



DF-420

SERVICE MANUAL

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First Edition

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

It may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for proper disposal.

ATTENTION

IL Y A UN RISQUE D'EXPLOSION SI LA BATTERIE EST REMPLACÉE PAR UN MODÈLE DE TYPE INCORRECT. METTRE AU REBUT LES BATTERIES UTILISÉES SELON LES INSTRUCTIONS DONNÉES.

Il peut être illégal de jeter les batteries dans des eaux d'égout municipales. Vérifiez avec les fonctionnaires municipaux de votre région pour les détails concernant des déchets solides et une mise au rebut appropriée.

Revision history

Revision	Date	Replaced pages	Remarks


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Safety precautions


This booklet provides safety warnings and precautions for our service personnel to ensure the safety of their customers, their machines as well as themselves during maintenance activities. Service personnel are advised to read this booklet carefully to familiarize themselves with the warnings and precautions described here before engaging in maintenance activities.

Safety warnings and precautions

Various symbols are used to protect our service personnel and customers from physical danger and to prevent damage to their property. These symbols are described below:

 **DANGER:** High risk of serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

 **WARNING:** Serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

 **CAUTION:** Bodily injury or damage to property may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

Symbols

The triangle (△) symbol indicates a warning including danger and caution. The specific point of attention is shown inside the symbol.



General warning.



Warning of risk of electric shock.



Warning of high temperature.

⊘ indicates a prohibited action. The specific prohibition is shown inside the symbol.



General prohibited action.



Disassembly prohibited.

● indicates that action is required. The specific action required is shown inside the symbol.



General action required.



Remove the power plug from the wall outlet.



Always ground the copier.

1. Installation Precautions

WARNING

- Do not use a power supply with a voltage other than that specified. Avoid multiple connections to one outlet: they may cause fire or electric shock. When using an extension cable, always check that it is adequate for the rated current.
- Connect the ground wire to a suitable grounding point. Not grounding the copier may cause fire or electric shock. Connecting the earth wire to an object not approved for the purpose may cause explosion or electric shock. Never connect the ground cable to any of the following: gas pipes, lightning rods, ground cables for telephone lines and water pipes or faucets not approved by the proper authorities.



CAUTION:

- Do not place the copier on an infirm or angled surface: the copier may tip over, causing injury.
- Do not install the copier in a humid or dusty place. This may cause fire or electric shock.
- Do not install the copier near a radiator, heater, other heat source or near flammable material.



This may cause fire.



- Allow sufficient space around the copier to allow the ventilation grills to keep the machine as cool as possible. Insufficient ventilation may cause heat buildup and poor copying performance.



- Always handle the machine by the correct locations when moving it.
- Always use anti-toppling and locking devices on copiers so equipped. Failure to do this may cause the copier to move unexpectedly or topple, leading to injury.
- Avoid inhaling toner or developer excessively. Protect the eyes. If toner or developer is accidentally ingested, drink a lot of water to dilute it in the stomach and obtain medical attention immediately. If it gets into the eyes, rinse immediately with copious amounts of water and obtain medical attention.













- Advise customers that they must always follow the safety warnings and precautions in the copier's instruction handbook.







2.Precautions for Maintenance

WARNING

- Always remove the power plug from the wall outlet before starting machine disassembly. 
- Always follow the procedures for maintenance described in the service manual and other related brochures. 
- Under no circumstances attempt to bypass or disable safety features including safety mechanisms and protective circuits. 
- Always use parts having the correct specifications. 
- Always use the thermostat or thermal fuse specified in the service manual or other related brochure when replacing them. Using a piece of wire, for example, could lead to fire or other serious accident. 
- When the service manual or other serious brochure specifies a distance or gap for installation of a part, always use the correct scale and measure carefully. 
- Always check that the copier is correctly connected to an outlet with a ground connection. 
- Check that the power cable covering is free of damage. Check that the power plug is dust-free. If it is dirty, clean it to remove the risk of fire or electric shock. 
- Never attempt to disassemble the optical unit in machines using lasers. Leaking laser light may damage eyesight. 
- Handle the charger sections with care. They are charged to high potentials and may cause electric shock if handled improperly. 

CAUTION

- Wear safe clothing. If wearing loose clothing or accessories such as ties, make sure they are safely secured so they will not be caught in rotating sections. 
- Use utmost caution when working on a powered machine. Keep away from chains and belts. 
- Handle the fixing section with care to avoid burns as it can be extremely hot. 
- Check that the fixing unit thermistor, heat and press rollers are clean. Dirt on them can cause abnormally high temperatures. 

• Do not remove the ozone filter, if any, from the copier except for routine replacement.



• Do not pull on the AC power cord or connector wires on high-voltage components when removing them; always hold the plug itself.



• Do not route the power cable where it may be stood on or trapped. If necessary, protect it with a cable cover or other appropriate item.



• Treat the ends of the wire carefully when installing a new charger wire to avoid electric leaks.



• Remove toner completely from electronic components.



• Run wire harnesses carefully so that wires will not be trapped or damaged.



• After maintenance, always check that all the parts, screws, connectors and wires that were removed, have been refitted correctly. Special attention should be paid to any forgotten connector, trapped wire and missing screws.



• Check that all the caution labels that should be present on the machine according to the instruction handbook are clean and not peeling. Replace with new ones if necessary.



• Handle greases and solvents with care by following the instructions below:



- Use only a small amount of solvent at a time, being careful not to spill. Wipe spills off completely.
- Ventilate the room well while using grease or solvents.
- Allow applied solvents to evaporate completely before refitting the covers or turning the power switch on.
- Always wash hands afterwards.

• Never dispose of toner or toner bottles in fire. Toner may cause sparks when exposed directly to fire in a furnace, etc.



• Should smoke be seen coming from the copier, remove the power plug from the wall outlet immediately.



3.Miscellaneous

WARNING

• Never attempt to heat the drum or expose it to any organic solvents such as alcohol, other than the specified refiner; it may generate toxic gas.



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1-1-1 Specifications

Type	Built-in
Number of trays	1 tray
Paper weight.....	60 to 105 g/m ²
Maximum sheets (Not stapling)	A3, B4, Ledger, Legal, Folio, OfficioII, 8K: 250 sheets A4, A4R, B5, Letter, LetterR, 16K: 500 sheets
Muximum sheets for stapling	A3, B4, Ledger, Legal, Folio, OfficioII, 8K: 20 sheets A4, A4R, B5, Letter, LetterR, 16K: 30 sheets
Power source	Electrically connected to the machine
Dimension.....	325 (W) x 450 (D) x 165 (H) mm 12 13/16" (W) x 17 11/16" (D) x 6 1/2" (H)
Weight.....	8 kg/17.6 lbs or less

NOTE: These specifications are subject to change without notice.

1-1-2 Parts names

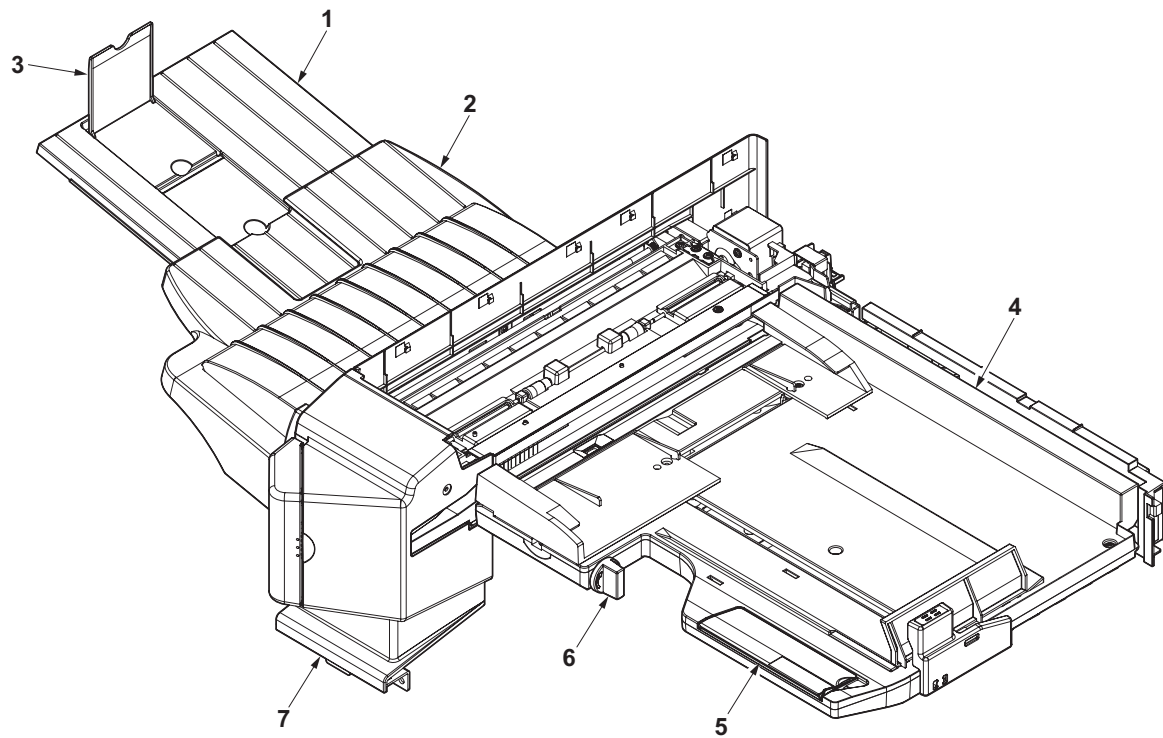
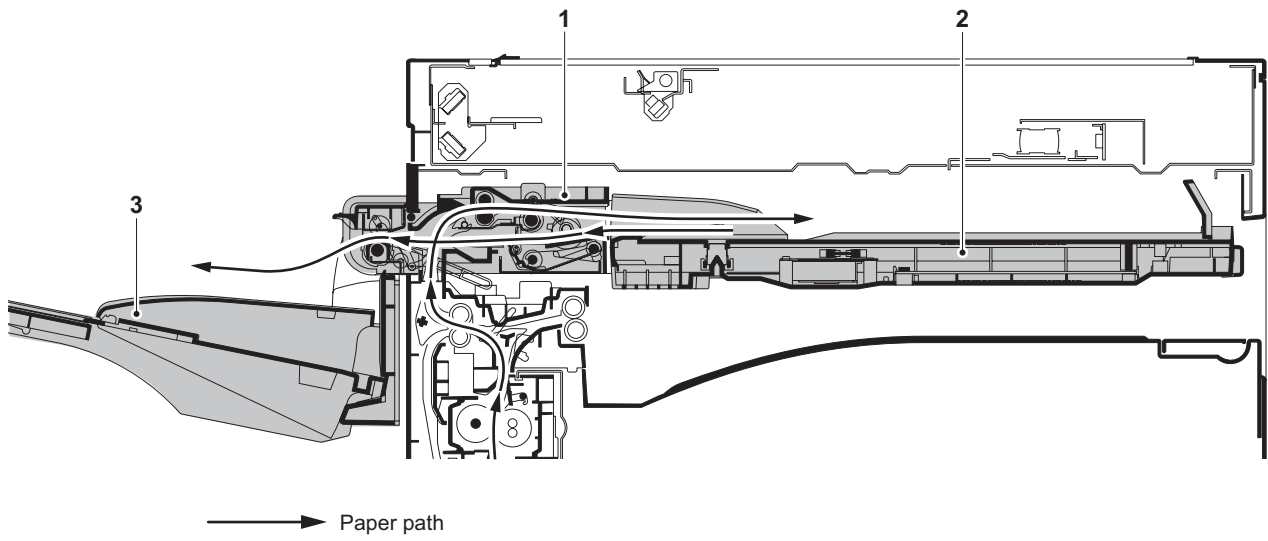


Figure 1-1-1

1. Ejected paper guide extension
2. Finisher tray
3. Ejected paper guide
4. Process table
5. Finisher tray extension
6. JAM release lever
7. Staple

1-1-3 Machine cross section**Figure 1-1-2 Machine cross section**

1. Paper conveying section
2. Process table section
3. Eject section

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1-2-1 Installation environment

Installation location (Be based on the machine establishment place.)

Avoid direct sunlight or bright lighting. Ensure that the photoconductor will not be exposed to direct sunlight or other strong light when removing paper jams.

Avoid locations subject to high temperature and high humidity or low temperature and low humidity; an abrupt change in the environmental temperature; and cool or hot, direct air.

Avoid places subject to dust and vibrations.

Choose a surface capable of supporting the weight of the machine.

Place the machine on a level surface (maximum allowance inclination: 1°).

Avoid air-borne substances that may adversely affect the machine or degrade the photoconductor, such as mercury, acidic or alkaline vapors, inorganic gasses, NOx, SOx gases and chlorine-based organic solvents.

Select a well-ventilated location.

1-2-2 Unpacking

(1) Unpacking

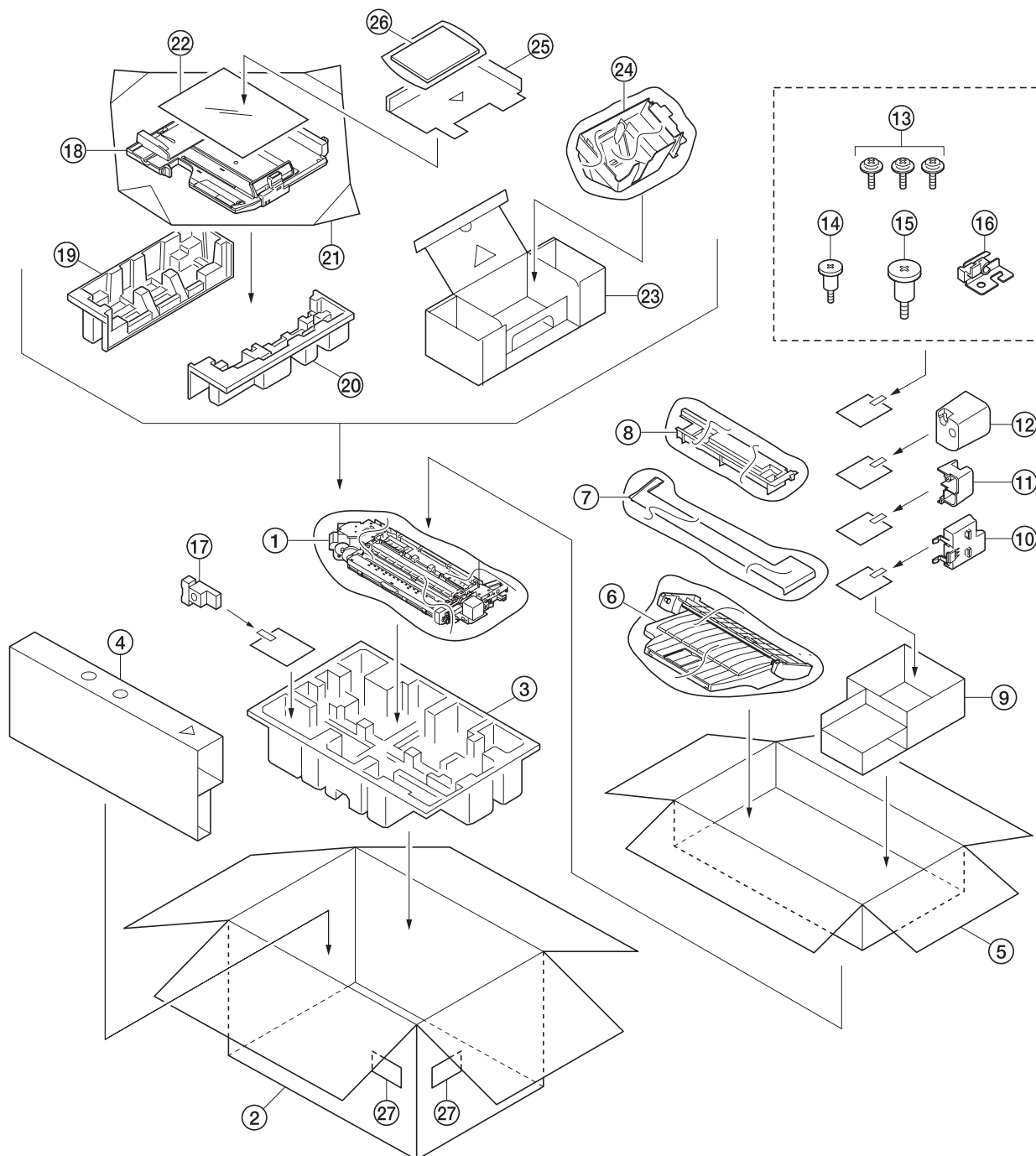


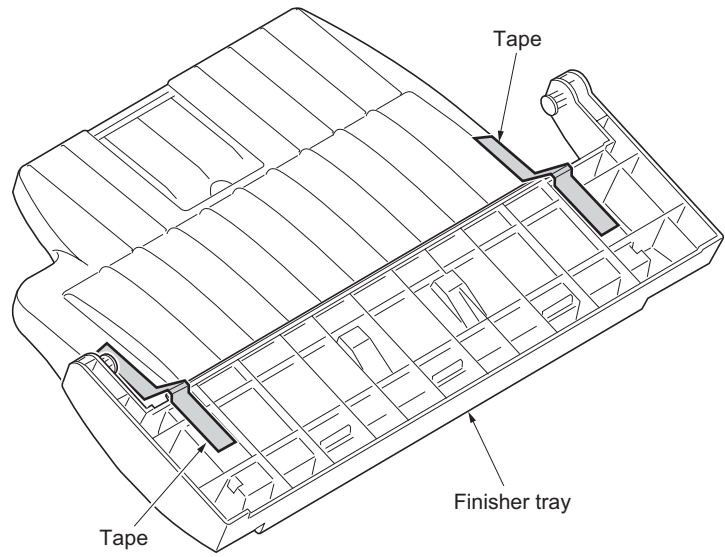
Figure 1-2-1 Unpacking

- | | | |
|-------------------------|-----------------------|------------------------|
| 1. Paper conveying unit | 10. Sub staple cover | 19. Tray left pad |
| 2. Outer case | 11. Front eject cover | 20. Tray right pad |
| 3. Finisher bottom pad | 12. Rear eject cover | 21. Plastic sheet |
| 4. Spacer A | 13. M3 x 6 screws | 22. Paper |
| 5. Accessory case | 14. Small pin | 23. Spacer C |
| 6. Finisher tray | 15. Large pin | 24. Staple cover |
| 7. Left upper cover | 16. Hook holder | 25. Tray top pad |
| 8. Inner cover | 17. Staple cartridge | 26. Installation guide |
| 9. Spacer B | 18. Process table | 27. Barcode labels |

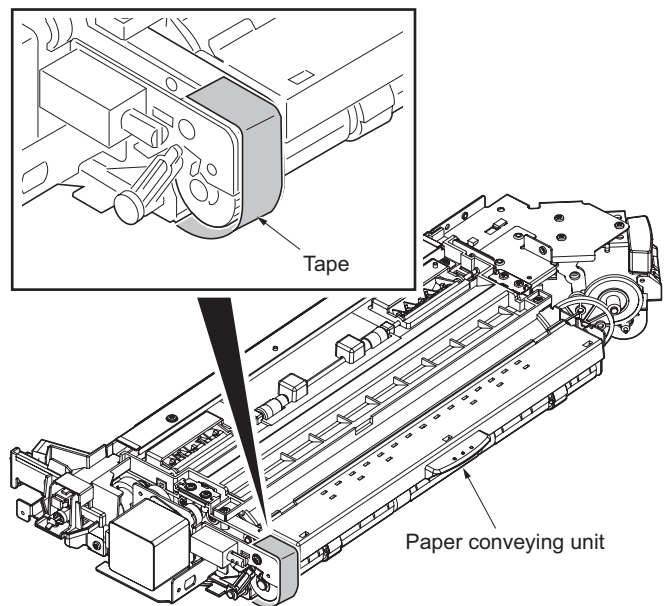
Caution: See the Installation Guide for installation.

(2) Remove the tapes**Procedure**

1. Remove two tapes from the finisher tray.

**Figure 1-2-2**

2. Remove the tape from the paper conveying unit.

**Figure 1-2-3**

3MJ

3. Remove the tape from the process table.

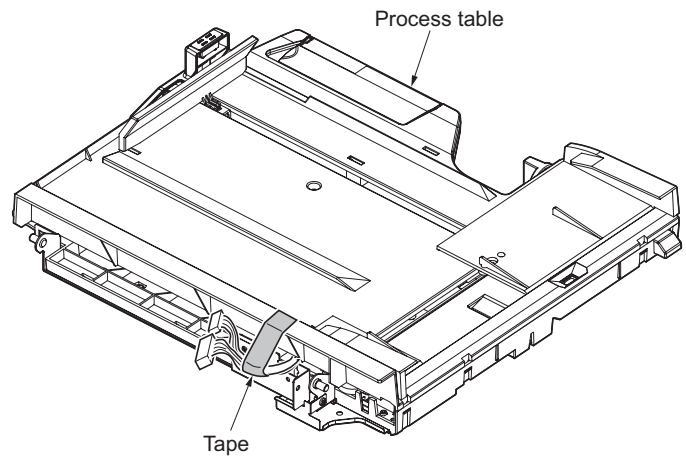
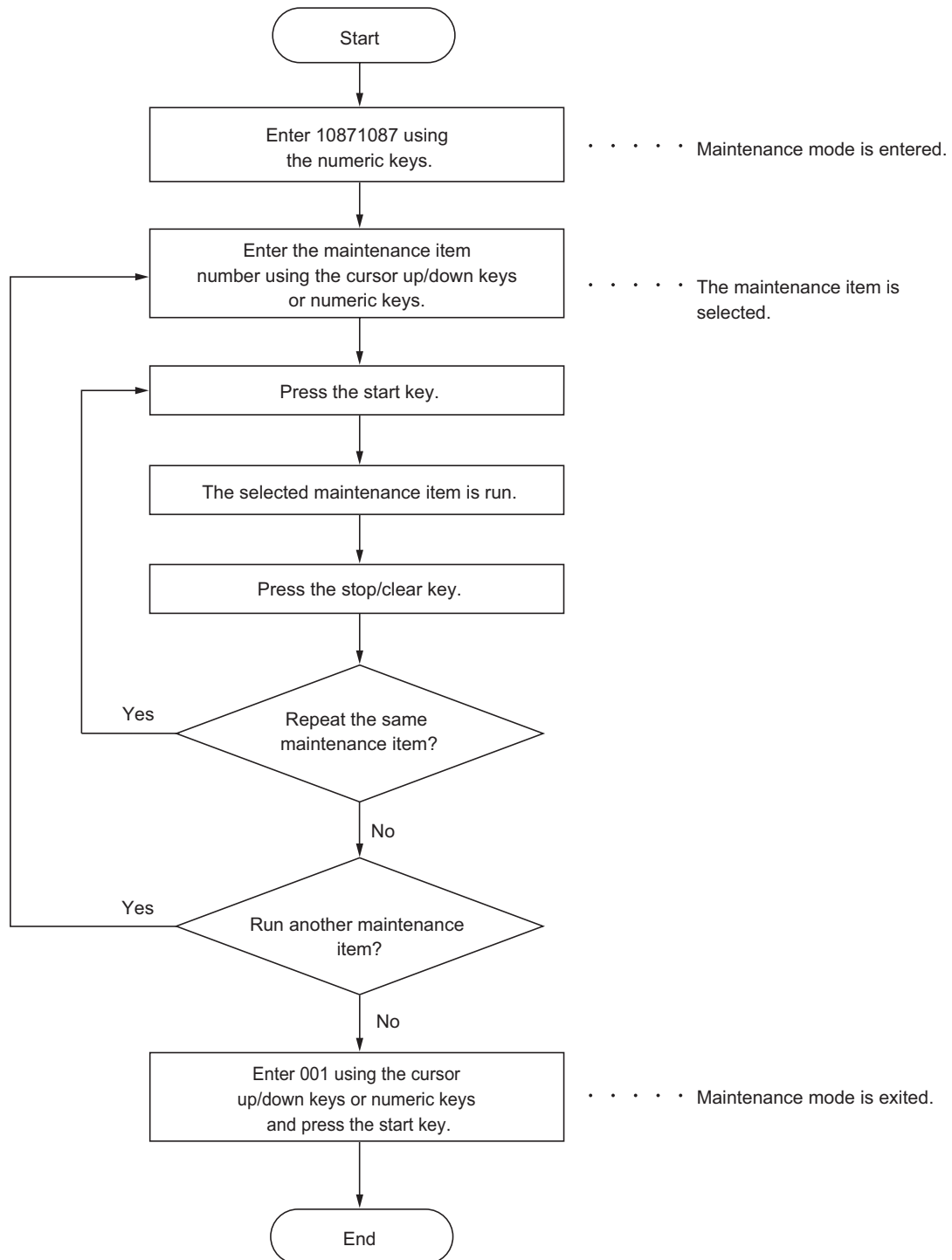


Figure 1-2-4

1-3-1 Maintenance mode

The machine is equipped with a maintenance function which can be used to maintain and service the machine.

(1) Executing a maintenance item



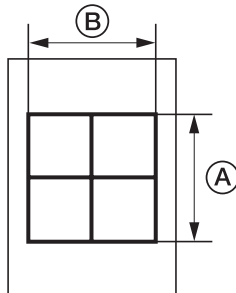
(2) Maintenance mode item list

Section	Item No.	Content of maintenance item	Initial setting*
General	U019	Displaying the ROM version	-
Drive, paper feed and paper conveying system	U053	Setting the adjustment of the motor speed	0.3/0.7/-0.5/0.0/-0.1 -0.1/-0.3/0.0/0.0/0.5/0.0*1
Operation panel and support equipment	U246	Setting the finisher	4/4/4*1
Mode setting	U342	Setting the ejection restriction	ON*1,*2
Other	U905	Checking counts by optional devices	-

*Initial setting for executing U020, *1: The item initialized for executing U020, *2: The item initialized for executing U021

(3) Contents of the maintenance mode items

Maintenance item No.	Description																										
U019	<p>Displaying the ROM version</p> <p>Description Displays the part number of the ROM fitted to each PWB.</p> <p>Purpose To check the part number or to decide, if the newest version of ROM is installed.</p> <p>Method</p> <ol style="list-style-type: none"> 1. Press the start key. The ROM version are displayed. 2. Change the screen using the cursor up/down keys. <table border="1"> <thead> <tr> <th>Display</th><th>Description</th></tr> </thead> <tbody> <tr> <td>MAIN</td><td>Main ROM</td></tr> <tr> <td>ENGINE</td><td>Engine ROM</td></tr> <tr> <td>LANG(St)</td><td>Standard language ROM</td></tr> <tr> <td>LANG(Op)</td><td>Optional language ROM</td></tr> <tr> <td>MAIN BOOT</td><td>Boot of main ROM</td></tr> <tr> <td>PRINTER</td><td>Printer ROM</td></tr> <tr> <td>NWS</td><td>Optional network scanner ROM</td></tr> <tr> <td>DP</td><td>Optional DP ROM</td></tr> <tr> <td>FINISHER</td><td>Built-in finisher ROM</td></tr> <tr> <td>CASS2</td><td>Optional first paper feeder ROM (standard for 22 ppm model)</td></tr> <tr> <td>CASS3</td><td>Optional second paper feeder ROM</td></tr> <tr> <td>CASS4</td><td>Optional third paper feeder ROM</td></tr> </tbody> </table> <p>Completion Press the stop/clear key. The screen for selecting a maintenance item No. is displayed.</p>	Display	Description	MAIN	Main ROM	ENGINE	Engine ROM	LANG(St)	Standard language ROM	LANG(Op)	Optional language ROM	MAIN BOOT	Boot of main ROM	PRINTER	Printer ROM	NWS	Optional network scanner ROM	DP	Optional DP ROM	FINISHER	Built-in finisher ROM	CASS2	Optional first paper feeder ROM (standard for 22 ppm model)	CASS3	Optional second paper feeder ROM	CASS4	Optional third paper feeder ROM
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Maintenance item No.	Description																																																
U053	<p>Setting the adjustment of the motor speed</p> <p>Description Performs fine adjustment of the speeds of the motors.</p> <p>Purpose To adjust the speed of the respective motors when the magnification is not correct.</p> <p>Method</p> <ol style="list-style-type: none">1. Press the start key.2. Select the item to be adjusted using the cursor up/down keys. <table><tr><th>Display</th><th>Description</th><th>Setting range</th><th>Initial setting</th></tr><tr><td>MAIN</td><td>Drive motor speed adjustment</td><td>-5.0 to 5.0</td><td>0.3</td></tr><tr><td>POLY</td><td>Polygon motor speed adjustment</td><td>-5.0 to 5.0</td><td>0.7</td></tr><tr><td>EJE</td><td>Eject motor speed adjustment</td><td>-5.0 to 5.0</td><td>-0.5</td></tr><tr><td>DRUM</td><td>Drum motor speed adjustment</td><td>-5.0 to 5.0</td><td>0.0</td></tr><tr><td>BYP</td><td>Motor speed adjustment (for paper feed from MP tray)</td><td>-5.0 to 5.0</td><td>-0.1</td></tr><tr><td>CAS</td><td>Motor speed adjustment (for paper feed from optional paper feeder)</td><td>-5.0 to 5.0</td><td>-0.1</td></tr><tr><td>DUP</td><td>Motor speed adjustment (for duplex mode)</td><td>-5.0 to 5.0</td><td>-0.3</td></tr><tr><td>EJE2</td><td>Eject motor speed (optional ejection correction value in the case of paper size of A3, B4 and Ledger)</td><td>-5.0 to 5.0</td><td>0.0</td></tr><tr><td>EJE3</td><td>Eject motor speed (optional ejection correction value in the case of paper size other than those above)</td><td>-5.0 to 5.0</td><td>0.0</td></tr><tr><td>EJE4</td><td>Eject motor speed (ejection motor correction value at the time of duplex inner ejection)</td><td>0.0 to 5.0</td><td>0.5</td></tr><tr><td>DF</td><td>Paper conveying motor speed adjustment (for built-in finisher)</td><td>-4.0 to 4.0</td><td>0.0</td></tr></table> <p>Adjustment</p> <ol style="list-style-type: none">1. Press the interrupt key.2. Press the start key to output an A3/Ledger VTC pattern. <div><p>Correct values for an A3/Ledger output are: A = 300 ± 1.0 mm B = 270 ± 1.0 mm</p></div> <p>Figure 1-3-1</p> <ol style="list-style-type: none">3. Change the setting value using the cursor left/right keys. A: Drive motor speed adjustment Increasing the setting makes the image longer in the auxiliary scanning direction, and decreasing it makes the image shorter in the auxiliary scanning direction. B: Polygon motor speed adjustment Increasing the setting makes the image shorter in the main scanning direction, and decreasing it makes the image longer in the main scanning direction.4. Press the start key. The value is set. <p>Completion Press the stop/clear key. The screen for selecting a maintenance item No. is displayed.</p>	Display	Description	Setting range	Initial setting	MAIN	Drive motor speed adjustment	-5.0 to 5.0	0.3	POLY	Polygon motor speed adjustment	-5.0 to 5.0	0.7	EJE	Eject motor speed adjustment	-5.0 to 5.0	-0.5	DRUM	Drum motor speed adjustment	-5.0 to 5.0	0.0	BYP	Motor speed adjustment (for paper feed from MP tray)	-5.0 to 5.0	-0.1	CAS	Motor speed adjustment (for paper feed from optional paper feeder)	-5.0 to 5.0	-0.1	DUP	Motor speed adjustment (for duplex mode)	-5.0 to 5.0	-0.3	EJE2	Eject motor speed (optional ejection correction value in the case of paper size of A3, B4 and Ledger)	-5.0 to 5.0	0.0	EJE3	Eject motor speed (optional ejection correction value in the case of paper size other than those above)	-5.0 to 5.0	0.0	EJE4	Eject motor speed (ejection motor correction value at the time of duplex inner ejection)	0.0 to 5.0	0.5	DF	Paper conveying motor speed adjustment (for built-in finisher)	-4.0 to 4.0	0.0
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Maintenance item No.	Description																				
U246	<p>Setting the finisher</p> <p>Description Provides various settings for the built-in finisher, if furnished.</p> <p>Purpose Adjusts the side registration cursor stop position if paper registration is poor or stapling is made outside the specified area.</p> <p>Setting</p> <ol style="list-style-type: none">1. Press the start key.2. Select the desired cursor position using the cursor up/down keys.3. Change the setting using the cursor left/right keys. <table><tr><th>Display</th><th>Description</th><th>Setting range</th><th>Initial setting</th><th>Change in value per step</th></tr><tr><td>FRONT</td><td>Front side registration cursor stop position</td><td>0 to 8</td><td>4</td><td>0.566 mm</td></tr><tr><td>REAR</td><td>Rear side registration cursor stop position</td><td>0 to 8</td><td>4</td><td>0.566 mm</td></tr><tr><td>END</td><td>Trailing edge registration cursor stop position</td><td>0 to 8</td><td>4</td><td>0.566 mm</td></tr></table> <ol style="list-style-type: none">4. Press the start key. The value is set. <p>Completion Press the stop/clear key. The screen for selecting a maintenance item No. is displayed.</p>	Display	Description	Setting range	Initial setting	Change in value per step	FRONT	Front side registration cursor stop position	0 to 8	4	0.566 mm	REAR	Rear side registration cursor stop position	0 to 8	4	0.566 mm	END	Trailing edge registration cursor stop position	0 to 8	4	0.566 mm
Display	Description	Setting range	Initial setting	Change in value per step																	
FRONT	Front side registration cursor stop position	0 to 8	4	0.566 mm																	
REAR	Rear side registration cursor stop position	0 to 8	4	0.566 mm																	
END	Trailing edge registration cursor stop position	0 to 8	4	0.566 mm																	
U342	<p>Setting the ejection restriction</p> <p>Description Sets or cancels the restriction on the number of sheets to be ejected continuously when the internal eject tray is selected as the eject location.</p> <p>Purpose According to user request, sets or cancels restriction on the number of sheets.</p> <p>Setting</p> <ol style="list-style-type: none">1. Press the start key.2. Select ON or OFF using the cursor up/down keys. <table><tr><th>Display</th><th>Description</th></tr><tr><td>ON</td><td>Sets restriction on the number of sheets</td></tr><tr><td>OFF</td><td>Cancels restriction on the number of sheets</td></tr></table> <p>Initial setting: ON Details of restriction (number of sheets to be ejected continuously after the start key is pressed)</p> <table><tr><th>Condition</th><th>Number of sheets</th></tr><tr><td>When no optional ejection device is installed</td><td>250</td></tr><tr><td>When the job separator is installed</td><td>150</td></tr><tr><td>When the built-in finisher is installed</td><td>100</td></tr></table> <ol style="list-style-type: none">3. Press the start key. The setting is set. <p>Completion Press the stop/clear key. The screen for selecting a maintenance item No. is displayed.</p>	Display	Description	ON	Sets restriction on the number of sheets	OFF	Cancels restriction on the number of sheets	Condition	Number of sheets	When no optional ejection device is installed	250	When the job separator is installed	150	When the built-in finisher is installed	100						
Display	Description																				
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When the built-in finisher is installed	100																				

Maintenance item No.	Description																				
U905	<p>Checking counts by optional devices</p> <p>Description Displays the counts of DP or finisher.</p> <p>Purpose To check the use of DP and finisher.</p> <p>Method</p> <ol style="list-style-type: none"> 1. Press the start key. 2. Select the device, the count of which is to be checked using the cursor up/down keys. 3. Press the start key. The count of the selected device is displayed. <table border="1"> <thead> <tr> <th>Display</th><th>Description</th></tr> </thead> <tbody> <tr> <td>DP</td><td>Counts of optional DP</td></tr> <tr> <td>FINISHER</td><td>Counts of finisher</td></tr> </tbody> </table> <p>DP</p> <table border="1"> <thead> <tr> <th>Display</th><th>Description</th></tr> </thead> <tbody> <tr> <td>ADP</td><td>No. of single-sided originals that has passed through the DP</td></tr> <tr> <td>RADP</td><td>No. of double-sided originals that has passed through the DP</td></tr> </tbody> </table> <p>Finisher</p> <table border="1"> <thead> <tr> <th>Display</th><th>Description</th></tr> </thead> <tbody> <tr> <td>CP CNT</td><td>No. of copies that has passed</td></tr> <tr> <td>STAPLE</td><td>Frequency the stapler has been activated</td></tr> <tr> <td>BUNDLE EJECT</td><td>Frequency the bundle discharge has been activated</td></tr> </tbody> </table> <p>Completion Press the stop/clear key. The screen for selecting a maintenance item No. is displayed.</p>	Display	Description	DP	Counts of optional DP	FINISHER	Counts of finisher	Display	Description	ADP	No. of single-sided originals that has passed through the DP	RADP	No. of double-sided originals that has passed through the DP	Display	Description	CP CNT	No. of copies that has passed	STAPLE	Frequency the stapler has been activated	BUNDLE EJECT	Frequency the bundle discharge has been activated
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BUNDLE EJECT	Frequency the bundle discharge has been activated																				

1-4-1 Paper misfeed detection

(1) Paper misfeed indication

When paper jams, the machine immediately stops operation and the occurrence of a paper jam is indicated on the operation panel.

To remove the jammed paper, lower the process table.

To reset the paper misfeed detection, detach and refit the process table to turn the tray open/close switch off and on.

(2) Paper misfeed detection conditions

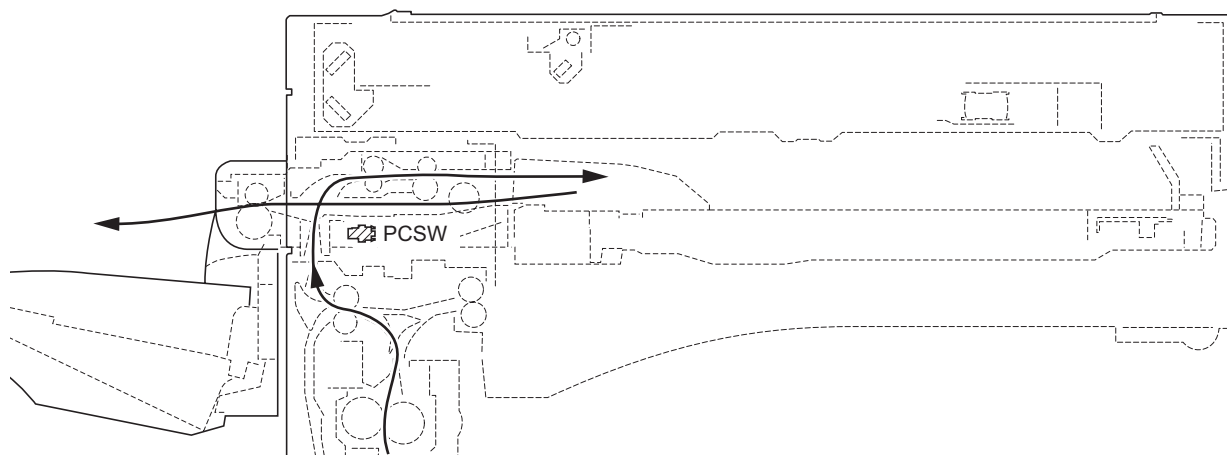


Figure 1-4-1

Section	Description	Conditions	Specified time
Finisher	80 Jam between the finisher and machine	Paper ejection is not output from the machine to the document finisher within specified time of the paper conveying switch (PCSW) turning on.	15 s
	81 Finisher paper entry nonarrival jam	The paper conveying switch (PCSW) is not turned on even if a specified time has elapsed after the machine eject signal was received.	2598 ms
	83 Finisher paper entry jam	The paper conveying switch (PCSW) does not turn off within specified time of its turning on when paper is conveyed to the process table from the paper conveying unit.	1869 ms + Paper length
	84 Finisher eject jam	The paper conveying switch (PCSW) is not turned on within the specified time when paper is ejected to the finisher tray from the process table.	2570 ms
		The paper conveying switch (PCSW) does not turn off within specified time of its turning on when paper is ejected to the finisher tray from the process table.	1869 ms + Paper length

(3) Paper misfeeds

Problem	Causes/check procedures	Corrective measures
(1) A paper jam in built-in finisher is indicated as soon as the main power switch is turned on.	A piece of paper torn from copy paper is caught around the paper conveying switch.	Check visually and remove it, if any.
	Defective paper conveying switch.	With 5 V DC present at YC2-23 on the finisher control PWB, check if YC2-21 on the finisher control PWB remains low when the paper conveying switch is turned on and off. If it does, replace the paper conveying switch.
(2) A paper jam in finisher is indicated during copying (jam between the finisher and machine). Jam code 80	Extremely curled paper.	Change the paper.
	Defective paper conveying switch.	With 5 V DC present at YC2-23 on the finisher control PWB, check if YC2-21 on the finisher control PWB remains low or high when the paper conveying switch is turned on and off. If it does, replace the paper conveying switch.
(3) A paper jam in finisher is indicated during copying (finisher paper entry nonarrival jam). Jam code 81	Extremely curled paper.	Change the paper.
	Defective paper conveying switch.	With 5 V DC present at YC2-23 on the finisher control PWB, check if YC2-21 on the finisher control PWB remains low or high when the paper conveying switch is turned on and off. If it does, replace the paper conveying switch.
(4) A paper jam in finisher is indicated during copying (finisher paper entry jam). Jam code 83	Defective paper conveying switch.	With 5 V DC present at YC2-23 on the finisher control PWB, check if YC2-21 on the finisher control PWB remains low or high when the paper conveying switch is turned on and off. If it does, replace the paper conveying switch.
	Check if the feedshift roller or feedshift pulley is deformed.	Check visually and replace.
(5) A paper jam in finisher is indicated during copying (finisher eject jam). Jam code 84	Defective paper conveying switch.	With 5 V DC present at YC2-23 on the finisher control PWB, check if YC2-21 on the finisher control PWB remains low or high when the paper conveying switch is turned on and off. If it does, replace the paper conveying switch.
	Check if the feedshift roller or feedshift pulley is deformed.	Check visually and replace.
	Check if the eject roller or eject pulley is deformed.	Check visually and replace.

1-4-2 Self-diagnosis

(1) Self-diagnostic function

This unit is equipped with a self-diagnostic function. When a problem is detected, copying is disabled and the problem displayed as a code consisting of C followed by a number, indicating the nature of the problem.

A message is also displayed requesting the user to call for service.

After removing the problem, the self-diagnostic function can be reset by turning the main power switch off and back on.

(2) Self diagnostic codes

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C8170	Built-in finisher front side registration motor problem When the front-side registration home-position sensor is turned on during initialization, the sensor did not turn on while it has moved by 106 pulses. When the front-side registration home-position sensor is turned off during initialization, the sensor did not turn on in 3 s.	The front side registration motor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective front side registration motor.	Replace front side registration motor.
		The front side registration home position sensor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective front side registration home position sensor.	Replace the front side registration home position sensor.
		Defective finisher control PWB.	Replace the finisher control PWB and check for correct operation.
C8180	Built-in finisher rear side registration motor problem When the rear-side registration home-position sensor is turned on during initialization, the sensor did not turn on while it has moved by 106 pulses. When the rear-side registration home-position sensor is turned off during initialization, the sensor did not turn on in 3 s.	The rear side registration motor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective rear side registration motor.	Replace rear side registration motor.
		The rear side registration home position sensor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective rear side registration home position sensor.	Replace the rear side registration home position sensor.
		Defective finisher control PWB.	Replace the finisher control PWB and check for correct operation.

Code	Contents	Remarks	
		Causes	Check procedures/corrective measures
C8190	Built-in finisher trailing edge registration motor problem When the trailing edge registration home-position sensor is turned on during initialization, the sensor did not turn on while it has moved by 106 pulses. When the trailing edge registration home-position sensor is turned off during initialization, the sensor did not turn on in 3 s.	The trailing edge registration motor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective trailing edge registration motor.	Replace trailing edge registration motor.
		The trailing edge registration home position sensor connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		Defective trailing edge registration home position sensor.	Replace the trailing edge registration home position sensor.
		Defective finisher control PWB.	Replace the finisher control PWB and check for correct operation.
C8210	Built-in finisher stapler problem The stapler home position sensor does not change state from nondetection to detection within 200 ms of the start of stapler motor counterclockwise (forward) rotation. During initialization, the stapler home position sensor does not change state from non-detection to detection within 600 ms of the start of stapler motor clockwise (reverse) rotation.	The stapler connector makes poor contact.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
		The stapler is blocked with a staple.	Remove the stapler cartridge, and check the cartridge and the stapling section of the stapler.
		The stapler is broken.	Replace the front stapler and check for correct operation.
		Defective finisher control PWB.	Replace the finisher control PWB and check for correct operation.

1-4-3 Electric problems

Troubleshooting to each failure must be in the order of the numbered symptoms.

Problem	Causes	Check procedures/corrective measures
(1) The paper conveying motor does not operate.	1. Poor contact in the connector terminals.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
	2. Defective drive transmission system.	Check if the rollers and gears rotate smoothly. If not, grease the bushings and gears. Check for broken gears and replace if any.
	3. Broken motor coil.	Check for continuity across the coil. If none, replace the motor.
(2) The feedshift solenoid does not operate.	1. Poor contact in the connector terminals.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
	2. Broken solenoid coil.	Check for continuity across the coil. If none, replace the solenoid.
(3) The pickup solenoid does not operate.	1. Poor contact in the connector terminals.	Reinsert the connector. Also check for continuity within the connector cable. If none, remedy or replace the cable.
	2. Broken solenoid coil.	Check for continuity across the coil. If none, replace the solenoid.

1-4-4 Mechanical problems

Problem	Causes/check procedures	Corrective measures
(1) Paper jams.	Check if the contact between the feedshift roller and feedshift pulleys is correct.	Check and remedy.
	Check if the contact between the feedshift roller and press roller is correct.	Check and remedy.
	Check if the contact between the eject roller and eject pulleys is correct.	Check and remedy.
(2) Abnormal noise is heard.	Check if the rollers and gears operate smoothly.	Grease the bearings and gears.

1-5-1 Precautions for assembly and disassembly

(1) Precautions

Before starting disassembly, press the Power key on the operation panel to off. Make sure that the Power lamp is off before turning off the main power switch. And then unplug the power cable from the wall outlet.

Turning off the main power switch before pressing the power key to off may cause damage to the equipped hard disk.

When handling PWBs (printed wiring boards), do not touch parts with bare hands.

The PWBs are susceptible to static charge.

Do not touch any PWB containing ICs with bare hands or any object prone to static charge.

When removing the hook of the connector, be sure to release the hook.

Take care not to get the cables caught.

To reassemble the parts, use the original screws. If the types and the sizes of screws are not known, refer to the PARTS LIST.

(2) Adjusting the positions of the front side registration cursor, rear side registration cursor and trailing edge registration cursor (reference)

Perform the following adjustment if paper registration is poor or stapling is made outside the specified area.

Procedure

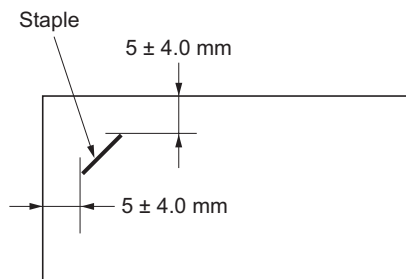
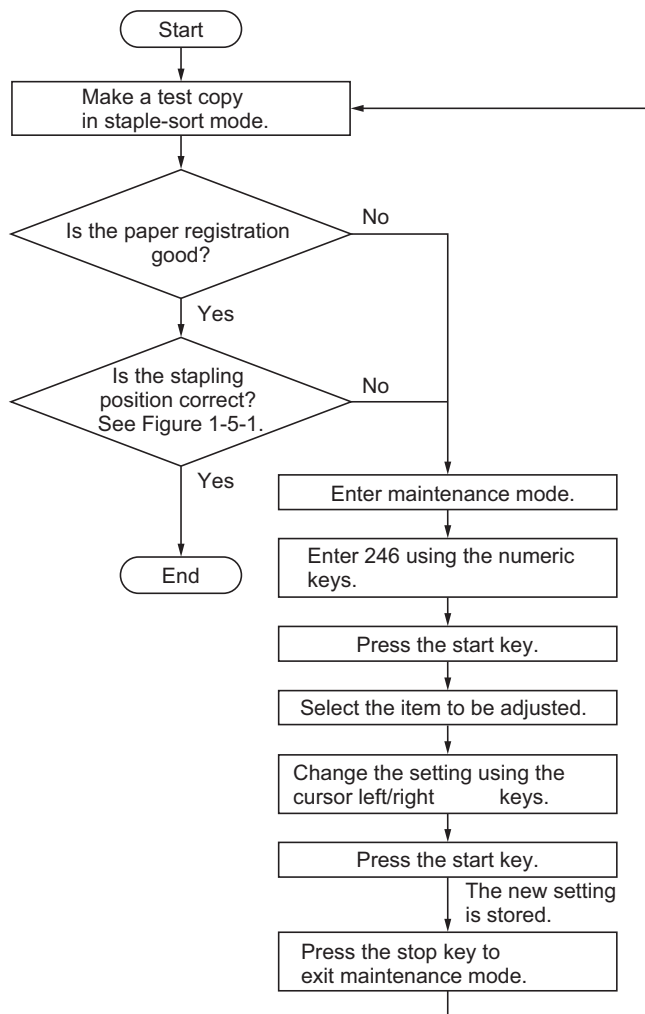


Figure 1-5-1 Stapling position

FRONT: Stop position of the front side registration cursor
 REAR : Stop position of the rear side registration cursor
 END : Stop position of the trailing edge registration cursor

Setting range: 0 to 8
 Initial setting: 4
 Changing the value by 1 changes the position by 0.566 mm.

Decreasing the value moves the front or rear side registration cursor or trailing edge registration cursor outward (➡); increasing the value moves each cursor inward (⬅). See Figure 1-5-2.

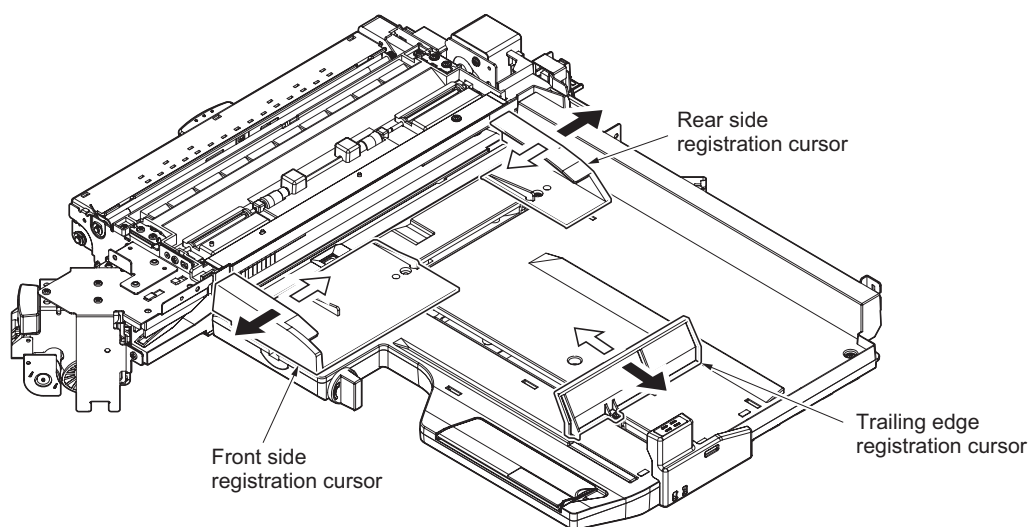


Figure 1-5-2

(3) Adjusting the pressure of curl eliminator mechanism

Increase the pressure of the curl eliminator mechanism to reduce upward curling of paper stacked on the process table if a paper jam occurs when batch ejection is performed because of strong upward curling.

Procedure

1. Remove the paper conveying unit from the machine.
2. Loosen each two screws from the front and rear curl eliminator pressure adjusting plates respectively and then remove the plates.
3. Retighten each two screws.
4. Refit the all removed parts.

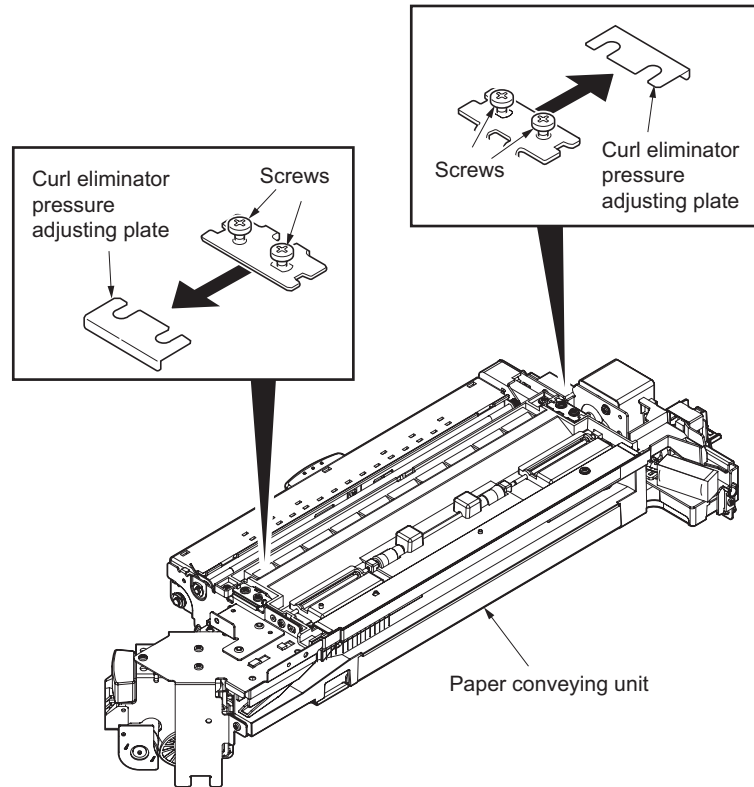


Figure 1-5-3

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2-1-1 Construction of each section

The paper conveying section consists of the components shown in Figure 2-1-1. It switches the path for the paper conveyed from the machine in sort mode. Also the paper conveying section contains a curl eliminator mechanism, which reduces curling of paper with curl eliminator rollers.

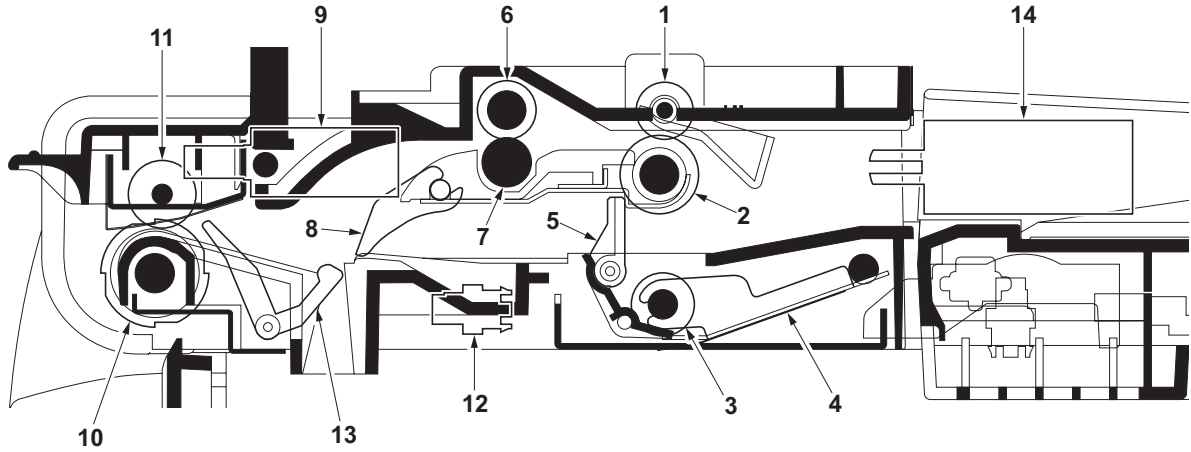


Figure 2-1-1 Paper conveying section

- | | |
|----------------------------------|--|
| (1) Feedshift pulleys | (8) Feedshift claw |
| (2) Feedshift roller | (9) Feedshift solenoid (FSSOL) |
| (3) Press roller | (10) Eject roller |
| (4) Press roller lift | (11) Eject pulleys |
| (5) Stopper | (12) Paper conveying switch (PCSW) |
| (6) Upper curl eliminator roller | (13) Actuator (paper conveying switch) |
| (7) Lower curl eliminator roller | (14) Pickup solenoid (PUSOL) |

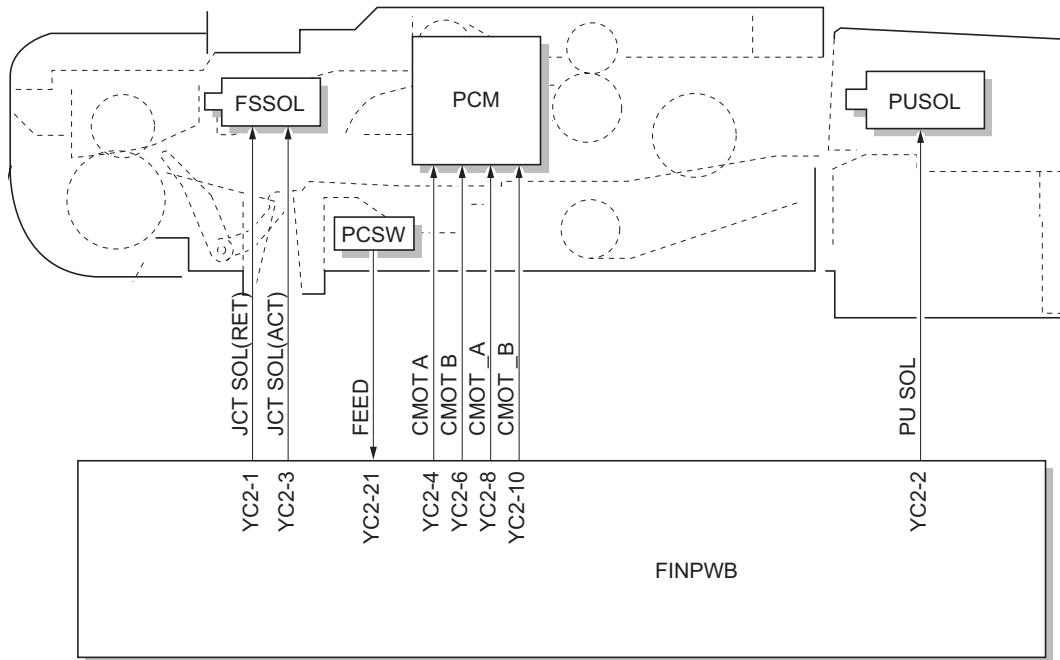


Figure 2-1-2 Paper conveying section block diagram

(1) Paper conveying operation in sort mode

In the sort mode, the feedshift solenoid (FSSOL) turns on and the feedshift guide of the machine operates to switch the paper path to the paper conveying unit. After curling of the conveyed paper is eliminated by the curl eliminator rollers, the paper is conveyed to the process table by the feedshift roller. When the trailing edge registration cursor of the process table shifts the paper stocked in the process table to the stopper, the pickup solenoid (PUSOL) turns on to lift the press roller and release the stopper. The stack of paper on the process table is ejected to the finisher tray by the feedshift roller and eject roller.

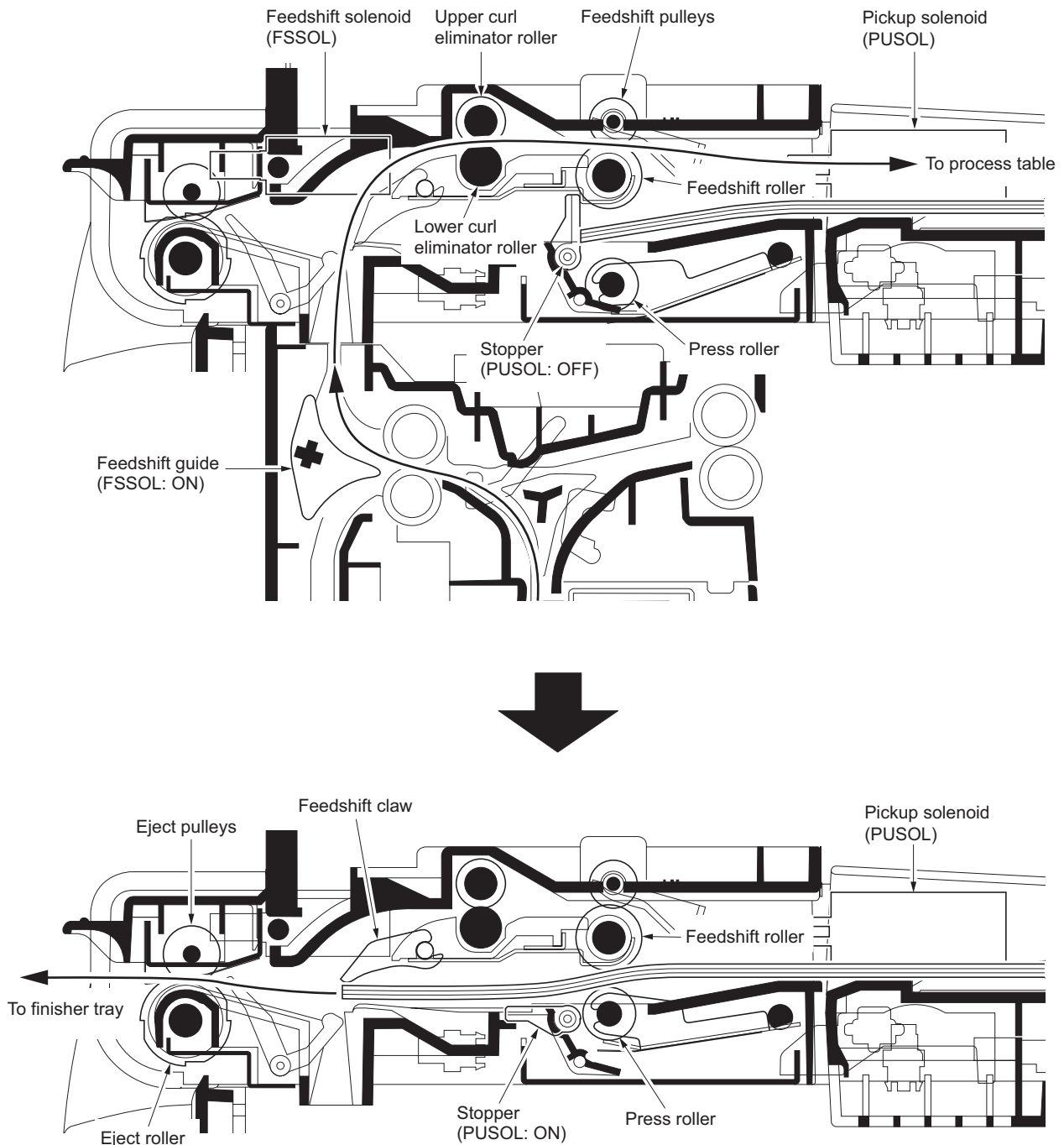


Figure 2-1-3

2-1-2 Process table section

The process table section consists of the components shown in Figure 2-1-4. It stores and evens up the paper conveyed from the paper conveying section and returns the stack of paper to the paper conveying section.

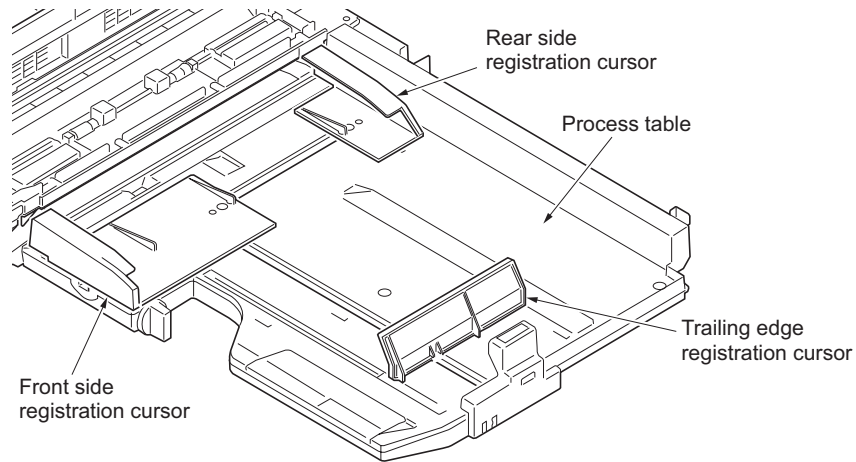


Figure 2-1-4 Process table section

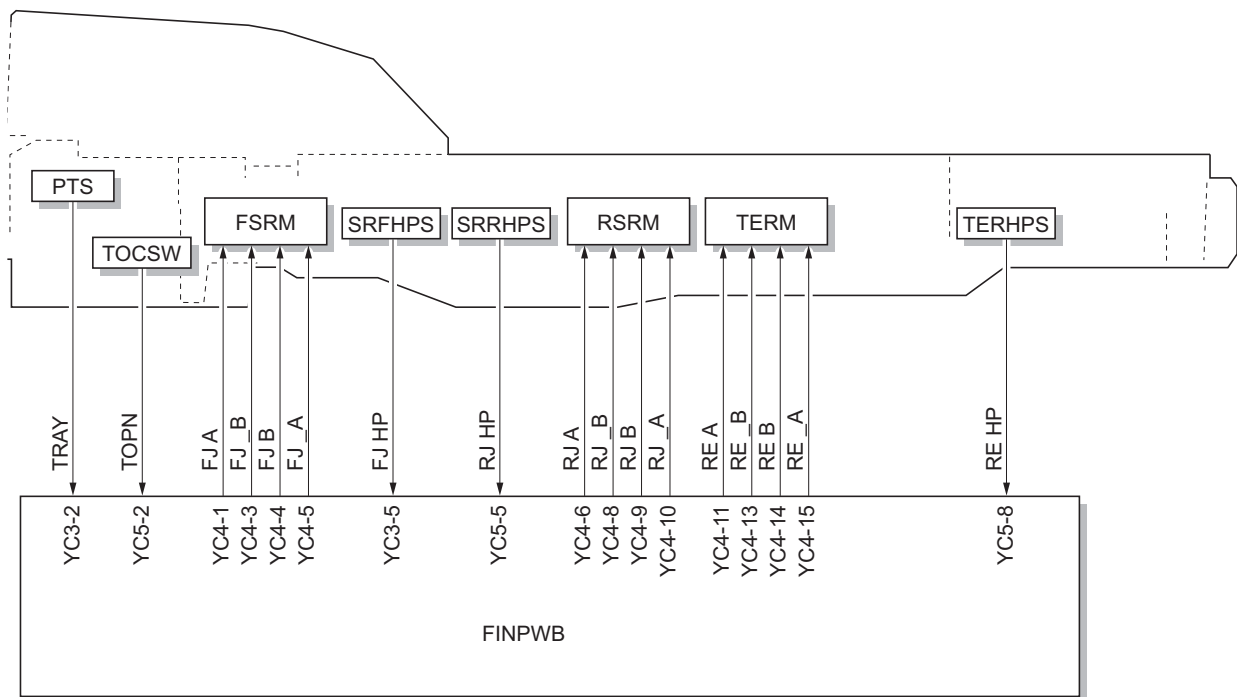
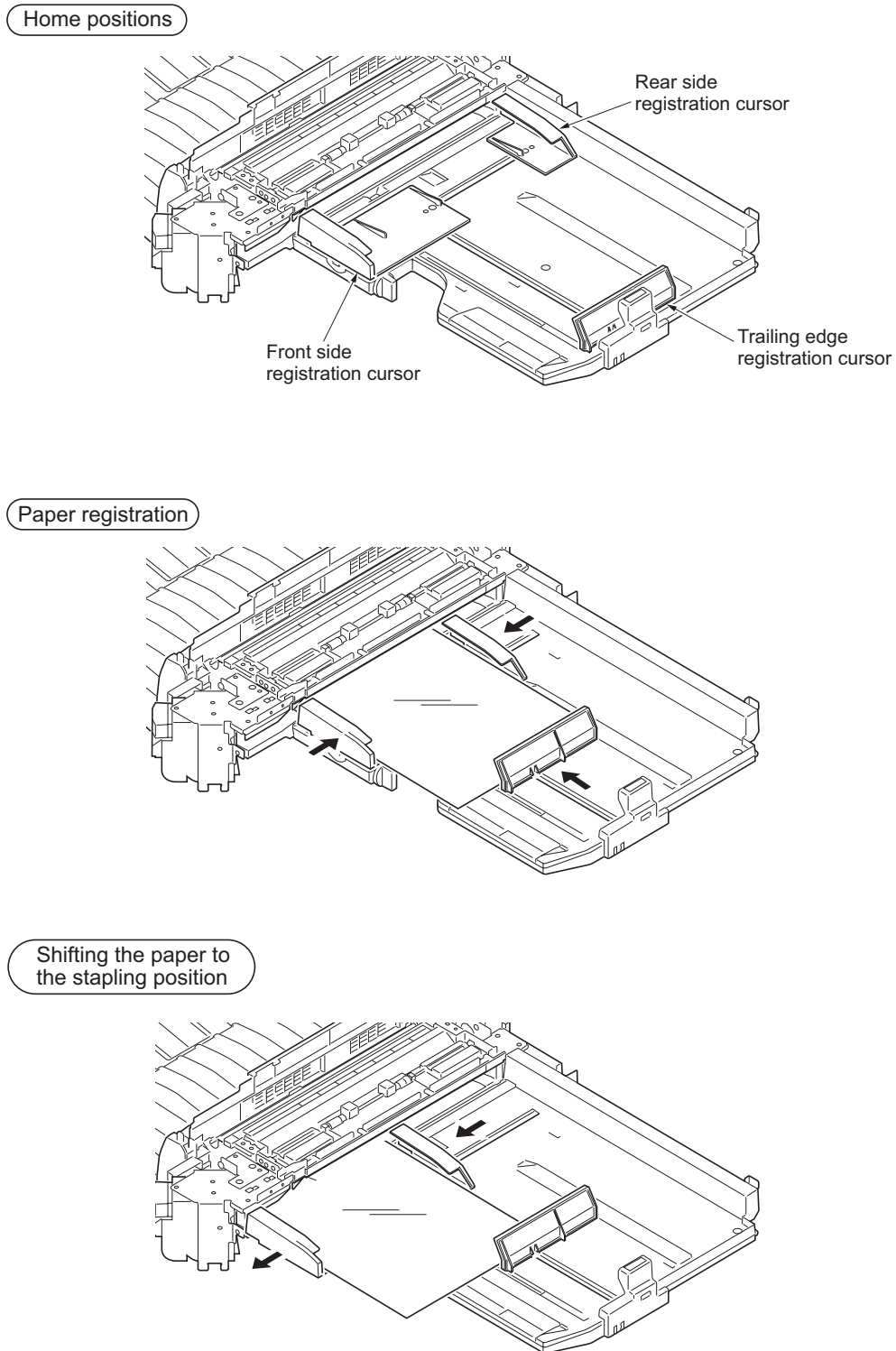


Figure 2-1-5 Process table section block diagram

(1) Paper registration on the process table

In sort mode, the front and rear side registration cursors move to the size of the paper used to even up the sides of the stack of paper and the trailing edge registration cursor shifts the paper to the paper conveying section.

In staple-sort mode, the front and rear side registration cursors even up the sides of the stack of paper and shift the stack toward the machine front, and then the trailing edge registration cursor shifts the stack to the stapling position.

**Figure 2-1-6**

2-1-3 Stapler section

In staple-sort mode, paper stocked on the process table is stapled by the stapler.
The stapler motor (STM) drives the stapler cam via the stapler drive gear to staple paper.

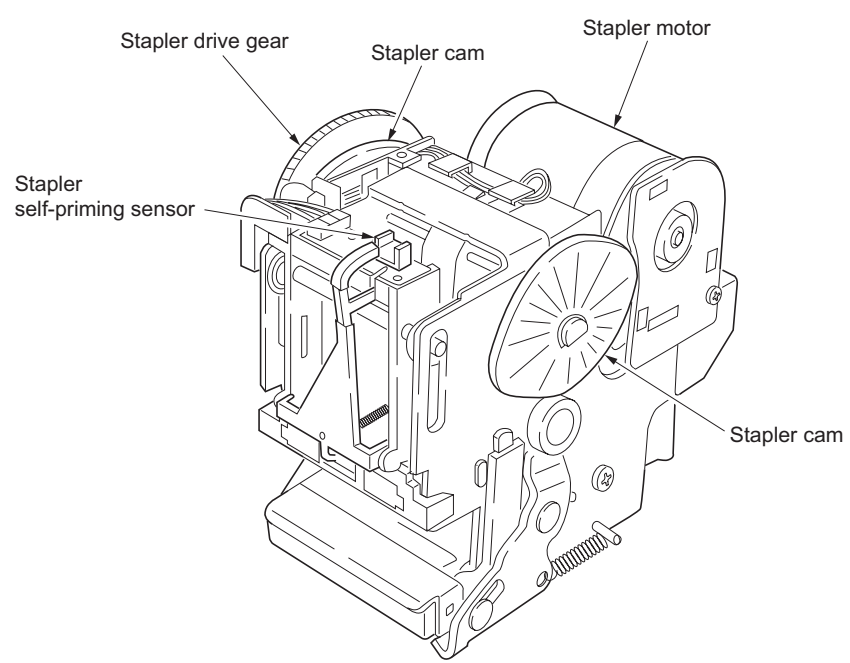


Figure 2-1-7 Stapler section

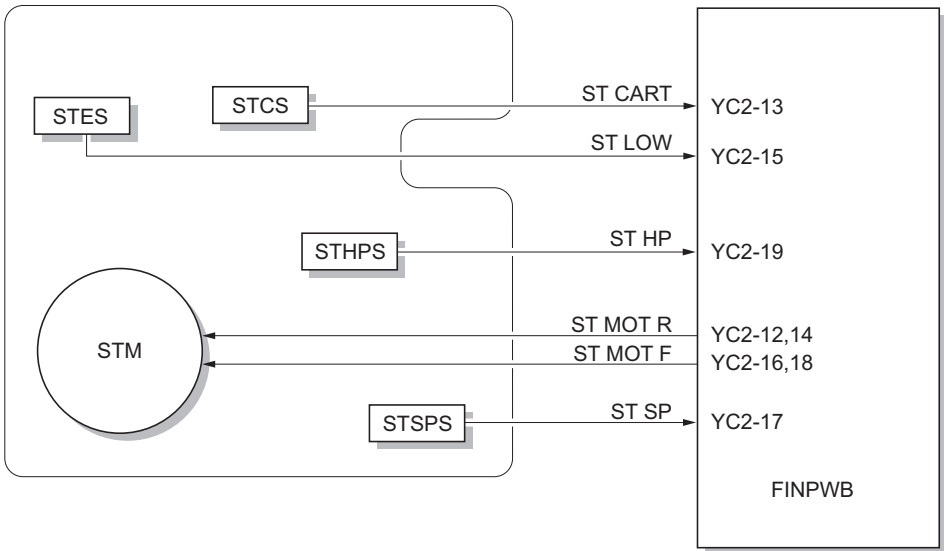


Figure 2-1-8 Stapler section block diagram

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2-2-1 Electrical parts layout

(1) Paper conveying section

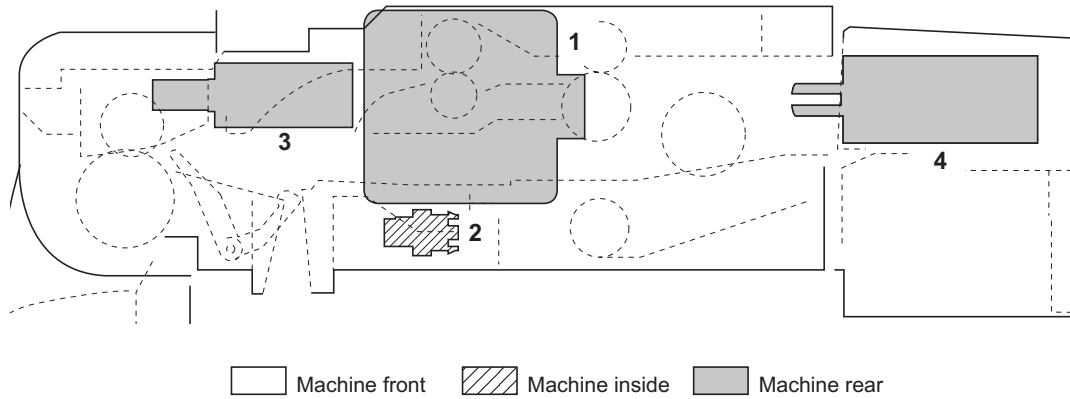
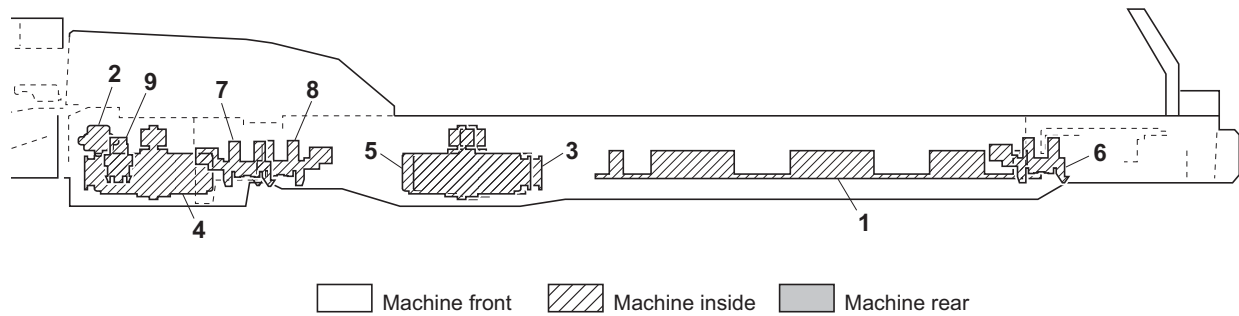
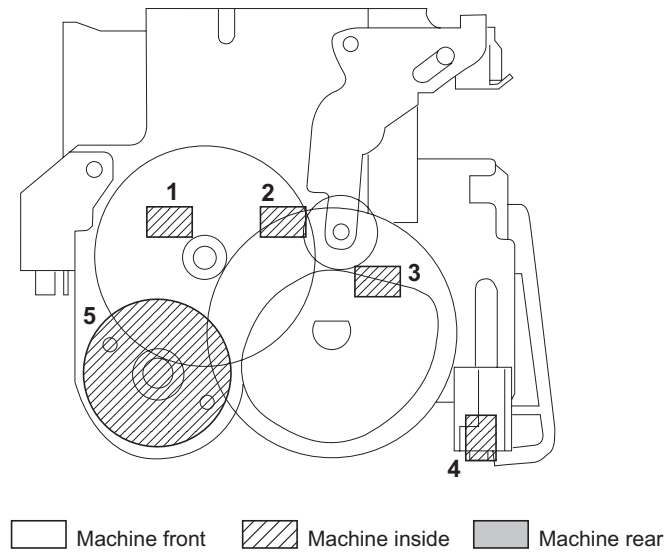


Figure 2-2-1 Paper conveying section

1. Paper conveying motor (PCM)..... Drives the paper conveying section.
2. Paper conveying switch (PCSW) Detects a paper jam in the finisher.
3. Feedshift solenoid (FSSOL)..... Operates the feedshift guide of the machine.
4. Pickup solenoid (PUSOL) Operates the press roller.

(2) Process table section**Figure 2-2-2 Process table section**

1. Finisher control PWB (FINPWB)..... Controls electrical components.
2. Process table sensor (PTS) Detects the presence of paper on the process table.
3. Trailing edge registration motor (TERM)..... Drives the trailing edge registration cursor.
4. Front side registration motor (FSRM) Drives the front side registration cursor.
5. Rear side registration motor (RSRM)..... Drives the rear side registration cursor.
6. Trailing edge registration home position sensor (TERHPS) Detects the trailing edge registration cursor in the home position.
7. Side registration front home position sensor (SRFHPS) Detects the front side registration cursor in the home position.
8. Side registration rear home position sensor (SRRHPS)..... Detects the rear side registration cursor in the home position.
9. Tray open/close switch (TOCSW)..... Detects if the process table is opened or closed.

(3) Stapler section**Figure 2-2-3 Stapler section**

1. Stapler empty sensor (STES) Detects the presence of staples.
2. Staple cartridge sensor (STCS) Detects the presence of the staple cartridge.
3. Stapler home position sensor (STHPS) Detects the stapler in the home position.
4. Stapler self-priming sensor (STSPS) Detects the pre-stapling state of the stapler.
5. Stapler motor (STM) Drives the stapler.

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2-3-1 Finisher control PWB

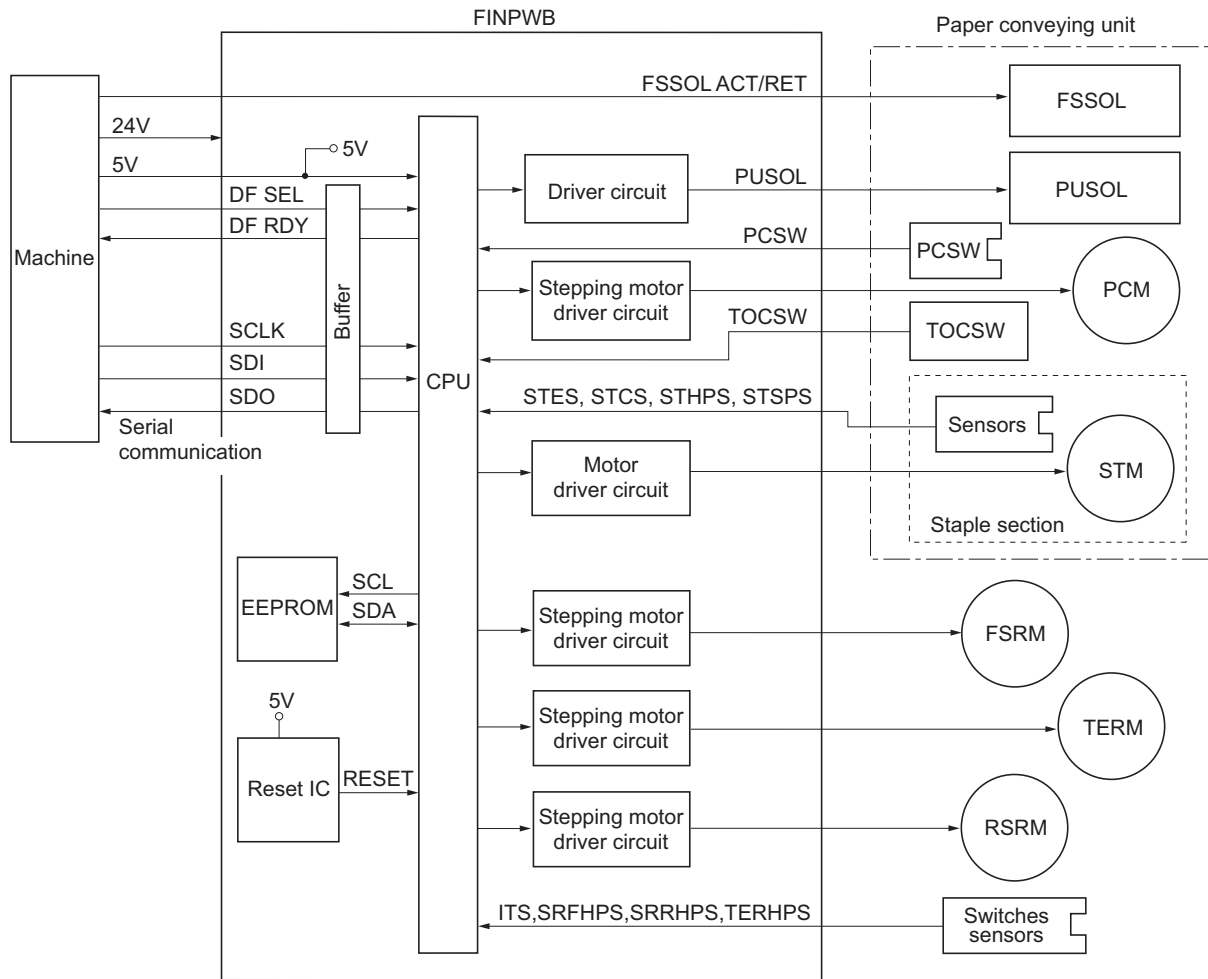


Figure 2-3-1 Finisher control PWB diagram

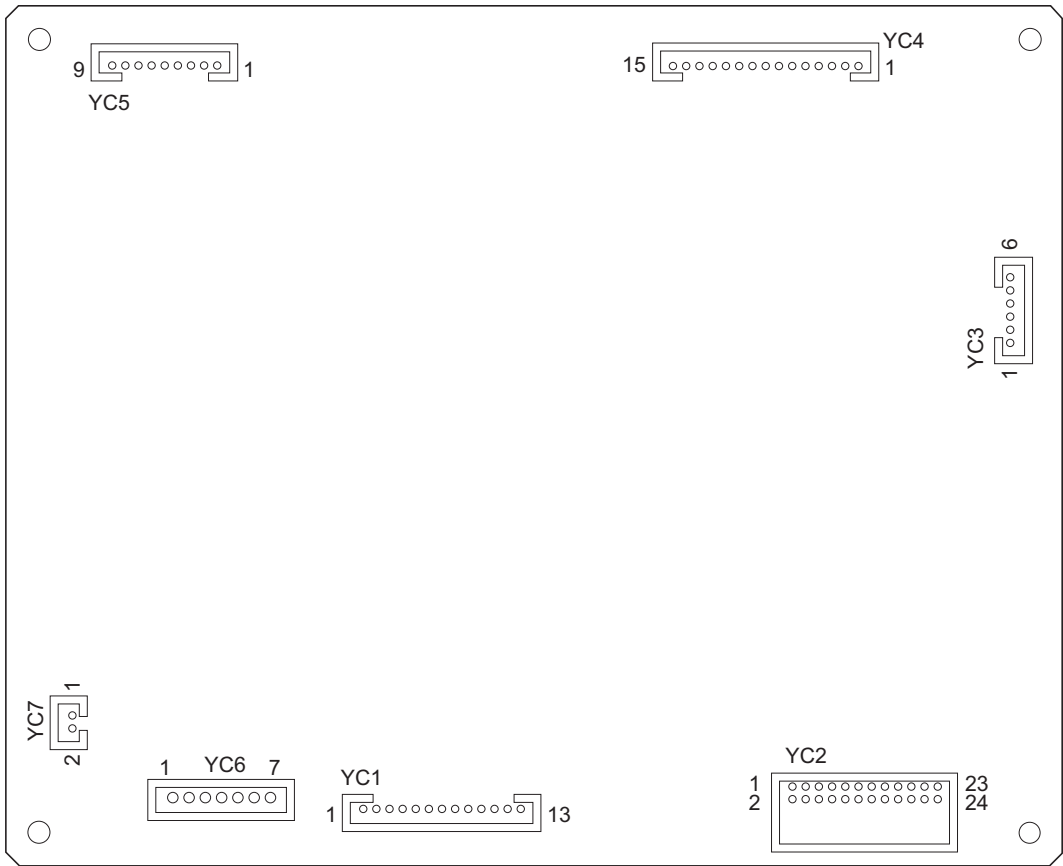


Figure 2-3-2 Finisher control PWB silk-screen diagram

Connector	Pin No.	Signal	I/O	Voltage	Description
YC1 Connected to the machine	1	24V	I	24 V DC	24 V DC power input from EPWB
	2	24V	I	24 V DC	24 V DC power input from EPWB
	3	PGND	-	-	Ground
	4	PGND	-	-	Ground
	5	5V	I	5 V DC	5 V DC power input from EPWB
	6	SGND	-	-	Ground
	7	DF SEL	I	0/5 V DC	Finisher select signal
	8	DF RDY	O	0/5 V DC	Finisher ready signal
	9	SDO	I	0/5 V DC (pulse)	Finisher serial communication data signal
	10	SDI	O	0/5 V DC (pulse)	Finisher serial communication data signal
	11	SCLK	I	0/5 V DC (pulse)	Clock signal for serial communication
	12	JCT SOL(ACT)	I	0/24 V DC	FSSOL: On/Off (active)
	13	JCT SOL(RET)	I	0/24 V DC	FSSOL: On/Off (return)
YC2 Connected to pickup solenoid, feedshift solenoid, paper conveying motor, stapler section and paper conveying switch	1	JCT SOL(RET)	O	0/24 V DC	FSSOL: On/Off (return)
	2	PU SOL	O	0/24 V DC	PUSOL: On/Off
	3	JCT SOL(ACT)	O	0/24 V DC	FSSOL: On/Off (active)
	4	CMOT A	O	0/24 V DC (pulse)	PCM drive control signal (A)
	5	JCT SOL 24V	O	24 V DC	24 V DC power output to FSSOL
	6	CMOT B	O	0/24 V DC (pulse)	PCM drive control signal (B)
	7	PU SOL 24V	O	24 V DC	24 V DC power output to PUSOL
	8	CMOT _A	O	0/24 V DC (pulse)	PCM drive control signal (_A)
	9	CMOT A 24V	O	24 V DC	24 V DC power output to PCM
	10	CMOT _B	O	0/24 V DC (pulse)	PCM drive control signal (_B)
	11	CMOT B 24V	O	24 V DC	24 V DC power output to PCM
	12	ST MOT R	O	0/24 V DC	STM reverse rotation drive signal
	13	ST CART	I	0/5 V DC	STCS: On/Off
	14	ST MOT R	O	0/24 V DC	STM reverse rotation drive signal
	15	ST LOW	I	0/5 V DC	STES: On/Off
	16	ST MOT F	O	0/24 V DC	STM forward rotation drive signal
	17	ST SP	O	0/5 V DC	STSPS: On/Off
	18	ST MOT F	O	0/24 V DC	STM forward rotation drive signal
	19	ST HP	I	0/5 V DC	STHS: On/Off
	20	ST GND	-	-	Ground
	21	FEED	I	0/5 V DC	PCSW: On/Off
	22	FEED GND	-	-	Ground
	23	FEED 5V	O	5 V DC	5 V DC power output to PCSW
	24	ST 5V	O	5 V DC	5 V DC power output to STM

Connector	Pin No.	Signal	I/O	Voltage	Description
YC3 Connected to process table sensor and side registration front home position sensor	1	TRAY 5V	O	5 V DC	5 V DC power output to PTS
	2	TRAY	I	0/5 V DC	PTS: On/Off
	3	TRAY GND	-	-	Ground
	4	FJHP 5V	O	5 V DC	5 V DC power output to SRFHPS
	5	FJ HP	I	0/5 V DC	SRFHPS: On/Off
	6	FJHP GND	-	-	Ground
YC4 Connected to front side registration motor, rear side registration motor and trailing edge registration motor	1	FJ A	O	0/24 V DC (pulse)	FSRM drive control signal (A)
	2	COM	O	24 V DC	24 V DC power output to FSRM
	3	FJ _B	O	0/24 V DC (pulse)	FSRM drive control signal (_B)
	4	FJ B	O	0/24 V DC (pulse)	FSRM drive control signal (B)
	5	FJ _A	O	0/24 V DC (pulse)	FSRM drive control signal (_A)
	6	RJ A	O	0/24 V DC (pulse)	RSRM drive control signal (A)
	7	COM	O	24 V DC	24 V DC power output to RSRM
	8	RJ _B	O	0/24 V DC (pulse)	RSRM drive control signal (_B)
	9	RJ B	O	0/24 V DC (pulse)	RSRM drive control signal (B)
	10	RJ _A	O	0/24 V DC (pulse)	RSRM drive control signal (_A)
	11	RE A	O	0/24 V DC (pulse)	TERM drive control signal (A)
	12	COM	O	24 V DC	24 V DC power output to TERM
	13	RE _B	O	0/24 V DC (pulse)	TERM drive control signal (_B)
	14	RE B	O	0/24 V DC (pulse)	TERM drive control signal (B)
	15	RE _A	O	0/24 V DC (pulse)	TERM drive control signal (_A)
YC5 Connected to tray open/close switch, side registration rear home position sensor and trailing edge registration home position sensor	1	TOPN 5V	O	5 V DC	5 V DC power output to TOCSW
	2	TOPN	I	0/5 V DC	TOCSW: On/Off
	3	TOPN GND	-	-	Ground
	4	RJ HP 5V	O	5 V DC	5 V DC power output to SRRHPS
	5	RJ HP	I	0/5 V DC	SRRHPS: On/Off
	6	RJ HP GND	-	-	Ground
	7	RE HP 5V	O	5 V DC	5 V DC power output to TERHPS
	8	RE HP	I	0/5 V DC	TERHPS: On/Off
	9	RE HP GND	-	-	Ground

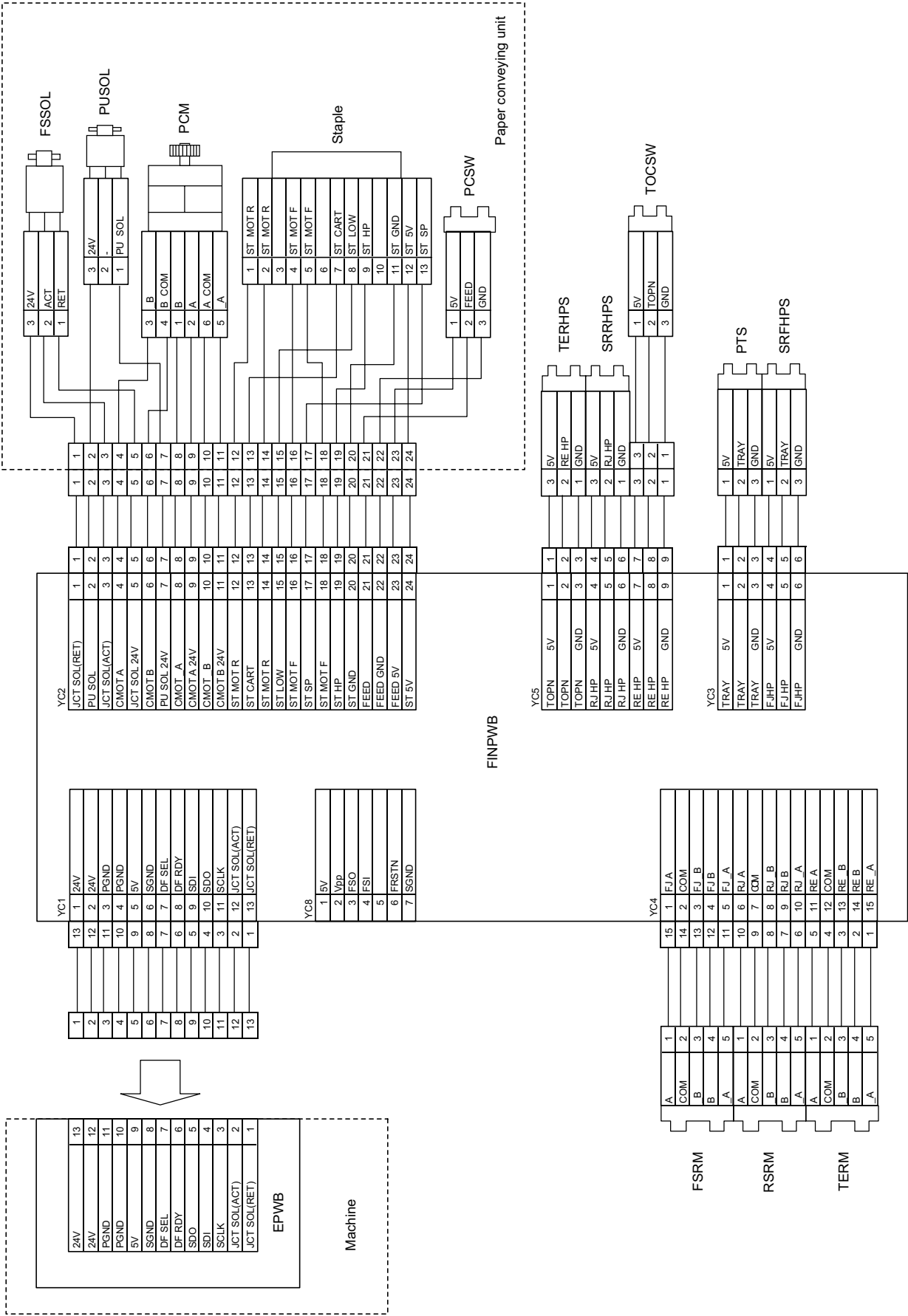
Maintenance parts list

Maintenance part name		Part No.	Alternative part No.	Fig. No.	Ref. No.
Name used in service manual	Name used in parts list				
Process table	-	-	-	3	-
Upper curl eliminator roller	UPPER ROLLER DECURLER	3HP08110	-	2	27
Lower curl eliminator roller	ROLLER DECURLER	303HP08101	3HP08101	1	33
Eject roller	ROLLER EJECT	303HP08121	3HP08121	1	21
Eject pulleys	PULLEY, LOOP FEED	63210170	-	1	41
Feedshift roller	ROLLER FEED SHIFT	303HP08091	3HP08091	1	32
Feedshift pulleys	PULLEY, BRANCH	3BN08100	-	2	38
Press roller	PULLEY STOPPER PRESSURE	3HP08390	-	1	13
Switches and sensors	-	-	-	-	-

Periodic maintenance procedures

Section	Maintenance part/location	Method	Maintenance cycle	Points and cautions	Page
Paper conveying and process table section	Process table	Clean and grease	Every service	Clean the rail section and apply molycote grease EM-50L/50G.	
	Upper curl eliminator roller	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Lower curl eliminator roller	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Eject roller	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Eject pulleys	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Feedshift roller	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Feedshift pulleys	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Press roller	Clean	Every service	Clean with alcohol. (Check and clean with alcohol when user call occurs.)	
	Switches and sensors	Clean	Every service	Airbrush.	

Wiring diagram



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