

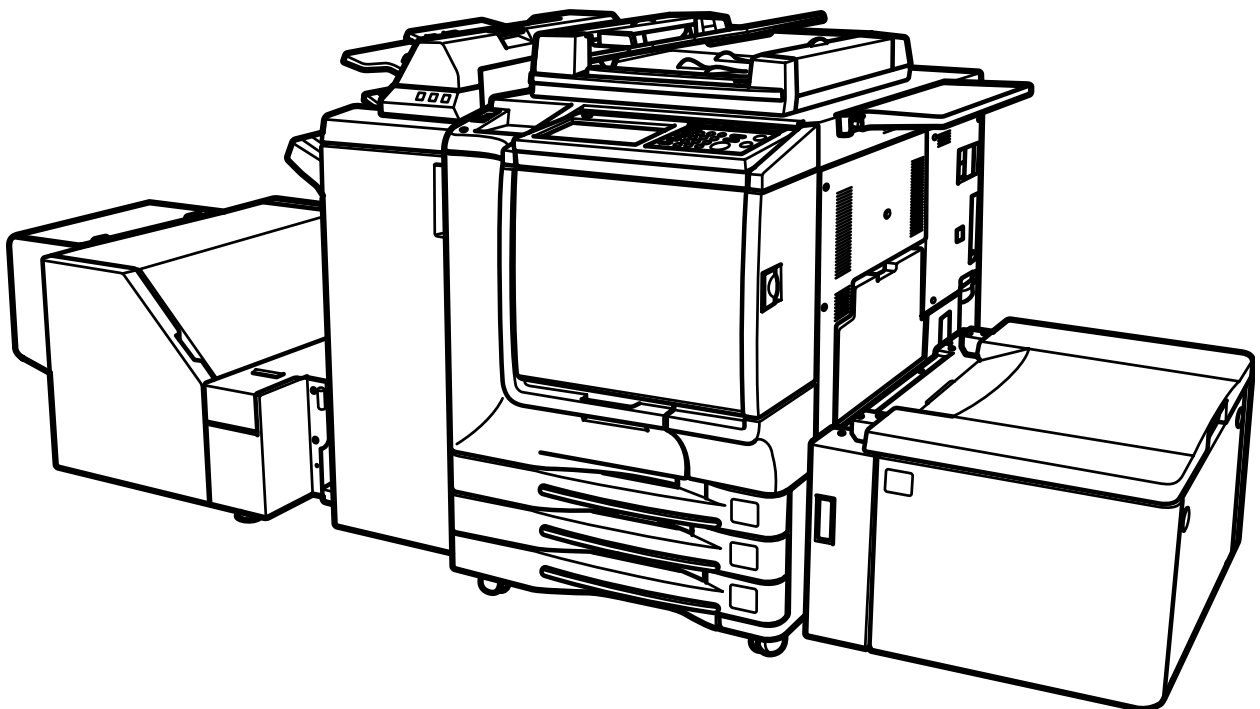
KONICA MINOLTA

Service Manual

[General]

The essentials of imaging

CF5001



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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 copier as well as the risk of damage to the copier, Minolta Corporation strongly recommends that all servicing be performed only by Minolta-trained service technicians.




Changes may have been made to this copier to improve its performance after this Service manual was printed. Accordingly, Minolta Corporation 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 copier while servicing the copier 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 copier 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 copier, 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 copier.

 General precaution

 Electric hazard

 High temperature

 :Prohibition when using the copier.

 General prohibition

 Do not touch with wet hand

 Do not disassemble

 :Direction when using the copier.

 General instruction

 Unplug





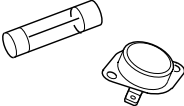

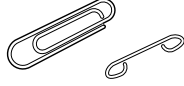

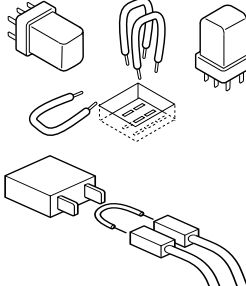



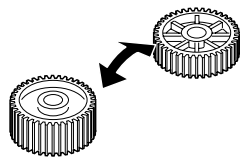
 Ground/Earth

SAFETY WARNINGS

1. MODIFICATIONS NOT AUTHORIZED BY MINOLTA

Minolta copiers are renowned for their high reliability. This reliability is achieved through high-quality design and a solid service network.

Copier 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	
<ul style="list-style-type: none"> Using any cables or power cord not specified by Minolta. 	 
<ul style="list-style-type: none"> Using any fuse or thermostat not specified by Minolta. Safety will not be assured, leading to a risk of fire and injury. 	 
<ul style="list-style-type: none"> Disabling fuse functions or bridging fuse terminals with wire, metal clips, solder or similar object. 	 
<ul style="list-style-type: none"> Disabling relay functions (such as wedging paper between relay contacts) 	 
<ul style="list-style-type: none"> Disabling safety functions (interlocks, safety circuits, etc.) Safety will not be assured, leading to a risk of fire and injury. 	
<ul style="list-style-type: none"> Making any modification to the copier unless instructed by Minolta. 	
<ul style="list-style-type: none"> Using parts not specified by Minolta. 	 

2. CHECKPOINTS WHEN PERFORMING ON-SITE SERVICE

Minolta copiers 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.

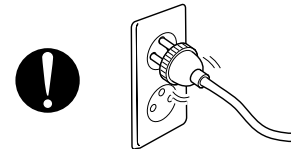


- If two or more power cords can be plugged into the wall outlet, the total load must not exceed the rating of the wall outlet.

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

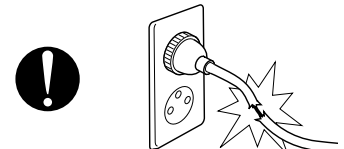
WARNING: Power Plug and Cord

- 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.

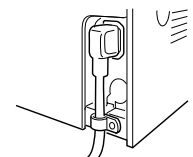
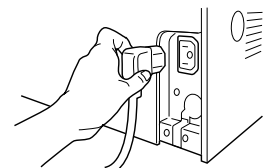
If the power plug, cord, or sheath is damaged, replace with a new power cord (with plugs on both ends) specified by Minolta. Using the damaged power cord may result in fire or electric shock.



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

- Make sure the copier-side power plug is securely inserted in the socket on the rear panel of the copier. 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 Minolta.

If the power cord (inlet type) is not connected to the copier 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.

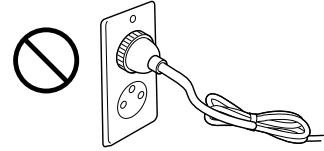
Overheating may occur there, leading to a risk of fire.



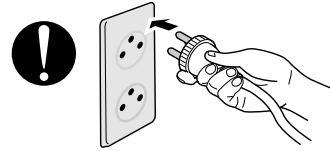
SAFETY AND IMPORTANT WARNING ITEMS

 **WARNING: Power Plug and Cord**

- Do not bundle or tie the power cord.
Overheating may occur there, leading to a risk of fire.



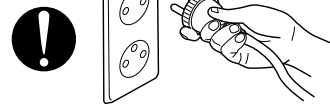
- Check whether dust is collected around the power plug and wall outlet.
Using the power plug and wall outlet without removing dust may result in fire.



- Do not insert the power plug into the wall outlet with a wet hand.
The risk of electric shock exists.

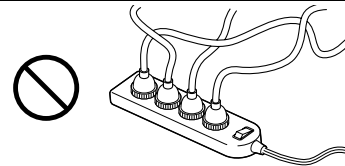


- When unplugging the power cord, grasp the plug, not the cable.
The cable may be broken, leading to a risk of fire and electric shock.

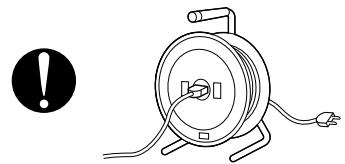


 **WARNING: Wiring**

- Never use multi-plug adapters to plug multiple power cords in the same outlet.
If used, the risk of fire exists.

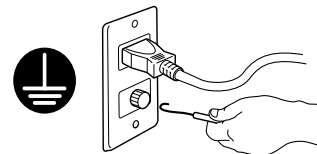


- When an extension cord is required, use a specified one.
Current that can flow in the extension cord is limited, so using an extension cord which is too long, may result in fire.
Do not use an extension cable reel with the cable taken up. Fire may result.



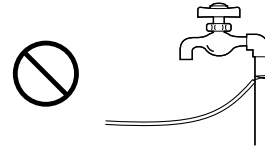
 **WARNING: Ground Lead**

- Check whether the copier is grounded properly.
If current leakage occurs in an ungrounded copier, you may suffer electric shock while operating the copier. 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

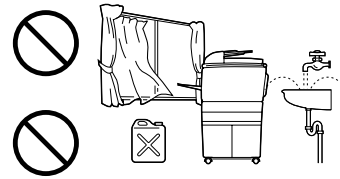
- Pay attention to the point to which the ground lead is connected.
Connecting the ground lead to an improper point such as the points listed below results in a risk of explosion and electric shock:
 - a. Gas pipe (A risk of explosion or fire exists.)
 - b. Lightning rod (A risk of electric shock or 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.)



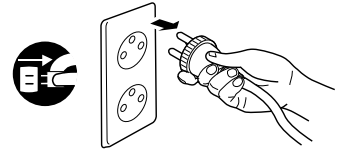
2.2. Installation Requirements

! WARNING: Prohibited Installation Place

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

**! WARNING: Nonoperational Handling**

- When the copier 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 copier in a place exposed to direct sunlight or near a heat source such as a heater.
A risk of degradation in copier performance or deformation exists.
Do not place the copier 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.

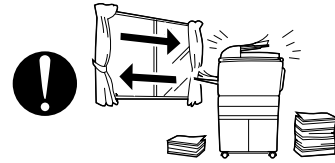
**! CAUTION: Ventilation**

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



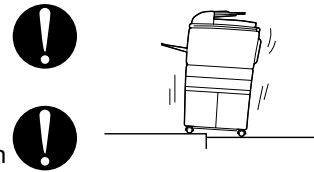
! CAUTION: Ventilation

- The copier 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 copier is used in a poorly ventilated room
 - b. When making a lot of copies
 - c. When using multiple copiers at the same time



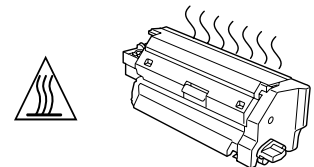
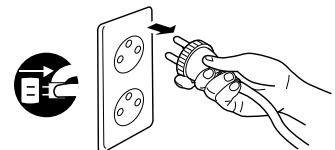
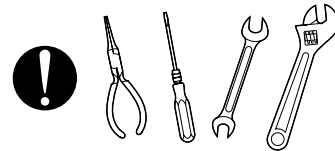
! CAUTION: Vibration

- When installing the copier, read the Installation Guide thoroughly. Be sure to install the copier 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 copier may slide, leading to an injury.



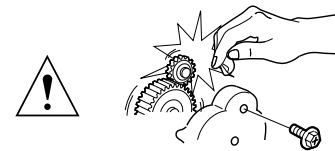
! CAUTION: Inspection before Servicing

- 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 copier may break and a risk of injury or fire exists.
- Before conducting an inspection, be sure to disconnect the power plugs from the copier 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 burnt.



! DANGER: Work Performed with the Copier Powered

- Take every care when making adjustments or performing an operation check with the copier 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.



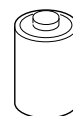
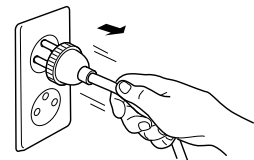
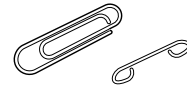
DANGER: Work Performed with the Copier Powered

- 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


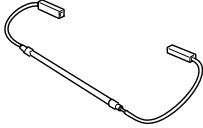
- Check the exterior and frame for edges, burrs, and other damages.
The user or CE may be injured.
- Do not allow any metal parts such as clips, staples, and screws to fall into the copier.
They can short internal circuits and cause electric shock or fire.
- Check wiring for squeezing and any other damage.
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 copier 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.




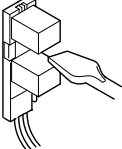
SAFETY AND IMPORTANT WARNING ITEMS

⚠ 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.


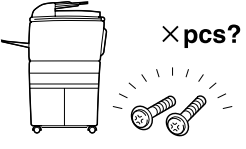
- Check the interlock switch and actuator for loosening and check whether the interlock functions properly.
If the interlock does not function, you may receive an electric shock or be injured when you insert your hand in the copier (e.g., for clearing paper jam).

- 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 copier 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.


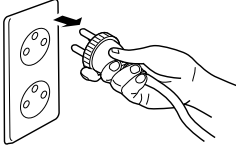


- Never throw the used cartridge and toner into fire.
You may be burned due to dust explosion.

⚠ 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.

! DANGER : HANDLING OF SERVICE MATERIALS

- Do not replace the cover or turn the copier ON before any solvent remnants on the cleaned parts have fully evaporated.

A risk of fire exists.



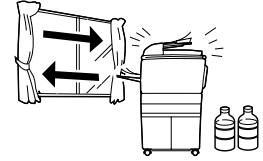
- Use only a small amount of cleaner at a time and take care not to spill any liquid. If this happens, immediately wipe it off.

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 Minolta Corporation 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 Minolta Corporation.
- 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 copier 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 copier 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 copier is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

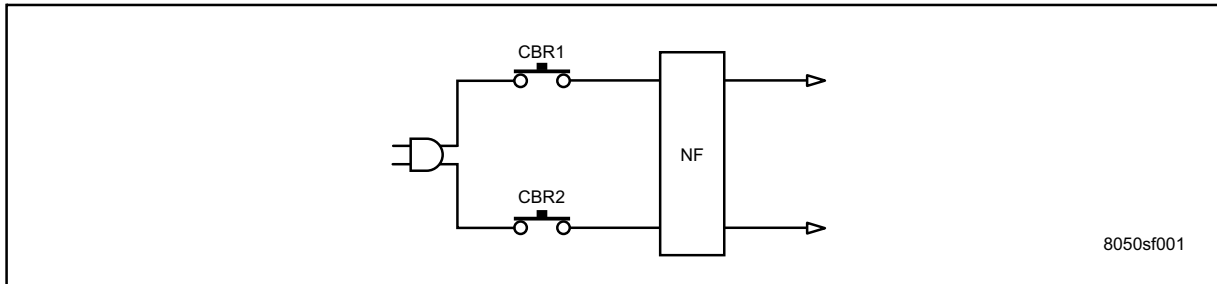
SAFETY CIRCUITS

This machine is provided with the following safety circuits to prevent machine 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 them in order to prevent servicing errors that may the service engineer with a renewed awareness of impair their functions.

1. Overall protection circuit



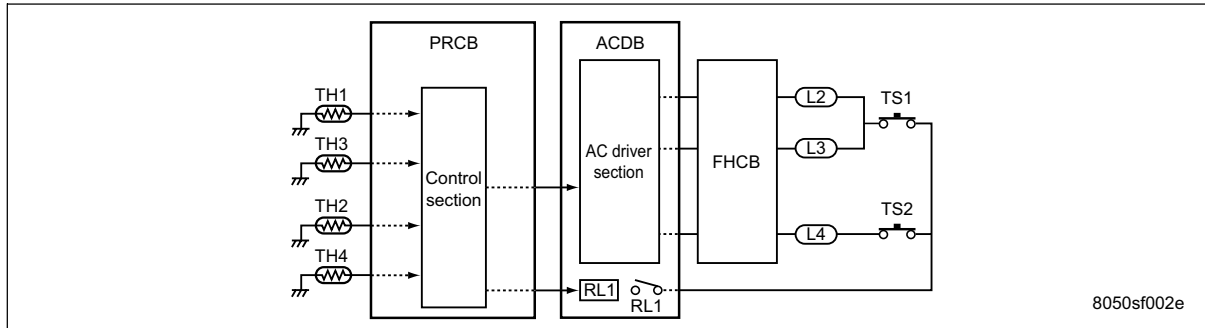
1.1 Protection by circuit breaker /1 (CBR1) and circuit breaker /2 (CBR2)

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 MACHINE

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

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

(Right side of the fixing unit)

CAUTION
DO NOT put your hand between the main body and developing fixing unit; otherwise you may be injured.

CAUTION
The fixing unit is very hot. To avoid getting burned DO NOT TOUCH.

(Top surface of the fixing unit)

CAUTION
The conveyance fixing unit is heavy. Use care and draw it out gently; otherwise you may be injured.

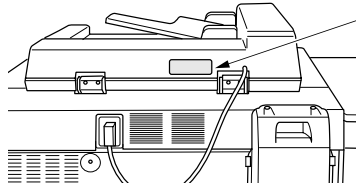
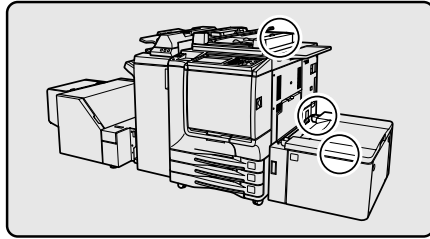
(Inside of the fixing unit)

8050sf003e

CAUTION

Please adhere to all caution labels to avoid burns or injury.

SAFETY AND IMPORTANT WARNING ITEMS

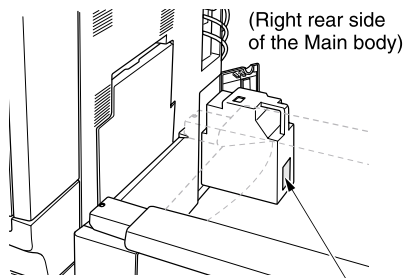


(Rear side of the RADF)

⚠ CAUTION	⚠ CAUTION	⚠ ATTENZIONE	
⚠ ATTENTION	⚠ ATTENTION	⚠ 注意	
⚠ PRECAUCION	⚠ VORSICHT	⚠ 위험	
⚠ CUIDADO	⚠ PRECAUCION	⚠ تحذير	

⚠ CAUTION

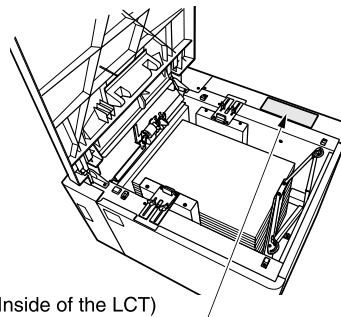
DO NOT INSERT your finger into the two RADF hinge portions; otherwise you may be injured.



(Right rear side of the Main body)

⚠ 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 LCT)

⚠ CAUTION	⚠ ATTENTION		
⚠ PRECAUCION	⚠ CUIDADO		
⚠ CAUTION	⚠ ATTENTION		
⚠ VORSICHT	⚠ 注意		
⚠ PRECAUCION	⚠ 위험		
⚠ ATTENZIONE	⚠ تحذير		

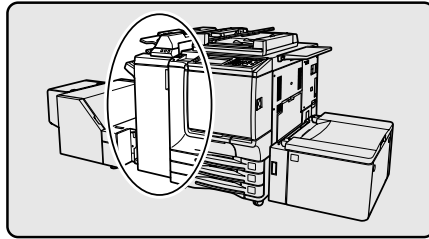
⚠ CAUTION

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

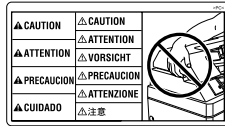
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⚠ CAUTION

Please adhere to all caution labels to avoid burns or injury.



(Finisher with Cover Inserter D
Cover Sheet Feeder only)



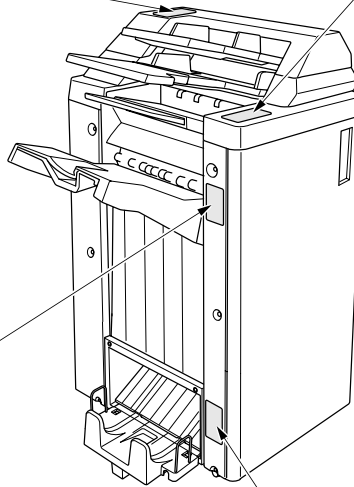
CAUTION

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.

8050sf005e

CAUTION

Please adhere to all caution labels to avoid burns or injury.

SAFETY AND IMPORTANT WARNING ITEMS



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<




	DANGER	注意	WARNING
	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。ビームを直接見たり、触れたりしないでください。	SYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STRÅLEN ÄR FARLIG.
	VORSICHT	ADVARSEL	注意
	LASERSTRÅLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.	SYNLIG LASERSTRÅLNING NÄR DEKSEL ÅPNS. UNNGÅ EKSPONERING FÖR STRÅLEN.	打开此处后射出激光束。请不要直接观看和接触光束。
DANGER	VARO!	注意	
RAYON LASER VISIBLE LORS DE L'OUVERTURE. EVITER L'EXPOSITION DIRECTE.	AVATTAESSA OLET ALTIHINA NÄKYVÄLLE LASERSÄTELYLLE. ÄLÄ KÄYTSÖ SÄTESEEN.	打開此處將會射出雷射光束。 應避免雷射光束直接的曝露接觸。	
위험	ADVARSEL	تحذير	
개방시 레이저 방사선이 노출될 수 있으므로 직접적인 노출을 피하십시오.	SYNLIG LASERSTRÅLNING VED ÅBNING. UNDGÅ UDSÆTTELSE FOR STRÅLING.	شعاع ليزر مرئي عند الفتح. تجنب التعرض المباشر للأشعة.	

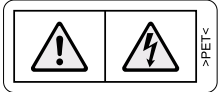
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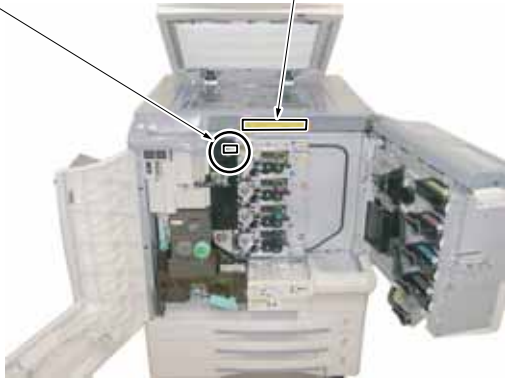
CAUTION

Please adhere to all caution labels to avoid burns or injury.

SAFETY AND IMPORTANT WARNING ITEMS

	DANGER	DANGER	注意	注意
	VISIBLE LASER RADIATION WHEN PROCESS UNIT IS WITHDRAWN. AVOID DIRECT EXPOSURE TO BEAM.	RAYON LASER VISIBLE AU RETRAIT DE L'UNITE DE TRAITEMENT IMAGE. EVITER L'EXPOSITION DIRECTE.	プロセスユニットを引き出すとレーザー光が出ます。ビームを直接観たり、触れたりしないでください。	拉出雷射組時恐有雷射光束射出，請勿直接觀看或接觸雷射光束。
	VORSICHT	위험	注意	تحذير
	LASERSTRAHLUNG BEIM ENTNEHMEN DER PROZESSOREINHEIT. NICHT DEM STRAHL AUSSETZEN.	프로세스 유닛을 제거하면 레이저 방사선이 누출됩니다. 광선에 직접적인 노출을 피하십시오.	拉出处理装置后将射出激光光束，请不要直接观看和接触光束。	شعاع ليزر مرئي عند سحب وحدة المعالجة. تجنب التعرض المباشر للأشعة.






8050sf007e

 CAUTION

Please adhere to all caution labels to avoid burns or injury.

SAFETY AND IMPORTANT WARNING ITEMS

	▲ WARNING	Unplug the machine before removing platen 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.



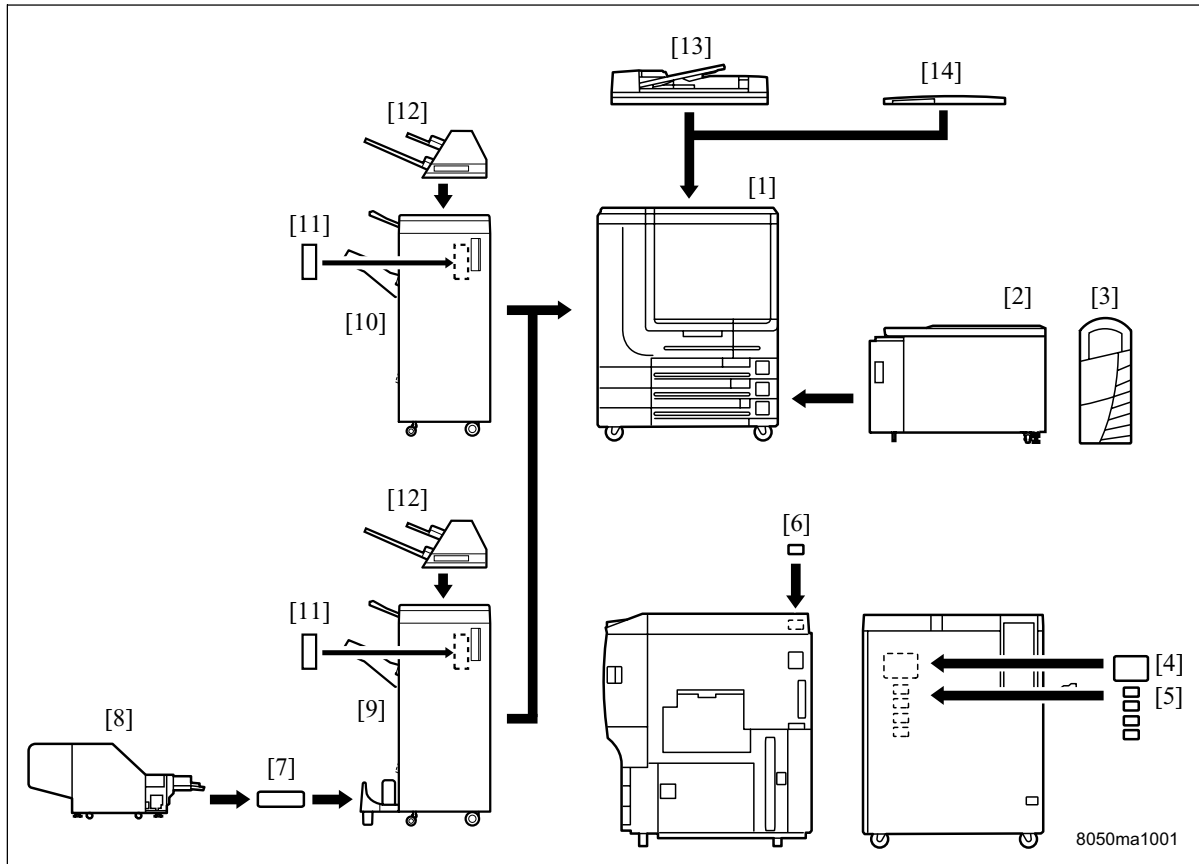
8050sf008e

CAUTION

Please adhere to all caution labels to avoid burns or injury.

I OUTLINE

1. OUTLINE OF SYSTEM



- | | |
|-------------------------------------------|--------------------------------------------|
| [1] Main body | [8] Trimmer (TMG-3) |
| [2] LCT (C-208) | [9] Finisher (FN-9) |
| [3] Printer controller (Fiery S300 50C-K) | [10] Finisher (FN-120) |
| [4] Hard disk (HDD-7) | [11] Puncher (PK-5) |
| [5] Expansion memory (256MB x 4) | [12] Cover sheet feeder (Cover Inserter D) |
| [6] Key counter | [13] RADF (AFR-20) |
| [7] TMG-3 Connection kit (TMG Kit A) | [14] Original cover Kit (OC-2) |

2. PRODUCT SPECIFICATIONS

A. Type

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 90 g/m ²) (400 sheets x 3, 105 g/m ²) Multisheet by-pass tray (250 sheets, 80 to 90 g/m ²) (200 sheets, 105g/m ²) C-208 (2500 sheets, 80 to 90g/m ²) *1

*1: Optional

B. Functions

Original to be copied:	Sheet, book, solid object
Maximum original size:	A3, or 11 x 17 (303 x 438 mm for non standard)
Copy size (for metric area):	Tray 1 to 3: A3, B4, A4, A4R, B5, B5R, A5R, 8.5 x 11, 8.5 x 14, 11 x 17, 12 x 18, 13 x 19, wide paper *1 By-pass feed: A3, B4, A4, A4R, B5, B5R, A5R, 8.5 x 11, 8.5 x 11R, 11 x 17, 12 x 18, 13 x 19, wide paper *1 ADU: A3, B4, A4, A4R, B5, B5R, A5R, 8.5 x 11, 8.5 x 11R, 11 x 17, 12 x 18, 13 x 19, wide paper *1
Copy size (for inch area):	Tray 1 to 3: A3, B4, A4, B5, B5R, 5.5 x 8.5R, 8.5 x 11, 8.5 x 11R, 8.5 x 14, 11 x 17, 12 x 18, 13 x 19, wide paper *1 By-pass feed: A3, B4, A4, B5, B5R, 5.5 x 8.5R, 8.5 x 11, 8.5 x 11R, 8.5 x 14, 11 x 17, 12 x 18, 13 x 19, wide paper *1 ADU: A3, B4, A4, B5, B5R, 5.5 x 8.5R, 8.5 x 11, 8.5 x 11R, 8.5 x 14, 11 x 17, 12 x 18, 13 x 19, wide paper *1

*1: Wide paper is available up to 330 x 487 mm.

Magnification:	Fixed magnification for metric area: x 1.000, x 2.000, x 1.414, x 1.224, x 1.154, x 0.866, x 0.816, x 0.707, x 0.500 for inch area: x 1.000, x 2.000, x 1.545, x 1.294, x 1.214, x 0.786, x 0.772, x 0.647, x 0.500 Special ratio magnification: 3 types Zoom magnification: x 0.250 to x 4.000 (graduated at increment of 0.1 %) Vertical magnification: x 0.250 to x 4.000 (graduated at increment of 0.1 %) Horizontal magnification: x 0.250 to x 4.000 (graduated at increment of 0.1 %)
Warm-up time	(at room temperature of 20 °C with rated voltage)
for metric area:	Less than 420 sec.
for inch area:	Less than 390 sec.

First copy time:	Full color:	Less than 7.6 sec. (platen mode, life size, manual density, paper feed tray /1 to /3, plain paper, without gloss, face up paper exit, A4 or 8.5 x 11)
	Monochrome:	Less than 7.6 sec. (platen mode, life size, manual density, paper feed tray /1 to /3, plain paper, without gloss, face up paper exit, A4 or 8.5 x 11)
	Black-and-white:	Less than 6.0 sec. (platen mode, life size, manual density, paper feed tray /1 to /3, plain paper, without gloss, face up paper exit, A4 or 8.5 x 11)
Continuous copy speed:	Full color:	51 sheets/min. (A4, memory copy) 50 sheets/min. (8.5 x 11, memory copy)
	Monochrome:	51 sheets/min. (A4, memory copy) 50 sheets/min. (8.5 x 11, memory copy)
	Black-and-white:	51 sheets/min. (A4, memory copy) 50 sheets/min. (8.5 x 11, memory copy)
Continuous copy count:		9999 sheets, max. or 9999 copies
Paper exit tray loading capacity:		150 sheets (A4), max.
Copy density selection:		AE, manual (9 steps)
Resolution:	Scan:	600 dpi x 600 dpi
	Copy:	600 dpi x 600 dpi
E-RDH memory *2	Standard:	128 MB for each color (Y, M, C, K);
	Max.:	384 MB for each color (Y, M, C, K)
Interface:		Serial port (USB Type B), Serial port (RS-232C), RJ45 Ethernet connector, parallel port (based on IEEE 1284), Video interface for Fiery Controller.
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 option memory.

(set of 4 by 256MB)

C. Copy paper

Standard specified paper:	For full color:	Neusiedler Color Copy 90g/m ² Hammermill Tidal 75 g/m ²
	For black-and-white:	Konica Business Class 80 g/m ² Hammermill Laser Color Copy Photo White/ Brightness 96 105 g/m ²
Ordinary paper:	High quality paper, coated paper and recycled paper of 64 g/m ² to 105 g/m ²	
Special paper *1	Label paper, and ordinary paper of 106g/m ² to 256g/m ²	

*1 Label paper should be fed one at a time by the by-pass feed method.

Coated paper of 106 g/m² to 256 g/m² is fed one at a time by by-pass feed. However, it is possible to feed it through C-208 (optional).

Double sided copy is unavailable for special paper that is other than the ordinary paper of 106 g/m² to 209 g/m².

D. Machine data

Power source	
for metric area:	230 VAC -14 % to 10.6 % 50 Hz
for inch area:	208 ~ 240 VAC ± 10% 60 Hz
Power consumption	
for metric area:	3400 W max. (Full option)
for inch area:	3600 W max. (Full option)
Weight:	Approx. 313 kg
Dimensions:	794 mm (W) x 889 mm (D) x 1056 mm (H) with platen cover provided

E. Maintenance and life

Maintenance:	Once every 100,000 copies
Machine service life:	5,000,000 copies or 5 years (whichever earlier)

F. Consumables

Developer:	Exclusively for CF5001
Toner:	Exclusively for CF5001
Drum:	Exclusively for CF5001 (φ60)

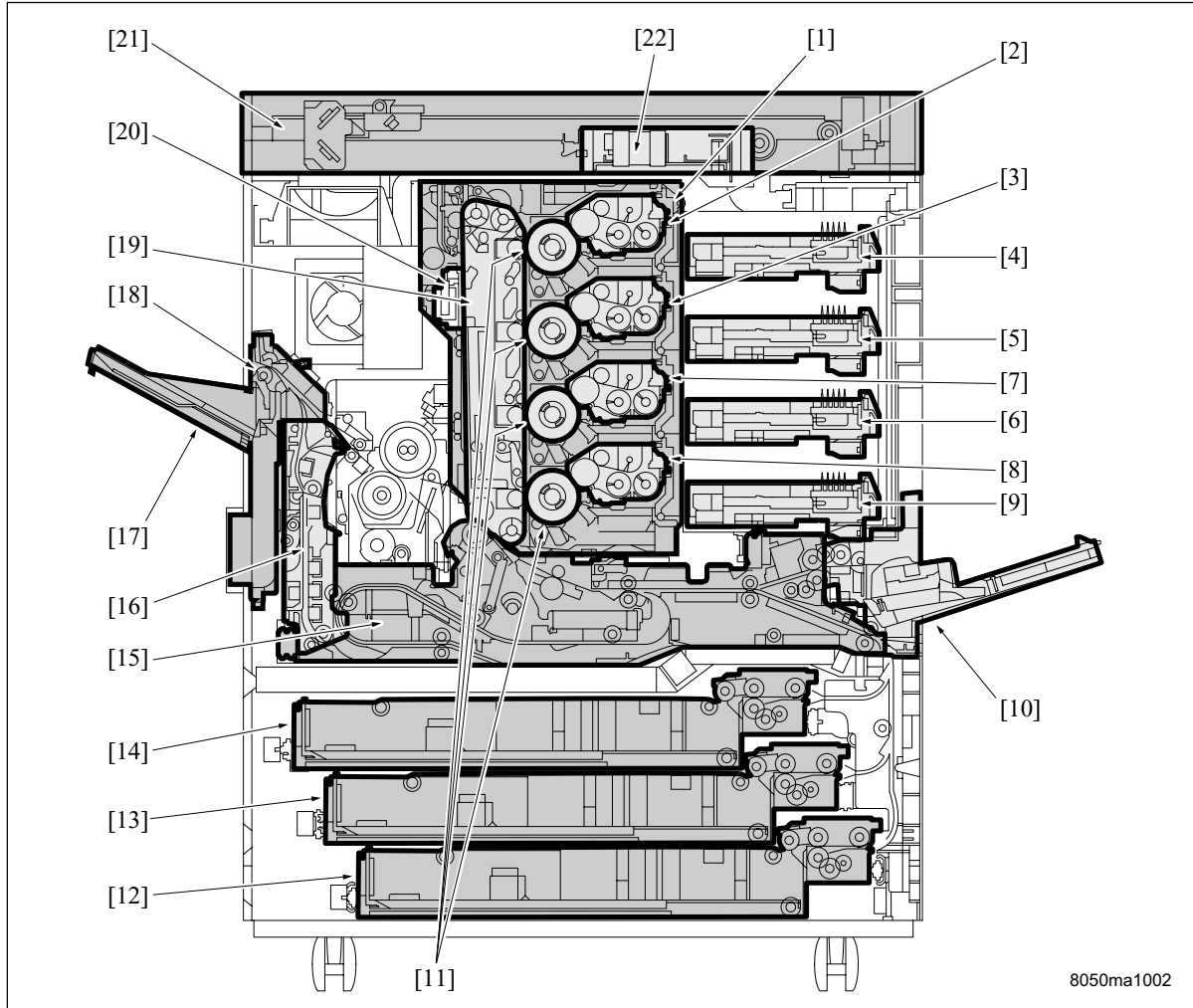
G. Operating environment

Temperature:	10°C to 30°C
Humidity:	10% RH to 80% RH

Note:

- The information herein may be subject to change for improvement without notice.

3. CENTER CROSS SECTION

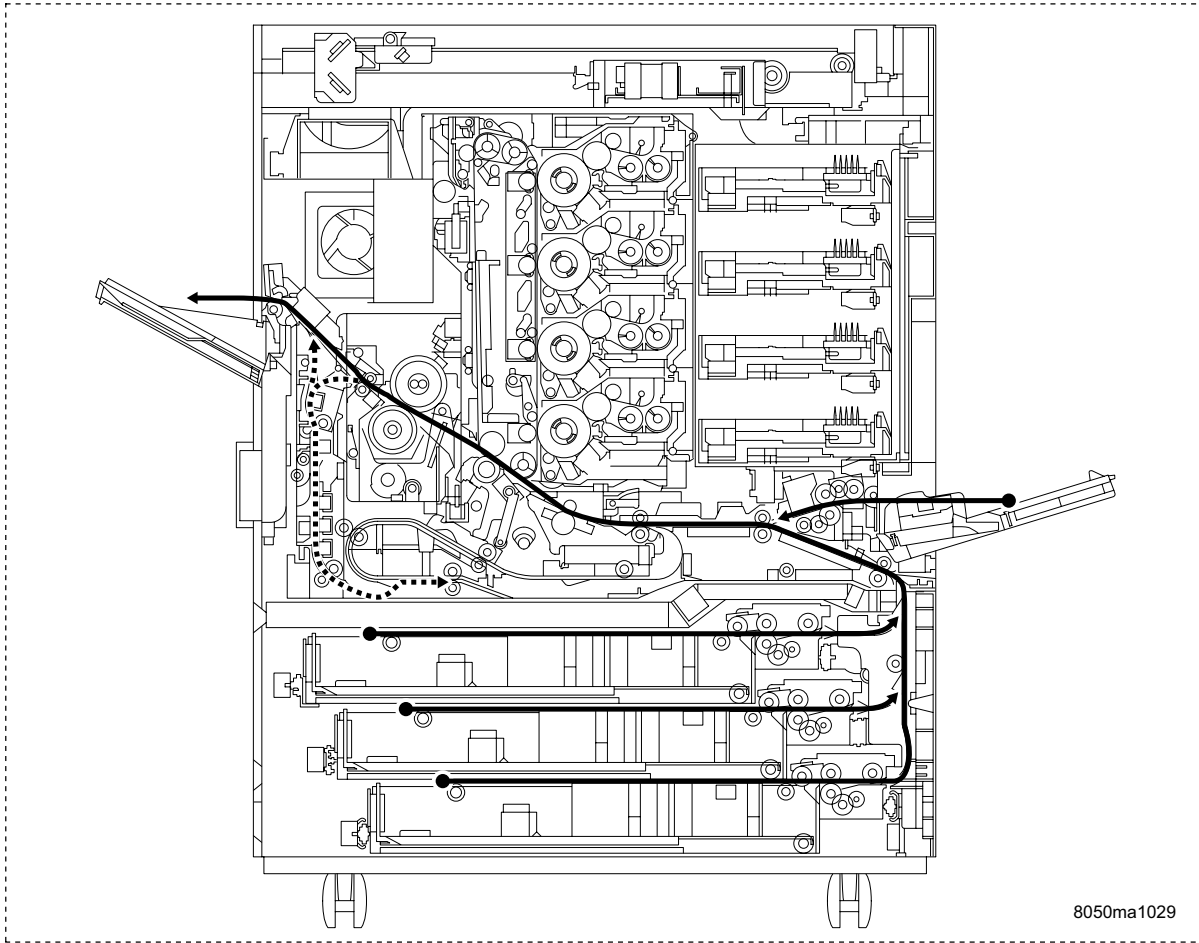


- | | |
|------------------------|----------------------------|
| [1] Process unit | [12] Paper feed tray /3 |
| [2] Developing unit /Y | [13] Paper feed tray /2 |
| [3] Developing unit /M | [14] Paper feed tray /1 |
| [4] Write unit /Y | [15] ADU |
| [5] Write unit /M | [16] Reverse section |
| [6] 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 |

8050ma1002

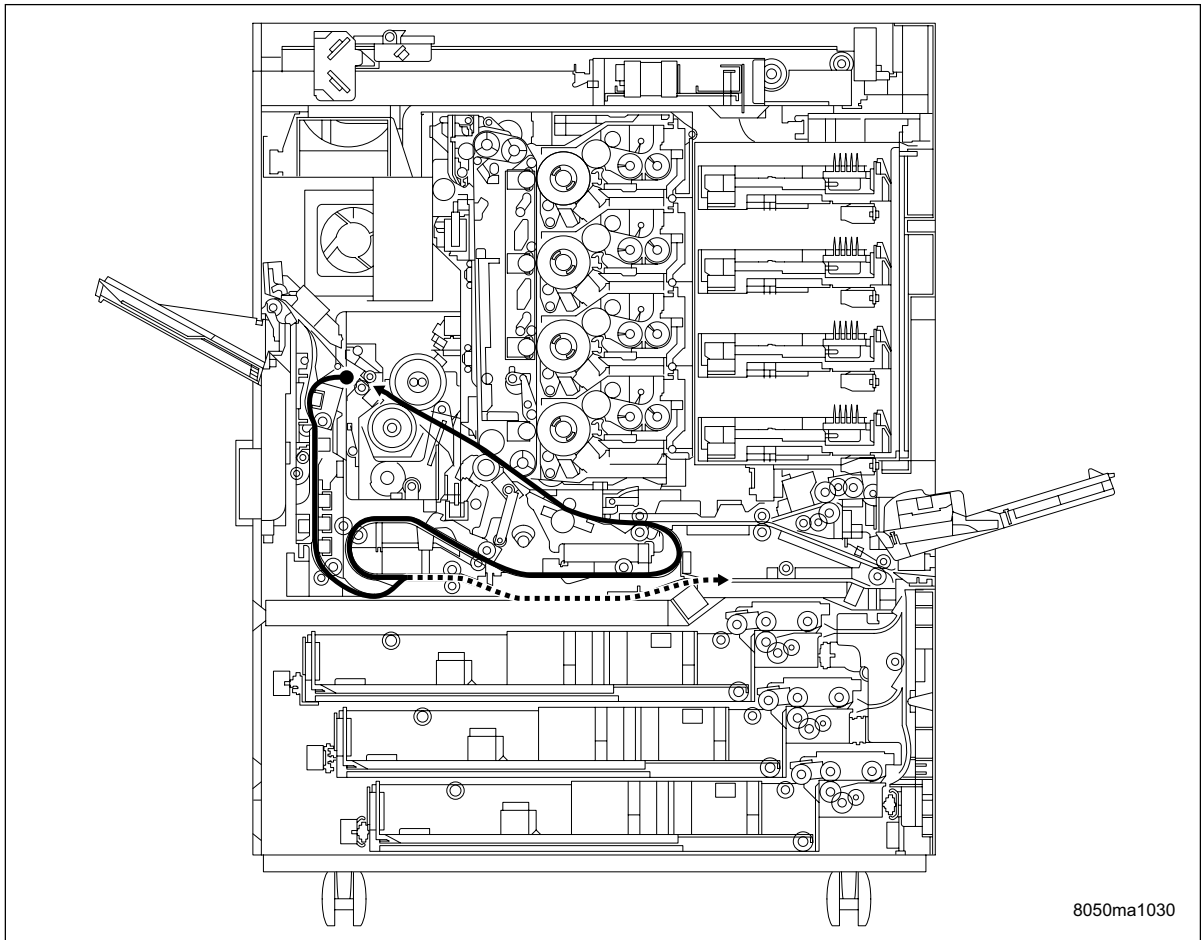
4. PAPER PATH

Front side



8050ma1029

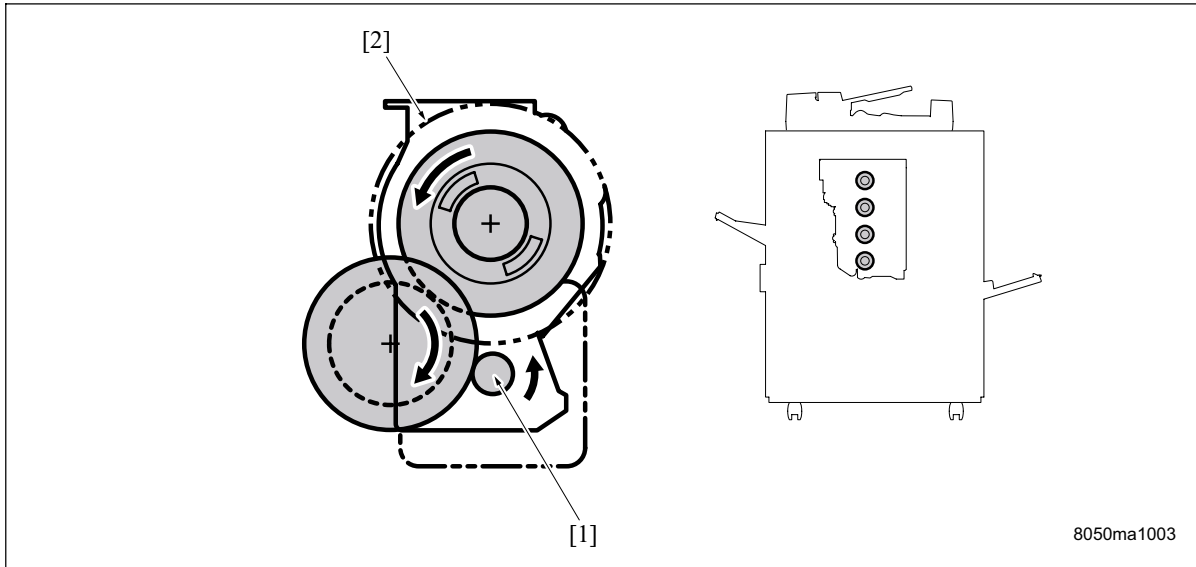
Back side



I OUTLINE

5. DRIVE SYSTEM DIAGRAM

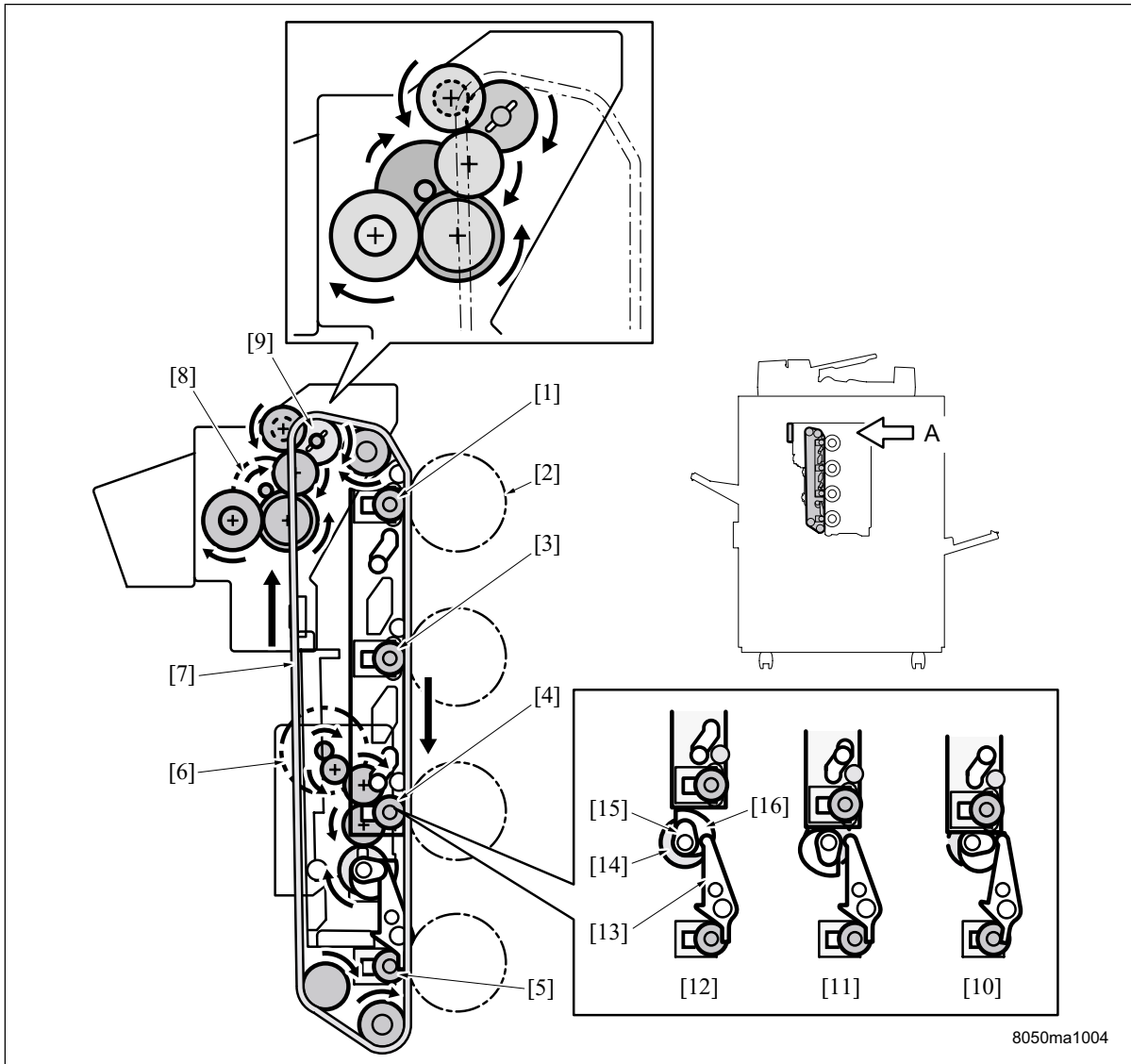
5.1 Drum drive



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

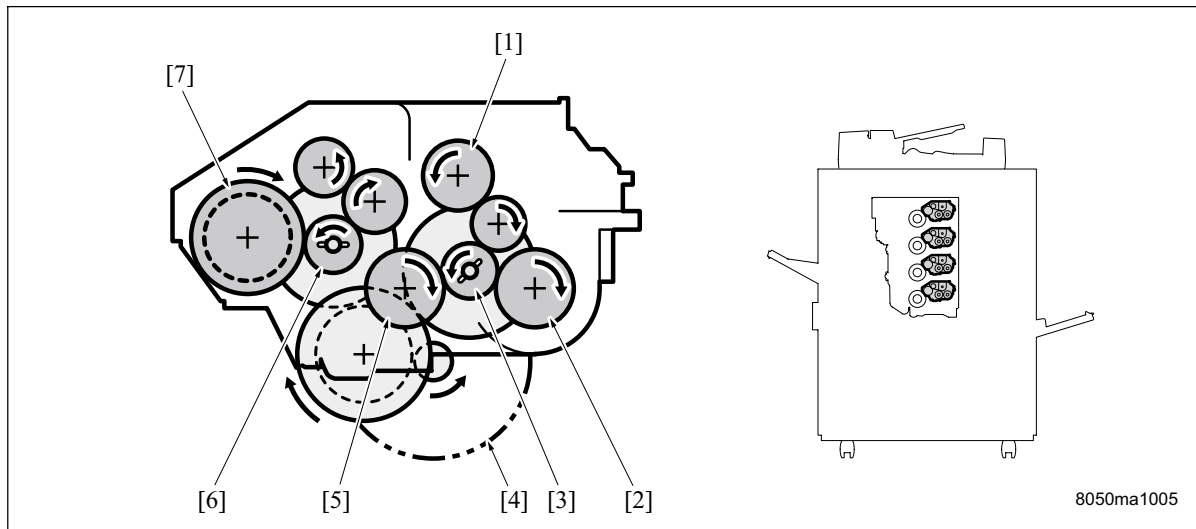
[2] Drum

5.2 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 |

5.3 Developing drive



[1] Toner collection screw

[2] Toner agitator screw

[3] Developing coupling /2

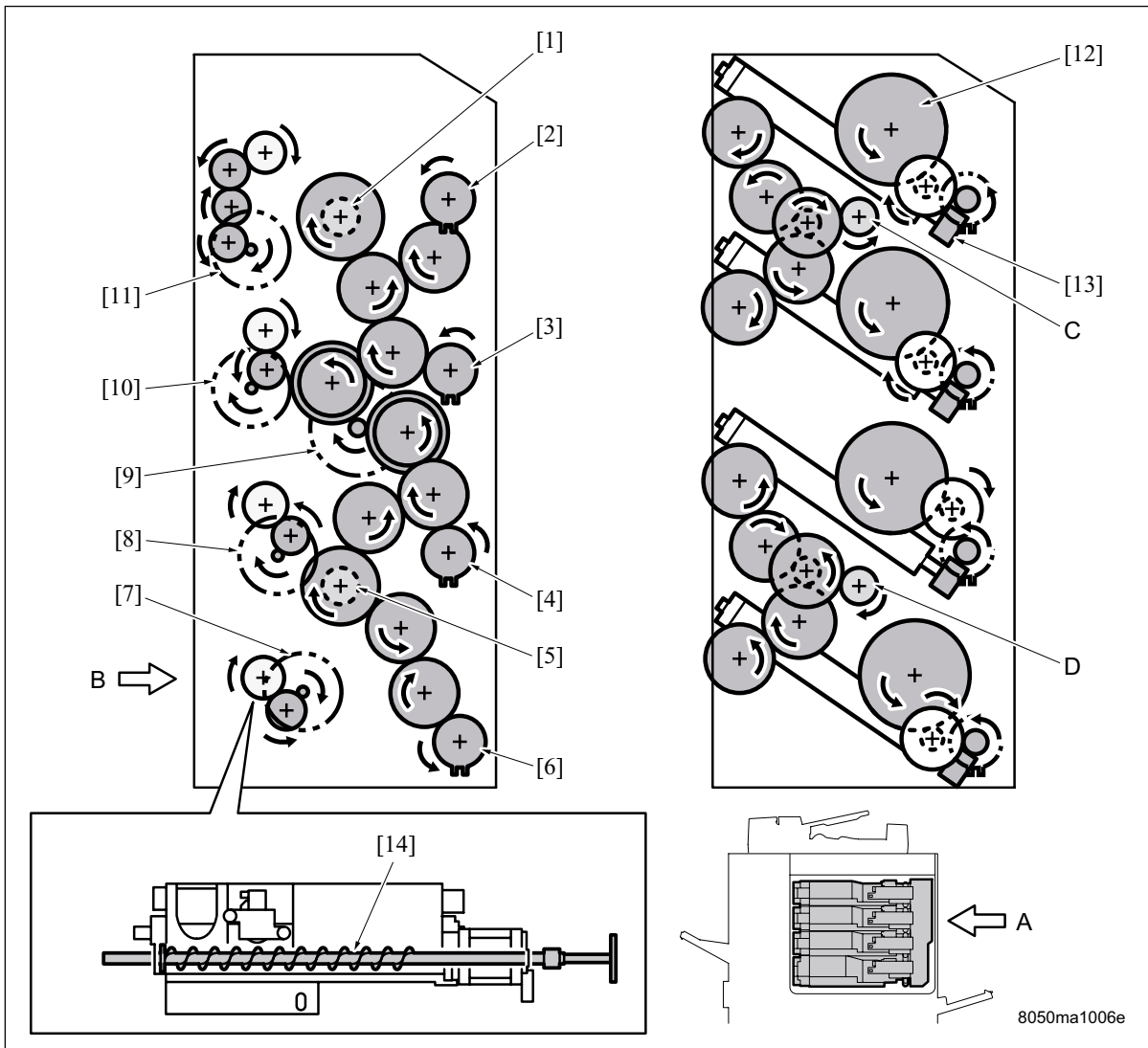
[4] Developing motor /Y, /M, /C, /K
(M20, M21, M22, M23)

[5] Toner conveyance screw

[6] Developing coupling /1

[7] Developing sleeve

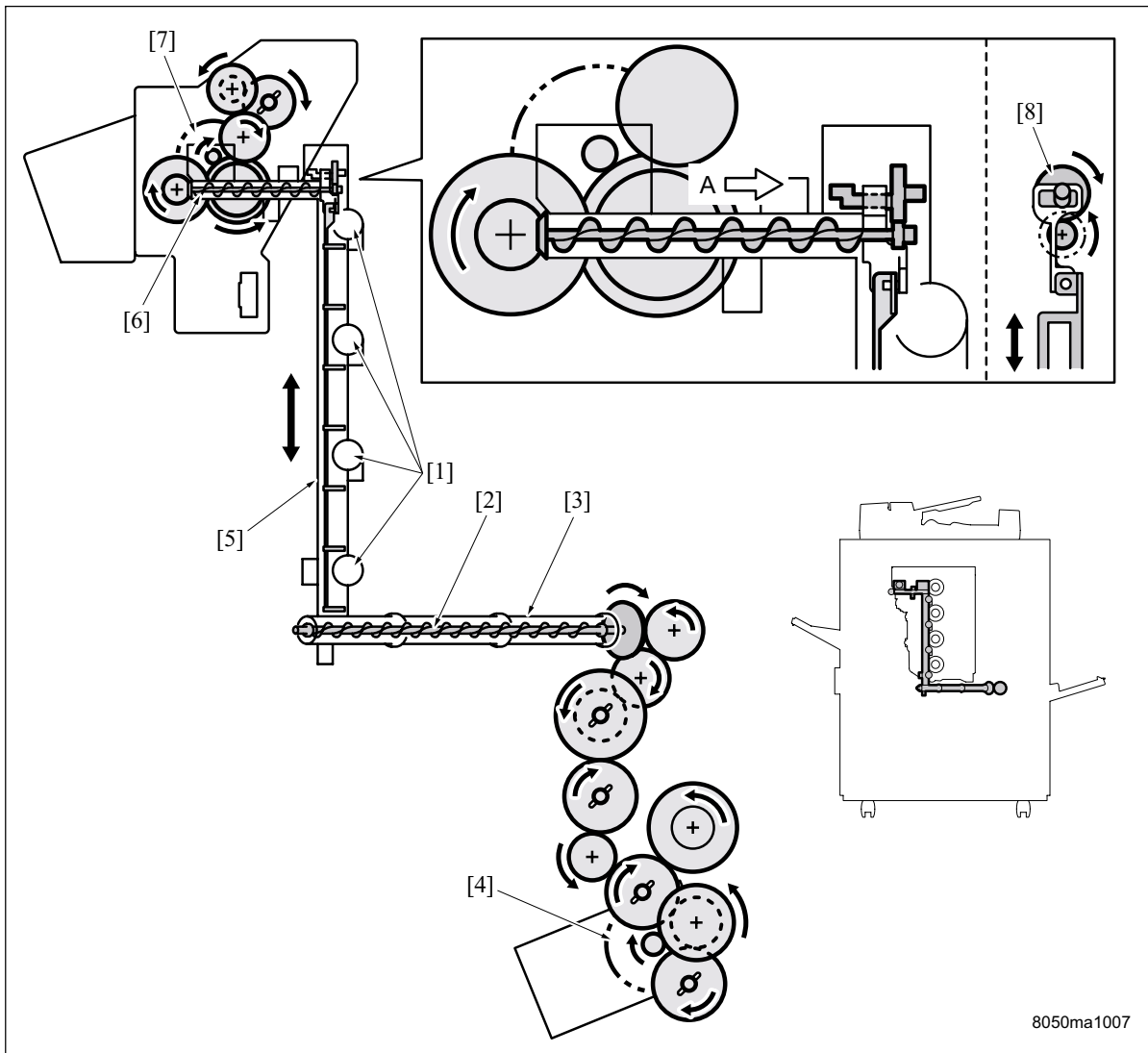
5.4 Toner supply drive



- [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

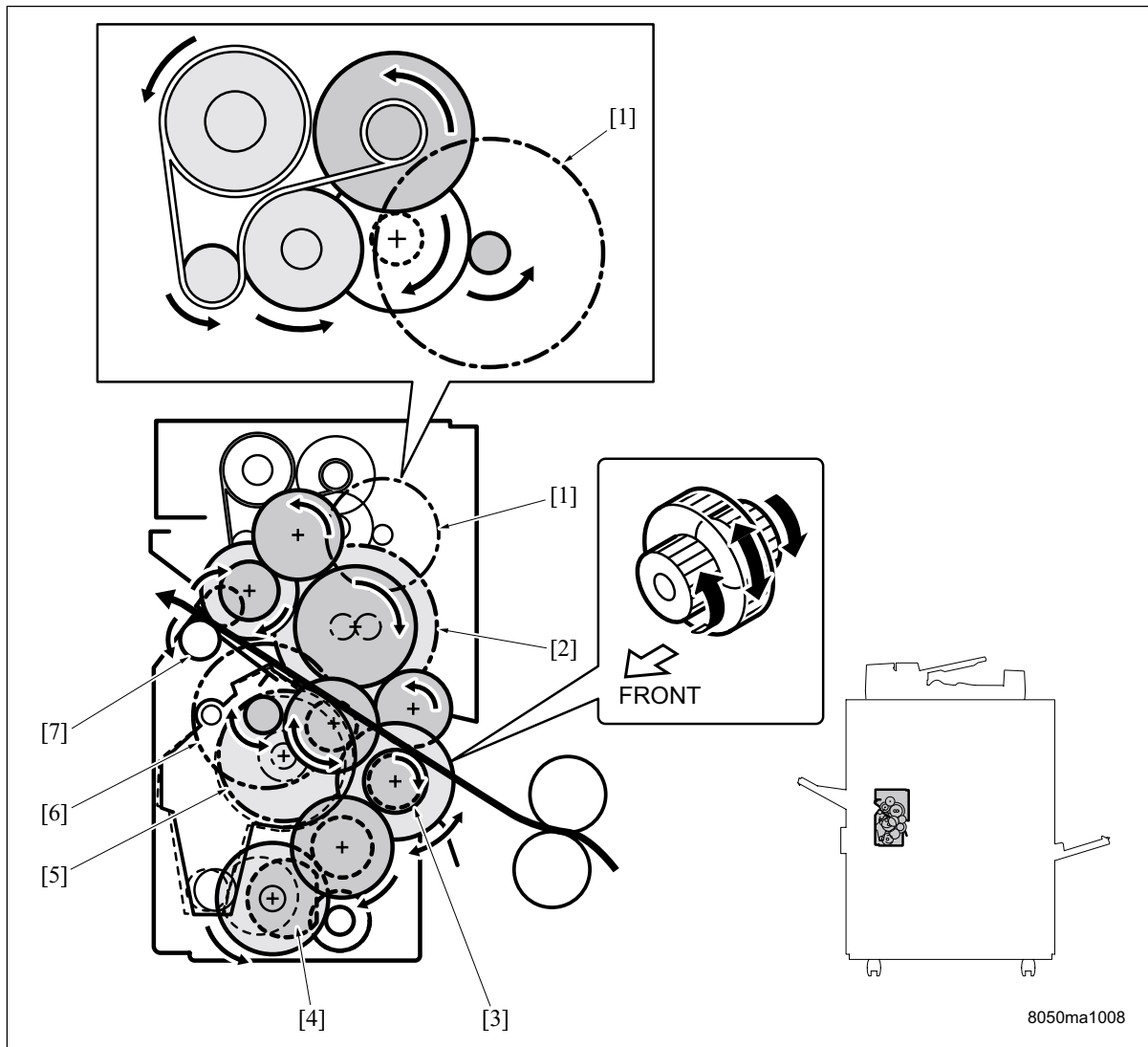
5.5 Toner collection drive



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- | | |
|-------------------------------------|-------------------------------|
| [1] Drum waste toner receiving port | [5] Vertical conveyance pipe |
| [2] Horizontal conveyance screw | [6] Belt collection screw |
| [3] Horizontal conveyance pipe | [7] Transfer belt motor (M18) |
| [4] Paper feed motor (M41) | [8] Belt collection drive cam |

5.6 Fixing drive



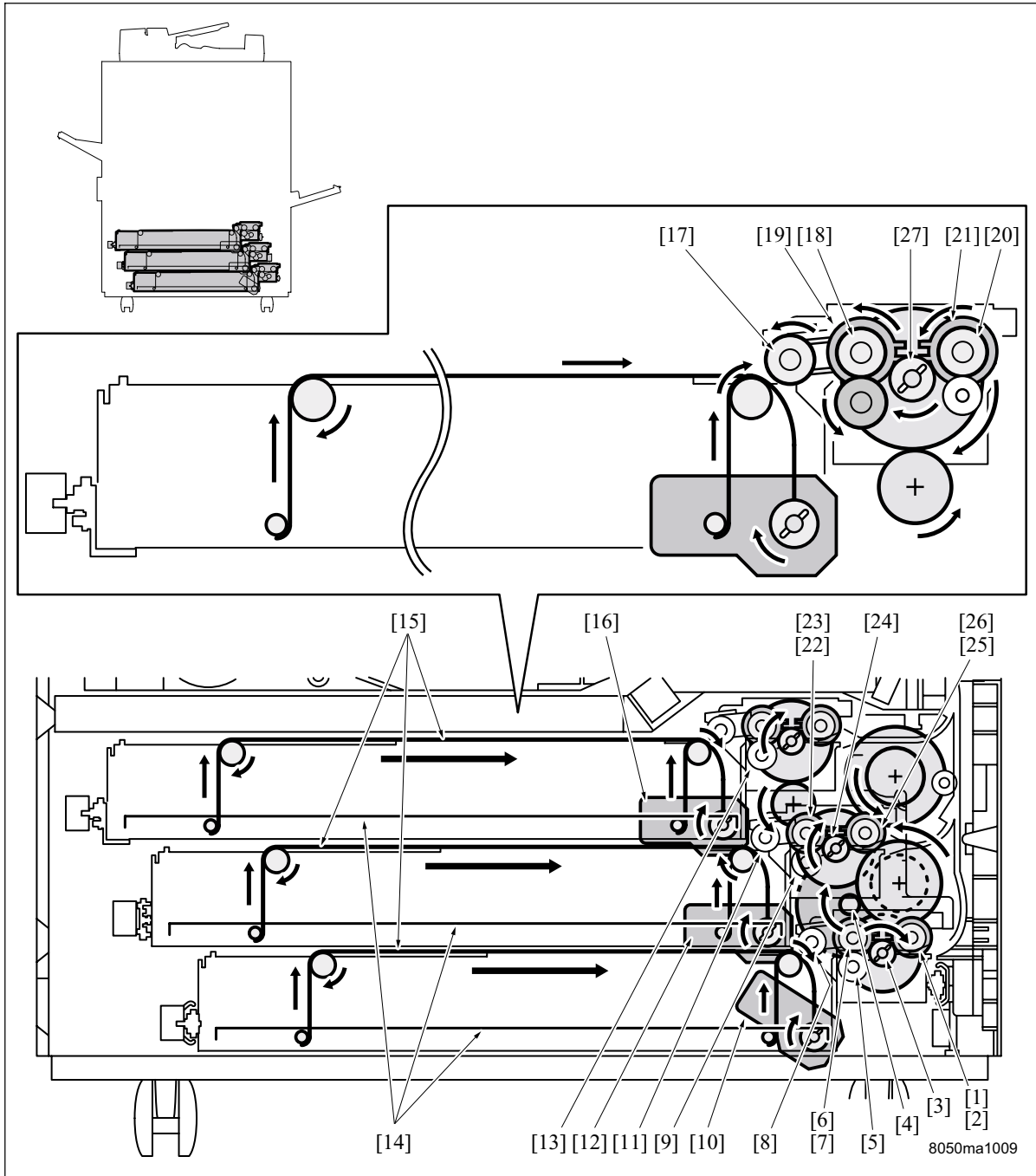
- [1] Web motor (M54)
- [2] Fixing roller /U
- [3] One-way clutch
- [4] Pressure/release cam

- [5] Fixing roller /L
- [6] Fixing motor (M29)
- [7] Fixing paper exit roller

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5.7 Paper feed drive

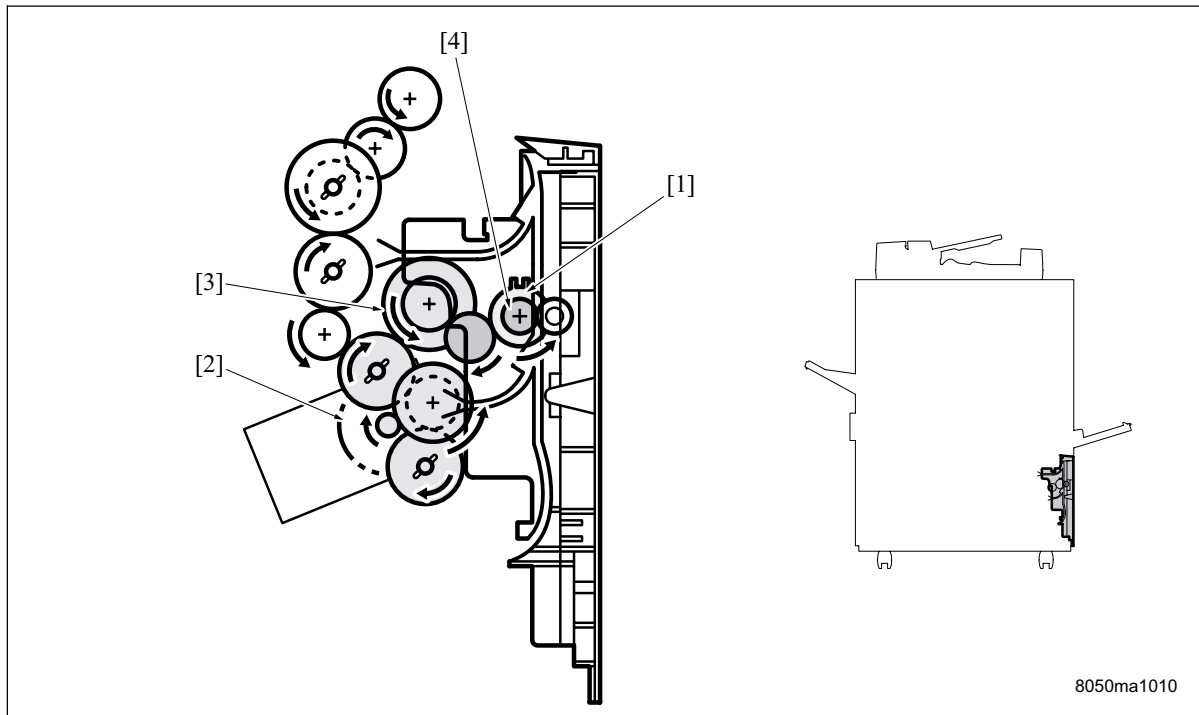
5.7.1 Paper feed tray /1 to /3 drive



- | | |
|---------------------------------------|---------------------------------------|
| [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) | |

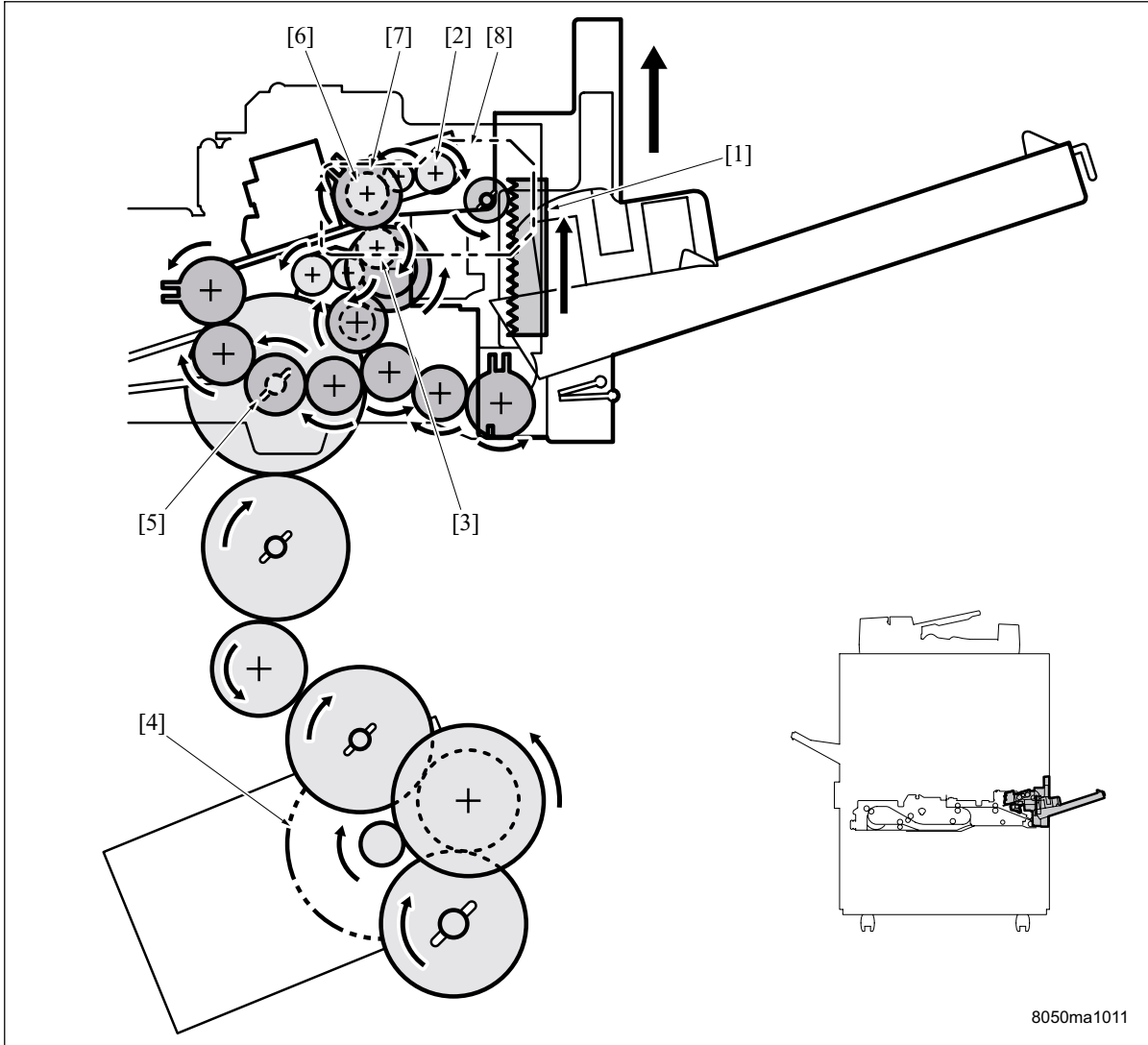
5.7.2 Vertical conveyance drive



- | | |
|----------------------------------------------|---------------------------------------|
| [1] Intermediate conveyance clutch /1 (MC13) | [3] Drive coupling |
| [2] Paper feed motor (M41) | [4] Intermediate conveyance roller /1 |

5.8 ADU drive

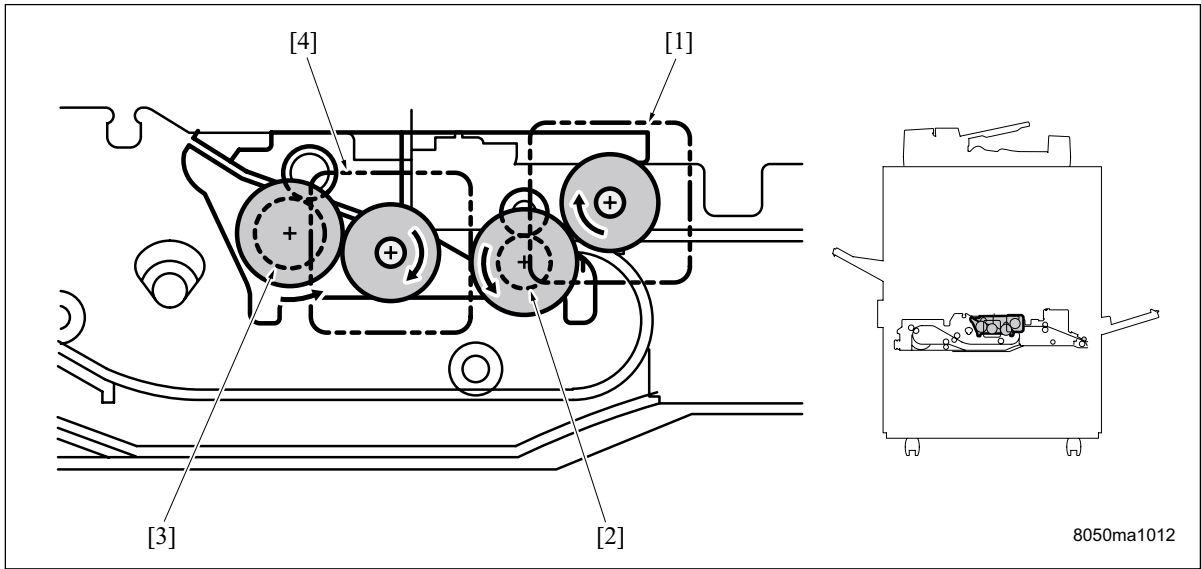
5.8.1 By-pass tray drive



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- | | |
|---------------------------------------|-----------------------------------|
| [1] Up/down gear | [5] Drive coupling |
| [2] Paper feed roller /BP | [6] Feed roller /BP |
| [3] Double feed prevention roller /BP | [7] Paper feed clutch /BP (MC6) |
| [4] Paper feed motor (M41) | [8] Tray up drive motor /BP (M35) |

5.8.2 Registration drive/loop drive



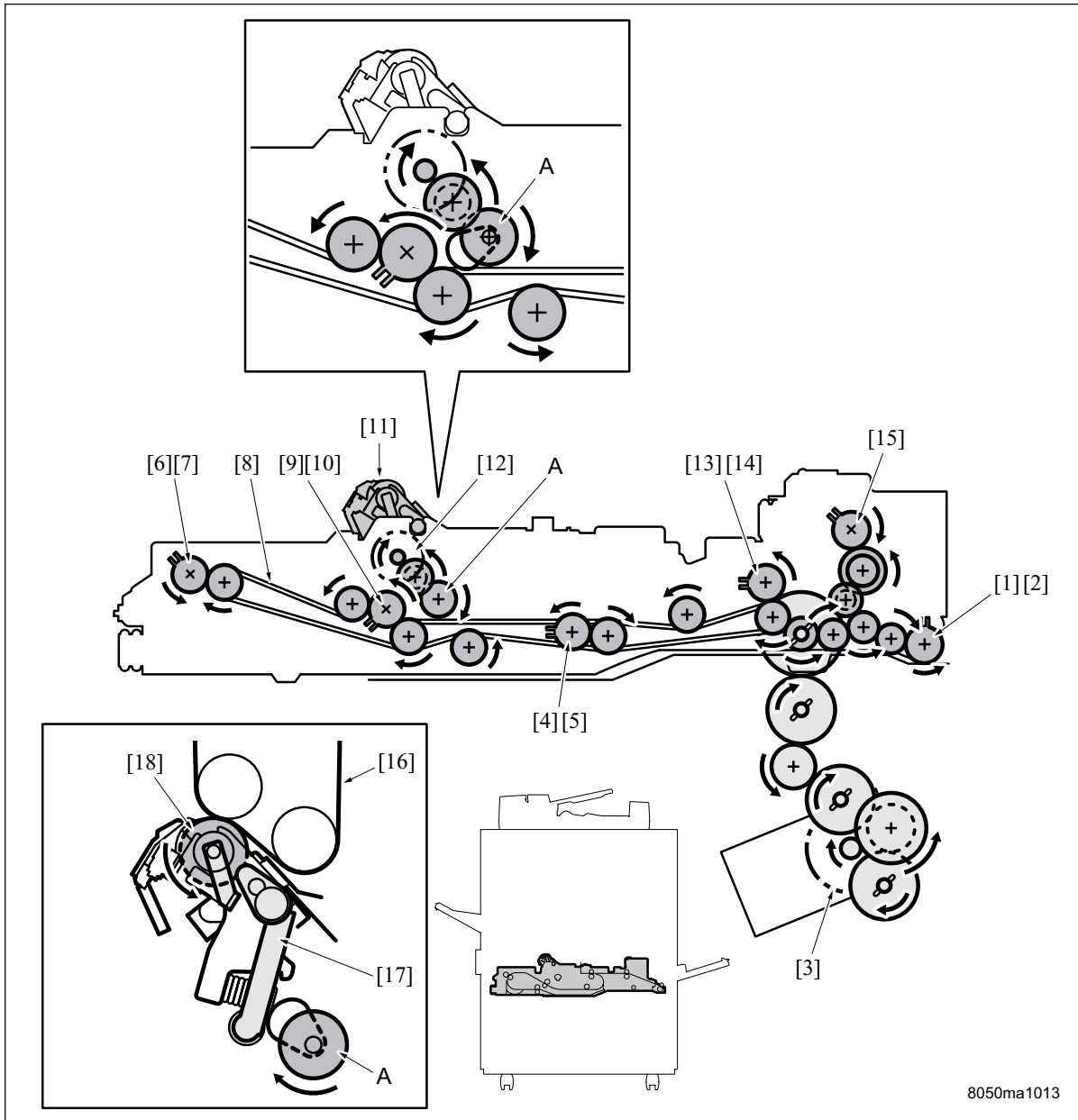
[1] Loop roller motor (M31)

[2] Loop roller

[3] Registration roller

[4] Registration roller motor (M30)

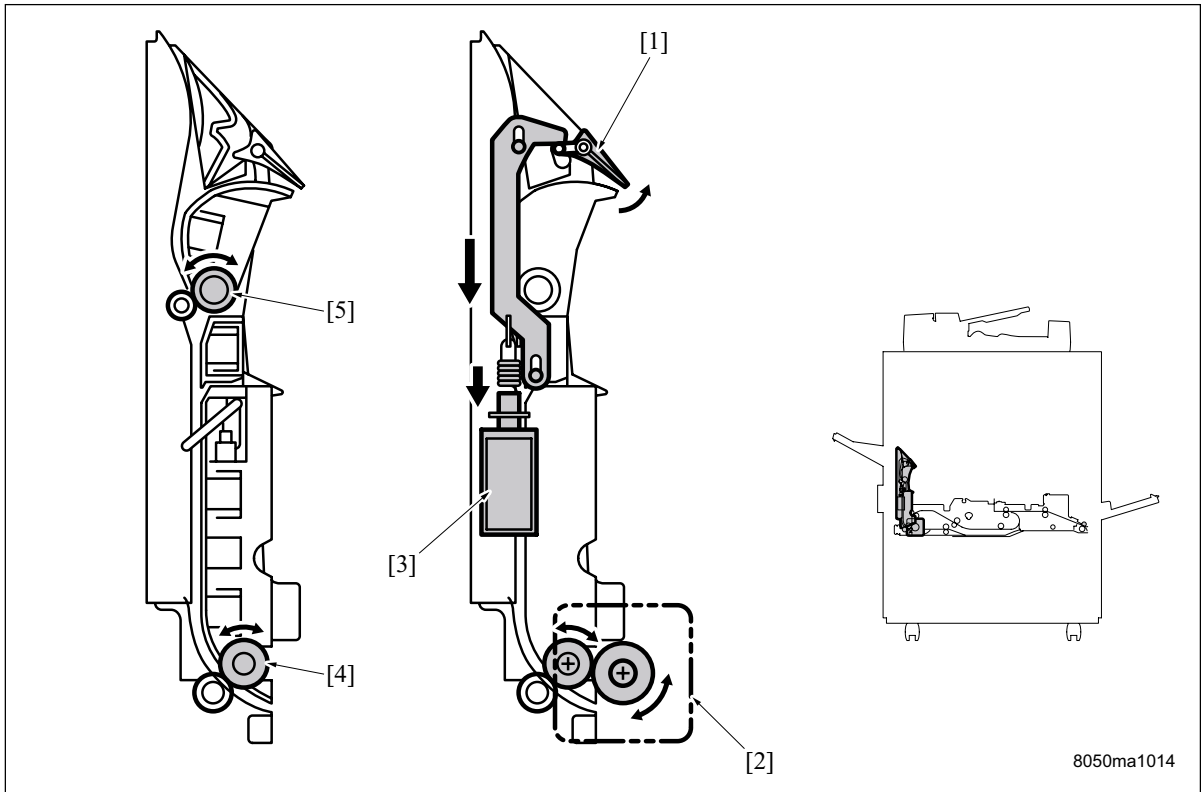
5.8.3 ADU conveyance drive



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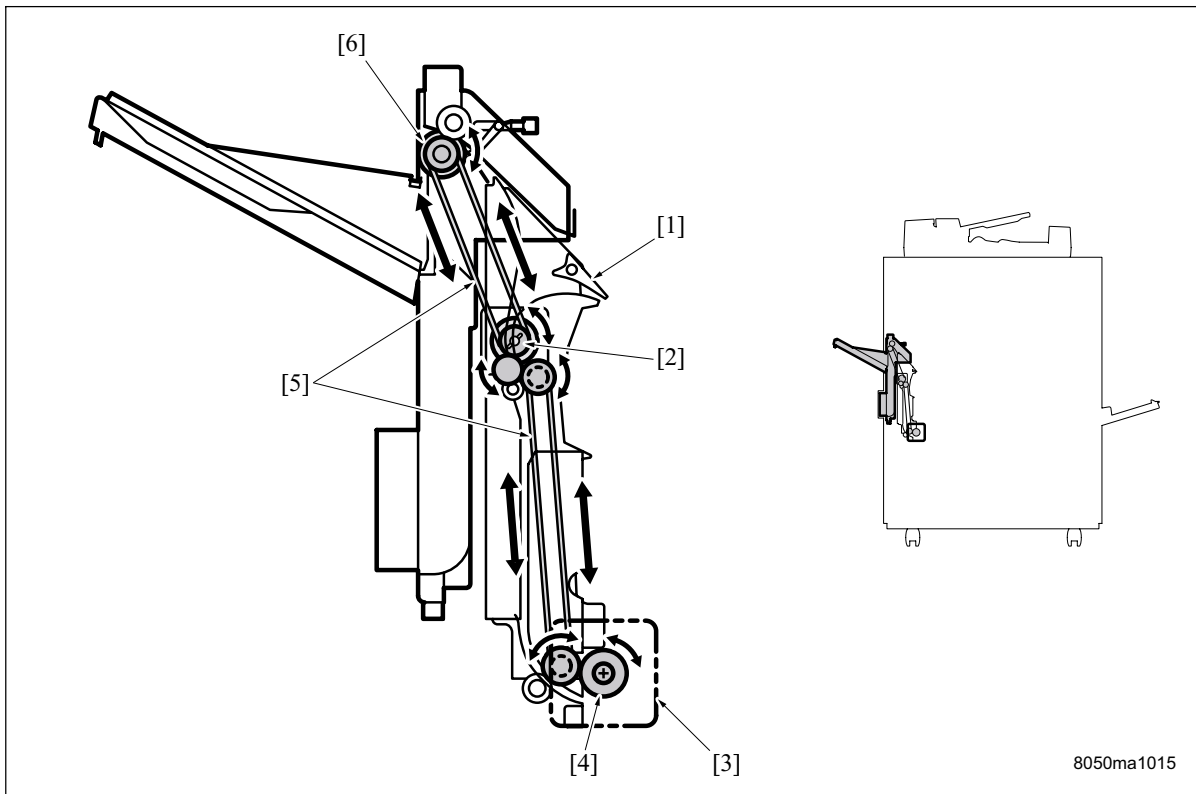
- | | |
|---------------------------------------------|------------------------------------------------|
| [1] Intermediate conveyance roller /2 | [10] ADU conveyance clutch /2 (MC1) |
| [2] Intermediate conveyance clutch /2 (MC4) | [11] 2nd transfer section |
| [3] Paper feed motor (M41) | [12] 2nd 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 |

5.8.4 Reverse paper exit drive



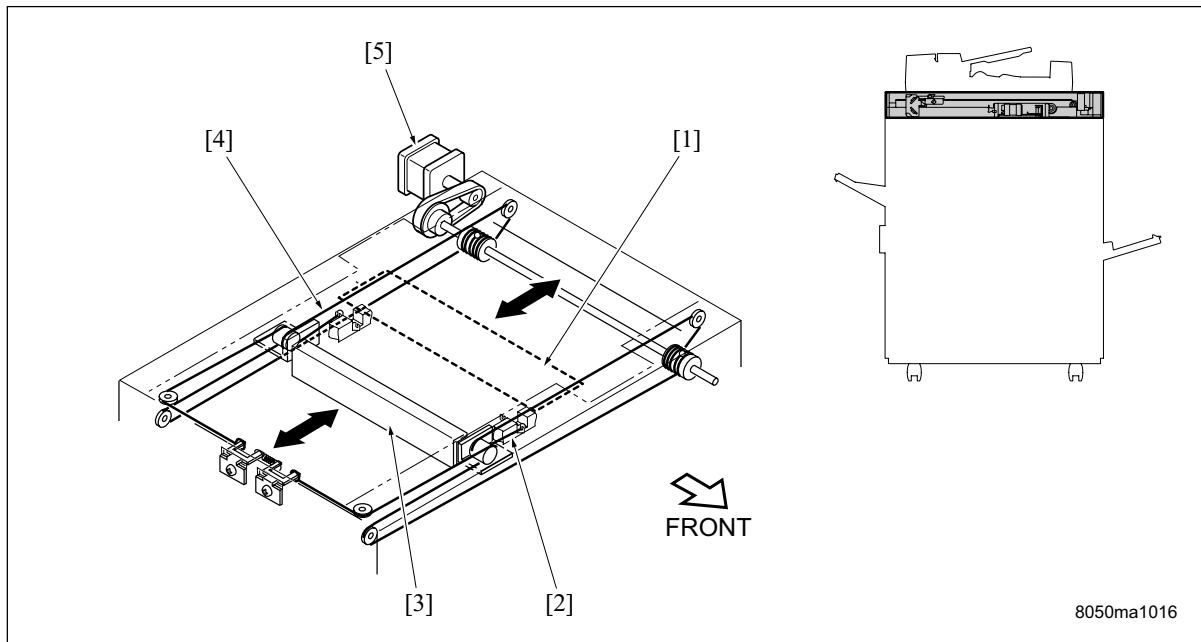
- | | |
|---------------------------------|----------------------------|
| [1] Reverse gate | [4] Reverse/exit roller /2 |
| [2] Reverse/exit motor (M33) | [5] Decurler roller |
| [3] Reverse/exit solenoid (SD4) | |

5.9 Main body paper exit drive



- | | |
|------------------------------|----------------------------|
| [1] Reverse gate | [4] Reverse/exit roller /2 |
| [2] Drive coupling | [5] Timing belt |
| [3] Reverse/exit motor (M33) | [6] Paper exit roller |

5.10 Scanner drive



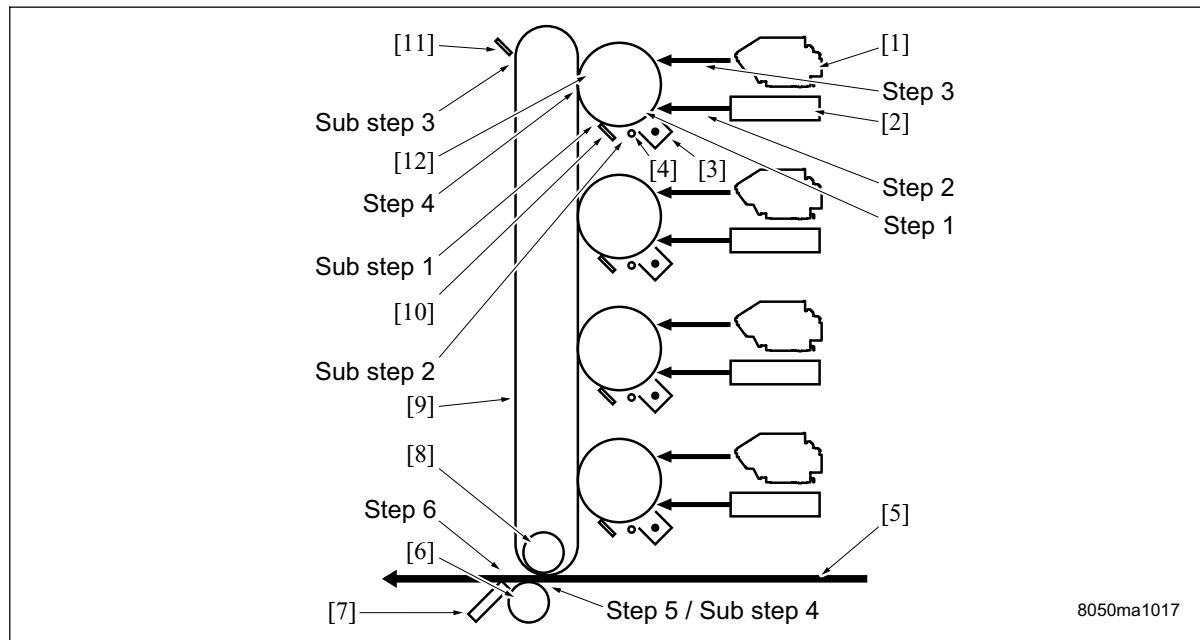
- [1] Exposure unit
- [2] Scanner drive wire /F
- [3] V-mirror unit

- [4] Scanner drive wire /R
- [5] Scanner motor (M1)

6. IMAGE CREATION PROCESS

6.1 Image creation flow and function

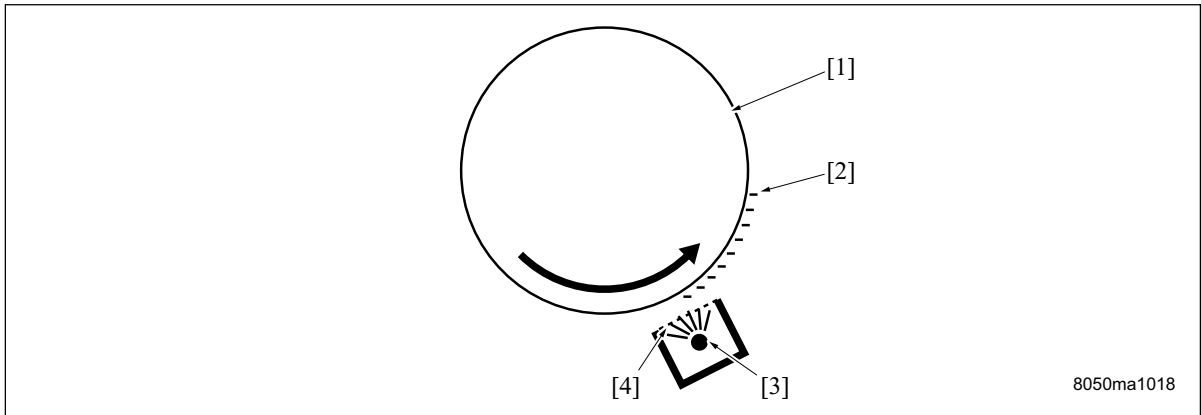
Step	Process	Function
Step 1	Charging process	Forms the layer of charges on the photosensitive drum.
Step 2	Laser exposure process	Form an electrostatic latent image on the photosensitive drum.
Step 3	Developing process	Makes an electrostatic latent image visible.
Step 4	1st transfer process	Forms an 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 neutralizing section
- [8] 2nd transfer roller /U
- [9] Transfer belt
- [10] Blade (drum cleaning)
- [11] Blade (transfer belt cleaning)
- [12] Drum

6.2 Charging process (Step 1)

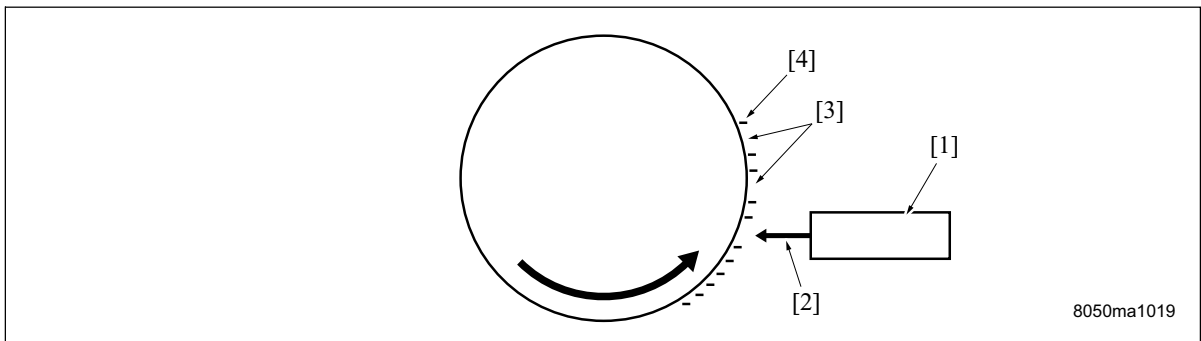
The charging corona, having a gold-plated tungsten wire, is applied with a high DC voltage (minus) to negatively charge the surface of the photosensitive drum by wire discharge. The charging corona is provided with a charging control plate to make charges on the surface of the photosensitive drum uniform.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



- | | |
|-----------------------|----------------------------|
| [1] Drum | [3] Charging corona |
| [2] Charge (negative) | [4] Charging control plate |

6.3 Laser exposure process (Step 2)

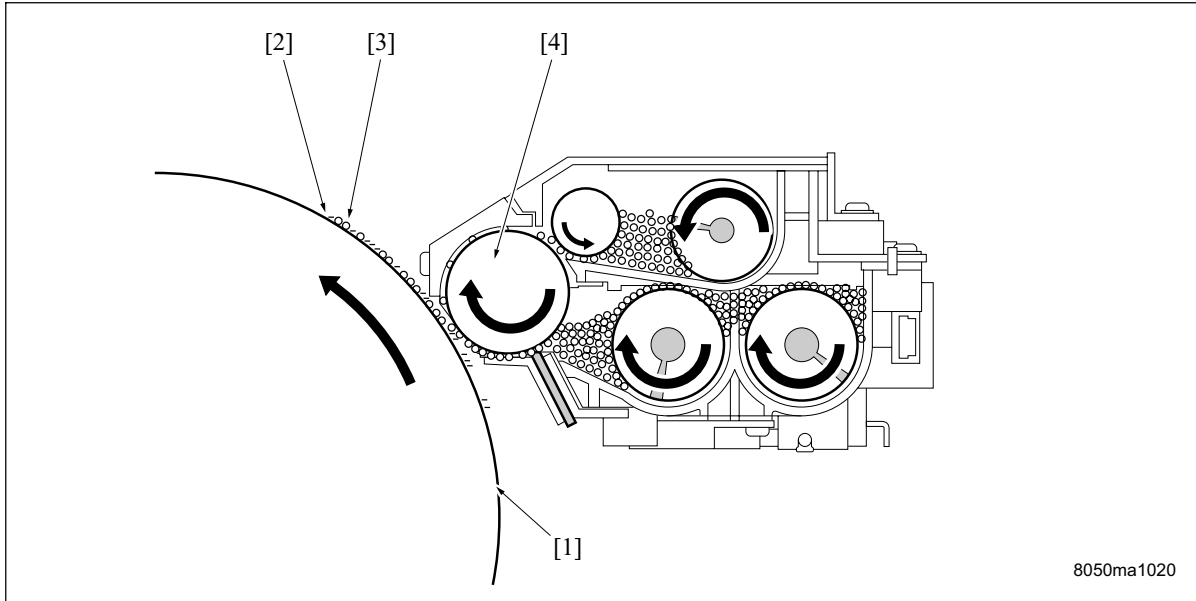
Charges on the surface of the photosensitive drum have a characteristic that when they are irradiated with light, they are neutralized and vanish. Using this characteristic, a laser beam is irradiated on the image region to create an image by removing charges on the photosensitive drum. This image is 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 | [3] Neutralized section |
| [2] Laser beam | [4] Charge (negative) |

6.4 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 photosensitive 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.



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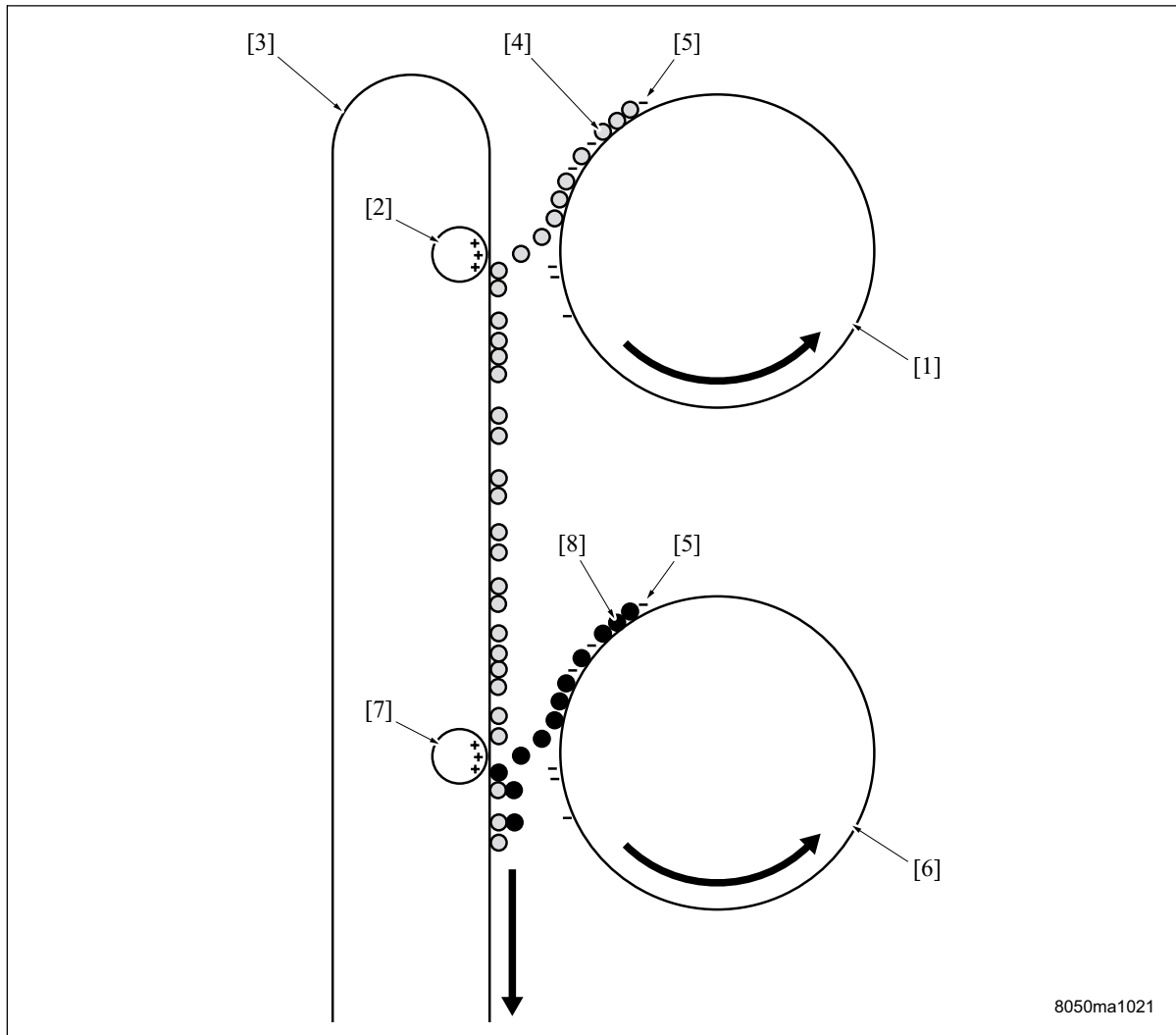
- [1] Drum
- [2] Charge (negative)

- [3] Toner (negative)
- [4] Developing sleeve

6.5 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.

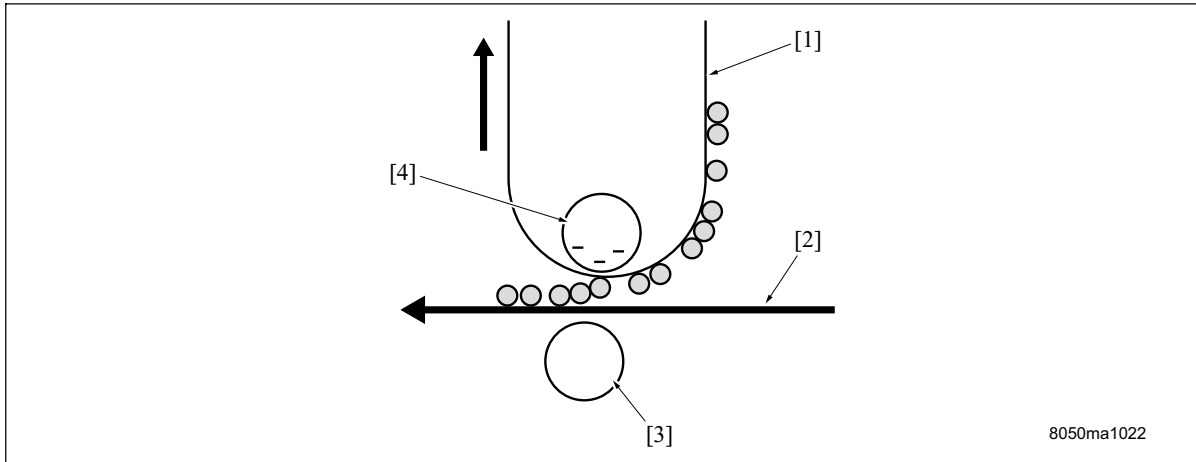


- [1] Drum /Y
- [2] 1st transfer roller /Y
- [3] Transfer belt
- [4] Toner /Y

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

6.6 2nd transfer process (Step 5)

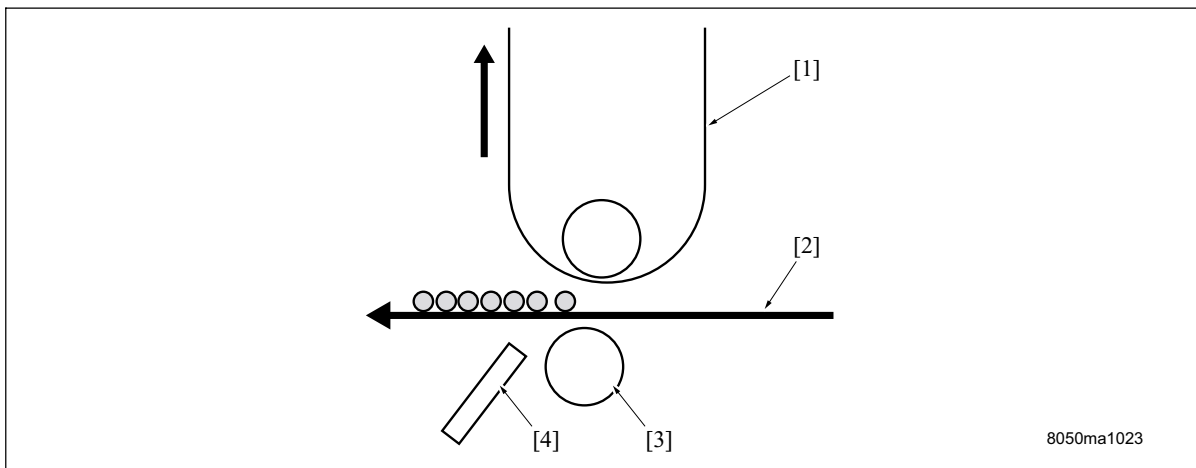
The operation to transfer the toner image of the four colors on the transfer belt to paper is referred to as the 2nd transfer. While in the 2nd transfer, the 2nd transfer roller /L provided at the lower section of the transfer belt conveys paper while pressing it against the transfer belt. At this time, 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

6.7 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 adsorption phenomenon where paper is attracted to the transfer belt. This operation to peel paper that is thus adsorbed off the transfer belt is referred to as separation. Separation is made by applying high AC and DC bias voltages to the separation neutralizing section. As a result the charges of the paper and the transfer belt are neutralized.

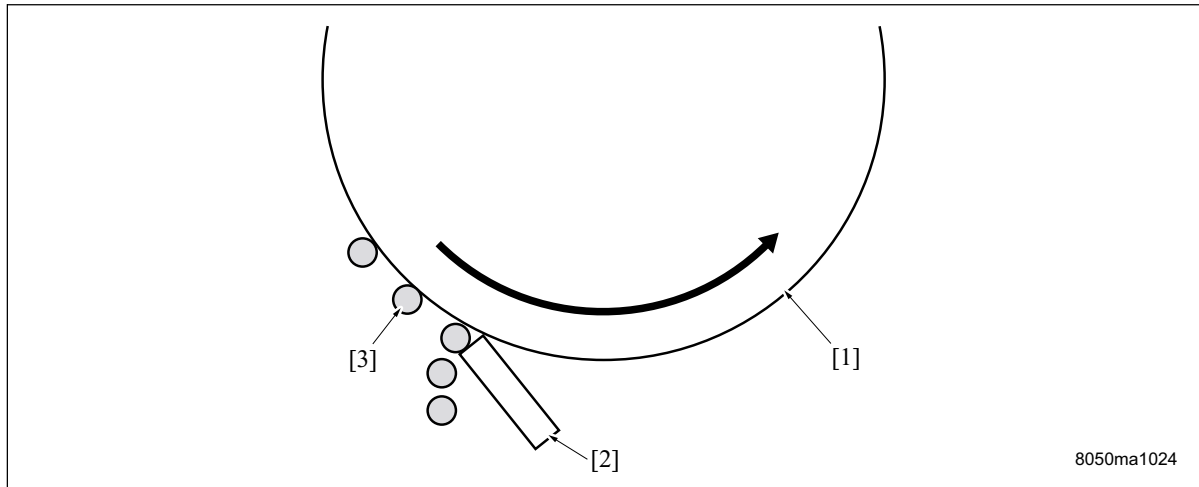


- [1] Transfer belt
- [2] Paper
- [3] 2nd transfer roller /L
- [4] Separation neutralizing section

6.8 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

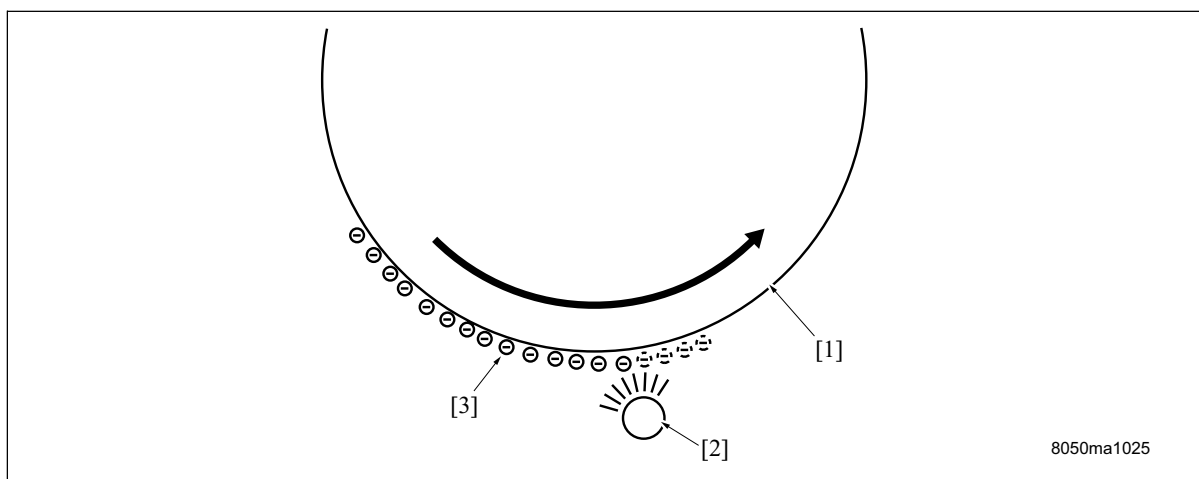
[3] Residual toner

[2] Cleaning blade

6.9 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 machine conducts this process by using a pre-charging exposure lamp (PCL).



[1] Drum

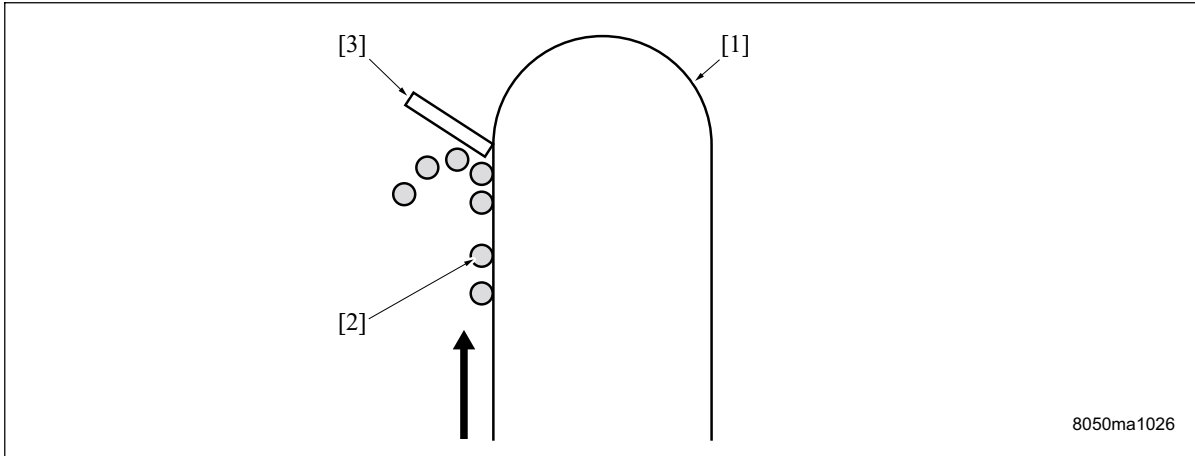
[3] Residual charge

[2] Pre-charging exposure lamp (PCL)

6.10 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.

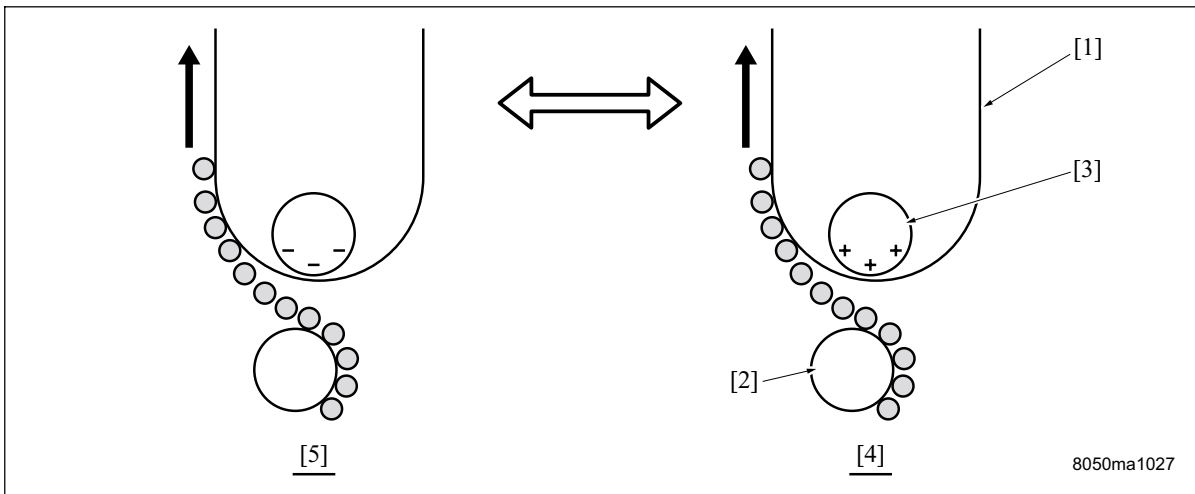


[1] Transfer belt
 [2] Residual toner
 [3] Cleaning blade

6.11 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.

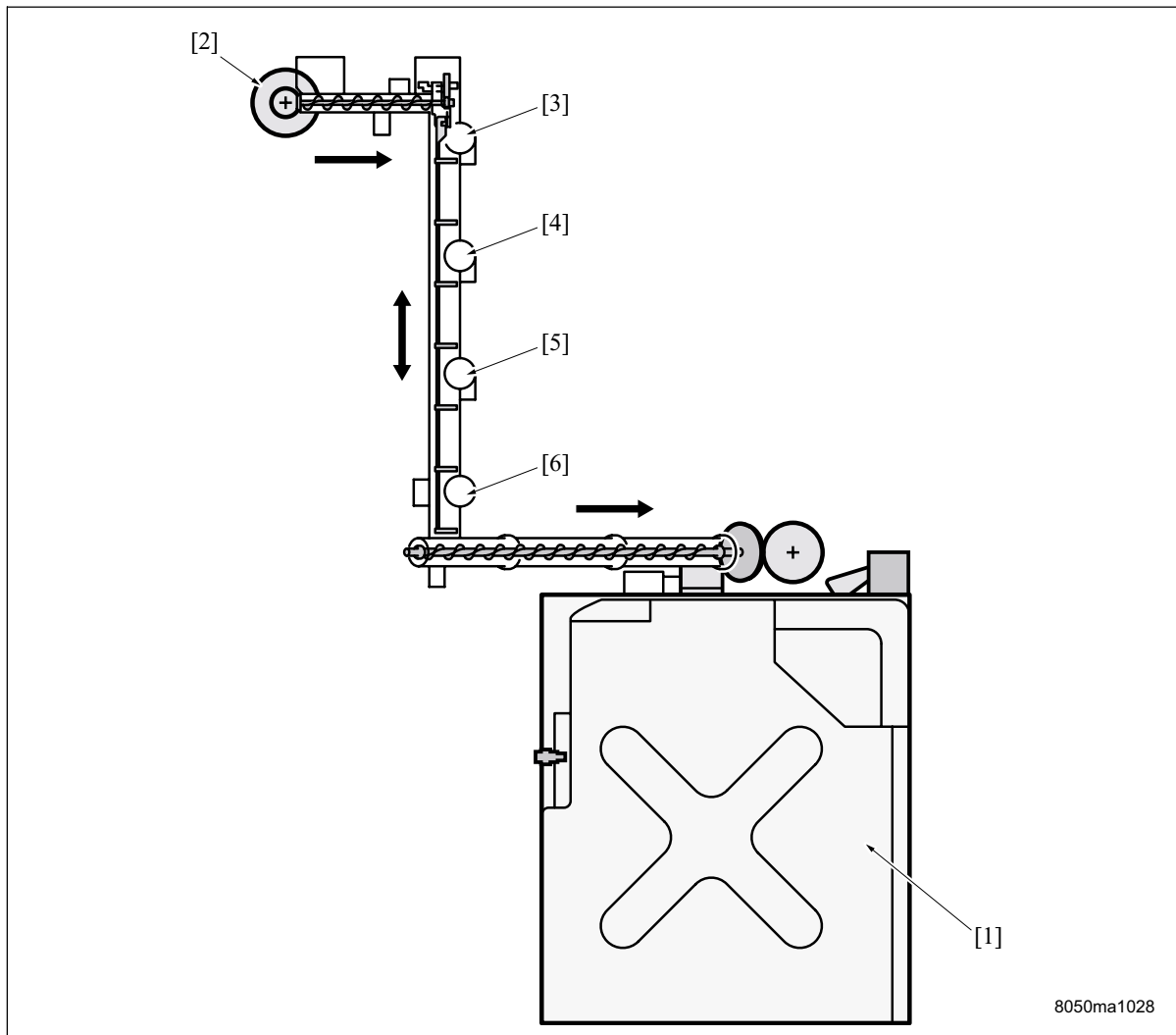
So, the 2nd transfer roller /U is applied with a positive and a negative high DC bias voltage alternately to move toner on the 2nd transfer roller /L to the transfer belt side. The toner on the transfer belt that has been moved is cleaned by the transfer belt cleaning mentioned above.



[1] Transfer belt
 [2] 2nd transfer roller /L
 [3] 2nd transfer roller /U
 [4] DC bias (positive) applied
 [5] DC bias (negative) applied

6.12 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 |

6.13 Process speed

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

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

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

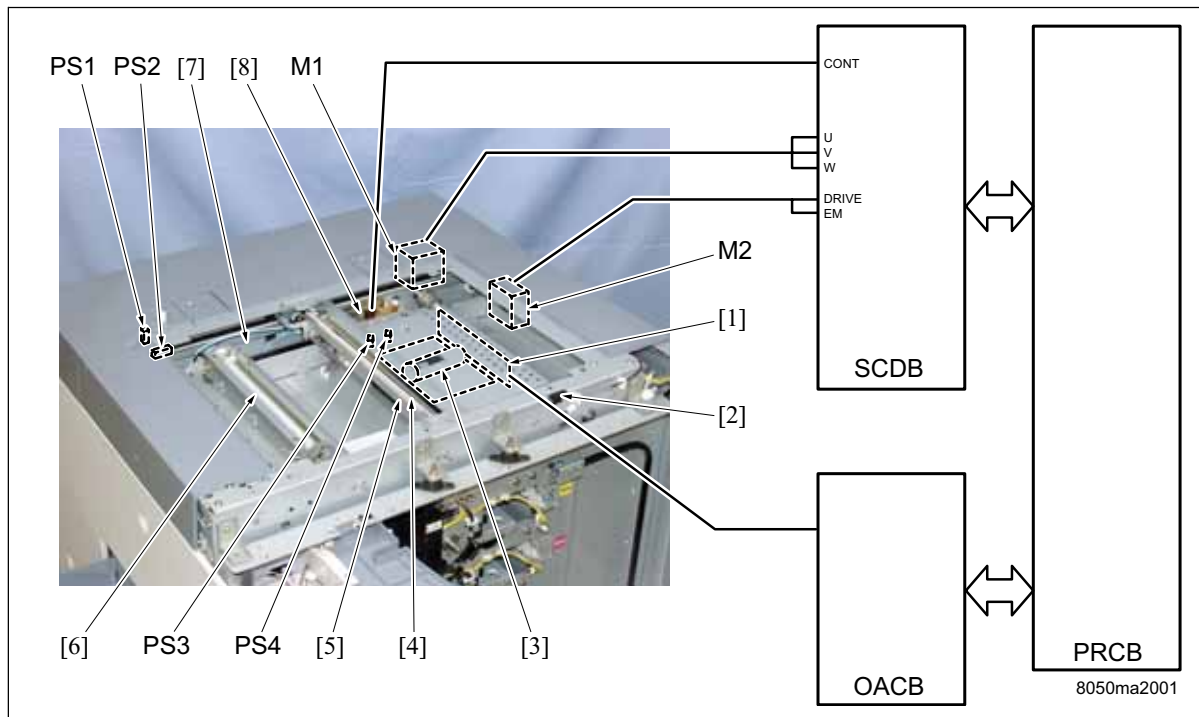
I OUTLINE

Blank Page

II UNIT EXPLANATION

1. SCANNER

1.1 Composition



II UNIT EXPLANATION

Symbol	Name	Function or method
[1]	CCD board (CCDB)	Converts an analog signal to a digital signal
[2]	DF reset read switch (RS1)	Detects whether the platen cover or RADF is closed Magnet sensor type
[3]	CCD unit	Converts the read image optoelectronically (600 dpi) 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: 220 mm/sec (at life-size) • Backhaul: 802 mm/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
PS2	APS timing sensor	Detects whether the platen cover or RADF is opened/closed

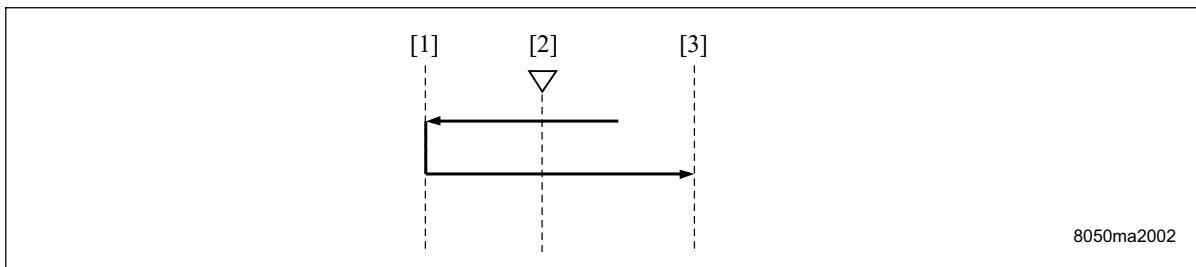
Symbol	Name	Function or method
PS4	APS sensor /L	Detects the original size in the sub-scan direction (for large size)
PS3	APS sensor /S	Detects the original size in the sub-scan direction (for small size)

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

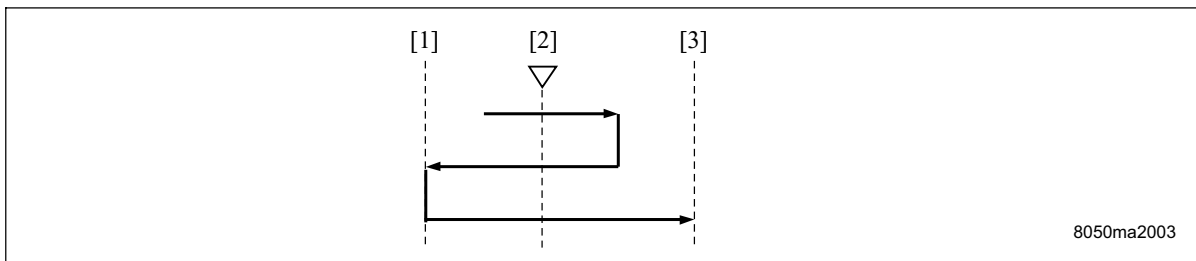


[1] Home position

[3] Platen APS location

[2] PS1

B. When PS1 is on



[1] Home position

[3] Platen APS location

[2] PS1

1.2.2 Shading correction reading

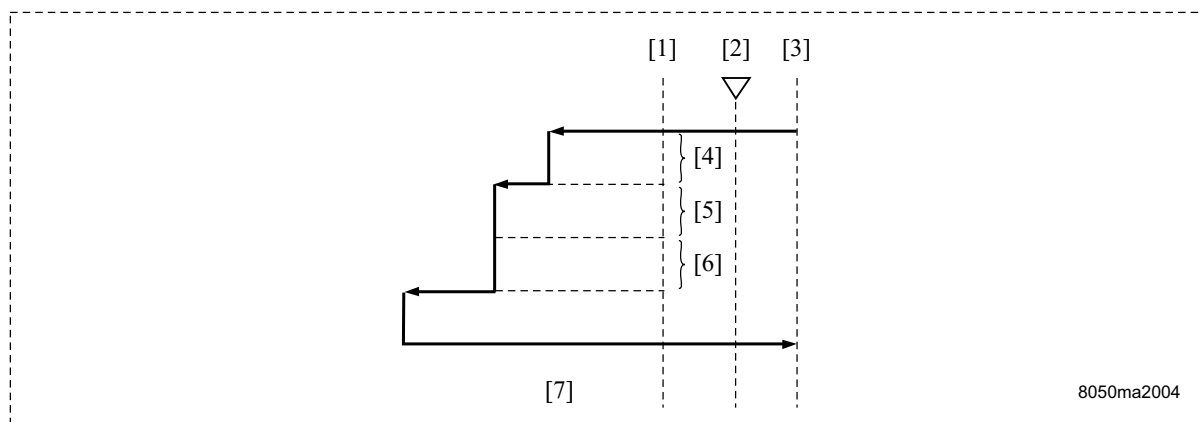
The exposure unit starts the shading correction with the white standard board attached to the platen glass once it completes the home position search.

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 turned on.

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



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

B. When the start button is turned on

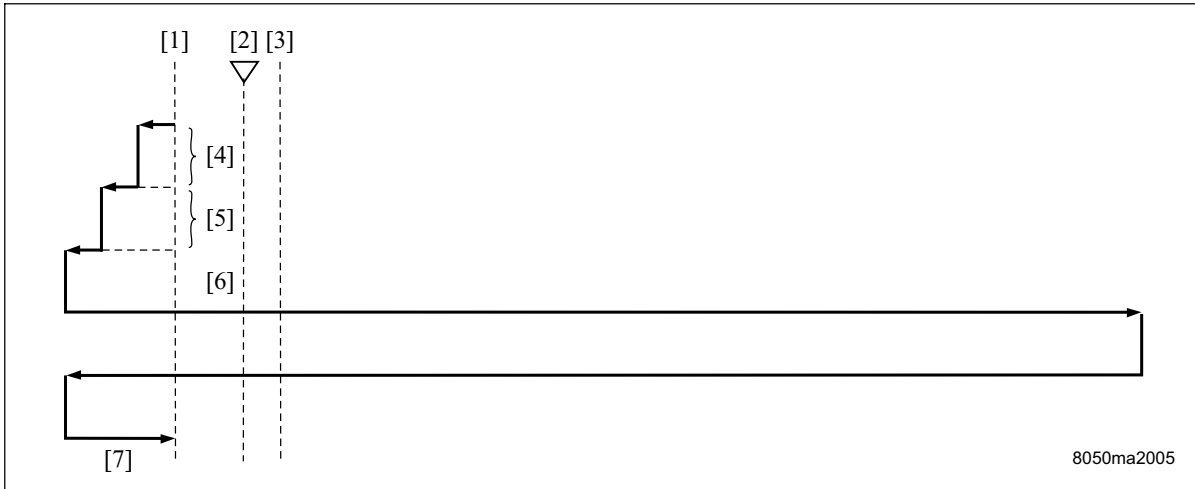
The basic operation is identical to when the main switch (SW2) is turned on; however, it starts the copying operation without stopping at the platen APS location after reading the shading correction.

1.2.3 Original reading mode

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

A. When copying with the manual density setting

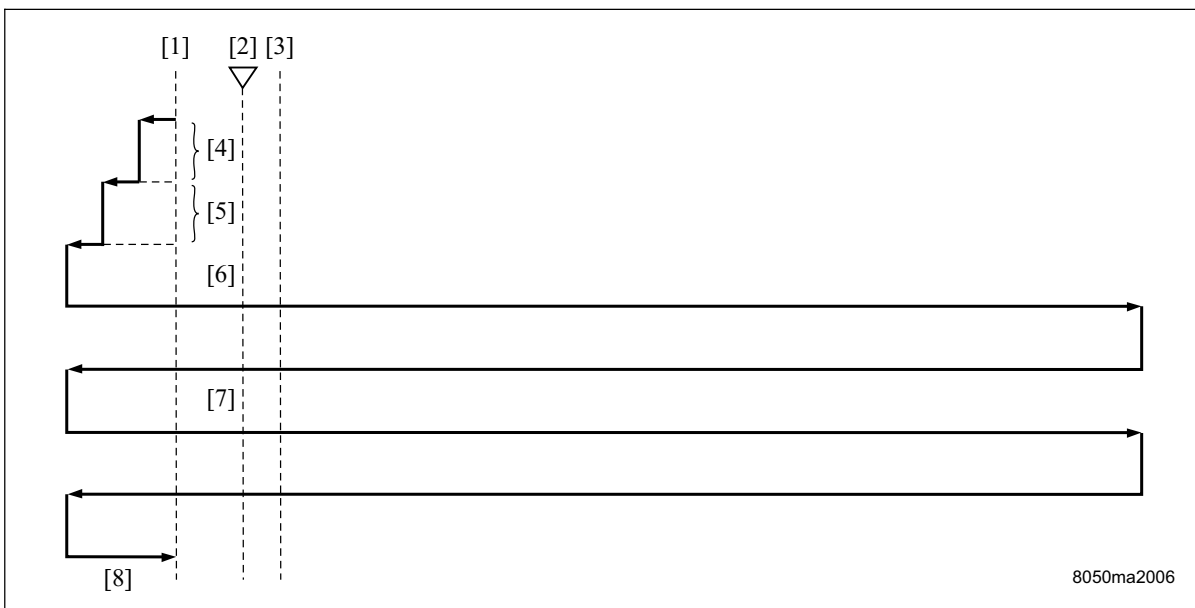
II UNIT EXPLANATION



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- | | |
|--------------------------|--------------------------|
| [1] Home position | [5] 2nd white correction |
| [2] PS1 | [6] Exposure scan |
| [3] Platen APS position | [7] Home position search |
| [4] 1st white correction | |

B. When performing the AE copy



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- | | |
|--------------------------|--------------------------|
| [1] Home position | [5] 2nd white correction |
| [2] PS1 | [6] AE scan |
| [3] Platen APS position | [7] Exposure scan |
| [4] 1st white correction | [8] Home position search |

1.2.4 Original reading control

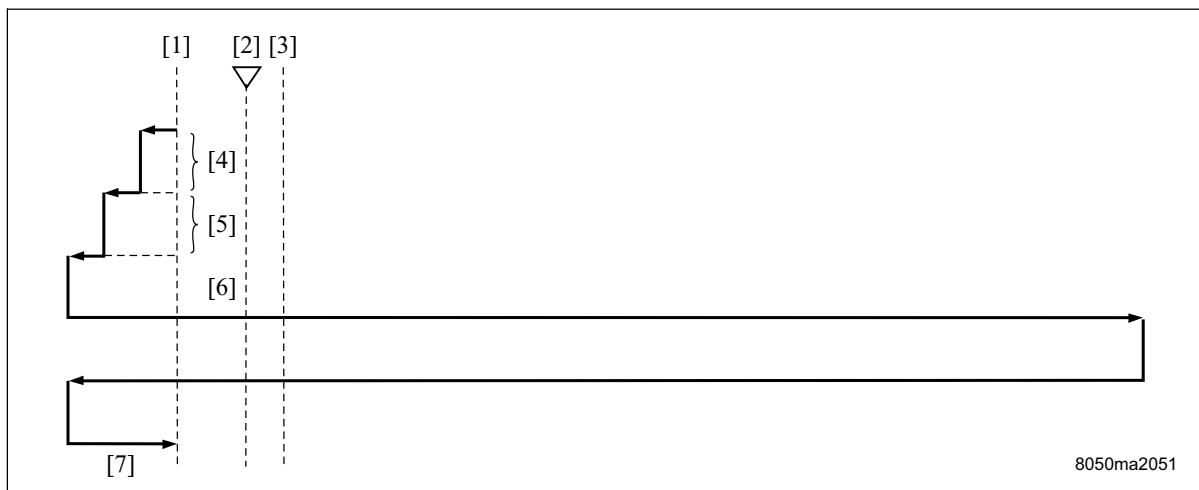
The reflection from the exposed original reaches to the CCD sensor through the lens. The CCD sensor outputs an electric signal (analog) proportional to the amount of light and then the analog signal is converted to a digital signal in the CCD board (CCDB) according to directions from the overall control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

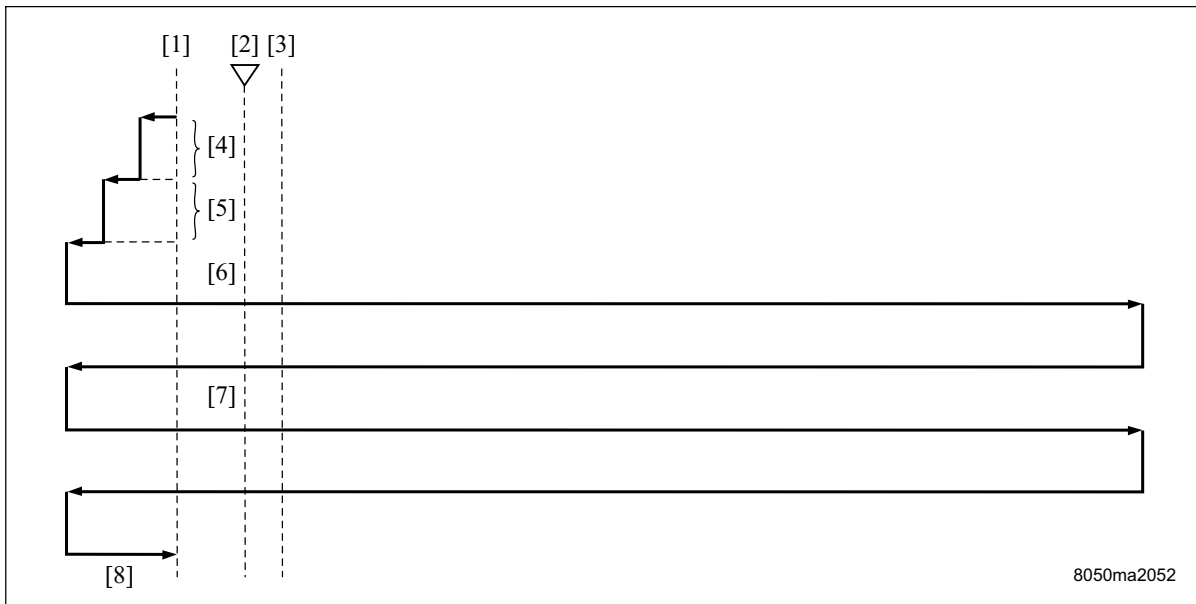


- [1] Home position
- [2] PS1
- [3] Platen APS position
- [4] 1st white correction

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

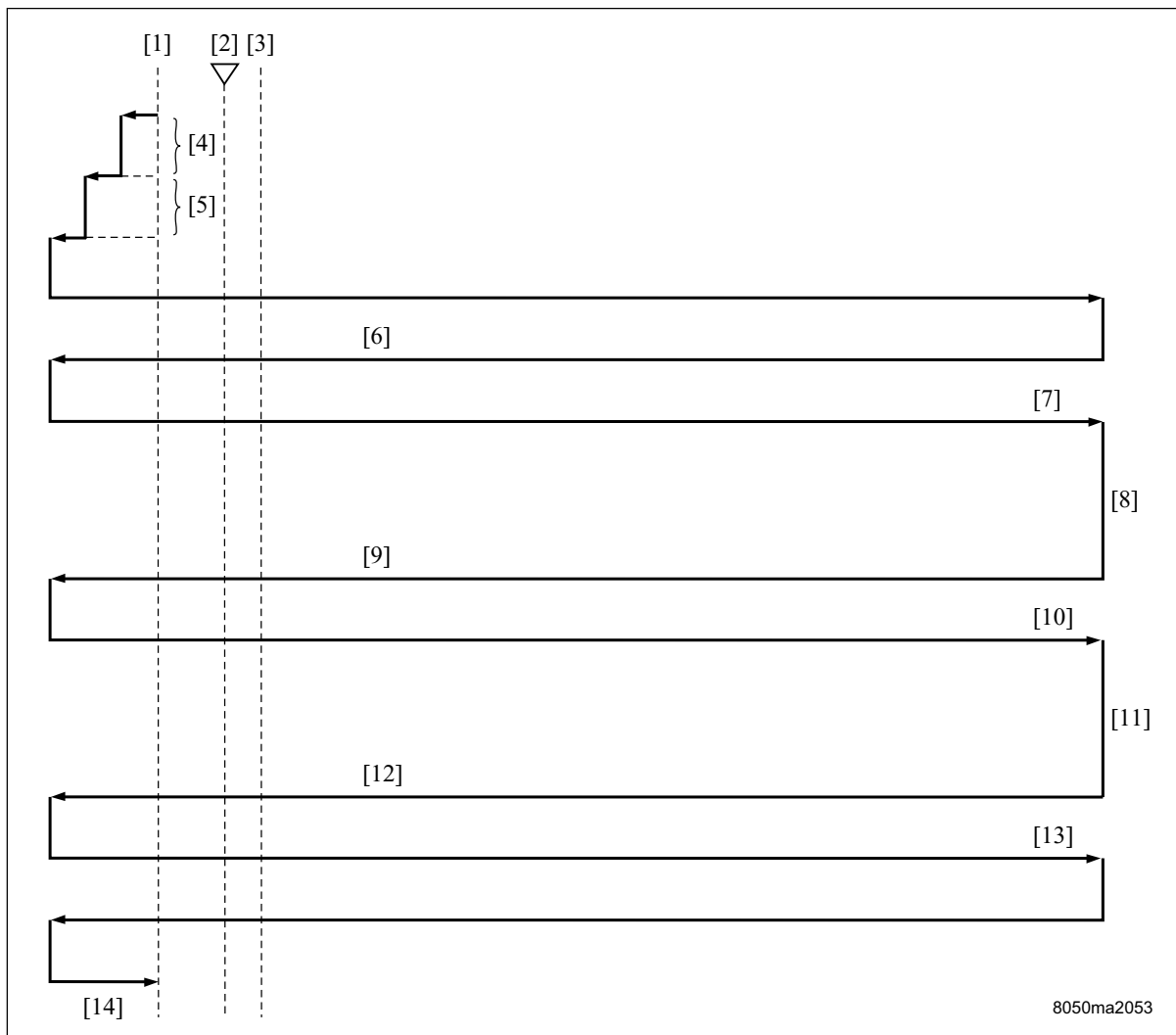
(2) When AE/ACS has been set (the platen mode)

II UNIT EXPLANATION



- | | |
|--------------------------|------------------------------|
| [1] Home position | [5] 2nd white correction |
| [2] PS1 | [6] AE/ACS scan (429 mm/s) |
| [3] Platen APS position | [7] Exposure scan (220 mm/s) |
| [4] 1st white correction | [8] Home position search |

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



II UNIT EXPLANATION

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

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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 platen cover or RADF is opened/closed. The signal is sent via the scanner drive board (SCDB) and the overall control board (OACB) (see the AFR-20 Service manual for more detailed information on the APS control by AFR-20).

A. APS operation

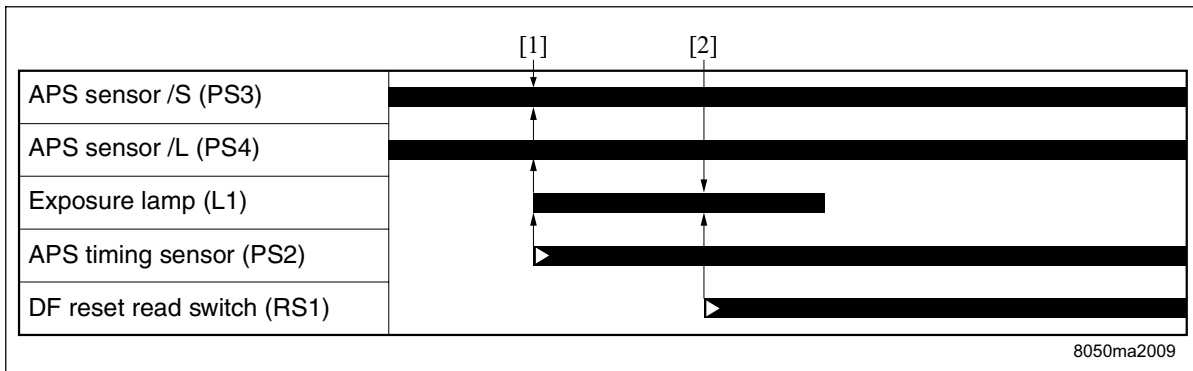
The APS sensor /S (PS3) and the APS sensor /L (PS4) detect the original size in the sub-scan direction and the CCD sensor detects the original size in the main scan direction.

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 (platen 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)

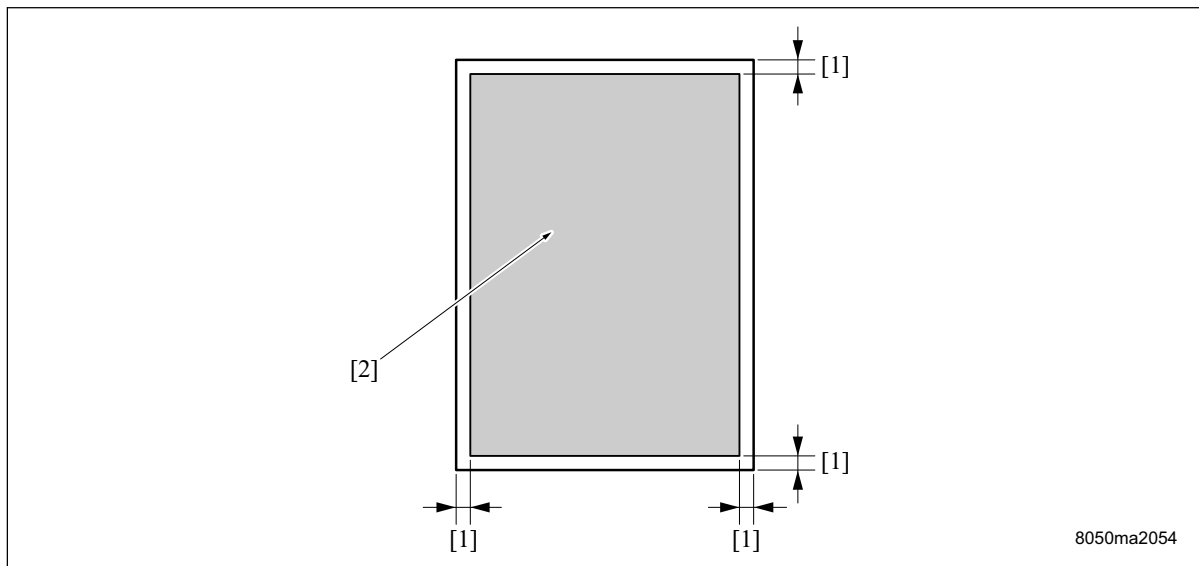
[2] 2nd original size detection
(main scan direction)

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 platen mode and the DF mode.



[1] 10 mm

[2] AE/ACS sampling range

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)

GC 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

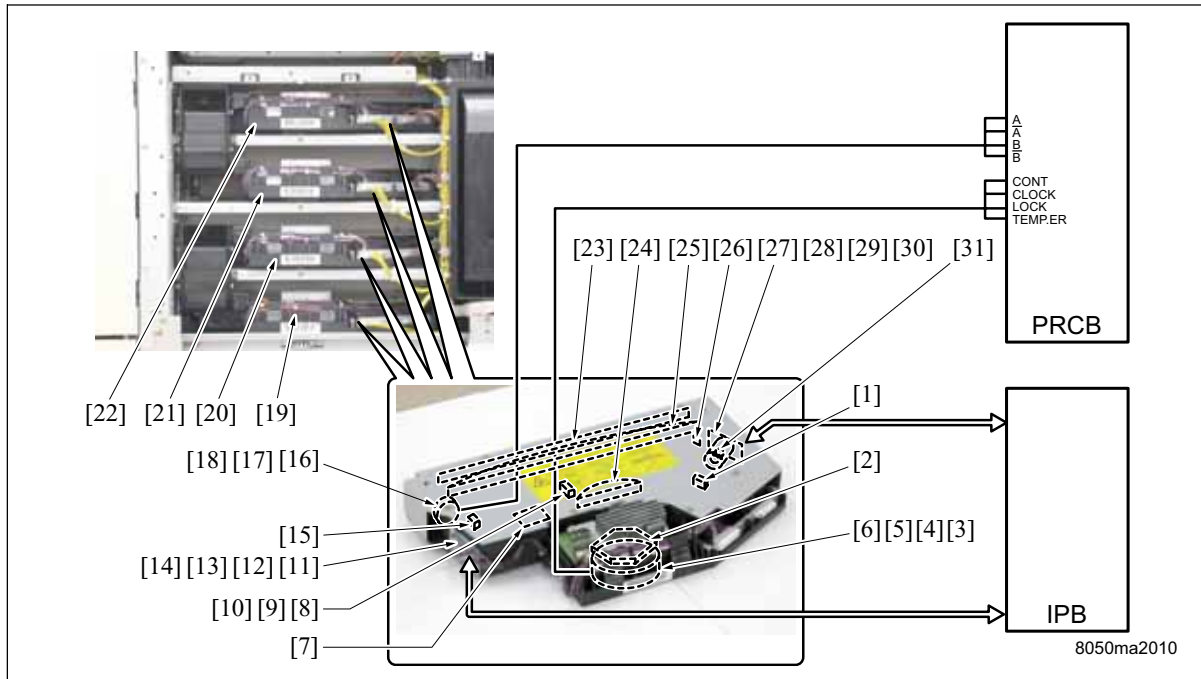
(2) Execution timing

- 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. WRITE

2.1 Composition



II UNIT EXPLANATION

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, 51,968.51 rpm
[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)

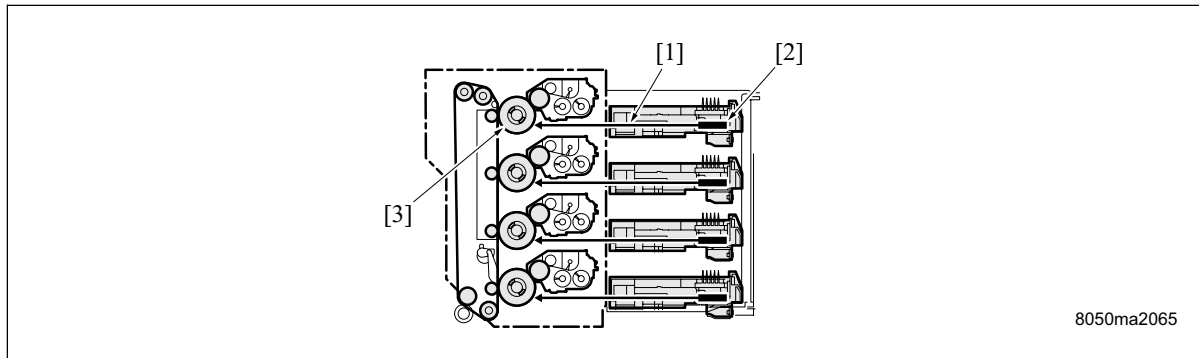
Symbol	Name	Function or method
[13]	Index sensor board /C (INDX SB C)	Controls the laser writing position in the main scan direction (write unit /C)
[14]	Index sensor board /K (INDX SB K)	Controls the laser writing position in the main scan direction (write unit /K)
[15]	Index lens	Collects the laser 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, 7 mW 650 nm
[28]	Laser drive board /M (LDB M)	Laser light (write unit /M) 1 chip 1 beam method, 7 mW 650 nm
[29]	Laser drive board /C (LDB C)	Laser light (write unit /C) 1 chip 1 beam method, 7 mW 650 nm
[30]	Laser drive board /K (LDB K)	Laser light (write unit /K) 1 chip 1 beam method, 7 mW 650 nm
[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

[2] Polygon mirror

[3] Drum

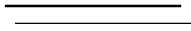
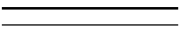
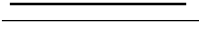

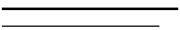
2.2.2 Color registration correction control

In a black-and-white copier, a transfer image formed on its drum is transferred onto paper directly; however, in this machine, 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.

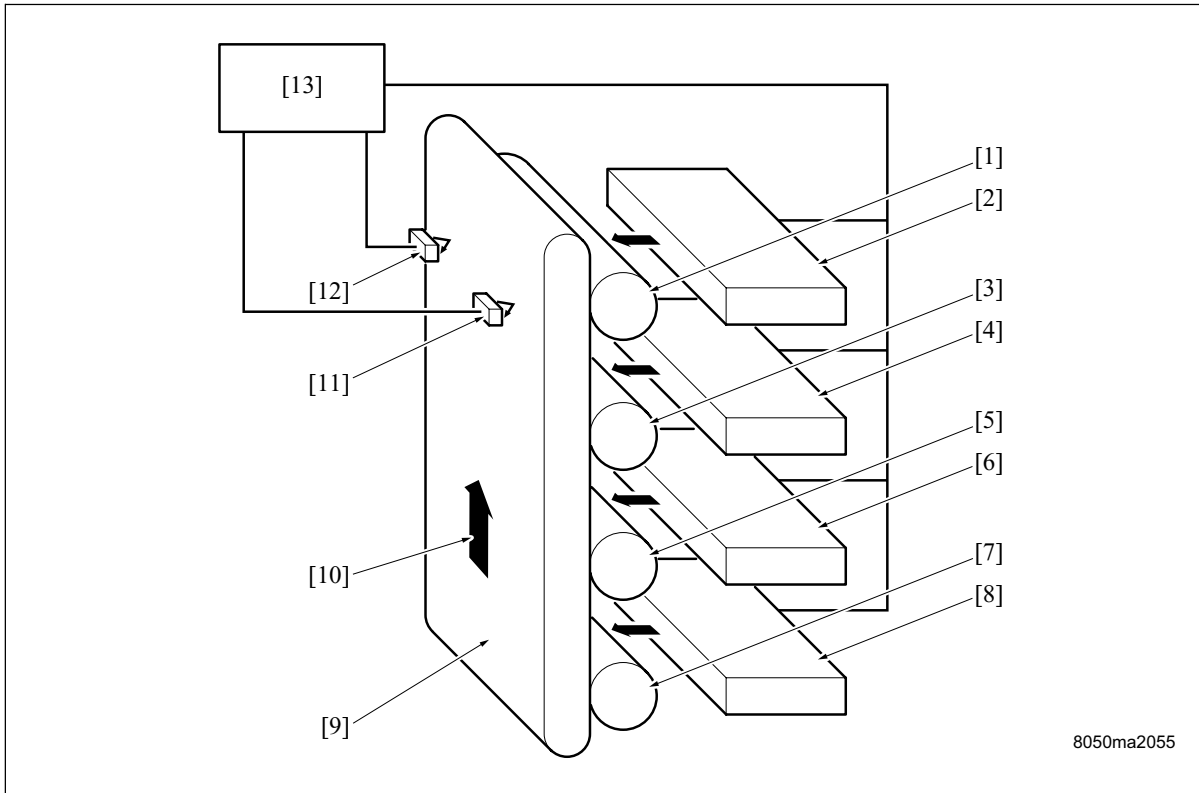
Correction type		Correction method
Drift in the main scan direction		Adjusts the write start timing in the main scan direction
Drift in the sub-scan direction		Adjusts the write start timing in the sub-scan direction
Entire horizontal magnification		Adjusts the clock frequency at write
Inclination		Adjusts 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.



II UNIT EXPLANATION

- | | |
|-------------------|-----------------------------------------|
| [1] Drum /Y | [8] Write unit /K |
| [2] Write unit /Y | [9] Transfer belt |
| [3] Drum /M | [10] Direction of image |
| [4] Write unit /M | [11] Color registration sensor /F (PS8) |
| [5] Drum /C | [12] Color registration sensor /R (PS9) |
| [6] Write unit /C | [13] Data processing |
| [7] Drum /K | |

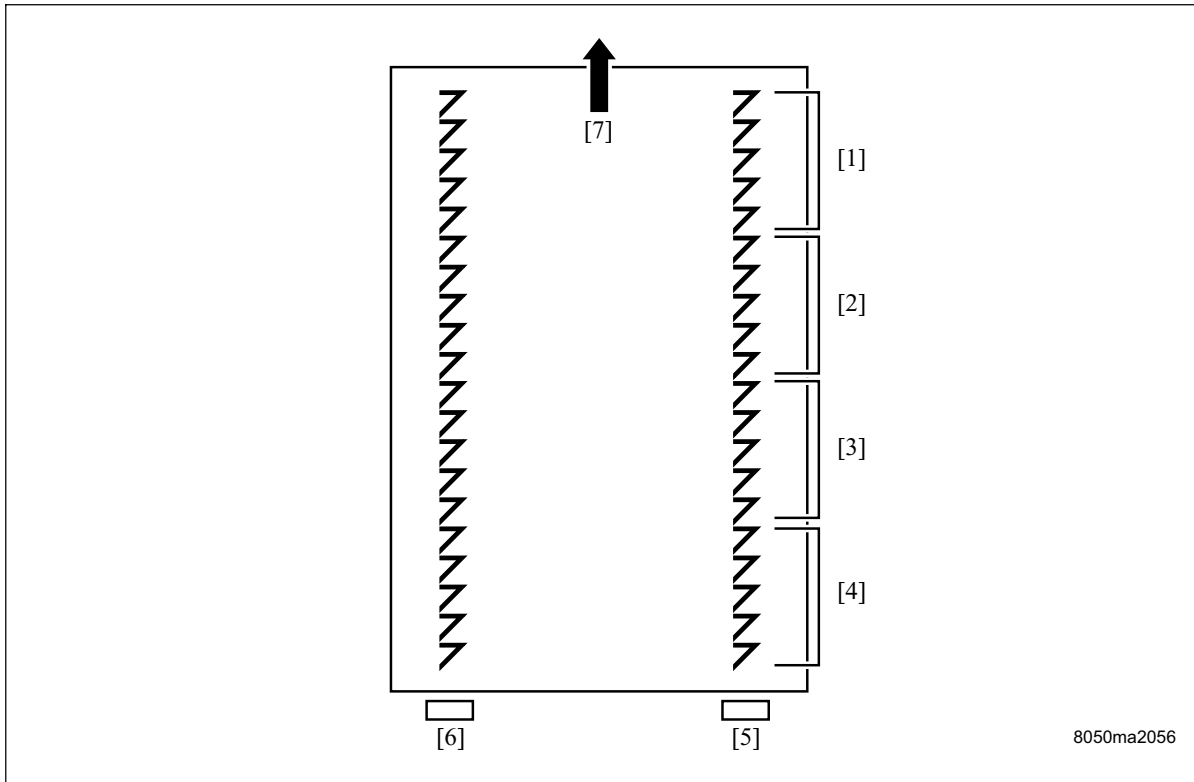
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C. Procedure for the color registration automatic correction control operation

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).

II UNIT EXPLANATION

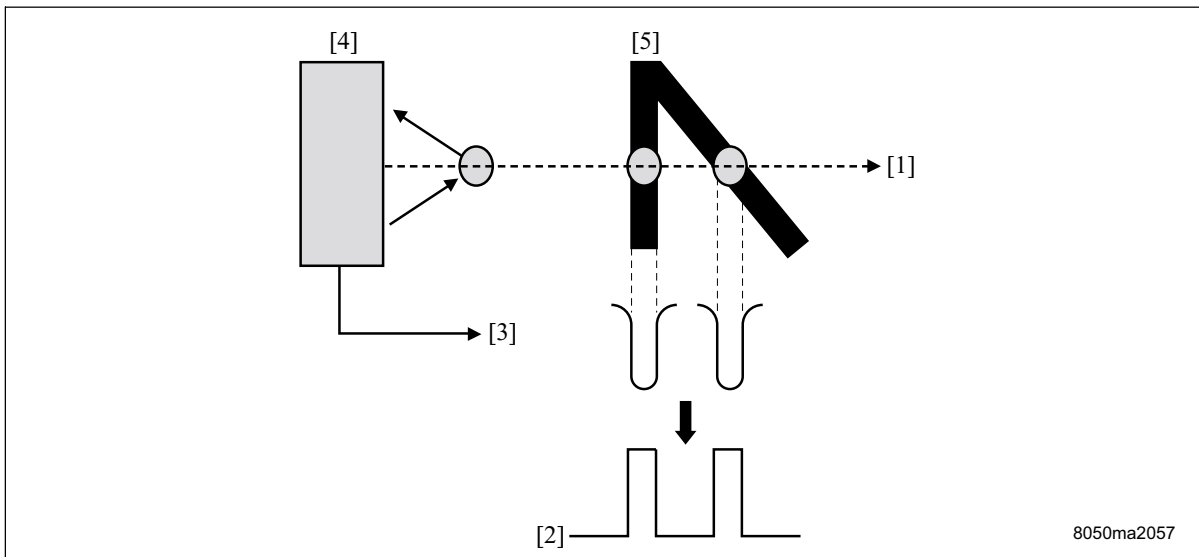


- [1] Color registration mark /K
- [2] Color registration mark /C
- [3] Color registration mark /M
- [4] Color registration mark /Y

- [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.

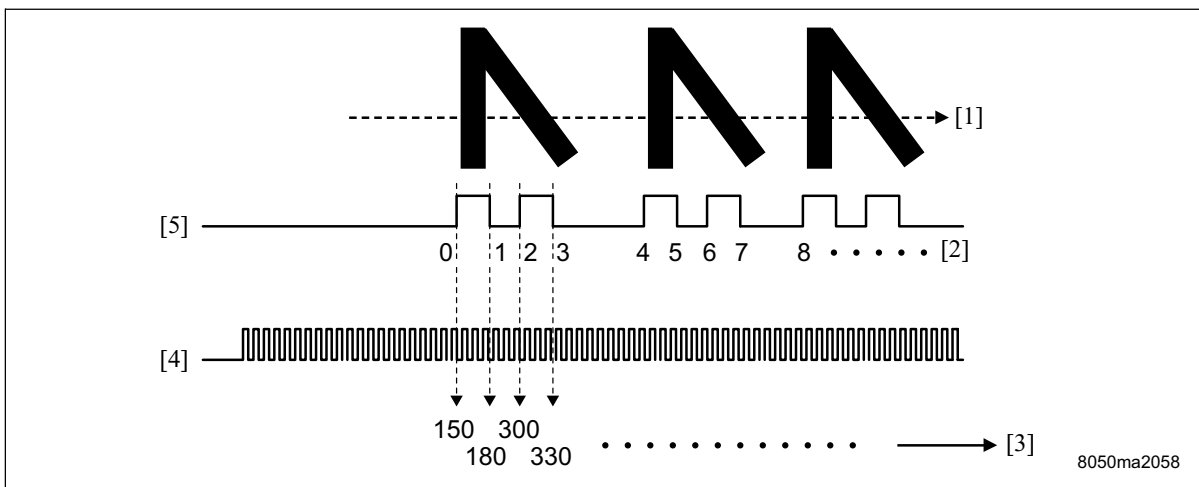


II UNIT EXPLANATION

- [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)
- [2] Address number of the detected edge
- [3] Clock signal count value corresponding to the address for each detected edge
- [4] Clock signal
- [5] Binarized digital signals

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:

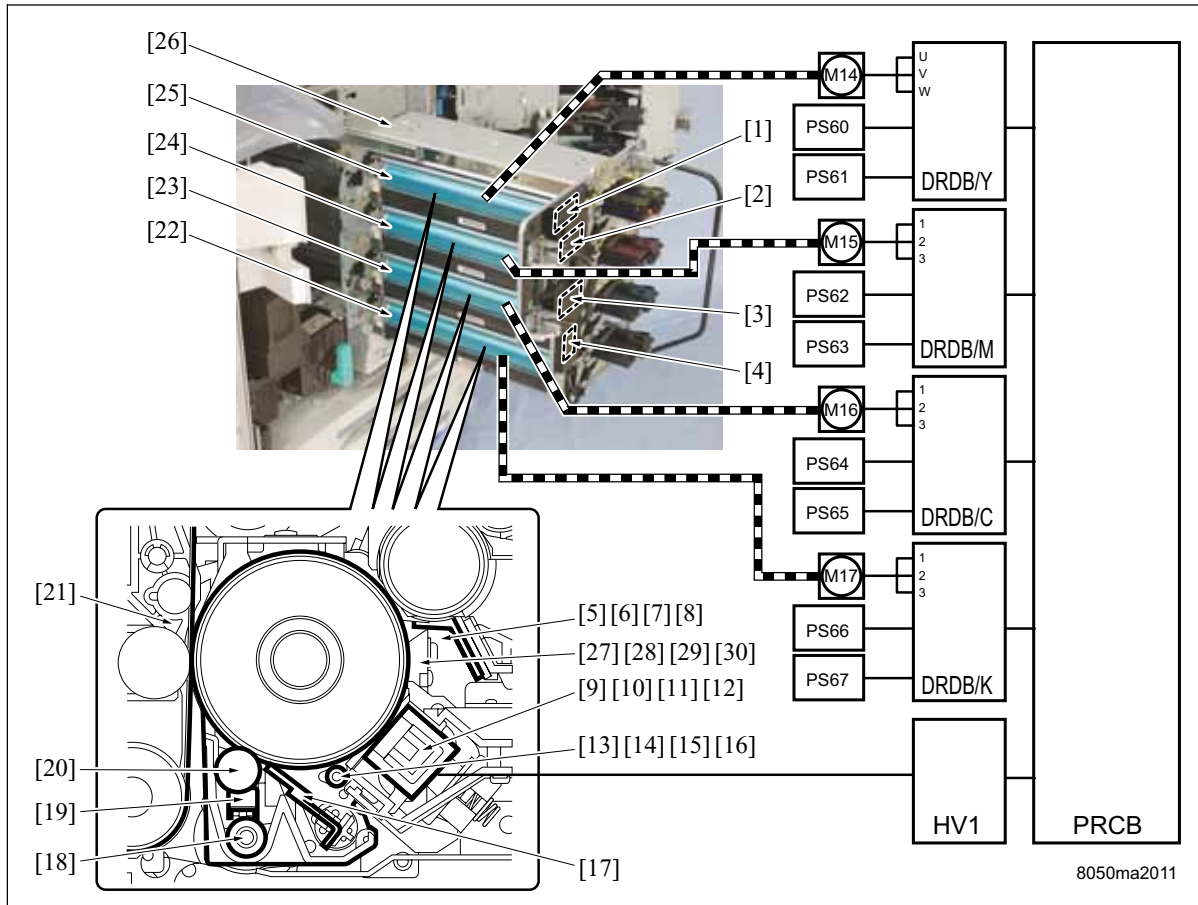
- Operation condition 1
The color registration automatic correction control is executed in the 36 mode.
Perform the operation when replacing a component described in "3. LIST OF ADJUSTMENT ITEMS " in Field Service.
- Operation condition 2
The machine is in a warm-up cycle, except when the fusing temperature is 70 °C or more at the start of the warm-up cycle.
- 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:

- **In operation condition 3, the correction control is performed by temporarily interrupting the current job. Setting using the DIP SW of the 25 mode can nonetheless be made to let the machine perform the correction control after completing the current job.**
- **For operation condition 4 and 5, the first copy/print cycle is started after the corresponding operation condition has been met.**

3. DRUM UNIT

3.1 Composition



II 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 30μm) Constant-current method DC output range: -450 to -1100μA Grid bias: charging control 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: changing control 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: changing control 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: changing control 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]	Grease	Assists the drum cleaning ability Zinc stearate rod
[20]	Grease applying brush roller	Applies grease 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

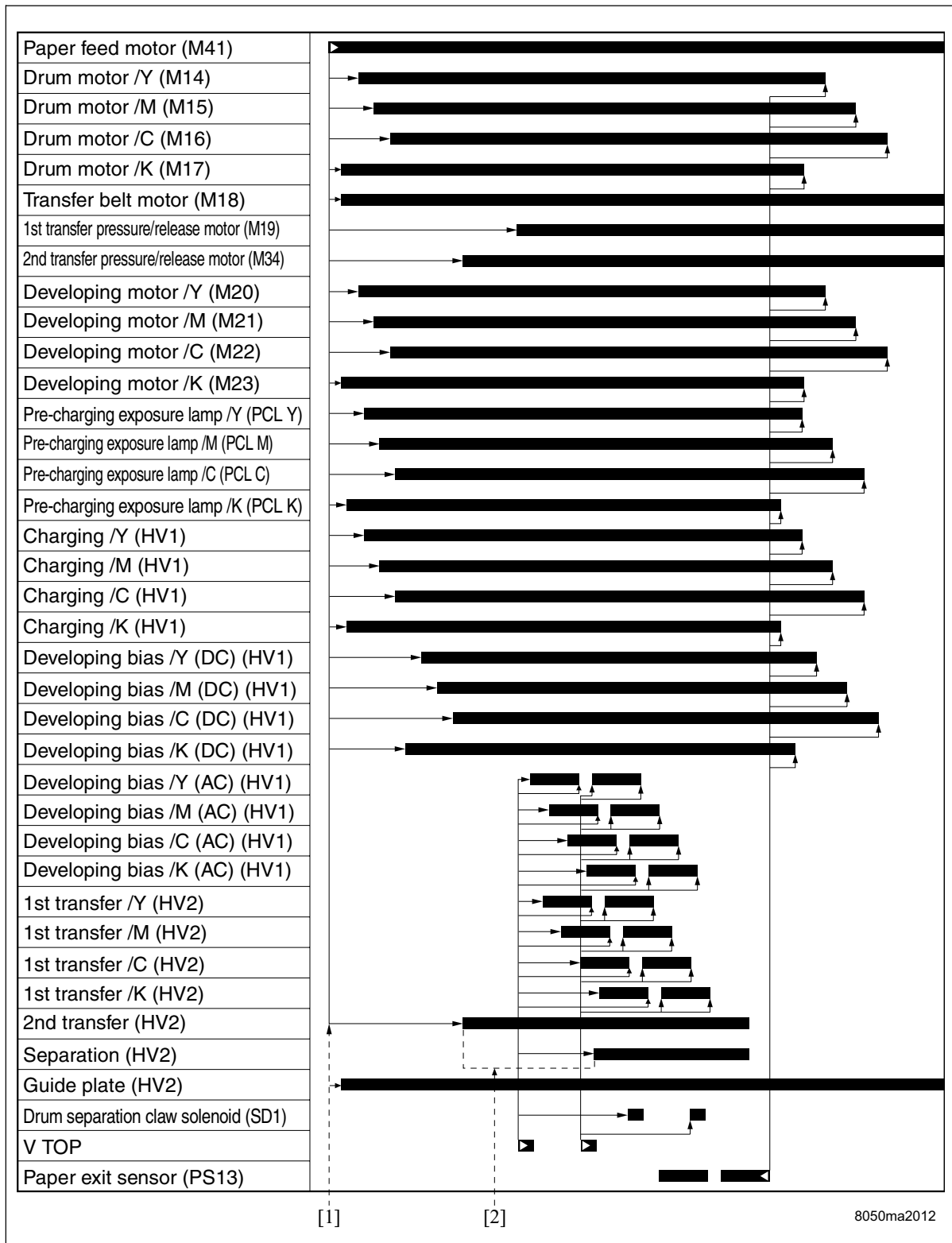
Symbol	Name	Function or method
[27]	Drum potential sensor /K (DRPS K)	Detects the surface potential of the drum /K
[28]	Drum potential sensor /C (DRPS C)	Detects the surface potential of the drum /C
[29]	Drum potential sensor /M (DRPS M)	Detects the surface potential of the drum /M
[30]	Drum potential 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	<p>Detects the rotation of the encoder for the drum /K</p> <p>Manages the drive of the drum motor /K (M17)</p> <p>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</p>
PS67	Encoder sensor /K2	<p>Detects the rotation of the encoder for the drum /K</p> <p>Manages the drive of the drum motor /K (M17)</p> <p>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</p>

II UNIT EXPLANATION

3.2 Operation

3.2.1 Image formation timing



II UNIT EXPLANATION

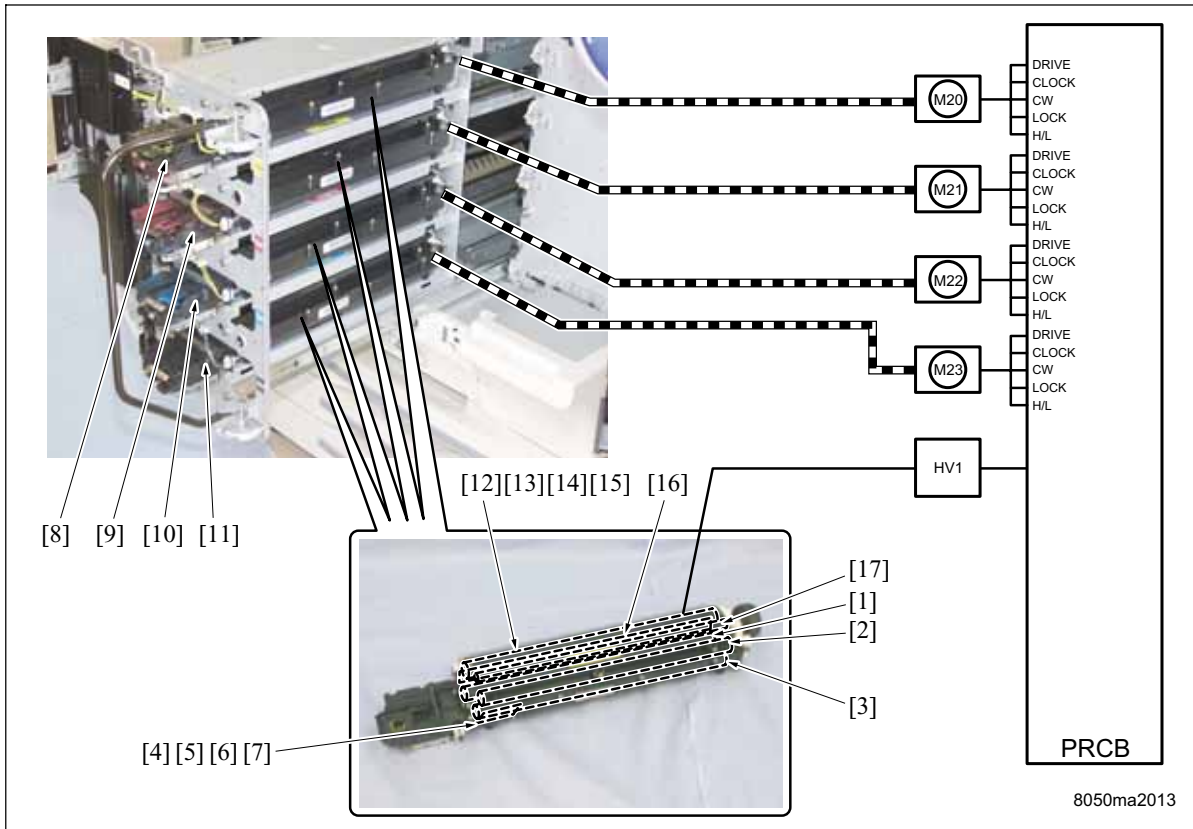
[1] Paper feed start

[2] 2nd transfer cleaning

4. DEVELOPING UNIT

4.1 Composition

II UNIT EXPLANATION



8050ma2013

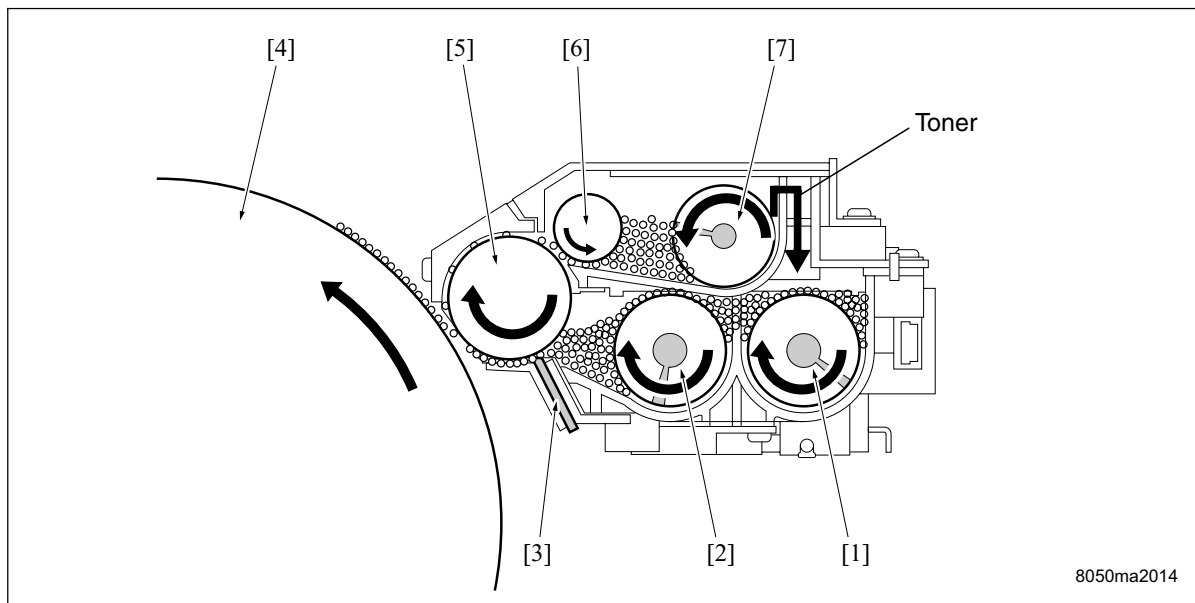
Symbol	Name	Function or method
[1]	Conveyance screw	Conveyance of developer from the agitator screw to the developing sleeve Screw method
[2]	Collection screw	Conveyance of developer from the scraper magnet roller to the collection sector Screw method
[3]	Agitator screw	Agitation of developer and the 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 adsorption 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 check 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.

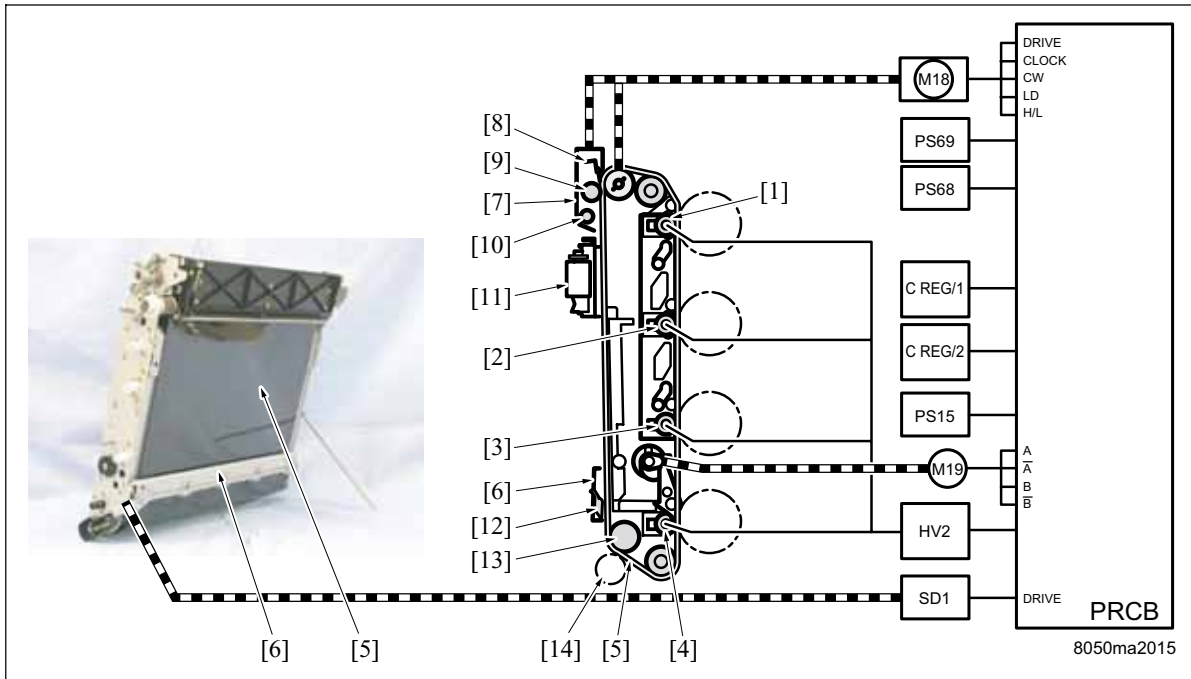
Durability: 83,000km/color

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

II UNIT EXPLANATION



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 24 VDC 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

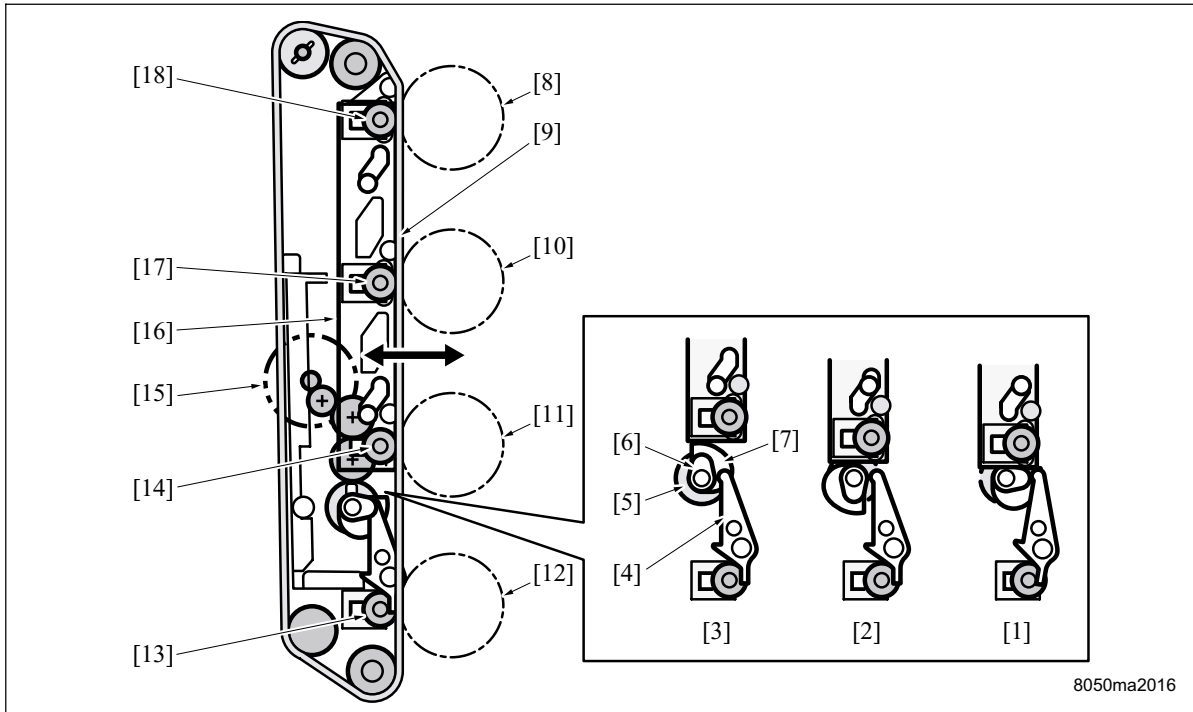
The 1st transfer roller that presses the transfer belt against the drum is made up of the 1st transfer rollers /Y, /M and /C for the drums /Y, /M and /C and the 1st transfer roller /K for the drum /K. The 3 1st transfer rollers /Y, /M and /C of these rollers operate as a unit (color 1st transfer roller 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.

II UNIT EXPLANATION

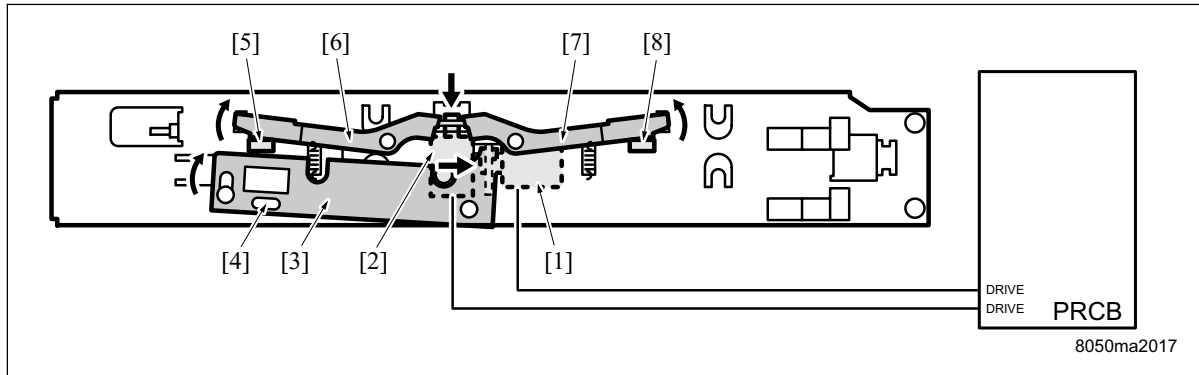


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- | | |
|-------------------------------------------------|------------------------------------------------|
| [1] When totally released | [10] Drum /M |
| [2] When in the black-and-white mode | [11] Drum /C |
| [3] When in the full color mode | [12] 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 24 VDC drive
[2]	Color registration shutter solenoid (SD2)	Open/close of the color registration sensor shutters /F and /R 24 VDC 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 (PS9)	Prevention of contamination of the color registration sensor /F (PS9)
[7]	Color registration sensor shutter /R (PS9)	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, is being sent.

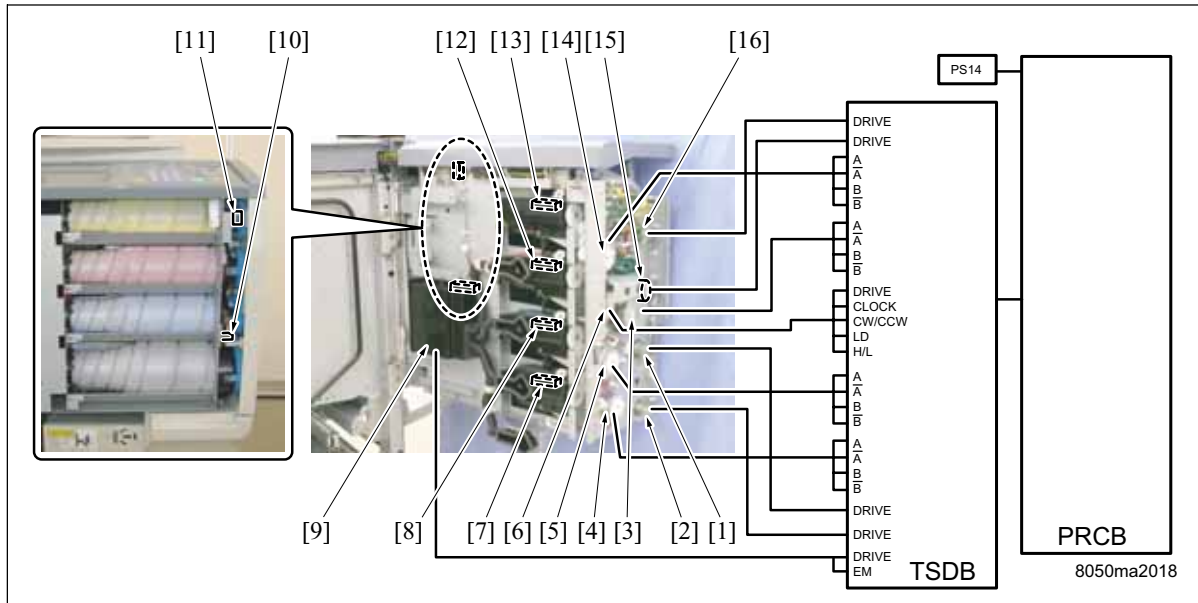
The 2nd transfer roller /U is positioned inside the transfer belt directory above the 2nd transfer roller /L, and applied with a DC bias value according to the following conditions:

- 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



II UNIT EXPLANATION

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 24 VDC drive
[2]	Toner bottle clutch /K (MC17)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle /K 24 VDC 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 50 g) Toner bottle capacity: Approx. 690 g
[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 50 g) Toner bottle capacity: Approx. 460 g
[9]	Charging intake fan (M48)	Cooling around charging /Y, /M, /C, /K Sirocco fan
[10]	Toner supply interlock switch (MS2)	24 VDC 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 50 g) Toner bottle capacity: Approx. 460 g
[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 50 g) Toner bottle capacity: Approx. 460 g
[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 24 VDC drive
[16]	Toner bottle clutch /Y (MC13)	Transmission of driving force from the toner bottle motor (M53) to the toner bottle /Y 24 VDC 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 becomes the reference value of the toner density.

6.2.3 Copy/print operation stop control due to no toner

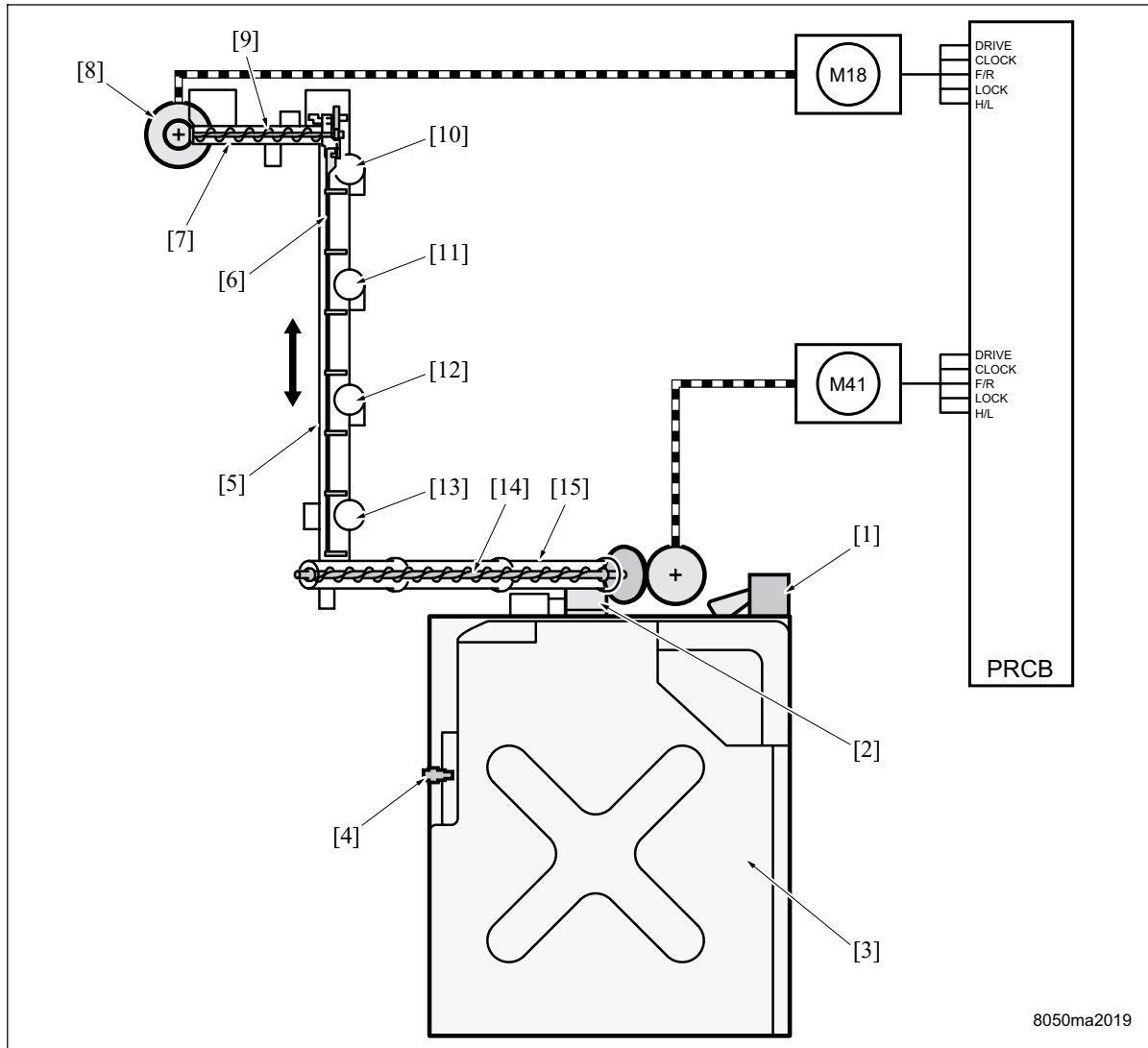
After the no-toner display is shown on the operation LCD, the consumption of about 50g of remaining toner in the toner hopper is detected by the length of time during which the toner supply motor has been driven. When it is determined by the length of time during which the toner supply motor has been 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 machine is ejected.

7. TONER COLLECTION

7.1 Composition

II UNIT EXPLANATION



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 "5. Transfer belt unit."
M41	Paper feed motor	See "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.

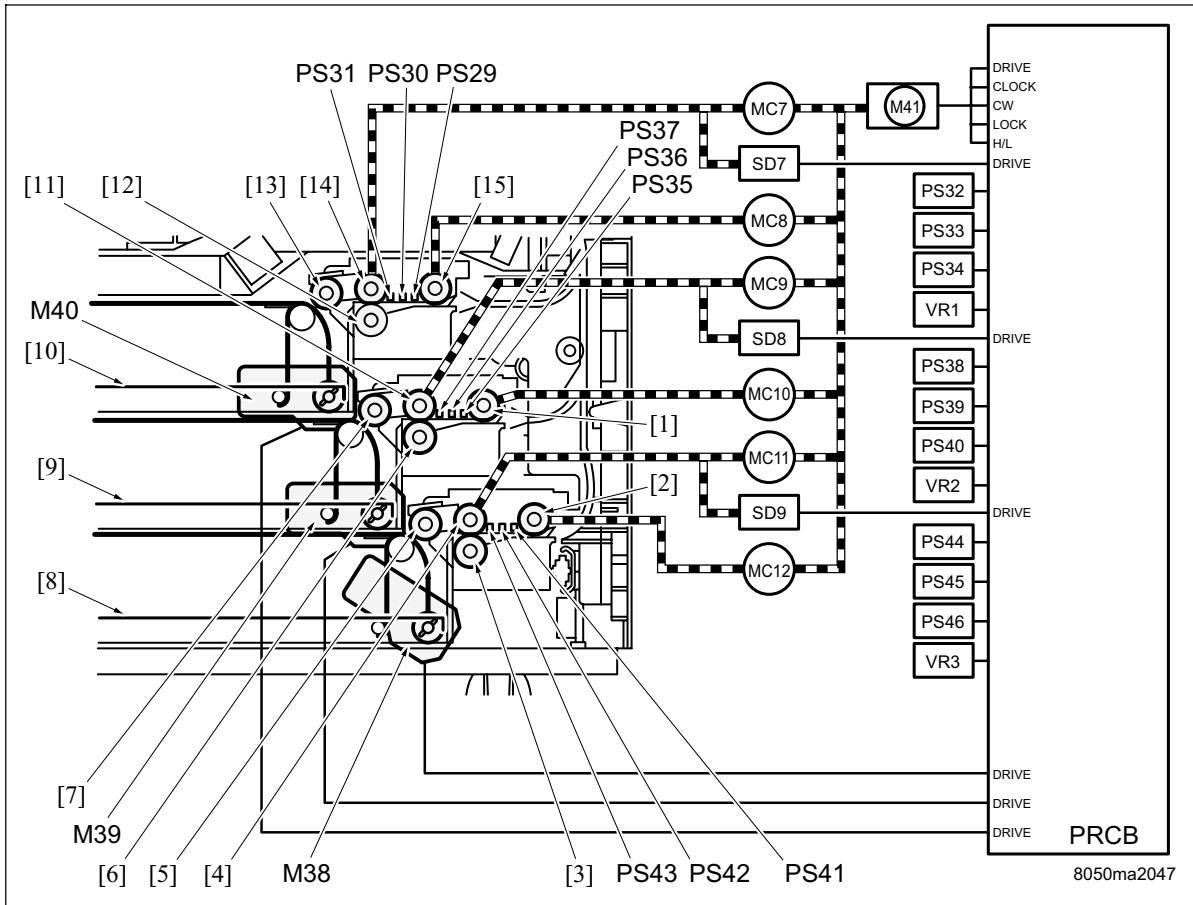
7.2.2 Waste toner full detection control

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

II UNIT EXPLANATION



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 (80 g/m ²)
[9]	Up/down plate /2	Tray /2 paper stacking section Up/down function provided Maximum tray capacity: Up to 500 sheets (80 g/m ²)
[10]	Up/down plate /1	Tray /1 paper stacking section Up/down function provided Maximum tray capacity: Up to 500 sheets (80 g/m ²)

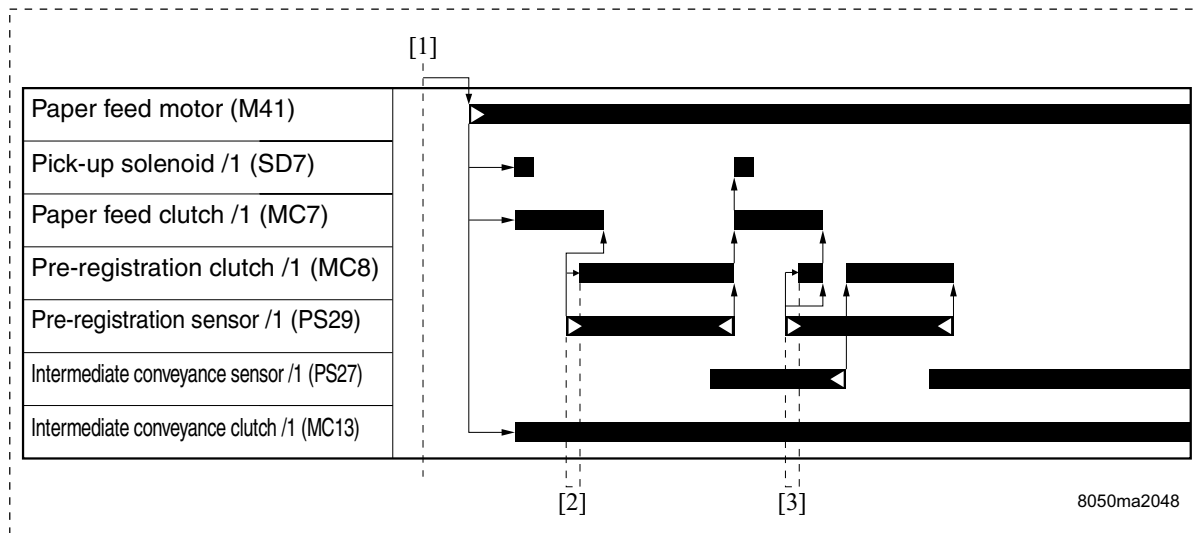
Symbol	Name	Function or method
[11]	Feed roller /2	Feed of the tray /2 paper
[12]	Double feed prevention roller /1	Double feed prevention of the tray /1 paper
[13]	Paper feed roller /1	Paper feed of the tray /1 paper
[14]	Feed roller /1	Feed of the tray /1 paper
[15]	Pre-registration roller /1	Conveyance 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 24 VDC drive, DC brushless motor, PLL control
M38	Tray up drive motor /3	Driving of the up/down plate /3 24 VDC drive, DC brushless motor
M39	Tray up drive motor /2	Driving of the up/down plate /2 24 VDC drive, DC brushless motor
M40	Tray up drive motor /1	Driving of the up/down plate /1 24 VDC 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 24 VDC drive
MC8	Pre-registration clutch /1	Transmission of the driving force from the paper feed motor (M41) to the pre-registration roller /1 24 VDC drive
MC9	Paper feed clutch /2	Transmission of the driving force from the paper feed motor (M41) to the paper feed roller /2 24 VDC drive
MC10	Pre-registration clutch /2	Transmission of the driving force from the paper feed motor (M41) to the pre-registration roller /2 24 VDC 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 24 VDC 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)
- [2] 1st sheet pre-registration loop

- [3] 2nd 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 main body, the tray up drive motor /1 (M40) of the main body 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, the 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, the 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.

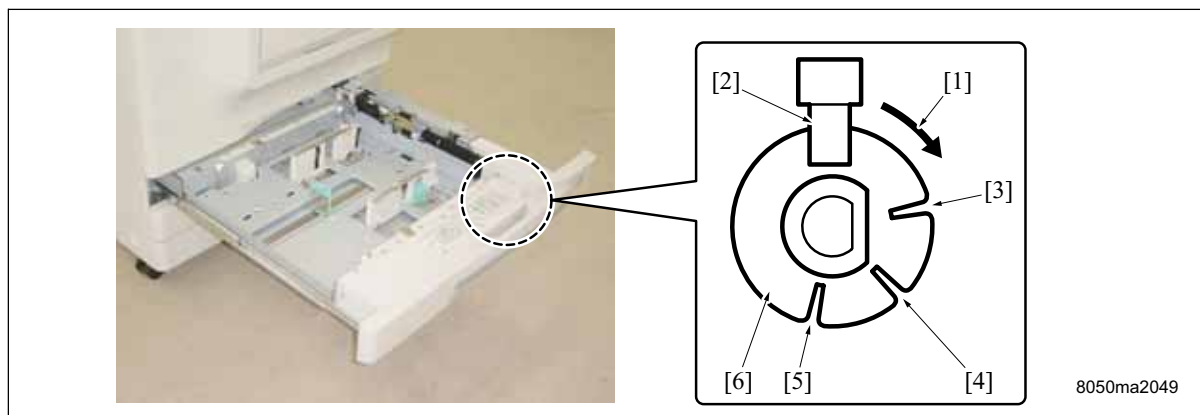
When the paper feed tray /1 is pulled out, the coupling is released from the drive section and the up/down plate goes down by its own weight.

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 main body 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 lit
1	75 to 50 %	3 lit
2	50 to 25 %	2 lit
3	25 to 0 %	1 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) of the bottom of the paper feed tray.

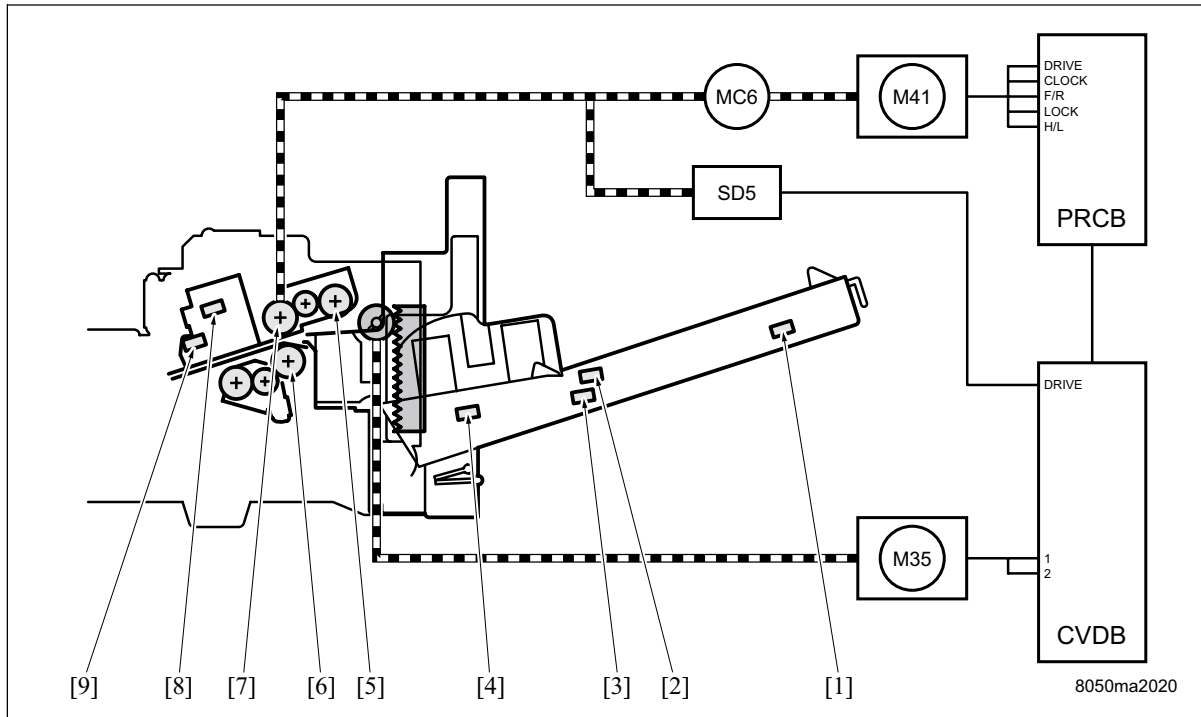
The sub-scan direction is detected in the combination of the on/off of the paper size /S1 (PS33) of the up/down plate and the paper size /L1 (PS34).

Paper size	Paper size /S	Paper size /L	Paper size VR
13 x 19R	○	○	333.2
12.6 x 18R/17.7R	○	○	317.0
A3 wide	○	○	307.4
12 x 18R	○	○	292.8
A3R	○		280.4
A4			280.4
8.5 x 11R			252.4
11 x 17R	○		252.4
8K	○		235.8
16K			235.8
B4R	○		216.7
B5			216.7
8.5 x 14R	○		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



II UNIT EXPLANATION

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

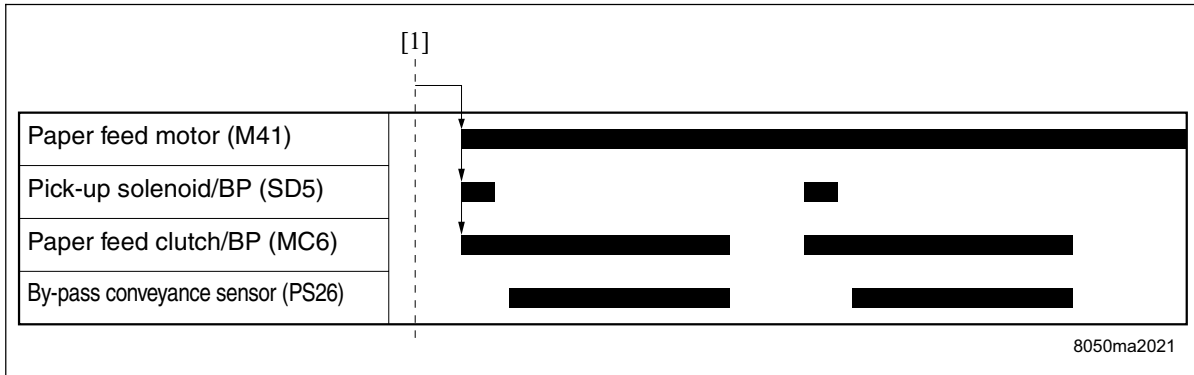
9.2.1 Tray up drive control

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

II UNIT EXPLANATION



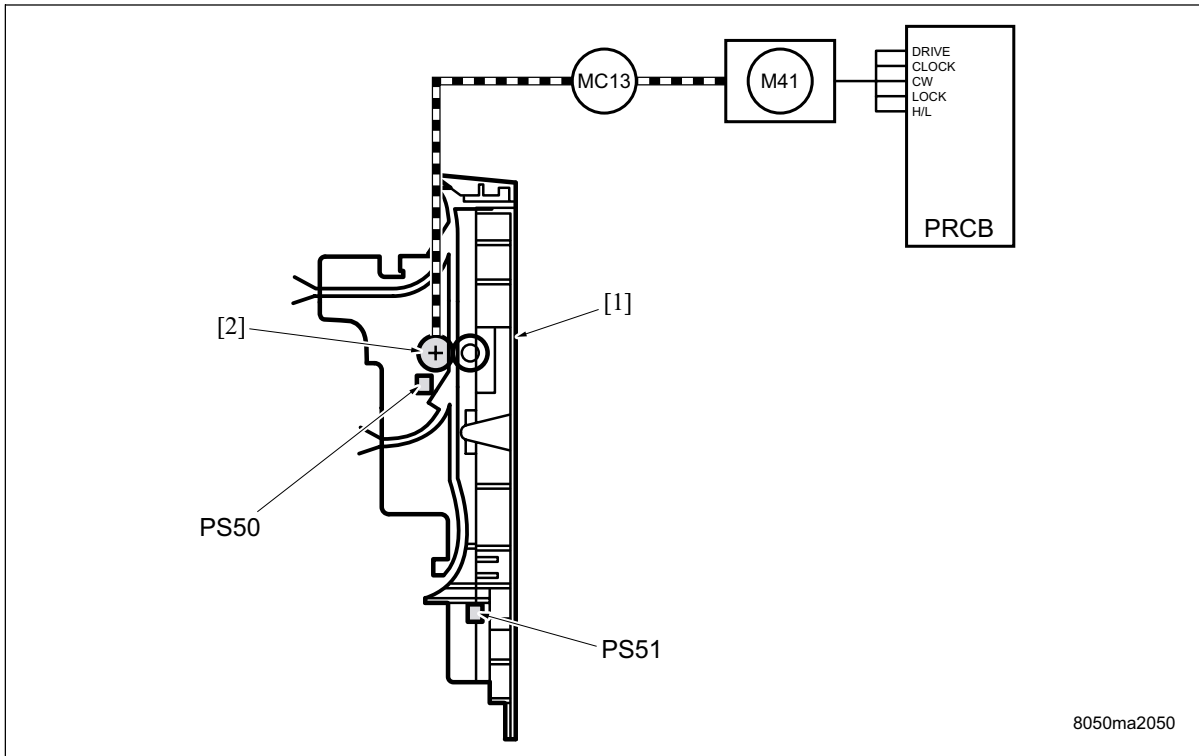
[1] START button (ON)

9.2.3 Paper size detection control

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

10. VERTICAL CONVEYANCE

10.1 Composition



II UNIT EXPLANATION

Symbol	Name	Function or method
[1]	Vertical conveyance door	Cleaning 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 24 VDC 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

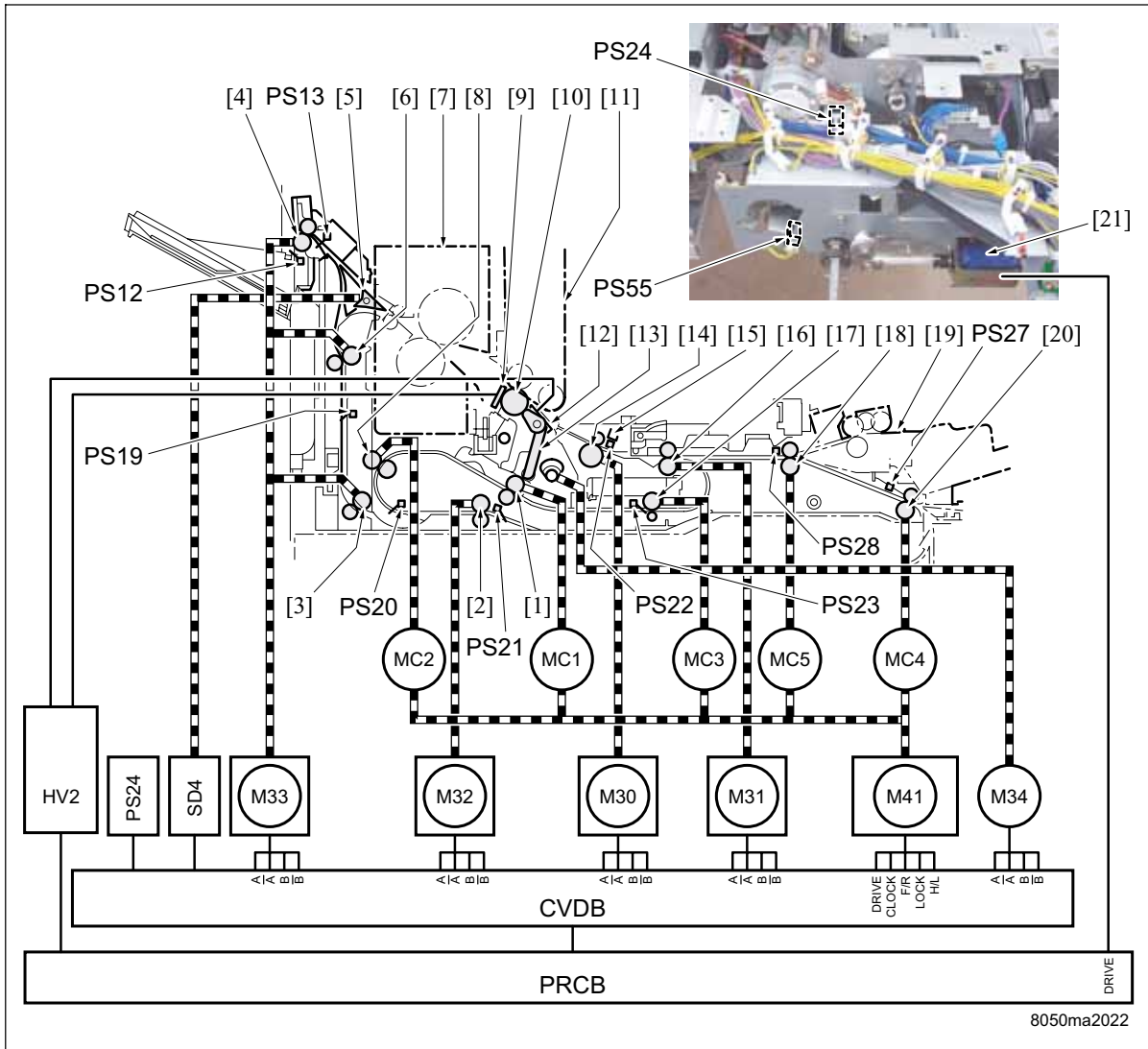
10.2.1 Vertical conveyance control

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

II UNIT EXPLANATION



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 neutralizing 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 LCT 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 LCT Motor drive
[21]	ADU lock solenoid (SD6)	ADU lock 24 VDC 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 24 VDC

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 brush-less motor
MC1	ADU conveyance clutch /2	Transmission of driving force from the paper feed motor (M41) to the ADU conveyance roller /2 24 VDC drive
MC2	ADU conveyance clutch /1	Transmission of driving force from the paper feed motor (M41) to the ADU conveyance roller /1 24 VDC drive
MC3	ADU pre-registration clutch	Transmission of driving force from the paper feed motor (M41) to the ADU pre-registration roller 24 VDC drive
MC4	Intermediate conveyance clutch /2	Transmission of driving force from the paper feed motor (M41) to the intermediate conveyance roller /2 24 VDC drive
MC5	Intermediate conveyance clutch /3	Transmission of driving force from the paper feed motor (M41) to the intermediate conveyance roller /3 24 VDC drive
SD4	Reverse/exit solenoid	Reverse gate drive 24 VDC 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

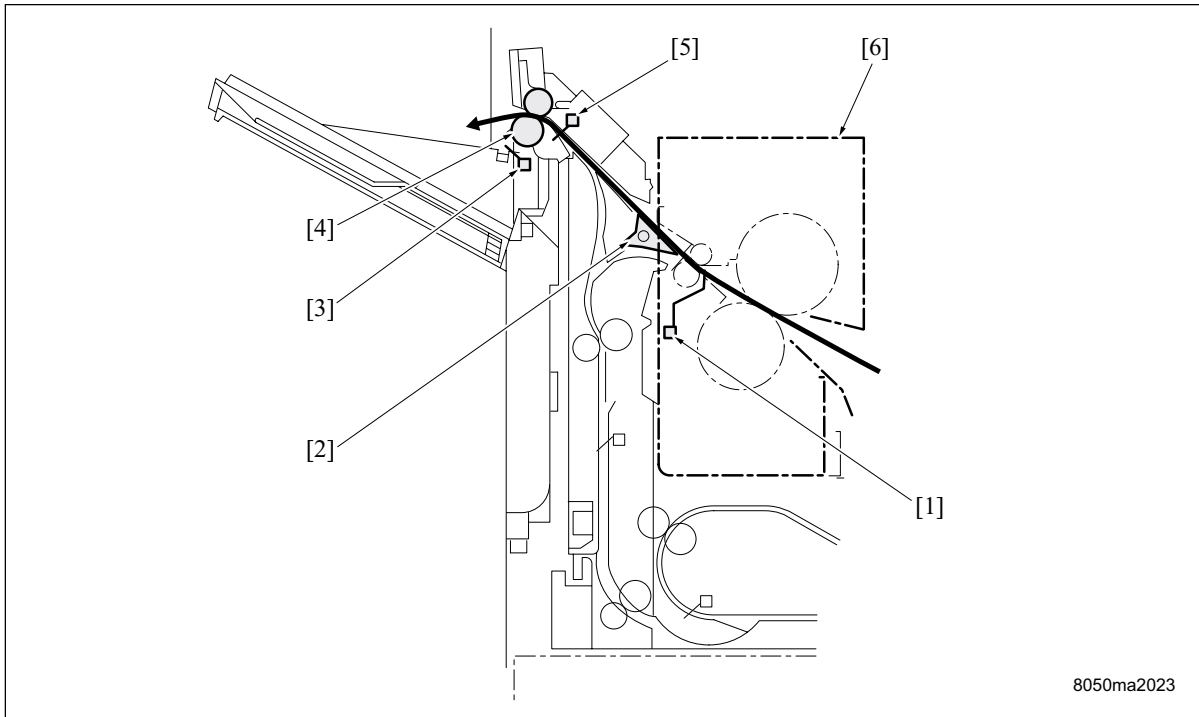
II UNIT EXPLANATION

11.2 Operation

11.2.1 Switching control of the paper exit/ADU conveyance path

A. Straight paper exit path

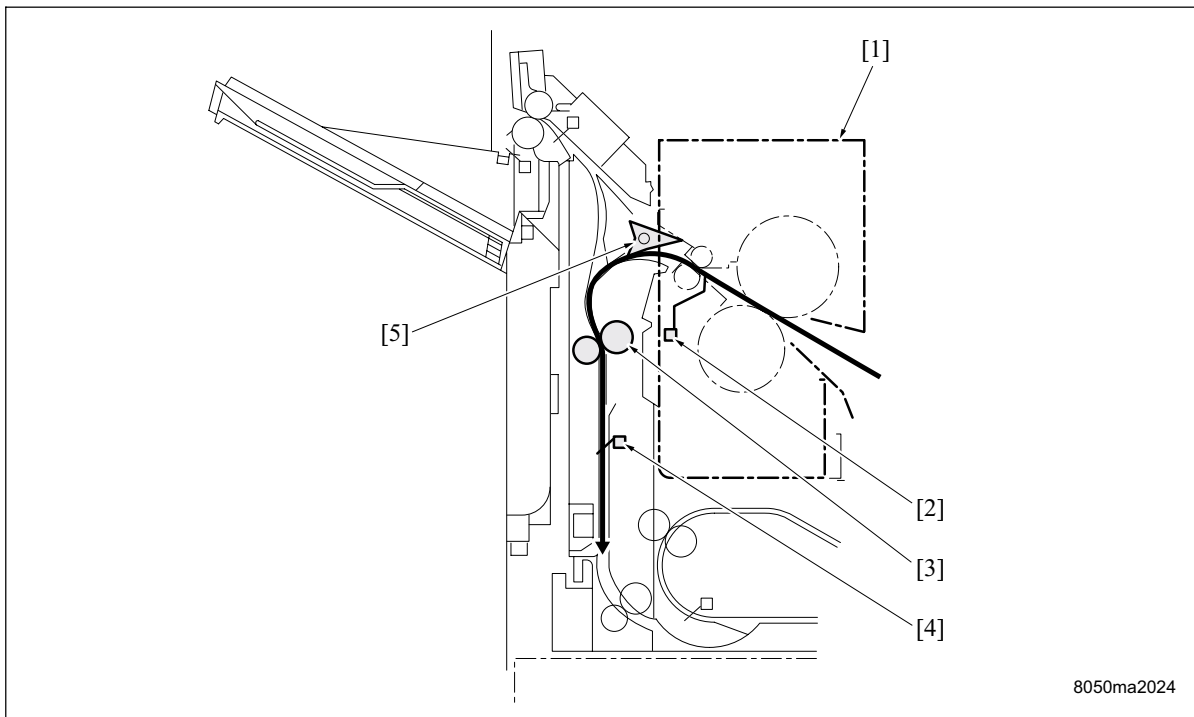
The straight paper exit path is applicable to the face-up paper exit after completion of copy in the single side copy mode, as well as after completion of the back side copy in the double side copy mode.



- | | |
|-------------------------------------|------------------------------|
| [1] Fixing paper exit sensor (PS17) | [4] Paper exit roller |
| [2] Reverse gate | [5] Paper exit sensor (PS13) |
| [3] Paper exit full sensor (PS12) | [6] Fixing section |

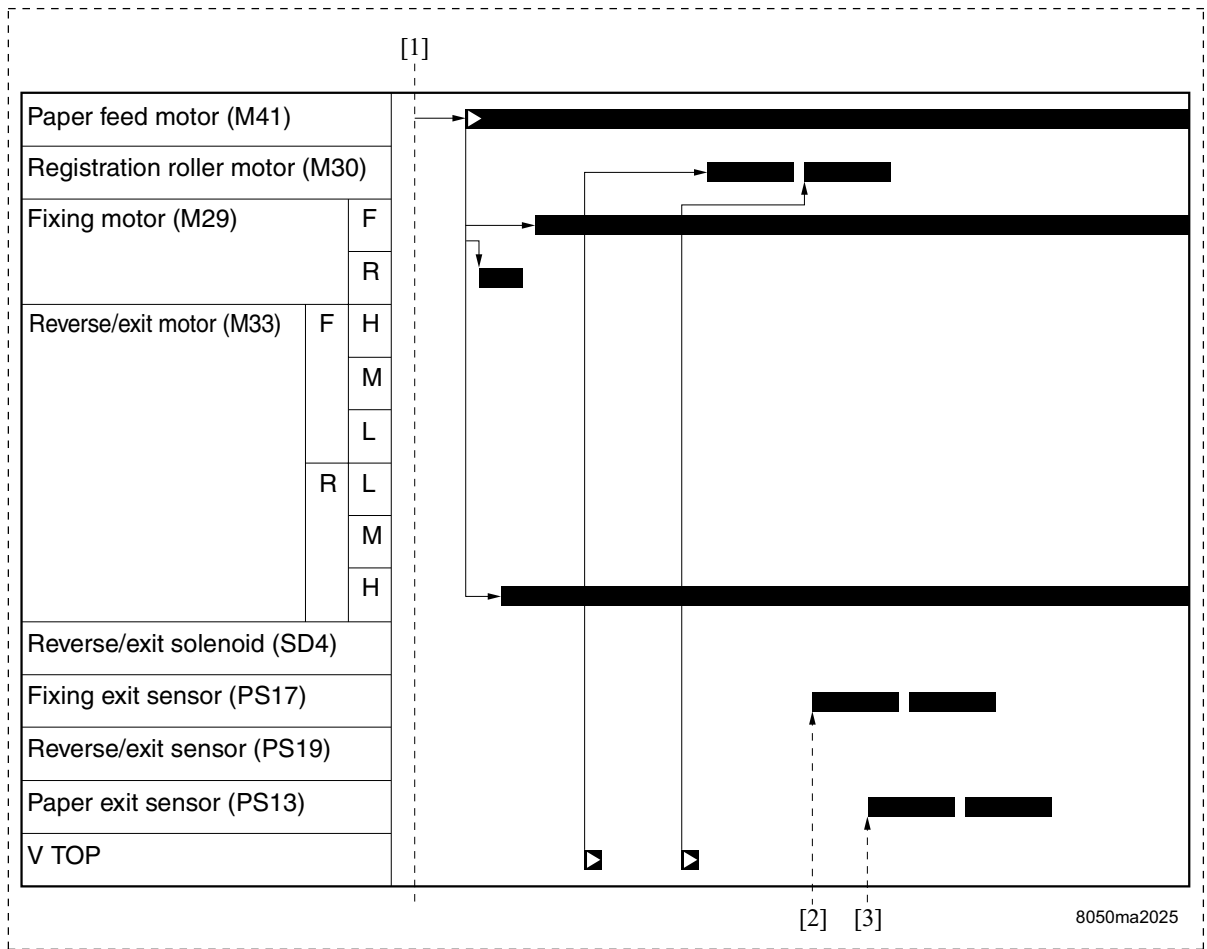
B. ADU conveyance path

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 | [4] Reverse/exit sensor (PS19) |
| [2] Fixing paper exit sensor (PS17) | [5] Reverse gate |
| [3] Decurler roller | |

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



II UNIT EXPLANATION

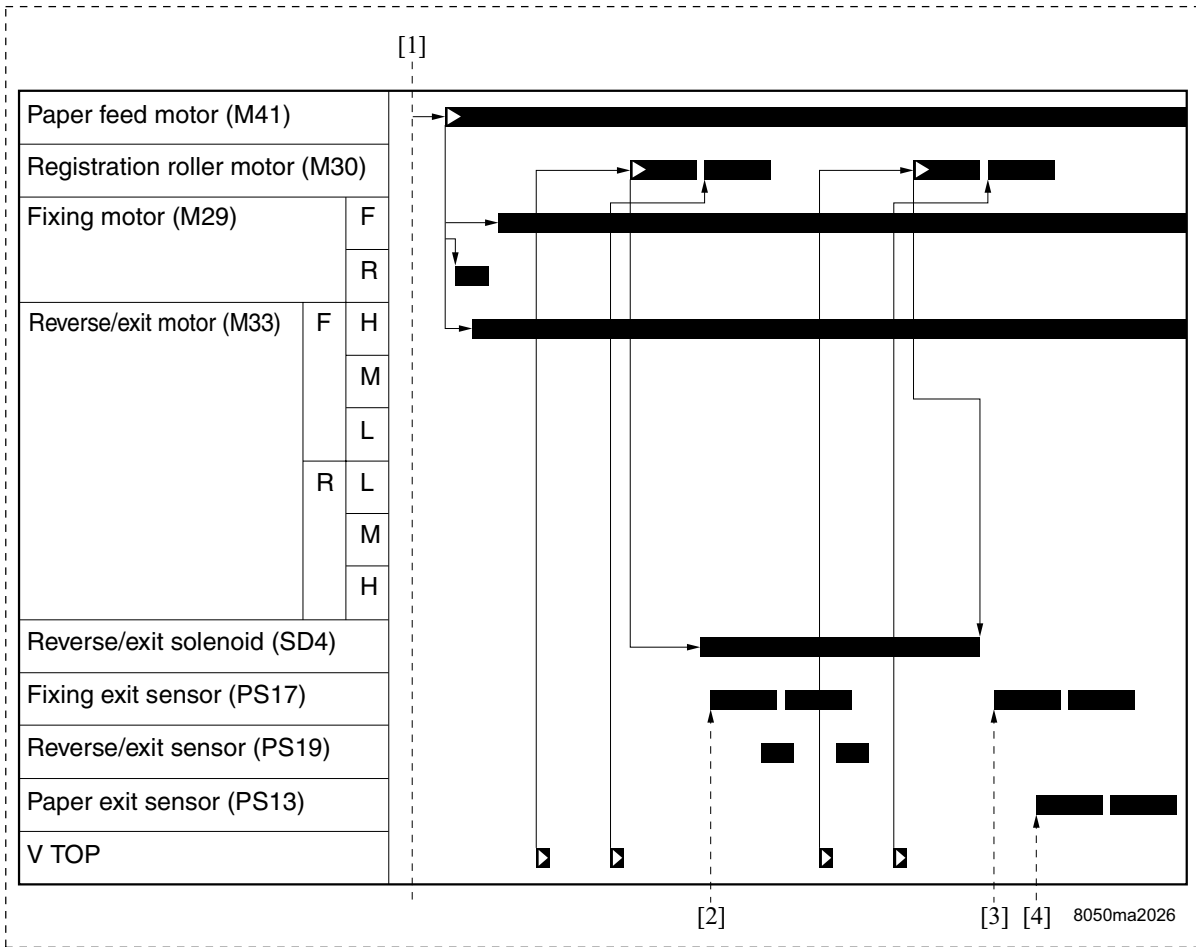
[1] START button (ON)

[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

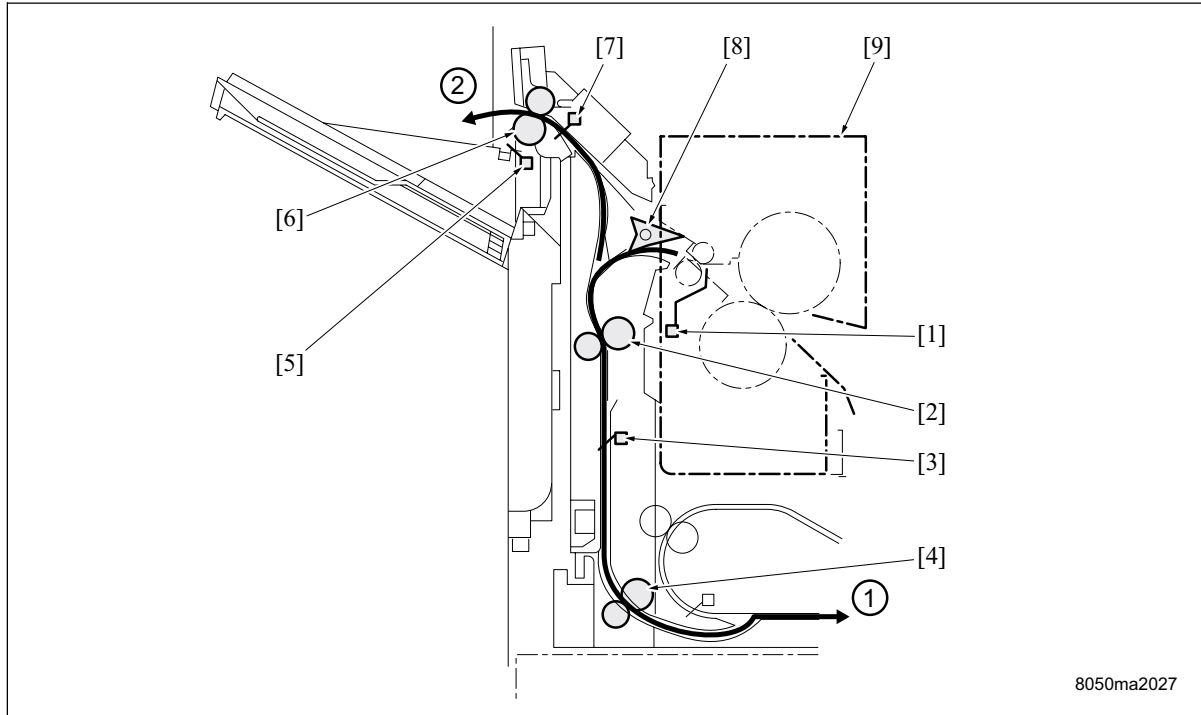
[4] 1st paper exit

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.

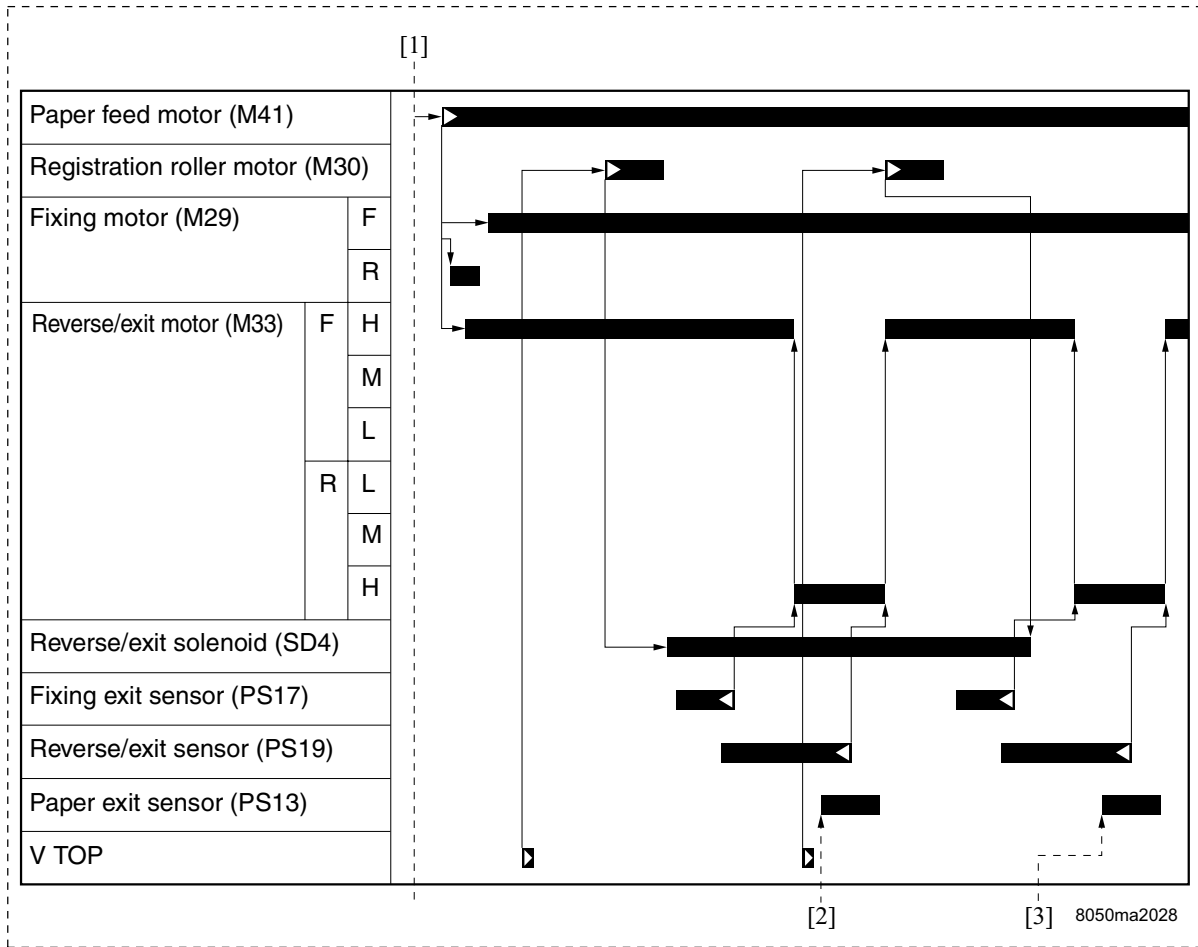
- ① Double sided copy mode
- ② Face-down



- | | |
|-------------------------------------|------------------------------|
| [1] Fixing paper exit sensor (PS17) | [6] Paper exit roller |
| [2] Decurler roller | [7] Paper exit sensor (PS13) |
| [3] Reverse/exit sensor (PS19) | [8] Reverse gate |
| [4] Reverse/exit roller /2 | [9] Fixing section |
| [5] Paper exit full sensor (PS12) | |

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

II UNIT EXPLANATION



[1] START button (ON)

[3] 2nd paper exit

[2] 1st paper exit

11.2.3 ADU conveyance control

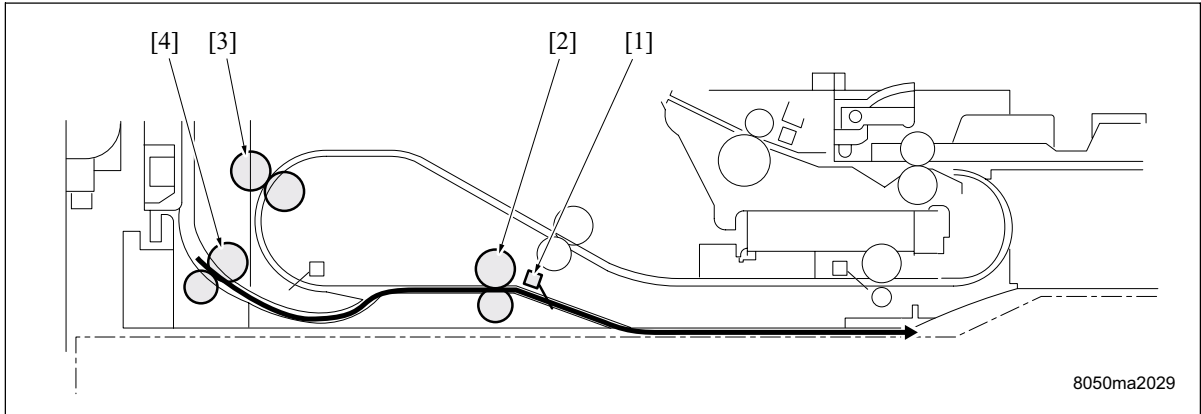
Paper that has been copied on the front side and conveyed to the reverse/exit section while in the double side copy mode is conveyed to the ADU reverse section by the reverse/exit roller /2.

11.2.4 Paper reverse control

A. Paper reverse path

(1) When conveying paper

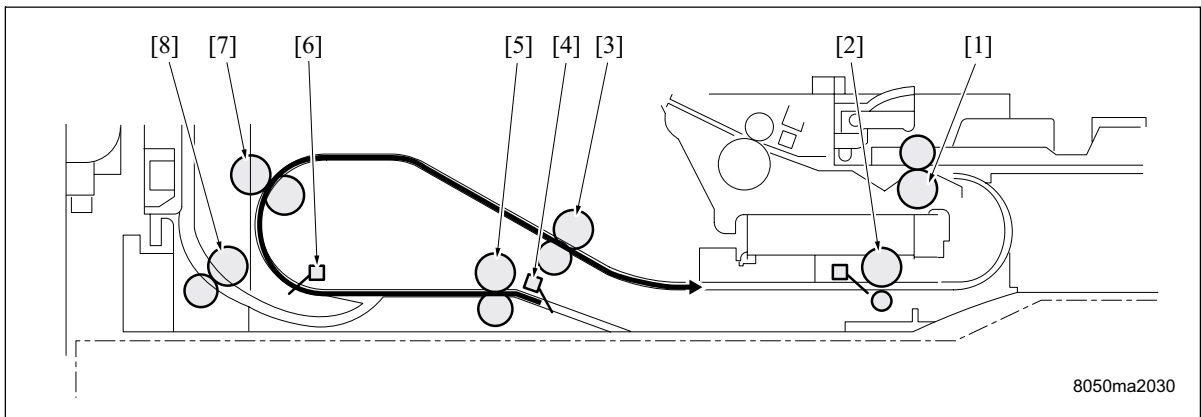
Paper conveyed from the reverse/exit roller /2 is conveyed to the ADU reverse roller according to the form of the conveyance path.



- | | |
|-------------------------------------|------------------------------|
| [1] ADU paper reverse sensor (PS21) | [3] ADU conveyance roller /1 |
| [2] ADU reverse roller | [4] Reverse/exit roller /2 |

(2) When paper reverse

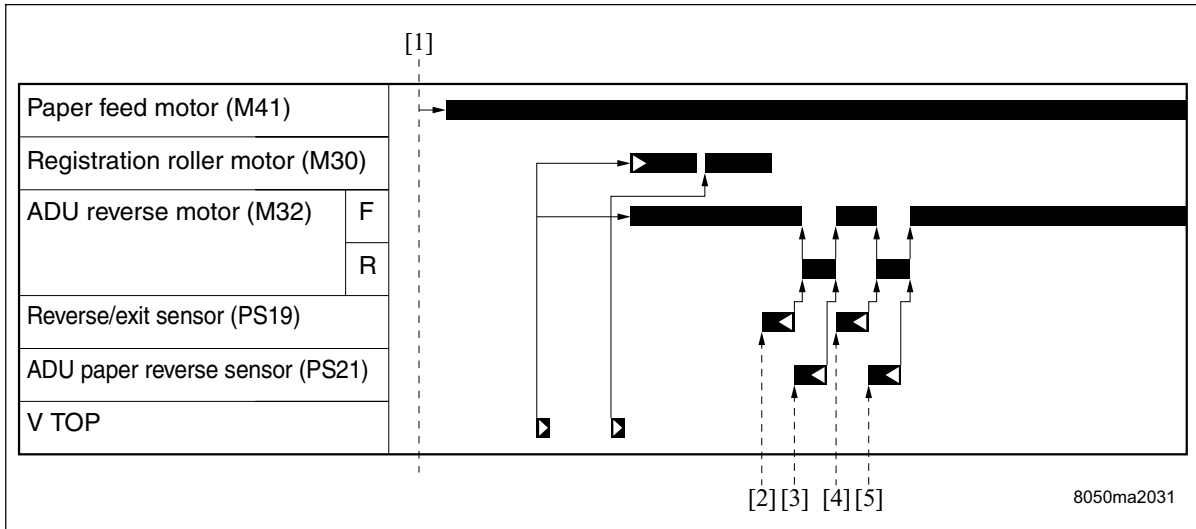
Paper conveyed to the ADU reverse section is sent back by the reverse rotation of the ADU reverse roller. At this time, it is conveyed to the ADU conveyance roller /1, not to the reverse/exit roller /2, according to the form of the conveyance path. As a result, the paper is flipped over out. The paper 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 | [5] ADU reverse roller |
| [2] ADU pre-registration roller | [6] ADU conveyance sensor (PS20) |
| [3] ADU conveyance roller /2 | [7] ADU conveyance roller /1 |
| [4] ADU paper reverse sensor (PS21) | [8] Reverse/exit roller /2 |

II UNIT EXPLANATION

B. Paper reverse operation



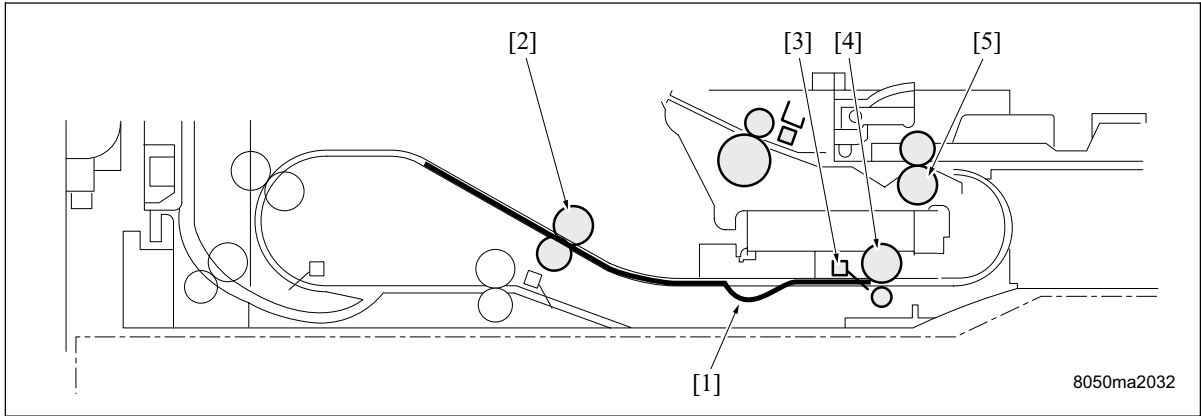
II UNIT EXPLANATION

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

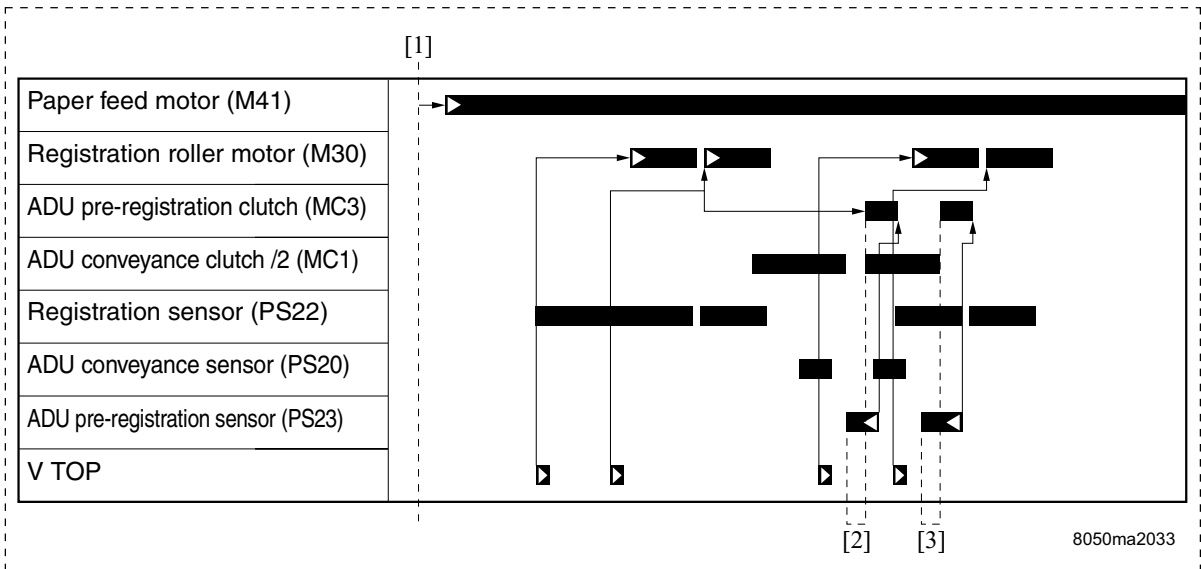
A. ADU pre-registration path



II UNIT EXPLANATION

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

B. ADU pre-registration operation

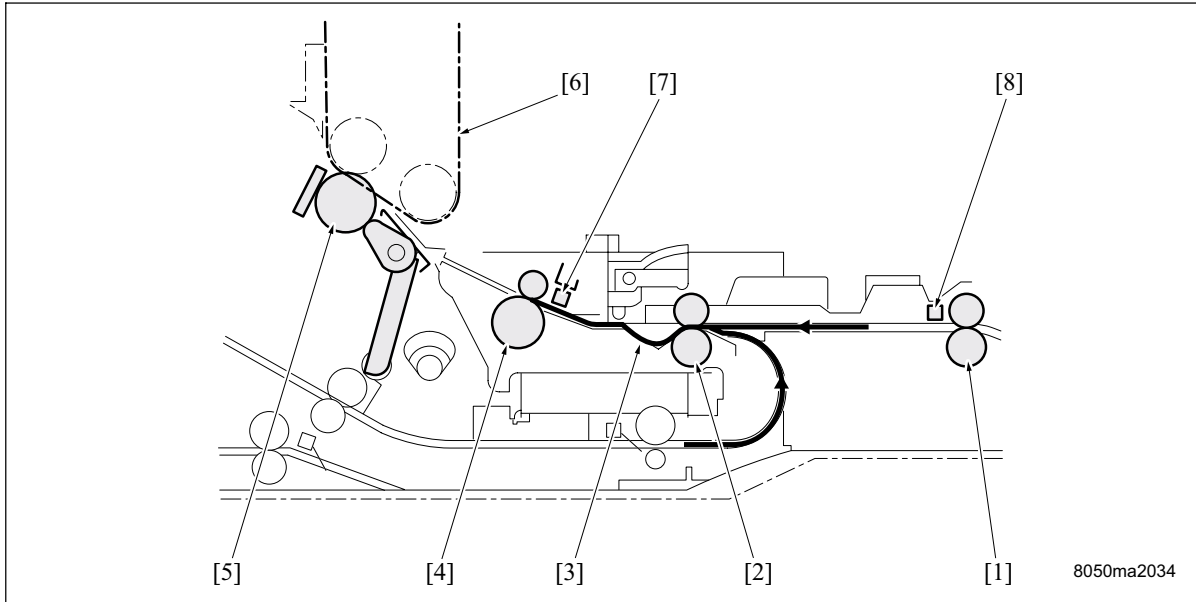


- [1] START button (ON)
- [2] 1st paper: ADU pre-registration loop
- [3] 2nd paper: ADU pre-registration loop

11.2.6 Registration control

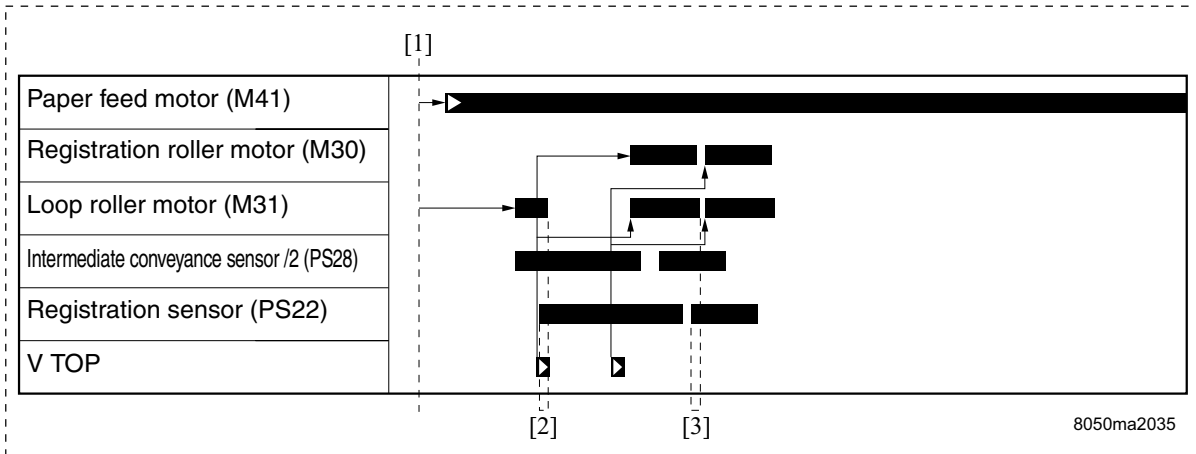
Paper conveyed to the loop roller is formed into a loop between the registration roller and the loop roller, and paper skew is corrected.

A. Registration path



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

B. Registration operation

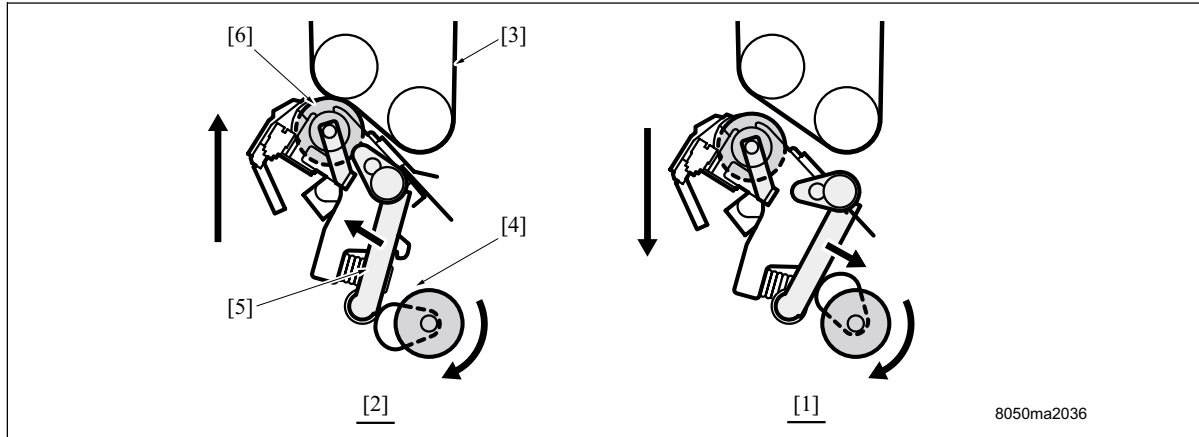


- [1] START button (ON)
- [2] 1st paper: Registration loop
- [3] 2nd paper: Registration loop

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 | [4] Cam |
| [2] Pressure | [5] Pressure arm |
| [3] Transfer belt unit | [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."

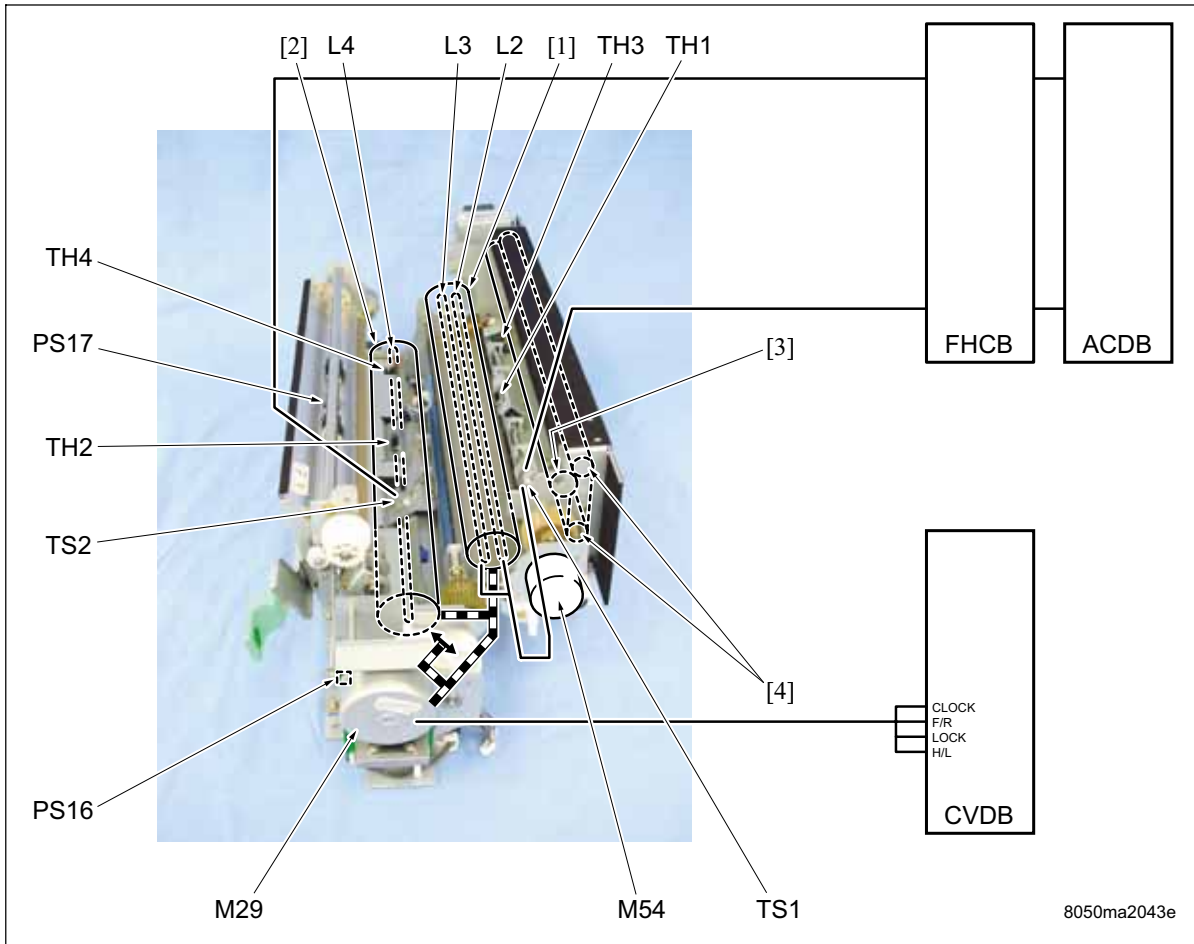
11.2.8 Paper exit full detection control

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

II UNIT EXPLANATION



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 750 W
L3	Fixing upper lamp /2	Heating of the fixing roller /U (sub) Halogen heater 750 W
L4	Fixing lower lamp	Heating of the fixing roller /L Halogen heater 550 W
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 /L	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) 220 V system only

12.2 Operation

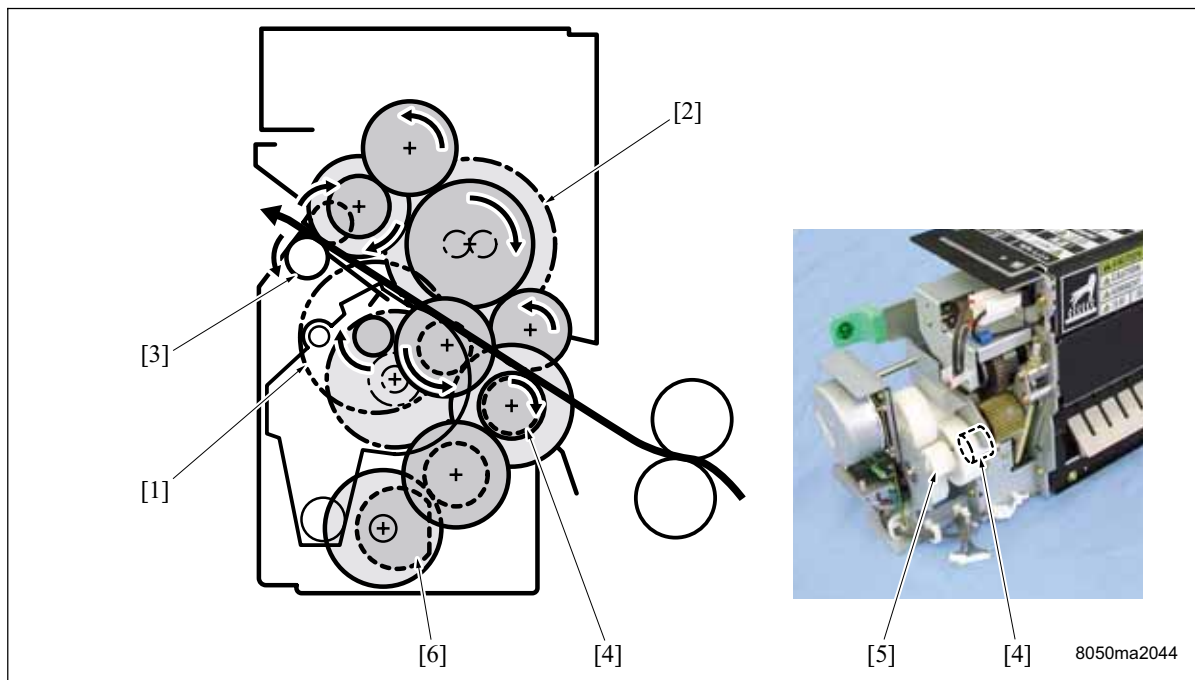
12.2.1 Fixing drive control

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 one-way clutches [4] and [5] operate one way in the opposite direction of each other.

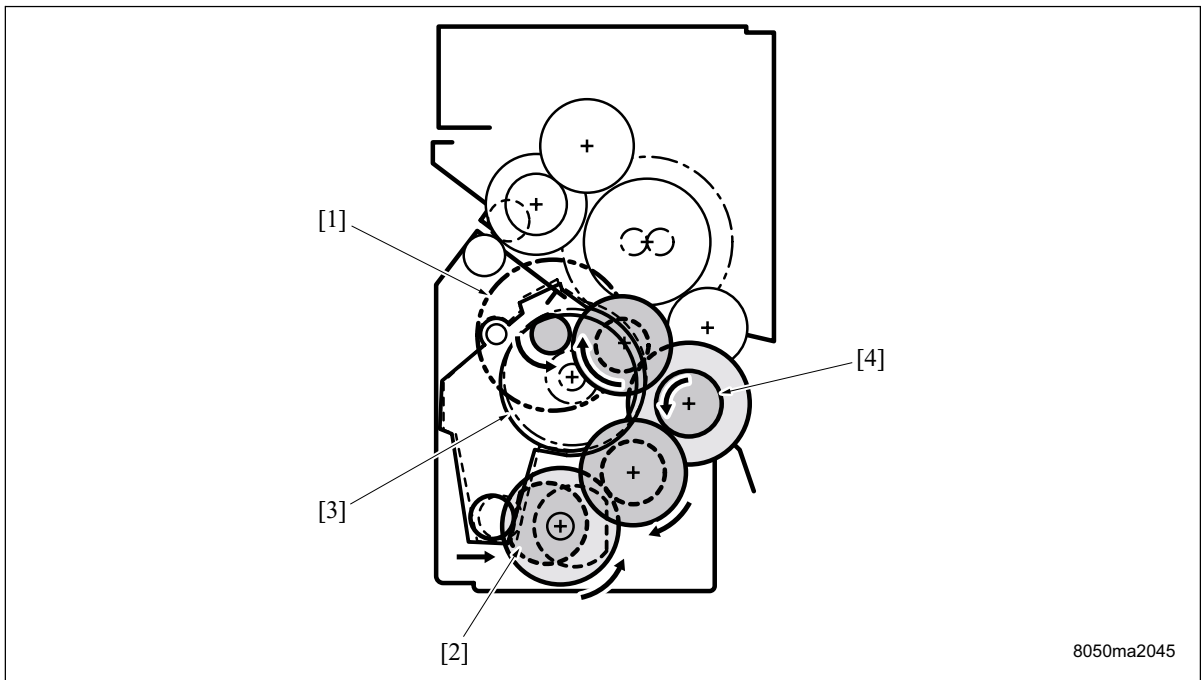


12.2.2 Pressure/release control

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

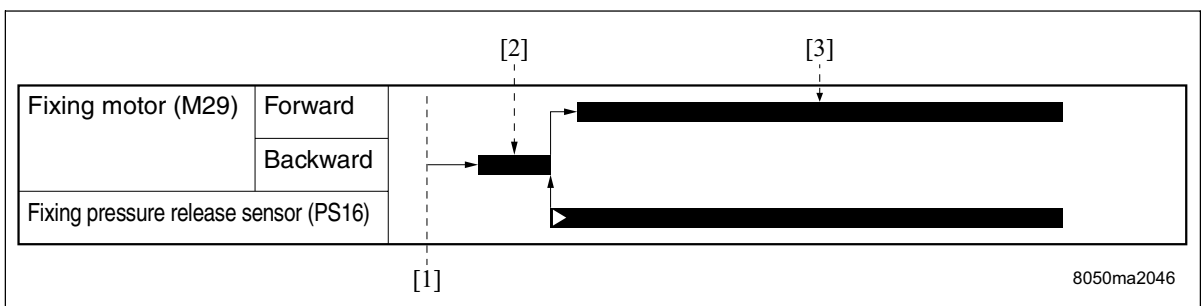
When the fixing motor (M29) [1] rotates in the reverse direction, the cam mechanism applies pressure (a broken line in the drawing) onto the fixing roller /L [3]. There is a one-way clutch [4] provided between M29 and the cam mechanism to provide the transmission of driving force when M29 is rotating 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.



II UNIT EXPLANATION

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 moment 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

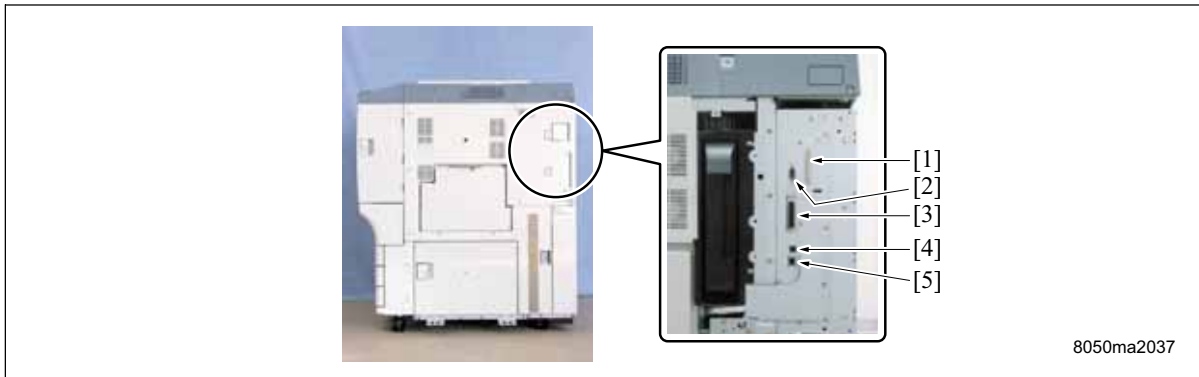
Thermostats are employed to protect the fixing roller against its abnormal temperature rise. The fixing roller /U is provided with thermostat /1 (TS1) and the fixing roller /L is provided with thermostat /2 (TS2) respectively.

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
[1]	Video interface for controller	For controller
[2]	Serial port (RS-232C)	For RD-mode communications D-SUB 9-pin connector
[3]	Parallel port (based on IEEE 1284)	For ISW of copier 36-pin centronics connector
[4]	Serial port (USB Type B)	For ISW of copier Ver.1.1
[5]	RJ45 Ethernet connector	Port for network

II UNIT EXPLANATION

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 change 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 machine 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 result 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 slow 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

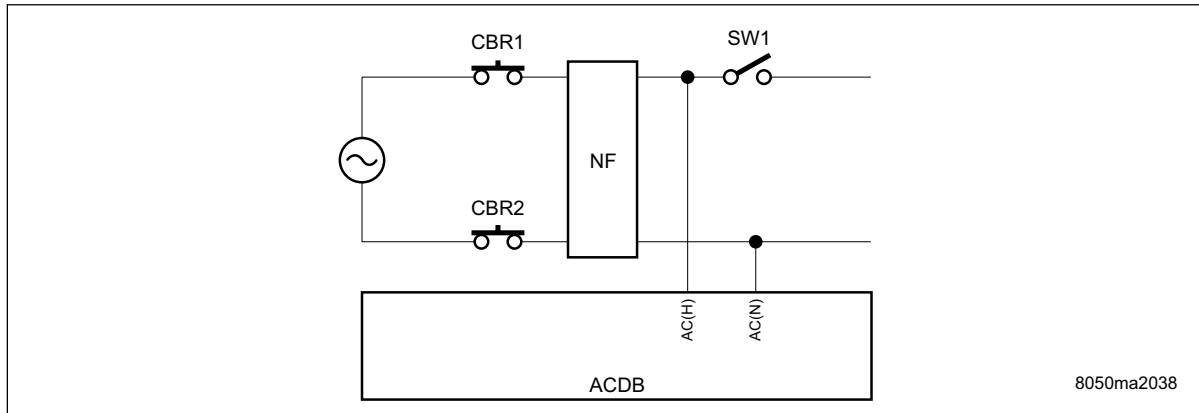
The gradation patch is created on the transfer belt and read by the gamma sensor (PS11). The correction value for the gamma curve is determined by the sensor output value with the predefined relationship between the sensor output and the output image.

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 slow 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 so long 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 machine.

B. Noise filter (NF)

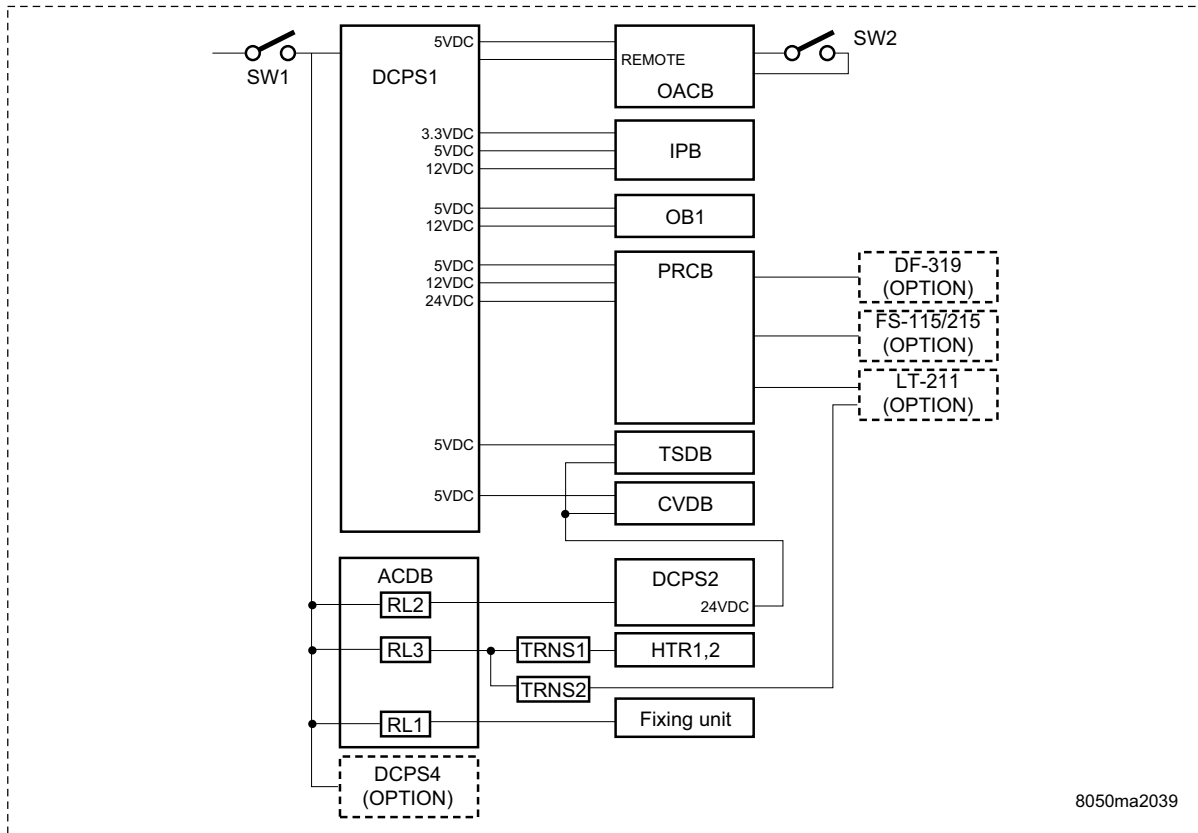
This reduces the level of noise that enters through the power line.

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 is turned on

15.2.1 Parts that operate when the reset switch is turned on



II UNIT EXPLANATION

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 5 VDC to the overall control board (OACB) to monitor it with the main switch (SW2).

The ACDB turns ON the HTR relay (RL3) in the board and provides 24 VAC to each heater via the transformer/main body (TRNS1) and the transformer/LCT (TRNS2).

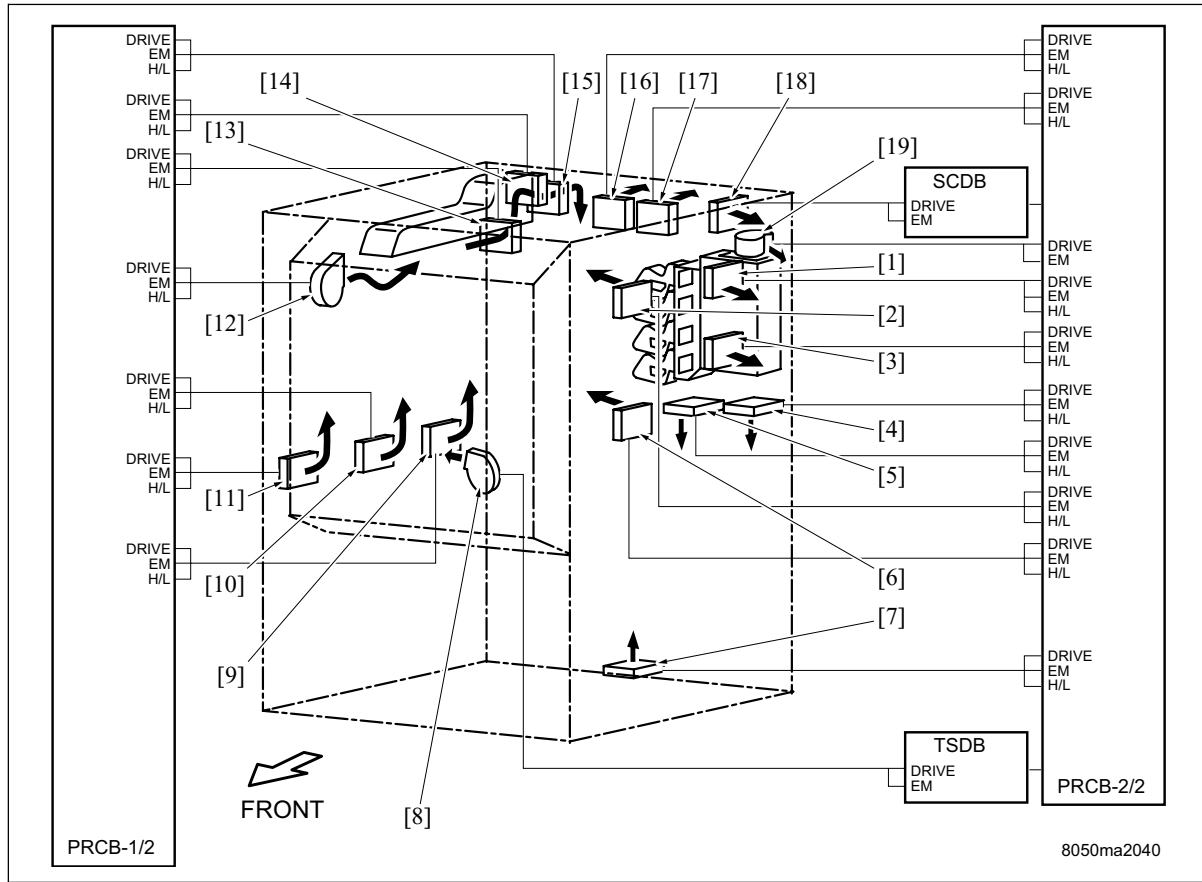
15.2.2 Parts that operate when the main switch is turned on

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 3.5 VDC, 5 VDC, 12 VDC and 24 VDC to all the boards and optional devices. The ACDB turns ON the HTR relay (RL3) in the board and provides 24 VAC to each heater via the transformer/main body (TRNS1) and the transformer/LCT (TRNS2).

15.3 Fan control

15.3.1 Fan composition

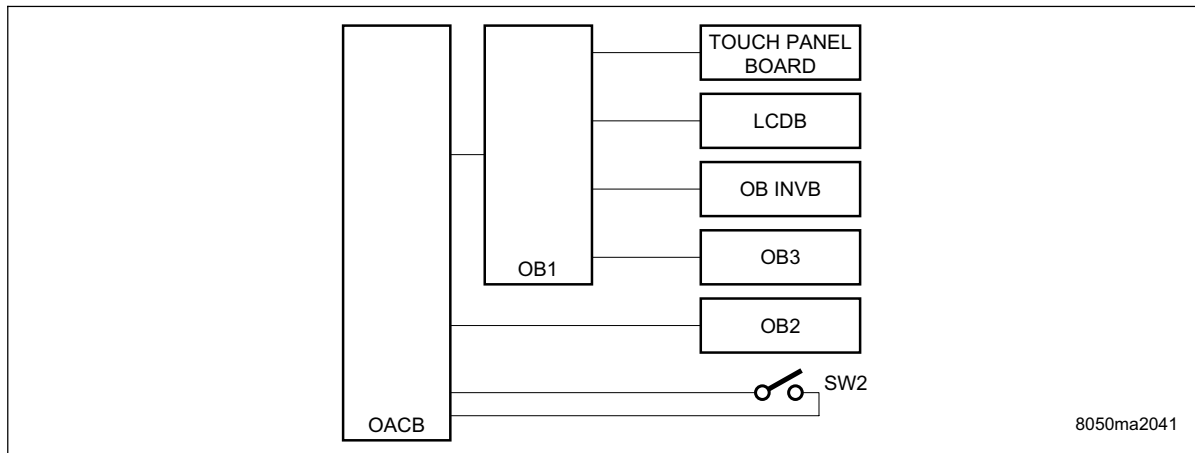


II UNIT EXPLANATION

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)
[8]	Paper exit fan /F (M28)	Cooling around the paper reverse exit section and cooling of paper
[9]	Charging intake fan (M48)	Adverse wind to the charging corona
[10]	Paper exit fan /R (M26)	Cooling around the paper reverse exit section and cooling of paper
[11]	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
[16]	Drum cooling fan /1 (M12)	Discharging heat around the drum drive motor out of the machine
[17]	Drum cooling fan /2 (M13)	Discharging heat around the drum drive motor out of the machine
[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

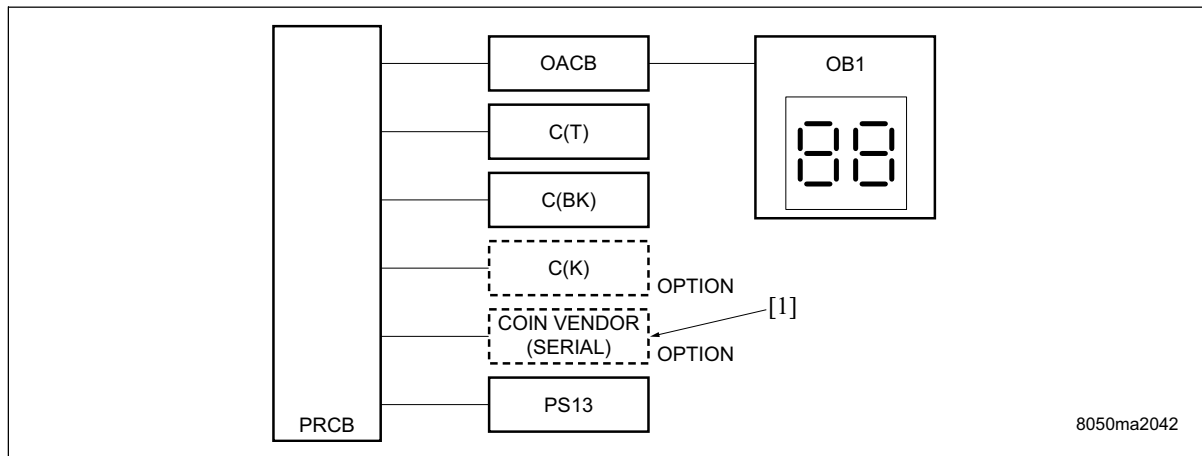


II UNIT EXPLANATION

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



II UNIT EXPLANATION

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 machine 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	5 V Pull up
	4	OP_SIN	In	5 V Pull up
	5	OP_DSR	In	5 V Pull up
	6	OP_RTS	Out	Open collector output (LS07)
	7	SGND	—	Signal ground
	8	COPV_ENB	In	5 V Pull up
	9	24 VDC	—	Power supplied to the vendor
	10	PGND	—	Power ground
	11	5 VDC	—	Power supplied to the vendor

II UNIT EXPLANATION
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	24 V, 500 mA
	9B	PGND	Power ground	—	—
	2A	PAT1	Light on signal	L signal outputted when print is available	Open collector 5 V, 200 mA
	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

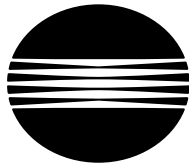
B. The color mode (the 1st transfer roller /Y/M/C is in the pressure state)

	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

*1If 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.

II UNIT EXPLANATION

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