

SERVICE MANUAL

THEORY OF OPERATION

magicolor 2590MF

2007.08 KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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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 product as well as the risk of damage to the product, KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. (hereafter called the KMBT) strongly recommends that all servicing be performed only by KMBT-trained service technicians.

Changes may have been made to this product to improve its performance after this Service Manual was printed. Accordingly, KMBT 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 product while servicing the product 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 product properly.

Keep this Service Manual also for future service.

DESCRIPTION ITEMS FOR DANGER, WARNING AND CAUTION

In this Service Manual, each of three expressions " $\underline{\land}$ DANGER", " $\underline{\land}$ WARNING", and " $\underline{\land}$ CAUTION" is defined as follows together with a symbol mark to be used in a limited meaning.

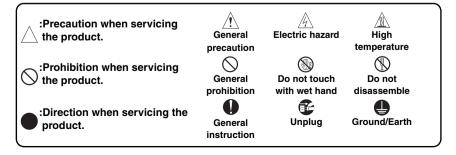
When servicing the product, the relevant works (disassembling, reassembling, adjustment, repair, maintenance, etc.) need to be conducted with utmost care.

 $_{
m }$ 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:



SAFETY WARNINGS

[1] MODIFICATIONS NOT AUTHORIZED BY KONICA MINOLTA BUSINESS TECHNOLOGIES, INC.

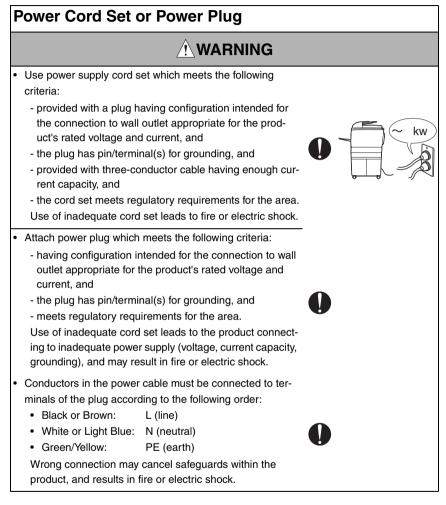
KONICA MINOLTA brand products are renowned for their high reliability. This reliability is achieved through high-quality design and a solid service network.

Product 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.

F	Prohibited Actions		
•	Using any cables or power cord not specified by KMBT.	\bigcirc	
•	Using any fuse or thermostat not specified by KMBT. Safety will not be assured, leading to a risk of fire and injury.	\bigcirc	
•	Disabling fuse functions or bridging fuse terminals with wire, metal clips, solder or similar object.	\bigcirc	Ø,
•	Disabling relay functions (such as wedging media between relay contacts)	\bigcirc	
•	Disabling safety functions (interlocks, safety circuits, etc.) Safety will not be assured, leading to a risk of fire and injury.	\bigcirc	Corestination of the second se
•	Making any modification to the product unless instructed by KMBT	\bigcirc	
•	Using parts not specified by KMBT	\bigcirc	or [®]

[2] POWER PLUG SELECTION

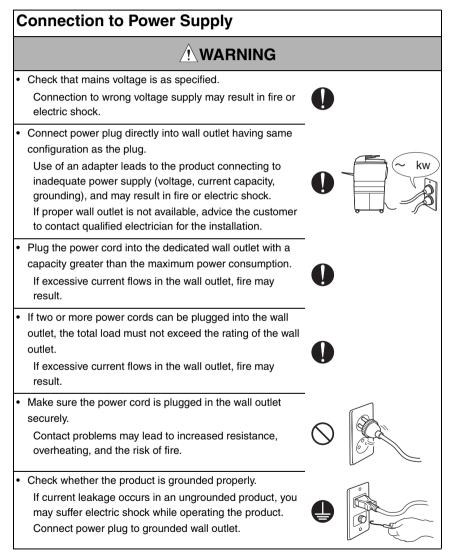
In some countries or areas, the power plug provided with the product may not fit wall outlet used in the area. In that case, it is obligation of customer engineer (hereafter called the CE) to attach appropriate power plug or power cord set in order to connect the product to the supply.



[3] CHECKPOINTS WHEN PERFORMING ON-SITE SERVICE

KONICA MINOLTA brand products 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.

1. Power Supply



Pc	ower Plug and Cord		
	WARNING		
tl ir V	Vhen using the power cord set (inlet type) that came with his product, make sure the connector is securely inserted in the inlet of the product. When securing measure is provided, secure the cord with he fixture properly. If the power cord (inlet type) is not connected to the prod- uct securely, a contact problem may lead to increased resistance, overheating, and risk of fire.	0	
	Check whether the power cord is not stepped on or inched by a table and so on. Overheating may occur there, leading to a risk of fire.	\bigcirc	
	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 plug and connector on each end) specified by KMBT. Using the damaged power cord may result in fire or electric shock.	0	0
	Do not bundle or tie the power cord. Overheating may occur there, leading to a risk of fire.	\bigcirc	
а	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.	0	
	Do not insert the power plug into the wall outlet with a wet and. The risk of electric shock exists.		
С	Vhen unplugging the power cord, grasp the plug, not the able. The cable may be broken, leading to a risk of fire and electric shock.	0	0

Wiring

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

2. Installation Requirements

Prohibited Installation Places

WARNING

• Do not place the product near flammable materials or volatile materials that may catch fire.

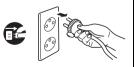
A risk of fire exists.

- Do not place the product in a place exposed to water such as rain.
 - A risk of fire and electric shock exists.

When not Using the Product for a long time

WARNING

• When the product 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.

Ventilation

 The product generates ozone gas during operation, but it will not be harmful to the human body.

If a bad smell of ozone is present in the following cases, ventilate the room.

- a. When the product is used in a poorly ventilated room
- b. When taking a lot of copies
- c. When using multiple products at the same time

Stability

 Be sure to lock the caster stoppers.
 In the case of an earthquake and so on, the product may slide, leading to a injury.

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, 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 product may break and a risk of injury or fire exists.

- Before conducting an inspection, be sure to disconnect the power plugs from the product 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.

Work Performed with the Product Powered On

WARNING

Take every care when making adjustments or performing an operation check with the product 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.
Take every care when servicing with the external cover detached. High-voltage exists around the drum unit. A risk of electric shock exists.

S	Safety Checkpoints		
	WARNING		
•	Check the exterior and frame for edges, burrs, and other damage. The user or CE may be injured.	0	
•	Do not allow any metal parts such as clips, staples, and screws to fall into the product. They can short internal circuits and cause electric shock or fire.	\bigcirc	Po
•	Check wiring for squeezing and any other damage. Current can leak, leading to a risk of electric shock or fire.	0	
•	Carefully remove all toner remnants and dust from electri- cal parts and electrode units such as a charging corona unit. Current can leak, leading to a risk of product trouble or fire.	0	
•	Check high-voltage cables and sheaths for any damage. Current can leak, leading to a risk of electric shock or fire.	0	

Safety Checkpoints **WARNING** 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 (P/H 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 eve. 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. 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 product (e.g., for clearing media 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.

Safety Checkpoints

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 product trouble, electric shock, and fire exists.

Handling of Consumables

 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.

Handling of Service Materials

• Unplug the power cord from the wall outlet.

Drum cleaner (isopropyl alcohol) and roller cleaner (acetone-based) are highly flammable and must be handled with care. A risk of fire exists.

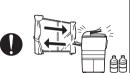
 Do not replace the cover or turn the product ON before any solvent remnants on the cleaned parts have fully evaporated.

A risk of fire exists.



Handling of Service Materials

- 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.



[4] Laser Safety

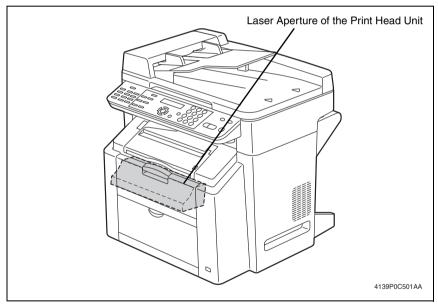
 This is a digital machine certified as a class 1 laser product. There is no possibility of danger from a laser, provided the machine is serviced according to the instruction in this manual.

4.1 Internal Laser Radiation

Semiconductor laser		
Maximum power of the laser diode	10 mW	
Maximum average radiation power(*)	7.5 μW	
Wavelength	775 - 800 nm	

*:Laser Aperture of the Print Head Unit

- This product employs a Class 3b laser diode that emits an invisible laser beam. The laser diode and the scanning polygon mirror are incorporated in the print head unit.
- The print head unit is NOT A FIELD SERVICE ITEM. Therefore, the print head unit should not be opened under any circumstances.



the U.S.A., Canada (CDRH Regulation)

- This machine is certified as a Class I Laser product under Radiation Performance Standard according to the Food, Drug and Cosmetic Act of 1990. Compliance is mandatory for Laser products marketed in the United States and is reported to the Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration of the U.S. Department of Health and Human Services (DHHS). This means that the device does not produce hazardous laser radiation.
- The label shown to page S-16 indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

• Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

Semiconductor laser		
Maximum power of the laser diode	10 mW	
Wavelength	775 - 800 nm	

All Areas

• Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

Semiconductor laser		
Maximum power of the laser diode	10 mW	
Wavelength	775 - 800 nm	

Denmark

ADVARSEL

 Usynlig Laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling. Klasse 1 laser produkt der opfylder IEC60825 sikkerheds kravene.

Halvlederlaser		
Laserdiodens højeste styrke	10 mW	
Bølgelængden	775 - 800 nm	

Finland, Sweden

A VARO!

 Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen.

LOUKAN 1 LASERLAITE KLASS 1 LASER APPARAT

A VAROITUS!

 Laitteen Käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

Puolijohdelaser		
Laserdiodin suurin teho	10 mW	
Aallonpituus	775 - 800 nm	

VARNING!

 Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

Halvledarlaser	
Den maximala effekten för laserdioden	10 mW
Våglängden	775 - 800 nm

/ VARNING!

 Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betrakta ej strålen.

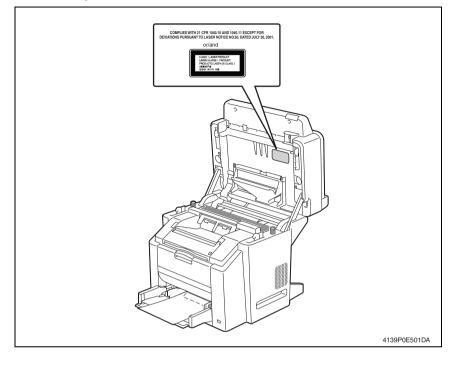
Norway

 Dersom apparatet brukes på annen måte enn spesifisert i denne bruksanvisning, kan brukeren utsettes for unsynlig laserstråling som overskrider grensen for laser klass 1.

Halvleder laser	
Maksimal effekt till laserdiode	10 mW
Bølgelengde	775 - 800 nm

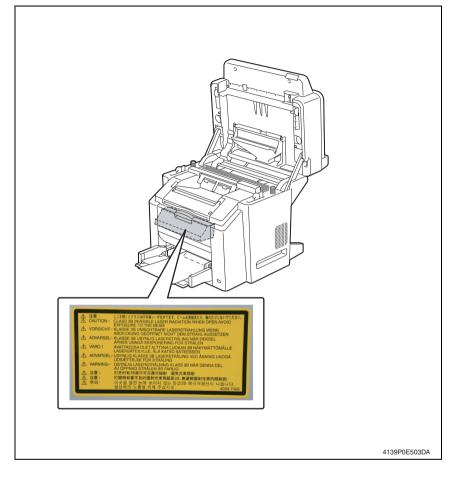
4.2 Laser Safety Label

• A laser safety labels is attached to the outside of the machine as shown below.



4.3 Laser Caution Label

• A laser caution label is attached to the inside of the machine as shown below.



4.4 Precautions For Handling The Laser Equipment

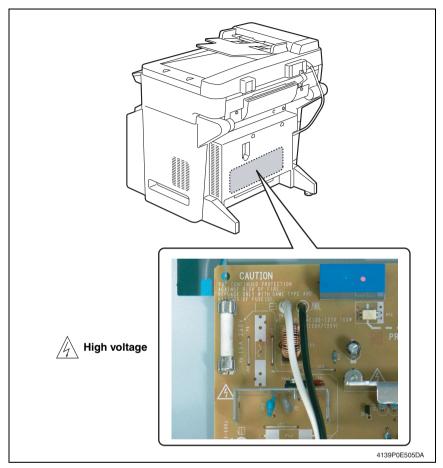
- When laser protective goggles are to be used, select ones with a lens conforming to the above specifications.
- When a disassembly job needs to be performed in the laser beam path, such as when working around the printerhead and PC Drum, be sure first to turn the copier OFF.
- If the job requires that the copier be left ON, take off your watch and ring and wear laser protective goggles.
- A highly reflective tool can be dangerous if it is brought into the laser beam path. Use utmost care when handling tools on the user's premises.

WARNING INDICATIONS ON THE MACHINE

Caution labels shown 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.





▲ CAUTION:

 You may be burned or injured if you touch any area that you are advised not to touch by any caution label. Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.

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.
- 2. If a report of a serious accident has been received from a customer, an on-site evaluation must be carried out quickly and KMBT must be notified.
- 3. To determine the cause of the accident, conditions and materials must be recorded through direct on-site checks, in accordance with instructions issued by KMBT.
- 4. For reports and measures concerning serious accidents, follow the regulations specified by every distributor.

Composition of the service manual

This service manual consists of Theory of Operation section and Field Service section to explain the main machine and its corresponding options.

Theory of Operation section gives, as information for the CE to get a full understanding of the product, a rough outline of the object and role of each function, the relationship between the electrical system and the mechanical system, and the timing of operation of each part.

Field Service section gives, as information required by the CE at the site (or at the customer's premise), a rough outline of the service schedule and its details, maintenance steps, the object and role of each adjustment, error codes and supplementary information.

The basic configuration of each section is as follows. However some options may not be applied to the following configuration.

<Theory of Operation section>

OUTLINE: COMPOSITION/OPERATION:	Explanation of system configuration, product specifications, unit configuration, and paper path Explanation of configuration of each unit, operating system, and control system
<field section="" service=""></field>	
GENERAL:	Explanation of system configuration, and product specifications
MAINTENANCE:	Explanation of service schedule, maintenance steps, ser- vice tools, removal/reinstallation methods of major parts, and firmware version up method etc.
ADJUSTMENT/SETTING:	Explanation of utility mode, service mode, and mechanical adjustment etc.
TROUBLESHOOTING:	Explanation of lists of jam codes and error codes, and their countermeasures etc.
APPENDIX:	Parts layout drawings, connector layout drawings, timing chart, overall layout drawing are attached.

Notation of the service manual

A. Product name

In this manual, each of the products is described as follows:

(1)	IC board:	Standard printer	
(2)	magicolor 2590MF:	Main body	
(3)	Microsoft Windows 98:	Windows 98	
	Microsoft Windows Me:	Windows Me	
	Microsoft Windows NT 4.0:	Windows NT 4.0 or Windows NT	
	Microsoft Windows 2000:	Windows 2000	
	Microsoft Windows XP:	Windows XP	
Microsoft Windows Vista: Windows Vista		Windows Vista	
	When the description is made in combination of the OS's mentioned above:		
		Windows 98/Me	
		Windows NT 4.0/2000	
	Windows NT/2000/XP/Vista		
		Windows 98/Me/ NT/2000/XP/Vista	

B. Brand name

The company names and product names mentioned in this manual are the brand name or the registered trademark of each company.

C. Feeding direction

- When the long side of the media is parallel with the feeding direction, it is called short edge feeding. The feeding direction which is perpendicular to the short edge feeding is called the long edge feeding.
- Short edge feeding will be identified with [S (abbreviation for Short edge feeding)] on the media size. No specific notation is added for the long edge feeding.
 When the size has only the short edge feeding with no long edge feeding, [S] will not be added to the media size.

<Sample notation>

Media size	Feeding direction	Notation
A4	Long edge feeding	A4
A4	Short edge feeding	A4S
A3	Short edge feeding	A3



SERVICE MANUAL

THEORY OF OPERATION

magicolor 2590MF Main Unit

2007.08 KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.

Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show $\underline{\land}$ to the left of the revised section. A number within $\underline{\land}$ represents the number of times the revision has been made.
- To indicate clearly a section revised, show **A** in the lower outside section of the corresponding page.

A number within **A** represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0: The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0: The revision marks for Ver. 2.0 are left as they are.

2007/08	1.0	_	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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magicolor 2590MF main unit

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Outline

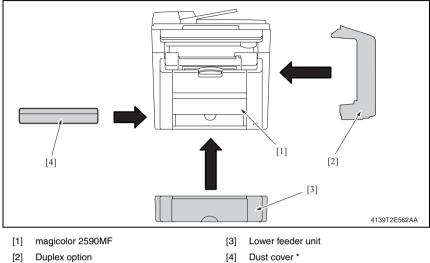
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Outline

System configuration 1.

Machine front view



- Duplex option [2]
- *: Standard for U.S.A and europe area

2. Product specifications

А. Туре

Туре	Desktop	
Printing system	Semiconductor laser and electrostatic image transfer to plain paper	
Exposure system	2 laser diodes and polygon mirror	
PC drum type	OPC (organic photo conductor)	
Photoconductor cleaning	Blade cleaning system	
Scan resolution	600 x 600 dpi, 600 x 300 dpi	
Print resolution	2400 x 600 dpi, 1200 x 600 dpi, 600 x 600 dpi	
Copy resolution	600 x 600 dpi	
Platen	Stationary	
Original scanning	Scanning in main scanning direction with a CCD	
Registration	Rear left edge	
Paper feeding system	Tray1: 200 sheets Tray2: 500 sheets (Option)	
Developing system	Single-element developing system	
Charging system	DC comb electrode scorotron system	
Image transfer system	Intermediate transfer belt system	
Paper separating system	Curvature separation + charge-neutralizing system	
Fusing system	Roller fusing	
Paper exit system	Face down (Output tray capacity: 100 sheets)	

B. Functions

Average: 45 seconds (100 V area) Average: 49 seconds (200 - 240 V area) (at ambient temperature of 23 °C/73.4 °F and rated source voltage)		
Plain paper	126.78 mm/second	
Thick stock	63.39 mm/second	
OHP film	42.26 mm/second	
Full color	22 seconds or less: LetterS, A4S	
Monochrome	13 seconds or less: LetterS, A4S	
Full color	52 seconds (600 x 300 dpi scan)	
Monochrome	23 seconds (600 x 300 dpi scan)	
Full color	5 pages/minute	
Monochrome	20 pages/minute	
Plain paper and letterhead Transparencies, thick stock, postcards, labels stock, and glossy stock		: 200 sheets : 50 sheets : 10 sheets
	Average: 49 seconds (200 (at ambient temperature of Plain paper) Thick stock OHP film Full color Monochrome Full color Monochrome	Average: 49 seconds (200 - 240 V area) (at ambient temperature of 23 °C/73.4 °F and rated source vol Plain paper 126.78 mm/second Thick stock 63.39 mm/second OHP film 42.26 mm/second Full color 22 seconds or less: LetterS, A4S Monochrome 13 seconds or less: LetterS, A4S Full color 52 seconds (600 x 300 dpi scan) Monochrome 23 seconds (600 x 300 dpi scan) Full color 5 pages/minute Monochrome 20 pages/minute Plain paper and letterhead Transparencies, thick stock, postcards, labels stock, and glossy stock

C. Media

Туре		Paper source (maximum tray capacity)		
		Tray1	Tray2 (Option)	
	Plain paper (60 to 90 g/m ² / 16 to 24 lb)	O (200 sheets)	O (500 sheets)	
	Thick stock (91 to 163 g/m ² / 25 to 40 lb)			
type P	Transparency		_	
	Postcards	O (50 sheets)		
	Letterhead			
	Label			
	Glossy media			
	Envelope	O (10 envelopes)		
Media dimensions	Width	92 to 216 mm (3- ¹ / ₂ to 8- ¹ / ₂ inch)	A4/Letter	
	Length	148 to 356 mm (5-³/₄ to 14 inch)		

D. Maintenance

Machine durability

E. Machine specifications

Power requirements	Voltage:	AC 110 V to 127V -10% +6% (AC 120 V \pm 10% only US/Canada) AC 220 to 240 V $\pm10\%$	
	Frequency:	50 to 60 Hz ± 3 Hz	
Max power consumption		1,100 W or less	
Dimensions		528 (W) x 475 (D) x 531 (H) mm 20.75 (W) x 18.75 (D) x 21 (H) inch	
Weight		33 kg (72.75 lb) or less 39 kg (86 lb) or less (include packing material)	
Operating noise		During standby :39 dB (A) or less During printing :52 dB (A) or less During copying :57 dB (A) or less (with ADF)	

F. Operating environment

Temperature	10 °C to 35 °C / 50 °F to 95 °F (with a fluctuation of 10 °C / 18 °F or less per hour)
Humidity	15% to 85% (with a fluctuation of 20% or less per hour)

G. Print functions

Туре	Built-in type controller	
	Personal computer	for Windows Pentium II: 400MHz or higher
		for Macintosh PowerPC G3 or later (G4 or later is recommended) Intel processor
System requirements	Operating System	 Microsoft Windows XP Home Edition/Professional, Windows XP Professional x64 Edition, Windows Server 2003, Windows Server 2003 x64 Edition, Windows 2000, Windows Vista (32-bit/64-bit) Mac OS X (10.2.8 or later; We recommend install- ing the latest patch)
	Free hard disk space	256 MB or more
	RAM	128 MB or more
	I/O interface	 10Base-T/100Base-TX (IEEE 802.3) Ethernet interface port USB Revision 2.0 and USB Revision 1.1 compliant port *The Ethernet cable and USB cable are not included with the machine.

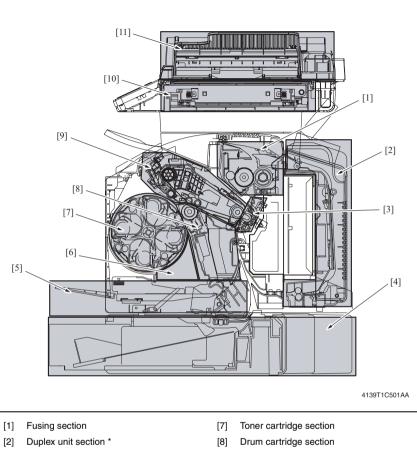
NOTE

• These specifications are subject to change without notice.

2.1 Fax specifications

	Standard (203 dpi x 98 dpi)	
Resolution	Fine (203 dpi x 196 dpi)		
	Super fine (203 dpi x 392 dpi)		
Halftone level	Standard/Fine/Super fine		
	Half tone standard/Half tone fine/Half tone super fine		
Automatic reduction	Receive	Supported	
	Transmit	Not supported	
Compatibility	ECM/Super G3		
Modem speed	V.34 (up to 33.6 Kbps)		
Transmit speed	3 Second/page (at V.34)		
Compression	MH/MR/MMR/JBIG		
Memory for receiving	4 MB for fax-RX (approx. 250 pages), (included in 32 MB NAND flash)		
Remote setting	Available via USB/Network		
Paper size	A4S, LegalS, LetterS		
	One touch dial	9 one-touch key on operation panel	
	Speed dial	100 fax numbers	
	Group dial	9 groups (50 destination stations for one group)	
Functions	Broadcast	Available maximum 125 stations. (One-touch dial 9 stations, speed dial 100 sta- tions, full dial 16 stations)	
	Other supported functions	Timer transmission, phone book, real time clock, auto redial, reduce/split, smoothing	

3. Center cross section



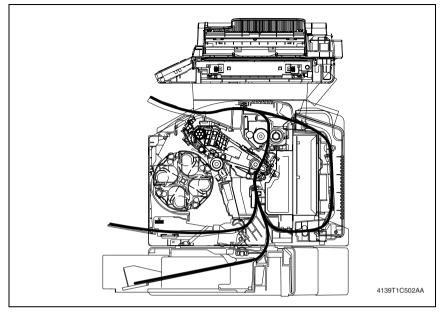
- [3] 2nd transfer section
- [4] Lower feeder section *
- [5] Paper feed section
- [6] Write section
- *: Option

- [9] Transfer belt section
- [10] IR section
- [11] Auto document feeder section

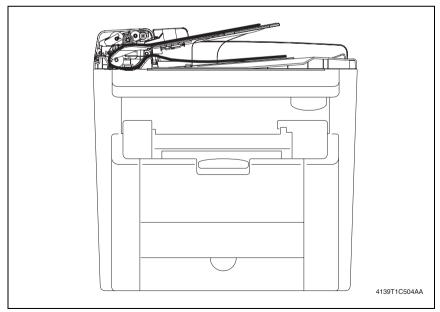
Outline

4. Paper path

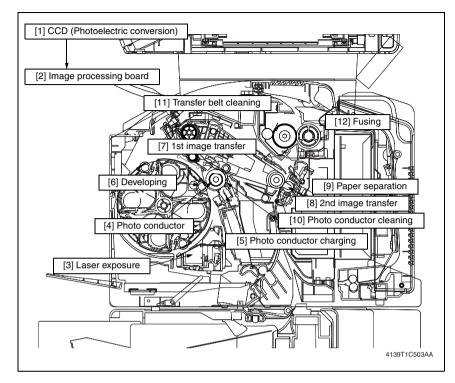
<Machine right side view>



<Machine front view>



5. Image creation process



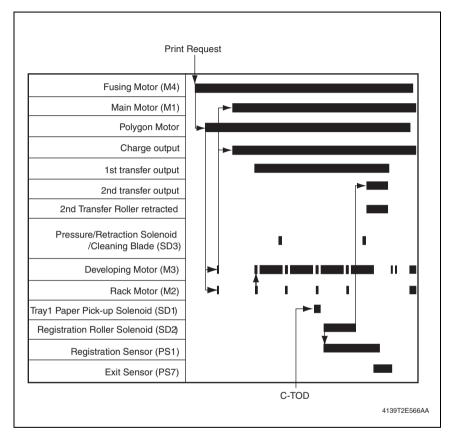
CCD (Photoelectric conversion)	 Light reflected off the surface of the original is converted to a corre- sponding electric signal by CCD and the resultant electric signal is sent to the image processing board.
Image processing board	 The intensity of the laser light is controlled based on the image signal transmitted to this board.
Laser exposure	 The surface of the photo conductor is irradiated with the laser light and an electrostatic latent image is thereby formed.
Photo conductor	 The image projected onto the surface of the photo conductor is con- verted to a corresponding electrostatic latent image.
Photo conductor charging	 A negative DC charge layer is formed on the surface of the photo con- ductor.
Developing	 The toner, negatively charged in the hopper, is attracted onto the electrostatic latent image formed on the surface of the photo conductor. It is thereby changed to a visible, developed image. A DC negative bias voltage is applied to the developing roller, thereby preventing toner from sticking to the background image portion.
1st image transfer	 A DC positive voltage is applied to the backside of the transfer belt, thereby allowing the visible, developed image on the surface of the photo conductor to be transferred onto the transfer belt.
2nd image transfer	 A DC positive voltage is applied to the backside of the paper, thereby allowing the visible, developed image on the surface of the transfer belt to be transferred onto the paper.
Paper separation	 The paper, which has undergone the 2nd image transfer process, is neutralized.
Photo conductor cleaning	The residual toner left on the surface of the photo conductor is scraped off.
Transfer belt cleaning	 A charge is applied to the transfer belt. By potential difference, residual toner on the surface of the transfer belt is collected for cleaning.
Fusing	 Toner is permanently fused to the paper by the combination of heat and pressure applied by the fusing roller.
	conversion) Image processing board Laser exposure Photo conductor Photo conductor charging Developing 1st image transfer 2nd image transfer Paper separation Photo conductor cleaning Transfer belt cleaning

Blank Page

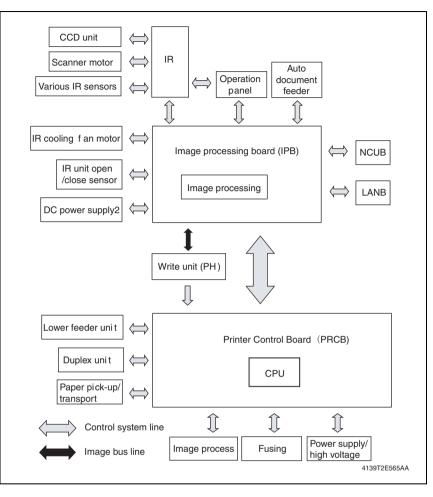
Composition/operation

6. Overall composition

6.1 Operation sequence

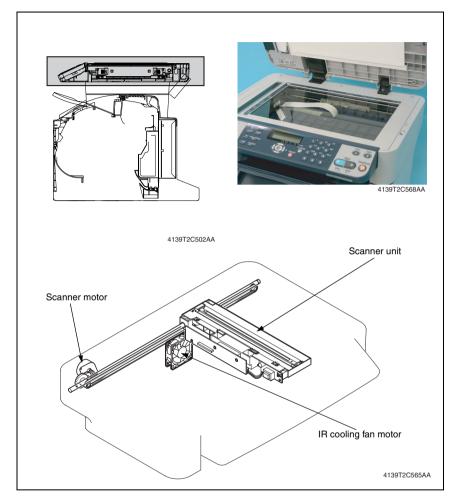


6.2 Control block diagram

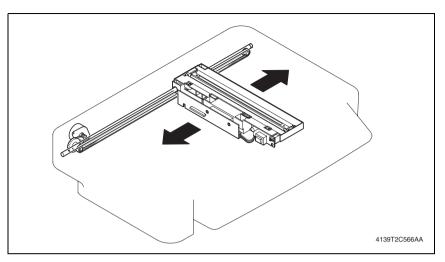


7. Scanner section (IR section)

7.1 Composition



7.2 Drive



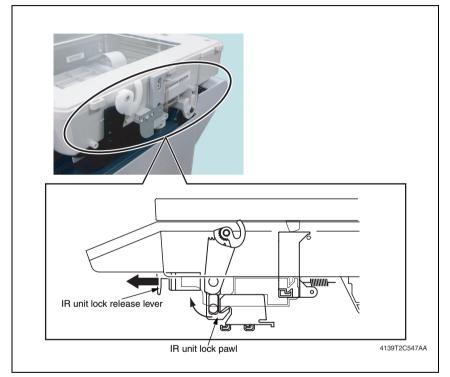
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7.3 Operation

7.3.1 IR unit open/close mechanism

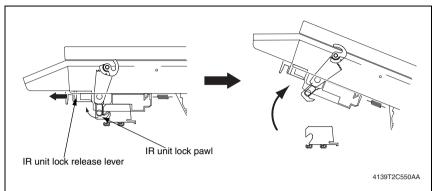
- The machine is provided with the IR unit open/close mechanism to allow the toner cartridge, drum cartridge, and other disposables to be replaced with new ones.
- Pulling the IR unit lock release lever will disengage the IR unit lock pawl, allowing the IR unit to be opened.

The IR unit lock release lever is, however, locked to prevent the IR unit from being opened when the auto document feeder unit is raised open. This is done to prevent the machine from toppling over.

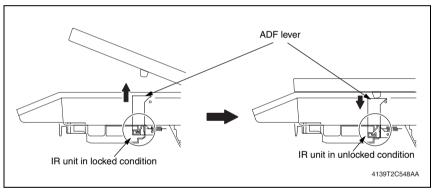


A. IR unit open/close operation

• Pulling the IR unit lock release lever will disengage the IR unit lock pawl, allowing the IR unit to be opened.

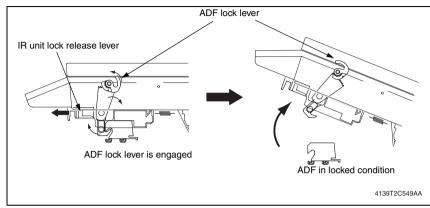


• When the auto document feeder unit is raised open, the ADF lever is pushed upward to lock the IR unit lock release lever, thus preventing the IR unit from being opened.



7.3.2 Auto document feeder unit open/close

- To prevent the auto document feeder unit from being raised or lowered when the IR unit is opened or closed, the auto document feeder unit is secured to the IR unit when the IR unit is to be opened or closed.
- When the IR unit lock release lever is pulled, the ADF lock lever is rotated through coupling of gears. This causes the auto document feeder unit to be secured to the IR unit.



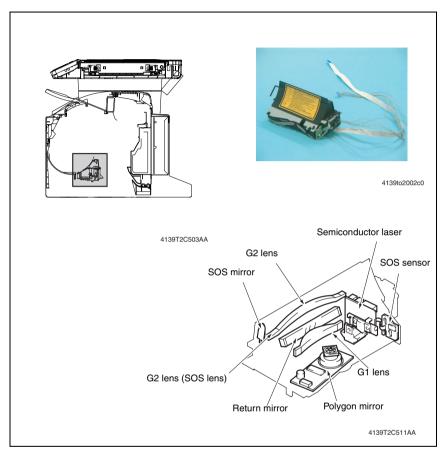
7.3.3 Original size detection

• Since the scanner is not mounted with any original size detection sensors, the scanning range of the scanner is determined according to the paper size setting made on the control panel.

If the correct paper size is not selected on the control panel or the paper of the correct size is not loaded in the tray, the machine gives an error message on the control panel after the print cycle.

8. Write section (PH section)

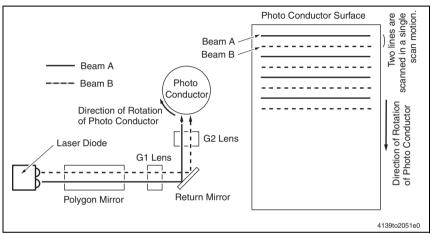
8.1 Composition



8.2 Operation

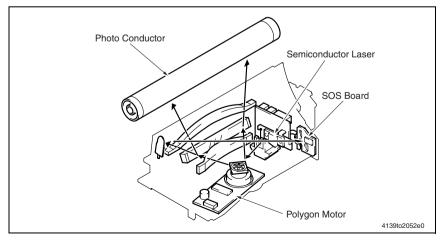
8.2.1 Outline

- The surface of the photo conductor is irradiated with a laser light and an electrostatic latent image is thereby formed.
- The polygon mirror has four faces. The machine uses a two-beam array LD to inhibit the speed of the polygon mirror from increasing because of the decreased number of faces the polygon mirror has as compared with the conventional models.
- The two-beam array LD consists of two LD elements arranged vertically. Two lines are scanned with two laser beams emitted from these two LD elements through a single face of the polygon mirror.



8.2.2 Laser exposure process

- 1. The laser light emitted from the semiconductor laser strikes the polygon mirror.
- 2. The polygon mirror with four faces is rotated at high speeds by the polygon motor.
- 3. The SOS sensor ensures that the laser light emission start timing remains constant for each line of main scan.



8.2.3 Laser emission timing

- When a ready signal is detected after the lapse of a given period of time after the print cycle has been started, a laser ON signal is output from the print control board.
- The laser ON signal triggers the firing of each laser light which illuminates the SOS board via the polygon mirror, G1 lens, return mirror, G2 lens (SOS lens), and SOS mirror. This generates an SOS signal.
- This SOS (start of scan) signal unifies the timing at which the laser lights are irradiated for each main scan line.

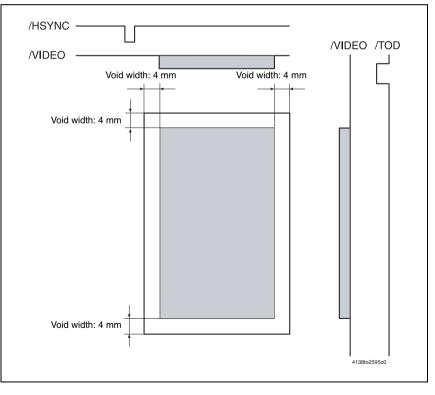
8.2.4 Laser emission area

A. Main scan direction

- The print start position in the CD direction is determined by the CD print start signal (/ HSYNC) that is output from the image processing board and the width of the paper.
- The laser emission area is determined by the paper size. The area of 4 mm on both edges of the paper is, however, the void image area.

B. Sub scan direction

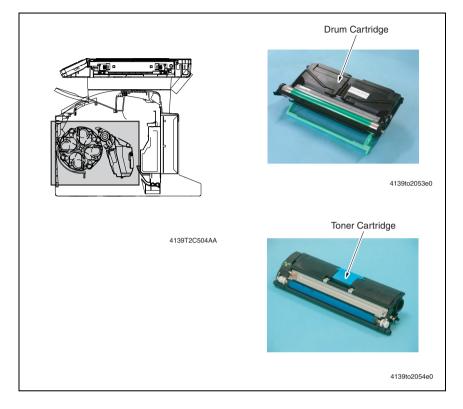
- The print start position in the FD direction is determined by the image write start signal (/ TOD) that is output from the image processing board and the length of the paper.
- The laser emission area is determined by the paper size. The area of 4 mm on both the leading and trailing edges of the paper is, however, the void image area.



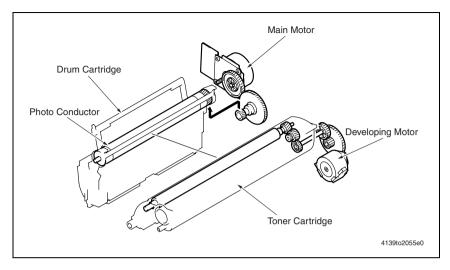
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9. Cartridge section

9.1 Composition



9.2 Drive



9.3 Operation

9.3.1 Drum cartridge (DC) life control

• The drum cartridge offers the following life controls: detecting a new DC and resetting the life counter.

A. New DC detection

• The machine attempts to perform a new DC detection sequence when the power switch is turned OFF and ON, or the front door is closed.

If no new DC is detected, the image stabilization sequence is not carried out.

• If a new DC is detected, the image stabilization sequence is carried out.

B. Reaching the life

- The life counter is reset when a new DC is detected.
- The machine gives a warning screen when the life value is reached. After a predetermined number of printed pages are produced after the life value has been reached, the machine displays a DC replacement message.

9.3.2 Toner cartridge (TC) life control

A. Toner cartridge detection and new cartridge detection timing

• The machine attempts to perform a detection sequence when the front door is closed.

B. Toner Cartridge detection

 The machine accesses the TC detection board (CSIC) to check for data stored in it. Using that data, the machine determines whether or not a toner cartridge is loaded.

C. New toner cartridge detection

• After a toner cartridge has been detected, the machine determines whether it is new or not based on the data acquired.

D. Toner cartridge near empty and empty condition detection

• The amount of toner consumed is calculated from the number of dots produced for one printed page by the controller. A toner near empty condition and a toner empty condition are thereby detected.

<Toner near empty decision>

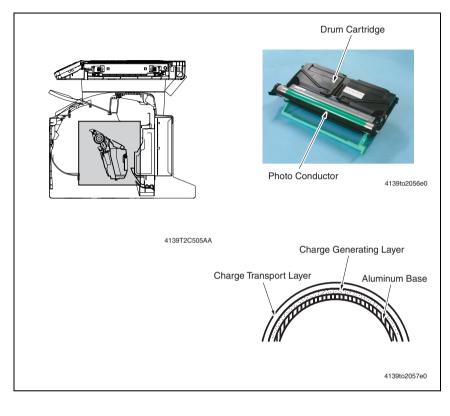
• The machine determines that there is a toner near empty condition when the image counter and dot counter reach the life value.

<Toner empty decision>

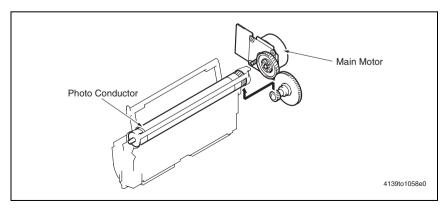
 The machine determines that there is a toner empty condition when a predetermined number of printed pages are produced after the toner near empty condition has been detected. magicolor 2590MF

10. Photo conductor section

10.1 Composition



10.2 Drive



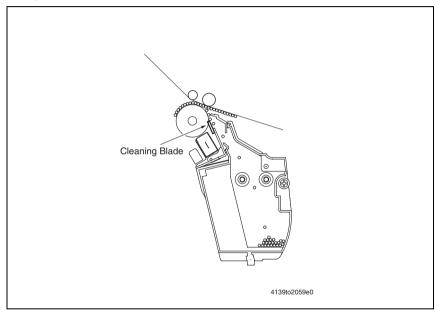
10.3 Operation

10.3.1 Photo conductor drive mechanism

- The photo conductor is driven by the main motor.
- When the main motor is energized, it turns the drive gear, which in turn rotates the photo conductor.

10.3.2 Photo conductor cleaning mechanism

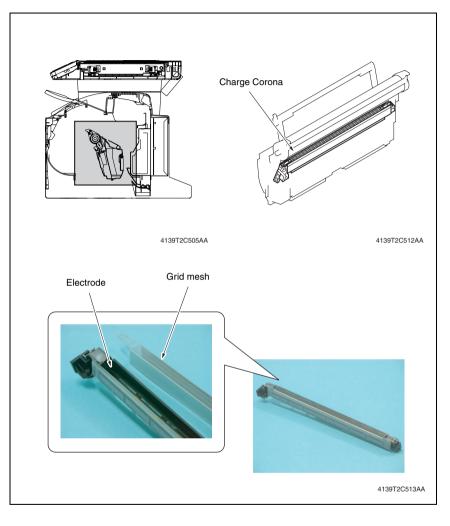
- The cleaning blade is pressed up against the surface of the photo conductor, scraping residual toner off the surface.
- The toner scraped off the surface of the photo conductor is collected in the drum cartridge.



Composition/Operation

11. Charge corona section

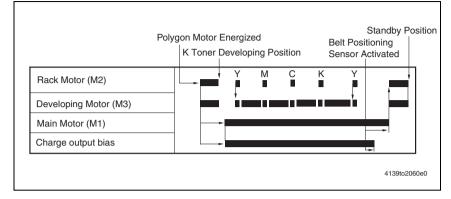
11.1 Composition



11.2 Operation

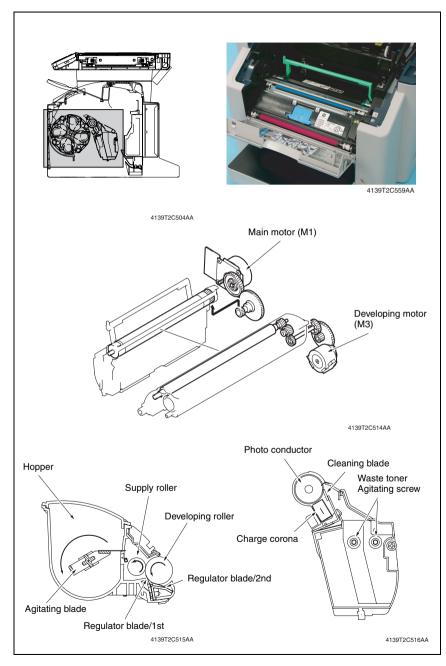
11.2.1 Charge corona unit ON/OFF control

• The grid voltage (Vg) applied to the grid mesh is controlled by image stabilization control.



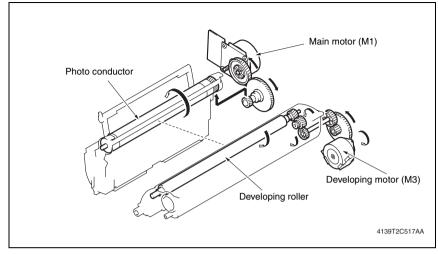
12. Developing section

12.1 Composition



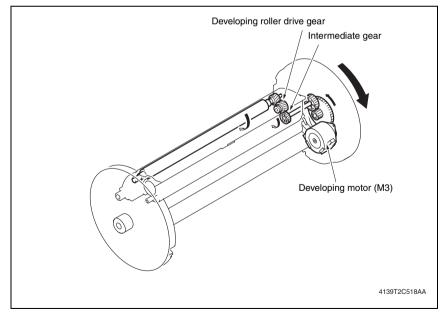
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12.2 Drive

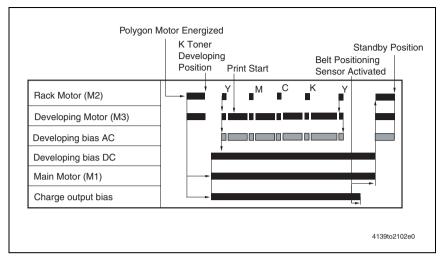


A. Developing roller drive

- The developing roller is driven by the developing motor and intermediate gear.
- When the toner cartridge rack is stationery at the developing position, the developing roller drive gear comes into mesh with the intermediate gear. The developing roller is then rotated through the drive provided by the developing motor and intermediate gear.

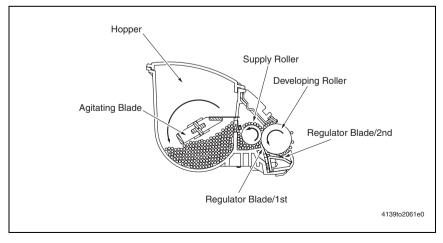


12.2.1 Developing drive control



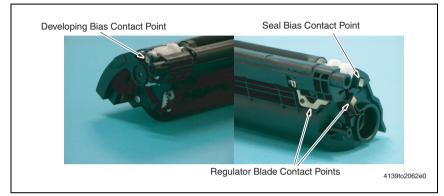
12.2.2 Toner flow

- Toner stored in the hopper is agitated by the agitating blade and conveyed into the toner supply portion by the conveyance blade fitted to the leading edge of the agitating blade.
- 2. The toner conveyed into the toner supply portion is conveyed by the supply roller onto the developing roller.
- 3. At this time, regulator blade/1st and /2nd regulate the height of toner on the surface of the developing roller.
- 4. Toner then sticks to the electrostatic latent image formed on the surface of the photo conductor. That part of toner left on the surface of the developing roller is returned to the toner supply portion.



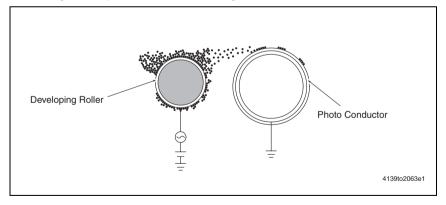
12.2.3 Developing bias

- The developing bias voltage (Vb) is applied to the developing roller so that an adequate amount of toner is attracted onto the surface of the photo conductor.
- To allow toner to fly to the photo conductor easily, DC (-) + AC developing bias voltage (Vb) is applied to the developing roller during development. This AC component of the developing bias voltage is applied only during development. At any time other than the development, only the DC (-) component of the developing bias voltage is applied.
- The developing bias voltage (Vb) is supplied by the high voltage unit.



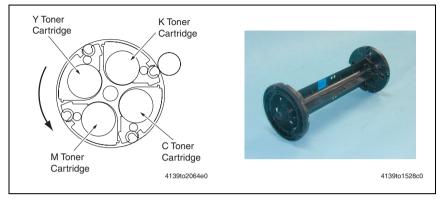
12.2.4 Developing system

- The machine employs the single-component, non-contact developing system.
- In the non-contact, single-component developing system, the magnetic brush does not rub the surface of the photo conductor (or the image). This prevents a foggy image from occurring and the photo conductor from being worn.



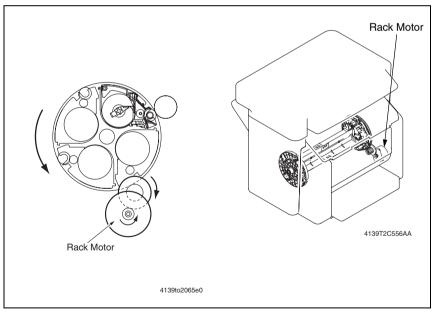
12.2.5 Toner cartridge rack

- The toner cartridge rack is mounted with four toner cartridges. The rack employs a rotary system.
- Development of the image of each color of toner is performed by rotating the toner cartridge rack.



A. Toner cartridge rack drive

• The toner cartridge rack is driven by the rack motor.

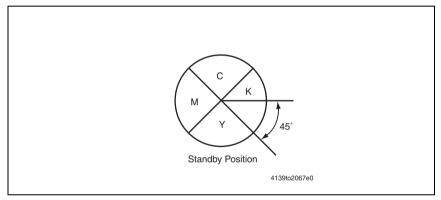


B. Toner cartridge rack stop position

- The toner cartridge rack must be brought to a stop so that the toner cartridge of each color of toner is located at its correct position. To accomplish this task, three stop positions are established: the standby (reference) position, the developing position, and the cartridge replacement position.
- The standby position refers to the position at which the toner cartridge rack is stationary when the machine is in the standby state. The toner cartridge rack is located at this standby position when the machine completes a warm-up cycle or waits for a print command.
- The development position refers to the position at which the toner cartridge rack stops during development of a specific color of toner.
- The cartridge replacement position refers to the position at which the toner cartridge rack is stopped for replacement of the toner cartridge of a specific color of toner.

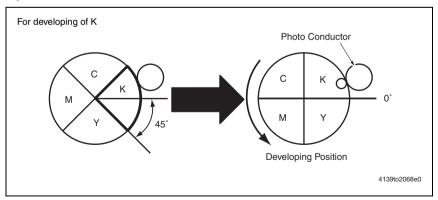
(1) Standby (reference) position

• The standby position is 45° before the developing position of the K toner cartridge.



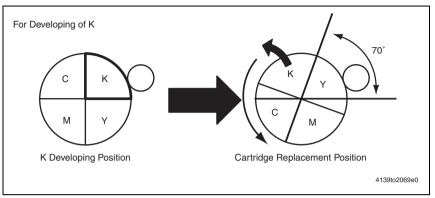
(2) Developing position

 The developing position is where the toner cartridge rack is rotated 45° from the standby position.



(3) Cartridge replacement position

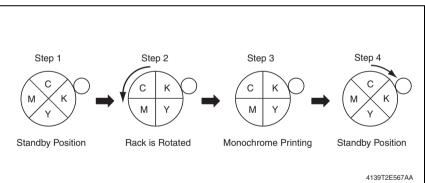
• The cartridge replacement position is where the toner cartridge rack is rotated 70° from the developing position.



C. Monochrome printing process

(1) Operation sequence

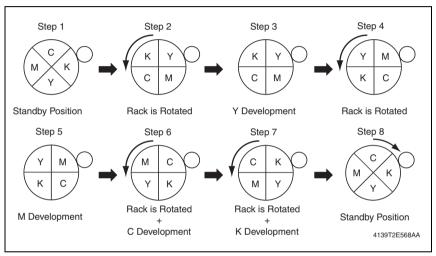
- 1. The toner cartridge rack is stationary at the standby position.
- 2. When a print request is received from the controller, the toner cartridge rack is rotated to bring the K toner cartridge to its developing position.
- 3. Development of monochrome printing is started.
- 4. When the development is completed, the toner cartridge rack is rotated and brought to a stop at the standby position.



D. Color printing process

(1) Operation sequence

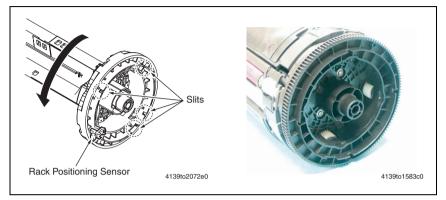
- 1. The toner cartridge rack is stationary at the standby position.
- 2. When a print request is received from the controller, the toner cartridge rack is rotated to bring the Y toner cartridge to its developing position.
- 3. Development of Y is carried out.
- 4. When development of Y is completed, the toner cartridge rack is rotated to bring the M toner cartridge to its developing position.
- 5. Development of M is carried out.
- 6. Similarly, the toner cartridge rack is rotated and development of C is carried out.
- 7. Similarly, the toner cartridge rack is rotated and development of K is carried out.
- 8. When the development of K is completed, the toner cartridge rack is rotated and brought to a stop at the standby position.



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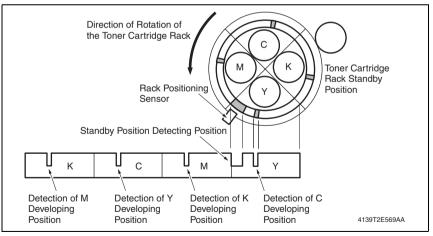
E. Toner cartridge rack stop position detection

- The toner cartridge rack stop position for each color of toner is detected by the rack motor and the rack positioning sensor.
- The toner cartridge rack is provided with slits, each for a specific color of toner. When the rack rotates, the rack positioning sensor is blocked and unblocked.
 A specific stop position is detected when the rack positioning sensor is blocked and unblocked.



(1) Toner cartridge rack standby position

- The standby position is 45 ° before the developing position of the K toner cartridge. The Y toner cartridge is therefore provided with a slit for detecting the K developing position.
- When the toner cartridge rack is rotated, the rack positioning sensor moves past the slit for detecting the K developing position. This allows the machine to determine that the current development is for K. Through pulse control of the rack motor, the machine then successfully brings the toner cartridge rack to its standby position.



(2) Toner cartridge rack developing position

 To bring the toner cartridge rack to a stop at the corresponding developing position, the rack is rotated from the standby position 45° through pulse control of the rack motor.

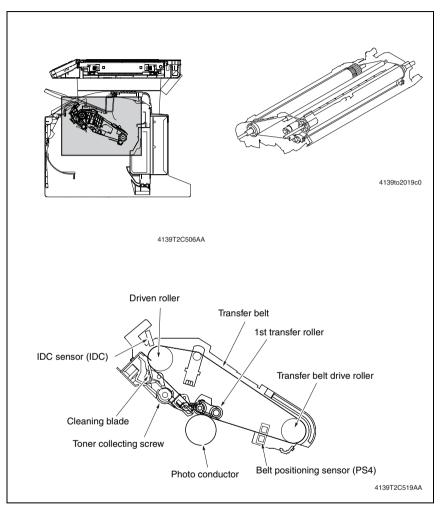
(3) Cartridge replacement position

 When a request is made for replacing the toner cartridge of a specific color of toner (by means of an input from the control panel, upon a toner empty condition, or through an input made via the printer driver), the toner cartridge rack is rotated 70° from the developing position through pulse control of the rack motor. magicolor 2590MF

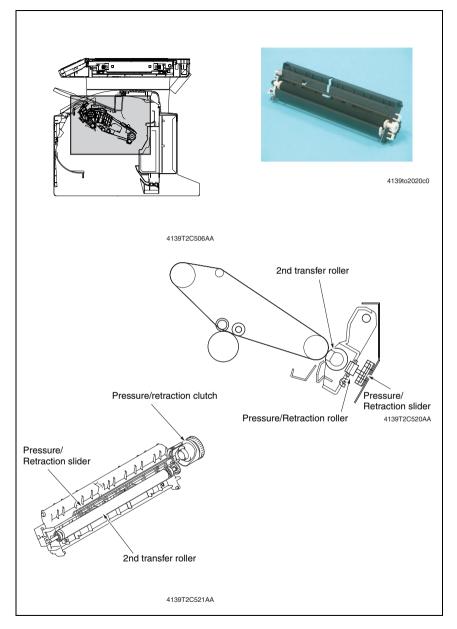
13. Image transfer section

13.1 Composition

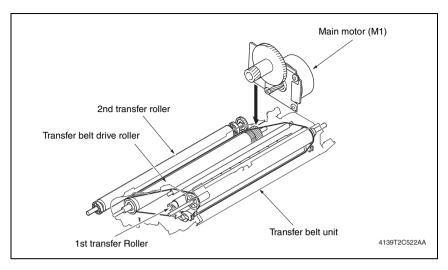
13.1.1 1st transfer section



13.1.2 2nd transfer section



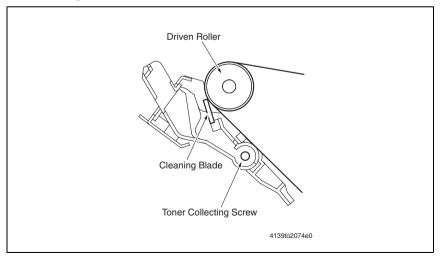
13.2 Drive



13.3 Operation

13.3.1 Transfer belt cleaning mechanism

- To scrape residual toner off the surface of the transfer belt, there is a cleaning blade provided.
- The cleaning blade is pressed up against the transfer belt, thereby scraping residual toner off the surface of the transfer belt.
- The toner collecting screw conveys toner scraped off by the cleaning blade onto the drum cartridge.

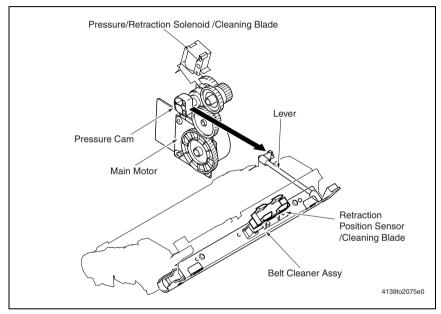


A. Cleaning blade pressure/retraction mechanism

- In color printing, an image is formed on the transfer belt for each color of toner. The cleaning blade is therefore provided with a pressure/retraction mechanism.
- In monochrome printing, no retraction sequence is carried out.
- The cleaning blade is normally in pressed contact with the transfer belt.

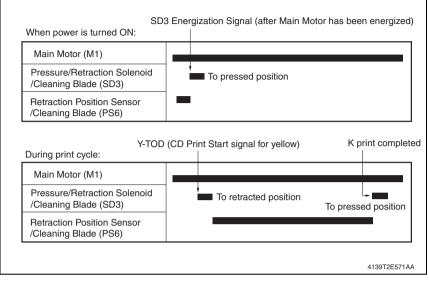
(1) Pressure/retraction operation

- The cleaning blade pressure/retraction operations are performed by the main motor, pressure/retraction solenoid/cleaning blade, pressure cam, lever, and retraction position sensor/cleaning blade.
- When the pressure/retraction solenoid/cleaning blade is energized, drive from the main motor is transmitted to the pressure cam.



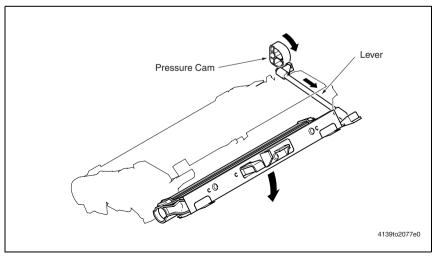
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(2) Operation timing



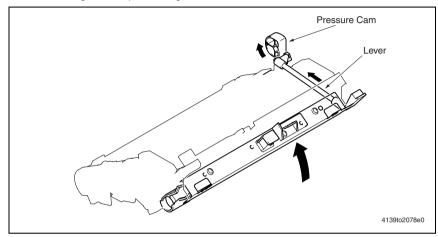
(3) Retraction sequence

- 1. Drive from the main motor is transmitted to the drive gear.
- 2. Rotation of the drive gear is transmitted to the pressure cam.
- 3. When the pressure/retraction solenoid/cleaning blade is energized, the half-moonshaped pressure cam rotates a half turn to push the lever forward.
- 4. When the lever is pushed forward, the cleaning blade is retracted.
- 5. When the cleaning blade is retracted, it results in the cleaning blade being retracted from the transfer belt.
- 6. During this time, the retraction position sensor/cleaning blade detects whether or not the cleaning blade is retracted from the transfer belt.



(4) Pressure sequence

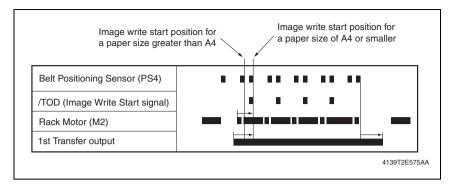
- 1. When the pressure/retraction solenoid/cleaning blade is energized in the condition, in which the cleaning blade is retracted from the transfer belt, the pressure cam rotates a half turn. This pushes the lever backward.
- 2. When the lever is pushed backward, the cleaning blade is returned. Then, the cleaning blade is pressed against the transfer belt.



(5) Home position detection

- The position of the cleaning blade is unknown when the power switch is turned ON or the cover is opened and closed, the machine performs a home position detection sequence during a warm-up cycle.
- During the warm-up cycle, the pressure/retraction solenoid/cleaning blade is energized to start a pressure/retraction sequence. When the retraction position sensor/cleaning blade is then blocked, the pressure/retraction solenoid/cleaning blade is deenergized.

13.3.2 1st transfer roller voltage ON/OFF control

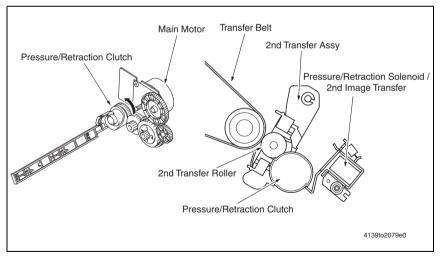


13.3.3 2nd transfer roller pressure/retraction mechanism

- In color printing, the toner image of each color of toner is transferred to the transfer belt (thus a total of four times to cover the four colors of toner). pressure/retraction control with respect to the transfer belt is therefore provided for the 2nd transfer roller.
- In the standby state, the 2nd transfer roller is in a position retracted from the transfer belt.

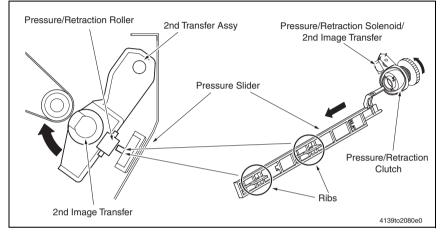
A. Pressure/retraction operation

- The pressure/retraction operation is performed by the main motor, pressure/retraction solenoid /2nd image transfer, and pressure/retraction clutch.
- When the pressure/retraction solenoid /2nd image transfer is energized, drive from the main motor is transmitted to the pressure/retraction clutch.



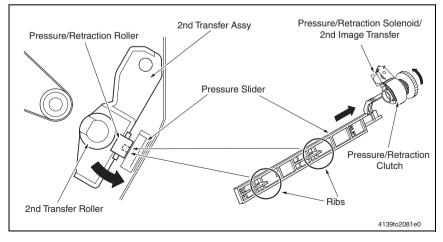
(1) Pressure sequence

- 1. Drive from the main motor is transmitted to the drive gear.
- 2. Rotation of the drive gear is transmitted to the pressure/retraction clutch.
- 3. When the pressure/retraction solenoid /2nd image transfer is energized, the pressure/retraction clutch rotates a half turn. This moves the pressure slider.
- 4. When the pressure slider is moved, ribs on the pressure slider push up the 2nd transfer assy.
- 5. When the 2nd transfer assy is pushed up, the 2nd transfer roller is pressed up against the transfer belt.



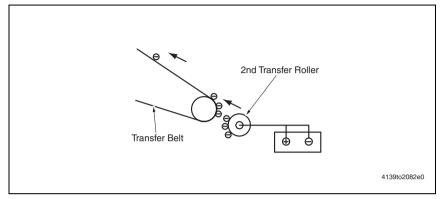
(2) Retraction sequence

- When the pressure/retraction solenoid /2nd image transfer is energized in the condition in which the 2nd transfer roller is pressed against the transfer belt, the pressure/retraction clutch rotates a half turn. This moves the pressure slider.
- 2. When the pressure slider is moved, the 2nd transfer assy, which has been pushed up by the ribs on the pressure slider, lowers.
- 3. When the 2nd transfer assy lowers, it allows the 2nd transfer roller to be retracted from the transfer belt.



13.3.4 2nd transfer roller cleaning

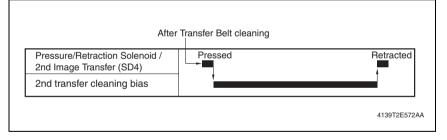
- DC positive and negative transfer bias voltages are alternately applied to the 2nd transfer roller. This allows toner residue on the surface of the 2nd transfer roller to be transferred back to the transfer belt, thus cleaning the 2nd transfer roller.
- The toner transferred back to the transfer belt is collected by the cleaning blade.



A. Operation timing

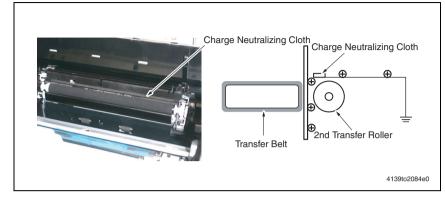
The 2nd transfer roller cleaning sequence is carried out under any of the following timings.

- · Power switch is turned ON
- · Cover is opened and closed
- A media error occurs during a print cycle.
- A paper empty condition occurs during a print cycle.
- A paper size error occurs during a print cycle.



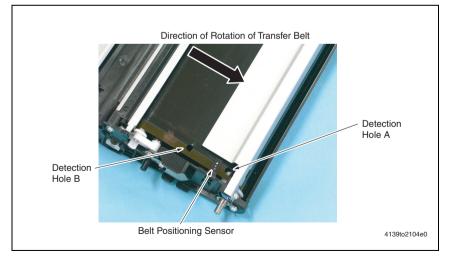
13.3.5 Neutralization and separation of paper

• To neutralize the paper that has undergone the 2nd transfer process, a charge neutralizing cloth is provided for the guide plate after the 2nd transfer roller.



13.3.6 Belt positioning sensor

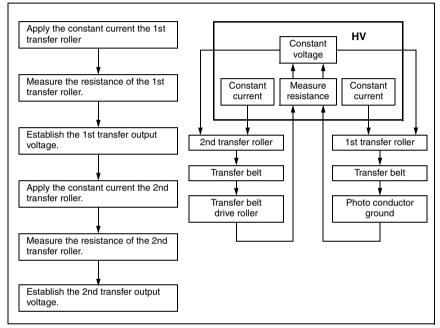
- When development takes place in this machine, the image of each color of toner is formed on the surface of the transfer belt. The leading edge of the image of each color of toner must therefore be aligned correctly with each other on the surface of the transfer belt.
- The position of the transfer belt is detected when the belt positioning sensor detects detection holes provided in the transfer belt.
- There are two detection holes provided in the transfer belt. The image write start position is varied according to the paper size. For a paper size of A4 or smaller, the image write start position is aligned with detection hole A. For a paper size greater than A4, detection hole B serves as the reference for the image write start position.



13.3.7 ATVC (Auto Transfer Voltage Control)

• The ATVC, or auto transfer voltage control, is for optimizing the transfer output. A constant current is made to flow through each of the transfer rollers. From the voltage thereby detected, the resistance of each of the 1st transfer roller, 2nd transfer roller, and transfer belt is measured. The ATVC then automatically adjusts the appropriate image transfer output voltage to be applied to the 1st transfer roller and the 2nd transfer roller during the print cycle.

A. Overview of ATVC operation



B. 1st transfer ATVC operation

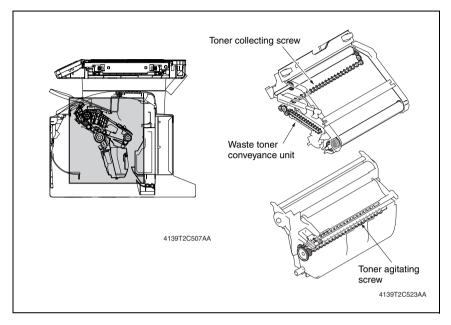
- 1. The data on the 1st transfer constant current for each color of toner output from the high voltage unit is fed back to the high voltage unit via the 1st transfer roller, transfer belt, and the photo conductor ground. The resistance of the transfer belt is thereby measured.
- 2. Based on the measured resistance value, the optimum 1st transfer voltage is established.

C. 2nd transfer ATVC operation

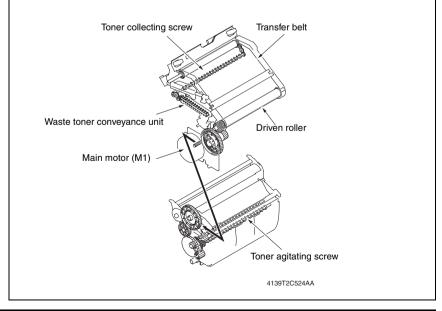
- 1. The data on the 2nd transfer constant current output from the high voltage unit is fed back to the high voltage unit via the 2nd transfer roller, transfer belt, and the transfer belt drive roller. The resistance of the transfer belt is thereby measured.
- 2. Based on the measured resistance value and inconsideration of the environmental conditions and print color, the optimum 2nd transfer voltage is established.

14. Toner collecting section

14.1 Composition



14.2 Drive



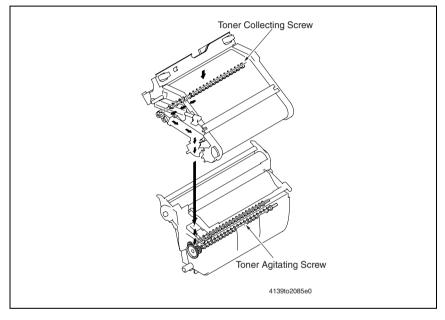
14.3 Operation

14.3.1 Toner collecting mechanism

• Waste toner scraped off by the cleaning blade of the transfer belt and that scraped off by the cleaning blade of the photo conductor are conveyed by each of the toner collecting screws into the drum cartridge.

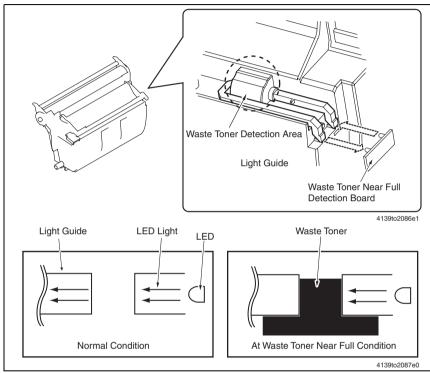
A. Image transfer belt unit

- Waste toner scraped off by the cleaning blade is collected by the toner collecting screw for transfer belt.
- The waste toner collected by the toner collecting screw is conveyed to the drum cartridge by way of the waste toner conveyance unit.



14.3.2 Waste toner full detection system

- A waste toner near full condition is detected using the output state of the waste toner near full detect board/led.
- A waste toner near full condition is detected by letting the light emitted from the LED mounted on the waste toner near full detect board/led travel through the light guide.
- To prevent false detection, the drum cartridge is provided with the toner agitating screw that ensures that the waste toner is evenly stored.



A. Waste toner near full condition detection control

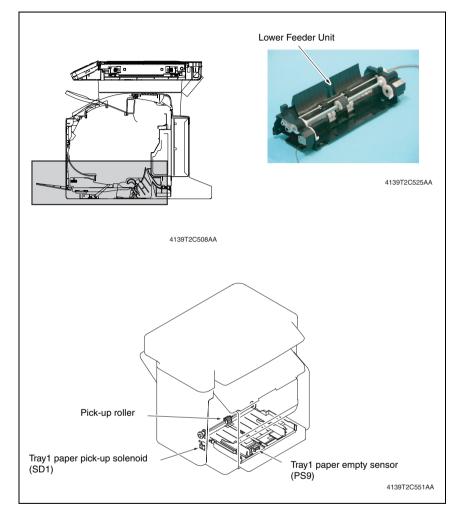
- Light emitted from the LED mounted on the waste toner near full detect board/LED is made to travel through the light guide. This light is blocked if the waste toner reaches an upper limit, which allows the machine to determine that there is a waste toner near full condition.
- To prevent false detection, the drum cartridge is provided with the toner agitating screw that ensures that the waste toner is evenly stored.

B. Waste toner full detection control

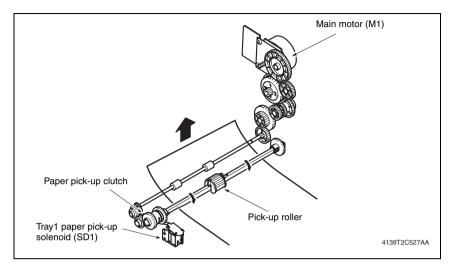
- The machine determines that there is a waste toner full condition when 200 images* are reached after a waste toner near full condition has been detected. (*: The initiation of any new print cycle is prohibited when 50 full-color printed pages are produced after the waste toner near full condition has been detected.)
- When light of the LED on the waste toner near full detect board/led is unblocked after the drum cartridge has been replaced, the waste toner full condition is reset.

15. Paper feed section

15.1 Composition

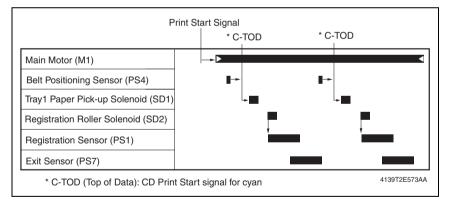


15.2 Drive



15.3 Operation

15.3.1 Paper feed control



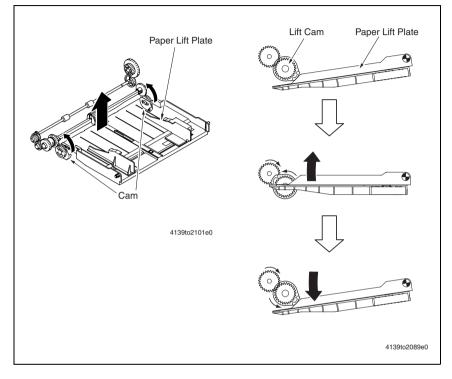
15.3.2 Paper feed speed control

- The conveyance roller and registration roller are driven by the main motor.
- The appropriate paper feed and conveyance speed are selected according to the type of paper.

Media type	Main motor (mm/sec)
Plain paper, letterhead	126.78
Thick stock, postcards, labels, glossy stock	63.39
OHP film, envelopes	42.26

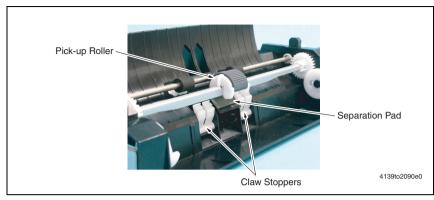
15.3.3 Paper feed mechanism

- When the tray1 paper pick-up solenoid is energized, drive from the main motor is transmitted to the pick-up roller via the paper pick-up clutch. The pick-up roller is thereby rotated.
- At the same time, the lift cam is rotated, which raises the paper lift plate. This allows the paper to be taken up and fed in by the pick-up roller.



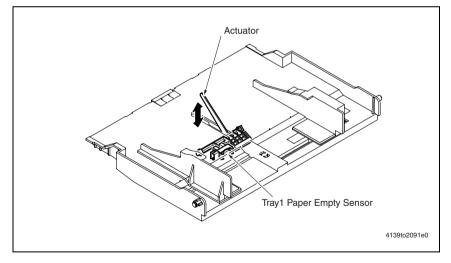
15.3.4 Double feed prevention mechanism

• The fixed separation pad system plus the claw stoppers are used for paper separation. This ensures that only the first sheet of paper is taken up and fed in.



15.3.5 Paper empty condition detection

- The tray1 paper empty sensor is located on the underside of tray1, detecting the paper loaded in the tray.
- When there is paper loaded in the tray, the actuator drops into the tray, unblocking the sensor light.
- When paper runs out, the actuator is raised, blocking the sensor light.

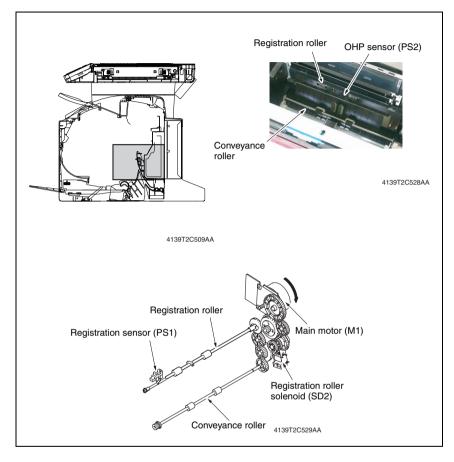


15.3.6 Paper feed retry function

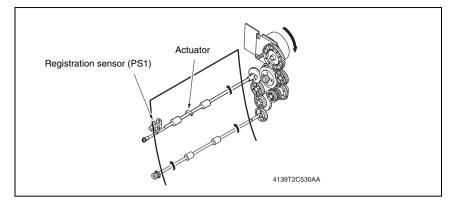
 To reduce the number of paper misfeeds detected due to failure to take up and feed in paper properly, another paper feed sequence is carried out if the registration sensor is not unblocked and blocked within a predetermined period of time.

16. Conveyance section/registration roller

16.1 Composition



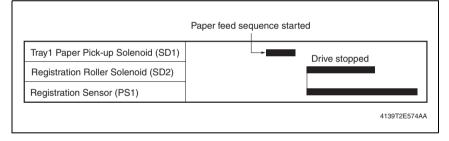
16.2 Drive



16.3 Operation

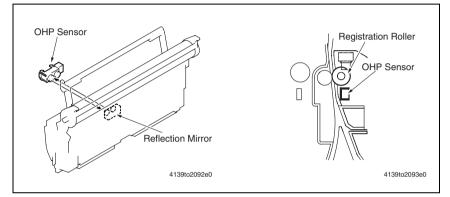
16.3.1 Registration roller control

- The registration sensor detects whether or not the paper has reached the conveyance section.
- Conveyance of paper is restarted by synchronizing the paper conveyed with the image.
- Since the conveyance roller and registration roller are synchronized with each other, no loop is formed in the paper at the registration roller.



16.3.2 OHP film detection

- To ensure that the paper of the correct type is being used, the OHP sensor detects the type of the paper being conveyed.
- When the registration sensor is activated, the OHP sensor is also activated and the type of paper being conveyed is determined if it is OHP film or any type other than OHP.
- If the OHP sensor is not deactivated, the machine determines that the paper is a type other than OHP film. If the OHP sensor is activated, the machine determines that the paper is OHP film.
- If the paper type specified by the controller when a print request is made does not match the results of OHP sensor detection, the machine suspends the print cycle and displays a corresponding message on the control panel.



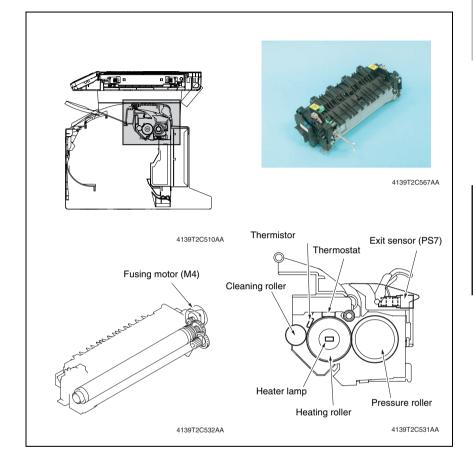
16.3.3 Size error detection control

- To prevent incorrect printed pages, the size of the paper being conveyed is detected using the registration sensor.
- The length of the paper is detected based on the value calculated using the period of time that begins when the sensor is activated and ends when it is deactivated.
- If the paper size specified by the controller does not match the paper size detected by the registration sensor, the machine displays a corresponding message on the control panel.
- The paper that has caused the size error is subject to the print processes. Operations for the subsequent sheets of paper can be specified from the controller.

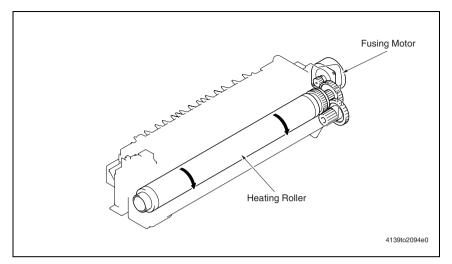
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17. Fusing section

17.1 Composition



17.2 Drive



17.3 Operation

17.3.1 Heating Roller drive control

A. Speed change control

- Drive for the heating roller is provided by the fusing motor.
- To prevent fusing failure, the fusing speed is changed in three steps according to the media type.

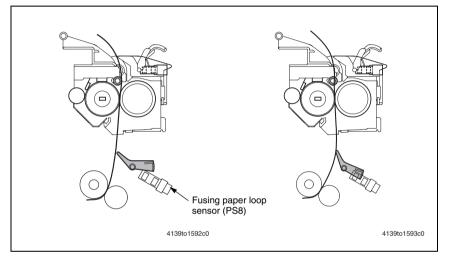
Media type	Fusing speed (mm/sec)
Plain paper, letterhead	126.78
Thick stock, postcards, labels, glossy stock	63.39
OHP film, envelopes	42.26

B. Speed stabilization

- To prevent double transferred image or brush effect, the difference between the fusing speed and paper transport speed during image transfer is corrected.
- The fusing speed is changed in two steps relative to the system speed, either at high speed (which is +2% of the system speed) or low speed (which is -2.5% of the system speed).
- The fusing motor is controlled to achieve this speed change in two steps.

C. Operation flow

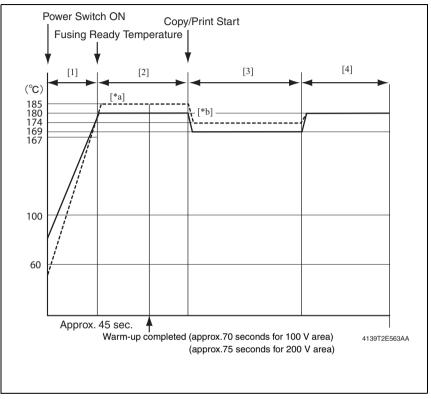
- 1. The initial fusing speed is set to the low speed, thereby forming a loop in the paper between the 2nd transfer roller and fusing rollers.
- 2. When the length of the loop formed in the paper becomes greater, the fusing paper loop sensor is activated (blocked).
- 3. While the fusing paper loop sensor remains activated, the fusing speed is kept at the high level.
- 4. When the fusing paper loop sensor is deactivated, the fusing speed is immediately switched to the low level.
- 5. The sequence of these operations is repeated so that the fusing speed is changed automatically according to the loop length. This effectively makes for the difference between the fusing speed and paper conveyance speed during image transfer.



17.3.2 Fusing temperature control

• A thermistor is used to detect the surface temperature of the heating roller. The heater lamp is then turned ON and OFF as necessary to achieve the set temperature.

Temperature control during monochrome printing (plain paper)



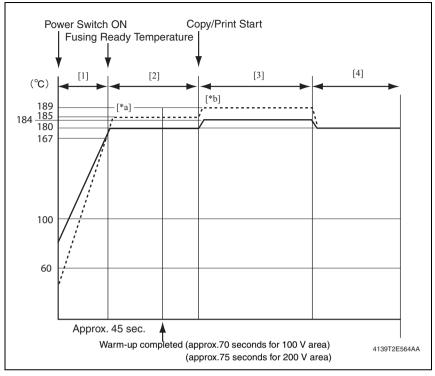
- [1] During warm-up Heat the heating roller temperature to 178 °C in average 45 seconds.
 (100 V – 120 V area) Heat the heating roller temperature to 178 °C in average 49 seconds.
 (220 V – 240 V area)
- [2] In standby state

Heating roller temperature setting: 180 °C *a: If the heating roller temperature is 60 °C or less when the warm-up cycle is started, temperature control is performed with the heating roller temperature setting changed to 185 °C. (5 min.)

After the lapse of the 5 min. period, the temperature stabilizes at 180 $^\circ\text{C}.$

- [3] During a print cycle Heating roller temperature setting: 169 °C
 *b: If the temperature/humidity sensor detects a temperature of less than
 20 °C, temperature control is performed with the heating roller temperature setting changed to 174 °C.
- [4] In standby state heating roller temperature setting: 180 °C

Temperature control during color printing (plain paper)



- [1] During warm-up cycle Heat the heating roller temperature to 178 °C in average 45 seconds.
 (100 V - 120 V area) Heat the heating roller temperature to 178 °C in average 49 seconds.
 (220 V - 240 V area)
- [2] In standby state

Heating roller temperature setting: 180 °C *a: If the heating roller temperature is 60 °C or less when the warm-up cycle is started, temperature control is performed with the heating roller temperature setting changed to 185 °C. (5 min.)

After the lapse of the 5 min. period, the temperature stabilizes at 180 °C.

[3] During a print cycle

Heating roller temperature setting: 189 °C (if the heater roller temperature at the start of the warm-up cycle is 60 °C or less) Heating roller temperature setting: 184 °C (if the heater roller temperature at the start of the warm-up cycle is more than 60 °C) *b: Temperature control is performed according to the temperature measured with the temperature/humidity sensor. For details, see "(2) color printing (1-sided)." P65

[4] In standby state Heating roller temperature setting: 180 °C

A. Warm-up

- Control is provided until the heating roller temperature reaches 178 $^\circ\text{C}.$
- This control is performed when the power switch is turned ON, a malfunction or paper misfeed is reset, the energy saver mode is canceled, or the door is opened and closed.

B. In standby

- The fusing temperature in the standby state is prevented from being dropped.
- The control temperature in the standby state after the warm-up cycle which was started with the heating roller temperature 60 °C or less is changed to that of the ordinary standby after the lapse of a predetermined period of time.

Standby state	Temperature (°C)
Ordinary standby	180 ^{*a}
In standby state after the warm-up cycle started with the heating roller temperature below 60 $^\circ\mathrm{C}$	185

*a: The fusing temperature in the standby state is changed if the standby state lasts for 20 min. or longer.

Machine interior temperature is less than 20 °C: 170 °C Machine interior temperature is 20 °C or more: 165 °C

C. During print cycle

• To ensure good fusing performance, the set temperature of each roller is varied according to the paper type and environment.

(1) Monochrome printing

• Temperature control is changed back to that listed under "ordinary environment" in the table when the temperature/humidity sensor detects 20 °C or more.

Media type	Ordinary environment (°C)	Temperature/humidity sensor less than 20 °C (°C)
Plain paper (plain paper, letterhead)	169	174
Plain paper (plain paper, letterhead) 257 mm or less	169	174
Thick stock (thick stock, postcards, labels)		169
OHP		169
Envelopes	194 ^{*a}	
Glossy stock	tock 169	

*a: The temperature is controlled at 159 °C if the machine interior temperature is 20 °C or more and humidity is 40% or higher.

(2) Color printing (1-sided)

 If the print cycle is started in a condition, in which the temperature/humidity sensor detects 20 °C or more, control is returned back to one having a control temperature of more than 60 °C after five printed pages have been produced.

Media type	Heating roller temperature at the start of warm-up cycle	Ordinary environment (°C)	Temperature/ humidity sensor less than 20 °C (°C)	Temperature/ humidity sensor 28 °C or more (°C)
Plain paper	60 °C or less	189	194	189
(plain paper, letterhead)	More than 60 °C	184	194	184
Plain paper (plain paper, letter- head) 257 mm or less	60 °C or less	189	194	189
	More than 60 °C	184	194	184
Thick stock (thick stock, postcards, labels)	-	184		
OHP	-	179		
Envelopes	-	194 ^{*a}		
Glossy stock	-	190	190	185

*a: The temperature is controlled at 159 °C if the machine interior temperature is 20 °C or more and humidity is 40% or higher.

D. Energy saver mode

• Heater control is suspended when a malfunction or paper misfeed occurs or in the energy saver mode.

(1) Control start timing

- · The door is opened or a malfunction or paper misfeed occurs
- A request for energy saver mode is granted

(2) Control termination timing

 All of the following events are canceled: door open, an error or malfunction that has occurred, and energy saver mode.

17.3.3 Protection against abnormally high temperature

• The machine provides protection at three different stages to prevent abnormally high temperature of the fusing Unit.

A. Soft protection

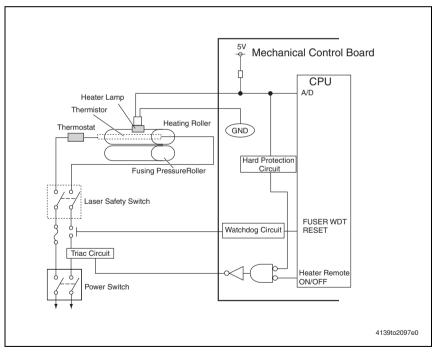
 If the thermistor detects a temperature exceeding a predetermined value, the malfunction code representing abnormally high temperature is displayed. At this time, the heater lamp is turned OFF forcibly and the initiation of any new print cycle is prohibited (abnormally high temperature detection control).

B. Hard protection

 If the CPU overruns and the output level of the CPU of the mechanical control board becomes a HIGH or LOW level, and not a pulse output, and a predetermined temperature or higher is detected, a circuit within the mechanical control board turns OFF the relay to shut down the power supply to the heater lamp.

C. Thermostat protection

• If neither the soft protection nor hard protection can detect an abnormally high temperature due to a defective thermistor or other reason, the thermostat operates at the specified temperature. This shuts down the power supply to the heater lamp, thus forcibly turning it OFF.



17.3.4 PPM control

- PPM control is provided to prevent the temperature on edges of the heating roller from increasing during a multi-print cycle using plain paper of a small size.
- The distance between sheets of paper is widened according to the number of printed pages set to be produced and the paper length. This evens out the temperature of the heating roller and thus stabilizes fusing performance of the printed toner image.
- To perform the PPM control, the number of printed pages per minute is established for each paper size.

A. Monochrome ordinary environment

		Length			
		Less than 210 mm	210 - 215 mm	216 - 256 mm	257 - 296 mm
Width	139 mm or less	14	14	14	14
	140 - 148 mm	18	18	14	14
width	149 - 182 mm	19	18	14	14
	183 - 210 mm	20	20	20	14

B. Monochrome low temperature environment

 The low temperature environment refers to the condition, in which the temperature/ humidity sensor detects a temperature of less than 20 °C.

		Length			
		210 mm 211 - 216 mm 217 - 257 mm 258 - 297			258 - 297 mm
Width	139 mm or less	12	12	12	12
	140 - 148 mm	15	15	12	12
width	149 - 182 mm	16	15	12	12
	183 - 210 mm	17	17	17	12

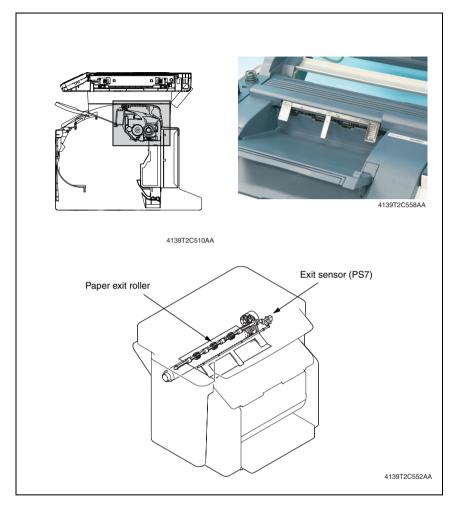
C. Color environment

		Length			
		210 mm	211 - 216 mm	217 - 257 mm	258 - 297 mm
Width	139 mm or less	3	3	3	3
	140 - 148 mm	5	5	3	3
width	149 - 182 mm	5	5	3	3
	183 - 210 mm	5	5	5	3

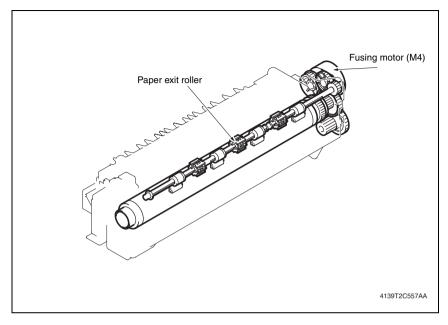
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18. Paper exit section

18.1 Composition



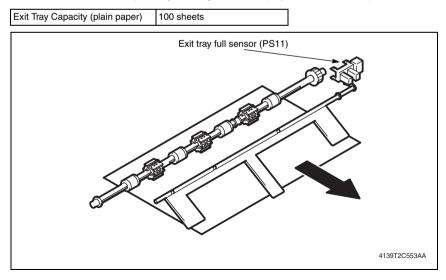
18.2 Drive



18.3 Operation

18.3.1 Exit tray full detection

• The exit tray is provided with a paper full detection system. When the exit tray full sensor is unblocked, the corresponding message will be displayed on the control panel.



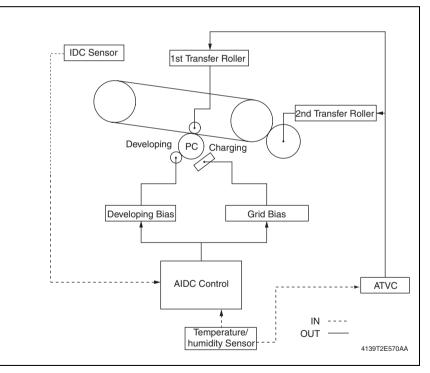
19. Image stabilization control

19.1 Overview

• To ensure that a stabilized output image is produced at all times, the following image stabilization controls are provided.

Purpose	Control	Detection
To ensure stabilized transfer output	ATVC * Described in the section dealing with the transfer section	Temperature/ humidity Sensor (TEM/HUMS)
To ensure stabilized image density; to ensure good tone reproduction	 AIDC control Leak detection control AIDC intensity control Reflectance measurement control Control of the maximum amount of toner sticking Laser intensity adjustment control γ correction control 	IDC Sensor (IDC) Temperature/ humidity Sensor (TEM/HUMS)

*An explanation is given of the control for each section.



19.2 Operation

19.2.1 Leak detection control

For the clearance between the photo conductor and developing roller, an optimum developing bias voltage is established that does not result in a leak image or uneven density.

19.2.2 AIDC Sensor LED intensity control

 The following adjustment is made to correct any changes in characteristics occurring due to change with time and contamination of the IDC Sensor: the intensity of the LED is adjusted for the surface of the transfer belt on which no toner sticks, so that the output value of the IDC Sensor becomes constant.

19.2.3 Reflectance measurement control

- The reflectance of the Image transfer belt is measured using the IDC sensor. One measurement is taken for one complete turn of the image transfer belt.
- The measured value is corrected during the laser intensity adjustment control and γ correction control.

19.2.4 Control of the maximum amount of toner sticking

 The developing bias setting value is adjusted to keep constant the amount of toner sticking to the surface of the photo conductor with reference to the 100% solid image.

19.2.5 Laser intensity adjustment control

• Characteristics of the photo conductor, developing, and charging change as affected by changes with time and in environment. The intensity of the laser light is adjusted so that fine lines and gradations of a predetermined level are reproduced at all times.

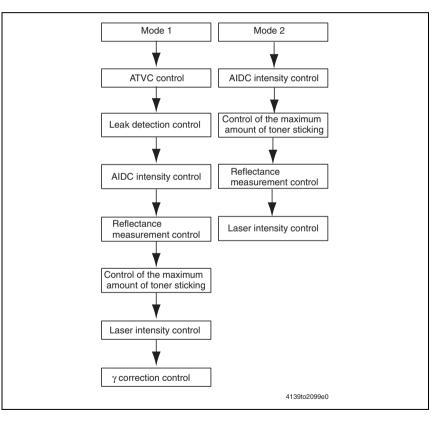
19.2.6 γ correction control

 A gradation pattern is produced on the surface of the image transfer belt. The IDC sensor measures the density of the pattern and sends the measured result to the controller for gradation adjustment. magicolor 2590MF

19.3 Operation timing

Mode	Operation timing
Mode 1	 The environment in which the power switch is turned ON is different from the environment the machine was in when the power switch was turned OFF last. The environment in which the energy saver mode is canceled is different from the environment the machine was in when it entered the energy saver mode last. The power switch is turned OFF and ON or the energy saver mode is canceled after a predetermined number of printed pages have been produced. A new drum cartridge or toner cartridge is detected.
Mode 2	• The power switch is turned OFF and ON or the energy saver mode is canceled after a predetermined number of printed pages have been produced.

19.4 Operation flow

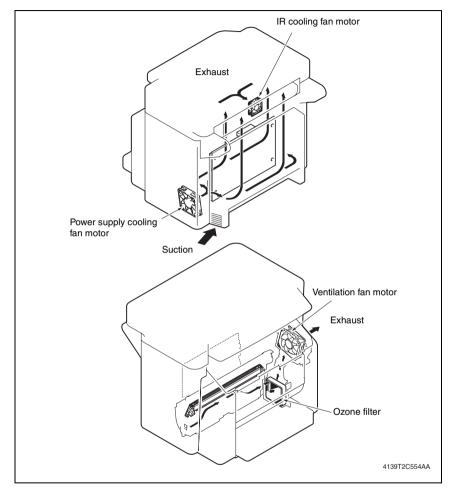


20. Other control

20. Other control

20.1 Fan control

20.1.1 Construction



20.1.2 Control

A. Power supply cooling fan motor

<Full-speed conditions>

- For the predetermined period of time after the power switch has been turned ON
- For the specified period of time up to the end of energy saver mode
- At the start of a print cycle (full-speed rotation after the lapse of a predetermined period of time of half-speed rotation). No full-speed rotation is performed if the print cycle is completed during half-speed rotation.

<Half-speed conditions>

- At the end of a print cycle (half-speed rotation after the lapse of a predetermined period of time of full-speed rotation)
- Half-speed rotation under any condition other than above

<Stop conditions>

- In energy saver mode
- The power supply cooling fan motor develops a malfunction

B. Ventilation fan motor

<Full-speed condition>

• While the main motor remains energized

<Stop conditions>

- The lapse of a predetermined period of time after the main motor has been deenergized
- Stop under any condition other than above

<Forced stop condition>

• A door is opened, a paper misfeed has occurred, or a malfunction has occurred.

C. IR cooling fan motor

<Full-speed conditions>

- For the predetermined period of time after the power switch has been turned ON
- At the start of a print cycle (full-speed rotation after the lapse of a predetermined period of time of half-speed rotation)

<Half-speed conditions>

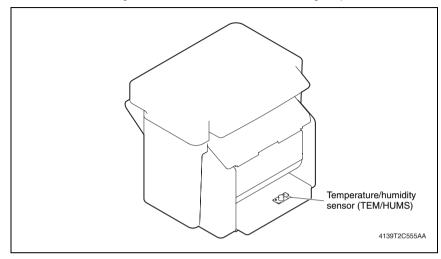
- At the end of a print cycle (half-speed rotation after the lapse of a predetermined period of time of full-speed rotation)
- Half-speed rotation under any condition other than above

20.2 Temperature/humidity sensor

20.2.1 Composition

• The temperature/humidity sensor is used to detect the temperature of the inside of the machine.

It is also used for image stabilization, transfer ATVC, and fusing temperature control.



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SERVICE MANUAL

THEORY OF OPERATION

Auto Document Feeder Unit

2007.08 KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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Outline

1. Product specifications

А. Туре

Name	Automatic document feeder
Installation	Inserted at upper-rear side of main unit
Document alignment	Center
Document loading	Face up

B. Functions

|--|

C. Paper type

Type of document	1-sided mode (plain paper): 60 g/m ² to 128 g/m ²		
	A5S, B5S, A4S, LegalS, LetterS		
Detectable document size	Width	140 to 216 mm	
0.20	Length	148 to 500 mm (500mm: Fax TX only)	
Capacity	50 sheets (80 g/m ²) or load height of 8 mm or less.		

D. Paper feed prohibited originals

• The following types of originals should not be used.

Types of document	Possible malfunctions
Original that is stapled or clipped.	Feed failure, damage to the original, or drive failure due to clip clogging
Pasted originals	Misfeed, broken original, or folded paste-up edges
Book original	Feed failure, damage to the original, or drive failure
Original weighing less than 60g/m ² or 129g/m ² or more	Feed failure
Torn original	Feed failure, damaged sheet
Highly curled original (15 mm or more)	Original misfeed due to dog-ear or skew
OHP transparencies	Feed failure
Label sheet	Feed failure
Photographic paper, gloss enamel paper, or other gloss original	Feed failure, damage to the original, or drive failure
Offset master	Feed failure
Sheets clipped or notched	Damaged sheet
Less-than-0.05-mm-thick thin paper	Misfeed
More-than-0.15-mm-thick thin paper	Misfeed

E. Paper feed not guaranteed originals

If fed, paper feed will be possible to some extent but trouble occurrence will be possible.

Type of original	Possible trouble
Sheets lightly curled (curled amount: 10 - 15 mm)	Dog-eared, exit failure
Heat sensitive paper	Edge folded, exit failure, transport failure
Translucent paper	Take-up failure, transport failure
Paper immediately after paper exit from the main unit	Take-up failure, transport failure
Paper with many punched holes (e.g., loose leaf) limited to vertical feeding	Multi-page feed due to flashes from holes
Sheets with 2 to 4 holes	Transport failure
Sheets two-folded or Z-folded	Transport failure, image deformation
Sheets folded	Image deformation, multi-page feed, take-up failure

F. Machine specifications

Power requirements	DC 24 V (supplied from the main unit)
	DC 5 V (supplied from the main unit)
Max. power consump- tion	30 W
Dimensions	518 (W) x 350.1 (D) x 90.3 (H) mm 20-1/ ₂ (W) x 13-3/ ₄ (D) x 3-1/ ₂ (H) inch
Weight	3.2kg (7 lb)

G. Operating

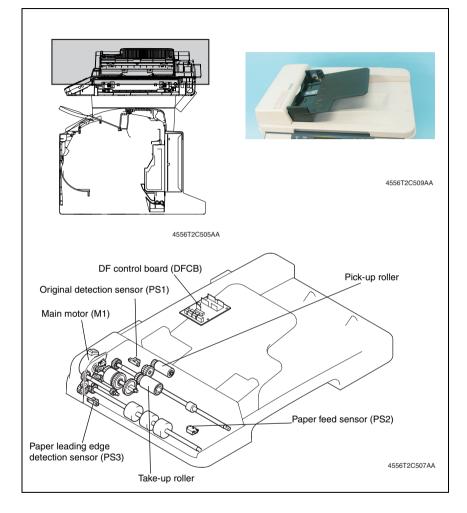
• Conforms to the operating environment of the main unit.

NOTE

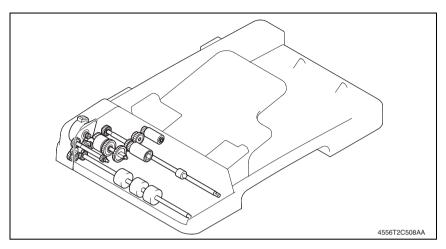
These specifications are subject to change without notice.

Composition/operation

2. Composition



3. Drive



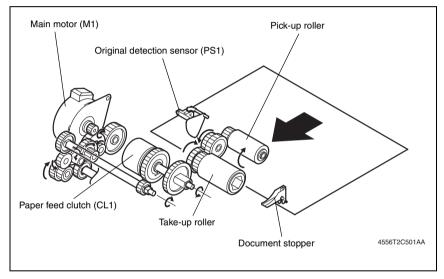
Auto Document Feeder Unit

4. Mechanical operations

4.1 Document take-up mechanism

4.1.1 Document take-up mechanism

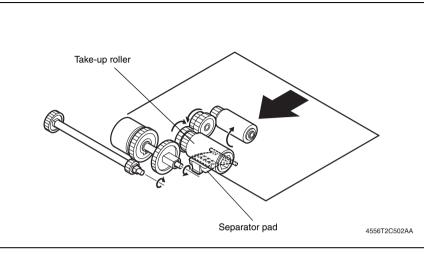
- The original detection sensor detects a document that has been properly loaded in the document feeder.
- The document stopper establishes the leading edge position of the document loaded in the document feeder. The stopper is lowered in the standby state and raised when the document is taken up and fed in.
- The document stopper is raised and lowered in synchronism with the raising and lowering motion of the pick-up roller.
- The pick-up roller and take-up roller turn to take up and feed the original properly.
- The pick-up roller transports the original up to the take-up roller.
- The main motor drives the pick-up roller and take-up roller through a gear train and the paper feed clutch.



Auto Document Feeder Unit

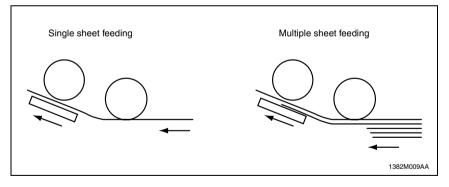
4.1.2 Document separation mechanism

• Double feeding of paper is prevented using coefficient of friction between the take-up roller and separator pad.



Single sheet feeding : The coefficient of friction on the front side of the paper fed between the takeup roller and separator pad is equal to that on the backside of the paper. This allows the take-up roller to transport the paper.

The coefficient of friction between the paper and separator pad is greater than that between sheets of paper. This allows only the first sheet of paper to be transported by the take-up roller.

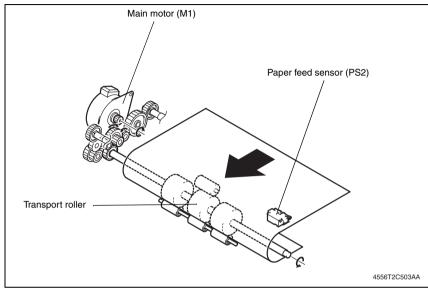


Multiple sheet feeding :

4.2 Document transport/exit mechanism

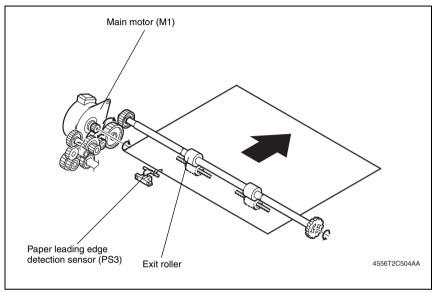
4.2.1 Document transport mechanism

- The original that has been taken up blocks the paper feed sensor. The transport roller turns to transport the original up to the document scanning position of the printer.
- The main motor drives the transport roller through a gear train.



4.2.2 Document exit mechanism

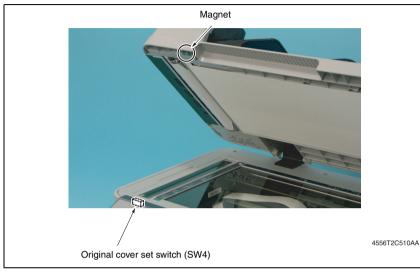
- The exit roller turns to feed the original out of the document feeder. During this sequence, the original blocks the paper leading edge detection sensor and is fed onto the document exit tray.
- The main motor turns the exit roller through a gear train.



4.3 Miscellaneous

4.3.1 Document feeder raised/lowered position detection mechanism

- There is a magnet provided in the document feeder, allowing the printer to detect the position of the document feeder whether the document feeder is raised or lowered.
- This magnet attracts the original cover set switch provided on the printer side, thus activating the sensor. The printer will then detect the position of the document feeder.



Auto Document Feeder Unit Blank Page



SERVICE MANUAL

THEORY OF OPERATION

Lower Feeder Unit

2007.08 KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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Lower feeder unit

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4.2	Paper empty detection	6
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Outline

1. Product specifications

А. Туре

Name	Add-on 500-sheet paper feed cassette
Туре	Front-loading type
Installation	Desk type
Document Alignment	Center

B. Paper type

Paper size	A4/Letter
Paper type	Plain paper: 60 to 90 g/m ² (16 to 24 lb)
Capacity	500 sheets

C. Machine specifications

Power requirements	DC 24 V \pm 10% (supplied from the main unit)
	DC 5 V \pm 5%
Max. power consumption	12 W
Dimensions	495 (W) × 581 (D) × 138 (H) mm 19.5 (W) × 22.75 (H) × 5.5 (D) inch
Weight	5.0 kg (11 lb)

D. Operating environment

Temperature	10 to 35 °C / 50 to 95 °F (with a fluctuation of 10 °C / 18 °F or less per hour)
Humidity	15% to 85% (with a fluctuation of 20%/h)

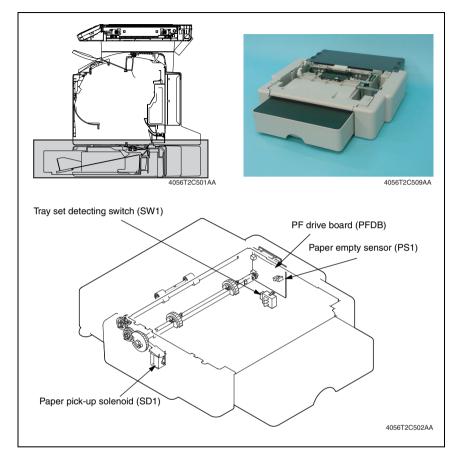
NOTE

• These specifications are subject to change without notice.

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Composition/operation

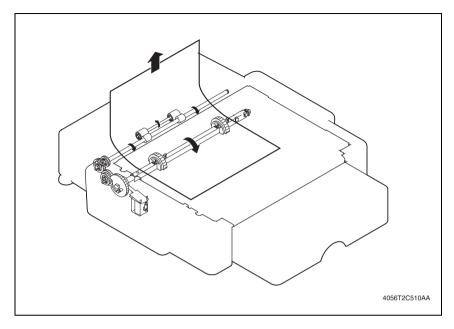
2. Composition



Lower Feeder Unit

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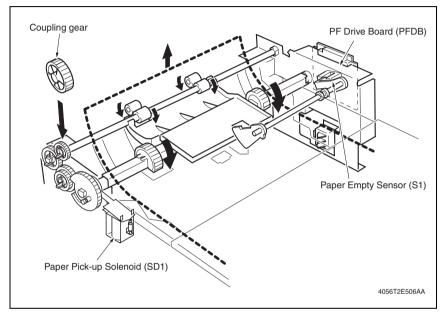
3. Drive



4. Mechanical operation

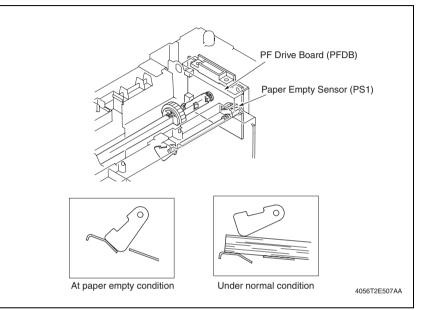
4.1 Conveyance drive mechanism

- The lower feeder unit is not provided with any drive motor. The driving force for paper feeding and conveyance (drive from main motor) is transmitted through a coupling gear from the printer.
- The paper separation mechanism uses separation claws installed in the unit and elasticity of the paper. It ensures that only one sheet of paper is fed in at time.
- The paper pick-up solenoid is controlled from the printer side through the PF drive board mounted in the lower feeder unit.



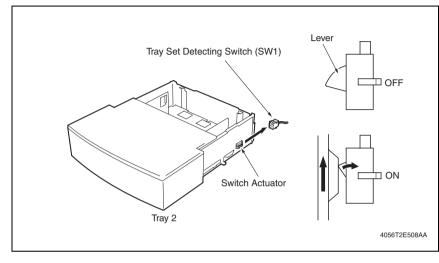
4.2 Paper empty detection

- The paper empty sensor of the PF drive board detects a paper empty condition in the lower feeder unit.
- When there is paper loaded in the lower feeder unit, the actuator is raised, which unblocks the sensor.
- When there is no paper, the actuator drops into the slit in the paper lift plate, thus blocking the sensor.



4.3 Tray set detection

- The lower feeder unit is provided with a tray set detecting switch that is attached with a segment lever.
- When tray 2 is inserted, the switch actuator on the right-hand side of tray 2 pushes the lever. This turns ON the tray set detecting switch.



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SERVICE MANUAL

THEORY OF OPERATION

Duplex Option

2007.08 KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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Outline

1. Product specifications

А. Туре

Name	Duplex option
Туре	Switchback and circulating duplex unit
Installation	Mounted on the right side door of main unit
Reversing system	Exit roller switchback
Conveyance system	Rubber roller + driven rolls
Document alignment	Center

B. Paper type

Paper size	A4/Letter/Legal
Paper type	 Plain paper: 60 to 90 g/m² (16 to 24 lb) Recycled paper: 60 to 90 g/m² (16 to 24 lb)

C. Machine specifications

Power requirements	DC 24 V \pm 10% (supplied from the main unit)
Fower requirements	DC 5 V \pm 5% (supplied from the main unit)
Max. power consumption	42 W
Dimensions	370 (W) × 153 (D) × 318 (H) mm 14- $\frac{1}{2}$ (W) × 6 (D) × 12- $\frac{3}{4}$ (H) inch
Weight	Approx. 2.4 kg (5 1/4 lb)

D. Operating environment

Temperature	10 to 35 °C / 50 to 95 °F (with a fluctuation of 10 °C / 18 °F or less per hour)
Humidity	15% to 85% (with a fluctuation of 20%/h)

NOTE

• These specifications are subject to change without notice.

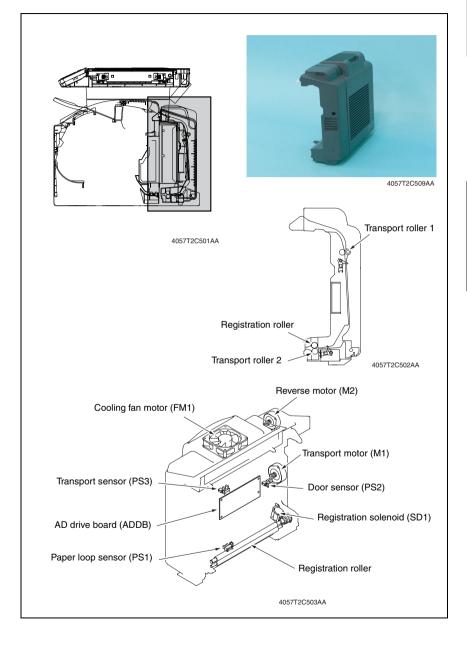
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2. Composition

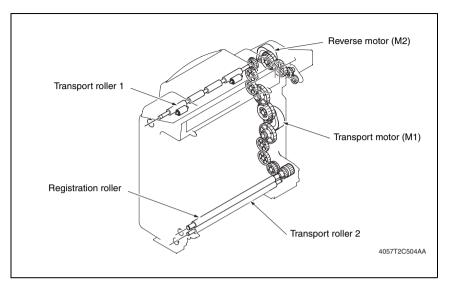
Duplex Option

Composition/Operation

2. Composition



3. Drive



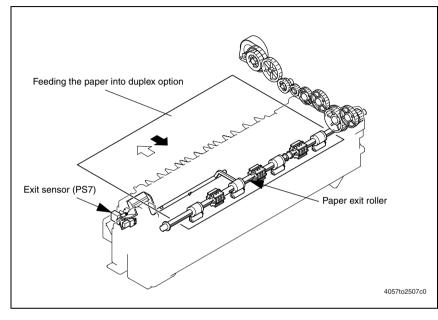
Duplex Option

4. Mechanical operations

4.1 Switchback mechanism

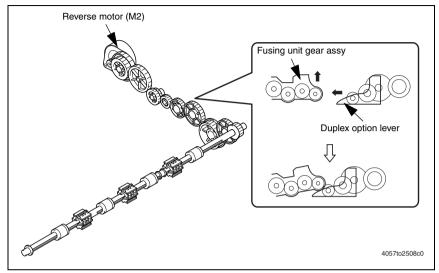
4.1.1 Switchback operation

• The paper exit roller of the main unit is used to subject the 1-sided print to a switchback sequence so that the 1-sided print is to be transported through the duplex option.



4.1.2 Paper exit roller drive coupling mechanism

• When the duplex option is mounted, the gear assy of the fusing unit is raised by the leading edge of the duplex option lever, thereby disconnecting drive from the machine (fusing roller). The paper exit roller is driven by the duplex reverse motor.



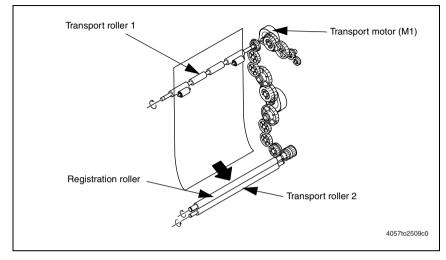
4.1.3 Switchback motor control

• Rotation of the reverse motor is controlled by the signal output from the DF control board.

4.2 Transport and duplex paper take-up mechanism

4.2.1 Transport and duplex paper take-up operation

• Drive for the duplex option is provided by the transport motor.



4.2.2 Duplex option transport motor control

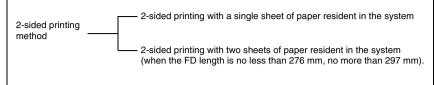
 Rotation of the transport motor is controlled by the signals output from the DF control board.

4.2.3 Duplex option loop correction control

- A loop correction mechanism is provided to prevent skew from occurring in the second page.
- The registration solenoid is energized after the lapse of a given period of time after the paper loop sensor has been activated. This drives the registration roller. When the registration roller is driven, the paper is conveyed into the machine.

4.3 2-sided printing method

• The following two types of 2-sided printing methods are available.

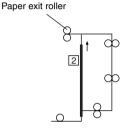


Automatic 2-sided printing is not effective when the FD length is less than 276 mm.

4.3.1 Operations in 2-sided printing with a single sheet of paper resident in the system

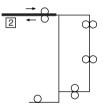
Operation 1

 The first sheet of paper is taken up and fed in from the main unit drawer and the main unit starts the first print cycle to produce the print image of the second page of the original.



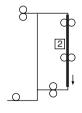
Operation 2

 Immediately before the 1-sided print leaves the paper exit roller, the direction of rotation of the paper exit roller is reversed and the 1-sided print is transported toward and into the duplex option.



Operation 3

- The paper conveyed through the duplex option is temporarily stopped at the duplex take-up position.
- Any skew in the paper is corrected at the registration roller before the paper is taken up and fed by the duplex option.



• Steps 2 through 5 are repeated.

2

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Operation 4

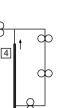
• The main unit carries out the second print cycle to produce the print image of the first page of the original on the other side of the 1-sided print.

Operation 5

 While feeding the first 2-sided print out of itself, the main unit carries out the first print cycle for the second sheet of paper to produce the print image of the fourth page of the original.

· Two A4 originals with a single sheet of paper resident in the system

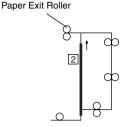
Belt Positioning Sensor (PS4) . Registration Sensor (PS1) Exit Sensor (PS7) Backward Rotation Forward Forward Rotation Rotation Duplex Reverse Motor (M2) Duolex Transport Motor (M1) **Duplex Registration Solenoid** (SD1) Duplex Paper Loop Sensor (PS1) 4057T2E507AA



432 Operations in 2-sided printing with two sheets of paper resident in the system

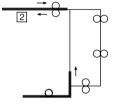
Operation 1

• The first sheet of paper is taken up and fed in from the main unit drawer and the main unit starts the first print cycle to produce the print image of the second page of the original.



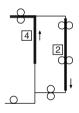
Operation 2

- · Immediately before the first 1-sided print leaves the paper exit roller, the direction of rotation of the paper exit roller is reversed and the first 1-sided print is transported toward and into the duplex option.
- At the same time, the second sheet of paper is taken up and fed into the main unit.



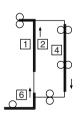
Operation 3

- The main unit carries out the first print cycle for the second sheet of paper to produce the print image of the fourth page of the original.
- At the same time, the first 1-sided print is transported through the duplex option.



Operation 4

- The main unit produces the print image of the first page of the original on the first 1-sided print that has been fed through the duplex option.
- At the same time, the second sheet of paper is subjected to a switchback sequence at the exit section and fed into the duplex option.
- At the same time, the third sheet of paper is taken up and fed into the main unit.



6

6

Duplex Option

Composition/Operation

reversed and the first 1-sided print for the third sheet is transported toward and into the duplex option.At the same time, the second sheet of paper is fed into the main unit again.

Operation 7

Operation 5

Operation 6

sheet of paper.

switchback sequence.

• The main unit carries out the first print cycle for the second sheet of paper to produce the print image of the third page of the original.

• While feeding the first 2-sided print out, main unit produces

 The second sheet of paper waits at the duplex take-up position until the third sheet of paper is subjected to a

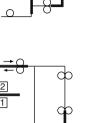
 Immediately before the first 1-sided print leaves the paper exit roller, the direction of rotation of the paper exit roller is

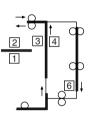
the print image of the 6th page of the original on the third

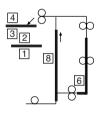
- At the same time, the first 1-sided print for the third is transported through the duplex option.
- At the same time, the forth sheet of paper is taken up and fed into the main unit.

Operation 8

- While feeding the second 2-sided print out, main unit produces the print image of the 8th page of the original on the fourth sheet of paper.
- The third sheet of paper waits at the duplex take-up position until the fourth sheet of paper is subjected to a switchback sequence.
- Steps 6 through 8 are repeated.







2-sided printing of two A4 originals with two sheets of paper resident in the system

Belt Positioning Sensor (PS4)	•	•	i.	•	i.	•	•	•	•	•	•	•	•	•	•	1
Registration Sensor (PS1)	-															
Exit Sensor (PS7)		_				_		_			_					ı
Duplex Reverse Motor (M2)		Forward Rotation	Backward Rotation	Forward Rotation			Fornia Rotatic			ockward Iotation		Backward Rotation		Forwar Rotatio		
Duolex Transport Motor (M1)			-					I		-	-				•	
Duplex Registration Solenoid (SD1)					• •	I	•					• •		••		
Duplex Paper Loop Sensor (PS1)					_	I									I	



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