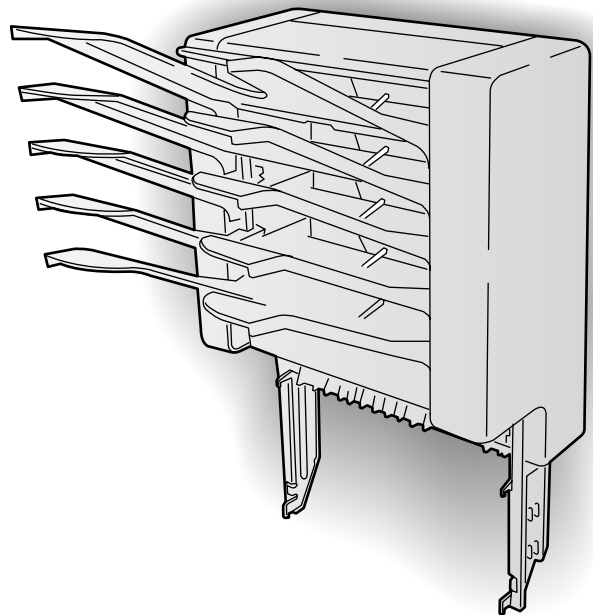


Service manual



Sorter SO-60

Conventions

Throughout this manual, the following conventions are used:

Italic letters refer related chapters or sections or documentations.



This symbol followed by **WARNING** denotes that the following paragraph(s) includes precautions which, if ignored, could result in personal injury, and/or irrevocable damage to the sorter.

When followed by **CAUTION** this symbol denotes that the following paragraph(s) include the precautions which, if ignored, could result in damage to the sorter.

About the chapters

The manual is comprised of the following chapters:

Chapter 1: Product Information

Chapter 2: Installation

Chapter 3: Maintenance

Chapter 4: Operation Overview

Chapter 5: Disassembly

Chapter 6: Troubleshooting

Appendix A: Diagrams

REVISION HISTORY

Version	Date	Replaced Pages	Remarks
1.00	2-Apr-2001	-	

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LIVING TOGETHER
This illustration symbolizes Kyocera's guiding concept of "Living Together."
The three puzzle pieces represent our global society, the environment and our local communities.
— live areas in which we continually strive to make tomorrow a little bit better than today.

Chapter 1 Product Information

Chapter 1 Contents

1-1 Specifications	1-3
1-2 Names of parts	1-4

1-1 Specifications

Table 1-1-1 Specifications

Item	Description
Compatible printer	Kyocera Mita Page Printers FS-1800/1800N and FS-3800/3800N
Number of paper trays	5
Paper sizes	A4 (21.0 × 29.7 cm) Letter (8-1/2 × 11 inches) JIS B5 (18.2 × 25.7 cm) ISO A5 (14.8 × 21.0 cm) Others: 14.8 to 21.0 cm × 21.6 to 29.7 cm (5-13/16 to 8-1/2 × 8-1/4 to 11-11/16 inches)
Paper capacity	Approximately 200 pages each of thickness 0.1 mm
Environmental requirements	Temperature: 10 to 32.5°C (50 to 90.5°F)
	Humidity: 20 to 80 % RH
	Ideal conditions are 20°C/65 % RH, altitude under 2000 m.
Power requirements	120 V, 60 Hz, max. 0.3 A 220 - 240 V, 50/60 Hz, max. 0.2 A Max. allowable voltage fluctuation: ±10 % Max. allowable frequency fluctuation: ±2%
Power consumption	Max. 67 W
Noise	Max. 59 dB (A) (excl. peak values) [Measured 1 m from the outside of the sorter]
Dimensions	Width: 34.5 cm (13-9/16 inches)
	Height: 31.5 cm (12-3/8 inches)
	Depth: 17.0 cm (6-11/16 inches)
Weight	5.3 kg (11-11/16 lb.)

1-2 Names of parts

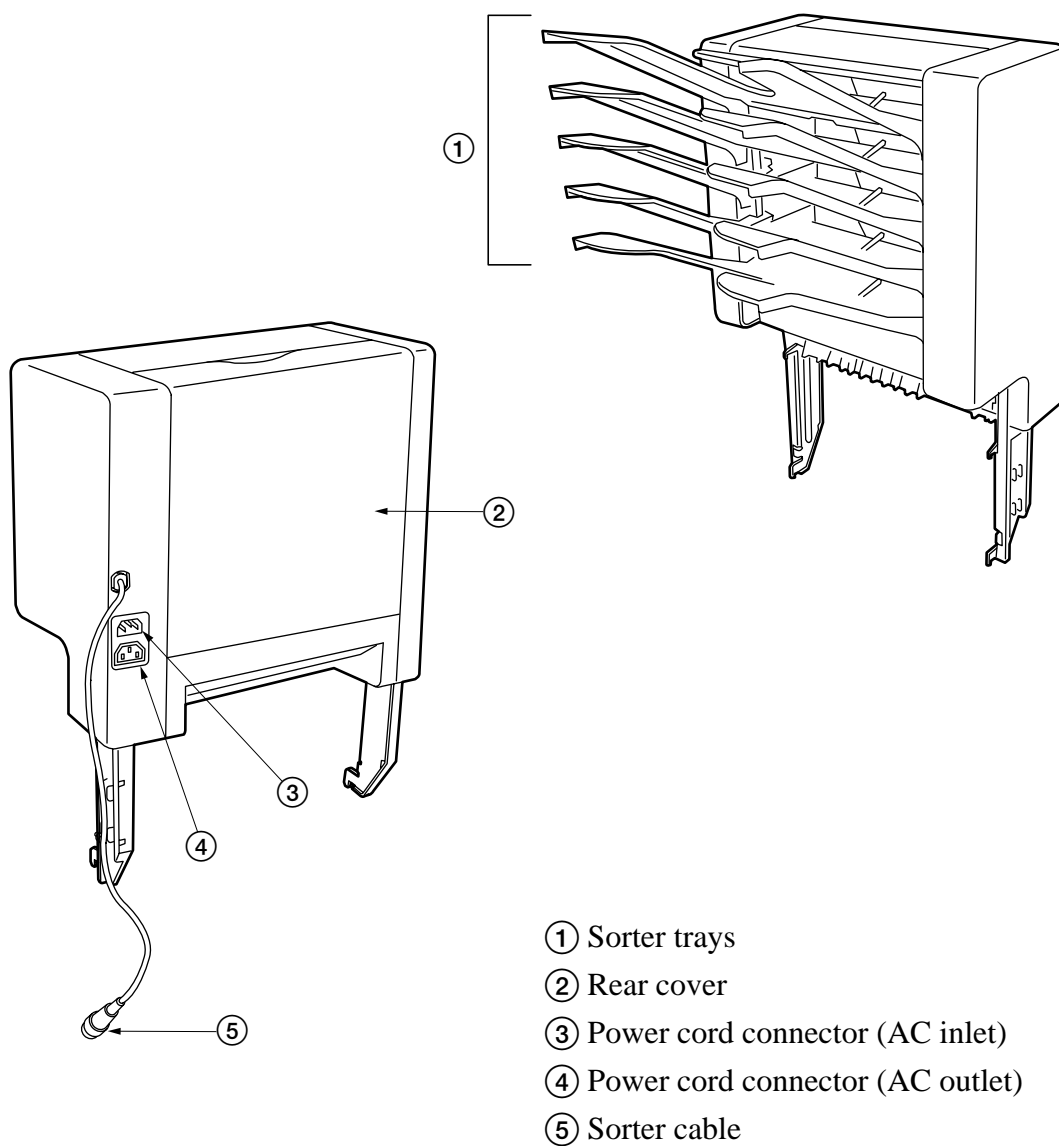


Figure 1-2-1 Names of parts

Chapter 2 **I n s t a l l a t i o n**

Chapter 2 Contents

2-1 Installing the duplexer	2-3
-----------------------------------	-----

2-1 Installing the duplexer

1. Unpack the sorter and place it on its side. Remove the tapes ① from the sorter.

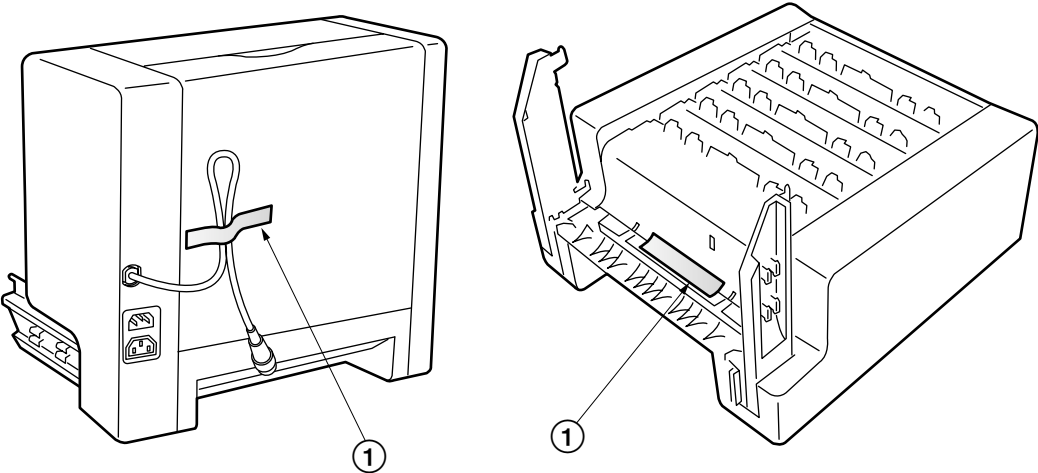


Figure 2-1-1 Remove the tapes

2. Unfold the two attachment legs ② of the sorter.

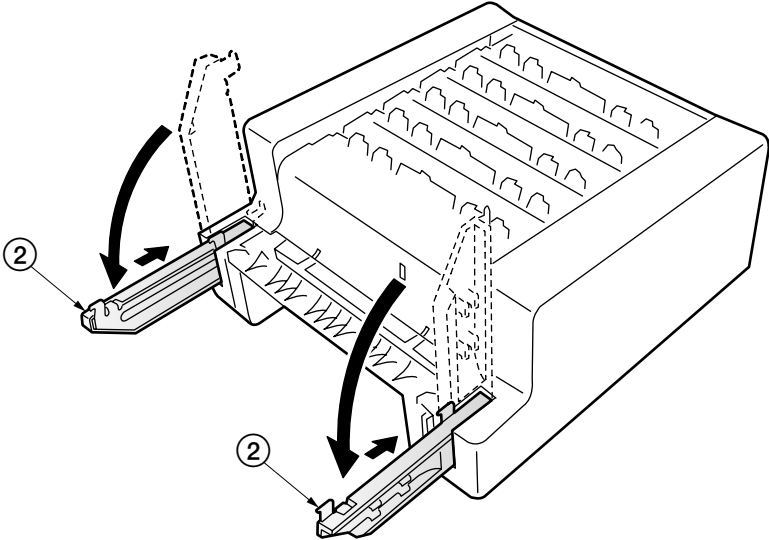


Figure 2-1-2 Unfold the attachment legs

3. Turn off the printer and disconnect the power cord and printer cable. If the duplexer is installed, remove the vertical path assembly ③, power cord, and printer cable.

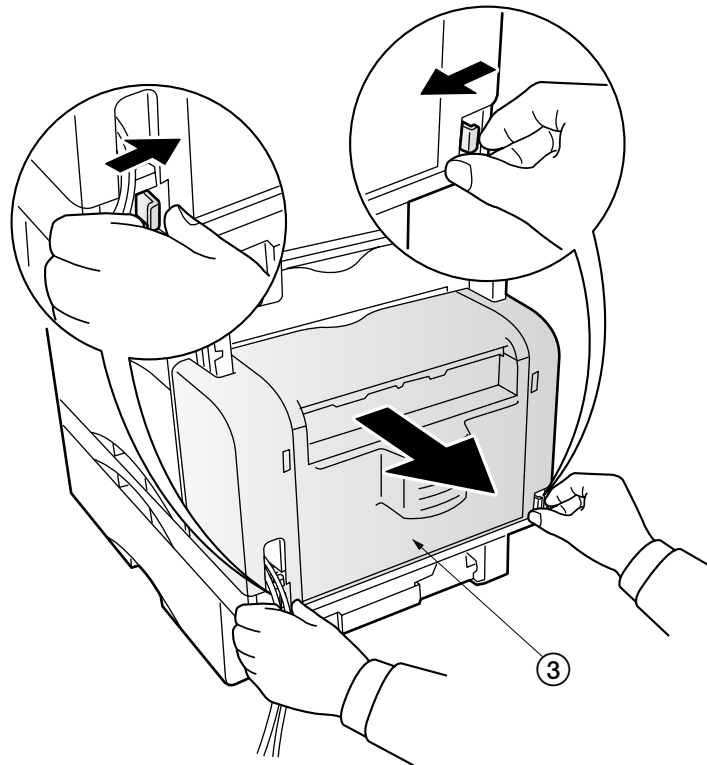


Figure 2-1-3 Remove the vertical path assembly

4. Remove the sorter connection cover ④ from the printer. Store the removed cover in a safe place.

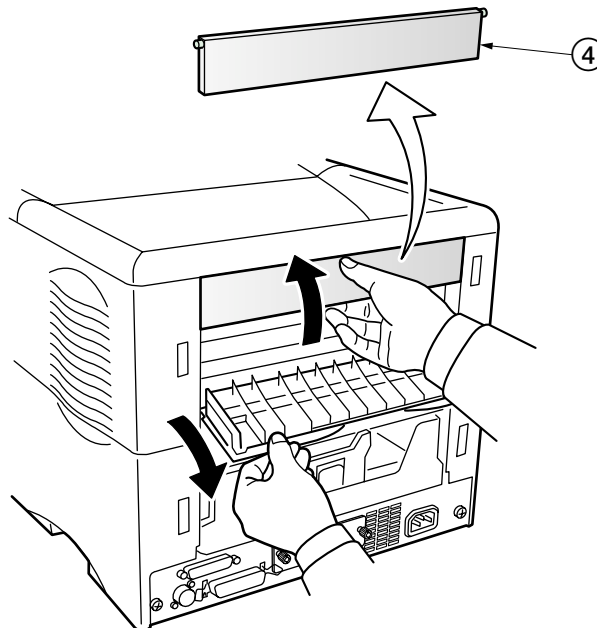


Figure 2-1-4 Remove the sorter connection cover

5. Install the sorter by inserting the four hooks (5) on its attachment legs into the notches (6) in the printer.

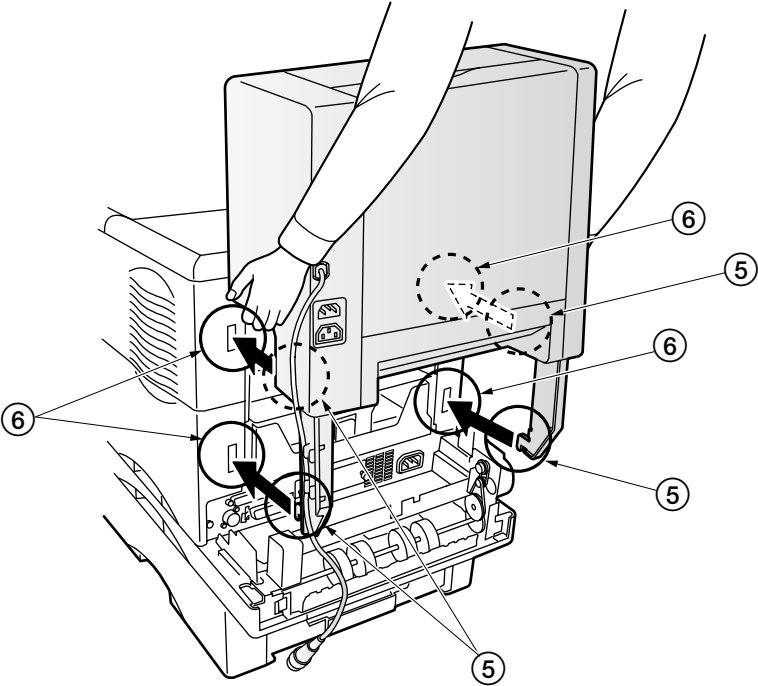


Figure 2-1-5 Install the sorter

6. Push the sorter down. The levers (7) of the attachment legs are in the lock position.

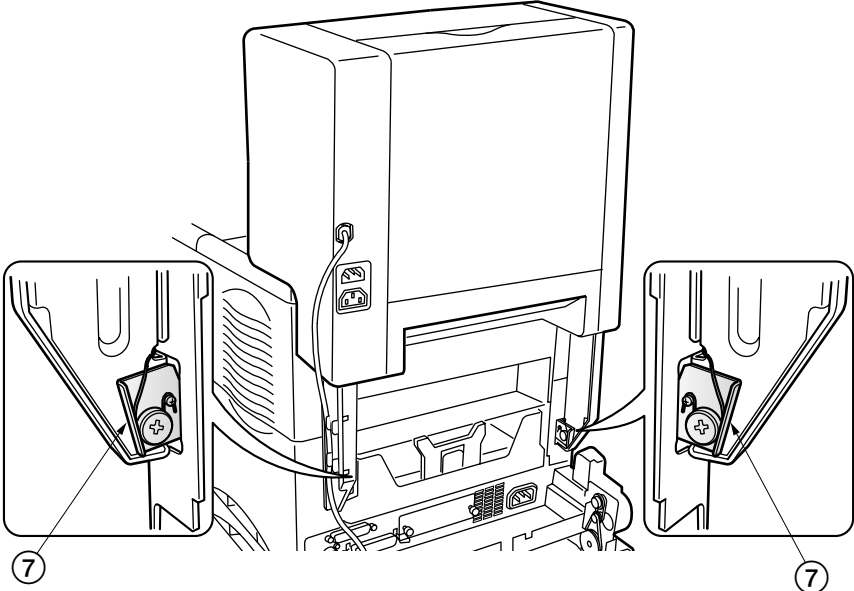


Figure 2-1-6 Push the sorter

7. Connect the sorter cable ⑧ to the printer.

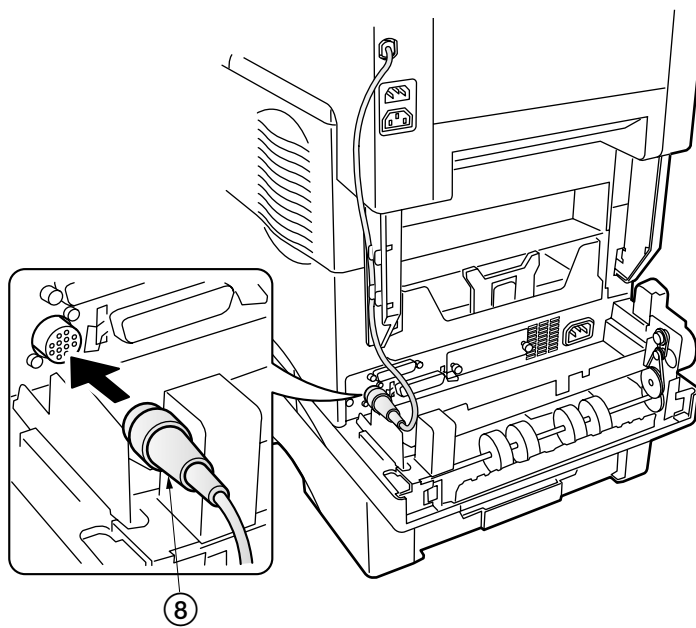


Figure 2-1-7 Connect the sorter cable

8. The sorter is equipped with two power cord sockets. The upper one ⑨ is to be connected to a AC outlet and the lower one ⑩ is to be connected to the printer.

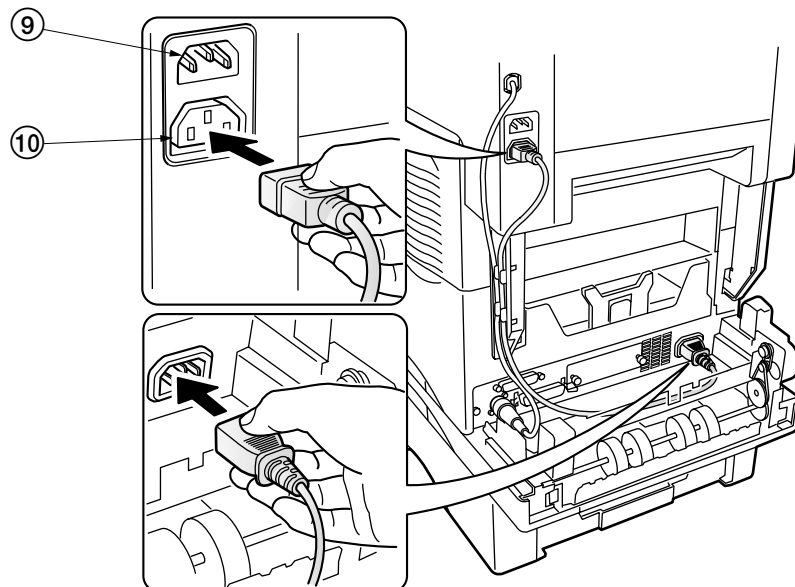


Figure 2-1-8 Connect the power cord

9. Secure the connected sorter cable (11) and power cord (12) to an attachment leg on the sorter.

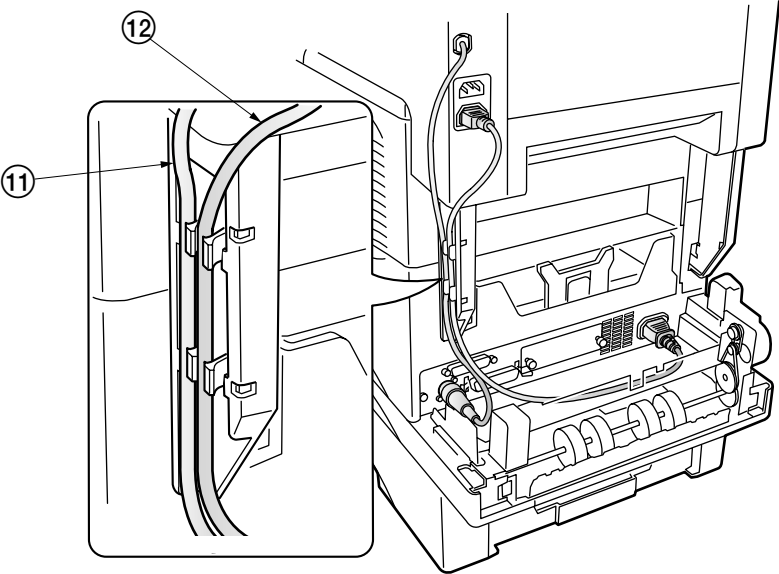


Figure 2-1-9 Secure the sorter cable and power cord

10. If the duplexer installed, secure the power cord (13) to the duplexer.

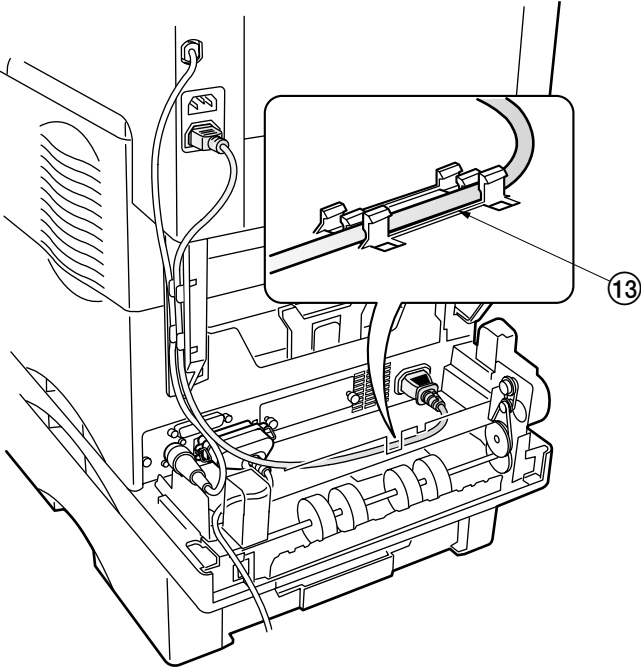


Figure 2-1-10 Secure the power cord

11. If the duplexer is installed, remove the two cut-out portions ⑭ from the upper part of the vertical path assembly removed in step 3. Reinstall the vertical path assembly.

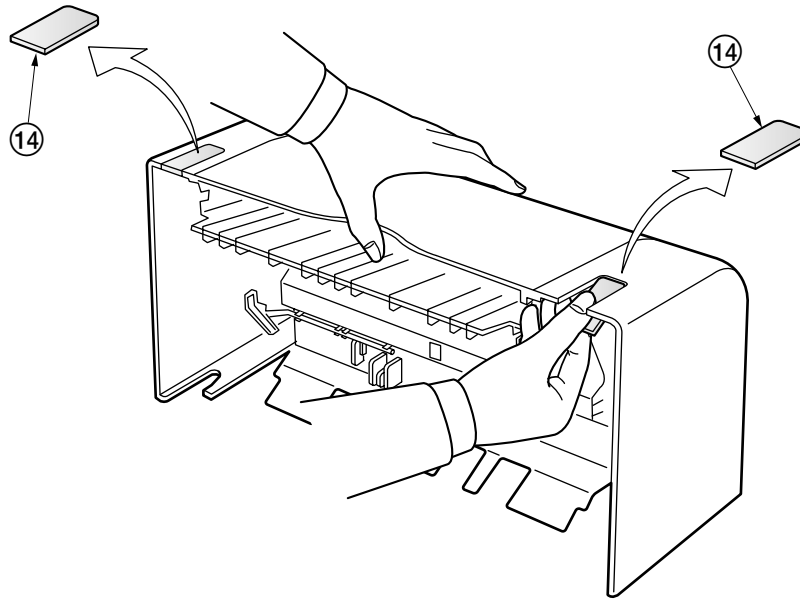


Figure 2-1-11 Remove the portions

12. Install the five sorter trays ⑮ to the sorter.

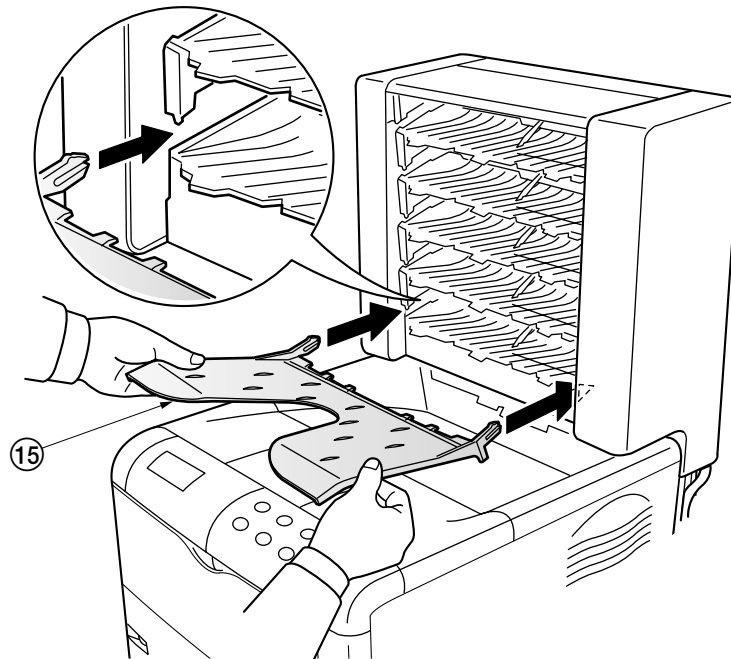


Figure 2-1-12 Install the sorter trays

13. Connect the power cord ⑯ supplied with the printer to the sorter.

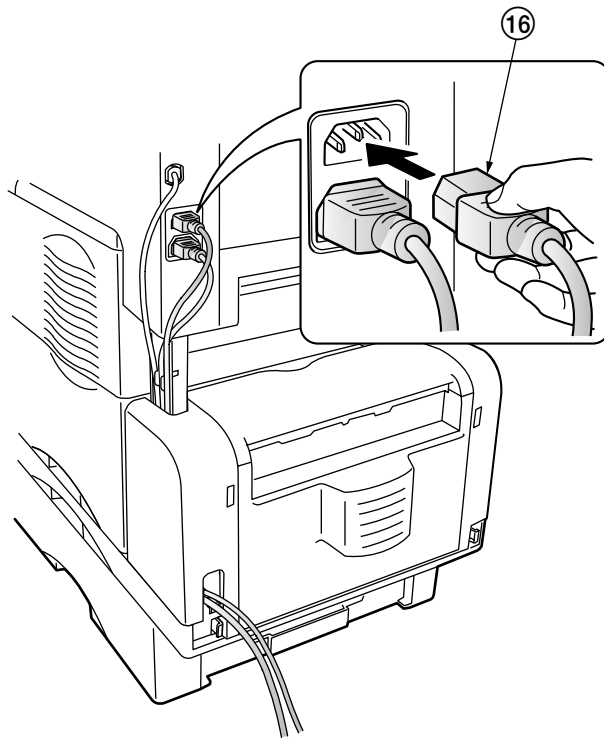


Figure 2-1-13 Connect the power cord supplied

Chapter 3 M a i n t e n a n c e

Chapter 3 Contents

3-1 Maintenance	3-3
3-1-1 Cleaning the conveying rollers	3-3

3-1 Maintenance

3-1-1 Cleaning the conveying rollers

Open the rear cover. Using the cleaning cloth, wipe the conveying rollers ①.

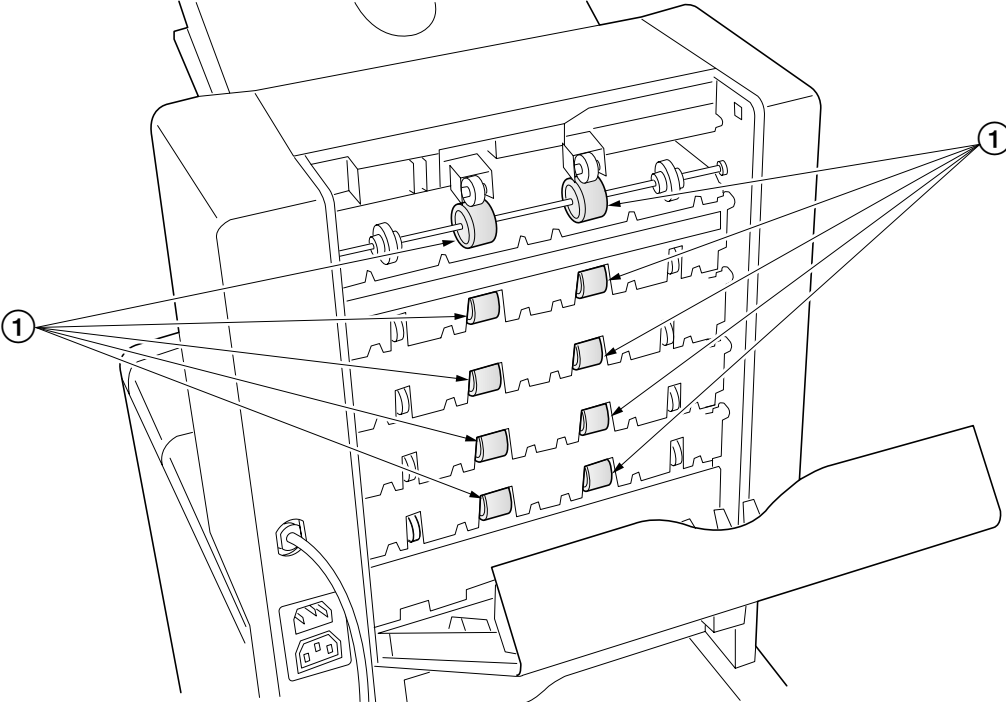


Figure 3-1-1 Cleaning the conveying rollers

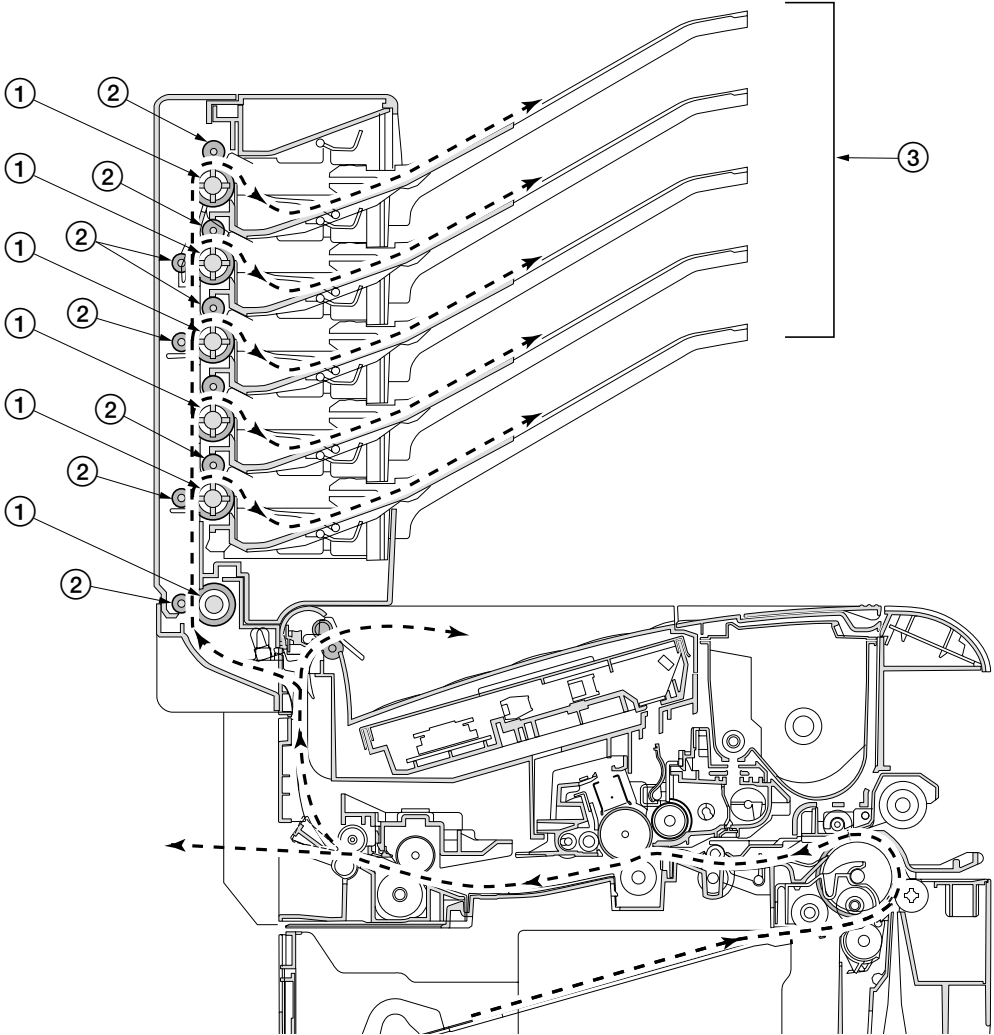
Chapter 4 Operation Overview

Chapter 4 Contents

4-1 Paper feeding system of sorter	4-3
4-1-1 Paper feed control of sorter	4-4
4-1-2 Paper feeding mechanism of sorter	4-5
4-2 Electrical control system	4-7
4-2-1 Electrical parts layout	4-7
4-2-2 Operation of circuit board	4-8
(1) Sorter main board	4-8
(2) Sorter sub board	4-9
(3) Sorter power supply board	4-10

4-1 Paper feeding system of sorter

The figure below shows the components in the sorter and the paths through which the paper travels. The sensors, solenoids, motor etc., are described in the following pages.



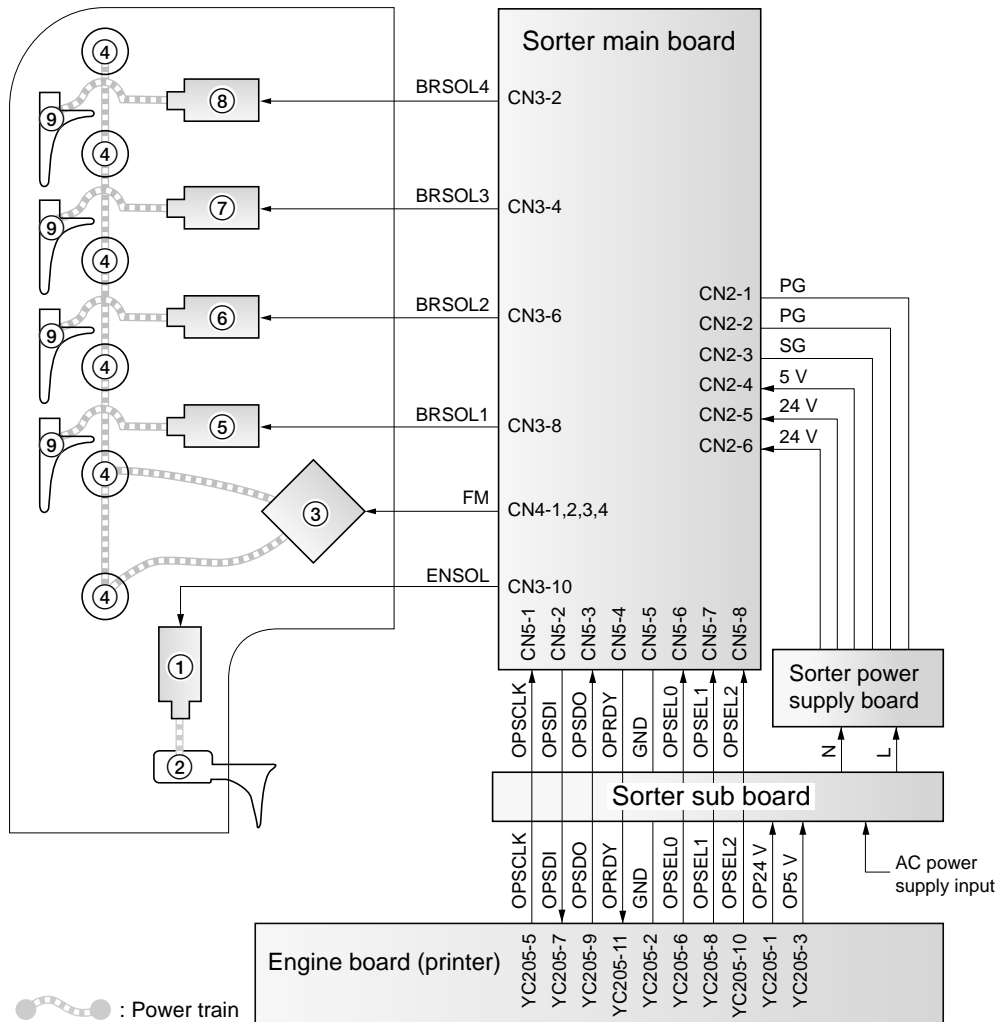
- ① Conveying rollers
- ② Pinch rollers
- ③ sorter trays

Figure 4-1-1 Paper feeding path

4-1-1 Paper feed control of sorter

The following diagram shows interconnectivity of the paper feeding system components including the rollers.

The sorter main board controls the sorting operation. Upon reception of a sort signal from the engine board of the printer, it drives the motor and solenoids to operate the rollers and guides.



- ① Entry solenoid
- ② Entry guide
- ③ Feed motor
- ④ Conveying roller
- ⑤ Branch solenoid 1
- ⑥ Branch solnoid 2
- ⑦ Branch solnoid 3
- ⑧ Branch solnoid 4
- ⑨ Branch guide

Figure 4-1-2 Feed control

4-1-2 Paper feeding mechanism of sorter

In the sort mode, when a sort signal is received from the engine board of the printer, the entry solenoid ①, feed motor ③ and branch solenoids ⑤ ⑥ ⑦ ⑧ for the specified sorter tray turn on.

The entry solenoid ① switches the path for the printed paper to the sorter by operating the entry guide ②, and the feed motor ③ vertically conveys the paper entering the sorter by rotating the conveying rollers ④. The branch solenoids ⑤ ⑥ ⑦ ⑧ operate the respective branch guides ⑨ to switch the paper path and eject the paper to the specified sorter tray ⑩.

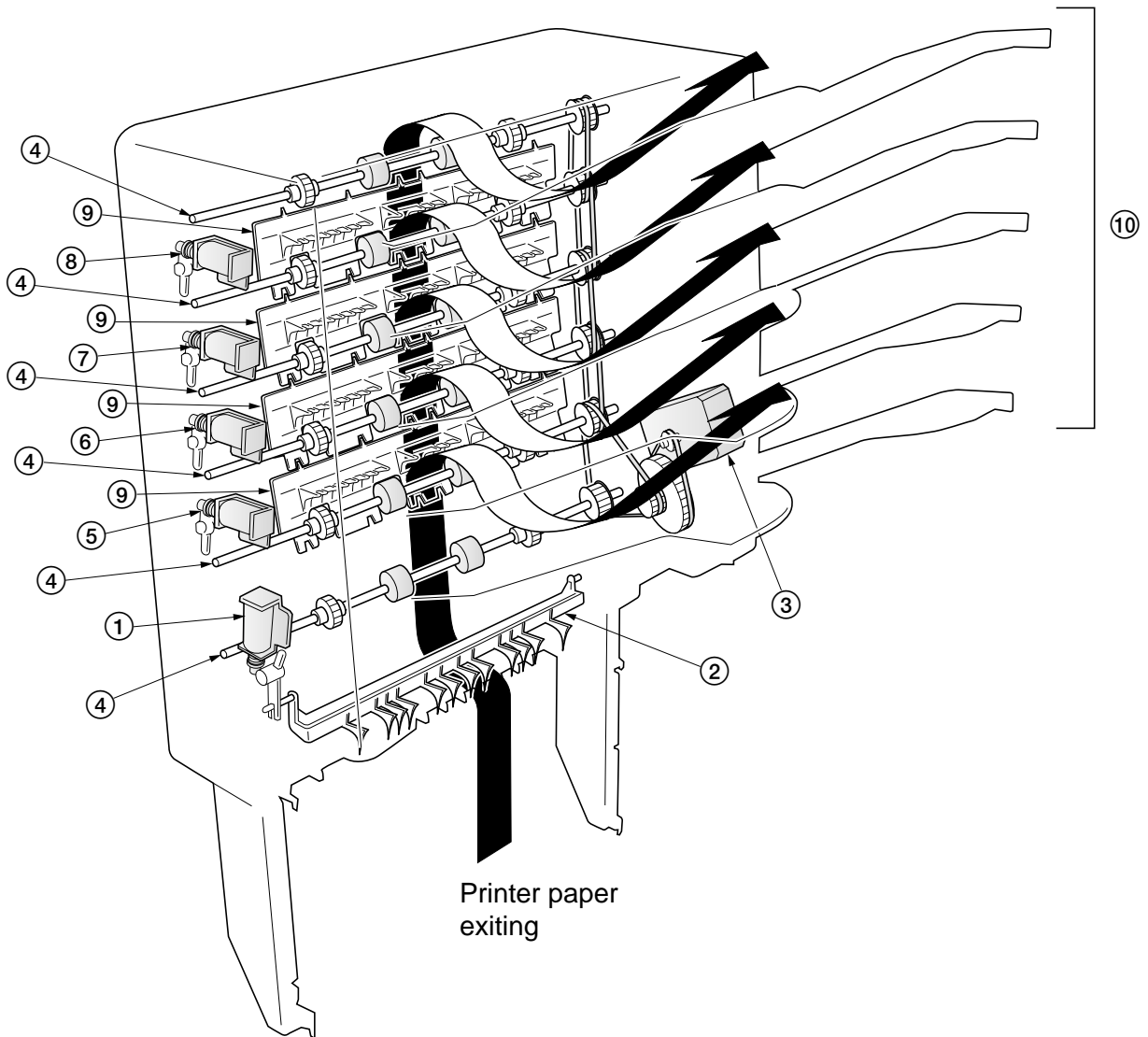


Figure 4-1-3 Paper feeding mechanism

As the number of sheets on a sorter tray increases, the respective pull flag ⑪ rises. When a sorter tray becomes full, the respective paper full sensor ⑫ ⑬ ⑭ ⑮ ⑯ goes low and a paper full message will appear on the printer display.

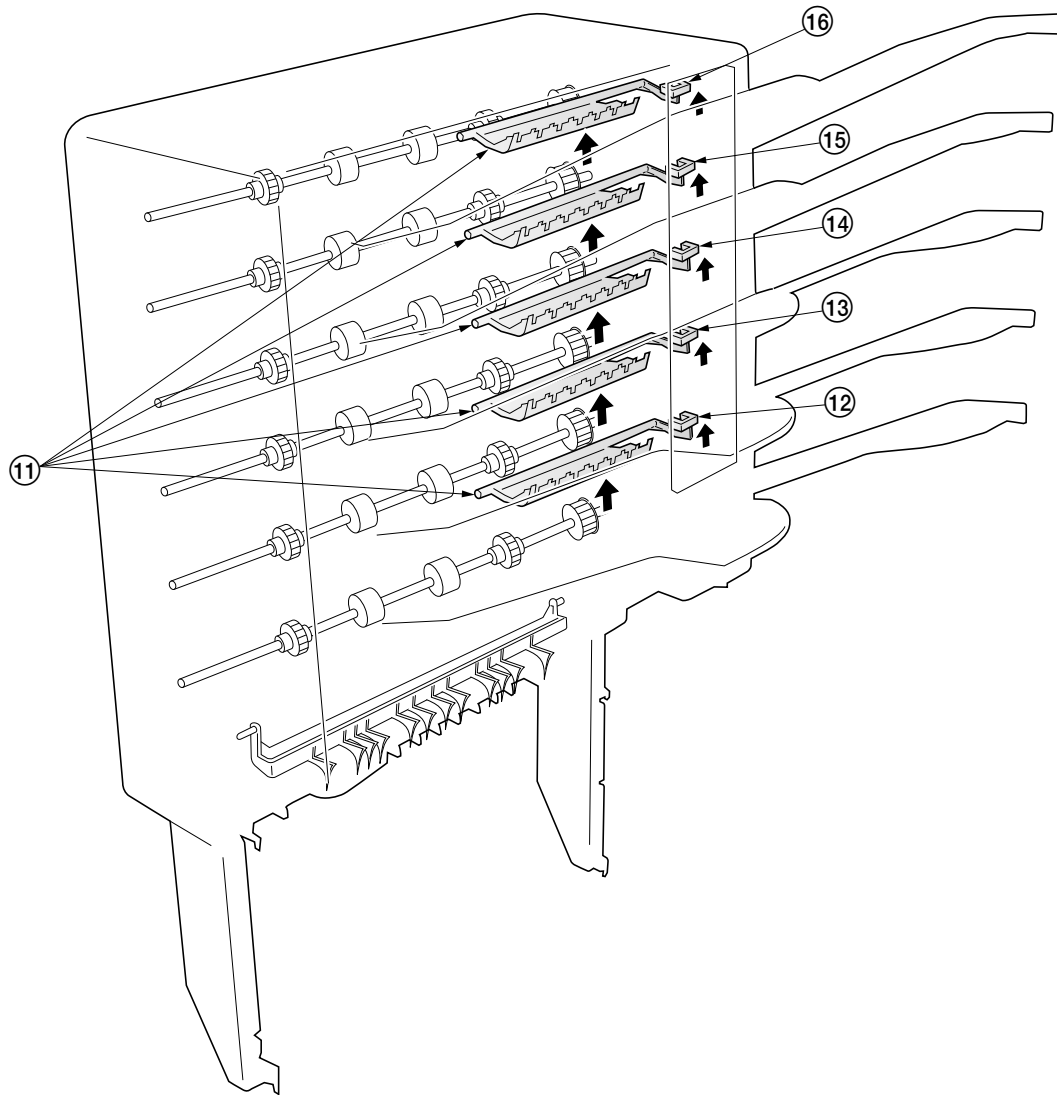
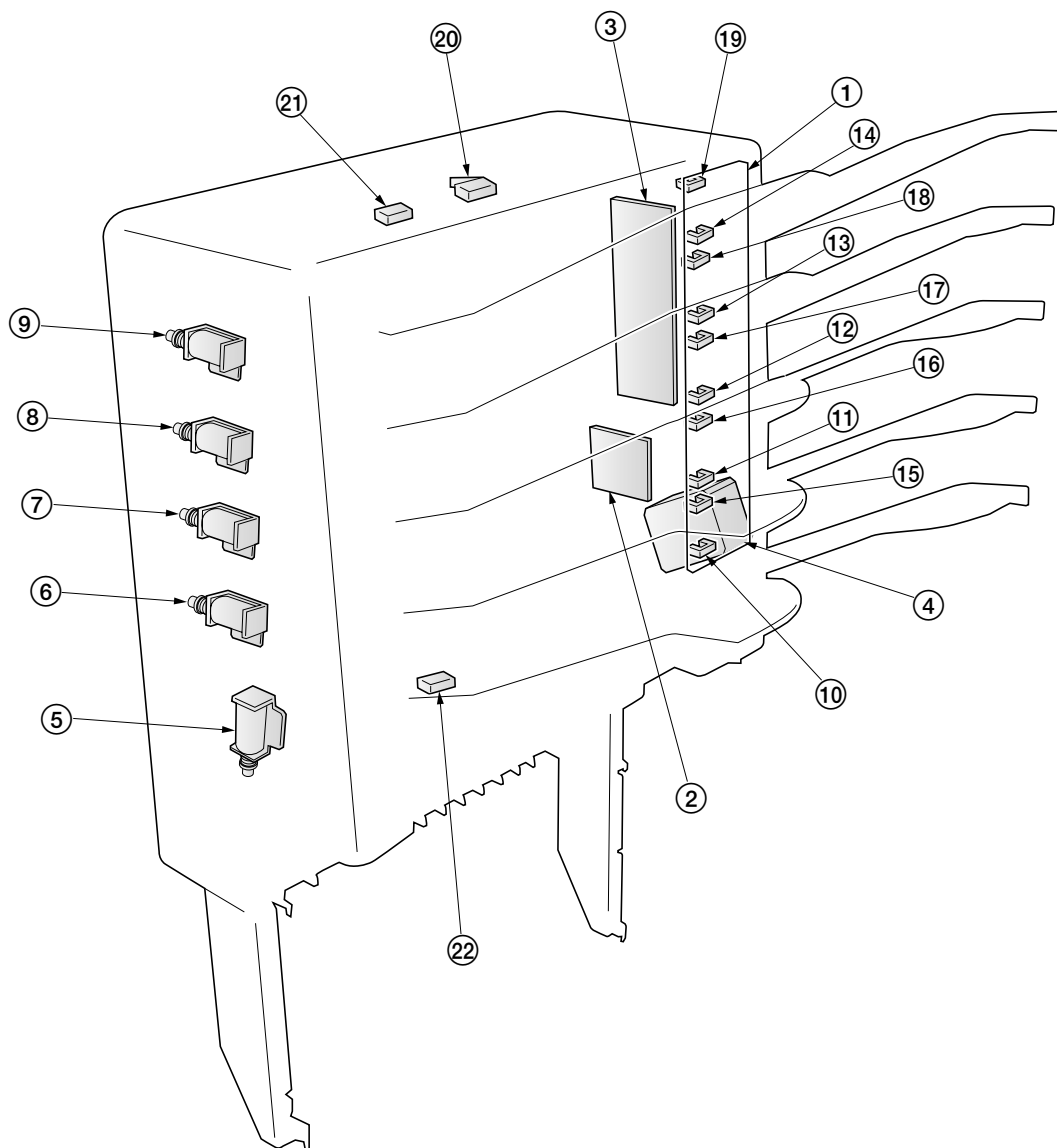


Figure 4-1-4 Paper full detecting

4-2 Electrical control system

4-2-1 Electrical parts layout



- | | | |
|-----------------------------|-----------------------|-------------------------------|
| ① Sorter main board | ⑨ Branch solenoid 4 | ⑯ Paper full sensor 2 |
| ② Sorter sub board | ⑩ Tray paper sensor 1 | ⑰ Paper full sensor 3 |
| ③ Sorter power supply board | ⑪ Tray paper sensor 2 | ⑱ Paper full sensor 4 |
| ④ Feed motor | ⑫ Tray paper sensor 3 | ⑲ Paper full sensor 5 |
| ⑤ Entry solenoid | ⑬ Tray paper sensor 4 | ⑳ Rear cover interlock switch |
| ⑥ Branch solenoid 1 | ⑭ Tray paper sensor 5 | ㉑ Trough tray sensor emitter |
| ⑦ Branch solenoid 2 | ⑮ Paper full sensor 1 | ㉒ Trough tray sensor receiver |
| ⑧ Branch solenoid 3 | | |

Figure 4-2-1 Electrical parts layout

4-2-2 Operation of circuit board

(1) Sorter main board

The sorter main board serially communicates with the engine board of the printer to exchange control signals.

In the sort mode, upon reception of a sort command from the engine board of the printer, CPU IC10 controls the sorting operation by operating the feed motor, entry solenoid and the branch solenoid for the specified sort tray, to feed paper from the printer into the sorter and convey it in the sorter while detecting the paper conveying status via the sensors.

The motor drive circuit consists mainly of motor driver IC6. It drives the feed motor based on the control signals (FM, PWM) from CPU IC10.

The reset circuit consists mainly of reset IC11. It monitors the 5 V DC supply voltage. When the power is turned on or when the power supply becomes low, it outputs a RESET signal to CPU IC10, to prevent system malfunction or runaway.

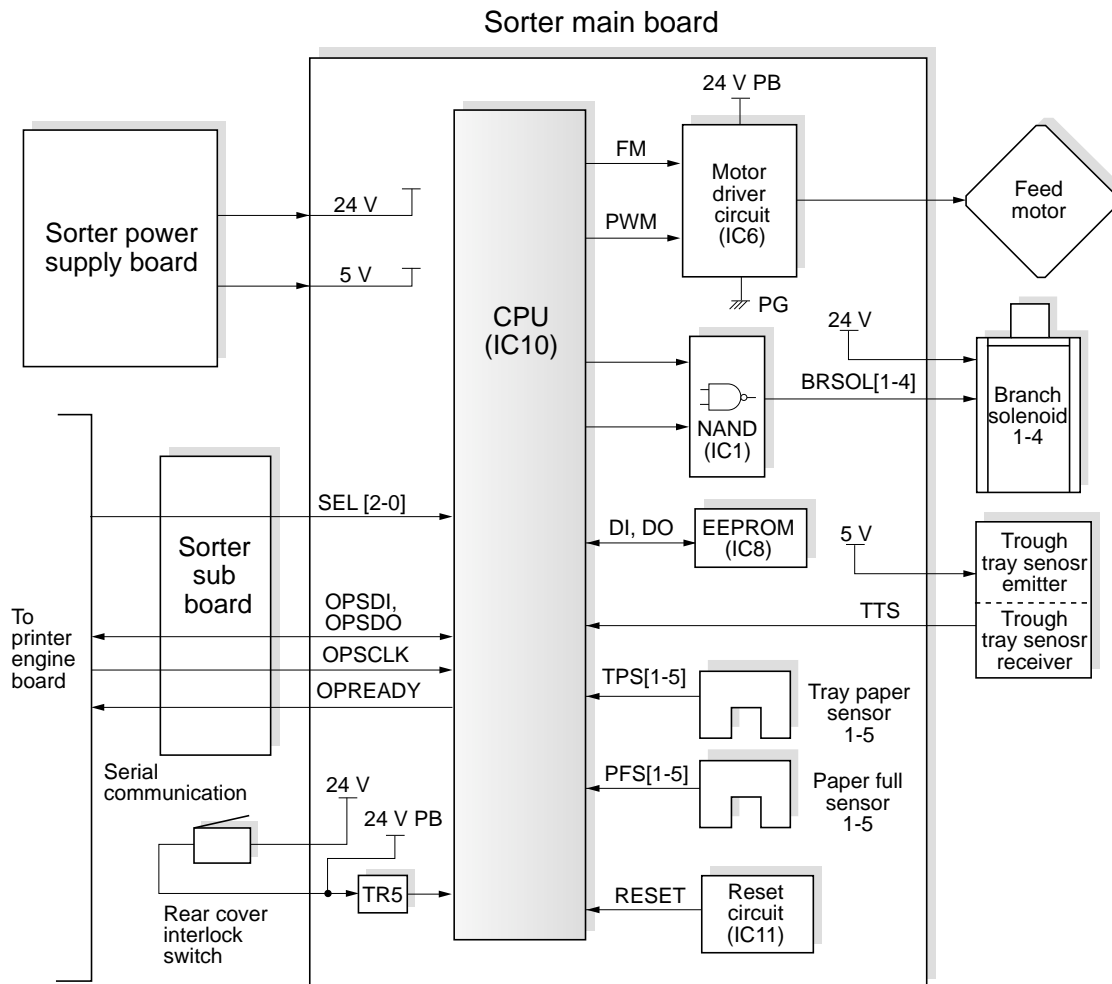


Figure 4-2-2 Sorter main board circuit block diagram

(2) Sorter sub board

The sorter sub board turns on and off the AC supply via power relay X1.

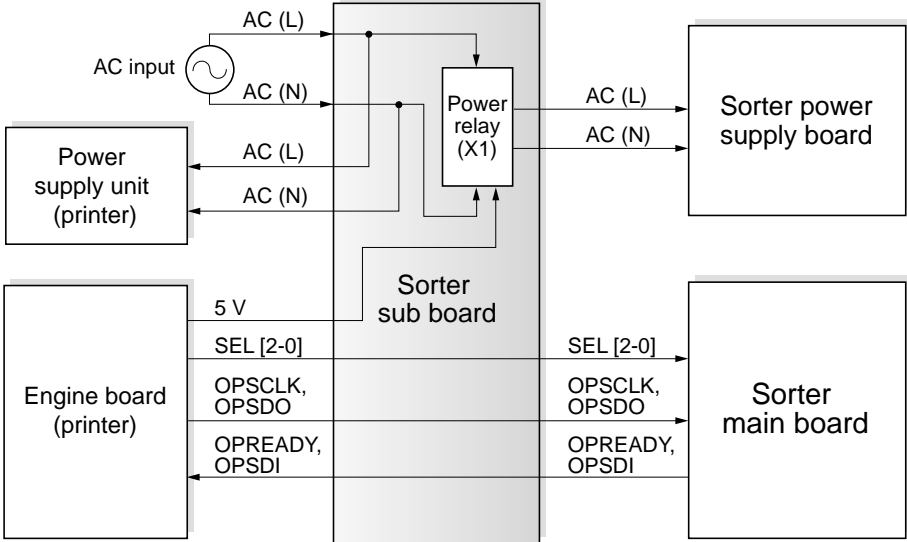


Figure 4-2-3 Sorter sub board circuit block diagram

(3) Sorter power supply board

The sorter power supply board is a switching generator that converts an AC input into 24 V DC and 5 V DC. It consists of a noise filter, rectifier circuits, smoothing circuits, a switching control circuit and an error detection circuit.

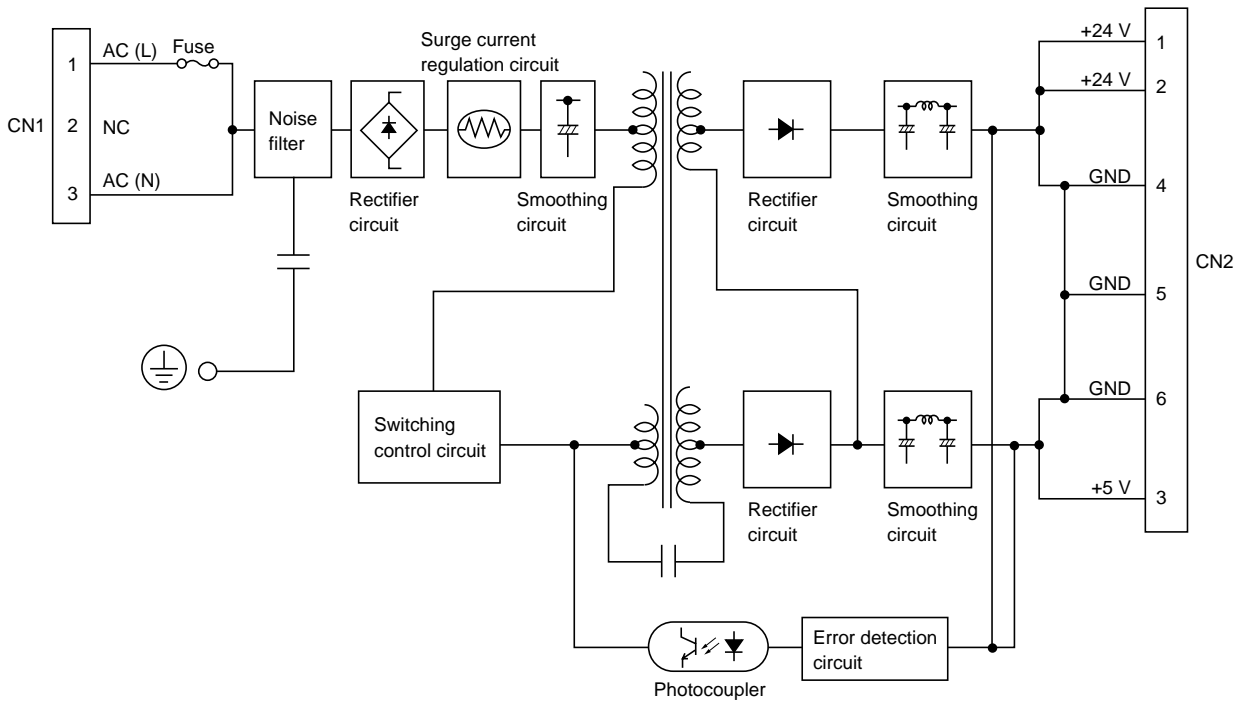


Figure 4-2-3 Sorter power supply board circuit block diagram

Chapter 5 D i s a s s e m b l y

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5-2 Disassembly	5-4
5-2-1 Removing the right cover	5-4
5-2-2 Removing the left cover	5-5
5-2-3 Removing the sorter main board	5-6
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5-2-5 Removing the power supply board	5-8

5-1 General instructions

This chapter provides the procedure for removal and replacement of field replacement components. For other components not explained in this chapter, the diagrams in the *Parts Catalog*. It is recommended that you refer to diagrams in the Parts Catalog as a supplemental reference to this chapter. It features all the part drawings and help you disassemble or refit the parts in the sorter. When replacing of a component, reverse the procedure for the removal procedure explained in this chapter.

WARNING



To avoid injury electric shock, make sure that AC power is removed and the power cord is unplugged from both the power line and the printer.

5-1-1 Screw/hardware

Screws and hardware used in the printer are listed in the *Ecosys Screw catalog*. These screw symbol numbers are universal to most Ecosys printers.

CAUTION



When securing a self-tapping screws, align it with the thread carefully. First turn it counterclockwise, then slowly clockwise. Do not overtighten. In case the self-tapped thread is damaged, the whole part may have to be replaced with a new part.

5-1-2 Before starting disassembly

Before proceeding, unplug the power cord from the printer and the power supply.

WARNING



Never attempt to operate the printer with components removed.

CAUTION



The sorter use electrostatic sensitive parts inside (circuit boards, etc.). Provide an antistatic (discharging) device, such as a wrist strap, that can effectively discharge your body before touching those components.

5-2 Disassembly

5-2-1 Removing the right cover

1. Remove two screws ①.
2. Disengage the two hooks ② of the right cover ③ and then remove the cover.

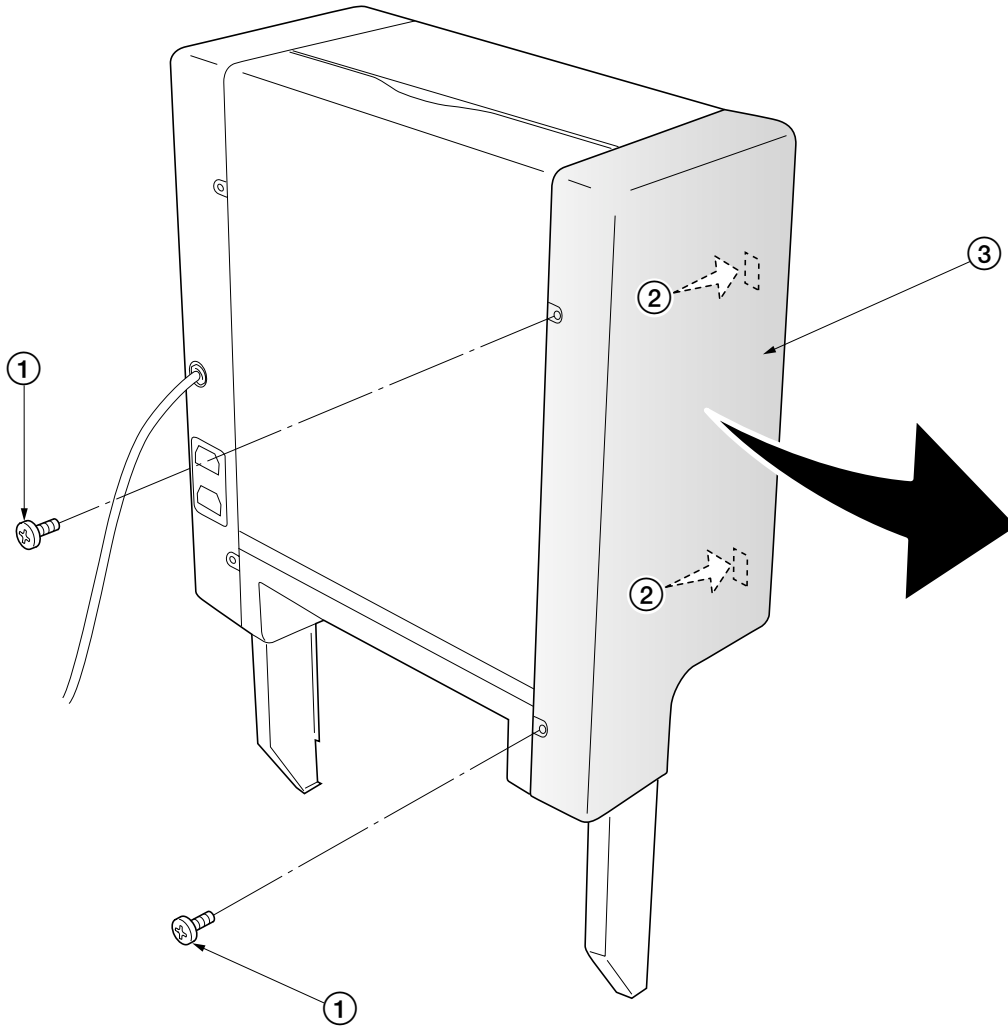


Figure 5-2-1 Removing the right cover

5-2-2 Removing the left cover

1. Remove two screws ①.

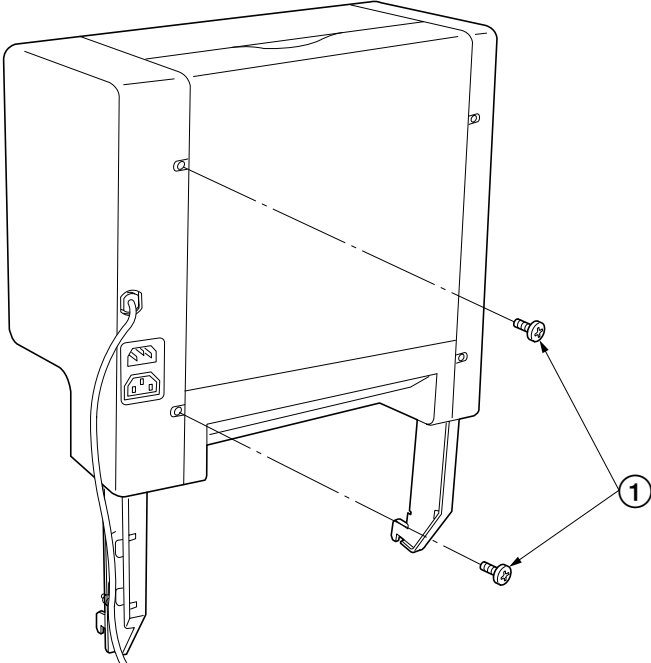


Figure 5-2-2 Removing the left cover

2. Withdraw the sorter cable ③ through the cutout ② in the left cover ⑤, disengage the two hooks ④ and then remove the left cover ⑤.

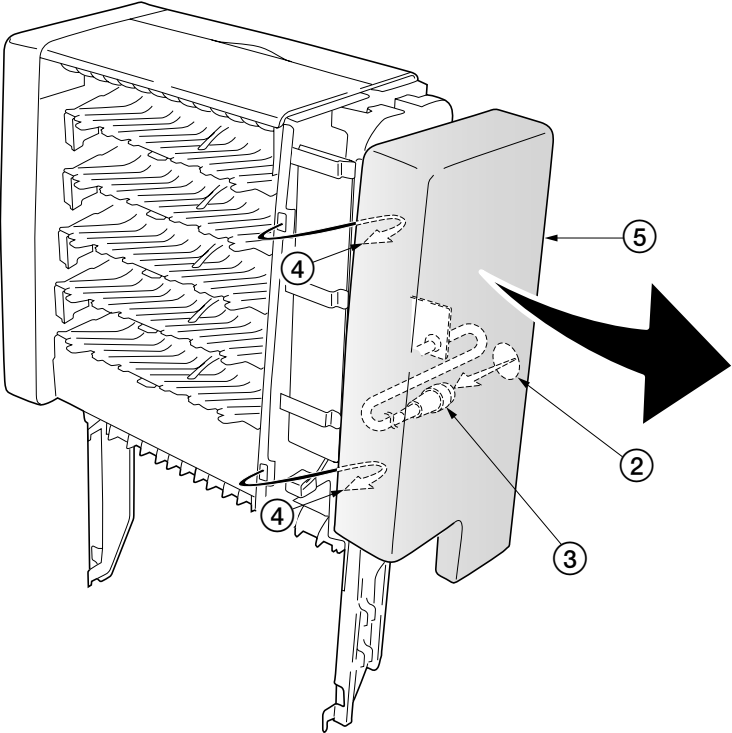


Figure 5-2-3 Removing the left cover

5-2-3 Removing the sorter main board

1. Remove the left cover. See page 5-5.
2. Remove seven connectors from sorter main board ①.
3. Remove three screws ②.
4. Remove the sorter main board ①.

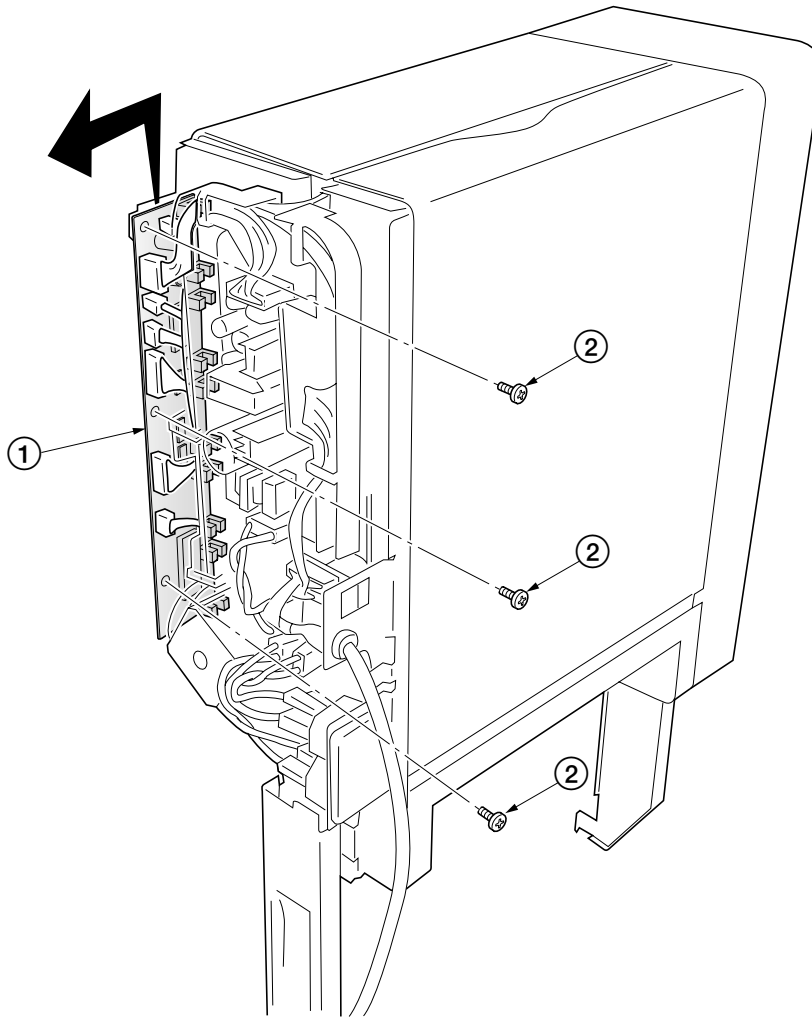


Figure 5-2-4 Removing the sorter main board

5-2-4 Removing the sorter sub board

1. Remove the left cover. See page 5-5.
2. Remove five connectors from sorter sub board ①.
3. Remove two screws ②.
4. Remove the sorter sub board ①.

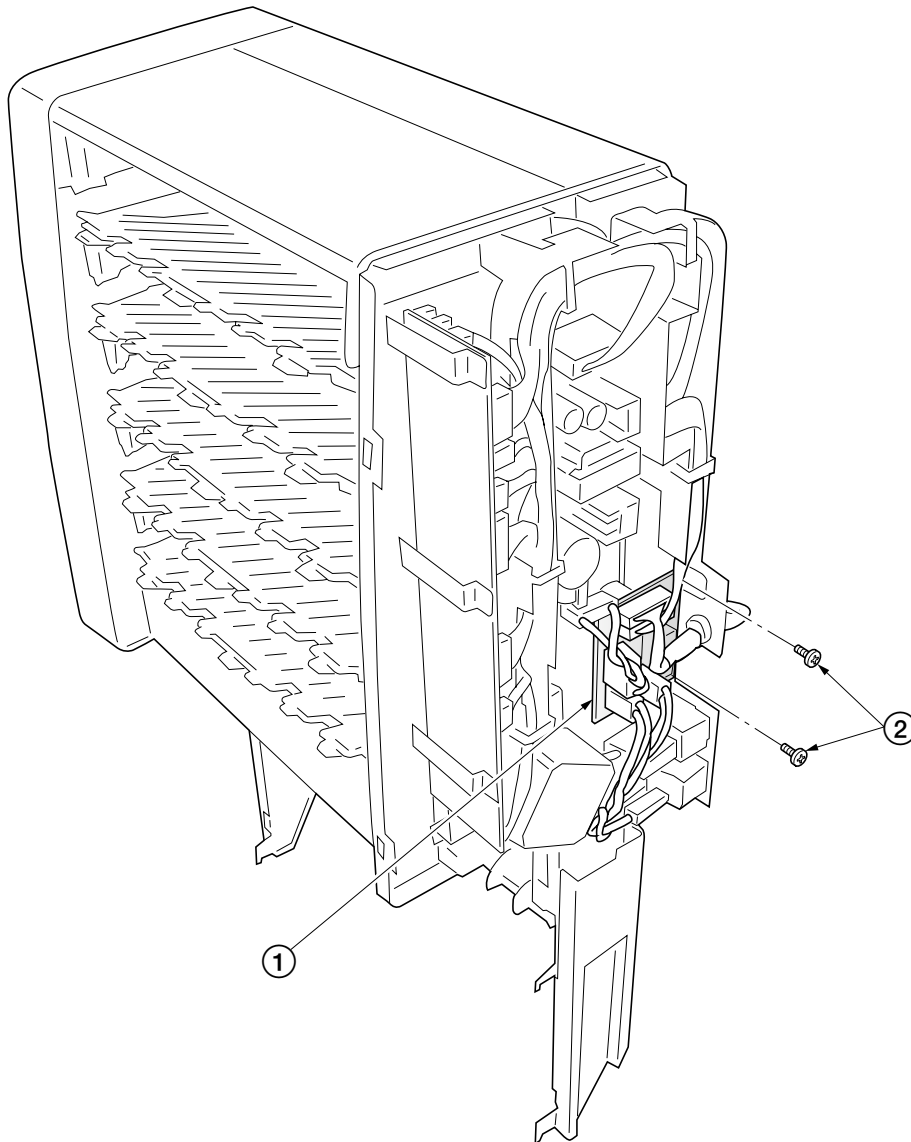


Figure 5-2-5 Removing the sorter sub board

5-2-5 Removing the power supply board

1. Remove the left cover. See page 5-5.
2. Remove two connectors (1) from power supply board (2).
3. Remove two screws (3).
4. Remove the power supply board (2).

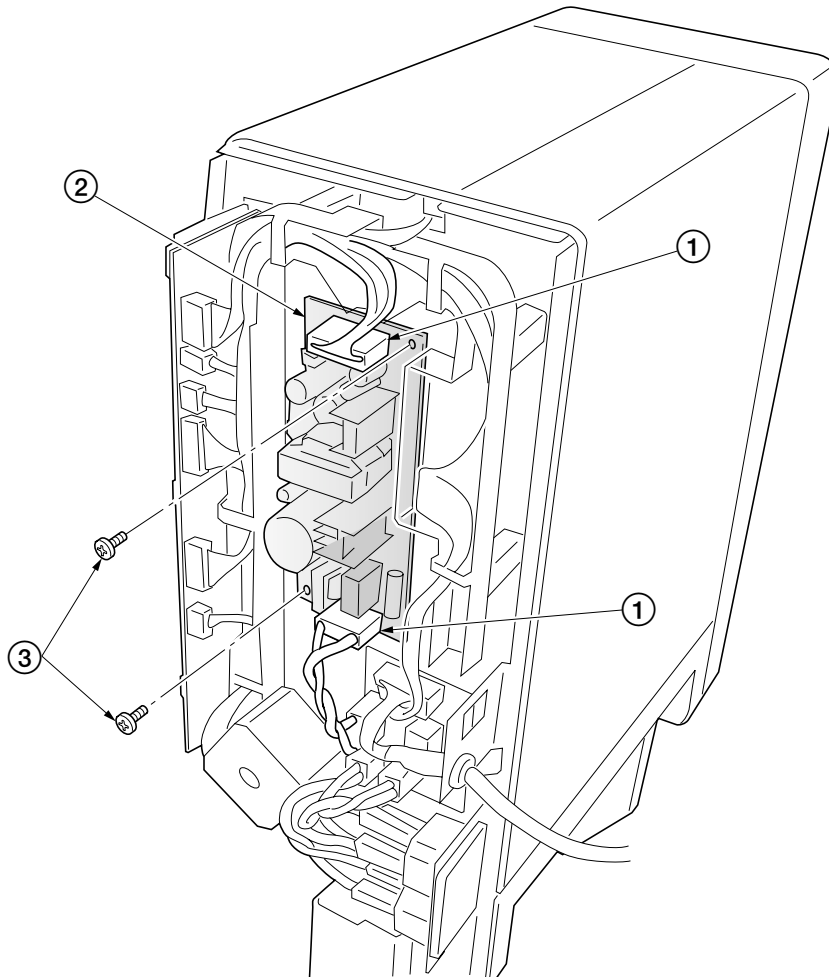


Figure 5-2-6 Removing the power supply board

Chapter 6 **T r o u b l e s h o o t i n g**

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6-1 Troubleshooting

6-1-1 General error handling

(1) Maintenance messages

Message	Corrective action
Opt.Stacker unit rear cover open	Open the rear cover of sorter, then close tightly.
Option tray ## paper full	The sorter tray indicated by # is now full. Remove some of the paper from the sorter tray concerned.
Remove paper option tray ##	There is still paper in the sorter tray indicated by # when the power was turned on or the sorter's mode was switched. Remove all the paper inside the sorter.

6-1-2 Diagnostic (Service error messages)

The printer does not operate when a message is displayed. The message is categorized as follows:

(1) C4 —Sorter communication error

Meaning	Suggested causes	Corrective action
Communication error between sorter and printer's engine board.	• Defective sorter sub board.	Replace sorter sub board. See page 5-7.
	• Defective sorter main board.	Replace sorter main board. See page 5-6.
	• Improper installation between sorter and printer.	Follow installation instruction carefully again.
	• Improper connector insertion.	
	• Defective gate array U204 on the printer's engine board (KP-864).	Refer to printer's <i>Service Manual</i> .
	• Blown-out fuse (F202) on the printer's engine board.	
	• Defective printer's main board.	

6-1-3 Circuit board terminal voltages

(1) Sorter main board

Connector	Pin#	Signal	I/O	Voltage	Function
(CN1)	1	5 V	O	5 V DC	Power supply
	2	TTSE	–	5 V DC	Trough tray sensor emitter
(CN2)	1	GND	–	–	Power ground
	2	GND	–	–	Power ground
	3	GND	–	–	Signal ground
	4	5 V	I	5 V DC	Power supply from power supply board
	5	24 V	I	24 V DC	Power supply from power supply board
	6	24 V	I	24 V DC	Power supply from power supply board
(CN3)	1	24 V	O	24 V DC	Power supply
	2	BRSOL4	O	0 V/24 V DC	Branch solenoid 4, On/Off
	3	24 V	O	24 V DC	Power supply
	4	BRSOL3	O	0 V/24 V DC	Branch solenoid 3, On/Off
	5	24 V	O	24 V DC	Power supply
	6	BRSOL2	O	0 V/24 V DC	Branch solenoid 2, On/Off
	7	24 V	O	24 V DC	Power supply
	8	BRSOL1	O	0 V/24 V DC	Branch solenoid 1, On/Off
	9	24 V	O	24 V DC	Power supply
	10	SOL	O	0 V/24 V DC	Entry solenoid, On/Off
(CN4)	1	FM 1B	O	0 V/24 V DC (Pulse)	Feed motor coil energization pulse (1B)
	2	FM 1A	O	0 V/24 V DC (Pulse)	Feed motor coil energization pulse (1A)
	3	FM 2B	O	0 V/24 V DC (Pulse)	Feed motor coil energization pulse (2B)
	4	FM 2A	O	0 V/24 V DC (Pulse)	Feed motor coil energization pulse (2A)
(CN5)	1	OPSCLK	I	5 V/0 V DC (Pulse)	Serial communication clock signal
	2	OPSDI	O	5 V/0 V DC	Serial communication data signal with printer
	3	OPSDO	I	5 V/0 V DC	Serial communication data signal with printer
	4	OPRDY	O	0 V/5 V DC	Sorter, Ready/Not ready
	5	GND	–	–	Signal ground
	6	OPSEL0	I	0 V/5 V DC	Sorter identifying signal 0

Connector	Pin#	Signal	I/O	Voltage	Function
(CN5)	7	OPSEL1	I	0 V/5 V DC	Sorter identifying signal 1
	8	OPSEL2	I	0 V/5 V DC	Sorter identifying signal 2
	9	–	–	0 V/5 V DC	Not used
(CN6)	1	TTSR	–	5 V DC	Trough tray sensor receiver
	2	GND	–	–	Signal ground
	3	TTS	I	0 V/5 V DC	Trough tray sensor, On/Off
	4	5 V	O	5 V DC	Power supply
	5	–	–	–	Reserved
(CN12)	1	24 V	O	24 V DC	Power supply
	2	RCISW	I	0 V/24 V DC	Rear cover interlock switch, On/Off

(2) Sorter sub board

Connector	Pin#	Signal	I/O	Voltage	Function
(CN7)	1	OPCLK	O	5 V/0 V DC (Pulse)	Serial communication clock signal
	2	OPSDI	I	5 V/0 V DC	Serial communication data signal with printer
	3	OPSDO	O	5 V/0 V DC	Serial communication data signal with printer
	4	OPRDY	I	0 V/5 V DC	Sorter, Ready/Not ready
	5	GND	–	–	Signal ground
	6	OPSEL0	O	0 V/5 V DC	Sorter identifying signal 0
	7	OPSEL1	O	0 V/5 V DC	Sorter identifying signal 1
	8	OPSEL2	O	0 V/5 V DC	Sorter identifying signal 2
	9	–	–	–	Not used
(CN8)	1	AC (N)	O	Local AC supply voltage	AC power supply (N)
	5	AC (L)	O	Local AC supply voltage	AC power supply (L)
(CN9)	1	OPCLK	I	5 V/0 V DC (Pulse)	Serial communication clock signal
	2	24 V	I	24 V DC	Not used
	3	OPSDI	O	5 V/0 V DC	Serial communication data signal with printer
	4	OPSDO	I	5 V/0 V DC	Serial communication data signal with printer
	5	OPRDY	O	0 V/5 V DC	Sorter, Ready/Not ready
	6	–	–	–	Reserved
	7	OPSEL0	I	0 V/5 V DC	Sorter identifying signal 0
	8	OPSEL1	I	0 V/5 V DC	Sorter identifying signal 1
	9	OPSEL2	I	0 V/5 V DC	Sorter identifying signal 2
	10	–	–	–	Shield
	11	GND	–	–	Power ground
	12	5 V	I	5 V DC	Power supply for relay (X1)
(CN10)	1	AC (N)	O	Local AC supply voltage	AC power supply (N)
	3	AC (L)	O	Local AC supply voltage	AC power supply (L)
(CN11)	1	AC (N)	I	Local AC supply voltage	AC power supply (N)
	3	AC (L)	I	Local AC supply voltage	AC power supply (L)

(3) Sorter power supply board

Connector	Pin#	Signal	I/O	Voltage	Function
(CN1)	1	AC (N)	I	Local AC supply voltage	AC power supply (N)
	5	AC (L)	I	Local AC supply voltage	AC power supply (L)
(CN2)	1	24 V	O	24 V DC	Power supply to sorter main board
	2	24 V	O	24 V DC	Power supply to sorter main board
	3	5 V	O	5 V DC	Power supply to sorter main board
	4	GND	–	–	Signal ground
	5	GND	–	–	Power ground
	6	GND	–	–	Power ground

6-1-4 Correcting a paper jam

If a paper jam occurs in the sorter, remove the jammed paper as described below. After you have removed the jammed paper, open and close the printer's top cover to clear the error message from the message display.

1. Open the rear cover ①.

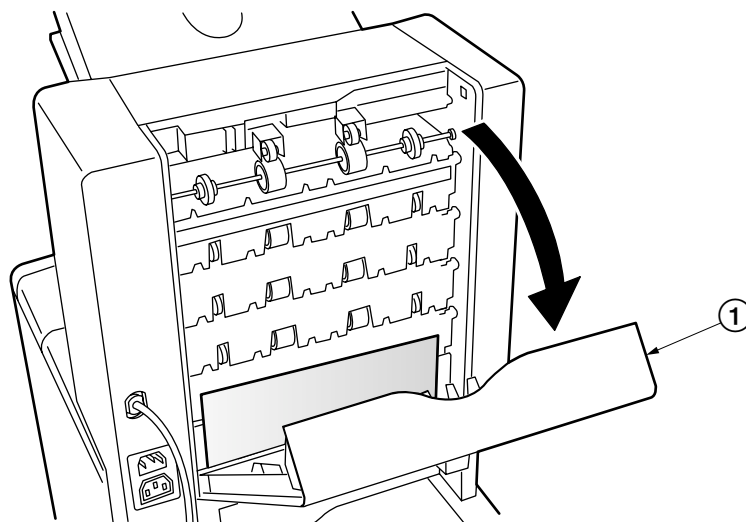


Figure 6-1-1 Open the rear cover

2. Remove the jammed paper. If both ends of the paper are inside the sorter, turn the paper feed gear ② in the direction of the arrows. The paper can then be removed easily.

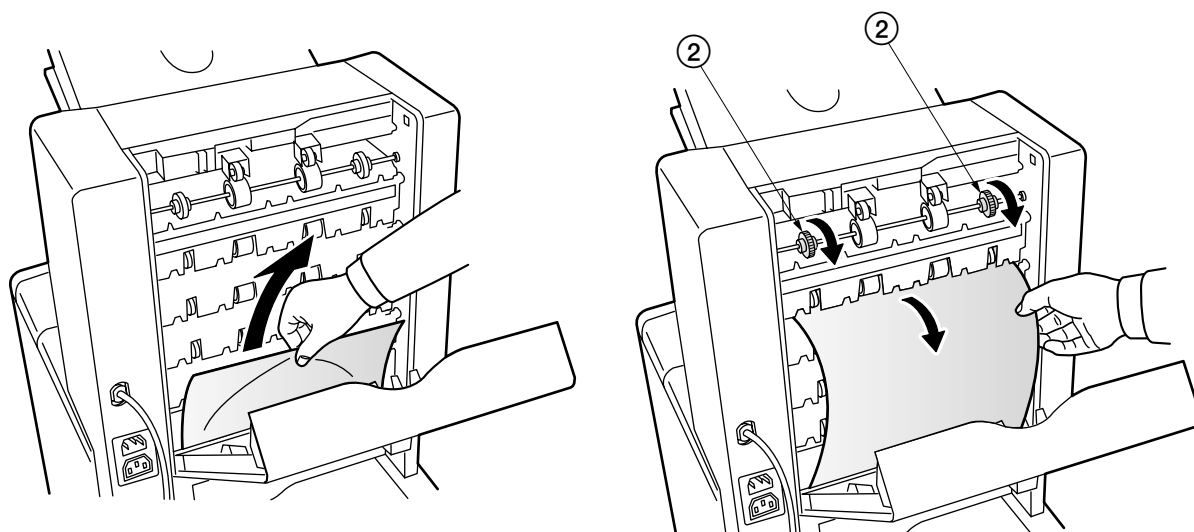


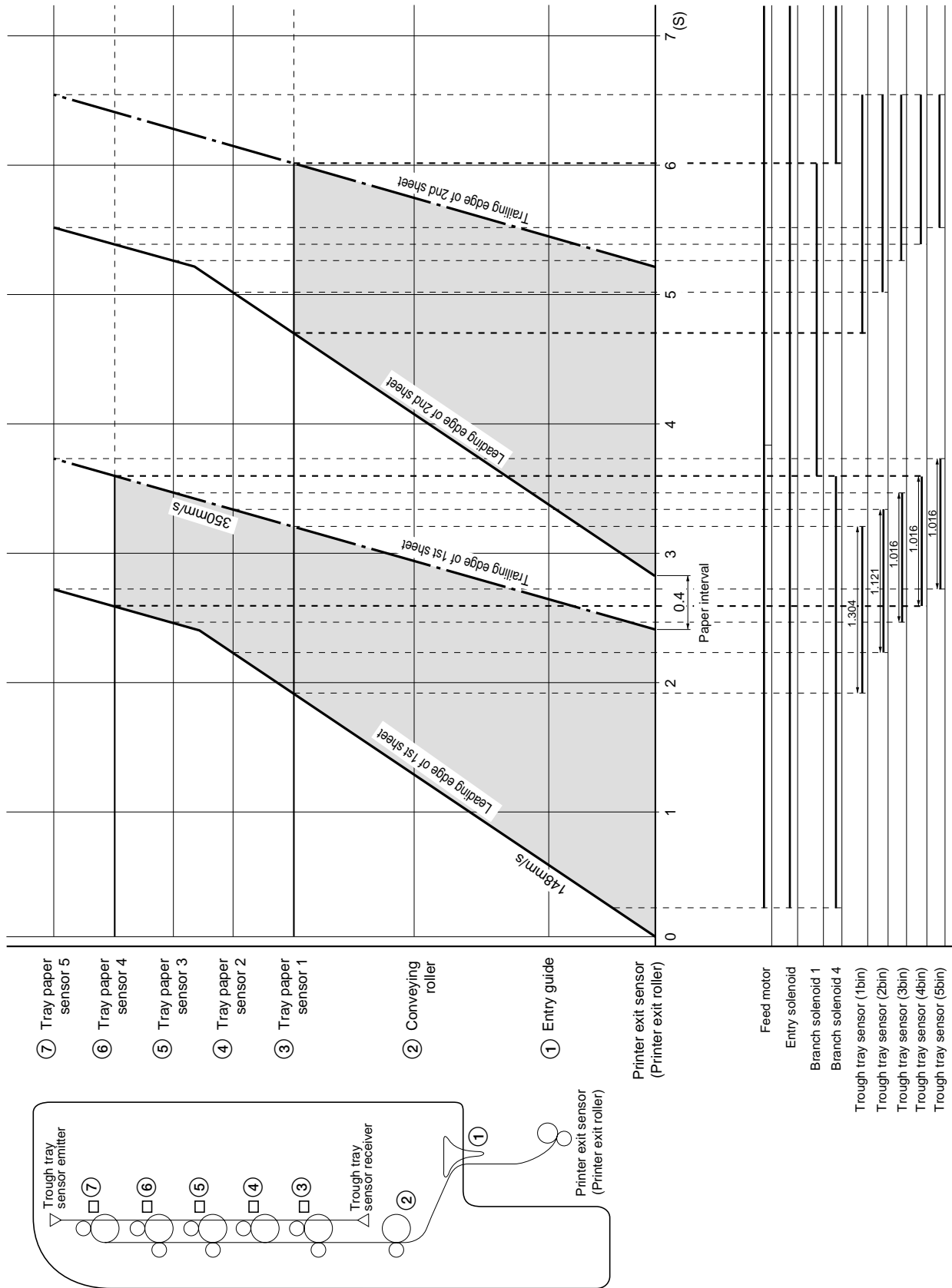
Figure 6-1-2 Remove the jammed paper

Appendix A D i a g r a m s

Appendix A Contents

Timing chart A-3
Wiring diagram A-4

Timing chart



Wiring diagram

