Service Manual

Duplex unit
Duplex Unit-A1

Canon

Sep 14 2005

Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

This manual may contain technical inaccuracies or typographical errors due to improvements or changes in products. When changes occur in applicable products or in the contents of this manual, Canon will release technical information as the need arises. In the event of major changes in the contents of this manual over a long or short period, Canon will issue a new edition of this manual.

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Caution

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

Symbols Used

This documentation uses the following symbols to indicate special information:

Symbol	Description
	Indicates an item of a non-specific nature, possibly classified as Note, Caution, or Warning.
	Indicates an item requiring care to avoid electric shocks.
	Indicates an item requiring care to avoid combustion (fire).
	Indicates an item prohibiting disassembly to avoid electric shocks or problems.
	Indicates an item requiring disconnection of the power plug from the electric outlet.
 Memo	Indicates an item intended to provide notes assisting the understanding of the topic in question.
 REF.	Indicates an item of reference assisting the understanding of the topic in question.
	Provides a description of a service mode.
	Provides a description of the nature of an error indication.

The following rules apply throughout this Service Manual:

1. Each chapter contains sections explaining the purpose of specific functions and the relationship between electrical and mechanical systems with reference to the timing of operation.
   In the diagrams, ▭▮▮▮▭ represents the path of mechanical drive; where a signal name accompanies the symbol , the arrow ⟶ indicates the direction of the electric signal.
   The expression "turn on the power" means flipping on the power switch, closing the front door, and closing the delivery unit door, which results in supplying the machine with power.
2. In the digital circuits, '1'is used to indicate that the voltage level of a given signal is "High", while '0' is used to indicate "Low".(The voltage value, however, differs from circuit to circuit.) In addition, the asterisk (*) as in "DRMD*" indicates that the DRMD signal goes on when '0'.
   In practically all cases, the internal mechanisms of a microprocessor cannot be checked in the field. Therefore, the operations of the microprocessors used in the machines are not discussed: they are explained in terms of from sensors to the input of the DC controller PCB and from the output of the DC controller PCB to the loads.

The descriptions in this Service Manual are subject to change without notice for product improvement or other purposes, and major changes will be communicated in the form of Service Information bulletins.
All service persons are expected to have a good understanding of the contents of this Service Manual and all relevant Service Information bulletins and be able to identify and isolate faults in the machine."

Contents

Chapter 1 Specifications

Chapter 2 Functions

Chapter 3 Parts Replacement Procedure

Chapter 4 Maintenance

Chapter 5 Error Code

Chapter 1 Specifications

Contents

1.1 Product Specifications

1.1.1 Specifications

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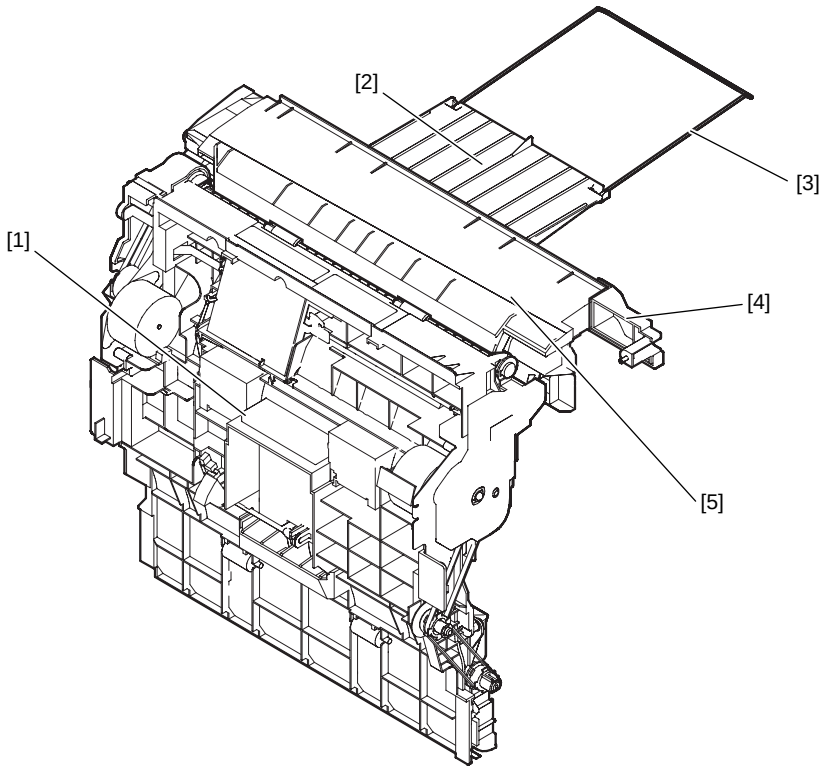
Item	Description	Remarks
Type	Built in the host machine	
Paper supply method	Switchback reversing method	
Copy paper type	60g/m2 to 90g/m2	
Copy paper size	A3, B4, A4, A4R, B5, B5R, A5R, 11X17, LGL, LTR, LTR-R, STMTR	
Power supply	DC power supply from host machine	
Weight	2.5 kg	
Dimensions	437.2 mm x 448 mm x 378.3 mm (W x D x H)	Incl. reversal tray dimensions

1.2 Names of Parts

1.2.1 External View

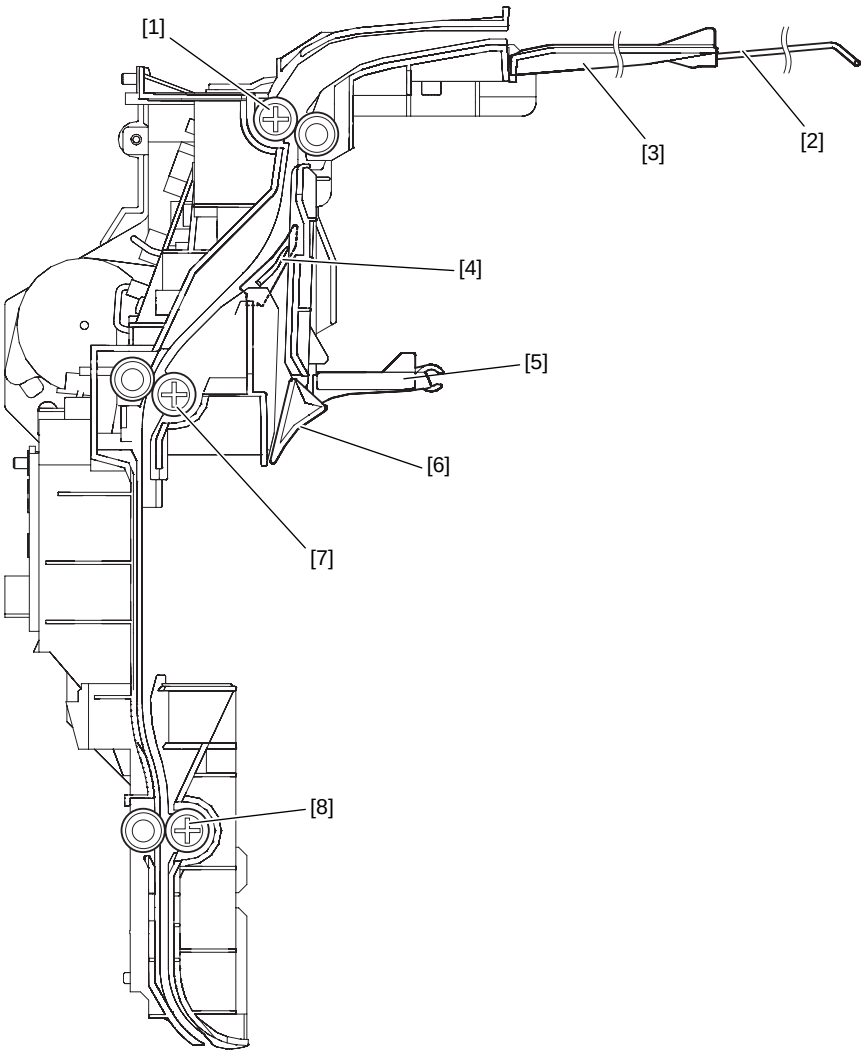


F-1-1

T-1-2

[1] Duplex unit
[2] Reversal tray
[3] Reversal tray (sub)
[4] Blind cover
[5] Reversal guide

1.2.2 Sectional View



F-1-2

T-1-3

[1] Feed roller 1	[5] Delivery guide
[2] Reversal tray (sub)	[6] Duplex flapper
[3] Reversal tray	[7] Feed roller 2
[4] Reversal flapper	[8] Feed roller 3

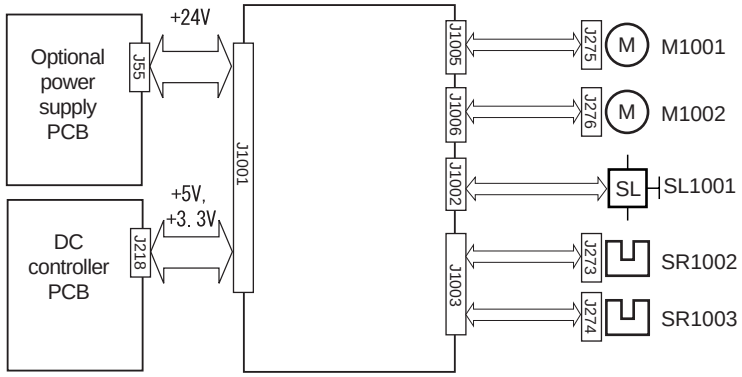
Chapter 2 Functions

Contents

2.1 Basic Construction

2.1.1 Outline

The operation sequence of the duplex unit is controlled by the duplex controller PCB. An 8-bit microcomputer mounted on the duplex controller PCB controls the operation sequence of the duplex unit and the serial communication with the DC controller PCB.
The duplex controller PCB drives motors in response to various commands sent from the DC controller PCB. The DC controller PCB sends the duplex unit status back to the printer. The duplex unit is powered by 24 VDC supplied from the power supply kit PCB and +5VDC and +3.3 VDC supplied from the DC controller PCB.
The duplex unit circuit configuration is shown below.



F-2-1

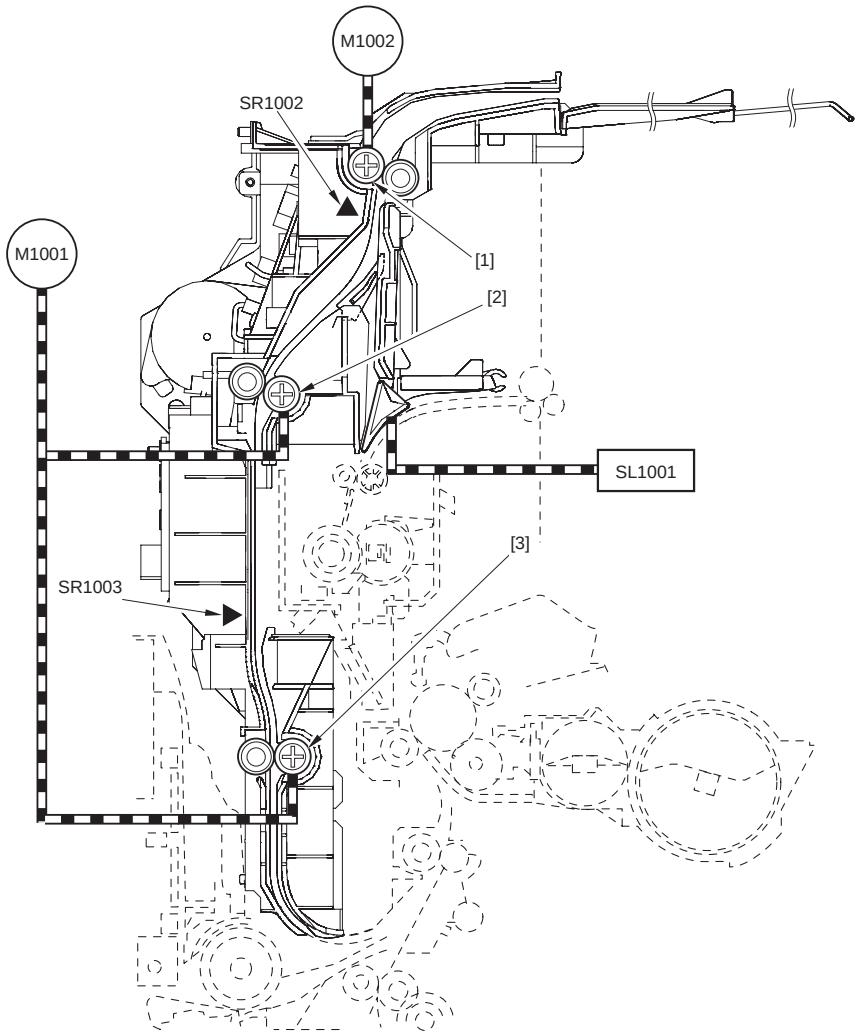
T-2-1

M1001	Feed motor	SR1002	Duplex paper sensor 1
M1002	Reversal motor	SR1003	Duplex paper sensor 2
SL1001	Duplex flapper solenoid		

2.2 Pick-Up/Feed Systm

2.2.1 Outline

After the printing paper is fed by the delivery roller in the fixing unit of the host machine, the duplex flapper solenoid (SL1001) turns on to lead the paper to the duplex unit.
The printing paper led to the duplex unit is fed by three feed rollers to the printer.
The reversal motor (M102) and feed motor (M1001) are stepping motors. The rotation direction of these motors is controlled by the microcomputer (CPU) mounted on the duplex controller PCB.
Feed roller 1 is driven by the reversal motor (M1002). Feed rollers 2 and 3 are driven by the feed motor (M1001). The paper transport path is provided with two photo interrupters, duplex paper sensor 1 (SR1002) and duplex paper sensor 2 (SR1003).

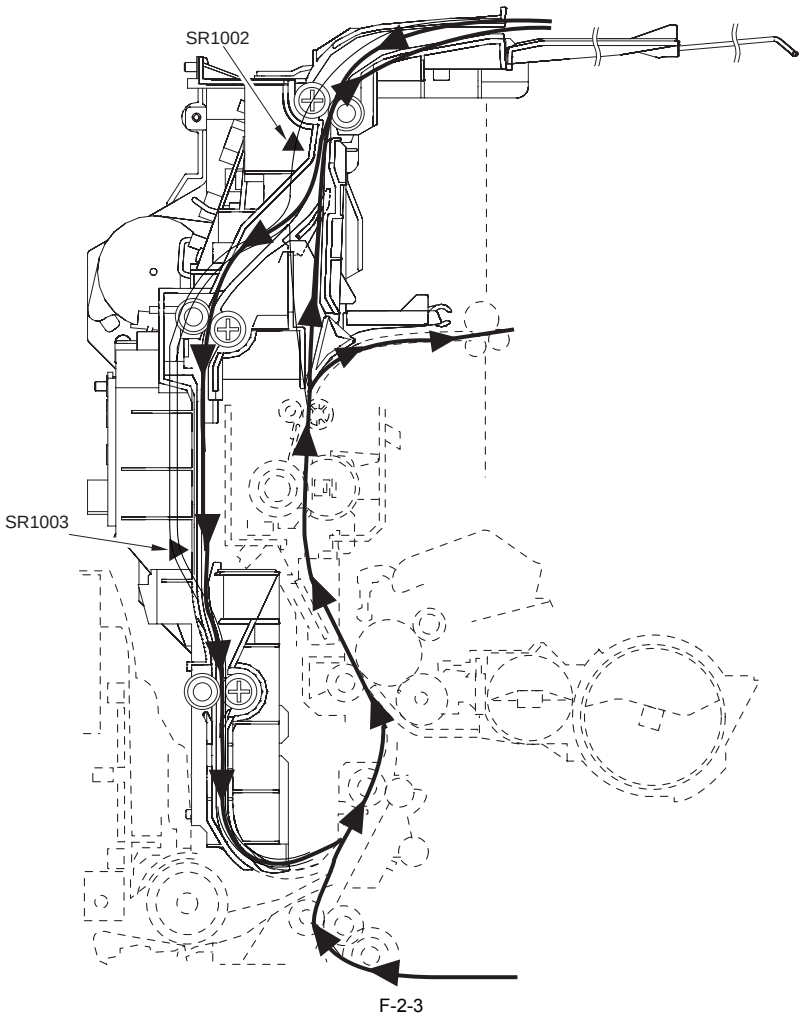


F-2-2

T-2-2

[1] Feed roller 1	M1001: Feed motor
[2] Feed roller 2	M1002: Reversal motor
[3] Feed roller 3	SR1002: Duplex paper sensor 1
SL1001: Duplex flapper solenoid	SR1003: Duplex paper sensor 2

2.2.2 Paper Feed Path

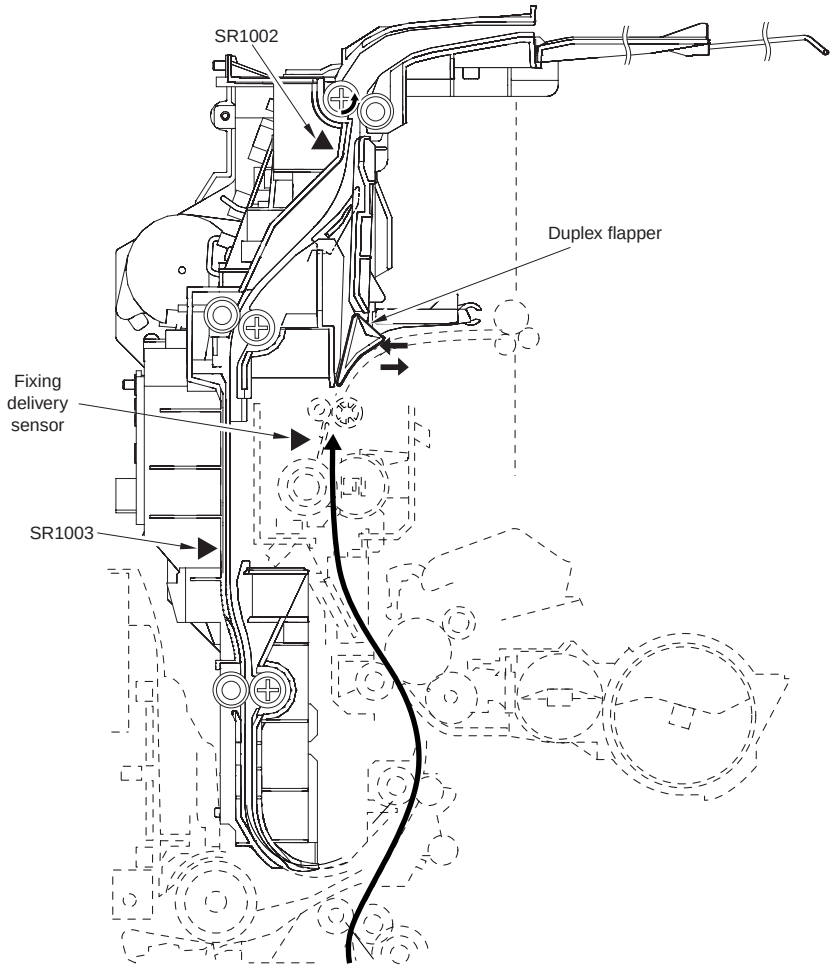


F-2-3

2.2.3 Paper Feed Operation

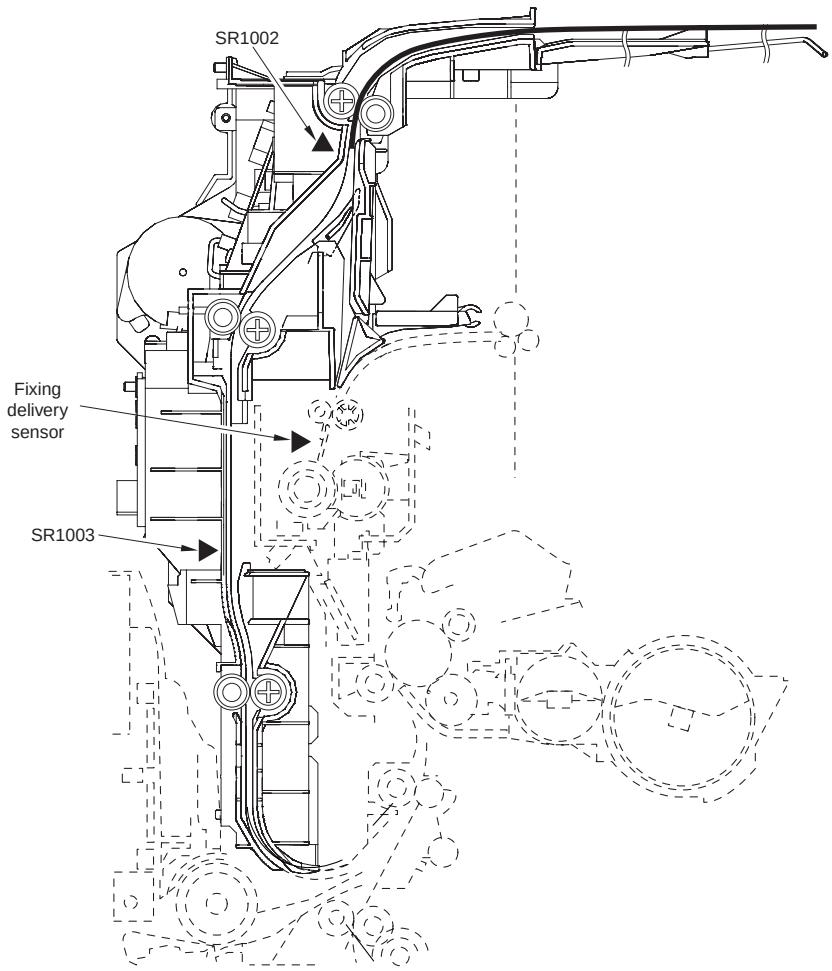
This section explains how two sheets of A4 paper are fed for duplex printing.

1) When the predetermined time lapses after the first paper is supplied, the reversal motor (M1002) starts rotating to feed the paper toward the reversal tray. Immediately after the leading edge of the paper is detected by the delivery sensor, the duplex flapper solenoid turns on to feed the paper to the duplex unit. The duplex flapper solenoid turns off immediately after the trailing edge of the paper is detected by the delivery sensor.



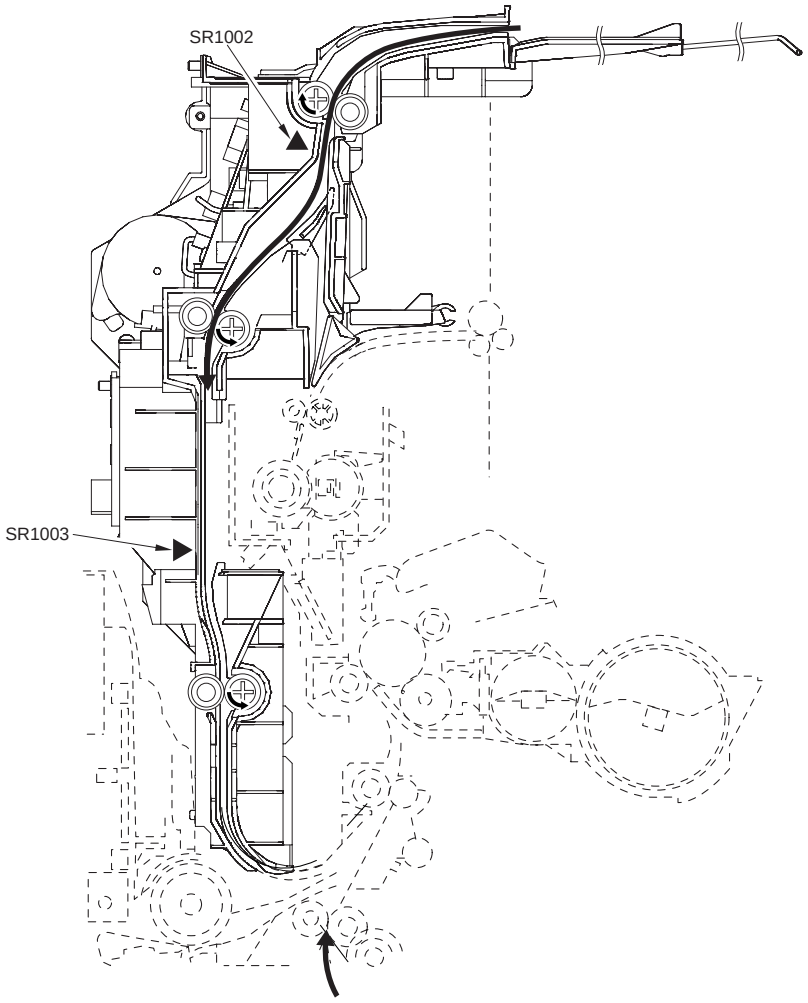
F-2-4

2) When the trailing edge of the paper reaches the reversal point (when the predetermined time lapses after the trailing edge of the paper is detected by the delivery sensor), the reversal motor (M1002) stops.



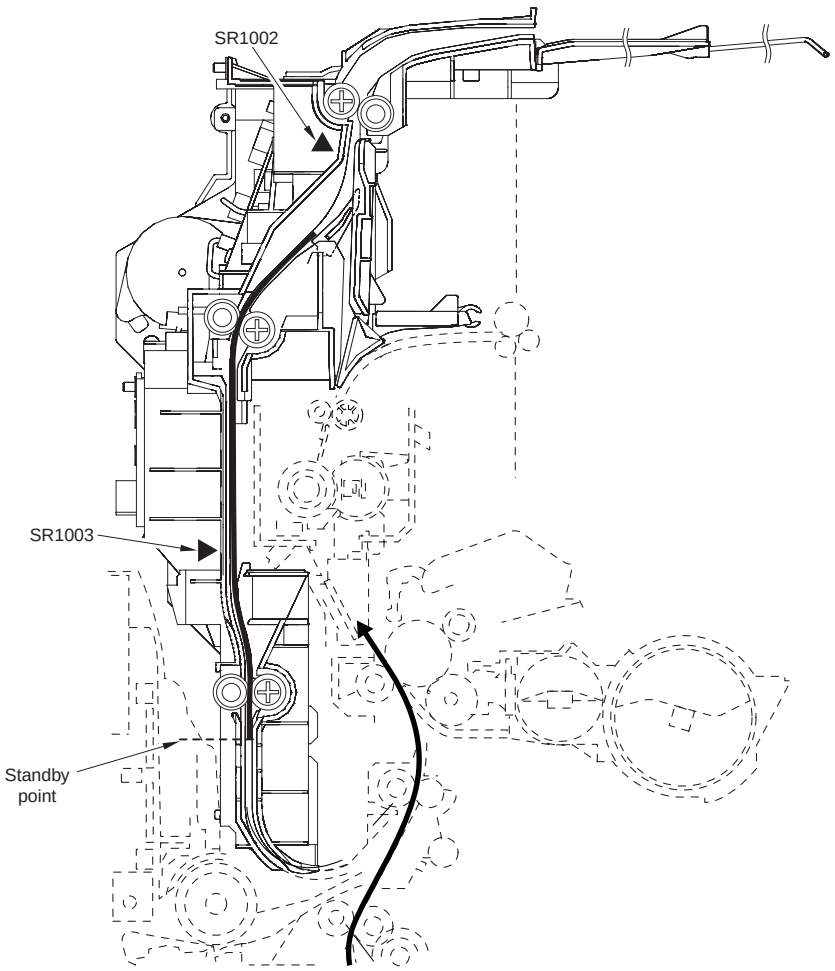
F-2-5

3) After stopping for the predetermined time, the reversal motor (M1002) starts rotating to feed the paper toward the duplex unit, allowing the paper to be fed into the host machine. During this time, the second paper is supplied. When the predetermined time lapses after the reversal motor (M1002) stops, the feed motor (M1001) starts rotating.



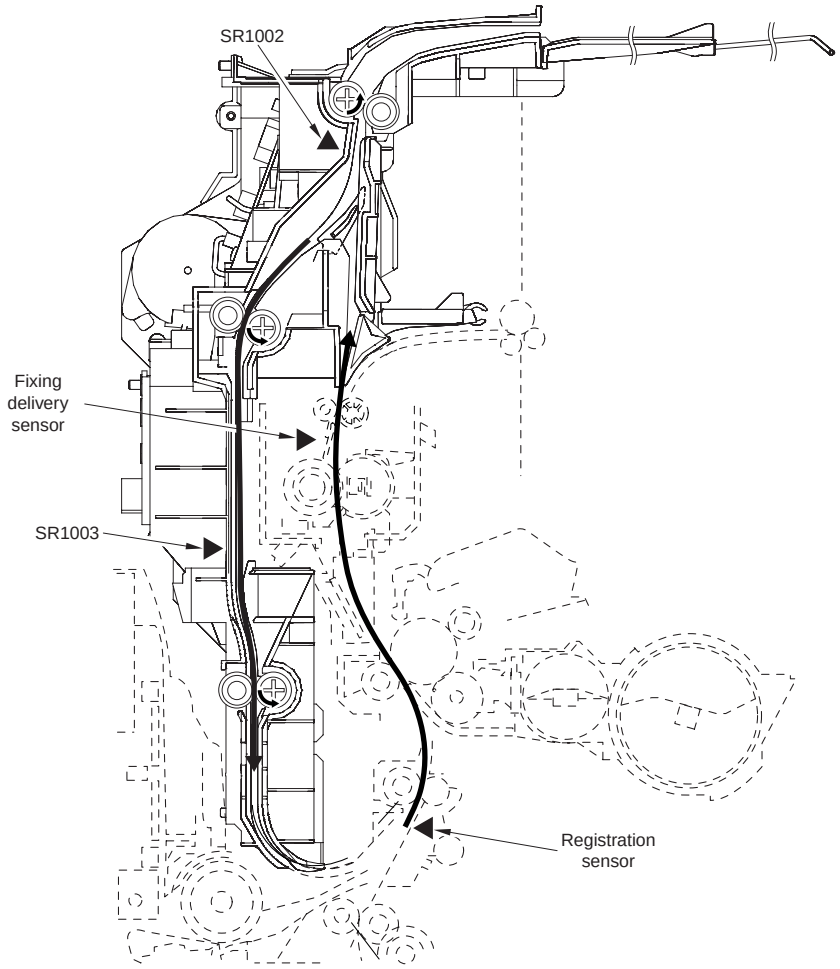
F-2-6

4) When the predetermined time lapses after the trailing edge of the paper is detected by the duplex paper sensor 1 (SR1002), the reversal motor stops (M1002).
5) When the predetermined time lapses after the duplex paper sensor detects the leading edge of the fist paper is detected by the duplex paper sensor 2 (SR1003), the feeder motor stops. The first paper stops at the standby point (about 90 mm downstream from the duplex paper sensor 2).



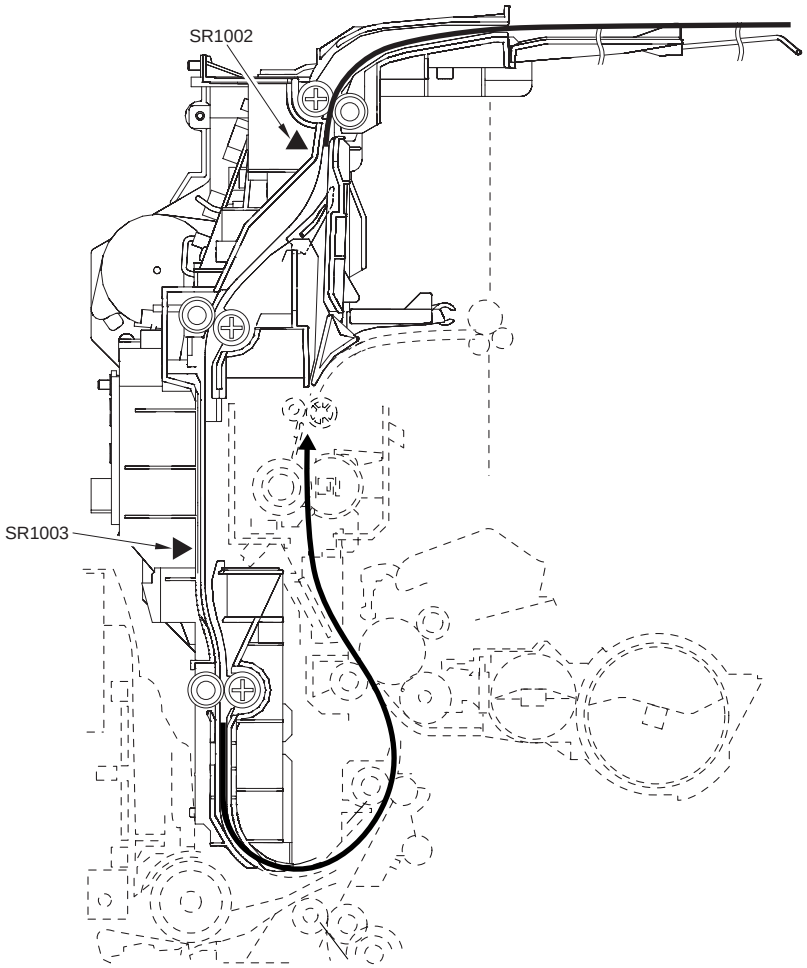
F-2-7

6) After lapse of the predetermined time, the first paper is picked again. When the predetermined time lapses after the leading edge of the paper is detected by the pre-registration sensor in the host machine, the feed motor (M1001) stops.



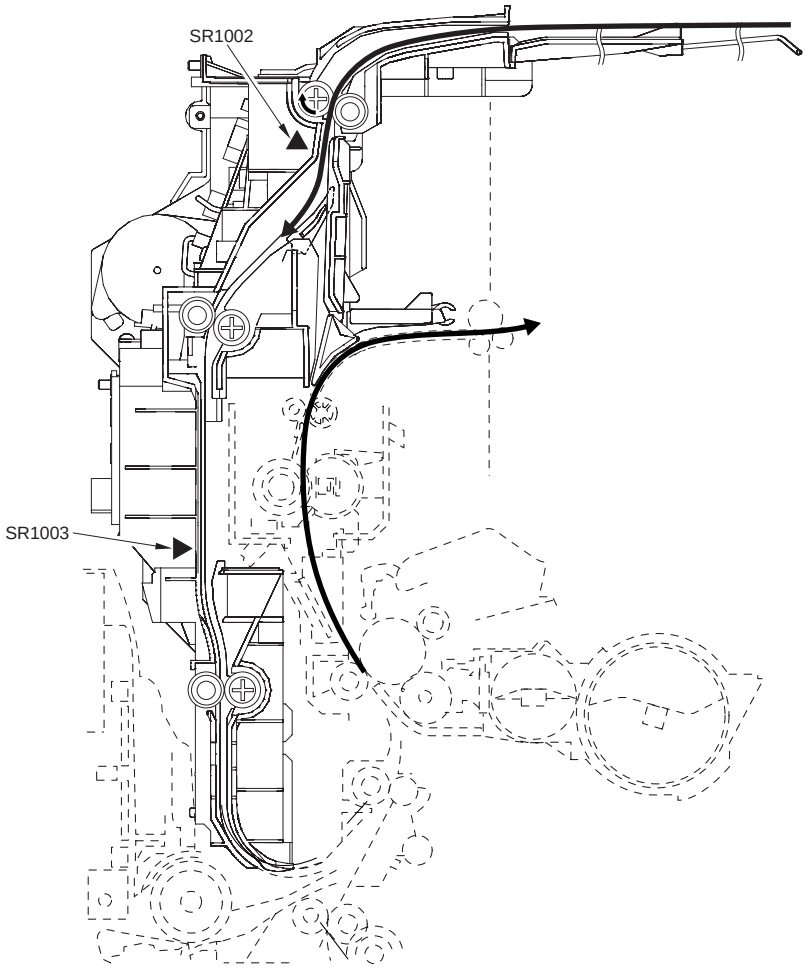
F-2-8

7) During printing on the first paper, the second paper reaches the reversal point.



F-2-9

8) After completion of printing, the first paper is ejected. The second paper is supplied again and ejected after completion of printed.



F-2-10

2.3 Detecting Jams

2.3.1 Outline

The following paper detection sensors are mounted to check whether paper is fed properly in the duplex unit:
- Duplex paper sensor 1 (SR1002) (upper)
- Duplex paper sensor 2 (SR1003) (lower)

Occurrence of a jam is detected according to whether paper exists at a sensor at the check timing memorized in the CPU. If the CPU judges that a jam has occurred, printing is stopped and occurrence of the jam is reported to the image processor PCB.
This machine can detect the following types of jams:
- Duplex paper sensor 1 delay jam
- Duplex paper sensor 1 stationary jam
- Duplex paper sensor 2 delay jam
- Duplex paper sensor 2 stationary jam

2.3.2 Delay Jam

Duplex paper sensor 1 delay jam
This jam occurs if the duplex paper sensor 1 does not turn on within the predetermined time after the delivery sensor in the host machine turns on.
Duplex paper sensor 2 delay jam
This jam occurs if the duplex paper sensor 2 does not turn on within the predetermined time after the duplex reversal motor starts rotating.

2.3.3 Stationary Jam

Duplex paper sensor 1 stationary jam
- This jam occurs if the duplex paper sensor 1 does not turn off when the predetermined time lapses after the duplex paper sensor 2 turns on.
- This jam occurs when the duplex print paper sensor 1 does not turn off when the paper with a longitudinal length of less than 280 mm reaches the standby point (about 90 mm downstream from the duplex paper sensor 2).

Duplex paper sensor 2 stationary jam
This jam occurs when the duplex paper sensor 2 does not turn off when the predetermined time lapses after the feed motor starts rotating.

Chapter 3 Parts Replacement Procedure

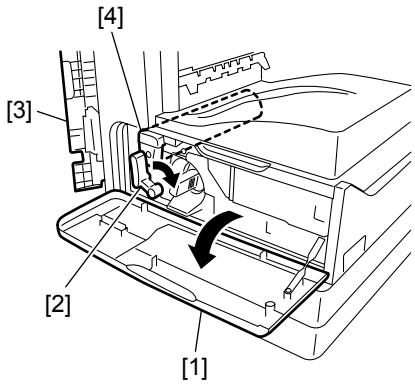
Contents

3.1 Removing from the Host Machine

3.1.1 Duplex Unit

3.1.1.1 Removing the Drum Unit

1) Open the front cover [1].
2) Turn the developing assembly locking lever [2] clockwise to open the left door [3].
3) Draw out the drum unit [4].

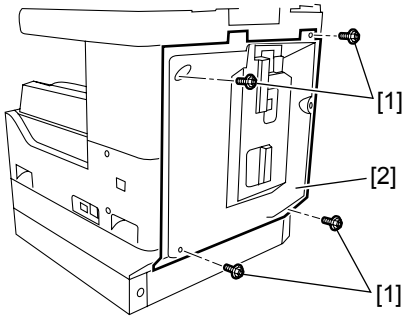


F-3-1

- When attaching or detaching the drum unit, open the left door fully to prevent the damage to the drum unit.
- To prevent exposure of the drum, cover the drum unit with a few sheets of paper and place it in a safe place.

3.1.1.2 Removing the Rear Cover

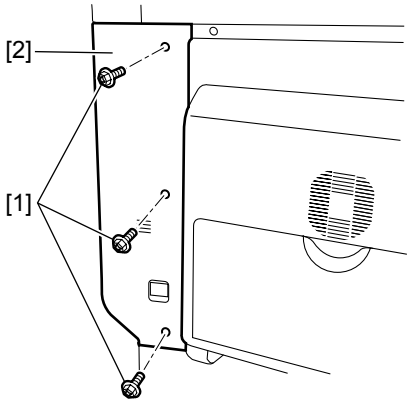
1) Remove the four screws [1], and then detach the rear cover [2].



F-3-2

3.1.1.3 Removing the Left Cover (Rear)

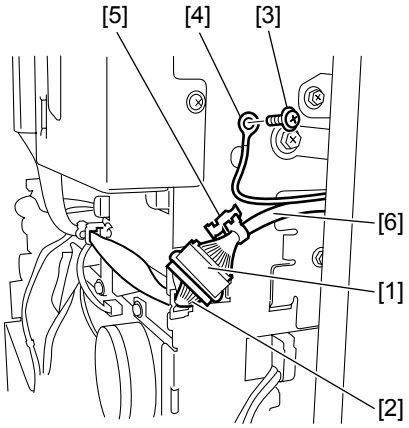
1) Remove the three screws [1], and then detach the left cover (rear).



F-3-3

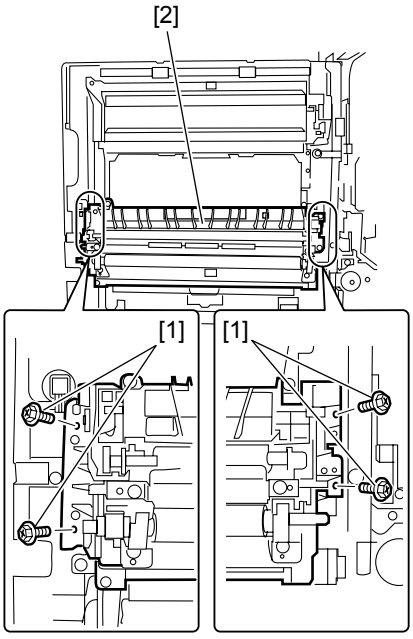
3.1.1.4 Removing the Duplex Unit

1) Disconnect the relay harness [2] from the connector [1].
2) Remove the screw [3], and disconnect the ground cable [4].
3) Remove the reusable band [5] from the duplex unit harness at the rear-left of the main body, and then return the duplex unit harness [6] to the left door side.



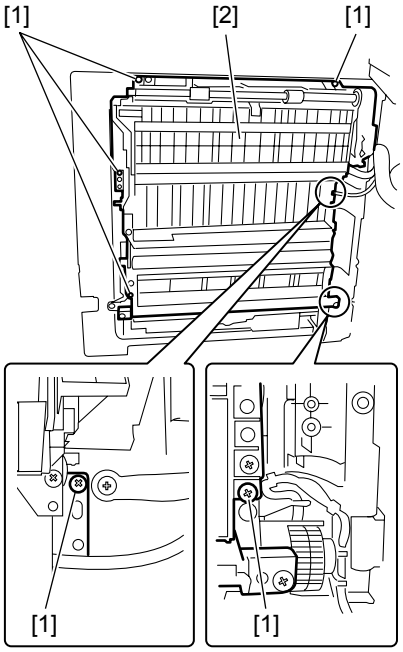
F-3-4

4) Remove the four screws [1], and then remove the transfer/registration unit [2].



F-3-5

5) Remove the six screws [1], and then remove the duplex unit [2] from the left door.



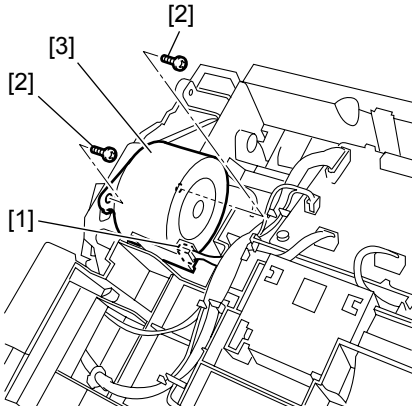
F-3-6

3.2 Drive System

3.2.1 Reversal Motor

3.2.1.1 Removing the Reversal Motor

1) Remove the duplex unit from the left door.
2) Disconnect the connector [1], remove the two screws [2], and then remove the duplex reversal motor [3].



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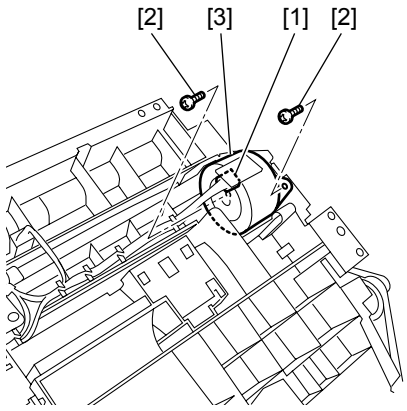
3.2.2 Feed Motor

3.2.2.1 Removing the Feed Motor

1) Remove the duplex unit from the left door.
2) Disconnect the connector [1], remove the two screws [2], and then remove the duplex feeder motor [3].



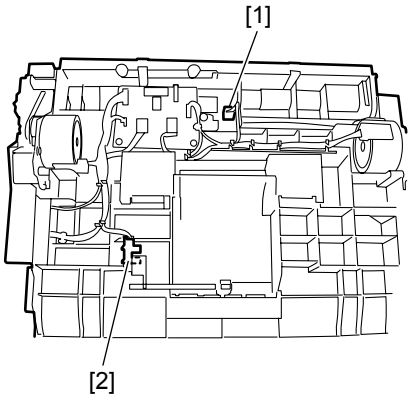
F-3-8

3.3 Electrical System

3.3.1 Duplex Paper Sensor

3.3.1.1 Removing the Duplex Paper Sensor

1) Remove the duplex unit from the left door.
2) Remove the connector, and then remove the duplex paper sensor 1 [1].
3) Remove the connector, and then remove the duplex paper sensor 2 [2].

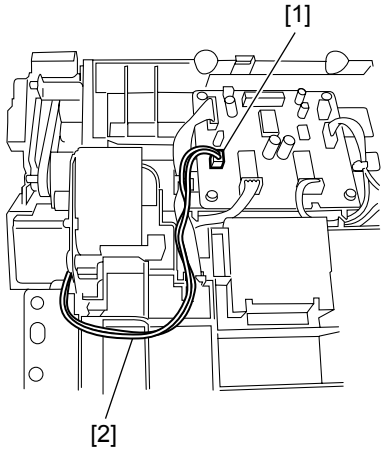


F-3-9

3.3.2 Duplex Flapper Solenoid

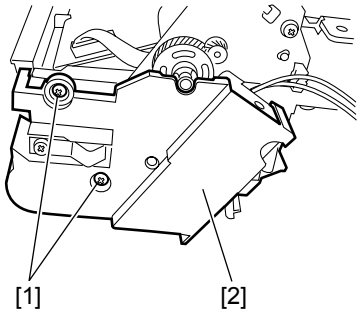
3.3.2.1 Removing the Duplex Flapper Solenoid

1) Remove the duplex unit from the left door.
2) Remove the connector [1] form the duplex controller PCB, and then remove the duplex flapper solenoid harness [2] from the harness guide.



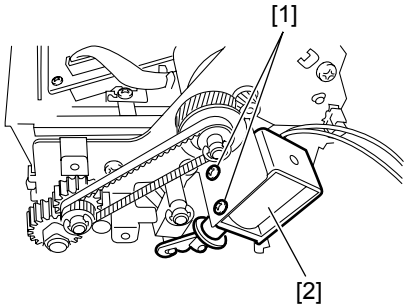
F-3-10

3) Remove the two screws [1], and then detach the drive cover [2].



F-3-11

4) Remove the two screws [1], and then remove the duplex flapper solenoid [2].



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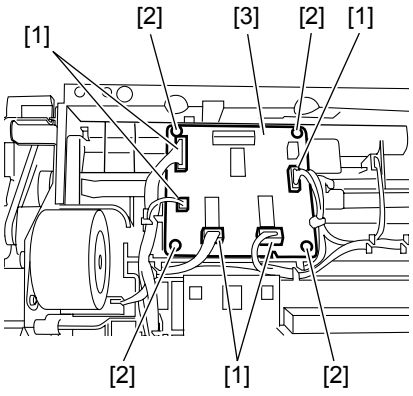
3.3.3 Duplex Controller PCB

3.3.3.1 Removing the Duplex Controller PCB

1) Remove the duplex unit from the left door.
2) Remove the five connectors [1] form the duplex controller PCB.
3) Remove the four screws [2], and remove he duplex controller PCB [3].



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Chapter 4 Maintenance

Contents

4.1 Maintenance and Inspection

4.1.1 Periodically Replaced Parts

4.1.1.1 Periodically Replaced Parts

This machine has no periodically replaced parts.

4.1.2 Durables

4.1.2.1 Durables

This machine has no durables.

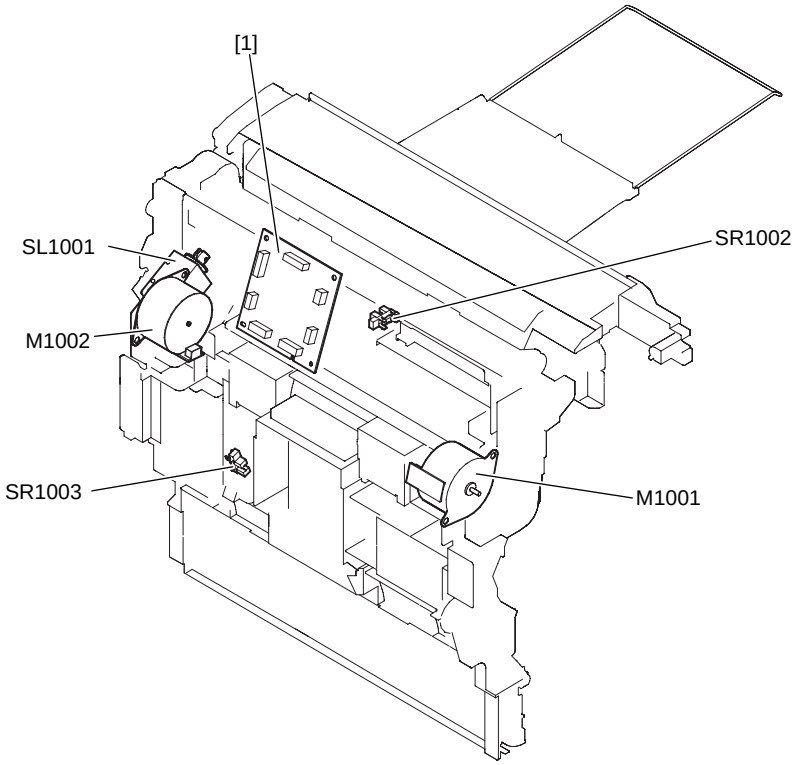
4.1.3 Periodical Servicing

4.1.3.1 Periodical Servicing Items

This machine has no periodical servicing items.

4.2 Outline of Electrical Components

4.2.1 Outline of Electrical Components



F-4-1

T-4-1

Ref.	Name	Parts number	JAM code/E code
[1]	Duplex controller PCB	FM2-4515	E052
M1001	Feed motor	FK2-1114	
M1002	Reversal motor	FK2-1114	
SL1001	Duplex flapper solenoid	FL2-3744	
SR1002	Duplex paper sensor 1 (upper)	WG8-5696	0120, 0221
SR1003	Duplex paper sensor 2 (lower)	WG8-5696	0124, 0228

Chapter 5 Error Code

Contents

5.1 Service Error Code

5.1.1 Error Code list

T-5-1

Code	Details code	Explanation	Countermeasure
E052	0000	Cause of faulty connection to duplex unit: Broken line or faulty duplex controller PCB or DC controller PCB	- Check the connectors of the duplex controller PCB and DC controller PCB. - Replace the duplex controller PCB. - Replace the DC controller PCB.

5.2 Jam Codes

5.2.1 Jam Code List

T-5-2

Code	Name	Sensor No.	Description
0120	Delay jam at duplex paper sensor 1	SR1002	The duplex paper sensor 1 does not turn on within the specified time after the delivery sensor on the main unit side turns on.
0124	Delay jam at duplex paper sensor 2	SR1003	The duplex paper sensor 2 does not turn on within the specified time after the duplex reverse motor starts.
0221	Stationary jam at duplex paper sensor 1	SR1002	- The duplex paper sensor 1 does not turn off when the specified time has lapsed since the duplex paper sensor 2 turned on.
			- The duplex paper sensor 1 does not turn off when the paper with a longitudinal length of 280 mm reaches the standby position (about 90 mm from the duplex paper sensor 2).
0228	Stationary jam at duplex paper sensor 2	SR1003	The duplex paper sensor 2 does not turn off when the specified time has lapsed since the feed motor started.

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