Canon

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New Product Information

iR2200/2800/3300

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OIP QA Center
OIP TS Division

This document precedes the Service Manual for the product in question and serves as a reference, thereby providing the Sales Companies with a good understanding of the product in advance.

Most of the contents of this document are not official and, therefore, are subject to change before the product is brought into being, making it important to bear in mind that the descriptions are true only as of the date indicated on the cover.

Yoshiaki Takase, General Manager
OIP QA Division

(TS001102)

Introduction to New Product Information

The document “New Product Information” replaces the Trainer’s Manual (TR) most of you are familiar with, and is the result of our efforts to provide information useful to all departments concerned in each Sales Company.

Most of the contents of this document are not official and, therefore, are subject to change before the product is brought into being, making it important to bear in mind that the descriptions are true only as of the date indicated on the cover.

The Service Manual for the product will have descriptions updated to reflect the changes that may have occurred. Kindly make arrangements so that this document is properly disposed of as soon as the Service Manual is released.

January,25, 2001
Canon Inc.
OIP QA Center
OIP QA Division

CHAPTER 1

GENERAL DESCRIPTION

1 Specifications

1.1 Main Body

1.1.1 Type

Item	Description
Body	Desktop
Copyboard	Fixed
Light source	Xenon lamp
Lens	Lens array
Photosensitive medium	OPC drum (30-mm dia.)

T01-101-01

1.1.2 Systems

Item		Description
Reproduction		Indirect electrostatic
Charging		AC roller
Exposure		Laser
Copy density adjustment		Auto or manual
Development		Single-component toner projection
Pickup	Auto	Front cassette (2 cassettes)
		Retard method (about 500 sheets of 80 g/m^2 paper, about 550 sheets of 64 g/m^2 paper)
	Manual	Multifeeder
		Dual process method (about 50 sheets of 80 g/m^2 paper)
Transfer		Roller
Separation		Static eliminator (static separation) + curvature
Cleaning		Blade
Fixing		SURF method (plane heater and fixing film)

T01-101-02

1.1.3 Functions

Item			Description
Resolution	Reading		600dpi×600dpi
	Copying		1200dpi×600dpi
	Printer output		2400dpi×600dpi
Original type			Sheet, book 3-D object (2 kg max.)
Maximum original size			A3/279.4×431.8mm (11"×17")
Reproduction ratio			Direct (1:1), Reduce I (1:0.250), Reduce II (1:0.500), Reduce III (1:0.611), Reduce IV (1:0.707), Reduce III (1:1.414), Enlarge IV (1:2.000), Enlarge V (1:4.000), Enlarge VI (1:8.000), Zoom (1:0.250 to 8.000 in 1% increments)
Wait time			10 sec or less (at 20°C)
First copy time			5.4 sec (book mode, cassette 1, Direct, A4/LTR, text mode)
Continuous copying			999 copies max.
Copy size			
	Cassette	A/B	A3 max., A5 (vertical feed) min.
		Inch	279.4×431.8 mm (11"×17") max., STMT (vertical feed) min.
	Manual feed	AB	A3 max., postcard (vertical feed) min.
		Inch	279.4×431.8 mm (11"×17") max., STMT (vertical feed) min.
Cassette 1/2			• Plain paper (64 to 80 g/m^2):A3, B4, A4, B5, A5R, A4R, B5R, 279.4×431.8mm (11"×17"), LGL, LTR, LTRR, STMT, STMTR • Tracing paper (SM-1):A3, B4, A4, B5, A4R, B5R • Colored paper (Canon-recommended):B4, A4, A4R
Multifeeder			• Plain paper (64 to 80 g/m^2):A3, B4, A4, B5, A5R, A4R, B5R, 279.4×431.8mm (11"×17"), LGL, LTR, LTRR, STMT, STMTR • Tracing paper (SM-1, GSN-75):A3, B4, A4, B5, A4R, B5R • Transparency (Canon-recommended):A4, A4R, LTR, LTRR • Colored paper (Canon-recommended):B4, A4, A4R • Postcard: Jpn (vertical feed), double-card, 4-sheet card • Label sheet (Canon-recommended):B4, A4, A4R, LTR, LTRR • Thick paper (90 to 128 g/m^2):A3, B4, A4, B5, A4R, B5R, LTR, LTRR • Envelope

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Item	Description
Single-sided copying mode	• Plain paper (64 to 80 g/m²):A3, B4, A4, B5, A5R, A4R, B5R, 279.4×431.5mm (11"×17"), LGL, LTR, LTRR, STMT, STMTR • Tracing paper (SM-1, GSN-75):A3, B4, A4, B5, A4R, B5R • Transparency (Canon-recommended)A4, A4R, LTR, LTRR • Colored paper (Canon-recommended):B4, A4, A4R • Postcard: Jpn postcard (vertical feed), double-card, 4-sheet card • Label sheet (Canon-recommended):B4, A4, A4R, LTR, LTRR • Thick paper (90 to 128 g/m²):A3, B4, A4, B5, A4R, B5R, LTR, LTRR • Envelope
Double-sided copying mode (automatic)	• Plain paper (64 to 80 g/m²):A3, B4, A4, B5, A5R, A4R, B5R, 279.4×431.8mm (11"×17"), LGL, LTR, LTRR, STMT, STMTR • Colored paper (Canon-recommended):B4, A4, A4R • Thick paper (90 to 128 g/m²):A3, B4, A4, B5, A4R, B5R, LTR, LTRR
Double-sided copying mode (multifeeder)	• Plain paper (64 to 80 g/m²):A3, B4, A4, B5, A5R, A4R, B5R, 279.4×431.8mm (11"×17"), LGL, LTR, LTRR, STMT, STMTR • Colored paper (Canon-recommended):B4, A4, A4R • Postcard: Jpn (vertical feed), double-card, 4-sheet card • Thick paper (90 to 128 g/m²):A3, B4, A4, B5, A4R, B5R, LTR, LTRR

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Item		Description
Cassette	Claw	None
	Capacity	55 mm deep (approx.; about 500 sheets of 80 g/m^2 paper)
Hard disk		6.4GB (*1)
Non-image width	Leading edge	Direct, Enlarge/Reduce:4.0±1.5/-1.0mm <4.5±1.8mm>*2
	Trailing edge	Direct, Enlarge/Reduce:2.0±1.5mm <2.0±1.8mm>*2
	Left/right (1st side)	Direct, Enlarge/Reduce:2.5±1.5mm <2.5±2.0mm>*2
Auto clear		Yes (2 min standard; may be changed in 1-min increments between 0 and 9 min)
Auto power-off		Yes
Low-power mode		Yes (15 min standard; may be changed in user mode to 10, 15, 20, 30, 40, 50, 60, 90 min, 2, 3, or 4 hr)
Sleep mode		Yes (60 min standard; may be changed in user mode to 10, 15, 20, 30, 40, 50, 60, 90 min, 2, 3, or 4 hr)
		Yes (-10% standard; may be changed in user mode to -10%, -25%, -50%, or no return (0%))
Accessory		• DADF-H1 • Copyboard Cover Type-E • Copyboard-D1 • Copy Tray-F1 • Saddle Finisher-G1 • Puncher Unit-G1 • Finisher-J1 • Inner 2-Way Tray-A1 • Side Paper Deck-L1 • 2-cassette Pedestal-W1 • Options Power Supply-B1 (required for SF, PD) • Cassette Heater Kit-16N • Control Card-IV • Network LIPS Printer Kit-A1 (100V model only) • Network Multi-PDL Printer Kit-A1 (120/230V model only)

*1:The HDD that comes with the machine and the HDD that is made available as a service part may have different memory sizes; however, the area of the HDD used by the machine will be the same, and either may be used without a problem.

*2:The values within parentheses indicate when the DADF is used.

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The above specifications are subject to change for product improvement.

1.1.4 Others

Item		Description
Operating environment	Temperature range	15° to 30°C
	Humidity range	5 to 80%
	Atmospheric pressure	810.6 to 1013.3 hpa (0.8 to 1.0 atm)
Power supply		E201
		LQHxxxxx
100V (50/60Hz)		LQJxxxxx
		NRFxxxxx
120V (50/60Hz)		NRGxxxxx
		PKMxxxxx
220V/60Hz		PKKxxxxx
230V (50/60Hz)		PKLxxxxx
		QCWxxxxx
		RBZxxxxx
		SCKxxxxx
		TBZxxxxx
		UFMxxxxx
Power consumption	Maximum	E201: 1.5 kW or less
	Standby	E201: 282 W (approx.; reference only)
	Continuous	E201: 995 W (approx.; reference only)
Noise		Sound power level (Impulse mode)
	Copying	E201: 66 dB or less, E202: 71 dB or less
	Standby	E201: 40 dB or less, E202: 50 dB or less
Ozone		0.01 ppm or less avg., 0.02 ppm or less max.
Dimensions (mm)	(iP-Lite)	565 (W) × 678 (D) × 1020 (H)
	(iP-Std)	565 (W) × 678 (D) × 1040 (H)
Weight		80 kg (approx.)
Consumables	Copy paper	Keep wrapped to protect against humidity.
Toner		Keep away from direct sunshine, and keep at 40°C/85% or less.

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Reproduction mode	Side	Paper size	copies /min (1-to-N)	
			E201	E202
Direct	A3 (297×420mm)	A3	-	16
	A4 (210×297mm)	A5	-	-
	A5 (149×210mm)	A4	22	33
	B4 (257×364mm)	B4	-	14
	B5 (182×257mm)	B5	-	28
	A4R (297×210mm)	A4R	-	-
	B5R (257×182mm)	B5R	-	-
	A5R (210×149mm)	A5R	-	-
Reduce II				
(50.0%)	A3 → A5R	A5R	-	-
III				
(61.1%)	A3 → B5R	B5R	-	-
IV				
(70.7%)	B4 → B5R	B5R	-	-
V	A3 → A4R	A4R	-	-
(81.6%)	B4 → A4R	A4R	-	-
VI	B5R → A5R	A5R	-	-
(86.5%)	A4 → B5	B5	-	-
	A3 → B4	B4	-	-
Enlarge IV				
(200.0%)	A5R → A3	A3	-	-
III				
(141.4%)	A4R → A3	A3	-	-
II	B5R → B4	B4	-	-
(122.4%)	A4R → B4	B4	-	-
I	A5 → B5	B5	-	-
(115.4%)	B4 → A3	A3	-	-
	B5 → A4	A4	-	-

Delivery by copier, Auto paper select ON, Auto density, Non-sort, Deck/Cassette

T01-101-07 Copying Speeds (copier only)

Reproduction mode	Size		(1toN) E201	E202
Direct	279.4×431.8mm (11"×17")	279.4×431.8mm (11"×17")	-	16
	LTR	LTR	22	33
	LGL	LGL	-	14
	LTRR	LTRR	-	-
	STMTR	STMTR	-	-
Reduce II (50.0%)	279.4×431.8mm (11"×17") → STMTR	STMTR	-	-
III (64.7%)	279.4×431.8mm (11"×17") → LTRR	LTRR	-	-
IV (73.3%)	279.4×431.8mm (11"×17") → LGL	LGL	-	-
V (78.6%)	LGL → LTRR	LTRR	-	-
Enlarge IV (200.0%)	STMTR* → 279.4×431.8mm (11"×17")	279.4×431.8mm (11"×17")	-	-
III (129.4%)	LTRR → 279.4×431.8mm (11"×17")	279.4×431.8mm (11"×17")	-	-
II (121.4%)	LGL → 279.4×431.8mm (11"×17")	279.4×431.8mm (11"×17")	-	-
	Paper size	copies/min		

*STMTR cannot be used as an original.
Delivery by copier, Auto paper select ON, Auto density, Non-sort, Deck/Cassette

T01-101-08 Copying Speeds (copier only)

The above specifications are subject to change for product improvement.

1.2 Side Paper Deck-L1

Item	Description
Pickup method	Retard
Paper accommodation	Front loading
Paper type (horizontal feed only)	Plain paper (65 to 80 g/m^2): A4, B5, LTR Colored paper (Canon-recommended): A4
Capacity	2,500 sheets (approx.; 80 g/m^2 paper)
Serial number	A4 type:XCQxxxxx LTR type: XCRxxxxx
Paper size switch	By size guide plate/in service mode
Dimensions	324 (W) × 591 (D) × 432 (H) mm
Weight	30 kg (approx.)
Power supply	None (DC power supplied by accessories power supply of host machine)
Operating conditions	Same as host machine

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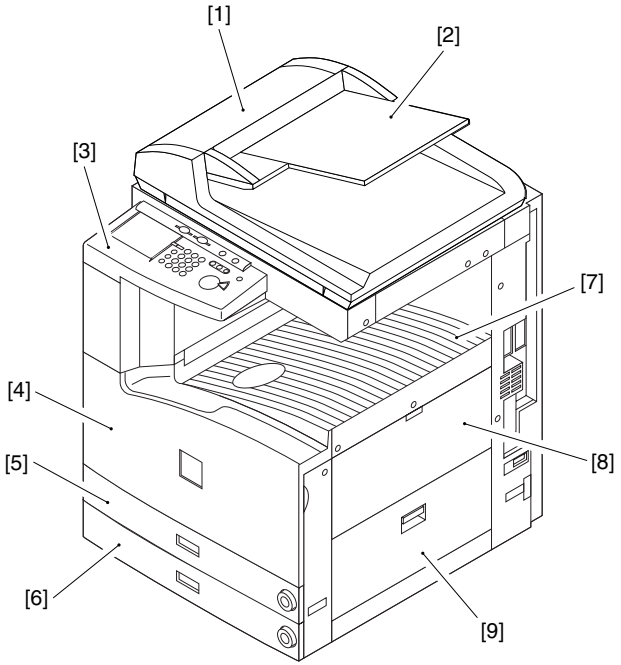
The above specifications are subject to change for product improvement.

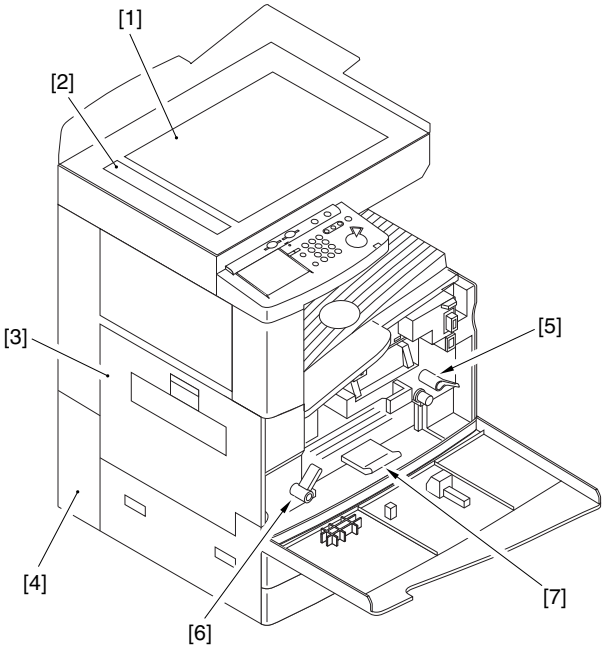
2 Names of Parts

2.1 External View



[1] ADF
[2] Original tray
[3] Control panel
[4] Front cover
[5] Cassette 1
[6] Cassette 2
[7] Delivery tray
[8] Multifeeder
[9] Right lower cover
[10] DIMM ROM replacement cover
[11] Network card slot
[12] Parallel connector
[13] Extension board slot
[14] Main power switch
[15] Cassette heater switch

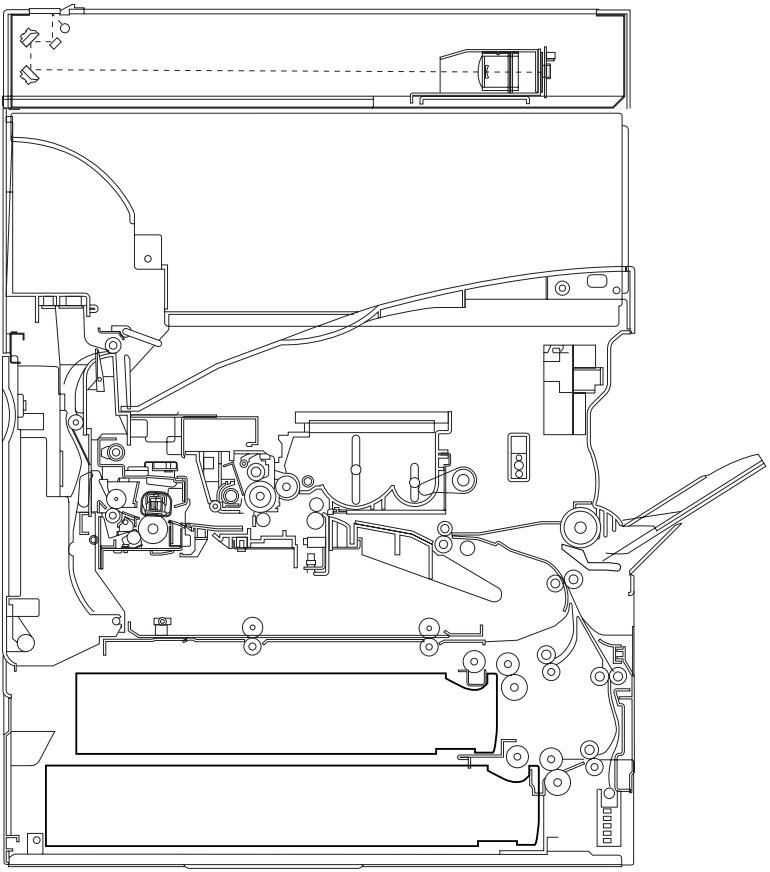
F01-201-01 External View 1



[1] Copyboard glass
[2] DADF reading glass
[3] Left cover
[4] Left lower rear cover (waste toner case cover)
[5] Developing assembly releasing lever
[6] Feeding assembly releasing lever
[7] Duplex feeding assembly releasing lever

F01-201-02 External View 2

2.2 Cross Section



F01-202-01 Cross Section

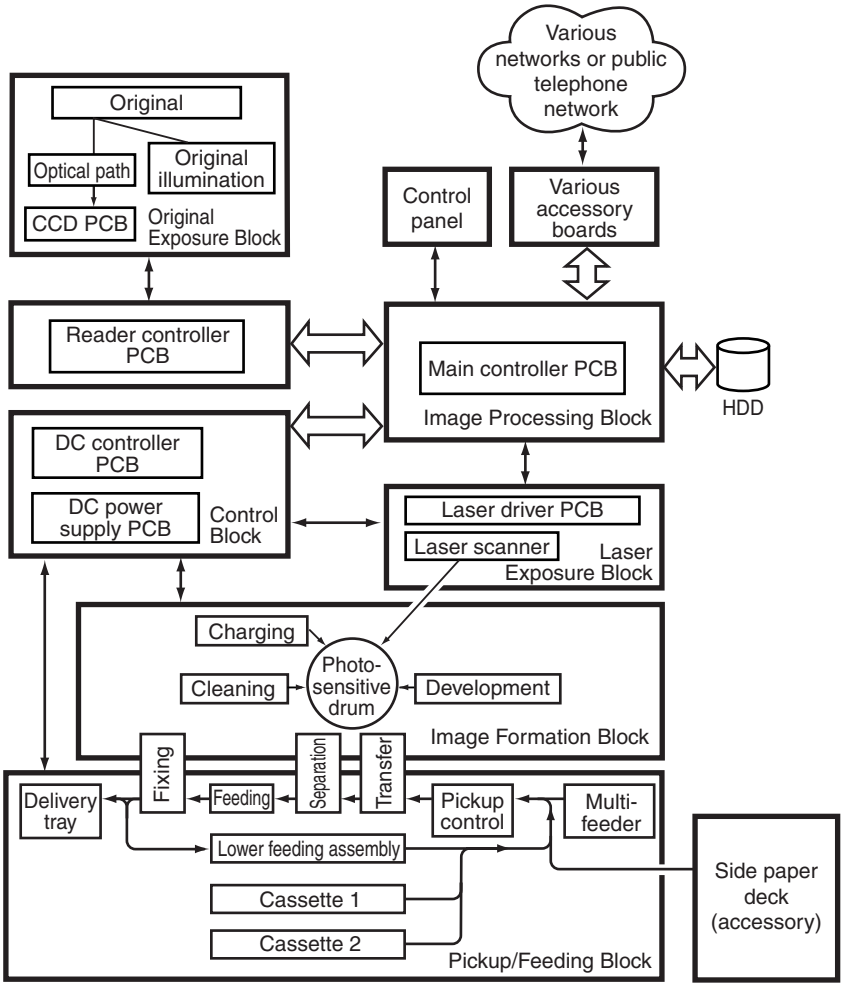
[1] DADF reading glass
[2] No. 1 mirror
[3] Scanning lamp
[4] Copyboard glass
[5] Fixing assembly
[6] Feeding assembly
[7] Laser mirror 3
[8] Laser mirror 2
[9] Laser mirror 1
[10] Drum cleaner assembly
[11] Primary charging assembly
[12] Photosensitive drum
[13] Laser mirror 4
[14] CCD unit
[15] Laser unit
[16] Dust-proofing glass
[17] Developing cylinder
[18] Pre-transfer charging assembly
[19] Multifeeder pickup roller
[20] Multifeeder separation roller
[21] Registration roller
[22] Transfer roller
[23] Static eliminator
[24] Cassette 1 pickup roller
[25] Cassette 1 feeding roller
[26] Cassette 1 separation roller
[27] Cassette 2 pickup roller
[28] Cassette 2 feeding roller
[29] Cassette 2 separation roller
[30] Cassette 1
[31] Cassette 2
[32] Lower fixing roller
[33] Inside delivery roller
[34] Outside delivery roller
[35] Upper fixing roller
[36] No. 3 mirror
[37] No. 2 mirror

T01-202-01

3. System Configuration

3.1 Functional Construction

The machine may be broadly divided into the following six functional blocks:



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3.2 Outline of the Electrical Circuitry

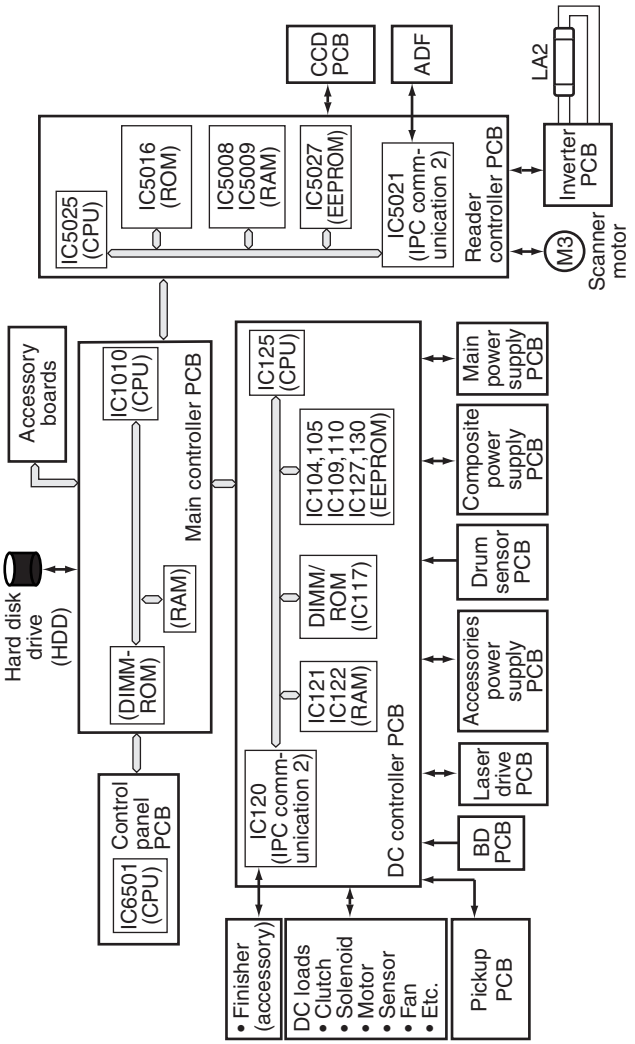
3.2.1 Construction of the Electrical Circuit

The major electrical mechanisms of the machine are controlled by the following PCBs:

[1] Man controller PCB; controls the system as a whole, processes images

[2] DC controller PCB; controls the printer unit, controls the finisher communication

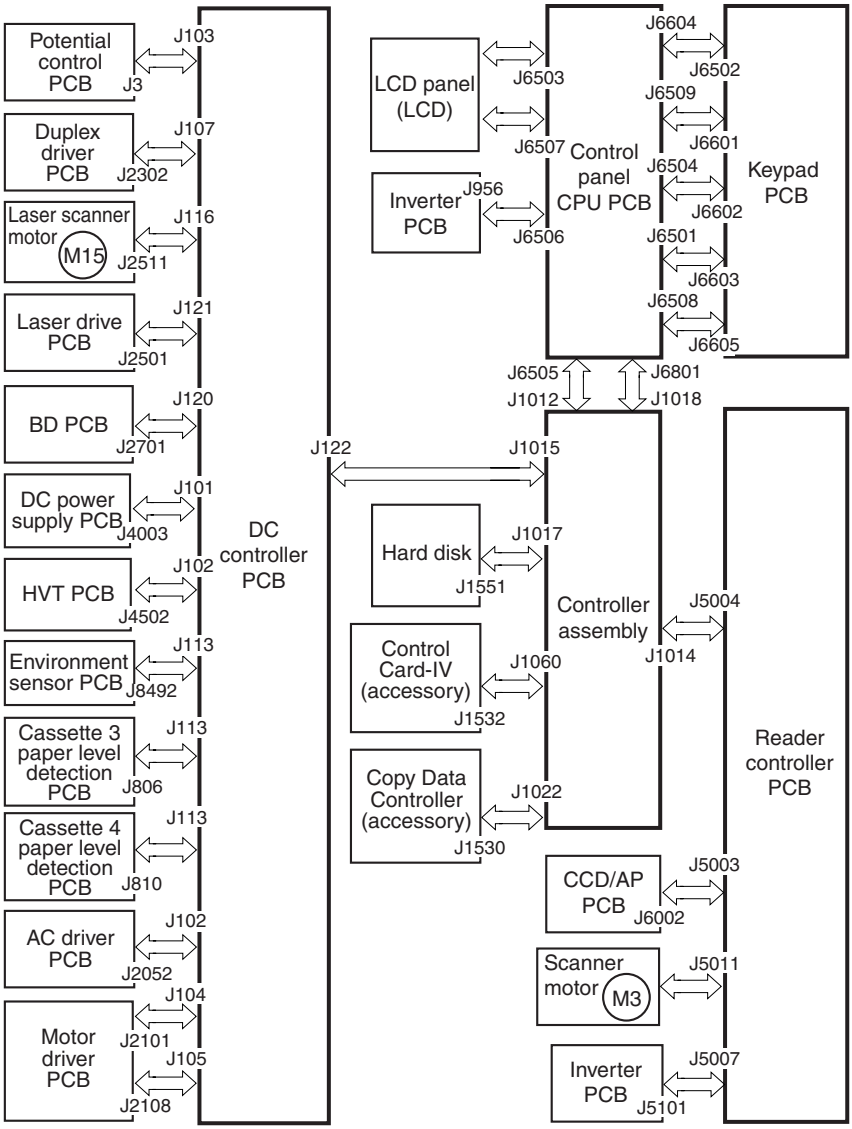
[3] Reader controller PCB; controls the reader unit, controls the DADF communication



F01-302-01

3.3 Inputs to and Outputs from the Major PCBs

3.3.1 Wiring Diagram of the Major PCBs

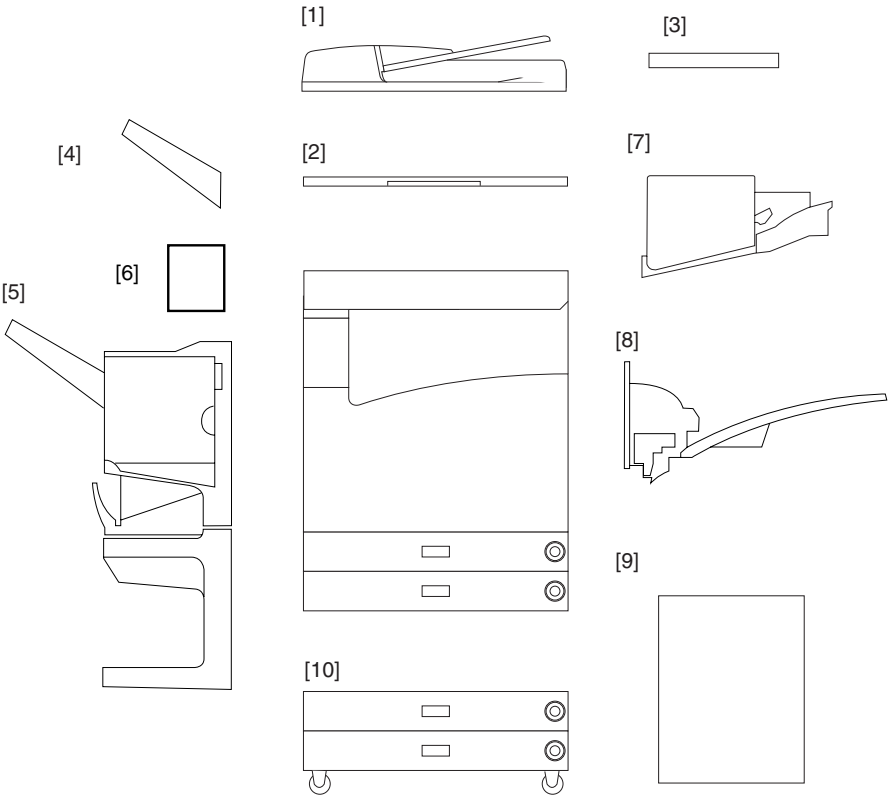


Note: The ⟺ in the diagram indicates connection between PCBs, NOT the flow of signals.

F01-303-01

3.4 Configuration with Accessories

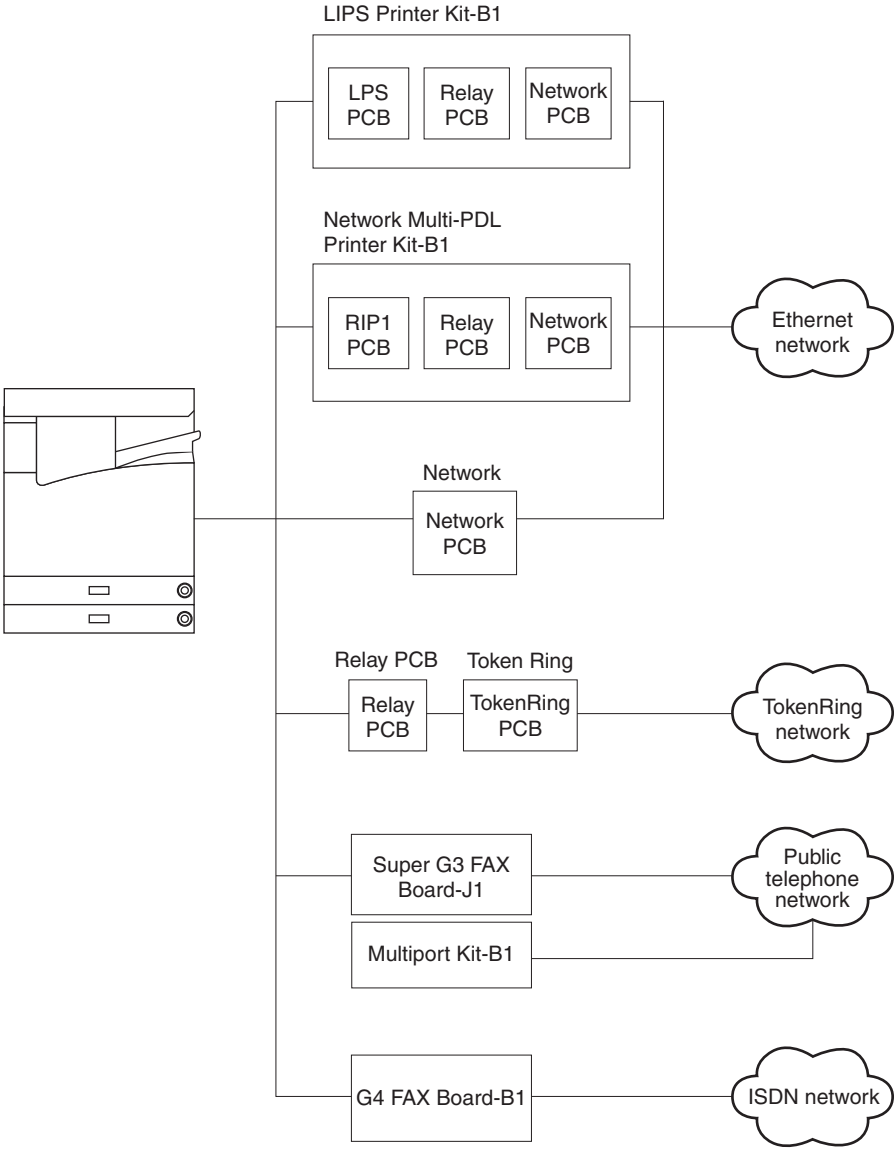
3.4.1 Accessories for Original/Paper Feeding



[1] DADF-H1
[2] Copyboard Cover Type-E
[3] Copyboard-D1
[4] Copy Tray-F1
[5] Saddle Finisher-G1
[6] Puncher Unit-E1
[7] Finisher-J1
[8] Inner 2-Way Tray-A1
[9] Side Paper Deck-L1
[10] 2-Cassette Pedestal-W1
[11] Options Power supply-N1
(required when [5] or [9] is used)

F01-304-01

3.4.2 Accessory Boards



F01-304-02

CHAPTER 2

ORIGINAL EXPOSURE SYSTEM

1. Outline of Operations

1.1 Outline

The original exposure system has the following major functions:

Item	Description
Original illumination	Xenon tube
Original scanning	In Book mode: by moving scanner With ADF in use: by fixed No. 1 mirror base at stream reading position
scanner position detection	Scanner HP sensor (PS400)
Reproduction ratio (zoom)	[1] Copyboard Mode (25% to 800%) Main scanning direction: image processing by controller assembly Sub scanning direction: for a ratio of 50% or higher, changing scanning speed of No. 1 mirror; for a ratio of lower than 50% and 400% or higher, chaining scanning speed and image processing [2] ADF Mode (25% to 400%) Main scanning direction: image processing by controller assembly Sub scanning direction: for a ratio of 50% or higher, changing original feeding speed; for a ratio of lower than 50% and 200% or higher,
Scanner drive control	No. 1/No. 2 mirror base: control by stepping motor (M400)
Lens	Lens array, fixed type
Scanning lamp control	[1] Control of activation by inverter circuit [2] Control for error detection
Original size detection	[1] In Book Mode Sub scanning direction: by reflection type sensor Main scanning direction: by CCD [2] With ADF in Use By ADF

1.2 Changing the Reproduction Ratio (Zoom)

[1] In Copyboard Mode
If for a reproduction ratio of 25% to 800%, the speed of the scanner is changed.

[2] With ADF in Use
If for a reproduction ratio of 25% to 400%, the speed of the movement of the original is changed.

1.2.1 Changing the Reproduction Ratio in Main Scanning Direction

For scanning direction, reading is always at 100% in both copyboard and ADF modes; the ratio is changed in the course of data processing in the main controller assembly.

To reduce, data units are skipped.

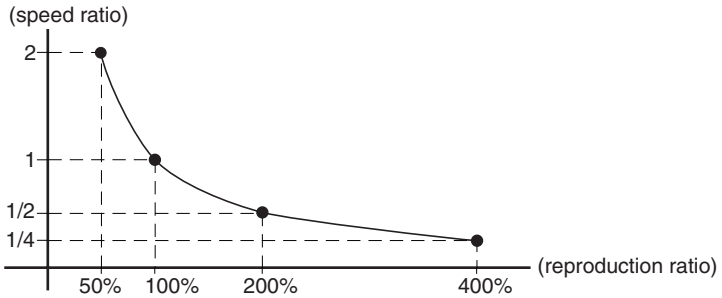
To enlarge, data units are repeated.

1.2.2 Changing the Reproduction Ratio in Sub Scanning Direction

For sub scanning direction, the speed of the scanner/movement of the original is changed. However, for a reduction between 25% and 49% and enlargement between 401% and 800%, data processing in the main controller assembly is also used in combination.

[1] For enlargement, the speed of the mirror/original is reduced from that used in Direct: e.g., at 200%, the speed is 1/2 of the speed used in Direct.

[2] For reduction between 50% and 99%, the speed of the mirror/original is increased; e.g., at 50%, the speed is twice as high as that used in Direct.



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[3] For a reduction between 25% and 49%, image data read at 50% to 98% is subjected to skipping (1/2) in the main controller assembly.

[4] For an enlargement between 401% and 800%, image data read at 200% to 400% is subjected to repeating (doubling) in the main controller assembly.

CHAPTER 3

LASER EXPOSURE SYSTEM

1 Outline of Operations

1.1 Outline

Part 2>Chapter 4>1.1 “Outline of Laser Exposure”

The reader controller PCB serves to read image signals from the CCD and send image signals to the main controller assembly. The video signals from the main controller assembly are converted by the DC controller PCB into laser drive signals, and are turned into laser intensity signals to suit signal levels by the laser driver PCB.

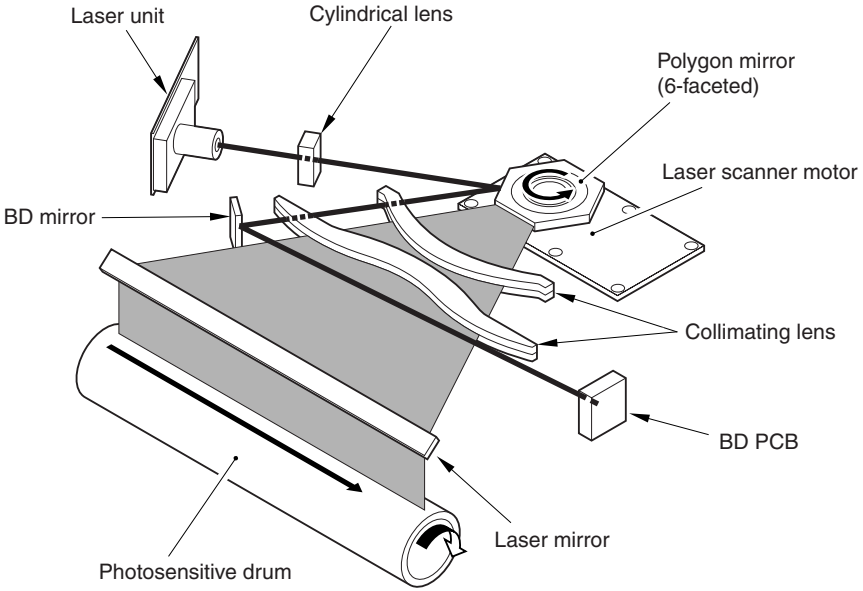
The laser intensity signals are used to cause the laser unit to generate a laser beam, which is directed to the photosensitive drum for the formation of latent static images.

The laser beam is also used for blank exposure to create non-image areas.

Item	Description
Laser intensity control	Laser power auto control (APC control)
Laser scanning	By semiconductor laser
Synchronization control	Main scanning direction: control by BD signal
	Sub scanning direction: control by image leading edge signal
Laser scanner motor control	Constant speed rotation control

T03-101-01

F03-101-01 shows the major components for the laser exposure system; the machine's laser scanning is performed by means of a 6-facet polygon mirror and a single-beam laser unit:

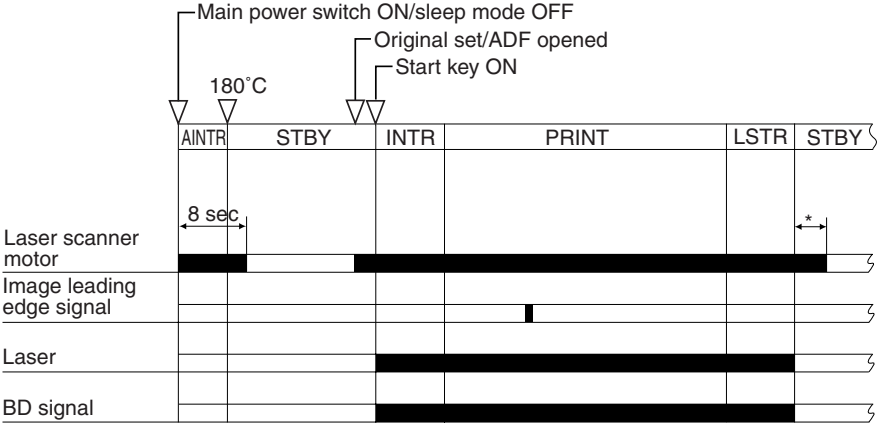


F03-101-01 External View

Component	Description
Laser semiconductor	Visible laser light (about 6760 nm), single-beam
Laser scanner motor (M10)	DC brush-less motor, constant speed control
Polygon mirror	6-faceted
BD mirror/BD PCB	Laser beam detection
Laser driver PCB	Laser activation control
DC controller PCB	Laser scanner motor rotation control

T03-101-02 List of Components

1.2 Sequence of Operations (laser exposure system)



*: If silent mode (in user mode) is selected, the motor stops after a specific period of time.

F03-102-01 Basic Sequence of Operations

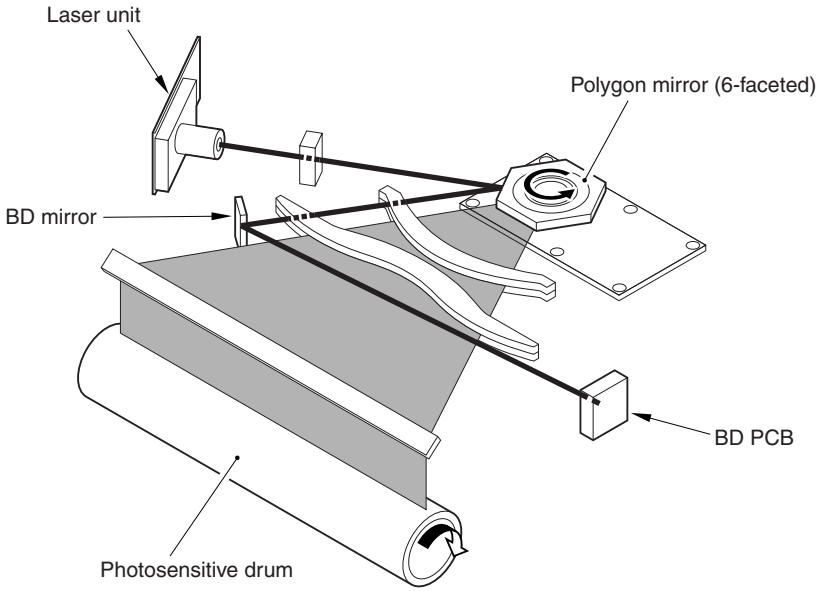
2 Generating Sync Signals

2.1 Outline

Part 2>Chapter 4>2 “Generating BD Signals”

The BD signal used to synchronize the video signals in laser scanning direction is generated by the BD PCB with reference to the laser beam reflected by the BD mirror mounted in the path of the laser beam.

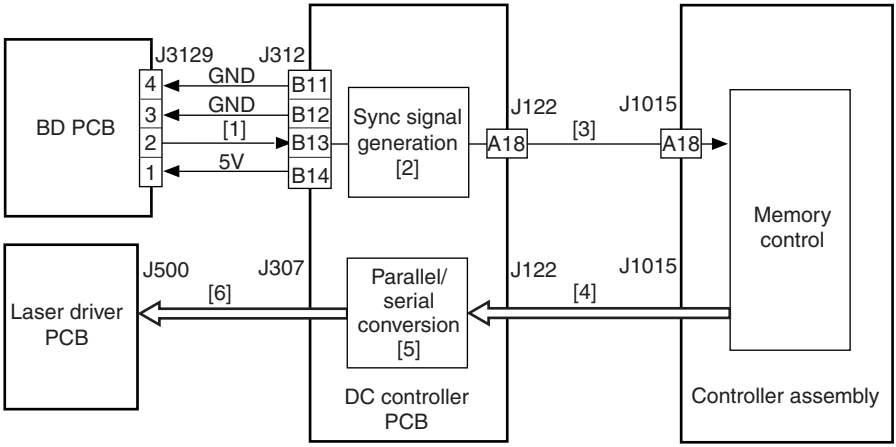
The edge of paper re-picked in double-sided mode is detected by the horizontal registration sensor to measure the displacement to the rear/front. Based on the measurement, the timing of laser activation is changed with reference to the BD signal so that the image will be placed at a specific position on the paper without fail.



F03-201-01 Construction of the Control System

2.2 Flow of Sync signals

[1] The BD signal goes '0' when laser light is detected.
[2] The phase is matched with the phase of the printer, and a sync signal is generated.
[3] Based on the printer sync signal, image data is read from the image memory.
[4] Video signal
[5] The 2-pixel parallel signal is converted into a single-pixel serial signal.
[6] The laser drive signal is used to drive the laser unit to suit the video signal.



F03-202-01 Flow of Signals

Error

E100
Indicates that the BD signal cannot be detected within a specific period of time after the laser has been turned on.

3 Laser Driver Circuit

3.1 Controlling the Laser Unit

The laser driver circuit is used to drive the semiconductor laser according to the laser drive signal from the DC controller PCB.

The laser driver circuit performs the following:

1. Turning on/off the laser.
2. Controlling the light intensity of the laser (APC control).

The signals have the following meanings and functions:

[1] Laser drive signal; used to drive the semiconductor laser.

[2] Sample laser activation signal; used to turn on the laser for intensity sampling (the result is used for activation for imaging).

[3] Laser enable signal; goes '0' when the laser is ready after the Start key is pressed.

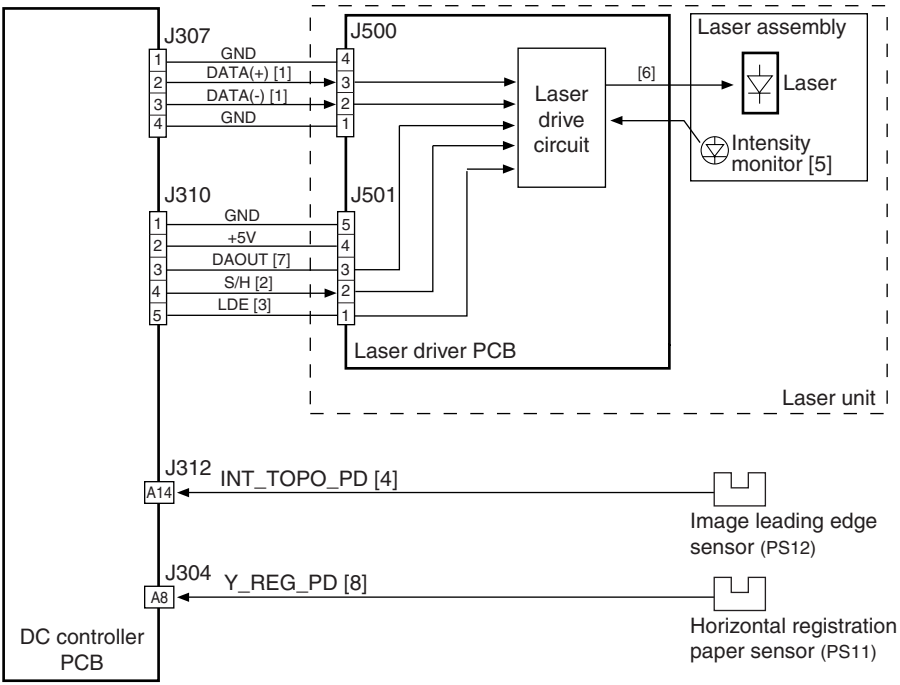
[4] Image leading edge signal; used to start laser writing when paper reaches the image leading edge sensor (PSS12) mounted in front of the photosensitive drum.

[5] Used to monitor the laser intensity when the laser is turned on for sampling, and feeds back the level appropriate to the intensity to the laser driver circuit.

[6] Used to control the output so that the feedback level and the reference level from the DC controller will be identical.

[7] Laser intensity reference signal; used as the laser activation reference level determined by the DC controller.

[8] Horizontal registration paper detection signal; used to adjust the image position by changing the timing of laser activation with reference to the result of detection of the edge of paper re-picked in double-sided mode by the horizontal registration sensor (PS11).



F03-301-01

REF.

1. The laser power of the laser unit is adjusted when the unit is shipped out of the factory.

DISPLAY>DPOT>LLMT-P
Use it to indicate the laser power voltage control for printer (PDL) images.
DISPLAY>DPOT>LLMT
Use it to indicate the laser power voltage control for the copier.
DISPLAY>DPOT>LPOWER-P
Use it to indicate the result of potential control for the laser intensity during output of printer (PDL) images.
DISPLAY>DPOT>LPOWER-C
Use it to indicate the result of potential control for laser intensity during output of copier images.
ADJUST>LASER>PVE-OFST
Use it to adjust the position of laser illumination.
ADJUST>LASER>LA-OFF
Use it to adjust the timing of laser trailing edge de-activation for non-default size papers.

4 Controlling the Laser Scanner Motor

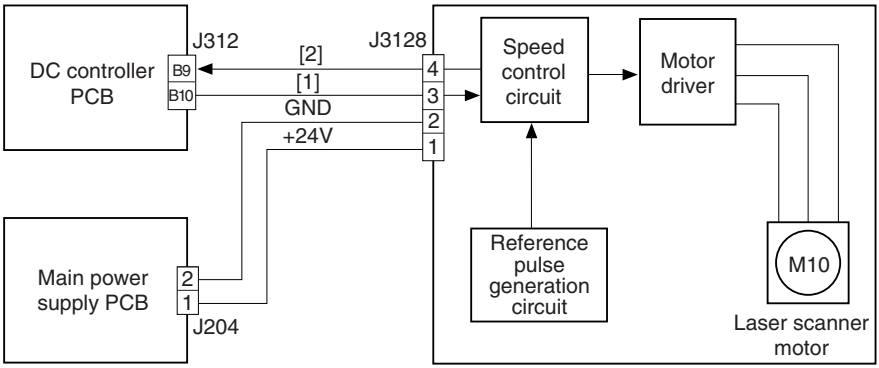
4.1 Outline

Part 2> Chapter 4> 4.1 “Outline”

The following items are related to laser scanner motor control:

[1] Laser scanner motor drive signal; when ‘1’, the laser scanner motor goes ON (turning on/off the motor).

[2] Laser scanner motor ready signal; when ‘0’, the laser scanner motor rotates at a specific speed (constant speed rotation control).



F03-401-01 Functional Block Diagram

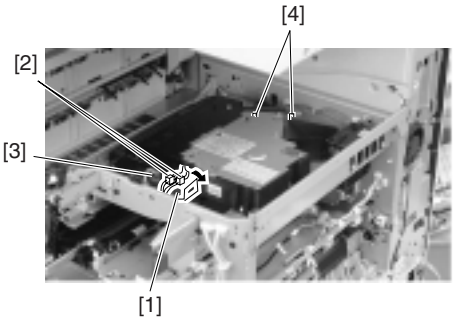
Error

E110
Indicates the presence of an error in the laser scanner motor.

5.1 Laser Scanner Assembly

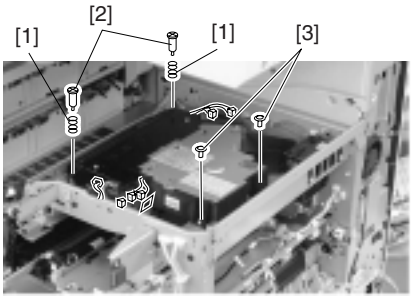
5.1.1 Removing the Laser Unit

1) Remove the delivery tray. (See p. ?.)
2) Open the harness guide [1], and disconnect the two connectors [2].
3) Disconnect the connector [3] of the BD PCB, and disconnect the two connectors [4] of the laser PCB.



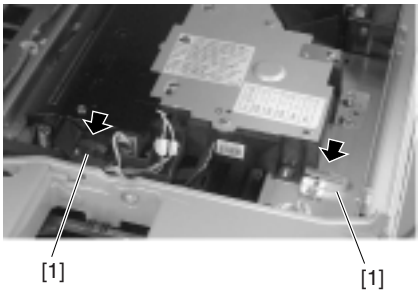
F03-501-01

4) Remove the two springs [1] and the two stepped screws [2] on the left side, and remove the two screws [3] (w/washer) on the right; then, detach the laser unit.



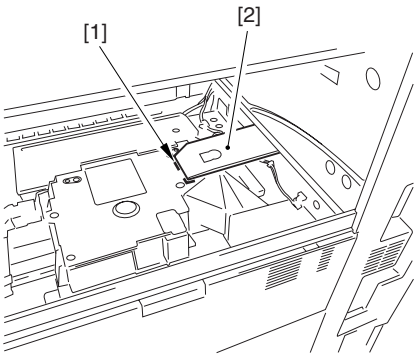
F03-501-02

When mounting, be sure to do so while butting it against the two leaf springs [1] at the front.



F03-501-03

When installing the Finisher-J1 (Chapter 10), be sure to attach the protective sheet [2] along the line marking [1] on the laser unit.



F03-501-04

CHAPTER 4

IMAGE FORMATION SYSTEM

1 Outline of Processes

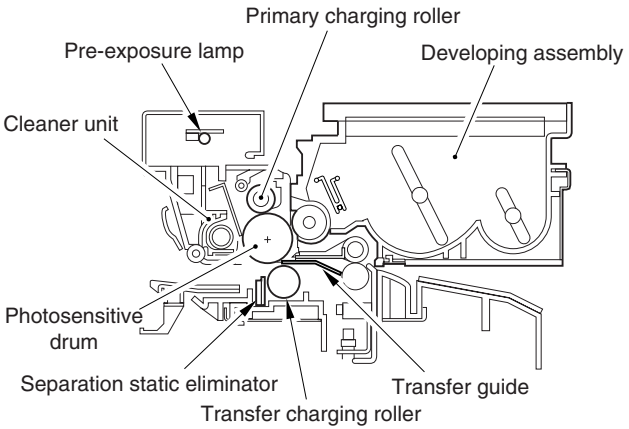
1.1 Outline

T04-101-01 shows the functions of and the methods used in the image formation system:

Item	Description
Photosensitive drum	OPC (30-mm dia.)
drum cleaning	cleaning blade
Developing assembly	Developing cylinder (20-mm dia.) Development method:dry, 1-component, toner projection Toner:magnetic, negative
Pre-exposure (LAMP2)	Fuse lamp (8 pc.) ON/OFF control (activated in sync with main motor)
Drum sensor (U701)	Primary charging roller DC bias corrected to temperature around photosensitive drum
Environment sensor (S3)	Primary charging roller AC bias corrected to suit humidity reading
Primary charging roller auto cleaning	Pad push-on type
Primary charging roller bias control	DC constant voltage control (-500 to -850 V) AC constant current control (2000 to 2300 µA; about 1800 Hz)
Developing bias control	DC constant voltage control (0 to -650 V) AC constant voltage control (810 Vp-p; about 1800 Hz)
Transfer charging roller bias control	Transfer bias:DC constant current control (switching among +15 µA, +10 µA, +7 µA) + DC constant voltage control (up to 7 kVmax) Cleaning bias: DC constant voltage control (-2.6 kV)
Transfer guide bias control	DC constant voltage (-600 v)
Separation static eliminating bias control	DC constant voltage (switching between -2.3 KV and -3.0 KV)

T04-101-01

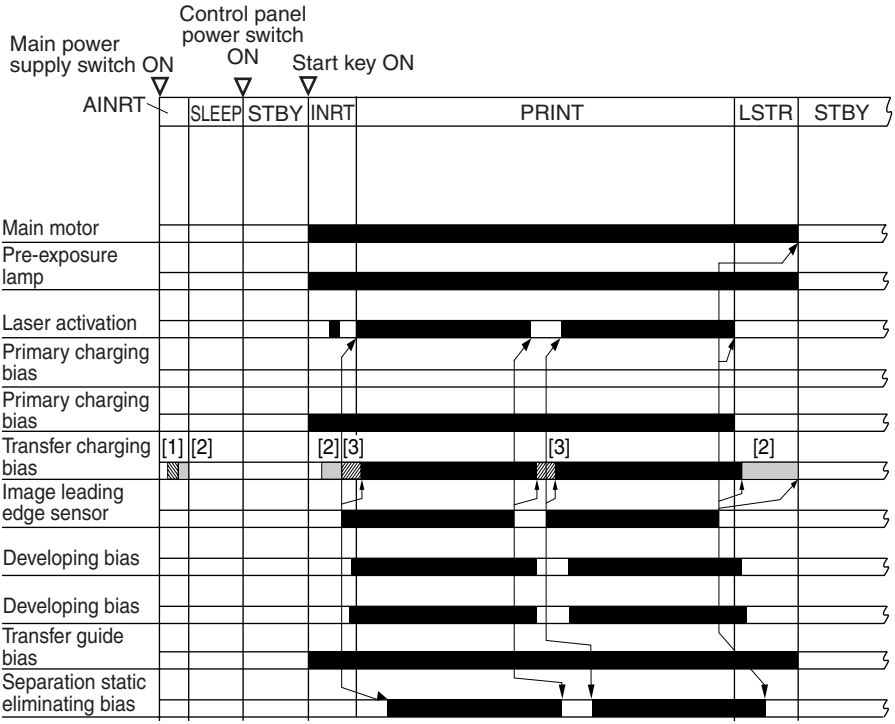
F04-101-01 shows the major components of the image formation system:



F04-101-01

1.2 Basic Sequence of Operations (image formation system)

- 1 Original, 2 Prints



[1] transfer charging reference bias
[2] transfer charging cleaning bias
[3] transfer sheet-to-sheet interval bias

F04-102-01

2 Controlling the Primary Charging Roller Bias

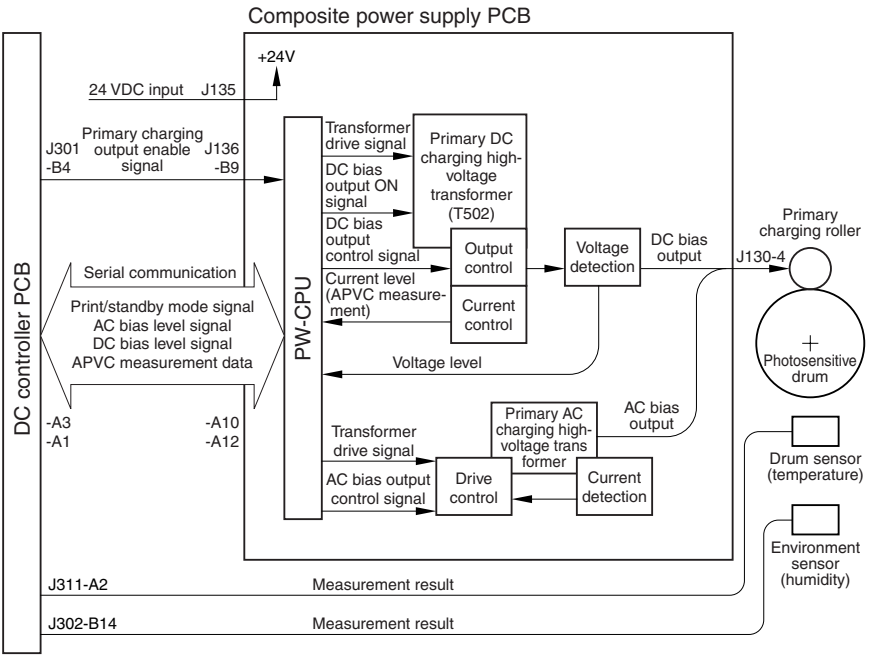
2.1 Outline

Part 2>Chapter 5>4.4 “Controlling the Primary Charging Roller Bias”

The machine’s primary charging is a direct charging method that uses a charging roller. In addition to a DC bias, the charging roller is subjected to an AC bias to ensure stable charging.

The following items relate to the control of primary charging:

[1] Turning on/off the bias.
[2] Controlling the DC bias to a specific level of voltage.
[3] Controlling the AC bias to a specific level of current.
[4] Controlling the photosensitive drum resistance detection mechanism (APVC control).
[5] Controlling the AC bias based on the readings of the environment sensor (humidity) and the soft counters.
[6] Controlling the DC bias based on the reading of the drum sensor (temperature).



F04-201-01

Memo

The primary charging output enable signal is used as the AC pulse ON signal when the developing bias is being controlled.

2.2 Turning On/Off the Bias

The primary charging roller bias is turned on/off as follows:

2.2.1 DC Bias

[1] When the primary charging output enable signal from the DC controller PCB goes '0', the DC bias output control signal (pulse signal) is generated.
[2] The DC bias is sent to the primary charging roller.

2.2.2 AC Bias

[1] When the primary charging output enable signal from the DC controller PCB goes '0', the AC bias output control signal is generated.
[2] The AC bias is generated to the primary charging roller.

2.3 Controlling the Current Voltage/Current to a Specific Level

The output level of the DC/AC bias applied to the primary charging roller is controlled by the DC/AC bias output control signal from the PW-CPU.

2.3.1 Controlling the DC Bias to a Specific Level

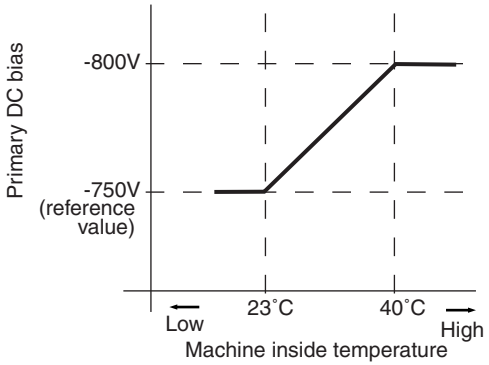
[1] The output voltage level of the DC bias is fed back to the PW-CPU, and the DC bias output control signal is varied as needed to suit the level when driving the transformer.
[2] The DC bias is made to assume a specific voltage level.

2.3.2 Controlling the AC Bias to a Specific Current Level

[1] The output current level of the AC bias is communicated to the drive control circuit and is compared against the reference current level; the result is used to vary the AC bias output control signal as needed to drive the transformer.
[2] The AC bias is made to assume a specific current level.

2.4 Temperature Correction of the DC Bias

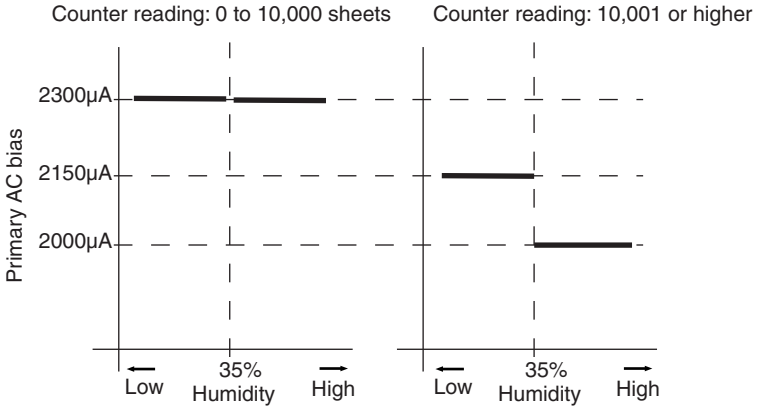
When the temperature inside the machine increases, the resistance of the photosensitive drum will decrease, thereby lowering the charging characteristics. To ensure a stable potential level, the drum sensor (U701) mounted to the rear side plate is used to check the temperature inside the machine; when the temperature increases, the absolute value of the DC bias level is increased.



F04-204-01

2.5 Humidity Correction of the AC Bias

The current level of the AC bias needs to be kept on the higher side to prevent uneven charging because of a lower changing efficiency occurring in a low-humidity environment. The AC bias, therefore, is varied as shown in F04-205-01 to suit the readings of the environment sensor (humidity). When the resistance of the drum surface decreases because of advancing wear, the current level is decreased to facilitate the flow of current.



F04-205-01

2.6 Controlling the Detection of the Photosensitive Drum Resistance (APVC control)

The primary charging efficiency changes because of changes in the site environment (temperature, humidity), deterioration of the charging roller, and wear of the photosensitive drum. The reference voltage is applied to the charging roller when the main power switch is turned on, and the resulting output current level is measured for correction.

[1] When the main power switch is turned on, the reference voltage is applied to the charging roller, and the output is measured as the current level for use as feedback to the PW-CPU.

[2] The photosensitive drum is charged (primary charging) using the voltage level determined by the PW-CPU.

2.7 Controlling the Output Mode

In continuous print mode, the outputs of both AC bias and DC bias are varied between image areas and non-image areas to prevent stray toner in the non-image areas.

Error

E064
Indicates the presence of a high-voltage (primary charging, transfer charging, developing) output fault.

COPIER>DISPLAY>HV-STS>PRIMARY
Use it to indicate the current level of primary charging.
COPIER>ADJUST>HV-PRI>P-DC
Use it to enter the adjustment value of the primary charging DC component for the image area.
COPIER>ADJUST>HV-PRI>P-AC
Use it to enter the adjustment value of the primary charging AC component for the image area.
COPIER>ADJUST>HV-PRI>AGS-GAIN
Use it to enter the gain adjustment value of the application voltage level correction for the primary charging bias.
CCOPIER>ADJUST>HV-PRI>AGS-OFST
Use it to enter the offset adjustment value of the application voltage level correction for the primary charging bias.
CCOPIER>ADJUST>HV-PRI>OFST1-DC
Use it to enter the adjustment value of offset 1 for the primary charging DC component.
CCOPIER>ADJUST>HV-PRI>OFST1-AC
Use it to enter the adjustment value of offset 1 for the primary charging AC component.
CCOPIER>ADJUST>HV-PRI>P-AC2
Use it to enter the adjustment value of primary charging AC component 2 of the image area.
CCOPIER>ADJUST>HV-PRI>P-AC3
Use it to enter the adjustment value of primary charging AC component for the image area.

3 Controlling the Transfer Charging Roller Bias

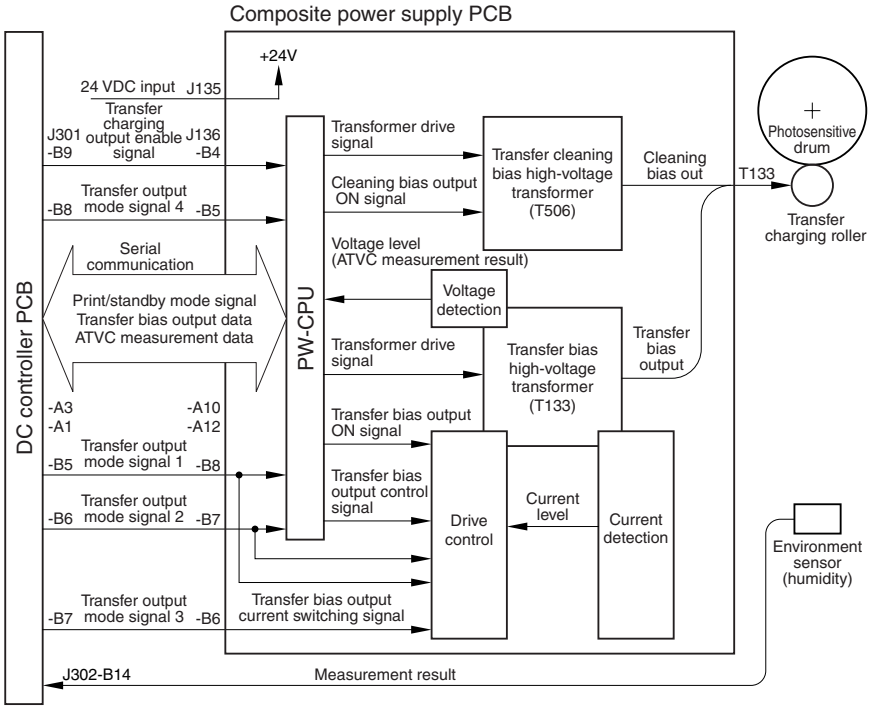
3.1 Outline

Part 2>Chapter 5>7.8.3 “Controlling the Transfer Roller”

The machine’s transfer charging is a direct charging method that uses a transfer charging roller. A DC bias is applied to the transfer charging roller.

The following relate to the transfer charging system:

[1] Turning on/off the bias.
[2] Controlling the DC bias to a specific voltage/current level.
[3] Controlling the detection of transfer charging roller resistance (ATVC control)
[4] Controlling the output by operation mode
[5] Controlling the output by the environment sensor (humidity)



F04-301-01

3.2 Turning On/Off the Bias

The transfer charging roller bias is turned on/off as follows:

[1] When the transfer charging output enable signal from the DC controller PCB goes '0', the transfer bias output signal (serial communication) is generated.

[2] The transfer bias output control signal (pulse) is generated, and the DC bias is sent to the transfer charging roller.

3.3 Controlling the Detection of the Transfer Charging Roller Resistance (ATVC control)

The transfer charging efficiency changes because of changes in humidity and deterioration in the transfer charging roller. The reference current is applied to the transfer charging roller during initial multiple rotation after the main power switch is turned on, and the resulting output voltage is measured for correction.

[1] The reference current is applied to the transfer charging roller, and the output is checked as a voltage level for use as feedback to the PW-CPU.

[2] The transfer charging mechanism operate using the voltage level determined by the PW-CPU.

3.4 Controlling the Output by Operating Mode

3.4.1 Types of Modes

The transfer charging output may be any of the following output modes, and the output is varied to suit each mode. The switch-over among these is based on the combination of transfer output mode signals from the DC controller PCB.

a. Image Transfer Bias

This bias is used to transfer toner from the photosensitive drum to paper, and is a positive voltage.

b. Cleaning Bias

This bias is used to return toner sticking to the transfer charging roller to the photosensitive drum, and applies a negative voltage.

- During initial rotation after the Start key is pressed
- During last rotation
- During initial rotation after jam removal or error resetting
- During execution of roller cleaning in user mode ('adjust/clean'; in this case, the primary charging roller is also cleaned)
- During multiple rotation after the main power switch is turned on

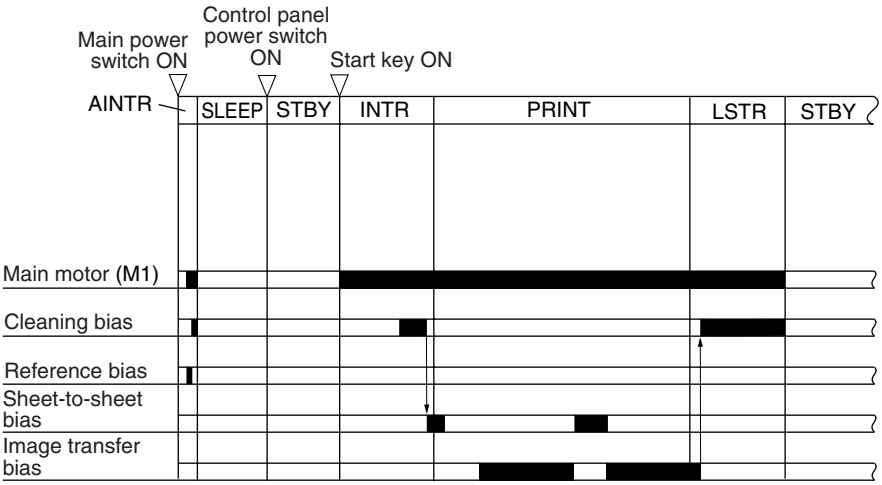
c. Reference Bias

This bias is used to control the detection of the photosensitive drum, and is applied during multiple initial rotation after the main power switch is turned on.

d. Sheet-to-Sheet Interval Bias

This bias is used in a non-image area (between sheets) in continuous print mode; the bias level is reduced to prevent adhesion of toner to the transfer charging roller.

E064
Indicates the presence of a high-voltage (primary charging, transfer charging, development) output fault.



F04-304-01

3.4.2 Turning On/Off the Cleaning Bias

When the cleaning bias output ON signal (composite power supply PCB) goes '1', the output of the transfer cleaning bias transformer is applied to the transfer charging roller.

3.5 Controlling the Output

The output of the DC bias applied to the transfer charging roller is controlled as follows: The optimum transfer charging roller bias differs depending on paper size and site environment; as such, the DC controller is designed to automatically control the output level to suit the paper size and the site environment in question.

COPIER>DIPLAY>HV-STS>TR
Use it to indicate the current level of transfer charging.
COPIER>DIPLAY>HV-STS>TR-V
Use it to indicate the voltage level of the transfer charging roller resistance detection.
COPIER>ADJUST>HV-TR>TR-N1
Use it to enter the output adjustment value for transfer charging (plain paper; single-sided print or 1st side of double-sided print).
COPIER>ADJUST>HV-TR>TR-N2
Use it to enter the output adjustment value for transfer charging (plain paper; 2nd side of double-sided print)
COPIER>ADJUST>HV-TR>TR-OFST
Use it to enter the offset output adjustment value for transfer charging roller resistance detection.
COPIER>ADJUST>HV-TR>TR-SPP
Use it to enter the output adjustment value for transfer charging (special paper; single-sided print and double-sided print)
COPIER>OPTION>BODY>TRANS-SW
Use it to set the transfer charging roller bias output control method for large-size paper.

4 Controlling the Separation Static Eliminator Bias

4.1 Outline

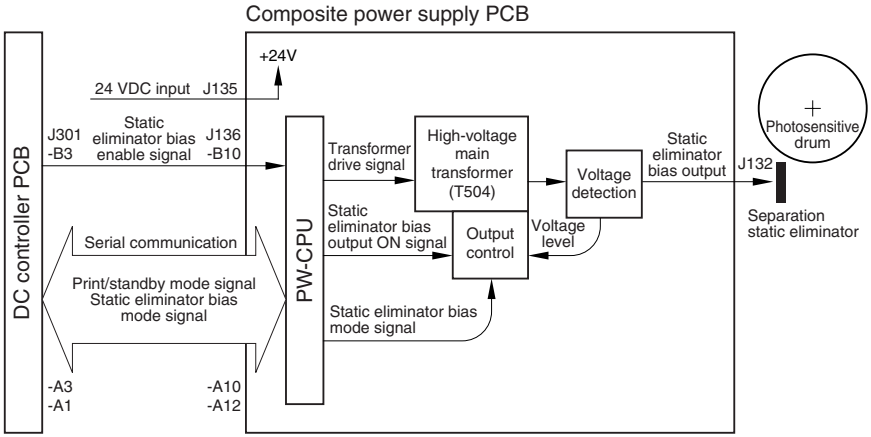
Part 2>Chapter 5>8.3 “Separation by the Static Eliminator”

The machine uses a static eliminator for separation. A DC bias is applied to the static eliminator; the following are items of control:

[1] Turning on/off the bias

[2] Controlling the bias to a specific voltage level

[3] Controlling the output to suit paper type and reading by the environment sensor (humidity)



F04-401-01

4.2 Turning On/Off the Bias

The separation static eliminator bias is turned on/off as follows:

[1] When the static eliminator bias enable signal from the DC controller PCB goes '0', the static eliminator bias output ON signal is generated.

[2] A DC bias is sent to the separation static eliminator.

4.3 Controlling the Bias to a Specific Voltage Level

The bias output is fed back to the output control circuit, thereby ensuring a specific level of voltage.

4.4 Controlling the Output by Paper Type and Environment Sensor (humidity)

In a low-humidity environment, separation can fail when thin paper is used or when the second side of a double-sided sheet is hadled. To ensure good separation, the voltage applied is increased between -2.3 and -3.0 KV with reference to the type of paper and the reading of the environment sensor (humidity).

The selection of an application voltage is done in response to the static eliminator bias mode signal (serial communication) from the DC controller PCB.

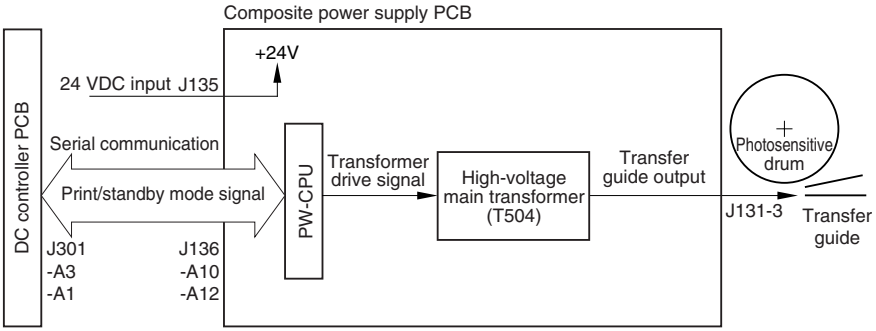
5 Controlling the Transfer Guide Bias

5.1 Transfer Guide Bias

Part 2>Chapter 5>7.2 “Transfer Guide Method”

The transfer guide bias is used to prevent adhesion of toner to the transfer guide, and is a negative component (-600 VDC), which is of the same polarity as the toner.

The transfer guide bias is continuously applied as long as printing is under way.



F04-501-01

6 Primary Charging Roller Cleaning Mechanism

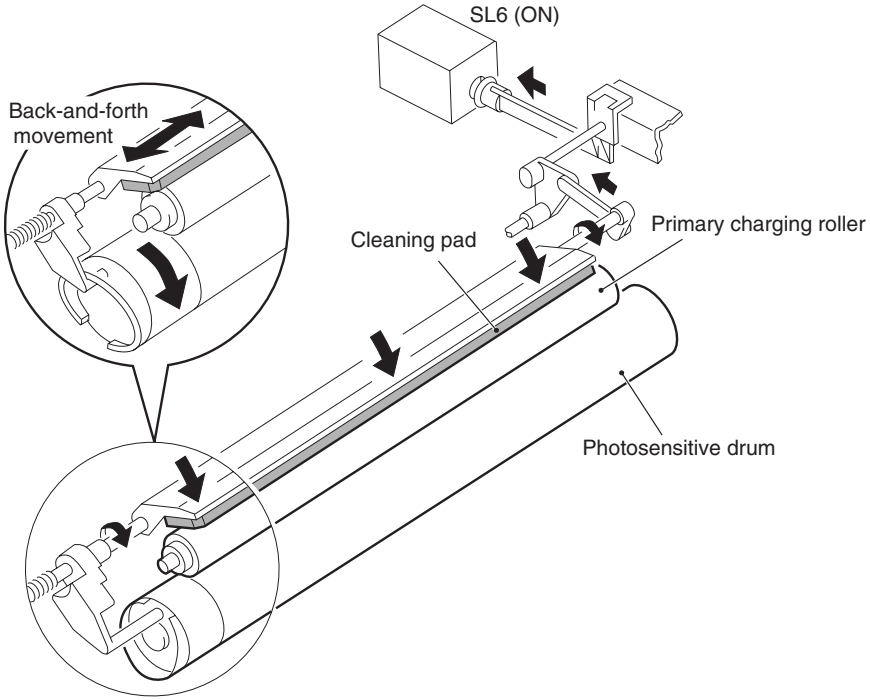
6.1 Outline

Part 2>Chapter 5>10.1.5 “Primary Charging Roller Cleaning Mechanism”

The machine’s primary charging roller is cleaned by turning on the primary charging roller cleaning solenoid (SL6) while the primary charging roller is rotating, thereby butting the cleaning pad against the primary charging roller. At the same time, the cleaning pad is moved back and forth in the axial direction of the primary charging roller.

Cleaning is executed under the following conditions:

- During last rotation after the cumulative count reaches 500 sheets
- During execution of roller cleaning in user mode (‘adjust/clean’; in this case, the cleaning bias is applied to the transfer charging roller pad for cleaning)



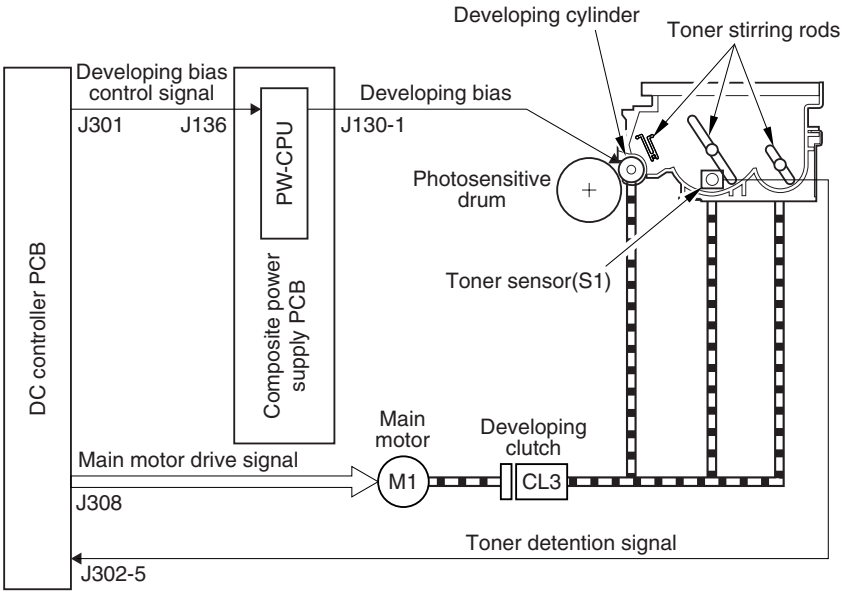
F04-601-01

7 Developing Assembly

7.1 Outline

The developing assembly consists of the developing cylinder, toner sensor (S1), and toner stirring rod; its is locked manually together with the developing rail using the locking lever.

The developing cylinder and the toner stirring rod are rotated by the drive of the main motor (M1) transmitted by way of the developing clutch (CL3).



F04-701-01

7.2 Controlling the Developing Bias

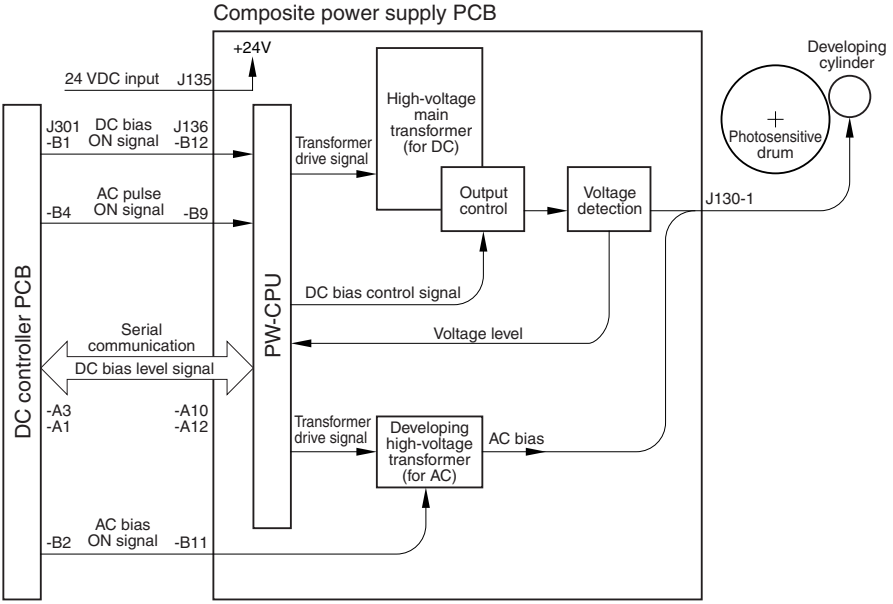
7.2.1 Outline

Both DC bias and AC bias are applied to the developing cylinder. The output is controlled by the composite power supply PCB based on the control signal from the DC controller PCB.

The following relate to the developing bias control system:

[1] Controlling the DC developing bias to a specific voltage level

[2] Controlling the AC developing bias to a specific voltage level



F04-702-01

Memo

The AC pulse ON signal is used as the primary charging output enable signal when controlling primary charging.

7.2.2 Controlling the DC Developing Bias

[1] When the DC bias ON signal from the DC controller PCB goes '0', the bias control signals (pulse signals) are generated by the PW-CPU of the high-vole power supply PCB.
[2] The DC bias from the high-voltage main transformer is applied to the developing cylinder.
[3] The output voltage level of the DC bias is fed back to the HV-CPU.
[4] The pulse width of the DC control signal is varied to suit the return voltage, thereby maintaining the DC bias to a specific level.

7.2.3 Controlling the AC Developing Bias

[1] When the AC bias ON signal and the AC pulse ON signal from the DC controller PCB goes '0', the AC transformer is driven.
[2] An AC bias is added to the DC bias and applied to the developing cylinder.

7.2.4 Controlling the Level of the DC Developing Bias

the level of the DC developing bias is varied between image area and non-image area to prevent stray toner inside the machine.

In memory copy mode, the laser is driven based on binary image data which lacks density information, not enabling adjustment using a density correction curve for the density of the image being generated. To make up for the lack, the DC developing bias is varied for density adjustment.

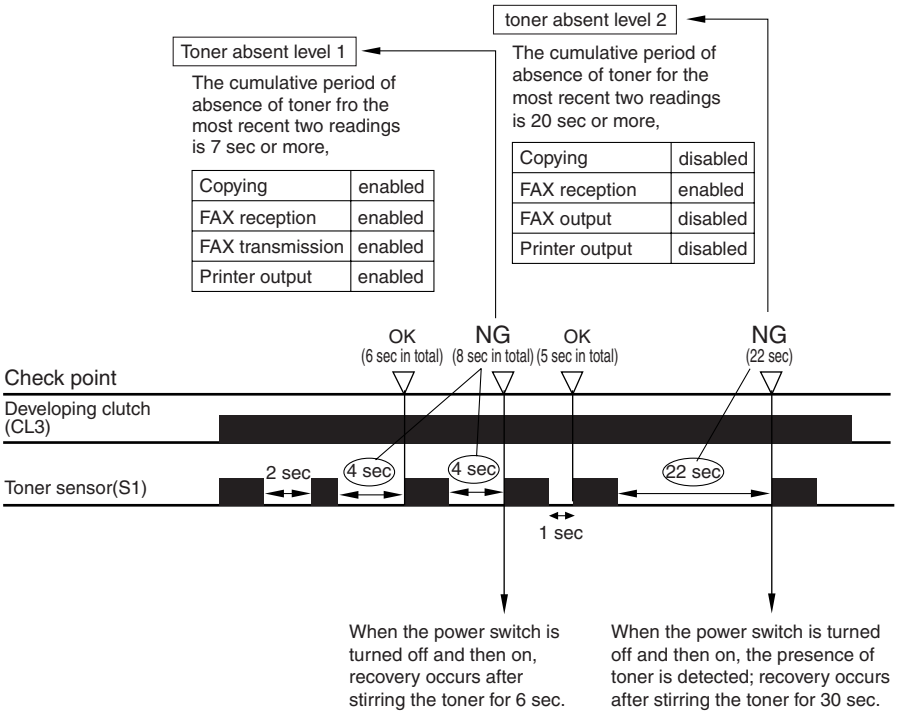
E064
Indicates the presence of a high-voltage (primary charging, transfer charging, development) output fault.

COPIER>ADJUST>DEVELOP>DE-DC
Use it to enter the adjustment value of the developing bias DC component for the image area.
COPIER>ADJUST>DEVELOP>DE-OFST
Use it to enter the offset value for the developing bias DC component.

7.3 Detecting the Level of Toner

Part 2>Chapter 5>6.2.2 “Piezoelectric Sensor”

A toner sensor (S1) of a piezoelectric oscillation type is mounted inside the developing assembly for detection of the level of toner. The DC-CPU on the DC controller PCB reads the output of the toner sensor as long as the developing clutch (CL3) remains on; it keeps track of the ‘0’ state of the toner sensor (most recent two readings), and indicates the Add Toner message as needed.



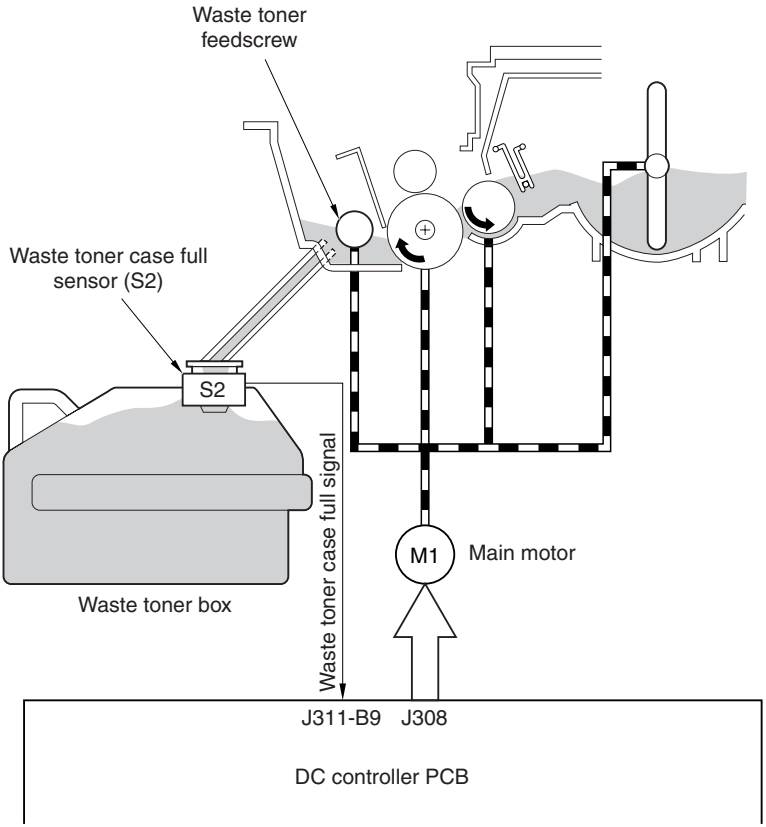
F04-703-01

8 Drum Cleaner

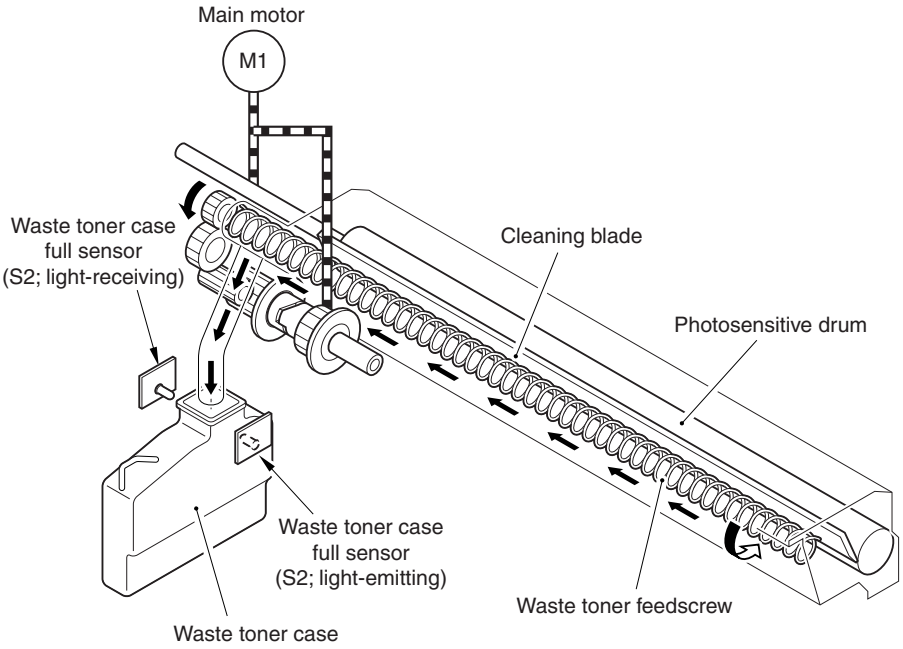
8.1 Outline

The drum cleaner assembly is rotated by the drive of the main motor (M1) transmitted through drive gears; the waste toner is colleted by the cleaning blade, and is sent to the waste toner case using the waste toner feedscrew.

The amount of waste toner inside the waste toner case is monitored by the waste toner case full sensor (S2); when the amount exceeds a specific level, the Waste Toner Full message will be indicated on the control panel.



F04-801-01


Main motor
M1
Waste toner case full sensor (S2; light-receiving)
Cleaning blade
Photosensitive drum
Waste toner case full sensor (S2; light-emitting)
Waste toner feedscrew
Waste toner case

F04-801-02

8.2 Monitoring the Waste Toner Case

The machine checks the waste toner case in reference to two levels.

The amount of waste toner inside the waste toner case is monitored by the waste toner case full sensor (S2); the sensor is a pair of photosensors (light-emitting unit piece and light-receiving piece). The machine will assume that the waste toner case has become full when waste toner blocks the light between the two photosensors.

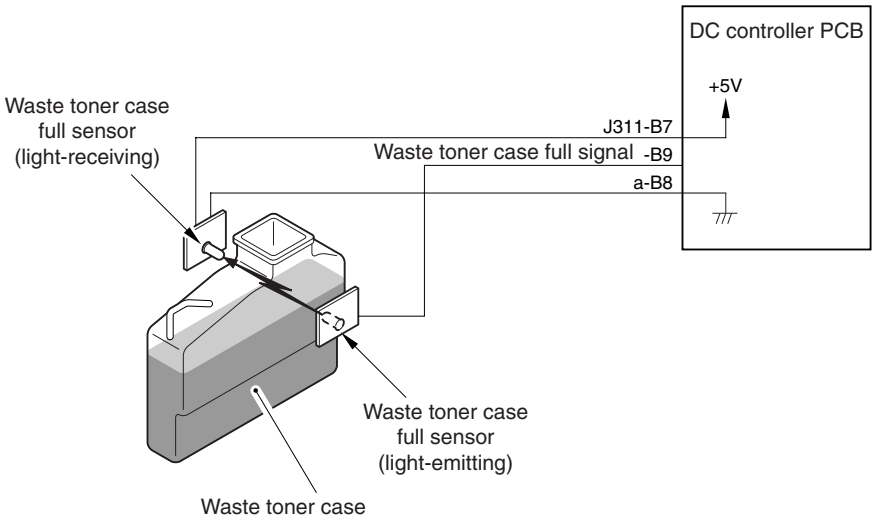
The DC controller PCB checks the waste toner case full sensor when the power is tuned on and at time of delivery; it will assume a “waste toner full warning” after making a total of 100 prints (A4/LTR) after the waste toner case has become full, thereby indicating the Waste Toner Case Full message on the control panel.

Thereafter, if the waste toner case is not replaced after making a total of about 2000 prints (A4/LTR), the machine will indicate ‘E019’ on the control panel; the error code can be reset by replacing the waste toner case and then turning off and then on the power switch.

If the waste toner case is not set, the light-blocking plate will block the light between the photosensors, causing the Waste Toner Case Full message to appear.

Memo

The light between the photosensors is not visible to the eye.



F04-802-01

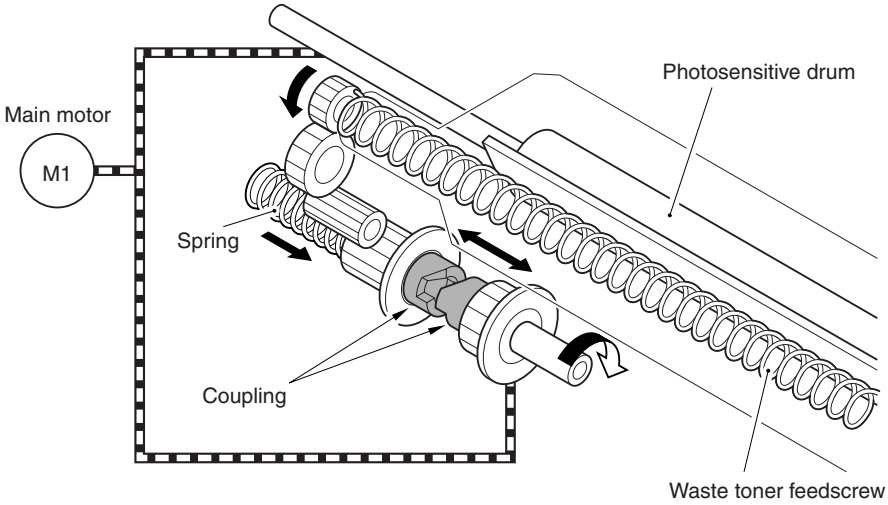
8.3 Locking of the Waste Toner Feedscrew

The waste toner feedscrew is rotated by the drive of the main motor transmitted by the coupling built into the main motor drive assembly. The coupling is butted against the gear used to rotate the screw by the work of a spring.

If the drum cleaning assembly is clogged with waste toner, the coupling will start to move back and forth in the axial direction, causing a clicking sound.

Memo

The machine is not equipped with a sensor to detect the locking of the waste toner feedscrew.



F04-803-01

Error

E019
Indicates that the waste toner case is full.

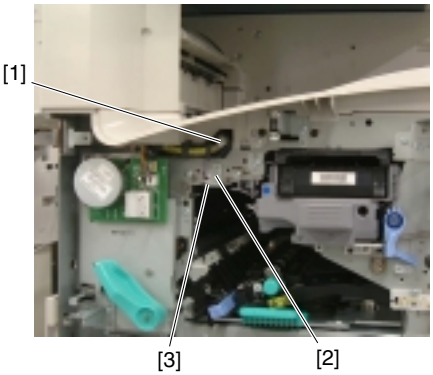
Memo

The waste toner case can hold waste toner equivalent of about 200,000 prints.

9.1 Pre-Exposure Lamp Unit

9.1.1 Handling of the Pre-Exposure Lamp Unit

1) Remove the drum unit. (See p. $.)
2) Remove the inside cover. (See p. $.)
3) Disconnect the connector [1], and remove the screw [2].
4) Take out the pre-exposure lamp unit [3].

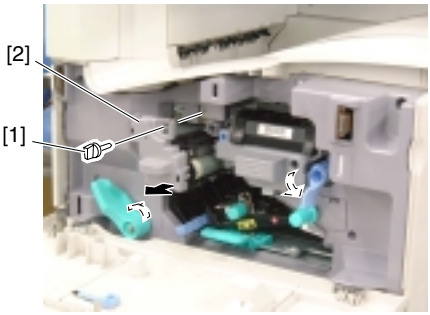


F04-901-01

9.2 Photosensitive Drum

9.2.1 Removing the Drum Unit

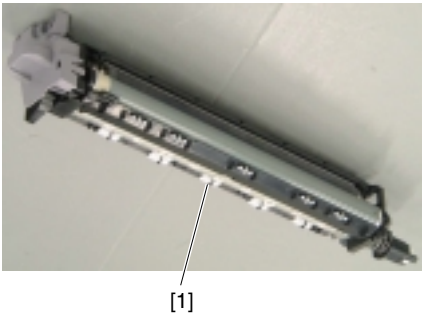
1) Open the front cover.
2) Release the feeding assembly.
3) Release the developing assembly.
4) Remove the fixing screw [1].
5) Slide out the drum unit [2] slowly to the front.



F04-902-01

Take care not to damage or soil the photosensitive drum. Further, be sure to protect the photosensitive drum against light once it is outside the machine; it is highly susceptible to light.

As many as 19 stirrups [1] (4 types) are attached to the bottom of the drum unit. Take care not to crush them.
Further, be sure to place the drum unit on a flat surface once it has been removed out of the machine.



F04-902-02

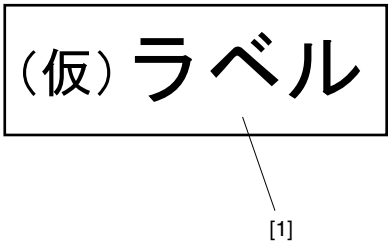
9.2.2 Cleaning the Photosensitive Drum

If the surface of the photosensitive drum has become soiled, wipe it with a flannel cloth coated with toner. (Do not use paper, lint-free or otherwise.)

Never dry-wipe the photosensitive drum or use solvent.

9.2.3 When Replacing the Drum Unit

Be sure to record the date of replacement and the latest counter reading to the label [1], and attach it to the front cover of the drum unit; then, make adjustments according to the Image Adjustment Basic Procedure (p. $).



F04-902-03

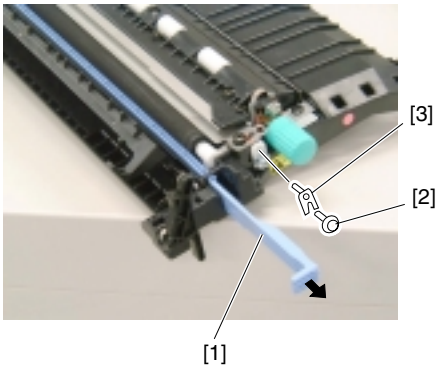
After replacing the drum unit, be sure to perform the work under 7.7 “Removing Paper Lint.”

9.3 Transfer Charging Roller

9.3.1 Removing the Transfer Charging Roller

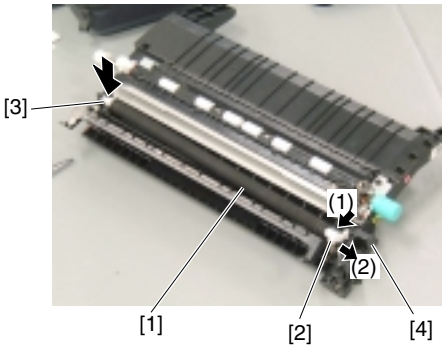
Do not touch the surface of the transfer charging roller when removing it. Otherwise, image faults can occur.

1) Remove the feeding assembly. (See p. $.)
2) Pull off the static eliminator [1].
3) Remove the screw [2], and detach the hinge bin [3].



F04-903-01

4) Remove the transfer arm [1] equipped with a spring to the left together with the transfer charging roller [2].



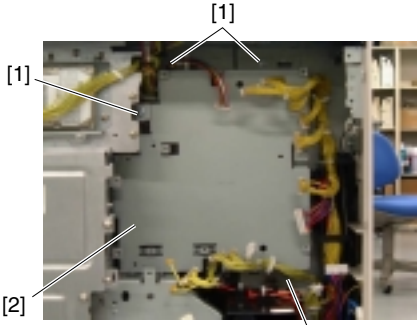
F04-903-02

5) Pull it off to the front.

9.4 Charging Roller Solenoid

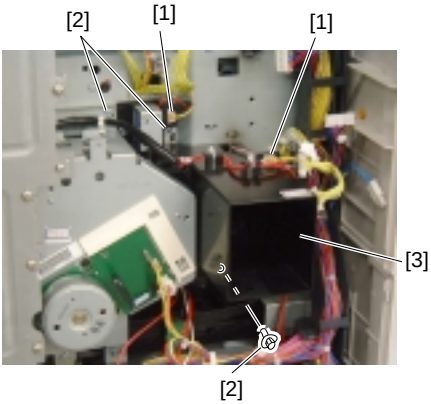
9.4.1 Removing the Charging Roller Solenoid (SL6)

1) Remove the photosensitive drum. (See p. $.)
2) Open the rear cover. (7 screws)
3) Remove the DC controller PCB. (see p. $.)
4) Remove the four screws [1], and detach the DC controller base [2].



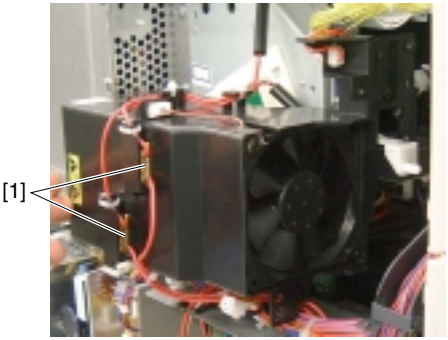
F04-904-01

5) Disconnect that two connectors [1] of the harness.
6) Remove the three screws [2], and pull out the duct unit [3] to the front.



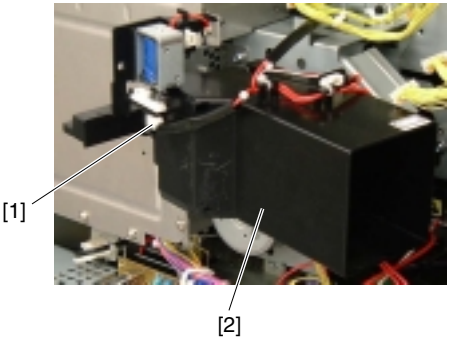
F04-904-02

7) Remove the claw, and detach the two relay PCBs [1].



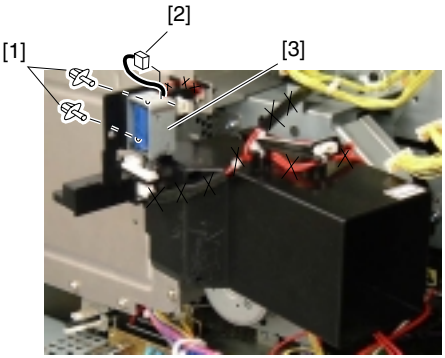
F04-904-03

8) Remove the faston [1] of the harness, and detach the duct unit [2].



F04-904-04

9) Remove the two screws [1], and disconnect the connector [2]; then, detach the charging roller solenoid [3].



F04-904-05

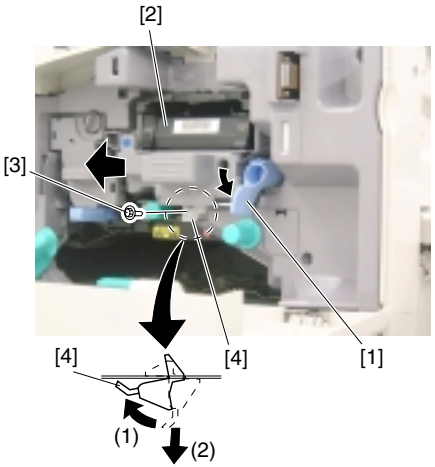
9.5 Developing Assembly

Keep the following in mind when disassembling/assembling the developing assembly:

1. When holding the developing assembly, avoid touching the developing cylinder.
2. After mounting the developing assembly, be sure to mount the developing assembly stopper.
3. The blade and the blade base of the blade base unit are adjusted at the factory to a high accuracy; do not separate them.

9.5.1 Removing the Developing Assembly

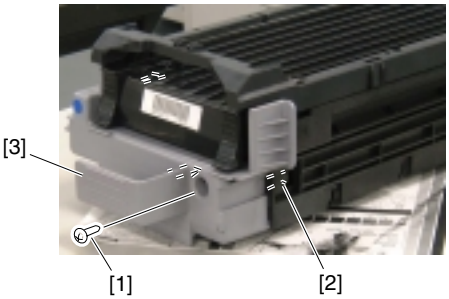
1) Open the front cover.
2) Shift down the developing assembly releasing lever [1] to free the developing assembly [2].
3) Remove the screw [3], and lift the bottom of the developing assembly stopper [4] to the front to remove it to the bottom.
4) Holding the grip of the developing assembly with one hand and supporting it on its bottom with the other, pull it to the front.



F04-905-01

9.5.2 Removing the Grip Assembly

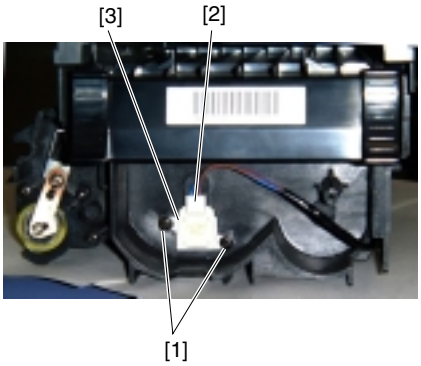
1) Remove the developing assembly. (See p. $.)
2) Remove the screw [1] and the three claws [23], and detach the grip assembly [3].



F04-905-02

9.5.3 Removing the Tone Sensor

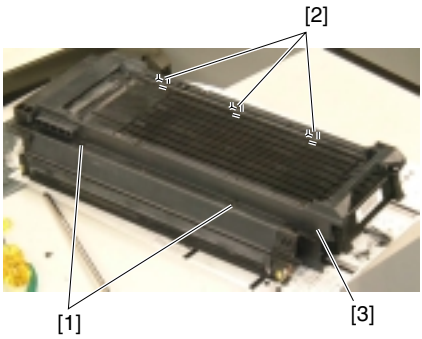
1) Remove the grip assembly. (See 7.6.2.)
2) Remove the two screws [1], and disconnect the connector [2].
3) Detach the toner sensor [3].



F04-905-03

9.5.4 Removing the Developing Assembly Upper Cover

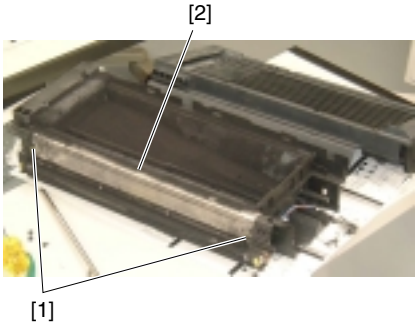
1) Remove the grip assembly. (See 7.6.2.)
2) Remove the two screws [1] and the three claws [2].
3) Remove the developing assembly upper cover [3].



F04-905-04

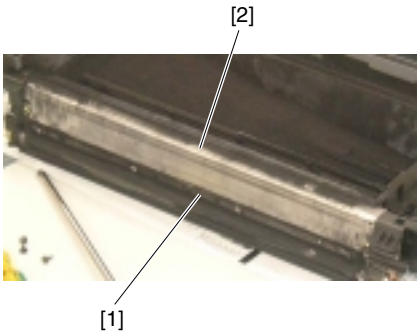
9.5.5 Removing the Developing Cylinder

1) Remove the developing assembly upper cover. (See p. $.)
2) Remove the two screws [1], and detach the blade base unit [2].



F04-905-05

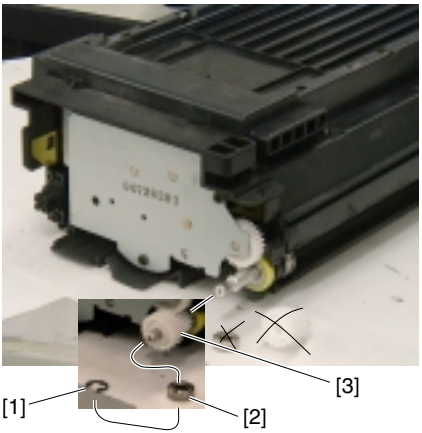
The blade [1] and the blade base [2] of the blade base unit are assembled to a high accuracy at the factory. Do not separate them.



F04-905-06

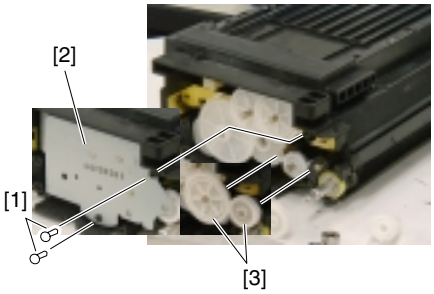
9.5.6 Developing Assembly Cylinder

1) Remove the developing assembly upper cover. (See p. $.)
2) Remove the E-ring [1], bearing [2], and gear [3].



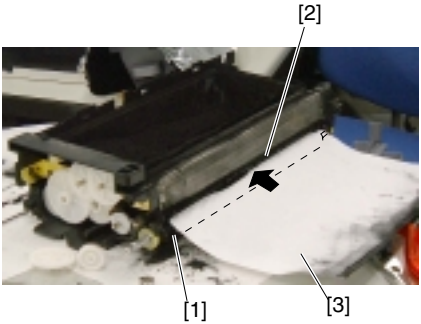
F04-905-07

3) Remove the two screws [1], and detach the gear cover [2].
4) Remove the two gears [3].



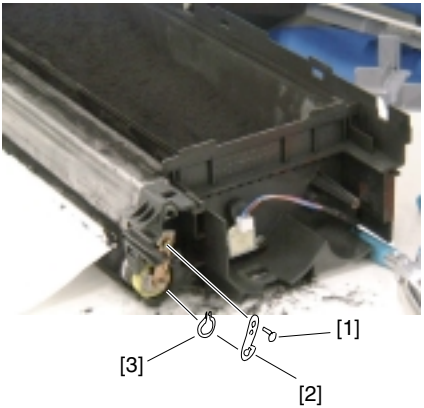
F04-905-08

5) Put copy paper [3] between the developing cylinder [1] and the blade [2].



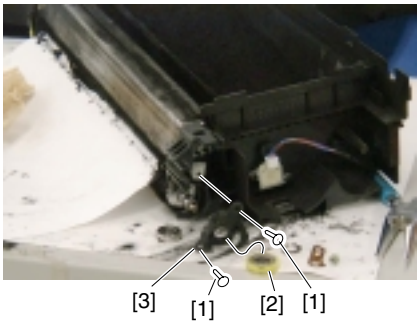
F04-905-09

6) Remove the screw [1] and the grounding plate [2].
7) Remove the grip ring [3].



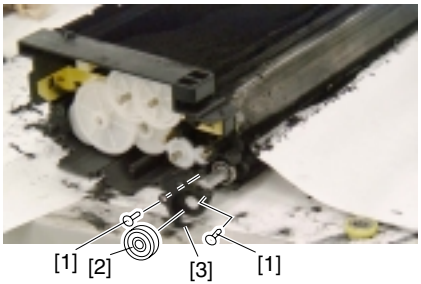
F04-905-10

8) Remove the two screws [1], and detach the member [2] and the front sleeve holder [3].



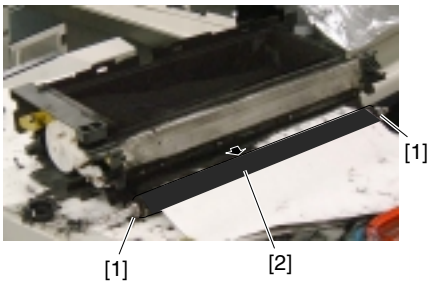
F04-905-11

9) Remove the two screws [1], and detach the member [2] and the rear sleeve holder [3].



F04-905-12

10) Detach the developing cylinder [2] together with the two bearings [1].

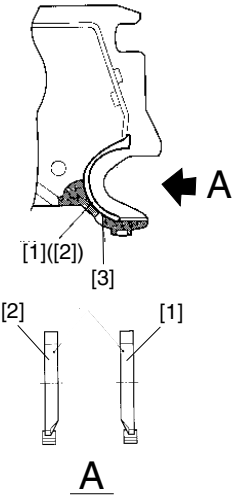


F04-905-13

9.5.7 Position of the Developing Assembly Magnetic Seal

1) Mount the front magnetic seal [1] and the rear magnetic seal [2] while butting them against the opening [3] (reference).

Check to be sure that the magnetic seal is in firm contact with the housing.

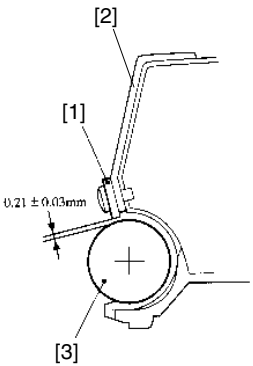


F04-905-14

9.5.8 Mounting the Developing Assembly Blade

The blade [1] and the blade base [2] of the blade base unit are assembled to high accuracy at the factory. Do not separate them.

If you happened to have removed the blade by mistake, be sure to adjust the position of the blade using a gap gauge (CK-0057-000) so that the gap between the blade and the developing cylinder [3] is 0.21±0.3 mm.



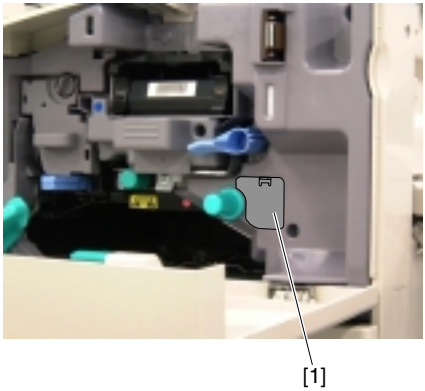
F04-905-15

The surface of the developing cylinder is susceptible to damage. Be sure to limit the gap gauge to both sides of the developing cylinder.

9.6 Removing Paper Lint

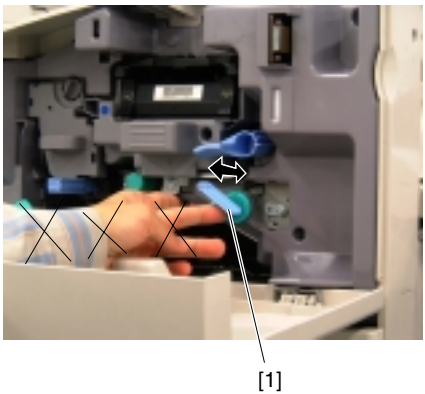
9.6.1 Removing Paper Lint

1) Open the front cover.
2) Remove the lever cover [1].



F04-906-01

3) Slide out the paper lint cleaning lever [1], and move it back and forth.



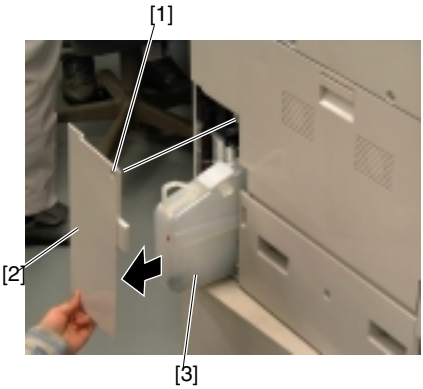
F04-906-02

9.7 Waste Toner Case

9.7.1 Replacing the Waste Toner Bottle

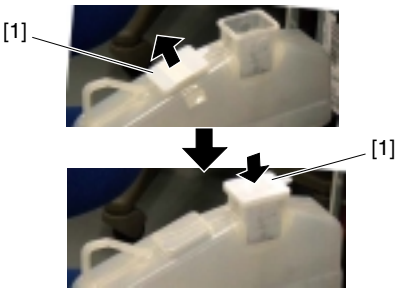
When the control panel indicates the Waste Toner Case Full message, be sure to replace the waste toner case.
Never use the waste toner case for a second time. Otherwise, the sensor will malfunction.

1) Remove the screw [1], and detach the waste toner cover [2].
2) Remove the waste toner case [3].



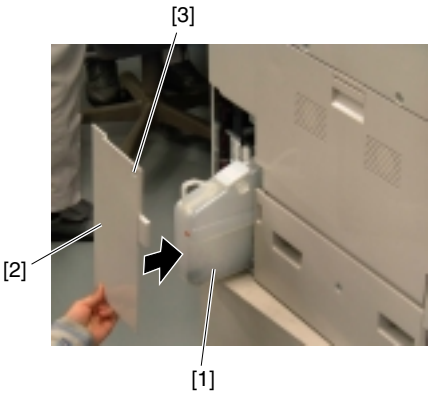
F04-907-01

3) Remove the case cap [1] taped to the waste toner case, and close the case.



F04-907-02

4) Fit the new waste toner case [1], and secure the waste toner cover [2] in place with a screw [3].



F04-907-03

CHAPTER 5

PICK-UP/FEEDING SYSTEM

1 Outline

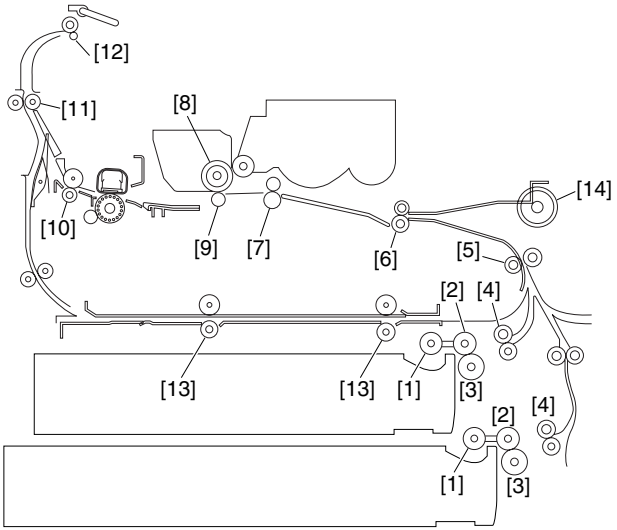
1.1 Specifications and Construction

T05-101-01 shows the major functions and the construction of the pickup/feeding system:

Item	Description
Paper feed reference	Center
Paper stack	Cassette (1, 2):500 sheets each (980 g/m^2)
	Multifeeder:50 sheets (80 g/m^2)
Paper size switching	Cassette 1:by user
	Cassette 2 (100V model): by user
	Cassette 2 (120/230V model):by service person
	Multifeeder:by user
Duplex copying	Through path
Related user mode	Cassette auto selection (enabled/disabled)
	Paper icon
Related mechanical adjustments	Cassette horizontal registration adjustment
	Multifeeder horizontal adjustment

T05-101-01

1.2 Arrangement of Rollers and Sensors



F05-101-01

The following rollers are mainly used to move paper:

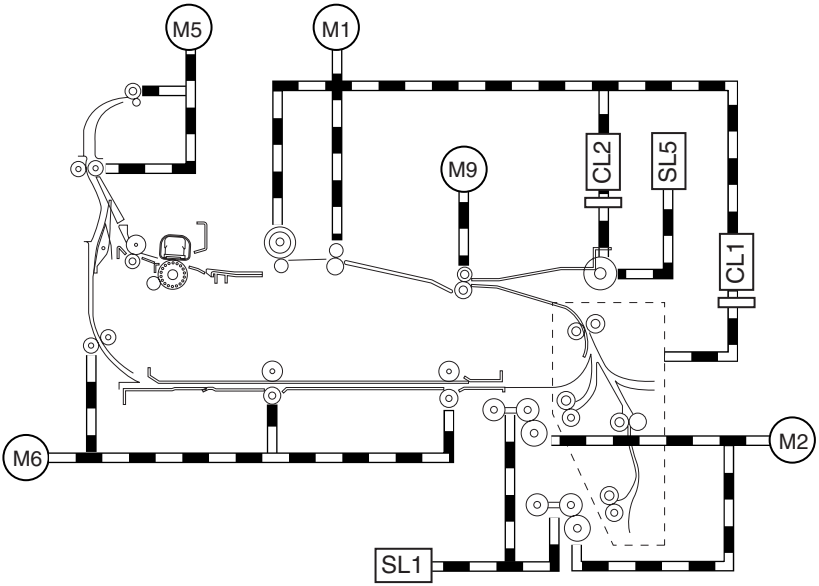
Ref.	Name
[1]	Pre-registration roller
[2]	Registration roller
[3]	Photosensitive drum
[4]	Duplex roller
[5]	Duplex roller
[6]	Multifeeder pickup roller
[7]	Pickup roller
[8]	Feeding roller
[9]	Separation roller

The following sensors are used to monitor the movement of paper:

Notation	Name	Delay jam	Stationary jam	Power-on stationary jam
PS1	Cassette 1 paper sensor	No	No	No
PS2	Cassette 2 paper sensor	No	No	No
PS7	Cassette 1 retry paper sensor	Yes	No	No
PS8	Cassette 2 retry paper sensor	Yes	No	No
PS9	Pre-registration paper sensor	Yes	No	No
PS10	Registration paper sensor	Yes	Yes	No
PS11	Horizontal registration paper sensor	Yes	No	No
PS12	Image leading edge paper sensor	Yes	No	No
PS13	fixing feeding sensor	Yes	Yes	No
PS15	No. 1 delivery paper sensor	Yes	Yes	No
PS16	No. 1 delivery full sensor	No	No	No
PS17	Duplex inlet paper sensor	Yes	No	No
PS18	Duplex outlet paper sensor	Yes	No	No
PS22	Multifeeder paper sensor	No	No	No

T05-102-01

1.3 Arrangement of Motors, Clutches, and Solenoids



F05-103-01

The following motors, clutches, and solenoids are used to move paper:

Notation	Name
M1	Main motor
M2	Pickup motor
M5	Delivery motor
M6	Duplex motor
M9	Registration motor
CL1	Vertical path clutch
CL2	Multifeeder clutch
SL1	Pickup DOWN solenoid
SL5	Multifeeder rely releasing solenoid

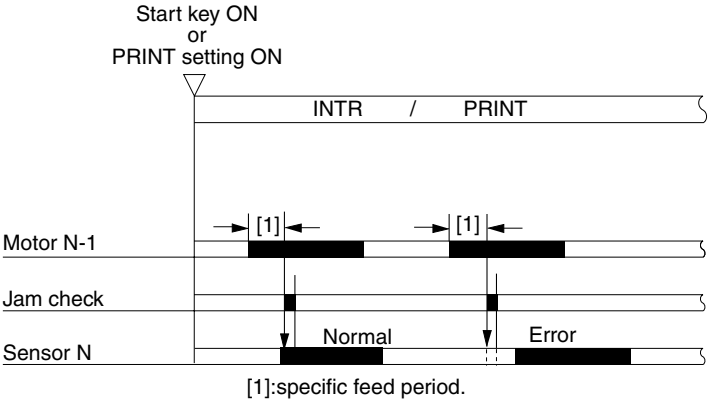
2 Detecting Jams

2.1 Sequence of Operations (jam detection)

2.1.1 Delay Jam

a. Cassette Pickup Assembly (cassette 1, 2)

The leading edge of paper does not reach the sensor within a specific period of time after the motor has gone ON.



F05-201-01

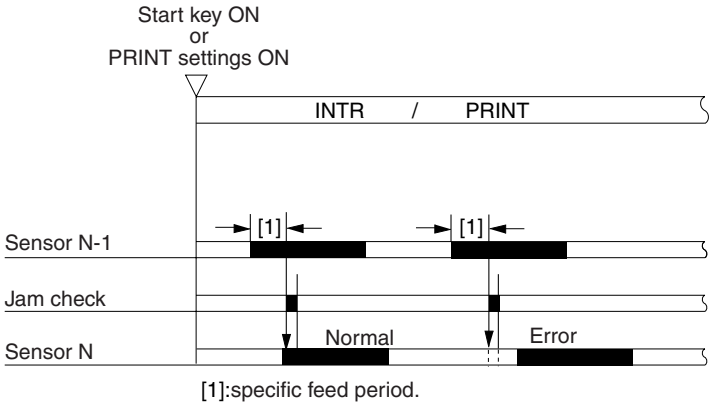
Pickup assembly	Motor	Sensor
Cassette 1	Pickup motor (M2)	Cassette 1 retry sensor (PS7)
Cassette 2	Pickup motor (M2)	Cassette 2 retry sensor (PS8)

T05-201-01

b. Other Delay Jams

Other than pickup sensor delay jams, jams are found by other sensors at the following timing of detection.

The period of time for travel between sensor N-1 and delay jam sensor N are monitored with reference to the clock pulses from the main motor; a delay jam will be identified if the leading edge of paper does not reach the delay jam sensor N in question within a specific period of time after the sensor N-1 goes ON.



F05-201-02

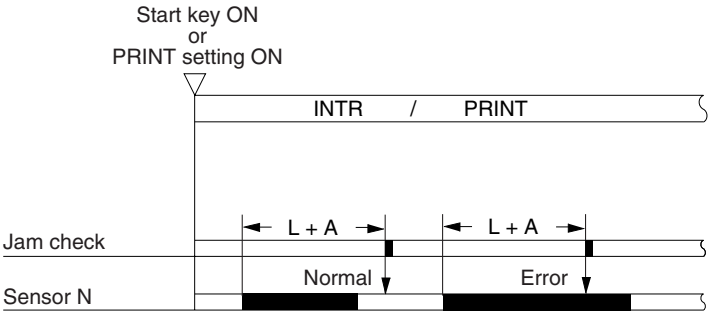
Notation	Name	Delay jam
PS9	Pre-registration paper sensor	Yes
PS10	Registration paper sensor	Yes
PS11	Horizontal registration paper sensor	Yes
PS12	Image leading edge sensor	Yes
PS13	Fixing feeding sensor	Yes
PS15	No. 1 delivery paper sensor	Yes
PS17	Duplex inlet paper sensor	Yes
PS18	Duplex outlet paper sensor	Yes
PS22	Multifeeder paper	No

T05-201-02

2.1.2 Stationary Jam

a. Common Stationary Jam

Registration paper sensor (PS10), Fixing feeding sensor (PS13), No. 1 delivery paper sensor (PS15)



(L: paper length; A: specific feed distance)

F05-201-03

b. Power-On Stationary Jam

A stationary jam at power on is identified based on the presence/absence of paper over a specific sensor about 1 sec after the control panel power switch is turned on.

2.1.3 Jam History

The host machine maintains a history of jams that occur inside it, and the history may be checked in service mode.

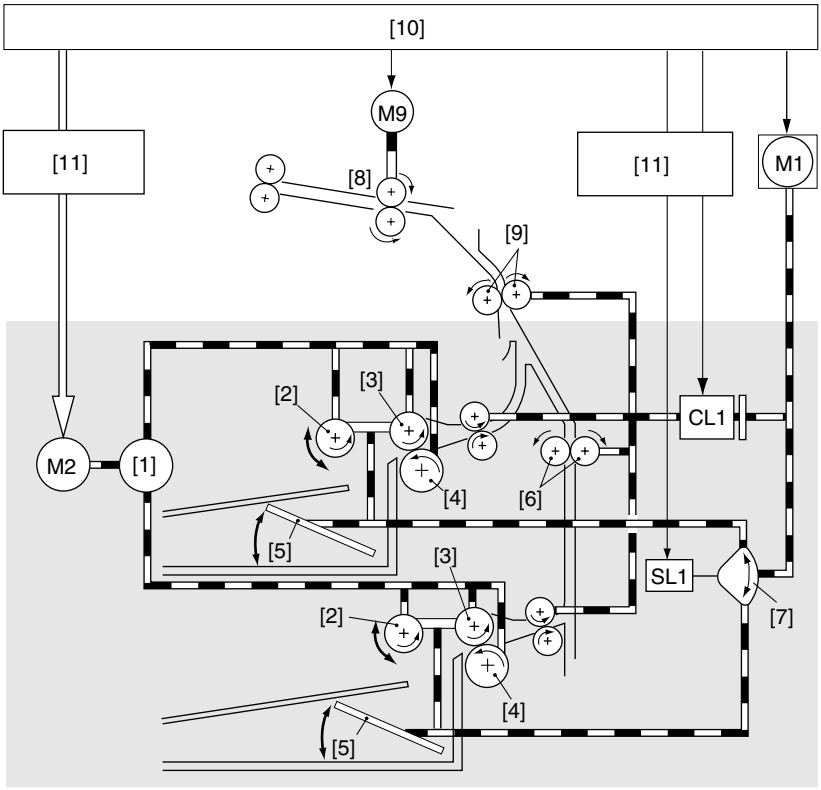
COPIER>DIPLAY>JAM
Use it to indicate jam data.
COPIER>FUNCTION>JAM-HIST
Use it to clear the jam history.

The following are retained in response to a jam, and brought back to use after the jam has been removed.

- Remaining number of copies to make
- Selected copying mode

3 Pickup Assembly

3.1 Pickup Control System



F05-301-01

Notation	Name
[1]	Gear
[2]	Pickup roller
[3]	Feeding roller
[4]	Separation roller
[5]	Lifter
[6]	Vertical path roller
[7]	Cam
[8]	Registration roller

Notation	Name
[9]	Pre-registration roller
[10]	DC controller PCB
[11]	Cassette pickup PCB
M1	Main motor
M2	Pickup motor
M5	Registration motor
CL1	Vertical path clutch
SL1	Pickup DOWN solenoid

3.2 Outline

The paper inside the cassette is held up by the lifter, and remains in contact with the pickup roller when pickup takes place:

(1) The pickup motor (M2) is used to drive the pickup roller. The pickup roller is moved down in relation to the feeding roller, and is brought into contact with paper only when pickup takes place.

(2) The pickup roller is moved down when the cam released by the DOWN solenoid (SL1) rotates by the drive of the main motor (M1).

The feeding roller and the separation roller serve to make sure that only one sheet of paper from the pickup roller is sent to the feeding path; the No. 2 registration roller and the vertical path roller then forwards the paper as far as the registration roller.

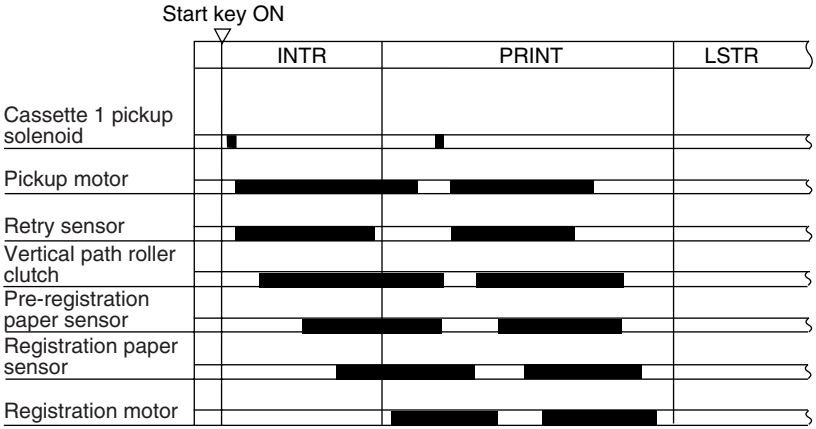
The drive for the vertical path roller and the No. 2 registration roller is provided by the pickup motor (M2) through the vertical path clutch (CL1).

The registration roller is driven by the registration motor (M9).

3.3 Sequence of Operations (pickup)

a. Cassette 1

- A4, 2 Copies, Continuous



F05-303-01 Sequence of Operations (cassette)

3.4 Operation of the Cassette Lifter

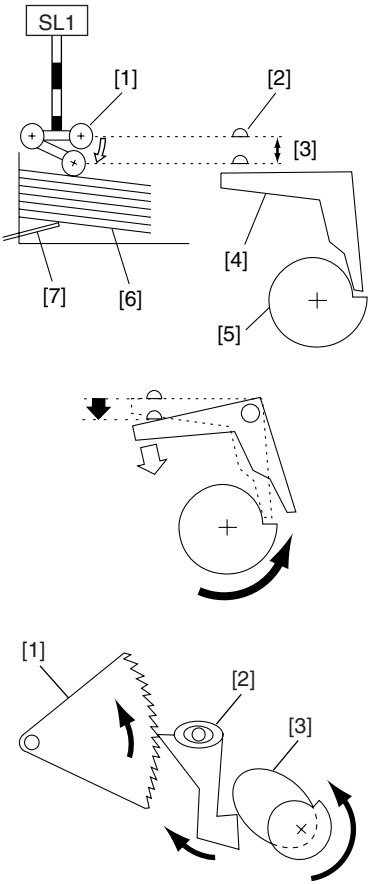
The lifter is operated as necessary in the course of printing to maintain the stack of sheets to a specific height.

3.4.1 Operation of the Lifter During Printing

The lifter is controlled by the movement of the pickup roller shaft. When the pickup roller shaft pushes the lifter trigger lever, the cam is released, and the lifter starts to move up until the lifter trigger lever stops the cam.

1) Each time the pickup roller DOWN solenoid (SL1) goes ON, the pickup roller shaft [2] moves down to initiate pickup operation.
2) When the sheets decrease and, as a result, the descent distance [3] of the pickup roller increases, the pickup roller shift pushes down the lifter trigger lever [4].
3) When the lever is pushed down, the cam [5] is released, causing it to rotate.
4) The rotation of the cam turns the eccentric cam [3] mounted to the same shaft. The eccentric cam operates the lifter UP lever [2] to move up the lifter gear [1].
5) The lifter moves up and, as a result, the paper stack moves up; when the pickup roller shaft reaches a specific height, the lifter trigger lever is drawn back by the work of a spring, thereby stopping the cam.

The foregoing series of operation is repeated to maintain the height of the paper stack to a specific level. The cassette pickup operation ends when paper runs out and the cassette paper sensor detects the absence of paper.



F05-304-01 Cassette Lifter Operation

3.4.2 Releasing the Lifter

The lifter is released mechanically when the cassette is slid out. When the machine is in standby state, the lifter gear is held in place by the lifter gear retaining lever. When the cassette is slid out, the lifter gear retaining lever is freed, thereby allowing the lifter to move down.

If the main power is cut while the lifter is moving up, the lifter is held up with the claw used to move up the lifter remaining in contact with the lifter gear; the lifter will not be fully released in this condition, and damage can occur if the cassette is forced out. Be sure to turn off and then on the main power so that the machine will be in standby state whenever the cassette must be slid out.

3.5 Cassette Pickup Operation

3.5.1 Rotating the Pickup Roller

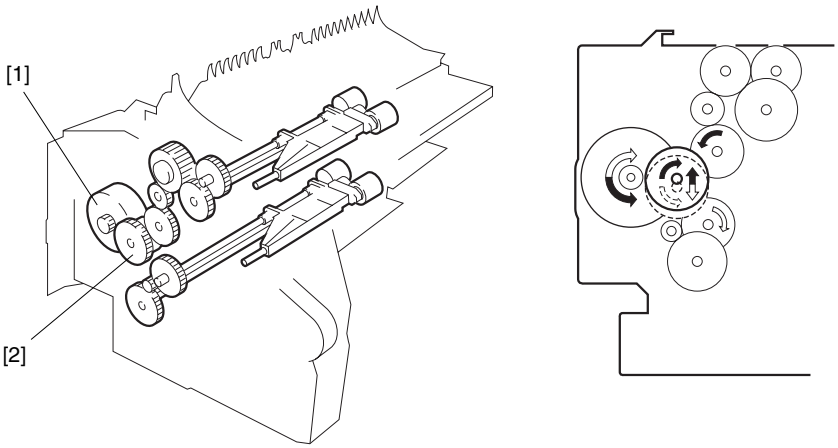
The drive used to rotate the pickup roller is transmitted through gears. The cassette motor rotates clockwise and counterclockwise to initiate pickup operation of the cassette 1/2.

3.5.2 Switching the Pickup Roller Drive

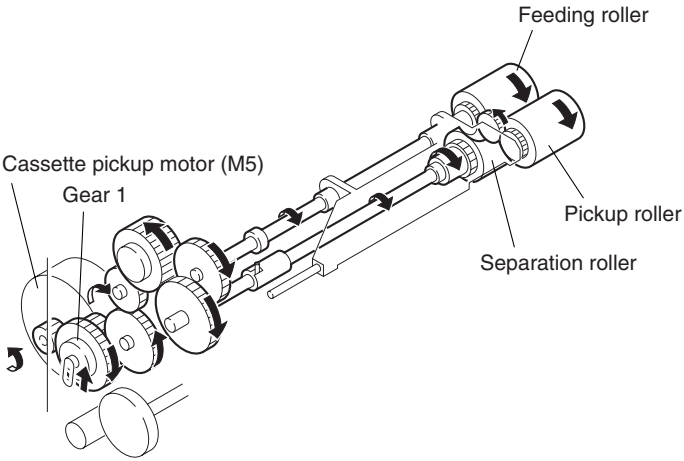
When the pickup roller rotates clockwise, the gear 1 moves up to drive the pickup roller of the upper cassette holder; when the motor rotates counterclockwise, on the other hand, the gear 1 moves down to drive the pickup roller of the lower cassette holder. The figure below shows how the drive of the pickup roller is controlled.

3.5.3 Pickup Roller Shaft Reference

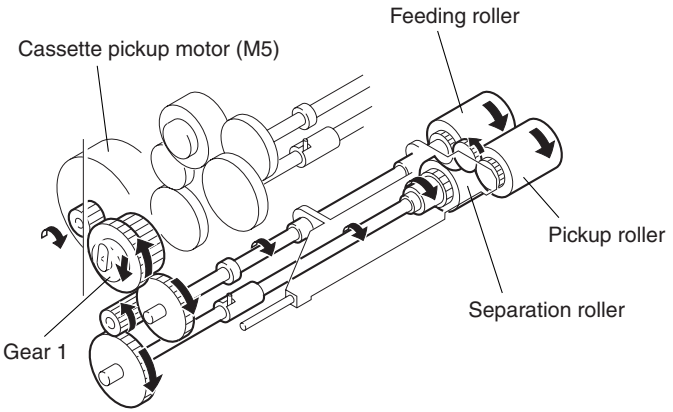
The up and down movement of the pickup roller when the cassette is set in the machine is driven with reference to the position of the pickup roller shaft.



F05-305-01



F05-305-02 Pickup Drive for the Upper Cassette Holder (pickup motor in CW rotation)

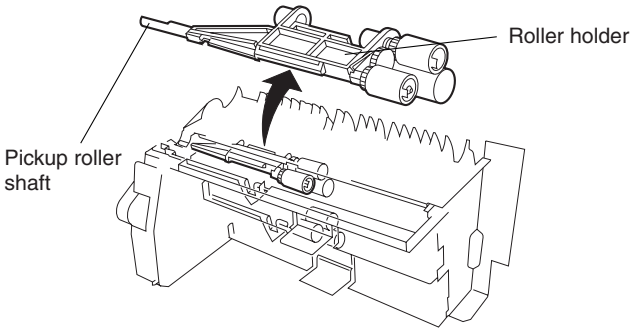


F05-305-03 Pickup Drive for the Lower Cassette Holder (pickup motor CCW rotation)

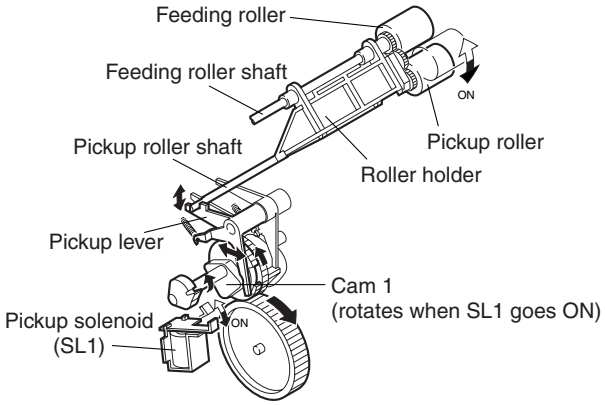
3.6 Moving Up/Down the Pickup Roller

The pickup roller and the feeding roller are supported by a roller holder, and the pickup roller is moved up and down in relation to the feeding roller. In standby state, the pickup roller is at the uppermost position; during pickup operation, on the other hand, it moves down to reach the paper surface. It operates as follows to pick up a single sheet of paper:

1) When the pickup solenoid (SL1) goes ON, the drive of the main motor (M1) causes the cam 1 to rotate.
2) The rotation of the cam 1 causes the pickup lever to swing.
3) The swing of the lever causes the pickup roller to move down to come into contact with the paper, and the pickup motor (M2) starts pickup operation.
4) The rotation of the cam 1 moves up the pickup roller shaft.



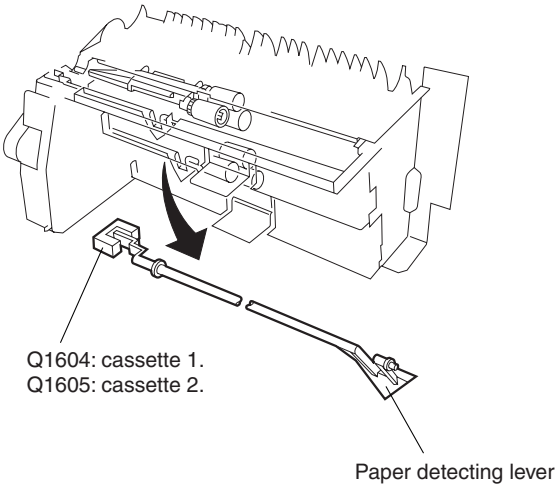
F05-306-01 Arrangement of the Pickup Roller



F05-306-02 Up/Down Movement of the Pickup Roller Shaft

3.7 Detecting the Presence/Absence of Paper Inside the Cassette

When the cassette runs out of paper, the paper detecting lever falls through the detecting hole of the cassette, causing the light-blocking plate linked to the lever to block the light of the photointerrupter (Q1604 for cassette 1; Q1605 for cassette 2).



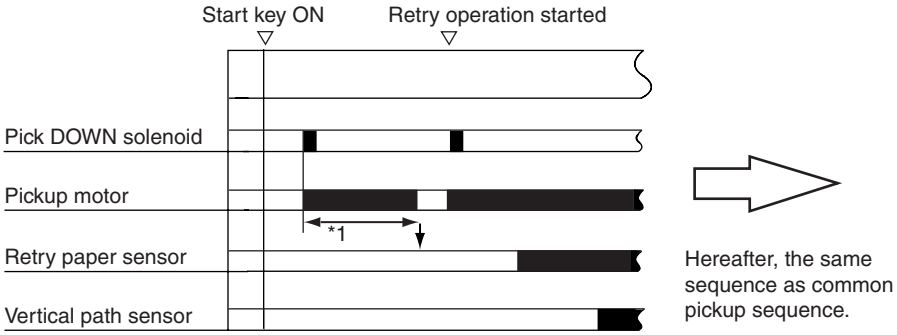
F05-307-01 Arrangement of the Paper Detecting Lever

3.8 Pickup Retry Operation

When a delay is detected by a pickup sensor because of wear on the pick roller, pickup retry operation is executed. If a delay is still detected after a retry, the control panel indicates the Jam message.

3.8.1 Conditions for Detecting a Delay

Paper does not reach the retry sensor when it has been moved over a specific distance after the pickup DOWN solenoid (SL1) has gone ON.



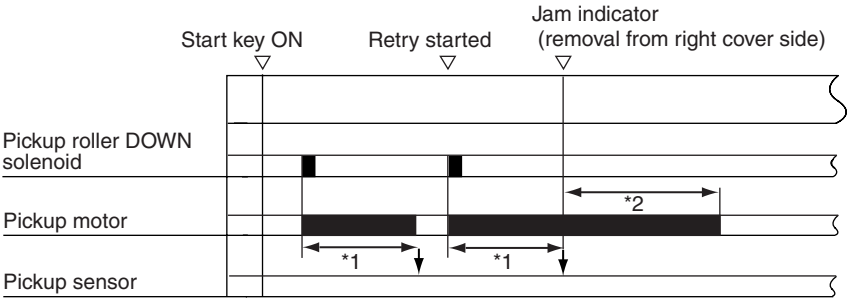
*1:retry operation is executed if paper does not arrive after moving it over 'distance to the retry sensor + 100 mm'.

F05-308-01 Retry Operation

3.8.2 Paper Retraction

If a delay is detected once again after a retry and the jam must be removed, the paper can become torn if an attempt is made form the cassette side. To enable removal from the right cover side, the following operation takes plate:

1) After detecting the jam, the retracting roller is driven for a period equivalent to a distance over which paper may be moved 10 cm. The paper will be moved to a point where it is in view when the right cover is opened.
2) The control panel indicates an instruction to the effect that the jam may be removed from the right cover side.
3) The right cover may be opened to remove the jam. If the jam is not in view when the right cover is opened, it may be removed from the cassette side.



*1:paper does not arrive about 1 sec after detection.

*2:paper moved by the retracting roller for a equivalent of a distance over which paper may be moved 10 cm.

F05-308-02

3.9 Operation Other Than Cassette Pickup (standby)

When the cassette is slid into or out of the machine, the following takes place:

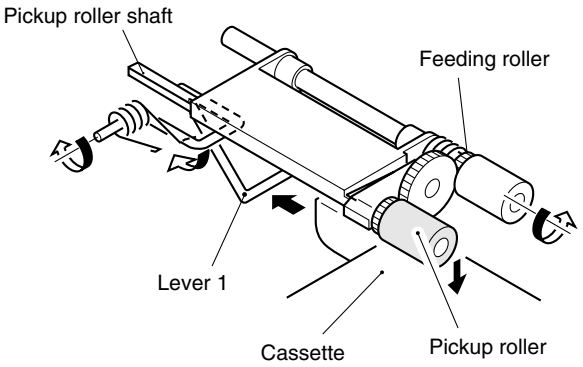
3.9.1 Moving Up the Lifter/Moving Down the Pickup Roller Shaft (cassette slid in)

1) Moving Down the Pickup Roller Shaft

With the power on, when the cassette is slid into the machine, the pickup roller moves down until it comes into contact with the paper surface as follows:

- The cassette rear end pushes in the lever 1 of the pickup unit.
- When the cassette size detection mechanism goes ON, the main motor (M1) and the pickup solenoid (SL1) go ON to swing the pickup lever.

■ The pickup roller shaft is subject to the moment of the lever 1 and the pickup lever.



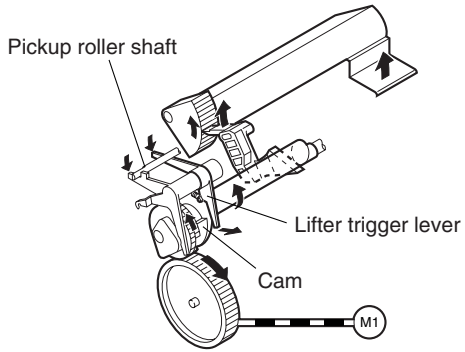
F05-309-01 Movement of the Lever 1 When the Cassette Is Slid In

2) Moving Up the Lifter

When the main power is turned on with the cassette set in the machine or the cassette is slid in while the machine is in standby state, the pickup roller shaft moves down to push down the lifter trigger lever.

The cam is released when the pickup roller shaft pushes one side of the lifter trigger lever, and the drive from the main motor (M1) move sup the lifter.

When the pickup roller remaining in contact with the paper surface moves up to a specific height, the movement of the levers cause the pickup roller shaft to return to the uppermost position to end the upward movement of the lifter.



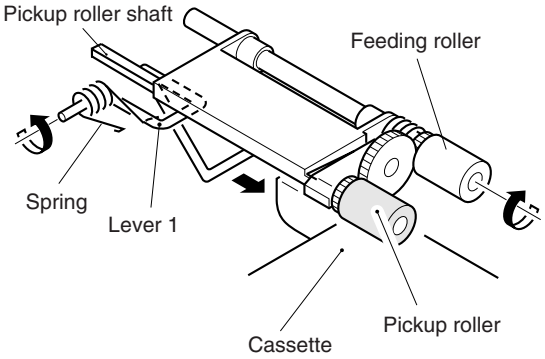
F05-309-02 Moving Up the Lifter

3.9.2 Moving Up the Pickup Roller Shaft and Releasing the Separation Roller Pressure (cassette slid out)

When the cassette is slid out of the machine, the pickup roller shaft is mechanically moved up and the separation roller pressure is also released.

1) Moving Up the Pickup Roller Shaft and Releasing the Separation Roller Pressure

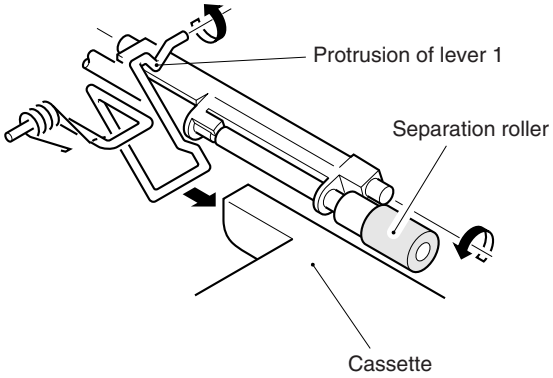
When the cassette is slid out, the lever 1 rotates by the work of a spring. When the lever 1 rotates, the pickup roller shaft moves so that the pickup roller and the cassette will not interfere with each other.



F05-309-03 Moving Up the Pickup Roller Shaft

2) Releasing the Separation Roller Pressure

The lever 1 is provided with a protrusion used to push down the separation roller assembly. When the cassette is slid out, the lever 1 rotates causing the separation roller to move down, thereby removing the pressure between the separation roller and the feeding roller.



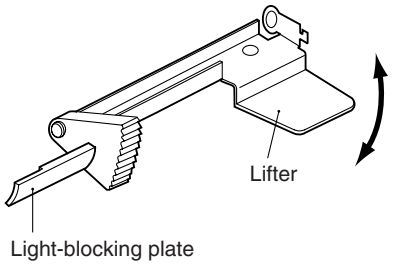
F05-309-04 Releasing the Separation Roller

b. Releasing the Lifter

The lifter is released when the cassette is slid out while the machine is in standby state.

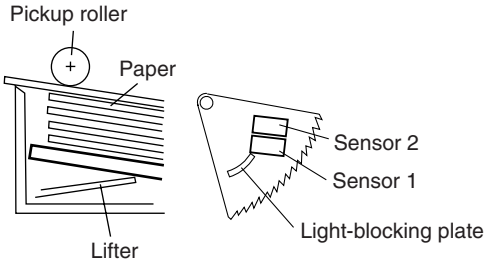
3.10 Detecting the Level of Paper

The level of paper inside the cassette is detected by the light-blocking plate of the lifter gear and a sensor in relation to the distance over which the lifter moves up. When paper starts to run out, the lifter gradually moves up; when paper fully runs out, the cassette paper sensor (Q1604 for cassette 1) identifies the condition as indicating the absence of paper.

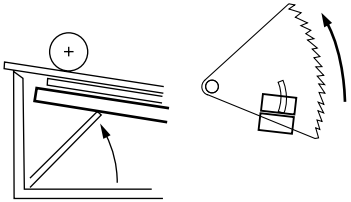


F05-310-01

If the cassette is full of paper



If the cassette is empty of paper



Note: The diagram is a view from the rear of the copying machine.

F05-310-02 Detecting the Level of Paper in the Cassette (upper cassette holder)

The amount of paper inside the cassette is indicated on the control panel in terms of four levels (including the absence of paper).

	Indication	Level	Sensor 1	Sensor 2
	3 bars	100% to about 50% of capacity	0	0
	2 bars	50% to about 10% of capacity	1	0
	1 bar	about 10% or less of capacity	1	1
	no bar	No paper	-	-

0: light-blocking plate over the sensor.
1: light-blocking plate not over the sensor.

T05-310-01

4 Identifying the Size of Paper

The size of paper inside the cassette may be set using the dial on the cassette. The AB-setting and the Inch-setting are switched over using the switch found next to the dial.

4.1 Identifying the Size

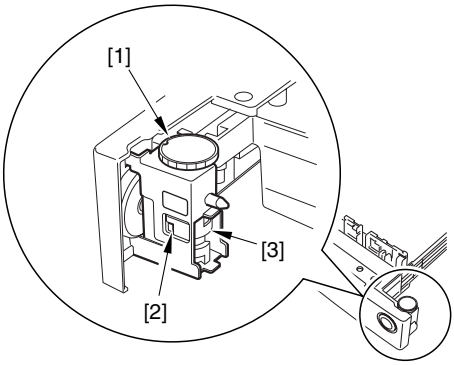
The dial on the cassette may be set to any of 16 stops.

When the dial is set to an appropriate paper size and the cassette is slid into the machine, the four cassette size detecting switches recognize the size of the paper based on the resulting combination of indentations and protrusions of the size detecting cam.

4.2 AB-/Inch-Setting Switch

The AB-setting and the Inch-setting is switched over using the switch found next to the dial.

When the cassette is slid into the machine, the cassette side detecting switch recognizes the paper configuration (AB or Inch)

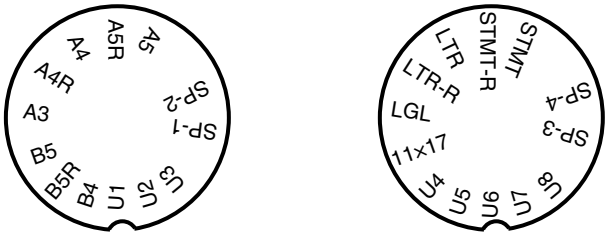


Ref.	Name
[1]	Dial
[2]	AB-/Inch-setting switch
[3]	Size detecting cam

F05-402-01

4.3 Paper Size

The width and the length of paper are identified by the CPU of the machine with reference to how the dial mounted to the cassette is set. The following diagram shows the rotary label attached to the dial, and the following table shows the paper sizes that are recognized by the machine:



A/B-setting rotary label Inch-setting rotary label

F05-403-01 Rotary Label

Note 1: U Cassette

The following are special types of paper:

U1...FOOLSCAP	U2...FOLIO
U8...K-LGL(R)	
OFFICIO	U3...A-FLS
A-OFFICIO	U4...G-LTR
E-OFFICIO	U5...G-LTR(R)
B-OFFICIO	U6...G-LGL
A-LGL	U7...X-LGL

Note 2: SP-1, -2 (SPECIAL 1, 2)

A default size paper that suits t the needs of the user may be registered in user mode. A SPECIAL cassette icon may be indicated on the control panel for immediate access. For details, see the User's Manual.

(AB-setting)	Combination of states of cassette size detection switches					Main scanning	Sub scanning
Cassette name	SW1	SW2	SW3	SW4	SW5	direction (mm)	direction(mm)
No cassette	OFF	OFF	OFF	OFF	OFF	-	-
A5	OFF	ON	ON	OFF	ON	210	148
A5R	OFF	ON	ON	ON	ON	148	210
A4	OFF	ON	ON	ON	OFF	297	210
A4R	OFF	ON	OFF	ON	OFF	210	297
A3	OFF	ON	OFF	ON	ON	297	420
B5	OFF	ON	OFF	OFF	ON	257	182
B5R	OFF	ON	OFF	OFF	OFF	182	257
B4	OFF	ON	ON	OFF	OFF	257	364
U1 (FLSO)	OFF	OFF	ON	OFF	OFF	216	330
U1 (OFICIO)	OFF	OFF	ON	OFF	OFF	216	317
U1 (A-OFI)	OFF	OFF	ON	OFF	OFF	220	340
U1 (E-OFI)	OFF	OFF	ON	OFF	OFF	220	320
U1 (B-OFI)	OFF	OFF	ON	OFF	OFF	216	355
U1 (A-LGL)	OFF	OFF	ON	OFF	OFF	220	340
U2 (FOLIO)	OFF	OFF	ON	OFF	ON	210	330
U3 (A-FLS)	OFF	OFF	ON	ON	ON	206	337

(Inch-setting)	Combination of states of cassette size detection switches					Main scanning	Sub scanning
Cassette name	SW1	SW2	SW3	SW4	SW5	direction (mm)	direction(mm)
No cassette	OFF	OFF	OFF	OFF	OFF	-	-
STMT	ON	ON	ON	OFF	ON	216	140
STMTR	ON	ON	ON	ON	ON	140	216
LTR	ON	ON	ON	ON	OFF	279	216
(A-LTR)	ON	ON	ON	ON	OFF	280	220
LTRR	ON	ON	OFF	ON	OFF	216	279
(A-LTRR)	ON	ON	OFF	ON	OFF	220	280
LGL	ON	ON	OFF	ON	ON	216	356
11×17	ON	ON	OFF	OFF	ON	279	432
U4	ON	ON	OFF	OFF	OFF	267	203
U5	ON	ON	ON	OFF	OFF	203	267
U6	ON	OFF	ON	OFF	OFF	203	330
U7	ON	OFF	ON	OFF	ON	268	190
U8	ON	OFF	ON	ON	ON	190	206

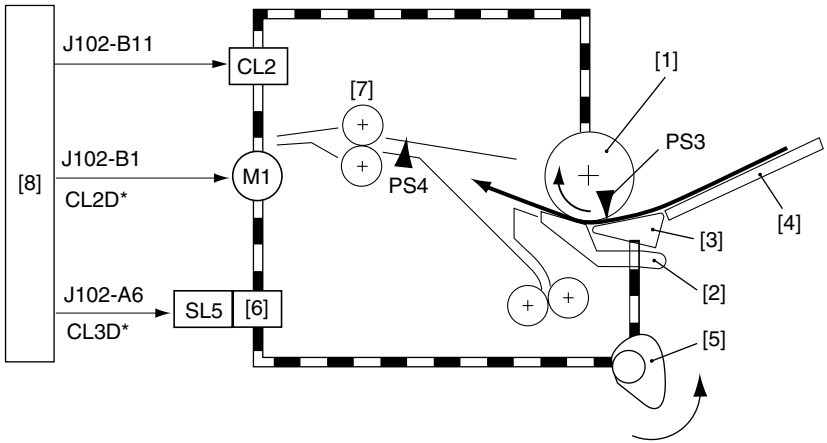
T05-403-01 List of Paper Sizes

5 Multifeeder

5.1 Outline

When the paper guide plate moves up, the paper on the multifeeder tray is butted against the pickup roller, and the pickup roller and the separation pad make sure that only one sheet of paper is picked up and fed into the machine.

1) The paper guide plate is operated by the drive of the main motor (M1) transmitted by the paper guide solenoid (SL5).
2) The pickup roller is operated by the drive of the main motor (M1) transmitted by the multifeeder clutch (CL2).



F05-501-01

Ref.	Name
[1]	Multifeeder pickup roller
[2]	Separation pad
[3]	Paper guide plate
[4]	Multifeeder tray
[5]	Drive cam
[6]	Spring cutch

Ref.	Name
[7]	Registration roller
[8]	DC controller PCB
M1	Main motor
CL2	Multifeeder clutch
SL5	Multifeeder holding plate releasing solenoid

5.2 Identifying the Size of Paper in the Multifeeder

5.2.1 Detecting the Width of Paper

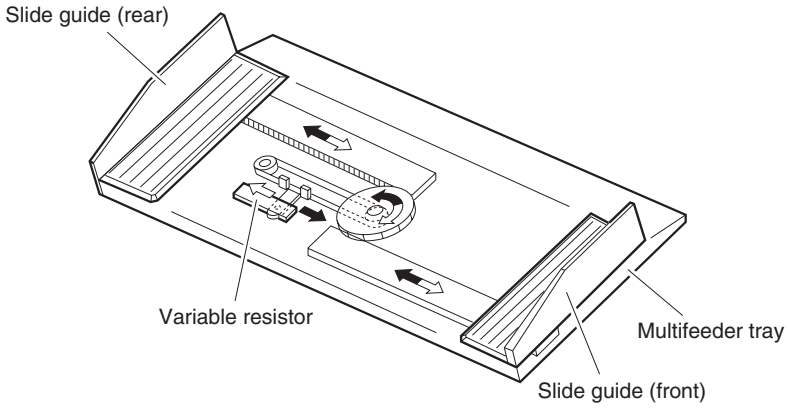
The width of paper is detected by a variable resistor operating in conjunction with the movement of the slide guide. The slide guide is set when the user adjusts the multifeeder tray to suit the paper placed on it.

5.2.2 Rear/Front Registration

The rear/front registration of the multifeeder may be adjusted by turning the screw on the slide guide. For details, see $. “Standards and Adjustments” in Chapter 7.

5.2.3 Identifying the Length of Paper

The length of paper is detected with reference to the period of time during which the pre-registration sensor (PS4) remains ON while copies are being made. The maximum size of paper is 432 × 279 mm (11×17).



F05-602-01

COPIER>ADJUST>CST-ADJ>MF-A4R
Use it to adjust the paper width basic value of A4R paper for the manual feed tray.
COPIER>ADJUST>CSRT-ADJ>MF-A6R
Use it to adjust the paper width basic value of A6R for the manual feed tray.
COPIER>ADJUST>CST-ADJ>MF-A4
Use it to adjust the paper width basic value of A4 paper for the manual feed tray.

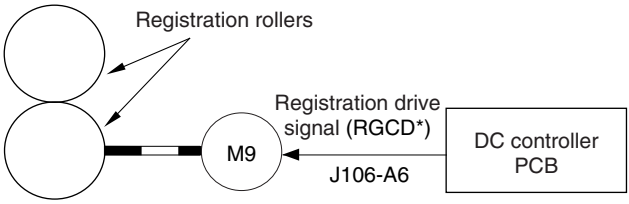
6 Controlling the Registration Roller

6.1 Outline

The registration roller is driven by the registration motor (M9) so that the paper and the image on the photosensitive drum will match at a specific point.

The timing at which the registration roller rotates may be adjusted in service mode (ADJUST>FEED-ADJ>REGIST).

6.2 Control System



F05-602-01

COPIER>ADJUST>FEED-ADJ>REGIST
Use it to adjust the timing at which the registration roller is started.

7 Double-Sided Printing

7.1 Through-Path Operation

In this sequence of operations, paper after fixing is fed to the delivery assembly and then to the duplex feeding assembly using the reversing flapper. the machine re-arranges the order of images in its memory for printing.

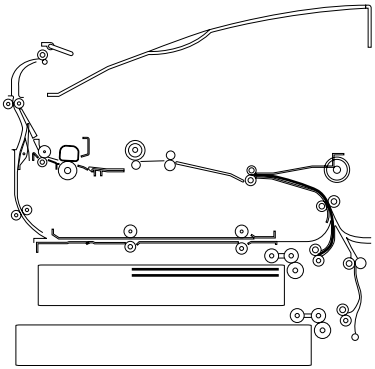
As many as two sheets may exist at a time between the registration sensor and the duplex paper sensor.

COPIER>ADJUST>FEED-ADJ>ADJ-REFE
Use it to adjust the image write start position in main scanning direction for re-pickup. (-100 to 100 mm)

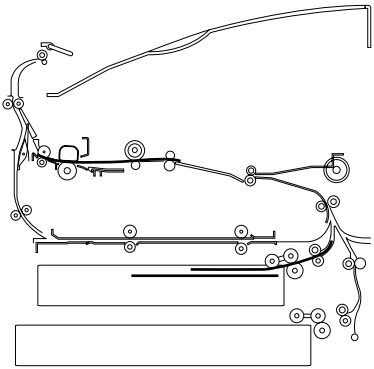
7.2 Outline of Operations

For instance, through-path operations take place as follows when one set of double-sided prints are made of six originals:

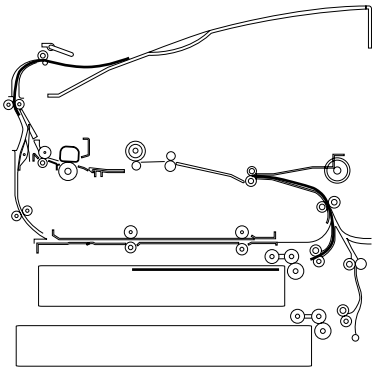
1) The 1st sheet is picked up from the cassette.
2) The 2nd side is printed on the 1st sheet.



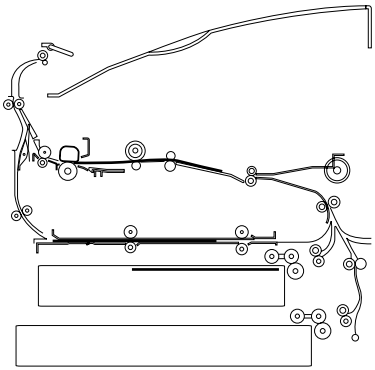
3) The 1st sheet is switched back in the delivery assembly, and is then sent to the duplex feeding assembly.
4) The 2nd sheet is picked up, and the 4th side is printed.



5) The 2nd sheet is switched back in the delivery assembly, and is then sent to the duplex feeding assembly.
6) The 1st side is printed on the back of the 1st sheet.

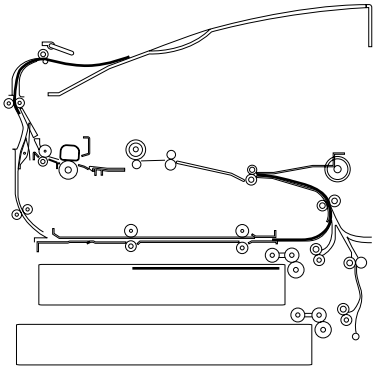


7) The 1st sheet is delivered.
8) The 2nd sheet is in the duplex feeding assembly.
9) The 3rd sheet is picked up, and the 6th side is printed.

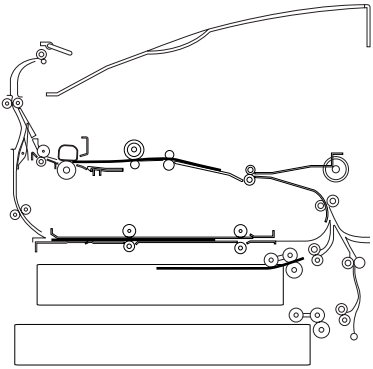


F05-703-01

10) The 3rd sheet is switched back in the delivery assembly, and is then sent to the duplex feeding assembly.
11) The 3rd side is printed on the back of the 2nd sheet.



12) The 2nd sheet is delivered.
13) The 3rd sheet is in the duplex feeding assembly.



F05-703-02

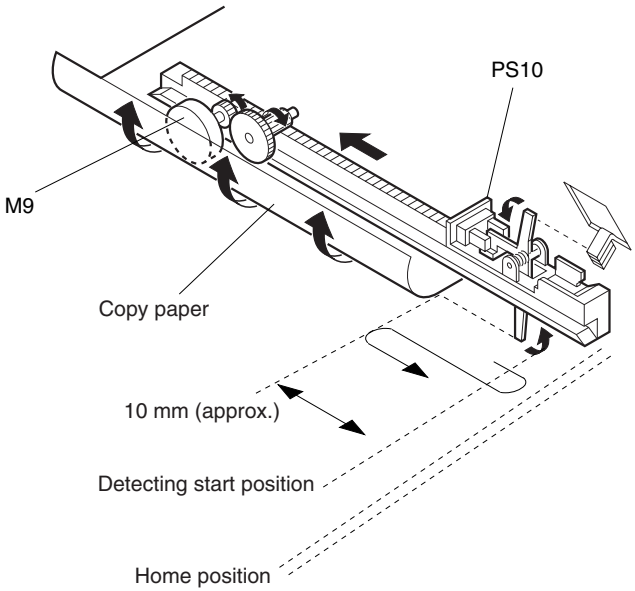
7.3 Detecting the Horizontal Registration Position

7.3.1 Outline

- In duplex printing, paper coming from the duplex feeding assembly is checked for horizontal registration, and the detected displacement in rear/front direction is made up for by adjusting the point of laser exposure.

Paper position:	by duplex horizontal registration sensor (PS31)
Timing of detection:	after duplex paper sensor (PS34) goes ON
Drive:	by duplex horizontal registration motor (M16)
Position:	by pulse from duplex horizontal registration motor (1 pulse = about 0.16 mm)
Related service mode:	COPIER>ADJUST>FEED-ADJ>ADJ-REFE
Related error code:	E051 (home position not detected within specific time)

T05-703-01



F05-703-01

7.3.2 Operation

1) Timing of Detecting Home Position

When the main power switch is turned on, During jam recovery, When the front cover is closed

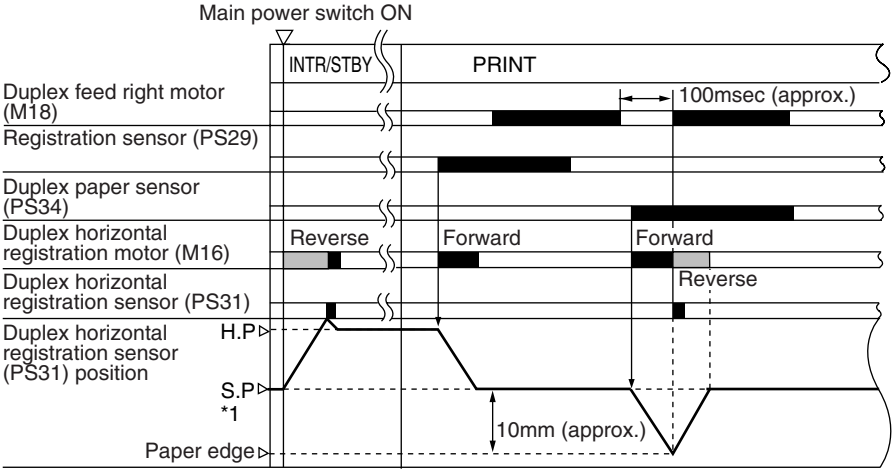
2) Start Position

Point of A4 detection

When paper fed to the duplex feeding assembly reaches the duplex paper sensor (PS34), the horizontal registration motor (M16) goes ON, and the duplex horizontal registration sensor (PS31) starts paper edge detection. The detection takes place for 100 msec while the duplex feed right motor (M19) is at rest and each time a double-sided print is made.

The detection start position is set at a point about 10 mm from the edge of paper whose movement is ideal with reference to the data on the paper width collected from the slide guide on the manual feed tray and the cassette size when the registration sensor goes ON.

The detection of paper position is done with reference to the start position, and the displacement from the actual paper position is identified with reference to the drive pulses from the motor (1 pulse = about 0.16 mm).



*1: the edge of paper and the contact against the sensor are detected in the absence of the light-blocking plate.

*2: the position of the edge of paper differs depending on the size of paper, hence different SP.

HP: start position of the duplex horizontal sensor.

SP: detection start position of the duplex horizontal registration sensor.

F05-703-02

8 Controlling the Pickup Assembly Motor

8.1 Pickup Assembly Motor

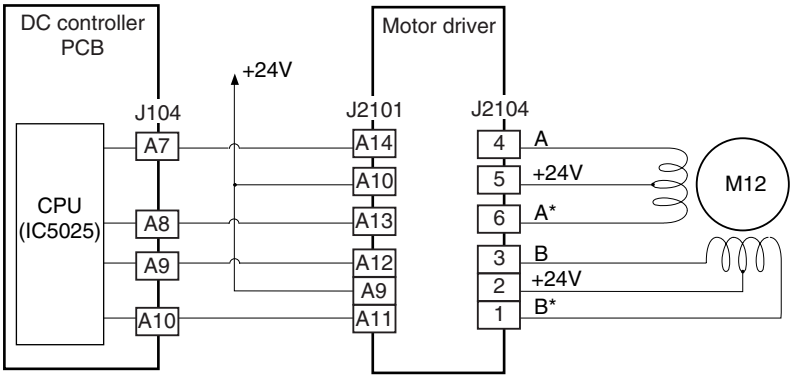
The pickup assembly motor system consists of six stepping motors of 2-phase magnetic excitation type.

Each motor is supplied with power by the motor driver PCB, and is turned on/off and rotated clockwise or counterclockwise by pulse signals from the DC controller PCB.

T05-801-01 shows the motors used in the pickup assembly and F05-801-01 shows a block diagram of the control circuit for the cassette 1/2 pickup motor:

Location	Motor name	Notation	Drive unit	Error detection
Pickup system	Cassette 1/2 pickup motor	(M2)	p.	Motor error Jam occurred
Vertical path system	Duplex motor	(M6)	p.	Same as above
Duplex system	Duplex registration motor	(M3)	p.	Same as above
Others	Registration moter	(M9)	p.	Same as above
	Delivery moter	(M5)	p.	Same as above

T05-801-01



F05-801-01

CH APTER 6

FIXING SYSTEM

1 Outline of Operations

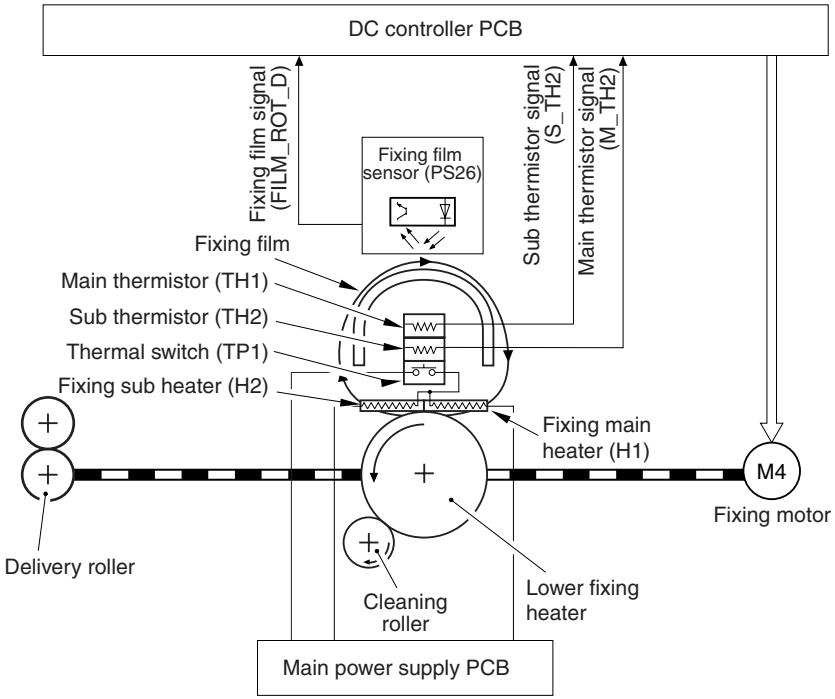
1.1 Outline

The following are major functions of the fixing system.

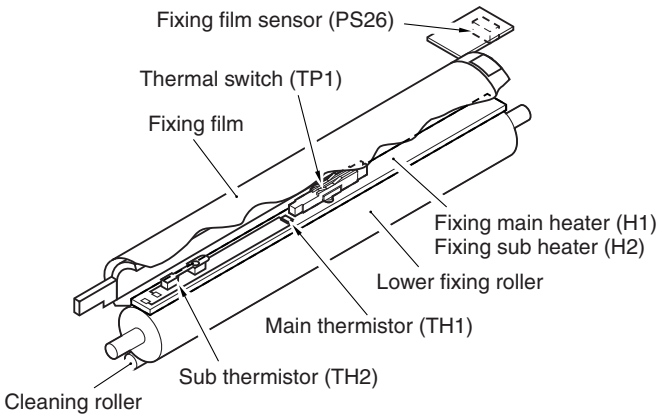
Item	Function
Fixing method	SURF method
Fixing heater	Main heater: flat heater
	Sub heater: flat heater
Control temperature	As selected in service mode
Temperature detection	[1] Main thermistor (temperature control, error detection)
	[2] Sub thermistor (error detection)
	[3] Thermal switch (error detection)
Fixing temperature control	[1] Sequence at power-on
	[2] Sequence for site of installation
	[3] Sequence for ambient temperature
Cleaning method	Cleaning roller
Error detection	[1] Temperature control error detection by thermistor
	[2] Overheating detection by thermal switch
Fixing film	Equipped with rotation detection mechanism

T06-101-01

The following are the major components for the fixing system:



F06-101-01



F06-101-02

Component	Notation	Description
Lower fixing roller		Pressure roller
Fixing motor	M4	24VDC
Main sub heater	H1•H2	230V model: 637W 120V model: 607W 100V model: 621W
Main thermistor	TH1	Temperature control, Error detection
Sub thermistor	TH2	Error detection
Thermal switch	TP1	Set to 250 ± 7°C
Fixing film sensor	PS26	Fixing film rotation detection (reflection type sensor)

T06-101-02

2 Fixing Drive System

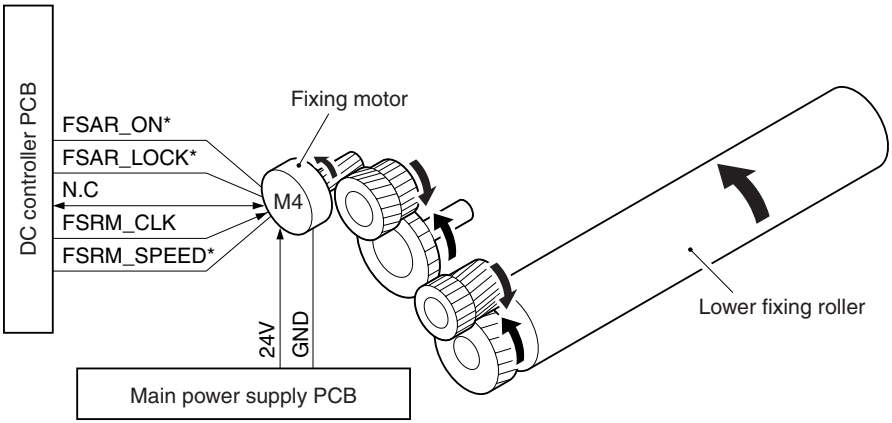
2.1 Outline

The fixing drive system is controlled for the following:

1. Fixing roller drive
2. Fixing film rotation speed detection (control)

2.2 Controlling the Drive of the Fixing roller

F06-202-01 shows the construction of the control system used to control the drive of the fixing roller:



F06-202-01

The following signals are used:

[1] Fixing motor drive signal; when '1', the motor goes ON.
[2] Fixing motor drive lock signal; when the rotation speed of the fixing motor reaches a specific level, '0'.
[3] Fixing motor low-speed drive signal; when the operation speed of the fixing motor is controlled 1/4, '1'.

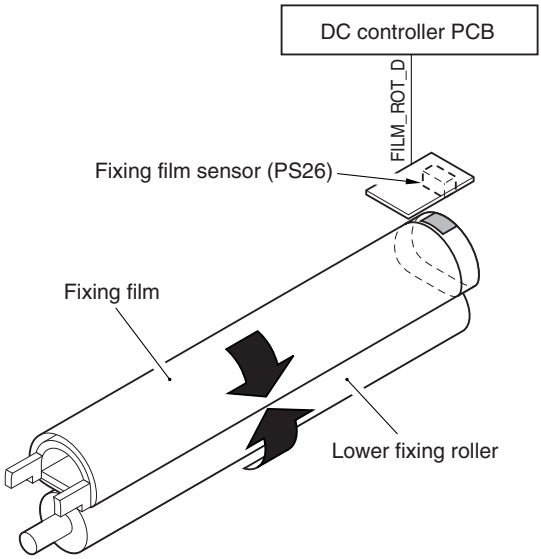
Error

E014 (fixing motor speed error)
Indicates that the fixing motor drive signal (M4) is generated but the drive lock signal is not detected within 1.3 sec thereafter.

2.3 Controlling the Fixing Film Speed

F06-203-01 shows the control signal used to control the speed of the fixing film.

The speed of rotation is controlled according to the changes in the output of the fixing film sensor (PS26).



F06-203-01

The following signals are used:

[1] Film rotation detection signal; when the fixing film is rotating, alternates between '1' and '0'.

Error

E007 (fixing film rotation error)

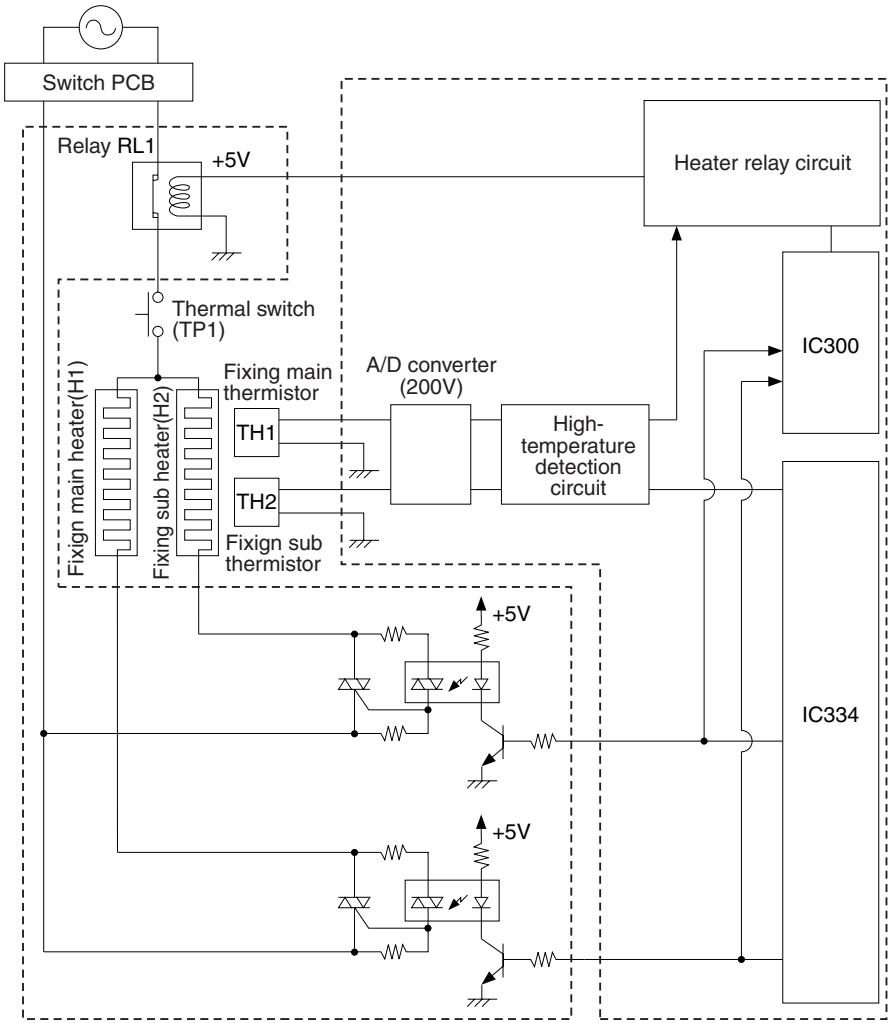
Indicates that that detection temperature of the main thermistor is 100°C or higher and, in addition, the fixing motor is rotating but the film rotation detection signal cannot be detected for 6 sec or more.

3 Controlling the Fixing Temperature

3.1 Outline

The following relates to the control of the fixing temperature:

1. Fixing heater temperature control
2. Thermistor error detection



F06-301-01

3.2 Controlling the Temperature

The machine uses the following types of mechanisms to control its fixing temperature:

Operation	Item	Description
Normal	[1] Power-on sequence (wait-up control)	If the reading of the main thermistor (TH1) is 100°C or lower during return from sleep mode or at power-on, control is initiated aiming at 180°C.
	[2] Start-up sequence	When copying is started.
	[3] Normal temperature control sequence	When the temperature is controlled based on an assumed temperature of the lower roller while paper is moving through the fixing assembly.
	[4] Sheet-to-sheet control sequence	When the temperature is controlled to a lower fixing level between sheets being fed continuously.
	[5] Duplex control sequence	When the temperature is controlled to a lower level for the 2nd side of a double-sided copy.
	[6] Small-size paper sequence	When overheating is prevented on the heater ends otherwise caused by small-size sheets fed continuously. In this mode, the copying speed will decrease.
Service mode ON	[7] Switching the fixing temperature COPIER>OPTION>BODY>FIX-TEMP	The target temperature for fixing control is lowered: 1 : -10°C 2 : -6°C 3 : -3°C 4 : +3°C 5 : +6°C

T06-302-01

3.2.1 Fixing Control Table

The machine assumes a surface temperature for the lower fixing roller in relation to the reading by the main thermistor (TH1), and determines a target temperature level for the fixing heater to suit its assumption. For instance, the following control temperature levels will be used for normal temperature control sequence in relation to the assumed lower fixing roller temperature:

Assumed lower fixing roller temperature (°C)	Control temperature (°C)
50≦T<55	205
55≦T<60	200
60≦T<65	195
65≦T<70	190
70≦T<70	185
75≦T<80	180
80≦T<85	175
85≦T<90	170
90≦T<95	165
95≦T<100	160
100≦T	155

T06-302-02

In addition to the selected paper size, number of sheets fed, and type of paper, the machine uses this type of table to determine control temperature levels.

3.3 Detecting Faults

The fixing temperature control mechanism checks for the following faults:

1. Temperature control error by the main thermistor (TH1)
2. Sensor error by the sub thermistor (TH2)
3. Overheating error by the thermal switch (TP1)

The following signals are used in relation to error detection:

[1] Fixing temperature detection signal 1; generates a voltage of a level suited to the reading of the main thermistor.
[2] Fixing temperature detection signal 2; generates a voltage of a level suited to the reading of the sub thermistor.
[3] Sub heater drive signal; when '1', the sub heater turns on .
[4] Sub heater temperature detection signal; when the sub heater is powered, '0'.
[5] Main heater drive signal; when '1', the main heater goes ON.
[6] Main heater temperature detection signal; when the main heater is powered, '0'.
[7] Relay drive signals; when '1', the relay (RL1) on the main power supply PCB goes ON.

Error

E000
Indicates either of the following: the main thermistor (TH1) has poor contact or an open circuit; the thermal switch (TP1) has an open circuit; the main/sub heater has an open circuit; the main power supply PCB is faulty; the DC controller PCB is fatly; the door switch is faulty.

E001
Indicates either of the following: the main thermistor (TH1) has a short circuit; the sub thermistor (TH2) has a short circuit; the main power supply PCB is faulty; the DC controller PCB is faulty.

E002
Indicates any of the following: the main thermistor (TH1) has poor contact or an open circuit; the thermal switch (TP1) has an open circuit; the fixing heater has an open circuit; the AC driver PCB is faulty; the DC controller PCB is faulty; the door switch is faulty.

E003
Indicates either of the following: the main thermistor (TH1) has poor contact or an open circuit; the thermal switch (TP1) has an open circuit; the fixing heater has an open circuit; the main power supply PCB is faulty; the DC controller PCB is faulty; the door switch is faulty.

In the case of E000 through E003, the code will not be reset when the main power switch is turned off, requiring the use of service mode (COPIER>FUNCTION>CLEAR>ERROR).

However, if E001 or E003 is detected within 3 sec after the front door switch is identified to have been opened or closed, the code will be reset when the main power switch is turned off and then on. This consideration is to prevent a service call in response to an error detected when the switch operation is not fully stable (as immediately after turning off and then on the main power switch).

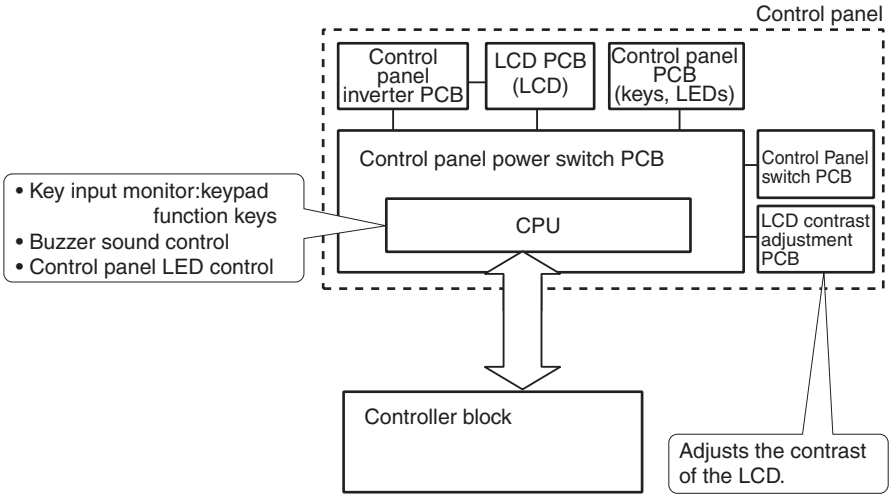
CHAPTER 7

EXTERNALS AND CONTROLS

1 Control Panel

1.1 Outline

The machine's control panel consists of the following PCBs and a touch panel (LCD) capable of displaying at a resolution of 320×240 dots:



F07-101-01

COPIER>FUNCTION>PANEL>LCD-CHK
Use it to check for missing dots on the LCD.
COPIER>FUNCTION>PANEL>LED-CHK
Use it check the activation of the LEDs on the control panel.
COPIER>FUNCTION>PANEL>LED-OFF
Use it to check the de-activation of the LEDs on the control panel.
COPIER>FUNCTION>PANEL>KEY-CHK
Use it to check key inputs.
COPIER>FUNCTION>PANEL>TOUCHCHK
Use it to adjust the coordinates on the touch panel.

2 Fans

2.1 Arrangement, Functions, and Error Code

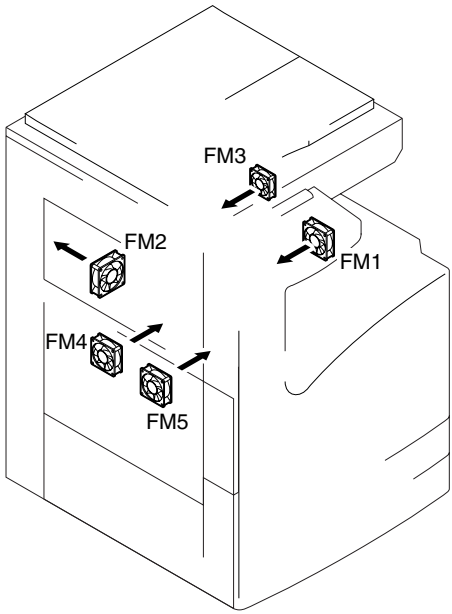
The names and the functions of the fans used in the machine and the error codes associated with the fans are as follows:

Notation	Name	Function	2-speed control (voltage)	Error code
FM1	Developing assembly fan	Cooling the developing assembly	Yes (24/12 V)	E805-0001
FM2	Fixing fan	Cooling the fixing assembly.	Yes (24/12 V)	E805-0002
FM3	Electric unit fan	Cooling the power unit.	Yes (24/12 V)	E805-0003
FM4	Curl removing fan 1	Prevents curling of paper.	No (24 V)	E805-0004
FM5	Curl removing fan 2	Prevents curling of paper.	No (24 V)	E805-0005

The curl removing fans 1 and 2 may be enabled or disabled in service mode: COPIER>OPTION>BODY>DECRL-FN.

T07-201-01

The arrangement and the direction of current are as follows:

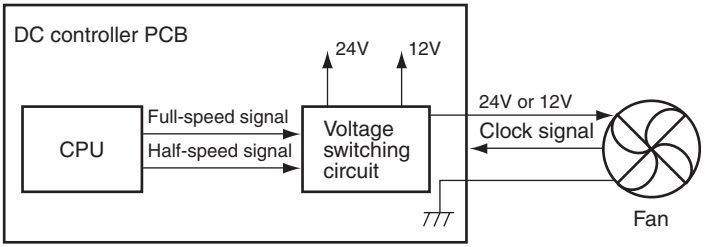


F07-201-01

2.2 Operations

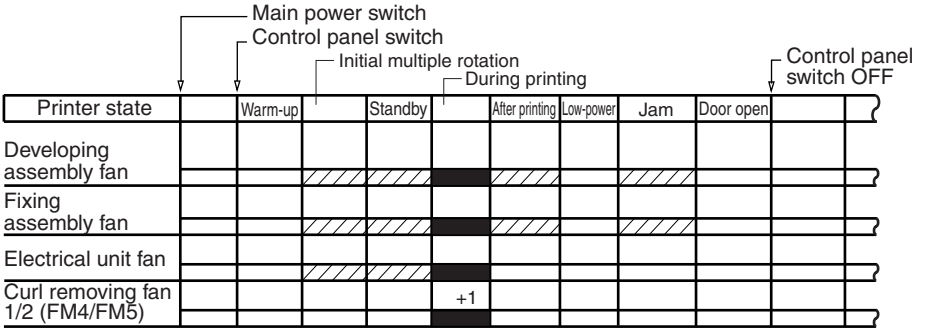
2.2.1 Controlling the Speed

Some of the fans used in the machine are 2-speed fans (F07-202-01) whose speed of rotation is switched over by their respective voltage switching circuits:



F07-202-01

2.2.2 Sequence of Operations



:full-speed.

:half-speed or at rest (half-speed if the polygon mirror motor M10 is ON; otherwise, at rest).

*1: Rotates for 30 sec after the leading edge sensor goes ON during printing; if the sensor goes ON once again during the 30-sec period, rotates for another 30 sec. The fan may be enabled or disabled in service mode: COPIER>OPTION>BODY>DECRL-FN>

F07-202-02

3 Power Supply

3.1 Power Supply

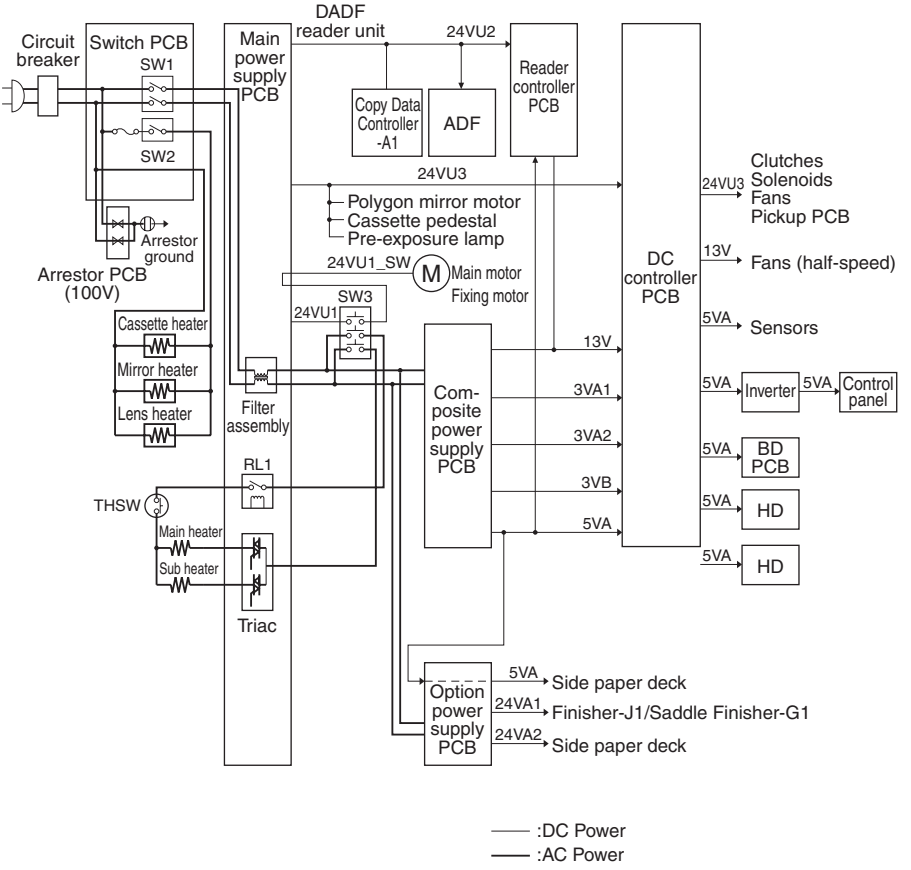
3.1.1 Outline

The machine is supplied with DC power by the DC power supply PCB; the function of each PCB and associated components are shown in T07-301-01 and the loads of each power supply are indicated in F07-301-01:

Name	Description
Main power supply PCB	• Generates DC power from AC power. • Protection against over-current.
Composite power supply PCB	• Generates high voltage.
Option PCB	• Supplies power to the side paper deck and the finisher.
Switch PCB (SW1/SW2)	• Switches on/off (SW1) power to the main paper supply; switches on/off (SW2) power to the cassette heater, mirror heater, and lens heater.
Door switch (SW3)	• Identifies the state (open/closed) of the front door; cuts off AC power to the fixing heater; cuts off 24V power to the main motor, fixing motor, and composite power supply PCB.
Thermistor power supply PCB (200 V)	• Supplies power to the thermistor.

T07-301-01

The following shows how power is distributed inside the machine:



F07-301-01

3.1.3 Outputs of the Power Supplies

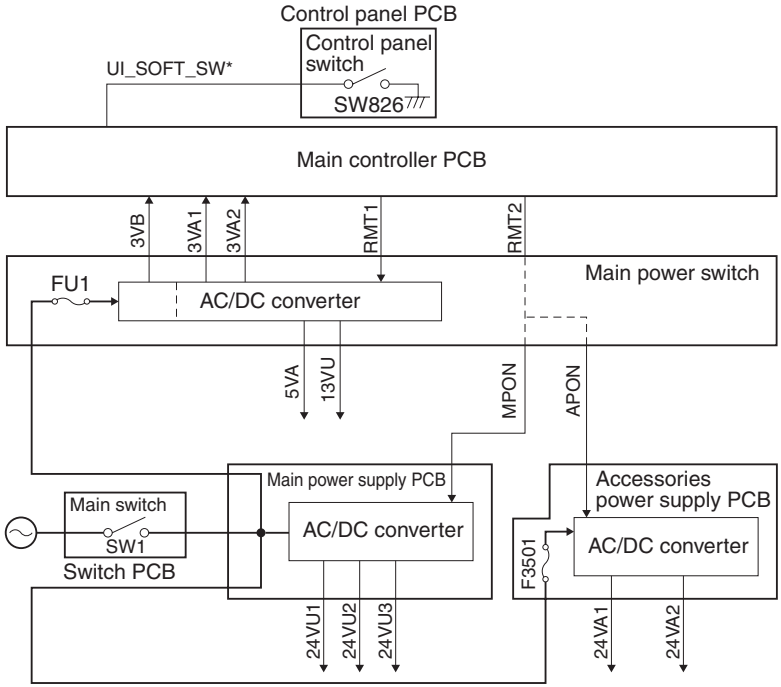
The outputs of the machine's power supplies are controlled by the main power switch (SW1), control panel power switch (SW826), or signals from the printer board.

The following shows the states of power supplies from each power supply PCB based on combinations of printer board signals and in relation to the main power switch and the control panel switch:

Main paper switch (SW1)	Control panel switch (SW826) or printer board signal	Power supply output from power supply PCB	Power supply output from composite power supply PCB	Power supply output from accessories power supply PCB
OFF*1	OFF	None	None	None
ON	OFF	None	3VB*2	None
ON	ON	All	All	All

*1:If the environment switch (SW2) is ON, the cassette heater, mirror heater, and lens heater are supplied with power.

T07-301-02



F07-301-03

3.2 Rated Outputs of the Main Power Supply PCB

Output	24VU1	24VU1-SW	24VU2	24VU3
Connector No.	J200-1	J202-1	J203-2	J204-1
	J203-1	J202-3		J204-3
		J202-5		J204-7
		J200-3*1		J204-8
				J204-9
				J206-2
Output voltage tolerance		±5%*2		
Rated output voltage		24V		
Rated output current		9.0A		
Overcurrent protection activation level		5.5 to 8.0A		

*1:input.
*2:+7%, -5%, depending on output current.

T07-302-01

3.3 Rated Outputs of the Composite Power Supply PCB

Output	3VA1	3VA2	3VB	5V	13VU
Connector No.	J121-4	J121-1	J121-11	J122-1	J126-2
	J121-5	J121-2	J121-12	J122-2	J126-3
	J122-3	J121-3	J121-13	J124-9	J126-5
	J122-4			J124-10	J126-7
Output voltage tolerance	+2%, -4%		±2%	+3%, -4%	-
Rated output voltage	3.4V		3.4V	5.1V	12.5 to 17.0V
Rated output current	3.4A		1.9A	4.7A	0.11A
Overcurrent protection activation level	5.0 to 8.0A		5.0 to 8.0A	5.5 to 8.0A	1.0 to 8.0A

T07-303-01

Note:However, applies only when the AC input is from 85 to 135 V in the case of the 100V model and from 187 to 264 V in the case of the 230V model.

3.4 Rated Outputs of the Accessories Power Supply PCB

Output	24VA1	24VU1-SW
Connector No.	J703-2 J704-6	J702-1 J702-4
Output voltage tolerance	+7%,-5%	
Rated output voltage	24V	
Rated output current	5.5A	
Overcurrent protection activation level	5.5 to8.0A	

T07-304-01

However, applies only when the AC input is from 85 to 135 V in the case of the 100V model and from 187 to 264 V in the case of the 230V model.

3.5 Protective Functions

Each power supply PCB of the machine is equipped with an overcurrent protective circuit, and the respective output will stop in response to the activation of each PCB.

The output from each power supply PCB goes ON in response to the signals RMT1 and RMT2 from the main controller PCB; if an error in the high-voltage output occurs or the fuse blows, 3VB from the composite power supply PCB will stop to cut off the output of all power supplies.

4 Others

4.1 Silent Mode

In silent mode, the rotation of the laser scanner motor while in standby is controlled (1/2) to reduce the operating noise of the machine.

When the Start key is pressed in silent mode, the laser scanner motor will take extra time before its rotation returns to normal, so that the first print time will be somewhat longer.

The period of time before silent mode is started may be changed in user mode.

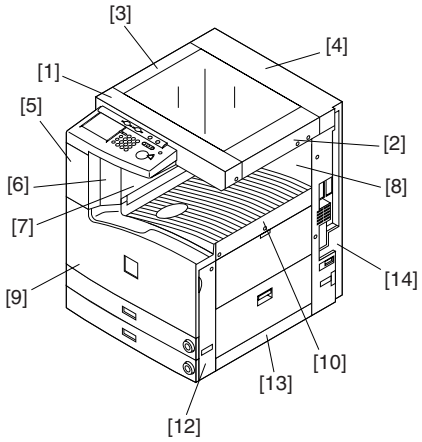
5.1 External Covers

The following covers may have to be removed when cleaning, inspecting, or repairing the inside of the machine:

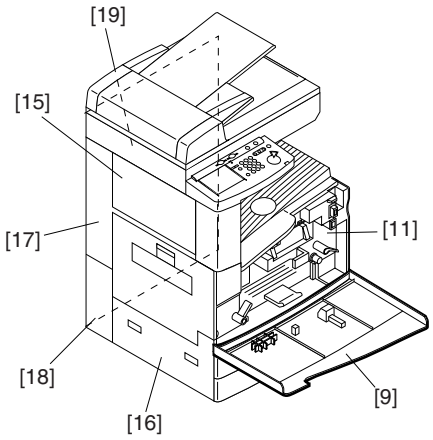
REF.

Those covers that can be remove by merely removing the mounting screws are omitted from the discussions (the number of mounting screws used are indicated).

[1] Reader for cover (2 screws)
[2] Reader right cover (2 screws)
[3] Reader left cover (2 screws)
[4] Reader rear cover (5 screws)
[5] Support cover (1 screw)
[7] Support right cover (1 screw)
[8] Rear cover (4 screws)
[9] Front cover (2 L-shaped pins)
[10] Delivery tray (2 screws)
[11] Inside cover (6 screws)
[12] Right front cover (2 screws)
[13] Right lower cover (none if the Cassette Feeding Unit-W1 is installed)
[14] Right rear cover (5 screws)
[15] Left upper cover (2; none if the Finisher-J1 or the Inner 2-Way-A1 is Installed
[17] Left lower cover (1 screw)
[18] Waste toner cover (1 screw)
[19] Rear cover (7 screws)



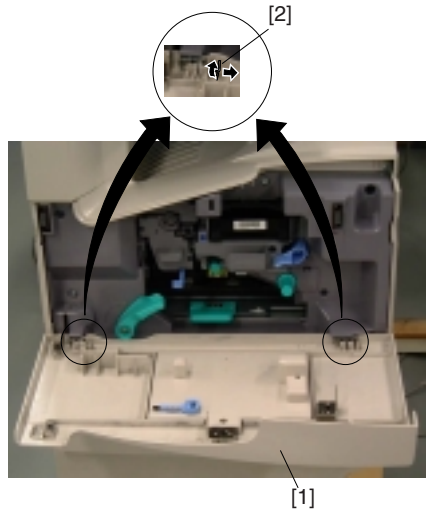
F07-501-01



F07-501-02

5.1.1 Removing the Front Cover

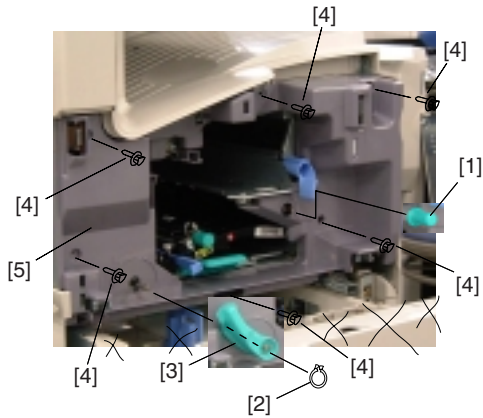
1) Open the front cover [1], and shift up the L-shaped pin [2] of the hinge with your finger.
2) Pull out the shifted L-shaped pin [2] to the right, and detach the front cover [1].



F07-501-03

5.1.2 Removing the Inside Cover

1) Remove the front cover. (See 5.1.1.)
2) Remove the drum unit. (See p. $.)
3) Remove the developing assembly. (See p. $.)
4) Remove the cassette 1 (topmost cassette).
5) Remove the tab [1] of the registration roller.
6) Remove the grip ring [2], and detach the feeding lever [3]
7) Remove the six mounting screws [4], and detach the inside cover [5].

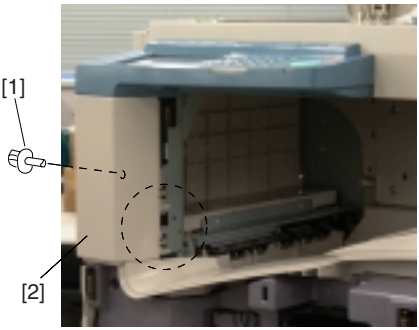


F07-501-04

5.1.3 Removing the Support Cover

1) Open the support right cover (1 screw).
2) Remove the left rear cover.
3) Open the front cover.
4) Remove the screw [1], and remove the support cover [2].

Take care not to break the claw (indicated by a circle) found behind the support cover.

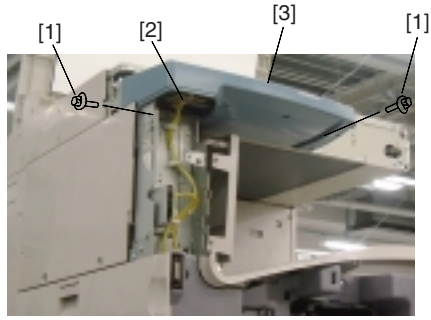


F07-501-05

5.2 Control Panel

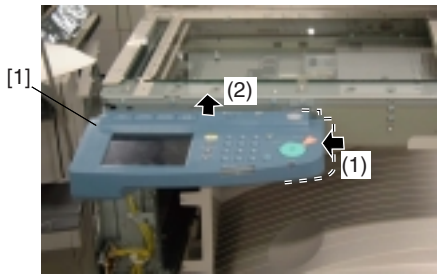
5.2.1 Removing the Control Panel

1) Remove the support cover. (See p. $.)
2) Remove the reader front cover. (2 screws)
3) Remove the two screws [1], and disconnect the connector [2].



F07-502-01

4) Shift the control panel [1] to the left, and detach it upward.

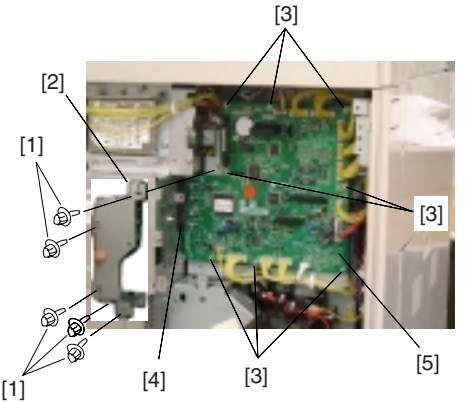


F07-502-02

5.3 PCBs

5.3.1 DC controller PCB

1) Remove the rear cover. (7 screws)
2) Remove the five screws [1], and detach the connector guard plate [2].
3) Disconnect all connectors of the harness.
4) Remove the eight screws [3].
5) Disconnect the connector [4] connecting the main controller, and remove the DC controller PCB [5].

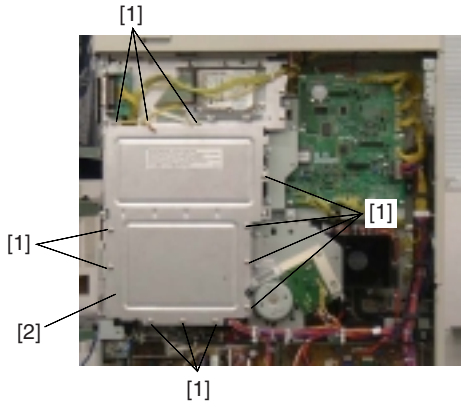


F07-503-01

5.3.2 HDD Unit

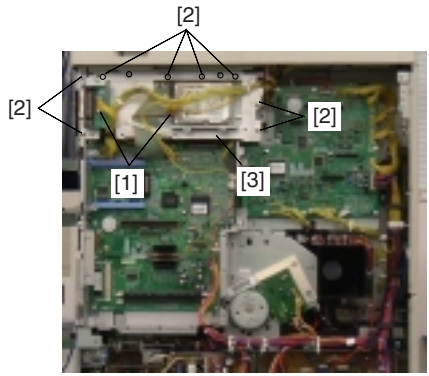
When removing the HDD unit, be sure to take care against damage by static electricity. Further, be sure to avoid impact on the HDD unit.

1) Remove the rear cover. (7 screws)
2) Remove the 12 screws [1], and detach the controller cover [2].



F07-503-02

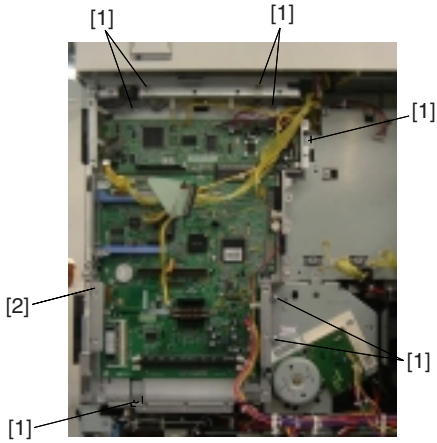
3) Disconnect the two connectors [1].
4) Remove the eight screws [2], and detach the HDD unit [3].



F07-503-03

5.3.3 Controller Box Unit

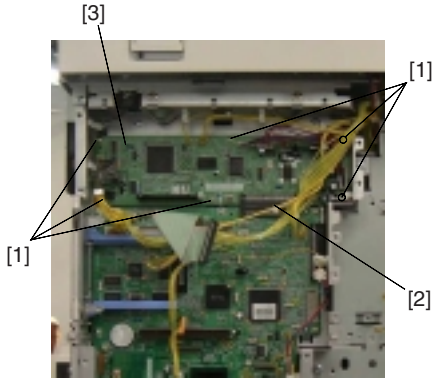
1) Remove the rear cover. (7 screws)
2) Detach the DC controller PCB. (See p. $.)
3) Remove the hard disk unit. (See p. $.)
4) Disconnect all connectors of the harness.
5) Remove the eight screws [1], and detach the controller box unit [2].



F07-503-04

5.3.4 Reader Controller PCB

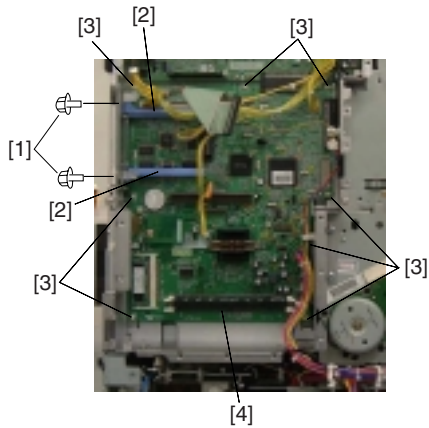
1) Remove the rear cover. (7 screws)
2) Remove the hard disk unit. (See p. $.)
3) Disconnect all connectors of the harness.
4) Remove the six screws [1].
5) Disconnect the connector [2] connected to the main controller, and detach the reader controller PCB [3].



F07-503-05

5.3.5 Main Controller PCB

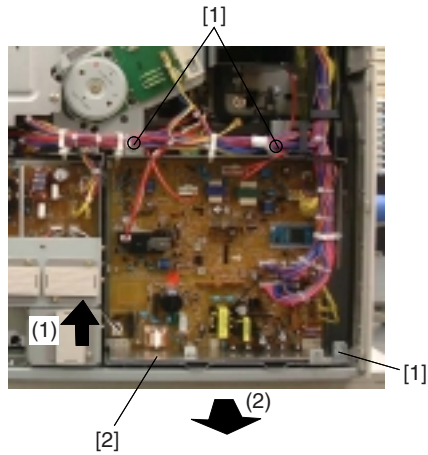
1) Remove the rear cover. (7 screws)
2) Remove the DC controller PCB. (See p. $.)
3) Remove the reader controller PCB. (See p. $.)
4) Disconnect all connectors of the harness.
5) Remove the screw [1] (one each), and detach the two PCB guides [2].
6) Remove the eight screws [3], and detach the main controller PCB [4].



F07-503-06

5.3.6 Composite Power Supply

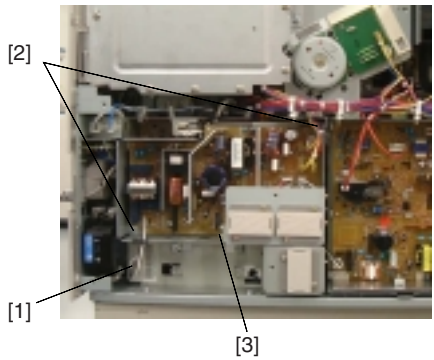
1) Remove the rear cover. (7 screws)
2) Disconnect all connectors.
3) Remove the three screws [1], and lift the composite power supply [2], and detach it to the front.



F07-503-07

5.3.7 Accessories Power Supply

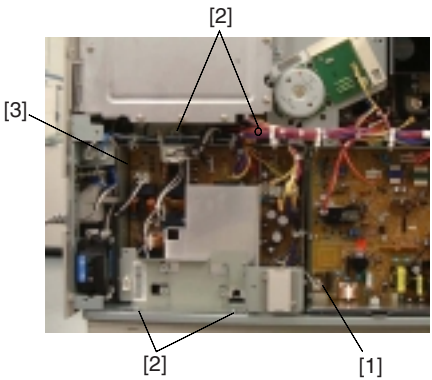
1) Remove the rear cover. (7 screws)
2) Disconnect all connectors.
3) Disconnect the connector [1] connected to the main power supply.
4) Remove the two screws [2], and detach the accessories power supply [3].



F07-503-08

5.3.8 Main Power Supply

1) Remove the accessories power supply. (See 5.3.7.)
2) Disconnect all connectors.
3) Disconnect the connector [1] connected to the composite power supply.
4) Remove the four screws [2], and detach the main power supply [3].



F07-503-09

5.4 Cassette Heater

5.4.1 Removing the Cassette Heater

1) Remove the support cover. (See p. $.)
2) Remove the reader front cover. (2 screws)
3) Remove the two screws [1], and disconnect the connector [2].

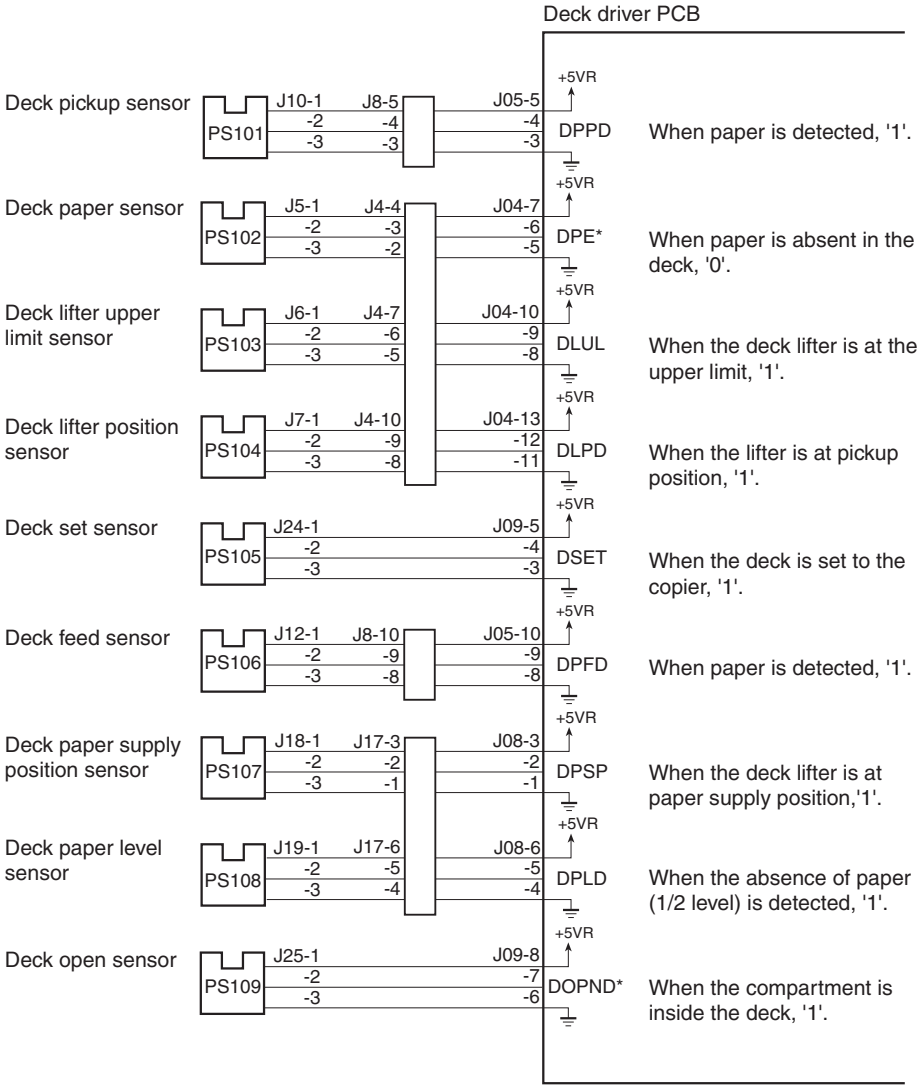
CHAPTER 8

PAPER DECK

1 Side Paper Deck

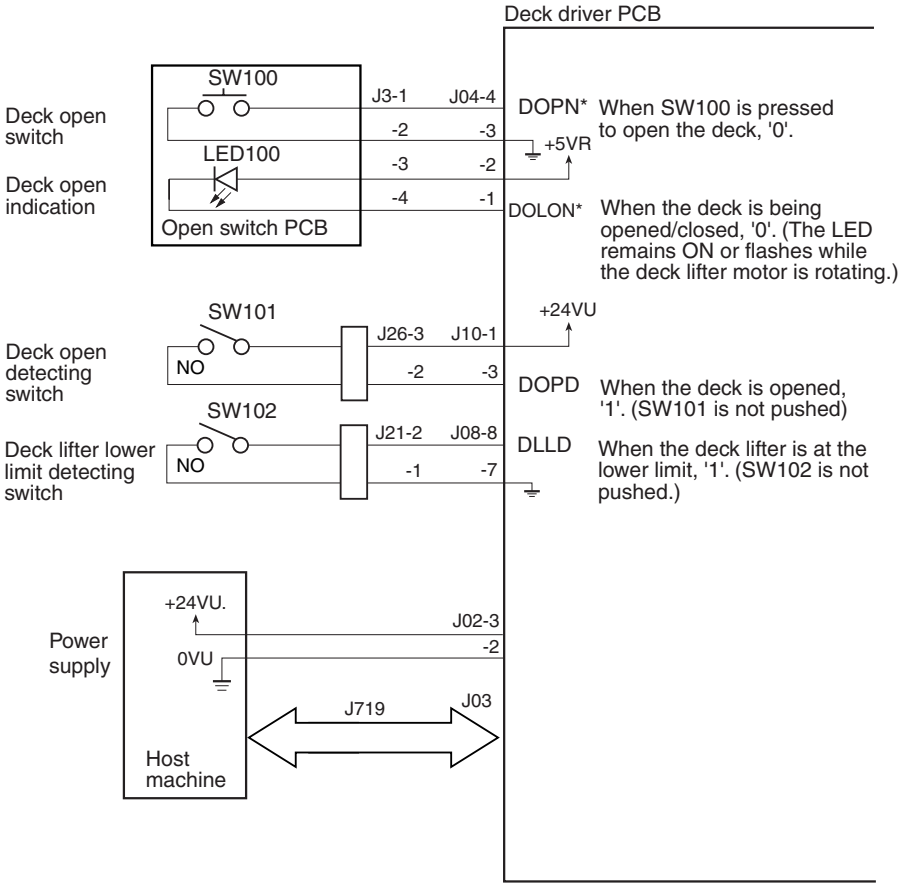
1.1 Inputs to and Outputs from the Deck Driver

1.1.1 Inputs to the Deck Driver (1/2)



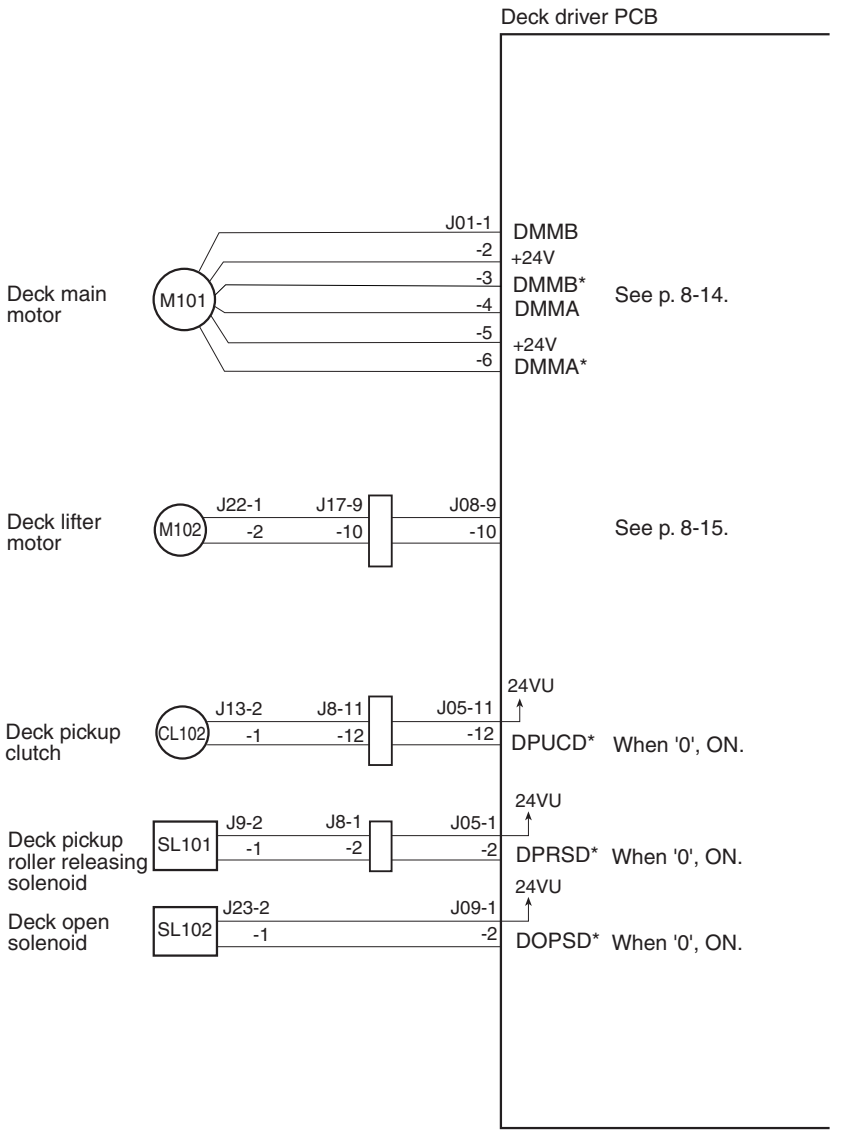
F08-101-01

1.1.2 Outputs from the Deck Driver (2/2)



F08-101-02

1.1.3 Outputs from the Deck Driver (1/1)



F08-101-03

1.2 Pickup

1.2.1 Outline

The paper deck (hereafter, deck) is capable of accommodating 200 sheets of paper at a time (A4/LTR/B5; 80 g/m^2), feeding paper to its host machine in response to control signals from the DC controller.

The deck lifter is driven by the deck lifter motor (M2D), and paper is picked up and fed using the drive of the deck main motor (M1D).

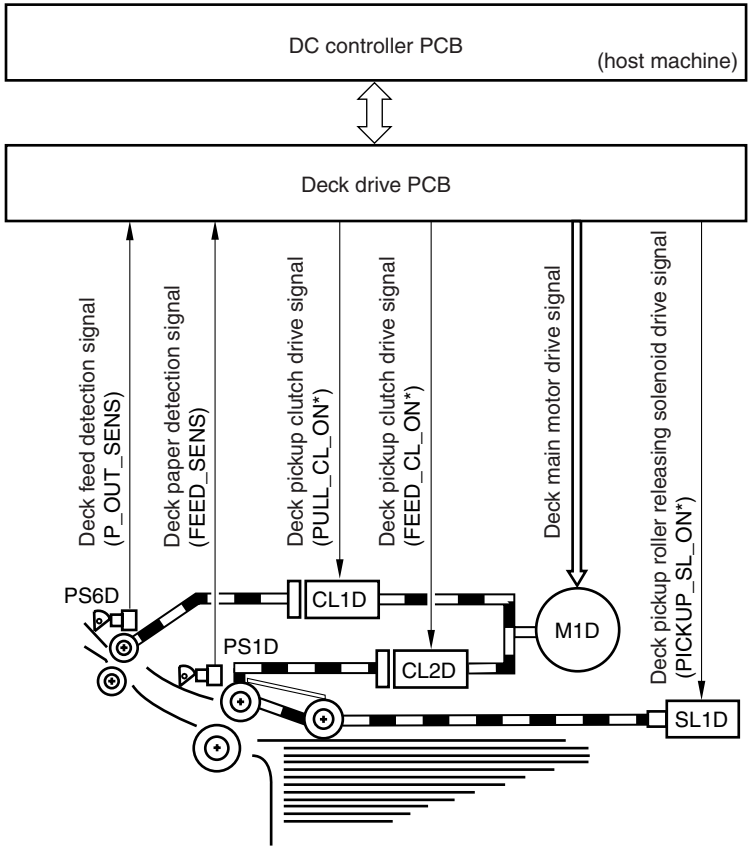
1.2.2 Pickup Operation

The paper placed inside the deck is held up by the lifter, and is kept at a specific level (pickup position).

When the Start key is pressed and, in response, the deck pickup clutch (CL2D) goes ON, the drive of the deck main motor (M1D) rotates the pickup roller to pick up paper. At this time, the pickup/feeding roller and the separation roller serve to make sure that only one sheet of paper is fed; thereafter, when the deck pickup sensor (PS1D) debts paper, the deck pickup roller releasing solenoid (SL1D) goes ON to cause the pickup roller to move away from the stack of paper.

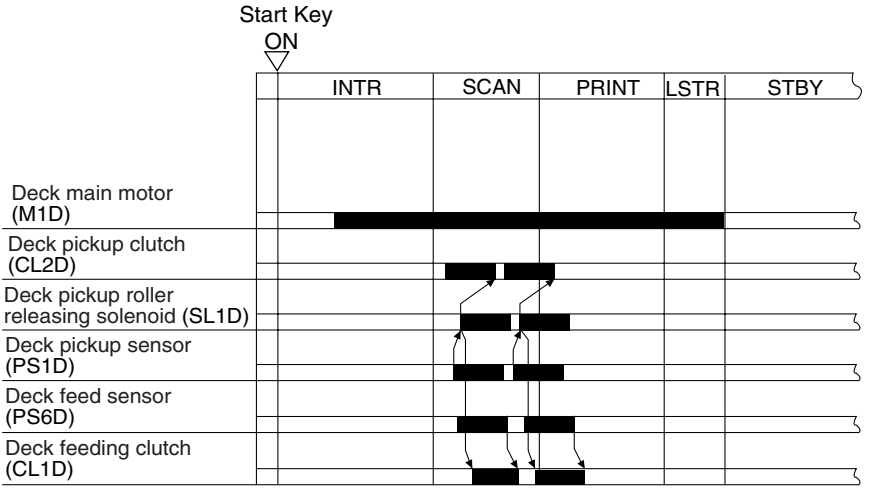
The deck feeding roller is designed to rotate when the deck feeding clutch (CL1D) goes ON; the paper that has been picked up by it is sent to the registration roller of the host machine and is arched for the removal of the skew.

The registration roller controls the paper so that the leading edge of the paper will match the image on the photosensitive drum.


DC controller PCB
(host machine)
Deck drive PCB
Deck feed detection signal
(P_OUT_SENS)
Deck paper detection signal
(FEED_SENS)
Deck pickup clutch drive signal
(PULL_CL_ON*)
Deck pickup clutch drive signal
(FEED_CL_ON*)
Deck main motor drive signal
Deck pickup roller releasing solenoid drive signal
(PICKUP_SL_ON*)
PS6D
PS1D
CL1D
CL2D
M1D
SL1D

F08-102-01

1.2.3 Sequence of Operations (pickup from the deck)

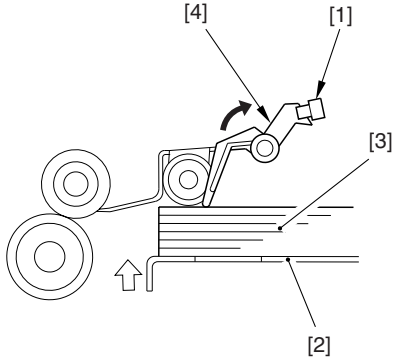


F08-102-02

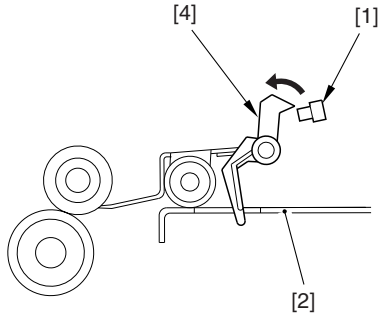
1.3 Detecting Paper in the Deck

1.3.1 Detecting the Presence/Absence of Paper

The presence/absence of paper inside the deck is detected by the deck paper sensor (PS2D) [1]. When the paper placed on the lifter [2] runs out and, as a result, the paper detecting lever [4] of the pickup roller assembly leaves the deck paper sensor, the host machine will indicate the absence of paper on its control panel.



F08-103-01



F08-103-02

1.3.2 Switching the Deck Paper Size

The paper size of the deck is switched at time of installation or as requested by the user: move the guide plate inside the deck to suit the new paper size, and store the new paper size in service mode (OPTION>ACC>DK-P).

1.3.3 Detecting the Level of Paper Inside the Deck

The deck uses the deck paper supply position sensor (PS7D), deck paper level sensor (PS8D), and deck paper sensor (PS2D) to find out the level of paper inside the compartment and indicates the result on the control panel of the host machine. T08-103-01 shows how detection and indication are done (based on the states of the sensors):

Paper level	PS2D	PS7D	PS8D	Indication on control panel
100% to about 50%	1	1	1	
about 50% to about 10%	1	1	0	
about 10% or less	1	0	0	
No paper	0	0	0	

1: light-blocking plate over the sensor.

0: light-blocking plate not over the sensor.

T08-103-01

1.4 Deck Lifter

1.4.1 Detecting the Presence/Absence of Paper

The lifter of the deck is connected to a reel by means of a cable, and is driven by the deck lifter motor (M2D). The lifter is moved up or down depending on the direction of the rotation of the motor.

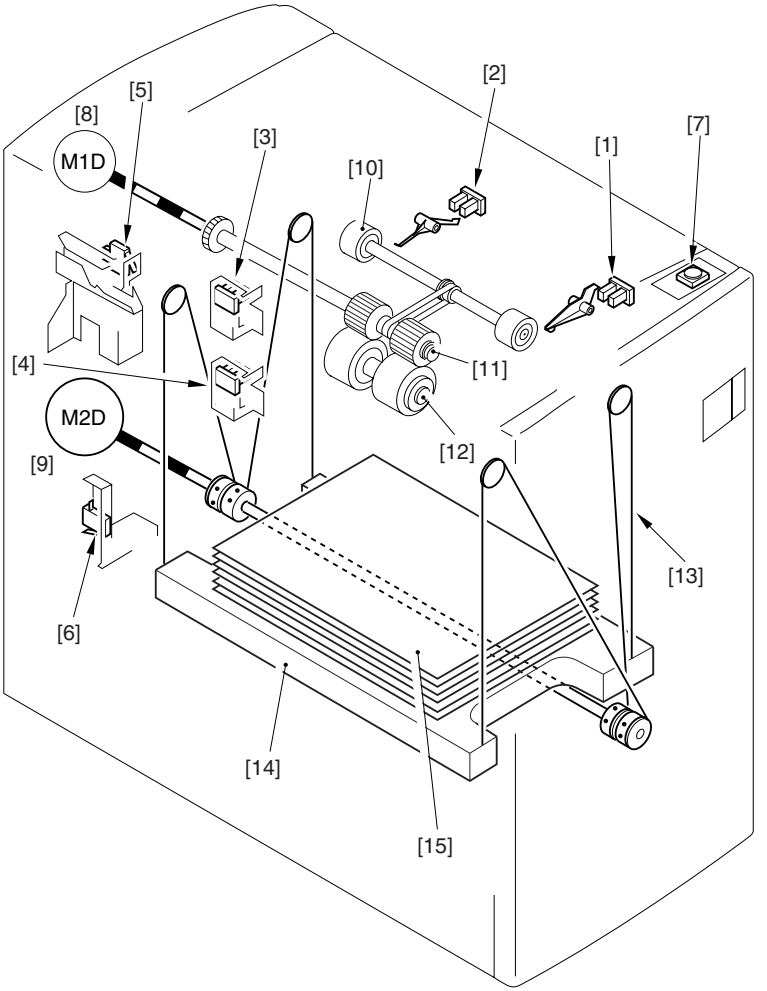
When the compartment is pushed inside the deck, the deck open detection switch (SW1D) is pushed and, in addition, when the deck open sensor (PS9D) detects the light-blocking plate, the lifter starts to move up; the lifter will stop when the deck lifter position sensor (PS4D) detects the top of the stack of paper placed on the lifter.

If the lifter fails to stop after the sensor lever blocks the deck lifter position sensor for some reason, the deck lifter upper limit sensor (PS3D) will go ON to prevent damage to the deck otherwise occurring if the lifter was let to continue to move up.

The lifter starts to move down, on the other hand, when the deck open switch (SW100D) is pressed; it stops when it leaves the sensor lever of the deck paper supply position senor (PS7D; i.e., at the falling edge of the sensor output).

When paper is supplied with the lifter in this position, the lever of the deck paper supply sensor is pushed, and the lifter moves farther down until the stack of paper moves past the sensor lever.

A this time, the lifter keeps repeating the descent each time paper is supplied unit the deck lifter lower limit detecting switch (SW2D) is pressed (maximum paper supply position).



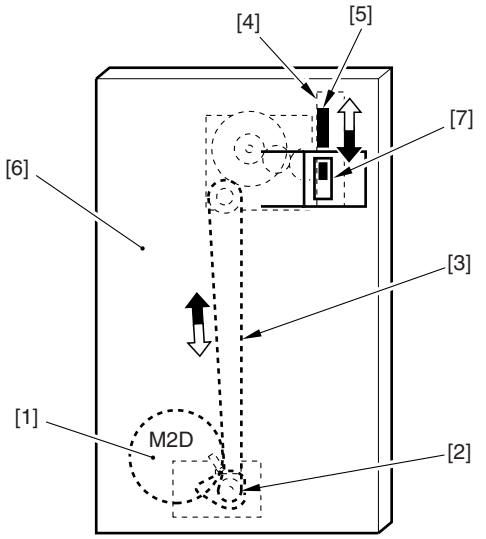
F08-104-01

[1] Deck lifter upper limit sensor
[2] Deck lifter position sensors
[3] Deck paper supply position sensor
[4] Deck paper level sensor
[5] Deck open detecting switch
[6] Deck lifter lower limit detecting switch
[7] Deck open switch
[8] Deck main motor
[9] Deck lifter motor
[10] Pickup roller
[11] Feeding roller
[12] Separation roller
[13] Deck lifter cable
[14] Lifter
[15] Copy paper

1.4.2 Indicating the Level of Paper on the Deck Front Cover

The drive of the deck lifter motor (M2D) [1] is transmitted through a coupling [2] and forwarded to the rack [4] by the drive belt [3]. The rack is equipped with a black belt [5] which moves in conjunction with the rack, moving up and down inside the window [7] in the deck front cover [6].

When the paper starts to run out and the lifter moves up to reach the pickup position, the area of the black belt in the window increases while the area of white (amount of paper) decreases, thereby indicating the level of paper.



F08-104-02

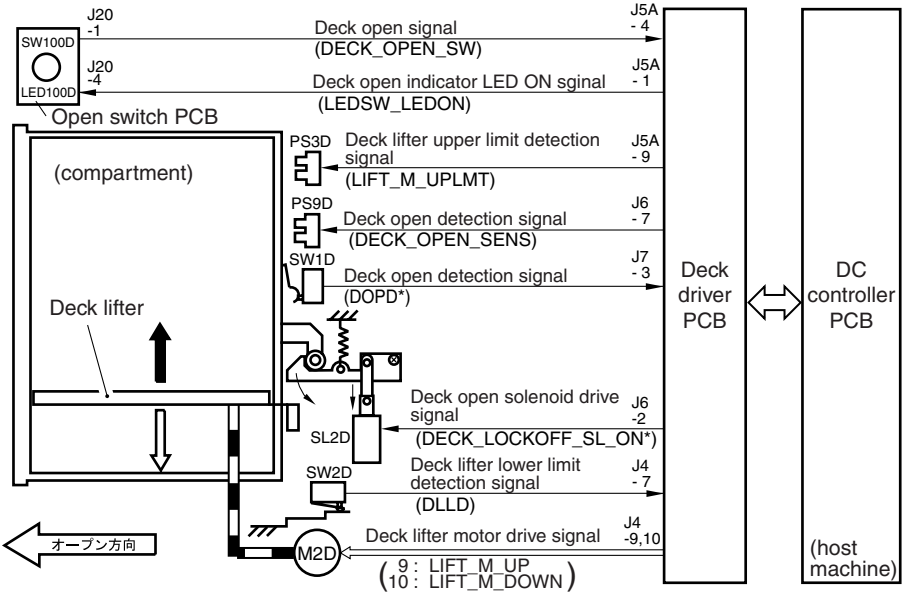
1.5 Opening/Closing the Compartment

1.5.1 Opening/Closing the Compartment

When the deck open switch (SW100D) is pressed, the deck open solenoid (SL2D) goes ON to release the lock of the compartment; the work of a spring then pushes the compartment several centimeters toward the front.

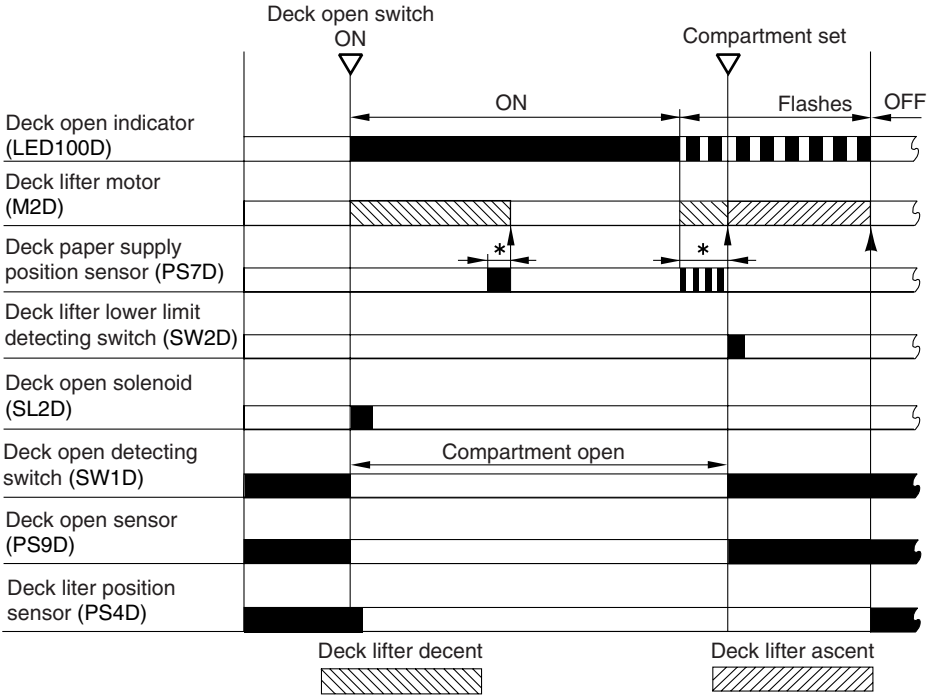
At the same time, the deck lifter motor (M2D) starts to rotate and the lifter inside the compartment starts to move down.

When the compartment is pushed manually inside the deck, the deck open sensor (PS9D) detects the light-blocking plate of the compartment, and the lifter moves up to pickup position. When the deck lifter motor rotates in response to the opening/closing of the deck, the deck open indicator (LED100D) on the open switch PCB will go ON or flash.



F08-105-01

1.5.2 Sequence of Operations (opening/closing the compartment)



∗ : Varies depending on the amount of paper.

F08-105-02

1.6 Controlling the Deck Motor

1.6.1 Controlling the Deck Main Motor (M1D)

The deck main motor is a stepping motor controlled by the DC controller of the host machine. F08-106-01 shows the circuit used to drive the deck main motor, and it has the following functions:

[1] Turning on/off the deck main motor.

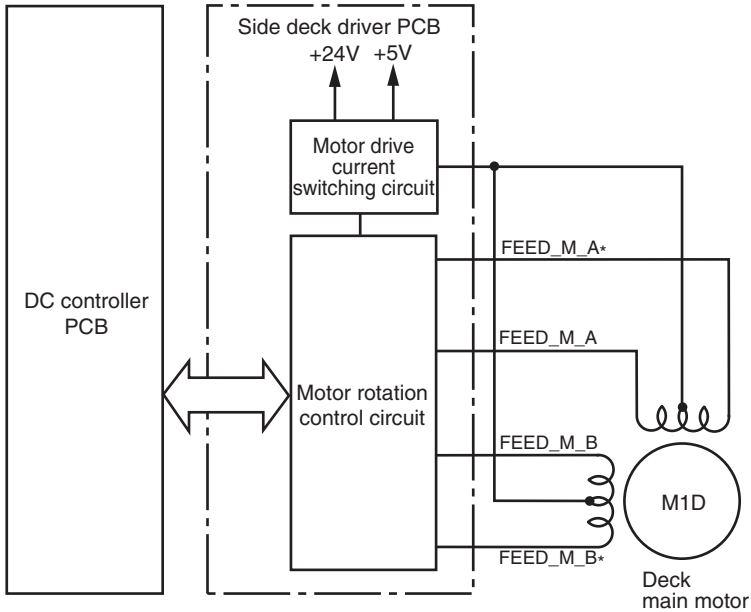
[2] Switching the rotation speed of the deck main motor.

a. Turning On/Off the Motor

The deck main motor is turned on/off by controlling the output of the following pulse signals from the host machine: FEED_M_A, FEED_M_A*, FEED_M_B, FEED_M_B*.

b. Switching the Motor Rotation Speed

The deck is equipped with an automatic pickup/feed speed switching mechanism to suit the speed of its host machines expected in the future. The speed is switched in response to motor clock signals (M-CLK) sent from the DC controller of the host machine to the deck driver PCB.



F08-106-01

1.6.2 Controlling the Deck Lifter Motor (M2D)

The deck lifter motor control circuit is located on the side deck drive PCB. (F08-106-02 is its block diagram.)

The combination circuit found in the diagram consists of various logic circuits, and rotates the deck lifter motor clockwise or counterclockwise depending on the combination of the states of the deck lifter motor DOWN signal (LIFT_M_DOWN) and the deck lifter UP signal (LIFT_M_UP) from the DC controller of the host machine.

If the deck lifter position sensor (PS4D) does not detect the lifter within a specific period of time in the presence of the deck lifter UP signal for some reason, an alarm code (‘05’) will be indicated in service mode (DISPLAY>ALARM1>BODY).

[1] Conditions for Moving Up the Lifter

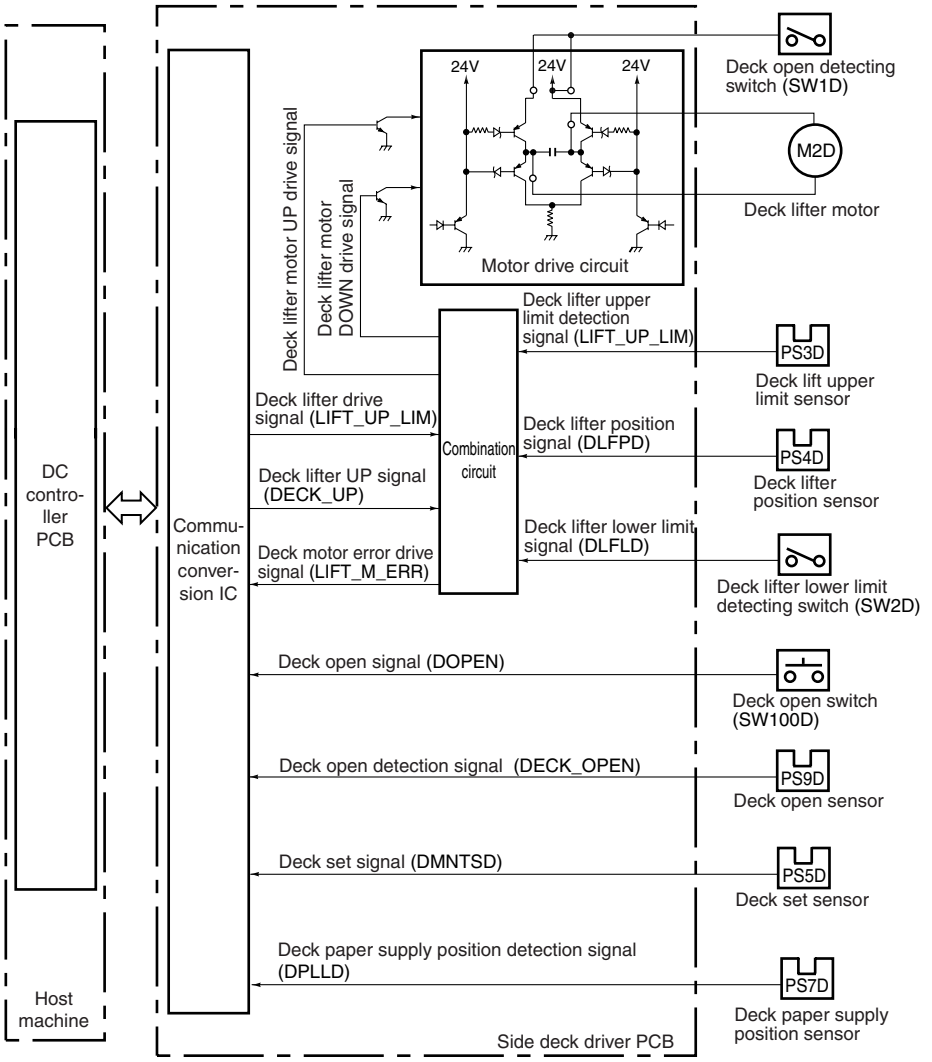
- The deck is connected to the host machine.
  The deck set signal (DECK_MOUNT_SENS) goes ‘1’
- The compartment is closed.
  The deck open detention signal (DECK_OPEN_SNS) goes ‘1’.
- The compartment is closed.
  The deck open detecting switch (DECK_OPEN_SW) goes ON.
- The deck lifter upper limit detection signal (LIFT_M_UPLMT) goes ‘0’ and, in addition, the deck lifter position detection signal (PAP_TOP_SENS) goes ‘0’.
- The deck lifter motor DOWN signal (LIFT_M_DOWN) goes ‘0’.
- The deck lifter UP signal (LIFIT_M_UP) goes ‘0’.

The above conditions cause the lifter to move up.

[2] Conditions for Moving Down the Lifter

- The compartment is open.
  The deck open detection signal (DECK_OPEN_SENS) goes ‘0’.
- The deck lower limit detection signal (LIFT_LOW_LIMIT) goes ‘0’ and, in addition, the deck lifter position detection signal (PAP_TOP_SENS) goes ‘0’.
- The deck lifter DOWN signal (LIFT_M_DOWN) goes ‘0’.
- The deck lifter UP signal (LIFT_M_UP) goes ‘1’.

The above conditions cause the lifter to move down.



Not: The communication conversion IC (IC4) in the diagram is used to convert serial signals into parallel signals and vice versa.

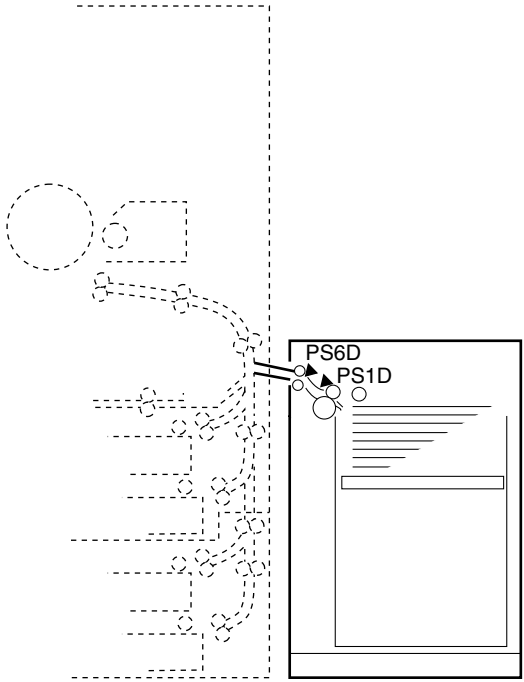
F08-106-02

2 Detecting Jams

2.1 Outline

The paper deck is equipped with the two sensor indicated in F08-201-01 to monitor the movement of paper. The presence/absence of a jam is detected with reference to the signals from the sensors by the DC controller PCB of the host machine at such times as stored in memory.

When the DC controller of the host machine identifies a jam, it will deliver the sheets in front of the jam and then stop the machine; thereafter, it will indicate instructions on jam removal on the control panel.



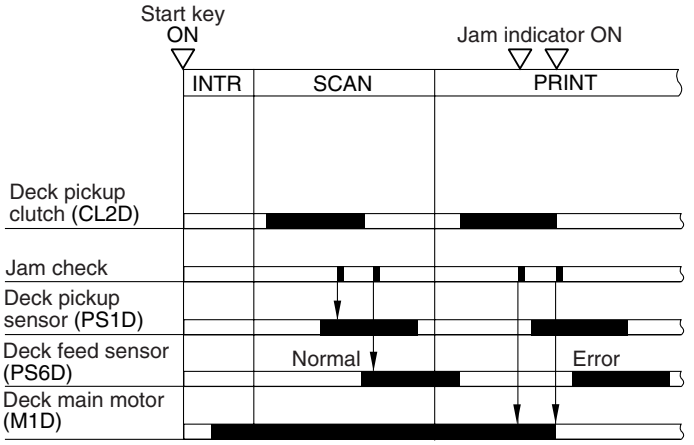
F08-201-01

Notation	Name	Function
PS6D	Deck feed sensor	Detect a delay jam.
PS1D	Deck pickup sensor	Detects a delay jam.

T08-201-01

The DC controller of the host machine identifies a jam in response to the following conditions:

1. Paper exists over the deck feed sensor (PS6D) when the host machine is turned on, ends its WAIT period, or remains at standby: deck pickup/vertical path delay jam.



F08-201-02

SYSTEM
INSTALLATION

1 Selecting the Site of Installation

Select the site of installation against the following conditions; if possible, visit the user's in advance of the delivery of the machine:

1. There must be a power outlet that may be used exclusively for the machine and rated as indicated (±10%).

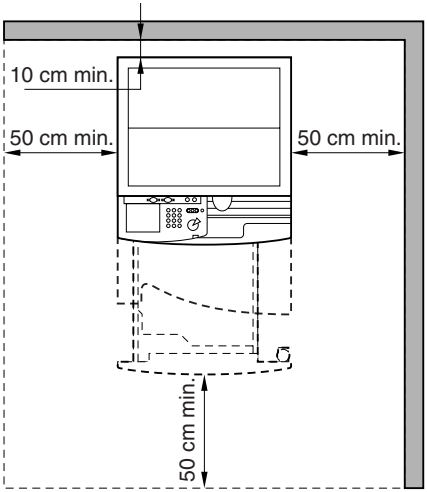
2. The temperature of the room must be between 7.5° and 30°C and humidity, between 5% and 80%. Avoid areas near a water faucet, water boiler, humidifier, or refrigerator.

3. The site must not be near a source of fire or must not be subject to dust or ammonium gas. If the site is exposed to direct rays of the sun, provide curtains.

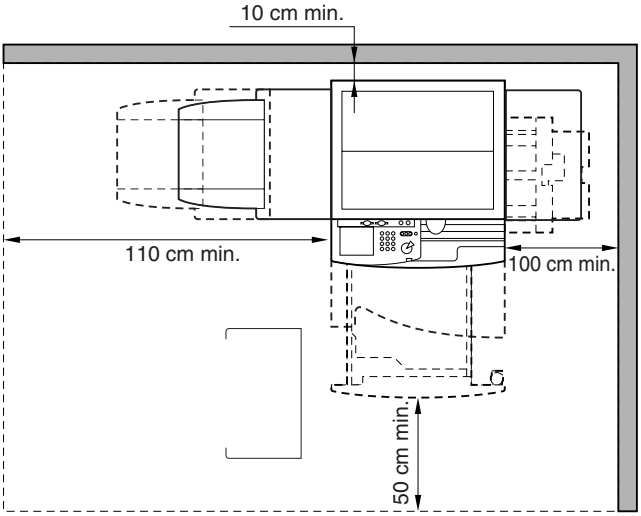
4. The level of ozone generated by the machine in operation will not affect the health of the individuals around it. Nevertheless, some may find the odor unpleasant, requiring good ventilation of the work place.

5. The floor of the site must be level so that the feet of the machine will remain in contact and the machine itself will remain level.

6. The site must be such that the machine will be at least 10 cm away from any wall, allowing adequate space for work.



F03-100-01



F03-100-02

7. The site must be well ventilated. Do not install the machine near the air inlet of the room.

2 Unpacking and Installation

2.1 Before Starting the Work

Keep the following in mind for the work:

1. If the machine is brought in from a cold to warm place, its pickup/feeding assembly can develop condensation, leading to image faults. Leave the machine alone for at least one hour, and start the work after the machine has become used to the room temperature.
   The term condensation refers to the symptom that occurs when a piece of metal is brought in from a cold to warm place, cooling the vapor in the air rapidly and turning it into droplets of water on the metal surface.
2. The machine weighs about 80 kg. Be sure to work in a group of two.

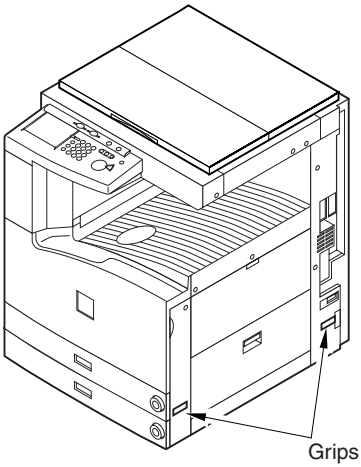
2.2 Unpacking and Removing the Fixing Materials

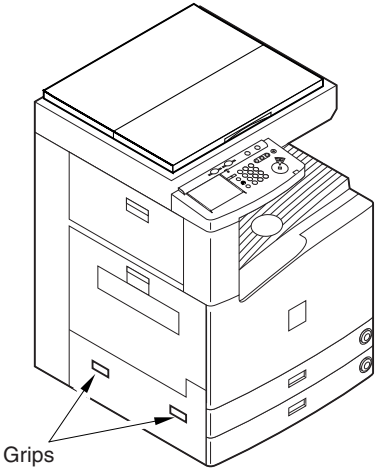
Work	Checks/remarks

1) Open the shipping box, and remove the plastic sheets.
- If you are installing the pedestal at the same time, unpack it.

2) While working in a group of two, hold the grips, and place it on the pedestal. (weight of body: about 80kg)

Take care so that the main power switch will not be turned on when the machine is lifted.

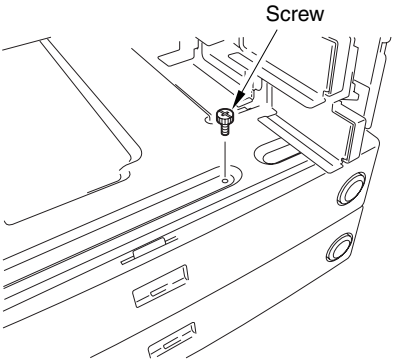




Work	Checks/remarks

3) Remove the packing tape of the machine.
4) Press the cassette release button, and take out each cassette to the front; then, remove all packing material from inside.
5) Connect the machine and the pedestal using a screw.

Other types of pedestal may also be connected using a screw.



6) Slide the cassettes into the machine.

7) Open the cardboard box that comes with the machine, and take out the components and attachments;

check to make sure that none of the following is missing:

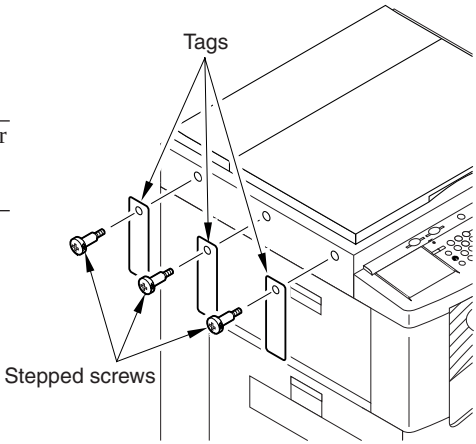
- User's Manual
- Drum unit
- Right lower cover
- Toner cartridge (100V model only)
- Cassette size label (inside cassettes)
- Cassette size plate (inside cassette)
- QR sheet (100V model only)
- Service Book (100V model only)
- Guidebook (model w/ printer function only)
- CD-ROM (model w/ printer function only)

2.3 Mounting the Scanner

Work	Checks/remarks

1) Remove the three screws and the three tags used to hold the scanner in place on the left cover of the reader unit.

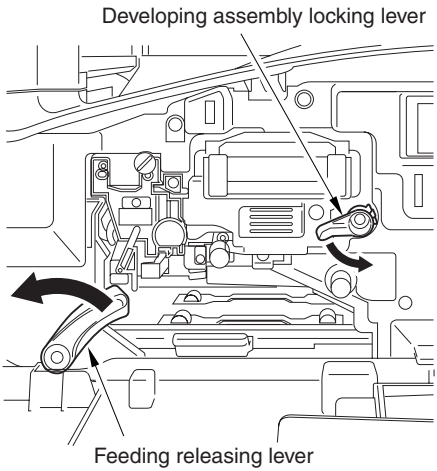
Keep the screws stored away for possible relocation of the machine.



2.4 Removing the Dummy Drum

Work	Checks/remarks

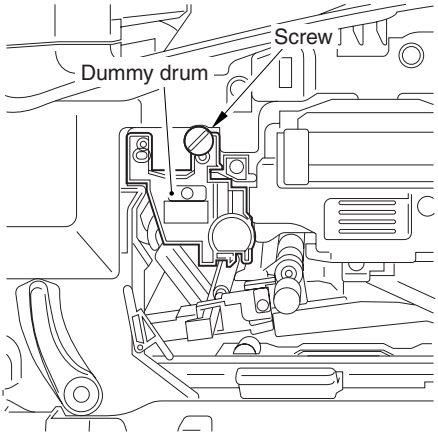
1) Open the front cover.
2) Shift down the feeder releasing lever to release the feeding assembly.
3) Turn the developing assembly locking lever counterclockwise to free the developing assembly.



Work	Checks/remarks

4) Remove the fixing screw from the dummy drum.
- The removed fixing screw will be used when mounting the drum unit.

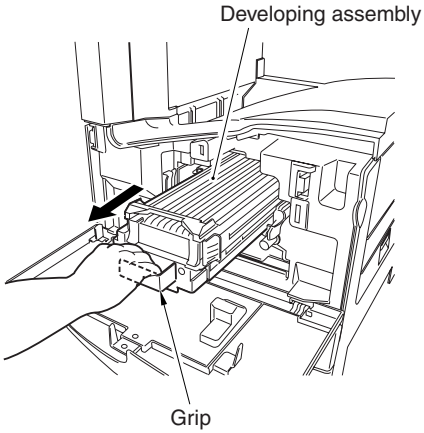
5) Pull the dummy drum straight out to the font.
- The removed dummy drum will no longer be used.



2.5 Supplying the Toner

Work	Checks/remarks

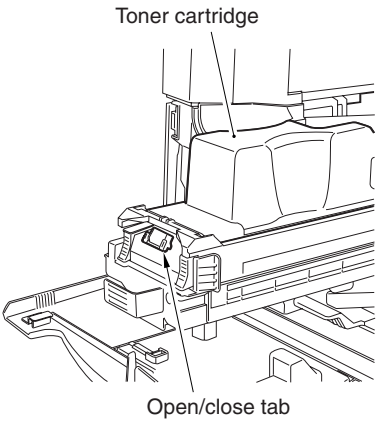
1) Holding the grip of the developing assembly, pull the developing assembly to the front until it stops.



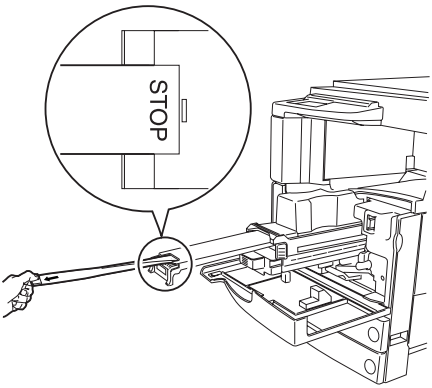
Work	Checks/remarks

2) Shake the toner cartridge several items.
3) Set the toner cartridge to the developing assembly, and push it down until the opening tab springs to view.

• The toner cartridge is locked to the developing assembly.



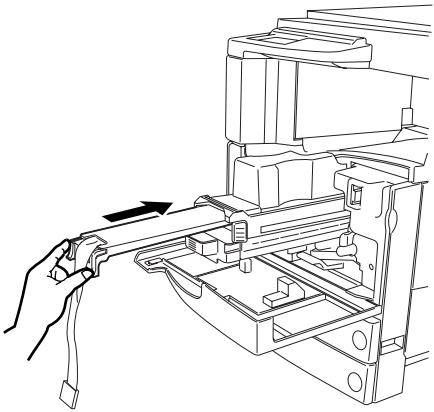
4) While lightly holding down the toner cartridge with one hand, pull the open tab to the front until it stops (where the marking STOP is found).
5) Tap lightly on the top of the toner cartridge so that all toner will drop.



Work	Checks/remarks

6) Push in the black cover of the developing assembly back to its initial position.
- The toner cartridge will become disengaged.

7) Remove the toner cartridge.
8) Push in the developing assembly until it butts against the rear.

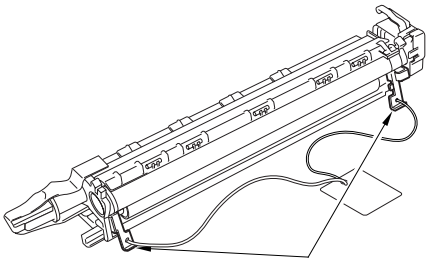


2.6 Mounting the Drum Unit

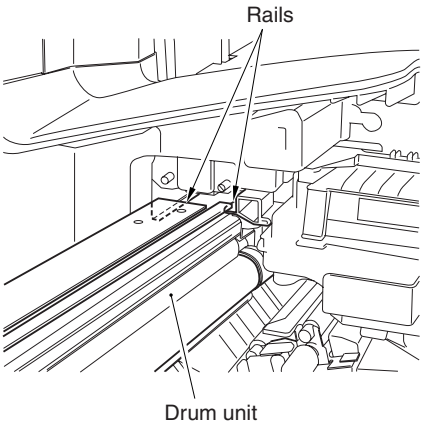
Work	Checks/remarks

1) Unpack the drum unit, and remove the two releasing members of the primary charging roller.

1. Do not touch the dump area of the photosensitive drum to avoid damage.
2. Take care not to expose the photosensitive drum to strong light.
3. Take care not to damage the stirrups found at the bottom of the drum unit.

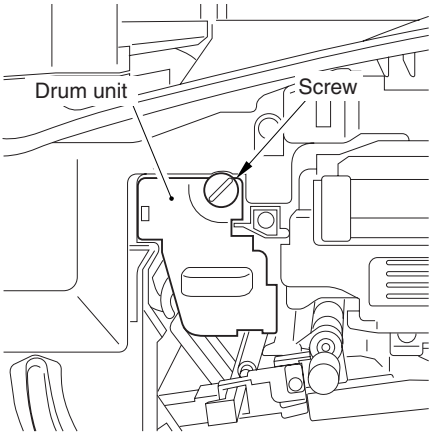


2) Check to make sure that the developing assembly has been freed; then, insert the drum unit slowly along the rails. At this time, take extra care not to bring the developing assembly in contact with the developing cylinder or the like that are closely located.



Work	Checks/remarks

3) Using the fixing screw removed from the dump unit previously, secure the dump unit in place.

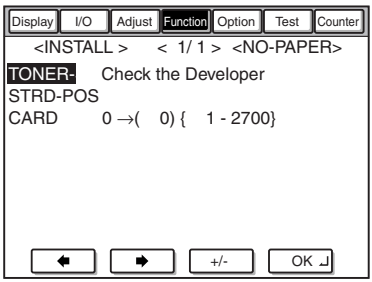


4) Fill out the date label, and attach it to the front cover of the drum unit.
5) Turn the developing assembly locking lever clockwise to lock the developing assembly in place.
6) Shift up the feeding releasing lever to lock the feeding assembly in place.
7) Close the front cover.

2.7 Stirring the Toner

Be sure to remove the packing material from inside the cassette before turning on the main power switch.

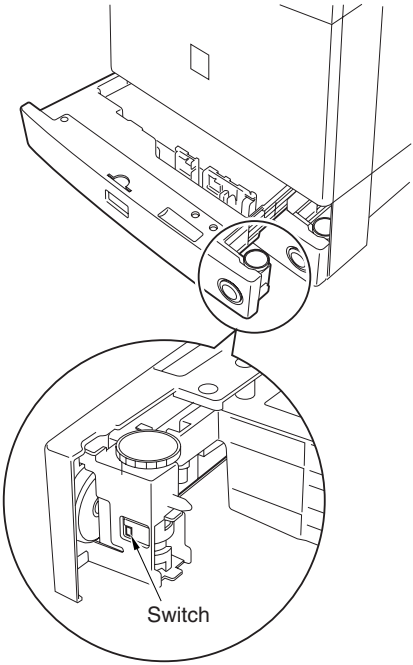
Work	Checks/remarks
1) Connect the power plug to the power outlet. 2) Turn on the main power switch. • Wait until the control panel indicates that the machine is ready for operation. 3) Start service mode. 4) Make the following selections: COPIER>FUNCTION>INSTALL>TONER-S. 5) Press the OK key. • The stirring operation will last for 240 sec (4 min), after which the operation stops automatically. 6) Press the Reset key twice to end service mode.	The power supply must be as rated. (The voltage may be ± 10% of the rating, but it must have the rated amperage.) Press the ⊛ key, '2' and '8' at the same time, and the ⊛ key once again. The following message will appear: "CHECK THE DEVELOPER." In response, check to see if the developing assembly is properly locked in place. If you inadvertently stopped stirring of the toner in the middle, be sure to execute 'TONER-S' once again.



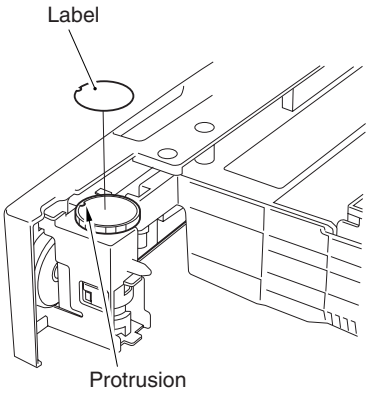
2.8 Setting the Cassette

Work	Checks/remarks

1) Press the cassette releasing button, and slide out the cassette to the front.
2) Check with the user to find out the size of paper to use, and set the size (A/B or Inch) using the selection switch of each cassette.

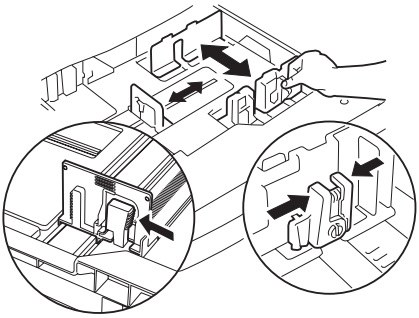


3) Attach the label indicating the selected paper size (A/B or Inch) to the paper size dial.



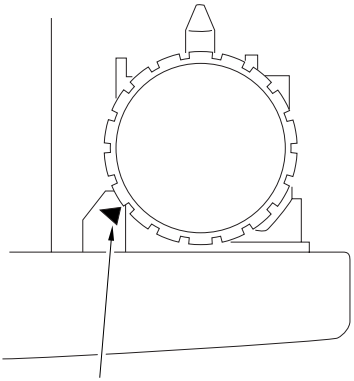
Work	Checks/remarks

4) Pick the lever of the side guide plate and the rear guide plate, and adjust it to the appropriate paper size index.



The middle cassette cannot hold A3 or 11×17 paper.

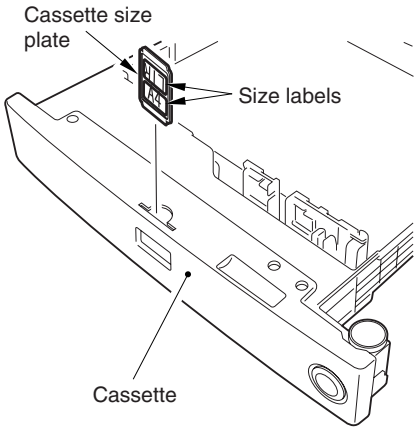
5) Set the paper size dial to suit the selected paper size.



Set the dial as indicated.

Work	Checks/remarks

6) Attach the size label to the cassete size plate, and fit the cassette size plate to each cassette.
7) Put paper into the cassettes, and slide them into the machine.

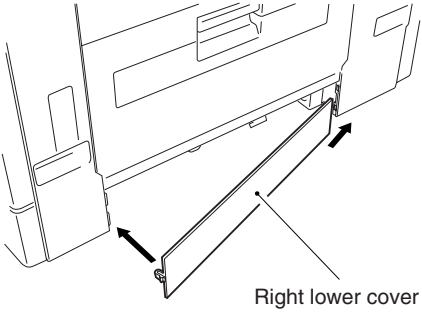


2.9 Checking the Images/Operations

Work	Checks/remarks

1) To install the machine not using the 2-cassette pedestal, mount the right lower cover.

Skip this step if the machine is installed on a 2-cassette pedestal.



2) Using the NA-3 Chart as the original, make a print to check the images and the operation.
3) Make user mode settings (e.g., date, time) and service mode settings (COPIER>OPTION>USER) to suit the needs of the user.

Optimum Image

- In text mode, the white background must not be foggy.
- In text/photo mode, step edge No. 10 must be barely visible. The white background must be free of fogging.
- In photo mode, the white background must be free of fogging. (The moire, if any, along the step edges and the halftone area does not indicate a fault.)

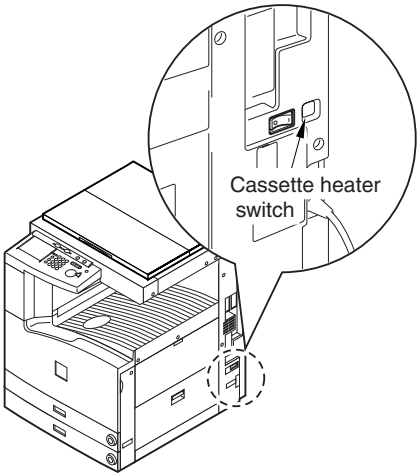
The non-image width must be as indicated: 2.5±1.5 mm.

Checking the Operations

- During copying operation, check to make sure the operations are normal.
- During double-sided copying operation, check to make sure that paper is moved normally in the duplex unit.
- For pickup operation, check to make sure that pickup from each source of paper is normal.
- There must not be abnormal operating noise.
- Make copies at each default reproduction ratio, and check to make sure that the images are normal.
- Make copies in multiple sets, and check to make sure that copies are made specified numbers.

Work	Checks/remarks

4) If necessary in view of the site environment, turn on the cassette heater switch.
5) Move the machine to the site of installation; if it is placed on a pedestal, secure it in place using the four adjusters.
6) Clean the area around the machine, and fill out the Service Book.



2.10 Connecting to the Network

Perform the following steps if the machine is equipped with printer functions:

1) Turn off the main power.
2) Connect the network cable to the machine, and turn on the main power.
3) Inform the user's system administrator that the machine has been installed, and ask him/her to make the network settings for the machine.

2.11 Checking the Network Connection

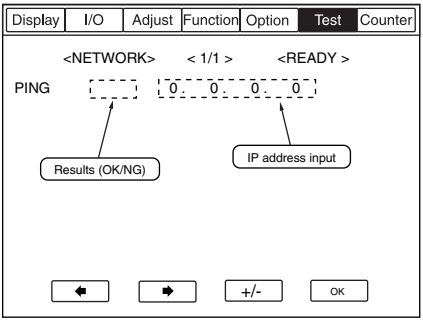
Perform the following steps if the machine is equipped with printer functions:

If the user's network environment is TCP/IP, use the PING function to make sure that the network PCB has properly been installed and the network settings have properly been made. If the user's network environment is IPX/SPX or AppleTalk, on the other hand, these checks are not needed.

2.11.1 Using the PING Function

1) Make the following selections to select PING: COPIER>NETWORK>PING.
2) Enter the IP address using the keypad on the control panel, and press the OK key.
3) Press the Start key.

- If PING is successful, 'OK' will be indicated: otherwise, 'NG' will be indicated.



2.11.2 Making a Check Using a Remote Host Address

The connection to the network may be checked by executing PING using a remote host address (i.e., the IP address of a PC terminal connected to and operating on the TCP/IP network to which the machine is connected).

1) Inform the user's system adminisrator that the network connection will be checked using PING.
2) Check with the user's system administrator to find out the remote host address.
3) Enter the remote host address in the PING field.

- If 'OK' is indicated, the connection to the network is correct.
- If 'NG' is indicated, the connection to the network is not correct; investigate the cause as follows:

2.12 Troubleshooting the Network

Perform the following steps if the machine is equipped with printer functions:

If the connection to the network is not made, the following can be suspected; perform the steps under 2.12.1 to correct the faults:

a. The connection between the network and the network PCB is faulty.
b. The TCP/IP settings on the machine are faulty.
c. The network PCB is faulty, or the PCB is mounted wrongly.
d. The user network is faulty.

2.12.1 Checking the Connection of the Network Cable

1) Check to find out if the network cable is correctly connected to the network PCB.

- If the connection is correct, go to 2.12.2.
- If the connection is wrong, correct it, and make a check once again using the remote host address.

2.12.2 Making a Check Using a Loop-Back Address

A loop-back address is returned before it reaches the network PCB; therefore, executing PING using it will enable a check on the TCP/IP settings made on the machine.

1) Enter the loop-back address (127.0.0.1) in the PING field.

- If 'NG' is indicated, check the TCP/IP settings of the machine once again, and execute PING once again.
- If 'OK' is indicated, go to 2.12.3.

2.12.3 Making a Check Using a Local Host Address

The local host address is the IP address of the machine, and executing PING using it will enable a check on the network PCB (it is retuned after it reaches the network PCB).

1) Enter the IP address of the machine in the PING field.

- If 'NG' is indicated, perform the following check/correction, and execute PING once again:

a. If the IP address of the machine is wrong, check the IP address settings made on the machine once again, or find out if the IP address assigned to the machine is correct or not by consulting the user's system administrator.
b. If the network has faulty connection, check the connector of the network PC for connection.
c. If the network PCB is faulty, replace the network PCB.

- If 'OK' is indicated, suspect a problem in the user's network environment; report to the user's system administrator, and ask for corrective measures.

3 Relocating the Machine

3.1 Preparing for Relocation

If the machine must be relocated by truck or other means of transportation after it has been installed, perform the following:

Do not lift the machine by holding its grips as when moving it over a step; otherwise, the machine will become separated from the pedestal. Be sure to lift the pedestal if the machine is connected to it.

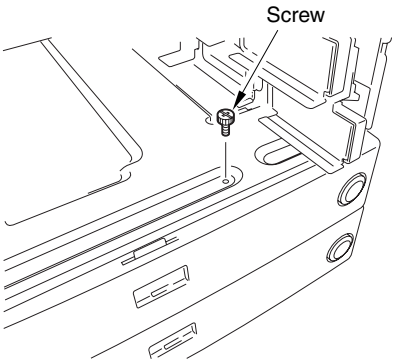
Work	Checks/remarks
1) Remove the fixing screw, and detach the drum unit.	
2) Fix the scanner in place.	
3) Tape the front cover, delivery assembly, and cassette in place.	
4) Place a single sheet of A3 paper on the copyboard glass, and tape the copyboard cover (DADF) in place.	

3.2 Lifting the Machine Off the Pedestal

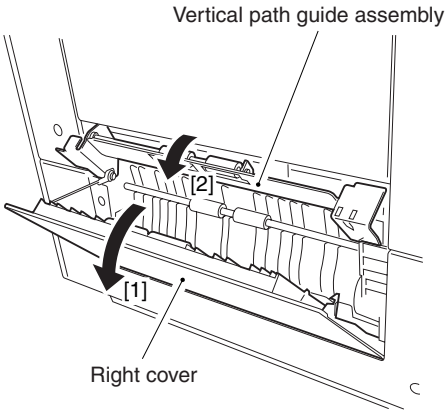
Work	Checks/remarks

1) Disconnect the lattice connector of the pedestal from the machine.
2) Slide out the two cassettes from the machine, and remove the screw used to connect the machine to the pedestal.

Remove the screw likewise if the machine is installed to a different type of cassette pedestal.



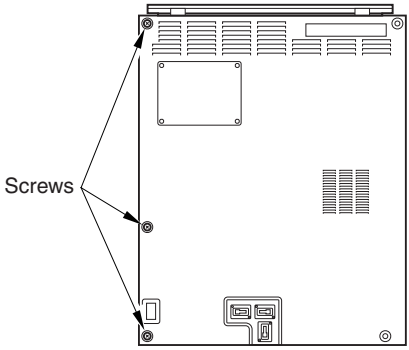
3) Open the right cover of the pedestal, and release the guide assembly connected to the machine (i.e., shift it down to the right).
4) While working in a group of two or more, hold the grips of the machine, and lift it straight up (pay attention to the pins of the pedestal).
5) Place the machine on the floor or on a desk.



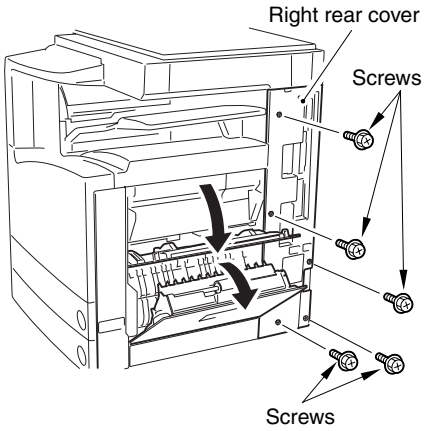
4 Installing the Card Reader-C1

Work	Checks/remarks

1) Turn off the main power switch.
2) To facilitate the removal of the right rear cover, remove the screws from the rear cover.

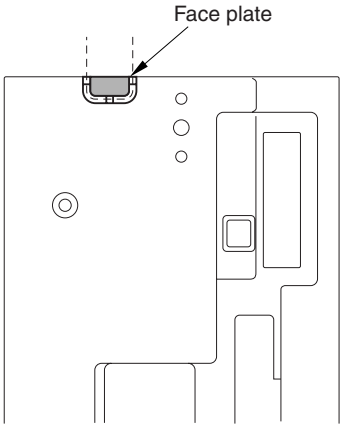


3) Open the manual feed tray and the right lower cover.
4) Remove the five screws; and, while opening the right rear cover slightly, detach the right rear cover.

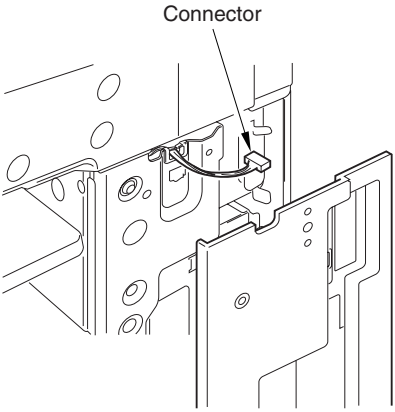


Work	Checks/remarks

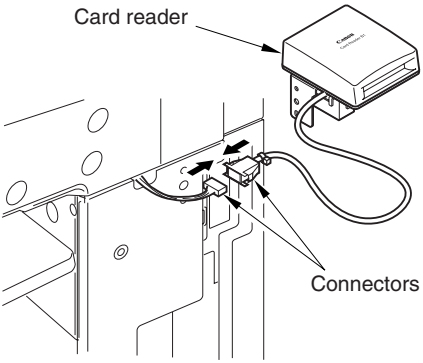
5) Cut off the face plate at the top of the right rear cover with a nipper or the like.



6) Lead out the connector of the card reader on the machine side, and mount the right rear cover.



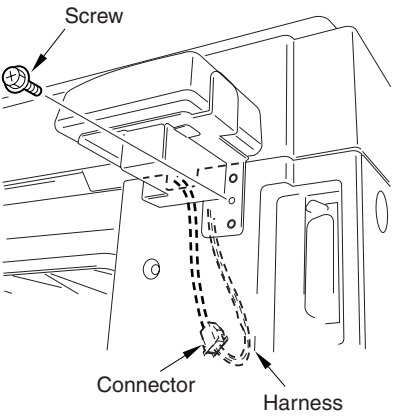
7) Connect the connector on the card reader side and the connector on the machine side.



Work	Checks/remarks

8) While pushing the connector and the harness into the machine, put the boss of the right rear cover into the hole in the card reader support plate, and secure the card reader to the machine with a screw.

Take care not to trap the connector or the harness.



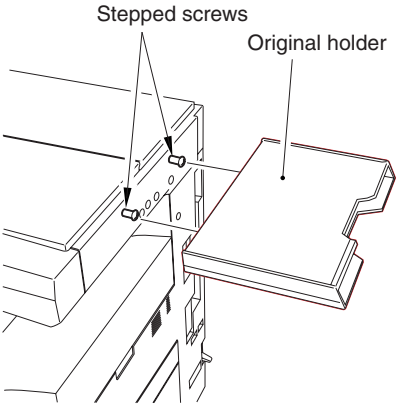
9) Make the following selections in service mode:
COPIER>FUNCTION>INSTALL>CARD; then, enter the card number (1 through 2700).

- Enter the number of the card (of all the cards used by the user) that have the lowest number.
- As many as 300 cards may be used having a number higher than the one entered.

5 Installing the Original Holder-D1

Work	Checks/remarks

1) Remove the two stickers from the right top of the machine.
   Using the two stepped screws (RS tightening; M4×10) that come with the machine, mount the original holder to the machine.
- If the work proves to be difficult, loosen the two stepped screws, and try again.



1. Be sure to use the stepped screws designed for the machine; ones for other types come together with the machine.
2. The original holder may be mounted to the left side of the machine.