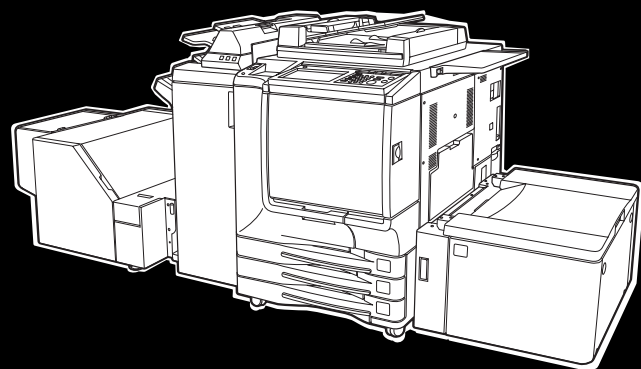




hp Color 9850mfp



Service
Manual

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The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

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Edition 1: 03/ 2004

FCC Regulations

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If this equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna. Increase separation between equipment and receiver.

Connect equipment to an outlet on a circuit different from that to which the receiver is located.

Consult your dealer or an experienced radio/TV technician.

Any changes or modifications to the printer that are not expressly approved by HP could void the user's authority to operate this equipment. Use of a shielded interface cable is required to comply with the Class A limits of Part 15 of FCC rules. For more regulatory information, see the hp 9085mfp user's guide. Hewlett-Packard shall not be liable for any direct, indirect, incidental, consequential, or other damage alleged in connection with the furnishing or use of this information.

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CONTENTS

SAFETY AND IMPORTANT WARNING ITEMS	S-1
IMPORTANT NOTICE	S-1
DESCRIPTION ITEMS FOR DANGER, WARNING AND CAUTION	S-1
SAFETY WARNINGS	S-2
SAFETY INFORMATION	S-10
IMPORTANT INFORMATION	S-10
SAFETY CIRCUITS	S-11
INDICATION OF WARNING ON THE ENGINE	S-13

I OUTLINE

1. PRODUCT INFORMATION	1-1
1.1 Product features	1-1
1.2 Product specifications	1-2
1.3 Product overview	1-4
1.4 Space requirements	1-6
1.5 Setup	1-8
1.6 Media specifications	1-9
1.7 Media assessment tools and suppliers	1-19
1.8 Functions	1-20
1.9 Maintenance and life	1-21
2. CENTER CROSS SECTION	1-22
3. PAPER PATH	1-23
4. DRIVE SYSTEM DIAGRAM	1-25
4.1 Drum drive	1-25
4.2 Transfer belt conveyance/pressure drive	1-26
4.3 Developing drive	1-27
4.4 Toner supply drive	1-28
4.5 Toner collection drive	1-29
4.6 Fixing drive	1-30
4.7 Paper feed drive	1-31
4.7.1 Paper feed tray 1 to 3 drive	1-31
4.7.2 Vertical conveyance drive	1-33
4.8 ADU drive	1-34
4.8.1 By-pass tray drive	1-34
4.8.2 Registration drive/loop drive	1-35
4.8.3 ADU conveyance drive	1-36
4.8.4 Reverse paper exit drive	1-37
4.9 Engine paper exit drive	1-38
4.10 Scanner drive	1-39
5. IMAGE CREATION PROCESS	1-40
5.1 Image creation flow and function	1-40
5.2 Charging process (Step 1)	1-41
5.3 Laser exposure process (Step 2)	1-41

5.4	Developing process (Step 3)	1-42
5.5	1st transfer process (Step 4)	1-43
5.6	2nd transfer process (Step 5)	1-44
5.7	Separation process (Step 6)	1-44
5.8	Drum cleaning (Sub step 1)	1-45
5.9	Pre-charging exposure (Sub step 2)	1-45
5.10	Transfer belt cleaning (Sub step 3)	1-46
5.11	2nd transfer roller L cleaning (Sub step 4)	1-46
5.12	Toner collection (Sub step 5)	1-47
5.13	Process speed	1-47

II UNIT EXPLANATION

1.	SCANNER	2-1
1.1	Composition	2-1
1.2	Operation	2-2
1.2.1	Home position search in the exposure unit	2-2
1.2.2	Shading correction reading	2-3
1.2.3	Original reading mode	2-4
1.2.4	Original reading control	2-5
1.2.5	APS control	2-8
1.2.6	AE control	2-10
1.2.7	Image processing	2-10
2.	WRITE	2-12
2.1	Composition	2-12
2.2	Operation	2-14
2.2.1	Image writing	2-14
2.2.2	Color registration correction control	2-14
3.	DRUM UNIT	2-21
3.1	Composition	2-21
3.2	Operation	2-25
3.2.1	Image formation timing	2-25
4.	DEVELOPING UNIT	2-26
4.1	Composition	2-26
4.2	Operation	2-28
4.2.1	Flow of developer	2-28
4.2.2	Developing control	2-28
4.2.3	Toner supply control to the developing unit	2-28
4.2.4	Developing bias control	2-29
4.2.5	Durability of the developer	2-29
5.	TRANSFER BELT UNIT	2-30
5.1	Composition	2-30
5.2	Operation	2-32
5.2.1	Transfer belt pressure/release mechanism	2-32
5.2.2	Image correction unit	2-33
5.2.3	1st transfer control	2-34
5.2.4	2nd transfer control	2-34

6. TONER SUPPLY	2-35
6.1 Composition	2-35
6.2 Operation	2-36
6.2.1 Toner supply control to the toner hopper section	2-36
6.2.2 Toner supply control to the developing unit	2-36
6.2.3 Copy/print operation stop control due to no toner	2-37
7. TONER COLLECTION	2-38
7.1 Composition	2-38
7.2 Operation	2-39
7.2.1 Toner collection control	2-39
7.2.2 Waste toner full detection control	2-39
8. PAPER FEED TRAY 1 TO 3	2-40
8.1 Composition	2-40
8.2 Operation	2-42
8.2.1 Paper feed control	2-42
8.2.2 Up/down plate control	2-43
8.2.3 Remaining paper detection control	2-44
8.2.4 Paper size detection control	2-45
9. BY-PASS FEED	2-46
9.1 Composition	2-46
9.2 Operation	2-47
9.2.1 Tray up drive control	2-47
9.2.2 Paper feed control	2-47
9.2.3 Paper size detection control	2-47
10. VERTICAL CONVEYANCE	2-48
10.1 Composition	2-48
10.2 Operation	2-48
10.2.1 Vertical conveyance control	2-48
11. REGISTRATION/ADU/REVERSE/PAPER EXIT	2-49
11.1 Composition	2-49
11.2 Operation	2-53
11.2.1 Switching control of the paper exit/ADU conveyance path	2-53
11.2.2 Reverse/exit control	2-57
11.2.3 ADU conveyance control	2-58
11.2.4 Paper reverse control	2-59
11.2.5 ADU pre-registration control	2-60
11.2.6 Registration control	2-62
11.2.7 2nd transfer control	2-63
11.2.8 Paper exit full detection control	2-63
12. FIXING UNIT	2-64
12.1 Composition	2-64
12.2 Operation	2-66
12.2.1 Fixing drive control	2-66
12.2.2 Pressure/release control	2-67
12.2.3 Web control	2-68
12.2.4 Temperature control	2-68

13. INTERFACE	2-69
13.1 Composition	2-69
14. IMAGE STABILIZATION CONTROL	2-70
14.1 Toner density control	2-70
14.2 Dmax control	2-70
14.3 Charging potential control	2-71
14.3.1 Correction of the reference value	2-71
14.3.2 Low humidity environment correction	2-71
14.4 Dot diameter adjustment control	2-72
14.5 Gamma correction control	2-73
15. OTHER CONTROLS	2-74
15.1 Parts to which power is supplied even when the reset switch is turned off	2-74
15.2 Parts that operate only when the power switch is turned on	2-75
15.2.1 Parts that operate when the reset switch is turned on	2-75
15.2.2 Parts that operate when the main switch is turned on	2-75
15.3 Fan control	2-76
15.3.1 Fan composition	2-76
15.4 Operation board control	2-77
15.4.1 Operation board composition	2-77
15.5 Counter control	2-78
15.5.1 Counter composition	2-78
15.5.2 Counter operation	2-78
15.6 ACS control	2-80
15.6.1 Switching between the color mode and the black and white mode	2-80
15.6.2 Copy count when using ACS	2-80

III DISASSEMBLY/ASSEMBLY

1. EXTERIOR	3-1
1.1 Replacing the dust filter 2	3-1
1.2 Replacing the dust filter 1 and the ozone filter 1	3-3
1.3 Replacing the toner collection box	3-5
1.4 Angle adjustment of the operation board	3-7
1.5 Removing and reinstalling the main board unit	3-8
2. SCANNER	3-12
2.1 Screws that must not be removed	3-12
2.2 Removing and reinstalling the scanner glass	3-13
2.3 Removing and reinstalling the CCD unit	3-14
2.4 Removing and reinstalling the exposure unit	3-16
2.5 Removing and reinstalling the exposure lamp	3-19
2.6 Removing the scanner wire	3-20
2.7 Reinstalling the scanner wire	3-22
3. WRITING	3-25
3.1 Screw that must not be removed	3-25
3.2 Removing and reinstalling the write unit	3-26
4. PROCESS UNIT	3-29
4.1 Flow of the disassembly of the process unit section	3-29
4.2 Cleaning the charging corona unit	3-30

4.3	Cleaning/replacing, removing and reinstalling the charging wire assy /the charging grid plate	3-32
4.4	Pulling out the process unit	3-33
4.5	Removing and reinstalling the transfer belt unit	3-34
4.6	Replacing the belt cleaning brush unit	3-37
4.7	Replacing the belt cleaning blade	3-38
4.8	Replacing the toner collection sheet 1	3-39
4.9	Replacing the belt separation claw	3-40
4.10	Replacing the transfer belt	3-41
4.11	Replacing the 1st transfer roller	3-43
4.12	Replacing the 2nd transfer roller U	3-44
4.13	Replacing the drum cartridge	3-45
4.14	Removing and reinstalling the drum	3-46
4.15	Replacing the developing unit	3-48
4.16	Replacing the developer	3-50
4.17	Replacing the belt separation claw solenoid	3-52
4.18	Removing and reinstalling the process unit	3-53
4.19	Removing and reinstalling the image correction unit	3-54
5.	TONER SUPPLY	3-55
5.1	Opening and closing the toner supply section	3-55
5.2	Replacing the charging dust filter	3-56
6.	PAPER FEED TRAYS 1 to 3	3-57
6.1	Removing and reinstalling the paper feed unit	3-57
6.2	Removing and reinstalling the paper feed trays 1 to 3	3-59
6.3	Replacing the paper feed roller and the feed rubber	3-60
6.4	Replacing the double feed prevention rubber	3-62
6.5	Replacing the paper feed clutch and the pre-registration clutch	3-63
6.6	Removing and reinstalling the tray up/down wire	3-64
7.	BY-PASS TRAY	3-68
7.1	Replacing the paper feed roller and the feed roller	3-68
7.2	Replacing the double feed prevention roller	3-70
7.3	Replacing the paper feed clutch BP	3-71
8.	VERTICAL CONVEYANCE	3-73
8.1	Removing and reinstalling the vertical conveyance	3-73
8.2	Replacing the intermediate conveyance clutch 1	3-76
9.	FIXING	3-77
9.1	Screws that must not be removed	3-77
9.2	Removing and reinstalling the fixing unit	3-78
9.3	Replacing the fixing upper heater lamps 1 and 2	3-79
9.4	Replacing the fixing lower heater lamp	3-81
9.5	Replacing the fixing roller U, ball bearing U and the heat insulating sleeve U	3-84
9.6	Replacing the fixing roller L, ball bearing L and the heat insulating sleeve L	3-86
9.7	Replacing the fixing temperature sensor 3, and removing and reinstalling the fixing temperature sensor 1 and the thermostat 1	3-88
9.8	Replacing the fixing temperature sensor 4, and removing and reinstalling the fixing temperature sensor 2 and the thermostat L	3-93
9.9	Replacing the fixing drive gear	3-98
9.10	Replacing the fixing cleaning unit	3-100

9.11 Replacing the fixing torque limiter	3-102
10. REGISTRATION/ADU/REVERSE/PAPER EXIT	3-104
10.1 Removing and reinstalling the ADU	3-104
10.2 Replacing the registration cleaning sheet	3-106
10.3 Replacing the separation corona unit	3-107
10.4 Replacing the transfer ground plate unit and the 2nd transfer roller L	3-108
10.5 Replacing the registration roller	3-109
10.6 Replacing the intermediate conveyance clutches 2 and 3	3-111
10.7 Replacing the ADU conveyance clutches 1 and 2	3-112
10.8 Replacing the ADU pre-registration clutch	3-113
10.9 Replacing the decurler roller	3-114

SAFETY AND IMPORTANT WARNING ITEMS

Read carefully the Safety and Important Warning Items described below to understand them before doing service work.

IMPORTANT NOTICE

Because of possible hazards to an inexperienced person servicing this MFP as well as the risk of damage to the MFP, hp strongly recommends that all servicing be performed only by hp-trained service technicians.

Changes may have been made to this MFP to improve its performance after this Service Manual was printed. Accordingly, hp does not warrant, either explicitly or implicitly, that the information contained in this Service Manual is complete and accurate.

The user of this Service Manual must assume all risks of personal injury and/or damage to the MFP while servicing the MFP for which this Service Manual is intended.

Therefore, this Service Manual must be carefully read before doing service work both in the course of technical training and even after that, for performing maintenance and control of the MFP properly.

Keep this Service Manual also for future service.

DESCRIPTION ITEMS FOR DANGER, WARNING AND CAUTION

In this Service Manual, each of three expressions “ DANGER”, “ WARNING”, and “ CAUTION” is defined as follows together with a symbol mark to be used in a limited meaning.

When servicing the MFP, the relevant works (disassembling, reassembling, adjustment, repair, maintenance, etc.) need to be conducted with utmost care.

 **DANGER** :Action having a high possibility of suffering death or serious injury

 **WARNING**:Action having a possibility of suffering death or serious injury

 **CAUTION** :Action having a possibility of suffering a slight wound, medium trouble, and property damage

Symbols used for safety and important warning items are defined as follows:

 :Precaution when using the MFP.

 :Prohibition when using the MFP.

 :Direction when using the MFP.

 General precaution

 General prohibition

 General instruction

 Electric hazard

 Do not touch with wet hand

 Unplug

 High temperature

 Do not disassemble

 Ground/Earth

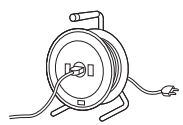
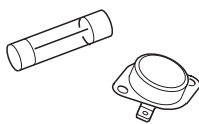
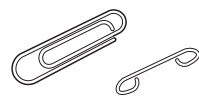
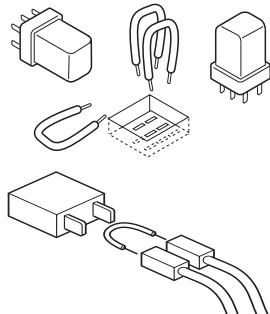
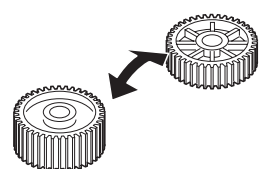
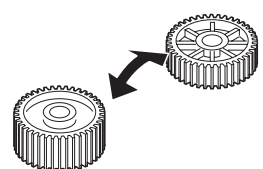
SAFETY WARNINGS

1. MODIFICATIONS NOT AUTHORIZED BY hp

HP MFP's are renowned for their high reliability. This reliability is achieved through high-quality design and a solidservice network.

MFP design is a highly complicated and delicate process where numerous mechanical, physical, and electrical aspects have to be taken into consideration, with the aim of arriving at proper tolerances and safety factors. For this reason, unauthorized modifications involve a high risk of degradation in performance and safety. Such modifications are therefore strictly prohibited. The points listed below are not exhaustive, but they illustrate the reasoning behind this policy.

DANGER : PROHIBITED ACTIONS

• Using any cables or power cord not specified by hp.	 
• Using any fuse or thermostat not specified by hp. Safety will not be assured, leading to a risk of fire and injury.	 
• Disabling fuse functions or bridging fuse terminals with wire, metal clips, solder or similar object.	 
• Disabling relay functions (such as wedging paper between relay contacts)	 
• Disabling safety functions (interlocks, safety circuits, etc.) Safety will not be assured, leading to a risk of fire and injury.	 
• Making any modification to the MFP unless instructed by hp	 
• Using parts not specified by hp	 

2. CHECKPOINTS WHEN PERFORMING ON-SITE SERVICE

HP MFP's are extensively tested before shipping, to ensure that all applicable safety standards are met, in order to protect the customer and customer engineer (hereafter called the CE) from the risk of injury. However, in daily use, any electrical equipment may be subject to parts wear and eventual failure. In order to maintain safety and reliability, the CE must perform regular safety checks.

2.1 Power Supply

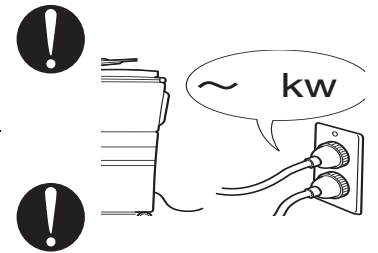
WARNING: Wall Outlet

- Check that main voltage is as specified. Plug the power cord into the dedicated wall outlet with a capacity greater than the maximum power consumption.

If excessive current flows in the wall outlet, fire may result.

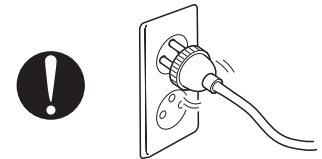
- If two or more power cords can be plugged into the wall outlet, the total load must not exceed the rating of the wall outlet.

If excessive current flows in the wall outlet, fire may result.



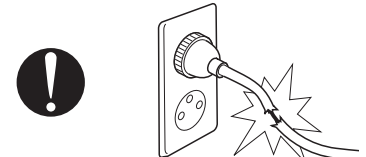
WARNING: Power Plug and Cord

- Make sure the power cord is plugged in the wall outlet securely.
Contact problems may lead to increased resistance, overheating, and the risk of fire.



- Check whether the power cord is damaged. Check whether the sheath is damaged.

If the power plug, cord, or sheath is damaged, replace with a new power cord (with plugs on both ends) specified by hp. Using the damaged power cord may result in fire or electric shock.

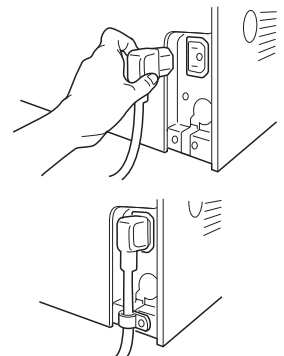


- When using the power cord (inlet type) that came with this MFP, be sure to observe the following precautions:

- Make sure the MFP-side power plug is securely inserted in the socket on the rear panel of the MFP.
Secure the cord with a fixture properly.

- If the power cord or sheath is damaged, replace with a new power cord (with plugs on both ends) specified by hp.

If the power cord (inlet type) is not connected to the MFP securely, a contact problem may lead to increased resistance, overheating, and risk of fire.



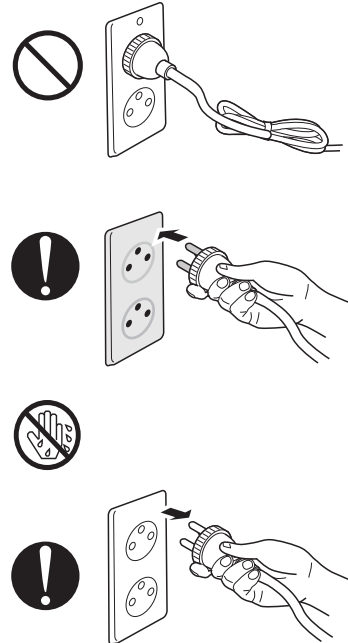
- Check whether the power cord is not stepped on or pinched by a table and so on.

Overheating may occur there, leading to a risk of fire.



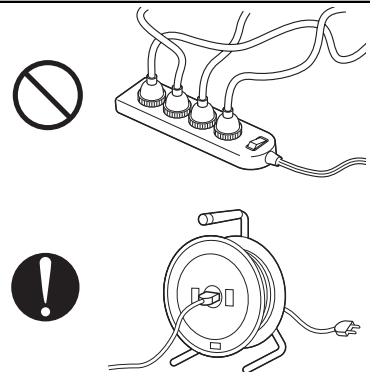
WARNING: Power Plug and Cord

- Do not bundle or tie the power cord.
Overheating may occur there, leading to a risk of fire.
- Check whether dust is collected around the power plug and wall outlet.
Using the power plug and wall outlet without removing dust may result in fire.
- Do not insert the power plug into the wall outlet with a wet hand.
The risk of electric shock exists.
- When unplugging the power cord, grasp the plug, not the cable.
The cable may be broken, leading to a risk of fire and electric shock.



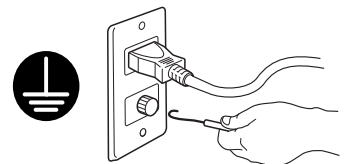
WARNING: Wiring

- Never use multi-plug adapters to plug multiple power cords in the same outlet.
If used, the risk of fire exists.
- When an extension cord is required, use a specified one.
Current that can flow in the extension cord is limited, so using a too long extension cord may result in fire.
Do not use an extension cable reel with the cable taken up. Fire may result.



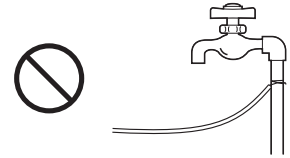
WARNING: Ground Lead

- Check whether the MFP is grounded properly.
If current leakage occurs in an ungrounded MFP, you may suffer electric shock while operating the MFP. Connect the ground lead to one of the following points:
 - a. Ground terminal of wall outlet
 - b. Ground terminal for which Class D work has been done

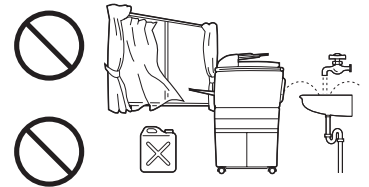


⚠ WARNING: Ground Lead

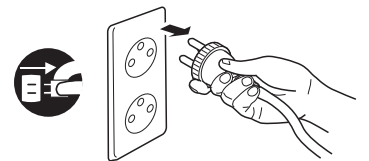
- Pay attention to the point to which the ground lead is connected.
Connecting the ground lead to an improper point such as the points listed below results in a risk of explosion and electric shock:
 - a. Gas pipe (A risk of explosion or fire exists.)
 - b. Lightning rod (A risk of electric shock or fire exists.)
 - c. Telephone line ground (A risk of electric shock or fire exists in the case of lightning.)
 - d. Water pipe or faucet (It may include a plastic portion.)

**2.2. Installation Requirements****⚠ WARNING: Prohibited Installation Place**

- Do not place the MFP near flammable materials such as curtains or volatile materials that may catch fire.
A risk of fire exists.
- Do not place the MFP in a place exposed to water such as rain water.
A risk of fire and electric shock exists.

**⚠ WARNING: Nonoperational Handling**

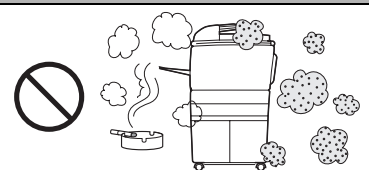
- When the MFP is not used over an extended period of time (holidays, etc.), switch it off and unplug the power cord.
Dust collected around the power plug and outlet may cause fire.

**⚠ CAUTION: Temperature and Humidity**

- Do not place the MFP in a place exposed to direct sunlight or near a heat source such as a heater.
A risk of degradation in MFP performance or deformation exists.
Do not place the MFP in a place exposed to cool wind.
Recommended temperature and humidity are as follows:
Temperature: 10°C to 30°C
Humidity: 10% to 80% (no dew condensation)
Avoid other environments as much as possible.

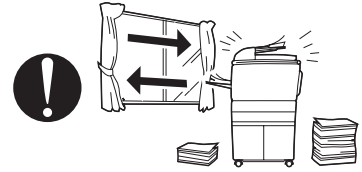
**⚠ CAUTION: Ventilation**

- Do not place the MFP in a place where there is much dust, cigarette smoke, or ammonia gas.
Place the MFP in a well ventilated place to prevent engine problems and image faults.



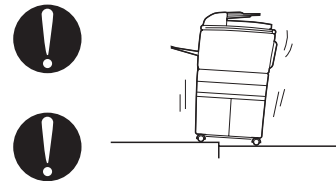
CAUTION: Ventilation

- The MFP generates ozone gas during operation, but it is not sufficient to be harmful to the human body.
If a bad smell of ozone is present in the following cases, ventilate the room.
 - a. When the MFP is used in a poorly ventilated room
 - b. When taking a lot of copies
 - c. When using multiple MFPs at the same time



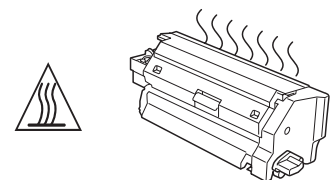
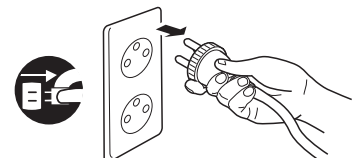
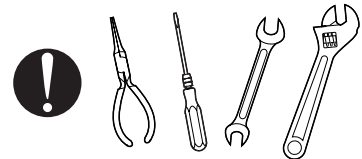
CAUTION: Vibration

- When installing the MFP, read the Installation Guide thoroughly. Be sure to install the MFP in a level and sturdy place.
Constant vibration will cause problems.
- Be sure to lock the caster stoppers.
In the case of an earthquake and so on, the MFP may slide, leading to a injury.



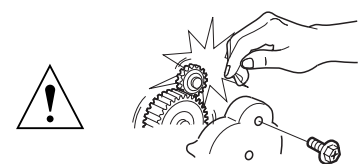
CAUTION: Inspection before Servicing

- Before conducting an inspection, read all relevant documentation (service manual, technical notices, etc.) and proceed with the inspection following the prescribed procedure in safety clothes, using only the prescribed tools.
Do not make any adjustment not described in the documentation.
If the prescribed procedure or tool is not used, the MFP may break and a risk of injury or fire exists.
- Before conducting an inspection, be sure to disconnect the power plugs from the MFP and options.
When the power plug is inserted in the wall outlet, some units are still powered even if the POWER switch is turned OFF. A risk of electric shock exists.
- The area around the fixing unit is hot.
You may get burned.



DANGER: Work Performed with the MFP Powered

- Take every care when making adjustments or performing an operation check with the MFP powered.
If you make adjustments or perform an operation check with the external cover detached, you may touch live or high-voltage parts or you may be caught in moving gears or the timing belt, leading to a risk of injury.



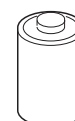
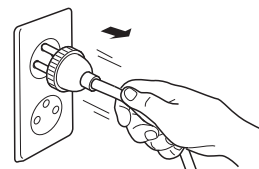
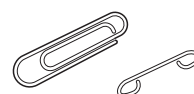
⚠ DANGER: Work Performed with the MFP Powered

- Take every care when servicing with the external cover detached.
High-voltage exists around the drum unit. A risk of electric shock exists.



⚠ WARNING: Safety Checkpoints

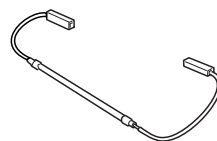
- Check the exterior and frame for edges, burrs, and other damages.
The user or CE may be injured.
- Do not allow any metal parts such as clips, staples, and screws to fall into the MFP.
They can short internal circuits and cause electric shock or fire.
- Check wiring for squeezing and any other damage.
Current can leak, leading to a risk of electric shock or fire.
- When disconnecting connectors, grasp the connector, not the cable.
(Specifically, connectors of the AC line and high-voltage parts)
Current can leak, leading to a risk of electric shock or fire.
- Carefully remove all toner remnants and dust from electrical parts and electrode units such as a charging corona unit.
Current can leak, leading to a risk of MFP trouble or fire.
- Check high-voltage cables and sheaths for any damage.
Current can leak, leading to a risk of electric shock or fire.
- Check electrode units such as a charging corona unit for deterioration and sign of leakage.
Current can leak, leading to a risk of trouble or fire.
- Before disassembling or adjusting the write unit incorporating a laser, make sure that the power cord has been disconnected.
The laser light can enter your eye, leading to a risk of loss of eyesight.
- Do not remove the cover of the write unit. Do not supply power with the write unit shifted from the specified mounting position.
The laser light can enter your eye, leading to a risk of loss of eyesight.
- When replacing a lithium battery, replace it with a new lithium battery specified in the Parts Guide Manual. Dispose of the used lithium battery using the method specified by local authority.
Improper replacement can cause explosion.



⚠ WARNING: Safety Checkpoints

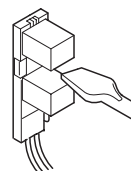
- After replacing a part to which AC voltage is applied (e.g., optical lamp and fixing lamp), be sure to check the installation state.

A risk of fire exists.



- Check the interlock switch and actuator for loosening and check whether the interlock functions properly.

If the interlock does not function, you may receive an electric shock or be injured when you insert your hand in the MFP (e.g., for clearing paper jam).



- Make sure the wiring cannot come into contact with sharp edges, burrs, or other pointed parts.

Current can leak, leading to a risk of electric shock or fire.



- Make sure that all screws, components, wiring, connectors, etc. that were removed for safety check and maintenance have been reinstalled in the original location. (Pay special attention to forgotten connectors, pinched cables, forgotten screws, etc.)

A risk of MFP trouble, electric shock, and fire exists.



⚠ DANGER: HANDLING OF SERVICE MATERIALS

- Toner and developer are not harmful substances, but care must be taken not to breathe excessive amounts or let the substances come into contact with eyes, etc. It may be stimulative.

If the substances get in the eye, rinse with plenty of water immediately.
When symptoms are noticeable, consult a physician.



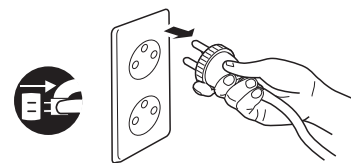
- Never throw the used cartridge and toner into fire.

You may be burned due to dust explosion.



! DANGER : HANDLING OF SERVICE MATERIALS

- Unplug the power cord from the wall outlet.
Drum cleaner (isopropyl alcohol) and roller cleaner (acetone-based) are highly flammable and must be handled with care. A risk of fire exists.



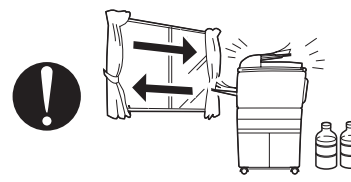
- Do not replace the cover or turn the MFP ON before any solvent remnants on the cleaned parts have fully evaporated.
A risk of fire exists.



- Use only a small amount of cleaner at a time and take care not to spill any liquid. If this happens, immediately wipe it off.
A risk of fire exists.



- When using any solvent, ventilate the room well.
Breathing large quantities of organic solvents can lead to discomfort.



3. MEASURES TO TAKE IN CASE OF AN ACCIDENT

- If an accident has occurred, the distributor who has been notified first must immediately take emergency measures to provide relief to affected persons and to prevent further damage.
- If a report of a serious accident has been received from a customer, an on-site evaluation must be carried out quickly and hp must be notified.
- To determine the cause of the accident, conditions and materials must be recorded through direct on-site checks, in accordance with instructions issued by hp.
- For reports and measures concerning serious accidents, follow the regulations given in "Serious Accident Report/Follow-up Procedures".

4. CONCLUSION

- Safety of users and customer engineers depends highly on accurate maintenance and administration. Therefore, safety can be maintained by the appropriate daily service work conducted by the customer engineer.
- When performing service, each MFP on the site must be tested for safety. The customer engineer must verify the safety of parts and ensure appropriate management of the equipment.

SAFETY INFORMATION

IMPORTANT INFORMATION

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States.

This MFP is certified as a “Class 1” laser product under the U.S.

Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. Since radiation emitted inside this MFP is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

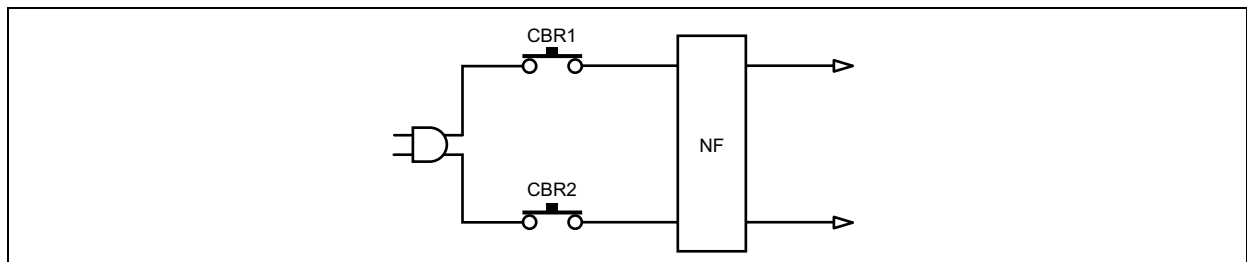
SAFETY CIRCUITS

This engine is provided with the following safety circuits to prevent engine faults from resulting in serious accidents.

- Overall protection circuit
- Fixing upper lamp 1 (L2), Fixing upper lamp 2 (L3), Fixing lower lamp (L4) overheating prevention circuit

These safety circuits are described below to provide the service engineer with a renewed awareness of them in order to pre-vent servicing errors that may impair their functions.

1. Overall protection circuit



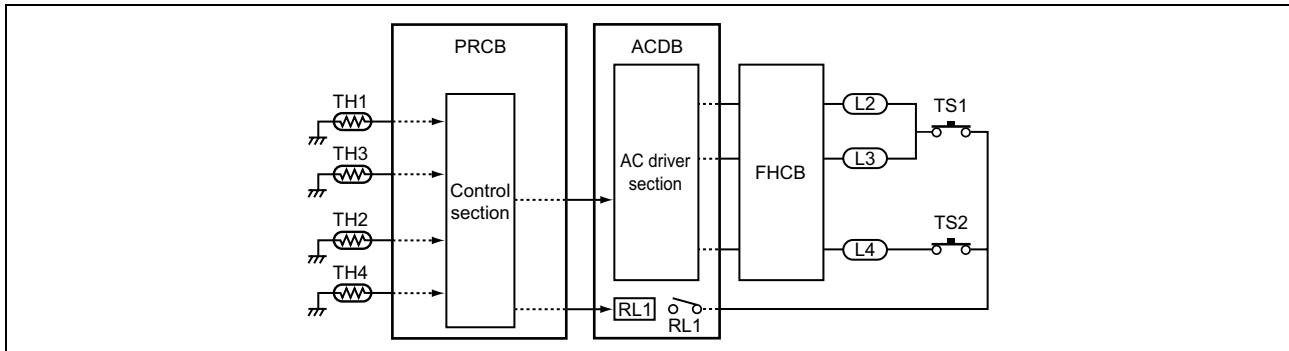
1.1 Protection by circuit breaker /1 (CBR1) and circuit breaker /2 (CBR2)

CBR1 and CBR2 interrupt the AC line instantaneously when an excessive current flows due to a short in the AC line.

⚠ CAUTION:

The CBR1 and CBR2 functions must not be deactivated under any circumstances.

2. Fixing upper lamp 1 (L2), Fixing upper lamp 2 (L3), Fixing lower lamp (L4) overheating prevention circuit



2.1 Protection by software

The output voltage from fixing temperature sensor 1 (TH1) and fixing temperature sensor 2 (TH2) is read by the CPU. If this voltage is abnormal, L2, L3, and L4 are turned OFF by opening main relay (RL1).

⚠ CAUTION:

- The clearance between the fixing upper roller and TH1 and the clearance between the fixing lower roller and TH2 must not be changed. When replacing them, make sure to comply with the specified clearances.
- The RL1 function must not be deactivated under any circumstances.

2.2 Protection by the hardware circuit

The output voltages from fixing temperature sensor 1 (TH1), fixing temperature sensor 2 (TH2), fixing temperature sensor 3 (TH3), and fixing temperature sensor 4 (TH4) are compared with the abnormality judgment reference value in the comparator circuit. If the output voltage from TH1, TH2, TH3, or TH4 exceeds the reference value, L2, L3, and L4 are turned OFF by opening RL1.

⚠ CAUTION:

- The clearance between the fixing upper roller and TH1 and the clearance between the fixing lower roller and TH2 must not be changed. When replacing them, make sure to comply with the specified clearances.
- Periodically check the contact between the fixing upper roller and TH3 and the contact between the fixing lower roller and TH4, and replace them if any abnormality is detected.
- The RL1 function must not be deactivated under any circumstances.

2.3 Protection by thermostat 1 (TS1) and thermostat 2 (TS2)

When the temperature of the fixing upper roller exceeds the specified value, TS1 is turned OFF, thus interrupting the power to L2 and L3 directly. When the temperature of the fixing lower roller exceeds the specified value, TS2 is turned OFF, thus interrupting the power to L4 directly.

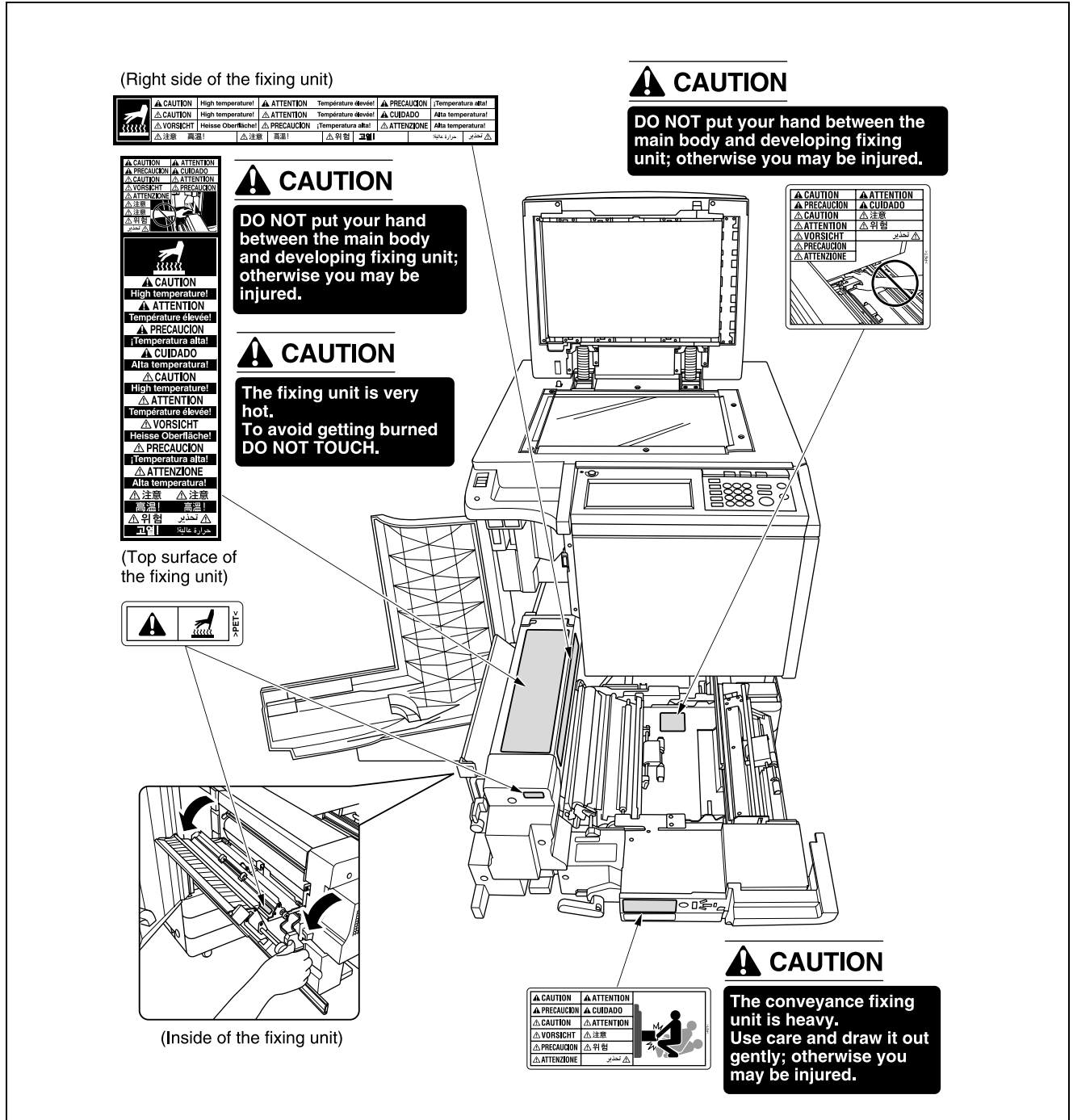
⚠ CAUTION:

Do not use any other electrical conductor in place of TS1 and TS2.

INDICATION OF WARNING ON THE ENGINE

Caution labels shown below are attached in some areas on/in the engine.

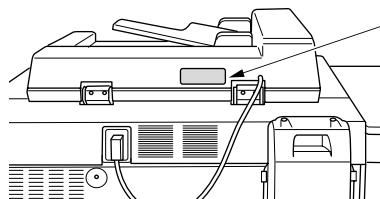
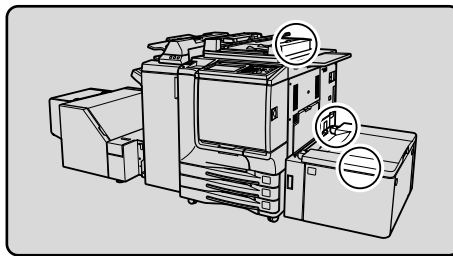
When accessing these areas for maintenance, repair, or adjustment, special care should be taken to avoid burns and electricshock.



⚠ CAUTION

You may be burned or injured if you touch any area that you are advised by any caution label to keep yourself away from.

Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.

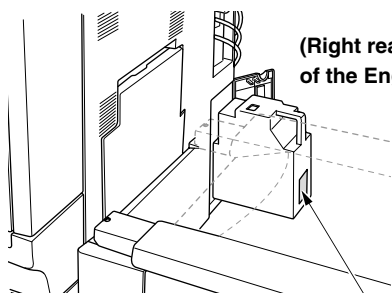


(Right rear side of the ADF)



! CAUTION

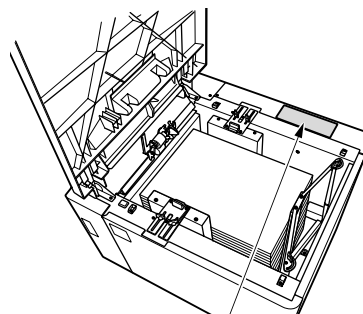
DO NOT INSERT your finger into the two RADF hinge portions; otherwise you may be injured.



(Right rear side of the Engine)

! WARNING

DO NOT throw the toner recovery box into a fire. If it is thrown into a fire, the toner may ignite and cause a dangerous situation.



(Inside of the HCI)



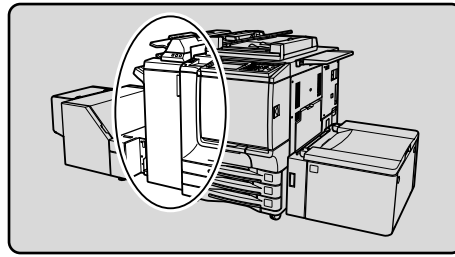
! CAUTION

To avoid any unexpected injury, **DO NOT** put your hand into the holes (3 places) on the bottom plate of the HCI.

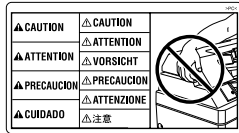
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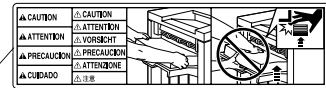


(Finisher with Q3636A
Cover Sheet Feeder only)



! CAUTION

DO NOT insert your finger into the bottom of the upper part of the feeder when returning to its original position; otherwise you may be injured.



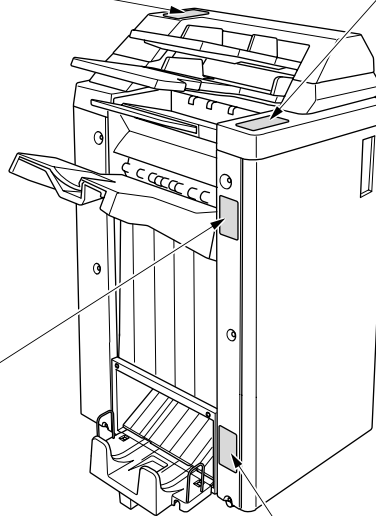
! CAUTION

To avoid injury, **DO NOT** put your hand on top of the printed sheets. Be sure to hold both sides of the printed sheets when removing them, and **DO NOT** leave your hand on the printed sheets while the primary (main) tray goes up.



! CAUTION

Use care after opening the paper exit outlet. **DO NOT** put your hand into it; otherwise you may be injured.



! CAUTION

Inside the lower paper exit outlet is the roller drive unit. **DO NOT** put your hand into it; otherwise you may be injured.

! CAUTION

You may be burned or injured if you touch any area that you are advised by any caution label to keep yourself away from.

Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.



NOTICE:
BEFORE REMOVING THE WRITING UNIT,
disconnect Connectors.

REMARQUE:
Avant de retirer l'unit d'criture,
dbrancher les connecteurs.

注意 :
書き込みユニットを外す前に、コネクタを
外してください。

>PET<



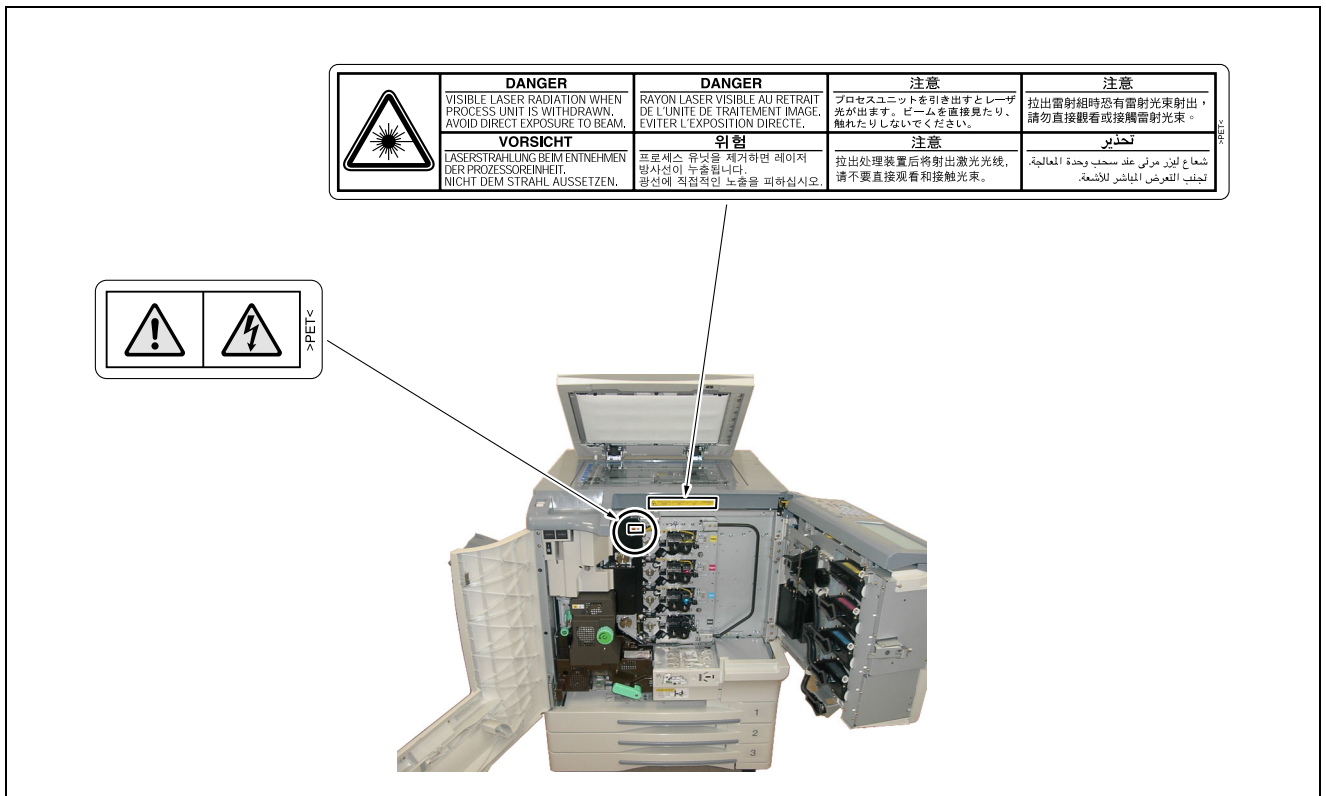
	ANGER	注意	ARNING
	VISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.	ここを開くとレーザー光が出ます。 ビームを直接受たり、触れたり しないでください。	SYNIG LASERSTRALNING NAR DENNA DEL AR OPPNAD. STRALEN AR FARLIG.
	VORSICHT	ADVARSEL	注意
	LASERSTRAHLUNG. WENN ABDECKUNG GEOFFNET. NICHT DEM STRAHL AUSSETZEN.	SYNIG LASERSTRALNING NAR DEKSEL APNES. UNNGA EKSPONERING FOR STRALEN.	打开此处后将射出激光光线。 请不要直接观看和接触光束。
DANGER	VARO!	注意	注意
RAYON LASER VISIBLE LORS DE L'OUVERTURE. EVITER L'EXPOSITION DIRECTE.	AVATTRESSA OLET ALTIIMA NÄKYVÄLLÄ LASERSATEILYLLE. ÄLÄ KATSO SÄTEELSEEN.	打開此處將會看到雷射光束。 應避免雷射光束直接的曝露接觸。	打開此處將會看到雷射光束。 應避免雷射光束直接的曝露接觸。
위험	ADVARSEL	تحذير	تحذير
가동시 레이저 방사선이 누출됩니다. 광선에 직접적인 노출을 피하십시오.	SYNIG LASERSTRALNING VED ÅBNING. UNNGÅ UDSETTELSE FOR STRÅLING.	شعاع ليزر مرئي عند الفتح. تجنب التعرض المباشر للاشعة.	شعاع ليزر مرئي عند الفتح. تجنب التعرض المباشر للاشعة.

>PET<

 CAUTION

You may be burned or injured if you touch any area that you are advised by any caution label to keep yourself away from.

Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.



⚠ CAUTION

You may be burned or injured if you touch any area that you are advised by any caution label to keep yourself away from.

Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.

SAFETY AND IMPORTANT WARNING ITEMS

	▲ WARNING	Unplug the engine before removing scanner glass.
	▲ DANGER	Debrancher le copieur avant de retirer la vitre d'exposition.
	▲ ADVERTENCIA	Desenchufe la maquina antes de quitar el vidrio.
	▲ ADVERTÊNCIA	Desconecte a unidade da tomada antes de remover o vidro de exposição.



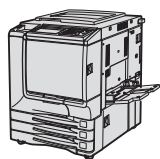
CAUTION

You may be burned or injured if you touch any area that you are advised by any caution label to keep yourself away from.

Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.

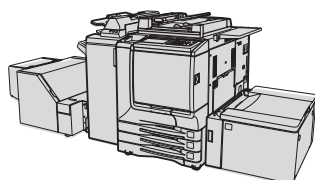
I Product information

1.1 Product features



HP Color 9850mfp (Q3225A) basic configuration

The HP Color 9850mfp comes standard with 128-MB RAM for each color, wide-format standalone copying capability, trays 1, 2 and 3 (500-sheets each), a 250-sheet multipurpose bypass tray and a Reversing Automatic Document Feeder RADF.



HP Color 9850mfp (Q3225A) fully loaded

The fully loaded HP Color 9850mfp comes with 384-MB RAM for each color, a 20-GB EIO hard disk, wide-format printing, copying and network printing capabilities, trays 1, 2 and 3 (500-sheets each), a 250-sheet multipurpose bypass tray, tray 4 (a 2,500-sheet high capacity input HCI), a Reversing Automatic Document Feeder RADF, an EFI print controller, a 3000-sheet Stapler-stacker or a Multifunction Finisher with a Trimming Unit at the output, a Post Insertion Unit for feeding covers, and a Hole Punch Unit at the output.

Table 1. Features of the HP Color 9850mfp

Speed	- Up to 50/51 pages per minute (ppm) for letter / A4-size media. - First page out in 7.6 seconds for color and 6 seconds for B/W.
Resolution	600-by-600 dots per inch (dpi). 600-by-1800 dots per inch (dpi) enhanced resolution mode (printing only).
Consumables	- CMYK toner bottles. - Staple cartridges.
Language and fonts	- PCL6 EC (XL) - PCL6e - PCL5EC (with color) - PCL6E (XL) - PJL - Post Script 3
Memory expansion	Basic 128 MB of RAM per color, expandable to 384 MB by using hp 256 MB memory module (Q6993A).
Functions	- Bypass tray supports up to 200 sheets of 28 lbs of custom-sized media up to 13 by 19 in. (250 sheets of 20 lbs) - Trays 1, 2 and 3 support up to 400 sheets of 28 lbs (500 sheets of 20 lbs) - Tray 4 supports up to 2,200 sheets of 28 lbs (2,500 sheets of 20 lbs) - Two-sided printing (duplex printing) - Wide-format printing - Glossy printing - Document finishing options (with stapler-stacker or multifunction finisher).
Expandability	- HP Color 9850mfp automatic document feeder (standard) 3,000-sheet stapler/stacker (optional) 3,000-sheet Multifunction finisher (optional) 4 DIMM slots for adding memory (standard) 20 GB hard disk drive (optional)
Wireless printing	Not supported
Interface connection	- Video interface for EFI print controller - Parallel port (based on IEEE 1284, for service) - Serial port (USB Type B, for service) - RJ45 Ethernet connector (available with EFI print controller)

Table 1. Features of the HP Color 9850mfp (continued)

Networking	• EFI print controller
Maximum monthly duty cycle	• 150,000 pages per month

1.2 Product specifications

Identification

A user-accessible label is located on the back cover of the engine. The model number is alphanumeric, such as Q3225A.

The serial number contains information about the country of origin, product type, engine voltage, revision number, and engine serial number. An example of a serial number is JPHCB00001. Please refer to the 9850mfp Parts Manual, section *How to use this manual* for detailed information.

The identification label also contains electrical information and regulatory information.

Note

The electrical information and regulatory information vary by country/region.

Specifications

Type:	Console type (floor-mounted type)
Copying method:	Tandem intermediate transfer type electrostatic method
Original table:	Fixed
Original alignment:	Rear left side as reference
Photosensitive material:	OPC
Sensitizing method:	Laser writing
Paper feed trays:	3 trays method (500 sheets x 3, 80 to 90g/m ²) (400 sheets x 3, 105g/m ²) Multisheet by-pass tray (250 sheets, 80 to 90g/m ²) (200 sheets, 105g/m ²) Q5690A (2500 sheets, 80 to 90g/m ² , optional)

Table 2. HP Color 9850mfp specifications

Specification	Out-of-box	Packaged
Height	1,179 mm (46.4 inches)	1,210 mm (47.6 inches)
Width	1,275 mm (50.2 inches)	950 mm (37.4 inches)
Depth	889 mm (35.0 inches)	1,258 mm (49.5 inches)
Weight	313 kg (690 lb)	361 kg (796 lb)

Table 3. Power requirements and circuit capacity

	Power source for inch area	Power source for metric area
Power requirements	208 to 240 V (+/- 10%) 60 Hz	230 V, -14% +10.6% 50 Hz
Minimum recommended circuit capacity	3600 Watts (dedicated circuit)	3450 Watts (dedicated circuit)

WARNING!

Power requirements are based on the country/region where the MFP is sold. Do not convert operating voltages. This can damage the MFP and void the product warranty.

Table 4. Power consumption

MFP state	Inch area consumption	Metric area consumption
Switch off mode	0.2 W	0.2 W
Sleep mode	12 W	11 W
Low power mode	172.4 W	178.8 W
Idling mode	568 W	548 W
Continuous copying mode (A4)	1,618 W	1,603 W

Environmental specifications

The environmental specifications must be maintained to ensure the proper operation of the MFP. Consider the following points before installing the MFP:

- Install the MFP in a well-ventilated, dust-free area.
- Install the MFP on a level, flat surface that can support its size and weight. Do not install on carpet or on other soft surfaces. Make sure that all four MFP feet are level.
- Install the MFP where temperature and humidity are stable, with no abrupt changes (away from water sources, humidifiers, air conditioners, refrigerators, or other major appliances).
- Install the MFP away from direct sunlight, areas that experience vibration, open flames, ammonia fumes, ultrasonic heaters, and devices that emit a magnetic field. If the MFP is placed near a window, make sure that the window has a curtain or blind to block direct sunlight.
- Maintain enough space around the MFP for proper access and ventilation.
- Be sure to use a power source of the voltage and frequency indicated in the product specifications. Ensure that the current carrying capacity of the power outlet is at least equal to the current listed in the product specifications.
- Power the machine directly from a dedicated power outlet. (Do not use an extension cord.)
- Do not plug or unplug the power cord with wet or dirty hands, to prevent an electric shock.

Table 5. Environmental specifications

	Allowable condition	Recommended condition
Operating temperature	10 to 30 Celsius (C) (50 to 86 Fahrenheit [F])	18 to 23 C (64 to 73 F)
Relative humidity	10 to 80 percent	40 to 60 percent

Table 6. Noise level specifications

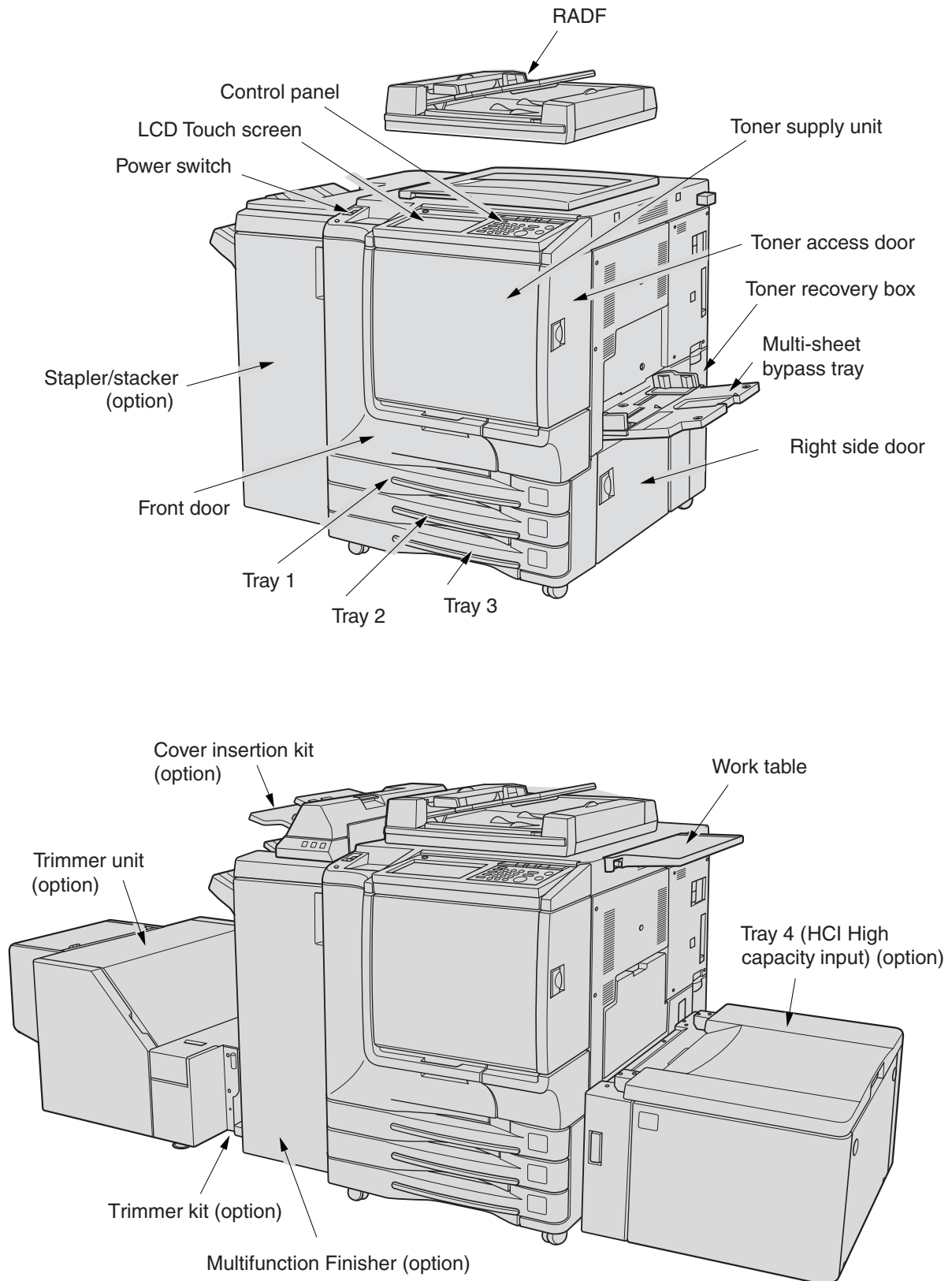
Acoustics	Printing (50 ppm)	Low power mode
Sound power level	$L_{WA} = 7.7 \text{ B(A)}$	essentially inaudible
Sound pressure level, L_{pAm} (Bystander position)	$L_{pAm} = 59 \text{ dB(A)}$	essentially inaudible

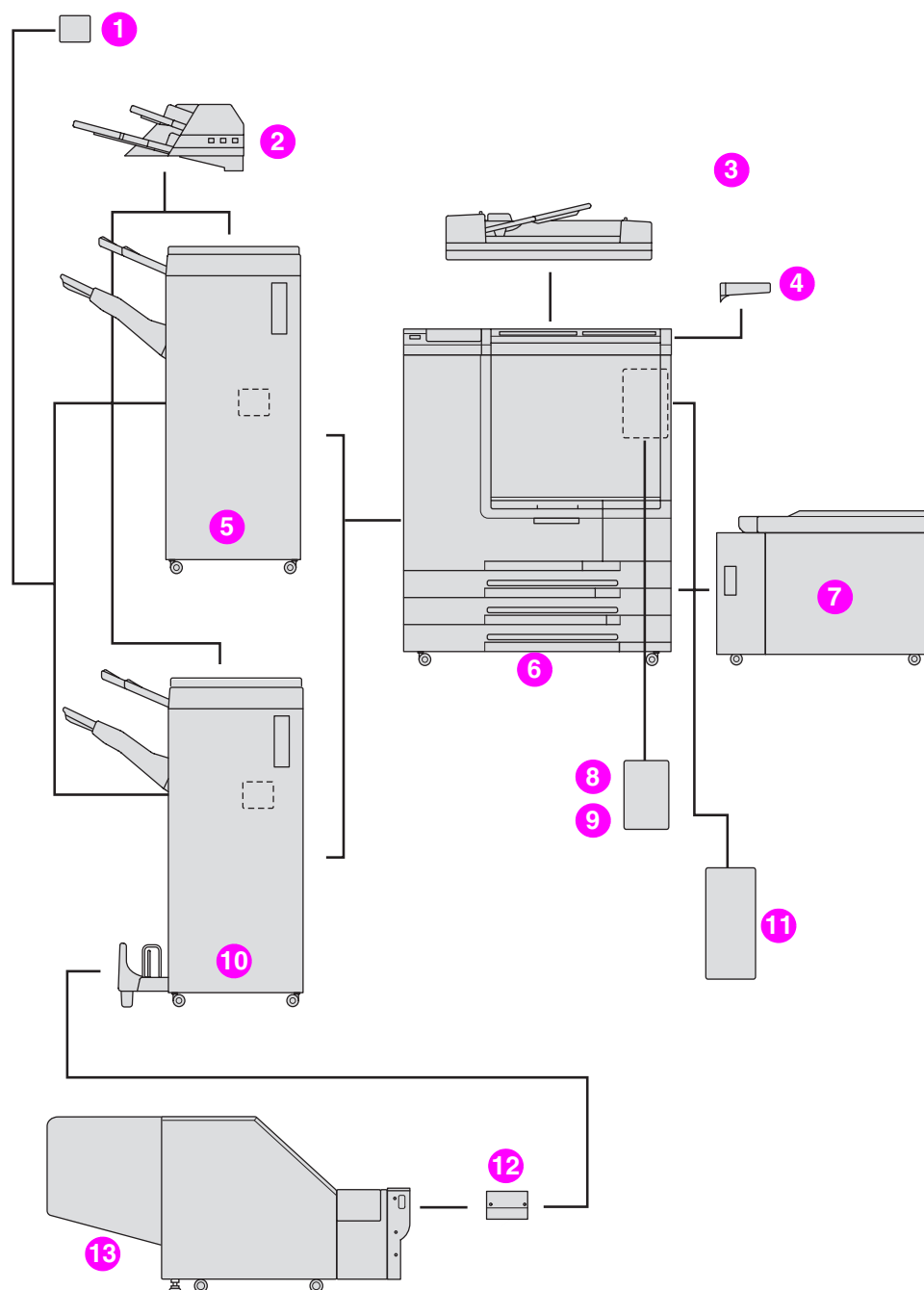
Note

Testing per International Standards Organization (ISO) 9296 and (ISO) 7779.

1.3 Product overview

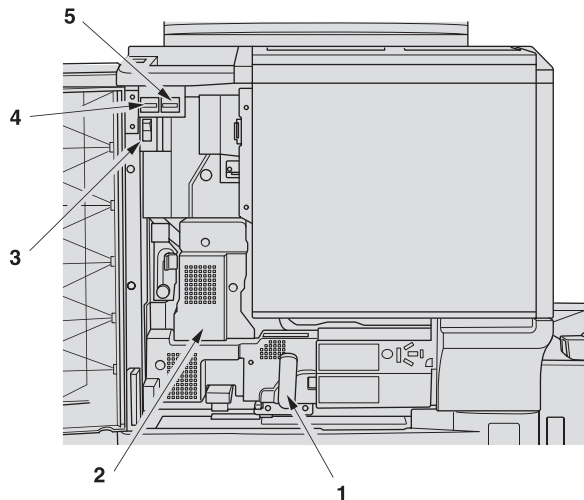
External assembly locations



Accessories**Standard/optional equipment**

- 1 HP 3 Hole Punch Kit
- 2 HP Post Insertion Kit
- 3 HP Automatic Document Feeder (RADF (ADF))
- 4 Work table
- 5 HP 3000-Sheet Stapler/Stacker
- 6 HP Color 9850mfp (engine)
- 7 HP 2500-Sheet High Capacity Input (HCI)
- 8 HP 256 MB Memory Module
- 9 HP Copy Controller Hard Drive
- 10 HP 3000-Sheet Multifunction Finisher
- 11 EFI Print Controller Kit
- 12 HP Trimmer Adapter Kit connects the Finisher and HP Trimmer Unit.
- 13 HP Trimmer Unit

Internal engine parts



- 1 Lever A can be moved to withdraw the ADU for removal of misfed paper.
- 2 Fixing unit fuses the toner onto the copy paper.
- 3 Main power switch (used only by a service representative) turns the engine power on and off.
- 4 Total counter indicates the total number of prints made.
- 5 Black print counter indicates the total number of the black prints made.

1.4 Space requirements

Printer with packaging

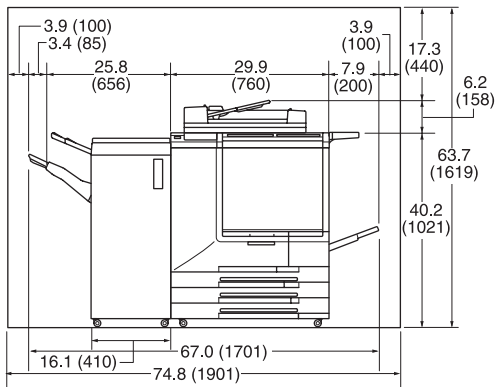
The shipping box that contains the HP Color 9850mfp is 950 mm (37.4 inches) wide, 1,258 mm (49.5 inches) deep and 1,210 mm (47.6 inches) high. The in-box weight of the HP Color 9850mfp is 361 kg (796 lb). The customer must locate a door or receiving area that is large enough to accept delivery of the shipping box.

Note

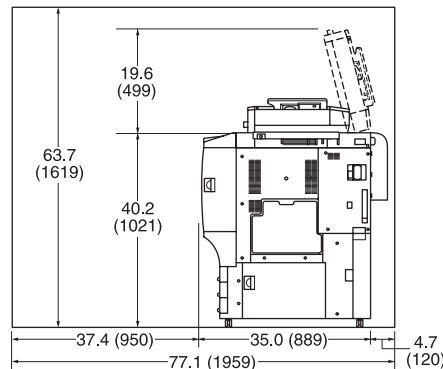
Before removing the printer from the box, make sure that adequate space is available to unpack the printer and to roll the product off of the shipping pallet. At least 10 feet of clearance around the box is required to remove all of the shipping materials.

Printer physical dimensions

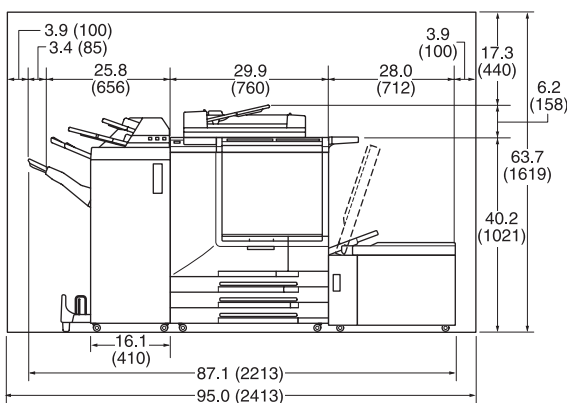
Install the MFP in an area with adequate space for performing all operations, replacing supply items, and conducting preventive maintenance.



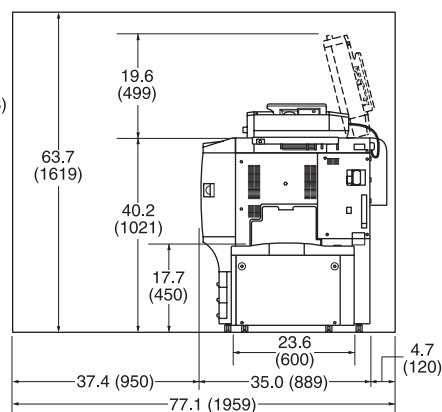
HP Color 9850mfp plus HP Automatic Document Feeder (Front) and 3000-sheet Stapler/Stacker



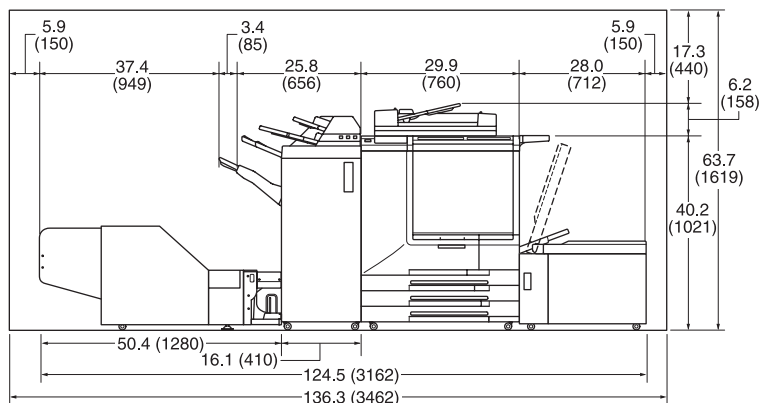
HP Color 9850mfp plus HP Automatic Document Feeder (Right side)



HP Color 9850mfp plus HP Automatic Document Feeder, HP 3000-Sheet Multifunction Finisher, HP Post Insertion Kit, and HP 2500-Sheet High Capacity Input (HCI) (Front)



HP Color 9850mfp plus HP Automatic Document Feeder and HP 2500-Sheet High Capacity Input (HCI) (Right side)



HP Color 9850mfp plus HP Automatic Document Feeder, HP 3000-Sheet Multifunction Finisher, HP Post Insertion Kit, HP 2500-Sheet High Capacity Input (HCI), and HP Trimmer Unit, (Front)

1.5 Setup

The initial printer setup includes the following steps:

- Remove the printer from the box.
- Set up and install the printer. See the *HP Color 9850 Install Guide*.
- Set up and install the finishing devices. See the install guide that came with the finishing devices.

The shipping box contains the following items:

- HP Color 9850mfp
- Rear cover
- One Ozone filter
- Four developers
 - Black
 - Yellow
 - Cyan
 - Magenta
- One developer charging funnel
- Four developing units
 - Black
 - Yellow
 - Cyan
 - Magenta
- Nails
- One transfer unit
- One belt cleaner unit
- One separation claw unit
- Three TP M3x6 screws
- One working table (shipped in Tray 2)
- HP Color 9850mfp System Administrator's Guide
- One manual holder (shipped in Tray 3)
- HP Color 9850mfp Installation Guide
- One primary power switch label
- One secondary power switch label

Note

The finishing devices are delivered in separate boxes.

1.6 Media specifications

Before purchasing large quantities of print media, make sure that it meets the requirements specified in this service manual and in the *HP Color 9850mfp System Administrator Guide*. Always test the print media before buying large quantities.

Hewlett-Packard neither warrants nor recommends the use of a particular brand of paper or print media other than HP media. Media properties are subject to manufacturing changes, and HP has no control over such changes. Although testing the media helps to characterize the performance and the manufacturer's process quality, the customer assumes all responsibility for the quality and performance of media.

CAUTION

Using print media that does not meet HP specifications might cause problems for the printer, requiring repair. Such repair is not covered by the Hewlett-Packard warranty or service agreements.

The HP Color 9850mfp accepts a variety of media, such as cut-sheet paper, labels, and custom-size paper. Properties such as weight, composition, grain, and moisture content are important factors affecting printer performance and output quality. Media that does not meet the guidelines outlined in this manual and in the print media guide can cause the following problems:

- poor print quality
- increased jams
- premature wear on the printer, requiring repair

Guidelines for selecting media

Selecting media by type and size at the control panel and in the MFP must be selected prior to print/copy. Using the wrong setting can result in unsatisfactory print quality. Always print by type for special print media such as labels.

Note

Some print media might meet all of the guidelines in this manual and still not produce satisfactory results. This might be the result of improper handling, unacceptable temperature and humidity levels, or other variables over which HP has no control.

If you are unsure what type of paper you are loading (such as bond or recycled), check the label on the package of paper.

- See Basis weight field test on [page 1-15](#) for information about measuring basis weight.
- See Caliper field test on [page 1-17](#) for information about measuring caliper.
- See Paper finish field test on [page 1-17](#) for information about smoothness.

Hint

Do not purchase more media than can be easily used in a short time (about 3 months). Media that is stored for long periods experiences heat and moisture extremes that can be damaging. Planning is important to prevent damage to a large supply of media.

Supported media and capacity for input and output

Note

The leading edge is listed first in the dimension measurements.

Table 7. Supported standard media sizes

Printing task	Trays 1, 2 and 3	Bypass tray	Tray 4 / HCI
Simplex, and duplex	letter, letter R, legal, 5.5 x 8.5R, A3, A4, A4R, A5R, B4, B5, B5R, 11 by 17, 12 by 18, and 13 by 19 inches	letter, letter R, legal, 5.5 x 8.5R, A3, A4, A4R, A5R, B4, B5, B5R, B6R, 11 by 17, 12 by 18, 13 by 19 in	letter, letter R, legal, A3, A4, B4, B5, 11 by 17, 12 by 18 and 13 by 19 inches

Table 8. Maximum custom sizes

Printing task	Trays 1, 2 and 3	Bypass tray	Tray 4 / HCI
Simplex, and duplex	330 by 487 mm (13 by 19.2 inches)	330 by 487 mm (13 by 19.2 inches)	330 by 487 mm (13 by 19.2 inches)

Table 9. Minimum custom sizes

Printing task	Trays 1, 2 and 3	Bypass tray	Tray 4 / HCI
Simplex and duplex	210 by 140 mm (8.27 by 5.51 inches)	100 by 148 mm (3.9 by 5.8 inches)	257 by 210 mm (10.1 by 8.3 inches)

Table 10. Supported media weights

Printing task	Trays 1, 2 and 3	Bypass tray	Tray 4 / HCI
Simplex and duplex	64 to 209 g/m² (17- to 115-lb)	64 to 256 g/m² (17- to 143-lb)	64 to 256 g/m² (17- to 143-lb)

Table 11. Input tray capacities

Type of media	Trays 1, 2 and 3	Bypass tray	Tray 4 / HCI
Cut sheets	Up to 400 sheets 28 lb paper	Up to 200 sheets 28 lb paper	Up to 2,200 sheets 28 lb paper

Table 12. Output bin capacities

Bin	75 g/m ² (20-lb bond)	105 g/m ² (28-lb bond)
Stapler/stacker	Up to 3000 sheets	Up to 2400 sheets
Multifunction finisher	Up to 3000 sheets	Up to 2400 sheets
Trimmer unit	Up to 500 sheets	Up to 410 sheets
Exit tray	up to 150 sheets	Up to 120 sheets

CAUTION

Do not use paper that is heavier than 200 g/m² (53-lb bond) for duplex printing. Damage to the printer and jams might result.

Coated paper of 106g/m² to 256g/m² is fed one at a time by by-pass feed. However, it is possible to feed it through HCI (optional).

Double sided copy is unavailable for special paper that is other than the ordinary paper of 105g/m² to 200g/m².

Recommended media

The media types that are listed in the following table meet these criteria:

- They have been tested in this printer.
- They have proven to be of good quality.
- They work well with the printer's settings.

Ordering recommended media

The product numbers for media are listed in parentheses after the media sizes. Use these product numbers when ordering media.

All of the HP-brand media is available at <http://www.hpshopping.com> or from your local office supplies retailer.

Note Set the type at the control panel when you load the trays.

Table 13. Recommended media

Recommended media	Type	Characteristics
HP High Gloss Laser Paper letter (Q2419A) 11 by 17 (tabloid) (Q2420A) A3 (Q2422A)	COATED 106-162 g/m ² WEIGHT 4	120 g/m ² (32-lb bond), 200 sheets, high-gloss finish coating on both sides, 95 bright Use for: brochures, catalogs, business plans, photographs, and images
HP Premium Cover Paper letter (Q2413A)	COATED 209-256 g/m ² WEIGHT 6	200 g/m ² (75-lb cover), 100 sheets, super-smooth matte finish on both sides, 96 bright Use for: postcards and document covers
HP Color Laser Paper letter (HPL245R)	NORMAL 81-105 g/m ² WEIGHT 3	90 g/m ² (24-lb bond), 500 sheets, smooth matte finish on both sides, 96 bright Use for: newsletters and color documents
HP Color Laser Paper 105 g/m ² (28-lb bond) letter (HPL285R)	NORMAL 81-105 g/m ² WEIGHT 3	105 g/m ² (28-lb bond), 500 sheets, smooth matte finish on both sides, 96 bright Use for: newsletters and color documents
HP Soft Gloss Laser Paper A4 (C4179B)	NORMAL 106-162 g/m ² WEIGHT 4	120 g/m ² (32-lb bond), 200 sheets, satin finish coating on both sides, 96 bright Use for: flyers, handouts, sales briefs, proposals, and color images

Table 13. Recommended media (continued)

Recommended media	Type	Characteristics
HP Soft Gloss LaserPaper 105 g/m ² (28-lb bond) 11 by 17 (tabloid) (Q2416A) A4 (Q2417A)	NORMAL 81-105 g/m WEIGHT 4	105 g/m ² (28-lb bond), 500 sheets, satin finish coating on both sides, 96 bright Use for: flyers, handouts, sales briefs, proposals, and color images
HP Premium Choice LaserJet Paper letter (HPU1132) 11 by 17 (tabloid) (HPU1732)	NORMAL 106-162 g/m WEIGHT 4	120 g/m ² (32-lb bond), 500 sheets (250 sheets for 11 by 17), matte finish on both sides, 98 bright Use for: proposals and charts
HP LaserJet Paper letter (HPJ1124) legal (HPJ1424)	NORMAL 81-105 g/m WEIGHT 3	90 g/m ² (24-lb bond), 500 sheets, matte finish on both sides, 96 bright Use for: reports, user manuals, letterhead, and correspondence
HP Multipurpose Office Paper letter (HPC8511) letter (Q1298A) letter (HPM1120) letter (HPA510) letter (HPP1122) 85 g/m ² (22-lb bond) legal (HPM1420) 11 by 17 tabloid (HPBC17) 11 by 17 tabloid (HPM1720)	NORMAL 75-80 g/m WEIGHT 4	75 g/m ² (20-lb bond), 500 sheets Use for: Everyday office documents

Table 14. Media weight, finish, and type

Weight	Finish	Type
Less than 75 g/m† (20-lb bond)	any	NORMAL 64-74 g/m
75 g/m † (20lb bond) to 105 g/m† (28-lb bond)	matte	NORMAL 75-105 g/m
75 g/m † (20lb bond) to 105 g/m† (28-lb bond)	glossy	COATED 75-105 g/m *
106 g/m† (29-lb bond) to 163 g/m† (43-lb bond)	matte	COATED 106-162 g/m
106 g/m† (29-lb bond) to 163 g/m† (43-lb bond)	glossy	COATED 106-162 g/m
164 g/m† (44-lb bond) and heavier	any	COATED 163-256 g/m

* Copy mode only

Special media specifications

Label specifications

CAUTION

To avoid damaging the printer, use only labels that are recommended for laser printers. Never print on the same sheet of labels more than once and never print on a partial sheet of labels.

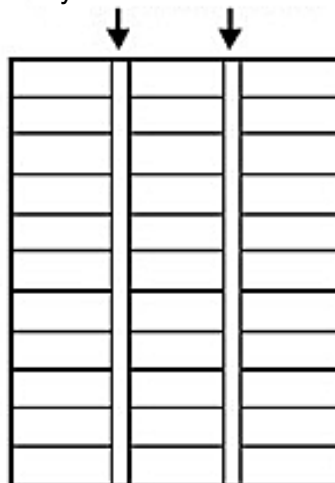
When selecting labels, consider the quality of each component:

- **Adhesives:** The adhesive material should be stable at 200 °C (392 °F), which is the MFP fusing temperature.
- **Arrangement:** Do not use labels that have exposed backing between them. Labels can peel off sheets with spaces between the labels, causing jams.
- **Curl:** Prior to printing, labels must lie flat with no more than 13 mm (0.5 inch) of curl in any direction.
- **Condition:** Do not use labels that have wrinkles, bubbles, or other indications of separation.

Note

Use only the bypass tray to print on labels. Feed one by one. Send labels straight through the printer, entering at the bypass tray and exiting from the exit tray.

Carrier sheet exposed
only in vertical columns



Card stock construction

When selecting card stock, consider the quality of each component:

- **Smoothness:** 135- to 220-g/m² (36- to 58-lb bond) card stock should have a smoothness rating of 100 to 180 Sheffield.
- **Curl:** Card stock should lie flat with less than 5 mm (0.2 inch) of curl.
- **Condition:** Make sure that the card stock is not wrinkled, nicked, or otherwise damaged.
- **Size:** See Supported media and capacity for input and output on [page 1-10](#).
- **Weight:** Card stock of 200 g/m² (53 lb) or less can be loaded in any tray. Card stock heavier than 200 g/m² (53 lb) must be printed from the bypass tray.

Note

When printing on card stock, make sure to set the **CARDSTOCK** type at the control panel when you load the tray, and in the printer driver when you print your print job.

Glossy media

Keep these considerations in mind when selecting or printing on glossy media:

- Print quality can vary with the media used. For best results, use HP-brand glossy media.
- When using media that has only one glossy side, make sure to orient the media so that the printer prints on the glossy side.

Note

When printing on glossy media that is between 75 g/m² (20-lb bond) and 105 g/m² (28-lb bond) in weight, make sure to set the **COATED** type at the control panel when you load the tray, and in the printer driver when you print your print job.

When printing on HP-brand glossy media that is between 106 g/m² (29-lb bond) and 163 g/m² (43-lb bond) in weight, make sure to set the **NORMAL 106-162 g/m** type at the control panel when you load the tray, and in the printer driver when you print your print job.

When printing on non HP-brand glossy media that is between 106 g/m² (29-lb bond) and 163 g/m² (43-lb bond) in weight, make sure to set the **NORMAL 106-162 g/m** type at the control panel when you load the tray, and in the printer driver when you print your print job.

Media with cutouts or perforations

Avoid media with cutouts or perforations for these reasons:

- Cut fibers absorb more moisture and can increase waviness and media curl. This decreases the print quality near the cutout or perforated area.
- If printing occurs over a cutout hole, the transfer roller is contaminated with unused toner, creating light streaks on the paper.

Chemically treated media

Coatings such as lacquers, polymers, laminations, or other chemicals protect the paper, but can cause problems in the fuser and transfer areas of HP printers. The surface resistivity and moisture content can be greatly altered, resulting in print-quality problems. Hard surface coatings increase wear on the rollers and media guides. All chemically treated media must meet Hewlett-Packard specifications for fusing compatibility.

Synthetic media

Synthetic media (those manufactured from man-made fibers) do not perform as well as bond media in any printer, especially HP printers. All synthetic media must meet Hewlett-Packard specifications, especially for caliper and fusing compatibility.

Other special media

- Non-standard sizes. Check minimum and maximum supported sizes on [page 1-10](#).

Storing print media

Ideally, the printing and media storage environment should be at or near room temperature, and should not be too dry or too humid. Remember that paper is hygroscopic; it absorbs and loses moisture rapidly. Store paper in a cool dry area. Damp paper may cause misfeeds.

Heat works with humidity to damage paper. Heat causes the moisture in paper to evaporate, while cold causes it to condense on the sheets. Heating systems and air conditioners remove most of the humidity from a room. As a paper package is opened and used, it loses moisture, causing streaks and smudging. Humid weather or water coolers can cause the humidity in a room to increase. As a package of paper is opened and used, it absorbs any excess moisture, causing light print and dropouts. Also, as paper loses and gains moisture, it can distort. This can cause jams.

Therefore, paper storage and handling are as important as the paper-making process itself. Paper storage environmental conditions directly affect the feed operation.

Users should not purchase more paper than can easily be used in a short time (about three months). Paper stored for long periods might experience heat and moisture extremes, which can cause damage. Planning is important to prevent damage to a large supply of paper.

Unopened paper in sealed packages can remain stable for several months before use. Opened packages of paper have more potential for environmental damage, especially if they are not wrapped with a moisture-proof barrier.

The paper storage environment should be correctly maintained to ensure optimum printer performance. The required condition is 20 to 24 °C (68 to 75 °F), with a relative humidity of 45 percent to 55 percent. The following guidelines should be helpful when evaluating the paper's storage environment:

- Paper should be stored at or near room temperature, laying flat. Do not store packages vertically.
- The air should not be too dry or too humid (because of the hygroscopic properties of paper).
- The best way to store an opened package of paper is to rewrap it tightly in its moisture-proof wrapping. If the printer environment is subject to extremes, unwrap only the amount of paper to be used during the day's operation to prevent unwanted moisture changes.

Testing media specifications

The following tests describe ways to evaluate media with respect to the specifications listed in this manual, and the *HP LaserJet Printer Family Print Media Guide*. See Media assessment tools and suppliers on [page 1-19](#) for help obtaining the tools that are needed to perform these tests.

Basis weight field test

The basis weight should be indicated on the package label. If the label is not available, a simple field test can determine the basis weight of paper. The basis weight of paper is equal to the weight of 2,000 sheets of paper, or about four full packages. Weigh a full package on a postal scale and then multiply that weight by four. Or weigh 10 sheets of paper, divide that weight by 10, multiply by 2,000, and then divide by 16.

Example

10 sheets weigh 1.6 ounces 1 0
 0.16 ounce x 2,000 = 320 ounces
 320 ounces ÷ 16 ounce/lb = 20 lb paper (letter only)

Table 15. Determining basis weight of paper

Amount	Formula
Four packages	weight = basis weight
One package	weight x 4 = basis weight
10 sheets	(weight divided by 10) x 2,000 and then divided by 16 = basis weight

Metric sizes

For metric-size paper (A4), use the following method to determine basis weight.

Take 16 sheets of A4 paper and weigh them. One square meter of paper contains approximately 16 A4 size sheets. Compare this weight to the appropriate weight in the paper weight equivalence table.

Paper weight equivalence table

Use this table to determine approximate equivalent points in weight specifications other than U.S. bond weight. For example, to determine the equivalent of 20 lb U.S. bond-weight paper in U.S. cover-weight paper, locate the bond weight (in row 3, second column) and scan across the row to the cover weight (in the fourth column). The equivalent is 28 lb. Shaded areas indicate a standard weight for that grade.

Table 16. Paper weight equivalence

U.S. post-card thickness (mm)	U.S. bond weight (lb)	U.S. text/book weight (lb)	U.S. cover weight (lb)	U.S. bristol weight (lb)	U.S. index weight (lb)	U.S. tag weight (lb)	Europe metric weight (g/m ²)	Japan metric weight (g/m ²)
	17	43	24	29	35	39	64	64
	20	50	28	34	42	46	75	75
	21	54	30	36	44	49	80	80
	22	56	31	38	46	51	81	81
	24	60	33	41	50	55	90	90
	27	68	37	45	55	61	100	100
	28	70	39	49	58	65	105	105
	32	80	44	55	67	74	120	120
	34	86	47	58	71	79	128	128
	36	90	50	62	75	83	135	135
0.18	39	100	55	67	82	91	148	148
0.19	42	107	58	72	87	97	157	157
0.20	43	110	60	74	90	100	163	163
0.23	47	119	65	80	97	108	176	176
	53	134	74	90	110	122	199	199
	54	137	75	93	113	125	203	203
	58	146	80	98	120	133	216	216
	65	165	90	111	135	150	244	244
	66	169	92	114	138	154	250	250
	67	171	94	115	140	155	253	253
	70	178	98	120	146	162	264	264
	72	183	100	123	150	166	271	271

Note

The U.S. postcard measurements are approximate. Use for reference only.

Caliper field test

The specified caliper differs according to the type of media used. Caliper can be measured in the field by using a micrometer.

CAUTION

Never use the coarse adjustment end of the micrometer when measuring for caliper. The coarse adjustment will compress the paper fibers, resulting in an inaccurate reading. For example, if the fibers are compressed, 6 mm (0.24 inch) paper could measure as little as 3 mm (0.12 inch). Always use the fine adjustment to measure caliper.

Using the fine adjustment, slide the micrometer along the edge of the paper and measure at one end. To double-check the accuracy of the reading, always measure again at the opposite end of the paper.

Paper finish field test

Paper finish, or smoothness, can be accurately measured with a Sheffield meter. If this tool is not available, a new U.S. dollar bill can be used as a benchmark for comparing paper texture. A dollar bill has a finish of 350 Sheffields. If paper feels rougher than a dollar bill, it is recommended that users do not continually use this paper in the printer.

Moisture content field test

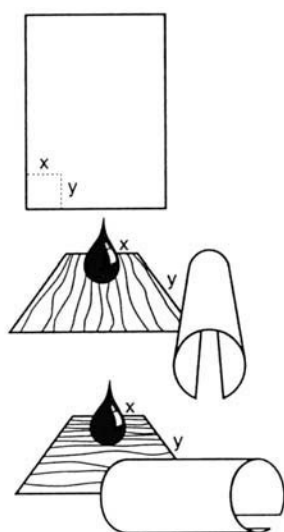
Specification: Use paper with 4 percent to 6 percent moisture content.

A package or a sheet of paper can be measured with a moisture meter. In general, only evaluate customer storage environment when trying to determine if excess moisture or dryness is the cause of a problem with paper.

Grain field test

Grain direction is usually specified on the package label (written out long or short). The paper dimensions listed on the label also indicate grain direction. For example, short-grain letter-size paper labels are marked 11 by 8.5, and long-grain paper labels are marked 8.5 by 11."

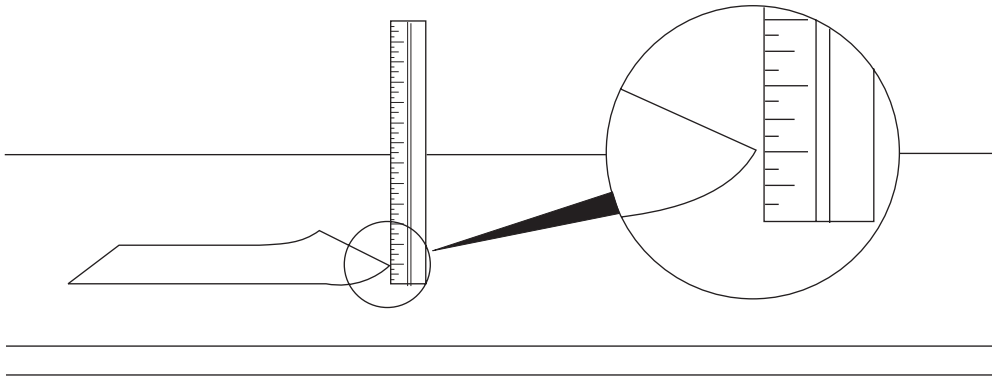
If grain direction is not included on the package label, it can be determined by a simple wet test. Cut a small square from the corner of a sheet of paper, wet it, and observe the manner in which it curls.



Long, short, and diagonal grain curl

Curl field test

To check for paper curl, place a single sheet of paper on a flat surface and measure curl at the greatest deflection, holding a ruler perpendicular to the flat surface.



Measuring curl

Cut edge condition field test

The condition of the cut edge can be easily observed with an eye loop. Under magnification, a good edge will appear even. A poorly cut edge will show fraying, jagged edges, compressed fibers, and other damage.

Furnish (fiber composition) field test

Use paper made from 100 percent chemical wood pulp and/or cotton fiber. Recycled paper made with no more than 5 percent groundwood is also acceptable.

Read the package label to determine the fiber composition of the paper. Paper is usually specified as xerographic bond (suitable for copiers or laser printers) or cotton bond. Cotton bond paper of 25 percent, 50 percent, or 100 percent will be indicated on a watermark. If paper is less than 25 percent cotton bond, the watermark will not indicate a percentage. A wood pulp test kit can also be used to test fiber composition.

Fusing compatibility field test

Inspect the rollers for colored ink buildup from preprinted logos or letterhead, and for toner buildup or spots. Inspect printed output for repetitive defects and smearing. If necessary, have users contact the forms vendor to ensure paper fusing compatibility with HP LaserJet printers.

1.7 Media assessment tools and suppliers

Hewlett-Packard neither warrants nor recommends a particular manufacturer, supplier, or tool. Products are subject to change, and HP has no control over such changes. However, the following table of tools and their suppliers is provided for convenience.

Table 18. Tools and suppliers

Tool	Part Number	Supplier Address
Paper moisture meter	2RRDMP	Mitchell Instrument 1570DDD Cherokee St. San Marcos, CA 92069-2433
Single-sheet clamp probe	2R43E	Mitchell Instrument 1570DDD Cherokee St. San Marcos, CA 92069-2433
Temperature/humidity meter	#3T331	Industrial Motor Service 2000 Albright Montgomery, IL 60538
Sheffield tester: precisionaire column	TM 58-25-01	TMI Testing Machines Inc. 400 Bayview Avenue Amityville, NY 11701 (516) 842-5400
Sheffield tester: smooth check gauge	TM 58-25-02	TMI Testing Machines Inc. 400 Bayview Avenue Amityville, NY 11701 (516) 842-5400
Wood pulp test kit	4280-2	Shape Products 1127 57th Avenue Oakland, CA 94621 (800) 444-0015
pH test kit	4360-2	Shape Products 1127 57th Avenue Oakland, CA 94621 (800) 444-0015
Resistivity test tool: precision current/resistance meter	278	Monroe Electronics 100 Housel Avenue PO Box 100 Lyndonville, NY 14098 (800) 821-6001
Resistivity test tool: surface resistivity probe	96117-1	Monroe Electronics 100 Housel Avenue PO Box 100 Lyndonville, NY 14098 (800) 821-6001

1-20

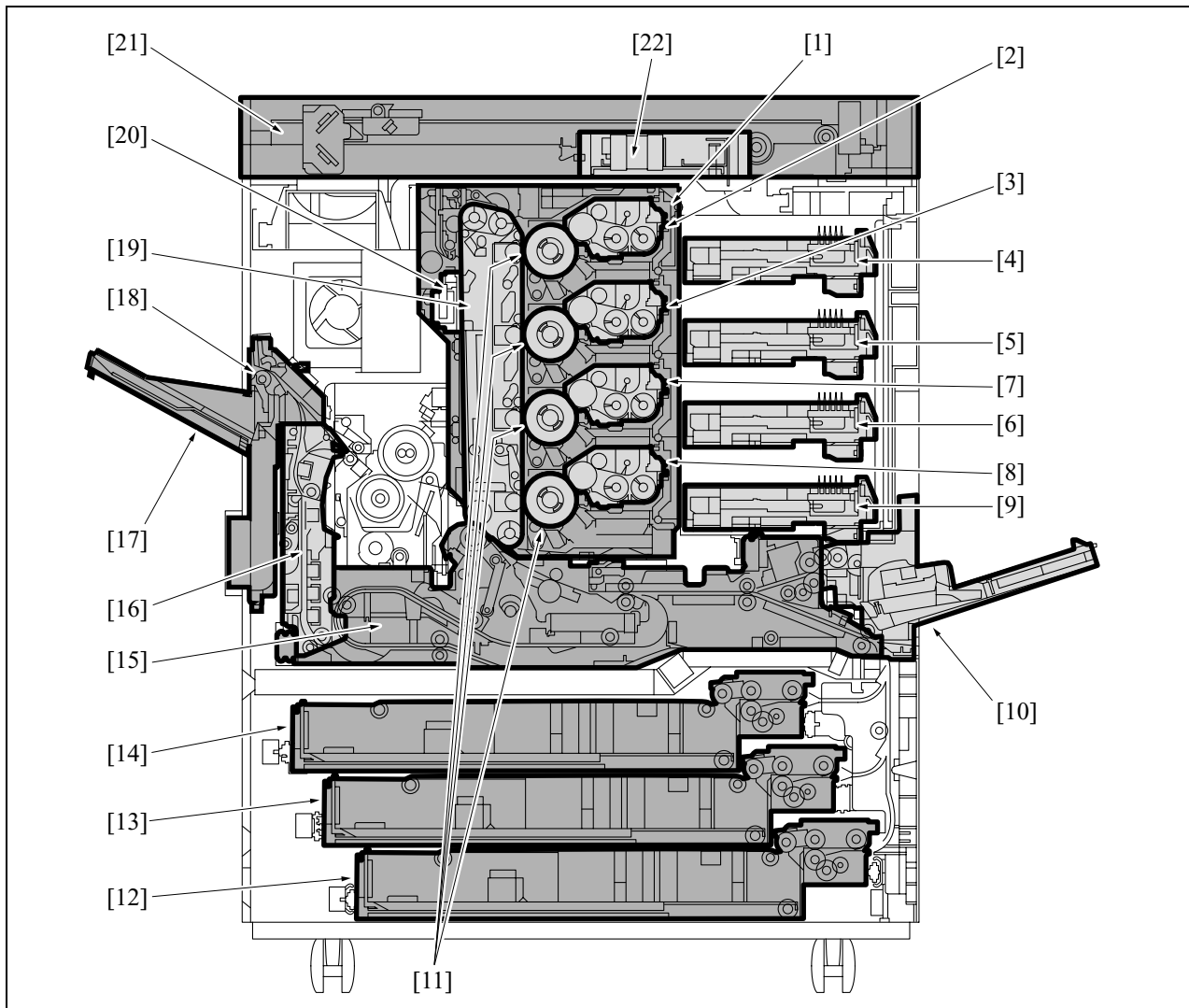
No. of originals in memory:	Full color:	Priority in high resolution: 18 faces or more Priority in smooth tone: 18 faces or more Priority in high compression: 38 faces or more Conditions: Original: KC #101/A3 (color) Density: Manual 5 Mode: Character/picture, printed original, life size Memory capacity: Standard 128 MB only loaded
	Black-and-white/monochrome:	Priority in high resolution: 101 faces or more Priority in smooth tone: 101 faces or more Priority in high compression: 318 faces or more Conditions: Original: Image electronic institute FAX #4 chart/A4 Density: Manual 5 Mode: Character/picture, printed original, life size Memory capacity: Standard 128 MB only loaded Job: Job in the mode in which job memory is not used.
*2 Standard 128MB memory is packaged on the board. So, it cannot be changed for a new one. Four slots are provided for expansion, and it is possible to install an hp 256 MB memory module (Q6993A, 256MB x 4).		

1.9 Maintenance and life

Maintenance:	Once every 100,000 copies
Engine service life:	5,000,000 copies

Note:
• The information herein may be subject to change for improvement without notice.

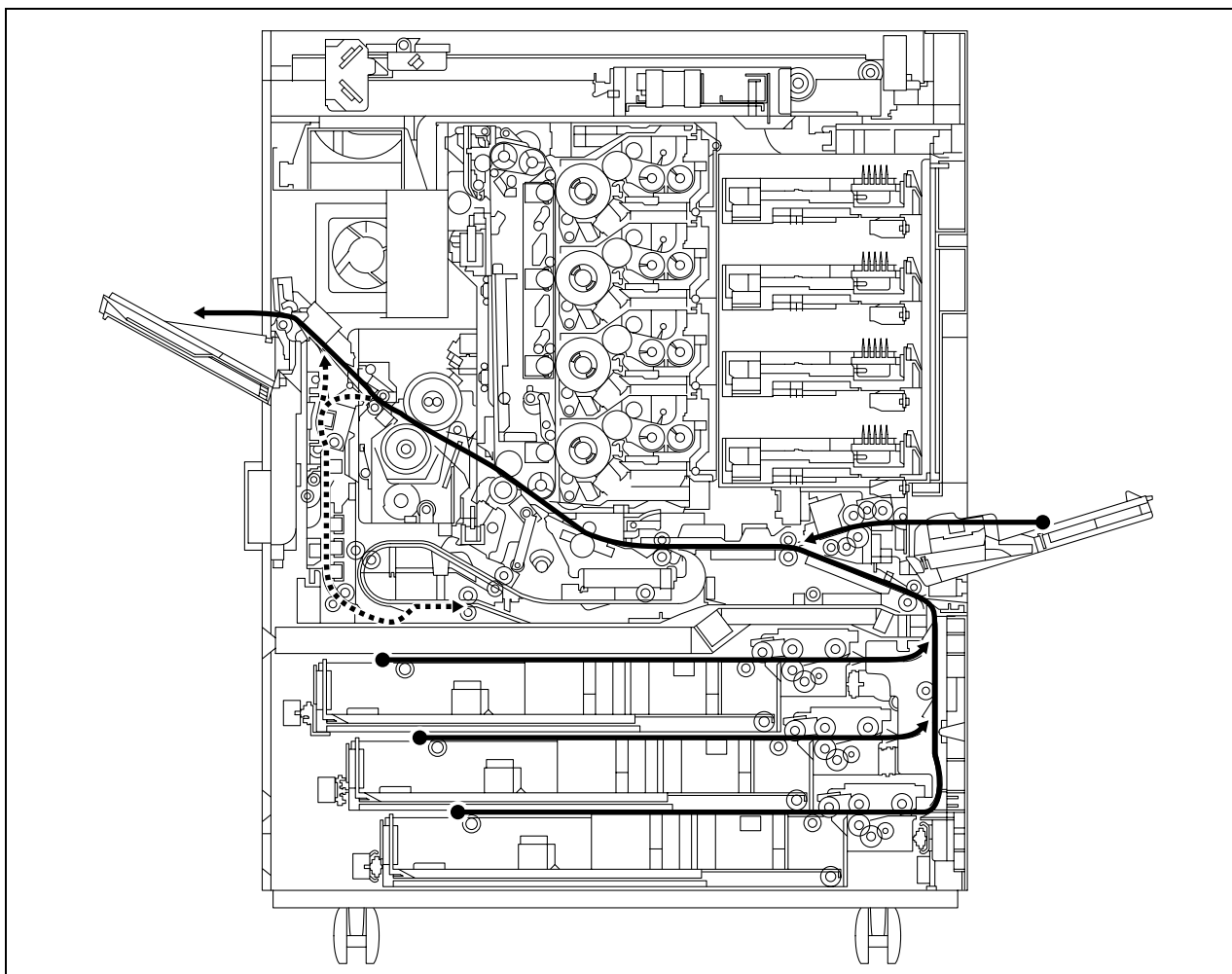
2. CENTER CROSS SECTION



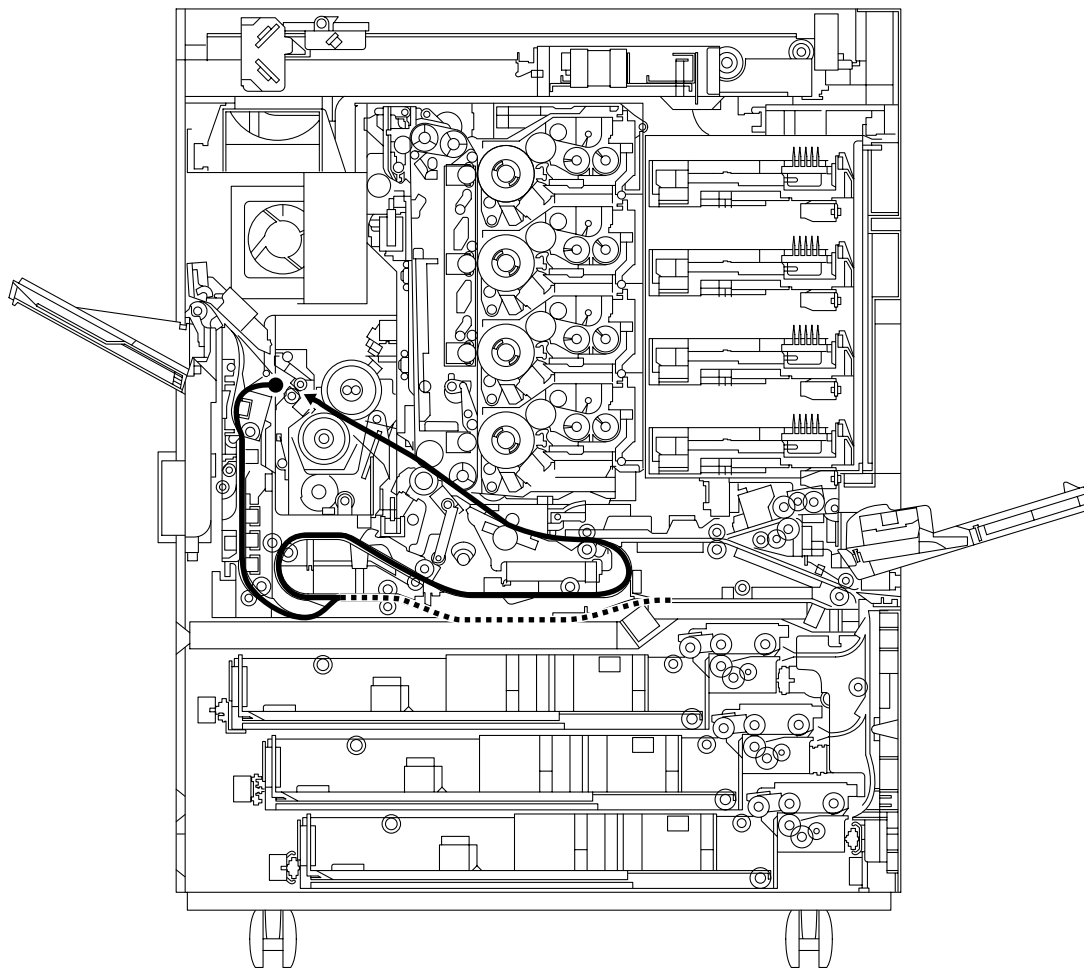
- | | |
|-----------------------|----------------------------|
| [1] Process unit | [12] Paper feed tray 3 |
| [2] Developing unit Y | [13] Paper feed tray 2 |
| [3] Developing unit M | [14] Paper feed tray 1 |
| [4] Write unit Y | [15] ADU |
| [5] Write unit M | [16] Reverse section |
| [6] Write unit C | [17] Paper exit tray |
| [7] Developing unit C | [18] Paper exit section |
| [8] Developing unit K | [19] Transfer belt unit |
| [9] Write unit K | [20] Image correction unit |
| [10] By-pass tray | [21] Scanner section |
| [11] Drum | [22] CCD unit |

3. PAPER PATH

Front side

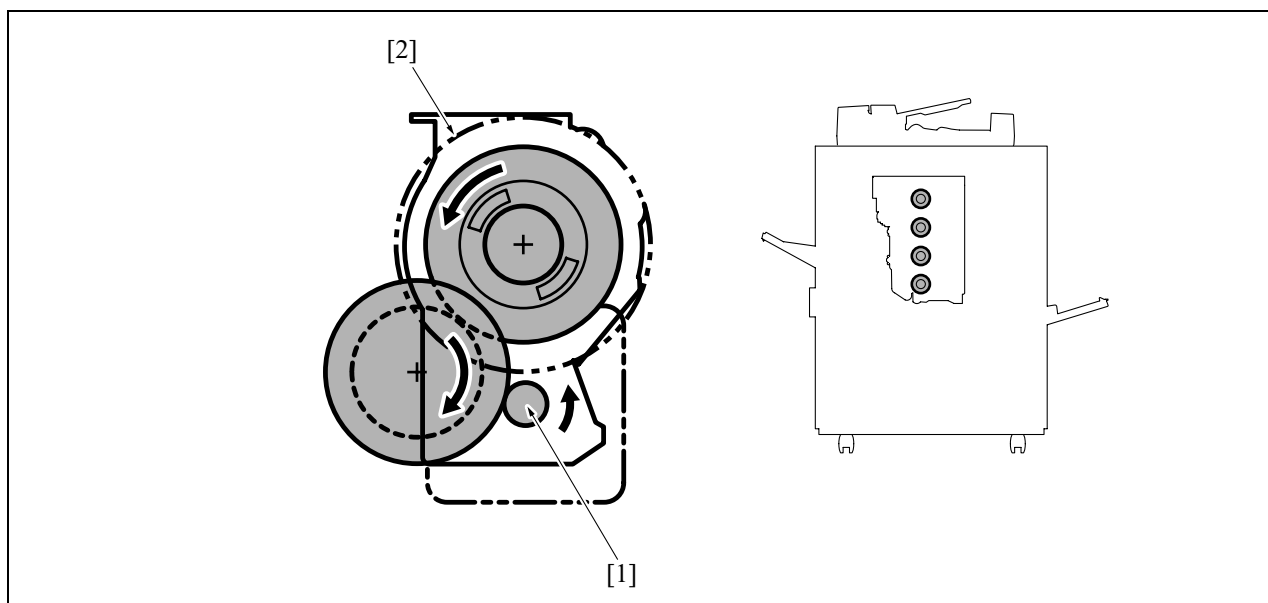


Back side



4. DRIVE SYSTEM DIAGRAM

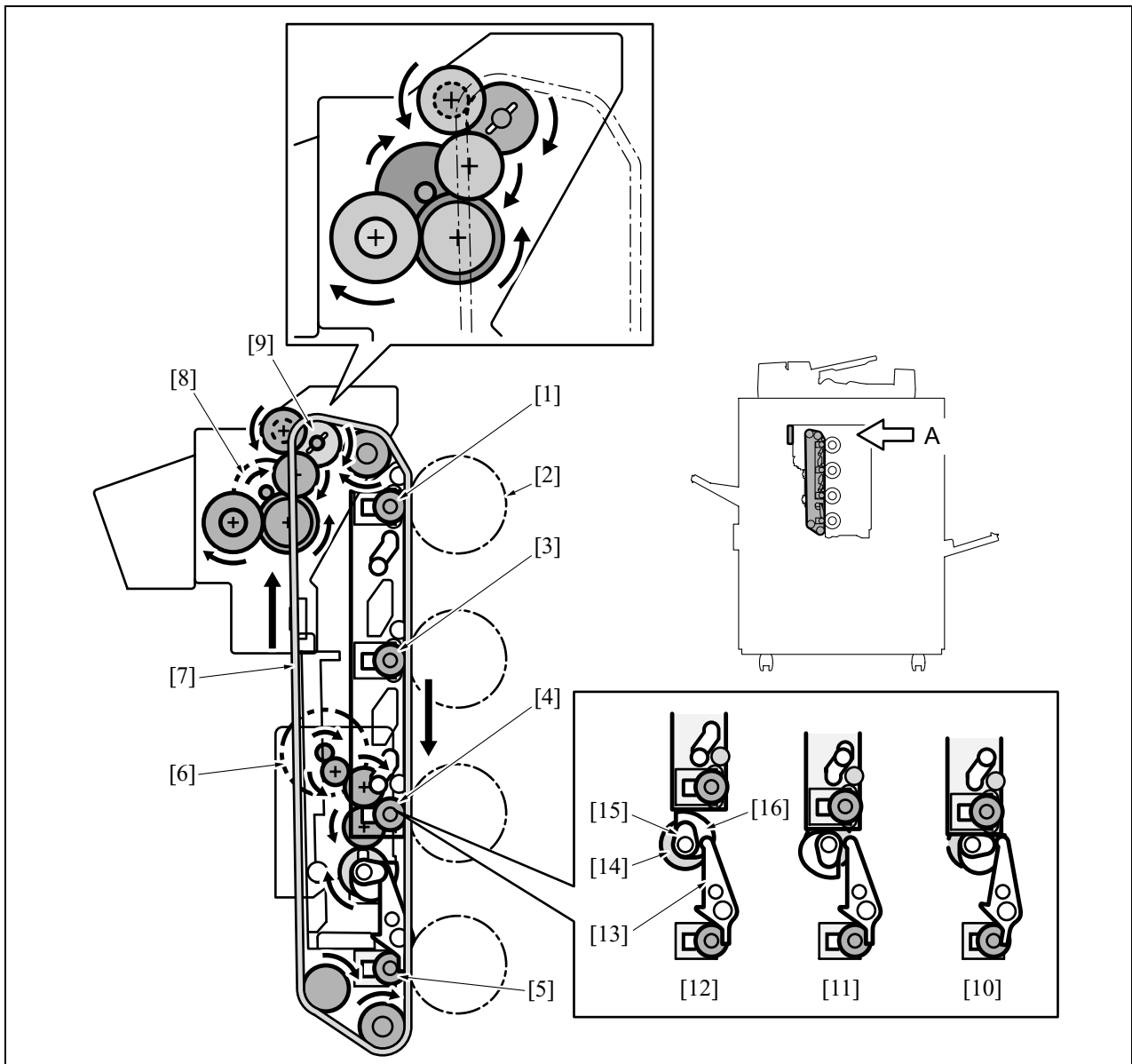
4.1 Drum drive



[1] Drum motor Y, M, C, K (M14, M15, M16, M17)

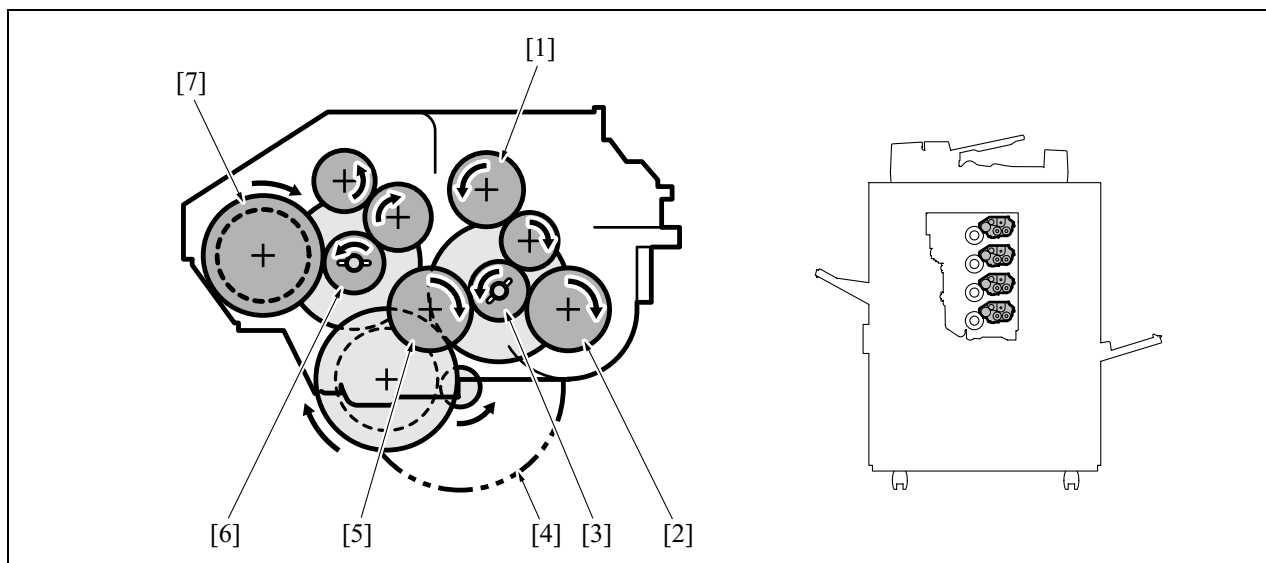
[2] Drum

4.2 Transfer belt conveyance/pressure drive



- | | |
|---|---|
| [1] 1st transfer roller Y | [9] Belt drive roller |
| [2] Drum | [10] While in stand-by (Total release) |
| [3] 1st transfer roller M | [11] Black-and-white mode
(Pressure on 1st transfer roller K only) |
| [4] 1st transfer roller C | [12] Full color mode (Total pressure) |
| [5] 1st transfer roller K | [13] 1st transfer roller K pressure release arm |
| [6] 1st transfer pressure/release motor (M19) | [14] Drive coupling |
| [7] Transfer belt | [15] 1st transfer roller K pressure release cam |
| [8] Transfer belt motor (M18) | [16] 1st transfer roller Y /M /C pressure release cam |

4.3 Developing drive



[1] Toner collection screw

[2] Toner agitator screw

[3] Developing coupling 2

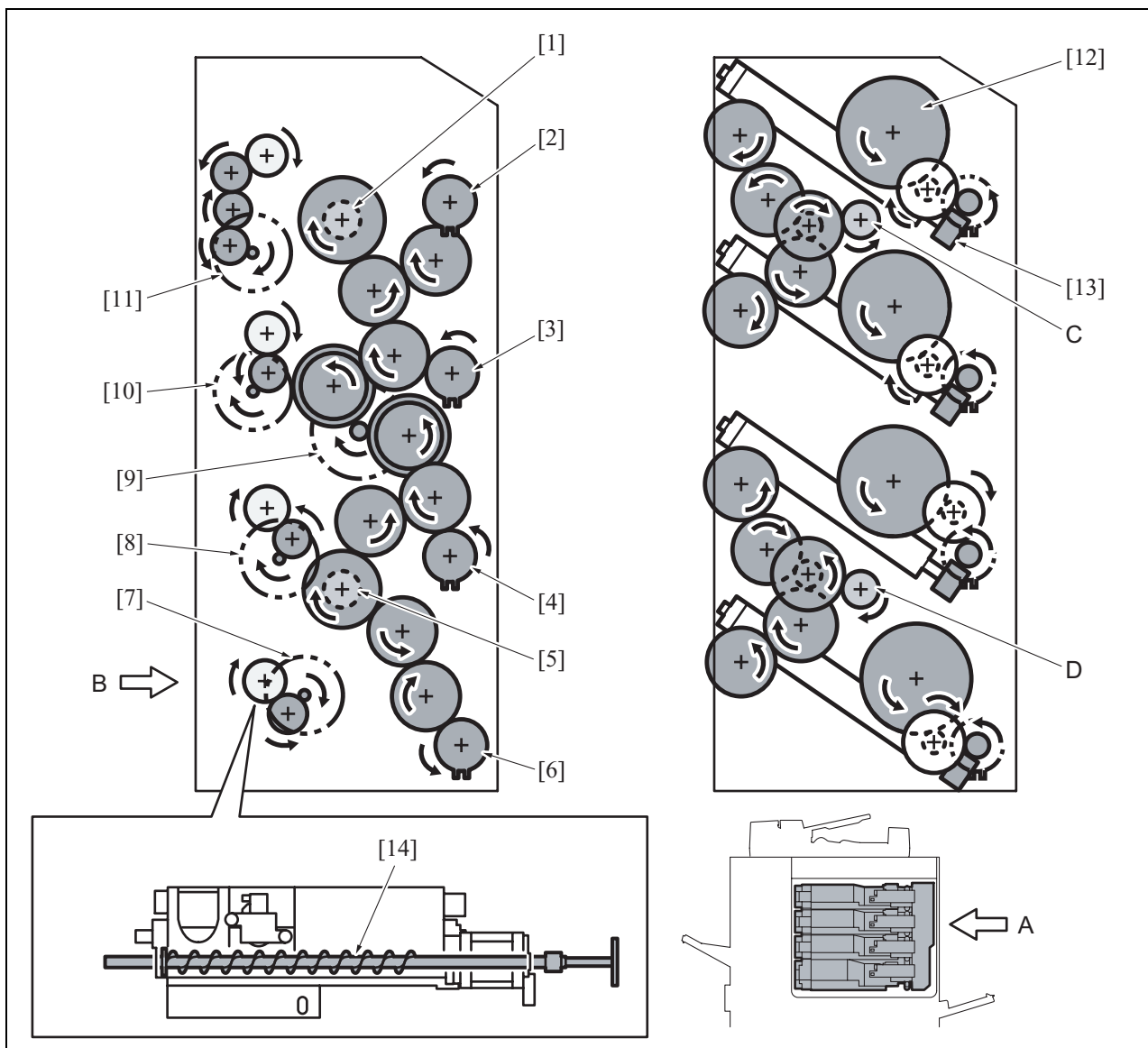
[4] Developing motor Y, M, C, K
(M20, M21, M22, M23)

[5] Toner conveyance screw

[6] Developing coupling 1

[7] Developing sleeve

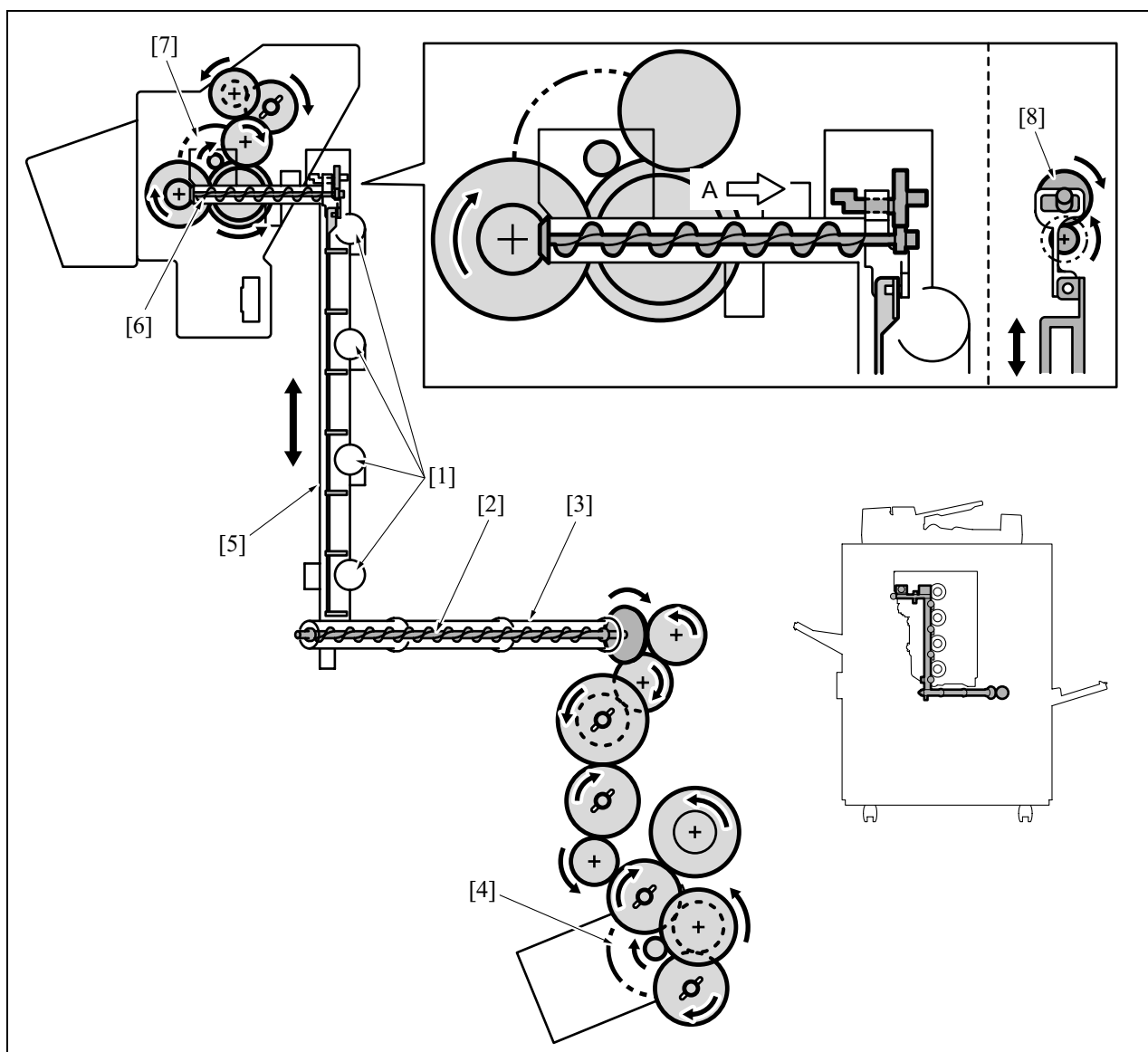
4.4 Toner supply drive



- [1] Toner supply gear A (Same shaft as C)
- [2] Toner bottle clutch Y (MC14)
- [3] Toner bottle clutch M (MC15)
- [4] Toner bottle clutch C (MC16)
- [5] Toner supply gear A (Same shaft as D)
- [6] Toner bottle clutch K (MC17)
- [7] Toner supply motor K (M52)

- [8] Toner supply motor C (M51)
- [9] Toner bottle motor (M53)
- [10] Toner supply motor M (M50)
- [11] Toner supply motor Y (M49)
- [12] Toner bottle drive gear
- [13] Toner conveyance screw
- [14] Toner supply screw

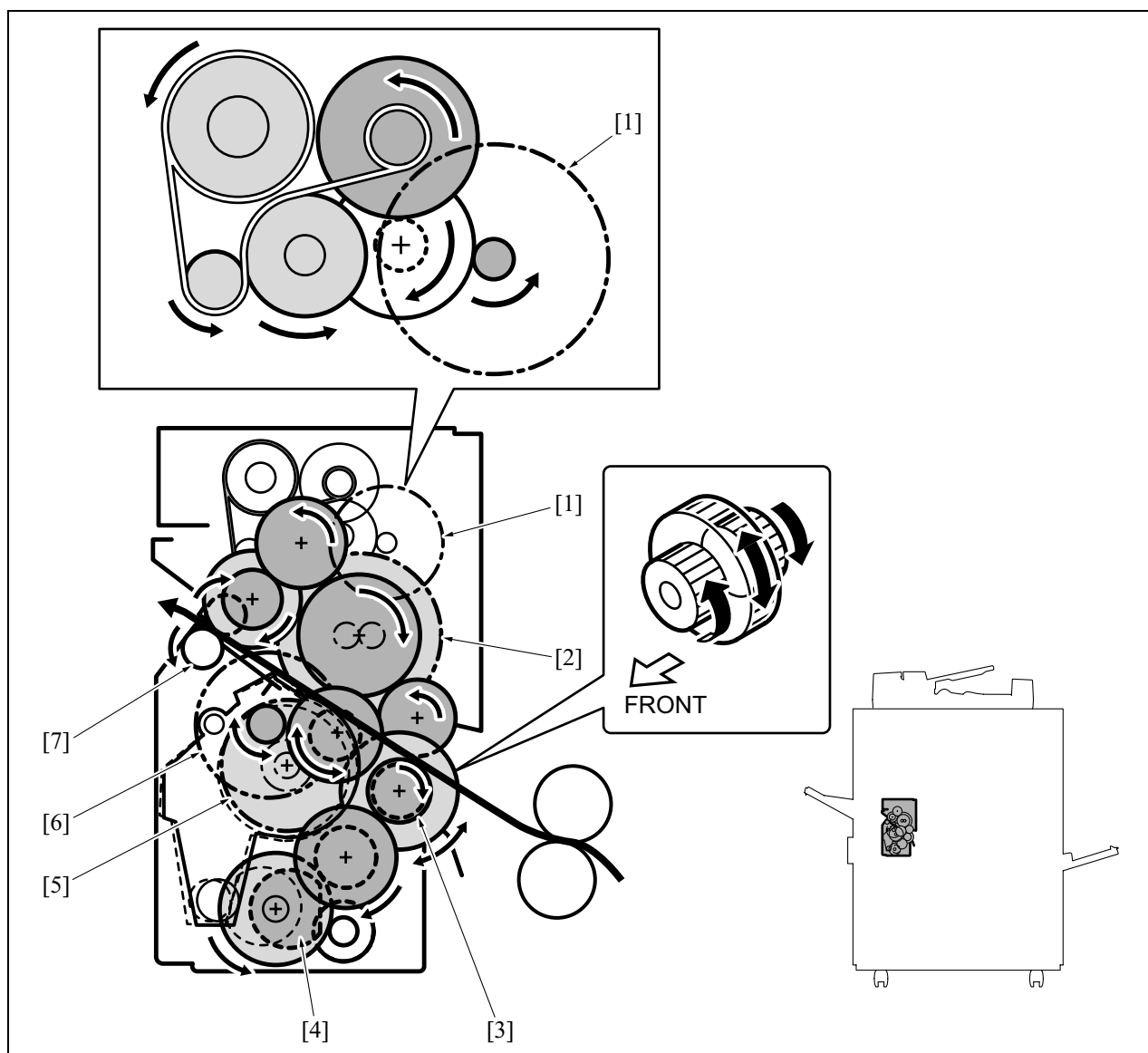
4.5 Toner collection drive



- [1] Drum waste toner receiving port
- [2] Horizontal conveyance screw
- [3] Horizontal conveyance pipe
- [4] Paper feed motor (M41)

- [5] Vertical conveyance pipe
- [6] Belt collection screw
- [7] Transfer belt motor (M18)
- [8] Belt collection drive cam

4.6 Fixing drive



[1] Web motor (M54)

[2] Fixing roller U

[3] One-way clutch

[4] Pressure/release cam

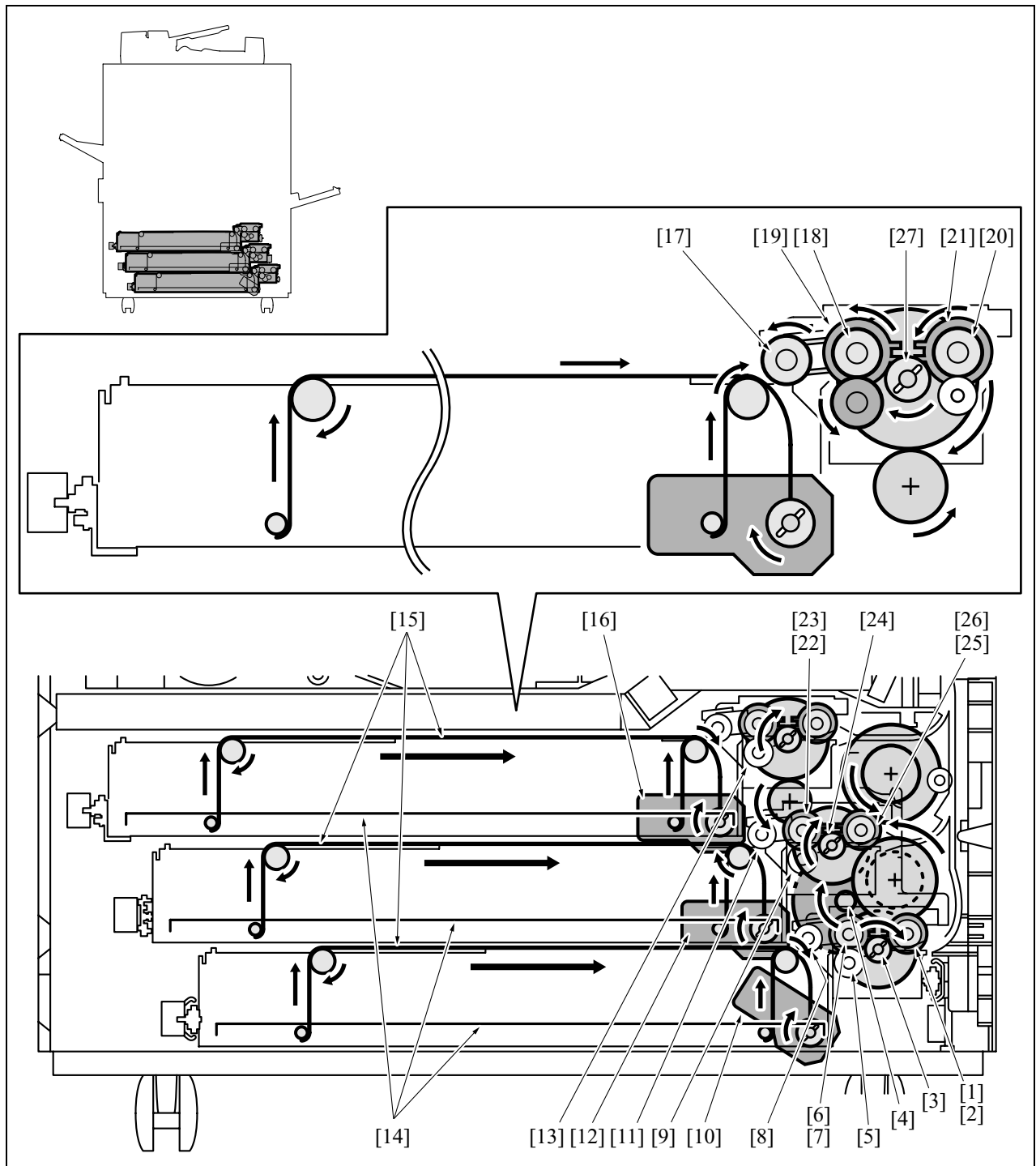
[5] Fixing roller L

[6] Fixing motor (M29)

[7] Fixing paper exit roller

4.7 Paper feed drive

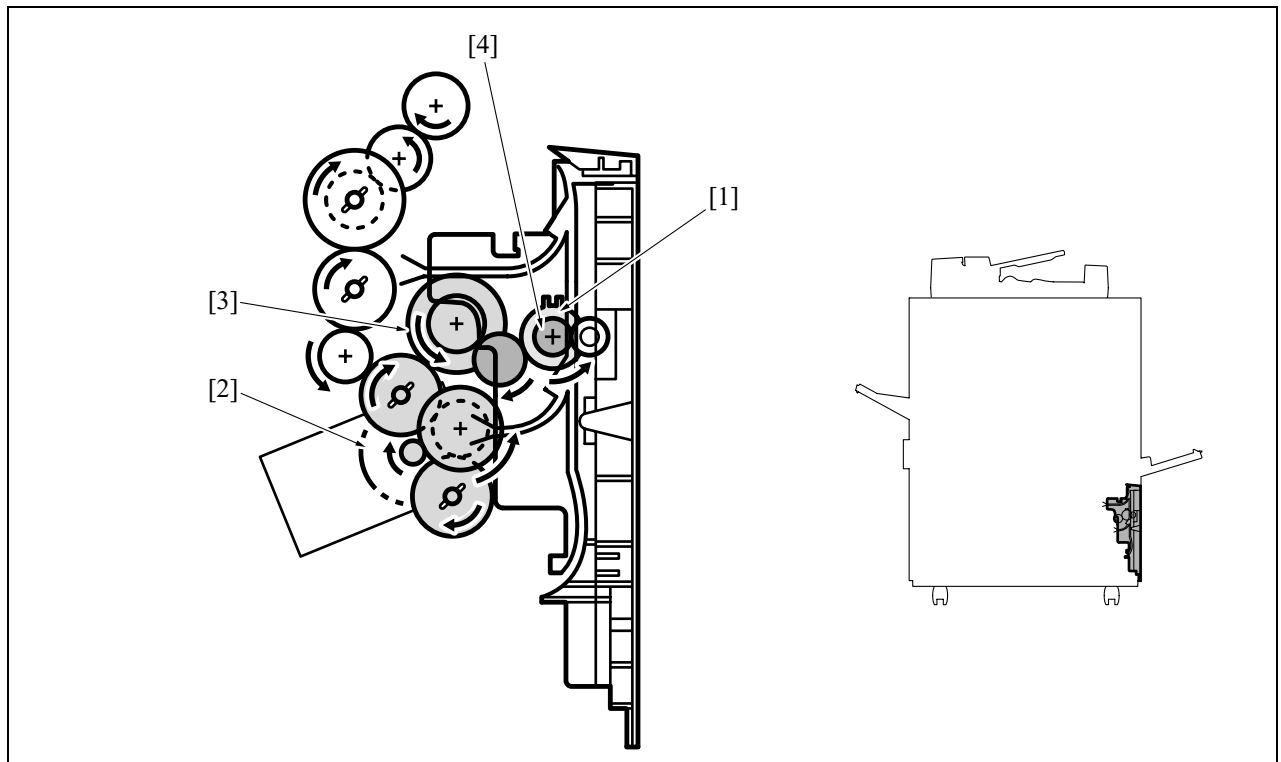
4.7.1 Paper feed tray 1 to 3 drive



- | | |
|--------------------------------------|--------------------------------------|
| [1] Pre-registration roller 3 | [8] Paper feed roller 3 |
| [2] Pre-registration clutch 3 (MC12) | [9] Double feed prevention roller 2 |
| [3] Drive coupling 3 | [10] Tray up drive motor 3 (M38) |
| [4] Paper feed motor (M41) | [11] Paper feed roller 2 |
| [5] Double feed prevention roller 3 | [12] Tray up drive motor 2 (M39) |
| [6] Feed roller 3 | [13] Double feed prevention roller 1 |
| [7] Paper feed clutch 3 (MC11) | [14] Paper feed tray |

- | | | | |
|------|---------------------------------|------|----------------------------------|
| [15] | Up/down wire | [22] | Feed roller 2 |
| [16] | Tray up drive motor 1 (M40) | [23] | Paper feed clutch 2 (MC9) |
| [17] | Paper feed roller 1 | [24] | Drive coupling 2 |
| [18] | Feed roller 1 | [25] | Pre-registration roller 2 |
| [19] | Paper feed clutch 1 (MC7) | [26] | Pre-registration clutch 2 (MC10) |
| [20] | Pre-registration roller 1 | [27] | Drive coupling 1 |
| [21] | Pre-registration clutch 1 (MC8) | | |

4.7.2 Vertical conveyance drive



- [1] Intermediate conveyance clutch 1 (MC13)

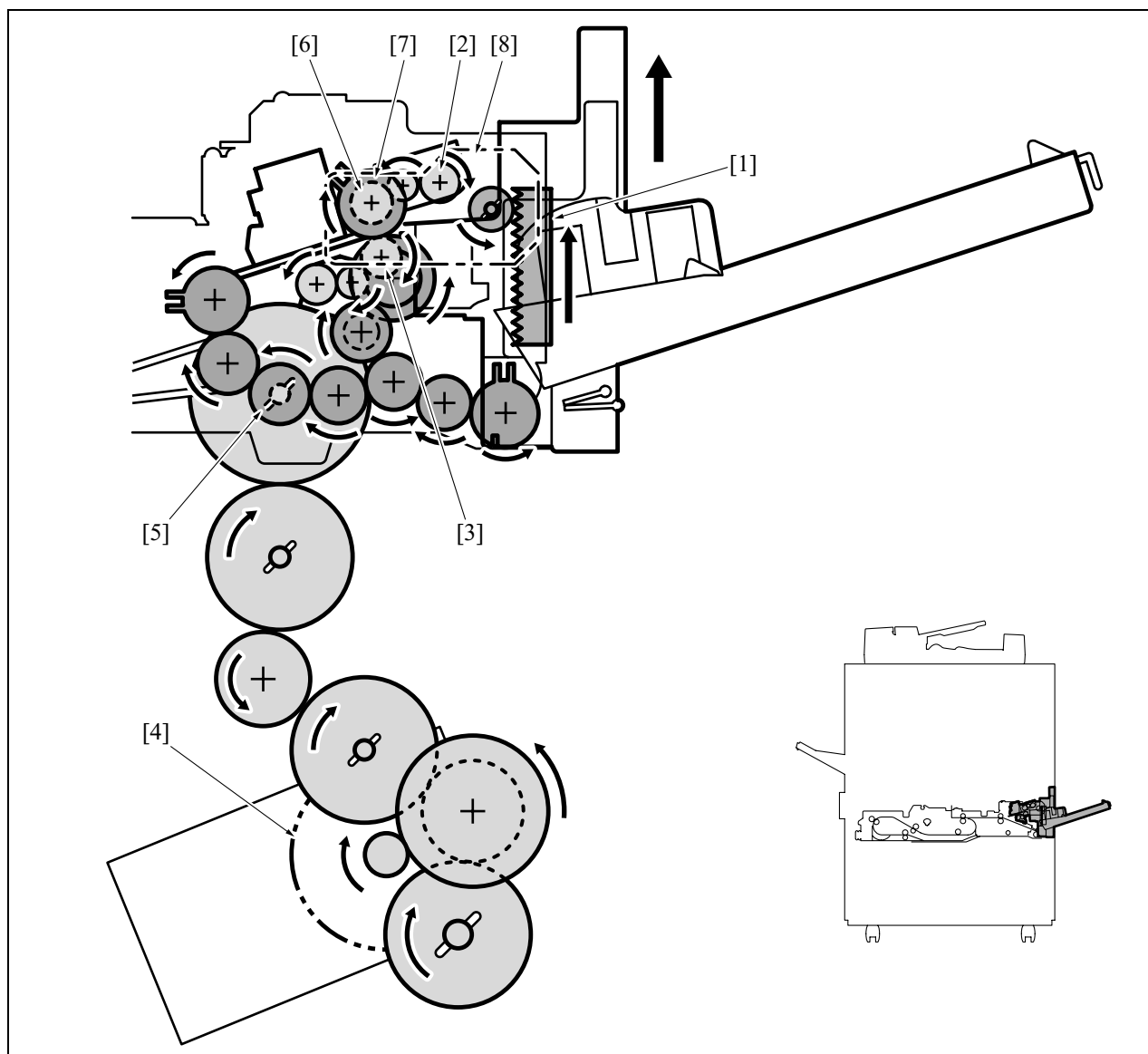
- [2] Paper feed motor (M41)

- [3] Drive coupling

- [4] Intermediate conveyance roller 1

4.8 ADU drive

4.8.1 By-pass tray drive



[1] Up/down gear

[2] Paper feed roller BP

[3] Double feed prevention roller BP

[4] Paper feed motor (M41)

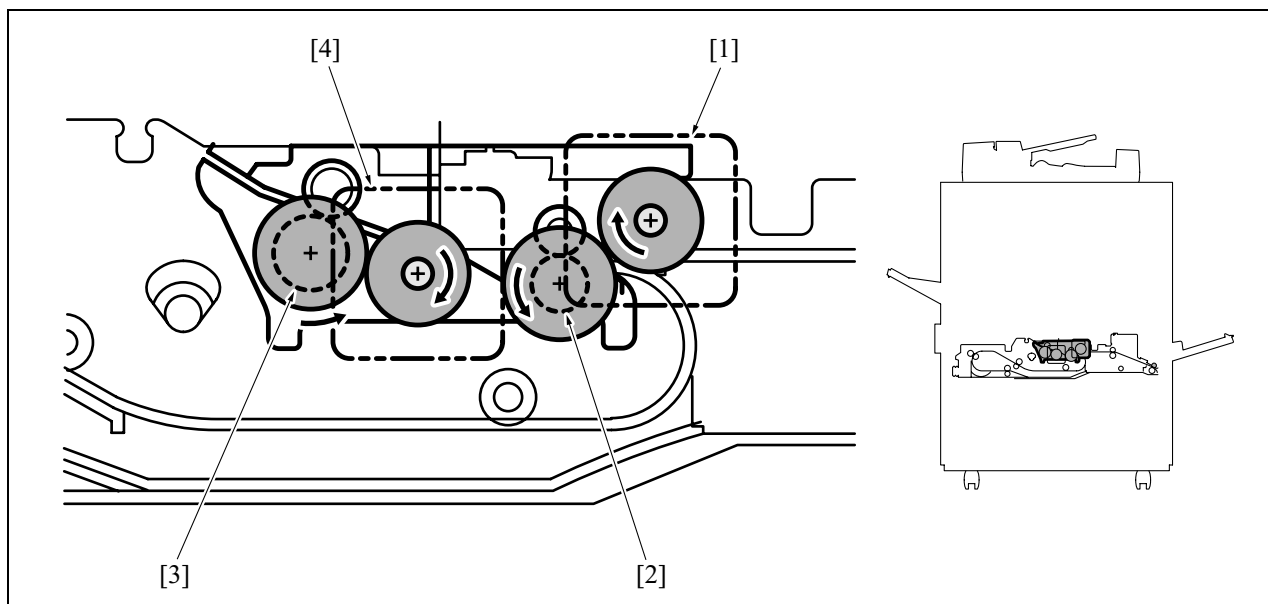
[5] Drive coupling

[6] Feed roller BP

[7] Paper feed clutch BP (MC6)

[8] Tray up drive motor BP (M35)

4.8.2 Registration drive/loop drive



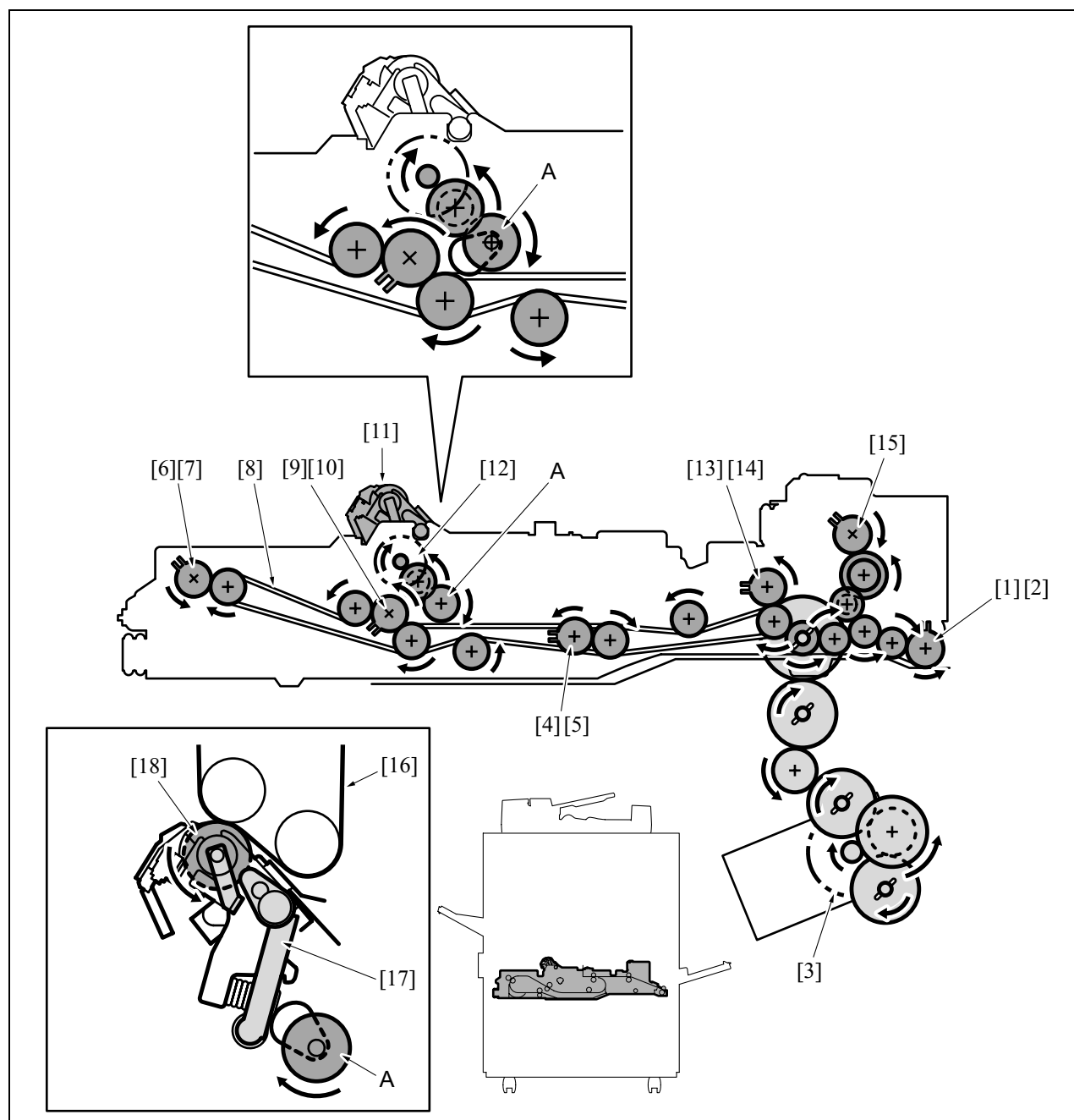
[1] Loop roller motor (M31)

[2] Loop roller

[3] Registration roller

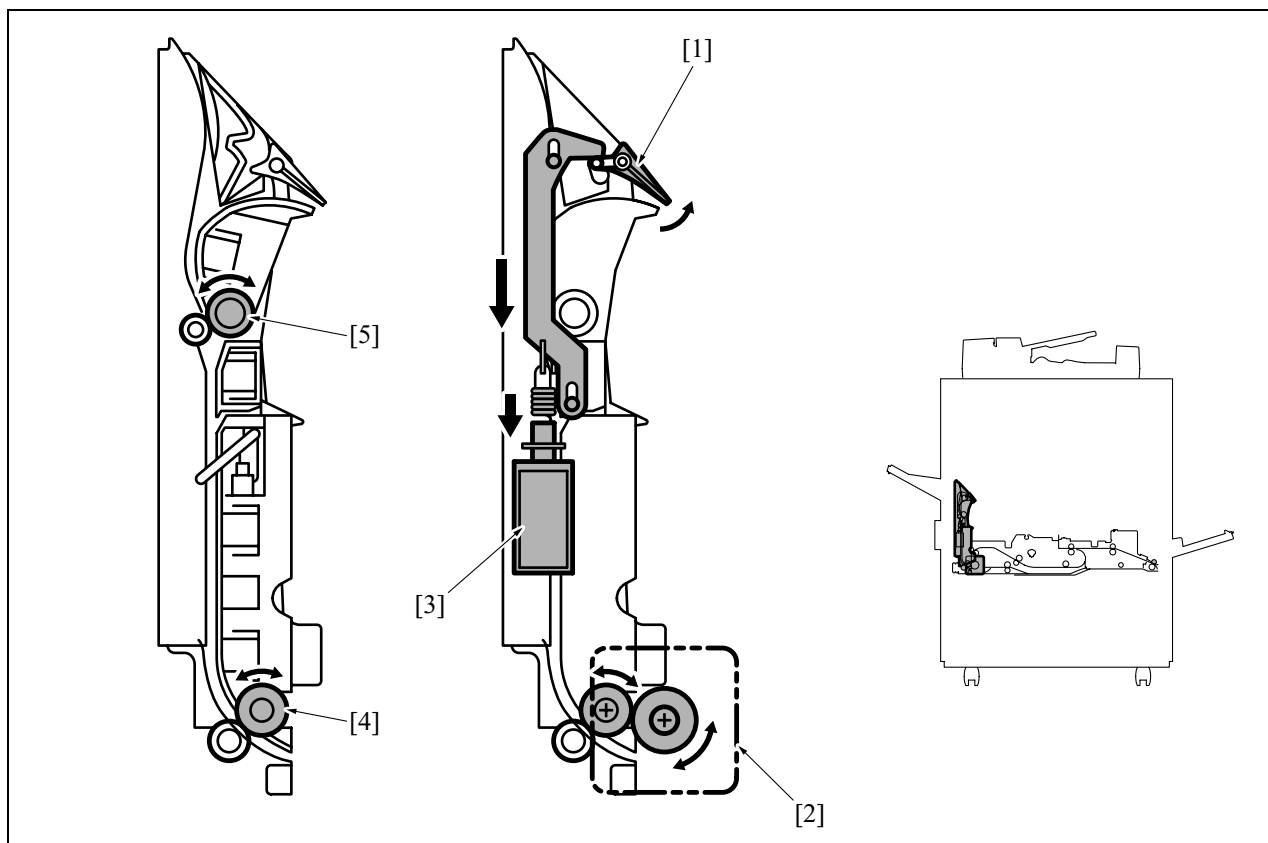
[4] Registration roller motor (M30)

4.8.3 ADU conveyance drive



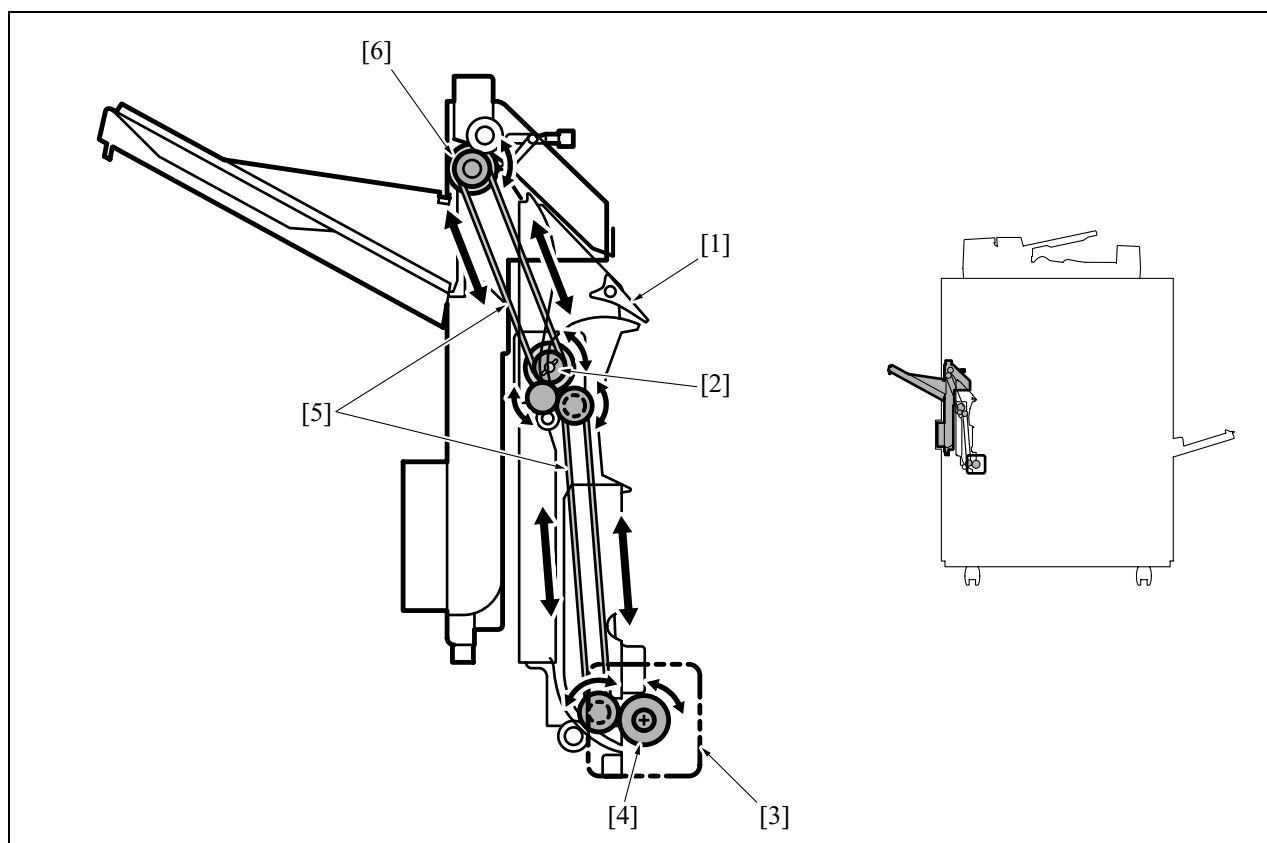
- | | |
|--|--|
| [1] Intermediate conveyance roller 2 | [10] ADU conveyance clutch 2 (MC1) |
| [2] Intermediate conveyance clutch 2 (MC4) | [11] 2nd transfer section |
| [3] Paper feed motor (M41) | [12] 2nd transfer pressure/release motor (M34) |
| [4] ADU pre-registration roller | [13] Intermediate conveyance roller 3 |
| [5] ADU pre-registration clutch (MC3) | [14] Intermediate conveyance clutch 3 (MC5) |
| [6] ADU conveyance roller 1 | [15] Drive coupling |
| [7] ADU conveyance clutch 1 (MC2) | [16] Transfer belt |
| [8] Timing belt | [17] Pressure arm |
| [9] ADU conveyance roller 2 | [18] 2nd transfer roller |

4.8.4 Reverse paper exit drive



- | | |
|---------------------------------|---------------------------|
| [1] Reverse gate | [4] Reverse/exit roller 2 |
| [2] Reverse/exit motor (M33) | [5] Decurler roller |
| [3] Reverse/exit solenoid (SD4) | |

4.9 Engine paper exit drive



[1] Reverse gate

[2] Drive coupling

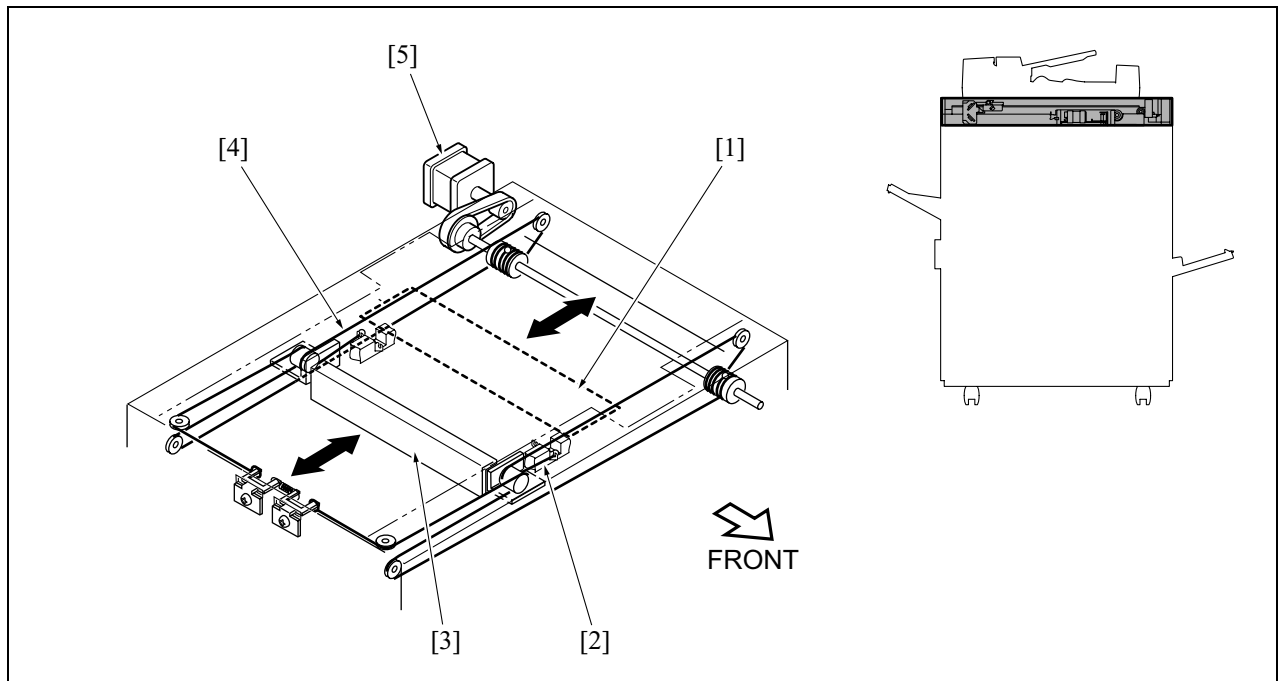
[3] Reverse/exit motor (M33)

[4] Reverse/exit roller 2

[5] Timing belt

[6] Paper exit roller

4.10 Scanner drive



[1] Exposure unit

[2] Scanner drive wire F

[3] V-mirror unit

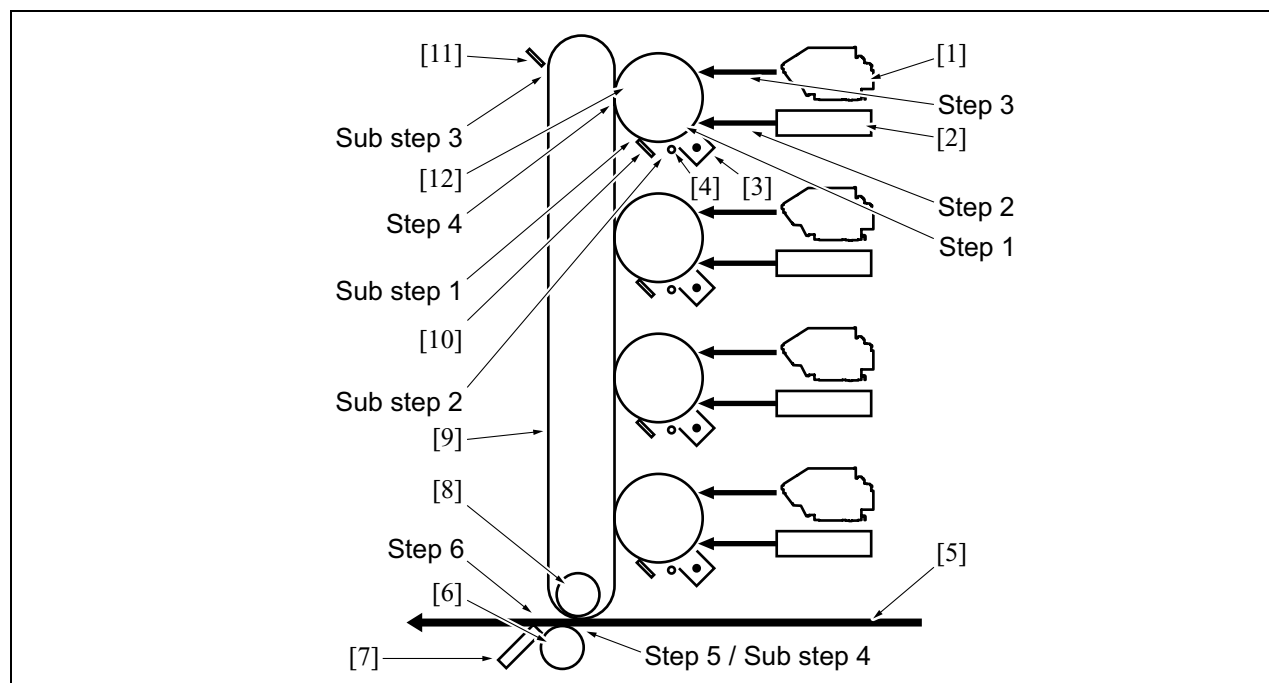
[4] Scanner drive wire R

[5] Scanner motor (M1)

5. IMAGE CREATION PROCESS

5.1 Image creation flow and function

Step	Process	Function
Step 1	Charging process	Forms the layer of charges on the photosensitive drum.
Step 2	Laser exposure process	Forms an electrostatic latent image on the photosensitive drum.
Step 3	Developing process	Makes an electrostatic latent image visible.
Step 4	1st transfer process	Forms an image by synthesizing on the transfer belt a mono-chrome (YMCK) visible image from each photosensitive drum.
Step 5	2nd transfer process	Transfers an image on the transfer belt to paper.
Step 6	Separation process	Separates paper from the transfer belt after completion of the transfer of the toner.
Sub step 1	Drum cleaning	Removes toner adhered on the surface of the photosensitive drum after completion of the primary transfer.
Sub step 2	Pre-charging exposure	Removes residual potential on the surface against the photosensitive drum after completion of drum cleaning.
Sub step 3	Transfer belt cleaning	Removes toner adhered on the surface of the transfer belt after completion of the 2nd transfer.
Sub step 4	2nd transfer roller L cleaning	Remove toner adhered on the 2nd transfer roller L after completion of the 2nd transfer.
Sub step 5	Toner collection	Collects toner that has been removed through the drum cleaning and the transfer belt cleaning. (Not shown in the drawing below.)

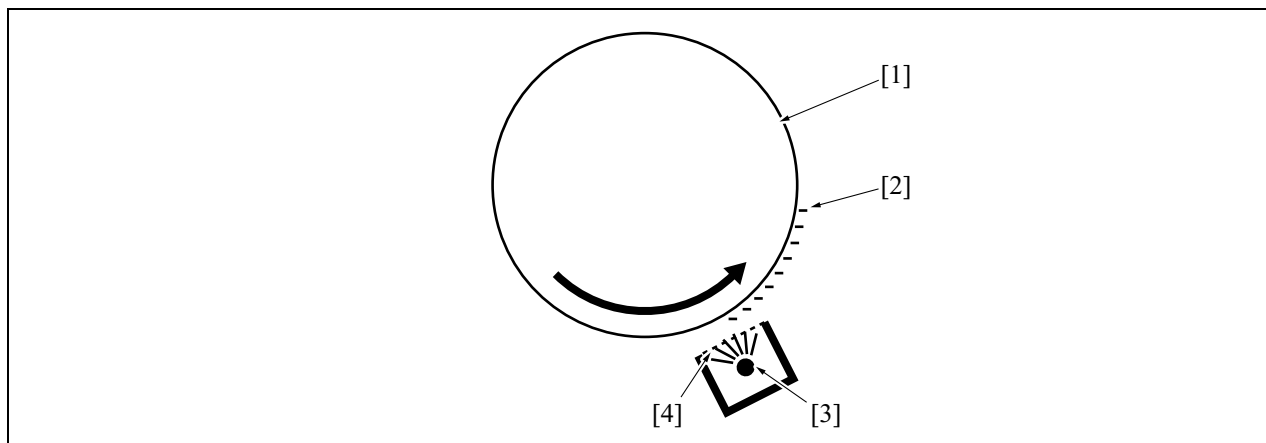


- [1] Developing unit
- [2] Write unit
- [3] Charging corona
- [4] Pre-charging exposure lamp (PCL)
- [5] Paper
- [6] 2nd transfer roller L

- [7] Separation discharging unit
- [8] 2nd transfer roller U
- [9] Transfer belt
- [10] Blade (drum cleaning)
- [11] Blade (transfer belt cleaning)
- [12] Drum

5.2 Charging process (Step 1)

The charging corona, having a gold-plated tungsten wire, is applied with a high DC voltage (minus) to negatively charge the surface of the photosensitive drum by wire discharge. The charging corona is provided with a charging grid plate to make charges on the surface of the photosensitive drum uniform. Photosensitive drums are provided for the four colors of Y, M, C and K.



[1] Drum

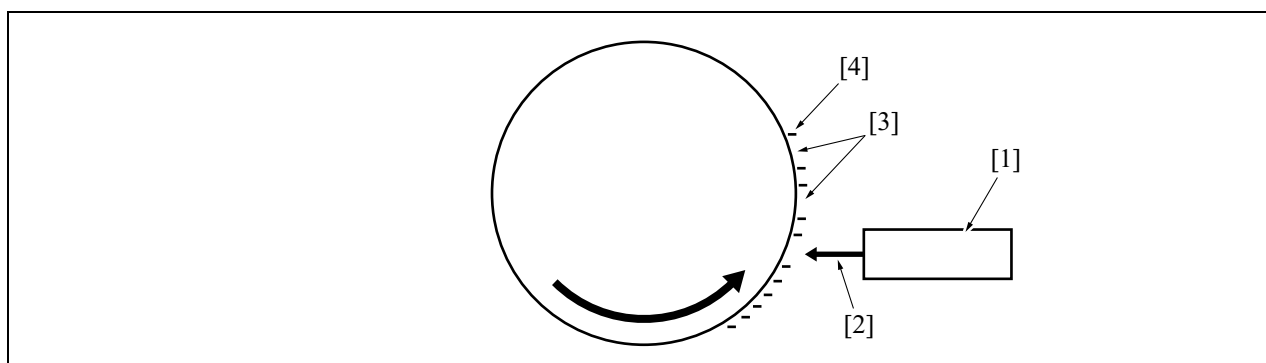
[2] Charge (negative)

[3] Charging corona

[4] Charging grid plate

5.3 Laser exposure process (Step 2)

Charges on the surface of the photosensitive drum have a characteristic that when they are irradiated with light, they are neutralized and vanish. Using this characteristic, a laser beam is irradiated on the image region to create an image by removing charges on the photosensitive drum. This image is referred to as an electrostatic latent image. A laser beam is irradiated on each photosensitive drum of Y, M, C and K corresponding to the four color data resolved by the image processing section.



[1] Write unit

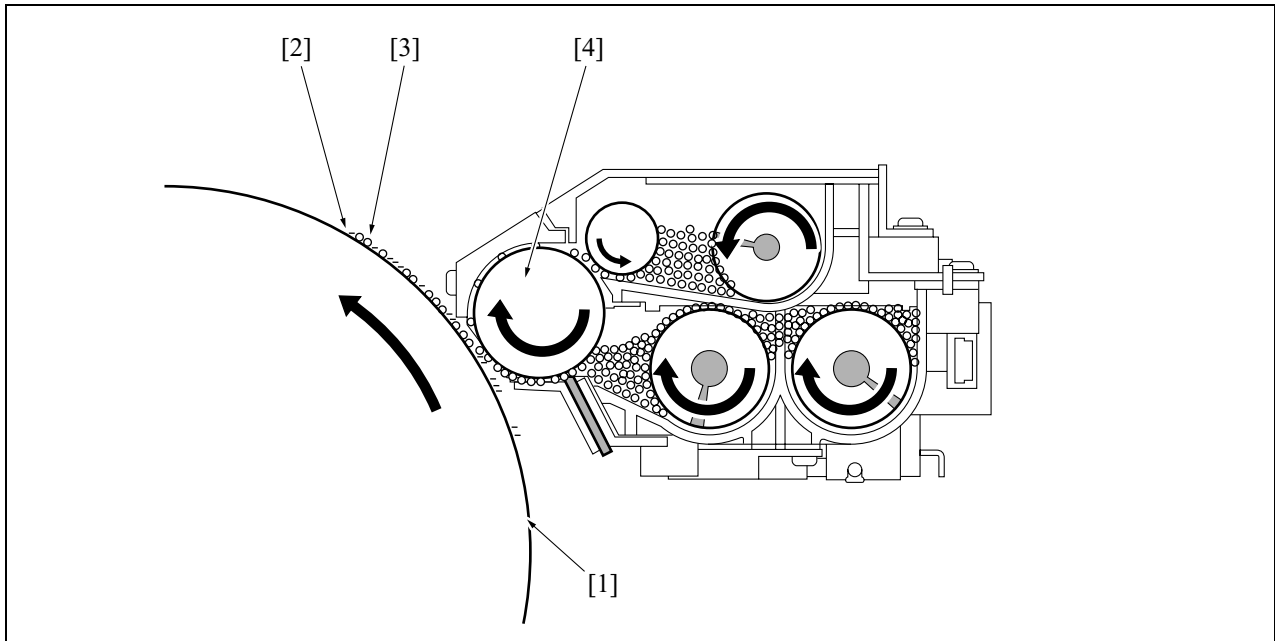
[2] Laser beam

[3] Neutralized section

[4] Charge (negative)

5.4 Developing process (Step 3)

In the electrostatic latent image on the photosensitive drum, the non-image section is negatively charged and the image section is neutralized. When toner, that is, negatively charged is brought close to the photo-sensitivity drum, toner is attracted to the image section on the drum by the potential difference with the developing bias and becomes visible. This process is called developing.



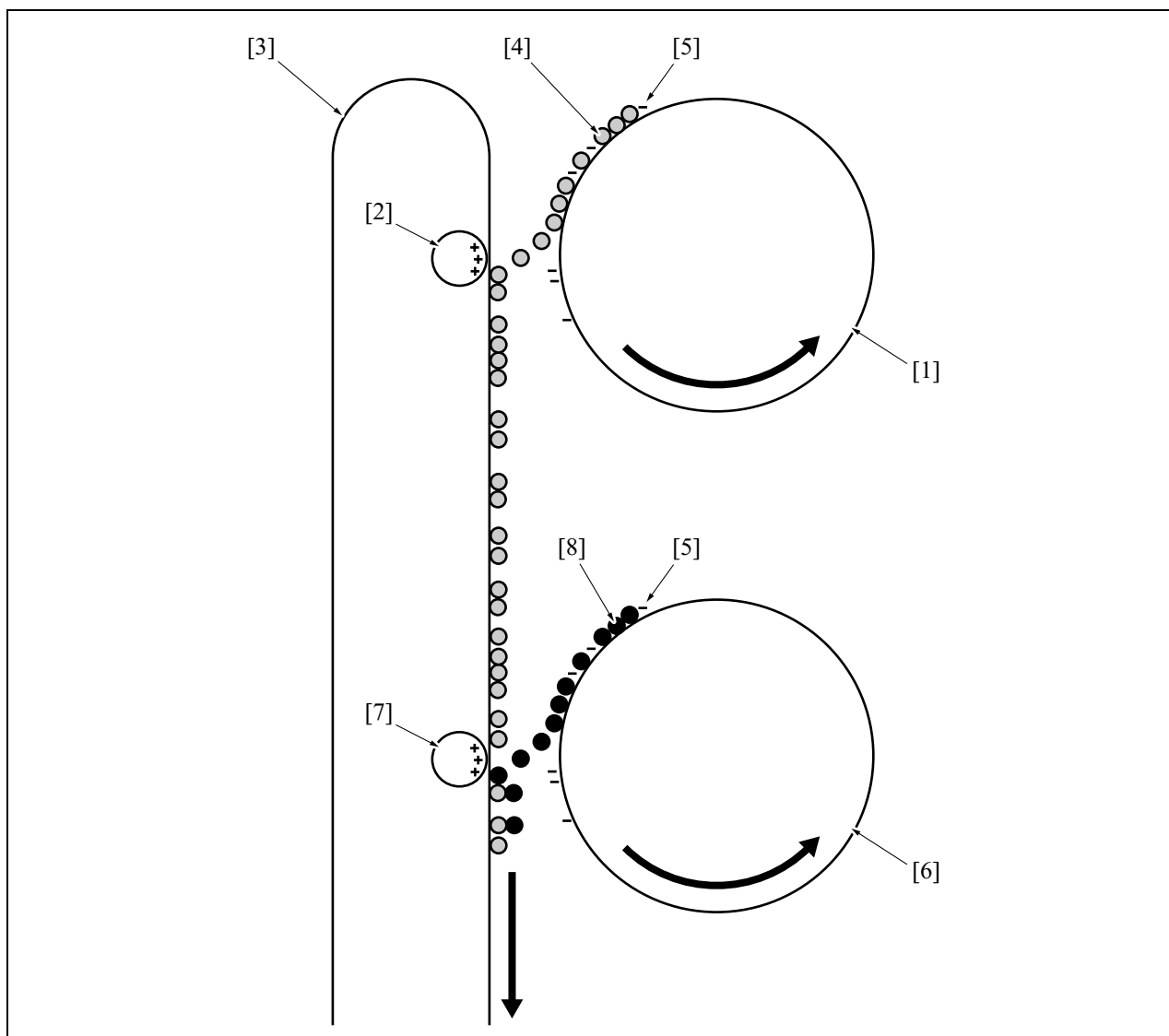
[1] Drum
[2] Charge (negative)

[3] Toner (positive)
[4] Developing sleeve

5.5 1st transfer process (Step 4)

Toner on each drum of Y, M, C and K is transferred onto the transfer belt, this allows for overlapping of the colors. This movement of toner from the drum to the transfer belt is referred to as the 1st transfer, where the transfer of toner is carried out sequentially in the order of Y, M, C and K.

While in the 1st transfer, the 1st transfer roller provided at the rear of the transfer belt is applied with a high DC bias voltage (positive). As a result, a positive potential on the surface of the transfer belt is higher than that of the surface of each drum, and toner moves from the drum to the transfer belt.

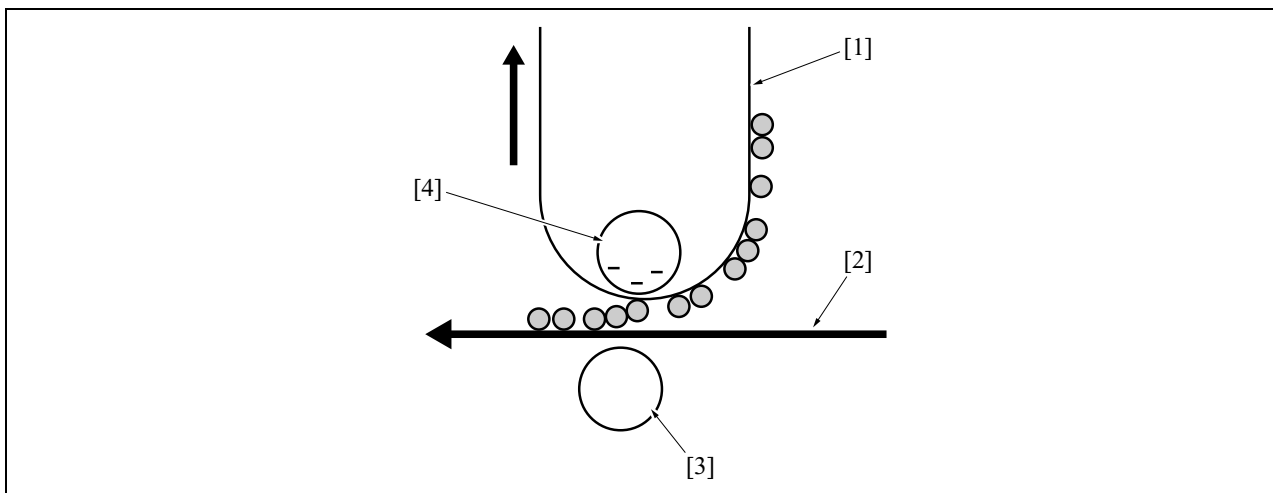


- [1] Drum Y
- [2] 1st transfer roller Y
- [3] Transfer belt
- [4] Toner Y

- [5] Charge (negative)
- [6] Drum M
- [7] 1st transfer roller M
- [8] Toner M

5.6 2nd transfer process (Step 5)

The operation to transfer the toner image of the four colors on the transfer belt to paper is referred to as the 2nd transfer. While in the 2nd transfer, the 2nd transfer roller L provided at the lower section of the transfer belt conveys paper while pressing it against the transfer belt. At this time, the 2nd transfer roller U provided at the rear of the transfer belt is applied with a high DC bias voltage (negative). Toner on the transfer belt is shifted toward the paper by the electric field formed between the 2nd transfer roller U and the 2nd transfer roller L.



[1] Transfer belt

[2] Paper

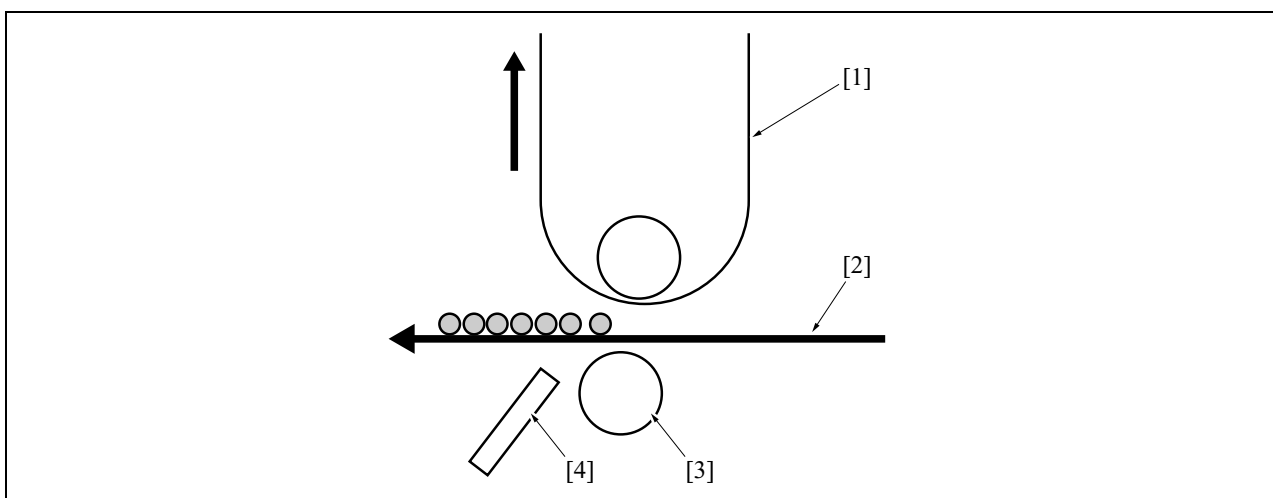
[3] 2nd transfer roller L

[4] 2nd transfer roller U

5.7 Separation process (Step 6)

While in the 2nd transfer, paper in the process of transfer is negatively charged by the 2nd transfer roller U, resulting in an absorption phenomenon where paper is attracted to the transfer belt. This operation to peel paper that is thus absorbed off the transfer belt is referred to as separation.

Separation is made by applying high AC and DC bias voltages to the separation discharging unit. As a result the charges of the paper and the transfer belt are neutralized.



[1] Transfer belt

[2] Paper

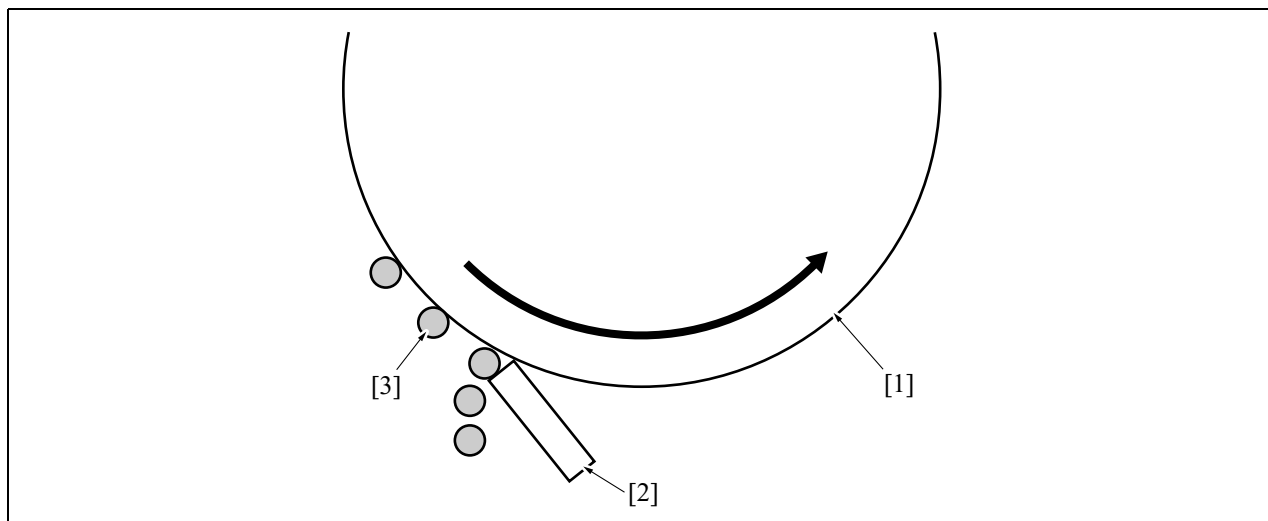
[3] 2nd transfer roller L

[4] Separation discharging unit

5.8 Drum cleaning (Sub step 1)

A drum that has completed the 1st transfer has a residual amount of toner that is left from the transfer process. The process to remove toner is referred to as drum cleaning.

Drum cleaning is made by scraping toner adhered to the drum surface with the edge of a plate called a blade that is made of urethane rubber.



[1] Drum

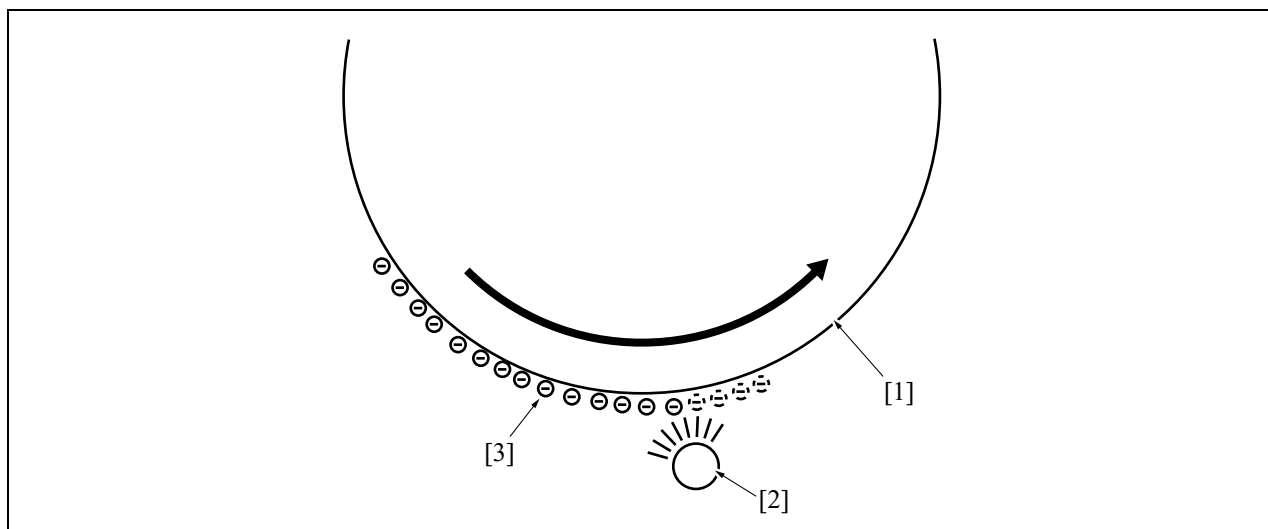
[2] Cleaning blade

[3] Residual toner

5.9 Pre-charging exposure (Sub step 2)

No toner adhesion is found on the surface of a drum that has completed drum cleaning, but there is a very small amount of residual potential found. Since a normal charging for the next copy/print cannot be carried out as it is, exposure other than a laser exposure is made to thoroughly neutralize a potential on the drum surface. This process is referred to as a pre-charging exposure.

This engine conducts this process by using a pre-charging exposure lamp (PCL).



[1] Drum

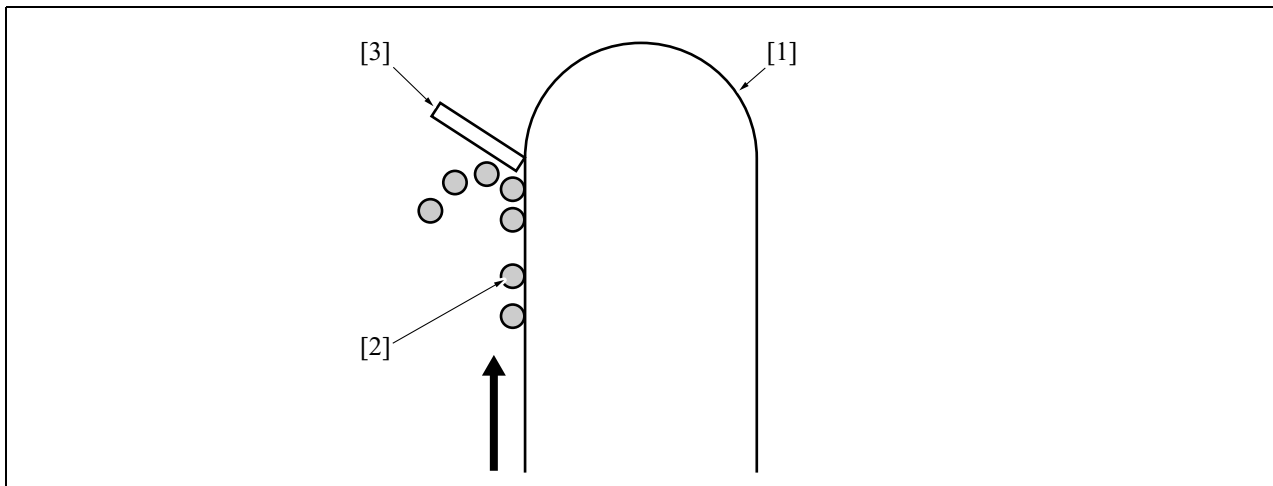
[2] Pre-charging exposure lamp (PCL)

[3] Residual charge

5.10 Transfer belt cleaning (Sub step 3)

A transfer belt that has completed the 2nd transfer has a residual amount of toner that is left from the transfer process. The process to remove toner is referred to as a transfer belt cleaning.

A transfer belt cleaning is made by scraping toner adhered to the drum surface with the edge of a plate called a blade that is made of urethane rubber.



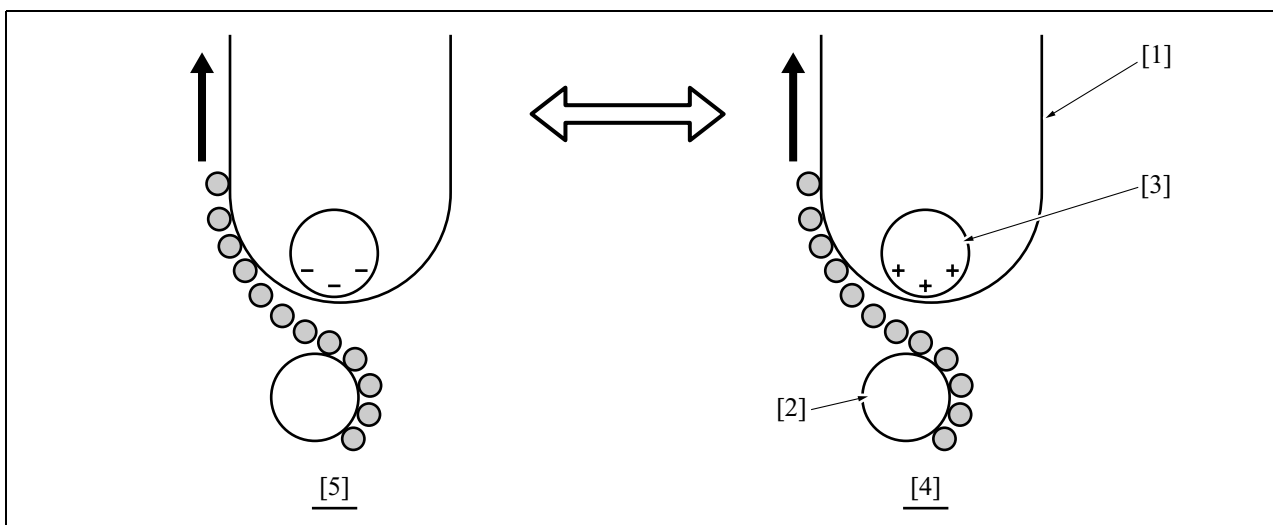
- [1] Transfer belt
[2] Residual toner

- [3] Cleaning blade

5.11 2nd transfer roller L cleaning (Sub step 4)

Residual toner on the transfer belt is in direct contact with the 2nd transfer roller L. As a result, the 2nd transfer roller L may be coated with toner.

So, the 2nd transfer roller U is applied with a positive and a negative high DC bias voltage alternately to move toner on the 2nd transfer roller L to the transfer belt side. The toner on the transfer belt that has been moved is cleaned by the transfer belt cleaning mentioned above.

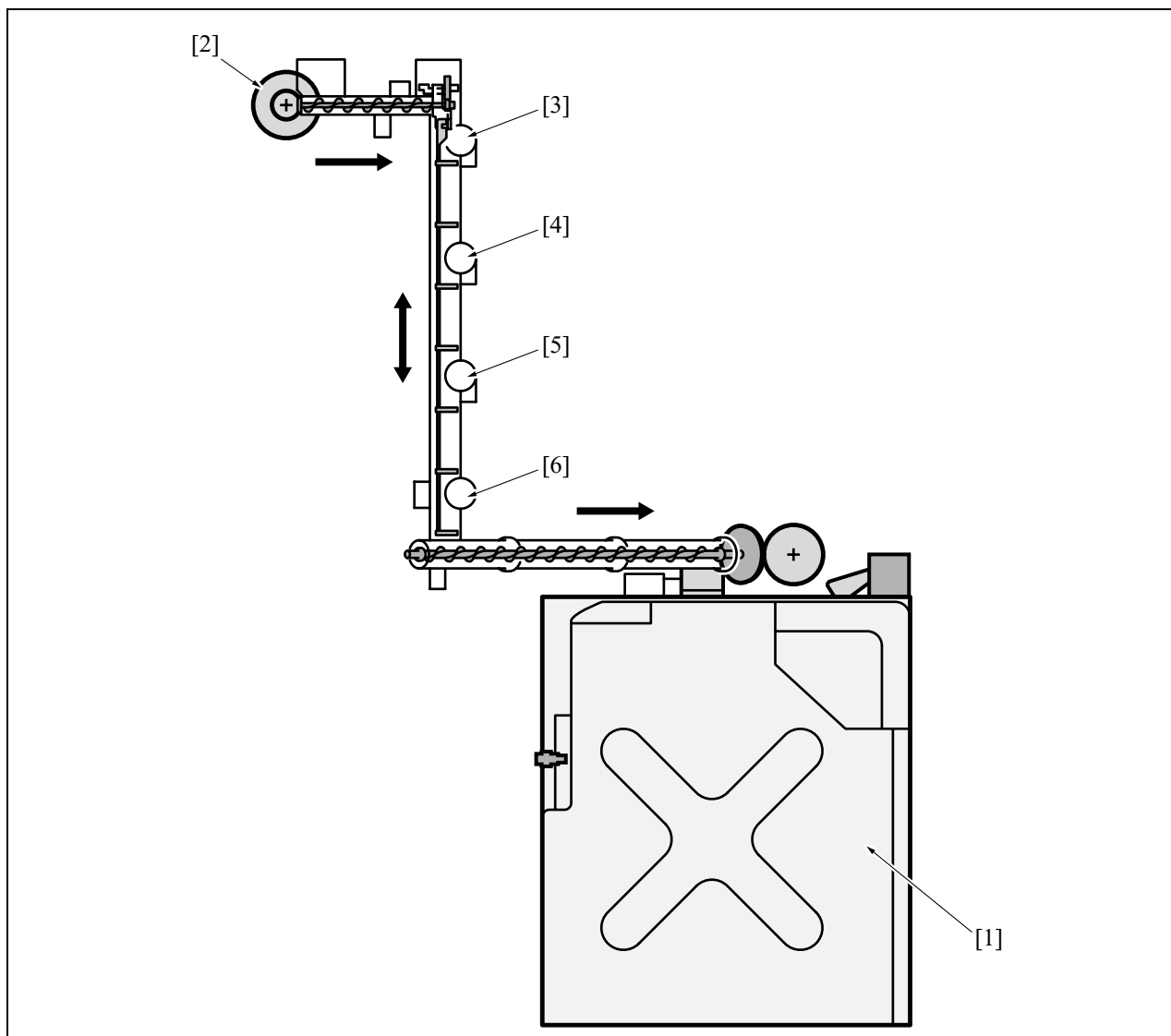


- [1] Transfer belt
[2] 2nd transfer roller L
[3] 2nd transfer roller U

- [4] DC bias (positive) applied
[5] DC bias (negative) applied

5.12 Toner collection (Sub step 5)

Toner that was cleaned in the drum cleaning section and the transfer belt cleaning section is collected into the toner collection box through the toner collection screw.



- | | |
|--|-------------------------------------|
| [1] Toner collection box | [4] Drum M toner collection opening |
| [2] Transfer belt toner collection opening | [5] Drum C toner collection opening |
| [3] Drum Y toner collection opening | [6] Drum K toner collection opening |

5.13 Process speed

In combination of the weighing of paper and the surface finish of an output image, this engine provides three types of process speeds.

Weighing	Without gloss	With gloss
64 to 105g/m ²	220mm/s *1	110mm/s (1/2 speed)
106 to 256g/m ²	110mm/s (1/2 speed)	73.3mm/s (1/3 speed)

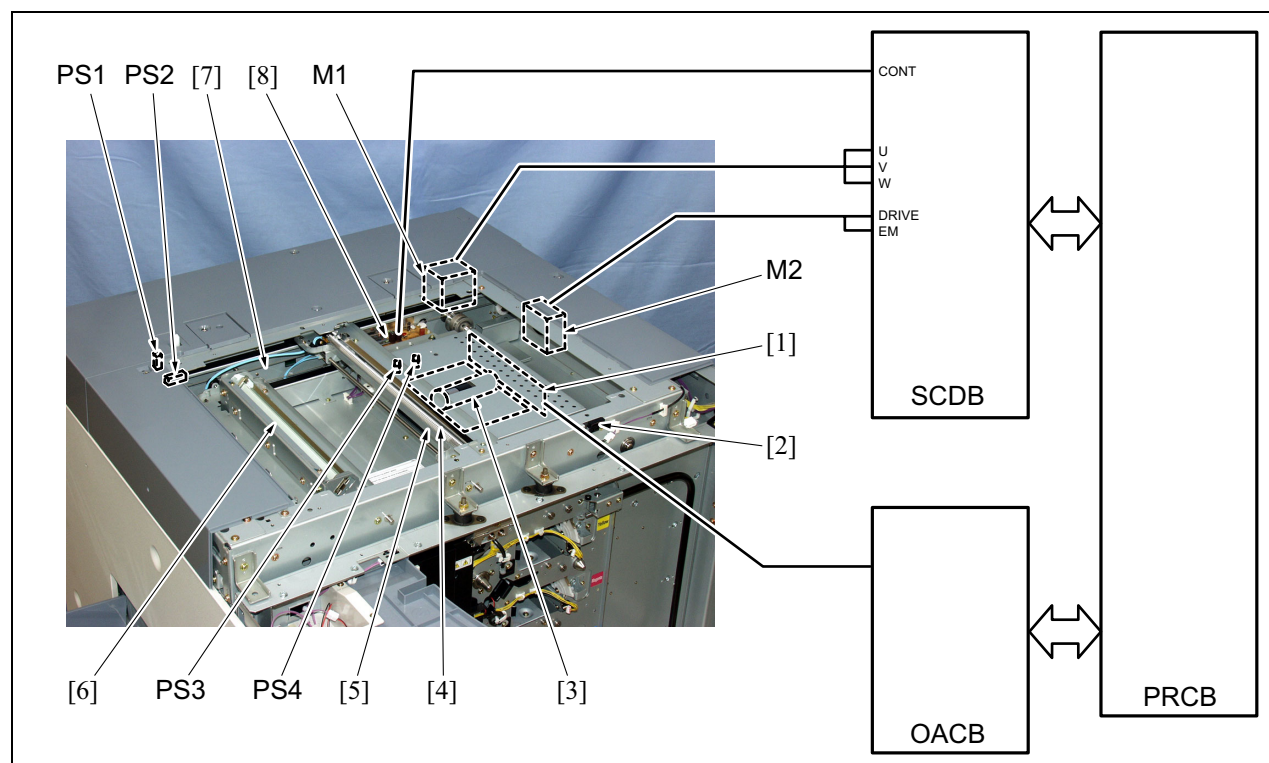
*1 If paper is coated paper, the speed will be 110mm/s.

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II UNIT EXPLANATION

1. SCANNER

1.1 Composition



Symbol	Name	Function or method
[1]	CCD board (CCDB)	Converts an analog signal to a digital signal
[2]	DF reset read switch (RS1)	Detects that RADF is closed Magnet sensor type
[3]	CCD unit	Converts the read image optoelectronically (600dpi) 3 lines (RGB) linear image sensor
[4]	Exposure lamp (L1)	The light source for reading an image Xenon fluorescent lamp (white)
[5]	Exposure unit	Reads an image Light source moving slit exposure • Outgoing: 220mm/sec (at life-size) • Backhaul: 802mm/sec (at life-size)
[6]	V-mirror unit	Reflects the read light (2nd, 3rd mirror)
[7]	Scanner wire	Transfers the driving force from M1 to the exposure unit and the V-mirror unit (front, back)
[8]	L1 inverter (L1 INVB)	Turns on L1
M1	Scanner motor	Drives the scanner wire for moving the exposure unit and the V-mirror unit 3-phase stepping motor
M2	Scanner cooling fan	Cools the scanner section (exhaust)
PS1	Scanner HP sensor	Detects the home position for the exposure unit

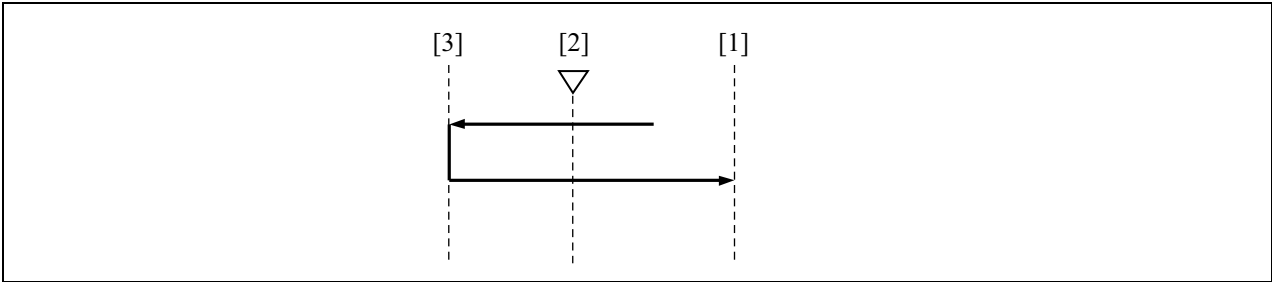
Symbol	Name	Function or method
PS2	APS timing sensor	Detects that RADF is opened/closed
PS4	APS sensor L	Detects the original size in the sub-scan direction (for large size)
PS3	APS sensor S	Detects the original size in the sub-scan direction (for small size)

1.2 Operation

1.2.1 Home position search in the exposure unit

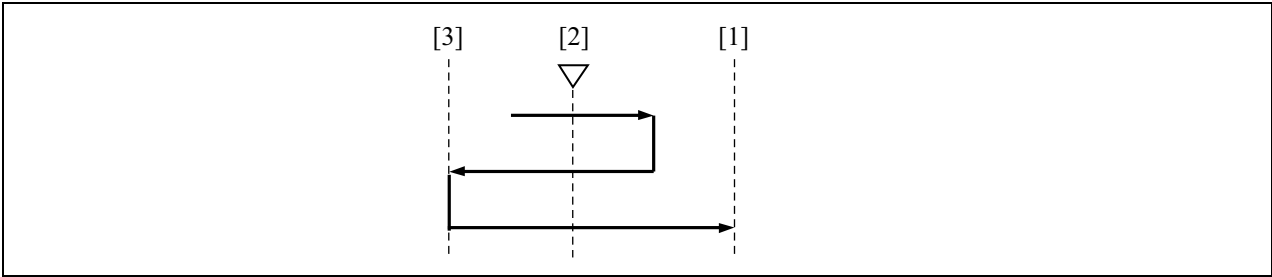
The exposure units searches for the home position when the main switch (SW2) or the start button is turned on. The operation may different depending on the state of the scanner HP sensor.

A. When PS1 is off



- [1] Scanner APS location
- [3] Home position
- [2] PS1

B. When PS1 is on



- [1] Scanner APS location
- [3] Home position
- [2] PS1

1.2.2 Shading correction reading

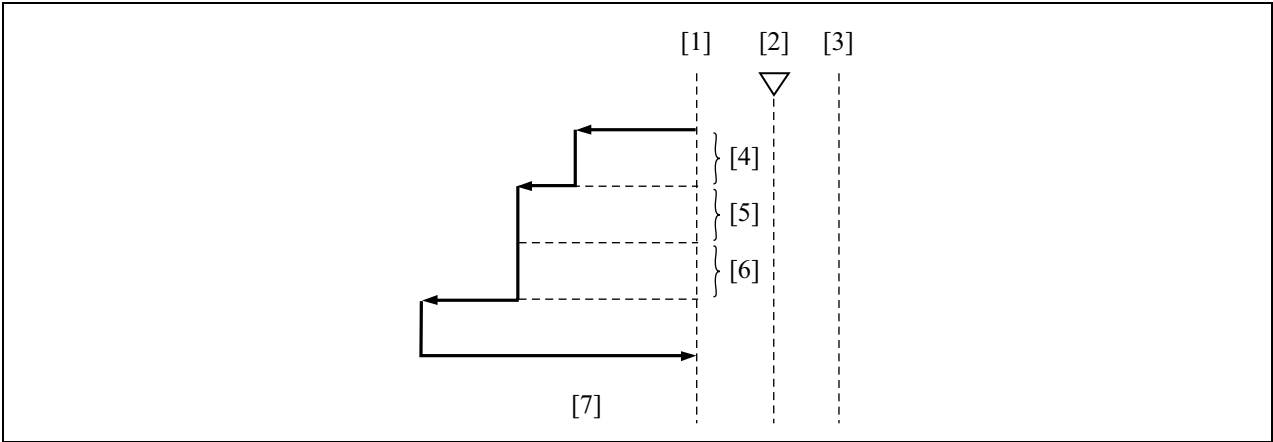
The exposure unit starts the shading correction with the white standard board attached to the scanner glass once it completes the home position search.

In the shading correction operation, the white correction is performed twice and the black correction once. In the white correction, the white standard board is read while the exposure lamp (L1) is turned on. In the black correction, the board is read while the lamp is off.

Data for each CCD sensor is read during the both white corrections and each pixel is compared its brightness. The brighter data is regarded as the white correction data.

The shading correction reading operation may differ between when the main switch (SW2) is turned on and when the start button is pressed.

A. When the main switch (SW2) is turned on



- | | | | |
|-----|--------------------------------------|-----|----------------------------|
| [1] | Scanner APS location (home position) | [5] | 2nd white correction |
| [2] | PS1 | [6] | Black correction |
| [3] | Scanner APS position | [7] | Returning the amount moved |
| [4] | 1st white correction | | |

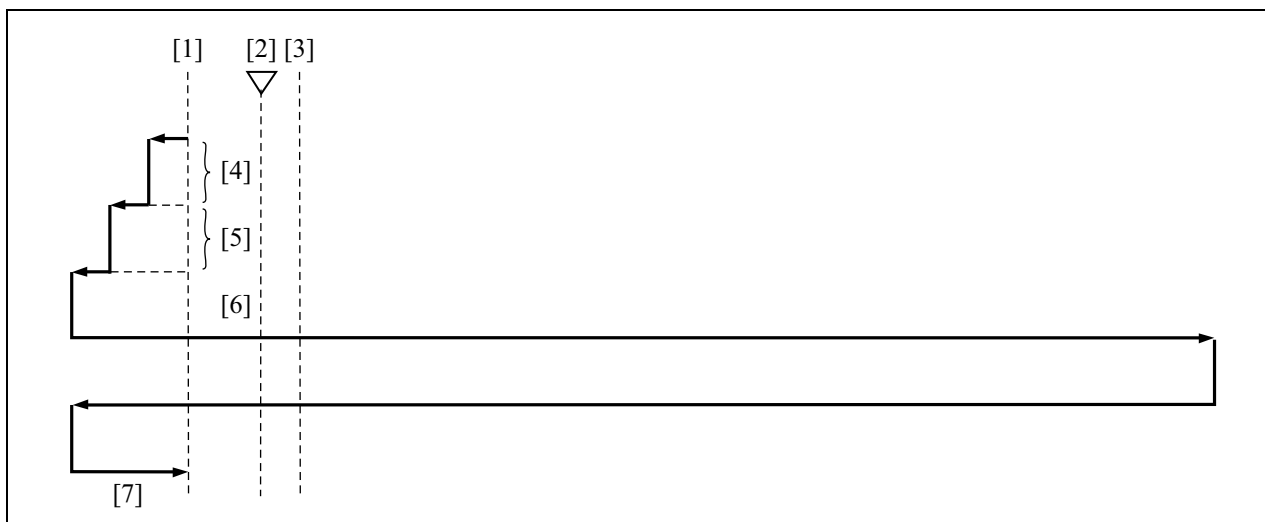
B. When the start button is pressed

The basic operation is identical to when the main switch (SW2) is turned on; however, it starts the copying operation without stopping at the scanner glass APS location (home position) after reading the shading correction.

1.2.3 Original reading mode

There are two original reading modes, the scanner glass mode and the DF mode. The original reading is a common operation.

A. When copying with the manual density setting



[1] Home position

[2] PS1

[3] Scanner APS position

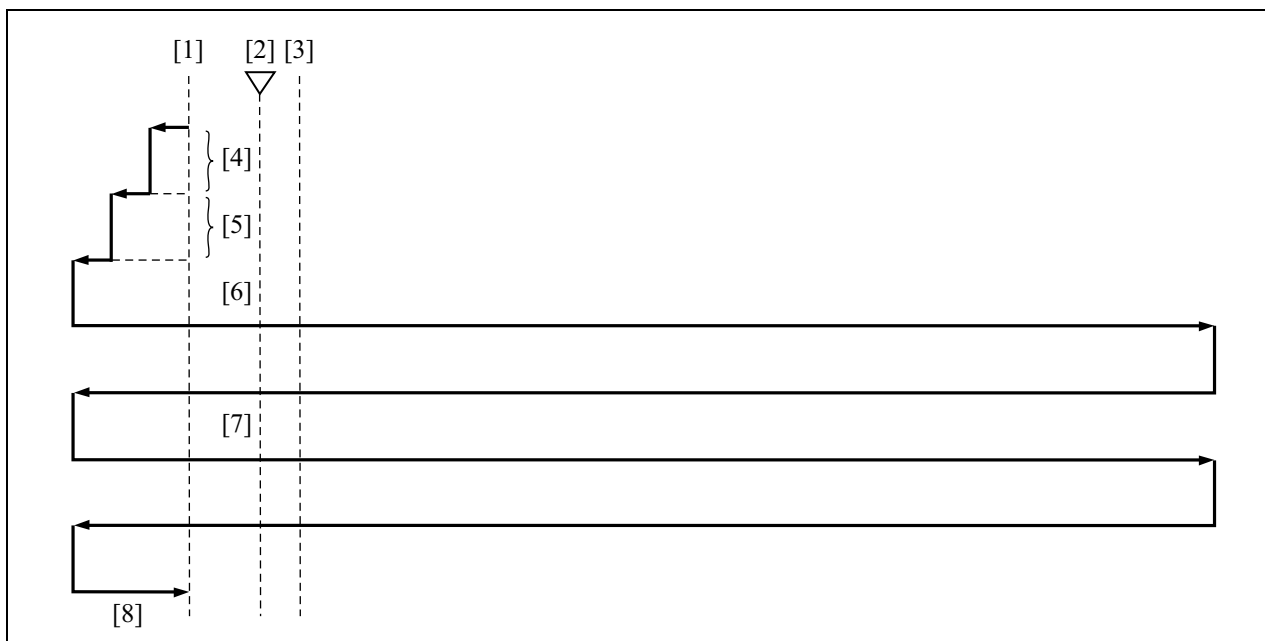
[4] 1st white correction

[5] 2nd white correction

[6] Exposure scan

[7] Home position search

B. When performing the AE copy



[1] Home position

[2] PS1

[3] Scanner APS position

[4] 1st white correction

[5] 2nd white correction

[6] AE scan

[7] Exposure scan

[8] Home position search

1.2.4 Original reading control

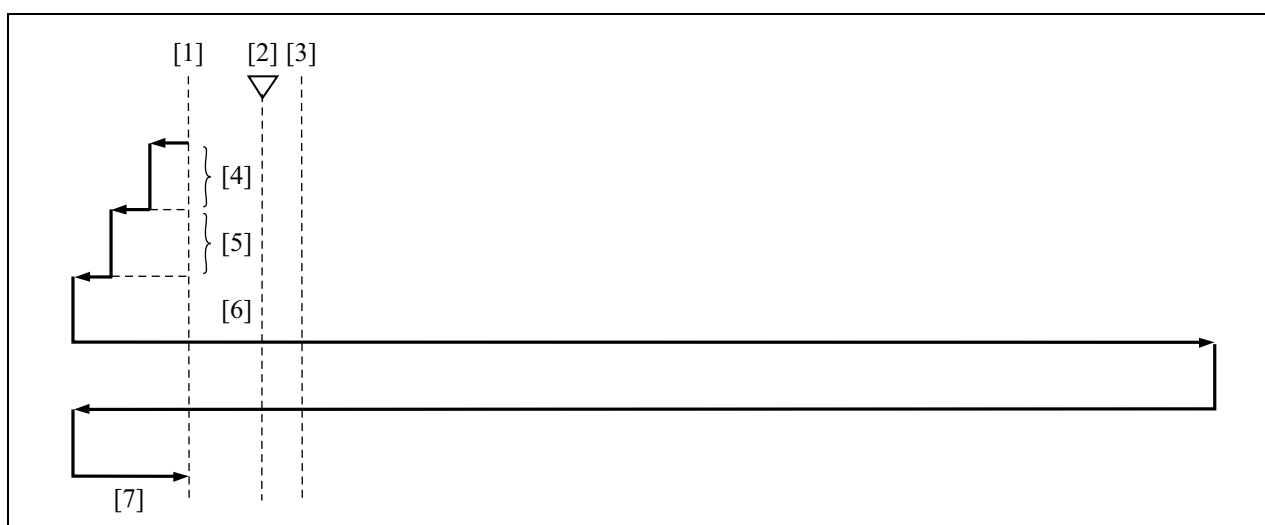
The reflection from the exposed original reaches to the CCD sensor through the lens. The CCD sensor outputs an electric signal (analog) proportional to the amount of light and then the analog signal is converted to a digital signal in the CCD board (CCDB) according to directions from the overall control board (OACB).

The CCD sensor includes three separate photoreceivers for the 1st colors R, G, and B. The A/D converter signals for each color are also created separately.

A. Original reading timing

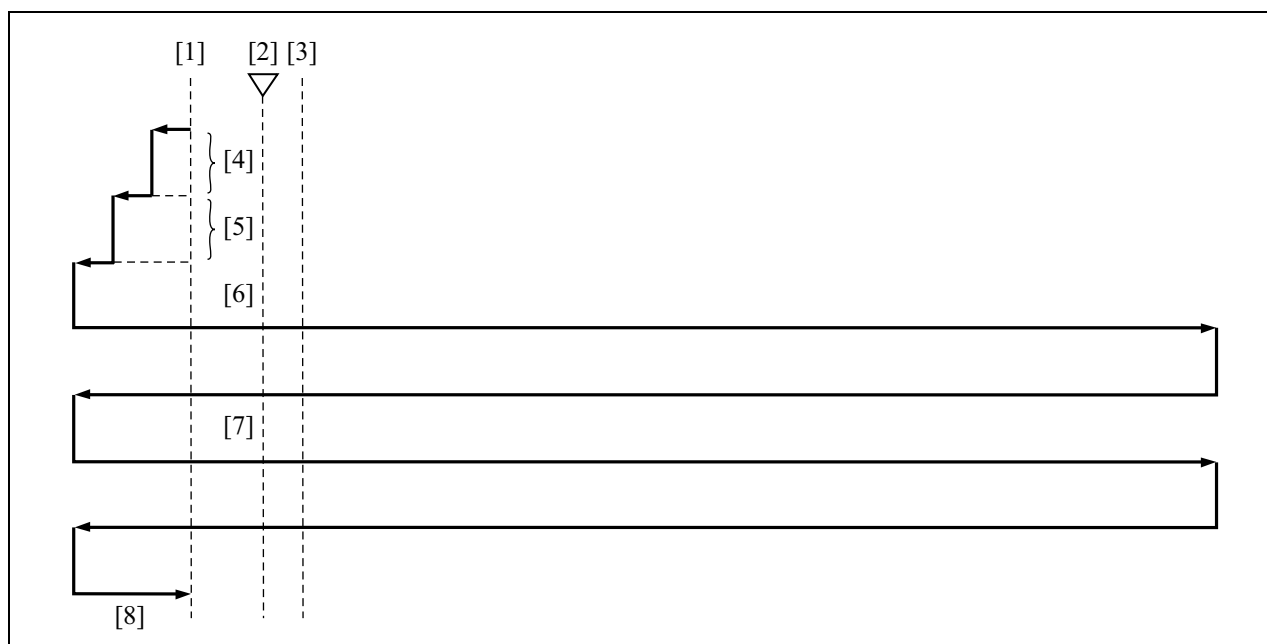
The original reading timing is same in the scanner glass mode and in the DF mode when AE/ACS has not been set; however, it is different when AE/ACS has been set.

(1) When AE/ACS has not been set



- [1] Home position
- [2] PS1
- [3] Scanner APS position
- [4] 1st white correction

- [5] 2nd white correction
- [6] Exposure scan (220mm/s)
- [7] Home position search

(2) When AE/ACS has been set (the scanner mode)

[1] Home position

[2] PS1

[3] Scanner APS position

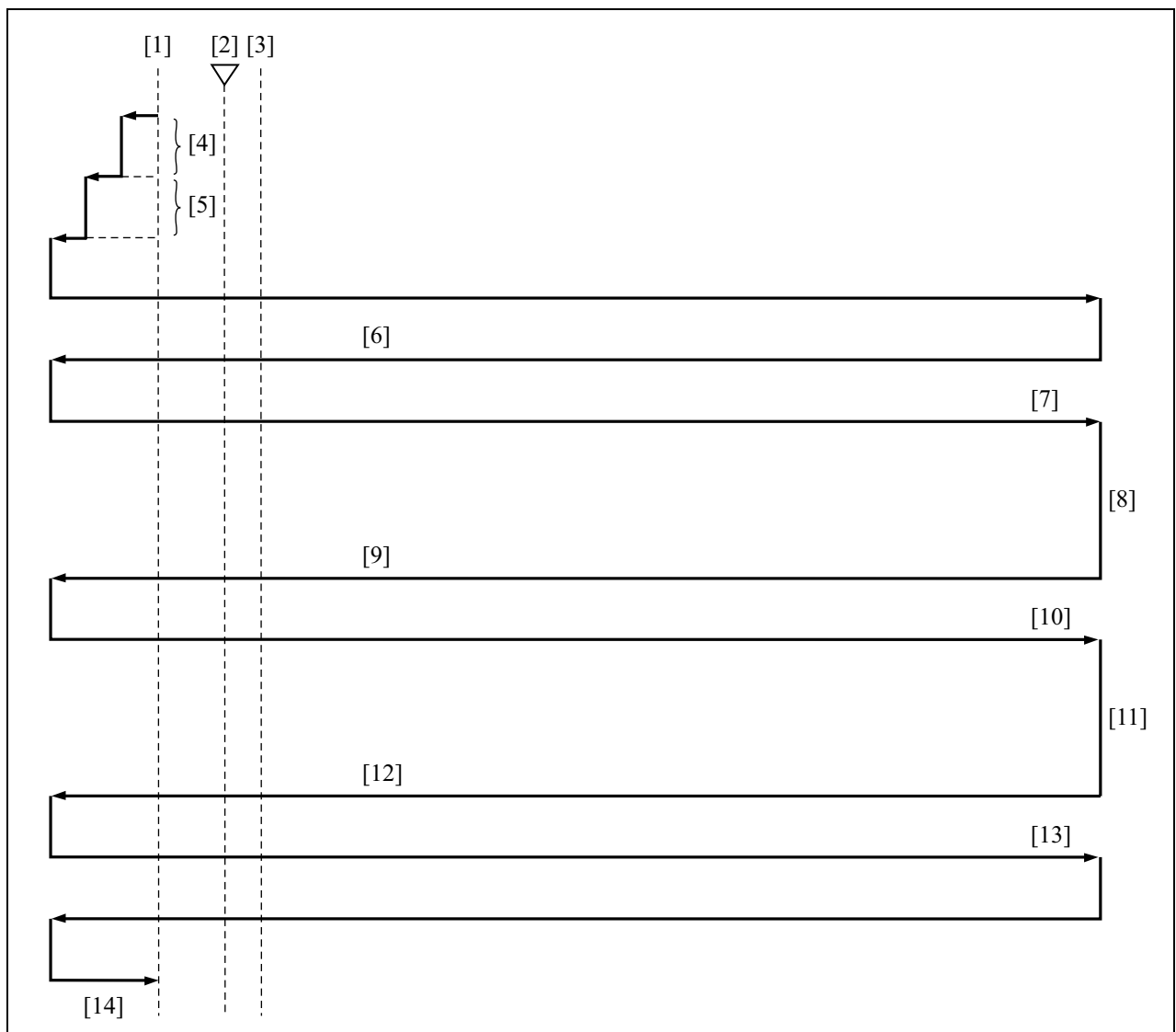
[4] 1st white correction

[5] 2nd white correction

[6] AE/ACS scan (429mm/s)

[7] Exposure scan (220mm/s)

[8] Home position search

(3) When AE/ACS has been set (the DF mode)

- | | |
|--|--|
| [1] Home position | [8] Original replacing time |
| [2] PS1 | [9] AE/ACS scan for the 2nd page (429mm/s) |
| [3] Scanner APS position | [10] Exposure scan for the 2nd page (220mm/s) |
| [4] 1st white correction | [11] Original replacing time |
| [5] 2nd white correction | [12] AE/ACS scan for the last page (429mm/s) |
| [6] AE/ACS scan for the 1st page (429mm/s) | [13] Exposure scan for the last page (220mm/s) |
| [7] Exposure scan for the 1st page (220mm/s) | [14] Home position search |

1.2.5 APS control

The APS control is performed in the printer control board (PRCB) with signals read by the APS sensor S (PS3), the APS sensor L (PS4), and the CCD sensor when the RADF is opened/closed.

The signal is sent via the scanner drive board (SCDB) and the overall control board (OACB) (see the ADF service manual for more detailed information on the APS control by RADF).

A. APS operation

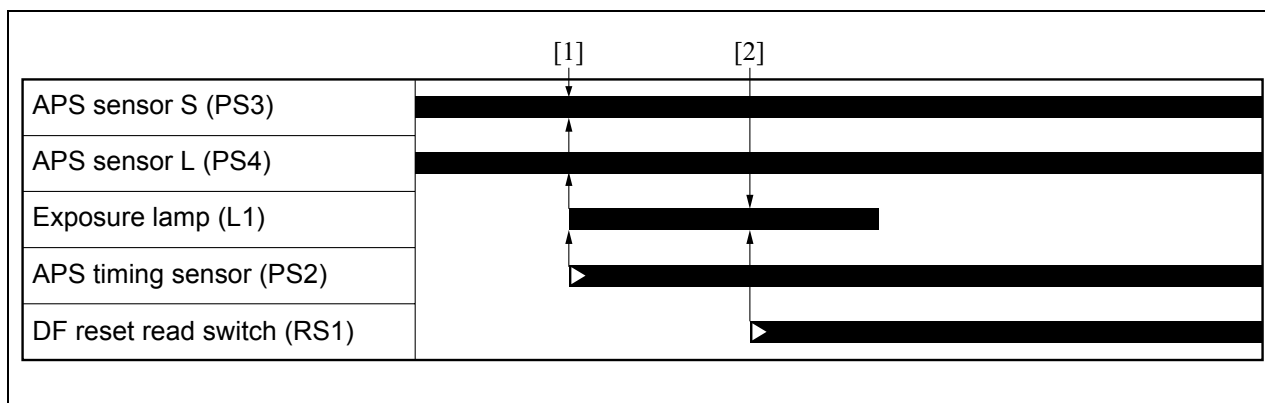
The APS sensor S (PS3) and the APS sensor L (PS4) detect the original size in the sub-scan direction and the CCD sensor detects the original size in the main scan direction.

B. Relationship between each of the sensors and the original size

Original size	CCD sensor (Length of detection: mm)	PS3 (ON/OFF)	PS4 (ON/OFF)
Smallest	102	OFF	OFF
B5R	182	ON	OFF
B5	257	OFF	OFF
B4	257	ON	ON
A4R	210	ON	OFF
A4	297	OFF	OFF
A3	297	ON	ON
8.5 x 11R	215.9	ON	OFF
8.5 x 11	279.4	OFF	OFF
8.5 x 14	215.9	ON	ON
11 x 17	279.4	ON	ON

C. APS detection timing (scanner mode)

The original size in the main scan direction is detected twice. The larger size is regarded as the original size.



[1] 1st original size detection
(main scan direction, sub-scan direction)

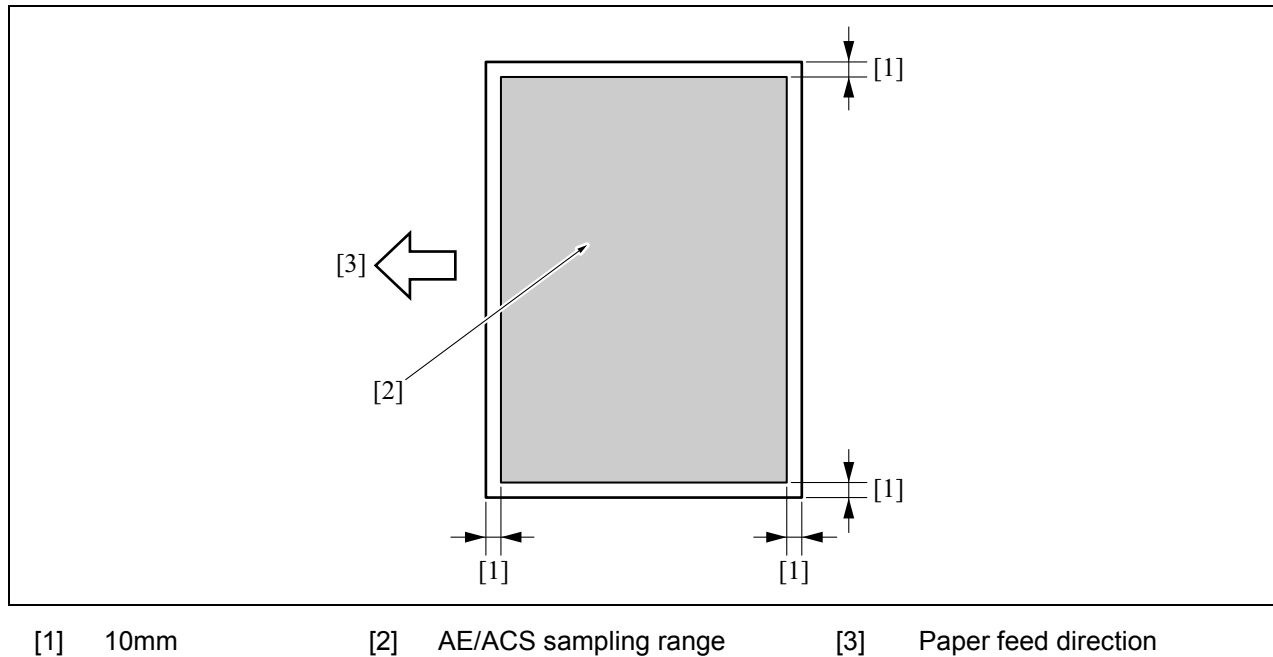
[2] 2nd original size detection
(main scan direction)

1.2.6 AE control

The CCD sensor installed on the A/D converter board (ADB) reads the copy density during the AE scan, it performs the process responsive to the read density on the overall control board (OACB), and then it selects the most favorable γ correction curve. The CPU on the image processing board (IPB) performs the selection.

A. AE/ACS sampling range

The AE/ACS sampling range is identical to the read range in both the scanner mode and the DF mode.



1.2.7 Image processing

A. AOC (automatic offset control)

With the circuit in the CCD sensor, AOC automatically adjusts the analog offset voltage from the sensor to be the lower limit of the A/D converter.

B. AGC (automatic gain control)

AGC automatically controls the level of the analog amplification of the CCD sensor output at the shading white correction to be the higher limit for the A/D converter.

C. Shading correction

(1) Types of the shading correction

- White correction
- Black correction

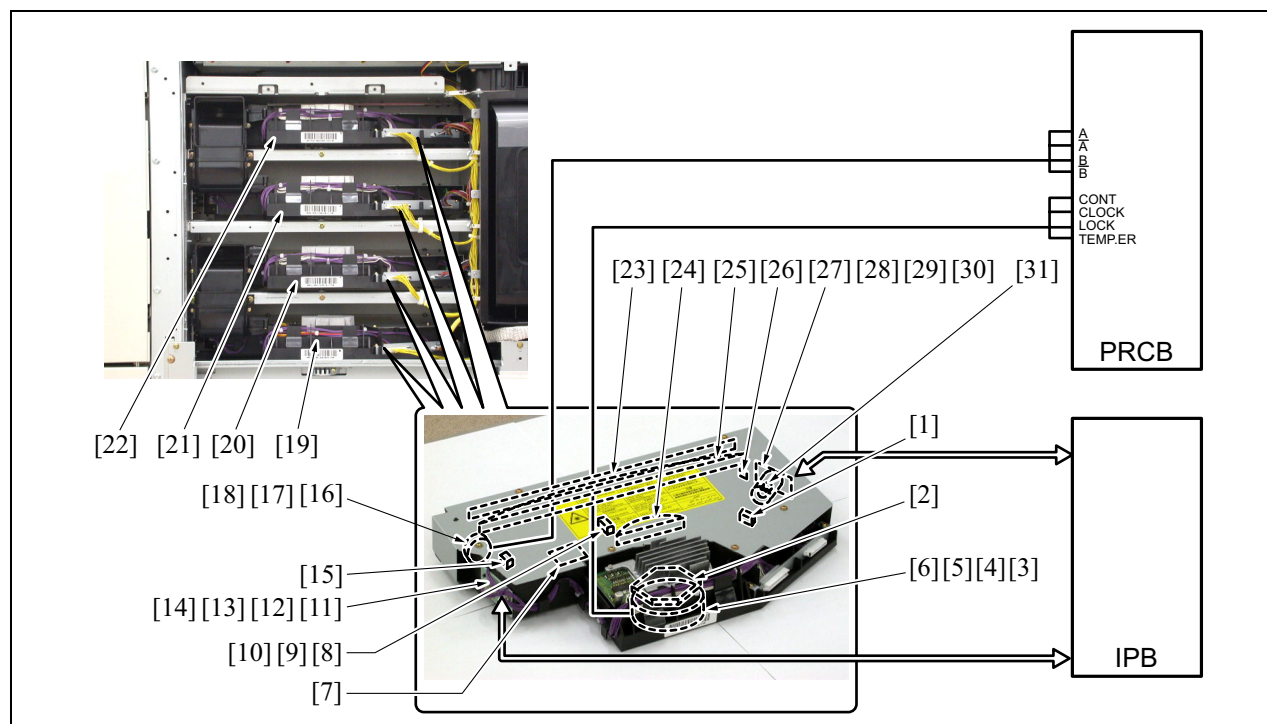
(2) Execution timing

- At the main switch (SW2) ON
- At the start of scan job

- D. Other image processing**
 - (1) Brightness/density conversion**
 - (2) Text/dot pattern/photo/map judgement**
 - (3) Filtering**
 - (4) Magnification change processing**
 - (5) Error diffusion processing**
 - (6) Data compression/elongation processing**
 - (7) AE**
 - (8) ACS**
 - (9) Screen processing**

2.1 Composition

2.1 Composition



Symbol	Name	Function or method
[1]	Cylindrical lens 1	Corrects the laser path against the angle error in the polygon mirror
[2]	Polygon mirror	Scans the laser light Hexahedron, 51,968.51rpm
[3]	Polygon motor Y (M3)	Drives the polygon mirror (write unit Y) DC brushless motor, PLL control
[4]	Polygon motor M (M4)	Drives the polygon mirror (write unit M) DC brushless motor, PLL control
[5]	Polygon motor C (M5)	Drives the polygon mirror (write unit C) DC brushless motor, PLL control
[6]	Polygon motor K (M6)	Drives the polygon mirror (write unit K) DC brushless motor, PLL control
[7]	Temp detection board (TDB)	Detects the temperature in the write unit (only installed on the write unit K)
[8]	Laser correction HP sensor Y (PS5)	Detects the home position for the cylindrical lens 2 (write unit Y)*1
[9]	Laser correction HP sensor /M (PS6)	Detects the home position for the cylindrical lens 2 (write unit M)*1
[10]	Laser correction HP sensor C (PS7)	Detects the home position for the cylindrical lens 2 (write unit C)*1
[11]	Index sensor board Y (INDX SB Y)	Controls the laser writing position in the main scan direction (write unit Y)
[12]	Index sensor board M (INDX SB M)	Controls the laser writing position in the main scan direction (write unit M)

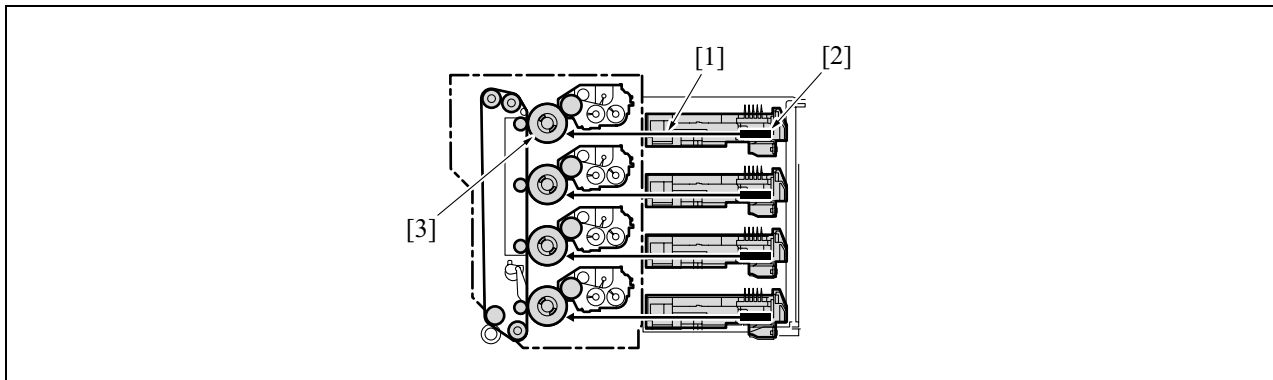
Symbol	Name	Function or method
[13]	Index sensor board C (INDX SB C)	Controls the laser writing position in the main scan direction (write unit C)
[14]	Index sensor board K (INDX SB K)	Controls the laser writing position in the main scan direction (write unit K)
[15]	Index lens	Collects the laser light reflected from the index mirror
[16]	Laser correction motor Y (M7)	Swing-drives the cylindrical lens 2 (write unit Y)
[17]	Laser correction motor M (M8)	Swing-drives the cylindrical lens 2 (write unit M)
[18]	Laser correction motor C (M9)	Swing-drives the cylindrical lens 2 (write unit C)
[19]	Write unit K	Write unit for black
[20]	Write unit C	Write unit for cyan
[21]	Write unit M	Write unit for magenta
[22]	Write unit Y	Write unit for yellow
[23]	Dust-proof glass	Keeps dust out from the write unit
[24]	f θ lens	Makes the laser scan speed uniform against the laser exposure surface on the drum
[25]	Cylindrical lens 2	Corrects the laser path against the angle error in the polygon mirror
[26]	Index mirror	Reflects the laser light to the index sensor boards Y, M, C, K (INDX SB Y, M, C, K)
[27]	Laser drive board Y (LDB Y)	Laser light (write unit Y) 1 chip 1 beam method, 7mW 650nm
[28]	Laser drive board M (LDB M)	Laser light (write unit M) 1 chip 1 beam method, 7mW 650nm
[29]	Laser drive board C (LDB C)	Laser light (write unit C) 1 chip 1 beam method, 7mW 650nm
[30]	Laser drive board K (LDB K)	Laser light (write unit K) 1 chip 1 beam method, 7mW 650nm
[31]	Collimator lens	Collimates the diffusing laser light

*1 It is not installed on the write unit /K.

2.2 Operation

2.2.1 Image writing

The RGB image data from the CCD sensor is converted into digital data, individually, in the A/D converter board (ADB) and then, it is sent to the overall control board (OACB). The OACB converts RGB signals to YMCK signals with the image processing board (IPB). The converted YMCK signals are divided to the laser drive board Y, M, C, K (LDB Y, M, C, K) by the IPB. They are written on the drums for each color with laser light from the each laser drive board.



[1] Laser light

[3] Drum

[2] Polygon mirror

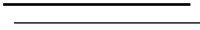
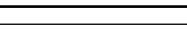
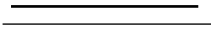
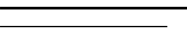
2.2.2 Color registration correction control

In a black-and-white MFP, a transfer image formed on its drum is transferred onto paper directly; however, in this engine, a color image is split into 4 colors, yellow (Y), magenta (M), cyan (C), and black (K), the images for each color are formed on each dedicated drum, they are combined on the transfer belt (1st transfer), and then the combined image is transferred onto paper (2nd transfer). At the 1st transfer, the transfer locations for each color must be matched to prevent the color drift. This control is called the color registration correction control.

A. Types of the color registration correction control

There are following, 5 color registration correction controls.

The write units are mechanically adjusted in the "Partial horizontal magnification"; however, the correction is performed automatically in the other four.

Correction type		Correction method
Drift in the main scan direction		Adjusts the write start timing in the main scan direction
Drift in the sub-scan direction		Adjusts the write start timing in the sub-scan direction
Entire horizontal magnification		Adjusts the clock frequency at write
Inclination		Adjusts the angle of the cylindrical lens 2
Partial horizontal magnification		Adjusts the position of the write unit (parallelism against drum) * See adjusting the timing for the image adjustment in 36 mode

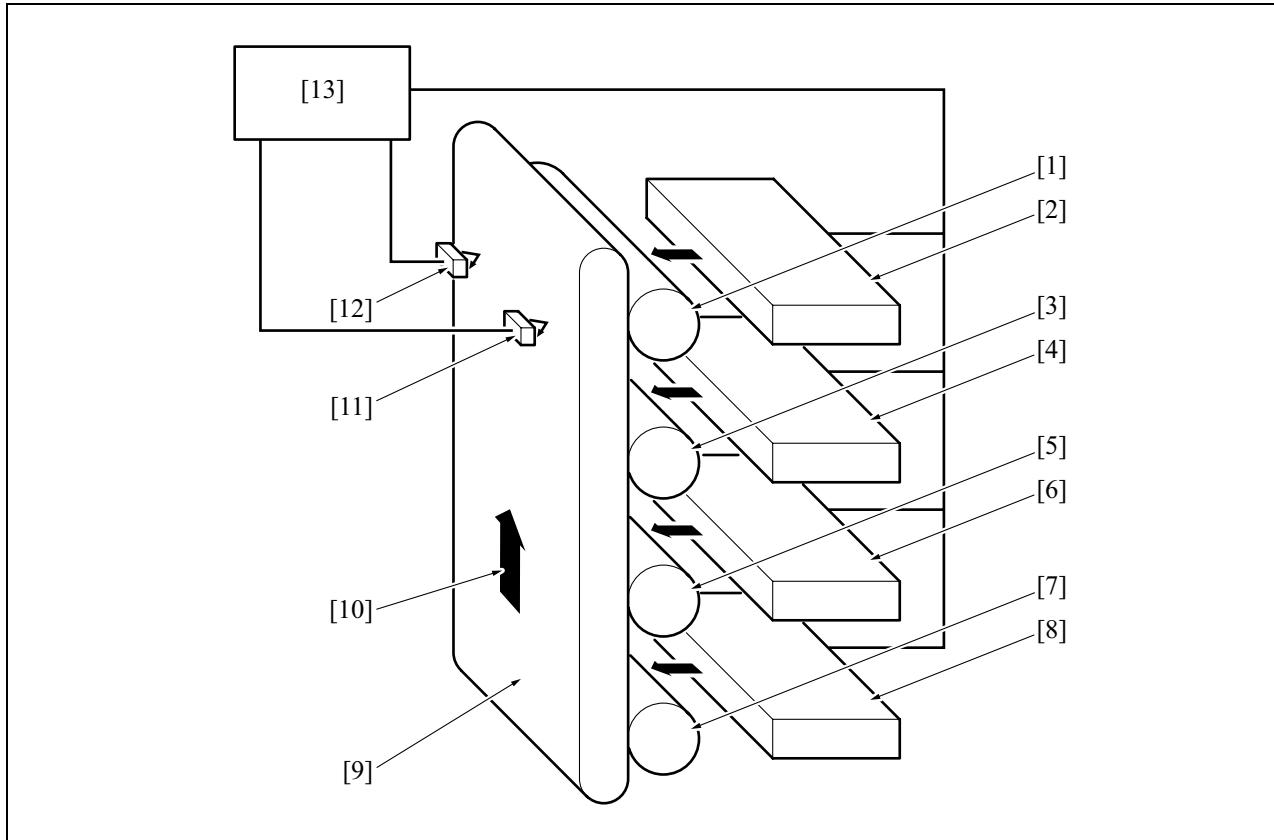
*1 The relationship between 2 colors are shown in the interests of simplicity.

*2 In "drift in the main scan direction", "Entire horizontal magnification", and "Partial horizontal magnification", colors are intentionally drifted in the sub-scan direction to make it clear the drift between 2 colors.

B. Overview of the color registration automatic correction control

In the color registration automatic correction control, the color registration marks for each color are transferred on the transfer belt in the different transfer area. The locations are detected by the color registration sensor F (PS8) and the color registration sensor R (PS9). This information is used to determine the image drift amount for each color.

If the amount for a color is beyond the set point, adjust the image write timing, the clock frequency, and the angle of the cylindrical lens 2 for the corresponding color are adjusted as necessary.



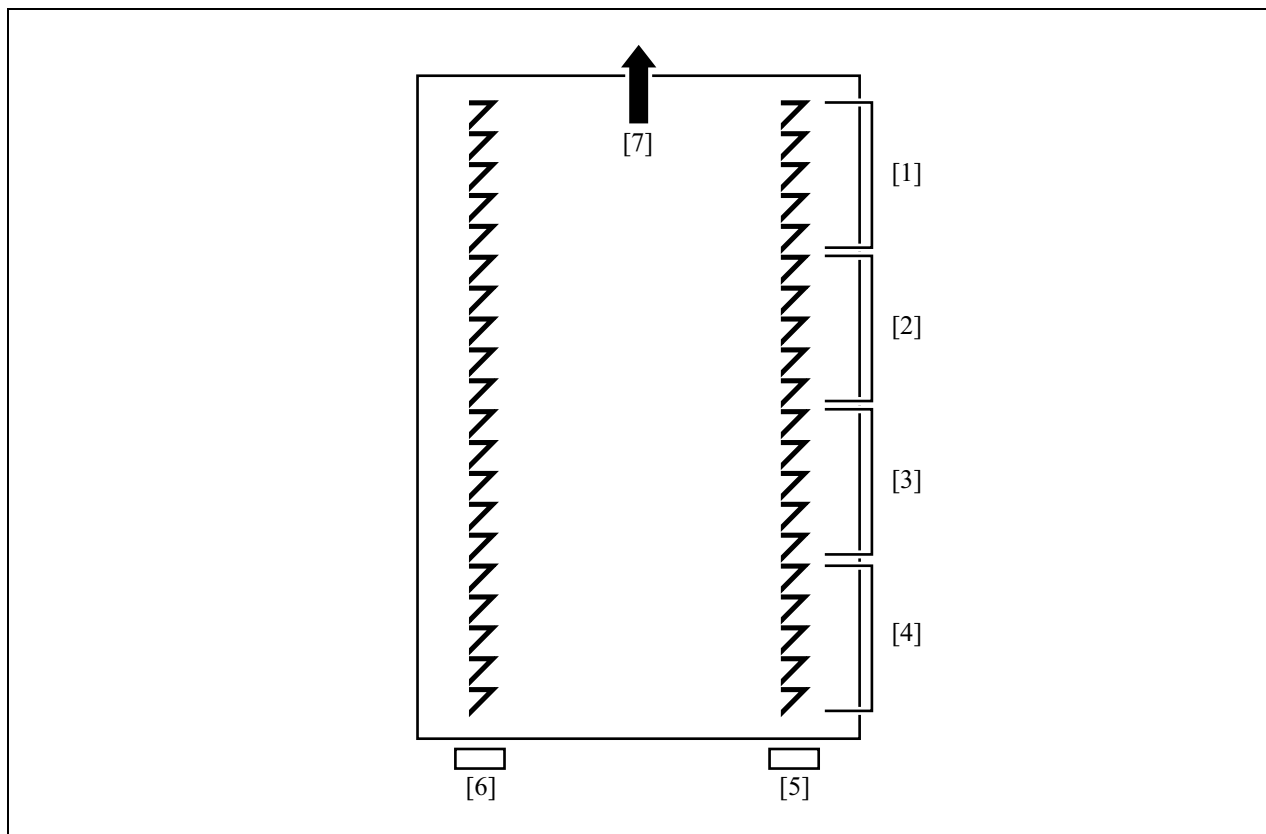
- [1] Drum Y
- [2] Write unit Y
- [3] Drum M
- [4] Write unit M
- [5] Drum C
- [6] Write unit C
- [7] Drum K

- [8] Write unit K
- [9] Transfer belt
- [10] Direction of image
- [11] Color registration sensor F (PS8)
- [12] Color registration sensor R (PS9)
- [13] Data processing

C. Procedure for the color registration automatic correction control operation

1. Transferring the color registration mark

The color registration marks "Z" for each color are transferred on the transfer belt in order of black (K), cyan (C), magenta (M), and yellow (Y). They are transferred on the front side and rear side in a line. These locations are corresponding to the color registration sensor /F (PS8) and the color registration sensor R (PS9).

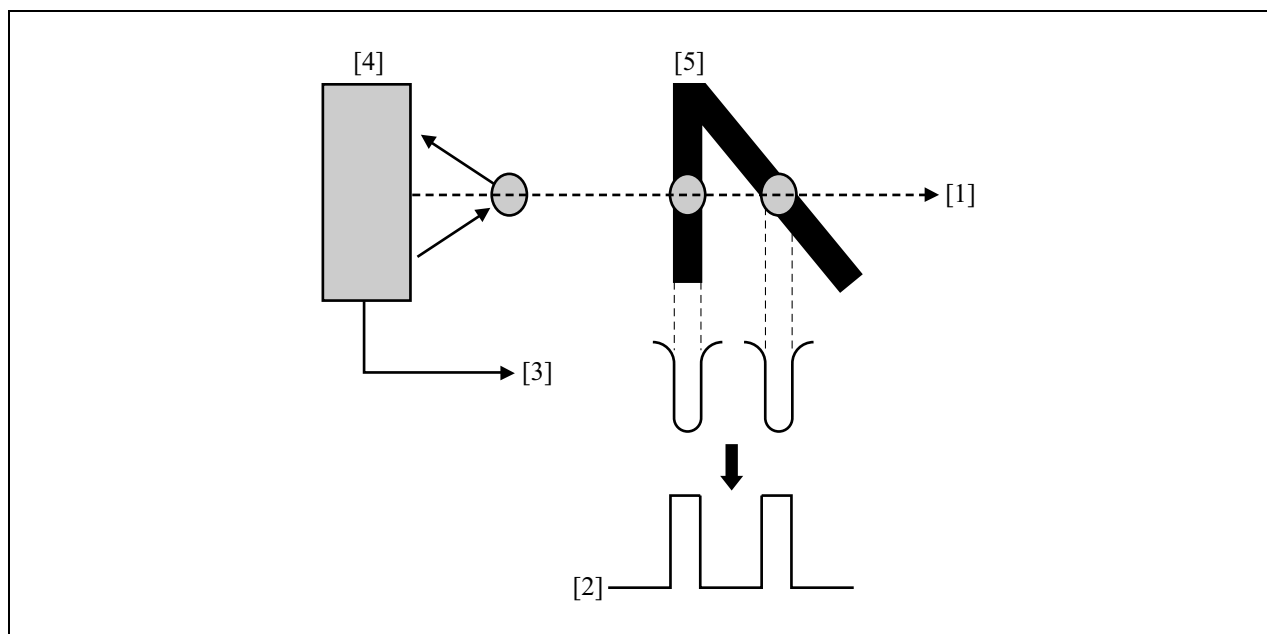


- [1] Color registration mark K
- [2] Color registration mark C
- [3] Color registration mark M
- [4] Color registration mark Y

- [5] Color registration sensor F (PS8)
- [6] Color registration sensor R (PS9)
- [7] Direction of image

2. Detecting the color registration mark

PS8 and PS9 detect the edge of the color registration mark "7" for each color and convert to digital signals. The edge detection for one "7" is performed at four positions.



[1] Direction of the edge detection (direction of image)

[2] Binarized digital signals

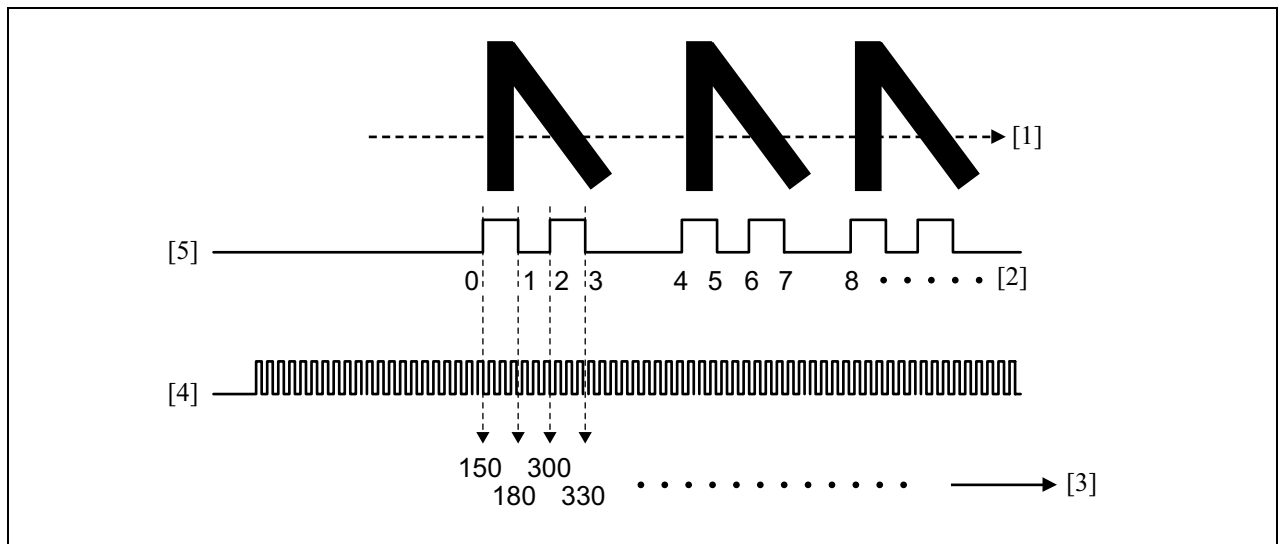
[3] Detection signal of the color registration sensor F, R (PS8, PS9) (analog signal)

[4] Color registration sensor F, R (PS8, PS9)

[5] Color registration mark

3. Calculating and correcting the color drift amount

The transfer belt rotates to record the passage time for each color registration mark. The passage time is determined by the clock signal count corresponding to the detection edge of each registration mark as shown below. The detected values from PS8 and PS9 are recorded individually.



- | | |
|--|-------------------------------|
| [1] Direction of the edge detection (direction of image) | [4] Clock signal |
| [2] Address number of the detected edge | [5] Binarized digital signals |
| [3] Clock signal count value corresponding to the address for each detected edge | |

The passage time differences between black (K) and each color are determined from the passage times detected at above. The time difference is called the color drift amount due to the image write timing. It also determines the difference between the edge detection timing difference for black (K) and the edge detection timing differences for each color. It is called the color drift amount due to the angle of the write unit. The determined value is compared with the set point and then it is corrected to meet the set point.

D. Operation condition of the color registration correction control

The color registration correction control is performed when:

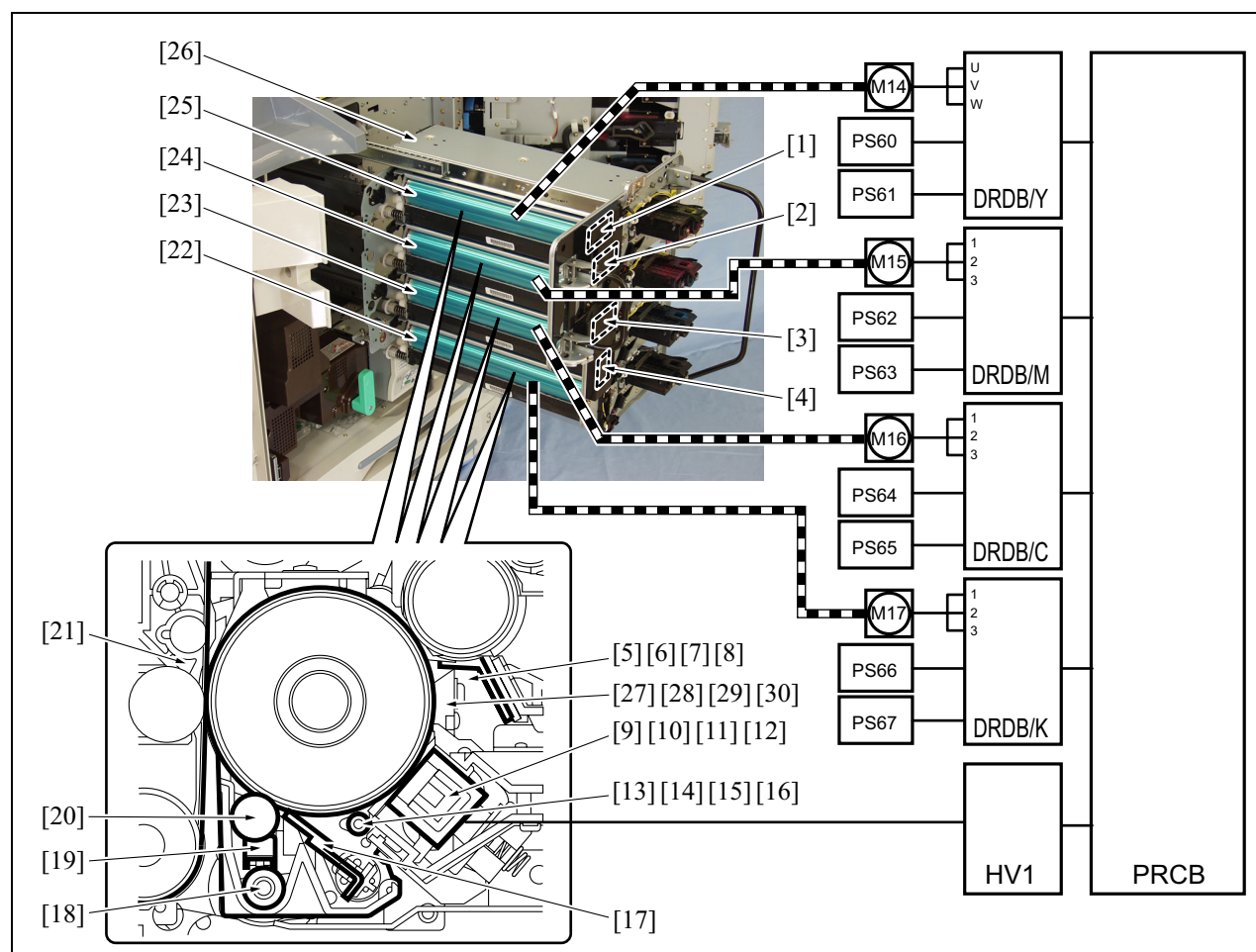
- Operation condition 1
The color registration automatic correction control is executed in the 36 mode.
Perform the operation when replacing a component described in "3. LIST OF ADJUSTMENT ITEMS FOR hp Color 9850mfp" in Field Service.
- Operation condition 2
The fixing temperature is below the specified temperature during warm-up.
- Operation condition 3
The specified number of page is copied/printed.
- Operation condition 4
The copy/print operation has not been performed for a certain time.
- Operation condition 5
A certain change in temperature is detected from the temp detection board (TDB).

Note:

- If one of the operating conditions is met at idle, the color registration correction control is started when the copy/print operation is started for the first time since then.

3. DRUM UNIT

3.1 Composition



UNIT EXPLANATION

Symbol	Name	Function or method
[1]	Drum potential sensor board Y (DRPSB Y)	Controls the drum potential sensor Y (DRPS Y)
[2]	Drum potential sensor board M (DRPSB M)	Controls the drum potential sensor M (DRPS M)
[3]	Drum potential sensor board C (DRPSB C)	Controls the drum potential sensor C (DRPS C)
[4]	Drum potential sensor board K (DRPSB K)	Controls the drum potential sensor K (DRPS K)
[5]	Developing unit Y	Deposits yellow toner to the transfer image on the drum Y See "4. Developing unit."
[6]	Developing unit M	Deposits magenta toner to the transfer image on the drum M See "4. Developing unit."
[7]	Developing unit C	Deposits cyan toner to the transfer image on the drum C See "4. Developing unit."
[8]	Developing unit K	Deposits black toner to the transfer image on the drum K See "4. Developing unit."
[9]	Charging Y	Forms a charging potential on the surface of the drum Y DC corona discharge (Scotron) Wire discharge: gold-plated tungsten wire (ϕ 30 μ m) Constant-current method DC output range: -450 to -1100 μ A Grid bias: charging grid plate Constant voltage method DC output range: -200 to -850V

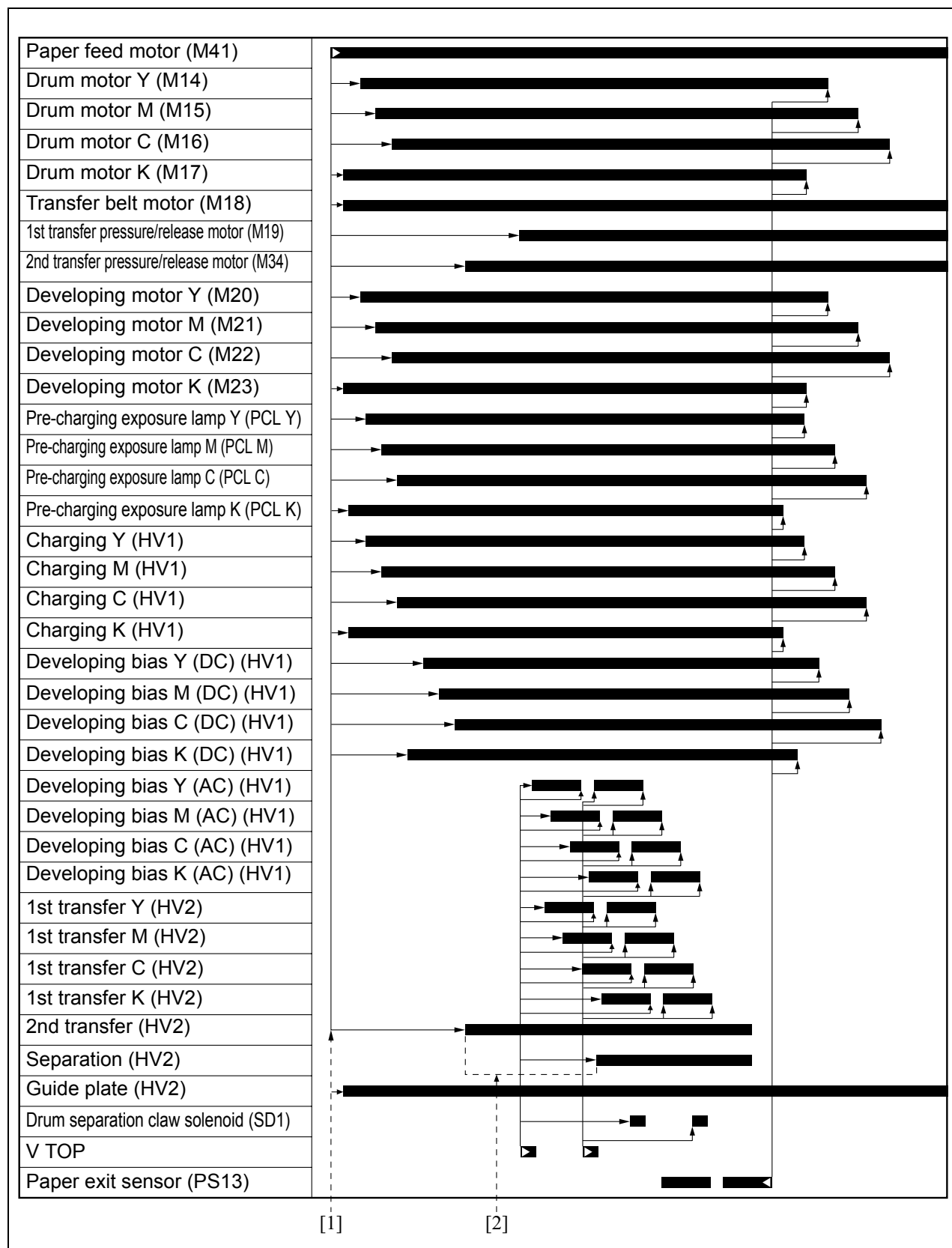
Symbol	Name	Function or method
[10]	Charging M	Forms a charging potential on the surface of the drum M DC corona discharge (Scotron) Wire discharge: gold-plated tungsten wire (ϕ 30 μ m) Constant-current method DC output range: -450 to -1100 μ A Grid bias: charging grid plate Constant voltage method DC output range: -200 to -950V
[11]	Charging C	Forms a charging potential on the surface of the drum C DC corona discharge (Scotron) Wire discharge: gold-plated tungsten wire (ϕ 30 μ m) Constant-current method DC output range: -450 to -1100 μ A Grid bias: charging grid plate Constant voltage method DC output range: -200 to -950V
[12]	Charging K	Forms a charging potential on the surface of the drum K DC corona discharge (Scotron) Wire discharge: gold-plated tungsten wire (ϕ 30 μ m) Constant-current method DC output range: -450 to -1100 μ A Grid bias: charging grid plate Constant voltage method DC output range: -200 to -950V
[13]	Pre-charging exposure lamp Y (PCL Y)	Lowers and unifies the drum Y surface potential LED
[14]	Pre-charging exposure lamp M (PCL M)	Lowers and unifies the drum M surface potential LED
[15]	Pre-charging exposure lamp C (PCL C)	Lowers and unifies the drum C surface potential LED
[16]	Pre-charging exposure lamp K (PCL K)	Lowers and unifies the drum K surface potential LED
[17]	Cleaning blade	Cleans the drum Drum contacting separation method
[18]	Toner collection screw	Conveys toner from the cleaning section to the toner collection section Screw method
[19]	Lubrication	Assists the drum cleaning ability Zinc stearate rod
[20]	Lube applying brush roller	Applies lubrication to the drum surface Drum contacting application method by brush
[21]	Transfer belt unit	YMCK synthetic transfer image formation base See "5. Transfer belt unit."
[22]	Drum K	Transfer image formation base for black OPC drum (ϕ 60mm)
[23]	Drum C	Transfer image formation base for cyan OPC drum (ϕ 60mm)
[24]	Drum M	Transfer image formation base for magenta OPC drum (ϕ 60mm)
[25]	Drum Y	Transfer image formation base for yellow OPC drum (ϕ 60mm)
[26]	Process unit	Color image formation section Consists of the developing unit, drum cartridge, and transfer belt unit

Symbol	Name	Function or method
[27]	Drum potential sensor K (DRPS K)	Detects the surface potential of the drum K
[28]	Drum potential sensor C (DRPS C)	Detects the surface potential of the drum C
[29]	Drum potential sensor M (DRPS M)	Detects the surface potential of the drum M
[30]	Drum potential sensor Y (DRPS Y)	Detects the surface potential of the drum Y
DRDB/Y	Drum drive board Y	Drive board for the drum motor Y (M14)
DRDB/M	Drum drive board M	Drive board for the drum motor M (M15)
DRDB/C	Drum drive board C	Drive board for the drum motor C (M16)
DRDB/K	Drum drive board K	Drive board for the drum motor K (M17)
M14	Drum motor Y	Drives the drum Y
M15	Drum motor M	Drives the drum M
M16	Drum motor C	Drives the drum C
M17	Drum motor K	Drives the drum K
PS60	Encoder sensor Y1	Detects the rotation of the encoder for the drum Y Manages the drive of the drum motor Y (M14) There are two sensors, PS 60 and PS61, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS61	Encoder sensor Y2	Detects the rotation of the encoder for the drum Y Manages the drive of the drum motor Y (M14) There are two sensors, PS 60 and PS61, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS62	Encoder sensor M1	Detects the rotation of the encoder for the drum M Manages the drive of the drum motor M (M15) There are two sensors, PS 62 and PS63, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS63	Encoder sensor M2	Detects the rotation of the encoder for the drum M Manages the drive of the drum motor M (M15) There are two sensors, PS 62 and PS63, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS64	Encoder sensor C1	Detects the rotation of the encoder for the drum C Manages the drive of the drum motor C (M16) There are two sensors, PS 64 and PS65, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS65	Encoder sensor C2	Detects the rotation of the encoder for the drum C Manages the drive of the drum motor C (M16) There are two sensors, PS 64 and PS65, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder

Symbol	Name	Function or method
PS66	Encoder sensor K1	Detects the rotation of the encoder for the drum K Manages the drive of the drum motor K (M17) There are two sensors, PS 66 and PS67, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder
PS67	Encoder sensor K2	Detects the rotation of the encoder for the drum K Manages the drive of the drum motor K (M17) There are two sensors, PS 66 and PS67, at opposite of the encoder to cancel the rotational fluctuations due to the eccentricity of the encoder

3.2 Operation

3.2.1 Image formation timing

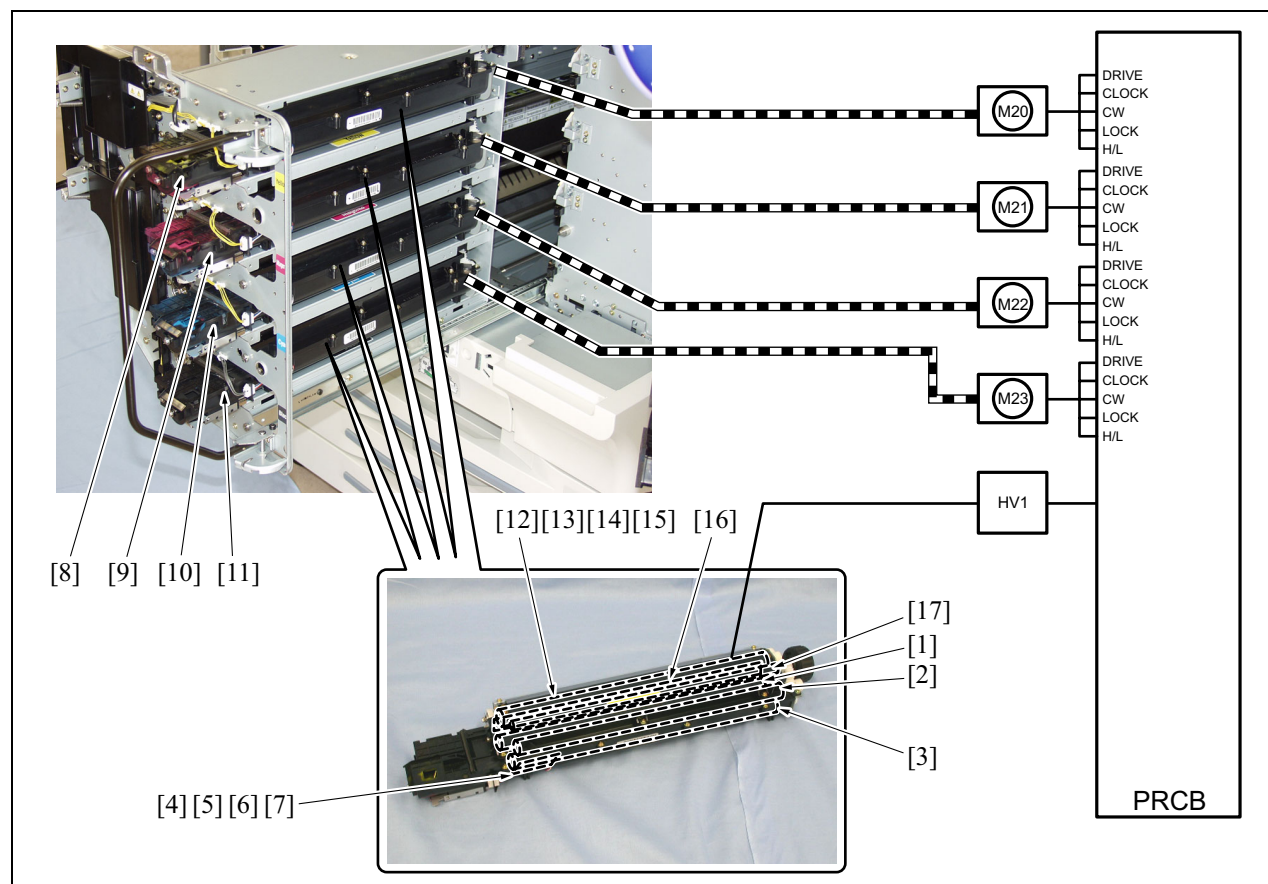


[1] Paper feed start

[2] 2nd transfer cleaning

4. DEVELOPING UNIT

4.1 Composition



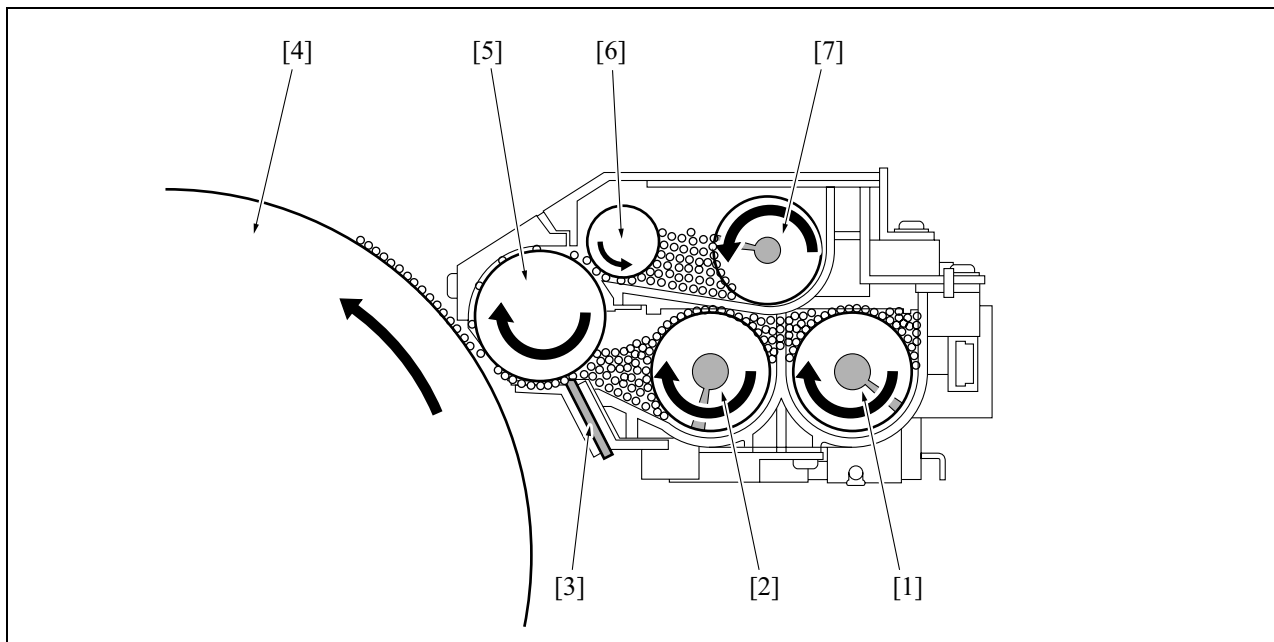
Symbol	Name	Function or method
[1]	Conveyance screw	Conveyance of developer from the agitator screw to the developing sleeve Screw method
[2]	Collection screw	Conveyance of developer from the scraper magnet roller to the collection sector Screw method
[3]	Agitator screw	Agitation of developer and the conveyance of developer to the conveyance screw Screw method
[4]	Toner density sensor Y (TDS Y)	Detection of toner density in the developing unit Y L detection method
[5]	Toner density sensor M (TDS M)	Detection of toner density in the developing unit M L detection method
[6]	Toner density sensor C (TDS C)	Detection of toner density in the developing unit C L detection method
[7]	Toner density sensor K (TDS K)	Detection of toner density in the developing unit K L detection method
[8]	Developing unit Y	Adhesion of yellow toner to the image transferred on the drum Y

Symbol	Name	Function or method
[9]	Developing unit M	Adhesion of magenta toner to the image transferred on the drum M
[10]	Developing unit C	Adhesion of cyan toner to the image transferred on the drum C
[11]	Developing unit K	Adhesion of black toner to the image transferred on the drum K
[12]	Developing sleeve Y	Conveyance of developer to the drum Y surface by means of magnetic force Two-component developing method (yellow toner + carrier) Developing bias applied (AC + DC) DC output range by constant voltage method: -150 to -650 V
[13]	Developing sleeve M	Conveyance of developer to the drum M surface by means of magnetic force Two-component developing method (magenta toner + carrier) Developing bias applied (AC + DC) DC output range by constant voltage method: -150 to -650 V
[14]	Developing sleeve C	Conveyance of developer to the drum C surface by means of magnetic force Two-component developing method (cyan toner + carrier) Developing bias applied (AC + DC) DC output range by constant voltage method: -150 to -650 V
[15]	Developing sleeve K	Conveyance of developer to the drum K surface by means of magnetic force Two-component developing method (black toner + carrier) Developing bias applied (AC + DC) DC output range by constant voltage method: -150 to -650 V
[16]	Developing regulation plate	Regulation of the spiking amount of developer on the developing sleeve Regulation plate method
[17]	Scraper magnet roller	Scraping of developer on the developing sleeve Magnetic absorption method
HV1	High voltage unit 1	Generation of developing bias Y, M, C and K
M20	Developing motor Y	Driving of the developing unit Y
M21	Developing motor M	Driving of the developing unit M
M22	Developing motor C	Driving of the developing unit C
M23	Developing motor K	Driving of the developing unit K

4.2 Operation

4.2.1 Flow of developer

Developer in the developing unit, after being agitated by the agitator screw, is supplied to the developing sleeve by the conveyance screw. At this time, the bristles amount of the developer on the developing sleeve is regulated by the developing regulation plate. After completion of developing, the developer on the developing sleeve is collected by the scraper magnet roller to prevent the developer immediately after completion of developing from mixing with a new developer. This secures the developing follow-up at a high rate of printing. Collected developer is returned to the agitator screw by the collection screw. This allows developer to make a circulation along a defined path.



- | | |
|---------------------------------|---------------------------|
| [1] Agitator screw | [5] Developing sleeve |
| [2] Conveyance screw | [6] Scraper magnet roller |
| [3] Developing regulation plate | [7] Collection screw |
| [4] Drum | |

4.2.2 Developing control

For details of each operation timing related to developing, see "Image formation timing" in "3. Drum unit."

4.2.3 Toner supply control to the developing unit

Each of the TDS Y, M, C and K (toner density sensors Y, M, C and K) uses the L detection method (permeability detection of the developer) to detect the toner density of the developer. A value thus obtained is compared with the reference value of the toner density stored in the CPU on the printer control board (PRCB) to see if the toner needs to be supplied. (For toner supply operation, see "6. Toner supply.")

4.2.4 Developing bias control

A. Control path

The developing bias Y, M, C and K are supplied from the high voltage unit 1 (HV1) and controlled by the printer control board (PRCB). Each developing bias is supplied with AC + DC to secure the uniformity of developing.

4.2.5 Durability of the developer

A. Concept of the durability of the developer

The durability (deterioration) of the developer depends on the developing sleeve drive distance (the moving distance of the developing sleeve surface) in the developing unit.

The developing sleeve drive distance includes the distance at idle time (the time when the developing sleeve does not perform the developing operation but rotates) and the job output pattern has a significant effect on it.

The idle time has a significant effect on the drive distance in such cases as followings.

- Continuous copy count in a job: the rate of the idle time increases if the continuous copy count is small.
- Switching the processing speed in a job: There is the idle time at switching the processing speed.
- Switching mode in ACS: There is the idle time at switching between the color mode and the black and white mode.
- The color mode operation of the black and white original in ACS: There is the idle time for the color developing sleeves when the black and white original is printed in the color mode.
- Double-sided operation: The operation is circulated in set of 4 sheets if the paper size is A4. If the copy count is not an integral multiple of 4, for example if it is 9, only 1 sheet is circulated for the operation, so the idle time is increased.

The relationship between the drive distance and actual copy/print count is affected by those output patterns and it is hard to be defined. The count could be significantly different even if the drive distance is same.

B. Specification of the durability of the developer

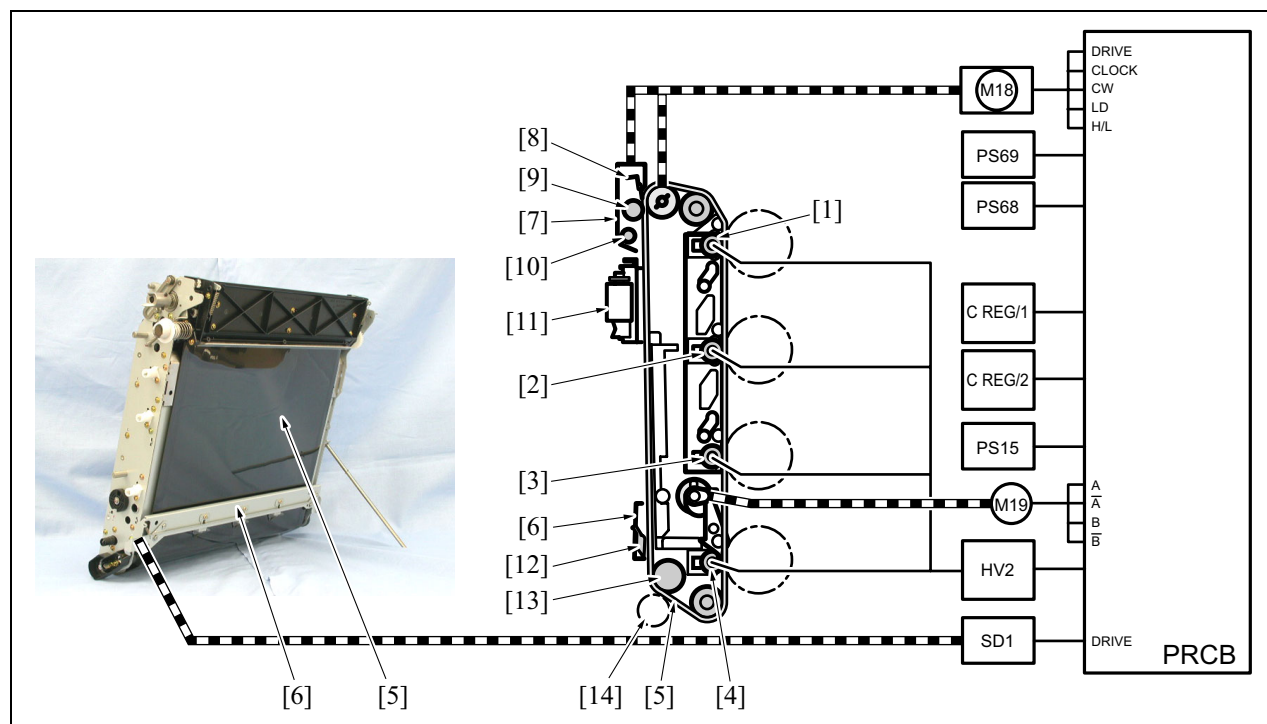
The durability of the drive distance for all color is specified as below.

Durability: 83,000km/color

As described in the previous section, the relationship between the drive distance and actual copy/print count is hard to be defined; however, 83,000km of drive distance corresponds to 100,000 copies/prints if 5 sheets are printed intermittently in the A4 single-sided copy mode as defined for the maintenance.

5. TRANSFER BELT UNIT

5.1 Composition



Symbol	Name	Function or method
[1]	1st transfer roller Y	Transfer of images from the drum Y to the transfer belt (1st transfer) Roller transfer method with constant current DC bias applied DC output range by the constant current method: 5 to 50 μ A
[2]	1st transfer roller M	Transfer of images from the drum M to the transfer belt (1st transfer) Roller transfer method with constant current DC bias applied DC output range by the constant current method: 5 to 50 μ A
[3]	1st transfer roller C	Transfer of images from the drum C to the transfer belt (1st transfer) Roller transfer method with constant current DC bias applied DC output range by the constant current method: 5 to 50 μ A
[4]	1st transfer roller K	Transfer of images from the drum K to the transfer belt (1st transfer) Roller transfer method with constant current DC bias applied DC output range by the constant current method: 5 to 50 μ A
[5]	Transfer belt	Image creation for paper transfer Semiconductor polyimide film
[6]	Separation claw unit	Paper separation assist from the transfer belt Pressure/release method by the transfer belt separation claw solenoid (SD1)
[7]	Belt cleaning unit	Cleaning and collection of toner on the transfer belt
[8]	Belt cleaning blade	Cleaning of the transfer belt Transfer belt contact/separation method

Symbol	Name	Function or method
[9]	Toner guide brush	Scraping and collection of toner on the transfer belt
[10]	Toner collection screw	Conveys toner from the belt cleaning section to the toner collection section Screw method
[11]	Image correction unit	Detection of variety of information of images transferred on the transfer belt
[12]	Transfer belt separation claw	Paper separation assist from the transfer belt Pressure/release method by the transfer belt separation claw solenoid (SD1)
[13]	2nd transfer roller U	Toner transfer from the transfer belt to paper Constant current DC bias applied roller method DC output range by constant current method: +30 to -120 μ A
[14]	2nd transfer roller L (Provided on ADU side)	Toner transfer from the transfer belt to paper Pressure/release mechanism by means of cam Driven idly by the transfer belt
M18	Transfer belt motor	Driving of the transfer belt DC brushless motor, PLL control
M19	1st transfer pressure/release motor	Pressure/release of the 1st transfer roller Y, M, C, K Stepping motor
SD1	Transfer belt separation claw solenoid	Pressure/release of the separation claw 24VDC drive
PS15	1st transfer HP sensor	Pressure/release mechanism of the 1st transfer roller Y, M, C, K Home position detection
PS68	Encoder sensor/belt 1	Detection of the rotation of encoder for the transfer belt drive shaft Drive control of the transfer belt motor (M18) 2 sensors of the PS68 and PS69 are provided at the opposite position of the encoder to cancel the change of rotation caused by the eccentricity of the encoder.
PS69	Encoder sensor/belt 2	Detection of the rotation of encoder for the transfer belt drive shaft Drive control of the transfer belt motor (M18) 2 sensors of the PS68 and PS69 are provided at the opposite position of the encoder to cancel the change of rotation caused by the eccentricity of the encoder.

5.2 Operation

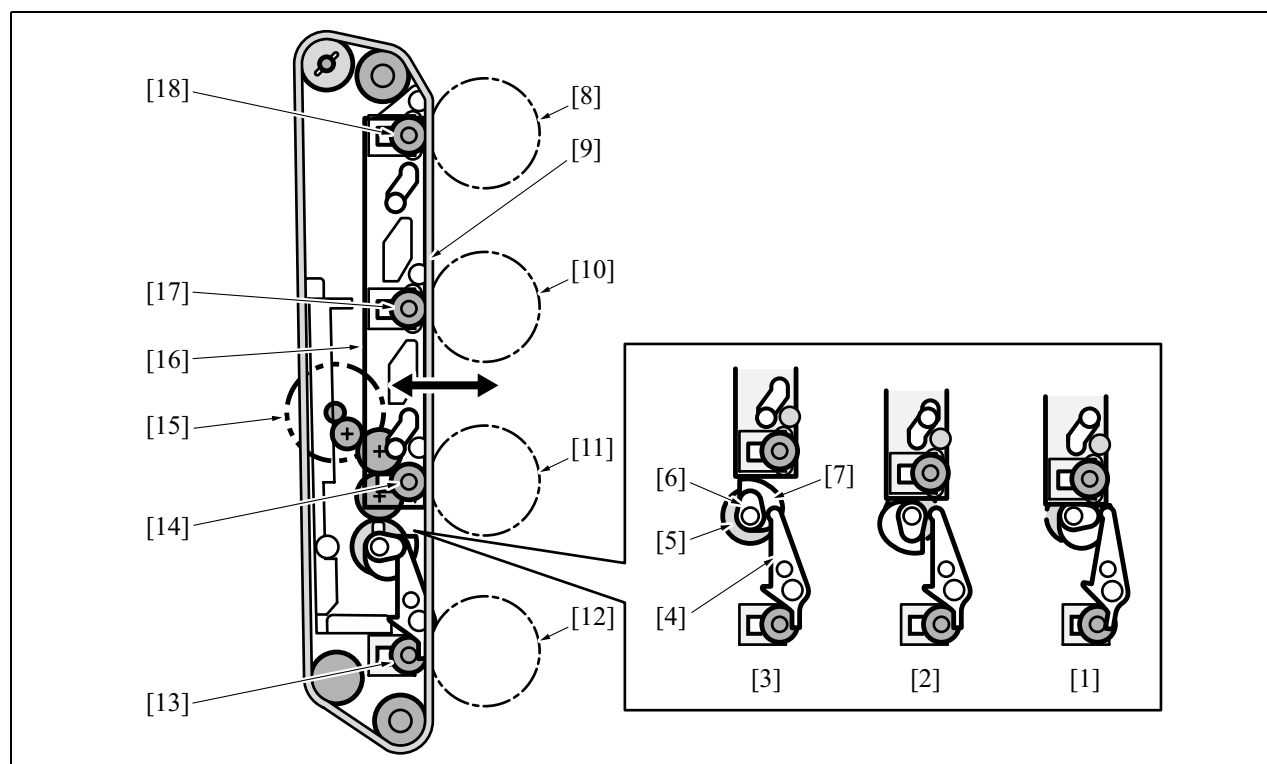
5.2.1 Transfer belt pressure/release mechanism

The 1st transfer roller that presses the transfer belt against the drum is made up of the 1st transfer rollers Y, M and C for the drums Y, M and C and the 1st transfer roller K for the drum K. The three 1st transfer rollers Y, M and C operate as a unit (color 1st transfer roller assembly).

When the 1st transfer is made from the drum to the transfer belt, the color 1st transfer roller assembly and the 1st transfer roller K push out the transfer belt from the inside and press it against the drum, by means of the cam that is driven by the 1st transfer pressure/release motor (M19).

The form of pressure varies with the copy mode. In the full color mode, both of the color 1st transfer roller assembly and the 1st transfer roller K are pressed. However in the black-and-white mode, only the 1st transfer roller K is pressed.

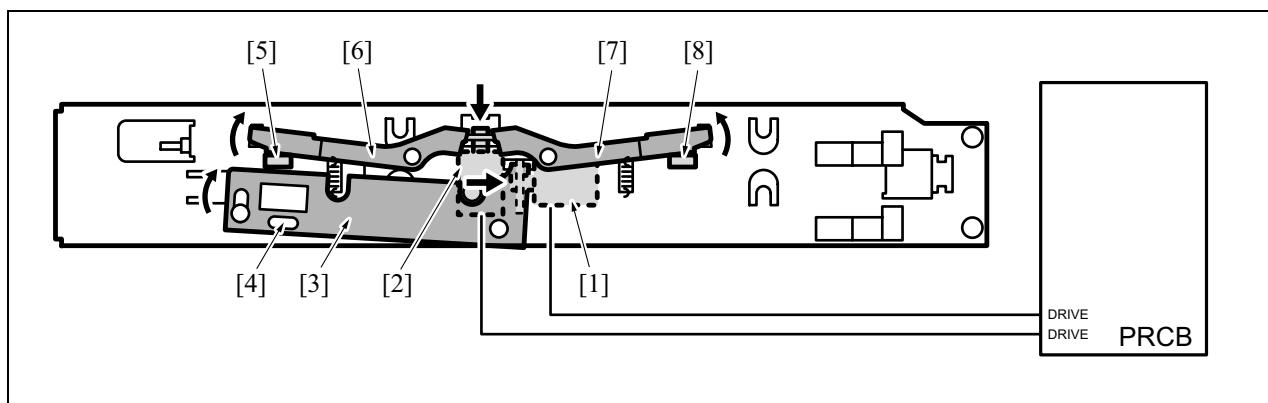
The release condition is detected by the 1st transfer HP sensor (PS15). The cam drive position which varies with the copy mode is controlled by the drive amount of the M19 which starts when the PS15 turns off.



- | | |
|--|--|
| [1] When totally released | [10] Drum M |
| [2] When in the black-and-white mode | [11] Drum C |
| [3] When in the full color mode | [12] Drum K |
| [4] 1st transfer roller K pressure release arm | [13] 1st transfer roller K |
| [5] Drive coupling | [14] 1st transfer roller C |
| [6] 1st transfer roller K pressure release cam | [15] 1st transfer pressure/release motor (M19) |
| [7] 1st transfer roller C pressure release cam | [16] Color 1st transfer roller assembly |
| [8] Drum Y | [17] 1st transfer roller M |
| [9] Transfer belt | [18] 1st transfer roller Y |

5.2.2 Image correction unit

A. Composition



Symbol	Name	Function or method
[1]	Gamma sensor shutter solenoid (SD3)	Open/close of the image density sensor shutter 24VDC drive
[2]	Color registration shutter solenoid (SD2)	Open/close of the color registration sensor shutters F and R 24VDC drive
[3]	Gamma sensor shutter	Prevention of contamination of the Dmax sensor (PS10) and the Gamma sensor (PS11) Open/close method by means of the image density sensor shutter solenoid (SD3)
[4]	Gamma sensor (PS11)	Detection of the maximum density and the gamma characteristics of the patch image on the transfer belt
[5]	Color registration sensor F (PS8)	Detection of the transfer image position on the front side in the direction of the main scan
[6]	Color registration sensor shutter F	Prevention of contamination of the color registration sensor F (PS9)
[7]	Color registration sensor shutter R	Prevention of contamination of the color registration sensor R (PS9)
[8]	Color registration sensor R (PS9)	Detection of the transfer image position on the rear side in the direction of the main scan

B. Shutter mechanism

The image correction unit is provided with a shutter mechanism that allows the sensor to be exposed only when necessary to prevent the contamination of various types of sensors.

The color registration sensor shutters F and R that protect the color registration sensors F and R (PS8 and PS9) are opened and closed by the color registration shutter solenoid (SD2). And also, the image density sensor shutter that protects the gamma sensor (PS11) is opened and closed by the image density sensor shutter solenoid (SD3).

5.2.3 1st transfer control

Toner on the drum is transferred onto the transfer belt side by a bias value applied on the 1st transfer roller provided inside the transfer belt.

The DC bias value of the 1st transfer roller changes according to the following conditions:

- Process speed
- Black-and-white mode or color mode
- Humidity
- No. of use counts of the 1st transfer roller

For each operation timing of the 2nd transfer control, see "Image formation timing" in "3. Drum unit."

5.2.4 2nd transfer control

Toner on the transfer belt is transferred onto the paper (which is pressed between the transfer belt and the 2nd transfer roller L on the ADU side).

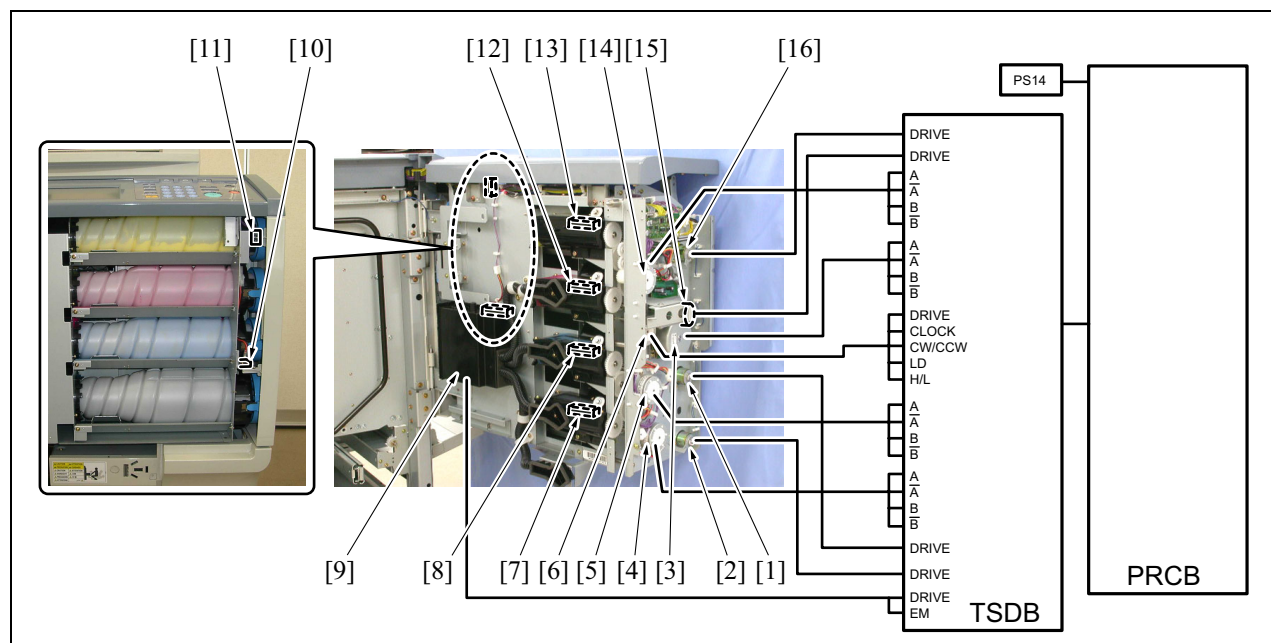
The 2nd transfer roller U is positioned inside the transfer belt directly above the 2nd transfer roller L, and applied with a DC bias value according to the following conditions:

- Process speed
- Black-and-white mode or color mode
- Humidity
- Type of copy paper
- Front or rear side of paper

For each operation timing of the 2nd transfer control, see "Image formation timing" in "3. Drum unit."

6. TONER SUPPLY

6.1 Composition



Symbol	Name	Function or method
[1]	Toner bottle clutch C (MC16)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle clutch C 24VDC drive
[2]	Toner bottle clutch K (MC17)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle K 24VDC drive
[3]	Toner bottle motor (M53)	Driving of the toner bottles Y, M, C, K and driving of the toner conveyance screw for each color
[4]	Toner supply motor K (M52)	Driving of the toner supply screw Stepping motor
[5]	Toner supply motor C (M51)	Driving of the toner supply screw Stepping motor
[6]	Toner supply motor M (M50)	Driving of the toner supply screw Stepping motor
[7]	Toner level detection sensor K (TLD K)	Detection of the toner level in the toner hopper section K (Detection is made at the remaining quantity of about 50g) Toner bottle capacity: Approx. 690g
[8]	Toner level detection sensor C (TLD C)	Detection of the toner level in the toner hopper section C (Detection is made at the remaining quantity of about 50g) Toner bottle capacity: Approx. 460g
[9]	Charging intake fan (M48)	Cooling around charging Y, M, C, K Sirocco fan
[10]	Toner supply interlock switch (MS2)	24VDC power line for MC13, MC14, MC15 and MC16 (toner bottle clutch /Y, /M, /C and /K) is shut off when the toner supply door is open
[11]	Toner supply door open/close sensor (PS54)	Toner supply door open/close detection

Symbol	Name	Function or method
[12]	Toner level detection sensor M (TLD M)	Detection of the toner level in the toner hopper section M (Detection is made at the remaining quantity of about 50g) Toner bottle capacity: Approx. 460g
[13]	Toner level detection sensor Y (TLD Y)	Detection of the toner level in the toner hopper section Y (Detection is made at the remaining quantity of about 50g) Toner bottle capacity: Approx. 460g
[14]	Toner supply motor Y (M49)	Driving of the toner supply screw Stepping motor
[15]	Toner bottle clutch M (MC14)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle M 24VDC drive
[16]	Toner bottle clutch Y (MC13)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle Y 24VDC drive
PS14	Toner supply unit open/close sensor	Toner supply unit open/close detection

6.2 Operation

6.2.1 Toner supply control to the toner hopper section

A. Toner supply operation

When the toner level detection sensors Y, M, C and K (TLD Y, M, C, K) detect the toner level of about 50g in the toner hopper section, the toner bottle motor (M53) and the toner bottle clutches Y, M, C and K (MC13, MC14, MC15 and MC16) turn on and rotate the toner bottle to supply a new toner to the toner hopper section.

B. No-toner display on the operation LCD

When the toner level detection sensors Y, M, C and K (TLD Y, M, C, K) detect the toner level of about 50 g and no toner is supplied to the toner hopper section even after the toner supply operation above is made, it is considered that no toner is left in the bottle. And a no-toner message is shown on the operation LCD.

6.2.2 Toner supply control to the developing unit

A. When power on

Each of the toner density sensors Y, M, C and K (TDS Y, M, C and K) detects the toner density in each developing unit the specified period of time after the main switch (SW2) is turned on. When a value detected at this time is below the reference value of the toner density that is stored in the CPU on the printer control board (PRCB), the toner supply motors Y, M, C and K (M49, M50, M51 and M52) are turned on to supply toner up to the specified density.

B. While in the copy/print operation

While in the copy/print operation, each of the toner density sensors Y, M, C and /K (TDS Y, M, C and K) monitors the toner density. The output voltage of each of TDS Y, M, C and K determines the length of the toner supply time which is activated by turning on each of the toner supply motors Y, M, C and K (M49, M50, M51 and M52) so that it matches the reference value of the toner density.

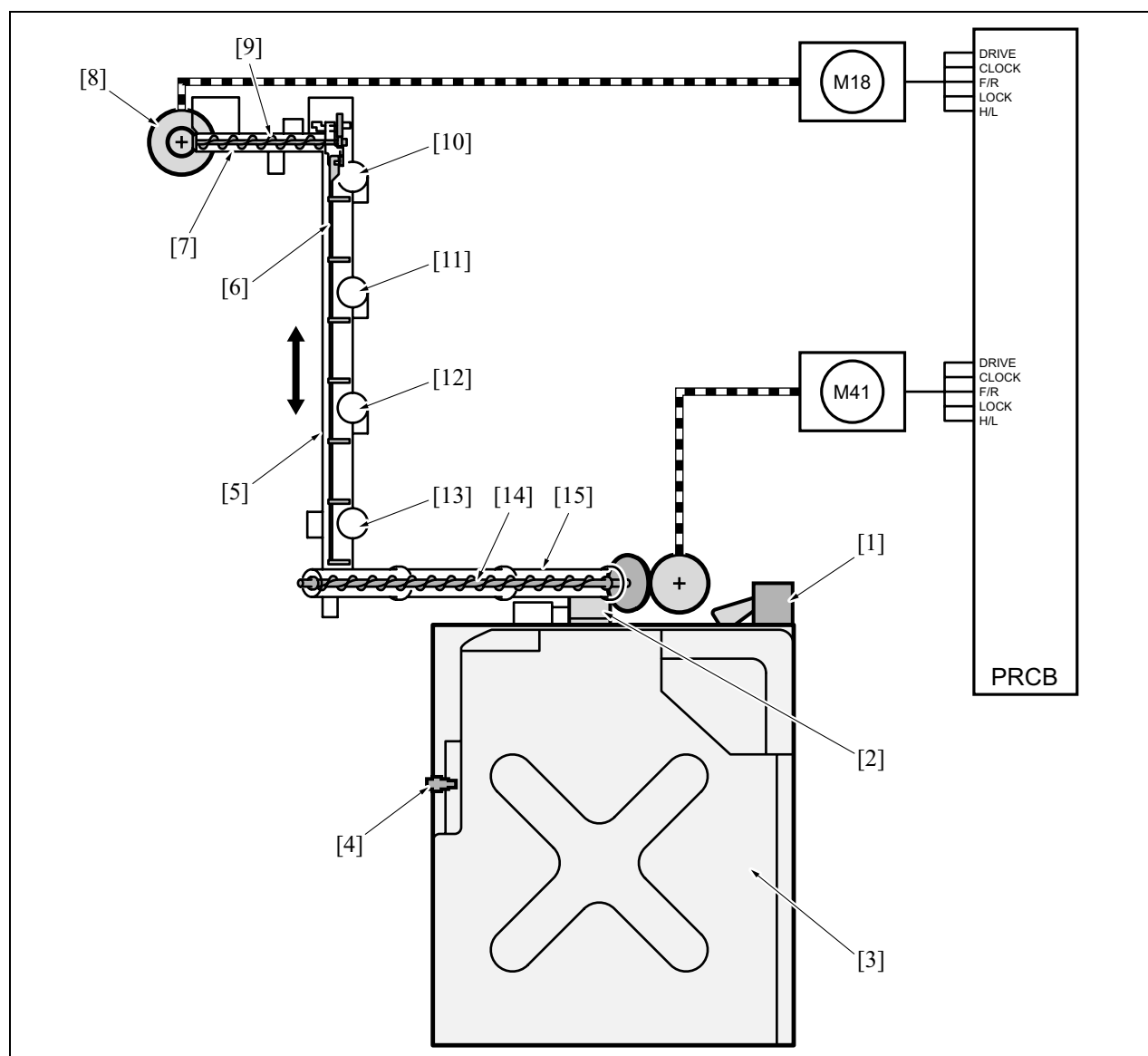
6.2.3 Copy/print operation stop control due to no toner

After the no-toner display is shown on the operation LCD, the consumption of about 50g of remaining toner in the toner hopper is detected by the length of time during which the toner supply motor has been driven. When it is determined by the length of time during which the toner supply motor has been driven that there is no remaining toner in the toner hopper, the copy/print operation is stopped according to the setting of DIPSW 1-2/1-3 of the 25 mode.

However, according to the setting of DIPSW 1-2/1-3 of the 25 mode, when the toner density in the developing unit is below the specified value while in the stop operation, the copy/print operation will stop immediately after paper in the engine is ejected.

7. TONER COLLECTION

7.1 Composition



Symbol	Name	Function or method
[1]	Waste toner door PS (PS53)	Open/close detection of the toner collection door, presence/absence detection of the toner collection box
[2]	Waste toner discharge exit	Discharge exit of waste toner for the toner collection box
[3]	Toner collection box	Waste toner collection container Capacity: 7.0 liters, max.
[4]	Waste toner full sensor (PS52)	Toner collection box full detection (Detection made at about 5.6 liters.)
[5]	Vertical conveyance pipe	Vertical conveyance of waste toner
[6]	Toner rocking plate	Toner conveyance in the vertical conveyance pipe Cam drive method
[7]	Belt collection pipe	Conveyance of waste toner from the transfer belt unit
[8]	Belt waste toner receiving port	Receiving port of waste toner from the transfer belt unit

Symbol	Name	Function or method
[9]	Belt collection screw	Waste toner conveyance from the belt waste toner receiving port to the upper section of the vertical conveyance pipe Screw method
[10]	Drum Y waste toner receiving port	Waste toner receiving port from the drum Y
[11]	Drum M waste toner receiving port	Waste toner receiving port from the drum M
[12]	Drum C waste toner receiving port	Waste toner receiving port from the drum C
[13]	Drum K waste toner receiving port	Waste toner receiving port from the drum K
[14]	Horizontal conveyance screw	Waste toner conveyance from the lower section of the vertical conveyance pipe to the waste toner discharge exit Screw method
[15]	Horizontal conveyance pipe	Waste toner conveyance from the vertical conveyance pipe to the toner collection box
M18	Transfer belt motor	See "2.5 Transfer belt unit."
M41	Paper feed motor	See "2.8 Paper feed trays 1 to 3."

7.2 Operation

7.2.1 Toner collection control

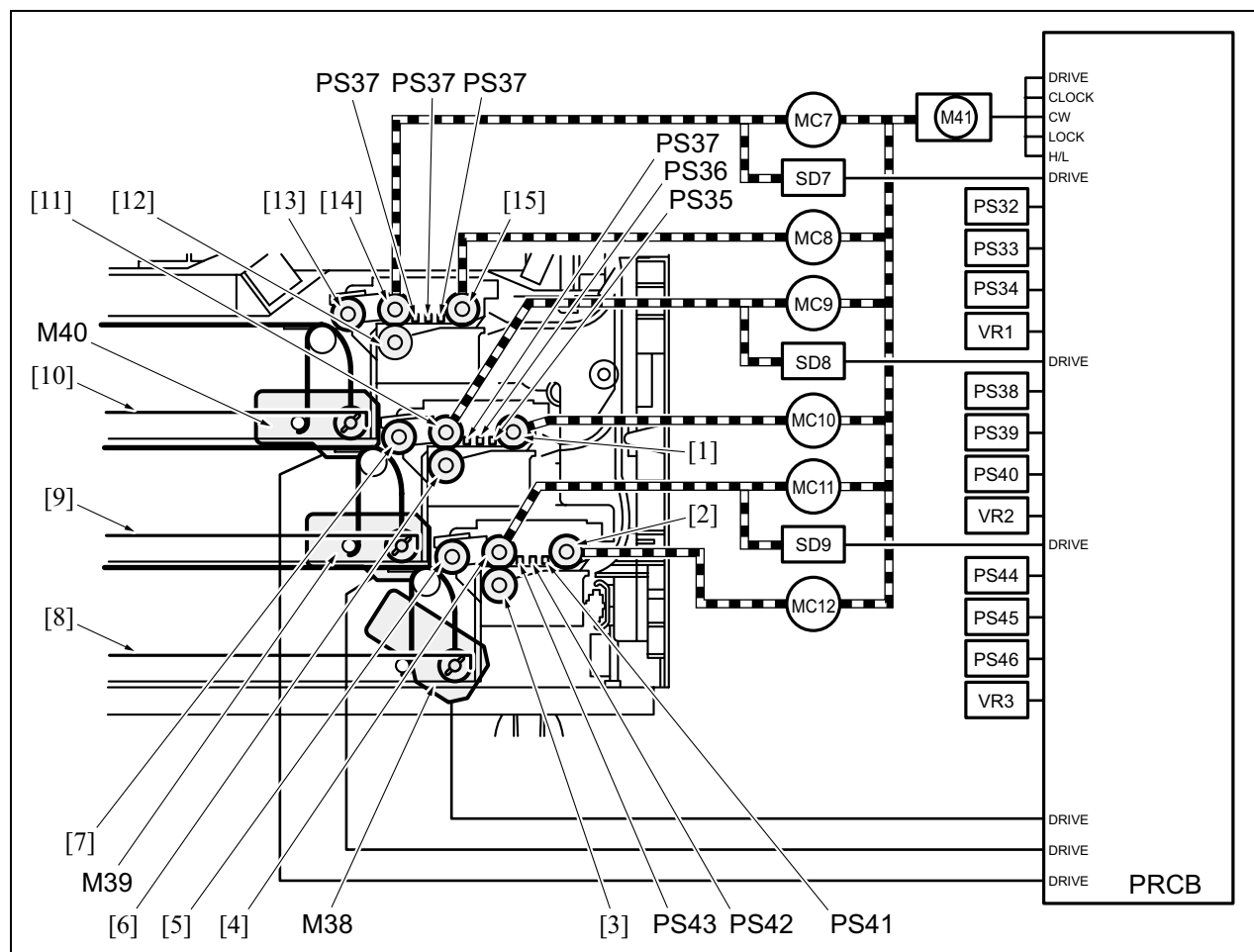
Since the toner collection section is driven by the transfer belt motor (M18) and the paper feed motor (M41), its control depends on the transfer belt drive and the paper feed drive.

7.2.2 Waste toner full detection control

When the waste toner full sensor (PS5) is kept on for a specified period of time, it is considered that the toner collection box is full with waste toner, and a message is shown on the operation LCD.

8. PAPER FEED TRAY 1 TO 3

8.1 Composition



Symbol	Name	Function or method
[1]	Pre-registration roller 2	Conveyance of the tray 2 paper and the paper stopper plate for the correction of paper skew
[2]	Pre-registration roller 3	Conveyance of the tray 3 paper and the paper stopper plate for the correction of paper skew
[3]	Double feed prevention roller 3	Double feed prevention of the tray 3 paper, Torque limiter
[4]	Feed roller 3	Feed of the tray 3 paper
[5]	Paper feed roller 3	Paper feed of the Tray 3 paper
[6]	Double feed prevention roller 2	Double feed prevention of the tray 2 paper, Torque limiter
[7]	Paper feed roller 2	Paper feed of the tray 2 paper
[8]	Up/down plate 3	Tray 3 paper stacking section Up/down function provided Maximum tray capacity: Up to 500 sheets (80g/m ²)
[9]	Up/down plate 2	Tray 2 paper stacking section Up/down function provided Maximum tray capacity: Up to 500 sheets (80g/m ²)
[10]	Up/down plate 1	Tray 1 paper stacking section Up/down function provided Maximum tray capacity: Up to 500 sheets (80g/m ²)

Symbol	Name	Function or method
[11]	Feed roller 2	Feed of the tray 2 paper
[12]	Double feed prevention roller 1	Double feed prevention of the tray 1 paper
[13]	Paper feed roller 1	Paper feed of the tray 1 paper
[14]	Feed roller 1	Feed of the tray 1 paper
[15]	Pre-registration roller 1	Conveyance of the tray 1 paper and the paper stopper plate for the correction of paper skew
M41	Paper feed motor	Driving of the paper feed system 24VDC drive, DC brushless motor, PLL control
M38	Tray up drive motor 3	Driving of the up/down plate 3 24VDC drive, DC brushless motor
M39	Tray up drive motor 2	Driving of the up/down plate 2 24VDC drive, DC brushless motor
M40	Tray up drive motor 1	Driving of the up/down plate 1 24VDC drive, DC brushless motor
MC7	Paper feed clutch 1	Transmission of the driving force from the paper feed motor (M41) to the paper feed roller 1 24VDC drive
MC8	Pre-registration clutch 1	Transmission of the driving force from the paper feed motor (M41) to the pre-registration roller 1 24VDC drive
MC9	Paper feed clutch 2	Transmission of the driving force from the paper feed motor (M41) to the paper feed roller 2 24VDC drive
MC10	Pre-registration clutch 2	Transmission of the driving force from the paper feed motor (M41) to the pre-registration roller 2 24VDC drive
MC11	Paper feed clutch 3	Transmission of the driving force from the paper feed motor (M41) to the paper feed roller 3 24VDC drive
MC12	Pre-registration clutch 3	Transmission of the driving force from the paper feed motor (M41) to the pre-registration roller 3 24VDC drive
SD7	Pick-up solenoid 1	Transmission of the driving force of the tray 1 paper feed
SD8	Pick-up solenoid 2	Transmission of the driving force of the tray 2 paper feed
SD9	Pick-up solenoid 3	Transmission of the driving force of the tray 3 paper feed
PS29	Pre-registration sensor 1	Detection of paper conveyance at the pre-registration roller 1 entrance
PS30	Tray upper limit sensor 1	Detection of the upper limit of the tray 1 paper
PS31	No paper sensor 1	Detection of the presence of the tray 1 paper
PS32	Remaining paper sensor 1	Detection of the remaining paper in the tray 1
PS33	Paper size S1	Detection of the paper size along the length of the tray 1
PS34	Paper size L1	Detection of the paper size along the length of the tray 1
PS35	Pre-registration sensor 1	Detection of paper conveyance at the pre-registration roller 2 entrance
PS36	Tray upper limit sensor 2	Detection of the upper limit of the tray 2 paper
PS37	No paper sensor 2	Detection of the presence of the tray 2 paper
PS38	Remaining paper sensor 2	Detection of the remaining paper in the tray 2
PS39	Paper size S2	Detection of the paper size along the length of the tray 2

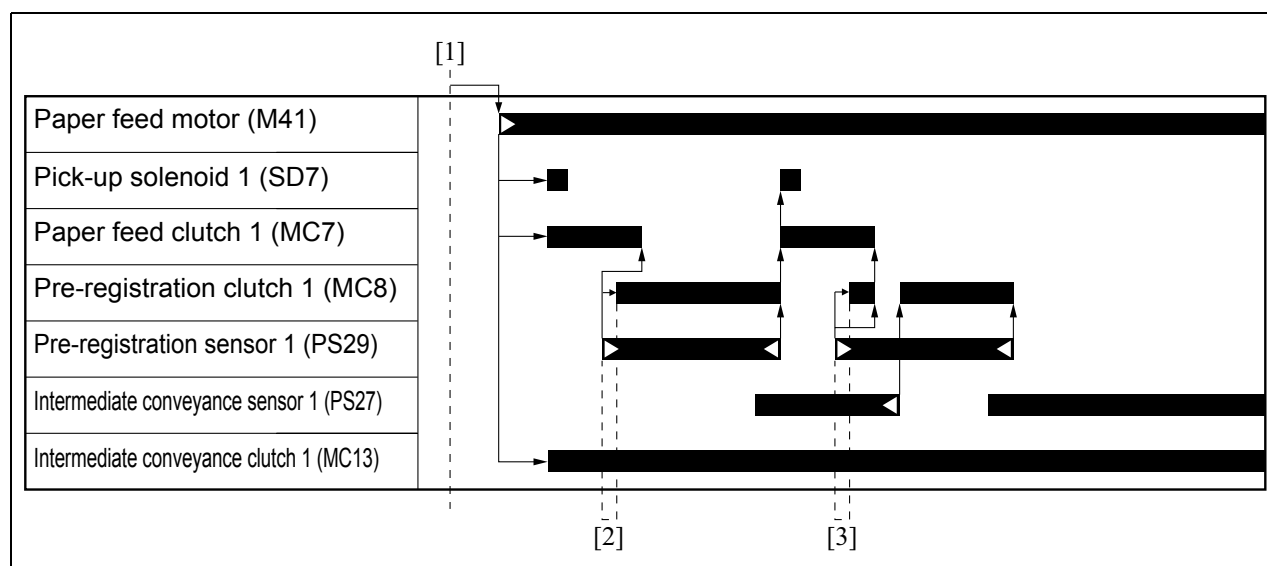
Symbol	Name	Function or method
PS40	Paper size L2	Detection of the paper size along the length of the tray 2
PS41	Pre-registration sensor 3	Detection of paper conveyance at the pre-registration roller 3 entrance
PS42	Tray upper limit sensor 3	Detection of the upper limit of the tray 3 paper
PS43	No paper sensor /3	Detection of the presence of the tray 3 paper
PS44	Remaining paper sensor 3	Detection of the remaining paper in the tray 3
PS45	Paper size S3	Detection of the paper size along the length of the tray 3
PS46	Paper size L3	Detection of the paper size along the length of the tray 3
VR1	Paper size VR/1	Detection of the paper size along the width of the tray 1
VR2	Paper size VR/2	Detection of the paper size along the width of the tray 2
VR3	Paper size VR/3	Detection of the paper size along the width of the tray 3

8.2 Operation

Since the composition and the operation of the paper feed trays 1 to 3 are the same, the explanation is given of the paper feed tray 1 only. The paper feed trays 2 and 3 are the same as the paper feed tray 1.

The intermediate conveyance sensor 1 (PS27) and the intermediate conveyance clutch 1 (MC13) are not used in the paper feed control in the paper feed tray 1.

8.2.1 Paper feed control



[1] START button (ON)

[3] 2nd sheet pre-registration loop

[2] 1st sheet pre-registration loop

8.2.2 Up/down plate control

The up/down plate in the paper feed tray is driven by the wire.

When the paper feed tray 1 is set to the engine, the tray up drive motor 1 (M40) of the engine starts to rotate. As a result, the wire is wound around the drive pulley and the up/down plate goes up. When the tray upper limit sensor 1 (PS30) detects the upper limit of paper, M40 turns off. When the amount of paper gets reduced as a result of the passage of paper, a no paper detection is made by the PS30. At this time, M40 keeps on until the PS30 detects the upper limit of paper again. Accordingly, paper is lifted up to the fixed level at all times.

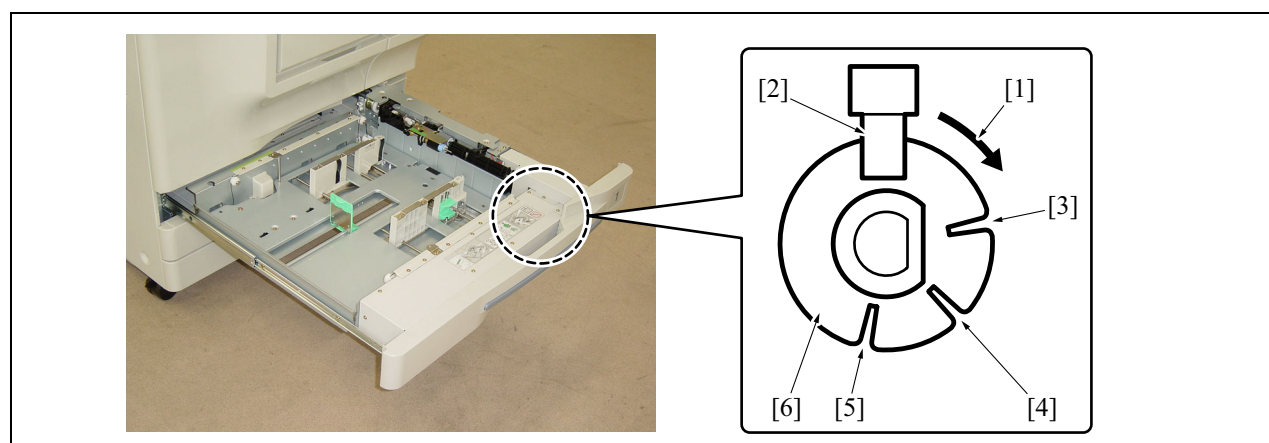
When the paper feed tray 1 is pulled out, the coupling is released from the drive section and the up/down plate goes down by its own weight.

8.2.3 Remaining paper detection control

The amount of remaining paper is detected by the remaining paper sensor 1 (PS32). As the amount of paper in the tray is getting reduced, the actuator provided at the front of the tray rotates gradually. The PS32 turns on and off each time a slit in the actuator passes through. The engine control section counts the number of on/off's of the PS32 after the installation of the tray to detect the amount of remaining paper in 4 steps.

The detection of no paper is made by the no paper sensor 1 (PS31).

No. of the slit counts	Remaining paper in the tray	Indication of remaining amount on the operation board
0	100 to 75%	4 lines lit
1	75 to 50%	3 lines lit
2	50 to 25%	2 lines lit
3	25 to 0%	1 lines lit



- [1] Rotational direction when the up/down plate goes up
- [2] Remaining paper sensor 1 (PS32)
- [3] Slit 1

- [4] Slit 2
- [5] Slit 3
- [6] Actuator

8.2.4 Paper size detection control

The main scan direction is detected by the resistance value of the paper size VR/1 (VR1) at the bottom of the paper feed tray.

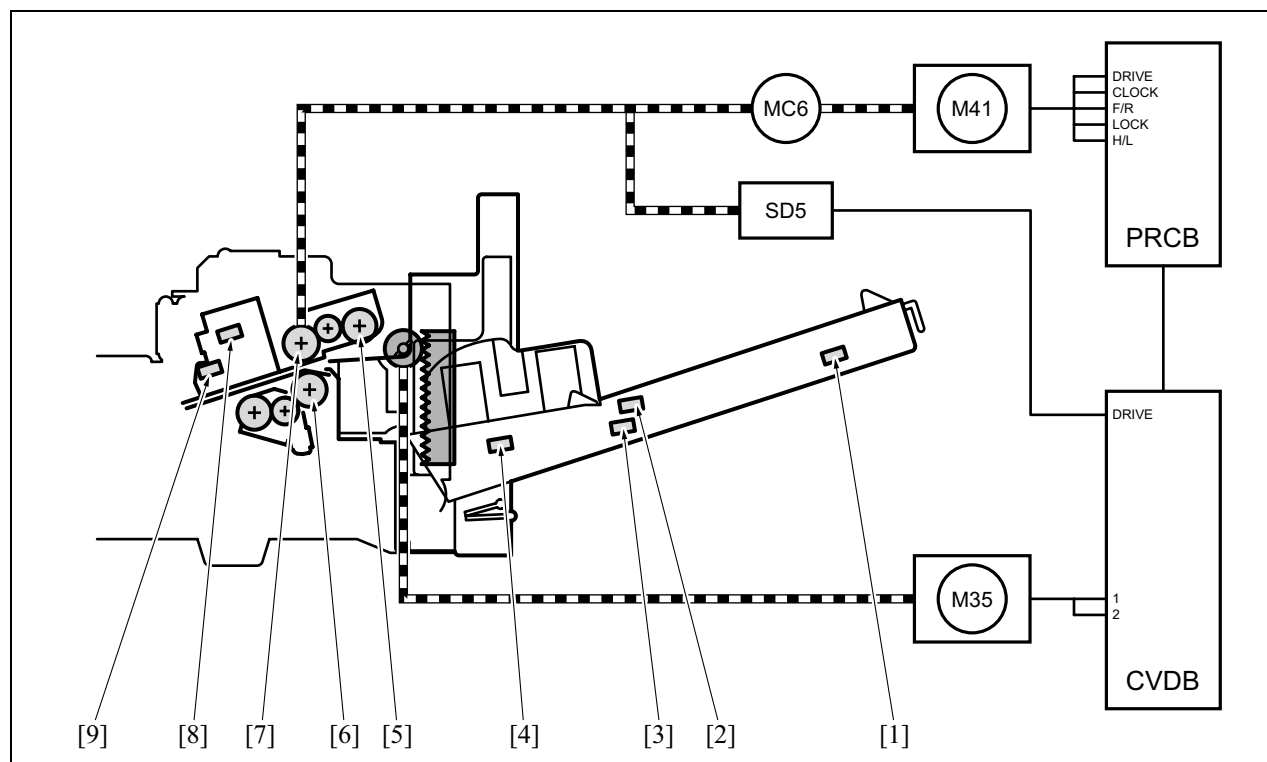
The sub-scan direction is detected in the combination of the on/off of the paper size S1 (PS33) of the up/down plate and the paper size /L1 (PS34).

Paper size	Paper size /S	Paper size /L	Paper size VR
13 x 19	○	○	333.2
12.6 x 18/17.7	○	○	317.0
A3 wide	○	○	307.4
12 x 18	○	○	292.8
A3	○		280.4
A4			280.4
8.5 x 11			252.4
11 x 17	○		252.4
8K	○		235.8
16K			235.8
B4R	○		216.7
B5			216.7
8.5 x 14	○		151.3
8.5 x 11R			151.3
A4R			141.9
F4	○		151.3
B5R			97.3
A5R			43.2
8.5 x 5.5R			30.0

○: Sensor on VR: VR angle

9. BY-PASS FEED

9.1 Composition



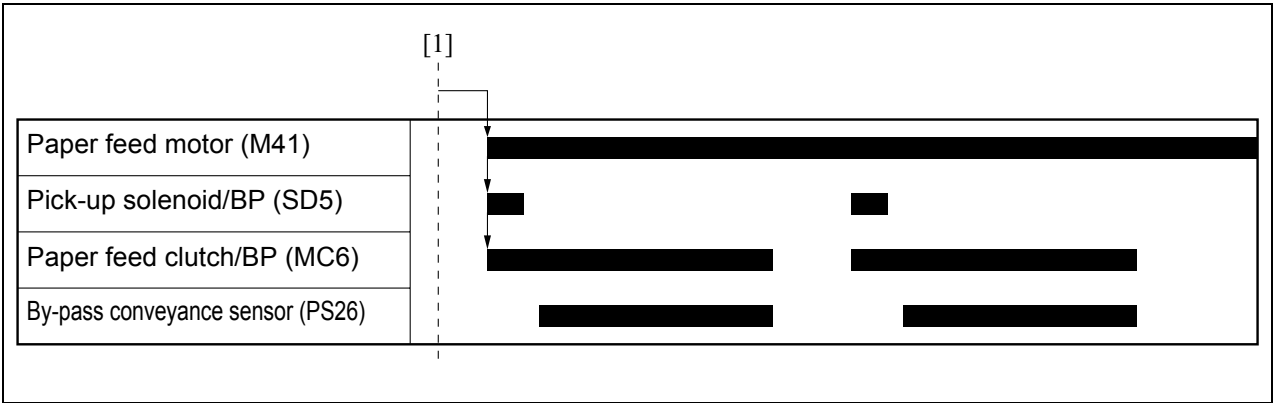
Symbol	Name	Function or method
[1]	Paper size/LBP (PS49)	Paper size detection along the length of the by-pass tray
[2]	No paper sensor/BP (PS47)	Detection of the presence of the by-pass feed paper
[3]	Paper size/SBP (PS48)	Assistance of paper size detection along the width of the by-pass tray
[4]	Paper size/VR/BP (VR4)	Paper size detection along the width of the by-pass tray
[5]	Paper feed roller/BP	Paper feed
[6]	Double feed prevention roller/BP	Double feed prevention of paper, Torque limiter
[7]	Feed roller/BP	Feeding of paper
[8]	Tray upper limit sensor/BP (PS25)	By-pass tray paper upper limit detection
[9]	By-pass conveyance sensor (PS26)	By-pass exit paper conveyance detection
M41	Paper feed motor	See "8. Paper feed tray 1 to 3."
M35	Tray up drive motor/BP	By-pass tray up/down plate drive DC motor with brush
MC6	Paper feed clutch/BP	Transmission of the by-pass tray paper feed power
SD5	Pick-up solenoid/BP	Transmission of the by-pass tray paper feed power

9.2 Operation

9.2.1 Tray up drive control

When Pick-up solenoid/BP (SD5) turns on after the paper feed motor (M41) turns on, the up/down plate is raised with paper going up.
When pulling out ADU, coupling comes off the drive section and the up/down plate comes down by its own weight.

9.2.2 Paper feed control



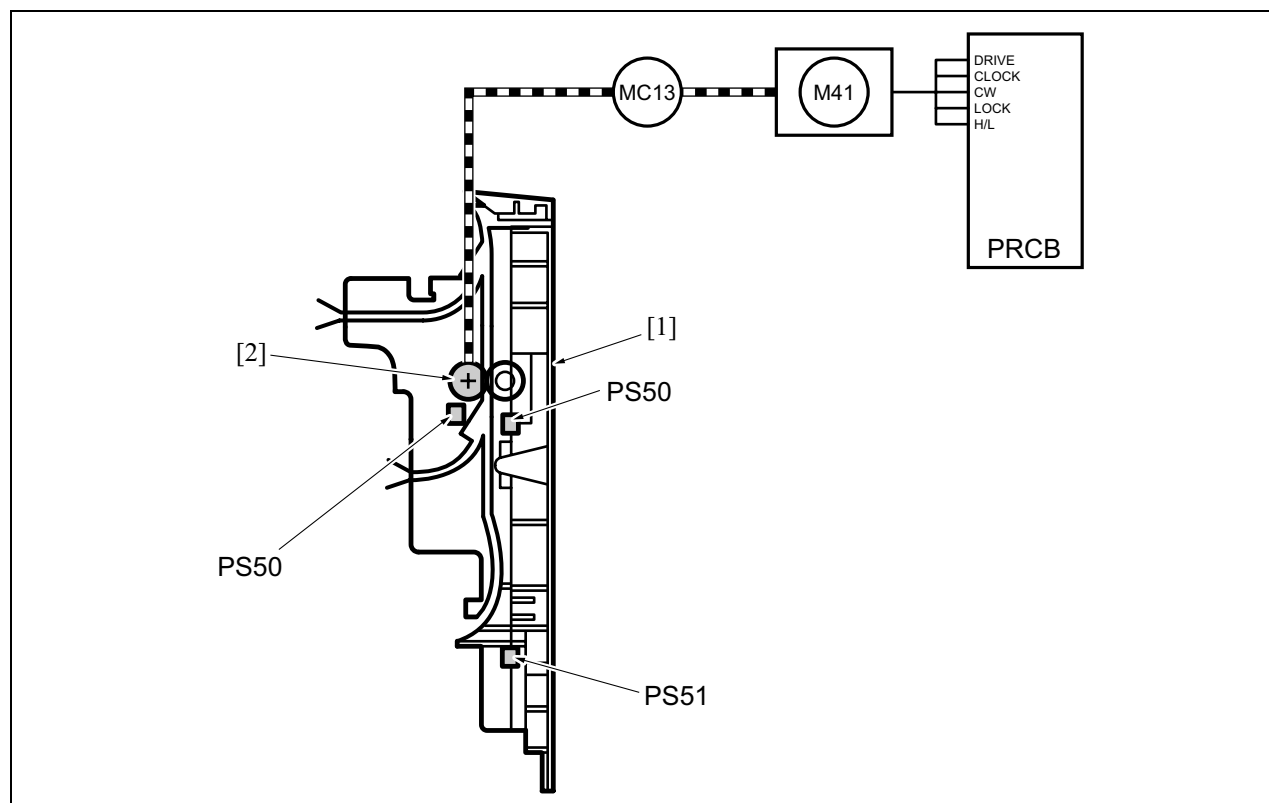
[1] START button (ON)

9.2.3 Paper size detection control

The paper size in the by-pass tray is detected along the width by the paper size/SBP (PS48) and the paper size/LBP (PS49), and along the length by the paper size VR/BP (VR4).

10. VERTICAL CONVEYANCE

10.1 Composition



Symbol	Name	Function or method
[1]	Vertical conveyance door	Clearing paper jam in the vertical conveyance section
[2]	Intermediate conveyance roller 1	Paper conveyance of the trays 2 and 3
M41	Paper feed motor	See "8. Paper feed tray 1 to 3."
MC13	Intermediate conveyance clutch 1	Transmission of driving force from the paper feed motor (M41) to the intermediate conveyance roller 1 24VDC drive
PS50	Vertical conveyance sensor	Paper detection in the vertical conveyance section
PS51	Vertical conveyance door sensor	Open/close detection of the vertical conveyance door

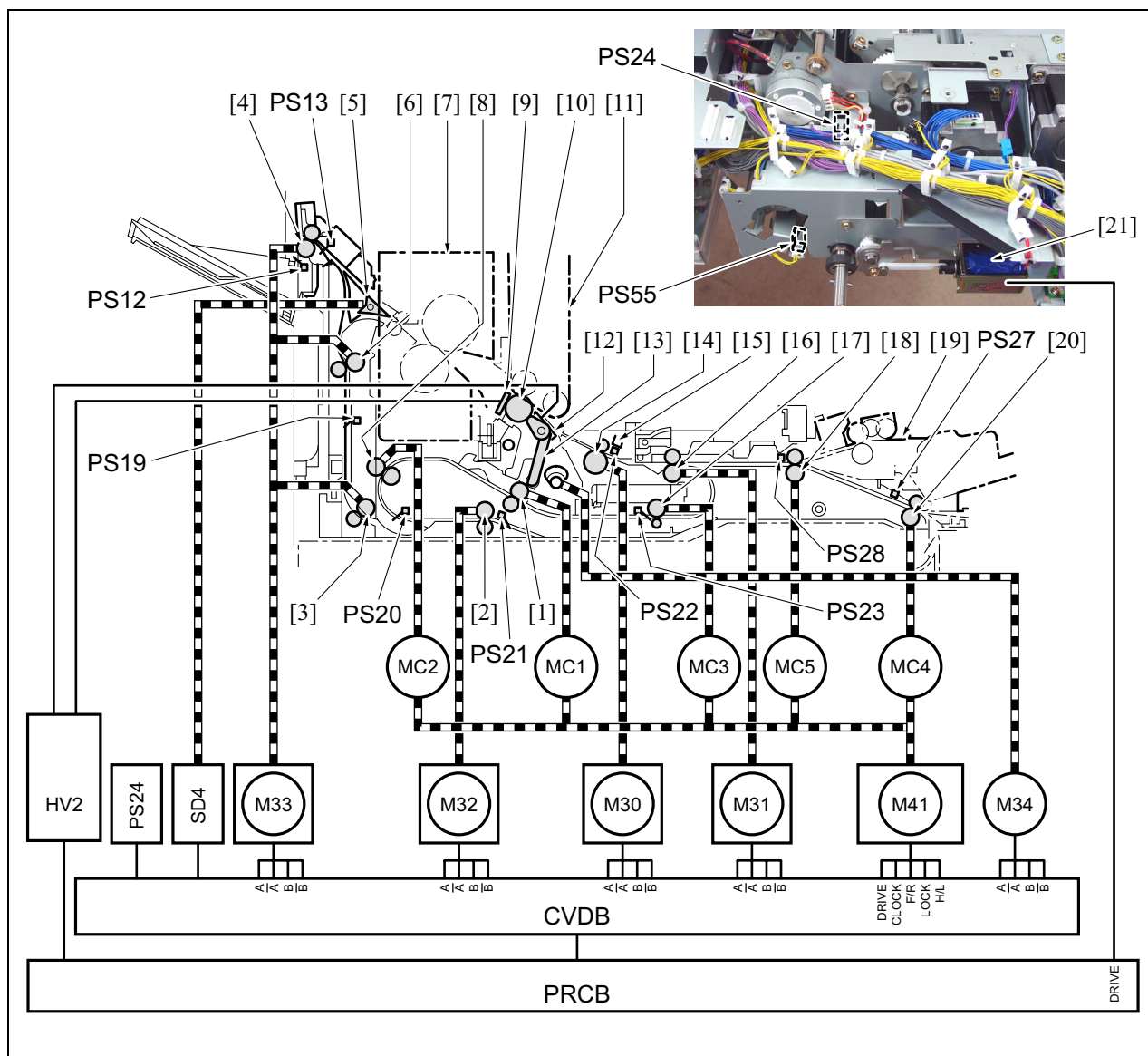
10.2 Operation

10.2.1 Vertical conveyance control

For operation timing of the vertical conveyance control, see "8. Paper feed tray 1 to 3."

11. REGISTRATION / ADU / REVERSE / PAPER EXIT

11.1 Composition



Symbol	Name	Function or method
[1]	ADU conveyance roller 2	Paper conveyance while in the double side copy mode and loop formation for the correction of paper skew correction Motor drive
[2]	ADU reverse roller	Paper conveyance in the ADU reverse section and switching of the conveyance path Motor drive
[3]	Reverse/exit roller 2	Paper conveyance in the reverse section Motor drive
[4]	Paper exit roller	Paper conveyance in the paper exit section Motor drive
[5]	Reverse gate	Switching of the paper exit path at the fixing unit exit section Solenoid drive

Symbol	Name	Function or method
[6]	Decurler roller	Paper conveyance and paper curl correction in the reverse section Motor drive
[7]	Fixing section	Fixing of paper that has been transferred See "12. Fixing Section."
[8]	ADU conveyance roller 1	Paper conveyance while in the double side copy mode Motor drive
[9]	Separation discharge plate unit	Separation of the transfer belt and the paper that has been transferred Constant current AC + DC bias applied discharging method Constant current method AC output range: 0 to 300 μ A Constant voltage method DC output range: -60 to 0 μ A
[10]	2nd transfer roller L	Transfer of toner from the transfer belt onto paper Pressure/release mechanism by means of cam Driven idly by the transfer belt
[11]	Transfer belt unit	Image formation for paper transfer See "5. Transfer belt unit."
[12]	Pre-transfer guide plate	Conveyance guide of paper supplied High voltage applied to prevent toner adhesion: -500 V $\pm$ 50 V (constant voltage)
[13]	Pressure arm	2nd transfer roller L pressure/release Motor drive
[14]	Registration roller	For paper conveyance in the registration section and the correction of paper skew caused by the paper stopper Motor drive
[15]	Registration cleaning sheet	Cleaning of the registration roller PET method
[16]	Loop roller	For paper conveyance in the registration section and loop formation while in paper skew correction Motor drive
[17]	ADU pre-registration roller	For paper conveyance while in the double side copy mode and the correction of paper skew correction caused by the paper stopper Motor drive
[18]	Intermediate conveyance roller 3	Paper conveyance from the paper feed trays 1 to 3, the by-pass tray and HCI Motor drive
[19]	By-pass tray	By-pass paper feed See "9. By-pass feed section."
[20]	Intermediate conveyance roller 2	Paper conveyance from the paper feed trays 1 to 3 and HCI Motor drive
[21]	ADU lock solenoid (SD6)	ADU lock 24VDC drive
HV2	High voltage unit 2	Supply of high voltage to the separation discharge plate unit and the pre-transfer guide plate Pressure rise method by the inverter from 24VDC

Symbol	Name	Function or method
M30	Registration roller motor	Registration roller drive Stepping motor
M31	Loop roller motor	Loop roller drive Stepping motor
M32	ADU reverse motor	ADU reverse roller drive Stepping motor
M33	Reverse/exit motor	Driving of the paper exit roller, decurler roller and the reverse/ exit roller 2 Stepping motor
M34	2nd transfer pressure/release motor	Pressure arm drive Stepping motor
M41	Paper feed motor	M41 Paper feed motor Driving of ADU conveyance rollers 1 and 2, ADU pre-registration roller and the intermediate conveyance rollers 2 and 3 DC brushless motor
MC1	ADU conveyance clutch 2	Transmission of driving force from the paper feed motor (M41) to the ADU conveyance roller 2 24VDC drive
MC2	ADU conveyance clutch 1	Transmission of driving force from the paper feed motor (M41) to the ADU conveyance roller 1 24VDC drive
MC3	ADU pre-registration clutch	Transmission of driving force from the paper feed motor (M41) to the ADU pre-registration roller 24VDC drive
MC4	Intermediate conveyance clutch 2	Transmission of driving force from the paper feed motor (M41) to the intermediate conveyance roller 2 24VDC drive
MC5	Intermediate conveyance clutch 3	Transmission of driving force from the paper feed motor (M41) to the intermediate conveyance roller 3 24VDC drive
SD4	Reverse/exit solenoid	Reverse gate drive 24VDC drive
PS12	Paper exit full sensor	Paper exit tray full detection Photo sensor + actuator
PS13	Paper exit sensor	Detection of paper in the paper exit unit Photo sensor + actuator
PS19	Reverse/exit sensor	Detection of paper in the reverse section Photo sensor + actuator
PS20	ADU conveyance sensor	Detection of paper at the ADU reverse path entrance Photo sensor + actuator
PS21	ADU paper reverse sensor	Detection of paper in the ADU reverse section Photo sensor + actuator
PS22	Registration sensor	Detection of paper in the registration section Photo sensor
PS23	ADU pre-registration sensor	Detection of paper in the ADU paper loop section Photo sensor + actuator

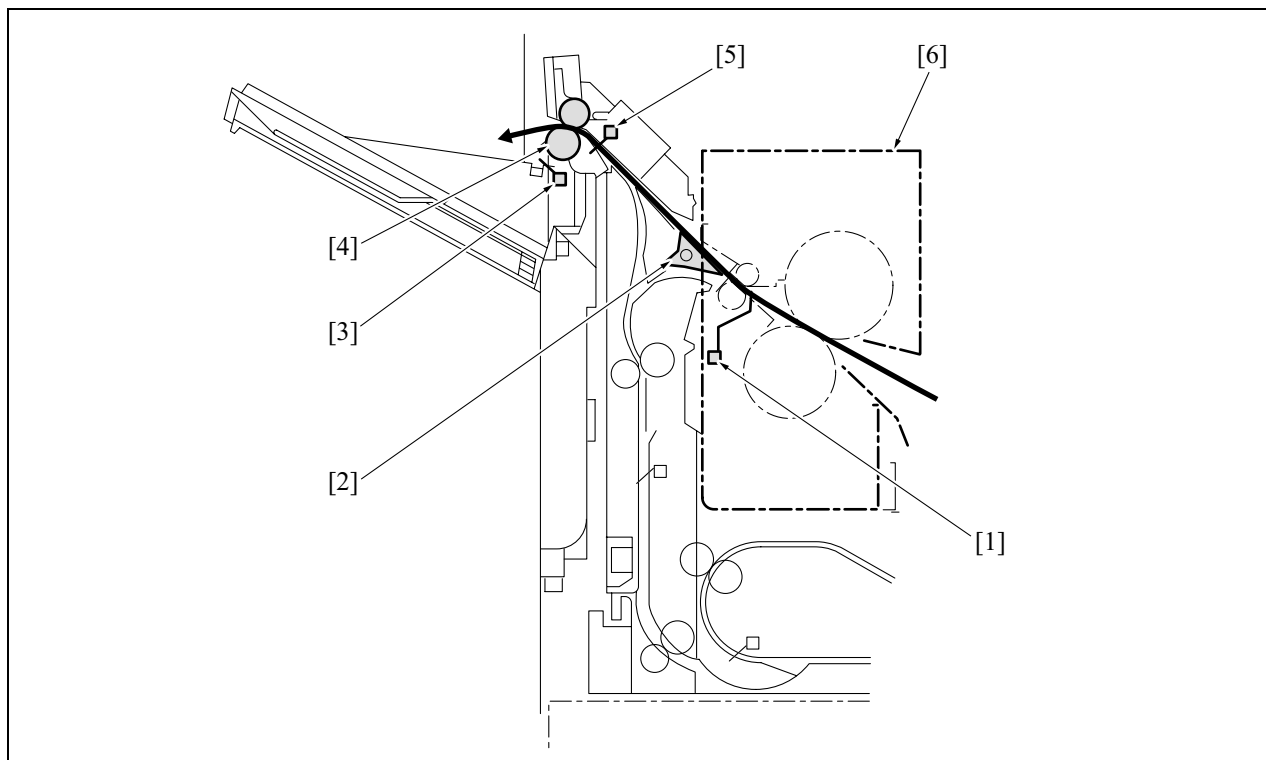
Symbol	Name	Function or method
PS24	2nd transfer HP sensor	2nd transfer roller home position detection Photo sensor
PS27	Intermediate conveyance sensor 1	Detection of paper at the intermediate conveyance roller 2 exit Photo sensor
PS28	Intermediate conveyance sensor 2	Detection of paper at the intermediate conveyance roller 3 exit Photo sensor
PS55	Conveyance lever sensor	ADU open/close detection Photo sensor

11.2 Operation

11.2.1 Switching control of the paper exit/ADU conveyance path

A. Straight paper exit path

The straight paper exit path is applicable to the face-up paper exit after completion of copy in the single side copy mode, as well as after completion of the back side copy in the double side copy mode.

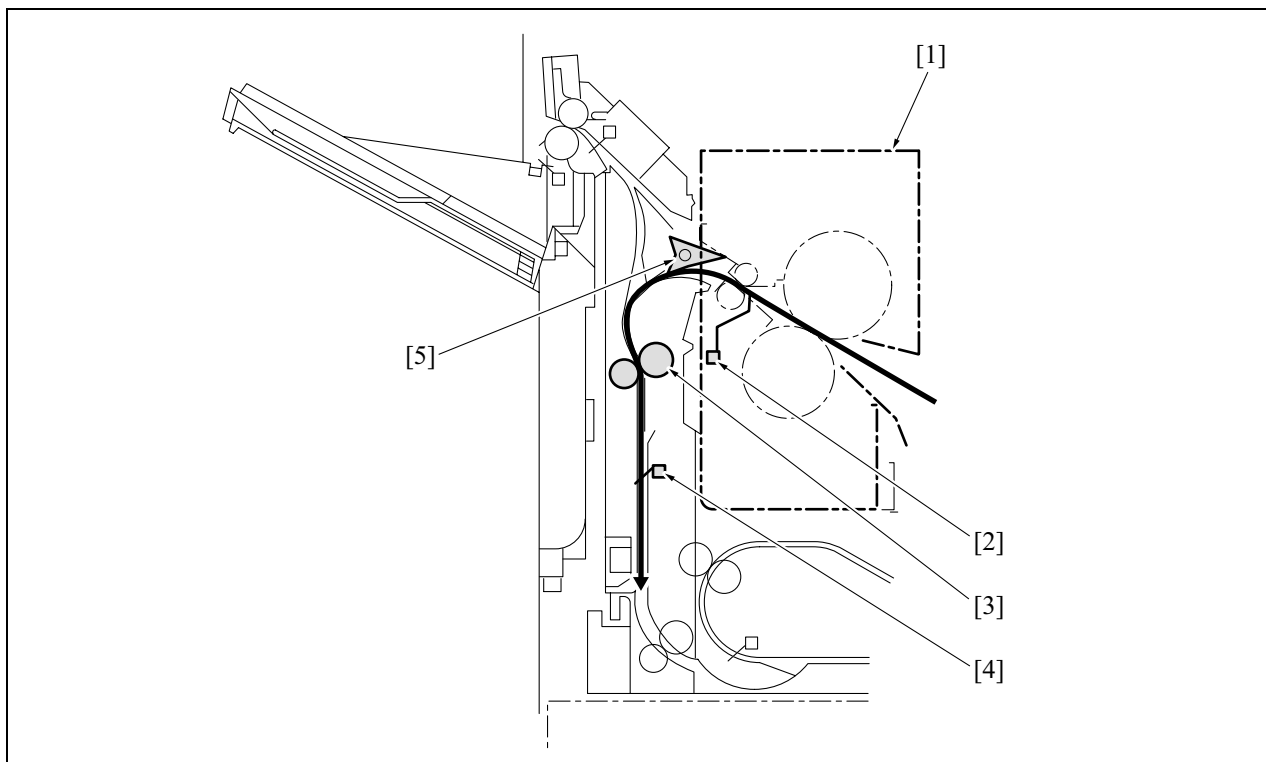


- [1] Fixing paper exit sensor (PS17)
- [2] Reverse gate
- [3] Paper exit full sensor (PS12)

- [4] Paper exit roller
- [5] Paper exit sensor (PS13)
- [6] Fixing section

B. ADU conveyance path

The ADU conveyance path is applicable to the face-down paper exit in the single side copy mode and the conveyance to the ADU after completion of the front side copy in the double sided copy mode.



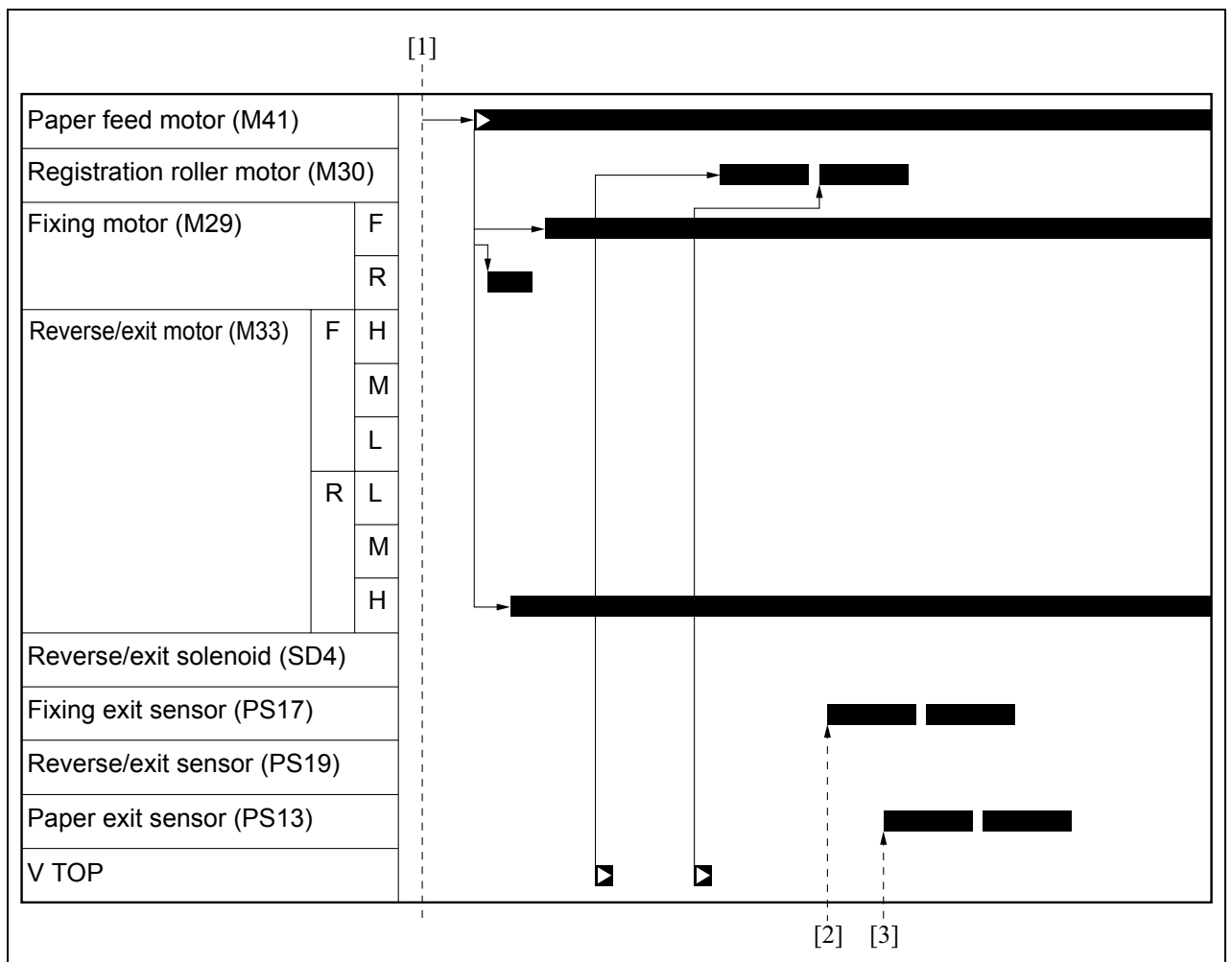
[1] Fixing section

[2] Fixing paper exit sensor (PS17)

[3] Decurler roller

[4] Reverse/exit sensor (PS19)

[5] Reverse gate

C. Straight paper exit operation (single sided 2 copies)

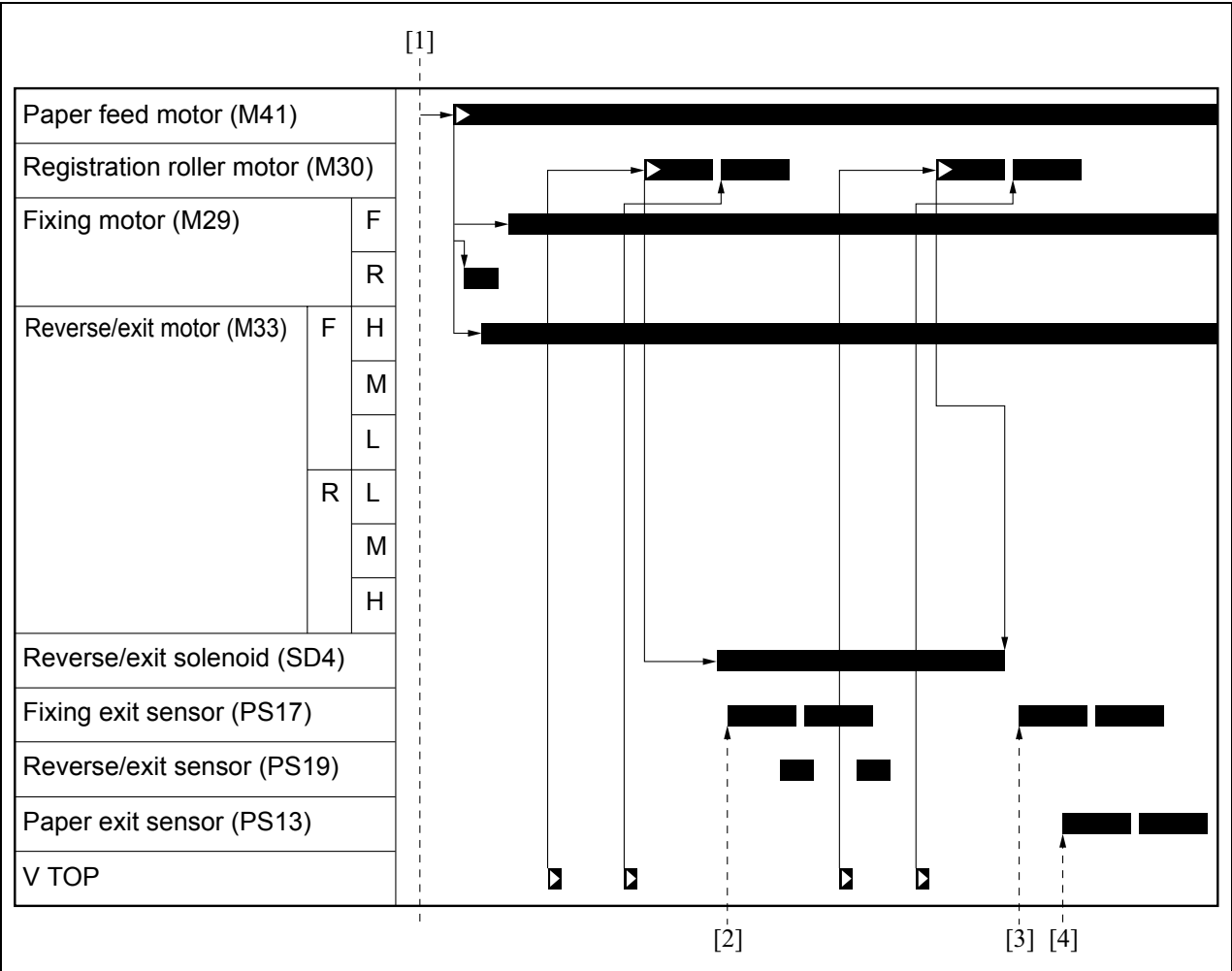
[1] START button (ON)

[3] 1st paper exit

[2] Completion of the first sheet fixing

D. ADU conveyance operation (double sided 2 copies)

II UNIT EXPLANATION



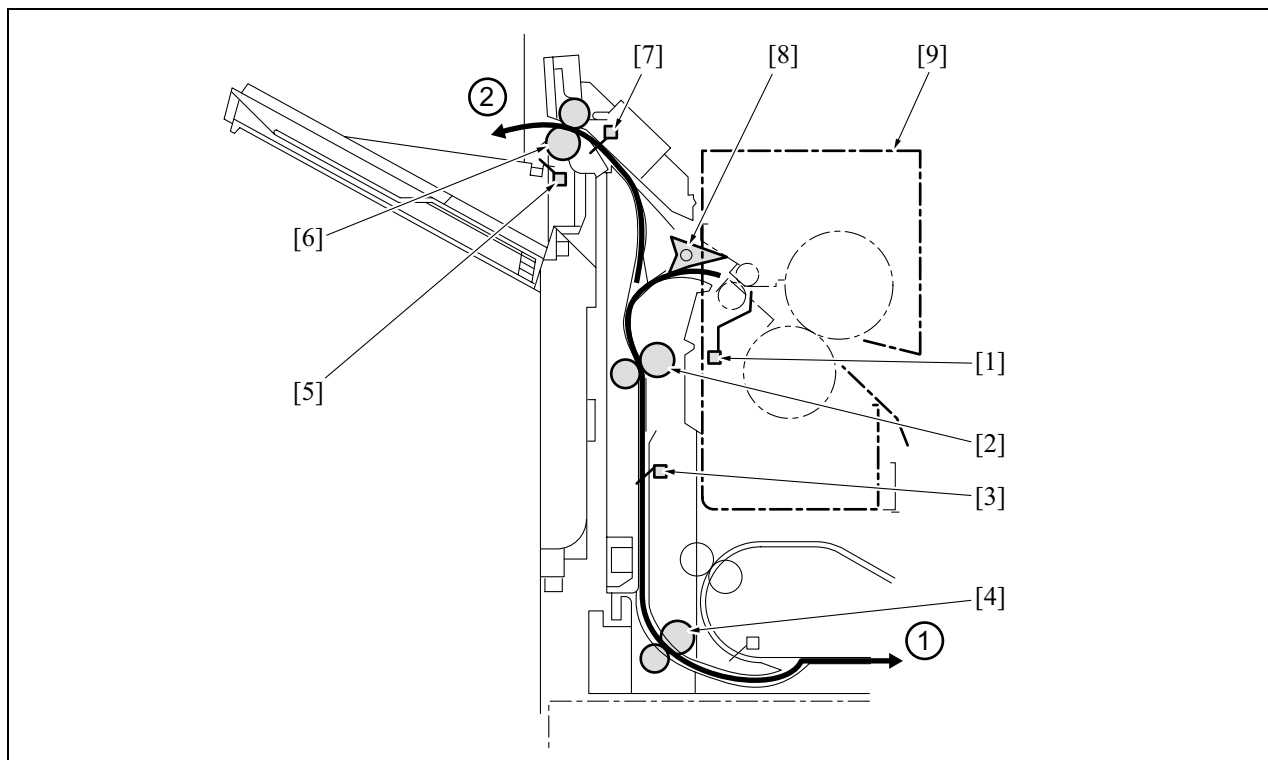
- [1] START button (ON)
- [2] Completion of the front side fixing of 1st paper
- [3] Completion of the back side fixing of 1st paper
- [4] 1st paper exit

11.2.2 Reverse/exit control

A. Reverse/exit path

The reverse/exit path is applicable to the face-down paper exit after completion of copy in the single side copy mode, as well as after completion of the back side copy in the double sided copy mode.

- ① Double sided copy mode
- ② Face-down

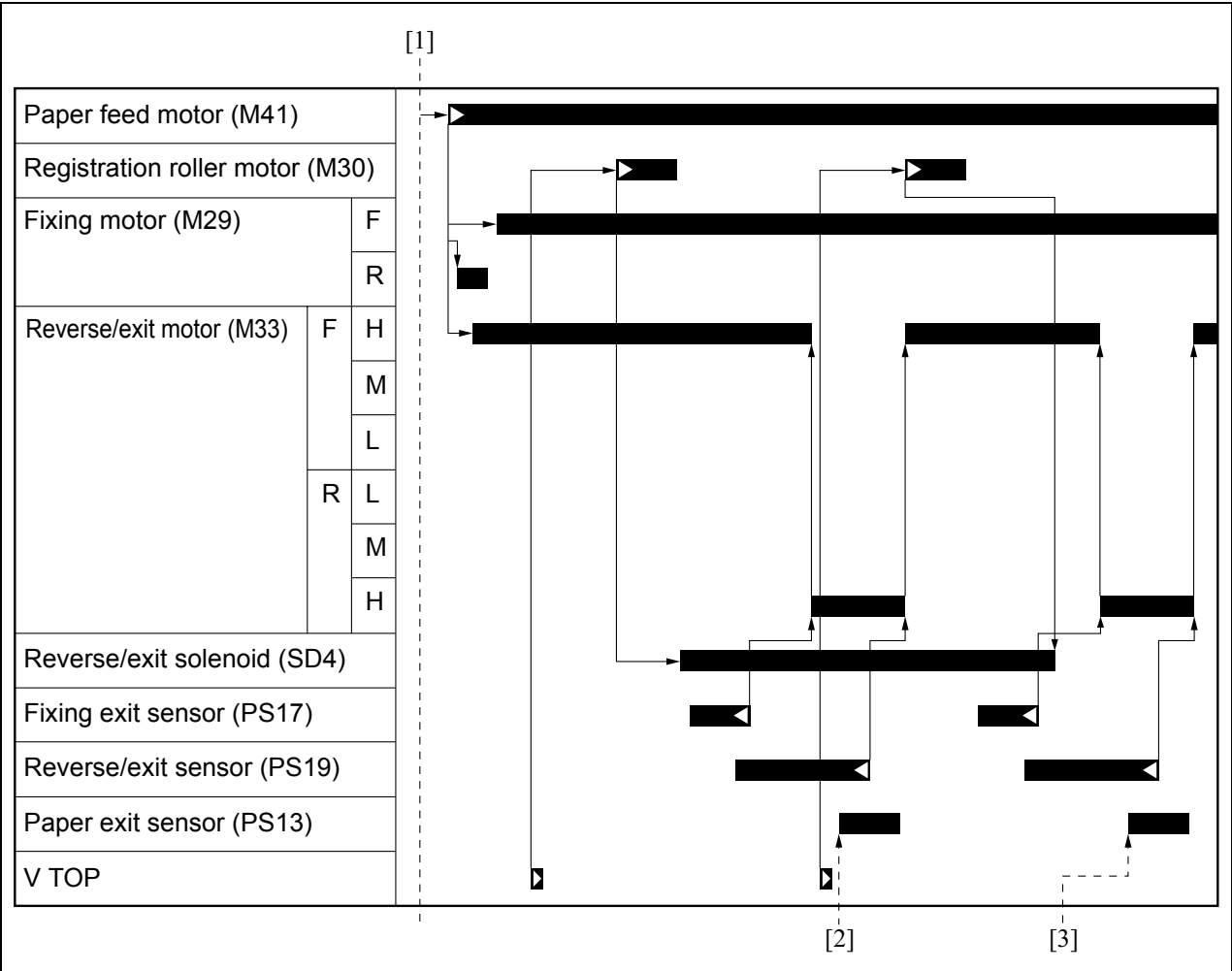


- [1] Fixing paper exit sensor (PS17)
- [2] Decurler roller
- [3] Reverse/exit sensor (PS19)
- [4] Reverse/exit roller /2
- [5] Paper exit full sensor (PS12)

- [6] Paper exit roller
- [7] Paper exit sensor (PS13)
- [8] Reverse gate
- [9] Fixing section

B. Reverse/exit operation (single sided 2 copies)

II UNIT EXPLANATION



- [1] START button (ON)
- [2] 1st paper exit
- [3] 2nd paper exit

11.2.3 ADU conveyance control

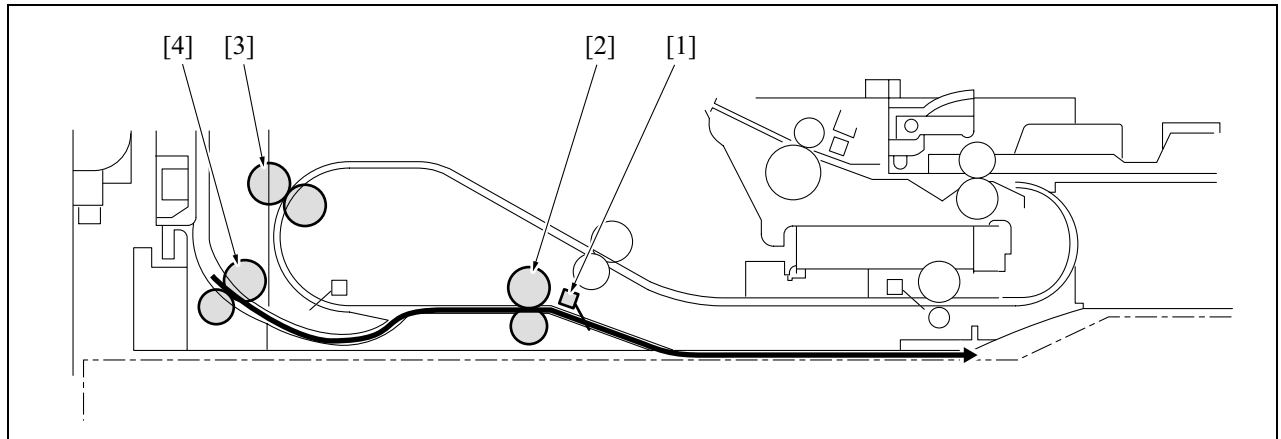
Paper that has been copied on the front side and conveyed to the reverse/exit section while in the double side copy mode is conveyed to the ADU reverse section by the reverse/exit roller 2.

11.2.4 Paper reverse control

A. Paper reverse path

(1) When conveying paper

Paper conveyed from the reverse/exit roller 2 is conveyed to the ADU reverse roller according to the form of the conveyance path.



[1] ADU paper reverse sensor (PS21)

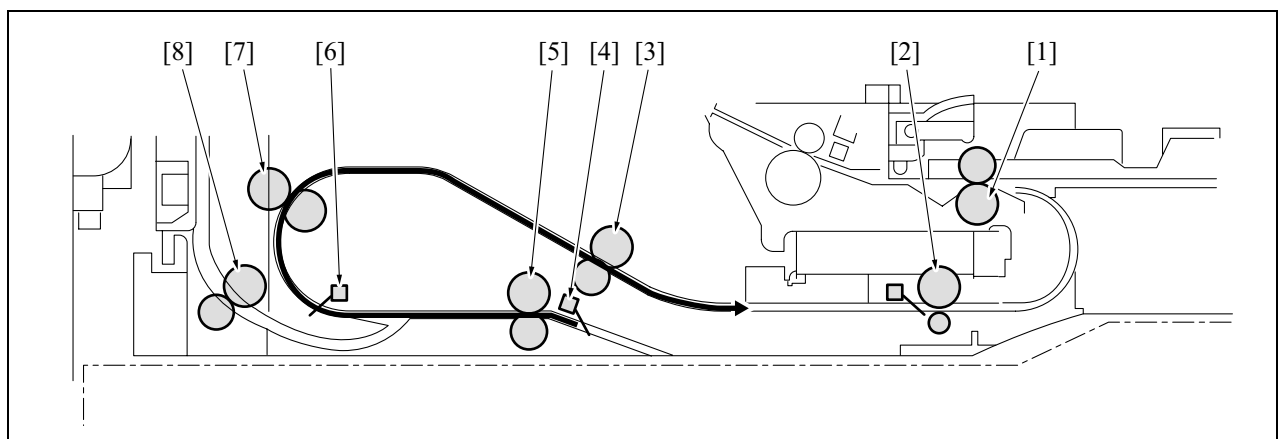
[2] ADU reverse roller

[3] ADU conveyance roller 1

[4] Reverse/exit roller 2

(2) When paper reverse

Paper conveyed to the ADU reverse section is sent back by the reverse rotation of the ADU reverse roller. At this time, it is conveyed to the ADU conveyance roller 1, not to the reverse/exit roller 2, according to the form of the conveyance path. As a result, the paper is flipped over out. The paper thus reversed is conveyed to the loop roller through the ADU conveyance rollers 1 and 2 and the ADU pre-registration roller to be copied on the back side.



[1] Loop roller

[2] ADU pre-registration roller

[3] ADU conveyance roller 2

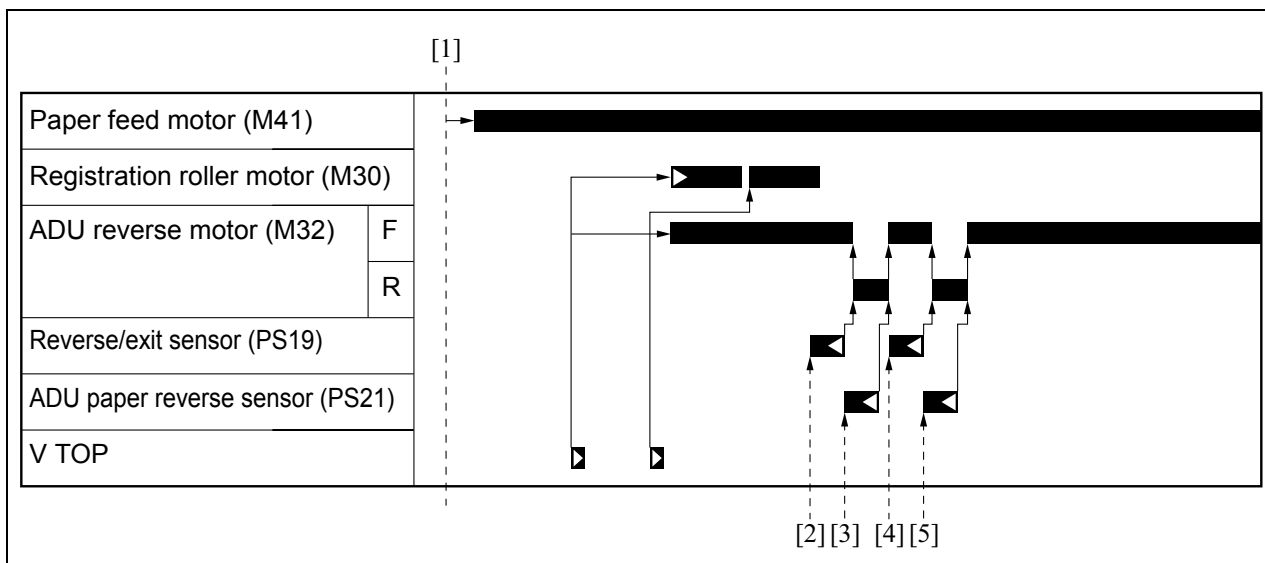
[4] ADU paper reverse sensor (PS21)

[5] ADU reverse roller

[6] ADU conveyance sensor (PS20)

[7] ADU conveyance roller 1

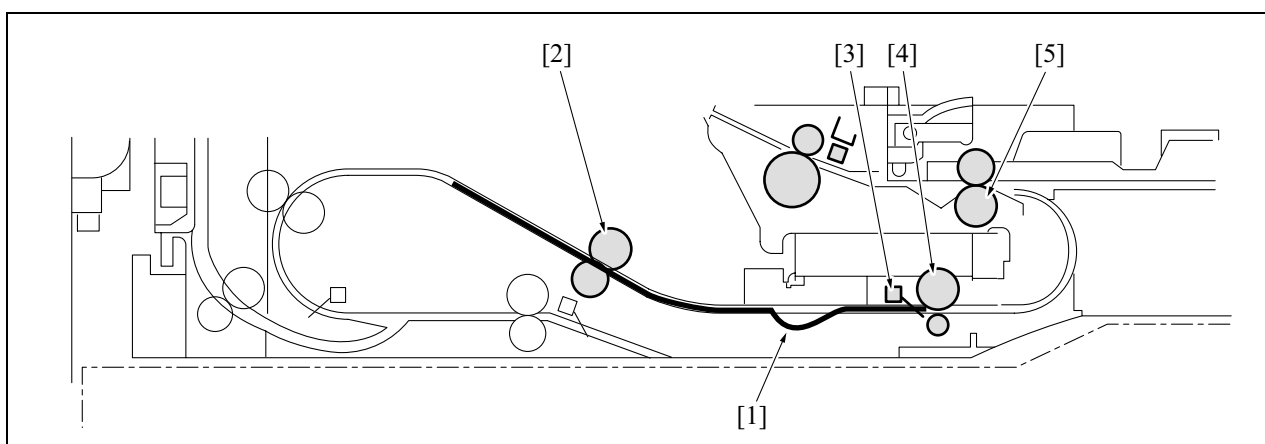
[8] Reverse/exit roller 2

B. Paper reverse operation

- | | |
|---|---|
| [1] START button (ON) | [4] Start of 2nd paper conveyance |
| [2] Start of 1st paper conveyance | [5] Start of reverse operation of 2nd paper |
| [3] Start of reverse operation of 1st paper | |

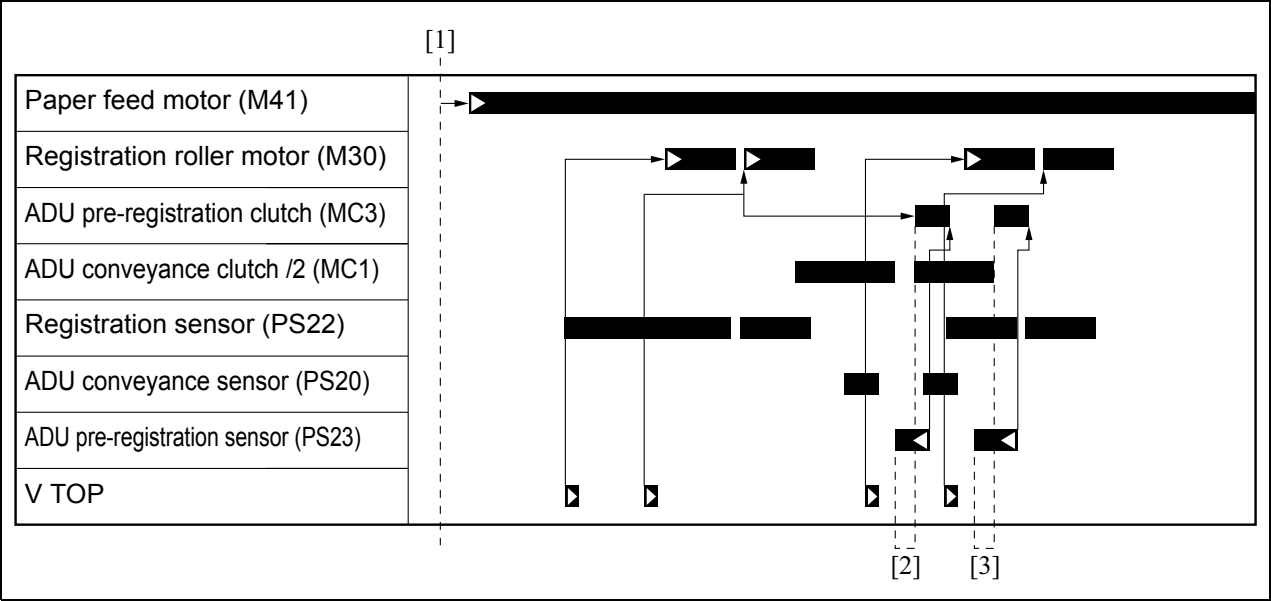
11.2.5 ADU pre-registration control

The paper conveyed from the ADU switchback section is formed into a loop between the ADU conveyance roller 2 and the ADU pre-registration roller, and a paper skew is corrected.

A. ADU pre-registration path

- | | |
|--|---------------------------------|
| [1] ADU pre-registration loop | [4] ADU pre-registration roller |
| [2] ADU conveyance roller 2 | [5] Loop roller |
| [3] ADU pre-registration sensor (PS23) | |

B. ADU pre-registration operation



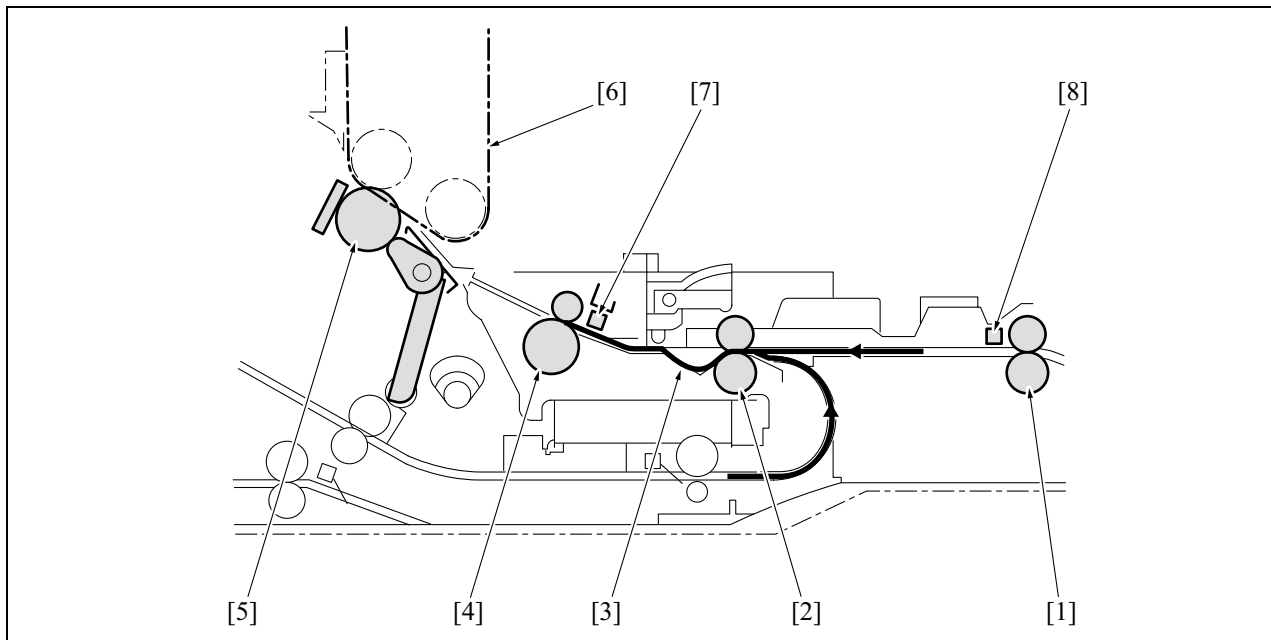
- [1] START button (ON)
- [2] 1st paper: ADU pre-registration loop

- [3] 2nd paper: ADU pre-registration loop

11.2.6 Registration control

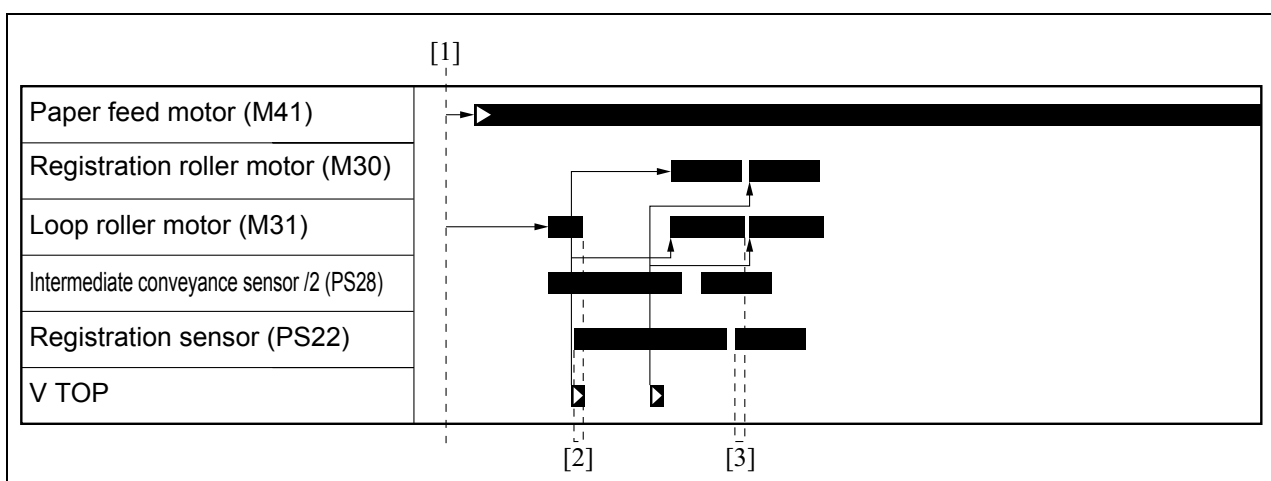
Paper conveyed to the loop roller forms a loop between the registration roller and the loop roller, and paper skew is corrected.

A. Registration path



- | | |
|--------------------------------------|--|
| [1] Intermediate conveyance roller 2 | [5] 2nd transfer roller |
| [2] Loop roller | [6] Transfer belt unit |
| [3] Registration loop | [7] Registration sensor (PS22) |
| [4] Registration roller | [8] Intermediate conveyance sensor /2 (PS28) |

B. Registration operation

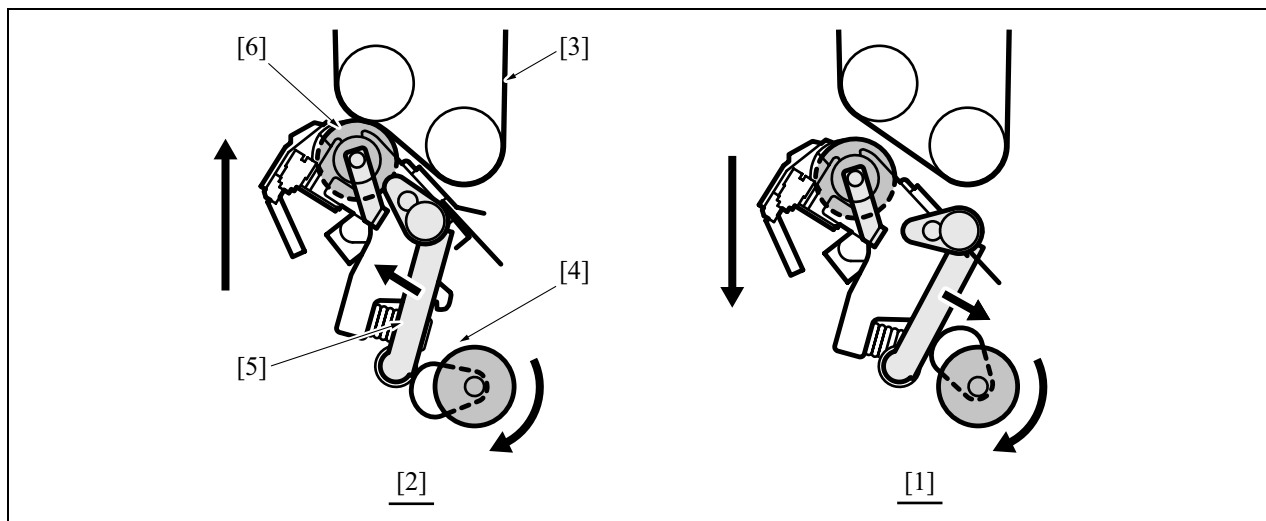


- | | |
|----------------------------------|----------------------------------|
| [1] START button (ON) | [3] 2nd paper: Registration loop |
| [2] 1st paper: Registration loop | |

11.2.7 2nd transfer control

The paper that has been conveyed from the registration roller undergoes the 2nd transfer by the pressure of the 2nd transfer roller L on the transfer belt.

A. 2nd transfer roller L pressure/release mechanism



- [1] Release
- [2] Pressure
- [3] Transfer belt unit

- [4] Cam
- [5] Pressure arm
- [6] 2nd transfer roller /L

B. 2nd transfer roller L pressure/release operation

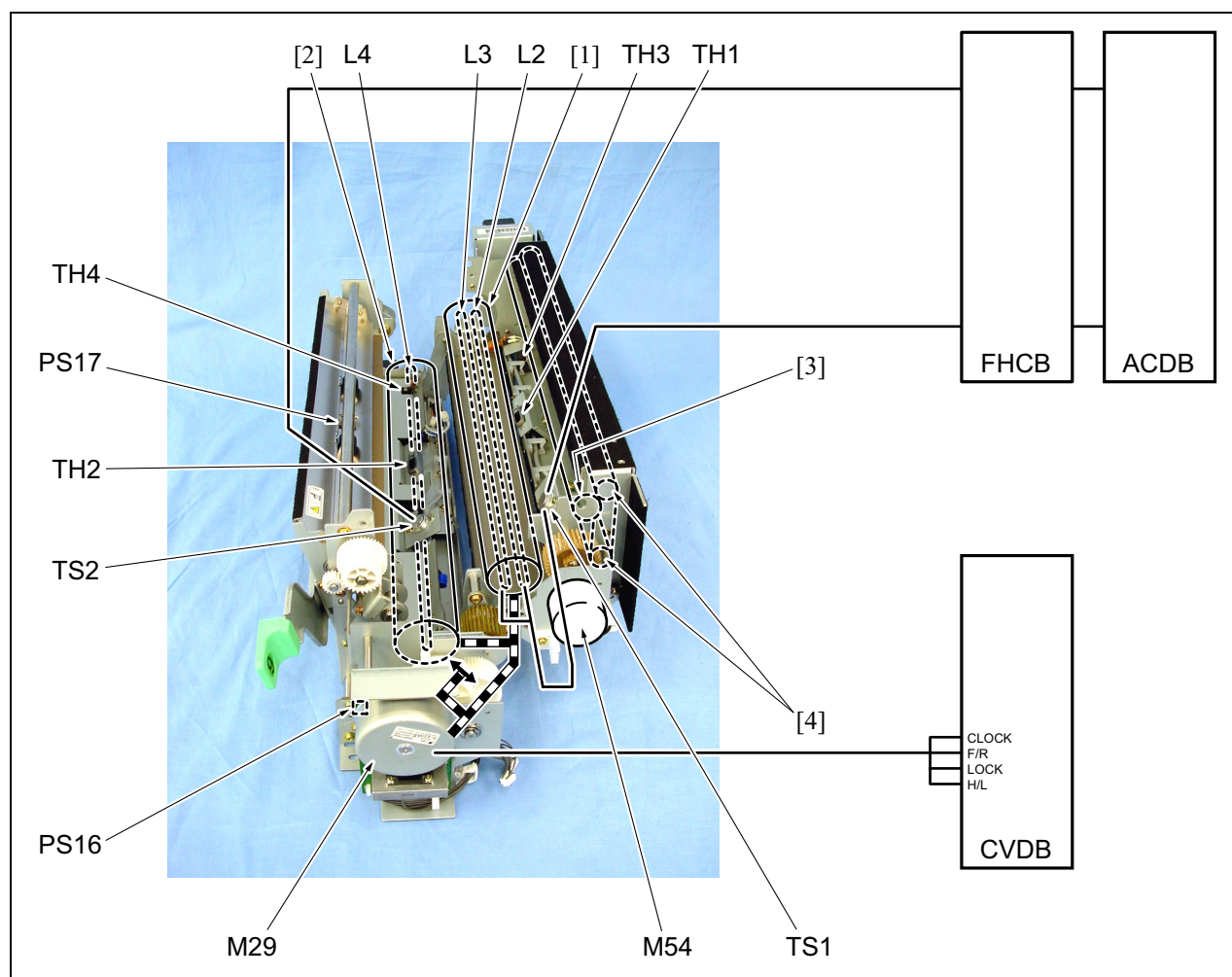
For timing of each operation of the 2nd transfer control, see "3. Drum unit section."

11.2.8 Paper exit full detection control

When the paper exit full sensor (PS12) is turned on and is kept in this condition during exiting a specified number of papers or for a specified period of time, it is considered that the paper exit tray is full with paper and a message is shown on the operational LCD.

12. FIXING UNIT

12.1 Composition



Symbol	Name	Function or method
[1]	Fixing roller U	Toner fixing by means of pressure and heating Heating roller method Silicon rubber + PFA resin layers Temperature: 210°C
[2]	Fixing roller L	Toner fixing by means of pressure and heating Heating roller method (driven by the fixing roller U) Pressure/release by means of cam drive Silicon rubber + PFA resin layers Temperature: 190°C
[3]	Cleaning roller	Cleaning of the fixing roller U
[4]	Cleaning web	Cleaning of the cleaning roller
M29	Fixing motor	Driving of the fixing roller U Fixing roller L pressure/release drive 24V brushless DC motor
M54	Web motor	Driving of the cleaning web, Synchronous motor
PS16	Fixing pressure release sensor	Fixing roller L pressure/release HP detection
PS17	Fixing paper exit sensor	Paper exit detection from fixing

Symbol	Name	Function or method
L2	Fixing upper lamp 1	Heating of the fixing roller U (main) Halogen heater 750W
L3	Fixing upper lamp 2	Heating of the fixing roller U (sub) Halogen heater 750W
L4	Fixing lower lamp	Heating of the fixing roller L Halogen heater 550W
TH1	Fixing temperature sensor 1	Temperature detection at the center of the fixing roller U (main) Non-contact microthermistor
TH2	Fixing temperature sensor 2	Temperature detection at the center of the fixing roller L (main) Non-contact microthermistor
TH3	Fixing temperature sensor 3	Temperature detection at the edge (at rear) of the fixing roller U (sub) Contact thermistor
TH4	Fixing temperature sensor 4	Temperature detection at the edge (at rear) of the fixing roller L (sub) Contact thermistor
TS1	Thermostat 1	Fixing roller U temperature abnormality detection Non-contact bimetal Set temperature: 190°C
TS2	Thermostat 2	Fixing roller L temperature abnormality detection Non-contact bimetal Set temperature: 160°C
FHCB	Fixing heater control board	Prevention of noise leak in the drive power for the fixing upper lamp /1, /2 (L2, L3) 220V system only

12.2 Operation

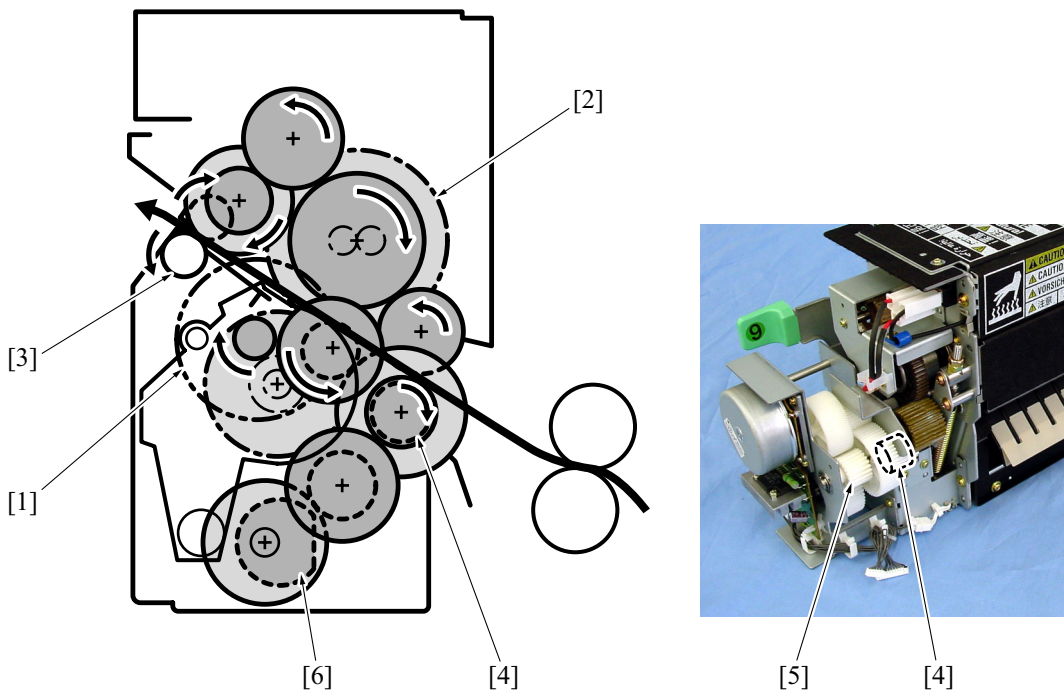
12.2.1 Fixing drive control

Paper is conveyed with the heated fixing roller U and the heated fixing roller L pressed together, and is fixed with toner. The pressure of the fixing roller is released at idling.

A. Fixing drive operation

The driving force of the fixing roller (M29) [1] is transmitted through the gear to the fixing roller [2] and the fixing paper exit roller [3]. There is a one-way clutch [4] provided between M29 and fixing roller U, and the transmission of driving force when M29 rotates in the normal direction is limited only to the fixing roller U and the fixing paper exit roller.

The same shaft of the one-way clutch [4] is provided with another one-way clutch [5] which is a transmission to the pressure/release drive cam mechanism [6]. The two one-way clutches [4] and [5] operate one way in the opposite direction of each other.

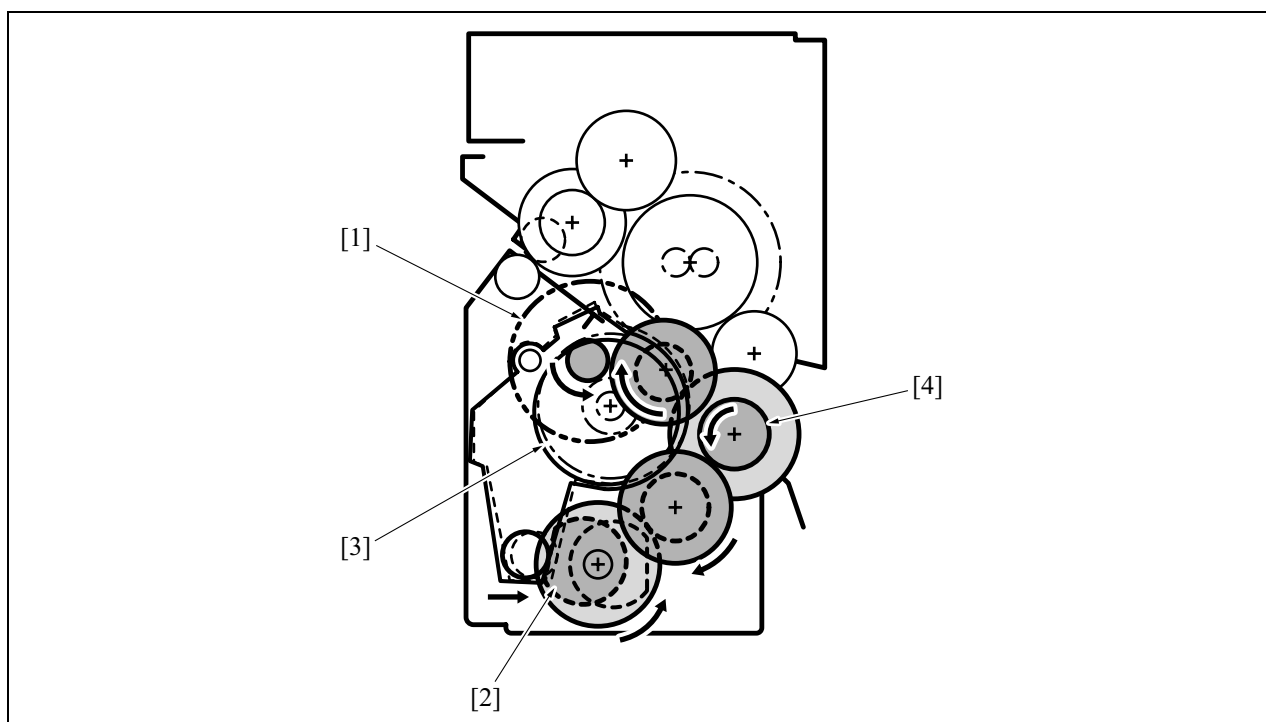


12.2.2 Pressure/release control

The pressure of the fixing roller L onto the fixing roller U is made by the reverse rotation of the fixing motor (M29) and the cam mechanism.

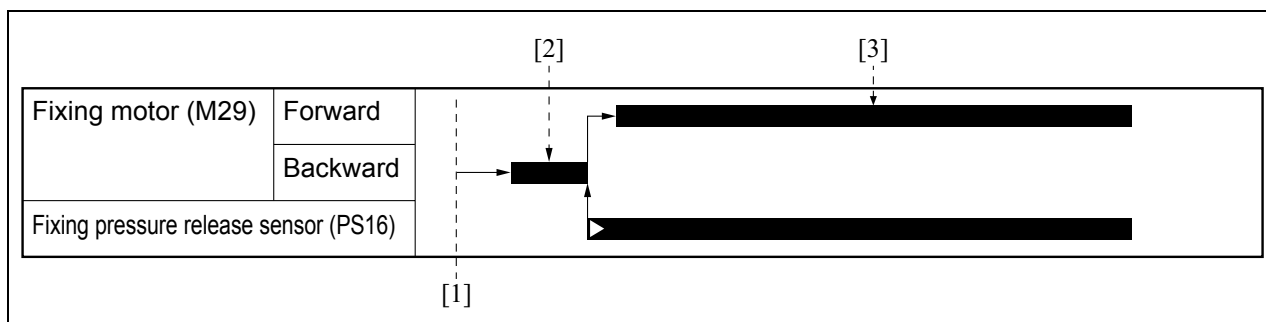
A. Pressure/release operation

When the fixing motor (M29) [1] rotates in the reverse direction, the cam mechanism applies pressure (a broken line in the drawing) onto the fixing roller L [3]. There is a one-way clutch [4] provided between M29 and the cam mechanism to provide the transmission of driving force when M29 is rotating reversely, this force is limited only to the cam. The detection of pressure/release is made by the fixing pressure release sensor (PS16) provided on the same shaft as the cam.



B. Pressure/release control

Pressure on the fixing roller L is released while in warm-up. When copy starts, the fixing motor (M29) rotates reversely to apply pressure, and it stops when the fixing pressure release sensor (PS16) turns off. The unit is now in the pressured state. M29 returns to the forward rotation to convey paper.



[1] START button (ON)

[3] Fixing paper in conveyance

[2] Pressure operation

12.2.3 Web control

The web motor (M54) is driven for a specified period of time for each print to clean the fixing roller U through the cleaning roller.

The operation of M54 starts at the same time as the registration roller motor (M30). In order to make web travel distance even on the cleaning roller, the ON time of M54 is determined by the accumulated M54 drive time.

12.2.4 Temperature control

The fixing roller U is heated by the fixing upper lamp 1 (L2) and the fixing upper lamp 2 (L3). The fixing roller L heated by the fixing lower lamp 2 (L4). L2 and L3 are connected in parallel and they turn on and off at the same time.

The fixing temperature sensor 1 (TH1) and the fixing temperature sensor 3 (TH3) detect the temperature of the fixing roller U and control it by turning on and off L2 and L3 through the AC drive board (ACDB) so that it is held at the specified temperature.

In the same way, the fixing temperature sensor 2 (TH2) and the fixing temperature sensor 4 (TH4) detect the temperature of the fixing roller L to turn on and off L4.

A. Warm-up

The main switch (SW2) turns on, the lighting circuits of the fixing upper lamps 1 and 2 (L2, L3) and the fixing lower lamp 2 (L4) inside the AC drive board (ACDB) turn on. L2, L3 and L4 are kept on until a specified temperature is obtained.

After completion of warming-up, the printer control board (PRCB) controls the L2, L3 and L4 so that the set temperature is maintained while in idling. At this time, L2, L3, and L4 are not turned on simultaneously.

Warm-up time: 420 sec. or less in Metric/390 sec. or less in Inch (at room temperature of 20°C)

B. Protection against abnormality

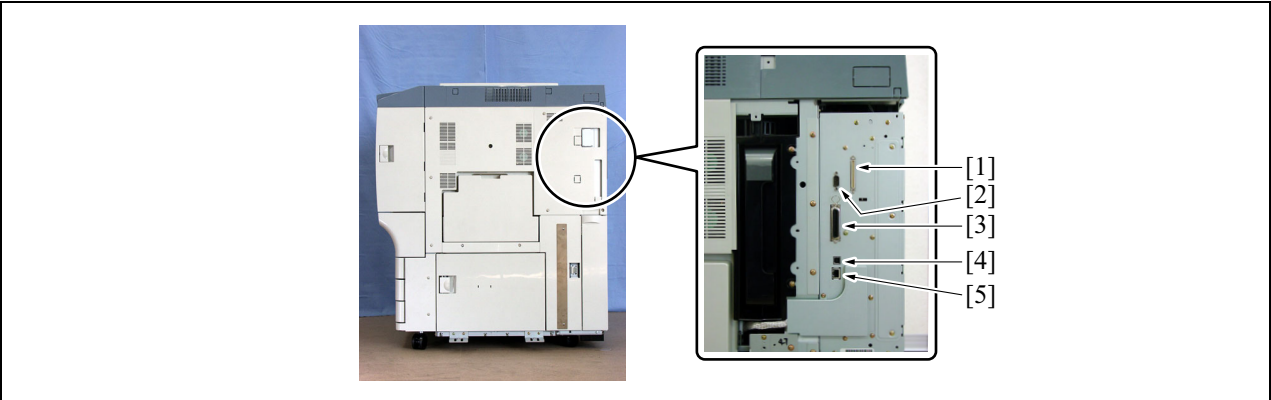
Thermostats are employed to protect the fixing roller against its abnormal temperature rise. The fixing roller U is provided with thermostat 1 (TS1) and the fixing roller L is provided with thermostat 2 (TS2) respectively.

When TS1 detects an abnormal temperature, the flow of electricity to the fixing upper lamp 1 (L2) and the fixing upper lamp 2 (L3) is shut off at the same time.

And when TS2 detects an abnormal temperature, the flow of electricity to the fixing lower lamp 2 (L4) is shut off.

13.INTERFACE

13.1 Composition



Symbol	Name	Function or method	Comments
[1]	Video interface for print controller	For the EFI print controller	Supported
[2]	Serial port (RS-232C)	D-SUB 9-pin connector	Not supported
[3]	Parallel port (based on IEEE 1284)	For ISW of MFP 36-pin centronics connector	Supported
[4]	Serial port (USB Type B)	For ISW of MFP Ver.1.1	Supported
[5]	RJ45 Ethernet connector	Port for network	Not supported *1

*1 RJ45 Ethernet connector port for network is available with the EFI print controller kit.

14. IMAGE STABILIZATION CONTROL

14.1 Toner density control

The purpose of this control is to correct the reference value of toner density for each color against variable factors of the image density such as environmental factors.

A. Explanation of the operation

The charging amount of toner changes depending on the environmental factors such as the temperature and humidity.

And in proportion to the length of time since developer was last used, toner tends to be hard to get charged.

The reference value of toner density is varied to correct these changes in the charging amount of toner.

B. Timing of the operation

- When the environmental factors such as the temperature and/or humidity change.
- For each elapsed hour of the use of developer

14.2 Dmax control

The purpose of the Dmax control is to set the highest image density for each color to the reference level.

The Dmax control is carried out by the gamma sensor (PS11), drum motors Y, M, C and K (M14, M15, M16 and M17), transfer belt motor (M18), 1st transfer pressure/release motor (M19) and the developing motors Y, M, C and K (M20, M21, M22 and M23), and controlled by the printer control board (PRCB).

Related sensors include the temperature/humidity sensor (TEMP/HUM).

A. Explanation of the operation

With a patch image created on the transfer belt at the maximum exposure amount, each density is read by the gamma sensor (PS11). This operation is repeated several times while changing a developing bias value each time. The developing bias value obtained when the density reaches the reference level is stored as an optimum developing bias value of the engine and developing is made at this developing bias value.

B. Timing of the operation

- When the main switch (SW2) is turned on for the first time in 6 hours or more after it was turned off.
- When the job starts 6 hours or more after the SW2 has been turned on.
- Every 1,000 pages of output. However at the time of completion of the job, when the 1,000th page is contained in the job.
- When the humidity has changed more than 30% RH from the value measured at the last operation.

14.3 Charging potential control

14.3.1 Correction of the reference value

The purpose of this control is to set the charging potential for each color to the reference level.

The charging potential control is carried out by the drum potential sensors Y, M, C and K (DRPS Y, M, C and K), drum potential sensor boards Y, M, C and /K (DRPSB Y, M, C and K), drum motors Y, M, C and K (M14, M15, M16 and M17), and the developing motors /Y, /M, /C and /K (M20, M21, M22 and M23), and controlled by the printer control board (PRCB). Related sensors include the temperature/humidity sensor (TEMP/HUM).

A. Explanation of the operation

Based on the DC bias value determined by the Dmax control, the grid voltage is corrected by using an output value read from the drum potential sensor so that the value becomes a charging potential shifted by the specified value from this DC bias value.

B. Timing of the operation

- When the main switch (SW2) is turned on for the first time in 6 hours or more after it was turned off.
- When the job starts 6 hours or more after the SW2 has been turned on.
- Every 1,000 pages of output. However at the time of completion of the job, when the 1,000th page is contained in the job.
- When the humidity has changed more than 30% RH from the value measured at the last operation.
- When the job starts where the process speed is slowed down to 1/2 or 1/3 speed. However, once operated under this condition after the SW2 turns on, the operation is not carried out again until the SW2 turns off.

14.3.2 Low humidity environment correction

When in a low humidity environment, the humidity is lower in the enclosed area (near the cleaning section) along the drum circumference. This results in an uneven charging potential along the circumference of the drum. Accordingly, this correction method is used to prevent these conditions from happening.

A. Explanation of the operation

To ease the influence on the drum caused by the ambient humidity around the drum, the drum for each color is rotated 45° periodically while in idling.

B. Timing of the operation

- The drums are turned once every 3 minutes when the humidity gets below 30% RH.

14.4 Dot diameter adjustment control

The dot diameter adjustment control is a method by which intermediate exposure potential is output stably, regardless of the changes in the sensitivity of photosensitive materials or the stain of the writing system. The laser output is controlled by the printer control board (PRCB) so that the intermediate exposure potential that is determined by the PWM128 value for each color is between a developing bias value determined by the Dmax control and a maximum exposure potential.

A. Explanation of the operation

The drum potential exposed with a PWM128 value is read by the drum potential sensor and the MPC value for the laser is corrected to be within the standard value.

B. Timing of the operation

- When the main switch (SW2) is turned on for the first time in 6 hours or more after it was turned off.
- When the job starts 6 hours or more after the SW2 has been turned on.
- Every 1,000 pages of output. However at the time of completion of the job, when the 1,000th page is contained in the job.
- When the humidity has changed more than 30% RH from the value measured at the last operation.
- When the job starts where the process speed gets slowed down to 1/2 or 1/3 speed. However, once operated under this condition after the SW2 turns on, the operation is not carried out under this condition until the SW2 turns off.

14.5 Gamma correction control

The gamma correction control detects the gamma characteristics of the image density against the exposure amount in the image creation section (drum and transfer belt) for each color, to make the relationship between the original density and the copy density become the set one.

The gamma correction control is carried out by the gamma sensor (PS11), drum motors Y, M, C and K (M14, M15, M16 and M17), transfer belt motor (M18), 1st transfer pressure/release motor (M19) and the developing motors Y, M, C and K (M20, M21, M22 and M23), and controlled by the printer control board (PRCB). Related boards and sensors include the drum potential sensor boards Y, M, C and K (DRPSB Y, M, C and K), drum potential sensor Y, M, C and K (DRPS Y, M, C and K) and the temperature/humidity sensor (TEMP/HUM).

A. Explanation of the operation

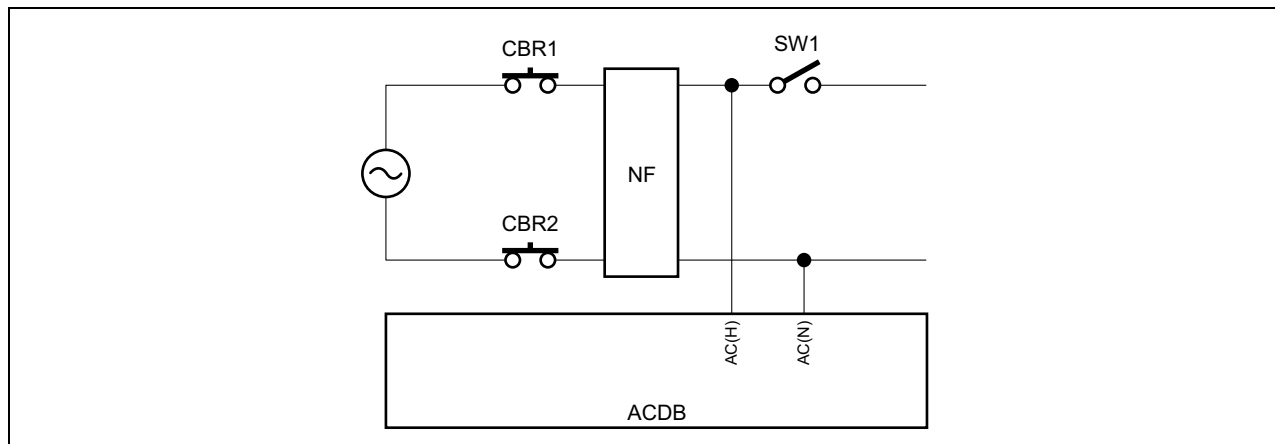
The gradation patch is created on the transfer belt and read by the gamma sensor (PS11). The correction value for the gamma curve is determined by the sensor output value with the predefined relationship between the sensor output and the output image.

B. Timing of the operation

- When the main switch (SW2) is turned on for the first time in 6 hours or more after it was turned off.
- When the job starts 6 hours or more after the SW2 has been turned on.
- Every 1,000 pages of output. However at the time of completion of the job, when the 1,000th page is contained in the job.
- When the humidity has changed more than 30% RH from the value measured at the last operation.
- When the job starts where the process speed gets slowed down to 1/2 or 1/3 speed. However, once operated under this condition after the SW2 turns on, the operation is not carried out again until the SW2 turns off.

15. OTHER CONTROLS

15.1 Parts to which power is supplied even when the reset switch is turned off



Regardless of the on/off position of the reset switch (SW1), the following components are supplied with power as the power cord is plugged into the power outlet.

A. Circuit breakers 1 and 2 (CBR 1 and 2)

When more than a specified amount of current flows due to the short-circuit of internal parts, it turns off to shut off the current to the engine.

B. Noise filter (NF)

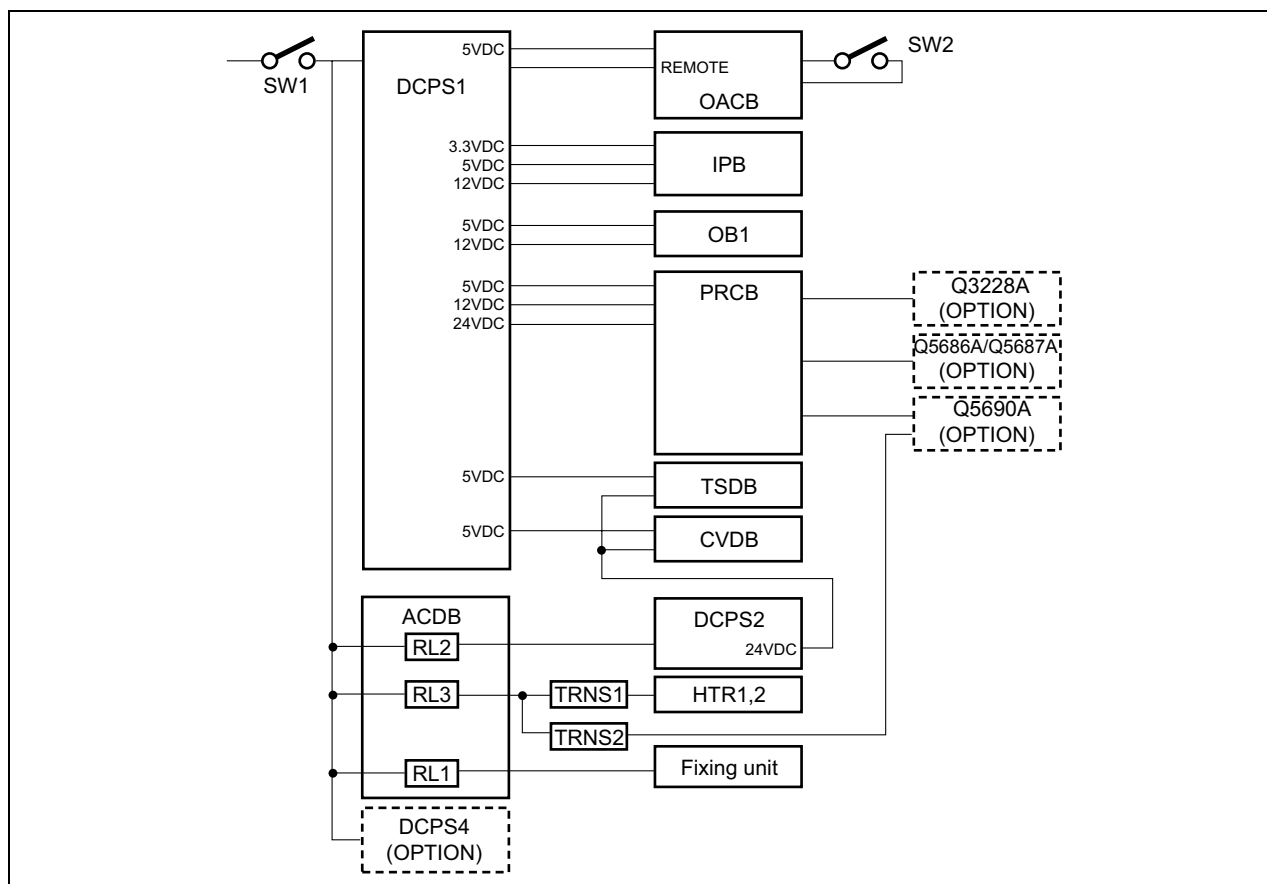
This reduces the level of noise that enters through the power line.

C. AC drive board (ACDB)

This supplies AC power to each unit and turns on and off the fixing heater lamps and the heaters.

15.2 Parts that operate only when the power switch (SW1) is turned on

15.2.1 Parts that operate when the reset switch (SW1) is turned on



When the reset switch (SW1) turns on, AC power is supplied to the DC power unit 1 (DCPS1), AC drive board (ACDB) and the DC power unit 4: optional (DCPS4).

As a result, DCPS1 supplies 5VDC to the overall control board (OACB) to monitor it with the main switch (SW2).

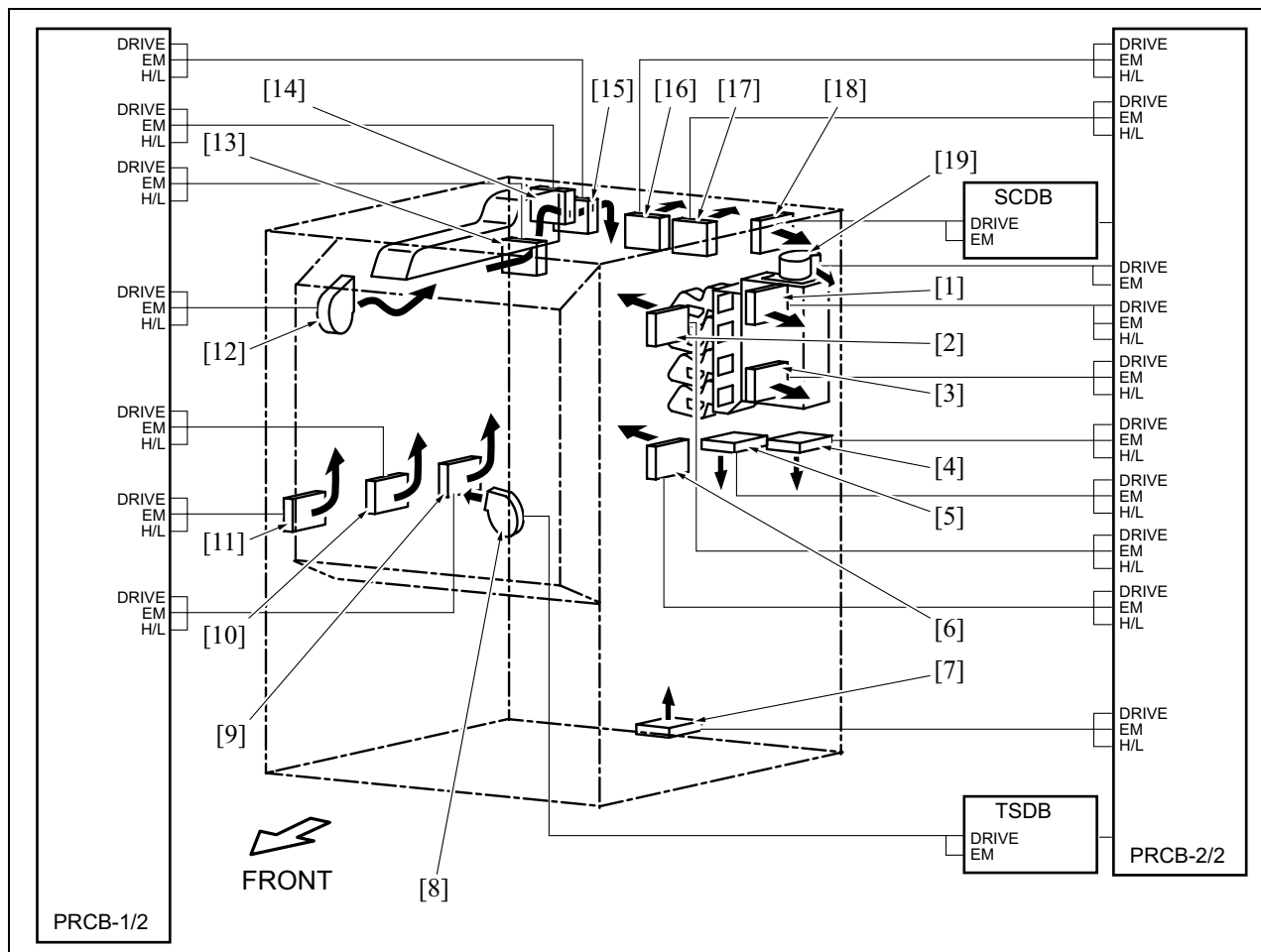
15.2.2 Parts that operate when the main switch (SW2) is turned on

When the main switch (SW2) is turned on, the overall control board (OACB) detects this condition and sends a control signal to the DC power unit /1 (DCPS1) and the AC drive board (ACDB).

As a result, DCPS1 supplies 3.5VDC, 5VDC, 12VDC and 24VDC to all the boards and optional devices. The ACDB turns ON the HTR relay (RL3) in the board and provides 24VAC to each heater via the transformer/engine (TRNS1) and the transformer/HCI (TRNS2).

15.3 Fan control

15.3.1 Fan composition

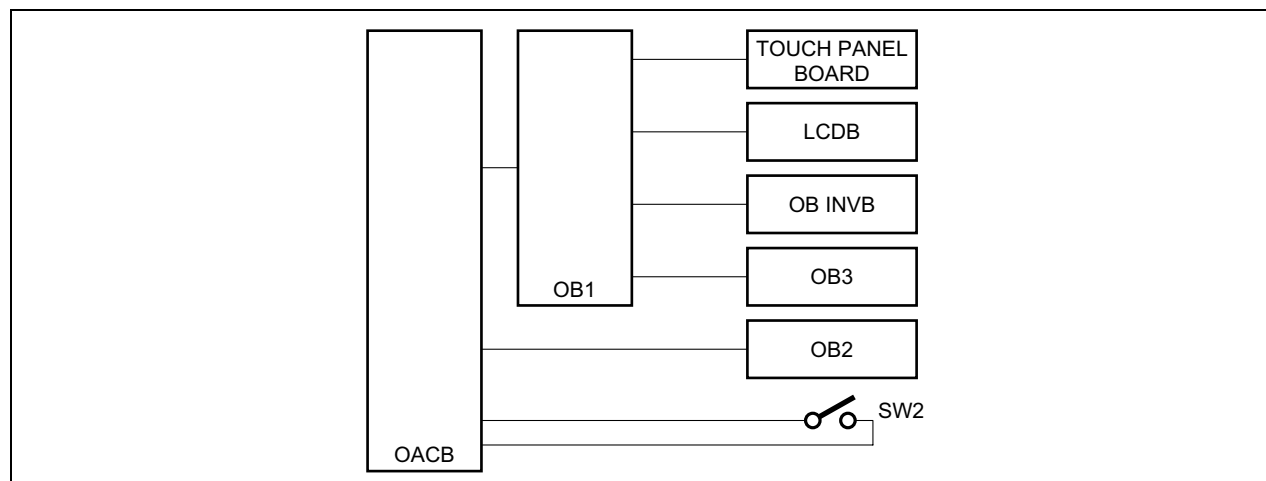


Symbol	Name	Function or method
[1]	Write exhaust fan 1 (M45)	Writing section cooling
[2]	Write intake fan 1 (M43)	Writing section cooling
[3]	Write exhaust fan /2 (M46)	Writing section cooling
[4]	IP cooling fan (M25)	Cooling of the overall control board (OACB)
[5]	IPB cooling fan (M24)	Cooling of the image processing board (IPB)
[6]	Write intake fan 2 (M44)	Writing section cooling
[7]	DCPS cooling fan (M42)	Cooling around DC power unit 1 (DCPS1)
[11]	Paper exit fan F (M28)	Cooling around the paper reverse exit section and cooling of paper
[8]	Charging intake fan (M48)	Adverse wind to the charging corona
[9]	Paper exit fan R (M26)	Cooling around the paper reverse exit section and cooling of paper
[10]	Paper exit fan M (M27)	Cooling around the paper reverse exit section and cooling of paper
[12]	Transfer belt cooling fan (M11)	Cooling around the transfer belt
[13]	Fixing cooling fan 1 (M10)	Cooling around the fixing section of the paper exit side
[14]	Fixing cooling fan 3 (M36)	Cooling around the fixing section
[15]	Fixing cooling fan 2 (M37)	Cooling around the fixing section

Symbol	Name	Function or method
[16]	Drum cooling fan 1 (M12)	Discharging heat around the drum drive motor out of the engine
[17]	Drum cooling fan 2 (M13)	Discharging heat around the drum drive motor out of the engine
[18]	Scanner cooling fan (M2)	Cooling of the scanner section
[19]	Drum unit fan (M47)	Cooling around the drum

15.4 Operation board control

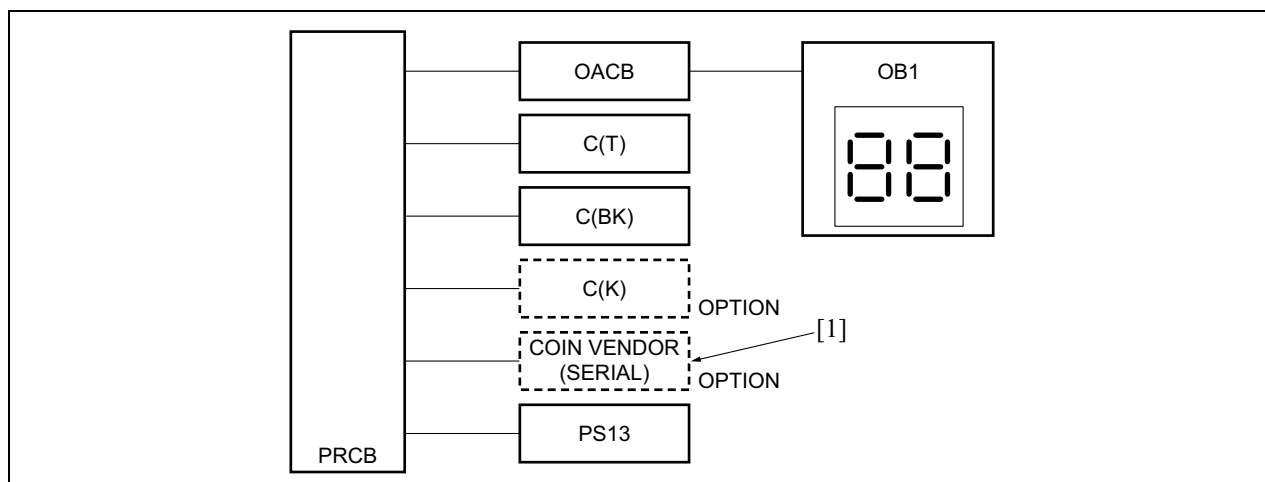
15.4.1 Operation board composition



Symbol	Name	Function or method
[1]	Touch panel board	Touch switch board used to directly select items shown on the LCD board (LCDB)
LCDB	LCD board	Information of all sorts is displayed on this
OB INVB	OB inverter board	Inverter that drives the LCD board (LCDB)
OB1	Operation board 1	Control of the touch panel board, LCD board (LCDB), OB inverter board (OB INVB), operation board 3 (OB3), and the control of the LED within the operation board 1 (OB2) and the numeric pad
OB2	Operation board 2	LED-loaded board to grasp the on/off condition of the reset switch (SW1)
OB3	Operation board 3	Volume loaded board to adjust the brightness of the LCD board (LCDB)
SW2	Main switch	Power switch of the operation board It does not function when the reset switch (SW1) is off

15.5 Counter control

15.5.1 Counter composition



Symbol	Name	Function or method
[1]	Coin vendor (serial) (Optional)	Copying is controlled depending on the presence of a coin. (Serial connection)
OB1	Operation board 1	This displays a copy count
C(T)	Total counter	This displays a total cumulative copy count in all copy modes Mechanical counter driven by an electric signal
C(BK)	Black counter	This displays a cumulative copy count in the black-and-white copy mode Mechanical counter driven by an electric signal
C(K)	Key counter (optional)	This is a counter that makes a copy operation unavailable when a specified number of copies has been counted Mechanical counter driven by an electric signal
PS13	Paper exit sensor	This detects paper in the paper exit section and sends a control signal to each counter Photo sensor + actuator

15.5.2 Counter operation

This engine uses a counter on the software to count a number of copies.

A. Paper exit counter

The counter takes the count of 1 every time the paper exit sensor (PS13) turns off from on. In the double side copy mode, however, this takes the count of 2.

B. Copy counter on OB1

This displays the number of copies that have been discharged.

C. C (T)

This counts up in conjunction with the paper exit counter.

D. C (BK)

This counts up in conjunction with the paper exit counter.

E. C (K)

This counts up in conjunction with the paper exit counter.

F. Signals in serial connection

Connector	Pin No.	Signal name	In/Out	Description
37	1	OP_SOUT	Out	Open collector output (LS07)
	2	OP_DTR	Out	Open collector output (LS07)
	3	OP_CTS	In	5V Pull up
	4	OP_SIN	In	5V Pull up
	5	OP_DSR	In	5V Pull up
	6	OP_RTS	Out	Open collector output (LS07)
	7	SGND	—	Signal ground
	8	COPV_ENB	In	5V Pull up
	9	24VDC	—	Power supplied to the vendor
	10	PGND	—	Power ground
	11	5VDC	—	Power supplied to the vendor

G. Signals for status indicator lights

Connector	Pin No.	Signal name	Description	Output timing	Type of signal
391	1A	DC24V	Power source of status indicator light	At all times	24V, 500mA
	9B	PGND	Power ground	—	—
	2A	PAT1	Light on signal	L signal outputted when print is available	Open collector 5V, 200mA
	3A	PAT2		L signal outputted while scanner or printer in operation	
	4A	PAT3		L signal outputted when stopped abnormally due to jamming, abnormal code, no paper or no toner	
	5A	PAT4		L signal outputted when a toner supply warning is displayed	

15.6 ACS control

15.6.1 Switching between the color mode and the black and white mode

If more than 5 black and white sheets are fed consecutively from RADF in which both the color sheets and the black and white sheets are stored, the pressure on the 1st transfer rollers Y/M/C are released and it shifts to the black and white mode. At this time, the switch is performed during JOB, so there is a time lag between the color copy and the black and white copy.

A. Switching sequence from the color mode to the black and white mode

1. The 2nd transfer for the previous copy sheet (color) is complete.
2. The pressure is executed on the 1st transfer roller K (the 1st transfer rollers Y/M/C are in release state).
3. Writing K is started.
4. Terminate the operation of the drum unit Y/M/C, the developing unit Y/M/C, and the toner supply unit Y/M/C.

B. Switching sequence from the black and white mode to the color mode

1. The color print is instructed.
2. The 2nd transfer for the previous copy sheet (black and white) is complete.
3. Start the operation of the drum unit Y/M/C, the developing unit Y/M/C, and the supply unit Y/M/C.
4. MPC or APC is executed for the write unit Y/M/C.
5. The pressure is executed on the 1st transfer roller Y/M/C/K.
6. Writing Y is started.

15.6.2 Copy count when using ACS

- There are following two kinds of copy count when using ACS.

A. The black and white mode (the 1st transfer roller Y/M/C is in the release state)

	Black and white original
Total counter	Counts as black and white
Developer counter	Counts as black and white

B. The color mode (the 1st transfer roller Y/M/C is in the pressure state)

	Color original	Black and white original
Total counter	Counts as color	Counts as black and white
Developer counter	Counts as color	Counts as color *1

- *1 If the original is black and white, the output will be black and white; however, the developer counter counts it as color copy and the total counter counts it as black and white copy.

III DISASSEMBLY/ASSEMBLY

⚠ Caution:

- Make sure the power cord of the MFP is unplugged from the power outlet before disassembly or assembly.

1. EXTERIOR

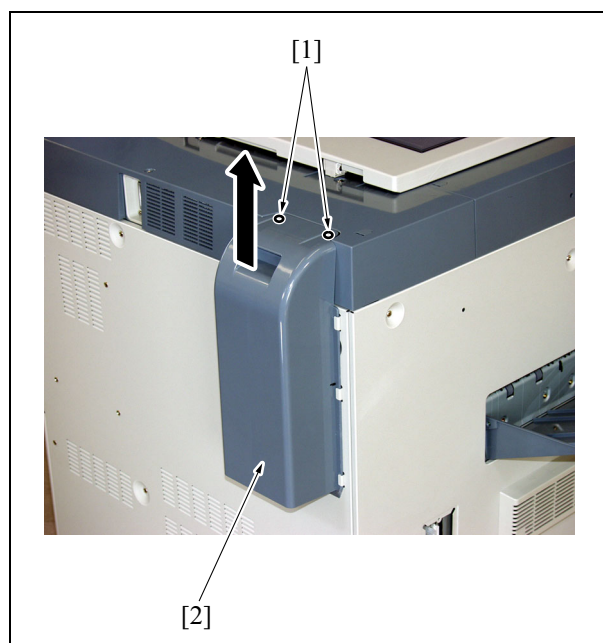
1.1 Replacing the dust filter 2

A. Periodically replaced parts/cycle

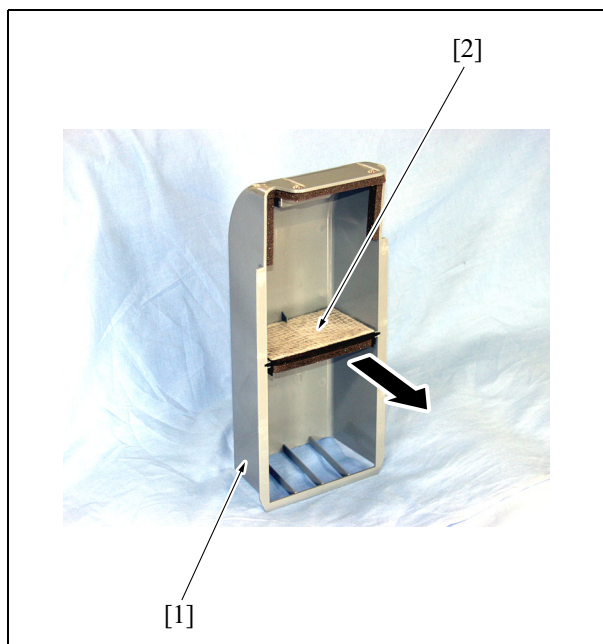
- Dust filter 2: Every 100,000 copies

B. Procedure

1. Loosen 2 screws [1] and remove the filter cover [2].



2. Pull out the dust filter 2 [2] from the filter cover [1].
3. Reinstall the above parts following the removal steps in reverse.



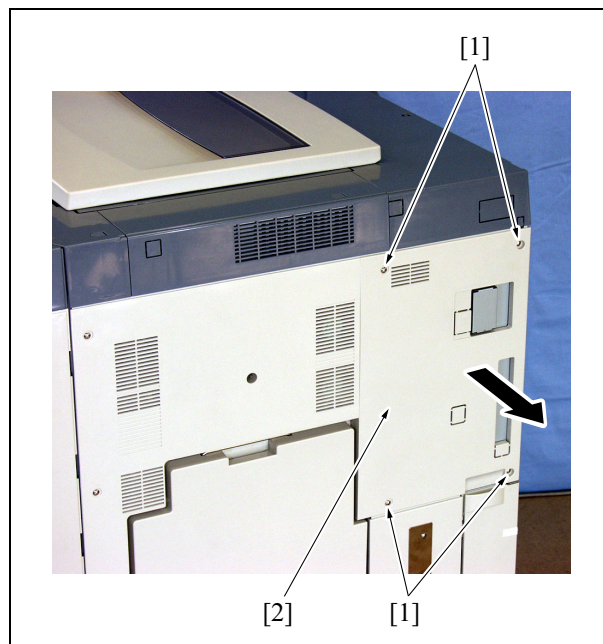
1.2 Replacing the dust filter 1 and the ozone filter 1

A. Periodically replaced parts/cycle

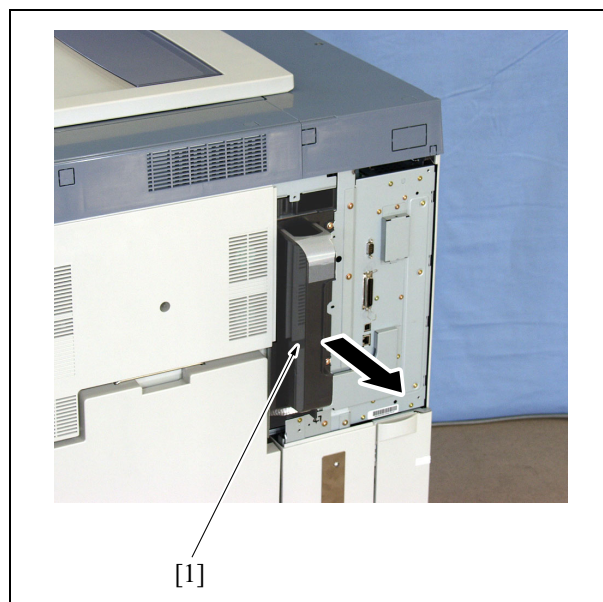
- Dust filter 1: Every 100,000 copies
- Ozone filter 1: Every 100,000 copies

B. Procedure

1. Loosen 4 screws [1] and remove the side cover 2 [2].



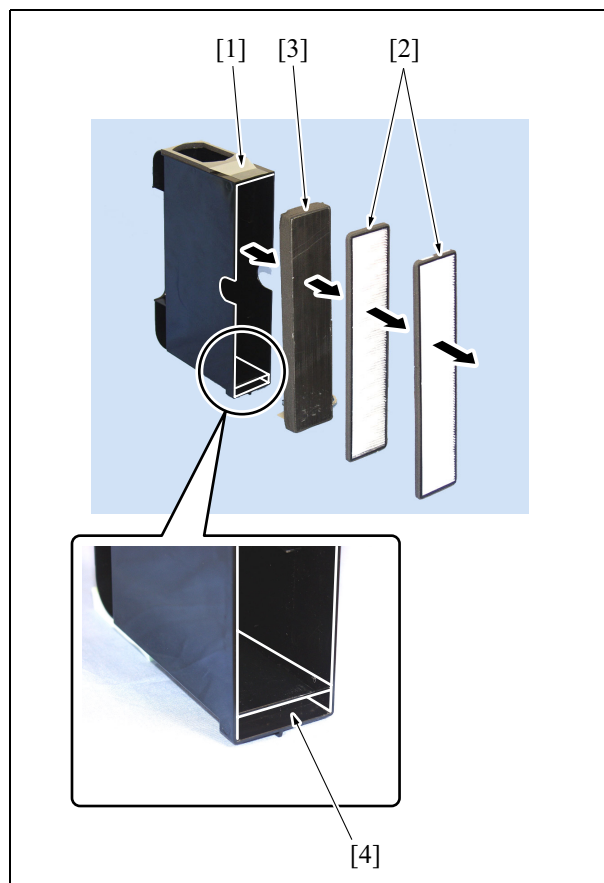
2. Pull out the filter replacement duct [1].



3. Remove the 2 dust filters 1 [2] and the ozone filter 3 [3] from the filter replacement duct [1].
4. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the ozone filter 1, be careful not to snap or fracture it.
- When reinstalling the dust filter 1, be sure to press it against the stopper section [4] of the filter replacement duct.



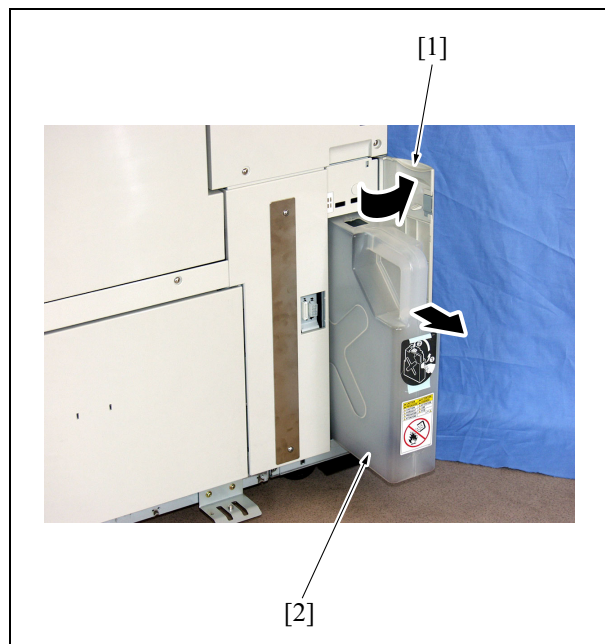
1.3 Replacing the toner collection box

A. Periodically replaced parts/cycle

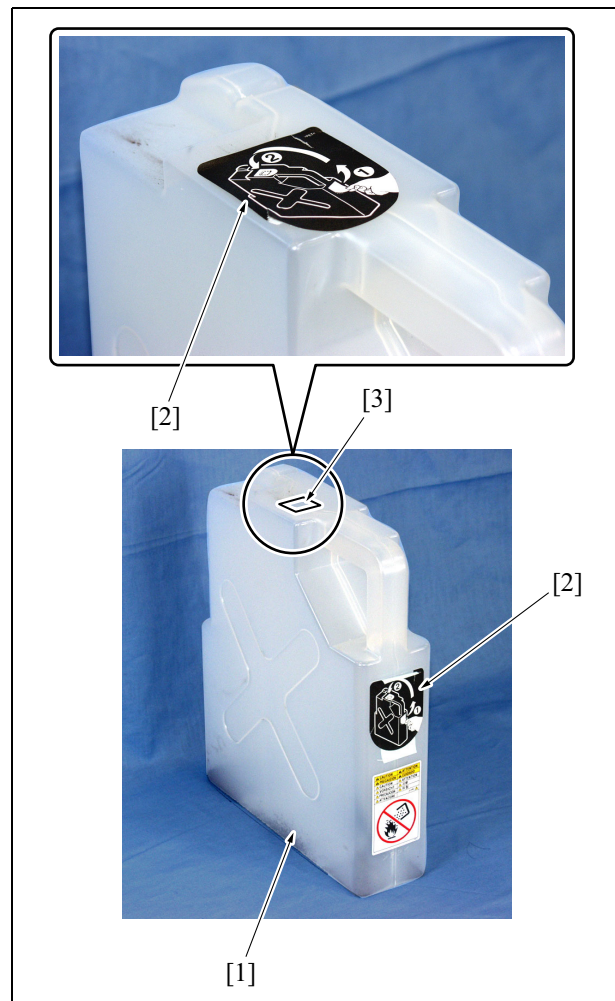
- Toner collection box: Every 50,000 copies (to be replaced by the user)

B. Procedure

1. Open the toner collection door [1] and pull out the toner collection box [2].



2. Peel the label [2] off the toner collection box [1] and plug the entrance of the toner collection box [1].
3. Reinstall the above parts following the removal steps in reverse.



1.4 Angle adjustment of the operation board

Note:

- The operation board can be set at the two steps of 7 and 18 degrees depending on the front cover 2 provided or not provided.

When the front cover 2 provided: 7 degrees

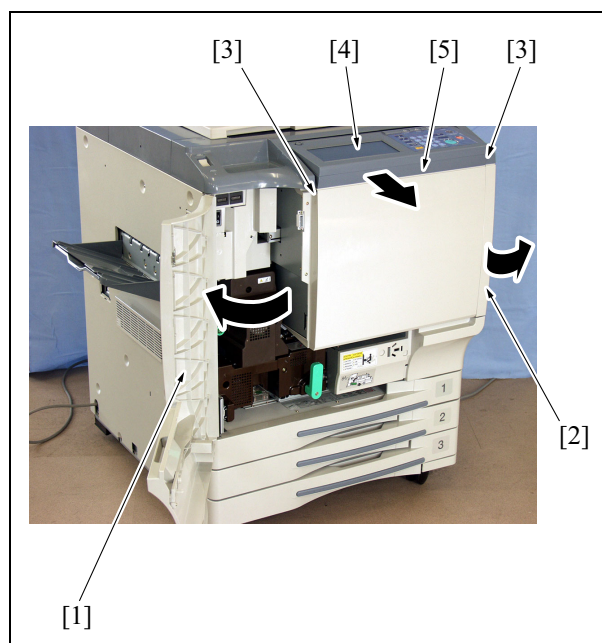
When the front cover 2 not provided: 18 degrees

A. Procedure

1. Open the front door [1] and the toner supply door [2].
2. Remove 2 screws [3] and release the fixing of the operation board [4].
3. With the operation board raised up, remove the front cover 2 [5] (when the angle is changed from 7 to 18 degrees).
4. Fasten the operation board [4] with 2 screws [3].
5. Close the front door [1] and the toner supply door [2].

Note:

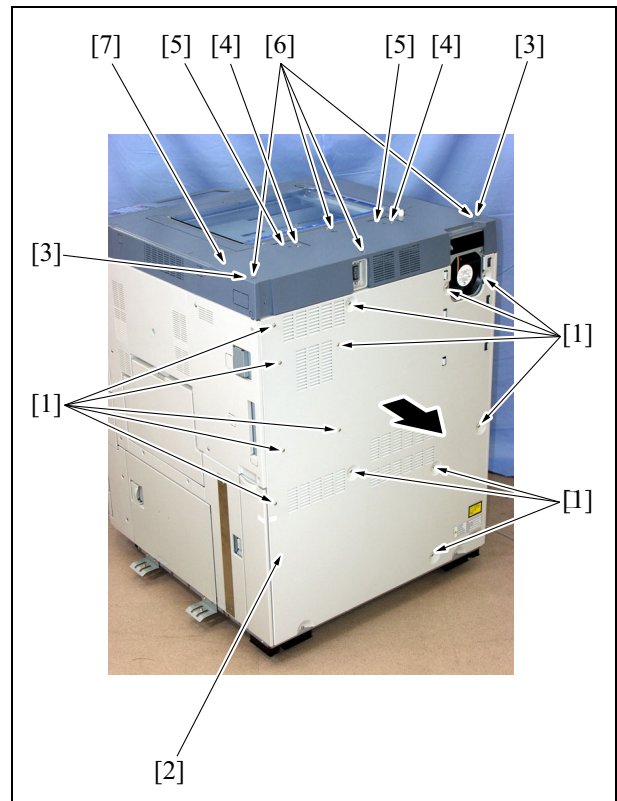
- When changing the angle of the operation board from 18 to 7 degrees, install the front cover 2 by following Step 3.



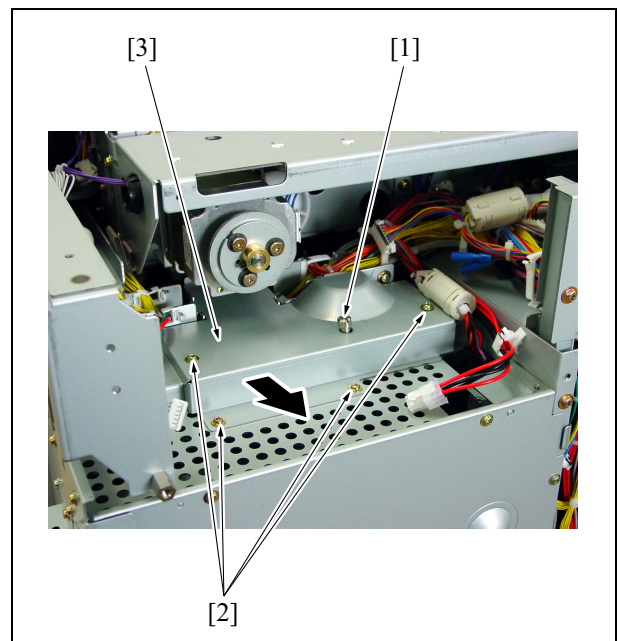
1.5 Removing and reinstalling the main board unit

A. Procedure

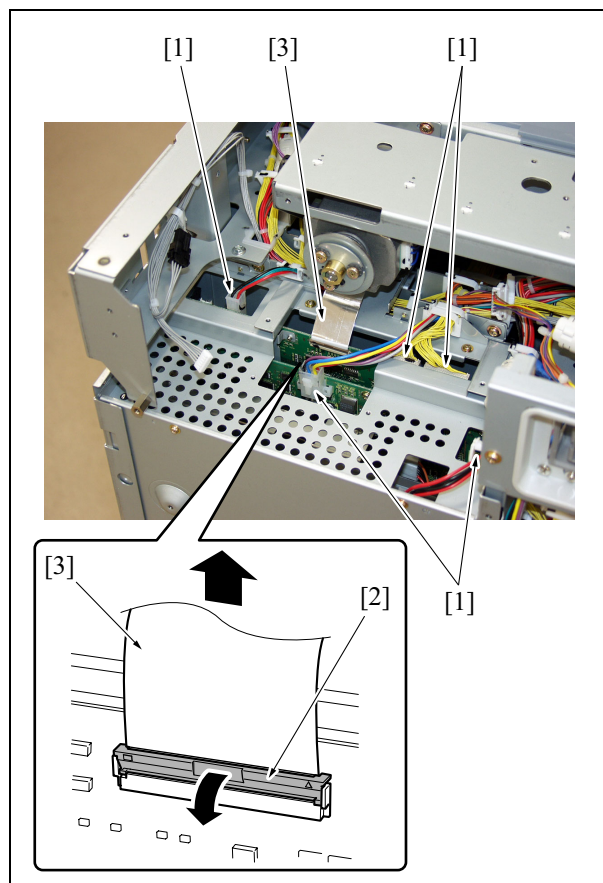
1. Remove the RADF. (See "**DISASSEMBLY / ASSEMBLY of the RADF.**")
2. Remove the filter cover. (See "**1.1 Replacing the filter 1 and the dust filter 2.**")
3. Loosen 2 screws [1], remove 13 screws [2], and then remove the rear cover [3].
4. Remove the side cover 2. (See "**1.2 Replacing the dust filter 1 and the ozone filter 1.**").
5. Remove the screws [5], one for each, and then remove the 2 original cover supports
6. [6]. Remove 2 caps [4].
7. Remove 4 screws [7] and then remove the scanner cover R [8].



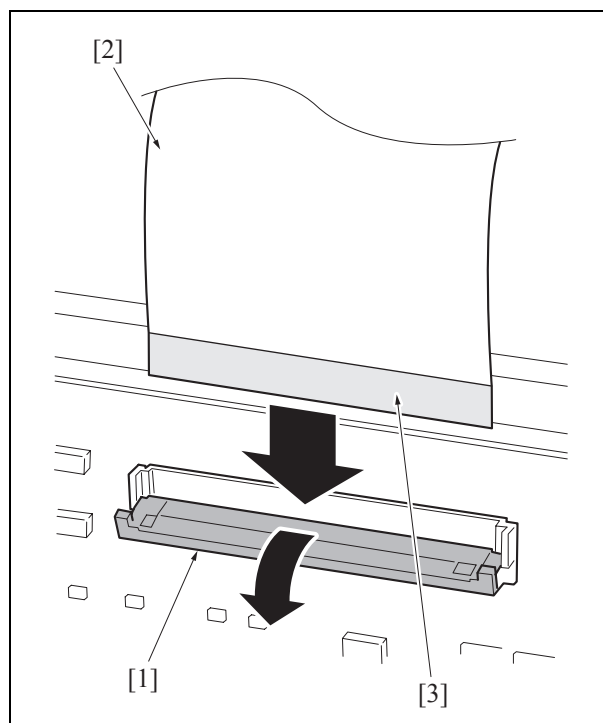
8. Remove the special screw [1].
9. Remove 4 screws [2] and then remove the board seal plate 2 [3].



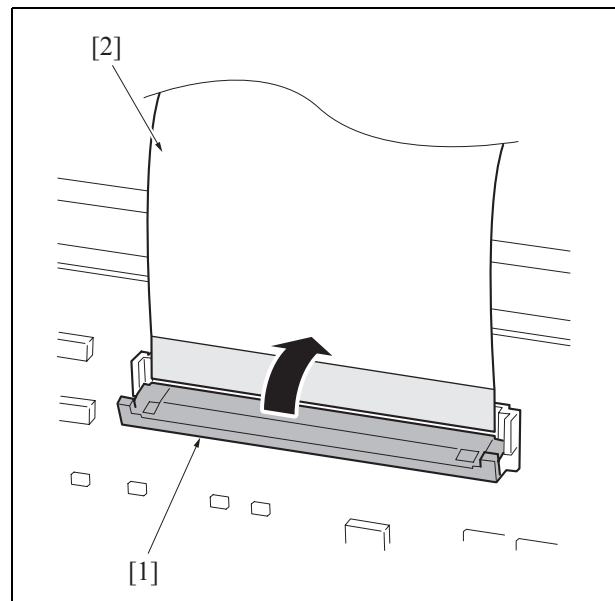
10. Remove 5 connectors [1].
11. With the lock lever [2] brought down this side, release the lock and pull out the ribbon cable [3].

**Note:**

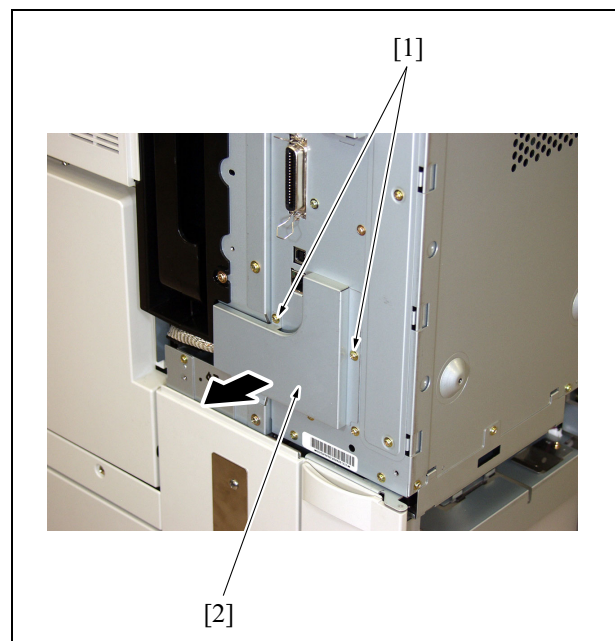
- Move the lock lever [1] forward, then insert the ribbon cable [2] firmly into the connector while ensuring that the conductive face of the ribbon cable [3] is positioned on the opposite side of the lock lever.



- Then with the lock lever [1] brought back to its original position, lock the ribbon cable [2].



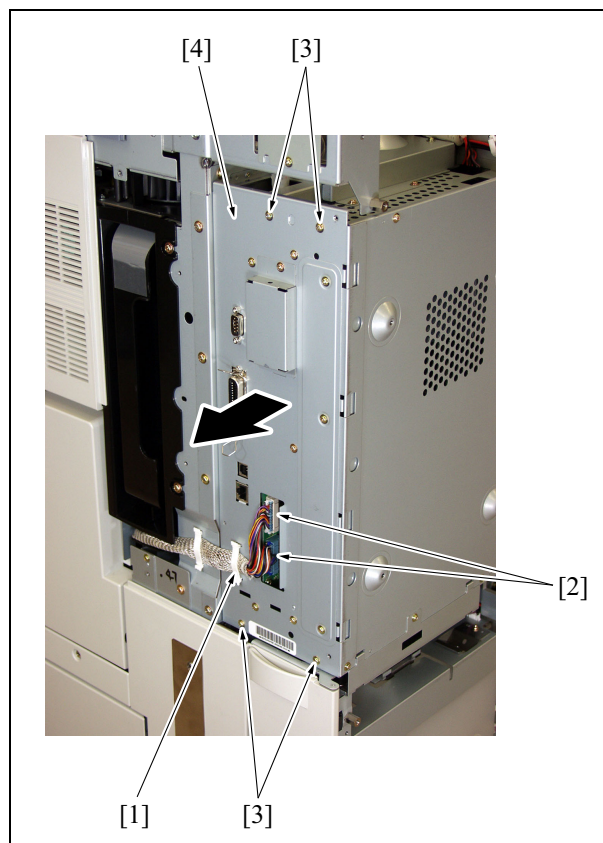
12. Remove 2 screws [1] and then remove the board seal plate 4 [2].



13. Remove a bracket cable clamp [1].
14. Remove 2 connectors [2].
15. Remove 4 screws [3] and then remove the main board unit [4].
16. Reinstall the above parts following the removal steps in reverse.

Note:

- When removing or reinstalling the main board unit, be careful that the battery on the memory board (MB) does not touch with the frame.



2. SCANNER

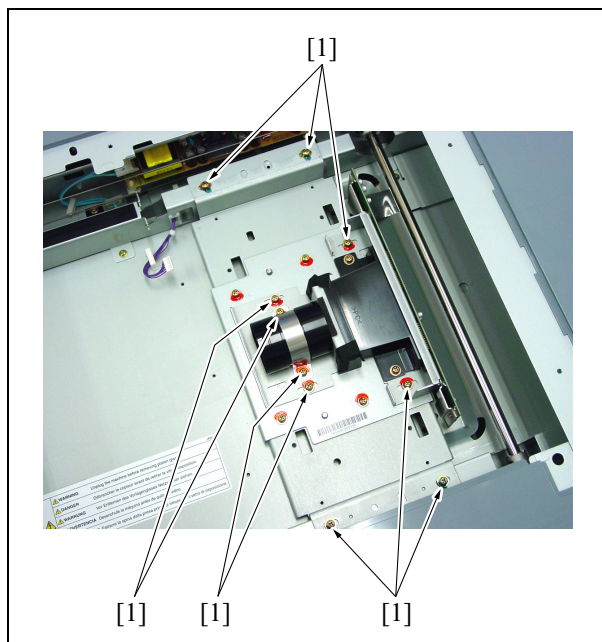
2.1 Screws that must not be removed

A. Procedure

1. □ Remove 10 screws [1].

Note:

- [1] Screws that have been paint-locked are not allowed to be removed.



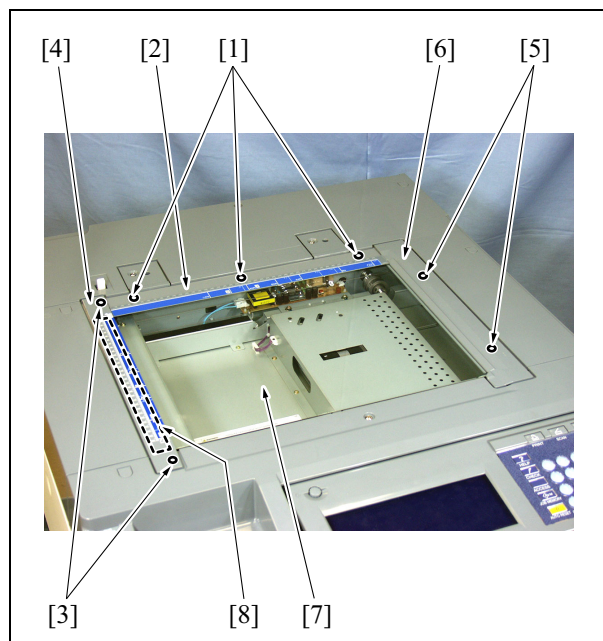
2.2 Removing and reinstalling the scanner glass

A. Procedure

1. Remove 3 screws [1] and then remove the original positioning plate R [2].
2. Remove 2 screws [3] and then remove the original positioning plate L [4].
3. Remove 2 screws [5] and then remove the scanner cover M [6].
4. Remove the scanner glass [7].
5. Reinstall the above parts following the removal steps in reverse.

Note:

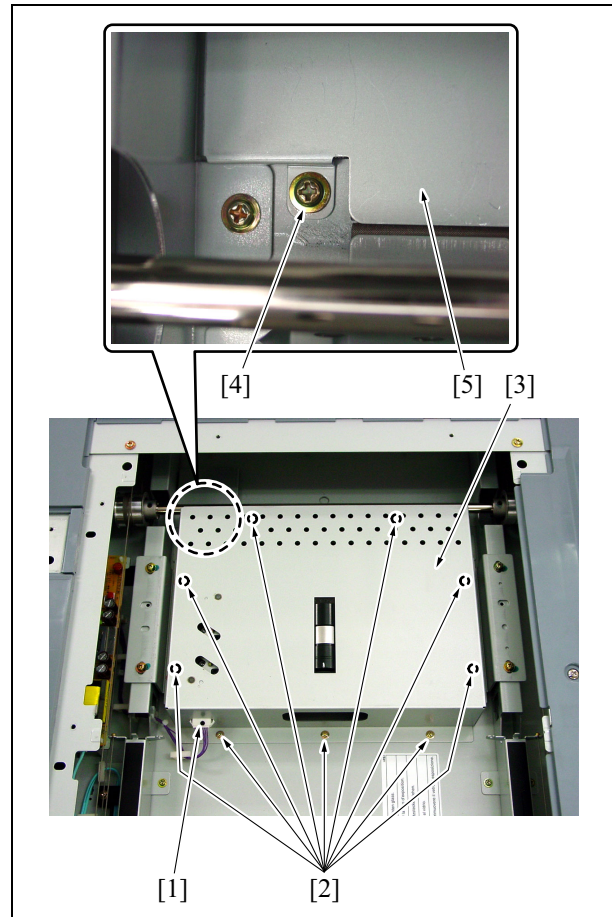
- Be sure to reinstall the scanner glass with its white reference plate [8] up.
- Do not separate the original positioning plate [4] from the glass. These two pieces are glued together to prevent dust on the white reference and prevent originals going into the gap between the original positioning plate and the glass.



2.3 Removing and reinstalling the CCD unit

A. Procedure for removal

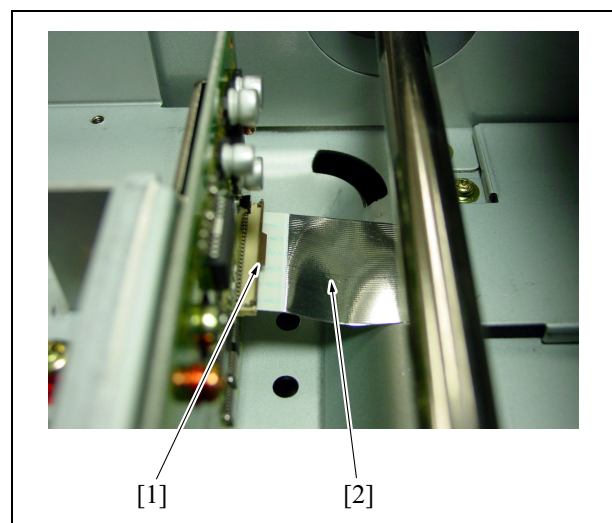
1. Remove the scanner glass. (See "2.2 Removing and reinstalling the scanner glass.")
2. Remove the connector [1].
3. Remove 9 screws [2] and then remove the CCD cover [3].
4. Remove the screw [4] and then remove the ribbon cable cover [5].



5. With the lock lever [1] brought down, release the lock and pull out the ribbon cable [2].

Note:

- Move the lock lever [1] downward, then insert the ribbon cable [2] firmly into the connector while ensuring that the conductive face of the ribbon cable is positioned on the opposite side of the lock lever.
- Then bring the lock lever back to its original position, lock the ribbon cable.

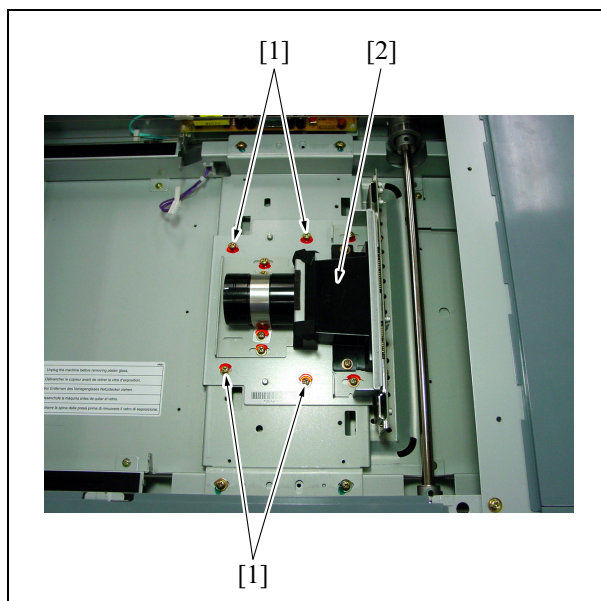


6. Remove 4 screws [1] and then remove the CCD unit [2].

Note:

- Be careful not to remove screws other than those mentioned above. Otherwise, it becomes necessary to make numerous optical adjustments which cannot be handled in the field.
- Be careful not to touch the lens. This may result in poor images.

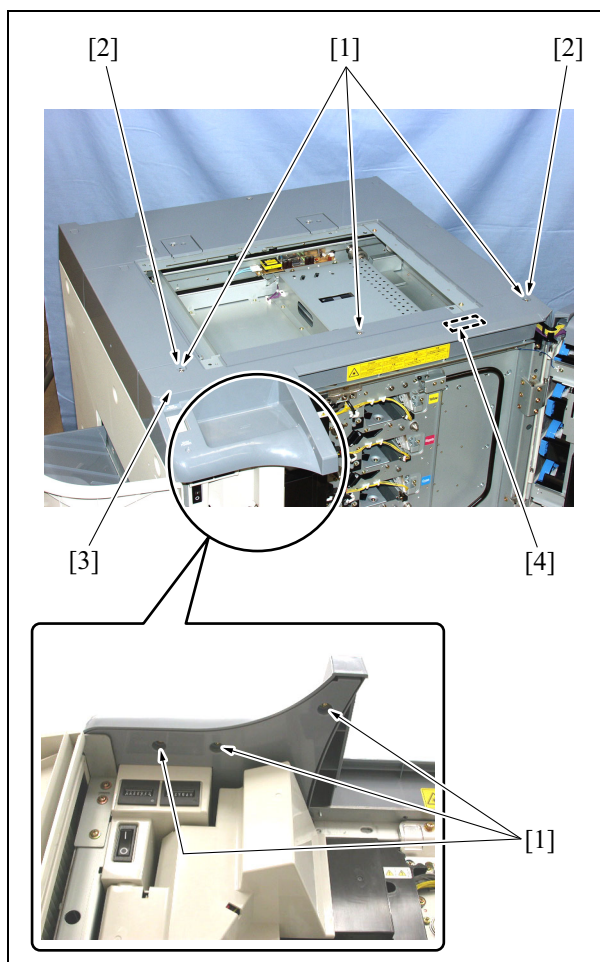
7. Reinstall the above parts following the removal steps in reverse.



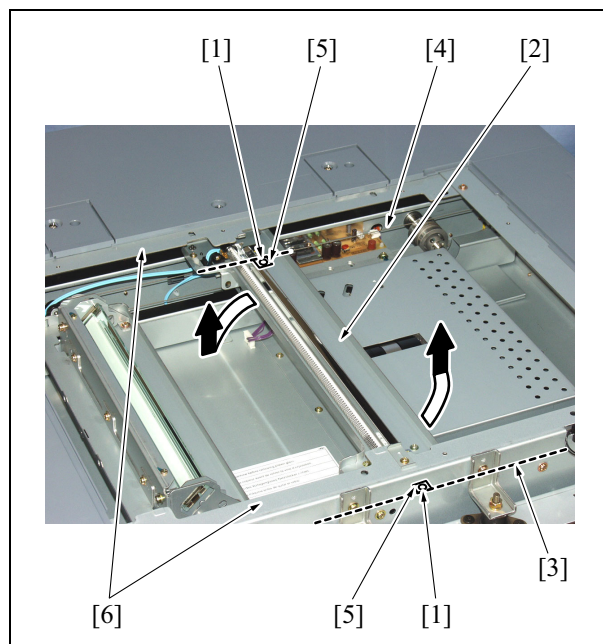
2.4 Removing and reinstalling the exposure unit

A. Procedure for removal

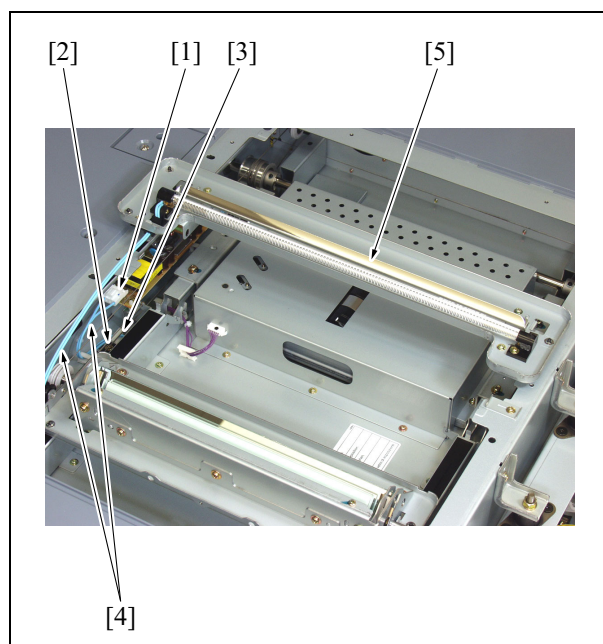
1. Remove the scanner glass. (See "[2.2 Removing and reinstalling the scanner glass](#).")
2. Open the toner supply section. (See "[5.1 Opening and closing of the toner supply section](#).")
3. Remove 2 caps [2].
4. Remove 6 screws [1].
5. After removing the relay connector [4] with the scanner cover F [3] shifted to the front side once, remove the scanner cover F [3].



6. Remove 2 screws [1] and release the fixing of the exposure unit [2].
7. Rotate the exposure unit [2] while holding it horizontally, pull it up and place it upon the scanner area [6].



8. Remove the connector [1].
9. Remove the screw [2] and release the cable [4] from the cable holder [3].
10. Remove the exposure unit [5].



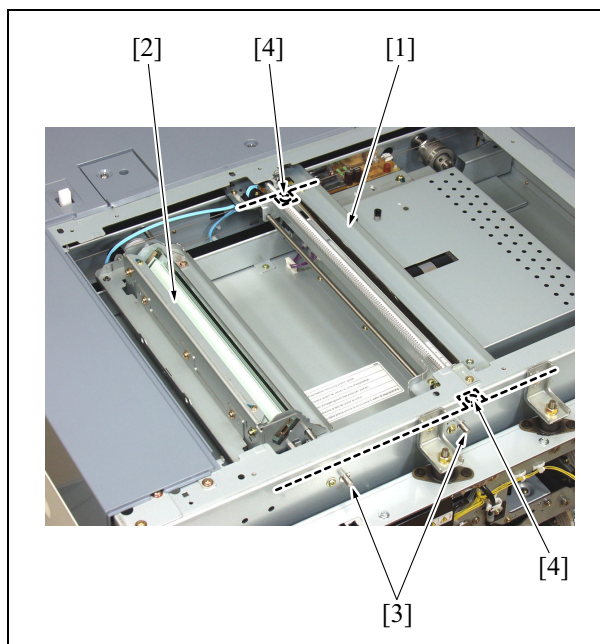
B. Procedure for reinstallation

1. Set the exposure unit [1] into the engine.
2. Move the V-mirror unit [2] to the paper exit side, and pass an optical positioning jig [3] through each of the exposure unit [1] and the V-mirror unit [2] from the front side.

Note:

- When reinstalling the exposure unit, be sure to use the optical positioning jig.

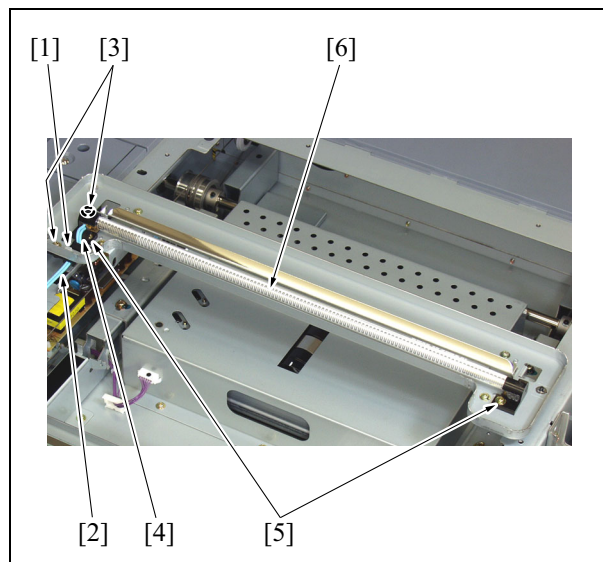
3. Fasten the exposure unit [1] with 2 screws [4].
4. Remove 2 optical positioning jigs [3].
5. For the subsequent steps, reinstall the parts following the removal steps in reverse.



2.5 Removing and reinstalling the exposure lamp

A. Procedure

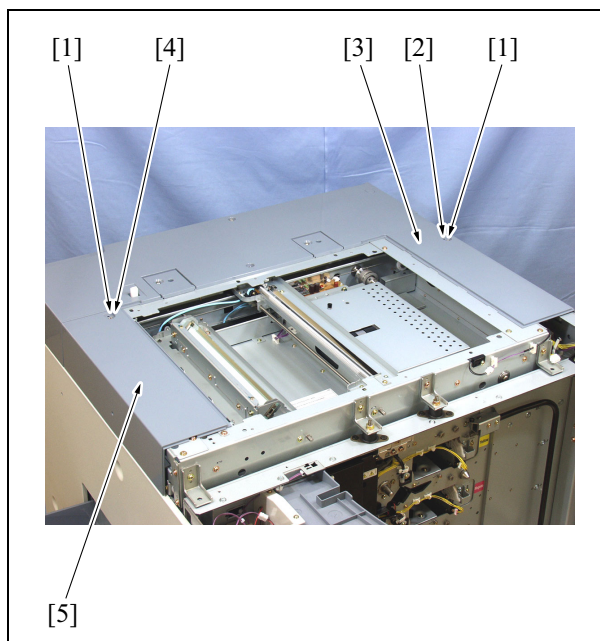
1. Remove the exposure unit. (See "2.4 Removing and reinstalling the exposure unit.")
2. Cut the binding band [1] and release the fixing of the cable [2].
3. Remove 2 screws [3] and then remove the HP detection plate [4].
4. Remove 2 screws [5] and then remove L1 (exposure lamp) [6].
5. Reinstall the above parts following the removal steps in reverse.



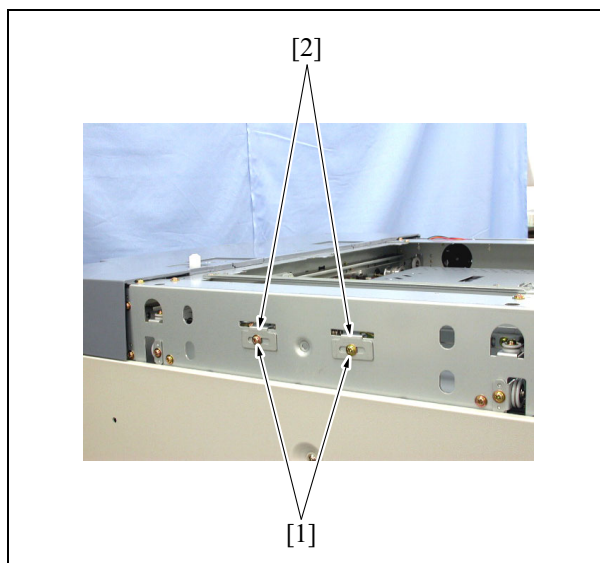
2.6 Removing the scanner wire

A. Procedure

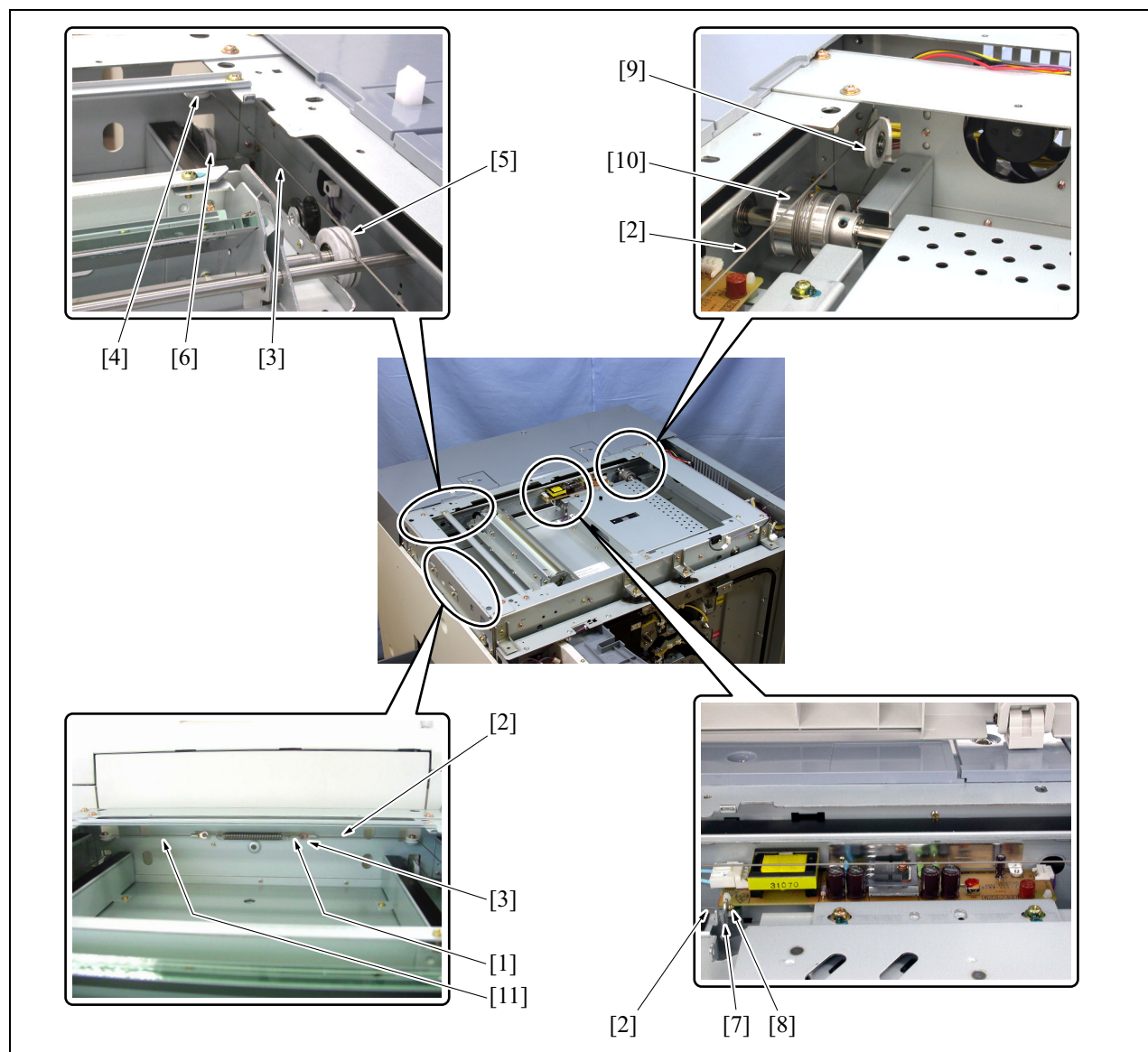
1. Remove the exposure unit. (See "2.4 Removing and reinstalling the exposure unit.")
2. Remove 2 caps [1].
3. Remove the screw [2] and remove the scanner cover R [3].
4. Remove the screw [4] and remove the scanner cover L [5].



5. Loosen the screws [1], one for each, and release the fixing of two spring fixing plates [2].



6. Remove the wire terminal [3] of the scanner wire R [2] from the spring fixing plate [1], and then remove the scanner wire R [2] in the order of the pulley 3 [4], the outside of the V-mirror pulley [5] and the pulley 2 [6].
 7. Remove the metal bead [8] of the scanner wire R [2] from the wire stopper [7], and then remove the scanner wire R [2] in the order of the inside of the V-mirror pulley [5] and the pulley /1 [9].
 8. Remove the scanner wire R [2] from the drive pulley [10].
 9. Remove the scanner wire F [11] by following Steps 5 to 7.
- Note:**
- The scanner wires F and R are installed symmetrically.



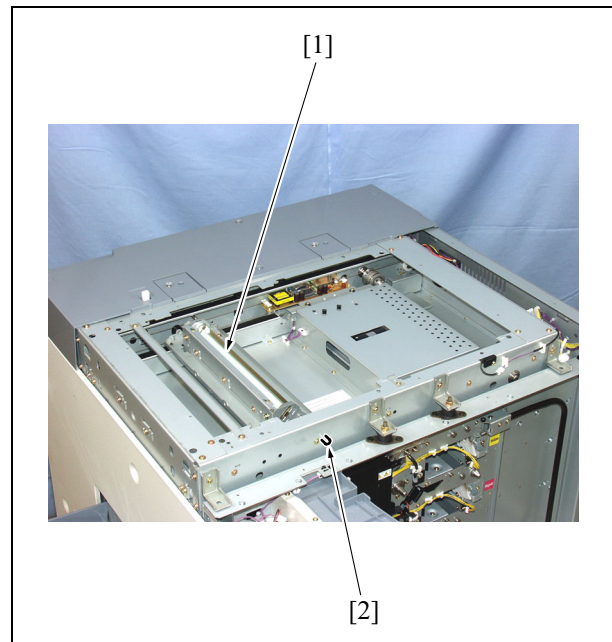
2.7 Reinstalling the scanner wire

A. Procedure

1. Move the V-mirror unit [1] to the paper exit side, and pass the optical positioning jig [2] through the V-mirror unit [1] from the front side.

Note:

- Be careful not to damage the mirror with the jig.
- When reinstalling the scanner wire, be sure to fasten the V-mirror with the optical positioning jig.

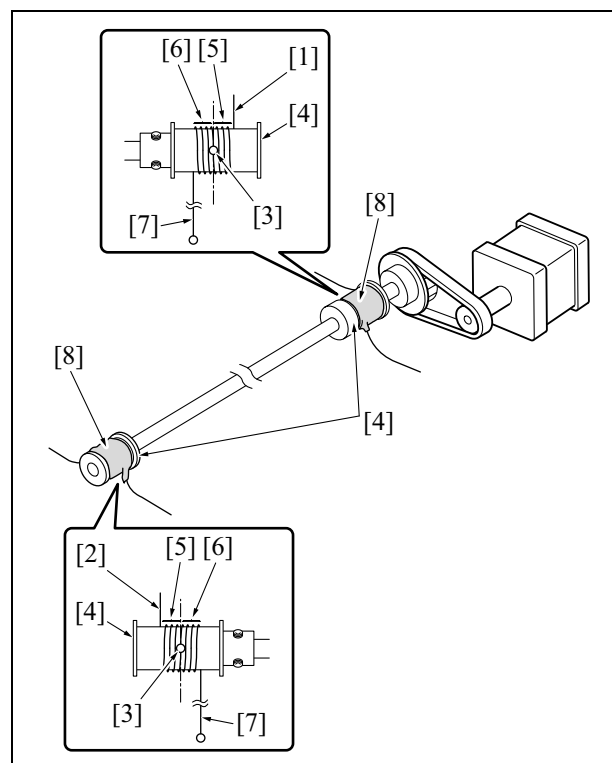


2. Drop into the fitting hole of the drive pulley [4] a metal bead [3] provided at the center of each of the scanner wires F [1] and R [2], and starting from this hole, wind the scanner wire 2.5 turns [5] outwards and 3.5 turns [6] inwards.

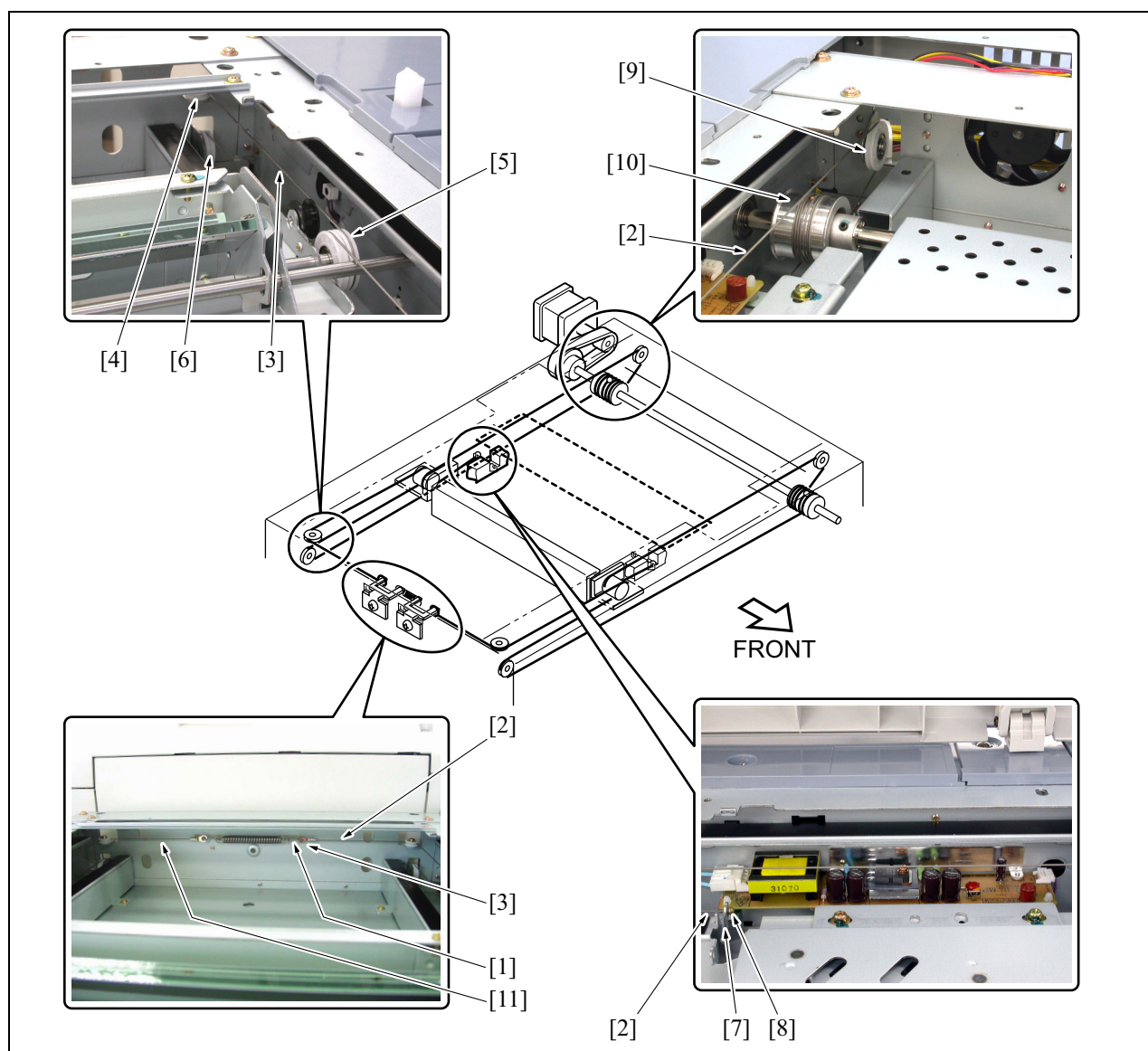
Note:

- For the scanner wires F and R, common wires are used.
- Be sure to wind each of scanner wires so that the wire terminal is on the outside and the metal bead [7] on the inside.
- Be sure to wind each of scanner wires so that both ends of the wire come out under the drive pulley.
- Be sure to wind each of the scanner wires closely around the drive pulley with no wire running on another wire.

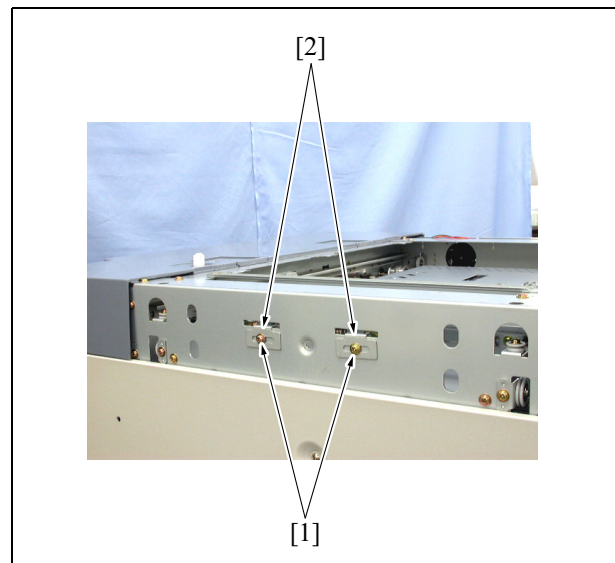
3. After winding the scanner wires F and R, be sure to fasten each wire end with a tape [8] so that it will not come off.



4. Pass the scanner wire R [2] on the metal bead [3] side (inside) which is wound around the drive pulley [1] through the pulley /1 [4] and the V-mirror pulley [5] in this order, and then hook the metal bead [3] onto the wire stopper [6].
5. Pass the scanner wire R [2] on the wire terminal [7] side (outside) which is wound around the drive pulley [1] through the pulley 2 [8] and the outside of V-mirror pulley [5] and the pulley 3 [9] in this order, and then hook the wire terminal [7] onto the spring fixing plate [10].
6. Reinstall the scanner wire F [11] by following Steps 4 and 5.



7. Tighten the screws [1], one for each, and fasten the 2 spring fixing plates [2].
8. For the subsequent steps, reinstall the parts following the removal steps in reverse.

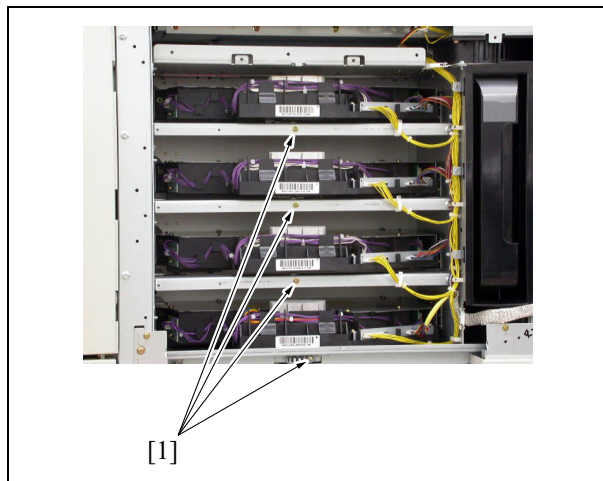


3. WRITING

3.1 Screws that must not be removed

Note:

- The screws [1] of each unit of the YMCK are not allowed to be removed. So, be careful not to remove them.



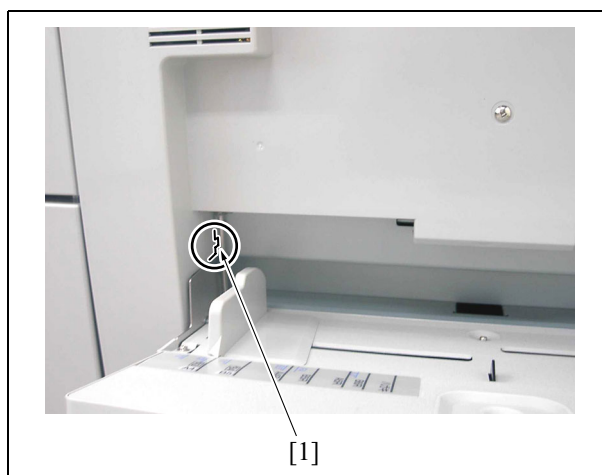
3.2 Removing and reinstalling the write unit

⚠ Warning:

- Be sure that the write unit should not be powered with it slid from its normal installation position.
- Be sure not to remove the write unit cover while being supplied with power. Otherwise, laser beams may get into your eyes and you may lose your sight.

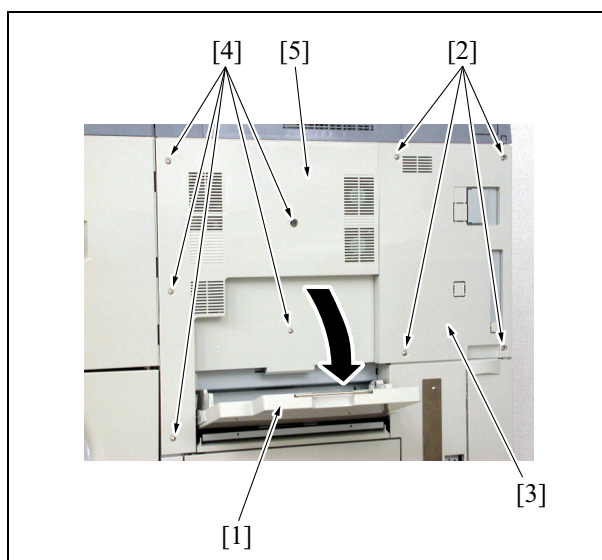
Note:

- Be sure not to remove the write unit cover. Do not loosen the screws, either.
- When removing the write unit, be careful not to touch the dust-proof glass (to prevent the mirror from being stained).
- Be sure not to remove the write unit for at least two minutes after the main power switch is turned off.
- When replacing the side cover 1, insert the prong [1] on the side cover 1 into the notch on the engine.

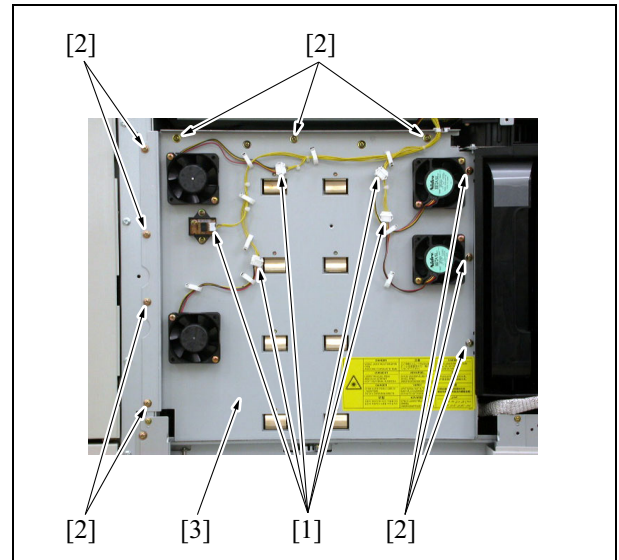


A. Procedure

1. Open the by-pass tray [1].
2. Loosen 4 screws [2] and remove the side cover 2 [3].
3. Loosen 5 screws [4] and remove the side cover 1 [5].



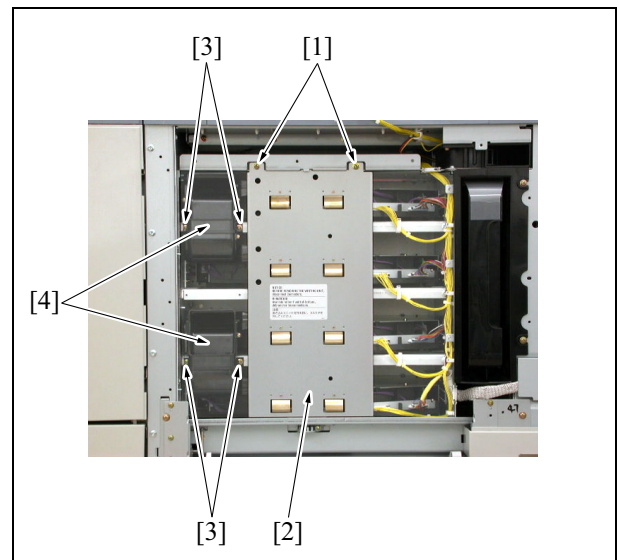
4. Remove 5 relay connectors [1].
5. Remove 10 screws [2] and then remove the fan holder R [3].



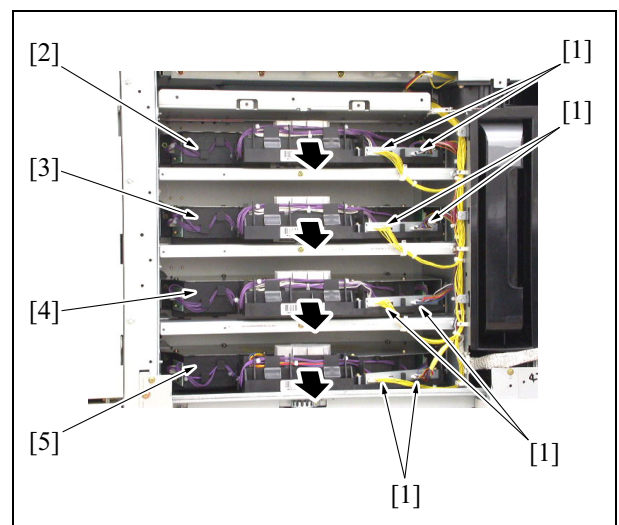
6. Remove 2 screws [1] and then remove the write pressing board [2] while pressing it downward.
7. Remove 2 screws [3] and then remove 2 write cooling ducts [4].

Note:

- Be sure to hold the upper half of the write pressing board when removing it.

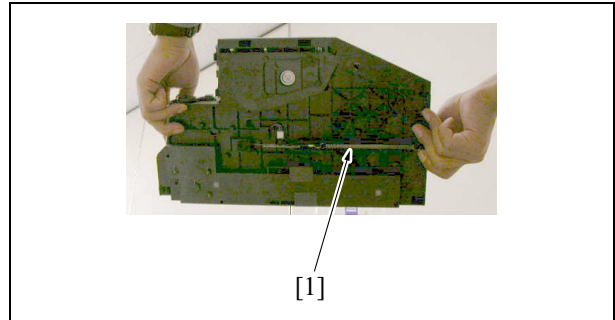


8. Remove the connectors [1], 2 each, and then remove the write unit Y [2], write unit M [3], write unit C [4] and the write unit K [5].
9. Reinstall the above parts following the removal steps in reverse.



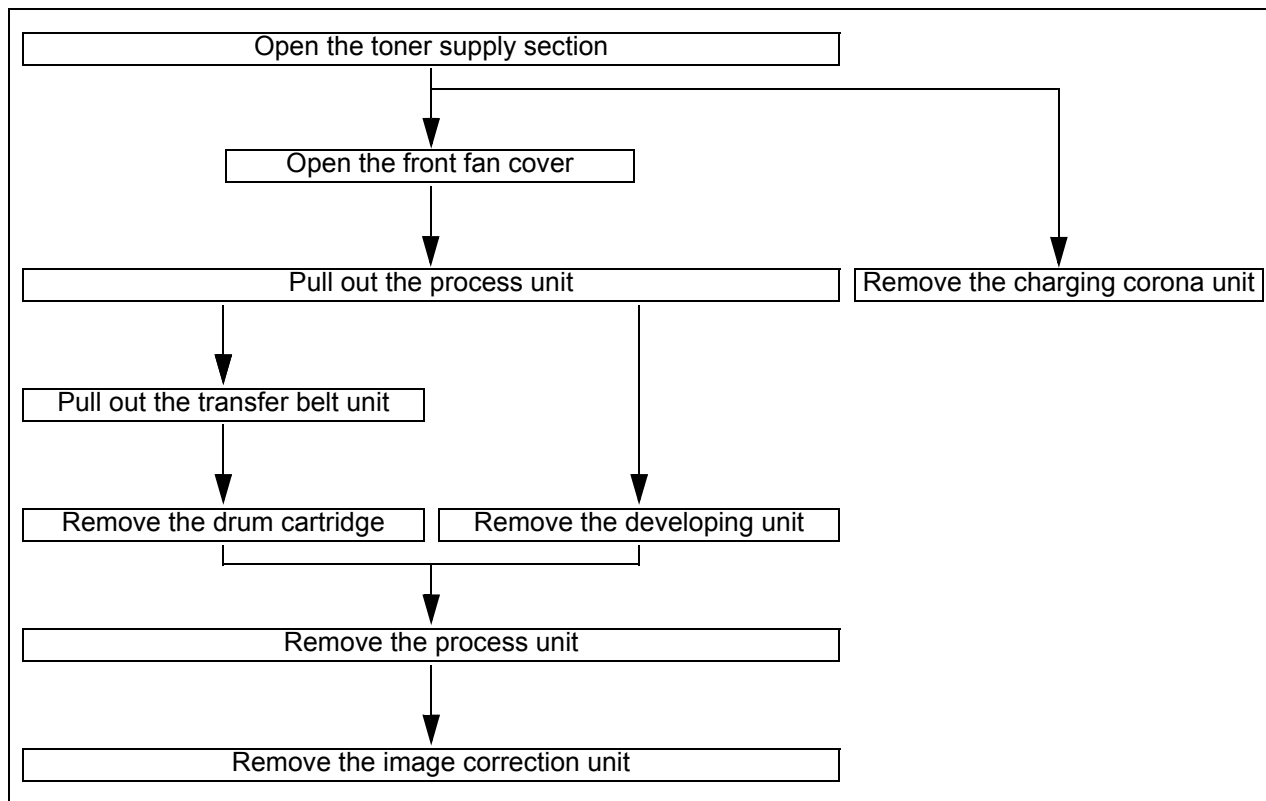
Note:

- The write units C, M and Y are all common.
- The bottom of the write units C, M and Y is provided with a wire tension spring [1] which differentiates these three write units from the write unit K.
- Be careful not install any other write unit in the installation place for the write unit K.



4. PROCESS UNIT

4.1 Flow of the disassembly of the process unit section



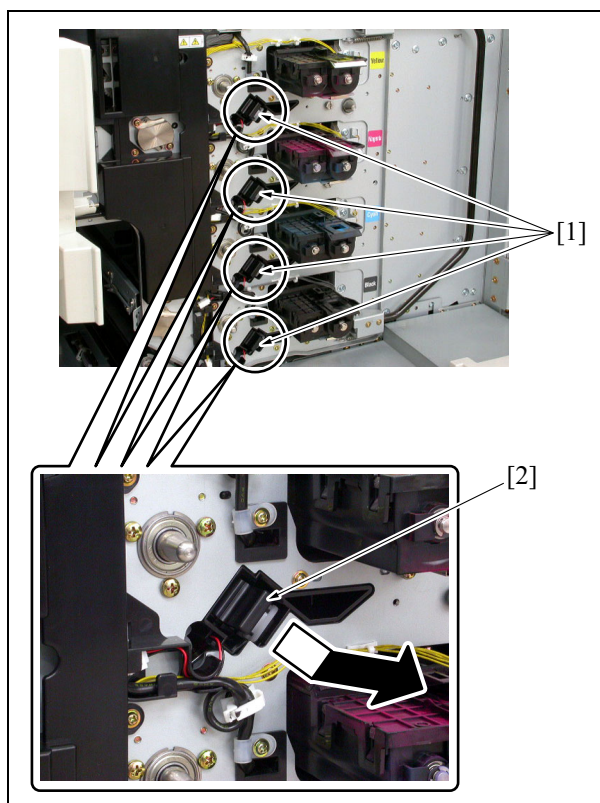
4.2 Cleaning the charging corona unit

A. Procedure

Note:

- The charging corona units are provided for the four colors of yellow, magenta, cyan and black. These units are common. Do not reuse a charging corona unit that was once used for another color since it has been stuck with the toner of the other color.

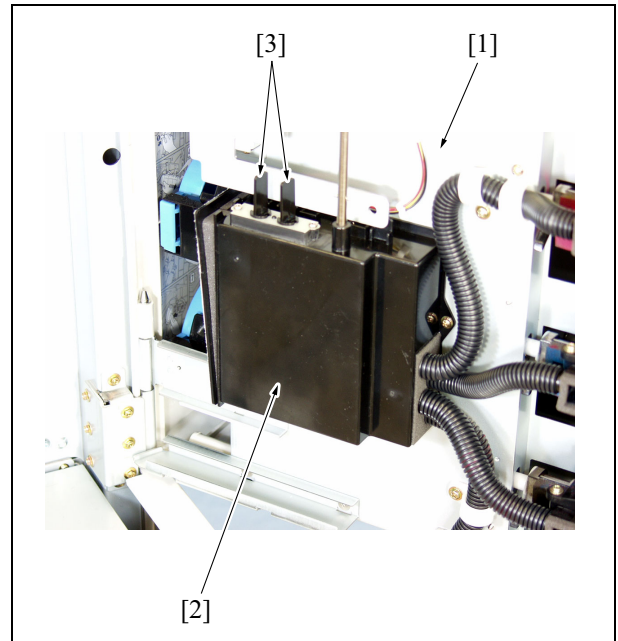
1. Open the toner supply section. (See "[5.1 Opening and closing the toner supply section](#).")
2. With the lever [2] of the charging corona unit [1] pressed down once to the lower right side, pull out the charging corona unit this side for removal.



3. Remove a charging cleaning block [3] from the charging suction assembly [2] provided on the outside of the toner supply unit [1].

Note:

- There are two charging cleaning blocks provided on the toner supply kit. Be sure to use either of these two blocks when cleaning the charging corona.

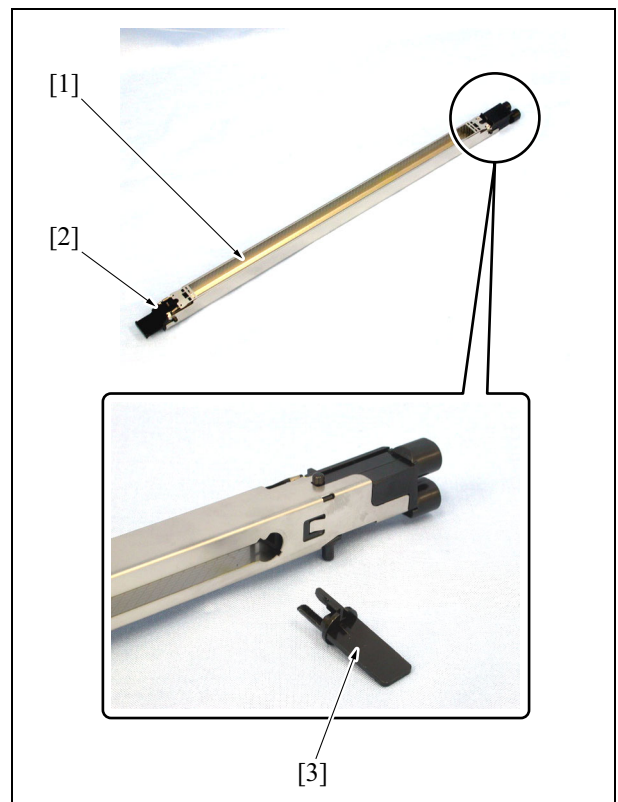


4. Holding the charging corona unit [2] so that the charging grid plate [1] comes up, set the charging cleaning block [3] to the notch and insert it from under the bottom on the rear side, and turn it about 45° clockwise.

Note:

- If the charging wire is cleaned with the charging grid plate facing down, there is a risk that dust that has stuck to the charging wire sticks to the charging grid plate. So, when cleaning the charging wire, be sure to hold the charging corona unit so that the charging grid plate comes upward.

5. Clean the charging wire [4] by sliding back and forth the charging cleaning block [3] 65AA -251 0KC.
6. Reinstall the above parts following the removal steps in reverse.



4.3 Cleaning / replacing, removing and reinstalling the charging wire assembly / the charging grid plate

A. Periodically replaced parts/cycle

- Charging wire assy: Every 100,000 copies
- Charging grid plate: Every 200,000 copies
- Charging grid spring: Every 200,000 copies

Note:

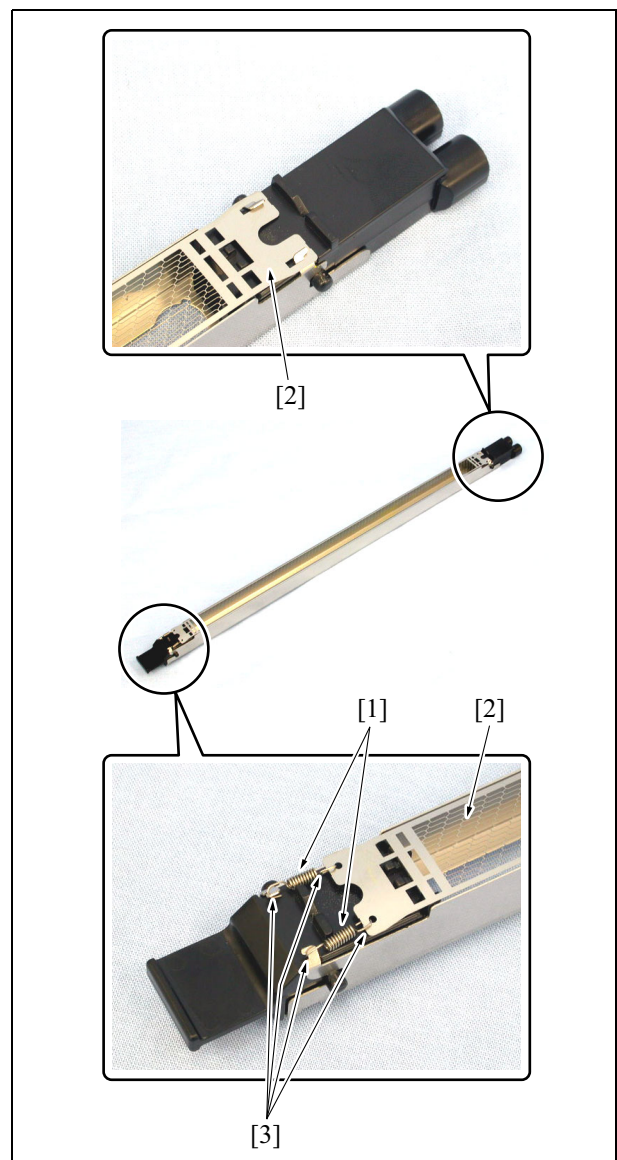
- The charging corona unit is made up of a charging wire assembly, charging grid plate and a charging grid spring.

B. Procedure

1. Remove the charging corona unit. (See "4.2 Cleaning and replacing the charging corona unit.")
2. Remove 2 charging grid springs [1] and then remove the charging grid plate [2].
3. Clean the charging grid plate by blowing off dust with a blower brush.
4. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to install the charging grid plate so that the side on which the charging grid spring is hooked comes to the front of the charging corona unit.
- Be sure to install each of the charging grid springs with its tips [3] of both ends point toward the charging wire.



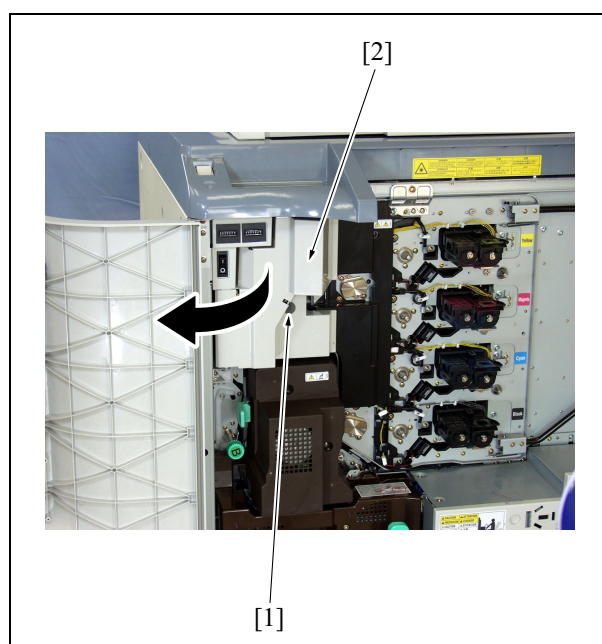
4.4 Pulling out the process unit

Note:

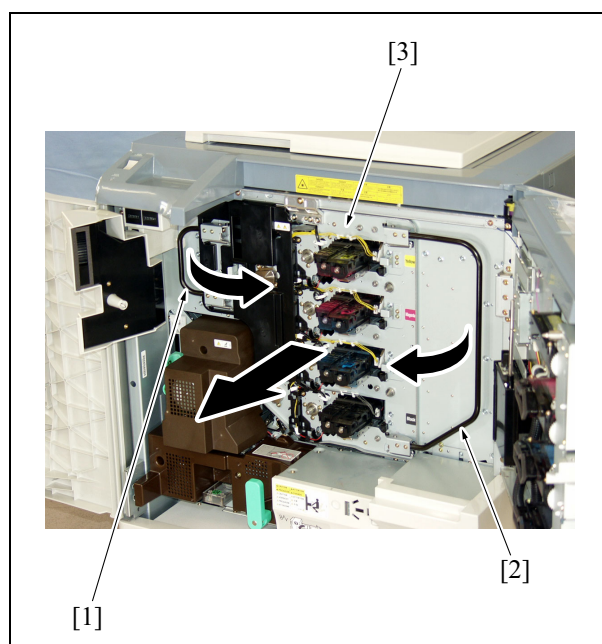
- In order to prevent the engine from falling over, the process unit and the ADU are provided with a safety mechanism so that they cannot be pulled out at the same time.
- If the ADU has been pulled out when pulling out the process unit, be sure to push it back into the engine.

A. Procedure

1. Open the toner supply section. (See "5.1 Opening and closing the toner supply section.")
2. Loosen the screw [1] and open the front fan cover [2].



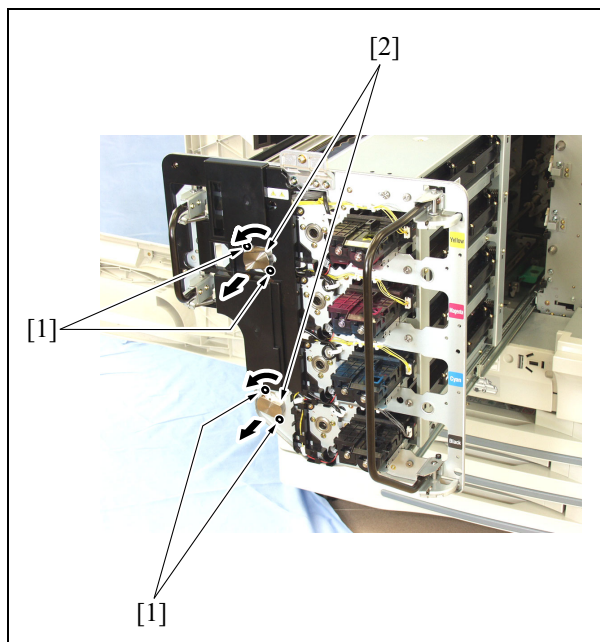
3. Bring down the stand handle L [1] and the stand handle R [2] to the inside at the same time to release the fixing of the process unit [3]. Then, hold each of the stand handles to pull out the process unit [3].
4. Reinstall the above parts following the removal steps in reverse.



4.5 Removing and reinstalling the transfer belt unit

A. Procedure

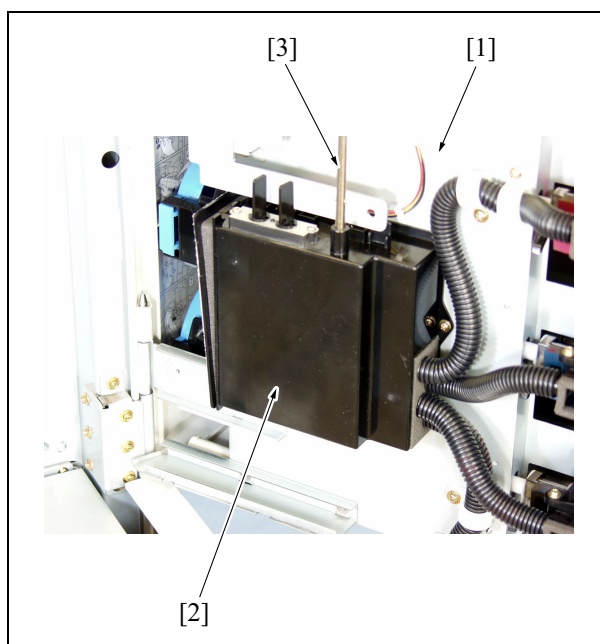
1. Pull out the process unit. (See "4.4 Pulling out the process unit.")
2. Loosen the screws [1], 2 each.
3. After turning once the belt positioning shaft [2] counterclockwise, pull it out for removal.



4. Remove the supporting rod [3] from the charging corona suction assembly [2] provided on the inside of the toner supply unit [1].

Note:

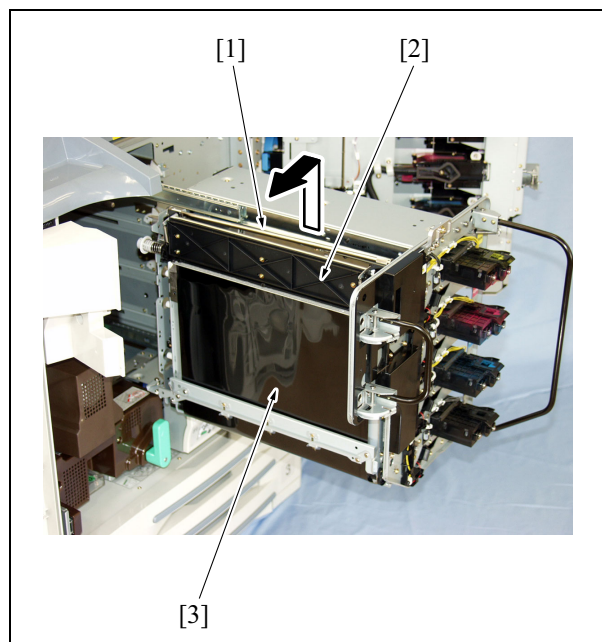
- The supporting rod is an auxiliary device to allow a removed transfer belt unit to self stand. When removing the transfer belt unit, be sure to make necessary arrangements in advance.



5. With the handle [1] raised up, remove the transfer belt unit [2].

Note:

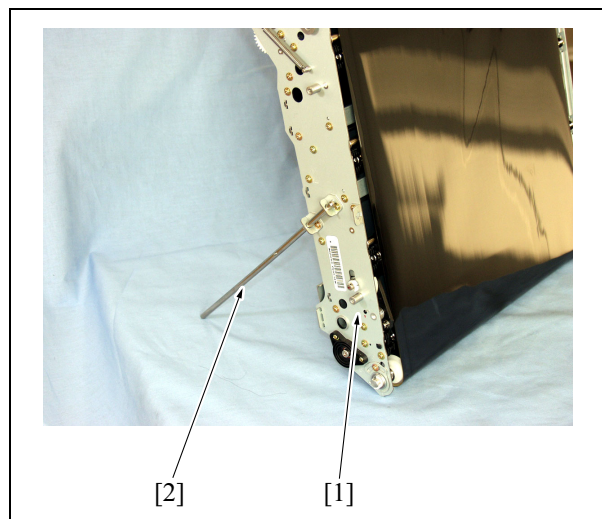
- Be careful not to touch and damage the transfer belt [3] with bare hands.
- Make sure to grab both ends of the handle of the transfer belt with both hands.



6. Set the supporting rod [2] to the transfer belt unit [1] to allow it to self stand.
7. Reinstall the above parts following the removal steps in reverse.

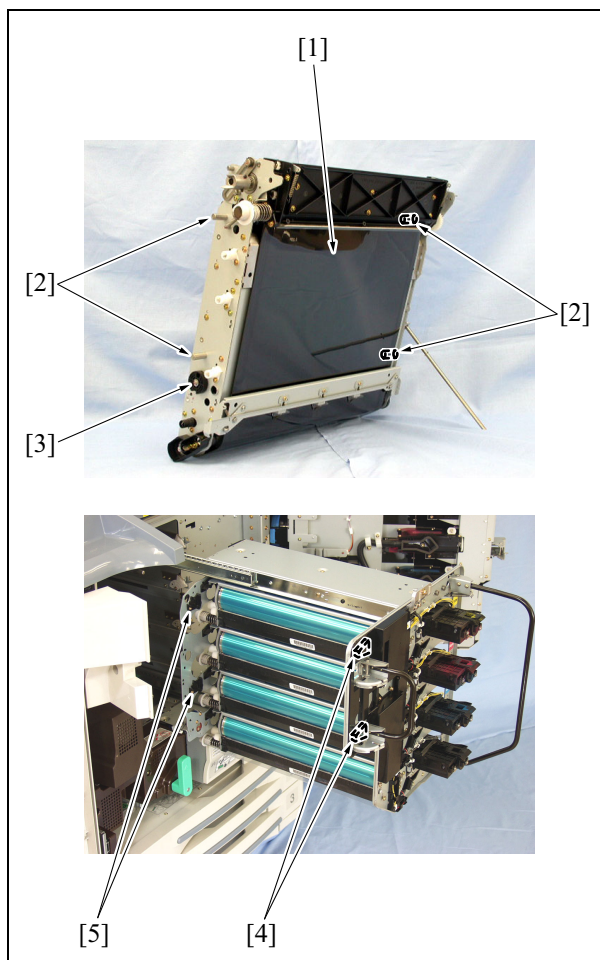
Note:

- Make sure not to touch and damage the transfer belt unit with the drum at installation.



Note:

- When reinstalling the transfer belt unit [1], be sure to turn the cam [3] clockwise fully until it will not turn any more before starting work.
- Be sure to install the transfer belt unit so that 2 transfer support blocks F [4] and the 2 transfer support blocks R [5] are accompanied with the guide pins [2] provided at two places each at front and rear.
- Be sure not to rotate the transfer belt when the transfer belt unit self stand with a supporting rod.



4.6 Replacing the belt cleaning brush unit

A. Periodically replaced parts/cycle

- Belt cleaning brush unit: Every 600,000 copies

B. Procedure

1. Remove the transfer belt unit. (See "4.5 Removing and reinstalling the transfer belt unit.")
2. Remove 2 screws [2] while holding the belt cleaning unit [1] by hand, and then remove the belt cleaning unit.
3. Replace the belt cleaning brush unit with a new one.
4. Reinstall the above parts following the removal steps in reverse.

Note:

- The belt cleaning unit is made up of the belt cleaning brush unit and the parts listed below. (For details of these parts, see "4.7 Replacing the belt cleaning blade" and "4.8 Replacing the toner collection sheet /1.")

Belt cleaning blade : 1 piece

Blade spring : 2 pieces

Stop ring : 2 pieces

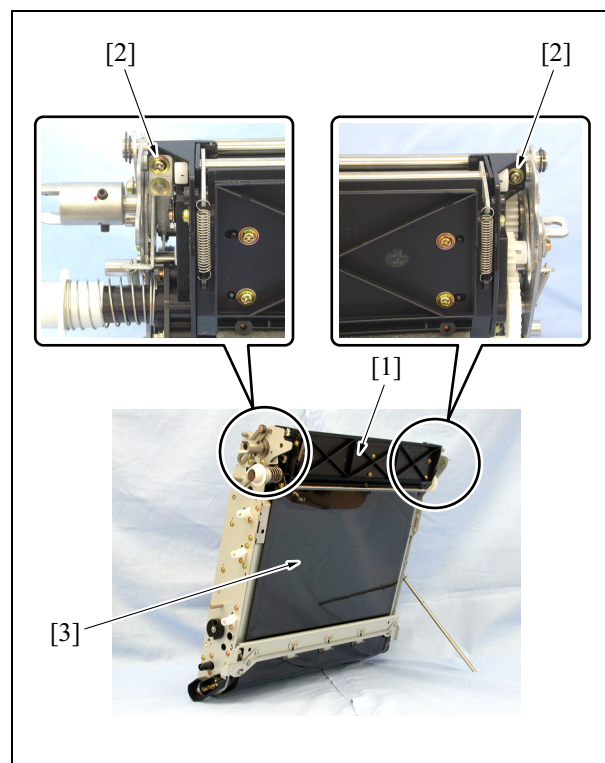
Blade fulcrum shaft : 1 piece

Toner collection sheet 1 : 1 piece

Toner collection sheet 2 : 1 piece

Screw : 3 pieces

- Before installing the belt cleaning unit, apply the setting powder on the portion [3] on the transfer belt.
- When reinstalling it, set the guide sections provided on both sides below the belt cleaning unit to the pins of the transfer belt unit, and then attach the screws.



4.7 Replacing the belt cleaning blade

A. Periodically replaced parts/cycle

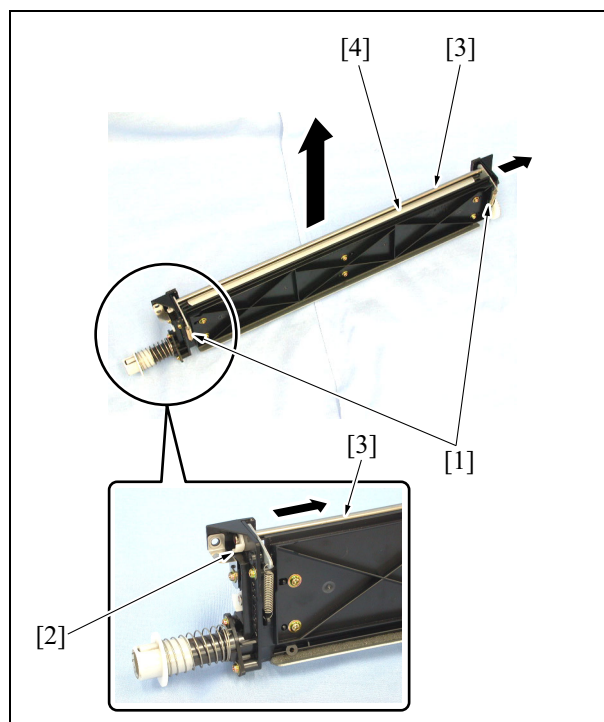
- Belt cleaning blade: Every 100,000 copies

B. Procedure

1. Remove the belt cleaning brush unit.
(See "4.6 Replacing the belt cleaning unit.")
2. Remove 2 blade springs [1].
3. After removing the stop ring [2], pull out the blade support shaft [3] and remove the belt cleaning blade [4].
4. Reinstall the above parts following the removal steps in reverse.

Note:

- Before installing the belt cleaning unit, apply the setting powder on the portion [3] on the transfer belt, shown in the previous page.



4.8 Replacing the toner collection sheet 1

A. Periodically replaced parts/cycle

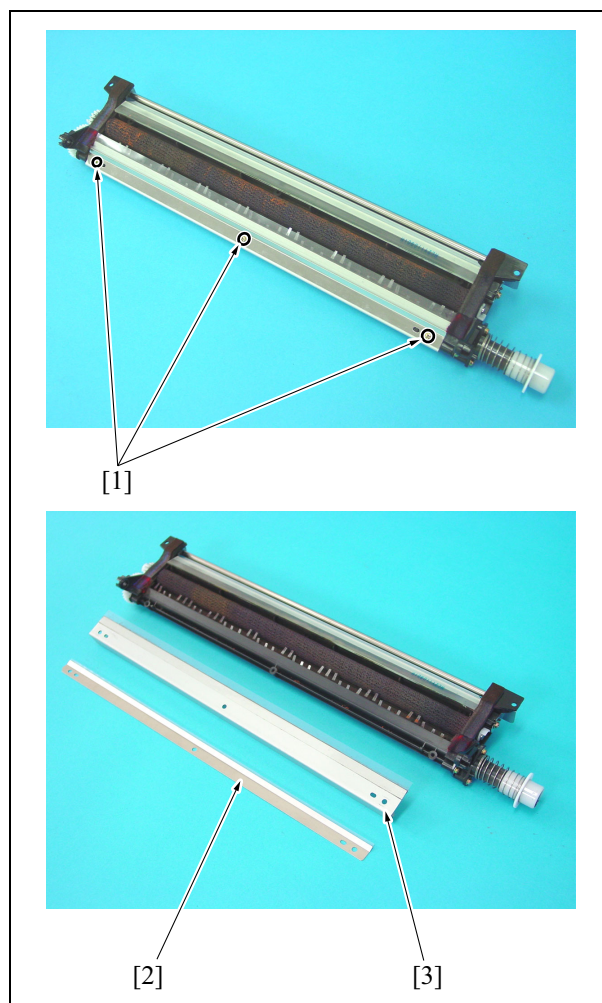
- Toner collection sheet 1: Every 200,000 copies

B. Procedure

1. Remove the belt cleaning brush unit (See "4.6 Replacing belt cleaning brush unit").
2. After removing 3 screws [1], remove the toner collection sheet 2 [2] and then remove the toner collection sheet 1 [3].
3. Reinstall the above parts following the removal steps in reverse.

Note:

- Be careful not to fold the PET sheet of the toner collection sheet 1, or damage it by hitting it on the edge.



4.9 Replacing the belt separation claw

A. Periodically replaced parts/cycle

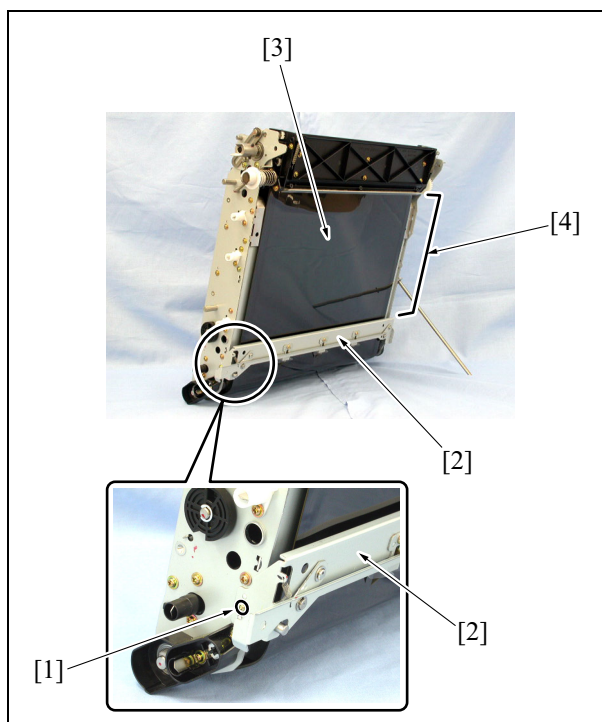
- Belt separation claw: Every 600,000 copies

B. Procedure

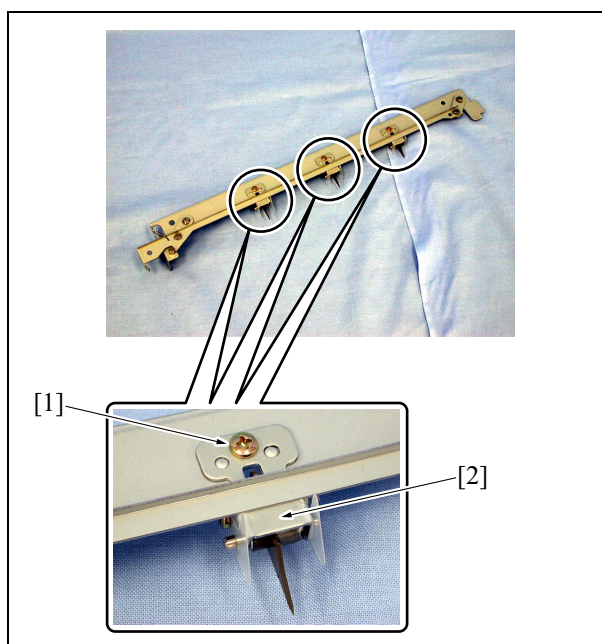
1. Remove the transfer belt unit. (See "4.5 Removing and reinstalling the transfer belt unit.")
2. Remove the screw [1] and then remove the separation claw unit [2].

Note:

- Be careful not to touch and/or damage the transfer belt [3] with bare hands.
- When reinstalling the separation claw unit, be sure to apply setting powder to the semicircle [4] of the transfer belt [3].



3. Remove the screws [1], one each, and then remove 3 transfer belt separation claws [2].
4. Reinstall the above parts following the removal steps in reverse.

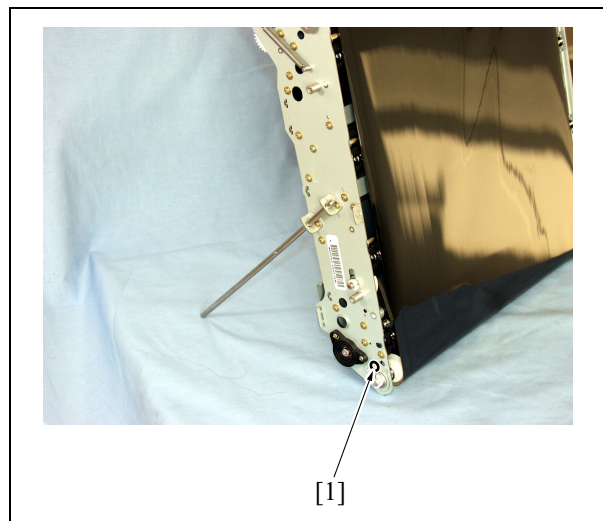


4.10 Replacing the transfer belt

A. Screw that must not be removed

Note:

- The screw [1] shown in the drawing below are not allowed to be removed. Be careful not to remove them.

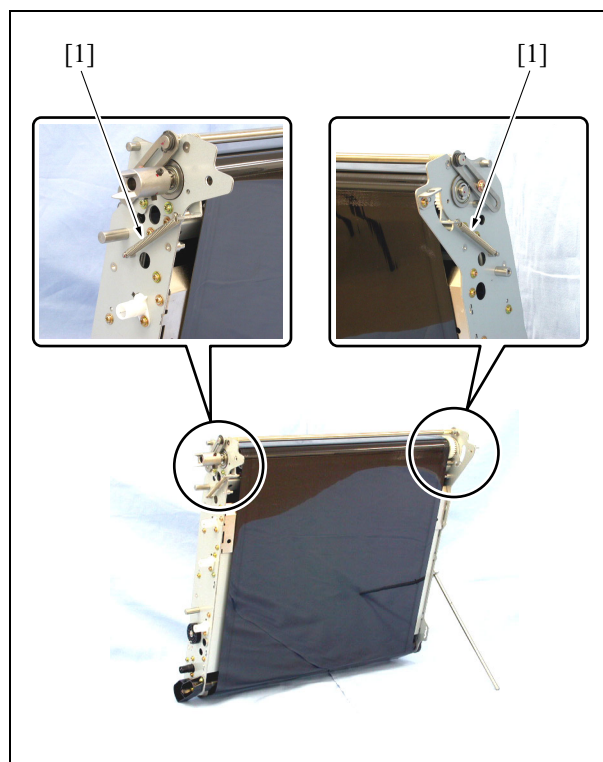


B. Periodically replaced parts/cycle

- Transfer belt: Every 200,000 copies

C. Procedure

1. Remove the transfer belt unit. (See "[4.5 Removing and reinstalling the transfer belt unit.](#)")
2. Remove the belt cleaning unit. (See "[4.6 Replacing the belt cleaning unit.](#)")
3. Remove the separation claw unit. (See "[4.9 Replacing the belt separation claw.](#)")
4. Remove 2 tension springs [1].



5. Stand up the transfer belt unit [1] by using the front side of the transfer belt unit [1] as the bottom.
6. Remove the screw [2] and release the fixing of the handle [3].
7. Remove 2 screws [4] and then remove the shaft stopper [5].
8. Remove the screw [6] and then remove the tension plate /R [7].

Note:

- When reinstalling the tension plate R, knock against the projection of the tension plate R.

9. Remove 2 screws [8] and then remove the high voltage supply curler R [9].
10. Remove the stop ring [10] and then remove the bearing [11].

Note:

- When reinstalling the stop ring, be sure to raise the shaft so that the stop ring is set in the groove of the shaft.

11. Pull up the transfer belt [12] for removal.

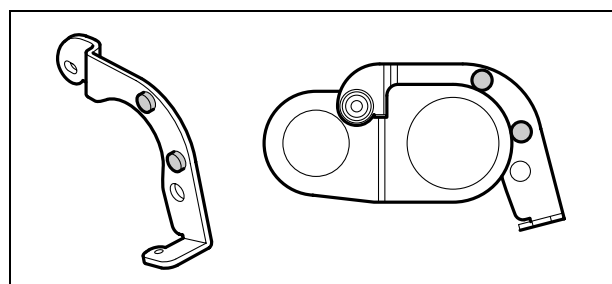
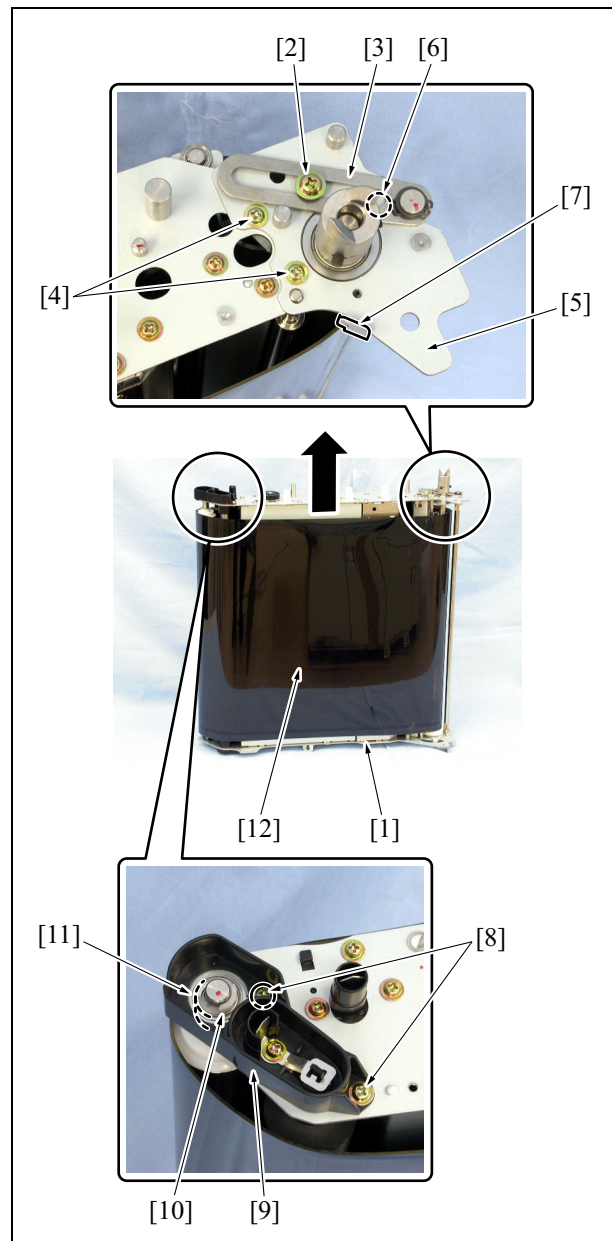
Note:

- Be sure to reinstall the transfer belt so that the rear side stamped with "UP SIDE" at the edge of the belt comes up.
- When holding the transfer belt by hand, hold it within 10mm from the upper end. Be careful not touch any part other than this.

12. Reinstall the above parts following the removal steps in reverse.

Note:

- Be careful not to touch and/or damage the transfer belt with bare hands.



4.11 Replacing the 1st transfer roller

A. Periodically replaced parts/cycle

- 1st transfer roller Y, M, C, K: Every 200,000 copies

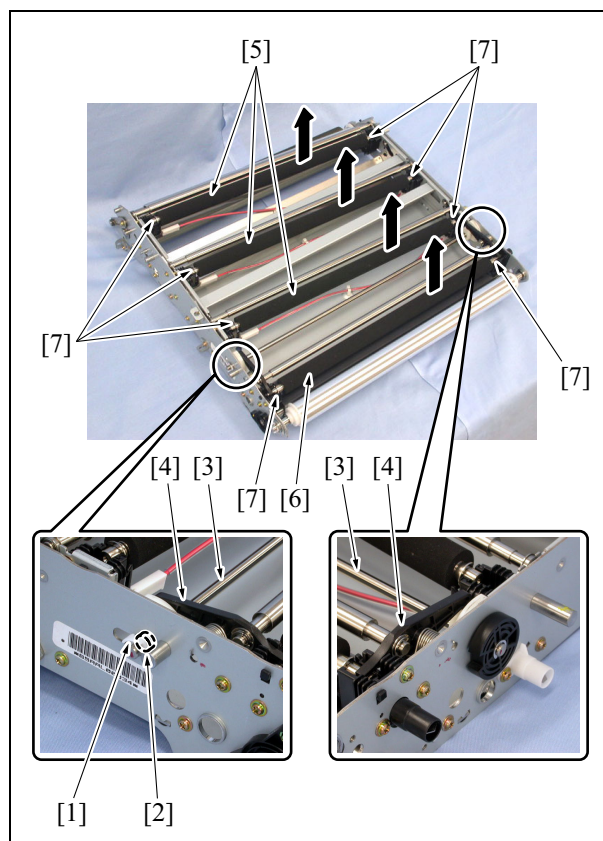
B. Procedure

1. Remove the transfer belt. (See "4.10 Replacing the transfer belt.")
2. Place the transfer belt unit as shown in the illustration.
3. Remove the stop ring [1].
4. After removing 1 bearing [2], slide the stopper /4 [3] to open the tip end of the transfer release arm [4].
5. Remove the 1st transfer roller K [6] while sliding it.
6. Remove three 1st transfer rollers Y, M, C [5].

Note:

- Be sure to reinstall the 1st transfer roller so that a shallow groove near the groove of the E-ring comes this side.

7. Remove the E-rings [7], 2 each, from each of the 1st transfer rollers.
8. Reinstall the above parts following the removal steps in reverse.



4.12 Replacing the 2nd transfer roller U

A. Periodically replaced parts/cycle

- 2nd transfer roller U: Every 200,000 copies

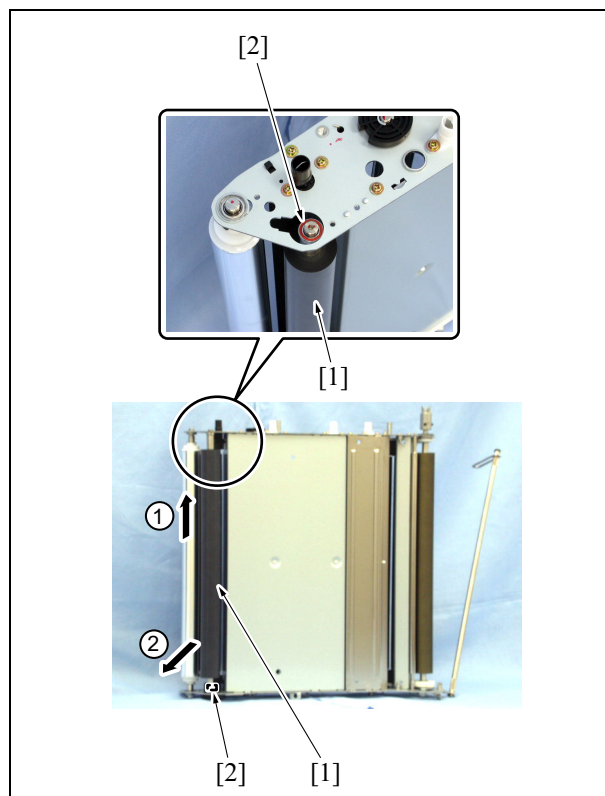
B. Procedure

1. Remove the transfer belt. (See "[4.10 Replacing the transfer belt.](#)")
2. After raising the 2nd transfer roller U [1] once, remove it diagonally from the lower side.

Note:

- The fixing of the 2nd transfer roller U was released when the transfer belt was removed at the time of the removal of the high voltage supply curler.
- Be sure to reinstall the 2nd transfer roller U so that the shaft end with a dent comes to the bottom.

3. Remove 2 bearings [2] from the 2nd transfer roller U [1].
4. Reinstall the above parts following the removal steps in reverse.



4.13 Replacing the drum cartridge

A. Periodically replaced parts/cycle

- Drum cartridge: Every 100,000 copies

B. Procedure

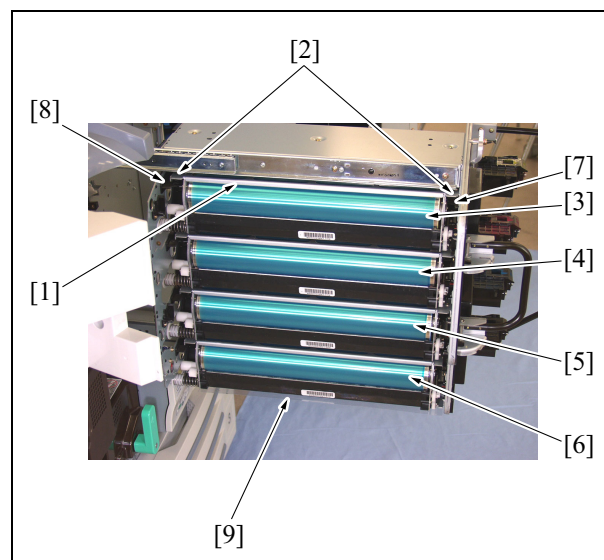
Note:

- The drum cartridges are provided for the four colors of yellow, magenta, cyan and black, and they are all common. However, be sure to avoid reusing a drum cartridge that was once used for a different color since it has been stuck with the toner of that color.

1. Remove the transfer belt unit. (See "4.5 Removing and reinstalling the transfer belt unit.")
2. After raising once both ends [2] of the drum stay U [1], hold them and remove the drum cartridge Y [3].
3. Remove the drum cartridge M [4], drum cartridge C [5] and the drum cartridge K [6] in the same manner as in Step 2.
4. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling each drum cartridge, be sure to check if both ends of the cartridge have been dropped into the grooves of the drum installation blocks F [7] and R [8]. (The drum installation blocks F [7] and R [8] are for yellow drum cartridges. Repeat the steps for other cartridges in the same manner.)
- When reinstalling the drum cartridge K [6], be careful that the mylar [9] is not caught up.
- Be careful not touch and damage the photo-sensitive material of the drum with bare hands.
- When the drum cartridge is not used for a long period of time, be sure to store it in the dark place with a cover on it (to shield the light).

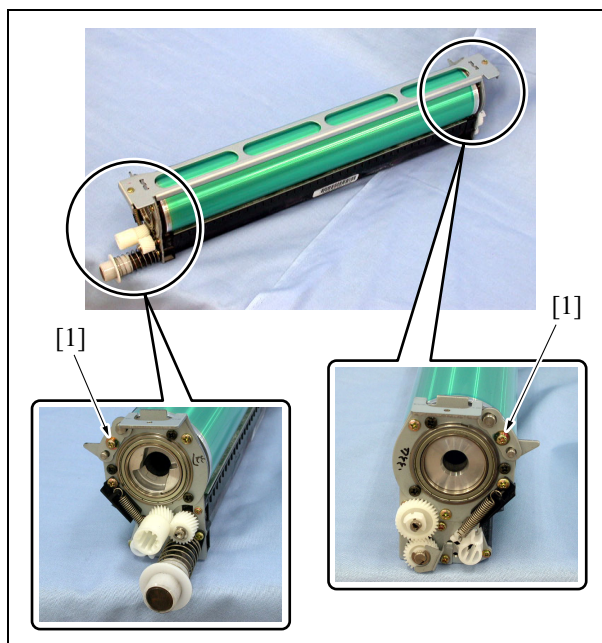


4.14 Removing and reinstalling the drum

A. Screw that must not be removed

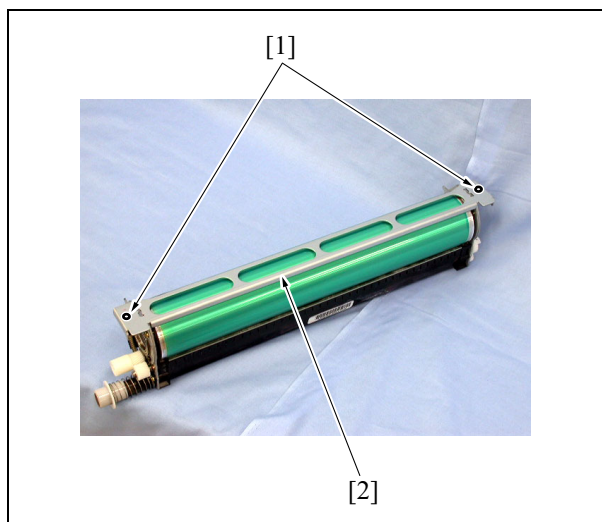
Note:

- Screws that are paint locked are not allowed to be removed. Be careful not to remove them at all costs. [1]



B. Procedure

1. Remove the drum cartridge. (See "4.13 Replacing the drum cartridge.")
2. Remove 2 screws [1] and then remove the drum stay U [2].

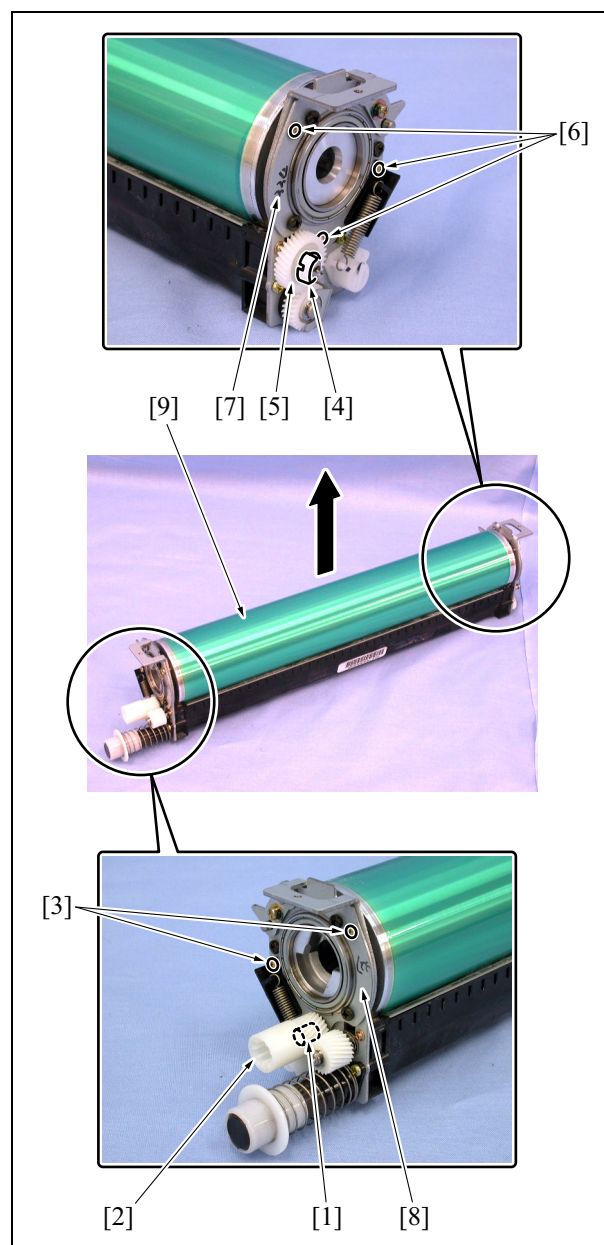


3. Remove the coupling shaft A [1] and then remove the coupling /A [2].
4. Remove 2 screws [3].
5. Remove the position adjusting plate R [8].
6. Remove the stop ring [4] and then remove the screw idler gear [5].
7. Remove 3 screws [6] (be careful not to remove black screw.).
8. Remove the position adjusting plate F [7].
9. Hold both ends of the drum [9] and raise it up for removal.

Note:

- Be sure to reinstall the drum so that the coupling side of the drum flange comes to the rear side of the drum cartridge.

10. Reinstall the above parts following the removal steps in reverse.



4.15 Replacing the developing unit

A. Periodically replaced parts/cycle

- Developing unit: Every 600,000 copies

B. Procedure

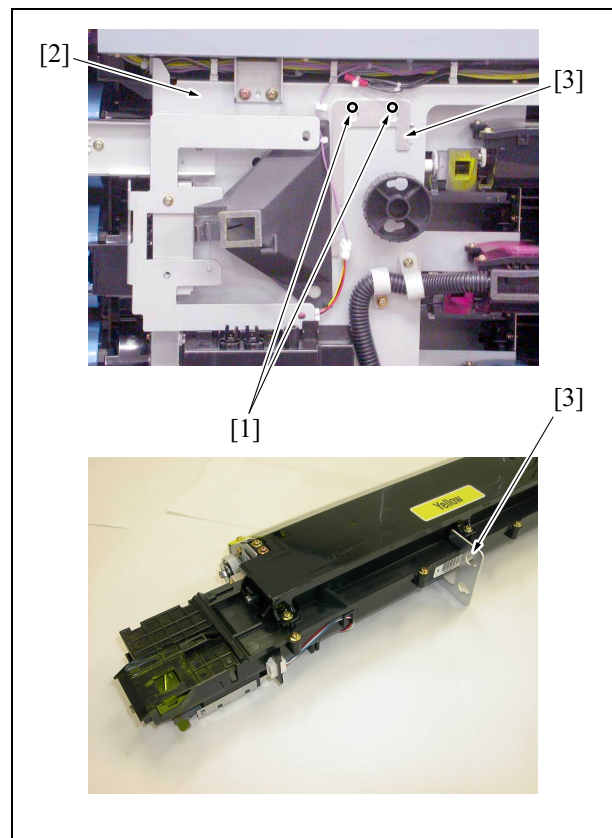
Note:

- Be careful not to fold the Teflon sheet posted at the developing sleeve side of the developing unit upper cover.
- When cleaning the developing unit, be sure to use Hydro-Wipe which is specified as a CE tool. Using paper or cloth other than Hydro-Wipe will cause the developing regulation plate in the developing unit to be stuck with dust and lint of the paper or cloth, thus resulting in white streaks on the images.
- The developing units are provided for the four colors of yellow, magenta, cyan and black, and they are all common. However, be sure to avoid reusing a developing unit that was once used for a different color since it has been stuck with the toner of that color.

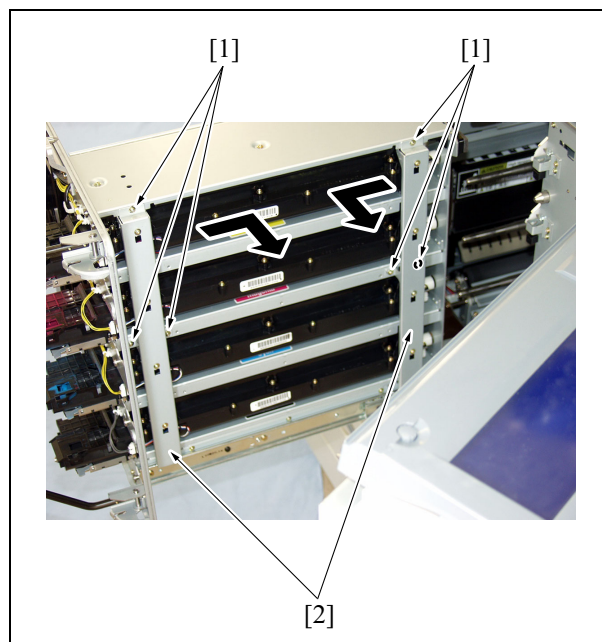
1. Open the toner supply section. (See "[5.1 Opening and closing the toner supply section.](#)")
2. Remove 2 screws [1] and then remove 4 developing support legs [3] provided inside the toner supply unit [2].

Note:

- When placing the developing unit by itself, be sure to set the developing support legs to the body of the developing unit as a seat to prevent the toner bristles section from getting in touch with other sections.
3. Pull out the process unit. (See "[4.4 Pulling out the process unit.](#)")



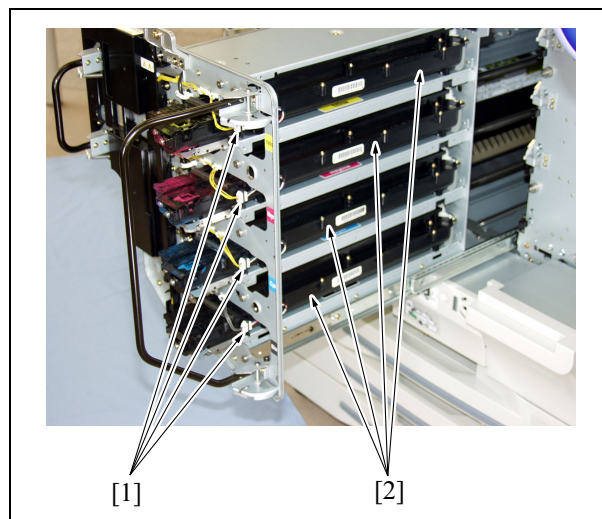
4. Remove the screws [1], 3 each, and then remove 2 developing pressing blocks [2] while sliding the upper side of the developing pressing blocks.



5. Remove the relay connectors [1], 1 each, and then remove 4 developing units [2] one at a time.
6. Reinstall the above parts following the removal steps in reverse. Place an appropriate color label supplied with the developing unit on the new unit.

Note:

- Be careful not to open the developing unit cover.



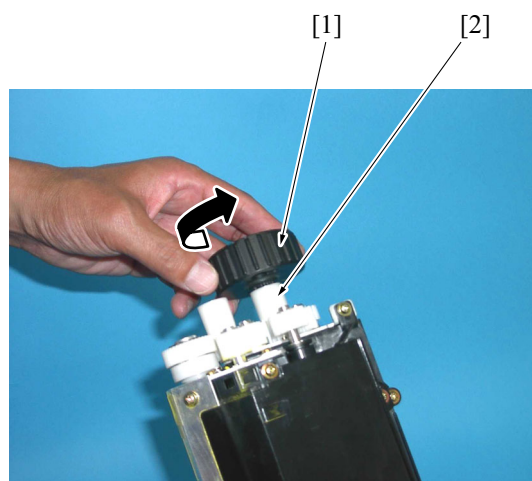
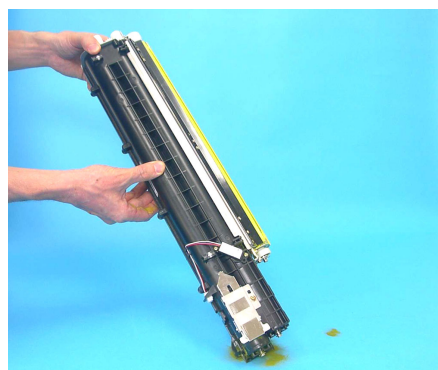
4.16 Replacing the developer

A. Periodically replaced parts/cycle

- Developer: Every 100,000 copies

B. Procedure

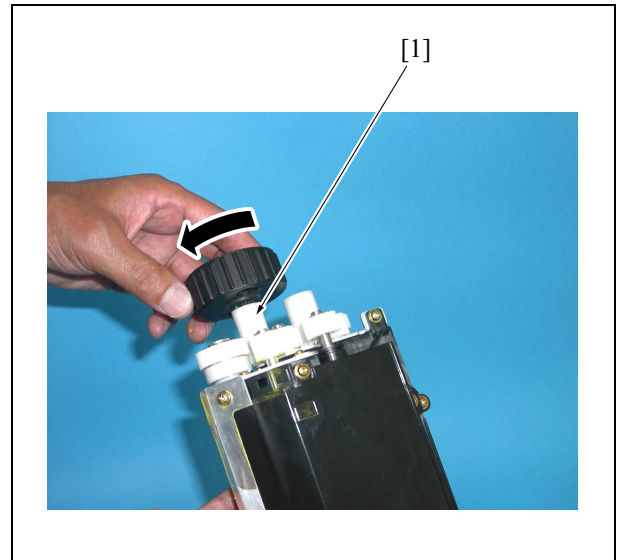
1. Remove the developing unit. (See "4.15 Replacing the developing unit.")
2. Put the developing unit [1] on end and rotate its upper end in drawing an arc to discharge developer. After discharging the developer, repeat Steps 3 and 4 below to discharge all of the developer.
3. Install the rotating jig [1] provided inside the toner supply unit to the coupling [2] on the agitator screw side and turn it in the arrow-marked direction.



4. Install the rotating jig to the coupling [1] on the developing sleeve side and turn it in the arrow-marked direction.

Note:

- If the jig is turned in the reverse direction, it sometimes occurs that the developer is not discharged completely. Be careful not to turn it in the reverse direction.
5. Charge a new developer. (See "7. 36 mode," "I. Adjustment" in Field Service Handbook.)



4.17 Replacing the belt separation claw solenoid

A. Periodically replaced parts/cycle

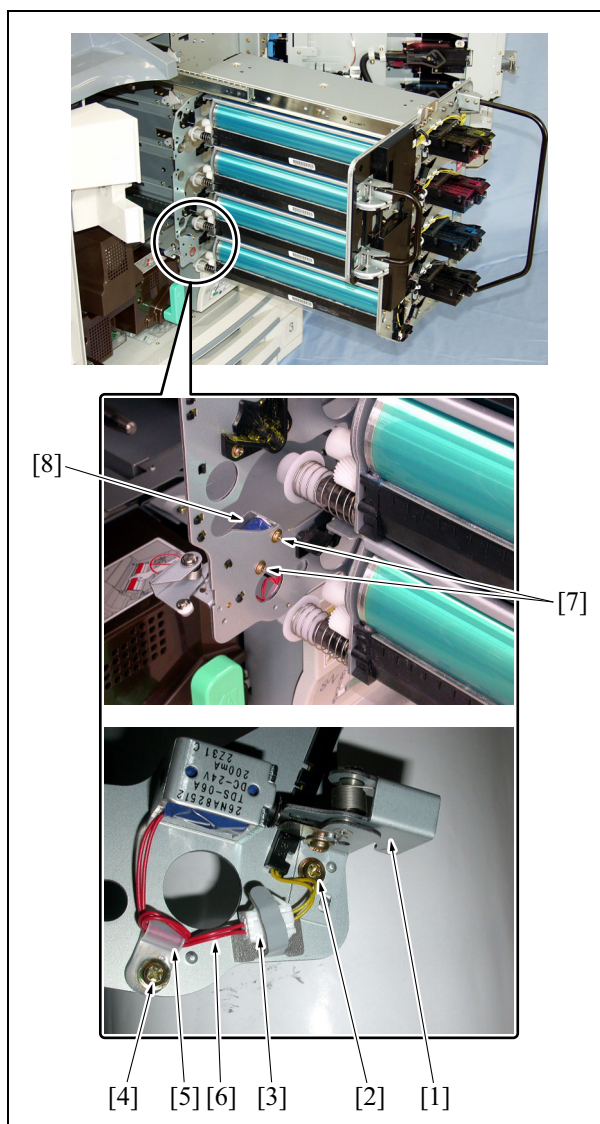
- Developer: Every 1,500,000 copies

B. Procedure

1. Remove the transfer belt unit. (See "4.5 Removing and reinstalling the transfer belt unit.")
2. Remove the screw [1] and then remove the solenoid lever [2].
3. Remove the relay connector [3].
4. Remove the screw [4] and release the cable [6] from the cable clamp [5].
5. Remove 2 screws [7] and then remove the SD1 (belt separation claw solenoid) [8].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- When having reinstalled the solenoid bar, check to see if the shaft [9] of SD1 (belt separation claw solenoid) moves smoothly while sliding it.



4.18 Removing and reinstalling the process unit

A. Procedure

1. Remove the transfer belt unit. (See "4.5 Removing and reinstalling the transfer belt unit.")
2. Remove all of the drum cartridges. (See "4.13 Replacing the drum cartridge.")
3. Remove all of the developing units. (See "4.15 Replacing the developing unit.")
4. Remove the screws [1], 2 each.

Note:

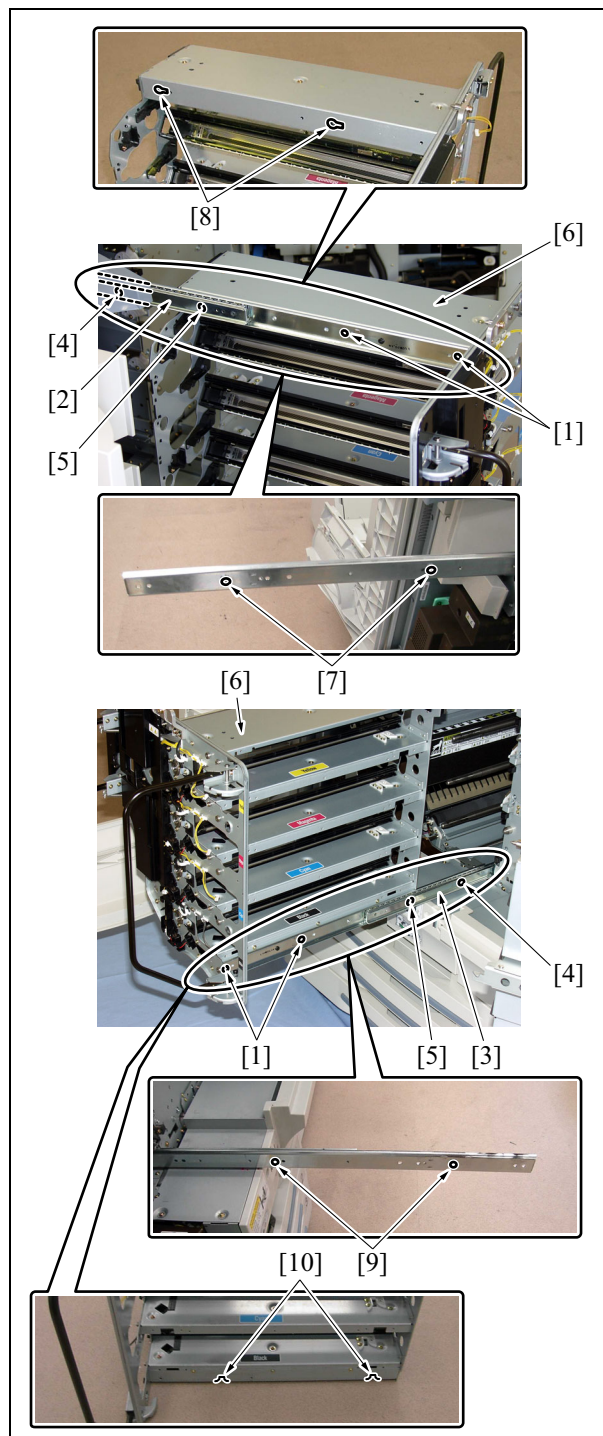
- When removing the process unit, be sure to remove in advance the transfer belt unit, drum cartridge and the developing unit.
- Be careful not to remove black screws.

5. Push back the process unit [6] until it becomes possible to see the screw [5] through each hole [4] of the guide rails L [2] and R [3].
6. Remove the screws [5], 1 each.

Note:

- Be careful not to remove black screws.

7. Pull out the process unit [6] again. Then remove it from the guide rails L [2] and R [3] as explained below:
The projection [7] on the guide rail L is set into the notch [8] of the process unit. The notch [10] of the process unit is placed on the projection [9] on the guide rail R. Accordingly, slide the guide rail L a little against the process unit to remove it from the guide rail L, and then remove it from the guide rail R by raising the process unit.
8. Reinstall the above parts following the removal steps in reverse.



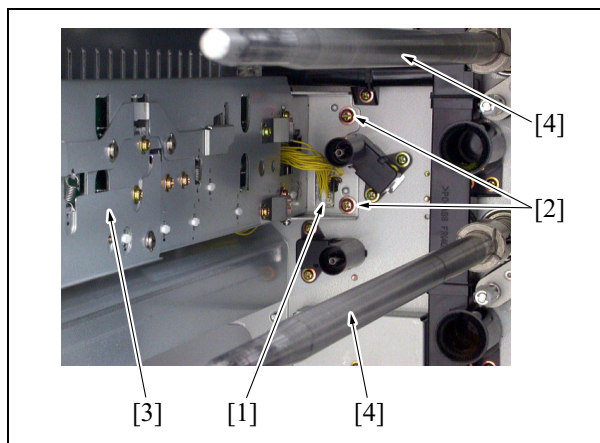
4.19 Removing and reinstalling the image correction unit

A. Procedure

1. Remove the process unit. (See "4.18 Removing and reinstalling the process unit.")
2. Remove a relay connector [1].
3. Remove 2 screws and then remove the image correction unit [3].
4. Reinstall the above parts following the removal steps in reverse.

Note:

- When removing the image correction unit, be sure to remove in advance the process unit.
- When removing the image correction unit, be careful not to touch the drum drive shaft [4] of each color. Otherwise, this may cause stress to it.



5. TONER SUPPLY

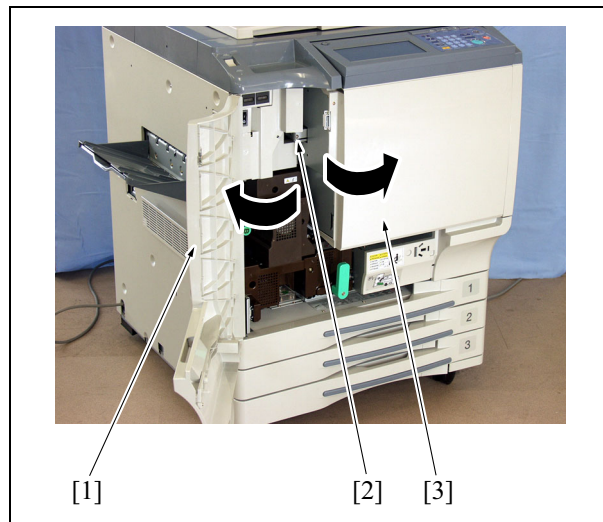
5.1 Opening and closing the toner supply section

A. Procedure

1. Open the front door [1].
2. Loosen the screw [2] and open the toner supply section [3].

Note:

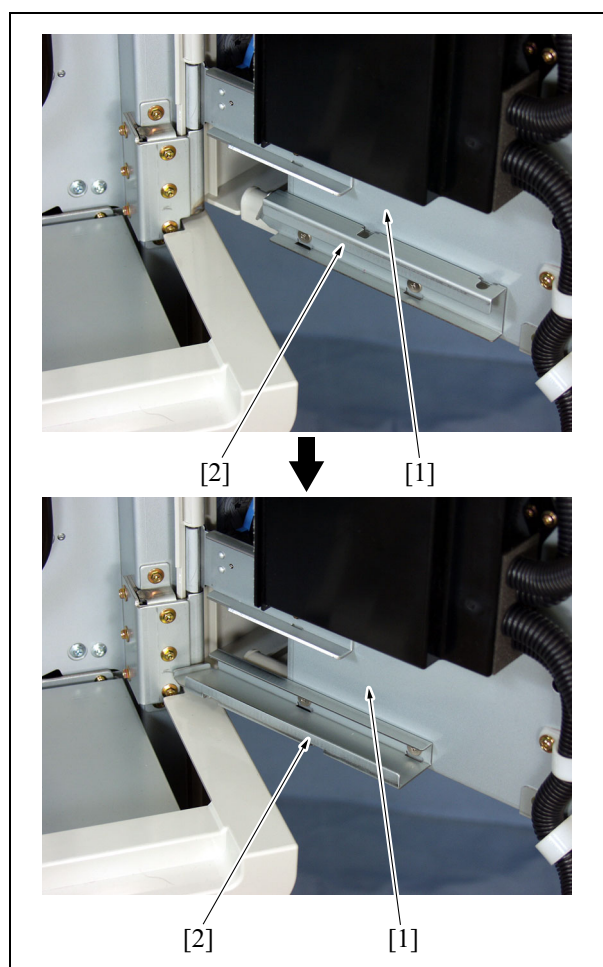
- With the toner supply section left open, be sure not to apply force to the toner supply sections such as the operation board. If applied, the hinge of the toner supply section may be deformed.
- When closing the toner supply section, tighten the screw with a hand before using a driver to prevent stripping the thread.



3. Remove once the door lock [2] provided on the inside of the toner supply unit [1] and replace it at a new position where it becomes a stopper.
4. Close the front door following the steps for opening in reverse order.

Note:

- When the toner supply section is opened, be sure to replace the door lock to a new position where it becomes a stopper and prevent it from getting in touch with the process unit when being pulled out.



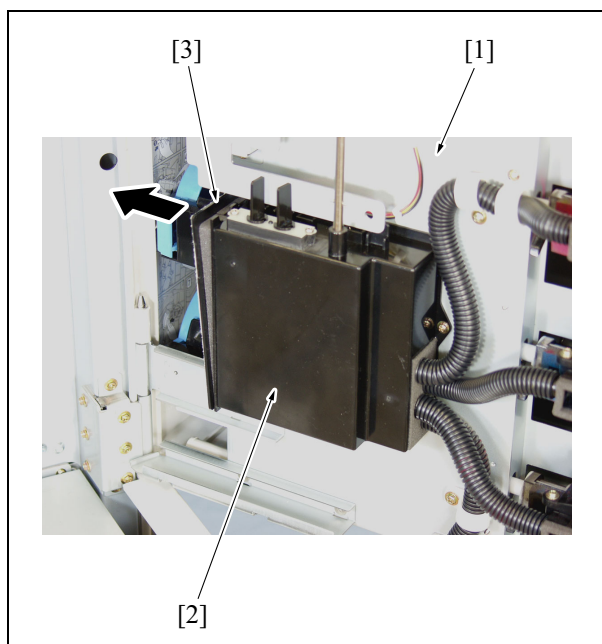
5.2 Replacing the charging dust filter

A. Periodically replaced parts/cycle

- Charging dust filter: Every 600,000 copies

B. Procedure

1. Open the toner supply section. (See "[5.1 Opening and closing the toner supply section.](#)")
2. Remove the charging dust filter [3] from the charging suction assembly [2] provided on the inside of the toner supply section [1].
3. Reinstall the above parts following the removal steps in reverse.



6. PAPER FEED TRAYS 1 to 3

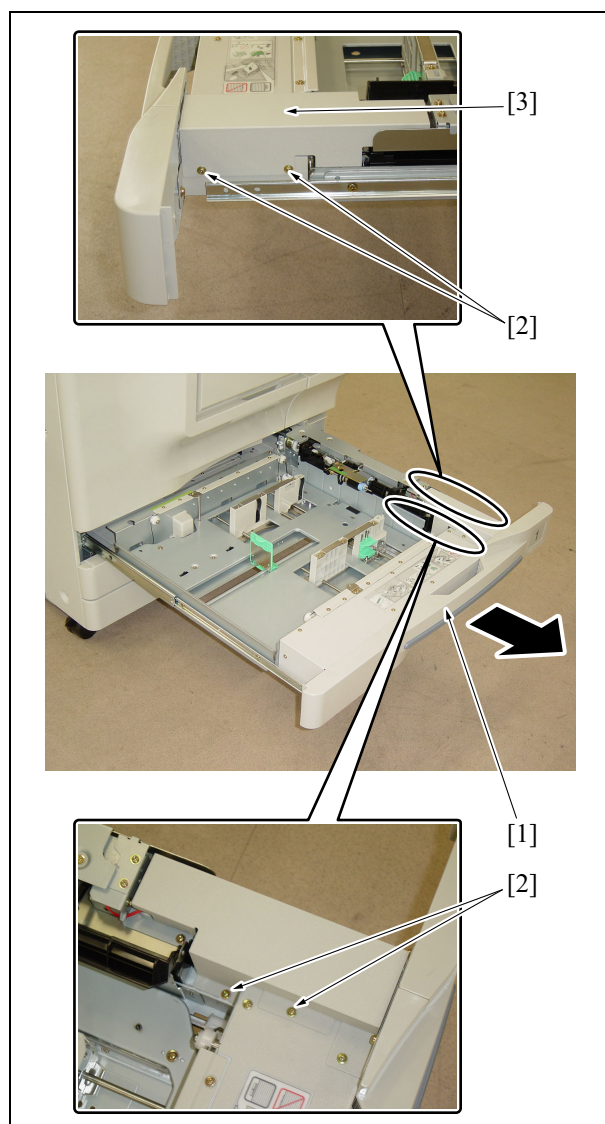
6.1 Removing and reinstalling the paper feed unit

A. Procedure

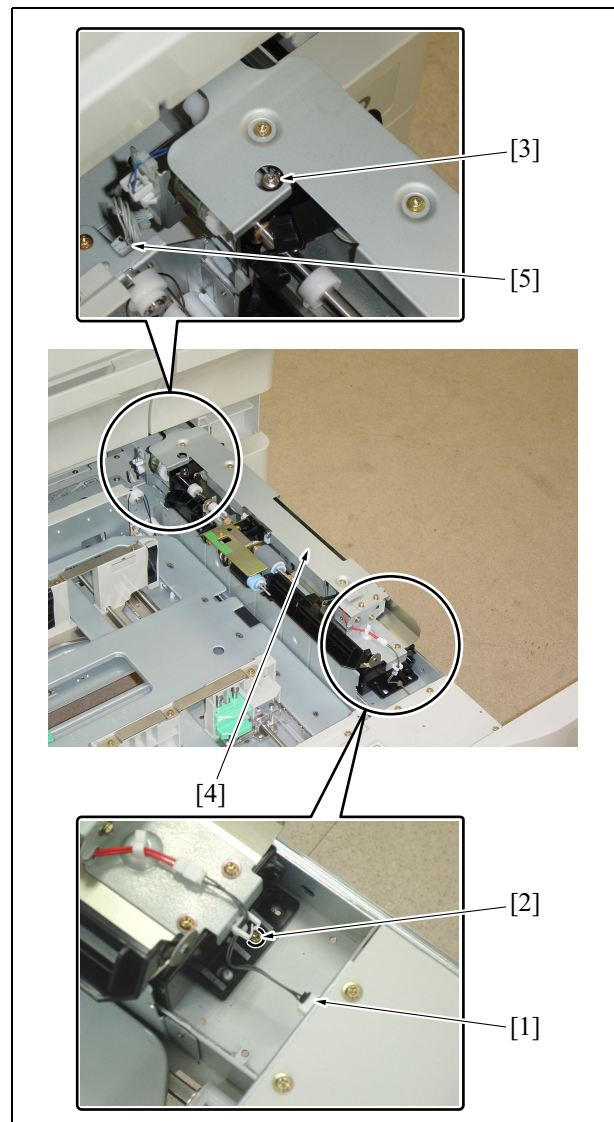
Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

1. Pull out the paper feed tray 1 [1].
2. Remove 4 screws [2] and then remove the paper feed unit cover [3].



3. Remove the connector [1].
4. Remove a screw [2] and loosen a hold-down shaft screw [3].
5. After sliding the paper feed unit [4] to the rear side, lift it up. Remove the connector [5] and then remove the paper feed unit [4].
6. Reinstall the above parts following the removal steps in reverse.



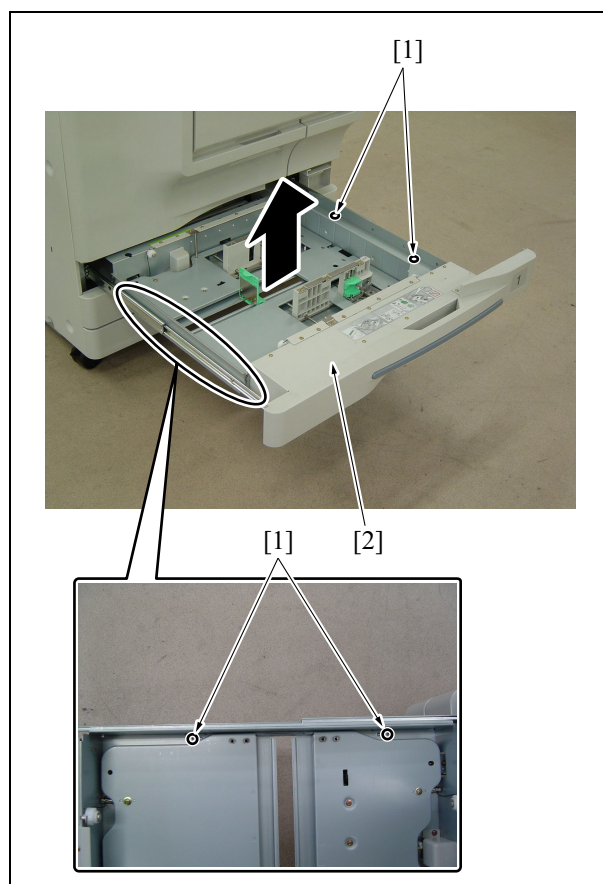
6.2 Removing and reinstalling the paper feed trays 1 to 3

A. Procedure

Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

1. Pull out the paper feed tray 1.
2. Remove the paper feed unit.
3. Remove 4 screws [1] and lift up the paper feed tray 1 [2] for removal.
4. Reinstall the above parts following the removal steps in reverse.



6.3 Replacing the paper feed roller and the feed rubber

A. Periodically replaced parts/cycle

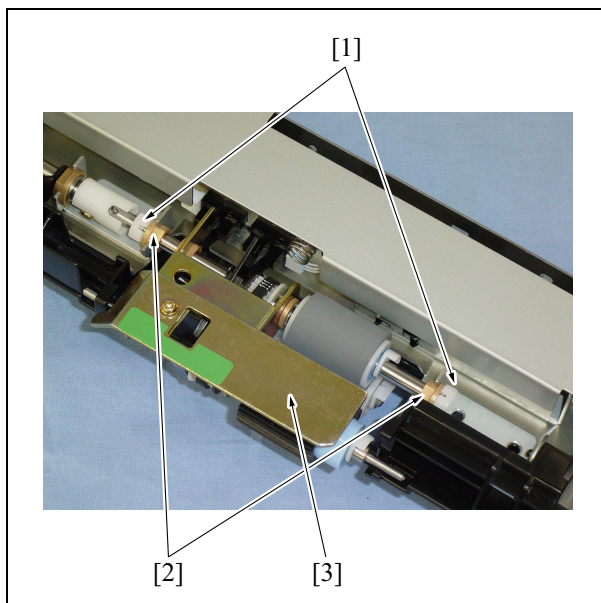
- Paper feed roller: Every 2,500,000 copies (Every 800,000 copies in actual replacement count)
- Feed rubber: Every 400,000 copies (Every 125,000 copies in actual replacement count)

B. Procedure

Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

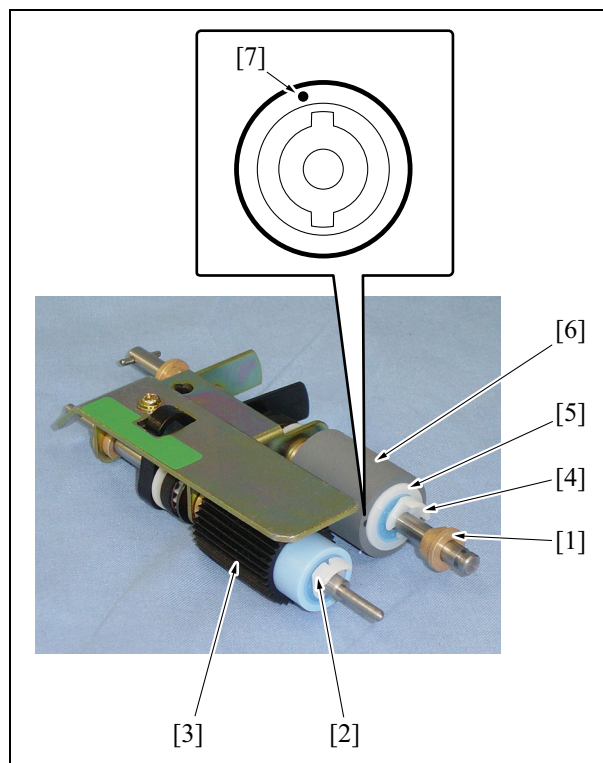
1. Pull out the paper feed tray 1.
2. Remove the paper feed unit.
3. Remove 2 stop rings [1], slide 2 bearings [2] to the outside and then remove the paper feed roller assembly [3].



4. Remove a bearing [1].
5. Remove a stop ring [2] and then remove the paper feed roller [3].
6. Remove a stop ring [4] and then remove the feed roller [5].
7. Remove the feed rubber [6] from the feed roller [5].
8. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to install the feed rubber [6] so that the paint mark [7] turns in the arrow-marked direction.
- Be sure to check that each roller is not stuck with grease.



6.4 Replacing the double feed prevention rubber

A. Periodically replaced parts/cycle

- Double feed prevention rubber: Every 400,000 copies (Every 125,000 copies in actual replacement count)

B. Procedure

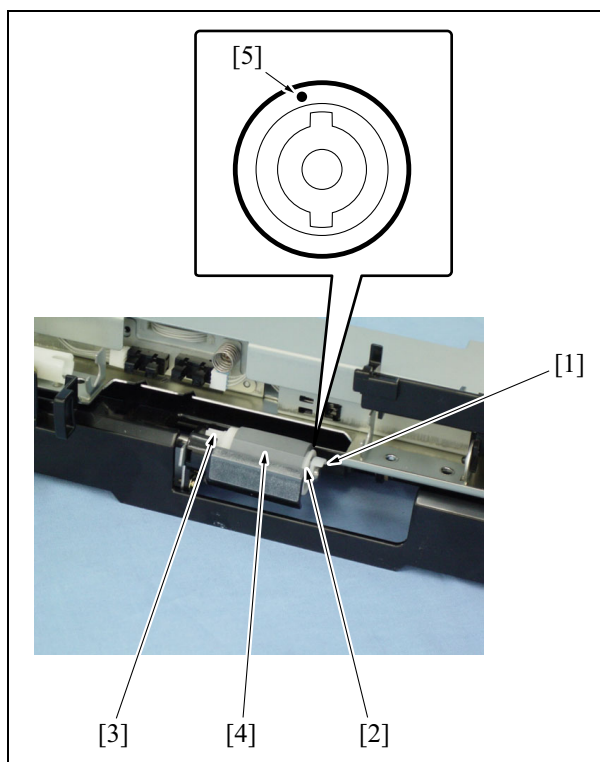
Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

1. Pull out the paper feed tray 1.
2. Remove the paper feed unit.
3. Remove the paper feed roller assembly.
4. Remove a stop ring [1] and then remove the double feed prevention roller [2].
5. Remove the gear [3] from the double feed prevention roller [2].
6. Remove the double feed prevention rubber [4] from the double feed prevention roller [2].
7. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to install the double feed prevention rubber [4] so that the paint mark [5] turns in the arrow-marked direction.
- Be sure to check that the double feed prevention roller is not stuck with grease.



6.5 Replacing the paper feed clutch and the pre-registration clutch

A. Periodically replaced parts/cycle

- Paper feed clutches 1 to 3 (MC7, MC9, MC11):
Every 4,000,000 copies (Every 2,000,000 copies in actual replacement count)
- Pre-registration clutches 1 to 3 (MC8, MC10, MC13): Every 4,000,000 copies (Every 2,000,000 copies in actual replacement count)

B. Procedure

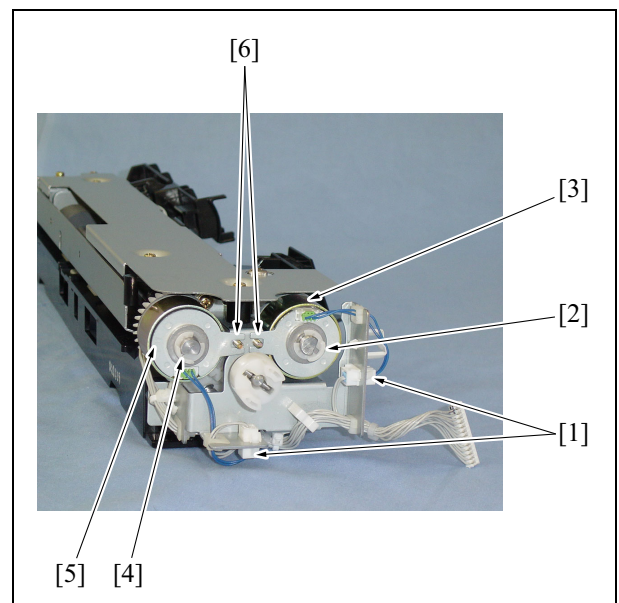
Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation her is made of the steps for the paper feed tray /1.

1. Pull out the paper feed tray 1.
2. Remove the paper feed unit.
3. Remove 2 connectors [1].
4. Remove a stop ring [2] and then remove the MC7 [3].
5. Remove a stop ring [4] and then remove the MC8 [5].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the clutches, be sure to check that the stopper [6] of each clutch is in the specified position.



6.6 Removing and reinstalling the tray up/down wire

Wire length:

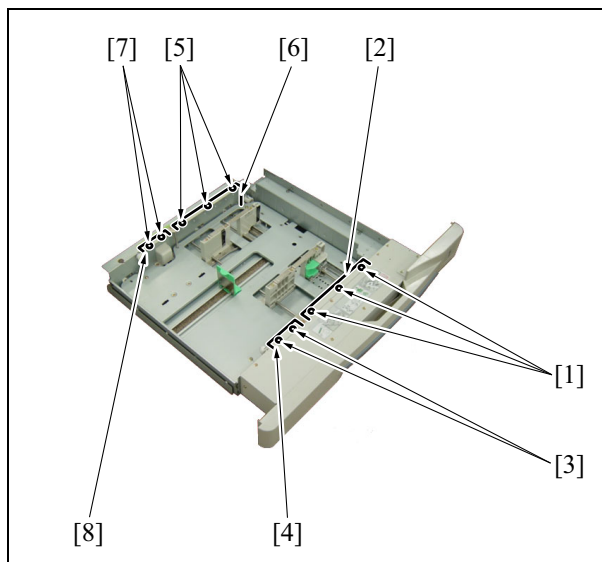
- Up/down wire A and up/down wire C: 531mm
- Up/down wire B and up/down wire D: 160mm

A. Removing the wire

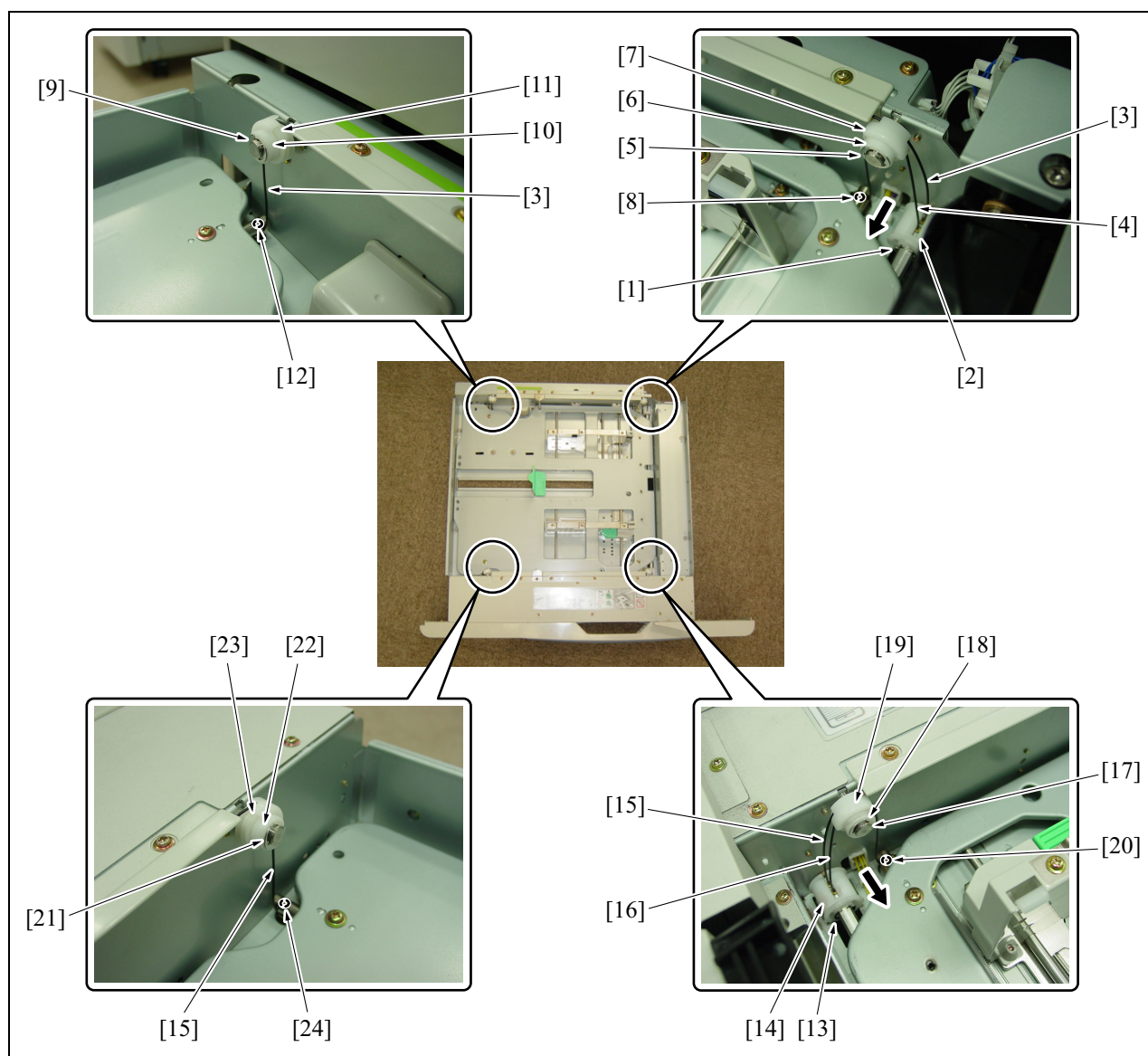
Note:

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

1. Pull out the paper feed tray 1.
2. Remove the paper feed unit.
3. Remove the paper feed tray 1.
4. Remove 3 screws [1] and then remove the wire cover FR [2].
5. Remove 2 screws [3] and then remove the wire cover FL [4].
6. Remove 3 screws [5] and then remove the wire cover RR [6].
7. Remove 2 screws [7] and then remove the wire cover RL [8].



8. Remove an E-ring [1].
9. Slide the drive pulley [2] to the inside and remove the wires C [3] and D [4].
10. After removing an E-ring [5], remove the pulley [6] and release the wires C [3] and D [4] from the wire restraining cover [7].
11. Remove a screw [8] from the bottom of the paper feed tray 1 and then remove the wire D [4].
12. After removing an E-ring [9], remove the pulley [10] and release the wire C [3] from the wire restraining cover [11].
13. Remove a screw [12] from the bottom of the paper feed tray 1 and then remove the wire C [3].
14. Remove an E-ring [13].
15. Slide the drive pulley [14] to the inside and remove the wires A [15] and B [16].
16. After removing an E-ring [17], remove the pulley [18] and release the wires /A [15] and B [16] from the wire restraining cover [19].
17. Remove a screw [20] from the bottom of the paper feed tray 1 and then remove the wire B [16].
18. After removing an E-ring [21], remove the pulley [22] and release the wire A [15] from the wire restraining cover [23].
19. Remove a screw [24] from the bottom of the paper feed tray 1 and then remove the wire A [15].



B. Attaching the wire**Note:**

- Since the composition of the paper feed trays 1 to 3 is the same, the explanation here is made of the steps for the paper feed tray 1.

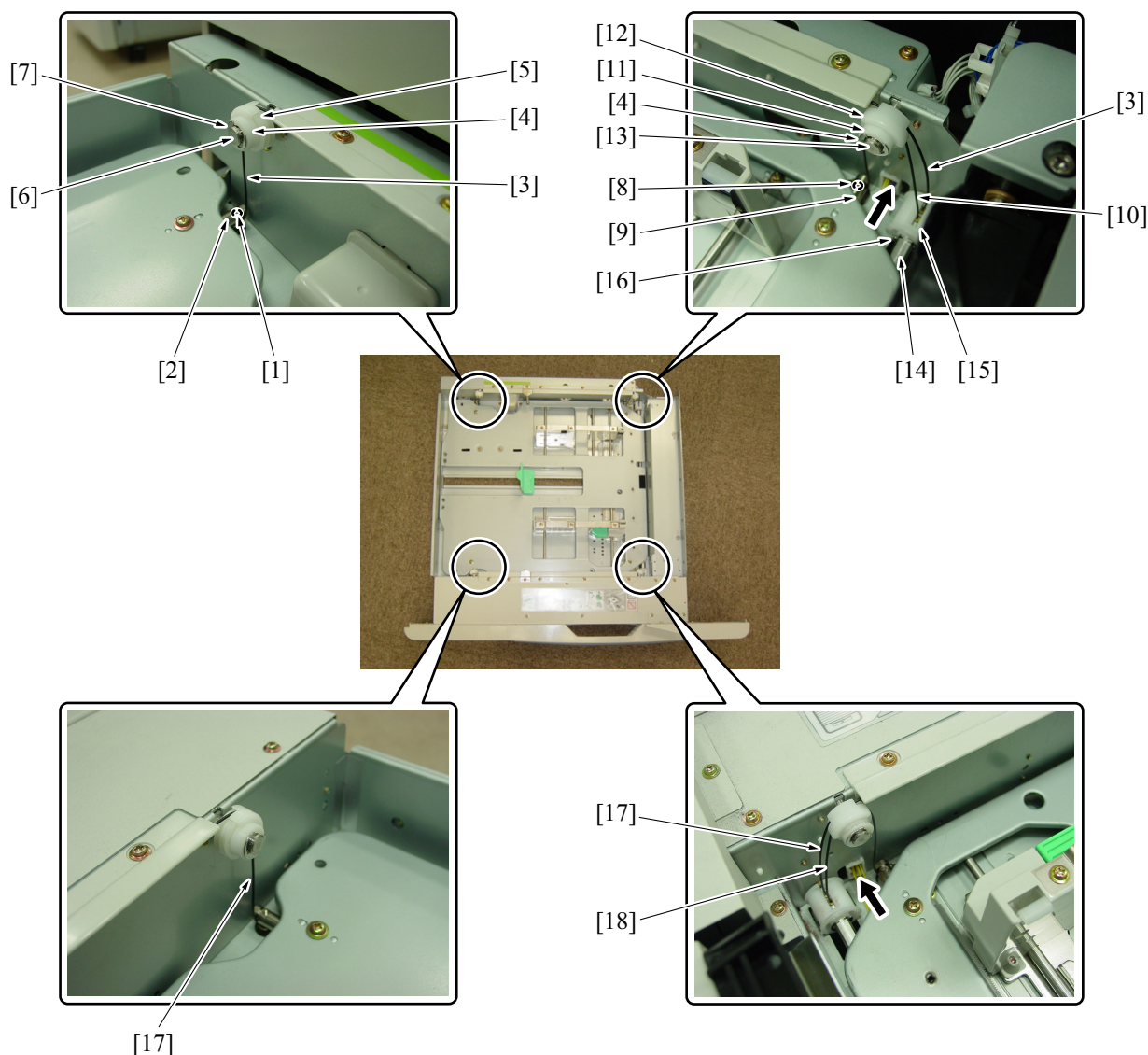
1. Install the wire C [3] to the wire holding shaft [2] with a screw [1] from the bottom side of the paper feed tray.
2. After winding the wire C [3] around the pulley [4], insert it into the shaft [6] together with the wire restraining cover [5] and fasten it with an E-ring [7].
3. Install the wire D [10] to the wire holding shaft [9] with a screw [8] from the bottom side of the paper feed tray.

4. After winding the wire C [3] and the wire D [10] around the pulley [11], insert it into the shaft [13] together with the wire restraining cover [12] and fasten it with an E-ring [14].

Note:

- Be sure to wind the wires around the pulley [11] so that the wire C [3] comes to the outside and the wire D [10] to the inside.

5. After sliding the drive pulley [15] to the outside with the wire C [3] and the wire D [10] inserted into the up/down drive shaft [14], fasten it with an E-ring [16].



Note:

- **Be sure to wind the wires around the pulley [14] so that the wire C [3] comes to the outside and the wire D [10] to the inside.**

6. Install the wires A [17] and B [18] by following Steps 1 to 5.

Note:

- **After completion of attaching the wires, be sure to rotate the up/down drive shaft by hand to check to see if the up/down plate goes up and down smoothly.**

7. For the subsequent steps, reinstall the parts following the removal steps in reverse.

7. BY-PASS TRAY

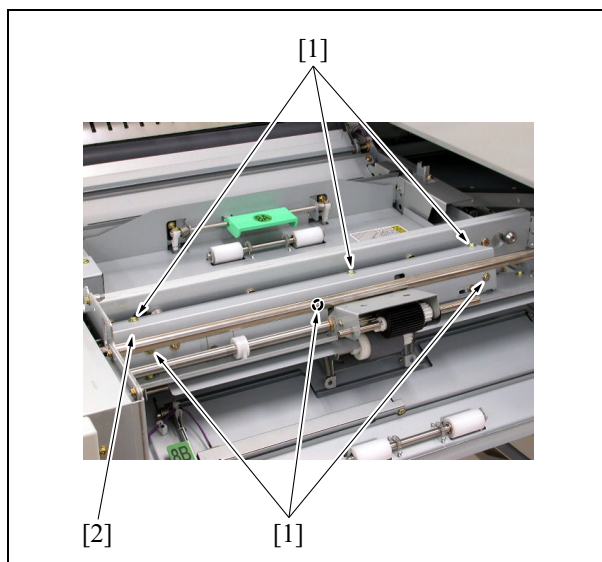
7.1 Replacing the paper feed roller and the feed roller

A. Periodically replaced parts/cycle

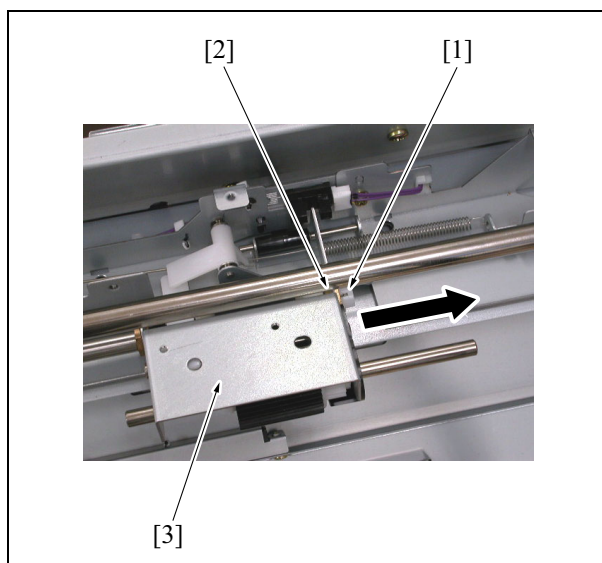
- Paper feed roller: Every 800,000 copies in actual replacement count
- Feed roller: Every 125,000 copies in actual replacement count

B. Procedure

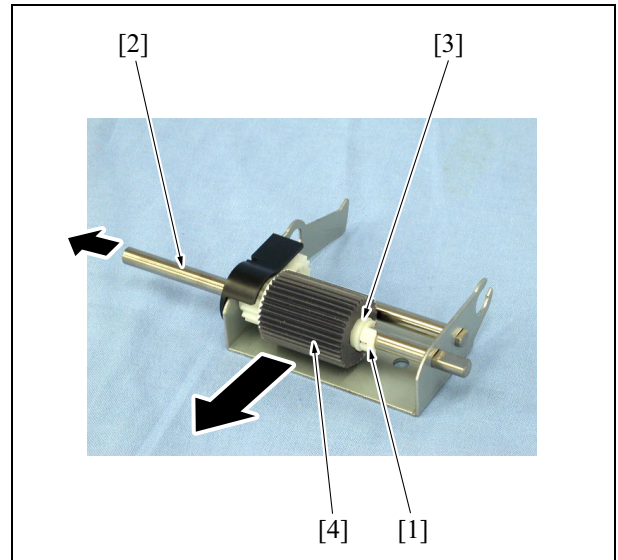
1. Pull out the ADU. (See "10.1 Removing and reinstalling the ADU.")
2. Remove 6 screws [1] and then remove the paper feed solenoid cover [2].



3. Remove the stop ring [1].
4. Remove the bearing [2] and then remove the paper feed roller unit [3].



5. After removing the stop ring [1], pull out the feed shaft [2] and remove the paper feed gear assembly [3].
6. Remove the paper feed roller [4] from the paper feed gear assembly [3].

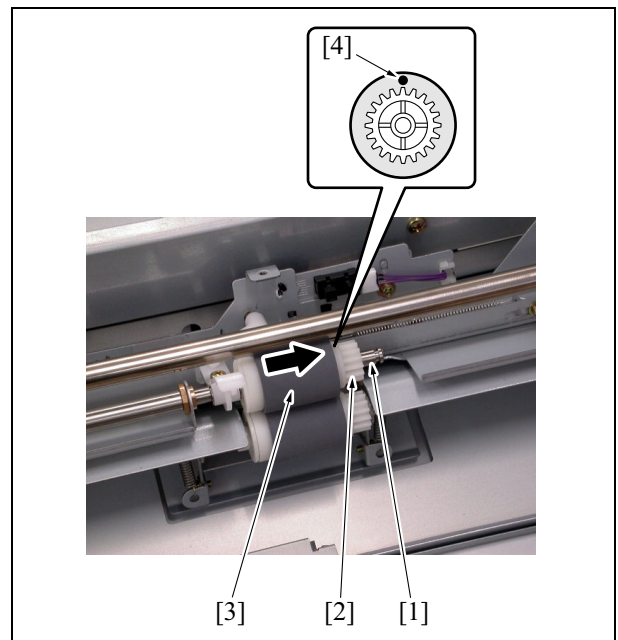


7. Remove the feed roller assembly [2] from the by-pass drive shaft [1].
8. Remove the feed roller [3] from the feed roller assembly [2].

Note:

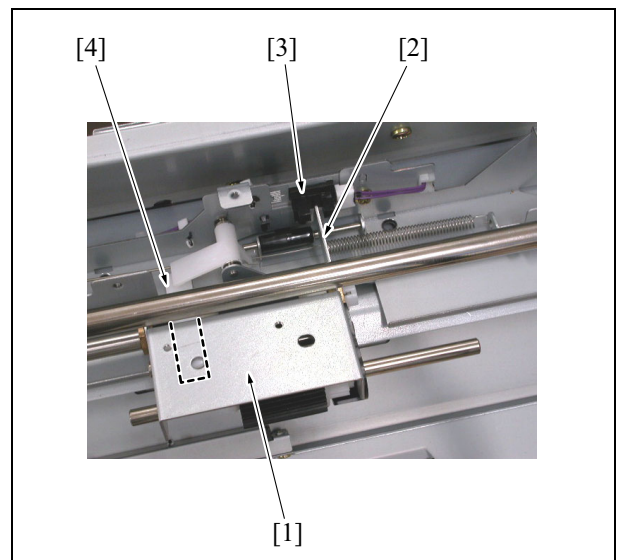
- Be sure to install the feed roller [3] so that the paint mark [4] turns in the direction shown in the drawing.

9. Reinstall the above parts following the removal steps in reverse.



Note:

- Be sure to install the paper feed roller unit [1] so that the actuator section [2] coincides with the detection section of the PS47 (no paper sensor BP) [3].
- Be sure to install the paper feed roller unit [1] so that the tip end of the paper feed side of the paper up/down lever comes into contact with the inside of the top plate of the paper feed roller unit [1].



7.2 Replacing the double feed prevention roller

A. Periodically replaced parts/cycle

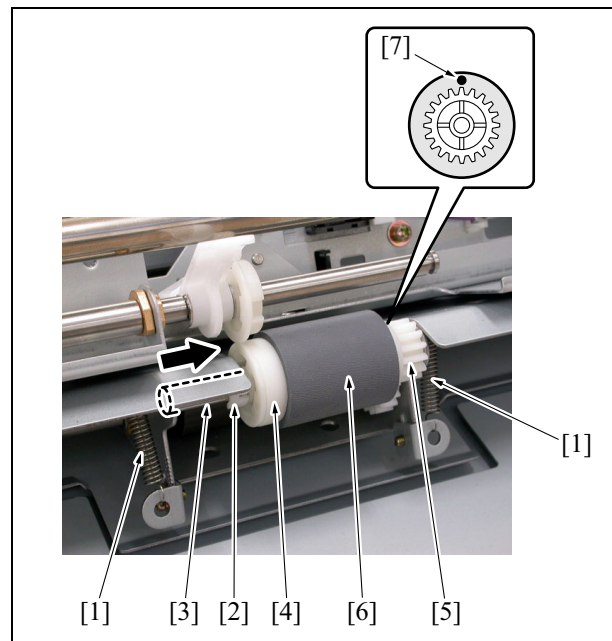
- Double feed prevention roller: Every 125,000 copies in actual replacement count

B. Procedure

1. Remove the paper feed roller and the feed roller. (See "Replacing the paper feed roller and the feed roller.")
2. Remove 2 double feed pressure springs [1].
3. After removing the stop ring [2], pull out the double feed prevention shaft [3] and remove the flange [4] and the double feed prevention roller assembly [5].
4. Remove the double feed prevention roller [6] from the double feed prevention roller assembly [5].
5. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to install the double feed prevention roller [6] so that the paint mark [7] turns in the direction shown in the drawing.



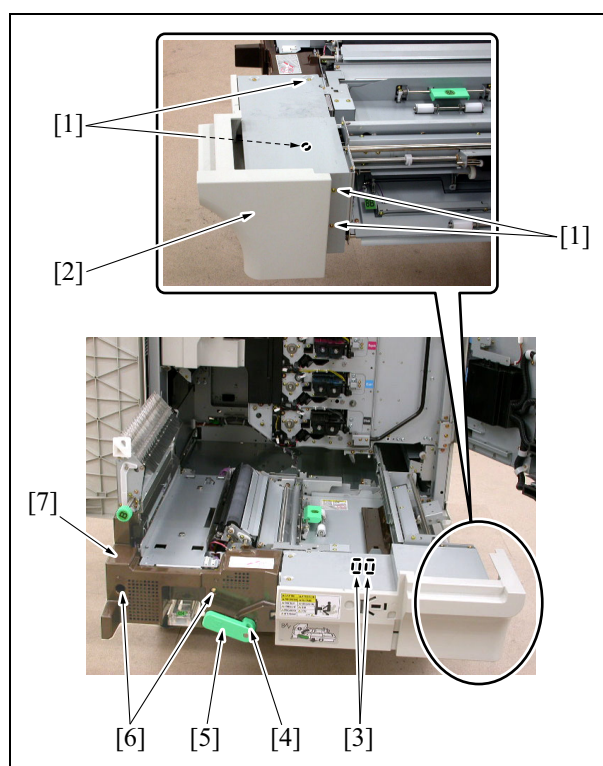
7.3 Replacing the paper feed clutch BP

A. Periodically replaced parts/cycle

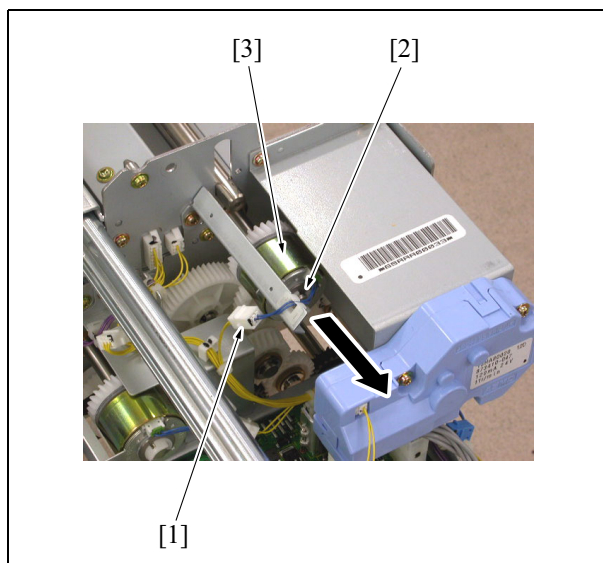
- Paper feed clutch BP (MC6): Every 2,000,000 copies in actual replacement count

B. Procedure

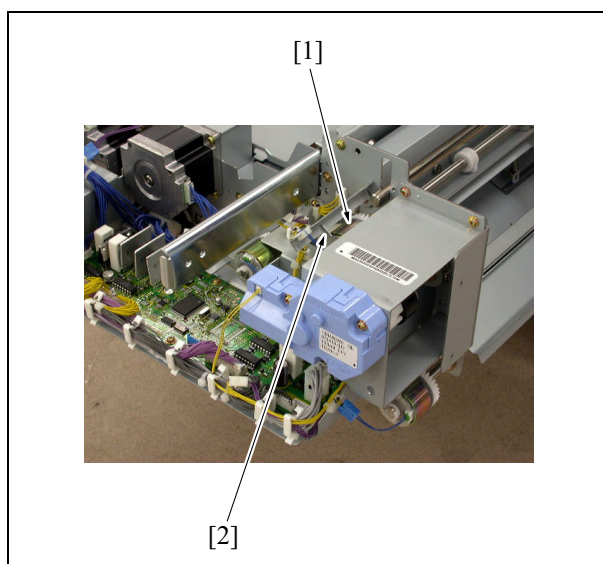
1. Open the toner supply section. (See "5.1 Opening and closing the toner supply section.")
2. Pull out the ADU. (See "10.1 Removing and reinstalling the ADU.")
3. Remove the fixing unit. (See "9.2 Removing and reinstalling the fixing unit.")
4. Remove 4 screws [1].
5. After pulling out the ADU cover R [2] halfway, remove 2 relay connectors [3] and then remove the ADU cover R [2].
6. Remove the screw [4] and then remove the stand pulling lever [5].
7. Remove 2 screws [6] and then remove the ADU cover L [7].



8. Remove a relay connector [1].
9. Remove the stop ring [2] and then remove the paper feed clutch BP (MC6) [3].
10. Reinstall the above parts following the removal steps in reverse.

**Note:**

- When reinstalling the paper feed clutch BP (MC6) [1], be sure to set the stopper in the detent groove [2].

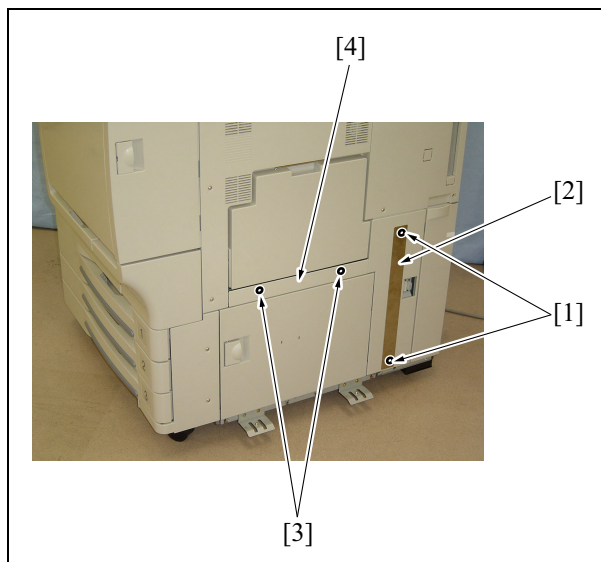


8. VERTICAL CONVEYANCE

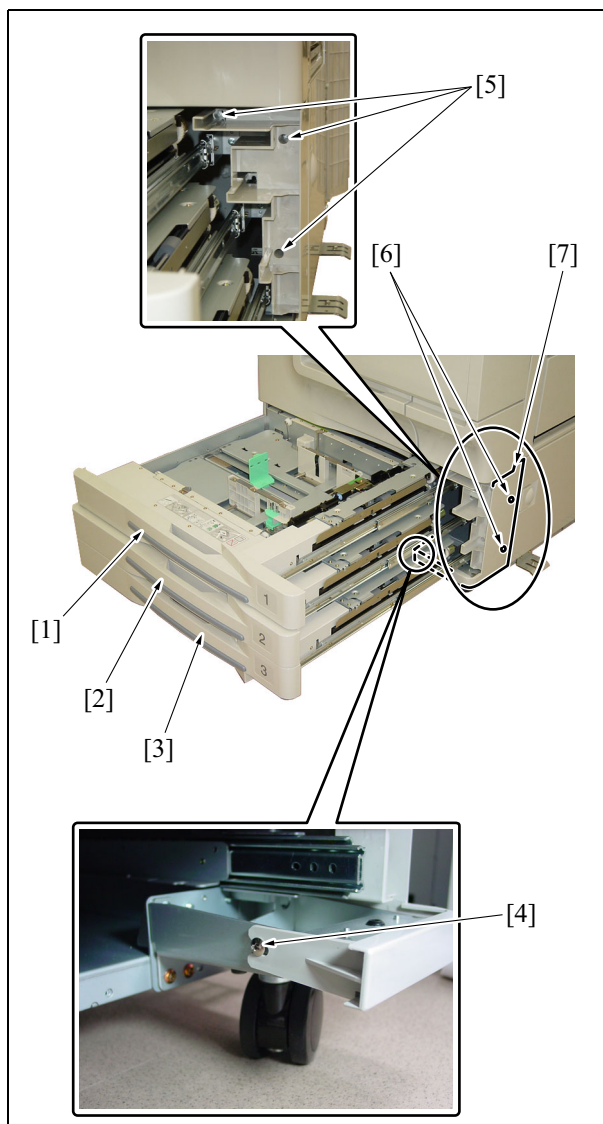
8.1 Removing and reinstalling the vertical conveyance

A. Procedure

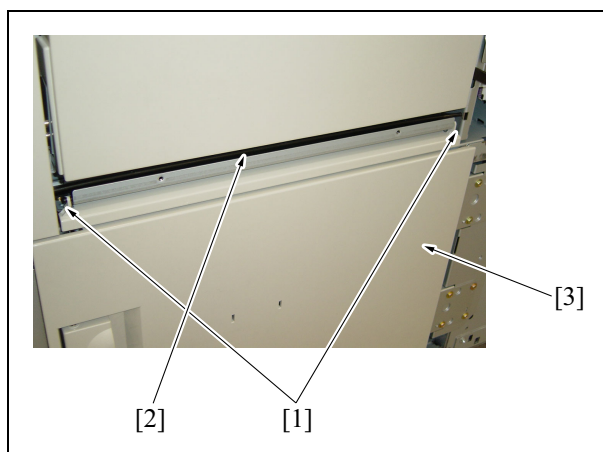
1. Loosen 2 screws [1] and remove the side cover 4 [2].
2. Loosen 2 screws [3] and remove the side cover 5 [4].



3. Pull out the paper feed trays 1 [1], 2 [2] and 3 [3].
4. Loosen a screw [4].
5. Remove 3 screws [5].
6. Remove 2 screws [6] and then remove the side cover 3 [7].



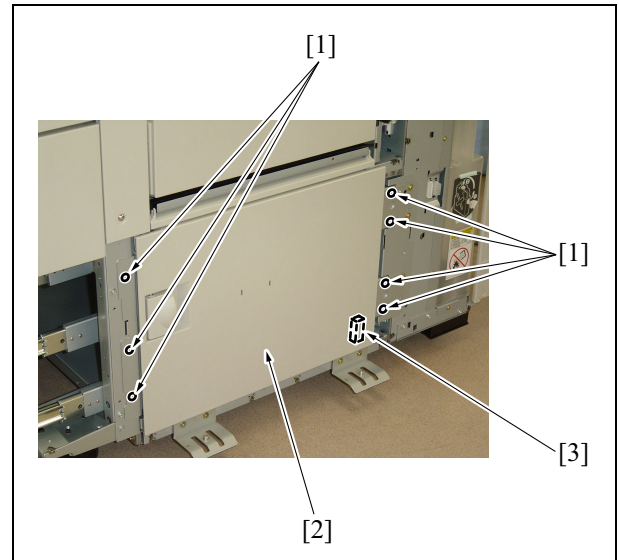
7. Push up the hooks [1] in 2 positions at both sides, and separate the by-pass up/down cover [2] from the vertical conveyance section [3].



8. Remove 7 screws [1].
9. Pull out the vertical conveyance section [2], remove a connector [3] and then remove the vertical conveyance section [2].
10. Reinstall the above parts following the removal steps in reverse.

Note:

- When installing the vertical conveyance section, be sure to fasten it with screws with the vertical conveyance door closed.



8.2 Replacing the intermediate conveyance clutch 1

A. Periodically replaced parts/cycle

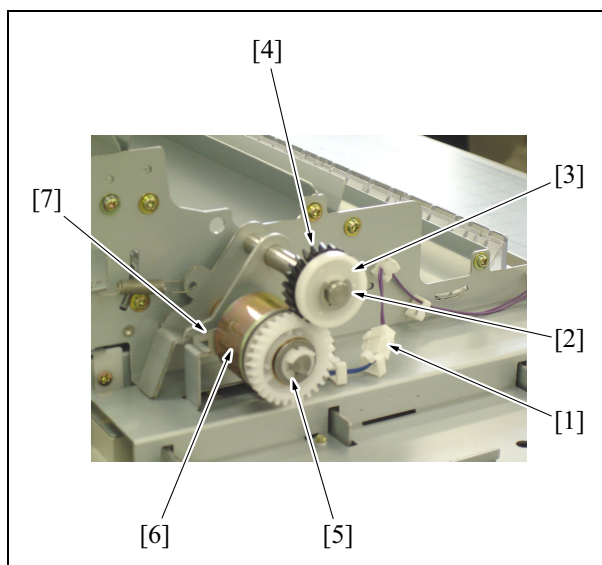
- Intermediate conveyance clutch 1 (MC13):
Every 2,000,000 copies

B. Procedure

1. Remove the vertical conveyance section.
2. Remove a connector [1].
3. Remove an E-ring [2] and then remove the spacer [3] and the gear [4].
4. Remove a stop ring [5] and then remove the MC13 [6].
5. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the clutch, be sure to check that the stopper [7] of the MC13 is in the specified position.



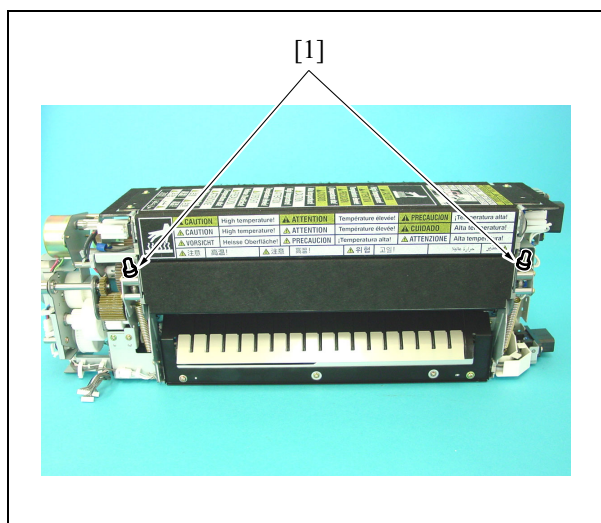
9. FIXING

⚠ Caution:

- The fixing unit is very hot immediately after turning off the main switch (SW2). In order to avoid getting burned, be sure to start operation after the temperature goes down sufficiently.

9.1 Screws that must not be removed

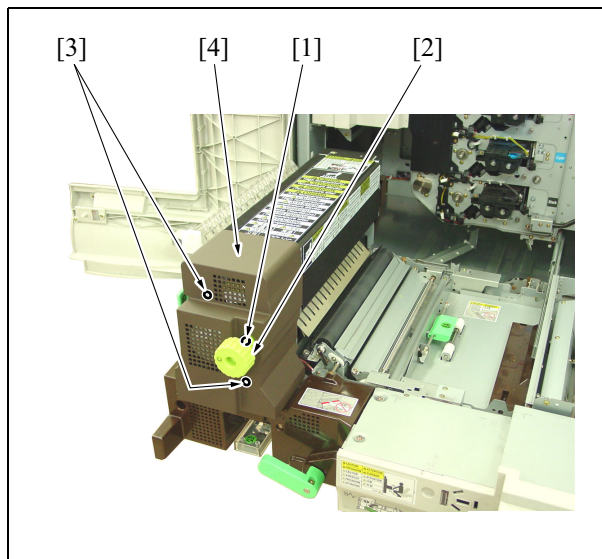
2 double nuts [1] are not allowed to be removed. Be careful not to remove them.



9.2 Removing and reinstalling the fixing unit

A. Procedure

1. Open the front door.
2. Pull out the ADU.
3. Remove a screw [1] and then remove the fixing knob [2].
4. Remove 2 screws [3] and then remove the fixing cover F [4].

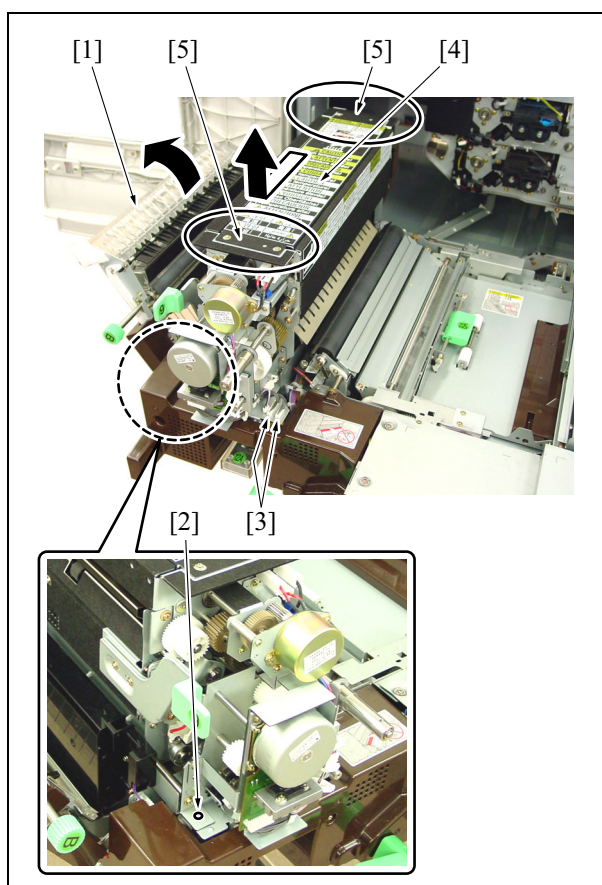


5. Open the reverse section [1] and remove a screw [1] and 3 connectors [3]. And then remove the fixing unit [4].

Note:

- When removing or reinstalling the fixing unit, slide it toward front and raise it while holding both ends [5] at front and rear.

6. Reinstall the above parts following the removal steps in reverse.



9.3 Replacing the fixing upper heater lamps 1 and 2

A. Periodically replaced parts/cycle

- Fixing upper lamp 1 (L2): Every 2,500,000 copies
- Fixing upper lamp 2 (L3): Every 2,500,000 copies

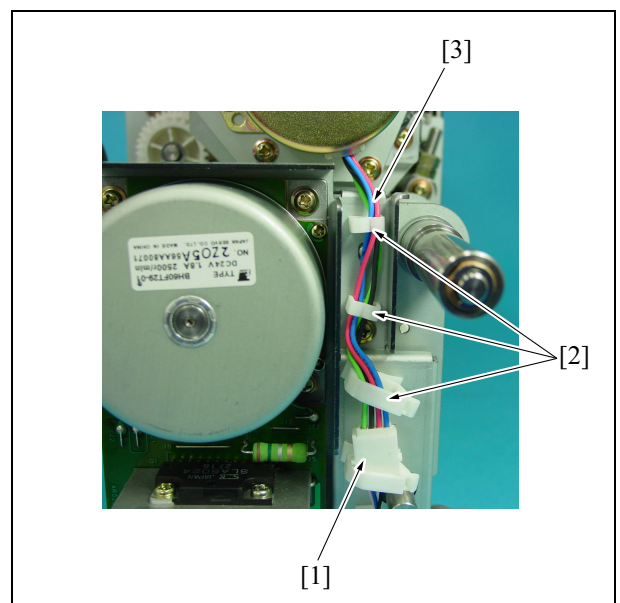
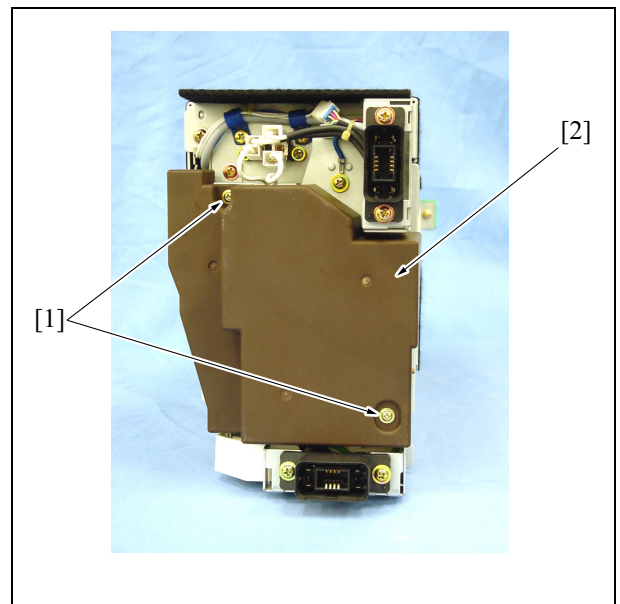
B. Procedure

1. Remove the fixing unit.
2. Remove 2 screws [1] and then remove the fixing cover R [2].

Note:

- Be careful not to touch the glass section of the fixing heater lamp with bare hands. This may shorten the effective life of the heater lamp.
- Be careful not to damage the surface of the fixing heater lamp. Especially when removing or reinstalling it, care should be taken not to contact and damage the inner surface of the fixing roller.
- When the installation is completed, check to see if the fixing heater lamp is set securely to the fixing plate and the faston terminal is properly installed.

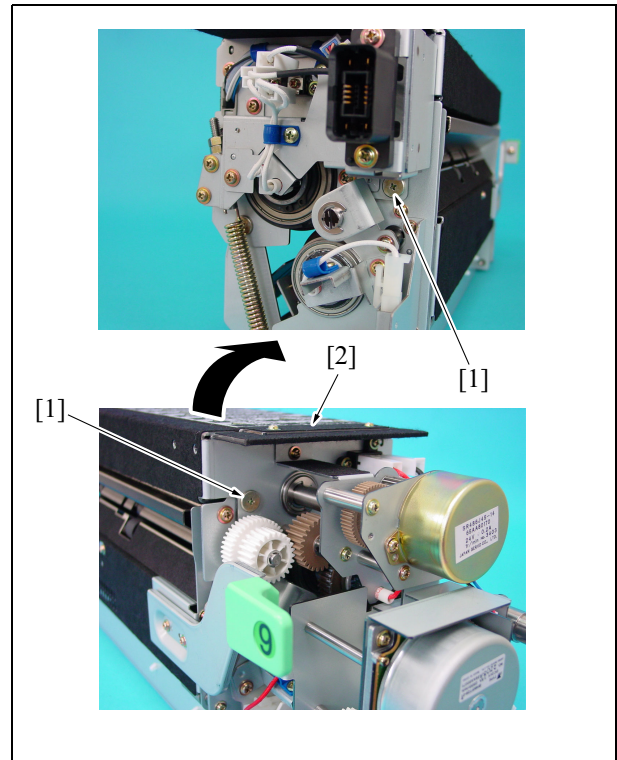
3. Remove the connector [1] and take out the web motor wiring harness [3] from the clamps [2] at the 3 places.



4. Remove 2 screws [1] and open the fixing upper unit [2].

Note:

- The screw [1] is a shoulder screw. When attaching it, be sure to set the shoulder section securely into the screw hole.



5. Remove 2 faston terminals [1] at the front, and a clamp fixing screw [2], 2 faston terminals [3] and a screw [4] at the rear. And then remove the fixing plate [5] and pull out gently the fixing heater lamps 1 and 2 [6] from the fixing roller U [7] for removal.

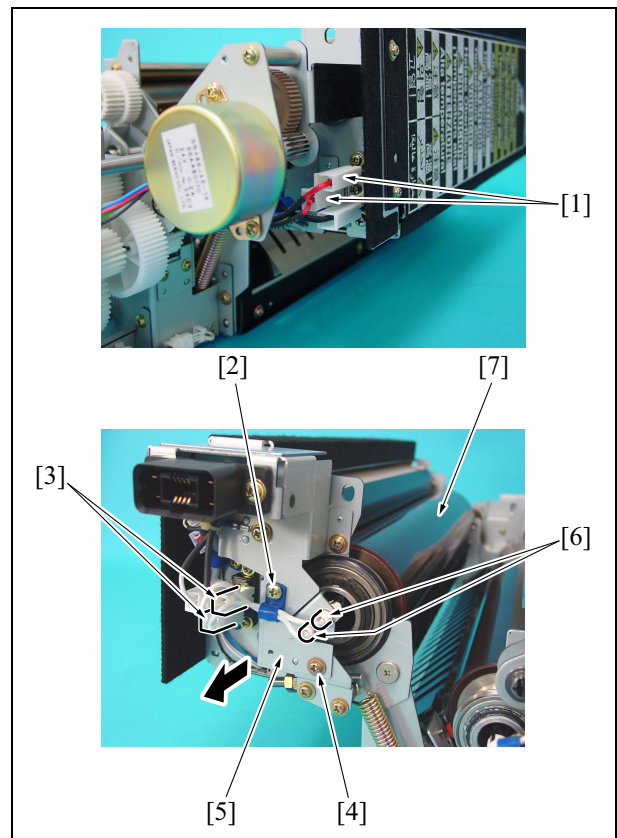
Note:

- When removing the faston terminal, be sure to hold it at the connector.

6. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to reinstall the fixing heater lamp so that the manufacturer's label indication comes to therear.
- When reinstalling the fixing heater lamps, please note that the lamp fitting holes on the fixing plate are different.



9.4 Replacing the fixing lower heater lamp

A. Periodically replaced parts/cycle

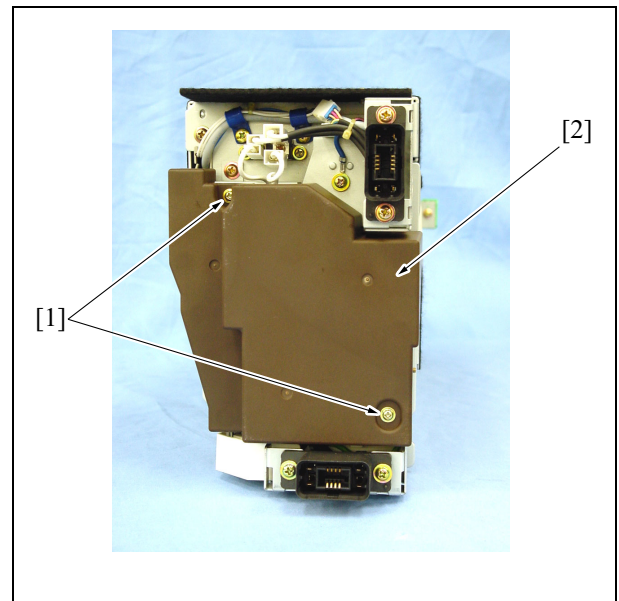
- Fixing lower lamp (L4): Every 2,500,000 copies

B. Procedure

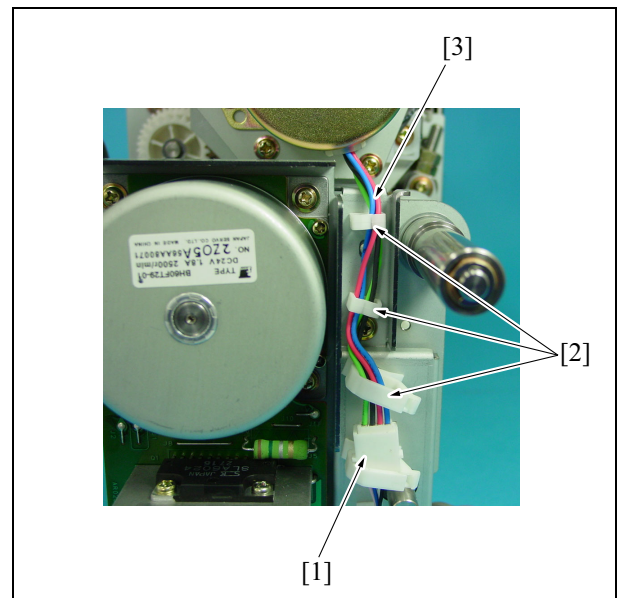
1. Remove the fixing unit.
2. Remove 2 screws [1] and then remove the fixing cover R [2].

Note:

- Be careful not to touch the glass section of the fixing heater lamp with bare hands. This may shorten the effective life of the heater lamp.
- Be careful not to damage the surface of the fixing heater lamp. Especially when removing or reinstalling it, care should be taken not to contact and damage the inner surface of the fixing roller.
- When the installation is completed, check to see if the fixing heater lamp is set securely to the fixing plate and the faston terminal is properly installed.



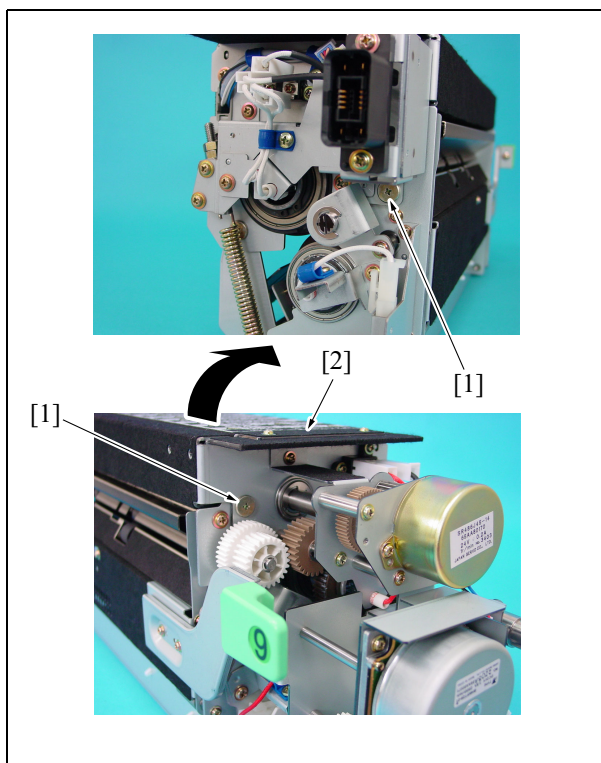
3. Remove the connector [1] and take out the web motor wiring harness [3] from the clamps [2] at the 3 places.



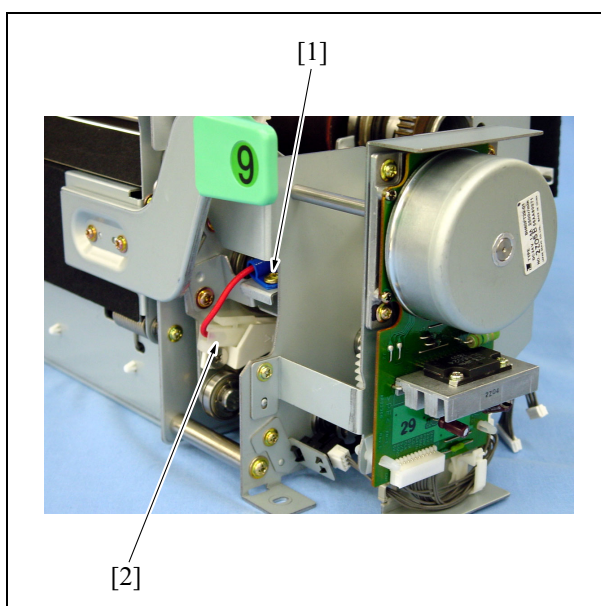
4. Remove 2 screws [1] and open the fixing upper unit [2].

Note:

- The screw [1] is a shoulder screw. When attaching it, be sure to set the shoulder section securely into the screw hole.



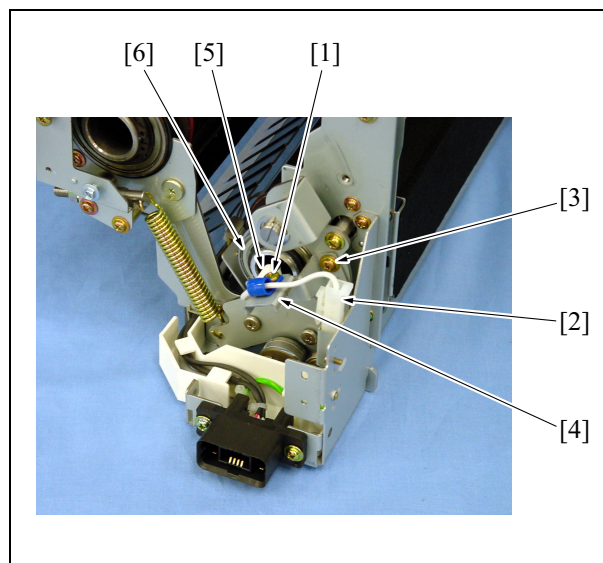
5. Remove the clamp fixing screw [1] and the connector [2] at the front.



6. Remove a clamp screw [1], a connector [2] and a screw [3] at the rear to remove the fixing plate [4]. And then pull out gently the fixing heater lamp [5] from the fixing roller L [6] for removal.
7. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to reinstall the fixing heater lamp so that the manufacturer's logo indication comes to the rear.



9.5 Replacing the fixing roller U, ball bearing U and the heat insulating sleeve U

A. Periodically replaced parts/cycle

- Fixing roller U: Every 100,000 copies
- Heat insulating sleeve U: Every 600,000 copies
- Ball bearing U: Every 600,000 copies

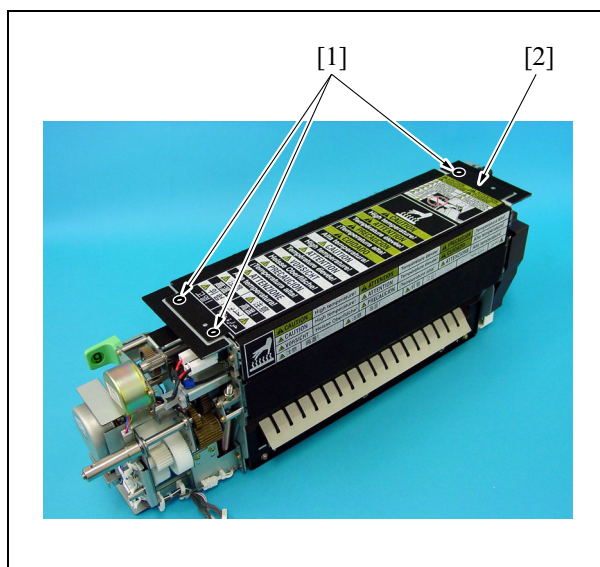
B. Procedure

1. Remove the fixing unit.
2. Remove 3 screws [1] and remove the fixing unit upper cover.

Note:

- When removing the fixing unit upper cover, raise it up without tilting it to avoid damage to the fixing roller U.

3. Remove the fixing upper heater lamps 1 and 2.



4. Remove the fixing upper lamps 1 and 2.
5. Remove the rear side O-ring [3].
Remove the heat insulating sleeve U [4] and the ball bearing [5] at the rear side, from the fixing roller U [6].

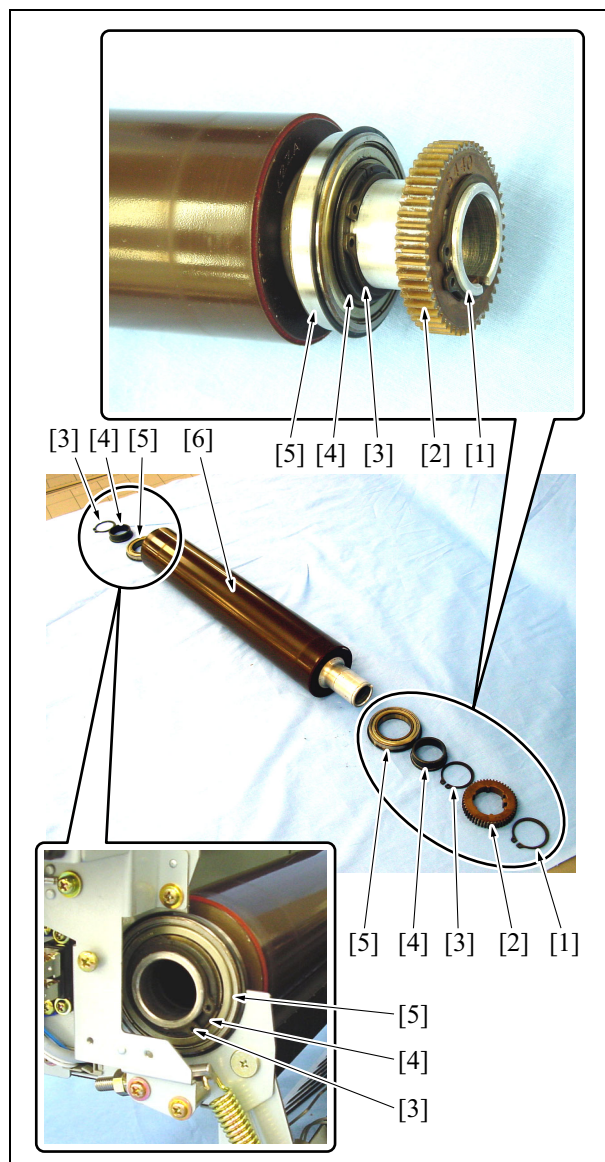
Note:

- Be careful not to damage the surface of the fixing roller.

6. Remove the fixing roller U [6].
7. Remove the O-ring [1] and then remove the fixing gear [2].
8. After removing the O-ring [3] of front side, remove the heat insulating sleeve U [4] and the ball bearings U [5] from the fixing roller U [6].
9. Reinstall the above parts following the removal steps in reverse.

Note:

- After replacing the fixing roller, check whether the fixing temperature sensor 3 is contacting with the roller.
- When fixing temperature sensor 3 is soiled with paper dust, clean the sensor with drum cleaner and cleaning pad.
- When having replaced the fixing roller U, be sure to make adjustments by referring to the 36 mode "hp Color 9850mfp Adjustment item list." Otherwise, poor images may result.
- Be sure to apply the inner and outer peripheries of the heat insulating sleeve with Maltemp FF-RM (or, Solvent 240) before reinstalling it.
- When reinstalling them, be sure to take note of the directions of the ball bearing and the flange of the heat insulating sleeve. Reinstall them so that their upper surface turns to the inside as seen in the picture in which they are arranged after disassembly.



9.6 Replacing the fixing roller L, ball bearing L and the heat insulating sleeve L

A. Periodically replaced parts/cycle

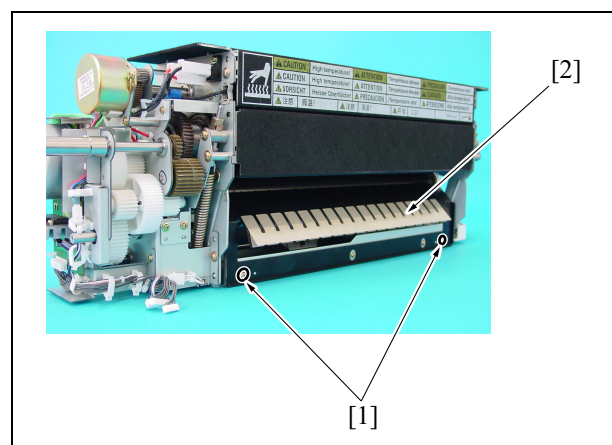
- Fixing roller L: Every 100,000 copies
- Heat insulating sleeve L: Every 600,000 copies
- Ball bearing L: Every 600,000 copies

B. Procedure

1. Remove the fixing unit.
2. Remove the fixing cover R.
3. Remove the fixing lower heater lamp.
4. Remove 2 screws [1] and then remove the fixing entrance plate L [2].

Note:

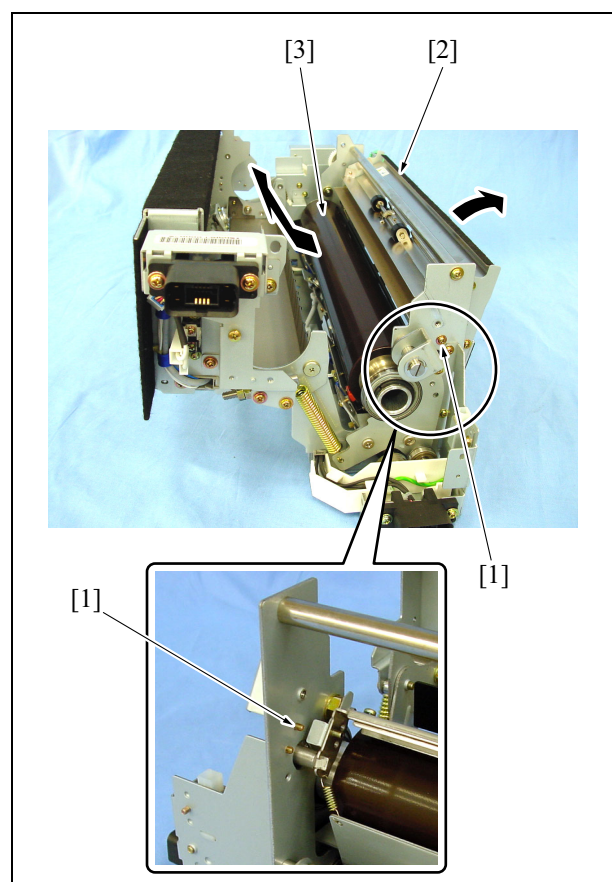
- Be careful not to damage the paper passage section of the entrance plate L.
- Be careful not to damage the surface of the fixing rollers U and L with the entrance plate L.



5. After loosening the stopper screw [1] once, open the fixing paper exit guide [2] up to the turnout position and retighten it temporarily and then remove the fixing roller L [3].

Note:

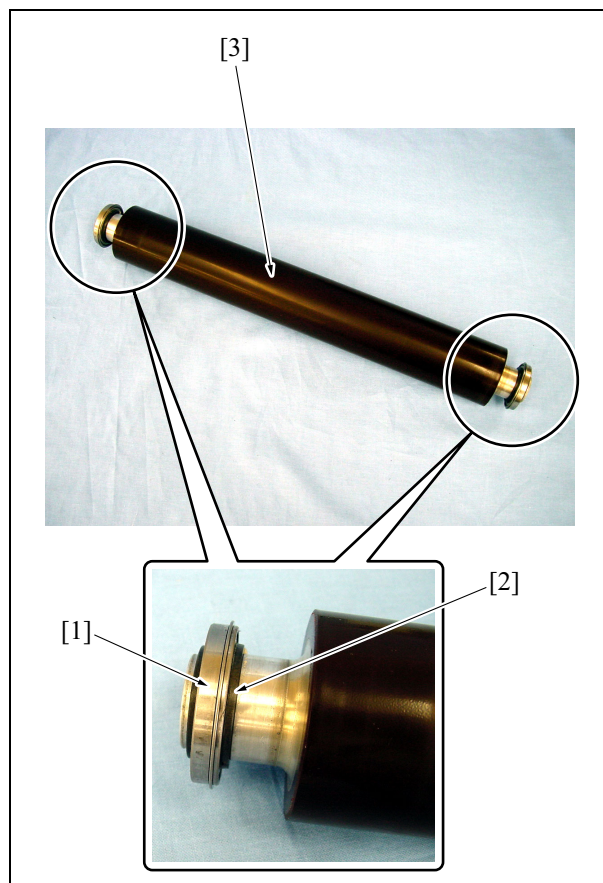
- Be careful not to damage the surface of the fixing roller.



6. Remove the ball bearings L [1], 1 each at both sides, and the heat insulating sleeves L [2], 1 each at both sides, from the fixing roller L.
7. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to apply the inner and outer peripheries of the heat insulating sleeve with Multemp FF-RM (or, Solvent 240) before reinstalling it.
- When reinstalling them, be sure to take note of the directions of the ball bearing and the flange of the heat insulating sleeve.
- After replacing the fixing roller/r, check whether the fixing temperature sensor 4 is in touch with the roller.
- When fixing temperature sensor 4 is soiled with paper dust, clean the sensor with drum cleaner and cleaning pad.



9.7 Replacing the fixing temperature sensor 3, and removing and reinstalling the fixing temperature sensor 1 and thermostat 1

Caution:

- After installing the fixing temperature sensor 3, be sure to check that the sensor section is in touch with the fixing roller. If not, the temperature control may go abnormal or the fixing temperature sensor 3 may detect the low fixing temperature abnormality.
 - Be sure to check that the wiring harness is not in touch with the fixing roller.
-

Caution:

- The thermostat 1 is an essential safety part. Be sure to follow the cautions and steps given below when removing and reinstalling (SP00 -003 0KC).
-

Caution:

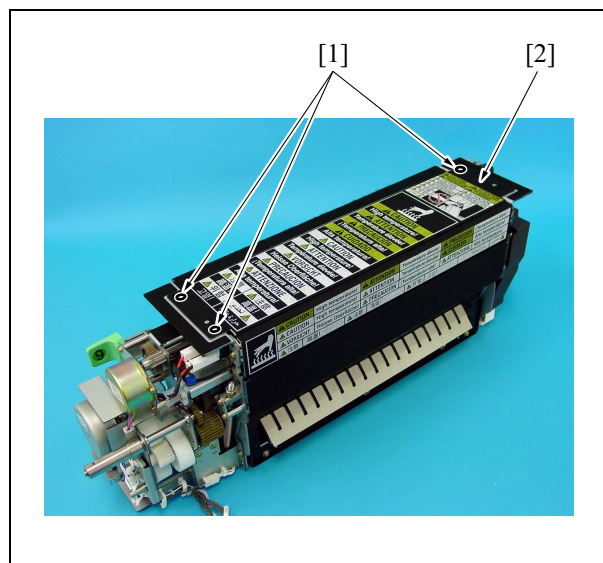
- After completion of the installation of the thermostat 1, be sure to check that the wiring harness is not in touch with the fixing upper roller.
 - Be sure to fasten the thermostat 1 after positioning it properly with a positioning jig (65AAJG021KC). Be sure to apply screws with screw lock paint. Also be sure to conduct this adjustment under the pressure-released condition and the temperature low condition of the fixing roller U.
-

A. Periodically replaced parts/cycle

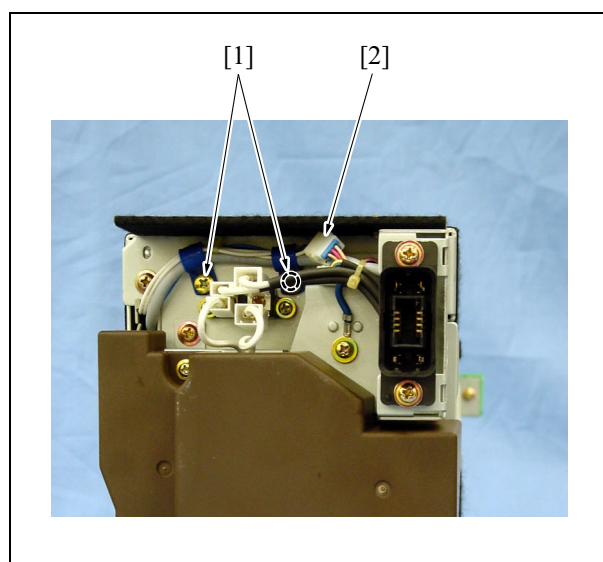
- Fixing temperature sensor 3: Every 2,500,000 copies

B. Procedure (for replacing the fixing temperature sensor /3)

1. Remove the fixing unit.
2. Remove 3 screws [1] and then remove the fixing upper cover [2].



3. Remove 2 clamp screws [1] and the connector [2].

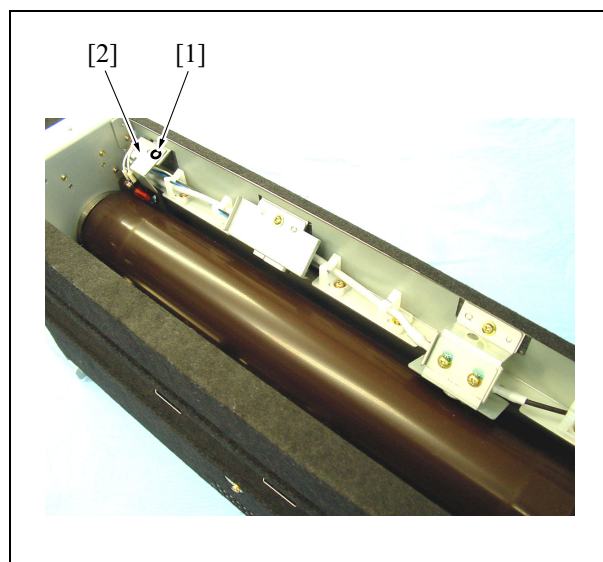


4. Remove a screw [1] and then remove the fixing temperature sensor 3 [2].

Note:

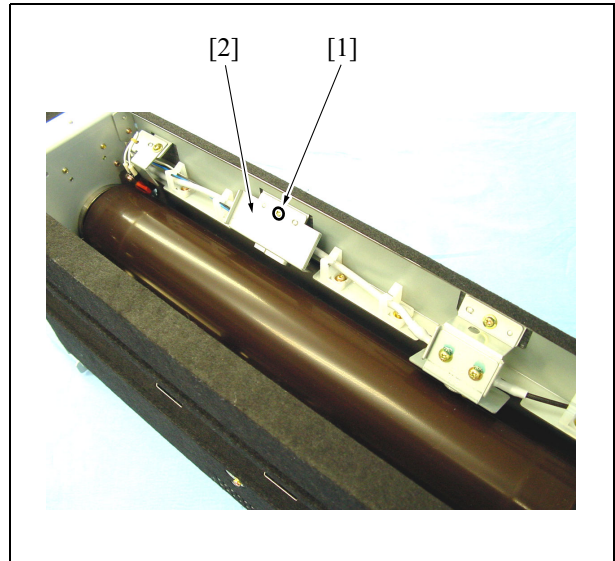
- When reinstalling it, check that the sensor section of the fixing temperature sensor is in touch with the fixing roller.

5. Reinstall the above parts following the removal steps in reverse.



C. Procedure (for removing and reinstalling the fixing temperature sensor 1)

1. Remove a screw [1] and then remove the mounting board [2] of the fixing temperature sensor 1.

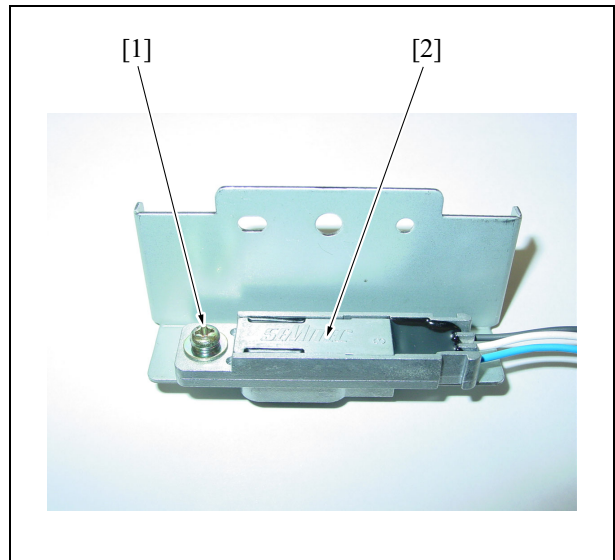


2. Remove a screw [1] and then remove the fixing temperature sensor 1 [2].

Note:

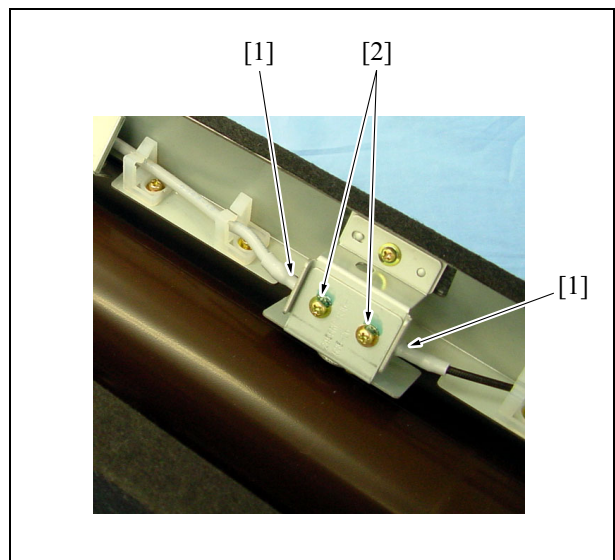
- Be careful not to change the position of the set screw of the fixing temperature sensor 1.
- Be careful not to damage the internal surface of the sensor.
- A positioning jig is not used when reinstalling it.

3. Reinstall the above parts following the removal steps in reverse.

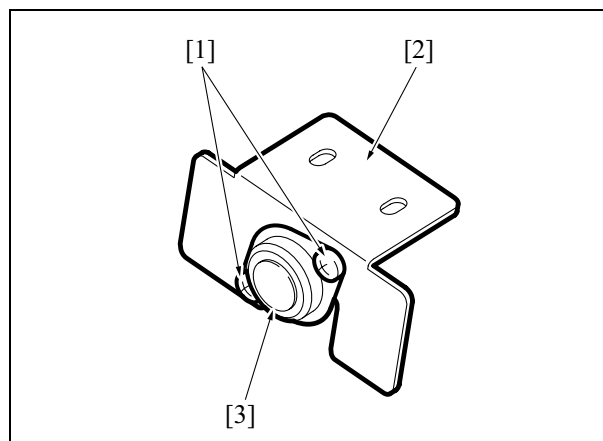


D. Procedure (for removing the thermostat 1)

1. Remove 2 faston terminals [1] and 2 screws [2] of the thermostat 1 and then remove the thermostat section.

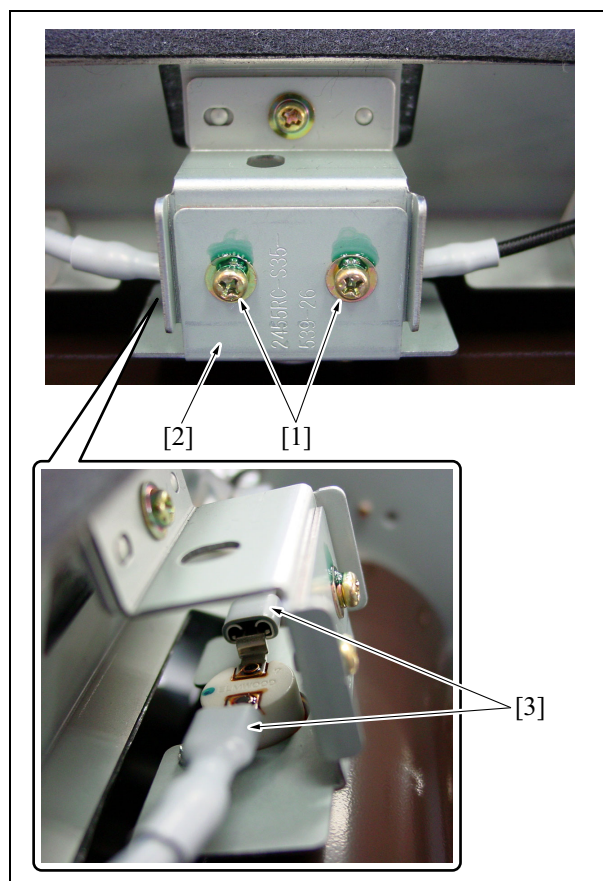
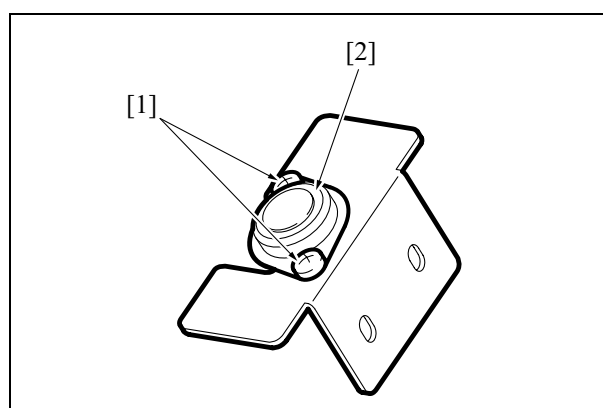


2. Remove 2 screws [1] and then remove the thermostat 1 [3] from the thermostat mounting board [2].

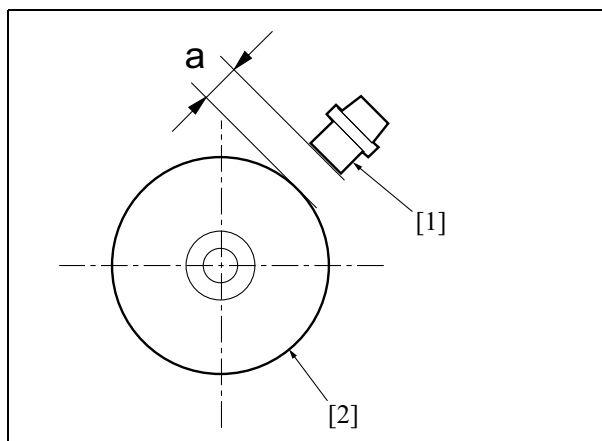


E. Procedure (for reinstalling the thermostat)

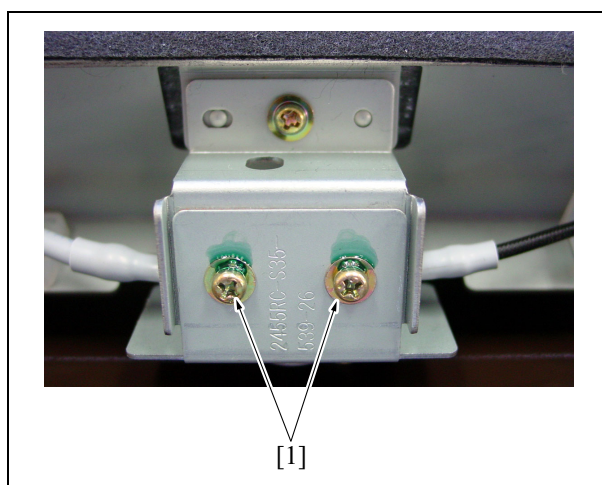
1. Fasten the thermostat 1 [2] with 2 screws [1].
2. Fasten the thermostat mounting board [2] with 2 screws [1].
3. Connect 2 faston terminals [3] to the thermostat 1.



4. With a thermostat positioning jig (65AAJG021KC) set between the thermostat 1 [1] and the fixing upper roller [2], fasten the thermostat mounting board with 2 screws so that the mounting board becomes the same thickness as the positioning jig.
 - Specification: $a = 3.1 \pm 0.2\text{mm}$



5. Apply 2 screws [1] of the thermostat section with screw lock paint.



9.8 Replacing the fixing temperature sensor 4, and removing and reinstalling the fixing temperature sensor 2 and thermostat L

Caution:

- After reinstalling the fixing temperature sensor 4, be sure to check that the sensor section is in touch with the fixing roller. If not, the temperature control may go abnormal or the fixing temperature sensor 4 may detect the low fixing temperature abnormality.
 - Be sure to check that the wiring harness is not in touch with the fixing roller.
-

Caution:

- The thermostat L is an essential safety part. Be sure to follow the cautions and steps given below when removing and reinstalling (SP00 -018 0KC).
-

Caution:

- After completion of the installation of the thermostat L, be sure to check that the wiring harness is not in touch with the fixing lower roller.
 - Be sure to fasten the thermostat L after positioning it properly with a positioning jig (65AAJG031KC). Be sure to apply screws with screw lock paint. And also be sure to conduct this adjustment under the pressure-released condition and the temperature low condition of the fixing roller L.
-

A. Periodically replaced parts/cycle

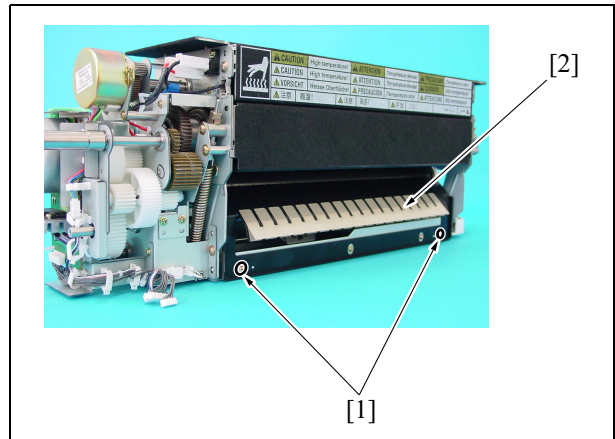
- Fixing temperature sensor 4: Every 2,500,000 copies

B. Procedure (for replacing the fixing temperature sensor 4)

1. Remove the fixing unit.
2. Remove 2 screws [1] and then remove the fixing entrance plate L [2].

Note:

- Be careful not to damage the paper passage section of the fixing admission plate L [2].

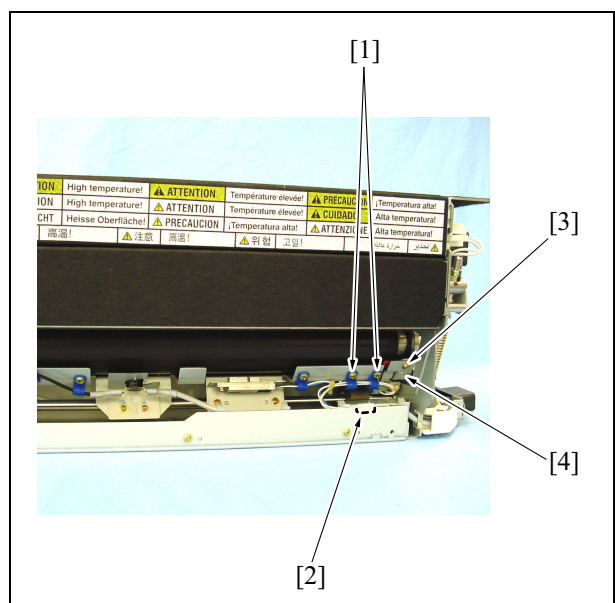


3. Remove 2 clamp screws [1], connector [2] and a screw [3], and then remove the fixing temperature sensor 4 [4].

Note:

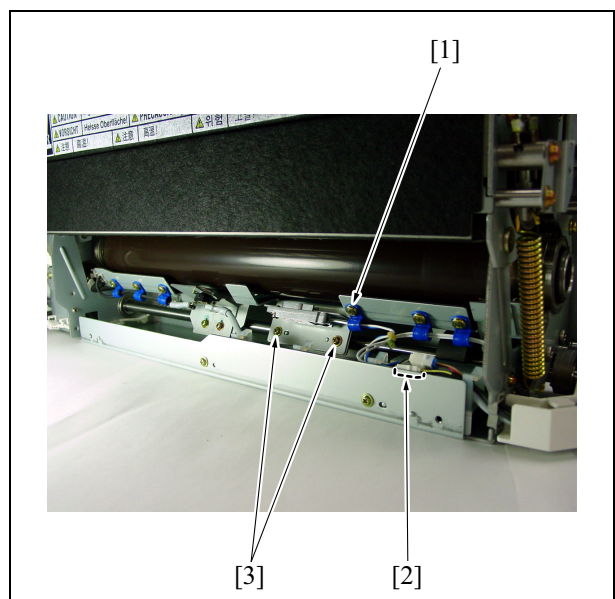
- When reinstalling it, be sure to check that the sensor section of the fixing temperature sensor 4 is in touch with the fixing roller.

4. Reinstall the above parts following the removal steps in reverse.



C. Procedure (for removing and reinstalling the fixing temperature sensor 2)

1. Remove a clamp screw [1], connector [2] and 2 screws [3], and then remove the mounting board [4] of the fixing temperature sensor 2.

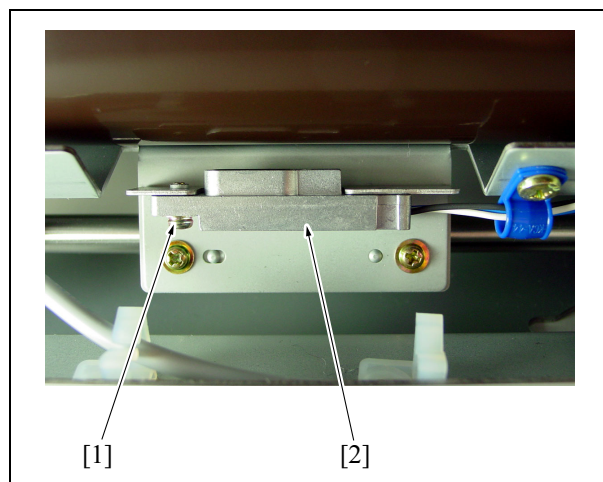


2. Remove a screw [1] and then remove the fixing temperature sensor 2 [2].

Note:

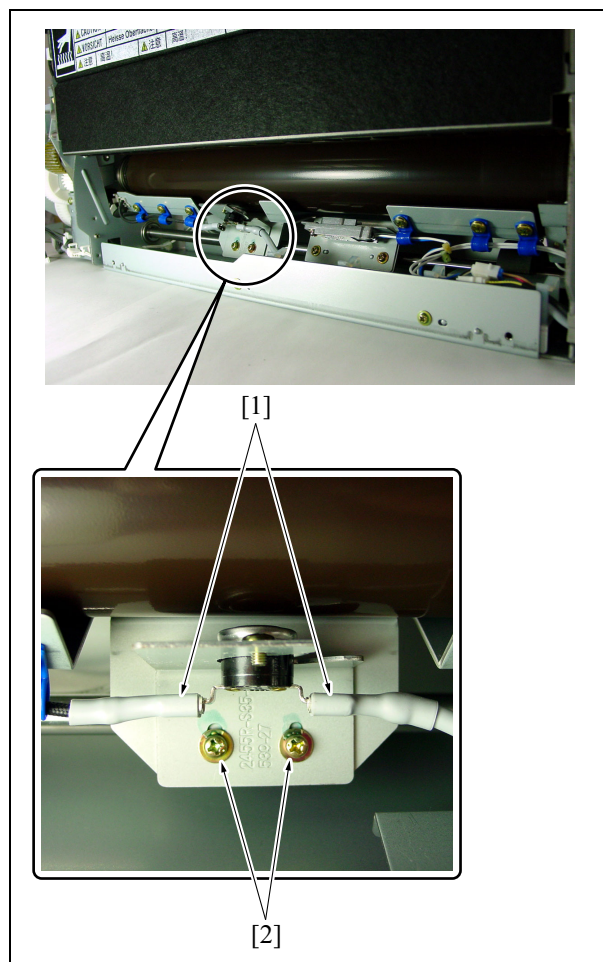
- Be careful not to change the position of the set screw of the fixing temperature sensor 2.
- Be careful not to damage the internal surface of the sensor.
- A positioning jig is not used when reinstalling it.

3. Reinstall the above parts following the removal steps in reverse.

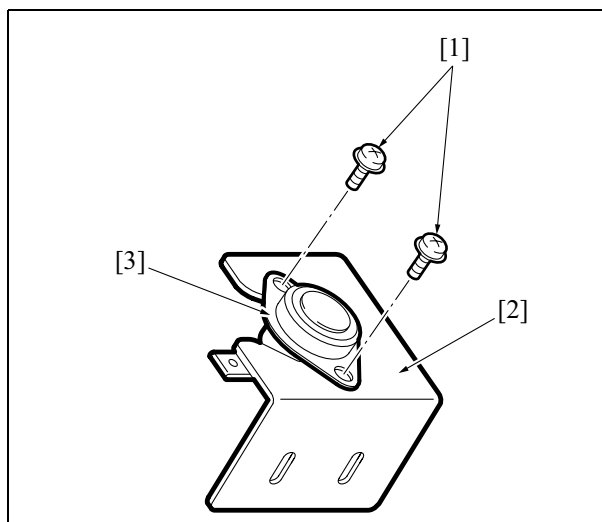


D. Procedure (for removing the thermostat L)

1. Remove 2 faston terminals [1] and 2 screws [2] of the thermostat L and then remove the thermostat section.

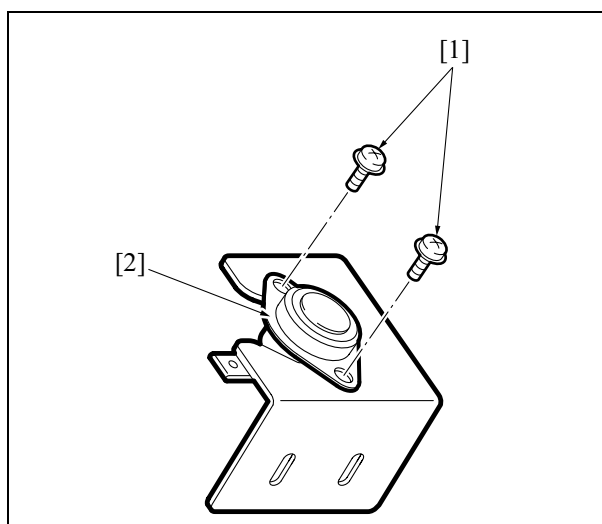


2. Remove 2 screws [1] and then remove the thermostat L [3] from the thermostat mounting board L [2].

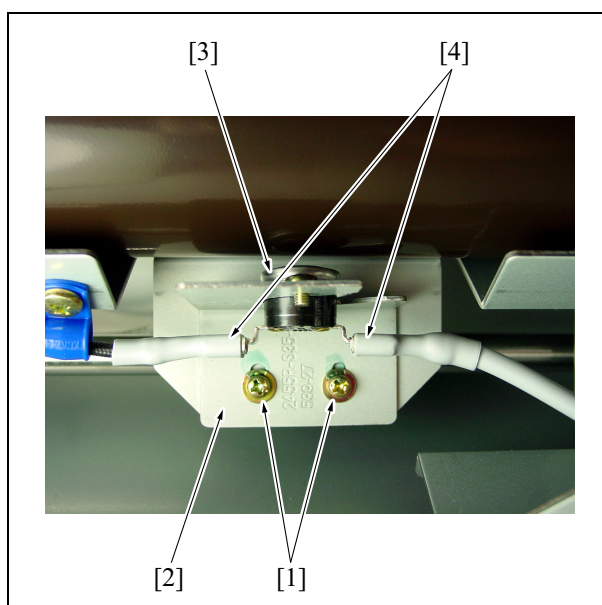


E. Procedure (for reinstalling the thermostat L)

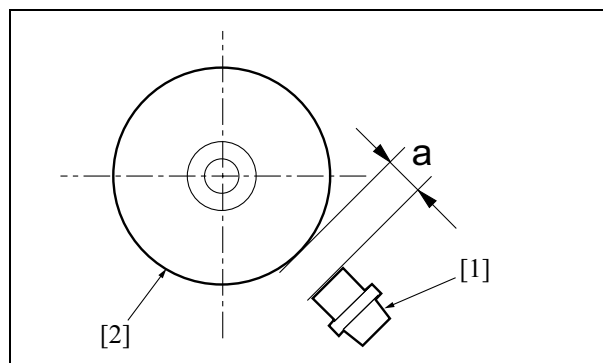
1. Fasten the thermostat L [2] with 2 screws [1].



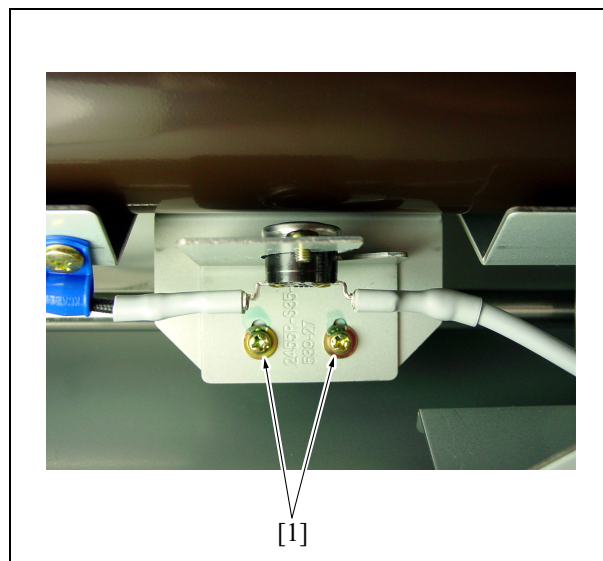
2. Fasten the thermostat mounting board L [2] with 2 screws [1].
3. Connect 2 faston terminals [4] to the thermostat L [3].



4. With a thermostat positioning jig (65AAJG031KC) set between the thermostat L [1] and the fixing lower roller [2], fasten the thermostat mounting board L with 2 screws so that the mounting board becomes the same thickness as the positioning jig.
 - Specification: $a = 2.7 \pm 0.2\text{mm}$



5. Apply 2 screws [1] of the thermostat section with screw lock paint.



9.9 Replacing the fixing drive gear

A. Periodically replaced parts/cycle

- Fixing drive gear: Every 1,000,000 copies

B. Procedure

- Remove the fixing unit.
- Remove the connector [1] and a screw [2], and then remove the PS16 (fixing pressure release sensor) [3].

Note:

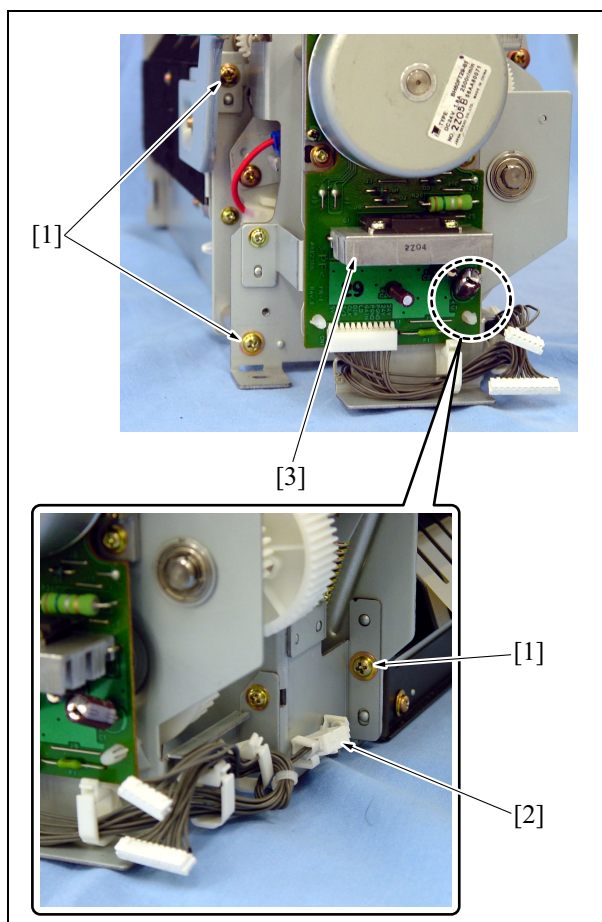
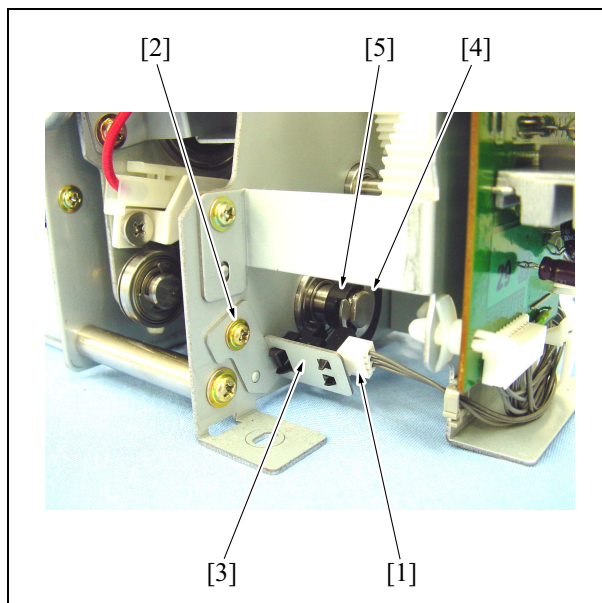
- Be careful not to damage the PS16 [3].

- Remove the E-ring [4] and then remove the actuator [5].

Note:

- Be sure to take note of the direction of the actuator when reinstalling it.

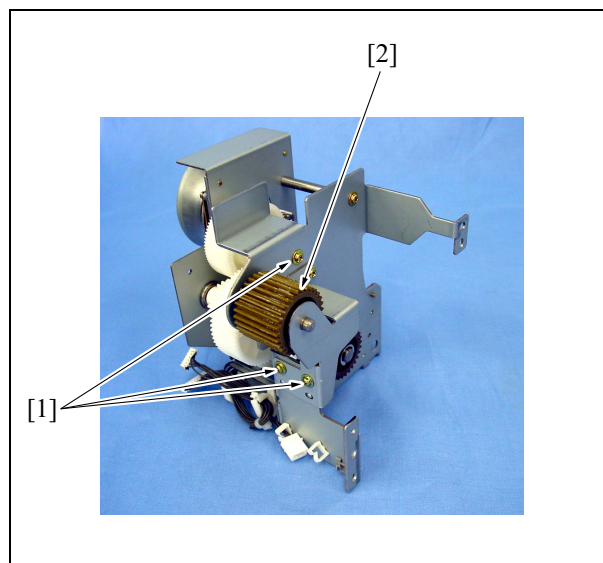
- Remove 3 screws [1] and the connector [2], and then remove the fixing drive panel assembly [3].



5. Remove 3 screws [1] and then remove the fixing drive gear [2].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- When installing the fixing drive gear, apply Multemp FF-RM (or, Solvent 240) on it.



9.10 Replacing the fixing cleaning unit

A. Periodically replaced parts/cycle

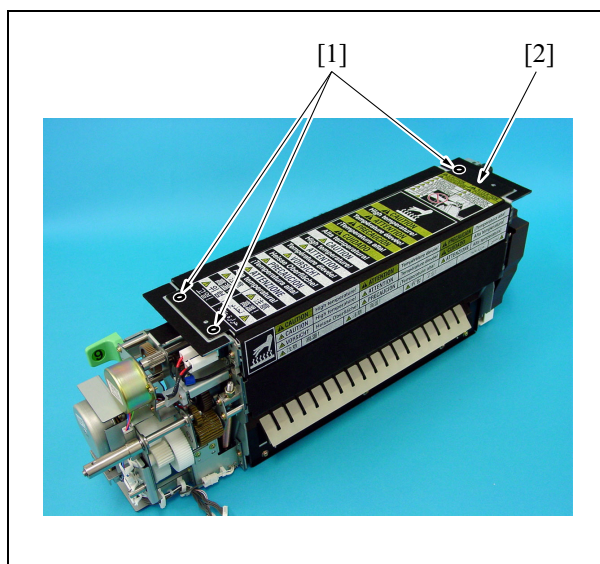
- Fixing cleaning unit: Every 200,000 copies

B. Procedure

- Remove the fixing unit.
- Remove 3 screws [1] and then the remove the fixing upper cover [2].

Note:

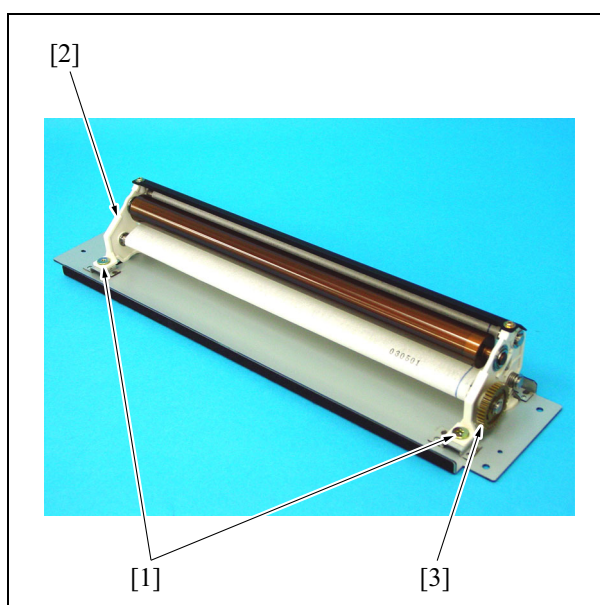
- When removing the fixing upper cover, raise it up without tilting it to avoid damage to the fixing roller U.



- Remove 2 screws [1] and then remove the fixing cleaning unit [2].

Note:

- Be sure to turn the web drive gear [3] to take up the slack of the cleaning web before reinstalling it to the fixing unit.



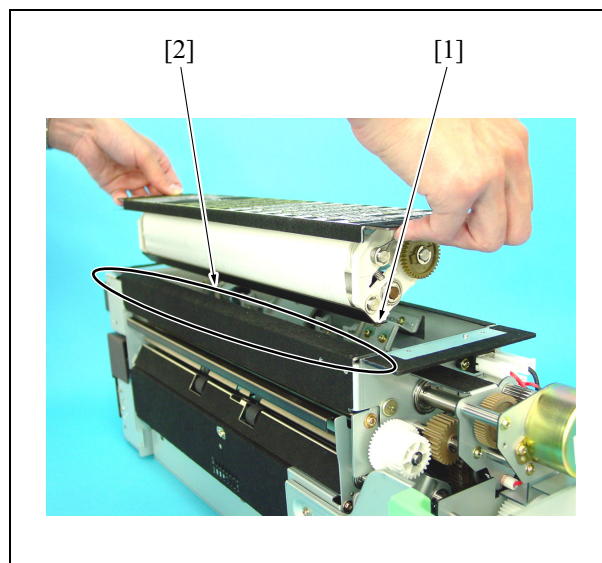
- When reinstalling it to the fixing unit, be sure to press it against the paper exit side [2] horizontally while being careful that the paper entrance prevention plate [1] does not get in touch with the roller. This is because the paper entrance prevention plate may cause damage to the roller.

4. Reinstall the above parts following the removal steps in reverse.

Note:

- After replacing the fixing cleaning unit, be sure to reset the count of the fixing cleaning unit in accordance with the 25 mode "Parts counter - Count of special parts."

If not, a problem such as image smudge may arise because the web feed amount becomes less than the set value or the engine displays the message "The fixing cleaning unit is require to be replaced. Contact the service manager or the authorized distributor" and is disabled to copy or print.



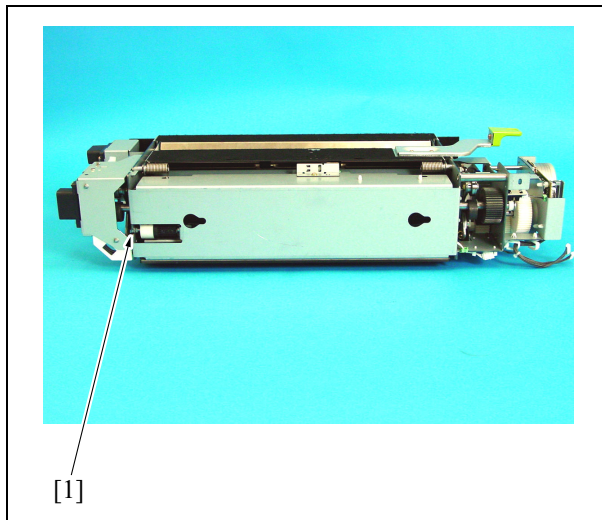
9.11 Replacing the fixing torque limiter

A. Periodically replaced part/cycle

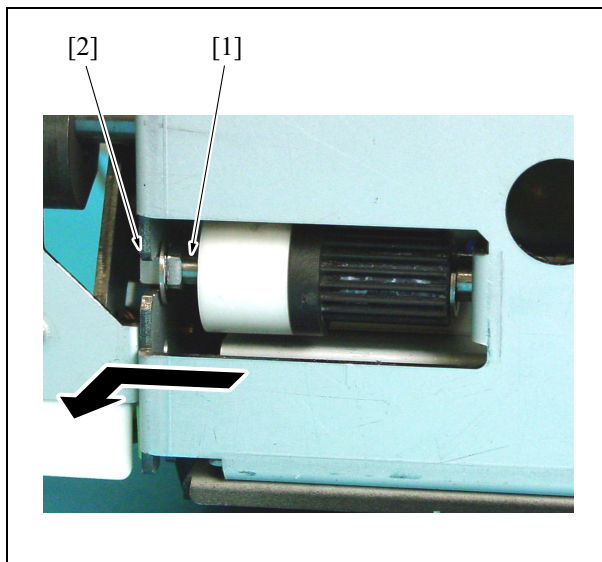
- Fixing torque limiter: Every 600,000 copies

B. Procedure

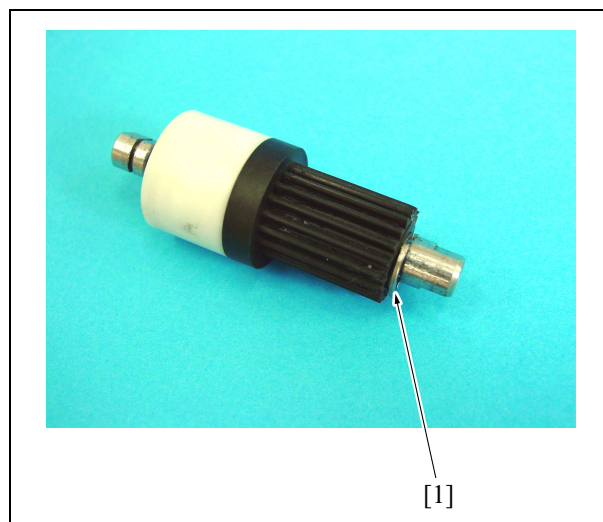
1. Remove the fixing unit.
2. Place it gently on an even table with its paper feed side down.
3. Remove the E-ring [1].



4. Slide the shaft [1] to the rear side, and pull it out with the notch [2] of the shaft aligned with the panel.



5. Remove the E-ring [1].

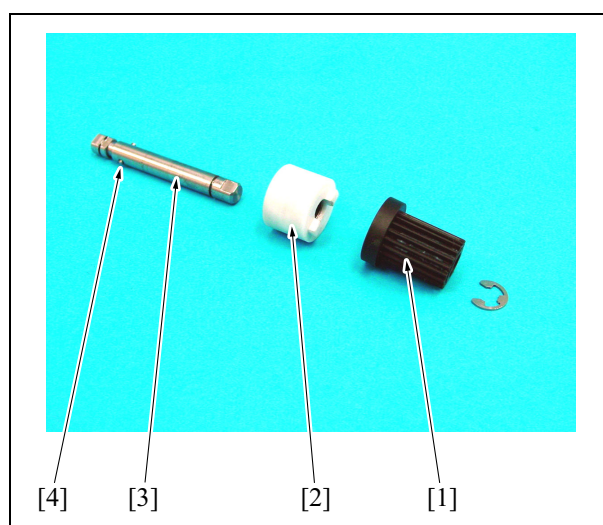


6. Remove the gear [1] and the fixing torque limiter [2] and replace the fixing torque limiter with a new one.

Note:

- The shaft [3] contains a pin [4]. Be careful that the pin does not get lost.

7. Reinstall the above parts following the removal steps in reverse.



10. REGISTRATION / ADU / REVERSE / PAPER EXIT

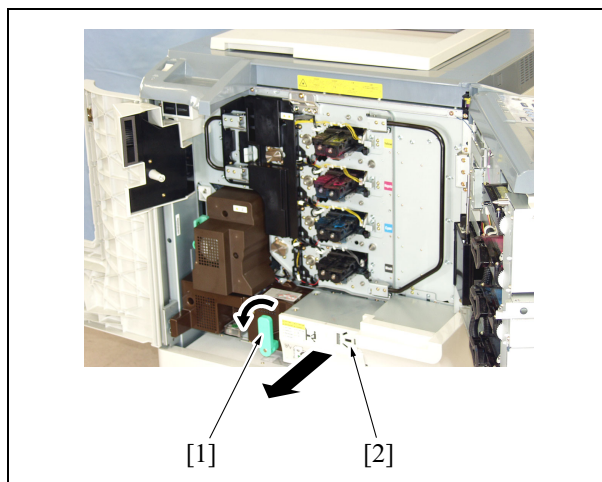
10.1 Removing and reinstalling the ADU

Note:

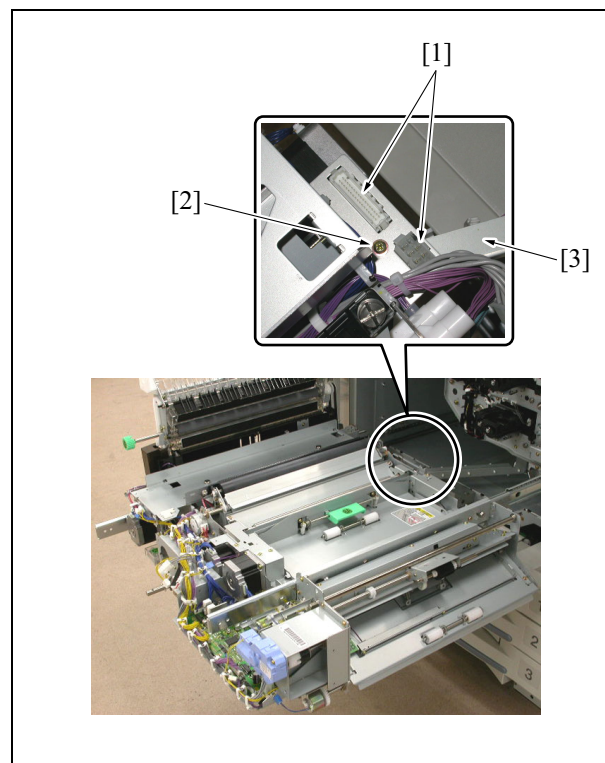
- In order to prevent the engine from falling over, the process unit and the ADU are provided with a safety mechanism so that they cannot be pulled out at the same time.
- If the process unit has been pulled out when pulling out the ADU, be sure to put the process unit back into the engine.

A. Procedure

1. Open the toner supply section. (See "5.1 Opening and closing the toner supply section.")
2. Release the lock and pull down the ADU release lever [1] counterclockwise and pull out the ADU [2].
3. Remove the fixing unit. (See "9.2 Removing and reinstalling the fixing unit.")
4. Remove the ADU cover /R, ADU release lever and the ADU cover L. (See "7.3 Replacing the paper feed clutch BP").
5. Remove the paper feed solenoid cover. (See "7.1 Replacing the paper feed roller and the feed roller.")



6. Remove 2 relay connectors [1].
7. Remove the screw [2] and then release the fixing of the ADU wiring harness assembly [3].



8. Remove 4 screws [1].
9. Remove the screw [2].
10. Push back the ADU [6] so that each of the screws [5] can be seen through the holes [4] in the the guide rail L [3], and then remove the screws [5] one at a time.

Note:

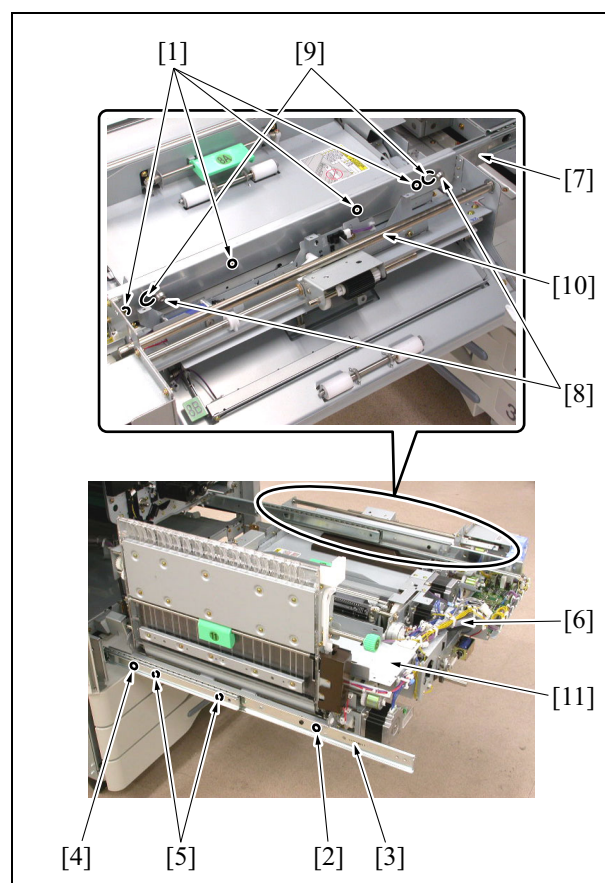
- Be careful not to remove black screws.

11. Pull out the ADU [6] once again and move the guide pin [8] of the guide rail R [7] into the turn-out place of the oblong hole [9].
12. Remove the ADU [6] from the guide rails L [3] and R [7].

Note:

- When removing the ADU [6], please note that this work requires two persons, with one person at the paper feed side and the other at the paper exit side.
- When removing the ADU [6], a person at the paper feed side must hold the ADU handle R [10].
- When removing the ADU [6], a person at the paper exit side must hold the handle provided at the center of the fixing positioning rail [11].

13. Reinstall the above parts following the removal steps in reverse.



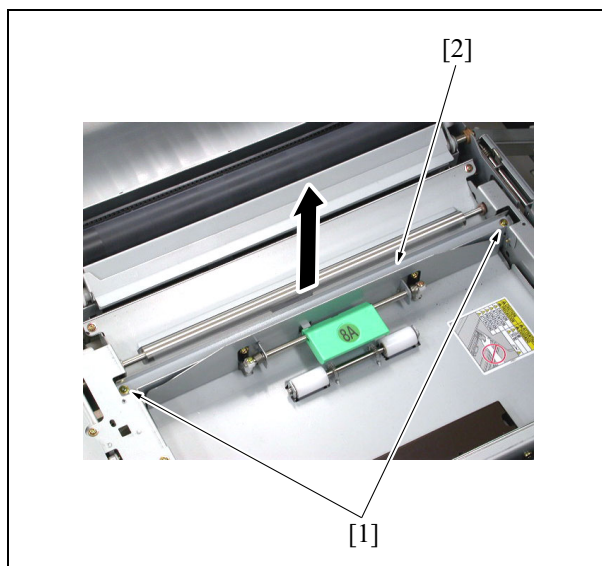
10.2 Replacing the registration cleaning sheet

A. Periodically replaced parts/cycle

- Registration cleaning sheet: Every 600,000 copies

B. Procedure

1. Open the toner supply section. (See "5.1 Opening and closing the toner supply section.")
2. Pull out the ADU. (See "10.1 Removing and reinstalling the ADU.")
3. Remove 2 screws [1] and then remove the registration cleaning sheet [2].
4. Reinstall the above parts following the removal steps in reverse.



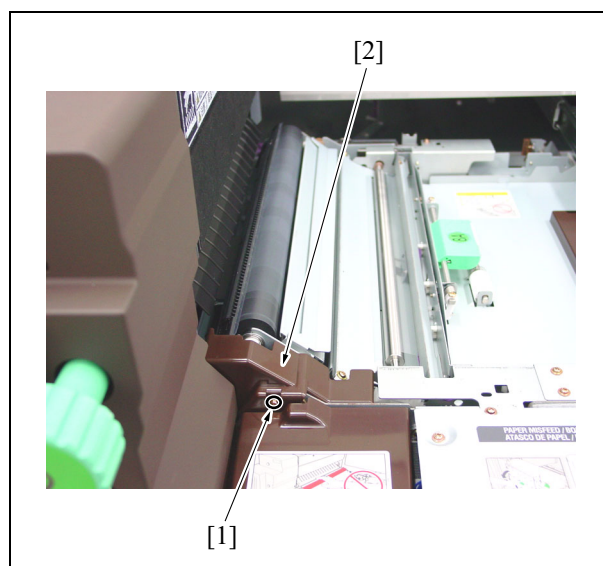
10.3 Replacing the separation corona unit

A. Periodically replaced parts/cycle

- Separation corona unit: Every 100,000copies

B. Procedure

1. Open the toner supply section. (See "5.1 Opening and closing the toner supply section.")
2. Pull out the ADU. (See "10.1 Removing and reinstalling the ADU.")
3. Remove the fixing unit. (See "9.2 Removing and reinstalling the fixing unit.")
4. Remove 2 screws [1] and remove the transfer release cover.



5. Remove 2 separation fitting screws [2].
6. Raise the separation corona unit [2] once, remove a faston [3] and then remove the separation corona unit [2].

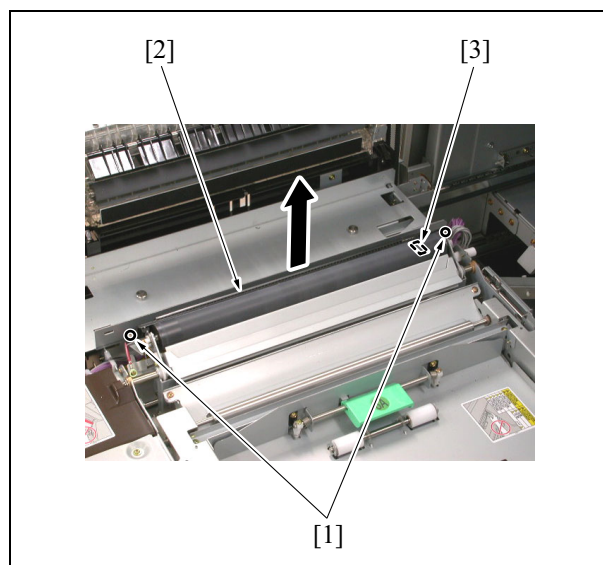
Note:

- When removing the faston from the separation corona unit, be sure to pull out straight the faston cover section.

7. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the separation corona unit, be sure to fasten in advance the separation fitting screw on the front side for positioning.



10.4 Replacing the transfer ground plate unit and the 2nd transfer roller L

A. Periodically replaced parts/cycle

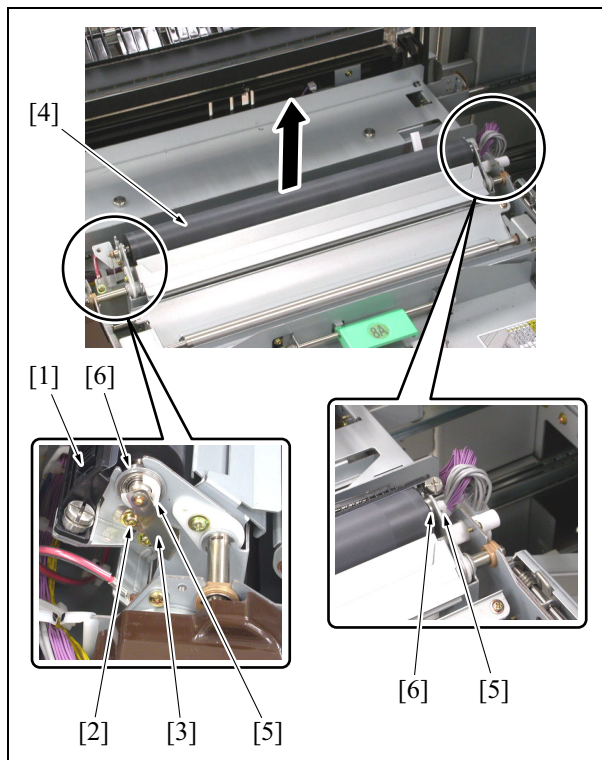
- Transfer ground plate unit: Every 1,000,000 copies
- 2nd transfer roller L: Every 200,000 copies

B. Procedure

1. Remove the separation corona unit [1]. (See "10.3 Replacing the separation corona unit.")
2. Remove the screw [2] and then remove the transfer ground plate unit [3].
3. Remove 2 stop rings [5].
4. Slide each of 2 bearings [6] to the outside and remove the 2nd transfer roller L [4].
5. Remove 2 bearings [6] from the 2nd transfer roller L [4].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- Be careful not to touch with bare hands the 2nd transfer roller L [4] on any sections other than the shaft section.
- When installing the 2nd transfer roller L, install it with the dent on the roller shaft comes to the rear of the engine (instead of coming to the side contacting with the transfer earth plate).



10.5 Replacing the registration roller

A. Periodically replaced parts/cycle

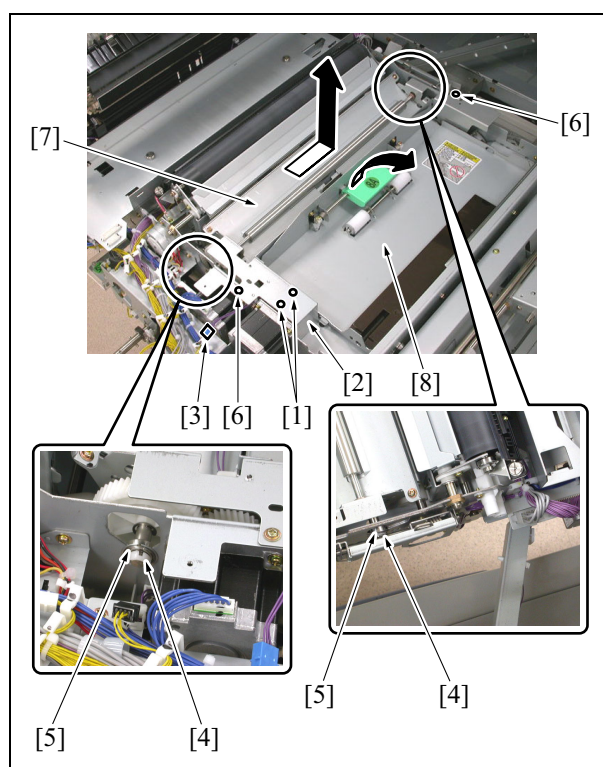
- Registration roller: Every 1,500,000 copies

B. Procedure

1. Remove the registration cleaning sheet. (See "10.2 Replacing the registration cleaning sheet.")
2. Remove the ADU cover R, ADU release lever and the ADU cover L. (See "7.3 Replacing the paper feed clutch /BP.")
3. Remove 2 screws [1] and then remove the gear cover [2].
4. Remove a relay connector [3].
5. Remove the stop rings [4], 1 each, and then remove the bearings [5], 1 each at front and rear.
6. Remove 2 screws [6] and then remove the registration unit [7].

Note:

- When removing the registration unit [7], open the conveyance guide plate U [8] and slide the registration unit toward the rear of the ADU to pull out the shaft of the front side from the ADU panel, and then remove the registration unit.



7. Remove the E-ring [1] and then remove the registration gear [2] and the pin [3].

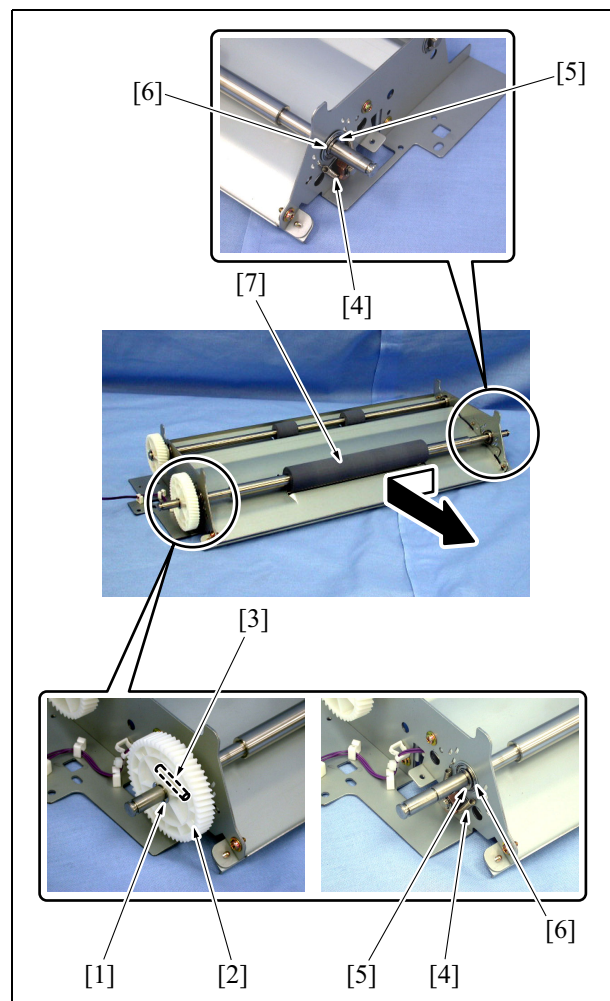
Note:

- When reinstalling the registration gear [2], be sure to attach the pin [3] without fail.

8. Remove 2 registration pressure springs [4].
9. Remove 2 E-rings [5] and 2 bearings [6] and then remove the registration roller [7].
10. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the registration unit, be careful not to damage the paper passage of the guide plate.
- Make sure to replace the registration pressure springs to the original position.



10.6 Replacing the intermediate conveyance clutches 2 and 3

A. Periodically replaced parts/cycle

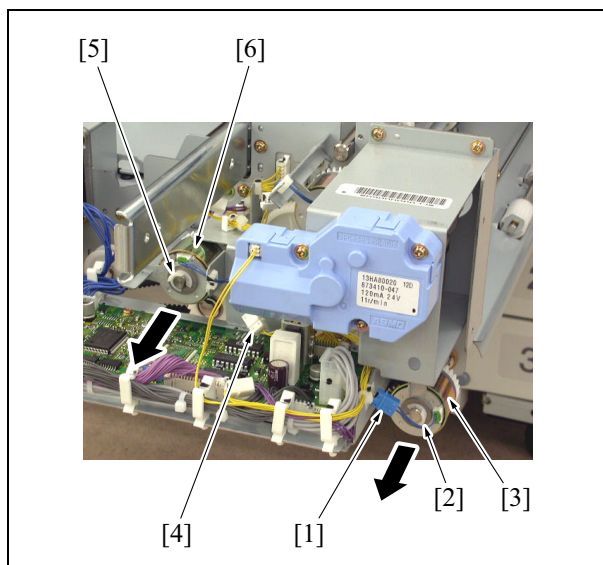
- Intermediate conveyance clutch 2 (MC4):
Every 2,000,000 copies
- Intermediate conveyance clutch 3 (MC5):
Every 2,000,000 copies

B. Procedure

1. Remove the ADU cover R. (See "7.3 Replacing the paper feed clutch BP.")
2. Remove a relay connector [1].
3. Remove the stop ring [2] and then remove the intermediate conveyance clutch 2 (MC4) [3].
4. Remove a relay connector [4].
5. Remove the stop ring [5] and then remove the intermediate conveyance clutch 3 (MC5) [6].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the MC4 and MC5, be sure to take note of the position of the stopper.



10.7 Replacing the ADU conveyance clutches 1 and 2

A. Periodically replaced parts/cycle

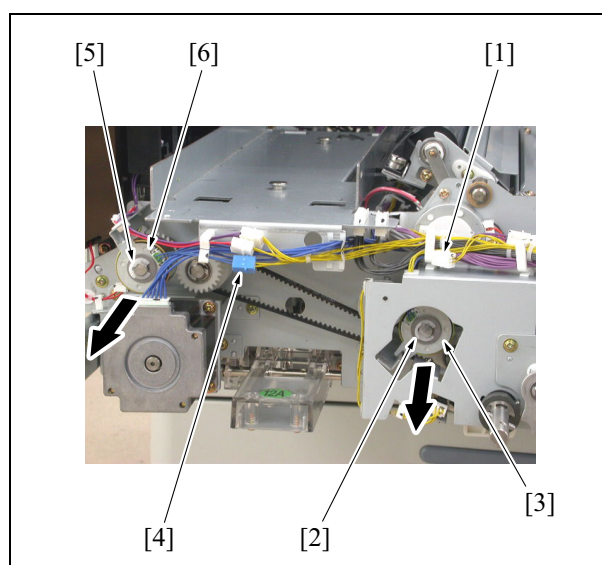
- ADU conveyance clutch 2 (MC1):
Every 2,000,000 copies
- ADU pre-registration clutch (MC2):
Every 2,000,000 copies

B. Procedure

1. Remove the ADU release lever and the ADU cover L (See "7.3 Replacing the paper feed clutch BP").
2. Remove a relay connector [1].
3. Remove the stop ring [2] and then remove the ADU conveyance clutch 2 (MC1) [3].
4. Remove a relay connector [4].
5. Remove the stop ring [5] and then remove the ADU conveyance clutch 1 (MC2) [6].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the MC1 and MC2, be sure to take note of the position of the stopper.



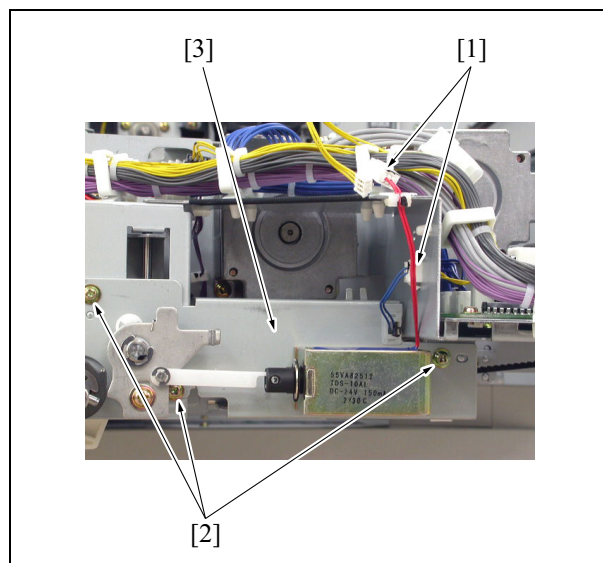
10.8 Replacing the ADU pre-registration clutch

A. Periodically replaced parts/cycle

- ADU pre-registration clutch (MC3):
Every 2,000,000 copies

B. Procedure

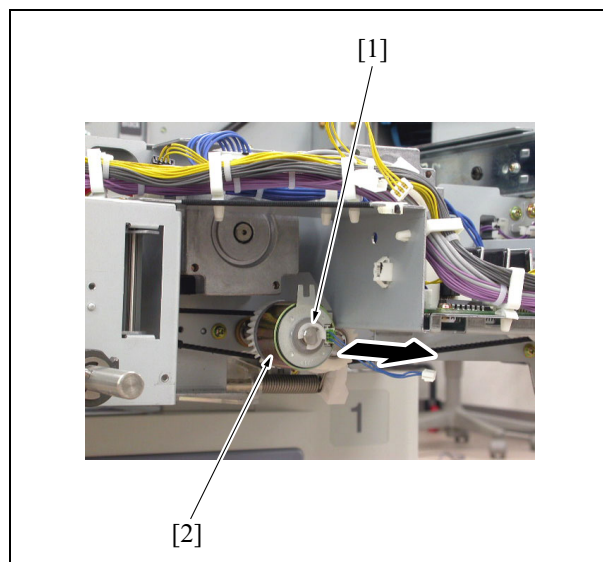
1. Remove the ADU cover /R, ADU release lever and the ADU cover L. (See "7.3 Replacing the paper feed clutch BP.")
2. Remove two relay connectors [1].
3. Remove 3 screws [2] and then remove the ADU lock section [3].



4. Remove the stop ring [1] and then remove the ADU pre-registration clutch (MC3) [2].
5. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the ADU lock section, be sure to take note of the stopper position of the the MC3.



10.9 Replacing the decurler roller

A. Periodically replaced parts/cycle

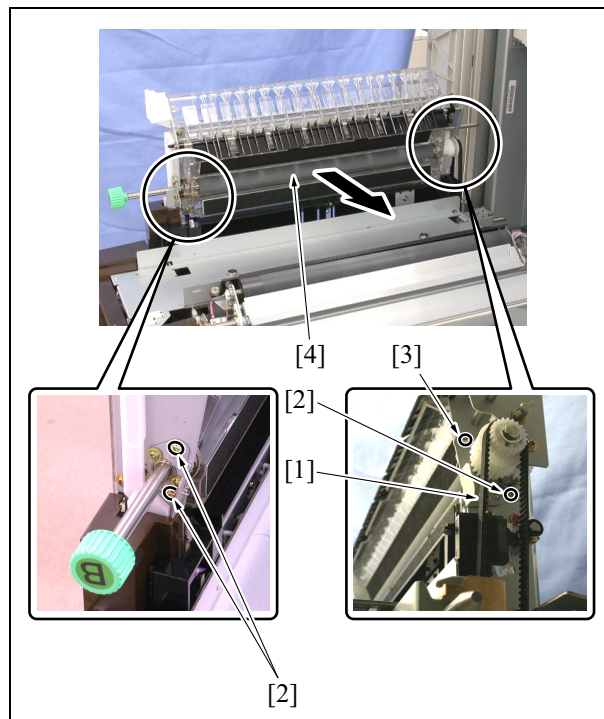
- Decurler roller: Every 100,000 copies

B. Procedure

1. Pull out the ADU. (See "10.1 Removing and reinstalling the ADU.")
2. Remove the fixing unit. (See "9.2 Removing and reinstalling the fixing unit.")
3. Remove the paper exit drive belt 1 [1].
4. Remove 3 screws [2] and the screw [3], and the remove the paper exit guide plate 4 assembly [4].

Note:

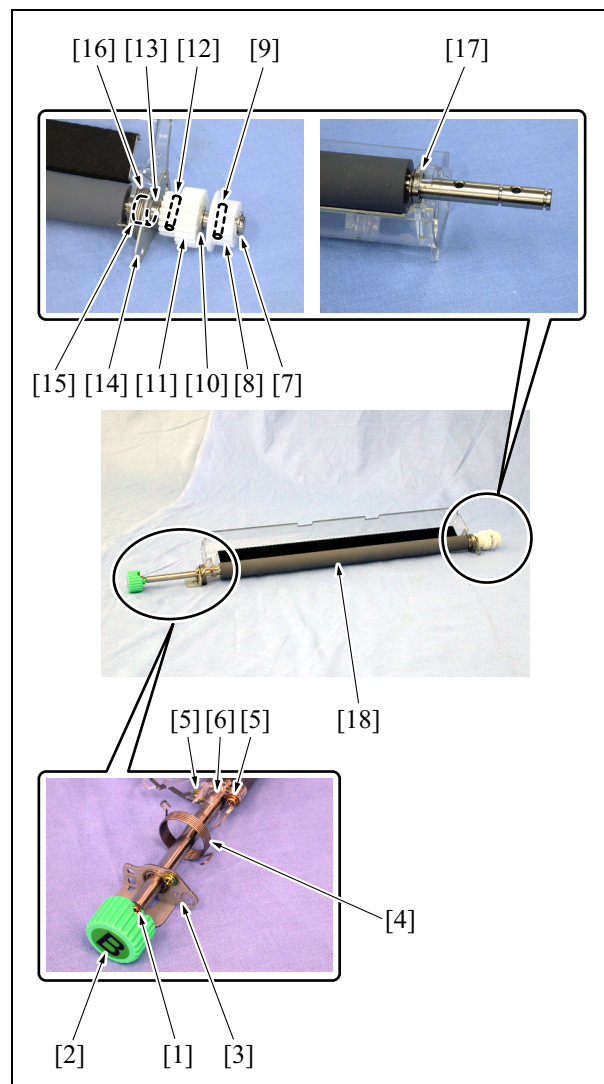
- The screw [2] and the screw [3] are different in length. Be sure to take note of the position of the screw [3] when reintalling the assembly.



5. Remove the screw [1] and then remove the knob [2].
6. Remove the paper exit mounting plate F [3] and the paper exit open/close spring F [4].
7. Remove two screw [5] and then remove the bearing [6].
8. Remove the E-ring [7] and then remove the paper exit drive pulley 1 [8] and the pin [9].
9. Remove the E-ring [10] and then remove the paper exit drive gear 4 [11] and the pin [12].
10. Remove the bearing [13], paper exit mounting plate R [14], curler 1 [15] and the paper exit open/close spring R [16].
11. Slide the bearing [17] to the inside and remove the decurler [18].
12. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the paper exit drive pulley 1 [8], be sure to take note of the direction of the belt guide.
- When the decurler roller is replaced, reset "5. Parts counter" and "1. Count of special parts." If not, the fixing jam may occur.



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Q3228A

Automatic Document Feeder (ADF)

SERVICE MANUAL

CONTENTS

SAFETY AND IMPORTANT WARNING ITEMS

Refer to the 9850 service manual

I OUTLINE

1. PRODUCT SPECIFICATIONS	1-1
2. CENTER CROSS SECTION	1-3
3. DRIVE SYSTEM DIAGRAM	1-4
3.1 Paper feed drive	1-4
3.2 Conveyance drive	1-4
3.3 Reverse/paper exit drive	1-5

II UNIT EXPLANATION

1. PAPER FEED	2-1
1.1 Composition	2-1
1.1.1 Paper feed drive	2-1
1.1.2 Conveyance drive	2-2
1.1.3 Reverse/paper exit drive	2-3
1.2 Operation	2-4
1.2.1 Single sided original mode	2-4
1.2.2 Double sided original mode	2-10
1.2.3 Original size detection	2-16

III DISASSEMBLY/ASSEMBLY

1. EXTERIOR	3-1
1.1 RADF hinge opening/closing angle adjustment	3-1
1.2 Removing and reinstalling the front cover	3-3
1.3 Removing and reinstalling the rear cover	3-4
1.4 Removing and reinstalling the registration roller cover	3-5
2. PAPER FEED	3-6
2.1 Cleaning the no paper sensor	3-6
2.2 Removing and reinstalling the paper feed unit	3-7
2.3 Replacing the paper feed roller and the feed roller	3-9
2.4 Replacing the double feed prevention roller	3-11
3. PAPER FEED	3-13
3.1 Cleaning the registration roller	3-13
3.2 Cleaning the registration sensor	3-14
3.3 Removing and reinstalling the conveyance belt	3-15
4. REVERSE/PAPER EXIT	3-17
4.1 Cleaning the paper exit roller/the paper exit sensor	3-17
4.2 Cleaning the reverse roller	3-17
5. REMOVING AND REINSTALLING RADF	3-18

I OUTLINE

II UNIT EXPLANATION

III DIS./ASSEMBLY

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I OUTLINE

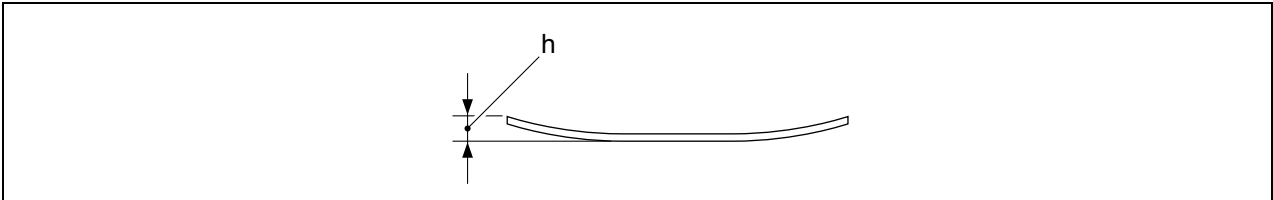
1. PRODUCT SPECIFICATIONS

A. Type

Type: RADF with automatic original reverse function

B. Functions

Original size	For metric area A3, B4, A4, A4R, B5, B5R, A5, A5R, 11 x 17, 8.5 x 13, 8.5 x 11 For inch area 11 x 17, 8.5 x 14, 8.5 x 11, 8.5 x 11R, A3, B4, A4, B5, B5R
Max. original size	297 x 431.8mm
Min. original size	128 x 139.7mm
	• Mixing of original size possible
Original type	
Plain paper	
Single sided	High-quality paper of 35 - 200 g/m ²
Double-sided	High-quality paper of 50 - 200g/m ²
Paper less than 49g/m ² is conveyed in the thin paper mode and paper more than 129 g/m ² in the thick paper mode.	
Special paper	Same as in the plain paper, but efficiency of paper feed and conveyance may not be guaranteed. • Recycled paper, thermal paper, binding-holed original, irregular size original, original with smooth surface, original with rough surface, and folded original. Following paper cannot be used: • OHP film, blueprint master, label paper, offset master, bonded original
Amount of paper curl (a sheet of original) h = 10mm or below (80 g/m ² paper)	



Maximum tray capacity:	100 (80 g/m ² paper)
Original scan speed (A4 size)	
Single side mode	
(including thin-paper mode)	37 sheets/minute
Double side mode	
(including thin-paper mode)	26 sheets/minute
Single side mode (thick-paper mode)	28 sheets/minute
Double side mode (thick-paper mode)	16 sheets/minute
Original scanning system	After the original conveyed on the belt stops, the scanner moves and scans the original.

C. Engine data

Power source:	24VDC/5V (supplied from the engine)
Power consumption:	Maximum 50VA
Weight:	Approx. 14.5kg
Dimensions:	588mm (W) x 519mm (D) x 135mm (H) (Excluding paper feed tray)

D. Maintenance and life

Maintenance:	Same as the engine
Engine service life:	Same as the engine

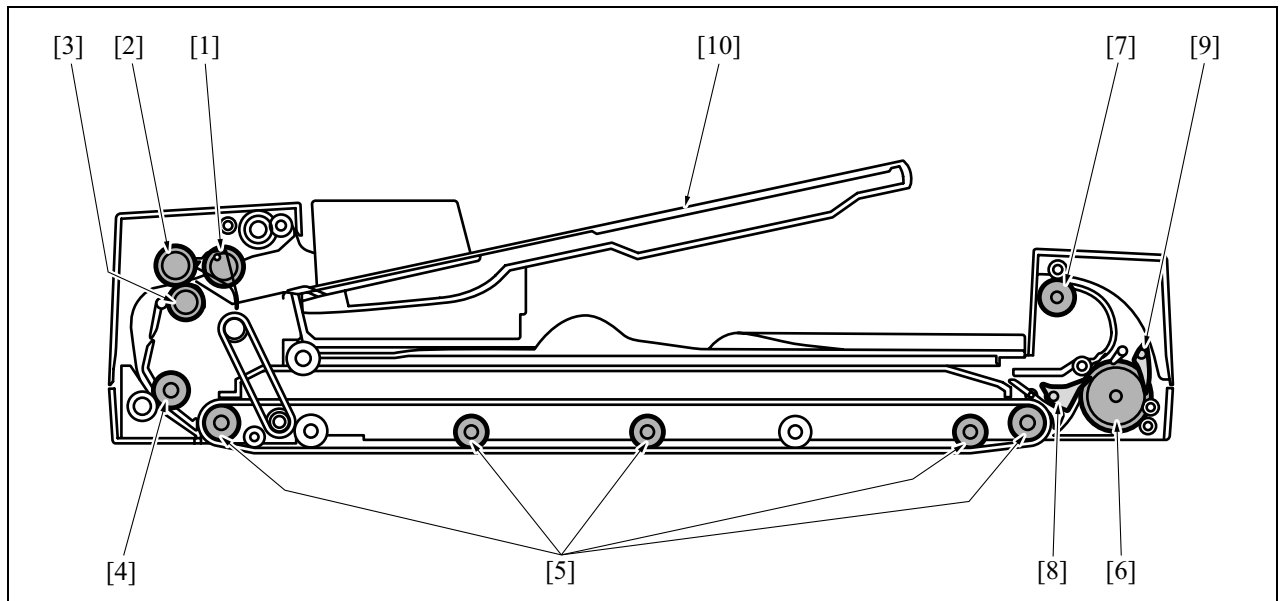
E. Operating environment

Temperature:	10°C to 30°C
Humidity:	10% RH to 80% RH (with no dew condensation)

Note:

- The information herein may be subject to change for improvement without notice.

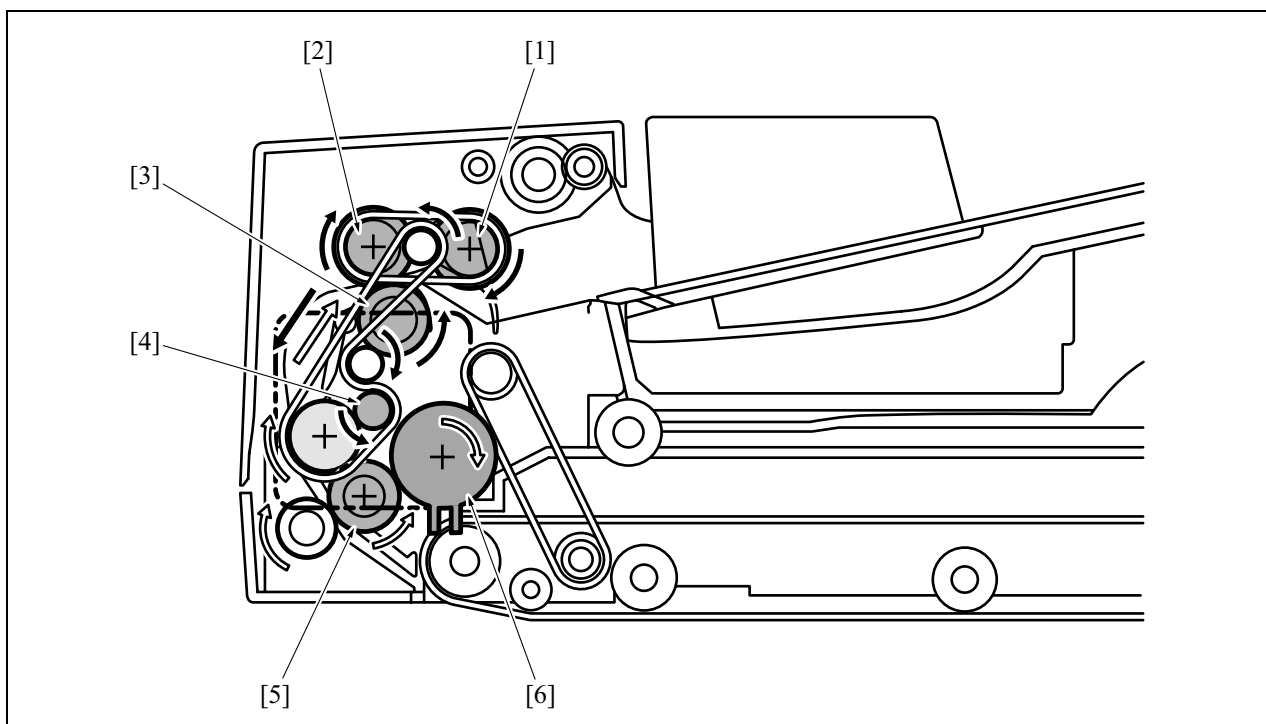
2. CENTER CROSS SECTION



- | | |
|---|-----------------------|
| [1] Paper feed roller | [6] Reverse roller |
| [2] Feed roller | [7] Paper exit roller |
| [3] Double feed prevention roller | [8] Reverse guide |
| [4] Registration roller | [9] Paper exit guide |
| [5] Conveyance roller or belt conveyance roller | [10] Paper feed tray |

3. DRIVE SYSTEM DIAGRAM

3.1 Paper feed drive



[1] Paper feed roller

[2] Feed roller

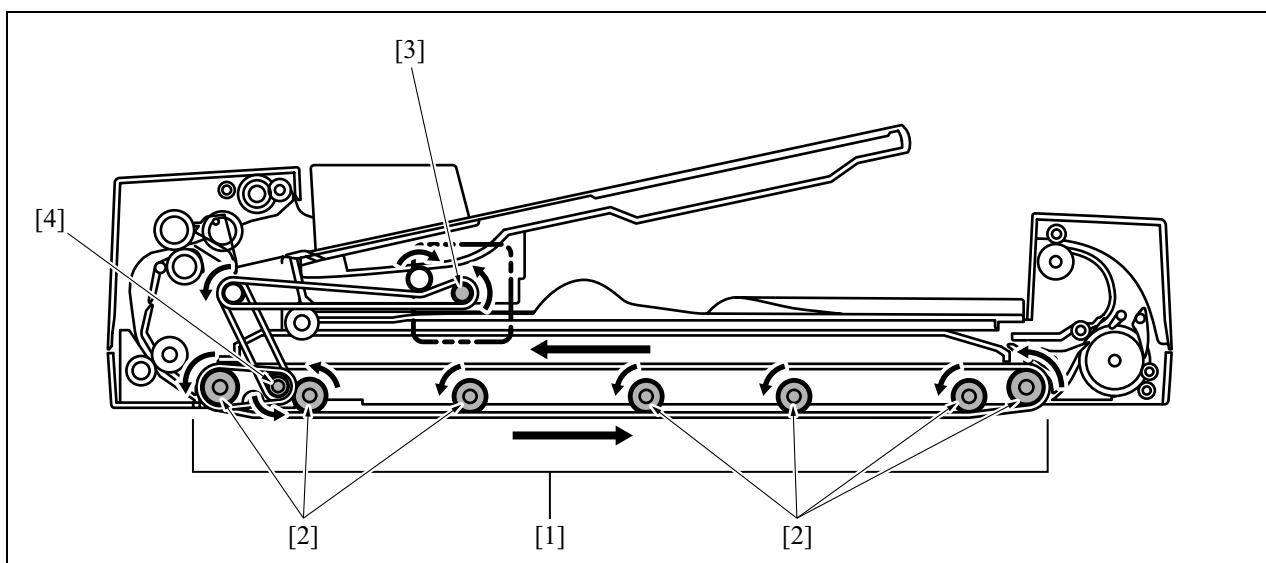
[3] Double feed prevention roller

[4] Paper feed motor (M301)

[5] Registration roller

[6] Registration clutch (MC301)

3.2 Conveyance drive

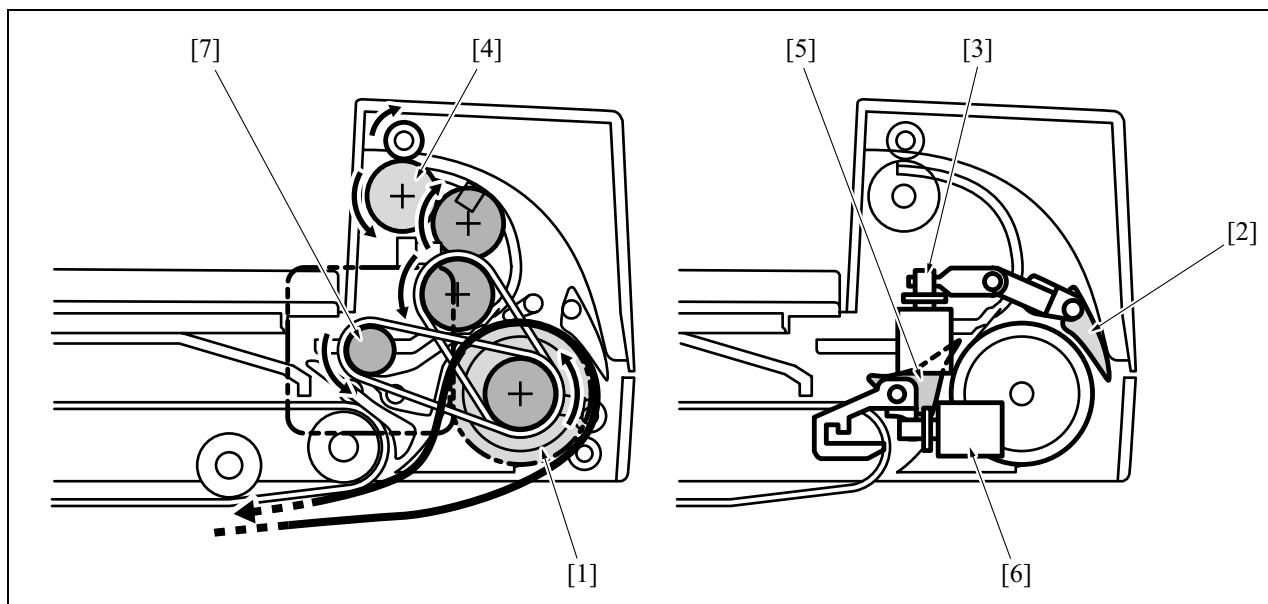


[1] Conveyance belt unit

[2] Conveyance roller or belt conveyance roller

[3] Conveyance motor (M302)

3.3 Reverse/paper exit drive



- | | |
|------------------------------|-------------------------------------|
| [1] Reverse roller | [5] Paper exit guide |
| [2] Reverse guide | [6] Paper exit solenoid (SD301) |
| [3] Reverse solenoid (SD302) | [7] Reverse/paper exit motor (M303) |
| [4] Paper exit roller | |

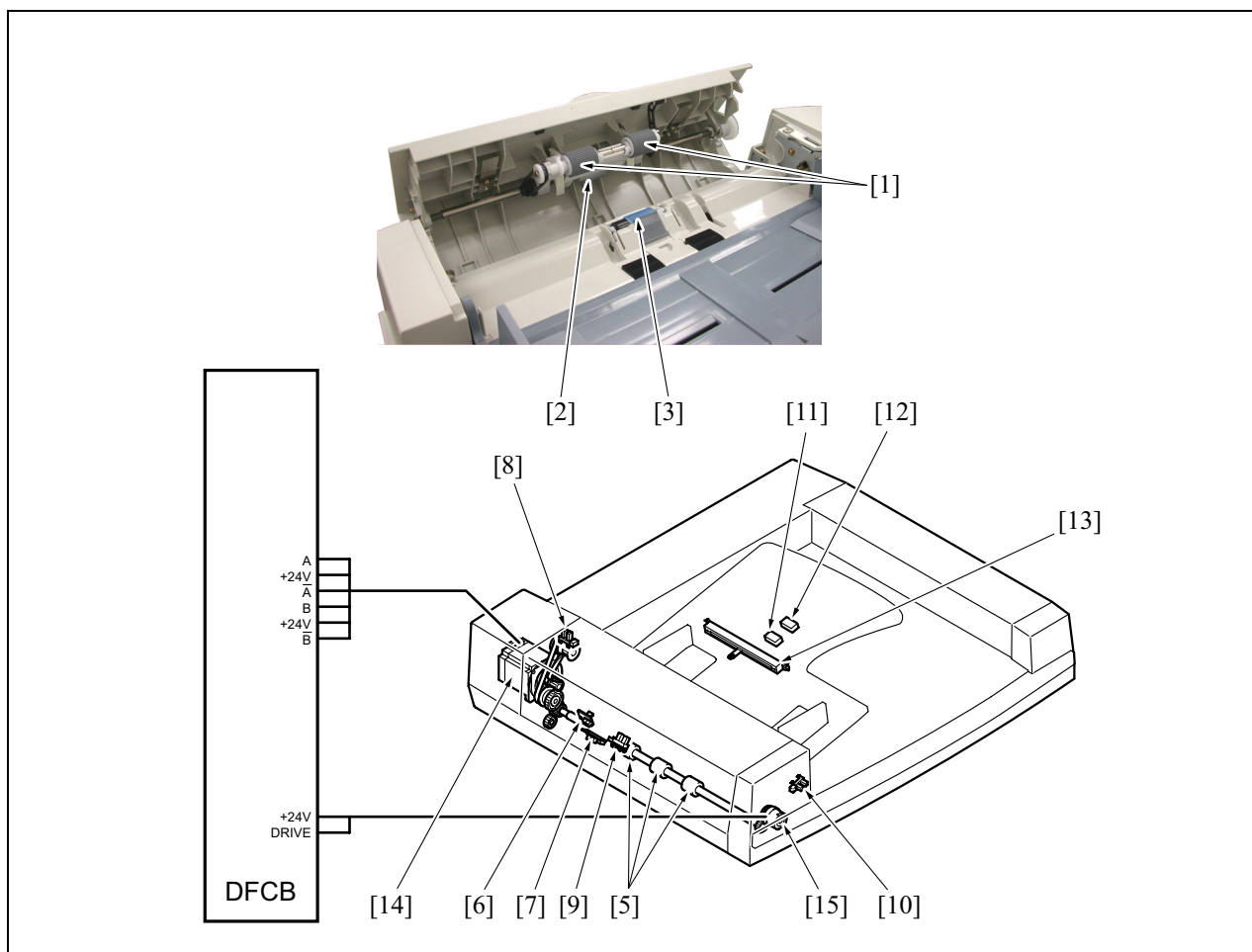
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II UNIT EXPLANATION

1. PAPER FEED

1.1 Composition

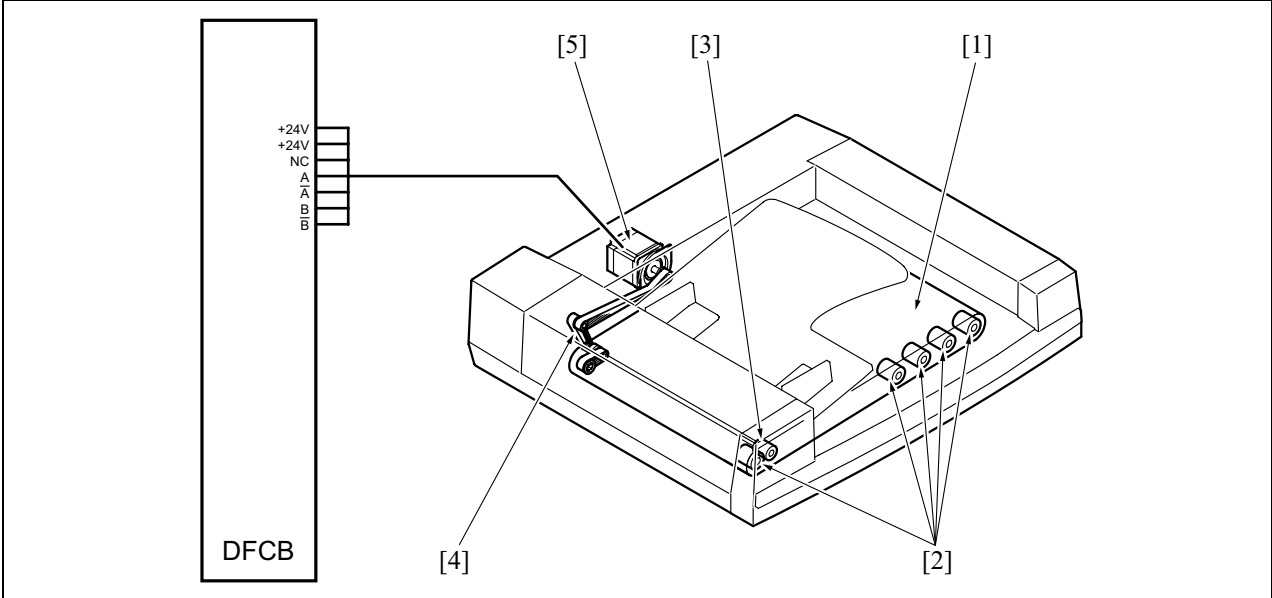
1.1.1 Paper feed drive



Symbol	Name	Function or method
[1]	Paper feed roller	Conveyance of original
[2]	Feed roller	Conveyance of original
[3]	Double feed roller	Prevention of double feed of original, Torque limiter
[5]	Registration roller	Original skew correction, original conveyance
[6]	Registration sensor (PS301)	Detection of original immediately before the registration
[7]	Timing sensor (PS302)	Detection of original swing back control start timing
[8]	Paper feed cover sensor (PS303)	Detection of opening/closing of paper feed cover
[9]	No paper sensor (PS304)	Detection of no original
[10]	Tray open/close sensor (PS308)	Detection of opening and closing of paper feed tray
[11]	Size sensor/S (PS309)	Original size detection in sub-scanning direction
[12]	Size sensor/LP (S310)	Original size detection in sub-scanning direction
[13]	Size VR (VR301)	Original size detection in main-scanning direction

Symbol	Name	Function or method
[14]	Paper feed motor (M301)	Drives the feed roller, feed roller and registration roller. 24VDC stepping motor
[15]	Registration clutch	Brakes to stop the registration roller

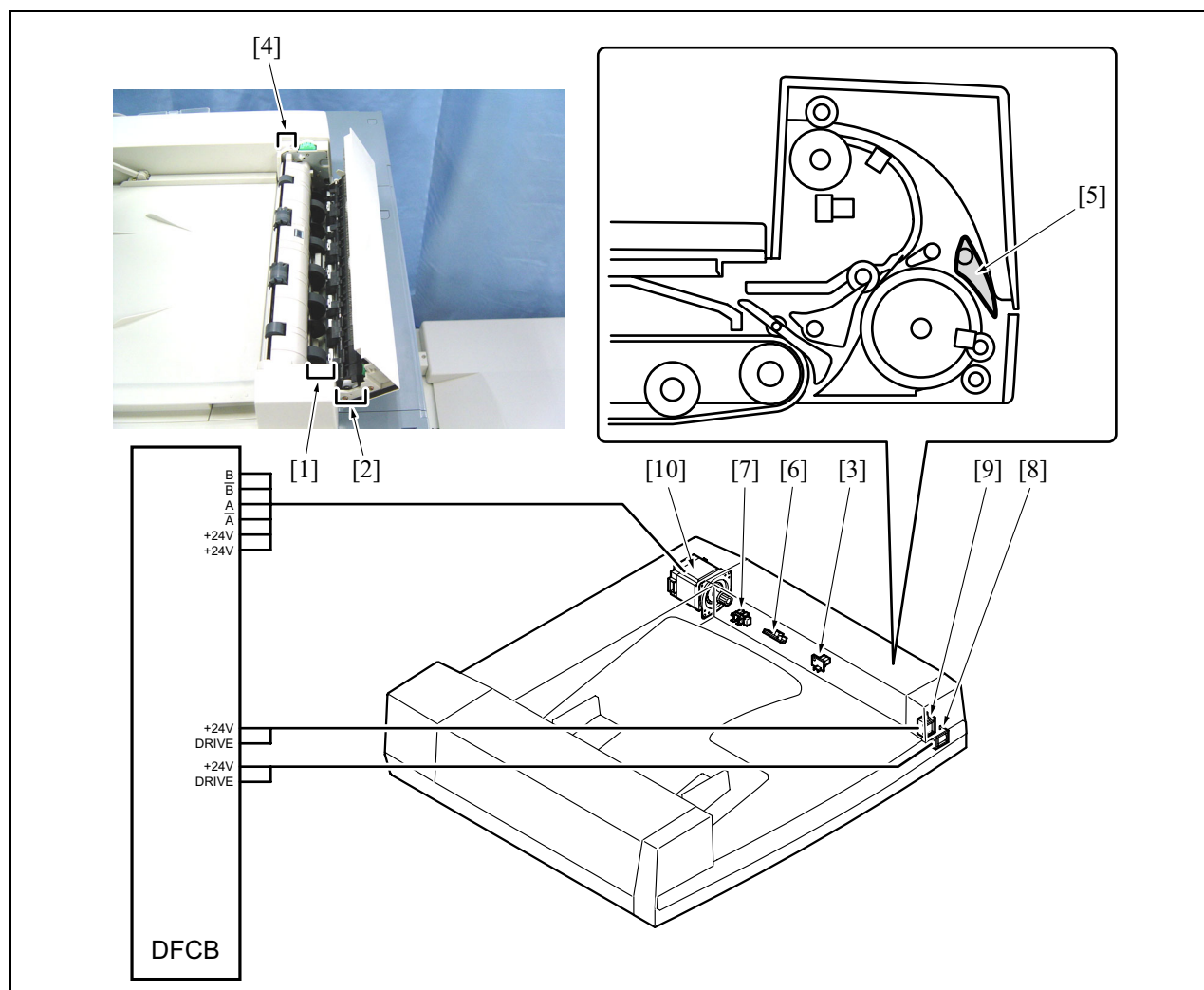
1.1.2 Conveyance drive



Symbol	Name	Function or method
[1]	Conveyance roller unit	Drives the belt unit. Paper conveyance
[2]	Conveyance roller	Drives the belt unit
[3]	Drive coupling belt	Drives the belt unit
[4]	Drive coupling roller	Drives the belt unit. Paper conveyance
[5]	Conveyance motor (M302)	Drives the conveyance section (conveyance belt unit), 24VDC stepping motor

II UNIT EXPLANATION

1.1.3 Reverse/paper exit drive



Symbol	Name	Function or method
[1]	Reverse roller	Reverses the original
[2]	Reverse guide	Switches the reverse original conveyance path with reverse solenoid (SD302)
[3]	Reverse sensor (PS305)	Reverse original detection
[4]	Paper exit roller	Exits the original
[5]	Paper exit guide	Switches the exit original conveyance path with paper exit solenoid (SD301)
[6]	Paper exit sensor (PS307)	Exit original detection
[7]	Paper exit cover sensor (PS308)	Detection of opening/closing of paper exit cover
[8]	Reverse solenoid	Drives the reverse guide 24VDC drive
[9]	Paper exit solenoid	Drives the paper exit guide 24VDC drive
[10]	Reverse/paper exit motor	Drives the reverse/paper exit 24VDC stepping motor

1.2 Operation

1.2.1 Single sided original mode

A. Original feed operation

The paper feed system is driven by the paper feed motor (M301). The registration clutch (MC301) functions as the brake to stop the registration roller, not to turn ON or OFF the drive force transmission.

When M301 turns ON, the paper feed roller is pressed against the original set to the original feed tray. the original stopper goes up to the turnout position, and the paper feed roller and feed roller send the original to the registration roller.

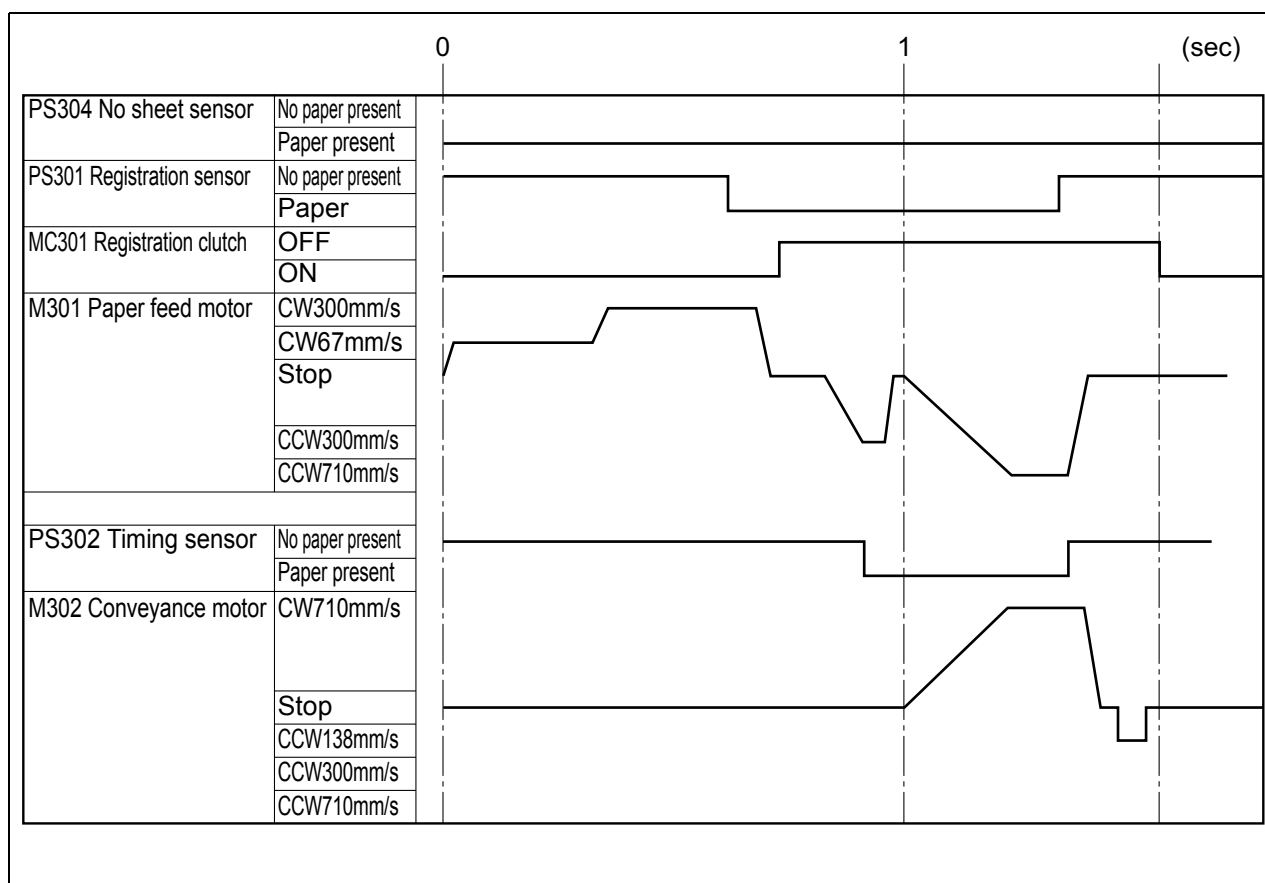
The original is struck against the reversing registration roller and M301 stops after the specified time. Thus, a loop is formed before the registration roller to correct the skewed original.

After M301 stops, MC301 turns OFF to release the registration roller.

Then, M301 starts reversing operation, and the timing sensor (PS302) turns ON and stops after the specified time.

After that, M301 and conveyance motor (M302) start reversing at the same time to send the original to the conveyance belt (conveyance section).

After PS302 turns ON by the original sent as described above, M301 stops after the specified time.



B. Scanning and conveying the original

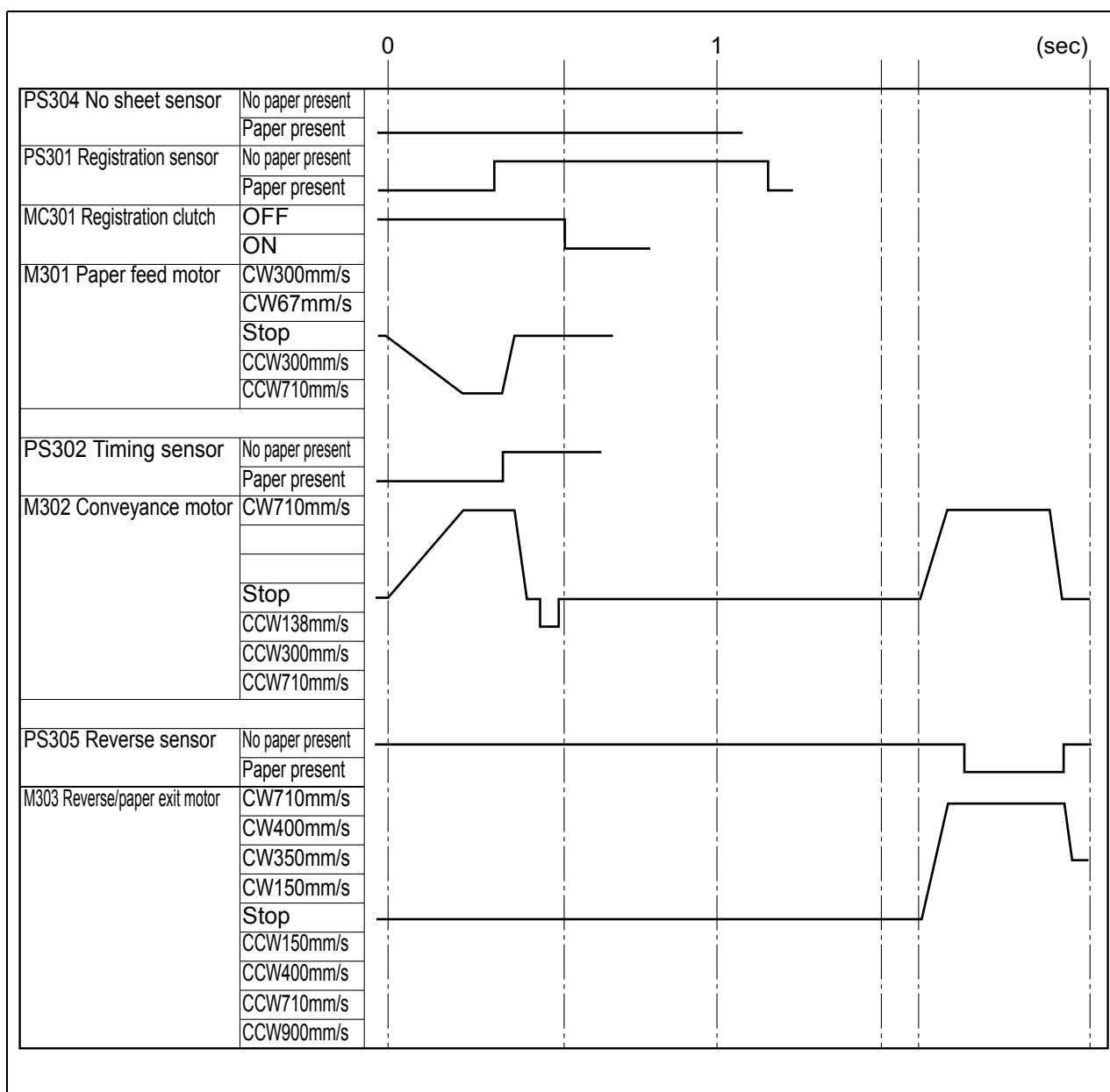
The transportation system is driven by the conveyance motor (M302).

The original fed to the conveyance belt (conveyance section) is positioned for scanning. Refer to "C. Original swing-back control" below for details of this process.

After the original is positioned, the scanner on the engine side scans the original.

Upon completion of scanning, M302 and reverse/paper feed motor (M303) turn ON and feed the original to the reverse/paper exit section.

M302 stops when the specified time elapses after the reverse sensor (PS305) turns ON.

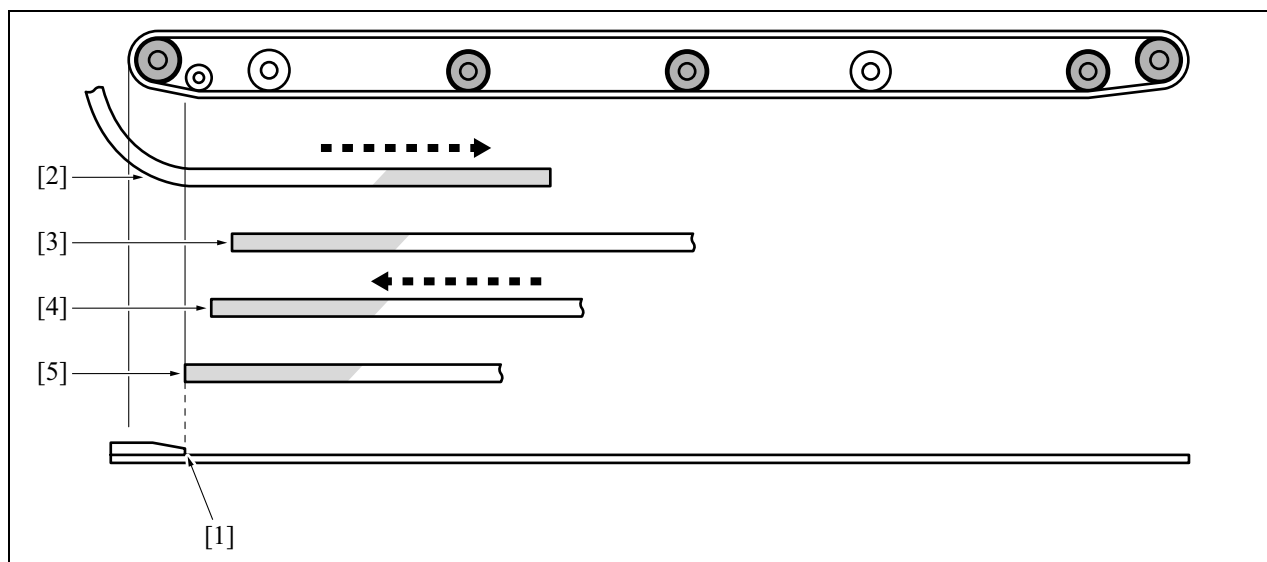


C. Original swing-back control

Original is positioned for scanning by this function.

Original is conveyed beyond the original positioning plate, conveyance motor (M302) is stopped when the specified time elapses after the timing sensor (PS302) turns OFF, the motor starts reversing to return the original, and the original is struck against the original positioning plate and stops.

Striking control differs between thin paper and others (paper of normal thickness and thick paper), therefore thin paper mode is available to be used for setting the original.



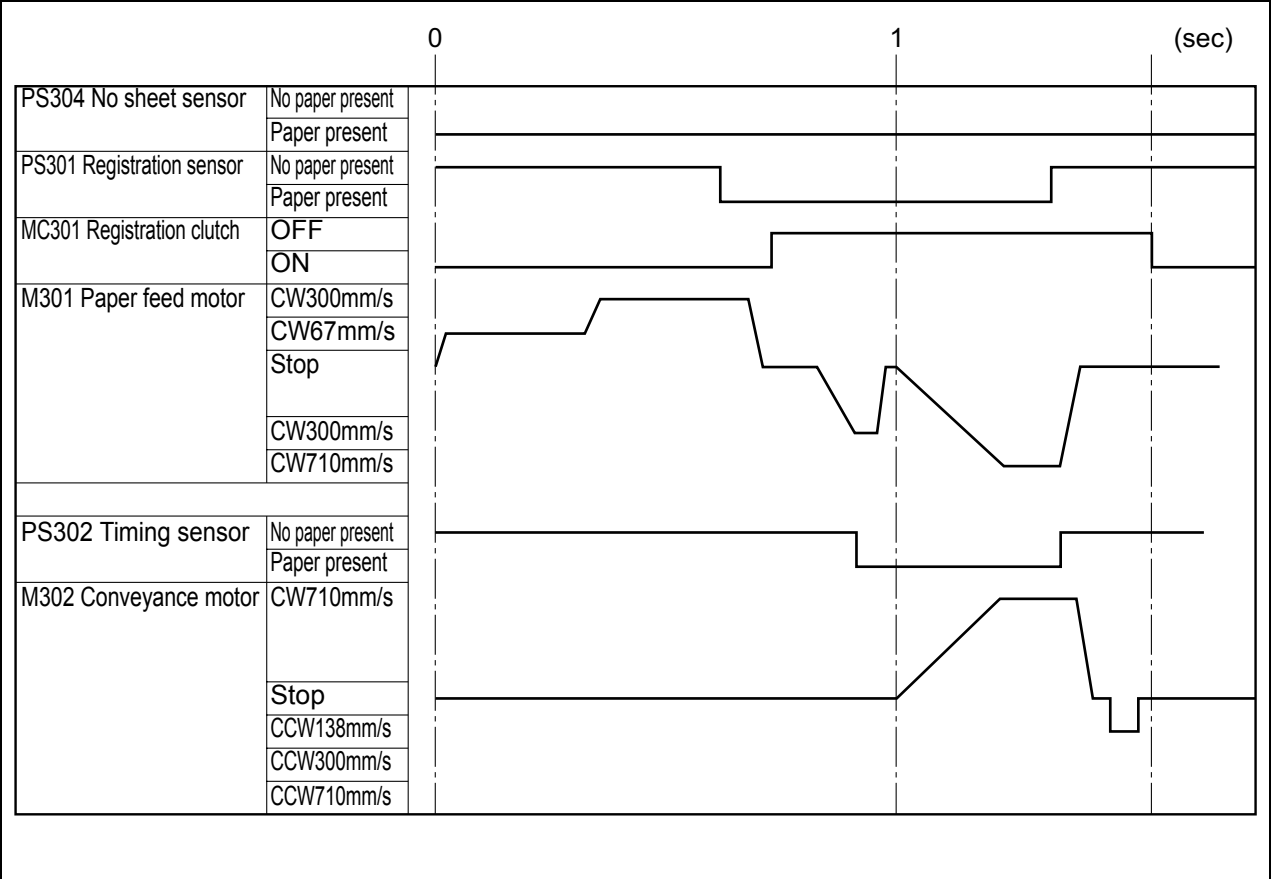
[1] Original striking position

[2] Paper conveyance

[3] Stops after the paper trailing end passes through the expected positioning point.

[4] Strike the paper against the expected positioning point conveying the paper at a low speed.

[5] Positioning completed

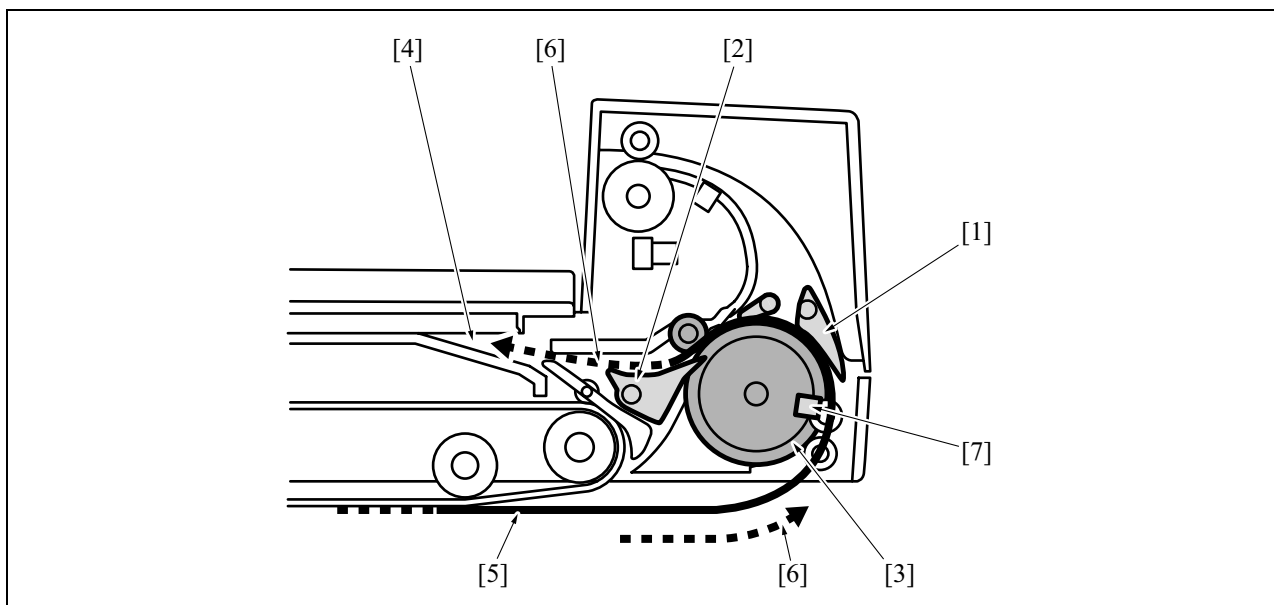


D. Original reverse/paper exit operation

The reverse/paper exit system is driven by the reverse/paper exit motor (M303). Conveyance path is switched by the paper exit solenoid (SD301) and reverse solenoid (SD302), both of which are OFF in this mode.

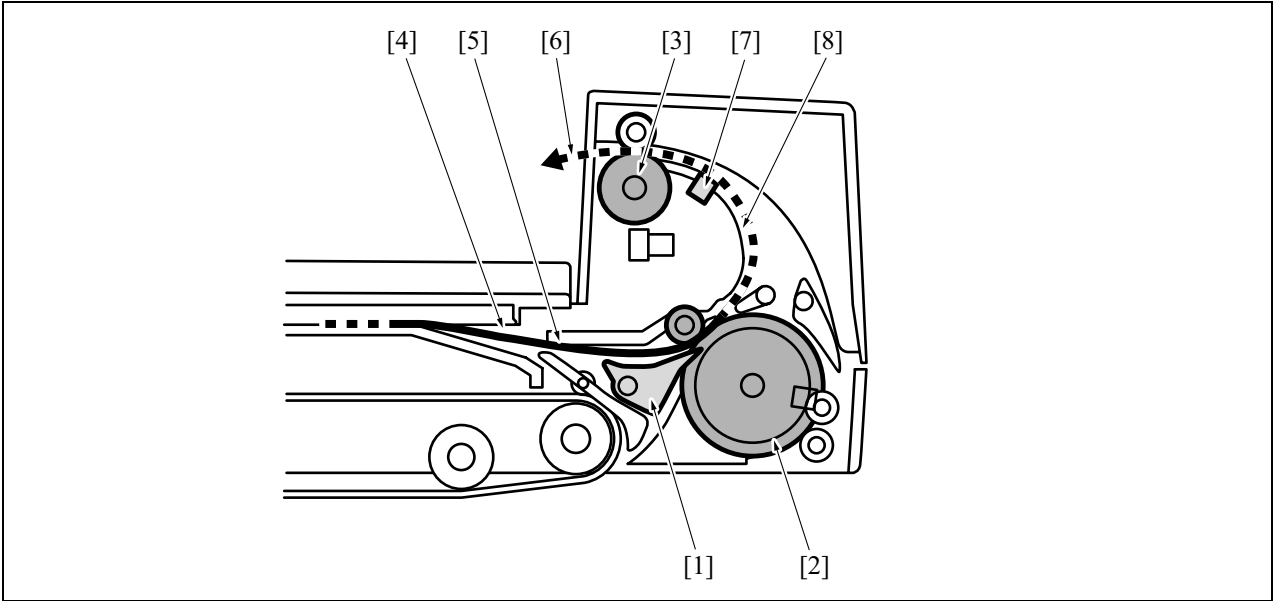
Original from the conveyance section is wound around the reverse roller and sent to the reverse paper path area. When the reverse sensor (PS305) turns OFF, M303 starts decelerating and stops. Then M303 starts reversing to send the original to the reverse/paper exit conveyance path. After the paper exit sensor (PS306) turns ON, M303 decelerates after the specified time and reverses to exit the original to the original exit tray at a low speed.

After PS306 turns OFF, M303 stops after the specified time.



- [1] Paper exit guide (At OFF)
- [2] Reverse guide (At OFF)
- [3] Reverse roller
- [4] Reverse paper path area

- [5] Paper
- [6] Conveyance direction
- [7] Reverse sensor (PS305)



- [1] Reverse guide (at OFF)

[2] Reverse roller

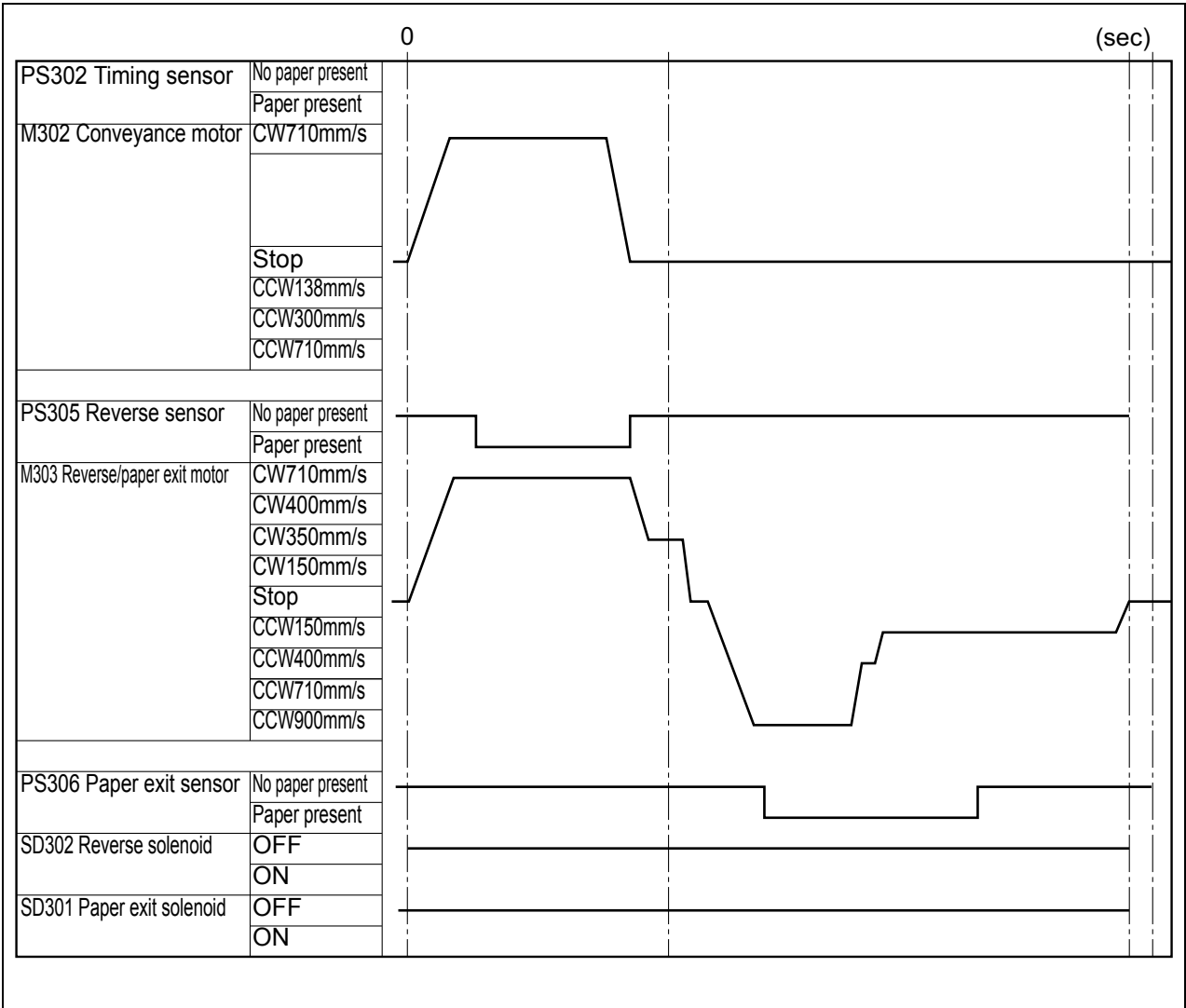
[3] Paper exit roller

[4] Reverse paper path area
- [5] Paper

[6] Conveyance direction

[7] Paper exit sensor (PS306)

[8] Reverse/paper exit conveyance path



1.2.2 Double sided original mode

A. Original feeding operation

Refer to "A. Original feeding operation" of "1.2.1 Single sided original mode" as the original feeding operation is the same.

B. Original surface scanning and conveyance operation

Refer to "B. Original scanning and conveyance operation" of "1.2.1 Single sided original mode" as the surface scanning and conveyance operation are the same.

C. Original reverse/conveyance operation

The reverse system is driven by the reverse/paper exit motor (M303).

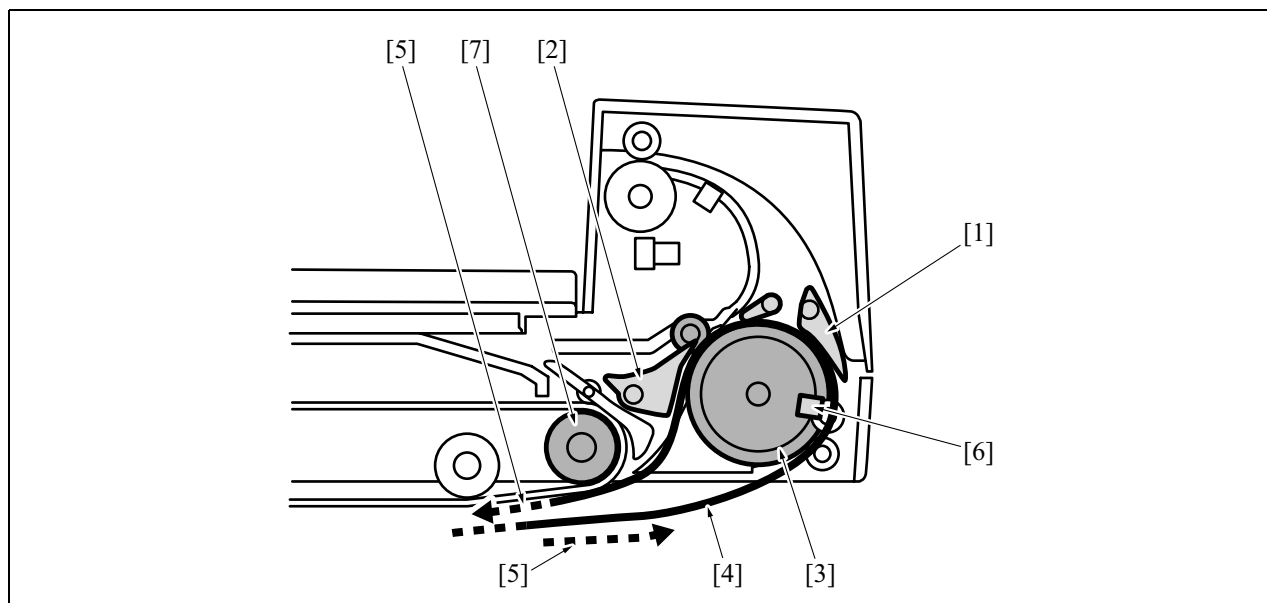
The conveyance path is switched by the paper exit solenoid (SD301) and reverse solenoid (SD302). At this time, SD301 turns OFF and SD302 turns ON.

Original from conveyance section is wound around the reverse roller, guided by the reverse guide which is ON, and returned to the conveyance section getting under the conveyance roller.

After the reverse sensor (PS305) turns ON, both the conveyance motor (M302) and M303 stop after the specified time.

At the same time, M302 starts reversing, turns M303 ON, and returns the reversed original to the conveyance section to be scanned.

M303 stops at the specified time after PS305 turns OFF.



[1] Paper exit guide (at OFF)

[2] Reverse guide (at ON)

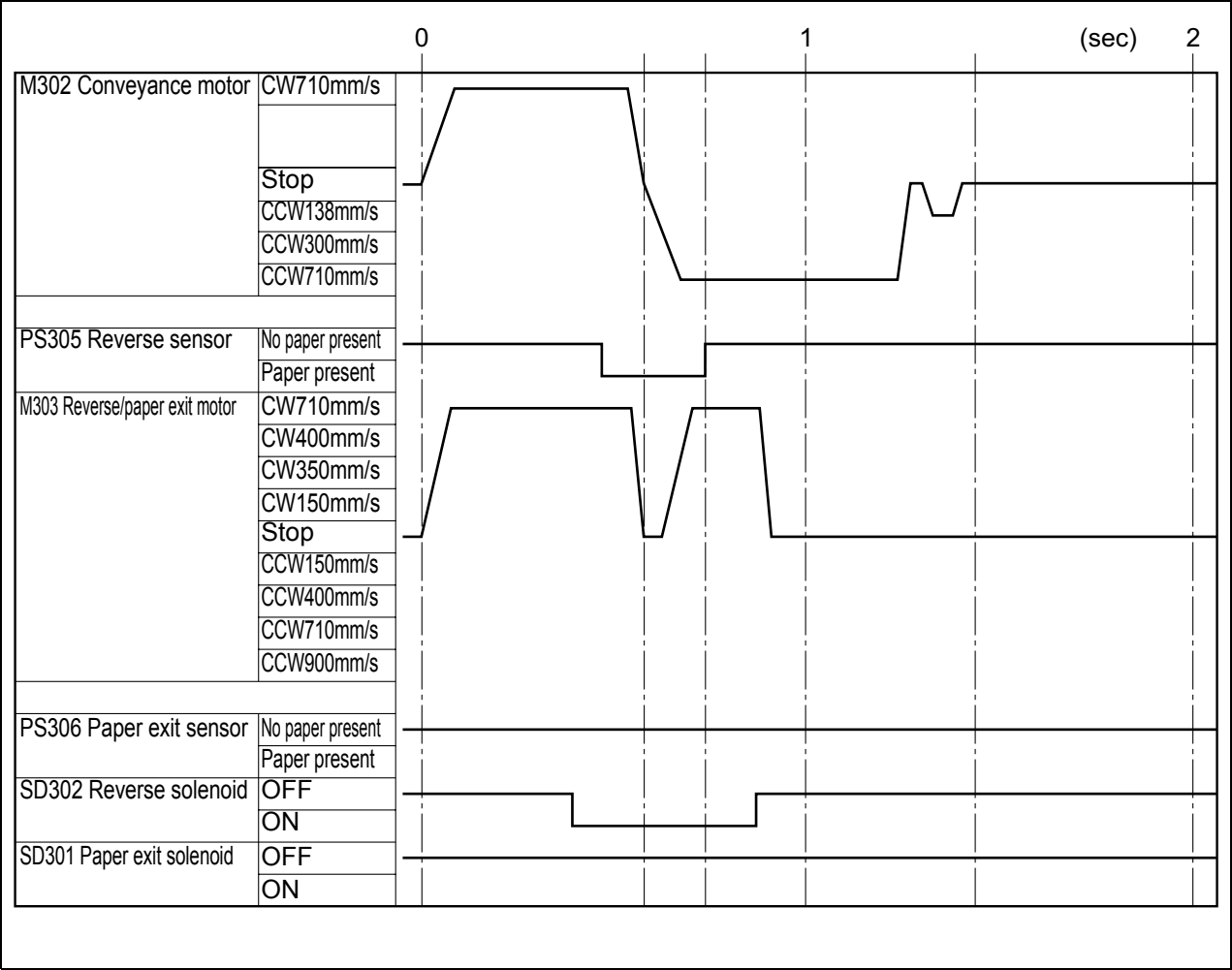
[3] Reverse roller

[4] Paper

[5] Conveyance direction

[6] Reverse sensor (PS305)

[7] Conveyance roller



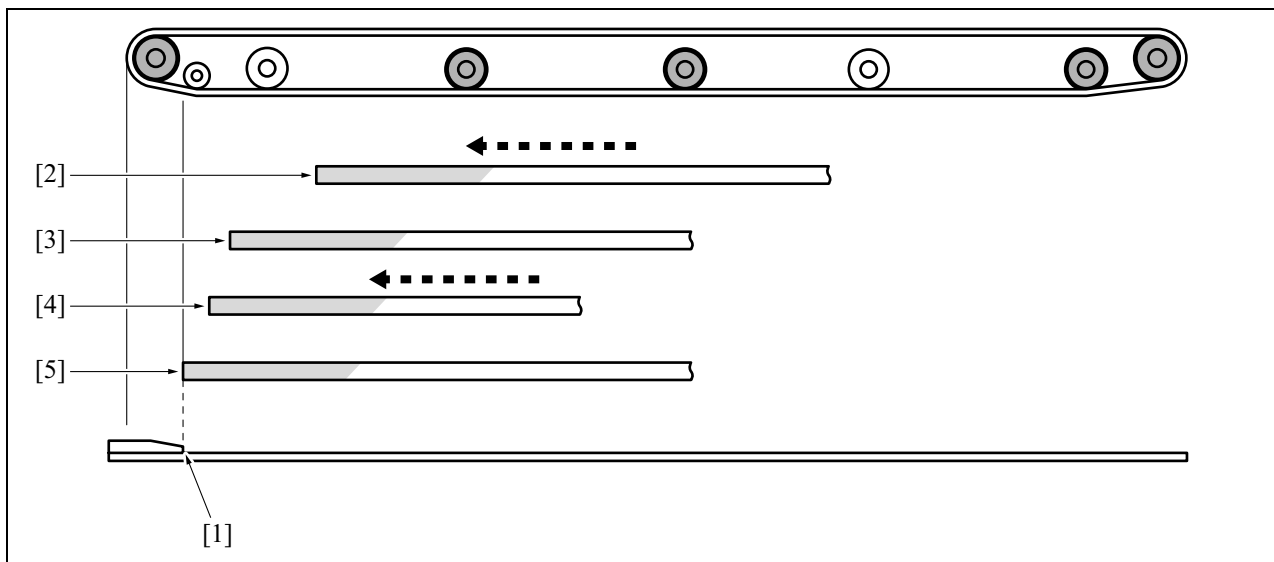
D. Reverse operation and scanning of original back side

The drive system is driven by the conveyance motor (M302).

The original returned to the conveyance section (conveyance belt) for scanning of the back side is sent in the reverse way when M302 starts reversing, stopped once, driven at a low speed again, and strikes the origin against the original positioning plate and stops.

After the positioning of original, the scanner on the engine side scans the original.

Striking control differs between thin paper and others (paper of normal thickness and thick paper), therefore thin paper mode is available to be used for setting the original.



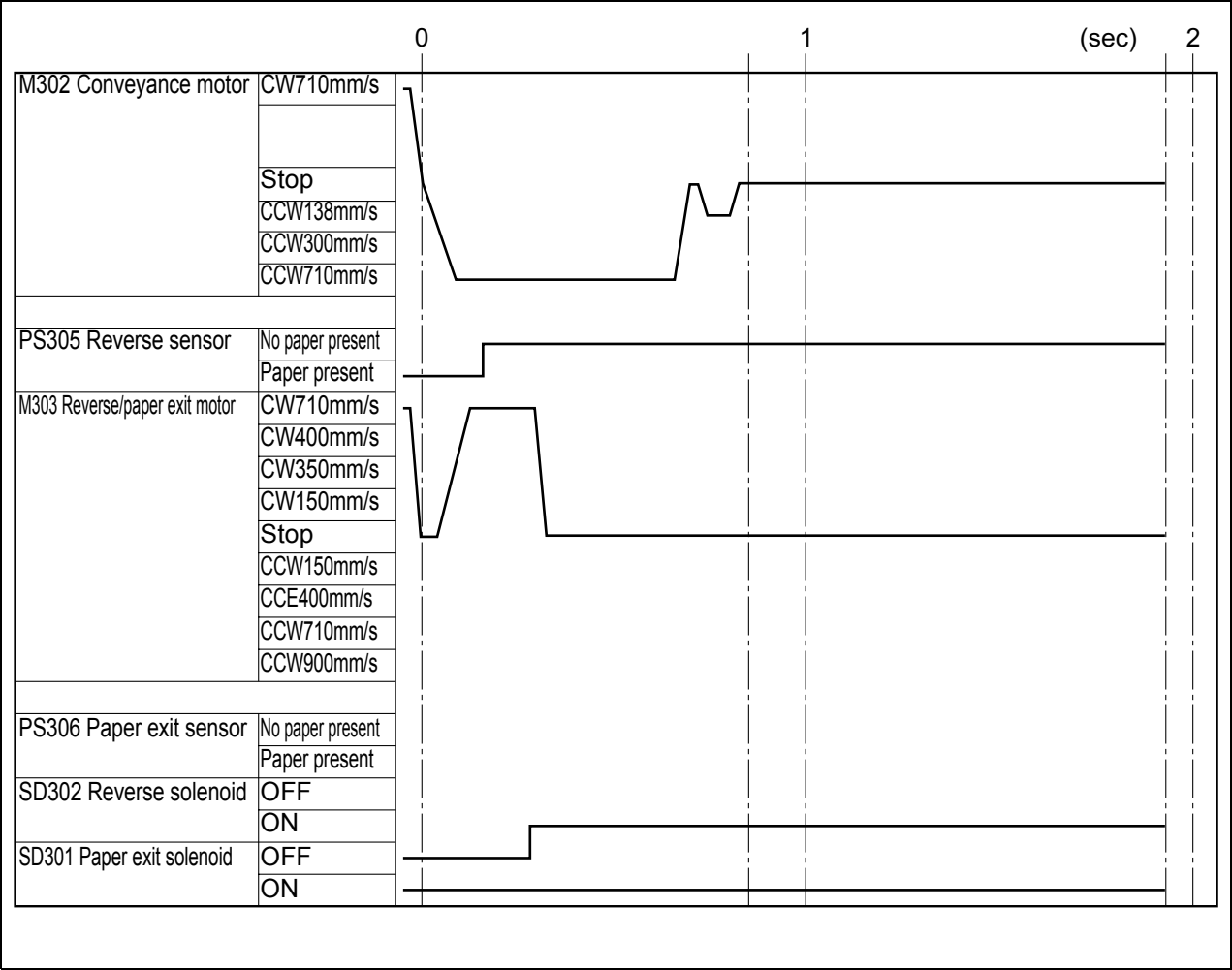
[1] Original striking position

[2] Return of paper from reverse section due to reverse feeding

[3] Stops paper before the expected positioning point.

[4] Strikes the paper against the expected positioning point conveying the paper at a low speed.

[5] Positioning completed



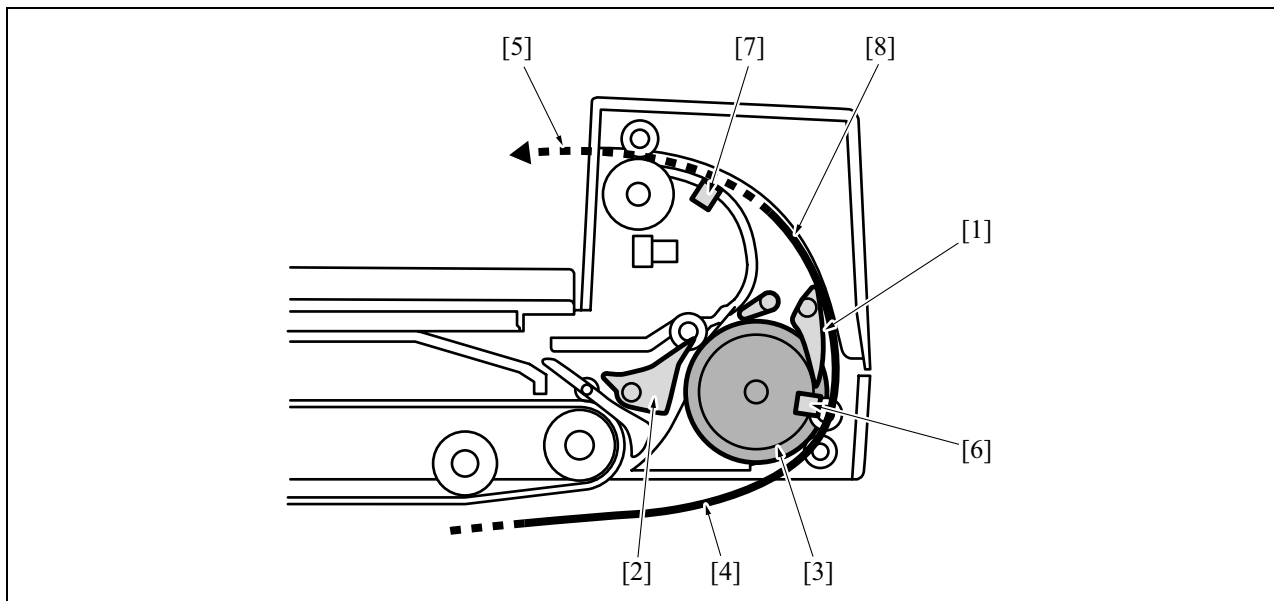
E. Original exit operation

The paper exit system is driven by the reverse/paper exit motor (M303). Paper exit conveyance path is switched by the paper exit solenoid (SD301) which is ON here.

When the scanning is completed, the conveyance motor (M302) and M303 turn ON at the same time to send the original to the reverse/paper exit section. M302 turns ON and stops after the specified time.

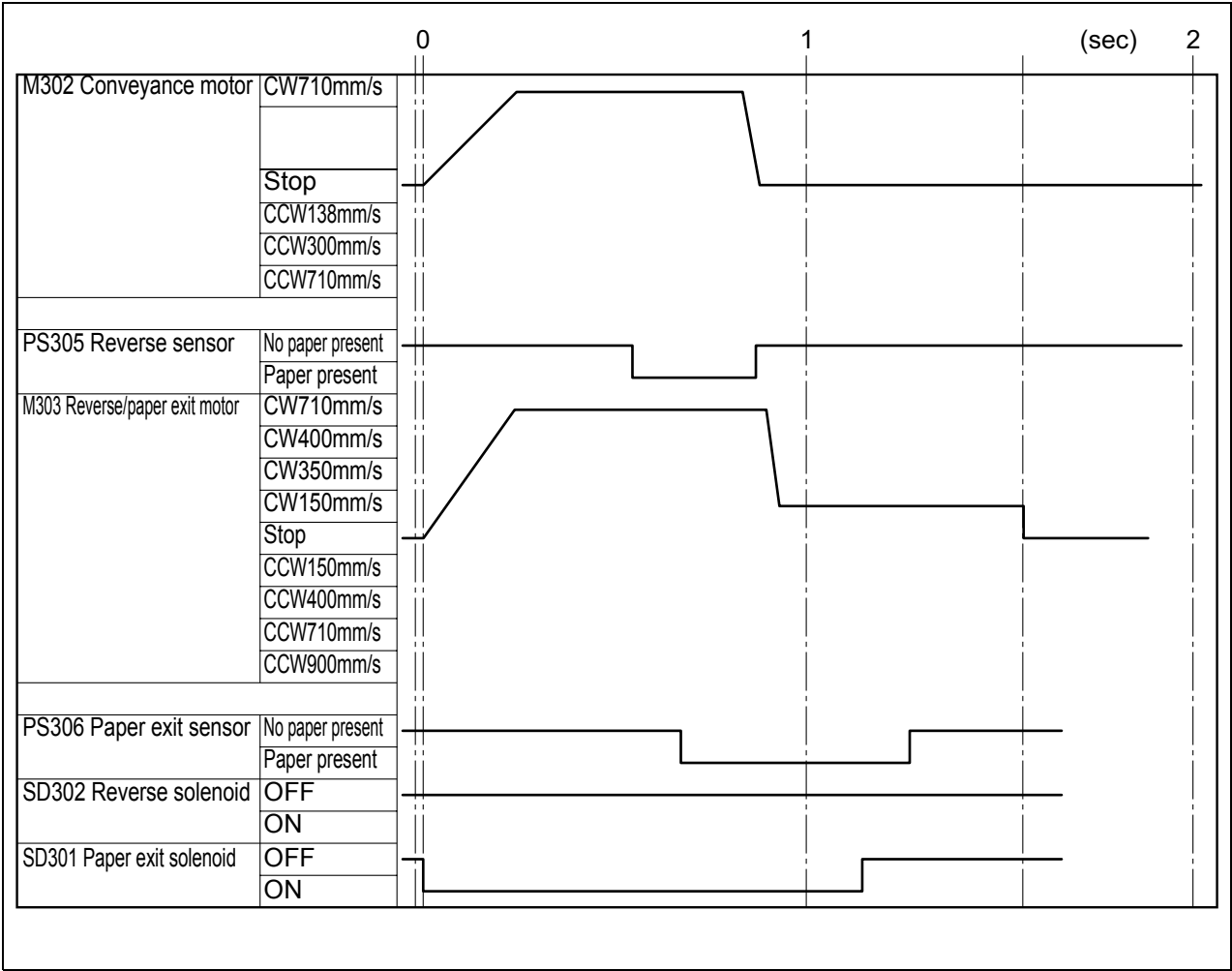
The original from the conveyance section is sent from the reverse roller to paper exit conveyance path guided by the paper exit guide at ON condition. When the reverse sensor (PS305) turns OFF, M303 decelerates after the specified time and exits the original to the original exit tray at a low speed.

M303 stops when the specified time elapses after the paper exit sensor (PS307) turns OFF.



- [1] Paper exit guide (at ON)
- [2] Reverse guide (at OFF)
- [3] Reverse roller
- [4] Paper

- [5] Conveyance direction
- [6] Reverse sensor (PS305)
- [7] Paper exit sensor (PS307)
- [8] Paper exit conveyance path



1.2.3 Original size detection

A. Normal copy mode

Main scanning direction is detected by the resistance value of the size VR (VR301) interlocked with the guide plate position on the paper feed tray. Sub-scanning direction is detected by the combination of the original size sensor/S (PS309) and original size sensor/L (PS310) when they are turned on and off.

B. Mixed original copy mode

Maximum original size in the main scanning direction is detected by the resistance value of the size VR (VR301) interlocked with the guide plate position on the paper feed tray.

Sub-scanning direction is detected by the time when the original passes by the timing sensor (PS302).

Allowed size combinations are as shown in the table below.

For metric area

Other originals	Standard originals (max. original size detected by guide plate)								
	A3	A4	B4	B5	A4R	A5	B5R	A5R	B6R
A3	□	○	—	—	—	—	—	—	—
A4	○	□	—	—	—	—	—	—	—
B4	◎ × Thick paper	◎ × Thick paper	□	○	—	—	—	—	—
B5	◆	◆	○	□	—	—	—	—	—
A4R	◆	◆	◎ ◆ Thick paper	◎ ◆ Thick paper	□	○	—	—	—
A5	◆	◆	◆	◆	○	□	—	—	—
B5R	×	×	◆	◆	◎ ◆ Thick paper	◎ ◆ Thick paper	□	—	—
A5R	×	×	×	×	×	×	◎	□	—
B6R	×	×	×	×	×	×	×	◆	□

For inch area

Other originals	Standard originals (max. original size detected by guide plate)					
	11 x 17	8.5 x 11	8.5 x 14	8.5 x 11R	8.5 x 5.5	8.5 x 5.5R
11 x 17	□	○	—	—	—	—
8.5 x 11	○	□	—	—	—	—
8.5 x 14	◆	◆	□	○	○	—
8.5 x 11R	◆	◆	○	□	○	—
8.5 x 5.5	◆	◆	○	○	□	—
8.5 x 5.5R	×	×	×	×	×	□

□ : same size, ○ : same series, ◎ : different series, ◆ : different series (out of guaranteed paper through performance), × : no mixed loading, — : not supported

III DISASSEMBLY/ASSEMBLY

⚠ Caution:

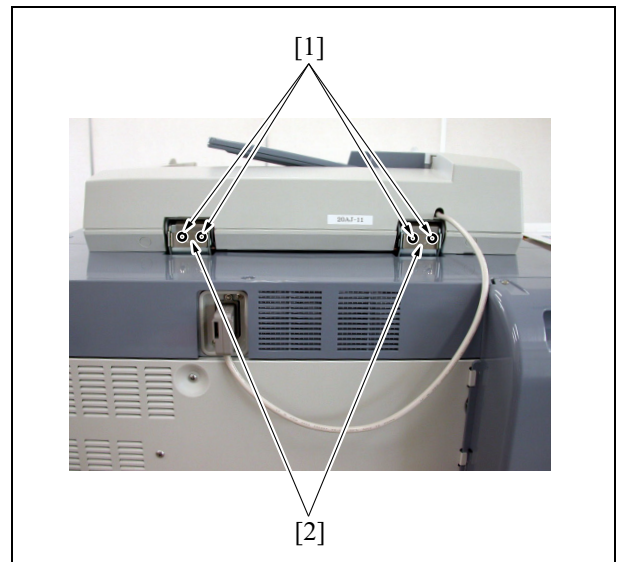
- Make sure the power cord of the MFP is unplugged from the power outlet before disassembly or assembly.

1. EXTERIOR

1.1 RADF hinge opening / closing angle adjustment

A. Replacing 70-degree and 40-degree fixtures

1. Untighten 4 screws [1] and remove 2 hinge opening/closing angle adjusting fixtures [2]. Fixtures are for 70 or 40-degree use and can be distinguished by the stamp on them.
2. Install 2 hinge opening/closing angle adjusting fixtures [2] and retighten 4 screws [2] positively.



B. Fixing the fixture at 90 degrees

Note:

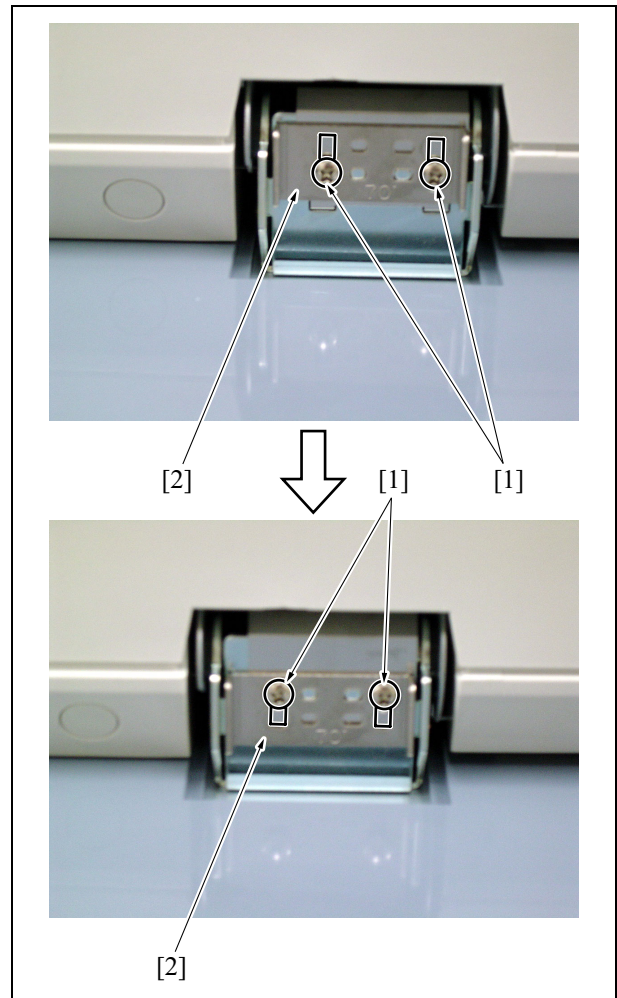
- When removing RADF or when opening RADF to remove the scanner components, the fixture should be fixed at an degree of 90°. If not, the RADF installing metal plate may be deformed.

1. Fix the hinge opening/closing angle adjusting fixture at an angle of 90° by either one of the following methods. Two types of fixtures, 70° and 40-degree use, are installed. They can be distinguished by the mark on them.

70-degree hinge opening/closing angle adjusting fixture: As shown in the drawing right, untighten 4 screws [1], slide down 2 adjusting fixtures [2] and retighten 4 screws [2] positively.

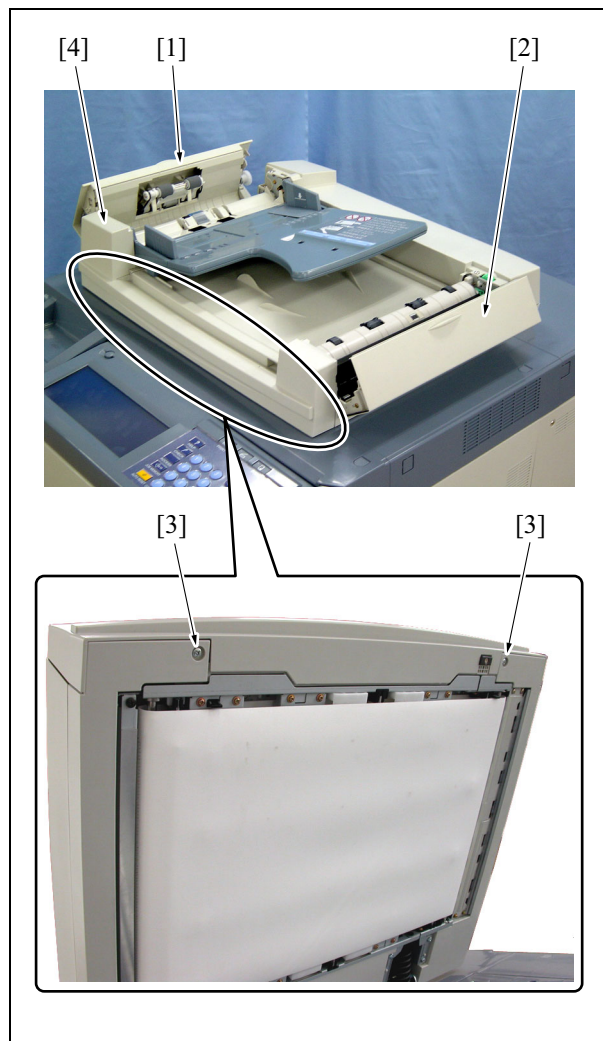
40-degree hinge opening/closing angle adjusting fixture: Untighten 4 screws [1], install 2 adjusting fixtures [2] changing their upper and lower positions and retighten 4 screws [2] positively.

2. After completion of required process, return them to the original positions.



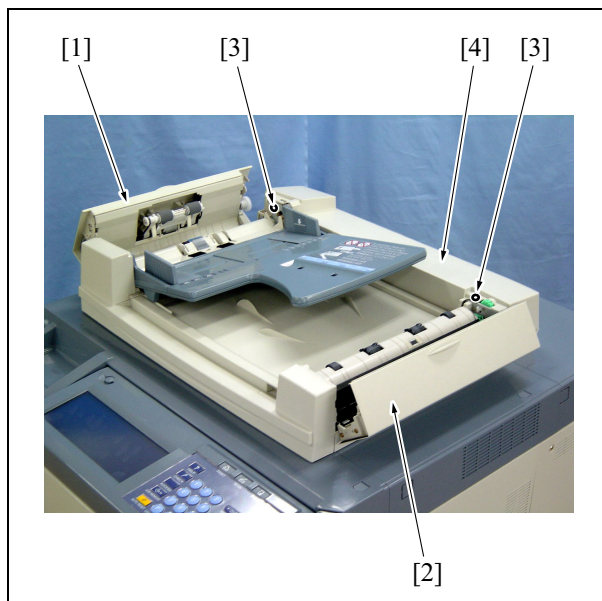
1.2 Removing and reinstalling the front cover

1. Open the paper feed cover [1] and paper exit cover [2].
2. Untighten 2 screws [3] and remove the front cover [4].
3. Install the removed components in the steps reverse to removal.



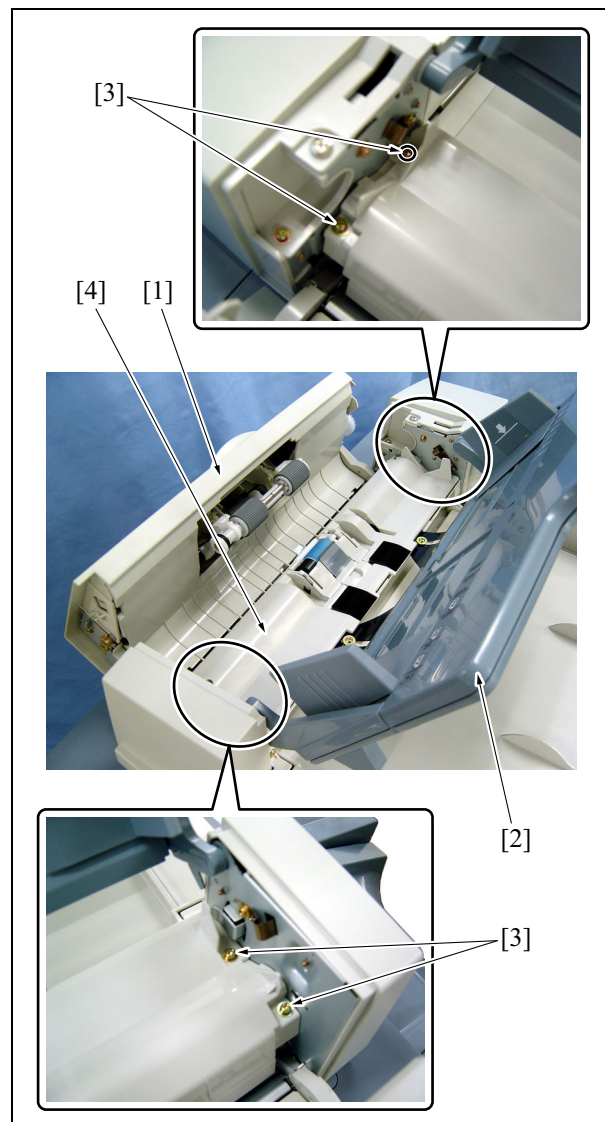
1.3 Removing and reinstalling the rear cover

1. Open the paper feed cover [1] and paper exit cover [2].
2. Untighten 2 screws [3] and remove the rear cover [4].
3. Install the removed components in the steps reverse to removal.



1.4 Removing and reinstalling the registration roller cover

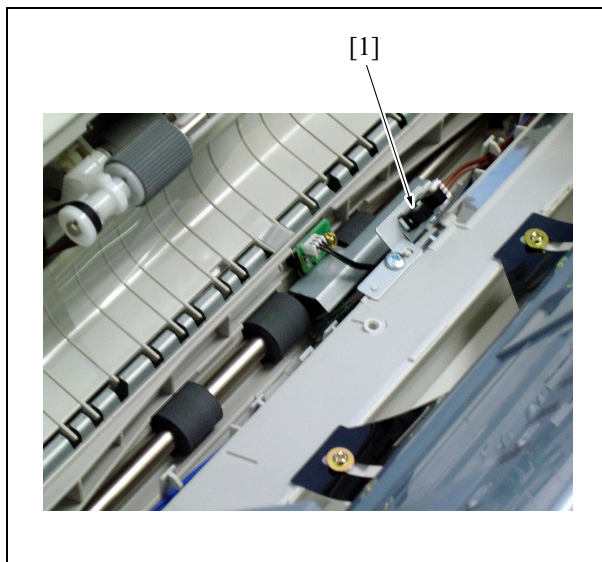
1. Open the paper feed cover [1].
2. Pull up the paper feed tray [2].
3. Unscrew 4 screws [3] and remove the registration roller cover [4].
4. Reinstall the above parts following the removal steps in reverse.



2. PAPER FEED

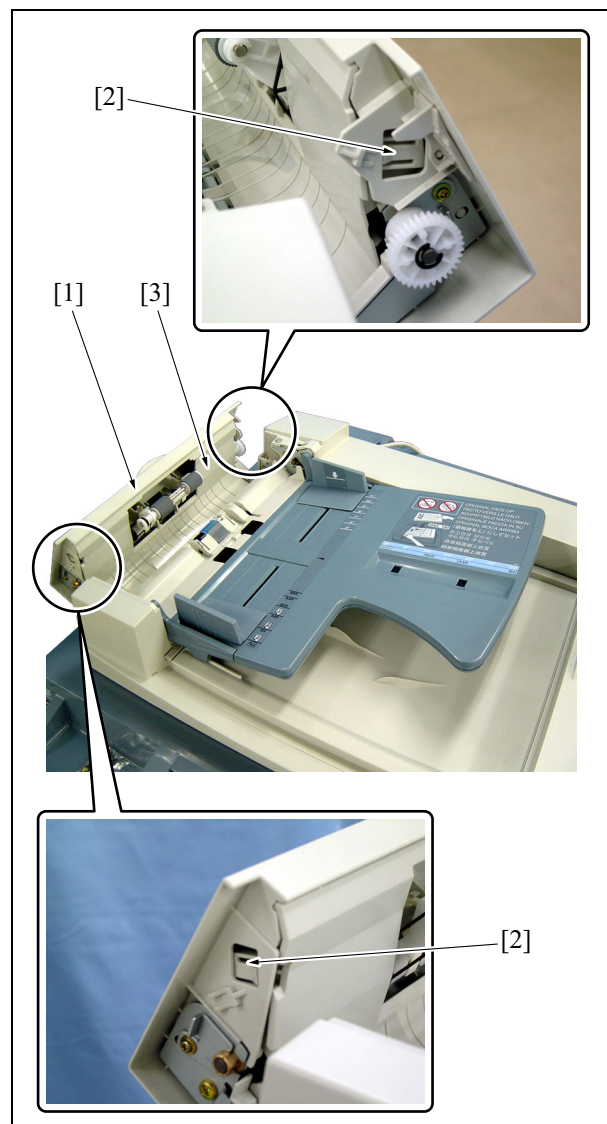
2.1 Cleaning the no paper sensor

1. Remove the registration roller cover. (See "1.4 Removing and reinstalling the registration roller cover.")
2. Clean the no paper sensor (PS304) [1] with a brush, etc.

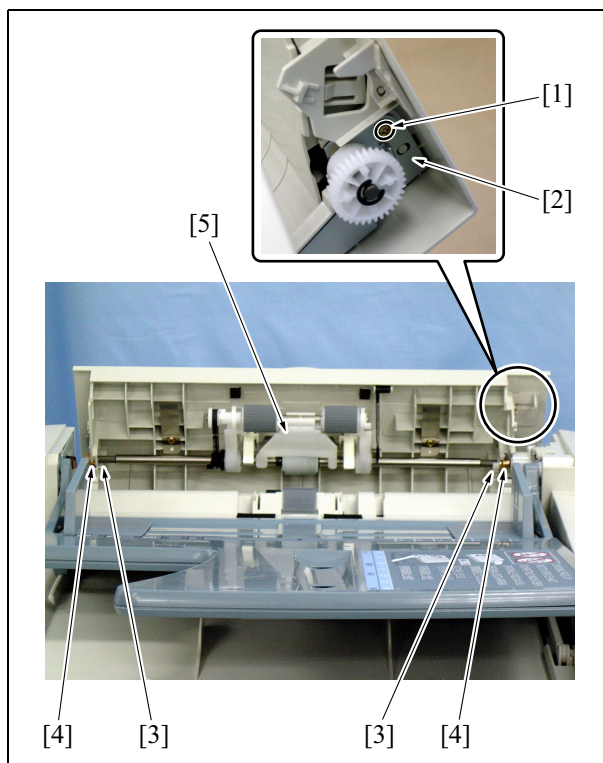


2.2 Removing and reinstalling the paper feed unit

1. Open the paper feed cover [1].
2. Push 2 claw locks [2] at both ends of the paper feed cover [1] to release and remove the paper feed guide [3].



3. Untighten 1 screw [1] and remove the shaft fixing plate [2].
4. Remove 2 snap rings [3].
5. Pushing 2 bearings [4] inward, remove the paper feed unit [5].
6. Reinstall the above parts following the removal steps in reverse.



2.3 Replacing the paper feed roller and the feed roller

A. Periodically replaced parts/cycle

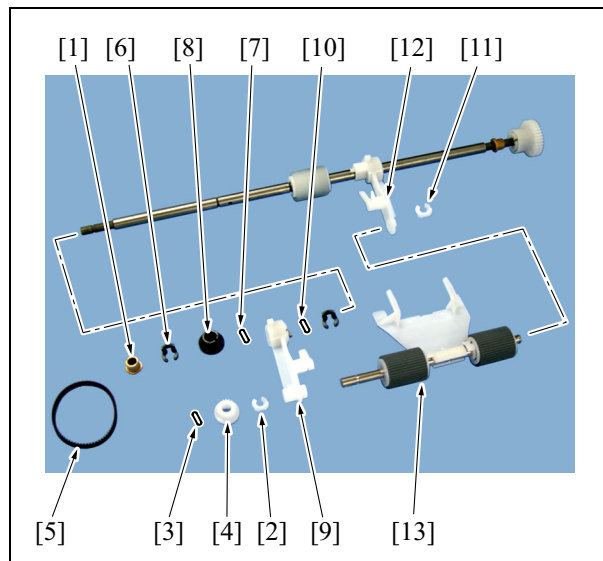
- Feed roller: Every 1,800,000 copies (every 625,000 copies for actual durable count)
- Paper feed roller: Every 1,800,000 copies (every 625,000 copies for actual durable count)

B. Procedure

1. Remove the paper feed unit. (See "1.4 Removing and reinstalling the paper feed unit.")



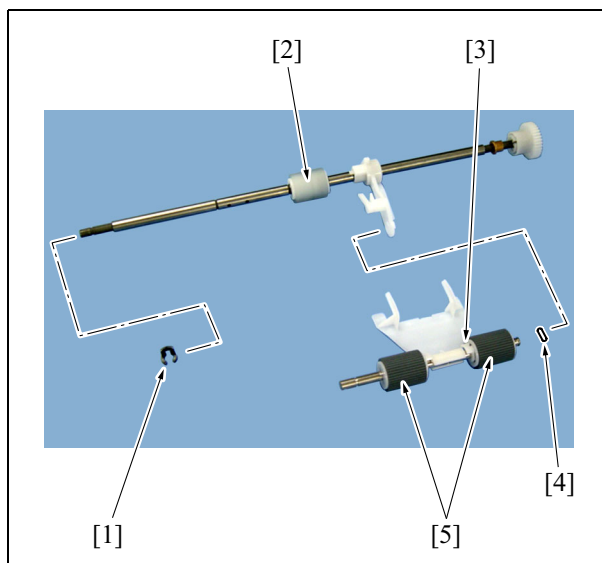
2. Remove 1 bearing [1].
3. Remove 1 snap ring [2] and remove 1 pin [3].
4. Remove the gear [4] and remove the belt [5].
5. Remove the black snap ring [6] and remove 1 pin [7] (long pin) and gear [8].
6. Remove the plastic arm [9] and remove 1 pin [10].
7. Remove 1 snap ring [11] and remove the paper feed roller assembly [13] from the arm [12].



8. Remove 1 snap ring [1].
9. Remove 1 feed roller [2] and replace with new one.
10. Remove 1 snap ring [3] and remove 1 pin [4].
11. Remove 2 paper feed rollers [5] and replace with new ones.
12. Reinstall the above parts following the removal steps in reverse.

Note:

- Be careful not to lose the paper feed roller and feed roller fixing pins.



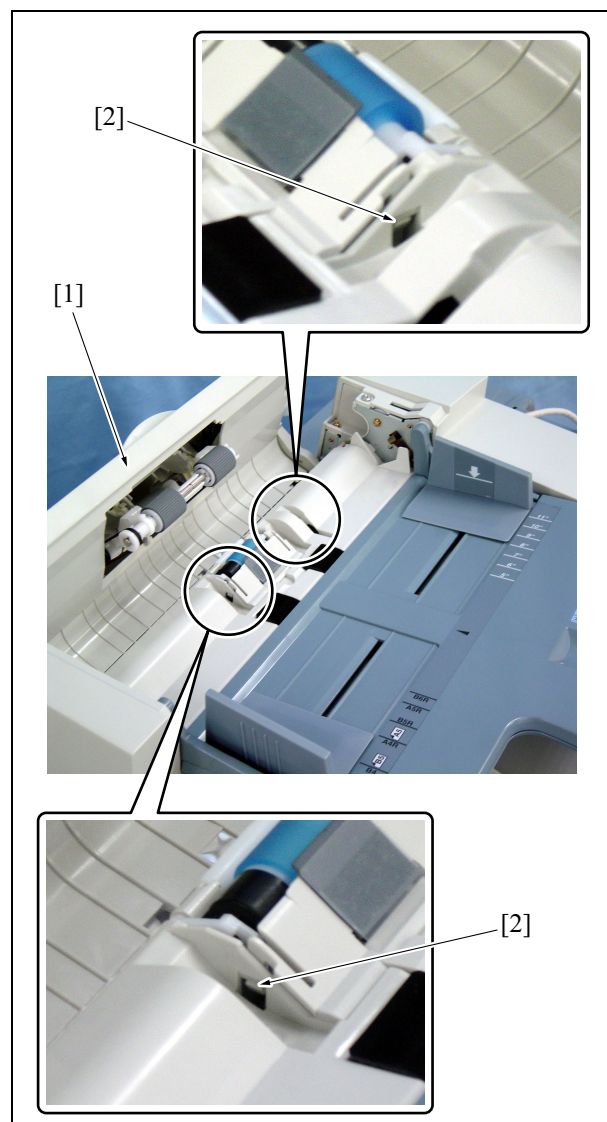
2.4 Replacing the double feed prevention roller

A. Periodically replaced parts/cycle

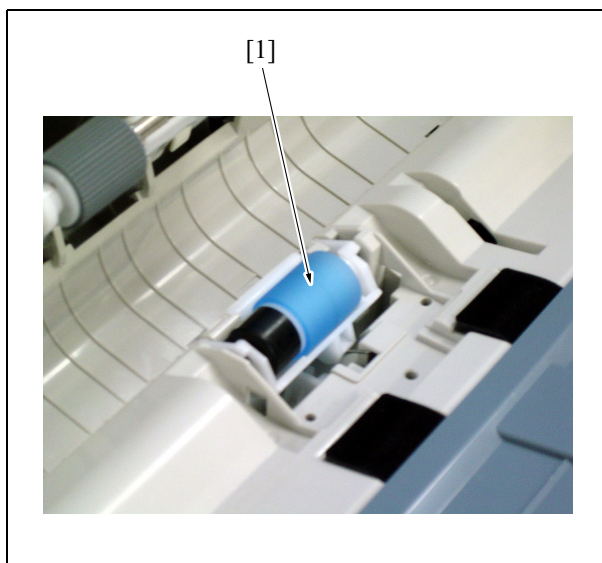
- Double feed prevention roller: Every 1,800,000 copies (every 625,000 copies for actual durable count)

B. Procedure

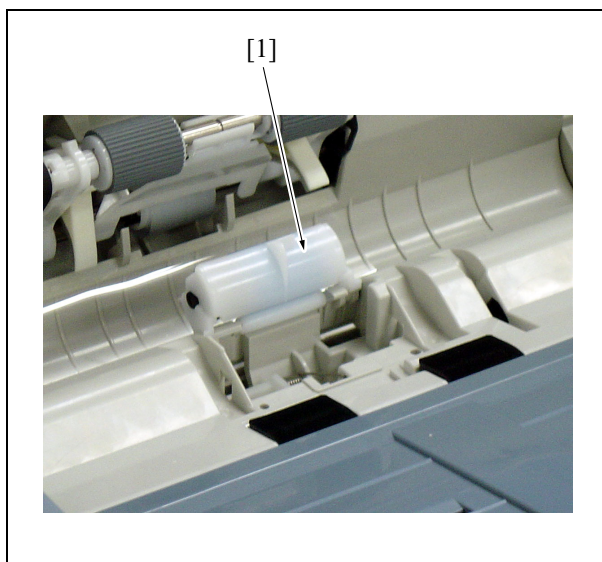
1. Open the paper feed cover [1].
2. Release the claw lock of the double feed prevention unit cover [2] and remove the cover.



3. Holding both edges of the roller shaft, stand the double feed prevention roller [1].



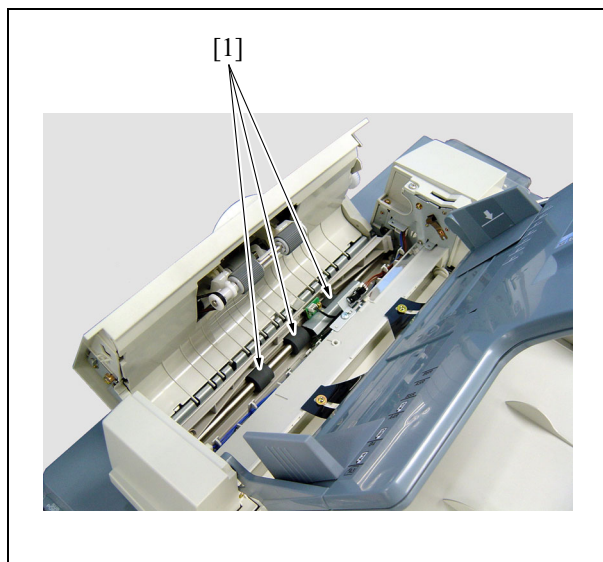
4. Remove the double feed prevention unit [1] and replace with new one.
5. Reinstall the above parts following the removal steps in reverse.



3. PAPER FEED

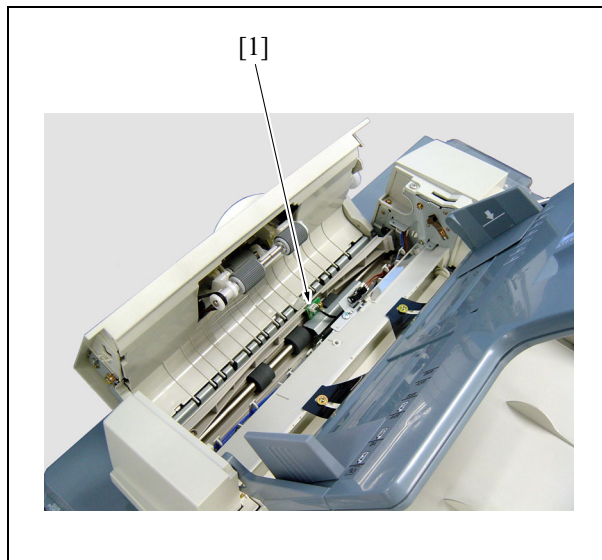
3.1 Cleaning the registration roller

1. Remove the registration roller cover. (See "1.4 Removing and reinstalling the registration roller cover.")
2. Moisten cloth with alcohol and wipe 3 registration rollers [1] with the cloth.



3.2 Cleaning the registration sensor

1. Remove the registration roller cover. (See "1.4 Removing and reinstalling the registration roller cover.")
2. Clean PS301 (registration sensor) [1] with a blower brush, etc.



3.3 Removing and reinstalling the conveyance belt

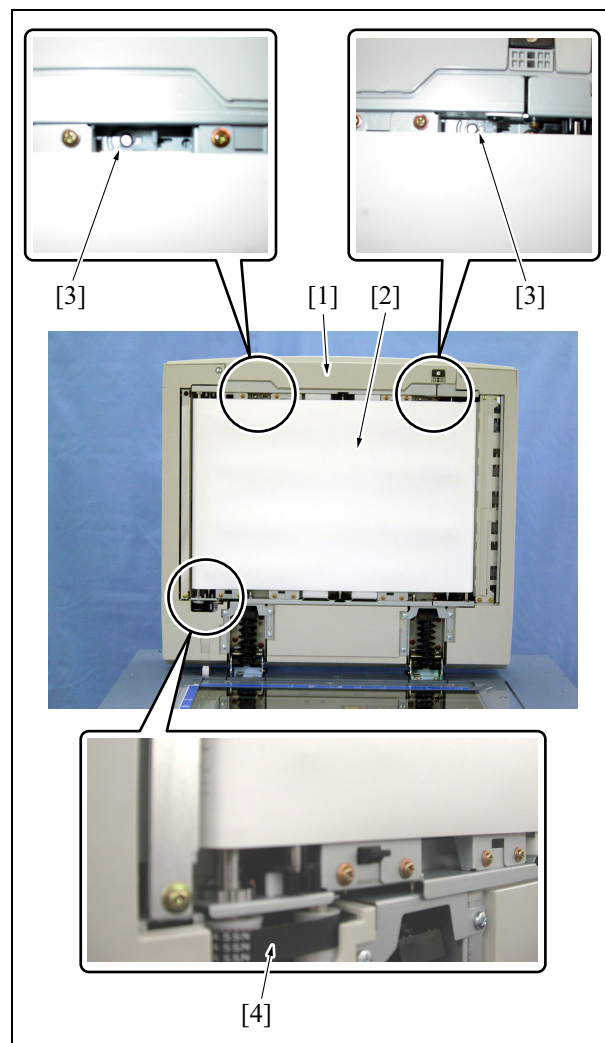
Note:

- Be careful not to touch the belt roller or avoid damage or crease on it. If touching it by hand, hold at the area of 20mm from the edges in the width direction.

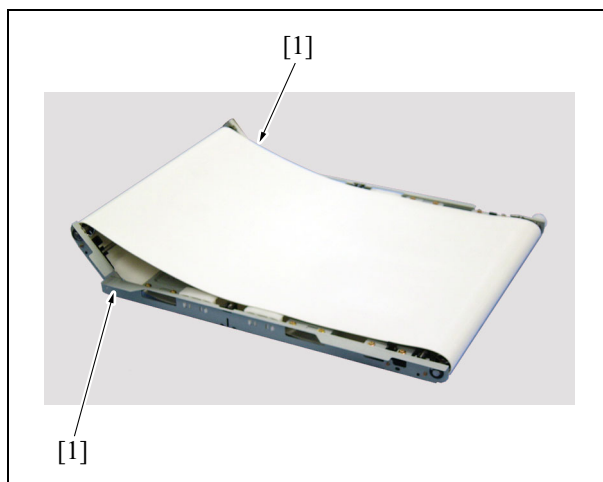
1. Fix the hinge opening/closing angle adjusting fixture at an angle of 90 degrees.
2. Open RADF [1] vertically.
3. Slide 2 stoppers [3] in the upper part of the conveyance belt [2] leftward and loosen.
4. Remove the drive interlocking belt [4] on the left lower inside of the conveyance belt [2].
5. Remove the conveyance belt unit.

Note:

- When reinstalling, fit the drive interlocking belt to the conveyance belt unit securely.



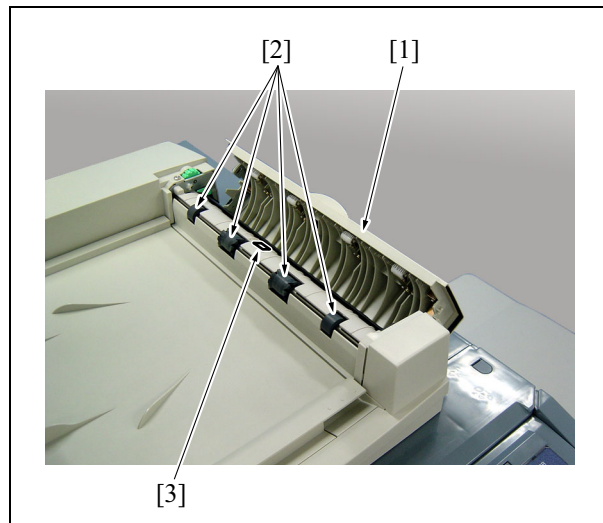
6. Remove 2 screws [1] and stand the roller.
7. Remove the conveyance belt.
8. Reinstall the above parts following the removal steps in reverse.



4. REVERSE/PAPER EXIT

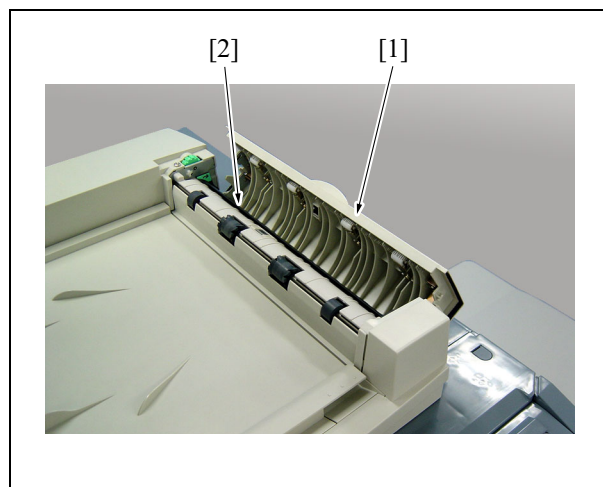
4.1 Cleaning the paper exit roller / the paper exit sensor

1. Open the paper exit cover [1].
2. Moisten the cloth with alcohol and wipe 4 paper exit rollers [2] with the cloth.
3. Clean the paper exit sensor (PS306) [3] with a brush, etc.

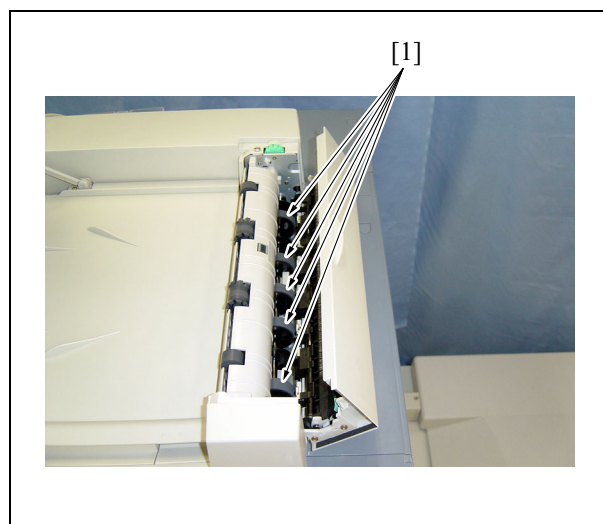


4.2 Cleaning the reverse roller

1. Open the paper exit cover [1].
2. Open the reverse guide [2].



3. Moisten the cloth with alcohol and wipe 5 reverse rollers [1] with the cloth.

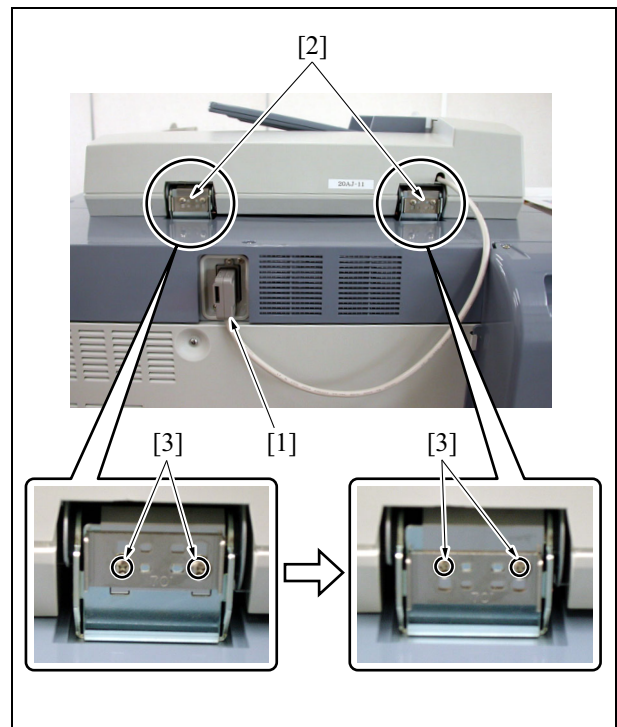


5. REMOVING AND REINSTALLING RADF

Note:

- Before removing RADF, fix the RADF hinge opening/closing angle at 90 degrees. Fix the fixture also at 90 degrees when opening RADF and removing parts of the scanner section. If not, RADF installing metal plate may be deformed.

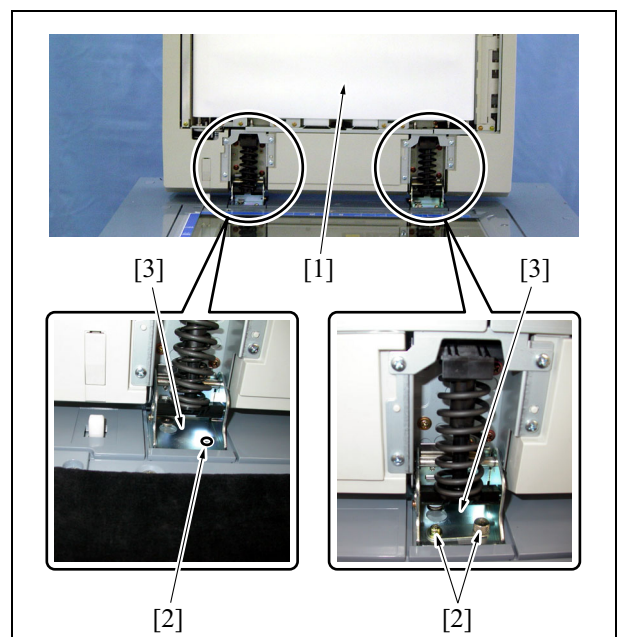
1. Remove the connector [1].
2. Fix 2 hinge opening/closing angle adjusting fixtures [2] at an angle of 90 degrees.
Two types of fixtures, 70 and 40-degree use, are installed. They can be distinguished by the mark on them.
70-degree hinge opening/closing angle adjusting fixture: Untighten 4 screws [3], slide down 2 adjusting fixtures [2] and retighten 4 screws [3] positively.
40-degree hinge opening/closing angle adjusting fixture: Untighten 4 screws [3], install 2 adjusting fixtures [2] changing their upper and lower positions and retighten 4 screws [3] positively.



3. Open RADF [1] vertically.
4. Remove 3 screws [2] and 2 fixtures [3].
5. Raise and remove RADF [1].
6. Reinstall the above parts following the removal steps in reverse.

Note:

- After installing RADF, perform the 36-mode "RADF installing position adjustment".





i n v e n t

Q5686A/Q5687A

hp 3000-sheet Finishers

SERVICE MANUAL

CONTENTS

SAFETY AND IMPORTANT WARNING ITEMS

Refer to the 9850 service manual

I OUTLINE

1. PRODUCT SPECIFICATIONS	1-1
2. CENTER CROSS SECTION	1-6
3. DRIVE SYSTEM DIAGRAM	1-7
3.1 Paper conveyance drive	1-7
3.2 Stacker drive	1-8
3.3 Staple drive	1-9
3.4 Tray drive	1-10
3.5 Folding drive	1-11

II UNIT EXPLANATION

1. CONVEYANCE	2-1
1.1 Composition	2-1
1.2 Operation	2-2
1.2.1 Finisher conveyance control	2-2
1.2.2 Gate drive control	2-3
1.2.3 By-pass gate control	2-4
1.2.4 Shift control	2-5
1.2.5 Paper exit roller control	2-6
1.2.6 Paper exit opening nip control	2-7
1.2.7 Open/close control of the paper exit opening	2-8
1.2.8 Sub-tray paper exit control	2-10
2. MAIN TRAY	2-11
2.1 Composition	2-11
2.2 Operation	2-12
2.2.1 Tray up/down control	2-12
3. STACKER	2-14
3.1 Composition	2-14
3.2 Operation	2-15
3.2.1 Alignment U control	2-15
3.2.2 Alignment L control (Q5687A only)	2-16
3.2.3 Stopper control (Q5687A only)	2-16
3.2.4 Stacker entrance conveyance control	2-21
3.2.5 Stacker paper exit control	2-26
4. STAPLER	2-28
4.1 Composition	2-28
4.2 Operation	2-29
4.2.1 Stapler movement control	2-29
4.2.2 Staple control	2-32

5. FOLDING/THREE-FOLDING (Q5687A ONLY)	2-34
5.1 Composition	2-34
5.2 Operation	2-35
5.2.1 Folding knife control	2-35
5.2.2 Folding conveyance control	2-36
5.2.3 Three-folding gate control	2-37

III DISASSEMBLY/ASSEMBLY

1. EXTERIOR	3-1
1.1 Removing and reinstalling of the booklet tray (Q5687A only)	3-1
1.2 Removing and reinstalling of the top cover 1	3-2
1.3 Removing and reinstalling of the top cover 2	3-2
1.4 Removing and reinstalling of the side cover	3-3
1.5 Removing and reinstalling of the finisher door	3-3
1.6 Removing and reinstalling of the rear cover	3-4
1.7 Removing and reinstalling of the main tray	3-5
1.8 Removing and reinstalling of the main paper exit opening cover	3-6
1.9 Removing and reinstalling of the booklet paper exit opening cover (Q5687A only)	3-6
2. CONVEYANCE	3-7
2.1 Replacing the paper exit roller /A (sponge roller)	3-7
2.2 Replacing the intermediate conveyance roller (sponge roller)	3-9
2.3 Removing and reinstalling of the paper exit opening unit	3-10
3. MAIN TRAY	3-12
3.1 Replacing the tray up/down motor	3-12
3.2 Removing and reinstalling of the up/down wire	3-13
4. STACKER	3-17
4.1 Replacing the stacking assist roller	3-17
4.2 Removing and reinstalling of the stacker unit cover	3-17
4.3 Removing and reinstalling of the stacker unit	3-18
5. STAPLER	3-21
5.1 Removing and reinstalling of the stapler unit cover	3-21
5.2 Replacing the clincher	3-22
5.3 Replacing the stapler	3-24

I OUTLINE

1. PRODUCT SPECIFICATIONS

A. Type

Q5686A	Post-processing equipment provided with functions such as offset collation (sort, group), staple, and sub-tray ejection.
Q5687A	Post-processing equipment provided with functions such as offset collation (sort, group), staple, sub-tray ejection, booklet (stitch-and-hold, folding), and three-holding.

B. Functions

Applicable copy paper:	Same as the finisher. However, label paper cannot be used in the staple mode, the stitch-and-fold or folding mode, and the three-folding mode.
------------------------	---

Paper size:

		Q5686A/Q5687A				Q5687A only	
		Non-sort	Sort/group	Staple	Sub-tray	Booklet	Three-folding
Metric series	A3	○	○	○	○	○	
	B4	○	○	○	○	○	
	F4R	○	○	○	○		
	A4	○	○	○	○		
	A4R	○	○	○	○	○	○ ^{*1}
	B5	○	○	○	○		
	B5R	○	○	○	○		
	A5R	○			○		
	B6R	○			○		
Inch series	11 x 17	○	○	○	○	○	
	8.5 x 14	○	○	○	○	○	
	8.5 x 11	○	○	○	○		
	8.5 x 11R	○	○	○	○		○ ^{*1}
	5.5 x 8.5R	○			○		
	Wide paper	○	○	○	○	○	
	Irregular				○		

*1 When changing the size of paper, it is necessary to change the installation position of the three-folding stopper.

The upper limit of wipe paper is to be 314mm x 458mm.

Paper stacking capacity (80g/m²)

Sub-tray exit mode 200 sheets, max. (limited only to the same size)

Non-staple/sort/group modes

1500 sheets, max. (A3, B4, F4R, 11 x 17, 8.5 x 14)

3000 sheets, max. (A4, A4R, B5, B5R, 8.5 x 11, 8.5 x 11R)

500 sheets, max. (A5R, B6R, 5.5 x 8.5R, A6R)

*However, the maximum number of sheets for A4, A4R, B5, B5R, 8.5 x 11, 8.5 x 11R of Q5687A is 2500 sheets.

Staple mode

1000 sheets, max. (limited only to the same size)

Main tray paper stacking capacity:

No. of sheets to be stapled	A3, 11 x 17	Other than the left
2 to 9	50 copies	100 copies
10 to 20	50 copies	50 copies
21 to 30	30 copies	30 copies
31 to 40	25 copies	25 copies
41 to 50	20 copies	20 copies

Booklet mode (Q5687A only)

Stitch-and-fold

20 copies for folding less than 5 sheets of paper. However, 15 copies for small size paper (A4R, 8.5 x 11R).

2 copies at least for folding more than 6 sheets of paper.

Folding

33 copies for folding less than 3 sheets of paper. However, 25 copies for small size paper (A4R, 8.5 x 11R).

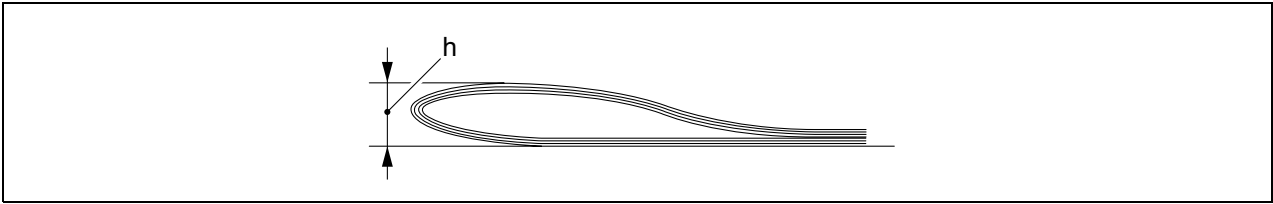
Three-folding mode

50 copies for folding a single sheet of paper

Copy paper curling (5 sheets of paper) $h = 10\text{mm}$ or less



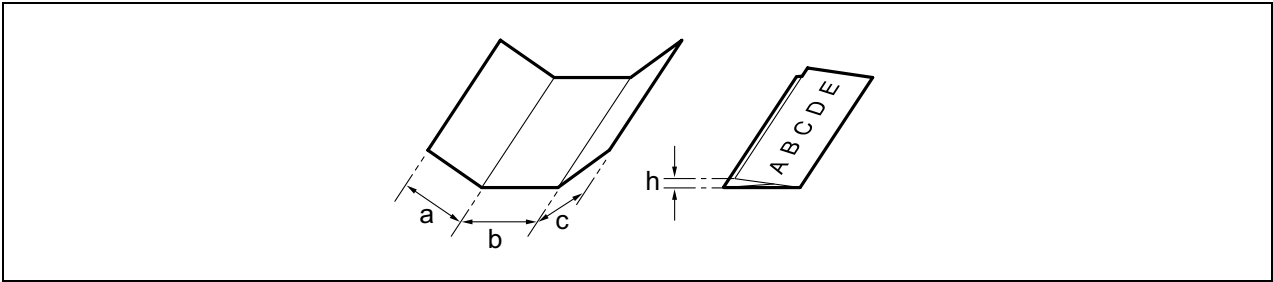
Height of folding in the booklet mode (80g/m² paper) (Q5687A only)



	Height of folding (h)		
No. of sheets folded	A3, 11 x 17	B4, 8.5 x 14	A4R, 8.5 x 11R
0 to 5	25mm or less	25mm or less	25mm or less
6 to 10	50mm or less	50mm or less	Not specified.* ²
11 to 20	Not specified.* ²	Not specified.* ²	Not specified.* ²

*² The height of folding may be larger after exit, although the booklet must be folded with ease manually.

Folding position in the three-folding mode, and its height



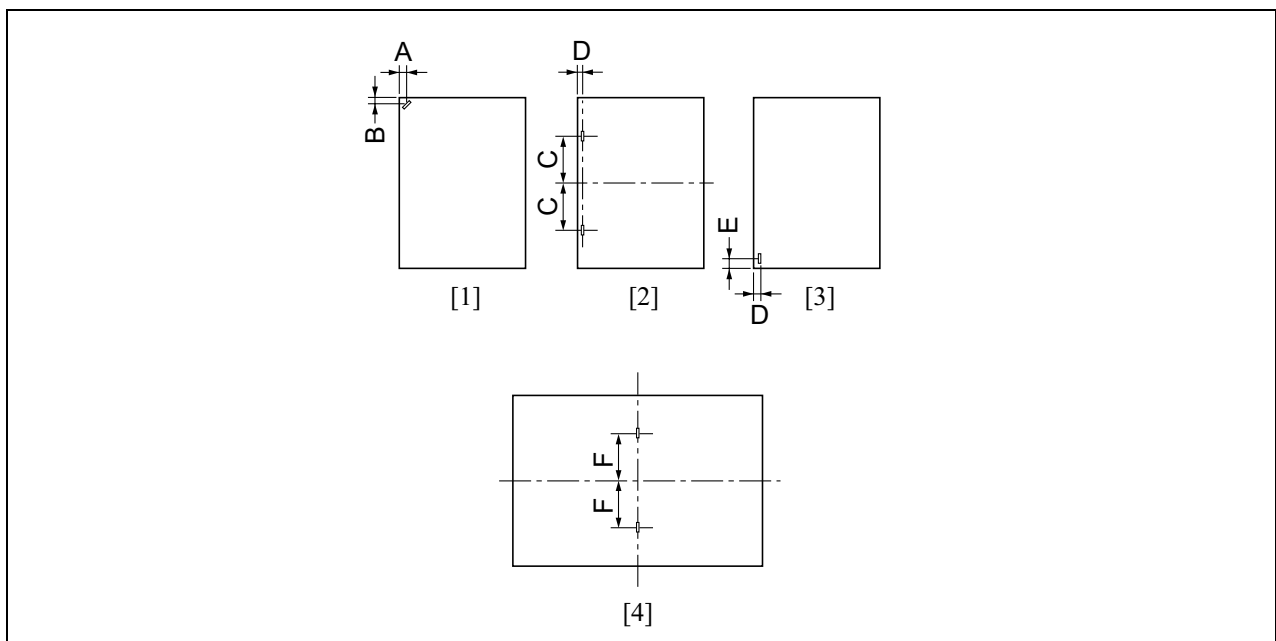
Section	Item	Reference value		Specification
		A4R	8.5 x 11R	
Folding position	a	95mm	89.4mm	± 2mm
	b	101mm	95mm	± 2mm
	c	101mm	95mm	± 2mm
Folding height	h	25mm or less	25mm or less	

* Measurements should be taken for a single sheet folding.

Amount of sort offsetting 30mm (when sorting/grouping)

C. Staple mode

Staple ability:	50 sheets, max. (for paper of 80g/m ² with 5mm or less in thickness) 16 sheets, max. (for paper of 105g/m ² with 5mm or less in thickness)
Staple position:	A=8.5mm ± 3mm (adjustable) B=8.5mm ± 3mm C=60mm ± 3mm (adjustable) D=8.5mm ± 3mm (adjustable) E=14mm ± 3mm F=60mm ± 3mm



[1] Single staple (rear)

[2] 2 staples

[3] Single staple (front)

[4] Stitch-and-fold (Q5687A only)

Staple capacity: 5000 staples/cartridge

D. Booklet mode (Q5687A only)

No. of sheets to be stitched and folded

20 sheets, max. (paper of 80g/m²)

19 sheets, max. (paper of 80g/m²) + 1 sheet (paper of 200g/m²)

16 sheets, max. (paper of 105g/m²)

15 sheets, max. (paper of 105g/m²) + 1 sheet (paper of 200g/m²)

No. of sheets to be folded

3 sheets, max. (paper of 105g/m²)

E. Three-folding mode (Q5687A only)

No. of sheets to be folded three times (Use of special paper is not allowed.)

3 sheets, max. (paper of 80g/m²)

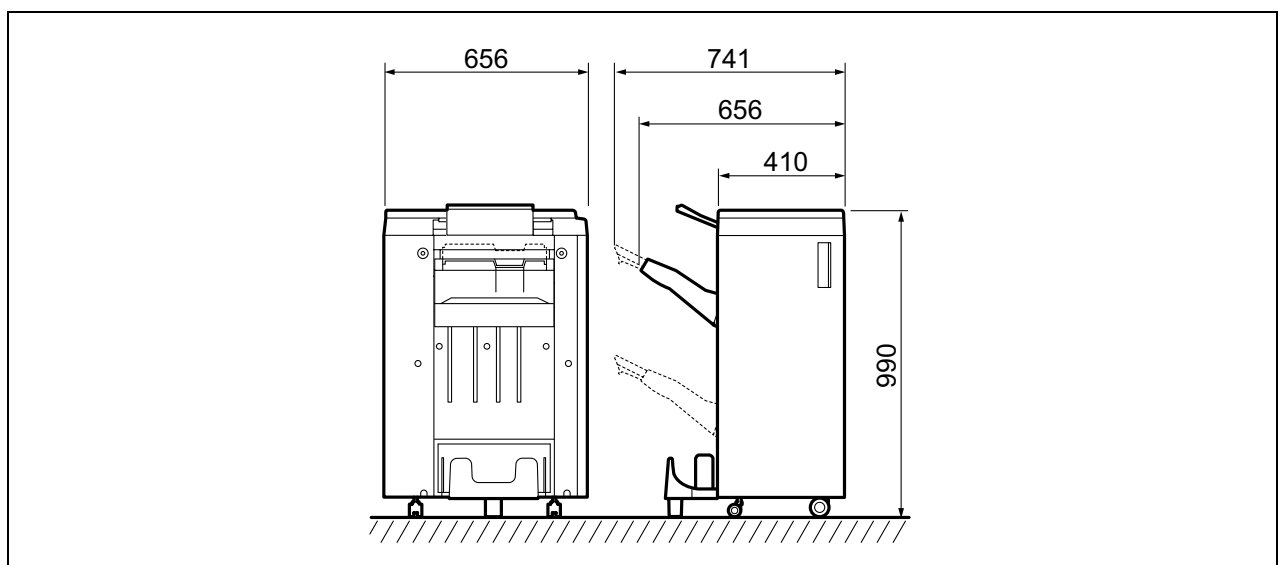
1 sheet, max. (paper of 105g/m²)

F. Option

hp post insertion kit	(sheet feeding)
hp punch kits	(punch)

G. Finisher data

Power source:	24V/5VDC (supplied from the finisher MFP)
Max. power consumption:	100VA
Weight:	Q5686A: Approx. 56kg Q5687A: Approx. 66kg
Dimensions:	



H. Maintenance and life

Maintenance:	Same as the engine
Finisher service life:	Same as the engine

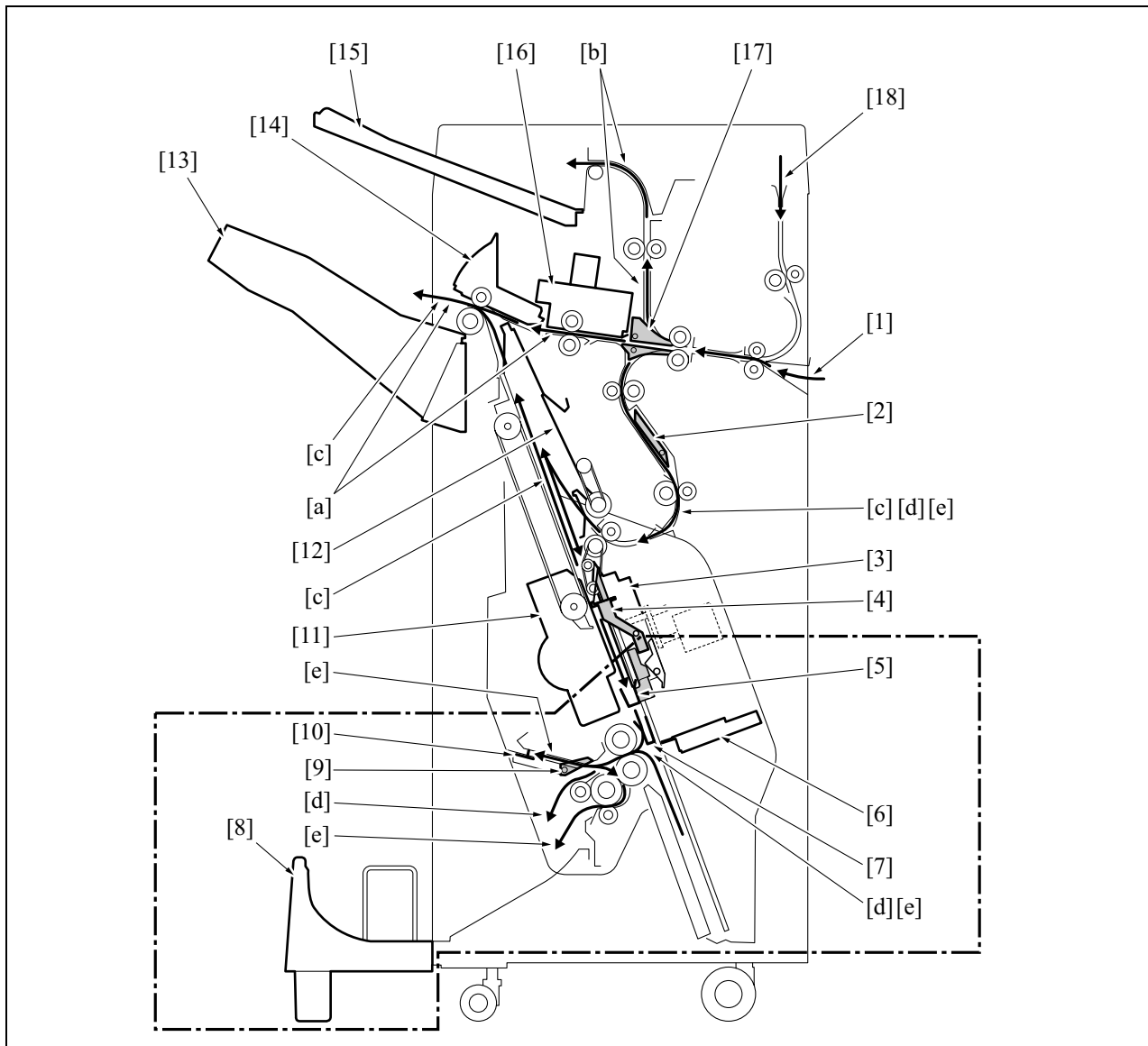
I. Operating environment

Temperature:	10 to 30°C
Humidity:	10 to 80% RH (with no dew condensation)

Note:

- The information herein may be subject to change for improvement without notice.

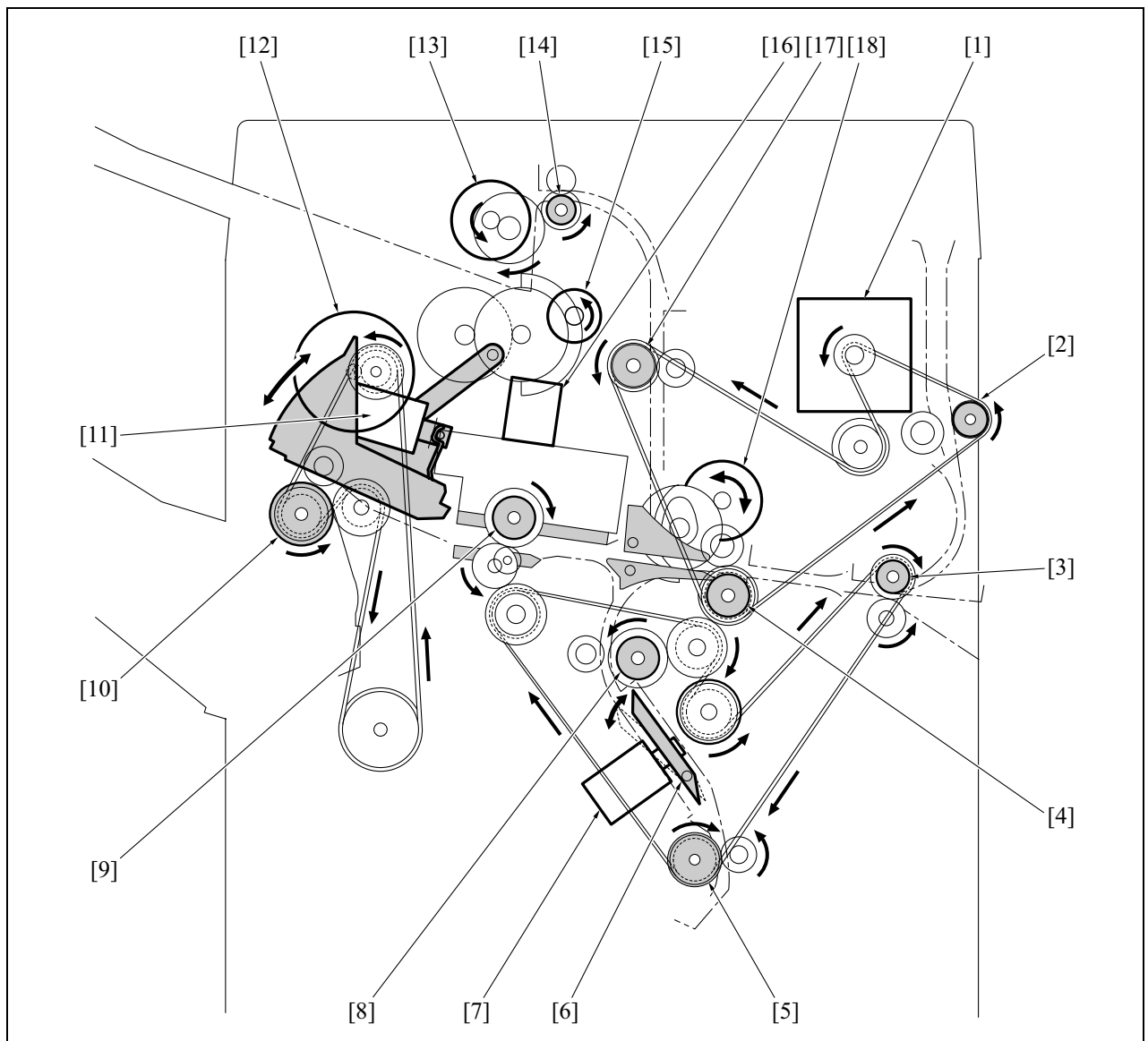
2. CENTER CROSS SECTION



- | | |
|---|--|
| [1] Path through which paper is sent from the finisher. | [12] Alignment plate U |
| [2] By-pass gate | [13] Main tray |
| [3] Clincher | [14] Paper exit opening unit |
| [4] Flat-stapling stopper | [15] Sub-tray |
| [5] Booklet stopper | [16] Shift unit |
| [6] Folding knife | [17] Gate |
| [7] Alignment plate L | [18] Path through which paper is sent from post insertion kit (optional) |
| [8] Booklet tray | [a] Path through which paper is sent in the non-sort/sort/group modes |
| [9] Three-folding gate | [b] Path through which paper is sent in the sub-tray mode |
| [10] Three-folding stopper | [c] Path through which paper is sent in the staple mode |
| [11] Stapler | [d] Path through which paper is sent in the booklet mode (Q5687A only) |
| | [e] Path through which paper is sent in the three-folding mode (Q5687A only) |

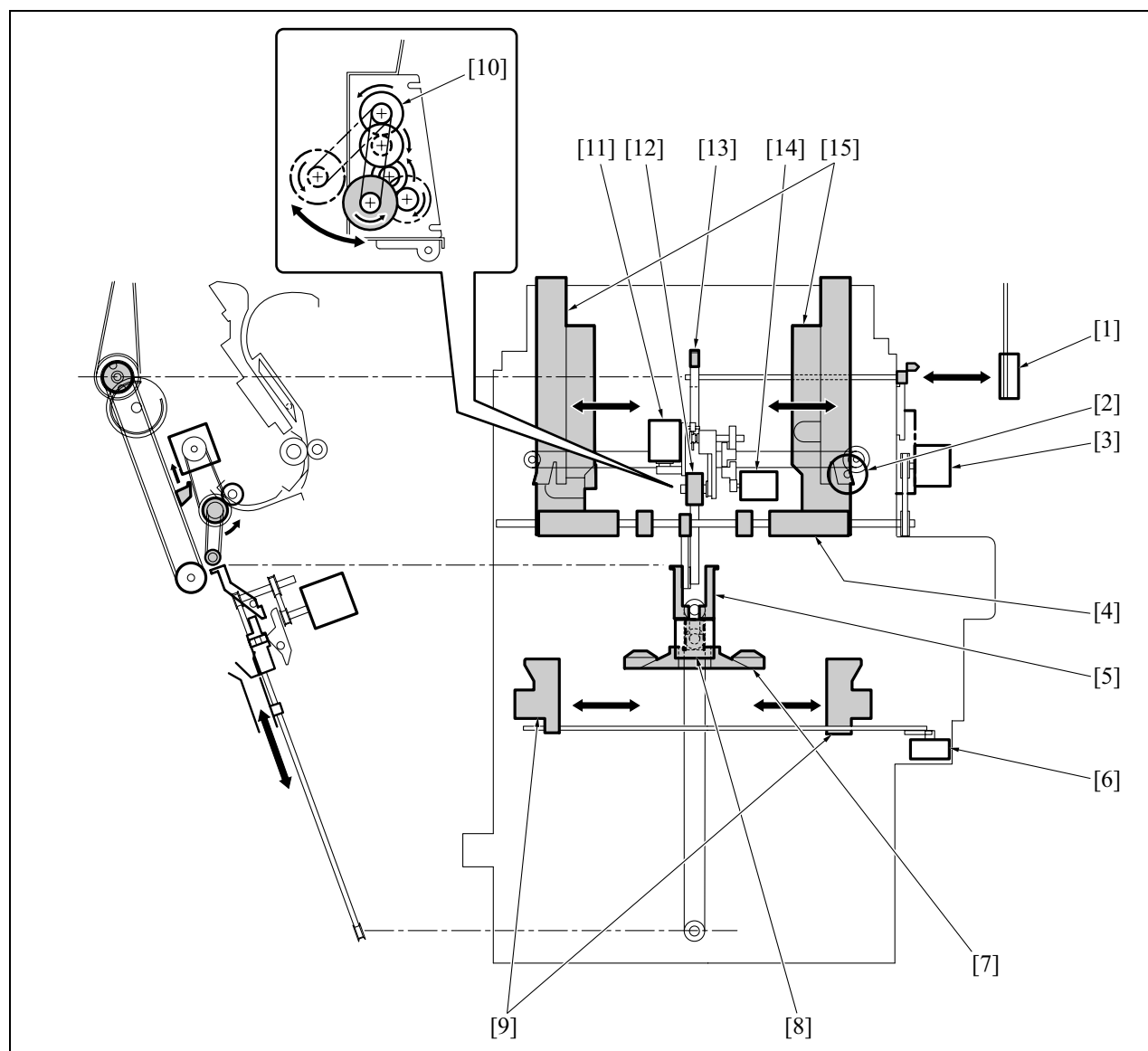
3. DRIVE SYSTEM DIAGRAM

3.1 Paper conveyance drive



- | | |
|--------------------------------------|--|
| [1] Finisher conveyance motor (M701) | [10] Paper exit roller |
| [2] Post Insertion conveyance roller | [11] Paper exit opening solenoid (SD704) |
| [3] Entrance roller | [12] Paper exit roller motor (M707) |
| [4] Conveyance roller A | [13] Sub-tray paper exit motor (M721) |
| [5] Intermediate conveyance roller | [14] Sub-tray paper exit roller |
| [6] By-pass gate | [15] Paper exit opening motor (M708) |
| [7] By-pass gate solenoid (SD705) | [16] Shift motor (M702) |
| [8] Conveyance roller B | [17] Sub-tray conveyance roller |
| [9] Shift roller | [18] Gate drive motor (M712) |

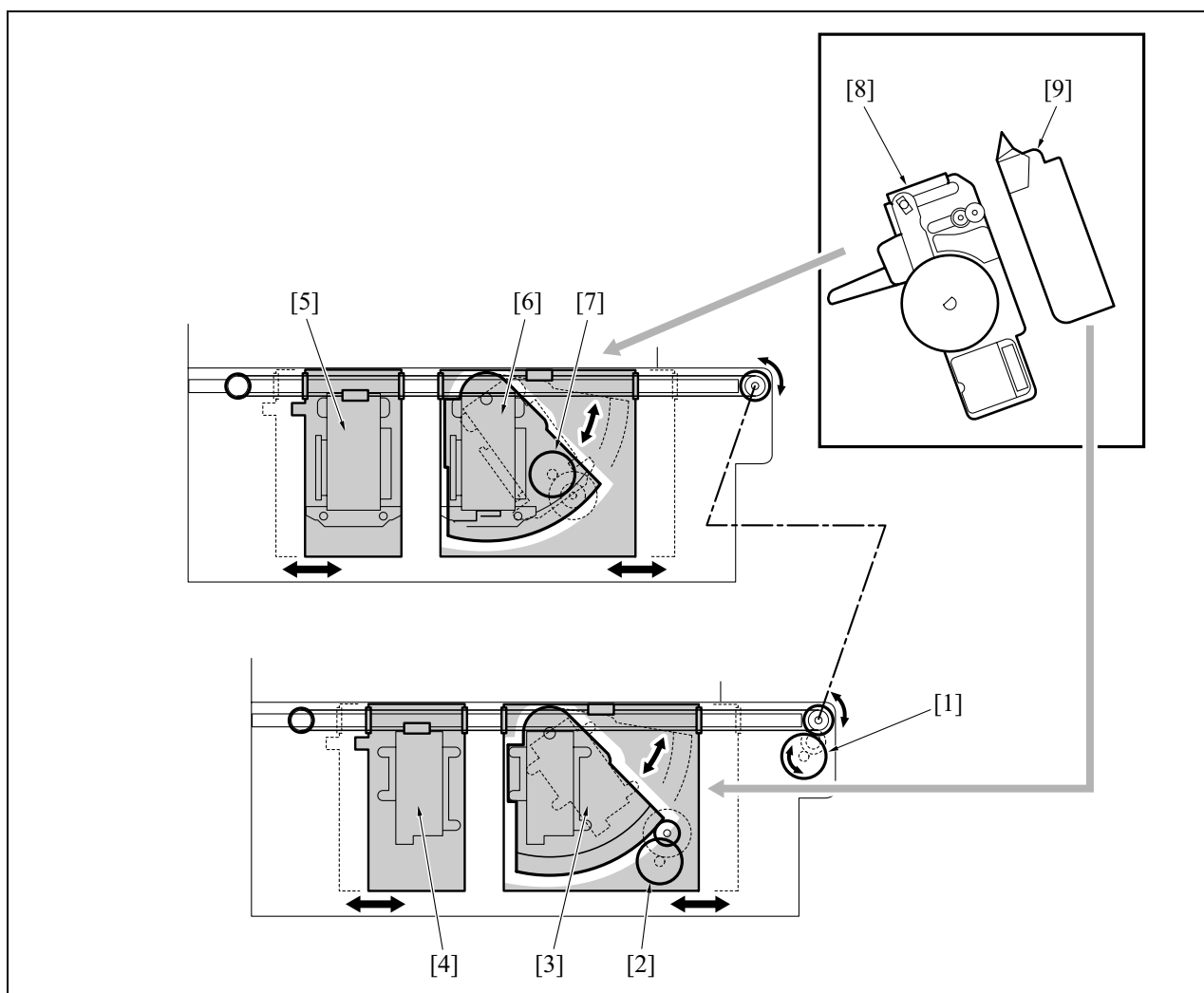
3.2 Stacker drive



- [1] Coupling: from the paper exit roller motor (M707)
- [2] Alignment motor U (M705)
- [3] Stacker entrance motor (M713)
- [4] Stacker entrance roller
- [5] Flat-stapling stopper
- [6] Alignment motor L (M716)
- [7] Booklet stopper
- [8] Stopper motor (M718)

- [9] Alignment plate L
- [10] One-way mechanical clutch
- [11] Stacking assist solenoid (SD702)
- [12] Stacking assist roller
- [13] Paper exit arm
- [14] Stacking assist motor (M722)
- [15] Alignment plate U

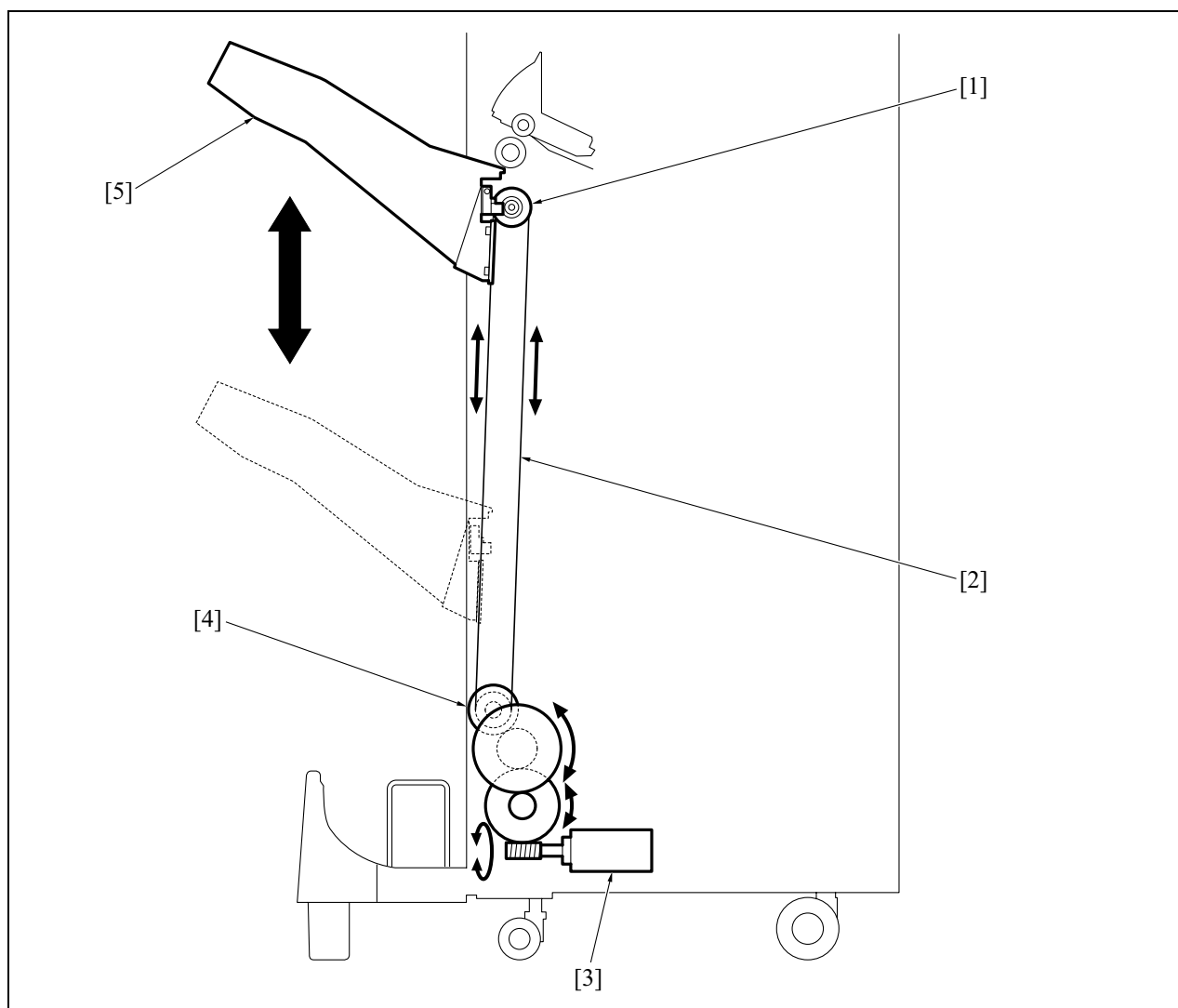
3.3 Staple drive



- [1] Stapler movement motor (M711)
- [2] Clincher rotation motor (M704)
- [3] Clincher R
- [4] Clincher F
- [5] Stapler F

- [6] Stapler R
- [7] Stapler rotation motor (M706)
- [8] Stapler
- [9] Clincher

3.4 Tray drive



[1] Up/down pulley U

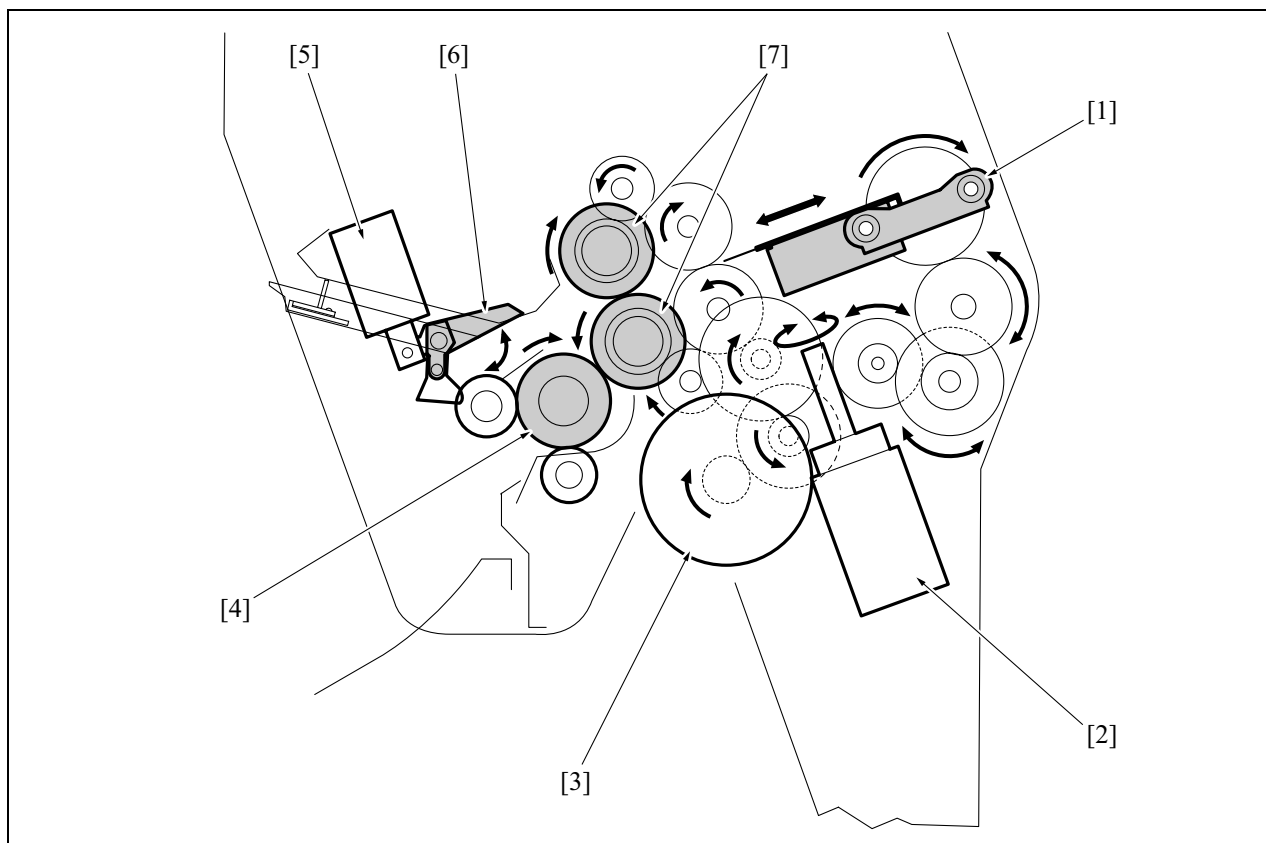
[2] Up/down wire

[3] Tray up/down motor (M703)

[4] Up/down pulley L

[5] Main tray

3.5 Folding drive



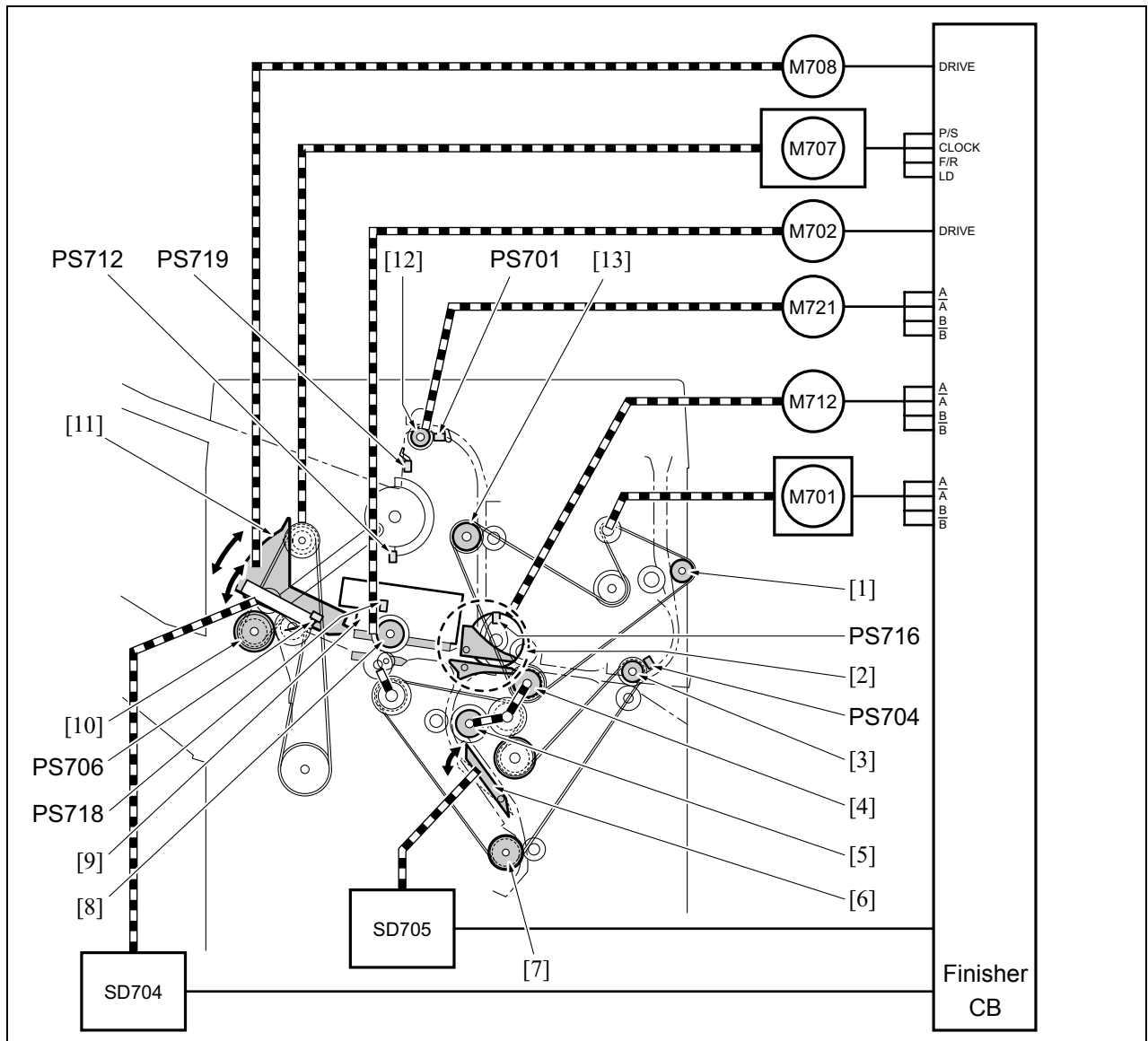
- | | |
|-------------------------------------|---|
| [1] Folding knife | [5] Three-folding gate solenoid (SD706) |
| [2] Folding knife motor (M719) | [6] Three-folding gate |
| [3] Folding conveyance motor (M720) | [7] Folding roller |
| [4] Three-folding roller | |

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II UNIT EXPLANATION

1. CONVEYANCE

1.1 Composition



Symbol	Name	Function and method
[10]	Main tray paper exit roller	Paper exit to the main tray
[11]	Paper exit opening unit	Space saving when stacking large size paper; Crank mechanism
[12]	Sub-tray paper exit roller	Paper exit to the sub-tray
[13]	Sub-tray conveyance roller	Paper conveyance to the sub-tray
M701	Finisher conveyance motor	Conveyance belt drive Stepping motor
M702	Shift motor	Driving of the shift roller in the cross direction DC motor
M707	Paper exit roller motor	Paper exit roller; Driving of the stacker paper exit belt Brushless DC motor
M708	Paper exit opening motor	Open/close drive of the paper exit opening unit DC motor
M712	Gate drive motor	Driving of the gate U and gate L Stepping motor
M721	Sub-tray paper exit motor	Paper conveyance drive to the sub-tray Stepping motor
SD704	Paper exit opening solenoid	Paper nip at the paper exit opening
SD705	By-pass gate solenoid	Drive to switch the by-pass gate
PS701	Sub-tray paper exit sensor	Detection of the paper passage to the sub-tray
PS704	Finisher entrance sensor	Paper detection at the finisher entrance
PS706	Main tray paper exit sensor	Detection of the paper passage to the main tray
PS712	Paper exit opening HP sensor	Detection of the paper exit opening unit HP
PS716	Gate HP sensor	Detection of the gate cam HP
PS718	Shift HP sensor	Detection of the shift unit HP

1.2 Operation

1.2.1 Finisher conveyance control

The finisher conveyance is made by a 24VDC motor by controlling the finisher control board (Finisher CB).

A. Interlock control

The finisher conveyance drive control of paper is commenced by the start button ON signal from the finisher. However, when the interlock (MS701) is off, an error message is output to the finisher PRCB with no control commenced.

B. Finisher conveyance control

In the mode in which a high speed rotation is made by turning on the start button and paper is exited at low speed from the finisher, turn on the finisher paper exit sensor (PS13) to switch conveyance to a low speed, and then to a high speed a specified period of time after the finisher entrance sensor (PS704) is turned ON.

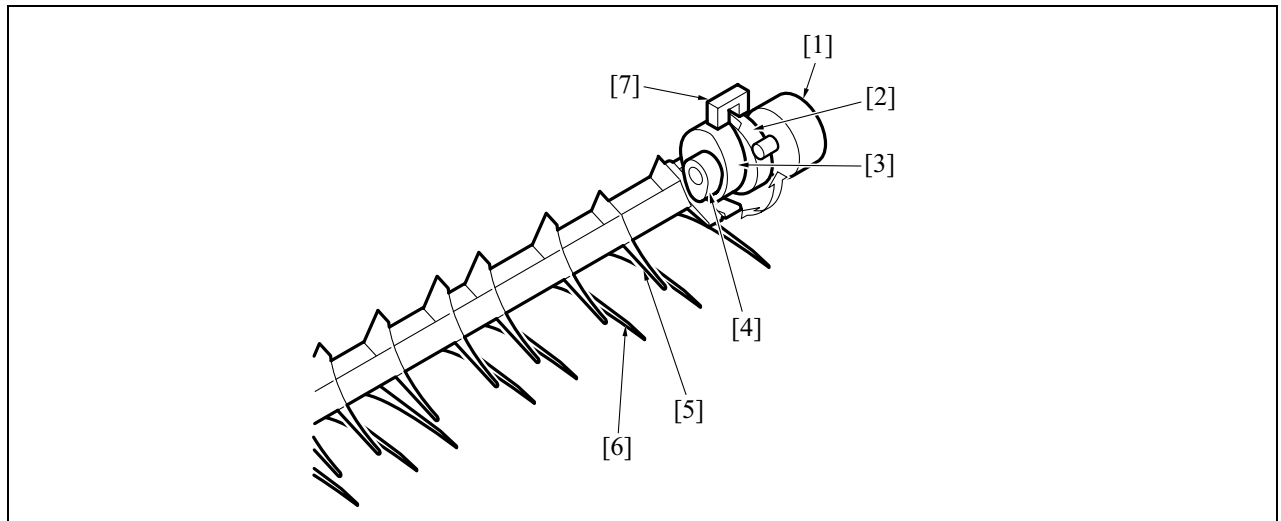
For main tray paper exit, conveyance is switched to a medium speed a specified period of time after PS704 detects the trailing edge of paper, and then maintained at the finisher paper exit line speed. And the conveyance returns to a high speed rotation after a specified period of time to stand by for the next conveyance of paper.

1.2.2 Gate drive control

The gate switches the paper conveyance path to the sub-tray, main tray or stacker.

A. Gate operation

To operate the gate, the gate drive motor (M712) [1] drives the gate cam [2], and the two cams (cams U [3] and L [4]) of this gate cam drive the two gates of gate U [5] and gate L [6] respectively. The home position is detected by the gate HP sensor (PS716) [7].

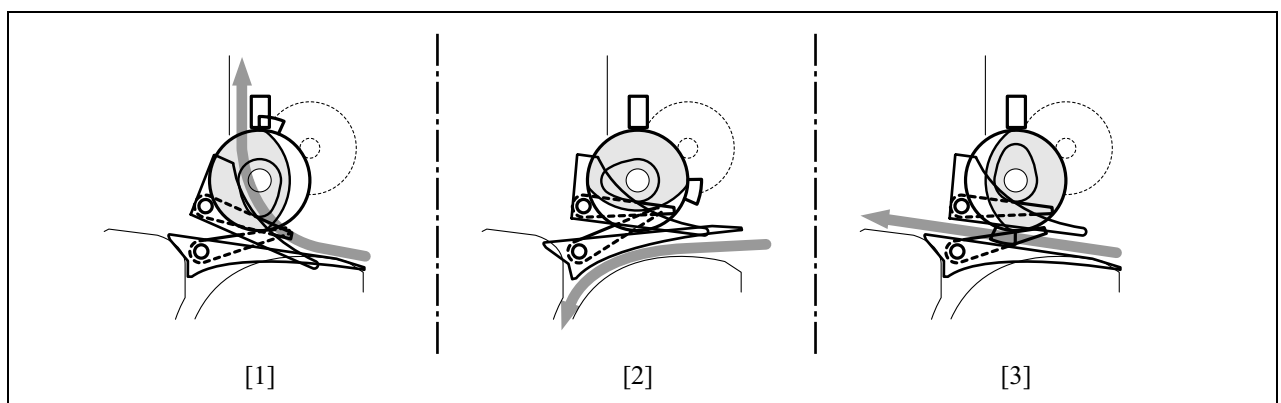


B. Gate control

The gate control is made by the finisher control board (Finisher CB).

When an finisher operation signal from the finisher turns on the gate, it stops at either one of the sub-tray (home position) [1], stacker [2] and main tray [3]. However, while in the paper exit to the sub-tray, the gate does not operate because of the home position being already set to the sub-tray.

After completion of copy, it stops when the gate HP sensor (PS716) detects the home position.



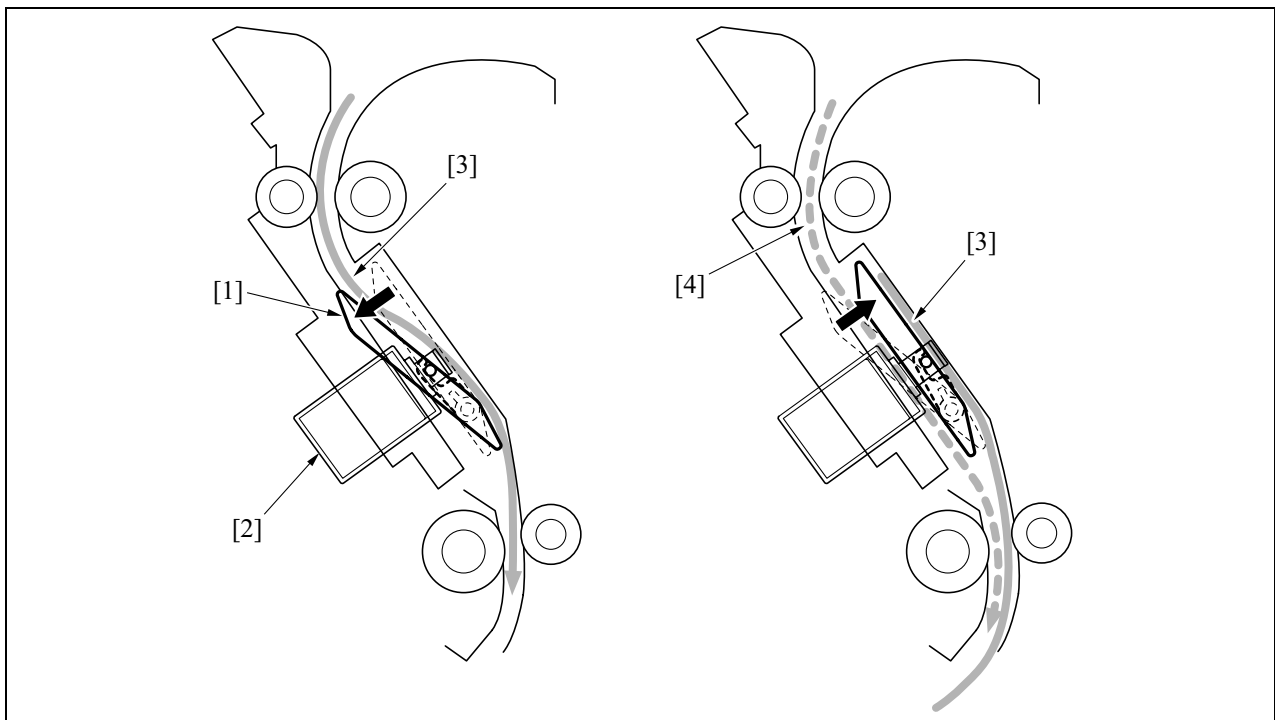
1.2.3 By-pass gate control

The by-pass gate is provided at the paper path to the stacker section. This is a gate to obtain a high productivity by conveying paper while in stapling with no time wasted.

A. By-pass gate operation

The by-pass gate [1] is driven by the by-pass gate solenoid (SD705) [2].

For small size paper (A4, B5, 8.5 x 11), the by-pass gate operates on only the first pages of the second and succeeding copies and sends them to the by-pass route [3]. The second pages of the second and succeeding copies are sent into the normal route [4], and the first pages are put upon the second pages to be conveyed to the stacker together.



B. By-pass gate control

The by-pass gate operates only for small size paper (A4, B5, 8.5 x 11) in the staple mode. The by-pass gate solenoid (SD705) is controlled by the finisher control board (Finisher CB).

(1) For the first copy

The by-pass gate solenoid (SD705) does not operate while in the paper passage of the first copy.

(2) For the second copy

A specified period of time after the stapling operation of the first copy turns on, the by-pass gate solenoid (SD705) turns on to pull in the first paper of the second copy to the by-pass side.

It turns off a specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of the first paper of the second copy.

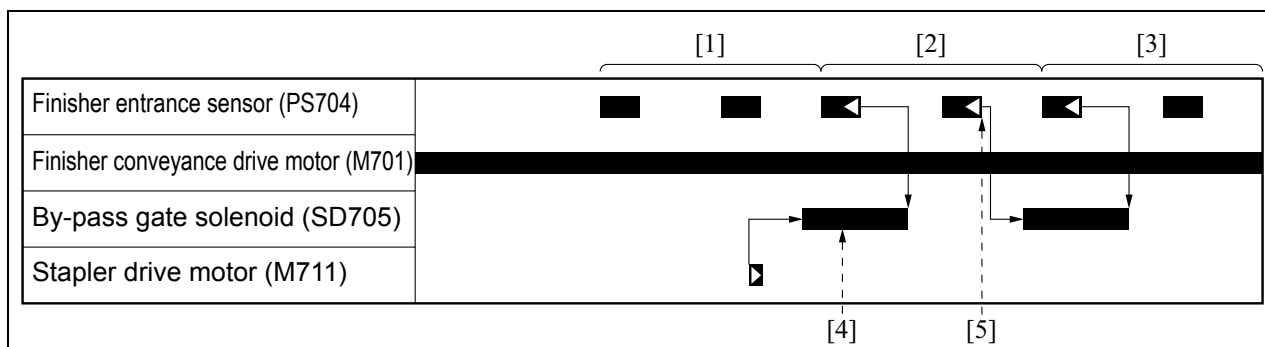
SD705 does not operate while in the conveyance of the second and succeeding papers.

(3) For the third and succeeding copies

A specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of the last paper of the second copy, the by-pass gate solenoid (SD705) turns on to pull in the first paper of the third copy to the by-pass side.

It turns off a specified period of time after PS704 detects the trailing edge of the first paper of the third copy.

SD705 does not operate while in the conveyance of the second and succeeding sheets of paper.



[1] First copy

[2] Second copy

[3] Third copy

[4] The first paper of the second copy being pulled into the by-pass

[5] Trailing edge of the last paper of the second copy

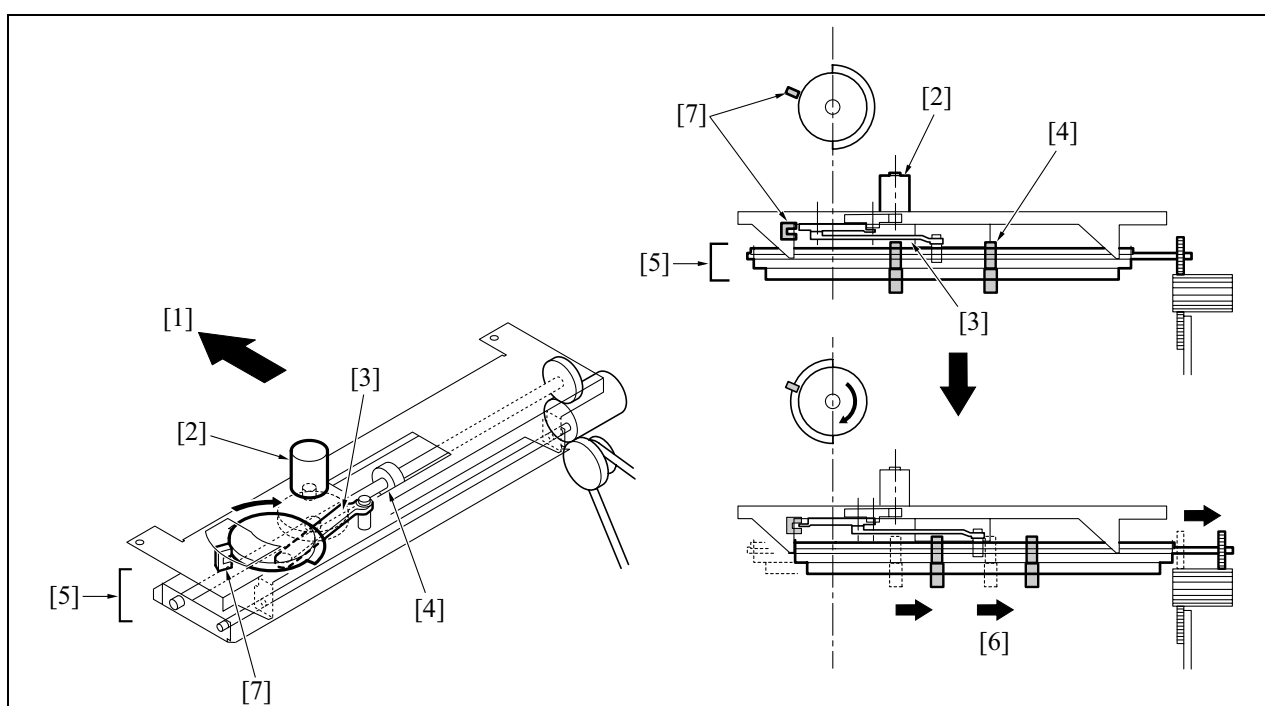
1.2.4 Shift control

The shift roller is driven by the finisher conveyance motor (M701) to convey paper to the main tray.

A. Shift operation

When the shift motor (M702) [2] rotates while in the paper conveyance to the main tray [1], the crank mechanism [3] shifts the entire shift moving section [5] including the shift roller [4] about 30 mm to the rear side to shift and move paper for exit.

The shift position is detected by the shift HP sensor (PS718) [7].

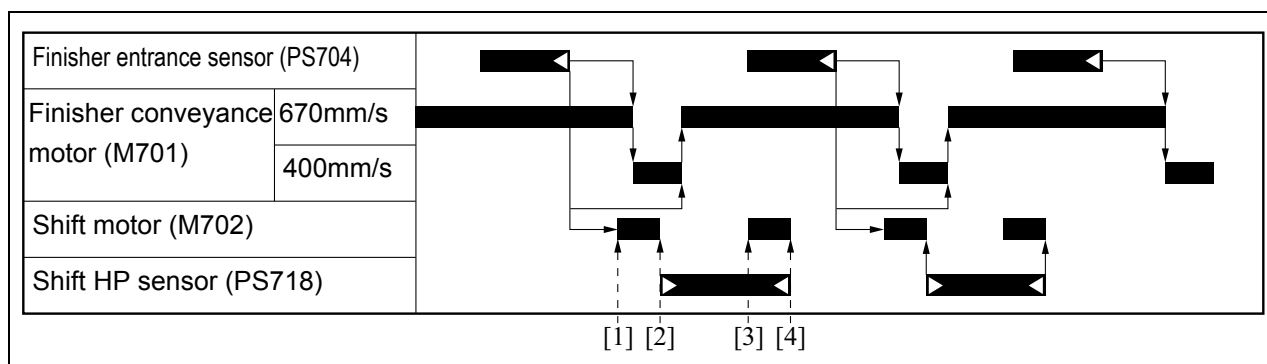


B. Shift control

In the sort/group mode, the shift motor (M702) turns on a specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of paper. M702 rotates to start to shift the shift moving section. The shift roller rotates by driving the finisher conveyance motor (M701), and it shifts while conveying paper. When the shift HP sensor (PS718) turns on from off and it is detected that the shift has been completed, M702 stops.

A specified period of time after it stops, M702 turns on again and stops at the position where PS718 turned off from on. This operation returns the shift moving section to its original position to stand by for the next page to be shifted.

Paper is offset one at a time by repeating a series of this operation.



[1] Start of shifting

[2] Completion of shifting

[3] Start of movement to HP

[4] Position of HP

1.2.5 Paper exit roller control

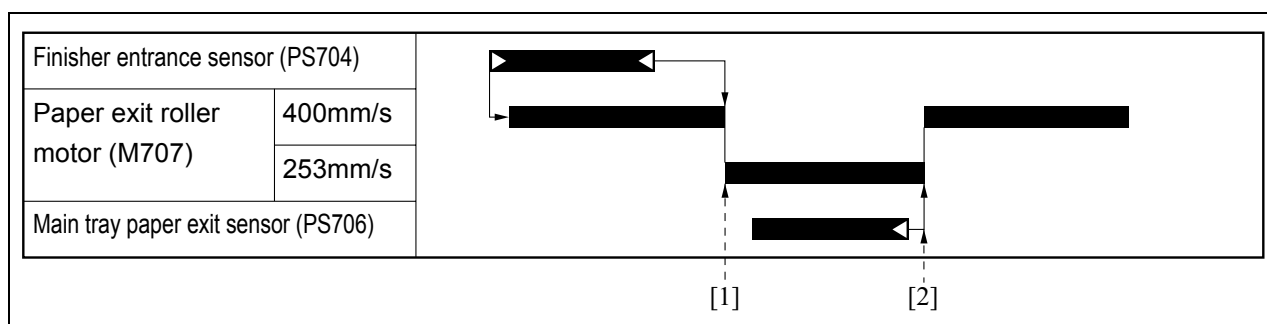
The paper exit roller motor (M707) controls the main tray paper exit roller and the paper exit belt of the stacker by controlling the finisher control board (Finisher CB).

A. Straight/sort/group modes

When the finisher entrance sensor (PS704) detects the leading edge of paper, the paper exit roller motor (M707) rotates at high speed. And a specified period of time after PS704 detects its trailing edge, the rotation changes to a low speed for paper exit.

To convey the next paper, the rotation changes again to a high speed a specified period of time after the main tray paper exit sensor (PS706) detects the trailing edge of paper.

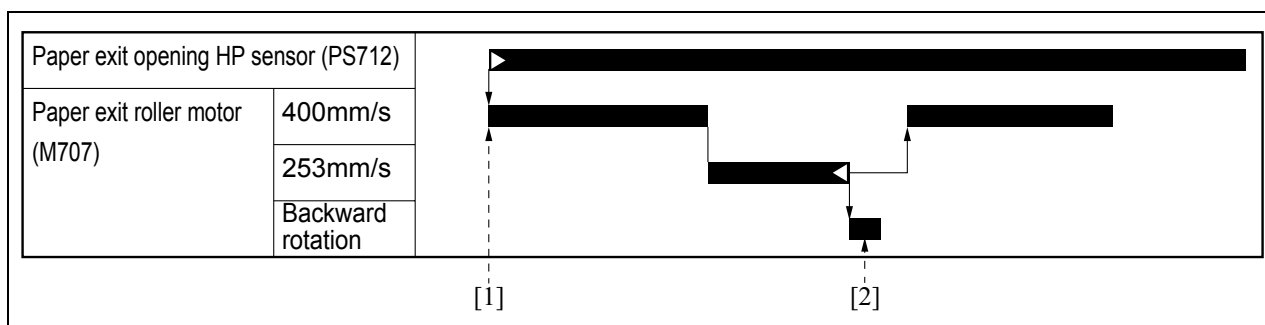
A specified period of time after PS706 detects the last paper, M707 stops.



[1] Start of paper exit

[2] Preparation for the next paper conveyance

B. Staple mode (more than 25 sheets other than extraordinarily small or large ones)



[1] Completion of closing of the paper exit opening

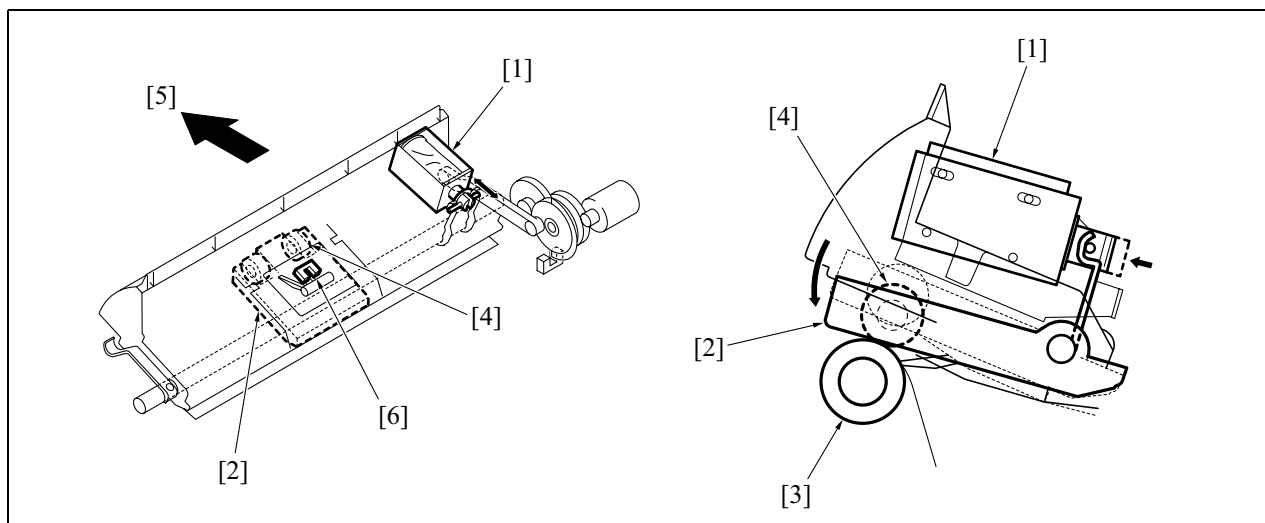
[2] Reverse operation of the brake

1.2.6 Paper exit opening nip control

Since its rotation is slower than that of the conveyance roller, the paper exit roller releases the nip function except while in paper exit. However, when paper reaches the paper exit opening, it drives the nip moving section to nip the paper.

A. Paper exit opening nip operation

When paper reaches the paper exit opening, the paper exit opening solenoid (SD704) [1] drives the nip moving section [2] and presses the nip roller [4] against the main tray paper exit roller [3] to nip the paper and discharge it to the main tray [5]. The main tray paper exit sensor (PS706) [6] detects the paper being discharged.



B. Timing when SD704 turns on

(1) Straight/sort/group mode

A specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of paper, the paper exit opening solenoid (SD704) turns on.

(2) Staple mode

A specified period of time after the completion of stapling, the paper exit opening solenoid (SD704) turns on to nip the paper.

C. Timing when SD704 turns off.

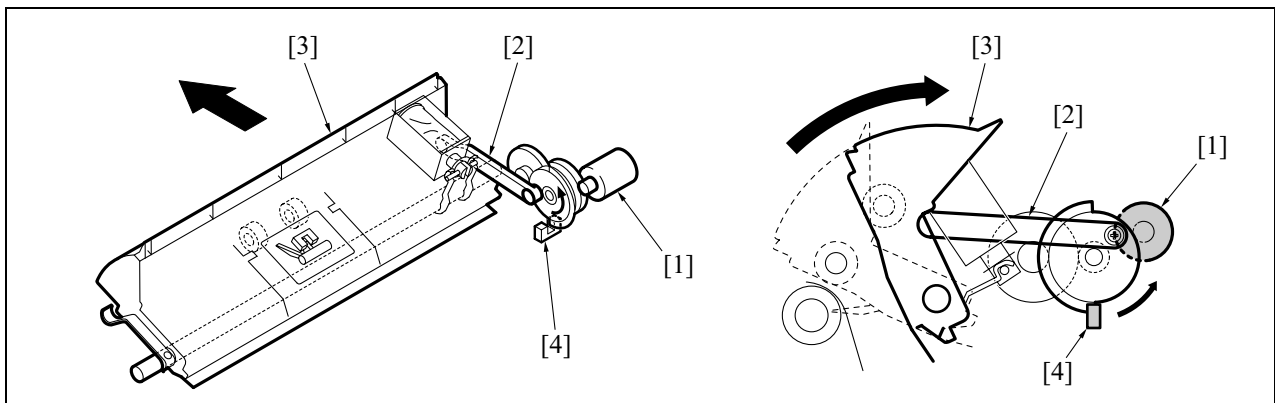
In all the modes, the paper exit opening solenoid (SD704) turns off a specified period of time after the main tray paper exit sensor (PS706) detects paper.

1.2.7 Open/close control of the paper exit opening

Since paper protrudes in the staple (when the length of the paper feed direction is over B5R), booklet and three-folding modes, the paper exit opening opens from the start of copying until the completion of stapling.

A. Open/close operation of the paper exit opening

The open/close of the paper exit opening rotates the paper exit opening motor (M708) [1] and the crank mechanism [2] raises the entire paper exit opening unit [3] to open the paper exit opening. The paper exit opening HP sensor (PS712) [4] detects the open/close of paper exit opening.



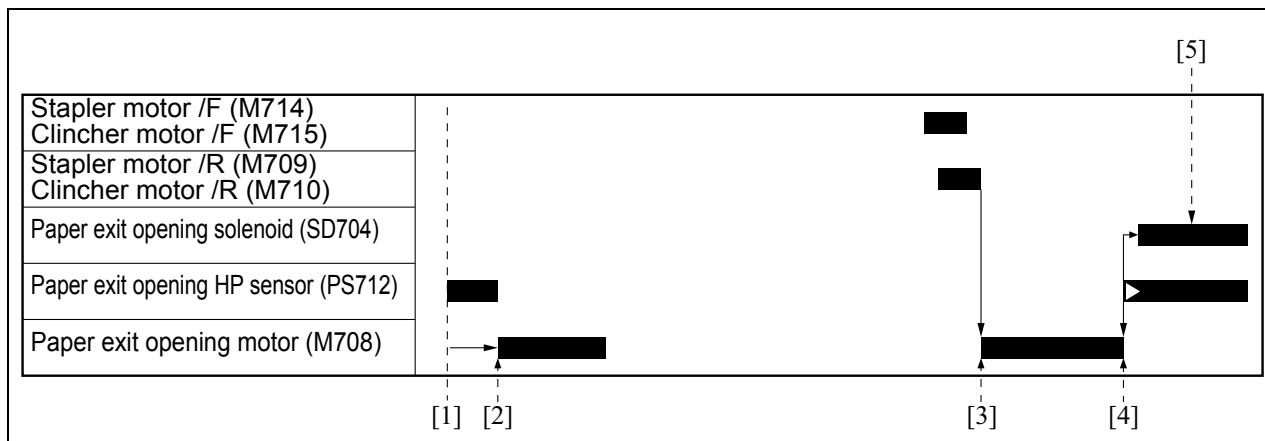
B. Open/close control of the paper exit opening

(1) Staple mode (when the length of the paper feed direction is over B5R)

An finisher operation signal from the finisher rotates the paper exit opening motor (M708) to open the paper exit opening.

Upon completion of the stapling operation, M708 turns on again to start to close the paper exit opening, and it stops when the paper exit opening HP sensor (PS712) detects the closing position.

This operation is repeated for each staple paper bundle.



[1] Finisher operation start signal ON

[2] Start of the opening operation of the paper exit opening

[3] Start of the closing operation of the paper exit opening

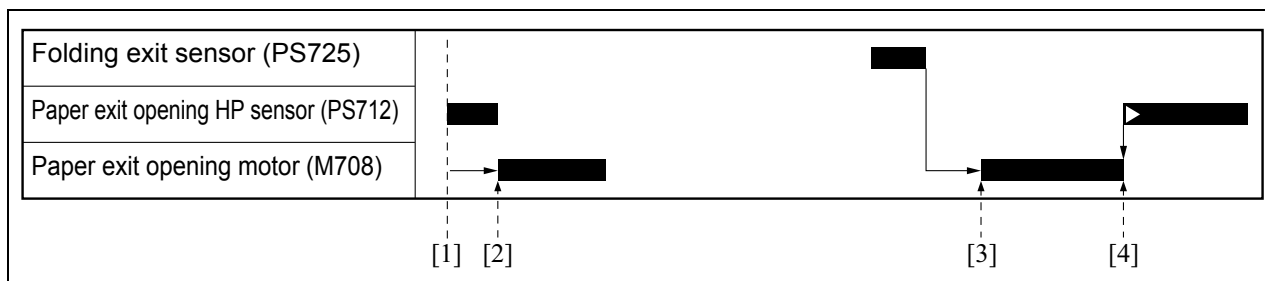
[4] The paper exit opening being closed

[5] Paper nip by means of the paper exit opening solenoid (SD704)

(2) Folding/stitch-and-fold/three-folding modes

A start button "ON" signal from the finisher rotates the paper exit opening motor (M708) to open the paper exit opening.

A specified period of time after the folding exit sensor (PS725) or the folding full sensor (PS729) detects the trailing edge of the last paper, M708 turns on again to start the closing operation of the paper exit opening. This operation stops when the paper exit opening HP sensor (PS712) detects the closing position.



[1] Finisher operation start signal ON

[2] Start of the opening operation of the paper exit opening

[3] Start of the closing operation of the paper exit opening

[4] The paper exit opening being closed

1.2.8 Sub-tray paper exit control

The sub-tray paper exit roller is driven by the sub-tray paper exit motor (M721) and controlled by the finisher control board (Finisher CB).

A. Sub-tray paper exit (M721) control

The sub-tray paper exit motor (M721) starts to rotate at high speed the moment sub-tray paper exit sensor (PS701) detects the leading edge of paper.

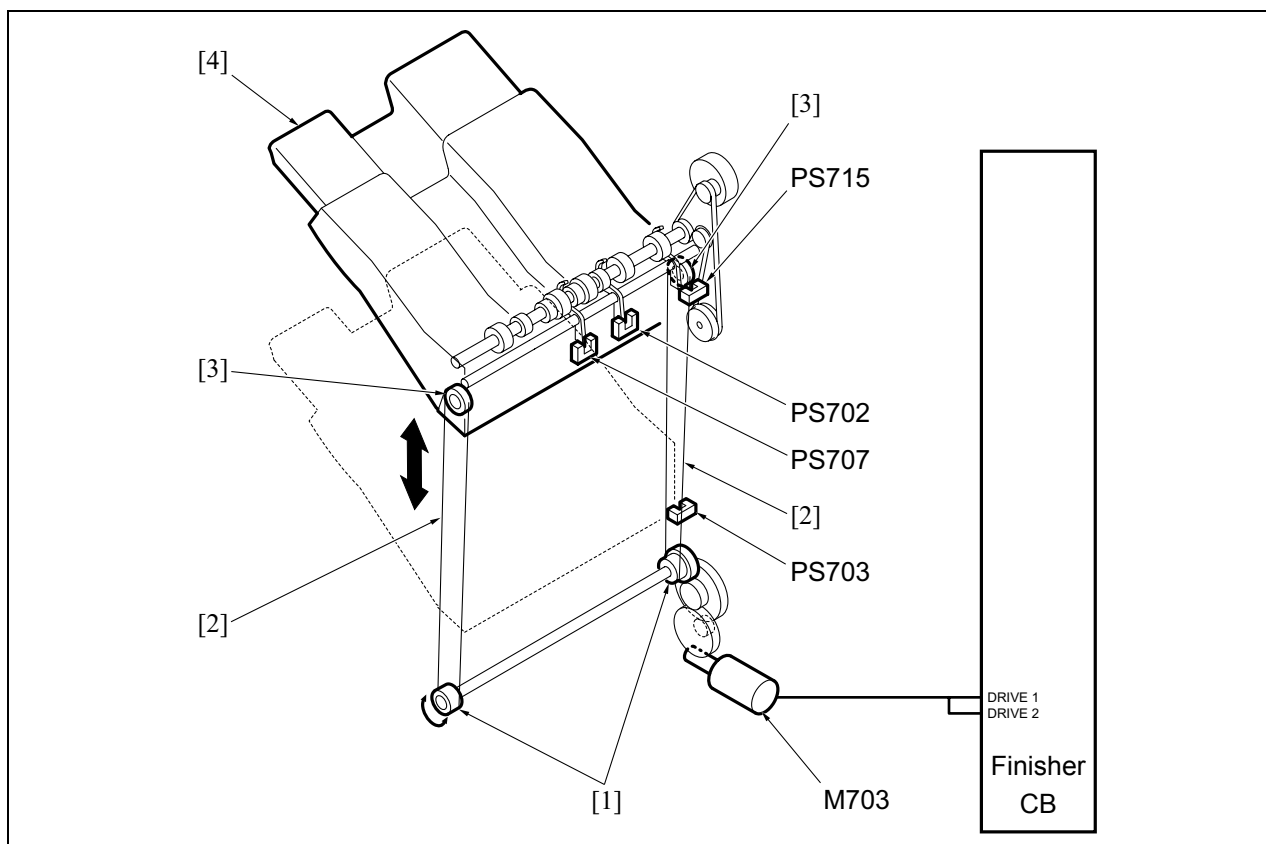
A specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of paper, the rotation changes to a low speed. M721 stops a specified period of time after PS701 detects the trailing edge of paper.

B. Sub-tray full detection

When a specified amount of paper is stacked in the sub-tray, the sub-tray full (PS719) turns on with a "Sub-tray full" information sent to the finisher. The finisher then displays a message on the operation panel.

2. MAIN TRAY

2.1 Composition



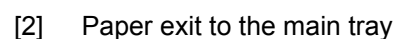
Symbol	Name	Function and method
[1]	Up/down pulley U	Transmission of drive from M703 to the up/down wire
[2]	Up/down wire	Transmission of drive from M703 to the main tray
[3]	Up/down pulley L	Transmission of drive from M703 to the up/down wire
[4]	Main tray	Main tray of paper discharged
M703	Tray up/down motor	Main tray drive DC brush motor
PS702	Tray upper limit sensor	Upper limit detection of the main tray
PS703	Tray lower limit sensor	Lower limit detection of the main tray
PS707	Stapler paper exit upper limit sensor	Upper limit detection of the main tray in the staple mode
PS715	Counter reset sensor	Detection of the tray paper being pulled out while in copy

2.2.1 Tray up/down control

The main tray goes up or down depending on the wind-up direction. The main tray goes up when the up/down pulley /L rotates clockwise as seen from the front, and goes down when it rotates counterclockwise.

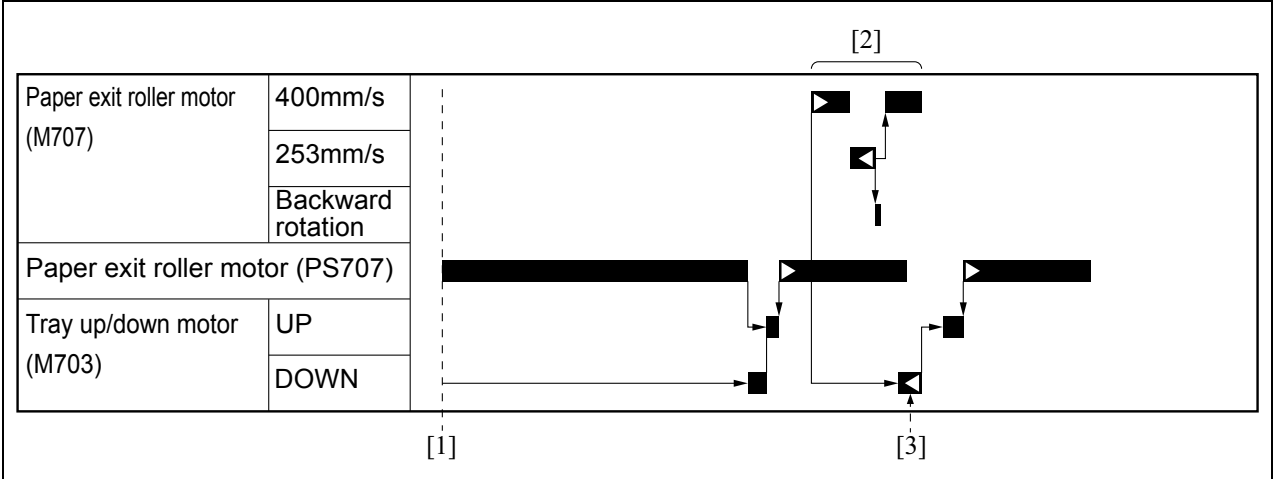
The tray lower limit sensor (PS703) detects the lowest limit of the tray. And while in intermittent copy, PS703 is used to control the number of copies since the total number of sheets are not accumulated in the soft counter.

Repeat the above for each paper.



(2) Staple mode

A specified period of time after the paper exit roller motor (M707) turns on, the tray up/down motor (M703) lowers the main tray. And after a specified period of time, M703 rotates in reverse direction to raise the main tray and stops at the position where the stapler paper exit upper limit sensor (PS707) turns on from off.

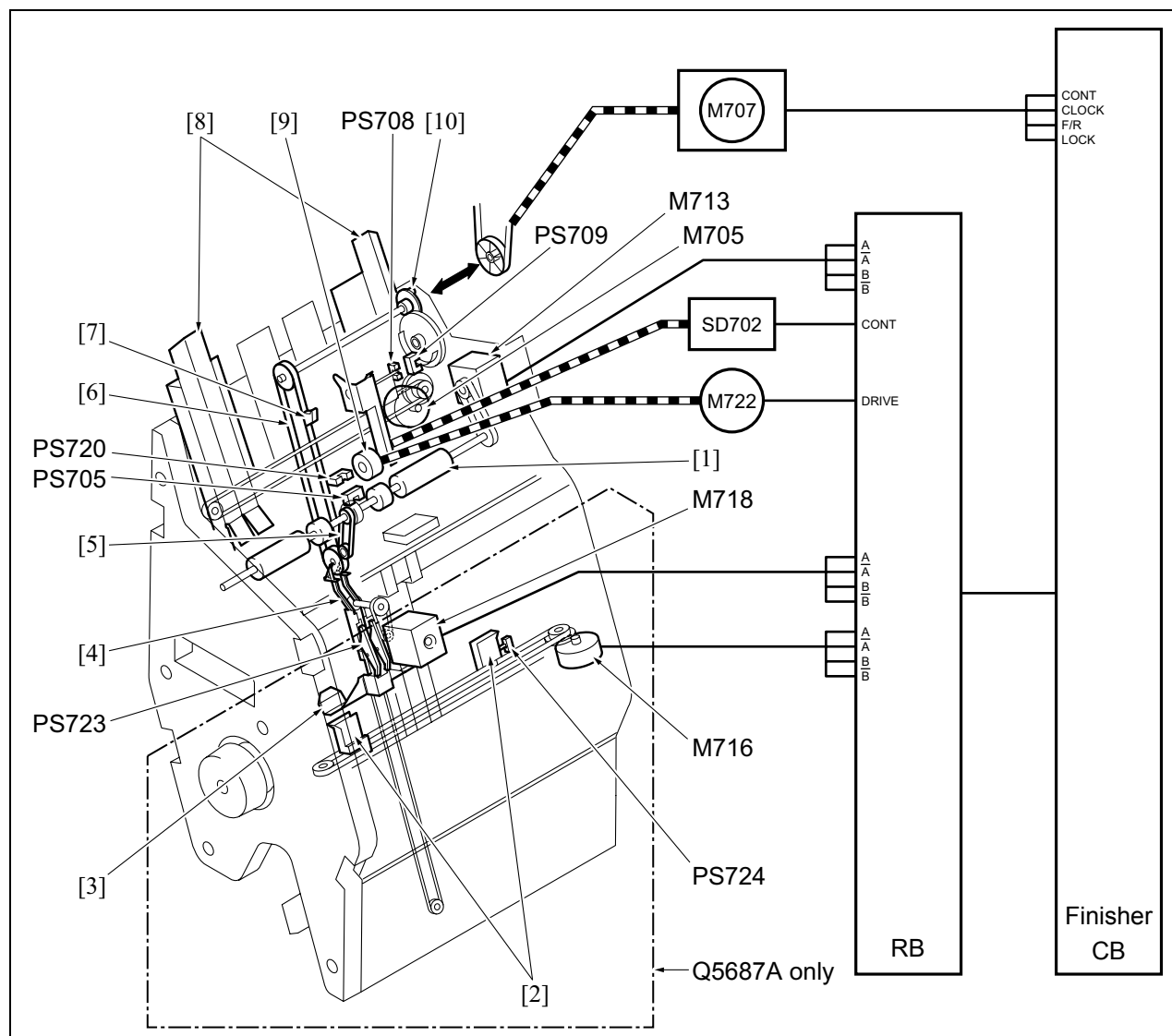


- [1] Finisher operation start signal ON
[2] Paper bundle exit into the main tray

- [3] Main tray down operation
0 to 9 sheets stapling : 200ms
10 to 24 sheets stapling : 350ms
25 or more sheets stapling : 500ms

3. STACKER

3.1 Composition



Symbol	Name	Function and method
[1]	Stacker entrance roller	Paper conveyance to the stacker; Corrugation roller
[2]	Alignment plate L	Paper alignment in the folding, stich-and-fold or three-folding mode
[3]	Booklet stopper	Paper stack in the booklet mode
[4]	Flat-stapling stopper	Paper stack in the staple (flat-stapling) mode; Link mechanism with the booklet stopper.
[5]	Swing belt	Proper arrangement of the trailing edge of paper in the stacker
[6]	Paper exit belt	Driving of the paper exit arm; Coupling synchronized drive
[7]	Paper exit arm	Paper exit to the main tray in the staple mode; Paper conveyance to the folding unit in the three-folding mode
[8]	Alignment plate U	Paper alignment in the staple (flat-stapling), folding, stitch-and-fold and three-folding modes
[9]	Stacking assist roller	Stacking assist of curled paper
[10]	Coupling pin	Transmission of drive from M707 to the paper exit belt
M707	Paper exit roller motor	Driving of the paper exit roller and paper exit arm Brushless DC motor

Symbol	Name	Function and method
M705	Alignment motor U	Driving of the alignment plate U Stepping motor
M713	Stacker entrance motor	Driving of the stacker entrance roller Stepping motor
M716	Alignment motor L	Driving of the alignment plate L Stepping motor
M718	Stopper motor	Driving of the booklet stopper Stepping motor
M722	Stacking assist motor	Driving of the stacking assist roller DC motor
SD702	Stacking assist solenoid	Pressing/releasing of the stacking assist roller
PS705	Stacker entrance sensor	Paper detection at the stacker entrance
PS708	Alignment HP sensor U	HP detection of the alignment plate U
PS709	Paper exit belt HP sensor	HP detection of the paper exit belt
PS720	Stacker no paper sensor	Detection of the presence of paper in the stacker
PS723	Stopper HP sensor	HP detection of the booklet stopper
PS724	Alignment HP sensor L	HP detection of the alignment plate L

3.2 Operation

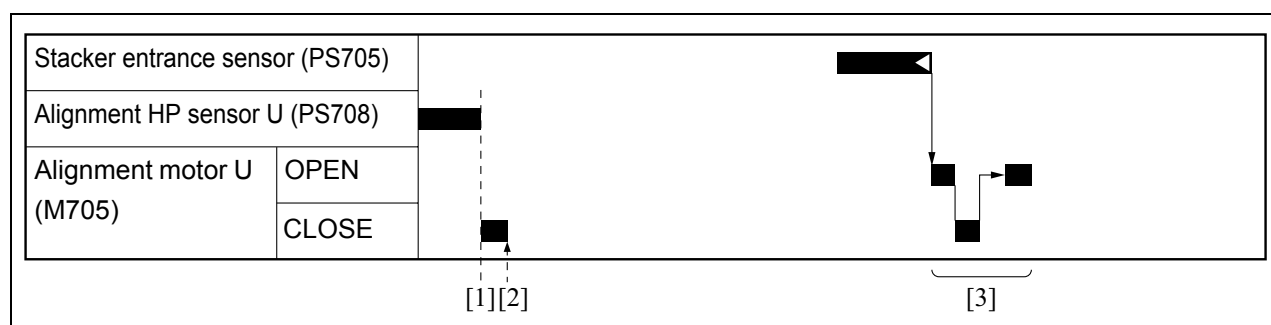
3.2.1 Alignment U control

In the staple, folding, stitch-and-fold, and three-folding modes, the alignment along the width of paper conveyed to the stacker is made by rotating the alignment motor U (M705) in normal or reverse direction to open or close the alignment plate U. The alignment HP sensor U (PS708) detects the home position of the alignment plate U.

A. Alignment /U control

An finisher operation signal from the finisher starts to rotate the alignment motor U (M705) in the direction in which the alignment plate U closes and stops at the stand-by position in which the alignment plate is open a little wider than the paper width.

A specified period of time after the stacker entrance sensor (PS705) detects the trailing edge of paper, M705 rotates in the normal or reverse direction to oscillate the alignment plate U for proper alignment of paper. Alignment is made each time a sheet of paper is sent in.



[1] Finisher operation start signal ON

[3] Alignment operation

[2] Standing by for paper size

The alignment plate L is oscillated by rotating the alignment motor L (M716) in the normal or reverse direction. The home position of the alignment plate /L is detected by the alignment HP PS/L (PS724).

A specified period of time after the stacker entrance sensor (PS705) detects the trailing edge of paper, M716 rotates in the normal or reverse direction to oscillate the alignment plate L for proper alignment of paper. Alignment is made each time a sheet of paper is sent in.



The longitudinal position of paper is controlled by the two stoppers (booklet stopper and flat-stapling stopper).

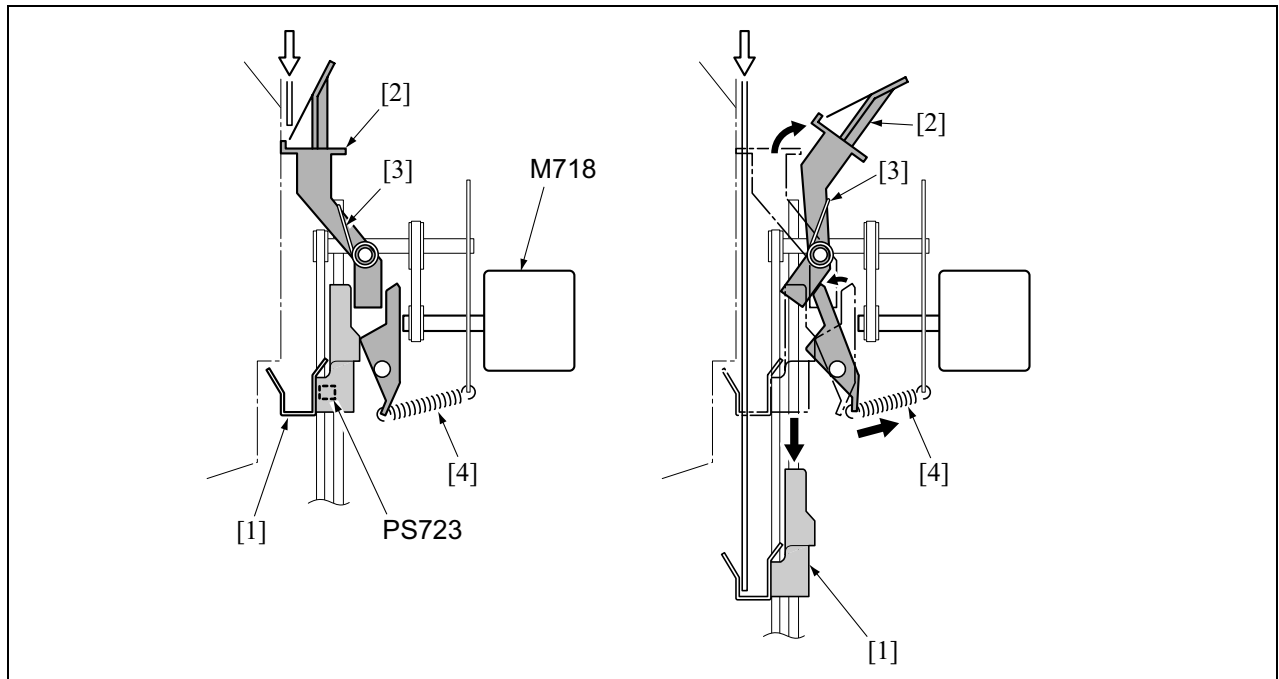
A. Stopper operation

The booklet stopper and the flat-stapling stopper are interlocked by the link mechanism. When the booklet stopper goes down, the flat-stapling stopper is released.

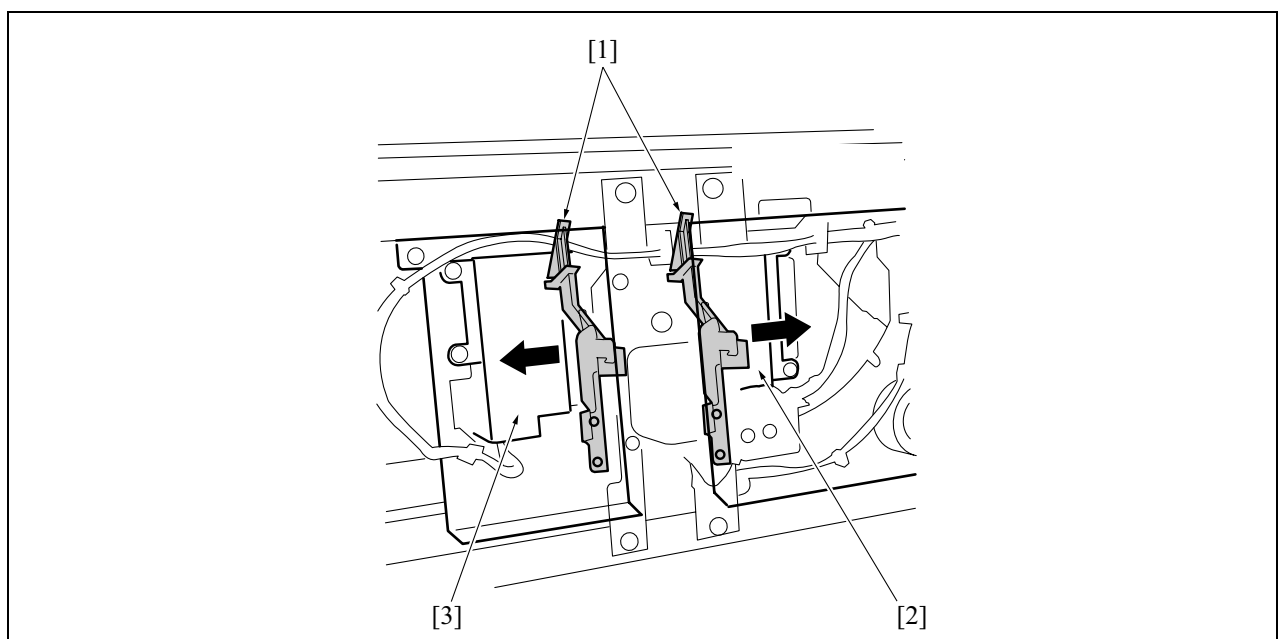
The stopper motor (M718) moves the booklet stopper, and its home position is detected by the stopper HP sensor (PS723).

When the booklet stopper [1] is at the home position, the flat-stapling stopper [2] is set by the pressure of the spring [3]. In the staple mode (flat stapling), stapling is made in this condition.

When the booklet stopper [1] goes down, the spring [4] in the link mechanism releases the flat-stapling stopper with paper arranged properly by the booklet stopper.



The flat-stapling stopper [1] is fixed to the fixed section of the clincher. When the distance between the two clinchers [1] and [2] gets increased, the distance of the flat-stapling stoppers also gets increased.



B. Stopper control

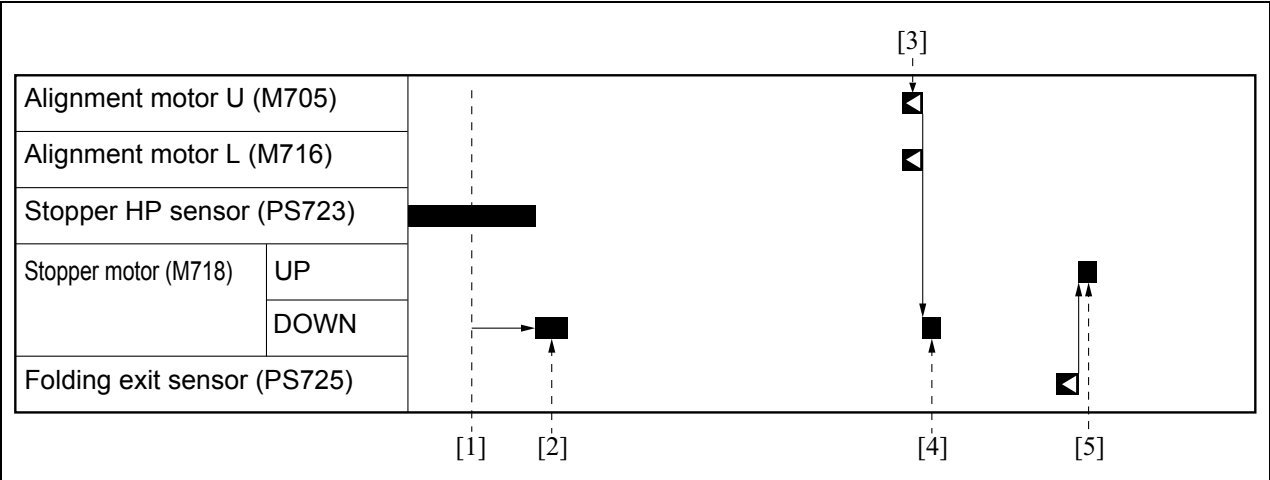
(1) Folding mode

An finisher operation signal from the finisher drives the stopper motor (M718) to lower the booklet stopper down to the alignment position suitable for the paper size.

After completion of the alignment of the last paper, M718 is driven to lower the paper down to the folding position.

After folding operation, the folding exit sensor (PS725) detects the trailing edge of the paper bundle and drives M718 to raise the booklet stopper to the paper size position to stand by for the paper of the next copy.

II UNIT EXPLANATION



- [1] Finisher operation start signal ON

[2] Movement to the folding position suitable for the paper size

[3] Alignment operation of the last page of the copy
- [4] Movement to the folding position suitable for the paper size

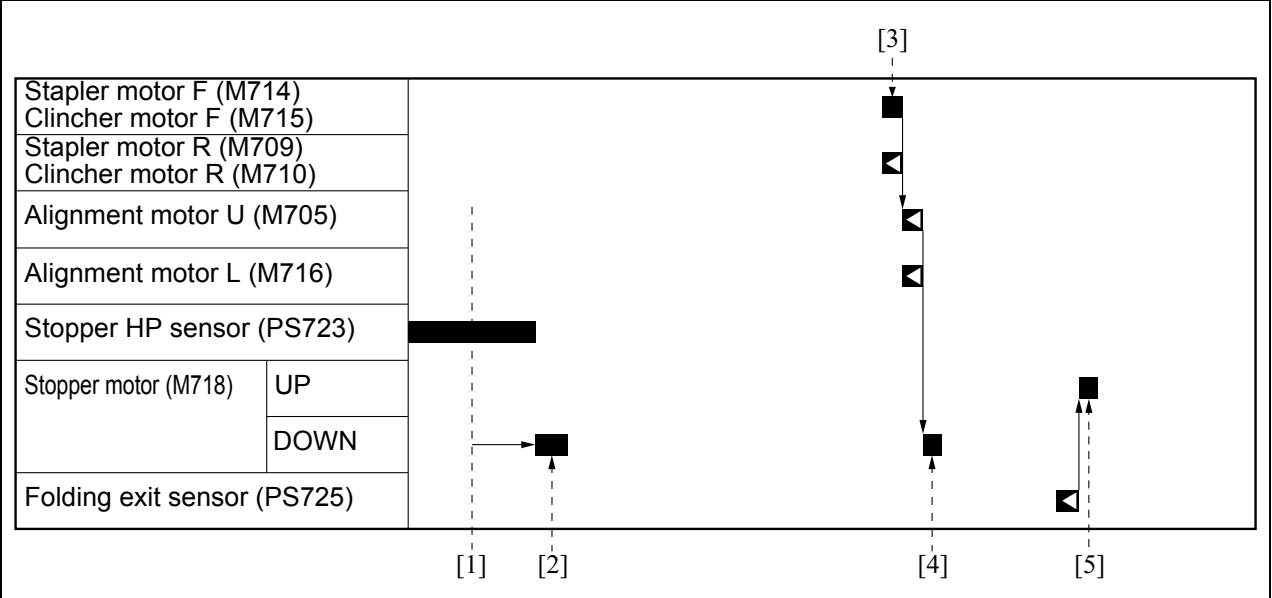
[5] Movement to the folding position of the next copy

(2) **Stitch-and-fold mode**

An finisher operation signal from the finisher drives the stopper motor (M718) to lower the booklet stopper down to the stitch-and-fold position suitable for the paper size.

Upon completion of the stapling operation, M718 is driven to lower the paper down to the folidng position.

After folding operation, the folding exit sensor (PS725) detects the trailing edge of the paper bundle and M718 is driven to raise the booklet stopper up to the paper size position to stand by for the paper of the next copy.



- [1] Finisher operation start signal ON

[2] Movement to the folding position suitable for the paper size

[3] Stapling operation
- [4] Movement to the folding position suitable for the paper size

[5] Movement to the folding position of the next copy

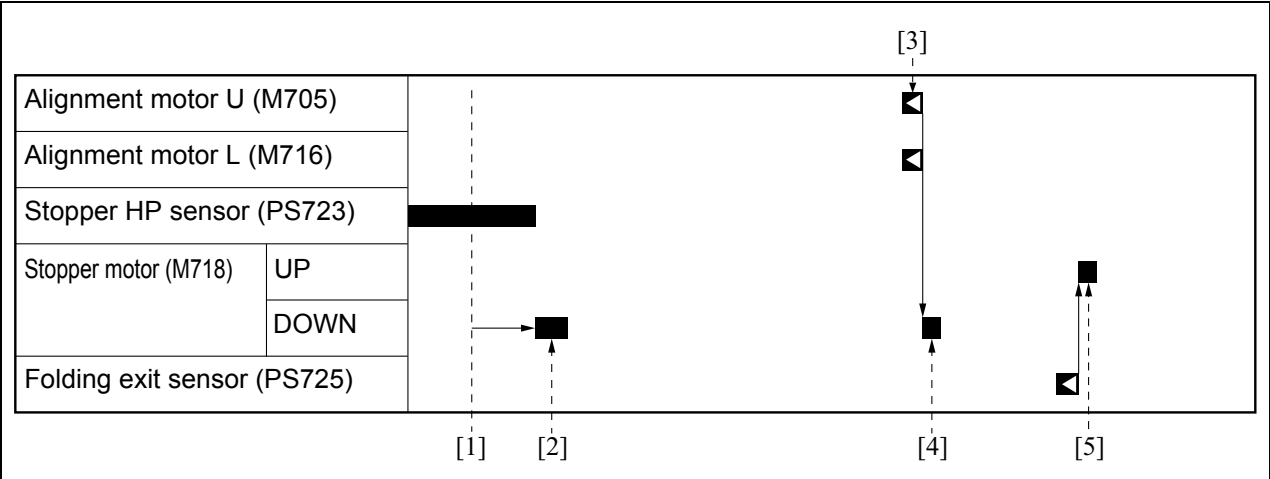
(3) Three-folding mode

An finisher operation signal from the finisher drives the stopper motor (M718) to lower the paper down to the alignment position suitable for the paper size.

After completion of the alignment of the last paper, M718 is driven to lower the paper down to the first folding line of the three-folding.

After folding operation, the folding exit sensor (PS725) detects the trailing edge of the paper bundle and M718 is driven to raise the booklet stopper to the paper size position to stand by for the paper of the next copy.

II UNIT EXPLANATION



- [1]

Finisher operation start signal ON
- [2]

Movement to the folding position suitable for the paper size
- [3]

Alignment operation of the last paper of the copy
- [4]

Movement to the first folding line
- [5]

Movement to the folding position of the next copy

(4) Flat-stapling mode

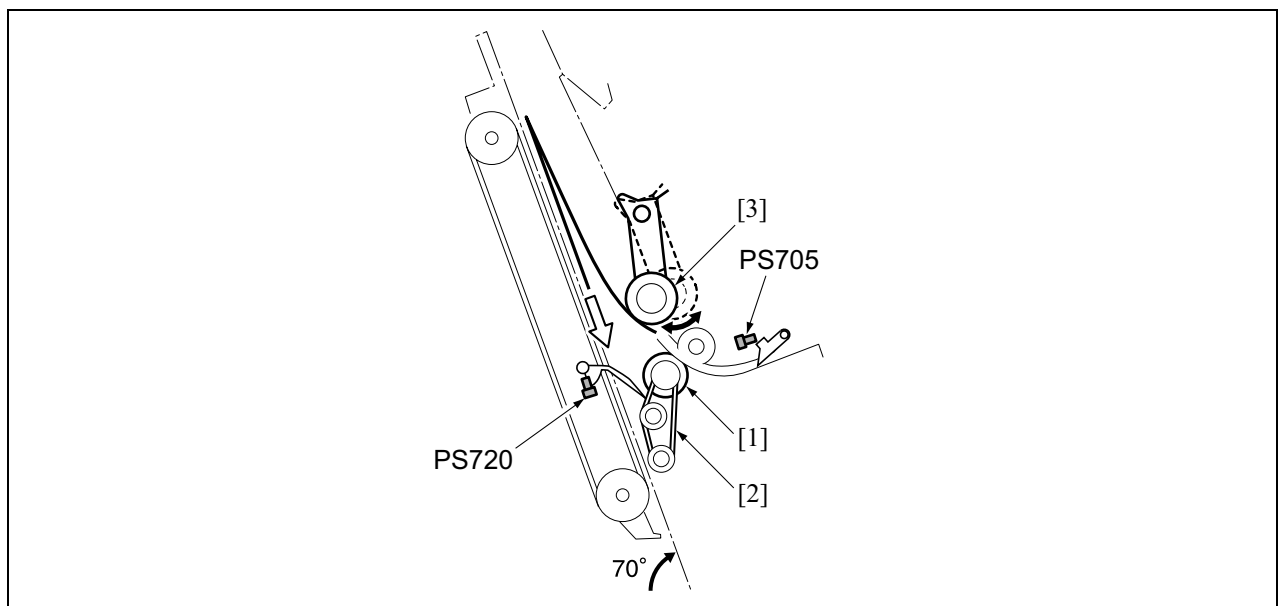
In the flat-stapling mode, the stopper motor (M718) does not operate.

3.2.4 Stacker entrance conveyance control

The stacker entrance motor (M713) drives the stacker entrance roller and the swing belt to convey paper to the stacker, arrange properly the trailing edge of paper, and adjust the stand-by timing for stapling.

A. Stacker entrance operation

A stacking method with a tilt angle of approx. 70 degrees is employed to realize a compact equipment. A corrugation roller is employed for the stacker entrance roller [1] to support the paper exit to the stacker. The proper arrangement of paper in the stacker is made by the paper's own weight and the swing belt [2]. To support the proper arrangement of the trailing edge of paper when curled, for stacking more than ten sheets of paper, the stacking assist roller [3] is not only rotated and driven by the stacking assist motor (M722) but also pressed by the stacking assist solenoid (SD702).



B. Stacker entrance conveyance control

(1) Staple mode (other than A4, B5, 8.5 x 11 in size, with no by-pass)

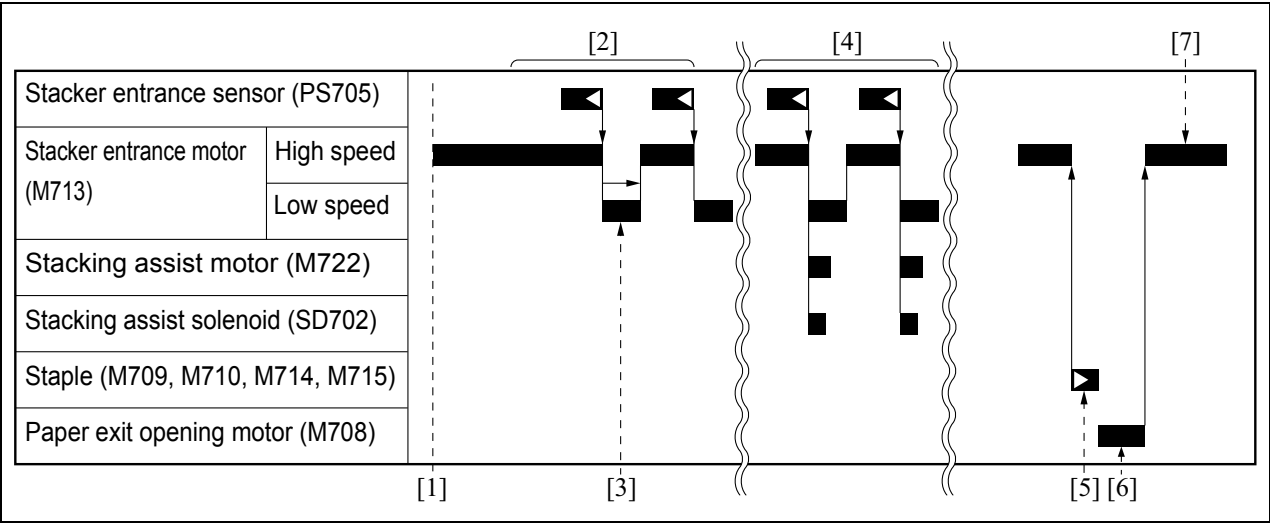
An finisher operation start signal from the finisher turns on the stacker entrance motor (M713) to start to rotate at high speed.

The moment the stacker entrance sensor (PS705) detects the trailing edge of paper, M713 changes to the low speed rotation, and the stacking assist roller starts to rotate at low speed to convey paper to the stacker. When any paper is conveyed after the first ten sheets of paper have been sent, the stacking assist solenoid also operates. A specified period of time after a low speed rotation starts, M713 resumes a high speed rotation to stand by for the conveyance of the next page.

After passage of the last paper of the copy, M713 stops upon the start of the stapling operation.

The moment the paper exit opening (M708) completes the closing operation, M713 turns on to return to the high speed rotation and stands by for the paper conveyance for the next stapling.

II UNIT EXPLANATION



- [1] Finisher operation start signal ON

[2] First 9 sheets of paper

[3] Paper conveyance to the stacker at low speed

[4] Sheets of paper conveyed after the first 9 sheets have been sent
- [5] Stapling operation

[6] Closing operation of the paper exit opening

[7] Standing by for the paper of the next copy

(2) Staple mode (A4, B5, 8.5 x 11 in size, with by-pass)

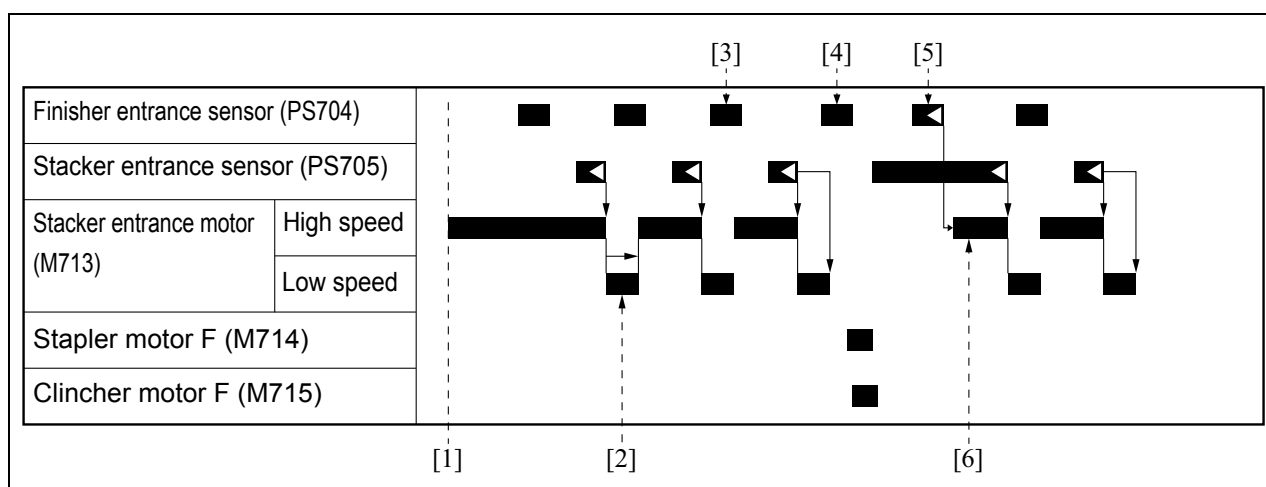
1. Paper conveyance of the first copy

The paper of the first copy to be stapled is conveyed in the same manner as those other than A4, B5 and 8.5 x 11 in size.

2. Conveyance of the first and second sheets of paper of the second and succeeding copies

A specified period of time after the stacker entrance sensor (PS705) detects the trailing edge of the last paper of the first copy, the stacker entrance motor (M713) stops. This prevents the paper of the second copy from being conveyed to the stacker before the stapling operation of the first copy is completed, and the first sheet of paper stands by on the by-pass route.

A specified period of time after the finisher entrance sensor (PS704) detects the trailing edge of the second paper, the stacker entrance motor (M713) turns on to rotate at high speed. This allows the first and second sheets to be conveyed one upon another to the stacker.



[1] Finisher operation start signal ON

[2] Paper conveyance to the stacker at low speed

[3] Last paper of the first copy

[4] First paper of the second copy

[5] Second paper of the second copy

[6] Simultaneous conveyance of the first and second sheets of paper of the second copy

3. Conveyance of the third and succeeding sheets of paper of the second and succeeding copies

The third and succeeding sheets of paper are conveyed one after another to the stacker in the same manner as the first copy.

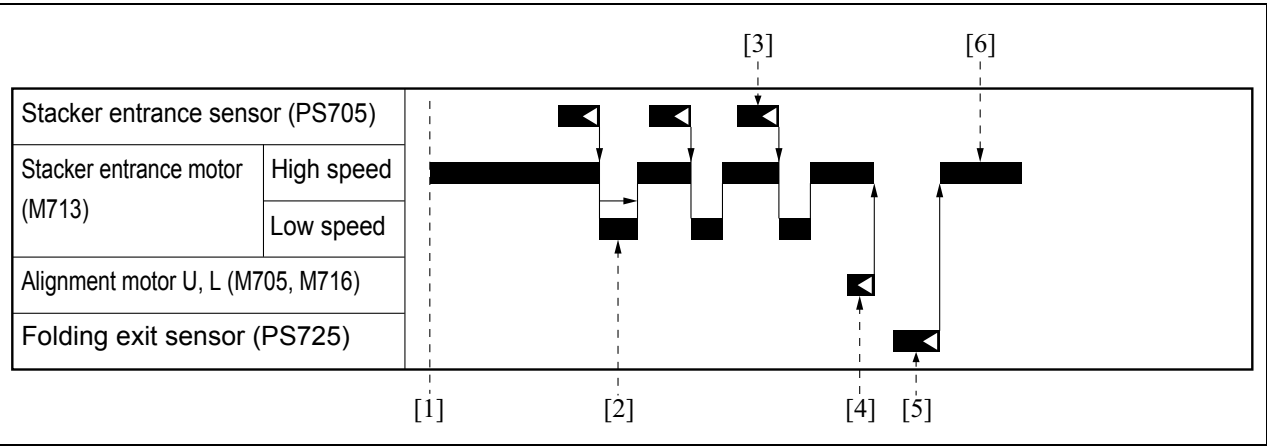
(3) Folding and stitch-and-fold modes

An finisher operation signal from the finisher turns on the stacker entrance motor (M713) to start a high speed rotation.

The moment the stacker entrance sensor (PS705) detects the trailing edge of paper, M713 changes to a low speed rotation to convey paper to the stacker at low speed. A specified period of time after the low speed rotation starts, M713 resumes the high speed rotation to stand by for the conveyance of the next page.

Upon completion of the alignment of the last page of the copy, M713 stops.

The moment the folding exit sensor (PS725) detects the trailing edge of paper bundle, M713 turns on and returns to the high speed rotation to stand by for the conveyance of the next page.



- [1] Finisher operation start signal ON

[2] Paper conveyance to the stacker at low speed

[3] Last paper of the copy
- [4] Alignment operation of the last paper of the copy

[5] Folding exit operation

[6] Standing by for the paper of the next copy

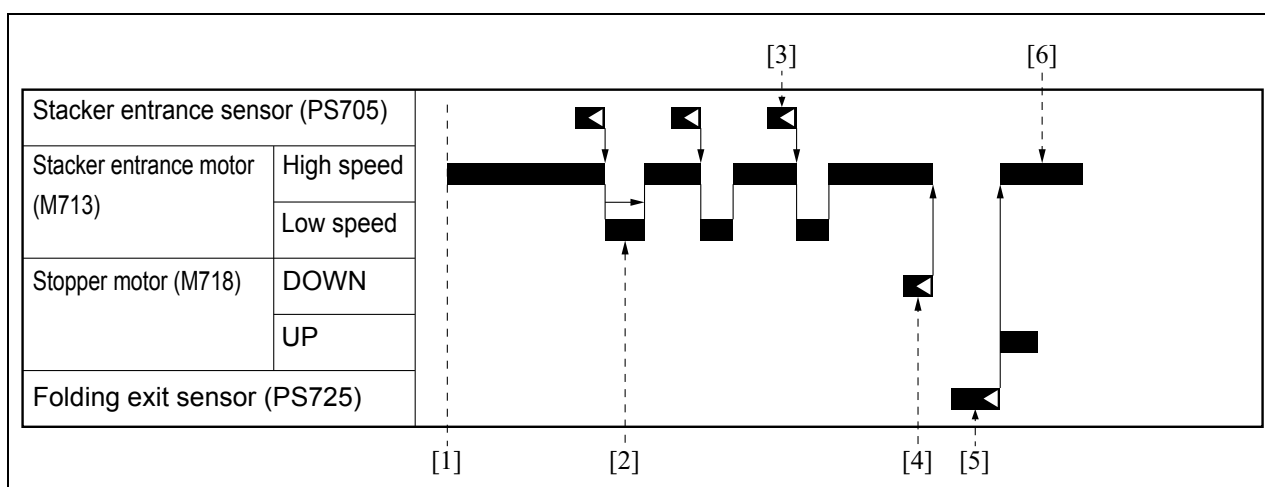
(4) Three-folding mode

An finisher operation signal from the finisher turns on the stacker entrance motor (M713) to start a high speed rotation.

The moment the stacker entrance sensor (PS705) detects the trailing edge of paper, M713 changes to a low speed rotation to convey paper to the stacker at low speed. A specified period of time after the low speed rotation starts, M713 resumes the high speed rotation to stand by for the conveyance of the next page.

Upon completion of the alignment of the last paper of the copy and the completion of the movement of the booklet stopper to the three-folding position, M713 stops.

The moment the folding exit sensor (PS725) detects the trailing edge of the paper bundle, the stacker entrance motor (M713) turns on and returns to the high speed rotation to stand by for the conveyance of the next page.



[1] Finisher operation start signal ON

[2] Paper conveyance to the stacker at low speed

[3] Last paper of the copy

[4] Movement of the booklet stopper to the three-folding position

[5] Three-folding exit operation

[6] Standing by for the paper of the next copy

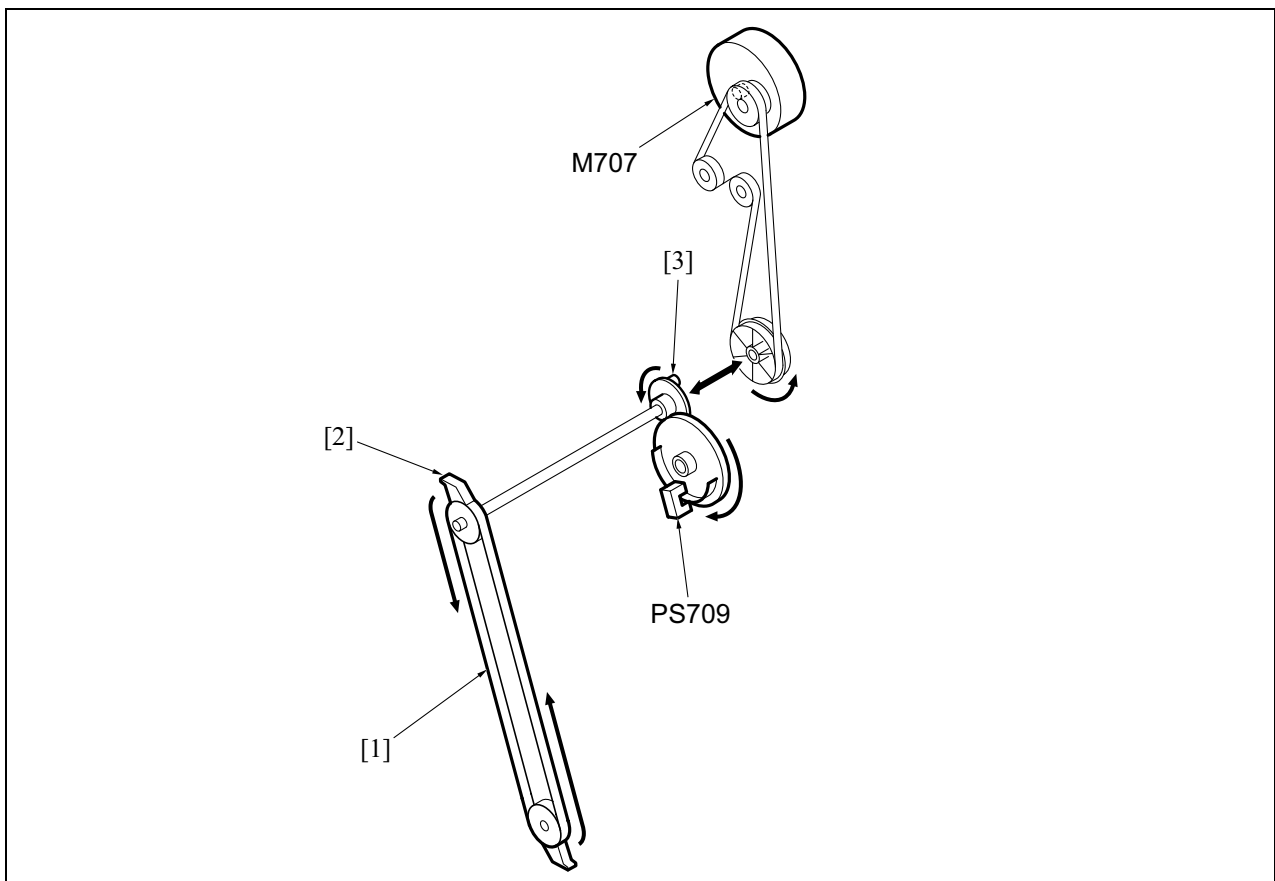
3.2.5 Stacker paper exit control

The control of the paper exit belt of the stacker is made by the paper exit roller motor (M707) through the coupling gear by controlling the finisher control board (Finisher CB).

A. Paper exit operation

The paper exit to the main tray in the staple mode and the paper conveyance to the folding section in the three-folding mode are made by the paper exit arm [2] installed to the paper exit belt [1]. The paper exit belt [1] is driven by the paper exit roller motor (M707) with the coupling pin [3] connected.

The home position of the paper exit arm is detected by the paper exit belt sensor (PS709).



B. Paper exit arm control

(1) Staple mode (When the vertical length is shorter than B5R)

When the stapling operation is completed, the paper exit roller motor (M707) rotates to drive the paper exit belt of the stacker section. This causes the paper exit arm to hook the paper to raise it up to the paper exit roller. And then, the paper exit roller discharges the paper to the main tray. When the paper exit belt HP sensor (PS709) detects the change from off to on, M707 stops.

(2) Staple mode (Other than the above)

When the paper size is other than the above, the paper exit opening is open.

When the stapling is completed, the paper exit opening motor (M708) operates. When the paper exit opening HP sensor (PS712) detects a fact that the paper exit opening is fully closed, the paper exit roller motor (M707) rotates to drive the paper exit arm of the stacker section. This causes the paper exit arm to hook the paper to raise it up to the paper exit roller. And then the paper exit roller discharges the paper to the main tray.

When the paper exit belt HP sensor (PS709) detects the change from off to on, M707 stops.

(3) Folding and stitch-and-fold modes

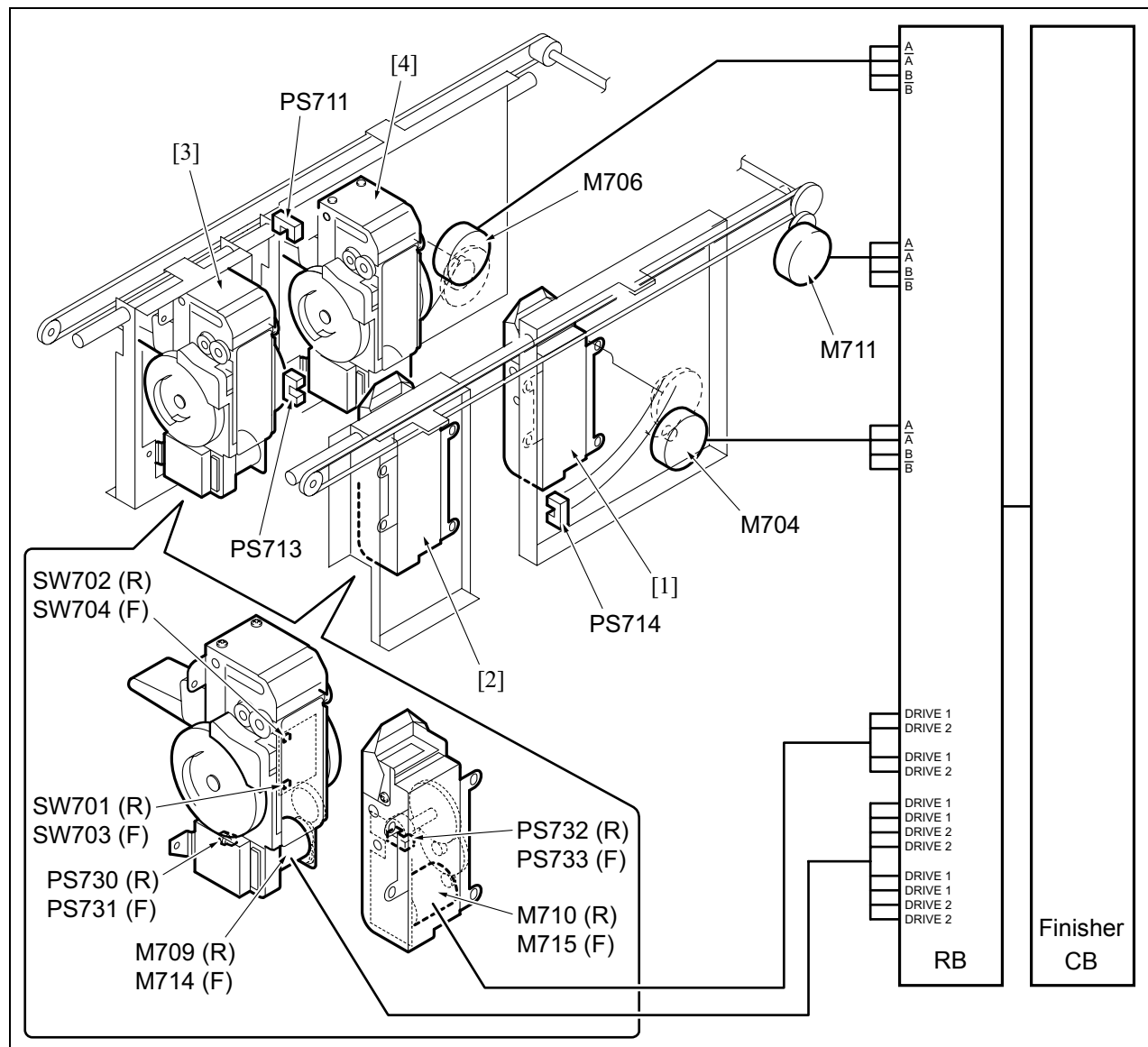
After completion of the stapling operation, paper is moved to the folding position. The paper exit arm do not rotate. This prevents the paper standing by at the folding position from coming into contact with the paper exit arm.

(4) Three-folding mode

Upon completion of the proper alignment of paper, M707 rotates in the reverse direction to support the paper conveyance to the three-folding position. When PS709 turns on from off, M707 stops.

4. STAPLER

4.1 Composition



Symbol	Name	Function and method
[1]	Clincher R	Clincher mechanism at rear
[2]	Clincher F	Clincher mechanism at front
[3]	Stapler F	Stapler mechanism at front
[4]	Stapler R	Stapler mechanism at rear
M704	Clincher rotation motor	Rotational drive of the clincher R, Ball lock mechanism PM stepping motor
M706	Stapler rotation motor	Rotational drive of the stapler R, Ball lock mechanism PM stepping motor
M709	Stapler motor R	Driving for stapling operation of the stapler R DC brush motor
M710	Clincher motor R	Driving for the belt staple-needle of the clincher R DC brush motor

Symbol	Name	Function and method
M711	Stapler movement motor	Horizontal movement of the staplers F and R, and the clinchers /F and /R by means of the timing belt Stepping motor
M714	Stapler motor F	Driving for the stapling operation of the stapler F DC brush motor
M715	Clincher motor F	Driving for the belt staple-needle of the clincher F DC brush motor
PS711	Stapler movement HP sensor	HP detection of the horizontal position of the staplers /F and /R and the clinchers /F and /R
PS713	Stapler rotation HP sensor	Detection of the rotation HP of the stapler R
PS714	Clincher rotation HP sensor	Detection of the rotation HP of the clincher R
PS730	Stapler HP sensor R	Detection of the stapling HP of the stapler R
PS731	Stapler HP sensor F	Detection of the stapling HP of the stapler F
PS732	Clincher HP sensor R	Detection of the belt staple-needle HP of the clincher R
PS733	Clincher HP sensor F	Detection of the belt staple-needle HP of the clincher F
SW701	Cartridge switch R	Detection of the presence of the cartridge of the stapler R
SW702	Stapler SW R	Detection of the presence of the staples of the stapler R
SW703	Cartridge switch F	Detection of the presence of the cartridge of the stapler F
SW704	Stapler SW F	Detection of the presence of the staples of the stapler F

4.2 Operation

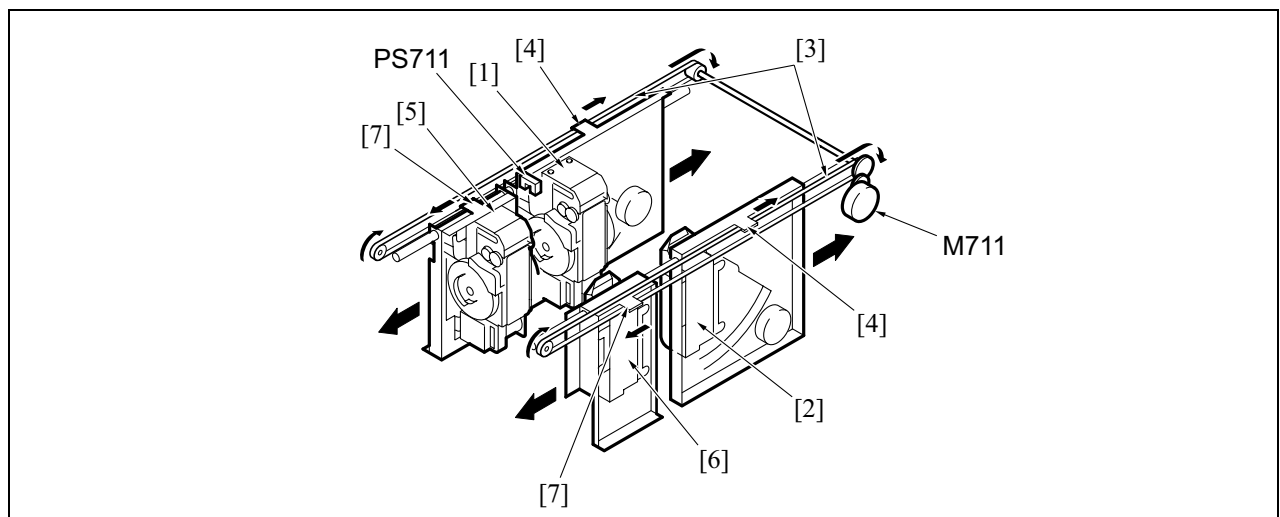
4.2.1 Stapler movement control

As examples of stapler movements, there are a horizontal movement of the stapler interval and a rotation of a stapler at the rear. The stapler moves in accordance with the staple mode.

A. Stapler horizontal movement operation

The stapler movement motor (M711) moves the stapler horizontally.

The stapler R [1] and the clincher R [2] are provided on the upper side [4] of the timing belt [3], and the stapler F [5] and the clincher F [6] on the lower side [7]. /R moves in the opposite direction of F.

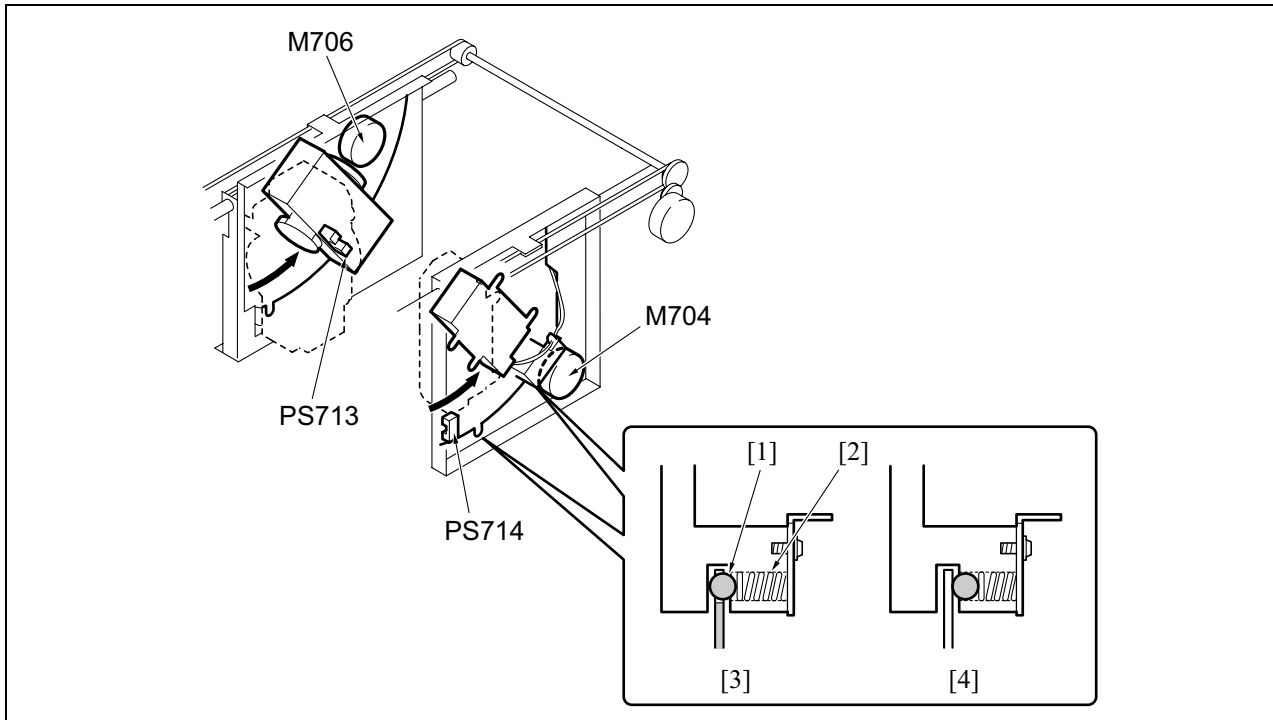


B. Stapler rotational movement operation

Because of one corner stapling at rear, the stapler R and the clincher R rotate 45°.

The rotational movement of the stapler R is made by the stapler rotation motor (M706) and the rotational movement of the clincher R made by the clincher rotation motor (M704).

The stapler is securely locked by the ball [1] and spring [2] of the ball lock mechanism at the angle of rotation of 0° and 45°. Fig. [3] shows the locked condition, and Fig. [4] shows the unlocked condition.



C. Stapler movement control

(1) Size movement for one-corner stapling at front

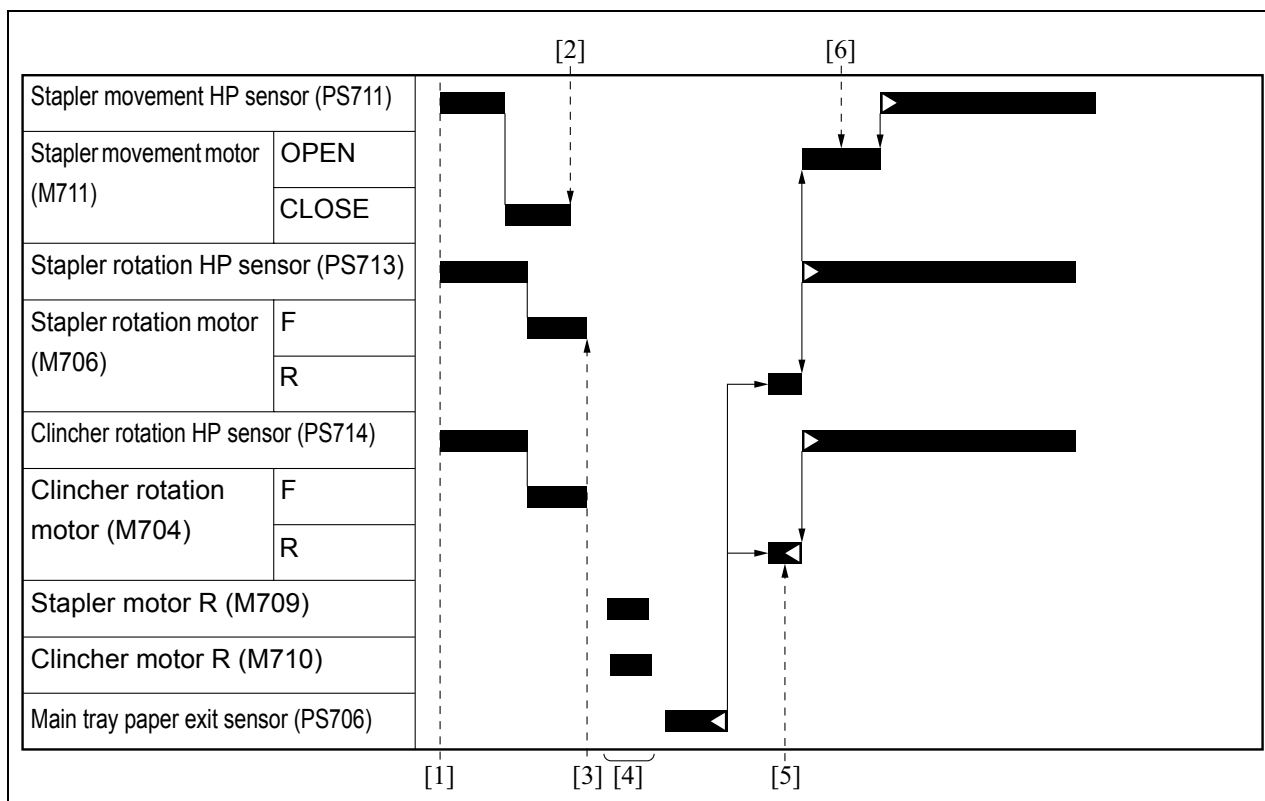
An finisher operation signal from the finisher turns on the stapler movement motor (M711) to widen the space between the stapler and the clincher, and they stop at the specified position.

A specified period of time after the last paper turns on the main tray paper exit sensor (PS706), M711 turns on and stops when the stapler movement HP sensor (PS711) turns on.

(2) Size movement for one-corner stapling at rear

An finisher operation signal from the finisher turns on the stapler movement motor (M711) to widen the space between the stapler and the clincher. After a specified period of time, the stapler rotation motor (M706) and the clincher rotation motor (M704) turn on to rotate and move aslant the stapler R and the clincher R. M704, M706 and M711 stop at their specified position.

A specified period of time after the last paper turns on the main tray paper exit sensor (PS706), M704 and M706 turn on to rotate the stapler R and the clincher R in the direction of the home position and stop when the stapler rotation HP sensor (PS713) and the clincher rotation HP sensor (PS714) turn on. At the same time, M711 turns on and stops when the stapler movement HP sensor (PS711) turns on.



- [1] Finisher operation start signal ON
 [2] Paper size horizontal position movement of the stapler R and the clincher R
 [3] 45° skew position of the stapler R and the clincher R

- [4] Stapling operation
 [5] Rotational position HP movement of the stapler R and the clincher R
 [6] Horizontal position HP movement of the stapler R and the clincher R

(3) Two staples

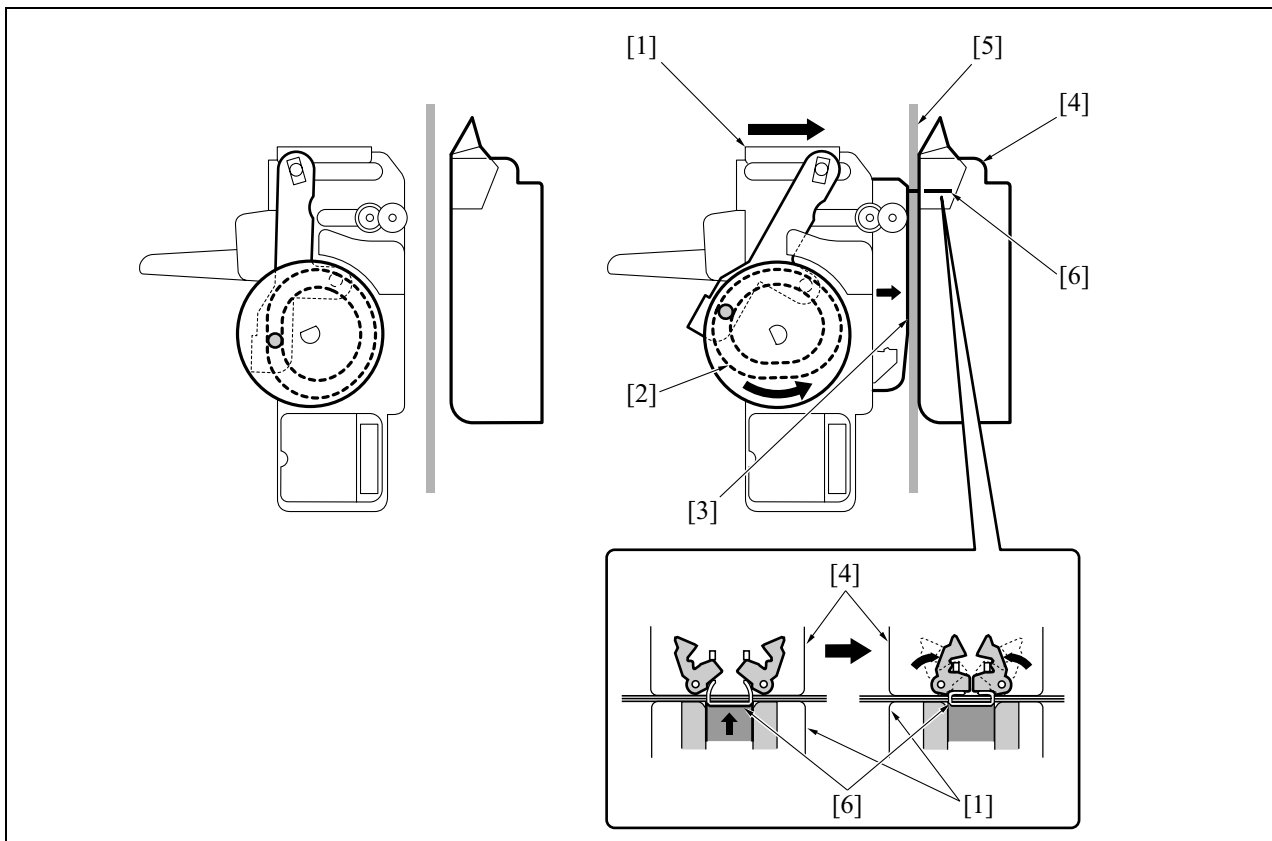
For two staples, no movement is required since stapling is made at the home position.

4.2.2 Staple control

Stapling is made by the stapler motors R and F (M709 and M714) and the clincher motors R and F (M710 and M715).

A. Stapling operation

In the stapling operation, the cam mechanism allows the stapler motors R and F (M709 and M714) within the staplers R and F [1] to push out the paper presser [3] to the clincher side [4] to press the paper [5], and then push out the staples [6]. After that, the clincher motors R and F (M710 and M715) in the clinchers R and F bend the staples [6].



B. Staple control

(1) Staple

After completion of the alignment operation of the alignment plate, the stapler motors R and F (M709 and M714) start the stapling operation. After a specified period of time, the clincher motors R and F (M710 and M715) start the clinching operation.

When the clincher HP sensors R and F (PS732 and PS733) and the stapler HP sensors R and F (PS730 and PS731) detect the home position (OFF to ON), the stapling operation is completed.

(2) Detection of staple-jamming

While in the stapling operation, if the stapler HP sensor R and F (PS730 and PS731) and the clincher HP sensors R and F (PS732 and PS733) do not turn on within a specified period of time after they turn off, it seems that staples have been jammed. Rotate reversely the stapler motors R and F (M709 and M714) and the clincher motors R and F (M710 and M715) and return them to the home position.

(3) Cartridge detection

The presence of a cartridge and its proper setting are detected by the cartridge switches R and F (SW701 and SW703) within the stapler.

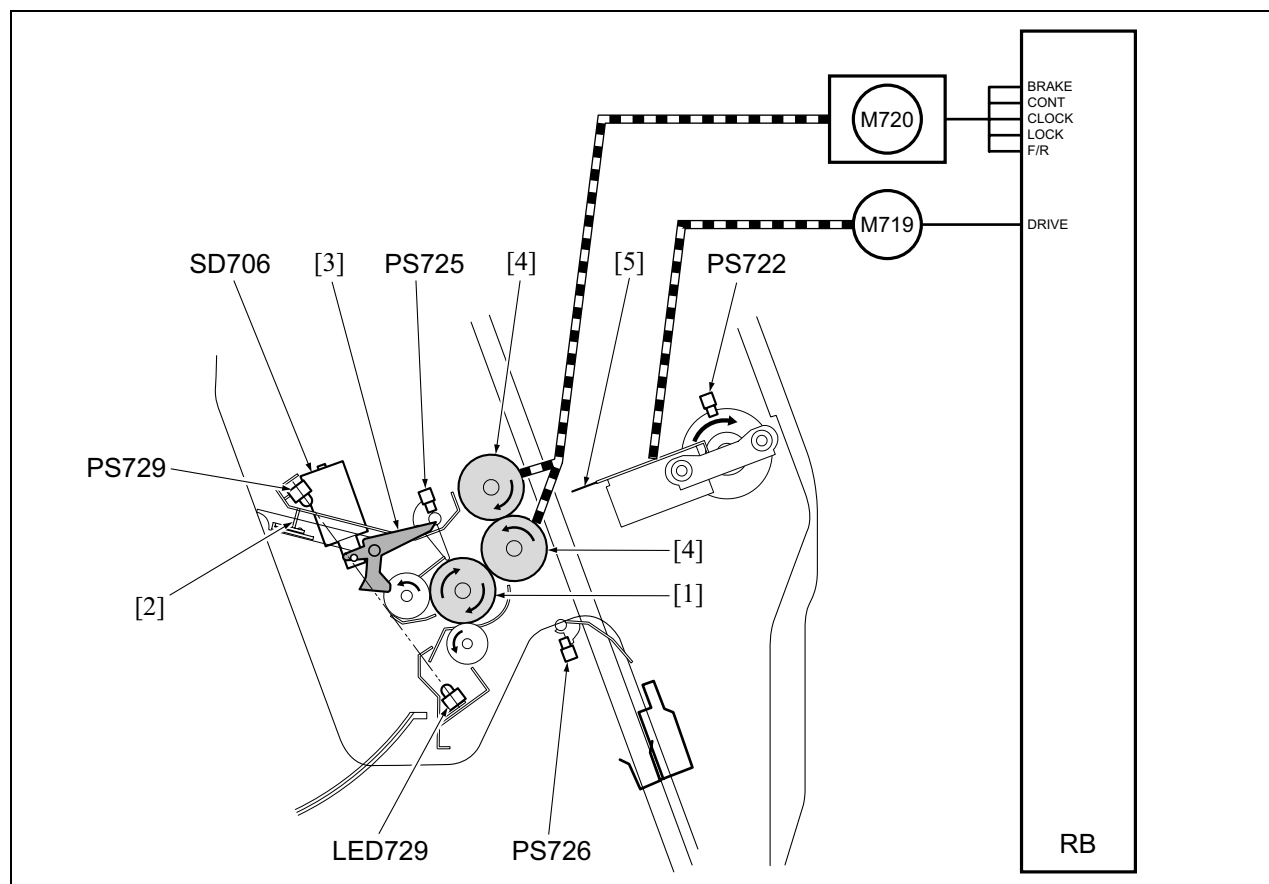
If no cartridge is found or if a cartridge is improperly set, an error message is shown on the finisher LCD.

(4) Staple detection control

When staples run out, the stapler SW R and F (SW702 and SW704) turn on with an error message shown on the finisher LCD.

5. FOLDING / THREE-FOLDING (Q5687A ONLY)

5.1 Composition



Symbol	Name	Function and method
[1]	Three-folding roller	Pressing and conveyance of the second folding of the three-folding
[2]	Three-folding stopper	Positioning of the second folding of the three-folding
[3]	Three-folding gate	Branching of the folding path and the three-folding path
[4]	Folding roller	Pressing and conveyance of the folding and the first folding of the three folding
[5]	Folding knife	Pushing of paper into the folding roller of the first folding of the folding and the three-folding, Crank mechanism
M719	Folding knife motor	Folding knife drive DC brush motor
M720	Folding conveyance motor	Folding roller drive Brushless DC motor
SD706	Three-folding gate solenoid	Switching of the three-folding gate
PS722	Folding knife HP sensor	Detection of the folding knife HP
PS725	Folding exit sensor	Detection of the booklet paper exit
PS726	Folding passage sensor	Detection of the presence of paper on the booklet stopper
PS729	Folding full sensor	Booklet tray full detection
LED729	Folding full LED	Booklet tray full detection (light emitting) Translucent sensor

5.2 Operation

5.2.1 Folding knife control

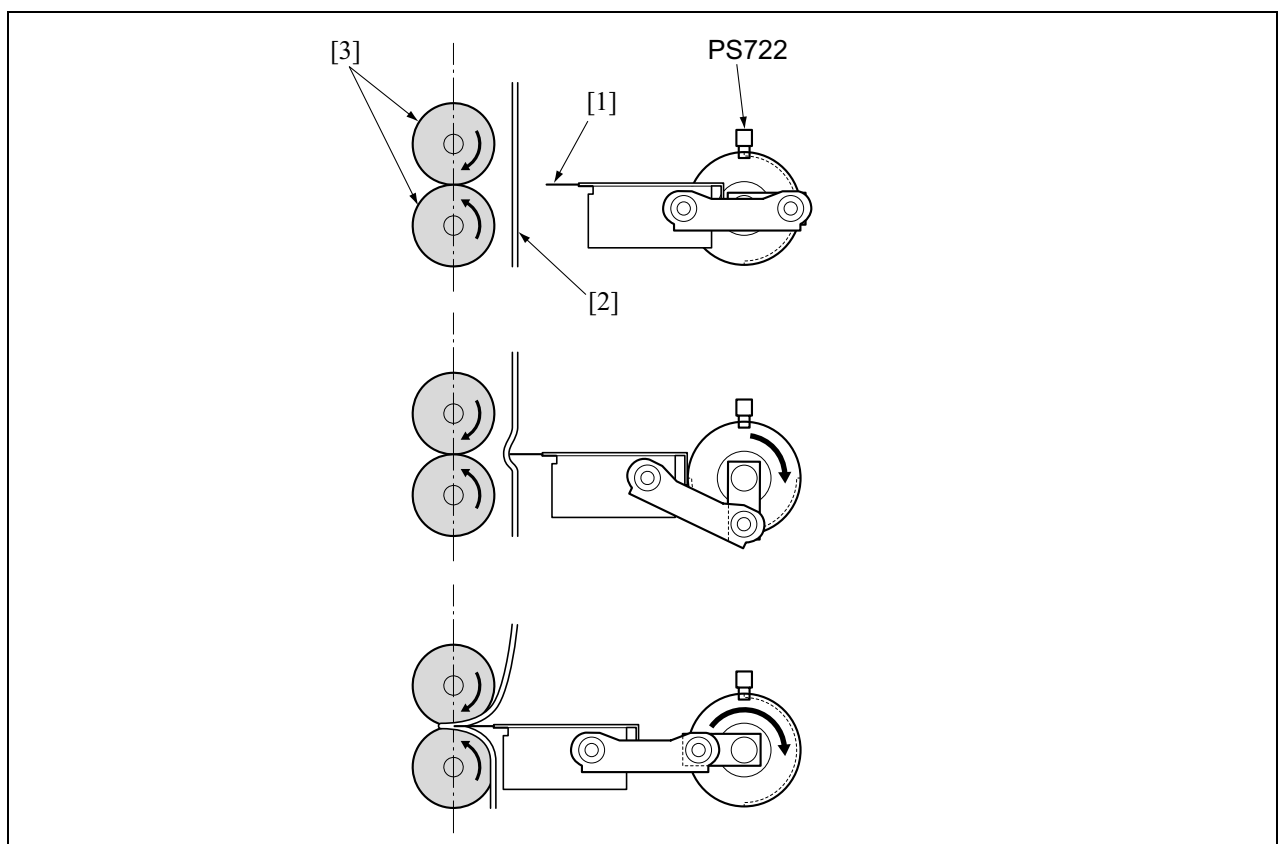
The folding knife driven by the folding knife motor (M719) is used in the folding, stitch-and-fold, and three-folding modes. In the three-folding mode, it is used at the first folding.

A. Folding knife operation

The folding knife motor (M719) rotates the crank shaft a half turn through gear to thrust the folding knife [1] to the nip section of the folding roller [2].

The folding roller pulls in the paper and presses it down for folding.

The folding position is controlled according to the stop position of the booklet stopper.



B. Folding knife control

A specified period of time after the folding passage sensor (PS726) detects paper and the booklet stopper stops at the folding position, the folding knife motor (M719) turns on to thrust the folding knife to the paper. The folding knife sticks out and draws back once, and stops when the folding knife HP sensor (PS722) detects the change from "H" to "L."

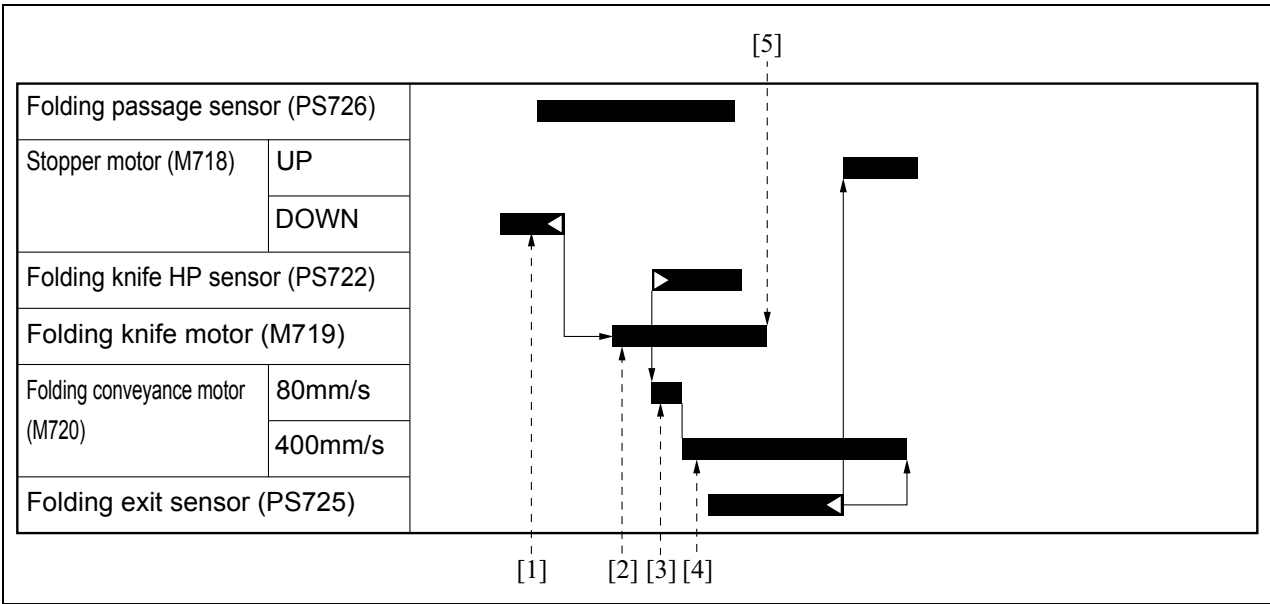
5.2.2 Folding conveyance control

The folding roller is driven by the folding conveyance motor (M720). The three-folding roller rotates by following the folding roller.

A. Folding conveyance control

A specified period of time after the folding passage sensor (PS726) detects paper and the booklet stopper stops at the folding position, the folding knife motor (M719) turns on. When M719 turns on, the folding knife HP sensor (PS722) turns on and the folding conveyance motor (M720) also turns on to fold the first folding by the folding roller, and for three-folding, fold the second folding by the three-folding roller, to be discharged to the booklet tray.

A specified period of time after the folding exit sensor (PS725) detects the trailing edge of paper bundle, M720 stops.



- [1] Size shift of the booklet stopper
- [2] Pushing of paper into the folding roller by the folding knife
- [3] Folding pressure
- [4] Paper conveyance
- [5] Folding knife evacuation position

B. Booklet full detection

Booklet tray full detection is made by a pair of translucent sensors of the folding full LED (LED 729) and the folding full sensor (PS729).

If the light is shielded by the paper discharged for more than a specified period of time, this is regarded as a full detection.

5.2.3 Three-folding gate control

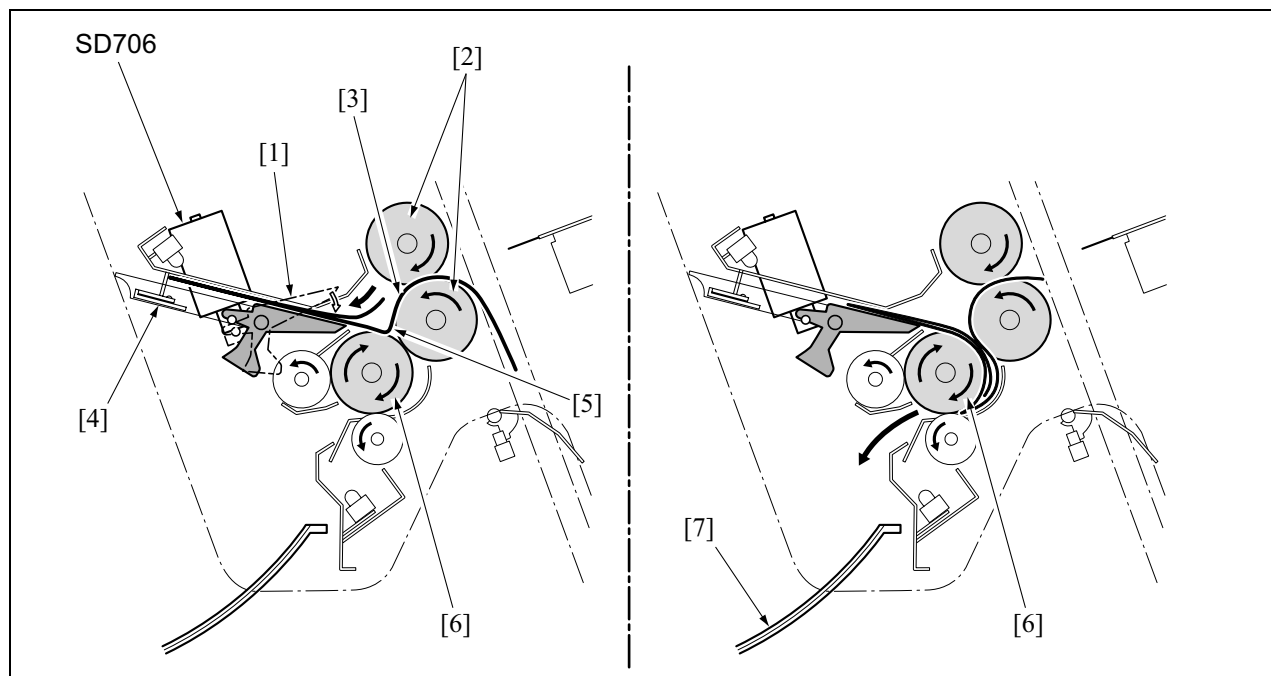
The three-folding gate switches between the folding/stitch-and-fold path and the three-folding path. The three-folding gate is driven by the three-folding gate solenoid (SD706).

A. Second folding operation of the three-folding

The three-folding gate solenoid (SD706) drives the three-folding gate [1] to switch the paper path to the three-folding path and guide the paper [3] discharged from the folding roller [2] to the three-folding stopper [4].

A sheet of paper that runs up against the three-folding stopper is made into a loop [5] which is drawn in between the folding roller and the three-folding roller [6]. This loop of paper, which is being pressed by the folding roller and the three-folding roller, is folded to make the second folding and then discharged to the booklet tray [7].

The folding position of the second folding depends on the position of the three-folding stopper.



B. Three-folding gate control

When the booklet stopper stops at the three-folding position, the three-folding gate solenoid (SD706) turns on to drive the three-folding gate and switch the paper path to the three-folding stopper.

A specified period of time after the folding exit sensor (PS725) detects the trailing edge of the paper bundle, SD706 turns off.

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III DISASSEMBLY / ASSEMBLY

⚠ Caution:

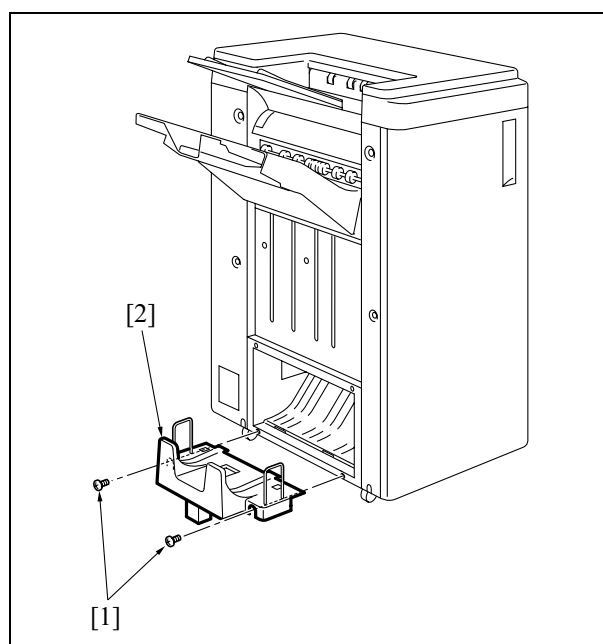
- Make sure the power cord of the MFP is unplugged from the power outlet before disassembly or assembly.

1. EXTERIOR

1.1 Removing and reinstalling of the booklet tray (Q5687A only)

A. Procedure

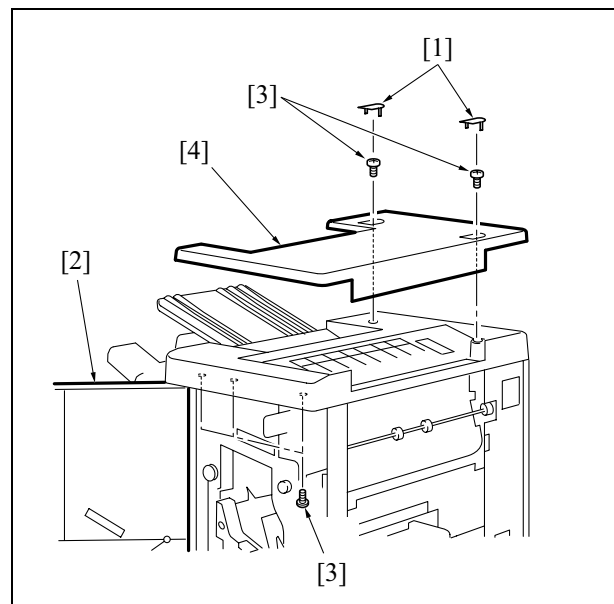
1. Remove 2 screws [1], and then remove the booklet tray [2].
2. Reinstall the above parts following the removal steps in reverse.



1.2 Removing and reinstalling of the top cover 1

A. Procedure

1. Remove 2 caps [1].
2. Open the finisher door [2] and remove 5 screws [3]. And then remove the top cover 1 [4].
3. Reinstall the above parts following the removal steps in reverse.



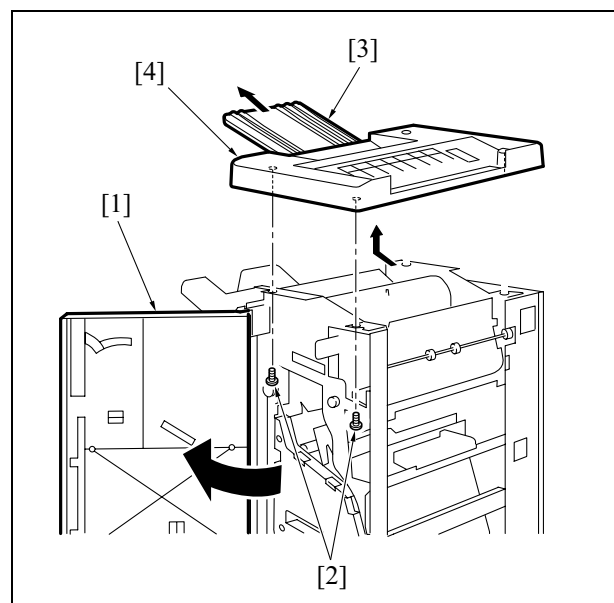
1.3 Removing and reinstalling of the top cover 2

Note:

- When an optional post insertion kit has been installed, be sure to remove it.

A. Procedure

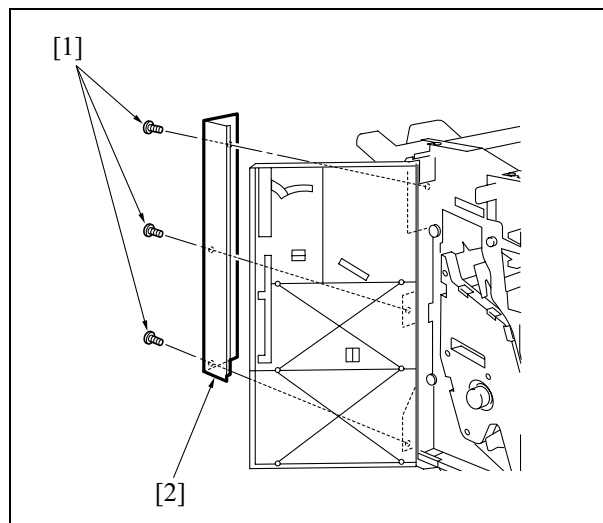
1. Remove the top cover 1.
2. Open the finisher door [1].
3. After removing 2 screws [2], pull out the sub-tray [3] and remove the top cover 2 [4].
4. Reinstall the above parts following the removal steps in reverse.



1.4 Removing and reinstalling of the side cover

A. Procedure

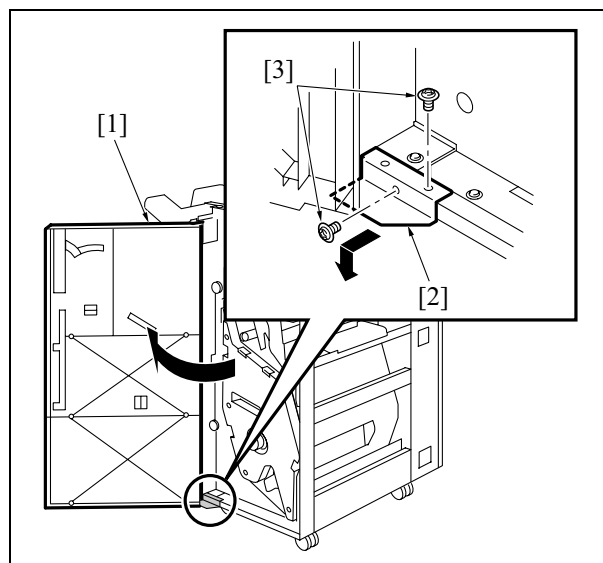
1. Open the finisher door.
2. Remove 3 screws [1] and then remove the side cover [2].
3. Reinstall the above parts following the removal steps in reverse.



1.5 Removing and reinstalling of the finisher door

A. Procedure

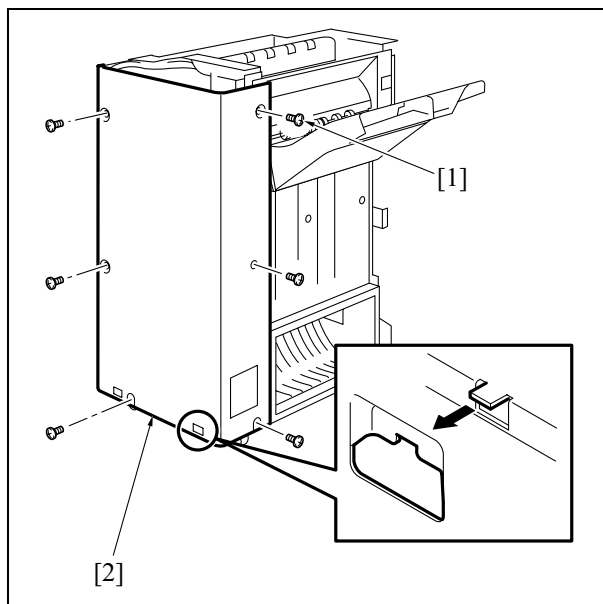
1. Open the finisher door [1].
2. Remove 2 screws [3] from the lower hinge [2] and remove the finisher door [1].
3. Reinstall the above parts following the removal steps in reverse.



1.6 Removing and reinstalling of the rear cover

A. Procedure

1. Remove 6 screws [1], and then remove the rear cover [2].
2. Reinstall the above parts following the removal steps in reverse.



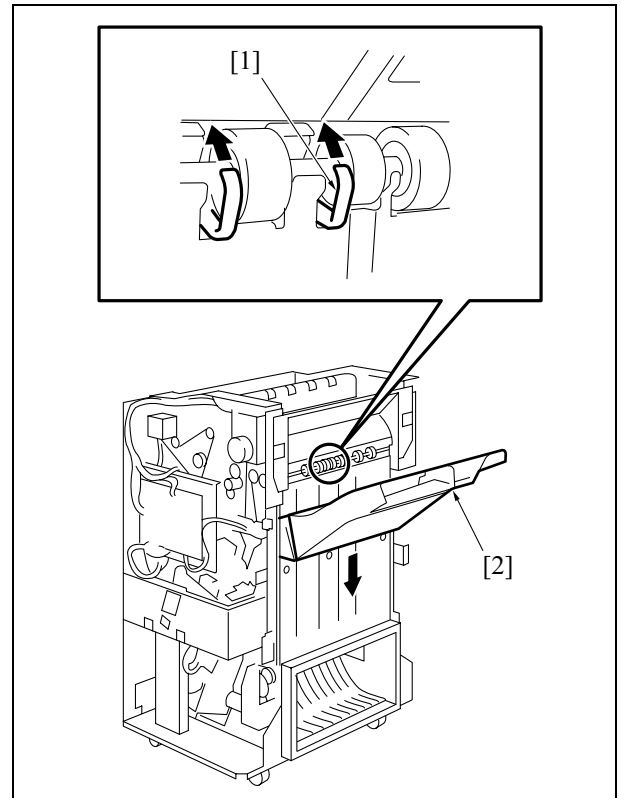
1.7 Removing and reinstalling of the main tray

⚠ Caution:

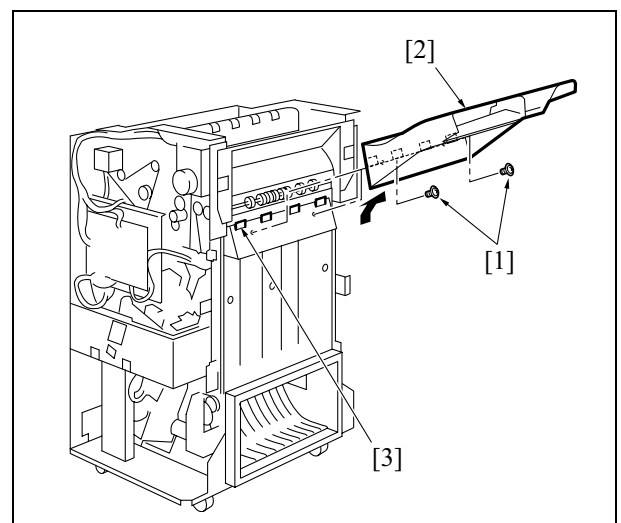
- After you have lowered the main tray, be sure to unplug the power cord of the finisher from the power outlet.

A. Procedure

1. Push up the actuator [1] of the tray upper limit sensor (PS702) with your finger, and lower the main tray [2].
2. Turn off the main switch (SW2) of the finisher and unplug the power cord from the power outlet.



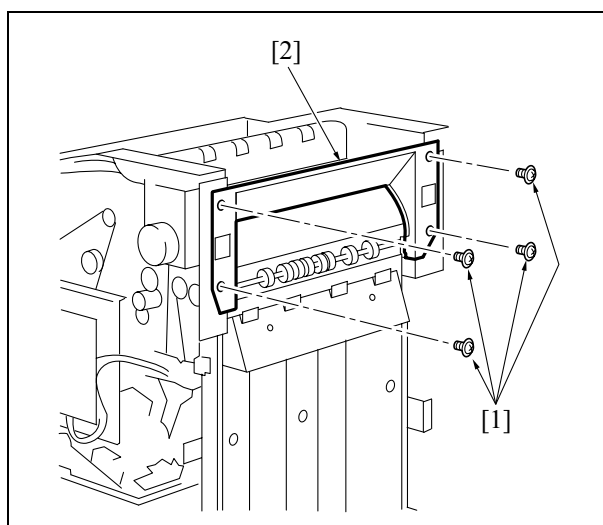
3. Remove 2 screws [1].
4. With the main tray [2] raised up, unhook the up/down stay [3] and remove the main tray [2].
5. Reinstall the above parts following the removal steps in reverse.



1.8 Removing and reinstalling of the main paper exit opening cover

A. Procedure

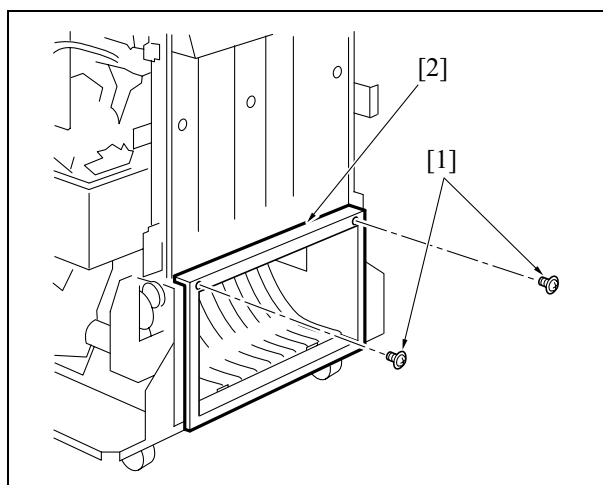
1. Remove the following parts:
 - Top cover 1, or an optional post insertion kit-installed finisher (Post insertion kit)
 - Top cover 2
 - Side cover
 - Rear cover
 - Main tray
2. Remove 4 screws [1], and then remove the main paper exit opening cover [2].
3. Reinstall the above parts following the removal steps in reverse.



1.9 Removing and reinstalling of the booklet paper exit opening cover (Q5687A only)

A. Procedure

1. Remove the booklet tray.
2. Remove 2 screws [1] and then remove the booklet paper exit opening cover [2].
3. Reinstall the above parts following the removal steps in reverse.



2. CONVEYANCE

2.1 Replacing the paper exit roller A (sponge roller)

⚠ Caution:

- After you have lowered the main tray, be sure to unplug the power cord of the finisher from the power outlet.
-

A. Periodically replaced parts/cycle

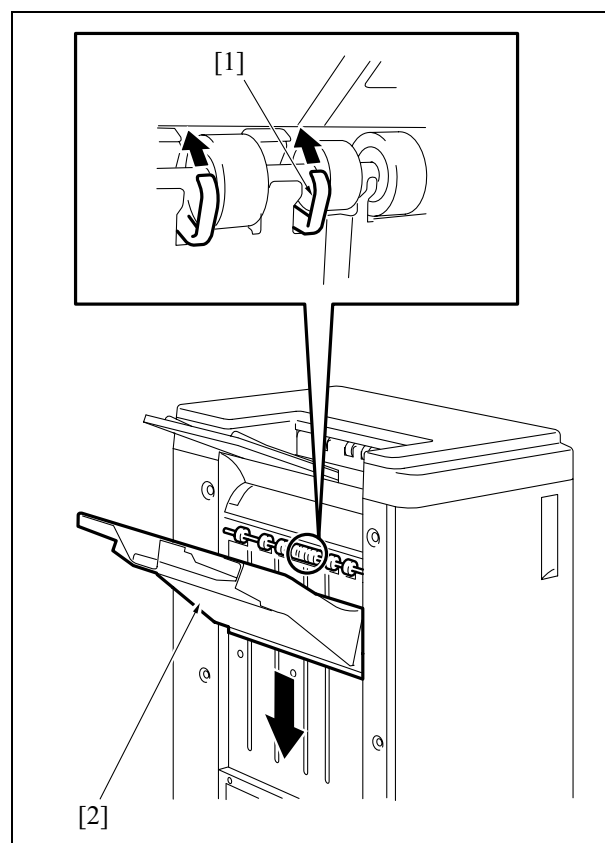
- Paper exit roller A (sponge roller): Every 250,000 copies.

Note:

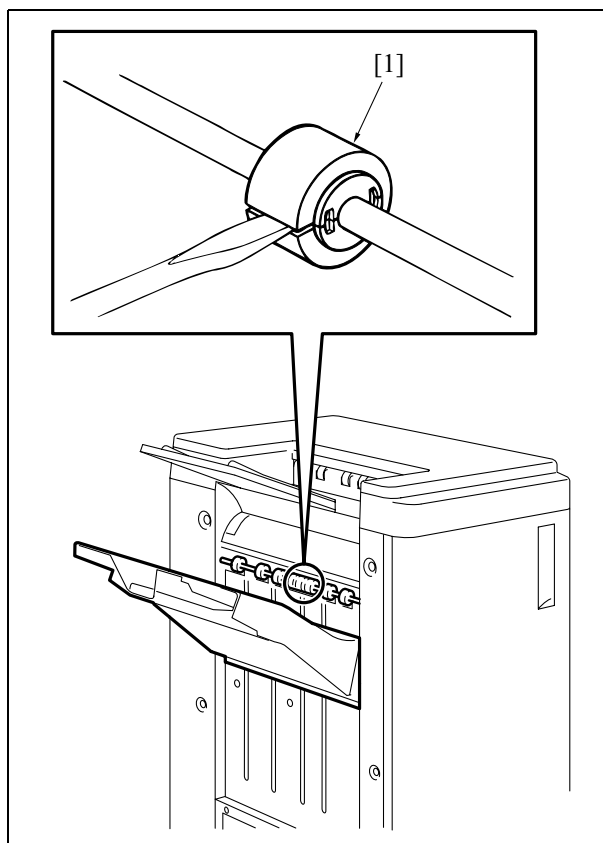
- When replacing the sponge rollers, all of the 5 pairs (10 components) must be replaced.

B. Procedure

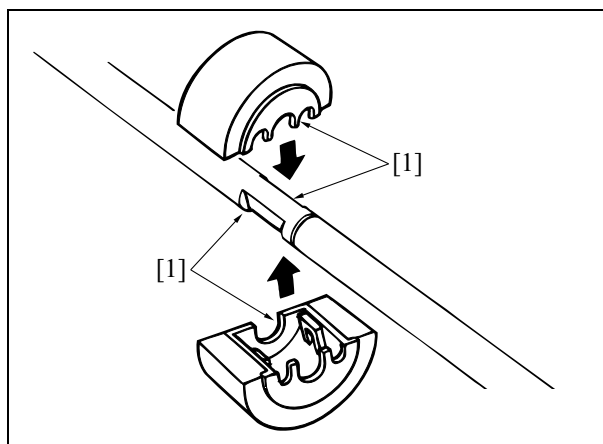
1. Push up the actuator [1] of the tray upper limit sensor (PS702) with your finger, and lower the main tray [2].
2. Turn off the main switch (SW2) of the finisher and unplug the power cord of the finisher from the power outlet.



3. With a driver inserted into the groove of the sponge roller [1], prize it open to remove the sponge roller.



4. With a new sponge roller and the shaft put together at their respective concave sections [1], install the sponge roller securely to the shaft by pressing it down until a click sound is heard.
5. Reinstall the above parts following the removal steps in reverse.



2.2 Replacing the intermediate conveyance roller (sponge roller)

A. Periodically replaced parts/cycle

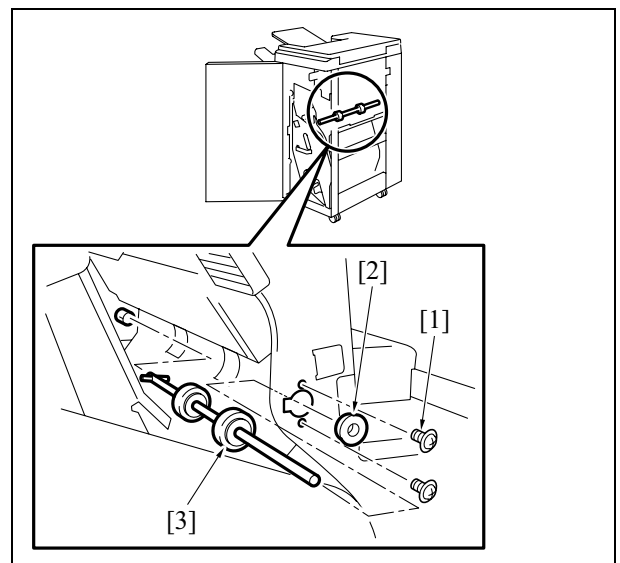
- Intermediate conveyance roller (sponge roller):
Every 250,000 copies.

Note:

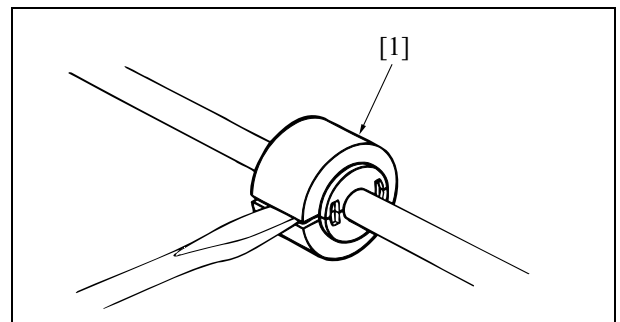
- When replacing the intermediate conveyance rollers, all of the 2 pairs (4 components) must be replaced.

B. Procedure

1. Open the finisher door.
2. Remove 2 screws [1] and a bearing [2], and then remove the intermediate conveyance roller [3].



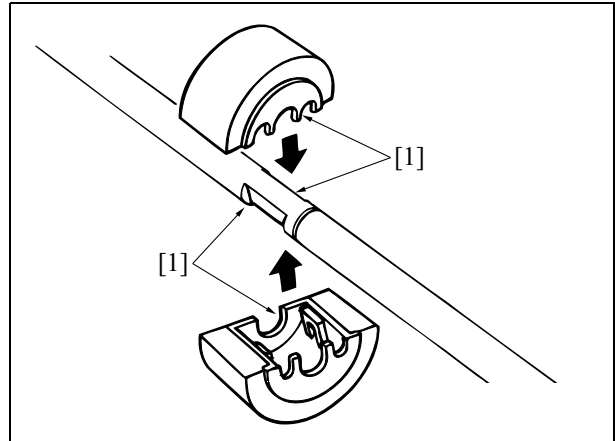
3. With a driver inserted into the groove of the sponge roller [1], prize it open to remove the sponge roller.



4. With a new sponge roller and the shaft put together at their respective concave sections [1], install the sponge roller securely to the shaft by pressing it down until a click sound is heard.
5. Reinstall the above parts following the removal steps in reverse.

Note:

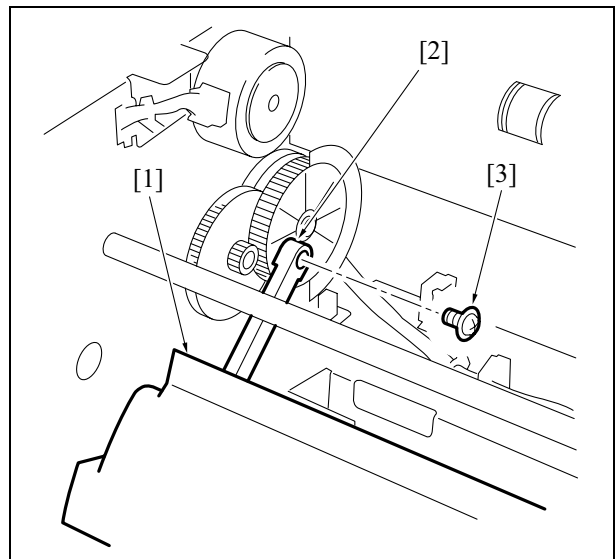
- When reinstalling, be sure to insert the pin at the rear of the intermediate conveyance roller securely into the receiving groove.



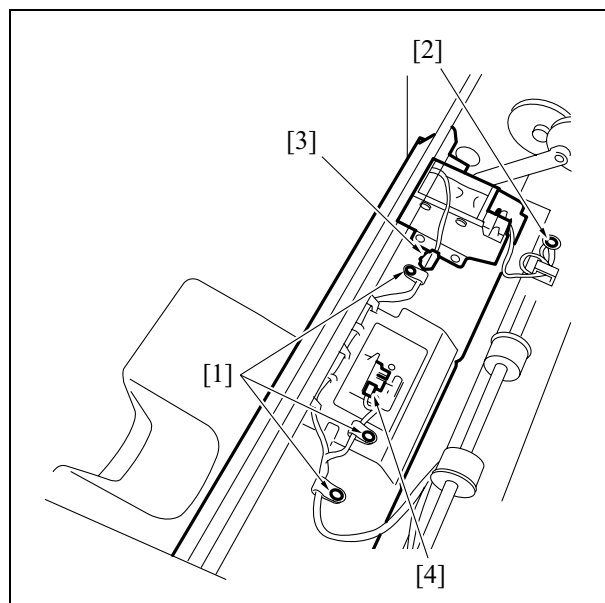
2.3 Removing and reinstalling of the paper exit opening unit

A. Procedure

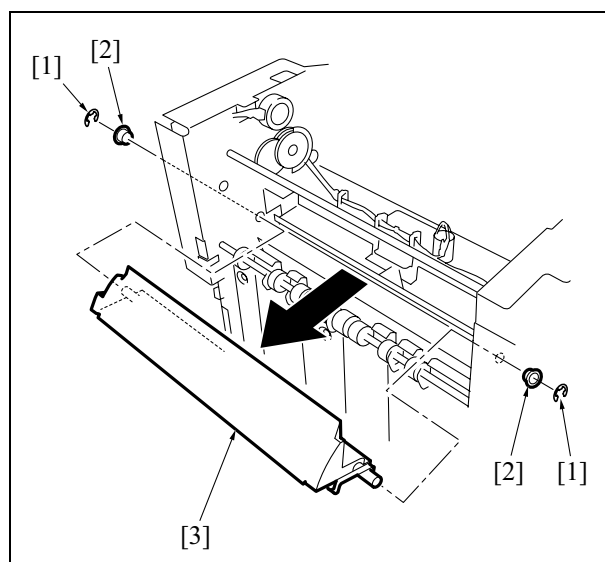
1. Remove the following parts:
 - Top cover 1, or an optional post insertion kit-installed finisher (Post insertion kit)
 - Top cover 2
 - Side cover
 - Rear cover
 - Main tray
 - Main paper exit opening cover
2. Remove a screw [3] of the paper exit open/close link [2] of the paper exit opening unit [1].



3. Remove 3 clamp screws [1], a ground screw [2], the paper exit opening solenoid (SD704) connector [3] and the main tray paper exit sensor (PS706) connector [4].



4. Remove E-rings [1] and bearings [2], two each, provided at front and rear, and then remove the paper exit opening unit [3].
5. Reinstall the above parts following the removal steps in reverse.



3. MAIN TRAY

3.1 Replacing the tray up / down motor

⚠ Caution:

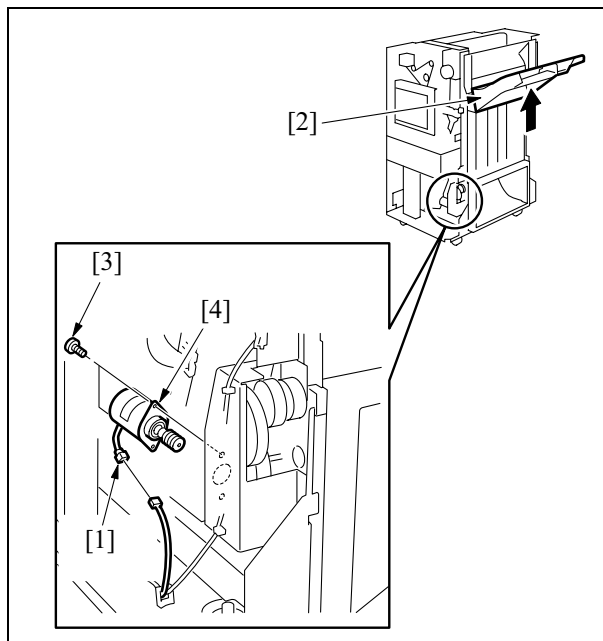
- When removing the tray up/down motor, be sure to hold the main tray to prevent it from falling.
-

A. Periodically replaced parts/cycle

- Tray up/down motor (M703): Every 2,500,000 copies

B. Procedure

1. Remove the rear cover.
2. After removing a connector [1], remove 2 screws [3] while supporting the main tray [2] with your hand, and then remove the tray up/down motor (M703) [4].
3. Reinstall the above parts following the removal steps in reverse.



3.2 Removing and reinstalling of the up / down wire

⚠ Caution:

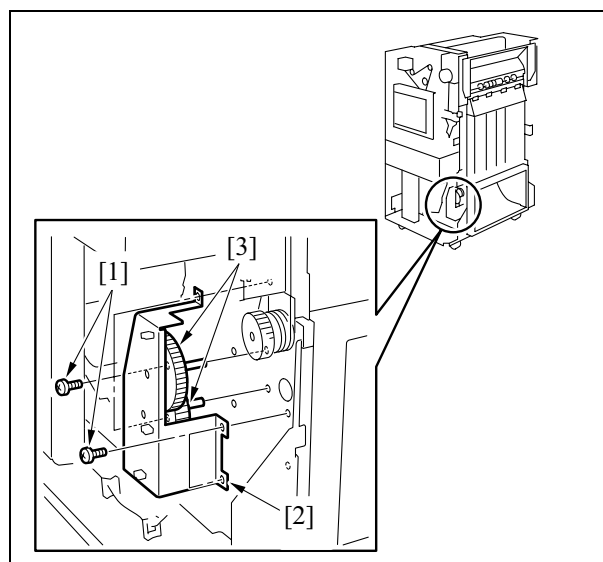
- When removing the tray up/down motor, be sure to hold the main tray to prevent it from falling.

Note:

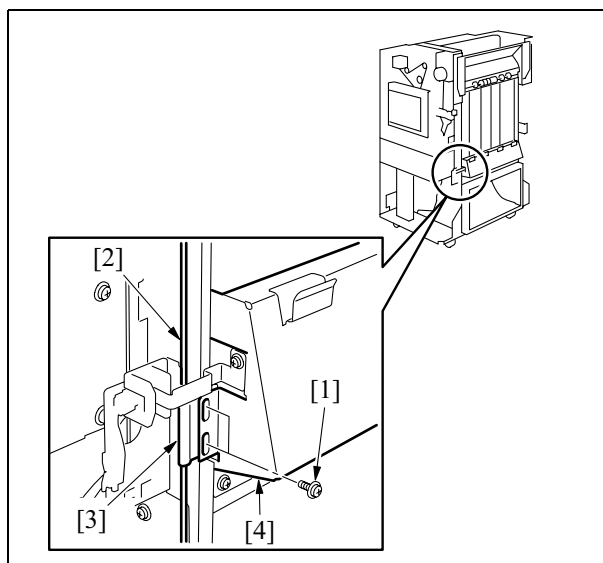
- The wire replacement steps shown below refer to those taken on the rear side. The shape and the winding of wire on the front side are symmetrically the same as those on the rear side.
- The wire brackets of the up/down wire is stamped with "F" for the front side and "R" for the rear side. When reinstalling, be careful not to mix up the front with the rear.

A. Procedure

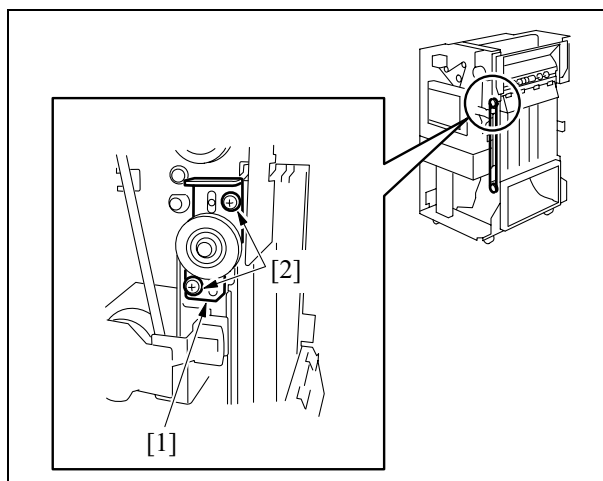
1. Remove the following parts:
 - Side cover
 - Finisher door
 - Rear cover
 - Tray up/down motor (M703)
 - Main tray
2. Remove 5 screws [1], and then remove the up/down gear cover [2] and the gear [3].



3. After removing 2 screws [1], remove the wire bracket [3] of the up/down wire [2] on the rear side from the up/down stay [4].



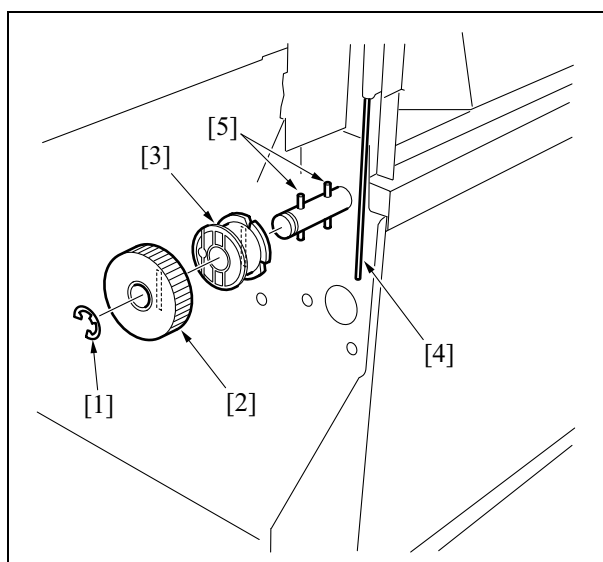
4. Loosen 2 screws [2] of the belt tensioner [1].



5. Remove an E-ring [1], the gear [2] and the up/down pulley /L [3], and then remove the up/down wire [4].

Note:

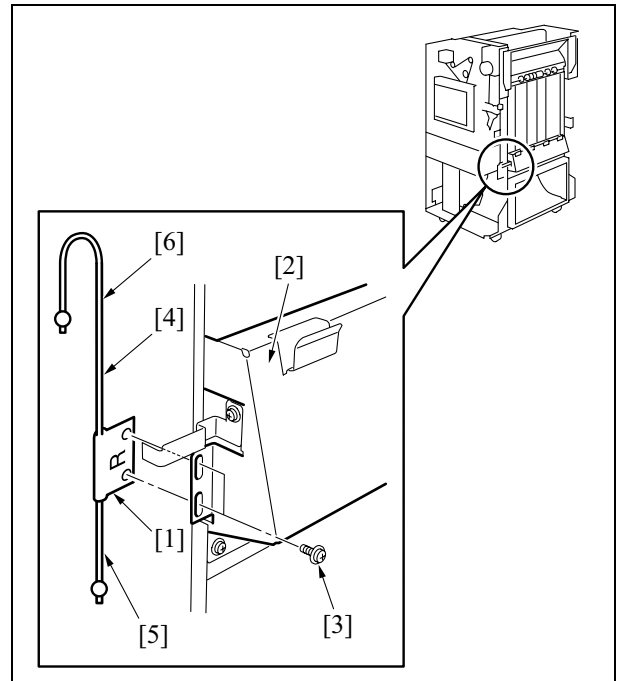
- When removing the up/down pulley L, be careful not to drop the pins [5]. Otherwise, they may get lost.



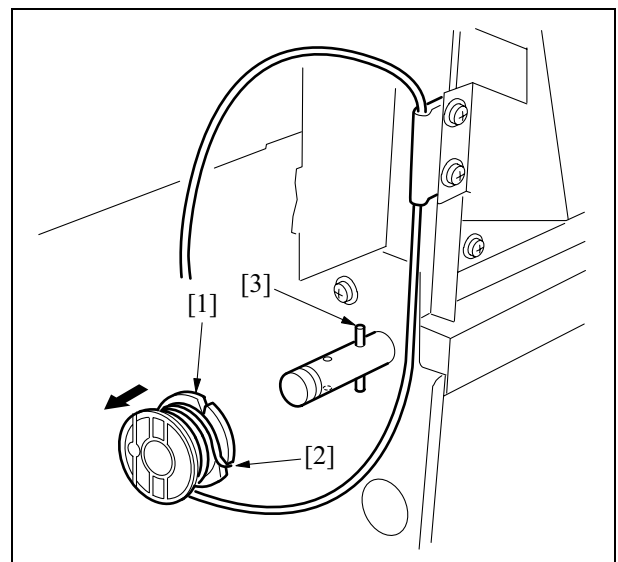
6. Fasten the wire bracket [1] tentatively to the up/down stay [2] with 2 screws [3].

Note:

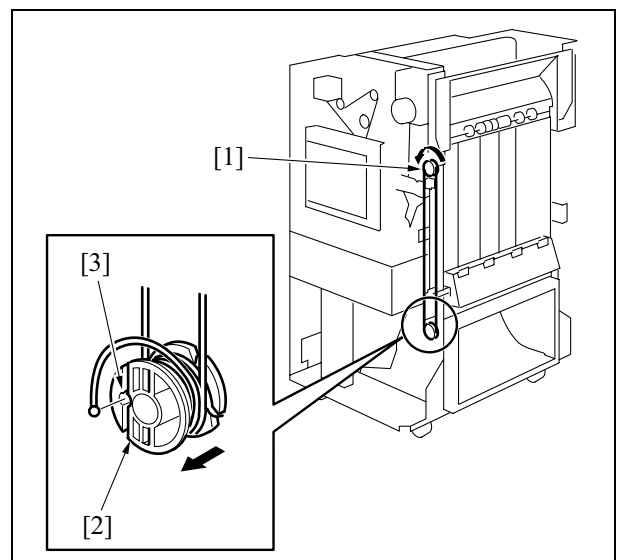
- Be sure to set the up/down wire [4] with the shorter section [5] up and the longer section [6] down.



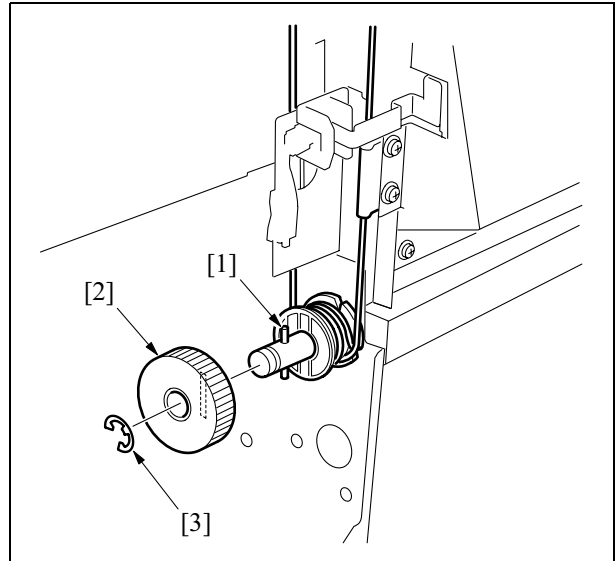
7. With a new up/down wire fastened to the wire end [2] of the up/down pulley L [1], wind the wire a little less than 5 turns from inside toward outside around the pulley without getting loosened and set the up/down pulley L [1] to the shaft so that it is in tune with the pin [3].



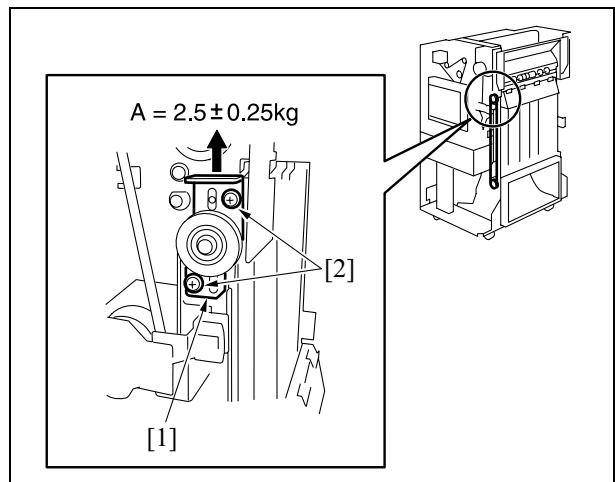
8. After putting the up/down wire on the up/down pulley U [1], wind it 2 turns from inside toward outside around the up/down pulley L [2] without getting loosened and fasten it to the wire end [3].



9. Set the pin [1] and the gear [2] to the shaft and fasten it with the E-ring [3].



10. Using a tension gauge or spring balance, pull the belt tensioner [1] to the specified force "A" and tighten it with 2 screws [2].
Specified value: $A = 2.5 \pm 0.25 \text{ kg}$

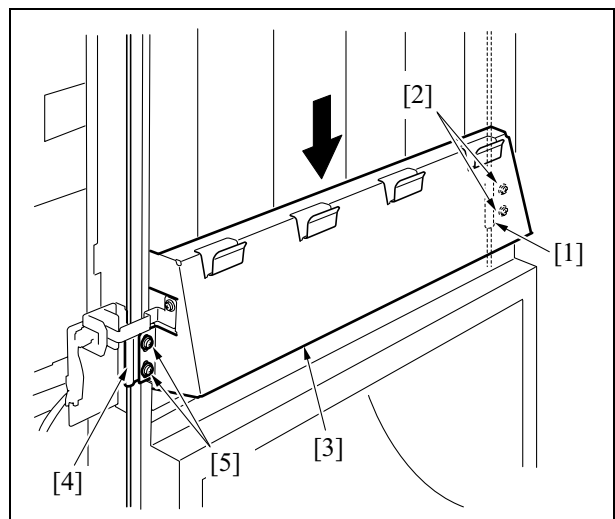


11. Loosen 2 screws [2] of the wire bracket [1] on the front side. Press down the up/down stay [3] to make it level, and tighten screws [5] of the wire bracket [4] on the rear side and screws (4 screws in all).

Note:

- Be sure to check if the up/down stay [3] is level. If it is out of the level, an undesirable load may be imposed on the tray up/down motor (M703) or the gear, causing damage to it.

12. Reinstall the above parts following the removal steps in reverse.



4. STACKER

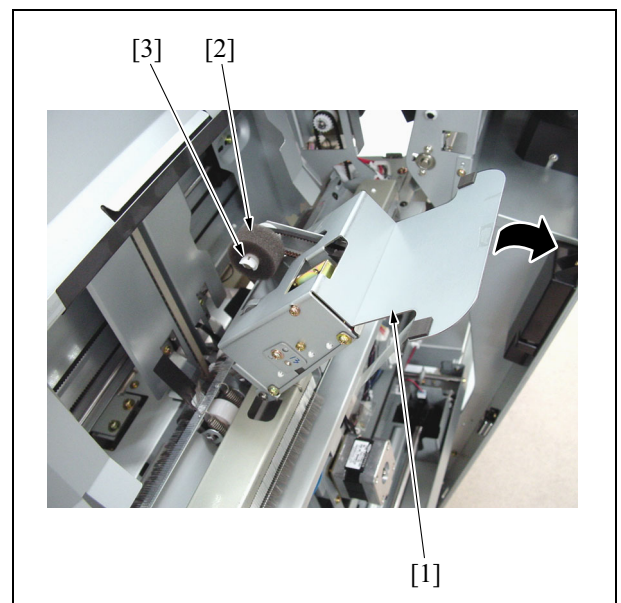
4.1 Replacing the stacking assist roller

A. Periodically replaced parts/cycle

- Stacking assist roller: Every 400,000 copies

B. Procedure

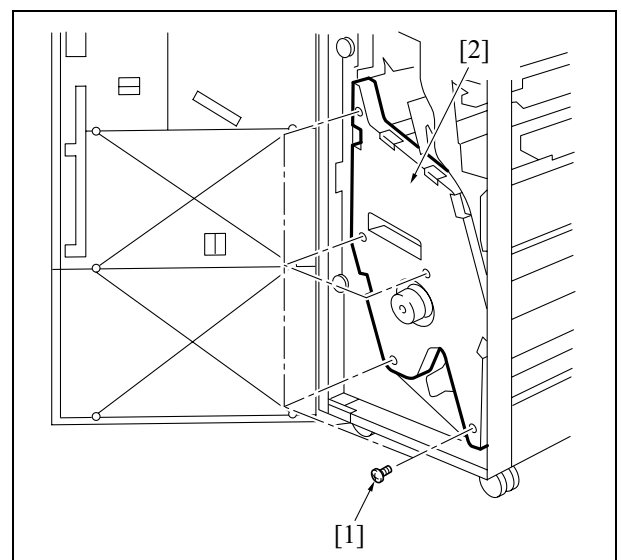
1. Open the finisher door.
2. Pull out the stacker unit.
3. Open the stacking assist section [1] and lift up the stacking assist roller [2].
4. Remove the stop ring [3], and then remove the stacking assist roller [2].
5. Reinstall the above parts following the removal steps in reverse.



4.2 Removing and reinstalling of the stacker unit cover

A. Procedure

1. Open the finisher door.
2. Remove 5 screws [1] and then remove the stacker unit cover [2].
3. Reinstall the above parts following the removal steps in reverse.



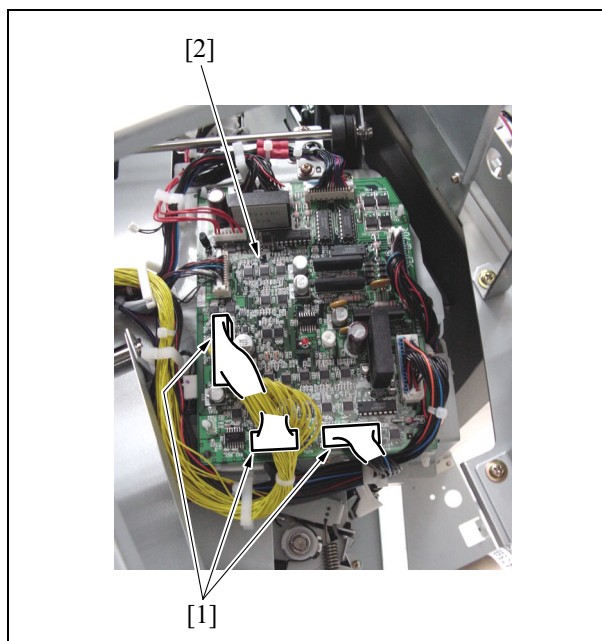
4.3 Removing and reinstalling of the stacker unit

⚠ Caution:

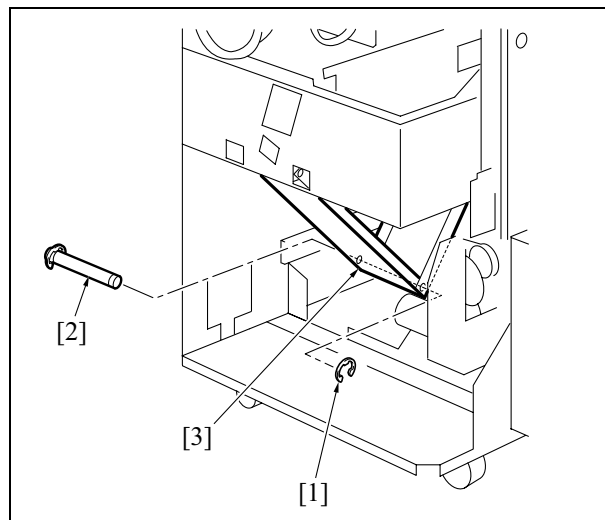
- We recommend that at least two people perform this service.
- Be careful when you detach the finisher from the finisher. If you pull out the stacker unit, the finisher may fall. This may cause injury.

A. Procedure

1. Remove the following parts:
 - Booklet tray
 - Side cover
 - Finisher door
 - Rear cover
2. Detach the finisher from the finisher.
3. Pull out the stacker unit.
4. Remove 3 connectors [1] (CN1, CN2, CN3) from the relay board (RB) [2].
(For Q5686A, two connectors (CN1, CN2) are provided.)
5. Remove each cable from the wiring harness guide.



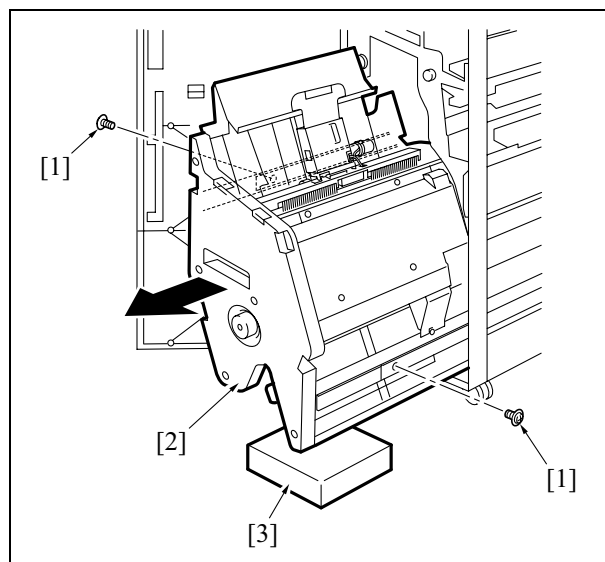
6. After removing an E-ring [1] and the shaft [2], detach the connecting arm [3].



7. Remove 2 rail stopper screws [1] and pull out the stacker unit [2].

Note:

- To prevent the finisher from falling down, be sure to put a support [3] under the stacker unit.



8. Remove 2 screws [1] and raise the stacker unit [2] to remove the guide rail [3].

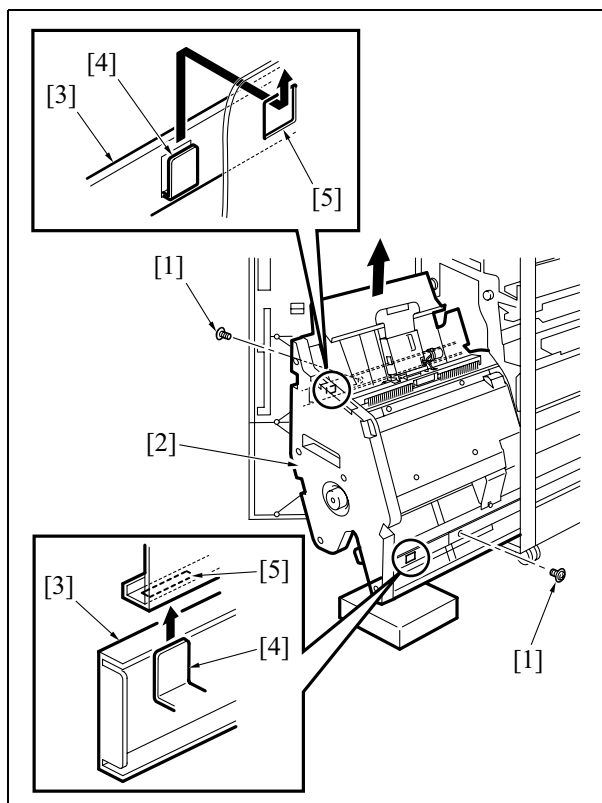
⚠ Caution:

- When removing the guide rail, be careful not to hurt your hip by taking an appropriate posture.
-

9. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling the stacker unit [2] to the guide rail [3], be sure to check to see if the hook [4] is set securely into the fitting hole [5].



5. STAPLER

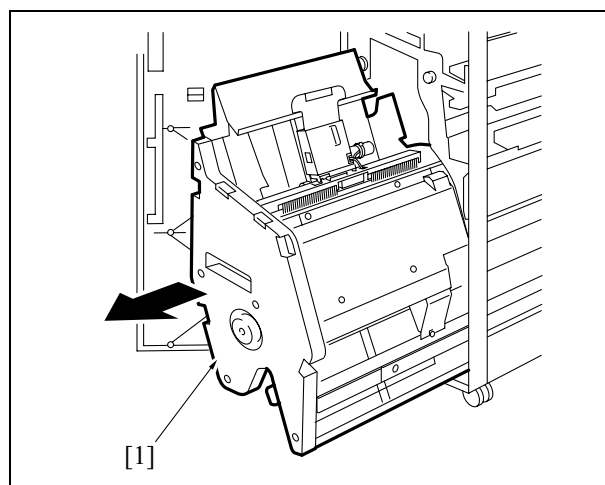
5.1 Removing and reinstalling of the stapler unit cover

⚠ Caution:

- Be careful when you detach the finisher from the finisher. If you pull out the stacker unit, the finisher may fall. This may cause injury.
-

A. Procedure

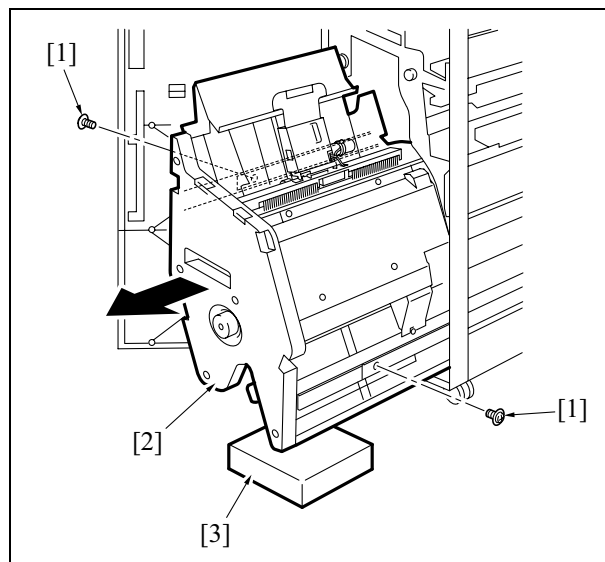
1. Open the finisher door.
2. Pull out the stacker unit [1].



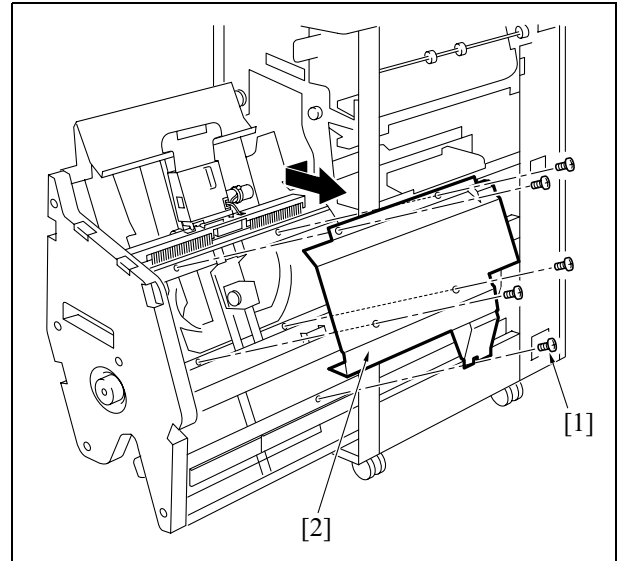
3. Remove 2 rail stopper screws [1] and pull out the stacker unit [2].

Note:

- To prevent the finisher from falling down, be sure to put a support [3] under the stacker unit.



4. Remove 5 screws [1] and then remove the stapler unit cover [2].
5. Reinstall the above parts following the removal steps in reverse.



5.2 Replacing the clincher

Note:

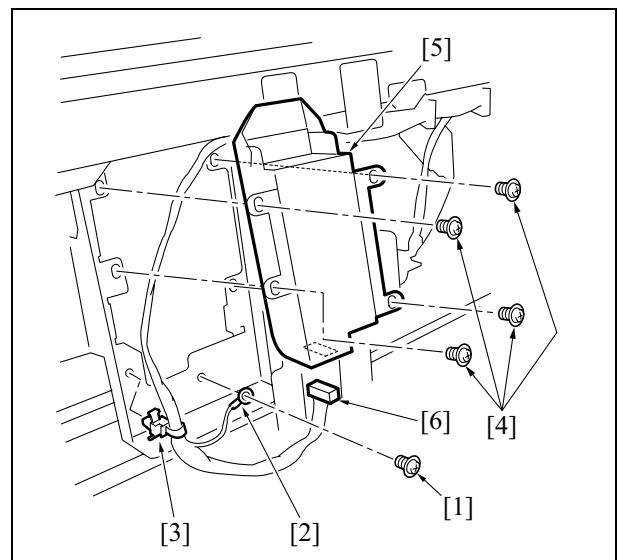
- Do not use hands to move clincher units to horizontal direction. Otherwise the belt and the gear teeth skipping may occur.
- After reinstalling the clincher, be sure to conduct the "vertical adjustment of the finisher stapler." (See "ADJUSTMENT.")

A. Periodically replaced parts/cycle

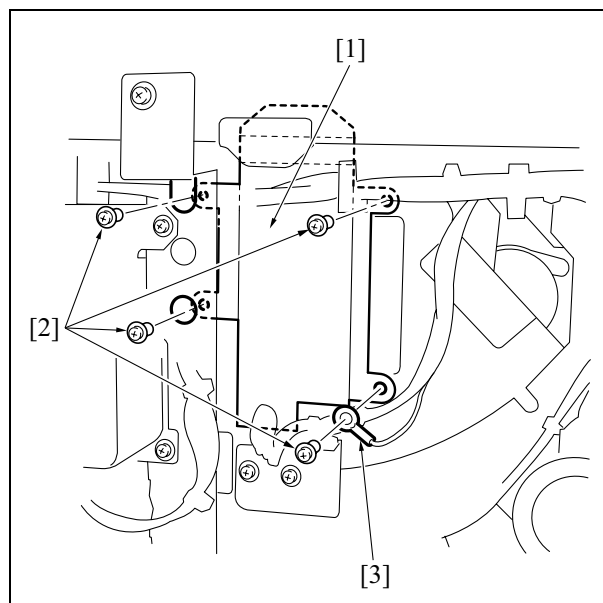
- Clincher: Every 200,000 staples

B. Procedure

1. Open the finisher door.
2. Pull out the stacker unit and remove the stapler unit cover.
3. Remove a ground screw [1], and then remove the ground [2] and the clamp [3].
4. After removing 4 screws [4], remove the clincher /F [5] and then remove the connector [6].



5. Remove 4 screws [2] of the clincher R [1] and the ground [3].

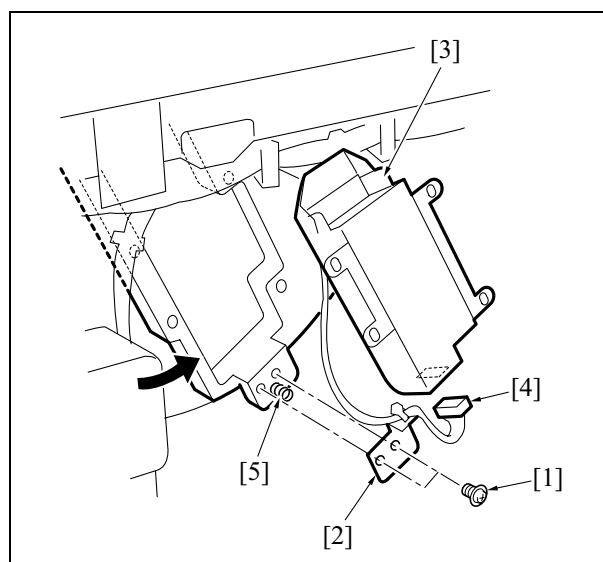


6. After removing 2 screws [1] and the ball bearing spring mounting bracket [2], rotate the clincher R [3] to the position in which it can be easily taken out, and then remove the connector [4].

Note:

- Be careful not to lose the bearing spring [5] and the ball.

7. Reinstall the above parts following the removal steps in reverse.



5.3 Replacing the stapler

A. Periodically replaced parts/cycle

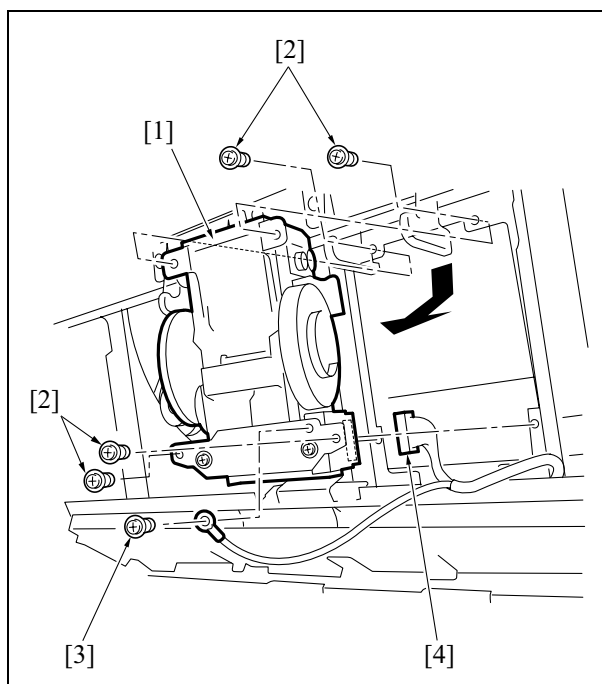
- Stapler: Every 200,000 staples

Note:

- Do not use hands to move stapler units to horizontal direction.
Otherwise the belt and the gear teeth skipping may occur.
- After reinstalling the clincher, be sure to conduct the "vertical adjustment of the finisher stapler." (See "ADJUSTMENT.")

B. Procedure

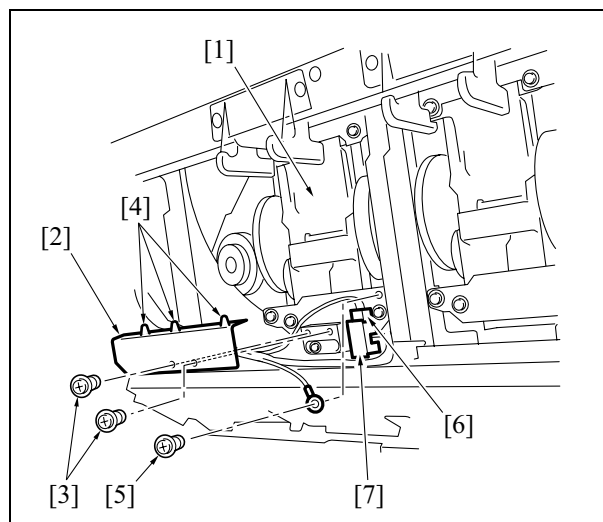
1. Open the finisher door.
2. Pull out the stacker unit.
3. Remove the cartridge from the stapler.
4. After removing 4 screws [2] of the stapler F [1] and a ground screw [3], take out the stapler F [1] and remove the connector [4].



5. After removing 2 screws [3] of the sensor cover [2] of the stapler F [1] and 3 clamps [4], remove a ground screw [5] and the connector [6].

Note:

- When reinstalling the sensor cover [2], be careful that the wiring harness does not interfere with the stapler rotation HP sensor (PS713) [7] or get caught by the gear.

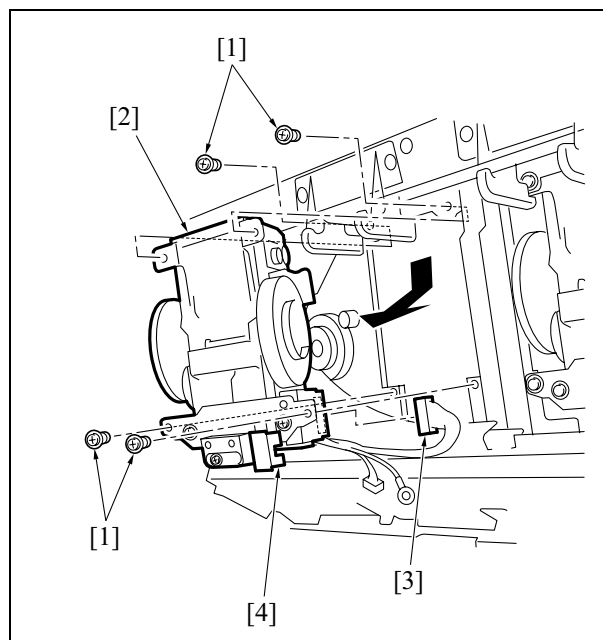


6. After removing 4 screws [1], take out the stapler R [2] and remove the connector [3].

Note:

- When taking out the stapler R [2], be careful not to damage PS713 [4].

7. Reinstall the above parts following the removal steps in reverse.



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i n v e n t

Q5690A

High Capacity Input

SERVICE MANUAL

CONTENTS

SAFETY AND IMPORTANT WARNING ITEMS

Refer to the 9850 service manual

I OUTLINE

1. PRODUCT SPECIFICATIONS	1-1
2. CENTER CROSS SECTION	1-2
3. DRIVE SYSTEM DIAGRAM	1-3
3.1 Paper feed drive	1-3
3.2 Up/down plate drive	1-5

II UNIT EXPLANATION

1. PAPER FEED	2-1
1.1 Composition	2-1
1.2 Operation	2-3
1.2.1 Up/down plate control	2-3
1.2.2 Paper feed control	2-3
1.2.3 Paper feed assist fan control	2-4
1.2.4 Mis-centring adjustment control	2-4
1.2.5 Remaining paper detection	2-5

III DISASSEMBLY/ASSEMBLY

1. EXTERIOR	3-1
1.1 Removing and reinstalling the front cover	3-1
1.2 Removing and reinstalling the clutch replacement cover and the rear cover	3-3
1.3 Removing and reinstalling the paper feed pick-up cover	3-4
2. PAPER FEED	3-5
2.1 Cleaning the paper dust removing brush	3-5
2.2 Removing and reinstalling the paper feed unit	3-6
2.3 Replacing the paper feed roller and the feed roller	3-7
2.4 Replacing the double feed prevention roller	3-8
2.5 Replacing the paper feed clutch and the pre-registration clutch	3-10
3. TRAY UP/DOWN	3-11
3.1 Removing and reinstalling the rear drive	3-11
3.2 Removing and reinstalling the up/down wire	3-16

I OUTLINE

II UNIT EXPLANATION

III DIS./ASSEMBLY

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I OUTLINE

1. Q5690A PRODUCT SPECIFICATIONS

A. Type

Type: Side mount type volume paper feed tray

B. Functions

Paper size (for metric area): B5, A4, B4, A3, 8.5 x 11, 8.5 x 14, 11 x 17, 12 x 18, 13 x 19
Wide size: Up to 330mm x 487mm (13 x 19.2)
Applicable copy paper: 64 to 256g/m², plain paper and high-quality paper (recommended), and art paper/ coated paper (recommended)
Maximum tray capacity (for metric area): 2,500 sheets (90g/m²)
Maximum tray capacity (for inch area): 2,200 sheets (28lbs)

C. Engine data

Power source: DC24V/12V/5V, AC24V (supplied from the engine)
Power consumption: Maximum 40VA (with one internal heater used)
Weight: Approx. 40kg
Dimensions: 719mm (W) x 639mm (D) x 485mm (H)

D. Maintenance and life

Maintenance: Same as the engine
Engine service life: Same as the engine

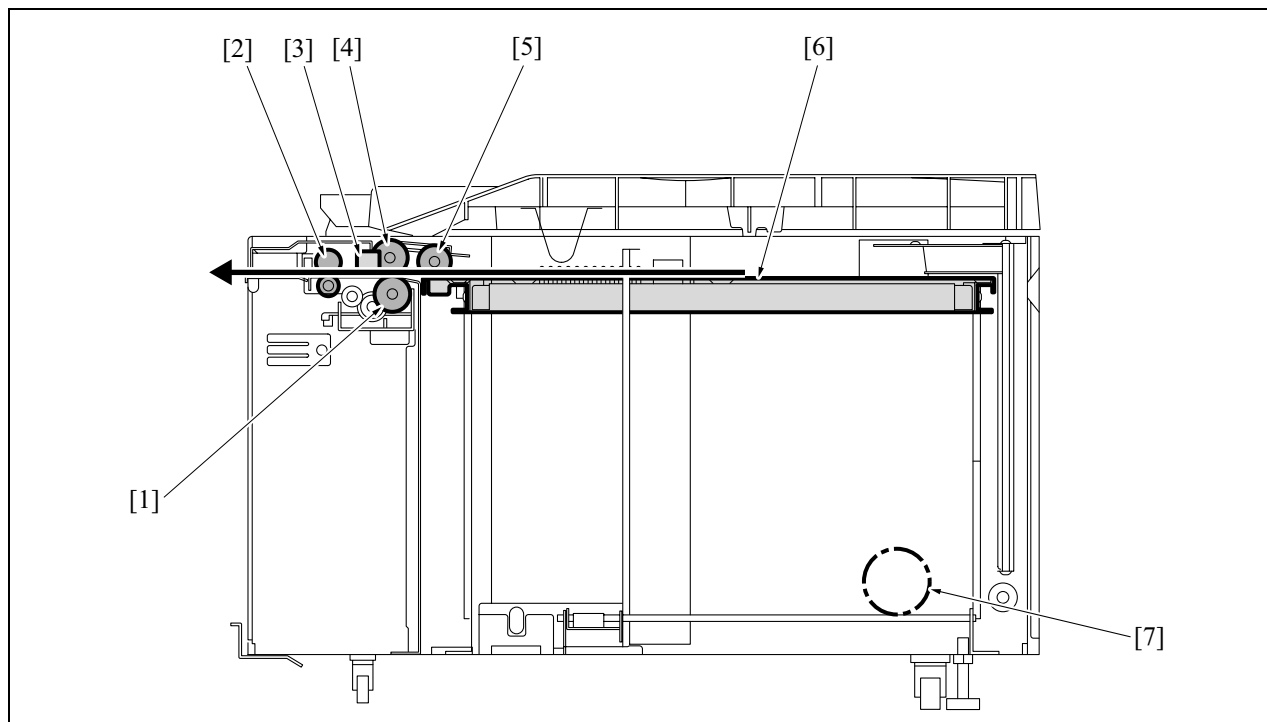
E. Operating environment

Temperature: 10°C to 30°C
Humidity: 10% RH to 80% RH (with no dew condensation)

Note:

- The information herein may be subject to change for improvement without notice.

2. CENTER CROSS SECTION



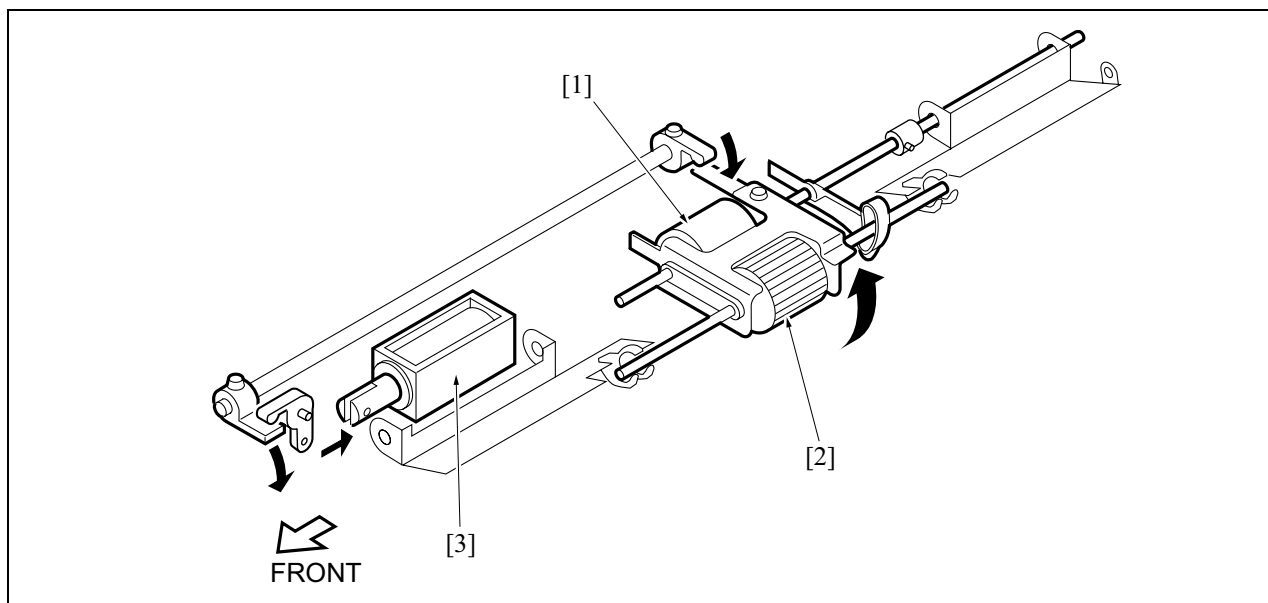
- [1] Double feed prevention roller
- [2] Conveyance roller
- [3] Paper feed solenoid (SD100)
- [4] Feed roller

- [5] Paper feed roller
- [6] Up/down plate
- [7] Up/down motor (M100)

3. DRIVE SYSTEM DIAGRAM

3.1 Paper feed drive

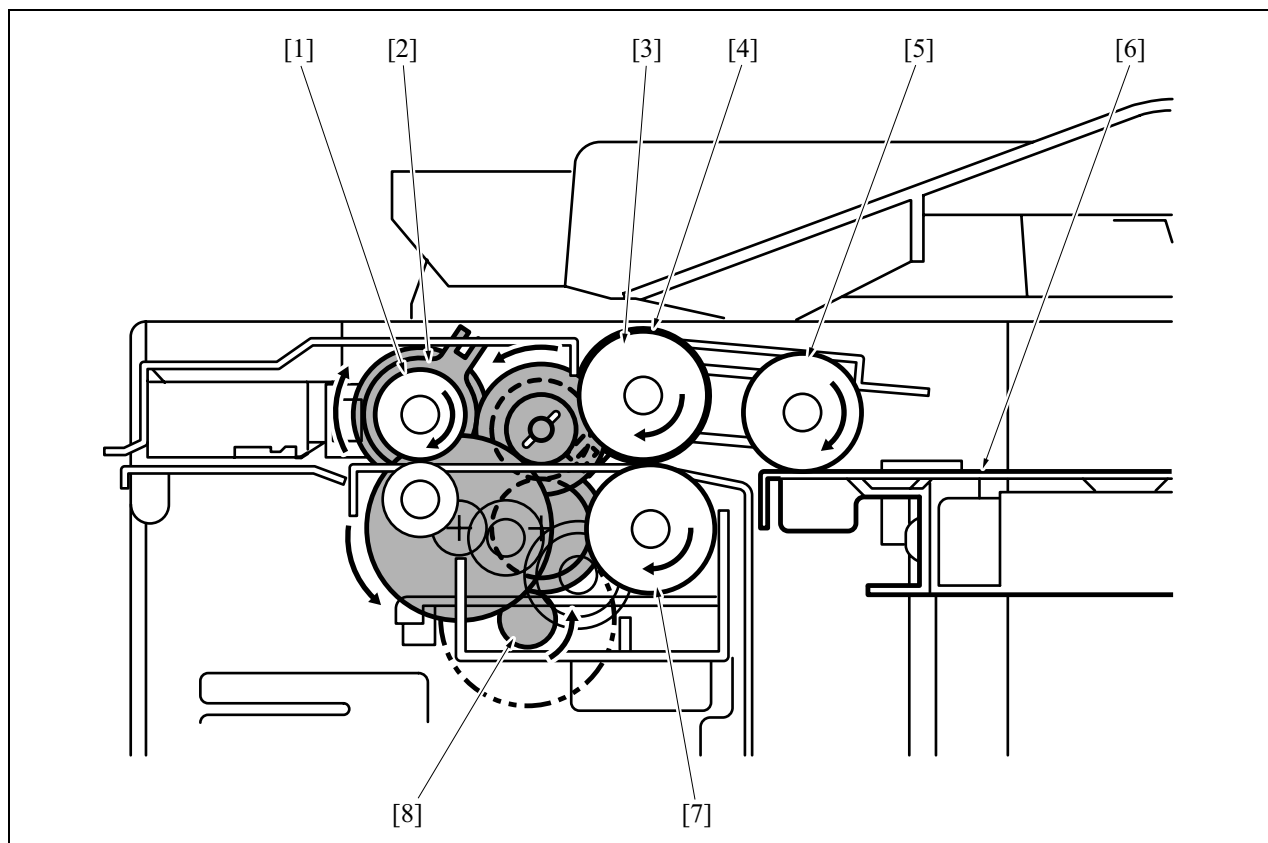
A. Paper feed unit drive



[1] Feed roller

[2] Paper feed roller

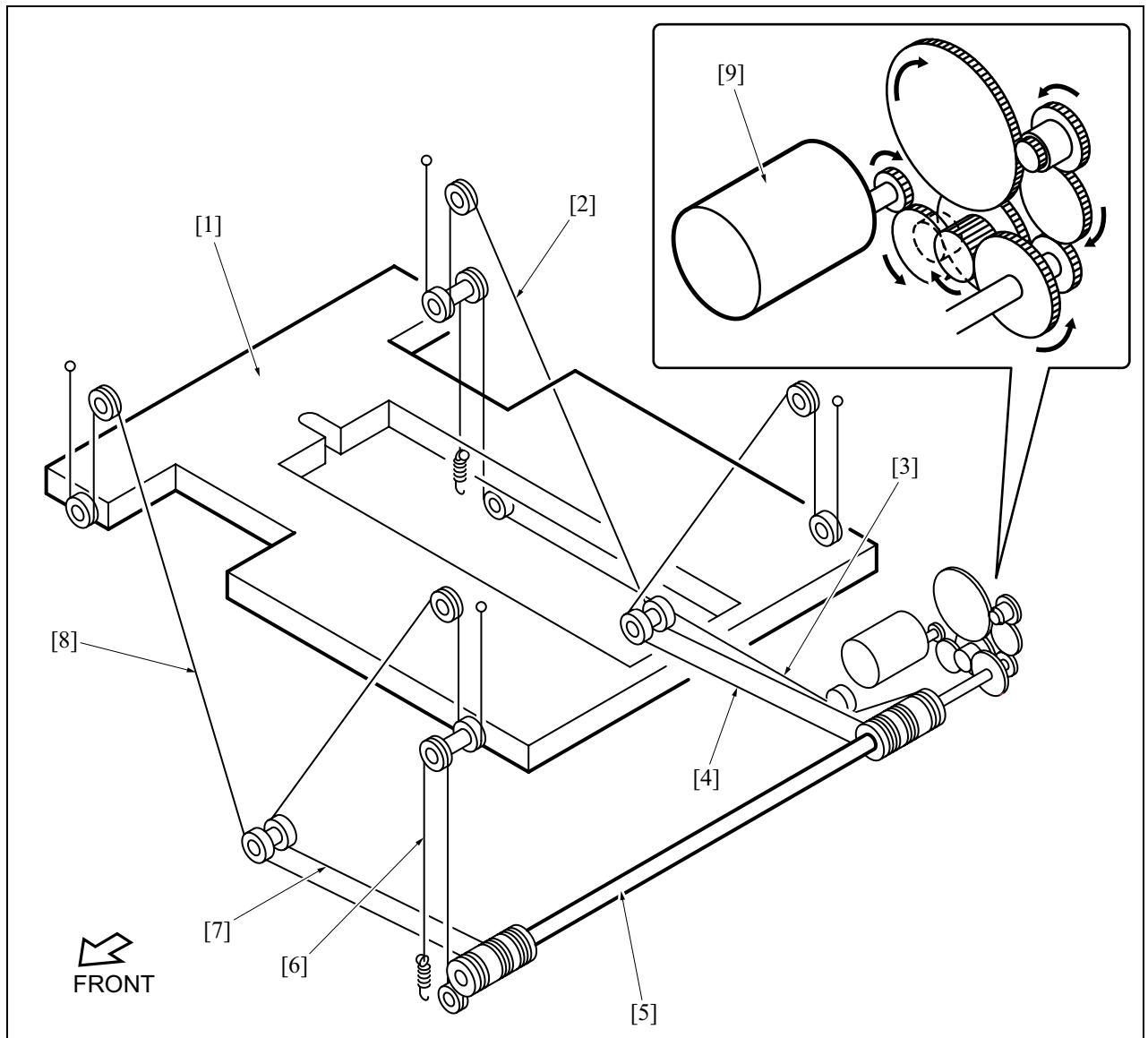
[3] Paper feed solenoid (SD100)

B. Front side drive

- [1] Conveyance roller
- [2] Pre-registration clutch (MC102)
- [3] Feed roller
- [4] Paper feed clutch (MC101)

- [5] Paper feed roller
- [6] Up/down plate
- [7] Double feed prevention roller
- [8] Paper feed motor (M101)

3.2 Up/down plate drive



- [1] Up/down plate
- [2] Up/down wire A
- [3] Assist wire D
- [4] Up/down wire A
- [5] Up/down drive shaft

- [6] Assist wire C
- [7] Up/down wire A
- [8] Up/down wire A
- [9] Up/down motor (M100)

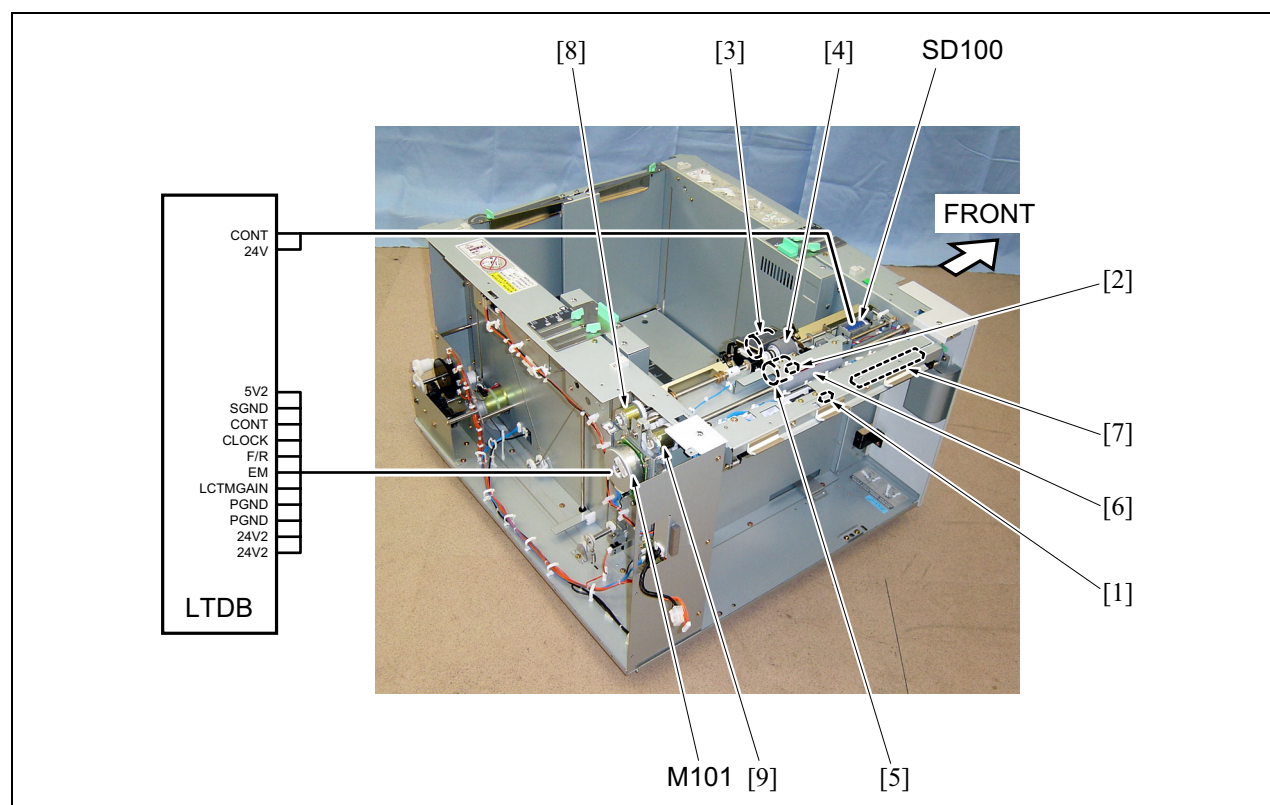
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II UNIT EXPLANATION

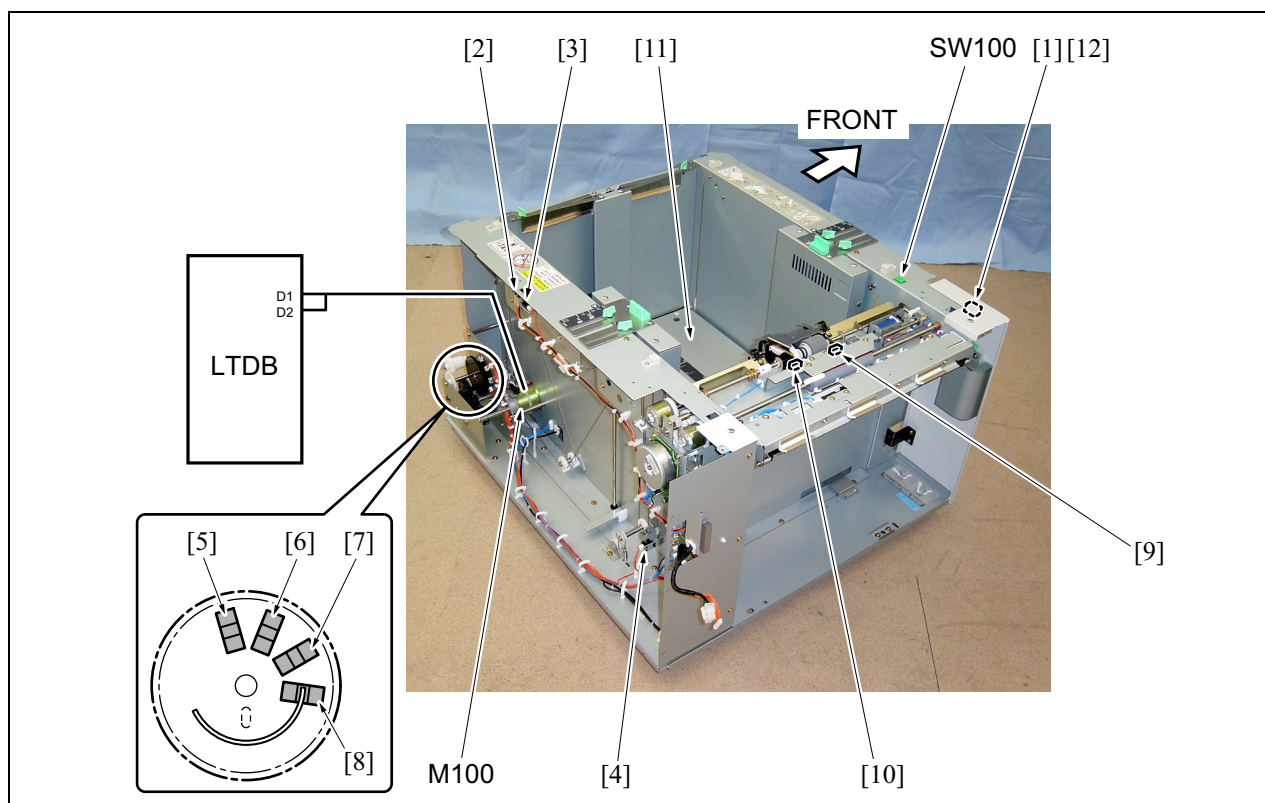
1. PAPER FEED

1.1 Composition

A. Paper feed drive



Symbol	Name	Function or method
[1]	Feed sensor (PS106)	Detection of the presence of paper
[2]	Paper feed sensor (PS107)	Detection of the presence of paper
[3]	Paper feed roller	Paper conveyance
[4]	Feed roller	Paper conveyance
[5]	Double feed prevention roller	Prevention of the double feed of paper, Torque limiter
[6]	Conveyance roller	Paper conveyance
[7]	Mis-centering sensor (PS120)	Detection of the mis-centering of paper conveyance
[8]	Paper feed clutch (MC101)	Turning on/off the transmission of power to the paper roller unit
[9]	Pre-registration clutch (MC102)	Turning on/off the transmission of power to the conveyance roller
M101	Paper feed motor	Driving of the primary paper feed system, 24VDC, Brushless PLL control
SD100	Paper feed solenoid	Transmission of driving force to the primary paper feed

B. UP/down plate drive

Symbol	Name	Function or method
[1]	Front door interlock switch (MS101)	Turning on/off the 24VDC supply in interlock with the front door
[2]	Upper cover interlock switch (MS102)	Turning on/off the 24VDC supply in interlock with the upper cover
[3]	Upper cover sensor (PS100)	Open/close of the detection of the upper cover
[4]	Lower limit sensor (PS101)	Detection of the lower limit of the up/down plate
[5]	Remaining paper sensor 1 (PS102)	Remaining paper detection
[6]	Remaining paper sensor 2 (PS103)	Remaining paper detection
[7]	Remaining paper sensor 3 (PS104)	Remaining paper detection
[8]	Remaining paper sensor 4 (PS105)	Remaining paper detection
[9]	No paper sensor (PS108)	Detection of the presence of paper
[10]	Upper limit sensor (PS109)	Paper upper limit detection
[11]	Up/down plate	Up/down of paper
[12]	Front door open/close sensor (PS115)	Front door open/close sensor detection
SW100	Tray down switch	Turning on of the manual tray down drive
M100	Up/down motor	Up/down drive of the up/down plate

1.2 Operation

1.2.1 Up/down plate control

The up/down plate in the HCI is driven by the wire.

When the upper cover and the front door are closed, the front door interlock switch (MS101) and the upper cover interlock switch (MS102) turn on to supply 24VDC to the drive system and the up/down motor (M100) turns on to lift the up/down plate.

The MS101 and the MS102 turn on/off 24V and the upper cover open/close sensor (PS100) and the lower limit sensor (PS101) turn on/off the M100 control signal.

When the upper sensor (PS109) turns on and detects the upper limit of paper, the M100 turns off.

When paper is fed and the PS109 turns off, the M100 turns on to lift the up/down plate until the PS109 turns on again.

When the upper cover is opened, the PS100 turns off and the M100 rotates in reverse direction to lower the up/down plate by 90mm.

After this, each time the tray down switch (SW100) is pressed, the up/down plate goes 90mm down and stops at the position where the PS101 was turned on.

1.2.2 Paper feed control

The paper feed system is driven by the paper feed motor (M101).

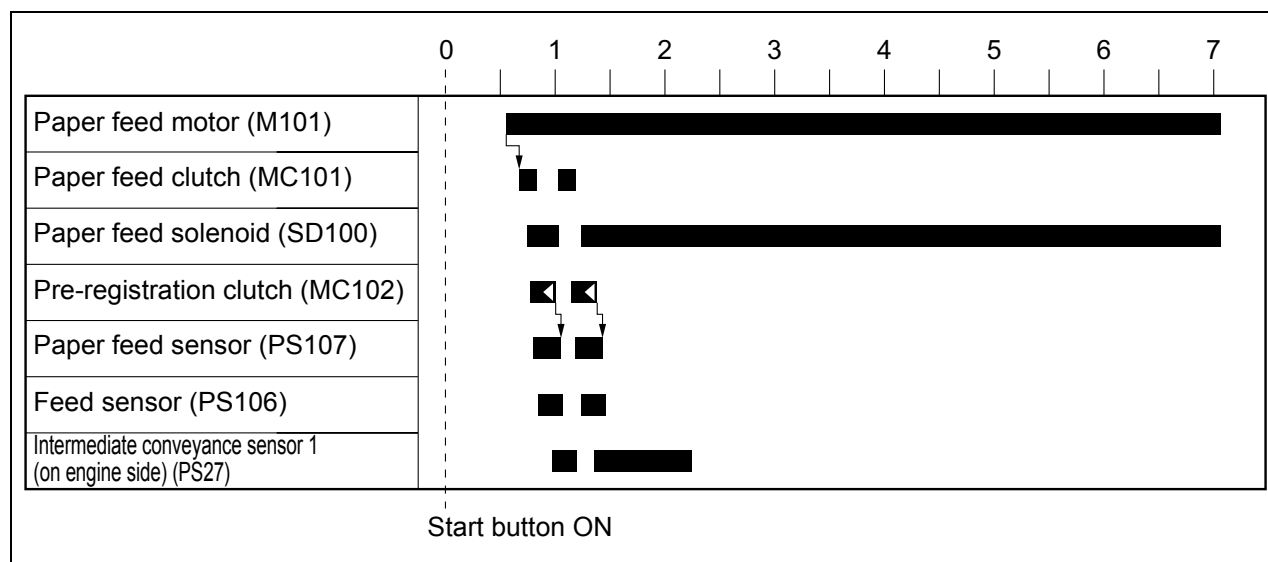
The transmission of driving force to the paper feed unit (paper feed roller and feed roller) is controlled by turning on/off the paper feed clutch (MC101). And the transmission of driving force to the conveyance roller is controlled by turning on/off the pre-registration clutch (MC102).

When paper can be fed and the paper feed solenoid (SD100) turns off, the paper feed unit comes into contact with paper to feed it to the conveyance roller. Then, the SD100 turns on and the paper feed unit is detached from paper.

As a result of this operation, a loop is formed in front of the conveyance roller to correct the tilt of paper.

After completion of the tilt correction of paper, the MC102 turns on to feed paper to the 2nd paper feed section of the engine.

Paper feed speed is 470mm/s at all times. The M101 stops after specified period of time after copy/print is complete.

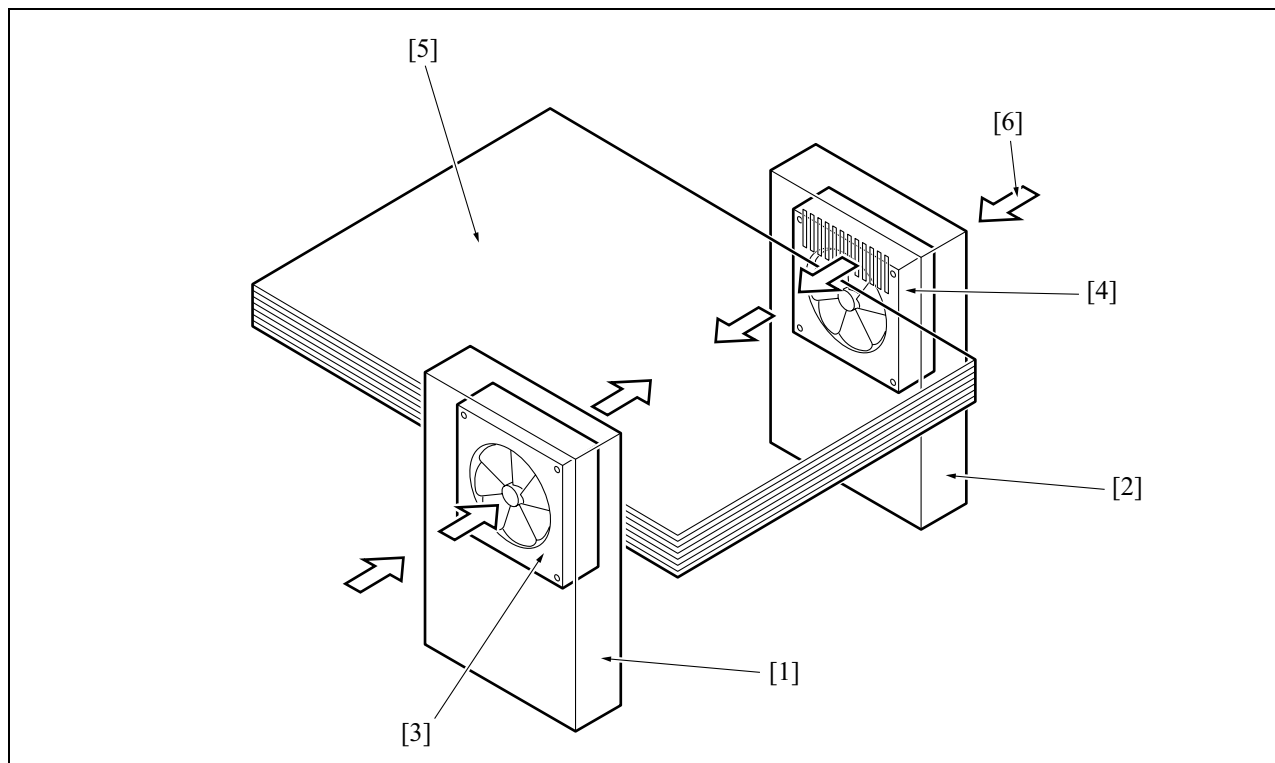


1.2.3 Paper feed assist fan control

Some of the side guides (at front and rear) are provided with a fan to assist the handling of paper while is being fed. The fan turns on/off at the same timing as the paper feed motor (M101).

The auto-mode has been set when the engine was shipped from the factory, and this air assist turns on when the coated paper is selected.

The 25 mode DIPSW allows the mode to be switched among "ON for coated paper only," "ON for all types of paper" and "OFF at all times."



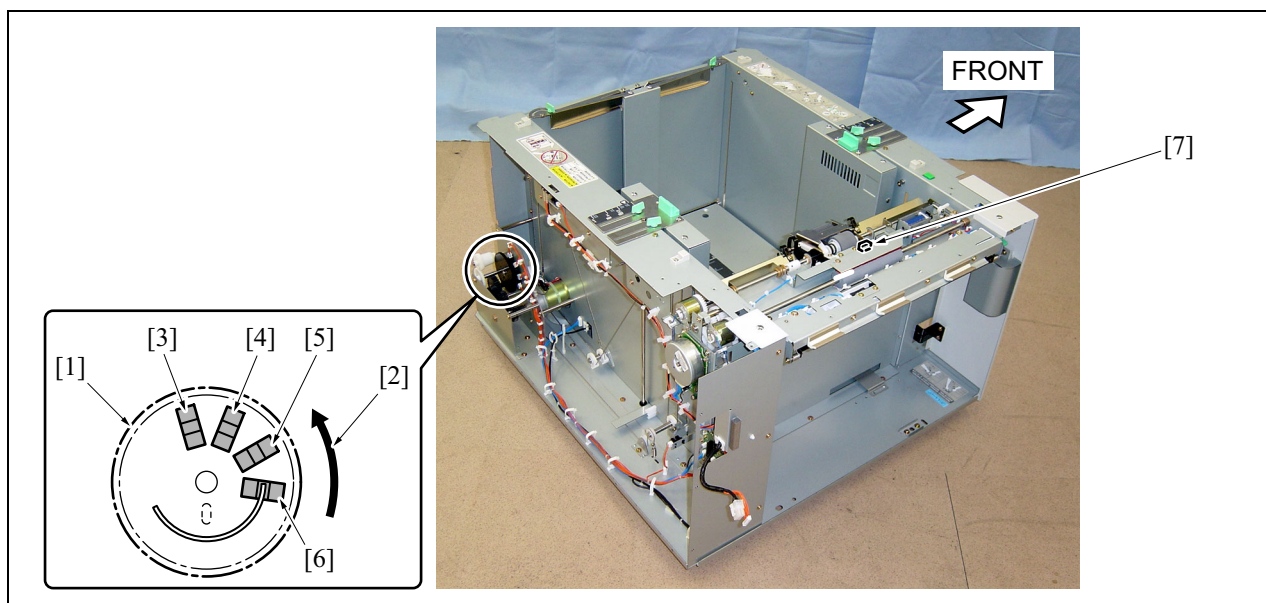
1.2.4 Mis-centring adjustment control

In combination with the paper feed sensor (PS107), the mis-centering sensor (PS120) detects the position of paper in conveyance. The image processing section uses this information for writing so that an original to be read comes at the same position as paper.

The contact-type sensor of PS120 detects the paper edge position along the main scan, and the PS107 detects the leading edge of paper to be used for correction along the sub-scan.

1.2.5 Remaining paper detection

Remaining paper is detected by the remaining paper sensors 1 to 4 (PS102 to PS105).



- | | |
|--|--------------------------------------|
| [1] Actuator | [5] Remaining paper sensor 3 (PS104) |
| [2] Direction of rotation while in tray up drive | [6] Remaining paper sensor 4 (PS105) |
| [3] Remaining paper sensor 1 (PS102) | [7] No paper sensor (PS108) |
| [4] Remaining paper sensor 2 (PS103) | |

As paper gets reduced, the up/down plate goes up little by little. The actuator at the rear rotates in interlock with this up drive.

The remaining paper is detected in eight steps in combination of the PS102 to the PS105 that are turned on and off by the actuator.

When the PS108 turns on, no-paper detection is made with a message shown on the display of the engine.

No. of sheets to be stacked (in 80g/m ² sheet)	PS102	PS103	PS104	PS105	Remaining paper indication on operation board
Less than 600 sheets					1 bar on the LCD
600 to 850 sheets	○				1 bar on the LCD
850 to 1100 sheets	○	○			2 bars on the LCD
1100 to 1400 sheets	○	○	○		2 bars on the LCD
1400 to 1700 sheets	○	○	○	○	3 bars on the LCD
1700 to 1950 sheets		○	○	○	3 bars on the LCD
1950 to 2250 sheets			○	○	4 bars on the LCD
More than 2250				○	4 bars on the LCD

○: Sensor on

- * The remaining paper indication on the operation board is made by 4 bars that turn on or flash. The number of sheets to be stacked varies depending on the thickness of paper.

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III DISASSEMBLY / ASSEMBLY

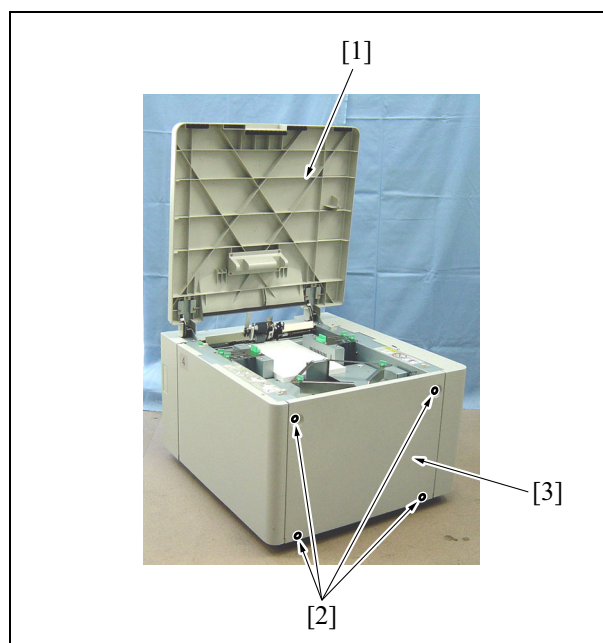
Caution:

- Make sure the power cord of the MFP is unplugged from the power outlet before disassembly or assembly.
-

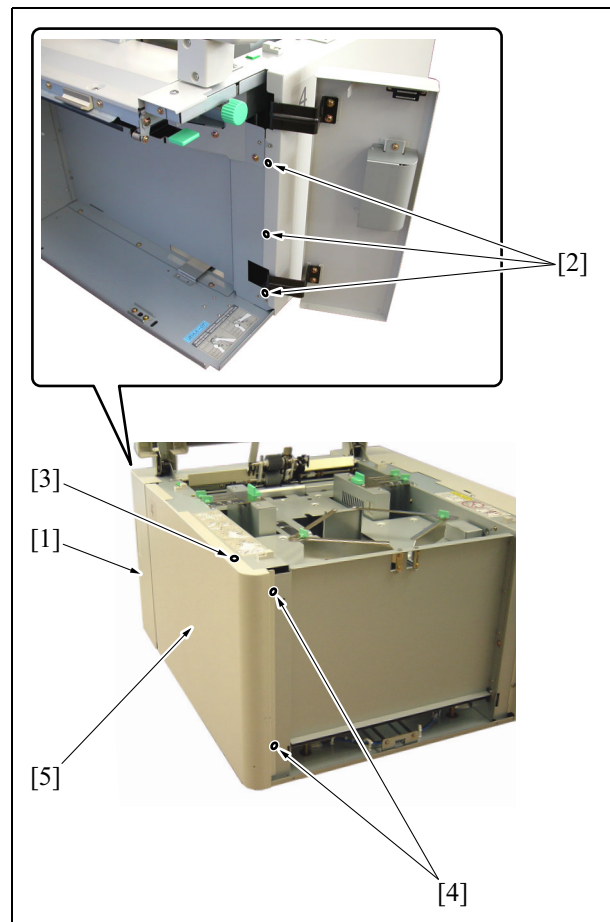
1. EXTERIOR

1.1 Removing and reinstalling the front cover

1. Remove the HCI from the engine.
2. Open the top cover [1], remove 4 screws [2] and then remove the right side cover [3].

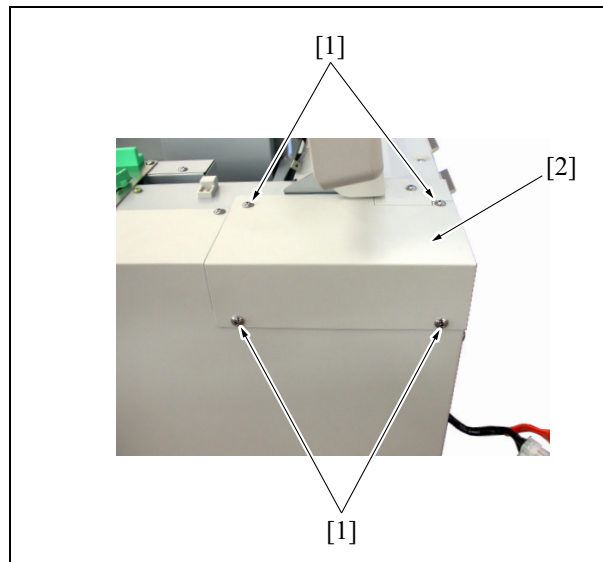


3. Open the front door [1] and remove 3 screws [2] provided on the side inside the door.
4. Remove a screw [3] on the upper face.
5. Remove 2 screws [4] on the right side and then remove the front cover [5].

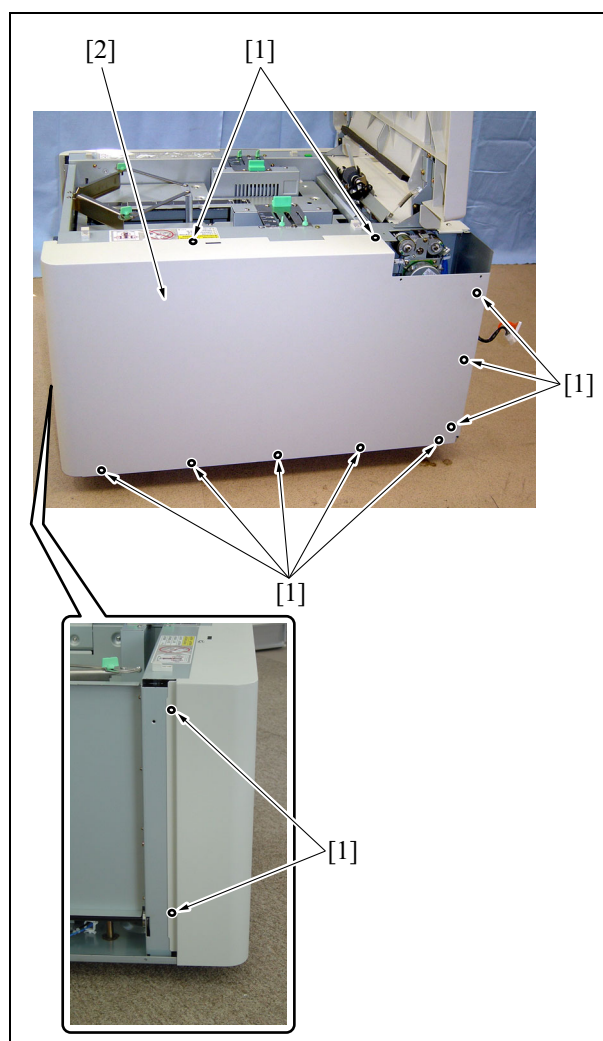


1.2 Removing and reinstalling the clutch replacement cover and the rear cover

1. Remove the right side cover.
2. Remove 4 screws [1] and then remove the clutch replacement cover [2].



3. Remove 12 screws [1] and then remove the rear cover [2].
4. Reinstall the above parts following the removal steps in reverse.

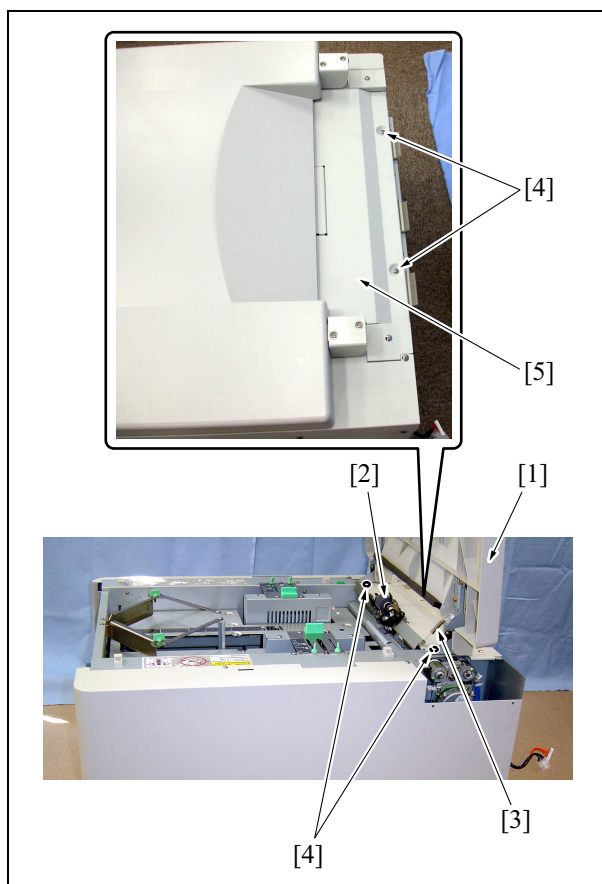


1.3 Removing and reinstalling the paper feed pick-up cover

1. Remove the HCI from the engine.
2. Open the top cover [1].
3. Remove the spring [3] from the paper feed unit [2].
4. Remove 4 springs [4].
5. Pull out the paper feed pick-up cover B [5] to the right side and remove it.
6. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to fit the spring that connects the top cover to the paper supply unit without fail.



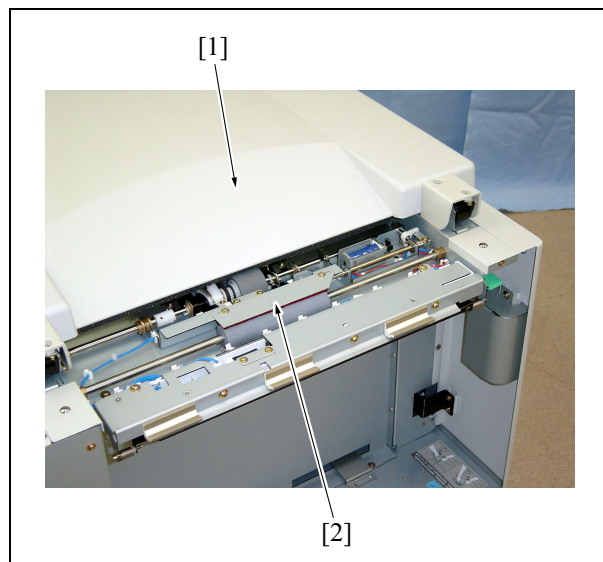
2. PAPER FEED

2.1 Cleaning the paper dust removing brush

1. Remove the HCI from the engine.
2. Remove the paper feed pick-up cover B.
3. Close the top cover [1].
4. Clean the paper dust removing brush [2] with the blower brush.
5. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to fit the spring that connects the top cover to the paper supply unit without fail.

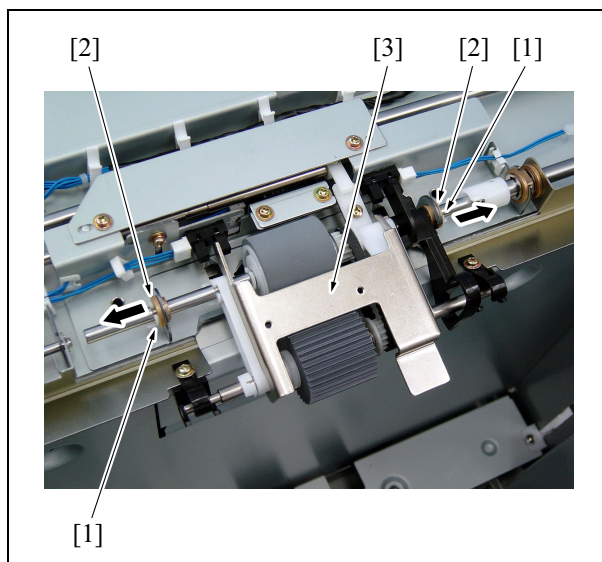


2.2 Removing and reinstalling the paper feed unit

1. Remove the HCI from the engine.
2. Remove the paper feed pick-up cover B.
3. Remove 2 stop rings [1].
4. Slide 2 bearings [2] to the outside and remove the paper feed unit [3].
5. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to fit the spring that connects the top cover to the paper supply unit without fail.



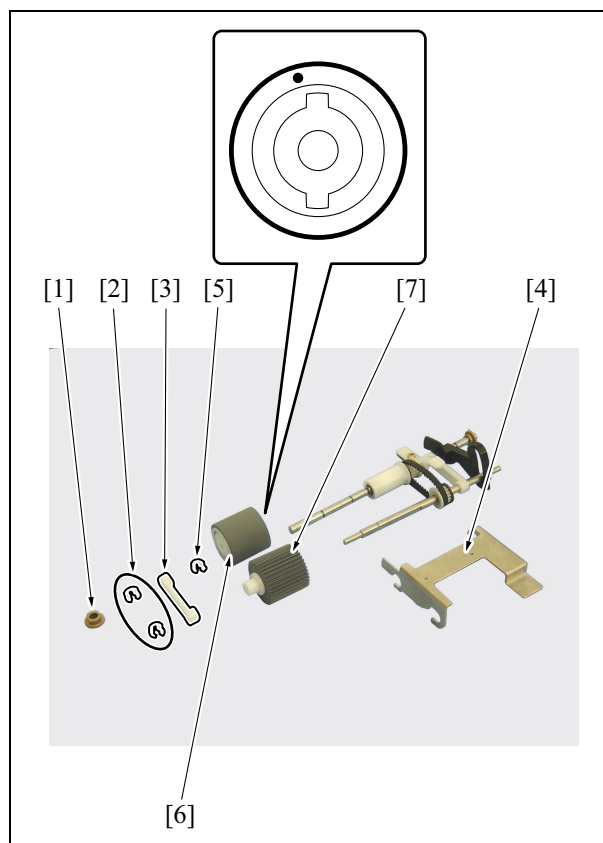
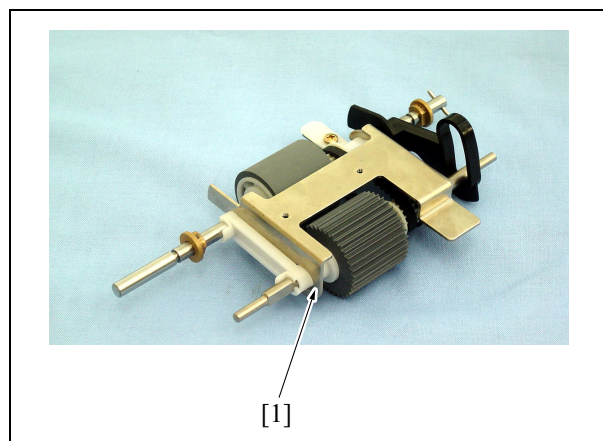
2.3 Replacing the paper feed roller and the feed roller

A. Periodically replaced parts/cycle

- Paper feed roller: Every 600,000 copies (Every 500,000 copies in actual replacement count)
- Feed roller: Every 600,000 copies (Every 500,000 copies in actual replacement count)

B. Procedure

1. Remove the HCI from the engine.
2. Remove the paper feed pick-up cover B.
3. Remove the paper feed unit [1].
4. Remove the bearing [1].
5. Remove 2 stop rings [2] and then remove the arm [3].
6. Remove the holder plate [4].
7. Remove a stop ring [5].
8. Remove the feed roller [6] and replace it with a new one.
9. Remove the paper feed roller [7] and replace it with a new one.
10. Reinstall the above parts following the removal steps in reverse.



2.4 Replacing the double feed prevention roller

A. Periodically replaced parts/cycle

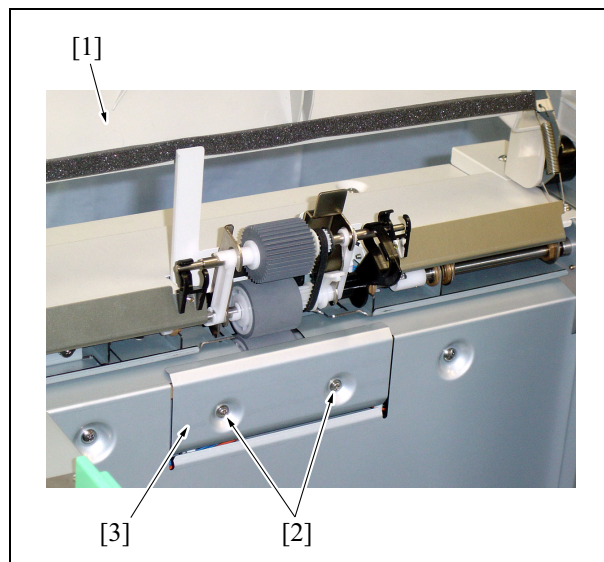
- Double feed prevention roller: Every 600,000 copies (Every 500,000 copies in actual replacement count)

B. Procedure

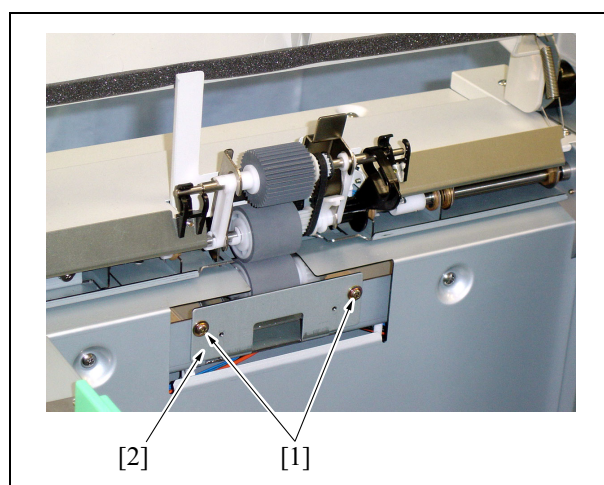
Note:

- Be sure to lower the up/down plate to its lower most position in advance by pressing the tray down switch (SW100) with electricity supplied.

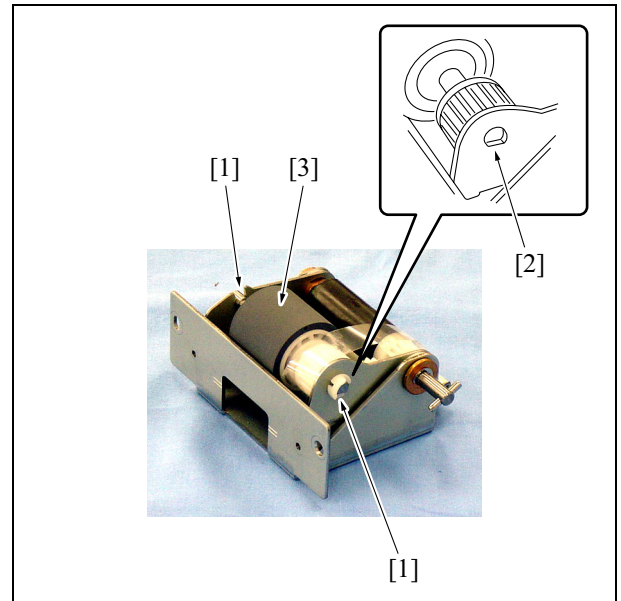
1. Remove the HCI from the engine.
2. Open the top cover [1].
3. Remove 2 screws [2] and then remove the protective cover [3].



4. Remove 2 screws [1] and then remove the double feed prevention unit [2].



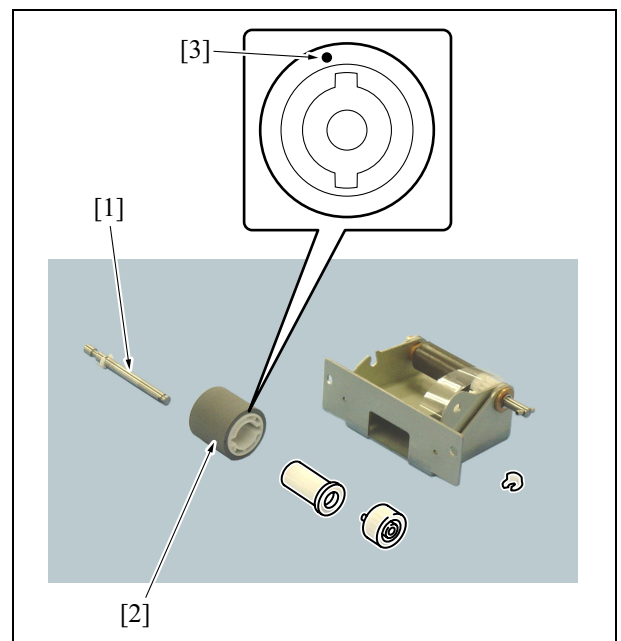
5. Remove 2 stop rings [1].
6. With the "D" cuts [2] of the shaft and the fixture attached together, remove the double feed prevention roller [3].



7. Remove the double feed prevention roller rubber [2] from the shaft [1] and replace it with a new one.
8. Reinstall the above parts following the removal steps in reverse.

Note:

- Be sure to install the double feed prevention roller rubber [2] so that the paint mark [3] turns in the arrow-marked direction.
- Be sure to check to see if the PET sheet for the drive gear cover is not damaged.
- Be sure to check that the double feed prevention roller is not smeared with grease.



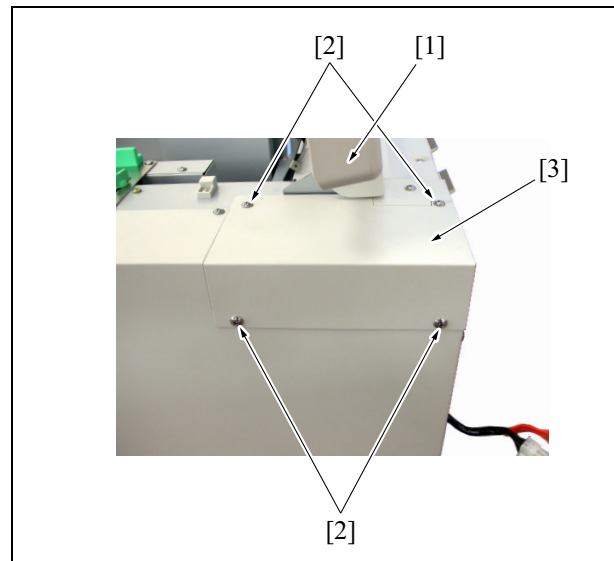
2.5 Replacing the paper feed clutch and the pre-registration clutch

A. Periodically replaced parts/cycle

- Paper feed clutch (MC101): Every 2,500,000 copies (Every 2,000,000 copies in actual replacement count)
- Pre-registration clutch (MC102): Every 2,500,000 copies (Every 2,000,000 copies in actual replacement count)

B. Procedure

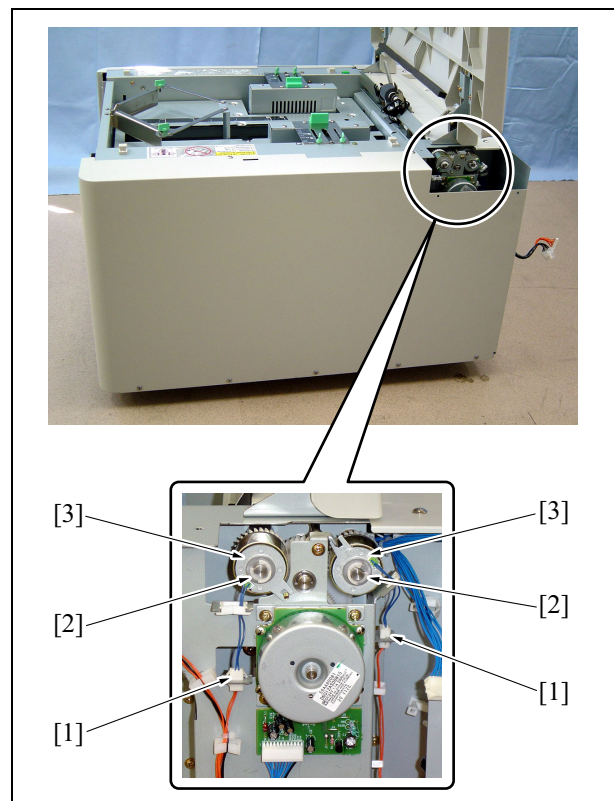
1. Remove the HCI from the engine.
2. Open the top cover [1].
3. Remove 4 screws [2] and then remove the clutch replacement cover [3].



4. Remove 2 relay connectors [1].
5. Remove 2 stop rings [2].
6. Remove 2 clutches [3] and replace them with new ones.
7. Reinstall the above parts following the removal steps in reverse.

Note:

- When reinstalling them, be sure to check that a stopper for each clutch is in its specified position.



3. TRAY UP/DOWN

3.1 Removing and reinstalling the rear drive

A. Removing the cover

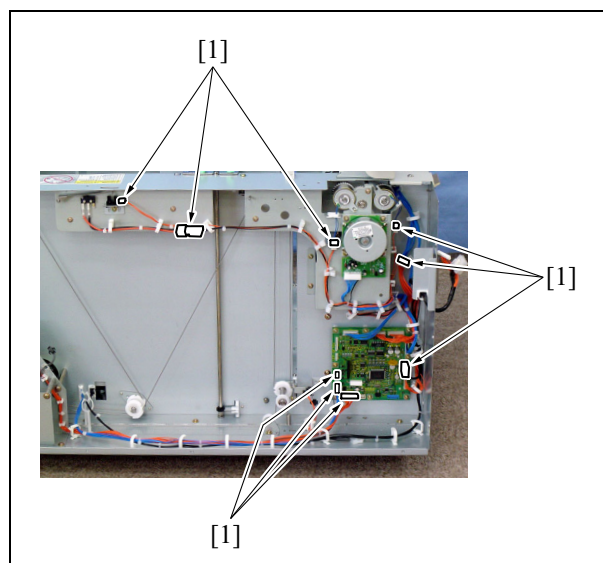
Note:

- Be sure to lower the up/down plate to its lower most position in advance by pressing the tray down switch (SW100) with electricity supplied.

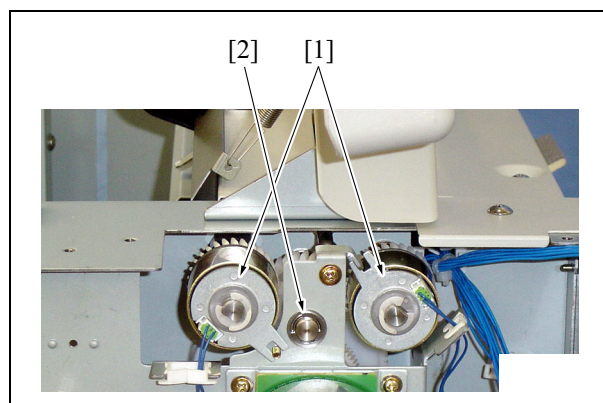
1. Remove the HCI from the engine.
2. Remove the right side cover and the front cover.
3. Remove the clutch replacement cover and the rear cover.

B. Removing the paper feed drive

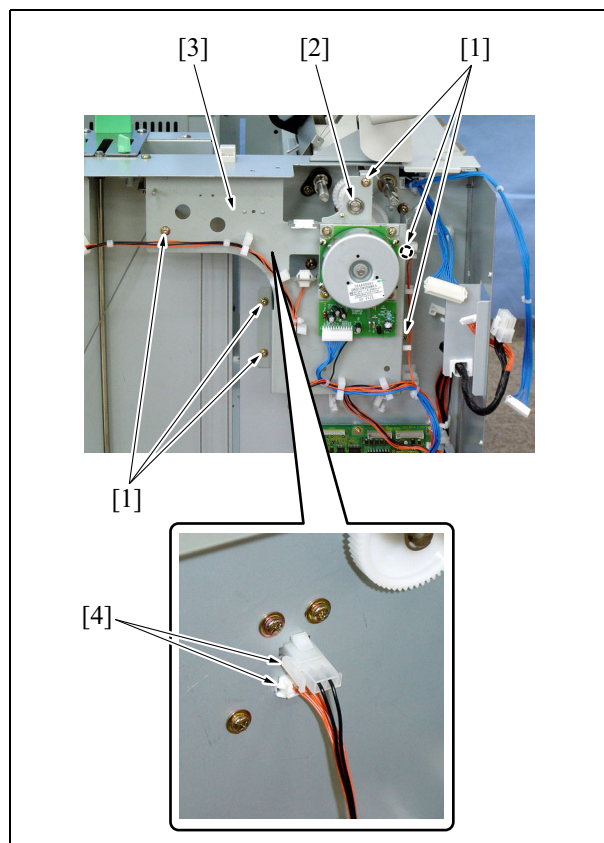
1. Remove 9 connectors [1] provided on the rear left side.



2. Remove the paper feed clutch (MC101) and the pre-registration clutch (MC102) [1]. See ("2.5 Replacing the paper feed clutch and the pre-registration clutch").
3. Remove an E-ring [2].

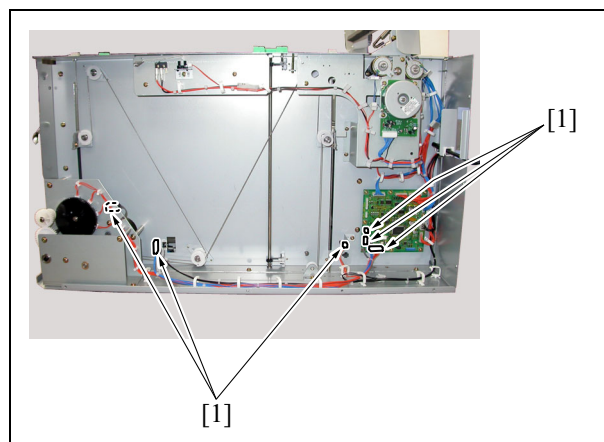


4. Remove 6 screws [1], remove then a bearing [2] and the HCI drive unit [3].
5. Remove 2 connectors [4] provided on the back of the HCI drive unit [3] and then remove the HCI drive unit [3].

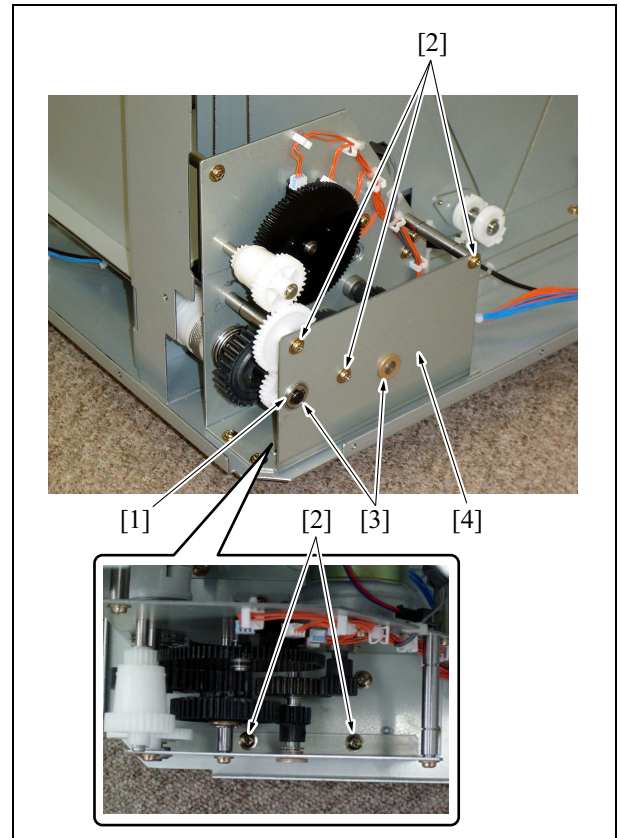


C. Removing the up/down drive

1. Remove 6 connectors [1] provided on the lower back side.



2. Remove an E-ring [1].
3. Remove 5 screws [2].
4. Remove 2 bearing [3] and then remove the guide plate [4].

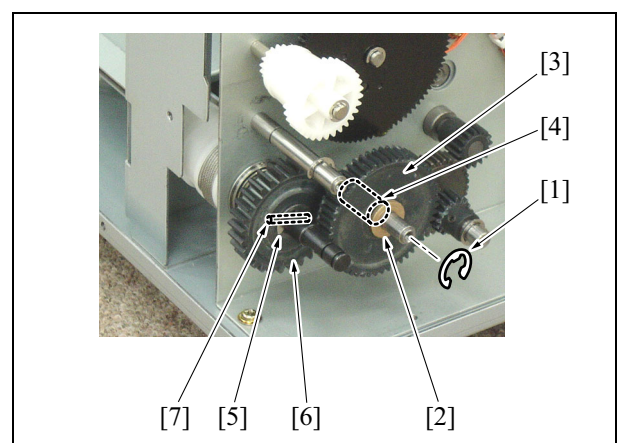
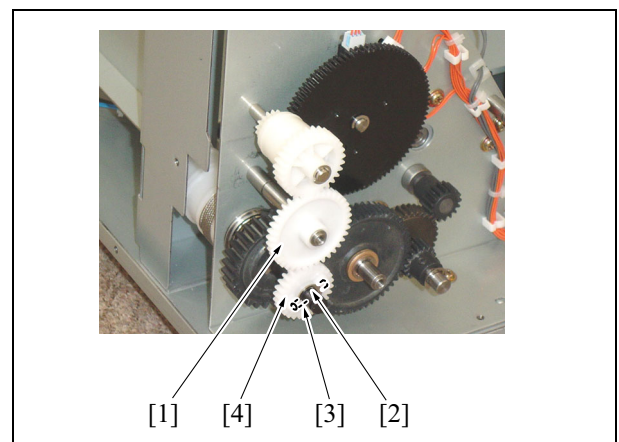


5. Remove the gear [1].

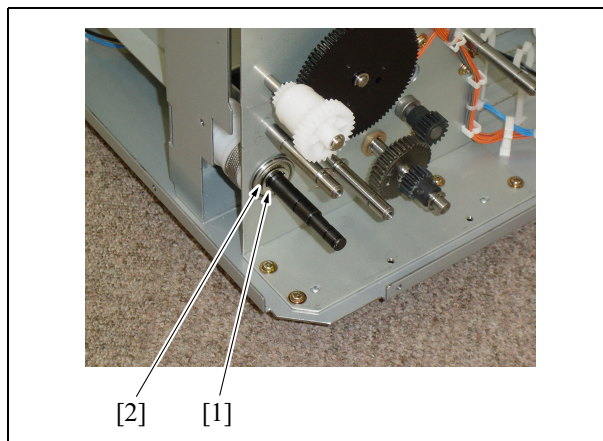
Note:

- When reinstalling this gear, be sure to make the positioning adjustments of the remaining paper detection gear at this step. For positioning adjustments, see "D. Reinstalling the rear drive."

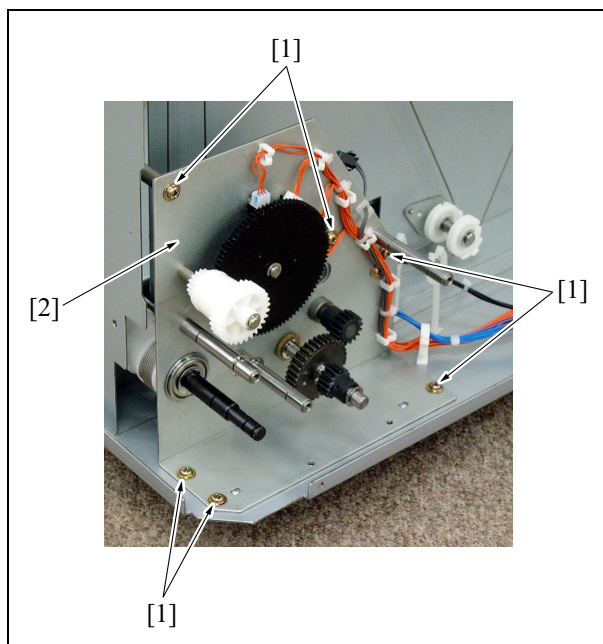
6. Remove an E-ring [2] and a pin [3] and then remove the gear [4].
7. Remove an E-ring [1], and then remove a bearing [2], the gear [3] and a bearing [4].
8. Remove an E-ring [5] and then remove the gear [6] and a pin [7].



9. Remove an E-ring [1] and then remove a bearing [2].



10. Remove 6 screws [1] and then remove the up/down motor unit [2].

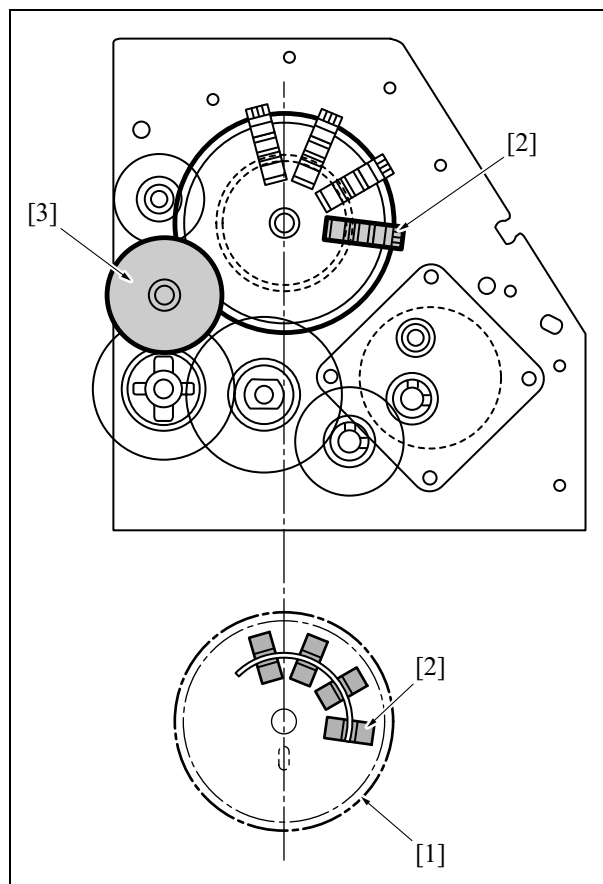


D. Reinstalling the rear drive

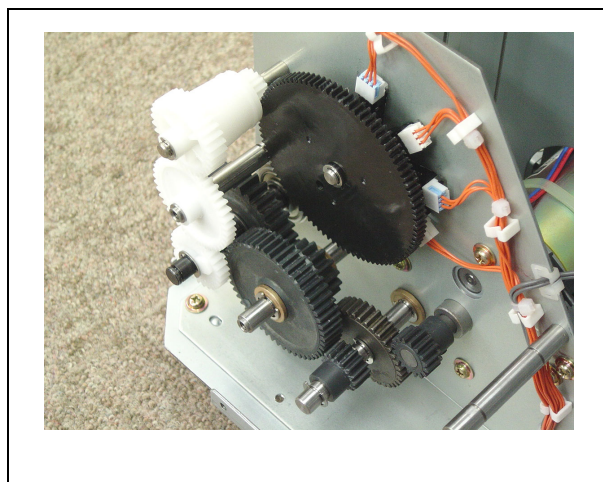
Note:

- Reinstall the rear drive following the removal steps in reverse, but be sure to make positioning adjustments of the remaining paper detection gear at "C. Removing the up/down drive."

1. Conduct in reverse the steps 10 to 6 of "C. Removing the up/down drive."
2. With the up/down plate at its lower most position, stop the actuator of the remaining paper detection gear [1] at the position where it detects the remaining paper sensor 4 (PS105) [2] and install the gear [3].



3. Conduct in reverse the steps 1 of "C. Removing the up/down drive."



3.2 Removing and reinstalling the up / down wire

A. Wire length:

- Up/down wire A: 1450mm (4 wires)
- Assist wire C: 1240mm
- Assist wire D: 820mm

B. Removing the wire

Note:

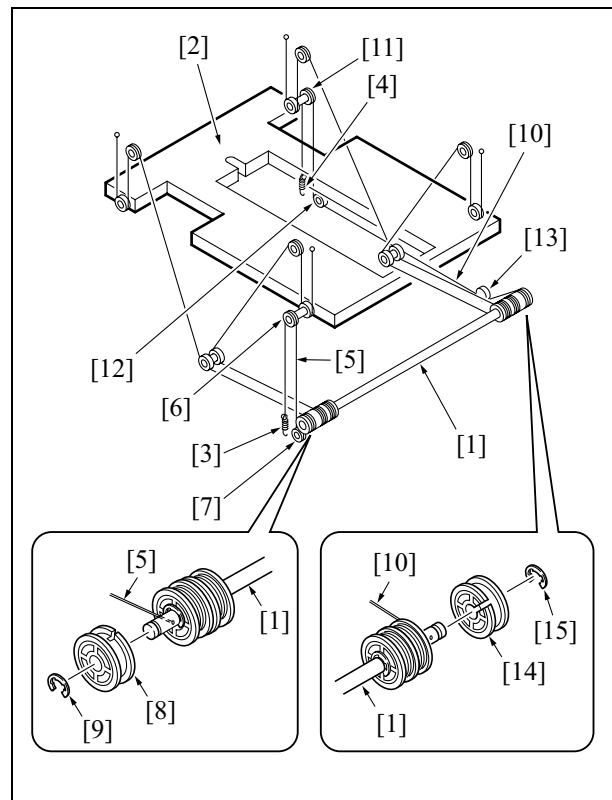
- **Be sure to lower the up/down plate to its lower most position in advance by pressing the tray down switch (SW100) with electricity supplied.**

1. Remove the HCl from the engine.
2. Remove the right side cover, front cover, clutch replacement cover, and the rear cover.
3. Remove the rear drive.
4. Rotate the up/down drive shaft [1] clockwise as seen from the rear side to lift the up/down plate [2] up to its upper most position.

Note:

- **When the springs [3] and [4] are removed in the succeeding steps, the up/down plate [2] comes down. For this reason, be sure to support the up/down plate [2] by hands. (This work requires two persons.)**

5. Remove the spring [3] and then remove the assist wire C [5] from the guide pulleys [6] and [7].
6. After releasing the winding of the assist wire C [5] around the drive pulley [8], remove the E-ring [9] and then remove the drive pulley [8].
7. Remove the assist wire C [5] from the up/down drive shaft [1].
8. Remove the spring [4] and then remove the assist wire D [10] from the guide pulleys [11], [12] and [13].
9. After releasing the winding of the assist wire D [10] around the drive pulley [14], remove the E-ring [15] and then remove the drive pulley [14].
10. Remove the assist wire D [10] from the up/down drive shaft [1].
11. Bring down the up/down plate [2].

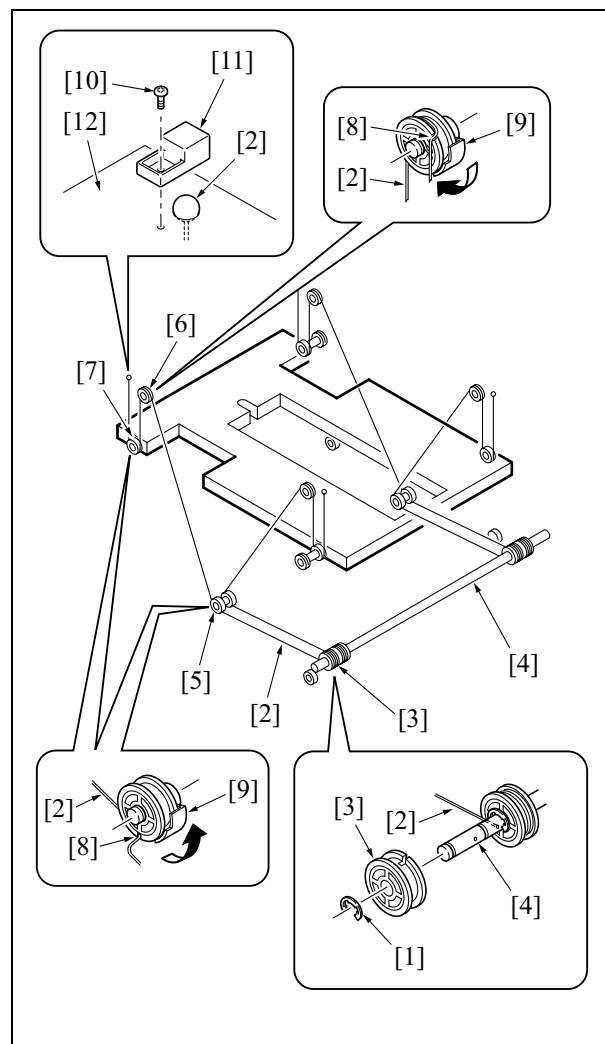


12. Remove the E-ring [1] and then remove the drive pulley [3] while releasing the winding of the up/down wire /A [2].
13. Remove the up/down wire A [2] from the up/down drive shaft [4].
14. Remove the up/down wire A [2] from the guide pulleys [5], [6] and [7].

Note:

- When removing the up/down wire A [2] installed onto the guide pulleys [5], [6] and [7], be sure to pull out the wire from a notch [8] provided on the side of each pulley to move the wire cover [9] of each pulley to the location where the notch [8] can be avoided.

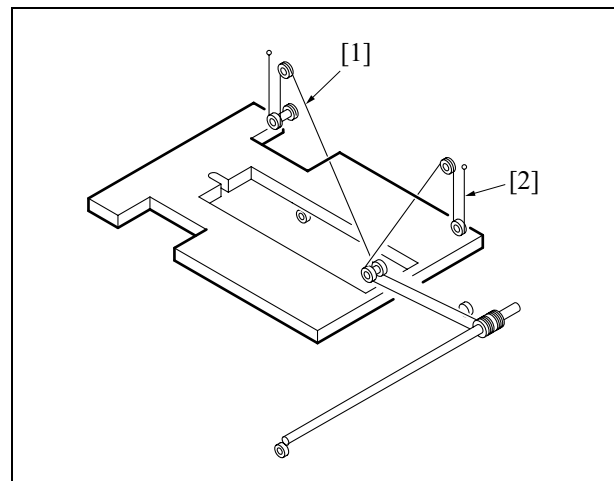
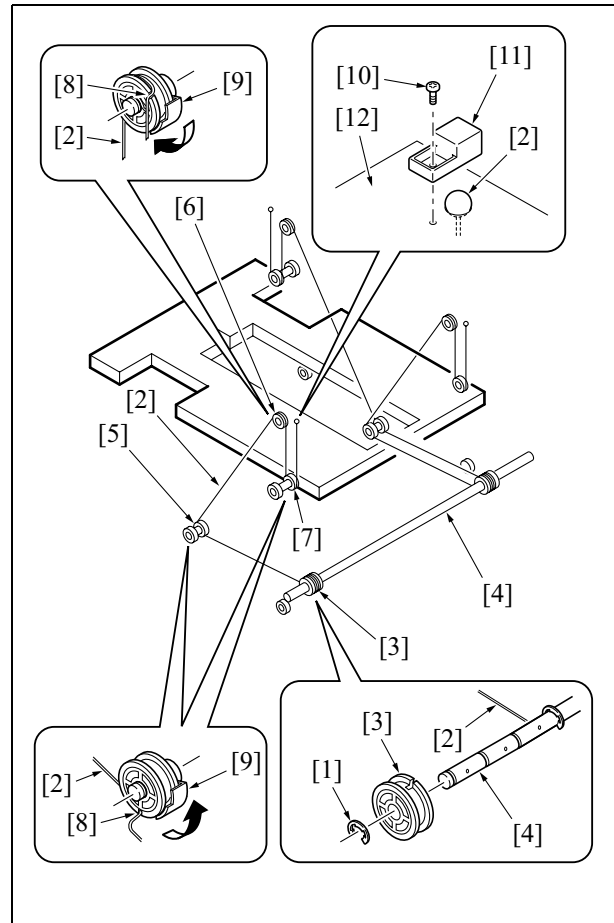
15. Remove a screw [10] and then remove the up/down wire protective cover [11].
16. Pull out the up/down wire A [2] from the upper surface [12] of the HCl engine to remove it.



17. Remove the E-ring [1] and then remove the drive pulley [3] while releasing the winding of the up/down wire /A [2].
18. Remove the up/down wire /A [2] from the up/down drive shaft [4].
19. Remove the up/down wire /A [2] from the guide pulleys [5], [6] and [7].

Note:

- When removing the up/down wire A [2] installed onto the guide pulleys [5], [6] and [7], be sure to pull out the wire from a notch [8] provided on the side of each pulley to move the wire cover [9] of each pulley to the location where the notch [8] can be avoided.
20. Remove a screw [10] and then remove the up/down wire protective cover [11].
 21. Pull out the up/down wire A [2] from the upper surface [12] of the HCI engine to remove it.
22. In the same manner as Steps 12 to 16, remove the up/down wire A [1] on the rear side.
 23. In the same manner as Steps 17 to 21, remove the up/down wire A [2] on the rear side.



C. Reinstalling the wire

1. Insert the up/down wire A [2] into the hole [1] provided on the upper surface of the HCI main body.
2. Reinstall the up/down wire A [2] onto the guide pulleys [3], [4] and [5] in this order.

Note:

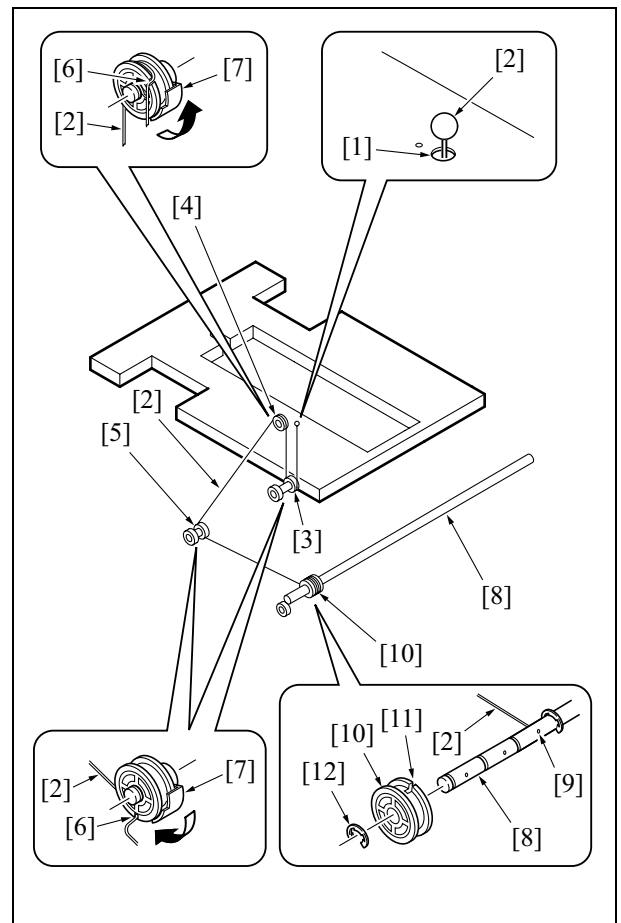
- When reinstalling the up/down wire A [2] onto the guide pulleys [3], [4] and [5], be sure to insert the wire into the pulley through the notch [6] provided on the side of each pulley and then move the wire cover [7] of each pulley to the wire that has been already inserted. When moving the wire cover [7], move it first to the position where the notch [6] can be avoided and then move the wire in the notch [6] into each pulley.

3. Insert the up/down wire A [2] into the wire installation hole [9] provided inside the up/down drive shaft [8].

Note:

- The up/down drive shaft [8] is provided with 3 wire installation holes each on the front side and the rear side. In this step, the inner-most wire installation hole is used.

4. Insert the drive pulley [10] into the up/down drive shaft [8] so that the notch [11] of the drive pulley [10] comes to the position in which the up/down wire A [2] is put.
5. Fit the E-ring [12] and fasten the drive pulley [10].



6. Insert the up/down wire A [2] into the hole [1] provided on the upper surface of the HCI main body.
7. Reinstall the up/down wire A [2] onto the guide pulleys [3], [4] and [5] in this order.

Note:

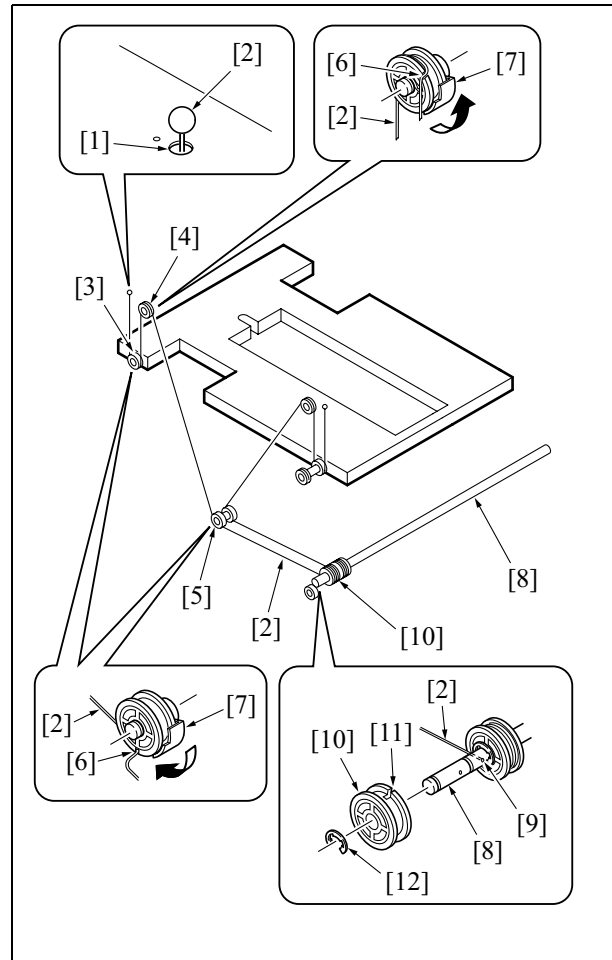
- When reinstalling the up/down wire A [2] onto the guide pulleys [3], [4] and [5], be sure to insert the wire into the pulley through the notch [6] provided on the side of each pulley and then move the wire cover [7] of each pulley to the wire that has been already inserted. When moving the wire cover [7], move it first to the position where the notch [6] can be avoided and then move the wire in the notch [6] into each pulley.

8. Insert the up/down wire A [2] into the wire installation hole [9] provided at the middle of the up/down drive shaft [8].

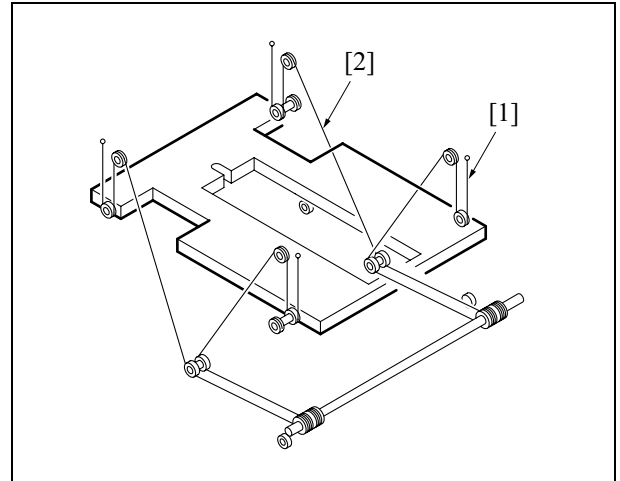
Note:

- The up/down drive shaft [8] is provided with 3 wire installation holes each on the front side and the rear side. In this step, the wire installation hole at the middle is to be used. Since the inner-most wire installation hole has been already used, however, only two wire installation holes can be confirmed for this steps. As a result, the one near to the drive pulley that has been already installed is the wire installation hole [9] at the middle.

9. Insert the drive pulley [10] into the up/down pulley shaft [8] so that the notch [11] of the drive pulley [10] comes to the position into which the up/down wire A [2] is put.
10. Fit the E-ring [12] to fasten the drive pulley [10].



11. In the same manner as Steps 1 to 5, reinstall the up/down wire A [1] on the rear side.
12. In the same manner as Steps 17 to 21, reinstall the up/down wire A [2] on the rear side.



13. Rotate the up/down drive shaft [1] clockwise as seen from the rear side to lift the up/down plate [2] up to its upper most position.

Note:

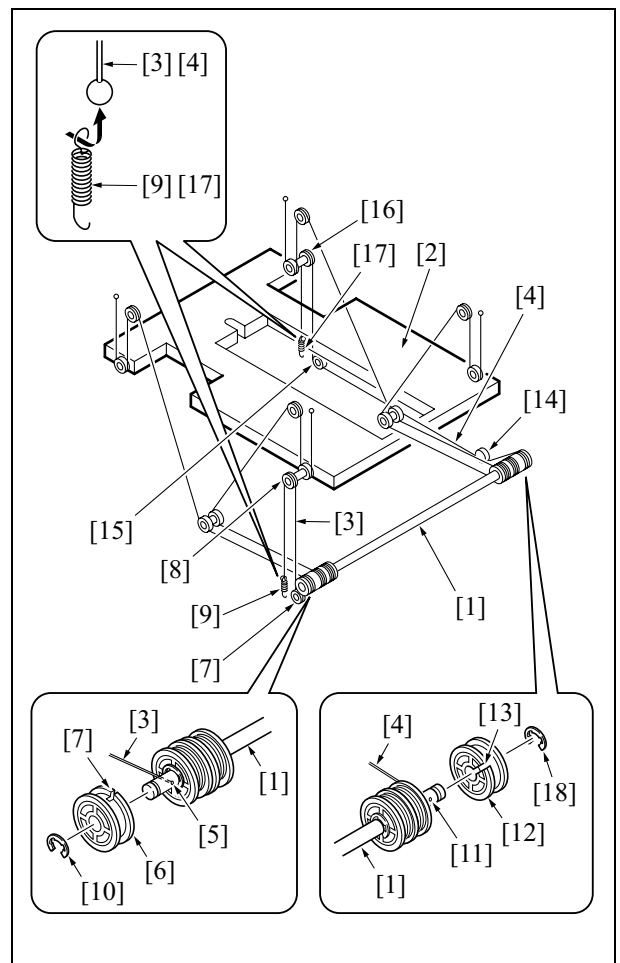
- Be sure to wind up the up/down wire A form inside to outside in each drive pulley.
- The up/down plate [2] comes down by its own weight if the installation of the assist wire C [3] and the assist wire D [4] have not been completed. For this reason, be sure to support the up/down plate [2] by hands until the installation of Step 23 is completed. (This work requires two persons.)

14. Insert the assist wire C [3] into the wire installation hole [5] provided outside the up/down drive shaft [1].

Note:

- The up/down drive shaft [1] is provided with 3 wire installation holes each on the front side and the rear side. However, since the wire installation holes on the inside and at the middle have been already used, only the wire installation hole on the outside can be confirmed for this steps.

15. Insert the drive pulley [6] into the up/down drive shaft [1] so that the notch [7] of the drive pulley [6] comes to the position into which the assist wire C [3] is put.



16. Wind the assist wire C [3] around the drive pulley [6] one turn counterclockwise as seen from the front side.

Note:

- Be sure to wind the assist wire C [3] from inside to outside in the drive pulley [6].

17. Reinstall the assist wire C [3] onto the guide pulleys [7] and [8] in this order and then fasten them with the springs [9].

Note:

- Be sure to take note of the direction of the spring [9] when reinstalling it.

18. Fit the E-ring [10] to fasten the drive pulley [6].

19. Insert the assist wire D [4] into the wire installation hole [11] provided outside the up/down drive shaft [1].

20. Insert the drive pulley [12] into the up/down drive pulley [1] so that the notch [13] of the drive pulley [12] comes to the position into which the assist wire D [4] is put.

21. Wind the assist wire D [4] around the drive pulley [12] one turn clockwise as seen from the rear side.

Note:

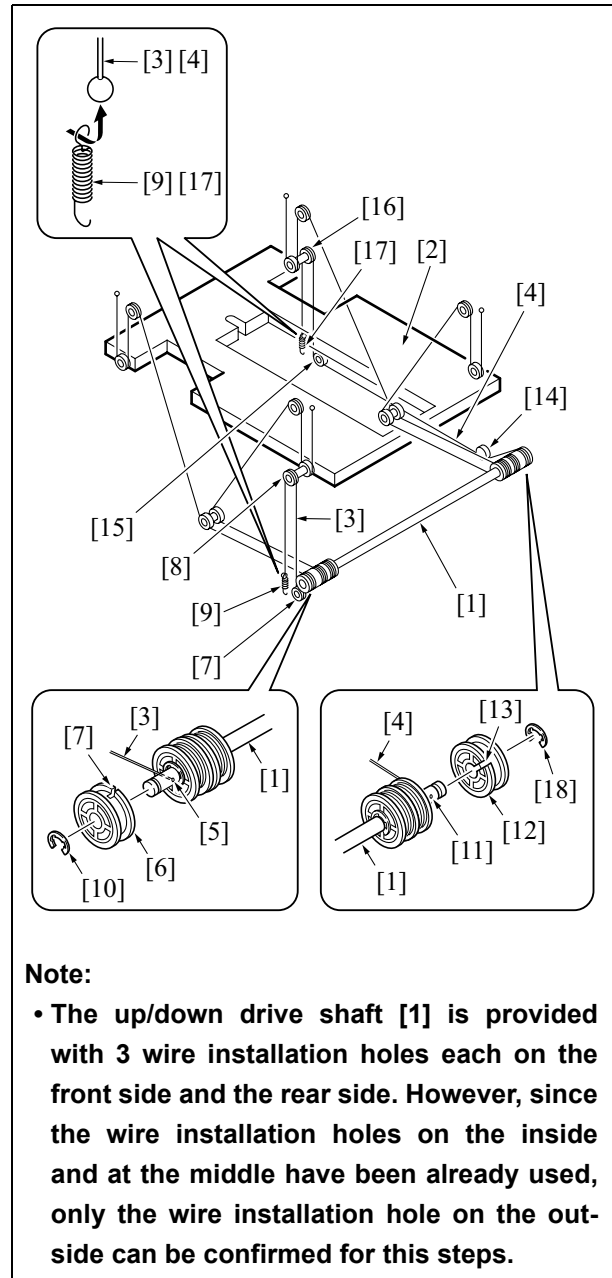
- Be sure to wind the assist wire D [4] from inside to outside in the drive pulley [12].

22. Reinstall the assist wire D [4] onto the guide pulleys [14], [15] and [16] in this order and then fasten them with the spring [17].

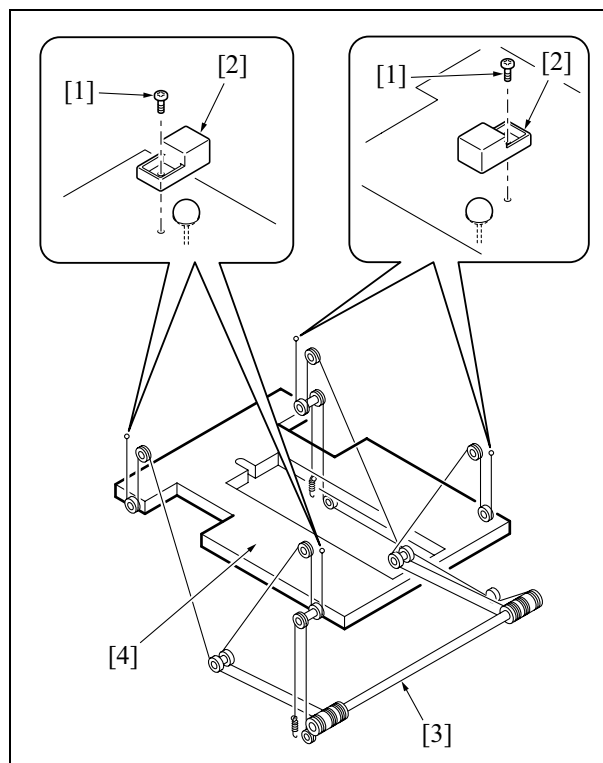
Note:

- Be sure to take note of the direction of the spring [17] when reinstalling it.

23. Fit the E-ring [18] to fasten the drive pulley [12].



24. Reinstall 4 up/down wire protective covers [2] with a screw [1] for each.
25. Rotate the up/down drive shaft [3] counterclockwise as seen from the rear side to bring down the up/down plate [4].
26. Reinstall the rear drive.
27. Reinstall the rear cover, clutch replacement cover, front cover and the right side cover.



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Q3636A

Post Insertion Kit

SERVICE MANUAL

Contents

1 Post insertion overview

Post insertion kit (Q3636A) product specifications	2
Type	2
Functions	2
Copy paper	2
Power, weight, dimensions	2
Maintenance	3
Operating environment	3
Center cross section	3
Drive system diagram	4
Feeding process	5
Automatic sheet feeding (online operation)	5
Manual sheet feeding (offline operation)	5

2 Post insertion unit explanation

External section	8
Mechanisms	8
Interlock control	8
Paper feed unit	9
Composition	9
Mechanisms	9
Feed control	10

3 Post insertion disassembly/assembly

External section	18
Removing/reinstalling the external covers	18
Paper feed unit	19
Replacing the paper pick roller and pick roller	19
Replacing the double feed prevent roller and torque limiter	20

Index

1

Post insertion overview

Post insertion kit (Q3636A) product specifications	2
Type	2
Functions	2
Copy paper	2
Power, weight, dimensions	2
Maintenance	3
Operating environment	3
Center cross section	3
Drive system diagram	4
Feeding process	5
Automatic sheet feeding (online operation)	5
Manual sheet feeding (offline operation)	5

Post insertion kit (Q3636A) product specifications

Type

Sheet feeder employing torque-limiter separation

Functions

Automatic sheet feed (online operation)

The Q3636A automatically feeds sheets into the finisher in accordance with instructions from the MFP.

Manual sheet feed (offline operation)

User feeds sheets into finisher by operating the PI control panel.

User can select from the following four finishing modes

Single-staple mode (staple at rear)

Two-staple mode (flat stapling)

Punch mode (with punch kit)

Staple-and-fold mode (available only if mounted to the Q3634A)

Tri-fold mode (available only if mounted to the Q3634A)

Manual sheet feed is only available with the lower tray.

This is not allowed for wide papers.

Copy paper

Plain paper

60 to 90 g/m² or 17 lb to 24 lb high-quality paper, recycled paper

Special paper

- 50 to 59 g/m² or 13 lb to 16 lb high-quality paper, recycled paper
- 91 to 200 g/m² or 24 lb to 45 lb high-quality paper, recycled paper

Printing paper

- Double-sided art paper
- Mat coating paper
- High-quality paper

Upper tray copy sizes

- Metric area
A4, A4R, B5, B5R, A5
- Inch area
Letter, Letter R, 5.5 by 8.5

Lower tray copy sizes

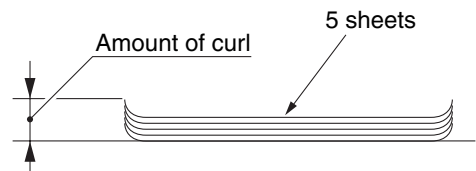
- Metric area
A3, B4, A4, A4R, B5, B5R, A5, F4 wide paper (314 mm by 445 mm maximum)
- Inch area
Ledger, 8.5 by 14, Letter, Letter R, 5.5 by 8.5, wide paper (314 mm by 445 mm maximum.)

Paper staking capacity

Up to 200 sheets (when using 128 g/m² or 28 lb-equivalent paper) to maximum. height of 30 mm

Paper curling

Maximum 10 mm



Power, weight, dimensions

Power source

24 VDC, 5 VDC (supplied from finisher)

Maximum power

30 VA

Weight

Maximum 10.5 kg

External dimensions

Approximately 511 mm (W) by 620 mm (D) by 220 mm (H)

Maintenance

Maintenance

Same as the MFP

Service life

Same as the MFP

Operating environment

Temperature

10° C to 30° C (50° F to 86° F)

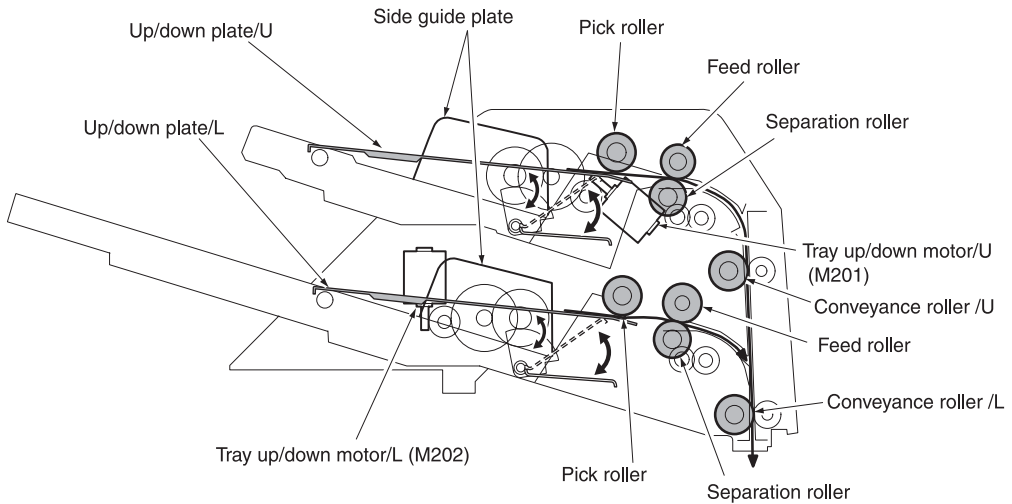
Humidity

10 percent to 80 percent RH

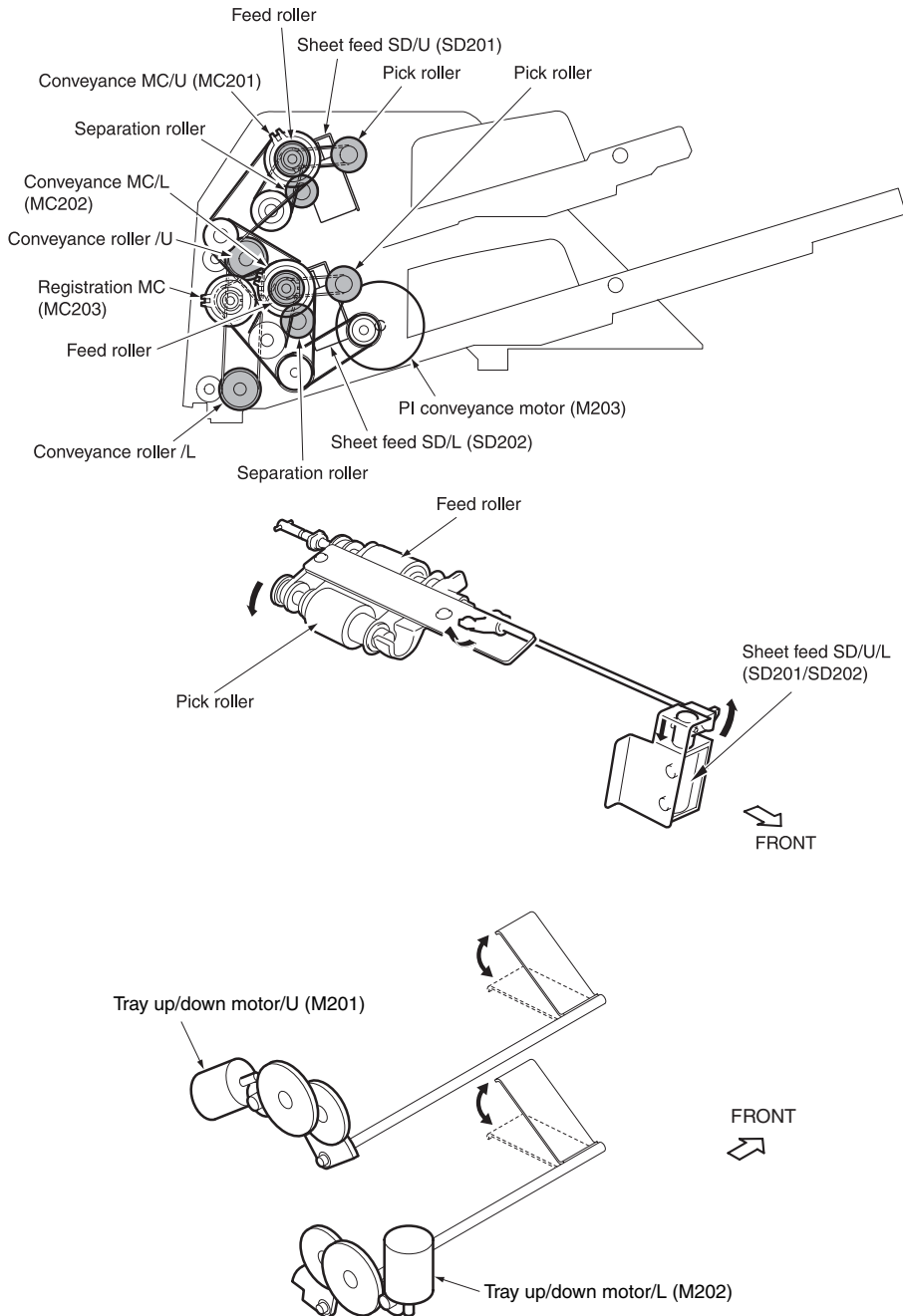
Note

The information herein may be subject to change for improvement without notice.

Center cross section



Drive system diagram



Feeding process

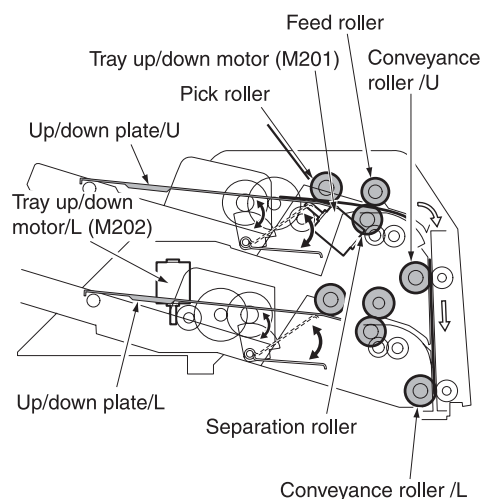
Automatic sheet feeding (online operation)

Tray up/down motors/U/L (M201/M202) raise the Up/down plate/U/L.

When sheet feed SD/U/L (SD201/SD202) and conveyance MC/U/L (MC201/MC202) come on, the drive of PI conveyance motor (M203) is transmitted and the sheets are fed, one by one, by pick, feed, and separation rollers.

For the fed sheet, a loop is formed at the conveyance rollers /U/L to correct the bend temporarily, and then the sheet is conveyed.

Sheets are stacked in the finisher as cover sheets for papers conveyed from the MFP, and then applied with finishing processes.

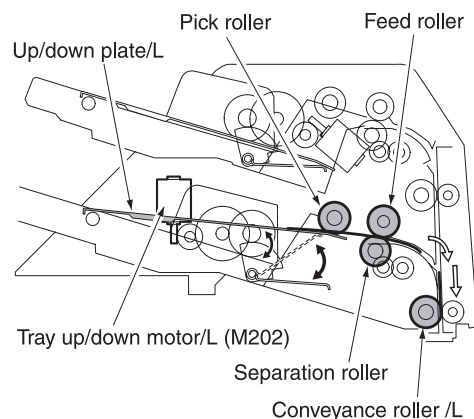


Manual sheet feeding (offline operation)

M201/M202 (tray up/down/U/L) raises the Up/down plate/L.

When sheet feed SD/U/L (SD201/SD202) and conveyance MC/U/L (MC201/MC202) come on, the drive of PI conveyance motor (M203) is transmitted and all sheets set on the lower tray are fed into the finisher stacker by pick, feed, and separation rollers. finisher carries out finishing processes.

In this case, a loop is formed at the conveyance roller /L for the sheet, the bend is corrected temporarily, and then the sheet is conveyed.

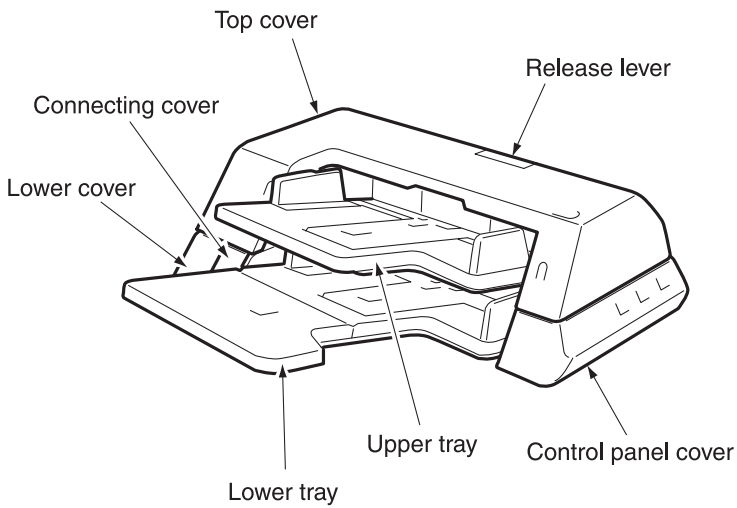


2 Post insertion unit explanation

External section	8
Mechanisms	8
Interlock control	8
Paper feed unit	9
Composition	9
Mechanisms	9
Feed control	10

External section

Composition



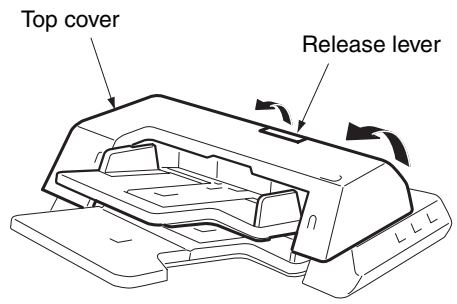
Mechanisms

Mechanism	Method
Clearing paper jams*1	Release lever

*1 Clearing paper jams

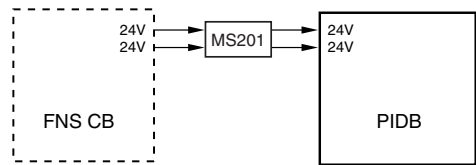
Clear paper jams with the following procedure:

- 1 Lift the release lever.
- 2 In that status, lift up the upper tray in a slanting direction.



3 Remove paper jams.

Interlock control



Interlock control uses MS201 (PI interlock MS) that detects the opened upper tray.

1 Operation

a Detecting the opened upper tray

MS201 (PI interlock) is a switch for the interlock.

When opening the upper tray of PI, MS201 goes off and 24V power from finisher CB is shut off.

2 Signals

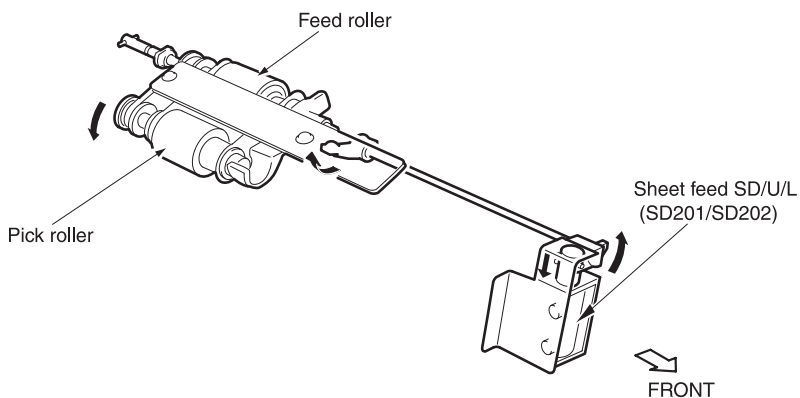
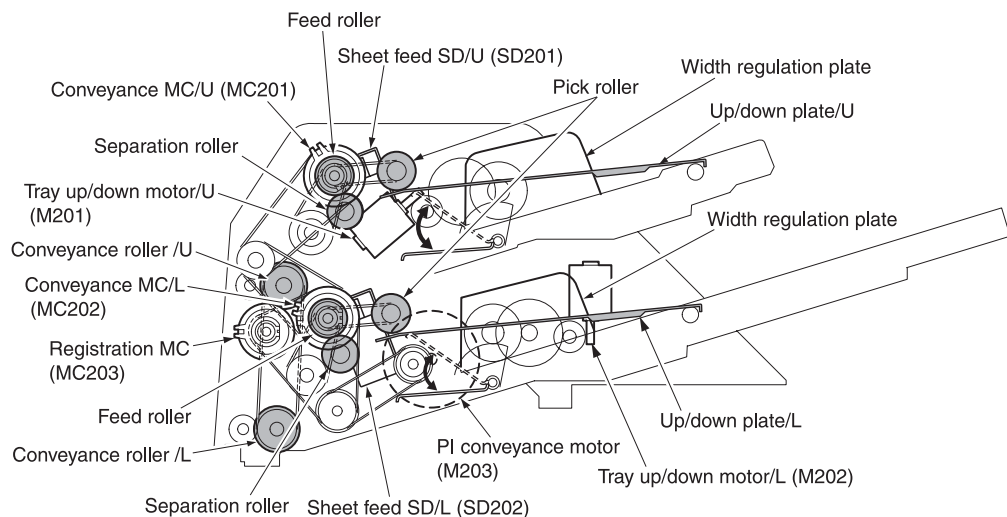
a Input signals

- 1 24V, 24V (finisher CB to PIDB)

Input from a DC24V power source

Paper feed unit

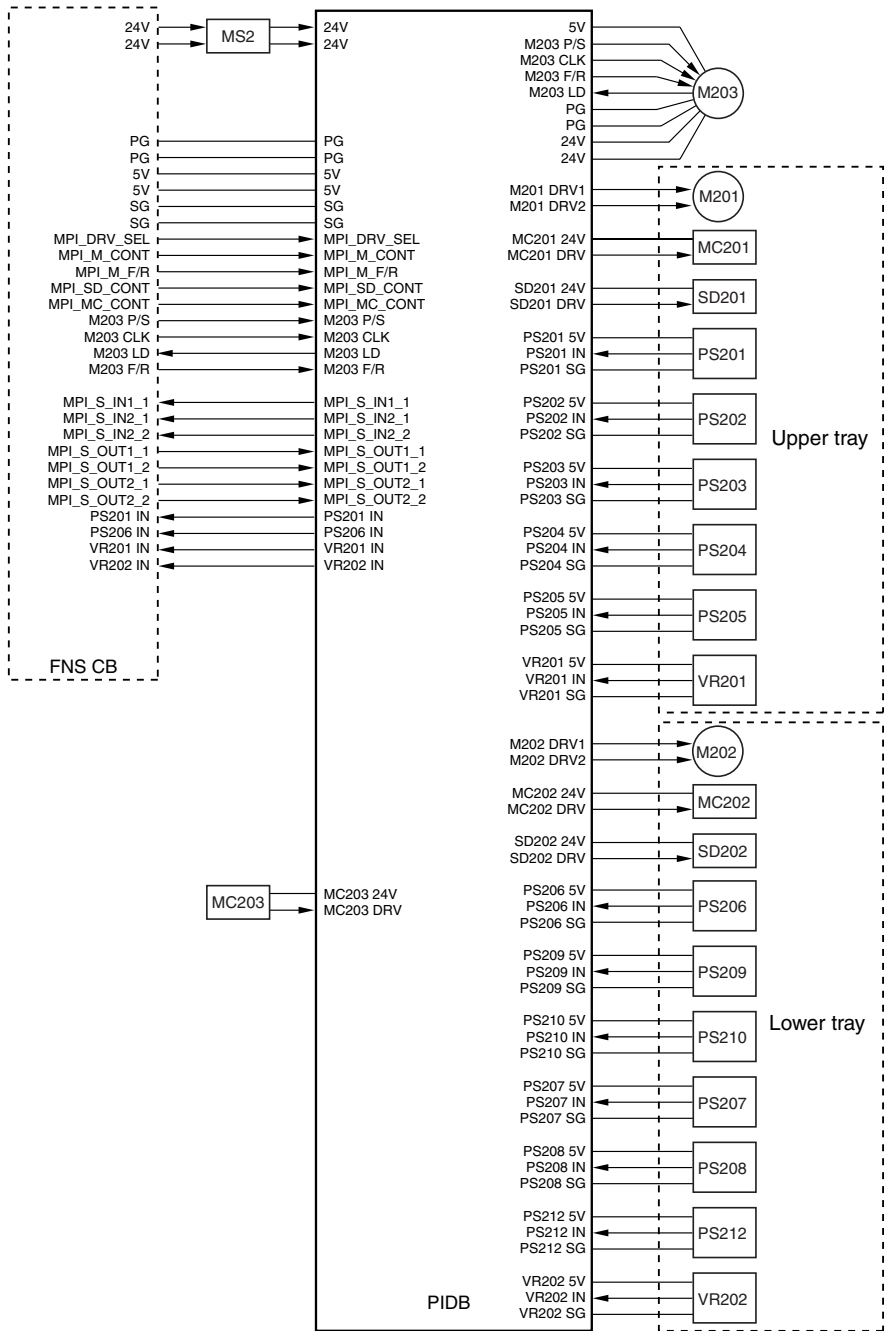
Composition



Mechanisms

Mechanism	Method
Pickup section	Upward feeding method, Oscillated pick roller, paper pick roller
Sheet feed section	Reverse torque limiter method, Separation roller. Torque limiter
Loop formation	Thrust method Conveyance rollers /U/L

Feed control



M201/M202 (tray up/down/U/L) raises the up/down plate/U/L.

When SD201/SD202 (sheet feed/U/L) and MC201/MC202 (conveyance/U/L) comes on, the drive of M203 (PI conveyance) is transmitted and the sheets are fed one by one by pick, feed, and separation rollers.

MC203 (registration) controls the drive force transmitted to the conveyance rollers /U/L, which forms a loop for the fed sheet.

The related signals are:

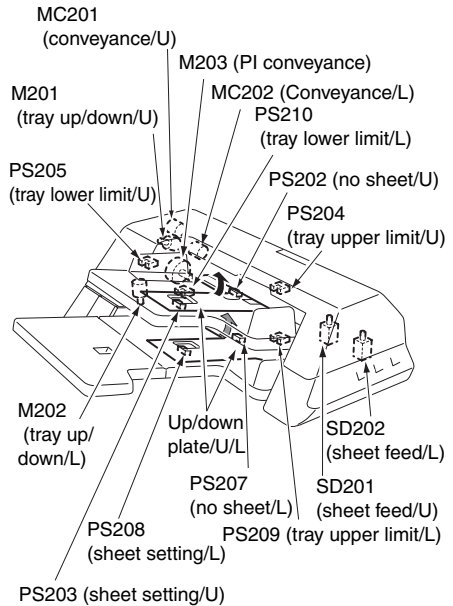
PS201/PS206 (PI passage U/L),
PS202/PS207 (No sheet/U/L),
PS203/PS208 (Sheet setting/U/L),
PS204/PS209 (Tray upper limit/U/L),
PS205/PS210 (Tray lower limit/U/L), PS212
(Sheet size/L), and VR201/VR202 (Sheet
size/U/L).

1 Operation

a Automatic sheet feeding (online)

- 1 When the MFP's START button turns on, M201/M202 (tray up/down/U/L) are driven in forward, which lifts the up/down plate/U/L until PS204/PS209 (tray upper limit/U/L) are activated.
- 2 Concurrently, while M203 (PI conveyance) is driven at low speed, SD201/SD202 (sheet feed/U/L) and MC201/MC202 (conveyance/U/L) comes on and sheets are fed into the finisher stacker.
- 3 When the last sheet on the up/down plate/U/L is fed and PS203/PS208 (sheet setting/U/L) comes off, the no-sheet-signal is sent to the MFP, causing the first feed of MFP to stop.

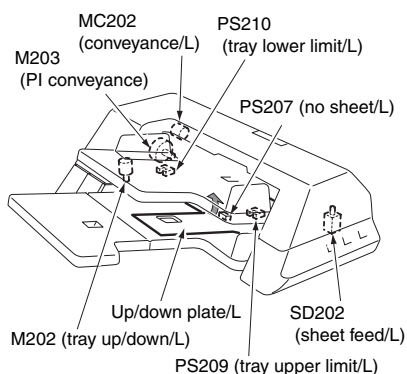
After that, when PS202/PS207 (no sheet/U/L) comes off, M201/M202 (tray up/down/U/L) are driven in reverse, which lowers the up/down plate/U/L until PS205/PS210 (tray lower limit/U/L) are activated.



b Manual sheet feeding (offline)

Only the lower tray is allowed.

- 1 When the PI control panel's START button turns on, M202 (tray up/down/L) is driven in forward, which lifts the up/down plate/L until PS209 (tray upper limit/L) is activated.
- 2 Concurrently, while M203 (PI conveyance) is driven at low speed, SD202 (sheet feed/L) and MC202 (conveyance/L) comes on and all sheets set in the up/down plate/L fed into the finisher stacker.
- 3 The finisher carries out the required finishing processes (stapling, tri-folding, etc.).
- 4 PS207 (no sheet/L) comes off, M202 (tray up/down/L) is driven in reverse, which lowers the sheet tray until PS210 (tray lower limit/L) is activated.



c Sheet conveyance

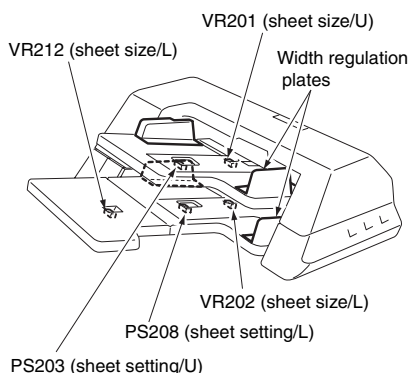
When the sheet fed from the paper feed unit at low speed turns PS201/PS206 (PI passage /U/L) on, M203 (PI conveyance) changes its rotating speed to high-speed. At this time, as MC203 (registration) turns off, the sheet is pressed against the conveyance rollers /U/L to form a loop. MC203 turns on when a specified time has passed since PS201/PS206 turned on, and the drive force of M203 is transmitted to the conveyance rollers /U/L. This causes the sheet whose bend is corrected by loop formation to be conveyed into finisher.

When the sheet turns PS206 off, MC203 turns off after a specified time. With the same timing, MC203 changes its rotating speed to low-speed and comes into feeding operation for the next sheet.

d Detection of sheet size

VR201/VR202 (sheet size/U/L) detect the sheet width.

Sheet length is detected by the combination of PS203/PS208 (sheet setting/U/L) and PS212 (sheet size/L).



2 Signals

a Input signals

1 PS201 IN (PS201 to PIDB)

Detection signal of sheet passage on upper tray

L: Sheet passed

H: Sheet not passed

2 PS202 IN (PS202 to PIDB)

Detection signal of no sheet on upper tray

L: Sheet detected

H: Sheet not detected

3 PS203 IN (PS203 to PIDB)

Detection signal of sheet setting on upper tray

L: Sheet detected

H: Sheet not detected

4 PS204 IN (PS204 to PIDB)

Detection signal of upper limit of up/down plate/U

L: Positioned at upper limit

H: Not positioned at upper limit

5 PS205 IN (PS205 to PIDB)

Detection signal of lower limit of up/down plate/U

L: Positioned at lower limit

H: Not positioned at lower limit

6 PS206 IN (PS206 to PIDB)

Detection signal of sheet passage on lower tray

L: Sheet passed

H: Sheet not passed

7 PS207 IN (PS207 to PIDB)

Detection signal of no sheet on lower tray

L: Sheet detected

H: Sheet not detected

8 PS208 IN (PS208 to PIDB)

Detection signal of sheet setting on lower tray

L: Sheet detected

H: Sheet not detected

9 PS209 IN (PS209 to PIDB)

Detection signal of upper limit of up/down plate/L

L: Positioned at upper limit

H: Not positioned at upper limit

10PS210 IN (PS210 to PIDB)

Detection signal of lower limit of up/down plate/L

L: Positioned at lower limit

H: Not positioned at lower limit

11PS212 IN (PS212 to PIDB)

Detection signal of sheet size on lower tray

L: Sheet detected

H: Sheet not detected

12VR201 IN (VR201 to PIDB)

Detection signal of sheet size on lower tray

13VR202

Detection signal of sheet size on lower tray

14M203 LD (M203 to PIDB)

Achieves specified speed of M203

L: Achieves specified speed

H: Not achieves specified speed

15MPI_DRV_SEL IN (finisher CB to PIDB)

Switch signal between M201/M202, MC201/MC202, and SD201/SD202

16MPI_M_CONT (finisher CB to PIDB)

Drive control signal of M201/M202

L: ON

H: OFF

17MPI_M_F/R (finisher CB to PIDB)

Rotating direction signal of M201/M202

L: Tray down

H: Tray up

18MPI_SD_CONT (finisher CB to PIDB)

Drive control signal of SD201/SD202

L: ON

H: OFF

19MPI_MC_CONT (finisher CB to PIDB)

Drive control signal of M201/M202

L: ON

H: OFF

20MC203 P/S (finisher CB to PIDB)

Drive control signal of M203

L: ON

H: OFF

21M203 CLK (finisher CB to PIDB)

Clock signal for controlling the rotating speed of M203

22M203 F/R (finisher CB to PIDB)

Rotating direction signal of M203

L: CW

H: CCW

- 23MPI_S_OUT1_1** (finisher CB to PIDB)
Output selecting signal 1 of PS202 to 205
- 24MPI_S_OUT1_2** (finisher CB to PIDB)
Output selecting signal 2 of PS202 to 205
- 25MPI_S_OUT2_1** (finisher CB to PIDB)
Output selecting signal 1 of PS207 to 210, PS211
- 26MPI_S_OUT2_2** (finisher CB to PIDB)
Output selecting signal 2 of PS207 to 210, PS211
- b Output signals**
- 1 M201 DRV1, 2** (PIDB to M201)
Signal for driving M201
- 2 MC201 DRV** (PIDB to MC201)
Signal for driving MC201
L: ON
H: OFF
- 3 SD201 DRV** (PIDB to SD201)
Signal for driving SD201
L: ON
H: OFF
- 4 M202 DRV1, 2** (PIDB to M202)
Signal for driving M202
- 5 MC202 DRV** (PIDB to MC202)
Signal for driving MC202
L: ON
H: OFF
- 6 SD202 DRV** (PIDB to SD202)
Signal for driving SD202
L: ON
H: OFF
- 7 M203 P/S** (PIDB to M203)
Drive control signal of M203
L: ON
H: OFF
- 8 M203 CLK** (PIDB to M203)
Clock signal for controlling the rotating speed of M203
- 9 M203 F/R**
Rotating direction signal of M203
L: CW
H: CCW
- 10M203 LD** (PIDB to finisher CB)
Achieves specified speed of M203
L: Achieves specified speed
H: Not achieves specified speed
- 11MPI_S_IN1_1** (PIDB to finisher CB)
Detection signal from PS202 to PS205
- 12MPI_S_IN2_1** (PIDB to finisher CB)
Detection signal from PS207, PS208, PS209 or PS210
- 13MPI_S_IN2_2** (PIDB to finisher CB)
Detection signal from PS212
- 14PS201 IN** (PIDB to finisher CB)
Detection signal of sheet passage on upper tray
L: Sheet passed
H: Sheet not passed
- 15PS206 IN** (PIDB to finisher CB)
Detection signal of sheet passage on lower tray
L: Sheet passed
H: Sheet not passed
- 16VR201 IN** (PIDB to finisher CB)
Detection signal of sheet size on upper tray

17VR202 IN (PIDB to finisher CB)

Detection signal of sheet size on
lower tray

18MC203 DRV (PIDB to MC203)

Signal for driving MC203

L: ON

H: OFF

3

Post insertion disassembly/assembly

External section	18
Removing/reinstalling the external covers	18
Paper feed unit	19
Replacing the paper pick roller and pick roller	19
Replacing the double feed prevent roller and torque limiter	20

This section explains how to disassemble and reassemble the MFP. When disassembling and reassembling the MFP, follow the precautions given below.

CAUTION

- Be sure the power cord has been unplugged from the wall outlet.
- The disassembled parts must be reassembled following the disassembly procedure in reverse unless otherwise specified.
- Care should be taken not to lose small parts. Care should also be taken not to install small parts in wrong places.
- Do not operate the MFP before installing all the disassembled parts completely.
- Removal of some screws is prohibited in this section. Never loosen them.

External section

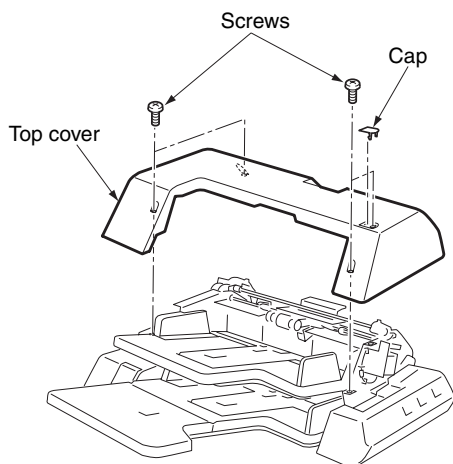
Removing/reinstalling the external covers

CAUTION

Make sure that the power cord of the MFP is unplugged from the power outlet.

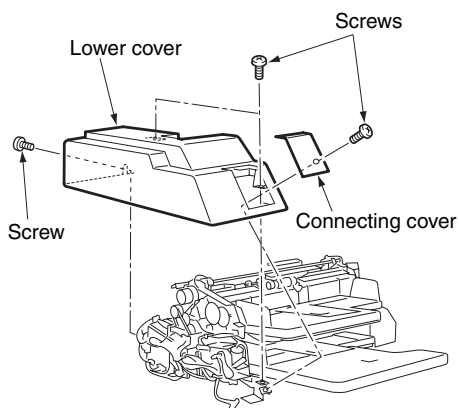
Procedure

- 1 Remove cap on the top cover.
- 2 Remove four screws to detach the top cover.

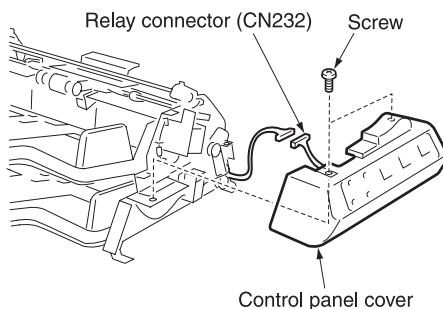


- 3 Remove one screw to detach the connector cover.

- 4 Remove three screws to detach the lower cover.



- 5 Remove two screws, disconnect the inline connector (CN232), and detach the control panel cover.



- 6 Reinstall the above parts following the removal steps in reverse.

Paper feed unit

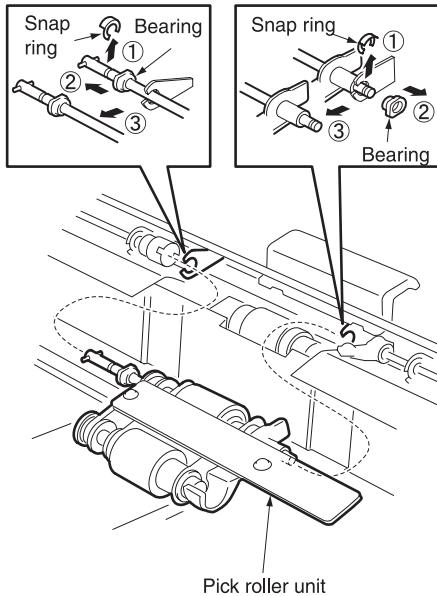
Replacing the paper pick roller and pick roller

CAUTION

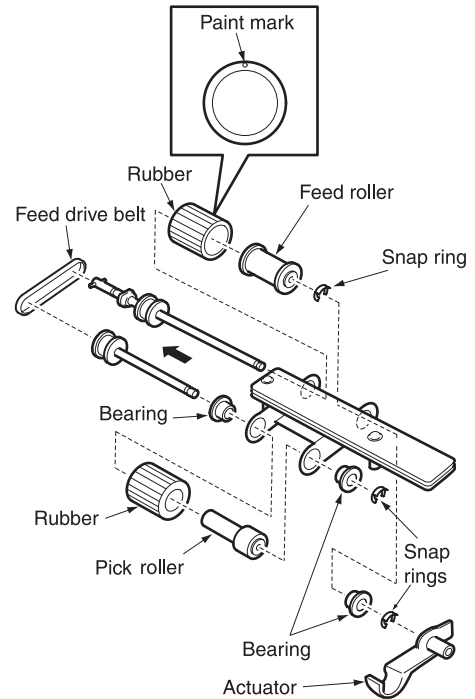
Make sure that the power cord of the MFP is unplugged from the power outlet.

Procedure

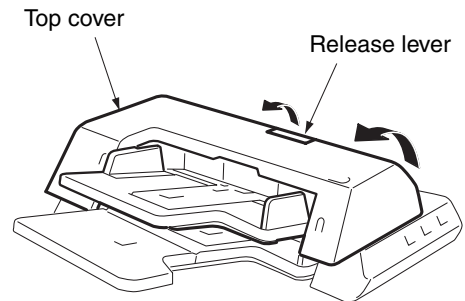
- 1 When replacing the paper pick roller and pick roller for the upper tray, detach the top cover.
- 2 Remove the two snap rings, then shift the left and right bearings outside, and remove the pick roller unit.



- 3 Remove actuator, three snap rings, three bearings of the pick roller unit, then slide the roller shaft in the direction of the arrow to remove each roller.



- 4 When replacing the paper pick roller and pick roller for the lower tray, open the upper tray and perform the steps 2 and 3.



- 5 Reinstall the above parts following the removal steps in reverse.

CAUTION

Ensure that the mounting direction of each roller and rubber is correct.

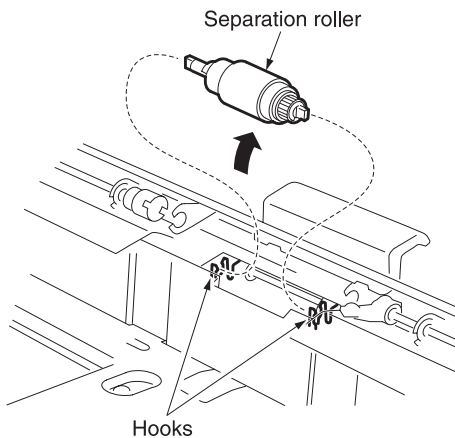
Replacing the double feed prevent roller and torque limiter

CAUTION

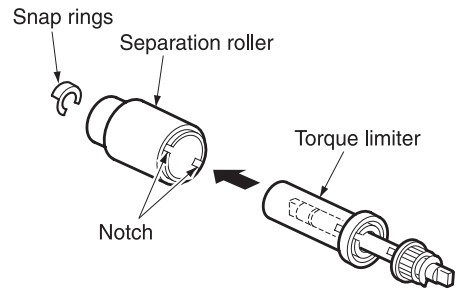
Make sure that the power cord of the MFP is unplugged from the power outlet.

Procedure

- 1 When replacing the double feed prevent roller and the torque limiter for the upper tray, detach the top cover.
- 2 Detach the paper pick roller unit.
- 3 Release the hooks on both sides, remove the separation roller assembly by lifting up, then pull out the shaft, and remove the double-feed-prevention roller together with the feed-reverse gear.



- 4 Separate the separation roller and the torque limiter from the separation roller assembly.



- 5 When replacing the separation roller and the torque limiter for the lower tray, open the upper unit and perform the steps 2 and 3.
- 6 Reinstall the above parts following the removal steps in reverse.

CAUTION

Ensure that the mounting direction of each roller and rubber is correct.

Index

A

- automatic sheet feeding (online operation)
 - specifications 2
 - theory of operation 5

C

- center cross section drawing 3
- copy paper 2
- copy sizes
 - lower tray 2
 - upper tray 2
- curling, paper 2

D

- dimensions, machine 2
- double feed prevent roller 20
- drive system diagram 4

E

- environment, operating 3
- external covers 18
- external section
 - removing and reinstalling 18
 - theory of operation 8

F

- feed control 10
- feeding process 5

H

- humidity 3

I

- interlock control 8

L

- lower tray copy sizes 2

M

- maintenance 3
- manual sheet feeding (offline operation)
 - specifications 2
 - theory of operation 5

O

- operating environment 3

P

- paper
 - curling 2
 - plain 2
 - printing 2
 - special 2
 - stacking capacity 2
- paper feed unit
 - removing and reinstalling 19
 - theory of operation 9
- paper pick roller 19
- pick roller 19
- plain paper 2
- power consumption 2
- power source 2
- printing paper 2
- product specifications 2

S

- service life 3
- sheet feeding, specifications
 - automatic (online operation) 2
 - manual (offline operation) 2
- sheet feeding, theory of operation
 - automatic (online operation) 5
 - manual (offline operation) 5
- special paper 2
- specifications, product 2
- stacking capacity, paper 2

T

temperature 3

torque limiter 20

U

upper tray copy sizes 2

W

weight, machine 2



Q3635A/Q3689A
Q3690A/Q3691A
Hole Punch Kits

SERVICE MANUAL

Contents

1 Punch kit overview

Punch Kit product specifications	2
Type	2
Functions.	2
Applicable paper	2
Punch kit data	3
Maintenance	3
Operating environment	3
Center cross-sectional view	4
Drive system diagram	5
Punch section	5
Moving section	5
Punching process	6
Movement of the standby position of the punch unit	6
Formation of a registration loop	7
Correction of the punch position	8
Punch	8

2 Punch kit unit explanation

Punch section	12
Composition	12
Mechanisms	13
Punch control	13
Punch waste box section	16
Composition	16
Mechanisms	16
Punch waste conveyance control	17

3 Punch kit disassembly/assembly

Punch section	20
Screws that should not be removed	20
Replacing the punch unit.	20
Cleaning the punch edges and punch waste full PS (PS802)	22

Index

1 Punch kit overview

Punch Kit product specifications	2
Type	2
Functions	2
Applicable paper	2
Punch kit data	3
Maintenance	3
Operating environment	3
Center cross-sectional view	4
Drive system diagram	5
Punch section	5
Moving section	5
Punching process	6
Movement of the standby position of the punch unit	6
Formation of a registration loop	7
Correction of the punch position	8
Punch	8

Punch Kit product specifications

Type

Self-contained puncher

Functions

Punching method

Reciprocating type punching

Number of holes

Inch 2 holes / 3 holes (for inch area),
4 holes / Swedish 4 holes (for metric area)
and 2 holes (for Japan) *1

Hole diameter

φ6.5 mm (2 holes / 4 holes / Swedish
4 holes)

φ8.0 mm (3 holes / Inch 2 holes)

Hole pitch

80 mm (2 holes / 4 holes)

108 mm (3 holes)

70 mm (Inch 2 holes)

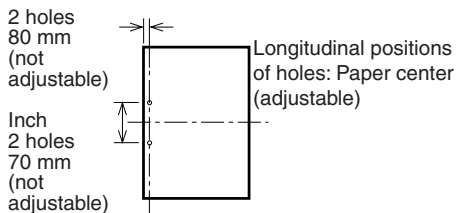
21 mm, 70 mm, 21 mm (Swedish 4 holes)

Hole positions

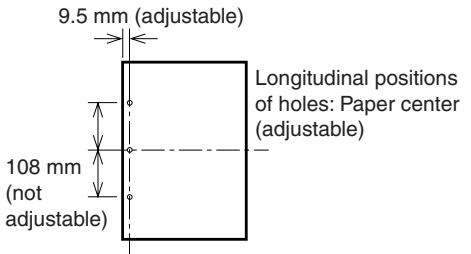
<2 holes / Inch 2 holes>

2 holes: 10.5 mm (adjustable)

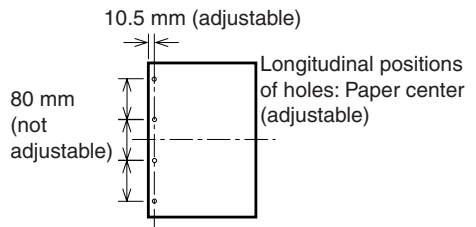
Inch 2 holes: 9.5 mm (adjustable)



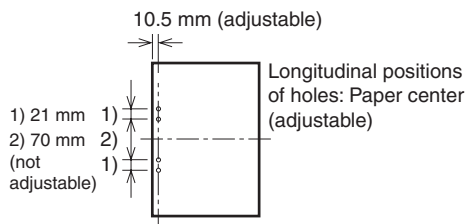
<3 holes>



<4 holes>



<Swedish 4 holes>



*1 The 2 holes type is used in Japan.
There are five types of punch kit
2 holes, inch 2 holes, 3 holes, 4 holes
and swedish 4 holes types. All the five
types can be purchased as product.

Applicable paper

Non-Punch mode

Same as MFP

Punch mode

Metric area (4 holes / Swedish 4 holes)

A3 / B4 / A4 / B5 / Ledger / Letter

Inch area (3 holes)

Ledger / Letter / A3 / B4 / A4 / B5

Inch area (2 holes)

Ledger / Legal / Letter / Letter R

5.5 by 8.5 / 5.5 by 8.5R

A3 / B4 / A4 / A4R / B5 / B5R / A5 / A5R / F4

Punch mode with A5R or 5.5 by 8.5R size paper cannot be used together with the stapling mode

High quality paper of 64 g/m² to

128 g/m² or 16 lb to 24 lb

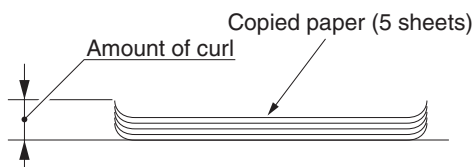
Punch mode cannot be used together with the fold mode, staple-and-fold mode, or tri-fold mode.

Media not supported in punch mode

Transparency, label paper, blueprint master, binding-holed paper, tabs

Amount of paper curl

Maximum 10 mm for 5 sheets of copied paper in piles



Punch kit data

Power source

DC24V, DC5V (supplied from finisher)

Maximum power consumption

40VA

Punch kit dimensions

130 mm (W) by 470 mm (D) by

115 mm (H)

Weight

Approximately 3 kg

Maintenance

Maintenance

Same as the MFP

Operating environment

Temperature

10° C to 30° C (50° F to 86° F)

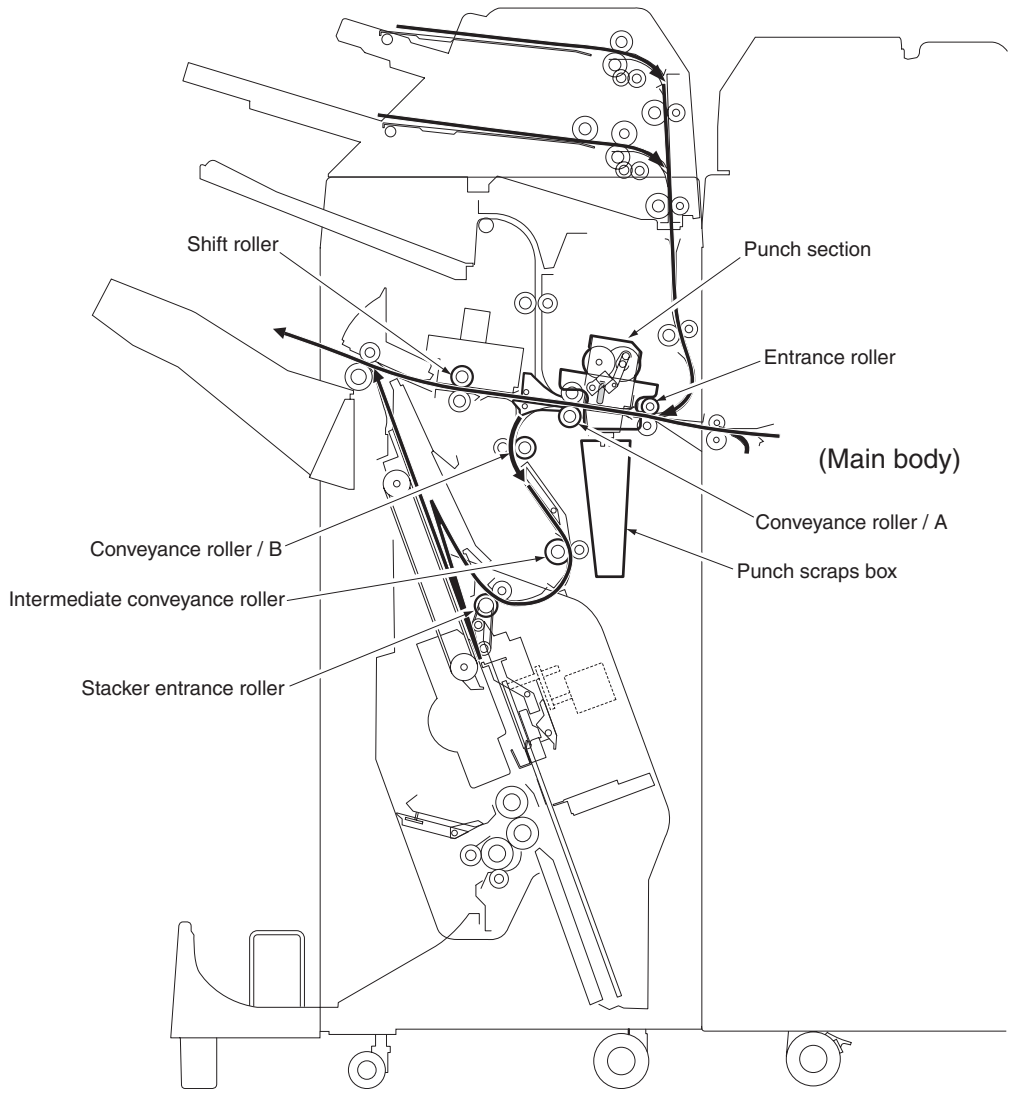
Humidity

10 percent to 80 percent RH

Note

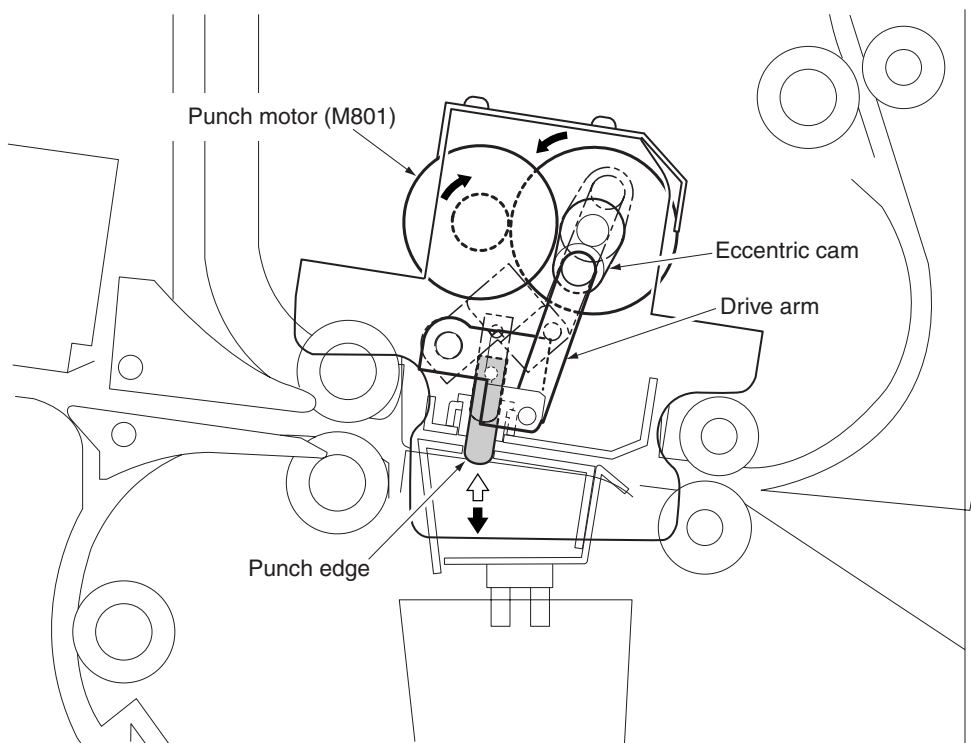
The information herein may be subject to change for improvement without notice.

Center cross-sectional view

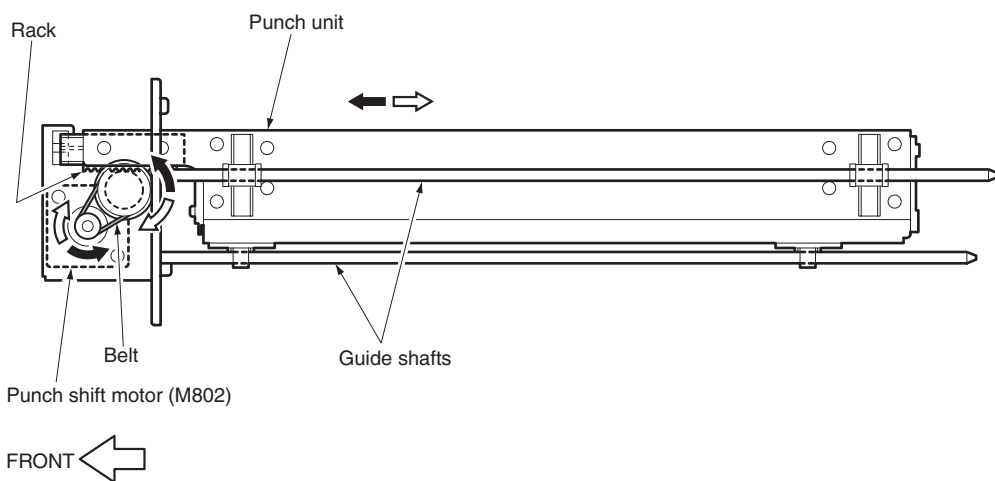


Drive system diagram

Punch section

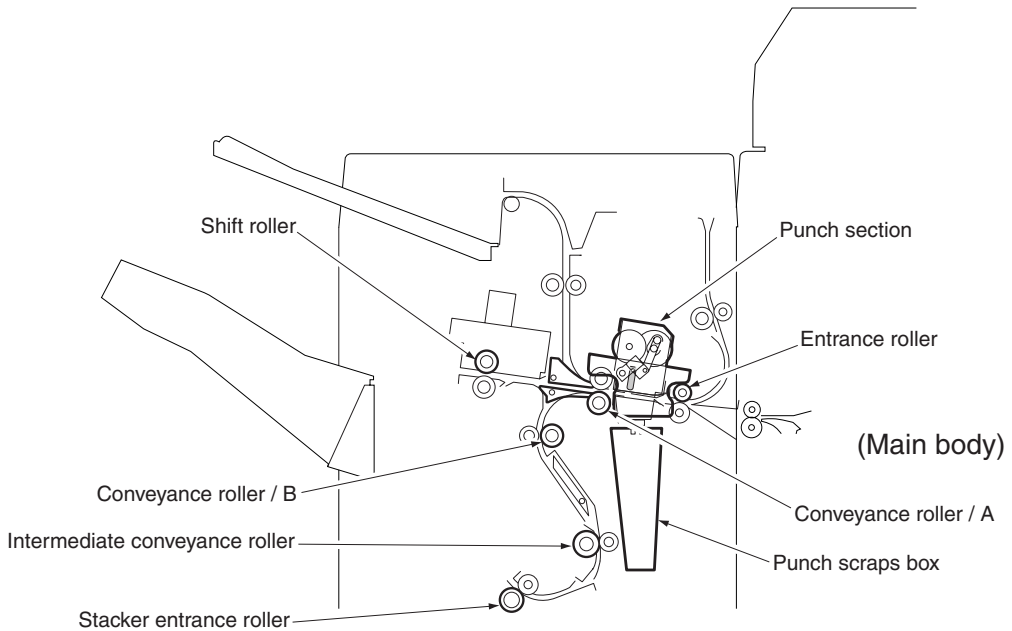


Moving section



Punching process

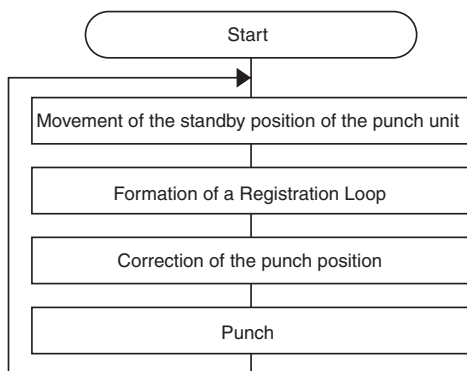
Punch Kit consists of the following sections:



Note

The punching process differs between the punch mode (holes are made) and non-punch mode (no holes are made). Either of these modes can be selected on the control panel of the MFP.

The following flowchart shows the flow of operations performed by the above sections. These operations are explained according to this flowchart.



Movement of the standby position of the punch unit

When the punch mode is selected, the punch shift motor (M802) runs to move the punch unit so that the paper edge sensor mounted on the punch unit is placed inside of the side edge of paper by 5 mm. However, if the paper size is Letter, Legal, or 5.5 by 8.5R, the sensor is positioned by 10 mm inside.

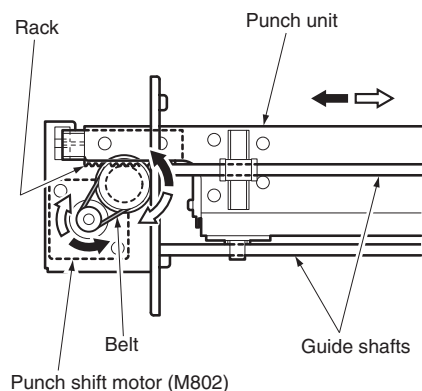
The above operation is not generally performed in the non-punch mode, however, for the paper sizes shown below, the punch unit is moved to the position located inside of the side edge of paper by 10 mm in order to secure the easy feeding of paper when conveyed.

2 holes / 4 holes / Inch 2 holes / Swedish
4 holes MFPs

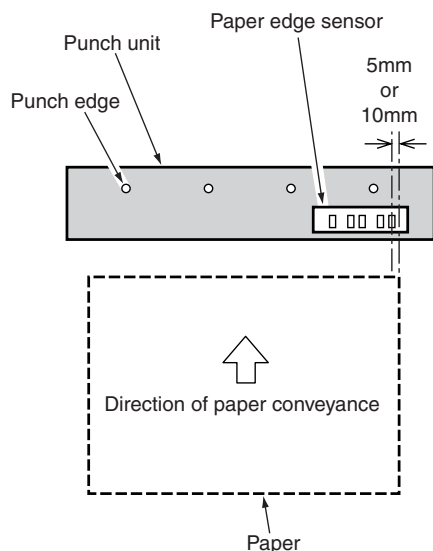
B6 / 16K

3 holes MFP

Letter / Legal / 5.5 by 8.5R / A5R / A4



FRONT

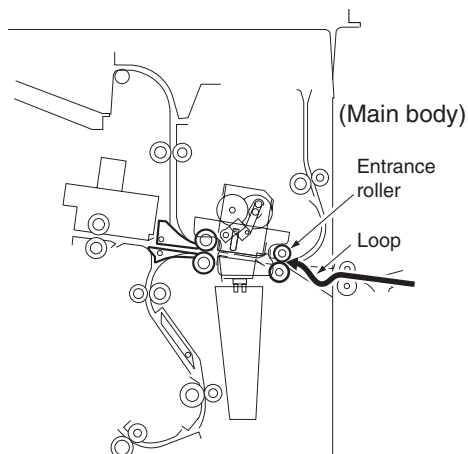


Formation of a registration loop

The finisher conveyance motor (M701) turns off temporarily to stop conveyance of paper when the specified time has passed since paper exit PS (PS37) detected the leading edge of the paper. Thus the paper is pressed against the entrance roller forming a loop to correct the bend. When the specified time has passed, M701 turns on to restart conveying the paper.

The above operation is not performed when conveying a large paper (220 mm and longer in direction of conveyance) and in the non-punching mode.

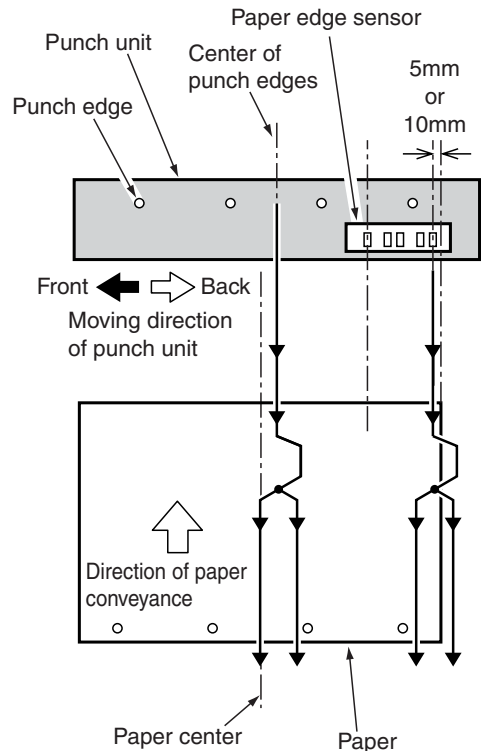
When punching the paper conveyed from PI, the loop is formed on the PI's side. For details, refer to Q3636A SHB.



Correction of the punch position

The punch unit positioned inside of the side edge of paper by 5 mm or 10 mm performs the following procedures to correct the punch position so that the punch is always centered on the paper. The punch position is corrected by moving the punch unit to and fro during conveyance of the paper.

- When finisher entrance PS (PS704) detects the leading edge of the paper, the punch unit is moved backward temporarily until the paper edge sensor detects the side edge of the paper. If punching is performed for the paper conveyed from PI, the time when PI passage PS/U (PS201) or PI passage PS/L (PS206) detects the leading edge of the paper becomes the starting point.
- Subsequently, the punch unit moves back frontward until the paper edge sensor re-detects the side edge of the paper (Detection of side edge reference position).
- When the side edge reference position is detected, the punch unit is again moved to position the center of punch edges to the center of the paper. The distance and direction of this movement differ from paper sizes. Only when moving backward, the punch unit makes a stop at the side edge reference position.

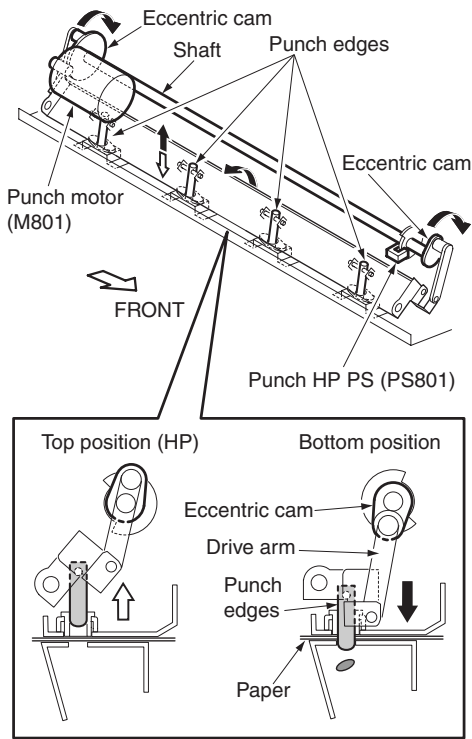


Punch

In the punch mode, the finisher conveyance motor (M701) turns off to stop the paper conveyance temporarily when the specified time has passed since the finisher entrance PS (PS704) detected the trailing edge of the paper, and holes are punched.

During punching, the drive force of the punch motor (M801) is transferred to the shaft to rotate the shaft once. As the shaft rotates, the eccentric cams at both ends of the shaft rotate to lower the punch edges, making holes in the paper.

After the punch is finished, the punch unit moves to the side edge reference position when the specified time has passed since the trailing edge of the paper is detected by PS704, which makes a standby status for the punch process for the following paper.

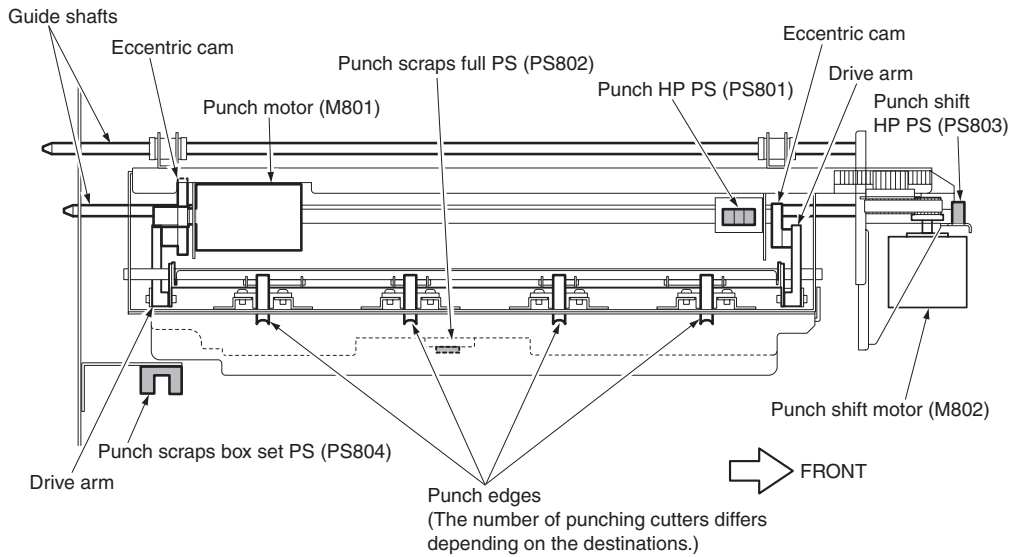


2 Punch kit unit explanation

Punch section	12
Composition	12
Mechanisms	13
Punch control	13
Punch waste box section	16
Composition	16
Mechanisms	16
Punch waste conveyance control	17

Punch section

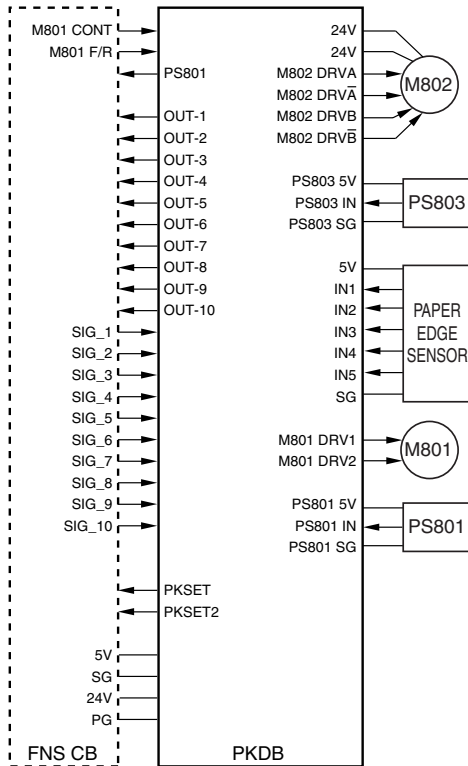
Composition



Mechanisms

Mechanism	Method
Back-and-forth movement of punch unit	Punch motor (M801) Eccentric cam Drive arms Punch edges
Punch unit movement	Punch shift motor (M802) Concurrent use of Gear / Rack

Punch control



The movement of the punch unit is driven by M802 (punch shift) and the punching operation is driven by M801 (punch). M801 is DC motor, and rotates once per punch. Related signals are PS801 (punch HP), PS803 (punch shift HP), and paper edge sensor.

1 Operation

The punching operation can be divided into the movement of the punch unit and the punch movement that makes holes. In the punch mode, these movements are performed for every sheet of paper, while in the non-punch mode these are not performed. However, the movement of the punch unit is performed for some paper sizes even in the non-punch mode.

a Searching the standby home position of the punch unit

With power turned on, M802 (punch shift) runs to move the punch unit to the position where PS803 (punch shift HP) is turned on, which makes a standby state. This position becomes the standby home position of the punch unit.

b Moving the standby position of the punch unit

When the punch mode is selected, M802 (punch shift) runs to move the punch unit so that the paper edge sensor mounted on the punch unit is located inside of the side edge of paper by 5 mm. However, if the paper size is Letter, Legal, or 5.5 by 8.5R, the sensor is positioned by 10 mm inside. Either of these positions becomes the standby position in the punch mode.

The above operation is not generally performed in the non-punch mode, however, for the paper sizes shown below, the punch unit is moved to the position located inside of the side edge of paper by 10 mm in order to secure the easy feeding of paper when conveyed.

2 holes / 4 holes / Inch 2 holes /
Swedish 4 holes MFPs:

B6 / 16K

3 holes MFP:

Letter / 8.5 by 14 / 5.5 by 8.5R / A5R /
A4

c Detecting the side edge reference position

When the finisher entrance PS (PS704) detects the leading edge of paper, M802 (punch shift) runs again to move the punch unit backward temporarily until the paper edge sensor detects the side edge of the paper. If punching is performed for the paper conveyed from PI, the time when PS201 (PI passage/U) or PS206 (PI passage/L) detects the leading edge of the paper is the starting point.

Subsequently, M802 runs inversely to move the punch unit frontward until the paper edge sensor re-detects the side edge of the paper. This position becomes the side edge reference position.

d Moving the punch position

When the side edge reference position is detected, M802 (punch shift) moves the punch unit again so that the center of punch edges is positioned to the center of paper. The distance and direction of this movement differ from paper sizes. Only when moving backward, the punch unit makes a stop at the side edge reference position. The direction of the movement from the side edge reference position to the punch position classified by paper sizes is as follows:

Frontward:

A5 / A5R / B5R / A4 / A4R / B4 / A3 / Letter / 8.5 by 14 / 5.5 by 8.5 / 5.5 by 8.5R / 8K / 16K / 16KR

Backward:

B5 / F4 / Letter R / Ledger

The series of movement from c. Detecting the side edge reference position to d. Moving the punch position is performed per each paper, and these movements correct the punch position.

e Forming a registration loop

M701 (finisher conveyance) turns off temporarily a specified time after PS37 (paper exit) detects the leading edge of the paper to form a loop at the entrance roller. If punching is performed for the paper conveyed from PI, the loop will be formed on the PI's side.

f Punch movement

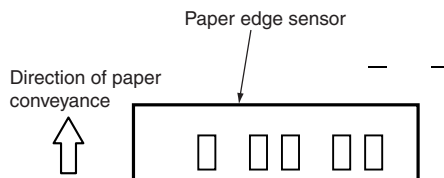
When finisher entrance PS (PS704) detects the trailing edge of the paper, M801 (punch) runs and performs the punch movement. For some paper sizes, the punch movement is executed before completing the correction of the punch position for the punch unit. To avoid this, switch the conveyance speed on finisher to a low speed only for such paper size.

Paper size	Conveyance speed
A5 / 5.5 by 8.5R	345 mm/s
Other sizes	670 mm/s

If punching is performed for the paper conveyed from PI, the time when the trailing edge of the paper is detected by PS206 (PI passage/L) is the starting point.

g Paper edge sensor

To detect the side edge of the paper, the paper edge sensor mounted on the punch unit is used. The paper edge sensor consists of 5 sensors shown in the below figure. Which sensor is used depends on the paper sizes.



2 Signals

a Input signals

- 1 PS801 IN (PS801 to PKDB)
Punch drive HP detection signal
[L]: Other than HP
[H]: HP
- 2 PS803 IN (PS803 to PKDB)
Punch unit HP detection signal
[L]: Other than HP
[H]: HP
- 3 IN1 to 5 (PAPER EDGE SENSOR to PKDB)
IN1 to 5 (paper edge sensors)
[L]: Without paper
[H]: With paper
- 4 M801 CONT (finisher CB to PKDB)
on/off control signal for M801 (punch)
[L]: M801 ON
[H]: M801 OFF
- 5 M801 F/R (finisher CB to PKDB)
Signal for switching the direction of rotation for M801 (punch)
[L]: Forward direction
[H]: Reverse direction
- 6 SIG_1 to 10 (finisher CB to PKDB)
PK control signal from finisher CB

b Output signals

- 1 M801: DRV 1, 2 (PKDB to M801)
Drive signal for M801 (punch)
- 2 M802: DRVA, A, B, B (PKDB to M802)
Drive signal for M802 (punch shift)
(A phase, B phase)

3 PKSET, PKSET2 (PKDB to finisher CB)

Connection signal of PK

[L]: Connected

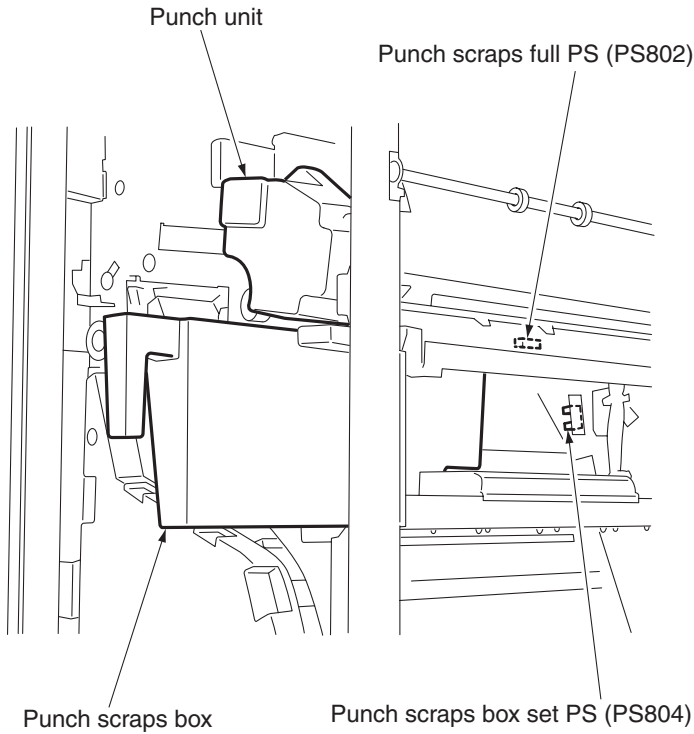
[H]: Not connected

4 OUT-1 to 10 (PKDB to finisher CB)

Status informing signal from PK to finisher CB

Punch waste box section

Composition



Mechanisms

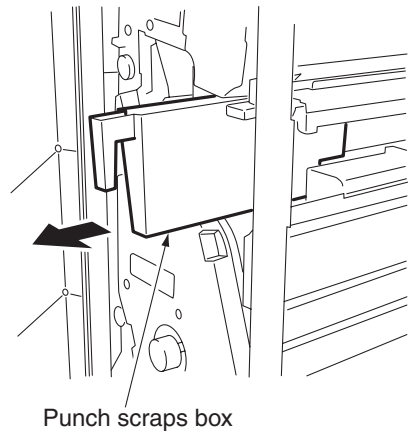
Mechanism	Method
Alarm clear *1	Punch waste box

*1 Alarm clear

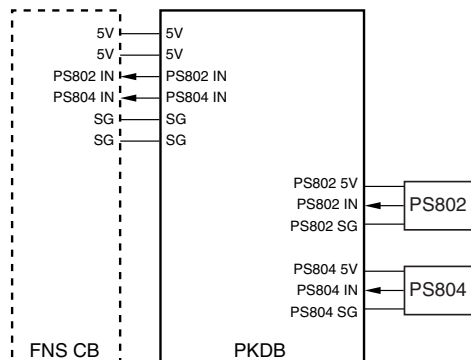
Punch waste are collected in the punch waste box.

When the punch waste box is full or it is removed, the related message appears on the control panel of the MFP.

To remove the punch waste box, open the front door of the finisher and pull forward.



Punch waste conveyance control



Punch waste are collected in the punch waste box.

Related signals are PS802 (punch waste full) and PS804 (punch waste box set).

1 Operation

a Punch waste full detection

PS802 (punch waste full) detects whether the punch waste box is full.

When the punch waste box becomes full, PS802 turns on to send the punch waste full signal to the MFP.

Upon receipt of this signal, the MFP displays a related message on the control panel.

b Punch waste box detection

PS804 (punch waste box set) detects whether the punch waste box is attached.

If the punch waste box is not attached, PS804 turns off to send the punch waste box not attached signal to the MFP.

Upon receipt of this signal, the MFP displays a related message on the control panel.

2 Signals

a Input signals

1 PS804IN (PS804 to PKDB to finisher CB)

Punch waste box existence detection signal

[L]: Punch waste box is not set

[H]: Punch waste box is set

2 PS802IN (PS802 to PKDB to finisher CB)

Punch waste box full detection signal

[L]: Punch waste box is full

[H]: Punch waste box is not full

3 Punch kit disassembly/assembly

Punch section	20
Screws that should not be removed	20
Replacing the punch unit	20
Cleaning the punch edges and punch waste full PS (PS802)	22

This section explains how to disassemble and reassemble the MFP. When disassembling and reassembling the MFP, follow the precautions given below.

CAUTION

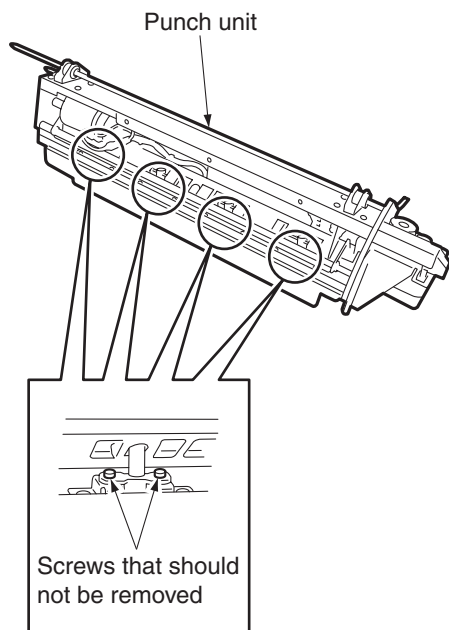
- Be sure the power cord has been unplugged from the wall outlet.
- The disassembled parts must be reassembled following the disassembly procedure in reverse unless otherwise specified.
- Care should be taken not to lose small parts. Care should also be taken not to install small parts in wrong places.
- Do not operate the MFP before installing all the disassembled parts completely.
- Removal of some screws is prohibited in this section. Never loosen them.

Punch section

Screws that should not be removed

CAUTION

The following screws should not be removed. If you do, punching cannot be done as designed.



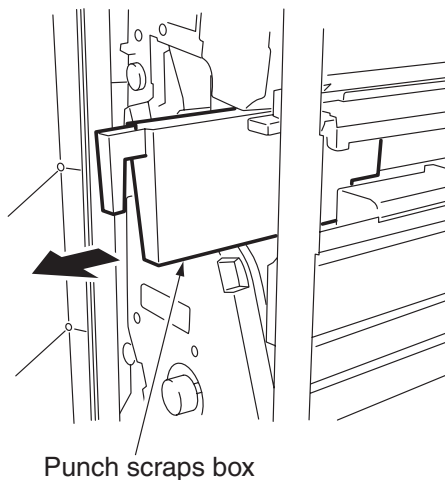
Replacing the punch unit

CAUTION

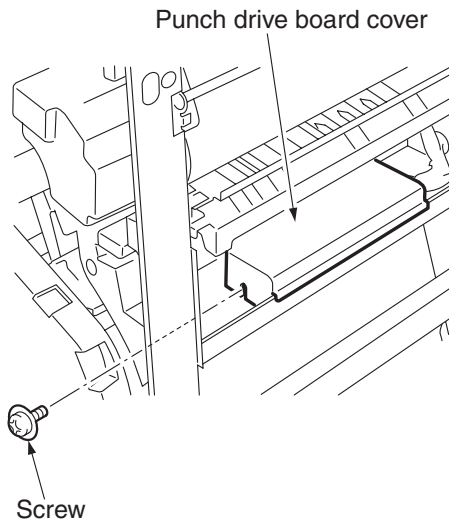
Be sure to unplug the power cord of the MFP from the wall outlet.

Procedure

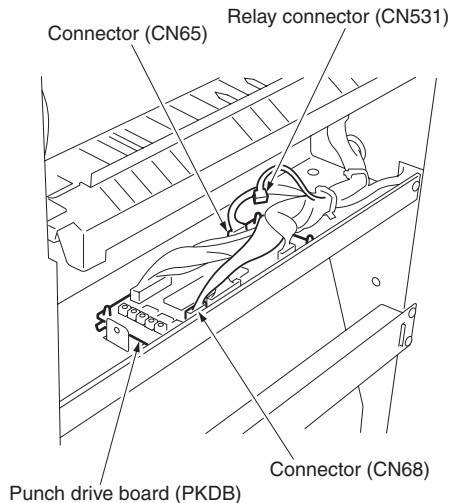
- 1 Remove the punch waste box.



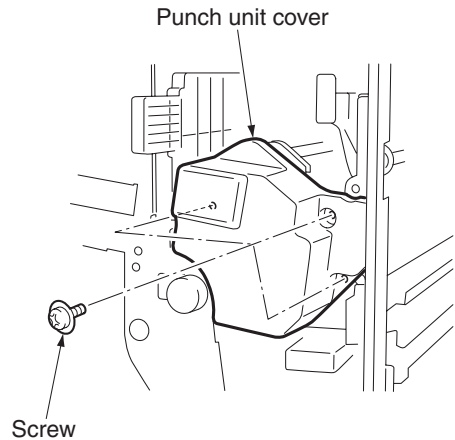
- 2 Remove the punch drive board cover by removing one screw.



- 3 Disconnect two connectors (CN65, 68) and one inline connector (CN531) from the punch drive board (PKDB).

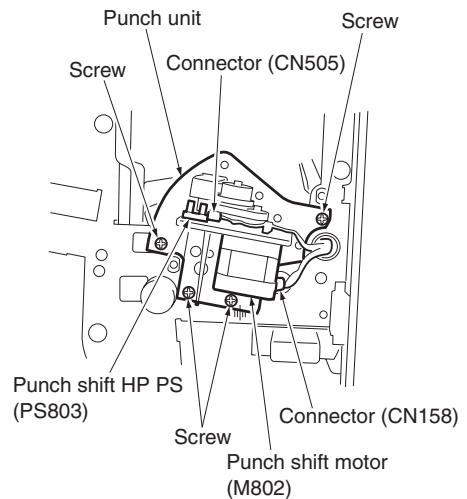


- 4 Remove three screws to remove the punch unit cover.



- 5 Disconnect two connectors (CN158, 505).

- 6 Remove the punch unit from finisher by removing four screws.



- 7 Reinstall the above parts following the removal steps in reverse.

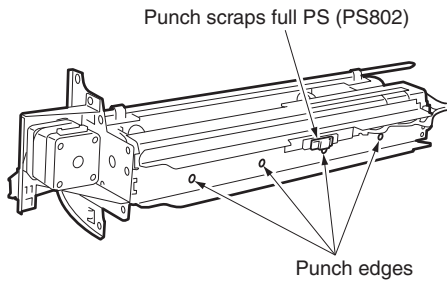
Cleaning the punch edges and punch waste full PS (PS802)

CAUTION

Be sure to unplug the power cord of the MFP from the wall outlet.

Procedure

- 1 Remove the punch unit.
- 2 Use a blower brush to remove paper dust and punch waste from the punch edges and punch waste full PS (PS802).



- 3 Reinstall the above parts following the removal steps in reverse.

Index

C

center cross-sectional view 4
curl, amount of 3

D

diameter of holes 2
dimensions, machine 3
drive system diagram 5

E

environment, operating 3

H

holes
 diameter 2
 number of 2
 pitch 2
 positions 2
humidity 3

M

maintenance 3
moving section 5

N

non-punch mode, paper 2
number of holes 2

O

operating environment 3

P

paper
 amount of curl 3
 non-punch mode 2
 not supported in punch mode 3
 punch mode 3
pitch of holes 2
position of holes 2
power consumption 3
power source 3

product specifications 2
PS802 (punch waste full PS) 22
punch control 13
punch edges 22
punch mode
 overview 8
 paper 3
punch position correction 8
punch section
 diagram 5
 removing and reinstalling 20
 theory of operation 12
punch unit 20
punch waste box section 16
punch waste conveyance control 17
punch waste full PS (PS802) 22
punching method 2
punching process 6

R

registration loop formation 7

S

specifications, product 2
standby position movement 6

T

temperature 3

W

weight, machine 3



i n v e n t

Q3224A

Trimmer Unit

SERVICE MANUAL

CONTENTS

1. OUTLINE

Q3224A PRODUCT SPECIFICATIONS	1-1
[1] Type	1-1
[2] Functions	1-1
[3] Machine Specifications	1-1
[4] Maintenance	1-1
[5] Operating environment	1-1
CENTER CROSS-SECTIONAL VIEW	1-2
DRIVE SYSTEM DIAGRAM	1-3
[1] Conveyance Drive Section	1-3
[2] Stopper Drive/Stopper Release Drive Section	1-3
[3] Press Drive Section	1-4
[4] Pusher Plate Drive/Holder Plate Drive	1-4
TRIMMING PROCESS	1-5
[1] Booklet Conveyance	1-5
[2] Trimming Position Adjustment	1-5
[3] Booklet Press	1-6
[4] Trimming	1-6
[5] Press Release/ Stopper Release	1-7
[6] Booklet Ejection	1-7

2. UNIT EXPLANATION

EXTERNAL SECTION	2-1
[1] Composition	2-1
[2] Mechanisms	2-1
CONVEYANCE SECTION	2-2
[1] Composition	2-2
[2] Mechanisms	2-2
[3] Conveyance Control	2-2
PRESS SECTION	2-4
[1] Composition	2-4
[2] Mechanisms	2-4
[3] Stopper/Press Control	2-5
TRIMMER SECTION	2-8
[1] Composition	2-8
[2] Mechanisms	2-8
[3] Trimmer Control	2-9
[4] Scraps Removal Control	2-10
STACKER SECTION	2-11
[1] Composition	2-11
[2] Mechanisms	2-11
[3] Booklet Ejection/Stack Control	2-12

3. DISASSEMBLY/ASSEMBLY

TRIMMER SECTION	3-1
[1] Replacing the Upper and Lower Knives	3-1



OUTLINE

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Q3224A PRODUCT SPECIFICATIONS

[1] Type

Type:

Upper-knife-reciprocating-type booklet edge trimming machine with large-capacity stacker

[2] Functions

Booklet edge trimming function:

Receives the booklet made by the finisher and trims its edge.

Number of sheets cut:

Max. 32 pages (16 sheets of 80 g/m² paper folded into two or 15 sheets of 80 g/m² paper folded into two + one sheet of 200 g/m² cover paper)

Stacker capacity:



Number of sheets cut	Number of stackable booklets
2 to 10	More than 100
12 to 20	More than 50
22 to 32	More than 32

Minimum Trimming Width:

More than 2mm from the edge

Paper size

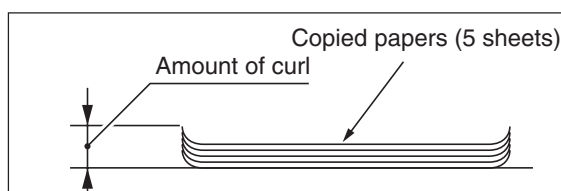
Regular sizes:

Sizes of paper that can be handled in the stapling and folding / folding mode of the finisher(A3, B4, A4R, 11 x 17R, 8.5 x 14R, 8.5 x 11R)

Wide paper:

Sizes of paper supported by the engine to which the finisher is connected, but should be within 314mm x 445mm.

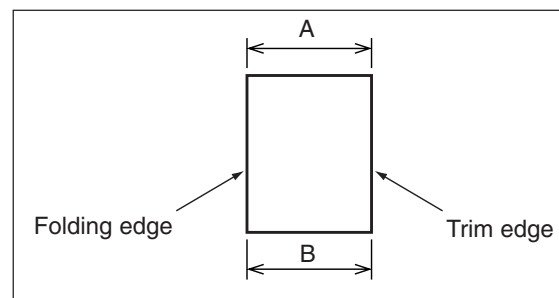
Amount of paper curl: Max. 10 mm



Parallelism with fold:

Within ± 1 mm

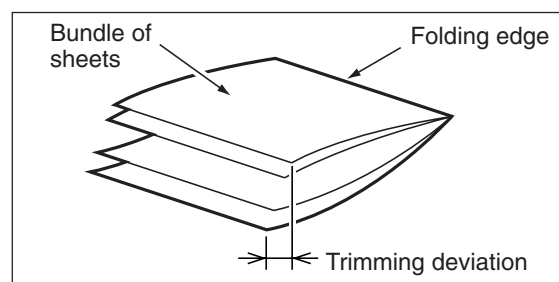
Parallelism = A - B



Trimming deviation:



Number of sheets cut	Trimming deviation
2 to 10	Max. 0.5 mm
12 to 32	Max. 1.5 mm



[3] Machine Specifications

Power source:

5 VDC (supplied from the engine via the finisher)

24 VDC (supplied from the DCPS mounted in this machine. The internal DCPS is compatible with 100 to 240 VAC.)

Maximum power consumption:

Less than 300 VA

Weight: Approx. 68 kg



Machine dimensions:

1279.5(W) x 610(D) x 562(H) mm

[4] Maintenance

Maintenance:

Same as the engine.

[5] Operating environment

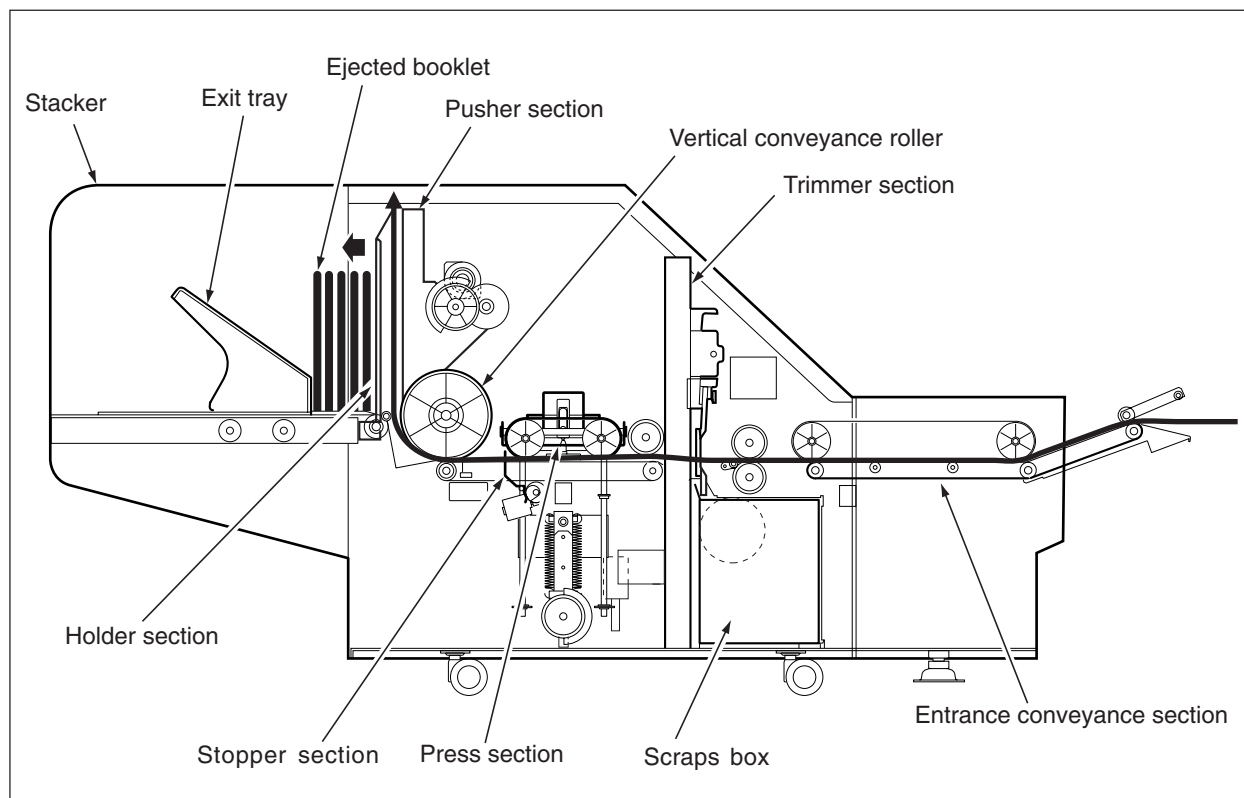
Temperature: 10 to 30 °C (50 °F to 86 °F)

Humidity: 10 to 80%RH

Note: The information herein may subject to change for improvement without notice.

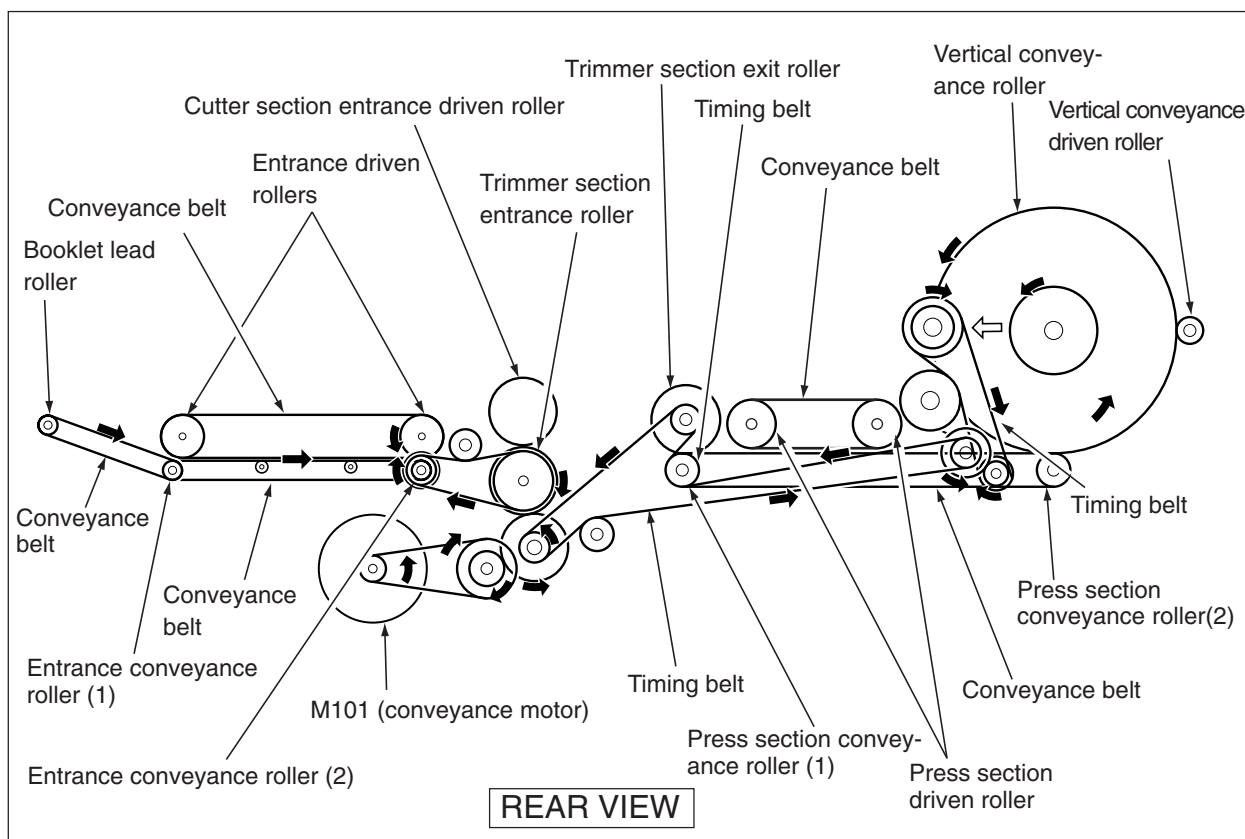
Q3224A

CENTER CROSS-SECTIONAL VIEW

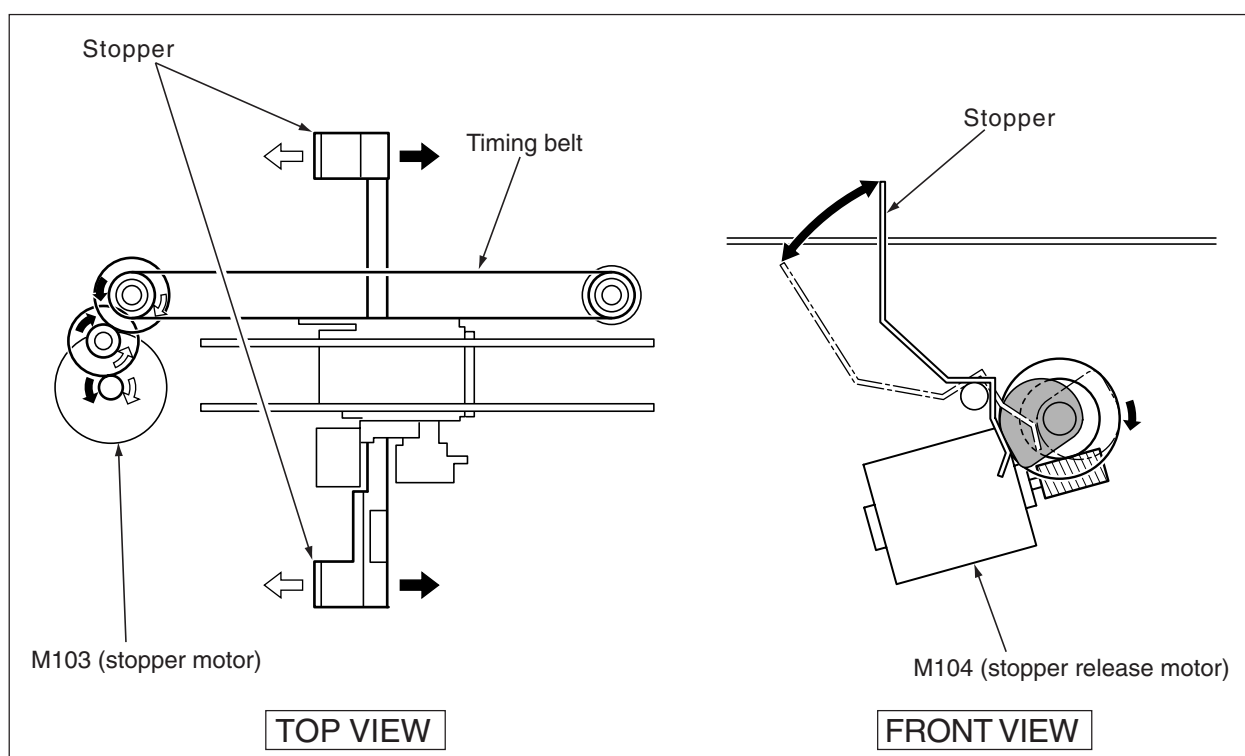


DRIVE SYSTEM DIAGRAM

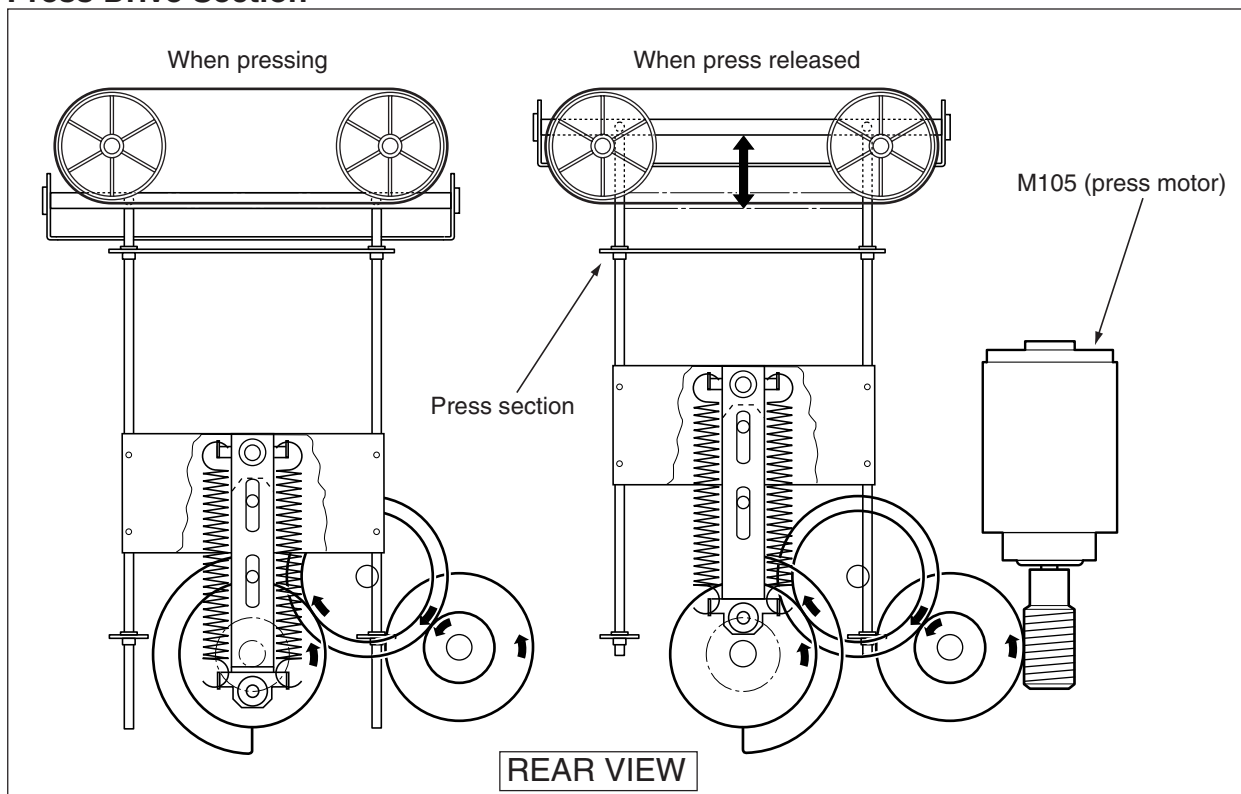
[1] Conveyance Drive Section



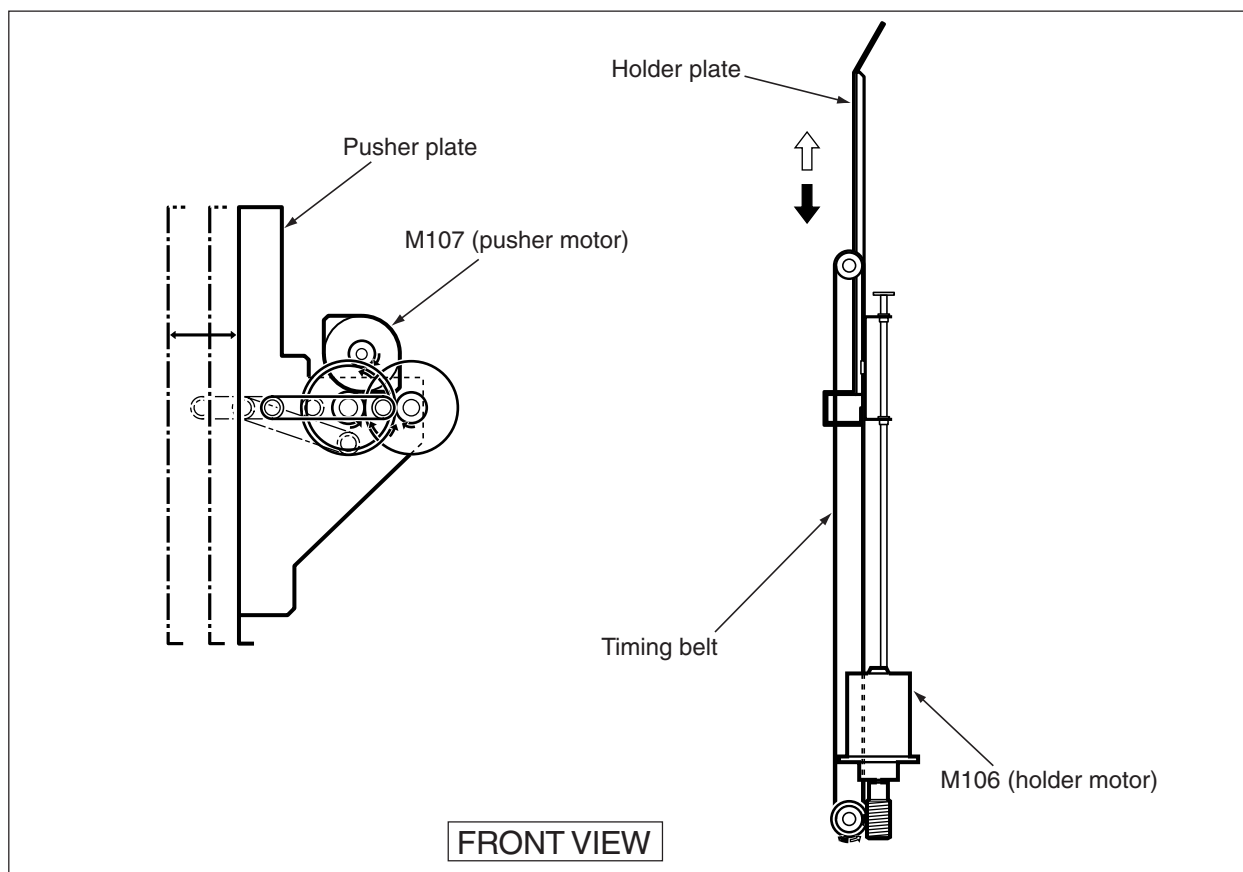
[2] Stopper Drive/Stopper Release Drive Section



[3] Press Drive Section

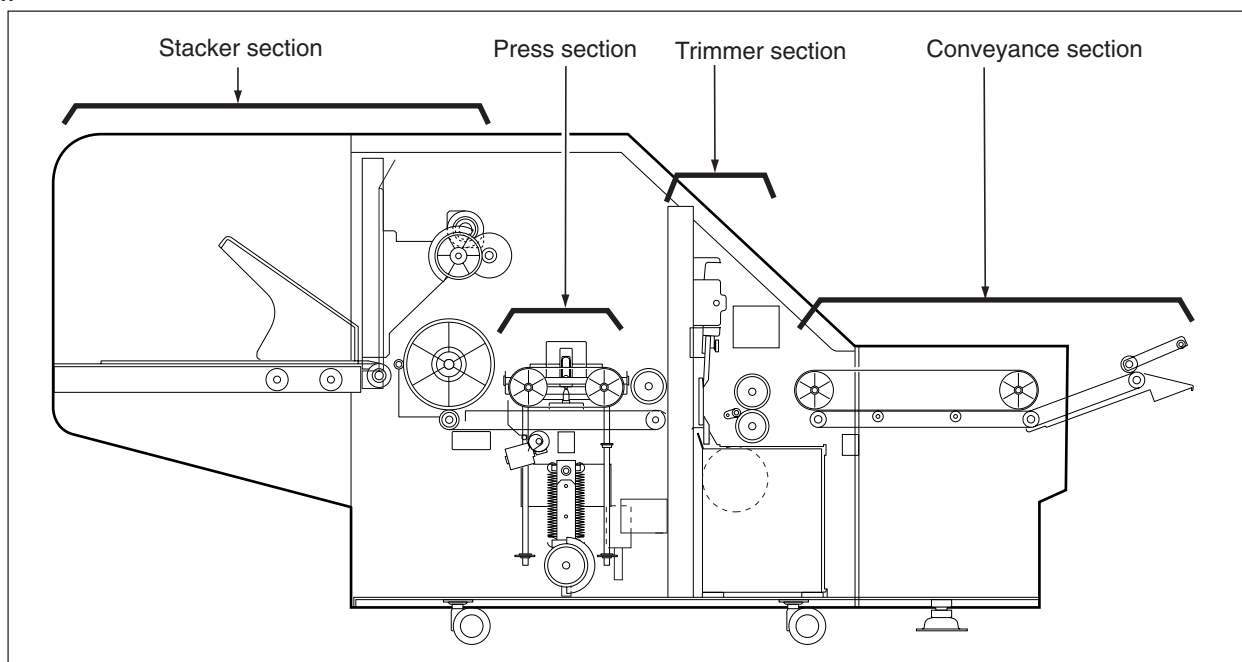


[4] Pusher Plate Drive/Holder Plate Drive



TRIMMING PROCESS

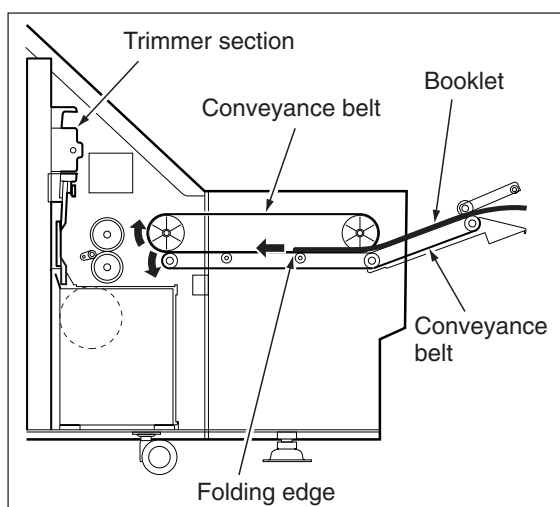
The Q3224A consists of a conveyance section, trimmer section, press section, and stacker section as shown below.



Note: The trimming process differs between the trim mode (booklet is cut) and the through mode (booklet is not cut). Select either of these modes using the operation panel of the engine.

[1] Booklet Conveyance

The conveyance belt conveys the booklet ejected from the finisher toward the trimmer with the folding edge facing forward.

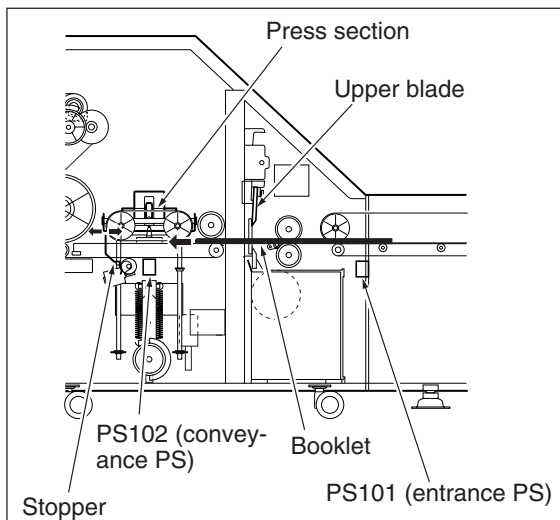


[2] Trimming Position Adjustment

a. Trim mode

The booklet conveyed to the trimmer section is then conveyed to the press section through the gap between the upper and lower knives (trimmer section) because the upper knife is in the upper position.

The stopper provided in the press section normally stands upright. It moves to the standby position specified for each paper size during the initial process performed at the beginning of stapling and folding copy operation. When the specified time lapses after the PS101 (entrance) is turned ON by the conveyed booklet, the stopper initiates a fine adjustment movement according to the number of booklet sheets and stops there. The folding edge of the booklet conveyed from the trimmer section is pressed against the stopper, then it stops when the specified time lapses after the PS102 (conveyance) is turned ON. Thus, the length in booklet feed direction (from the folding edge to the trim edge) is determined.



b. Through mode

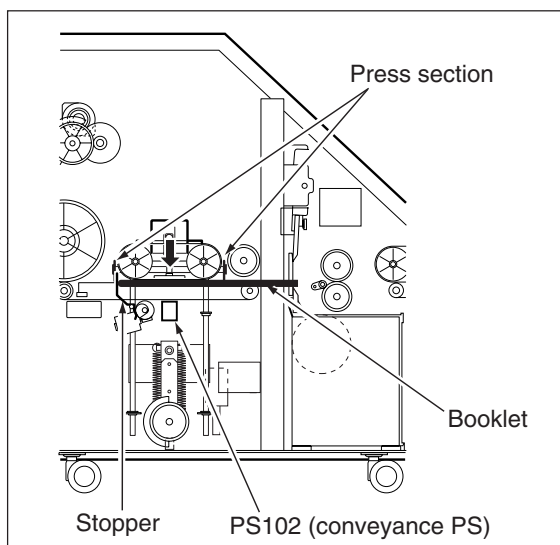
The stopper provided in the press section stands upright normally. In the through mode, the stopper is released at the start of the M101(conveyance), allowing the booklet to be conveyed toward the stacker.

[3] Booklet Press

a. Trim mode

The booklet stopped at the trimming position is held by the press plate provided in the press section when the specified time lapses after the PS102 (conveyance) is turned ON. This process is necessary so that all pages of the booklets are trimmed to the same size.

The press operation by the press plate continues until the trimming of booklet edge completes in the trimmer section.



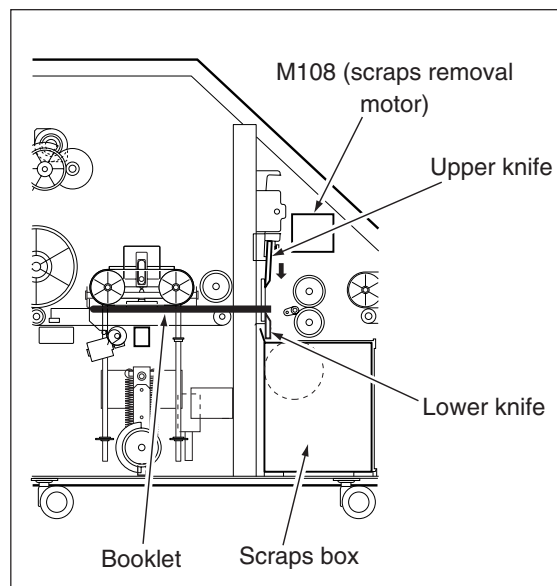
b. Through mode

Booklet press operation is not performed because the booklet is not trim in this mode.

[4] Trimming

a. Trim mode

After the press plate has pressed the booklet, the upper knife moves down to trim the booklet. Immediately after trimming the booklet, the upper knife moves up to the standby position. Paper scraps of the trim booklet are blown by the M108 (scraps removal) provided in the entrance of the conveyance section and collected in the scraps box provided in the lower part of the cutter section.



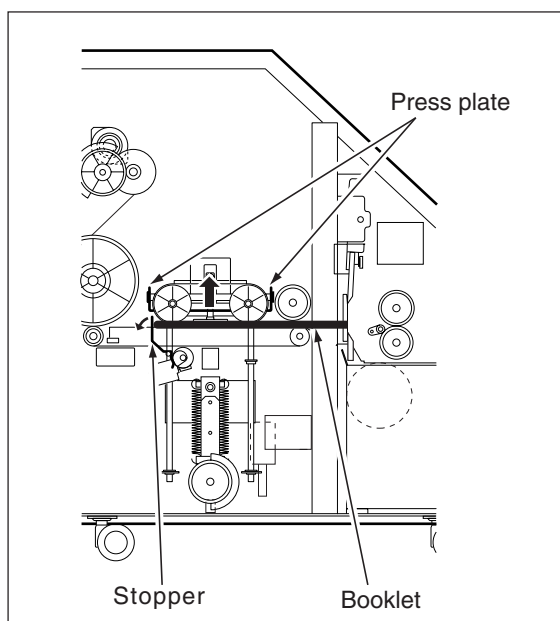
b. Through mode

The booklet is not trim in this mode.

[5] Press Release/Stopper Release

a. Trim mode

When trimming of the booklet is complete, the press plate moves up and the pressurized booklet is released. At the same time, the stopper is released, allowing the booklet to convey toward the stacker.

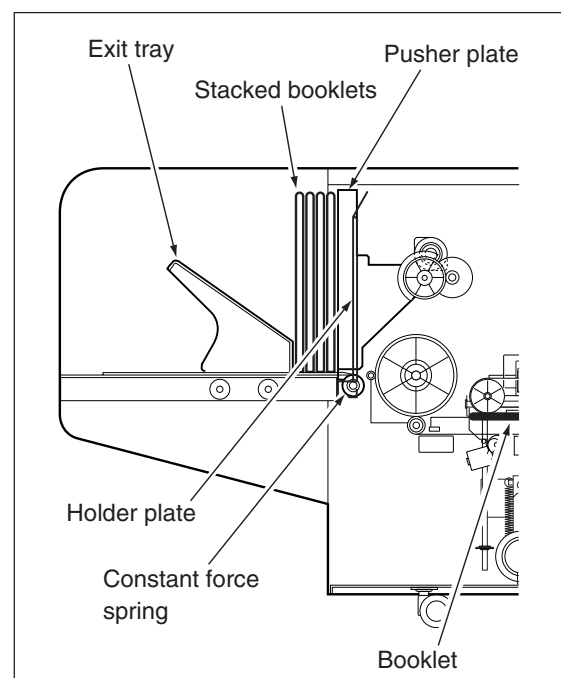


b. Through mode

Press release operation is not performed because the booklet is not trim in this mode.

[6] Booklet Ejection

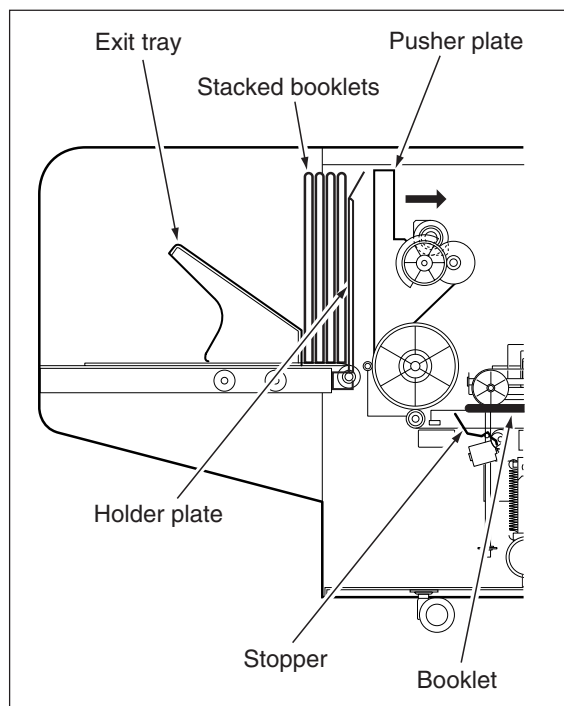
Normally, the pusher plate is positioned nearer the exit tray than holder plate. The exit tray is pulled toward the pusher plate by the constant force spring. The booklet is stacked upright between the pusher plate and the exit tray by the force of this spring.



a. Trim mode

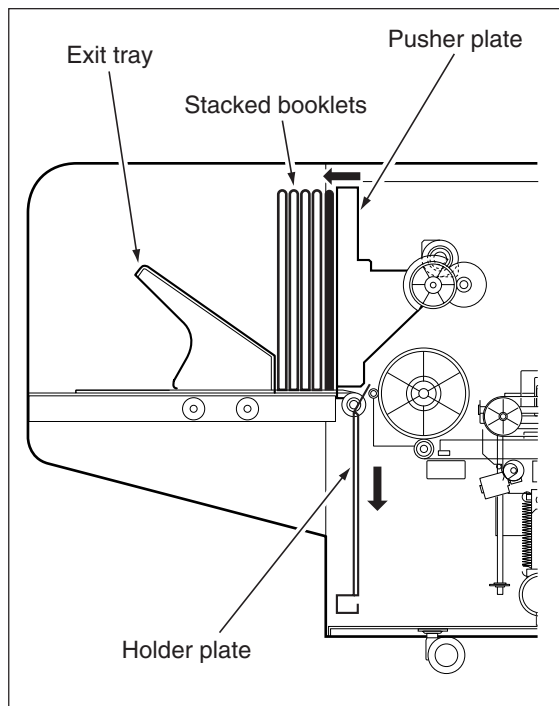
When the stopper is released, the pusher plate moves backward to the turnout position to open the booklet ejection path.

While the pusher plate is at the turnout position, the trimmed booklet is held stacked upright between the holder plate and the exit tray.



When the booklet ejection path is made with backward movement of the pusher plate and release of the press and stopper, the booklet conveyance is re-started again.

When the booklet comes out of the vertical conveyance roller, the holder plate moves down and the pusher plate moves forward.



When M101 (conveyance) turns ON, the stopper is released.

When the pusher plate reaches the forward position to hold the booklet between the pusher plate and the exit tray, the holder plate starts moving upward, stopping the upper limit position.

b. Through mode

When M101 (conveyance) Turns On, the stopper is released.

When the booklet is detected in the entrance conveyance section, the pusher plate moves back to the turnout position to open the booklet ejection path.

The succeeding operation is the same as in the trim mode. In the through mode, booklet conveyance does not stop temporarily because neither the press operation nor trimming operation is not performed in this mode.

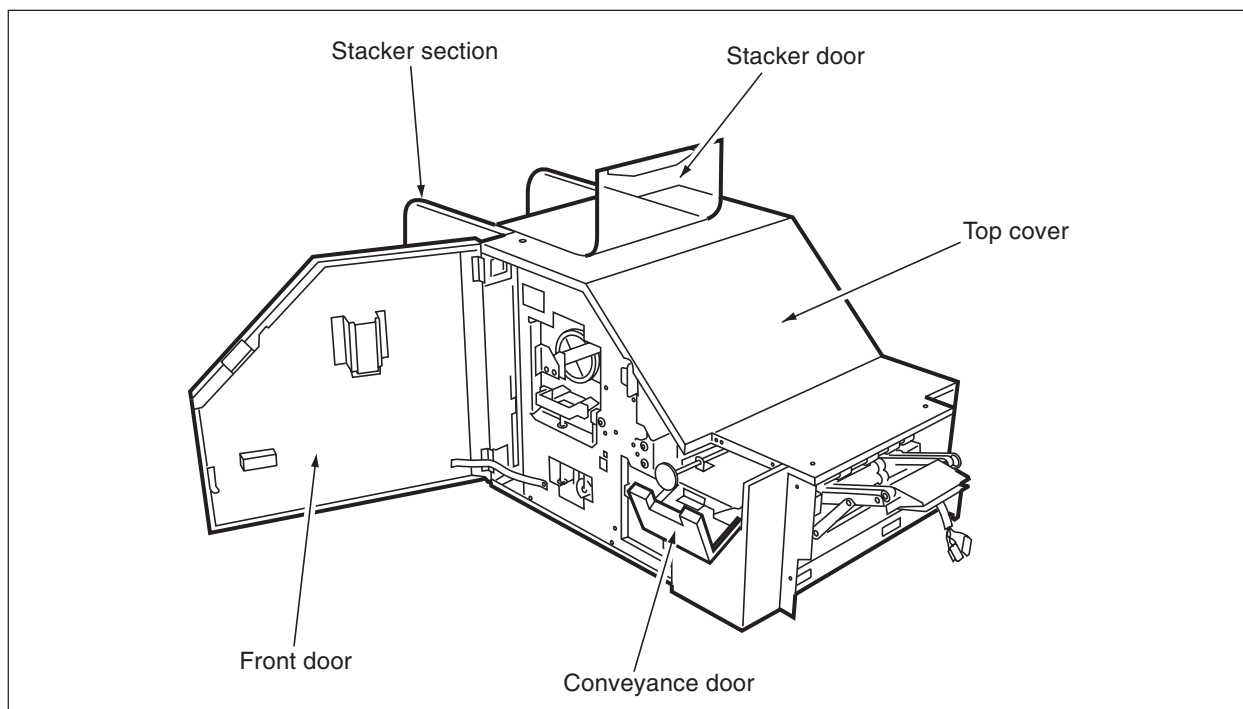


UNIT EXPLANATION

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EXTERNAL SECTION

[1] Composition



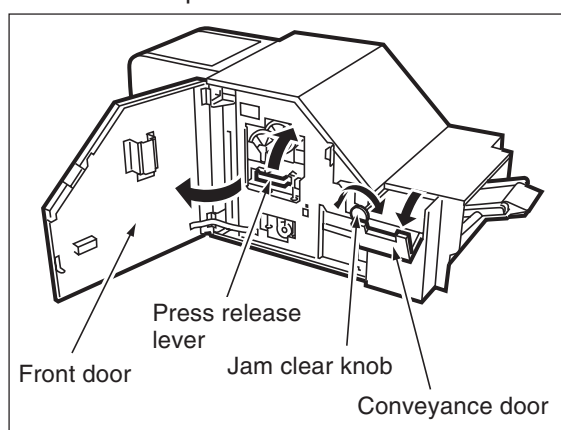
[2] Mechanisms

	Mechanism	Method
*1	Jam removal	Front door Conveyance door Jam clear knob Press release lever
*2	Paper scraps collection/removal	Scraps box

*1 Jam removal

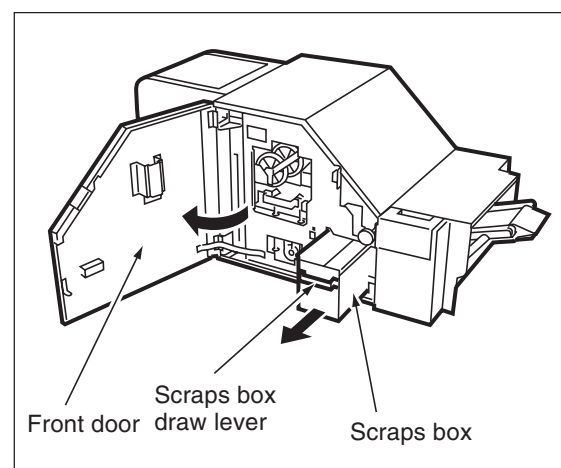
To remove the paper jammed at the entrance of the conveyance section, open the front door and conveyance door and turn the jam clear knob.

To remove the paper jammed in the press section, open the front door and move the press release lever upward.



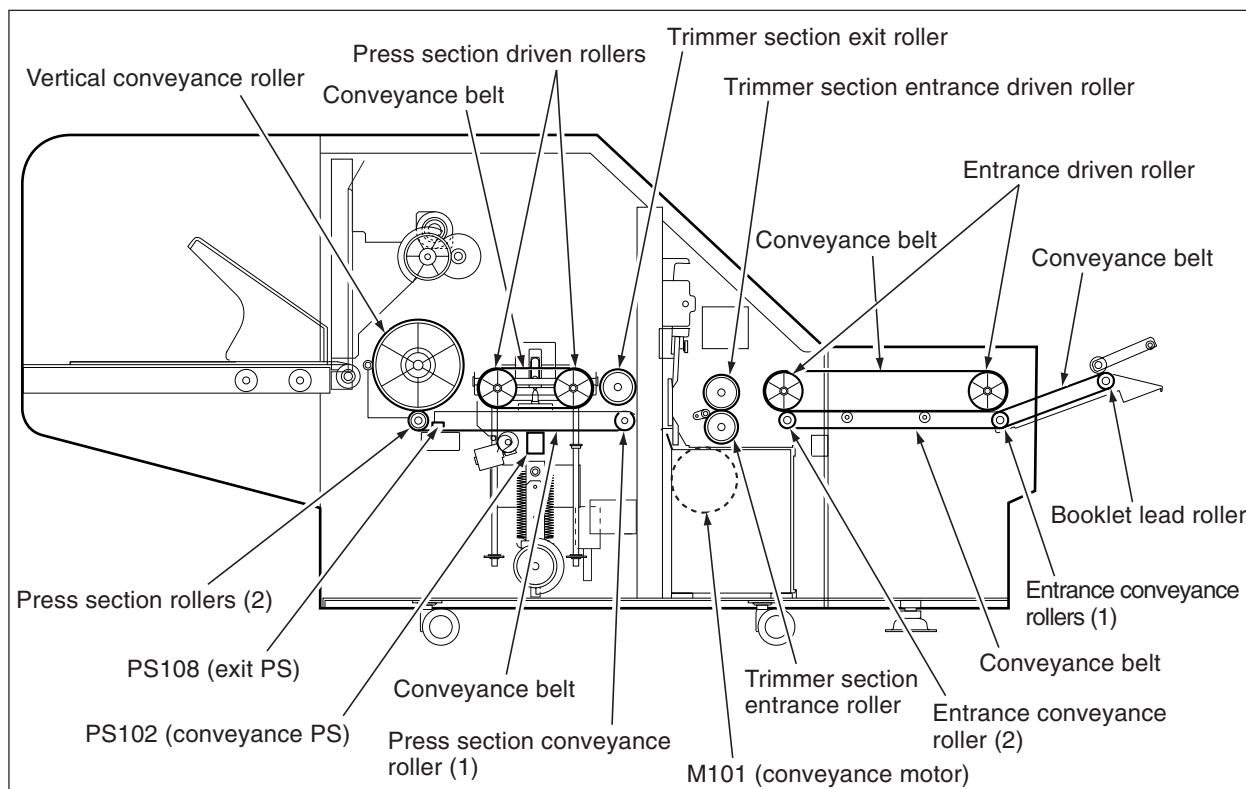
*2 Paper scraps collection/removal

Paper scraps of the trimmed booklet are collected in the scraps box. To remove the collected paper scraps, open the front door and draw out the scraps box with holding the scraps box draw lever.



CONVEYANCE SECTION

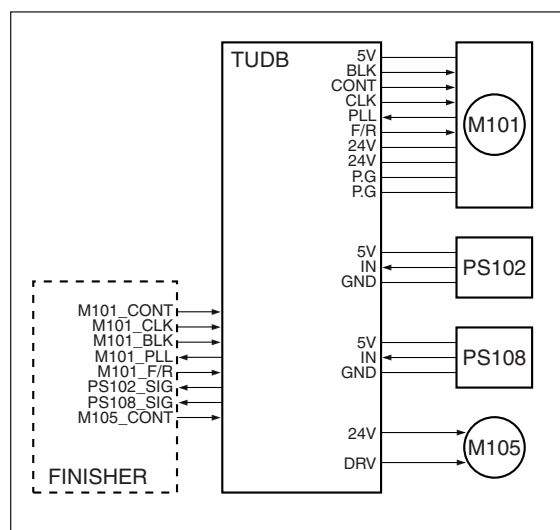
[1] Composition



[2] Mechanisms

Mechanism	Method
Conveyance drive	M101 (conveyance) for driving all components of conveyance drive section
Entrance conveyance	Booklet lead roller Entrance conveyance rollers (1) and (2) Entrance driven roller Conveyance belt
Trimmer section conveyance	Trimmer section entrance roller Trimmer section entrance driven roller
Press section conveyance	Press section conveyance rollers (1) and (2) Trimmer section exit roller Press section driven rollers Conveyance belt
Vertical conveyance	Vertical conveyance roller

[3] Conveyance Control



Booklets are conveyed by transferring the drive force of the M101(conveyance) to rollers. The M101 is driven by the TUDB (Trimmer drive board) under the control of the finisher. Related signals are PS102 (conveyance), and PS108 (exit).

1. Operation

There are two types of conveyance operations: entrance and ejected booklet conveyance. These conveyance operations differ between the trim mode (booklet is cut) and the through mode (booklet is not cut).

a. Entrance conveyance

(1) Trim mode

When the M20 (folding conveyance) of the finisher is turned ON, the M101(conveyance) is turned ON to convey the booklet ejected from the finisher to the entrance conveyance section at a speed of 580 mm/s.

The M101 turns OFF to stop conveying the booklet when the specified time lapses after the PS102 (conveyance) provided in the press section is turned ON by detecting the leading edge (folding edge) of the booklet.

The folding edge of the booklet is pressed against the stopper provided in the press section, allowing the booklet to be trimming.

(2) Through mode

The M101 is turned ON at the same timing as in the trim mode.

In the through mode, booklet conveyance does not stop temporarily for trimming; ejected booklet conveyance starts without turning OFF the M101.

b. Ejected booklet conveyance

(1) Trim mode

When the M105(press) stops pressing the press plate after the completion of trimming, the M101 turns ON again to convey the trimmed booklet toward the stacker section and eject it.

When the PS108 (exit) provided at the entrance of the holder section is turned OFF by detecting the trailing edge (trim edge) of the conveyed booklet, the M101 turns OFF to stop conveying the booklet, allowing the next booklet to be conveyed.

(2) Through mode

The M101 is held ON from the moment the booklet enters the entrance conveyance section to the moment it reaches the stacker section.

The M101 is turned OFF at the same timing as in the trim mode.

2. Signals

a. Input signals

(1) PS102_SIG (PS102 to TUDB to finisher)

This signal is used to detect a conveyed booklet in the press section.

[L]: Booklet exists.

[H]: Booklet does not exist.

(2) PS108_SIG (PS108 to TUDB to finisher)

This signal is used to detect ejection of a booklet at the entrance of the holder section.

[L]: Booklet exists.

[H]: Booklet does not exist.

(3) M101_PLL (M101 to TUDB to finisher)

M101 rotation monitoring signal

[L]: Stopped or locked

[H]: Rotating at the specified speed

(4) M105_CONT (Finisher to TUDB)

M105 ON/OFF control signal.

[L]: M105 ON

[H]: M105 OFF

b. Output signals

(1) M101_CONT (Finisher to TUDB to M101)

M101 ON/OFF control signal.

[L]: M101 ON

[H]: M101 OFF

(2) M101_CLK (Finisher to TUDB to M101)

This is a reference clock signal used to perform PLL control over the M101.

(3) M101_F/R (Finisher to TUDB to M101)

M101 rotational direction change signal.

[L]: Reverse

[H]: Forward

(4) M101_BLK (Finisher to TUDB to M101)

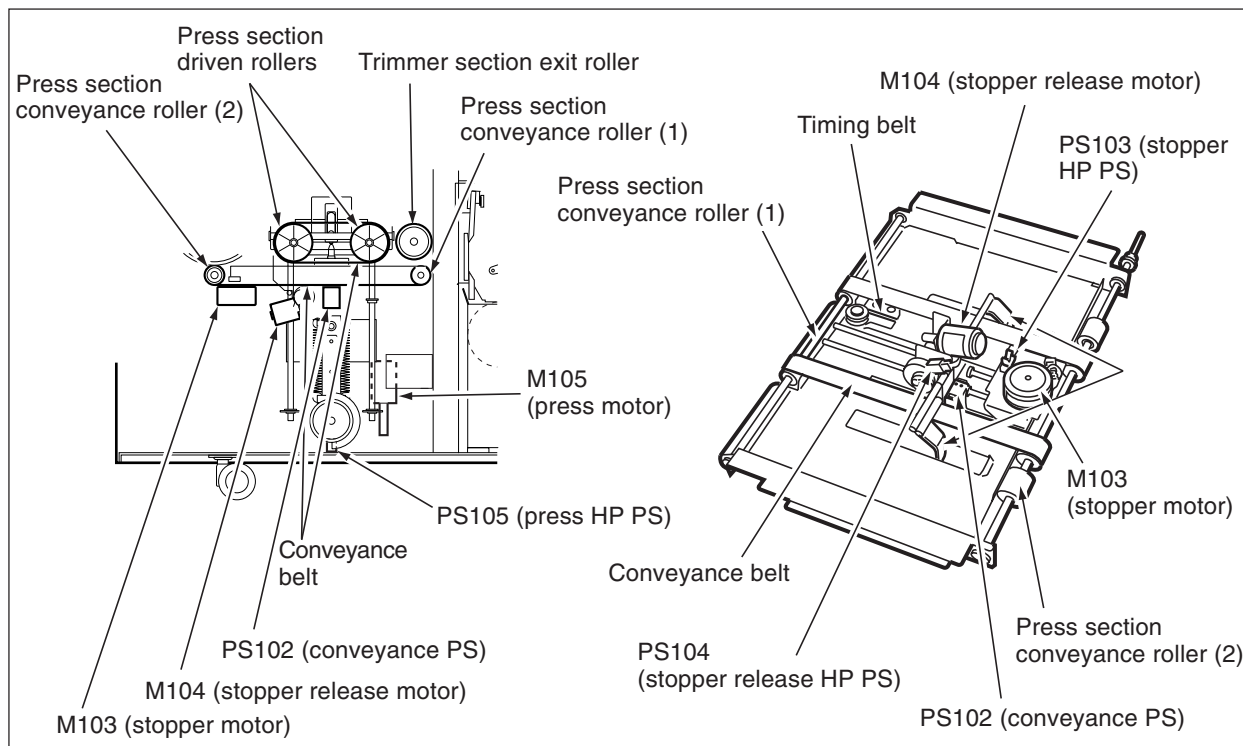
M101 brake signal.

[L]: Brake ON

[H]: Brake OFF

PRESS SECTION

[1] Composition

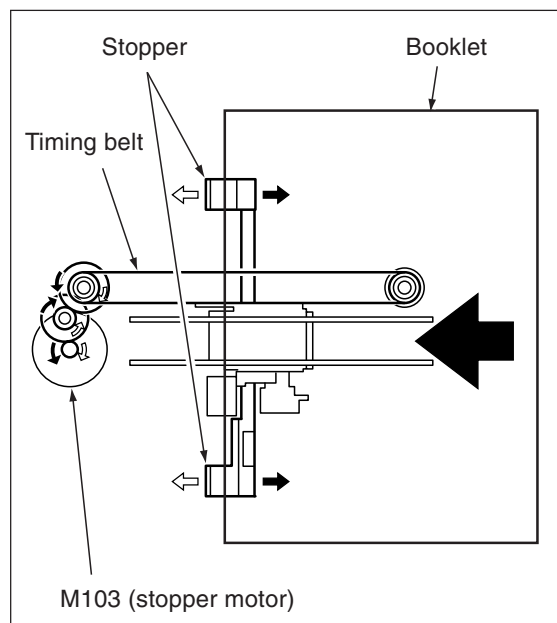


[2] Mechanisms

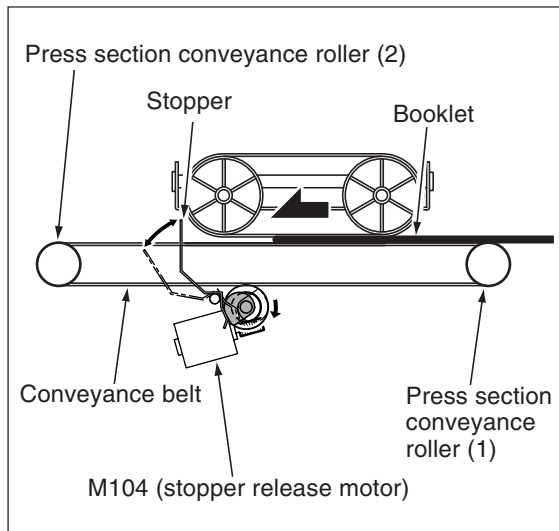
Mechanism	Method
Conveyance	Press section conveyance rollers (1) and (2) Trimmer section exit roller Press section driven roller Conveyance belt
*1 Stopper drive	Timing belt
*1 Stopper release	Movable stopper plate
*2 Booklet press	Guide plate pressurization

*1 Stopper drive/release

The length of the booklet to be trimmed in the feed direction is determined by the position of the stopper provided in the press section. The stopper is secured to the timing belt and moved horizontally by the M103 (stopper).

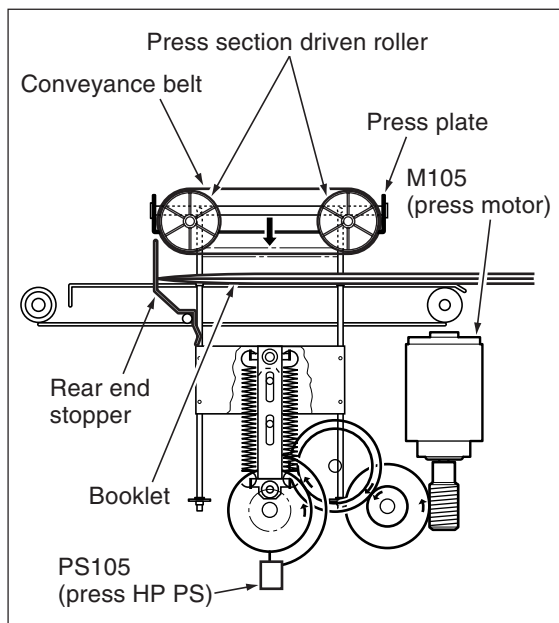


When a booklet arrives from the press section, the stopper is released by the M104 (stopper release) to allow the booklet to be conveyed to the next section.

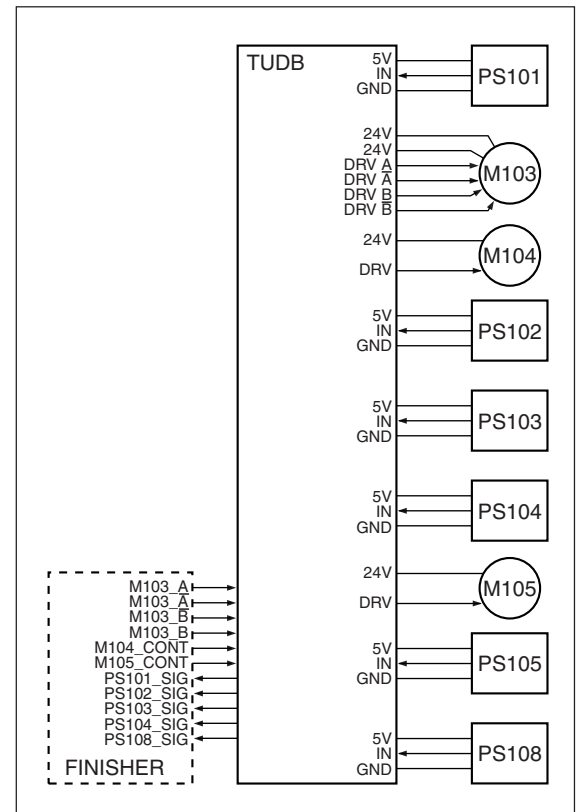


*2 Booklet press

The press plate is pressed against the booklet to hold it so that all pages of the booklets are trimmed to the same size. The press plate is driven by the M105 (press).



[3] Stopper/Press Control



To move the stopper horizontally, the M103(stopper) drives the timing belt to which the stopper is secured.

To release the stopper, the drive force of the M104 (stopper release) is transferred via gears.

To press the booklet, the drive force of the M105 (press) is transferred to the press plate via gears and linkages.

The M103, M104 and M105 are driven by the TUDB (Trimmer drive board) under the control of the finisher. Related signals are PS101 (entrance), PS102 (booklet conveyance), PS103 (stopper HP), PS104 (stopper release HP), PS105 (press HP), and PS108 (exit).

1. Operation

The press operation is performed only in the trim mode (booklet is cut); it is not performed in the through mode (booklet is not cut).

a. Stopper movement

The stopper moves to the standby position specified for each paper size during the initial process performed at the beginning of stapling and folding copy operation by finisher. In the trim mode, when the specified time lapsed after the PS101 (entrance) is turned ON by detecting the leading edge (folding edge) of the conveyed booklet, the M103 (stopper) turns ON again and the stopper takes fine adjustment movement. (to adjust it to the number of booklet sheets in order to trim the booklet exact regardless of the number of sheets.) Then, the folding edge of the conveyed booklet is pressed against the stopper to position the booklet at the trimming position.

For wide paper and the through mode, stopper's fine adjustment movement is not taken.

b. Booklet press

When the PS102(conveyance) detects the leading edge (folding edge) of the conveyed booklet, conveyance stops after lapse of the specified time and at the same time the M105(press) turns ON to pressurize the booklet.

The booklet is pressurized for the specified period of time to complete trimming. The stopper returns to the stand by position determined for the size of booklet

c. Press release

When trimming is complete, the M105 turns ON again to release the booklet press. At the same time the M104 (stopper release) turns ON to release the stopper.

Upon detection of the home position by PS105(press HP), the M105 turns OFF to enter the standby state.

d. Stopper release

(1) Trim mode

After completion of trimming, the M104 is ON unit PS104(stopper release HP) is turned OFF to release the stopper, allowing the booklet to be ejected.

(2) Through mode

When M101(conveyance) turns ON, the M104 turns ON to release the stopper, allowing the booklet to be conveyed through.

e. Stopper setting

When the PS108 (exit) detects the trailing edge (trim edge) of the booklet conveyed for ejection, the M104 turns ON again. Then, the M104 turns OFF when the PS104 (stopper release HP) turns ON, thus the stopper stands upright.

f. Stopper movement to home position

When the last booklet ejection process is completed in the stacker section, the M103 turns ON again to move the stopper to the home position. When the home position is detected by the PS103 (stopper HP), the M103 turns OFF.

2. Signals

a. Input signals

(1) PS101_SIG (PS101 to TUDB to finisher)

This signal is used to detect a conveyed booklet at the entrance of the conveyance section.

[L]: Booklet exists.

[H]: Booklet does not exists

(2) PS103_SIG (PS103 to TUDB to Q3220A)

This signal is used to detect the lateral home position of the stopper.

[L]: Home position

[H]: Other than home position

(3) PS104_SIG (PS104 to TUDB to finisher)

This signal is used to detect the posture of the stopper.

[L]: Upright

[H]: Release

(4) PS105_SIG (PS105 to TUDB to finisher)

This signal is used to detect the home position of the press plate.

[L]: Home position

[H]: Other than home position

(5) DRV (TUDB to M105)

M105 drive signal

[L]: M105 ON

[H]: M105 OFF

(6) M103_A, $\bar{A}$ (Finisher to TUDB)

This signal is used to control the A-phase of the M103.

(7) M103_B, $\bar{B}$ (Finisher to TUDB)

This signal is used to control the B-phase of the M103.

- (8) M104_CONT (Finisher to TUDB)

M104 ON/OFF control signal.

[L]: M104 ON

[H]: M104 OFF

b. Output signals

- (1) DRV A, $\bar{A}$ (TUDB to M103)

This signal is used to drive the A-phase of the M103.

- (2) DRV B, $\bar{B}$ (TUDB to M103)

This signal is used to drive the B-phase of the M103.

- (3) DRV (TUDB to M104)

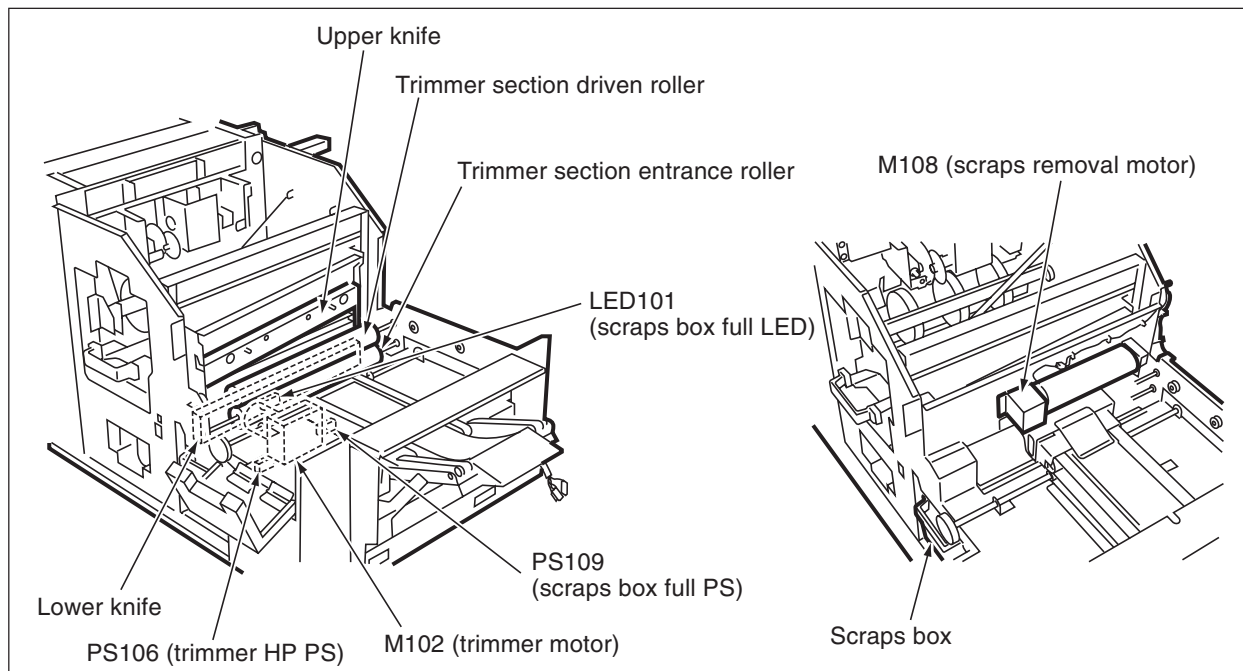
M104 drive signal

[L]: M104 ON

[H]: M104 OFF

TRIMMER SECTION

[1] Composition

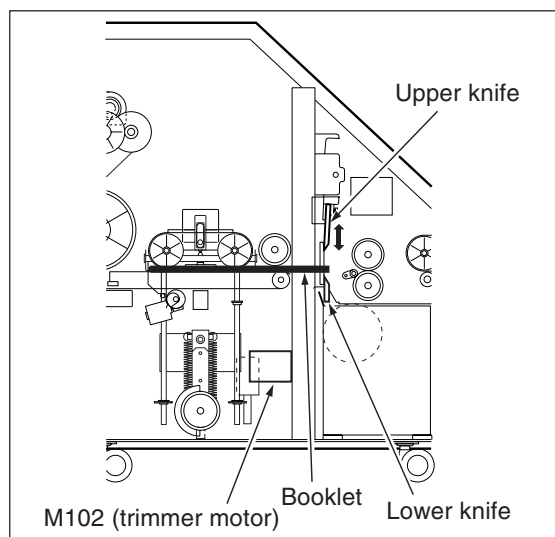


[2] Mechanisms

Mechanism	Method
Conveyance	Trimmer section entrance roller Trimmer section driven roller
*1 Trimming	Upper-knife-reciprocating-type trimmer
*2 Paper scraps removal	Blow by fan Paper scraps box

*1 Trimming

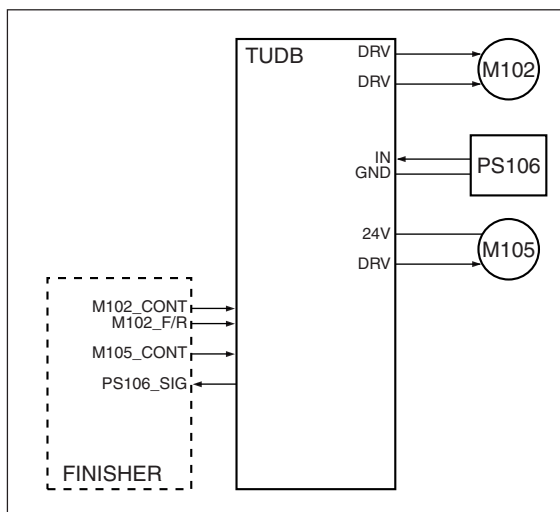
The lower knife is fixed and the upper knife moves vertically to trim a booklet. The upper knife is driven by the M102 (trimmer). Normally, it stays at the home position (upper position).



*2 Paper scraps removal

Paper scraps of the cut booklet are blown by the scraps removal fan driven by M108 (scraps removal) and collected in the scraps box provided in the lower part of the trimmer section.

[3] Trimmer Control



The upper knife is driven by the M102 (trimmer). Normally, the upper knife is held at the upper position (no trimming position). It is supervised by the PS106 (trimmer HP) at all times.

The M102 is driven by the TUDB (Trimmer drive board) under the control of the finisher.

1. Operation

When the M105 (press) stops pressuring the booklet, the M102 starts turning forward to move the upper knife down to trim the booklet and then upward to release it.

The PS106 is used to detect the home position of the upper knife.

2. Signals

a. Input signals

- (1) PS106_IN (PS106 to TUDB to finisher)

This signal is used to detect the home position of the upper knife.

[L]: Home position

[H]: Other than home position

- (2) M102_CONT (Finisher to TUDB)

M102 and M108 ON/OFF control signal.

[L]: M102/M108 ON

[H]: M102/M108 OFF

- (3) M102_F/R (Finisher to TUDB)

M102 rotational direction change signal.

[L]: Reverse

[H]: Forward

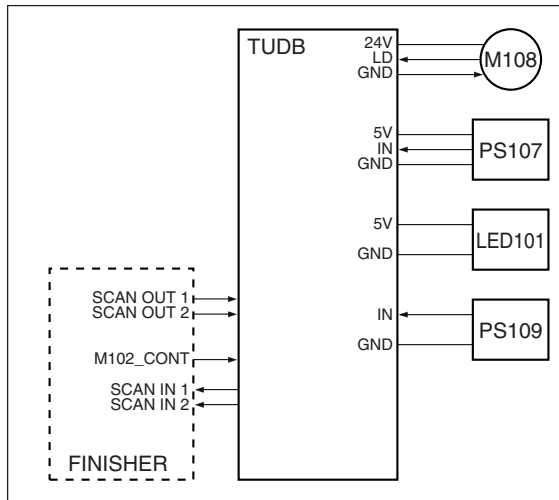
b. Output signals

- (1) DRV (TUDB to M102)

M102 drive control signal.

The rotational direction of the M102 is controlled according to the combination of the levels of two DRVs.

[4] Scraps Removal Control



Paper scraps are blown by the scraps removal fan driven by M108 (scraps removal) and collected in the scraps box. The scraps box is provided with an LED101 (scraps full LED) and a PS109 (scraps full). When the scraps box becomes full, the full state is displayed on the operation panel of the engine. The M108 is driven by the TUDB (Trimmer drive board) under the control of the finisher. The related signal is a PS107 (scraps box detect).

1. Operation

a. Scraps removal motor operation

The M108 turns ON/OFF in sync. with the M102 (trimmer).

b. Scraps box full state detection

When the scraps box is filled with scraps, the light path between the LED101 and the PS109 which are provided on both sides of the scraps box is blocked to turn OFF the PS109. Thus, the message indicating that the scraps box is full is displayed on the engine.

2. Signals

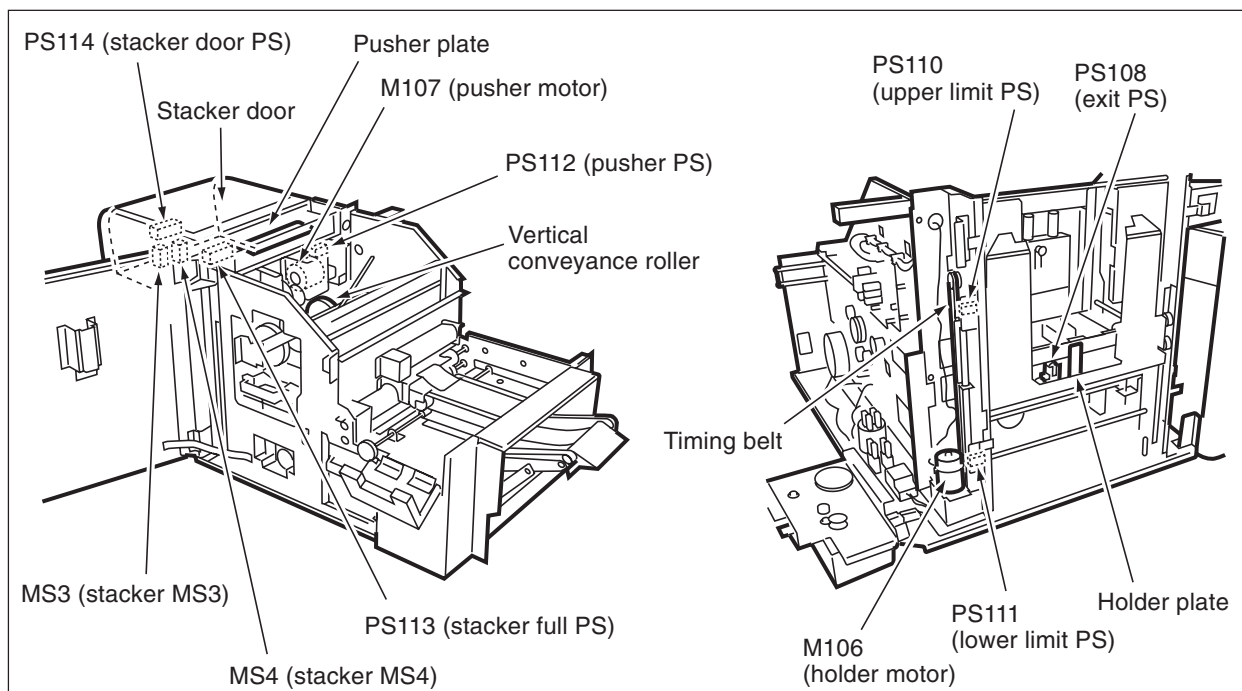
a. Input signals

- (1) IN (PS107 to TUDB)
Scraps box setting detection signal.
[L]: Scraps box is set.
[H]: Scraps box is not set.
- (2) IN (PS109 to TUDB)
Scraps box full state detection signal.
[L]: Not full
[F]: Full

- (3) LD (M108 to TUDB)
M108 error detection signal.
[H]: Error
 - (4) SCAN OUT1, 2 (Finisher to TUDB)
Serial data line used to report the operating state of the finisher to the Q3224A.
- b. Output signals**
- (1) GND (TUDB to M108)
M108 drive signal.
[L]: M108 ON
[H]: M108 OFF
 - (2) SCAN IN1, 2 (TUDB to finisher)
Serial data line used to report the operating state of this machine to the finisher.

STACKER SECTION

[1] Composition



[2] Mechanisms

	Mechanism	Method
	Conveyance	Vertical conveyance roller
*1	Booklet ejection	Holder plate Pusher plate
*2	Upright stack	Exit tray Constant force spring

*1 Booklet ejection

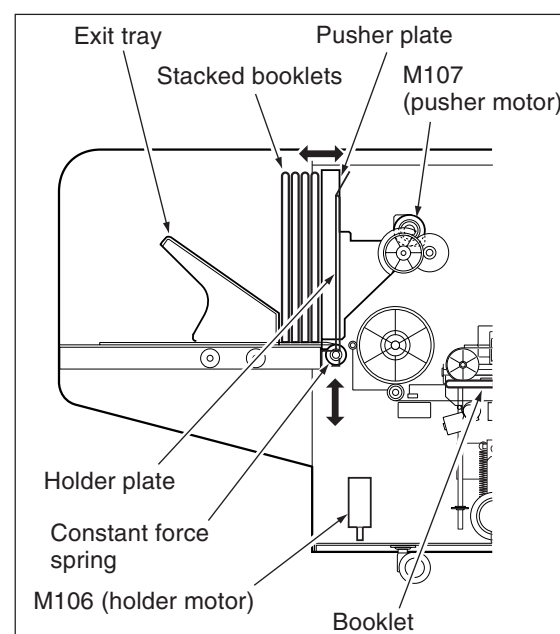
Normally, the pusher plate is at the forward position to hold the booklet upright with it pressed against the exit tray pulled by the constant force spring.

At this position, the pusher plate blocks the booklet ejection path.

When the booklet ejection process starts, the M107 (pusher) moves the pusher plate back to the turnout position, opening the booklet ejection path. At this time, the booklet is stacked upright between the exit tray and the holder plate located at the upper limit position.

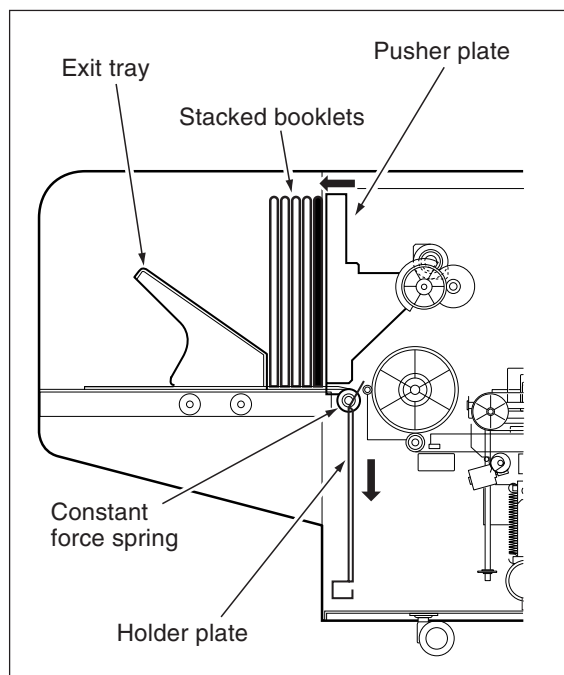
The booklet conveyed from the press section is then ejected by the vertical conveyance roller. When the PS108 (exit) detects the trailing edge of the booklet, conveyance stops. After the specified period of time, the M106 (holder)

rotates to move the holder plate downward. Furthermore, the pusher plate moves forward after the specified period of time to push the newly ejected booklet out of the booklet ejection path. Thus, the booklet is stacked upright between the pusher plate and the exit tray. When the specified time lapses after the pusher plate stops, the holder plate moves to the upper limit position.

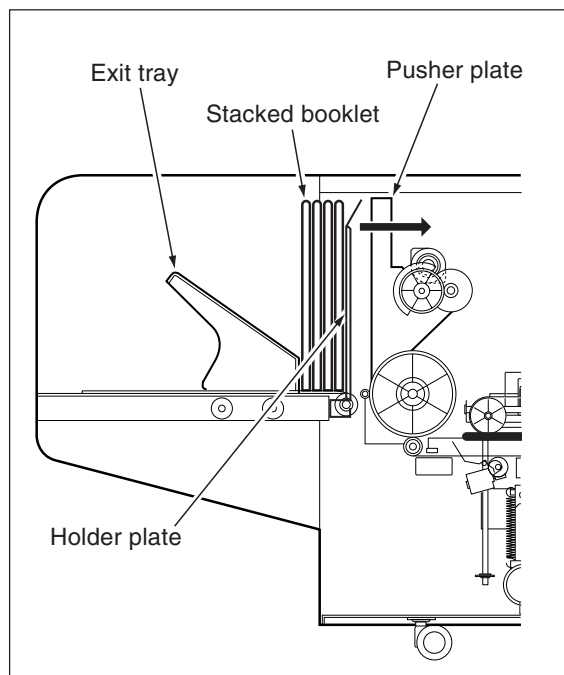


*2 Upright stack

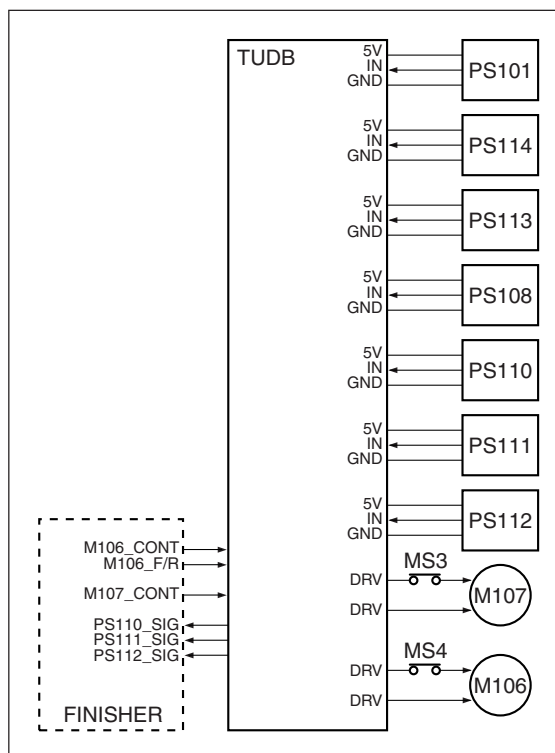
The ejected booklet is stacked upright between the exit tray and the pusher plate. The exit tray is pressed against the pusher plate by the force of the constant force spring.



When the pusher plate is at the turnout position to open the booklet ejection path, the booklet is held stacked upright between the exit tray and the holder plate.



[3] Booklet Ejection/Stack Control



The holder plate is driven by the M106 (holder) via the timing belt. The pusher plate is driven by the M107 (pusher) via gears. The M106 and M107 are driven by the TUDB (Trimmer drive board) under the control of the finisher. The related signals are PS101 (entrance), PS108 (exit), PS110 (upper limit), PS111 (lower limit), PS112 (pusher), PS113 (stacker full) and PS114 (stacker door).

1. Operation

The ejection/stack operation differs between the trim mode (booklet is cut) and through mode (booklet is not cut).

a. Preparaton of booklet ejection to the stacker

(1) Trim mode

When the specified time lapses after trimming has completed and stopper release operation started, the M107 turns ON to move the pusher plate to the turnout position to open the booklet ejection path.

(2) Through mode

When the PS101 (entrance) detects the leading edge (folding edge) of the conveyed booklet, the M107(pusher) turns ON to move the pusher plate to the turnout position to open the booklet ejection path.

b. Booklet ejection to stacker

(1) Trim mode

When the specified time lapses after the PS108 (exit) detects the trailing edge (trim edge) of the booklet conveyed by the M101(conveyance), the M106(holder) starts reversing to lower the holder plate. When the PS111(lower limit) detects the lower limit of the holder plate, the M106 turns OFF.

When the specified time lapses after the M106(holder) turns ON, the M107 turns ON again to drive the pusher plate to push out the booklet in the holder section to the exit tray.

When the specified time lapses after the booklet is pushed out by the pusher plate, the M106 rotates in the forward direction to raise the holder plate. When the PS110(upper limit) detects the upper limit position of the holder plate, the M106 stops rotating in the forward direction, thus completing booklet ejection.

(2) Through mode

The operation in the through mode is the same as in the trim mode.

c. Upright stack/stacker full state detection

The booklet pushed out of the booklet ejection path is stacked upright between the pusher plate and the exit tray. When the total thickness of the stacked booklets becomes the specified value, the PS113(stack full) turns ON to display the message indicating that the stacker is full on the operation panel of the engine.

d. Safety mechanism

If the stacker door is opened while this machine is operating, the MS3 and MS4 turn OFF to block the drive signal paths of the M106 and M107, causing this machine to stop operating.

At this time, PS114(stacker door) also turns OFF to display an error message on the operation panel of the engine.

2. Signals**a. Input signals**

- (1) PS110_SIG (PS110 to TUDB to finisher)
Holder plate upper limit detection signal.
[L]: Other than upper limit
[H]: Upper limit
- (2) PS111_SIG (PS111 to TUDB to finisher)
Holder plate lower limit detection signal.
[L]: Other than lower limit
[H]: Lower limit
- (3) PS112_SIG (PS112 to TUDB to finisher)
Pusher plate home position detection signal.
[L]: Home position
[H]: Other than home position
- (4) IN (PS113 to TUDB)
Stacker full state detection signal.
[L]: Full
[H]: Not full
- (5) M106_CONT (Finisher to TUDB)
M106 ON/OFF control signal.
[L]: M106 ON
[H]: M106 OFF
- (6) M106_F/R (Finisher to TUDB)
M106 rotational direction change signal.
[L]: M106 Forward
[H]: M106 Reverse
- (7) M107_CONT (Finisher to TUDB)
M107 ON/OFF control signal.
[L]: M107 ON
[H]: M107 OFF

b. Output signals

- (1) DRV (TUDB to M106)
M106 drive control signal.
The rotational direction of the M106 is controlled according to the combination of the levels of two DRVs.

State	DRV	DRV
Holder moves down	H	L
Holder moves up	L	H
Stop	L	L

- (2) DRV (TUDB to M107)
M107 drive control signal.

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DISASSEMBLY / ASSEMBLY

This section explains how to disassemble and reassemble the machine. When disassembling and reassembling the machine, follow the precautions given below.

1. Be sure the power cord has been unplugged from the wall outlet.
2. The disassembled parts must be reassembled following the disassembly procedure in reverse unless otherwise specified.
3. Care should be taken not to lose small parts. Care should also be taken not to install small parts in wrong places.
4. Do not operate the machine before installing all the disassembled parts completely.
5. Removal of some screws is prohibited in this section. Never loosen them.

TRIMMER SECTION

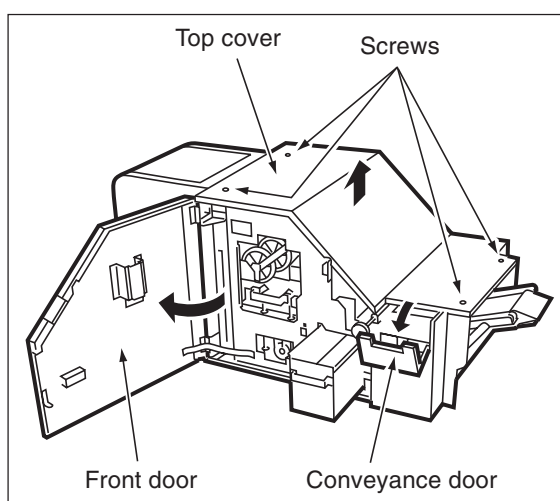
[1] Replacing the Upper and Lower Knives

⚠ Caution:

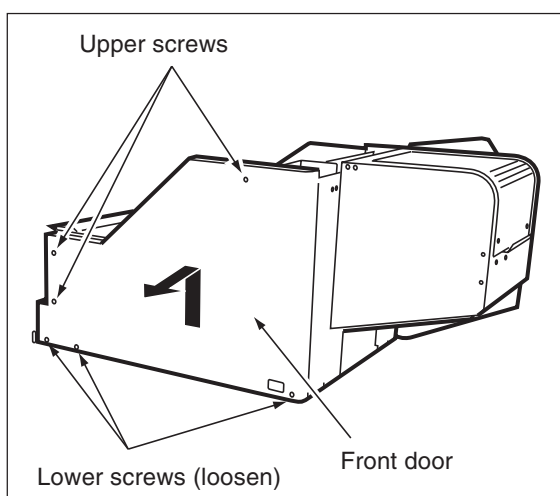
1. Be sure to unplug the power cords of the engine, and this machine from the wall out let.
2. Trimming knives (upper and lower) are used in this machine. Be extremely careful in handling these knives.

a. Procedure

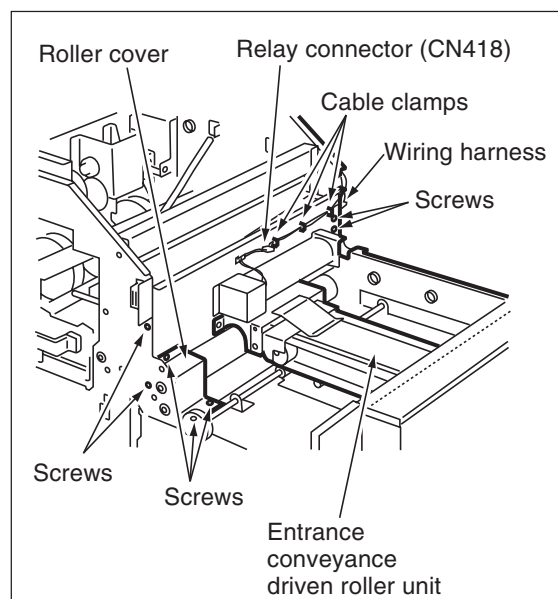
- (1) Open the front door and conveyance door.
- (2) Remove the four screws to detach the top cover.



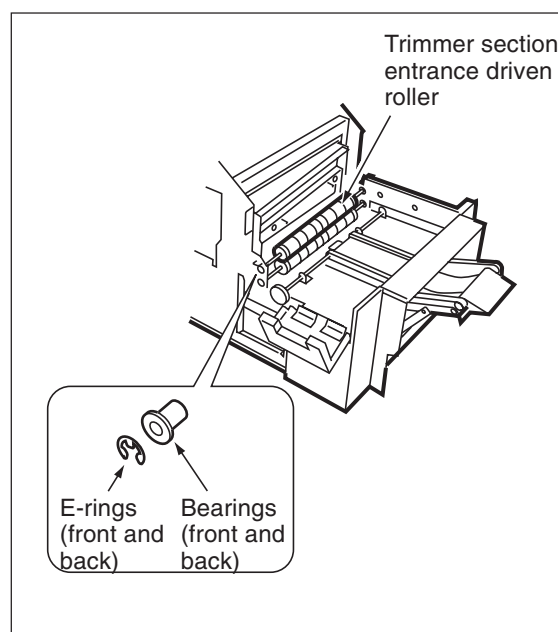
- (3) Remove the securing screw of cable clamp which holds the power cable, then unplug the power plug.
- (4) Loosen the three lower screws, then remove the three upper screws to detach the rear cover.



- (5) Remove the three screws to detach the roller cover.
- (6) Disconnect the relay connector (CN418) and release the wiring harness from cable clamps.
- ⚠ (7) Remove the two screws at the front and the two screws at the back to remove the entrance conveyance roller unit.



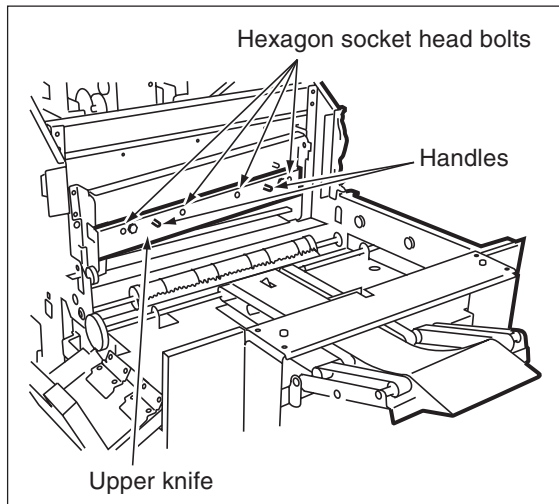
- ⚠ (8) Remove the E-ring and bearing at the front and the E-ring and bearing at the back to remove the trimmer section entrance driven roller.



- ⚠ (9) Remove the four hexagon socket head bolts to remove the upper knife.

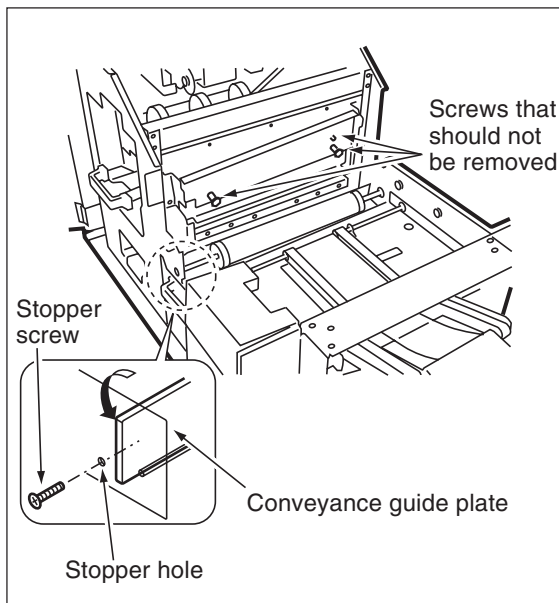
Caution 1: Remove the upper knife holding the two handles.

Caution 2: Take care not to drop the upper knife or chip the knife by hitting a solid component.



- ⚠ (10) Turn down the conveyance guide plate. Then, insert a small shaft such as a screw (longer than M4 x 16) into the stopper hole to prevent the guide plate from returning to the original position.

Caution: Do not touch the three screws that should not be removed.

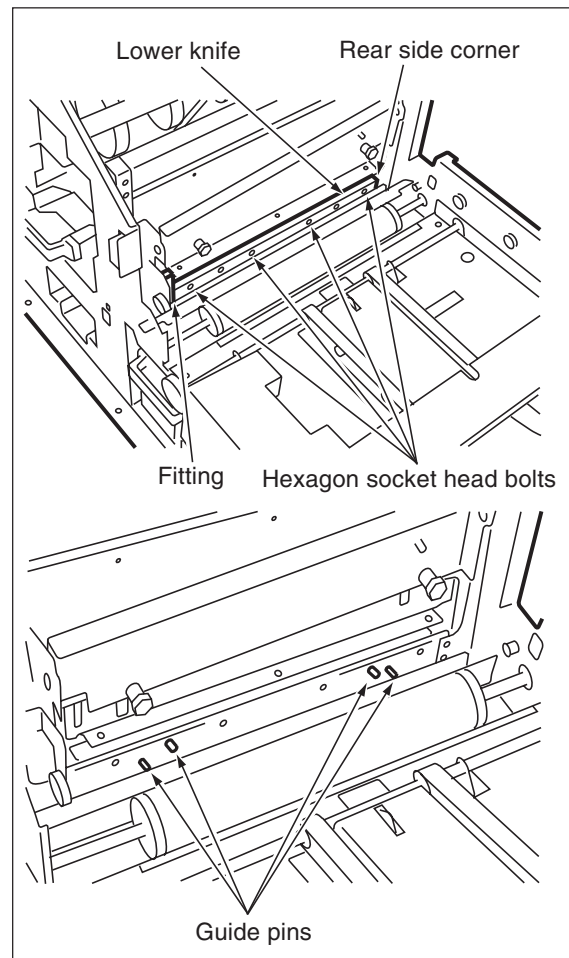


- ⚠ (11) Remove the four hexagon socket head bolts to remove the lower knife.

Caution 1: Remove the lower knife holding the fitting at the front and the corner at the back.

Caution 2: Take care not to drop the lower knife or chip the knife by hitting a solid component.

Caution 3: To install the lower knife, insert it with its holes aligned with the four guide pins.



- ⚠ (12) Reinstall the above parts following the removal steps in reverse.

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