CS	2010-08-20	CE	對外秘

SINDOH 신도리코

SERVICE MANUAL

A400/A400s/A400x

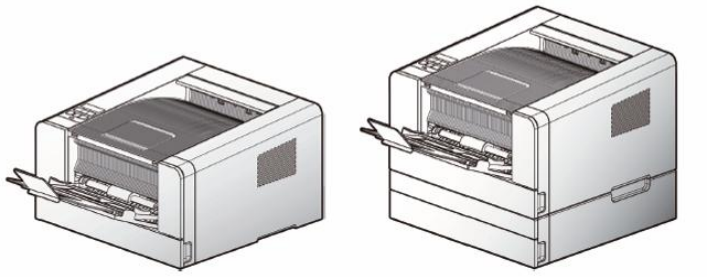
A400ser. LASER PRINTER

FIELD SERVICE MANUAL

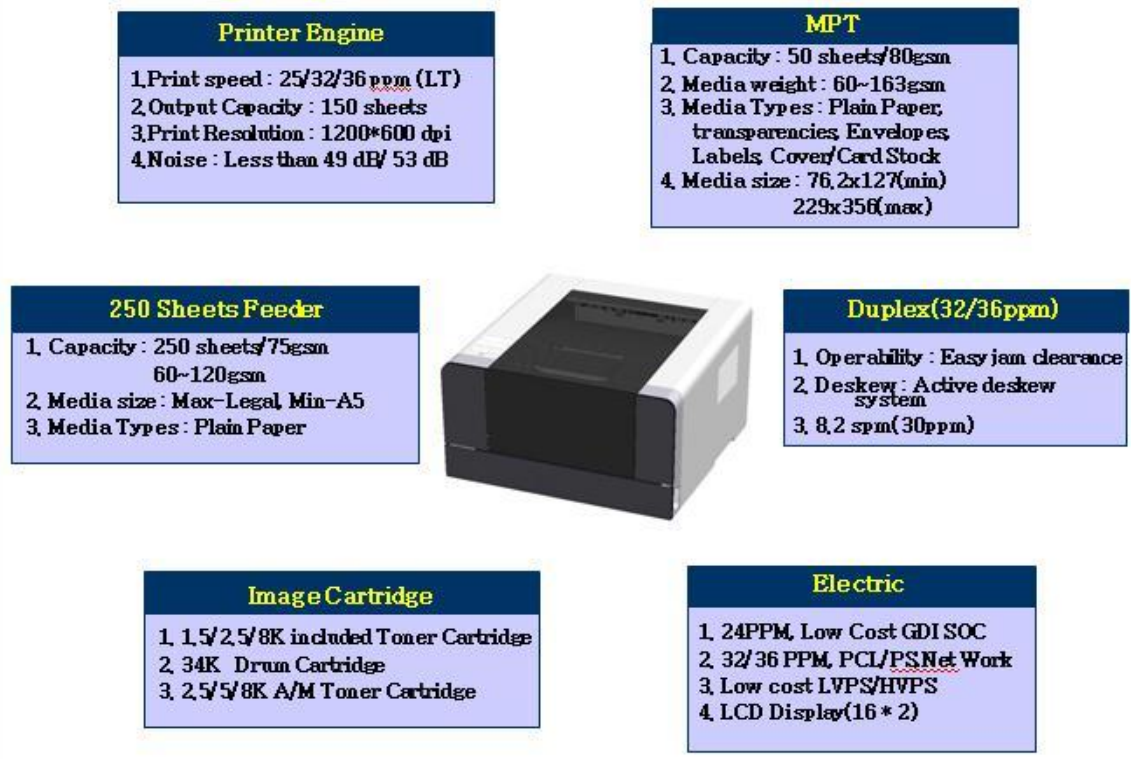
Specifications

Main Body

Main Body Components



1. Basic Components: Tray 1 (250 sheets) + Multipurpose Tray (50 sheets)
2. Basic Components + 2 Option trays (250 sheets) + Multipurpose Tray (50 sheets)



Main Body Specification

Category	L model	M/H model
Print Speed (Letter)	24ppm	32/36ppm
First Print Speed	Under 10 seconds	Under 10 seconds
Resolution (dpi)	600X600 (max. 1200x600)	600X600 (max. 1200x600)
Tray Capacity	250 sheets	250 sheets
Paper Size	A5 ~ Legal	A5 ~ Legal
Multipurpose Tray Capacity	50 sheets	50 sheets
Feed Capacity	150 sheets	150 sheets
2 Side Print	X	O
Option	250 sheet Tray	250 sheet Tray, Wi-Fi
Memory	64MB	128M
Processor	266MHz	266MHz
LCD Display	16X2	16X2
Interface Port	1 USB	1 USB, Ethernet
Emulation	GDI	PCL, PS, Network
Operating System	Windows NT4.0 and 2000	Windows NT4.0 and 2000
Image Cartridge	Enclose: 1.5K(A400/400S), 8K(A400x) AM: 2.5K/5K/8K	2K(enclose), 8K(A/M)
Weight	9.6Kg	9.6Kg
Dimension (W X D X H)	383 X 377 X 228mm	383 X 377 X 228mm

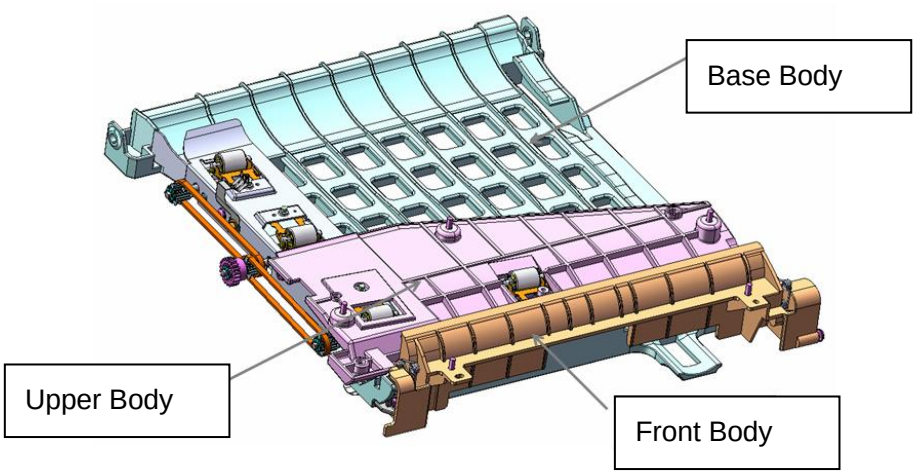
Paper Specification

Feeder	By paper type	Paper Size
Main Feeder	250 sheets of plain paper, 50 labels, 100 thick papers	A4, A5, JIS B5, Folio, Letter, Legal, Executive, Statement
Option tray	250 sheets of plain paper, 50 labels, 100 thick papers	A4, A5, JIS B5, Folio, Letter, Legal, Executive, Statement
Multipurpose Tray	50 sheets of plain paper, 5 envelopes, 15 labels, 5 postcards, 50 legal papers	Min. 76.2 X 127mm(3 X 5 inch) Max. 216 X 355.6mm(8.5 X 14 inch) size papers
2 Side Print	Plain papers 60 ~ 90 gsm (16 ~ 24 lb)	A4, Letter

Option

Duplex Unit

Duplex Unit Components



Duplex Unit Specification

Category	Description
Paper Weight	75g/㎡(20 lb), 60~90 g/㎡(16~24 lb)
Paper Size	Paper (A4 & Letter), 210~215.9 mm X 279.4~355.6 mm (W X L)
Sort Method	Left Alignment
Operation Method	Main operation and gear link operation
Paper Method	Peek-a-boo method
Paper skew size	x=0.0075mm, y=0.008mm
Basic Mount	32 ppm/ 36ppm

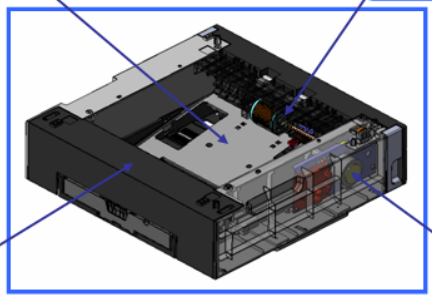
* Can be opened easily with a button in from ⇒ easy to remove jams

Paper Feed Unit

Feeder Components

Feeder
1. Friction Pad Assy
2. Center Align System
3. Incline plate (1 EA) + Incline spring (2 EA)
4. 2 step end fence
5. Feeder beam sensor

Pickup & Feed roll Assy
1. Pickup roll assy
   -D-roller, 2 idler
   -2 Segment gear clutch assy
   -DC solenoid (1 EA)
2. Feed roll assy
   -Rubber (EPDM) + TU
   -Backup Roller (POM, 2EA), Plate spring



Frame & Exterior
1. Frame: 2 mold parts + 1 Press part
2. Exterior: 6 mold parts.
3. Printer and AIO up/down mounted
4. Dimension:

Operation
1. 1 Stepping motor
   - PM type, 1-2 Phase.
     3.75° step angle
2.Use train of gears

Feeder Specification

Category	Description
Function	Increase Tray's capacity
Speed	25PPM(Letter) ~ 36PPM(A4)
Feeder Capacity	250 sheets(75gsm xerographic paper)
Supporting Papers	Min. A5 ~ max. Legal(xerographic or business paper) (N/A : Envelops, postcards, labels, etc.)
Paper Weight	16 ~ 28 lb(60 ~ 105gsm) paper
Dimension(H/W/D)	103 / 389 / 377mm
Weight	Appx. 3.5kg

Installation

Installing Conditions

Environments

⚠CAUTION

The printer must be installed at following places.

- Good ventilation and flat surface
- No obstacles within 8cm from printer's right side for cooling fan to operate properly
- No direct sunlight exposure and dustless and clean place
- No direct cold or warm air blown from air conditioner or heater
- Printer operating temperature: 15.6°C ~ 32.2°C (shipping and storage: -40.0°C ~ 60.0°C)

Installation

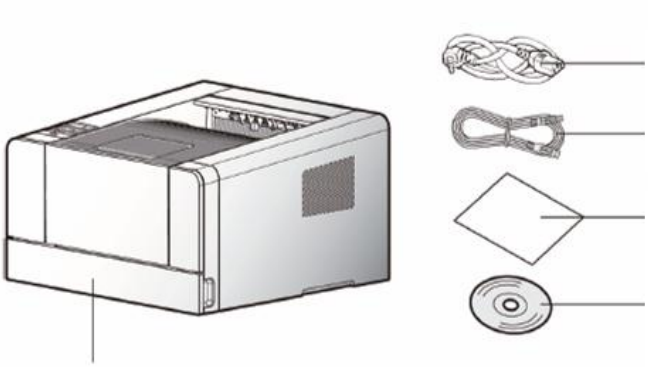
Unpacking and Checking Components

Unpacking

1. Take the printer and all components from the box.
2. Remove tapes in and on the printer.
3. Check the printer and included components.

Included components

No	Item No.	Item	Qty.	Remarks
1	-	Basic Tray	1	250 sheets
2	LA258055	AC power cord	1	220V
3	LA258072	USB cable	1	
4	-	CD User manual & Quick manual	1	
5	LA258071	Driver CD	1	



2. Power cord

3. USB cable

4. User’s manual CD & Quick manual

5. Driver CD

1. Tray (basic 250 sheets), Cartridge
(wrapped and enclosed in the printer)

Option tray

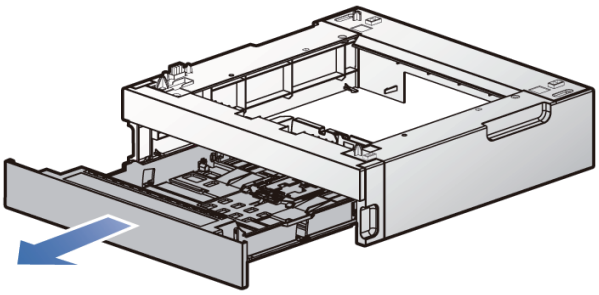
Installation

⚠CAUTION

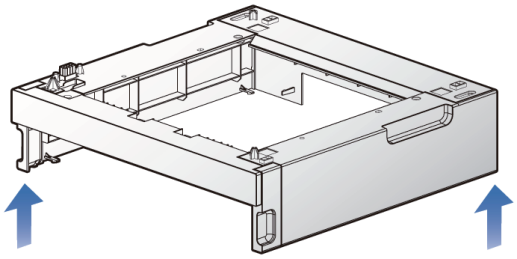
Please proceed with the followings before installing the option tray after the printer installation.

- Turn the printer’s power off
- Remove the power cord from the printer and remove all cables on the backside

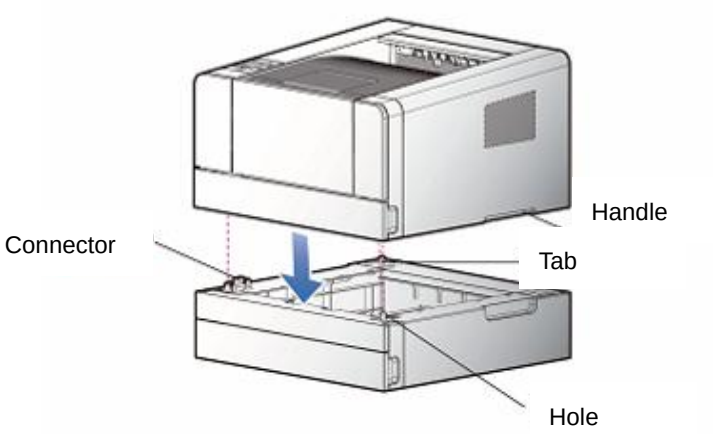
1. Remove all wrappings and tapes on the feeder.
2. Pull the feeding unit out from the feeder.



3. Hold both edges of support and place it on the printer placing location.
4. Re-install the feeder. Push it in until it completely attaches.



5. Hold both handles on the bottom sides and lift it up and place it on the placing location.
   Match the tab, narrow hole and connector on the top of the feeder exactly with printer's bottom.
   Place it on the feeder and check if it is accurately on the feeder.



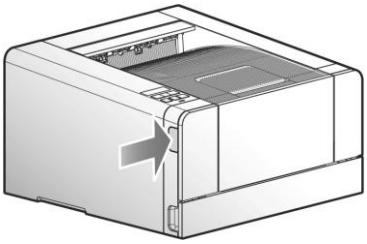
⚠CAUTION

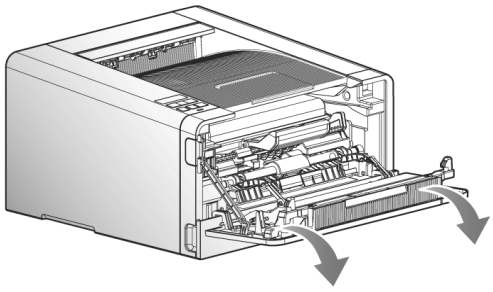
You must turn the printer's power off before installing or removing option tray.

Image Cartridge

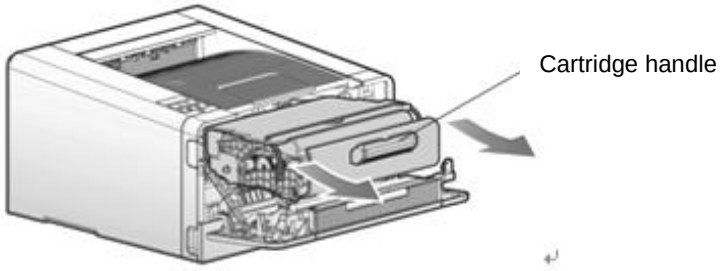
Installation

1. Open the top front cover.

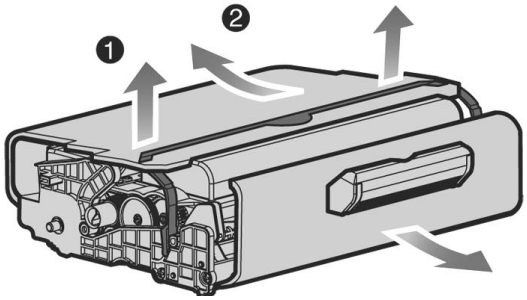




2. Hold the cartridge handle and pull it out while lifting it up toward outside.



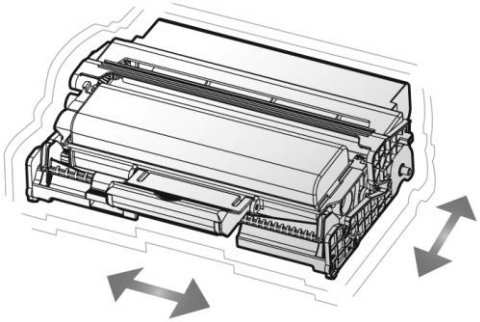
3. Remove the cartridge wrapping.



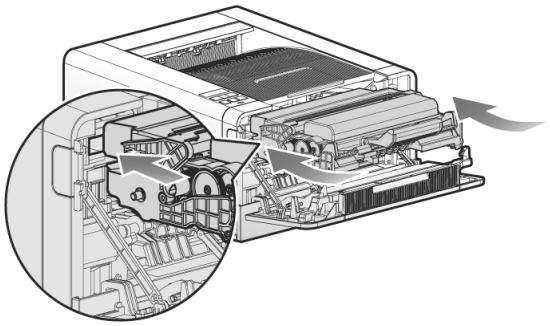
⚠CAUTION

Do not touch the cartridge's bottom drum with bare hands.

4. Hold cartridge handles and shake it lightly to spread toner evenly.



5. Hold cartridge handles and place the both cartridge hooks with the printer holes.
6. Push the cartridge in until it clicks and locks.



7. Close the front cover. Check if both ends of cover clicked and locked.

⚠CAUTION

Check if multipurpose tray's cover is closed when closing the front cover. If the front cover is closed while multipurpose feeder's cover is open, it can cause paper jam and malfunction.

Maintenance

Preventive Maintenance

User Replaceable Items

Items	Model	Life Span	
		Enclosed	AM
Toner Cartridge	A400/A400s	1.5K	2.5K / 5K
	A400x	8K	2.5K / 5K / 8K
	A405/A405t/A405g	2.5K	2.5K / 5K
Drum Unit	-	34K	

Conditions:

1. Above life span was measured by A4 and 5% chart as base
2. Standard temperature and humidity conditions
3. Life span may vary per ambient conditions and printing conditions.

Other maintenance items

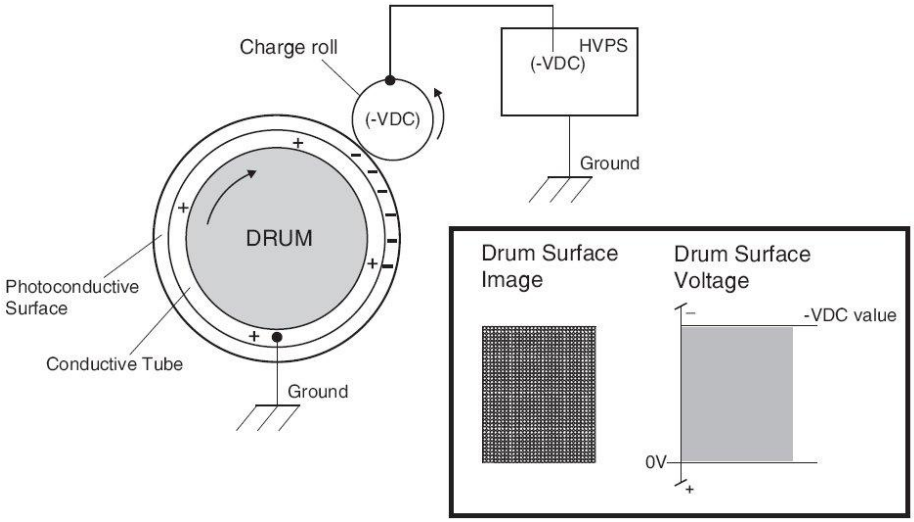
This printer does not require additional maintenance items. However, guaranteed life spans of fusing unit, print roller, pickup roller, and isolation pad are 50,000 sheets and replaced by each unit.

The durability of this printer is 5 years and 100,000 sheets.

Detailed Description

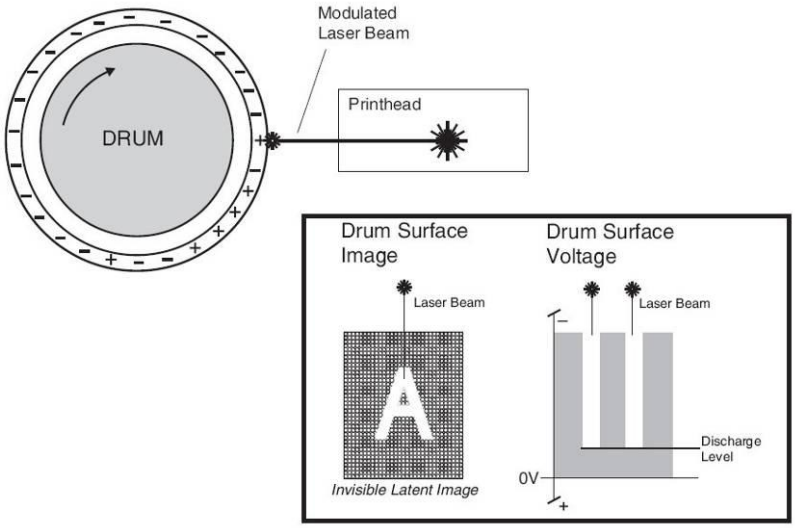
IMAGE PROCESS

Electrification



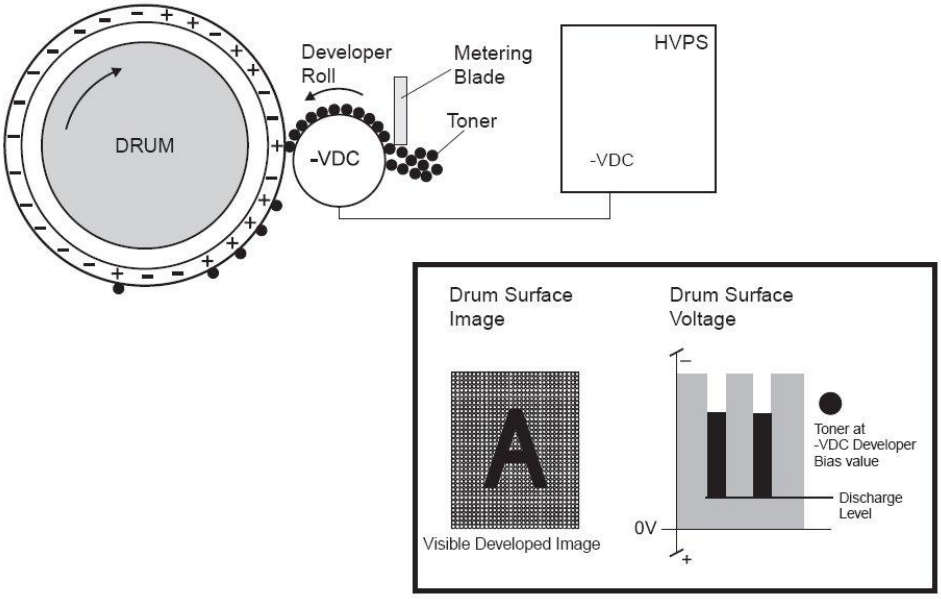
Voltage of -1650V is applied to electrification roller from HVPS and the drum surface gets electrification of 1100V.

Exposure



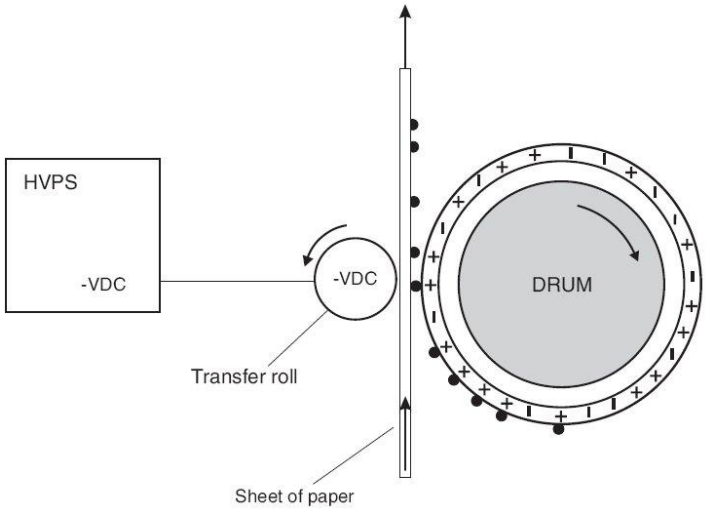
Laser scanning is performed to the image printing area and the surface electric potential of scanned area drops to about -300V to form ‘Latent Image’.

Development



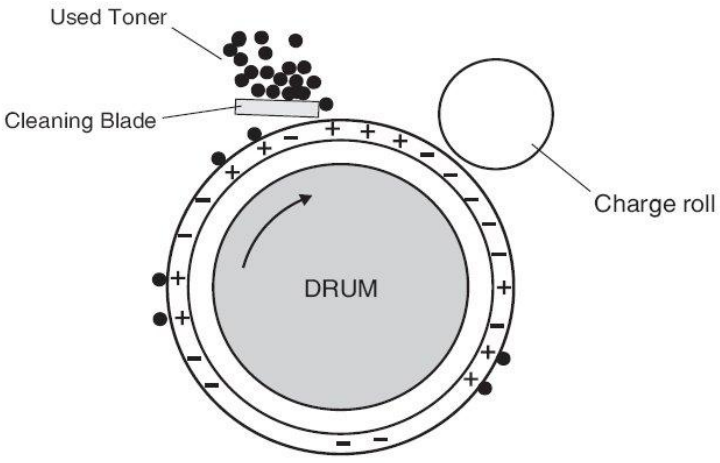
Images are formed on the drum surface by attaching the electrification toner with about -600V via development roller and Doctor blade on the latent image area formed by laser from exposure stage.

Transfer



Images are formed by tonner transfer on the drum surface from the Development stage and when paper passes, about over +2000V electric potential applied transfer roller pulls the image forming toner particles on drum surface to form unsettled images on the paper.

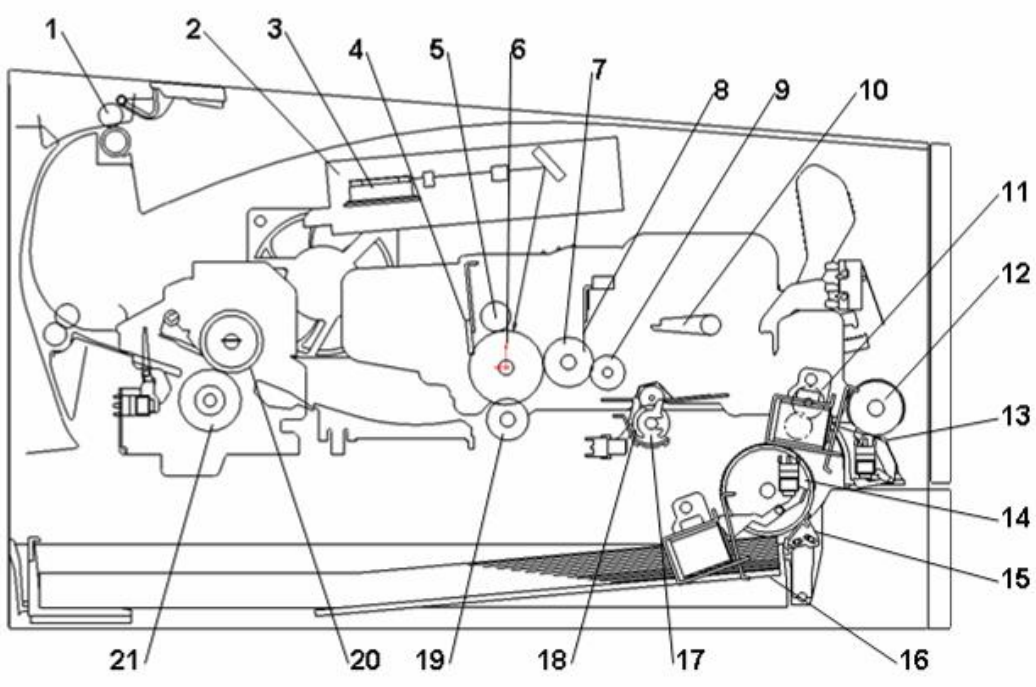
Cleaning



Remaining toner on the drum surface after transferred to paper gets trimmed by cleaning blade before getting into electrification roller and gets collected in the used toner collecting space.

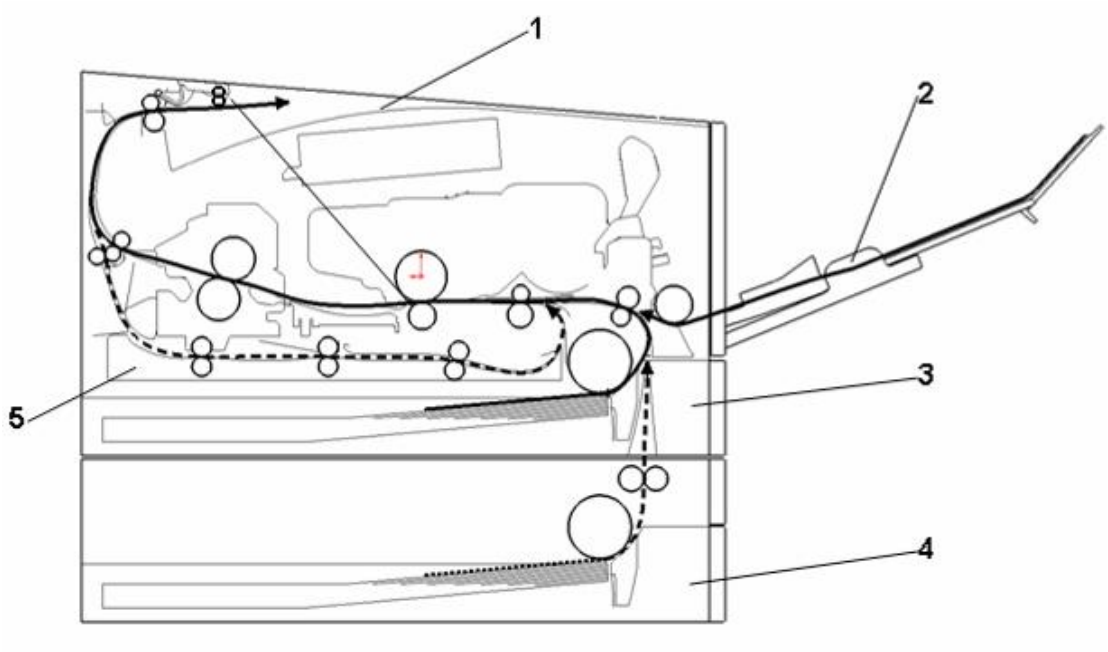
Machine Overview

Machine Components



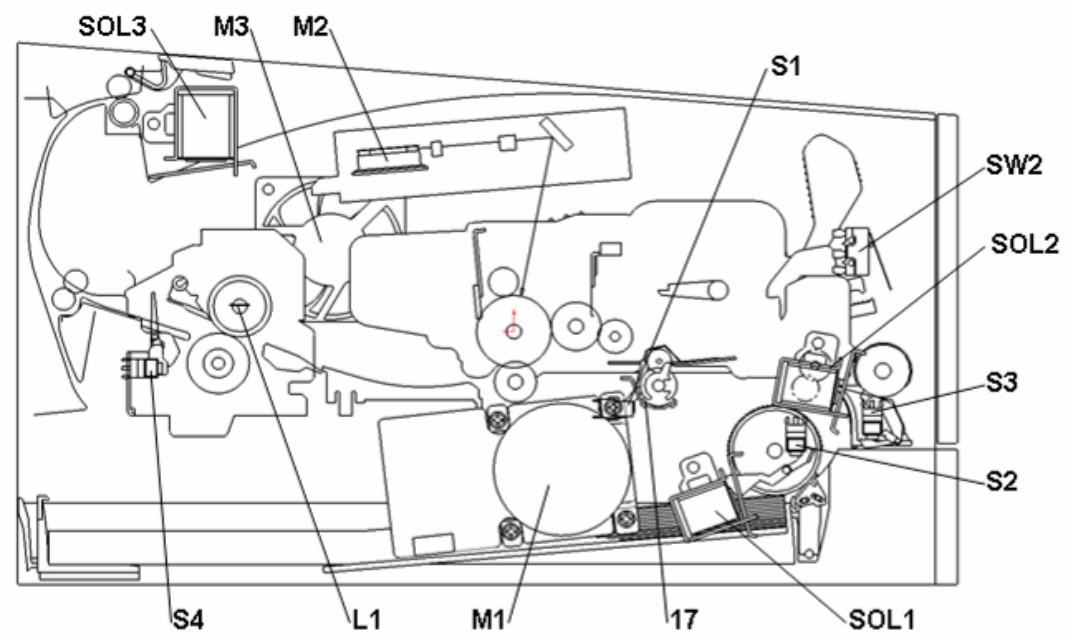
1. Badge Roller
2. LSU
3. Polygon Mirror Motor
4. Cleaning Blade
5. Electrification Roller
6. OPC Drum
7. Development roller
8. Doctor Blade
9. Add Roller
10. Paddle Roller
11. Mid Roller
12. Multipurpose Tray Feed Roller
13. Multipurpose Tray Friction Pad
14. Tray 1 Feed Roller
15. Tray 1 Friction Pad
16. Tray 1 Base Plate
17. Resist Dam
18. Resist Roller
19. Transfer Roller
20. Fixing Hot Roller
21. Pressurize Roller

Paper Path



1. Print bin
2. Multipurpose Tray
3. Main Feeder
4. Optional Feed Unit
5. Duplex Unit

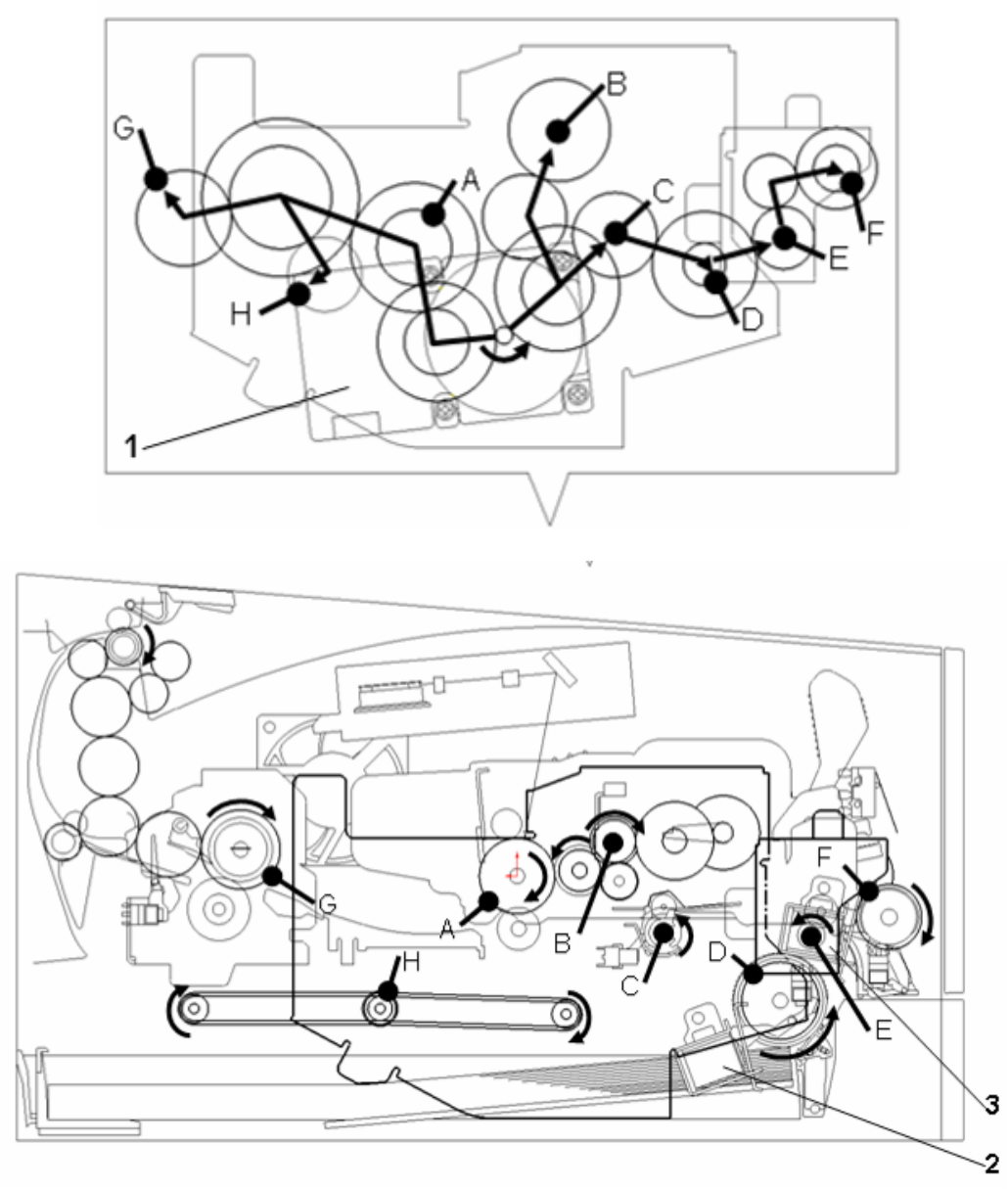
Electrical Components



Symbol	Name	Function
Motor		
M1	Main	Operates main body
M2	Polygon mirror	Rotates polygon mirror motor
M3	Exhaust fan	Cools the heat around pressurize unit.
Switch		
SW1	Power	Supplies power to the machine If this is turned off, no power will be supplied to the machine (Located on the bottom right on the back of the machine)
SW2	Front Cover	Detects opening of front cover and isolates +3.3VLD and +24V dc power line.
Sensor		
S1	Paper feed	When printing, detects paper entrance and allows images to be formed on OPC drum. Detects misfeed/paper jam
S2	Feeder Empty	When there's no paper on the tray, it is notified to CPU.
S3	Multipurpose tray empty	When there's no paper on the tray, it is notified to CPU.
S4	Paper Feed	Detects paper jam

Symbol	Name	Function
PCBs		
PCB1	System	Directly and indirectly controls all applications via other control boards.
PCB2	PDU (Power supply unit)	Supplies AC power to fixing lamp and optical heater and DC power to the system.
Solenoid		
SOL1	Tray feeding	Controls Tray's feeder roller operation
SOL2	Multipurpose Tray feeding	Controls multipurpose Tray's feeder roller operation
SOL3	Duplex Unit	Controls Duplex Unit's operation
Lamp		
L1	Fixing Lamp	Applies heat to Hot Roller.
Others		
TS1	Thermostat	When fixing unit is overheated, the Fixing Lamp circuit gets opened (Located on top of fixing Hot roller)
TH1	Thermistor	Detects temperature of Hot roller. (Located on top of fixing Hot roller)

Drive Chain

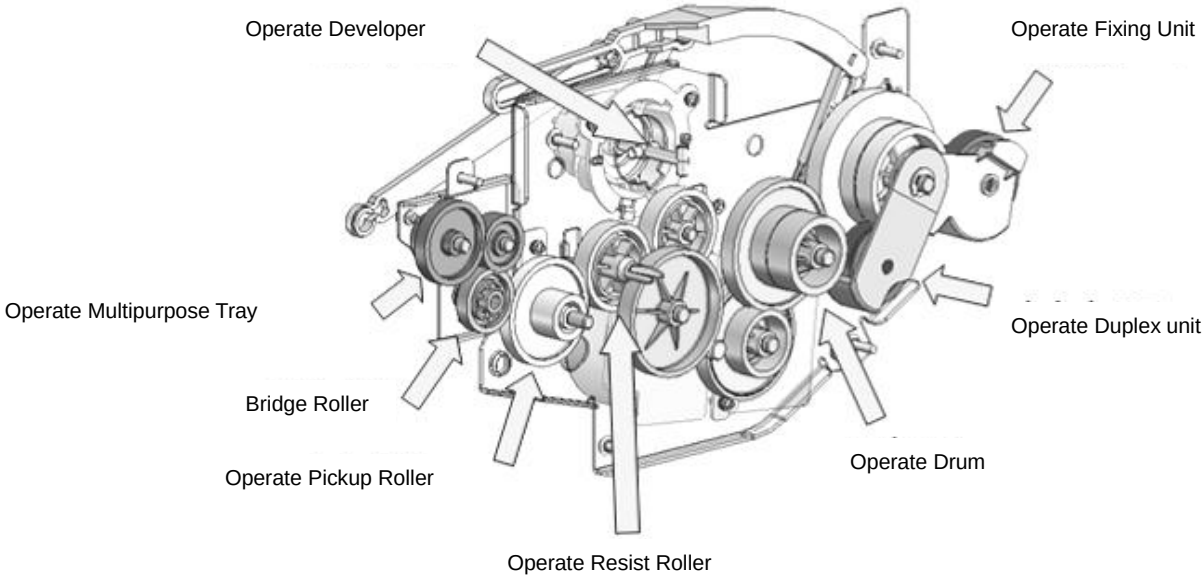


1. Main Motor
2. Tray Feed Solenoid
3. Multipurpose Tray feeding solenoid

Main Driving Gear Units

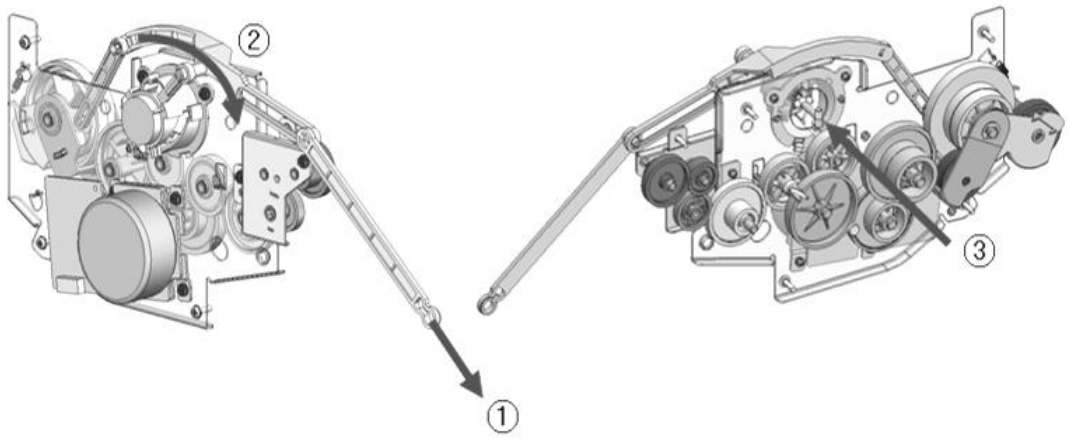
Main Driving Gear Unit Components

The machine has one main motor and the rotation of this motor is delivered to the train of gears composed with various gears to operate developer/drum, manual feeder, Fixing Unit, Duplex Unit, resist roller and pickup roller.



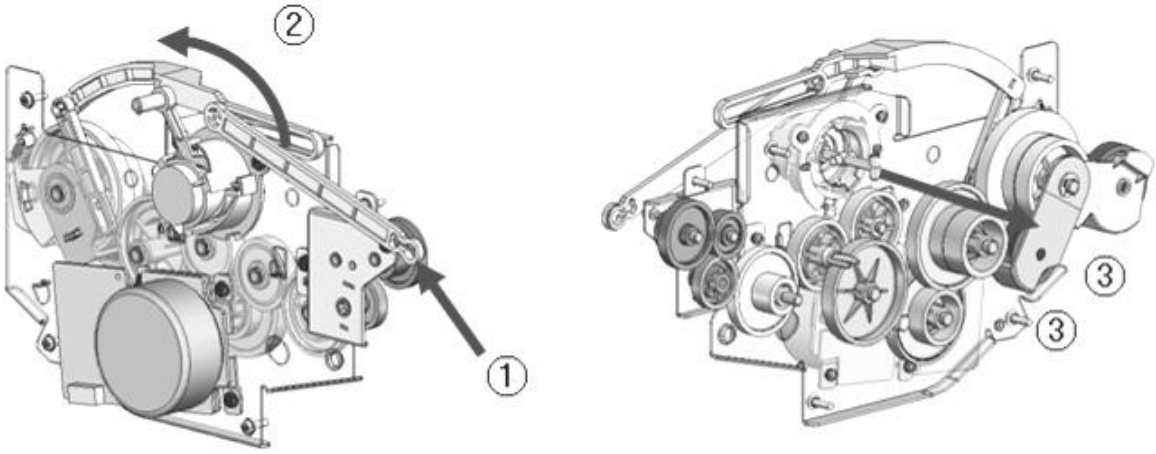
Installing/Removing Image Cartridge

1. Opening Front Cover



When machine's front door is opened, the link connected to the front door moves to the position 1. The guide lever rotates as 2 by moving link and pulls coupler to 3 direction on the rail to disconnect from image cartridge.

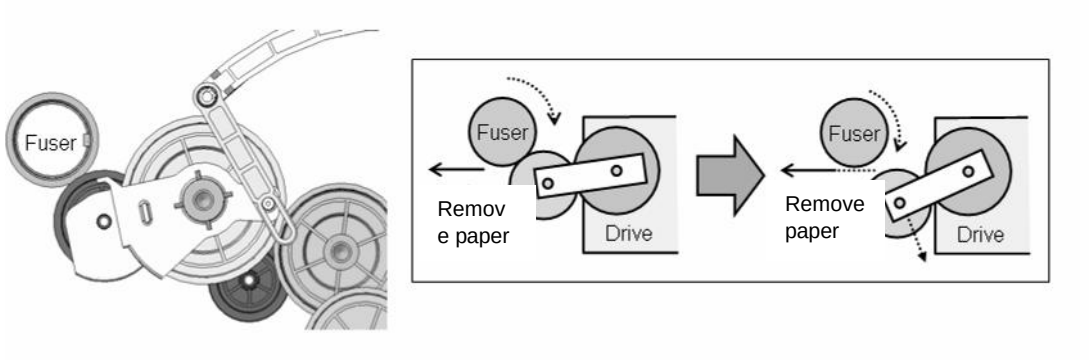
2. Closing Front Cover



When closing the front door, the link connected to the front door moves to the position 1 and the connected guide lever rotates to 2 direction. When the guide lever rotates and goes down on the rail, the coupler returns to 3 direction by spring and connects with image cartridge.

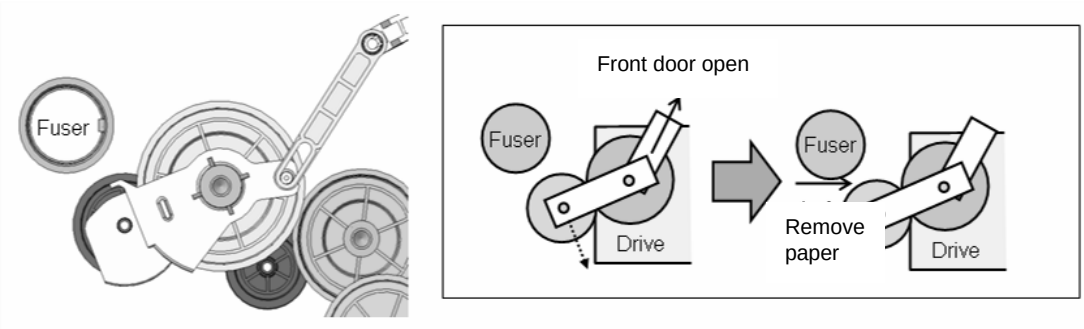
Removing Fixing Paper Jam

1. Removing paper on the back of fixing unit



The gear link gets pushed back and disconnects gear connection and allows it to remove jammed paper.

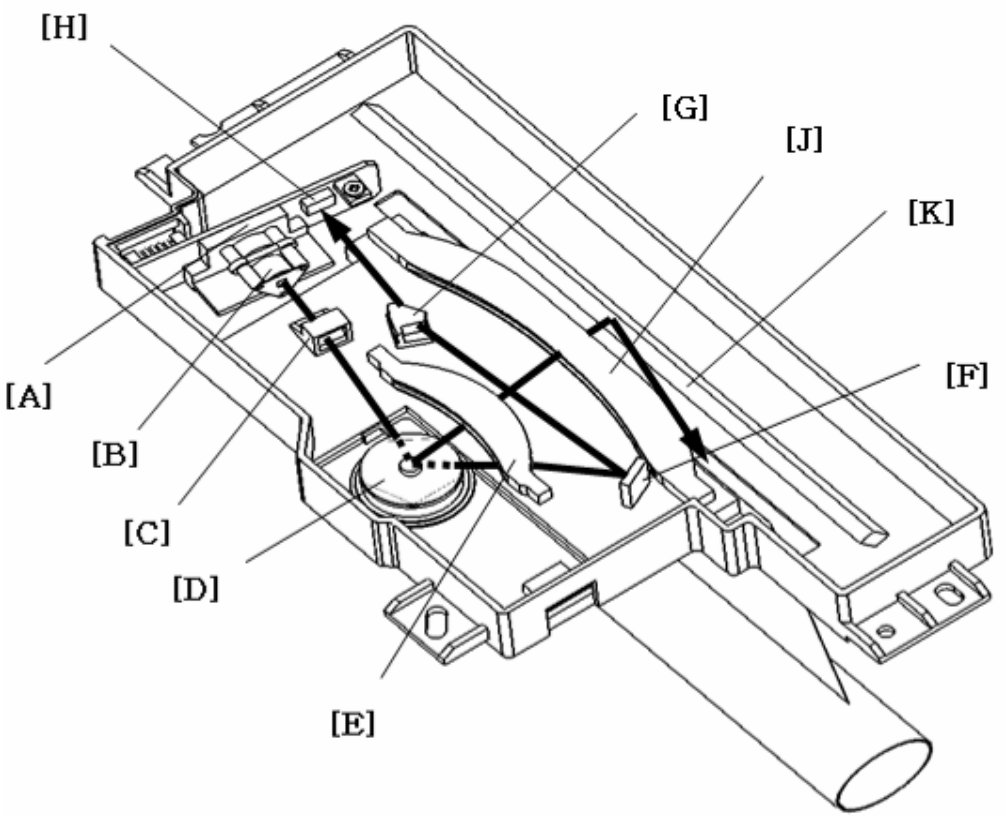
2. Removing paper on the front of fixing unit



When front door is opened, gears are disconnected by the link connected with front door and allow it to remove paper easily.

Laser Unit

Structure and Optical System Path



A : Laser Diode Unit	F : Synchro Reflection Mirror
B : Collimator Lens Unit	G : Synchro Detect Sensor Mirror
C : Cylindrical Lens	H : Synchro Detect Sensor
D : Polygon Motor	J : #2 F-theta lens
E : #1 F-theta lens	K : Reflection Mirror

Laser Diode Unit: Generates laser beam

Collimator lens: Converts dispersed laser beams to straight beam

Cylindrical Lens: Directs laser to one point

Polygon Motor: Alters laser's direction to main direction

#1 & #2 F-theta lenses: Alters laser angle to be scanned equally on drum surface

Reflection Mirror: Alters laser's direction

Synchro Detect Sensor: Determines the scan starting position

AIO Cartridge

Overview

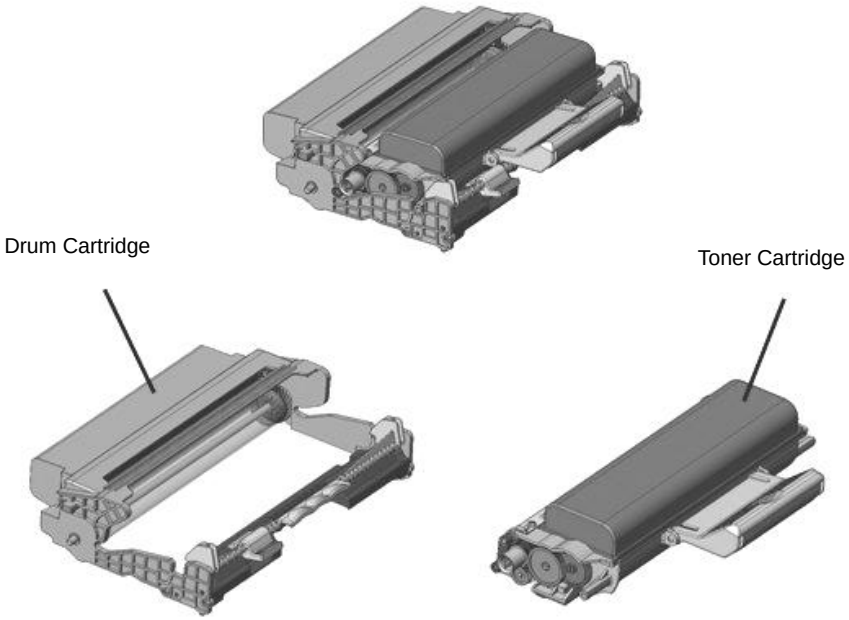
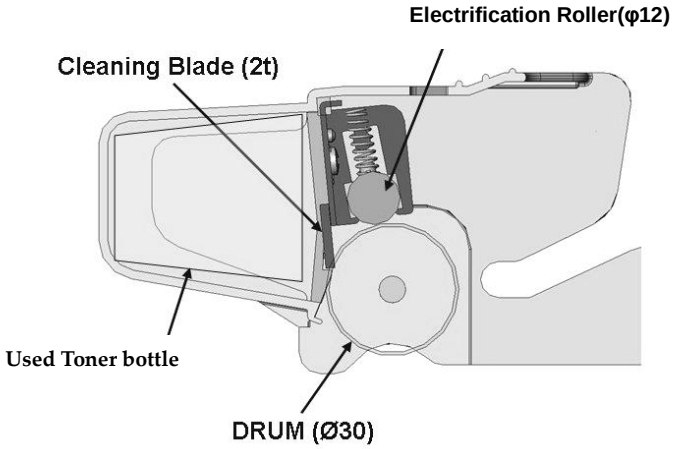


Image cartridge is composed with drum cartridge and toner cartridge as above figure and it can be separated.

Drum's life span is 34K with 5% chart as the base and enclosed toner cartridge is 1.5K for A400/A400s and 8K for A400x and for AM is 2.5K/5 for all three, but A400x has one more of 8K. A405, A405t and A405g enclosed ones are 2.5K and for AM is 2.5K and 5K for all three.

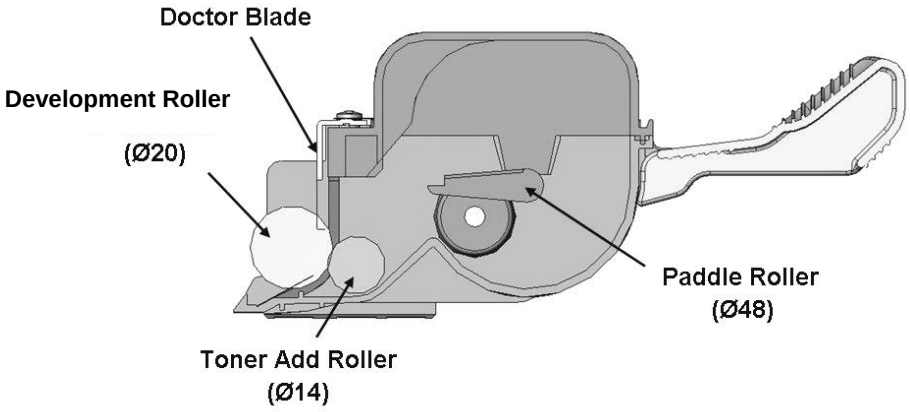
Drum cartridge does not have a separate chip, but toner cartridge has a separate information chip to store toner counter and manufacturer information and the machine refers to the information on the chip to determine toner replacing period and auto toner counter reset.

Drum Cartridge Component



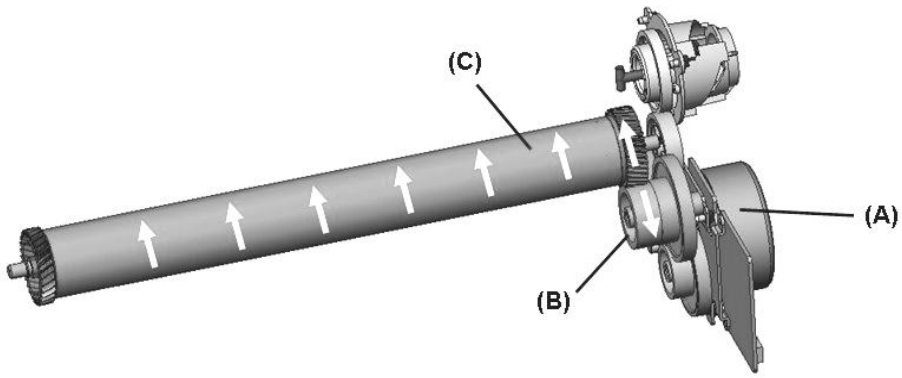
Drum cartridge has drum, electrification roller and cleaning blade along with used toner bottle.

Toner Cartridge Components



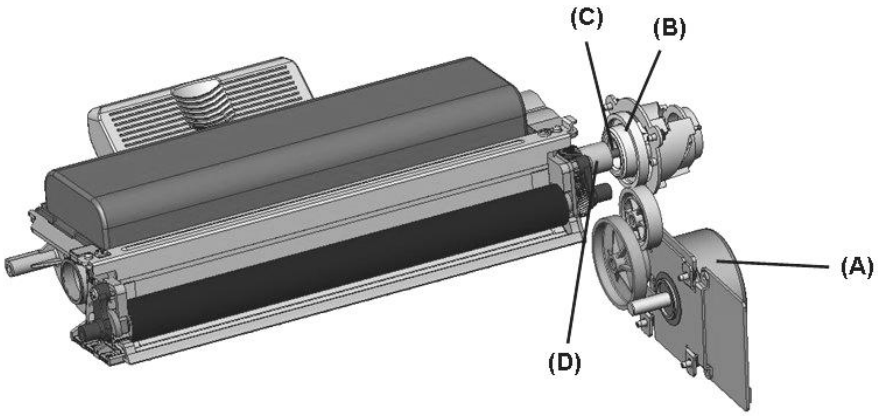
Toner cartridge is composed with development roller, add roller and doctor blade as above figure and has a paddle roller carrying toner to add roller.
Doctor blade allows toner supplied to development roller surface by add roller to be applied equally on the development roller.

Drum Cartridge Drive



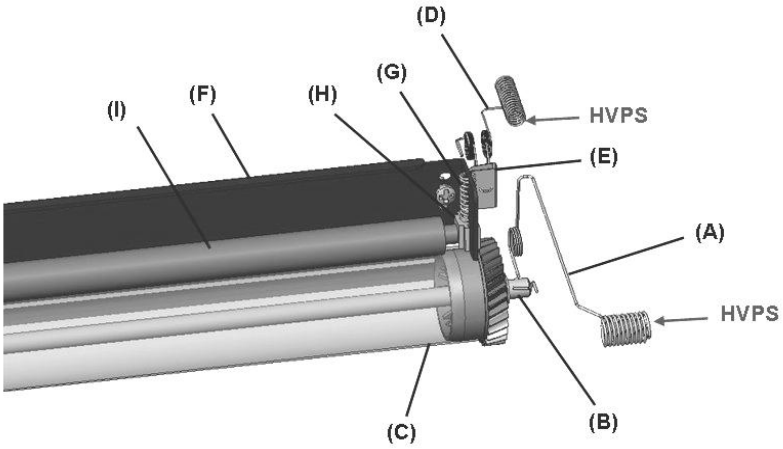
Drum cartridge's drum rotates by delivering the motor's driving force generated by the rotation of main motor (A) to drum (C) via drum driving gear (B).

Toner Cartridge Operation



The driving force of main motor (A) is delivered to development coupler driving gear (B) via serial train of gears attached on the left frame of the machine to rotate the coupler rod (C) and this allows the driving force of main motor to be finally delivered to Idle coupler gear (D) on toner cartridge. With the driving force delivered Idle coupler gear's rotation, the attached development roller, Add roller and Paddle roller get rotated.

Drum Cartridge's Applied Voltage

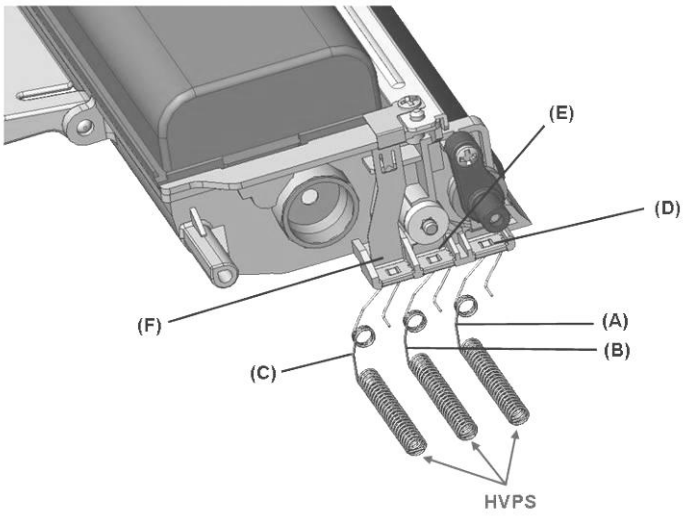


Electrification voltage of -1650V is applied to the electrification roller (I) contacting Drum (C).

The charged voltage is applied to the cleaning blade BKT (F) via electrification voltage applied spring (D) and electrification voltage applied plate (E), and this applied voltage is delivered to electrification roller again via electrification roller spring (G) and conductive roller bushing (H). Drum surface gets charged with about -1100V with this electrification voltage.

Also, -200V of core voltage is applied to drum and this voltage is delivered to drum surface via drum voltage applied spring (A) and Drum shaft (B) from HVPS. This core voltage is applied to give more smooth image on half-tone images and somewhat prevents dual image occurrences due to remaining toner without a separate per-transfer lamp.

Toner Cartridge's Applied Voltage



Three types of voltages are applied to a toner cartridge. The necessary voltage is applied to development roller via development applied voltage spring (A) and development roller plate (D), and to add roller via add voltage applied spring (B) and add roller plate (E), and to doctor blade via DB voltage applied spring (C) and DB plate (F).

Toner Cartridge and Drum Unit Replacement

Drum Unit

Drum unit has a life span of A4 with 5% chart as base and the machine displays "DRUM CARTRIDGE CHANGE" message to notify the user to replace the drum unit when it exceeds 34,000 sheets by calculating LSU dot count or drum rotation, but it still can print even if it is not replaced with a new drum unit. But the image quality cannot be guaranteed.

Toner Cartridge

Toner also is like the drum unit, which is A4 with 5% chart base and calculated with LSU dot count or drum's rotation and displays Toner Low message when 1.5K/2.5K toner reaches 1.2K/2.2K sheets and 5K/8K toner reaching 4.5K/7.5K sheets to notify the user to allow the user to purchase a new toner before the Toner End.

After displaying this message, up to only **"Guaranteed Life Span + 1,000 sheets"** can be printed additionally. For 1.5K, "TONER CARTRIDGE CHANGE" occurs when about 2.5K sheets are reached with 5% chart base, allowing no additional prints and it must be replaced with a new toner cartridge. As like 2.5K at 3.5K point/5K at 6K point/8K at 9K point, the "TONER CARTRIDGE CHANGE" message appears and it cannot be used anymore.

Paper Feed

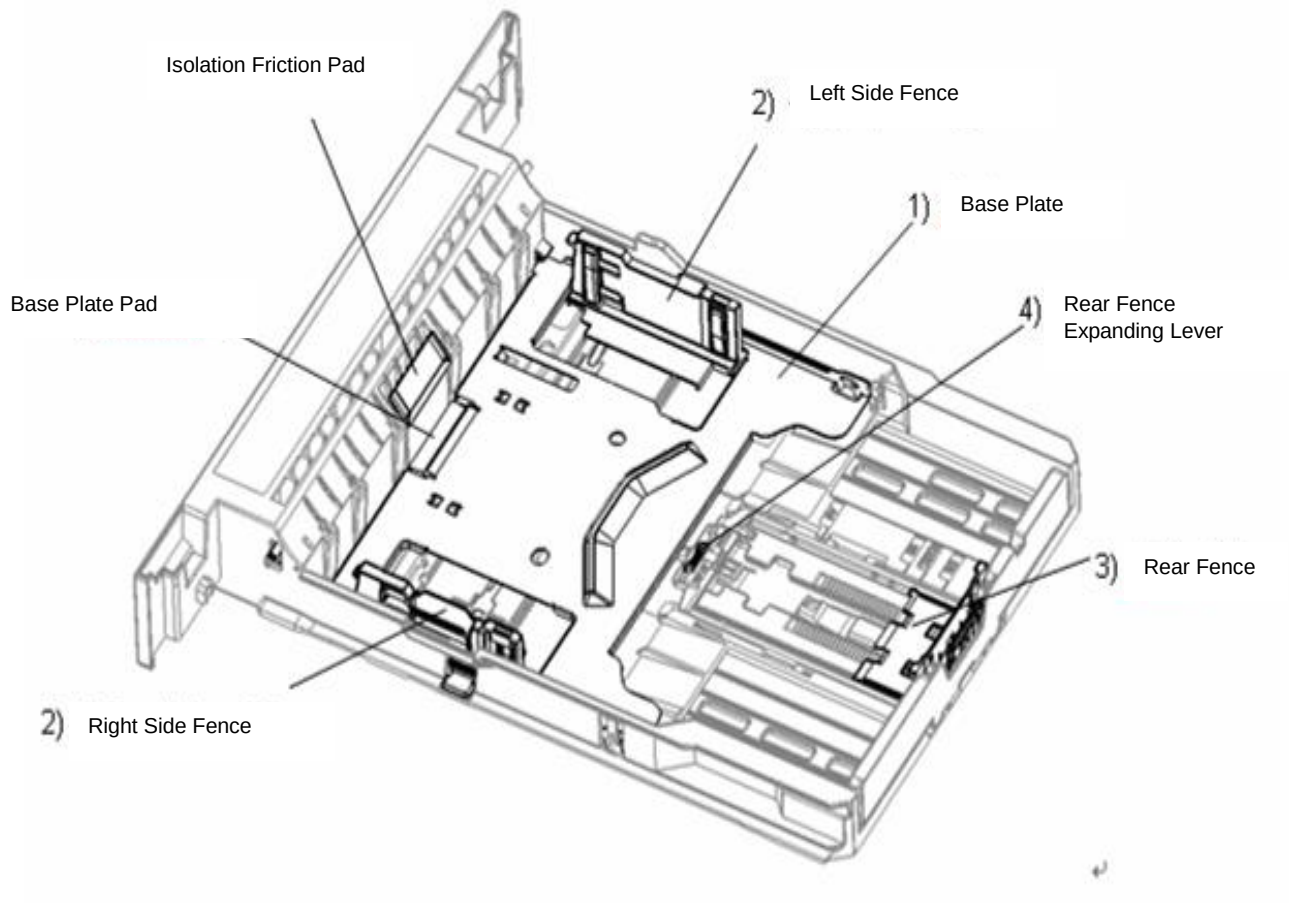
Overview

The printer is installed with a 250 sheets of A4 cassette Tray with 75gsm as base and a bypass tray as the base and 250 sheet feeding unit can be added optionally.
A friction pad method is used as paper separating method for main tray and a paper detecting sensor is mounted to determine paper presence, but a separate auto paper size detecting sensor is not installed, which allows the printer to detect the paper size by on-off timing of resist sensor.
When loading papers to main tray, adjust the side fences and rear fence to not to have gaps in the cassette.
For thick papers (28lb, 105g/m^2) and special papers, there is a load limit line indication.

Main Tray Components and Feeding and Isolating Mechanism

Main Tray is composed with the following 6 components and rolls of each component are as the followings.

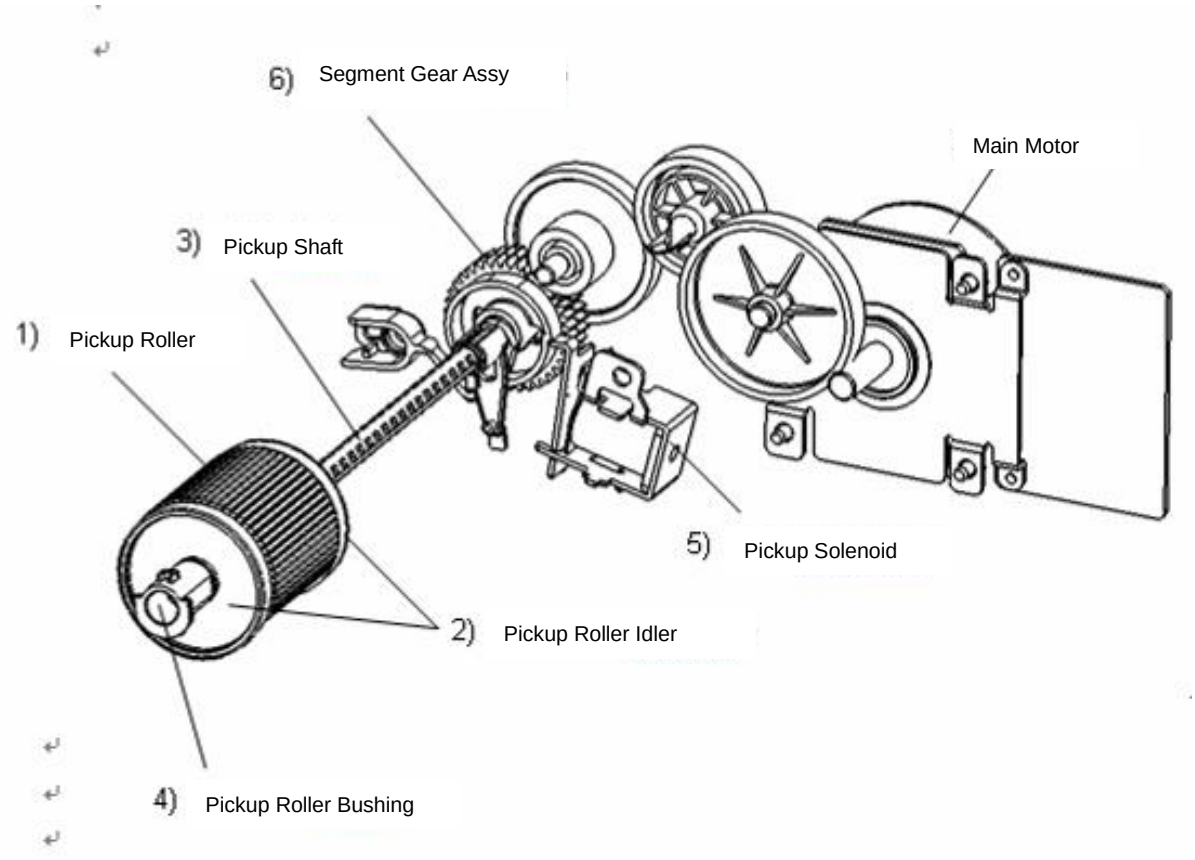
1) Base Plate: It is in the cassette tray loading papers and apply appropriate pressure between roller and paper by picking the paper loaded in the tray with main body's pickup roller.
2) Left and Right Side Fences: Aligns the loaded papers to its size.
3) Rear Fence: Aligns the rear side of loaded papers to its size.
   Move the rear fence lever to adjust.
4) Rear Fence Expanding Lever: Use it to expand the rear fence when loading legal papers.
5) Isolation Friction Pad Assy: Isolates the papers fed from the tray one by one
6) Base Plate Pad: It holds the bottom paper to allow papers not to be fed more than 2 when there's small amount of papers in the tray.



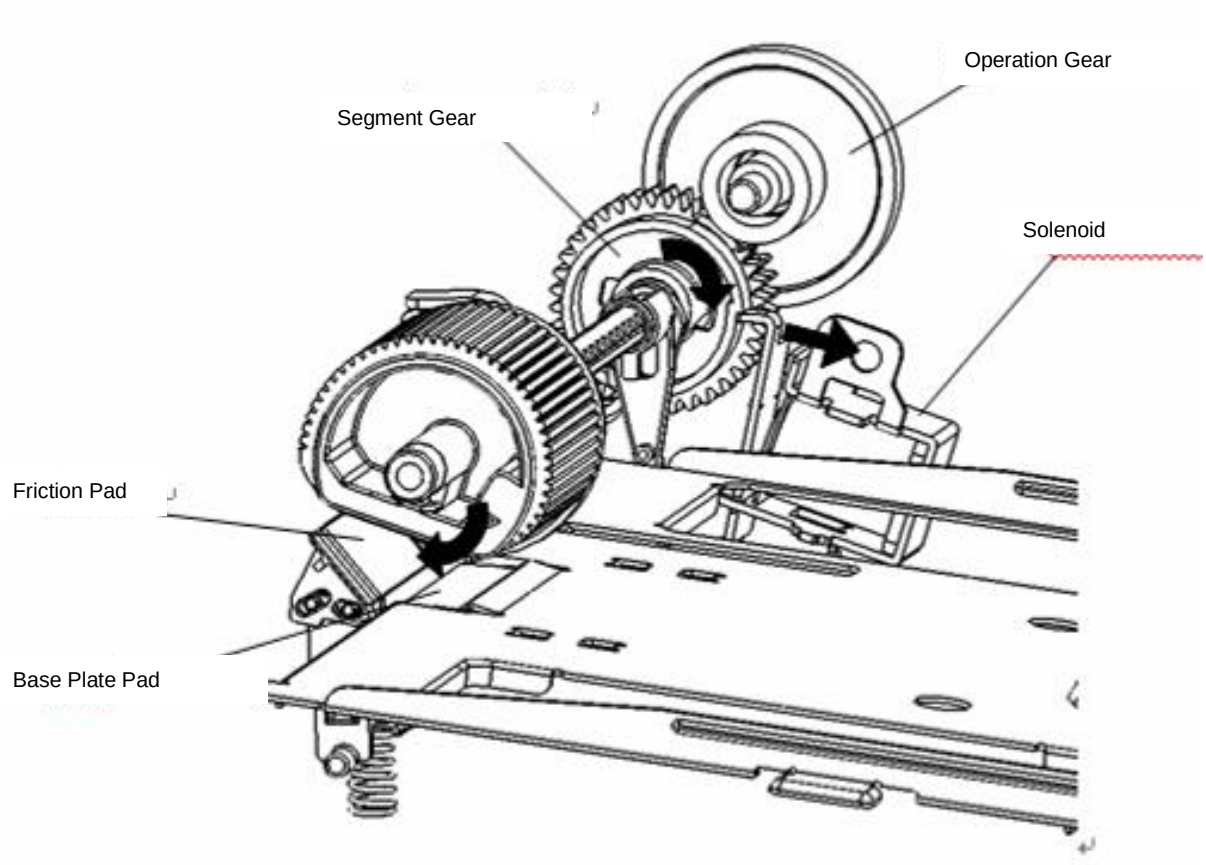
Main Body's Pickup Part Components and Driving Mechanism

Main Tray is composed with the following 6 components and rolls of each component are as the followings.

1) Pickup Roller: It picks the paper up by using tray's feeding pressure.
2) Pickup roller Idler: It is at the both sides of pickup roller to reduce resistances from paper transfer and contacts with feeder friction pad on pickup stand-by mode.
3) Pickup Shaft: It delivers the operation from segment gear to the pickup roller.
4) Pickup Roller Bushing: It holds the pickup roller's position from both ends of pickup roller.
5) Pickup Solenoid: Pickup solenoid operates per feed timing to connect operation with pickup roller.
6) Segment Gear Assy: Some gear teeth are missing to disconnect the operation of main operation and pickup roller's operation at Pickup roller's Home-Position.


6) Segment Gear Assy
Main Motor
3) Pickup Shaft
1) Pickup Roller
5) Pickup Solenoid
2) Pickup Roller Idler
4) Pickup Roller Bushing

Main Paper Feeder Drive



When cassette tray is opened and paper is loaded and the tray is closed, the base plate gets unlocked to lift the papers toward pickup roller (D-roller) and enables feeding stand-by status. When feeding signal is sent from the machine, solenoid is operated and segment gear gets unlocked to rotate pickup roller to picks up the paper on top in the tray to the machine.

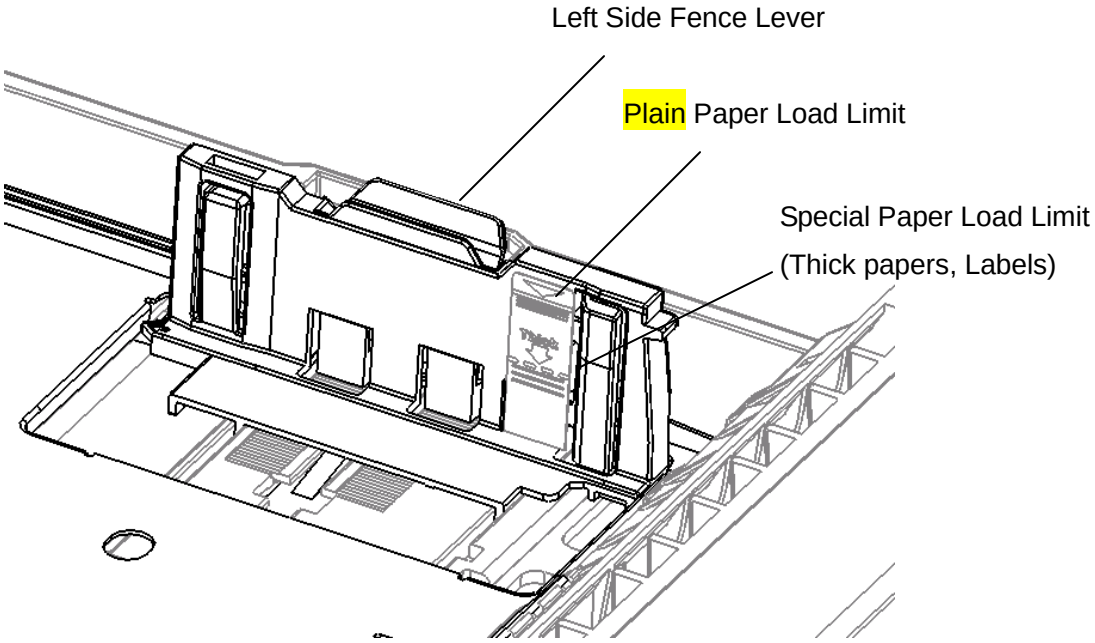
At here, the paper fed by the feeding pressure between pickup roller and base plate is fed one by one with the friction from the friction pad.

Paper is fed to return roller when pickup roller rotates once and the paper after that goes through return roller and resist roller for feeding.

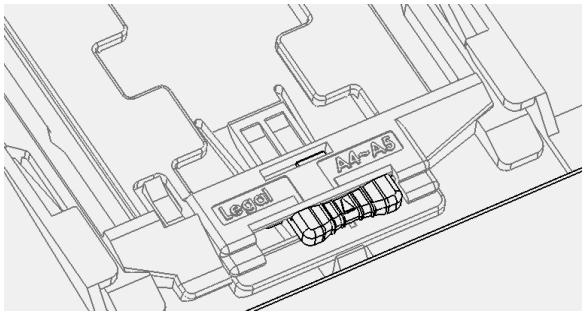
When the pickup roller rotated once due to paper or other feeding condition, but paper was not fed to return roller, the pickup roller rotates once more to pick up paper.

When all loaded papers were used, the paper detecting sensor detects it and indicates that all papers have been used.

Side Fence/Rear Fence Operation

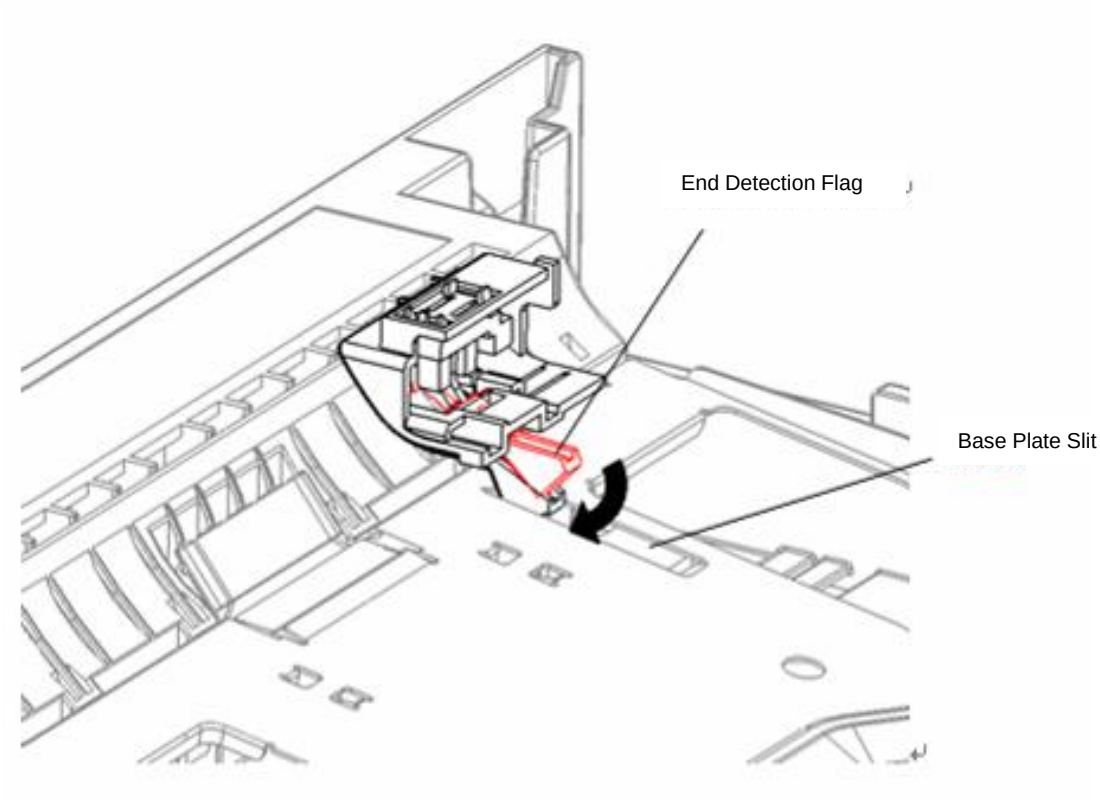


Hold right side fence lever and right side fence to move the side fence. Load papers up to the paper load limit on the side fence. Especially, the preprinted papers can be categorized as special papers due to paper's curls.



Hold rear fence lever to move the rear fence. Especially, for Legal papers, the rear fence need to be expanded and for such case, expand the rear fence expand lever to Legal size. When loading A5~A4 papers, reset the expand lever and move the expanded rear fence walls to inside.

No Paper Detection



When all the papers loaded in the cassette tray were used, the paper detect sensor flag drops on to the base plate's slit and light from the sensor flag gets blocked to alter the sensor's output value. The printer detects paper presence with this sensor's output value.

Paper Jam Detection

When input sensor was not turned on within a certain time after one pickup roller rotation, the pickup roller rotates once more. After 2 pickup roller rotation and paper cannot turn the input sensor on, the machine determines it as paper jam or miss-feed and it is notified to the user.

Also, the machine does not have an automatic paper size detection sensor and it detects paper size with resist sensor's on-off timing on feeding and when this detected paper size does not match with the paper size set from PC, paper jam will occur as well.

Paper Size Detection

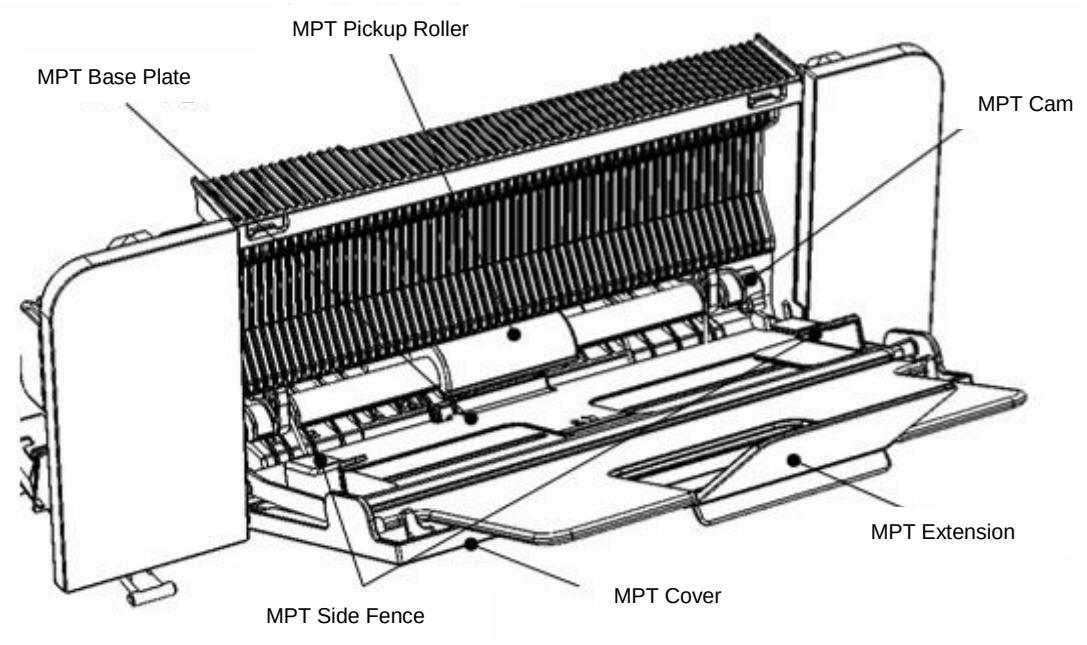
As A400 does not have size detection sensor, user need to configure it from driver.

MPT (Multipurpose Tray)

Overview

A MPT with 50 A4 sheets of 75gsm base is installed on the printer as default.
A friction pad method is used as paper separating method for MPT as like main tray and a paper detecting sensor is mounted to determine paper presence, but a separate auto paper size detecting sensor is not installed, which allows the printer to detect the paper size by on-off timing of resist sensor.
When loading papers to MPT, expand the extension all the way and adjust side fences to the paper size to have no gaps.
Paper load limit lines are marked separately for postcards, envelops, labels and other special papers.

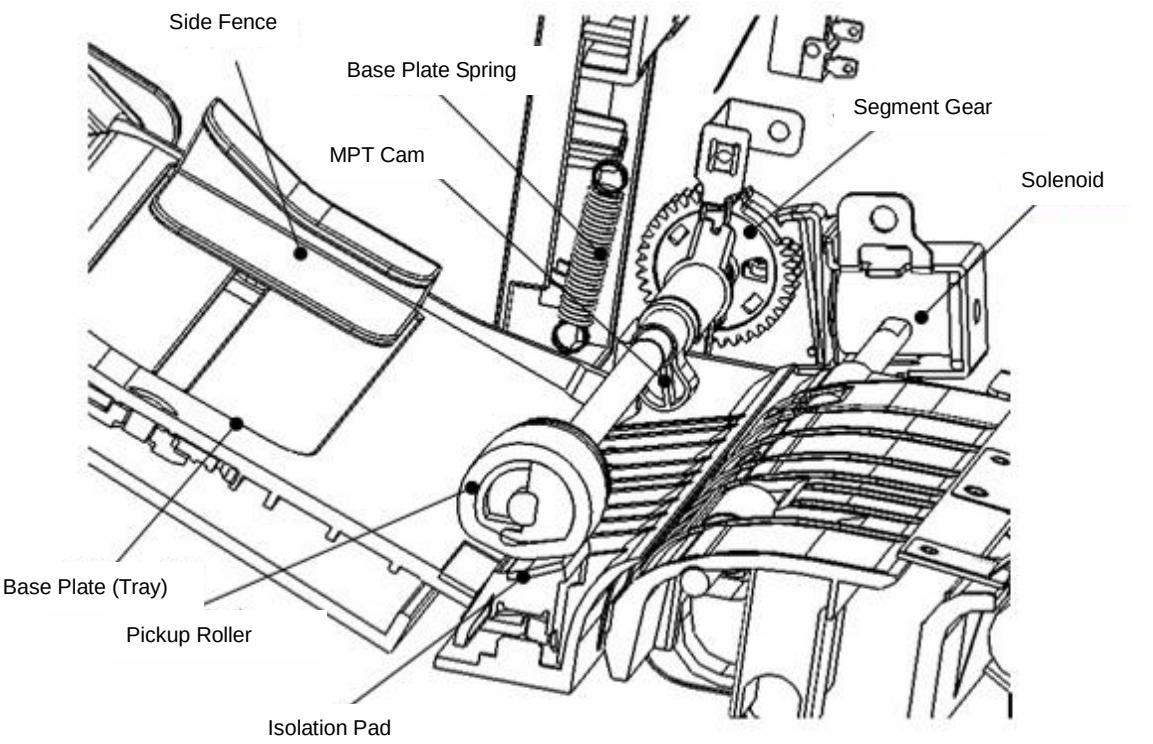
MPT Components



MPT is composed with the following 6 components and rolls of each component are as the followings.

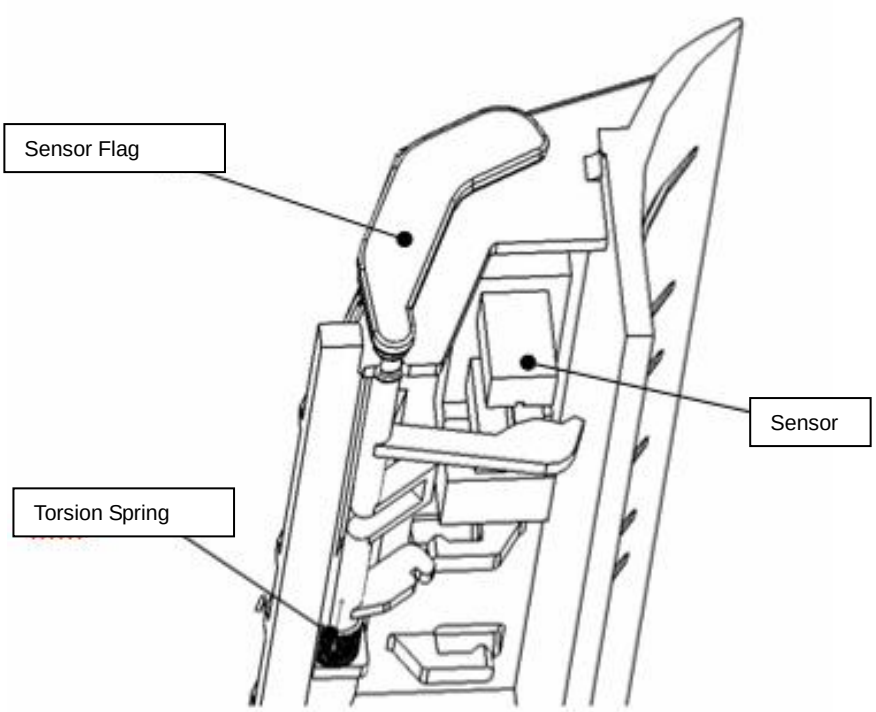
1) MPT A'ssy: Composed with MPT cover, base plate and extension.
2) MPT Cam: Links with the MPT pickup roller and pickup roller
3) Lower Body and Upper Guide: Act a guide on paper feeding
4) Solenoid and Segment Gear A'ssy: Delivers or isolates power to MPT pickup roller
5) Friction Pad: Prevent multiple paper feeding
6) Paper Load Detect Sensor: Detects paper presence in the tray

MPT Drive



MPT can load 50 sheets of plain paper, and when MPT is opened to load papers, the base plate goes down by cam and isolates with pickup roller for easy paper loading.
When loading papers, pull the extension out all the way and load papers less than 50 sheets on the tray and adjust side fences to not to have papers move around.
When feed signal is sent, solenoid gets operated to disable segment gear and delivers power from main motor to MPT's pickup roller. Therefore, when the cam that operates with MPT's pickup roller rotation rotates, the base plate rises by base plate spring to generate feeding force by contacting loaded paper with pickup roller and allows loaded paper to be fed in orders from top by pickup roller's rotation.
When the pickup roller rotates once, the segment gear works with solenoid to isolate power from main motor and the pickup roller stops its rotation to lower MPT base plate to initial position.
The friction pad isolation method is used for paper isolation method and papers get isolated one by one with friction pad's resistance force and friction pad spring's pressure.
Paper presence detect sensor is installed, so, when all papers in the tray is used, MPT detects it and stops feeding operation.
As there is no paper size detect sensor, the user must assign the paper size from printer driver and if the paper size assigned from driver does not match with paper loaded in the tray, a paper jam will occur.

No Paper in MPT Detection



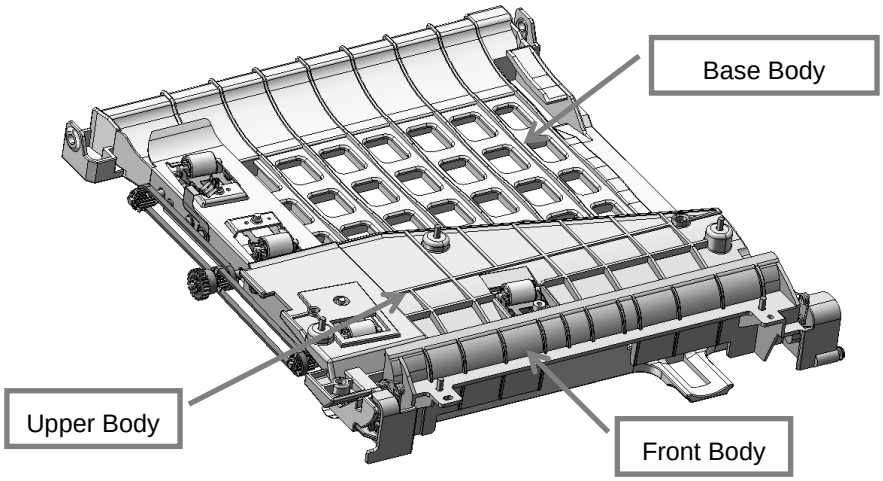
When papers are loaded on MPT, the sensor flag gets pressed and acknowledges paper presence and when all loaded papers are used, the paper presence detect sensor at the bottom body ASSY returns to initial position by torsion sprint for sensor flag to isolate the light and causing the sensor's output value to change. The printer detects paper presence with this sensor's output value.

Paper Jam Detection

When the input sensor does not get turned on by the feeding Tray within certain time after MPT pickup roller rotates once, the machine operates pickup roller up to 3 times. But when input sensor was not turned on by paper even after the 3 pickup roller operations, the machine will display miss-feed.

Also, the machine does not have an automatic paper size detection sensor and it detects paper size with input sensor's on-off timing on feeding and when this detected paper size does not match with the paper size set from PC, paper jam will occur as well.

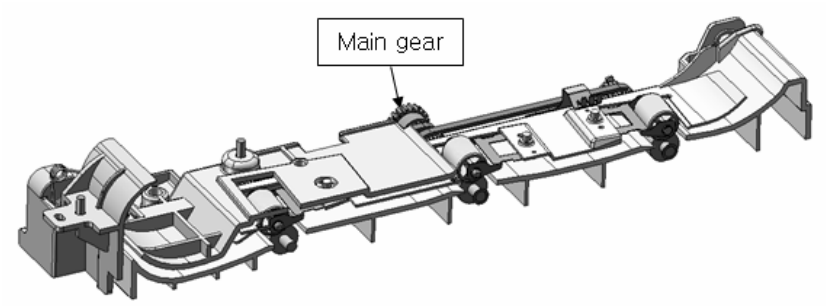
Duplex Unit Components



Duplex Unit is composed with below 3 bodies and roles of each part are as the followings.

1) Upper Body: It works as upper rib to make the papers to through smoothly as main function and compensates skew partially by having one roller.
2) Front Body: It works as a guide to move the papers to EP frame. And supports base body with a fixture using spring.
3) Base Body: It compensates skew to print the paper (regardless of A4 or letter) fed by 3 mounted rollers in parallel.

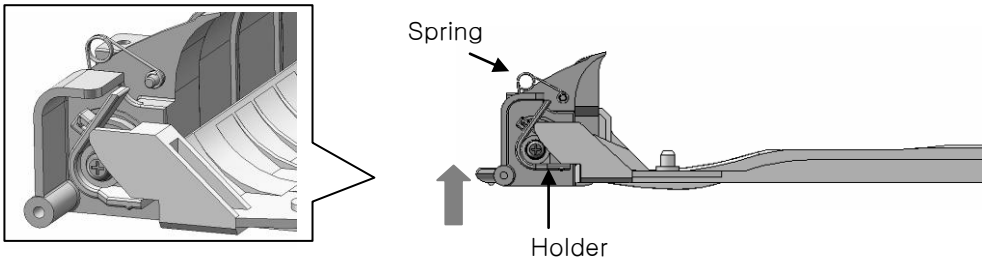
Duplex Unit Drive



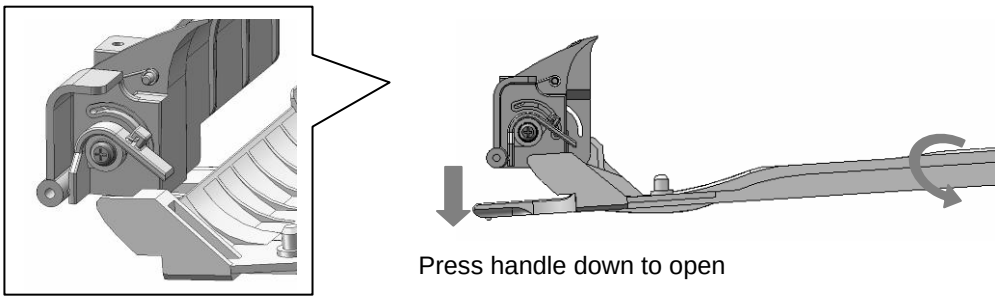
Duplex Unit is connected with main operation and gears, and papers are fed to base body with reverse method of pick-a-boo method. The paper is re aligned to left by tilted roller in reverse area. (Regardless of letter or A4)

Paper Jam Detection

When a paper jam occurs at reverse area of Duplex Unit, remove the tray first and press handles down to disengage base body to remove paper jam in the unit.

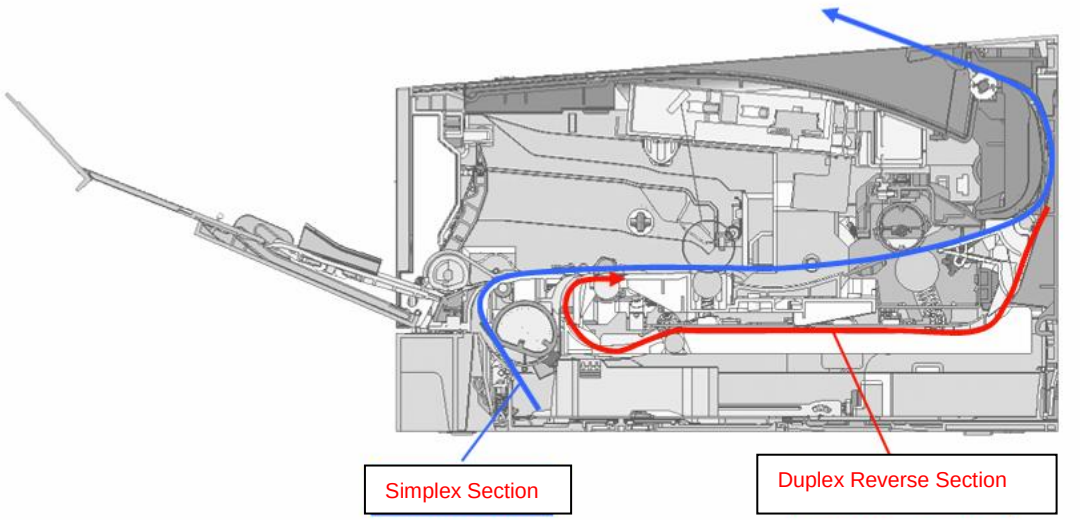


Lift handle up to close



Press handle down to open

Duplex Unit Paper Path

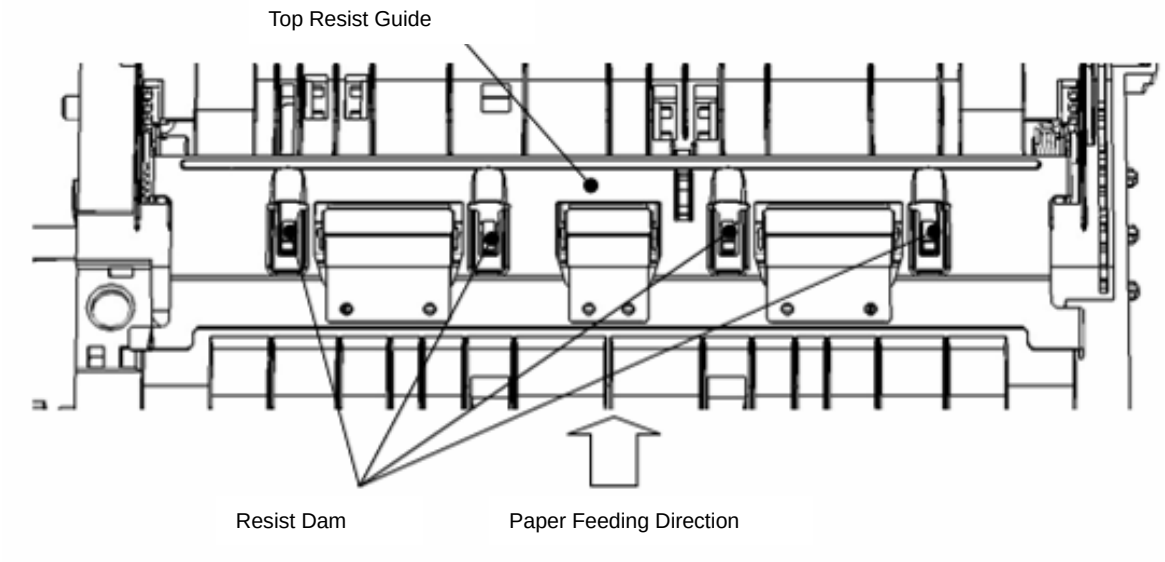


When printing 2 sides, the paper proceeds to printer's simplex section first by pickup roller to print front side. The front side printed paper passes fixing unit and goes to delivery roller and the solenoid operates forward/reverse bracket and the roller turns reverse allowing the paper to be transferred to Duplex Unit's duplex section.

The paper transferred to duplex section again passes simplex section and at here, the backside of the paper gets printed and finally goes to bin tray through the roller.

Resist Unit

Resist unit aligns the papers fed from feeder to not to have skew occurrences when printing image to the paper.



Resist unit Components

Resist unit is composed with the following 3 components.

1) Resist driving roller
2) Top resist guide and pressure backup roller
3) Resist dam and spring to align paper

Resist unit Drive

When a paper is fed from main tray or MPT, the paper enters into resist unit by the guide and the paper temporarily gets stopped by resist dam.

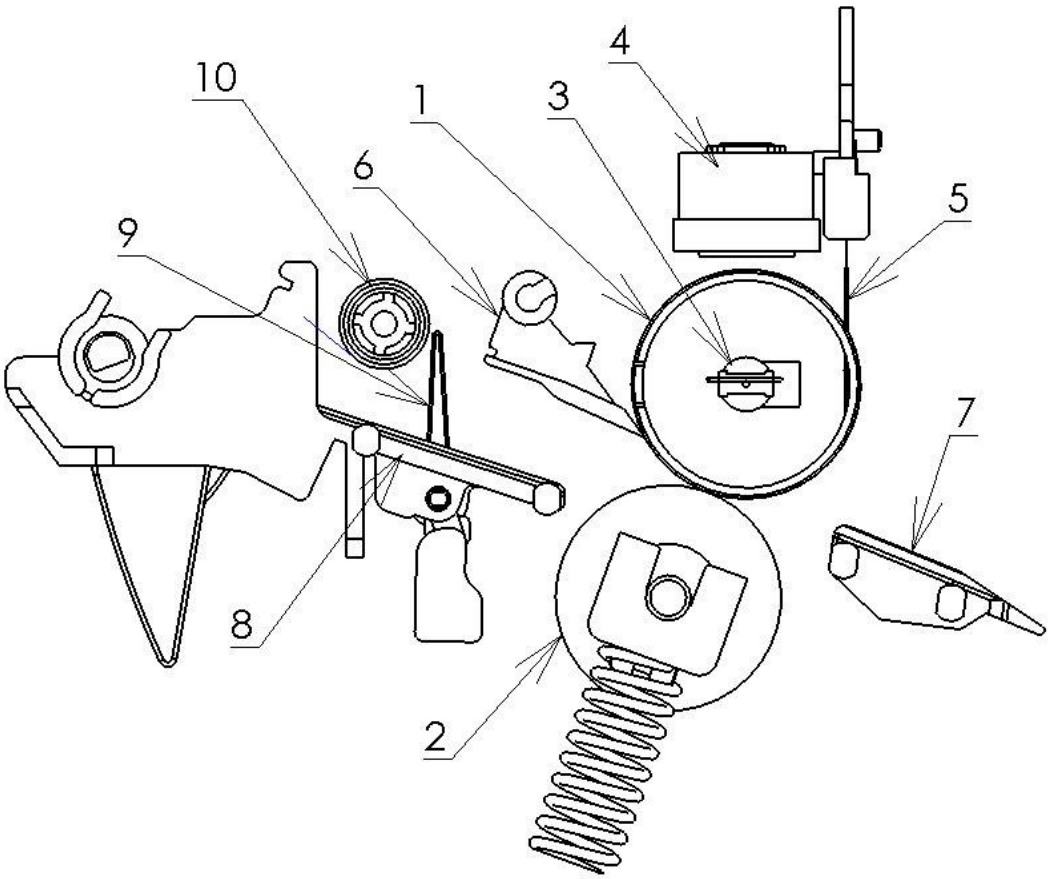
The feeding got suspended by resist dam, but the paper gets transferred by pickup roller's rotation and at here, top part of paper gets a slight curl with this rotation and suspension and during this operation, the paper gets aligned.

The paper with curl on the top pushes resist dam when it gets pressure over a certain pressure continuously and when the dam gets unlocked by it, the top of the paper get caught between resist driving roller and backup roller to transfer the paper into the printer.

Image Fixing

Overview

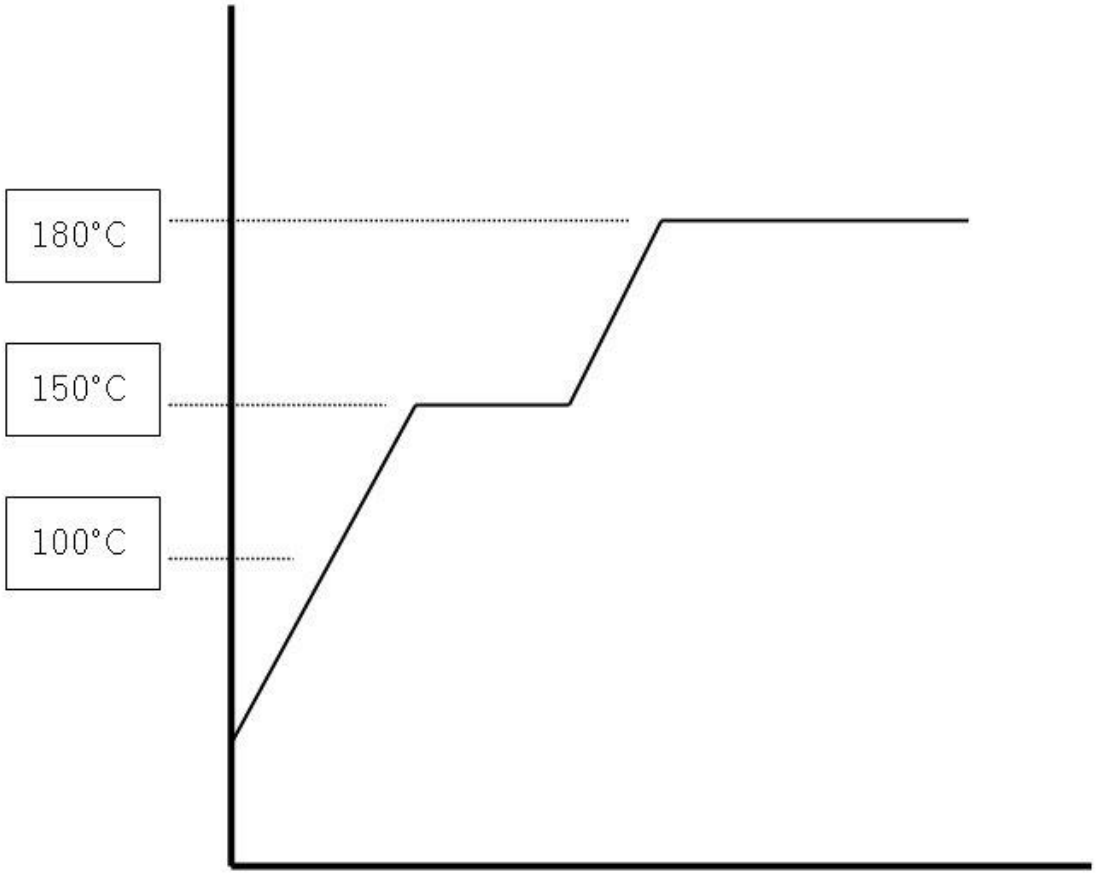
Fixing Unit Components



Fixing Unit and paper discharge unit are composed with following components.

1. Fixing Roller
2. Pressure Roller
3. Heater
4. THERMOSTAT
5. THERMISTOR
6. Separator
7. Entrance Guide
8. Exit Guide
9. Exit Sensor
10. IDLE Roller

Fixing Temperature Control



The fixing heater is turned on right after main power switch is turned on.

When there's no output signal on main motor operation at 100˚C, 150˚C READY status is maintained.

When output signal is sent, the fixing temperature maintains 180˚C and settles to paper. (180˚C is default value for plain papers)

Fixing temperature is configured differently for each paper, but the fixing temperature can be changed within a certain range when the user desires.

Overheat Prevention

When Fixing Roller's temperature rises higher than 230˚C, CPU isolates Fixing Lamp's power and indicates an error at same time.

To be prepared for failure of overheat prevention by thermistor, there are thermostat and thermal cut off installed parallel to Fixing Lamp's general grounding cable.

Thermal cut off is a dual safety device, which is installed additionally to prevent overheat when thermostat does not function.

Thermostat and thermal cut off get operated when fixing temperature gets overheated to isolate power applied to Fixing Lamp and indicate an error at the same time to stop the machine operation.

Delivery Unit

Overview

The unit that transfers the papers delivered via Fixing Unit lastly to get the papers to stacked on bin tray on the top of the printer and for the models with Duplex Unit, it also rotates in reverse for Duplex Unit's operation.

As there is no paper full detection sensor that can prevent paper jam by having papers over a certain height, a paper jam or paper falling may occur when there are papers over certain amount of sheets (150 sheets of base paper and standard environment).

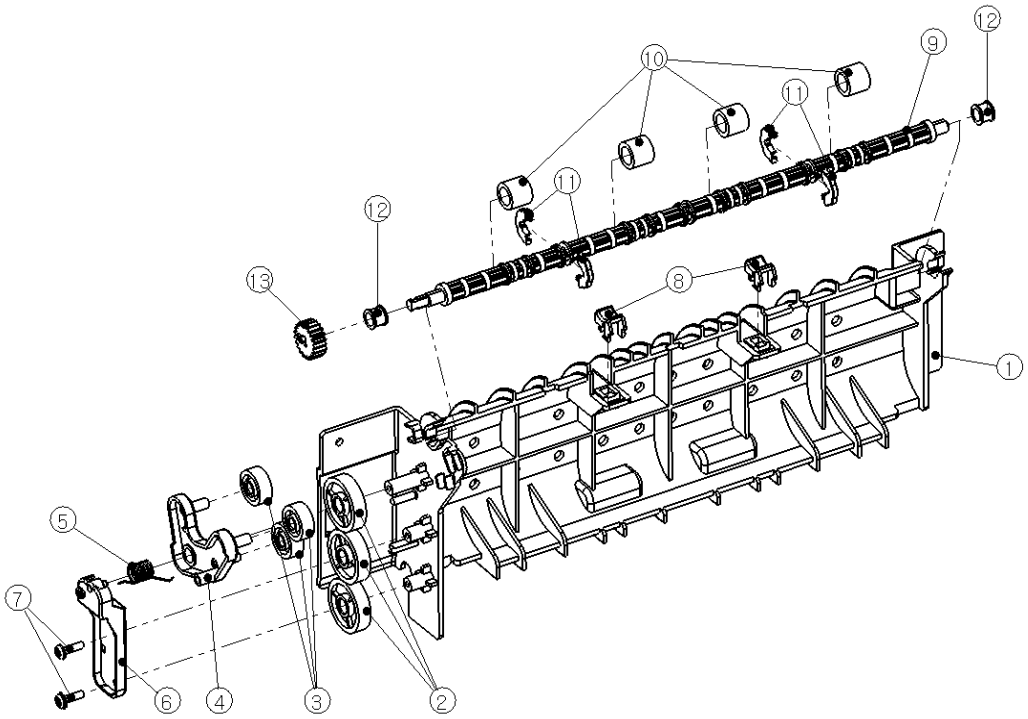
When paper jam occurs and if paper is behind the fixing unit, open the delivery cover and remove the jammed paper.

Delivery Unit Components

Delivery unit is composed with the following 13 components and rolls of each component are as the followings.

1) Delivery Frame: Other parts of delivery components are assembled and performs a role as a guide on paper print side
2) Large Delivery Gear: Delivers power from fixing gear to no. 3 small delivery gear.
3) Small Delivery Gear: The gear delivering rotation force lastly to the delivery shaft.
4) Forward/Reverse Bracket: The function to control delivery shaft's rotation by moving position with solenoid operation
5) Bracket Spring: When there's no solenoid operation, it locates no. 4 bracket to rotate delivery shaft to forward direction.
6) Gear Bracket: Fixates large and small delivery gears and forward/reverse bracket.
7) Bracket fixing screw

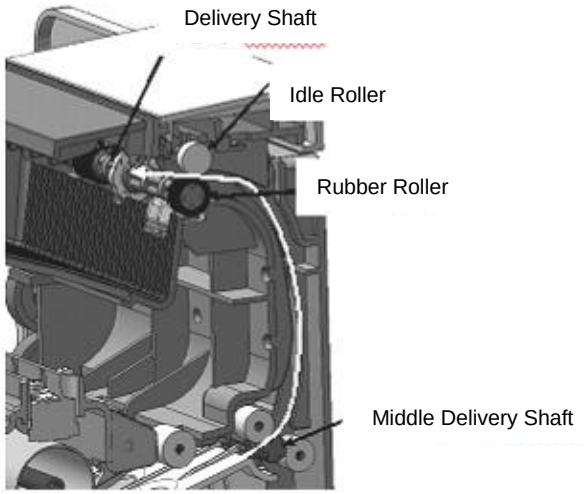
8) Delivery Shaft Support: Delivery shaft gets weight from idle roller assemble to laser cover in lower direction and the support prevent it from dropping.
9) Delivery Shaft: Rubber roll and kicker are assembled and connects to rotate
10) Rubber Roller: It's not delivery shaft built-in, but an assembly type that gives moving force to papers by working with idle roller assembled to laser cover.
11) Kicker: It performs a function to push backside of paper to get paper discharged completely.
12) Bushing: It reduces friction force of rotation part of delivery shaft
13) Shaft Gear: It delivers rotation force to delivery shaft from small delivery gear.



Delivery Unit Drive

The papers passed through fixing unit get transferred to paper proceeding direction by fixing roller. The paper fed to fixing unit first goes through middle delivery shaft and to delivery shaft and the paper transferred to the shaft and get discharged through fixing roller and middle shaft that rotates by delivery shaft. Each shaft always rotates together with main motor operation and allows paper to move.

2 and 4 rubber rollers are assembled on middle delivery shaft and delivery shaft and the rubber rollers are paired with idle rollers. Each idle roller pressed against rubber rollers by springs to apply friction force on papers to move.



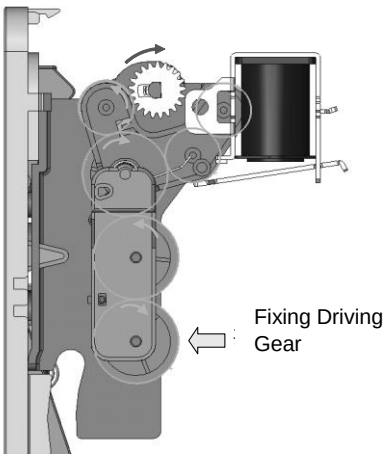
Delivery Forwarding and Reversing (Duplex Unit Drive)

Main Driving Motor on main body always moves forward and the rotation force of main driving motor is delivered to delivery shaft through delivery unit's fixing driving gear to rotate delivery shaft.

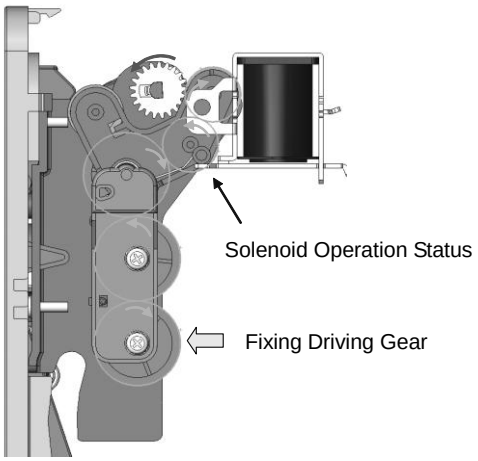
As fixing driving gear always rotates forward, in order to print 2 sides by reversing delivery unit, the forward/reverse bracket is operated by solenoid operation.

Below figure on the left shows that solenoid is turned off when rotating forward and 4 gears are connected to rotate delivery shaft rotating forward.

The right figure shows that solenoid is turned on and 5 gears are connected to Fixing driving gear to convert rotation in reverse.



Forward Rotation

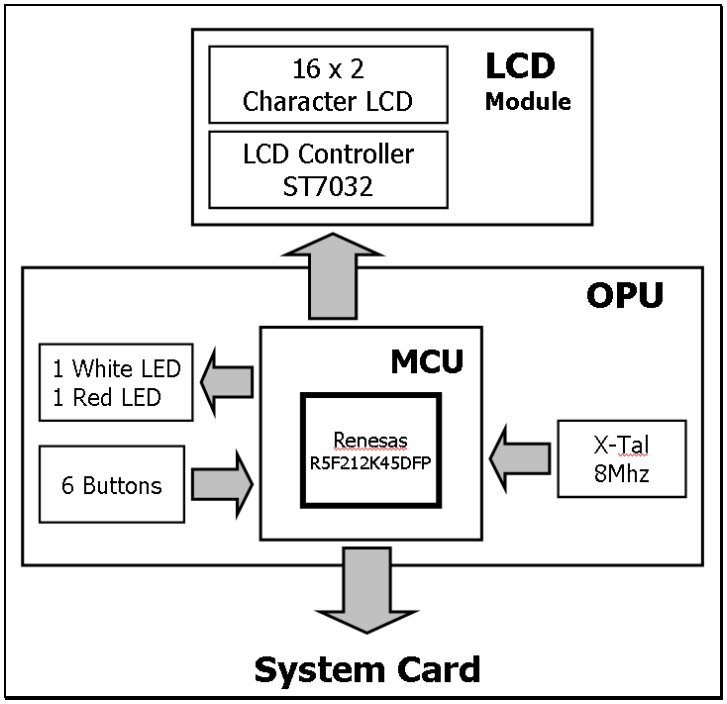


Reverse Rotation

Front Part Overview

Operational Panel Unit (OPU) Components and Main Functions

Structure's Block Diagram



Pin Array

PIN No.	Signal	Description
1.	+5V	5V power
2.	+3.3V	3.3V power
3.	GND	Grounding
4.	n_RESET	MCU Reset
5.	TX	UART TX
6.	RX	UART RX
7.	GND	Grounding

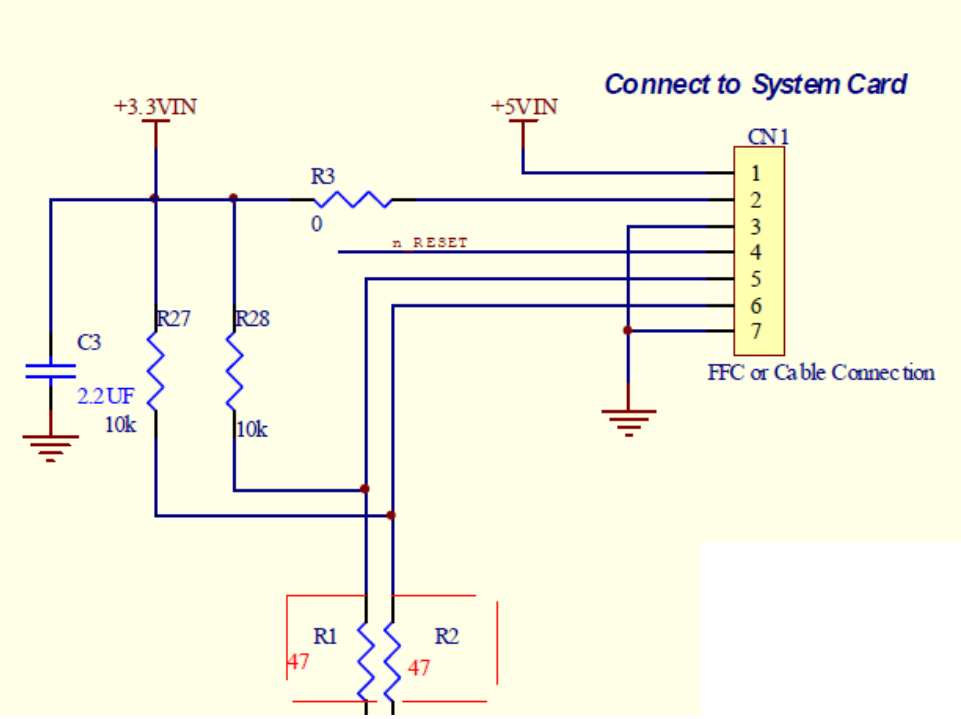
Components and Basic Functions

Basic components and functions of OPU are the followings.

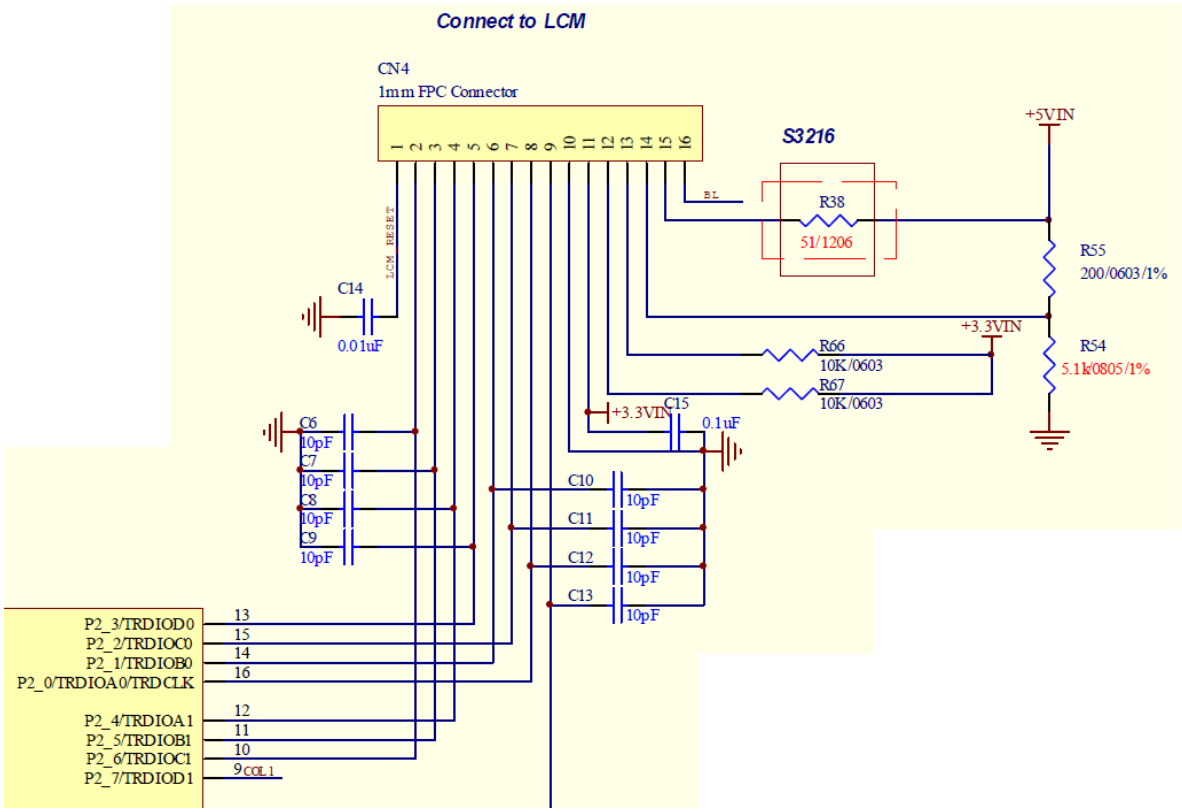
1. R5F212K45DFP of MCU uses 8Mhz external clock to communicate with system card by UART. Communication standards are 9600bps, No parity, 8 data bit and stop bit.
2. OP key is composed with total of 6 matrix formats. Signals are sent from COL1~6 line sequentially and the signal incoming timing is checked at ROW1 to detect which button was pushed.
3. White LED and red LED are controlled separately by using LED S8050 (NPN TR) as a switching element.
4. The MCU on OPU and LCD controller on LCM (LCD module) transmit and receive signals with 4-bit parallel method.
5. LCD's backlight uses S8050 (NPN TR) as a switching element to control on and off.

Circuit Diagram

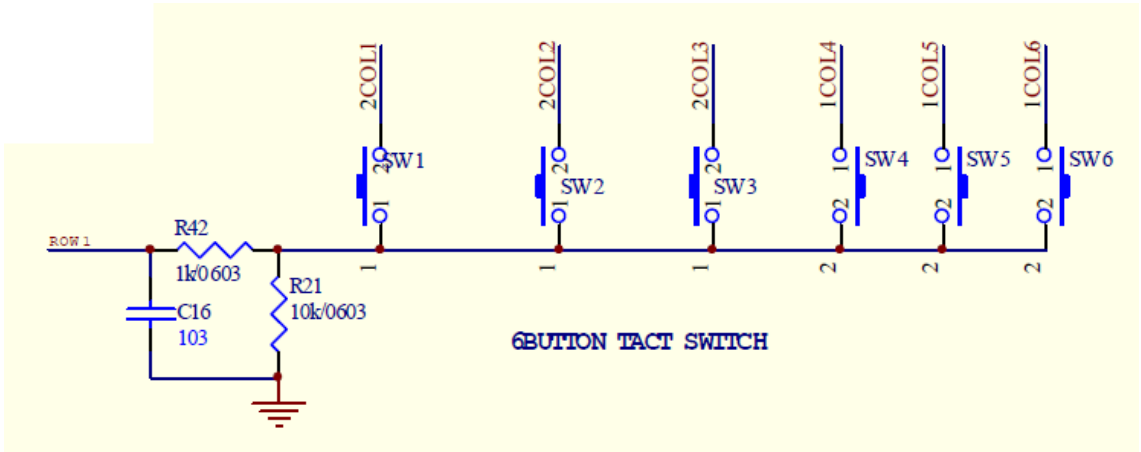
1. Connector Part



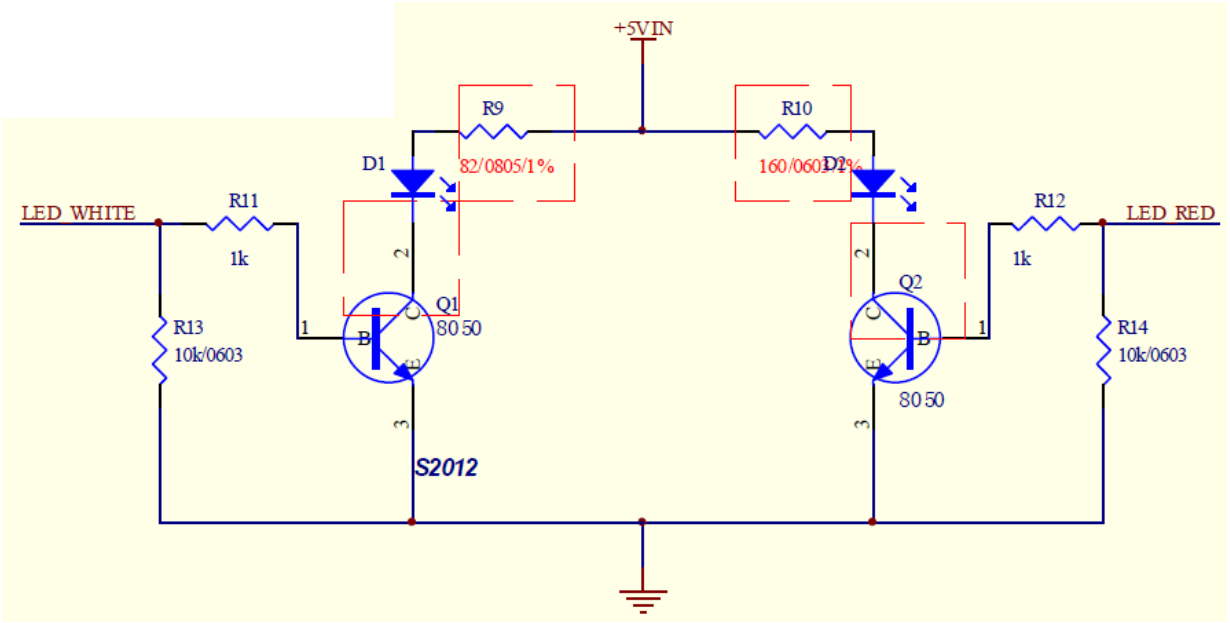
2. LCM Connection Part



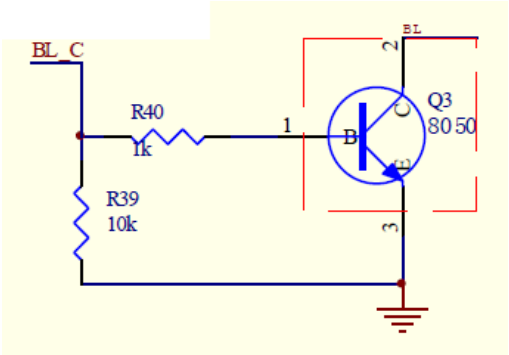
3. Button Input



4. LED Drive section

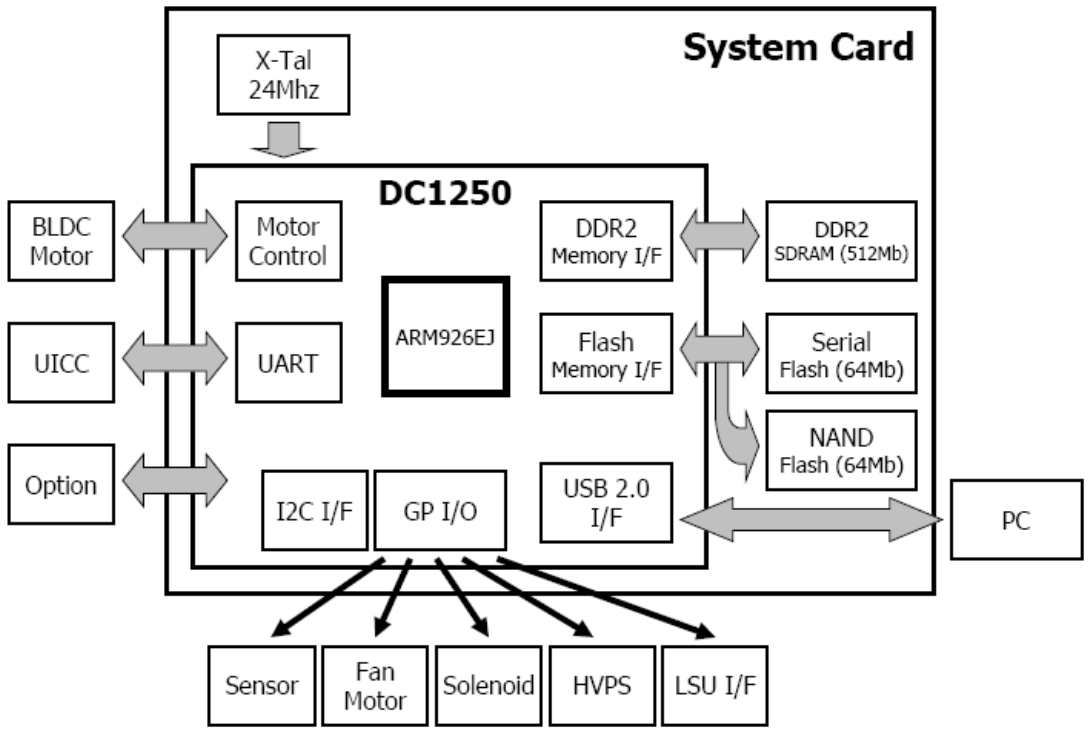


5. Backlight Controller



System Card Components and Main Functions

Structure's Block Diagram



Components and Basic Functions

System card is composed with above figure structure and main functions are as the followings.

■ Main Functions of SOC (DC1250)

- It controls entire program flow by reading execution codes from flash memory (serial and NAND flash).
- 24MHz is used as system main clock.
- SOC with each function module built-in performs following functions.
  - Motor Control: It controls BLDC motor to control the controller.
  - UICC (Control Panel) I/F : The built-in URAT I/F is used as to control the controller.
  - Option tray I/F: The built-in I2C module is used as to control the option tray.
  - USB I/F controller is built in to transmit information with PC.
  - LSU and each component are controlled by using GP I/O.

Pin Array

1. CN2 (Smart IC)

NO.	Signal	Description
1	3.3V	3.3V power
2	I2C_DAT	Transmit data with SMART IC
3	I2C_CLK	Data transmitting standard clock
4	GND	GND

2. CN6 (BLDC_M)

NO.	Signal	Description
1	S.GND	SIGNAL GND
2	BLDC_FG	F/B signal to confirm motor rotation standard
3	BLDC_CLK	Standard clock supplied to motor
4	BLDC_ST	Motor ON signal
5	BLDC_LD	Configured RPM reception detection
6	P.GND	POWER GND
7	24V	24V power
8	3.3V	3.3V power
9	Direction	Rotating direction setup

3. CN7 (Tray_IF)

NO.	Signal	Description
1	I2C_DAT	Transmit data with tray
2	I2C_CLK	Data transmitting standard clock
3	NOTIFY	Tray set detection
4	GND	GND
5	24VIN	24V power
6	GND	GND
7	5VIN	5V power
8	GND	GND

4. CN8 (P_MOTOR)

NO.	Signal	Description
1	nLSU_CLK_H	Standard clock supplied to polygon motor
2	nREADY_H	Ready signal from polygon motor
3	nSTART_H	Polygon ON motor
4	GND	GND
5	24V	Power

5. CN11 (LSU_IF)

NO.	Signal	Description
1	nHSYNC_H	Synchronization detection signal
2	GND	GND
3	5VSW	Power
4	nSH_H	SAMPLING&HOLD
5	nLDEN_H	LD ON signal
6	nVIDEO_H	Video data
7	GND	GND

6. CN14 (Power_IF)

NO.	Signal	Description
1	TX_SENSING	Transfer F/B signal
2	TX_ENB	Enable Transfer
3	TX_PWM	Transfer print
4	CHGPWM	Electrification print
5	DEVPWM	Development print
6	24V	24V power
7	GND	GND
8	24V	24V power
9	24V	24V power
10	GND	GND
11	GND	GND
12	5VIN	5V power
13	GND	GND
14	HR_PSU	Fixing heater ON signal

7. CN25 (MAIN FAN)

NO.	Signal	Description
1	MAIN_FAN	Fan ON signal
2	MAIN_FAN_BACK	Configured RPM reception detection
3	GND	GND

8. CN27 (MPT SOL)

NO.	Signal	Description
1	24VIN	24V power
2	MPT_SOL_L	MPT feeding solenoid ON

9. CN28 (TRAY SOL)

NO.	Signal	Description
1	24VIN	24V power
2	TRAY_SOL_L	Tray solenoid ON

10. CN30 (OP_IF)

NO.	Signal	Description
1.	+5V	5V Power
2.	+3.3V	3.3V Power
3.	GND	Ground
4.	n_RESET	MCU Reset
5.	RX	UART RX : The signal receiving data from OP
6.	TX	UART TX : Signal sending data to OP
7.	GND	GND

11. CN31 (Micro Switch)

NO.	Signal	Description
1	24VIN	24VIN
2	24V_SW	24V_SW : 24V F/B via switch

12. CN41 (Input_S)

NO.	Signal	Description
1	INPUT_S	Paper return detection
2	GND	GND
3	3.3V	3.3V

13. CN42 (EMPTY_MPT_S)

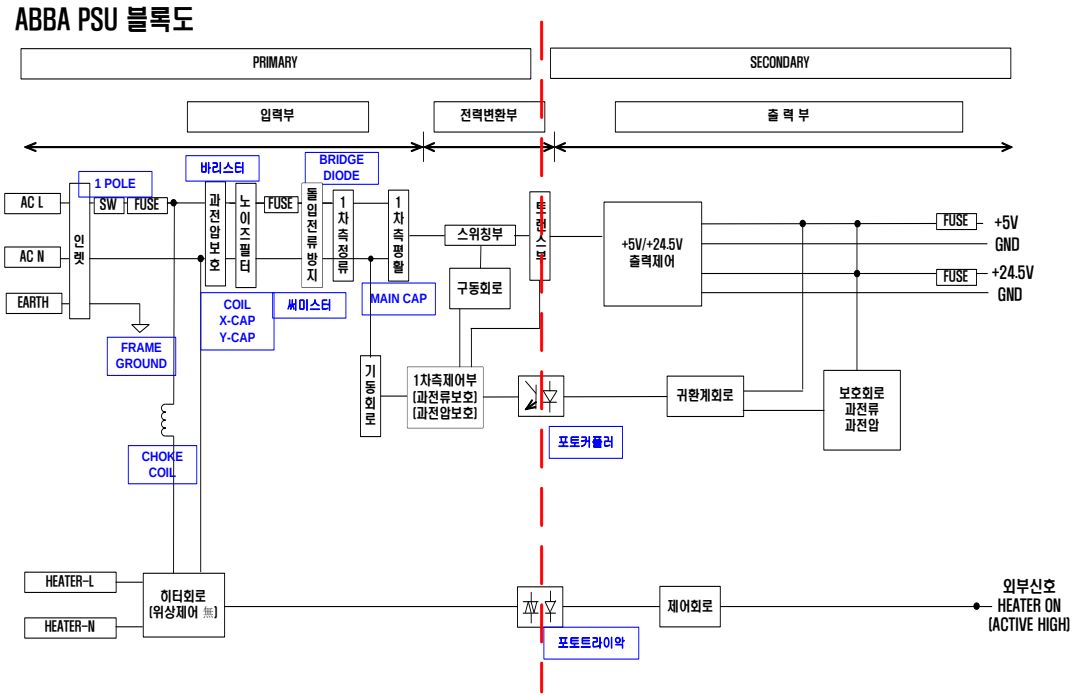
NO.	Signal	Description
1	EMPTY_S	Tray paper detection
2	GND	GND
3	3.3V	3.3V
4	MPT_S	MPT paper detection
5	GND	GND
6	3.3V	3.3V

14. CN43 (Fuser Exit_S)

NO.	Signal	Description
1	THERMISTER	Fixing temperature F/B
2	GND	GND
3	FUSER_S	Fixing set detection
4	GND	GND
5	3.3V	3.3V power

LVPS Components and Main Functions

Structure's Block Diagram



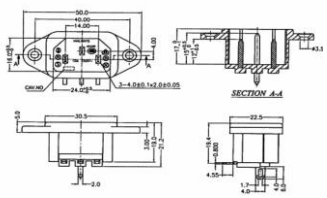
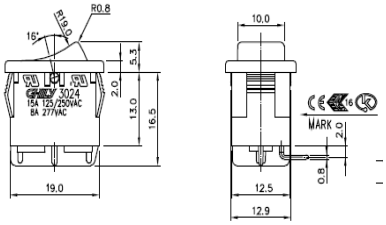
Components and Basic Functions

Basic LVPS components are each function are as the followings.

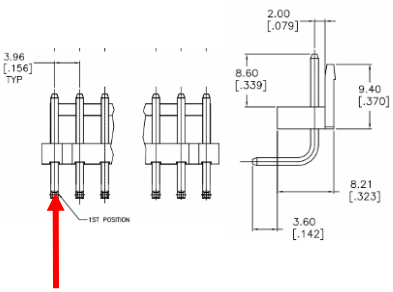
1. AC Switch: Open only one AC line (1-Pole type)
2. Varistor: Prevent rear circuit damage by short circuiting it when over current leads in to input
3. BRIDGE DIODE / MAIN CAP : Rectify AC waves to DC
4. Noise Filter: Prevent noise lead in at input section
5. Photocoupler: Perform feedback to maintain output constant voltage
6. Photo Triac: Control the heater in the machine to turn on and off
7. Fuse (1^{st} & 2^{nd}): Protect rear circuit on over current lead in

Pin Array

1. INLET + AC SW

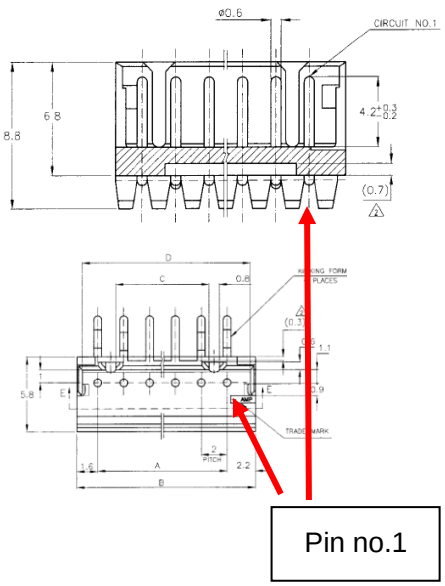
Connector No.	Connector Name	Manufacturer	Image
INLET	0707-1-C7D	INALWAYS	
AC SW	3024-P2T7SBKBK (SPST)	CHILY	 1pole SW

2. Heater Connector

Connector No.	Connector Name	Pin No.	Signal Name	Image
CN2	HEATER CONNECTOR 1744056-3 (AMP)	1	HEATER_L	 Pin no.1
		2	(removed)	
		3	HEATER_N	

* Spacing for no. 2 pin from total of 3 pins (to secure isolation distance)

3. DC Connector

Connector No.	Connector Name	Pin No.	Signal Name	Image
CN3	DC CONNECTOR 1-292250-4 (AMP)	1	TX SENSING	
		2	TX EN	
		3	TX PWM	
		4	CHG PWM	
		5	DEV PWM	
		6	+24.5VS	
		7	GND	
		8	+24.5V	
		9	+24.5V	
		10	GND	
		11	GND	
		12	+5V	
		13	GND	
		14	HEAT ON	

* Total of 14 pins composed with LVPS (7 pins) and HVPS (7 pins)

Standard

Parameter	Range III (230V)
Input Frequency (nominal)	Single phase, 50/60±3 Hz
Voltage Range (nominal)	220 ~ 240Vac
Voltage (min-max)	198 ~ 264Vac
*Nondestructive Voltage	187 ~ 276Vac
Input Current	AC + DC : ≤3.5A, DC : ≤1A
Input Power (Energy Saver Mode)	Over 55% efficiency on energy saver mode
Rush Current	≤ 50A 1/4 cycle, after complete discharge
EMC Filter	PCB fix
Protection	Fuse (T**8A** H 250V)
Heater On/Off control	Zero Crossing only, Turn-On
Power Factor	Over 0.5, on average load
Efficiency	Over 75%, on average load

		CH1	**CH2**	**Heater**
Voltage (V)		**+5.0Vdc**	+24.5Vdc	220V
Voltage Range	Static Mutual Load Variation and dynamic load variation	**+4.75V~+5.25V (-5%~+5%)**	+21.44V~+27.56V (-12.5%~+12.5%)	
	Average Load	**Same as above**	**+22.78V~+26.22V (-7.0%~+7.0%)**	
Output Load Condition	Cover Open	**0.25A**	0.025A	-
	Energy Saver	**0.1A**	0.05A	-
	Minimum Output Current	**0.25A**	0.05A	-
	Nominal Output Current	1.2A	2.3A	-
	Maximum Output Current	2.0A **(maintain operation for minimum of 30 min.)**	**2.8A (maintain operation for minimum of 30 min.)**	-
	Peek Output Current	-	**5.4A**	-
	2nd Rush Current (Surge Current)		**20A (Min. of 50uS)**	
	Total Max. Output Power	10.0W	68.6W	750W

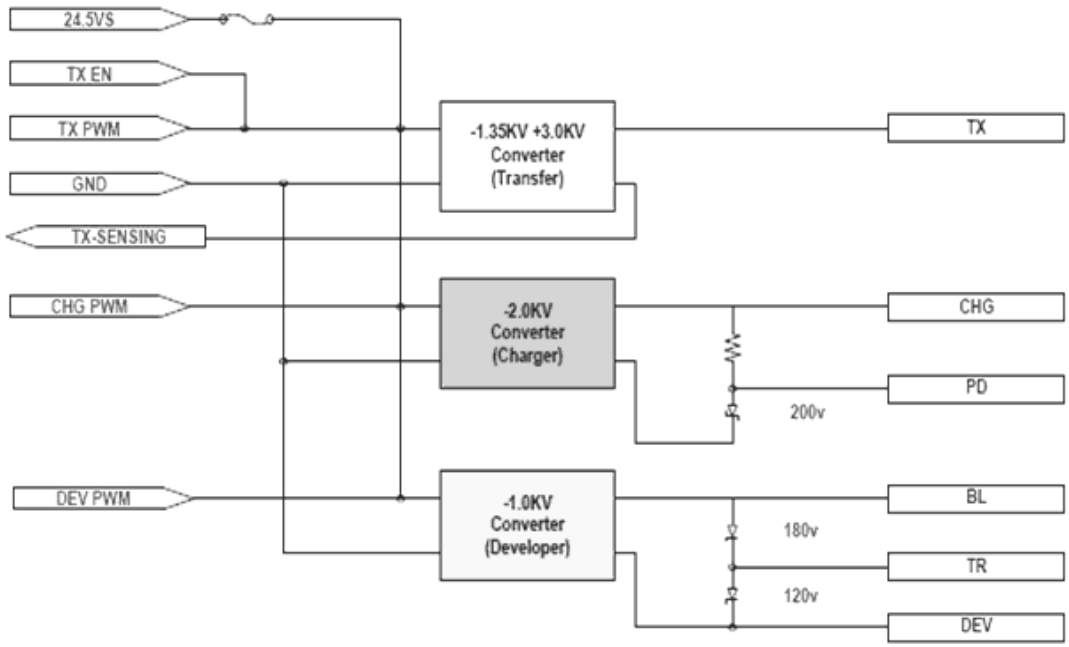
	Static Mutual Load Variation Condition	**5V min – 24V max 5V max – 24V min**		
Ripple and Noise Voltage		100mVp-p	300mVp-p	-
Over Voltage		Within voltage range	Within voltage range	-
Over Current Protection	Over current limit	**Fuse**	6A ~ 10A	-
	Restoration Method	Fuse Exchange	AC Reset	-
	Short circuit protection operation	Power Isolation	Power Isolation	-
Over Voltage Protection	Over voltage limit	7V	30V	-
	Restoration Method	AC Reset	AC Reset	-

* (1) Channels: 2 channels with 5V and 24V

(2) Operate power isolation mode on OCP, OVP and other protect activations

HVPS Components and Main Functions

Structure's Block Diagram



Pin Array

Refer to DC connector parts from LVPS pin array.

Basic Functions

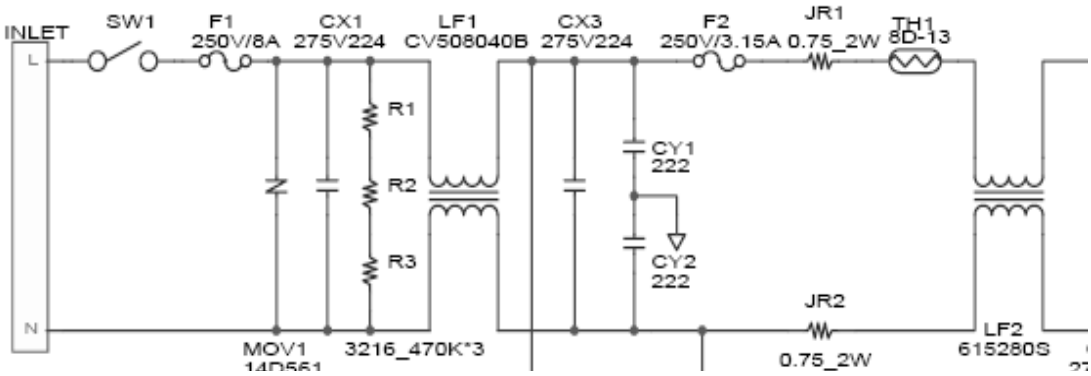
Categories	CHG	PD	DEV	TR	BL	-TX	+TX	TX-SENSING
Power Voltage	∘ **+24.5V ± 12.5% (+21.44V~+27.56V)**							
Power Current	∘ Max. 350mA							
PWM Signal	∘ Voh 5.0V Pull-up, Vol = Max. 0.8V(at Iol = 40mA, Vcc = 4.75V)							
Frequency	∘ 24.41KHz ± 1KHz							
Rated Output Voltage	-1690V	-200V	-620V	DEV-180V	DEV-300V	-1350V	+3000V	3.3V
Range	-250V ~ -2000V	-	-20V ~ -1000V			Enable	-400V ~ 3500V	-
Tolerance	±21V : -250V ~ -700V ±3% : -700V ~ -2000V	± 10V	±10V:-20V ~ -333V ±3%: -333V ~-1000V	±5%	±5%	±100V	±22V:-400V ~ 600V ±100V:600V~ 3500V	-
Rate Load	20MΩ ~ 1GMΩ		20MΩ ~ 1GMΩ			270MΩ ~ 1GMΩ	30 MΩ ~ 1GMΩ	-
Setup Output Voltage	-1690V ± 21V	-200V ± 10V	-620V± 10V	± 3%	± 3%	-1350V ± 60V At 450 MΩ (Active Low)	+3000V±100V	TX Output Current **12 ± 1** μA

1. Channels: HVPS is composed with 4 DC-DC converters and with 7 channels of electrification (CHG), drum (PD), development (DEV, TR, BL) and transfer (TX+, TX-)
2. Output Characteristics: Constant voltage method including transfer channels
3. Each of logic control is entered to each DC-DC converter and has PWM signals for converter control.
4. 24.5VS is supplied from LVPS. Front section of 24.5V is composed with safety interlock structure to prevent high voltage output of HVPS when cover is opened.
5. TX channel operates when TX enable signal is entered. TX channel has 2 channels of TX+ and TX-.
6. Enable signal basically applies -1350V to TX-.
7. TX-Sensing works as to detect 12μA current constantly.
   TX-Sensing signal delivers “LOW LEVEL” when transfer’s output current is lower than 12μA and “HIGH LEVEL” when it is higher than 12μA.
8. CHG PWM : It controls CHG and PD channel voltages. PD channel always maintains 200V versus GND using zener diode.

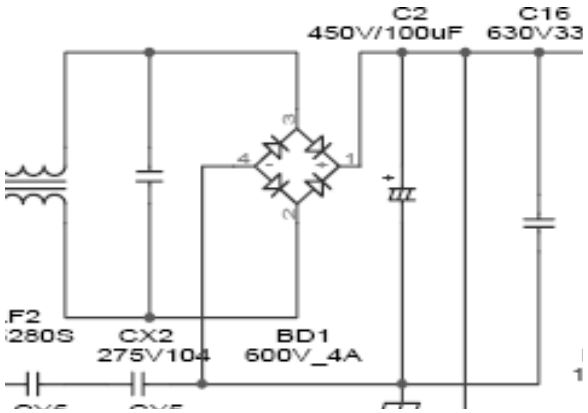
9. DEV PWM : It controls DEV, TR and BL channel voltages. TR and BL voltages use zener diode to always maintain DEV-120V and DEV-300V versus DEV output voltage

Circuit Diagram-LVPS Input Section

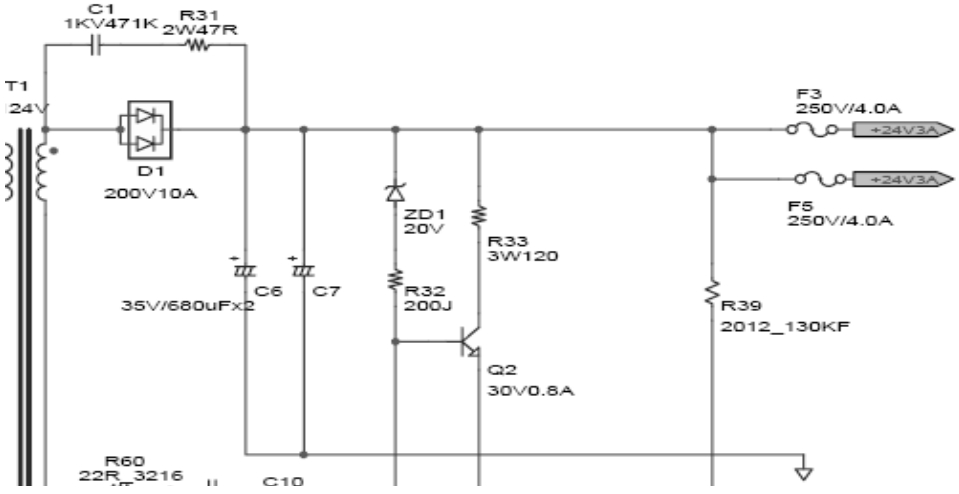
1. Line Filter Part



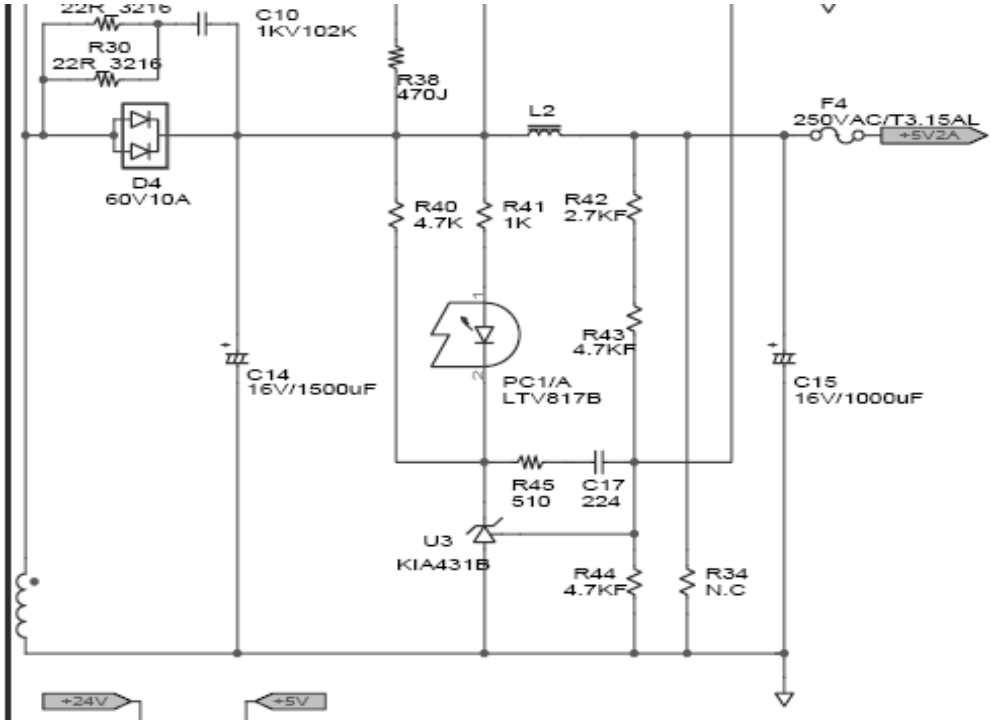
2. AC-DC Rectification Part



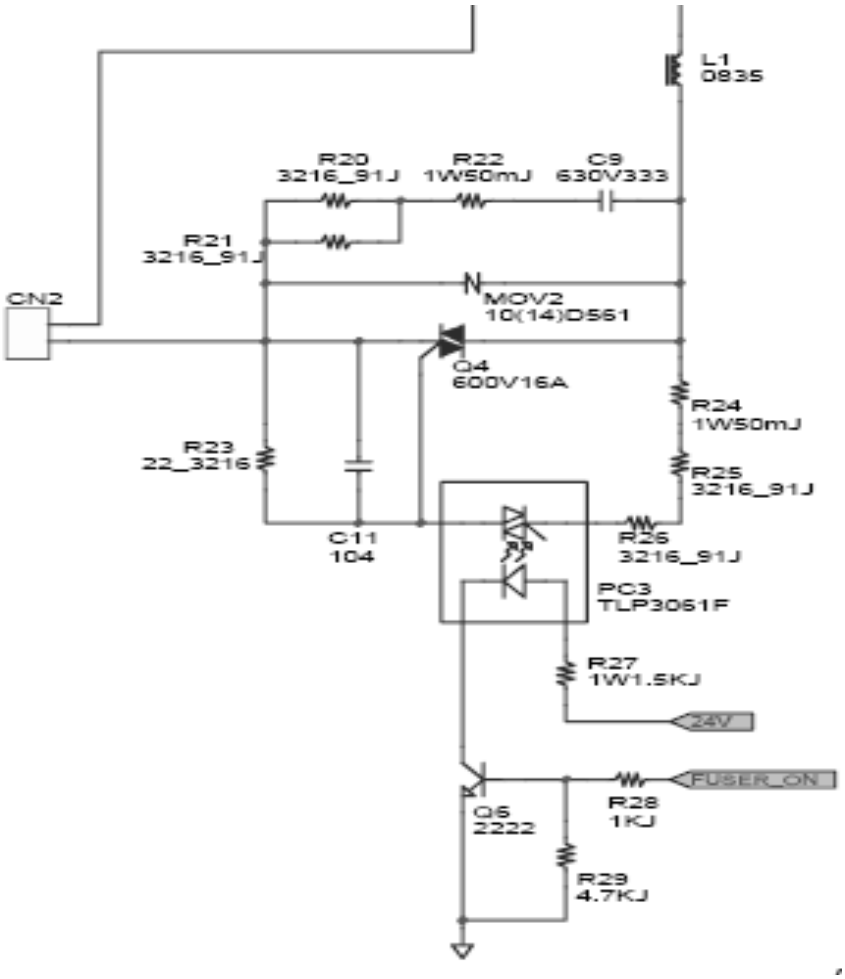
3. 24V Output Part



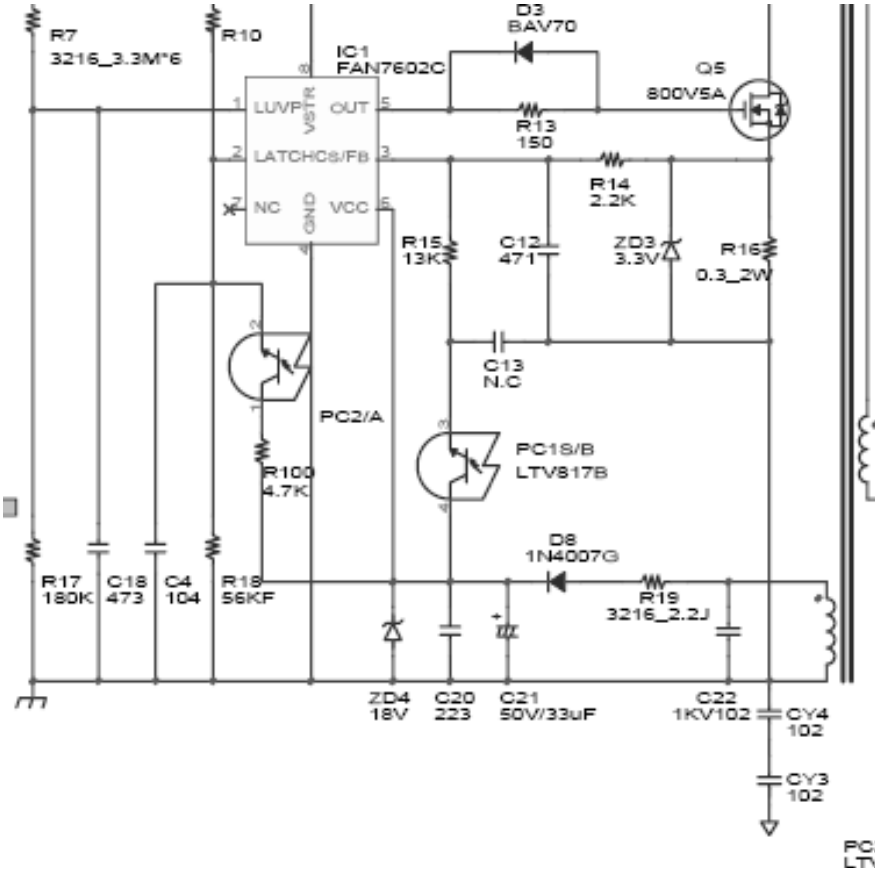
4. 5V Output Part



5. AC Drive Section

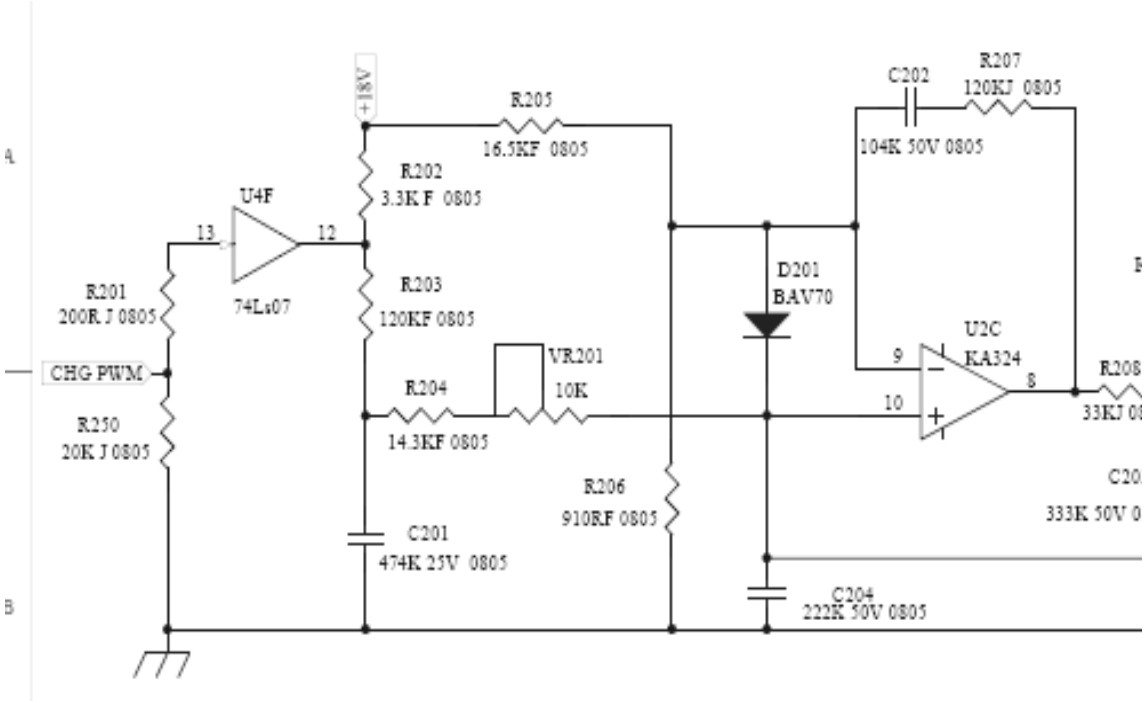


6. Switching Part

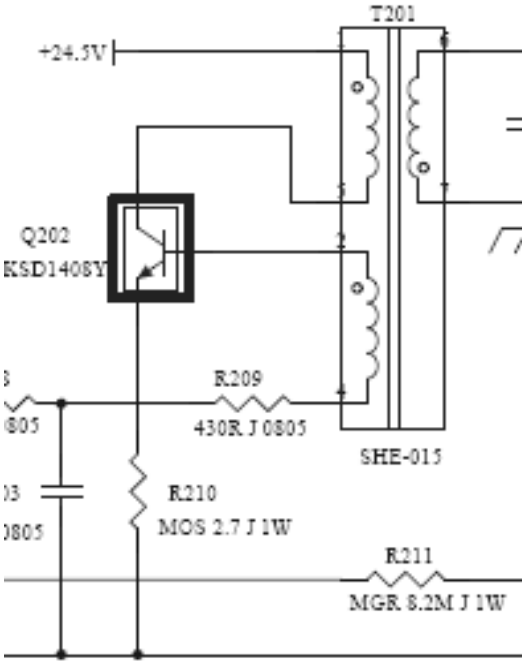


Circuit Diagram-HVPS Input Section

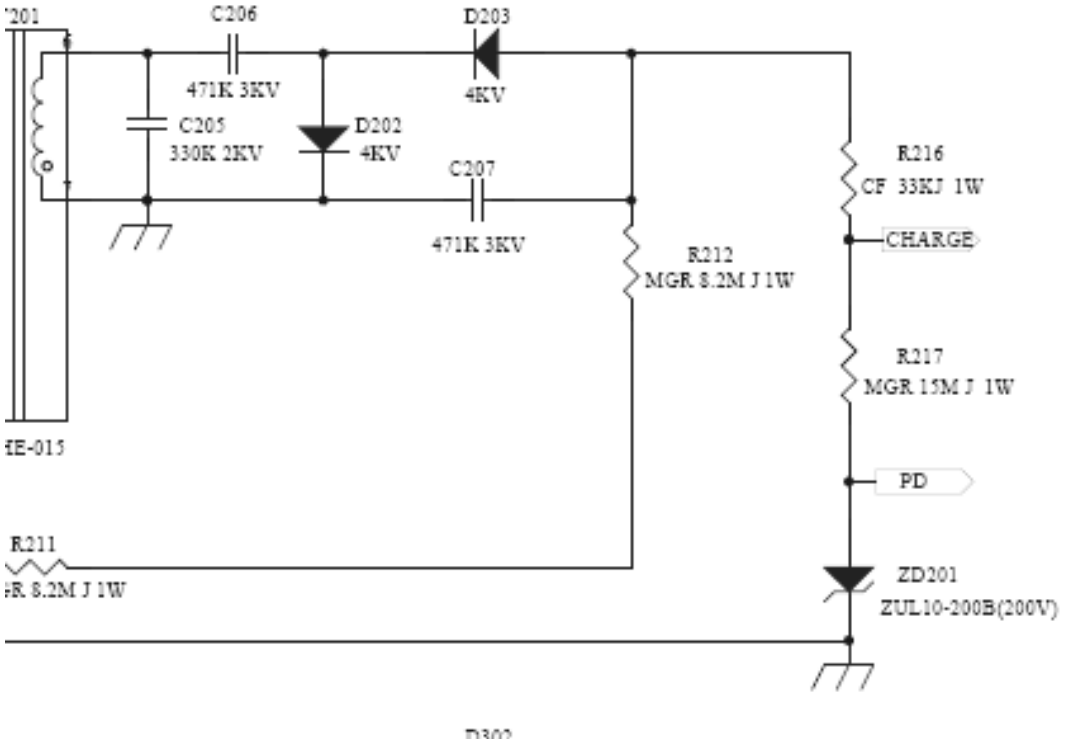
1. PWM Input Section



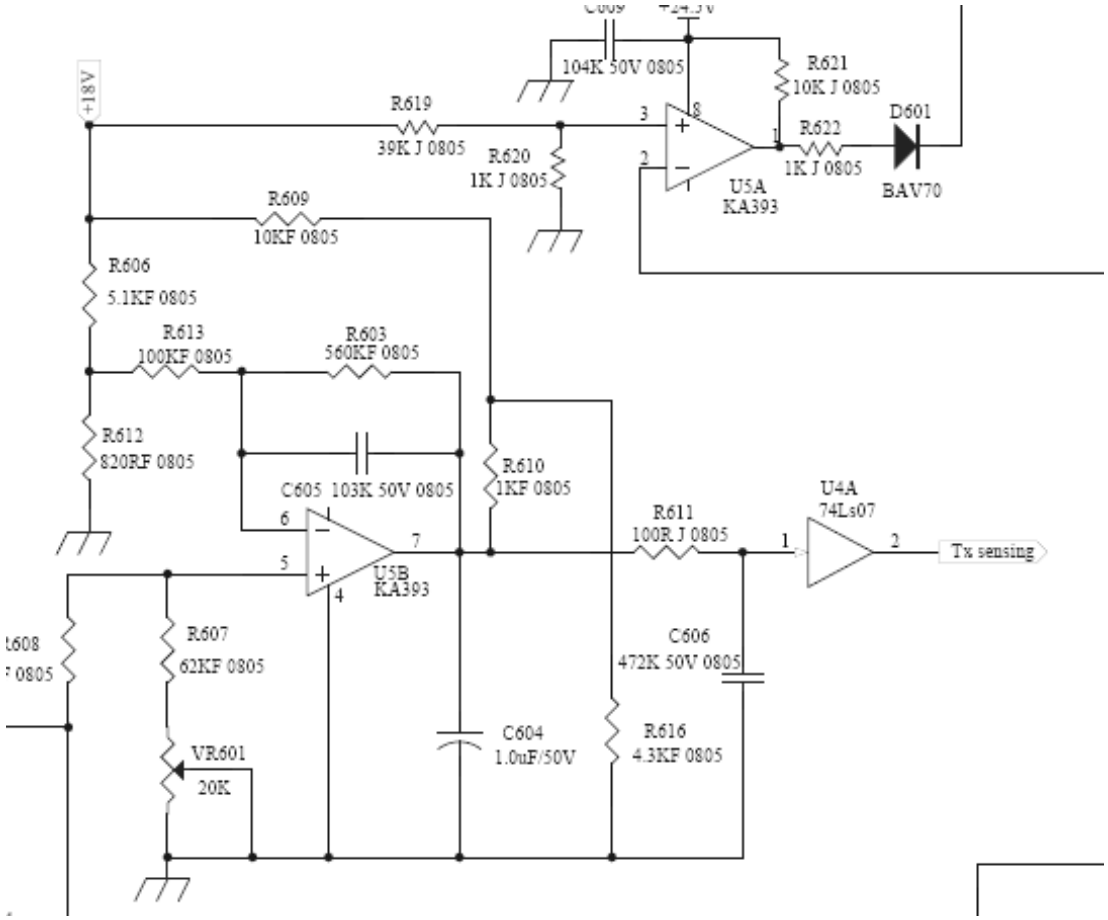
2. RCC Control drive section



3. High Voltage Output



4. TX-Sensing Part



Replacement and Adjustment

Before Starting

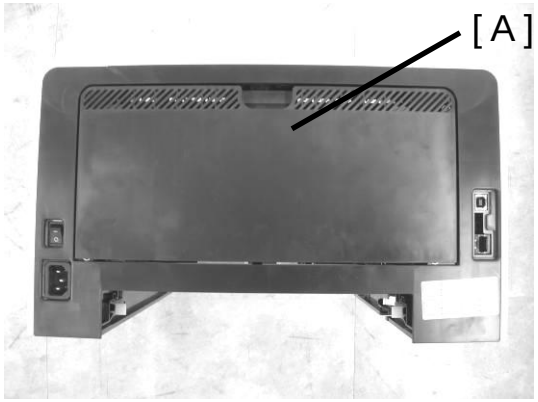
⚠CAUTION

Before installing options, please proceed with the followings:

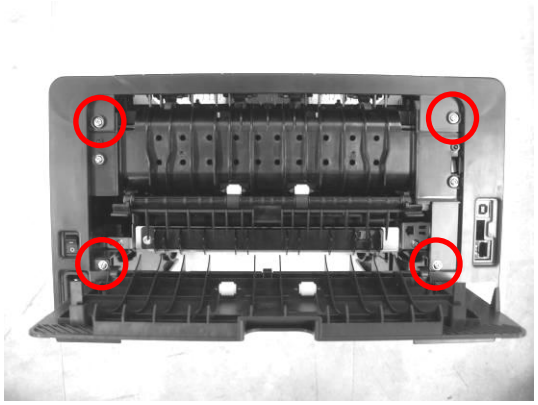
- If there are any printing jobs, print all jobs in the printer buffer out.
- Turn the main power switch off and remove power cord and network cable from the machine.
- Be careful not to lose bolts when disassembling and see harness path to handle paths identical when reassembling.
- Assembly should be in reverse order of disassemble.

Exterior Cover

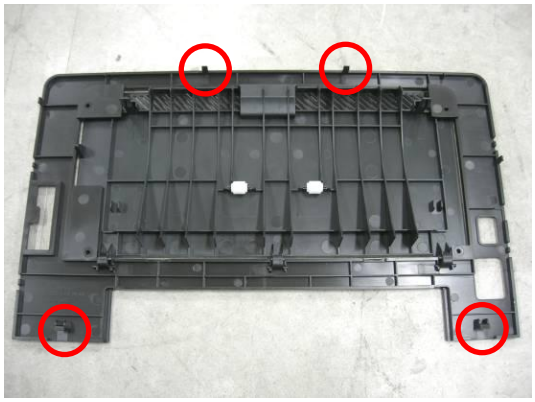
Rear Door and Cover



1. Open the rear door [A].



2. Remove 4 bolts and pull it out forward to remove the back door and cover from main body.

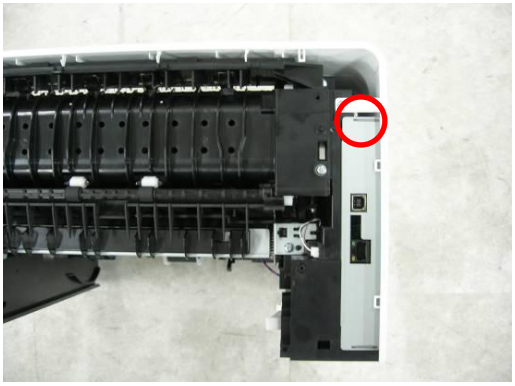


⚠CAUTION

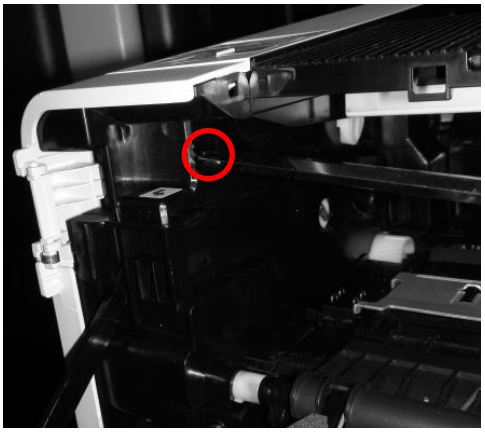
- When removing rear cover from the main body, be careful not to damage 4 hooks inside the cover.

Left Cover

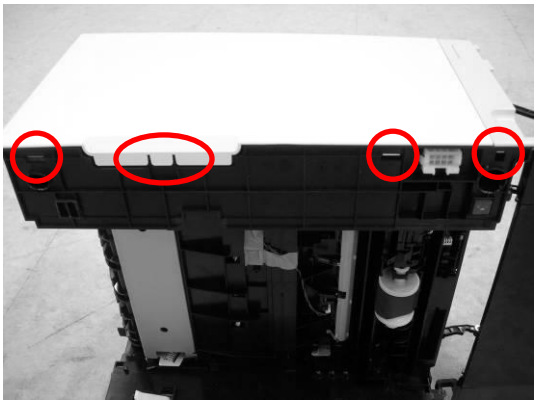
1. Remove rear door and cover from the main body.
2. Remove the bolt in below figure.

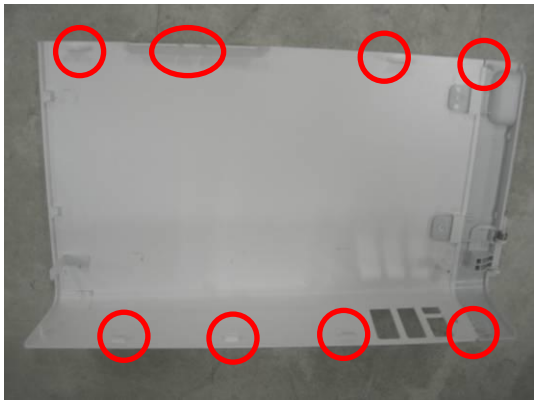


3. Open the front cover, remove toner cartridge and screw on inside left.



4. Unlock 4 hooks at the bottom of the machine and lift the cover up to remove it from the machine.





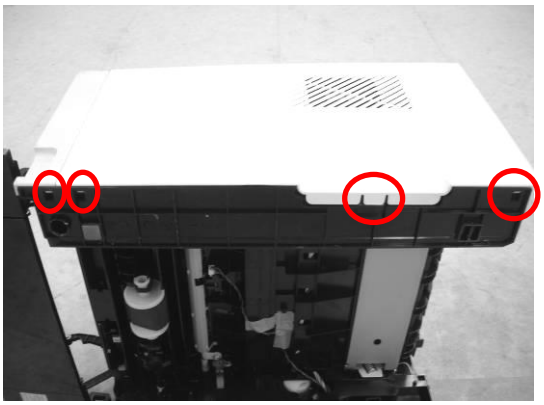
⚠CAUTION

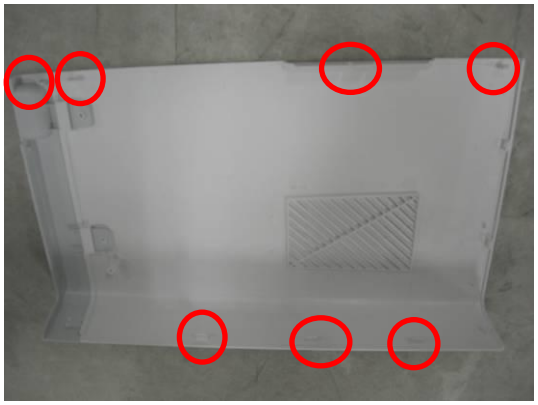
- Be careful not damage 8 hooks inside the cover when removing the left cover.

Right Cover

1. Remove rear door and cover from the main body.
2. Remove 1 screw on the inside right.

3. Unlock 4 hooks at the bottom of the machine and lift the cover up to remove it from the machine.

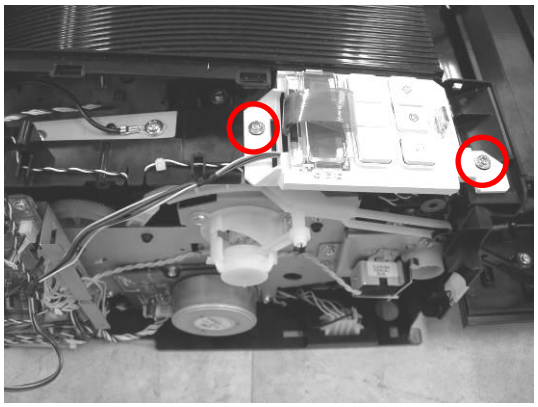




⚠CAUTION

- Be careful not damage 7 hooks inside the cover when removing the right cover.

Control Panel

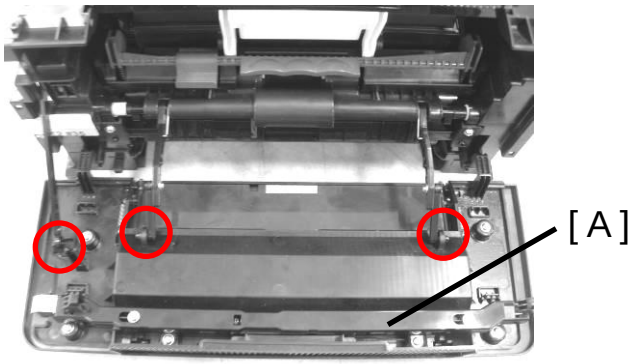


1. Remove the rear cover and open the front door.
2. Remove the left cover.
3. Remove 2 bolts at the top and bottom of Control Panel and the harness connected to the CN30 connector on main board and remove Control Panel from the frame.

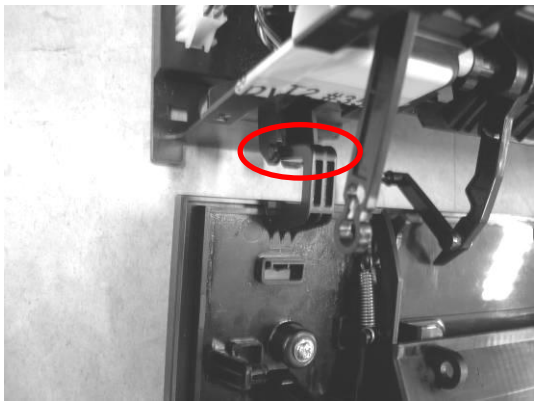
⚠CAUTION

- Be careful not to disconnect harness wires when removing the harness from the connector.
- Be careful not to damage flat harness on Control Panel.
- Refer to the harness path to main board to reassemble.

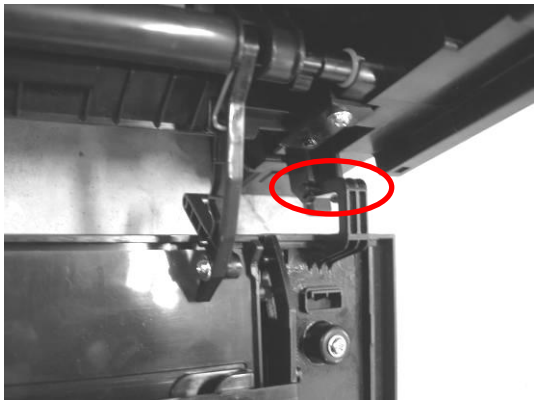
Front Door



1. Open the front door [A].
2. Unlock 3 hooks on the left and right to remove links.

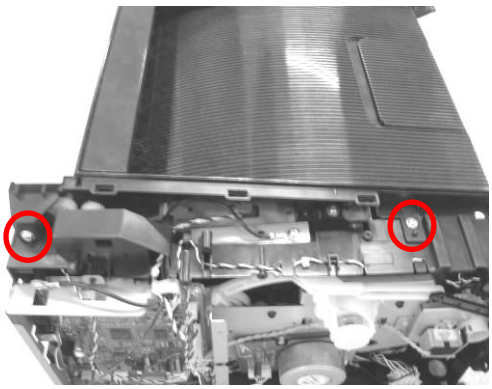


3. Push the left door hinge to the left and remove it from the frame.

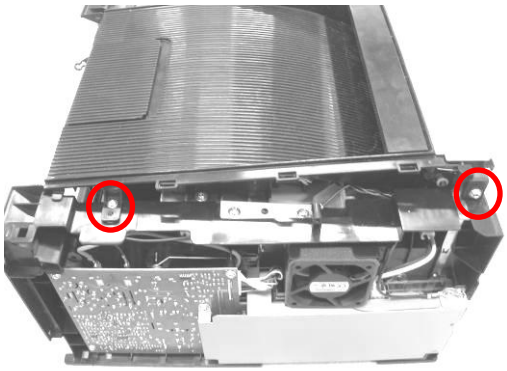


4. Push the right door hinge also to the left and remove it from the frame.
   When reassembling, push the left and right hinges to frame's right side to fixate it and connect 3 links.

Upper Cover

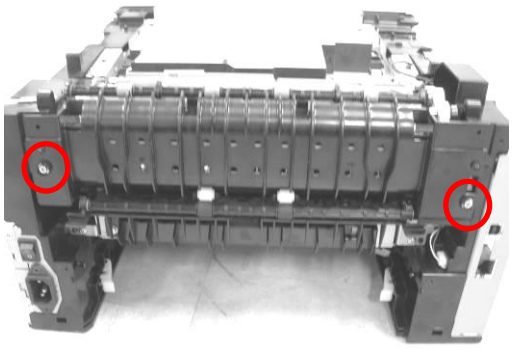


1. Remove the rear cover and the left and right covers from the machine.
2. Remove the Control Panel.
3. Remove 2 bolts on the top left of the frame.



4. Remove 2 bolts on the right of the frame and lift the upper cover up to remove it from the machine.

Paper Delivery Cover



1. Remove the rear cover.
2. Remove 2 bolts on the left and right side on the frame and pull it forward to remove the paper delivery cover from the machine.

Laser Optics

⚠WARNING

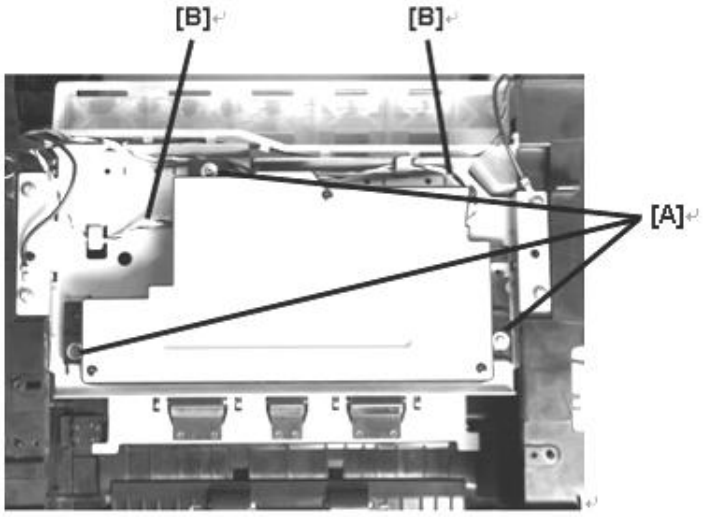
- Before starting any procedures in this section, turn the main power switch off and remove the power cord. If not, your eyes can seriously be injured by the laser.

Laser Unit Removal

⚠CAUTION

- Make sure that main power switch is turned off and power cord is pulled out from the outlet before disassembling or adjusting the laser unit.

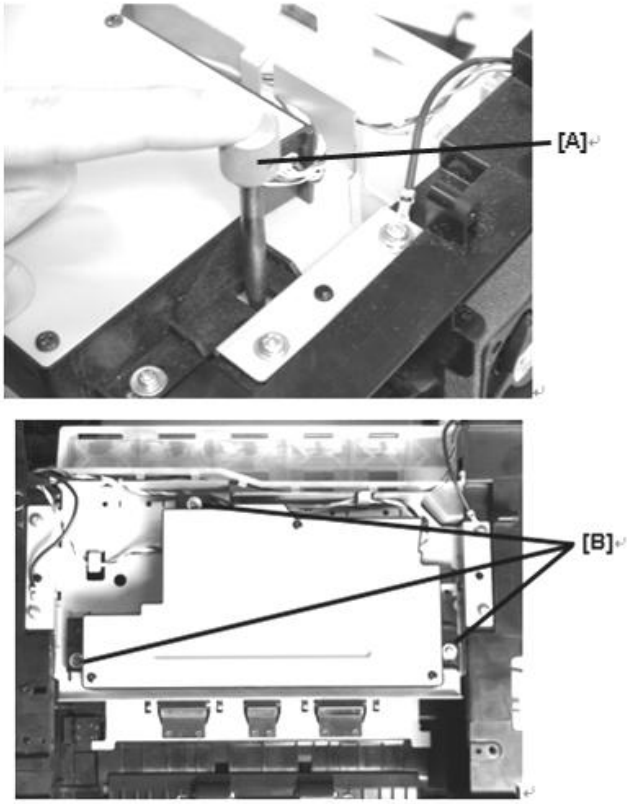
1. Open the front door
2. Remove the rear cover
3. Remove left and right covers
4. Remove the upper cover.
5. Remove 3 screws [A] on the laser unit.



6. Remove the laser unit from the frame.
7. Remove the laser unit cables [B].

Installing Laser Unit

1. Connect the laser unit cables.
2. Before tightening the laser unit with screws, use skew JIG [A] to position the laser unit and tighten 3 screws [B].



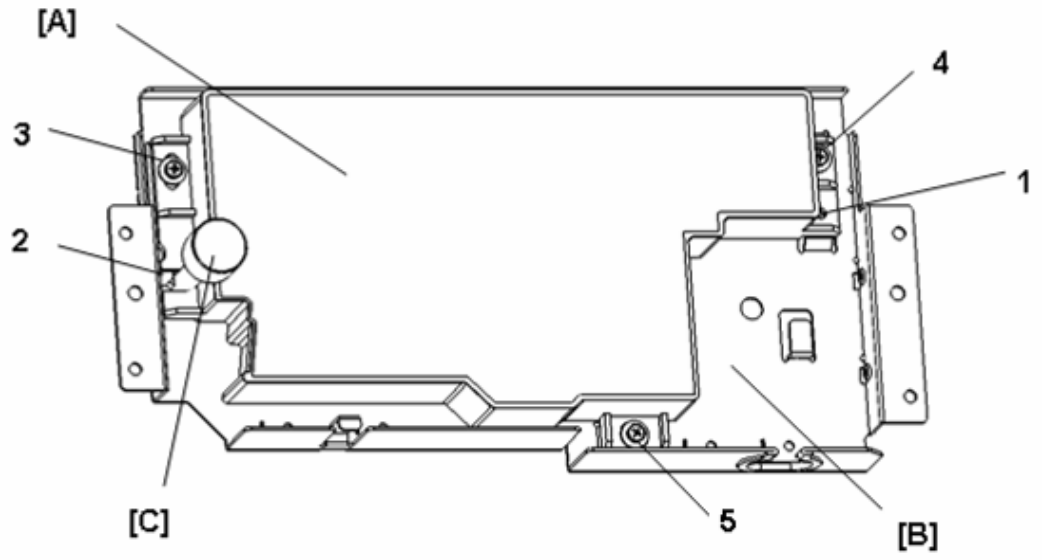
⚠CAUTION

When re-installing the laser unit, check the laser unit's alignment and proceed with the "Laser Unit Adjustment" before the upper cover installation.

Laser Optical Housing Unit Alignment

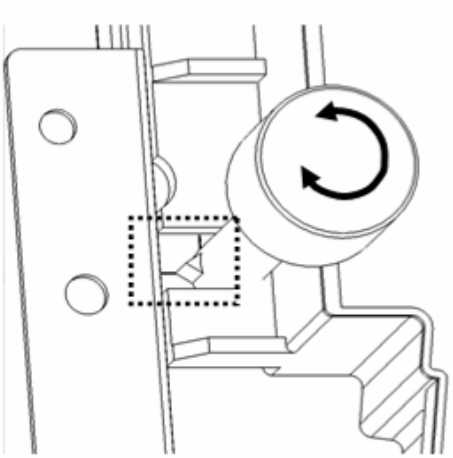
When replacing the laser unit with a new one, please proceed with following procedures to align the laser unit.

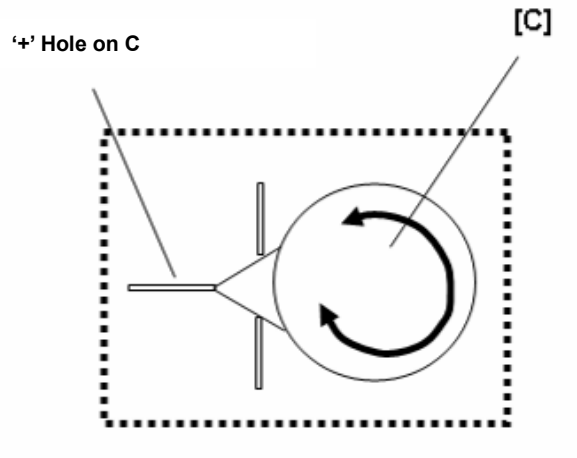
<How to assemble LSU>



A : LSU unit	C : Assembly knob (cam format)
B : BLACKET STAY : LSU	

1. Put ‘1’ hole on ‘A’ to ‘1’ EMBO shape on ‘B’
2. Put bump on ‘C’ floor through ‘2’ shape on ‘A’ to ‘2’ hole on B
3. Rotate ‘C’ to circumferential direction to match the end of the arrow on the bottom of ‘C’ with ‘+’ hole around ‘2’ hole on B.

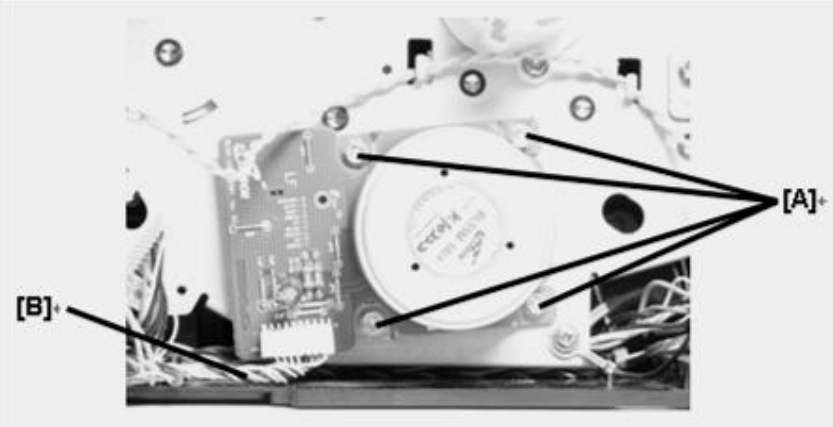




4. Lock a washer bolt on ‘3’ position.
5. Lock a washer bolt on ‘4’ position.
6. Lock a washer bolt on ‘5’ position.
7. Remove ‘C’.

Main Driving Motor

1. Remove the rear cover and left cover.
2. Remove 4 main driving motor supporting screws [A]
3. Remove the cable [B] on main driving motor.



4. Remove the main driving motor.

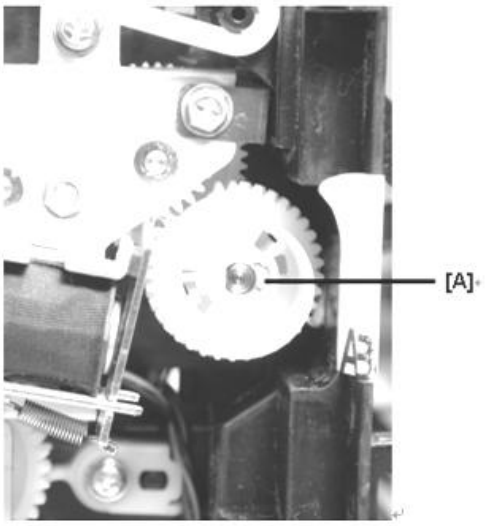
Main Driving Gear Unit

Main Driving Gear Unit Removal

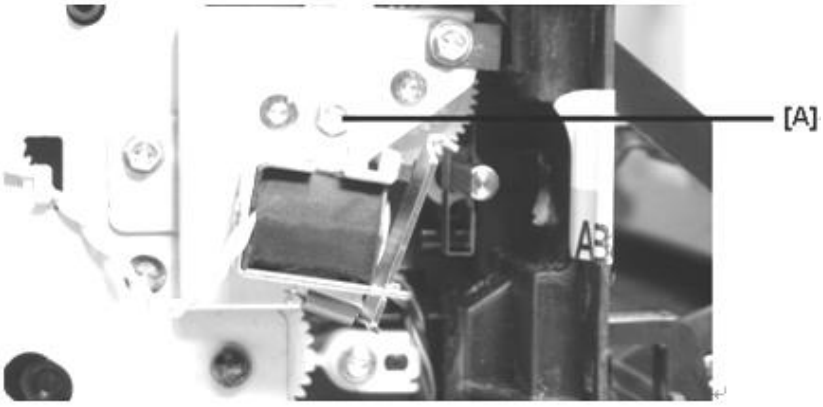
1. Remove system card and internal shield and front cover link.
2. Remove the rear cover and left cover.
3. Remove the main board.
4. Remove the main driving motor.
5. Unlock the hook [A] on MPT driving gear spindle and remove gears

⚠CAUTION

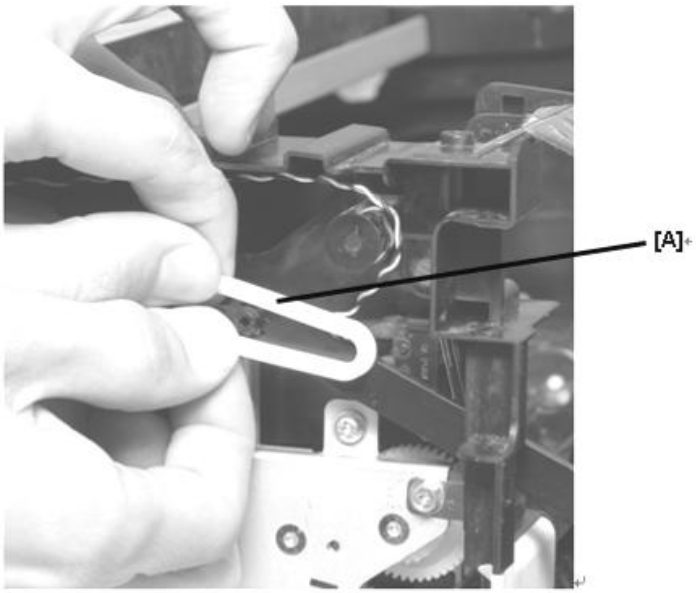
When removing the gear fix hook, be careful not to damage or alternate it.



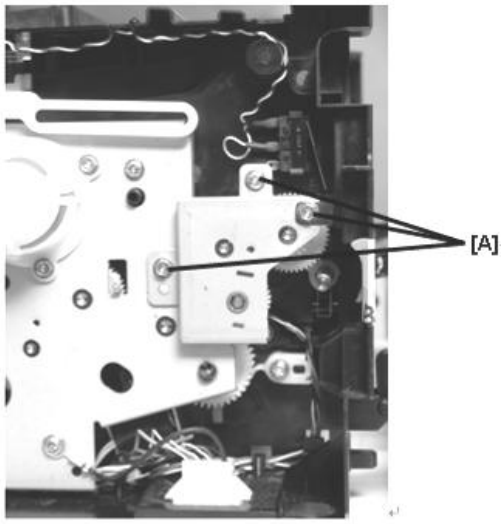
6. Remove the screw [A] on MPT solenoid.



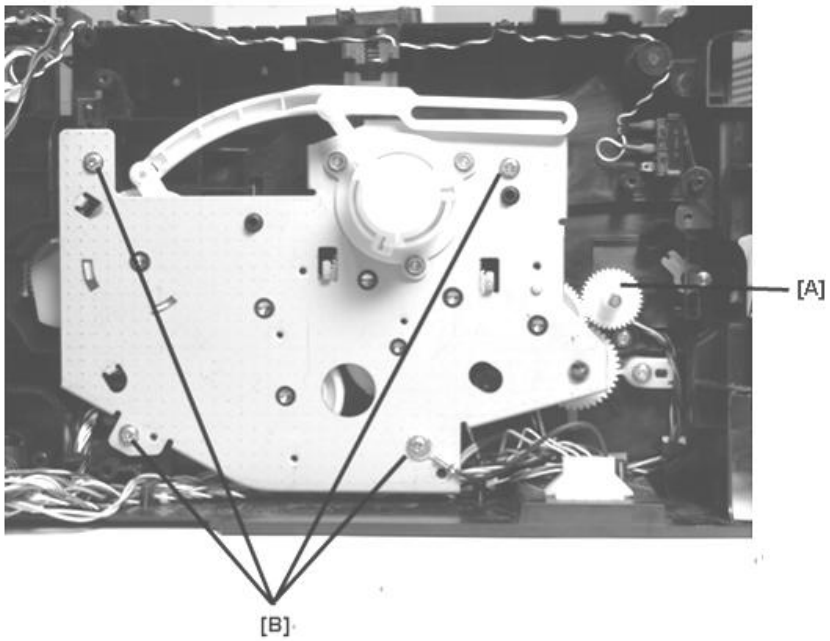
7. Remove the solenoid.
8. Spread the center of the link hook [A] connected to front cover to unlock the link.



9. Remove 3 screws [A] on the sub-bracket.



10. Remove the sub-bracket.
11. Remove link gear [A] and 4 screws [B] on main driving gear.



12. Lightly pull the main driving gear unit to remove it from the frame.

⚠CAUTION

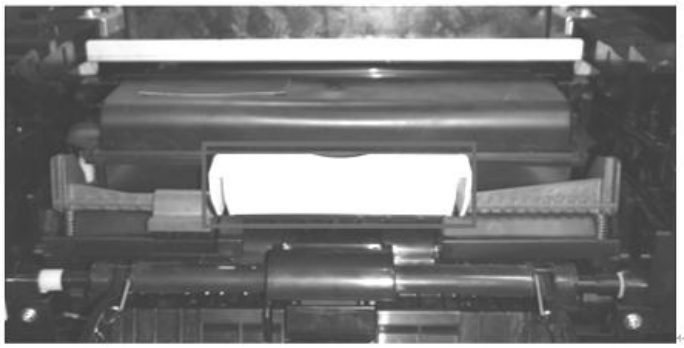
When removing the main driving gear unit, make sure not to drop it and not to cut the cables.

Re-assembly should be in reverse order of disassemble.

Drum and Development Unit

Removing Image Cartridge from the Main Body

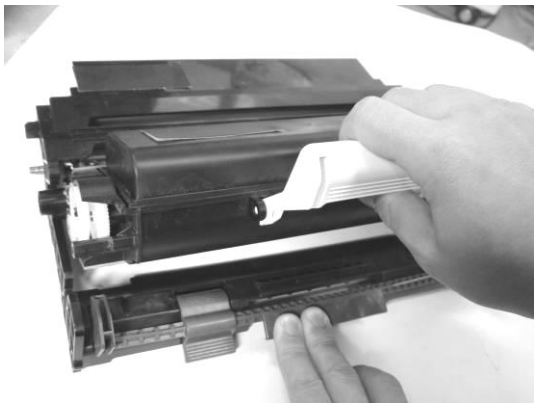
1, Open the front cover of the machine.



2. Hold the development unit handle and pull it upward to remove it.

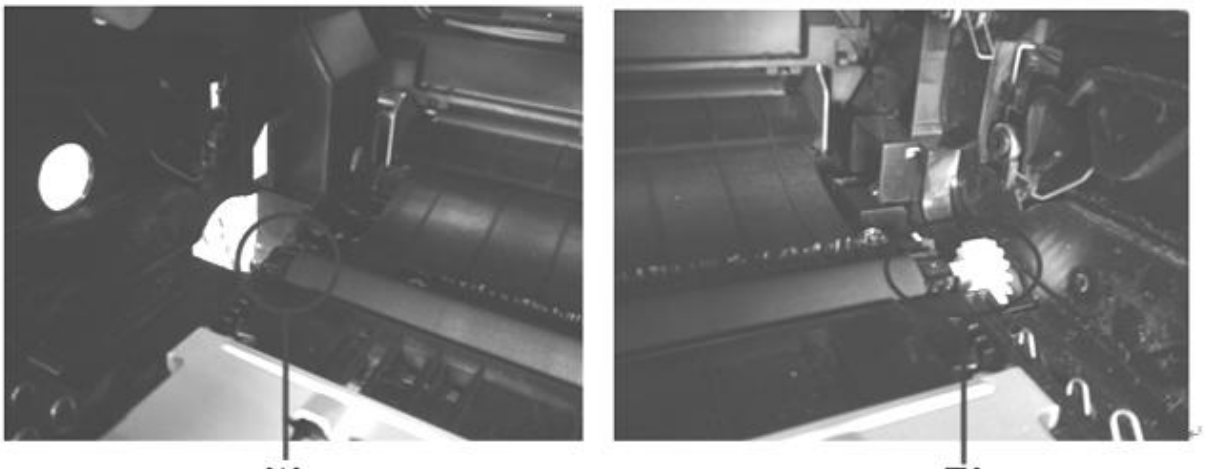
Separating Drum Unit and Development unit

1. Press and hold the [A] development unit pressure release lever down and hold [B] handle.
2. Pull the development unit obliquely upward and remove the drum unit.



Transfer Roller

1. Remove the front door.
2. Remove the image cartridge.
3. Unlatch the left bushing latch on transfer roller and pull it up.
4. In the same manner, unlatch the right bushing latch and lift it up to remove the transfer roller.



⚠CAUTION

When disassembling, be careful not to touch the transfer roll.

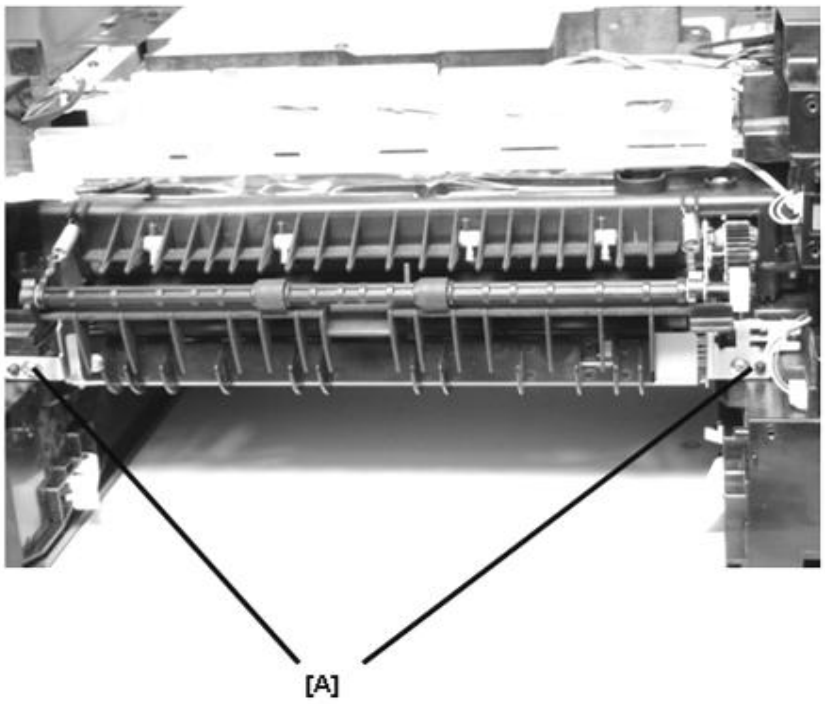
Fixing Unit

Fixing Unit Removal

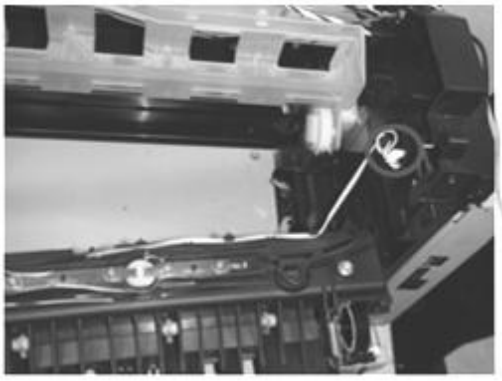
⚠CAUTION

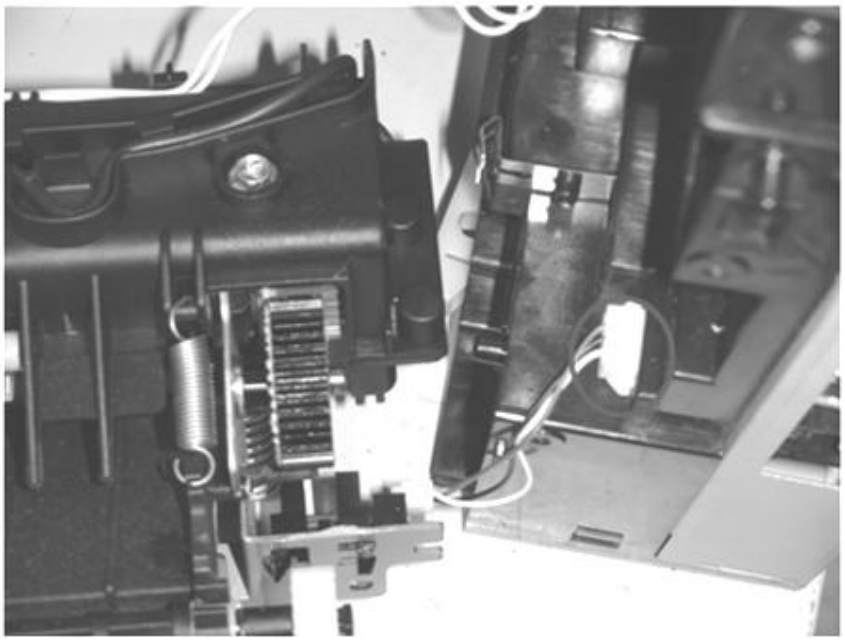
- Before proceeding with any procedures in this section, turn the main power switch off and wait until the Fixing Unit cools down. You can get burn from the fixing unit.
- Turn the main power switch off.

1. Open the front door
2. Remove the rear cover.
3. Remove 2 screws [A].



4. Separate 3 connectors in red circles.



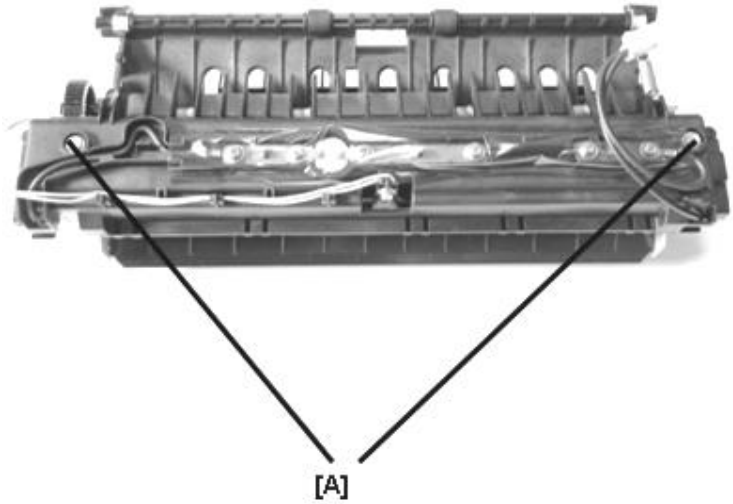


5. Remove fixing assembly from the machine.

Assembly should be in reverse order of disassemble.

Fixing Lamp

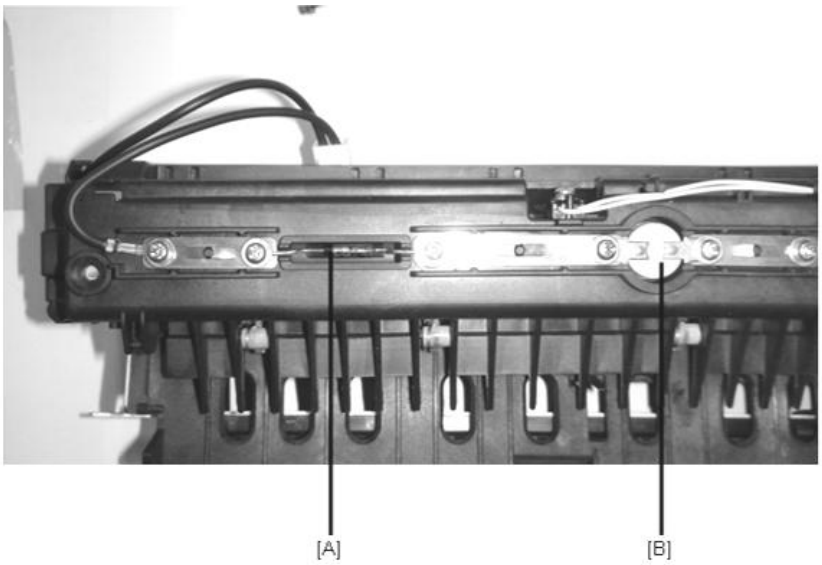
1. Open the front door
2. Remove the rear cover.
3. Remove fixing assembly from the machine.
4. Remove 2 screws [A] to remove the 2 removed fixing assembly side covers.



5. Remove the cover and unscrew 2 screws fixing the Fixing Lamp.

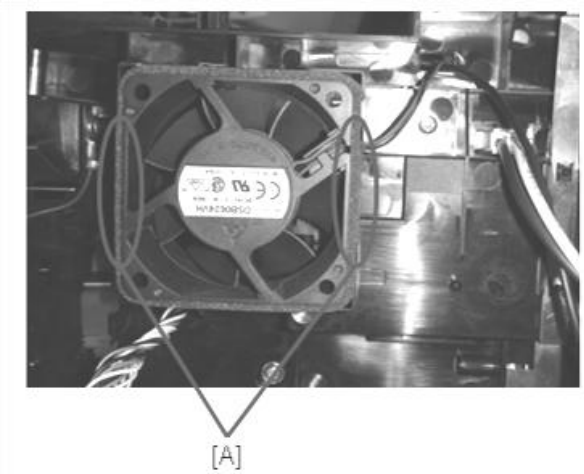
Thermostat and Fuse

1. Open the front door and remove rear cover.
2. Remove the fixing assembly.
3. [A] : Fuse, [B]: Thermostat



Cooling Fan

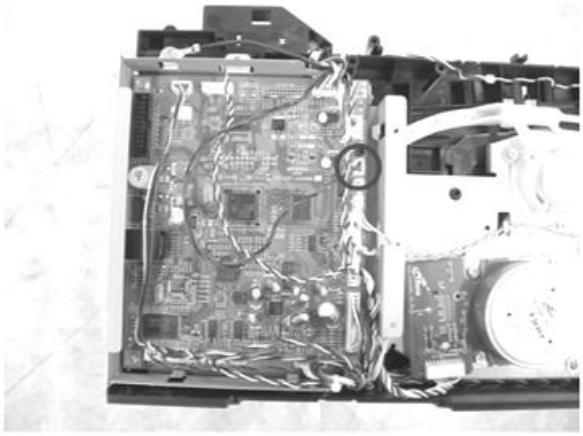
1. Open the front door and remove left and right covers from frame.
2. Remove the upper cover.
3. Hold the [A] part on the cooling fan and remove it from frame.



⚠CAUTION

When reassembling the cooling fan, make sure to have correct left and right sides.

4. Remove the cooling fan harness connected to CN25 connector from system card.

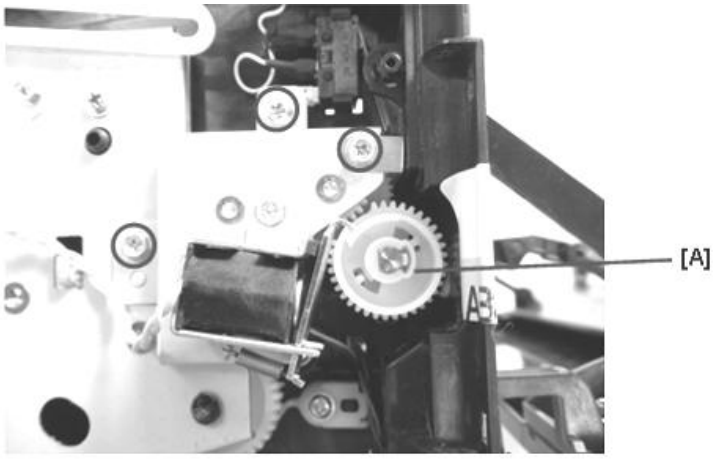


Paper Feed

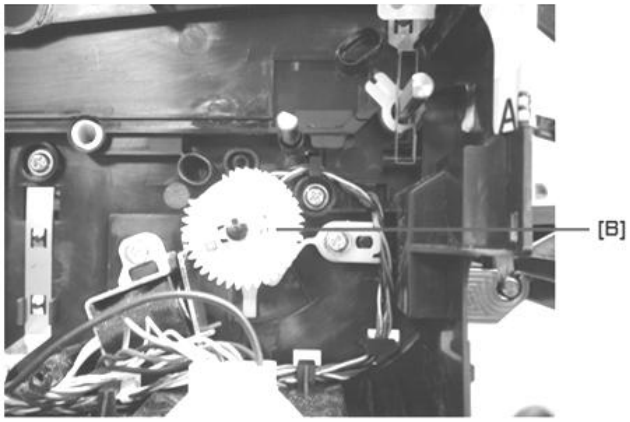
Separating Main Feed Roller

1. Open the front door and separate the link.

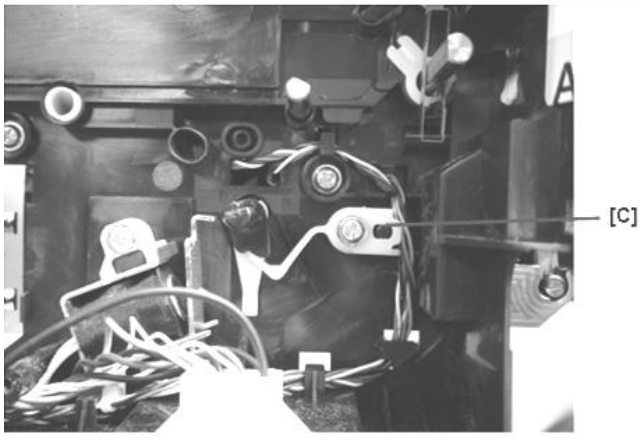
2. Remove the left cover.
3. Remove 3 screws to separate segment gear [A] and bypass solenoid a’ssy.



4. Remove the driving gear a’ssy.
5. Remove the segment gear [B] contacting with feed solenoid.

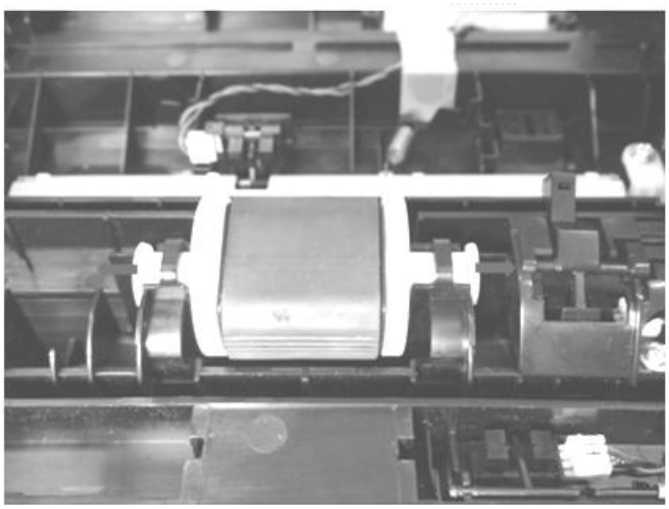


6. Remove pickup shaft holder [C].



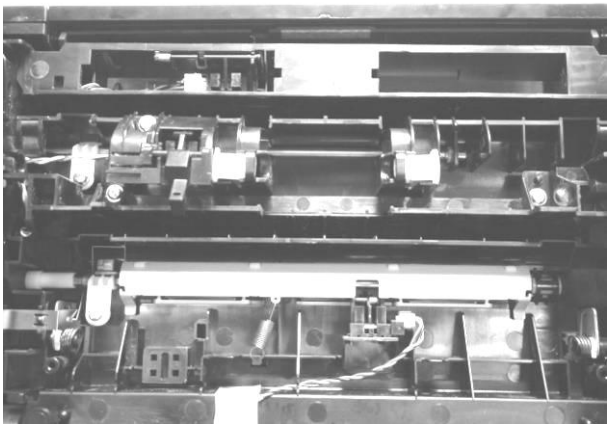
7. Turn the bushing holding the pickup shaft to the machine to the right to remove.

8. Push the bushings on both ends of pick roller frame to remove the pickup roller.



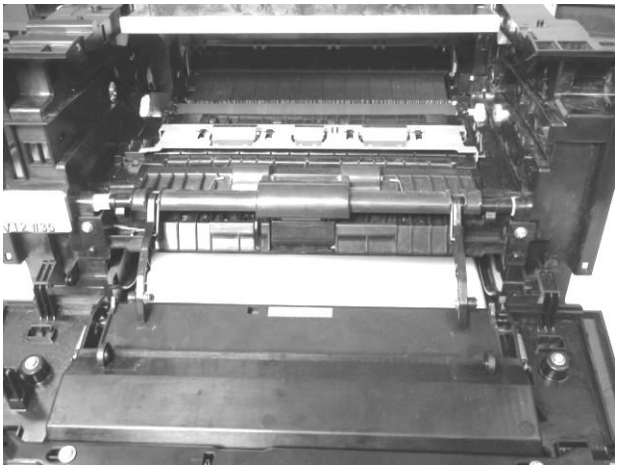
Paper Detection Sensor

1. Separate the feeder and remove one screw at the bottom of the machine to remove it.



Multipurpose Tray (MPT)

1. Open the front door and disconnect the link connected with the machine.
2. Push the front door to the left to remove it from the machine.

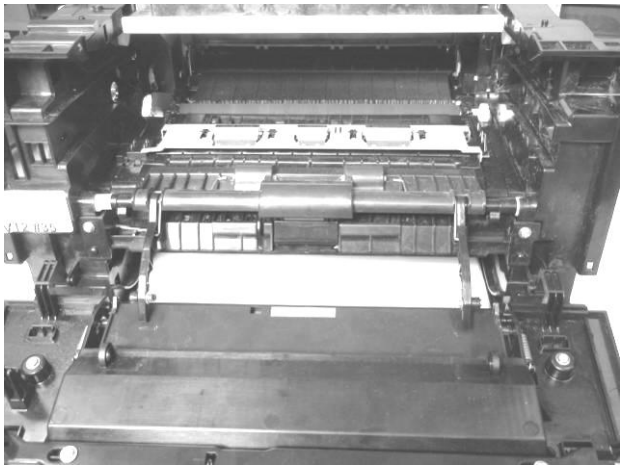


3. Remove 2 screws to separate door open shaft.

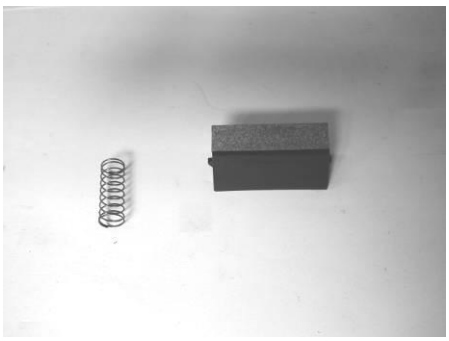
4. Separate MPT from the front door hole.

MPT’s Bottom Body A’ssy Friction Pad Replacement

1. Open the front door and remove 2 screws.
2. Separate the harness connected to the left paper detection sensor.



3. Separate MPT’s bottom body a’ssy to replace friction pad a’ssy.

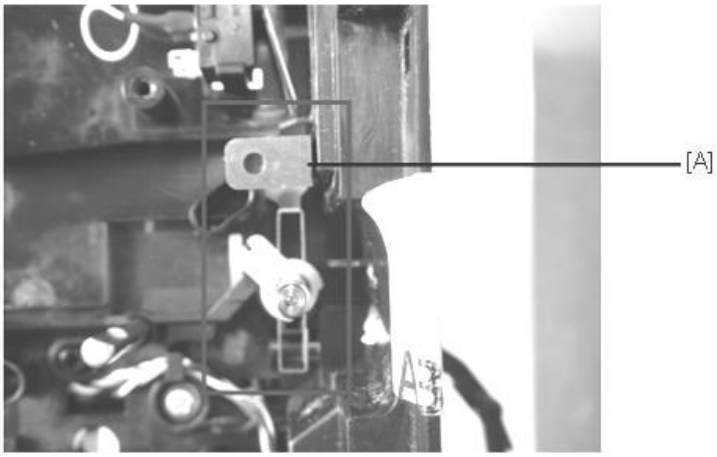


MPT Paper Detection Sensor Removal

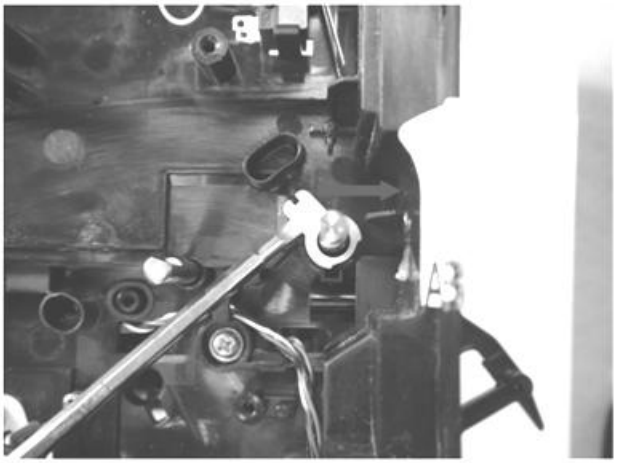
1. Separate MPT’s bottom body a’ssy.
2. Remove the hook on the side of friction pad to remove MPT paper detection sensor.

Pick Roll’s Top Body A’ssy Removal

1. Remove the front door.
2. Remove the segment gear and clutch a’ssy.
3. Remove the metal clamp [A] contacting with pick roll.

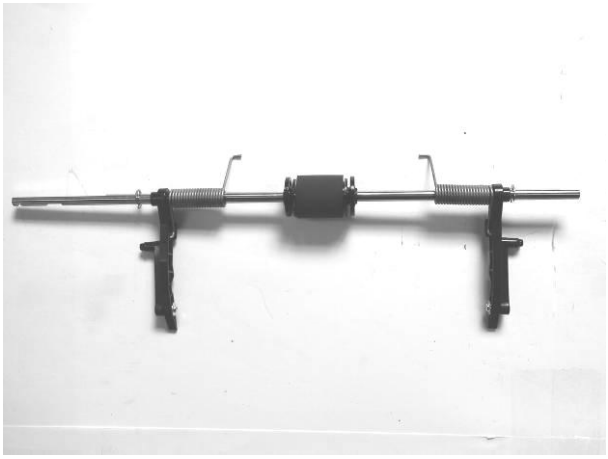


4. Remove the bushing holding the pick roll shaft to the right to 12 o'clock direction and remove it.



5. Separate top body a'ssy while pushing to the left. Separate the pick roll shaft installed on top body a'ssy hole.

6. Remove both caps on shaft ends and paper top guide and E-ring to separate arm from the shaft.



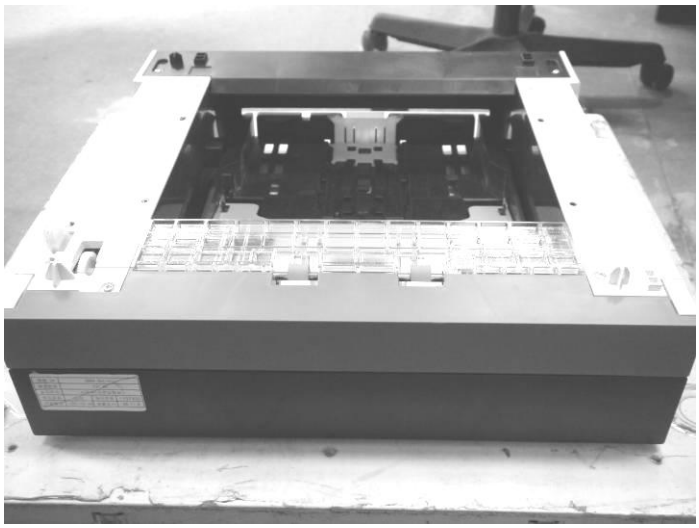
7. Pick up roller and idle roller can be removed and replaced.

Option tray Unit Cover Removal

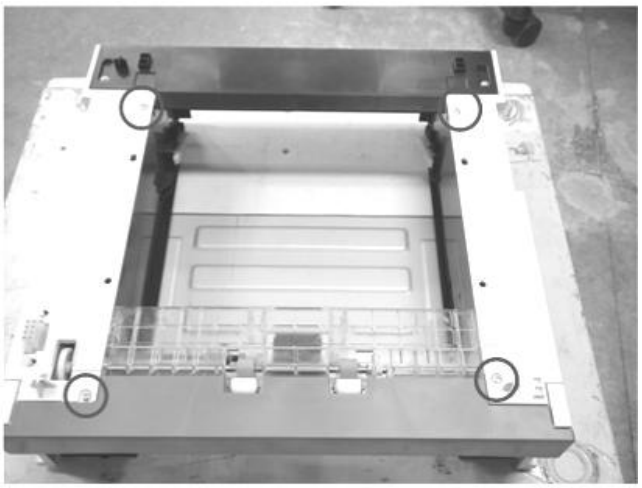
1. Take the tray cassette out and separate feeding unit from the machine.

⚠CAUTION

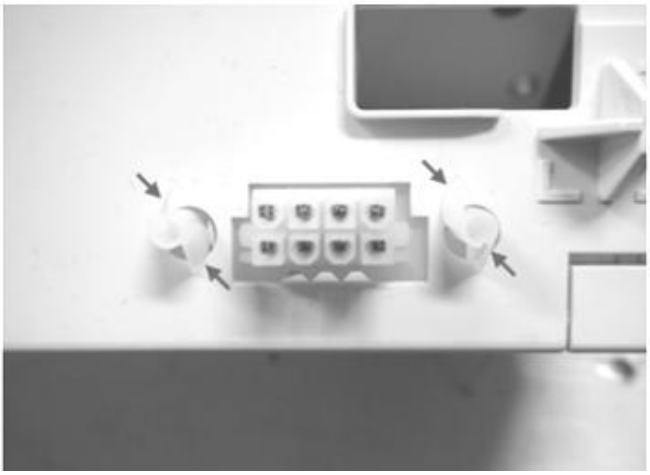
Before removing the tray unit from the machine, the machine's power must be turned off.

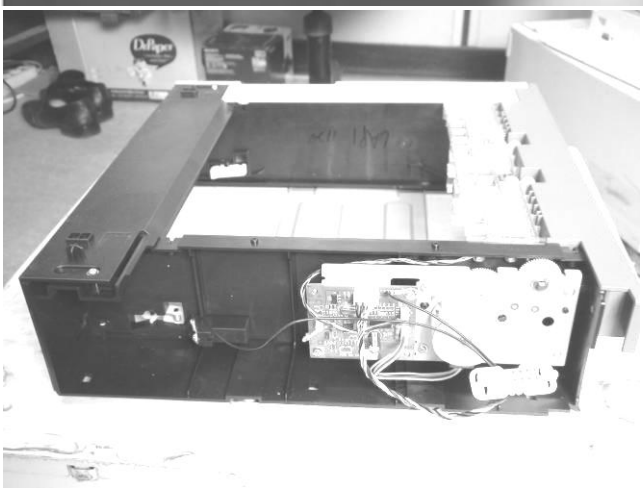


2. Separate the tray unit and remove 4 screws.



3. Separate the connector to remove the left cover. Be careful not to damage the hook inside top left cover.

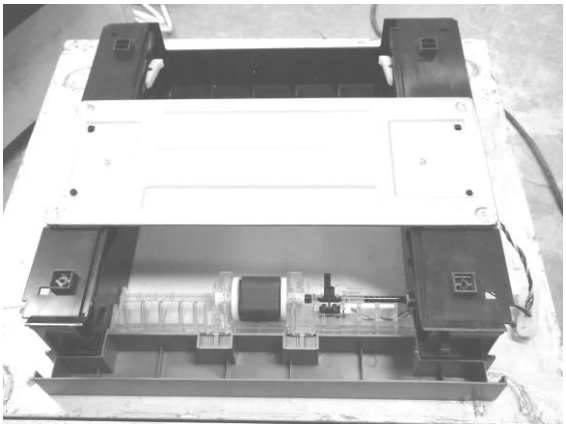




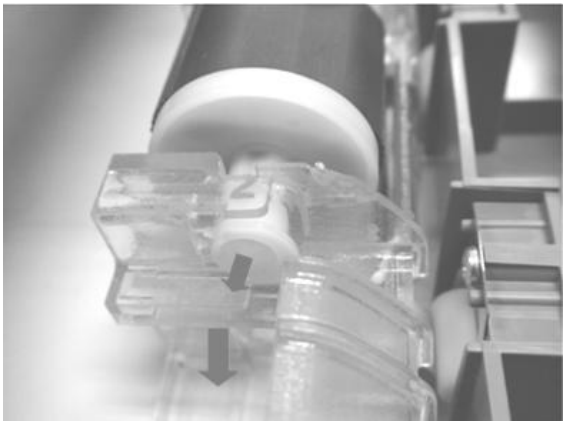
4. Separate right cover. Be careful not to damage the hook inside top right cover.

Option tray Pickup Roller Removal

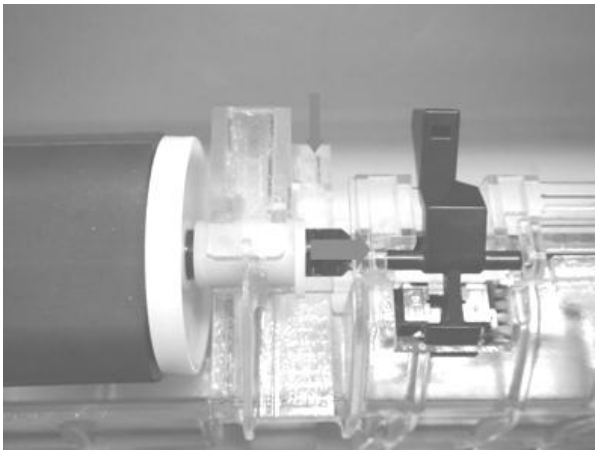
1. Flip the tray.



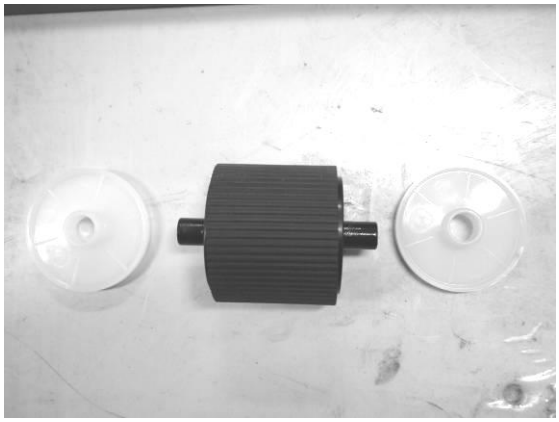
2. Push down the plastic preventing bushing separation and remove the bushing.



3. Remove the bushing on the other side with same manner.

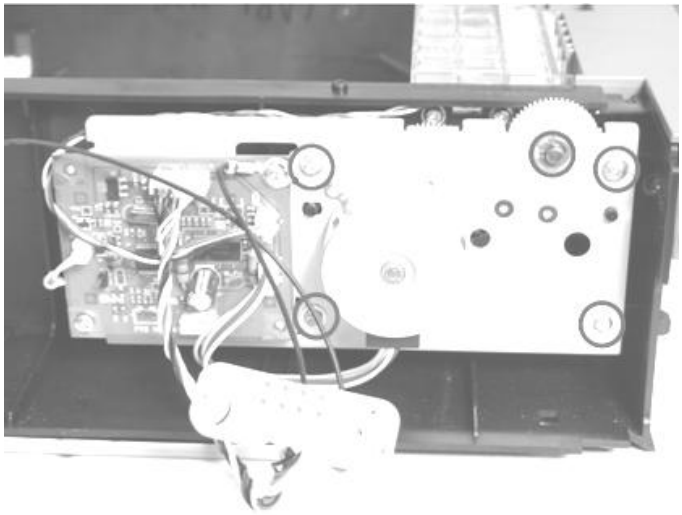


4. Disassembled Pickup Roller

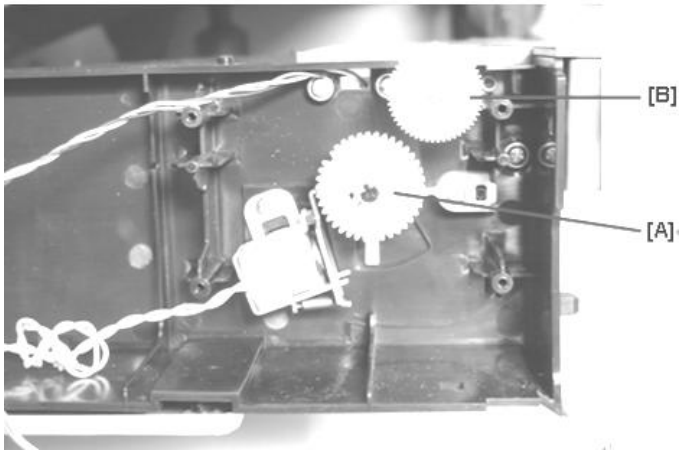


Option tray Feeding Roller Removal

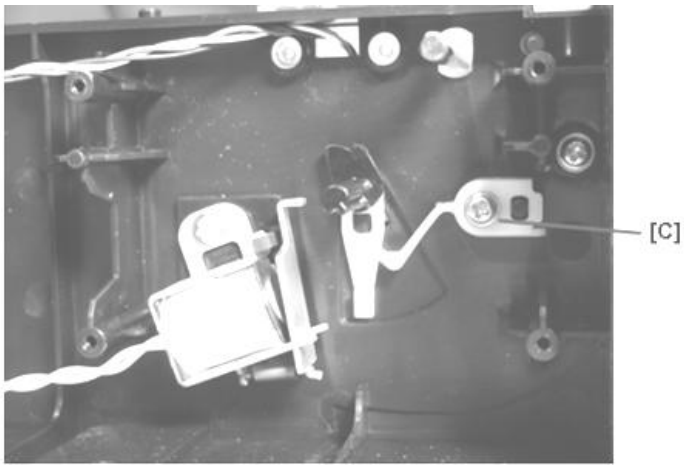
1. Remove one E-ring and 4 screws to separate left board and motor mounted bracket.



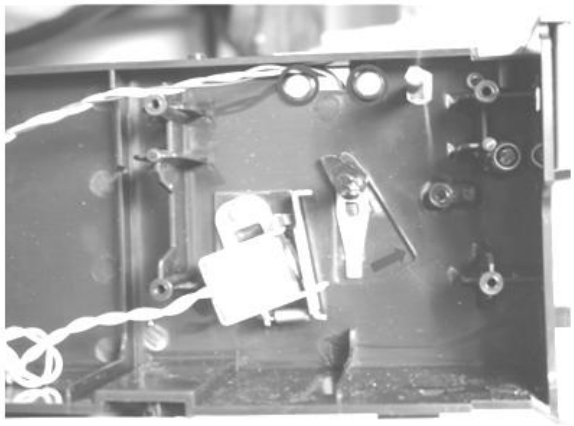
2. Remove the segment gear [A] and gear [B].



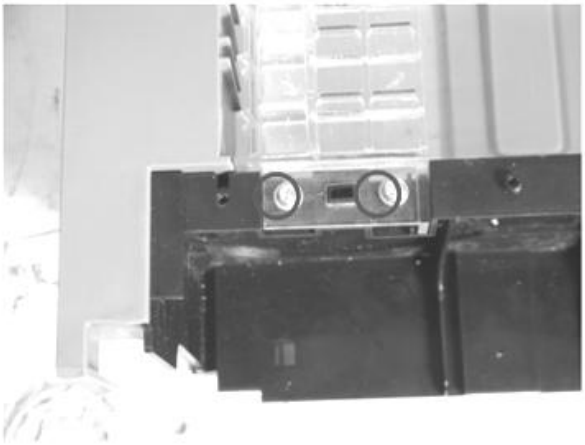
3. Remove one screw to remove pickup shaft holder [C].



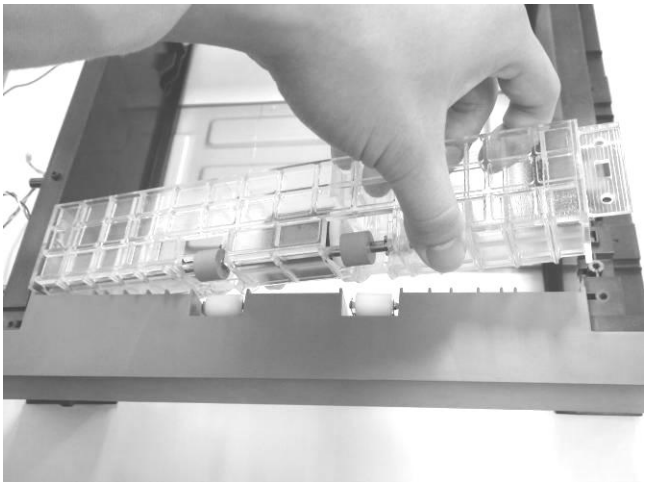
4. Rotate the pickup shaft bushing to right to remove pickup shaft and 2 screws.

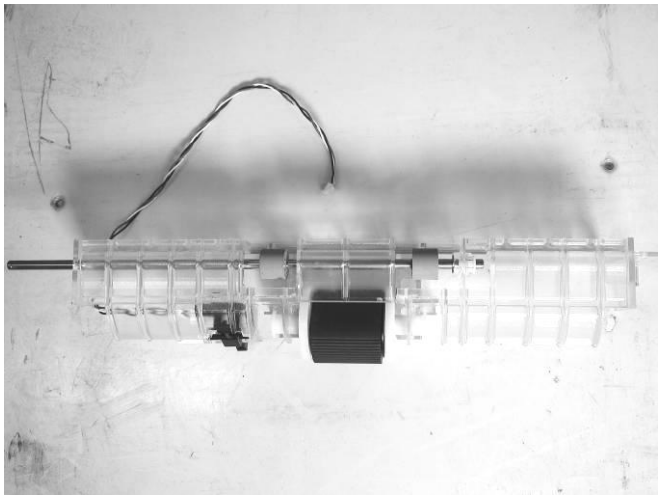


5. Remove 2 screws on the top right of pickup a’ssy.

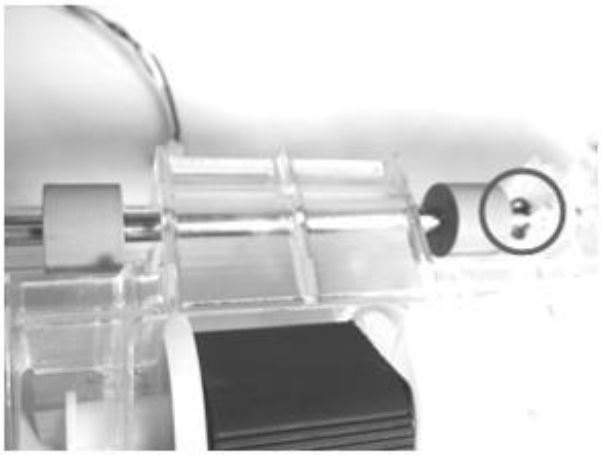


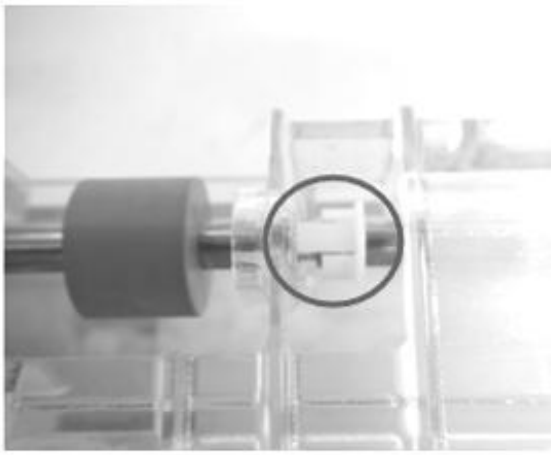
6. Separate the pickup a’ssy. Pick the right side up to remove harness through the frame hole

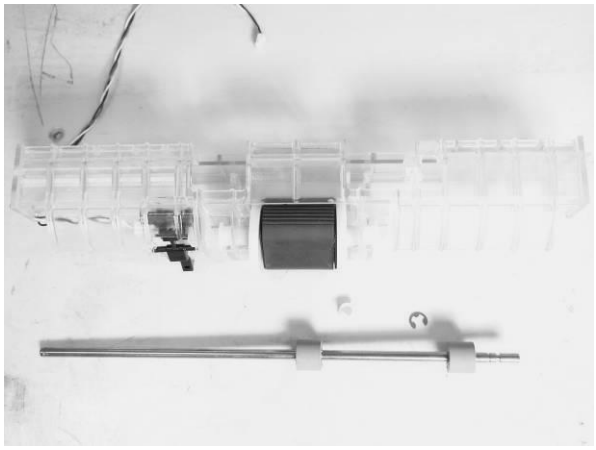




7. Remove E-ring and bushing to remove feeding roller shaft.

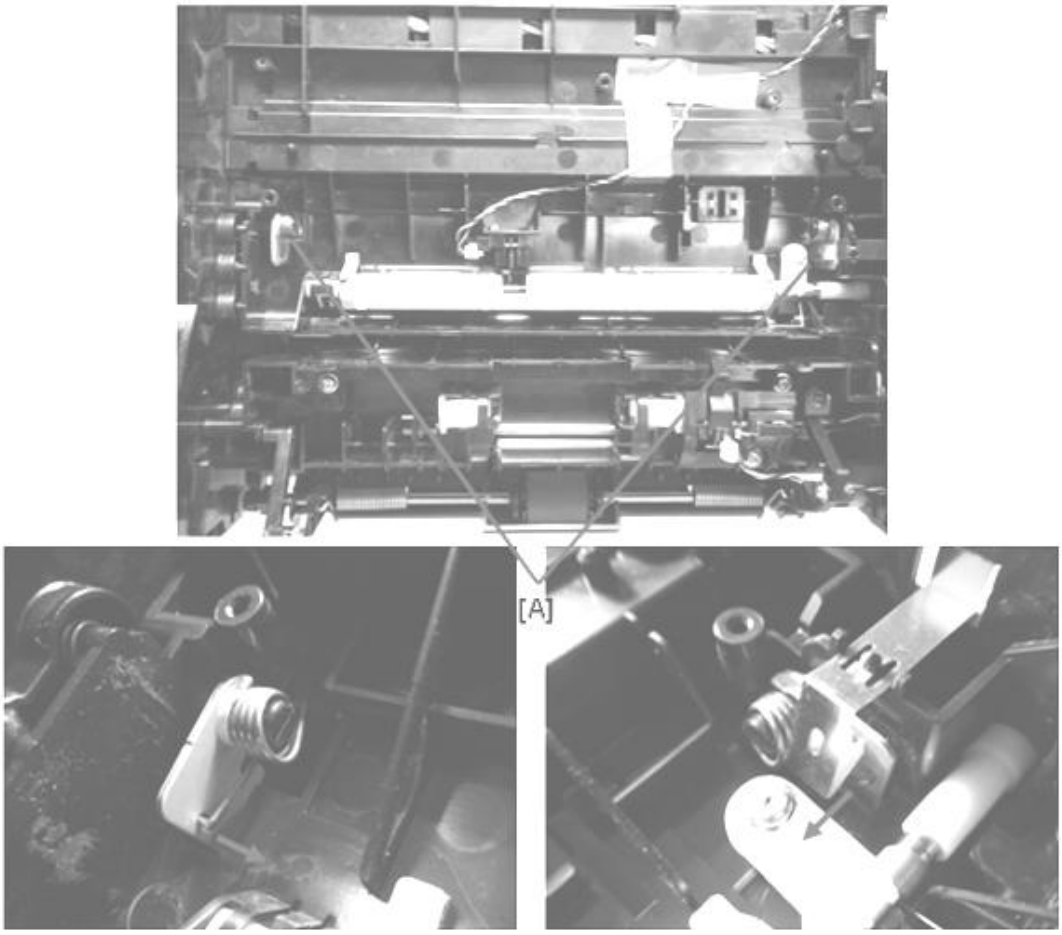




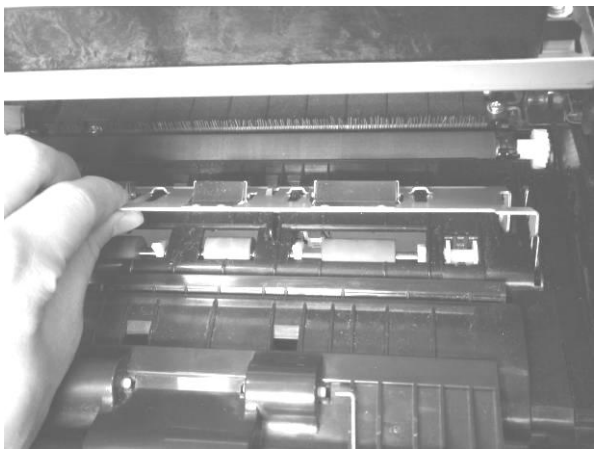


Resist Guide A'ssy

1. Remove 2 springs [A] connected to the Resist Guide A'ssy on the bottom of the machine.

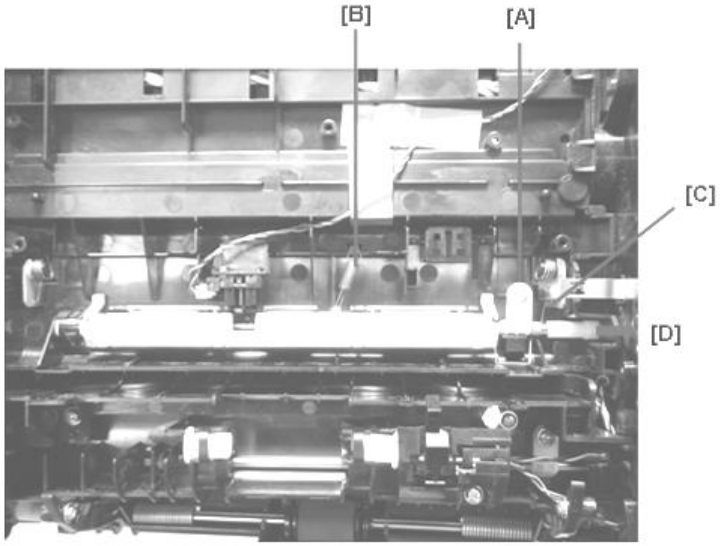


2. Tilt the Resist Guide A'ssy to 60° and pull it forward to remove it.

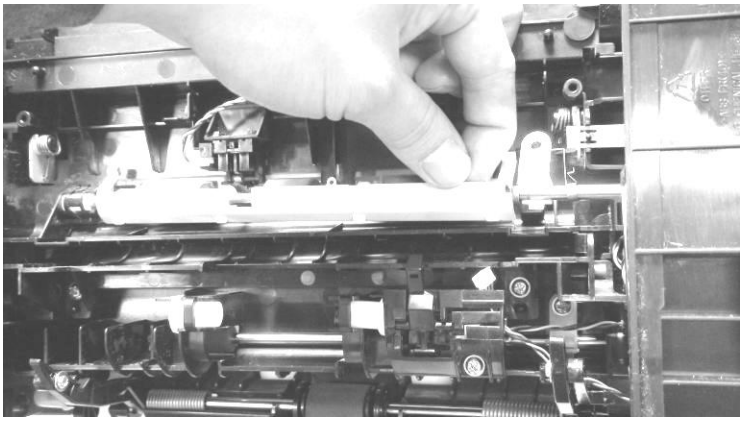


Resist Roller Removal

1. Remove the screw [A] and spring [B] from the bottom and disconnect spring [C].
2. Push coupler [D] outward to remove.

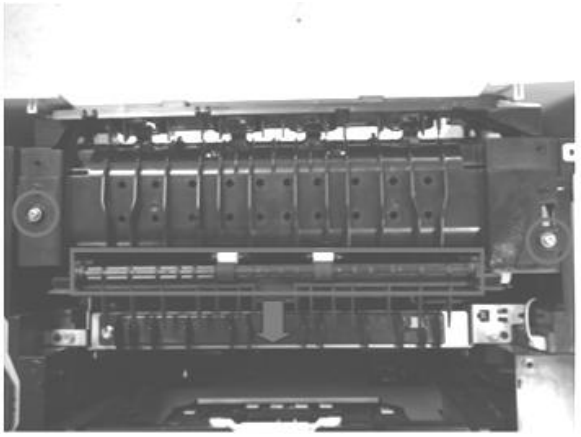


2. Hold the coupler removed cover's side and lift it to remove the resist roller a'ssy.

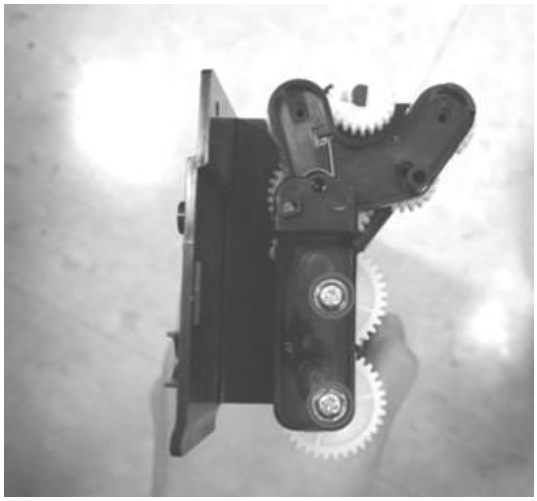


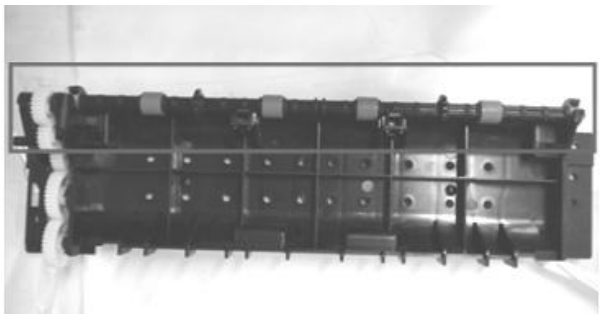
Paper Delivery Unit

1. Remove the rear cover.
2. Remove 2 screws holding delivery frame and push fixing delivery guide down and remove the delivery frame.

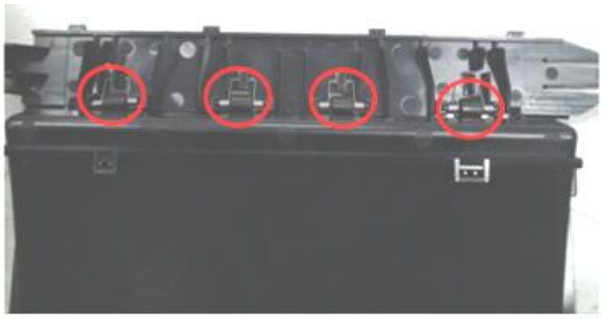


3. Remove 2 screws to replace Fixing Driving Gear. Delivery roller shaft can be separated.





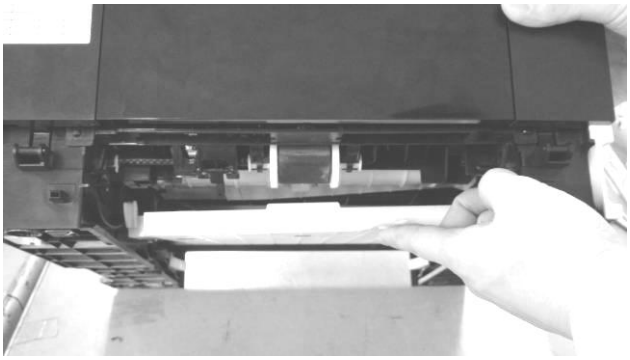
4. Remove the left and right covers.
5. Remove the top cover and the idle roller inside the cover can be replaced.



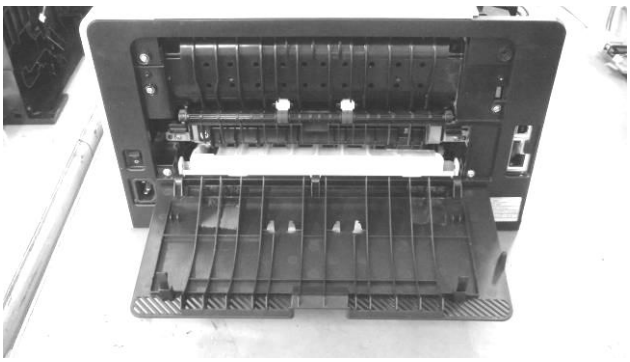
Duplex Unit

Duplex Unit Removal

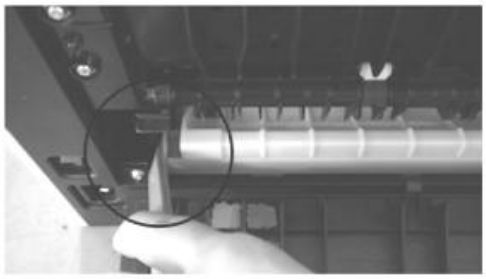
1. Remove the bin tray and option tray from the machine.
2. Push down the bottom body of duplex unit to remove the duplex unit.



3. Open rear cover.



4. Use a flat head driver on the bottom left cover connector to push it in and disconnect it.



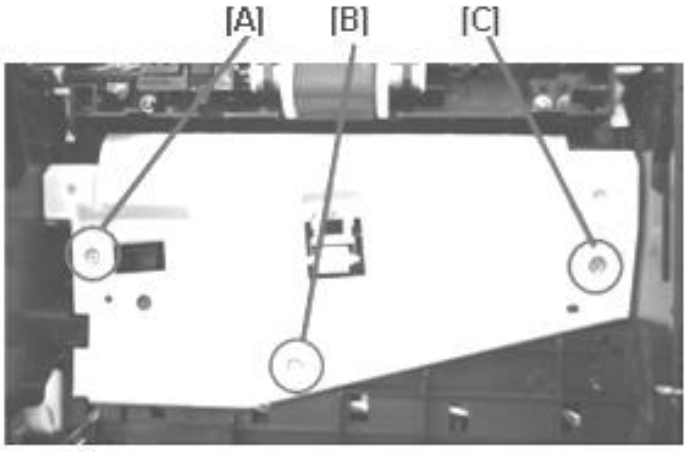
⚠CAUTION

Be careful not to damage the connecting part. (Each on left and right)

5. Stand the machine to remove Duplex Unit's bottom body.

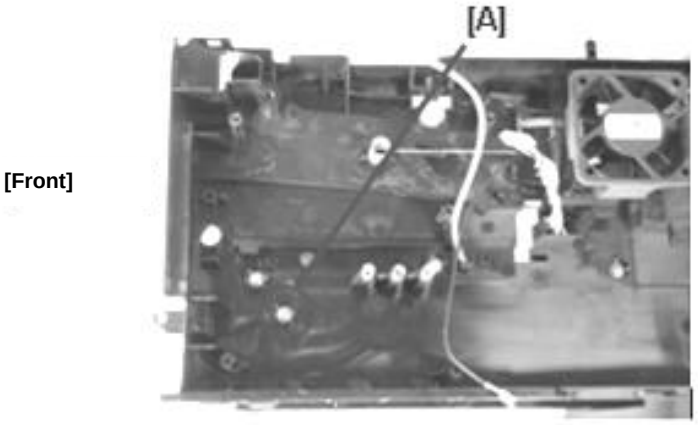
Push the cassette fixing clip on the rear to not to get caught and remove it.

6. Remove 3 screws [A], [B] and [C] on Duplex Unit's top body to remove the top body.



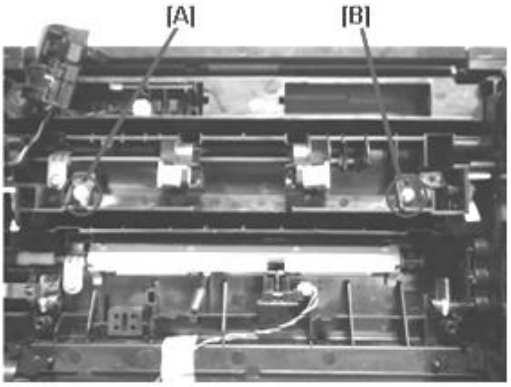
7. Remove the machine's right cover.

8. Remove PDU and screw [A].

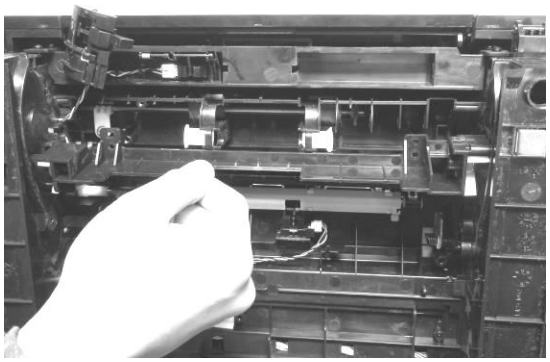


9. Remove the pickup roller a'ssy.

10. Remove 2 screws [A] and [B] to remove the duplex unit's front guide.

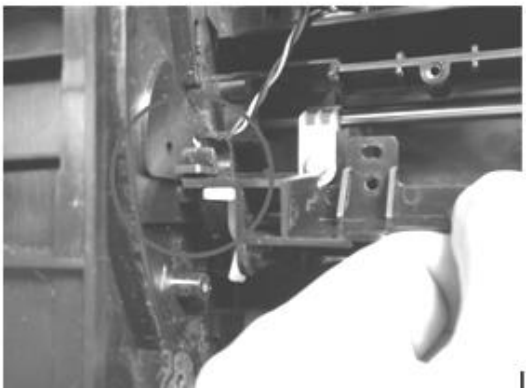


11. Remove the screw and pull the duplex unit's front guide obliquely.

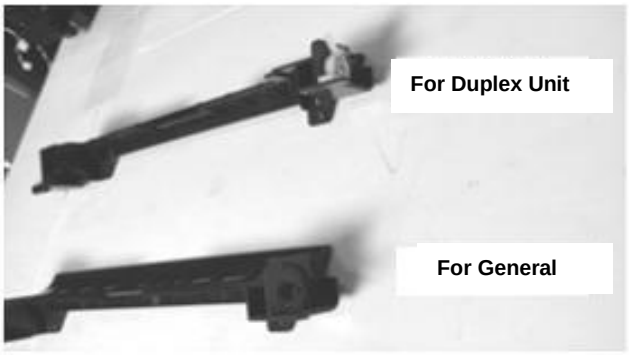


⚠CAUTION

When installing duplex unit, assemble the front body as the figure exactly to the frame hole.



12. Replace the front body with no white holders on left and right to install them.

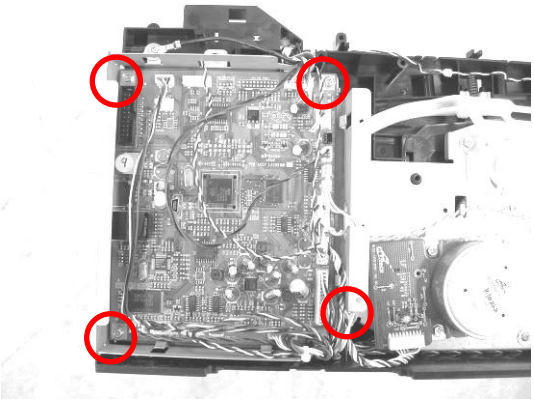


Install duplex unit with reverse of removal procedure.

Front Part

Main Board

1. Remove the rear cover of the machine.
2. Open the front door and remove the left cover.



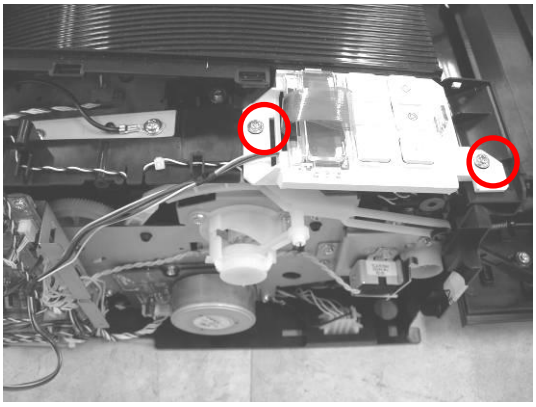
3. Separate 15 harnesses from the connector and 4 bolts and the main board.

⚠CAUTION

- Be careful not to disconnect harness wires when removing the harness from the connector.
- When disassembling, take caution on paths to use it on re-assemble.

OPU

1. Remove the rear cover and open the front cover.
2. Remove the left cover.



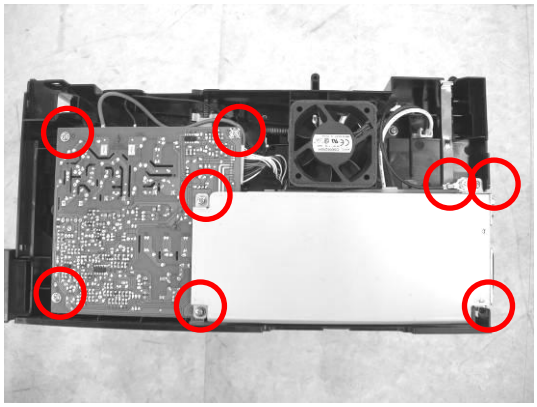
3. Remove 2 bolts at the top and bottom of Control Panel and the harness connected to the CN30 connector on main board and remove control panel from the frame.

⚠CAUTION

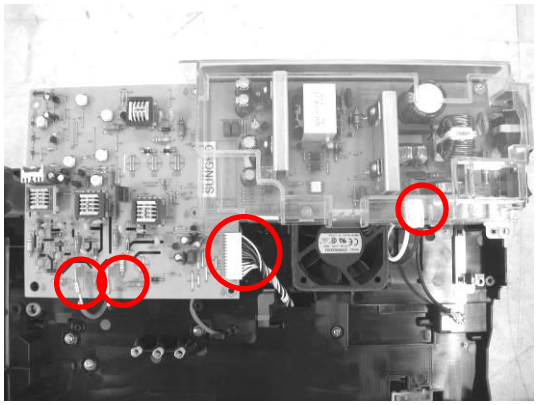
- Be careful not to disconnect harness wires when removing the harness from the connector.
- Be careful not to damage flat harness on control panel.
- Refer to the harness path to main board to reassemble.
- When disassembling OPU, make sure not to lose LED indicator below the button.

PDU

1. Remove the rear cover and open the front cover.
2. Remove the right cover.



3. Remove 8 bolts.



4. Separate 4 harnesses from the connector and remove PDU board.

⚠CAUTION

- Be careful not to disconnect harness wires when removing the harness from the connector.
- When reassembling, take caution not to have the harness to get caught on the right cover hook.

Troubleshooting

Error Messages and Error Codes

Service Error Codes

Generally, it is not possible to recover when service error code is displayed, but temporary errors may disappear when POR the printer.

Service Error Code (3xx)

Errors	Descriptions	Actions
300	Fuser under temperature while printing	It occurs when fixing temperature is lower than the set temperature for more than 10 seconds while printing 1. Check the harness between fixing and power unit 2. It the problem is not solved, replace the fixing unit
301	Fuser under temperature while at standby	It occurs when fixing temperature is lower than the set temperature for more than 10 seconds during stand by 1. Check the harness between fixing and power unit 2. It the problem is not solved, replace the fixing unit
302	Fuser failed to reach standby temperature	It occurs when Fixing temperature does not reach stand-by temperature within 60 seconds after POR 1. Check the harness between fixing and power unit 2. Check the harness between system card and thermistor 3. It the problem is not solved, replace the fixing unit
303	Fuser over temperature	It occurs when Fixing temperature goes over 230 degrees 1. Check the harness between fixing and power unit 2. It the problem is not solved, replace the fixing unit
304	Fuser thermistor failure	It occurs when Fixing temperature does not go over 35 degrees within 10 seconds after POR 1. Check the harness between fixing and power unit 2. Check the harness between system card and thermistor 3. It the problem is not solved, replace the fixing unit
310	Print head lost Hsync	It occurs when printer head cannot detect Hsync properly 1. Check the harness between system card and printer head 2. It the problem is not solved, replace the print head
311	Mirror motor lock failure	It occurs when print head's internal mirror motor does not reach target speed within the configured time 1. Check the harness between system card and printer head 2. It the problem is not solved, replace the print head
320	Main motor lock failure	It occurs when driving motor does not reach target speed within the configured time 1. Check the harness between system card and

		driving motor unit 2. If the problem is not solved, replace the driving motor unit
330	Fan motor lock failure	It occurs when fan motor does not reach target speed within the configured time 1. Check the harness between system card and fan unit 2. If the problem is not solved, replace the fan unit
340	Option Tray Lost link Error	It occurs when there's a communication problem between option tray 1. Check the harness between system card and option tray 2. If the problem is not solved, replace the option tray board
390	Engine Software Error	It occurs when a problem that cannot be recovered from engine software 1. Check the problem reoccurrence after POR 2. If the problem reappears, replace the system card

Service Error Code (5xx)

Errors	Descriptions	Actions
501	OPL Parsing Error	It occurs when a problem occurs during OPL parsing (sentence analyzing) 1. Check if correct printer driver is installed 2. Check if recommended USB cable is being used 3. Replace the system card
502	PJL Parsing Error	It occurs when a problem occurs during PJL parsing 1. Check if correct printer driver is installed 2. Check if recommended USB cable is being used 3. Replace the system card
503	Software Error Module 1	Software Error Module 1 1. Check reoccurrence after POR 2. Replace the system card
504	Software Error Module 1	Software Error Module 2 1. Check reoccurrence after POR 2. Replace the system card
505	Software Error Module 1	Software Error Module 3 1. Check reoccurrence after POR 2. Replace the system card
506	Software Error Module 1	Software Error Module 4 1. Check reoccurrence after POR 2. Replace the system card
507	Software Error Module 1	Software Error Module 5 1. Check reoccurrence after POR 2. Replace the system card

Service Error Code (2xx)

Errors	Descriptions	Actions

201	Insufficient Memory	It occurs when allocated memory is insufficient 1. Check reoccurrence after POR 2. Replace the system card
202	Memory Full	It occurs when memory is full 1. Check reoccurrence after POR 2. Replace the system card
211	Defective Flash	It occurs when flash drive cannot be recognized 1. Check reoccurrence after POR 2. Replace the system card
212	Too Many Bad Block	It occurs when there are too many bad blocks in flash partition 1. Check reoccurrence after POR 2. Replace the system card
213	Flash Full	It occurs when flash is full 1. Format the flash 2. Close some stand-by tasks
221	Boot Argument Read Failure	It occurs when necessary arguments when booting 1. Check reoccurrence after POR 2. Replace the system card
251	USB Device Open Failure	It occurs when USB device cannot be used 1. Check reoccurrence after POR 2. Replace the system card

User Interactive Messages and Paper Jam Message

Paper jam and paper jam messages occur with the following reasons.

- Bad pickup solenoid or solenoid cam abrasion
- Flag and spring defect
- Standard guide backup roller abrasion
- Inappropriately adjusted standard guide
- Obstacles in paper path
- Different paper length than the length assigned from driver

User Interactive Messages & Paper Jam Messages (1xx)

Messages	Descriptions
110 Cartridge Certification failure	It occurs when cartridge recognition fails or when cartridge is not installed 1. Reinstall the cartridge and check if it reoccurs 2. Check the contact between Smart IC installed in cartridge and system card 3. Replace the cartridge
111 Cartridge Over run failure	It occurs when cartridge capacity is exceeded 1. Replace the cartridge
112 Cartridge Toner Low	It occurs when remaining cartridge toner is insufficient 1. Prepare to replace the cartridge

120 Tray1 Empty	It occurs when a task was sent to 1 Tray while there's no paper (copy tray) 1. Check the operation status of tray 1 empty sensor flag 2. Check if tray 1 empty sensor is operating (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
121 Tray2 Empty	It occurs when a task was sent to Tray 2 while there's no paper (option tray) 1. Check the operation status of tray 2 empty sensor flag 2. Check if tray 2 empty sensor is operating (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
122 MPT Empty	It occurs when a MPT task was sent while there's no paper 1. Check the operation status of MPT empty sensor flag 2. Check if MPT empty sensor is operating (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
101 Paper Jam Tray1~Input path	It occurs when paper does not reach at the entrance sensor within a certain time after pick up attempt from copy tray (Even if 101 paper jam occurs when pickup from feeder fails, there might be a jammed paper on the paper path) 1. Check if papers are loaded properly (check feeder guide's status) 2. Check if there are too many papers in the tray 3. Check the paper status (check if paper is damaged or not) 4. Check if there's an obstacle between the tray and entrance sensor's paper path 5. Check if the pickup solenoid operates properly picks up 6. If it does not operate, replace the solenoid and test again 7. Check if entrance sensor works properly (Diagnosis Mode) 8. If it does not operate, replace the sensor and test again

Messages	Descriptions
102 Paper Jam Option~Input path	It occurs when paper does not reach at the entrance sensor within a certain time after pick up attempt from option tray (Even if 102 paper jam occurs when pickup from feeder fails,

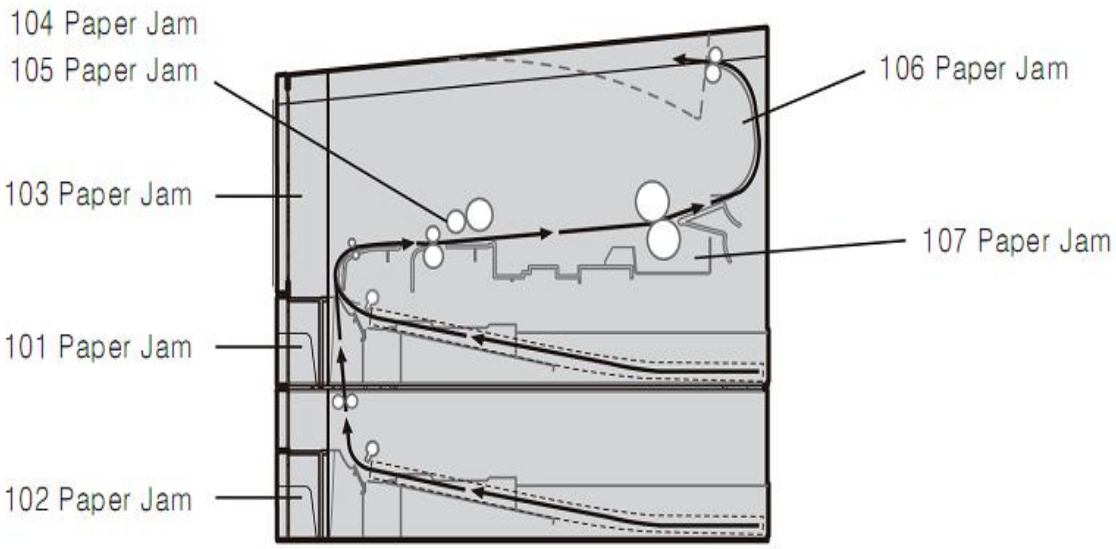
	there might be a jammed paper on the paper path) 1. Check if papers are loaded properly (check feeder guide's status) 2. Check if there are too many papers in the tray 3. Check the paper status (check if paper is damaged or not) 4. Check if there's an obstacle between the tray and entrance sensor's paper path 5. Check if there is a communication problem between system card and option tray (Diagnosis Mode) 6. Check harnesses when problem occurs and if the problem still exists, replace the option board and test again. 7. Check if the pickup solenoid operates properly picks up 8. If it does not operate, replace the solenoid and test again 9. Check if entrance sensor works properly (Diagnosis Mode) 10. If it does not operate, replace the sensor and test again
103 Paper Jam MPT~Input path	It occurs when paper does not reach at the entrance sensor within a certain time after pick up attempt from MPT (Even if 102 paper jam occurs when pickup from MPT fails, there might be a jammed paper on the paper path) 1. Check if papers are loaded properly (check feeder guide's status) 2. Check if there are too many papers in the tray 3. Check the paper status (check if paper is damaged or not) 4. Check if there's an obstacle between the tray and entrance sensor's paper path 5. Check if the pickup solenoid operates properly picks up 6. If it does not operate, replace the solenoid and test again 7. Check if entrance sensor works properly (Diagnosis Mode) 8. If it does not operate, replace the sensor and test again
104 Paper Jam Input~Exit path	It occurs when paper's top does not reach at the delivery sensor within a certain time after passing the entrance sensor 1. Check if there's an obstacle between the entrance sensor and delivery sensor's paper path 2. Check if delivery sensor works properly (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
105 Paper Jam Input~Exit path	It occurs when paper's bottom does not get out entrance sensor within a certain time 1. Check if there's an obstacle on paper delivery path after the delivery sensor 2. Check if entrance sensor works properly (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
106 Paper Jam Exit path	It occurs when paper's bottom does not get out the delivery sensor within a certain time 1. Check if there's an obstacle on paper delivery path after

	the delivery sensor 2. Check if delivery sensor works properly (Diagnosis Mode) 3. If it does not operate, replace the sensor and test again
107 Paper Jam Duplex path	It occurs when paper jam occurs at Duplex Unit's path 1. Check if there's an obstacles on Duplex Unit's paper path 2. Check if duplex solenoid operates properly 3. If it does not operate, replace the solenoid and test again 4. Check if entrance sensor works properly (Diagnosis Mode) 5. If it does not operate, replace the sensor and test again

Paper Jam

Most of paper jams occur by inappropriate print paper or incorrect paper loading.
If a paper jam message is displayed from a paper jam, all the papers jammed on the entire path must be eliminated to remove the message

Next figure displays the paper's internal path. Paper path varies by the tray (copy tray, option tray and bypass tray) and paper discharge direction. See the "**Paper Jam Message**" described above for details.



⚠CAUTION

Slowly and softly pull the jammed paper to not to tear the jammed paper. If possible, use both hands with even strength to remove the jammed paper.

Service Menu

Diagnosis Menu

This chapter describes to check occurred errors and tests and procedures to repair the error.

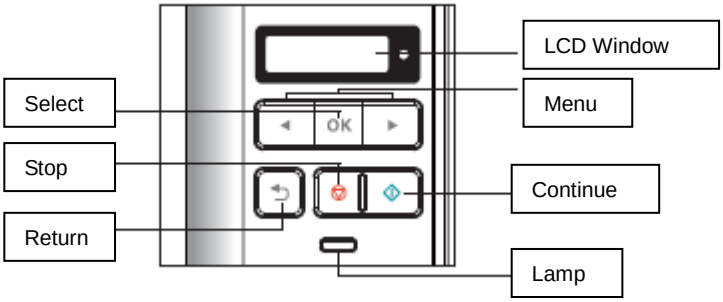
Most of service modes can be used by selecting special keys during POR.

Diagnosis Mode

In order to run the Diagnosis test described in this chapter, you need to enter Diagnosis Mode.

The configurations and operations used for machine manufacturing and servicing are included in the Diagnosis Mode group.

Entering Diagnosis Mode



1. Turn the machine's power on.
2. Push either arrow button on Ready.
3. Press Stop key twice.
4. Press the Select key.
5. When password is indicated, press left arrow once and right arrow once.
6. Press the Select key.

Diagnosis Mode menus are displayed on the panel in following orders

REGISTRATION
- Margin Adjust
- Magnification
- Print Skew Page

PRINT TEST
- Tray 1
- Tray 2 (it is displayed only when option tray is installed)
- MP Feeder

Duplex Test
Quality Pages
HARDWARE TEST
Button Test
DRAM Test
Sensor Test
Solenoid Test
PRINTER SETUP
Page Count
Perm Page Count
Serial Number
ERROR LOG
Display Log
Print Log
Clear Log

To exit the Diagnosis Mode, press the **Return** button from the top menu to return to general mode.

REGISTRATION

■ Margin Adjustment

To print margin adjustment:

1. Select **REGISTRATION** from Diagnosis Mode.
2. Select **Margin Adjust**.
3. Select a value to change from **Top Margin, Bottom Margin, Left Margin** and **Right Margin**.
4. Press the **arrow keys** to set desired value and press **Select key**.
   Print margin range is like the followings and can be change with unit of 1.

Categories	Values
Top Margin	-25 ~ +25
Bottom Margin	-10 ~ +10

Left Margin	-25 ~ +25
Right Margin	-10 ~ +10

5. To exit, press **Return**.

Select **Print Skew Page** from the menu to print on the letter or A4 paper.

- **Magnification**

To adjust magnification:

1. Select **REGISTRATION** from Diagnosis Mode.
2. Select **Magnification**.
3. Select a value from either **Vertical or Horizontal**.
4. Press the **arrow keys** to set desired value and press **Select** key.
   Magnification ranges that can be configured are as the following.

Descriptions	Values
Vertical Magnification	-2~2 (default: 0)
Horizontal Magnification	-2~2 (default: 0)

5. To exit, press **Return**.

- **Print Skew Page**

Print the Skew Test Page that can check the changes after changing margins or magnification. When each configuration was changed, select this menu to check the changed results.

Test Print

- **Tray 1, tray 2 or MP tray**

Tray test print can check if papers on each tray installed to the printer can be printed.

To run the tray test:

1. Select **PRINT TESTS** from Diagnosis Mode.
2. All trays installed on the printer are listed. Select the tray that to be tested from the **Feed Test** menu.

Menu Selection	Descriptions
Tray 1	Default Tray
Tray 2*	Option tray
MP Tray	Bypass Tray
* when installed	

3. Select **Single** (feed one white paper from the selected tray) or **continuous** (feed papers continuously from the selected tray until **Return** or **Stop** is pressed).
4. Press **Return** or **Stop** to exit test.

- **Duplex Test**

This test is used as to verify if 2 side print's top margin is configured correctly or not. This test prints 2 side prints that can be used as to adjust the top margin of 2 side printed page.

Use a letter or A4 to perform the test.

To perform 2 side test print:

1. Select **Duplex Test** from Diagnosis Mode.
2. Select **Single** to print one 2-side print page and select **Continuous** to keep printing until **Return** or **Stop** is pressed.
   The printer attempts to print the test page from the selected tray.
3. Check if the offsets on the first scan line and back side of 2 side printed test page are accurate.
   See Margin Adjustment if it need to be adjusted.
4. Press **Return** or **Stop** to exit test.

- **Quality Pages (Print Quality Page)**

To print the print quality page:

1. Select **PRINT TESTS** from Diagnosis Mode.
2. Select **Quality Pages.**
   2 pages will be printed. Button operations will be ignored until pages are printed.

First page is a skew adjusting page and the other page is a print quality checking page.

HARDWARE TESTS

■ Button Test

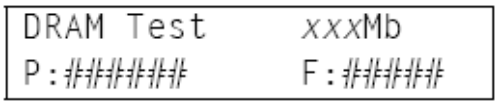
1. Select **Button Test** from Diagnosis Mode.
2. To test operations of each button, press each button on the Control Panel once and see if names of each key are displayed on LCD. But, for **Return** button, it is used as to exit the test menu; it will not be displayed, but exits the test.
3. Press **Return** to cancel the test.

■ DRAM Test

The purpose of this test is to inspect validations of standard and optional DRAM. This test records data patterns to DDR RAM to check if each memory beat are accurately configured and read.

To run DDR RAM memory test:

1. Select **DRAM Test** from the menu.
2. Installed memory capacity is displayed and number of success and failure will be indicated.
3. LED flickers to show the test is in progress.



xxxMB is the indication of installed DRAM capacity in MB.

P:###### is the number of passed memory tests. Initial value is 000000 and counts up to 999,999.

F:### is the number of failed memory tests. Initial value is 000 and counts up to 999.

4. When it reaches maximum “Passed” count or “Failed” count, the test is stopped and final result will be displayed. If a test fails, 1 is added to error count.

In order to stop the test before its completion, turn the power off.

■ Sensor Test

This test is used as to check if all the sensors and switches installed in the machine operates properly or not.

The sensors and switches that can be checked from the sensor test mode are the followings:

- Input Sensor
- Exit Sensor
- Tray1 Empty Sensor
- Tray2 Empty Sensor
- MPT Empty Sensor
- Front / Rear Cover

To run the Sensor Test:

1. Select **Hardware Test** from Diagnosis Mode.
2. Select Sensor Test. (Entering sensor test mode completed)

When 6 sensors and switches listed above change its status during the sensor test mode, the status will be displayed on LCD.

For example, if you close and open cover continuously during the sensor test mode and 'Cover open/close' message appears normally, the status of cover switch is normal. If message is not displayed properly, there's a problem with cover switch status and it needs to be inspected.

- **Solenoid Test**

This test is used as to check if all solenoids installed in the machine operate properly or not.

The solenoids that can be checked from the solenoid test mode are the followings:

- Tray1 Pick up Solenoid
- MPT Pick up Solenoid
- Duplex Solenoid

To run the solenoid test:

1. Select **Device Test** from Diagnosis Mode.
2. Select Solenoid Test. (Entering solenoid test mode completed and start test)

When solenoid test starts, 3 solenoids listed above are turned on at the same time. And turned off after 2 seconds.

PRINTER SETUP

- **Page Count**

You can check and modify the page count value.
To modify the page count:

1. Select **Page Count** from **PRINTER SETUP** menu.
2. Far left number flickers. Use **arrow keys** to move to the number to be changed and press **continue** to select the changing number.
3. The selected number can be increased or decreased with **arrow keys** and pressing **Select** will temporarily apply the changed value.

4. Pressing **Select** again will save the changed number.
5. To cancel, press **Return** key.

- **Perm Page Count (Permanent Page Count)**

Permanent page count can be seen from this menu option. The permanent page count cannot be changed from Control Panel by a user or technical engineer.

- **Perm Page Count**

Selecting this menu will display the total print counter values of the machine.
This value cannot be changed by a user or technical engineer.

- **Serial Number**

Serial number can be checked and modified.
To modify the serial number:

1. Select **Serial Number** from **PRINTER SETUP** menu.
2. Far left number flickers. Use **arrow keys** to move to the number to be changed and press **Continue** to select the changing number.
3. The selected number can be increased or decreased with **arrow keys** and pressing **Select** will apply the changed value.
4. Pressing **Select** again will save the changed number.
5. To cancel, press **Return** key.

ERROR LOG

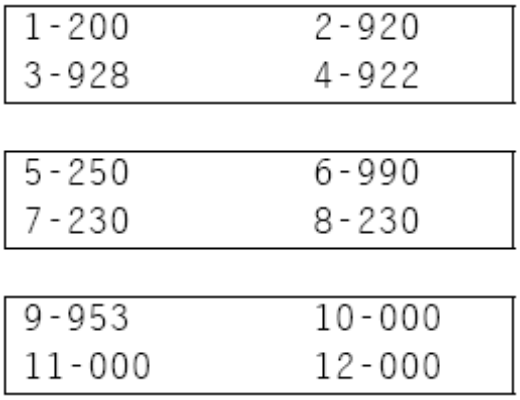
- **Display Log**

Error log offers the printer's error history. Up to recent 12 printer errors are displayed. Most recent error is on position 1 and oldest is on position 12 (when 12 errors have occurred). When the log is full and an error occurs, the oldest error gets deleted.

To view error log:

1. Select **Display Log** from **Error Log** menu.
   Error log displays 4 errors in three times as the figure. To move to next screen, press Continue.

   For example,



   The latest error is the error 200. Positions 10, 11 and 12 do not have recorded codes.

2. To exit error log, press **Return**.

- **Print Log**

Error log can be printed from additional analysis information.

To print error log:

1. Select **Print Log** from **Error Log** menu.
2. To exit **Error Log** menu, press **Return**.

- **Clear Log**

1. Select **Clear Log** from **Error Log** menu.
2. **Clear Log?** is displayed.
3. Press **Select** to clear log. To exit without clearing log, press **Return**.

Firmware Upgrade (Download)

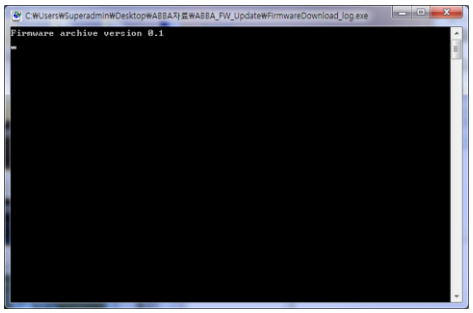
Pre-condition Setting

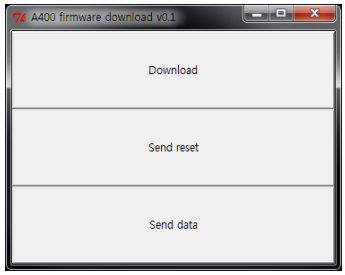
⊙ Connect PC and printer with USB cable

※ Note: A400 driver must be set as default printer on the PC.

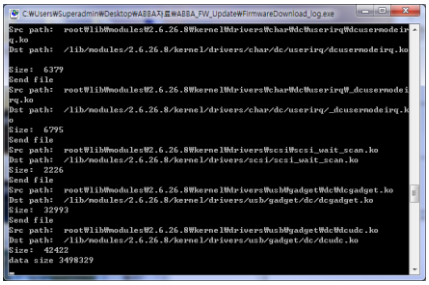
Program Download

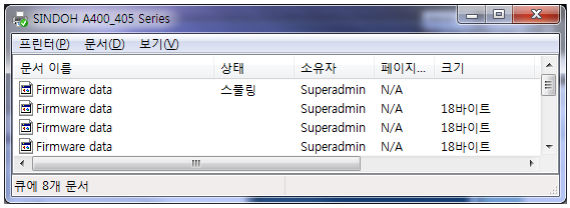
1. Turn the printer on.
2. Set the printer as default printer from Printer and Fax window.
3. Run FirmwareDownload_log.exe file from Windows.
4. Below DOS window is displayed and a download window appears.





4. Click Download button. Update progress is displayed on both DOS window and print queuing. (You don't need to use the Send reset and Send data buttons)





5. Update will progress automatically and the lamp will turn red light on and display the following messages in order on LCD window.

- Code Updating Do Not Power Off
- Download Start..
- Waiting for USB FM ver 0.0.0
- Extract archive FM ver 0.0.0
- Download Succeed

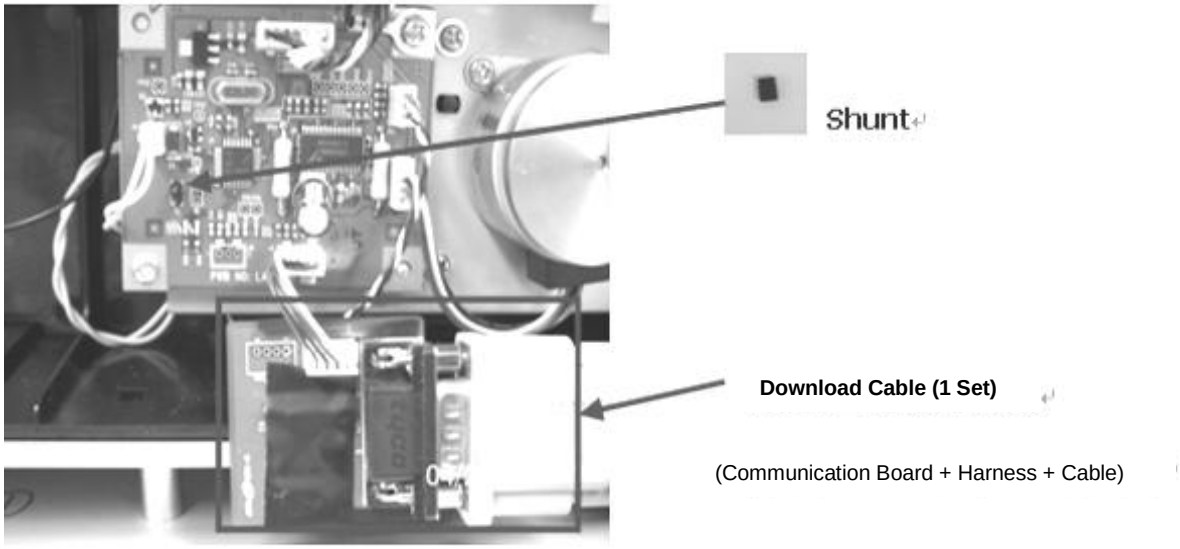
- SINDOH A400 Warming up…
- Ready

6. Printer will restart and display Ready at the end to show that the update is completed.

Optional Tray S/W Upgrade (Download)

Pre-Condition Setting (Step 1)

The download program (FlashSta) must be installed on PC and ABBAbank.mot file and ABBAbank.id file must be in same folder.

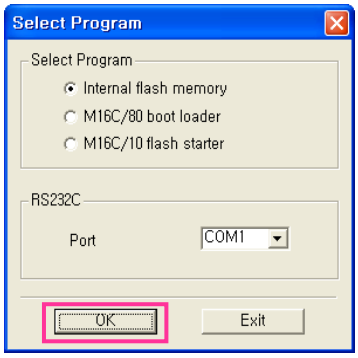


Proceed with the followings before running the download program.

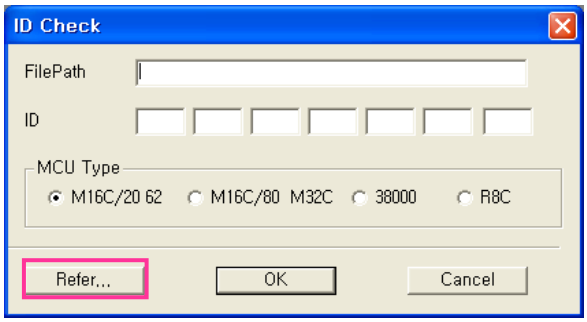
1. Turn the power off and plug Shunt on arrow to tray board as above figure.
2. Connect 1 set of download cable as the figure and connect it to serial port on PC.
3. When setting is completed as above figure, apply power.

Program Download (Step 2)

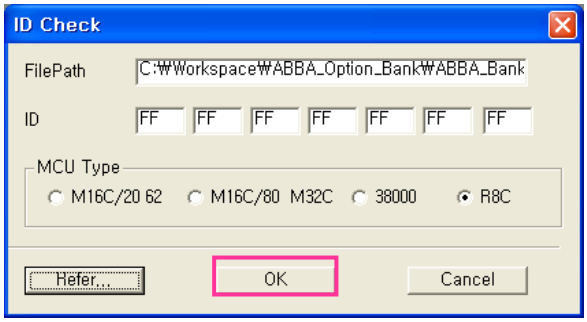
When step 1 is completed, run the FlashSta.exe file from PC.
Download will proceed as the followings.



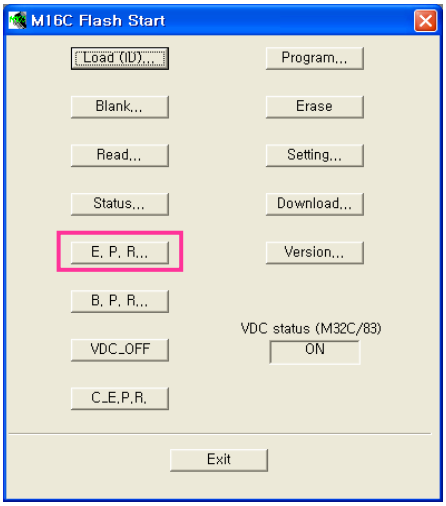
Step 1: Click OK.



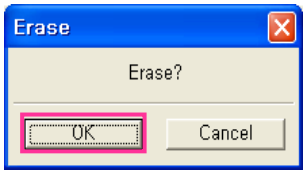
Step 2: Click Refer... and select and run ABBAbank.mot file from the folder.



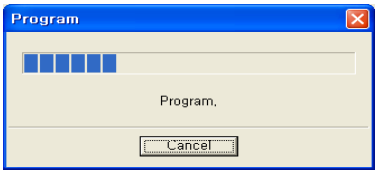
Step 3: When ID value is filled as above figure, click OK.



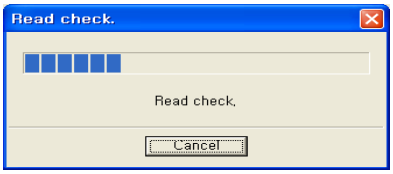
Step 4: Click E.P.R...



Step 5: Click OK.



Step 6: Downloading the program



Step 7: From Read Check.

Step 8: Download complete

Program Download (Step 2)

When program downloading is completed, proceed with the followings.

1. When downloading is completed and step 4 of download procedure window appears, click Exit button.
2. Turn the power off and remove the Shunt and download cable 1 set on tray board from step 1.

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