TOSHIBA

SERVICE MANUAL

MULTIFUNCTIONAL DIGITAL SYSTEMS

e-STUDIO205L/255/305
e-STUDIO355/455

Model: DP-2090/2520/3000/3570/4570
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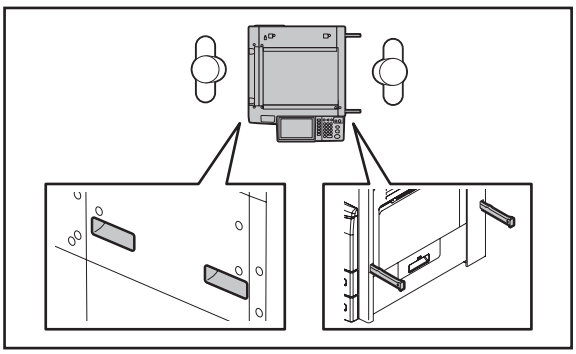
GENERAL PRECAUTIONS REGARDING THE SERVICE FOR e-STUDIO205L/255/305/355/455

The installation and service should be done by a qualified service technician.

1) **Transportation/Installation**
   - When transporting/installing the equipment, employ two persons and be sure to hold the positions as shown in the figure.
     The equipment is quite heavy, and e-STUDIO205L/255/305 weighs approximately 57 kg (125.66 lb.), and e-STUDIO355/455 weighs approximately 60 kg (132.28 lb.), therefore pay full attention when handling it.



   - Be sure not to hold the movable parts or units (e.g. the control panel, ADU or RADF) when transporting the equipment.
   - Be sure to use a dedicated outlet with AC 110 V / 13.2 A, 115 V or 127 V / 12 A, 220-240 V or 240 V / 8 A for its power source.
   - The equipment must be grounded for safety.
   - Select a suitable place for installation. Avoid excessive heat, high humidity, dust, vibration and direct sunlight.
   - Provide proper ventilation since the equipment emits a slight amount of ozone.
   - To insure adequate working space for the copying operation, keep a minimum clearance of 80 cm (32”) on the left, 80 cm (32”) on the right and 10 cm (4”) on the rear.
   - The equipment shall be installed near the socket outlet and shall be accessible.
   - Be sure to fix and plug in the power cable securely after the installation so that no one trips over it.
   - When the equipment is used after the option is removed, be sure to install the parts or the covers which have been taken off so that the inside of the equipment is not exposed.

2) **General Precautions at Service**

- Be sure to turn the power OFF and unplug the power cable during service (except for the service should be done with the power turned ON).
- Unplug the power cable and clean the area around the prongs of the plug and socket outlet once a year or more. A fire may occur when dust lies on this area.
- When the parts are disassembled, reassembly is the reverse of disassembly unless otherwise noted in this manual or other related documents. Be careful not to install small parts such as screws, washers, pins, E-rings, star washers in the wrong places.
- Basically, the equipment should not be operated with any parts removed or disassembled.
- The PC board must be stored in an anti-electrostatic bag and handled carefully using a wristband since the ICs on it may be damaged due to static electricity.

  Caution: Before using the wristband, unplug the power cable of the equipment and make sure that there are no charged objects which are not insulated in the vicinity.

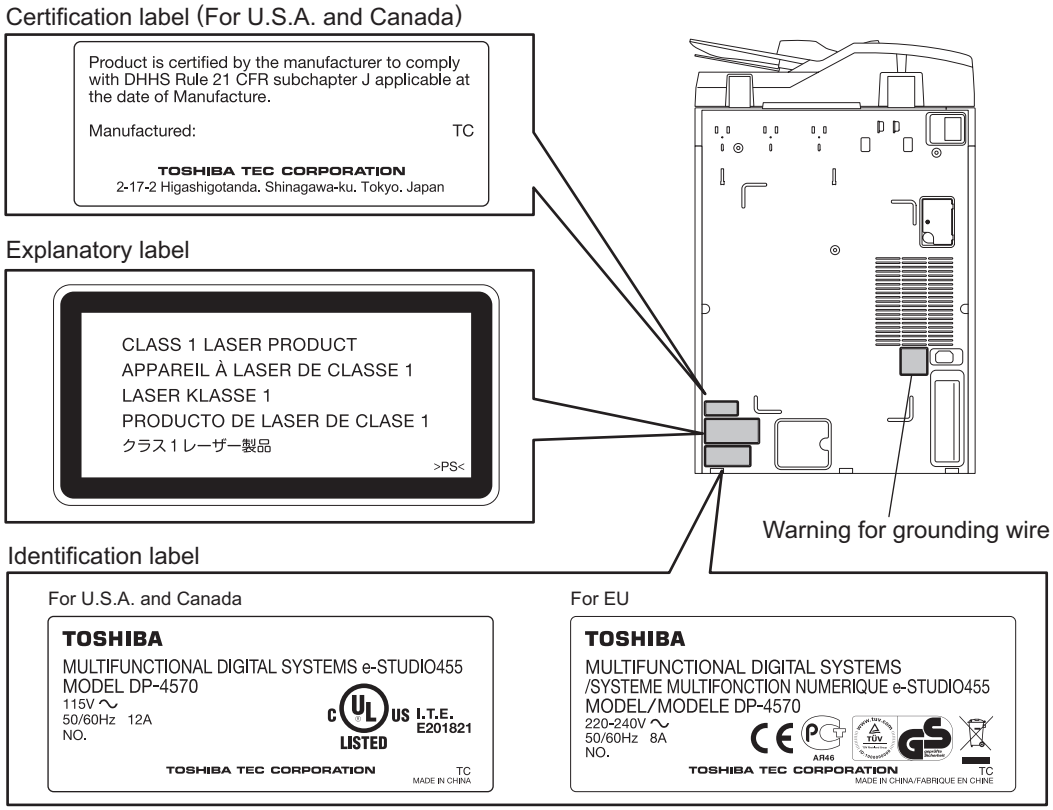
- Avoid expose to laser beam during service. This equipment uses a laser diode. Be sure not to expose your eyes to the laser beam. Do not insert reflecting parts or tools such as a screwdriver on the laser beam path. Remove all reflecting metals such as watches, rings, etc. before starting service.
- Be sure not to touch high-temperature sections such as the exposure lamp, fuser unit, damp heater and areas around them.
- Be sure not to touch high-voltage sections such as the chargers, transfer roller, developer, high-voltage transformer, exposure lamp control inverter, inverter for the LCD backlight and power supply unit. Especially, the board of these components should not be touched since the electric charge may remain in the capacitors, etc. on them even after the power is turned OFF.
- Make sure that the equipment will not operate before touching potentially dangerous places (e.g. rotating/operating sections such as gears, belts pulleys, fans and laser beam exit of the laser optical unit).
- Be careful when removing the covers since there might be the parts with very sharp edges underneath.
- When servicing the equipment with the power turned ON, be sure not to touch live sections and rotating/operating sections. Avoid exposing your eyes to laser beam.
- Use designated jigs and tools.
- Use recommended measuring instruments or equivalents.
- Return the equipment to the original state and check the operation when the service is finished.
- Be very careful to treat the touch panel gently and never hit it. Breaking the surface could cause malfunctions.

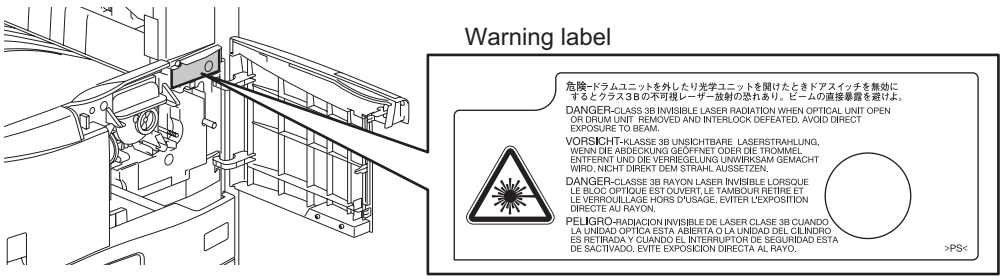
3) **Important Service Parts for Safety**

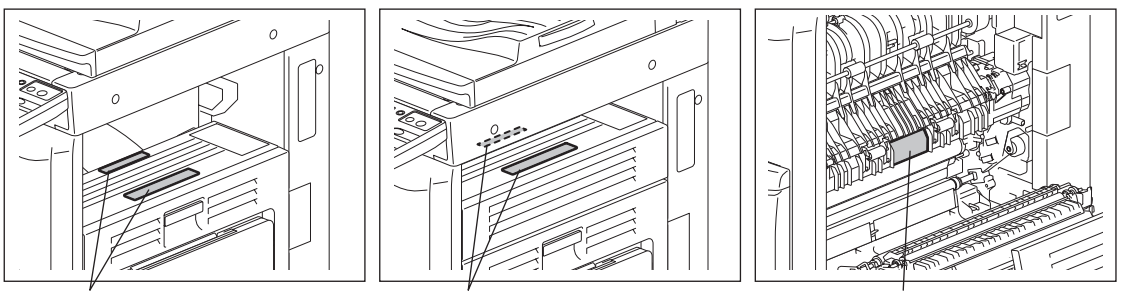
- The breaker, door switch, fuse, thermostat, thermofuse, thermistor, batteries, IC-RAMs including lithium batteries, etc. are particularly important for safety. Be sure to handle/install them properly. If these parts are short-circuited and their functions become ineffective, they may result in fatal accidents such as burnout. Do not allow a short-circuit or do not use the parts not recommended by Toshiba TEC Corporation.

4) **Cautionary Labels**

- During servicing, be sure to check the rating plate and cautionary labels such as “Unplug the power cable during service”, “CAUTION. HOT”, “CAUTION. HIGH VOLTAGE”, “CAUTION. LASER BEAM”, etc. to see if there is any dirt on their surface and if they are properly stuck to the equipment.







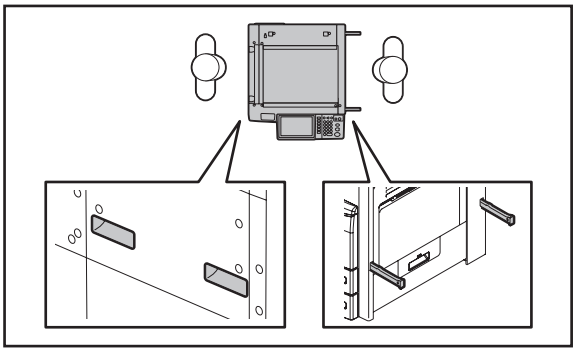
5) **Disposal of the Equipment, Supplies, Packing Materials, Used Batteries and IC-RAMs including lithium batteries**
   - Regarding the recovery and disposal of the equipment, supplies, packing materials, used batteries and IC-RAMs including lithium batteries, follow the relevant local regulations or rules.

Caution:
Dispose of used batteries and IC-RAMs including lithium batteries according to this manual.
Attention:
Se débarrasser de batteries et IC-RAMs usés y compris les batteries en lithium selon ce manuel.
Vorsicht:
Entsorgung der gebrauchten Batterien und IC-RAMs (inclusive der Lithium-Batterie) nach diesem Handbuch.

ALLEGEMEINE SICHERHEITSMASSNAHMEN IN BEZUG AUF DIE WARTUNG FÜR e-STUDIO205L/255/305/355/455

Die Installation und die Wartung sind von einem qualifizierten Service-Techniker durchzuführen.

1. Transport/Installation
   - Zum Transportieren/Installieren des Gerätes werden 2 Personen benötigt. Nur an den in der Abbildung gezeigten Stellen tragen.
     Das Gerät ist sehr schwer und wiegt etwa 57 kg (e-STUDIO205L/255/305) oder 60 kg (e-STUDIO355/455); deshalb muss bei der Handhabung des Geräts besonders aufgepasst werden.



   - Beim Transportieren des Geräts nicht an den beweglichen Teilen oder Einheiten (z.B. das Bedienungsfeld, die Duplexeinheit oder die automatische Dokumentenzuführung) halten.
   - Eine spezielle Steckdose mit Stromversorgung von AC 110 V / 13.2 A, 115 V oder 127 V / 12 A, 220-240 V / 8 A als Stromquelle verwenden.
   - Das Gerät ist aus Sicherheitsgründen zu erden.
   - Einen geeigneten Standort für die Installation wählen. Standorte mit zuviel Hitze, hoher Luftfeuchtigkeit, Staub, Vibrieren und direkter Sonneneinstrahlung sind zu vermeiden.
   - Für ausreichende Belüftung sorgen, da das Gerät etwas Ozon abgibt.
   - Um einen optimalen Kopierbetrieb zu gewährleisten, muss ein Abstand von mindestens 80 cm links, 80 cm rechts und 10 cm dahinter eingehalten werden.
   - Das Gerät ist in der Nähe der Steckdose zu installieren; diese muss leicht zu erreichen sein.
   - Nach der Installation muss das Netzkabel richtig hineingesteckt und befestigt werden, damit niemand darüber stolpern kann.
   - Falls der Auspackungsstandort und der Installationsstandort des Geräts verschieden sind, die Bildqualitätsjustierung (automatische Gammajustierung) je nach der Temperatur und Luftfeuchtigkeit des Installationsstandorts und der Papiersorte, die verwendet wird, durchführen.

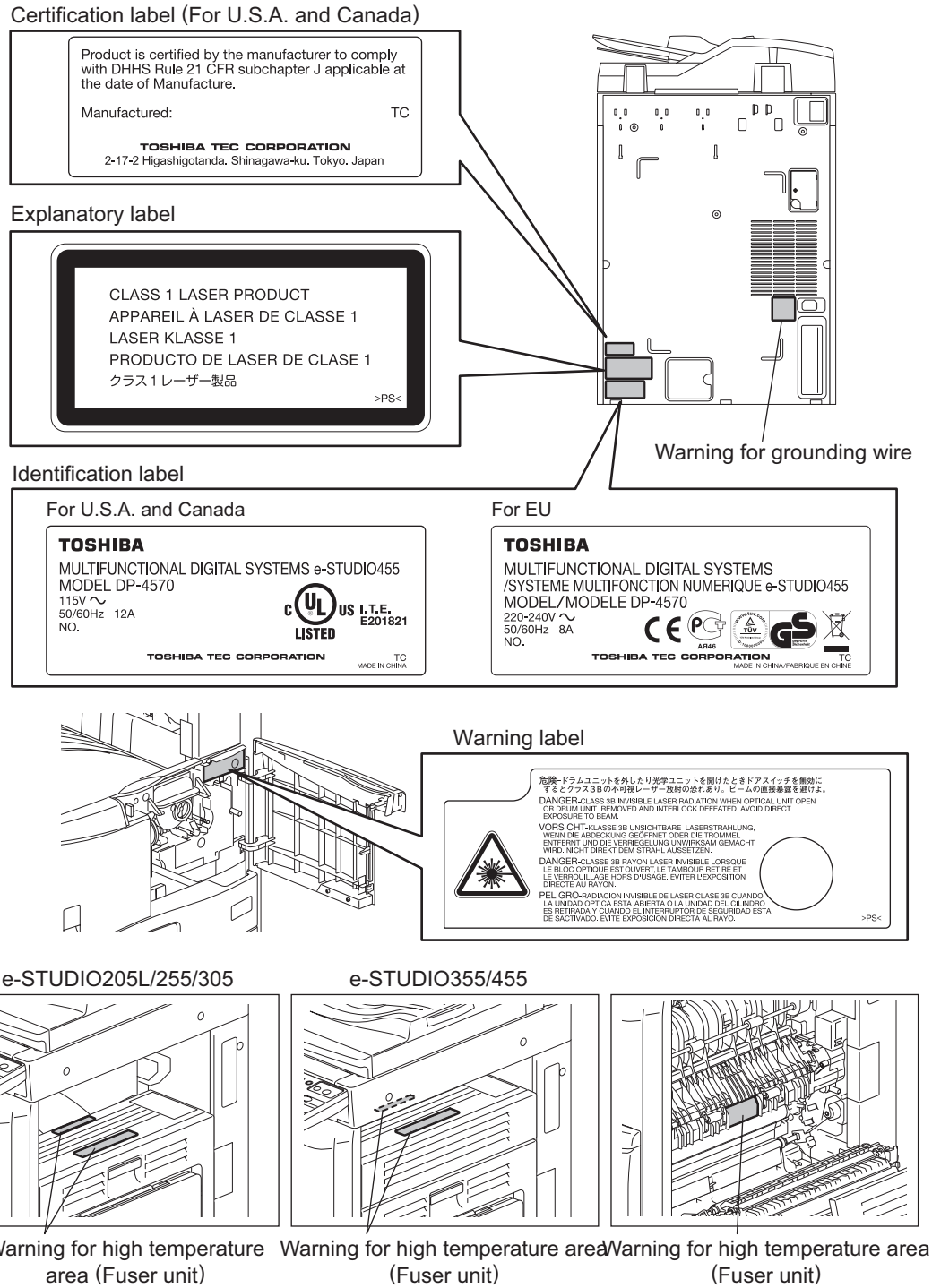
2) Allgemeine Sicherheitsmassnahmen in bezug auf die Wartung
   - Während der Wartung das Gerät ausschalten und das Netzkabel herausziehen (ausser Wartung, die bei einem eingeschalteten Gerät, durchgeführt werden muss).
   - Das Netzkabel herausziehen und den Bereich um die Steckerpole und die Steckdose die Umgebung in der Nähe von den Steckerzacken und der Steckdose wenigstens einmal im Jahr reinigen. Wenn Staub sich in dieser Gegend ansammelt, kann dies ein Feuer verursachen.
   - Wenn die Teile auseinandergenommen werden, wenn nicht anders in diesem Handbuch usw erklärt, ist das Zusammenbauen in umgekehrter Reihenfolge durchzuführen. Aufpassen, dass kleine Teile wie Schrauben, Dichtungsringe, Bolzen, E-Ringe, Stern-Dichtungsringe, Kabelbäume nicht an den verkehrten Stellen eingebaut werden.
   - Grundsätzlich darf das Gerät mit enfernten oder auseinandergenommenen Teilen nicht in Betrieb genommen werden.
   - Das PC-Board muss in einer Anti-elektrostatischen Hülle gelagert werden. Nur Mit einer Manschette bei Betätigung eines Armbandes anfassen, sonst könnte es sein, dass die integrierten Schaltkreise durch statische Elektrizität beschädigt werden.

     Vorsicht: Vor Benutzung der Manschette der Betätigung des Armbandes, das Netzkabel des Gerätes herausziehen und prüfen, dass es in der Nähe keine geladenen Gegenstände, die nicht isoliert sind, gibt.
   - Setzen Sie sich während der Wartungsarbeiten nicht dem Laserstrahl aus. Dieses Gerät ist mit einer Laserdiode ausgestattet. Es ist unbedingt zu vermeiden, direkt in den Laserstrahl zu blicken. Keine reflektierenden Teile oder Werkzeuge, wie z. B. Schraubendreher, in den Pfad des Laserstrahls halten. Vor den Wartungsarbeiten sämtliche reflektierenden Metallgegenstände, wie Uhren, Ringe usw., entfernen.
   - Auf keinen Fall Hochtemperaturbereiche, wie die Belichtungslampe, die Fixiereinheit, die Heizquelle und die umliegenden Bereiche, berühren.
   - Auf keinen Fall Hochspannungsbereiche, wie die Ladeeinheiten, die Transferwalze, die Entwicklereinheit, den Hochspannungstransformator, den Steuerumrichter für die Belichtungslampe, den Umrichter für die LCD-Hintergrundbeleuchtung und das Netzgerät, berühren. Insbesondere sollten die Platinen dieser Komponenten nicht berührt werden, da die Kondensatoren usw. auch nach dem Ausschalten des Geräts noch elektrisch geladen sein können.
   - Vor dem Berühren potenziell gefährlicher Bereiche (z. B. drehbare oder betriebsrelevante Bereiche, wie Zahnräder, Riemen, Riemenscheiben, Lüfter und die Laseraustrittsöffnung der optischen Lasereinheit) sicherstellen, dass das Gerät sich nicht bedienen lässt.
   - Beim Entfernen von Abdeckungen vorsichtig vorgehen, da sich darunter scharfkantige Komponenten befinden können.
   - Bei Wartungsarbeiten am eingeschalteten Gerät dürfen keine unter Strom stehenden, drehbaren oder betriebsrelevanten Bereiche berührt werden. Nicht direkt in den Laserstrahl blicken.
   - Ausschließlich vorgesehene Werkzeuge und Hilfsmittel verwenden.
   - Empfohlene oder gleichwertige Messgeräte verwenden.
   - Nach Abschluss der Wartungsarbeiten das Gerät in den ursprünglichen Zustand zurück versetzen und den einwandfreien Betrieb überprüfen.
   - Das berührungsempfindliche Bedienungsfeld stets vorsichtig handhaben und keinen Stößen aussetzen. Wenn die Oberfläche beschädigt wird, kann dies zu Funktionsstörungen führen.

3) Sicherheitsrelevante Wartungsteile
   - Der Leistungsschutzschalter, der Türschalter, die Sicherung, der Thermostat, die Thermosicherung, der Thermistor, die IC-RAMs einschließlich der Lithiumakkus usw. sind besonders sicherheitsrelevant. Sie müssen unbedingt korrekt gehandhabt und installiert werden. Wenn diese Teile kurzgeschlossen und funktionsunfähig werden, kann dies zu schwerwiegenden Schäden, wie einem Abbrand, führen. Kurzschlüsse sind zu vermeiden, und es sind ausschließlich Teile zu verwenden, die von der Toshiba TEC Corporation empfohlen sind.

4) Warnetiketten

- Im Rahmen der Wartung unbedingt das Leistungsschild und die Etiketten mit Warnhinweisen überprüfen [z. B. „Unplug the power cable during service“ („Netzkabel vor Beginn der Wartungsarbeiten abziehen“), „CAUTION. HOT“ („VORSICHT, HEISS“), „CAUTION. HIGH VOLTAGE“ („VORSICHT, HOCHSPANNUNG“), „CAUTION. LASER BEAM“ („VORSICHT, LASER“) usw.], um sicherzustellen, dass sie nicht verschmutzt sind und korrekt am Gerät angebracht sind.



5) Entsorgung des Geräts, der Verbrauchs- und Verpackungsmaterialien, alter Akkus und IC-RAMs
   - In Bezug auf die Entsorgung und Wiederverwertung des Geräts, der Verbrauchs- und Verpackungsmaterialien, alter Akkus und IC-RAMs, einschließlich Lithiumakkus, sind die einschlägigen nationalen oder regionalen Vorschriften zu befolgen.

Caution:
Dispose of used batteries and IC-RAMs including lithium batteries according to this manual.
Attention:
Se débarrasser de batteries et IC-RAMs usés y compris les batteries en lithium selon ce manuel.
Vorsicht:
Entsorgung der gebrauchten Batterien und IC-RAMs (inclusive der Lithium-Batterie) nach diesem Handbuch.

- **Laseremissionseinheit**

  Diese Einheit besteht aus der Laserdiode, dem Fokussierungsobjektiv, der Blende und dem Zylinderobjektiv.

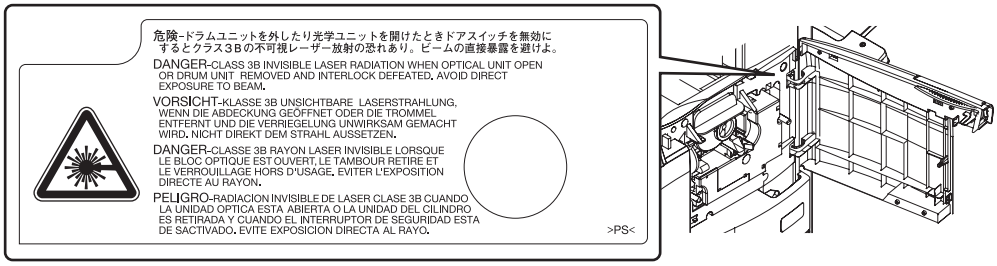
  - Laserdiode

  Diese Laserdiode zeichnet sich durch eine geringe Regeldifferenz, eine kleine Laservariation und einen niedrigen Schwellenstrom aus.
  Die Blende der Laseremissionseinheit ist unter dem Fokussierobjektiv angeordnet, um die Form der Laserstrahlen in der primären und sekundären Scanrichtung festzulegen.
  Die Laserdiode gibt Laserstrahlen als Reaktion auf die Signale der Laseremissionssteuerung (ein/aus) von der Lasertreiber-PC-Platine (LDR) aus. Die durch das Fokussierobjektiv geführten Laserstrahlen werden auf die Trommeloberfläche fokussiert.

  - Vorsichtsmaßnahmen im Zusammenhang mit Lasern

  Dieses Gerät enthält eine Laserdiode, die einen unsichtbaren Laserstrahl emittiert.
  Da man diesen Laserstrahl nicht sehen kann, ist bei der Handhabung der Komponenten der optischen Lasereinheit, bei der Durchführung von Arbeiten und bei der Justierung des Laserstrahls äußerste Vorsicht geboten. Arbeiten dürfen niemals anhand anderer als den vorgeschriebenen Anleitungen durchgeführt werden; andernfalls kann es zu einer Schädigung Exposition durch Laserstrahlung kommen.
  Die Lasereinheit ist vollständig mit einer Schutzabdeckung versiegelt. Solange ausschließlich die Arbeitsschritte der vorgeschriebenen Anleitungen durchgeführt werden, tritt der Laserstrahl nicht aus, und es besteht keine Gefahr, der Laserstrahlung ausgesetzt zu werden.

  Das folgende Laser-Warnetikett ist an der Abdeckung vorne rechts angebracht.



- Warnhinweise:
  - Setzen Sie sich während der Wartungsarbeiten nicht dem Laserstrahl aus.
    Dieses Gerät ist mit einer Laserdiode ausgestattet. Es ist unbedingt zu vermeiden, direkt in den Laserstrahl zu blicken. Keine reflektierenden Teile oder Werkzeuge, wie z. B. Schraubendreher, in den Pfad des Laserstrahls halten. Vor den Wartungsarbeiten sämtliche reflektierenden Metallgegenstände, wie Uhren, Ringe usw., entfernen.
  - Bei Wartungsarbeiten am eingeschalteten Gerät dürfen keine unter Strom stehenden, drehbaren oder betriebsrelevanten Bereiche berührt werden. Nicht direkt in den Laserstrahl blicken.
  - Im Rahmen der Wartung unbedingt das Leistungsschild und die Etiketten mit Warnhinweisen überprüfen [z. B. „Unplug the power cable during service“ („Netzkabel vor Beginn der Wartungsarbeiten abziehen“), „CAUTION. HOT“ („VORSICHT, HEISS“), „CAUTION. HIGH VOLTAGE“ („VORSICHT, HOCHSPANNUNG“), „CAUTION. LASER BEAM“ („VORSICHT, LASER“) usw.], um sicherzustellen, dass sie nicht verschmutzt sind und korrekt am Gerät angebracht sind.

CONTENTS

1. SPECIFICATIONS / ACCESSORIES / OPTIONS / SUPPLIES

1.1 Specifications

Values in [[ ]] are for e-STUDIO205L, values in {{ }} are for e-STUDIO305, values in [ ] are for e-STUDIO355, values in { } are for e-STUDIO455 and values in < > are for e-STUDIO355/455 in case that the specification is different among e-STUDIO205L, e-STUDIO255, e-STUDIO305, e-STUDIO355 and e-STUDIO455.
e-STUDIO255S/305S for CNS is the same as e-STUDIO255/305 for CNS except that the Printer/Scanner Kit (GM-2150C/GM-2160C) is not included.
e-STUDIO305SD for CNS is the same as e-STUDIO305 for CND except that HDD is changed to SSD and the Printer/Scanner Kit (GM-2160C) is not included.
e-STUDIO205SE/255SE/305SE/355SE/455SE for NAS is the same as that for NAD except that the Data Overwrite Enabler (GP-1070) and External Interface Enabler (GS-1020) are included as standard.

1.1.1 General

•Type..... Desktop type (console type: when paper feed pedestal (PFP) and large capacity feeder (LCF) are installed)

•Original glass..... Fixed type (the left rear corner used as guide to place originals)

•Copy process ..... Indirect electrophotographic process (dry)

•Fixing method..... Halogen lamp (2 pieces) <Halogen lamp (3 pieces)>

•Photosensor type ..... OPC

•Original scanning sensor..... Linear CCD sensor

•Scanning light source ..... Xenon lamp

•Reproduction ratio..... Actual ratio: 100±0.5%
Zooming: 25 to 400% in increments of 1%
(25 to 200% when using RADF)

•Resolution ..... Scanning: 600 dpi x 600 dpi
Printing: Equivalent to 2400 dpi x 600 dpi

•Gradation..... 256 steps

•Paper feeding..... 2 drawers + Bypass feeding + LCF (optional)
2 drawers + Bypass feeding + 2 PFP (optional)

•Paper supply ..... Standard drawers:
Stack height 60.5 mm, equivalent to 550 sheets; 80 g/m^2 (20 lb. Bond)): Depends on destinations or versions.

Bypass feeding:
Stack height 11 mm: equivalent to 100 sheets; 80 g/m^2 (20 lb. Bond)

PFP:(Option):

Two drawer: stack height 60.5 mm, 550 sheets; 80 g/m^2 (20 lb. Bond)

LCF:(Option)

Stack height 110 mm x 2: equivalent to 1000 sheets; 80 g/m^2 (20 lb. Bond)

•paper

Paper size	Drawers	A3, A4, A4-R, A5-R, B4, B5, B5-R, FOLIO, 8K, 16K, 16K-R, LD, LG, LT, LT-R, ST-R, COMPUTER, 13"LG, 8.5"x8.5" (Non-standard sizes are not available)
	Bypass feeding	A3, A4, A4-R, A5-R, B4, B5, B5-R, FOLIO, 8K, 16K, 16K-R, LD, LG, LT, LT-R, ST-R, COMPUTER, 13"LG, 8.5"x8.5", Envelope (DL, COM10, Monarch, CHO-3, YOU-4)
	LCF (optional)	A4, LT (Non-standard sizes are not available)
Paper type	Drawers/LCF (optional)	Plain paper (Tracing paper, OHP films, sticker labels, envelopes and punched paper are not available)
	Bypass feeding	Plain paper, Tracing paper, OHP film, Sticker labels, Tab paper, Envelope (DL, COM10, Monarch, CHO-3, YOU-4)
Paper weight	Drawers/LCF (optional)	64 - 105 g/m^2 (17 - 28 lb. Bond)
	Bypass feeding	52 - 209 g/m^2 (14 lb. Bond - 110 lb. Index) (for single feed) Plain paper: 64 - 80 g/m^2 (17 - 20 lb. Bond) Thin paper: 52 - 63 g/m^2 (14 - 17 lb. Bond) Thick 1: 81 - 105 g/m^2 (21 - 28 lb. Bond) Thick 2: 106 - 163 g/m^2 (29 lb. Bond - 90 lb. Index) Thick 3: 164 - 209 g/m^2 (91 - 110 lb. Index)
		64 - 209 g/m^2 (17 lb. Bond - 110 lb. Index)(for continuous feed)
	ADU	64 - 105 g/m^2 (17 - 28 lb. Bond)

•Automatic duplexing unit ..... Stackless, Switchback type

e-STUDIO205L/255/305: No exclusive switchback mechanism
e-STUDIO355/455: Uses an exclusive switchback mechanism

Acceptable paper size

A3, A4, A4-R, A5-R, B4, B5, B5-R, FOLIO, 8K, 16K, 16K-R, LD, LG, LT, LT-R, ST-R, COMPUTER, 13"LG, 8.5" x 8.5"

Acceptable paper weight

64 - 105 g/m^2 (17 - 28 lb. Bond)

•Offset mechanism ..... e-STUDIO205L/255/305: No exclusive offset mechanism
e-STUDIO355/455: Uses an exclusive offset mechanism

Offsetting mechanism with movable exit roller
(Shift amount: 30 mm, Stack height: 40 mm (250 sheets))

•Interface ..... Standard:

USB 2.0 (High Speed),
Ethernet (10BASE-T/100BASE-TX)

Optional:

Wireless LAN (IEEE 802.11b/g),
Bluetooth (HCRP and BIP)

•Toner supply ..... Automatic toner density detection/supply
Toner cartridge replacing method (There is a recovered toner supply mechanism.)

•Toner density control ..... Automatic density mode and manual density mode selectable in 11 steps

•Memory (RAM) ..... Main memory: 1GB(Incl. page memory)

•HDD 60GB

•Account Codes ..... 10,000 codes

•Department Codes ..... 1,000 codes

•Warming-up time ..... Approx. 20 sec. (temperature: 20°C)

•Power requirements ..... AC 110 V / 13.2 A, 115 V or 127 V / 12 A
220-240 V or 240 V / 8 A (50/60 Hz)

* The acceptable value of each voltage is ±10%.

•Power consumption ..... 1.5 kW or less (115 V series, 200 V series)
Super Sleep mode: 1 W or less (When the damp heater switch is set to OFF, and only 1 FAX line is used)

* The electric power is supplied to the RADF, (ADU), Finisher, Job Separator, Offset Tray, PFP and LCF through the equipment.

•Total counter ..... Electronical counter

•Dimensions of the equipment ..... See the figure below (W 575 x D 586 x H 756 (mm))

* The height includes the surface of the original glass.

* When the tilt angle of the control panel is 7 to 84 degrees.

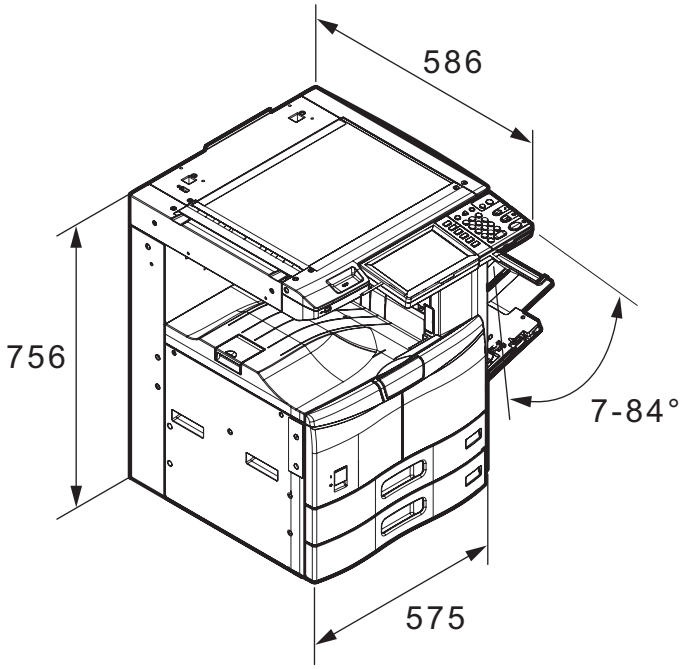


Fig. 1-1

•Weight	Approximately 57 kg (125.66 lb.): e-STUDIO205L/255/305 (include the developer material and drum) Approximately 60 kg (132.28 lb.): e-STUDIO355/455 (include the developer material and drum)

1.1.2 Copy

•Reversing automatic document feeder (Option)

Original scanning system:

Fixed scanning system by feeding the original (the center used as guide to place originals)

Original type:

Sheets (carbon, bounded or stapled originals cannot be accepted)

Original size:

A3, A4, A4-R, A5-R, B4, B5, B5-R, LD, LG, LT, LT-R, ST-R

Original paper weight:

Single-sided copy: 35 - 157 g/m^2 (9.3 - 41.8 lb. Bond)

Double-sided copy: 50 - 157 g/m^2 (13.3 - 41.8 lb. Bond)

Original capacity

Max. 100 sheets (80 g/m^2) (Stack height 16 mm)

•Accepted originals ..... Sheet, book and 3-dimensional object. The reversing automatic document feeder (RADF) only accepts paper which are not pasted or stapled. Carbon paper are not acceptable either.
Maximum size: A3/LD

Single - sided original	Double - sided original
35 - 157 g/m^2 (9.3 - 41.8 lb. Bond)	50 - 157 g/m^2 (13.3 - 41.8 lb. Bond)

•Eliminated portion..... Leading edges: 3.0±2.0 mm, Side/trailing edges: 2.0±2.0 mm (copy)
Leading / trailing edges: 4.2±2.0 mm, Side edges: 4.2±2.0 mm (print)

•Multiple copying..... Up to 999 copies; Key in set numbers

•First copy time ..... Approx. [[4.7]] 4.7 {{4.7}} <3.7> sec. or less
(A4/LT, upper drawer, 100%, original placed manually)

•Copy speed (Copies/min.)

e-STUDIO205L

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	20.3	20.3	13.2	20.3	20.3
A4-R, B5-R, LT-R	16.9	16.9	13.2	16.9	–
B4, LG	14.8	14.8	13.2	14.8	–
A3, LD	13.2	13.2	13.2	13.2	–

e-STUDIO255

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	25.3	25.3	16.8	25.3	25.3
A4-R, B5-R, LT-R	23.3	23.3	16.8	23.3	–
B4, LG	19.5	19.5	16.8	19.5	–
A3, LD	16.8	16.8	16.8	16.8	–

e-STUDIO305

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	30.3	30.3	16.8	30.3	30.3
A4-R, B5-R, LT-R	23.3	23.3	16.8	23.3	–
B4, LG	19.5	19.5	16.8	19.5	–
A3, LD	16.8	16.8	16.8	16.8	–

e-STUDIO355

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	35.3	35.3	25.4	35.3	35.3
A4-R, B5-R, LT-R	35.0	35.0	25.4	35.0	–
B4, LG	29.5	29.5	25.4	29.5	–
A3, LD	25.4	25.4	25.4	25.4	–

e-STUDIO455

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	45.3	45.3	25.4	45.3	45.3
A4-R, B5-R, LT-R	35.0	35.0	25.4	35.0	–
B4, LG	29.5	29.5	25.4	29.5	–
A3, LD	25.4	25.4	25.4	25.4	–

* "–" means "Not acceptable".

* The copy speed in the above table are available when originals are manually placed for single side, multiple copying.

Copy speed for thick paper (Copies/min.)

Thick 1 (81 - 105 g/m^2, 21 - 28 lb. Bond)

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}
A4-R, B5-R, LT-R	[[16.5]] 22.5 {{22.5}} [33.9] {33.9}	[[16.5]] 22.5 {{22.5}} [33.9] {33.9}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[16.5]] 22.5 {{22.5}} [33.9] {33.9}	[[-]] - {{-}} [-] {-}
B4, LG, FOLIO, COMPUTER	[[14.5]] 19.0 {{19.0}} [28.7] {28.7}	[[14.5]] 19.0 {{19.0}} [28.7] {28.7}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[14.5]] 19.0 {{19.0}} [28.7] {28.7}	[[-]] - {{-}} [-] {-}
A3, LD	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}

Thick 2 (106 - 163 g/m^2, 29 lb. Bond - 90 lb. Index)

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	[[-]] - {{-}} [-] {-}	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
A4-R, B5-R, LT-R	[[-]] - {{-}} [-] {-}	[[16.5]] 22.5 {{22.5}} [33.9] {33.9}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
B4, LG, FOLIO, COMPUTER	[[-]] - {{-}} [-] {-}	[[14.5]] 19.0 {{19.0}} [28.7] {28.7}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
A3, LD	[[-]] - {{-}} [-] {-}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}

Thick 3 (164 - 209 g/m^2, 91 - 110 lb. Index)

Paper size	Drawer	Bypass feed		PFP	LCF
		Size specified	Size not specified		
A4, LT, B5, A5-R, ST-R	[[-]] - {{-}} [-] {-}	[[19.7]] 25.3 {{29.0}} [35.3] {43.4}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
A4-R, B5-R, LT-R	[[-]] - {{-}} [-] {-}	[[16.5]] 22.5 {{22.5}} [33.9] {33.9}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
B4, LG, FOLIO, COMPUTER	[[-]] - {{-}} [-] {-}	[[14.5]] 19.0 {{19.0}} [28.7] {28.7}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}
A3, LD	[[-]] - {{-}} [-] {-}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[12.9]] 16.4 {{16.4}} [24.8] {24.8}	[[-]] - {{-}} [-] {-}	[[-]] - {{-}} [-] {-}

* "–" means "Not acceptable".
* Only A4/LT size is available for the LCF.
* The tolerance is within ±2.

* System copy speed

		A4 (%)			
		1 sheet	5 sheets	10 sheets	20 sheets
e-STUDIO 205L	Single-sided originals ↓ Single-sided copies	92	97	99	100
	Single-sided originals ↓ Double-sided copies	83	97	99	100
	Double-sided originals ↓ Double-sided copies	88	99	100	100
	Double-sided originals ↓ Single-sided copies	93	99	100	100

		A4 (%)			
		1 sheet	5 sheets	10 sheets	20 sheets
e-STUDIO 255	Single-sided originals ↓ Single-sided copies	89	96	98	99
	Single-sided originals ↓ Double-sided copies	78	95	98	99
	Double-sided originals ↓ Double-sided copies	80	97	99	100
	Double-sided originals ↓ Single-sided copies	87	98	99	100
e-STUDIO 305	Single-sided originals ↓ Single-sided copies	85	94	97	99
	Single-sided originals ↓ Double-sided copies	72	93	96	98
	Double-sided originals ↓ Double-sided copies	67	96	98	99
	Double-sided originals ↓ Single-sided copies	72	97	99	100
e-STUDIO 355	Single-sided originals ↓ Single-sided copies	88	96	97	99
	Single-sided originals ↓ Double-sided copies	72	93	96	98
	Double-sided originals ↓ Double-sided copies	60	96	97	99
	Double-sided originals ↓ Single-sided copies	64	97	99	100
e-STUDIO 455	Single-sided originals ↓ Single-sided copies	83	92	96	98
	Single-sided originals ↓ Double-sided copies	61	90	94	97
	Double-sided originals ↓ Double-sided copies	47	94	97	98
	Double-sided originals ↓ Single-sided copies	49	96	98	99

* The system copy speed, including scanning time, is available when 10 sheets of A4/LT size original are set on RADF and one of the copy modes in the above table is selected. The period of time from pressing [START] to the paper exit completely out of the equipment based on the actually measured value.
* Upper drawer is selected and copying is at the non-sort mode.
* Automatic copy density, APS/AMS are turned off.
* Finisher is not installed.

1.1.3 Print

Page Description Language (Printer Driver)		PCL6, PostScript 3 emulation, XPS
Page Description Language (RIP)		PCL6, PostScript 3 emulation, XPS, PCL5e, PDF(emulation)
Supported OS		Windows 2000 / XP / Server 2003 / Server 2003 R2/ Vista / Server 2008/ Server 2008 R2 / Windows 7 / Mac OS X (Ver.10.2.4 or higher) Solaris (SUN) / HP-UX / AIX (IBM) / Linux / SCO
Resolution		600 x 600 dpi
Eliminated portion		Leading edges / Trailing edges / Side edges: 4.2 (±2.0) mm
Interface	Standard	USB 2.0 (High Speed), Ethernet (10BASE-T/100BASE-TX)
	Optional	Wireless LAN (IEEE 802.11b/g), Bluetooth

1.1.4 Scan

Scanning speed	45 sheets/min
Resolution	600 x 600 dpi
Original mode	[TEXT], [TEXT/PHOTO], [PHOTO], [Printed Image]
File formats	JPEG (Gray/Color), Multi/Single page TIFF, Multi/Single page PDF, Multi/Single page XPS

* Measuring condition of the scanning speed: Scanning single-sided A4/LT originals in the Text/Photo mode with 100% reproduction ratio using the RADF

1.1.5 e-Filing

Number of Boxes	Public Box	1
	User Box	200
Number of Folder		100 folders per box
Number of Document		400 documents per box/folder
Number of Page		200 pages per document
Capacity of HDD	e-Filing	9.5 GB

1.1.6 Internet Fax

[1] Internet FAX transmission

Resolution	TX Resolution < dots/mm >	Standard (8 x 3.85), Fine (8 x 7.7), U-Fine (16 x 15.4)* * If U-Fine is selected in TX resolution, data is converted to Fine resolution in RX.
Scanning	Original Document Size	A3, B4, A4, A4-R, A5, B5, B5-R, A5-R, LT, LT-R, LG, LD, ST, ST-R, Computer, FOLIO
	Speed	0.7sec. (per page/A4) Max.50 spm (ITU-T No.1, A4, 8 x 3.85,Text mode)
	Gray scale	256 levels (Error Diffusion)
Address book	Address Book	1000 stations
	Group	Max. 200 stations
Transmission Features	Broadcast transmission	Max. 400 destinations/job. (Fax number and E-mail address are available to registered in same job.)
	Message size limitation	Max. 30M Byte
	Message division	Page by page

[2] Internet FAX receiving

Format of receive attachment	TIFF-FX (Profile S, F, J)

1.1.7 Network Fax

Compatibility		Super G3, G3 (ITU-T.30) Internet Fax (Simple mode) (ITU-T.37)
TX Resolution	PSTN	Standard: 200 x 100 dpi, Fine: 200 x 200 dpi, Super Fine: 200 x 400 dpi, Ultra Fine: 400 x 400 dpi
	Internet Fax	200 dpi x 200 dpi
Original Document Size		A3, B4, A4, B5, A5, LT, LG, LD, ST, FOLIO, Computer
Mail Box	User defined	Max. 300 boxes
Data transfer format	Send to e-Filing	MMR
	Send to File (SMB)	Single TIFF, Multi-TIFF, Single PDF, Multi PDF
	Send to FTP	Single TIFF, Multi-TIFF, Single PDF, Multi PDF
	Send to E-mail	Single TIFF, Multi-TIFF, Single PDF, Multi PDF
	Send to I-Fax	TIFF-S
	Send to PSTN-FAX	MMR

1.2 Accessories

Unpacking/setup instruction	1 set
Operator’s manual	1 set (except for MJD)
Operator's manual pocket	1 pc. (for AUD)
Power cable	1 pc.
Warranty sheet	1 pc. (for NAD)
Setup report	1 set (for NAD and MJD, CND)
Drum (installed inside of the equipment)	1 pc.
Toner cartridge	1 pc. (except for NAD, MJD)
Developer material	1 pc. (except for NAD, MJD)
Control panel stopper	1 pc.
Rubber plug	6 pcs.
CD-ROM	1 set

Machine version

NAD: North America
ARD: Argentina and 220-volt South America
ASD: Hong Kong
AUD: Australia
MJD: Europe
SAD: Saudi Arabia
CND: China
TWD: Taiwan
JPD: Japan

1.3 Options

	e-STUDIO205L/255/305	e-STUDIO355/455
Original Cover	KA-1640 PC/PC-C	KA-1640 PC/PC-C
Reversing Automatic Document Feeder (RADF)	MR-3021/C	MR-3022/C
Drawer Module	MY-1033/C	MY-1033/C
Paper Feed Pedestal (PFP)	KD-1025/C	KD-1025/C
Large Capacity Feeder (LCF)	KD-1026 A4/LT/A4-C	KD-1026 A4/LT/A4-C
Finisher	-	MJ-1101/-C
Hanging Finisher	MJ-1031/C	MJ-1031/C
Saddle Stitch Finisher	MJ-1025	MJ-1024
Hole Punch Unit	MJ-6005N/E/F/S *1 (for MJ-1025)	MJ-6004N/E/F/S *1 (for MJ-1024) MJ-6101N/E/F/S *1 (for MJ-1101)
Staple Cartridge	STAPLE-2000 (for MJ-1025/MJ-1031)	STAPLE-600 (for MJ-1024) STAPLE-2000 (for MJ-1024/MJ-1031) STAPLE-2400 (for MJ-1101)
Bridge Kit	KN-2520/C	KN-2520/C
Job Separator	MJ-5004/-C	MJ-5006/C
Offset Tray	MJ-5005/-C	-
Operator's manual pocket	KK-1660/C	KK-1660/C
Accessible Arm	KK-2550	KK-2550
Work Table	KK-4550/C	KK-4550/C
Damp Heater Kit	MF-4550 U/E	MF-4550 U/E
Fax Unit	GD-1250 NA/EU/AU/AS/TW/C	GD-1250 NA/EU/AU/AS/TW/C
2nd Line for Fax Unit	GD-1260 NA/EU/AU/TW/C	GD-1260 NA/EU/AU/TW/C
Printer kit	GM-1150/C	GM-1160/C
Printer/Scanner kit	GM-2150/C	GM-2160/C
Scanner kit	GM-4150/C	GM-4160/C
Wireless LAN Module	GN-1050/C	GN-1050/C
Bluetooth Module	GN-2010	GN-2010
Antenna	GN-3010/C	GN-3010/C
e-BRIDGE ID Gate	KP-2004 (HID) KP-2005/C (MIFARE)	KP-2004 (HID) KP-2005/C (MIFARE)
Desk	MH-2520	MH-2520
Meta Scan Enabler	GS-1010	GS-1010
External Interface Enabler	GS-1020	GS-1020
Data Overwrite Enabler	GP-1070	GP-1070
IP Sec Enabler	GP-1080	GP-1080
Harness kit for coin controller	GQ-1180	GQ-1180

* 1) N: North America E: Europe F: France S: Sweden

Notes:

- "-" means "Not acceptable".
- The bridge unit (KN-2520) is necessary for installation of the finisher (MJ-1101, MJ-1024, MJ-1025, MJ-1031).
- The finisher (MJ-1101) is necessary for installation of the hole punch unit (MJ-6101N/E/F/S).
- The finisher (MJ-1024) is necessary for installation of the hole punch unit (MJ-6004N/E/F/S).
- The finisher (MJ-1025) is necessary for installation of the hole punch unit (MJ-6005N/E/F/S).
- The antenna (GN-3010) is necessary to enable the wireless LAN Module (GN-1050) and Bluetooth module (GN-2010).
- Only one Antenna (GN-3010) can be installed in the Bluetooth Module (GN-2010), while up to two can be installed in the Wireless LAN Module (GN-1050).
- The Work Table (KK-4550) and the e-BRIDGE ID Gate (KP-2004/2005) cannot be installed together.

1.4 Supplies

	e-STUDIO205L	STUDIO255/305	e-STUDIO355/455
Drum	OD-4530 /C	OD-4530 /C	OD-4530 /C
Toner cartridge	PS-ZT4530(1) /T/D/C/E/A*1 PS-ZT4530C10K(1)	PS-ZT4530(1) /T/D/C/E/A*1 PS-ZT4530C10K(1)	PS-ZT4530(1) /T/D/C/E/A*1 PS-ZT4530C10K(1)
Developer	D-4530 /C	D-4530 /C	D-4530 /C

* 1) T: Taiwan D: Asia C: China E: Europe A: Argentina/220-volt South America NONE: North America

1.5 System List

1.5.1 e-STUDIO205L/255/305

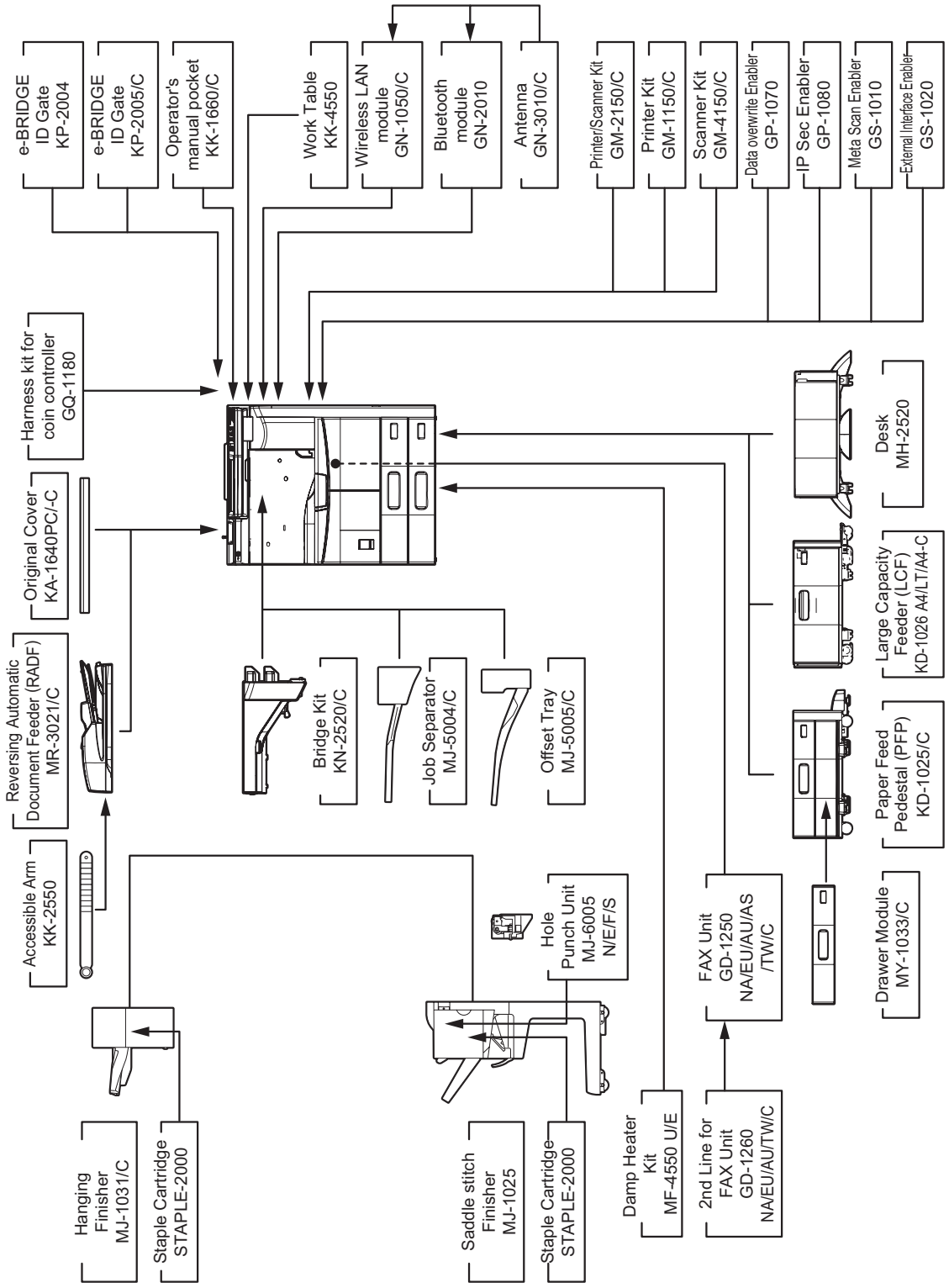


Fig. 1-2

1.5.2 e-STUDIO355/455

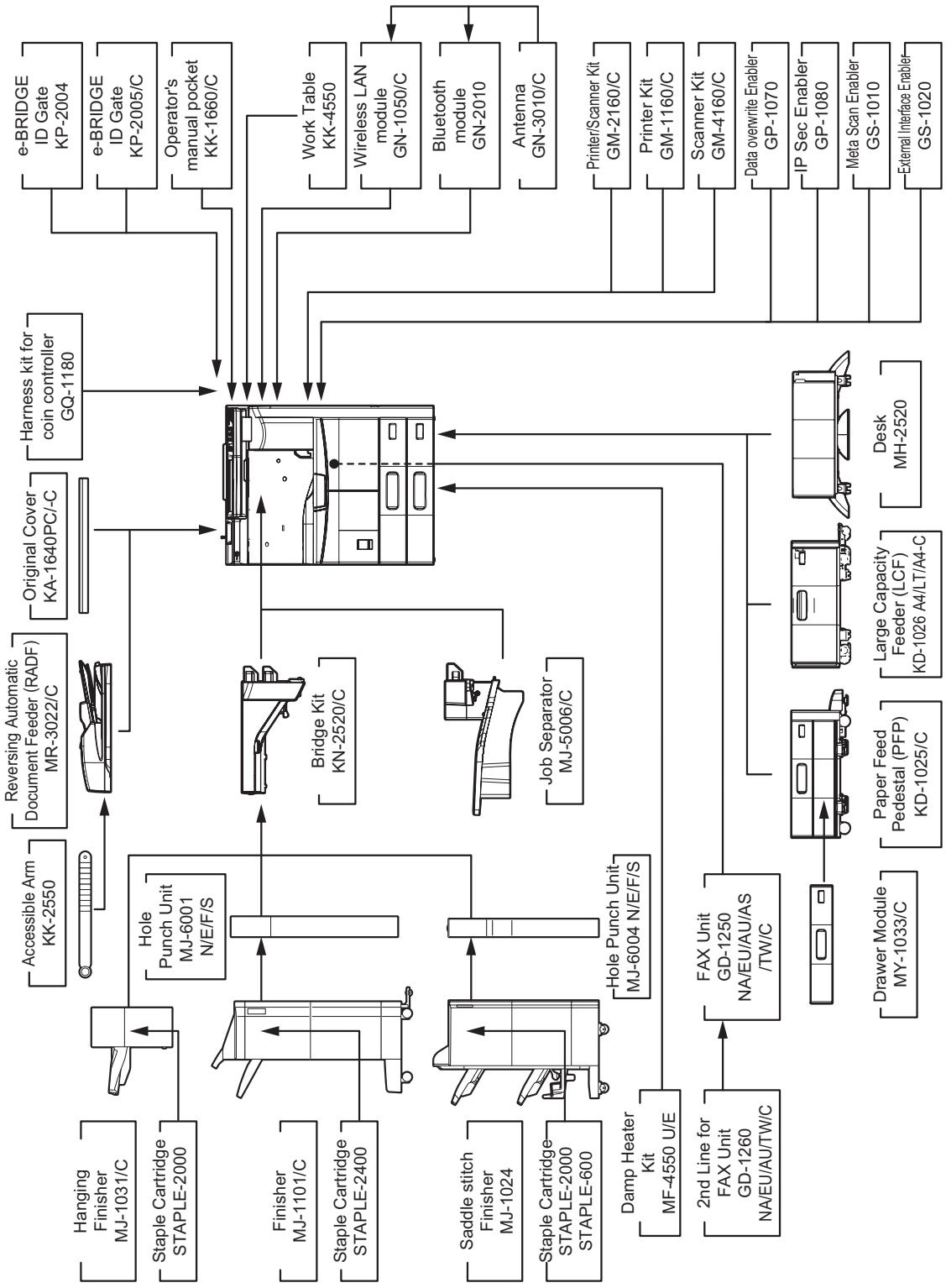


Fig. 1-3

2. OUTLINE OF THE MACHINE

2.1 Sectional View

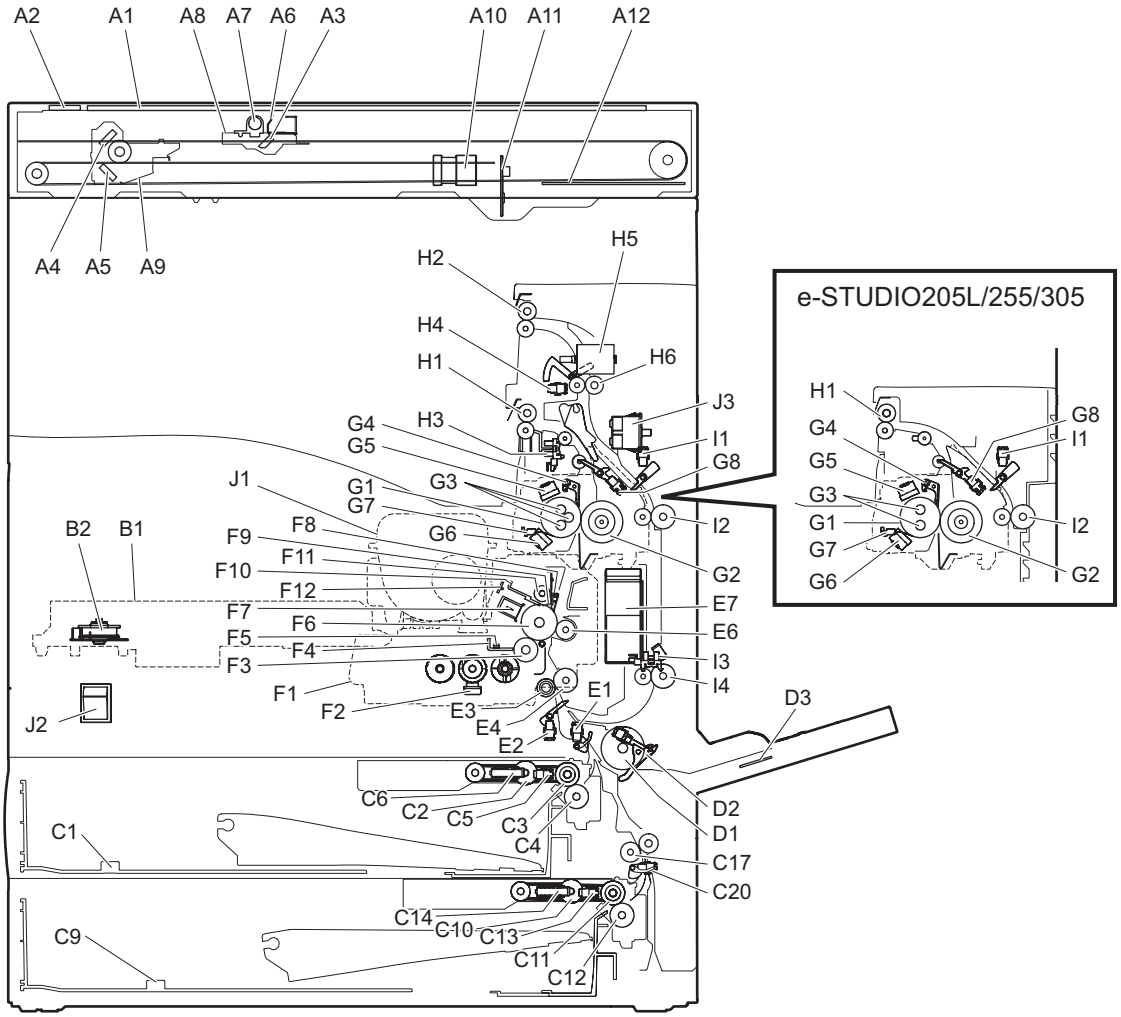


Fig. 2-1 Front side view

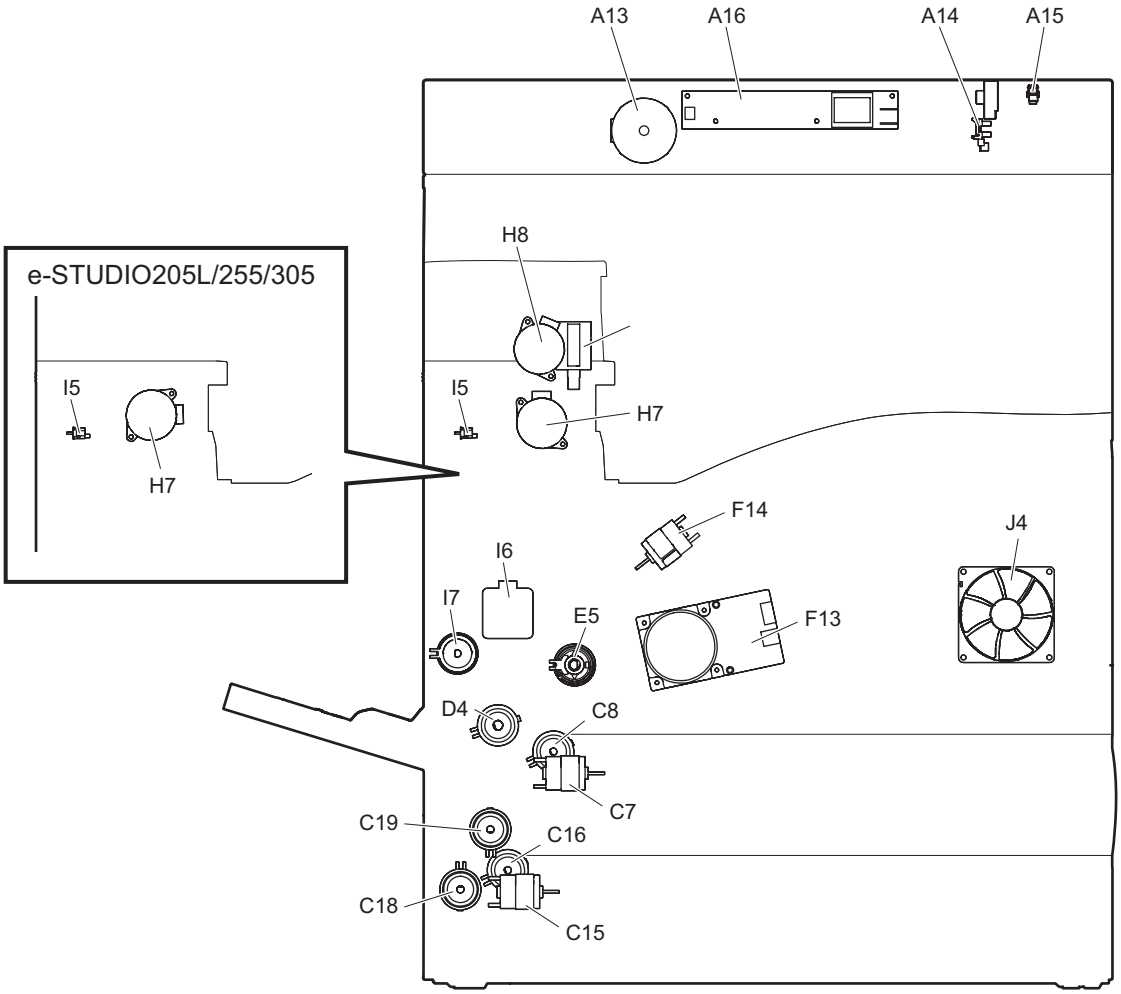


Fig. 2-2 Rear side view

A1	Original glass	E5	Registration roller clutch
A2	RADF original glass	E6	Transfer roller
A3	Mirror-1	E7	TRU fan
A4	Mirror-2	F1	Developer unit
A5	Mirror-3	F2	Auto-toner sensor
A6	Reflector	F3	Developer sleeve (magnetic roller)
A7	Exposure lamp	F4	Doctor blade
A8	Carriage-1	F5	Drum thermistor
A9	Carriage-2	F6	Drum
A10	Lens	F7	Main charger
A11	CCD driving PC board (CCD board)	F8	Separation finger for drum
A12	Scanning section control PC board (SLG board)	F9	Recovery blade
A13	Scan motor	F10	Cleaning blade
A14	Platen sensor	F11	Toner recovery auger
A15	Carriage home position sensor	F12	Discharge LED
A16	Inverter board	F13	Main motor
B1	Laser optical unit	F14	Toner motor
B2	Polygonal motor	G1	Heat roller
C1	Upper drawer	G2	Pressure roller
C2	Upper drawer pickup roller	G3	Heater lamp (center/side)
C3	Upper drawer feed roller	G4	Separation finger for heat roller
C4	Upper drawer separation roller	G5	Fuser center thermostat
C5	Upper drawer tray-up sensor	G6	Fuser front thermostat
C6	Upper drawer empty sensor	G7	Center/side/edge thermistor
C7	Upper tray-up motor	G8	Exit sensor
C8	Upper drawer feed clutch	H1	Exit roller
C9	Lower drawer	H2	Reverse exit roller
C10	Lower drawer pickup roller	H3	Offset gate home position sensor
C11	Lower drawer feed roller	H4	Reverse sensor
C12	Lower drawer separation roller	H5	Offset gate motor
C13	Lower drawer tray-up sensor	H6	Upper transport roller
C14	Lower drawer empty sensor	H7	Exit motor
C15	Lower tray-up motor	H8	Reverse motor
C16	Lower drawer feed clutch	H9	Reverse gate solenoid
C17	transport roller	I1	ADU entrance sensor
C18	Low speed transport clutch	I2	ADU upper transport roller
C19	High speed transport clutch	I3	ADU exit sensor
C20	2nd transport sensor	I4	ADU lower transport roller
D1	Bypass feed roller	I5	ADU opening/closing switch
D2	Bypass paper sensor	I6	ADU motor
D3	Paper size detection board	I7	ADU clutch
D4	Bypass feed clutch	J1	Toner cartridge
E1	1st transport sensor	J2	Main power switch
E2	Registration sensor	J3	ADU interlock switch
E3	Registration roller (rubber)	J4	Switching regulator cooling fan
E4	Registration roller (metal)		

2.2 Electric Parts Layout

1. Scanner unit, control panel

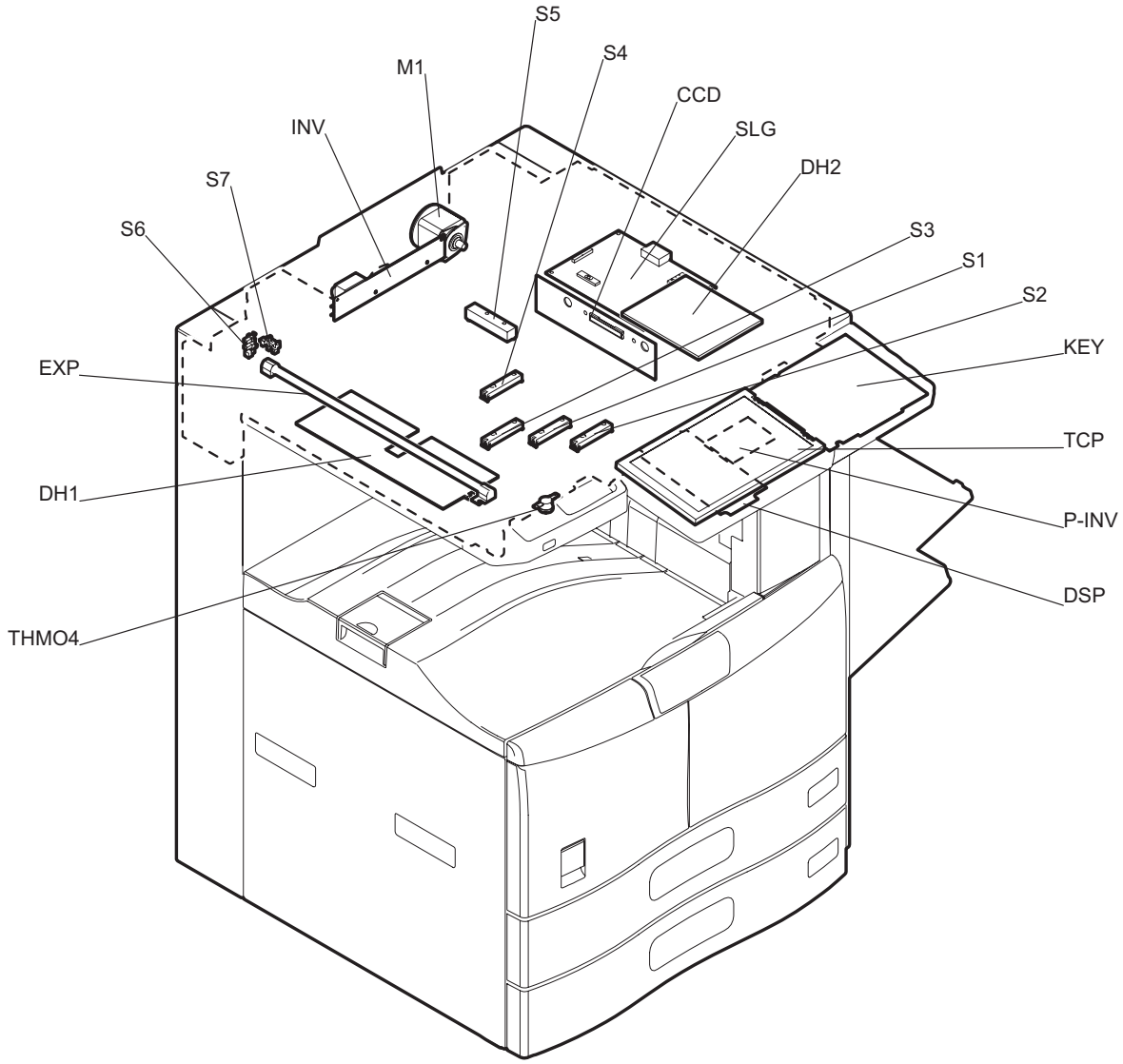


Fig. 2-3

2. Power supply, developer unit

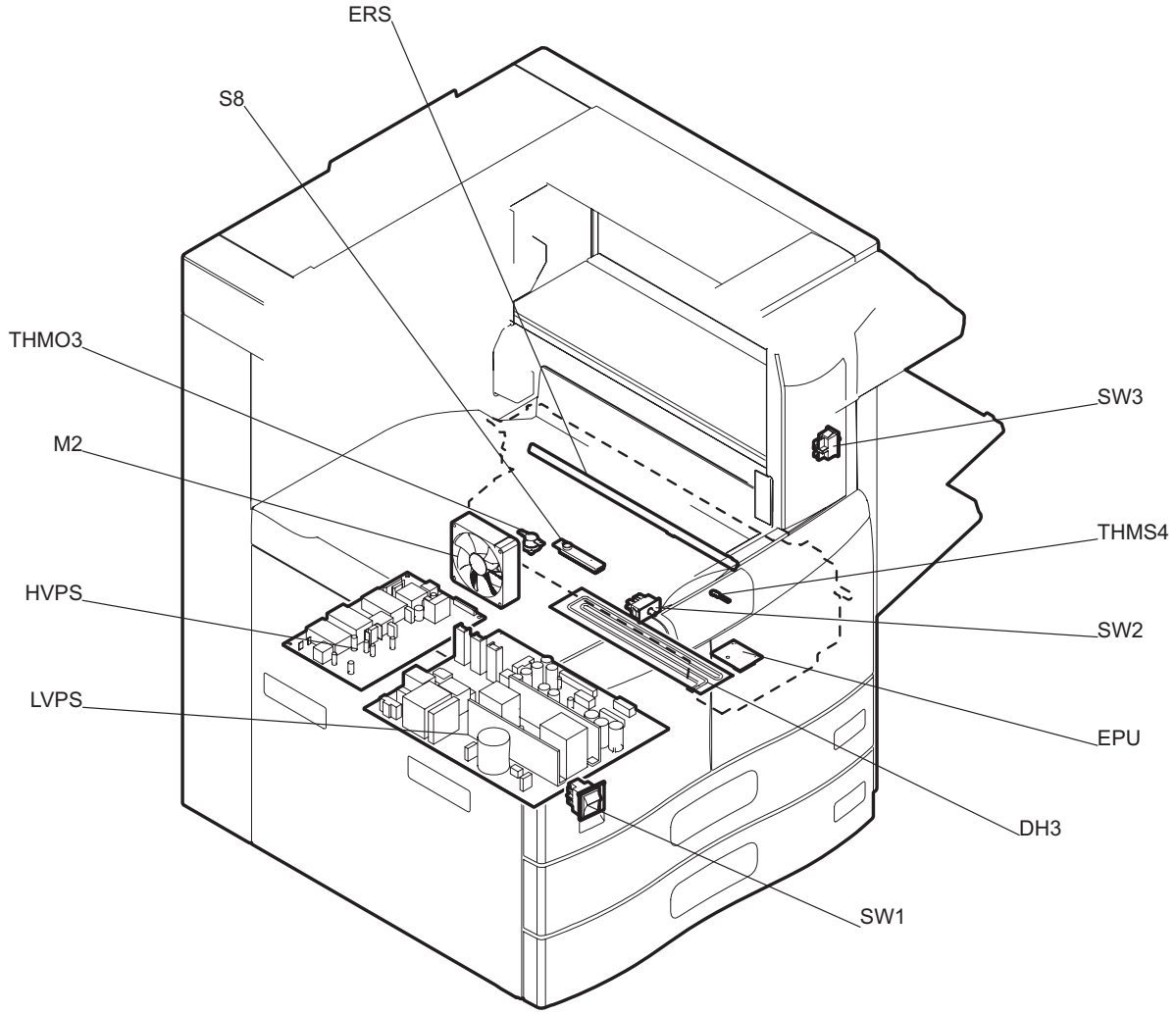


Fig. 2-4

3. Laser unit, fuser unit, toner cartridge

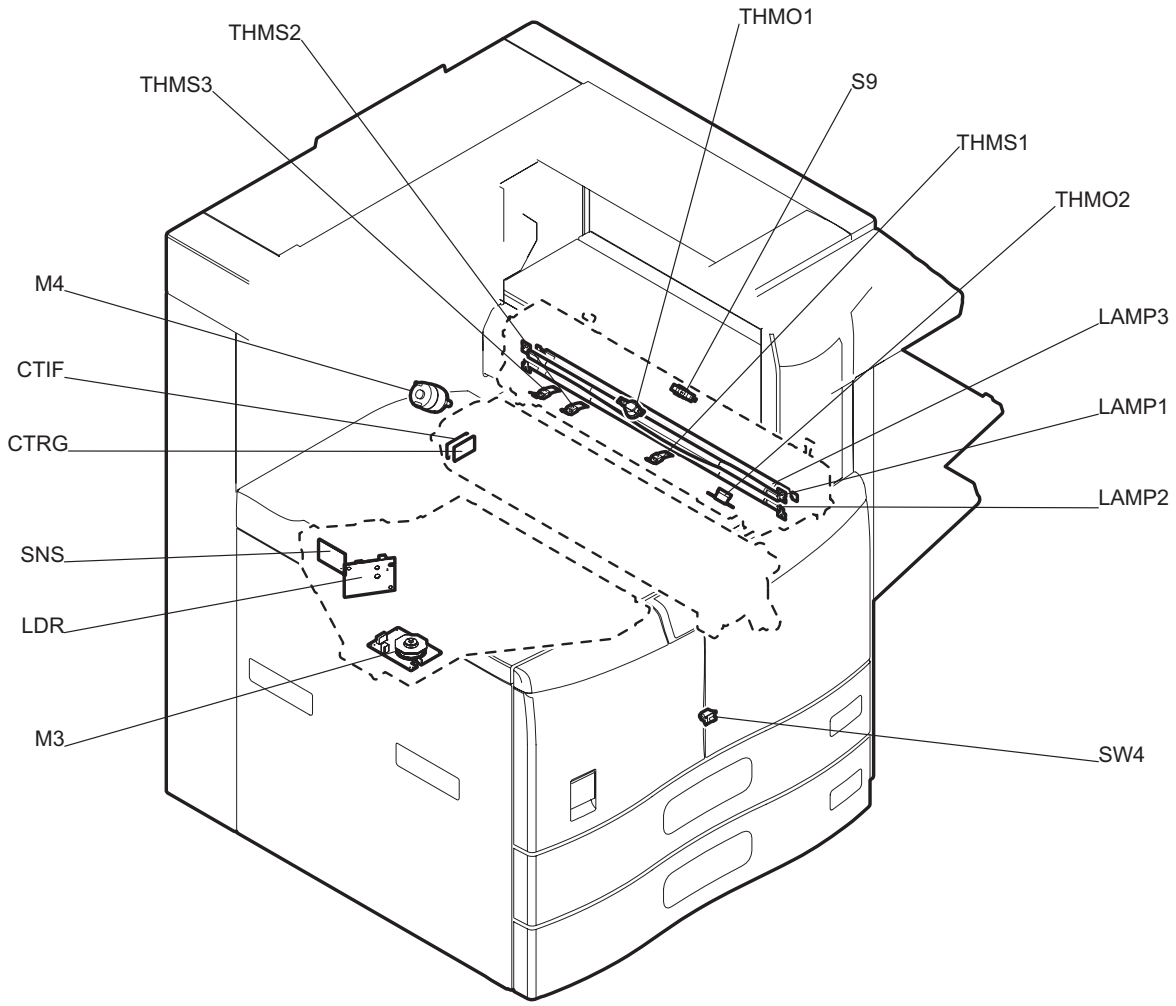


Fig. 2-5

4. Drive unit

e-STUDIO205L/255/305

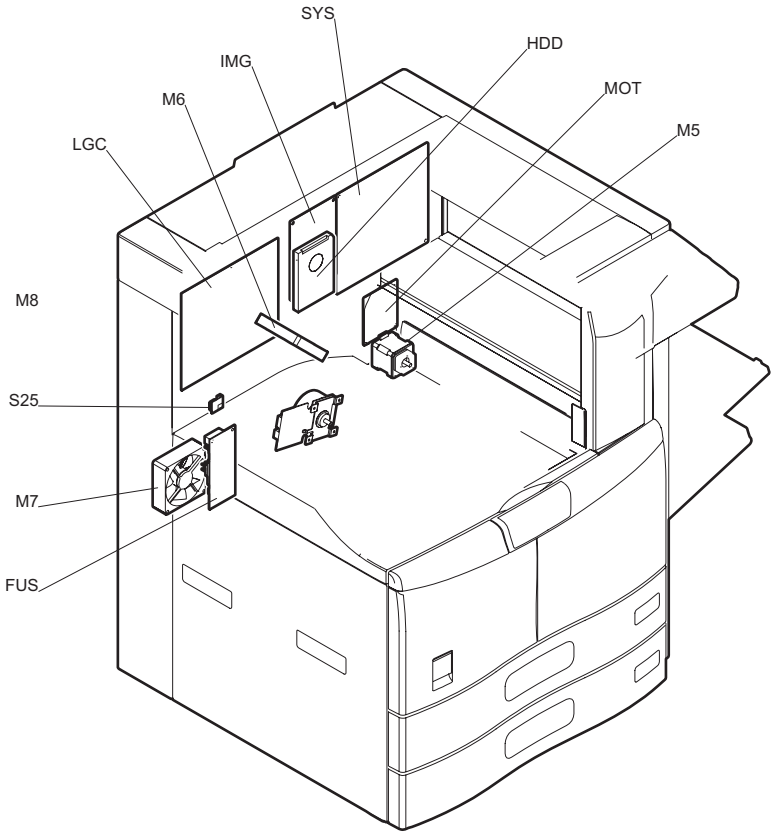


Fig. 2-6

e-STUDIO205L/255/305(SYS-IMG)

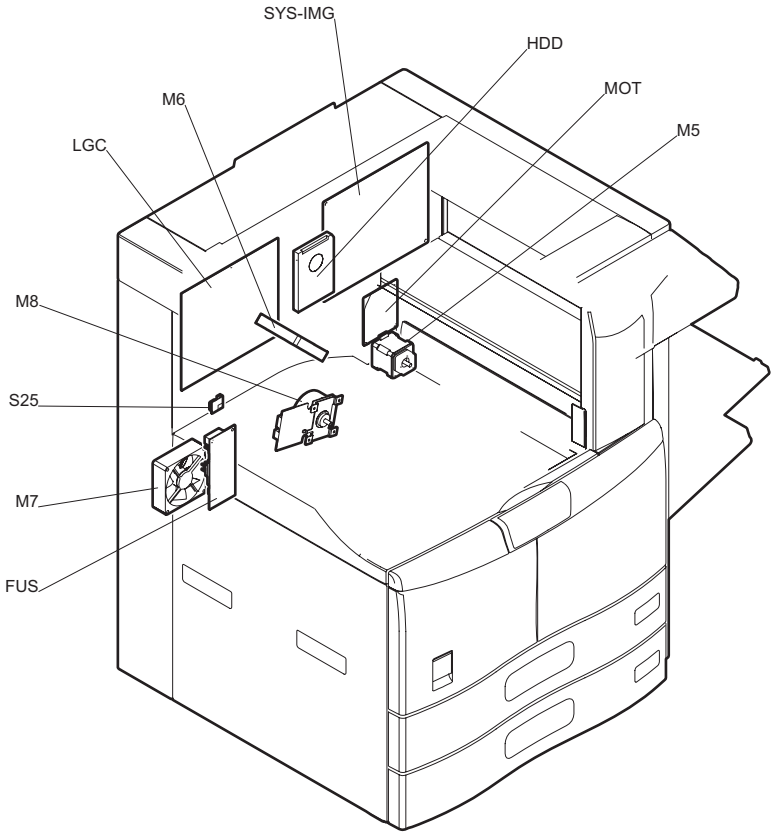


Fig. 2-7

e-STUDIO355/455

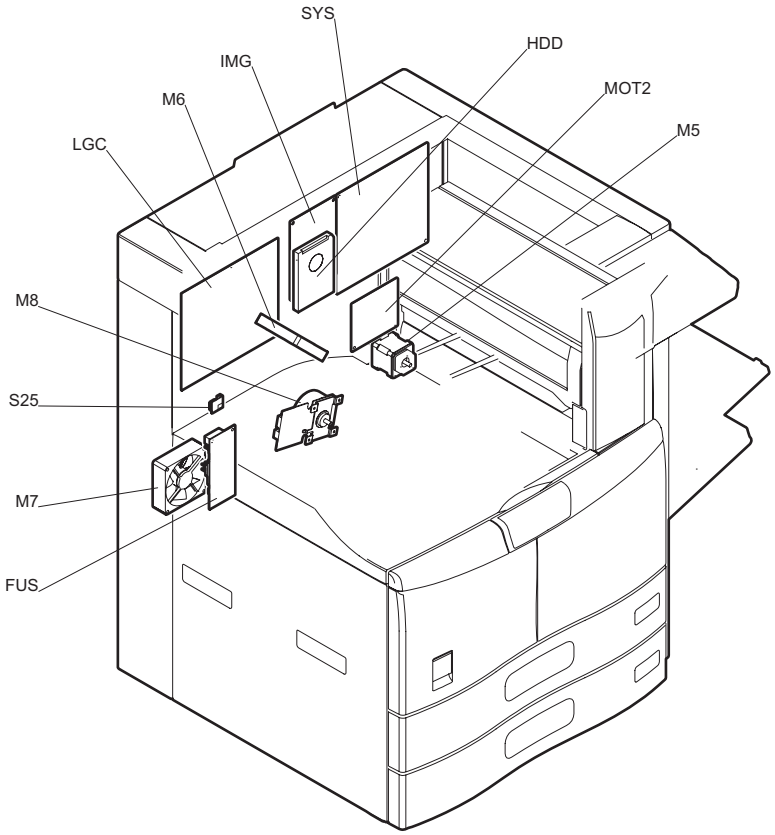


Fig. 2-8

e-STUDIO355/455(SYS-IMG)

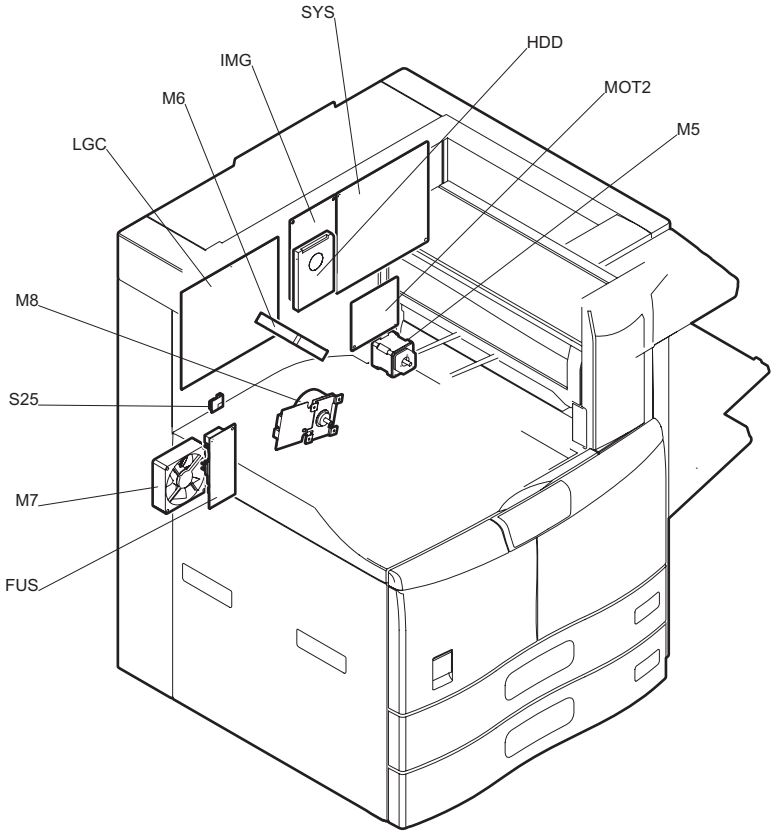


Fig. 2-9

5. Automatic duplexing unit, transfer unit, exit unit
e-STUDIO205L/255/305

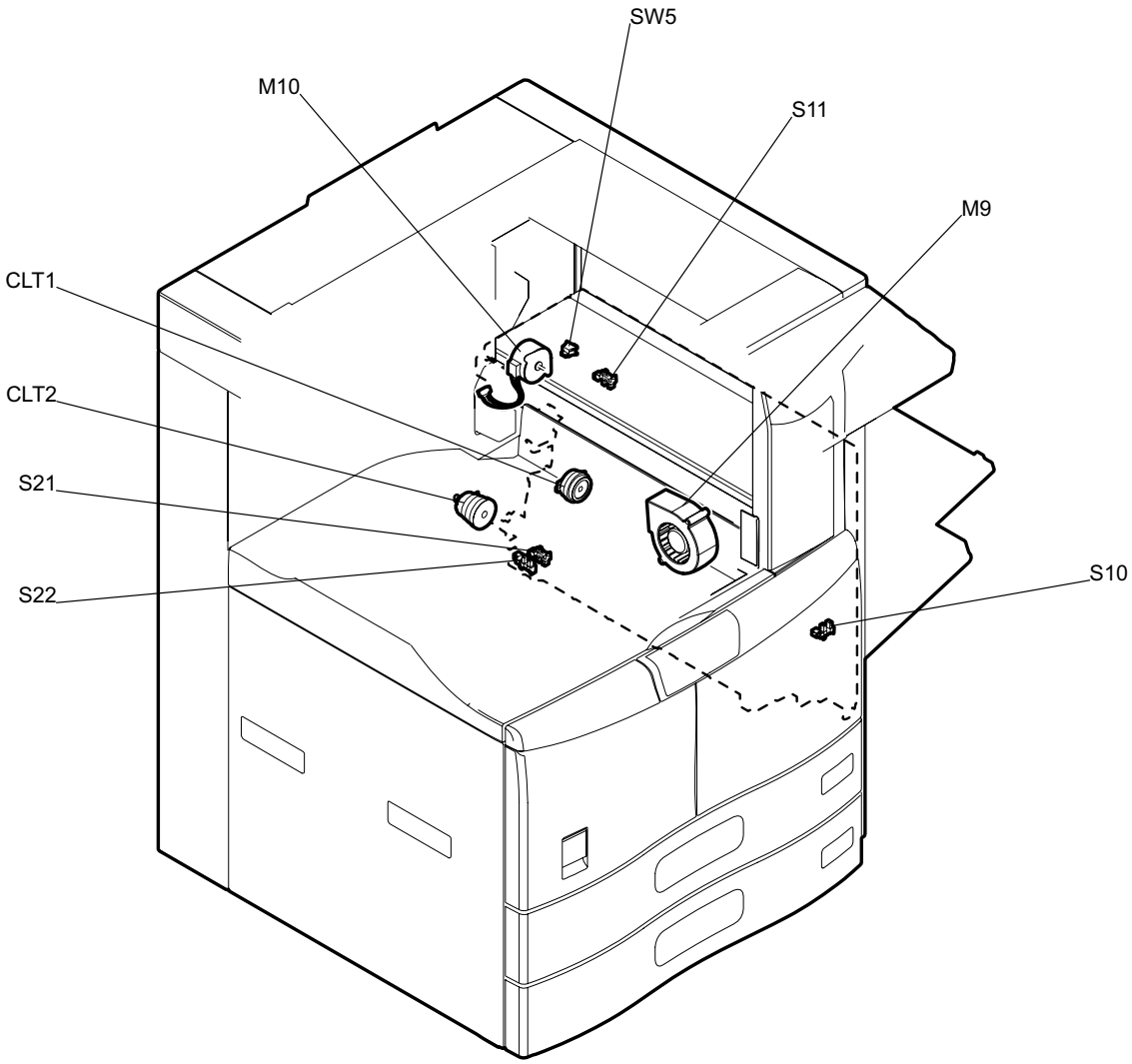


Fig. 2-10

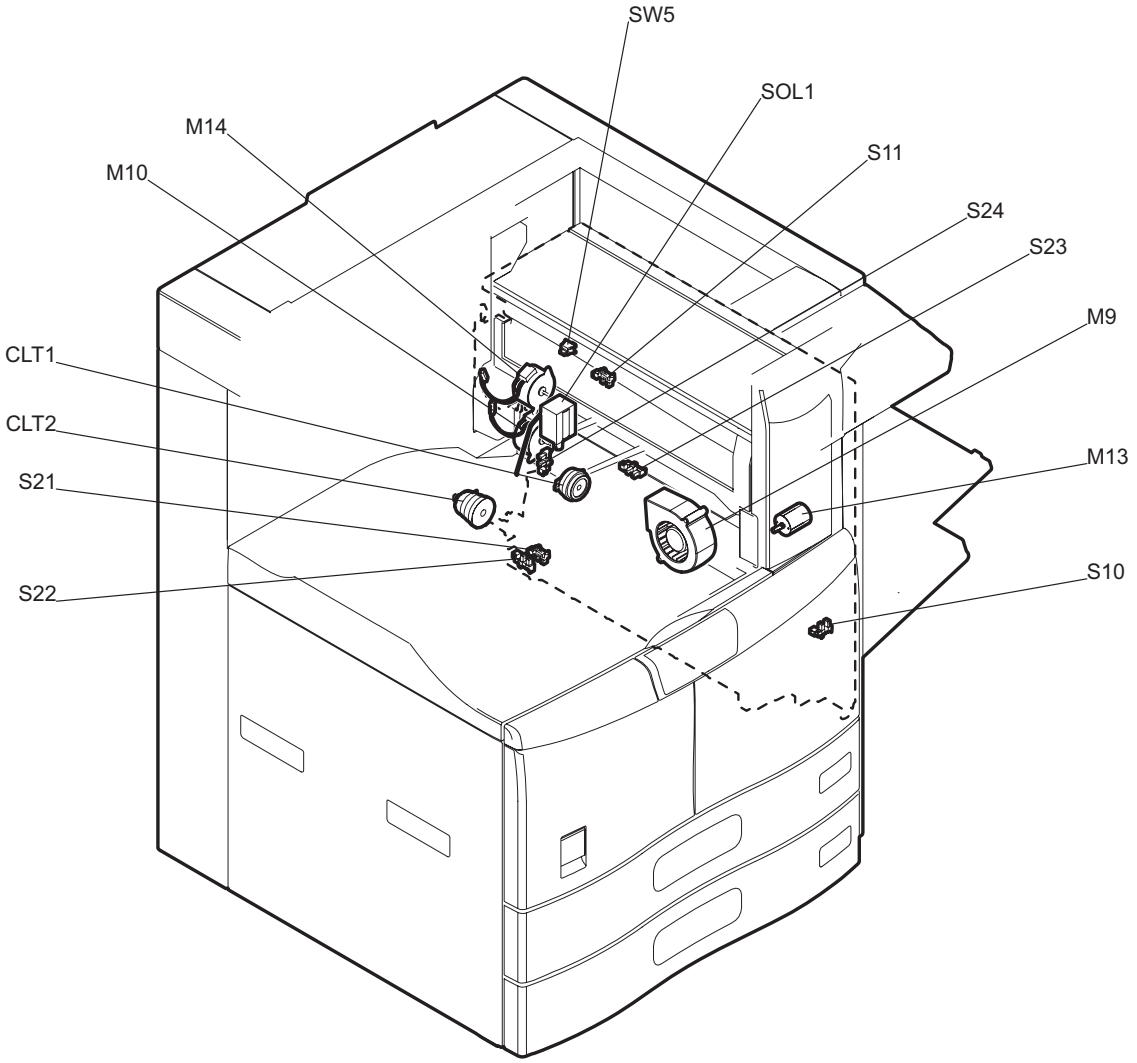


Fig. 2-11

6. Bypass feed unit

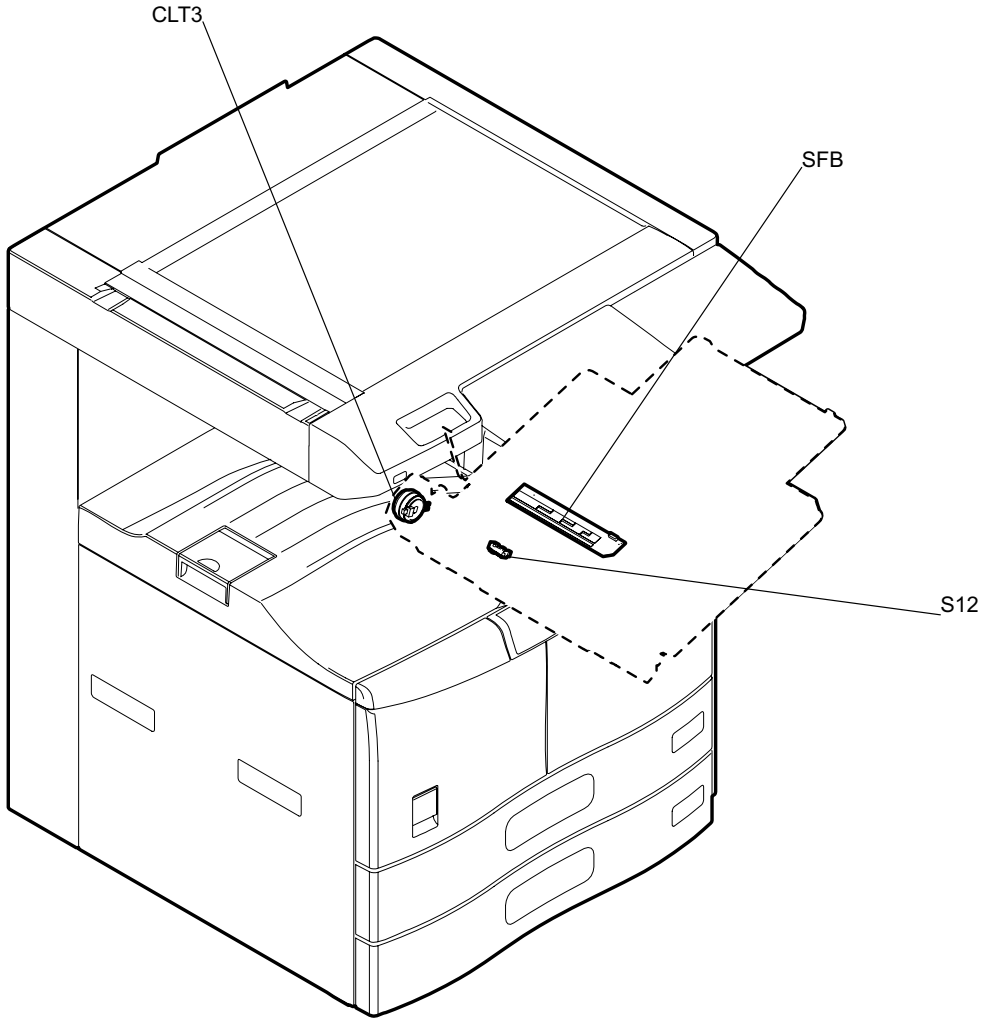


Fig. 2-12

7. Drawer unit

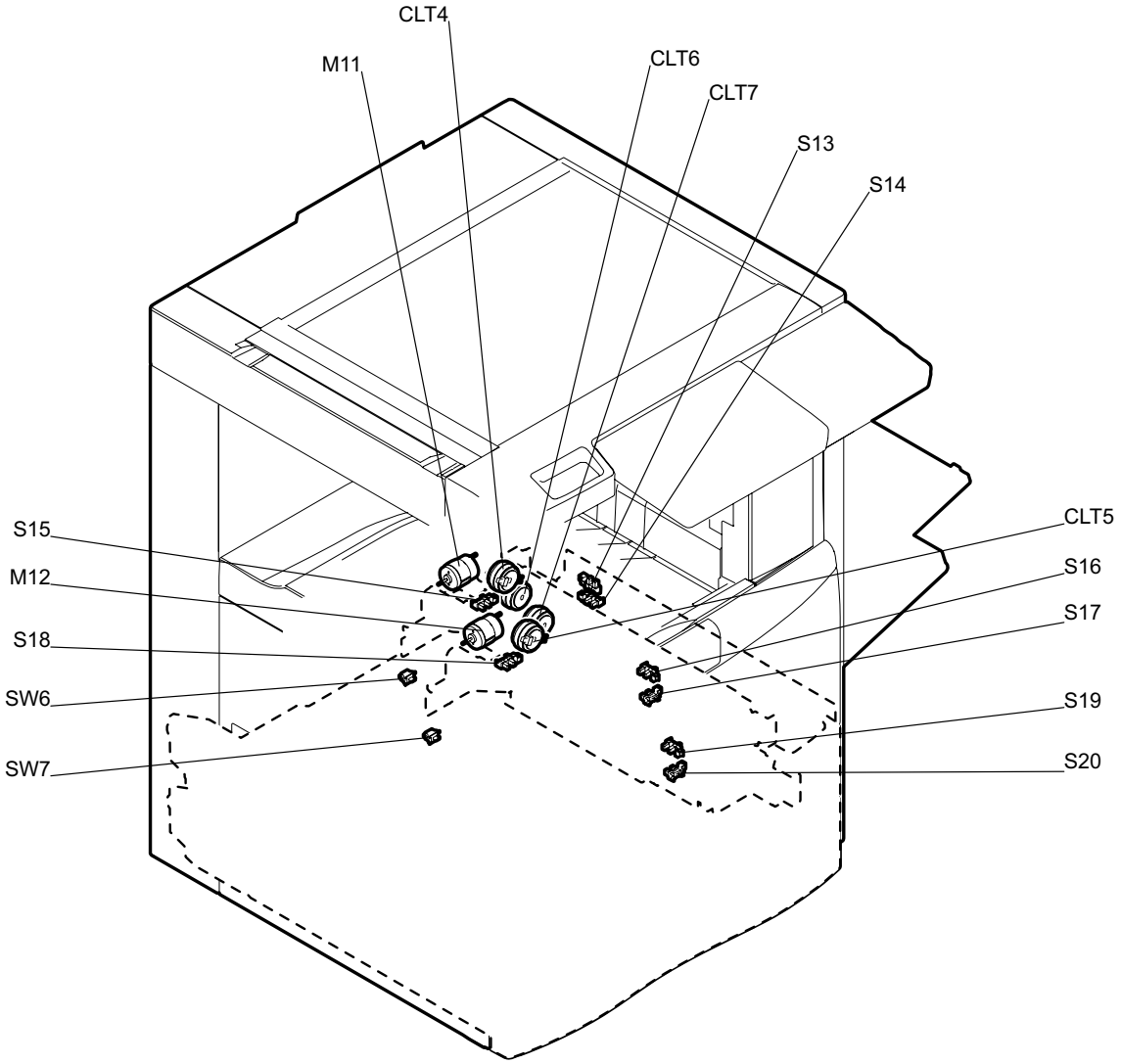


Fig. 2-13

2.3 Symbols and Functions of Various Components

The column "P-I" shows the page and item number in the parts list.

1. Motors

Symbol	Name	Function	Remarks	P-I
M1	SCAN-MOT Scan motor	Driving the carriages	Fig. 2-3	15-14
M2	PU-FAN Process unit fan	Cooling down the process unit	Fig. 2-4	1-25
M3	POL-MOT Polygonal motor	Driving the polygonal mirror	Fig. 2-5	11-1
M4	TNR-MOT Toner motor	Transporting toner from the toner cartridge to the developer unit	Fig. 2-5	14-29
M5	ADU-MOT ADU motor	Driving the automatic duplexing unit	Fig. 2-6 Fig. 2-8	8-1
M6	SYS-FAN-MOT SYS/HDD cooling fan	Cooling down the SYS board / SYS-IMG board and hard disk	Fig. 2-6 Fig. 2-8	9-3
M7	POW-FAN Switching regulator cooling fan	Cooling down the High-voltage transformer and switching regulator	Fig. 2-6 Fig. 2-8	4-14
M8	MAIN-MOT Main motor	Driving the drum, developer unit, fuser unit, registration roller, transport rollers, feed rollers and pickup rollers	Fig. 2-6 Fig. 2-8	14-21
M9	TRU-FAN TRU fan	Assisting the paper separation process	Fig. 2-10 Fig. 2-11	13-9
M10	EXIT-MOT Exit motor	Driving the exit roller	Fig. 2-10 Fig. 2-11	33-18
M11	TRAY-U-MOT Upper tray-up motor	Driving the lifting movement of trays in upper drawer	Fig. 2-13	7-18
M12	TRAY-L-MOT Lower tray-up motor	Driving the lifting movement of trays in lower drawer	Fig. 2-13	7-18
M13	OCT-GT-MOT offset gate motor	Driving the offset gate * e-STUDIO355/455 only	Fig. 2-11	34-24
M14	REV-MOT Reverse motor	Driving the reverse roller * e-STUDIO355/455 only	Fig. 2-11	34-22

2. Sensors and switches

Symbol	Name	Function	Remarks	P-I
S1-5	APS1-3, APS-C, APS-R Automatic original detection sensor	Original size detection	Fig. 2-3	S1-4: 12-16 S5: 12-17
S6	PLTN-SNR Platen sensor	Opening/closing detection of original cover or RADF	Fig. 2-3	15-31
S7	HOME-SNR Carriage home position sensor	Carriage home position detection	Fig. 2-3	12-25
S8	ATTNR-SNR Auto-toner sensor	Detecting the density of toner in the developer unit	Fig. 2-4	28-20
S9	EXIT-SW Exit sensor	Detecting the transporting paper at the exit section	Fig. 2-5	31-27
S10	ADU-TR1-SNR ADU exit sensor	Detecting the transporting paper in automatic duplexing unit	Fig. 2-10 Fig. 2-11	35-15

Symbol	Name	Function	Remarks	P-I
S11	ADU-TR2-SNR ADU entrance sensor	Detecting the transporting paper at automatic duplexing unit entrance section	Fig. 2-10 Fig. 2-11	35-15
S12	SFB-EMP-SNR Bypass paper sensor	Detecting presence/absence of paper on the bypass tray	Fig. 2-12	35-15
S13	FEED-COV-SNR Feed cover opening/closing sensor	Feed cover opening/closing detection	Fig. 2-13	18-6
S14	2ND-FEED-SNR 2nd transport sensor	Detecting the transport paper and jamming fed from the lower drawer or PFP/LCF	Fig. 2-13	18-6
S15	NEAR-EMP-U-SNR Upper drawer paper stock sensor	Paper amount detection in the upper drawer	Fig. 2-13	16-18
S16	TOP-U-SNR Upper drawer tray-up sensor	Position detection of the lifting tray of the upper drawer	Fig. 2-13	16-18
S17	EMP-U-SNR Upper drawer empty sensor	Paper presence/absence detection in the upper drawer	Fig. 2-13	16-18
S18	NEAR-EMP-L-SNR Lower drawer paper stock sensor	Paper amount detection in the lower drawer	Fig. 2-13	16-18
S19	TOP-L-SNR Lower drawer tray-up sensor	Position detection of the lifting tray of the lower drawer	Fig. 2-13	16-18
S20	EMP-L-SNR Lower drawer empty sensor	Paper presence/absence detection in the lower drawer	Fig. 2-13	16-18
S21	1ST-FEED-SNR 1st transport sensor	Detecting the transporting paper and jamming fed from the bypass, drawer, ADU	Fig. 2-10 Fig. 2-11	21-14
S22	RGST-SNR Registration sensor	Detecting the paper transport at the registration roller section	Fig. 2-10 Fig. 2-11	21-14
S23	REV-SNR Reverse sensor	Detecting the transporting paper at the reverse section * e-STUDIO355/455 only	Fig. 2-11	34-2
S24	OCT-HOME-SNR Offset gate home position sensor	Offset gate home position detection * e-STUDIO355/455 only	Fig. 2-11	33-25
S25	TEMP/HUMI-SNR Temperature/humidity sensor	Detecting the temperature and humidity of the outside air taken into the equipment	Fig. 2-6 Fig. 2-8	4-16
SW1	MAIN-SW Main switch	Turning ON/OFF of the equipment	Fig. 2-4	4-3
SW2	FRNT-COV-INTLCK-SW Front cover interlock switch	Supplying or shutting off AC power to the switching regulator (voltage-generating circuit interlocked with these covers) according to the opening/closing status of the front cover (Cover open: Shut off)	Fig. 2-4	1-11
SW3	ADU-INTLCK-SW ADU interlock switch	Supplying or shutting off AC power to the switching regulator (voltage-generating circuit interlocked with these covers) according to the opening/closing status of the automatic duplexing unit (Cover open: Shut off)	Fig. 2-4	5-18
SW4	FRONT-COV-SW Front cover switch	Detecting opening/closing of the front cover	Fig. 2-5	1-4

Symbol	Name	Function	Remarks	P-I
SW5	ADU-COV-SW ADU opening/closing switch	Detecting opening/closing of the automatic duplexing unit	Fig. 2-10 Fig. 2-11	8-31
SW6	CST-U-SW Upper drawer detection switch	Detecting presence/absence of the upper drawer	Fig. 2-13	9-33
SW7	CST-L-SW Lower drawer detection switch	Detecting presence/absence of the lower drawer	Fig. 2-13	9-33

3. Electromagnetic clutches

Symbol	Name	Function	Remarks	P-I
CLT1	ADU-CLT ADU clutch	Driving the transport roller of the automatic duplexing unit	Fig. 2-10 Fig. 2-11	35-9
CLT2	RGST-CLT Registration roller clutch	Driving the registration roller	Fig. 2-10 Fig. 2-11	21-17
CLT3	SFB-CLT Bypass feed clutch	Driving the bypass feed roller	Fig. 2-12	20-7
CLT4	CST-U-FEED-CLT Upper drawer feed clutch	Driving the upper drawer pickup roller	Fig. 2-13	16-5
CLT5	CST-L-FEED-CLT Lower drawer feed clutch	Driving the lower drawer pickup roller	Fig. 2-13	16-5
CLT6	TR-U-CLT High speed transport clutch	Driving with high speed for the transport roller	Fig. 2-13	7-21
CLT7	TR-M-CLT Low speed transport clutch	Driving with low speed for the transport roller	Fig. 2-13	7-21

4. Solenoids

Symbol	Name	Function	Remarks	P-I
SOL1	REV-SOL Reverse gate solenoid	Changing the paper transport route at the exit section * e-STUDIO355/455 only	Fig. 2-11	34-28

5. PC boards

Symbol	Name	Function	Remarks	P-I
CCD	PWA-F-CCD CCD driving PC board (CCD board)	Controlling CCD and outputting the analog signal	Fig. 2-3	12-13
CTIF	PWA-F-CTIF Toner cartridge interface PC board (CTIF board)	Interface for detecting the toner cartridge (Detecting the CTRG board)	Fig. 2-5	---
CTRG	PWA-F-CTRG Toner cartridge PC board (CTRG board)	Storing the status of the toner cartridge	Fig. 2-5	---
DSP	PWA-F-DSP Display PC board (DSP board)	Controlling the whole control panel	Fig. 2-3	3-24
EPU	PWA-F-EPU EPU memory board (EPU board)	Determining the used status of the developer unit (EPU) (Determining whether a unit is new or used) (Service management required)	Fig. 2-4	28-21
FUS	PWA-F-FUS Fuse PC board (FUS board)	Supplying the power to each damp heater	Fig. 2-6 Fig. 2-8	10-1

Symbol	Name	Function	Remarks	P-I
IMG	PWA-F-IMG Image processing PC board (IMG board)	Controlling the image processing	Fig. 2-6 Fig. 2-8	9-16
KEY	PWA-F-KEY Key control PC board (KEY board)	Controlling the key switches and LEDs	Fig. 2-3	3-25
LDR	PWA-F-LDR Laser driving PC board (LDR board)	Driving the laser diode	Fig. 2-5	11-1
LGC	PWA-F-LGC Logic PC board (LGC board)	Controlling the print engine section	Fig. 2-6 Fig. 2-8	9-13
MOT	PWA-F-MOT MOT board	Driving the automatic duplexing unit and exit section * e-STUDIO205/255/305 only	Fig. 2-6	14-22
MOT2	PWA-F-MOT2 MOT2 board	Driving the automatic duplexing unit, exit section, and paper handling option * e-STUDIO355/455 only	Fig. 2-8	14-22
SFB	PWA-F-SFB Paper size detection board	Detecting the width of paper on the bypass tray	Fig. 2-12	19-13
SLG	PWA-F-SLG Scanning section control PC board (SLG board)	Controlling the original scanning section	Fig. 2-3	12-12
SNS	PWA-F-SNS H-sync signal detection PC board (SNS board)	Detection of the laser beam position	Fig. 2-5	11-1
SYS	PWA-F-SYS System control PC board (SYS board)	Controlling the whole system and image processing	Fig. 2-6 Fig. 2-8	9-10
SYS-IMG	PWA-F-SYS System control PC board (SYS-IMG board)	Controlling the whole system and image processing	Fig. 2-7 Fig. 2-9	9-10

6. Lamps and heaters

Symbol	Name	Function	Remarks	P-I
DH1	SCN-L-DH Scanner damp heater (Left)	Preventing condensation of the mirrors of the carriages	Fig. 2-3	12-20
DH2	SCN-R-DH Scanner damp heater (Right)	Preventing condensation of the lens	Fig. 2-3	12-18
DH3	DRM-DH Drum damp heater	Preventing condensation of the drum	Fig. 2-4	5-20
ERS	LP-ERS Discharge LED	Removing the residual charge from the drum surface	Fig. 2-4	27-32
EXP	LP-EXPO Exposure lamp	Exposing the original to the light	Fig. 2-3	23-3
LAMP1	CNTR-LAMP Center heater lamp	Heating the center section of fuser roller	Fig. 2-5	31-19
LAMP2	SIDE-LAMP Side heater lamp	Heating the section of both sides of fuser roller	Fig. 2-5	31-20
LAMP3	LAMP-TRIPLE Sub heater lamp	Sub heating of the fuser roller * e-STUDIO355/455 only	Fig. 2-5	31-21

7. Thermistors and thermostats

Symbol	Name	Function	Remarks	P-I
THMO1	THERMO-FSR-C Fuser center thermostat	Preventing overheating in the fuser unit	Fig. 2-5	31-13
THMO2	THERMO-FSR-F Fuser front thermostat	Preventing overheating in the fuser unit	Fig. 2-5	31-26
THMO3	THERMO-DRM-DH Drum damp heater thermostat	Controlling the temperature of the drum damp heater	Fig. 2-4	5-21
THMO4	THERMO-SCN-DH Scanner damp heater thermostat	Controlling the temperature of the scanner damp heater	Fig. 2-3	12-22
THMS1	THMS-C-HTR Center thermistor	Detecting the surface temperature at fuser roller center (for controlling the temperature of the center heater lamp)	Fig. 2-5	31-31
THMS2	THMS-S-HTR Side thermistor	Detecting the surface temperature at the rear side of the fuser roller (for controlling the temperature of the side heater lamp)	Fig. 2-5	31-31
THMS3	THMS-EDG-HTR Edge thermistor	Detecting the surface temperature at the edge of the fuser roller (for preventing overheating)	Fig. 2-5	31-31
THMS4	THMS-DRM Drum thermistor	Detecting the temperature at the drum surface	Fig. 2-4	28-22

8. Transformer

Symbol	Name	Function	Remarks	P-I
HVPS	PS-HVT High-voltage transformer	Generating high-voltage and supplying it to the following sections • Needle electrode • Main charger grid • Developer bias • Transfer bias	Fig. 2-4	10-2

9. Others

Symbol	Name	Function	Remarks	P-I
TCP	TCP Touch panel	Displaying and entering various kinds of information	Fig. 2-3	3-22 3-23
HDD	HDD Hard disk	Storing the program data and image data	Fig. 2-6 Fig. 2-8	9-6
INV	INV-EXP Inverter board	Controlling the exposure lamp	Fig. 2-3	15-17
LVPS	PS-ACC Switching regulator	Generating DC voltage and supplying it to each section of the equipment	Fig. 2-4	10-7
P-INV	INV-PNL Panel inverter board (P-INV board)	Controlling the LCD backlight	Fig. 2-3	3-26

2.4 System block diagram

e-STUDIO205L/255/305

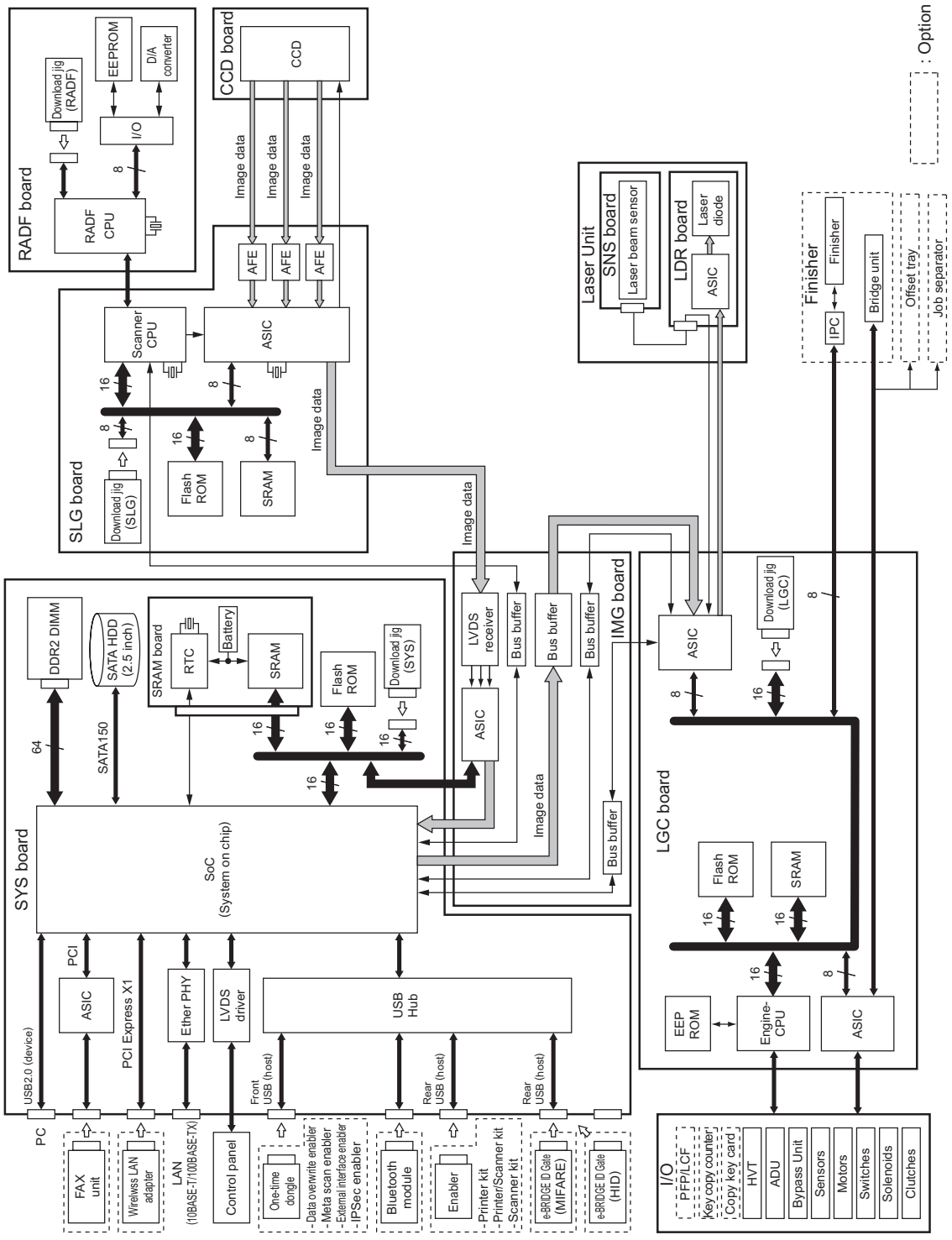


Fig. 2-14

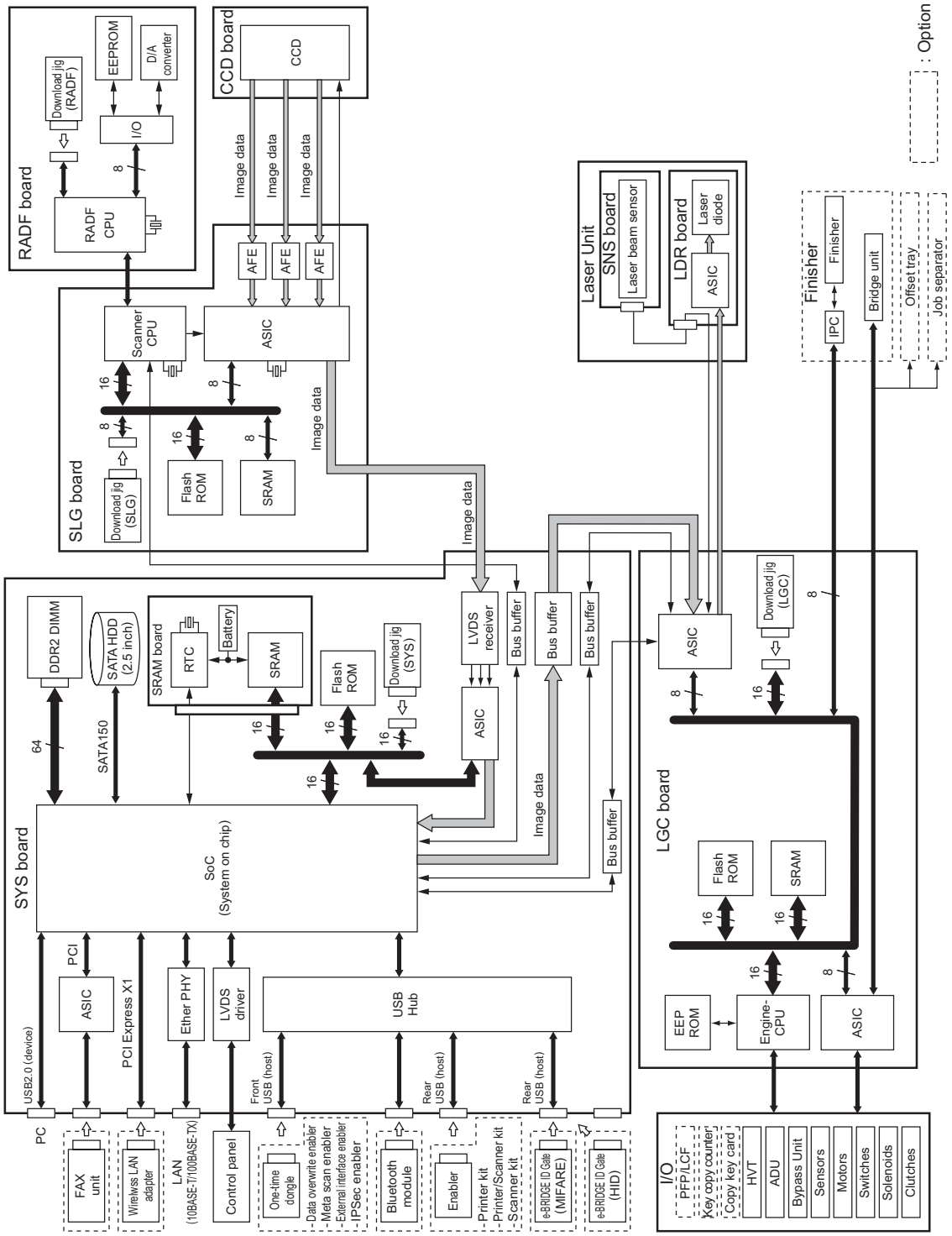


Fig. 2-15

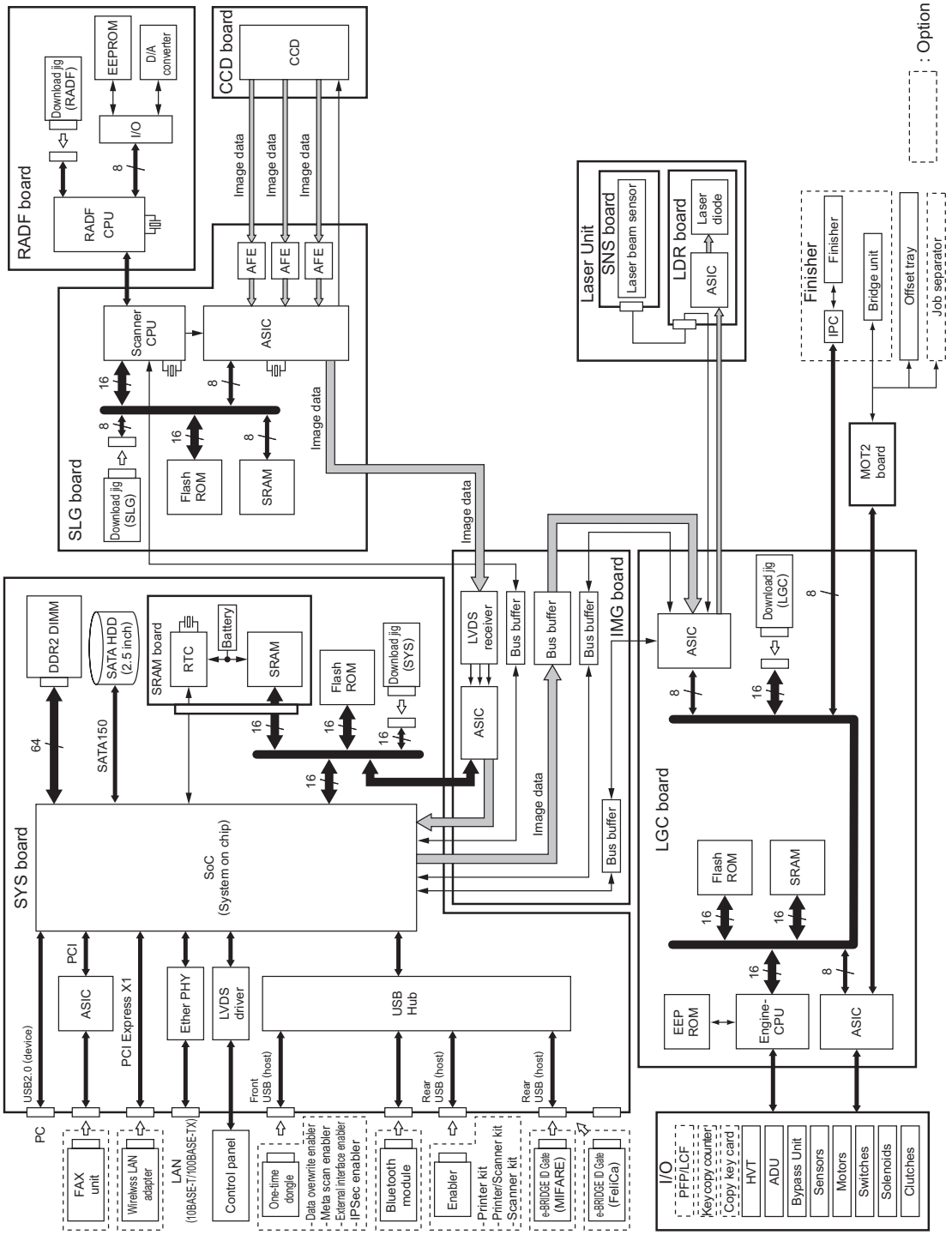


Fig. 2-16

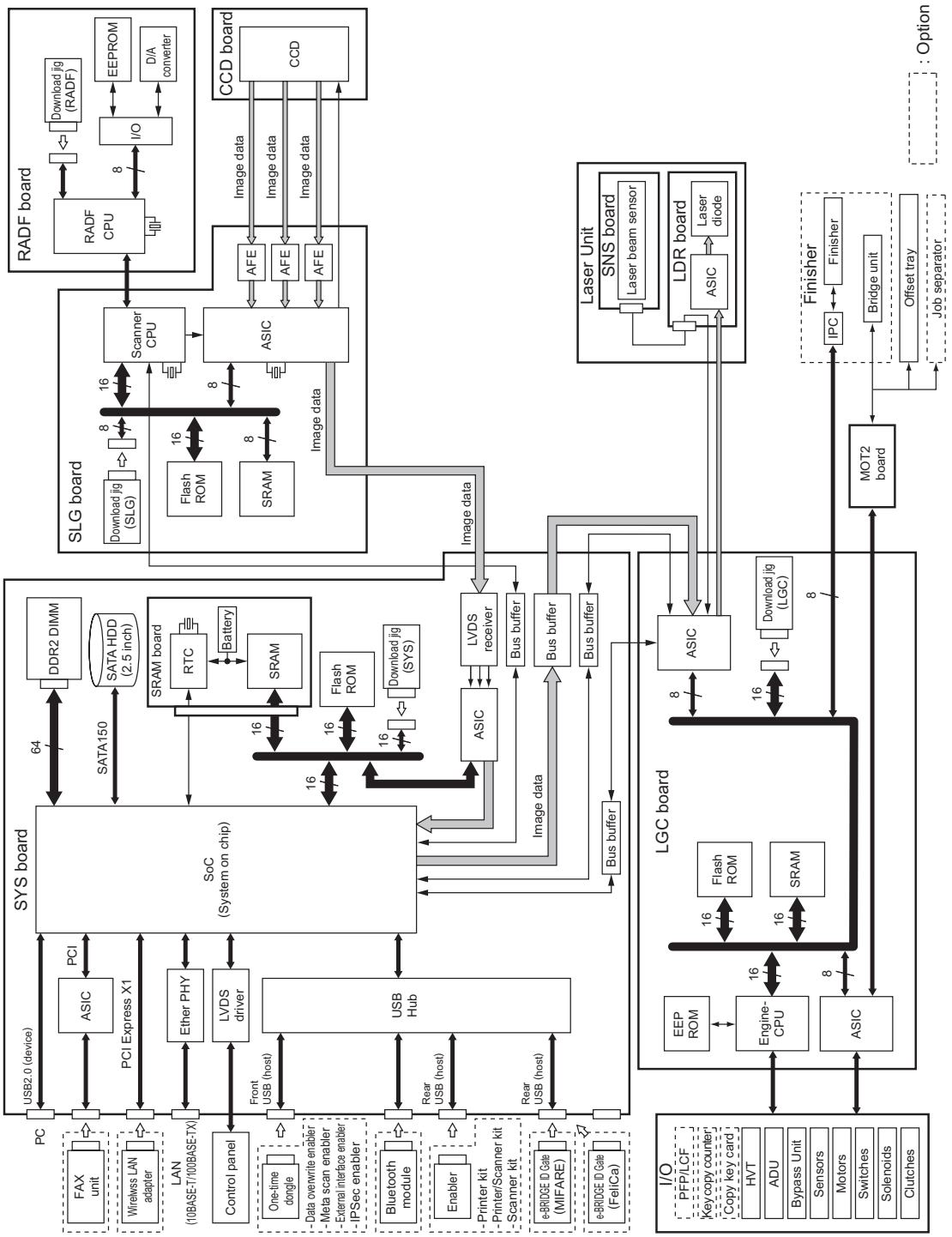


Fig. 2-17

2.5 Installation and Replacement of Covers

2.5.1 Front cover

(1) Open the front cover.

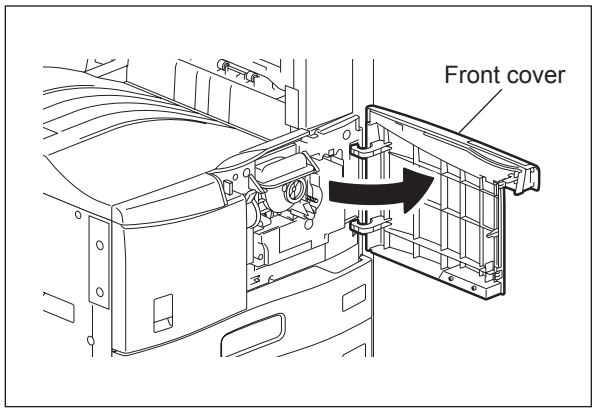


Fig. 2-18

(2) Slide the upper hinge to the left side while holding it down, and then take off the upper hinge.
(3) Take off the lower hinge by lifting up the front cover. Then take off the front cover.

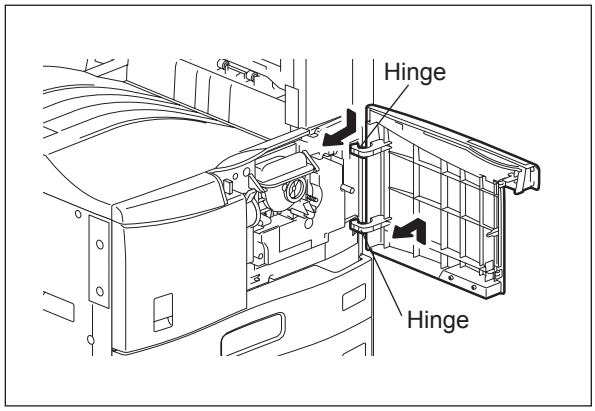


Fig. 2-19

2.5.2 Front upper cover

(1) Remove 1 screw and take off the front upper cover.

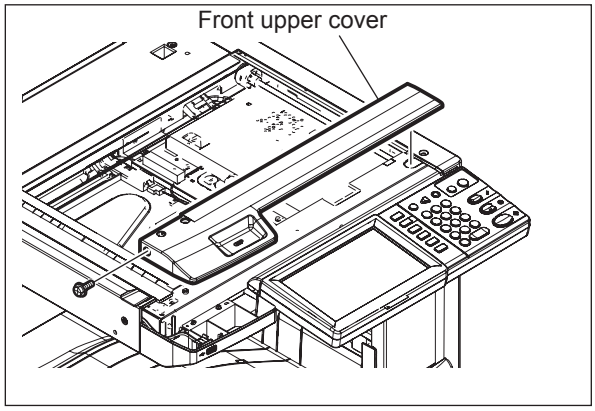


Fig. 2-20

2.5.3 Front lower cover

(1) Open the front upper cover.
📖 P.2-22 "2.5.2 Front upper cover"
(2) Remove 2 screws and then take off the control panel unit.
(3) Disconnect the USB port from the front lower cover.

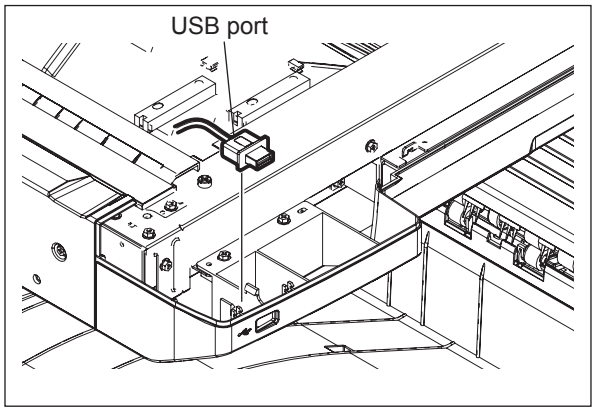


Fig. 2-21

(4) Remove 2 screws and pull the left side of the front lower cover toward you. Then take off the front lower cover by sliding it to the left side.

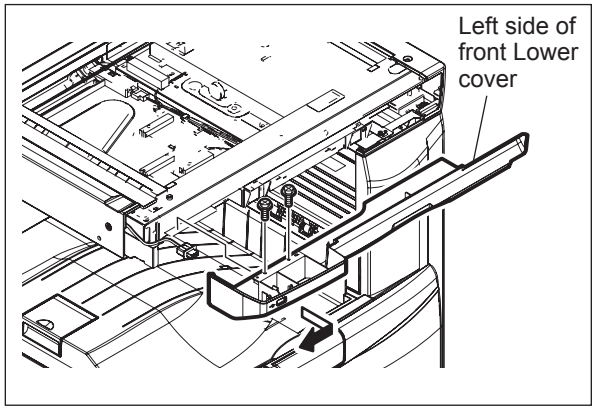


Fig. 2-22

2.5.4 Left upper cover

(1) Remove 2 screws and take off the left upper cover.

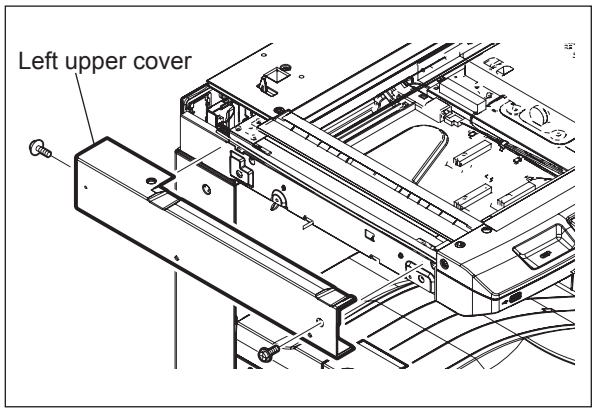


Fig. 2-23

2.5.5 Right upper cover

(1) Remove 3 screws and take off the right upper cover.

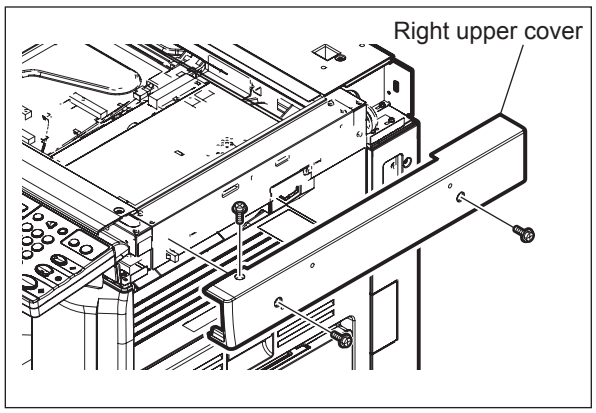


Fig. 2-24

2.5.6 Rear cover

(1) Remove 5 screws. Lift up the rear cover and then release 3 hooks on the upper side. Then open the upper side of the rear cover slightly toward you, and then take off the rear cover by lifting it up.

Remark:

When installing the rear cover, hang the 3 hooks of the rear cover on the frame of the equipment, and then hang the 3 hooks on the holes of the upper rear cover to fix it. Then tighten 5 screws to fix it securely.

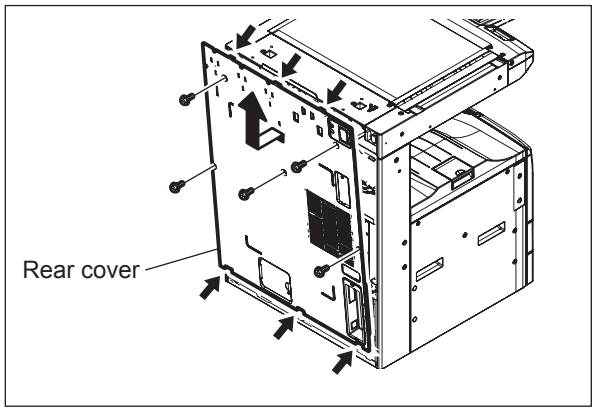


Fig. 2-25

Note:

When the Antenna (GN-3010, optional) is installed, take it off first and then remove the rear cover. Then hang the Antenna on the protrusion of the upper rear cover so that it will not fall off. If three Antennas are installed, hang two of them on the upper rear cover and then place the third one on the other two.

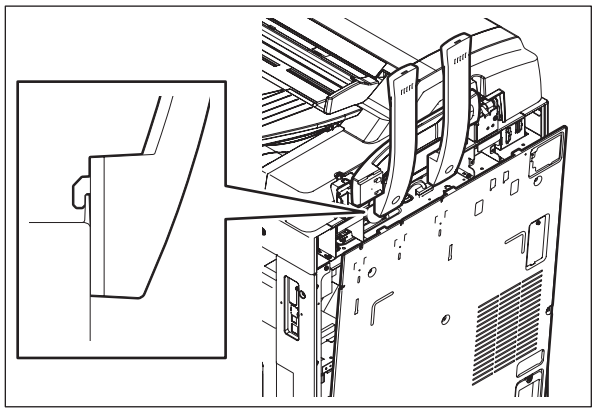


Fig. 2-26

2.5.7 Upper rear cover

(1) Take off the RADF or original cover.
(2) Take off the left upper cover
(📖 P.2-23 "2.5.4 Left upper cover").
(3) Take off the right upper cover.
(📖 P.2-24 "2.5.5 Right upper cover").
(4) Take off the rear cover.
(📖 P.2-24 "2.5.6 Rear cover").
(5) Remove 2 screws and take off the upper rear cover.

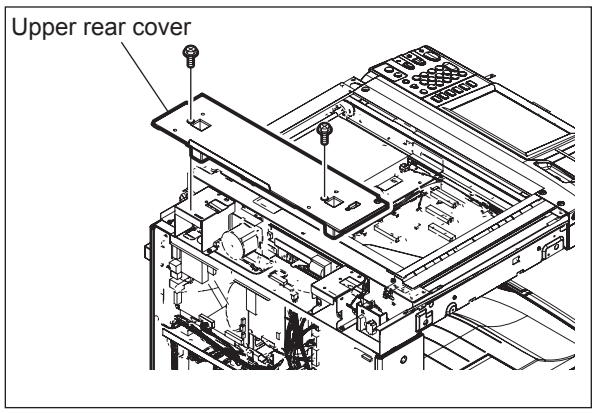


Fig. 2-27

2.5.8 Left rear cover

(1) Remove 1 screw and then take off the left rear cover by releasing 2 hooks.

Remark:
When installing the left rear cover, hang the 2 hooks of the left rear cover on the frame of the equipment, and then fix it with 1 screw.

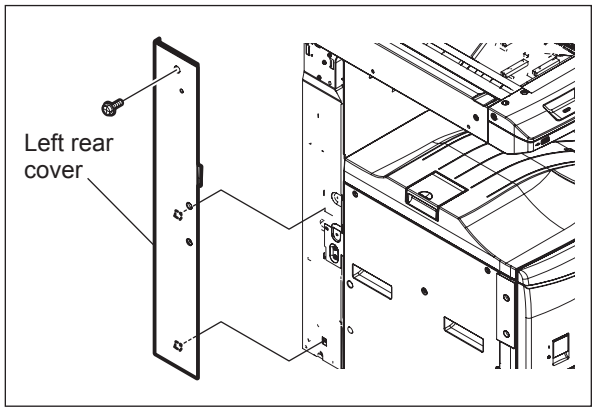


Fig. 2-28

2.5.9 Inner tray

(1) Open the front cover and then take off the toner cartridge.
(2) Remove 2 tap-tight screws, and then take off the inner tray.

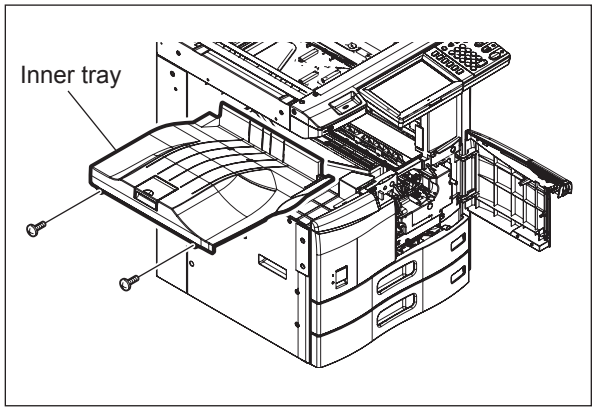


Fig. 2-29

2.5.10 Left cover

(1) Remove 2 tap-tight screws and 5 screws. Then take off the left cover.

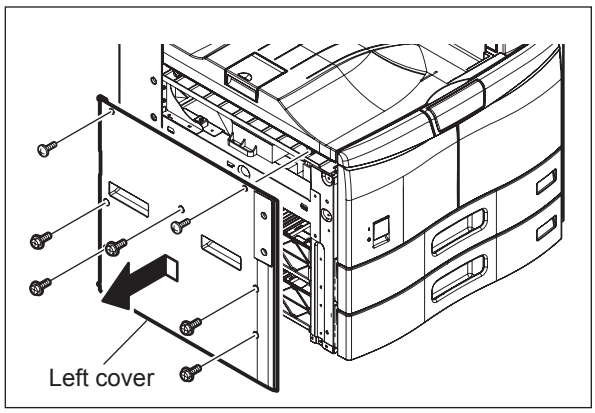


Fig. 2-30

2.5.11 Tray back cover

(1) Take off the left rear cover (📖 P.2-25 "2.5.8 Left rear cover").
(2) Take off the inner tray (📖 P.2-25 "2.5.9 Inner tray").
(3) Take off the tray back cover.

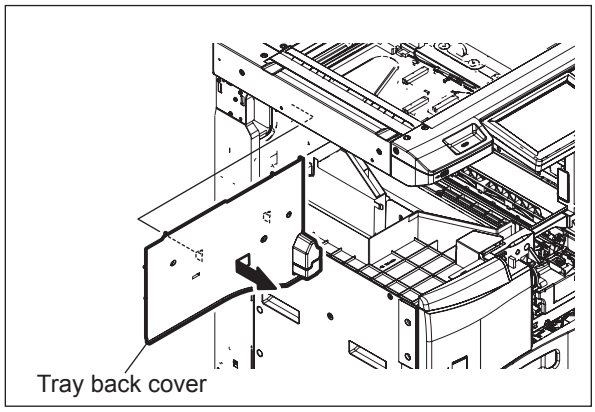


Fig. 2-31

2.5.12 Connecting port cover

(1) Open the automatic duplexing unit.
(2) Remove 1 screw and then take off the connecting port cover by releasing 2 hooks.

Remark:
When installing the connecting port cover, hang the 2 hooks of the connecting port cover on the frame of the equipment, and then fix it with 1 screw.

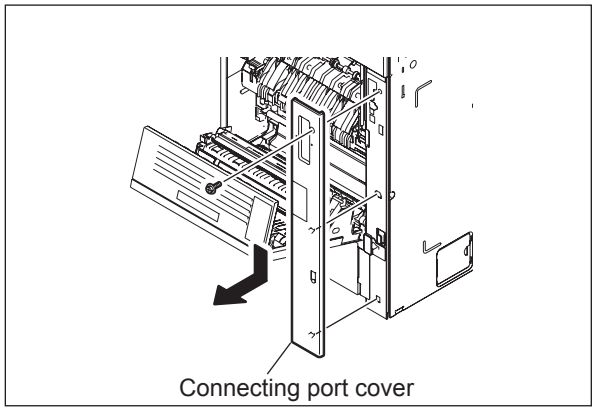


Fig. 2-32

2.5.13 Right rear cover

[A] e-STUDIO205L/255/305

(1) Take off the connecting port cover.
(📖 P.2-26 "2.5.12 Connecting port cover").
(2) Open the transfer cover.
(3) Release 3 hooks by sliding the right rear cover to the right side, and then take off the right rear cover.

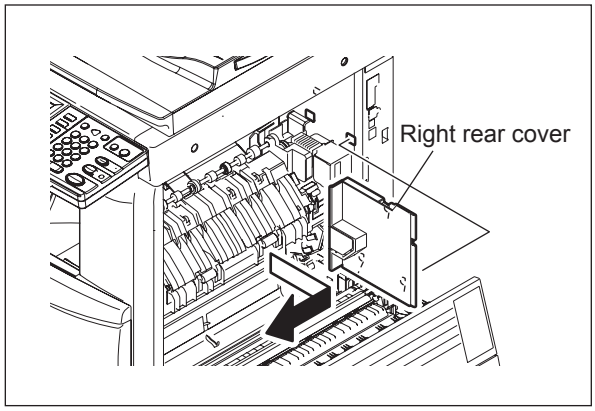


Fig. 2-33

[B] e-STUDIO355/455

(1) Take off the connecting port cover.
(📖 P.2-26 "2.5.12 Connecting port cover").
(2) Open the transfer cover.
(3) Release 2 hooks by sliding the right rear cover to the right side, and then take off the right rear cover.

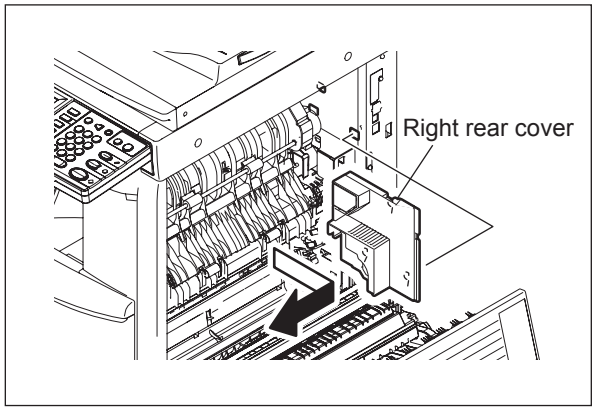


Fig. 2-34

2.5.14 Right front cover

(1) Take off the front cover.
(📖 P.2-24 "2.5.6 Rear cover").
(2) Take off the process unit.
(📖 P.11-12 "11.6.1 Process unit").
(3) Pull out the upper and lower drawers.
(4) Open the feed cover.
(5) Remove 2 screws. Release 4 hooks by sliding the right front cover downward, and then take off the right front cover by pulling out toward you.

Remark:
When installing the right front cover, hang the 4 hooks of the right front cover on the frame of the equipment, and then fix it with 2 screws.

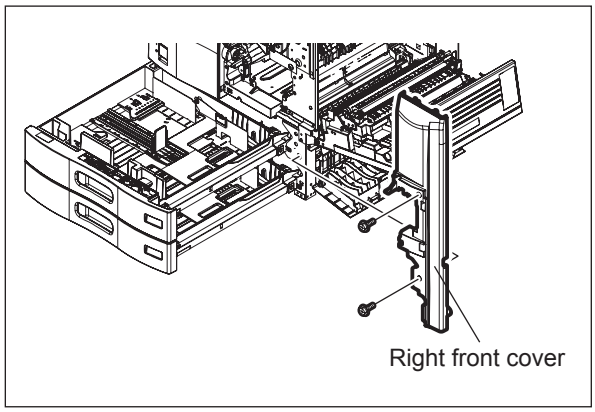


Fig. 2-35

2.5.15 Left front cover

(1) Take off the inner tray
(📖 P.2-25 "2.5.9 Inner tray").
(2) Take off the right front cover
(📖 P.2-27 "2.5.14 Right front cover").
(3) Remove 4 screws. Disconnect 3 connectors from the left front cover, and then take off the left front cover.

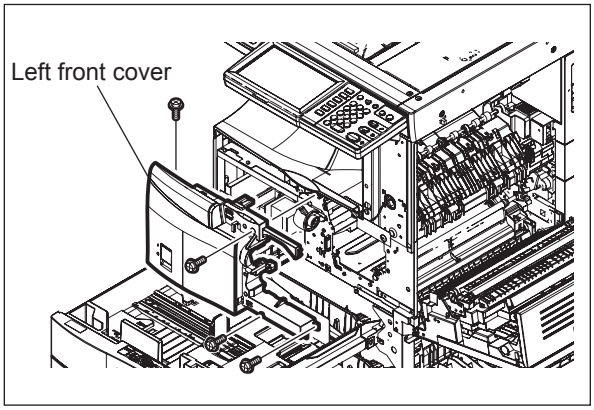


Fig. 2-36

2.6 Installation and Replacement of PC boards

Notes:

- When the PC board/HDD is replaced, refer to each CAUTIONS of TROUBLESHOOTHING in the SERVICE HANDBOOK.
- If the PC board has to be replaced due to an operational defect, this may have been caused by a contact failure of the connector. Before replacing the board, disconnect and then reconnect the connector to check if this action eliminates the operational defect.
- There are 2 types of SYS board as follows:
  SYS board: The functions of the IMG board are not included in this board. (This must be used together with the IMG board.)
  SYS-IMG board: The functions of the IMG board are included in this board. (This is called the "SYS-IMG board" to distinguish it from the current SYS board.)
  As there is no interchangeability between them, apply the corresponding board to the correct model.

2.6.1 Image processing PC board (IMG board)

(1) Take off the rear cover
(📖 P.2-24 "2.5.6 Rear cover").
(2) Disconnect 2 connectors, remove 4 screws, and then take off the IMG board.

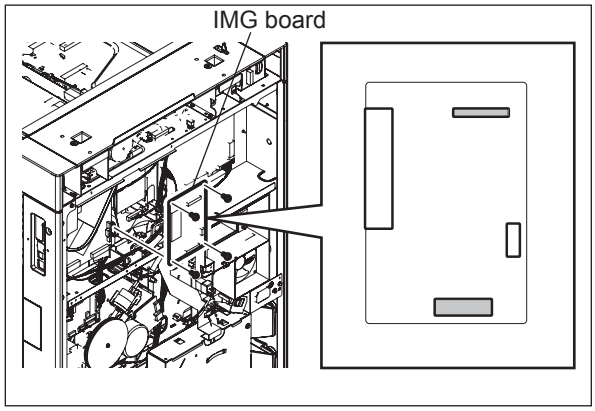


Fig. 2-37

2.6.2 Hard disk (HDD)

(1) Take off the IMG board.
(📖 P.2-29 "2.6.1 Image processing PC board (IMG board)").
(2) Remove 4 screws, disconnect 1 connector, and then take off the HDD.

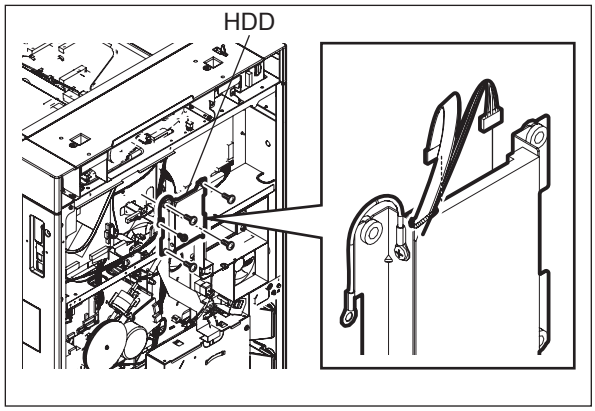


Fig. 2-38

(3) Remove 4 screws and then remove 2 brackets and the ground wire from the HDD.

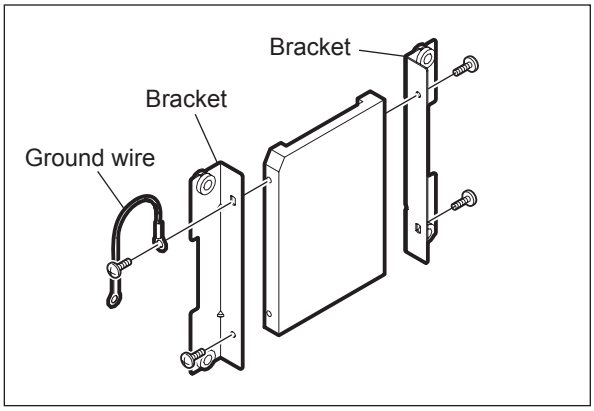


Fig. 2-39

2.6.3 System control PC board (SYS board)

(1) Take off the IMG board.
(📖 P.2-29 "2.6.1 Image processing PC board (IMG board)").
(2) Disconnect 6 connectors, remove 4 screws, and then take off the SYS board.

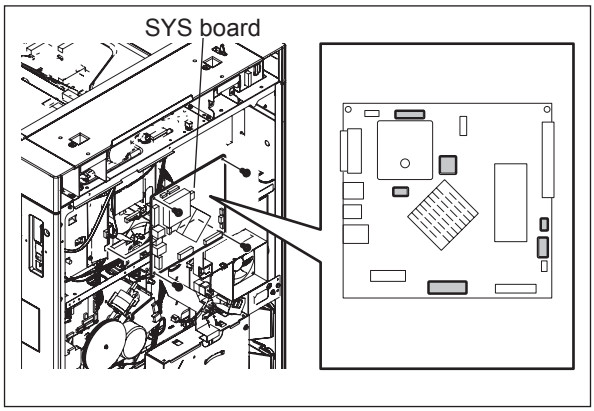


Fig. 2-40

2.6.4 System control PC board (SYS-IMG board)

(1) Take off the rear cover
(📖 P.2-24 "2.5.6 Rear cover").
(2) Disconnect 8 connectors, remove 5 screws, and then take off the SYS board.

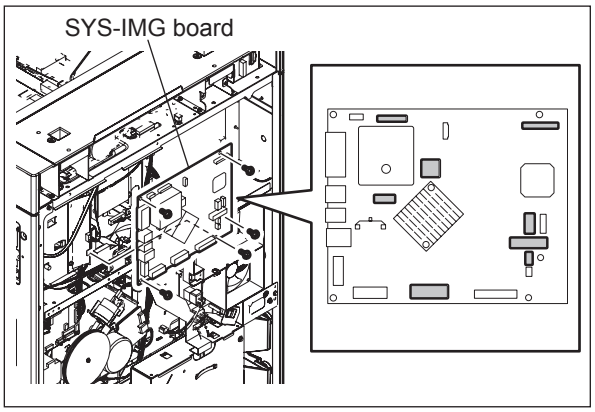


Fig. 2-41

2.6.5 Hard disk (HDD) (for SYS-IMG board)

(1) Take off the SYS board.
(📖 P.2-30 "2.6.4 System control PC board (SYS-IMG board)").
(2) Remove 2 screws, and then take off the protection film.

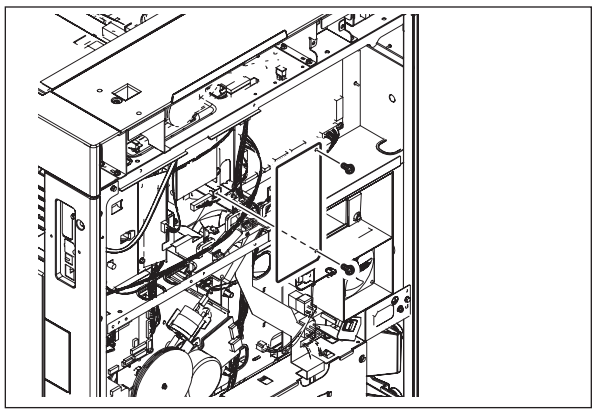


Fig. 2-42

(3) Remove 5 screws, disconnect 1 connector, and then take off the HDD.
(4) Remove 4 screws and then remove 2 brackets and the ground wire from the HDD. (This is the same procedure as that of the current one.)

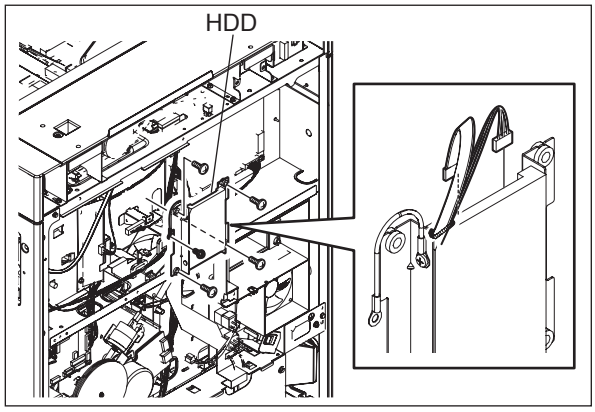


Fig. 2-43

2.6.6 Logic PC board (LGC board)

[A] e-STUDIO205L/255/305

(1) Take off the rear cover
(📖 P.2-24 "2.5.6 Rear cover").
(2) Disconnect 15 connectors, remove 4 screws, and then take off the LGC board.

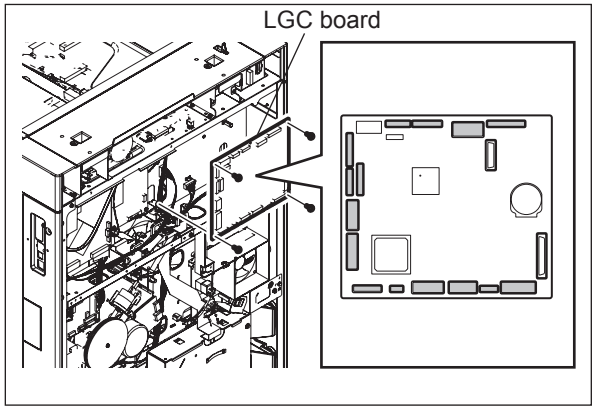


Fig. 2-44

[B] e-STUDIO355/455

(1) Take off the rear cover (📖 P.2-24 "2.5.6 Rear cover").
(2) Disconnect 16 connectors, remove 4 screws, and then take off the LGC board.

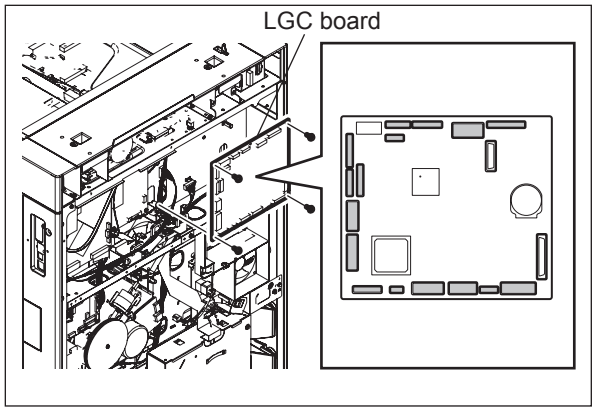


Fig. 2-45

2.6.7 MOT board (e-STUDIO205L/255/305)

(1) Take off the rear cover (📖 P.2-24 "2.5.6 Rear cover").
(2) Remove 1 screw, and take off the flywheel.

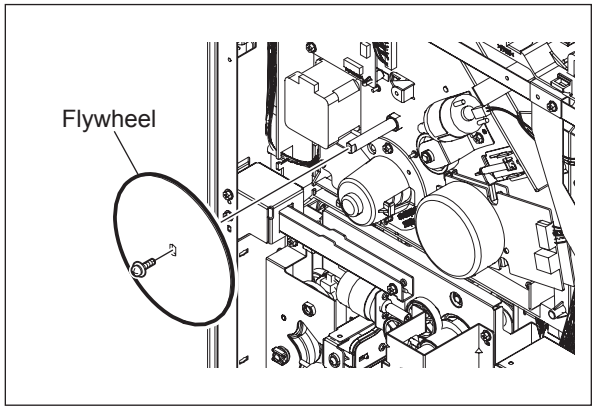


Fig. 2-46

(3) Disconnect 4 connectors, remove 2 locking supports and 2 screws, and then take off the MOT board.

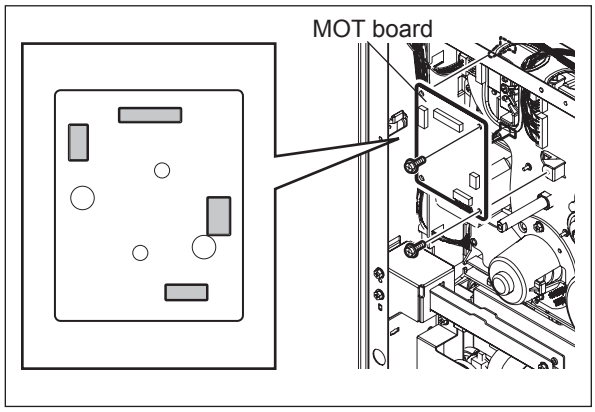


Fig. 2-47

2.6.8 MOT2 board (e-STUDIO355/455)

(1) Take off the rear cover
(📖 P.2-24 "2.5.6 Rear cover").
(2) Remove 1 screw, and take off the flywheel.

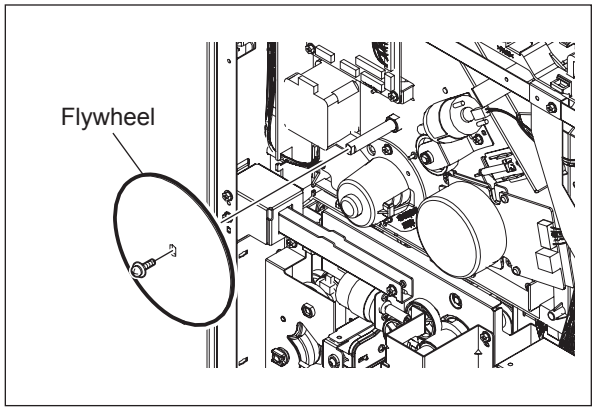


Fig. 2-48

(3) Disconnect 9 connectors, remove 4 screws, and then take off the MOT2 board.

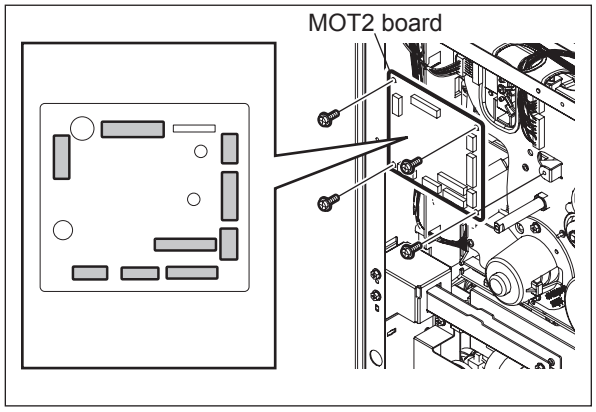


Fig. 2-49

2.6.9 Switching regulator

Note:

Be very careful of residual charge in the capacitors of the switching regulator; this may remain even after the main switch is turned OFF.

(1) Take off the laser optical unit.
(📖 P.7-7 "7.5.1 Laser optical unit").
(2) Take off the left cover
(📖 P.2-26 "2.5.10 Left cover").
(3) Disconnect 10 connectors, remove 9 screws, and then take off the Switching regulator.

Note:

Be careful not to touch the area covered with a Mylar since electrical charge may remain.

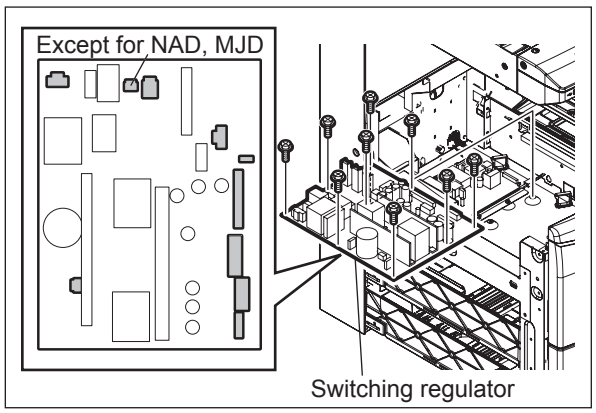


Fig. 2-50

2.6.10 High-voltage transformer

(1) Take off the laser optical unit.
(📖 P.7-7 "7.5.1 Laser optical unit").
(2) Take off the left cover
(📖 P.2-26 "2.5.10 Left cover").
(3) Remove 1 screw and take off the duct.

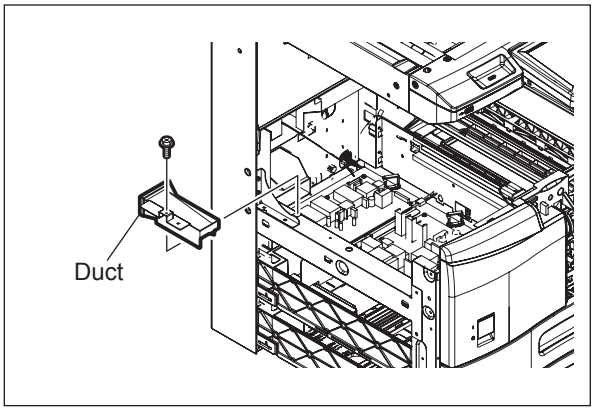


Fig. 2-51

(4)

- e-STUDIO205L/255/305: Disconnect 6 terminals and one connector, remove 2 screws, and then take off the High-voltage transformer together with its bracket.

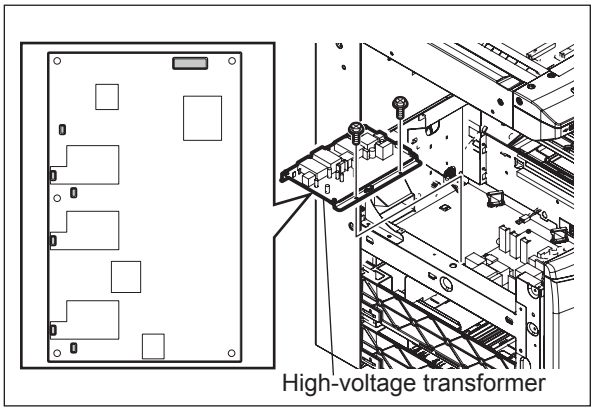


Fig. 2-52

- e-STUDIO355/455: Disconnect 6 terminals and 2 connectors, remove 2 screws, and then take off the High-voltage transformer together with its bracket.

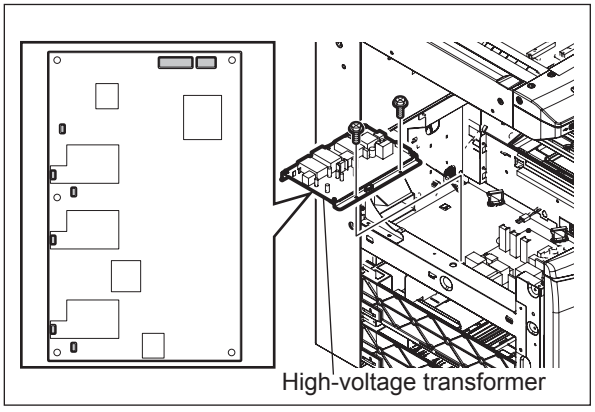


Fig. 2-53

(5) Remove 5 screws and then take off the bracket from the High-voltage transformer.

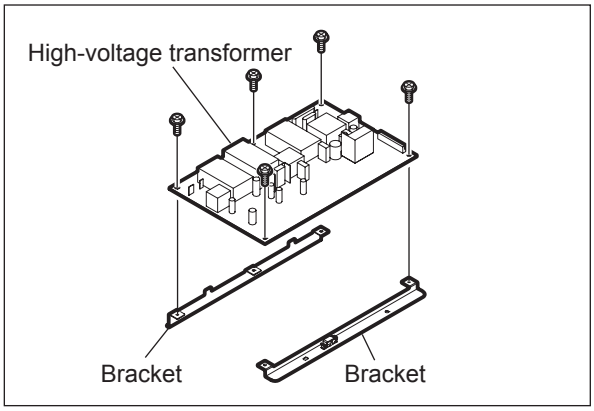


Fig. 2-54

2.6.11 SRAM board

(1) Take off the rear cover (📖 P.2-24 "2.5.6 Rear cover").
(2) Release 2 latches and take off the SRAM board for the LGC board with the case.

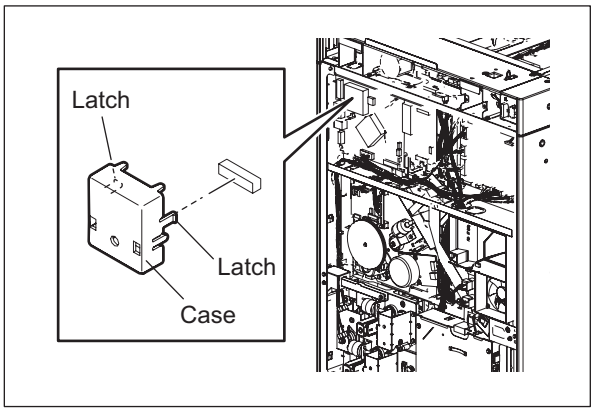


Fig. 2-55

(3) Release 2 latches and take off the SRAM board for SYS board / SYS-IMG board from the case.

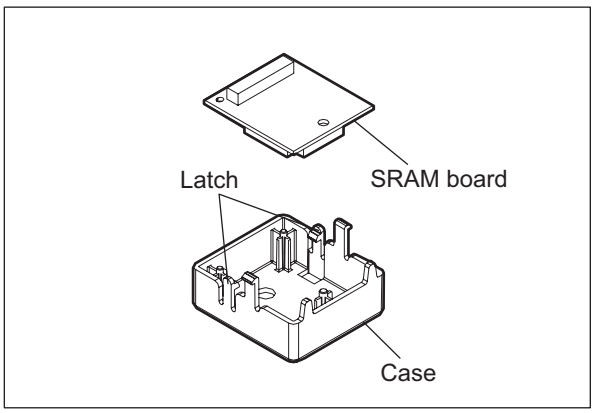


Fig. 2-56

2.7 Installation and Replacement of Options

Important:

- Be sure to turn the power OFF and unplug the power cable before installing and removing of options.

2.7.1 MR-3021/MR-3022 (Reversing Automatic Document Feeder (RADF))

(1) Turn the power OFF and unplug the power cable.
(2) Remove 1 screw and take off the connector cover.

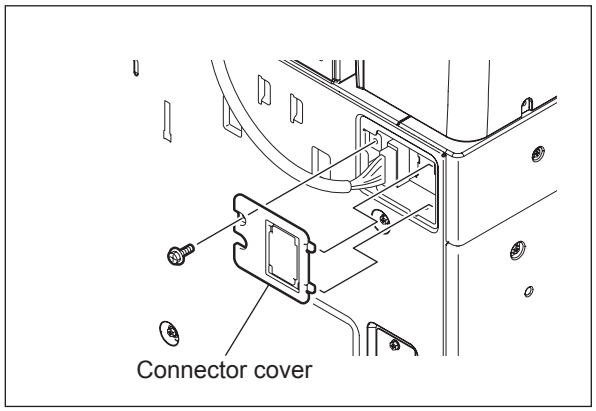


Fig. 2-57

(3) Disconnect the connector.

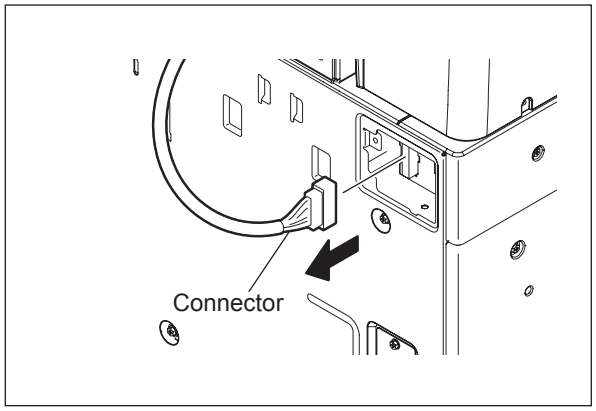


Fig. 2-58

(4) Remove 2 screws and take off the bracket on the rear side.

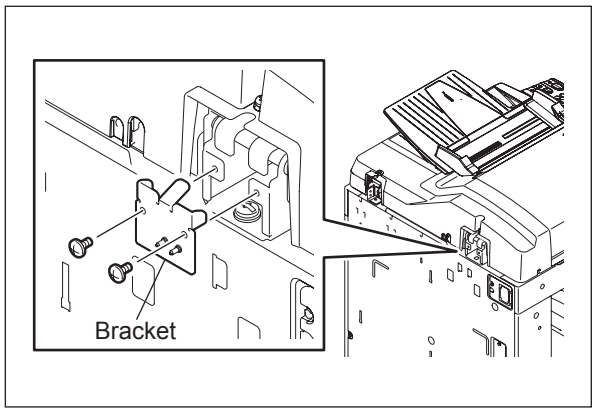


Fig. 2-59

(5) Remove 1 screw and 1 washer on the rear side.

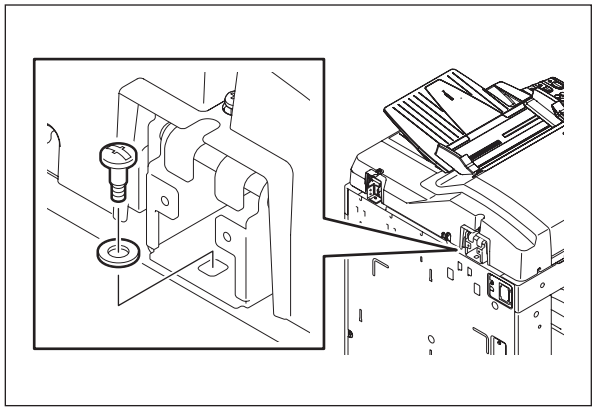


Fig. 2-60

(6) Remove 1 screw on the rear side.

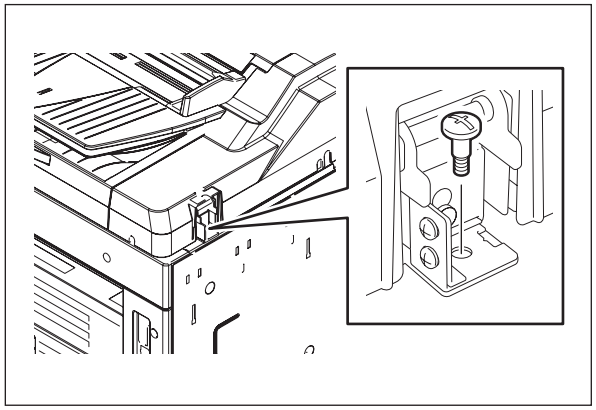


Fig. 2-61

(7) Open the RADF.

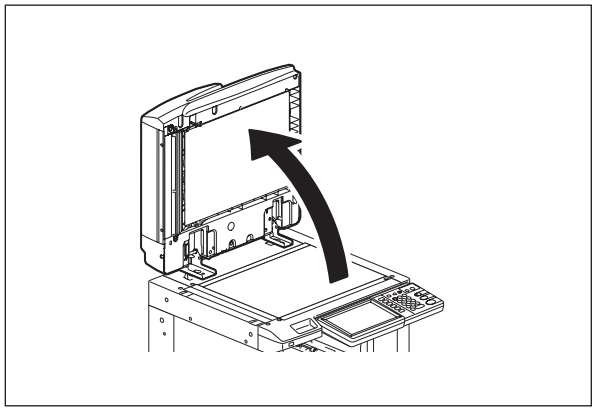


Fig. 2-62

(8) Remove 2 screws on the front side.

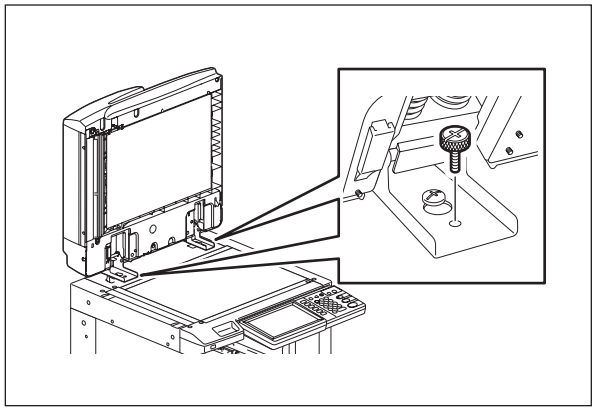


Fig. 2-63

(9) Slide the RADF backward and take it off by lifting it up.

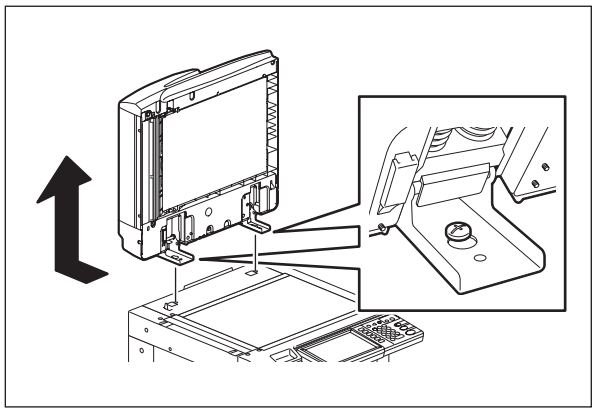


Fig. 2-64

2.7.2 KD-1025 (Paper Feed Pedestal (PFP))

(1) Turn the power OFF and unplug the power cable.
(2) Remove 1 screw and take off the connector cover.

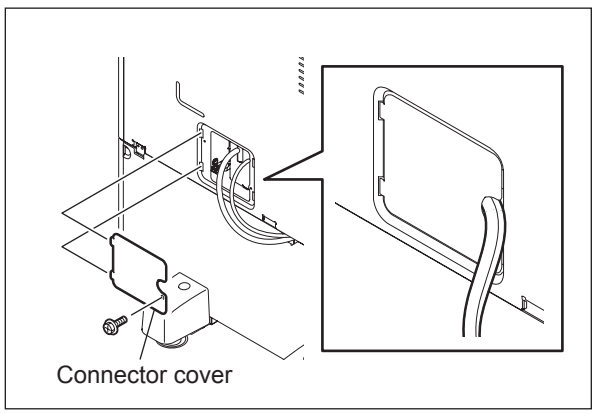


Fig. 2-65

(3) Remove 1 screw and the ground wire, and then disconnect 2 connectors (3 connectors if the optional damp heater is installed).

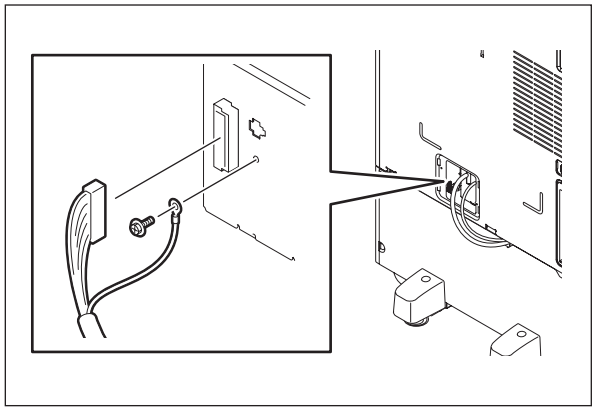


Fig. 2-66

(4) Remove 1 screw each from the lower drawer of the equipment and the PFP upper drawer. Then take off the stoppers.
(5) Take off the lower drawer of the equipment and PFP upper drawer.

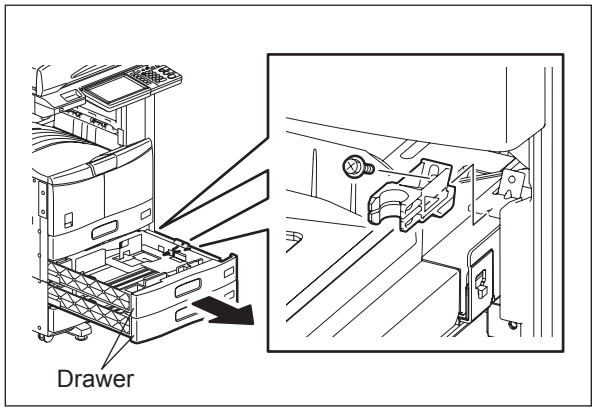


Fig. 2-67

(6) Remove 3 screws and take off 2 fixing brackets on the rear side.

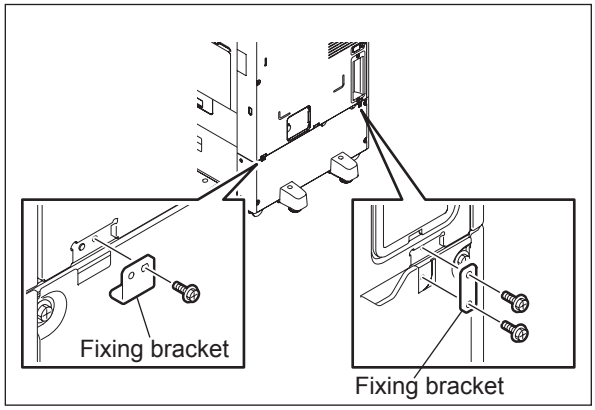


Fig. 2-68

(7) Remove 3 screws and take off 2 fixing brackets on the front side.

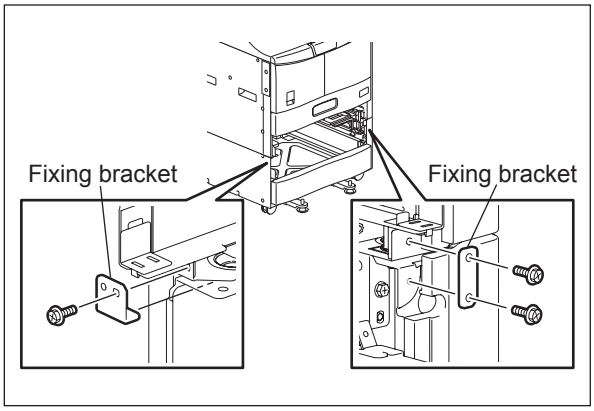


Fig. 2-69

(8) Lift up the equipment and take off the PFP.

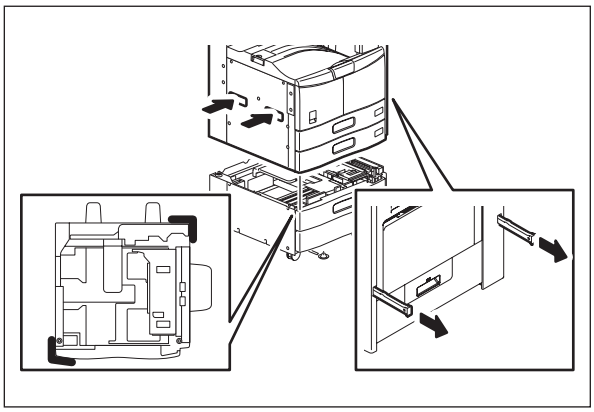


Fig. 2-70

2.7.3 KD-1026 (Large Capacity Feeder (LCF))

(1) Turn the power OFF and unplug the power cable.
(2) Remove 1 screw and take off the connector cover.

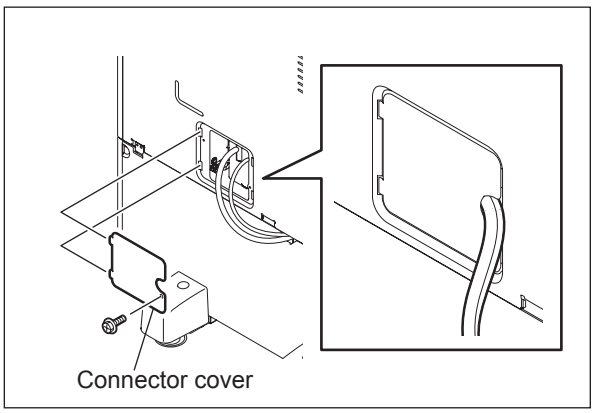


Fig. 2-71

(3) Remove 1 screw and the ground wire, and then disconnect 2 connectors.

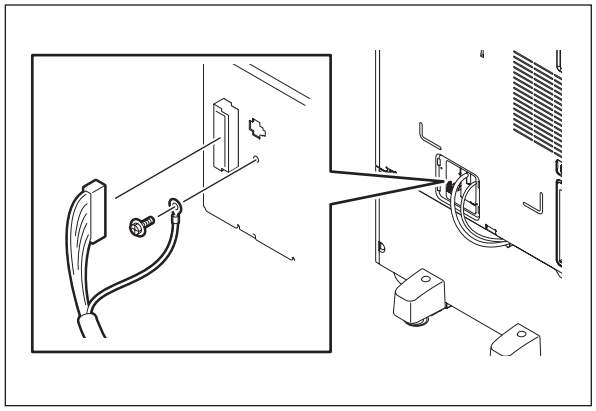


Fig. 2-72

(4) Remove 1 screw and then take off the stopper from the lower drawer of the equipment.
(5) Take off the lower drawer of the equipment.

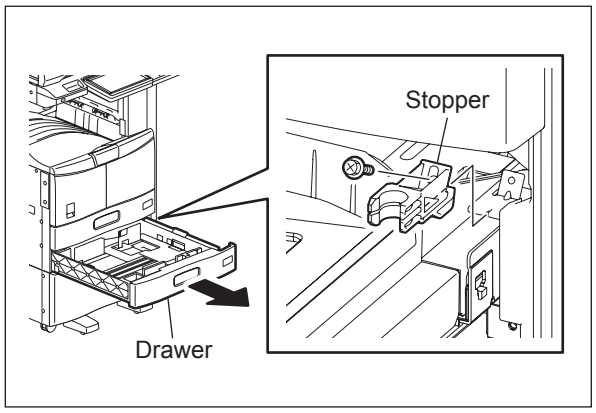


Fig. 2-73

(6) Pull out the LCF drawer.

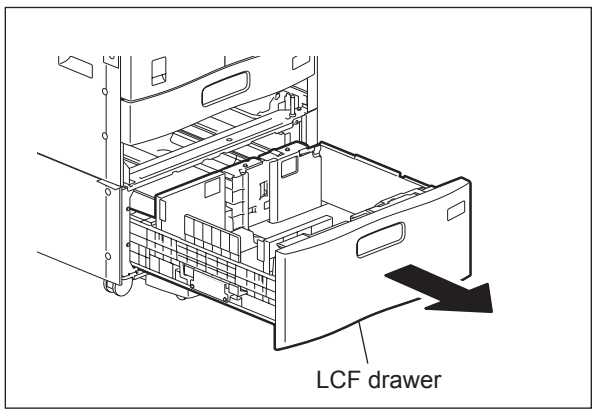


Fig. 2-74

(7) Remove 3 screws and take off 2 fixing brackets on the rear side.

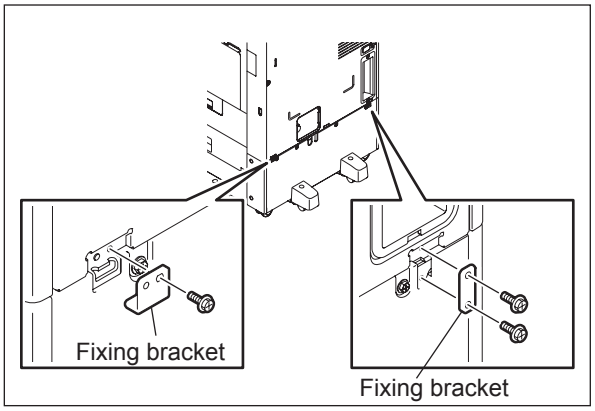


Fig. 2-75

(8) Remove 3 screws and take off 2 fixing brackets on the front side.

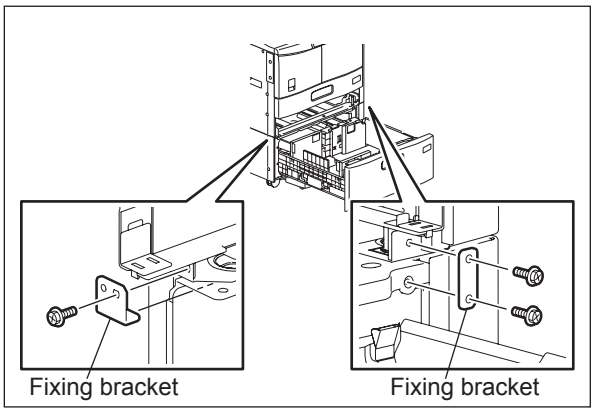


Fig. 2-76

(9) Lift up the equipment and take off the LCF.

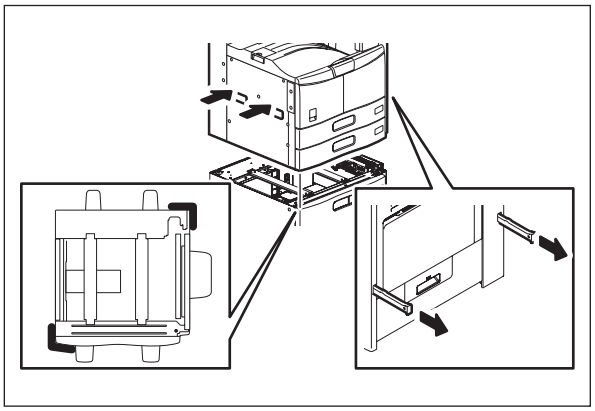


Fig. 2-77

2.7.4 MJ-1031 (Hanging finisher)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the connector cover and disconnect the connector.

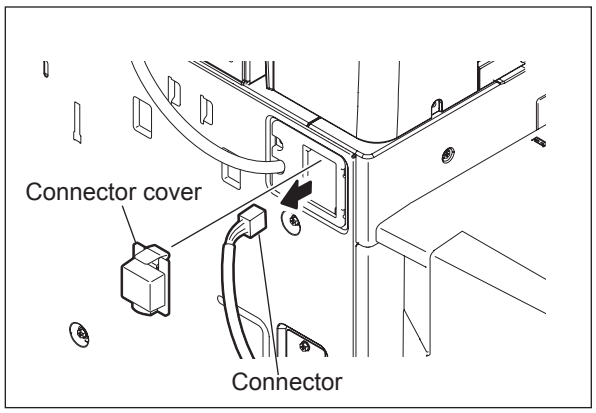


Fig. 2-78

(3) Remove 2 screws and take off 2 covers.

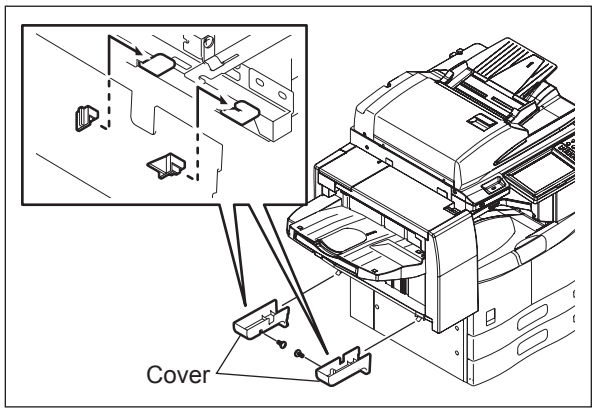


Fig. 2-79

(4) Remove 1 screw and take off the bracket.

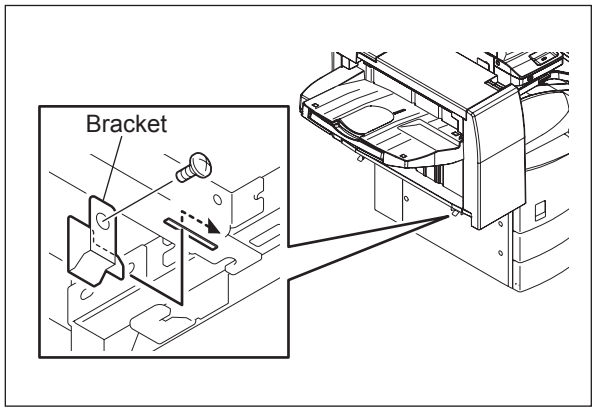


Fig. 2-80

(5) Remove 1 screw and take off the bracket.

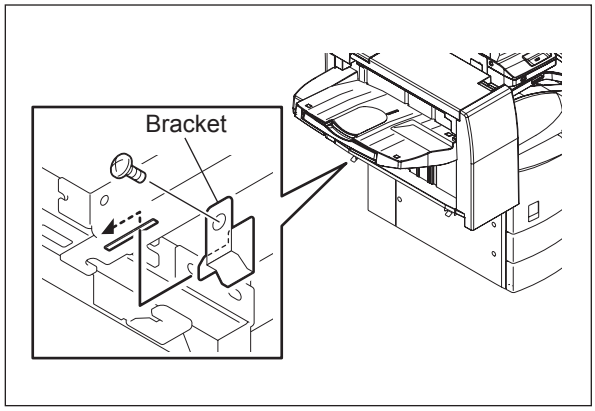


Fig. 2-81

(6) Lift up the finisher and take it off.

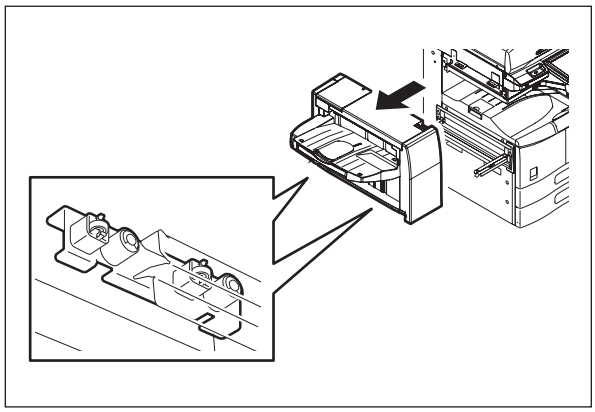


Fig. 2-82

2.7.5 MJ-1101 (Finisher)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the connector cover and disconnect the connector.

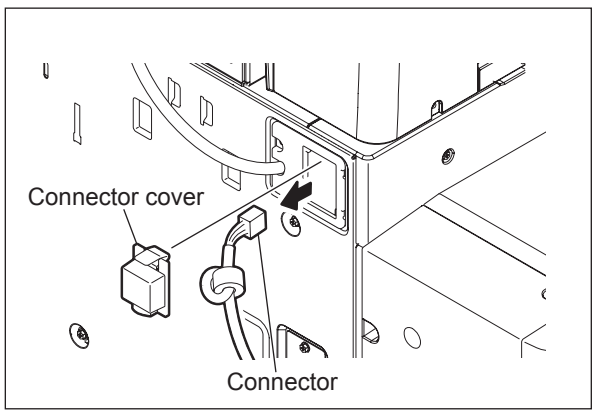


Fig. 2-83

(3) Open the front cover of the finisher.
(4) Remove 1 screw and take off the bracket.

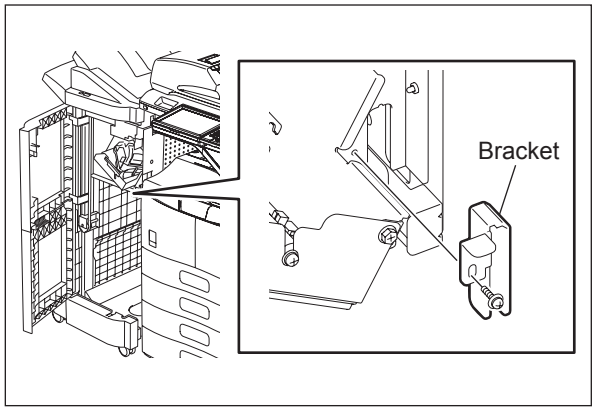


Fig. 2-84

(5) Hold down the fixing lever of the finisher. Then take off the Finisher.

Note:
Be careful not to fell the finisher when moving the finisher unit only.

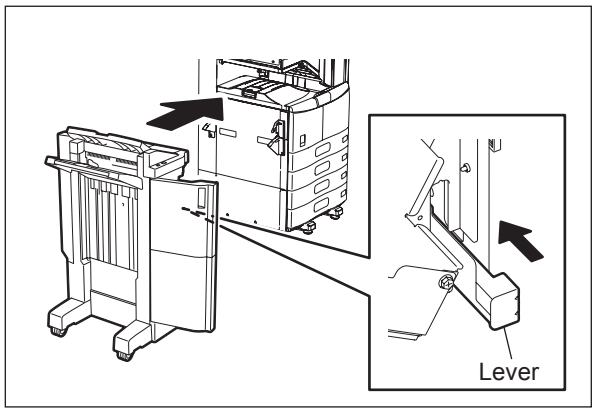


Fig. 2-85

2.7.6 MJ-1024 (Saddle stitch finisher)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the connector cover and disconnect the connector.

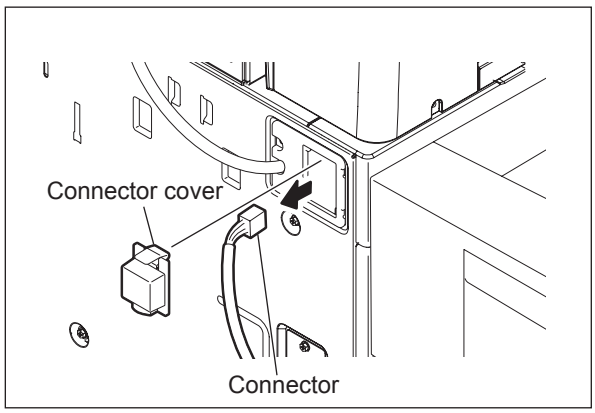


Fig. 2-86

(3) Open the front cover of the finisher.
(4) Remove 1 screw.

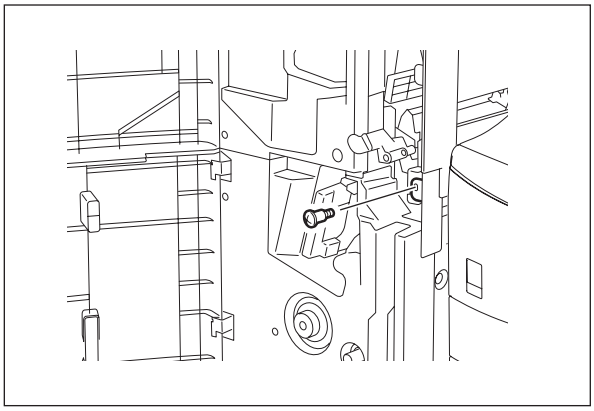


Fig. 2-87

(5) Remove 1 screw and take off the cover.

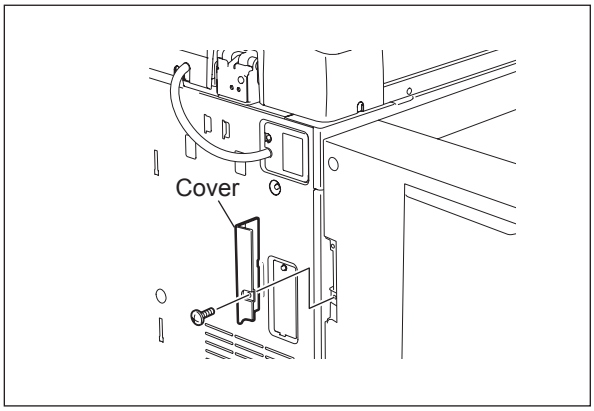


Fig. 2-88

(6) Remove 1 screw and take off the finisher.

Note:
Be careful not to fell the finisher when moving the finisher unit only.

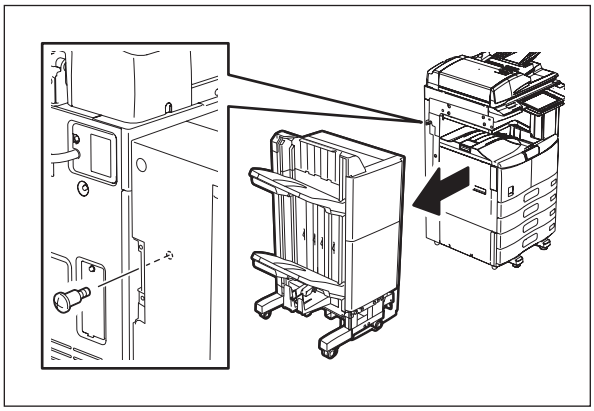


Fig. 2-89

2.7.7 MJ-1025 (Saddle stitch finisher)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the connector cover and disconnect the connector.

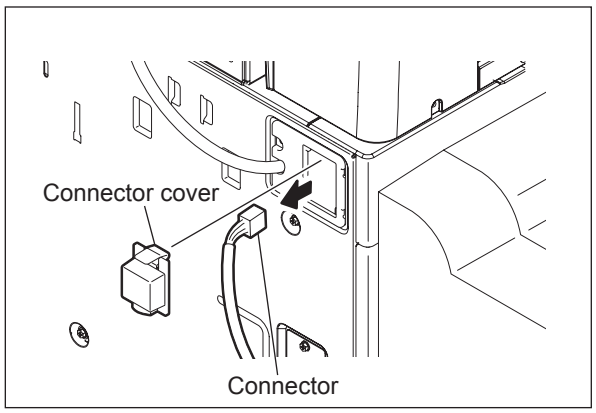


Fig. 2-90

(3) Pull out the finisher while pushing the lever.

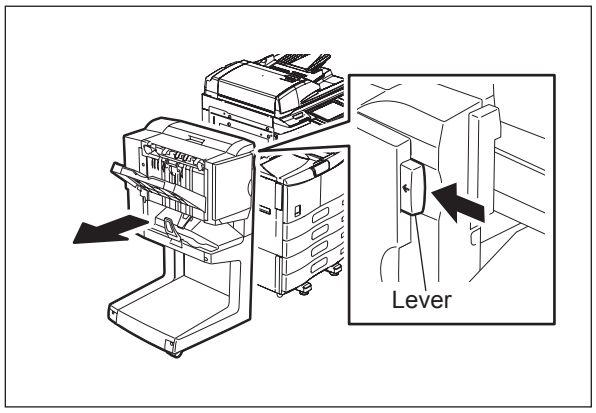


Fig. 2-91

(4) Remove 1 screw and take off the finisher from the rail.

Note:
Be careful not to fell the finisher when moving the finisher unit only.

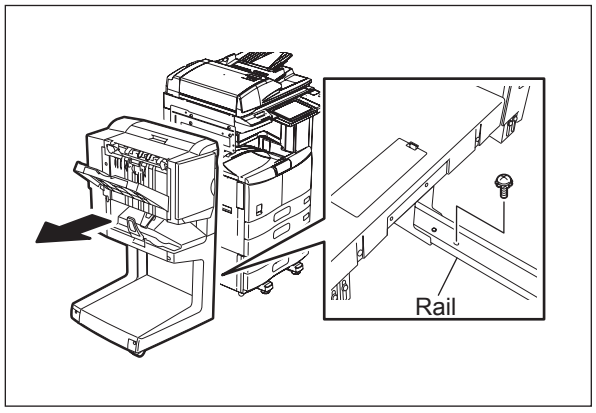


Fig. 2-92

2.7.8 KN-2520 (Bridge unit)

(1) Turn the power OFF and unplug the power cable.
(2) Pull out the finisher from the equipment.
(3) Take off the right rear cover.
📖 P.2-27 "2.5.13 Right rear cover"
(4) Disconnect 1 connector.

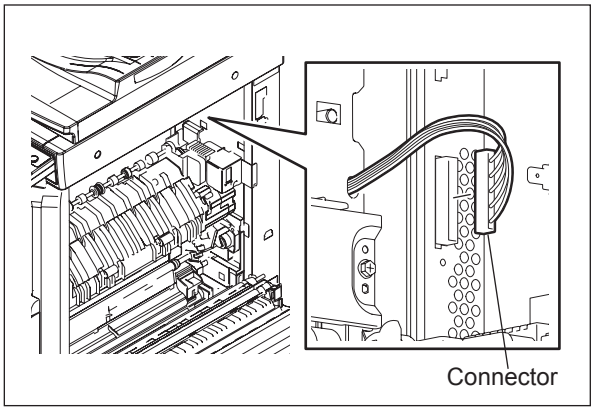


Fig. 2-93

(5) Remove 1 screw and take off the cover.

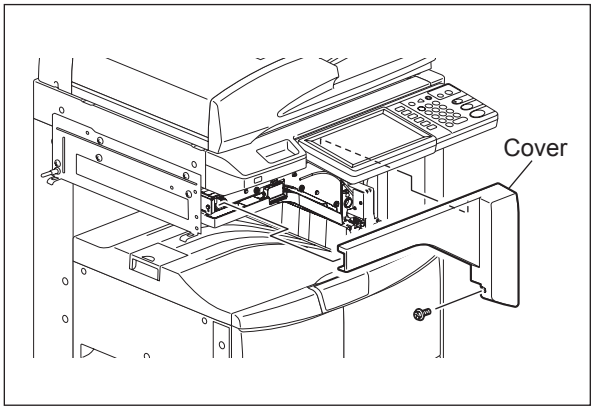


Fig. 2-94

(6) Remove 1 screw.

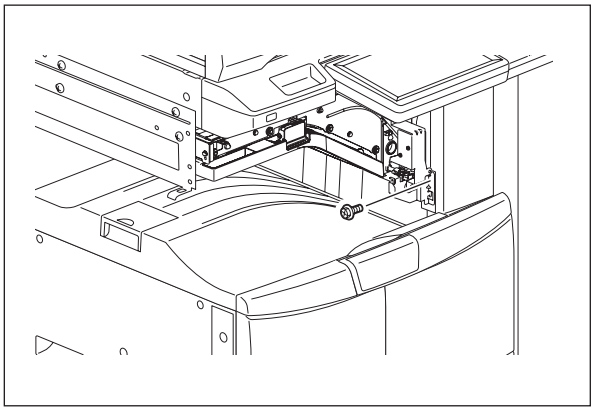


Fig. 2-95

(7)

- When MJ-1031 is installed; Remove 4 screws and take off the bracket.

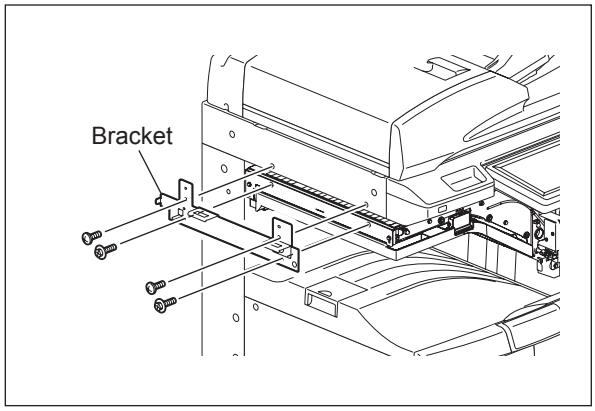


Fig. 2-96

- When MJ-1101 is installed; Remove 4 screws and take off the bracket.

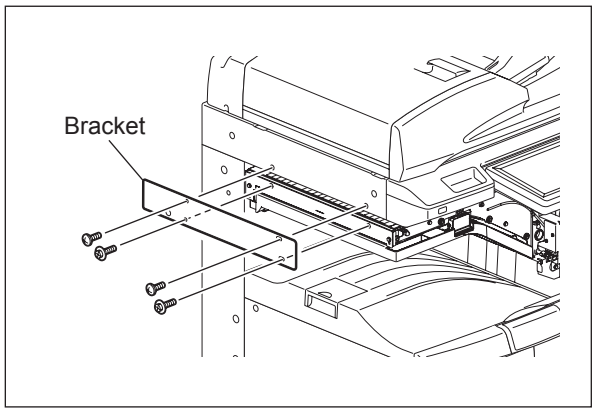


Fig. 2-97

- When MJ-1024 is installed; Remove 4 screws and take off the bracket.

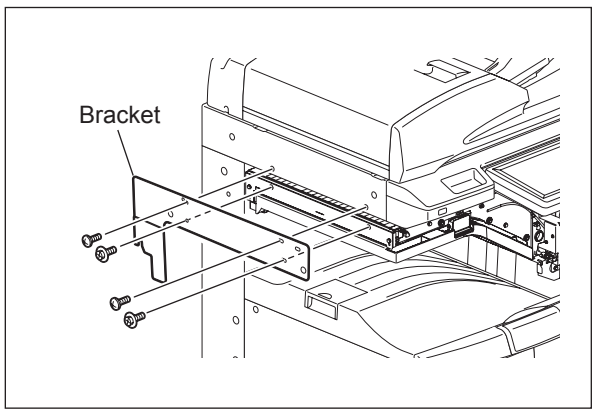


Fig. 2-98

- When MJ-1025 is installed; Remove 5 screws and take off the bracket.

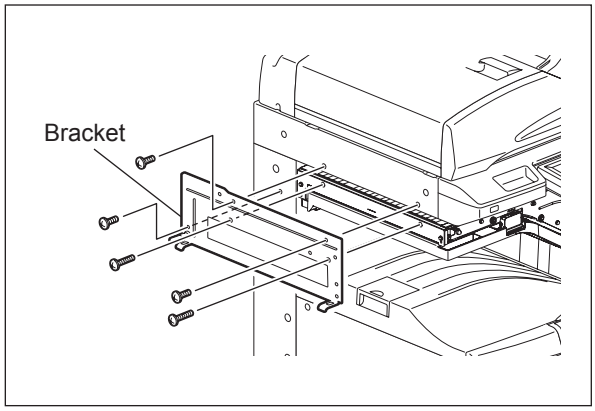


Fig. 2-99

(8) Lift up the bridge unit and release the hook. Take off the bridge unit toward the front.

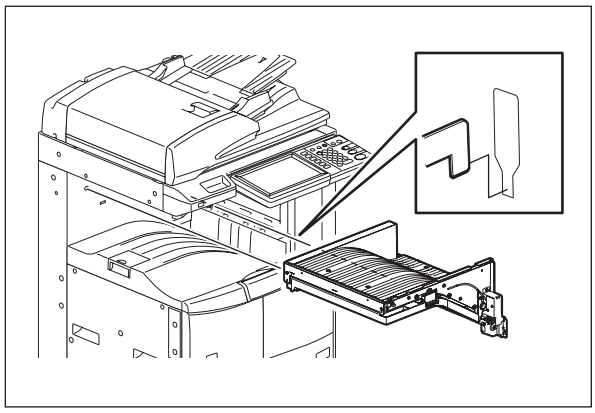


Fig. 2-100

2.7.9 MJ-5004 (Job separator) (e-STUDIO205L/255/305)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the tray.

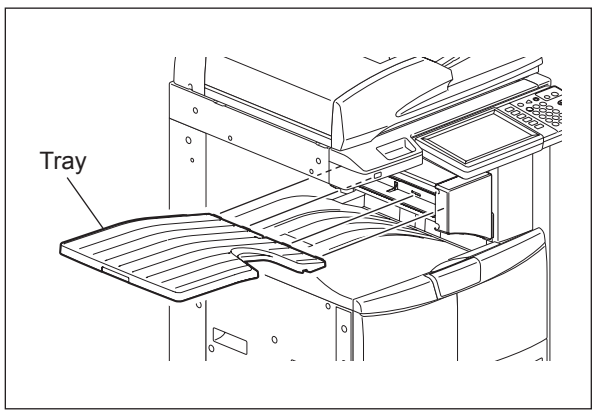


Fig. 2-101

(3) Remove 2 screws and take off the cover.

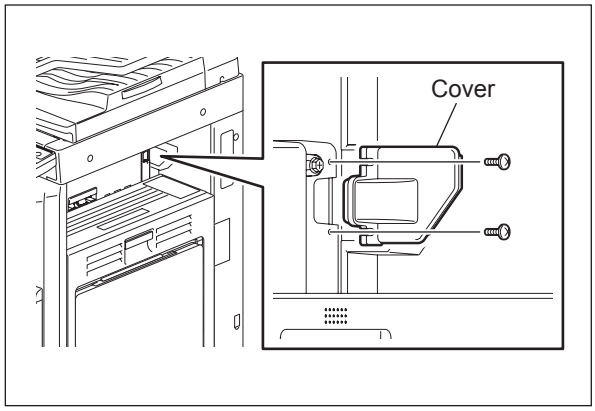


Fig. 2-102

(4) Take off the right rear cover.
📖 P.2-27 "2.5.13 Right rear cover"
(5) Disconnect 2 connectors.

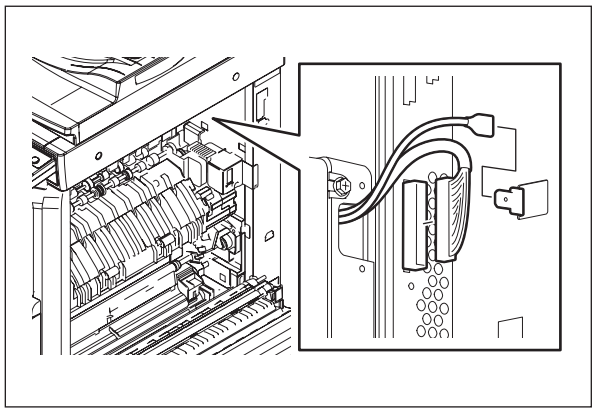


Fig. 2-103

(6) Loosen 2 screws and take off the cover.

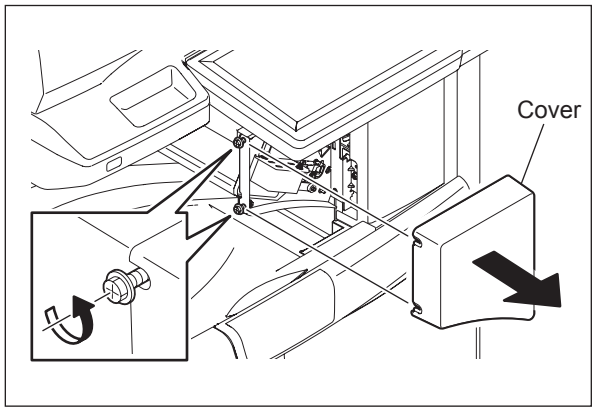


Fig. 2-104

(7) Remove 1 screw. Lift up the job separator and release the hook. Take off the job separator toward the front.

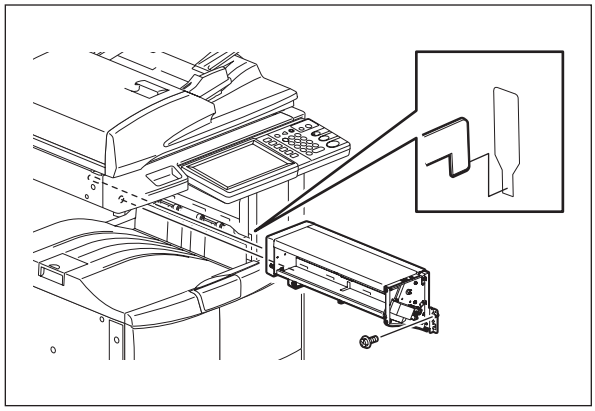


Fig. 2-105

2.7.10 MJ-5005 (Offset tray) (e-STUDIO205L/255/305)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the tray.

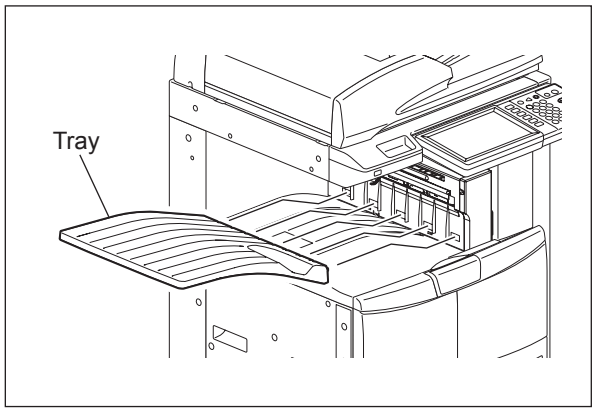


Fig. 2-106

(3) Remove 2 screws and take off the cover.

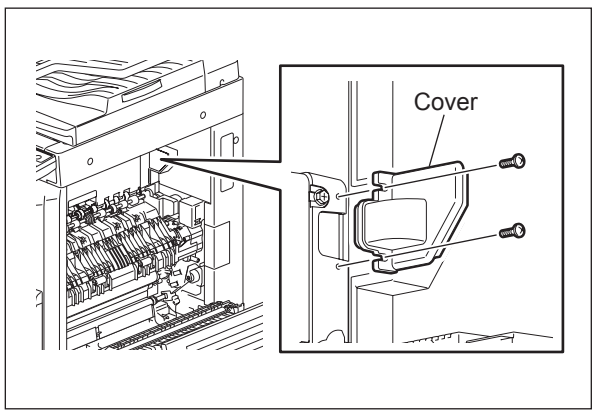


Fig. 2-107

(4) Take off the right rear cover.
📖 P.2-27 "2.5.13 Right rear cover"
(5) Disconnect 2 connectors.

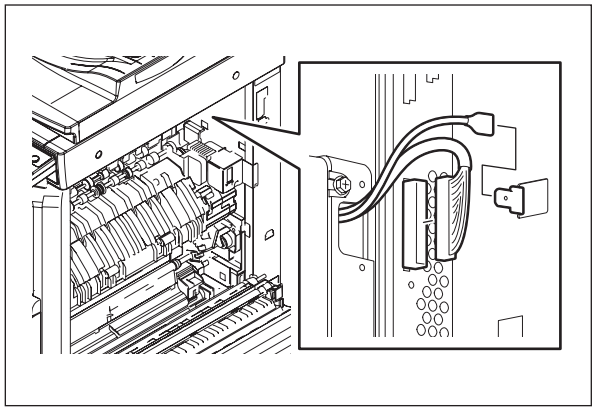


Fig. 2-108

(6) Remove 1 screw and take off the cover.

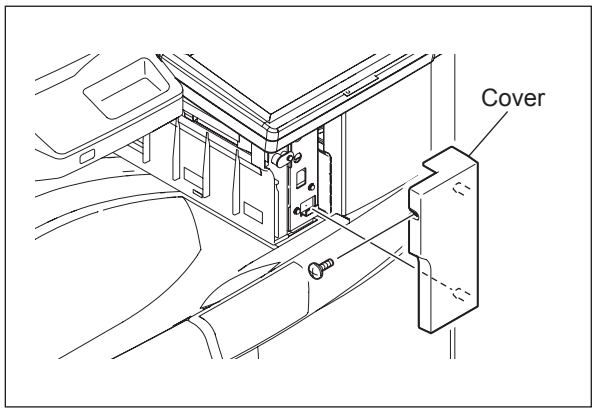


Fig. 2-109

(7) Lift up the offset tray and release the hook. Take off the offset tray toward the front.

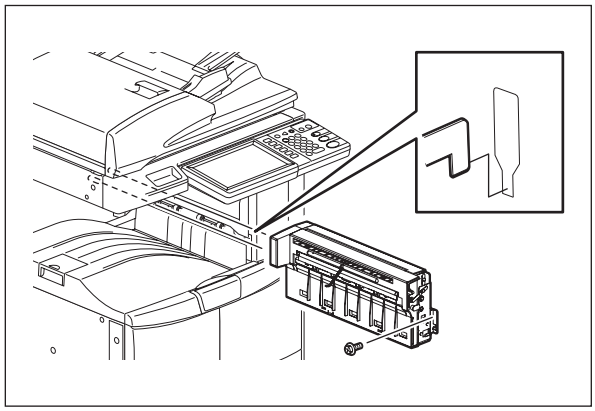


Fig. 2-110

2.7.11 MJ-5006 (Job separator) (e-STUDIO355/455)

(1) Turn the power OFF and unplug the power cable.
(2) Take off the tray.

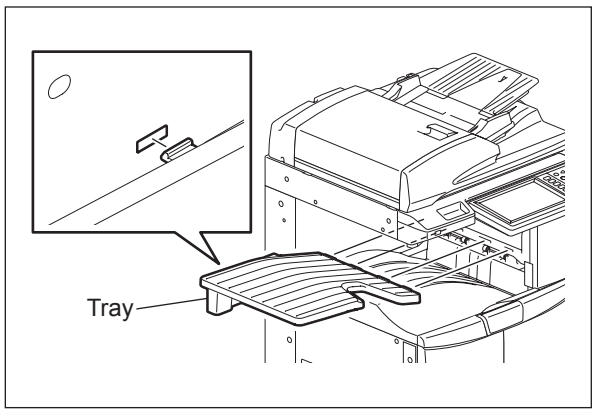


Fig. 2-111

(3) Remove 2 screws and take off the cover.

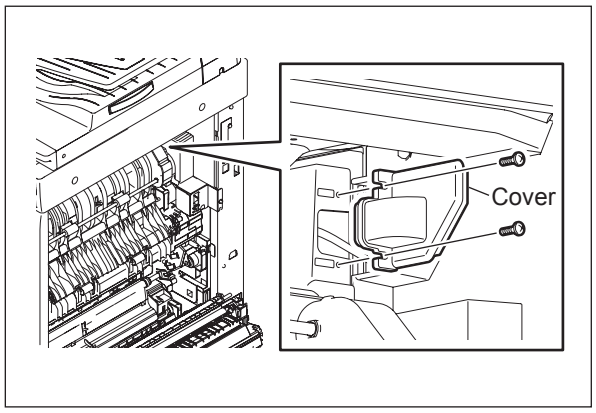


Fig. 2-112

(4) Take off the right rear cover.
📖 P.2-27 "2.5.13 Right rear cover"
(5) Disconnect 2 connectors.

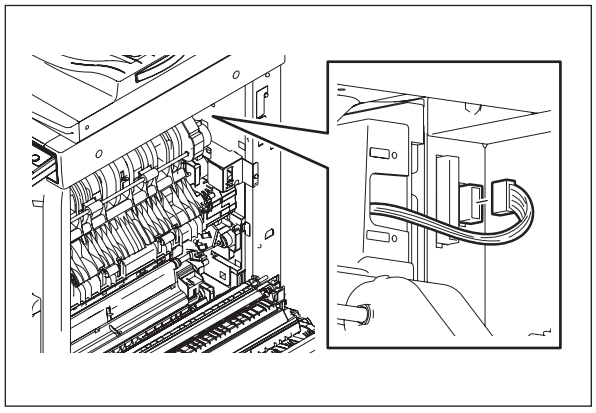


Fig. 2-113

(6) Remove 2 screws and take off the cover.

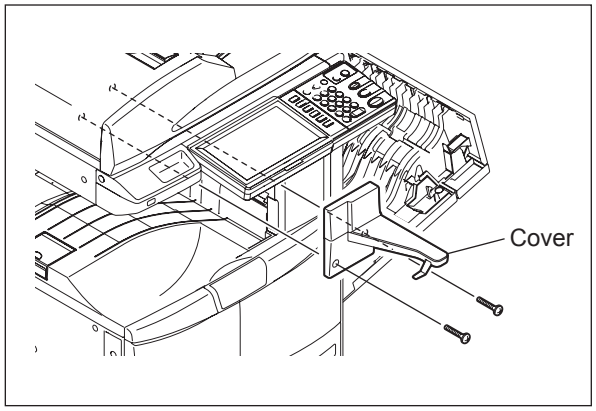


Fig. 2-114

2.8 Damp Heater Kit (MF-4550U/E) Installation Procedure

2.8.1 Preparation

Damp Heater Kit (check if all of the following parts are in it), tools

(a) Scanner Damp Heater (Left)
(b) Scanner Damp Heater (Right)
(c) Drum Damp Heater
(d) Fuse board
(e) Fixing screw M3x6 (for the scanner)
(f) Fixing screw M3x8 (for the fuse board and drum)
(g) Clamp (for the scanner (Left))
(h) Harness (for the scanner and drum)
(i) Harness (for the fuse board)
(j) Harness (for the scanner (right))
(k) Harness (for the fuse board and the switching regulator join)

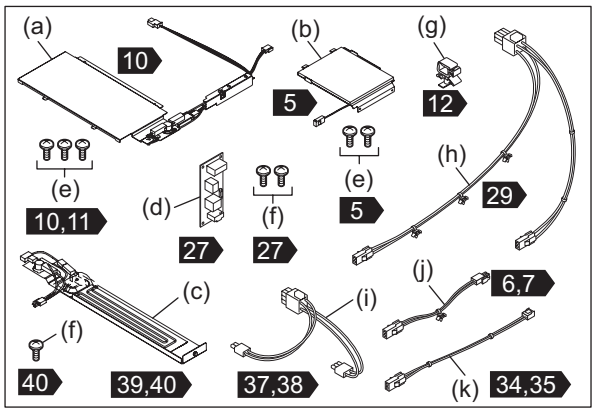


Fig. 2-115

Notes:

1. When installing the Damp Heater, ensure sufficient work space for disassembling the equipment.
2. Turn the power of the equipment OFF and unplug the power cable before the installation.
3. Take off the Finisher (optional), the FAX unit, the Job separator (optional), Offset tray (optional), or the Hole Punch Unit (optional) before starting the installation, if installed.
4. Be sure not to drop small parts such as screws into the equipment.

2.8.2 Procedure

(1) Remove 3 screws and take off the right upper cover.

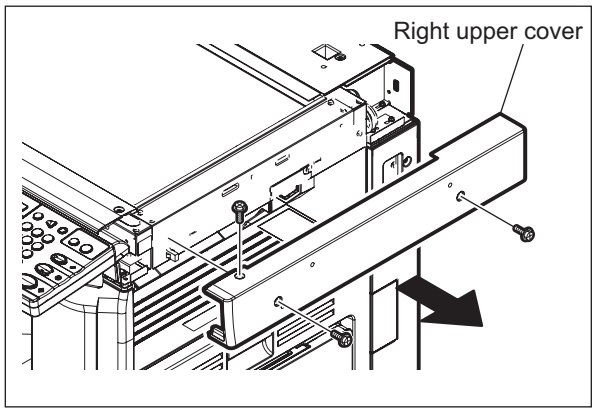


Fig. 2-116

(2) Remove 2 screws and take off the fixing bracket.

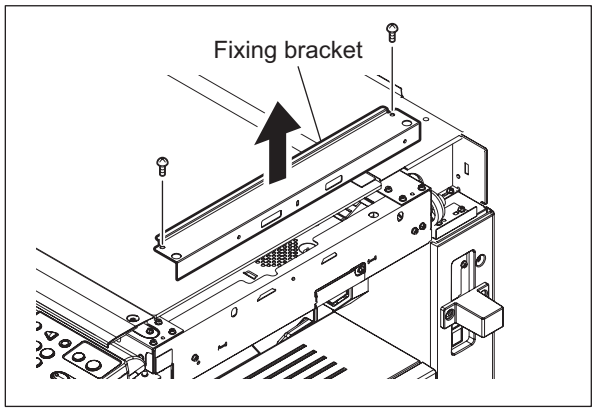


Fig. 2-117

(3) Take off the original glass.

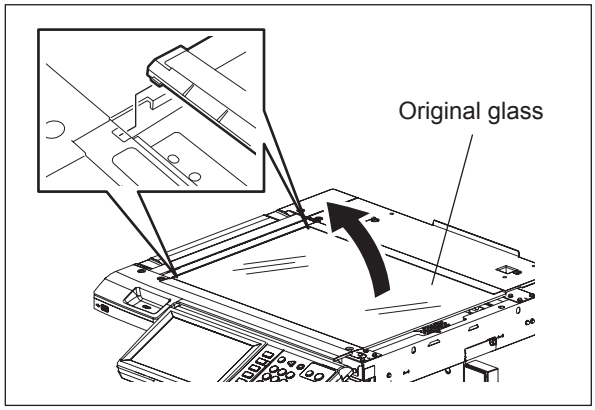


Fig. 2-118

(4) Remove 4 screws and take off the lens cover.

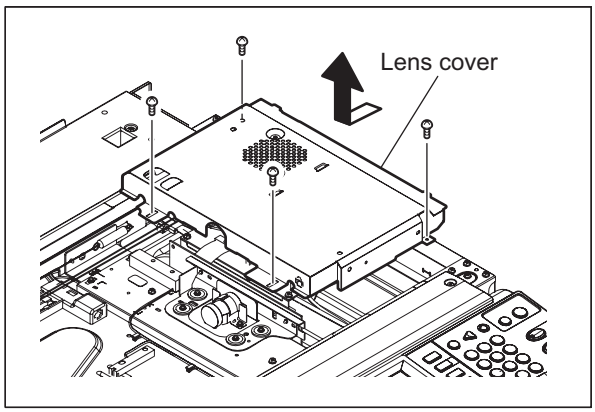


Fig. 2-119

(5) Install the Scanner Damp Heater (Right) on the lens cover with 2 screws.

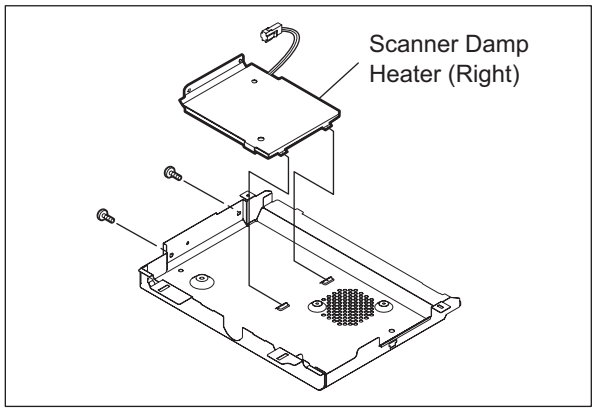


Fig. 2-120

(6) Connect the connector of the harness and install the clamp to the lens unit.
(7) Insert the connector into the lens unit.

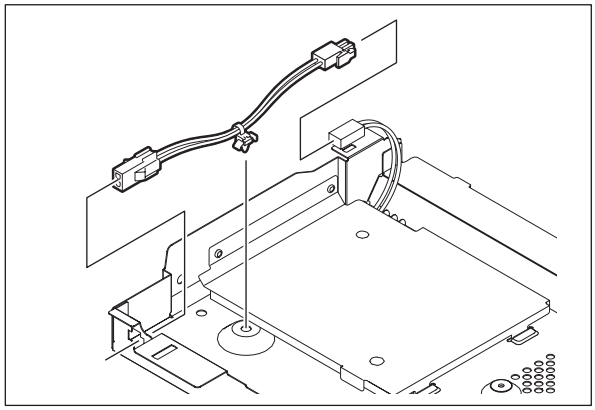


Fig. 2-121

(8) Install the lens cover with 4 screws.

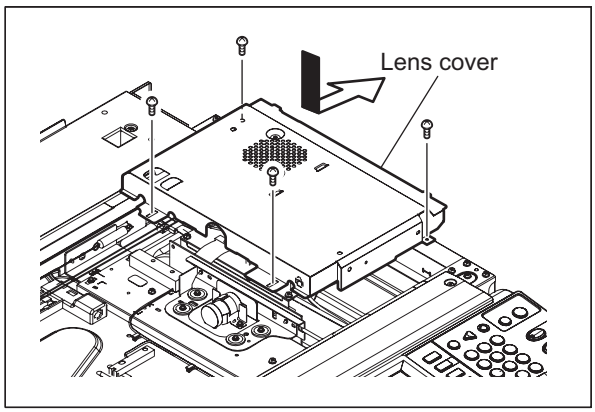


Fig. 2-122

(9) Rotate the pulley to move the carriage to the paper exit side.

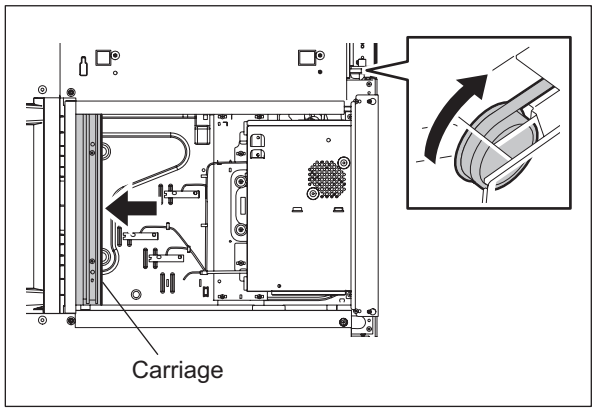


Fig. 2-123

(10) Install the Scanner Damp Heater (Left) with 2 screws.

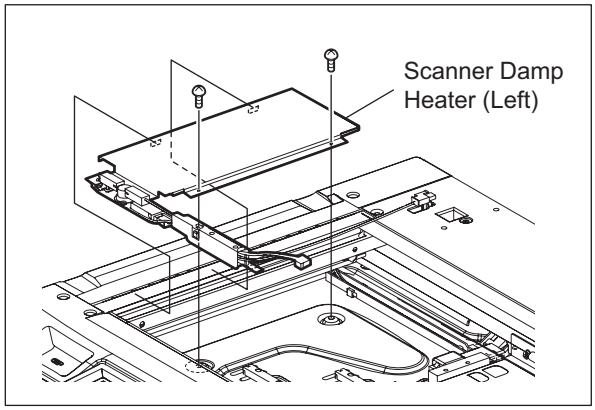


Fig. 2-124

(11) Install the Scanner Damp Heater (Left) in the cutout of the frame in the equipment as shown in the right-hand figure.
Fix the Scanner Damp Heater (Left) with 1 screw and then insert 1 connectors.

Note:
Check that no harnesses will be caught by moving the carriage.

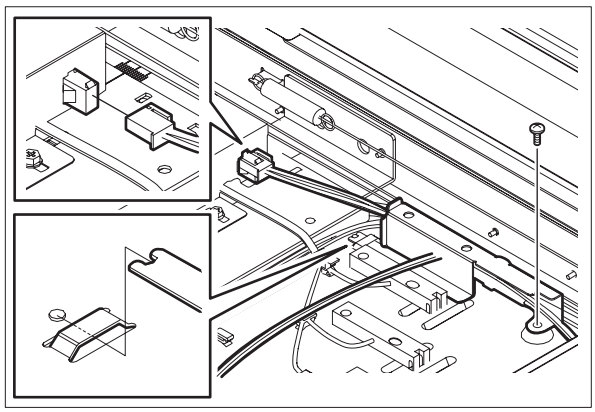


Fig. 2-125

(12) Attach the harness to 1 connector and then install the clamp in the equipment.
(13) Fix the harness with 2 clamps.

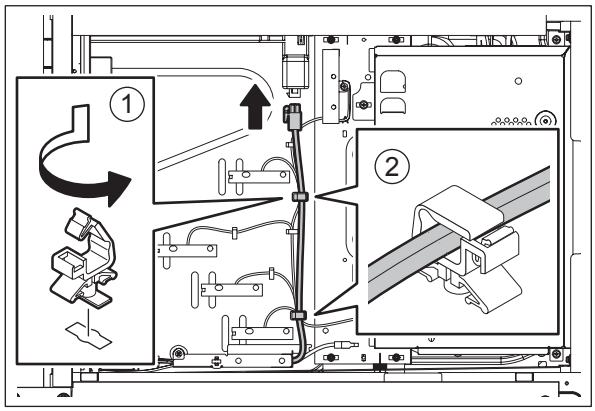


Fig. 2-126

(14) Install the original glass.

Note:
When installing, fit 2 small protrusions of the original glass in the groove of the equipment and fix the original glass with the fixing bracket by pushing it to the left rear direction.

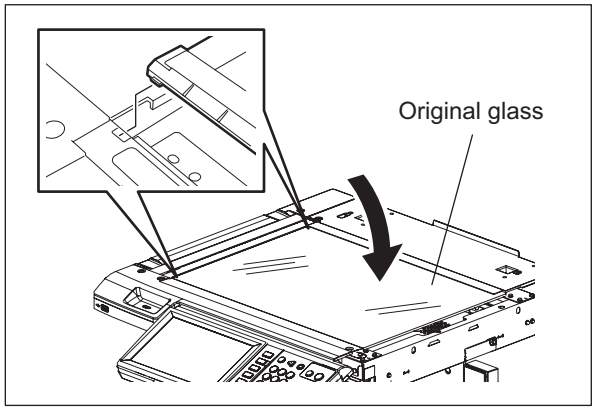


Fig. 2-127

(15) Install the fixing bracket with 2 screws.

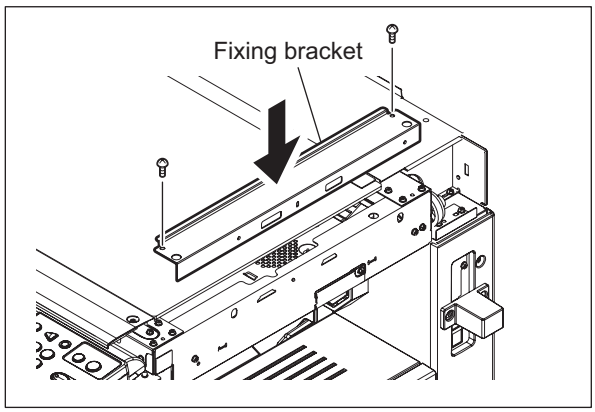


Fig. 2-128

(16) Install the right upper cover with 3 screws.

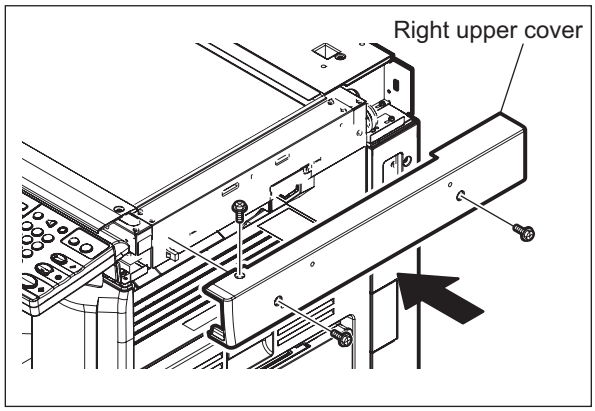


Fig. 2-129

(17) Open the front cover.

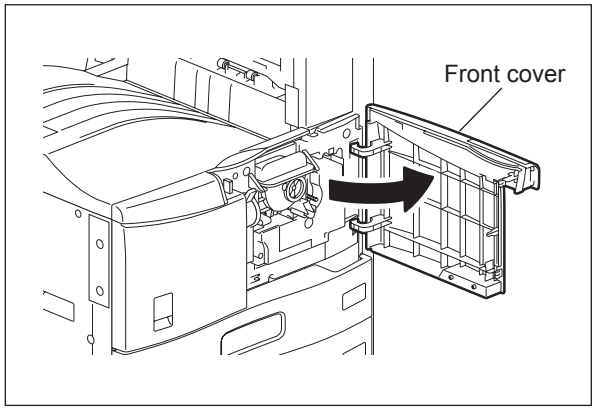


Fig. 2-130

(18) Take off the toner cartridge.

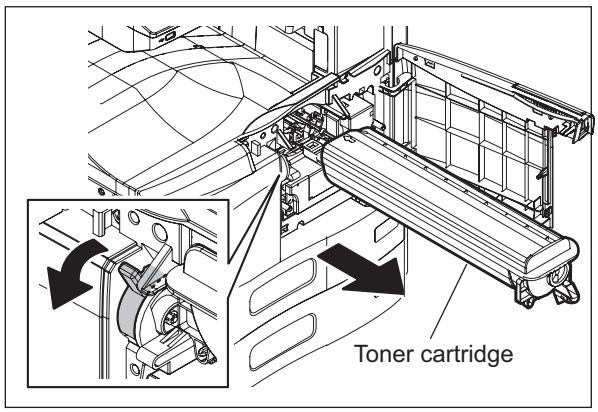


Fig. 2-131

(19) Open the automatic duplexing unit.

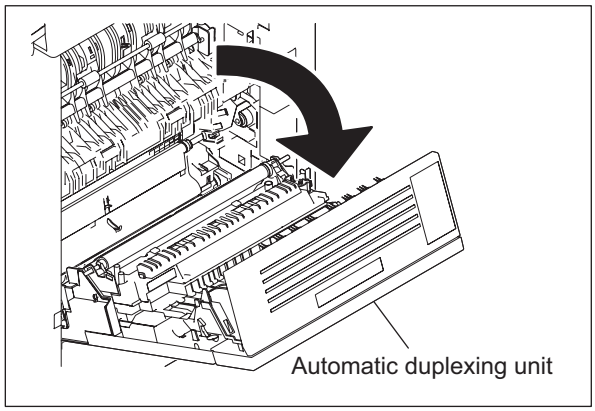


Fig. 2-132

(20) Loosen 2 screws and pull out the process unit.

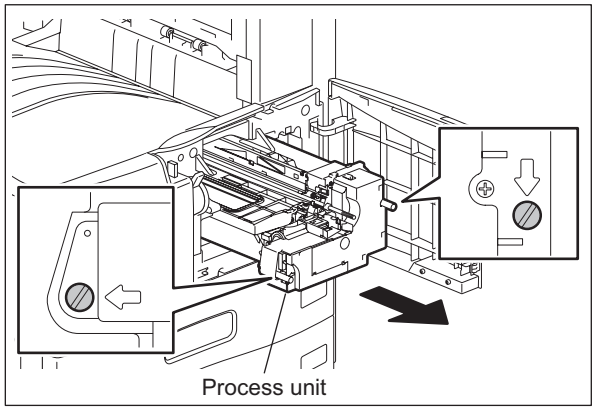


Fig. 2-133

(21) Remove 2 screws, and then take off the inner tray.

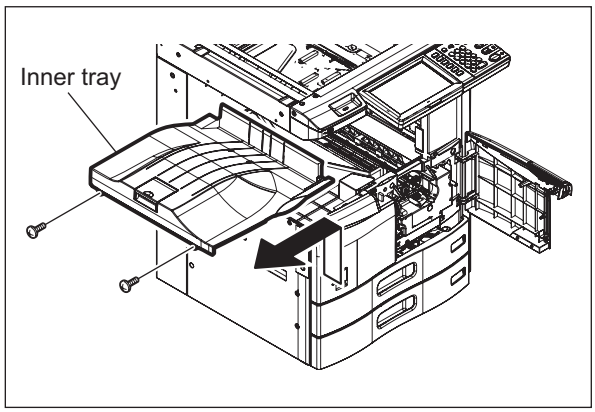


Fig. 2-134

(22) Remove 1 screw and disconnect 1 connector. Take off the duct.

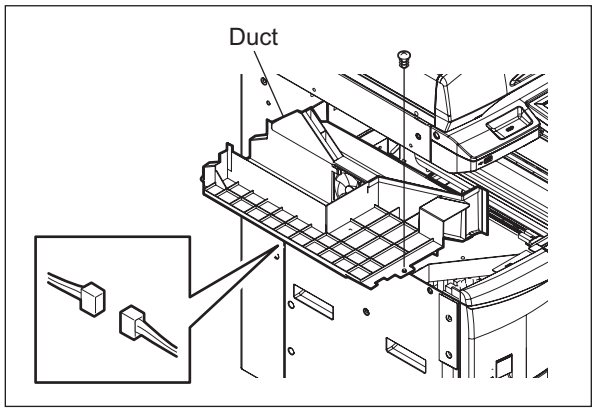


Fig. 2-135

(23) Remove 1 screw and then take off the Damp Heater cover.

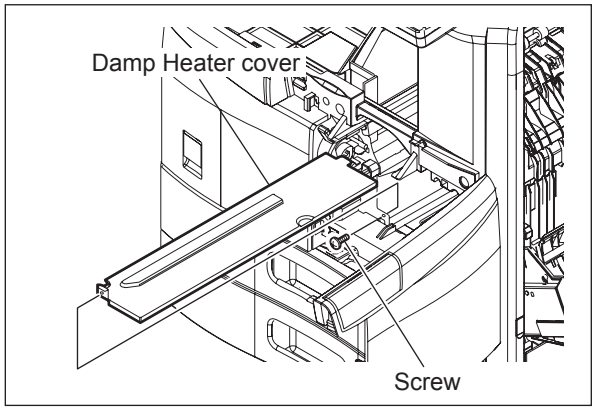


Fig. 2-136

(24) Remove 5 screws. Lift up the rear cover and then release 3 hooks on the upper side. Then open the upper side of the rear cover slightly toward you, and then take off the rear cover by lifting it up.

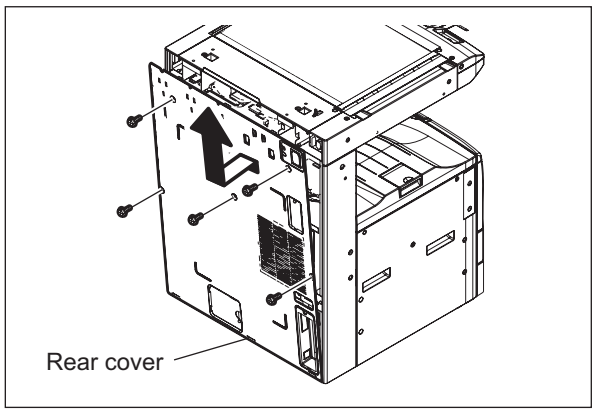


Fig. 2-137

(25) Disconnect 2 connectors from the LGC board.

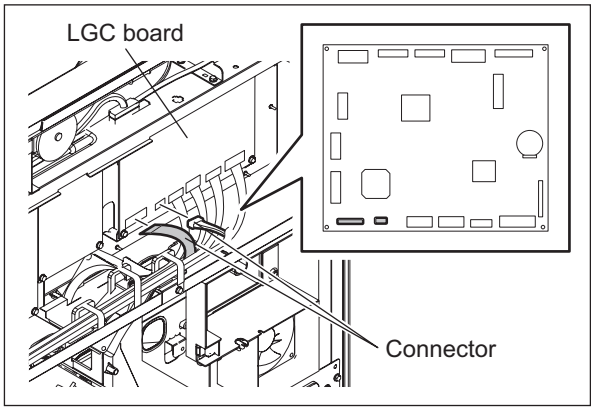


Fig. 2-138

(26) Remove 1 screw and take off the laser optical unit.

Note:
When removing and installing the laser optical unit, be careful not to deform the leaf spring.

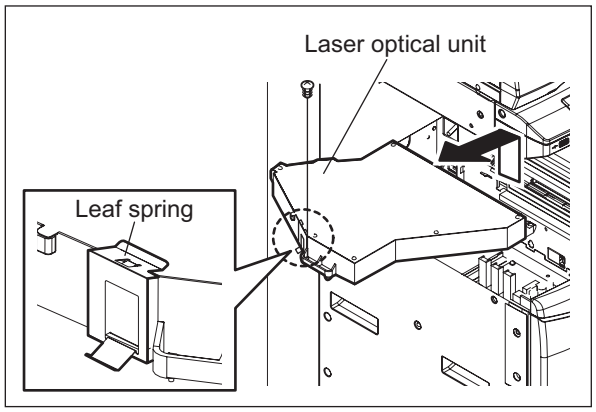


Fig. 2-139

(27) Fix the fuse board with 2 screws.

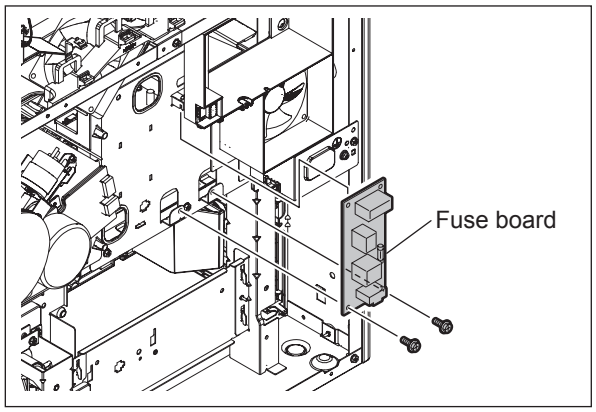


Fig. 2-140

(28) Attach the harness to the connector of the fuse board.

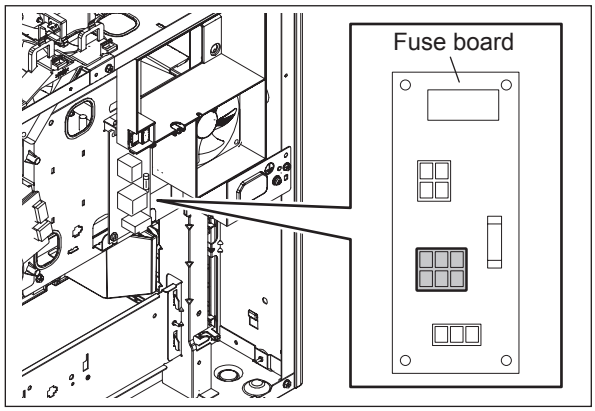


Fig. 2-141

(29) Run the harness through the clamp, and then through the hole of the frame of the equipment.

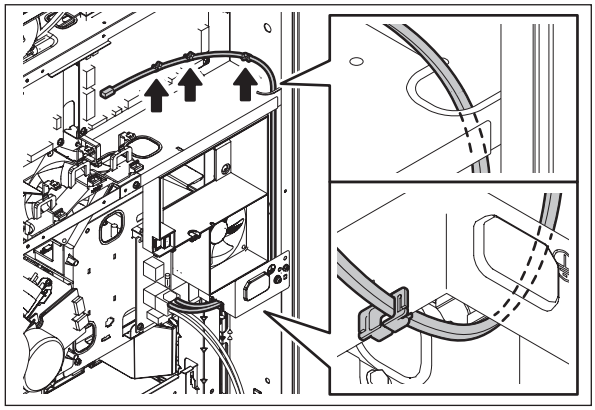


Fig. 2-142

(30) Run the harness through the clamp. Then run it through the hole in the equipment and wire it to the front side as shown in the right-hand figure.

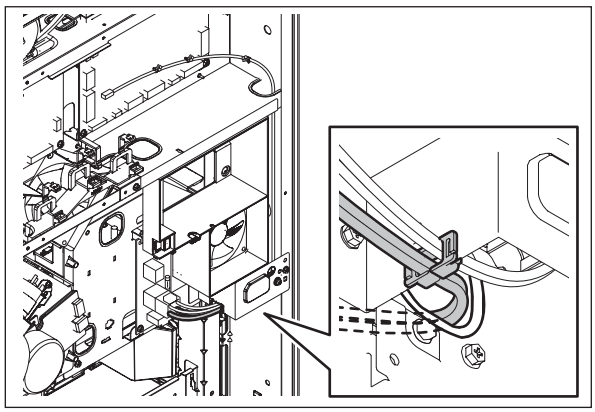


Fig. 2-143

(31) Connect 1 connector and install 3 clamps.

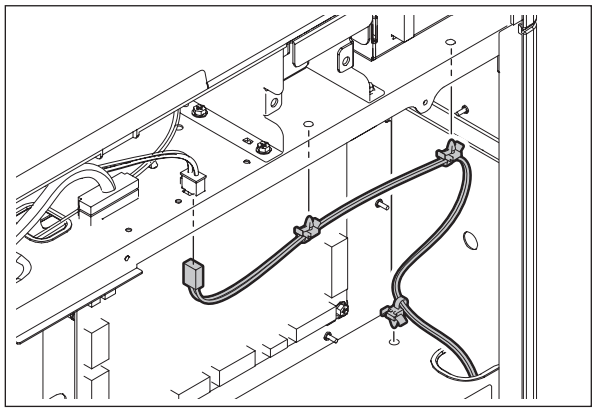


Fig. 2-144

(32) Remove 1 screw and take off the duct.

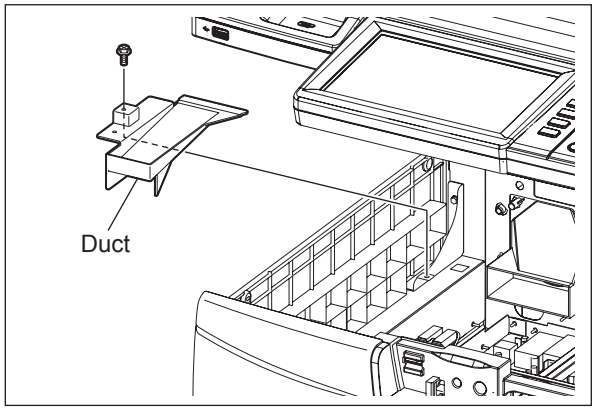


Fig. 2-145

(33) Fix the harness with 1 clamp, and then insert the connector into the hole of the frame of the equipment.

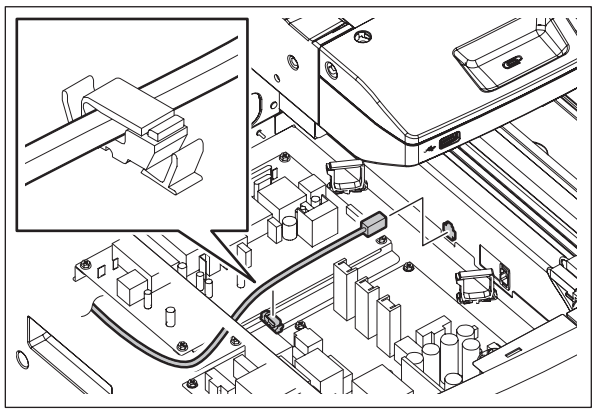


Fig. 2-146

(34) Attach the harness to the connector of the switching regulator.
(35) Run the harness through the hole of the frame of the equipment, and then wire it to the rear side.

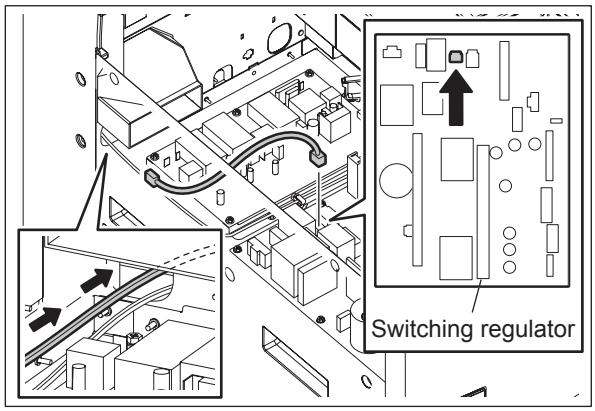


Fig. 2-147

(36) Attach the harness to the clamp.

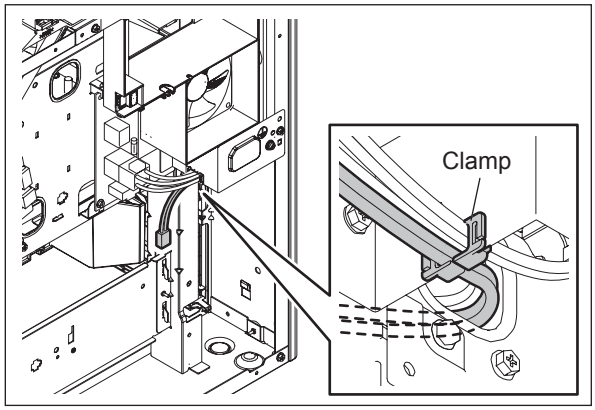


Fig. 2-148

(37) Attach the harness to the connector of the fuse board and the one of the frame of the equipment.
(38) Connect the harness coming from the clamp to the connector.

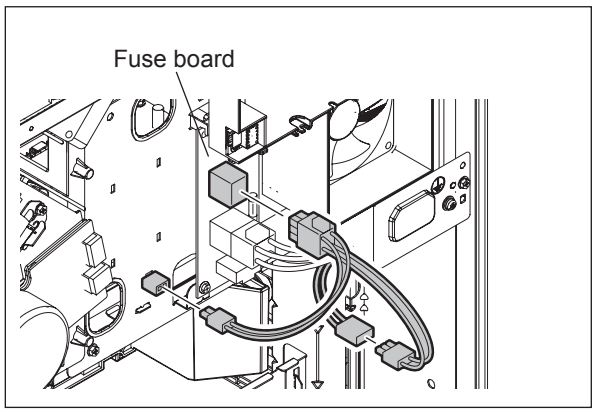


Fig. 2-149

(39) Apply 1 hook to the frame of the equipment.
(40) Attach the harness to the connector, and then fix the Drum Damp Heater with 1 screw.

Notes:

- After the Scanner Damp Heater (Left), Scanner Damp Heater (Right) and Drum Damp Heater have been installed, perform the installation following the opposite procedure of the disassembly.
- Check the following after the installation of the Damp Heater
  1. Image quality
  2. Abnormal heating
  3. Any screws not installed

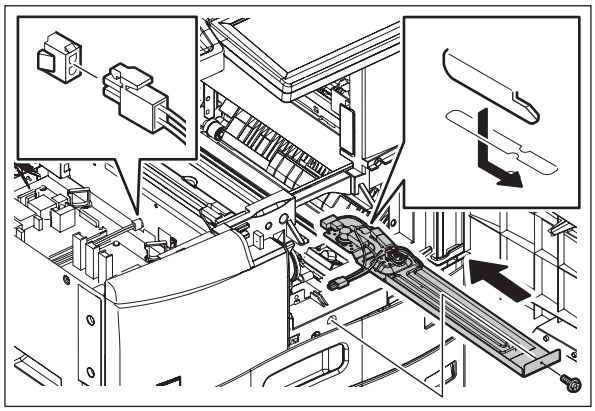


Fig. 2-150

3. COPY PROCESS

3.1 General Description of Copying Process

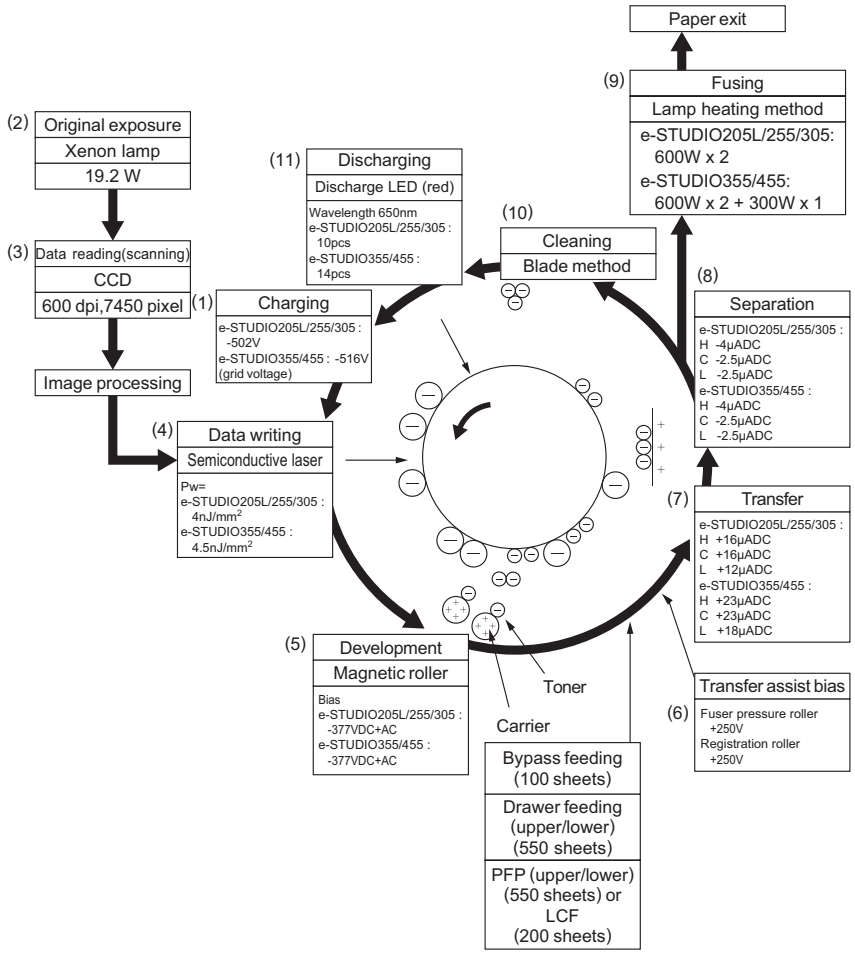
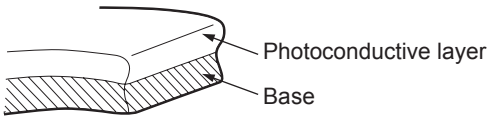


Fig. 3-1

(1) Charging: Applies negative charge on the surface of the photoconductive drum.
↓
(2) Original exposure: Converts images on the original into optical signals.
↓
(3) Data reading: The optical signals are converted into electrical signals.
↓
(4) Data writing: The electrical signals are converted into light signal (laser emission) which exposes the surface of the photoconductive drum.
↓
(5) Development: Negatively-charged toner adheres to the photoconductive drum and forms visible image.
↓
(6) Transfer assist bias: Improves transfer efficiency.
↓
(7) Transfer: Transfers the visible toner image on the photoconductive drum onto paper.
↓
(8) Separation: Separates paper with the toner image from the photoconductive drum.
↓
(9) Fusing: Fuses the toner image onto the paper by applying heat and pressure.
↓
(10) Cleaning: Scrapes off the residual toner from the drum.
↓
(11) Discharging: Eliminates the residual negative charge from the surface of the photoconductive drum.

3.2 Details of Copying Process

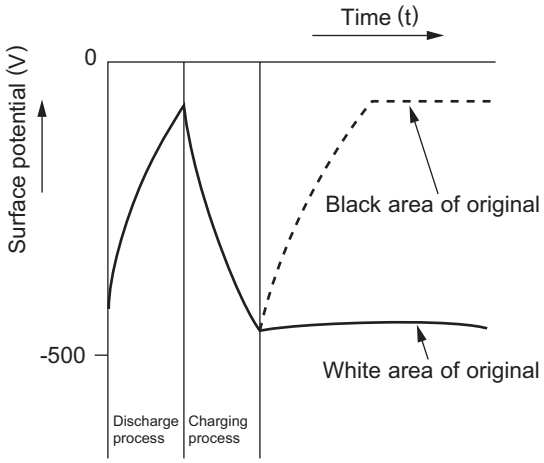
1. Photoconductive drum
   The photoconductive drum consists of two layers. The outer layer is a photoconductive layer made of an organic photoconductive carrier (OPC), and the inner layer is an aluminum conductive base in a cylindrical form. The photoconductor has the following property: when it is exposed to light, the electrical resistance it possesses increases or decreases according to the strength of the light.
   Example:
   - Strong light
     Resistance is decreased (works as a conductor.)
   - Weak light
     Resistance is increased (works as an insulator.)



Structure of the photoconductive drum
(Example of OPC)

Fig. 3-2

[Formation of electrostatic latent image]
In the processes of charging, data reading, data writing, discharging described later, negative potential of the areas on the drum corresponding to black areas of the original are eliminated, while the areas on the drum corresponding to white areas retains the negative charge.
As this image on the drum formed by the negative potential is not visible, it is called an “electrostatic latent image.”



Electric potential of the photoconductive drum

Fig. 3-3

2. Charging
   Charging is the process to apply charge evenly on the drum surface.
   The needle electrode produces negative corona discharge is controlled by the grid, allowing the drum surface to be evenly charged with the negative potential.
   The surface potential on the drum is determined by the grid potential and is controlled to a certain value by the grid control circuit.

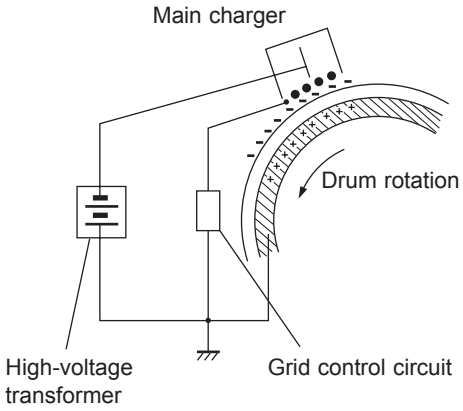


Fig. 3-4

3. Data reading (scanning)
   Data reading is a process of illuminating the original with light and converting the reflected light into electrical signals.
   The light reflected from the original is directed to the Charge Coupled Device (CCD) and this optical image information is converted to electrical signals (image signals), which are then transmitted to the image processing section via the scanning section control PC board.
   The CCD for color processing has RGB filters provided over its surface, which allow the CCD to read the light amount in the respective ranges of wavelength. The image data corresponding to the respective RGB colors is then transmitted to the image processing section.

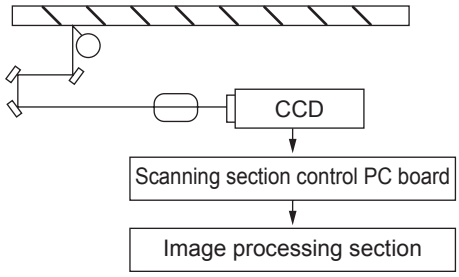


Fig. 3-5

(Example)

CCD light receiving amount	Value of image signals to be output
Light	255
Dark	0

Difference between "light " and "dark" is divided into 256 steps.

Fig. 3-6

4. Data writing
   Data writing is the process of converting the image signals sent from the image processing section into optical signal and exposing the drum surface with the light.
   Semiconductive laser element converts image signals transmitted from the image processing section into optical signal (laser emission) to expose the drum surface and form an electrostatic latent image on it.

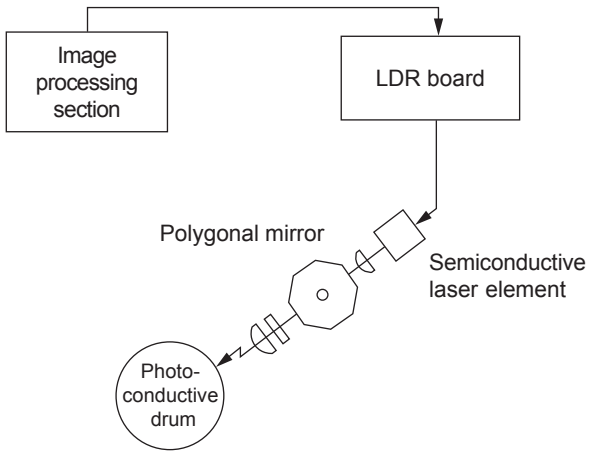


Fig. 3-7

5. Development

Development is the process of making the electrostatic latent images visible to the eye (visible images).

Developer material is supplied to the photoconductive drum surface by the magnetic roller.

The toner in the developer material adheres to the areas on the drum surface where the potential is lower than the developer bias which is applied to the magnetic roller (reverse development method).

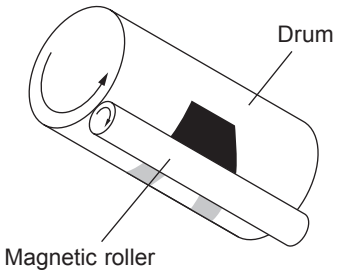


Fig. 3-8

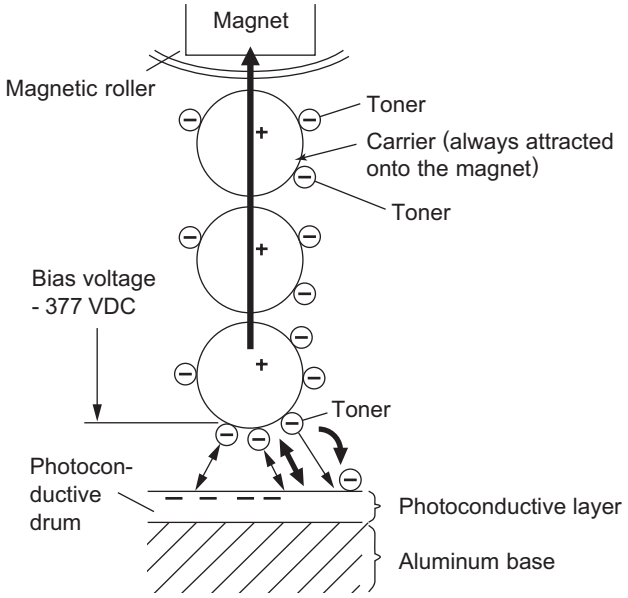


Fig. 3-9

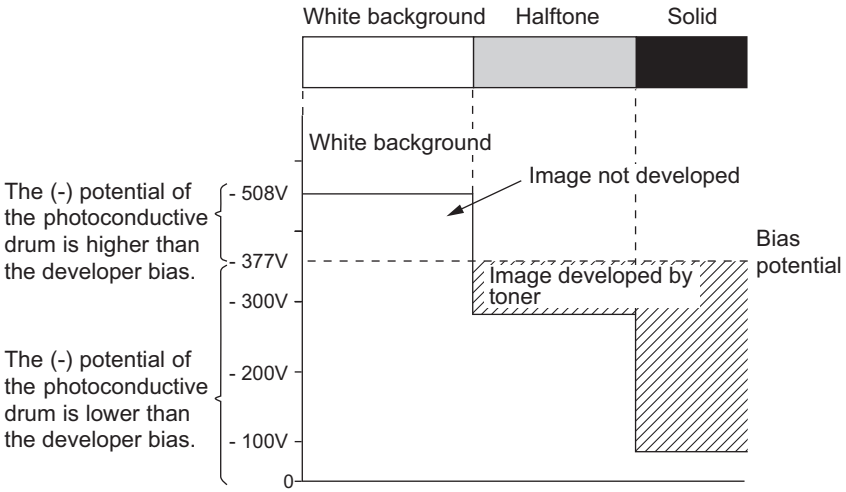


Fig. 3-10

- Charging AC bias

  To obtain the stable development characteristics, AC bias (approx. 1,100 V) is charged to the development bias (DC bias).

- Developer material
  The developer material consists of a mixture of the toner and carrier. The toner is charged to the negative polarity and the carrier to positive polarity due to the friction with each other caused by mixing.

Toner: Mainly consists of the resin and carbon.
Carrier: Consists of the ferrite and resin coating on its surface to provide consistent frictional electrification.

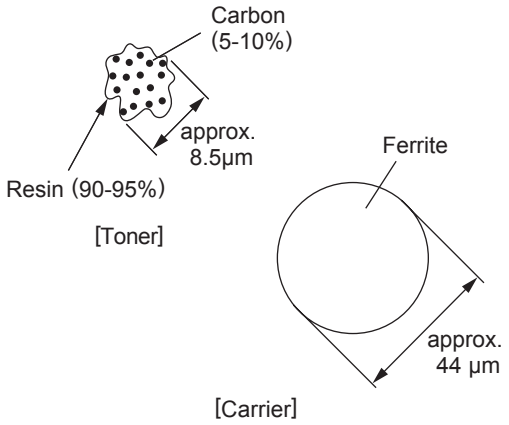


Fig. 3-11

Note:
If the developer material is used for a long time (beyond its normal life span), the toner is caked onto the carrier.
↓
The charging performance of the carrier is lowered.
Symptom: 1. Image density is lowered.
2. Toner scattering occurs.
3. Background fogging occurs.
Solution: Replace the developer material.

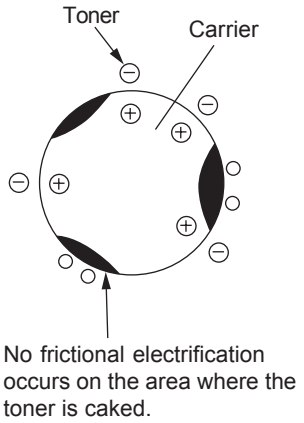


Fig. 3-12

- Magnetic roller
  Magnetic brush development
  The south and north poles are arranged inside the magnetic roller as shown in the right figure.
  The developer material forms a brush-like fluff which contacts the photoconductive drum surface.
  ↓
  This is caused by the magnetic force lines between the south and north poles.

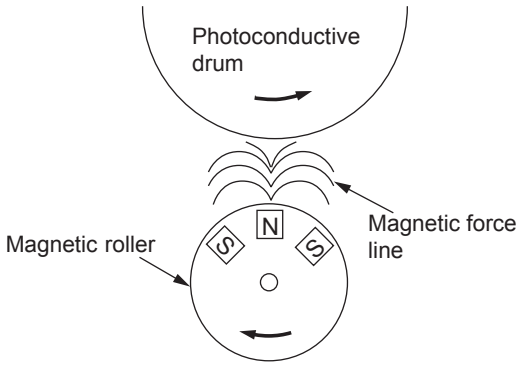


Fig. 3-13

- **Additional Explanation**

The life of the toner cartridge (number of output pages) varies depending on the following conditions.

Coverage of originals (printing image ratio of the original size) and density of original background

Size and density of originals

The existence of solid black when making prints (when a book is copied and the original cover is partially opened)

Temperature and humidity in the room when making prints.

Prints density and image quality mode
As indicated in the figure below, the life of the toner cartridge varies depending on the copy mode and coverage of originals.

A full block in the figure below denotes approx. 5,000 output pages.

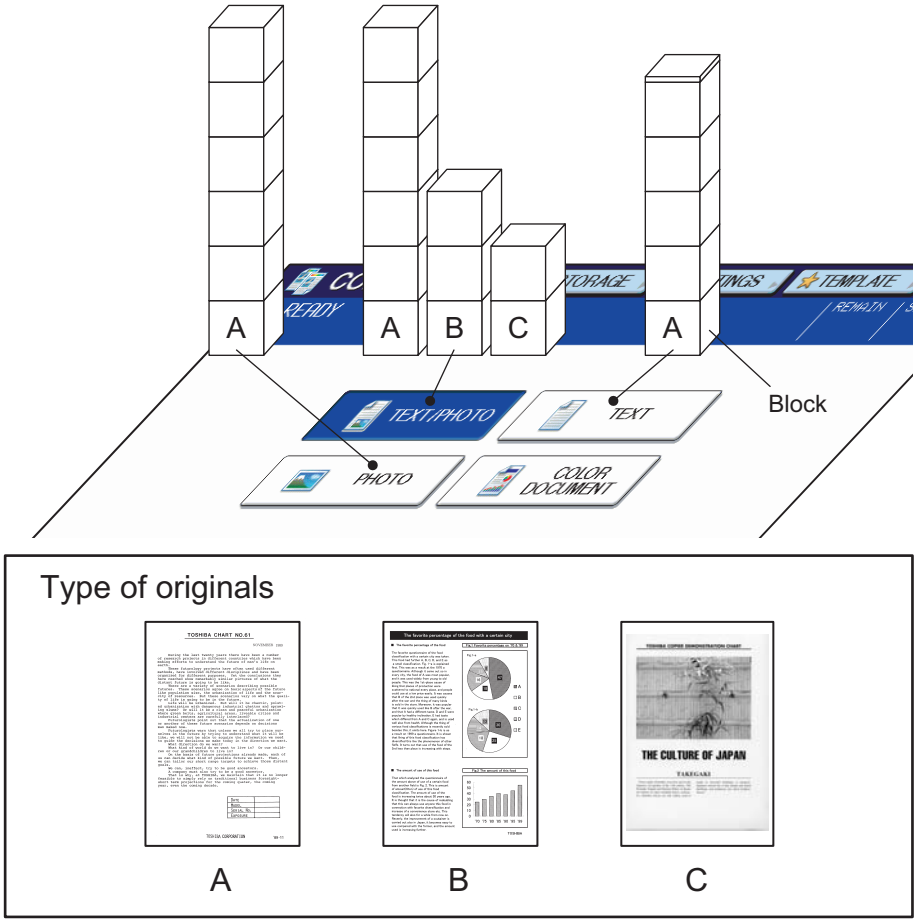


Fig. 3-14

6. Transfer

Transfer is a process of transferring the toner image (visible image) formed on the drum surface onto the paper.

An electric charge applied by the high voltage power supply flows to the transfer roller. Then it flows to the paper and photoconductor. The toner, which has been developed on the photoconductor, is transferred to this paper with an electric charge.

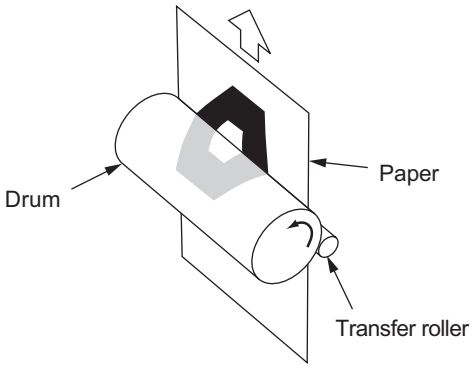


Fig. 3-15

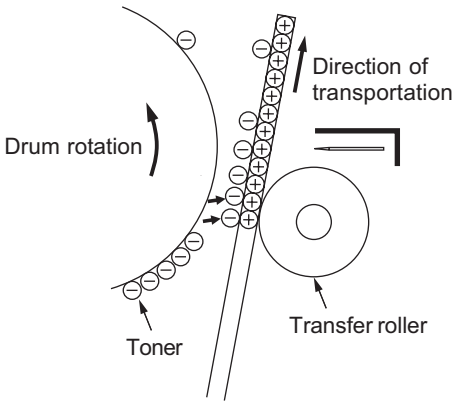


Fig. 3-16

- Output is controlled as follows to realizes the desirable transfability.

Paper position against transfer point		Transfer output	
		e-STUDIO205L/255/305	e-STUDIO355/455
Leading edge	(H)	+16µADC	+23µADC
Center	(C)	+16µADC	+23µADC
Trailing edge	(L)	+12µADC	+18µADC

Since the drum and the transfer roller are always contacted, control the amount of adhering toner.

Output is controlled the optimal cleaning efficiency.

7. Separation
Separation is the process of separating paper which is temporarily adhering to the drum due to the static electricity during the transfer process.

Method: Apply negative DC bias to the separation needle.
↓
The positive charge on the paper is decreased.
↓
The electrostatic adherence force between the paper and drum becomes weak.
↓
The paper is separated from the drum by its own stiffness.

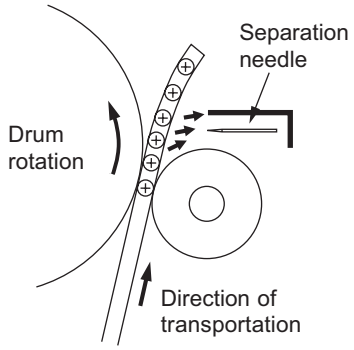


Fig. 3-17

- Output is controlled as follows to realizes the desirable separability.

Paper position against transfer point		Separation output	
		e-STUDIO205L/255/305	e-STUDIO355/455
Leading edge	(H)	-4μADC	-4μADC
Center	(C)	-2.5μADC	-3μADC
Trailing edge	(L)	-2.5μADC	-3μADC

Paper may not be separated from the drum surface because of moisture or malfunction of the separation output during printing. As the result, the paper enters into the cleaner and causes jamming. To prevent this, a separation finger is used to forcibly separate the paper which was left around the drum.

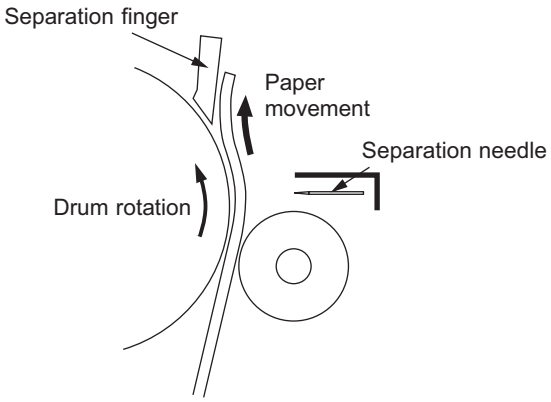


Fig. 3-18

8. Transfer assist bias
In the transfer assist bias processing of this equipment, bias voltage is applied to the registration roller and fuser pressure roller to prevent the charge produced by the transfer roller from flowing into the transfer unit transport path through the paper.

9. Fusing

Fusing is the process of melting the toner on the paper and fixing it firmly on the paper.

Method: The melting point of the toner (main ingredient: resin) is 90-100°C.

↓

(Heat) Toner is melted by the heat of the surface of the fuser roller.

+

(Pressure) The pressure roller is pressed against the fuser roller by the springs to increase the adherence of the melted toner onto the paper.

↓

Heat and pressure are applied to the paper when it passes between the fuser roller and pressure roller.

↓

(Fusing) The toner is fused on the paper.

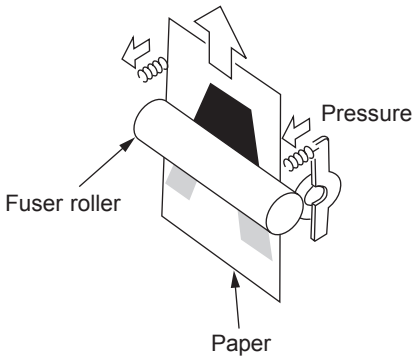


Fig. 3-19

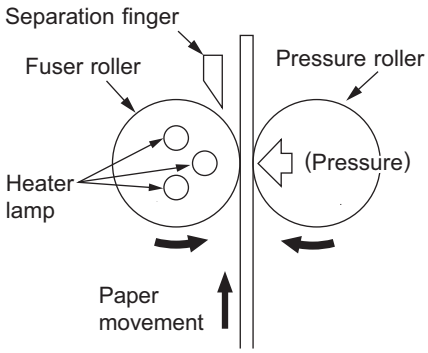


Fig. 3-20

In the transfer sub bias processing of this equipment, bias voltage is applied to the surface of the pressure roller in the fuser unit to prevent the offset to the heat roller.

10. Cleaning

Cleaning is the process of removing the residual toner from the photoconductive drum.

The edge of the urethane rubber cleaning blade is pressed against the photoconductive drum surface to scrape off the residual toner on it. The toner is then caught by the recovery blade. The polymer (PET) sheet on the recovery toner transport auger prevents paper dust from remaining on the drum surface.

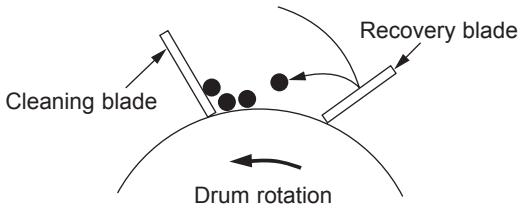


Fig. 3-21

11. Discharging

Discharging is the process of eliminating the negative charge remaining on the photoconductive drum before the next charging process.

If the residual charge is not eliminated, the following phenomenon occurs:

Negative charge remaining on the photoconductive drum surface causes ungiven application of the charge for the next printing.

↓

The next print will have a double image. (The preceding image appears.)

↓

Solution:
The entire surface of the photoconductive drum is illuminated with light by the discharge LED array.

↓

The photoconductive drum becomes electrically conductive.

↓

All of the negative charge remaining on the photoconductive drum is conducted to the ground.

↓

Preparation for the next printing is completed.

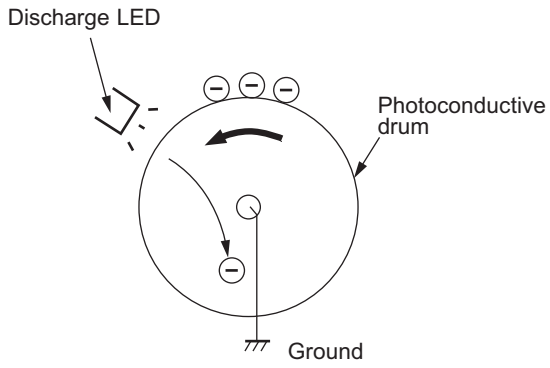


Fig. 3-22

3.3 Comparison with e-STUDIO200L/202L/203L/230/230L/232/233/232S/280/280S/282/283/282S/283S

Process	e-STUDIO200L/202L/203L/230/230L/232/233/232S/280/280S/282/283/282S/283S	e-STUDIO205L/255/305/355/455	
		e-STUDIO205L/255/305	e-STUDIO355/455
1. Photoconductive drum	OD-1600 (OPC ø30)	OD-4530, OD-4530C (OPC ø30)	←
• Sensitivity	Highly sensitized/durable drum	←	←
• Surface potential	-475 V (Adjustment not required)	-508V (Adjustment not required)	←
2. Charging	Scorotron method(Needle electrode)	←	←
• Grid voltage	-495 V(Adjustment not required)	-502 V(Adjustment not required)	-516 V(Adjustment not required)
3. Data writing			
• Light source	Semiconductor laser (Adjustment not required)	←	←
• Light amount	4.0 nJ/mm^2	←	4.5nJ/mm^2
4. Development			
• Magnetic roller	One magnetic roller	←	←
• Auto-toner	Magnetic bridge-circuit method	←	←
• Toner supply	Toner cartridge	←	←
• Toner-empty detection	Density detection method	←	←
• Toner	T-2320, T-2320E, T-2320D, T-2320C, T-2320T (e-STUDIO200L/230/230L/280/280S) T-2340, T-2340E, T-2340D, T-2340C, T-2340T (e-STUDIO202L/232/232S/282/282S) T-2840, T-2840E, T-2340C (e-STUDIO203L/233/283/283S)	PS-ZT4530, PS-ZT4530A, PS-ZT4530C, PS-ZT4530D, PS-ZT4530T, PS-ZT4530E, PS-ZT4530C10K	←
• Developer material	D-2320, D-2320C	PS-ZD4530, D-4530C	←
• Developer bias	DC-357 V Adjustable output (during printing)	DC-377 V Adjustable output	←
	AC 1100 V (Adjustment not required, during printing)	AC 1100 V	←
	DC+150 V Fixed (others)	No reverse bias output	←
5. Transfer			
• Transfer method	Corotron transfer method	Transfer roller output	←
• Transfer output	Adjustable output (Constant current)	Adjustable output (Constant current)	←
• Transfer assist bias	+600 V	+250V	←
6. Separation			
• Separation method	Corotron separation method(Wire electrode)	Needle separation method	←
• Separation output	Adjustable output (Constant current)	Adjustable output (Constant current)	←
7. Discharge			
• Discharging position	Exposure after cleaning	←	←
• Discharge LED	15 red LED's	10 red LED's	14 red LED's
8. Cleaning			
• Method	Cleaning blade	←	←
• Recovered toner	Reuse (There is the recovered toner supply mechanism.)	←	←

Process	e-STUDIO200L/202L/203L/230/230L/232/233/232S/280/280S/282/283/282S/283S	e-STUDIO205L/255/305/355/455	
		e-STUDIO205L/255/305	e-STUDIO355/455
9. Fusing			
• Method	Long-life fuser roller method • Fuser roller: Thin roller coated with fluoroplastic (ø30) • Pressure roller: PFA tube roller (ø30)	← • Fuser roller: Thin roller coated with fluoroplastic (ø35) • Pressure roller: PFA tube roller (ø30)	← • ← • Pressure roller: PFA tube roller (ø35)
• Cleaning	Cleaning roller for pressure roller (ø16)	←	←
• Heater	Heater lamp (564W x 2) Turned ON/OFF by thermistor	(600W x 2) ←	(600W x 2 + 300W x 1) ←

3

4. GENERAL OPERATION

4.1 Overview of Operation

- Operation of equipment
  - Operation during initializing, pre-running and ready
  - Copying operation
    - Drawer feed copying by [START] button
    - Bypass feed copying
    - Interrupt copying

4.2 Description of Operation

4.2.1 Warming-up

1. Initialization
   Power ON
   → Heater lamp ON
   → Set number “1” reproduction ratio “100%” and “WAIT WARMING UP” are displayed
   → Fan motors ON
   → Initialization of scanning system
   - The carriage moves to the home position.
   - The carriage moves to the peak detection position.
   - The exposure lamp is turned ON.
   - Peak detection (white color is detected by the shading correction plate)
   - The exposure lamp is turned OFF.

   → “READY (WARMING UP)” is displayed

2. Pre-running operation
   The pre-running operation is started when the temperature of the fuser roller surface reaches a certain temperature.
   → The main motor is turned ON.
   - Fuser roller rotated
   - Drum rotated

   → Initialization of feeding system
   - Each drawer tray goes up.

   → Pre-running operation stops after three seconds.

3. When the surface temperature of the fuser roller becomes sufficient for fusing,
   → “READY” is displayed.

4.2.2 Ready state (ready for copying)

Buttons on the control panel enabled
→ When no button is pressed for a certain period of time,
- Set number “1” and reproduction ratio “100%” are displayed. Equipment returns to the normal ready state.

4.2.3 Drawer feed copying (Upper drawer paper feeding)

1. Press the [START] button
   → "READY" changes to "COPYING"
   → Exposure lamp ON
   → Scan motor ON → carriages -1 and -2 move forward
   → Polygonal motor rotates in high speed
   → Main motor and exit motor ON
   - The drum, fuser unit, developer unit and exit roller are driven.

2. Drawer paper feeding
   → Main charger, developer bias and discharge LED ON. Fans are rotated in high speed. Drawer feed clutch ON.
   - The pickup roller, feed roller and separation roller start to rotate.
   → Paper reaches the 1st transport sensor
   - The 1st transport sensor is turned ON.
   → Paper reaches the registration roller.
   - The registration sensor is turned ON and aligning is performed.
   → Drawer feed clutch OFF after a certain period of time

3. After the carriage operation:
   → Registration clutch ON after a certain period of time → paper is transported to the transfer area.
   → Copy counter operates

4. After the registration clutch is turned ON:
   → Transfer charger ON after a certain period of time
   → Copy counter operates

5. Completion of scanning
   → Scan motor OFF
   → Exposure lamp OFF
   → Registration clutch OFF (after the trailing edge of the paper passed the registration roller)
   → "READY (PRINTING)" is displayed
   → "WAIT" is displayed

6. Paper exit
   → Exit sensor detects the trailing edge of the paper
   → Main charger, developer bias and discharge LED OFF
   → Polygonal motor, main motor and exit motor OFF
   → Drum, fuser unit and developer unit stop
   → Fans return to the ready rotation
   → "READY" is displayed and the equipment enters the ready mode

Timing chart for copying one A4 size sheet fed from the upper drawer

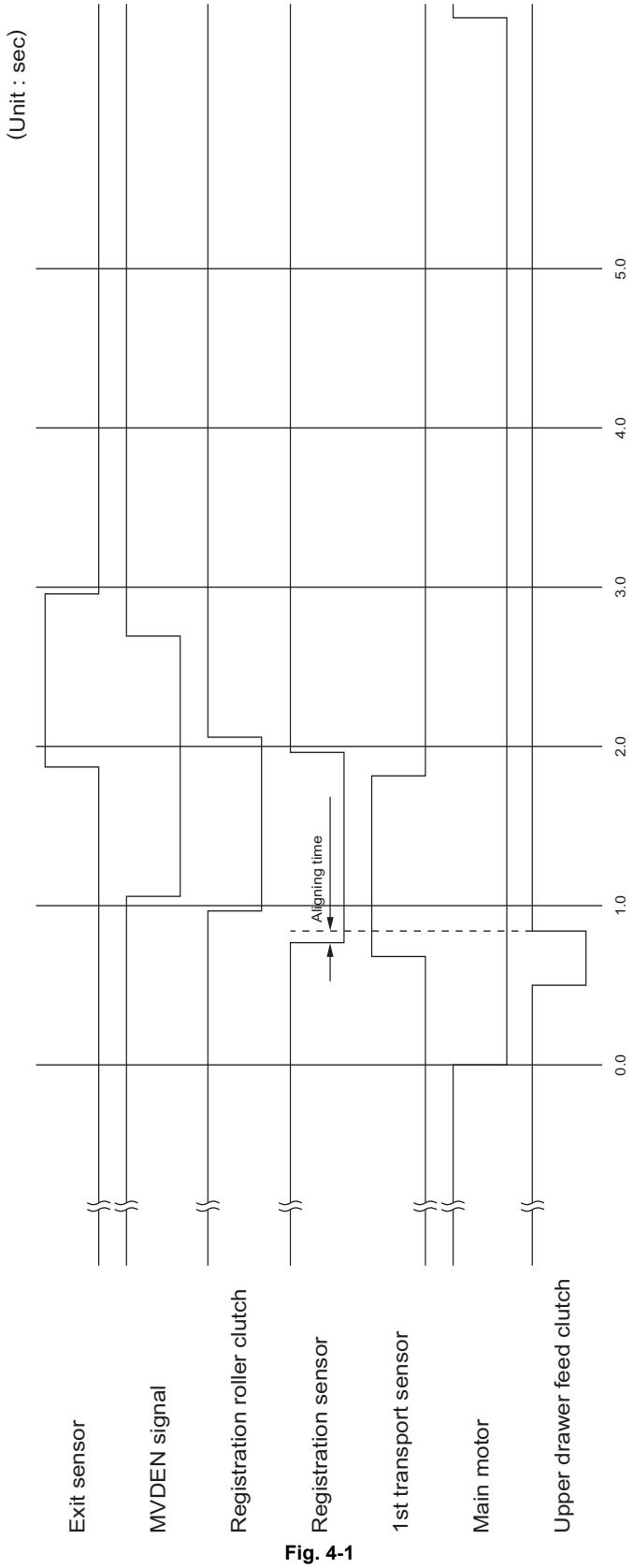


Fig. 4-1

4.2.4 Bypass feed copying

1. Insert a sheet of paper into the bypass tray.
   → Bypass paper sensor ON
   - "Ready for bypass feeding" is displayed.

2. Press the [START] button
   → "Ready for bypass feeding" changes to "COPYING"
   → Exposure lamp ON
   → Scan motor ON → Carriages -1 and -2 move forward
   → Polygonal motor rotates in high speed
   → Main motor and exit motor ON
   - The drum, fuser unit, developer unit and exit roller are driven.

3. Bypass feeding
   → Main charger, developer bias and discharge LED ON. Fans are rotated in high speed.
   → Bypass feed clutch ON
   - The bypass feed roller start to rotate.
   → Aligning operation
   → Paper reaches the registration roller
   → After a certain period of time, the bypass feed clutch OFF

4. Hereafter, the operation 3) through 6) of 📖 P.4-3 "4.2.3 Drawer feed copying (Upper drawer paper feeding)" is repeated.

4.2.5 Interruption copying

1. Press the [INTERRUPT] button
   → LED "INTERRUPT" ON
   → Copying operation in progress is temporarily stopped. Carriages -1 and -2 return to appropriate positions.
   → "Job interrupted job 1 saved" is displayed.
   → Automatic density and reproduction ratio 100% are set (The set number remains the same)

2. Select the desired copy condition

3. After the interruption copying is finished:
   → LED "INTERRUPT" OFF by pressing the [INTERRUPT] button
   → Equipment returns to the status before the interruption
   → "Ready to resume job 1" is displayed

4. Press the [START] button
   → The copying operation before the interruption is resumed.

4.3 Detection of Abnormality

When something abnormal has occurred in the equipment, the symbols corresponding to the type of abnormality are displayed.

4.3.1 Types of abnormality

1. Abnormality cleared without turning OFF the door switch
   (A) Add paper
   (B) Pick-up failure in bypass
   (C) Set key copy counter

2. Abnormality not cleared without turning OFF the door switch
   (D) Misfeed in equipment
   (E) Replace the toner cartridge
   (F) EPU not installed properly

3. Abnormality not cleared without turning OFF the main switch
   (G) Call for service

4.3.2 Description of abnormality

(A) Add paper

- Drawer empty sensor detects the presence or absence of paper.

  [When drawer is not installed]
  No drawer detected

  ↓

  Tray not going up (drawer empty sensor OFF)

  ↓

  “Add paper” displayed

  ↓

  [START] button disabled

  [When drawer is installed]

  ↓

  Drawer detected

  ↓

  Tray going up (drawer empty sensor OFF)

  ↓

  “Add paper” displayed

  ↓

  [START] button disabled

- When the power is turned ON or the LCF drawer is inserted (when the power is turned ON or equipment drawer / PFP drawers are inserted), LCF (PFP/equipment) performs initialization.

↓

Detects the presence of paper
Tray-up motor ON – The tray goes up

At this time, the tray-up sensor and empty sensor are OFF.

→ When the tray-up sensor is not turned ON in a fixed period of time, it means that the tray is in abnormal condition.

→ "Add paper" is displayed regardless of presence/absence of paper.

→ Cleared by turning the drawer open/close

→ Tray-up sensor is turned ON in a fixed period of time.

- The tray motor stops.

At this time, if the empty sensor is ON: It is judged that there is paper.

OFF: It is judged that there is no paper.

↓

Drawer area of the LCD panel blinks (When the drawer is selected)

- When the paper in the drawer runs out during copying,

→ The tray-up sensor turned OFF

→ The tray-up motor turned ON → Tray goes up

The tray-up sensor turned ON → Tray-up motor stopped.

- Empty sensor turned OFF during the copying in spite of the tray-up sensor is ON

↓

It is judged that there is no paper.

↓

Drawer area of the LCD panel blinks (When the drawer is selected)

↓

The copying operation is stopped.

(B) Pick-up failure in bypass (8)

- During bypass feeding
  Bypass feed clutch ON

↓

1st transport sensor is not turned ON in a fixed period of time

↓

Clear paper symbol is displayed ( ): E120

↓

Copying operation is disabled

↓

Solution: The bypass paper sensor is turned OFF by removing the paper from the bypass tray.

(C) Set key copy counter

- When the key copy counter (optional) is pulled out from the equipment which installs it:

  “Set key copy counter” displayed

  ↓

  Copying operation disabled

- When the counter is pulled out during copying:

  Copying is stopped when the key copy counter is pulled out.

  ↓

  “Set key copy counter” displayed

  ↓

  Copying operation disabled

(D) Misfeed in equipment ( )

- Exit sensor detects jamming of the leading edge of paper.

  ↓

  Registration clutch ON

  ↓ Less than regulation time

  Exit sensor ON
  If the exit sensor is not turned ON after the regulation time

  ↓

  Paper jam (E010) → The copying operation is stopped

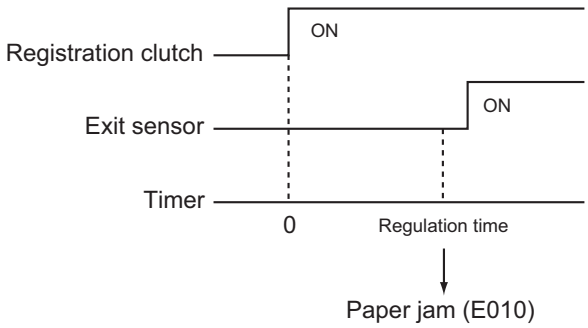


Fig. 4-2

- Exit sensor detects jamming of the tailing edge of paper

  ↓

Registration clutch OFF

↓ Less than regulation time

Exit sensor OFF
If the exit sensor is not turned OFF after the regulation time

↓

Paper jam (E020) → The copying operation is stopped

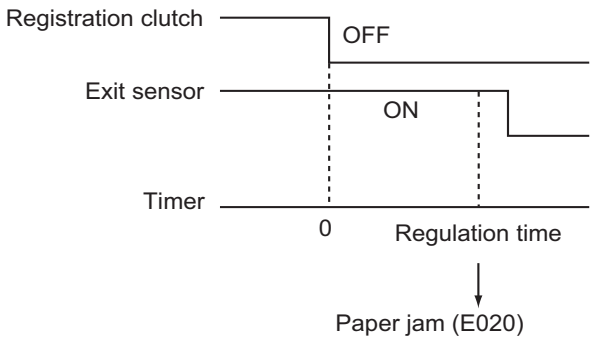


Fig. 4-3

- Reverse sensor detects jamming of the leading edge of paper: e-STUDIO355/455

  Exit sensor ON

  ↓ Less than regulation time

  Reverse sensor ON
  If the reverse sensor is not turned ON after the regulation time

  ↓

  Paper jam (E570) → The copying operation is stopped.

- Reverse sensor detects jamming of the tailing edge of paper: e-STUDIO355/455

  ↓

  Exit sensor OFF

  ↓ Less than regulation time

  Reverse sensor OFF
  If the reverse sensor is not turned OFF after the regulation time

  ↓

  Paper jam (E580) → The copying operation is stopped.

- Immediately after the power ON

  ↓

  Any of all sensors on paper transport path detects paper (ON)

  ↓

  Paper jam (E030)

- Front cover is opened during copying

  ↓

  Paper jam (E410)

- Registration sensor detects jamming of the leading edge of paper:
  Registration sensor is not turned ON in a fixed period of time after the leading edge of paper passed the 1st transport sensor.

  ↓

  Paper jam (E200, E210, E270, E300, E330 and E3C0)

- During paper feeding from ADU:
  Registration sensor is not turned ON in a fixed period of time after the ADU motor is turned ON.

  ↓

  Paper jam (E110)

- During paper transporting from ADU:
  ADU entrance/exit sensors do not detect the paper at the fixed timing

  ↓

  Paper jam (E510 or E520)

- The 1st/2nd transport sensor and each sensors of PFP/LCF are not turned ON in a fixed period of time after the feed clutch is turned ON

  ↓

  Paper jam (E220, E310, E320, E340–E360, E3D0 and E3E0: Error code differs depending on the paper source.) Refer to the error code table in the Service Handbook.

(E) Replace the toner cartridge ( )

- Toner density becomes low

  ↓

  Auto-toner sensor detects the absence of the toner

  ↓

  Control circuit → “Install new toner cartridge” displayed: the copying operation disabled

  Solution: Open the front cover and replace the toner cartridge with a new one.
  Toner is supplied → copying operation enabled.

(F) EPU not installed properly

- EPU not installed properly

  ↓

  “EPU not installed” is displayed.

  Solution: Check if the connector between the EPU drawer and the developer unit is connected. Then check if the EPU is installed in the equipment properly and close the front cover.

(G) Call for service

Error code is displayed instead of the set number by pressing the [CLEAR] button and [8] button simultaneously when the “Call for service” is blinking.
Refer to the error code table in the Service Handbook.

5. CONTROL PANEL

5.1 General Description

The control panel consists of button switches and touch-panel switches to operate the equipment and select various modes, and LEDs and an LCD to display the state of the equipment or the messages. When the operator's attention is required, graphic symbols light or blink with messages explaining the condition of the equipment in the LCD panel. When paper jams and "Call for service" occur, error codes are also displayed to notify users of the problem.
This equipment has a control panel that contains a color LCD. This movable control panel enables the up-down angular adjustment of itself so its visibility and operability have been upgraded.
The [ON/OFF] button is placed on the control panel of this equipment. Use this button instead of the main power switch to turn ON/OFF the power.
Press the [ON/OFF] button for 1 second or more to turn ON/OFF the power of the equipment.

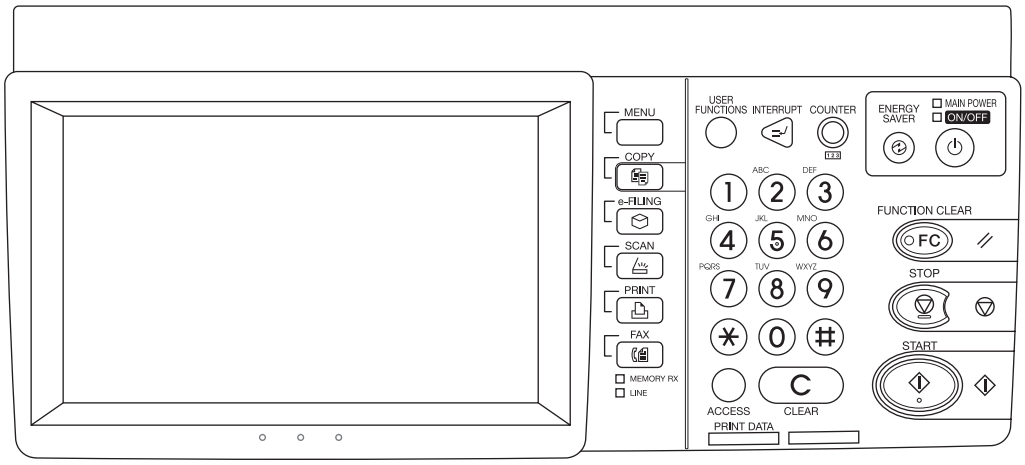


Fig. 5-1

5.2 Items Shown on the Display Panel

5.2.1 Display

1. Basic display
   Displays buttons and messages.

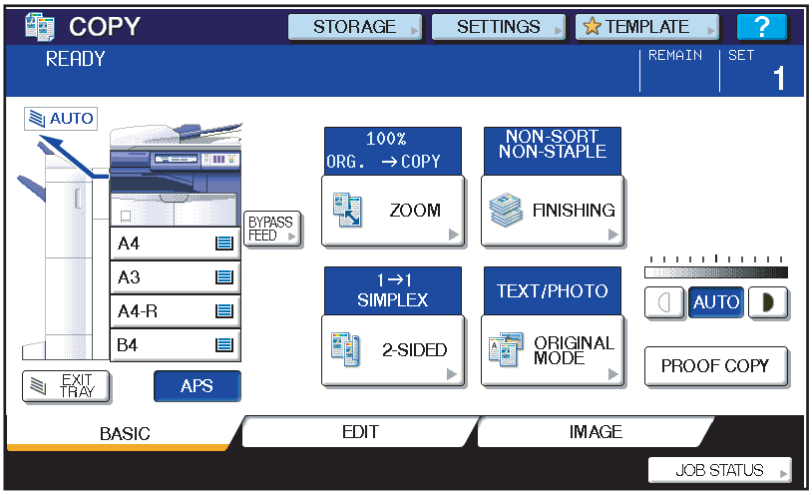


Fig. 5-2

2. Paper jam / service call display
   Displays error code, paper jam position and paper jam release guidance, etc.

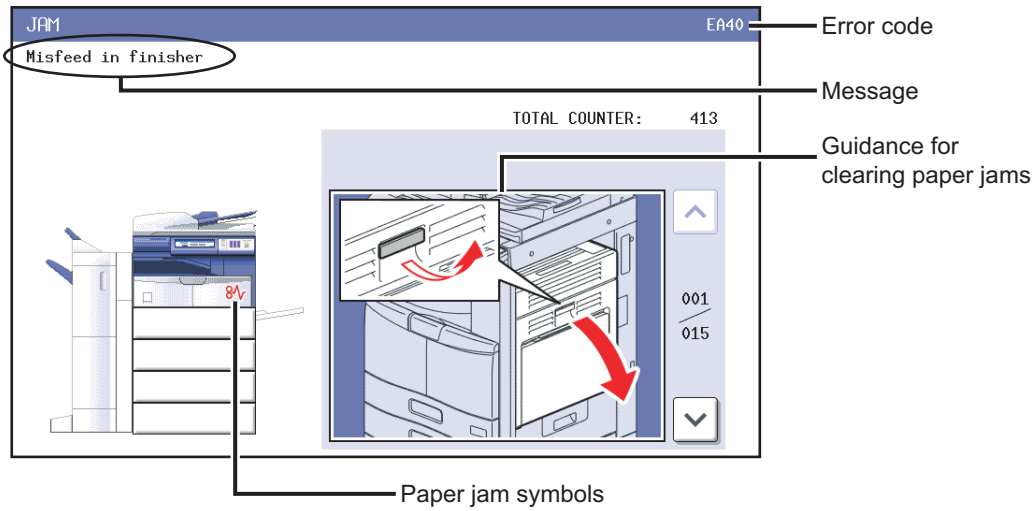


Fig. 5-3

5.2.2 Message

No.	Message	State of equipment	Note
1	-	Power is OFF (at Sleep Mode)	Press the [START] button or function button to clear
2	Saving energy - press START button	At Energy Saving Mode	Press the [START] button to clear
3	Wait Warming Up	Scanner warming up • Displayed until the equipment becomes ready to start scanning	Auto Start can be set
4	Wait Warming Up Auto Start	Scanner warming up • Displayed when Auto Start is set	Press the [STOP] button to clear the Auto Start.
5	WAIT	Displayed when performing the controlling function to keep the equipment at the best condition	
6	Wait adding toner	Supplying toner • Equipment becomes the toner supply state	Recovers when the toner supply has finished
7	READY	Ready for copying • Waiting for the operation	
8	READY Press START button to copy	Copying job interrupted	Press the [START] button to resume copying or press [MEMORY CLEAR] button to delete the job
9	READY (WARMING UP)	Scanner warming up • Ready to scan the original	
10	READY (PRINTING)	Printing out the data • Scanning is enabled	
11	READY (ADDING TONER)	Supplying toner • Scanning is enabled	
12	READY (INNER TRAY FULL)	Inner tray in the equipment is full • Scanning is enabled	- When the bridge unit is installed - Resumes printing by removing paper from the tray
13	READY (CHECK STAPLER)	No staples in finisher • Scanning is enabled	Cleared by supplying staples
14	READY (CHECK STAPLER)	Stapling jam occurred in finisher	Cleared by supplying staples
15	READY (CHECK SADDLE STITCH STAPLER)	No staples in saddle stitcher • Scanning is enabled	Cleared by supplying staples
16	READY (ADD PAPER) Press JOB STATUS button	No paper in drawer • Scanning is enabled	Cleared by supplying papers
17	READY (FINISHER FULL)	Finisher is full of paper • Scanning is enabled	Resumes printing by removing paper from the finisher
18	READY (HOLE PUNCH DUST BIN IS FULL)	Punching dust box is full • Scanning is enabled	Resumes printing by removing punching dust from the dust box
19	READY (SADDLE STITCH TRAY FULL)	Saddle stitcher tray is full of paper • Scanning is enabled	
20	READY (CHANGE DRAWER TO CORRECT PAPER SIZE)	Incorrect paper size setting	
21	Ready for bypass feeding	Paper is set on the bypass tray	
22	COPYING	At the copying state	
23	Auto Start	Auto Start is set during printing	Cleared by pressing [FUNCTION CLEAR] button
24	Close Large Capacity Feeder	LCF drawer is not installed when feeding from LCF is set	Cleared by installing LCF drawer

No.	Message	State of equipment	Note
25	Close Large Capacity Feeder Door	LCF cover is open when feeding from LCF is set	Cleared by closing the cover
26	Place Doc. Feeder in the down position	RADF is open when original is placed on RADF	Cleared by closing RADF
27	Place originals in the document feeder	Displayed when the conditions are set and [START] button is pressed with no original placed	Cleared by setting the original
28	Change direction of original	Displayed when the direction of original placed is different from the setting	
29	Place last %d originals in doc. feeder entrance tray	Paper jam occurred during copying (RADF scanning)	
30	Cannot copy this original	Displayed when the original which is not allowed to be copied is placed	Not printed out
31	Add paper	Displayed when the paper in selected drawer is running out	
32	Cannot duplex this size	Displayed when the paper size which is not specified for duplex copying is set	
33	Cannot use this media type	Displayed when the paper size which is not specified for the functions such as stapling or hole punching is set	
34	Copy size: A4/LT only	Displayed when the paper size which is not specified for “Book-type duplex copying” or “Dual-page” is set	
35	Copy size: A4/LT and A4-R/LT-R	Displayed when the paper size which is not specified for “Rotate Sort”	
36	CHANGE DRAWER TO CORRECT PAPER SIZE	Displayed when the selected paper size is not in the drawer	
37	Change drawer to correct media type	Displayed when the selected media type is not in the drawer	
38	Select a paper size for bypass feeding	Displayed when paper size needs to be specified for bypass feeding such as duplex copying	
39	Place the blank sheets in bypass tray and select the paper size	Displayed when no paper is in the selected feeder at Cover Copying Mode	
40	Place the blank sheets in the same direction as the originals	Displayed when the direction of cover page is different from that of other pages at Cover Copying Mode	
41	Place the same size blank sheets as the originals	Displayed when the paper size of cover page is different from that of other pages at Cover Copying Mode	
42	Place insertion sheets in the bypass tray and select the paper size	Displayed when no insertion sheet is in the selected drawer at Sheet Insertion Mode	
43	Select the same size insert1 sheets as the originals	Displayed when the size of insertion sheet (sheet 1) is different from that of other pages at Sheet Insertion Mode	
44	Select the same size insert2 sheets as the originals	Displayed when the size of insertion sheet (sheet 2) is different from that of other pages at Sheet Insertion Mode	
45	Set insert1 sheets in the same direction as the originals	Displayed when the direction of insertion sheet (sheet 1) is different from that of other pages at Sheet Insertion Mode	

No.	Message	State of equipment	Note
46	Set insert2 sheets in the same direction as the originals	Displayed when the direction of insertion sheet (sheet 2) is different from that of other pages at Sheet Insertion Mode	
47	Set transparency film in A4/ LT direction	Displayed when the selected paper size is other than A4/LT at OHP mode	
48	CHECK PAPER IN LARGE CAPACITY FEEDER	Papers in LCF are set incorrectly	
49	CANNOT PUNCH THIS SIZE PAPER	Displayed when the selected paper size is not specified for hole punching	
50	Remove paper from the finisher	Displayed when the paper sizes are mixed at Staple Sorting Mode	
51	Cannot staple this size	Displayed when the paper size is not specified for stapling at Staple Sorting Mode	
52	Remove paper from the saddle stitch unit	Finisher is full of papers	
53	Examine stapler	Trouble in the stapler unit in finisher	
54	Check staple cartridge	No stapler in finisher section	
55	Check staple cartridge in the saddle stitch unit	No stapler in saddle stitch unit	
56	Job interrupted job 1 saved	Interrupt copying is accepted	
57	Ready to resume job 1	Interrupt copying is cancelled (finished)	
58	Cannot use AMS mode	Displayed when reproduction ratio is set to be over 200% at AMS Mode on RADF	Set the reproduction ratio 200% or below manually
59	More than 200% is not available	Displayed when reproduction ratio is set manually to be over 200% on RADF	Set the reproduction ratio 200% or below
60	Updated the template setting	Displayed when the template stored is recalled by pressing [TEMPLATE] button	
61	Enter Department Code	Displayed when a button is pressed while the department management setting is available	
62	Cannot copy Check DEPARTMENT COUNTER	Displayed when the number of printouts exceeds the limit number of department counter	
63	Not enough memory to store original(s) Will you print out stored originals?	Displayed when confirming the user to print out the data as much as stored at memory - full state	
64	Not enough memory to store original(s) Will you send stored originals in?	Displayed when confirming the user to send the FAX data as much as stored at memory - full state	Displayed only in FAX Function
65	Not enough memory to store original(s) Will you save stored originals in?	Displayed when confirming the user to save the scanning data as much as stored at memory-full state	Displayed only in FAX Function
66	The number of originals exceeds the limits Will you copy stored originals?	Displayed when confirming the user to print out the data as much as stored at memory-full state	
67	The number of originals exceeds the limits. Will you send stored originals?	Displayed when confirming the user to send the FAX data as much as stored at memory-full state	Displayed only in FAX Function

No.	Message	State of equipment	Note
68	The number of originals exceeds the limits. Will you save stored originals?	Displayed when confirming the user to save the scanning data as much as stored at memory-full state	Displayed only in Scanning Function
69	Install new toner cartridge	No toner in the cartridge	Displayed when toner is running out. Copying not enabled
70	Time for periodic maintenance	PM cycle • Displayed at the time for maintenance • Copying is available	Maintenance and inspection are performed by qualified service technician.
71	READY (CHANGE DRAWER TO CORRECT MEDIA TYPE)	Displays when the printing is stopped because of media type mismatch	
72	PRESS [BASIC] and select normal paper size	Displays the warning that the copy is not enabled when any drawer but bypass feed is selected at Cover Sheet Mode or Sheet Insertion Mode.	
73	Misfeed in copier Press [HELP]	Paper jam in the equipment • Displayed when paper jam occurred in the equipment	Remove the paper in the equipment according to the messages displayed on the panel.
74	Call for service	Displayed when motor, sensor, switch, etc. do not work properly	Turn OFF the main power switch and solve the problem, then turn ON the power.
75	Please try again after a while	Displayed when the Department Code can no be keyed in immediately after power-ON.	Leave it for a while and key in the code again
76	Set standard size	Displayed when the paper size which is not acceptable is set (depends on the setting)	Reset the paper size
77	TONER NOT RECOGNIZED	Displayed when no toner cartridge is installed or other than recommended toner cartridge is used	
78	READY Press JOB STATUS button	Displayed when an operation is needed on the JOB STATUS screen because of a mismatch in the paper size or type	
79	Check the direction or size of the paper on the bypass tray and press START	Displayed when the size of the paper fed from the bypass tray and the one set on the control panel is different	
80	SET FUSER UNIT	Displayed when the fuser unit is not installed correctly, its connector is disconnected or the wire connection is open-circuited.	Check the fuser unit. Refer to Troubleshooting in the Service Handbook.

5.3 Relation between the Equipment State and Operator's Operation

	During READY status	During warming-up	Auto job start reserved	Scanning original/ Scanning original and printing out the copy
Press [ENERGY SAVER] button	Switches to energy saving mode	Display not changed	Display not changed	Display not changed
Press [INTERRUPT] button	Switches to interrupt mode	Display not changed	Display not changed	Display not changed (LED blinking)
Press [FUNCTION CLEAR] button after setting the copy mode	Copy mode is cleared after the copy mode is set	Copy mode is cleared after the copy mode is set	Auto job start cancelled	Display not changed
Press [STOP] button	Display not changed	Display not changed	Auto job start cancelled	Scanning or printing out stops, and "READY Press START to copy" and "MEMORY CLEAR" are displayed
Press [CLEAR] button after setting the copy mode	Number of printouts changes to 1 while the setting remains unchanged after the copy mode is set	Number of printouts changes to 1 while the setting remains unchanged after the copy mode is set	Display not changed	Display not changed
Press [CLEAR] button after keying in numbers (digital keys)	Number keyed in changes to 1 after being entered	Number keyed in changes to 1 after being entered	Display not changed	Display not changed
Press [FAX] button	Displays FAX screen	Display not changed	Display not changed	Display not changed
Press [COPY] button	Display not changed	Display not changed	Display not changed	Display not changed
Press [SCAN] button	Displays SCAN screen	Display not changed	Display not changed	Display not changed
Press [USER FUNCTIONS] button	Displays USER FUNCTIONS screen	Display not changed	Display not changed	Display not changed
Press [START] button with the original set on RADF	Displays "COPYING"	"Wait Warming Up Auto Start" is displayed	Display not changed	Display not changed
Press [MENU] button	Displays MENU screen	Display not changed	Display not changed	Display not changed
Press [COUNTER] button	Displays COUNTER screen	Display not changed	Display not changed	Display not changed
Press [e-FILING] button	Displays E-FILING screen	Display not changed	Display not changed	Display not changed
Press [ACCESS] button	When the setting of the department management or user management information is valid, displays ACCESS screen.	When the setting of the department management or user management information is valid, displays ACCESS screen.	Display not changed	Display not changed

	Printing out the copy	During paper jam	When interrupting	When displaying HELP screen	During energy saving mode
Press [ENERGY SAVER] button	Display not changed	Display not changed	Display not changed	Switches to energy saving mode	Energy saving mode is cleared and displays BASIC screen
Press [INTERRUPT] button	Display not changed (LED blinking)	Display not changed	Returns to the status before interrupting	Switches to interrupting mode	Display not changed
Press [FUNCTION CLEAR] button after setting the copy mode	Copy mode is cleared after the copy mode is set	Display not changed	Copy mode is cleared after the copy mode is set	Displays BASIC screen after the copy mode is set and then cancelled	Display not changed
Press [STOP] button	Printing out stops, and “READY Press START to copy” and “MEMORY CLEAR” are displayed	Display not changed	Display not changed	Display not changed	Display not changed
Press [CLEAR] button after setting the copy mode	Number of printouts changes to 1 while the setting remains unchanged after the copy mode is set	Display not changed	Number of printouts changes to 1 while the setting remains unchanged after the copy mode is set	Number of printouts changes to 1 while the setting remains unchanged after the copy mode is set	Display not changed
Press [CLEAR] button after keying in numbers (digital keys)	Number keyed in changes to 1 after being entered	Display not changed	Number keyed in changes to 1 after being entered	Number keyed in changes to 1 after being entered	Display not changed
Press [FAX] button	Displays FAX screen	Display not changed	Display not changed	Displays FAX screen	Displays FAX screen
Press [COPY] button	Display not changed	Display not changed	Display not changed	Display not changed	Displays COPY screen
Press [SCAN] button	Displays SCAN screen	Display not changed	Display not changed	Displays SCAN screen	Displays SCAN screen
Press [USER FUNCTIONS] button	Displays USER FUNCTIONS screen	Display not changed	Display not changed	Displays USER FUNCTIONS screen	Display not changed
Press [START] button with the original set on RADF	Displays “COPYING” and RADF starts feeding	Display not changed	Displays “COPYING” and RADF starts feeding	Displays “COPYING” and RADF starts feeding	Energy saving mode is cleared and displays BASIC screen
Press [MENU] button	Display not changed	Display not changed	Display not changed	Displays MENU screen	Displays MENU screen
Press [COUNTER] button	Display not changed	Display not changed	Display not changed	Displays COUNTER screen	Displays COUNTER screen
Press [e-FILING] button	Displays E-FILING screen	Display not changed	Display not changed	Displays E-FILING screen	Displays E-FILING screen

	Printing out the copy	During paper jam	When interrupting	When displaying HELP screen	During energy saving mode
Press [ACCESS] button	When the setting of the department management or user management information is valid, displays ACCESS screen.	Display not changed	Display not changed	Display not changed	Display not changed

5.4 Description of Operation

5.4.1 Dot matrix LCD circuit

1. Structure

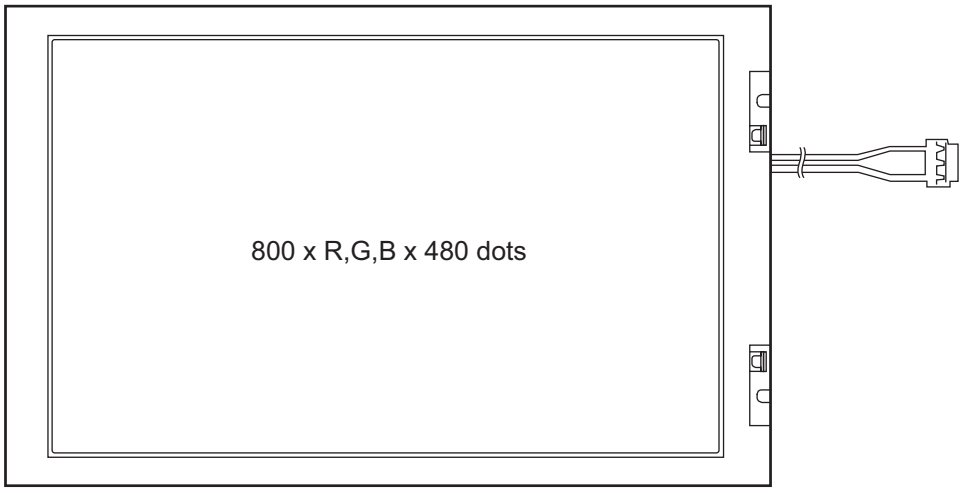


Fig. 5-4

The DSP-LCD-470 is an TFT type LCD with (800 x R, G, B) x 480-dot display capacity. It consists of a driver LSI, frame, printed circuit board, and straight type CCFL backlight.

* TFT: Thin Film Transistor
* CCFL: Cold Cathode Fluorescent Lamp

2. Block diagram

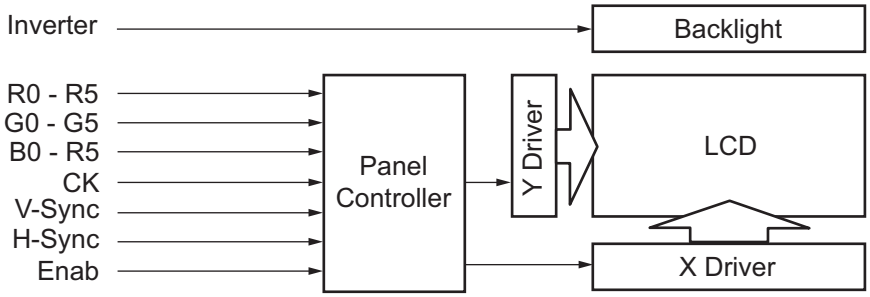


Fig. 5-5

5.4.2 LED display circuit

Method of LED display
Example: Displaying “COPY”

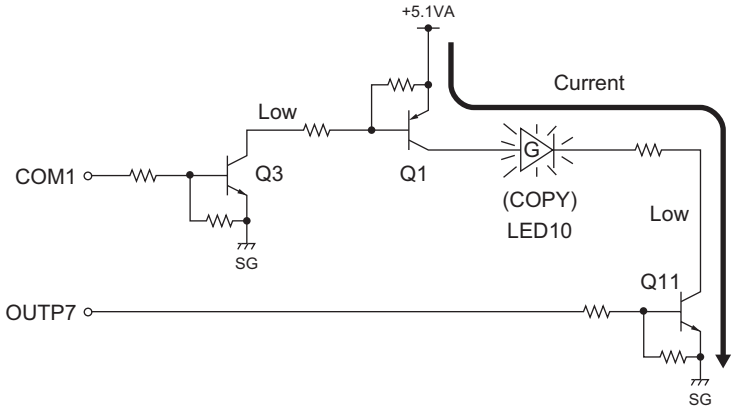


Fig. 5-6

The transistors (Q3 and Q1) are turned ON when the COM1 signal becomes Low level.
Also, when OUTP7 signal changes to Low level, the current flows from +5.1VA via the transistor (Q1) to the LED10 (COPY) to turned ON the LED10.

Conditions to turn ON the LED
1. The transistor (Q1) connected to the LED anode is ON.
2. The transistor (Q11) connected to the LED cathode side is ON.

The LED is turned ON when 1) and 2) are satisfied.

5.5 Disassembly and Replacement

5.5.1 Stopper

(1) Slide the stopper and pull it out.

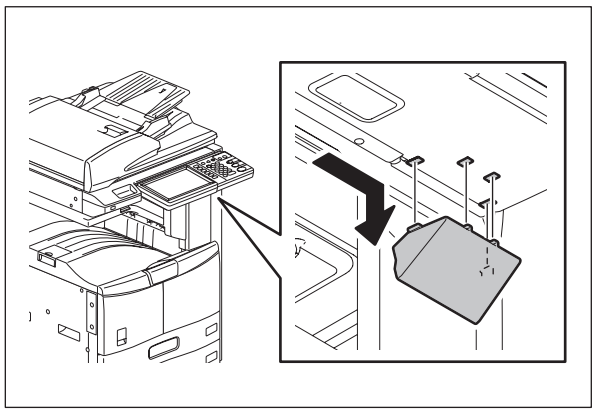


Fig. 5-7

(2) Hook the stopper into the grooves of the rear cover.

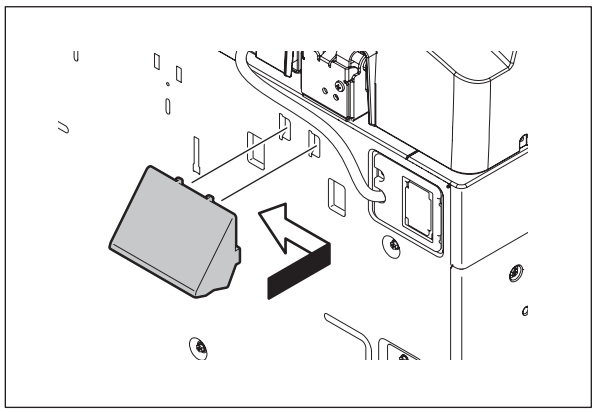


Fig. 5-8

5.5.2 Control panel unit

(1) Take off the front upper cover.
📖 P.2-22 "2.5.2 Front upper cover"
(2) Lower the control panel and remove 2 screws.

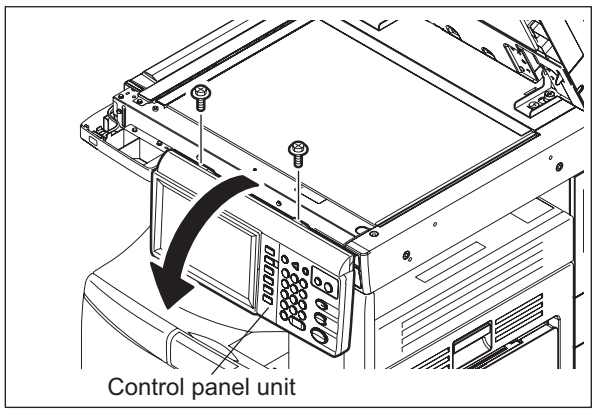


Fig. 5-9

(3) Release the hook and then take off the control panel unit.

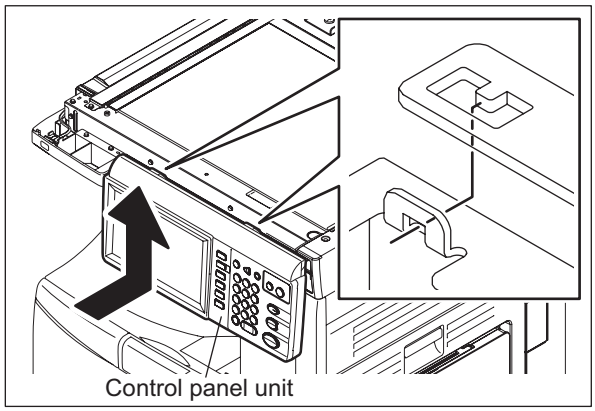


Fig. 5-10

(4) Remove the 3 screws and screw of the clamp. Take off the cover.

Note:
When installing the cover, set the cable in the case.

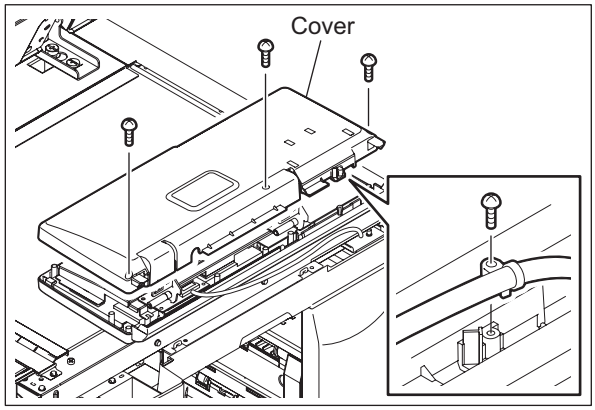


Fig. 5-11

(5) Remove 1 screw and take out the clamp.

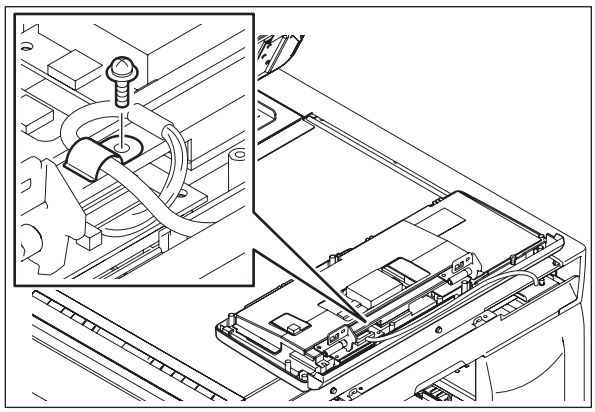


Fig. 5-12

(6) Disconnect 1 connector, and then take off the control panel unit.

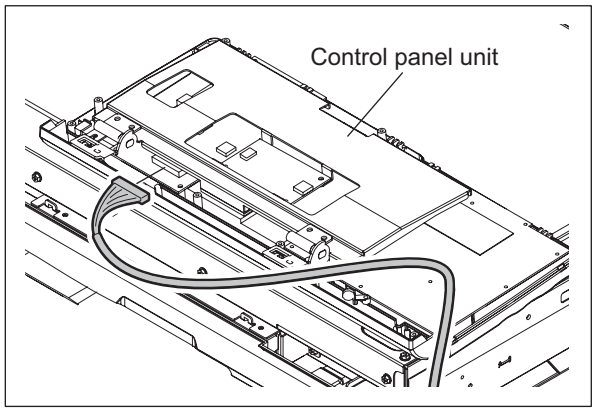


Fig. 5-13

5.5.3 Panel inverter board (P-INV)

(1) Take off the control panel unit.
📖 P.5-12 "5.5.2 Control panel unit"
(2) Remove 2 screws and disconnect 2 connectors, and then take off the panel inverter board.

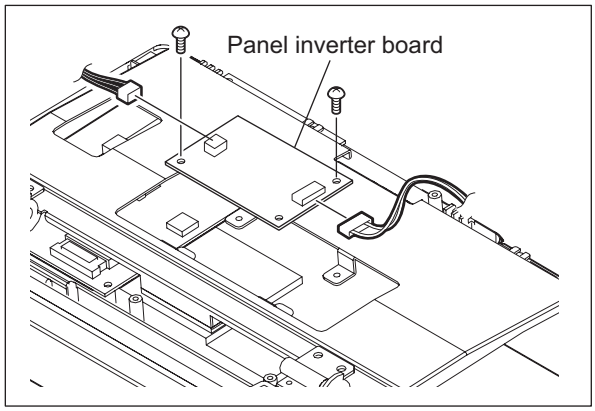


Fig. 5-14

5.5.4 Display board (DSP)

(1) Take off the control panel unit.
📖 P.5-12 "5.5.2 Control panel unit"
(2) Disconnect 1 connector.

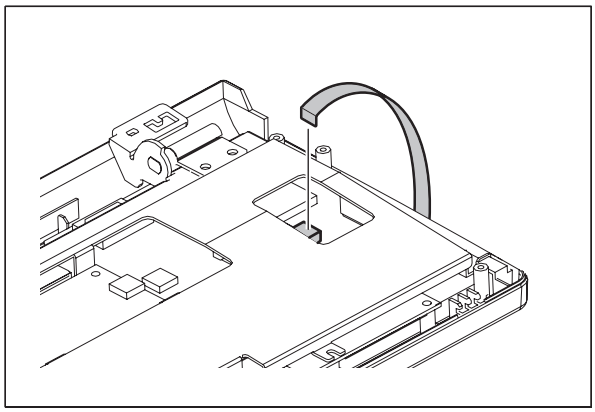


Fig. 5-15

(3) Disconnect the 2 connectors of the panel inverter board.

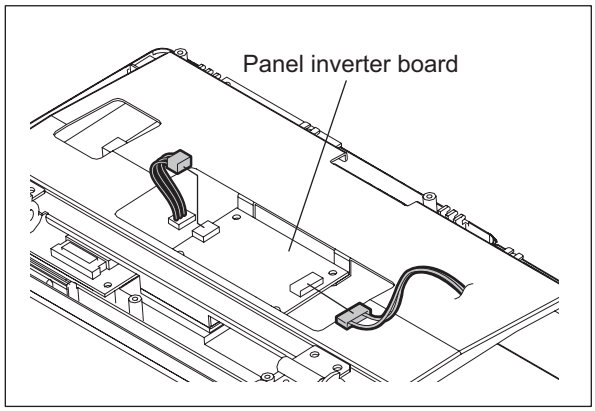


Fig. 5-16

(4) Remove 4 screws and take off the hinge bracket.

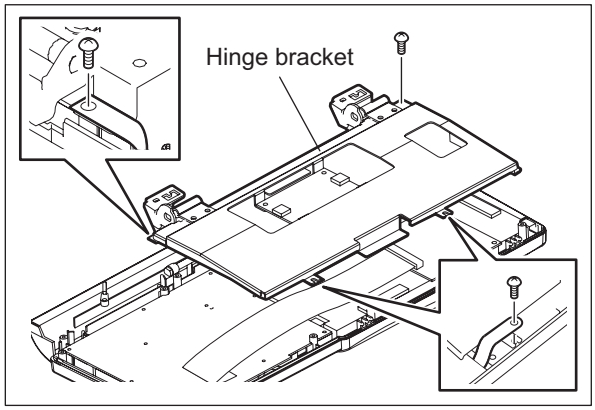


Fig. 5-17

(5) Disconnect 2 connectors.
(6) Remove 3 screws and take off the display board and the sheet.

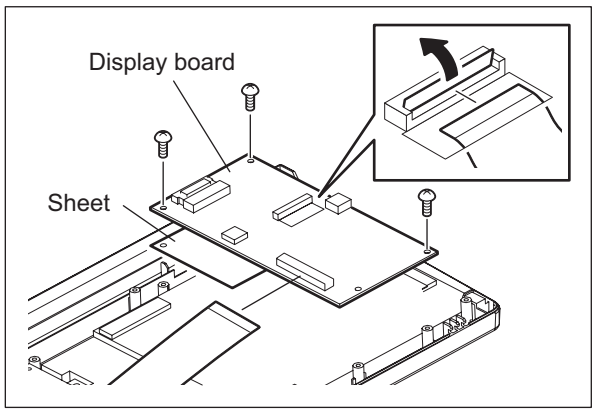


Fig. 5-18

5.5.5 KEY board (KEY)

(1) Take off the control panel unit.
📖 P.5-12 "5.5.2 Control panel unit"
(2) Disconnect 1 connector.

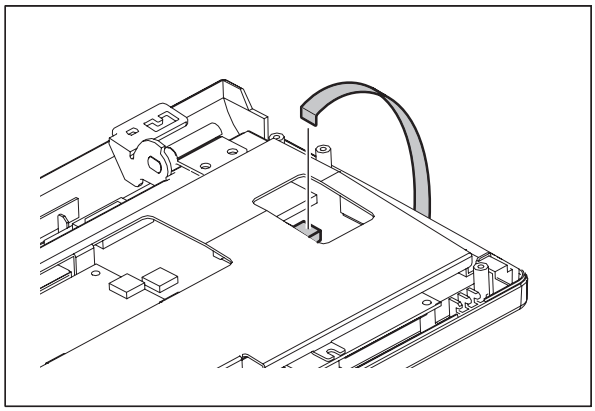


Fig. 5-19

(3) Disconnect the 2 connectors of the panel inverter board.

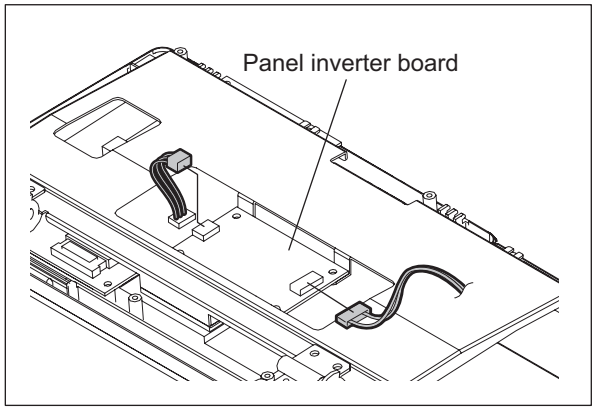


Fig. 5-20

(4) Remove 4 screws and take off the hinge bracket.

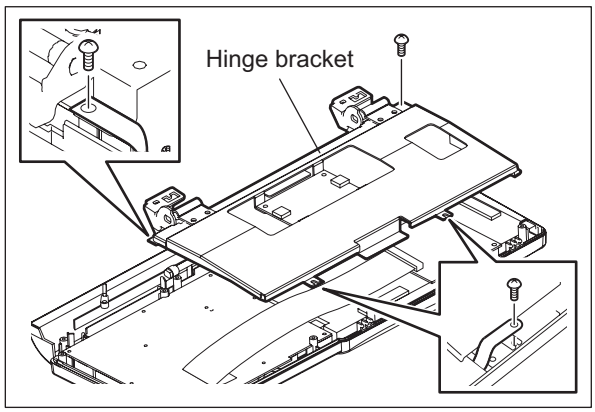


Fig. 5-21

(5) Disconnect 1 connector and remove 12 screws. Take off the KEY board.

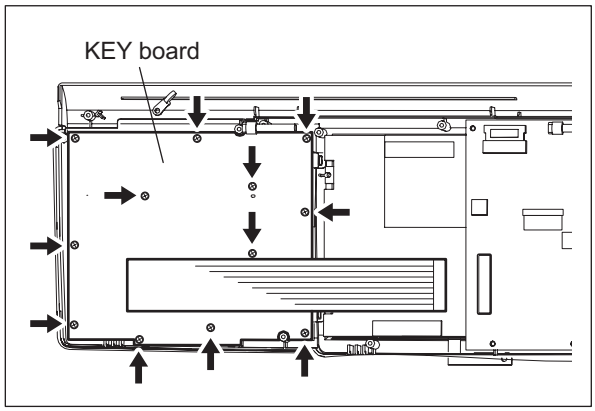


Fig. 5-22

5.5.6 Touch panel (TCP)

(1) Take off the control panel unit.
📖 P.5-12 "5.5.2 Control panel unit"
(2) Remove the DSP board.
📖 P.5-14 "5.5.4 Display board (DSP)"
(3) Remove 2 screws and take off the touch panel.

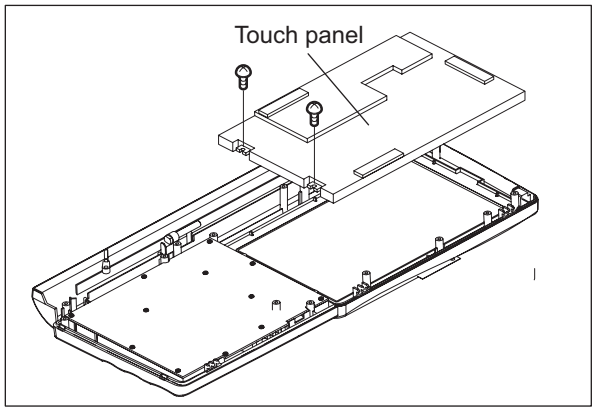


Fig. 5-23

5.5.7 Control panel cover

(1) Release the 4 latches, and take off the control panel cover.

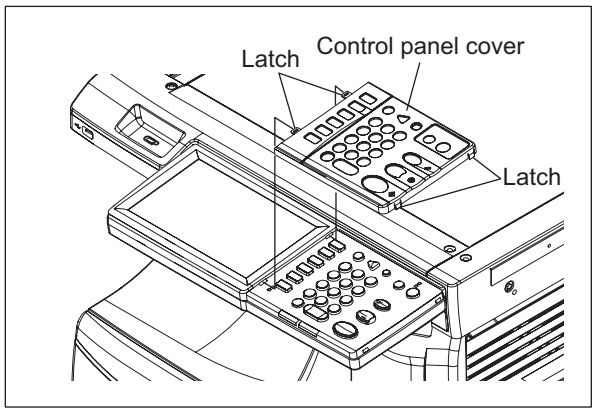


Fig. 5-24

6. SCANNER

6.1 General Description

In the scanning section of this equipment, the surface of an original is irradiated with a direct light and the reflected light is led through mirrors, a lens and a slit to CCD where optical-to-electrical conversion is performed, converting the optical image data into an electrical (analog) signal. This analog signal is changed to a digital signal, which then undertakes various corrective processes necessary for image formation. After that, arithmetic operation is performed on the digital signal, which is then transmitted to the data writing section.
In this equipment, the scanning of originals at high speed and with high quality can be performed by using a reduction-type CCD with 4-line devices for color processing. How this CCD differs from black-and-white CCDs is that its devices are arranged in 4 lines and covered with color filters (Red, Green, and Blue). These lines are composed with 3-line color devices and black-and-white device with no filter.

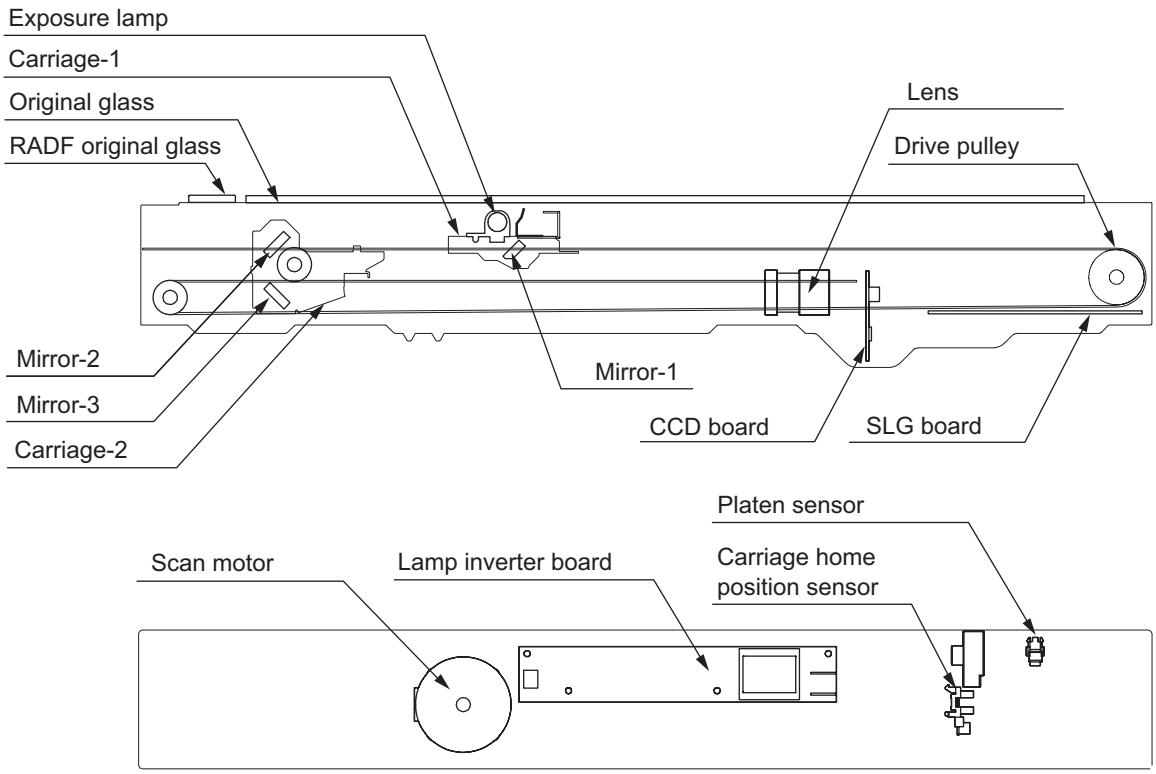


Fig. 6-1

6.2 Construction

Scanner		
Original glass	Original glass	
	RADF original glass	
Carriage-1	Exposure lamp (EXP)	Xenon lamp (17W)
	Reflector	
	Mirror-1	
Carriage-2	Mirror-2	
	Mirror-3	
Lens unit		
CCD driving PC board (CCD)		
Scanning section control PC board (SLG)		
Automatic original detection sensor (S1-5)		
Lamp inverter board (INV)		
Driving section	Scan motor (M1)	• 2-phase stepping motor • Wire drive • Driving the carriage-1 and carriage-2
Other	Carriage home position sensor (S7)	
	Platen sensor (S6)	
	Rubber damper	

6.3 Functions

The following shows the construction and purpose of the scanning system:

1. Original glass
   This is a glass for placing original. The light from the exposure lamp (EXP) is irradiated to the original through this glass.
   The RADF original glass is used when original is read with the Automatic Document Feeder. Original is transported on the RADF original glass by the Automatic Document Feeder, and the transported original is read under the ADF original glass by the carriage. Do not use such solvents as alcohol when cleaning the surface of the RADF original glass, because it is coated so as not to be scratched by originals.

2. Carriage-1
   Carriage-1 consists of the exposure lamp (EXP), reflector, mirror-1, etc. It is driven by the scan motor (M1) and scans an original on the glass.

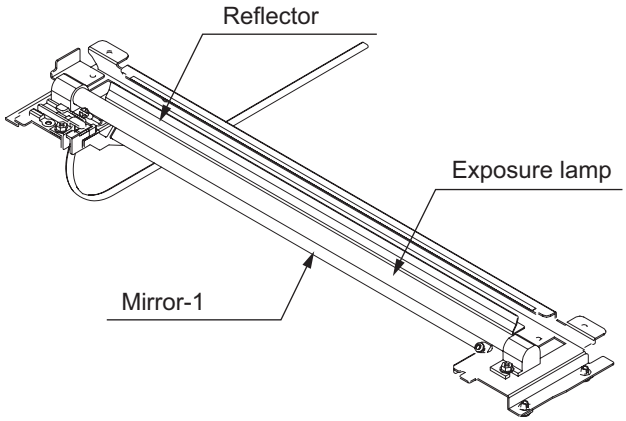


Fig. 6-2

- Exposure lamp (EXP)
  This lamp is the light source to irradiate the original on the glass. (One 17 W xenon lamp)
- Reflector
  This is a plate to efficiently direct the light from the exposure lamp (EXP) to the surface of the original on the glass.
- Mirror-1
  This mirror directs the light reflected from the original to the mirror-2 described later.

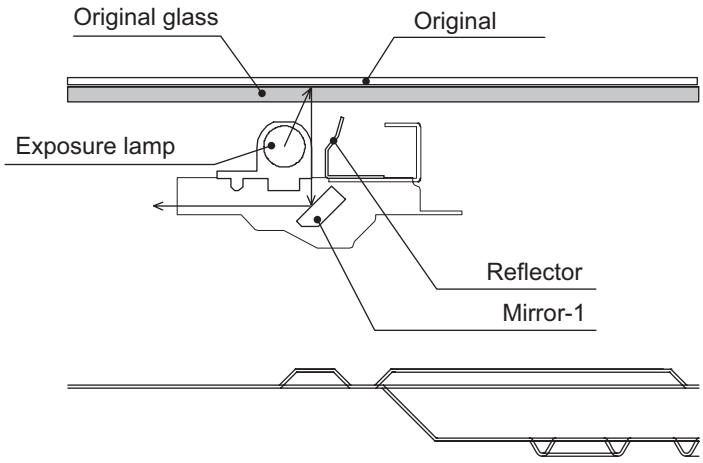


Fig. 6-3

3. Carriage-2
   Carriage-2 mainly consists of the mirror-2, mirror-3, etc. and directs the reflected light from the mirror-1 through the mirrors-2 and -3 to the lens.
   This carriage is driven by the same scan motor (M1) as that for the carriage-1 at half the scanning speed of the carriage-1 (The scanning distance is also half that of the carriage-1).

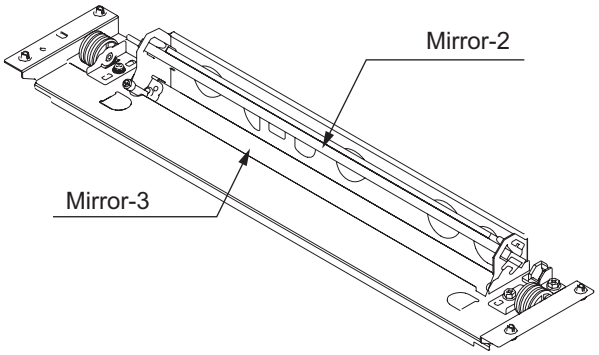


Fig. 6-4

4. Lens unit
   The light reflected from the mirror-3 is led to the CCD placed at the focal point of the lens which is fixed in a position.

5. CCD driving PC board (CCD)
   Processes such as signal amplification and A/D conversion are applied on the electrical signal which was converted by CCD.

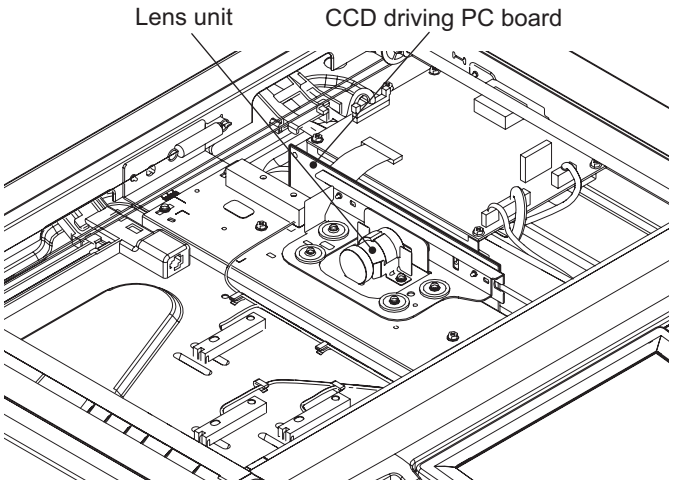


Fig. 6-5

6. Scanning section control PC board (SLG)
   This is a board to perform the image correction, such as the shading correction and 3-line correction, and control the scan motor (M1).

7. Automatic original detection sensor (S1-5)
   The size of an original placed on the glass is instantly detected using the automatic original detection sensors (S1-5) fixed on the base frame without moving the carriage-1.

8. Lamp inverter board (INV)
   Controls lighting of the exposure lamp (EXP).
   It is installed on the rear side since the scanner thickness is reduced.

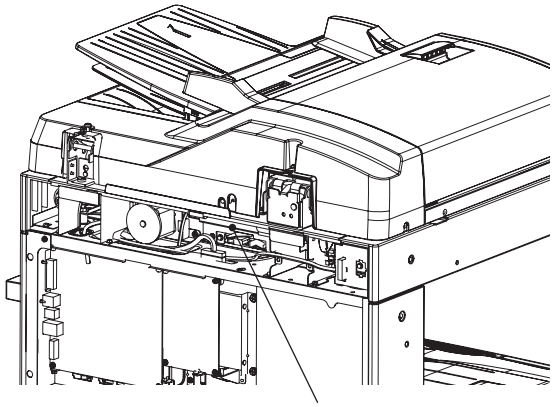


Fig. 6-6

6.4 Description of Operation

6.4.1 Scanning operation

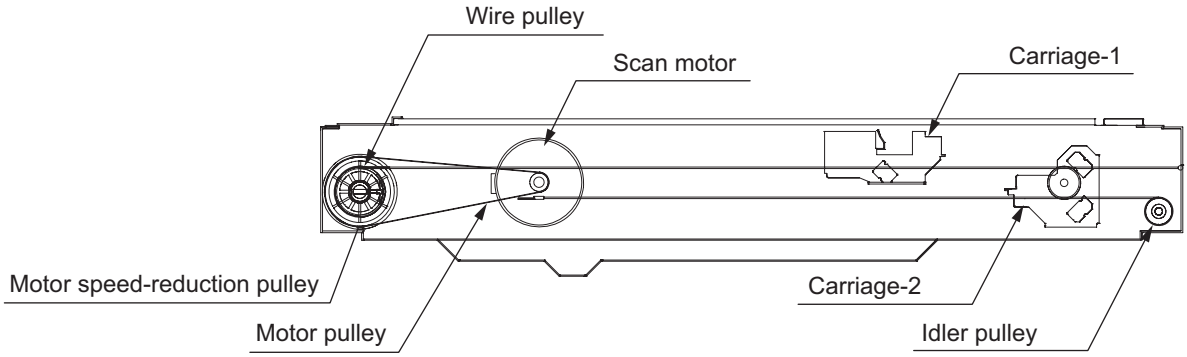


Fig. 6-7

- Scanning of an original placed on the original glass
  This motor drives the carriages-1 and -2 through the timing belt and carriage wire. First, the scan motor drives the carriages-1 and -2 to their respective home positions. The home positions are detected when the carriage-1 passes the carriage home position sensor (S7). When the [START] button is pressed, the both carriages start to move and scan the original on the glass.

- Scanning of an original placed on the RADF
  It stops at the scanning position and starts scanning, and performs shading correction before scanning and at constant intervals during scanning.

- Scanning speed
  The carriage speed of the original in the color scanning mode is half of that in the black and white scanning mode.

6.5 Electric Circuit Description

6.5.1 Scan motor control circuit

The scan motor is a stepping motor driven by the control signal output from the scanner CPU on the SLG board and drives carriage-1 and -2.
The scan motor is driven by the pulse signal (SCNM-A, SCNM-AB, SCNM-B, SCNM-BB) output from the motor driver. These pulse signals are formed based on the reference clock (MOTCLK) and output only when the enable signal (MOTEN) is a low level. Also, the rotation speed or direction of the motor can be switched by changing the output timing of each pulse signal.

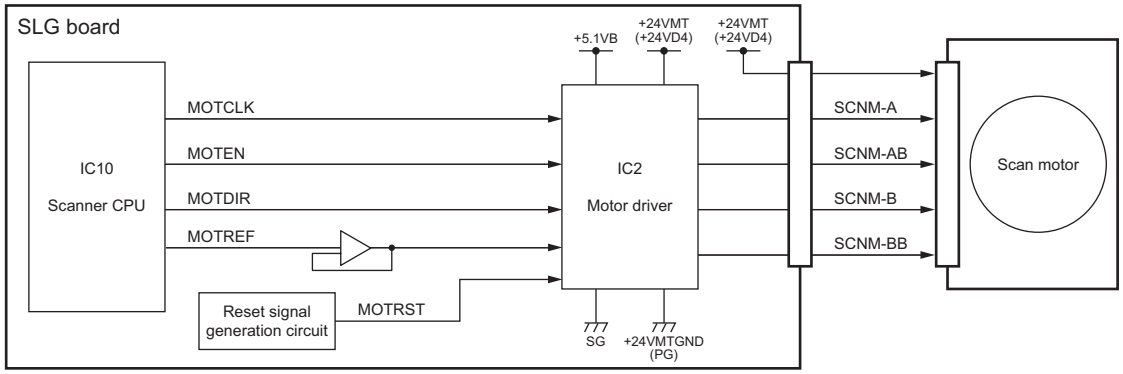


Fig. 6-8

Control signal

Signal	Function	Status	
		High level	Low level
MOTCLK	Reference clock	---	---
MOTEN	Enable signal	ON	OFF
MOTDIR	Rotation direction signal	CCW	CW
MOTRST	Reset signal	Normal operation	Reset
MOTREF	Motor current setting	Analog signal	

* CW: Clockwise rotation, CCW: Counter clockwise rotation viewing from the axis

6.5.2 Exposure lamp control circuit

[1] General description

Control circuit for the exposure lamp consists of the following two blocks:

1. Lighting device for the exposure lamp (Lamp inverter board)
   Turns ON/OFF the exposure lamp.

2. CCD board
   This circuit converts the reflected light amount from the original surface and the shading correction plate to electrical signals. The exposure amount is controlled in two ways:
   - White reference formation - reads the reflected light amount from the white shading correction plate
   - Black reference formation - reads the light amount at the regulation position with the exposure lamp lights OFF

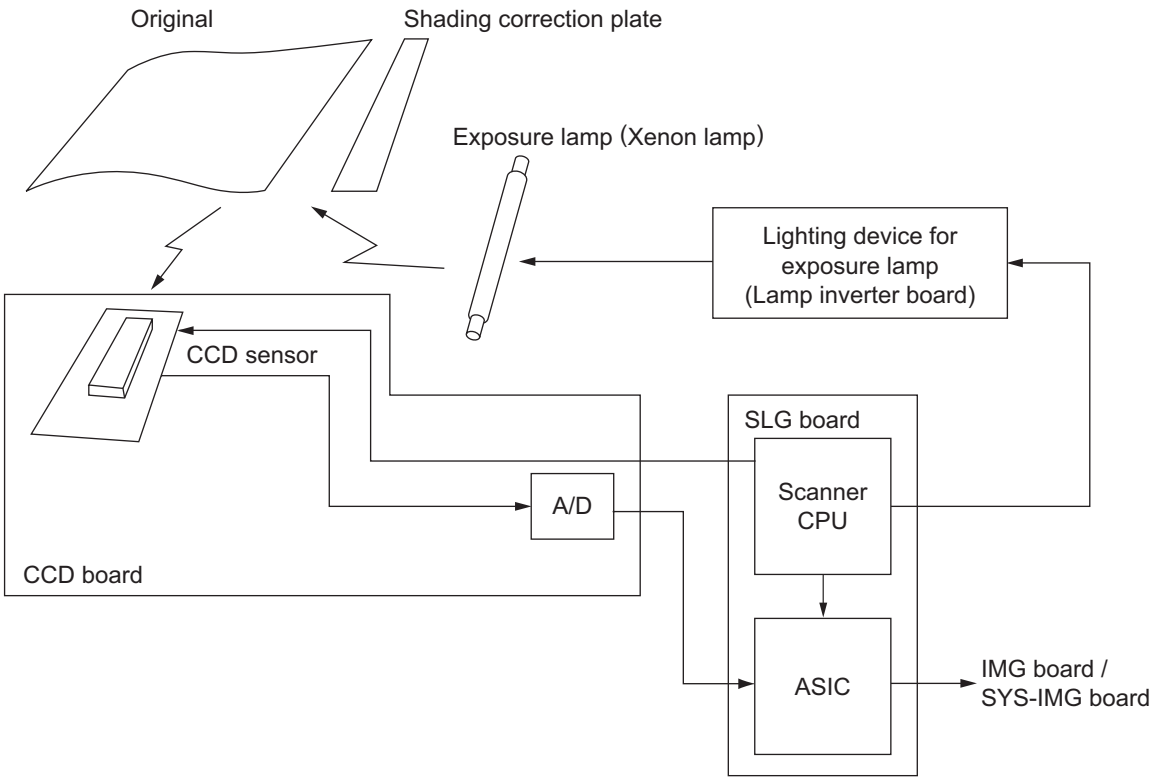


Fig. 6-9

[2] Exposure lamp

External electrode type xenon fluorescent lamp is used as an exposure lamp in this equipment.

1. Structure
   Fluorescer is applied on the inside surface of the lamp pipe (except a part to be an opening) which is filled with the xenon gas.
   A pair of the external electrodes covered by the film with the adhesive agent is attached over the pipe.

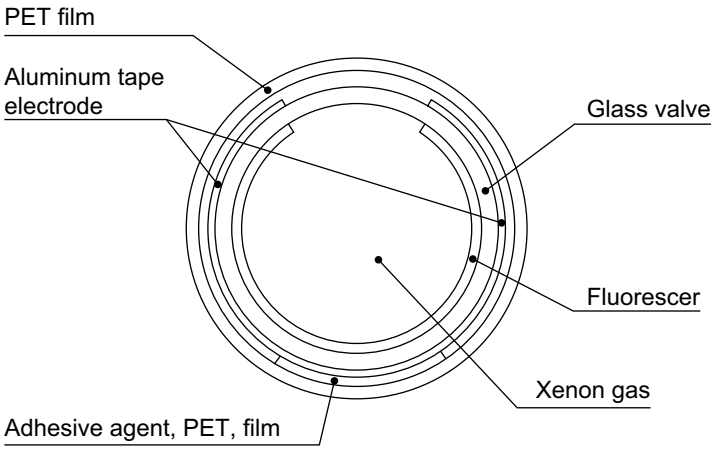
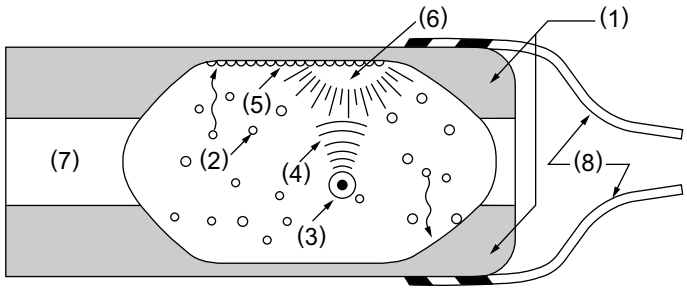


Fig. 6-10

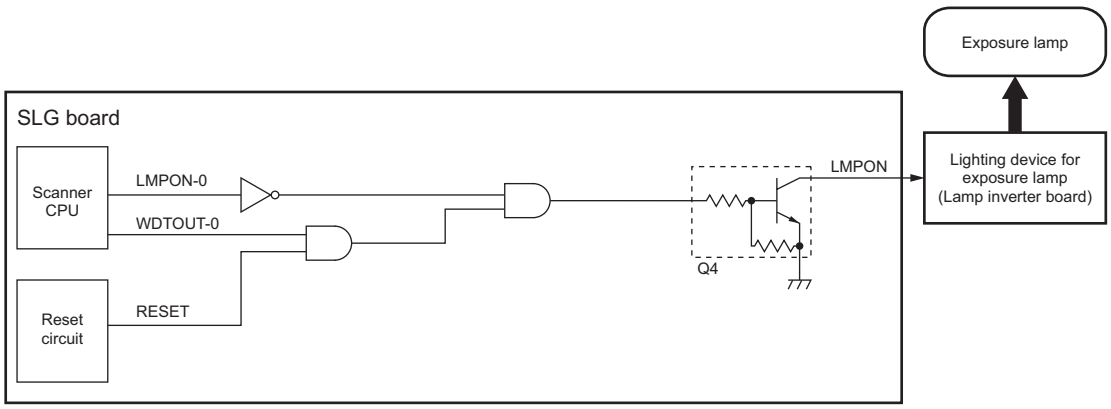
2. Behavior inside the lamp
   The electron inside the pipe is led to the electric field by applying voltage to the pair of the external electrodes, and discharge is started. Electrons then flow and clash with the xenon atoms inside the pipe to excite them, and generate ultraviolet rays. These ultraviolet rays excite the fluorescent substance to generate visible light.



(1) Electrode (2) Electron (3) Xenon atom
(4) Ultraviolet lay (5) Fluorescer
(6) Visible light (irradiated from the opening to outside the pipe)
(7) Opening (8) Harness

Fig. 6-11

[3] Exposure lamp control circuit



Signal	Function
LMPON-0	Exposure lamp ON signal
WDTOUT-0	Watchdog timer signal
LMPEN-0	Exposure lamp enable signal
RESET	Reset signal

LMPON-0	WDTOUT-0	RESET	LMPEN-0	+5VSW	Q4	Exposure lamp	State of equipment
L	H	L	L	ON	ON	ON	Normal operation
H	H	L	L	ON	OFF	OFF	
---	L	L	---	OFF	OFF		Scanner CPU overdriving
---	H	L	---	OFF	OFF		Call for service
---	---	L	H	---	OFF		Abnormality detected (Check sum error)
---	---	H	---	---	---		Reset error

6.5.3 General description of CCD control

[1] Opto-electronic conversion

A CCD (Charge-Coupled Device) is used to produce electrical signal corresponding to the reflected light amount from the original. CCD is a one-chip opto-electronic conversion device, comprised of several thousand light-receiving elements arranged in a line, each one of them is a few micron square. This equipment includes a CCD which has 7,450 light-receiving elements.
Each element of the light-receiving section consists of semiconductive layers P and N. When the light irradiates the element, light energy produces a (-) charge in the layer P; the amount of the charge produced is proportional to the energy and irradiating time. The charges produced in the light-receiving section are then sent to the transfer section where they are shifted by transfer clock from left to right as shown in the figure below, and are finally output from the CCD. At this time, to increase the transfer speed of the CCD, image signals are separated and output in parallel via two channels.

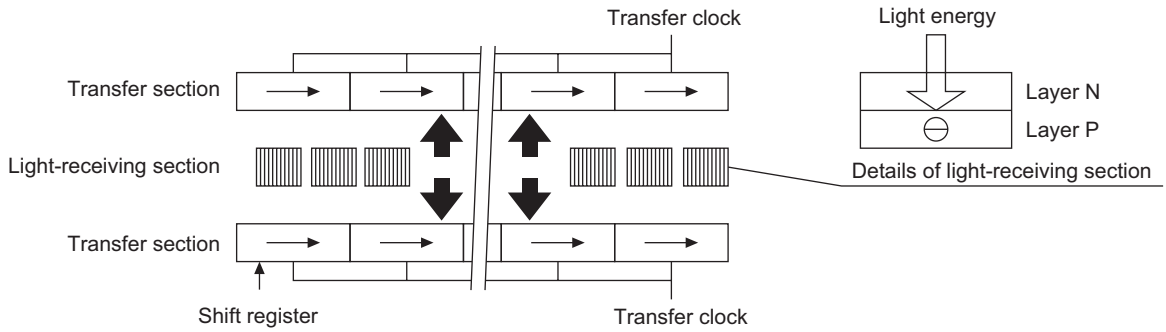


Fig. 6-12

[2] Shading correction

Signal voltages read by the CCD have the following characteristics:

1. Light source has a variation in its light distribution.

2. Since the light beam reflected from the original is converged using a lens, the light path is the shortest at the center of the CCD and the longest at ends. This causes difference in the amount of light reaching the CCD (i.e. the light amount is maximum at the CCD center, gradually decreases toward ends).

3. Each of the 7,450 elements varies in opto-electronic conversion efficiency.

These variation need to be corrected and this correction is referred to as shading correction. Shading correction is performed by applying normalization process using the following formula on the black and white data obtained in advance to correct lighting variance and element variation of the image data.

$$I = k \times \frac{(S-K)}{(W-K)}$$

k: Coefficient
S: Image data before correction
K: Black data (stored in "Black" memory)
W: White data (stored in "White" memory)

6.5.4 Automatic original size detection circuit

This circuit detects the size of original (standard sizes only) using the reflection type photosensors arranged on the base frame of the scanner unit.

[1] Principle of original size detection

Reflection type photosensors are placed on the base frame of the scanner unit as shown in the figure below. Each sensor consists of an infrared Light Emitting Diode (LED) on the light emitting side, and a phototransistor on the light receiving side.
When there is an original on the original glass, light beams from the LEDs are reflected by the original and led to the phototransistors. This means that the presence of the original is detected by the presence of reflection (when scanning black image).

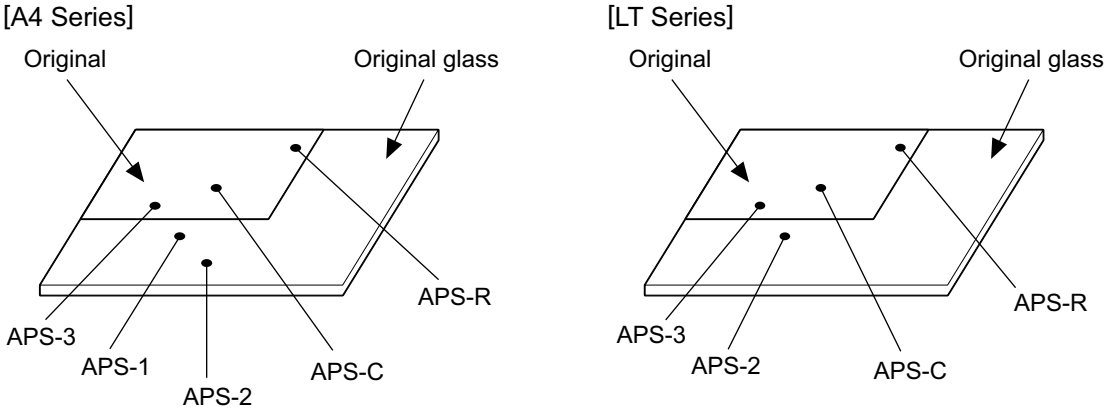


Fig. 6-13

[2] Process of detection of original size

1. When the equipment is in the original size detection mode, carriage-1 is set at its home position.

2. When the RADF or original cover is opened, the sensors receive the light reflected from the original and if one of the matrix conditions shown in 4) for original sizes are met, the size of the original is instantly detected.

3. The output signal from each sensor is input to Scanner CPU on the SLG board to determine the size of the original.

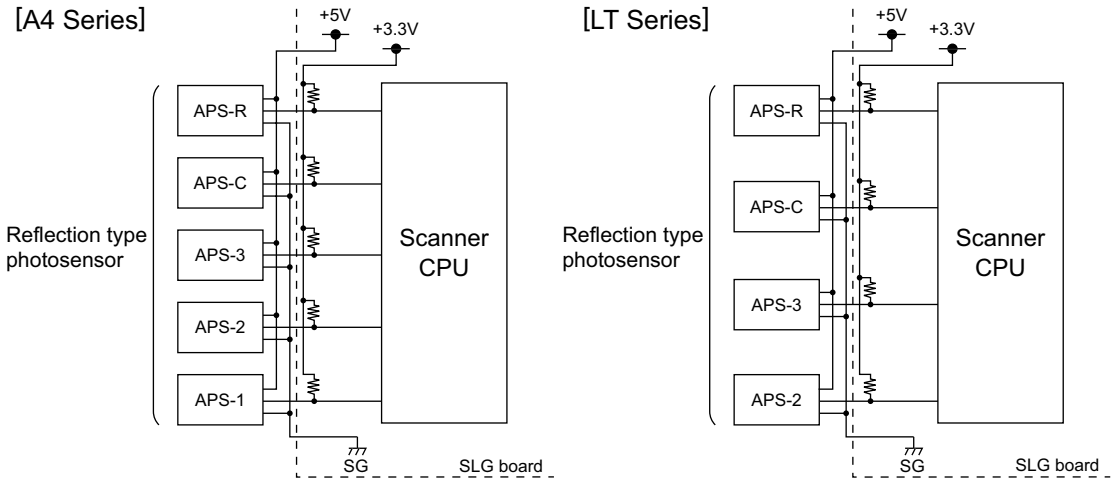


Fig. 6-14

Sensor detection points
[A4 Series]

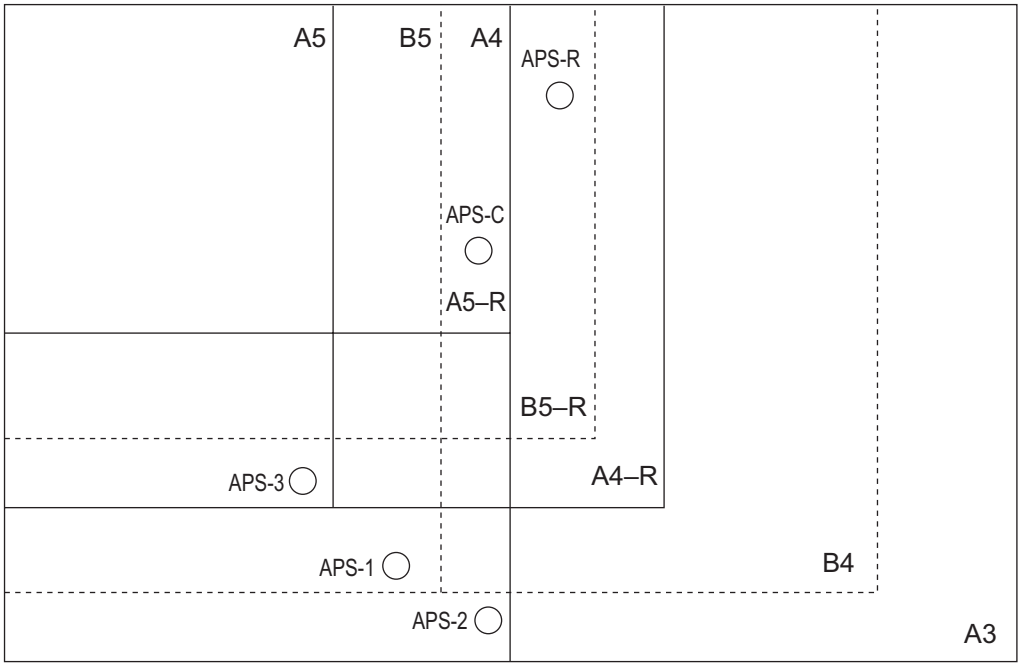


Fig. 6-15

[LT Series]

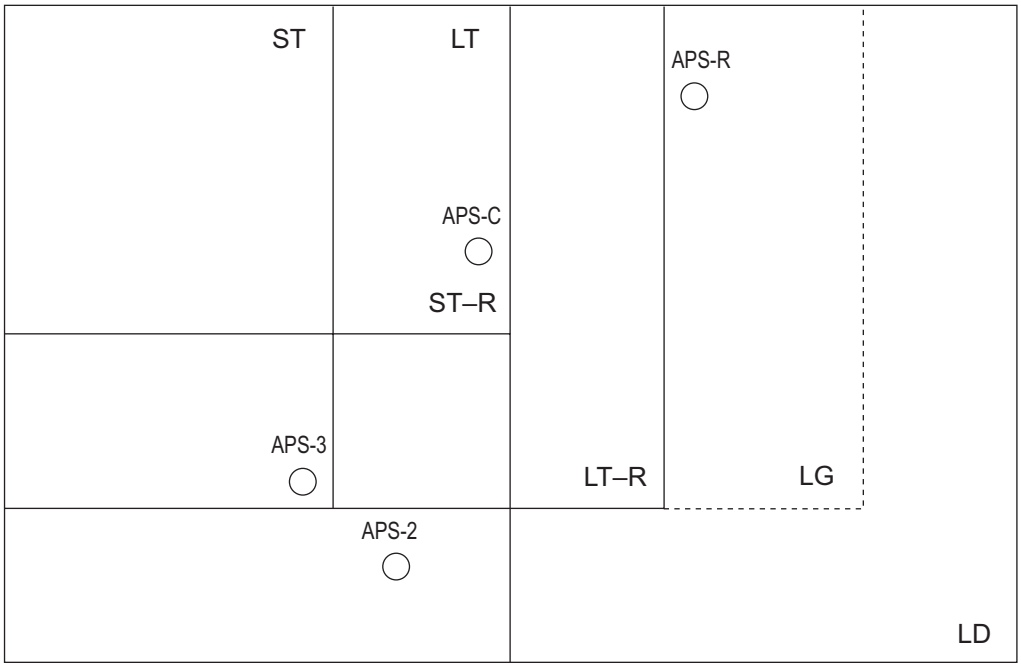


Fig. 6-16

4. Original size is determined by the combination of the signals output from each detection point. Combination charts for size determination of A4 series and LT series are as follows.

[A4 Series]

Size judgement	APS-C	APS-R	APS-1	APS-2	APS-3
A3	0	0	0	0	0
A4	0	1	0	0	0
B4	0	0	0	1	0
B5	1	1	0	1	0
A4-R	0	0	1	1	0
A5	1	1	1	1	0
B5-R	0	0	1	1	1
A5-R	0	1	1	1	1

[LT Series]

Size judgement	APS-C	APS-R	APS-2	APS-3
LD	0	0	0	0
LT	0	1	0	0
LG	0	0	1	0
LT-R	0	1	1	0
ST	1	1	1	0
ST-R	0	1	1	1

Code	Output signal	Original
1	H	Not available
0	L	Available

* When the platen sensor (S6) is OFF;
  - The followings are determined by output signals from the APS sensors.
    - Size (The combination of the signals satisfy any in the above chart)
      Size is displayed on the control panel and a specific paper or reproduction ratio is selected.
    - Size retention (The combination of the signals do not satisfy the above chart)
      The latest original size recognized (or no original state) until new paper size is recognized.
    - No original (Output from all the sensors are “1”.)
      Reproduction ratio and paper are not selected.
  - Size change is always observed and detected.
  - The carriage-1 stays at the standby position even if the reproduction ratio changes corresponding to the change of the original size.

* When the platen sensor (S6) is ON;
  The latest original size (or no original state) recognized right before the platen sensor (S6) is turned ON is retained regardless of the status the APS sensor output signals.

About reflection type photosensor

The reflection type photosensor is comprised of an infrared light emitting diode and a phototransistor. It uses pulse modulation to detect an original.

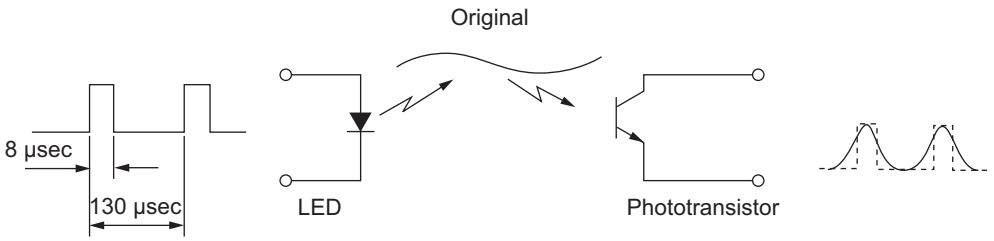


Fig. 6-17

The light emitting diode is driven by a pulse having a 130 µsec. cycle and an 8 µsec. ON time. When the phototransistor receives the same signal as this pulse, it is determined that there is an original. The pulse modulation is performed inside the reflection type phototransistor.

6.6 Disassembly and Replacement

6.6.1 Original glass

(1) Take off the right upper cover.
🕮 P.2-24 "2.5.5 Right upper cover"
(2) Remove 2 screws and take off the fixing bracket.

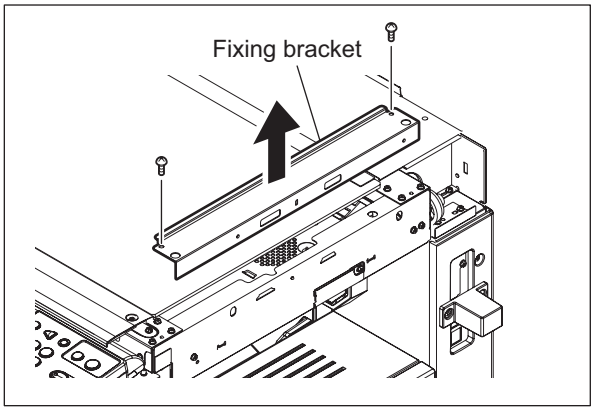


Fig. 6-18

(3) Take off the original glass.

Note:
When installing, fit 2 small protrusions of the original glass in the groove of the equipment and fix the original glass with the fixing bracket by pushing it to the left rear direction.

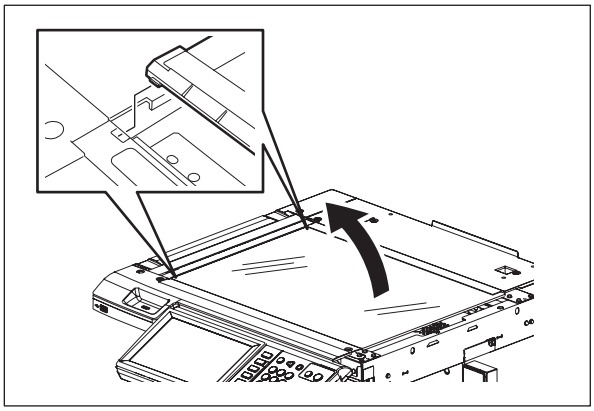


Fig. 6-19

6.6.2 Lens cover

(1) Take off the original glass.
🕮 P.6-16 "6.6.1 Original glass"
(2) Remove 4 screws and take off the lens cover.

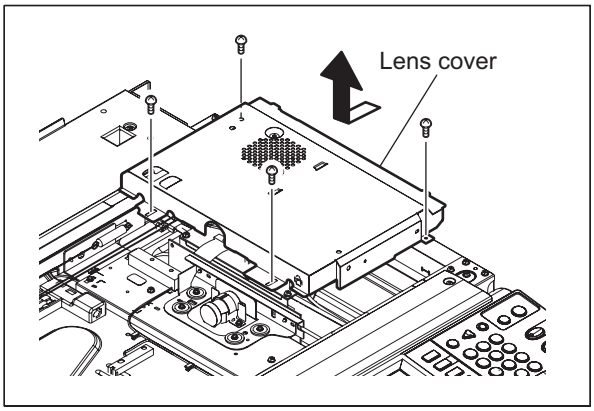


Fig. 6-20

6.6.3 Automatic original detection sensor (S1-5)

[A] A4 series (APS-1, -2, -3, -C, -R)

(1) Take off the lens cover.
P.6-16 "6.6.2 Lens cover"
(2) Disconnect 1 connector and remove 1 screw. Take off APS sensor.

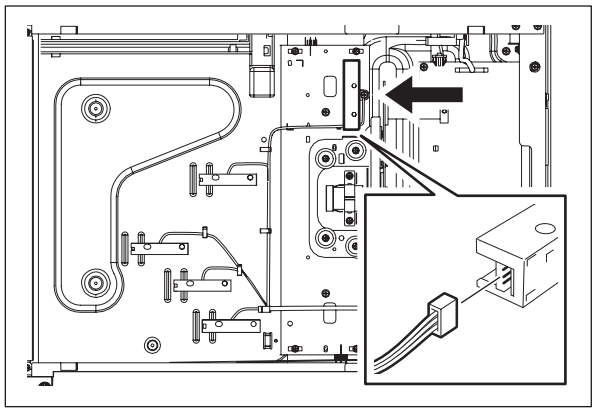


Fig. 6-21

(3) Disconnect 1 connector each, release 2 latches each and take off 4 APS sensors.

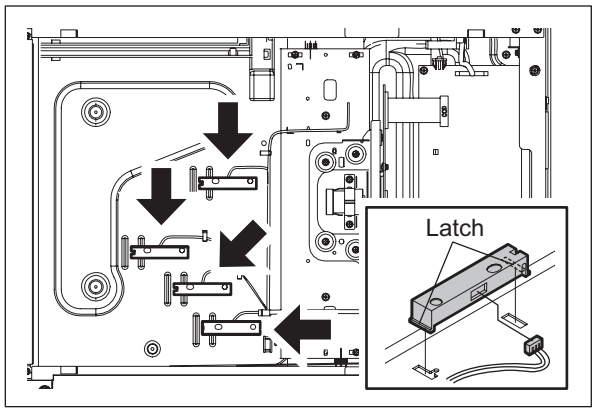


Fig. 6-22

[B] LT series (APS-1, -3, -C, -R)

(1) Take off the lens cover.
P.6-16 "6.6.2 Lens cover"
(2) Disconnect 1 connector and remove 1 screw. Take off APS sensor.

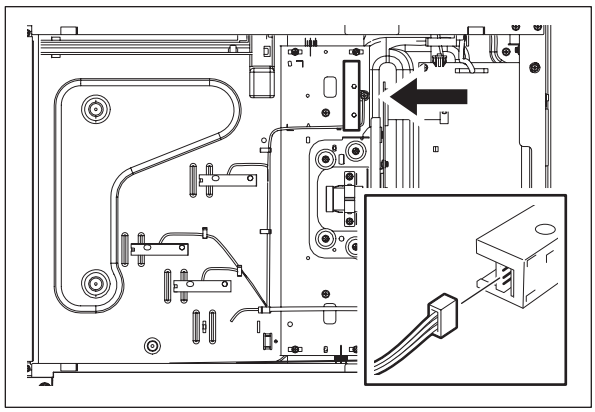


Fig. 6-23

(3) Disconnect 1 connector and remove 1 screw for each APS sensor. Take off 3 APS sensors.

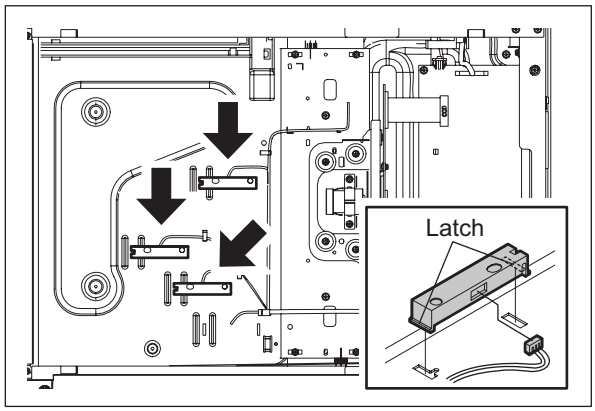


Fig. 6-24

6.6.4 Exposure lamp (EXP)

(1) Take off the original glass.
📖 P.6-16 "6.6.1 Original glass"
(2) Take off the front upper cover.
📖 P.2-22 "2.5.2 Front upper cover"
(3) Release the harness from 1 harness clamp.

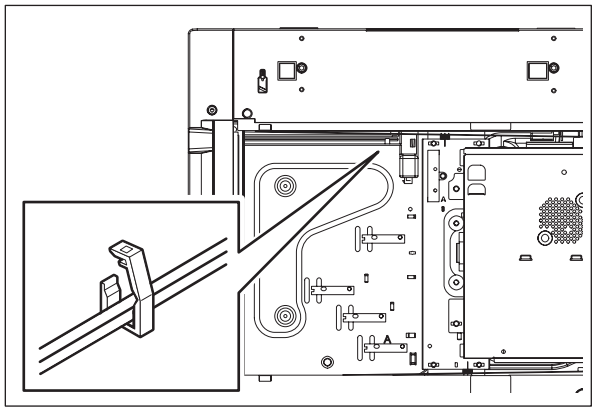


Fig. 6-25

(4) Release the harness from the harness guide.

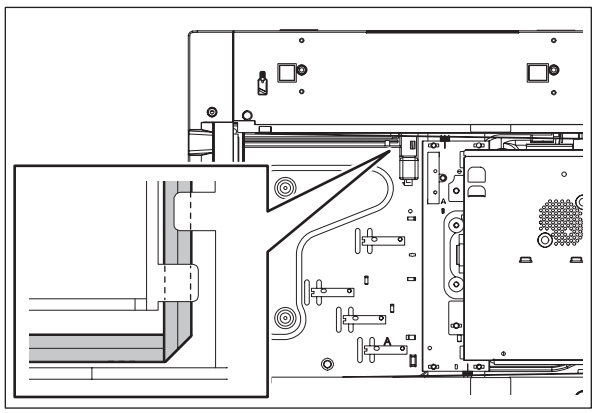


Fig. 6-26

(5) Rotate the drive pulley and move the carriage-1 so that the screw can be seen.

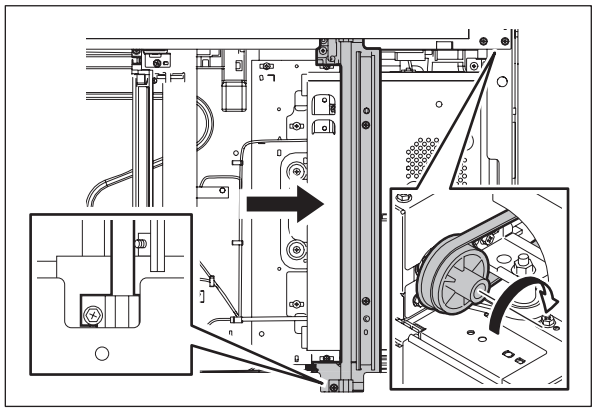


Fig. 6-27

(6) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"

(7) Disconnect the connector of the lamp harness from the lamp inverter board.

Note:
Be careful not to apply load to the lamp inverter board when disconnecting the connector.
See the following chapter for the installation procedure.
📖 P.6-28 "6.6.9 Installing the lamp harness"

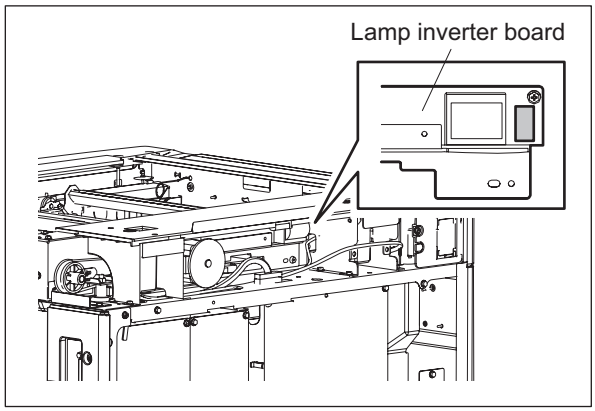


Fig. 6-28

(8) Release 1 clamp of the carriage and take off the harness wiring on the rear frame.

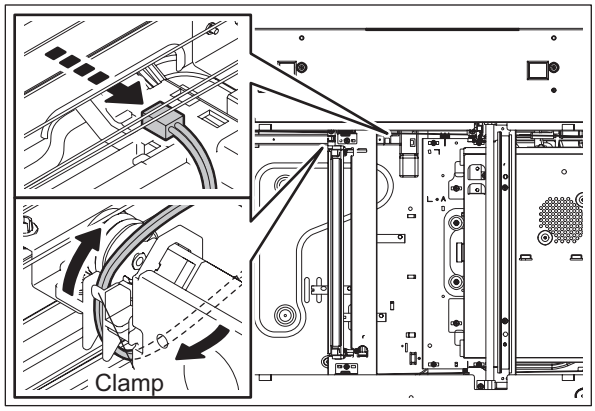


Fig. 6-29

(9) Release the harness from the harness holder.

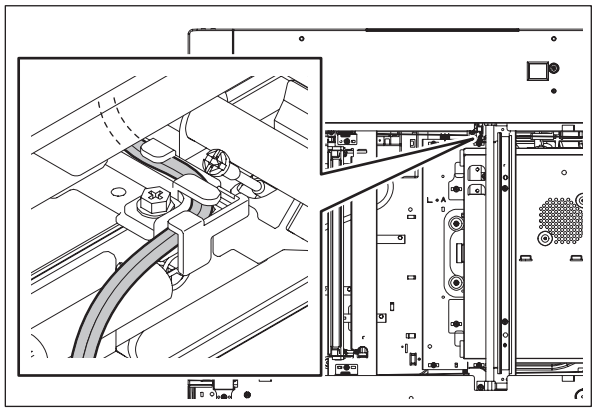


Fig. 6-30

(10) Remove 1 screw.
(11) Lift up the front side of the exposure lamp and take off by sliding it.

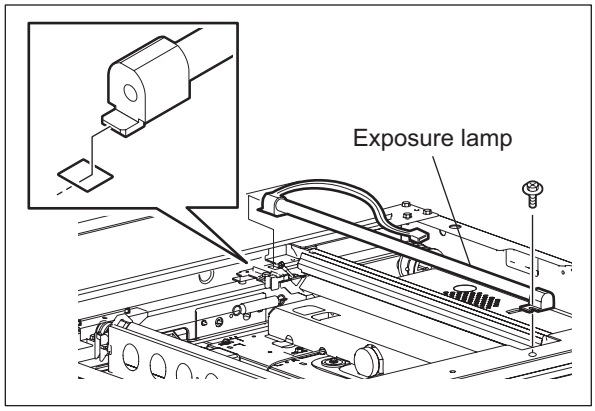


Fig. 6-31

6.6.5 Lens unit

(1) Remove the lens cover.
P.6-16 "6.6.2 Lens cover"
(2) Remove 1 screw and take off the APS sensor.

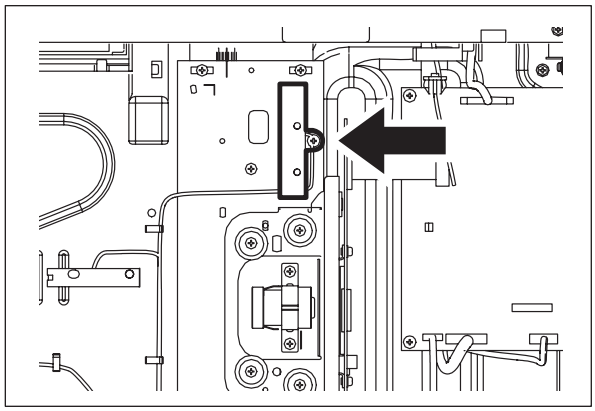


Fig. 6-32

(3) Disconnect 1 connector and remove 4 screws. Take off the lens unit.

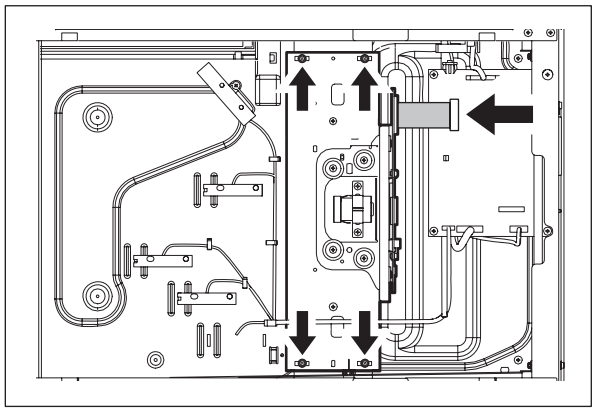


Fig. 6-33

Notes:

1. When installing, be sure that the harness of the APS sensor comes over the lens unit.

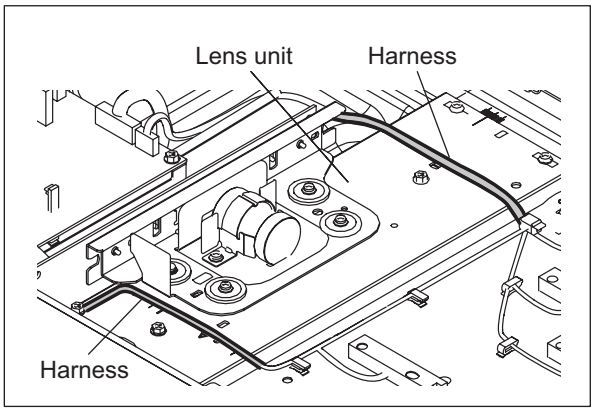


Fig. 6-34

2. See the following chapter for the adjustment procedure.
   Service Handbook Chap.3
3. Do not touch 10 screws shown with the arrows when replacing the lens unit.

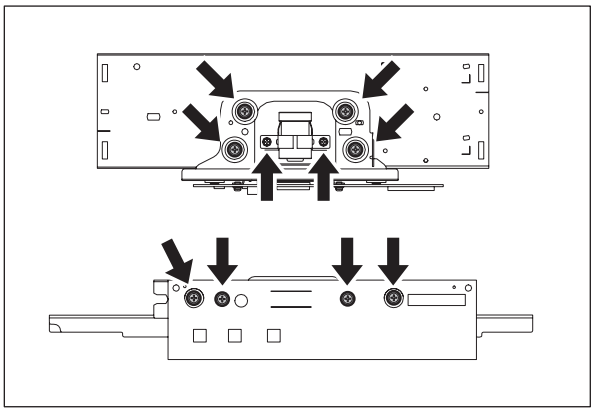


Fig. 6-35

4. Handle the unit with care. Do not touch the adjusted area and lens. (Hold the unit as the right figure.)

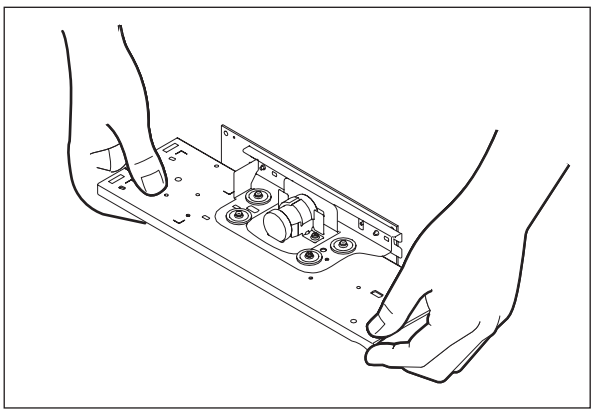


Fig. 6-36

6.6.6 Scan motor (M1)

(1) Take off the rear cover.
P.2-24 "2.5.6 Rear cover"
(2) Take off the upper rear cover.
P.2-25 "2.5.7 Upper rear cover"
(3) Disconnect 1 connector.

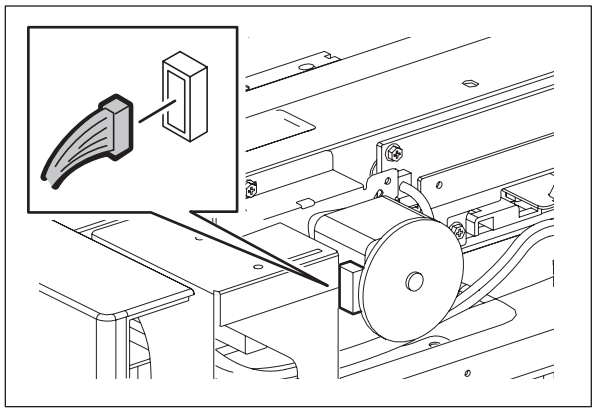


Fig. 6-37

(4) Remove 2 screws and take off the scan motor with the whole bracket.

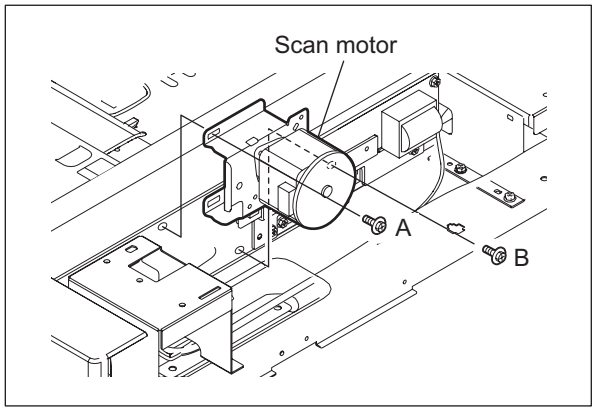


Fig. 6-38

Notes:

When installing the scan motor, use the belt tension jig (spring). The procedure is as follows.

1. Temporarily fix the screw A and B.
P.6-23 "Fig. 6-38 "
2. Hook the belt tension jig to the motor bracket and the flame.
3. The scan motor is pulled by the belt tension jig. Fix the screw A and then B at the stopped position.
4. Remove the belt tension jig.

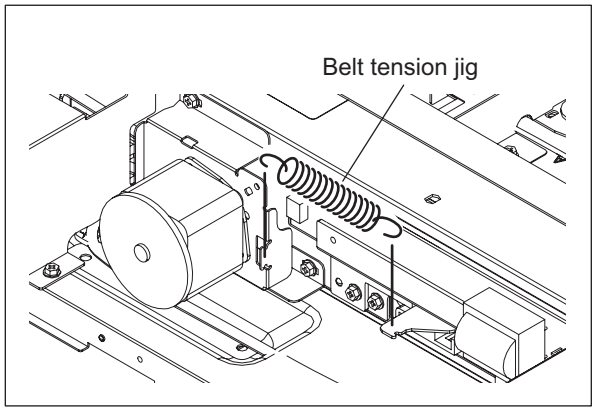


Fig. 6-39

6.6.7 Carriage-1

(1) Take off the original glass.
📖 P.6-16 "6.6.1 Original glass"
(2) Take off the upper rear cover.
📖 P.2-25 "2.5.7 Upper rear cover"
(3) Take off the front upper cover.
📖 P.2-22 "2.5.2 Front upper cover"
(4) Release the harness from 1 harness clamp.

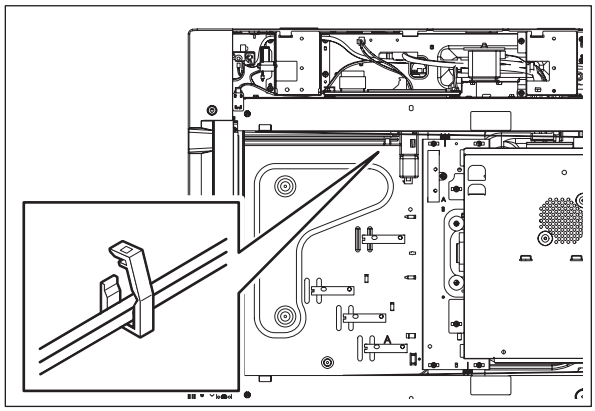


Fig. 6-40

(5) Release the harness from the harness guide.

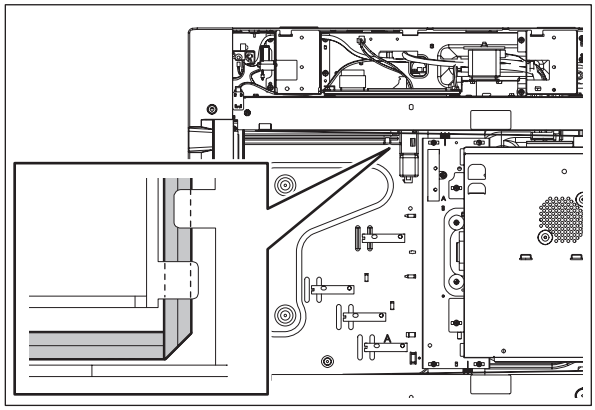


Fig. 6-41

(6) Rotate the drive pulley and move the carriage-1 so that the screw can be seen.

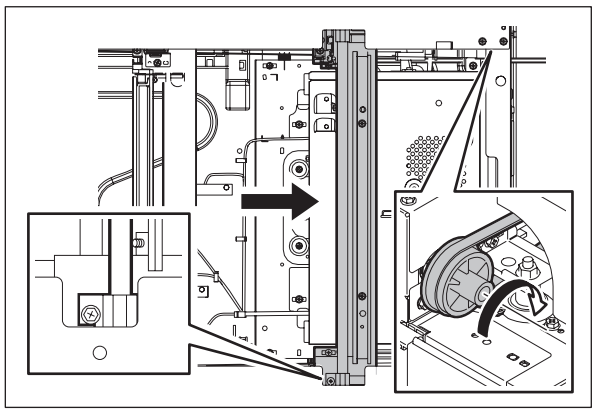


Fig. 6-42

(7) Disconnect the connector of the lamp harness from the lamp inverter board.

Note:

Be careful not to apply load to the lamp inverter board when disconnecting the connector.

See the following chapter for the installation procedure.

📖 P.6-28 "6.6.9 Installing the lamp harness"

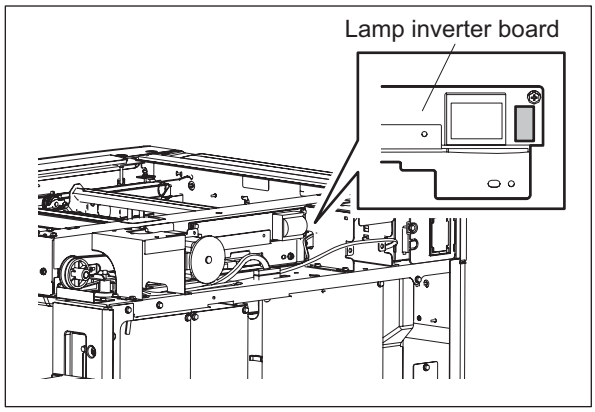


Fig. 6-43

(8) Release 1 harness clamp of the carriage and take off the harness wiring on the rear frame.

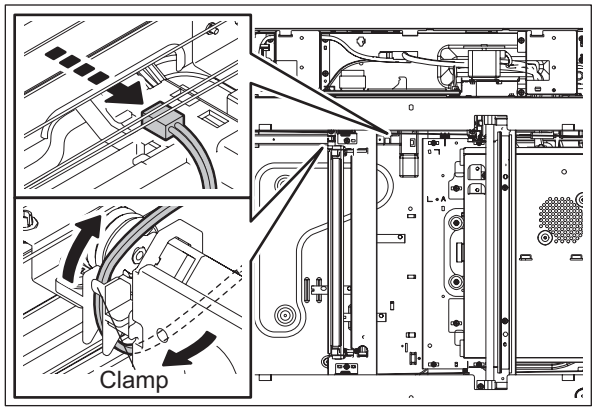


Fig. 6-44

(9) Release the harness from the harness holder.

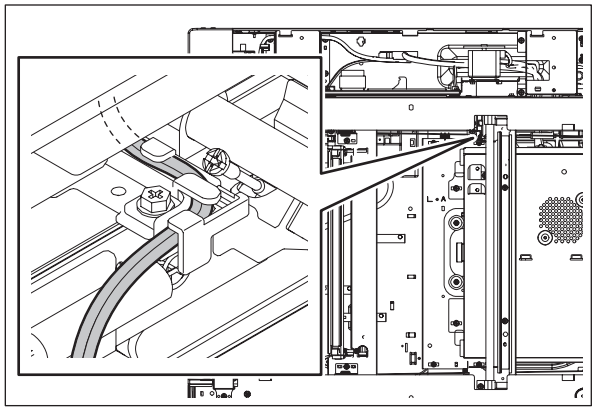


Fig. 6-45

(10) Remove 2 screws and take off the brackets fixing the carriage-1 to the wire.

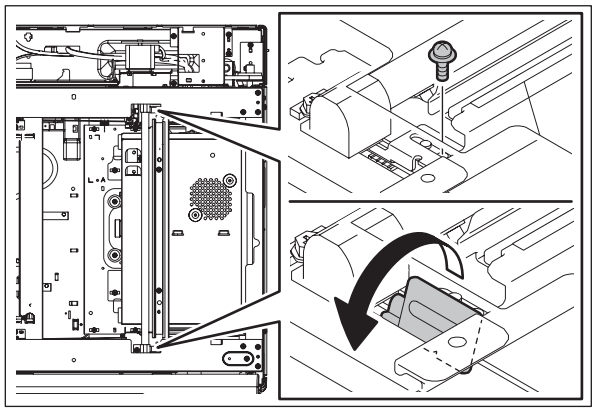


Fig. 6-46

(11) Rotate the carriage-1 in the direction shown in the figure at right, not to touch the mirror. Then take off the carriage-1.

Note:

When replacing the mirror-1, replace the carriage-1 together with mirror-1.
Mirror-1 should not be removed.

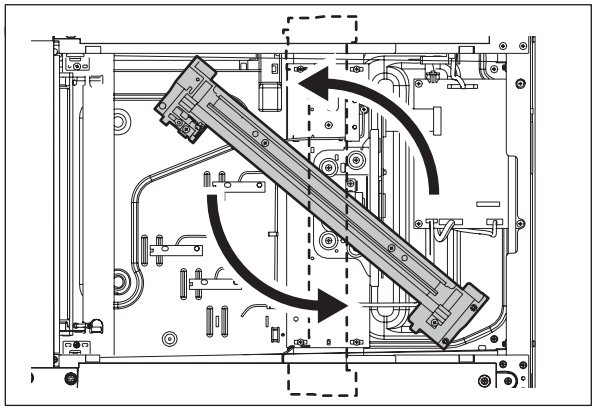


Fig. 6-47

Note:

When installing carriage-1, fix the bracket temporarily at the position (A). Then move it to the direction (B), push it to the end and fix securely.

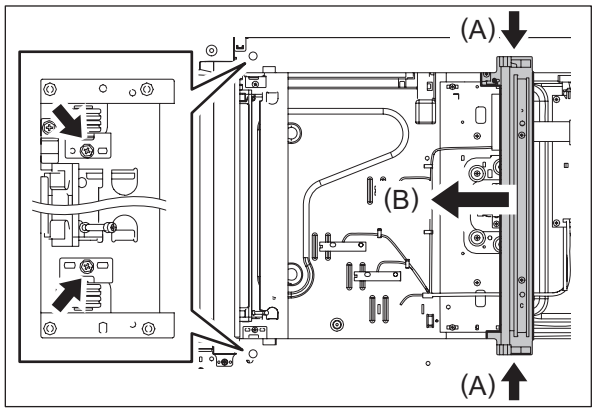


Fig. 6-48

6.6.8 Lamp inverter board (INV)

(1) Take off the rear cover.
P.2-24 "2.5.6 Rear cover"
(2) Disconnect 2 connector of the lamp inverter board.

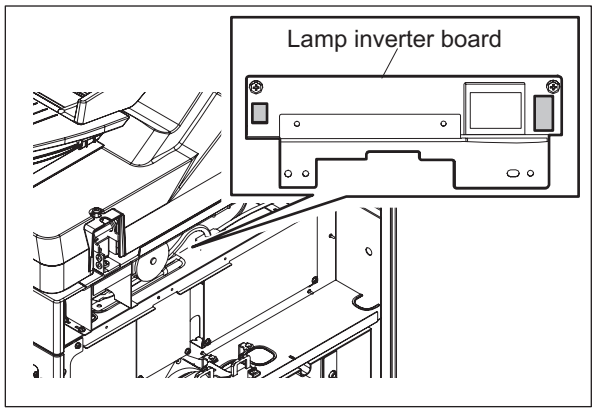


Fig. 6-49

(3) Remove 2 screws and take off the inverter unit.

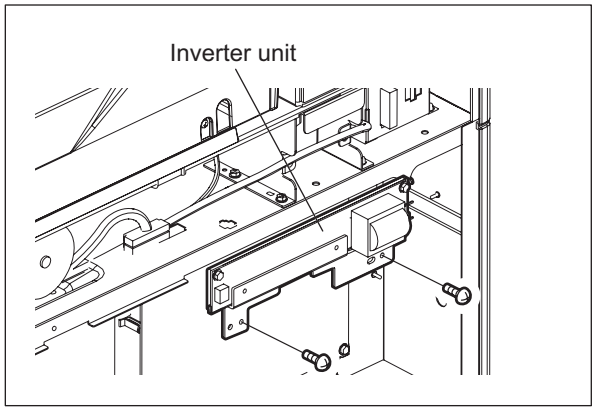


Fig. 6-50

(4) Remove 2 screws and take off the inverter cover.

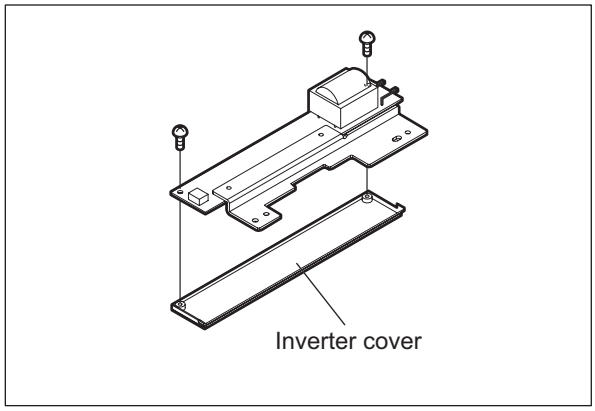


Fig. 6-51

(5) Remove 3 screws and take off the lamp inverter board.

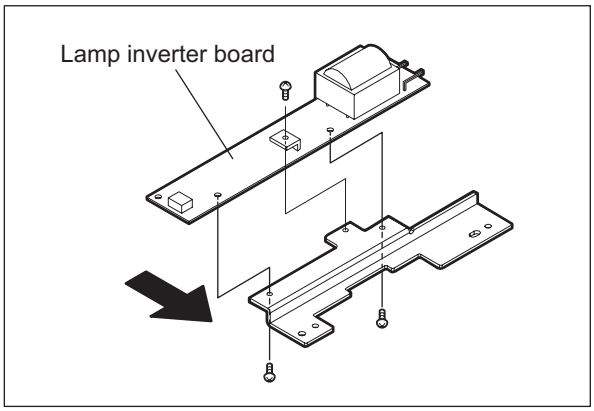


Fig. 6-52

6.6.9 Installing the lamp harness

(1) Install the harness to 2 harness clamps and wire it under carriage-2.

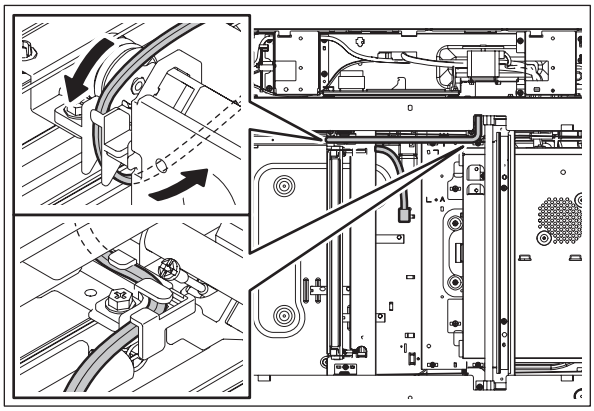


Fig. 6-53

(2) Rotate the drive pulley and move the carriage-1 to the left side.

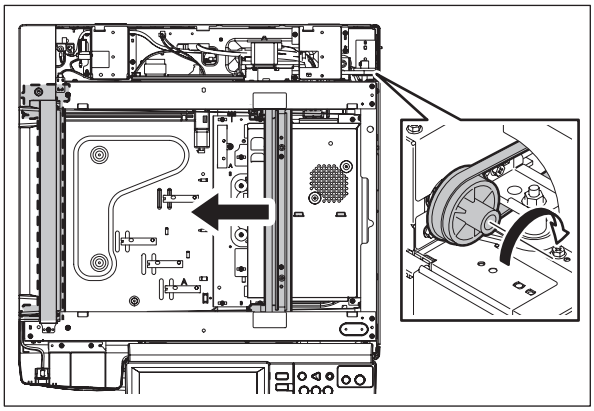


Fig. 6-54

(3) Install the harness in the harness guide and wire it to the rear side of the equipment.

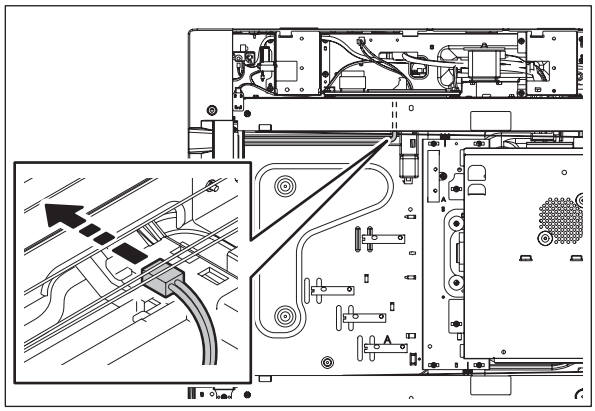


Fig. 6-55

(4) Fix the harness with 1 clamp, and fold the harness back.
(5) After installing, move carriage-1 to the left edge and confirm that there is no abnormality such as a twisted lamp harness.

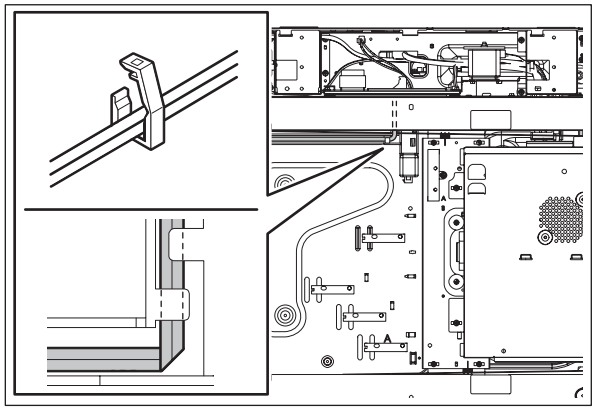


Fig. 6-56

(6) Install the harness in the connector of the lamp inverter board.

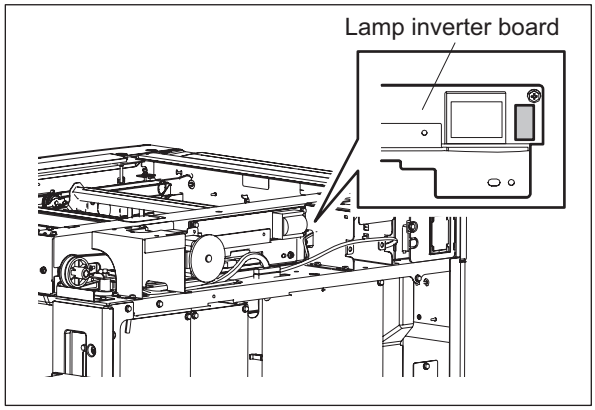


Fig. 6-57

6.6.10 Carriage wire / carriage-2

(1) Take off the carriage-1.
P.6-24 "6.6.7 Carriage-1"
(2) Attach the wire holder jigs to the pulleys to prevent the wires from loosening.

Note:
Refer to the following procedure for the direction of the wire holder jigs.
Service Handbook Chap.3

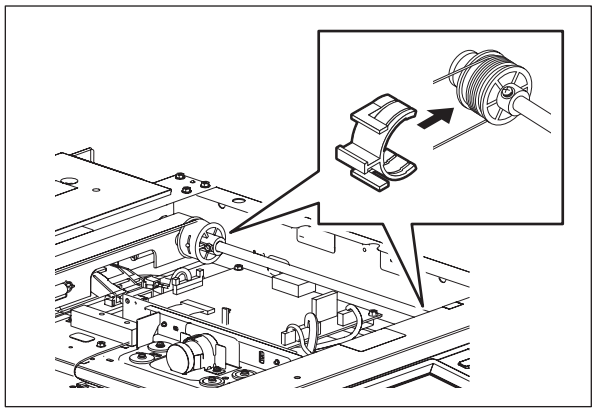


Fig. 6-58

(3) Detach the tension springs of the front and rear sides.
(4) Remove the carriage wires.

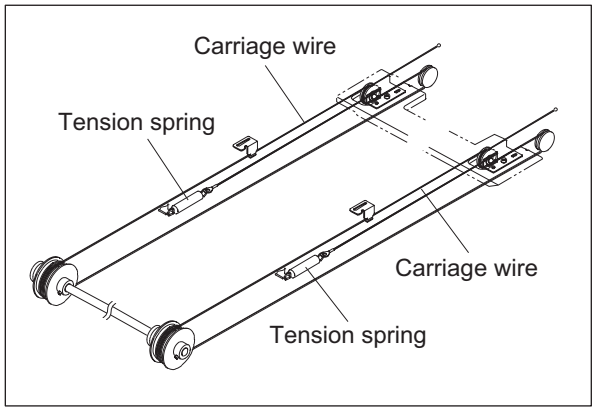


Fig. 6-59

(5) Take off carriage-2 by rotating it as shown in the figure on the right without touching the mirrors.

Notes:
1. When replacing the mirrors-2 and -3, replace the carriage-2 together with mirrors-2 and -3. Mirrors-2 and -3 should not be removed.
2. When installing carriage-2, fix the bracket temporarily at the position (A). Then move it to the direction (B), push it to the end and fix securely.
P.6-26 "Fig. 6-48 "

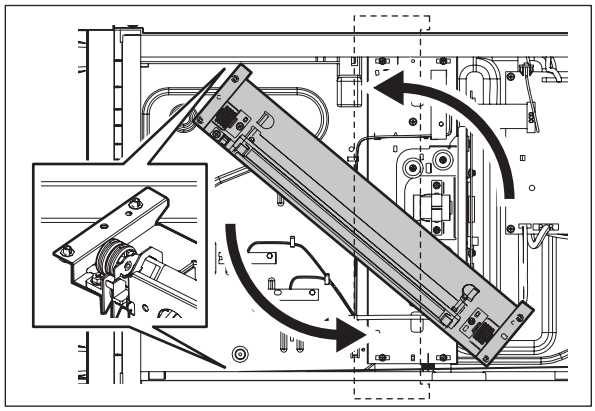


Fig. 6-60

6.6.11 Platen sensor (S6) / Carriage home position sensor (S7)

(1) Take off the upper rear cover.
📖 P.2-25 "2.5.7 Upper rear cover"
(2) Disconnect 1 connector. Release the latches and take off the platen sensor.
(3) Remove the seal on the carriage home position sensor.
(4) Disconnect 1 connector. Release the latches and take off the carriage home position sensor.

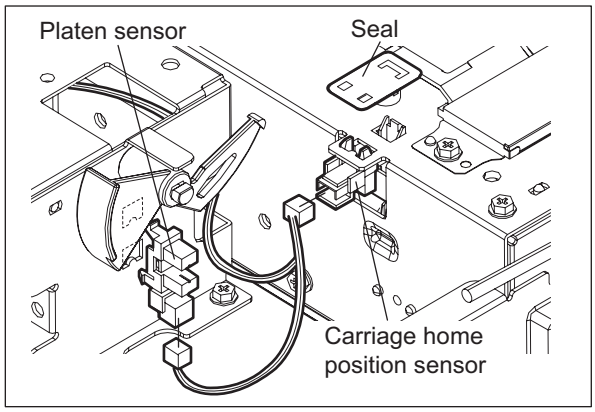


Fig. 6-61

6.6.12 SLG board (SLG)

(1) Take off the lens cover.
📖 P.6-16 "6.6.2 Lens cover"
(2) Disconnect 7 connectors, remove 4 screws and take off the SLG board.

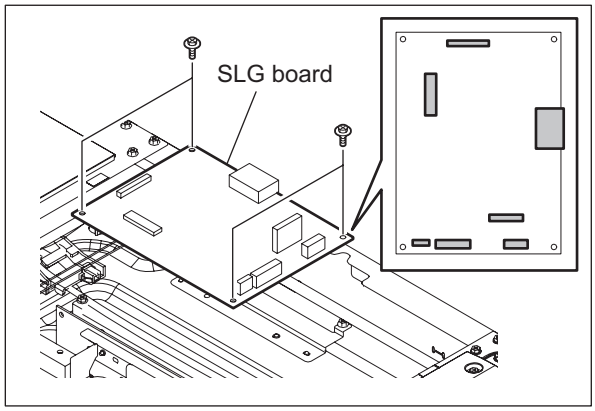


Fig. 6-62

7. LASER OPTICAL UNIT

7.1 General Description

The laser optical unit radiates the laser beam onto the photoconductive drum responding to the digital image signals transmitted from the LGC board. to create the latent image. Image signal is converted into the light emission signal of the laser diode on the laser driving PC board (LDR), then radiated on the drum through the optical elements such as cylinder lenses, polygonal mirror and fθ lens.
The unit must not be disassembled in the field as they are very sensitive to dust and finely adjusted at the factory.

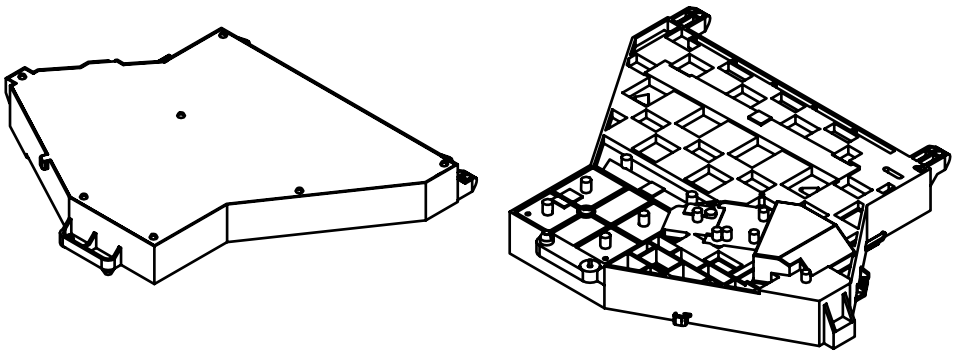


Fig. 7-1

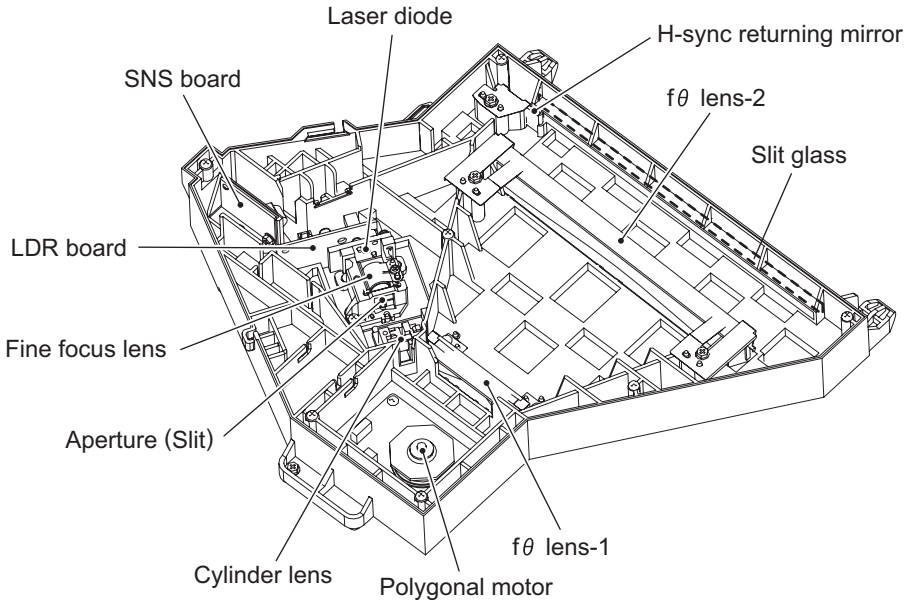


Fig. 7-2

7.2 Structure

Laser optical unit (1 beam)		
Laser emission unit	Laser diode	Wavelength: Approx.785 nm Output power rating: 7 mW
	Fine focus lens	
	Aperture (Slit)	
	Cylinder lens	
	Laser driving PC board (LDR)	
Polygonal motor unit	Polygonal motor (M3)	
	Polygonal mirror	8 planes
fθ lens-1		
fθ lens-2		
H-Sync returning mirror		
Slit glass		
H-sync signal detection PC board (SNS)		

1. Laser emission Unit
   This unit consists of the laser diode, finite focus lens, aperture and cylinder lens.
   - Laser diode
     This laser diode features low droop, small laser variation and low threshold current.
     Aperture determines the shape of the laser beam at laser emission position of the primary scanning and secondary scanning.
     Laser diode radiates the laser beams responding to the laser emission control (ON/OFF) signals from the laser driving PC board (LDR). Laser beams which passed through the finite focus lens are focused on the drum surface.

   - Laser precautions
     A laser diode is used for this equipment and radiates an invisible laser beam.
     Since it is not visible, be extremely careful when handling the laser optical unit components, performing operations or adjusting the laser beam. Also never perform the procedure with other than the specified manuals because you could be exposed to the laser radiation.
     The laser optical unit is completely sealed with a protective cover. As long as only the operations of specified manuals are performed, the laser beam is not leaked and you are in no danger of being exposed to laser radiation.
     The following cautionary label for the laser is attached to the right front cover.

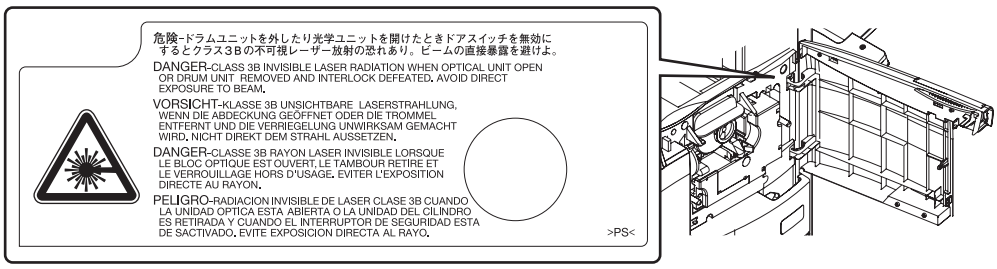


Fig. 7-3

Cautions:

- Avoid expose to laser beam during service. This equipment uses a laser diode. Be sure not to expose your eyes to the laser beam. Do not insert reflecting parts or tools such as a screwdriver on the laser beam path. Remove all reflecting metals such as watches, rings, etc. before starting service.
- When servicing the equipment with the power turned ON, be sure not to touch live sections and rotating/operating sections. Avoid exposing your eyes to laser beam.
- During servicing, be sure to check the rating plate and cautionary labels such as "Unplug the power cable during service", "CAUTION. HOT", "CAUTION. HIGH VOLTAGE", "CAUTION. LASER BEAM", etc. to see if there is any dirt on their surface and if they are properly stuck to the equipment.

2. Polygonal motor unit
   This unit consists of the polygonal motor (M3) and polygonal mirror.

a. Polygonal motor (M3)
   This motor rotates the polygonal mirror in high speed.

b. Polygonal mirror
   One laser beam emitted from the laser diode is reflected by this mirror. As the polygonal mirror is rotated by the polygonal motor (M3), the reflected laser light moves in sync with the rotation. The direction of the movement is the primary scanning direction of the image. One scan is performed on one plane of the polygonal mirror.
   As the polygonal mirror has eight planes, eight scans are performed in one rotation of the polygonal mirror.

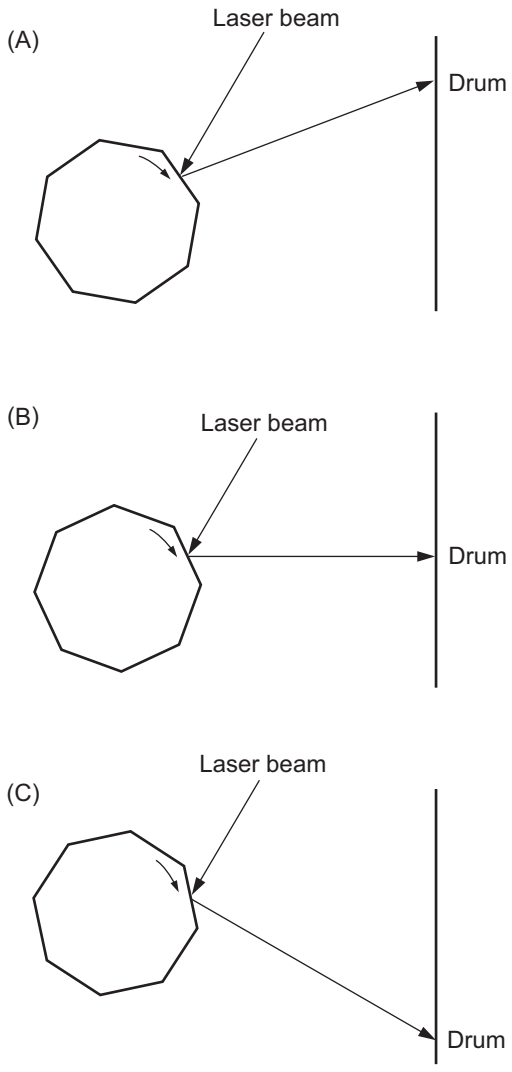


Fig. 7-4

One scan is completed by completion of steps (A) to (C). One scan is performed on one plane of the polygonal mirror. Eight scans can be made with one rotation of the polygonal mirror.

3. fθ lenses 1 and 2
   These two lenses perform the following adjustment on the laser beams reflected by the polygonal mirror.

   a. Uniform-velocity scanning
      Since the polygonal mirror is rotating at a uniform velocity, the laser beam reflected from the mirror scans over the drum surface at a uniform angular velocity; namely, the pitch between the dots on the drum is wider at both ends than at the center of the scanning range. The fθ lenses help to correct this difference, making all the dot-to-dot pitches equal on the drum surface.

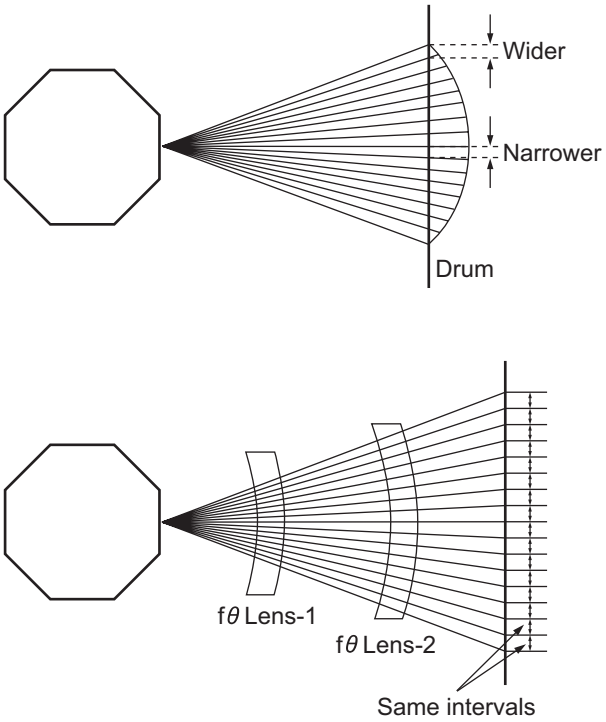


Fig. 7-5

   b. Face tilt correction
      The reflecting face of the polygonal mirror is tilted slightly to one side against the perfect vertical. Horizontal deviation of the laser light which is caused by the tilt is corrected.

   c. Sectional shape of laser beam
      The shape of the laser beam spotted on the drum is adjusted.

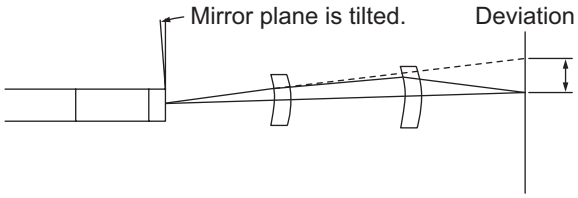


Fig. 7-6

4. H-sync signal detection PC board (SNS)
   The laser light which is started to be scanned from one of the reflected plane of the polygonal mirror is reflected by the H-Sync returning mirror and enters the PIN diode on the H-Sync signal detection PC board (SNS). The primary scanning synchronizing signal is generated based on this reflection.

5. Slit glass
   Slit glass is located where the laser beams are output from the laser optical unit, and it protects the unit from dust.

7.3 Laser Diode Control Circuit

This equipment uses an AlGaAs type semiconductive laser with 7 mW of optical output power rating. This laser emits a beam in a single transverse mode in approx. 785 nm wavelength. PIN diode for monitoring optical output in this laser controls the laser intensity.
The relation between the forward current and optical output of a semiconductive laser is as shown below. Beam emission starts when the forward current exceeds a threshold current, and then the laser outputs a monitor current which is proportionate to the optical output. Since semiconductive lasers have an individual variability in their threshold current and monitor current, the optical output needs an adjustment to be maintained at a certain value.
The optical output of a semiconductive laser decreases as the laser temperature rises. Therefore APC (Auto Power Control) needs to be performed to maintain a constant optical output.

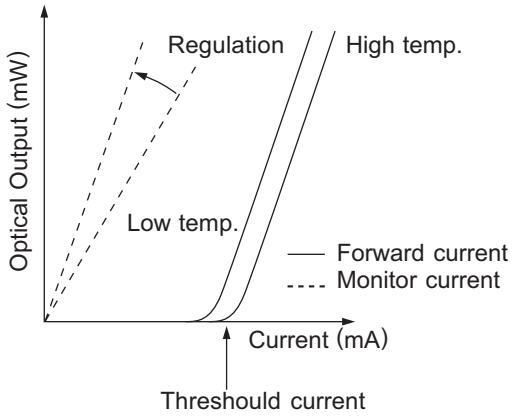


Fig. 7-7

A block diagram of the semiconductive laser control circuit is shown below. The semiconductive laser performs a monitor efficiency regulation (a process to regulate a monitor current regarding the beam emission amount), and adjusts the optical output in the initial state.
The voltage of the monitor output, which has been regulated by this adjustment, is then fed back to a laser power comparison circuit.
In the laser power comparison circuit, this voltage fed back and a laser power voltage set for the control circuit are compared for every scanning. As the result of this, a laser driver circuit increases its forward current when the laser power is insufficient and decreases it when the laser power is excessive to maintain a constant optical output.

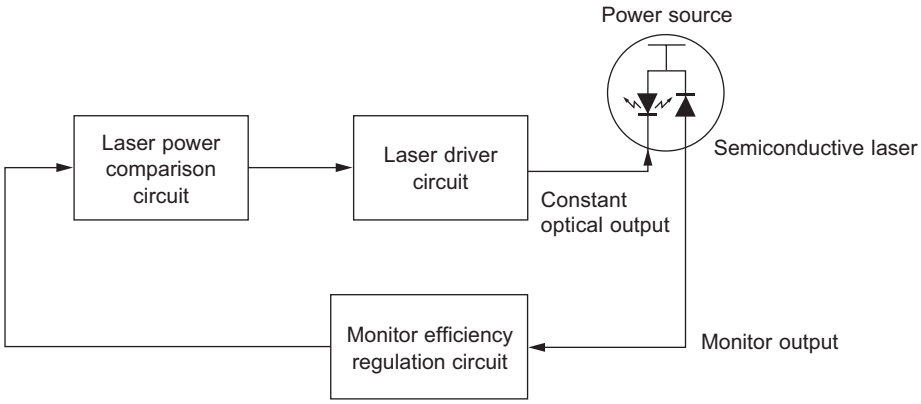


Fig. 7-8

7.4 Polygonal Motor Control Circuit

The polygonal motor is a DC motor rotated by a clock signal (POMCK-1) output from the ASIC. This motor is controlled under PLL (Phase Locked Loop) to realize an accurate and constant rotation. Its rotation status is converted to a status signal (POMPL-0) and then output to the ASIC. PMTRSTS-0 signal moves to a low level only when the rotation status of the motor is constant. The ASIC detects the rotation status with this signal, and emits a laser beam only when the rotation status is constant.

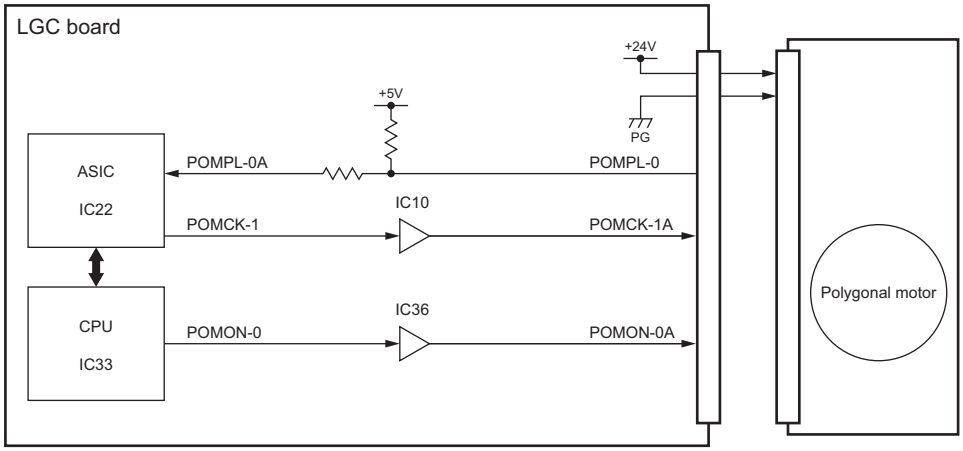


Fig. 7-9

Signal	Function	Low level	High level
POMON-0	Polygonal motor ON signal	ON	OFF
POMCK-1	Polygonal motor reference clock	-	-
POMPL-0	Polygonal motor PLL control signal	Rotating at a constant speed	Stopping or error

7.5 Disassembly and Replacement

7.5.1 Laser optical unit

(1) Take off the rear cover.
P.2-24 "2.5.6 Rear cover"
(2) Disconnect 2 connectors from the LGC board.

Note:
Connect the flat harness to the LGC board with its electrode side down. An error “CA20“ will be displayed if the connection is incorrect.

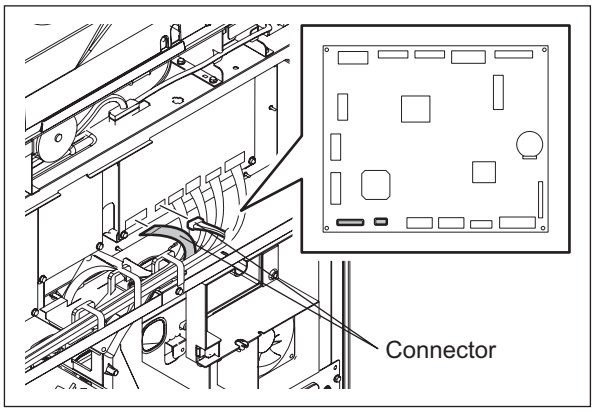


Fig. 7-10

(3) Take off the inner tray.
P.2-25 "2.5.9 Inner tray"
(4) Disconnect 1 connector and remove 1 screw. Take off the duct.

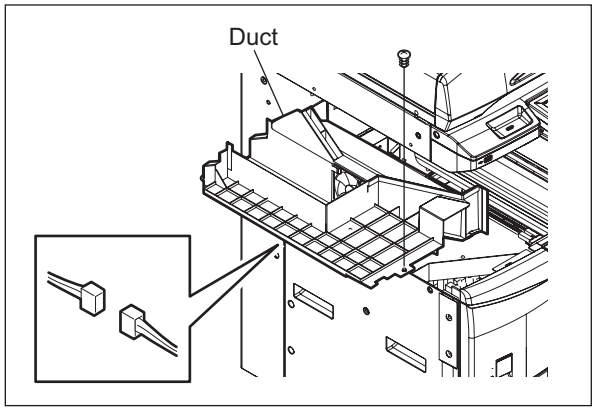


Fig. 7-11

(5) Remove 1 screw and take off the laser optical unit.

Note:
When removing and installing the laser optical unit, be careful not to deform the leaf spring.

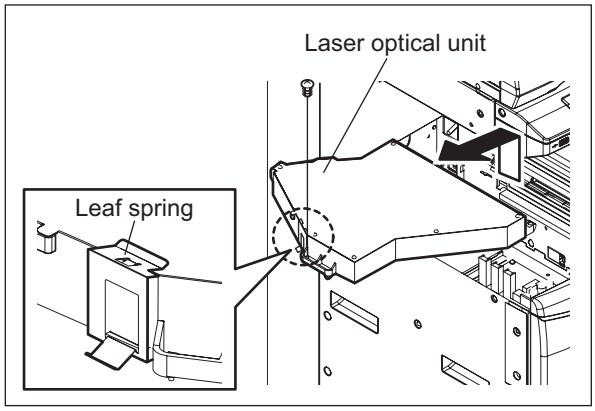


Fig. 7-12

(6) Release the catch of the leaf spring and then remove it from the laser optical unit.

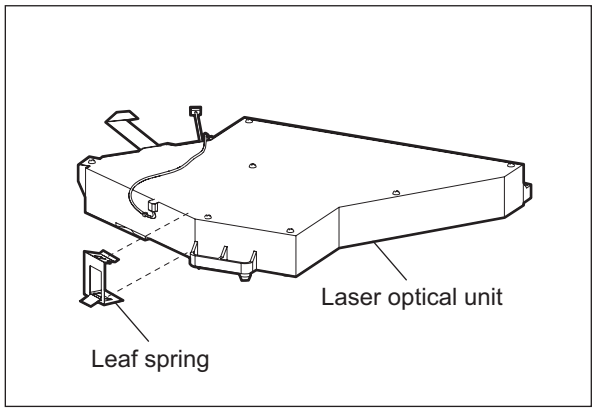


Fig. 7-13

Notes:

1. Do not leave fingerprints or stain on the slit glass of the laser optical unit.
2. Pay close attention not to make an impact or vibration on the laser optical unit because it is a precise apparatus.
3. Place the removed laser optical unit so as not to load on the polygonal motor.
4. Do not disassemble the laser optical unit in the field because it is precisely adjusted and very sensitive to dust and stain.
5. Hold the laser optical unit vertically. Do not press the top of the unit where the polygonal motor is installed with your hands or other things.

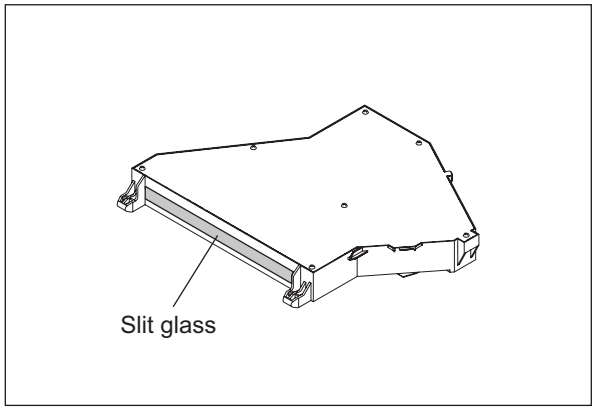


Fig. 7-14

8. PAPER FEEDING SYSTEM

8.1 General Descriptions

The purpose of this system is to pick up a sheet of paper from the drawer or bypass tray and transport it to the transfer position. The paper feeding system mainly consists of the pickup roller, feed roller, separation roller, transport roller, registration roller, bypass paper sensor, drawer empty sensor, drawer paper stock sensor, registration sensor and the drive system for these components.

Sectional view of paper feeding section (Front side)

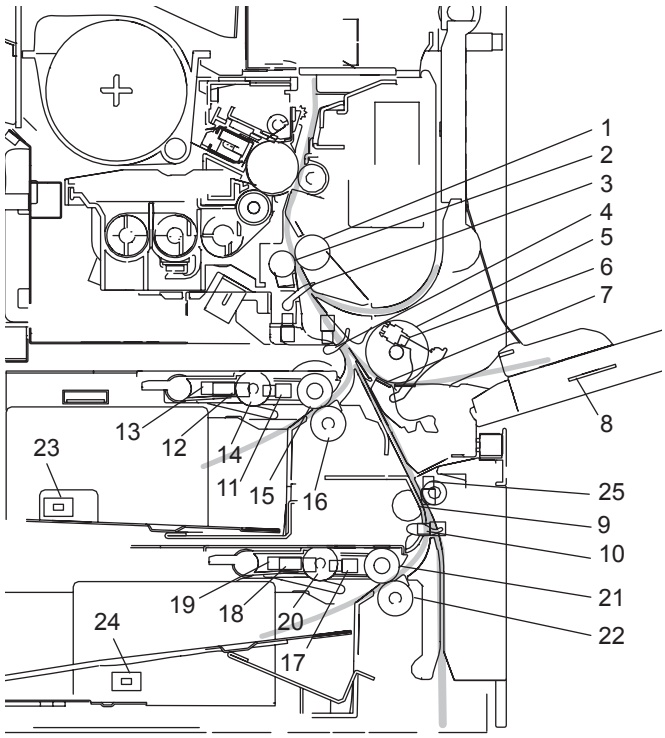


Fig. 8-1

No.	Name	No.	Name
1	Registration roller (rubber)	14	Upper drawer pickup roller
2	Registration roller (metal)	15	Upper drawer feed roller
3	Registration sensor (S22)	16	Upper drawer separation roller
4	1st/2nd transport sensor (S21)	17	Lower drawer tray-up sensor (S19)
5	Bypass feed roller	18	Lower drawer empty sensor (S20)
6	Bypass paper sensor (S12)	19	Lower drawer paper stock sensor (S18)
7	Bypass separation pad	20	Lower drawer pickup roller
8	Paper width detection PC board (SFB)	21	Lower drawer feed roller
9	Transport roller	22	Lower drawer separation roller
10	1st transport sensor (S14)	23	Upper drawer detection switch (SW6)
11	Upper drawer tray-up sensor (S16)	24	Lower drawer detection switch (SW7)
12	Upper drawer empty sensor (S17)	25	Feed cover opening/closing detection sensor (S13)
13	Upper drawer paper stock sensor (S15)		

Paper feeding section drive system (Rear side)

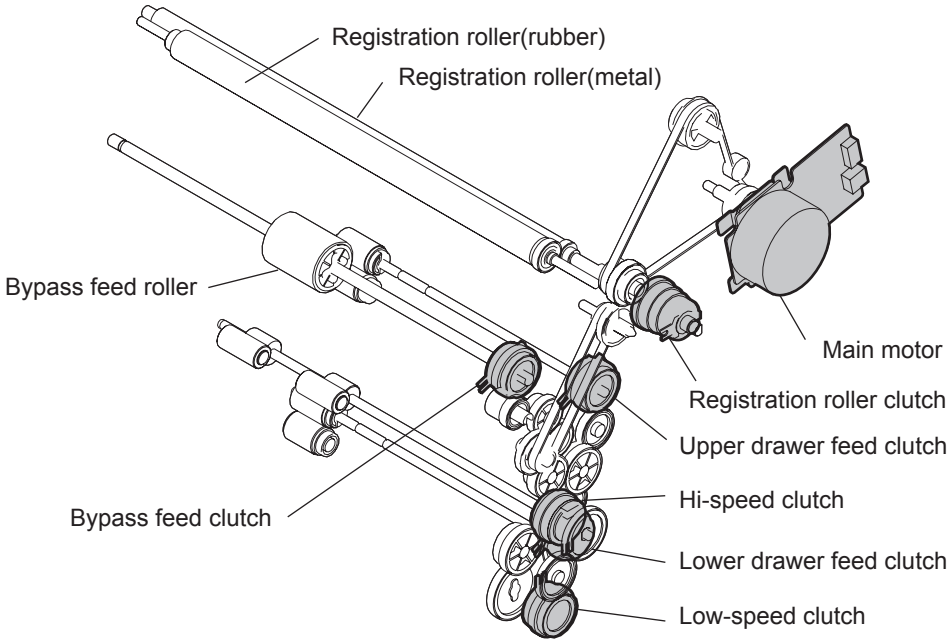


Fig. 8-2

8.2 Composition

Paper feed		
Upper/Lower drawer feed unit	Upper/Lower drawer pickup roller	PM parts
	Upper/Lower drawer feed roller	PM parts
	Upper/Lower drawer separation roller	PM parts
	Upper/Lower drawer paper stock sensor	S15/S18
	Upper/Lower drawer tray-up sensor	S16/S19
	Upper/Lower drawer empty sensor	S17/S20
	Upper/Lower drawer feed clutch	CLT4/CLT5
Bypass unit	Bypass feed roller	PM parts
	Bypass separation pad	PM parts
	Bypass paper sensor	S12
	Bypass feed clutch	CLT3
	Paper width detection PC board	SFB
Transport section, other	Upper/Lower drawer tray-up motor	M11/M12
	Upper/Lower drawer detection switch	SW6/SW7
	Registration sensor	S22
	Registration roller (rubber)	
	Registration roller (metal)	
	1st/2nd transport sensor	S21/S14
	Transport roller	
	Registration roller clutch	CLT2
	Hi-speed clutch	CLT6
	Low-speed clutch	CLT7
	Feed cover opening/closing detection sensor	S13

8.3 Functions

1. Pickup roller
   This roller moves up and down to draw out a sheet of paper from the drawer, and transport it to the feed roller.

2. Feed roller
   This roller transports the paper from the pickup roller to the registration roller.

3. Separation roller
   This roller is mounted against the feed roller. When two sheets of paper or more are transported from the pickup roller, the load of the torque limiter (spring) of the separation roller is greater than the frictional force between the sheets. As the result, the separation roller is stopped and the lower sheet of paper is not transported any further. When only one sheet of paper is transported from the pickup roller, the separation roller is forced to rotate following the feed roller.

4. Transport roller
   This roller transports the paper from the lower drawer or PFP/LCF to the 1st transport roller.

5. Registration roller
   Paper transported from the 1st transport roller is pushed against the registration rollers, which aligns the leading edge of paper. The registration roller then rotates to transport the paper to the transfer section.

6. Bypass feed roller
   This roller picks up and feeds paper from the bypass unit.

7. Bypass separation pad
   This pad is located under the bypass feed roller and pressed to this roller with spring force. This pad prevents more than one sheet of paper from being fed simultaneously with its frictional surface.

8. Bypass paper sensor(S12)
   This sensor detects whether paper is set in the bypass tray or not. If it is, bypass feeding is performed in preference to drawer feeding. And also detects whether paper has been transported from the bypass tray or not. In other words, whether the leading/trailing edge of paper has passed the feed sensor or not. This sensor is utilized to detect the jams such as paper misfeeding in the bypass unit.

9. Upper/Lower drawer empty sensor (S17/S20)
   This is a transmissive-type sensor which detects the presence/absence of paper in the drawer using an actuator. When there is no paper in the drawer, the actuator blocks the light path of the sensor. Then the sensor determines that there is no paper.

10. Upper/Lower drawer paper stock sensor (S15/S18)
    This is a transmissive-type sensor which detects the amount of paper remaining in the drawer using an actuator. When the remaining paper has become around 100 sheets, the actuator blocks the light path of the sensor to notify that the paper quantity is getting less.

11. Registration sensor (S22)
    This sensor detects whether the leading edge of the paper has reached the registration roller or not, and the trailing edge of paper has passed the registration roller or not.

12. 1st transport sensor sensor (S21)
    This sensor detects whether paper from each paper source is being transported or not.

13. 2nd transport sensor (S14)
    This sensor detects whether paper from the lower drawer, PFP or LCF (both optional) is being transported or not.

14. Upper/Lower drawer feed clutch (CLT4/CLT5)
    These clutches drive the upper and lower drawer pickup rollers. When these clutches are turned ON while the main motor (M8) is being rotated, the drive from these clutches rotates the pickup rollers so as to pick up paper.

15. Hi-speed clutch (CLT6)
    Drives the Transport roller at high speed by transmitting the drive from the main motor.

16. Low-speed clutch (CLT7)
    Drives the Transport roller at low speed by transmitting the drive from the main motor.

17. Registration roller clutch (CLT2)
    Drives the registration roller.

18. Bypass feed clutch (CLT3)
    This clutch drives the rotation of the bypass feed roller. When this clutch is turned ON while the main motor (M8) is being rotated, the drive from this clutch feeds and transports paper on the bypass tray to the inside of this equipment.

8.4 Operation

8.4.1 Bypass feeding mechanism

Paper on the bypass tray becomes ready for being fed when the paper holding lever is laid down to a side on which paper is placed (the equipment side).
When the paper holding lever is laid down to the equipment side, the paper holding guide lifts up the paper as shown in the figure so as to contact the paper with the bypass feed roller.
Then the paper is fed along with the rotation of the bypass feed roller.
The bypass separation pad prevents more than one sheet of paper from being fed simultaneously.

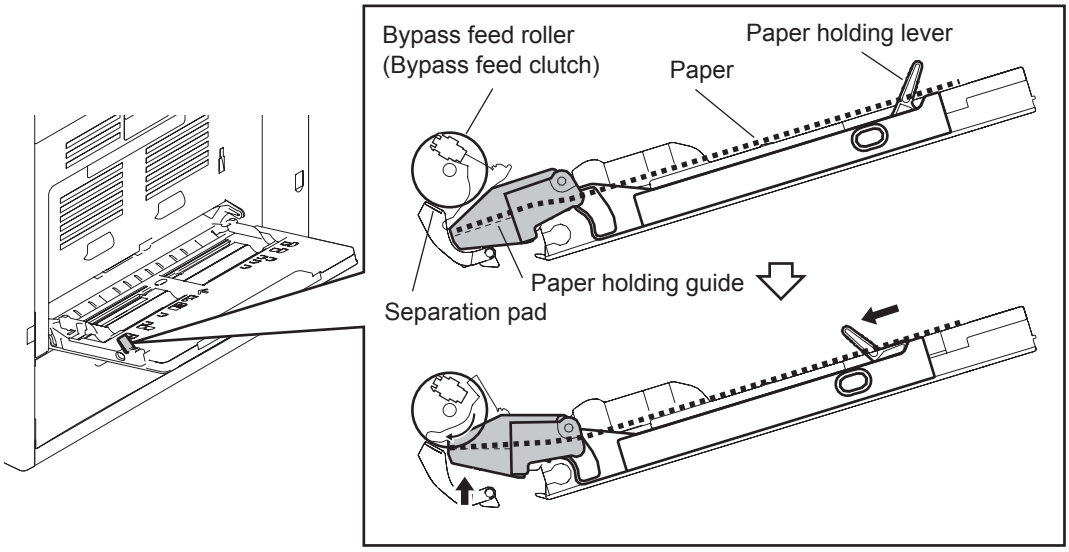


Fig. 8-3

8.4.2 Operation of drawer pickup roller

When the drawer is inserted, the pickup roller and roller holder fall by the tray-up motor driving force. Then the drawer tray lifts up and paper feeding is enabled.
When the drawer feed clutch is turned ON, the drive from the main motor is transmitted. Then the feed roller and pickup roller rotate to transport the paper from the drawer.
The separation roller under the feed roller prevents multiple transporting of paper.

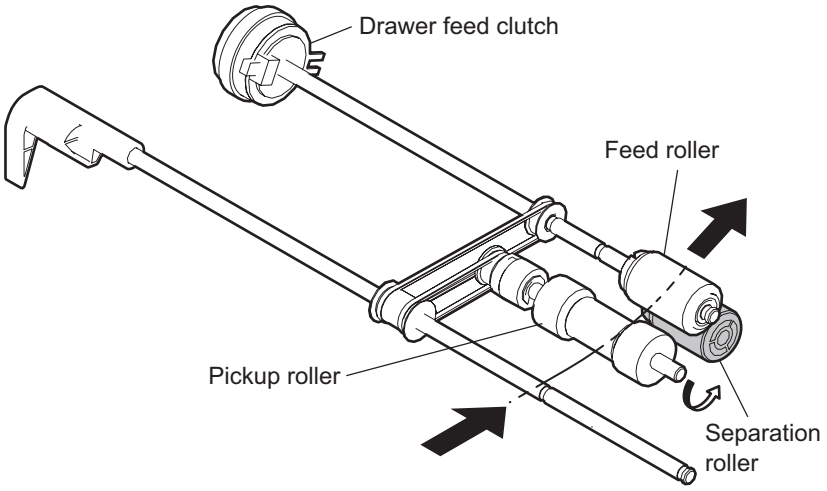


Fig. 8-4

8.4.3 Separation of paper

The separation roller in this equipment works to separate the sheets of paper being fed. The separation roller section consists of the feed roller, separation roller, spring joint, etc. The feed roller rotates in the direction of the white arrow (shown below in the figure at right) at the same timing as the pickup roller rotation when the feed clutch is turned ON.

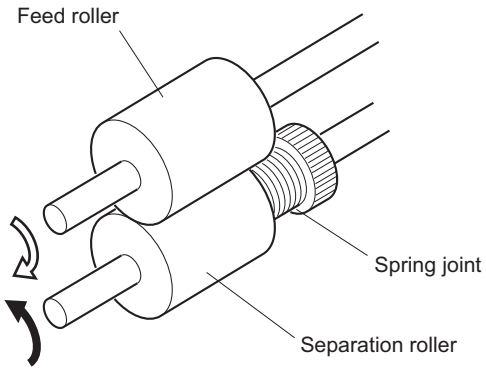


Fig. 8-5

When two sheets of paper are transported (shown in the figure at right), the lower sheet is braked by the separation roller and not transported any further and the upper sheet is transported in the direction of black arrow since the frictional force between two sheets is small.

(Example)
When only one sheet enters into the separation roller section:
Since the transporting force of the feed roller is greater than the braking force of the separation roller, these two rollers rotate together to transport the sheet to the registration roller.

When two sheets enter into the separation roller section:
Since the transporting force of the feed roller and the breaking force of the separation roller are greater than the frictional force between two sheets, the sheet A is transported in the direction of the black arrow and the sheet B is braked by the separation roller and is not transported any further.

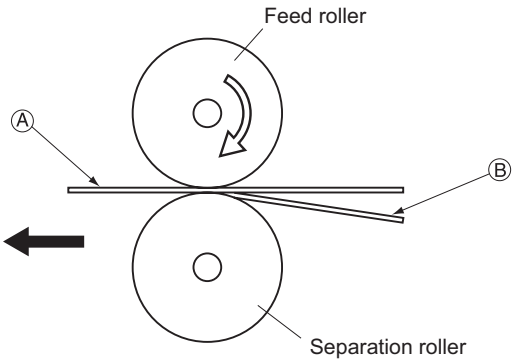


Fig. 8-6

8.4.4 Operation of clutch

The power ON/OFF of transport clutch and the operation of transport roller are as follows.

Transport roller	High-speed clutch	Low-speed clutch
Low speed	OFF	ON
High speed	OFF	ON
Stop	OFF	OFF

8.4.5 General operation

[A] From power-ON to ready status

- When the equipment is turned ON, the tray-up motor starts to rotate forward and the upper/lower drawer trays starts to rise. When the tray has risen and the tray-up sensor is turned ON, the tray-up motor is turned OFF, then the tray stops to rising. At this time, if the empty sensor is OFF, it is judged that there is no paper in the drawer. If the empty sensor is ON, there is paper in the drawer. The tray stops at raised position regardless of the presence/absence of paper.

- If the drawer is not completely inserted when the equipment is turned ON, the tray in that drawer does not rise. When the drawer is inserted completely, the tray is raised and checks the presence/absence of paper.

- If either of the feed sensors is ON (= there is paper on the transport path) at power-ON, it is determined that a paper jam has occurred and no operation is enabled until the jammed paper is removed.

[B] Ready status

- After the tray is moved up to check the presence/absence of paper as described above, the equipment enters the ready state. During the ready mode, the tray stays at the raised position.

- When a drawer is inserted or removed in the ready state, the tray is raised again and checks the presence/absence of paper.

[C] Bypass feeding

- The bypass feed sensor detects the passing of paper.

- The bypass feed clutch is turned ON, and the bypass feed roller is rotated to start feeding.

- Paper feeding is started and the bypass feed sensor detects the passing of paper.

- The leading edge of the paper turns the registration sensor ON, and the paper is aligned with the registration rollers.

- The bypass feed clutch is turned OFF, and the bypass feed roller is stopped.

- The registration clutch is turned ON, and the paper is transported to the transfer unit.

[D] Paper feeding

- Lower drawer
  - The feed clutch and high speed clutch is turned ON, and the pickup roller, feed roller and transport roller rotate to start paper feeding.

  - The leading edge of paper turns the 1st transport sensor ON, and the feed clutch is turned OFF. (Pick-up roller and feed roller stop rotating.)

  - The leading edge of paper turns the registration sensor ON and the paper is aligned by the registration rollers.

  - The high speed clutch is turned OFF, and the transport roller stop rotating.

  - The registration roller clutch and low speed clutch are turned ON, and the paper is transported to the transfer unit.

- Upper drawer
  - The feed clutch is turned ON and the pickup roller and feed roller rotate to start paper feeding.
  - The leading edge of paper turns the registration sensor ON, and the paper is aligned by the registration rollers.
  - The feed clutch is turned OFF and the pickup roller and feed roller to stop rotating.
  - The registration roller clutch is turned ON, and the paper is transported to the transfer unit.

8.5 Drive Circuit of Tray-up Motor

The upper and lower drawer tray-up motors (M11/M12) are DC brush motors driven by a control signal output from the ASIC on the LGC board and raise the tray in each drawer.
The motors rotate, stop or brake according to the status of the output drive signal.

Circuit diagram of the tray-up motor

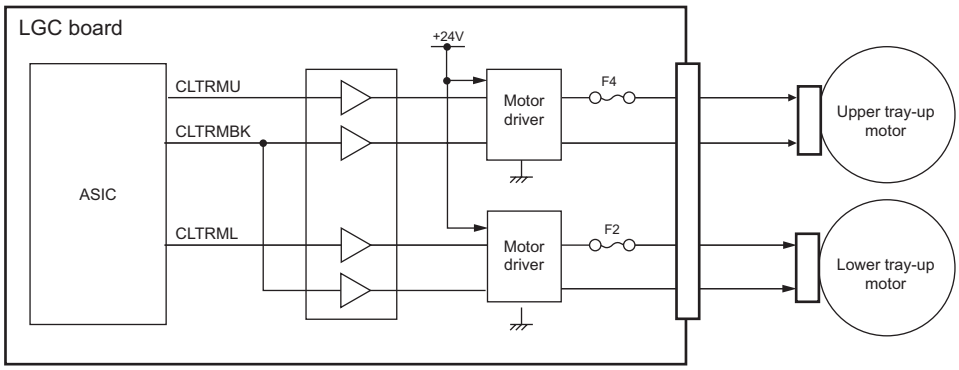


Fig. 8-7

The motor rotates or stops by the control signals from ASIC.

Control signal

Signal			Motor status
CLTRMU	**CLTRML**	**CLTRMBK**	
L	L	L	Stop
H	L	L	Tray-up of upper drawer
L	H	L	Tray-up of lower drawer
H	H	H	Brake

8.6 Disassembly and Replacement

8.6.1 Drawer

(1) Pull out the drawer until it comes to a stop.
(2) Remove 1 screw and the stopper.
(3) Take off the drawer.

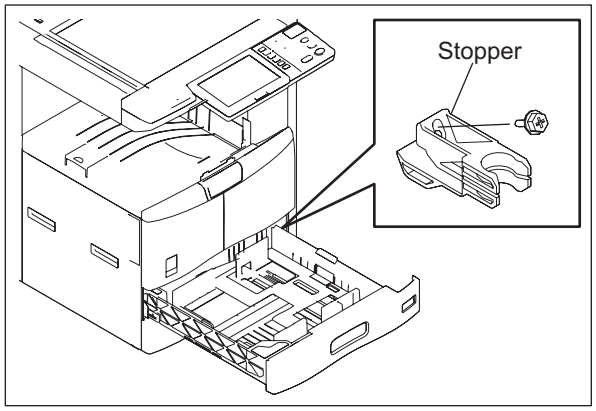


Fig. 8-8

8.6.2 Drawer feeding unit

(1) Take off the drawer.
(📖 P.8-13 "8.6.1 Drawer").
(2) Open the feed cover.
(3) Remove 1 screw and take off the drawer feeding unit by sliding it to the front side.

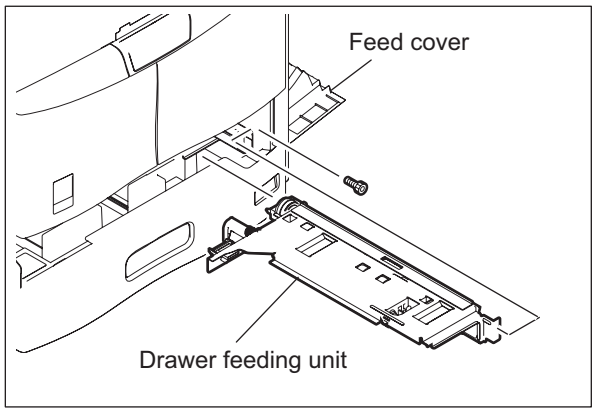


Fig. 8-9

8.6.3 Tray-up sensor (S16/S19)

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Disconnect the connector and release the 3 latches to take off the tray-up sensor.

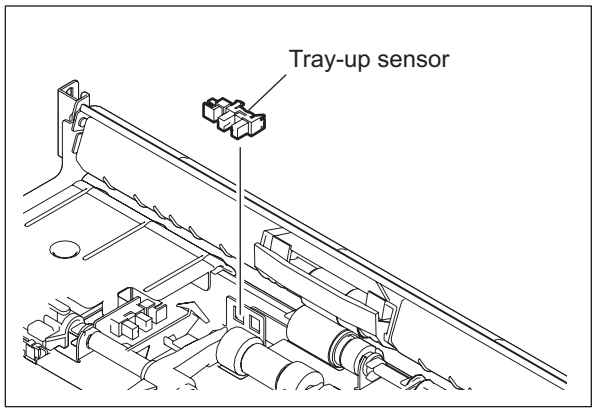


Fig. 8-10

8.6.4 Empty sensor (S17/S20)

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Remove 1 screw and then slide the guide slightly.

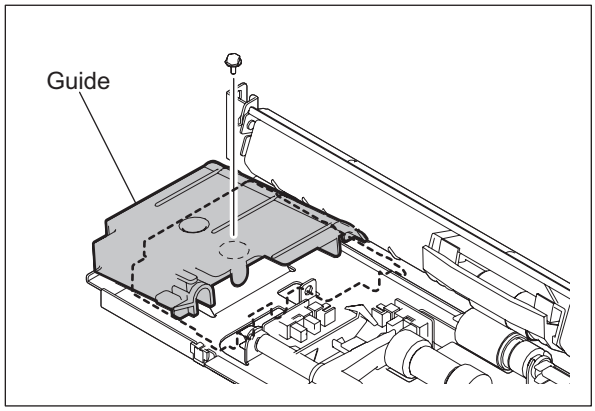


Fig. 8-11

(3) Disconnect 1 connector and then take off the upper/lower drawer empty sensor by releasing 3 latches.

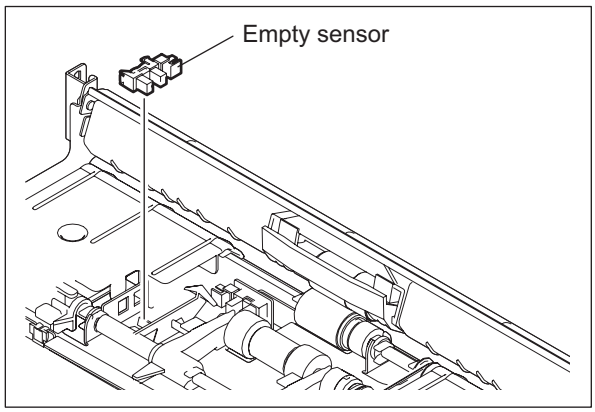


Fig. 8-12

8.6.5 Paper stock sensor (S15/S18)

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Pull up the paper stock sensor arm.
(3) Disconnect the connector and release the 3 latches to take off the paper stock sensor.

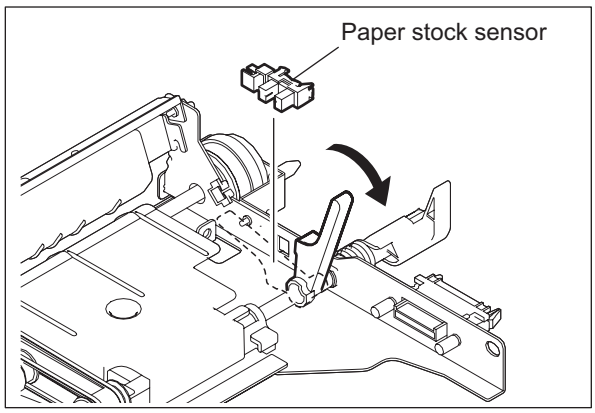


Fig. 8-13

8.6.6 Separation roller PM

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Remove 1 screw and take off the separation roller holder.

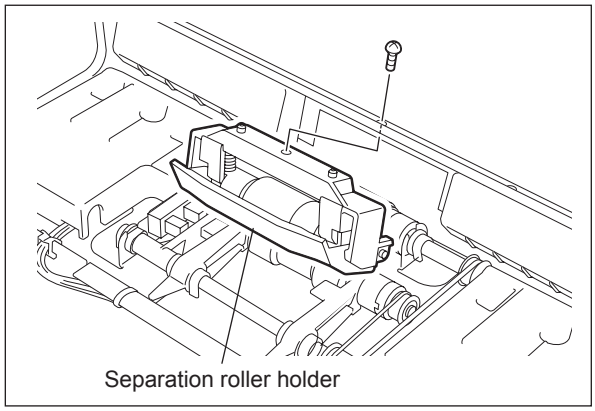


Fig. 8-14

(3) Detach the lever from the holder and take off the separation roller with the shaft.

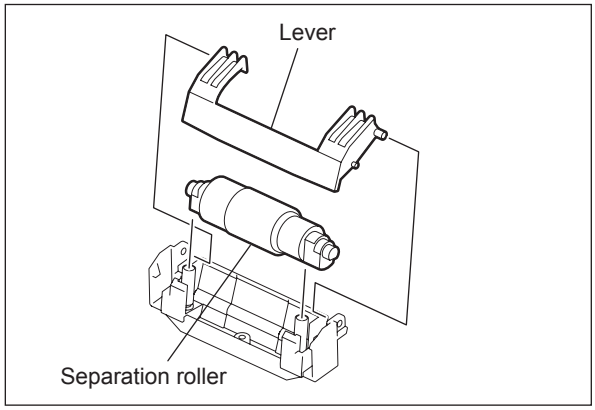


Fig. 8-15

(4) Detach the cover, arbor and clutch spring from the shaft, and then take off the separation roller.

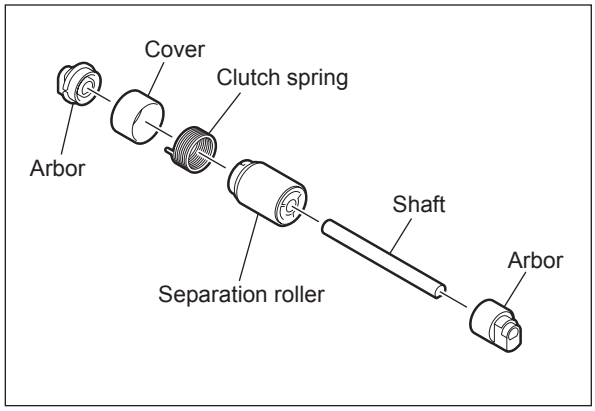


Fig. 8-16

8.6.7 Feed roller PM

(1) Take off the separation roller holder (📖 P.8-15 "8.6.6 Separation roller").
(2) Remove the clip and take off the feed roller.

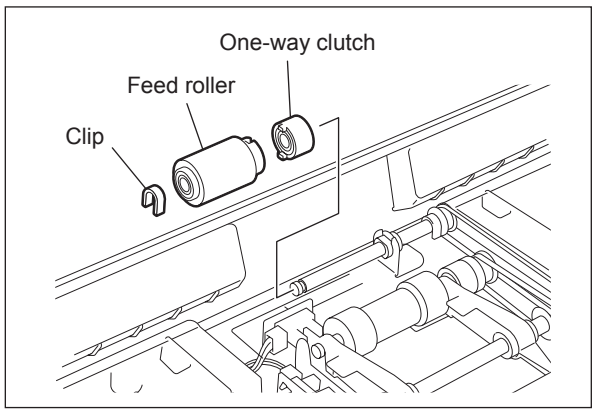


Fig. 8-17

8.6.8 Pickup roller PM

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Press the pickup roller and lift the rear pickup arm.
(3) Slide the pickup roller assembly to the rear side, and take off the front shaft from the pickup arm.
(4) Take off the timing belt and then the pickup roller assembly..

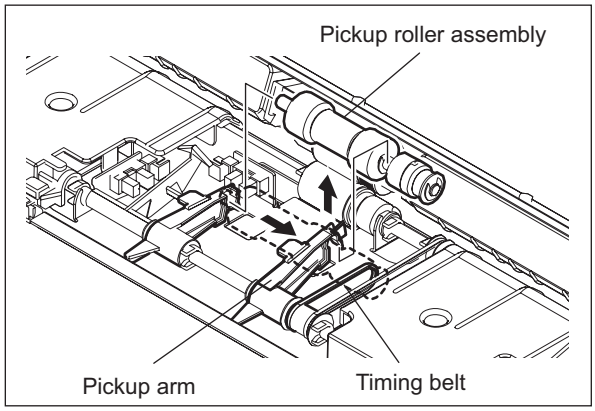


Fig. 8-18

(5) Remove the pulley, one-way clutch and 3 E-rings. Then take off the pickup roller.

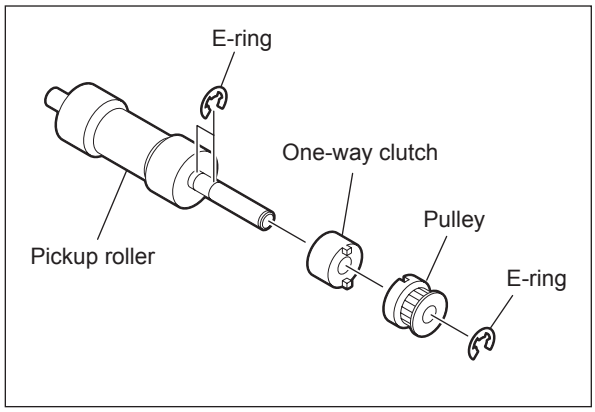


Fig. 8-19

8.6.9 Drawer feed clutch (CLT4/CLT5)

(1) Take off the drawer feeding unit (📖 P.8-13 "8.6.2 Drawer feeding unit").
(2) Remove 2 screws and take off the clutch plate.

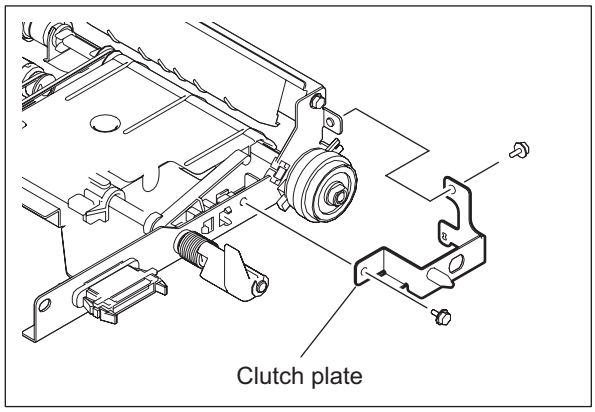


Fig. 8-20

(3) Disconnect 1 connector and take off the upper/lower drawer feed clutch and bushing.

Note:
Match the rotation stopper of the clutch with the position shown in the figure for assembling.

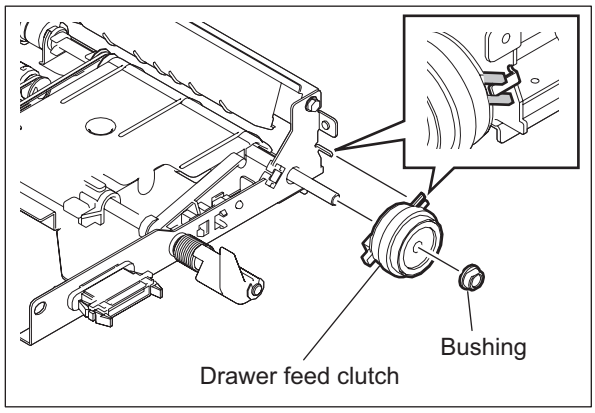


Fig. 8-21

8.6.10 Bypass tray

(1) Take off the transfer unit.
📖 P.10-20 "10.7.17 Transfer unit"

(2) Open the bypass tray and then remove the stopper by twisting it for 90 degrees.

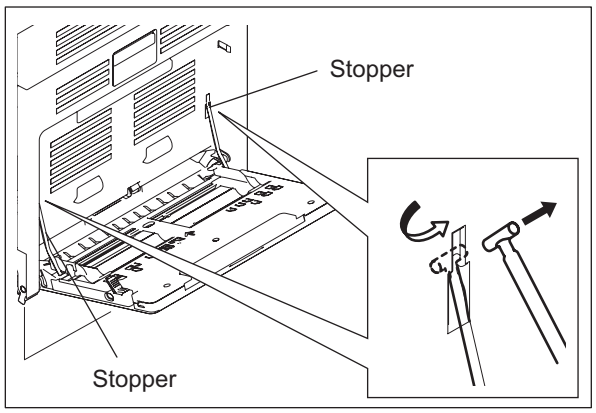


Fig. 8-22

(3) Remove 1 screw and then take off the link arm.

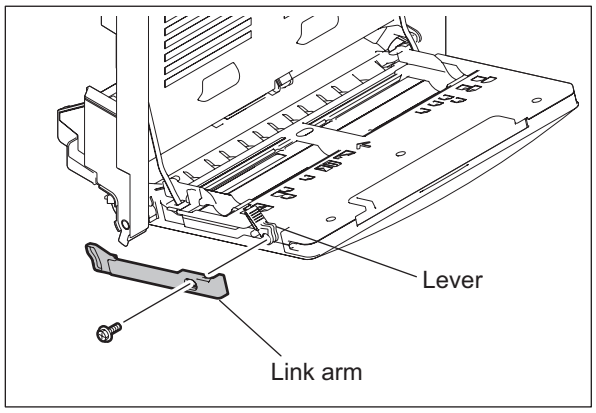


Fig. 8-23

(4) Remove 1 screw and then take off the harness cover.

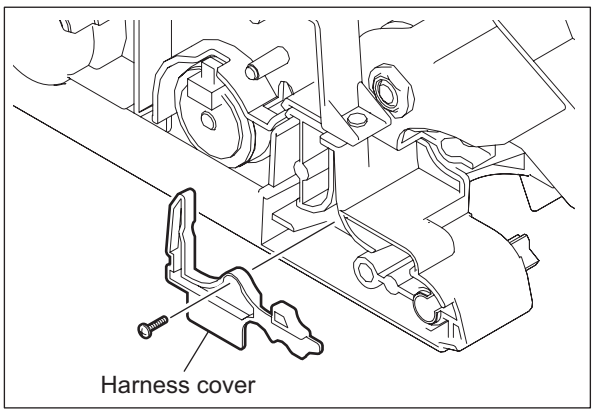


Fig. 8-24

(5) Disconnect 1 connector and then take off the bypass tray downward obliquely.

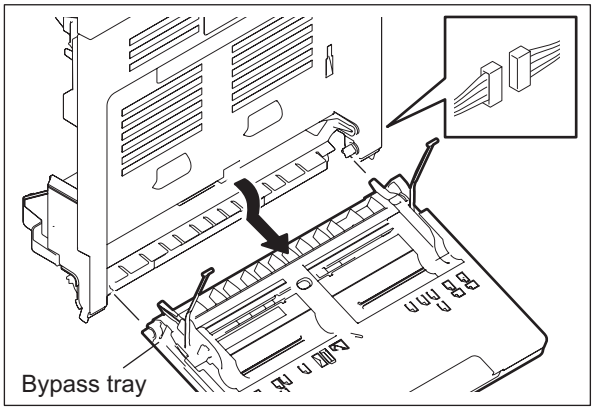


Fig. 8-25

8.6.11 Paper width detection PC board (SFB)

(1) Take off the bypass tray.
(📖 P.8-18 "8.6.10 Bypass tray").
(2) Remove 3 screws and take off the bypass tray upper cover.

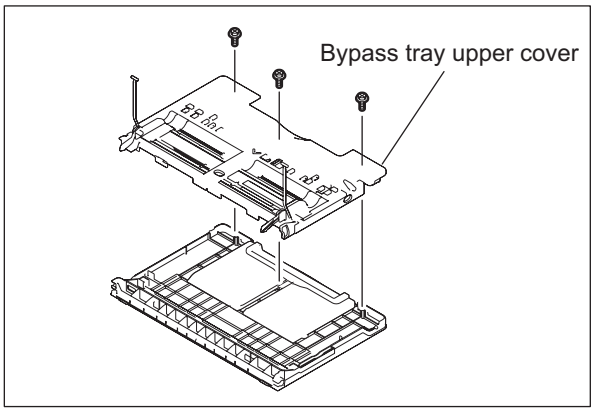


Fig. 8-26

(3) Remove 1 screw and then take off the sensor cover by releasing 3 hooks.

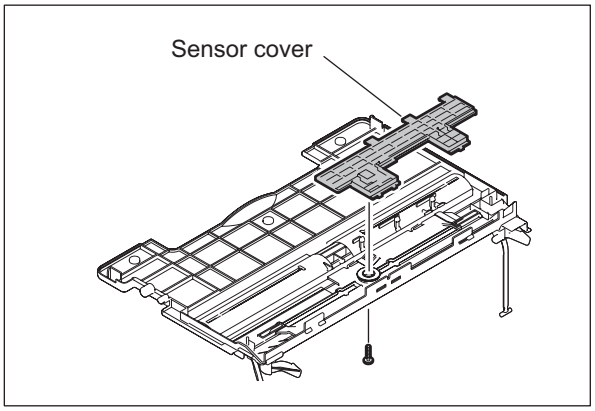


Fig. 8-27

(4) Disconnect 1 connector and then take off the paper width detection PC board.

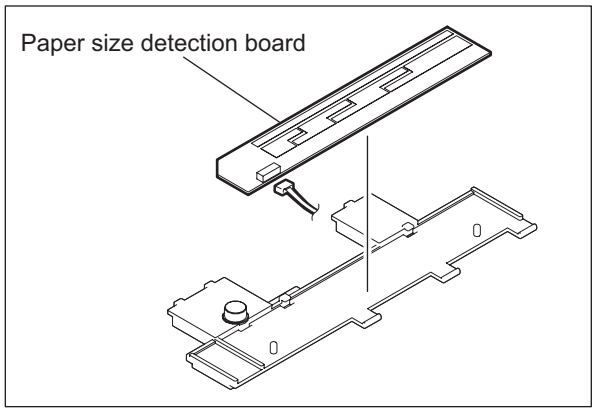


Fig. 8-28

8.6.12 Bypass feed unit

(1) Take off the automatic duplexing unit.
📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)"
(2) Release 2 latches and then take off the spring holder.

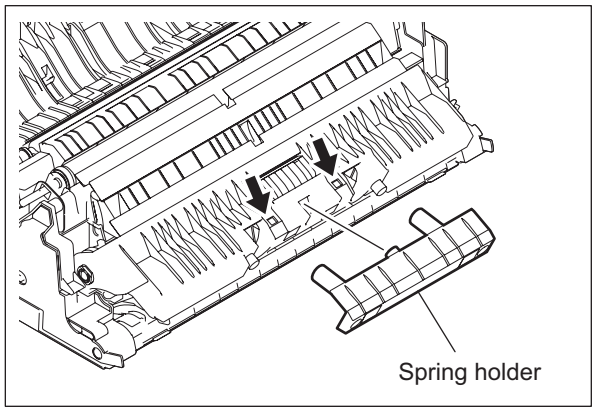


Fig. 8-29

(3) Disconnect 1 connector and remove 2 screws. Then take off the bypass feed unit.

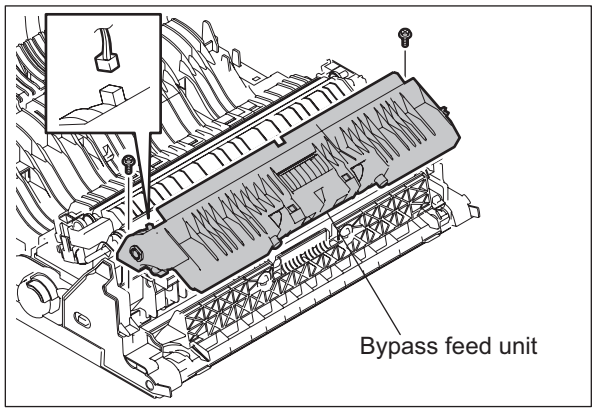


Fig. 8-30

8.6.13 Bypass separation pad PM

(1) Take off the bypass feed unit (P.8-20 "8.6.12 Bypass feed unit").
(2) Remove 1 clip and then slide the bypass feed roller.

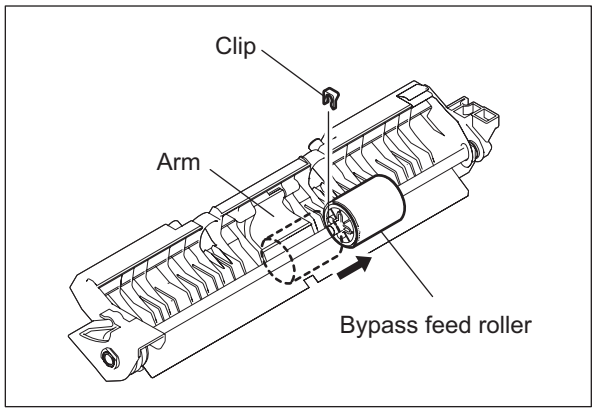


Fig. 8-31

(3) Take off the bypass separation pad (arm).

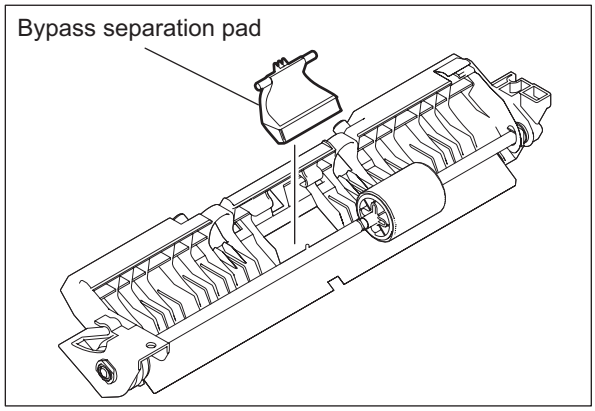


Fig. 8-32

8.6.14 Bypass feed roller PM/Bypass feed clutch (CLT3)

(1) Take off the bypass feed unit (P.8-20 "8.6.12 Bypass feed unit").
(2) Remove 1 clip.

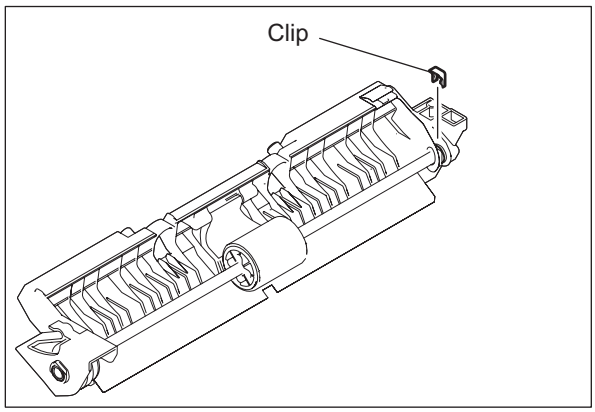


Fig. 8-33

(3) Take off the shaft by sliding it.

Note:
When installing the bypass feed clutch, be sure that the rotation stopper is inserted in the hole of the guide securely.

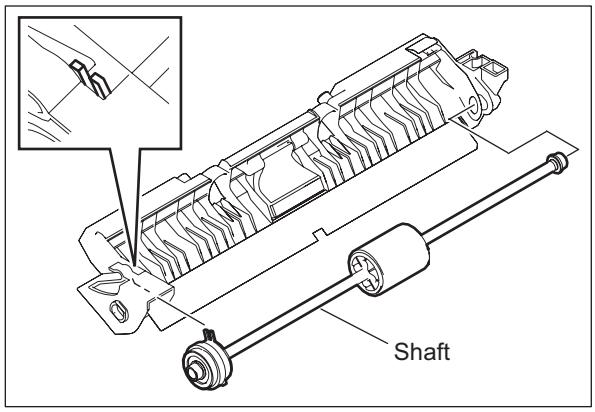


Fig. 8-34

(4) Remove 1 clip and 2 bushings. Then take off the bypass feed roller and the bypass feed clutch.

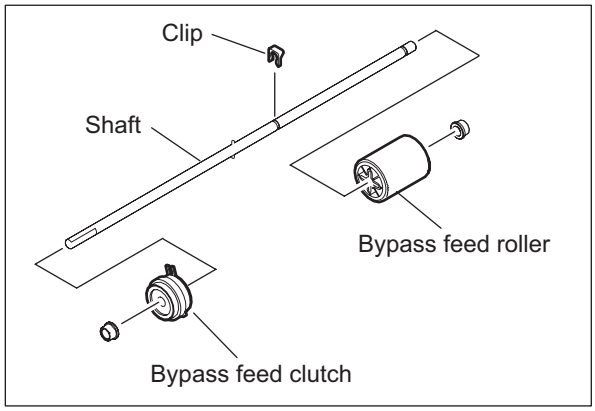


Fig. 8-35

8.6.15 Bypass paper sensor (S12)

(1) Take off the bypass feed unit (📖 P.8-20 "8.6.12 Bypass feed unit").
(2) Disconnect 1 connector and then take off the bypass paper sensor by releasing 3 latches.

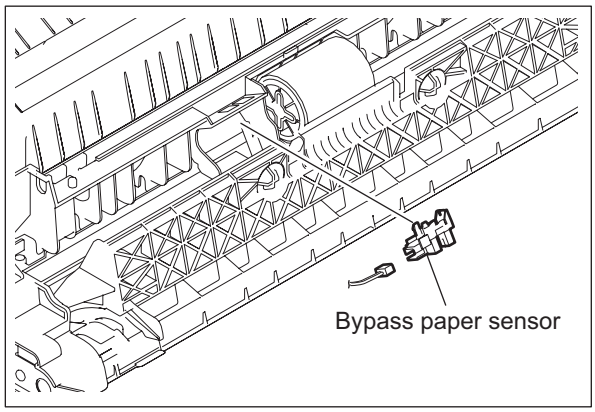


Fig. 8-36

8.6.16 Registration guide

(1) Take off the process unit.
(📖 P.10-9 "10.7.1 Process unit").
(2) Take off the automatic duplexing unit.
📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)"
(3) Remove 1 screw and then take off the registration guide by sliding it.

Note:
When installing the registration guide, be sure that the 2 Mylar sheets are attached at the positions shown in the figure.

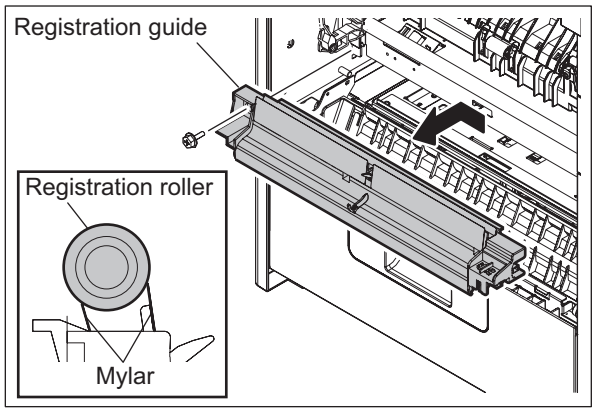


Fig. 8-37

(4) Disconnect 2 connectors.

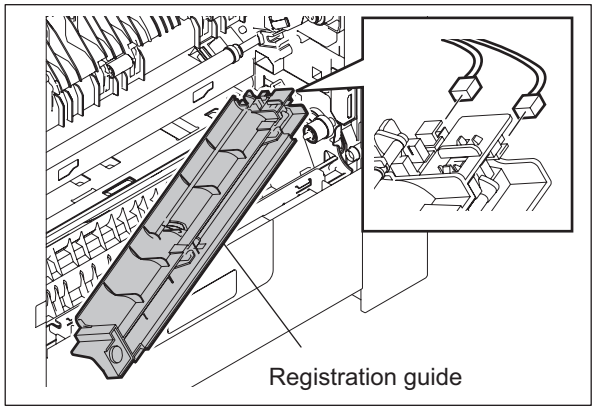


Fig. 8-38

8.6.17 Registration sensor (S22)

(1) Take off the registration guide.
(📖 P.8-23 "8.6.16 Registration guide").
(2) Take off the actuator.
(3) Release 3 latches and then take off the registration sensor.

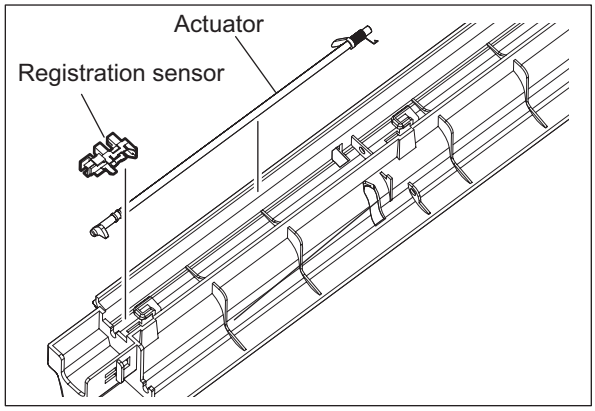


Fig. 8-39

8.6.18 1st transport sensor (S21))

(1) Take off the registration guide.
(📖 P.8-23 "8.6.16 Registration guide").
(2) Take off the actuator.
(3) Release 3 latches and then take off the 1st transport sensor.

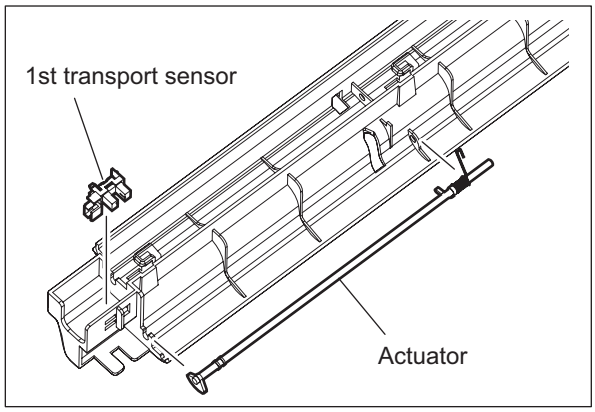


Fig. 8-40

8.6.19 Feed cover

(1) Open the feed cover and then pull out the locking pin.

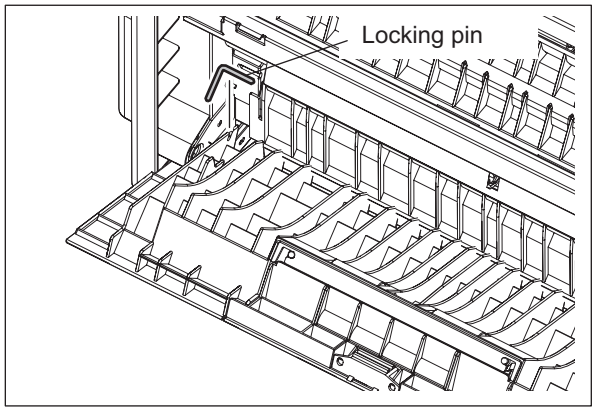


Fig. 8-41

(2) Take off the feed cover by sliding it.

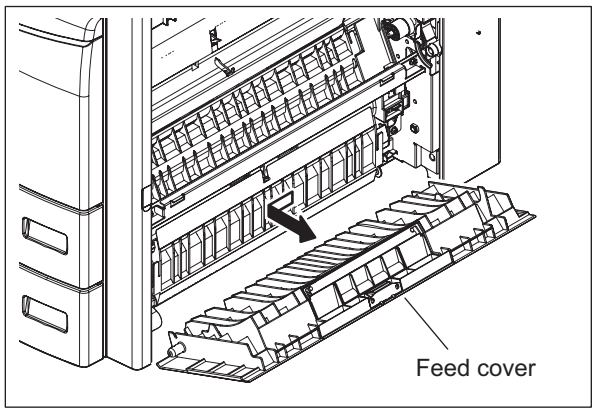


Fig. 8-42

8.6.20 Transport roller

(1) Take off the right front cover.
(📖 P.2-27 "2.5.14 Right front cover")
(2) Take off the high-speed clutch.
(📖 P.8-29 "8.6.28 Hi-speed clutch (CLT6) / Low-speed clutch(CLT7)").
(3) Take off the feed cover.
(📖 P.8-24 "8.6.19 Feed cover").
(4) Remove 2 screws and then take off the stay.

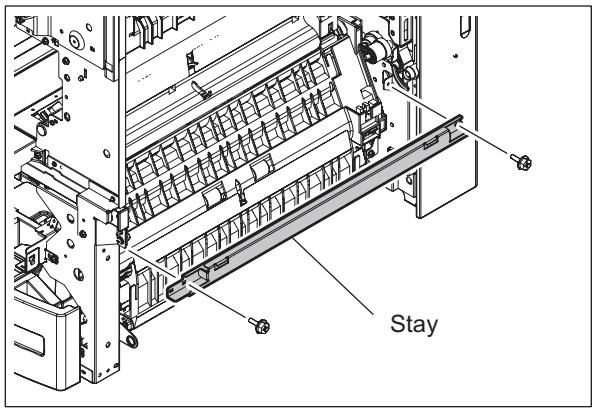


Fig. 8-43

(5) Remove 1 screw and then slide the paper guide B to the rear side.
(6) Disconnect 2 connectors and then take off the paper guide B.

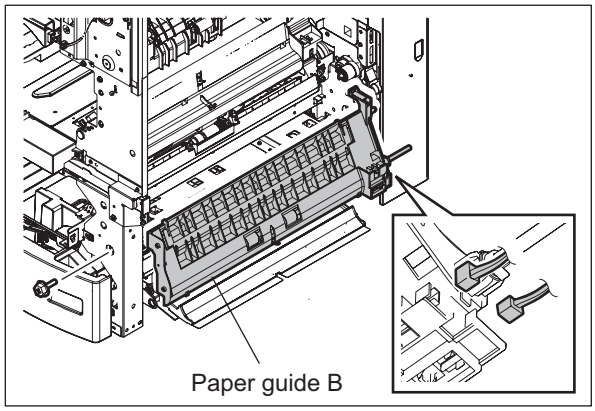


Fig. 8-44

(7) Remove 2 screws and take off the holder.
(8) Remove 1 clip, 1 E-ring, and then take off the transport roller.

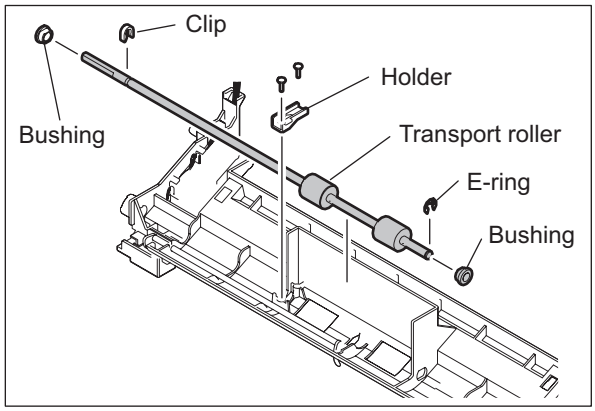


Fig. 8-45

8.6.21 2nd transport sensor (S14)

(1) Take off the transport roller.
(📖 P.8-25 "8.6.20 Transport roller").
(2) Take off the actuator.
(3) Release 3 latches and then take off the 2nd transport sensor.

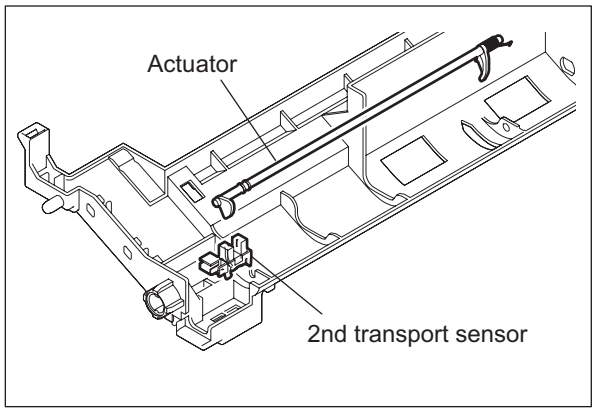


Fig. 8-46

8.6.22 Feed cover opening/closing detection sensor (S13)

(1) Take off the transport roller.
(📖 P.8-25 "8.6.20 Transport roller").
(2) Release 3 latches and then take off the feed cover opening/closing sensor.

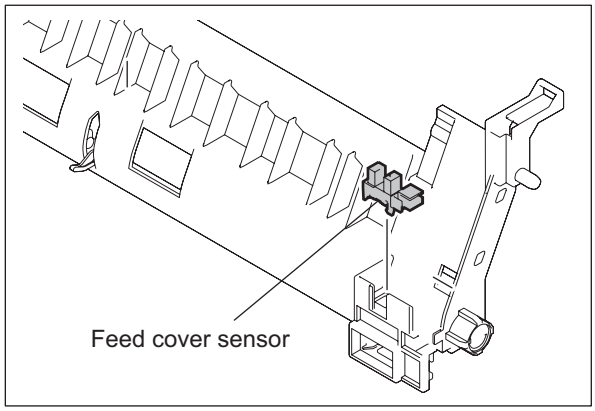


Fig. 8-47

8.6.23 Flywheel (e-STUDIO205L/255/305)

(1) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(2) Remove 1 screw and then remove 2 flywheels.

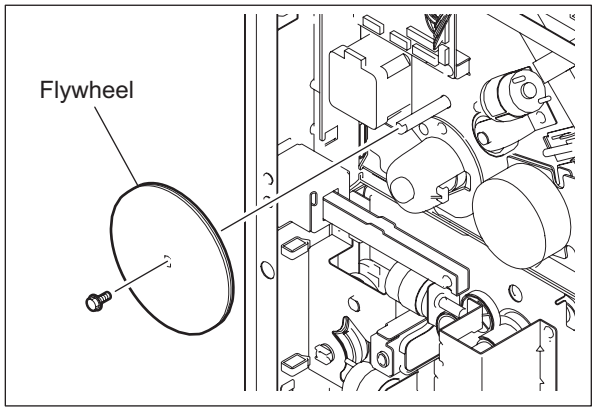


Fig. 8-48

8.6.24 Flywheel (e-STUDIO355/455)

(1) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(2) Remove 1 screw and then remove 4 flywheels.

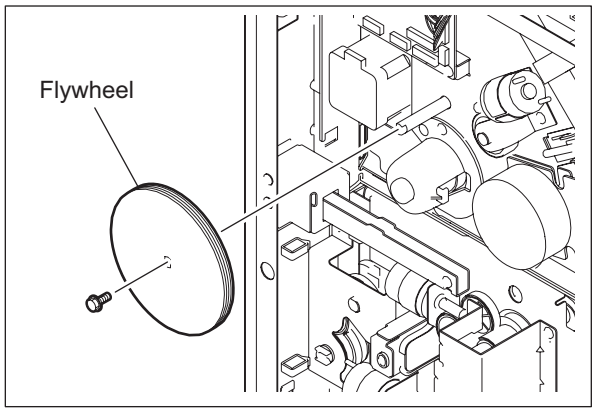


Fig. 8-49

8.6.25 Registration roller clutch (CLT2)

(1) Take off the flywheel.
📖 P.8-27 "8.6.24 Flywheel (e-STUDIO355/455)"
(2) Remove 2 screws and then take off the clutch cover.

Note:
Match the rotation stopper of the clutch with the position shown in the figure for assembling.

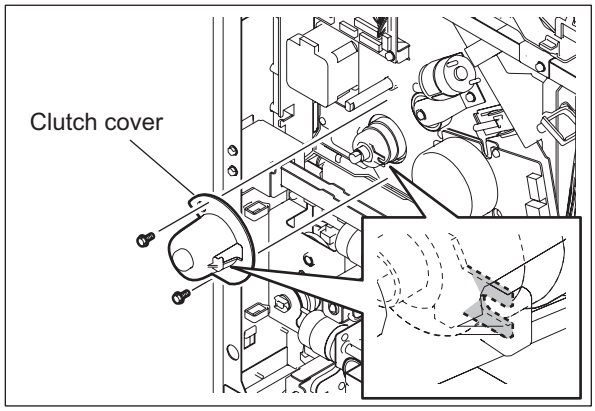


Fig. 8-50

(3) Disconnect 1 connector and then take off the registration roller clutch.

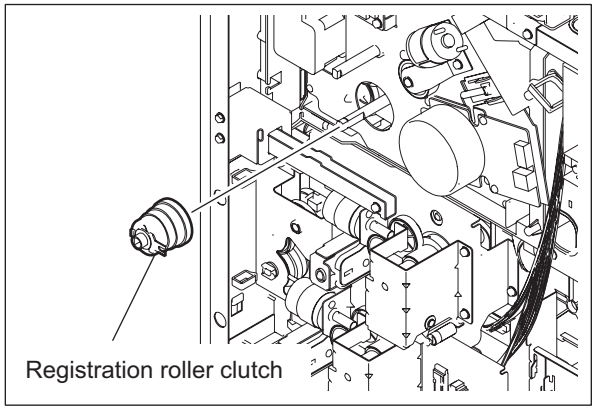


Fig. 8-51

8.6.26 Upper tray-up motor (M11)

(1) Pull out the upper drawer.
(2) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(3) Disconnect 1 connector and take off the harness clamp from the bracket.

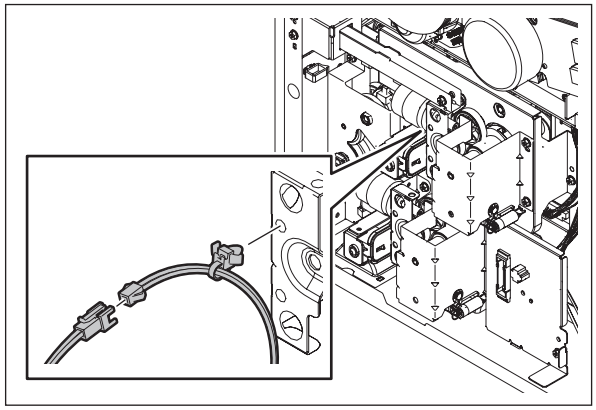


Fig. 8-52

(4) Remove 2 screws and take off the upper tray-up motor along with the bracket.

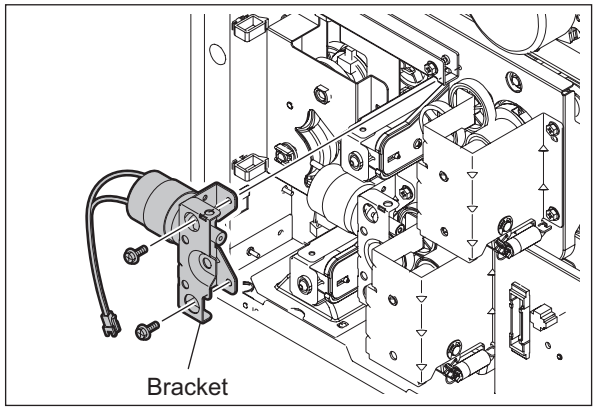


Fig. 8-53

(5) Remove 2 screws and take off the upper tray-up motor from the bracket.

Note:
Pay attention to the size (length) of the screws. If incorrect ones are used, the motor could be damaged.

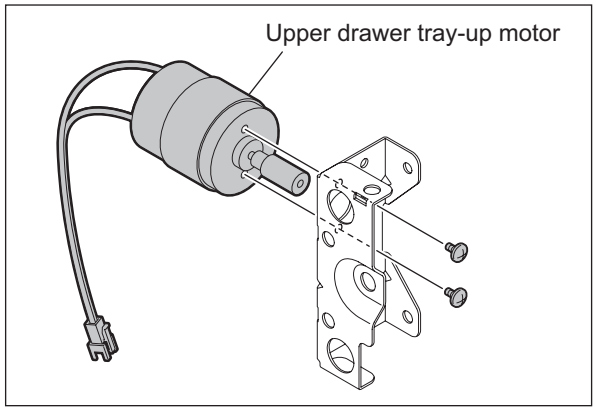


Fig. 8-54

8.6.27 Upper drawer detection switch (SW6)

(1) Pull out the upper drawer.
(2) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(3) Disconnect 1 connector and then take off the upper drawer detection switch.

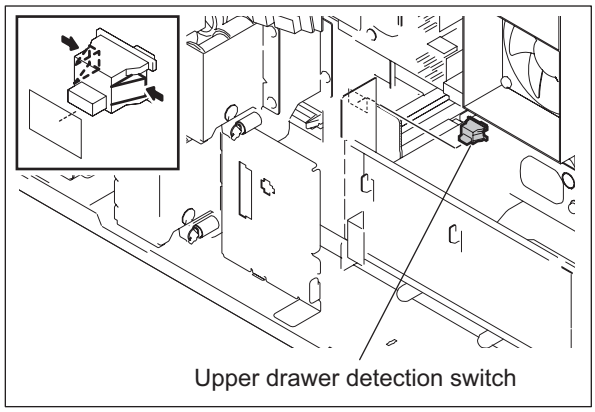


Fig. 8-55

8.6.28 Hi-speed clutch (CLT6) / Low-speed clutch(CLT7)

(1) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(2) Remove 1 clip and then take off the bushing.

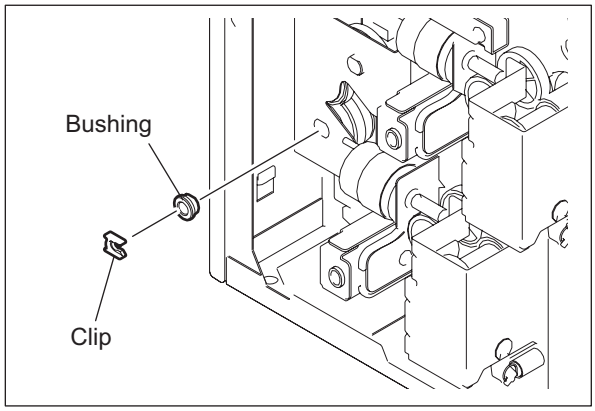


Fig. 8-56

(3) Remove 3 screws and then take off the bracket.

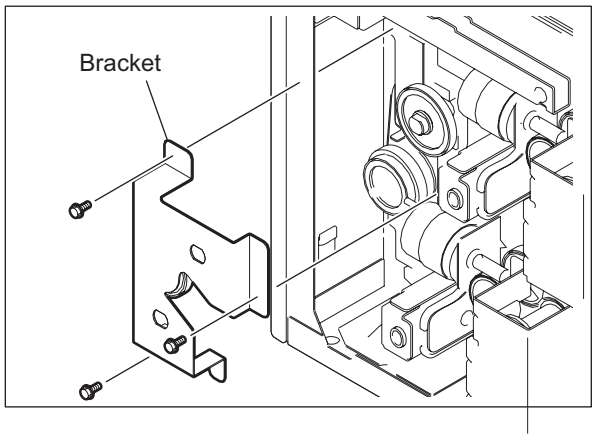


Fig. 8-57

(4) Disconnect 1 connector and then take off the low-speed clutch.

Note:
Match the rotation stopper of the clutch with the position shown in the figure for assembling.

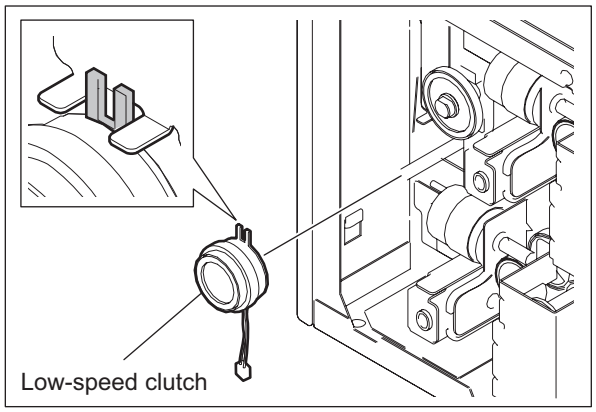


Fig. 8-58

(5) Remove 1 bushing and gear.
(6) Disconnect 1 connector and then take off the Hi-speed clutch.

Note:
Match the rotation stopper of the clutch with the position shown in the figure for assembling.

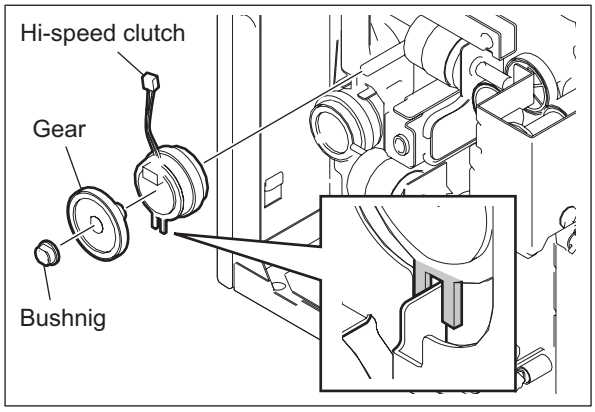


Fig. 8-59

8.6.29 Lower drawer detection switch (SW7)

(1) Pull out the lower drawer.
(2) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(3) Remove 2 screws and then take off the bracket.

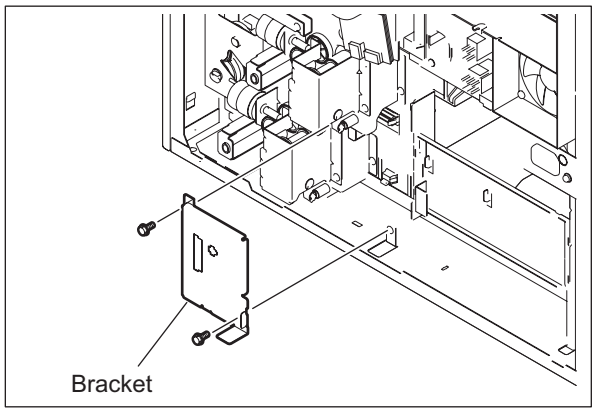


Fig. 8-60

(4) Disconnect 1 connector and then take off the lower drawer detection switch.

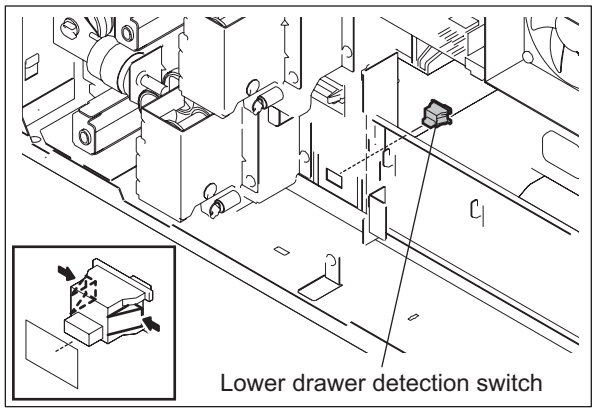


Fig. 8-61

8.6.30 Lower tray-up motor (M12)

(1) Pull out the lower drawer.
(2) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(3) Disconnect 1 connector and take off the harness clamp from the bracket.

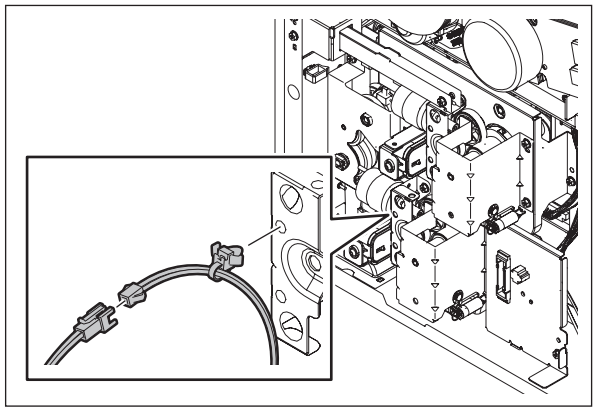


Fig. 8-62

(4) Remove 2 screws and take off the lower tray-up motor along with the bracket.

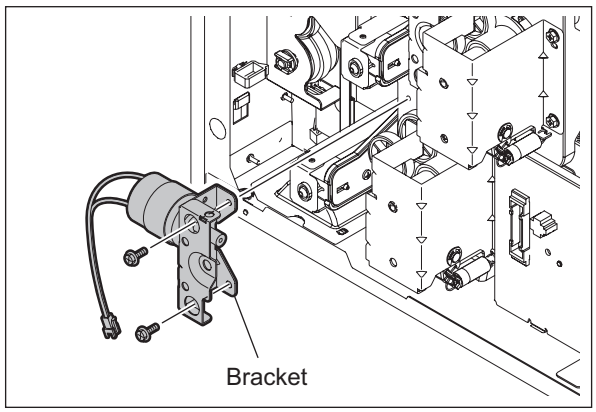


Fig. 8-63

(5) Remove 2 screws and take off the lower tray-up motor from the bracket.

Note:
Pay attention to the size (length) of the screws. If incorrect ones are used, the motor could be damaged.

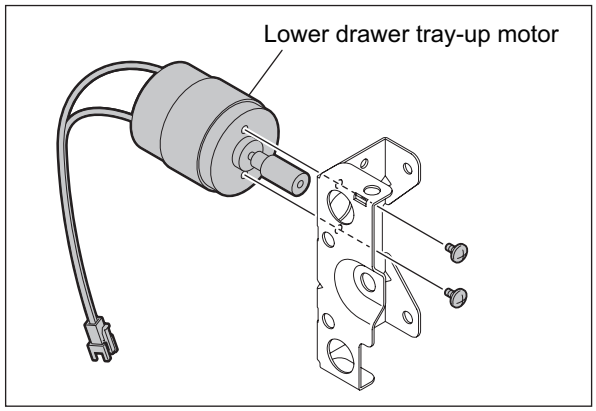


Fig. 8-64

8.6.31 Registration roller (rubber)

(1) Take off the transfer unit
📖 P.10-20 "10.7.17 Transfer unit"
(2) Remove 1 screw and then take off the bracket while holding the registration roller.

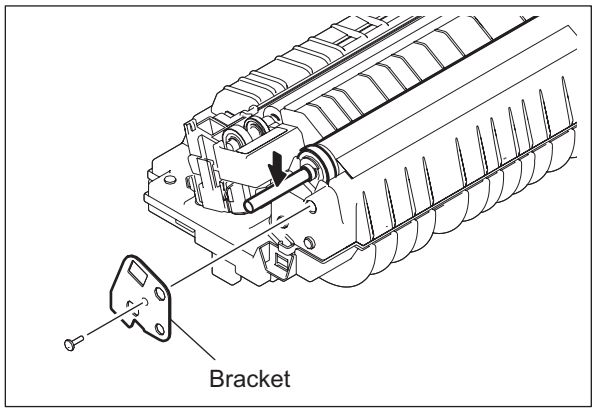


Fig. 8-65

(3) Lift up the rear side of the registration roller and then pull out the roller to the rear side.

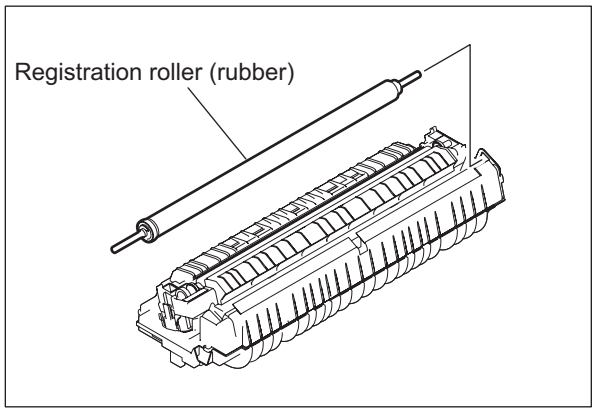


Fig. 8-66

(4) Take off 2 guide rollers. Then remove 1 E-ring and 1 gear.

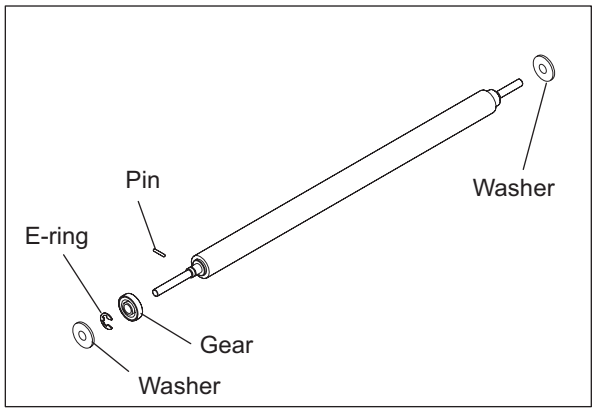


Fig. 8-67

8.6.32 Registration roller (metal)

(1) Take off the process unit
📖 P.10-9 "10.7.1 Process unit"
(2) Take off the automatic duplexing unit.
📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)"
(3) Take off the registration roller clutch.
📖 P.8-27 "8.6.25 Registration roller clutch (CLT2)"
(4) Remove 1 clip on the rear side.

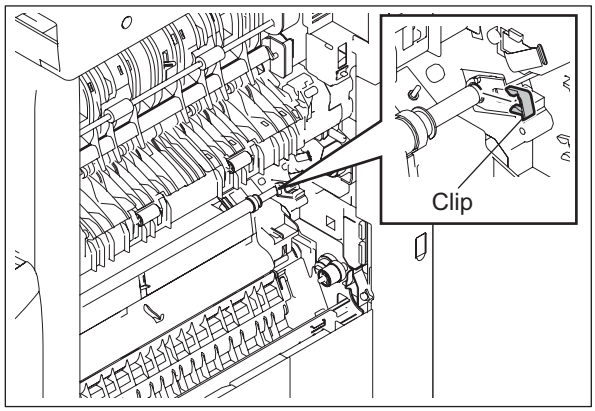


Fig. 8-68

(5) Take off the registration roller (metal) by sliding it to the rear side and pulling it out toward you.

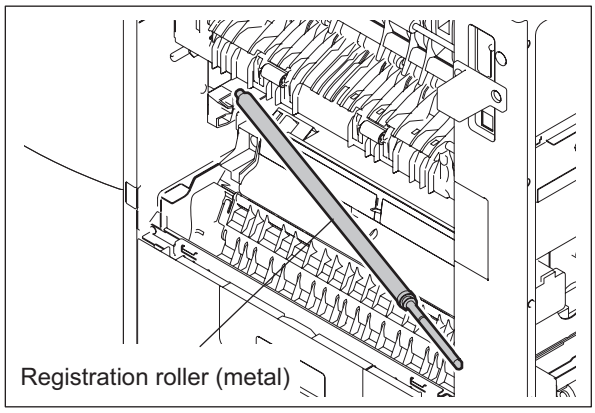


Fig. 8-69

9. DRIVE SYSTEM

9.1 General Description

The drive system drives the drum, developer unit, cleaner unit, fuser unit, transport roller, feed roller (upper/lower drawer and bypass unit) and registration roller.
The drive system is driven by the rotation of the main motor.

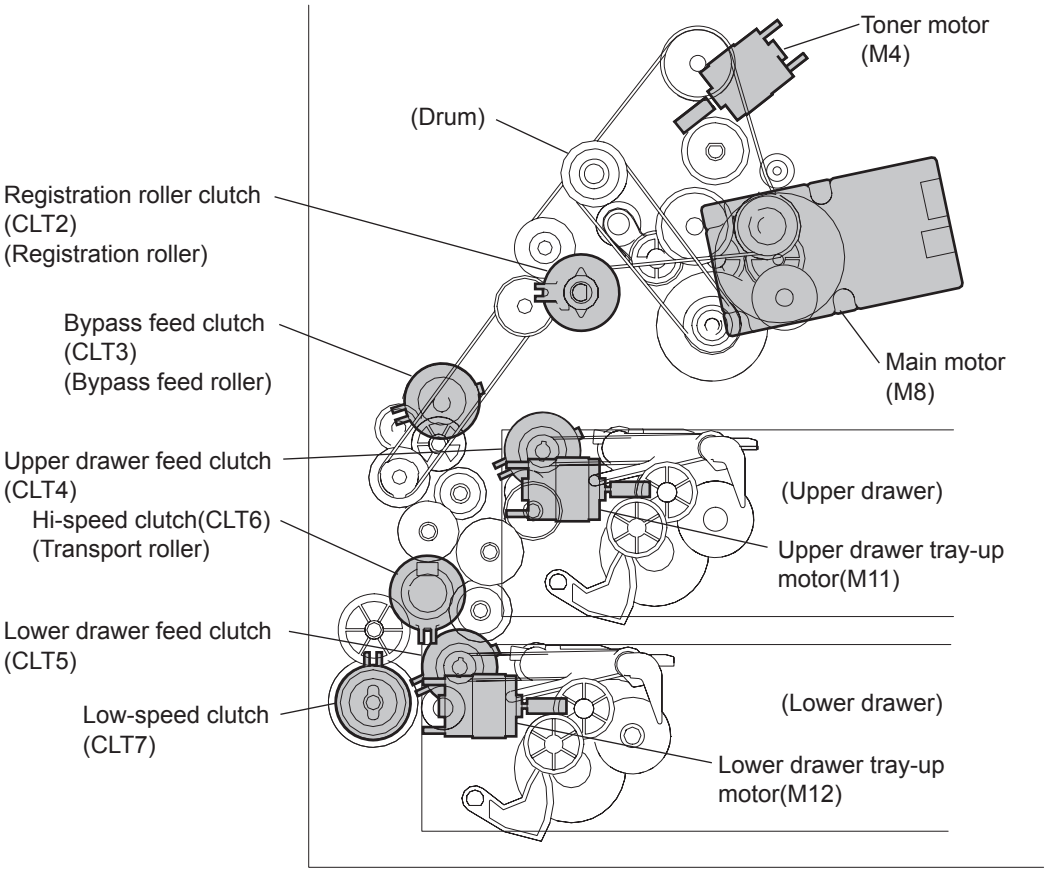


Fig. 9-1

9.2 Functions

1. Drum cleaner unit drive
   Drives the drum by transmitting the rotation of the main motor through the gears and the timing belt to the drum flange gear. Also drives the toner recovery auger to transport the used toner to the developer unit.

2. Developer unit drive
   Drives the developer unit by transmitting the rotation of the main motor through the gears to the developer unit gears.

3. Fuser unit drive
   Drives the fuser unit by transmitting the rotation of the main motor through the gears and timing belt to the fuser unit gears. The bridge unit, the job separator and the offset tray are driven by transmitting from the fuser unit.

4. Registration roller drive
   Drives the registration roller by transmitting the rotation of the main motor through the gears, timing belt and clutches.

5. Transport roller drive
   Drives the transport roller by transmitting the rotation of the main motor through the gears, timing belt and clutches.

6. Feed roller drive
   Drives the cassette feed roller by transmitting the rotation of the main motor through the gears and clutches.

7. Drives the paper exit options
   Drives the Bridge Kit, Job Separator and Offset Tray (all optional) by transmitting the rotation of the main motor through the gears and the timing belt to their gears.

9.3 Main Motor

9.3.1 Main motor drive

The main motor consists of the motor and the drive board combined with the motor, and its rotation is controlled by control signals (three) and reference frequency.

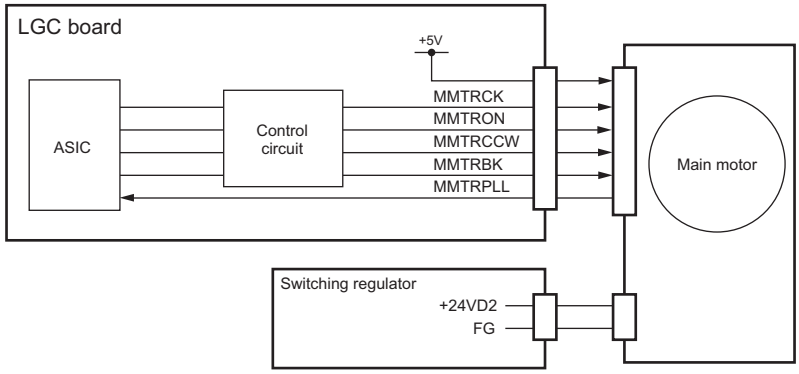


Fig. 9-2

Control signal

Signal	Function	Status	
		High level	Low level
MMTRON	Main motor ON signal	Stop	Rotation
MMTRCK	Reference clock	---	---
MMTRPLL	PLL signal	Abnormal	Normal operation
MMTRCCW	Rotation direction signal	CW	CCW
MMTRBK	Brake signal	Normal operation	Brake

* CW: Clockwise rotation, CCW: Counter clockwise rotation viewing from the axis

1. MMTRON signal (Main motor ON signal)
   This is a signal to control whether to turn ON or OFF the main motor. When this signal turns to "H" level, the motor is stopped. When it turns to "L" level, the motor is allowed to be rotated.

2. MMTRCK signal (Reference clock)
   This is a signal to control the rotational speed of the main motor. The motor is rotated in accordance with the clock frequency (motor rotational speed) output from the ASIC.

3. MMTRPLL signal (PLL signal)
   This is the PLL signal of the main motor and is output to the ASIC from the main motor.
   When the main motor is being rotated normally, this signal is at "L" level. When it is being rotated abnormally, this signal is at "H" level.

4. MMCCW signal (CW/CCW select signal)
   This is a signal to switch the rotational direction of the main motor. When the signal is at "L" level, the motor is rotated clockwise as seen from its shaft side. When it is at "H" level, the motor is rotated counterclockwise.
   When the main motor is being rotated counterclockwise, this is equal to the normal rotation for the equipment (feeding direction). When it is being rotated clockwise, this is equal to the reverse rotation for the equipment.

5. MMTRBK signal (Brake signal)
   This is a signal to put a brake on the main motor. When this signal turns to "L" level, the brake is applied to the motor. (Normally it is at "H" level.)
   The brake is applied to the main motor also when the power supply shut-off signal is output from the switching regulator or when 24V is shut down (the cover is opened).

9.4 Disassembly and Replacement

9.4.1 Main motor (M8)

(1) Take off the flywheel.
📖 P.8-27 "8.6.24 Flywheel (e-STUDIO355/455)"
(2) Disconnect 2 connectors (1 with a lock). Remove 2 screws and then take off the main motor.

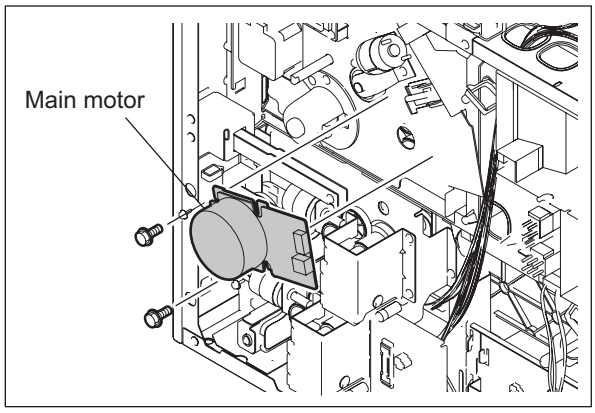


Fig. 9-3

9.4.2 Toner motor (M4)

(1) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(2) Disconnect 1 connector.
(3) Remove 1 screw and then take off the toner motor together with its bracket.

Note:
Be sure not to drop the gear and bushing.

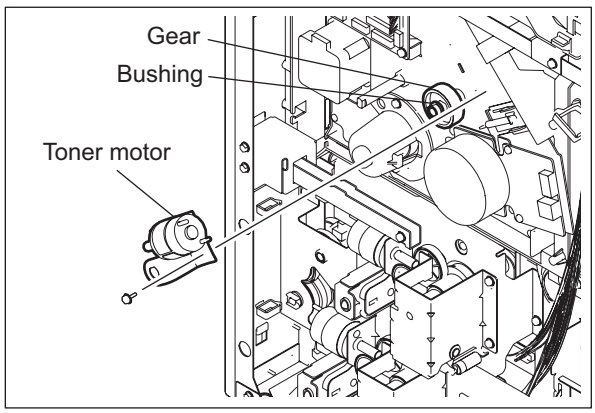


Fig. 9-4

(4) Remove 2 screws, and take off the toner motor.

Note:
Pay attention to the size (length) of the screws. If incorrect ones are used, the motor could be damaged.

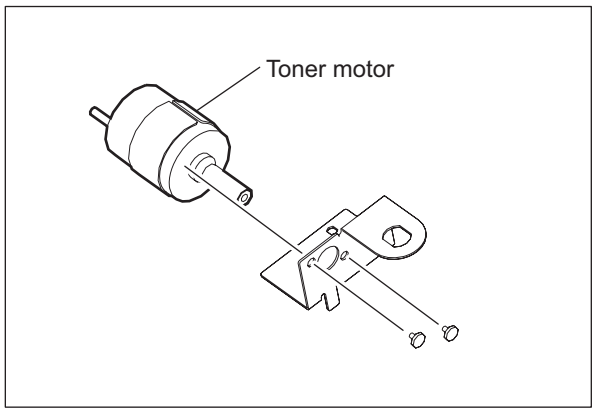


Fig. 9-5

9.4.3 Main motor drive unit

(1) Take off the toner motor
🕮 P.9-5 "9.4.2 Toner motor (M4)"
(2) Take off the registration roller clutch.
🕮 P.8-27 "8.6.25 Registration roller clutch (CLT2)"
(3) Disconnect 9 connectors. (e-STUDIO205L/255/305: 4 connectors.)
(4) Disconnect 2 connectors of the main motor.

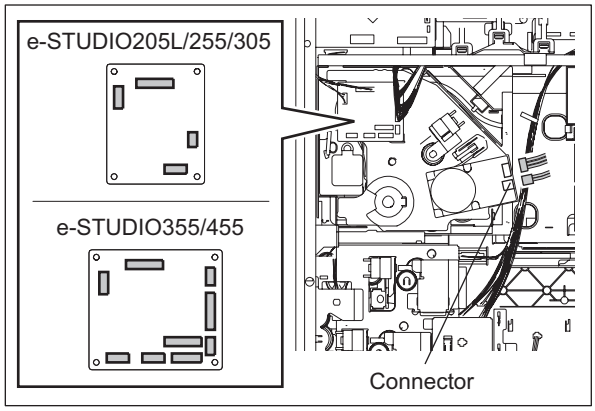


Fig. 9-6

(5) Remove 4 screws and then take off the main motor drive unit.

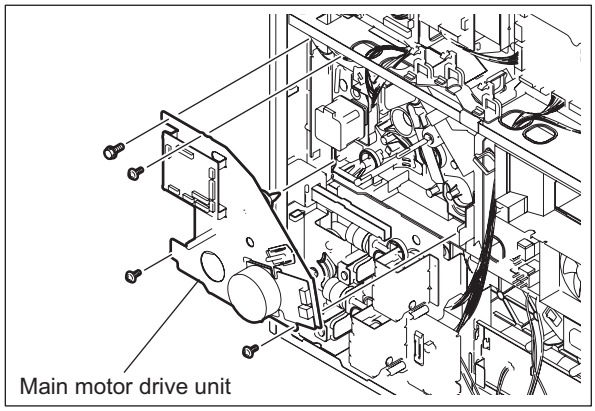


Fig. 9-7

9.4.4 Process unit fan (M2)

(1) Take off the duct.
🕮 P.7-7 "7.5.1 Laser optical unit"
(2) Take off the process unit fan from the duct..

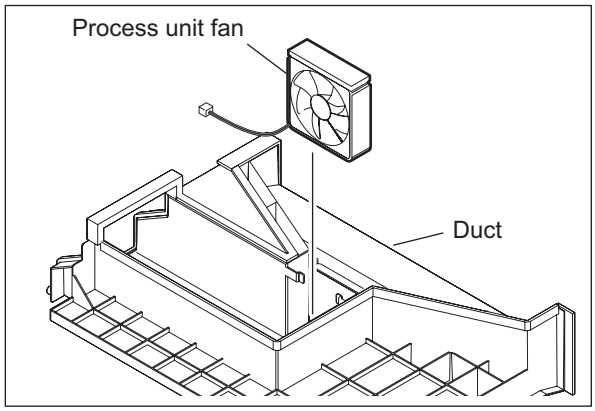


Fig. 9-8

10. DRUM RELATED SECTION

10.1 Configuration

This chapter explains about the area around the drum, drum itself, image processing, their parts and control circuits.

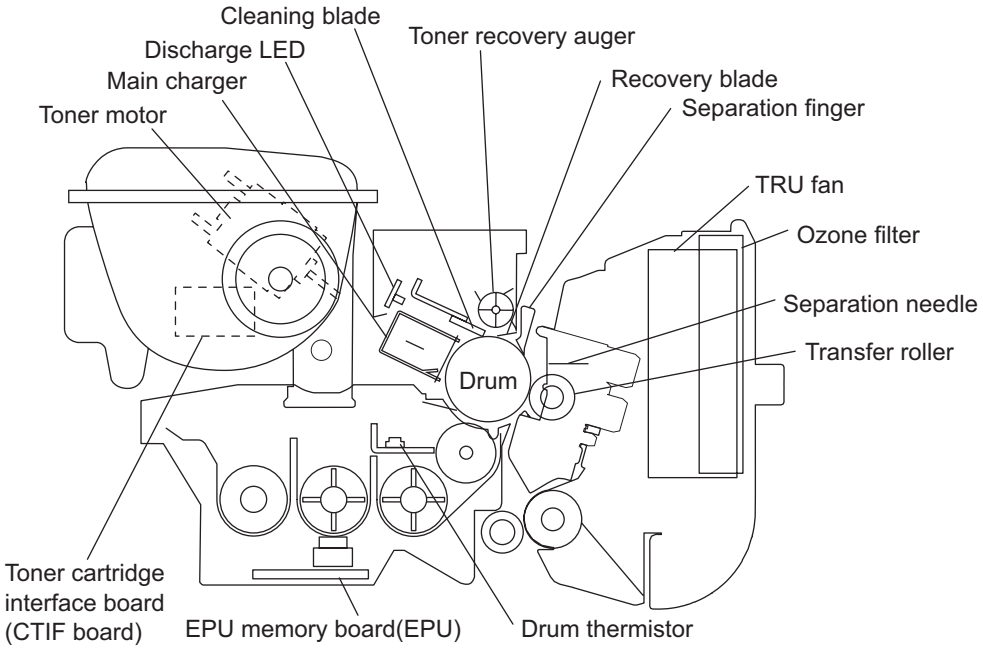


Fig. 10-1

10

10.2 Composition

Drum related section		
Drum cleaner unit	Drum	PM parts
	Main charger	PM parts
	Cleaner	
	Cleaning blade	PM parts
	Recovery blade	PM parts
	Needle electrode	PM parts
	Discharge LED	ERS
Transfer roller unit	Transfer roller	PM parts
	Separation needle	
Other	Drum thermistor	THMS4
	High-voltage transformer	HVT
	Temperature-humidity sensor	S25
	TRU fan	M9
	Process unit fan	M2
	Ozone filter	PM parts

10.3 Functions

1. Drum
   The drum is made of a cylindrical aluminum base coated with thin film of organic photoconductive substance.
   The photoconductive object becomes insulative (the electrical resistance is high) when it is not exposed to the light and electrically conductive (the electrical resistance is low) when it is exposed to the light. This object is called a photoconductor.

2. Main charger
   The main charger in this equipment consists of a metal rod with U-shaped section, insulated blocks at both ends of the rod and a needle electrode attached between them.
   When a high voltage is applied to the needle electrode, the air around it is charged (ionized). The ionized air then flows into the drum causing it to be charged. This phenomenon is called “corona discharge”. At the same time, a control bias is applied to the main charger grid to control the charging amount.
   In a dark place, negative charge is evenly applied onto the drum surface by the corona discharge and this grid. In addition, a cleaner is installed to clean up the dust attached on the needle electrode.
   - Needle electrode
     The needle electrode has aligned needles and their points perform the corona discharge. These points (electrodes) discharge toward the drum in one direction to realize the more efficient discharging comparing to the charger wire which discharges in a radial direction. Therefore, the needle electrode enables to reduce the ozone amount.

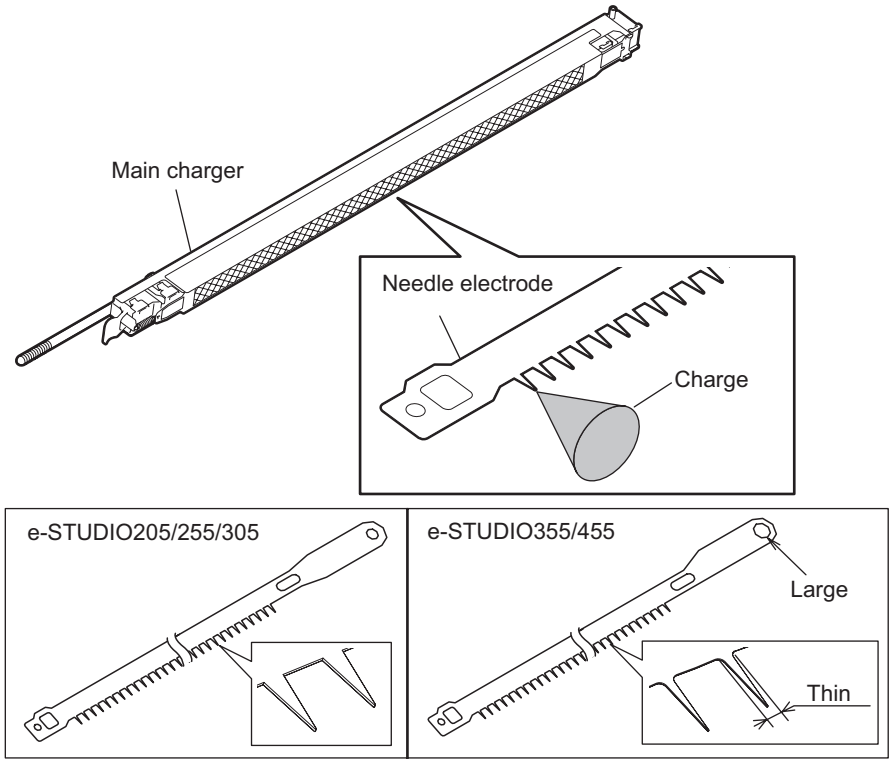


Fig. 10-2

3. Drum cleaner
   - Cleaning blade
     This blade is pressed against the drum surface and scrapes off the residual toner from the drum surface.
   - Recovery blade
     This blade catches the toner scraped off by the cleaning blade.

- Toner recovery auger
  This auger carries the residual toner scraped off to the developer unit and reuses the toner.

4. Transfer roller unit
   - Transfer supporting bias
     Positive bias is applied to the registration rollers and the pressure roller in the fuser unit so as to prevent the transfer ability from lowering under high humidity environments.
   - Transfer roller (transfer charger)
     A transfer roller is used as the transfer charger for this equipment.
     With the transfer roller, dots are reproduced more clearly because the electric charge is concentrated on a contact point between the paper and the drum surface, and thus toner is less scattered at the time of transfer. Therefore user maintenance such as the cleaning of the main charger wire of the existing models adopting the corona discharge method can be omitted.
   - Separation needle (separation charger)
     This needle requires a smaller capacity of the high-voltage transformer than the existing charger wire does. This needs to be cleaned with a brush at PM.

5. Discharge LED
   Discharging is a process to decrease or eliminate the electrical potential of the drum surface.
   The electrical resistance of the photosensitive layer is decreased by the light irradiation, and the residual charge on the drum surface is neutralized and eliminated. The electrical potential of the drum surface is fixed to a certain amount before the drum is charged.
   The number of the discharge LEDs for the e-STUDIO205L/255/305 differs from that for the e-STUDIO355/455 because the discharging amount differs depending on the copy speed.
   Therefore, be sure to install discharge LEDs in a correct model.
   e-STUDIO205L/255/305: 10 LEDs
   e-STUDIO355/455: 14 LEDs

6. Drum thermistor
   The drum thermistor detects the drum surface temperature, and thus each rotation speed of the exhaust fan and internal cooling fan-1 is controlled when the equipment is in the ready status.

7. High-voltage transformer
   This is a board to generate the output control voltage of the main charger, main charger grid, transfer charger, separation charger, developer bias and transfer supporting bias.

8. Temperature/Humidity sensor (S25)
   This sensor and drum thermistor detect the temperature and humidity inside of the equipment since the drum, developer material and paper are affected by environmental elements such as temperature or humidity. Thus the main charger grid, transfer/separation output, transfer guide bias, developer bias, laser output and auto-toner output are controlled to be at their optimum states.

9. Process unit fan (M2)
   This fan cools down the inside of the equipment, drum cleaning unit and developer unit.

10. TRU fan (M9)
    The TRU fan cools down the inside of the equipment. The air to exhaust includes the ozone generated by the corona discharge, and this ozone is removed by the ozone filter. The exhaust fan also helps the paper separation by absorbing the paper to post-transfer guide.

10.4 High-Voltage Transformer Output Control Circuit

10.4.1 General description

The high-voltage transformer is mainly controlled by the ON/OFF signal of each bias output from the CPU on the LGC board and the reference voltage Vc output from the ASIC through the D/A converter. The high-voltage transformer then generates the output current or output voltage of each bias according to the +24V voltage (+24VD1) input.

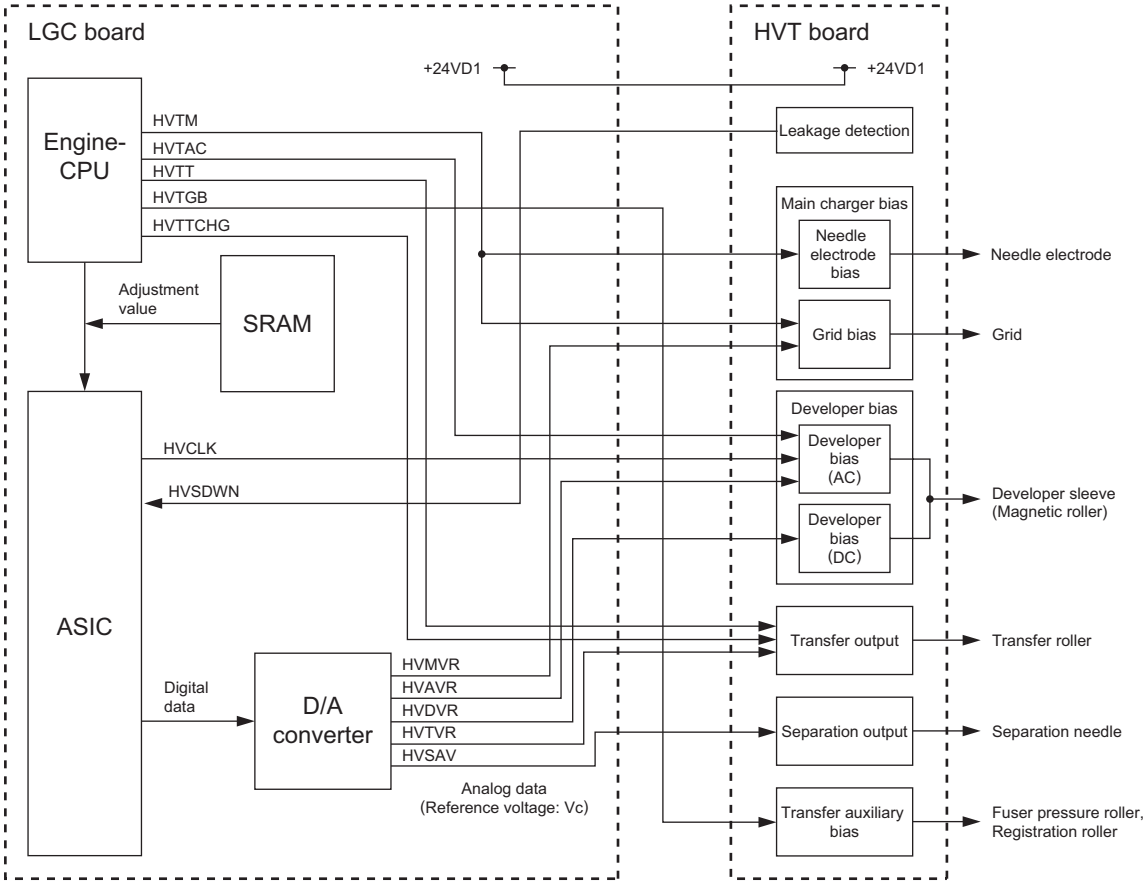


Fig. 10-3

10.4.2 Description of operation

The function and operation of each signal is as follows.

ON/OFF signal (HVTM / HVTAC / HVTT / HVTGB):
This is an ON/OFF signal for each output of the main charger (needle electrode and grid), developer bias (AC), transfer output and transfer supporting bias. When this signal turns to a low level, the generation circuit for each bias on the high-voltage transformer is turned ON so as to generate an electric current or voltage.

* The negative DC component of the developer bias is turned ON/OFF by switching a reference voltage (HVDVR) separately.

Transfer charger positive/negative output switching signal (HVTTCHG):
The transfer outputs a positive voltage or a negative voltage. When this signal is at "L" level, the transfer outputs a positive voltage. When it is at "H" level, the charger outputs a negative voltage.

Reference voltage Vc (HVMVR / HVAVR / HVDVR / HVTVR / HVSAV):
The reference voltage is an analog voltage which is the reference of each output of the main charger grid, developer bias (AC/DC), transfer charger and separation charger. Each output of the high-voltage transformer can be linearly changed by switching these reference voltages.
The output operation of the reference voltage is as follows.

- Outputs the adjustment values of the main charger, transfer charger, separation charger and developer bias in the SRAM to ASIC.
  ↓
- Outputs the reference voltage data from the ASIC to a D/A converter.
  ↓
- Outputs the reference voltage Vc of each bias to the high-voltage transformer.
  ↓
- The high-voltage transformer generates the output current/voltage which is proportional to the reference voltage.

* The reference voltage Vc is adjusted in the Adjustment Mode (05).
* The output of the main charger (needle electrode) and the transfer supporting bias are adjusted to be a certain value and fixed when the high-voltage transformer is shipped from the factory.
* The separation outputs is turned ON or OFF by changing a reference voltage (HVSAV) independently.

Developer bias (AC) generation clock (HVCLK):
This clock signal is a reference of AC component of the developer bias.

High-voltage transformer leakage detection signal (HVSDWN):
This signal is for the abnormality (leakage) detection of the high-voltage transformer output. This signal becomes “L” level at the occurrence of abnormality.

* This signal is for leakage detection for the main charger (needle electrode), transfer roller and separation needle.
  Each output is turned OFF when an abnormal output (leakage) is detected.

10.5 Drum Temperature Detection Circuit

10.5.1 General description

If the temperature of the drum and its surrounding area becomes too high, the property of the toner which is recovered by the drum cleaner easily changes. To prevent this, the drum thermistor detects the surface temperature of the drum. Based on the result, it controls the process unit fan to cool down the inside of the equipment.

10.5.2 Construction

The configuration of the drum temperature detection circuit is shown below. The voltage detected by the drum thermistor is input to the CPU on the LGC board through the EPU memory board.
The higher the detected temperature is, the smaller the resistance of the drum thermistor becomes. Therefore the input voltage to the CPU is lowered as the temperature rises.

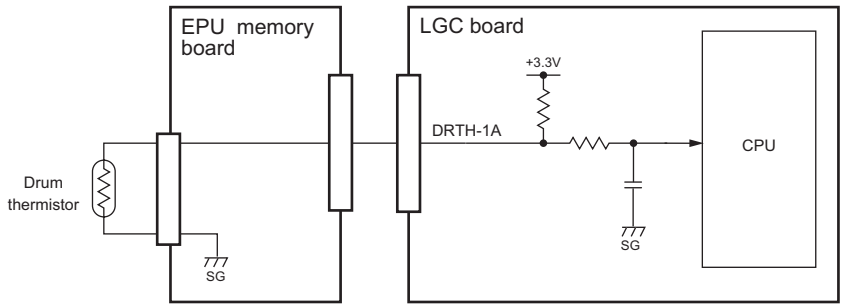


Fig. 10-4

10

10.6 Temperature/Humidity Detection Circuit

10.6.1 General description

To prevent a deterioration of printing quality by the variation of the temperature and humidity where the equipment is installed, the temperature/humidity sensor detects the temperature and humidity of the outside air taken into the equipment. Based on the result of the detection, this circuit corrects each output of main charger bias, developer bias, transfer bias and separation bias, output of the auto-toner sensor and output of the laser.

10.6.2 Construction

The configuration of the temperature/humidity detection circuit is shown below. The voltage detected by the temperature/humidity sensor is input to the CPU of the LGC board.
Signals output from the temperature/humidity sensor indicate that the higher the temperature is, the lower the detected voltage becomes, and the higher the humidity is, the higher the detected voltage becomes.

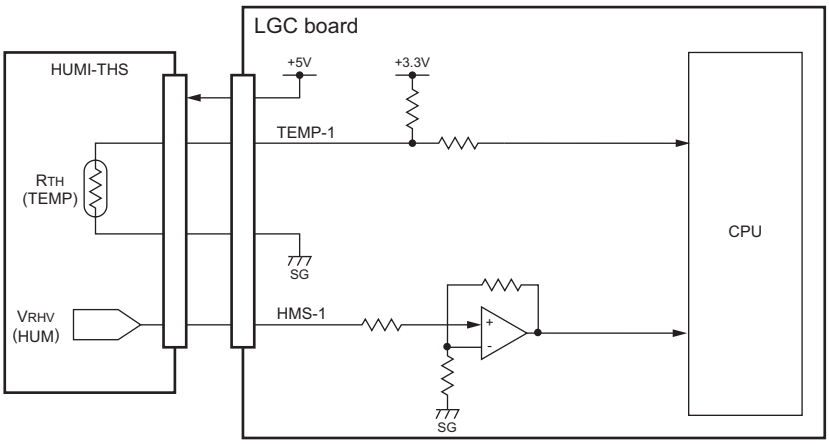


Fig. 10-5

10.7 Disassembly and Replacement

10.7.1 Process unit

(1) Open the automatic duplexing unit.
(2) Open the front cover and take off the toner cartridge.
(3) Loosen 2 screws and pull out the process unit.

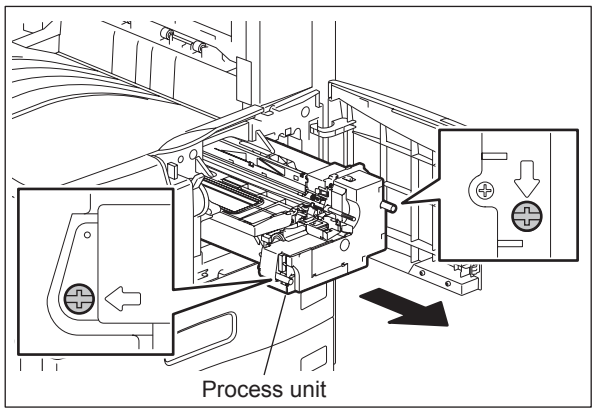


Fig. 10-6

10.7.2 Drum cleaner unit

(1) Take off the process unit
(P.10-9 "10.7.1 Process unit").
(2) Release 1 latch. Then pull out the harness cover and take it off.

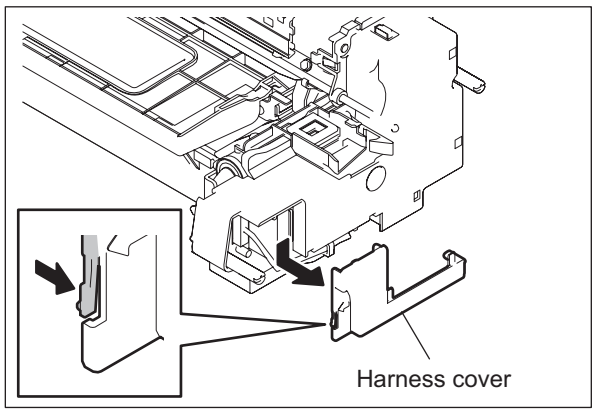


Fig. 10-7

(3) Disconnect 3 connectors.

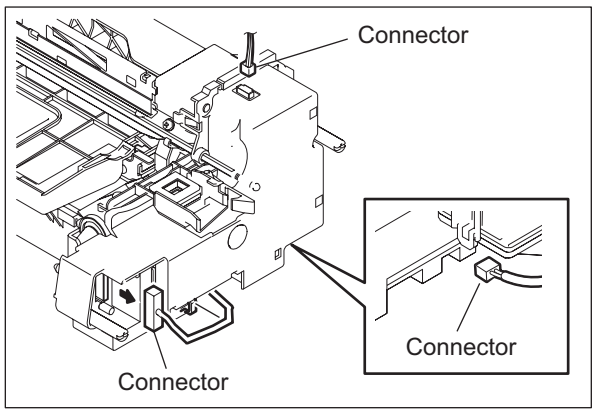


Fig. 10-8

(4) Remove 2 screws. Then take off the process unit front cover

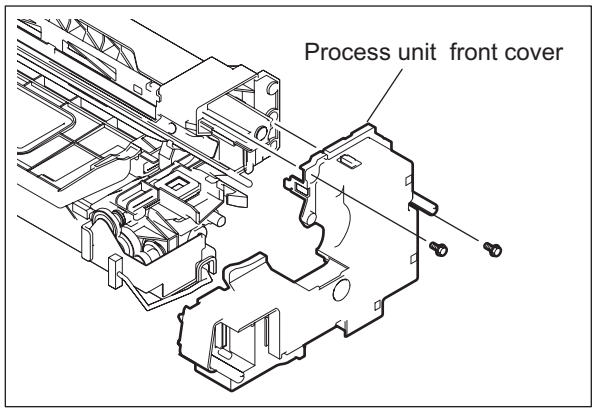


Fig. 10-9

Note:

When installing the process unit front cover, wire the harness correctly in order not to contact the gears and harness of the process unit front cover each other.

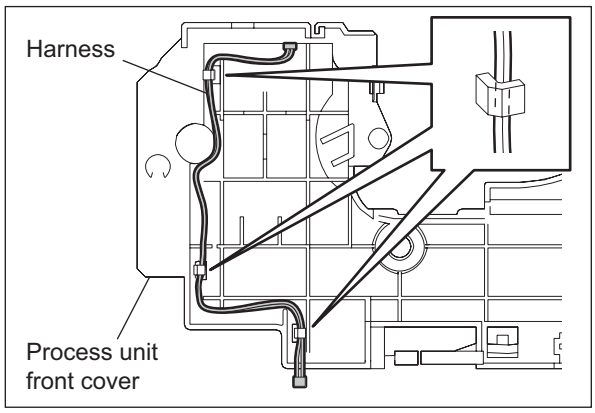


Fig. 10-10

(5) Lift up the drum cleaner unit and take it off.

Notes:

1. Be careful not to touch or scratch the drum surface at this time.

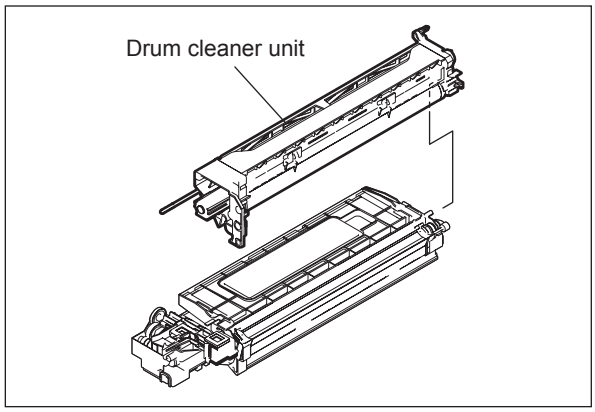


Fig. 10-11

2. Do not deform the Guide Mylar by touching this.

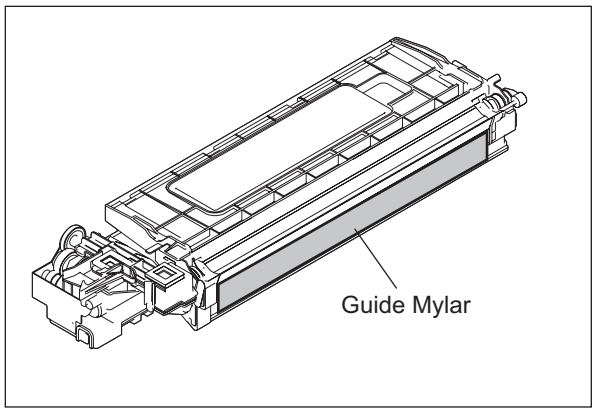


Fig. 10-12

10.7.3 Discharge LED

(1) Take off the drum cleaner unit (📖 P.10-9 "10.7.2 Drum cleaner unit").

(2) Release 1 latch and take off the discharge LED unit.

Note:

Be careful not to touch or scratch the drum surface at this time.

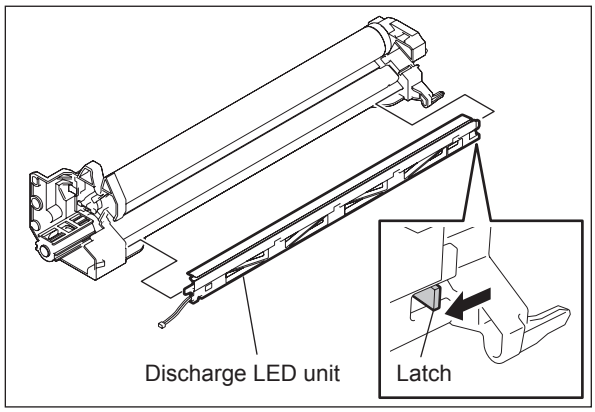


Fig. 10-13

(3) Release the harness from the harness clamp and pull out the discharge LED.

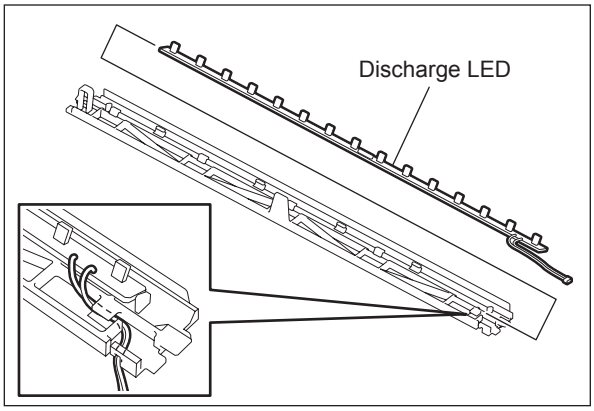
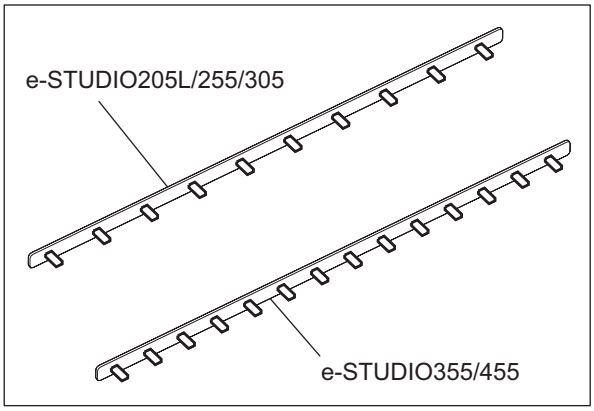


Fig. 10-14

Note:
The number of the discharge LEDs for the e-STUDIO205L/255/305 differs from that for the e-STUDIO355/455, therefore do not install the LEDs in a wrong model.



10.7.4 Main charger

(1) Take off the discharge LED unit (📖 P.10-11 "10.7.3 Discharge LED").
(2) Pull out the main charger and take it off by sliding it to the rear side.

Note:
Be careful not to touch or scratch the drum surface at this time.

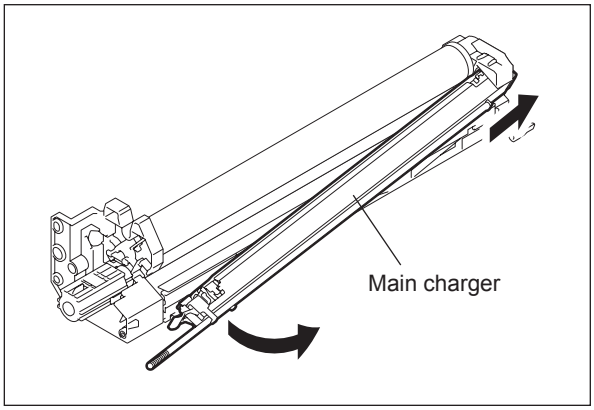


Fig. 10-15

10.7.5 Main charger grid PM

(1) Take off the main charger
(📖 P.10-12 "10.7.4 Main charger").
(2) Remove the spring and take off the main charger grid.

Note:
Do not touch the mesh area of the grid.

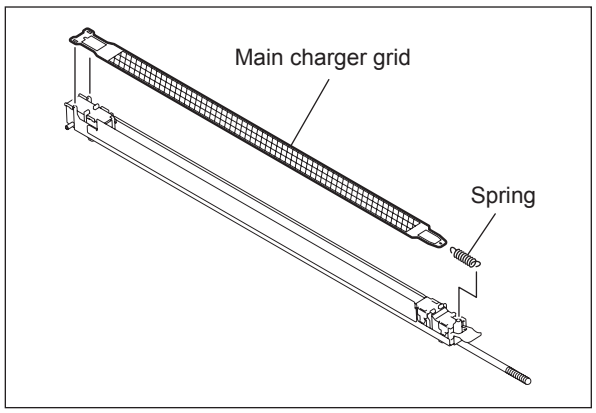


Fig. 10-16

10.7.6 Main charger cleaner

(1) Take off the main charger
(📖 P.10-12 "10.7.4 Main charger").
(2) Release the hook of the cleaning shaft. Then rotate the shaft at 90 degrees to take it off.

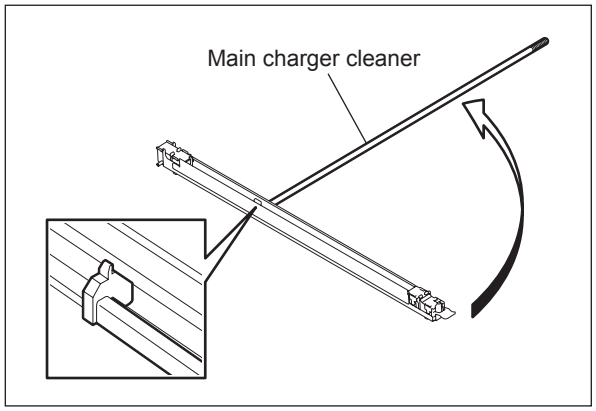


Fig. 10-17

10.7.7 Needle electrode PM

(1) Take off the main charger grid and main charger cleaner.
📖 P.10-13 "10.7.5 Main charger grid"
📖 P.10-13 "10.7.6 Main charger cleaner"
(2) Take off the terminal covers of both front and rear sides.

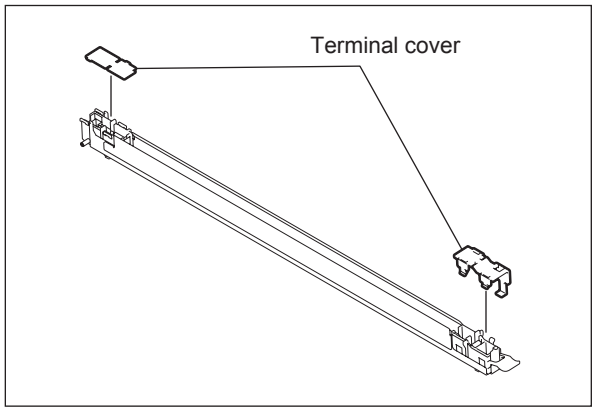


Fig. 10-18

(3) Remove the terminal and spring. Then take off the needle electrode.

Notes:

1. Do not touch the needle electrode directly with bare hands.
2. Make sure not to hold or bend the needle electrode.

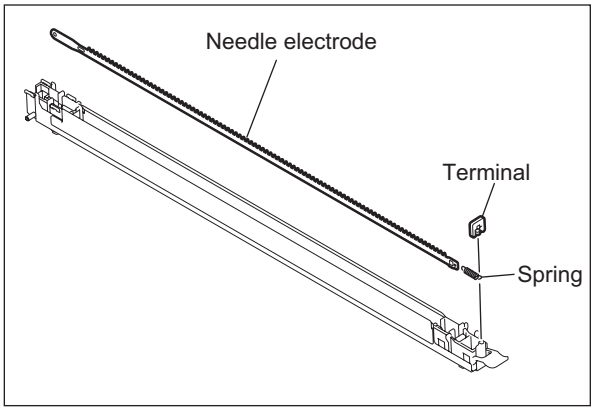


Fig. 10-19

3. The form of the needle electrode differs depending on the model as shown in the figure.
   Do not mix them when installing.

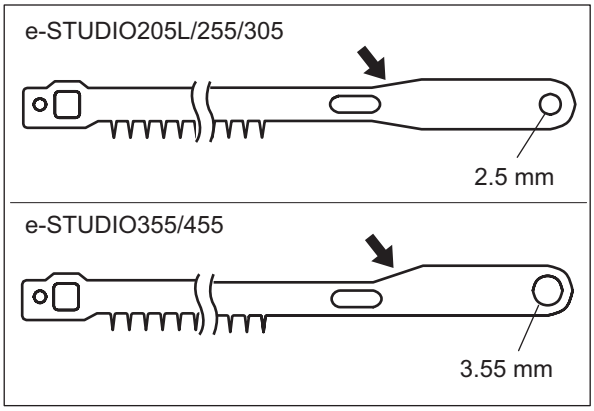


Fig. 10-20

10.7.8 Drum PM

(1) Take off the main charger
(P.10-12 "10.7.4 Main charger").
(2) Rotate the lever while pushing its latch and pull it out.
(3) Take off the drum.

Notes:

1. Be careful not to touch, spit or scratch the drum surface.
2. Avoid direct light. Place the drum in a dark place immediately after taking off.
3. Be careful not to touch or scratch the edge of the cleaning blade.

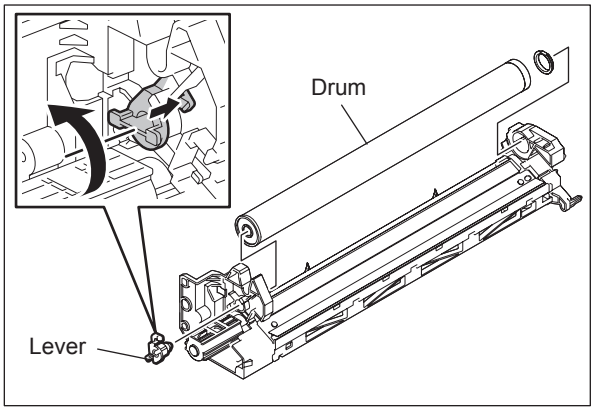


Fig. 10-21

10.7.9 Drum cleaning blade PM

(1) Take off the drum
(📖 P.10-14 "10.7.8 Drum").
(2) Remove 2 screws and take off the drum cleaning blade.

Note:
Be careful not to touch or scratch the edge of the drum cleaning blade.

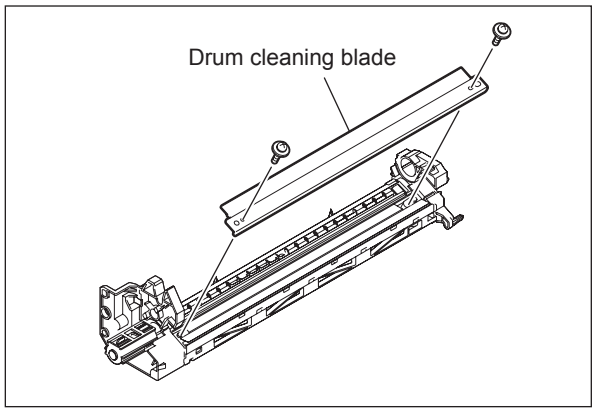


Fig. 10-22

10.7.10 Drum separation finger PM

(1) Take off the drum
(📖 P.10-14 "10.7.8 Drum").
(2) Remove 1 screw of each unit to take off the drum separation finger units (2 pc.).

Note:
1. When replacing the drum separation fingers, make sure that the drum has been taken off first since the fingers may scratch the drum surface.

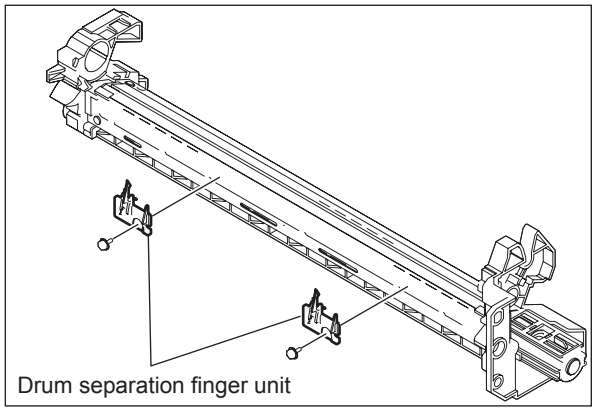


Fig. 10-23

(3) Remove the spring and take off the drum separation fingers.

Note:
When the drum separation fingers have been replaced, check if the pressure movement is normal by moving them with your hands.

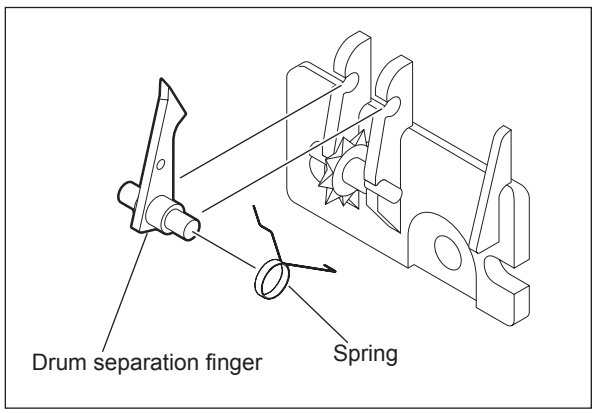


Fig. 10-24

10.7.11 Recovery blade PM

(1) Take off 3 drum separation finger units (📖 P.10-15 "10.7.10 Drum separation finger").
(2) Remove 2 screws, and take off the whole recovery blade with the bracket.

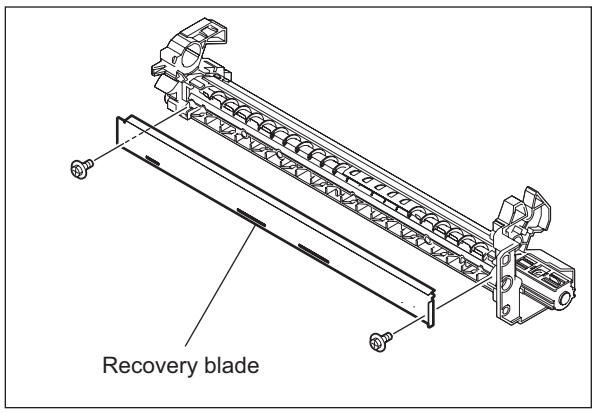


Fig. 10-25

Notes:
When cleaning the inside of the cleaner unit, be careful of the following in order not to damage the Mylar attached on the toner recovery auger:
1. Do not use an air blower for cleaning. (Use a vacuum cleaner.)
2. When using a vacuum cleaner, be careful not to hit the nozzle of the vacuum cleaner to the Mylar.
3. When rotating the toner recovery auger, rotate it only in the same direction as that for transporting toner.

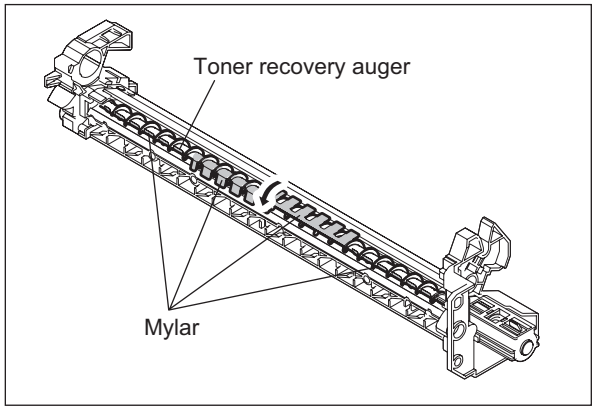


Fig. 10-26

10.7.12 Ozone filter PM

(1) Open the automatic duplexing unit.
(2) Lift up the transfer unit.

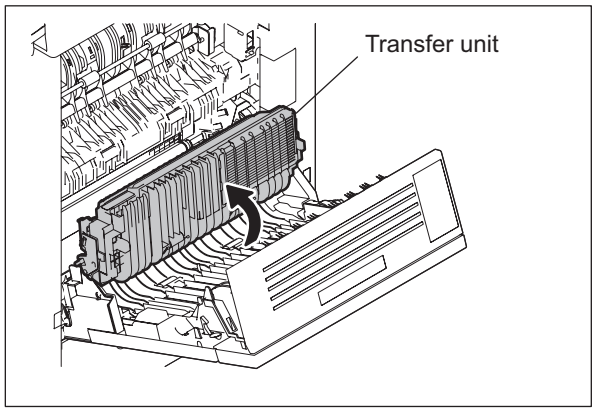


Fig. 10-27

(3) Release 1 hook and then take off the filter cover.

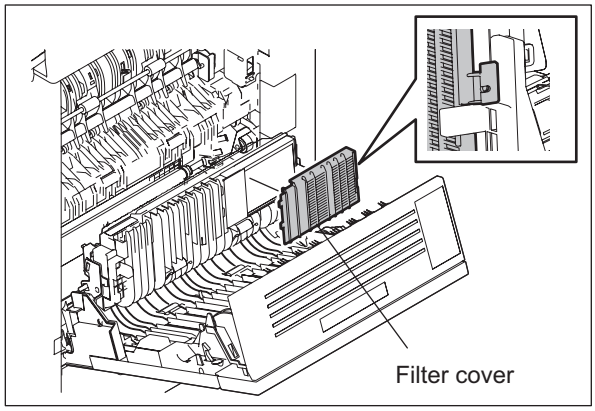


Fig. 10-28

(4) Take off the ozone filter.

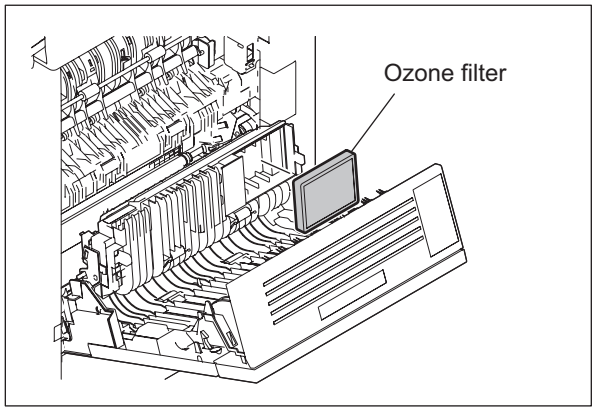


Fig. 10-29

10.7.13 TRU fan (M9)

(1) Take off the transfer unit (📖 P.10-20 "10.7.17 Transfer unit").
(2) Remove 1 screw and then take off the terminal on the rear side.

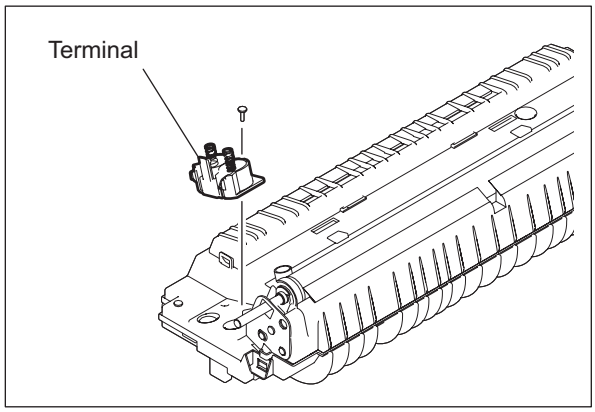


Fig. 10-30

(3) Remove 4 screws and then take off the inner duct.

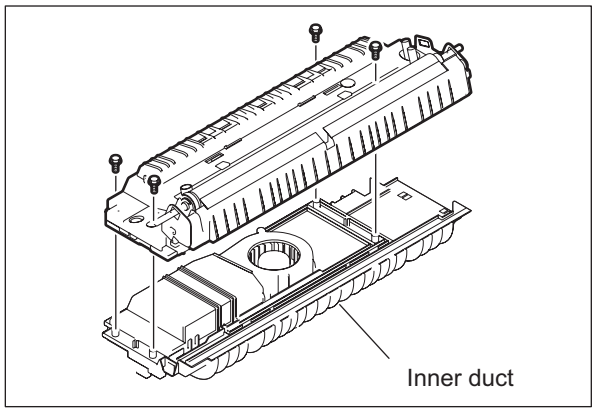


Fig. 10-31

(4) Take off the TRU fan.

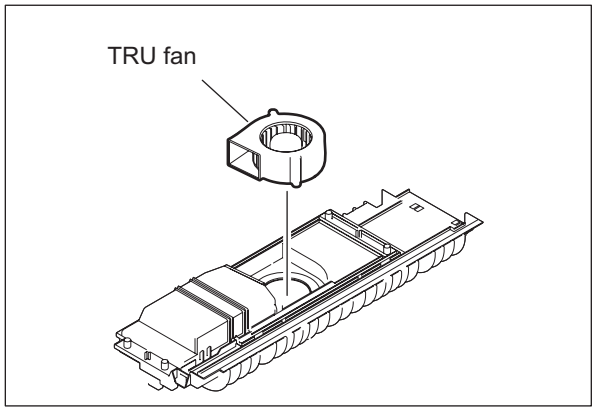


Fig. 10-32

10.7.14 Transfer roller unit

(1) Open the automatic duplexing unit.
(2) Release the hook on the rear side and then take off the transfer roller unit.

Notes:
1. Be careful not to drop the spring.
2. When installing the charger, pay attention to the position of the spring.

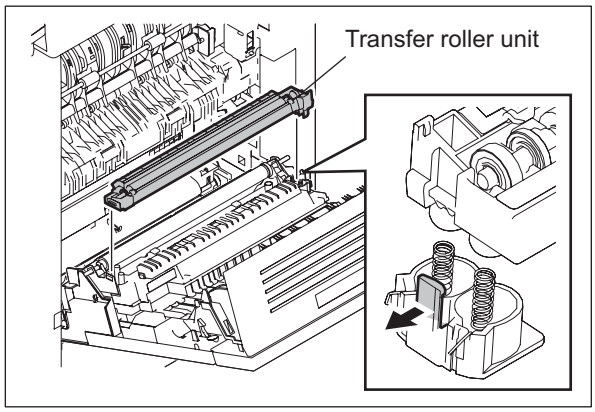


Fig. 10-33

10.7.15 Transfer roller PM

(1) Take off the transfer roller unit (📖 P.10-18 "10.7.14 Transfer roller unit").
(2) Release 4 hooks and then take off the transfer roller.

Note:
Be careful not to drop the spring.

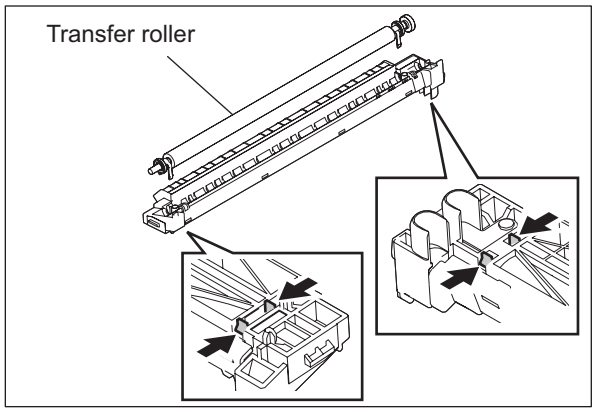


Fig. 10-34

(3) Remove 1 gear, 2 guide rollers and 2 bushings from the transfer roller.

Note:
When installing the bushings and gear, pay attention to the direction of them.

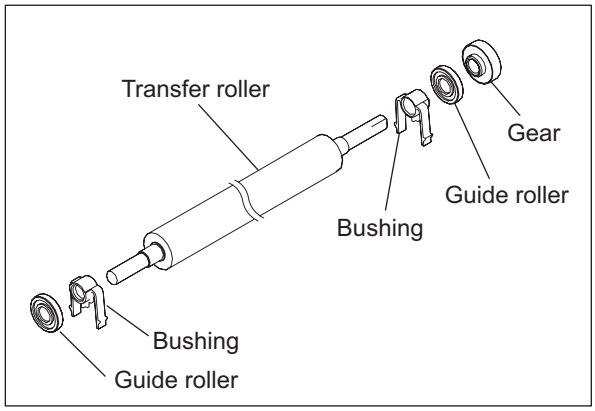


Fig. 10-35

10.7.16 Separation needle

(1) Take off the transfer roller unit.
(📖 P.10-18 "10.7.14 Transfer roller unit").
(2) Release 2 hooks and then take off the cover.
(3) Take off the separation needle paying attention not to deform it.

Note:
When installing the separation needle, be sure to insert it underneath the power supply plate.

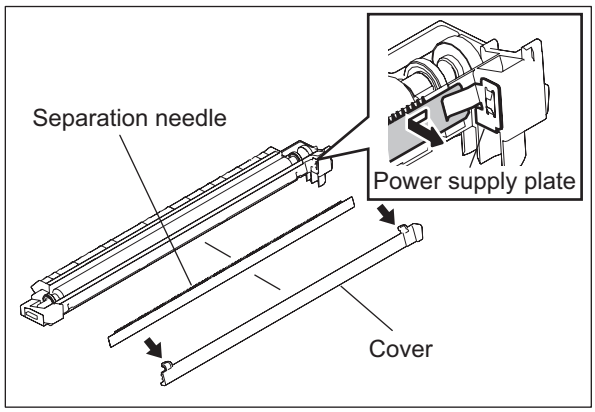


Fig. 10-36

10.7.17 Transfer unit

Note:
When taking off the transfer unit, take off the process unit first to prevent the drum from light.

(1) Take off the automatic duplexing unit.
📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)"
(2) Take off 2 brackets by removing 2 screws each.
(3) Disconnect 1 connector and then take off the transfer unit.

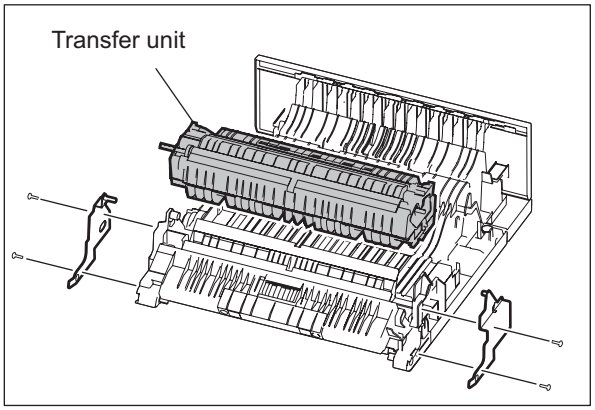


Fig. 10-37

10.7.18 Temperature/humidity sensor (S25)

(1) Take off the rear cover.
📖 P.2-24 "2.5.6 Rear cover"
(2) Disconnect 1 connector, remove 1 screw and then take off the temperature/humidity sensor.

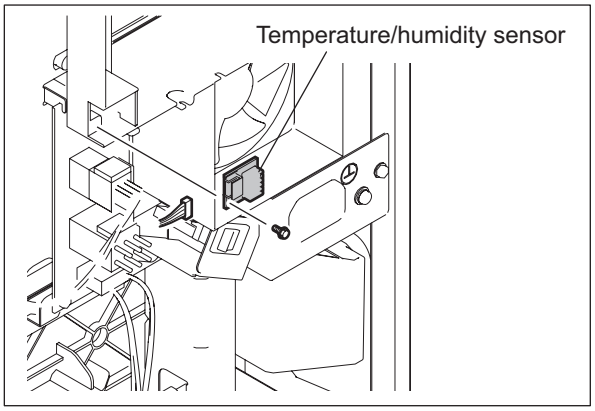


Fig. 10-38

11. DEVELOPMENT SYSTEM

11.1 Configuration

The developer unit in this equipment has a recovered toner supply mechanism which recovers the recovered toner scraped off by the drum cleaning blade and recycles the recovered toner. The developer unit is driven by the main motor to rotate the mixers and developer sleeve.

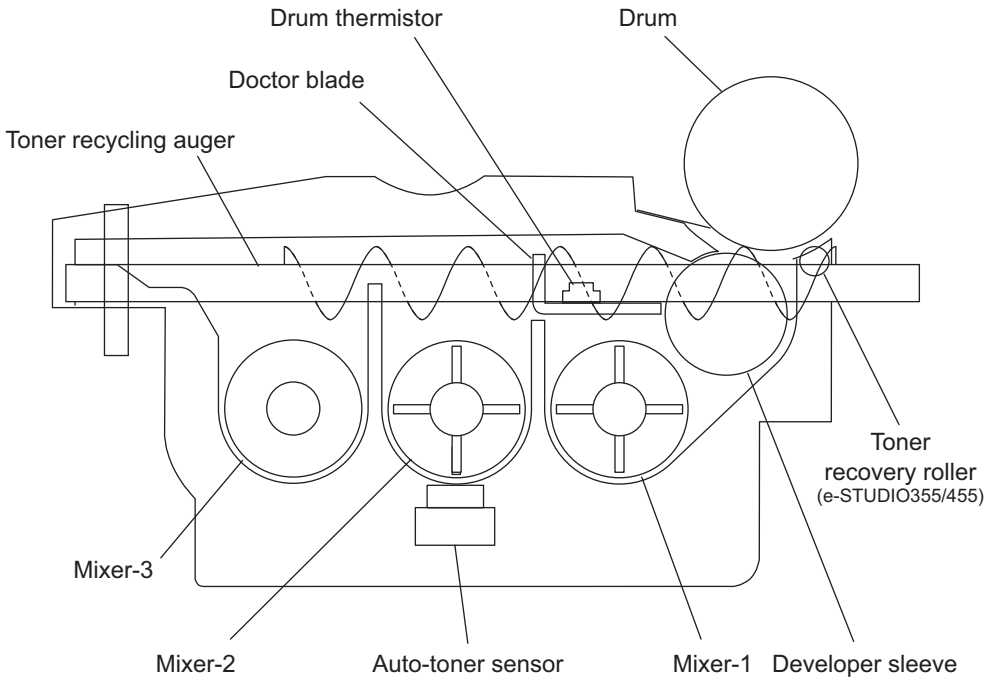


Fig. 11-1

11.2 Construction

Developer unit	Developer material	PM parts
	Mixers-1, -2 and -3	
	Developer sleeve (Magnet roller)	
	Doctor blade	
	Auto-toner sensor	S8
	Drum thermistor	THMS4
	EPU memory board	EPU
	Recovered toner supply mechanism (Toner recycling auger)	
Toner cartridge	Toner cartridge PC board	CTRG
	Toner cartridge interface PC board	CTIF
Toner motor		M4

11.3 Functions

11.3.1 General description

1. Toner cartridge drive unit / Toner cartridge installation detection mechanism (IC chip)
   The toner cartridge is filled with toner. The toner motor drives the cartridge to supply the toner to the developer unit.
   The IC chip detects whether a toner cartridge is installed.

2. Developer unit
   - Developer material
     The developer material is made of a mixture of the carrier and toner.
     The carrier is an electrical conductive ferrite whose size is approx 44 µm. The toner is a resin particle whose size is approx 8.5 µm.
     The developer material needs periodic replacement since its quality is deteriorated by long use.

   - Mixers-1, -2 and -3
     Friction is generated by mixing the developer material. The carrier is charged to (+) and the toner to (–), and the image is formed on the drum surface by the static electricity caused by the friction.
     The mixer-3 is mounted exclusively for the recovered toner to mix it with sufficient time.

   - Developer sleeve (Magnetic roller)
     This is an aluminum roller with a magnet inside. The magnet works to absorb the developer material and forms the magnetic brush. The magnet is fixed and only the sleeve around is rotated. This rotation makes the magnetic brush of the developer sleeve sweep over the drum surface and perform development.

   - Doctor blade
     Doctor blade controls the amount of the developer material transported by the developer sleeve so that the magnetic brush of the developer material contacts with the drum surface properly.

   - Auto-toner sensor
     The carrier and the toner (toner density) in the developer material should be always fixed to a certain ratio to output normal images. The auto-toner sensor detects the inclusion ratio of the toner in the developer material by using a magnetic bridge circuit. When the quantity of toner becomes insufficient, the toner motor is driven to supply the toner from the toner cartridge.

   - Recovered toner supply mechanism
     The recovered toner transported from the drum cleaner is transported into the developer unit by the toner recycling auger on the front side of the developer unit. The drive of the toner recycling auger is transmitted by the mixer-3.

11.3.2 Recovered process unit mechanism

The process unit of this equipment has two types; one is for the e-STUDIO205L/255/305 and another is for the e-STUDIO355/455.
The differences between two are shown below.
Be sure not to install the process unit to a wrong model when replacing them because they are incompatible each other.
To distinguish them, check the position of the bracket hole seen from the back side.

Parts	e-STUDIO205L/255/305	e-STUDIO355/455
Toner recovery roller	Not installed	Installed
Gear, belt	For low speed	For high speed
Discharge LED	10 LEDs	14 LEDs
Needle electrode	For low speed	For high speed
Position of bracket hole (seen from the back side)	Bottom	Top

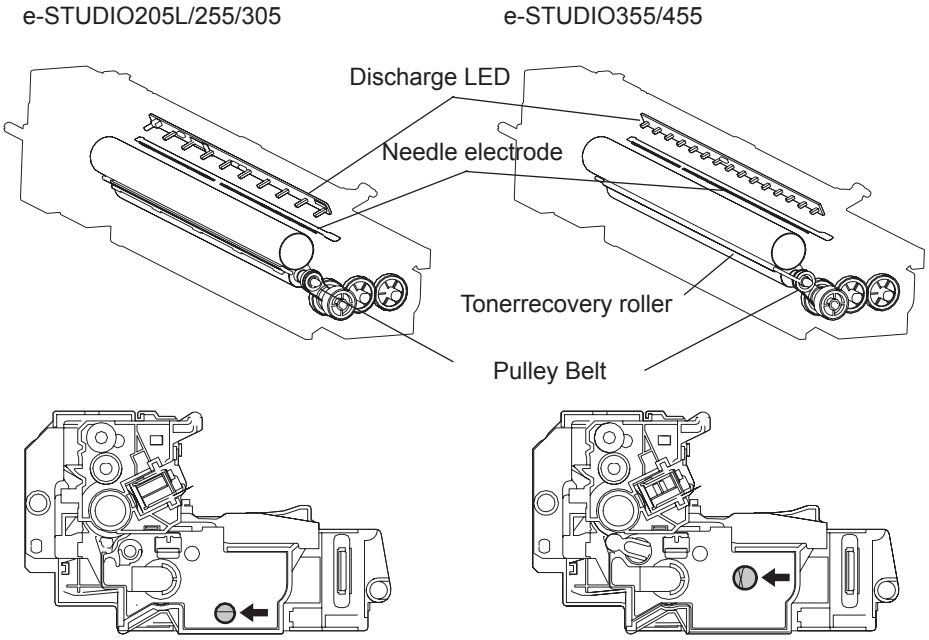


Fig. 11-2

11.3.3 Recovered toner supply mechanism

The toner scraped off by the drum cleaning blade is transported by the toner recovery auger, toner recycling auger to be recycled, and then returned to the developer unit. Then the recovered toner in the developer unit is mixed with developer material by the mixer-3. The mixer-3 is mounted exclusively for the recovered toner to mix it with sufficient time.
On the other hand, the toner (fresh) transported into the developer unit from the toner cartridge is mixed by the mixer-2. Then the toner (fresh) and recovered toner are mixed together and further transported to the mixer-1. They are further mixed and transported to the developer sleeve by the mixer-1.

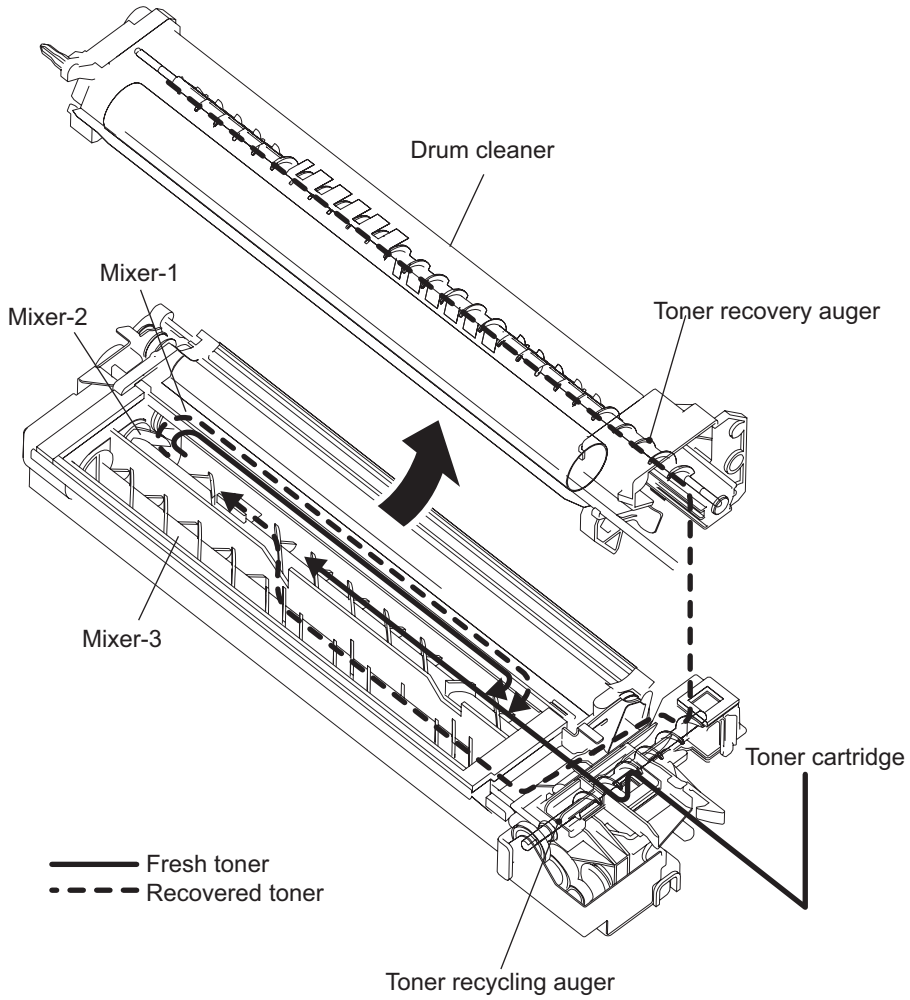


Fig. 11-3

11.4 Electric Circuit Description

11.4.1 Functions of the toner cartridge PC board (CTRG)

An IC chip is embedded in this board. Data such as identification information for the recommended TOSHIBA toner cartridge, thresholds to determine if the cartridge is nearly empty, and controlling data for the image quality to be optimal according to the toner characteristics are written in this chip.
To measure the amount of toner remaining in the cartridge, when the value of counter for period of toner cartridge rotation time (08-1410) is updated, this equipment writes the updated value into the toner cartridge PC board (CTRG).

These data written in the toner cartridge PC board (CTRG) enable the functions below, and accordingly this equipment operates as shown below. Data reading is performed every time the power of this equipment is turned ON and the front cover is closed.

[Data read by the toner cartridge PC board (CTRG)]
- Data to identify recommended TOSHIBA toner cartridges
- Thresholds to determine if the toner cartridge is nearly empty
- Value of counter for period of toner cartridge rotation time
- Data for optimizing image quality

[Functions]
- Cartridge detecting function
  This function checks whether the toner cartridge is inserted correctly or not, and whether the recommended toner cartridge is used or not.
- Toner remaining check function
  This function notifies the user of the near-empty status of toner. Normally, the message “Toner is low” is displayed when the toner is running out, and “Toner empty” when the toner cartridge is empty.
- Toner remaining check notification function
  Upon detecting the near-empty status of toner, this function automatically notifies your service representative.

- Image optimization function
  This function controls the quality of images to be optimal according to the characteristics of the toner used.

[Operations]

Toner cartridge	Recommended cartridge	Recommended cartridge refilled with new toner	Non-recommended cartridge
Cartridge detecting function	Enabled “Toner not recognized” is displayed when no cartridge is installed.	Enabled “Toner not recognized” is displayed when no cartridge is installed.	Disabled “Toner not recognized” is displayed even when the cartridge is installed.
Toner remaining check function	Enabled “Toner near Empty” is displayed when the cartridge is nearly empty.	Disabled “Toner near Empty” is displayed even when a new cartridge is installed.	Disabled This function does not operate.
Toner remaining check notification function	Enabled	Disabled	Disabled
Image optimization function	Enabled	Enabled	Disabled

A sign of the status that the toner cartridge is nearly empty (= the behavior of the toner lamp) appears when the value of counter for period of toner cartridge rotation time has exceeded the thresholds previously written in the toner cartridge PC board (CTRG). When a used cartridge refilled with new toner is used, that is the value of counter for period of toner cartridge rotation time in the toner cartridge PC board (CTRG) had already exceeded the threshold to determine the near-empty status of the toner at this moment, the sign of the near-empty status appears immediately after the installation of this cartridge. When a non-recommended toner cartridge is used, "Toner not recognized" appears on the touch panel, the equipment may stop normal operations. The toner remaining check function, automatic remote supply order to TOSHIBA sales representatives and image optimization function may also be disabled.
The toner near-empty status threshold setting (08-971) is provided to adjust the timing for displaying the toner near-empty status as follows.

The toner near-empty status threshold setting (08-971)

0: The period from the appearance of the toner near-empty sign to the actual complete consumption of the toner is set long.
1: Normal (Default)
2: The period from the appearance of the toner near-empty sign to the actual complete consumption of the toner is set short.
3: The sign of the status that the cartridge is nearly empty does not appear.

Note that the shorter the period described above is set, the more frequently the toner in the cartridge may run out before the sign of the near-empty status of the toner appears because the way the toner remains in the cartridge differs every time.

When the value of the toner near-empty status threshold setting (08-971) is set at “3”, the toner remaining check function is disabled.
When the cartridge detecting function is set to OFF (08-499 is set at “0”), the value of the toner near-empty status threshold setting (08-971) is automatically set at “3” and the toner remaining check function is disabled
When the cartridge detecting function is set to ON (08-499 is set at “1” or “2”), the value of the toner near-empty status threshold setting (08-971) is automatically set at “1” and the toner remaining check function is enabled.

Cartridge detecting function (08-499)

0: Not detected
1: Only displays a warning message (user selection)
2: Printing stops

When "0" is set for this code, the functions of the toner cartridge PC board (CTRG) will be disabled.
When "1" is set, the equipment will confirm whether the user can continue using the current toner cartridges, if the recommended TOSHIBA toner cartridge data cannot be verified.
When "2" is set, all print jobs requiring toner cartridges will be disabled if the recommended TOSHIBA toner cartridge data cannot be verified.

Image optimization function
Data for controlling the image quality according to the toner characteristics are written in the toner cartridge PC board (CTRG) so that images can be optimally printed.
Also there is a function that sets the image controlling level as required (08-5101).

0: Controlling amount - Medium (default)
1: Controlling amount - Small
2: Controlling amount - Large

11.4.2 Drive circuit of toner motor

The toner motor (brush motor) is a motor to supply toner from the toner cartridge to the developer unit. The toner is driven by the motor driver (LGC board).

Circuit diagram of the toner motor

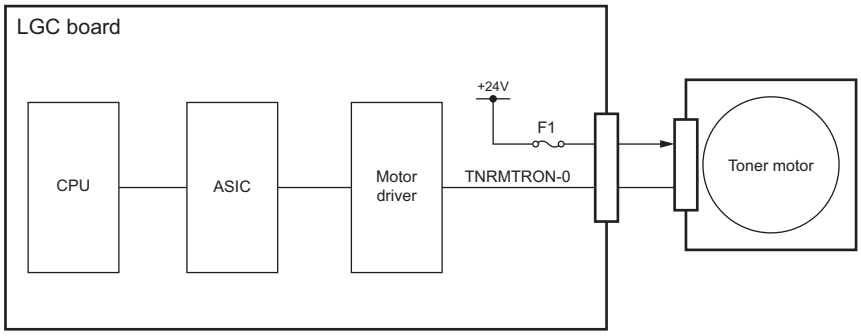


Fig. 11-4

Control signal

Signal	Function	Status	
		High level	Low level
TNRMTRON-0	Toner motor ON signal	Stop	Rotate

11.5 Auto-Toner Circuit

11.5.1 General description

1. Function of the auto-toner circuit
   - Detects the toner density in the developer material, and supplies toner when the density is lowered to a certain level.

   - Detects that there is no toner left in the cartridge (toner-empty detection).

2. The auto-toner circuit consists of the following:
   - Auto-toner sensor:
     Detects the toner density.

   - Control section:
     Controls the toner density so that the toner in the developer material is fixed to certain ratio.

   - Toner motor:
     Supplies toner to the developer material.

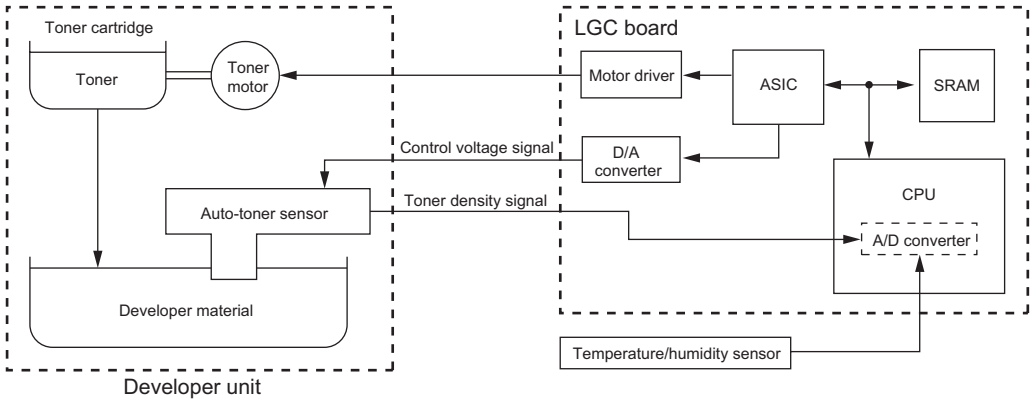


Fig. 11-5

11.5.2 Function of auto-toner sensor

1. Function
   - Initialization adjustment function - At the first use of the equipment or when the developer material is replaced with a new one.
     Automatically adjusts the output value of the auto-toner sensor responding to humidity (input value to the engine CPU) for the toner density of the new developer material so that it stays in range of 2.34 to 2.46 V.

   - Stabilizing the toner density - During the printing operation
     Maintains the toner density to a certain ratio as follows.

     Toner is consumed.
     → The toner density is lowered.
     → Change in the auto-toner sensor output responding to humidity is detected.
     → The toner motor is driven.
     → Toner is supplied from the toner cartridge to the developer unit.

   - Toner-empty detection and recovery:

     Detects that there is no toner in the toner cartridge:
     The toner motor is driven.
     → The auto-toner sensor output does not change.
     → The toner density does not change.
     → It is determined there is no toner in the cartridge (toner empty).

     Recovering from the toner-empty state:
     The toner motor is driven.
     → Toner is supplied from toner cartridge.
     → The auto-toner sensor output changes.
     → The toner density returns to normal value.
     → The toner-empty state is cleared.

2. Function of auto-toner sensor
   - The auto-toner sensor consists of the following circuits:

     Drive winding:
     A magnetic head (primary side) with a high-frequency magnetic field, which forms a magnetic circuit in the developer material.

     Detection winding:
     Receives the change in the magnetic resistance of the developer material through the magnetic circuit (secondary side).

     DC conversion circuit:
     Converts a high-frequency output from the detection winding into a DC signal (auto-toner output V_{ATS}).

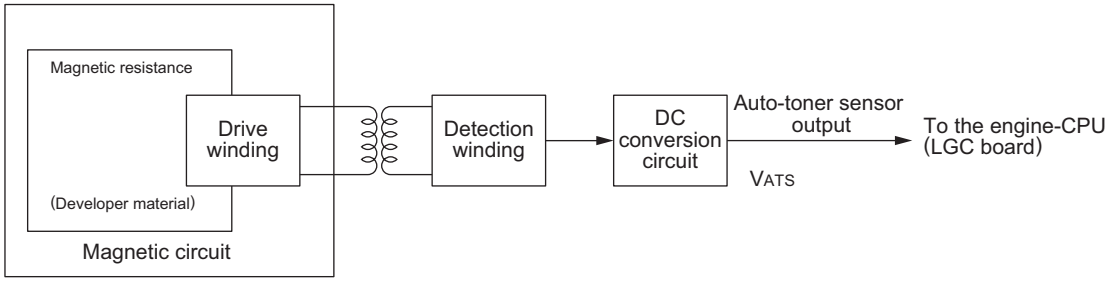


Fig. 11-6

- When the toner density is low

  The ratio of the toner against the carrier in the developer material decreases.
  → The magnetic resistance decreases.
  → The detection output increases.
  → The auto-toner output V_{ATS} increases.

- When the toner density is high

  The ratio of the toner against the carrier in the developer material increases.
  → The magnetic resistance increases.
  → The detection output decreases.
  → The auto-toner output V_{ATS} decreases.

11.6 Disassembly and Replacement

11.6.1 Process unit

(1) Open the automatic duplexing unit.
(2) Open the front cover and take off the toner cartridge.
(3) Loosen 2 screws and pull out the process unit.

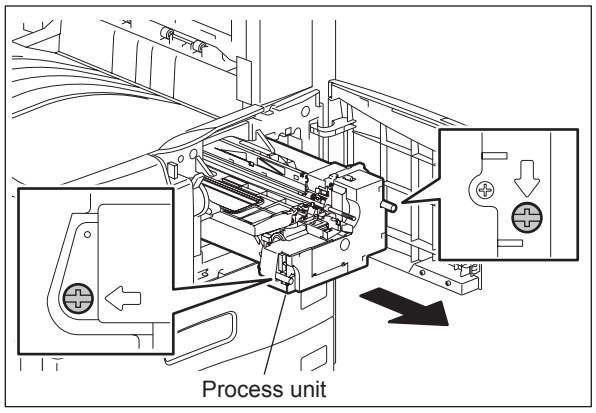


Fig. 11-7

11.6.2 Developer unit

Note:
Make sure to perform "05-280" and take off the process unit before the developer material is replaced.

(1) Take out the process unit
(📖 P.11-12 "11.6.1 Process unit").
(2) Take out the drum cleaner unit from the process unit so that only the developer unit will be left in it
(📖 P.10-9 "10.7.2 Drum cleaner unit").

Notes:
1. Be careful not to touch or scratch the drum surface at this time.

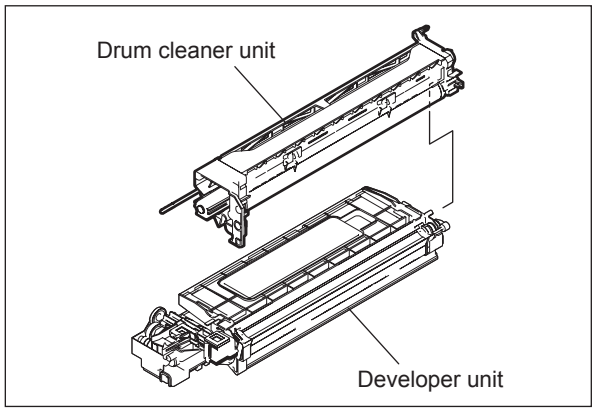


Fig. 11-8

2. Do not deform the Guide Mylar by touching this.

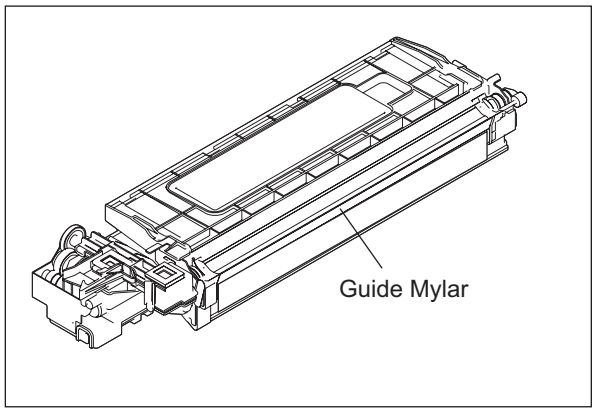


Fig. 11-9

11.6.3 Removing developer material

(1) Take out the developer unit
(📖 P.11-13 "11.6.2 Developer unit").
(2) Remove 2 screws and slide the developer unit upper cover to the direction of the arrow and take it off.

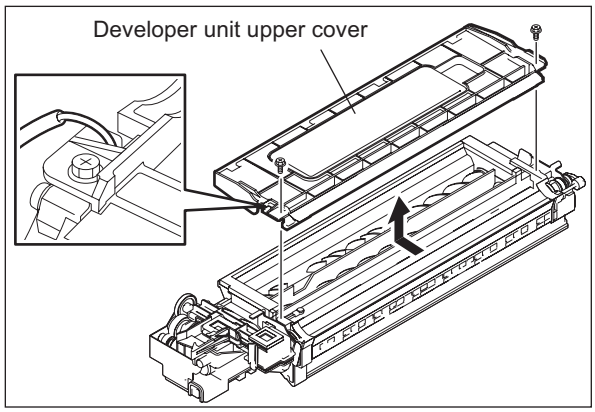


Fig. 11-10

Note:

When installing the developer unit upper cover, make sure that the side seal comes between the developer unit upper cover and rubber seal on the cover.

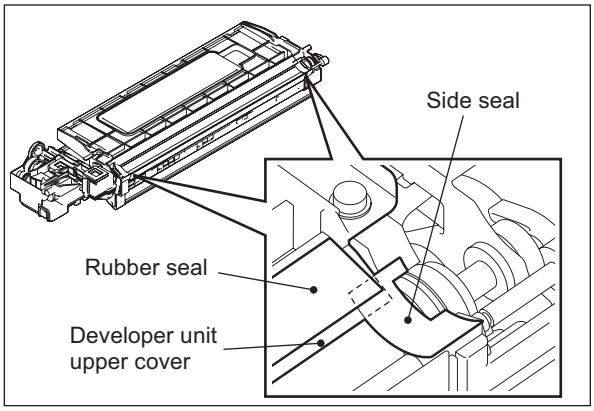


Fig. 11-11

(3) Remove the developer material from rear side.

Notes:

1. When removing the developer material, be careful not to drop the developer material on the gears of the developer unit.
2. When cleaning the developer unit, never attempt to use solvent.

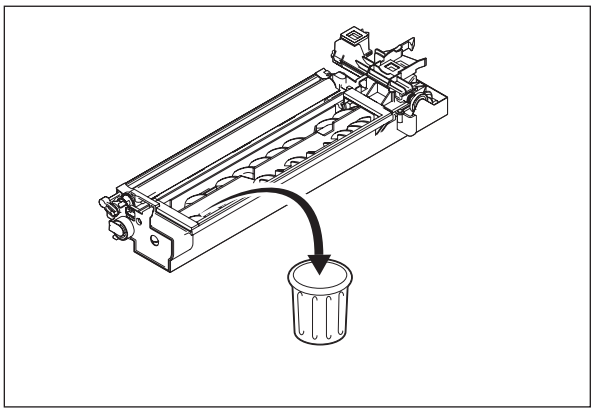


Fig. 11-12

11.6.4 Filling developer unit with developer material

(1) Install the developer nozzle jig on the developer bottle.
(2) Rotate the gear on the rear side of the developer unit to the direction of the arrow while filling the developer unit with the developer material. Spread out the developer material over the developer sleeve.

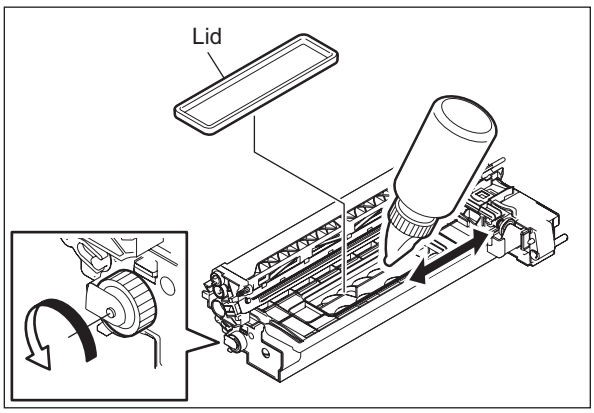


Fig. 11-13

11.6.5 EPU memory board (EPU)

(1) Remove the developer material (📖 P.11-13 "11.6.3 Removing developer material").
(2) Place the developer unit upside down. Disconnect 2 connectors.

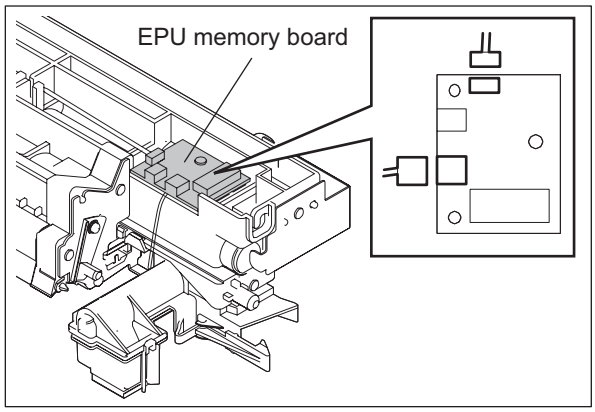


Fig. 11-14

(3) Remove 1 screw. Then take off the EPU memory board.

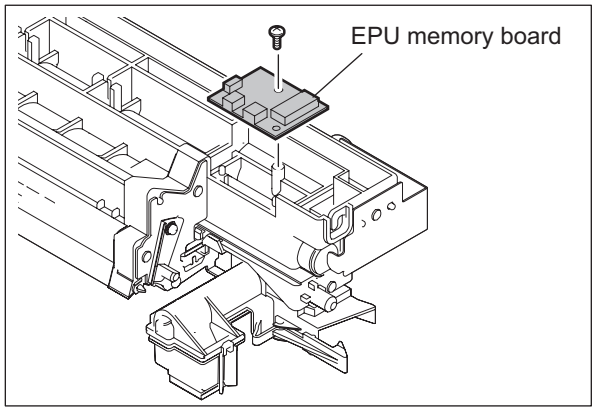


Fig. 11-15

11.6.6 Auto-toner sensor (S8)

(1) Remove the developer material (📖 P.11-13 "11.6.3 Removing developer material").
(2) Place the developer unit upside down. Disconnect 1 connector.

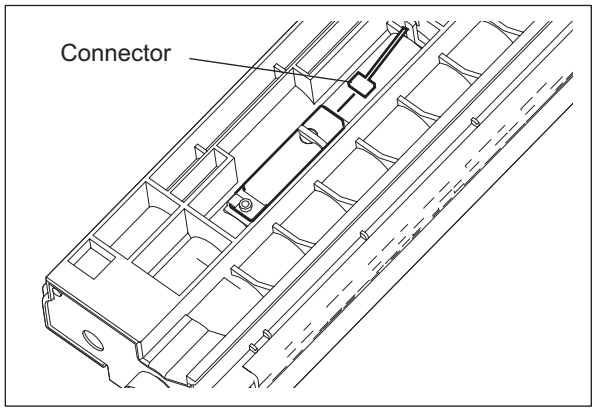


Fig. 11-16

(3) Take off the auto-toner sensor by rotating it.

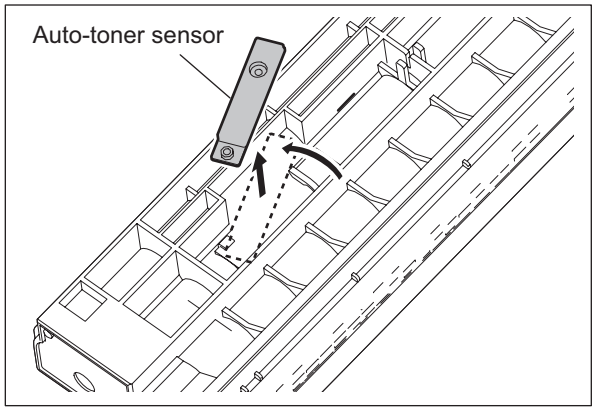


Fig. 11-17

11.6.7 Drum thermistor (THMS4)

(1) Remove the developer material (📖 P.11-13 "11.6.3 Removing developer material").
(2) Disconnect 1 connector, remove 1 screw and take off the drum thermistor.

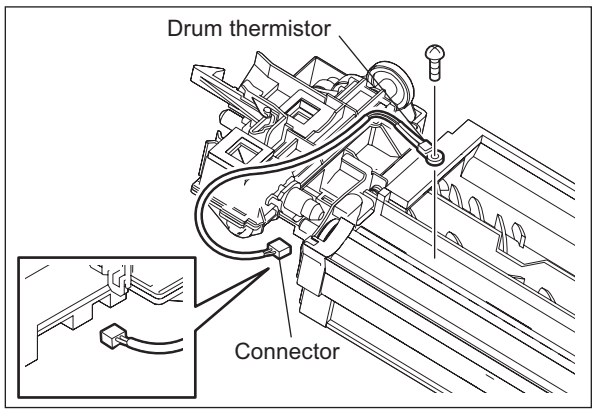


Fig. 11-18

11.6.8 Guide roller / Developer sleeve

(1) Remove the developer material (📖 P.11-13 "11.6.3 Removing developer material").
(2) Remove 2 screws and take off the recovered toner supply unit.

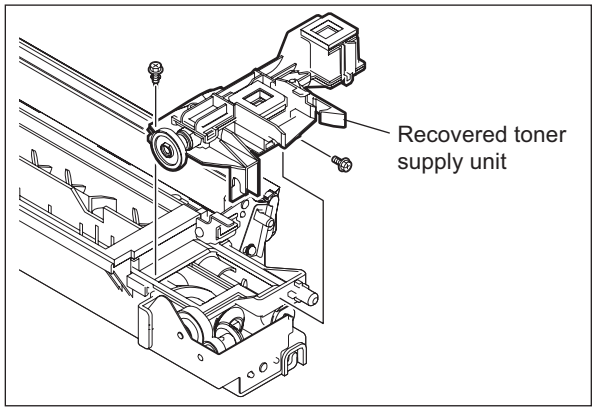


Fig. 11-19

(3) Remove 1 screw and take off the recovered toner drive unit. Remove 1 gear.

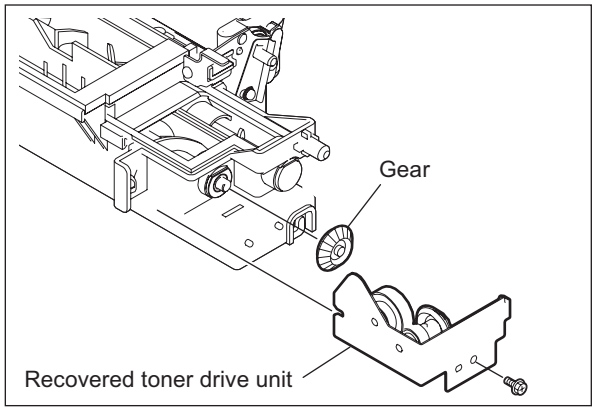


Fig. 11-20

(4) Remove 2 plate springs fixing the doctor sleeve on its both ends.

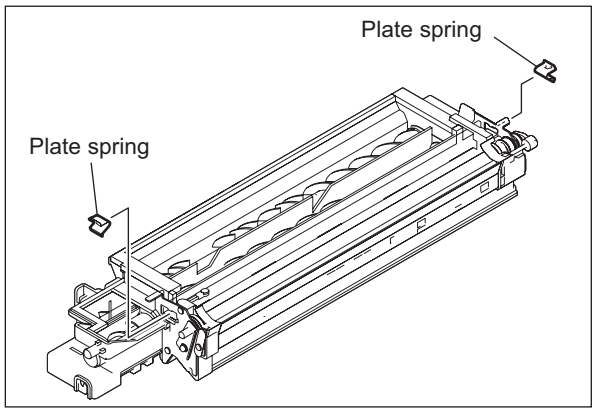


Fig. 11-21

(5) Remove 2 screws on both ends of the doctor sleeve and remove 2 coil springs.

Note:
When the screws on both ends of the doctor sleeve are removed, be sure to adjust the doctor sleeve gap (0.45±0.05 mm) after assembling.
(Refer to Service Handbook Chap. 3)

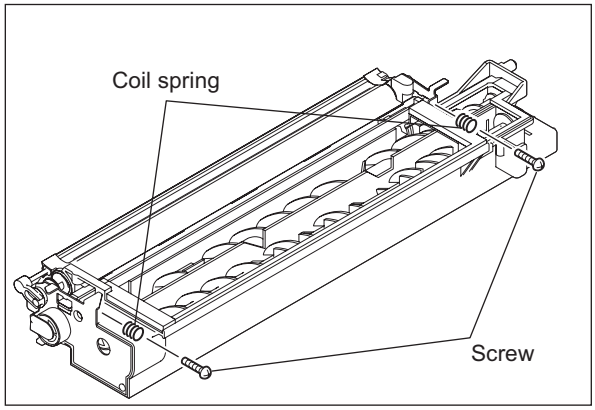


Fig. 11-22

(6) Remove 1 screw and plate spring. (only e-STUDIO355/455)

(7) Remove 1 screw and take off the polarity adjustment lever.

Note:

Make a note of the position where the polarity adjustment lever is pointing. (Mark the position if needed.) When reassembling, match the polarity adjustment lever with the previously marked position on the scale.

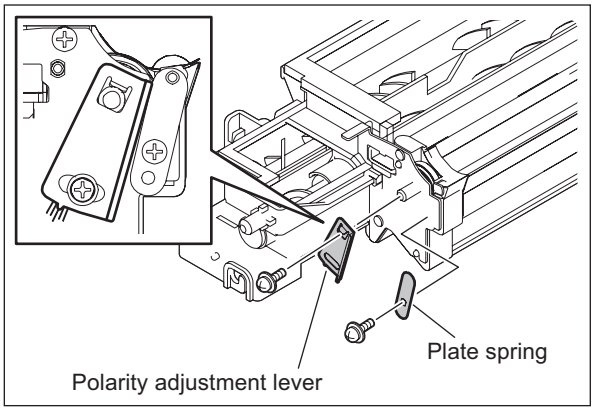


Fig. 11-23

(8) Remove 2 screws and take off the bracket.

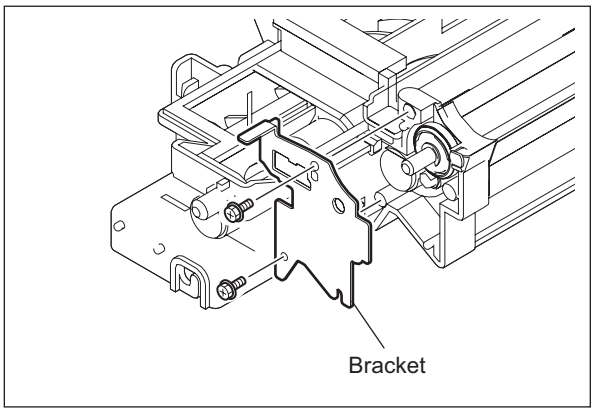


Fig. 11-24

(9) Remove 1 E-ring and take off the guide roller on the front side.

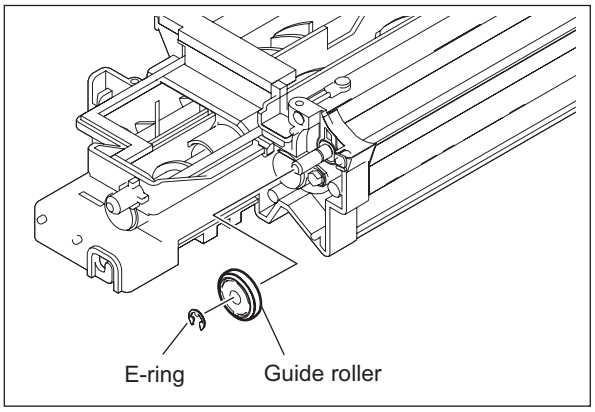


Fig. 11-25

(10) Remove 1 E-ring. Remove the arm and cam.

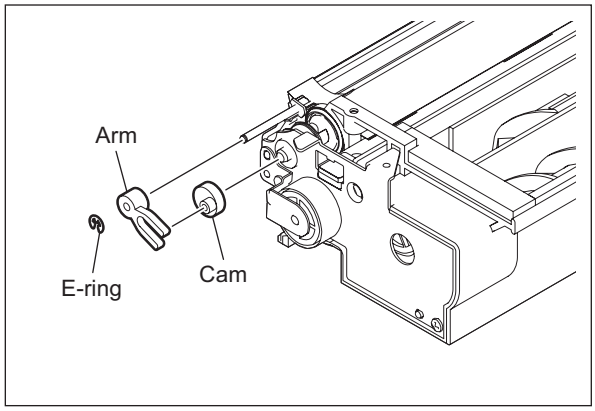


Fig. 11-26

(11) Remove 1 screw and the gear.

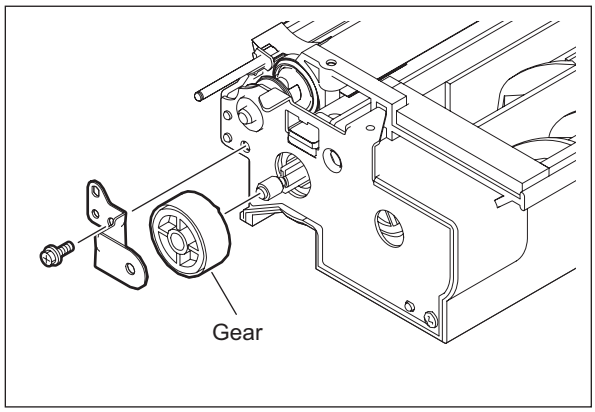


Fig. 11-27

(12) Remove 2 screws. Take off 1 bearing and the bracket.

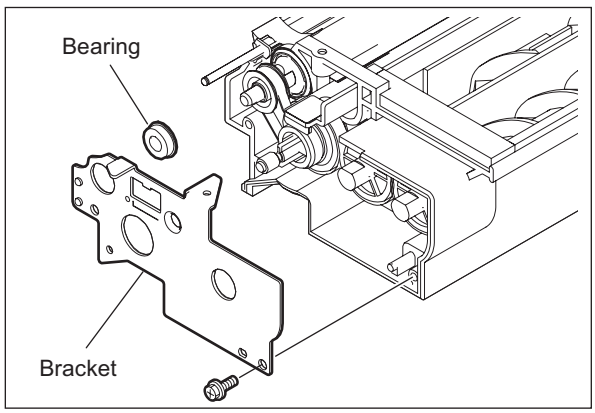


Fig. 11-28

(13) Take off 3 gears and 1 timing belt.

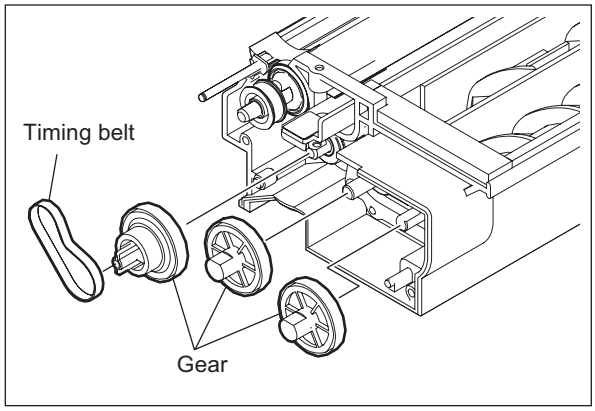


Fig. 11-29

(14) Remove 1 E-ring, 1 pin and 1 pulley.
(15) Take off the guide roller on the rear side.

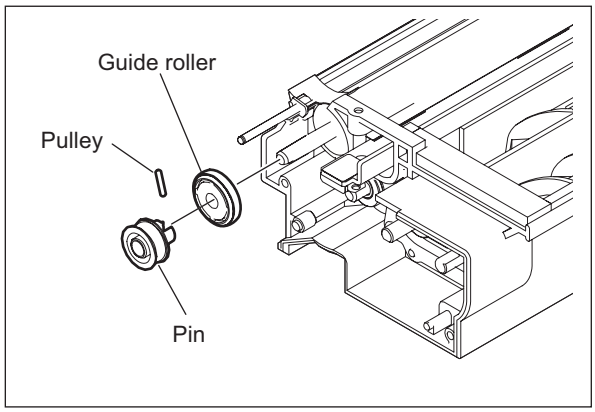


Fig. 11-30

(16) Remove the seal on the front side. Remove 1 E-ring and 1 bushing.

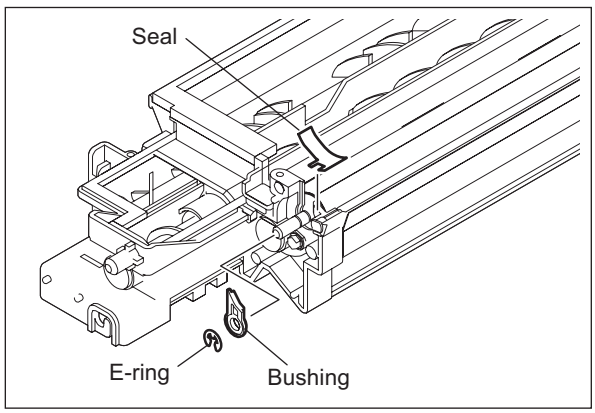


Fig. 11-31

(17) Take off the developer sleeve.

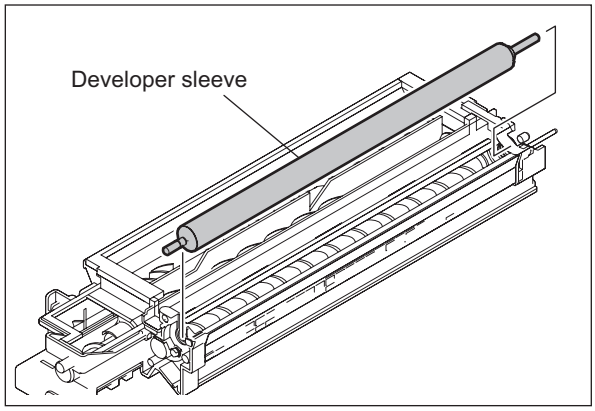


Fig. 11-32

11.6.9 Mixer

(1) Take off the developer sleeve (📖 P.11-16 "11.6.8 Guide roller / Developer sleeve").
(2) Take off the doctor sleeve.

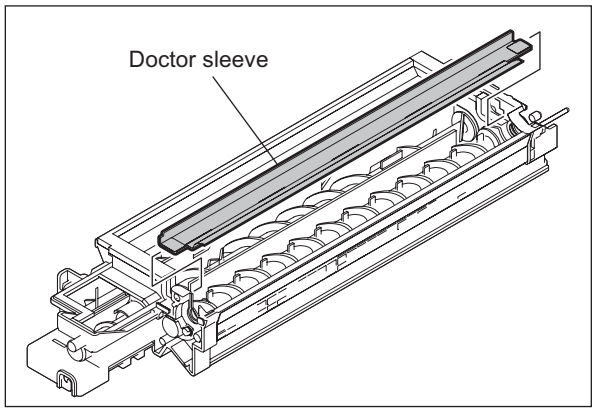


Fig. 11-33

(3) Remove 2 screws and take off the holder.

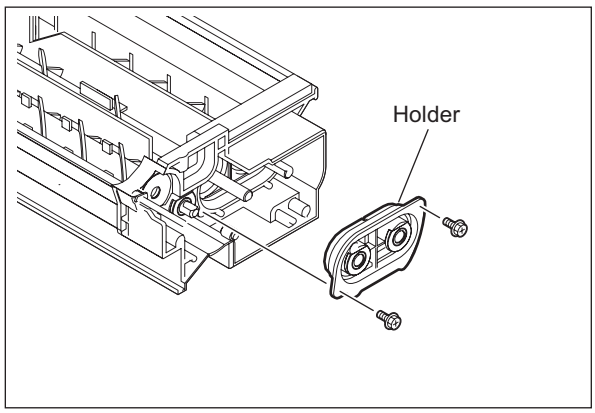


Fig. 11-34

(4) Remove 2 bushings and 2 oil seals from the holder.
(Replacement of Oil Seal: 🕮 P.11-24 "11.6.10 Replacement of oil seal")

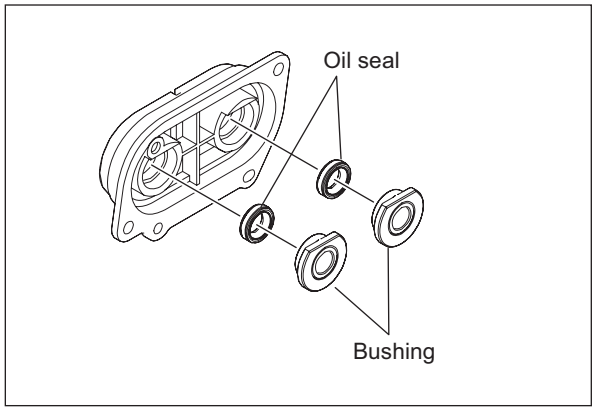


Fig. 11-35

(5) Take off the mixers-2 and -3.

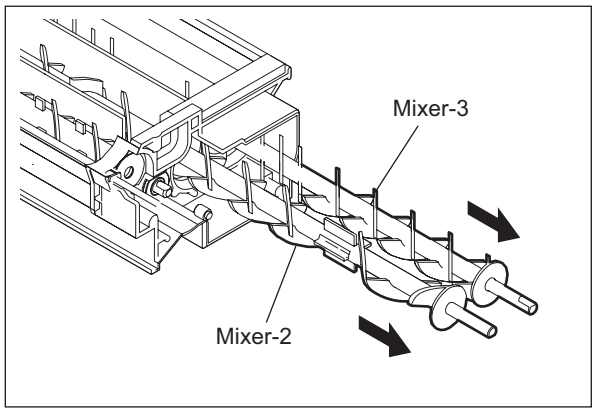


Fig. 11-36

(6) Remove 2 bushings and 2 oil seals on the front side.
(Replacement of Oil Seal: 🕮 P.11-24 "11.6.10 Replacement of oil seal"

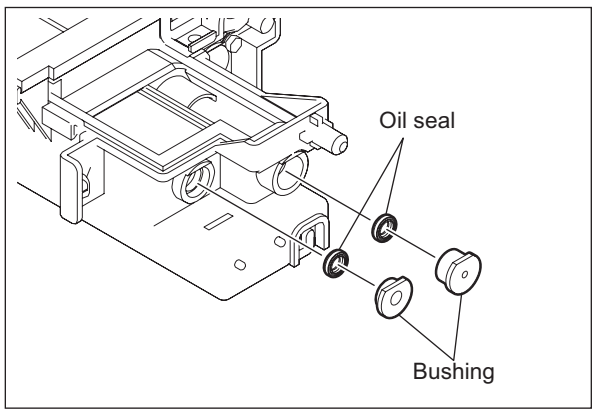


Fig. 11-37

(7) Remove the end section of the mixer-1.
(8) Remove the bushing and oil seal.
(Replacement of Oil Seal: 🕮 P.11-24 "11.6.10 Replacement of oil seal")

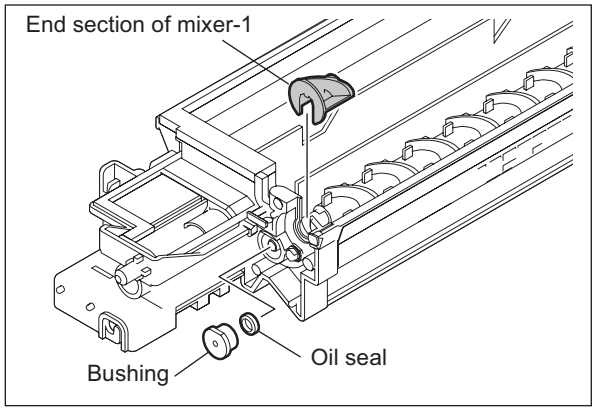


Fig. 11-38

(9) Take off the mixer-1.

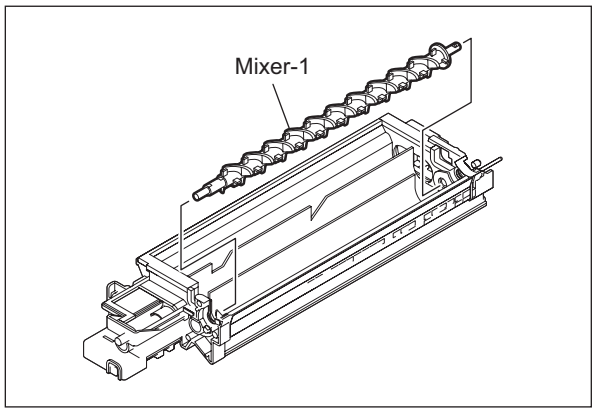


Fig. 11-39

(10) Remove the bushing on the rear side.
(11) Remove the oil seal.
(Replacement of Oil Seal: 🕮 P.11-24 "11.6.10 Replacement of oil seal")

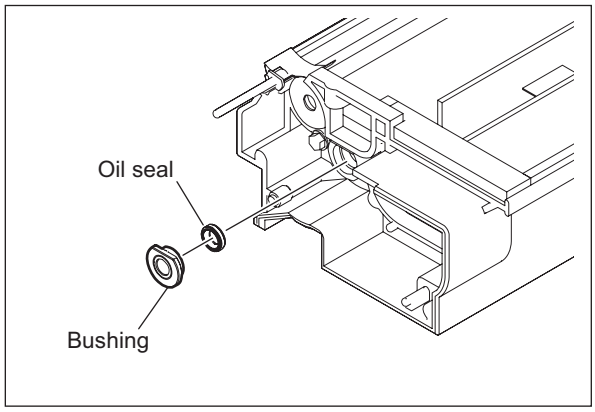


Fig. 11-40

11.6.10 Replacement of oil seal

(1) Insert a fine screwdriver into the depression of the oil seal to take it out.
(2) Push in a new oil seal parallel to the frame or bushing (shown figure at right).
(3) Apply the grease (Alvania No.2; amount of 2 rice grains) on entire surface of the oil seal evenly.

Note:
Wipe off the excessive grease.

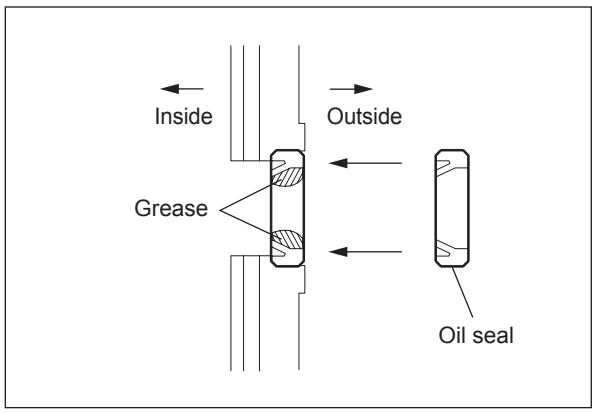


Fig. 11-41

12. FUSER UNIT

12.1 General Description

In the fuser unit, toner is fused by applying heat and pressure on the transferred image on the transported paper. The paper is then transported to the paper exit section after completion of fusing. The fuser unit consists of the heater lamps, fuser roller, pressure roller, separation fingers, thermistors, thermostat, etc.

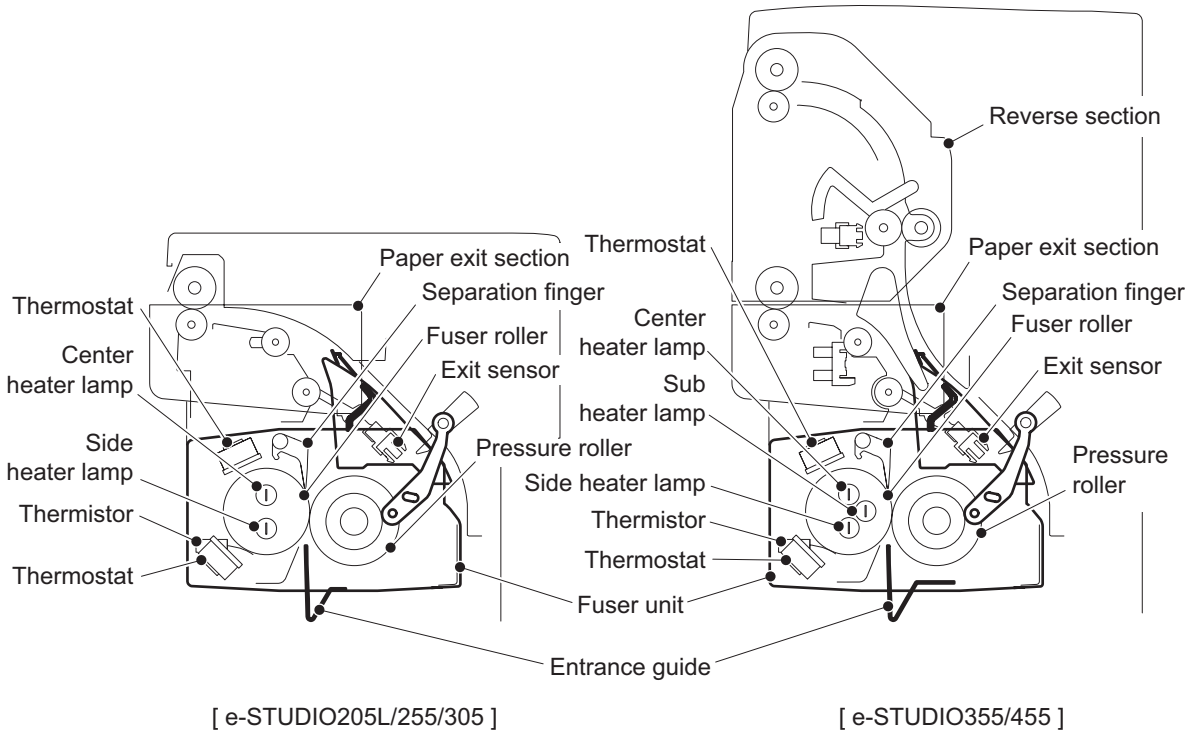


Fig. 12-1

12

Differences between e-STUDIO205L/255/305 and e-STUDIO355/455

item	e-STUDIO205L/255/305	e-STUDIO355/455
Sub heater lamp Pressure roller Connector	Not installed Ø30(mm) For e-STUDIO205L/255/305	Installed Ø35(mm) For e-STUDIO355/455

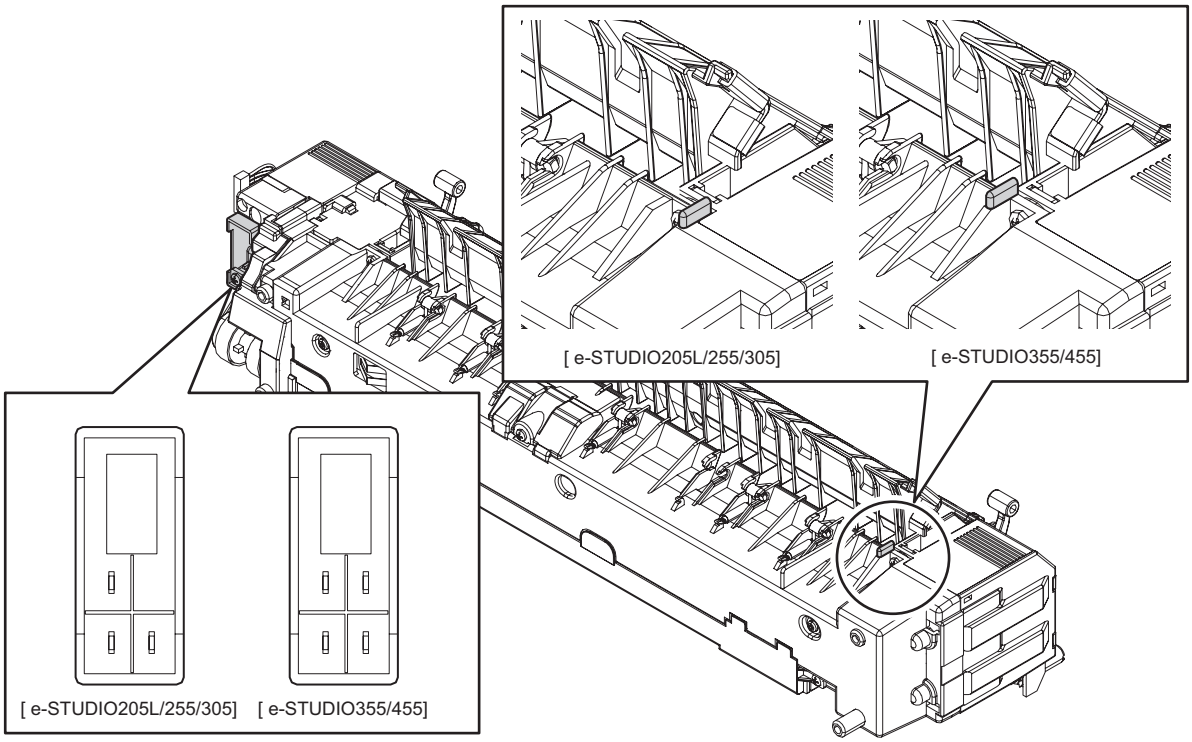


Fig. 12-2

12.2 Functions

1. Heater lamp
   The heater lamps are halogen lamps to apply heat to the fuser roller. The fuser unit in this equipment has 3 heater lamps with different functions each other.
   3 heater lamps having different functions are called the center heater lamp, the side heater lamp and the sub heater lamp. The center heater lamp has a coil wound up on its center and this part generates heat. The side heater lamp has coils wound up on its both ends and these parts generate heat. Te sub heater lamp has a coil wound up in whole and generates heat to assist the center heater lamp and the side heater lamp.
   For e-STUDIO205L/255/305, the sub heater lamp is not installed.
   The following is the output of each heater lamp.
   Center heater lamp: 600W
   Side heater lamp: 600W
   Sub heater lamp: 300W

2. Fuser roller
   The fuser roller applies heat onto the paper and is heated by the heater lamps installed inside of the fuser roller. The heat from this roller fuses toner onto the paper. The fuser roller in this equipment is a thin roller and the warming-up time is shortened.

3. Pressure roller
   The pressure roller is a sponge roller which assures the nip amount of the fuser roller. The pressure from the spring presses the paper onto the fuser roller to fuse the toner onto the paper efficiently. The pressure roller is electrical conductive, and to improve the transferability and prevent offset, positive (+) bias is applied to the pressure roller and the entrance guide. A sponge roller with a lower hardness is adopted for the pressure roller in this fuser unit to enable envelopes to pass through. The outside diameter of the pressure roller is ø30(mm) for e-STUDIO205L/255/305 and ø35(mm) for e-STUDIO355/455.

4. Separation fingers
   The separation fingers are installed, five above the pressure roller and five above the fuser roller, in order to separate the paper adhered on each roller.

5. Center thermistor / Side thermistor
   This thermistor detects the temperature of the fuser roller to maintain it in a certain temperature range (actually around 180°C) between the lower limit causing the poor fusing and the upper limit causing the high temperature offsetting. When the temperature of the fuser roller is lower than the preset temperature, it turns ON the power supply to the heater lamps, and when it is higher than the preset temperature, it cuts off the supply.
   The center thermistor detects the temperature of the center part of the fuser roller, and the side thermistor detects the temperature of one side of fuser roller and control the both sides.

6. Edge thermistor
   It detects the temperature abnormality at the both ends of the fuser roller. This area may be overheated without heat absorption by paper since paper does not pass through this area. This thermistor is not related to the temperature control of the fuser roller.

7. Thermostat
   The thermostat cuts off the power supply to the heater lamps by opening itself if the fuser roller becomes abnormally hot as a result of the problem such as thermistor malfunction. The thermostat for this equipment is used to prevent abnormal operation. When the thermostat detects any abnormality, it must be replaced as well as the other damaged parts in the fuser unit.

8. Exit sensor
   The exit sensor detects if the leading edge of the paper or the paper has passed through the fuser unit. This sensor is also used for the detection of a paper jam in the fuser unit and paper exit section.

12.3 Operation

The fuser roller is pressed with the spring force from the pressure roller side, and is rotated by the main motor drive. Then the paper transported to the fuser unit is hold between the fuser roller and pressure roller and the toner is fused on the paper with heat and pressure. After this, the separation fingers separate the paper from the fuser roller or pressure roller. Then the paper is transported to the inner tray, paper exiting options or ADU through the exit roller. In addition, the heater lamps in the fuser roller do not structurally rotate.
3 heater lamps having different functions each other are installed; the center heater lamp applies heat to the center part of the fuser roller, the side heater lamp applies heat to both ends of the roller, and the sub heater lamp applies heat to the whole roller and assists the heater lamp and the side heater lamp. For e-STUDIO205L/255/305, the sub heater lamp is not installed.

The thermistors control the temperature of fuser roller and detect temperature abnormalities. If the temperature becomes excessively high, the thermostat is opened to stop the power supply to the heater lamps.

12.4 Heater Control Circuit

12.4.1 Configuration

In this equipment, the surface temperature of the fuser roller is controlled by turning ON/OFF 3 heater lamps (center, side and sub) which have different heat-generating positions with the command from the engine-CPU on the LGC board.
The surface temperature of the fuser roller is detected by 3 thermistors (center, side and edge) and then the information of the temperature is transmitted to the engine-CPU and each control circuit. Based on the detected temperature, the engine-CPU transmits the control signal of the heater lamp to the control circuit (TRC: Triac) of each heater lamp on the switching regulator via the temperature control circuit. The power supply to the fuser roller is thus controlled by driving TRC. The temperature control circuit detects the overheating of the fuser roller. In case that the surface temperature of the fuser roller has exceeded the specified temperature, the temperature control circuit turns the heater lamp OFF. If the temperature control circuit does not function for some reason and the fuser roller is abnormally overheated as the result, a relay OFF circuit transmits a relay OFF signal to turn off the relay, and to turn the power OFF forcibly.
If the temperature control circuit does not function for some reason and the fuser roller is abnormally overheated as the result, a forcible power-OFF circuit transmits a reset signal to the power switch to turn the power OFF forcibly. In addition, if these control circuits do not function with thermistor abnormality or other reasons and the fuser roller is abnormally overheated as the result, 2 thermostats (front and center ones in the fuser unit) shut off the power supply to the heater lamps to protect the equipment.
For e-STUDIO205L/255/305, the sub heater lamp is not installed.

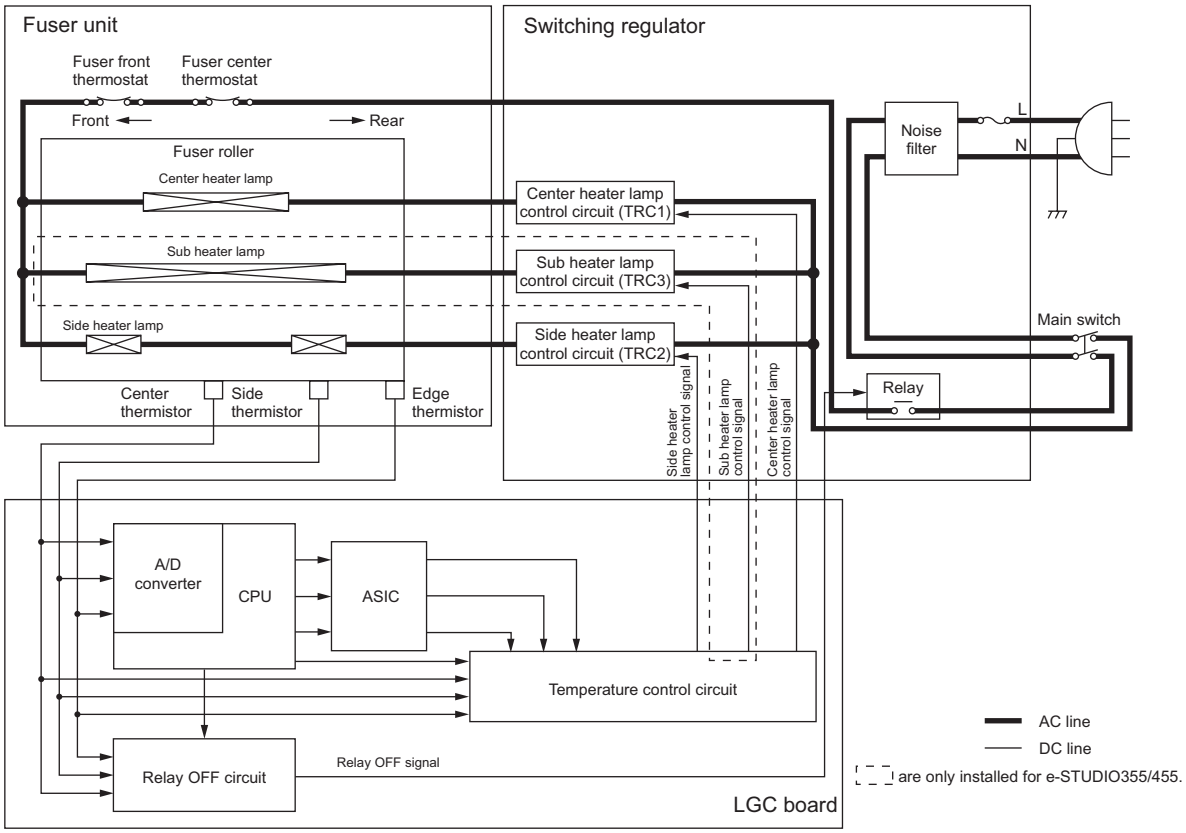


Fig. 12-3

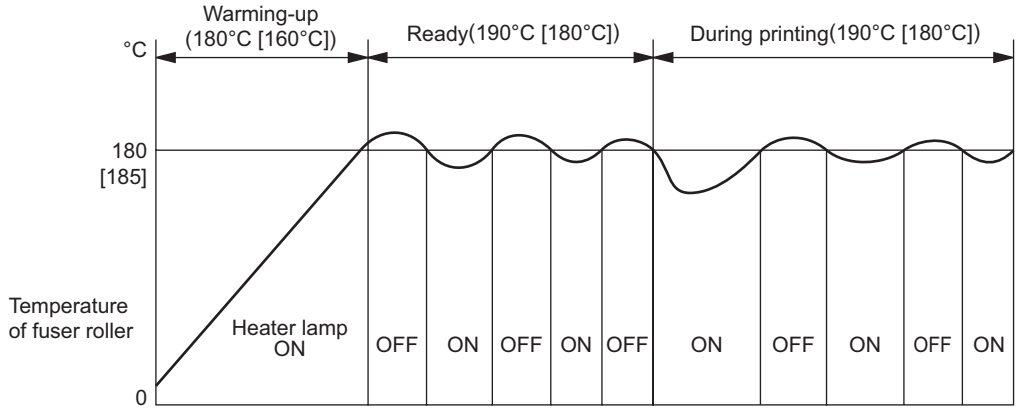
12.4.2 Temperature detection section

To maintain the surface temperature of the fuser roller at a certain level, 3 thermistors (center, side and edge) detect the surface temperature of the fuser roller to turn ON/OFF and control 3 heater lamps (center, side and sub).
For e-STUDIO205L/255/305, the sub heater lamp is not installed.

1. Relation between the thermistor output voltage and surface temperature of the fuser roller

Output voltages of thermistors [V]	Surface temperatures of fuser roller [ºC]
Approx. 0.3	40
Approx. 1.2	100
Approx. 2.4	180

2. Control of the surface temperature of the fuser roller



* [ ] are for e-STUDIO205L/255/305.

Fig. 12-4

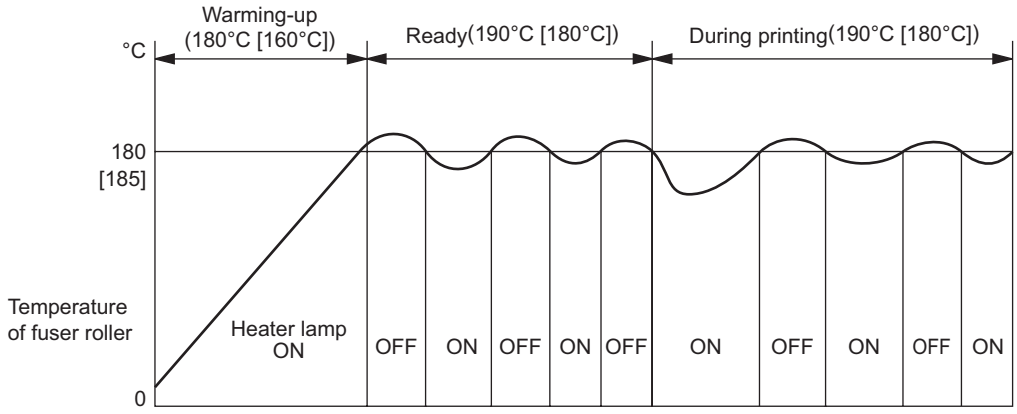
3. Temperature control for the both ends of the fuser roller
   During continuous printing, the temperature of the end of the fuser roller (area where the paper does not pass on) generally tends to be higher than that of other areas (areas where the paper passes on). For this reason, the edge thermistor detects the temperature of the end of the fuser roller. When this thermistor detects the abnormal temperature (230°C), the heater lamp is turned OFF regardless of the temperature of the area where the paper passes on.

4. Temperature control at Energy Saving Mode
   This equipment has the following two types of temperature control for saving energy and returns to ready status to perform printing in each mode upon printing request.
   The period of time from the printing request to this mode can be set in "Setting Mode (08)" or by an administrator.

   Administrator setting procedure:
   [USER FUNCTIONS] button → [ADMIN] (input of administrator's password) → [GENERAL] → [ENERGY SAVER]

   Low Energy Mode (Auto power save mode timer setting (08-205)):
   When the printing is not performed in a specified period of time (default setting: 1 min.) after the previous printing is completed, the equipment enters to Low Energy Mode to control the heater lamp in low temperature.

   Sleep Mode/ Super Sleep Mode (Auto Shut Off Mode timer setting (08-206)):
   When the printing is not performed in a specified period of time (default setting: 1 min. after the previous printing is completed, the equipment enters to Auto Shut Off Mode to turn OFF the heater lamp.
   *If the same setting time is set for both Low Energy Mode and Sleep Mode/ Super Sleep Mode, Sleep Mode/ Super Sleep Mode have the priority.
   *Set whether the Super Sleep Mode is valid or invalid in 08-8543.



* [ ] are for e-STUDIO205L/255/305.

Fig. 12-5

5. Fuser unit error status counter control

- To enhance the safety of the fusing section unit, engine-CPU provides the following protection: When the third [C410] error has occurred after two consecutive [C410] errors, the heater lamp is not turned ON and error [C410] is displayed immediately even if an operator turns OFF the power and back ON. However, if the equipment goes into a ready state normally with the fuser unit error status counter "1" or below, the counter is cleared to "0".

- If the error codes [C410] and [C430] to [C450] are displayed and still not cleared even though the thermistor, thermostat and heater lamp have been repaired (and the power ON/OFF does not clear the error), check the Setting Mode (08-400) to set the fuser unit error status counter to "0".

Remark:

The fuser unit error status counter (Setting Mode (08-400)) never has values other than 0-9.

- If the heater lamp does not turn ON and the service call [C410] is displayed immediately after the power is ON, ensure the fuser unit error status counter is "2" or over. If it is "2" or over, be sure to check the thermistor, thermostat and heater lamp. Reset the counter to "0" after repairing them, then turn ON the power.

- If the fuser unit error status counter is "20" or over (e.g., 21), the data in EEPROM or EEPROM itself may possibly have been ruined due to causes such as leakage from the chargers.
  Check the bias, high-voltage transformers and charge wires to see if any of them is defective, and also look through all the data in the EEPROM.

- When the thermistors detect overheating, the engine-CPU decides the error code and counter value of the fuser unit error status. After turning OFF each output (the heater lamp, exposure lamp, control panel display, motors and so on), the engine-CPU turns OFF the power to protect the fuser unit.

  Error code: C440 ([C] and [9])
  Counter value of the fuser unit error status: 9 (08-400)

  Thermistors continue detecting the abnormal temperature even after the error codes and counter values are decided. Even if the power is turned ON immediately, it is automatically turned OFF again when the surface temperature of the fuser roller is still higher than the abnormal temperature detected.
  Wait until the surface temperature of the fuser roller is lowered enough, and turn ON the power to check the counter value while it is turned OFF again. After confirming that it is the fuser unit abnormality, correct the abnormality and reset the counter value (08-400) to "0" to start up the equipment normally.

6. Temperature detection configuration
   Thermistor is a device whose resistance decreases as it detects a higher temperature. Thus its input voltage to engine-CPU changes and then engine-CPU judges whether this change is normal or abnormal. If one of the fuser roller thermistors is broken, the control circuit judges that the fuser roller temperature is extremely low and keeps turning the heater lamp ON. As a result, the fuser roller temperature rises, and possibly activates the thermostat which is a safety protection device. To prevent this in advance, engine-CPU works to detect whether each thermistor is broken or not. Also, the thermistors constantly check the temperature of heater lamp to prevent it from excessive heating by LGC circuit abnormality or thermistor abnormality. The thermistors automatically turn OFF the power when the temperature of heater lamp exceeds the specified temperature.

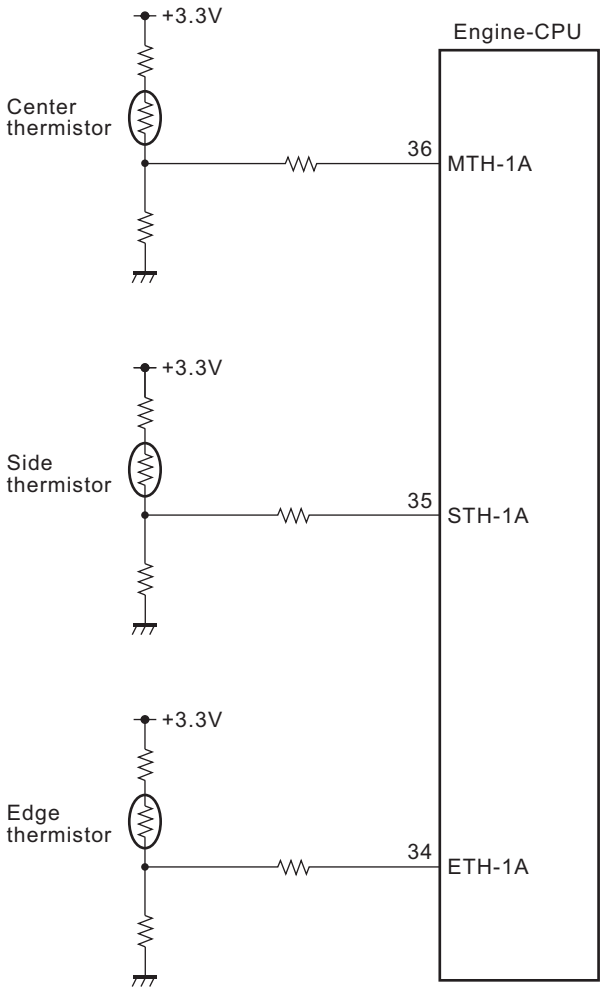


Fig. 12-6

7. Abnormality detection by the thermistors
   The following table shows the conditions judging the fuser roller temperature abnormality and detecting timing.

Checking timing	Priority	Temperature judged			Error-judging timing	Error code	Counter (08-400)
		Center thermistor	Side thermistor	Edge thermistor			
Power ON	1	240°C or above	-	-	Power ON	C440	9
		-	240°C or above	-			
Detecting 40°C	1	240°C or above	-	-	On usual	C440	9
		-	240°C or above	-			
	2	40°C or below	-	-	Specified time	C410	1 or 2
		-	40°C or below	-			
Detecting 100°C	1	240°C or above	-	-	On usual	C440	9
		-	240°C or above	-			
	2	40°C or below	150°C or above	-	During warming-up status	C430	4
		150°C or above	40°C or below	-			
	3	100°C or below	-	-	Specified time	C440	5
		-	100°C or below	-			
Detecting ready temperature	1	240°C or above	-	-	On usual	C440	9
		-	240°C or above	-			
	2	40°C or below	150°C or above	-	During warming-up status	C430	4
		150°C or above	40°C or below	-			
		-	150°C or above	40°C or below			
	3	Ready temp. or below	-	-	Specified time	C440	5
		-	Ready temp. or below	-			
During ready status	1	240°C or above	-	-	On usual	C440	9
		-	240°C or above	-			
	2	40°C or below	150°C or above	-	During ready status	C430	4
		150°C or above	40°C or below	-			
		-	150°C or above	40°C or below			
	3	40°C or below	-	-	During ready status	C440	7
		-	40°C or below	-			
During printing	1	240°C or above	-	-	On usual	C440	9
		-	240°C or above	-			
		-	-	240°C or above			
		40°C or below	-	-	During printing		7
		-	40°C or below	-			
	2	-	-	40°C or below	During printing	C450	6
In Energy Saving Mode	1	240°C or above	-	-	On usual	C440	9
		-	240°C or below	-			
At paper jam	1	240°C or above	-	-	On usual	C440	9
		-	240°C or below	-			
In Self-diagnosis Mode	1	240°C or above	-	-	On usual	C440	9
		-	240°C or below	-			

* The figures in the “priority” section denote the priority of error checking.

12.5 Fuser unit fuse status determining circuit

With this model, the fuser unit can be removed easily with ERU (Easy Replacement Unit).
The fuser unit fuse (service part) can be installed to the fuser unit.
The fuser unit use status determining circuit determines whether a fuser unit is new or used by detecting the status of the fuse.
In addition, when the circuit detects that a new fuser unit is connected, it supplies current to blow out the fuser unit fuse to clear the fuser-related life counters. (Service management required)

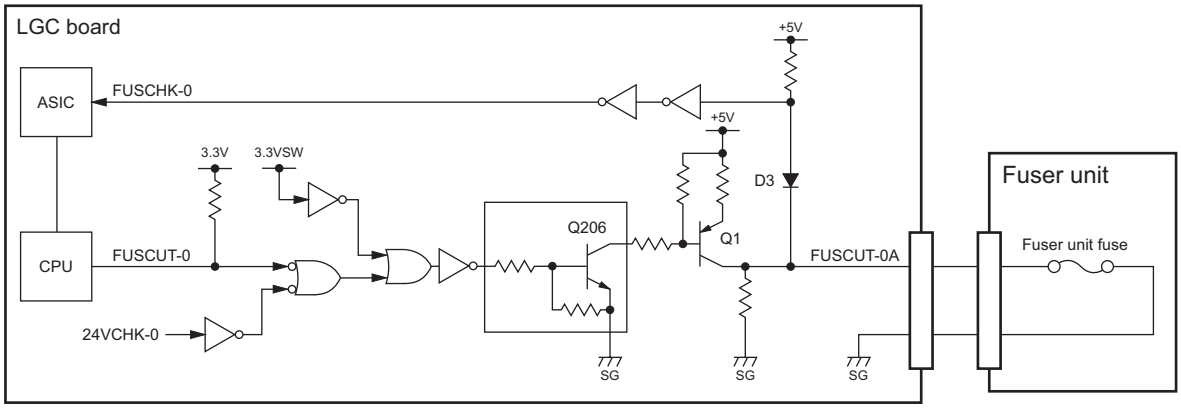


Fig. 12-7

Control signals

Signal	Functions	Status	
		Level H	Level L
FUSCHK-0	Fuser unit use status determining signal	Used	New
FUSCUT-0	Fuser unit fuse blowing out signal	OFF	ON (blowing out)
24VCHK-0	Cover opening/closing detection signal (24V energizing detection signal)	Cover closed	Cover open

Notes:

- C4C0 error occurs when it can not blow out the fuser unit fuse even if it detects a new fuser unit.

- Confirm if 08-4549 is "0" when the counter is not cleared even if a new fuser unit is connected.
  When it is "1", change it to "0" and confirm the counter again after turning the power off and on.
  08-4549 (Detection setting of new or old fuser unit) 0: Valid 1:Invalid

- When replacing supplies without installing the fuser unit fuse, clear the fuser-related life counters in the PM support mode written in chapter 5.

- The life counters which will be cleared when the fuser unit fuse is blown out are as follows in the table below.
  - Fuser roller counter 08-1246
  - Pressure roller counter 08-1250
  - Fuser roller separation finger counter 08-1268
  - Heater and energizing time accumulating counter 08-1372
  - Counter for period of time fuser unit is at ready temperature 08-1378
  - Counter for period of time fuser unit is at printing temperature 08-1380
  - Counter for period of time fuser unit is at energy saving temperature 08-1382
  - Number of output pages (Thick paper 1) 08-1385
  - Number of output pages (Thick paper 1) 08-1385
  - Number of output pages (Thick paper 2) 08-1386
  - Number of output pages (Thick paper 3) 08-1387
  - Number of output pages (OHP film) 08-1388
  - Counter for envelopes 08-1411
  - Counter for tab paper 08-1412

12.6 Disassembly and Replacement

12.6.1 Fuser unit

(1) Open the small right rear cover.
(2) Loosen 2 screws and take off the fuser unit.

Note:
Be careful when handling the fuser unit as it may become very hot.

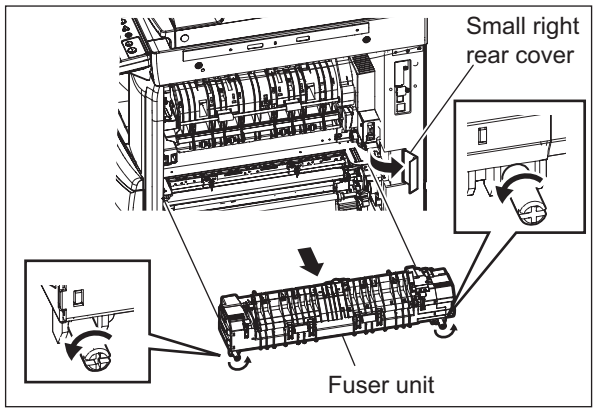


Fig. 12-8

12.6.2 Fuser roller unit / Pressure roller unit

(1) Take off the fuser unit
(P.12-13 "12.6.1 Fuser unit").
(2) Remove 1 screw and take off the rear cover. Disconnect 1 connector.

Note:
When installing the rear cover, make sure that the harness is not caught.

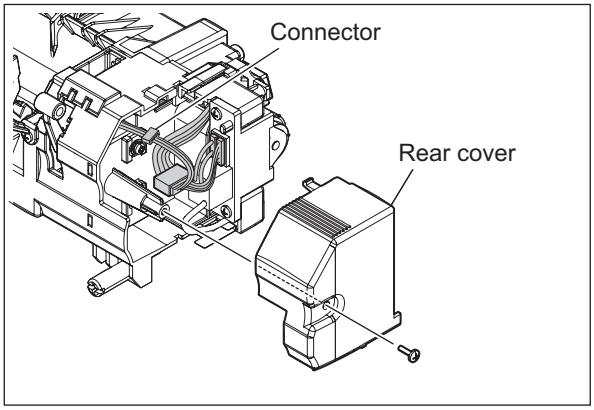


Fig. 12-9

(3) Remove 2 screws and take off the fuser roller unit and the pressure roller unit.

Note:
When installing, be sure to release the pressure release lever.

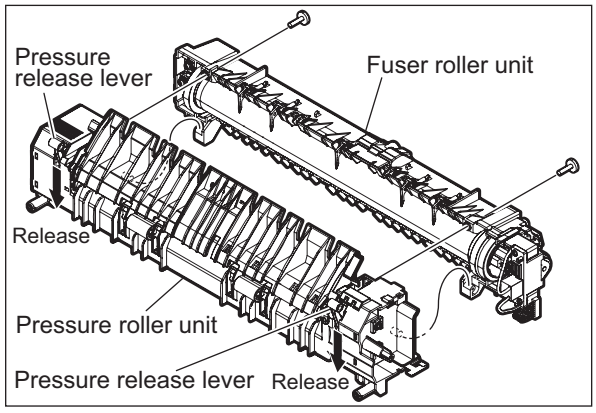


Fig. 12-10

12.6.3 Separation finger

(1) Take off the fuser roller unit
(📖 P.12-13 "12.6.2 Fuser roller unit / Pressure roller unit").

(2) Remove 5 springs and take off 5 separation fingers.

Note:
When installing these 5 separation fingers, make sure that the positions are correct as shown in the figure. (Do not install them in 2 positions indicated by the arrows.)

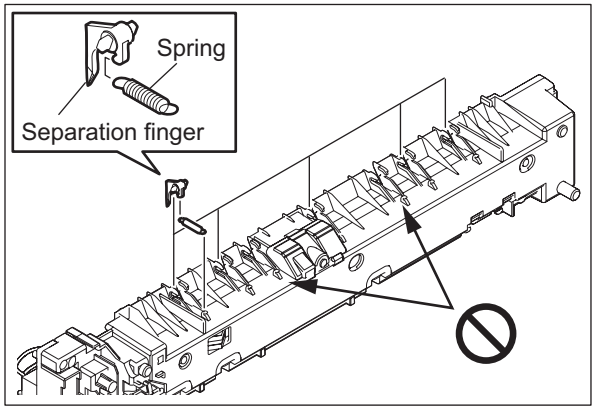


Fig. 12-11

12.6.4 Fuser roller

(1) Take off the separation fingers
(📖 P.12-14 "12.6.3 Separation finger").

(2) Remove 6 screws and take off the fuser roller and three heater lamps.

Notes:
1. Be careful not to deform the fuser roller by pushing strongly.
2. When installing the heater lamps, refer to the installation procedure.
(📖 P.12-15 "12.6.5 Heater lamp")
3. For e-STUDIO205L/255/305, the sub heater lamp is not installed.
4. When installing the fuser roller, be careful not to deform the thermistor.
5. When installing the fuser roller, confirm that the drive gears are engaged.

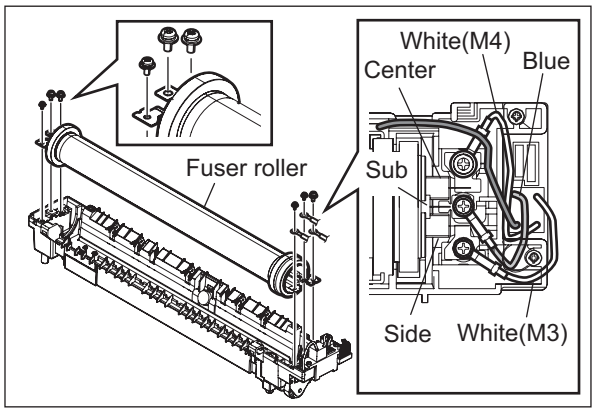


Fig. 12-12

(3) Remove 1 C-ring and 1 bearing from the fuser roller front side.

(4) Remove 1 C-ring, 1 gear and 1 bearing from the fuser roller rear side.

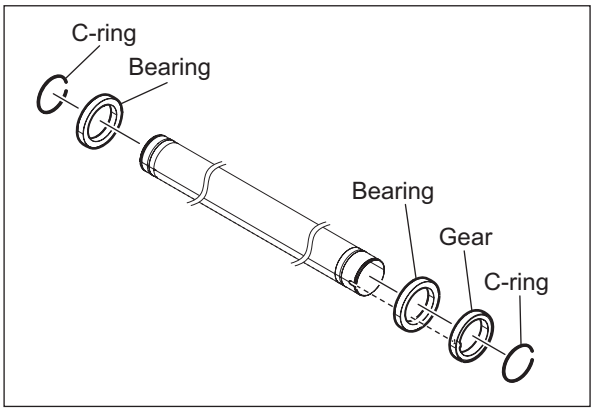


Fig. 12-13

12.6.5 Heater lamp

(1) Take off the separation fingers (📖 P.12-14 "12.6.3 Separation finger").

(2) Remove 2 screws of each lamp, and then take off the center heater lamp, side heater lamp, sub heater lamp and fuser roller.

Notes:

1. When fixing the screws, do not mix up the types of screws.

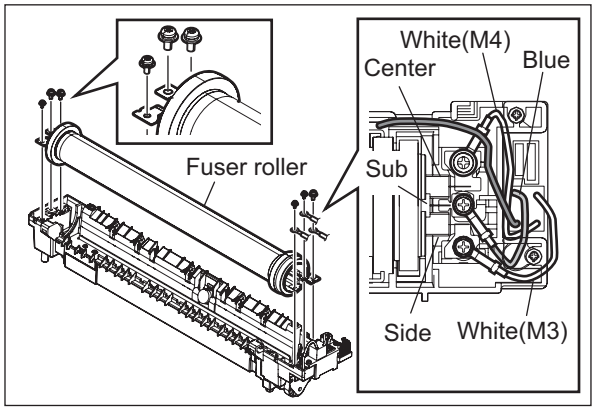


Fig. 12-14

2. When installing the heater lamps, do not mix up the types of heater lamps. The shapes and screw holes of each lamp vary. Install the heater lamps while referring to the figure at right.

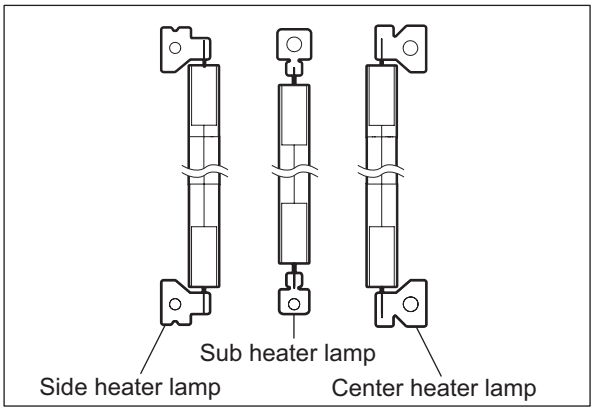


Fig. 12-15

3. Install the heater lamps on their welded sides on upper.
4. Make sure to connect the white lines to the center heater lamp and side heater lamp, and the blue line to the sub heater lamp.
5. For e-STUDIO205L/255/305, the sub heater lamp is not installed.
6. Be careful not to deform the fuser roller by pushing strongly.

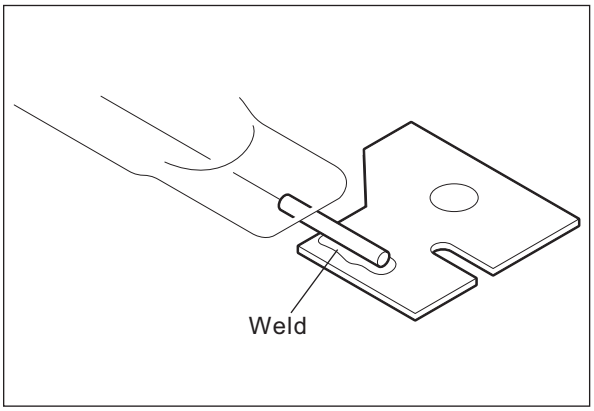


Fig. 12-16

(3) Pull out the center heater lamp, side heater lamp, and sub heater lamp.

Notes:

1. Do not touch the lamps directly with bare hands.
2. Be careful not to deform the fuser roller by pushing strongly.

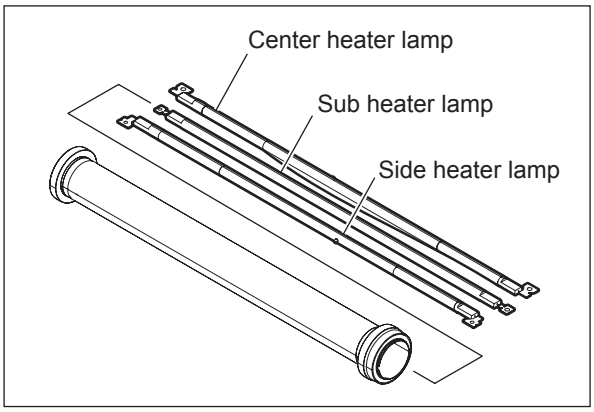


Fig. 12-17

12.6.6 Center / Side / Edge thermistor (THMS1 / THMS2 / THMS3)

(1) Take off the fuser roller unit (P.12-13 "12.6.2 Fuser roller unit / Pressure roller unit").

(2) Place the fuser roller unit upside down.

(3) Remove 2 screws, and then take off the harness cover while releasing a hook.

Note:

When installing the harness cover, make sure that the harness is not caught.

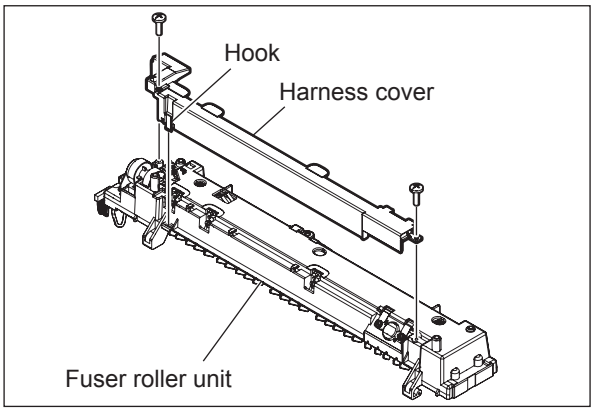


Fig. 12-18

(4) Take out the thermistor by removing 1 screw each.

Note:

When installing the thermistors, check the length of the harness first and distinguish the installation positions of the side thermistor and edge thermistor by the length of each harness.

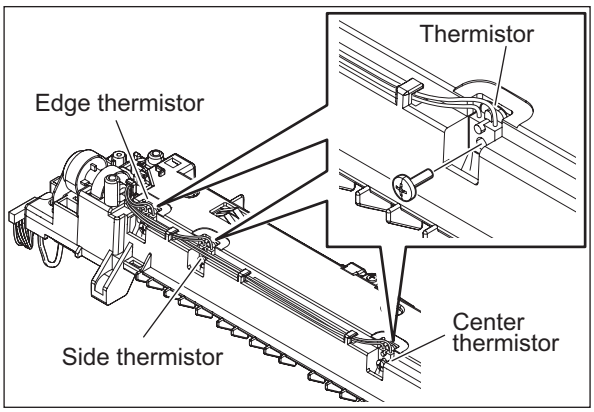


Fig. 12-19

Note:

When installing the thermistors, check the length of the harness first and distinguish the installation positions of the side thermistor and edge thermistor by the length of each harness.

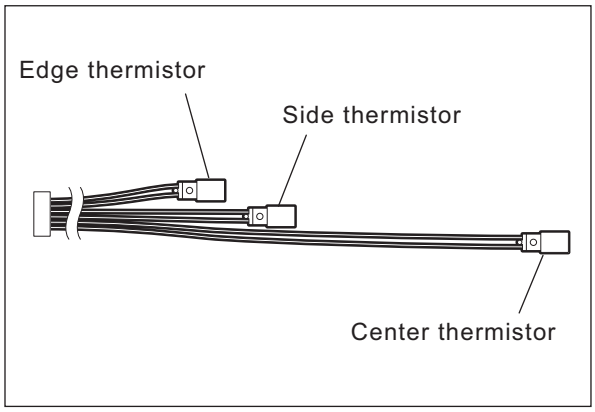


Fig. 12-20

12.6.7 Fuser center / Fuser front thermostat (THMO1 / THMO2)

(1) Take off the fuser roller unit (P.12-13 "12.6.2 Fuser roller unit / Pressure roller unit").

(2) Place the fuser roller unit upside down.

(3) Remove 2 screws, and then take off the harness cover while holding 2 hooks.

Note:

When installing the harness cover, make sure that the harness is not caught.

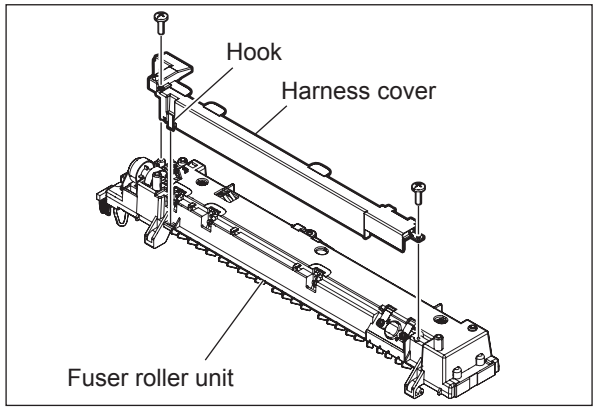


Fig. 12-21

(4) Remove 2 screws, and then take off the fuser front thermostat.

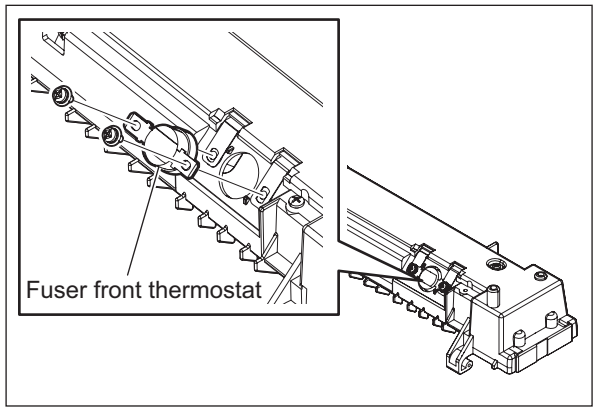


Fig. 12-22

(5) Remove 1 screw, and then take off the thermostat cover.

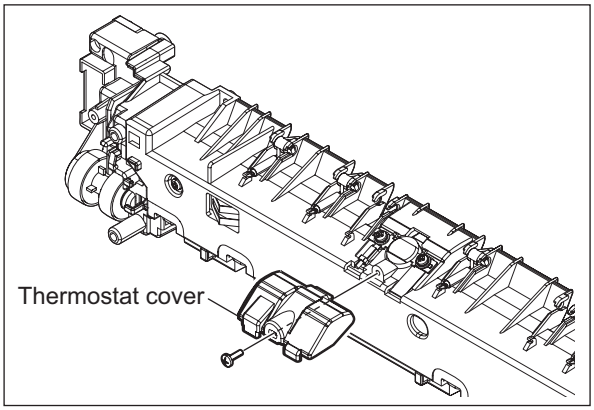


Fig. 12-23

(6) Remove 2 screws, and then take off the fuser center thermostat.

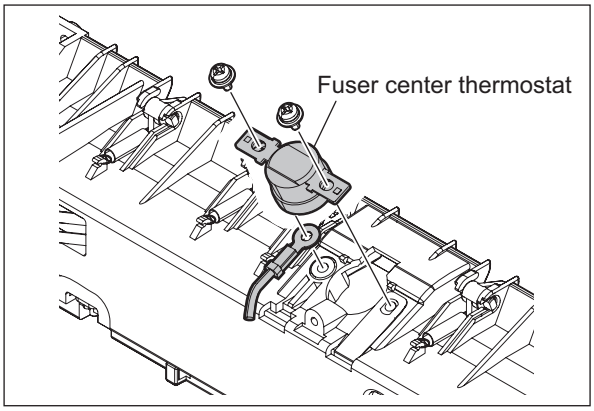


Fig. 12-24

Note:
Wire the harness as shown in the figure and fix it with clamp securely.

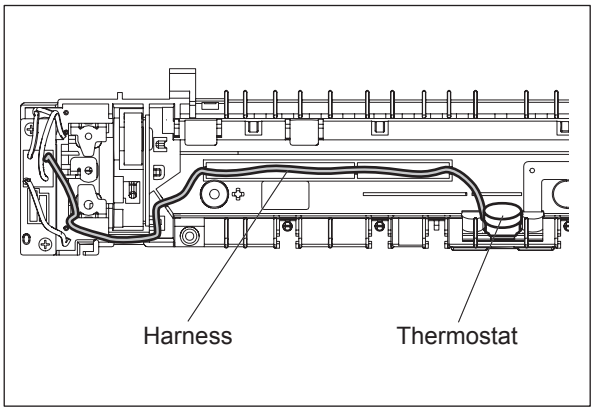


Fig. 12-25

12.6.8 Pressure roller

(1) Take off the pressure roller unit (📖 P.12-13 "12.6.2 Fuser roller unit / Pressure roller unit").

(2) Remove 3 screws and take off the entrance guide.

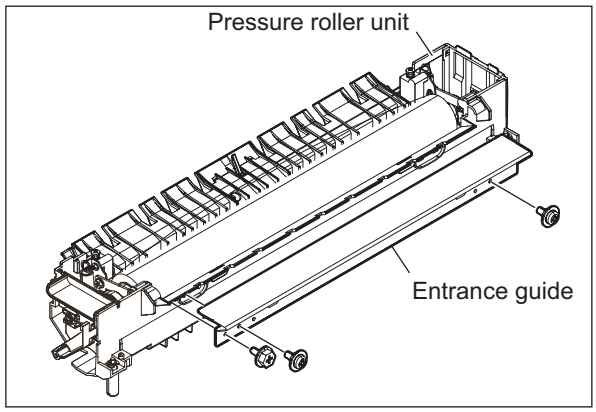


Fig. 12-26

(3) Take off the front cover.

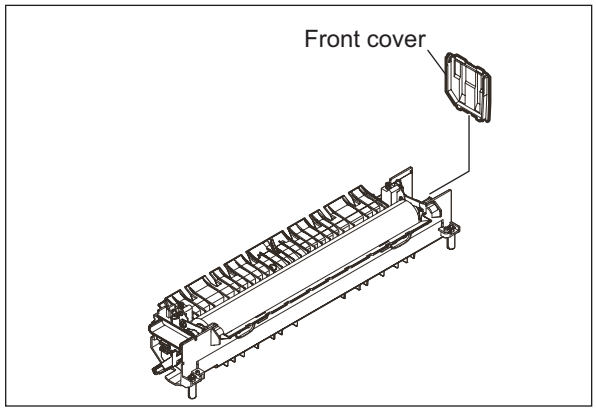


Fig. 12-27

(4) Disconnect 1 connector, and then take off the fuse cover while holding a hook.

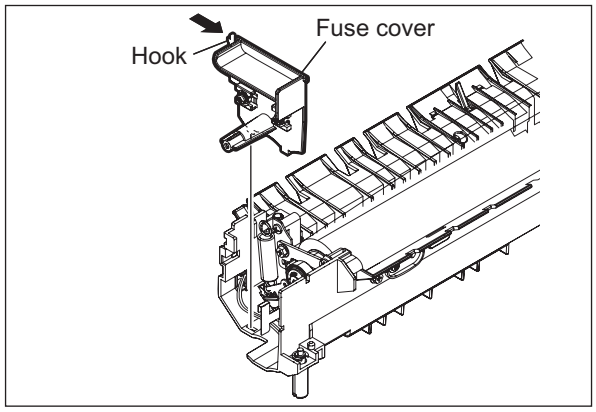


Fig. 12-28

(5) Remove 2 springs of both front and rear sides of the pressure roller unit.

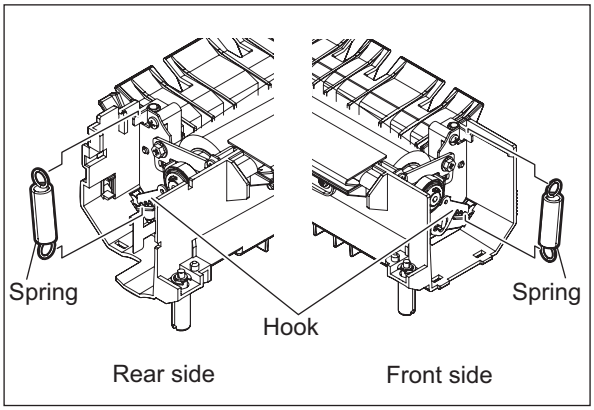


Fig. 12-29

Note:
When installing the spring, catch the spring on the hook in the middle.

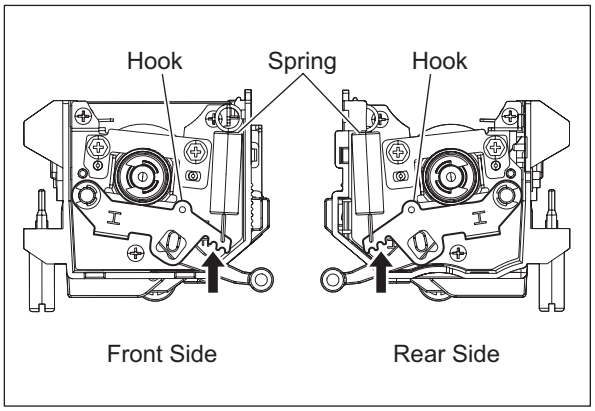


Fig. 12-30

(6) Remove 4 screws, and then take off 2 stoppers.
(7) Pull out the pressure roller.

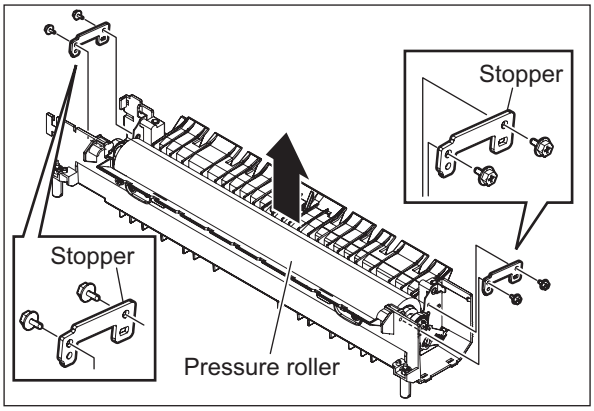


Fig. 12-31

(8) Remove 2 E-rings and the bearings on both ends of the pressure roller.

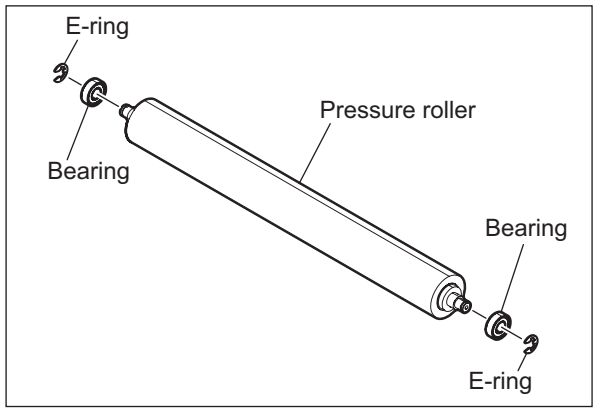


Fig. 12-32

12.6.9 Exit sensor (S9)

(1) Take off the pressure roller unit (📖 P.12-13 "12.6.2 Fuser roller unit / Pressure roller unit").

(2) Remove 1 screw, and then take off the sensor cover.

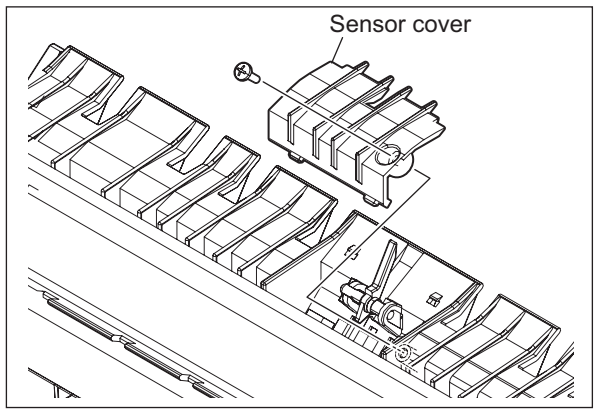


Fig. 12-33

(3) Disconnect 1 connector, and then take off the exit sensor while releasing a hook.

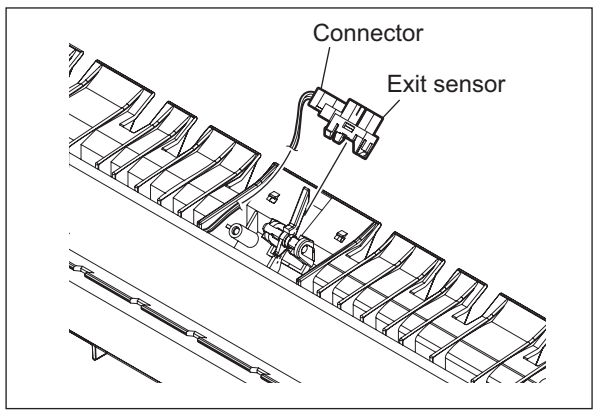


Fig. 12-34

Note:
Wire the harness as shown in the figure and fix it with clamp securely.

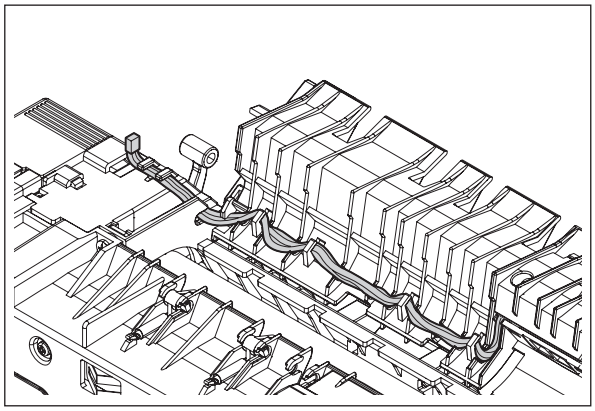


Fig. 12-35

12.6.10 Installation of the fuser unit fuse (service part)

(1) Take off the fuser unit
(📖 P.12-13 "12.6.1 Fuser unit").

(2) Remove 1 screw and take off the rear cover. Disconnect 1 connector.

Note:
When installing the rear cover, make sure that the harness is not caught.

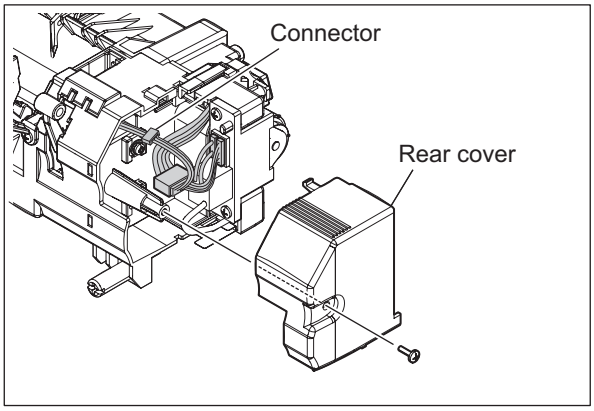


Fig. 12-36

(3) Connect the connectors of the fuser unit fuse.

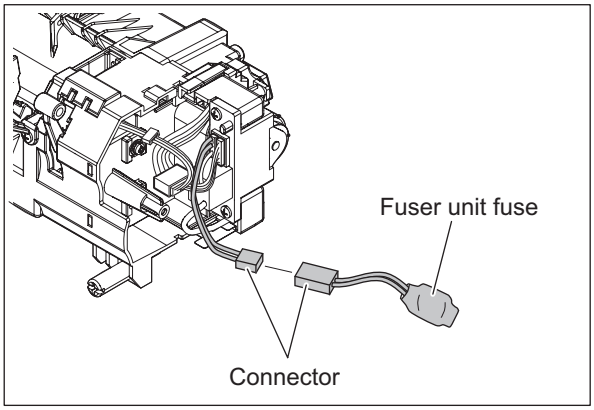


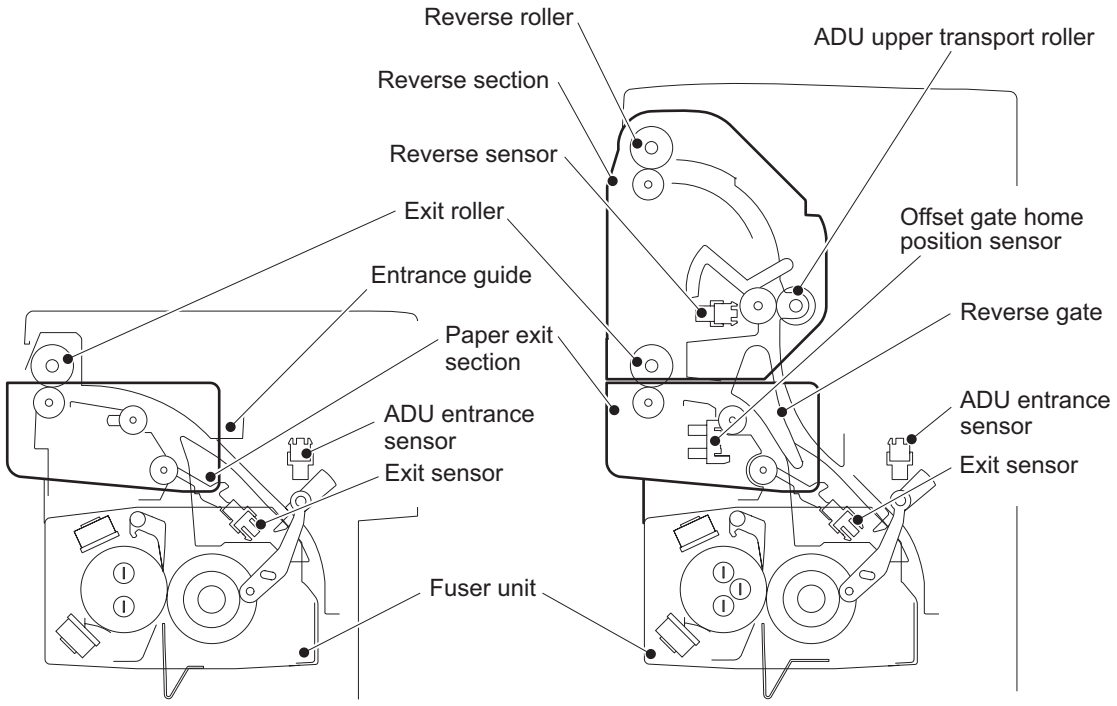
Fig. 12-37

13. PAPER EXIT SECTION/REVERSE SECTION

13.1 General Description

For e-STUDIO205L/255/305, a sheet of paper with the toner fused on is transported to the inner tray or Automatic Duplexing Unit (ADU) by switchbacking. in the paper exit section.
For e-STUDIO355/455, a sheet of paper with the toner fused on is transported to the inner tray, but the exit roller does not switchback.
For e-STUDIO355/455, the exit roller has the offset function and the paper position is shifted apart from one another back and forth.

The reverse section is only installed for e-STUDIO355/455.
It is a path only for switchbacking to the ADU to enhance the high-speed printing.
The reverse section has the reverse gate which switches the transport path to the the paper exit section or the reverse section.



[e-STUDIO205L/255/305] [e-STUDIO355/455]

Fig. 13-1

Differences between e-STUDIO205L/255/305 and e-STUDIO355/455

item	e-STUDIO205L/255/305	e-STUDIO355/455
Reverse section (Switchback mechanism) Reverse motor Reverse sensor Reverse roller	Not installed	Installed
Offset mechanism Offset motor Offset sensor Offset gate	Not installed	Installed

13.2 Functions

1. Exit motor (M10)
   The exit motor is a stepping motor which drives the exit roller. For e-STUDIO205L/255/305, this motor rotates exit roller reversely to switchback when the paper is transported to the ADU.

2. Exit roller
   The exit roller transports the paper from the fuser unit to the inner tray. This roller is driven by the exit motor.
   For e-STUDIO205L/255/305, this roller switchbacks to transport the paper to the ADU.
   For e-STUDIO355/455, the exit roller has the offset function.

3. Reverse sensor (S23) (only installed for e-STUDIO355/455)
   The reverse sensor detects if the leading edge of the paper from the paper exit section has reached to the exit roller. This sensor is also used for the detection of a paper jam in the reverse section, and the detection of the trailing edge of the reversed paper at duplex printing as well.

4. Reverse motor (M14) (only installed for e-STUDIO355/455)
   The reverse motor is a stepping motor which drives the reverse roller, however, this motor rotates reversely to switchback when the paper is transported to the upper exit area.

5. Reverse roller (only installed for e-STUDIO355/455)
   The reverse roller transports the paper from the paper exit section to the job separator (MJ-5006) or ADU. This roller is driven by the reverse motor.

6. Offset gate motor (M13) (only installed for e-STUDIO355/455)
   This offset gate motor drives the offset gate and shift the paper exit position back and forth.

7. Offset gate home position sensor (S24) (only installed for e-STUDIO355/455)
   This offset gate home position sensor detects if the offset gate driven is back in the home position.

8. Reverse gate solenoid (SOL1) (only installed for e-STUDIO355/455)
   This reverse gate solenoid drives the reverse gate and switches the paper transport path (exit section of reverse section).

13.3 Control Circuit of Exit Motor / Reverse Motor / Offset Gate Motor

1. Exit Motor
   The following is the control circuit of the exit motor.
   The exit motor is a stepping motor.
   It is driven by the pulse signals (EXTM+A, EXTM-A, EXTM+B, EXTM-B) output by the motor driver.
   These pulse signals are generated by the reference clock (EXTMCK-1) from the ASIC, and output only when the enable signal (EXTMEN-1) is at level "H".
   The direction and speed of its rotation is switched by changing the output timing of each pulse signal.
   EXTVR-1 is the reference voltage for the current control of the motor.

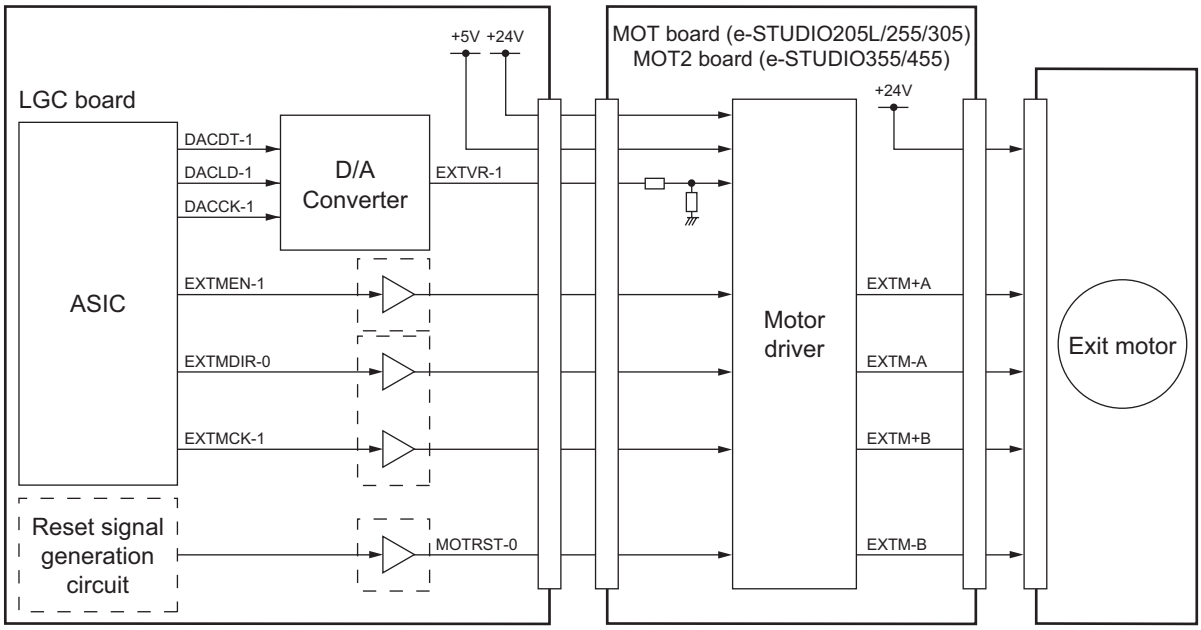


Fig. 13-2

Control signals

Signal	Functions	Status	
		Level H	Level L
EXTMCK-1	Reference clock	-	-
EXTMEN-1	Enable signal	ON	OFF
EXTMDIR-0	Rotation direction signal	CCW	CW
MOTRST-0	Reset signal	Normal	Reset
EXTVR-1	Reference voltage for the current control	-	-

* CW: rotates clockwise from the rotating shaft side, CCW: rotates counterclockwise

2. Reverse Motor (only installed for e-STUDIO355/455)
   The following is the control circuit of the reverse motor which drives the reverse roller.
   The reverse motor is a stepping motor.
   It is driven by the pulse signals (REVM+A, REVM-A, REVM+B, REVM-B) output by the motor driver.
   These pulse signals are generated by the reference clock (REVMCK-1) from the ASIC, and output only when the enable signal (REVMEN-1) is at level "H".
   The direction and speed of its rotation is switched by changing the output timing of each pulse signal.
   REVVR-1 is the reference voltage for the current control of the motor.

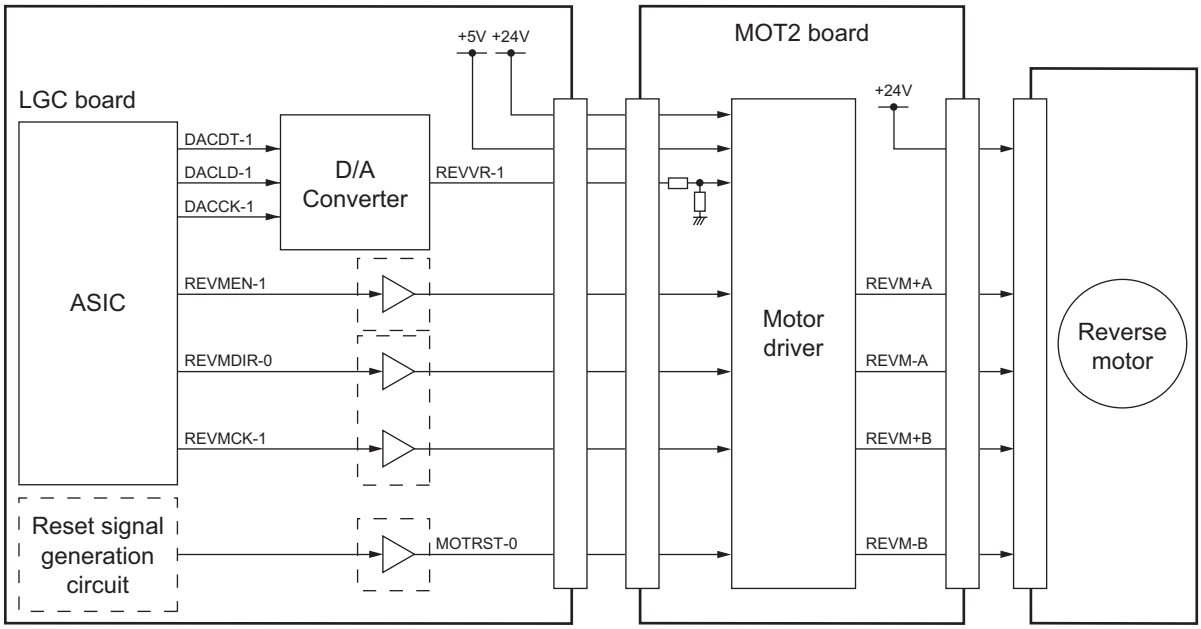


Fig. 13-3

Control signals

Signal	Functions	Status	
		Level H	Level L
REVMCK-1	Reference clock	-	-
REVMEN-1	Enable signal	ON	OFF
REVMDIR-0	Rotation direction signal	CCW	CW
MOTRST-0	Reset signal	Normal	Reset
REVVR-1	Reference voltage for the current control	-	-

* CW: rotates clockwise from the rotating shaft side, CCW: rotates counterclockwise

3. Offset gate motor (only installed for e-STUDIO355/455)
   The following is the control circuit of the offset gate motor which drives the offset gate.

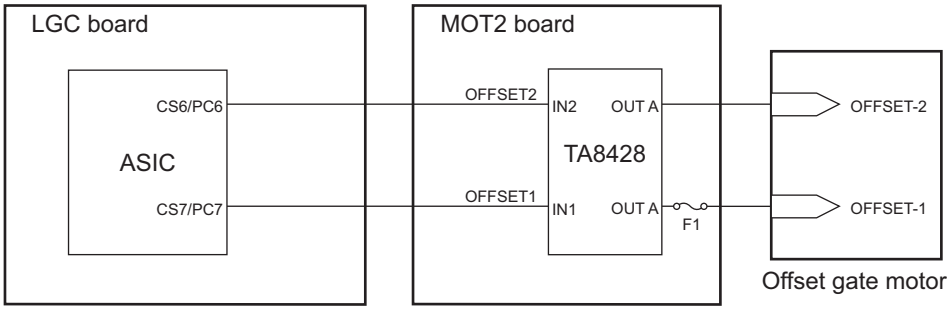


Fig. 13-4

13.4 Exit Motor / Reverse Motor / Offset Gate Motor Drive

1. Exit Motor
   The figure shown below is the layout of the driving gears of the exit roller.

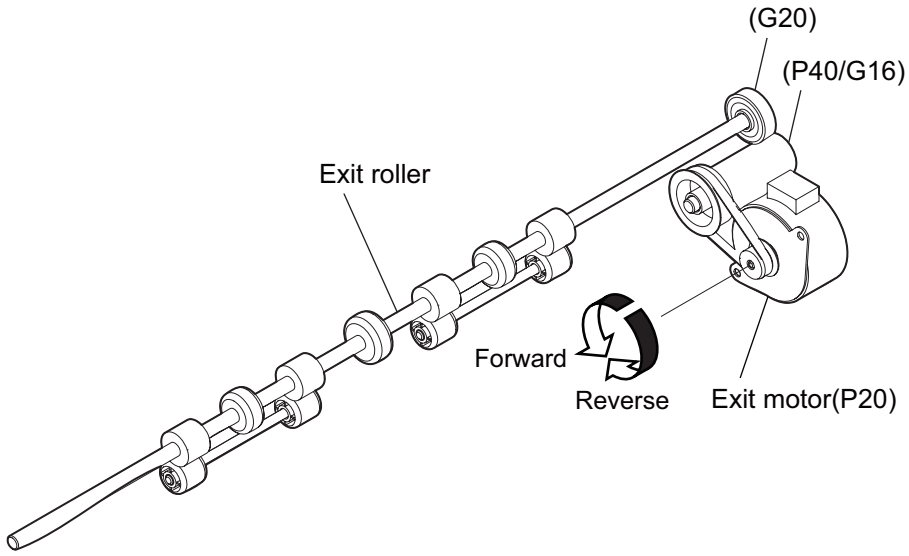


Fig. 13-5

2. Reverse Motor (only installed for e-STUDIO355/455)
   The figure shown below is the layout of the driving gears of the reverse roller.

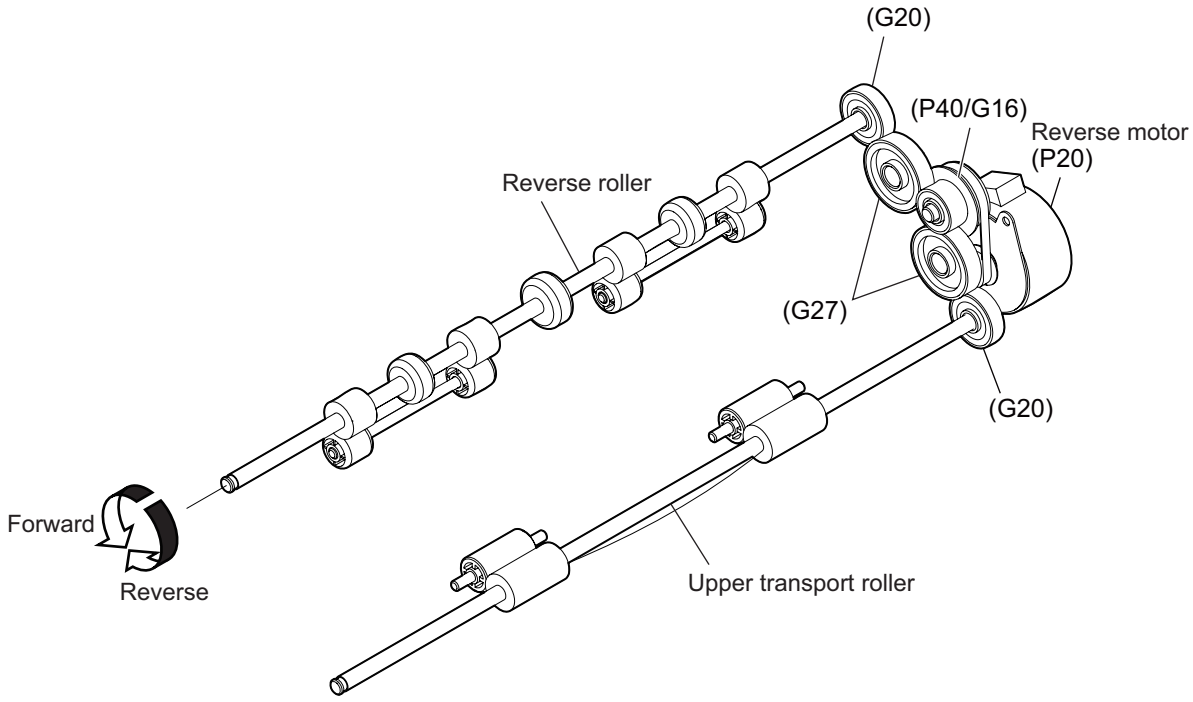


Fig. 13-6

3. Offset gate motor (only installed for e-STUDIO355/455)
   The figure shown below is the layout of the driving gears of the offset gate.

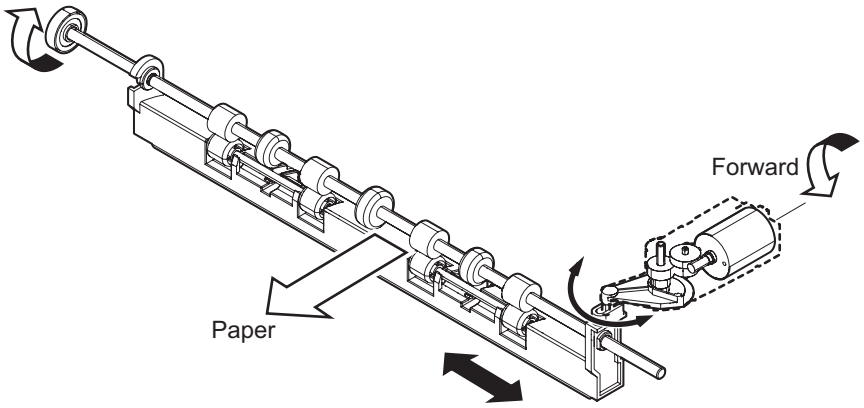


Fig. 13-7

13.5 Disassembly and Replacement

13.5.1 Reverse unit (only installed for e-STUDIO355/455)

(1) Take off the fuser unit.
(📖 P.12-13 "12.6.1 Fuser unit")

Note:
Be careful when handling the fuser unit as it may become very hot.

(2) Remove 3 screws from the left side of the reverse section, and then take off the cover.

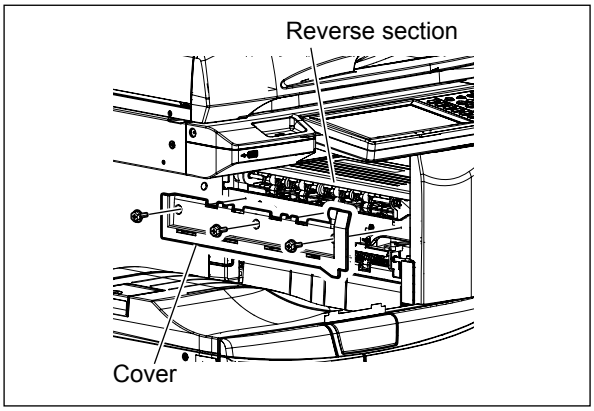


Fig. 13-8

(3) Take off the connecting port cover.
(📖 P.2-26 "2.5.12 Connecting port cover")

(4) Release the latches and take off the inner cover.

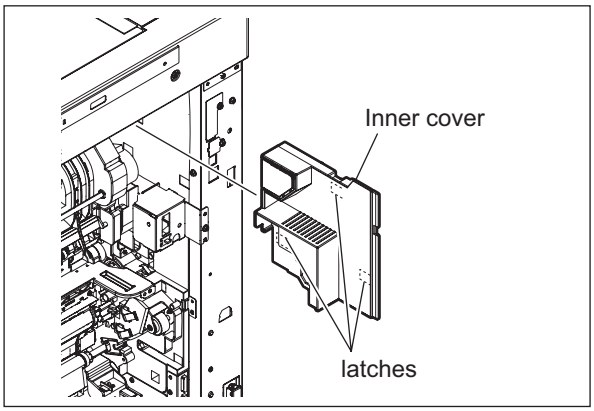


Fig. 13-9

(5) Disconnect 1 connecter and remove 1 screw, and take off the switch unit.

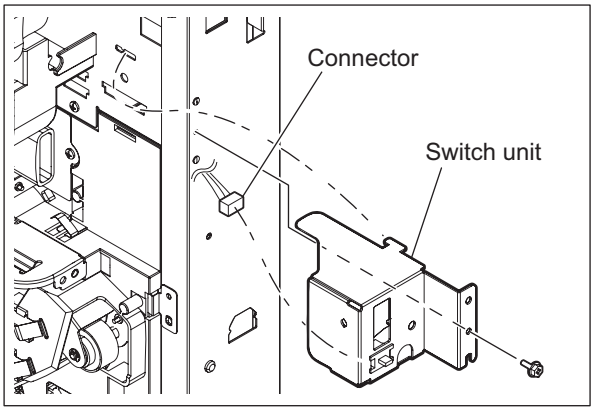


Fig. 13-10

(6) Disconnect 1 connecter and remove 2 screws, and take off the reverse unit.

Note:
Be sure to perform Step (2) before removing the reverse unit.

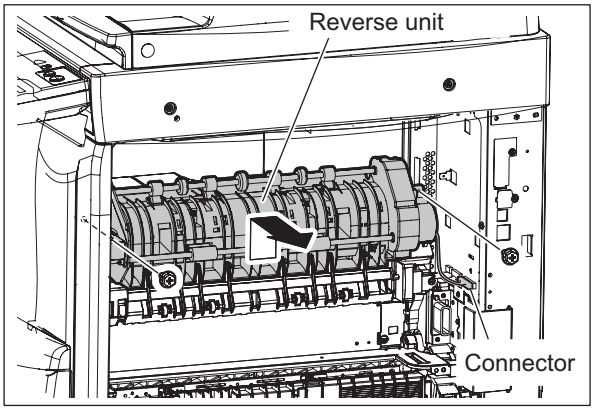


Fig. 13-11

Note:
When installing the reverse unit, engage the arm of the offset gate motor at the front of the reverse unit and the holder of the paper exit unit.

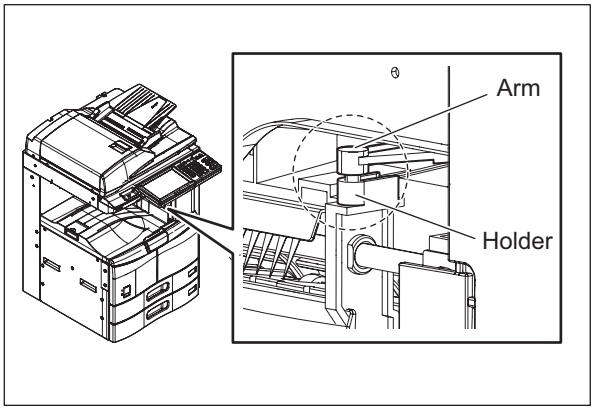


Fig. 13-12

13.5.2 Paper exit unit

(1) Take off the reverse unit
(📖 P.13-7 "13.5.1 Reverse unit (only installed for e-STUDIO355/455)")

(2) Disconnect 1 connecter and remove 2 screws, and take off the paper exit unit.

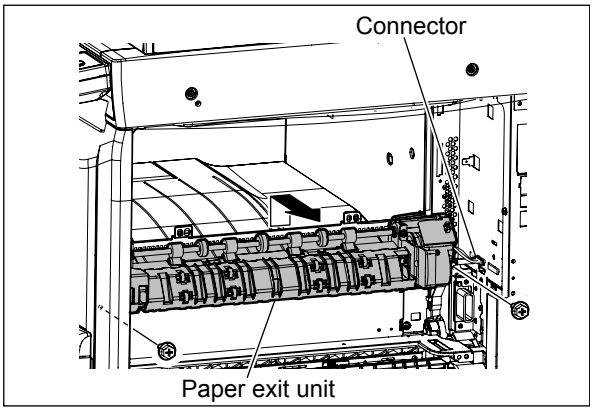


Fig. 13-13

13.5.3 Exit motor (M10)

(1) Take off the paper exit unit.
(📖 P.13-8 "13.5.2 Paper exit unit")

(2) Remote 2 screws and take off the duct.

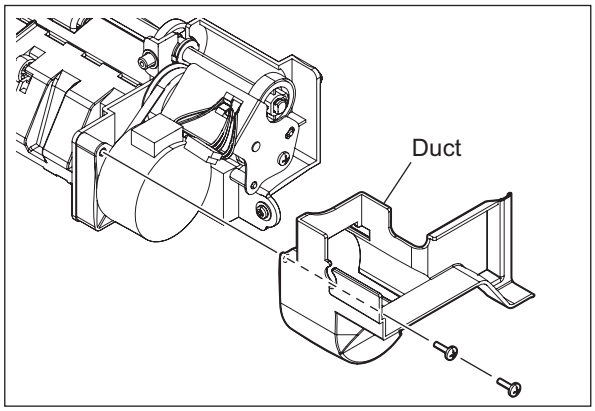


Fig. 13-14

(3) Release the harness from the harness clamp.
Remove 1 screw and take off the motor cover.

Note:
When installing the motor cover, engage the shaft of the motor cover and the bearing of the gear.

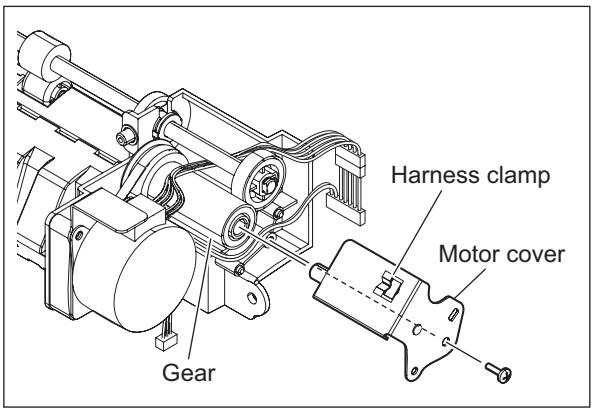


Fig. 13-15

(4) Disconnect 1 connecter and take off the exit motor and the heat sink.

Note:
When installing the exit motor, make sure to put on the timing belt.

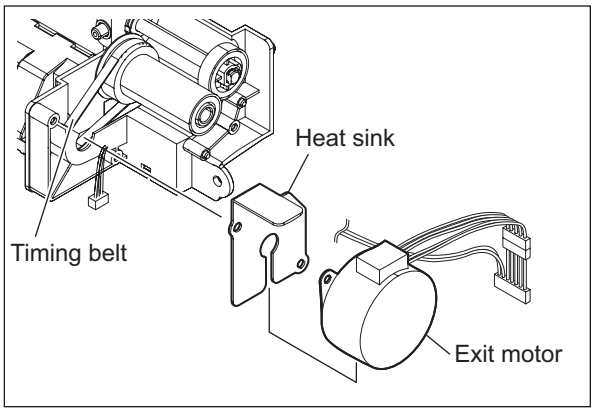


Fig. 13-16

13

13.5.4 Offset gate home position sensor (S24)

(1) Take off the paper exit unit.
(📖 P.13-8 "13.5.2 Paper exit unit")

(2) Disconnect 1 connector, release the latch and take off the offset gate home position sensor.

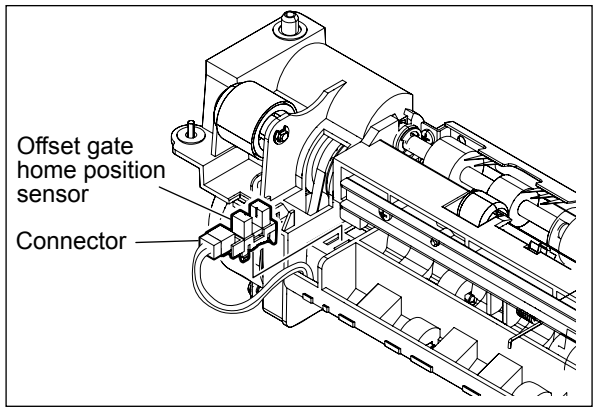


Fig. 13-17

13.5.5 Exit roller

(1) Take off the paper exit unit.
(📖 P.13-8 "13.5.2 Paper exit unit")

(2) Remove 2 screws and take off the duct.

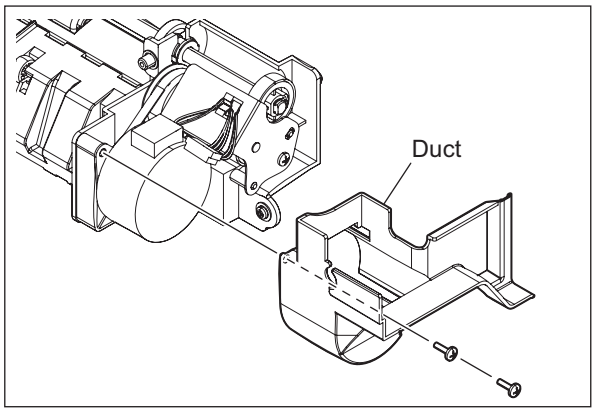


Fig. 13-18

(3) Release the harness from the harness clamp.
Remove 1 screw and take off the motor cover.

Note:
When installing the motor cover, engage the shaft of the motor cover and the bearing of the gear.

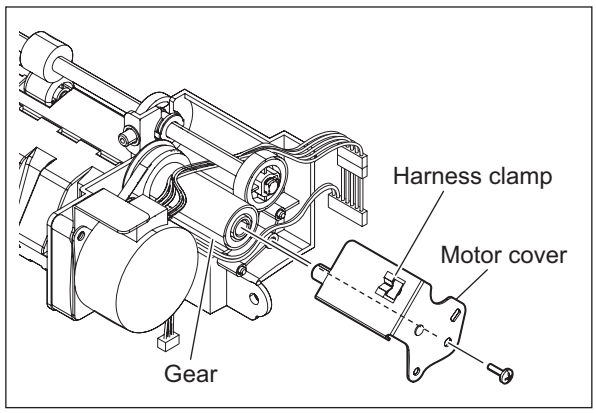


Fig. 13-19

(4) Remove 2 bushings and take off the roller unit by sliding it.

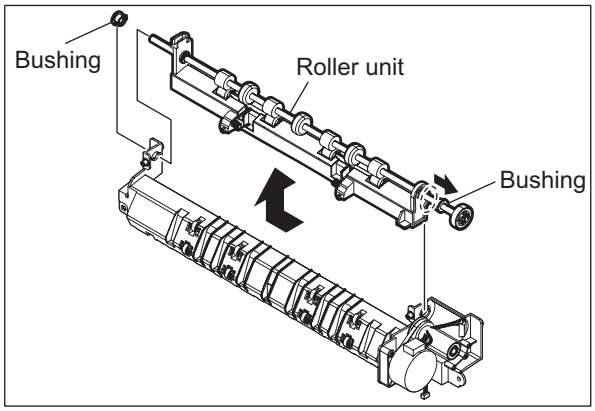


Fig. 13-20

(5) Remove 2 E-rings, 3 bushings and 1 gear, and take off the exit roller by sliding it to the direction of the arrow.

Note:
Be careful in taking off the roller because 2 rollers and 2 springs on the lower part of the exit roller come off.

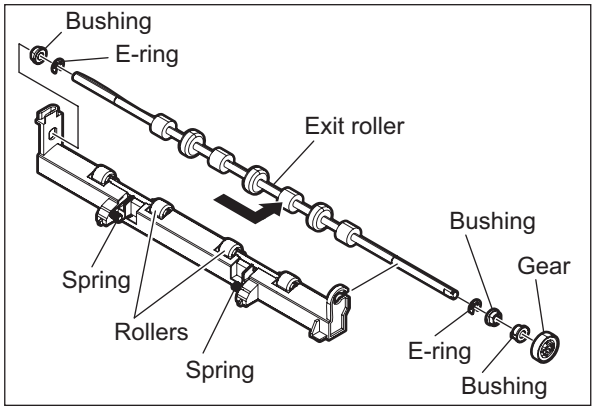


Fig. 13-21

13.5.6 Reverse motor (M14) (only installed for e-STUDIO355/455)

(1) Take off the reverse unit.
(📖 P.13-7 "13.5.1 Reverse unit (only installed for e-STUDIO355/455)")
(2) Release the harness from the harness clamp.
(3) Disconnect 1 connector and remove 3 screws, and take off the motor unit.

Note:
When installing the reverse motor, make sure to put on the timing belt.

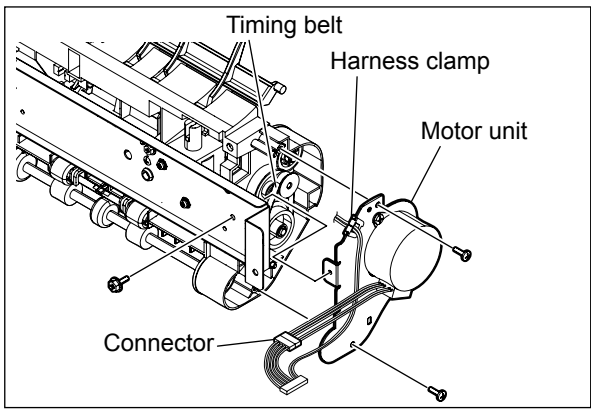


Fig. 13-22

(4) Remove 2 screws and take off the reverse motor.

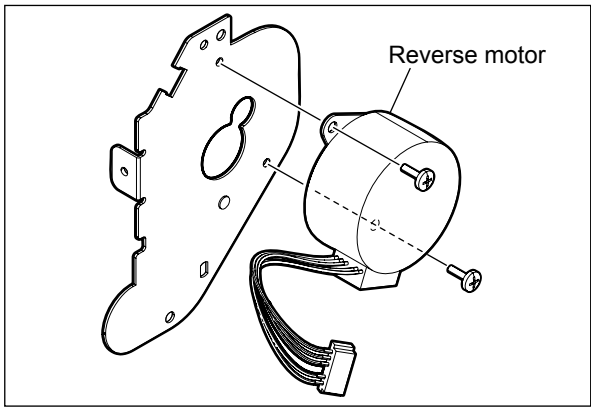


Fig. 13-23

13.5.7 Reverse gate solenoid (SOL1) (only installed for e-STUDIO355/455)

(1) Take off the reverse unit.
(📖 P.13-7 "13.5.1 Reverse unit (only installed for e-STUDIO355/455)")

(2) Remove 3 screws and take off the plate.

Note:
When installing, engage the slit of the reverse gate solenoid and the lever of the gate.

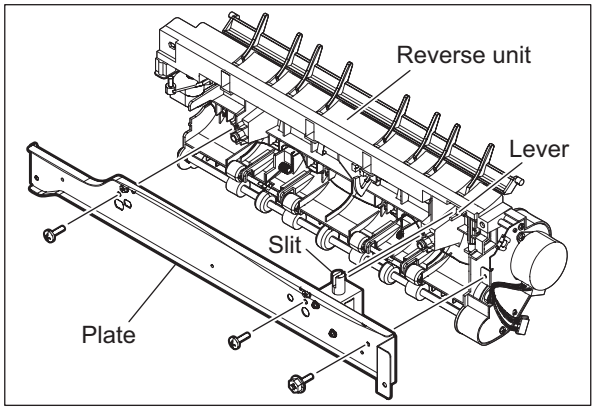


Fig. 13-24

(3) Release the harness from the harness clamp.

(4) Disconnect 1 connector and remove 2 screws, and take off the reverse gate solenoid.

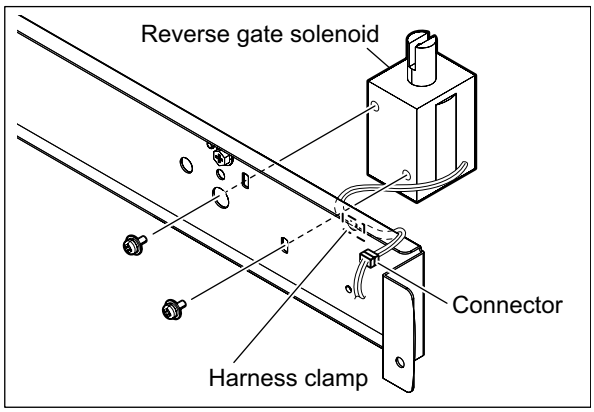


Fig. 13-25

Note:
When installing the solenoid, check if the solenoid is installed at the center of the scale. (The scale is longer in the center.).

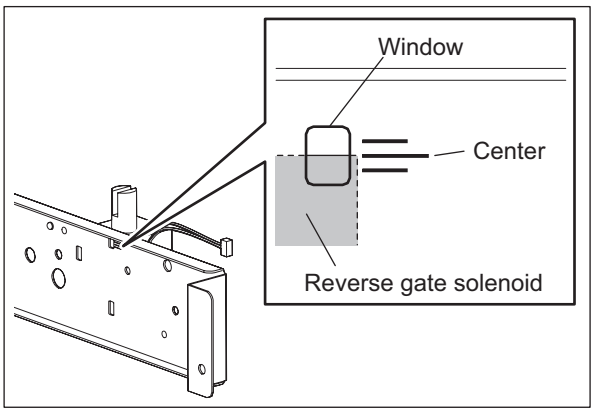


Fig. 13-26

13.5.8 Reverse sensor (S23) (only installed for e-STUDIO355/455)

(1) Take off the reverse unit.
(📖 P.13-7 "13.5.1 Reverse unit (only installed for e-STUDIO355/455)")

(2) Remove 3 screws and take off the plate.

Note:
When installing, engage the slit of the reverse gate solenoid and the lever of the gate.

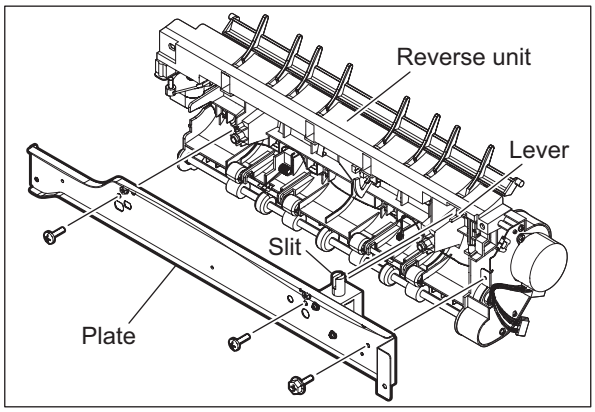


Fig. 13-27

(3) Disconnect 1 connector, release the latch, and take off the reverse sensor.

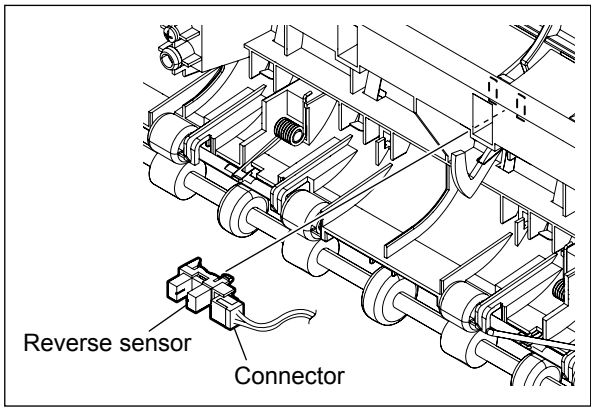


Fig. 13-28

13

13.5.9 Offset gate motor (M13) (only installed for e-STUDIO355/455)

(1) Take off the reverse unit.
(📖 P.13-7 "13.5.1 Reverse unit (only installed for e-STUDIO355/455)")

(2) Disconnect 1 connecter, remove 2 screws, and take off the offset gate motor.

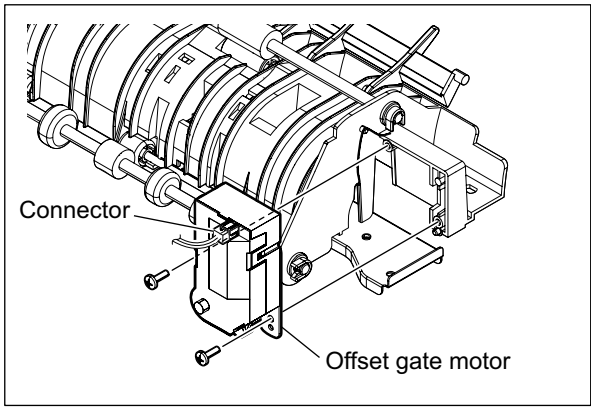


Fig. 13-29

13.5.10 Reverse roller (only installed for e-STUDIO355/455)

(1) Take off the reverse motor.
(📖 P.13-11 "13.5.6 Reverse motor (M14) (only installed for e-STUDIO355/455)"

(2) Remove 1 gear, 1 Clip, 2 springs and 2 bushings, and take off the reverse roller.

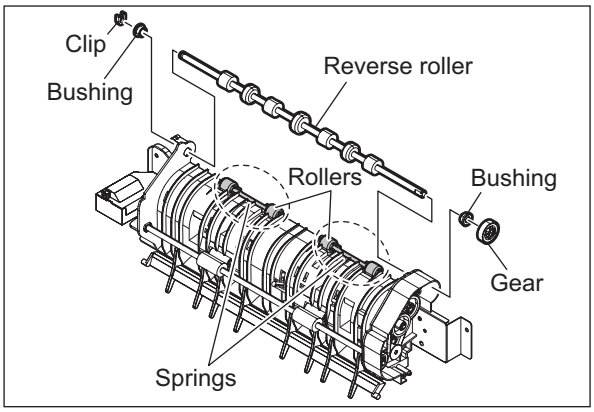


Fig. 13-30

13.5.11 Upper transport roller (only installed for e-STUDIO355/455)

(1) Take off the reverse motor.
(📖 P.13-11 "13.5.6 Reverse motor (M14) (only installed for e-STUDIO355/455)")

(2) Remove 1 gear, 1 clip and 2 bushings, and take off the upper transport roller.

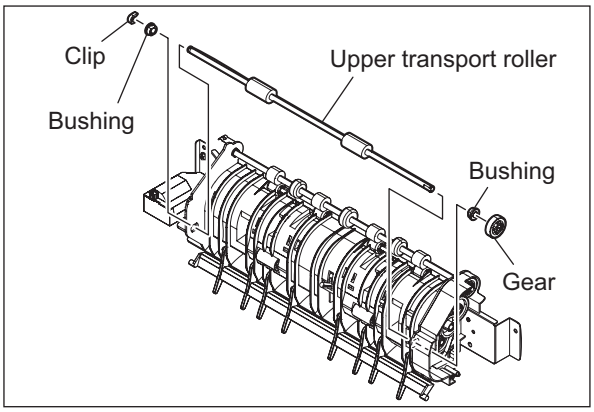


Fig. 13-31

13

14. AUTOMATIC DUPLEXING UNIT (ADU)

14.1 General Description

The Automatic Duplexing Unit (ADU) of this equipment is a unit to transport the paper, which is switchbacked at the paper exit section/ reverse section and transported reversed, to the registration roller again.

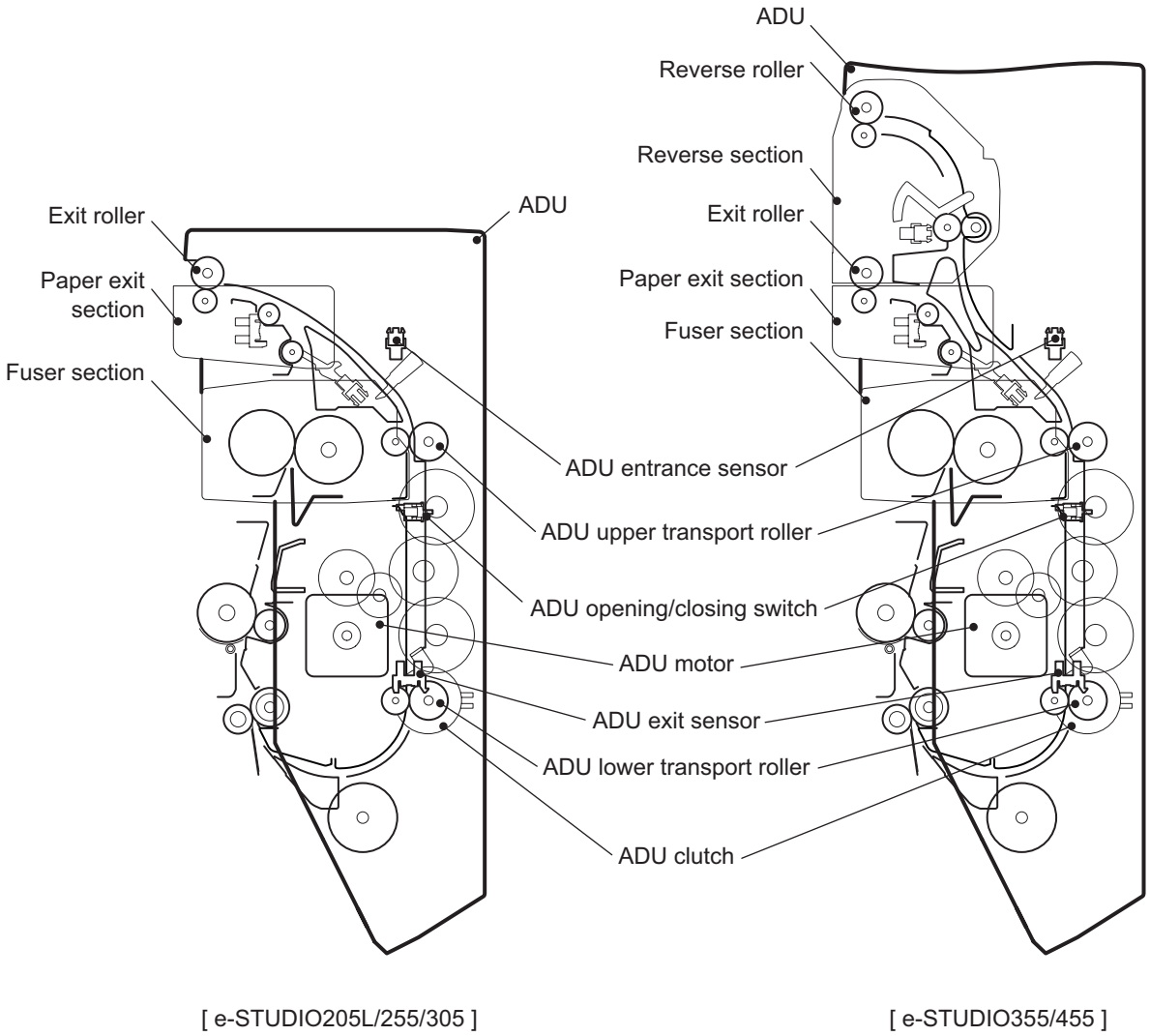


Fig. 14-1

14.2 Functions

1. ADU motor (M5)
   Drives the ADU upper transport roller and the ADU lower transport roller. The ADU motor is installed to the rear frame of the equipment.

2. ADU clutch (CLT1)
   Transmits the drive from the ADU motor (M5) to the ADU lower transport roller.

3. ADU entrance sensor (S11)
   Detects the paper transported in the ADU.

4. ADU exit sensor (S10)
   Detects the paper transported in the ADU.

5. ADU opening/closing switch (SW5)
   Detects opening/closing of the ADU.

6. ADU upper transport roller, ADU lower transport roller
   Transports the paper inside the ADU.

14.3 Description of Operations

The back side printing (recording data of the back side of paper) is performed first by selecting duplex printing mode and pressing the [START] button.
Then for e-STUDIO355/455, when the paper passed the reverse sensor, the reverse gate solenoid switches the reverse gate, and the reverse roller switchbacks to transport the paper into the ADU.
For e-STUDIO205L/255/305, when the paper passed the exit sensor, the exit roller switchbacks to transport the paper into the ADU.

The switchbacked paper is transported with acceleration. The transportation decelerates in front of the ADU exit sensor. The front side printing (recording data of the front side of paper) is performed at the registration section. The paper passes through the exit gate again and is transported to the inner tray to complete duplex printing.

There are three methods of judging a paper jam: (1) whether the ADU entrance sensor is turned ON or not in a specified period of time after the switchback to the ADU started (E510). (2) whether the ADU exit sensor is turned ON or not in a specified period of time after the ADU entrance sensor is turned ON (E520). (3) whether the registration sensor is turned ON or not in a specified period of time after the paper feeding from the ADU to the equipment (E110).

If the ADU is opened during duplex printing, the ADU motor and ADU clutch are stopped, namely, ADU open jam occurs (E430).
The equipment is never to be stopped during printing by interruption in any case except paper jam or service call.
The operation of the duplex printing differs depending on the size of the paper; single-paper circulation and alternateness circulation. The figures in the following pages show the circulating operations during duplex copying. The numbers in the figures indicate the page numbers.

1. Single-paper circulation (e-STUDIO205L/255/305)
   With the paper larger than A4 size, duplex printing (back-side printing .. front-side printing) is performed for one sheet at a time as shown below.

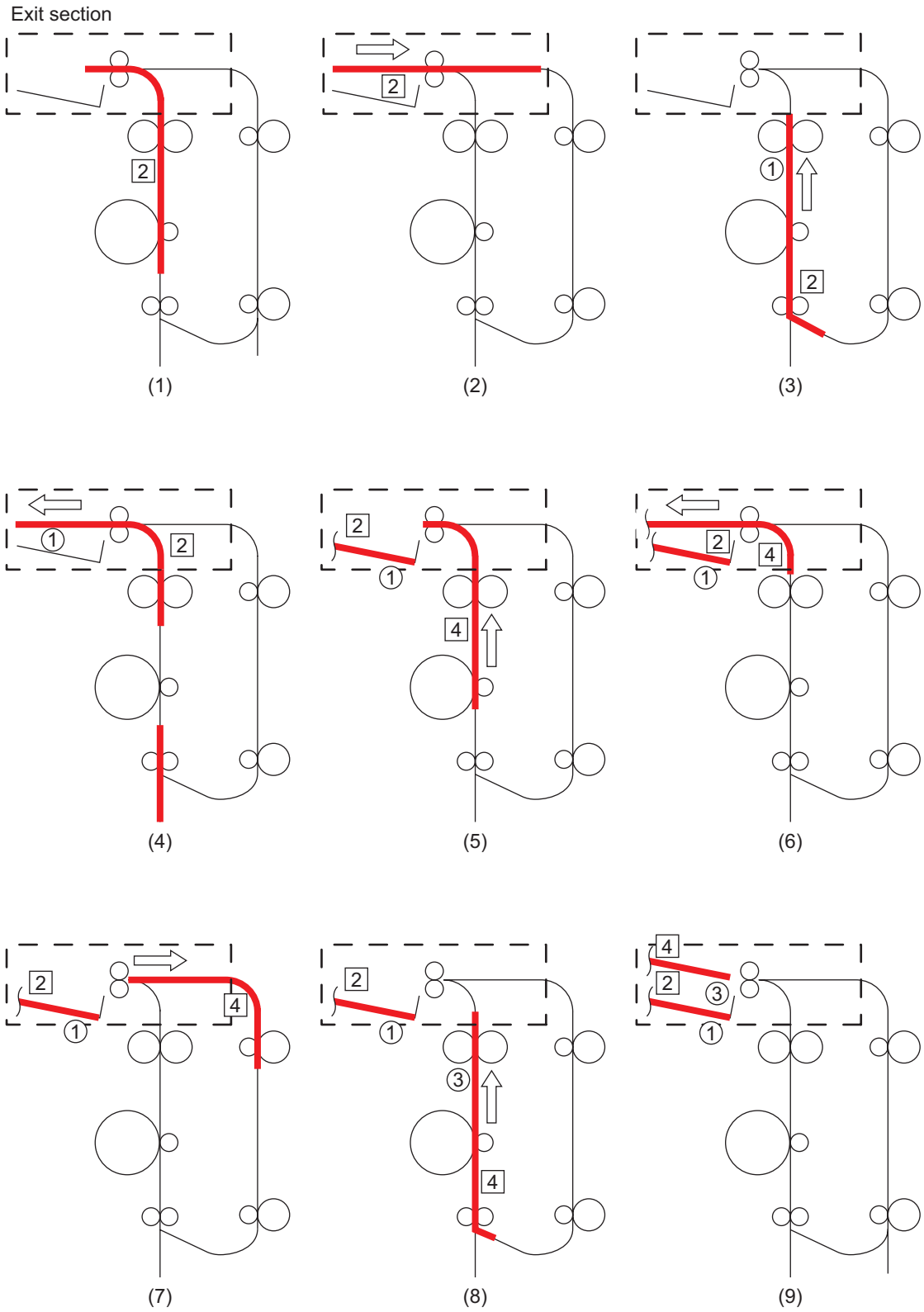


Fig. 14-2

2. Single-paper circulation (e-STUDIO355/455)
With the paper larger than A4 size, duplex printing (back-side printing .. front-side printing) is performed for one sheet at a time as shown below.

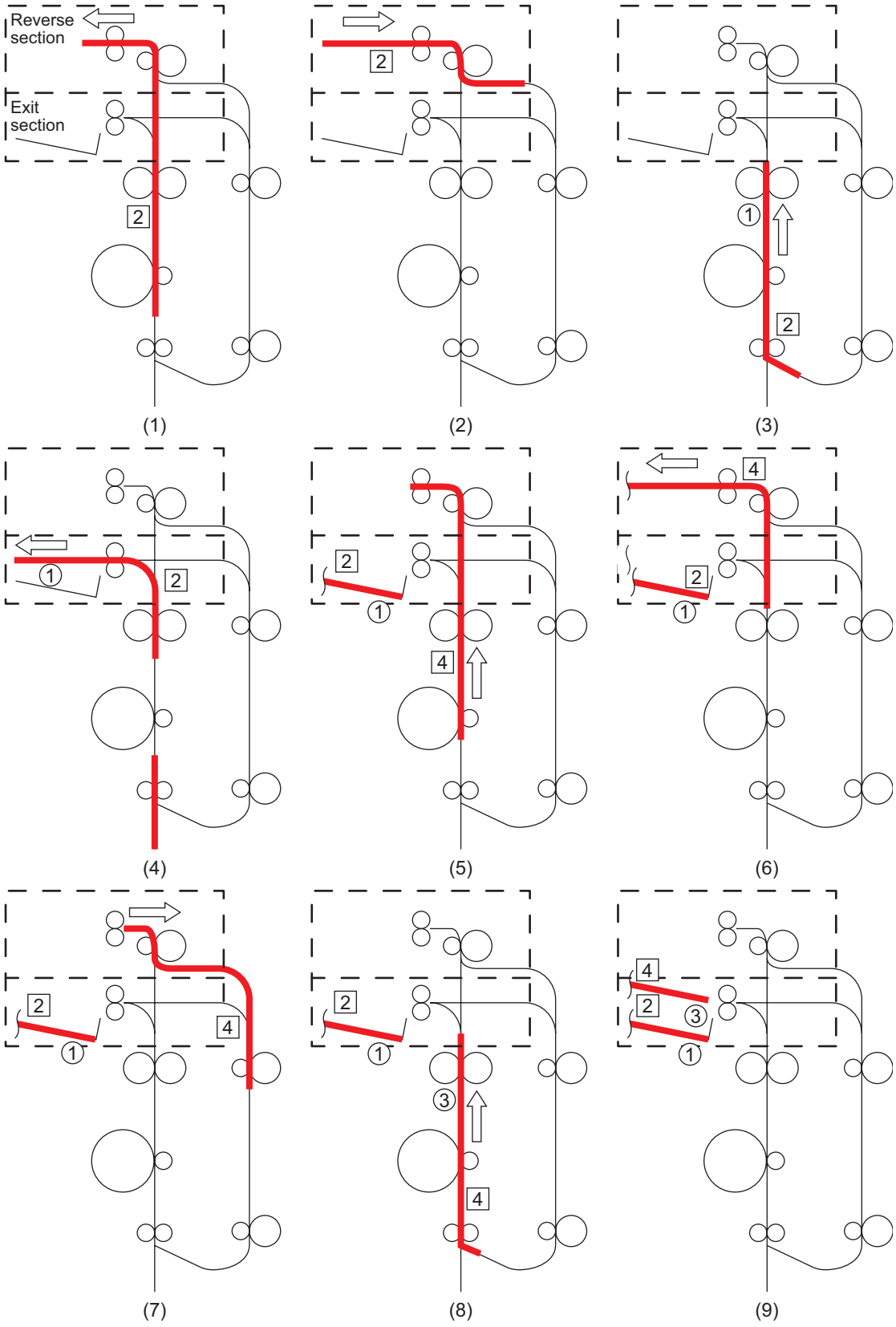


Fig. 14-3

14

3. Double-paper alternateness circulation (e-STUDIO205L/255/305)
With A4 size paper or smaller, duplex printing is performed for two sheets at a time as shown below.
Back side of the 1st sheet → Back side of the 2nd sheet → Front side of the 1st sheet → Front side of the 2nd sheet

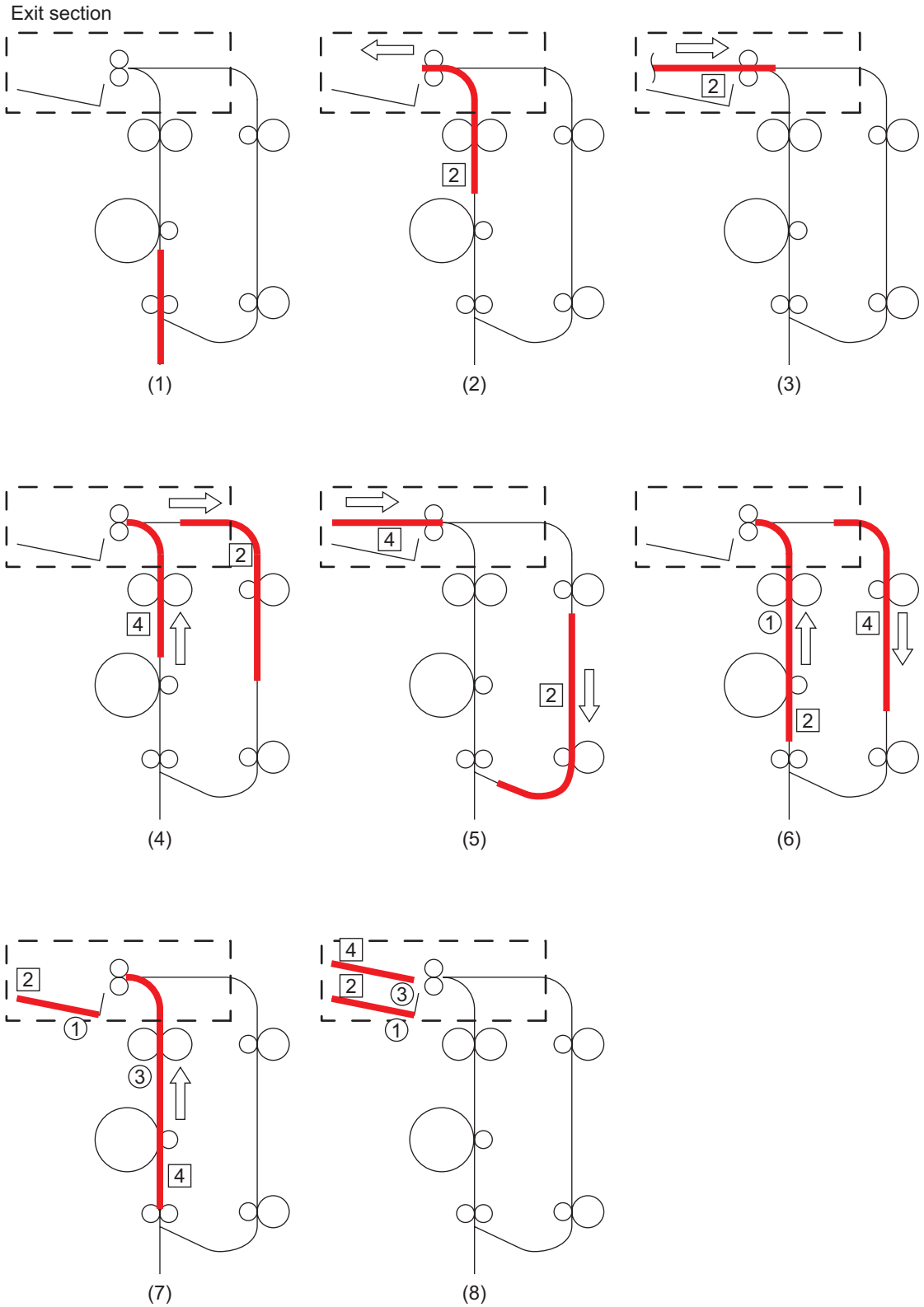


Fig. 14-4

4. Double-paper alternateness circulation (e-STUDIO355/455)
With A4 size paper or smaller, duplex printing is performed for two sheets at a time as shown below.
Back side of the 1st sheet → Back side of the 2nd sheet → Front side of the 1st sheet → Front side of the 2nd sheet

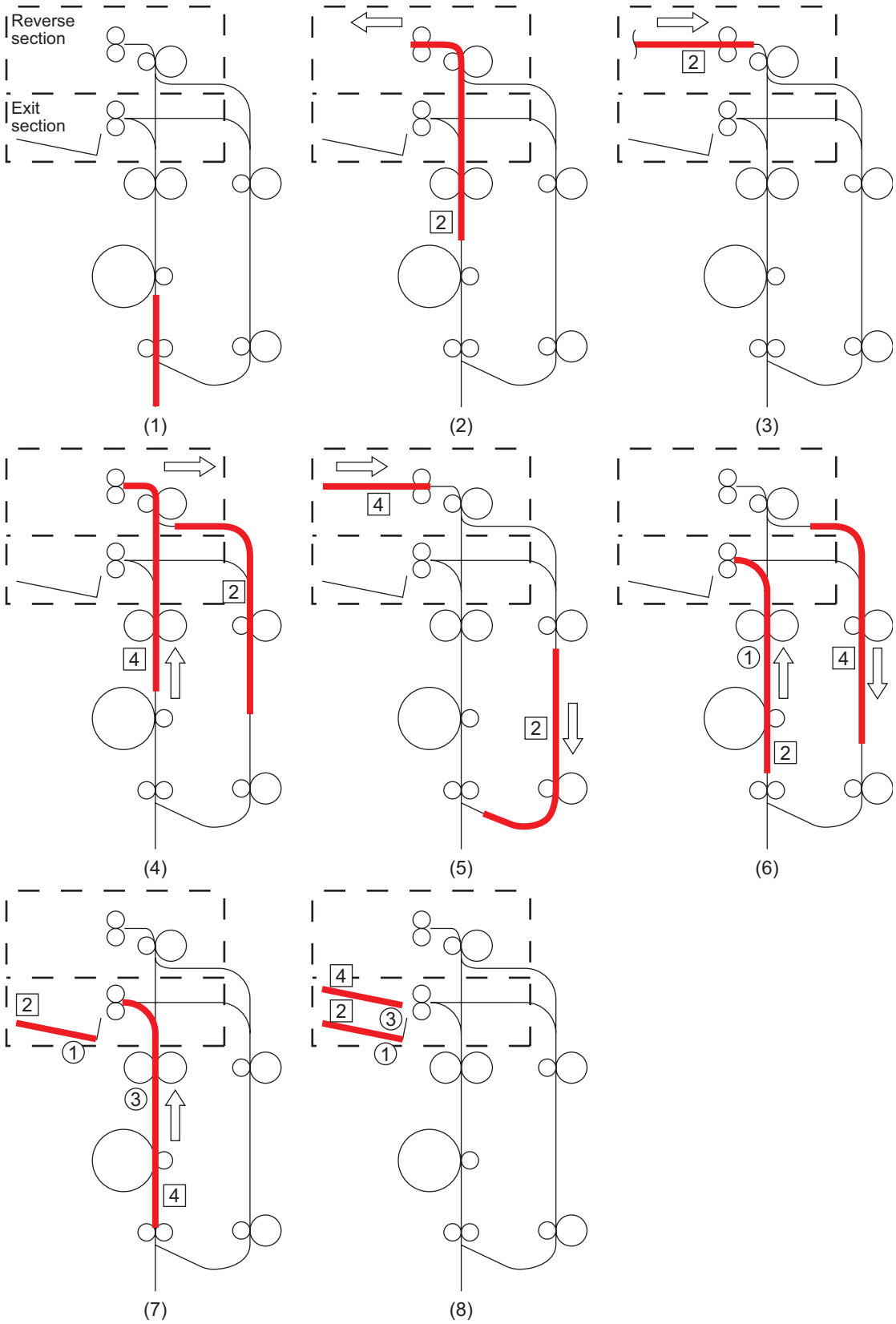


Fig. 14-5

14.4 Drive of ADU

When the ADU motor rotates in the direction A, the ADU upper transport roller is rotated with the drive of the gears and belt, and thus the paper is transported. When the ADU clutch is turned ON, the ADU lower transport roller is rotated.

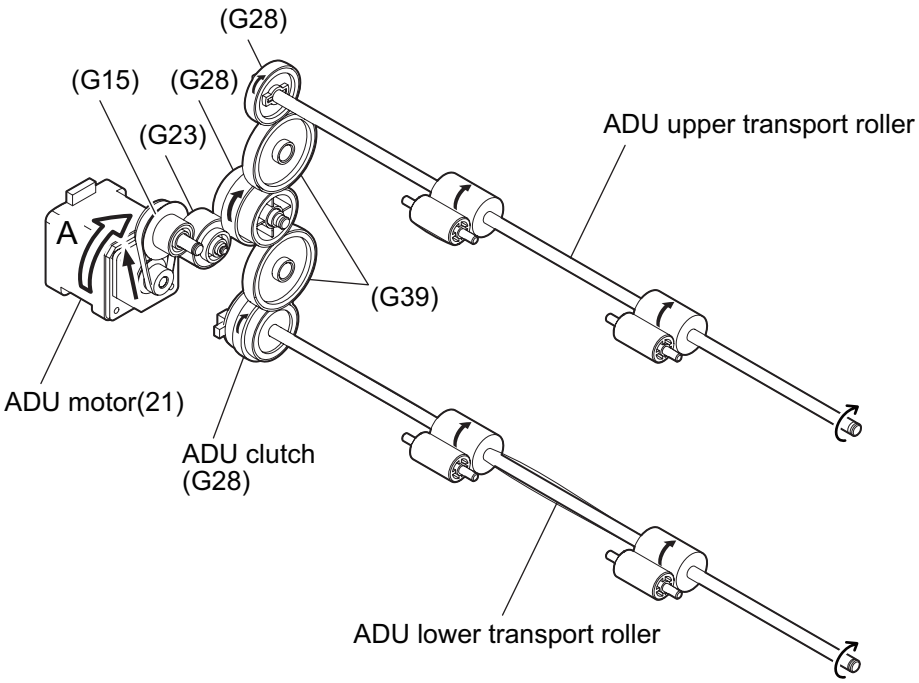


Fig. 14-6

14.5 Disassembly and Replacement

14.5.1 Automatic Duplexing Unit (ADU)

(1) Take off the right rear cover.
(P.2-27 "2.5.13 Right rear cover")
(2) Open the ADU.
(3) Disconnect 2 connectors and remove 1 screw.

Note:
When fixing the screw, connect the ground wire.

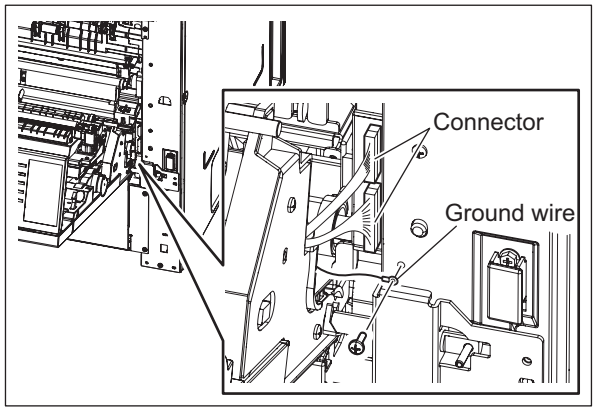


Fig. 14-7

(4) Slid the lever to the direction of the arrow.

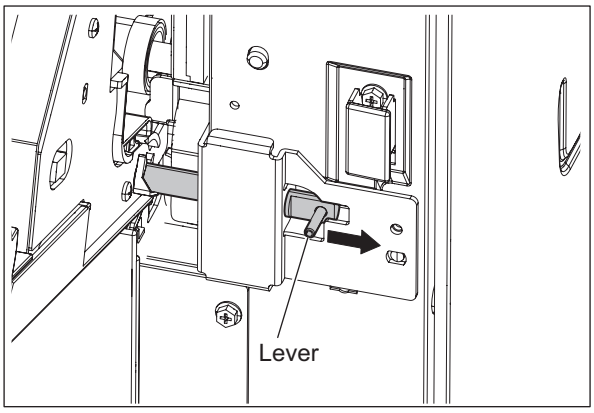


Fig. 14-8

(5) Remove 1 screw.
Slid and take off the fixing band, and then take off the ADU to the direction of the arrow.

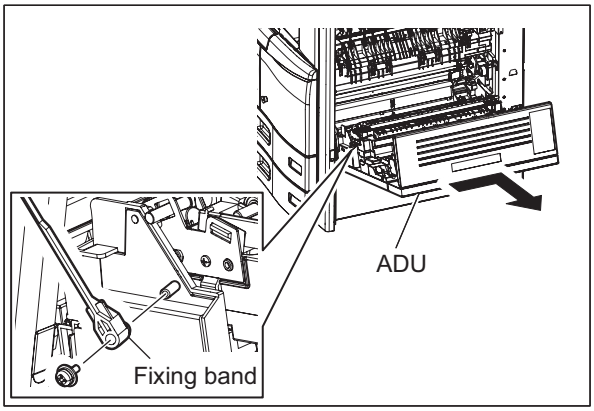


Fig. 14-9

14

Note:

After removing the ADU, attach the fixing band to the holder as shown in the figure.

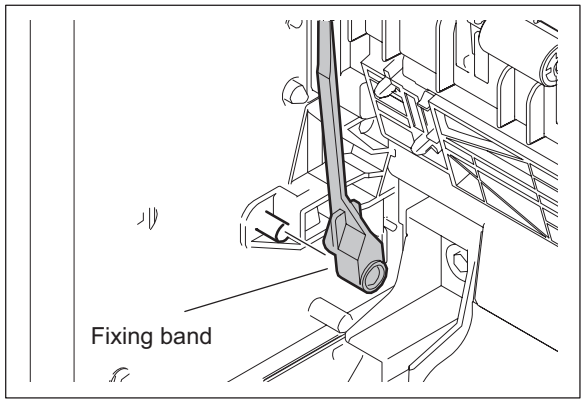


Fig. 14-10

14.5.2 ADU entrance sensor (S11)

(1) Take off the ADU.
(📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)")

(2) Remove 4 screws, disconnect 1 connector, and then take off the ADU upper guide.

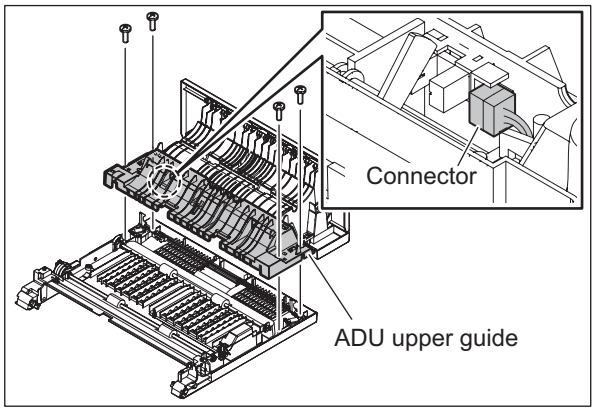


Fig. 14-11

(3) Release the latches and take off the ADU entrance sensor.

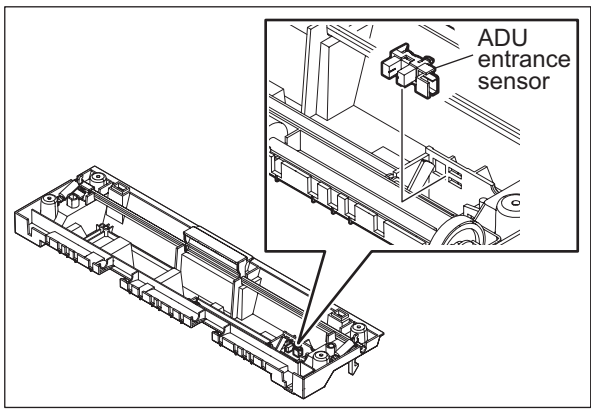


Fig. 14-12

14.5.3 ADU exit sensor (S10)

(1) Take off the ADU.
(📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)").
(2) Remove 4 screws and take off the 2 brackets.
(3) Take off the transfer unit.

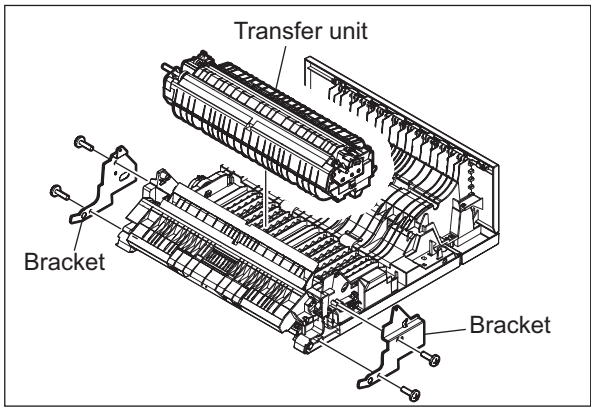


Fig. 14-13

(4) Disconnect 1 connector, remove 2 screws and take off the bypass feed unit.

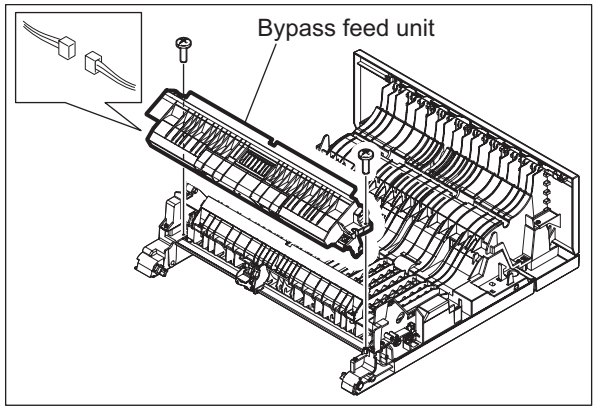


Fig. 14-14

(5) Remove 4 screws and the take off the ADU lower guide.

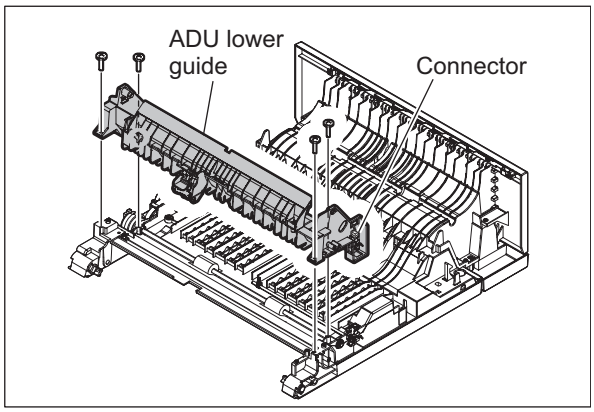


Fig. 14-15

(6) Disconnect 1 connector, release the latches and take off the ADU exit sensor.

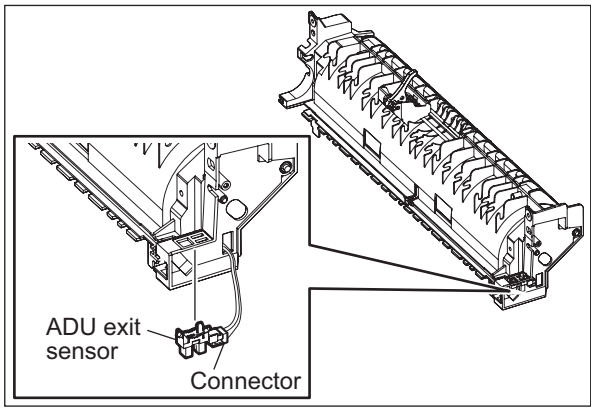


Fig. 14-16

14.5.4 ADU motor (M5)

(1) Take off the rear cover.
(📖 P.2-24 "2.5.6 Rear cover")

(2) Disconnect 1 connector and remove 2 screws, and take off the ADU motor unit.

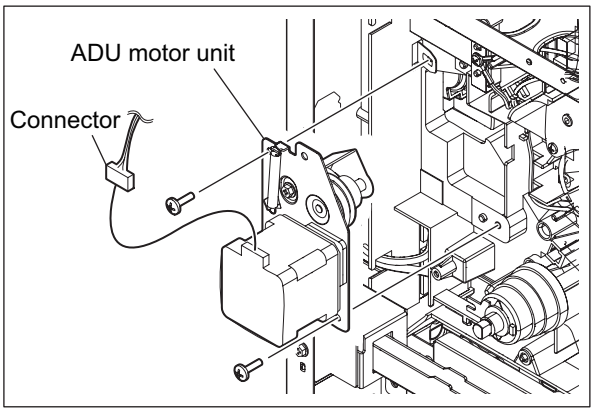


Fig. 14-17

(3) Loosen 1 screw.

Note:
When installing the ADU motor, install the ADU motor unit to the equipment, then close the Automatic Duplexing Unit before tightening this screw.

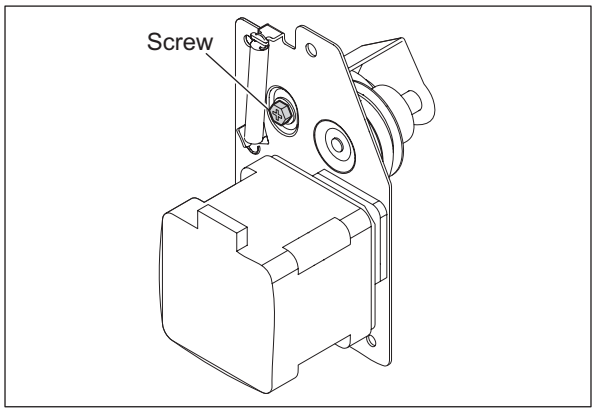


Fig. 14-18

(4) Remove 2 screws and take off the ADU motor.

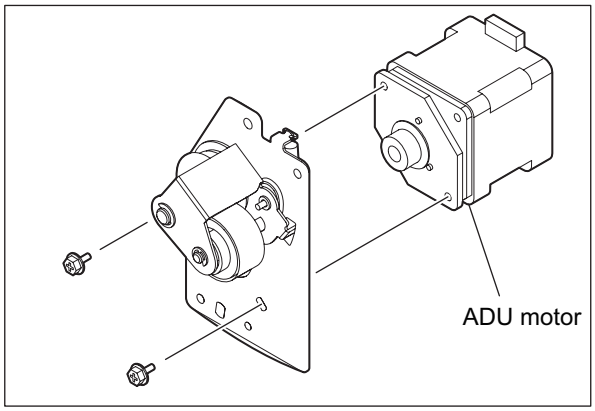


Fig. 14-19

14.5.5 ADU opening / closing switch (SW5)

(1) Take off the right rear cover.
(📖 P.2-27 "2.5.13 Right rear cover")

(2) Disconnect 1 connector and remove 1 screw, and then take off the switch unit.

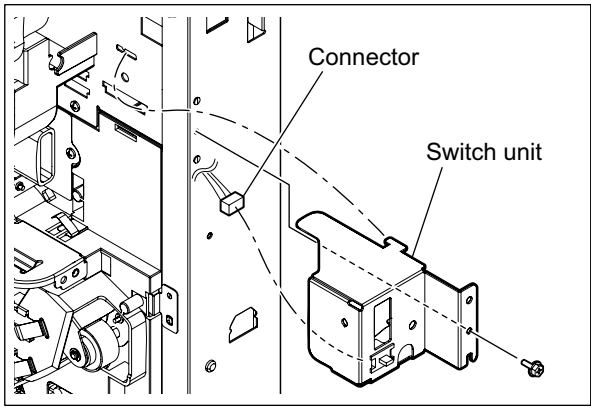


Fig. 14-20

(3) Take off the ADU opening/closing switch with pressing the both sides of it.

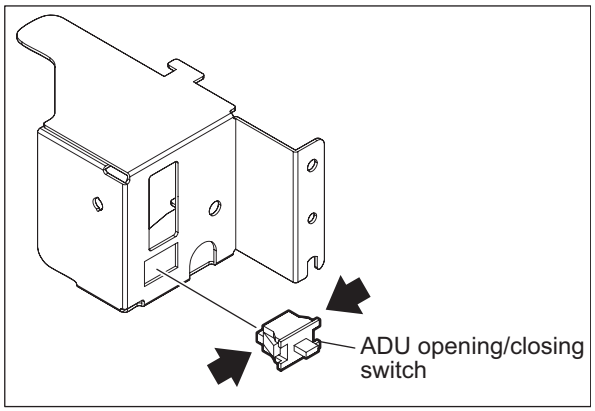


Fig. 14-21

14.5.6 ADU clutch (CLT1)

(1) Take off the ADU.
(📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)")
(2) Remove 4 screws and take off 2 brackets.
(3) Take off the transfer unit.

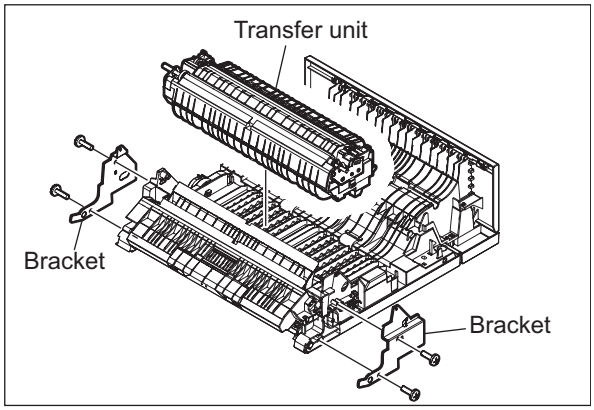


Fig. 14-22

(4) Disconnect 1 connector, remove 2 screws and take off the bypass feed unit.

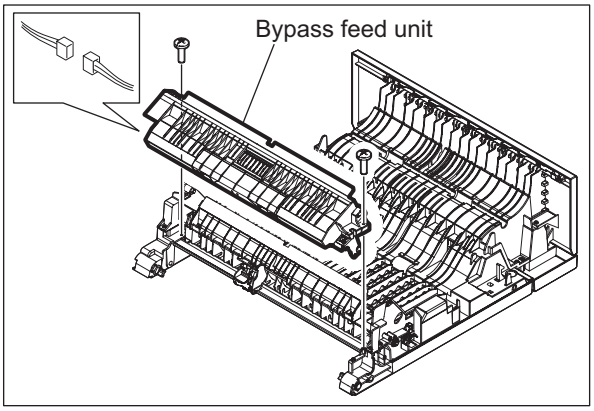


Fig. 14-23

(5) Remove 4 screws and the take off the ADU lower guide.

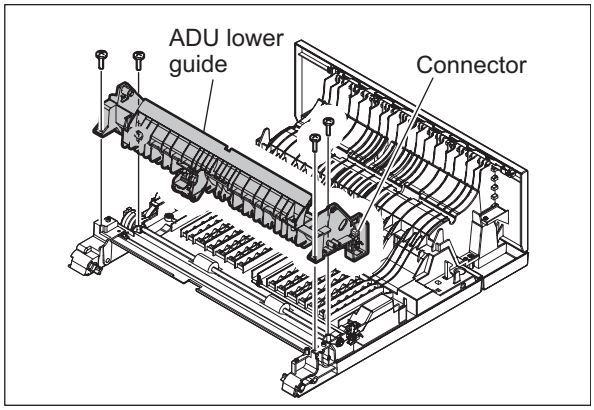


Fig. 14-24

(6) Remove 1 clip and take off the gear unit.

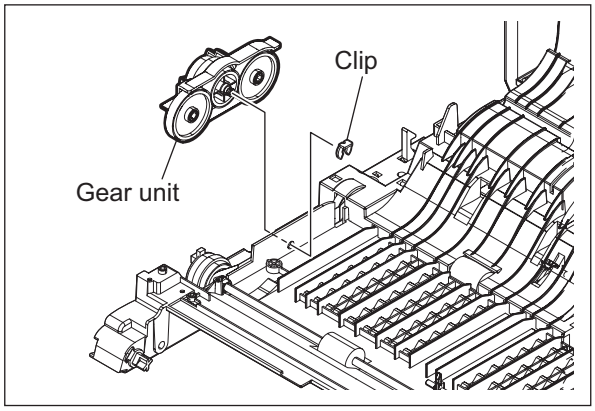


Fig. 14-25

(7) Remove 1 E-ring and 1 bushing, and then pull up the ADU lower transport roller by sliding it to the direction of the arrow.
(8) Take off the ADU clutch.

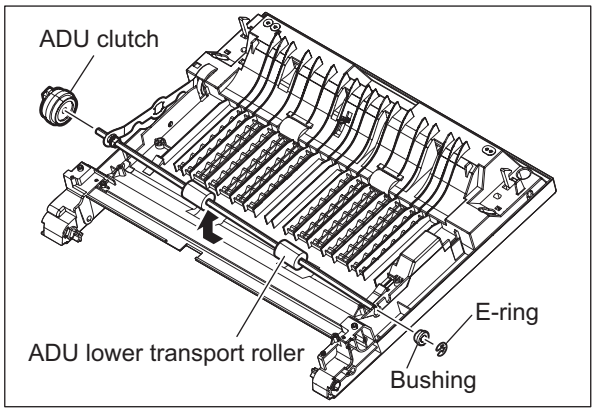


Fig. 14-26

Note:
When installing the ADU clutch, fit the guide of the ADU cover in the groove of the ADU clutch.

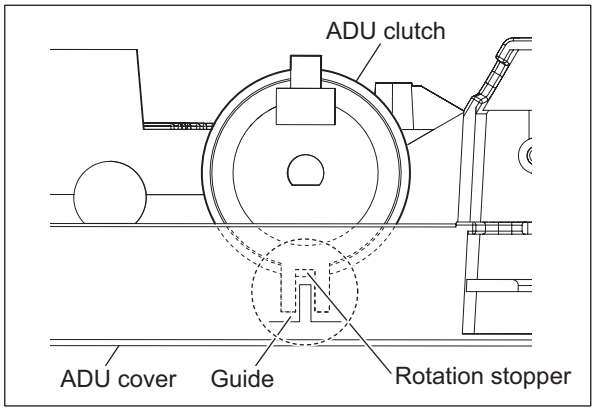


Fig. 14-27

14

14.5.7 ADU lower transport roller

(1) Take off the ADU clutch.
(📖 P.14-14 "14.5.6 ADU clutch (CLT1)")
(2) Remove the ground plate, 1 E-ring and 1 bushing, and then take off the ADU lower transport roller.

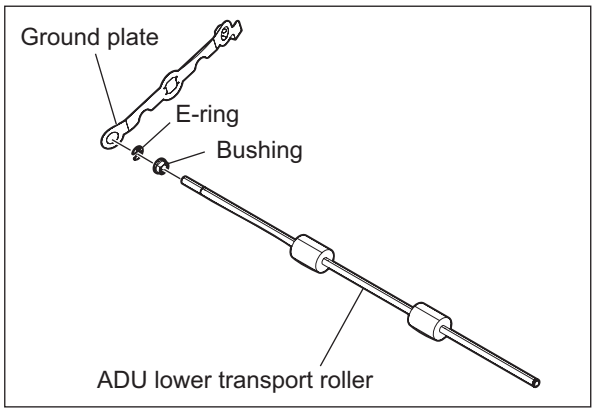


Fig. 14-28

14.5.8 ADU upper transport roller

(1) Take off the ADU.
(📖 P.14-9 "14.5.1 Automatic Duplexing Unit (ADU)")
(2) Remove 4 screws and take off 2 brackets.
(3) Take off the transfer unit.

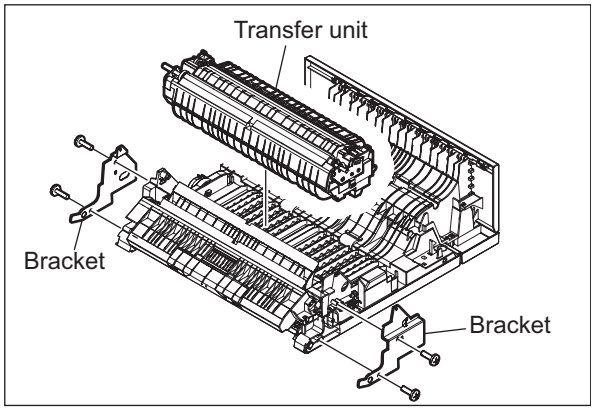


Fig. 14-29

(4) Disconnect 1 connector, remove 2 screws and take off the bypass feed unit.

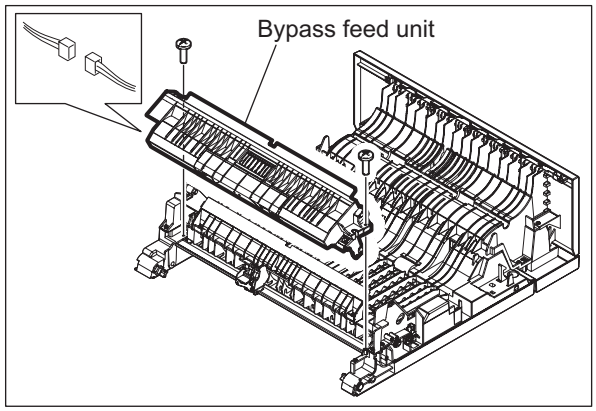


Fig. 14-30

(5) Remove 4 screws and the take off the ADU lower guide.

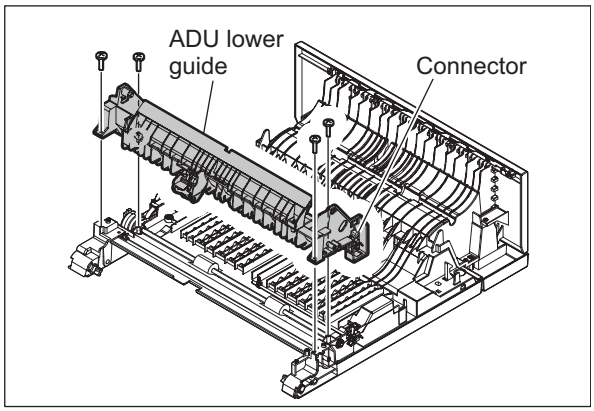


Fig. 14-31

(6) Remove 1 clip and take off the gear unit.

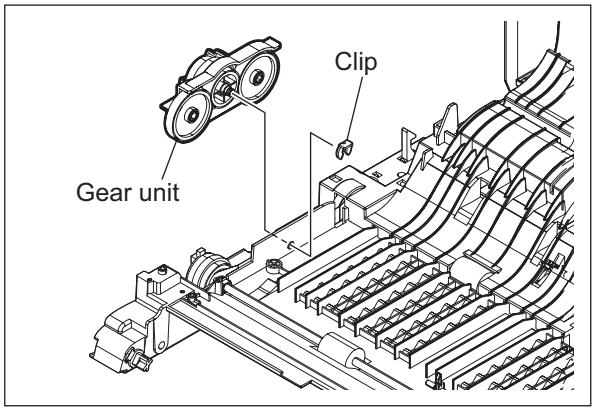


Fig. 14-32

(7) Disconnect 1 connector and remove 4 screws, and the take off the ADU upper guide.

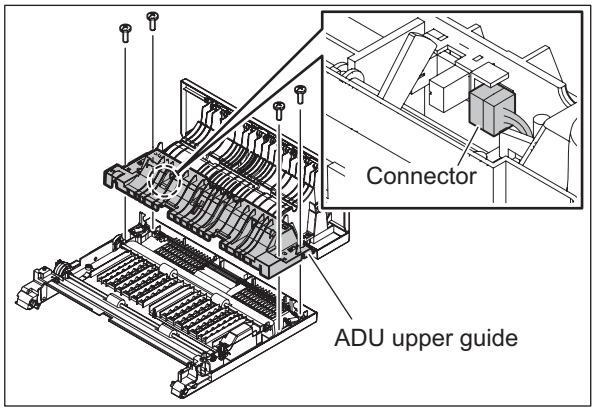


Fig. 14-33

(8) Remove 2 clips, 1 bushing, 1 gear, 1 pin and the ground plate. Then take off the ADU upper transport roller.

Note:

When installing the gear, insert the pin in the roller shaft and fit it in the groove of the gear.

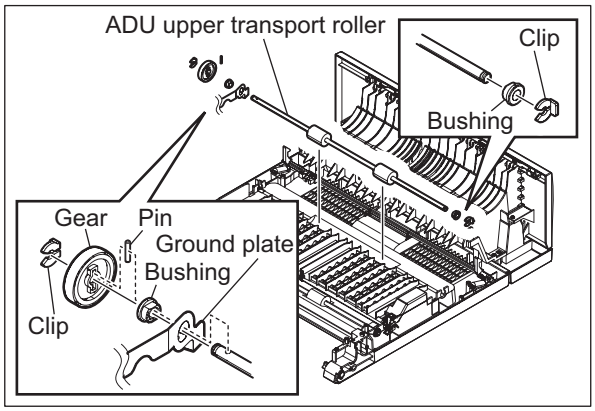


Fig. 14-34

15. POWER SUPPLY UNIT

15.1 Construction

The power supply unit consists of the AC filter, insulation type DC output circuit, heater lamp control circuit and damp heater power supply circuit.

1. AC filter
   Eliminates noise from the outside and prevents the noise generated by the equipment from leaking to the outside.

2. DC output circuits
   Converts AC voltage input from outside to DC voltage and supplies it to each electric part. The DC voltage is divided into the following two lines.

   a. Main switch line :Power supply used in the entire equipment during image forming process. Two kinds of voltage (+5V, +12V) are output when the main switch of the equipment is turned ON.

   b. Door switch line :Power supply used in the entire equipment during image forming process, being supplied via the interlock switch. Two kinds of voltage (+5VD and +24VD) are output only when the main switch of the equipment is turned ON and two doors (front cover and ADU unit) are closed.

3. Heater lamp control circuit
   TRC (Triac) is driven by the heater control signal (HTR1ON/HTR2ON/HTRASTON) from the LGC board and then AC power is supplied to each heater lamp (center, side and sub) in the fuser unit. For e-STUDIO205L/255/305, the sub heater lamp is not installed and the HTRASTON signal is not supplied.

4. Damp heater power supply circuit
   AC power input from outside is output directly to the FUS board and then supplied to the damp heater in each section in the equipment. The damp heater switch is set to OFF as initial setting for shutting off the power to the damp heater. When using the damp heater, the damp heater switch needs to be turn ON after installing the equipment. The damp heater (including the FUS board) is an option in NAD/MJD model, and is installed as standard device in other models.

15.2 Operation of DC Output Circuits

1. Starting line output
   When the main switch of the equipment is turned ON, power starts supplying to all the lines only when two doors (front cover and ADU) are closed.

2. Stopping line output
   When the main switch of the equipment is turned OFF, PWR-DN signal is output after the instantaneous outage insurance time elapses and then the supply of each voltage stops. If the supply of voltage of the main line (+5VS, +5VA, +12VA) stops earlier than the 24V line does, it may cause the damage of the electron device on each control circuit. To prevent this, the supply of these voltages stops after the PWR-DN signal is output and the minimum retaining time elapses.

3. Output protection
   Each output system includes an overcurrent and overvoltage protection circuits (a fuse and internal protection circuit). This is to prevent the defectives (damage or abnormal operation of the secondary circuit) which may be caused by an overcurrent due to a short circuit or an overvoltage due to a short circuit between different voltages. If the protection circuit is activated (except the case the fuse is blown out), remove the causes such as short-circuit. Turn ON the power again to clear the overcurrent protection.

4. Recovering from super sleep mode (normal starting)
   When the [ON/OFF] button on the control panel is pressed during the super sleep mode, a super sleep mode shifting/recovering signal (SYS-EN) is output from the SYS board / SYS-IMG board and then voltage starts being supplied to all the lines, if no error was detected.

5. Shifting to super sleep mode (normal stopping)
   When the [ON/OFF] button on the control panel is pressed for 1 second or more while the main switch of the equipment is toggled ON, a super sleep mode shifting/recovering signal (SYS-EN) is output from the SYS board / SYS-IMG board after the initialization is finished and then all lines for output voltage except +5VS are closed.

   The Super sleep mode is disabled under the following conditions.

   - When the Super sleep mode is set to be disabled on the control panel, TopAccess and with the code 08-8543

   - When the Wireless LAN Module, Bluetooth Module, e-BRIDGE ID Gate or Data Overwrite Enabler is installed, or when the IPsec Enabler is installed and its function is set to be enabled

   - When the setting for receiving confidential data on each line (08-3846) is set to ON

   - When operation is being performed in the self-diagnosis mode (Disabled until the main switch is turned OFF)

6. State of the power supply
   - Power OFF
     The main switch of the equipment is turned OFF. Since DC voltage is not supplied to each board, the equipment is not operable.

   - Normal state (including Energy saving mode)
     The main switch of the equipment is turned ON and DC voltage is supplied to each board. When the cover of the equipment is closed, 24V DC voltage is supplied and the equipment enters into the ready/printing state.

   - Sleep mode
     Since +5VB, +5VD, +12VB and +24V DC voltages are not supplied but +12VA, +5VA and +5VS DC voltages only, the equipment does not enter into the ready state.

- Super Sleep mode
  Only DC voltage and +5VS are output from the power supply unit. The [ON/OFF] button is monitored and the LED of the main switch is lit.

15.3 Output Channel

The followings are two output channels which are not linked with the door switch.

1. +5V
   - +5VS : CN418 Pins 11 and 12
     Output to the SYS board / SYS-IMG board
   - +5VA : CN418 Pins 8 and 9
     Output to the SYS board / SYS-IMG board
   - +5VB : CN418 Pins 1
     Output to the SYS board / SYS-IMG board
   - +5VB : CN415 Pin 4
     Output to the FUS board
   - +5VB : CN415 Pins 1, 2 and 3
     Output to the LGC board, PFP/ LCF (via LGC board),
     Bridge unit / Job separator / Offset tray (via LGC board)
   - +5VB : CN415 Pin 5
     Output to the finisher
   - +5VB : CN419 Pins 1 and 2
     Output to the SLG board
   - +5VB : CN419 Pin 4
     Output to the RADF

2. +12V
   - +12VA : CN418 Pin 5
     Output to the SYS board / SYS-IMG board
   - +12VB : CN419 Pin 5
     Output to the SLG board

The followings are two output channels which are linked with the door switch.

1. +5V
   - +5VD : CN415 Pin 14
     Output to the LGC board

2. +24V
   - +24VD1 : CN415 Pins 19, 21, 22 and 24
     Output to the LGC board, High-voltage transformer (via LGC board),
     PFP/LCF (via LGC board), Bridge unit / Job separator / Offset tray (via LGC board)
   - +24VD1 : CN419 Pins 11 and 12
     Output to the SLG board
   - +24VD2 : CN417 Pins 1 and 2
     Output to the MOT/MOT2 board
   - +24VD2 : CN417 Pins 3 and 4
     Output to the main motor
   - +24VD3 : CN419 Pins 15 and 16
     Output to the RADF
   - +24VD4 : CN415 Pin 23
     Output to the finisher

<<Output connector>>

Not linked with the door switch

Connector	Destination	Voltage
CN418	For the SYS board / SYS-IMG board	+5VS, +5VA, +5VB, +12VA
CN415	For the LGC board, FUS board, PFP/LCF (via LGC board), Bridge unit / Job separator / Offset tray (via LGC board), finisher	+5VB
CN419	For the SLG board, RADF	+5VB, +12VB

Linked with the door switch

Connector	Destination	Voltage
CN415	For the LGC board, High-voltage transformer (via LGC board), PFP/LCF (via LGC board), Bridge unit / Job separator / Offset tray (via LGC board), finisher	+5VD, +24VD1, +24VD4
CN417	For the Main motor, MOT/MOT2 board	+24VD2
CN419	For the SLG board, RADF	+24VD1, +24VD3

15.4 Fuse

When the power supply secondary fuse is blown out, confirm that there is no abnormality with each part using the following table.

Voltage	Board/Unit	Part	Fuse type
+24VD1	LGC	Process unit fan	F201:8A (Time-lag)
		Toner motor	
		Polygonal motor	
		Upper Tray-up motor	
		Lower Tray-up motor	
		TRU fan	
		Switching regulator cooling fan	
		Auto-toner sensor	
		Upper drawer feed clutch	
		Lower drawer feed clutch	
		Registration roller clutch	
		High speed transport clutch	
		Low speed transport clutch	
		ADU clutch	
		Discharge LED	
		Main switch	
		High-voltage transformer	
		Bypass feed clutch	
	SLG	Scan motor	
		Exposure lamp (lamp Inverter board)	
	Key copy counter / Coin controller		
	Bridge unit / Job separator / Offset tray		
	PFP/LCF		
+24VD2	MOT/MOT2	ADU motor	F202:8A (Time-lag)
		Exit motor	
		Reverse motor (e-STUDIO355/455 only)	
		REV gate solenoid (e-STUDIO355/455 only)	
	Main motor		
+24VD3	RADF		F203:4A (Time-lag)
+24VD4	Finisher		F204:5A (Time-lag)

15.5 Configuration of Power Supply Unit

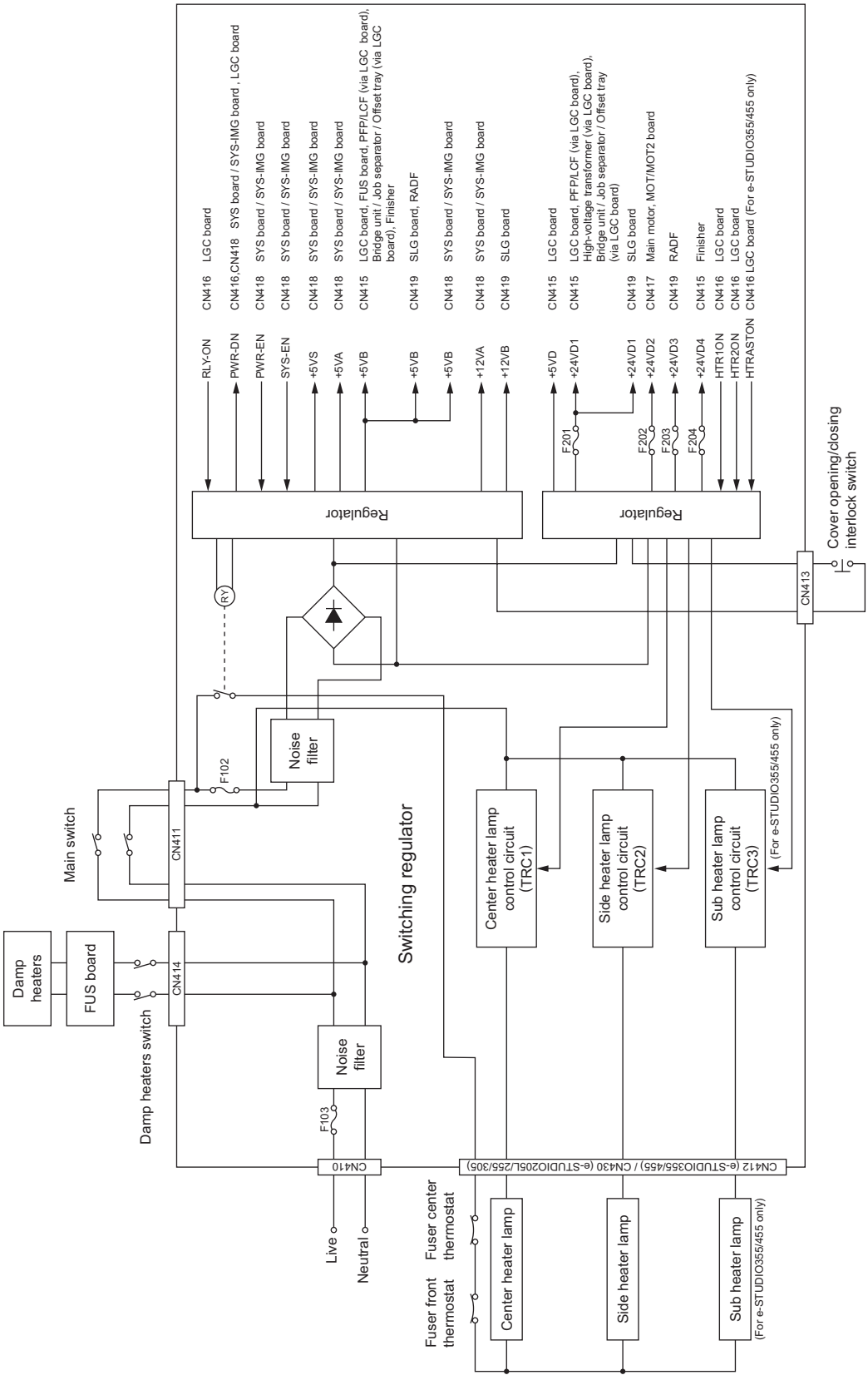


Fig. 15-1

15

15.6 AC Wire Harness

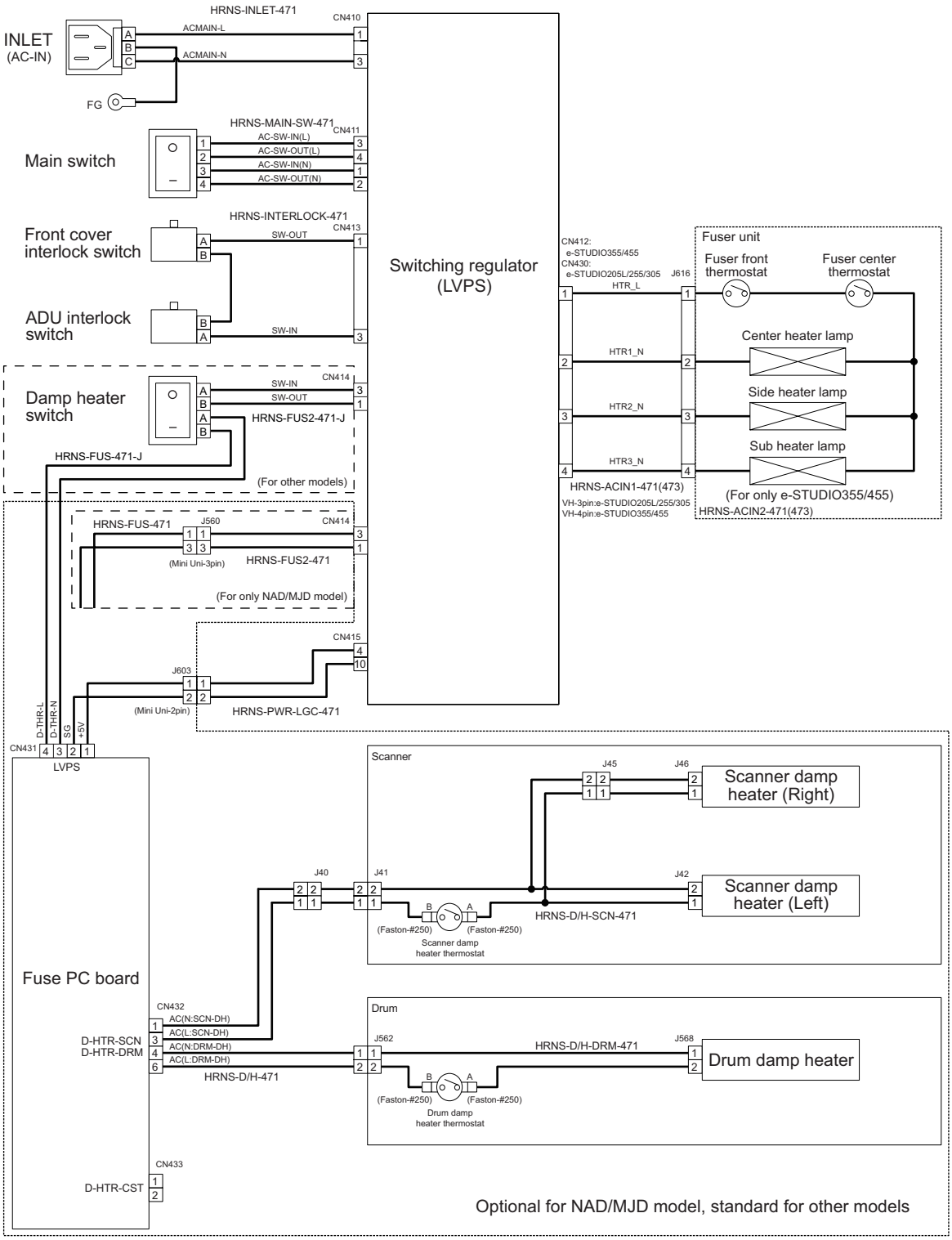


Fig. 15-2

16. PC BOARDS

1. PWA-F-SYS

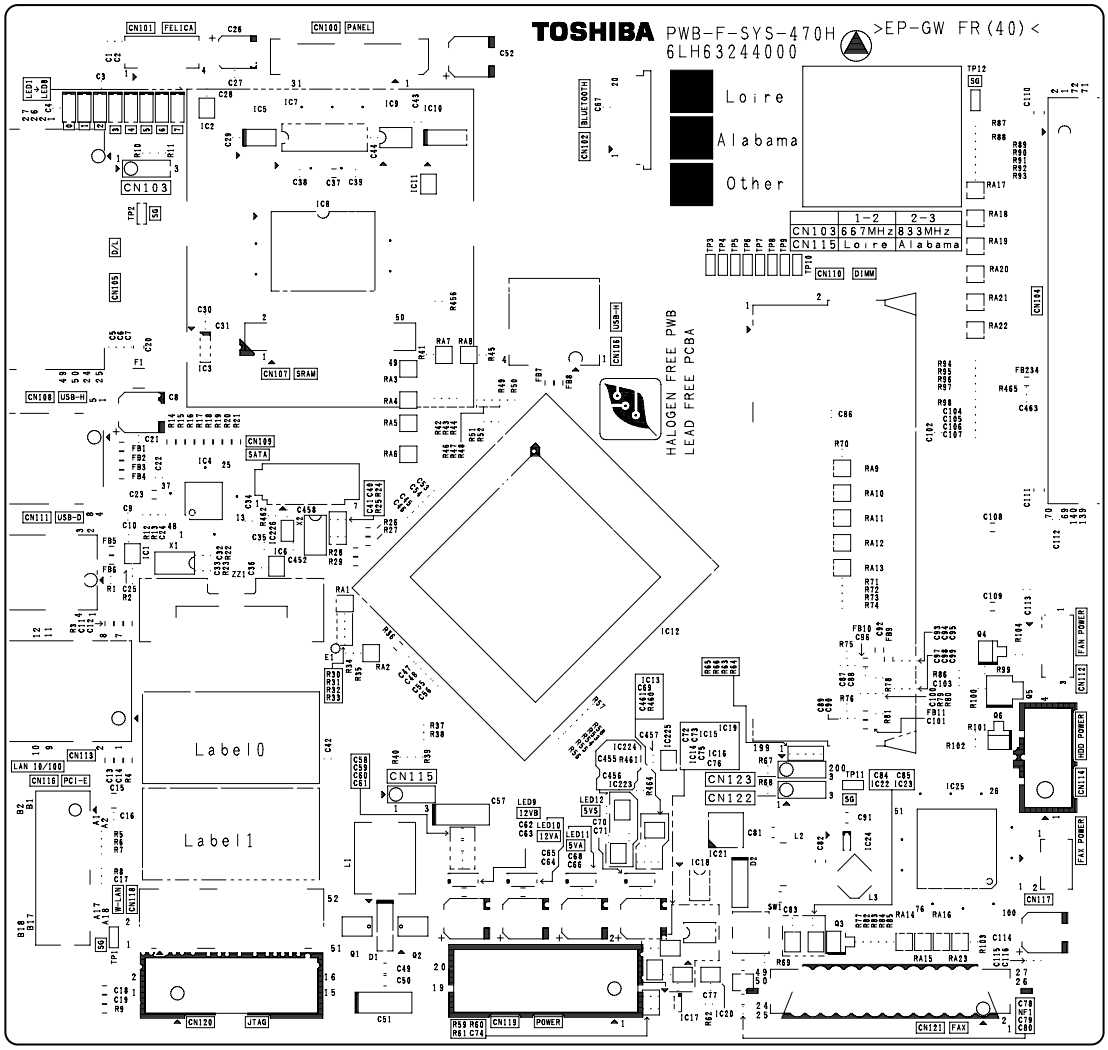


Fig. 16-1

2. PWA-F-SYS (SYS-IMG board)

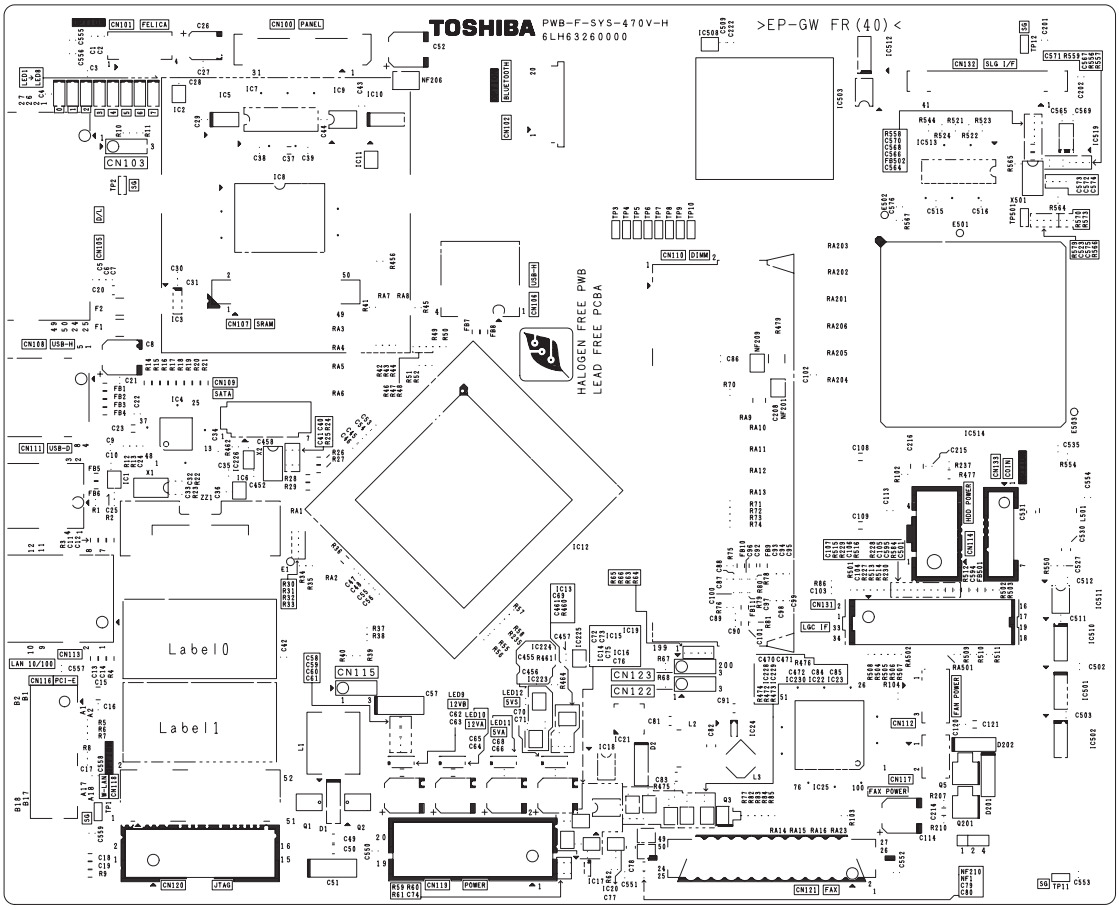


Fig. 16-2

3. PWA-F-LGC

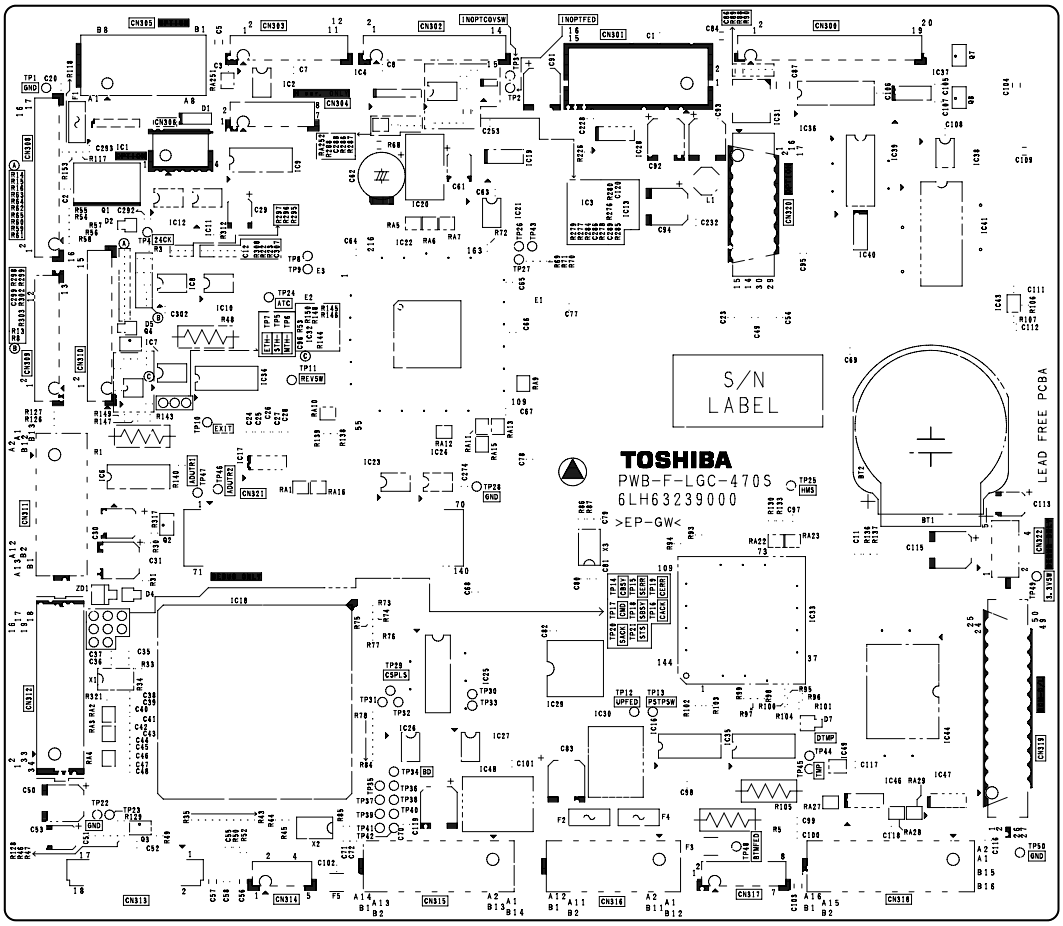


Fig. 16-3

16

4. PWA-F-SLG

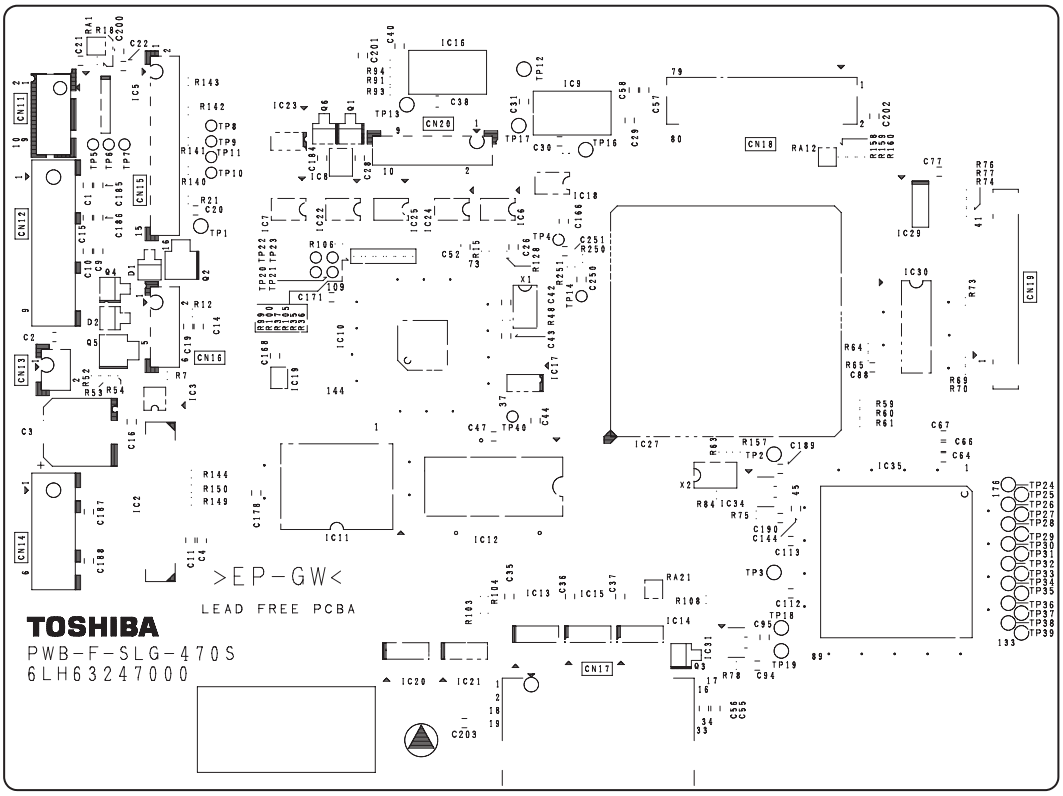


Fig. 16-4

5. PWA-F-CCD

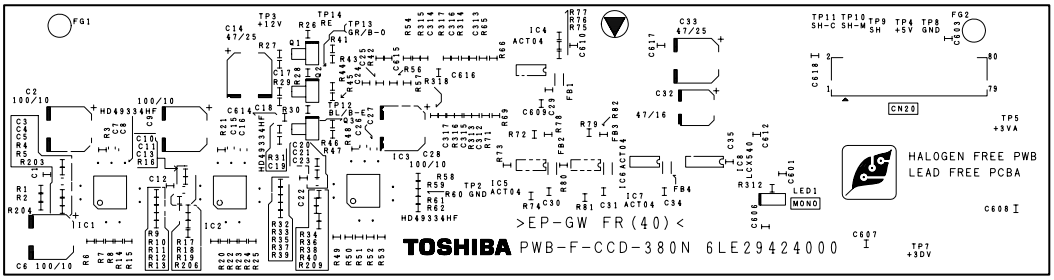


Fig. 16-5

6. PWA-F-IMG

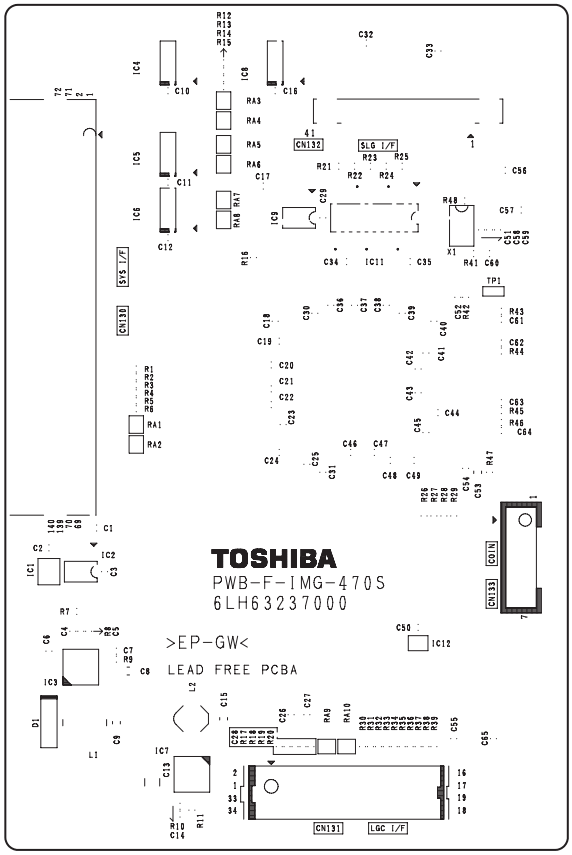


Fig. 16-6

7. PWA-F-LDR

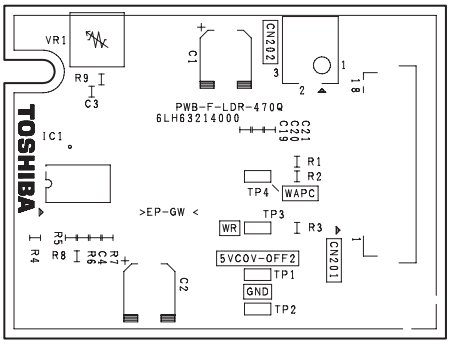


Fig. 16-7

8. PWA-F-SNS

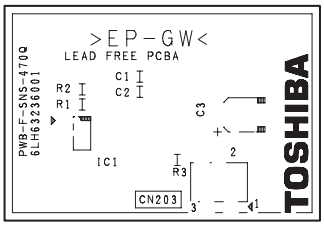


Fig. 16-8

9. PWA-F-MOT
e-STUDIO205L/255/305

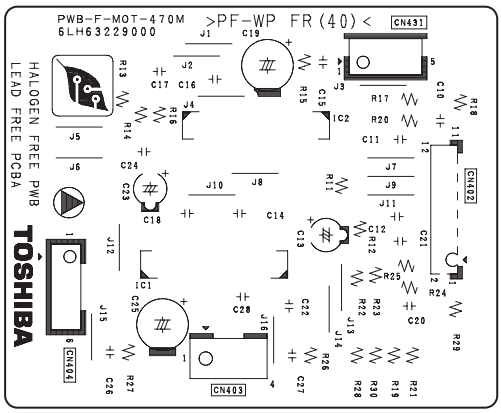


Fig. 16-9

10. PWA-F-MOT2
e-STUDIO355/455

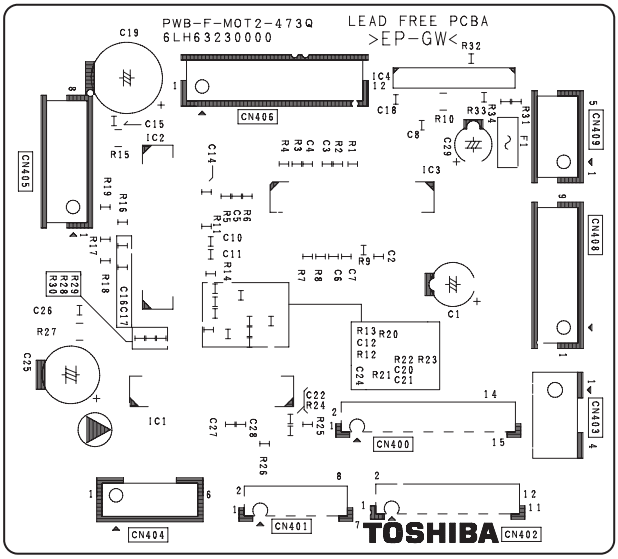


Fig. 16-10

11. PWA-F-DSP

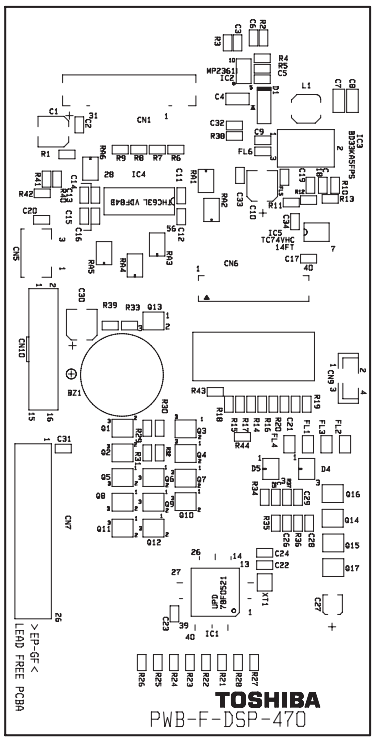


Fig. 16-11

12. PWA-F-KEY

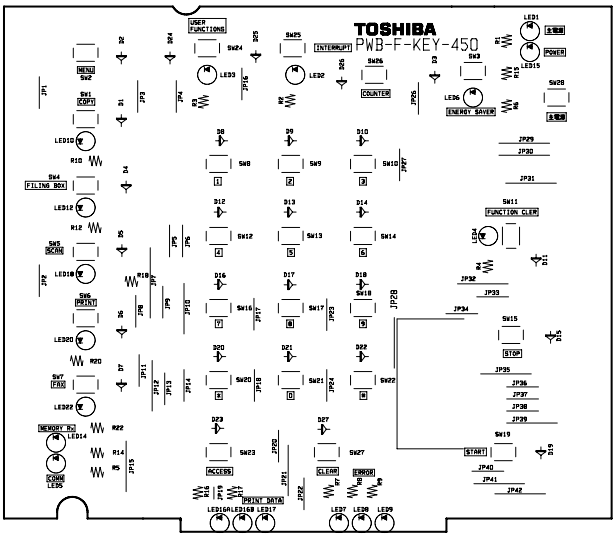


Fig. 16-12

16

13.PWA-F-FUS

* ASD/AUD/SAD/TWD/CND/IRD/ARD/KRD models: Standard, NAD/MJD models: Option

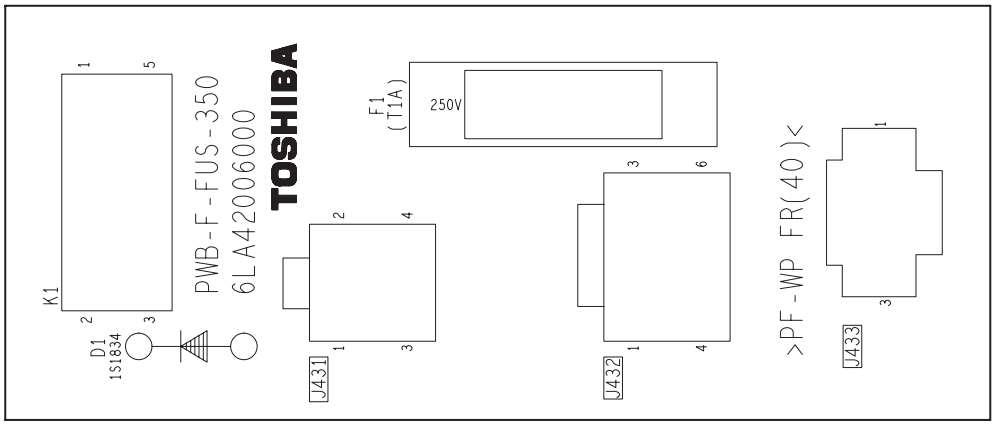


Fig. 16-13

14.PWA-F-CTRG

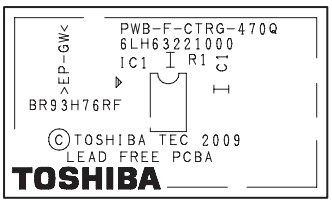


Fig. 16-14

15.PWA-F-EPU

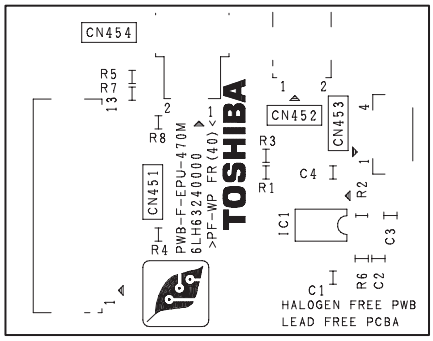


Fig. 16-15

17. EXTERNAL COUNTERS

17.1 Outline

This specification describes the interface between external counters, such as Coin Controller and Card Counter.

17.2 Signal

17.2.1 Pin Layout

1. Connector on the LGC board: CN305 (Coin Controller / Card Controller)

Pin No.	I/O	Signal name	Function	Voltage level	Remarks	GQ-1180
A1	Power	+24VD1	24V line	DC24V±10%	When cover opened: OFF	In use
A2	Out	CTRON	Total Counter On Signal	Open Collector (M63830)	L: ON	In use
A3	In	KCTRC	Counter Connection Signal	L=0V, H=DC5V	L: Connected H: Not connected	-
A4	Out	MCRUN	Ready to Copy Signal	Open Collector (SN7407)	L: Operating H: Stop	In use
A5	Out	EXTCTR	Exit Sensor On Signal (Exit Counter On Signal)	Open Collector (SN7407)	L: ON	In use
A6	GND	PG	Power ground	0V		In use
A7	Out	CSTCTR	Drawer paper feed counter On signal (Front side of paper print counter)	Open Collector (SN7407)	L: ON	-
A8	Out	ADUCTR	ADU paper feed counter On signal (Back side of paper print counter)	Open Collector (SN7407)	L: ON	-
B1	Out	FLCTR	Color counter On signal (Unused)	Open Collector (SN7407)	L: ON	-
B2	GND	SG	Signal Ground	0V		-
B3	Out	TSIZE3	Paper size Signal	Open Collector (SN7407)	L: ON	-
B4	Out	TSIZE2	Paper size Signal	Open Collector (SN7407)	L: ON	-
B5	Out	TSIZE1	Paper size Signal	Open Collector (SN7407)	L: ON	-
B6	Out	TSIZE0	Paper size Signal	Open Collector (SN7407)	L: ON	-
B7	Power	+5VB	5V line	DC5.1V±5%	At the sleep mode: OFF	In use
B8	In-	CTRCNT2	Counter enabled signal	L=0V, H=DC5V	L: Enabled H: Disabled	In use

* FLCTR signal is exclusively for color copy and not provided for this equipment.

2. Connector on the IMG board or SYS-IMG board: CN133 (Coin Controller)

Pin No.	I/O	Signal name	Function	Voltage level	Remarks
1	Out	L/S	Paper size (Large/Small) signal	Open Drain (LCX07)	L: Large size H: Small size
2	Out	FULL-C	Full color Counter On Signal (Unused)	Open Drain (LCX07)	L: Full color
3	Out	MONO-C	Mono color counter On signal (Unused)	Open Drain (LCX07)	L: Mono colors
4	Out	B/W	Black counter On signal (Unused)	Open Drain (LCX07)	L: Black
5	-	N.C.	-	-	-
6	GND	GND	Signal Ground	0V	
7	-	N.C.	-	-	-

* FULL-C, MONO-C and B/W signals are exclusively for color copy and not provided for this equipment.

3. Counter on the LGC board: CN306 (Key Counter)

Pin No.	I/O	Signal name	Function	Voltage level	Remarks
1	GND	SG	Signal Ground	0V	
2	In	KCTRC	Key Counter Connection Signal	L=0V, H=DC5V	L: Connected H: Not connected
3	Power	+24VD1	24V line	DC24V±10%	When cover opened: OFF
4	Out	KCTRO	Key Counter On Signal	Open Collector (M63830)	L: ON

17.2.2 Details of the signals

1. CTRON signal and KCTRO signal (output signals)
   The TOLON signal is a count signal synchronized with an electronic counter for the equipment. This signal is turned to a low level (ON) every time the counter counts up.
   This output signal also drives each mechanical counter directly.
   If “1” or “2” is set for the setting code 08-352 (counter setting for large-sized paper), a sheet of large-sized paper is counted as two sheets only when the KCTRO signal is turned to a low level.
   The CTRON signal, which is output from the LGC board, is used for both copy key cards and coin controllers. The KCTRO signal also output from the LGC board is for key copy counters.

2. KCTRC signal (input signals)
   This signal is a connection signal that detects whether each counter is installed or not. The counter is installed when this signal is at a low level. When this signal is at a high level, copying with the counter is disabled.
   This signal is used only for key copy counters.

3. MCRUN signal (output signal)
   This signal is turned to a low level while the equipment performs copying.
   When copying is interrupted due to forcible toner supply or another reason, however, this signal remains at a high level until the equipment becomes ready for copying again.
   This signal, which is output from the LGC board, is used for both copy key cards and coin controllers.

4. EXTCTR signal (output signal)
   This signal is turned ON, since it is synchronized with the turning OFF of the exit sensor.
   A coin controller counts up the degree of usage of copy cards by means of this signal.
   This signal, which is output from the LGC board is used only for coin controllers.

5. CSTCTR signal, ADUCTR signal (output signal)
   The CSTCTR signal is turned to a low level (ON), since it is synchronized with the CTRON signal when paper is fed from a drawer or the bypass tray. This signal is for counting print jobs for the front side of the paper.
   The ADUCTR signal is turned to a low level (ON), since it is synchronized with the CTRON signal when paper is fed from the ADU. This signal is for counting print jobs for the back side of the paper.
   This signal, which is output from the LGC board, is used only for copy key cards.

6. TSIZE3, 2, 1, 0 signal
   These four signals are output in combination corresponding to the size of the copy paper.
   This signal, which is output from the LGC board, is used only for copy key cards.

7. CTRCNT2 signal (input signal)
   This signal enables copying with each counter. Copying is enabled when this signal is at a low level. Copying is disabled when it is at a high level.
   This signal is used for both copy key cards and coin controllers.

8. L/S signal (output signal)
   This signal is turned to a low level immediately when large-sized paper is selected or when the paper size is not specified for bypass feeding. The signal is at a high level in other cases.
   The definition of large-sized paper can be set in the setting code 08-353.
   This signal is used only for coin controllers.

17.3 Notices

17.3.1 Setting code

Each signal will be enabled by configuring the setting code “08-202” (Counter installed externally).

08-202
0: No external counter (Default)
1: Coin controller
2: Card controller (For Japan only)
3: Key copy counter

17.3.2 Setting value change and restrictions when using the Card controller

1. Setting value
   - 08-202 (Counter installed externally): Set to “2” (Card controller).
   - 08-381 (Setting for counter installed externally): It should be charged precisely according to the usage.
     Example: To charge only when copies are made, set to “1”.

2. Restrictions
   - 08-352 (Large size double count setting): Set to “0” (Single count).

17.3.3 Setting value change and restrictions when using the coin controller

1. Setting value
   - 08-202 (Counter installed externally): Set to “1” (Coin controller).
   - 08-381 (Setting for counter installed externally): It should be charged precisely according to the usage.
     Example: To charge only when copies are made, set to “1”.

2. Restrictions
   For 08-353 (Large size double count setting), set to “0” when A3 and LD are specified as the large size, and set to “1” when B4, LG, FOLIO, COMP and 8K are specified as the large size in addition to A3 and LD.

17.3.4 Setting value change and restrictions when using the key counter

1. Setting value
   - 08-202 (Counter installed externally): Set to “3” (key counter)
   - 08-381(Setting for counter installed externally): It should be charged precisely according to the usage.
     Example: To charge only when copies are made, set to “1”.

2. Restrictions
   For 08-353 (Large size double count setting), set to “0” when A3 and LD are specified as the large size, and set to “1” when B4, LG, FOLIO, COMP and 8K are specified as the large size in addition to A3 and LD.

17.3.5 Installation of External Counter

It is not allowed to install more than one external counter (Key Counter, Card controller and Coin controller) at the same time. Physically, the card controller and coin controller cannot be installed together since the output signals are in common.

REVISION RECORD

Ver.07

Ver.07<2011.04.19>	
Page	**Contents**
2-7	e-STUDIO205L/255/305 (SYS-IMG) has been added.
2-8	e-STUDIO355/455 (SYS-IMG) has been added.
2-13	SYS board for M6 has been changed to "SYS board / SYS-IMG board".
2-16	An item of "SYS-IMG" has been added.
2-19	e-STUDIO205L/255/305 (SYS-IMG) has been added.
2-21	e-STUDIO355/455 (SYS-IMG) has been added.
2-29	Notes have been added.
2-30	2.6.4 System control PC board (SYS-IMG board) has been added.
2-31	2.6.5 Hard disk (HDD) (for SYS-IMG board) has been added.
2-35	SYS board in step 3 of "2.6.11 SRAM board" has been changed to "SYS board / SYS-IMG board".
2-53	Kind of the screw has been added.
6-8	SYS-IMG board has been added.
15-2	"SYS board" has been changed to "SYS board / SYS-IMG board".
15-4	"SYS board" has been changed to "SYS board / SYS-IMG board".
15-5	SYS board for CN418 has been changed to "SYS board / SYS-IMG board".
15-7	Fig. 15-1 has been changed.
16-2	PWA-F-SYS (SYS-IMG board) has been added.
17-2	"IMG board" has been changed to "IMG board or SYS-IMG board".

Ver.06

Ver.06<2010.11.18>	
Page	**Contents**
Trademarks	"Windows 95/98/Me" has been deleted.
Trademarks	"Windows 7" has been added.
1-1	An explanation of CNS and NAS models has been added.
1-9	The scanning speed has been corrected from "57" to "45".
1-12	ASU destination has been deleted.
5-6	No. 80 has been added to the list of "5.2.2 Message".
8-16	The disassembly procedure of "8.6.8 Pickup roller" has been changed.
12-10	The "Counter (08-400)" column has been added to the table of "7. Abnormality detection by the thermistors".
12-14	The illustration of Fig. 12-12 has been exchanged.
12-15	The illustration of Fig. 12-14 has been exchanged.
16-7	ASU destination has been deleted.
17-4	“08-202-4” has been deleted.

Ver.05

Ver.05 <2010.04.20>	
Page	**Contents**
1-1	The information of the paper basis weight has been corrected.
1-2	The information of the paper basis weight has been corrected.
1-4	The information of the paper basis weight has been corrected.
1-5	The information of the paper basis weight has been corrected.
1-6	The information of the paper basis weight has been corrected.

Ver.04

Ver.04 <2010.01.21>	
Page	**Contents**
PRECAUTIONS	The illustration of the cautionary labels has been added.
1-8	“1.1.3 Print”, “1.1.4 Scan” and “1.1.5 e-Filing” have been added.
1-9	“1.1.6 Internet Fax” has been added.
1-10	“1.1.7 Network Fax” has been added.
8-26	“8.6.23 Flywheel” has been changed to “8.6.23 Flywheel (e-STUDIO205L/255/305)”.
8-27	“8.6.24 Flywheel (e-STUDIO355/455)” has been added.
13-8	“Note” for the disassembling procedure of the reverse unit has been added.

Ver.03

Ver.03 <2009.11.09>	
Page	**Contents**
Precaution	"General precautions" in German has been corrected.
1-1	"Fixing method" has been corrected.
1-2	The descriptions of "Envelope (DL, COM10, Monarch, CHO-3, YOU-4)" have been added to "Bypass feeding".
1-3	The description of "Super Sleep mode" has been added to "Power consumption".
1-9	The names of options have been corrected.
1-11	The names of options have been corrected.
1-12	The names of options have been corrected.
2-13	"Platen cover" has been corrected to "original cover".
2-23	"Platen cover" has been corrected to "original cover".
8-1	No. 23 "Upper drawer detection switch (SW7)" has been corrected to "Upper drawer detection switch (SW6)". No. 24 "Lower drawer detection switch (SW8)" has been corrected to "Lower drawer detection switch (SW7)".
8-3	The description of "Upper/Lower drawer detection switch" has been corrected from "SW7/SW8" to "SW6/SW7".
8-25	A procedure for taking off the holder has been added.
8-27	The disassembly procedure of "8.6.25 Upper tray-up motor (M11)" has been changed.
8-28	"Note" for the screws to fix the motor has been added.
8-28	"8.6.26 Upper drawer detection switch (SW7)" has been corrected to "8.6.26 Upper drawer detection switch (SW6)".
8-30	"8.6.28 Lower drawer detection switch (SW8)" has been corrected to "8.6.28 Lower drawer detection switch (SW7)".
8-31	"8.6.29 Lower tray-up motor (M15)" has been corrected to "8.6.29 Lower tray-up motor (M12)". The disassembly procedure of "8.6.29 Lower tray-up motor (M12)" has been changed.
9-1	(M15) has been corrected to (M12) in Fig. 9-1.
9-5	"Note" for the gear and bushing has been added.
9-5	"Note" for the screws to fix the motor has been added.
9-6	A disassembly procedure of "9.4.4 Process unit fan (M2)" has been added.
12-14	"Note" for installing the separation fingers has been added.
12-16	"12.6.6 Thermistor" has been changed to "12.6.6 Center/Side/Edge thermistor (THMS1, THMS2, THMS3)". "Center thermistor", "Side thermistor" and "Edge thermistor" have been added to Fig. 12-19.
12-17	"12.6.7 Thermostat" has been corrected to "12.6.7 Fuser center / Fuser front thermostat (THMO1, THMO2)".
12-21	(S9) has been added to "12.6.9 Exit sensor".
13-2	(M10), (S23), (M14), (M13) and (SOL1) have been added.
13-9	(M10) has been added to "13.5.3 Exit motor".
13-10	(S24) has been added to "13.5.4 Offset gate home position sensor".
13-11	(M14) has been added to "13.5.6 Reverse motor (only installed for e-STUDIO355/455)".
13-12	(SOL1) has been added to "13.5.7 Reverse gate solenoid (only installed for e-STUDIO355/455)".
13-13	The notes have been changed.
13-13	(S23) has been added to "13.5.8 Reverse sensor (only installed for e-STUDIO355/455)".
13-14	(M13) has been added to "13.5.9 Offset gate motor (only installed for e-STUDIO355/455)".
14-10	(S11) has been added to "14.5.2 ADU entrance sensor".
14-11	(S10) has been added to "14.5.3 ADU exit sensor".
14-12	(M5) has been added to "14.5.4 ADU motor".

Ver.03 <2009.11.09>	
Page	**Contents**
14-13	(SW5) has been added to "14.5.5 ADU opening / closing switch".
14-14	(CLT1) has been added to "14.5.6 ADU clutch".
17-1	The columns of "GQ-1220" and "GQ-1230" have been deleted.

Ver.02

Ver.02 <2009.07.02>	
Page	**Contents**
10-9	The disassembling procedure of "Drum cleaner unit" has been changed.
17-1	"17. EXTERNAL COUNTERS" has been added.

Ver.01

Ver.01 <2009.06.03>	
Page	**Contents**
1-8	Errors in "1.2 Accessories" have been corrected.
1-10	An error in "1.4 Supplies" has been corrected.
2-22	Arrows have been added to Fig. 2-21. The direction of the antenna in Fig. 2-22 has been corrected.
2-27	A note for replacing the board has been added.

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