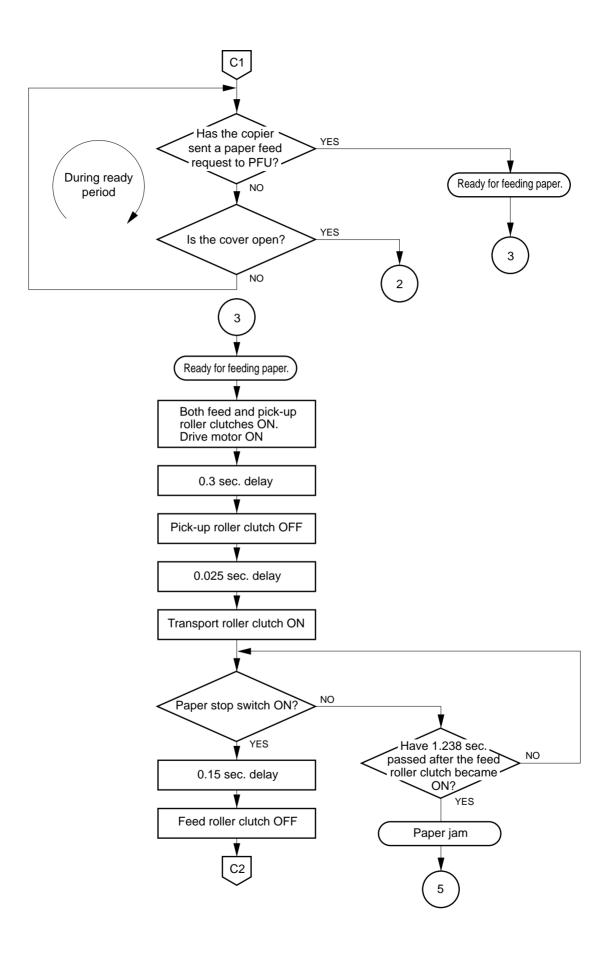
(3) Detach the switch from the cover.

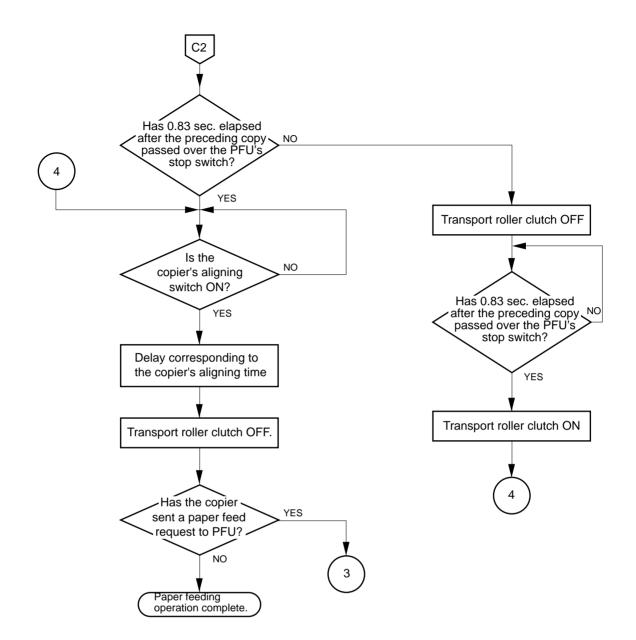


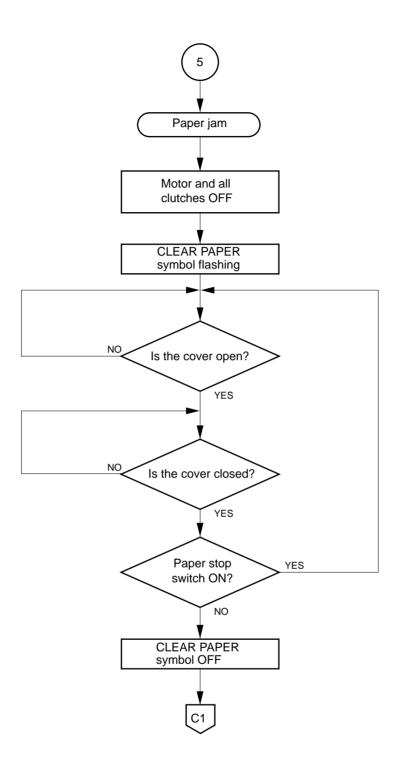
13.5 Flow Charts and Timing Charts

13.5.1 Flow chart



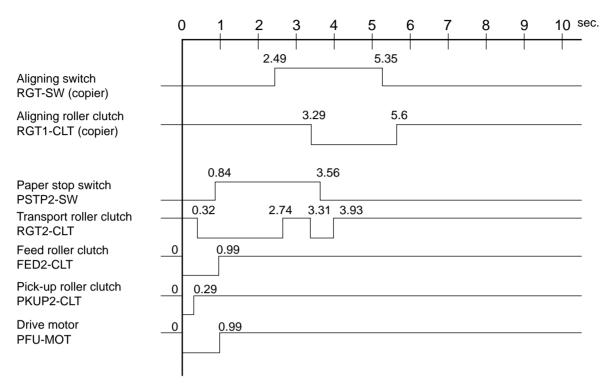




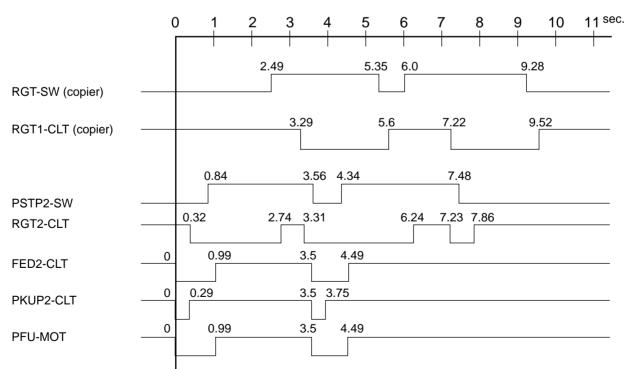


13.5.2 Timing chart

A4 lateral single-sheet copying (PFU)



A4 lateral two-sheets copying (PFU)



13.6 Explanation of Circuits

13.6.1 Interface signals

[A] Signals from the copier to the paper feeding unit (PFU):

(1) RGT-CLT2

Drives the transport roller clutch.

When the signal is "L", the clutch (RGT2-CLT) energizes.

(2) PKUP-CLT2

Drives the pick-up clutch.

When the signal is "L", the pick-up roller clutch (PKUP2-CLT) energizes.

(3) FED-CLT2

Drives the paper feed roller.

When the signal is "L", the clutch (FED2-CLT) energizes, causing the paper feed roller to start rotating.

(4) MOT-ON2

Rotates the drive motor.

When the signal is "L", the drive motor (PFU-MOT) starts rotating.

[B] Signals from the paper feeding unit (PFU) to the copier:

(1) CST2 (installation)

Tells the copier that PFU is installed. The signal becomes "L" with PFU installed.

(2) DR-SW2 (door switch)

Indicates whether or not the PFU's side cover is open. When the cover is closed, the door switch is turned on, causing the signal to become "L".

(3) FED-SW2 (paper stop switch)

Indicates the status of the PFU's paper stop switch. When there is paper on the paper stop switch, it is turned on, causing the signal to become "H".

(4) EMP-SW2 (paper empty switch)

Indicates whether or not there is paper in the PFU's cassette. When there is paper, the paper empty switch is turned on, causing the signal to become "L".

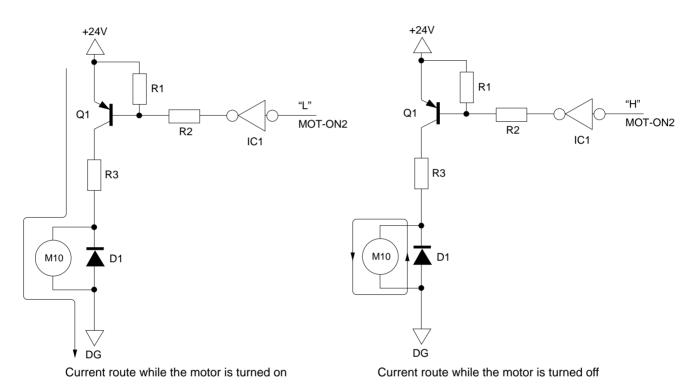
(5) SIZ13 - 10 (Paper size switches)

Indicate the size of the cassette. When the size mark plate pushes the switches, the corresponding paper size signal becomes "L".

13.6.2 Driving of the drive motor

The drive motor M10 (PFU-MOT) is driven by transistor Q1 as described below:

When the signal MOT-ON2^{*1} from the copier becomes "L", an "L" voltage is applied to the base of Q1, Q1 is turned on, causing current to flow from +24V \rightarrow Q1's emitter \rightarrow Q1's collector \rightarrow R3 \rightarrow DG. This will cause the drive motor M10 (PFU-MOT) to rotate. When the MOT-ON2 signal becomes "H", Q1 is turned off, shutting off the above current route. But while the motor continues to rotate due to its inertia, current also tries to continue to flow, causing a voltage to be generated between the input and output terminals of the motor. Since this voltage is applied between the anode and cathode of D1, the inverse electromotive voltage occurring in the motor is short-circuited and restricted.



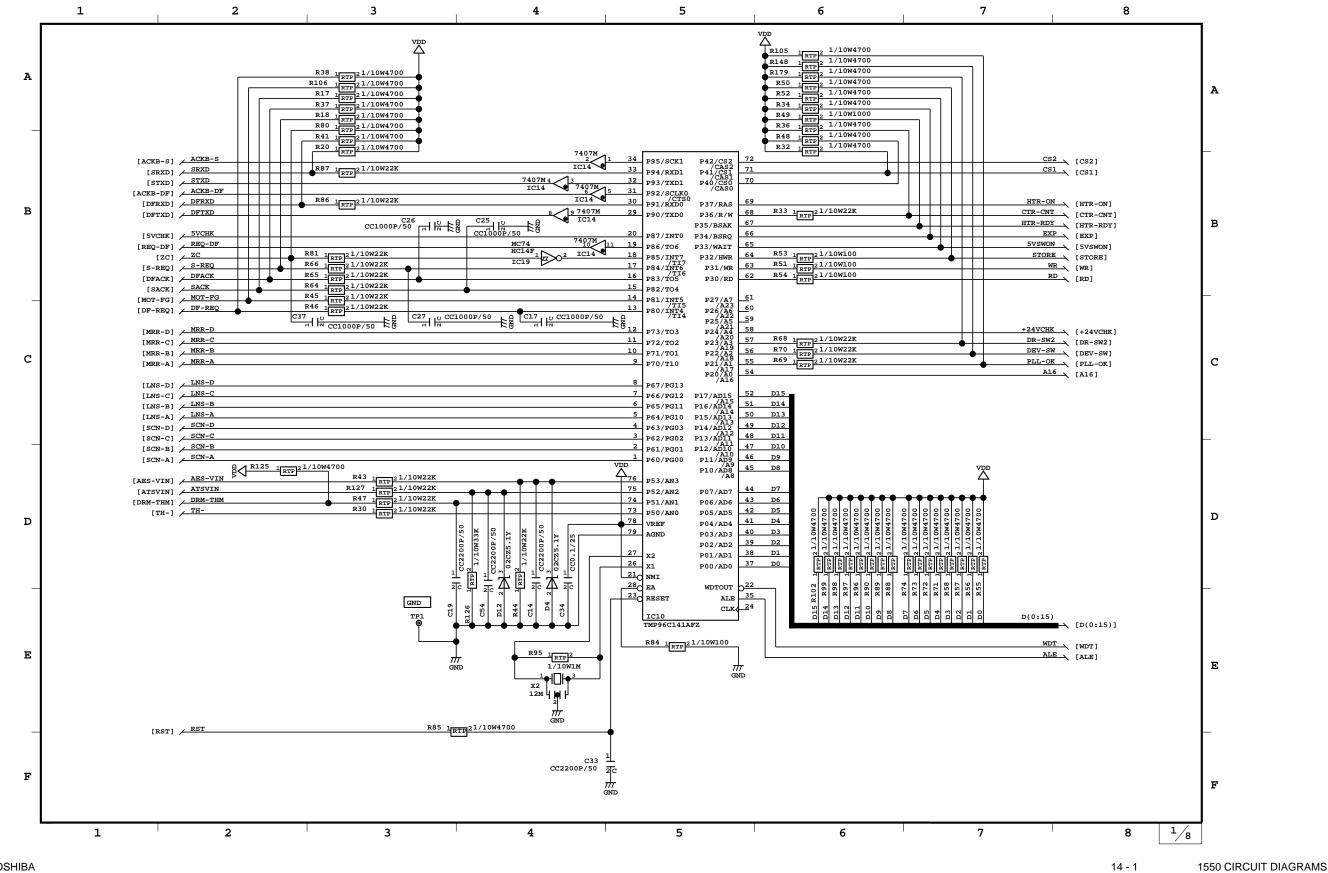
*1: The MOT-ON2 signal is to cause the motor (PFU-MOT) M10 to rotate and is supplied by the copier. When this signal becomes "L", the motor starts rotating.

14. ELECTRIC CIRCUIT DIAGRAM



How to search for where a signal in a circuit diagram has jumped to.

14.1 Logic Circuit (PWA-F-LGC) 1/8

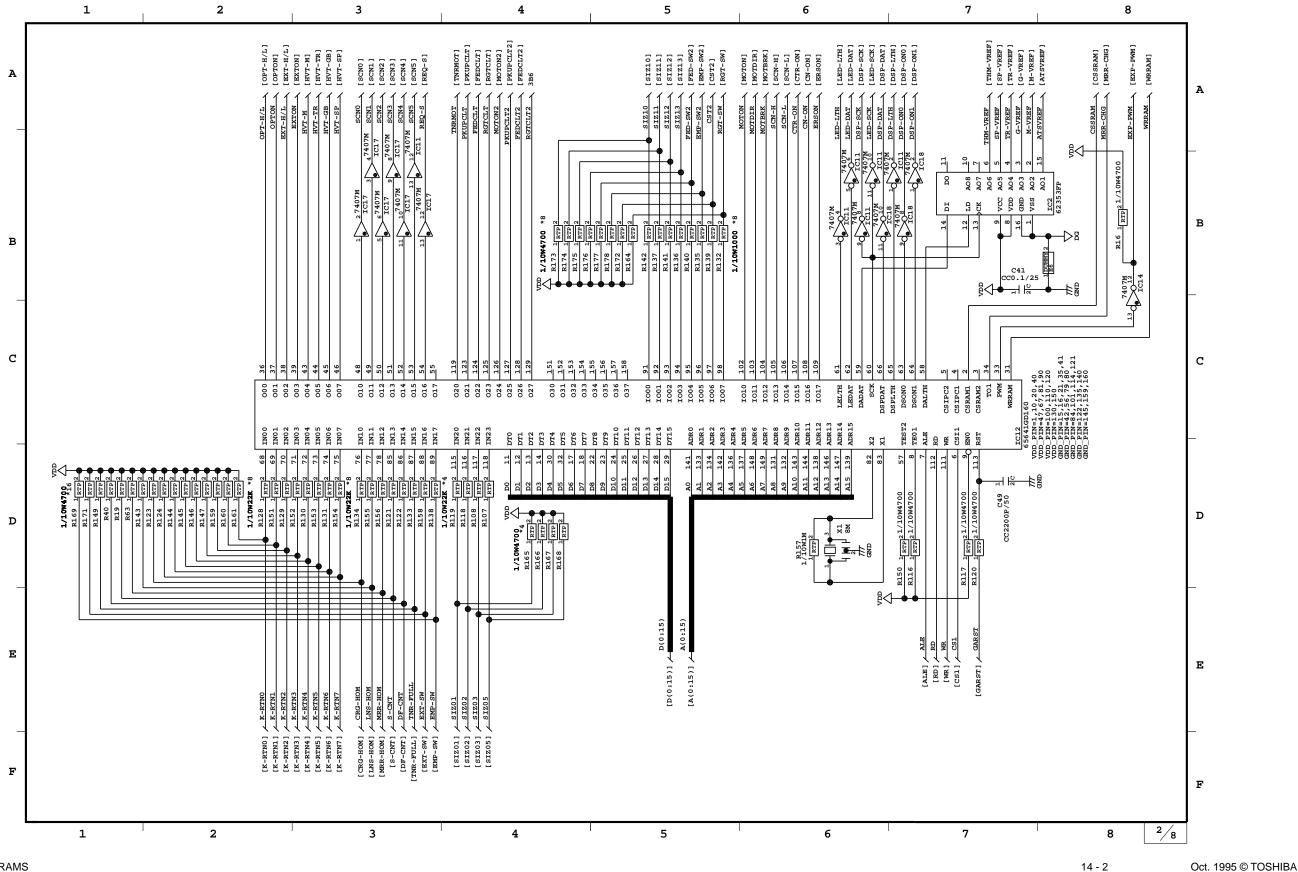


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Logic Circuit (PWA-F-LGC) 2/8



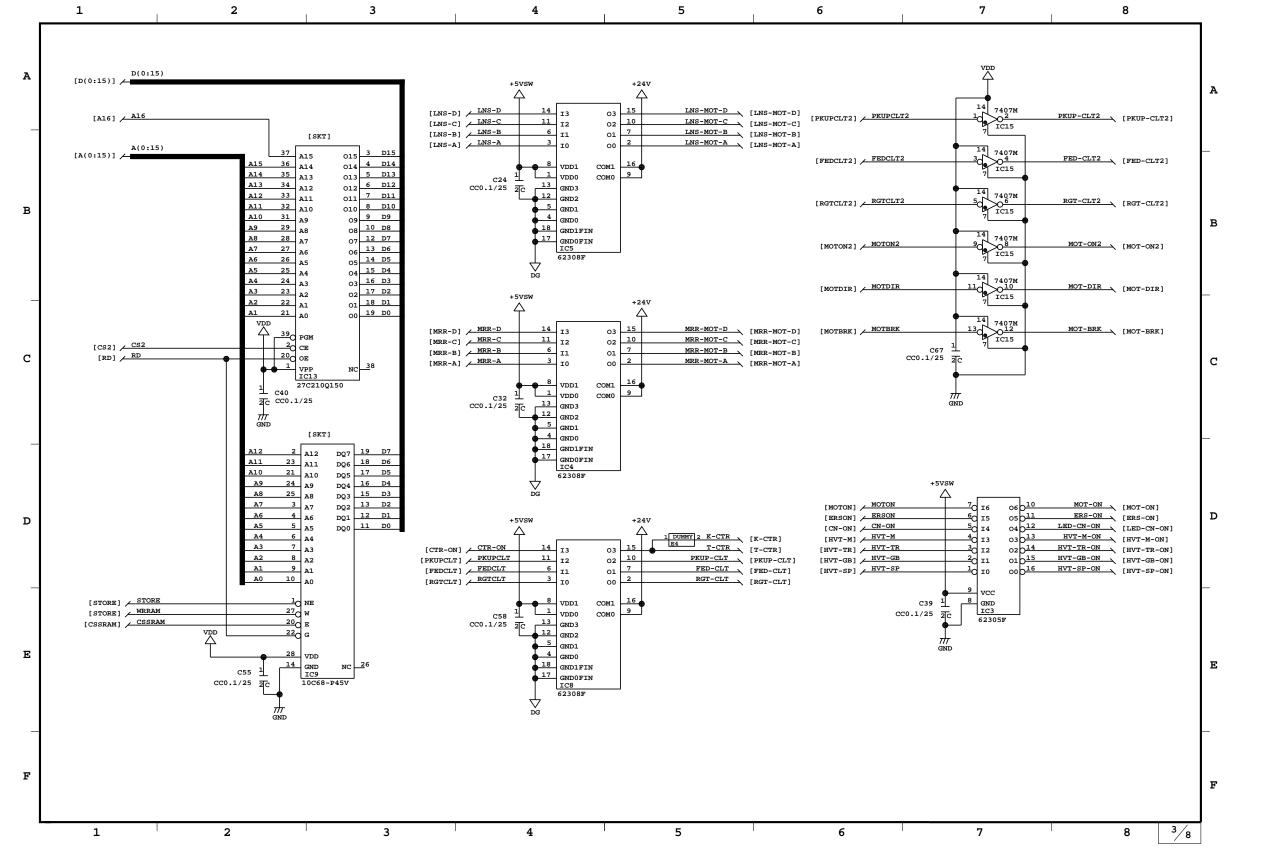
How to search for where a signal in a circuit diagram has jumped to.



Logic Circuit (PWA-F-LGC) 3/8



How to search for where a signal in a circuit diagram has jumped to.



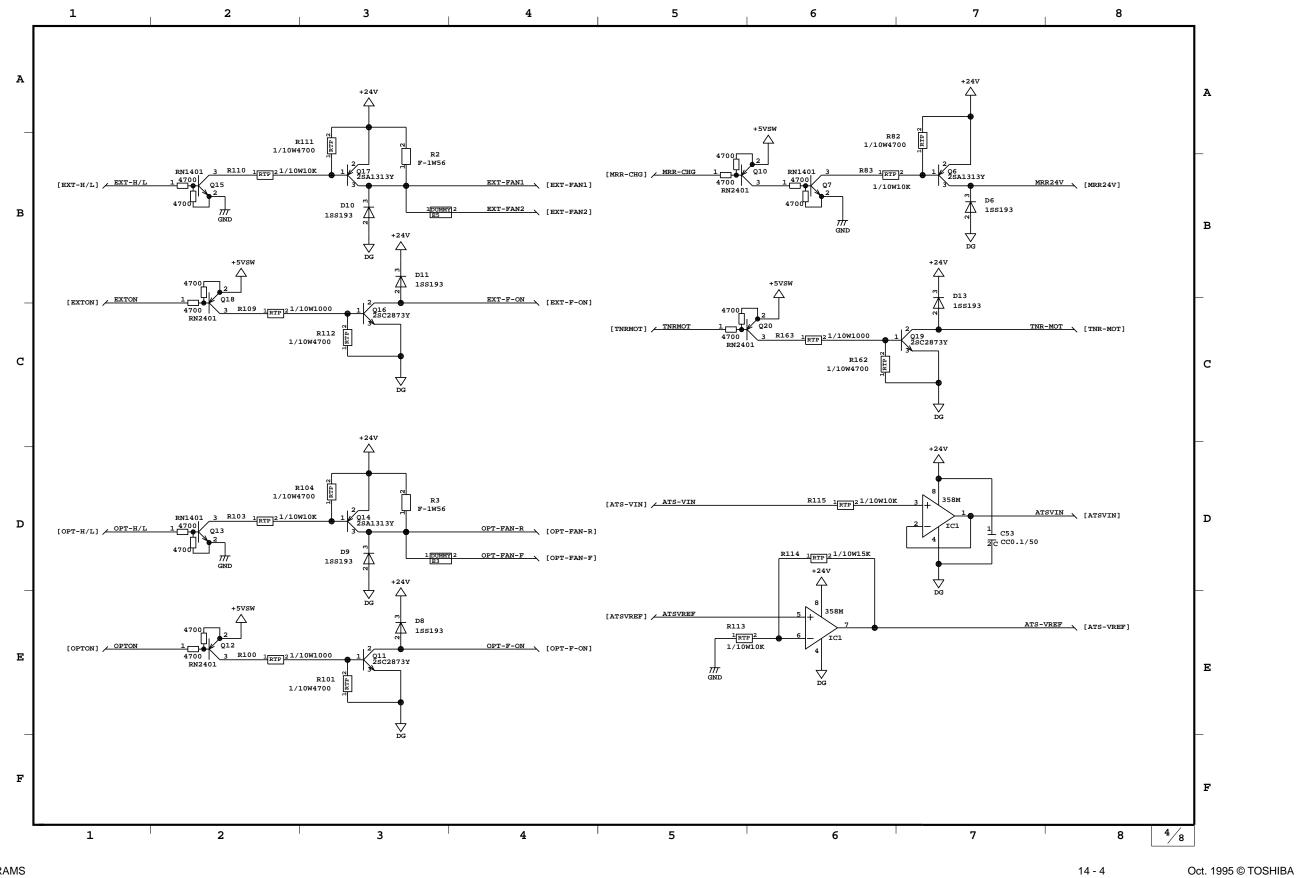
14 - 3

1550 CIRCUIT DIAGRAMS

Logic Circuit (PWA-F-LGC) 4/8



How to search for where a signal in a circuit diagram has jumped to.

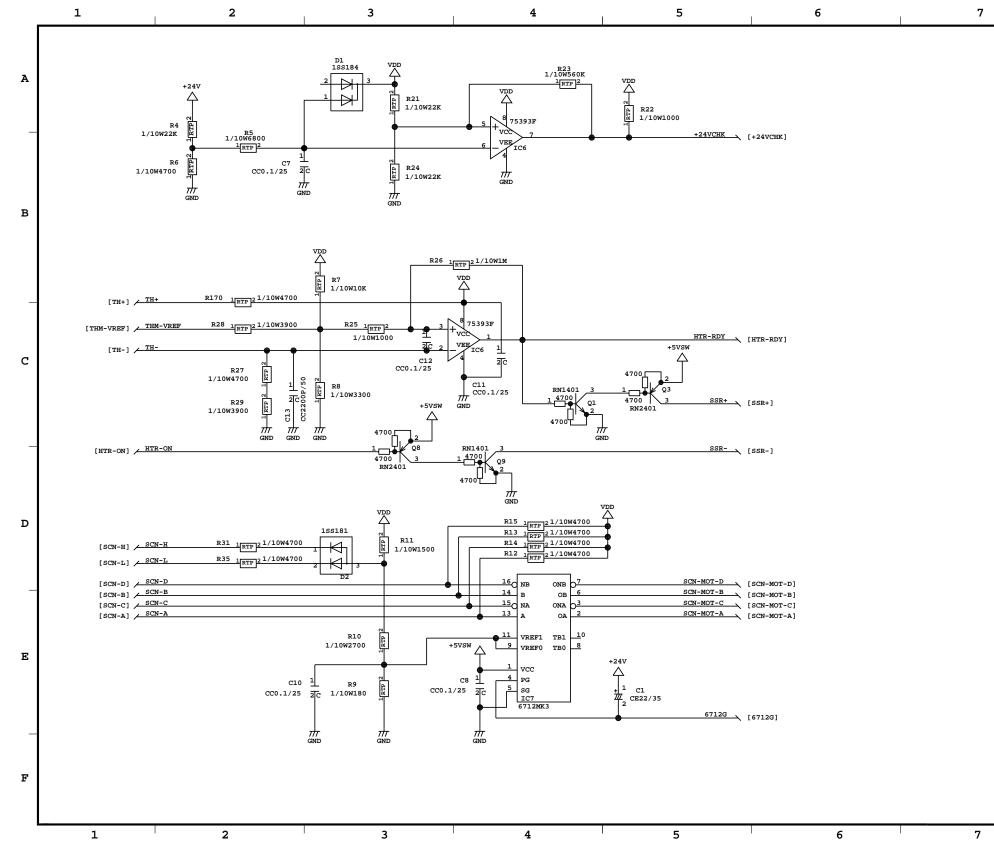


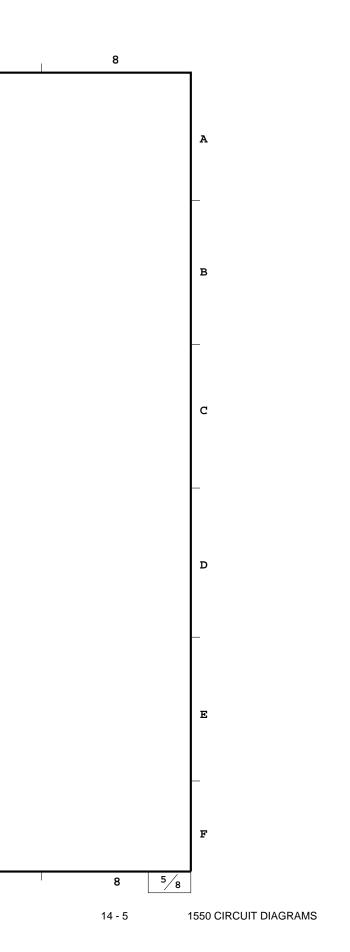
1550 CIRCUIT DIAGRAMS

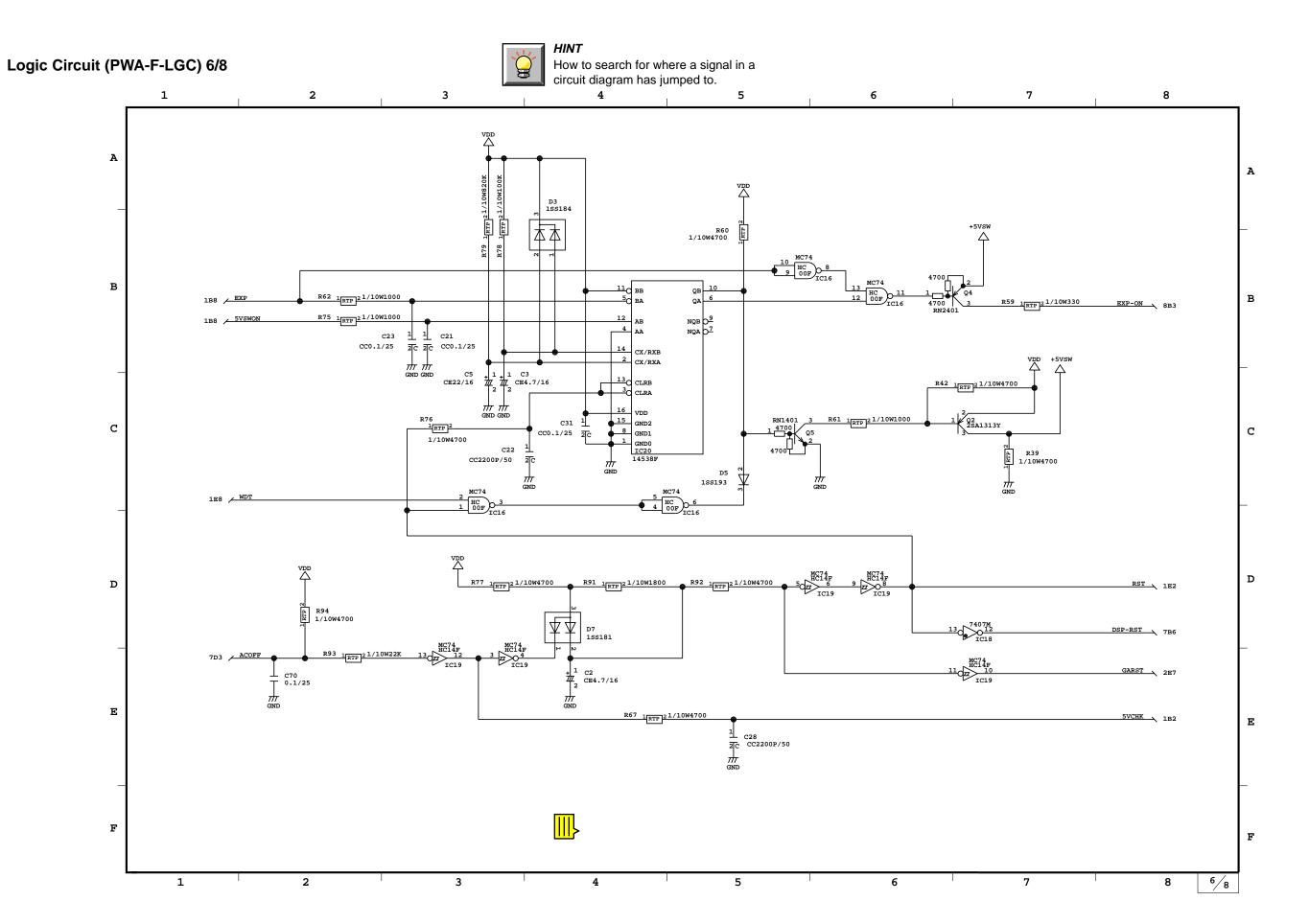
Logic Circuit (PWA-F-LGC) 5/8



How to search for where a signal in a circuit diagram has jumped to.







1550 CIRCUIT DIAGRAMS

14 - 6 ®

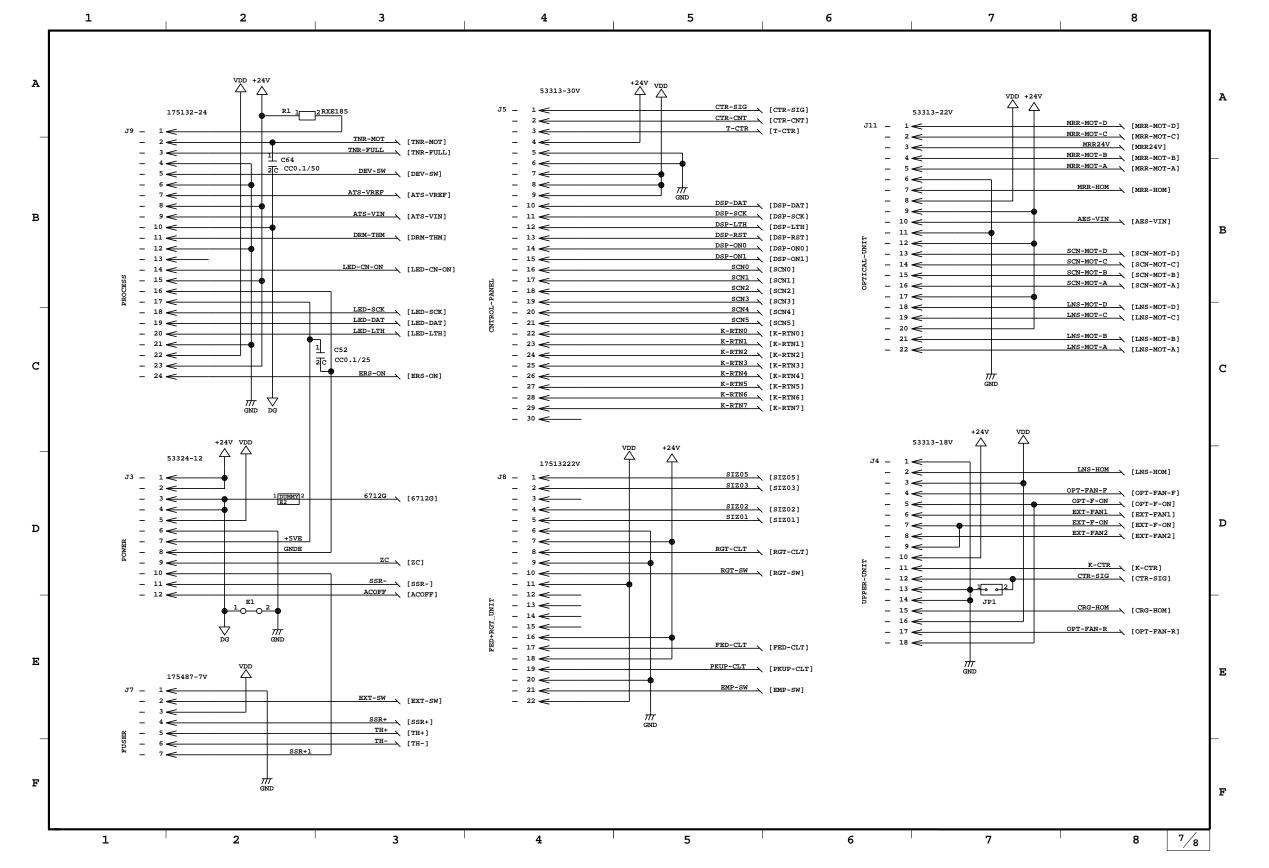
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Logic Circuit (PWA-F-LGC) 7/8



How to search for where a signal in a circuit diagram has jumped to.



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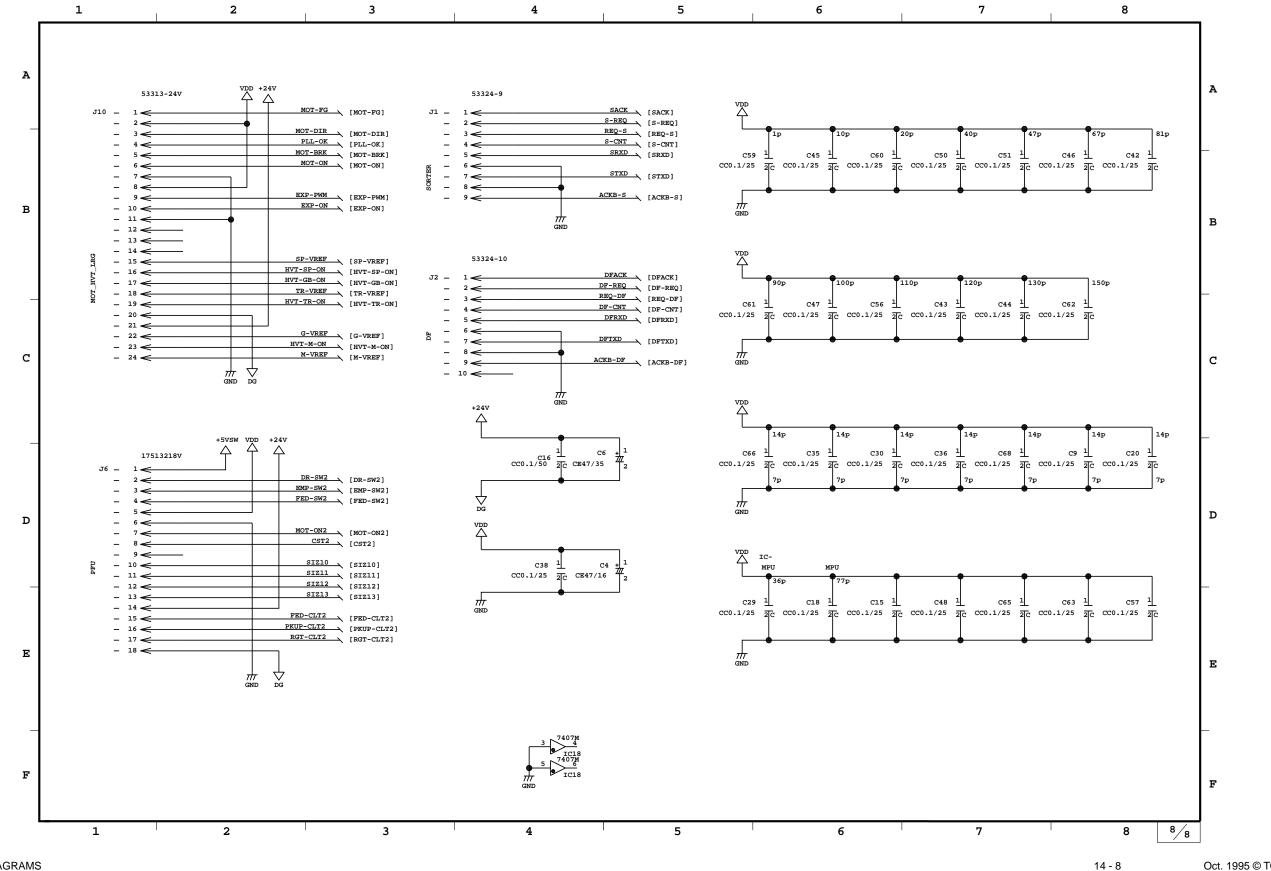
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1550 CIRCUIT DIAGRAMS

Logic Circuit (PWA-F-LGC) 8/8



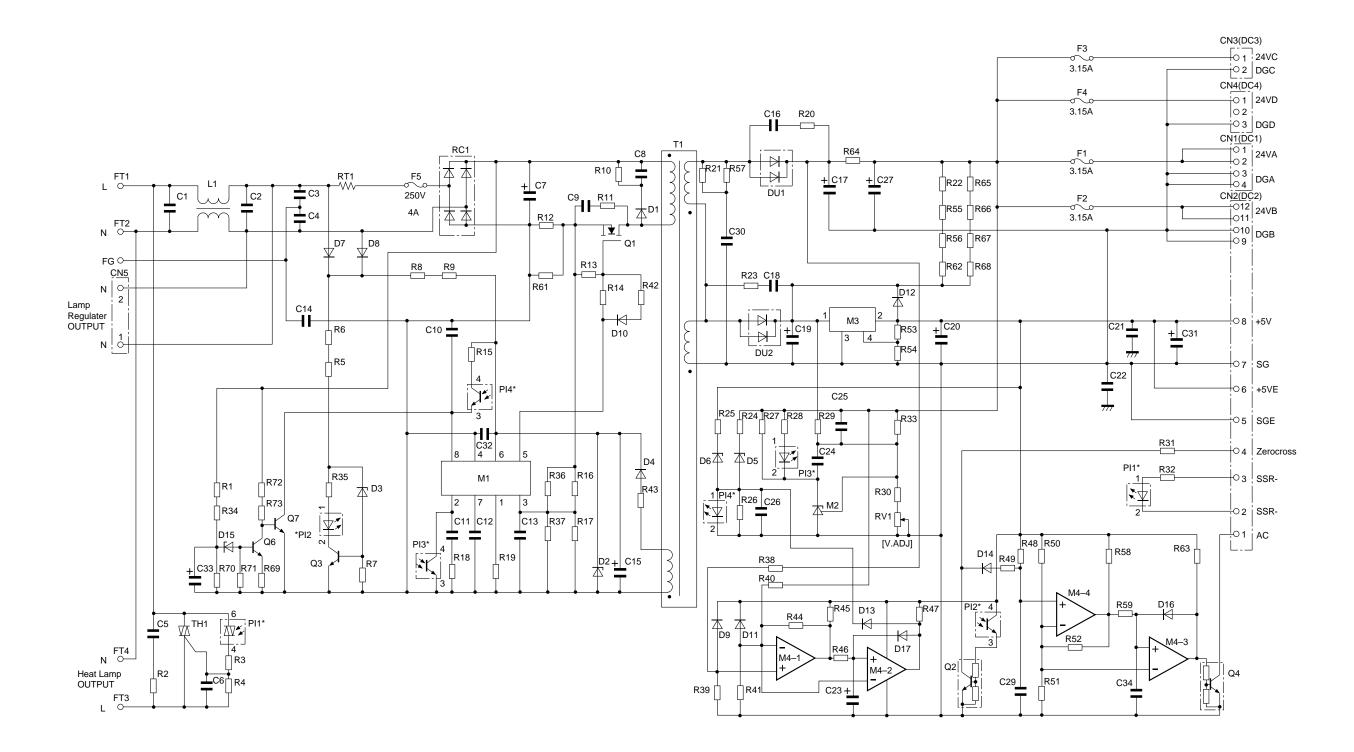
How to search for where a signal in a circuit diagram has jumped to.



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How to search for where a signal in a circuit diagram has jumped to.



14 - 9

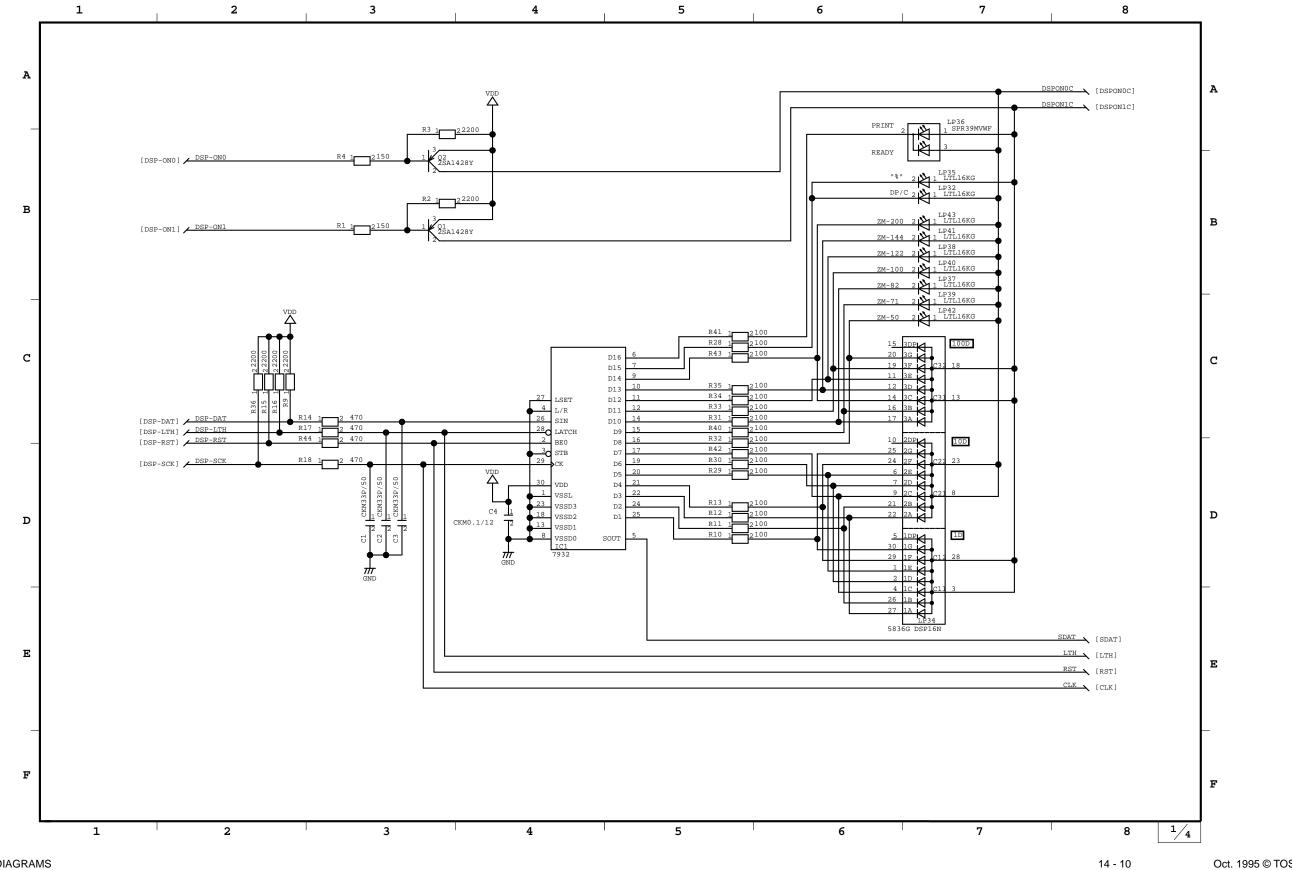
1550 CIRCUIT DIAGRAMS

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14.3 Control Panel Circuit (PWA-F-PNL) 1/4



How to search for where a signal in a circuit diagram has jumped to.



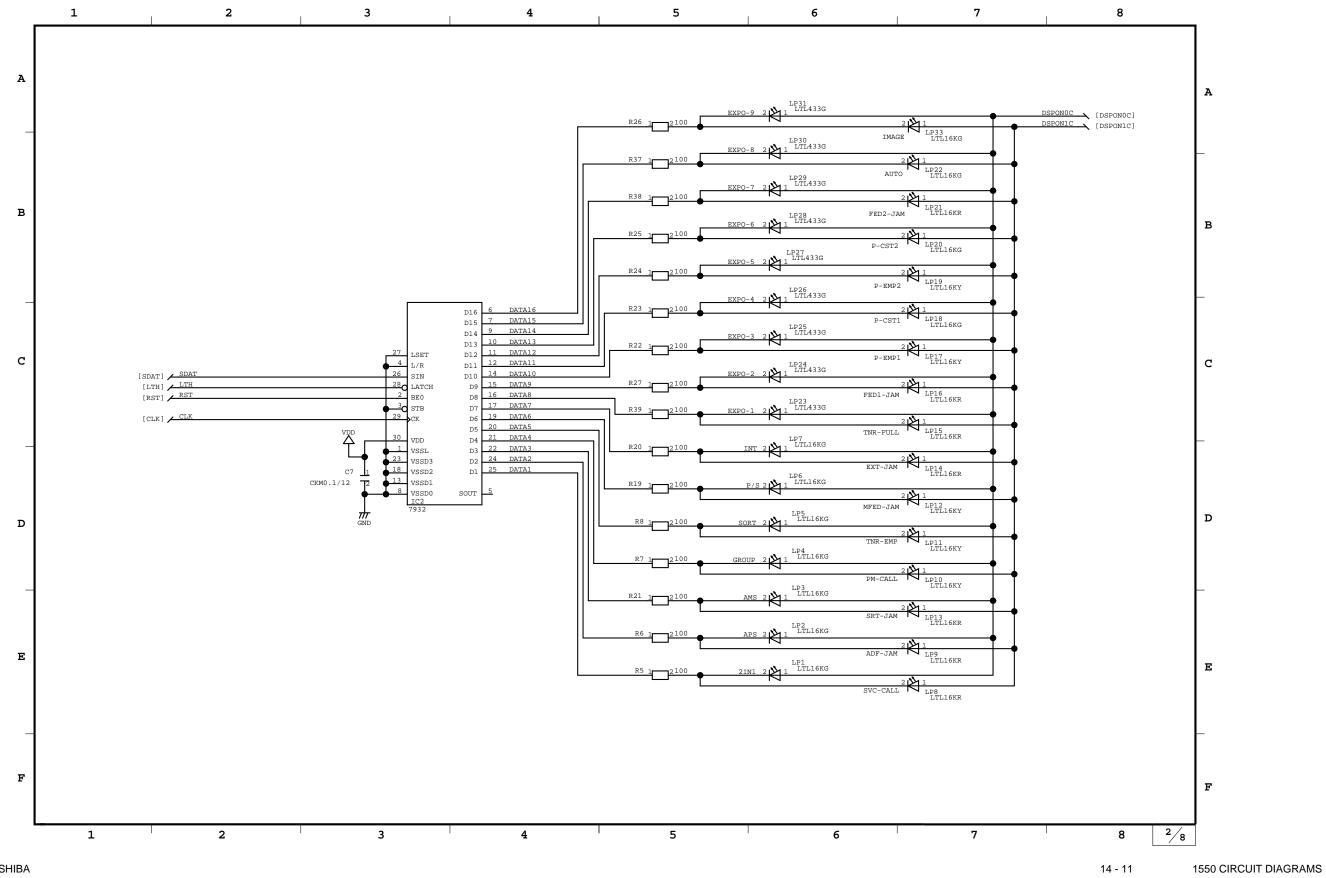
1550 CIRCUIT DIAGRAMS

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Control Panel Circuit (PWA-F-PNL) 2/4



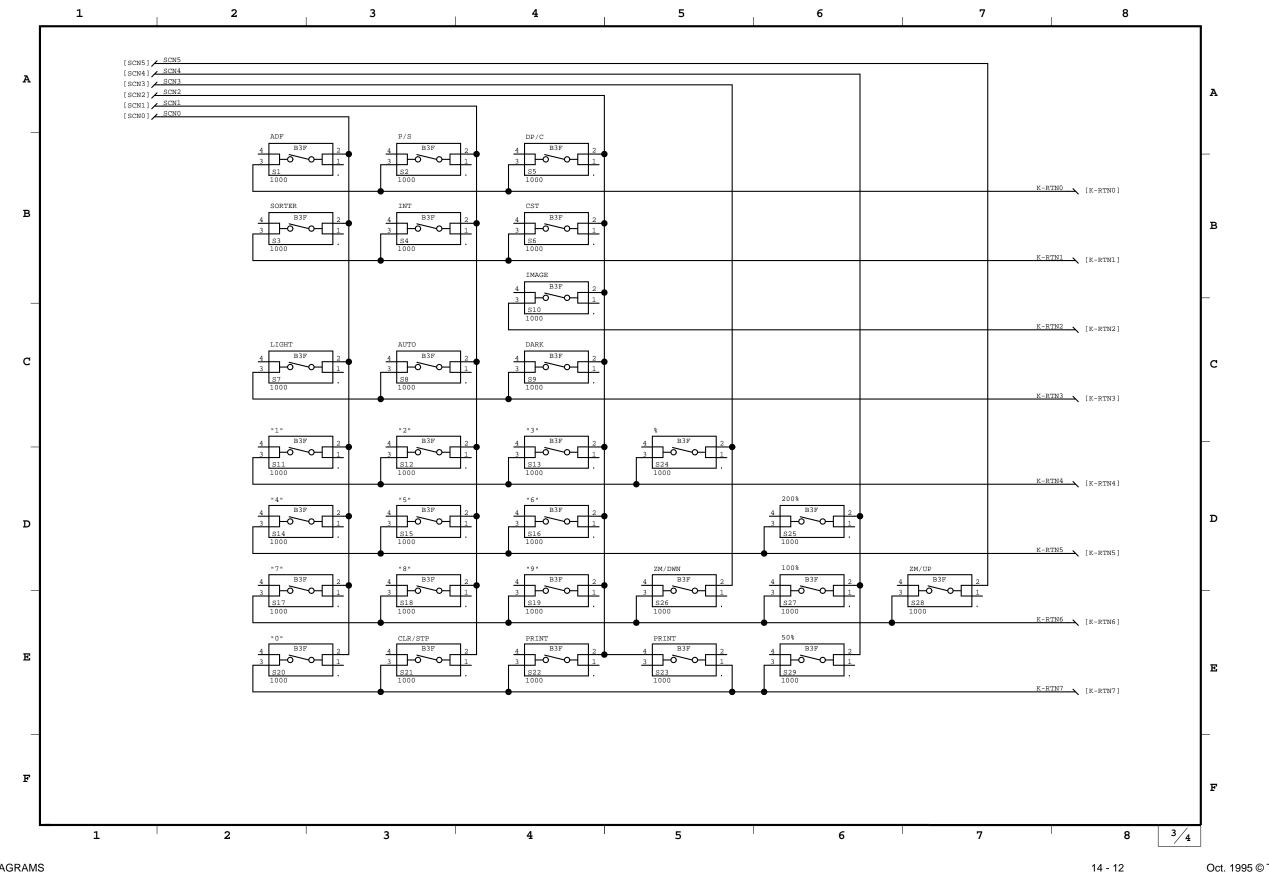
How to search for where a signal in a circuit diagram has jumped to.



Control Panel Circuit (PWA-F-PNL) 3/4

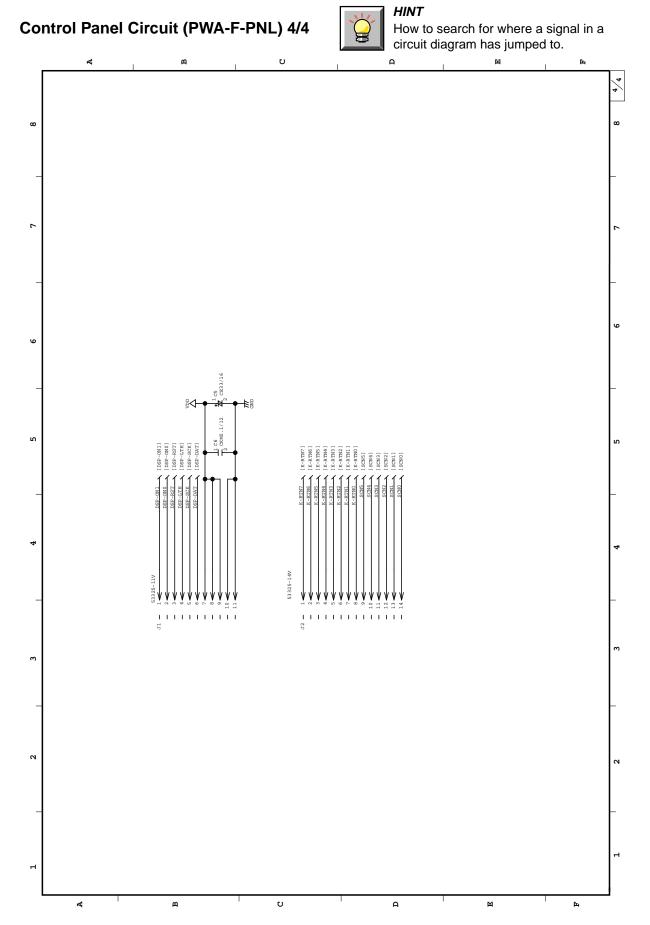


How to search for where a signal in a circuit diagram has jumped to.



1550 CIRCUIT DIAGRAMS

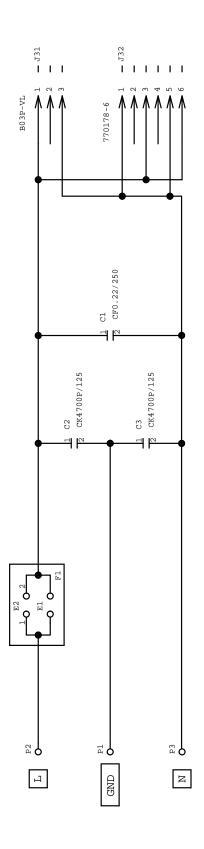
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1550 CIRCUIT DIAGRAMS

14.4 Fuser Circuit (PWA-F-FUS)



15. POWER STABILIZING CIRCUIT (AC UNIT)

15.1 General Description

This power supply circuit has the following outputs:

① DC outputs:

- +5V : Supplied to LSIs, logic ICs, driver ICs, etc.
- +5VE : Power supply for LED eraser array (DCH).
- +24VA : Power supply for the main motor (M1).
- +24VB : Power supply for clutches and high-voltage transformer.
- +24VC : Power supply for the optional sorter.
- +24VD : Power supply for the optional ADF.

② AC outputs:

- For driving the heater lamp
- For driving the lamp regulator

③ Other control signals:

- Zero-cross output : Zero-cross interrupting signals
- AC OFF signal : Reset signals

15.2 Explanation of Circuit Operation

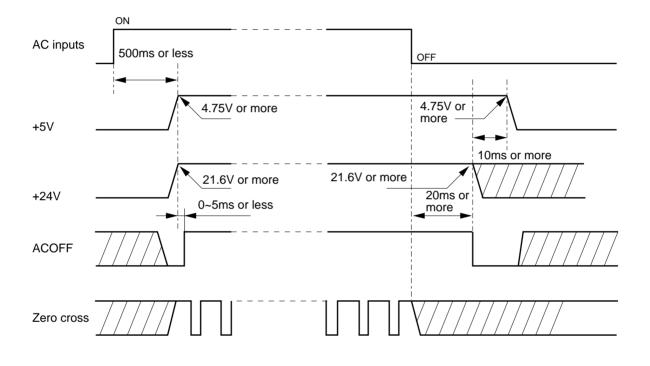
(1) DC + 24V

The +24V system, which is a rated voltage circuit based on the switching method, is always controlled to provide a fixed output voltage by feeding back fluctuation in the output to the primary side through a photocoupler.

(2) DC + 5V

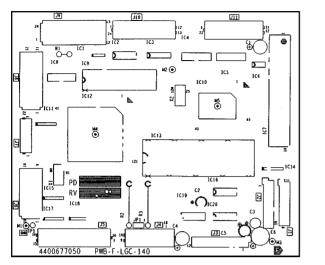
The +5V system is for providing a regulated 5V output by stabilizing the voltage from the 5V winding by means of a 3-terminal regulator.

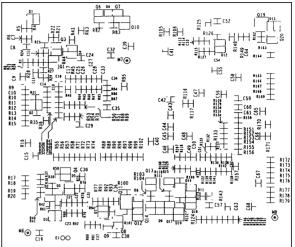
The following shows the output sequence of the power supply.



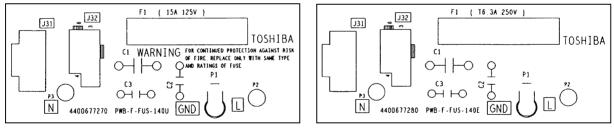
16. PC BOARD ASSEMBLY

16.1 PWA-F-LGC





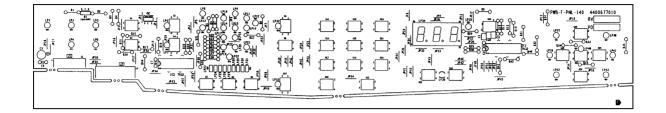
16.2 PWA-F-FUS



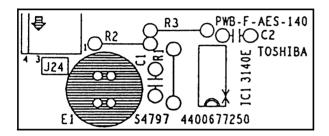
100V series

200V series

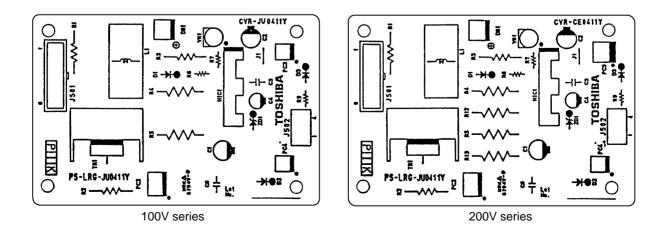
16.3 PWA-F-PNL



16.4 PWA-F-AES

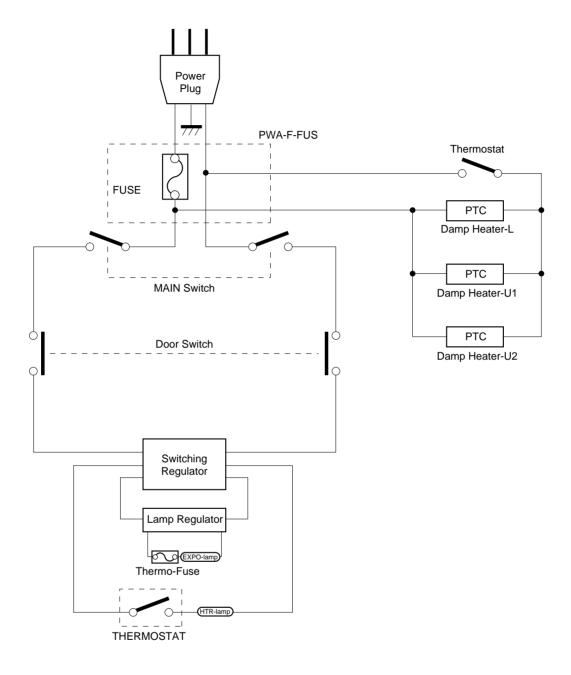


16.5 PWA-F-LRG



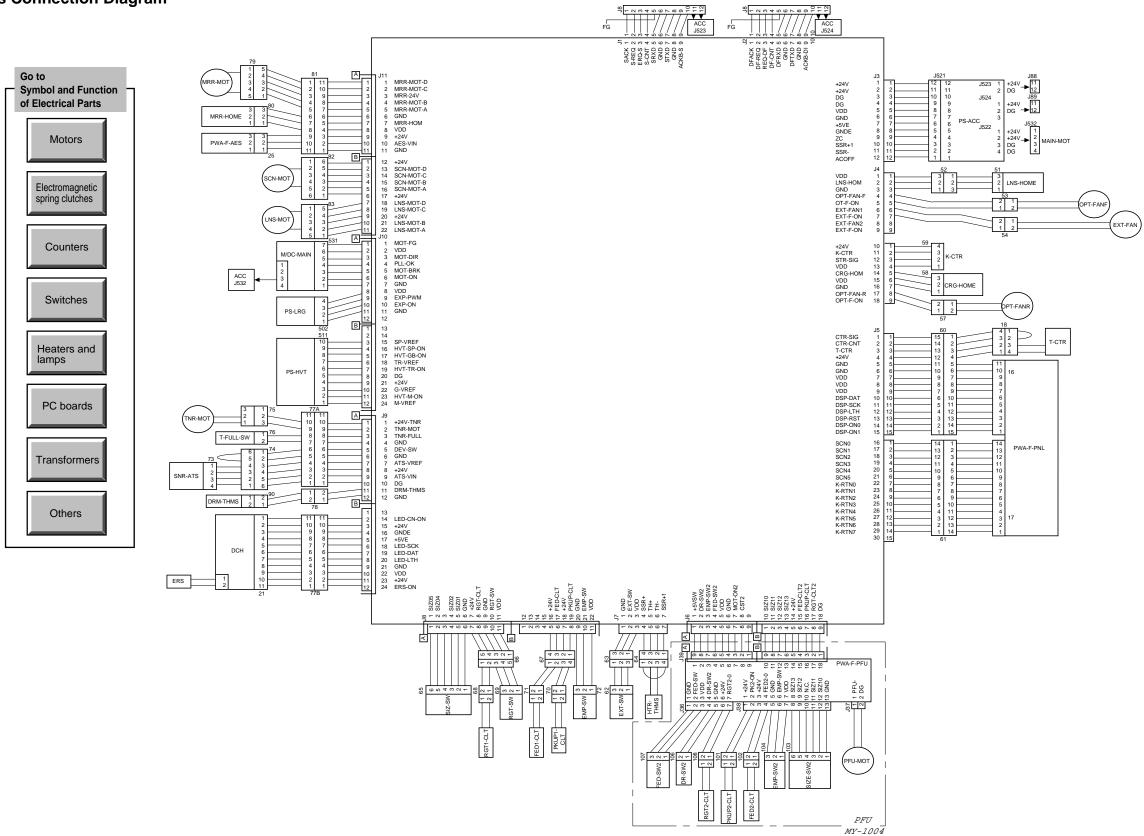
17. HARNESS CONNECTION DIAGRAM

17.1 AC Harness Connection Diagram



AC Control Circuit

17.2 DC Harness Connection Diagram

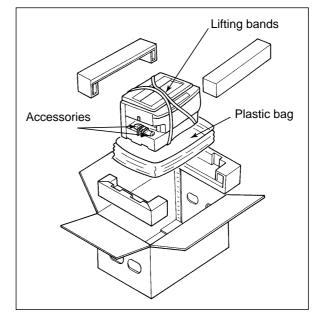


18. UNPACKING PROCEDURE

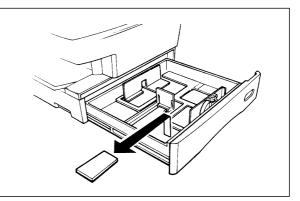
18.1 Unpacking and Set-up Procedure for the 1550

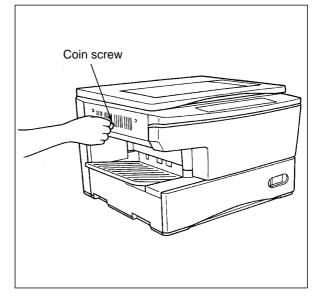
A. Unpacking Procedure

- Open the carton and take out the accessory package and other packing materials. The accessory package includes the following parts:
 - Copy receiving tray
 - Set-up report (U.S.A., Canada, Europe)
 - Operator's manual
 - Fuser unit lever caps (2 pcs.)
 - Set-up instruction

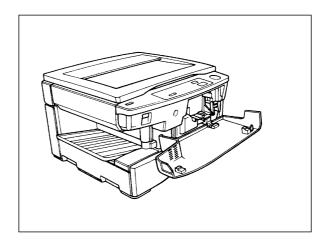


- 2. Open the plastic bag and holding the lifting bands, take out the machine from the carton.
- 3. Remove all packing materials from the outside and inside of the machine.
- 4. Pull out the cassette and take out the packing material located at the front side.
- Remove the screw fastening the carriage.
 Note: For the screw fastening the carriage, a coin screw is used. So, after loosening it with a suitable coin, the screw can be removed by manually turning it.
 - Remove the carriage fastening screw located in the left-top cover.





- 6. Open the front cover:
 - Open the front cover and raise the upper unit.



- 7. Install the fuser unit lever caps (2):
 - * The lever caps are provided in the accessory package.
 - Securely fit the lever caps onto front and rear levers.
 - Install the fuser unit lever cap paying particular attention to the orientation. Make sure the hook portion of the cap is firmly inserted in the window of the arm. (The C face of two caps on both sides (front and rear) must be installed toward the front side.)



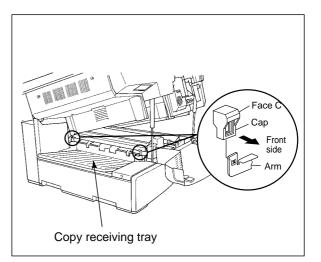
Caution:

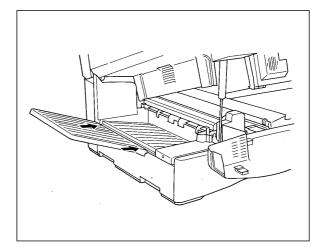
If the installation is not perfect, the PUSHR-FUSER pushing the cap may come off the duct.

B. Set-up Procedure

1. Installing the copy receiving tray

• Install the copy receiving tray by fitting it into the holes in the left-side cover.



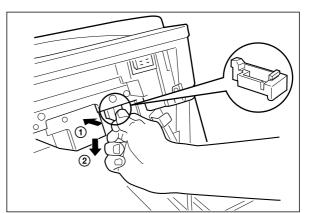


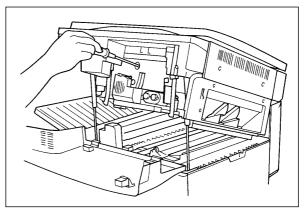
2. Setting the developer unit

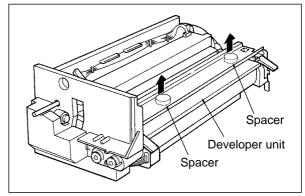
- (1) Remove the part fastening the lens unit from the machine.
 - Push it to the rear side and lower it simultaneously to remove it.
- (2) Take out the process unit (1 screw).

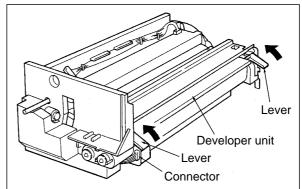
(3) Remove the developer unit spacer from the process unit.

- (4) Place the process unit on a flat surface.Raise the lever located on each side of the process unit in the direction of the arrow.
- (5) Pull out one connector.
- (6) Take out the developer unit from the process unit.
 - Note: If the photoconductor is exposed to fluorescent light or external light for long time, it may suffer from lightcaused fatigue. So, be sure to cover the process unit with, for example, a suitable cloth.





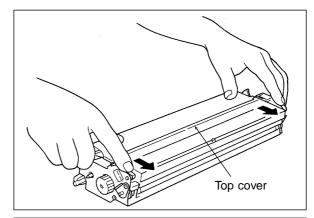


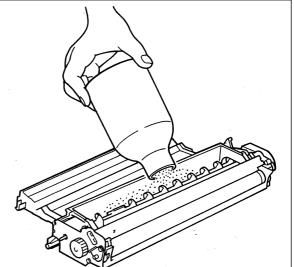


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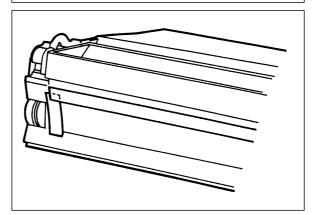
(7) Push the hook located on each side of the developer unit with your fingers in the direction of the arrows to disengage them and then remove the top cover.

- (8) Pour in the developer material.
 - **Note:** Before pouring in the developer material, be sure to shake the developer bottle fully.
- (9) By rotating the magnetic roller, check to make sure that the developer material is transported properly.





- (10) Reinstall the top cover. The two hooks should be securely latched.
 Make sure that the top cover is securely closed. Also, make sure that the rubber seal of the top cover is positioned outside of the side seals (both sides).
- (11) After placing the developer unit in the process unit, move down the lever on each side by 90° to fix the developer unit. Be sure to insert the connector securely.
- (12) Reinstall the proccess unit into the machine(1 screw).
 - **Note:** Be sure not to install the toner cartridge at this time.

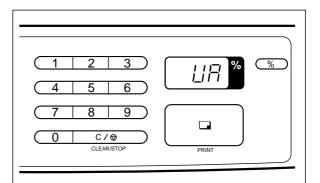


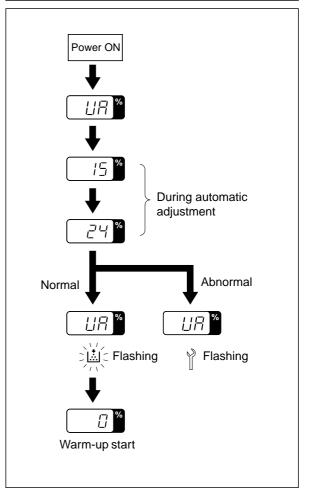
C. Adjustment Procedure

1. Automatic adjustment of the auto-toner sen-

sor

- (1) When the power switch is turned on, the auto-toner sensor is automatically adjusted by the following procedure.
- (2) "UA" is shown on the copy quantity display and the PRINT key lights in red.
 <u>And the automatic adjustment of the auto-</u> toner sensor starts.
- (3) The machine starts its operation. The output value of the toner sensor is shown on the display and changes quickly.
- (4) About 2 minutes and 30 seconds later, the value on the display stabilizes at 23 25.
- (5) About 30 seconds later, the automatic adjustment of the auto-toner sensor is complete and "UA" is shown on the copy quantity display. Also, the ADD TONER
- (6) Open the front cover and install the toner cartridge.
- (7) Close the front cover.
 - If the adjustment has finished abnormally, the machine stops its operation and displays the CALL SERVICE
 Then, for the subsequent adjustment of the auto-toner sensor, follow the procedure described in the Service Manual.





D. Final Operation Check

Making copies in both the cassette and bypass feeding modes, check the following items:

- Check for correct paper feeding from both the cassette and sheet bypass.
- Check for proper copy image.
- Check for correct displaying of the control panel lamps and the correct operation of the keys.

Note: Dispose of the packing materials properly.

E. Changing the Image Settings

1. Light distribution adjustment

- (1) With the exposure set at a darker point, make a copy of the test chart and check for uneven light distribution.
- (2) If necessary, make adjustment in the following manner:
 - a) Turn off the power and unplug the power cord plug. Then, remove the right-hand top glass holder (2 screws) and the glass.
 - b) Loosening the screw of the adjustment plate corresponding with the position of the uneven light distribution, adjust the plate:

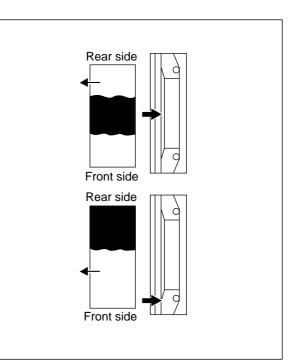
If you move it toward the left, copy image becomes darker and if you move it toward the right, copy image becomes lighter.

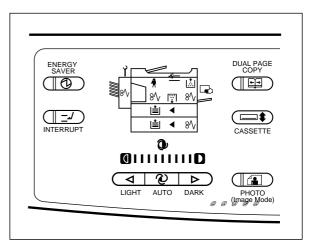
- c) If the rear side of the copy is too dark and gradually lighter toward the front, adjust the adjustment plates as shown on the right (lower).
- d) Make a copy of the test chart and check for the correct image density.

2. Exposure adjustment

2.1 Adjustment of manual exposure (100%)

- Turn off the power of the machine. While pressing keys 0 and 5 simultaneously, turn on the power switch.
 - Check that the "AJ" mode is shown.
- (2) Press the Auto Exposure 🕑 key to switch to manual exposure. (Check that the Auto Exposure lamp has gone off.)
- (3) Using the exposure keys, set the exposure level at the center point.



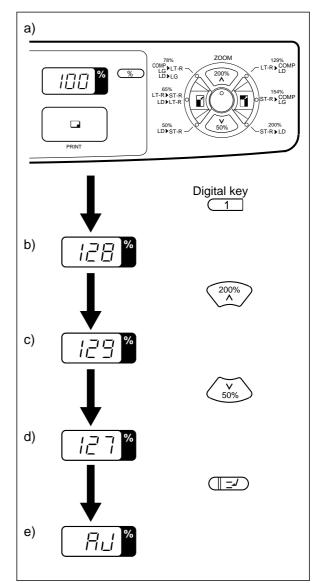


1550 UNPACKING PROCEDURE

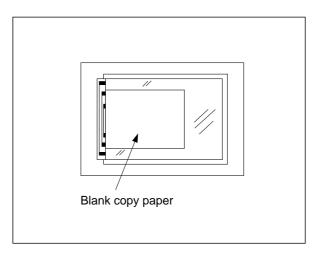
- (4) Press the (100%) key to set at 100% mode.
- (5) To check the current image density, press the ENERGY SAVER (10) key to make a test copy.
- (6) If the image density is not appropriate, make adjustment using the following procedure:
- (7) Key in code "1" from the 10-key pad and press the PRINT key.
 - The current adjustment value is shown on the display.
- (8) If the image density is too high, increase the value by using the ZOOM UP key.
- (9) If the image density is too low, reduce the value by using the ZOOM DOWN (v) 50% key.
- (10) Press the INTERRUPT (IF) key to cause the new value on the display to be memorized.
 - After you press the key, the display returns to "AJ".
 - Press the ENERGY SAVER (10) key to make a test copy.
- (11) If the image density is not appropriate, repeat steps (7) (10) above.

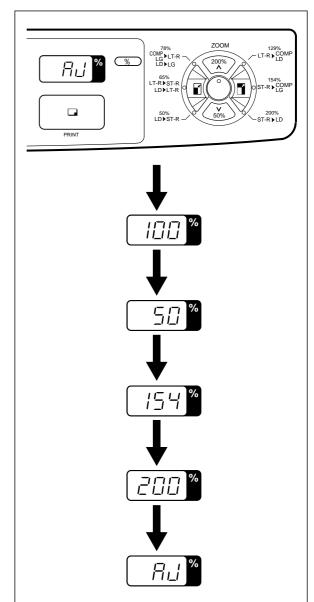
2.2 Adjustment of manual exposure (50%, 154% and 200%)

- **Note:** Before performing manual exposure adjustment (50%, 154% and 200%), check to make sure that manual exposure adjustment for 100% has been properly done.
- (1) Make copies at 154%, 50% and 200% reproduction ratios, respectively. (In the "AJ" mode, if you press the ENERGY SAVER
 key, copies will be made.)
- (2) If the image density is not appropriate for certain reproduction ratios, perform manual exposure adjustments (a), (b) or (c) in Sec.
 2.4 for the inappropriate ratios.



- 2.3 Automatic adjustment of auto exposure (50%, 100%, 154% and 200%)
 - Note: Before performing automatic exposure adjustment, check to make sure that manual exposure adjustment for 100% has been properly done.
 - Make sure that "AJ" is shown on the display.
 - (2) Place blank A3-sized (or Ledger-sized) copy paper on the glass and set it against the original scale, then close the original cover.
 - (3) After keying in code "49", press the PRINT
 After key and the automatic adjustment of auto exposure commences. (The carriage, lens unit and mirror unit, respectively, move to the positions corresponding to the four reproduction ratios, making the exposure lamp also to light four times.)
 - **Note:** Do not touch the machine while it is performing automatic exposure adjustment.
 - (4) When the display changes to "AJ", the automatic adjustment is complete.
 - (5) Make copies at the respective reproduction ratios and check the image density. (In the "AJ" mode, simply press the ENERGY SAVER () key to make copies.)
 - (6) If the image density of test copies is not appropriate for any reproduction ratio, make adjustments in Sec. 2.4 Automatic exposure adjustment (d), (e), (f) or (g) for the inappropriate reproduction ratio.





2.4 Manual adjustment of exposure

| Adjustment procedure | Exposure mode | Reproduction ratio | Adjustment code |
|----------------------|------------------------|--------------------|-----------------|
| (a) | Manual exposure center | 154% | 2 |
| (b) | | 50% | 3 |
| (c) | | 200% | 4 |
| (d) | - Automatic exposure - | 100% | 5 |
| (e) | | 154% | 6 |
| (f) | | 50% | 7 |
| (g) | | 200% | 8 |
| (h) | Light (max.) | 100% | 9 |
| (i) | Dark (min.) | 100% | 10 |
| (j) | Photo exposure | 100% | 14 |
| (k) | | 154% | 15 |
| (I) | | 50% | 16 |
| (m) | | 200% | 17 |
| | t © | ↑ © | ↑ (E) |

Note: Only when the user is not satisfied with the results of the exposure adjustments in Sec. 2.2 and 2.3, perform the manual adjustments of exposure (a) - (m) as described below.

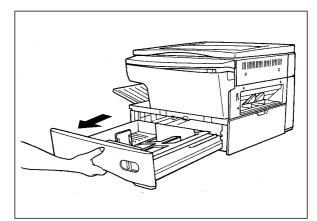
Adjustment Procedure

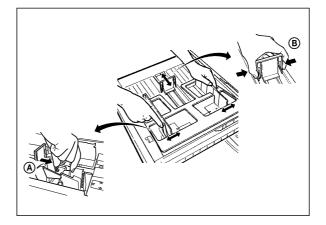
- (1) Make sure that "AJ" is shown on the display.
- (2) Set exposure mode ©.
- (3) Set reproduction ratio (a) using the REDUCE [], ENLARGE [], ZOOM DOWN $(\bigvee_{50\%})$ or ZOOM UP (20%).
- (4) To check the current image density, make test copies in the manual, automatic and photo modes and check them for proper image density.
- (5) Key in adjustment code (E) and press the PRINT key.
 Then, using the procedure of (7) (11) in Sec. 2.1, make adjustments.
- (6) Finally, press keys \bigcirc and \bigcirc simultaneously to clear the test mode.

Changing the Paper Size of the Cassette

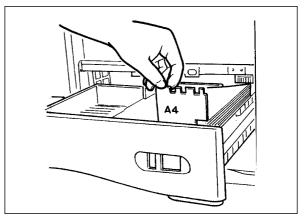
- Pull out the cassette and push down the bottom plate. Then move the both side guides and trail-edge guide to align them to the desired size.
 - Before moving the side guides, push the lever in the direction of (A) to unlock the side guides.
 - Before moving the trail-edge guide, push on its sides in the direction of

 B to unlock the guide.



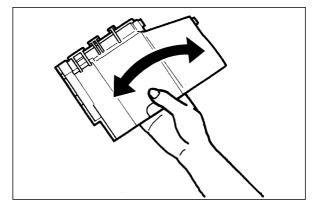


- (2) Take out the paper size plate from the cassette and reset it to show the desired size on the display.
- (3) Place the paper on the cassette and check the gaps between the paper and the side guides.
- (4) Insert the cassette gently.

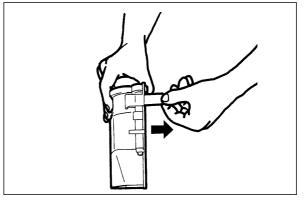


Procedure for Installing the Toner Cartridge

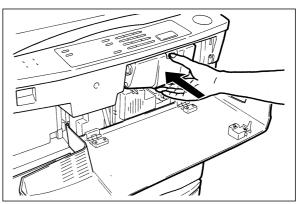
- Open the front cover and pushing the lock lever, take out the toner cartridge from the front side.
- (2) Shake the new toner cartridge to the right and to the left 5 or 6 times to loosen the toner inside.



- (3) Pull to remove the seal from the new toner cartridge.
 - Do not shake the toner cartridge after removing the seal (The toner may spill).



- (4) Install the new toner cartridge in the machine.
 - Push the toner cartridge fully in until it is locked securely.
- (5) Close the front cover.

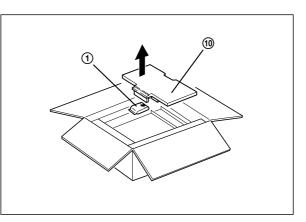


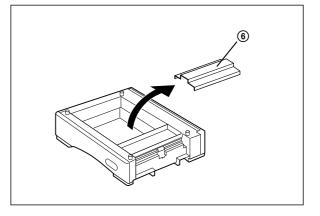
18.2 Unpacking and Set-up Procedure for the Paper Feeding Unit MY-1004

A. Unpacking Procedure

- (1) Open the carton and take out the package ① and the paper guide ⑩.
- (2) Remove packing materials and take out the paper feeding unit MY-1004.



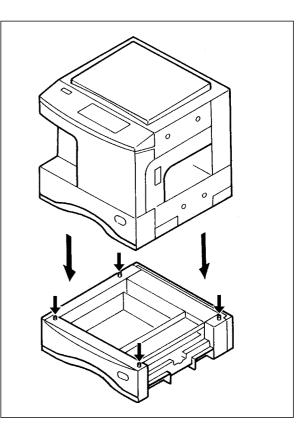




B. Installation Procedure

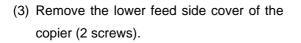
1. Docking the MY-1004 with the copier

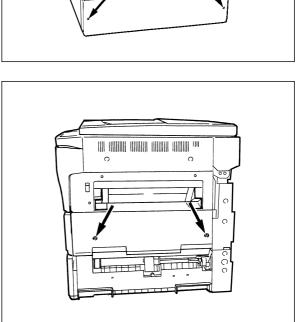
- (1) Place the MY-1004 on the copier stand.
- (2) Using two people, lift the copier and place it slowly onto the MY-1004 so that the copier's cassette guide holes (not shown in the diagram) are aligned with the MY-1004's positioning pins.
- Notes: 1 When docking the MY-1004 with the copier, aligning the front and right-hand surfaces of the copier with those of the MY-1004, respectively, will make the installation easier.
 - 2 Before the copier and the MY-1004 are fastened with screws (4 places), do not move or carry them to another place.



2. Removing the covers

- (1) Remove the rear cover of the MY-1004 (2 screws).
- (2) Remove the rear cover of the copier (2 screws).



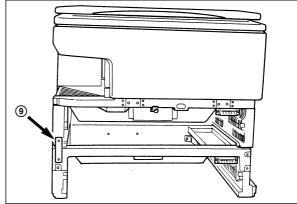


WIIII CT.

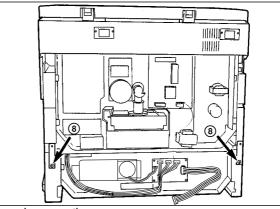
illill

3. Fastening the MY-1004 and the copier

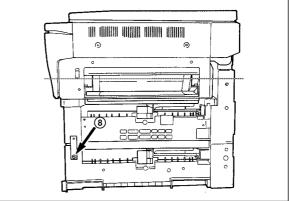
- Remove the cassettes from the copier and the MY-1004, respectively.
- (2) Using the fixing plate and screws ([®]), ^(®)) provided, fasten the copier and the MY-1004 as shown in the Figure.



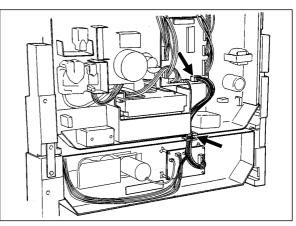
One place at the front



Two places on the rear



One place on the feed side



4. Installing the wire harness:

(1) Fit the wire harness on the rear of the MY-1004 into the respective edge saddles of the copier and the MY-1004 and connect the harness to the J6 connector of the copier's PC board.

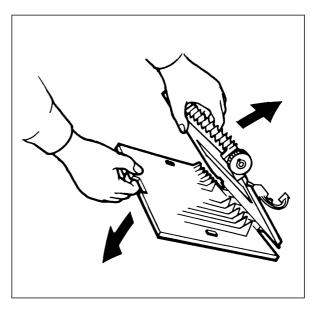
1550 UNPACKING PROCEDURE

5. Installing the paper guide

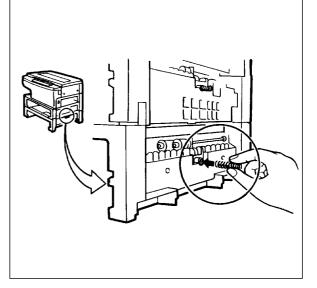
 The paper guide

 movided has its metal guide section and outer panel section joined by magnets.

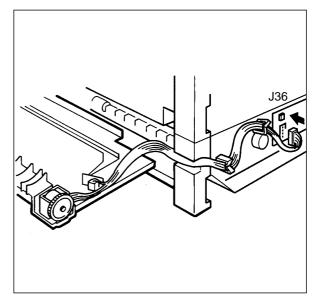
Separate them when installing the paper guide.



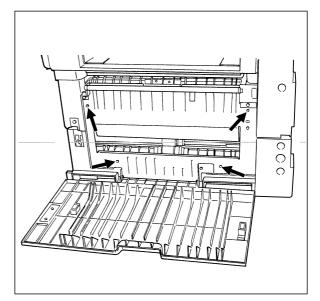
(2) Insert the separation roller pressure spring
(1) (provided) into the hole in the separation roller holder at the feed side of the MY-1004.



(3) Plug the connector of the paper guide (1) into the connector J36 from the feed side of the MY-1004.

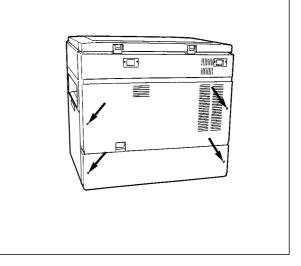


- (4) Fasten the paper guide ⁽¹⁾ using the fixing screws ⁽²⁾ provided, as shown (4 places).
- Note: When fastening the paper guide (10), check to make sure that the separation roller pressure springs (1) are fitted in the separation roller holders of the copier and the MY-1004, respectively.
- (5) Close the outer panel of the paper guide(1).



6. Reinstalling the rear covers

- (1) Reinstall the rear covers of the copier and the MY-1004.
- (2) Return the cassettes to the original positions, respectively.



C. Operation Check of the MY-1004

- (1) Plug the copier's power cord into the electrical outlet and turn on the power switch.
- (2) Set sheets of paper in the MY-1004's cassette.
- (3) Selecting the MY-1004's cassette, make a few copies and check that the MY-1004 operates normally.