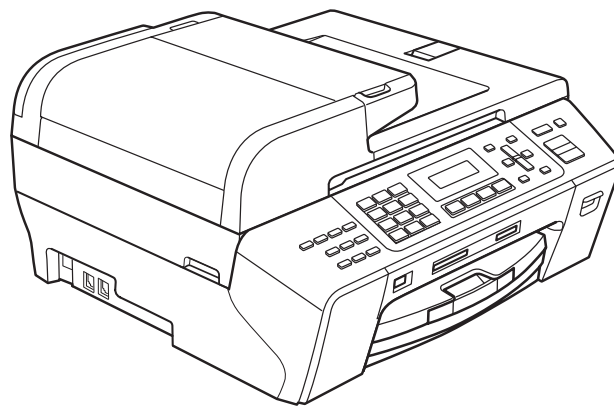




Inkjet MFC SERVICE MANUAL

MODEL: MFC5490CN



Read this manual thoroughly before maintenance work.
Keep this manual in a convenient place for quick and easy reference at all times.

July 2008
SM-FAX096
8CAH11(1)

Confidential

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Preface

This Service Manual is intended for use by service personnel and details the specifications, construction, theory of operation, and maintenance for the Brother machines noted on the front cover. It includes information required for troubleshooting and service--disassembly, reassembly, and lubrication--so that service personnel will be able to understand equipment function, repair the equipment in a timely manner and order spare parts as necessary.

To perform appropriate maintenance so that the machine is always in the best possible condition for the customer, service personnel must adequately understand and apply this manual.

The table below shows the functional comparison between the models covered by this manual.

Model	MFC5490CN
RAM	40 MB
LCD	Monochrome LCD (16 chars x 2 lines)
Touch panel	---
Wired LAN	√
Wireless LAN (WLAN PCB)	---
PhotoCapture Center	√
PictBridge/USB flash memory drive	√
Movable platen	√
ADF	√
High yield ink cartridge sensor	---
Ink cartridge detection sensors	√
Ink empty sensors	√
Handset (Hook switch PCB)	---
Duplex printing	---
Backup battery	---

This manual describes the models and their versions destined for major countries. The specifications and functions are subject to change depending upon each destination.

How this manual is organized

This manual is made up of nine chapters and appendices.

CHAPTER 1 PARTS NAMES AND FUNCTIONS

Contains external views and names of components and describes their functions. Information about the keys on the control panel is included to help you check operation or make adjustments.

CHAPTER 2 SPECIFICATIONS

Lists the specifications of each model, which enables you to make a comparison of different models.

CHAPTER 3 THEORY OF OPERATION

Gives an overview of the scanning and printing mechanisms as well as the sensors, actuators, and control electronics. It aids in understanding the basic principles of operation as well as locating defects for troubleshooting.

CHAPTER 4 ERROR INDICATION AND TROUBLESHOOTING

Details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.

The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

CHAPTER 5 HANDLING DATA HELD IN THE MACHINE PRIOR TO REPAIR

Describes how to handle data held in the machine to be repaired.

At the user site, if the machine cannot print FAX data received and left in the machine due to the printing mechanism defective, the service personnel should instruct the end user to follow the transfer procedure given in this chapter to transfer the FAX data to another machine before sending the machine for repair.

At the service site, the service personnel should back up the machine information and user data held in the machine into an external memory for restoration after repair, using the backup procedure given in this chapter.

CHAPTER 6 DISASSEMBLY/REASSEMBLY AND LUBRICATION

Details procedures for disassembling and reassembling the machine together with related notes. The disassembly order flow provided enables you to see at a glance the quickest way to get to component(s) involved.

At the start of a disassembly job, you check the disassembly order flow that guides you through a shortcut to the target components.

This chapter also covers screw tightening torques and lubrication points to which the specified lubricants should be applied during reassembly jobs.

CHAPTER 7 ADJUSTMENTS AND UPDATING of settings, REQUIRED AFTER PARTS REPLACEMENT

Details adjustments and updating of settings, which are required if the head/carriage unit, main PCB and some other parts have been replaced.

CHAPTER 8 CLEANING

Provides cleaning procedures not covered by the User's Guide. Before starting any repair work, clean the machine as it may solve the problem concerned.

CHAPTER 9 MAINTENANCE MODE

Describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments of the machine using the keys on the control panel.

In the maintenance mode, you can update memory (EEPROM: electrically erasable programmable read-only memory) contents for optimizing the drive conditions of the head/carriage unit or the paper feed roller and paper ejection roller in the engine unit, if those units have been replaced, or for setting the CIS scanner area, for example. You can also customize the EEPROM according to the shipment destination of the machine concerned. In addition, you can perform operational checks of the LCD, control panel PCB or sensors, perform a print test, display the log information or error codes, and modify firmware switches (WSW).

Appendix 1 Reading Labels

Shows the location of labels put on some parts and describes the coding information for serial number, property data, and manufacturing information.

Appendix 2 Firmware Installation

Provides instructions on how to change firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.

Appendix 3 EEPROM Customizing Codes

Provides instructions on how to set up the EEPROM customizing codes for the various preferences exclusively designed for each destination. The specified customizing code is stored in the EEPROM mounted on the main PCB. If the main PCB is replaced, therefore, you need to set up the proper customizing code with the machine in the maintenance mode.

Customizing codes customize firmware for individual models, enabling the common firmware to be used for various models. A list of EEPROM customizing codes comes with the firmware data provided by Brother Industries.

Appendix 4 Firmware Switches (WSW)

Describes the functions of the firmware switches, which can be divided into two groups: one is for customizing preferences designed for the shipping destination (as described in [Appendix 3](#)) and the other is for modifying preferences that match the machine to the environmental conditions. Use the latter group if the machine malfunctions due to mismatching.

Appendix 5 Wiring Diagrams

Provides the wiring diagrams that help you understand the connections between PCBs.

Appendix 6 Circuit Diagrams

Provides the circuit diagrams of the MJ PCB and power supply PCB.

Appendix 7 Deletion of Personal Information

Provides instructions on how to delete personal information recorded in the machine.

SAFETY PRECAUTIONS

Choosing a location

Put your machine on a flat, stable surface that is free of vibration and shocks, such as a desk. Put the machine near a telephone wall jack and a standard AC power outlet. Choose a location where the temperature remains between 50° F and 95° F (10° C and 35° C).

WARNING

DO NOT put the machine near heaters, air conditioners, refrigerators, medical equipment, chemicals or water.

DO NOT connect your machine to AC power outlets on the same circuit as large appliances or other equipment that might disrupt the power supply.

CAUTION

- Avoid placing your machine in a high-traffic area.
- Avoid placing your machine on a carpet.
- DO NOT expose the machine to direct sunlight, excessive heat, moisture, or dust.
- DO NOT connect your machine to AC power outlets controlled by wall switches or automatic timers.
- Disruption of power can wipe out information in the machine's memory.
- Avoid interference sources, such as speakers or the base units of non-Brother cordless telephones.



To use the machine safely

Please keep these instructions for later reference and read them before attempting any maintenance.



Note

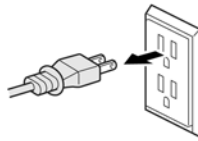
If there are faxes in the machine's memory, you need to print them or save them before you unplug the machine from the AC power outlet.



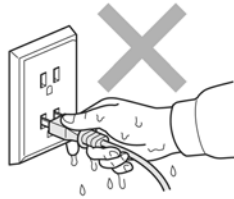
WARNING



There are high voltage electrodes inside the machine. Before you clean the inside of the machine, make sure you have unplugged the telephone line cord first and then the power cord from the AC power outlet. Doing this will prevent an electrical shock.



DO NOT handle the plug with wet hands. Doing this might cause an electrical shock.



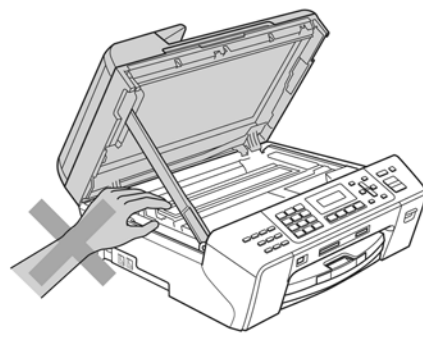
Always make sure the plug is fully inserted.



DO NOT pull on the middle of the AC power cord. Doing this might cause an electrical shock.

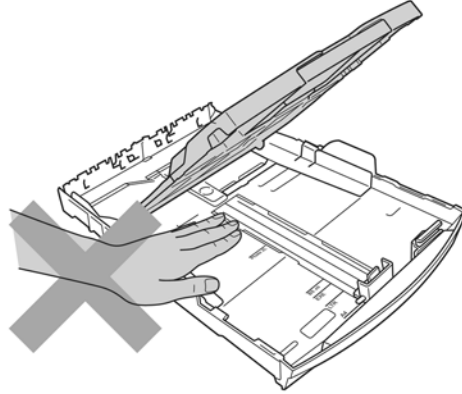


DO NOT put your hands on the edge of the machine under the document cover or the scanner cover. Doing this may cause injury.

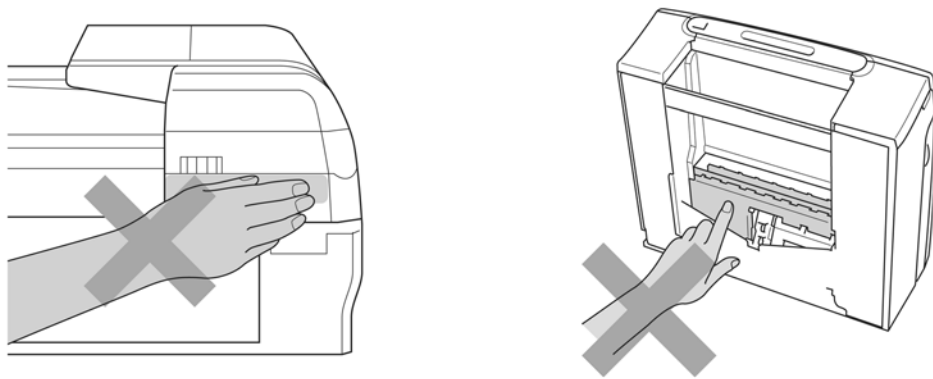




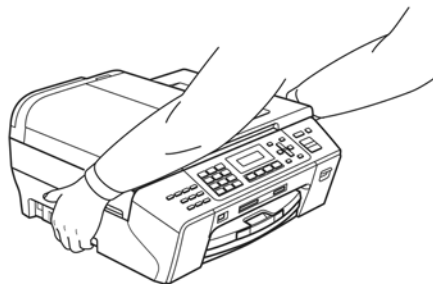
DO NOT put your hands on the edge of the paper tray under the paper tray cover. Doing this may cause injury.



DO NOT touch the area shaded in the illustration. Doing this may cause injury.



When moving the machine you must lift it from the base, by placing a hand at each side of the unit as shown in the illustration. **DO NOT** carry the machine by holding the scanner cover.





DO NOT use flammable substances or any type of spray to clean the inside or outside of the machine. Doing this may cause a fire or electrical shock.



If the machine becomes hot, releases smoke, or generates any strong smells, immediately unplug the machine from the AC power outlet. Call Brother Customer Service.



If metal objects, water or other liquids get inside the machine, immediately unplug the machine from the AC power outlet. Call Brother Customer Service.



Use caution when installing or modifying telephone lines. Never touch telephone wires or terminals that are not insulated unless the telephone line has been unplugged at the wall jack. Never install telephone wiring during a lightning storm. Never install a telephone wall jack in a wet location.



This product must be installed near an AC power outlet that is easily accessible. In case of an emergency, you must unplug the power cord from the AC power outlet to shut off the power completely.



This product should be connected to an AC power source within the range indicated on the rating label. DO NOT connect it to a DC power source or inverter. If you are not sure, contact a qualified electrician.



Always make sure the plug is fully inserted.



DO NOT use the machine if the power cord is frayed or damaged, doing so may cause a fire.



To reduce the risk of shock or fire, use only a No. 26 AWG or larger telecommunication line cord.

CAUTION

Lightning and power surges can damage this product! We recommend that you use a quality surge protection device on the AC power line and on the telephone line, or unplug the cords during a lightning storm.

WARNING

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to people, including the following:

- 1 DO NOT use this product near water, for example, near a bath tub, wash bowl, kitchen sink or washing machine, in a wet basement or near a swimming pool.
 - 2 Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.
 - 3 DO NOT use this product to report a gas leak in the vicinity of the leak.
 - 4 DO NOT dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.
-

If trouble is experienced with this equipment, for repair or warranty information, please contact Brother Customer Service. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment. If you have questions about what will disable alarm equipment, call your telephone company or a qualified installer.

If you are not able to solve a problem with your machine, call Brother Customer Service.



WARNING

For protection against the risk of electrical shock, always disconnect all cables from the wall outlet before servicing, modifying or installing the equipment.

This equipment may not be used on coin service lines provided by the telephone company or connected to party lines.

Brother cannot accept any financial or other responsibilities that may be the result of your use of this information, including direct, special or consequential damages. There are no warranties extended or granted by this document.

This machine has been certified to comply with FCC standards, which are applied to the USA only.

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CHAPTER 1

PARTS NAMES AND FUNCTIONS

CHAPTER 1 PARTS NAMES AND FUNCTIONS

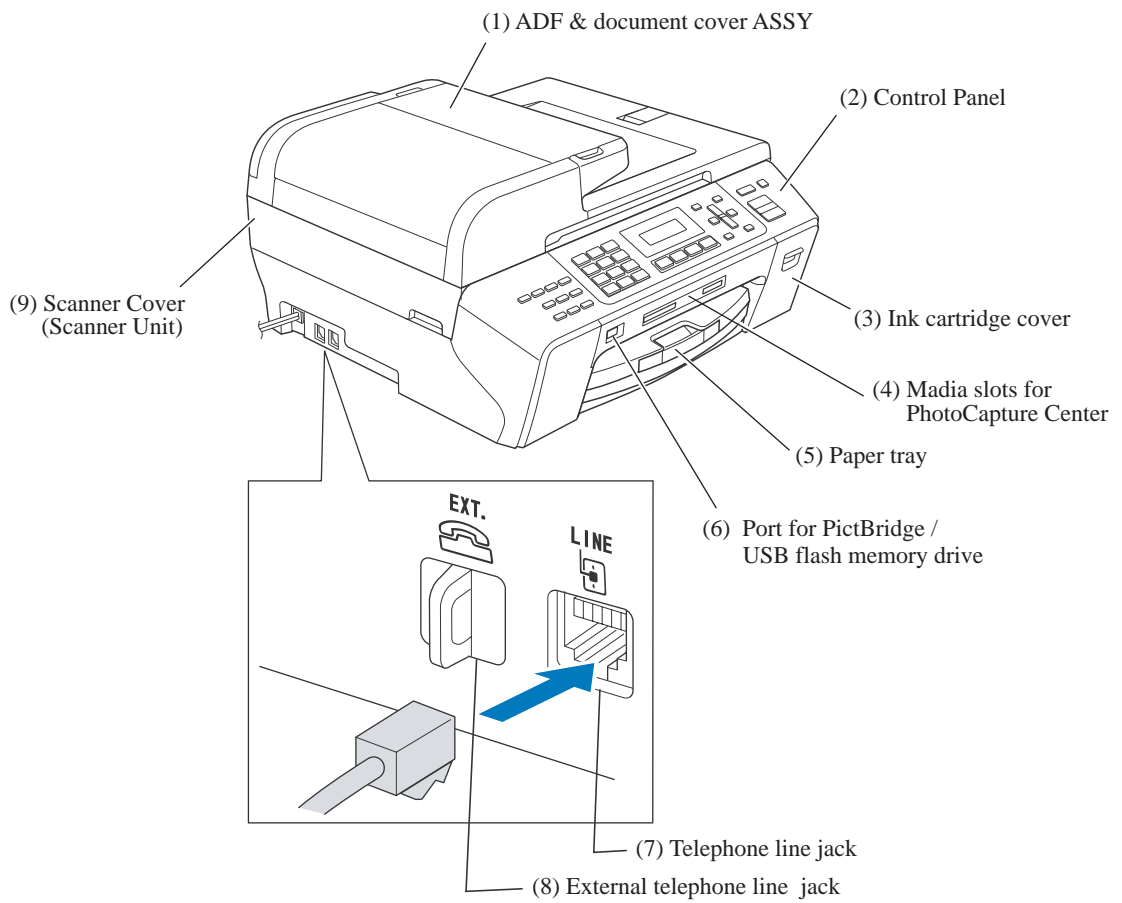
This chapter contains external views and names of components and describes their functions. Information about the keys on the control panel is included to help you check operation or make adjustments.

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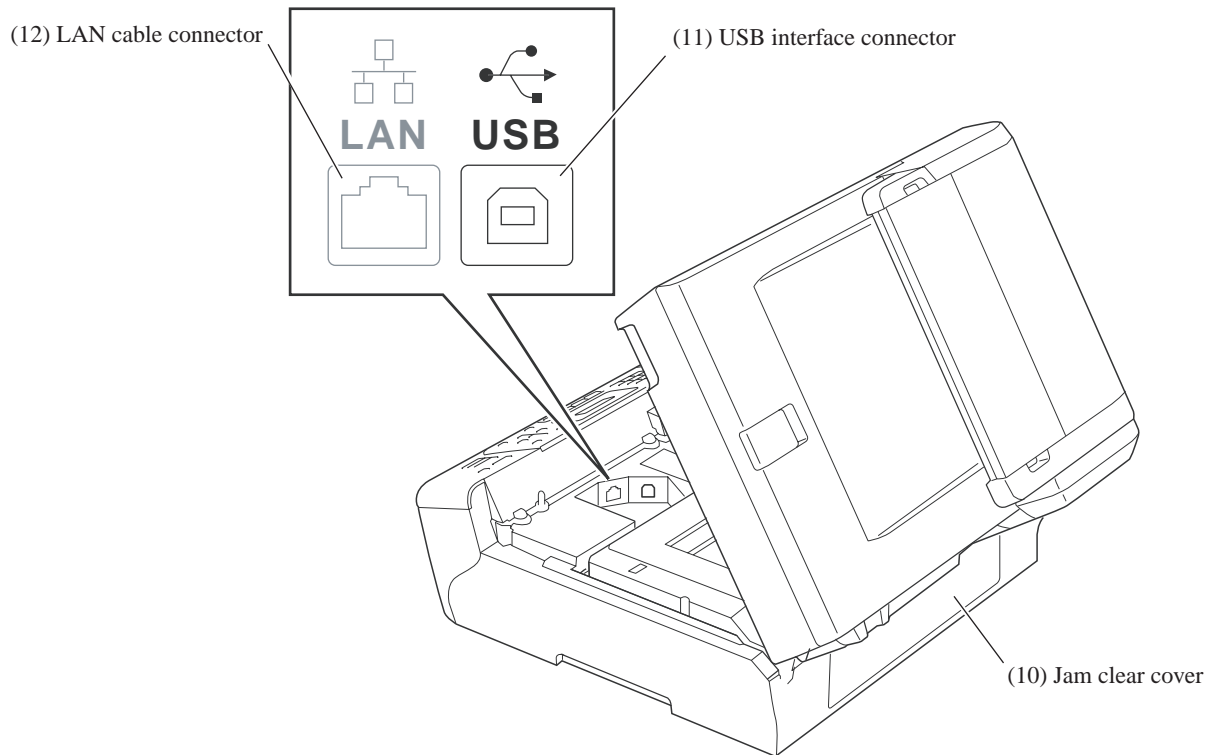
1.1 OUTLINE

Front view



(frontview_BHL9_A4)

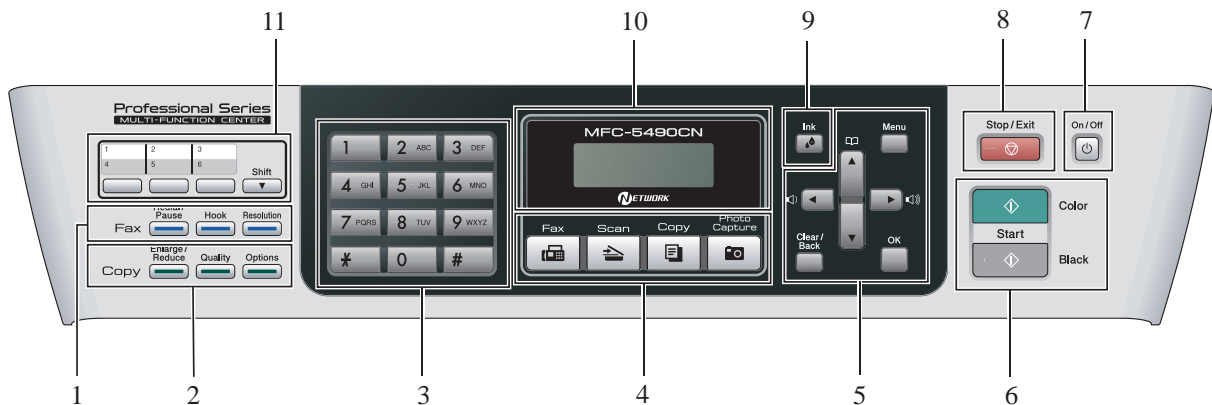
Back view



(backview_BHL9_A4)

No.	Name	Description
(1)	ADF & document cover ASSY	ADF: Load documents (originals) here. Documents will be fed into the machine, page by page. Document cover: Open to place the document (original) on the scanner glass.
(2)	Control Panel	Use the keys to operate the machine. The liquid crystal display (LCD) shows the machine operation status.
(3)	Ink cartridge cover	Open to replace ink cartridges.
(4)	Media slots for PhotoCapture Center	Insert a memory card here.
(5)	Paper tray	Load paper here. Paper will be fed into the machine, sheet by sheet.
(6)	Port for PictBridge / USB flash memory drive	Connect a digital camera (with PictBridge) to this connector using the USB cable. Insert a USB flash memory drive here.
(7)	Telephone line jack	Plug in the modular plug on the telephone line here.
(8)	External telephone line jack	Plug in the modular plug on the external telephone line here.
(9)	Scanner Cover (Scanner Unit)	Open to remove jammed paper.
(10)	Jam clear cover	Open to remove paper jammed inside the machine.
(11)	USB interface connector	Connect the USB cable here.
(12)	LAN cable connector	Connect the LAN cable here.

1.2 CONTROL PANEL



1 Fax and telephone keys

■ Redial/Pause

Redials the last number called. It also inserts a pause when programming quick dial numbers.

■ Hook

Press before dialing if you want to make sure a fax machine will answer, and then press **Black Start** or **Color Start**.

Also, press this key after picking up the handset of an external telephone during the F/T pseudo/double-ring.

■ Resolution

Lets you temporarily change the resolution when sending a fax.

2 Copy keys (temporary settings):

■ Enlarge/Reduce

Lets you temporarily enlarge or reduce copies depending on the ratio you choose.

■ Quality

Lets you temporarily change the quality setting.

■ Options

Lets you temporarily change multiple copy settings when in copy mode.

3 Dial Pad

Use these keys to dial telephone and fax numbers and as a keyboard for entering information into the machine.

(Canada only) The # key lets you temporarily switch the dialing mode during a telephone call from Pulse to Tone.

4 Mode keys:

■ Fax

Lets you access Fax mode.

■ Scan

Lets you access Scan mode.

■ Copy

Lets you access Copy mode.

■ Photo Capture

Lets you access PhotoCapture Center® mode.

5 Menu keys:

■ **Menu**

Lets you access the main menu to program the machine.

■ **Phone Book key**



Press to store Speed Dial, One Touch and Group numbers in the machine's memory.

Lets you store, look up, and dial numbers in the memory.

■ **Volume keys**



When the machine is idle, you can press these keys to adjust the ring volume.

■ ◀

Press to scroll backward to a menu selection.

■ ▲ or ▼

Press to scroll through the menus and options.

■ **Clear/Back**

Press to delete characters or to go back to the previous menu level.

■ **OK**

Lets you choose a setting.

6 Start keys:

■ **Color Start**

Lets you start sending faxes or making copies in full color. Also lets you start a scanning operation (in color or black & white, depending on the scanning setting in the ControlCenter software).

■ **Black Start**

Lets you start sending faxes or making copies in black & white. Also lets you start a scanning operation (in color or black & white, depending on the scanning setting in the ControlCenter software).

7 On/Off

You can turn the machine on and off. The On/Off key can be customized by changing the Power Off setting.

8 **Stop/Exit**

Stops an operation or exits from a menu.

9 Ink

Lets you clean the print head, check the print quality, and check the available ink volume.

10 LCD (liquid crystal display)

Displays messages on the screen to help you set up and use your machine.

11 One Touch keys

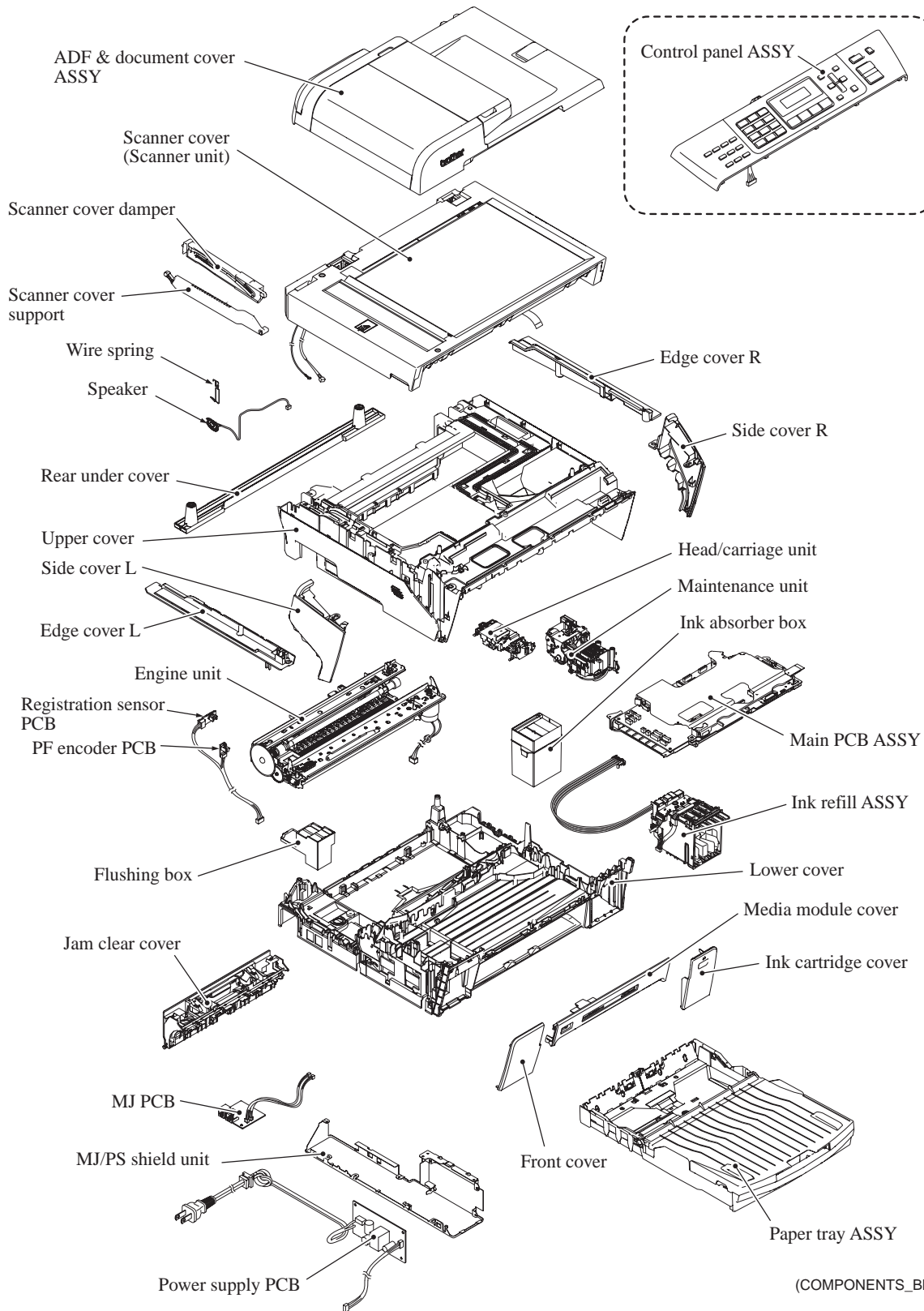
These three keys give you instant access to six previously stored numbers.

Shift

Lets you access One Touch numbers 4 to 6 when held down.

1.3 COMPONENTS

The machine consists of the following major components:



(COMPONENTS_BHL9_A4)

CHAPTER 2

SPECIFICATIONS

CHAPTER 2 SPECIFICATIONS

This chapter lists the specifications of each model, which enables you to make a comparison of different models.

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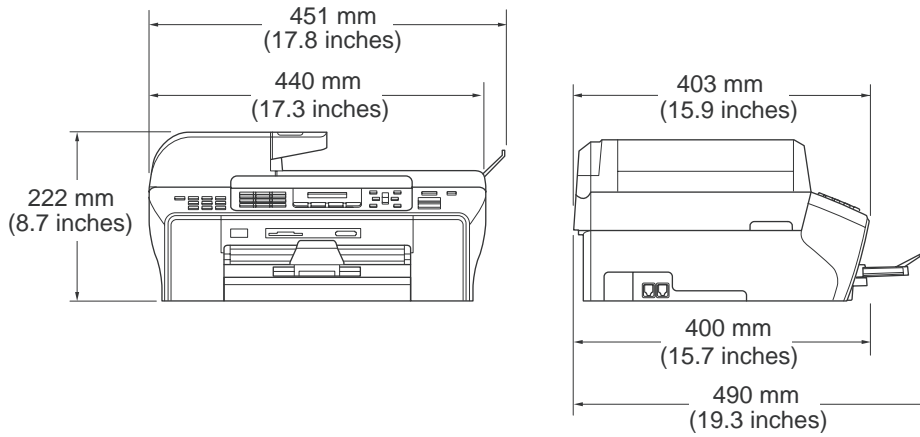
2.1 GENERAL

2.1.1 General Specifications

RAM Capacity		40 MB
Automatic Document Feeder (ADF)		Up to 50 pages
Paper Tray		150 sheets, 80 g/m ² (20 lb)
Printer Type		Ink Jet
Print Method		Piezoelectric, 376 nozzles - Color: 47 nozzles x 2 lines x 3 colors - Black: 47 nozzles x 2 lines x 1 color
Liquid Crystal Display (LCD)		Monochrome LCD (16 characters x 2 lines)
Operating Environment		Temperature: 10 to 35°C Humidity: 20 to 80%
Best Print Quality		68°F to 91°F (20°C to 33°C)
Power Source	(U.S.A./Canada) (Europe/Asia/Oceania)	100 to 120 VAC 200 to 230 VAC 50/60 Hz
Power Consumption		Operation: 27 W or less Standby: 5.5 W or less Power save (sleep): 4.0 W or less Off mode: 0.7 W or less

Dimensions (W x D x H)

MFC5490CN 440 x 403 x 222 mm (17.3 x 15.9 x 8.7 inches)
451 x 490 x 222 mm (17.8 x 19.3 x 8.7 inches)
(With document stopper and paper tray flap opened)



Weight (U.S.A./Canada) 9.4 kg (20.7 lb)
 (EU) 9.6 kg (21.2 lb)
 excluding ink cartridges and accessories

2.1.2 Paper Specifications

Recommended media

To get the best print quality, we suggest using Brother paper. (See table below.)

We recommend using '3M Transparency Film' when you print on transparencies.

Brother paper

Paper Type	Item
Letter Plain	BP60PL100 (USA only)
Letter Glossy Photo	BP71GLTR
Letter Inkjet (Matte)	BP60ML (USA only)
4 x 6 in. Glossy Photo	BP71GP

Paper type and size for each operation

Paper Type	Paper Size		Usage			
			Fax	Copy	Photo Capture	Printer
Cut Sheet	Letter	215.9 x 279.4 mm (8 1/2 x 11 inches)	Yes	Yes	Yes	Yes
	A4	210 x 297 mm (8.3 x 11.7 inches)	Yes	Yes	Yes	Yes
	Legal	215.9 x 355.6 mm (8 1/2 x 14 inches)	Yes	Yes	--	Yes
	Executive	184 x 267 mm (7 1/4 x 10 1/2 inches)	--	--	--	Yes
	JIS B5	182 x 257 mm (7.2 x 10.1 inches)	--	--	--	Yes
	A5	148 x 210 mm (5.8 x 8.3 inches)	--	Yes	--	Yes
	A6	105 x 148 mm (4.1 x 5.8 inches)	--	--	--	Yes
Cards	Photo	10 x 15 cm (4 x 6 inches)	--	Yes	Yes	Yes
	Photo 2L	13 x 18 cm (5 x 7 inches)	--	--	Yes	Yes
	Index Card	127 x 203 mm (5 x 8 inches)	--	--	--	Yes
	Post Card 1	100 x 148 mm (3.9 x 5.8 inches)	--	--	--	Yes
	Post Card 2 (Double)	148 x 200 mm (5.8 x 7.9 inches)	--	--	--	Yes
Envelopes	C5 Envelope	162 x 229 mm (6.4 x 9 inches)	--	--	--	Yes
	DL Envelope	110 x 220 mm (4.3 x 8.7 inches)	--	--	--	Yes
	COM-10	105 x 241 mm (4 1/8 x 9 1/2 inches)	--	--	--	Yes
	Monarch	98 x 191 mm (3 7/8 x 7 1/2 inches)	--	--	--	Yes
	JE4 Envelope	105 x 235 mm (4.1 x 9.3 inches)	--	--	--	Yes
Transparencies	Letter	216 x 279 mm (8 1/2 x 11 inches)	--	Yes	--	Yes
	A4	210 x 297 mm (8.3 x 11.7 inches)	--	Yes	--	Yes

Paper weight, thickness and capacity

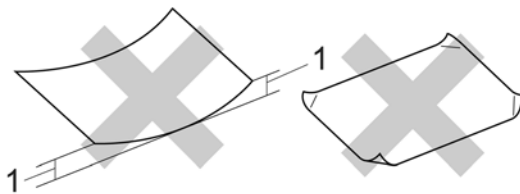
Paper Type		Weight	Thickness	No. of sheets
Cut Sheet	Plain Paper	64 to 120 g/m ² (17 to 32 lb)	0.08 to 0.15 mm (3 to 6 mil)	150*
	Inkjet Paper	64 to 200 g/m ² (17 to 53 lb)	0.08 to 0.25 mm (3 to 10 mil)	20
	Glossy Paper	Up to 220 g/m ² (Up to 58 lb)	Up to 0.25 mm (Up to 10 mil)	20
Cards	Photo 4" x 6"	Up to 220 g/m ² (Up to 58 lb)	Up to 0.25 mm (Up to 10 mil)	20
	Index Card	Up to 120 g/m ² (Up to 32 lb)	Up to 0.15 mm (Up to 6 mil)	30
	Post Card	Up to 200 g/m ² (Up to 53 lb)	Up to 0.23 mm (Up to 10 mil)	30
Envelopes		75 to 95 g/m ² (20 to 25 lb)	Up to 0.52 mm (Up to 20 mil)	10
Transparencies		--	--	10

* Up to 150 sheets for paper of 80 g/m² (20 lb)

Improper Setup

DO NOT use the following kinds of paper:

- Damaged, curled, wrinkled, or irregularly shaped paper



1 2 mm (0.08 inches) or greater

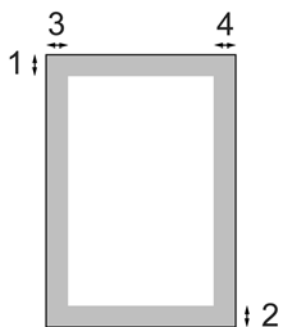
- Extremely shiny or highly textured paper
- Paper already printed on by a printer
- Paper that cannot be arranged uniformly when stacked
- Paper made with a short grain

2.1.3 Printable Area

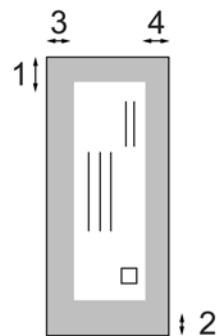
Printable area

The printable area depends on the settings in the application you are using. The figures below show the unprintable areas on cut sheet paper and envelopes. The machine can only print in the shaded areas when the Borderless print feature is available and turned on.

Cut Sheet Paper



Envelopes



	Top (1)	Bottom (2)	Left (3)	Right (4)
Cut Sheet	3 mm (0.12 inches)	3 mm (0.12 inches)	3 mm (0.12 inches)	3 mm (0.12 inches)
Envelopes	12 mm (0.47 inches)	24 mm (0.95 inches)	3 mm (0.12 inches)	3 mm (0.12 inches)

Note

The Borderless feature is not available for envelopes.

2.2 SPECIFICATIONS LIST

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
GENERAL				
Technology		Inkjet		
Print Head		94 nozzles / line 4 lines		
Variable Dot Print		YES (3 sizes)		
Minimum Droplet Size		BK: 4pl CMY: 1.5 pl		
Scanning Method		CIS		
CPU Speed		RISC 192MHZ		
Back up Clock		YES		
Simultaneous Operation		YES		
Demo	Demo Sheet	YES	N/A	
	Panel Key for demo	FAX + COPY (Print)	N/A	
	LCD Demo	N/A		
Test Sheet		YES: Print Quality/ Alignment (in Ink Key)		
Media Specifications				
Media Sizes	Standard Tray	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo (102x152 mm/4x6"), Indexcard (127x203 mm/5x8"), Photo-2L (127x178 mm/5x7"), Post Card 1 (100x148 mm/3.9x5.8"), Post Card 2 (Double) (148x200 mm/5.8x7.8"), C5 Envelope, Com-10, DL Envelope, Monarch, JE4 Envelope		
	Photo Tray	N/A		
	Lower Tray	N/A		
	Duplex	N/A		
	ADF (width/length)	148/148 mm to 215.9/355.6 mm (5.8/5.8" to 8.5/14.0")		
	Scanner Glass (width/length)	up to 215.9/297 mm (up to 8.5/11.7")		
Media Weights	Standard Tray	64-220 g/m2 (17-58 lb.)		
	Photo Tray	N/A		
	Lower tray	N/A		
	Duplex	N/A		
	ADF	64-90 g/mm2 (17-24 lb.)		
Media Types	Standard Tray	Plain, Inkjet, Glossy (cast/resin), Transparency		
	Photo Tray	N/A		
	Lower tray	N/A		
	Duplex	N/A		
	ADF	Plain		
Paper Handling				
Paper Input	Standard Tray	150 (80 g/m2)		
	Photo Tray	N/A		
	Lower tray	N/A		
	ADF	50 (90 g/m2)		
Output Paper Capacity (sheets)		50 (80 g/m2)		

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
LCD/LED/Panel				
LCD	Type & Size	16x2 lines		
	Touch-Screen	N/A		
	Back Light & Color	YES (White)		
	Language	US: Eng/Spa Can: Eng/Can-Fre	Be: Dut/Fre/Eng Swi: Ger/Fre/Eng PanNordic/Den: Eng/Nor/Swe/Fin/Den General: Eng/Cze/Hun/Pol/Bul/ Rom/Slo	English Spanish
Selectable Wallpaper	N/A			
Illuminated Key/LED		Fax/Scan/Copy /Photo Capture		
Illuminated Key Color		Blue		
Status LED Color		N/A		
Memory				
Memory Capacity (physical: Mbytes)		40 MB		
Memory Backup (with battery 24 hours)		N/A		
Back Up Print: ON/OFF (in function Menu)		YES		
Security				
Memory Security		N/A		
Transmission Lock		YES		
Secure Function Lock		N/A		
Others				
On/Off Switch		YES		
Power Source		100 to 120 VAC 50/60 Hz	220 to 240 VAC 50/60 Hz	
Operating Environment Temperature (BestPrintQuality)		5-40 (18-33) degrees centigrade		
Humidity		20 - 80 % (w/o condensation)		
Power Consumption (Operating/Standby/Off/Sleep mode)		27 W/ 5.5 W/ 0.7 W/ 4 W		
Machine Noise (Operating)		50 dBA (Maximum)		
Machine Dimensions		440 x 403 x 222		
Machine Weight		9.4 kg		
Energy Star Compliant		YES		
Blue Angel		N/A	YES	N/A
TCO99		N/A		
Speaker		YES		
Eco Mark (Japan Only)		N/A		
INTERFACE				
Host Interface		Hi-Speed USB 2.0		
LAN		YES		
Wireless LAN		N/A		
Bluetooth		N/A		
IrSimple		N/A		
PictBridge		YES		

AREA	USA	EUR	ASA/OCE
Model name	MFC-5490CN		
USB Memory	YES		
Acceptable Media Card	Compact Flash: 4 MB-8 GB (Type1 only, Type2 & Microdrive are not compatible) Memory Stick: 16 MB-128 MB (Duo with Adopter) Memory Stick Pro: 256 MB-8 GB (MagicGate: YES if not use MG function) Secure Digital: 16 MB-2 GB (MiniSD with Adopter) Secure Digital High Capacity (SDHC): 4-8 GB xD Picture Card: 16-512 MB xD Picture Card TypeM/TypeH: 256 MB-2 GB		
TELEPHONE			
Handset	N/A		
Digital Cordless Phone	N/A		
SKYPE API support	N/A		
Hook/ Tel R/ Recall/ On-hook Key	Hook	Tel R	Hook
Duplex Speaker Phone Key	N/A		
PBX Feature (EUR Only)	N/A	YES	N/A
Hold/Mute	N/A		
Music on Hold	N/A		
Monitoring the Line on Hold with Music	N/A		
Volume			
Handset Volume	N/A		
Speaker Volume	YES (3 steps +OFF)		
Ring Volume	YES (3 steps +OFF)		
Quick/Auto Dials			
One Touch Dial	YES - 6 locations (3 keys + Shift key)		
Speed Dial	100		
Figures of One Touch & Speed Dial	20 digits		
Resisterable Number Of Characters	16 characters		
Group Dial (Up to X groups)	YES (6)		
Telephone Index (Search/Speed dial key)	YES		
Tel Service			
Caller ID	YES		
Call Waiting Caller ID	N/A		
Call from Caller ID List	N/A		
Call from Call List	N/A		
Call waiting Ready	N/A		
Backup Caller ID list	N/A		
Call List Indication	N/A		
External TAD Interface	YES		
Distinctive Ringing	YES		

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
COLOR FAX				
Modem Speed (bps)		33,600 (Fax)		
Transmission Speed (sec.)		Approx. 3 sec (Brother#1, MMR)		
ITU-T Group		Super G3		
Coding Method		Mono: MH/MR/MMR Color: JPEG		
Paper Handling Size		LTR, A4, LEGAL (with ADF)		
Document Scanning Width		LTR (FB): 208 mm A4 (FB): 204 mm LTR/LGL (ADF): 208 mm A4 (ADF): 208 mm		
Color FAX	Document (Send/Receive)	YES/YES (ITU-T color FAX)		
	Memory (Send/Receive)	NO/YES (ITU-T color FAX)		
Display FAX	Send	N/A		
	Receive	N/A		
Super Fine		YES (TX&RX:B&W only)		
Gray Scale		Mono: 64 Color: 256		
Contrast (Auto/S.Light/S.Dark)		YES		
Dual Access		YES (B&W only)		
Enhanced Remote Activate		YES		
Station ID (20 digits/20 characters)		YES 20 digits/20 characters		
Remote Maintenance		YES		
Remote Access		YES		
Fax Retrieval		YES (B&W only)		
Paging		YES	N/A	
Sending				
Delayed Timer (up to 50: B&W only)		Up to 50 / B&W only		
Polled Sending (type) * B&W only		YES (Std)	YES (Std/Secure)	
Batch Transmission		YES (B&W only/not color)		
Quick-Scan (Memory transmission) (ITU-T Test Chart #1)		Approx. 3.3 sec/page@LTR Approx. 3.50 sec./page@A4		
Memory Transmission (ITU-T Test Chart #1/ MMR)		Up to 400 pages		
Memory Transmission (Brother Chart/ MMR)		Up to 480 pages		
Broadcasting (Speed+OneTouch+Manual)		YES (156 locations)		
Manual Broadcasting		YES (50 locations)		
Fax Forwarding		YES (B&W only)		
Receiving				
Easy Receive/Fax Detect		YES (Fax Detect only)		
Polling Receiving (type) * B&W only		YES (Std)	YES (Std/Seq/Secure/Timer)	
Auto Reduction		YES		
Out-of-Paper Reception (ITU-T Test Chart #1/MMR)		Up to 400 pages		
Out-of-Paper Reception (Brother Chart/ MMR)		Up to 480 pages		

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
PC FAX				
Color/Mono		Mono *only A4		
Sending		YES (Network/USB)		
Receiving		YES (Network/USB) NA for MAC		
PC-Fax Protocol		RX: Class 2 TX: PC-FAX Driver		
Broadcasting		Up to 50		
COLOR PRINTER				
Mono/Color		Color		
Print Speed (A4/LTR) *time calculated including paper feeding		up to 35/28 ppm (Mono: 450x150 dpi /Color: 600x150 dpi)		
Resolution (horizontal x vertical)		up to 1200x6000 dpi		
Fonts (CD Based)		N/A		
Auto Duplex Print		N/A		
Manual Duplex Print		Yes		
Print Paper Margin (upper, lower, left, right)		<p style="text-align: center;"><Borderless> On: 0, 0, 0, 0 mm/0, 0, 0, 0" (*) Off: 3, 3, 3, 3 mm/0.12, 0.12, 0.12, 0.12" (**)</p> <p style="text-align: center;">(*) Borderless for A4, LTR, A6, Photo (102x152 mm/4x6"), Indexcard (127x203 mm/5x8"), Photo-2L (127x178 mm/5x7"), Post Card 1 (100x148 mm/3.9x5.8") Only (**) 12, 24, 3, 3 mm/0.47, 0.95, 0.12, 0.12" for Envelops</p>		
Easy Print Setting for Printer Driver (Japan only)		N/A		
Color Enhancement		YES		
COLOR COPY				
Mono/Color		Color		
Copy Speed (A4/LTR) *time calculated including paper feeding **EU's default is calculated by "normal mode"speed		23/20 cpm		
Resolution (horizontal x vertical)	Mono	Print: Max. 1200x1200 dpi Scan: Max. 1200x1200 dpi		
	Color	Print: Max. 1200x1200 dpi Scan: Max. 1200x1200 dpi		
Multi Copy	Stack	YES (99)		
	Sort	YES		
Reduction/Enlargement (%)		25 - 400 in 1% increments		
N in 1		2in1/4in1 A4/LTR only (*Mono&Color)		
Poster		YES (3x3)		
Auto Skew Adjustment		N/A		
Fit to Page		YES		
Copy Enhancement	Book Copy (Shadow Correction & Skew Adjustment for book)	N/A		
	Watermark Copy	N/A		

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
Duplex Copy		N/A		
Print Paper Margin (upper, lower, left, right)		3, 3, 3, 3 mm/0.12, 0.12, 0.12, 0.12"		
Paper Sizes	Standard Tray	LTR, Legal, A4, A5, 10x15 cm(4x6")		
	Photo Tray	N/A		
	Lower Tray	N/A		
COLOR SCANNER				
Mono/Color		Color		
Scan speed (Mono/Color) *@100 dpi		Max. 3.24/4.55 sec (LTR) Max. 3.44/4.83 sec (A4)		
Resolution (horizontal x vertical)	Optical	1200x2400 dpi		
	Interpolated	1200x1200 dpi (For XP/Vista, up to 19200x19200 dpi with Scanner Utility)		
Gray Scale		256		
Scan to	Image	YES (Scan Key)		
	OCR	YES (Scan Key)		
	Email	YES (Scan Key)		
	File	YES (Scan Key)		
	Media (Media Card or USB memory)	YES (Scan Key)		
	FTP	N/A		
	E-mail Server	N/A		
Document Scanning width		210 mm		
Color Depth (Input/Output)		48/24 bit color processing		
PHOTO CAPTURE CENTER				
Acceptable Media (Type & Size)	Media Card	Compact Flash: 4 MB-8 GB (Type1 only, Type2 & Microdrive are not compatible) Memory Stick: 16 MB-128 MB (Duo with Adaptor) Memory Stick Pro: 256 MB-8 GB (MagicGate: YES if not use MG function) Secure Digital: 16 MB-2 GB (MiniSD with Adaptor) Secure Digital High Capacity (SDHC): 4-8 GB xD Picture Card: 16-512 MB xD Picture Card TypeM/TypeH: 256 MB-2 GB		
	USB flash Memory	up to 8 GB		
Paper Sizes	Standard Tray	LTR, A4, 10x15 cm (4x6"), 13x18 cm(5x7")		
	Photo Tray	N/A		
	Lower Tray	N/A		
Paper Types	Standard Tray	Plain, Inkjet, Glossy		
	Photo Tray	N/A		
	Lower Tray	N/A		
Print Paper Margin (upper, lower, left, right)		<Borderless> On: 0, 0, 0, 0 mm/0, 0, 0, 0" Off: 3, 3, 3, 3 mm/0.12, 0.12, 0.12, 0.12"		

AREA	USA	EUR	ASA/OCE
Model name	MFC-5490CN		
Available paper size for full (Max) size printing	All size		
Direct Print Size for A4/LTR (N/A for A3, LGR, B4)	8x10 cm (3x4"), 9x13 cm (3.5x5"), 10x15 cm (4x6"), 13x18 cm (5x7"), 15x20 cm (6x8"), Max.Size		
Borderless/Cropping (Full Auto)	YES/YES		
Media Format	DPOF (Ver 1.0, Ver 1.1) Exif DCF (Up to Ver 2.1)		
Image Format Print by Media Card/USB memory	Photo Print: JPEG/JPEG		
Color Enhancement	YES		
Removable Disk (Media Card/USB memory)	YES (read & write) (both Card & USB memory)		
Scan to Media (Media = Media Card or USB memory)	Color: JPEG/PDF B&W: TIFF/PDF		
Network Media Card/USB memory access	YES (read & write) (both Card & USB memory)		
Monochrome/Sepia	N/A		
Trimming	N/A		
Search from date	N/A		
Slide-show	N/A		
Photo Enhance	N/A		
PictBridge			
Paper Size	A4, LTR, 4x6", Printer Setting		
Paper Type	Plain Paper, Inkjet Paper, Glossy, Printer Setting		
Direct Print size for A4/LTR	Max.size only		
Borderless / Cropping (Full Auto)	YES/NO		
Index Print	N/A		
DPOF	YES		
Colour Enhancement	YES		
Print Quality	Normal, Fine, Printer Setting		
NETWORK			
COMMON			
ITU SUB Addressing	N/A		
Printer	YES		
Scanner	YES		
PC FAX	YES		
Internet FAX (Firmware)	N/A		
Format (Scan to E-mail server)	N/A		
Protocols (IPv4)	ARP, RARP, BOOTP, DHCP, APIPA (Auto IP), NetBIOS/WINS, LPR/LPD, Custom Raw Port/Port9100, DNS Resolver, mDNS, FTP Server, TELNET, SNMPv1, TFTP, Scanner Port, LLTD responder, Web Services		
Protocols (IPv6)	(Turned off as default) NDP, RA, LPR/LPD, Custom Raw Port/Port9100, mDNS, FTP Server, TELNET, SNMPv1, TFTP, Scanner Port, LLTD responder, Web Services		

AREA		USA	EUR	ASA/OCE
Model name		MFC-5490CN		
LDAP		N/A		
FAX to E-mail		N/A		
Network Management (BRAdmin Light)		YES		
Network Management (MIB-II as well as Brother private MIB)		YES		
Network reset		YES (for WLAN & WIRED at once) (in LAN Menu)		
WIRED				
Model name (Ether)		Embedded (NC-170 h)		
Network connection (Ether)		Ethernet 10/100BASE-TX Auto Negotiation		
LIST/REPORT				
Activity Report/ Journal Report		YES (up to 200)		
Transmission Verification Report		YES		
Help List		YES		
Caller ID List		YES		
Quick Dial List		YES (Print/ LCD Display)		
Tel Index List		ABC		
User Setting List		YES		
Order Form		N/A		
Network Config		YES		
SUPPLIES/ OPTIONS				
Ink Cartridge Model Name		LC61BK LC61C LC61M LC61Y	LC1100BK LC1100C LC1100M LC1100Y	LC67BK LC67C LC67M LC67Y
Bundled Ink Cartridge Type		Standard		
Ink Cartridge Yield (@ISO pattern/normal)	Bundled Cartridges	approx. 300/240 pages		
	Supply Standard Cartridges	Approx. 450/325 pages		
	Supply Low Yield Cartridges	N/A		
	Supply High Yield Cartridges	N/A		
Brother Paper (for Plain,Glossy and Inkjet)		Plain: LTR Inkjet: LTR Glossy(Resin): LTR/4x6"	Plain: A4 Inkjet: A4 Glossy(Resin): A4/4x6"	
Recommended Paper Only for Transparency		3M 3410 Transparency film		
Software				
Support OS version	Windows	2K/XP/XP Professional X64/Vista		
	Mac	Mac OSX 10.2.4 (greater)		
PC Application		See [PCApplicationOS] sheet		
Shindan-kun [Firmware] (Spec name is TBD)		YES		
SERVICE INFORMATION (Not to be used in sales leaflet)				
Monthly Volume		4000 pages		
Machine Life (year)		50000 pages or 5 years		
MTBF (Mean Time Between Failures)		4000 hours		
MTTR (Mean Time To BE Repaired)		30 min		

CHAPTER 3

THEORY OF OPERATION

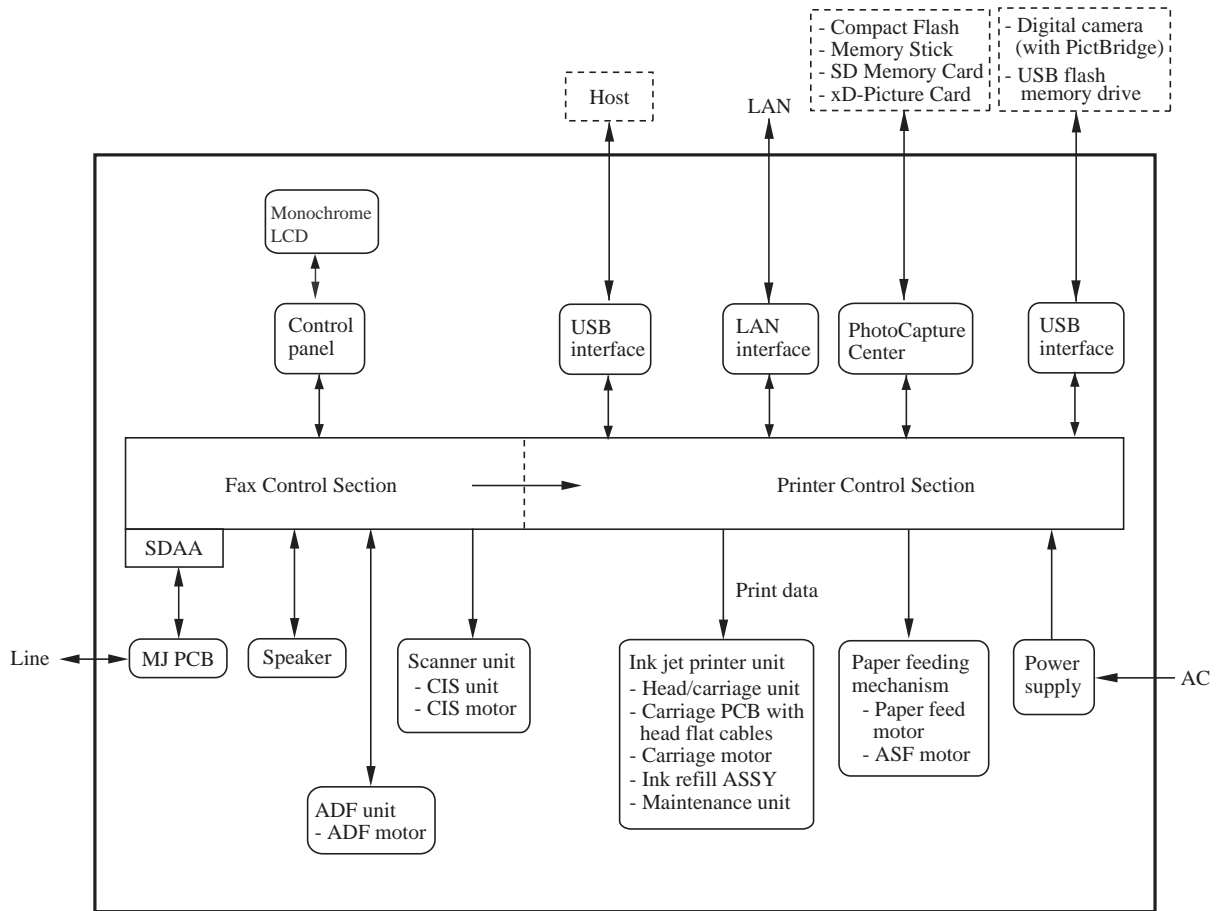
CHAPTER 3 THEORY OF OPERATION

This chapter gives an overview of the scanning and printing mechanisms as well as the sensors, actuators, and control electronics. It aids in understanding the basic principles of operation as well as locating defects for troubleshooting.

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3.1 OVERVIEW

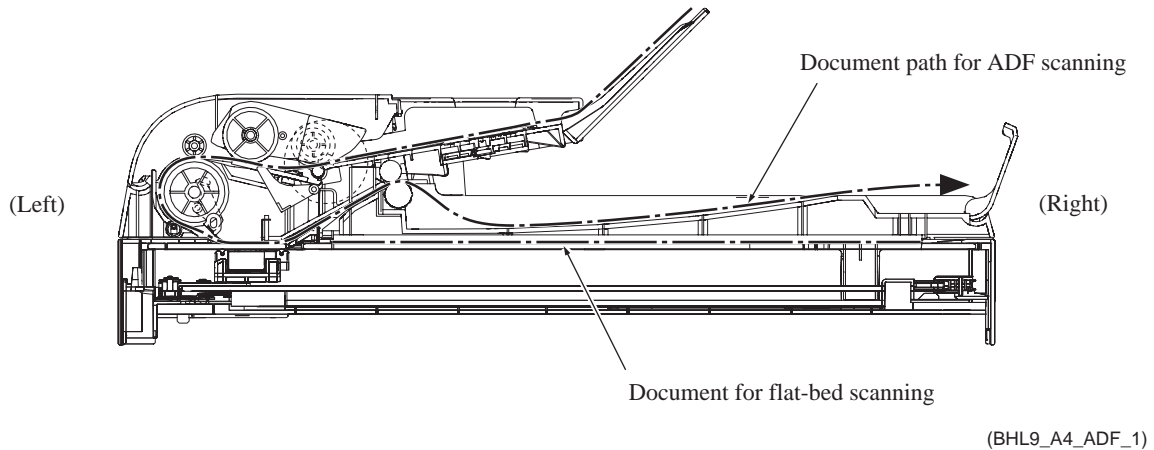


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3.2 MECHANICAL COMPONENTS

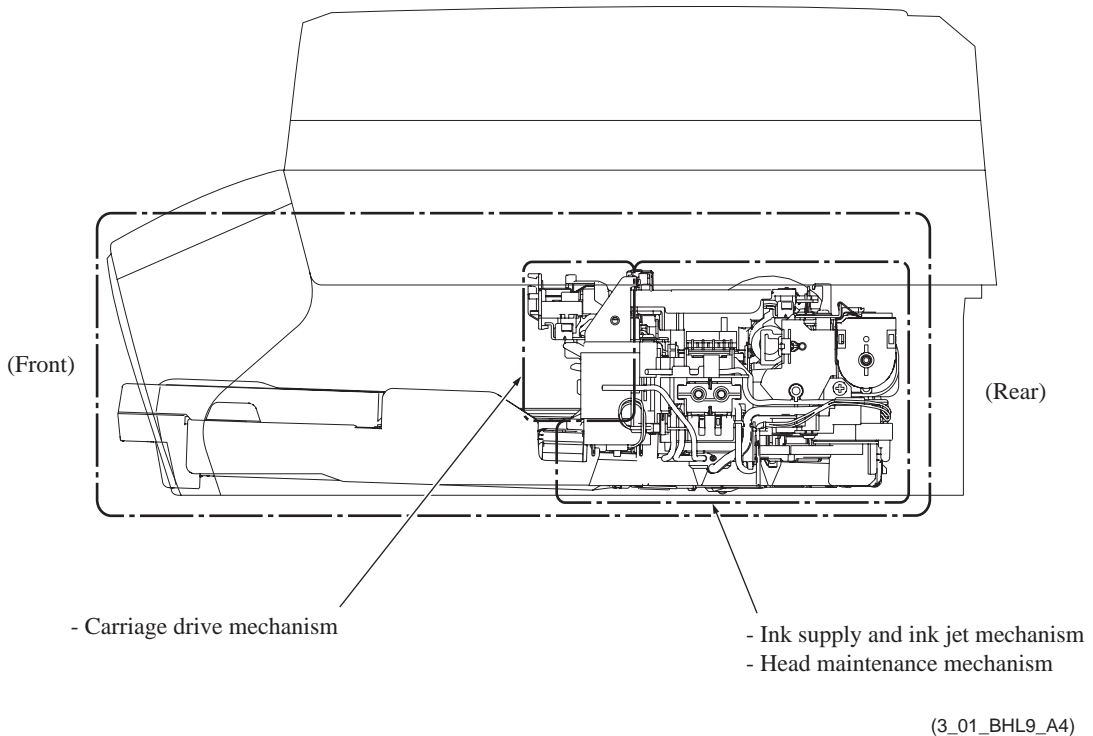
This machine consists of the scanner mechanism and printing mechanism. It uses five motors (CIS motor, ADF motor, paper feed motor, ASF motor, and carriage motor), three encoders (PF encoder, ASF encoder, and CR encoder), various sensors, and two thermistors.

■ Scanner Mechanism

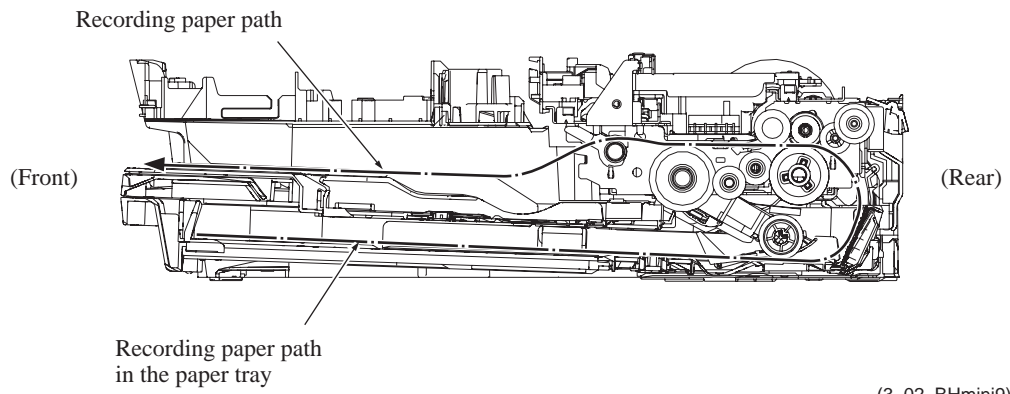


■ Printing Mechanism

Ink supply and ink jet mechanism, head maintenance mechanism, and carriage drive mechanism.



Paper pulling-in, registration, feeding and ejecting mechanisms



■ Scanner Mechanism (See Section 3.2.1.)	- Document scanning mechanism	CIS motor (stepping motor)
	- Automatic document feeder (ADF) mechanism	ADF motor (stepping motor)
■ Printing Mechanism (See Section 3.2.2.)	- Ink supply and ink jet mechanism (See Section 3.2.2.1.)	
	- Head maintenance mechanism (See Section 3.2.2.2.) (Head capping and carriage lock)	ASF motor* (DC motor)
	+ (Purge, air removing, and head wiper)	+
		Paper feed motor (DC motor)
	- Carriage drive mechanism (See Section 3.2.2.3.)	Carriage motor (DC motor)
- Paper pulling-in, registration, feeding and ejecting mechanisms (See Section 3.2.2.4.)	ASF motor* (DC motor) + Paper feed motor (DC motor)	
■ Encoders (See Section 3.2.3.)	- Paper feed motor encoder (PF encoder)	
	- ASF motor encoder (ASF encoder)	
	- Carriage motor encoder (CR encoder)	
■ Sensors (See Section 3.2.3.)	- Document front sensor	
	- Document rear sensor	
	- Scanner cover sensor	
	- Ink cartridge cover sensor	
	- Registration sensor	
	- Paper width (media) sensor	
	- Purge cam switch	
	- Cap lift cam switch	
	- Ink empty sensors (black, yellow, cyan and magenta)	
- Ink cartridge detection sensors (black, yellow, cyan and magenta)		
■ Thermistors (See Section 3.2.3.)	- Head thermistor	
	- Casing internal temperature thermistor	

* ASF motor: Auto Sheet Feeder motor

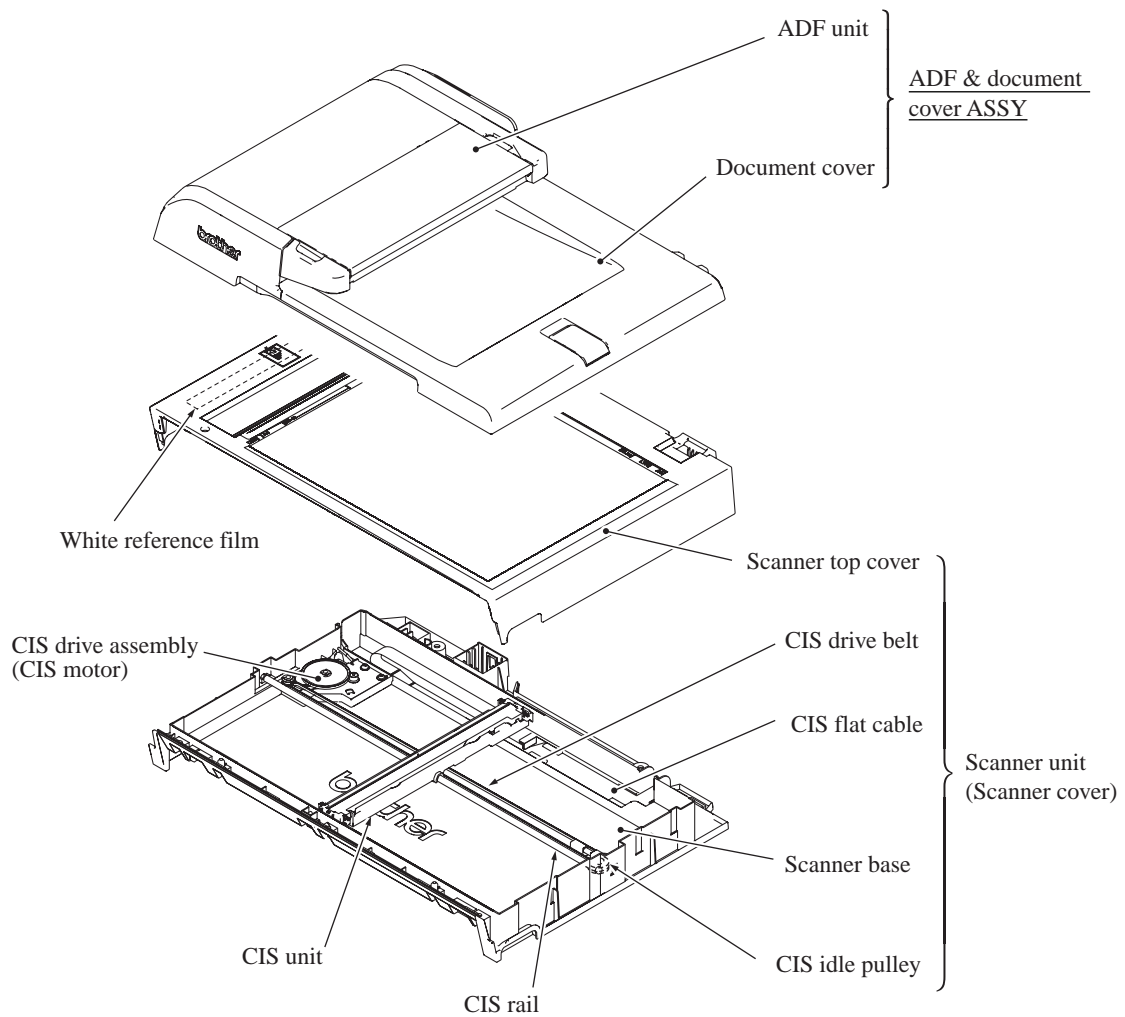
3.2.1 Scanner Mechanism

This mechanism consists of the automatic document feeder (ADF), document cover, and scanner unit (scanner cover).

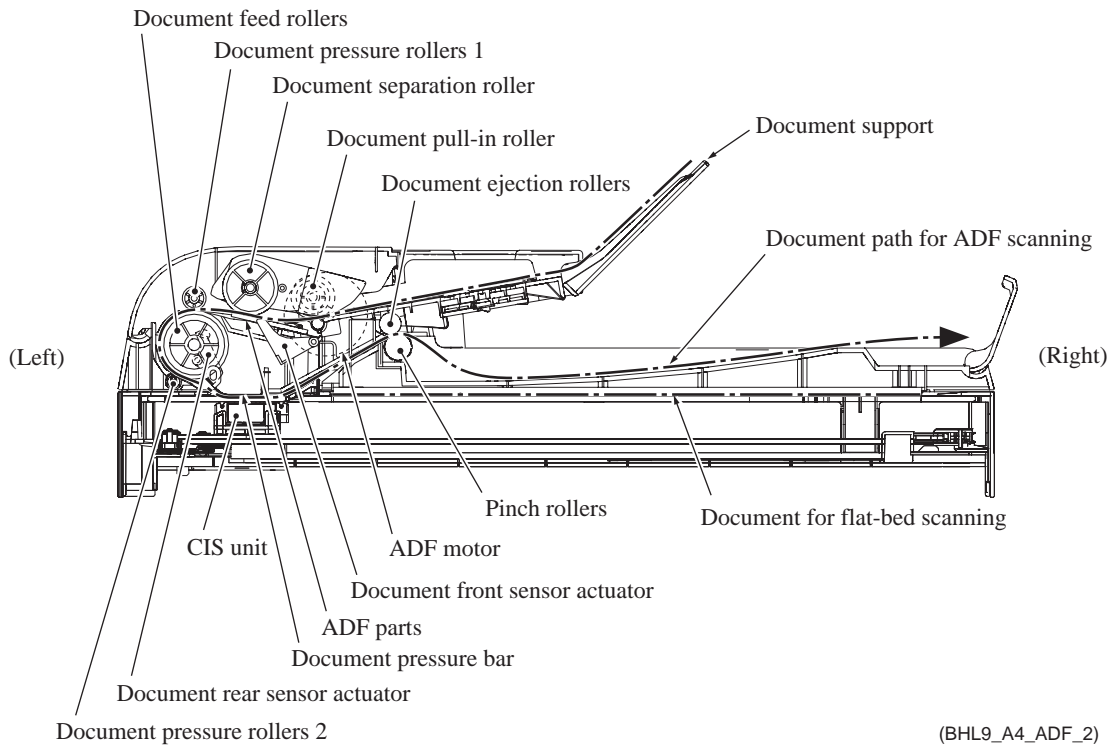
The scanner unit consists of a scanner top cover, CIS unit, CIS drive assembly, and scanner base.

The detailed illustration on the next page shows the components making up the ADF: document pull-in roller, document separation roller, document feed rollers, document ejection rollers, ADF motor, and document front and rear sensors.

For further details on the sensors, see [Section 3.2.3](#).



(3_03_BHL9_A4)



The scanner mechanism offers two types of scanning: ADF scanning and flat-bed scanning. It automatically switches to the former at the start of a scan operation if the document front sensor inside the ADF detects a document.

(1) ADF scanning: Document moves across stationary CIS unit

Placing a document *face up* in the ADF activates the document front sensor, switching to ADF scanning.

The CIS drive mechanism (details below) operates for each scanning command executed. First, the CIS motor moves the CIS unit to the white reference film for white level compensation. Secondly, the ADF motor rotates the document pull-in roller to pull the document into the ADF. Thirdly, the CIS motor again moves the CIS unit to the ADF scanning position.

The document separation roller feeds the pages one at a time, *starting from the top*, to the document feed roller, which rotates to move the page in a curve left, down, and right. The page is scanned as it passes over the CIS unit. It then leaves the machine *face down* onto the document cover. The machine ejects subsequent pages above this one to preserve the document page order.

(2) Flat-bed scanning: CIS unit moves under stationary document

The user lifts the document cover, places a page (or open book) *face down* with the left and top edges fitting on the left and top guidelines on the glass plate, and closes the document cover.

The CIS drive mechanism (details below) operates for each scanning command executed. The CIS unit first moves to the white reference film for white level compensation. It then moves right, scanning as it goes. It returns to its home position after the scan.

CIS drive mechanism

The contact image sensor (CIS) unit rides along the CIS rail, driven by the CIS drive belt. Clockwise motion of the CIS motor moves the unit to the left; counterclockwise motion, to the right.

This unit consists of the document illumination LED array, the lens array gathering the light reflected from the scanned image, the CIS PCB converting the light input to pixel data output, and CIS glass.

The CIS unit used in the machine supports color scanning. In scanning color documents, the CIS unit illuminates them by turning on the red (R), green (G), and blue (B) LEDs alternately. In scanning monochrome documents, it turns on the green LEDs only.

3.2.2 Printing Mechanism

The printing mechanism consists of the following.

- Ink supply and ink jet mechanism (Section 3.2.2.1)
- Head maintenance mechanism (Section 3.2.2.2)
- Carriage drive mechanism (Section 3.2.2.3)
- Paper pulling-in, registration, feeding and ejecting mechanisms (Section 3.2.2.4)

The **ink supply mechanism** supplies ink to the head/carriage unit, in which the **ink jet mechanism** sprays ink droplets from the head nozzles onto paper.

The major components of the ink supply mechanism (shown on page 3-10) are:

- Ink refill assembly: This secures the ink cartridges and connects them to the corresponding ink supply tubes.
- Ink supply tubes: These supply the head/carriage unit with ink fed from the ink cartridges via the ink refill assembly.

The major components of the ink jet mechanism (head/carriage unit shown on page 3-12) are:

- Front end: This is an ink-jet head consisting of piezoelectric plate (PZT), metal plates, nozzle plate, and head driver. It jets out ink to produce images on paper.
- Back end: This consists of damper assemblies and air vent unit. Each damper assembly dampens the ink pressure fluctuations in the corresponding ink supply tube and collects air bubbles that result from pressure changes on the ink.

To keep the optimum head performance, the **head maintenance mechanism** (shown on page 3-34) uses the rotational torque of the ASF motor* to cap the head nozzles in order to prevent them from drying up. It also uses the rotational torque of the paper feed motor to purge for removing air bubbles from the head/carriage unit and wipe off any ink remaining on the head nozzle surface.

The **carriage drive mechanism** (shown on page 3-37) moves the head/carriage unit with a carriage motor (DC motor) along the recording paper. The CR encoder sensor mounted on the head/carriage unit scans the CR encoder strip and monitors the current head position relative to the home position and the current travel speed.

The **paper pulling-in, registration, feeding and ejecting mechanisms** are driven by the ASF motor* and paper feed motor (both are DC motors).

The major components are:

- Paper tray: Recording paper is stored in this tray.
- Paper pull-in rollers (shown on page 3-42): These rollers pull in paper into the machine.
- Bank ASSY (shown on page 6-74): This separates paper, sheet by sheet to feed it into the printing section.
- Jam clear cover (shown on page 3-41): Opening this cover allows the user to access paper jammed. It also guides paper pulled in from the paper tray into the printing section.

*ASF motor: Auto Sheet Feeder motor

- Paper feed roller (shown on [page 3-42](#)):
This roller performs paper registration and feeds paper to the printing section precisely.
- Paper ejection roller (shown on [page 3-41](#)):
This roller ejects paper and keeps paper tension tight.
- ASF motor* (shown on [page 3-42](#)):
This motor pulls in paper, switches the paper feed operation modes, and drives the head capping mechanism and carriage lock mechanism of the maintenance unit.
- Paper feed motor (shown on [page 3-42](#)):
This motor feeds recording paper and drives the purge mechanism, air removing mechanism and head wiper mechanism of the maintenance unit.
- Clutch gears L and R (shown on [page 3-42](#)):
Clutch gear L switches the transmission route of the ASF motor rotation between the paper pulling-in mechanism and the head capping & carriage lock mechanisms.
Clutch gear R transmits the rotational torque of the paper feed motor to the purge gear (for purge, air removing and head wiper mechanisms).
- ASF rotary encoder:
This generates a signal indicating the rotation speed of the ASF motor shaft. The signal is sent to the controller and used for controlling the paper pull-in position and speed.
- PF rotary encoder:
This generates a signal indicating the rotation speed of the PF roller gear. The signal is sent to the controller and used for controlling the paper feed position and speed.

*ASF motor: Auto Sheet Feeder motor

3.2.2.1 Ink supply and ink jet mechanism

[1] Overview

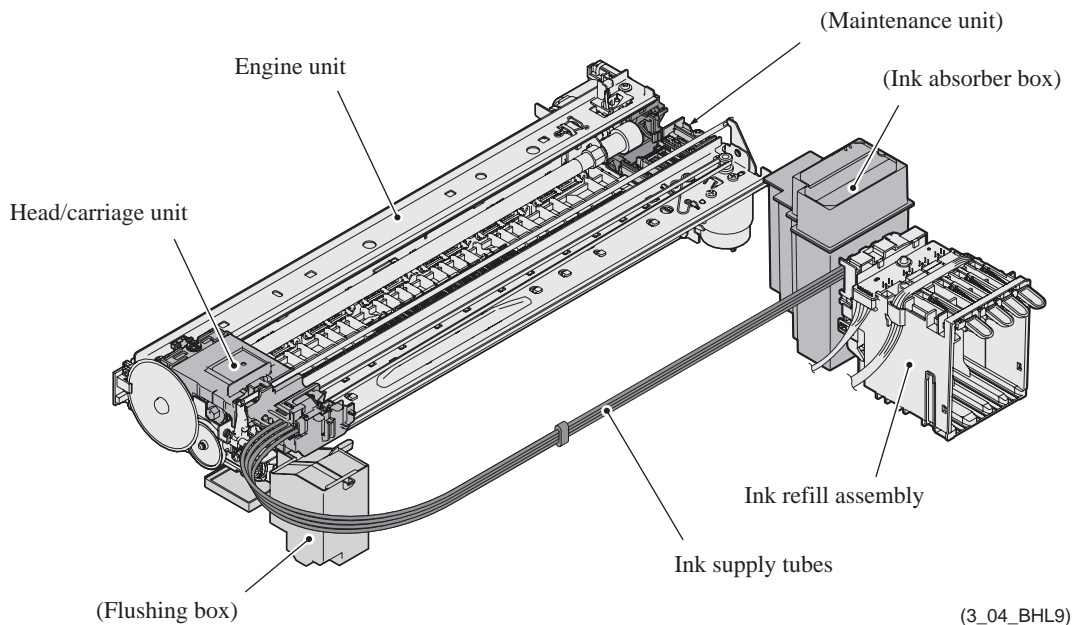
The ink supply and ink-jet mechanism consists of the head/carriage unit, four ink cartridges, ink refill assembly, and four ink supply tubes.

The head/carriage unit scans the surface of the recording paper, jetting out ink supplied through the ink supply tubes onto the paper to produce images. For further details, see "[3] Head/carriage unit" below.

The four ink cartridges (black, yellow, cyan, and magenta) are mounted on the ink refill assembly. For further details, see "[4] Ink cartridges" below.

The ink refill assembly secures the ink cartridges and connects them to the corresponding ink supply tubes. For further details, see "[5] Ink refill assembly" below.

The ink supply tubes supply the head/carriage unit with ink fed from the ink cartridges via the ink refill assembly. For further details, see "[6] Ink supply tubes" below.



[2] Features

A distinct feature of this machine is the use of ink supply tubes between the ink cartridges and the head/carriage unit. Relieving the head/carriage unit of the task of carrying heavy ink cartridges back and forth across the page, the approach generally adopted by other ink-jet printers, offers the following advantages.

- Lower power consumption
- Lower noise levels
- Lower vibration

During print operation, the ink-jet mechanism inside the head/carriage unit sprays ink droplets from the head nozzles. The loss of this ink from the head produces a negative pressure that replenishes the head with ink from the ink tank through the supply tubes.

Note, however, that the above ink flow is only possible when the ink supply tubes are full of ink. The factory therefore primes the ink supply path by applying strong suction to the head nozzles with the maintenance unit to suck both air and ink through the ink supply tubes.

Leaving too long interval between this priming and actual use, however, risks air bubbles, increased viscosity, and other quality issues with the ink in the supply tubes. Before using this machine for the first time, therefore, this machine automatically replaces the ink supply path contents with fresh ink using an initial purge, a repeat of this priming operation.

When the machine is on standby, a constant negative pressure (which is produced according to the difference in height between the head/carriage unit and ink cartridges) is applied to the rear of the print head, thus preventing ink from leaking out of those nozzles.

Note: The above applies only as long as this machine rests on a horizontal surface. Standing this machine on end or even just tilting it backwards with the print head uncapped risks overcoming this slight negative pressure preventing ink leakage from the head nozzles.

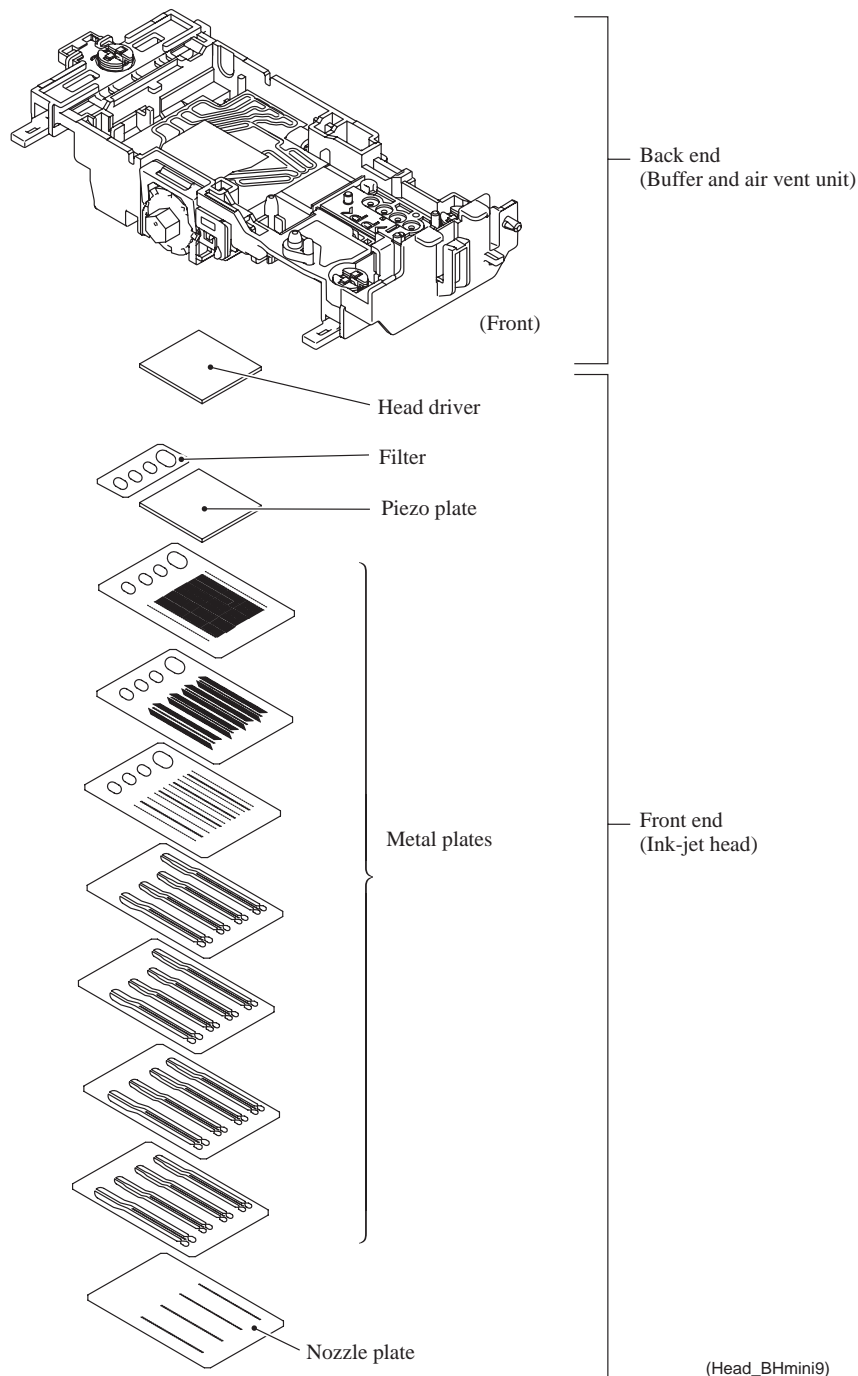
Piezoelectric ceramic actuators inside the print head convert this ink to droplets sprayed onto the paper. For further details, see "[3] Head/carriage unit" below.

[3] Head/carriage unit

The head/carriage unit consists of a front end (ink-jet head) and a back end (damper and air vent unit) as shown below.

The front end consists of metal plates laminated together and etched to form ink flow channels.

Piezoelectric ceramic actuators generate the spray pressure. The response of individual front ends to applied voltages and waveforms varies, however, because of the nature of piezoelectric materials, fluctuation in manufacturing accuracy, and other factors. The front end therefore leaves the production line with head property labels giving property data. The manufacturer writes this property data to the EEPROM on the main PCB incorporating this unit. Based on the property data of the front end, the processor drives piezoelectric ceramic actuators to insure consistent performance without fluctuations.



■ Front end

Front end components and their main roles

- Piezoelectric plate

Applying a voltage stretches the plate, serving as the actuator for spraying ink. Consisting of thin piezoelectric plates laminated together, this plate can be driven even by a low voltage.

- Filter

This removes foreign materials from the ink.

- Metal plates

These form the head nozzle pressure chambers, ink flow paths, and manifolds.

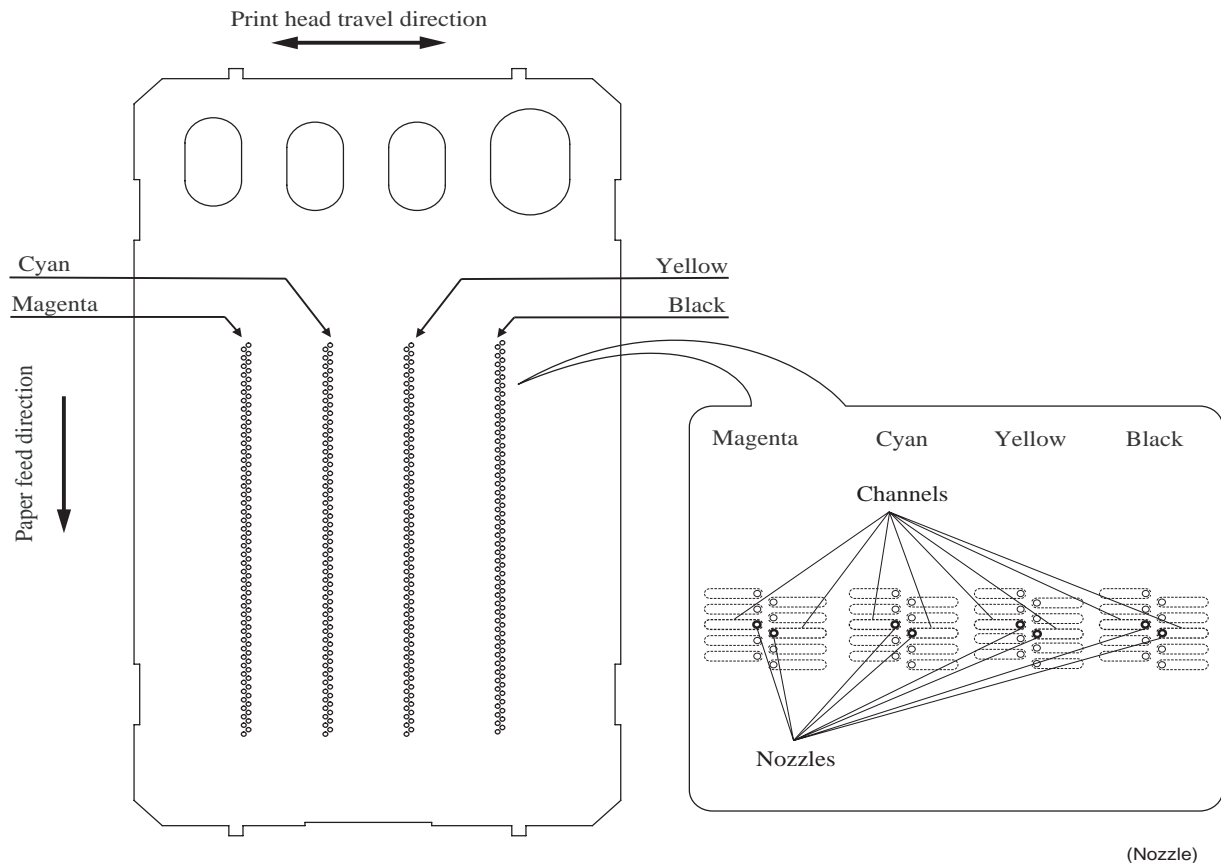
- Nozzle plate

This plate has a total of 376 nozzles--47 nozzles x 2 lines staggered x 4 rows (black, yellow, cyan, and magenta).

- Head driver

This flexible circuit board holds the piezoelectric driver chip.

Nozzle array (head bottom plate viewed from the top)



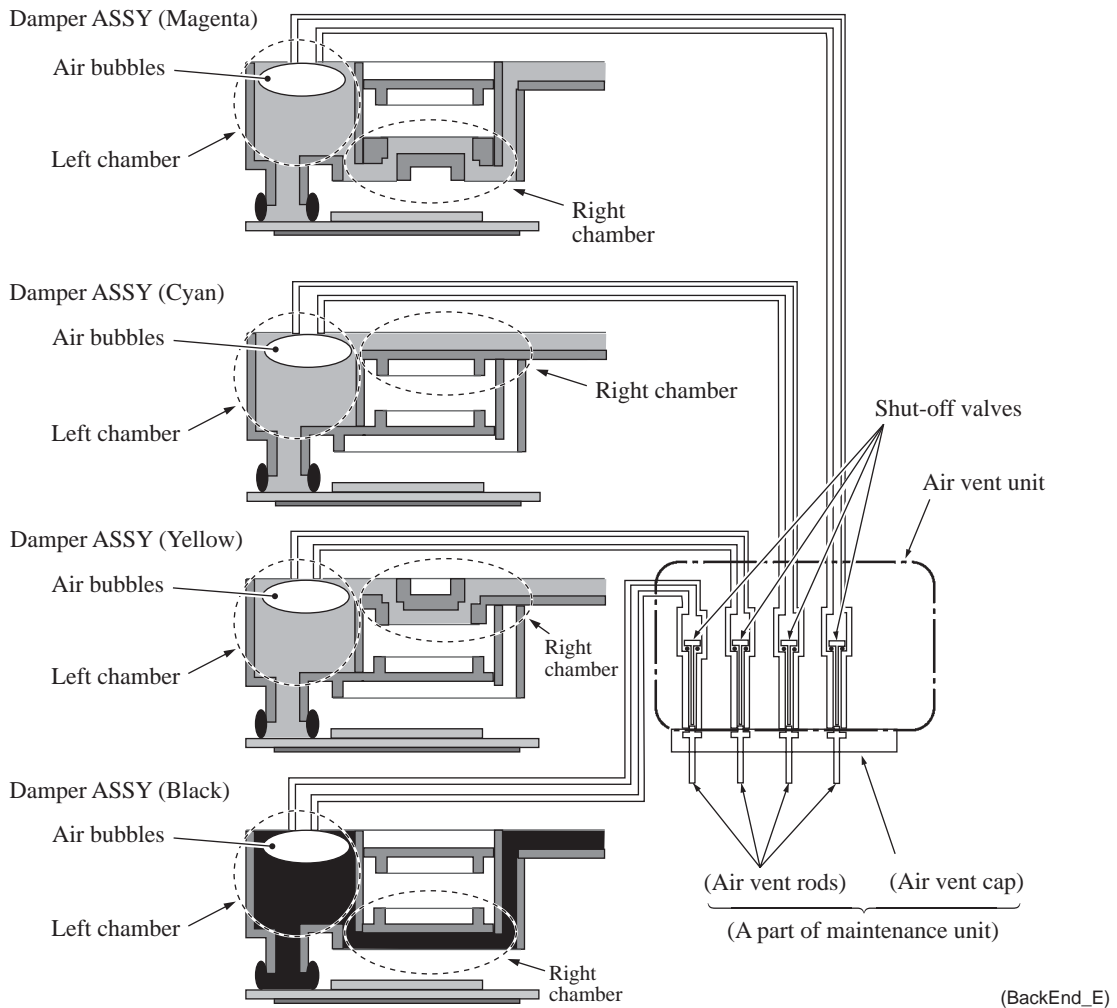
Ink spray function

The head employs drop-on-demand ink-jet printing.

Print commands to the drive circuit apply a bias voltage to the layer electrodes on the piezoelectric ceramic surface stretching the elements perpendicular to that surface. Drive signals removing this voltage for specific channel electrodes allow the piezoelectric elements to return to their original shape, sucking ink into the corresponding channels*. Reapplying the bias voltage stretches the elements once again, applying pressure to the ink, spraying it from the head nozzle. The ink drop hits the paper on the platen, forming a dot.

* Pressure chambers for individual nozzles

■ **Back end**



Back end components and their main roles

- Damper assemblies

Each assembly has two roles: dampening the ink pressure fluctuations* in the ink supply tube as the carriage moves and collecting air bubbles that grow in the ink flow path.

* Ink pressure fluctuations: As the head/carriage unit travels, inertia means that the ink remains in the same place, temporarily raising or lowering the pressure in the right chamber.

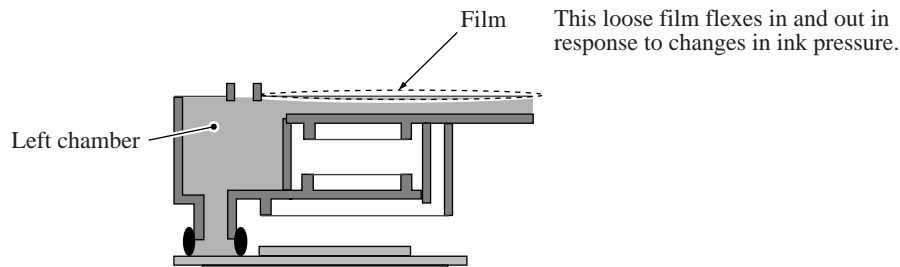
- Air vent unit

At regular scheduled intervals, this vents any air bubbles that have accumulated in the damper assemblies. The air vent rods in the maintenance unit push up the shut-off valves, opening the air vent flow paths.

Damping

Without damping, ink pressure fluctuations directly affect the size of ink-jet head droplets, risking lower print quality.

Each damper assembly has two chambers. The one on the right in the illustration below has a loose film across its top and serves as a damper. The film immediately flexes in and out in response to falls and rises in pressure, adjusting the chamber volume to counteract pressure fluctuations in the ink supply tubes.



This loose film flexes in and out in response to changes in ink pressure.

(DamperFunc)

Air buffering

Liquid ink contains trace amounts of air. These molecules coalesce into air bubbles as the piezoelectric ceramic actuators vary the pressure on the ink in the ink-jet head channel. (See the illustration on [page 3-13](#).) Removing as many of these bubbles as possible before the ink reaches the ink-jet head is essential to maintaining proper print quality. The above illustration shows how the damper assemblies provide air buffers, the chambers on the left, for consolidating these air bubbles away from the ink-jet head and vent flow paths for purging them at regular scheduled intervals.

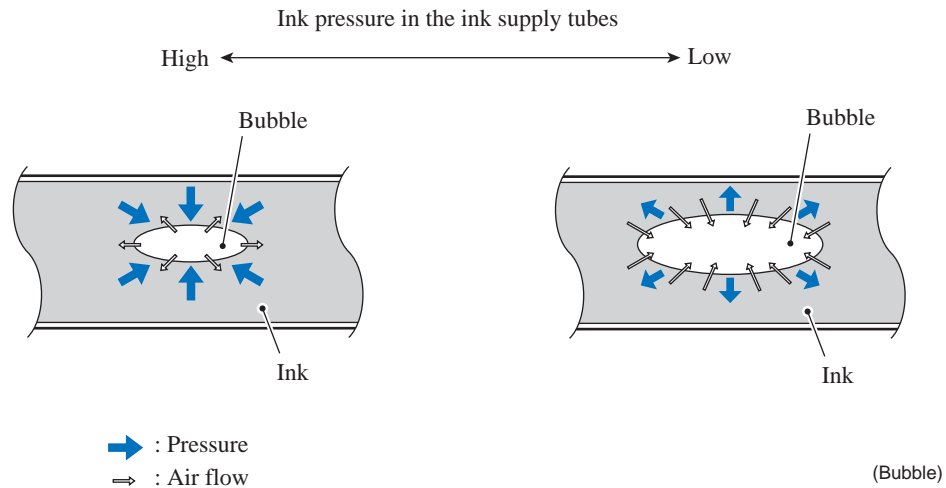
----- [**Tip: Air bubble growth**] -----

Liquid ink contains trace amounts of air. The amount varies with the pressure on the ink because increasing the pressure raises the ink's ability to absorb air from its surroundings and lowering the pressure forces the ink to give up some of this air.

The ink pressure fluctuations caused by the piezoelectric ceramic actuators repeatedly expand and contract any air bubbles, growing them larger gradually. This is because the amount of the air per unit area passing through the boundary surface between the ink and the bubble is always constant but the boundary surface area decreases or increases when the bubble contracts or expands, respectively.

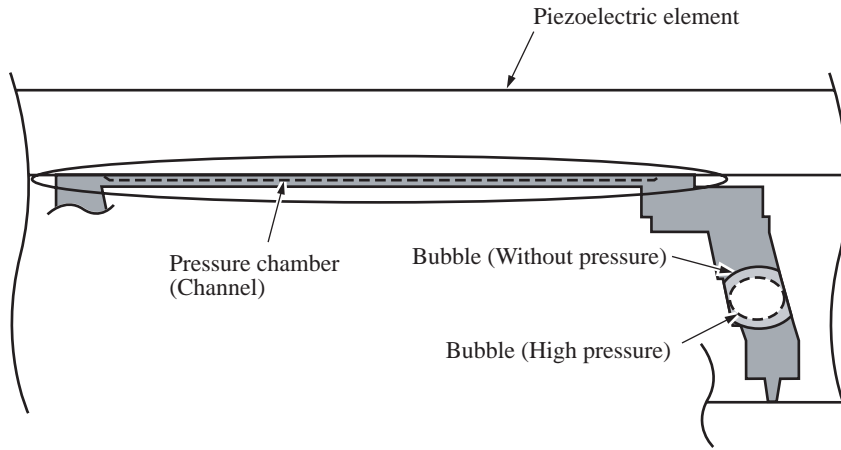
That is, when the pressure becomes high, the bubble contracts so that the amount of air moving from the bubble to the ink decreases in proportion to the boundary surface area decreased. On the contrary, when the pressure becomes low, the bubble expands so that the amount of air moving from the ink to the bubble increases in proportion to the boundary surface area increased.

The design therefore compensates by allowing the purging/flushing of air bubbles during printing to keep the amount of air dissolved in the ink to a minimum.



----- [**Tip: What's so bad about air bubble growth?**] -----

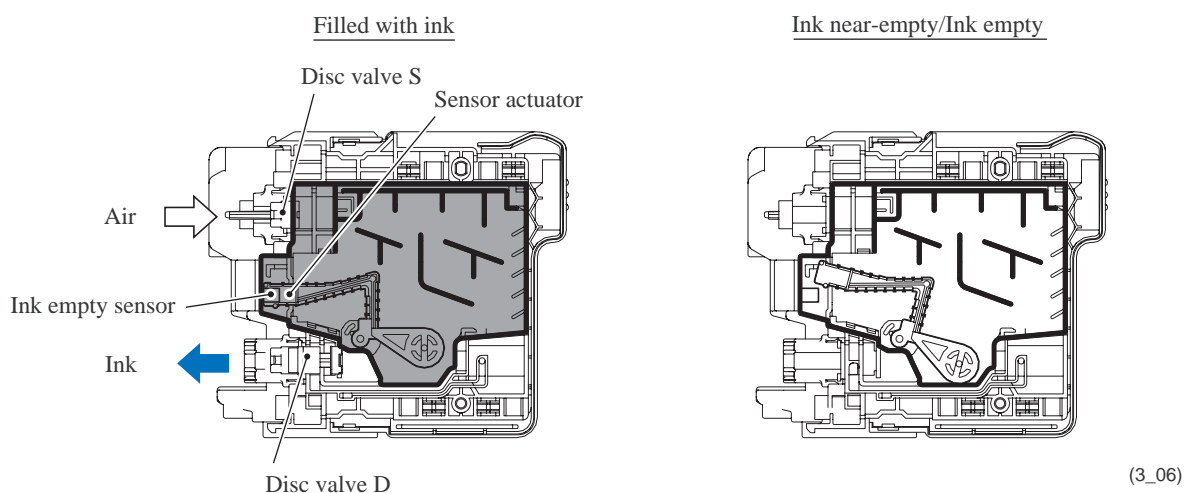
Pressure fluctuations do not affect the volume of a liquid (ink), but Boyle's Law says that the volume of a gas (air) varies with the pressure on it. The main issue with air bubbles in the ink flow path is their damping effect, absorbing the pressure from the piezoelectric ceramic actuators and thus degrading ink-jet performance.



(Head_bubble)

The above illustration shows an example of an extremely large air bubble reaching the head nozzle from the channel ink flow path; the dotted line, the changes resulting from applying a voltage to the laminated electrode, expanding the piezoelectric ceramic actuator. Note how contraction of the air bubble absorbs the pressure from the piezoelectric ceramic actuator, preventing ink ejection.

[4] Ink cartridges



Ink cartridge features

This machine uses four ink cartridges: a black one and three color ones with a slightly lower capacity. It features horizontal insertion in the ink refill base over plastic needles.

Each cartridge has two ports: one supplying the ink for printing and another intaking air to replace that ink. Both ports have a disc valve preventing ink leakage. When a cartridge is mounted over the plastic needles in the ink refill base, these valves are opened to secure flow paths for both the ink and the air.

These ink cartridges are single-use affairs. There is no provision for refilling them. The design reduces environment load by using only burnable materials yielding no toxic substances.

Inks

"Removing air"

An earlier page explained how too much air in the ink risks air bubbles degrading ink-jet performance. The manufacturing process prevents such air bubbles with a step, deaeration, that removes air from the ink before injection into the cartridge. Vacuum packaging then prevents air contamination during shipping and storage.

"Pigment-based ink"

This machine uses dye-based inks for colors and pigment-based ink for black. Using the pigment-based black ink reduces fuzziness from print character outlines, boosts resolution for black dots, and produces clearer images on plain paper.

For the pigment-based black ink and its dye-based color counterparts, this machine provides separate head caps and individual vent unit drive mechanisms. Such special design measures are necessary because any mixing of the two types triggers a chemical reaction producing residue clogging head nozzles, filters, maintenance unit piping, and other components, degrading print performance.

(Refer to [Section 3.2.2.2, \[6 \]](#) for the ink cartridge capacities and the number of printable pages per ink cartridge.)

Ink cartridge components and their main roles

- Disc valve S

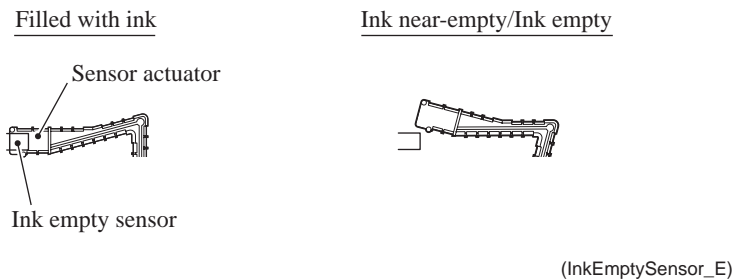
A plastic needle in the refill base opens this valve to supply air to the ink cartridge. Removing the ink cartridge closes this valve to prevent leakage due to ink backflow.

- Disc valve D

A plastic needle in the refill base opens this valve to allow ink to flow out of the ink cartridge. Removing the ink cartridge closes this valve to prevent leakage.

- Sensor actuator

This actuator indicates the amount of ink remaining. Certain positions cut the light beam to the ink empty sensor on the ink empty sensor PCB inside the ink refill assembly.



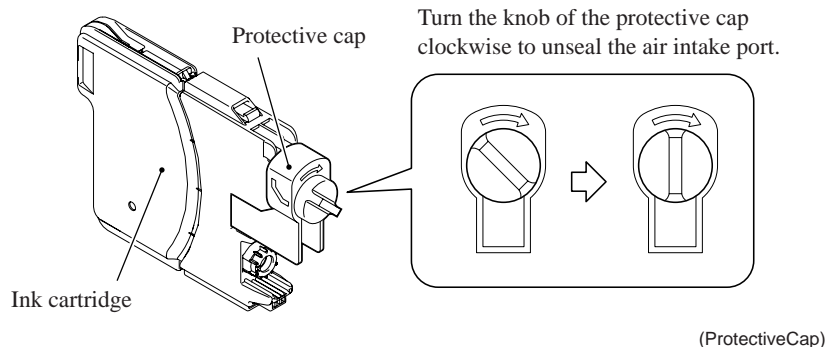
Ink backflow prevention in unsealing a new ink cartridge

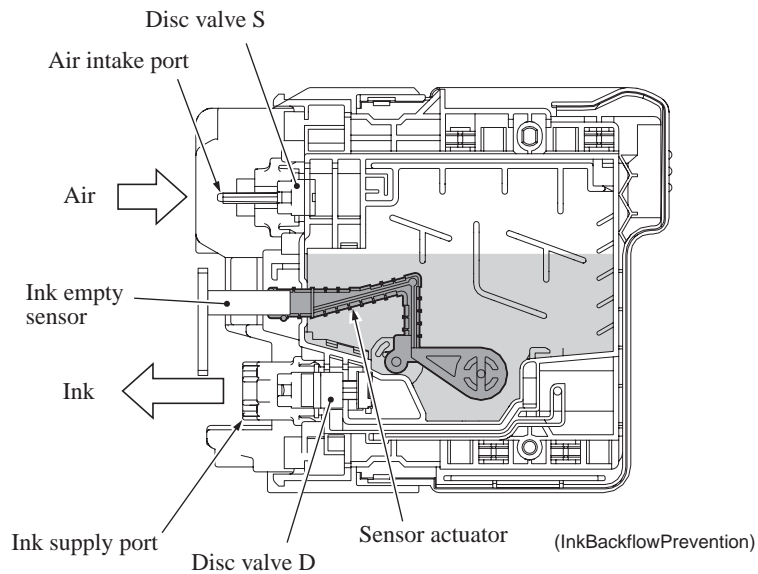
An ink cartridge is vacuum-processed and vacuum-packed in a plastic bag at the factory for preserving the quality. Even if unpacked, the cartridge is kept in vacuum. Opening the disc valve S (air intake port) causes the pressure in the cartridge to become equal to the atmospheric pressure.

Inserting a conventional cartridge swiftly may open not only the disc valve S but also the disc valve D (ink supply port) at almost the same timing, causing backflow of ink from the ink supply port. The backflow of ink could temporarily affect the performance of the ink jet mechanism, so conventional machines automatically perform a purge operation after replacement of an ink cartridge.

To prevent the backflow of ink, a new ink cartridge has a protective cap as shown below. Turning the knob of the protective cap clockwise opens the air intake port, making the pressure in the ink cartridge equal to the atmospheric pressure before insertion of the cartridge into the machine and preventing backflow of ink. This backflow prevention eliminates purge operations required.

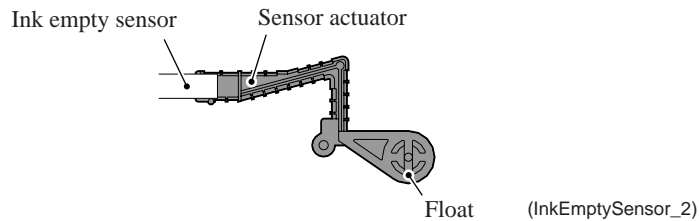
Note: This machine does not perform an automatic purge operation after replacement of an ink cartridge. If the user forcibly removes the protective cap without turning its knob, therefore, backflow of ink could occur, affecting the print quality after the replacement of an ink cartridge. If it occurs, manually perform the purge operation to maintain the proper print quality.





Ink near-empty/ink empty detection

The ink refill assembly has four ink empty sensors (photosensors of transparent type) that monitor the ink levels with sensor actuators inside the ink cartridges.

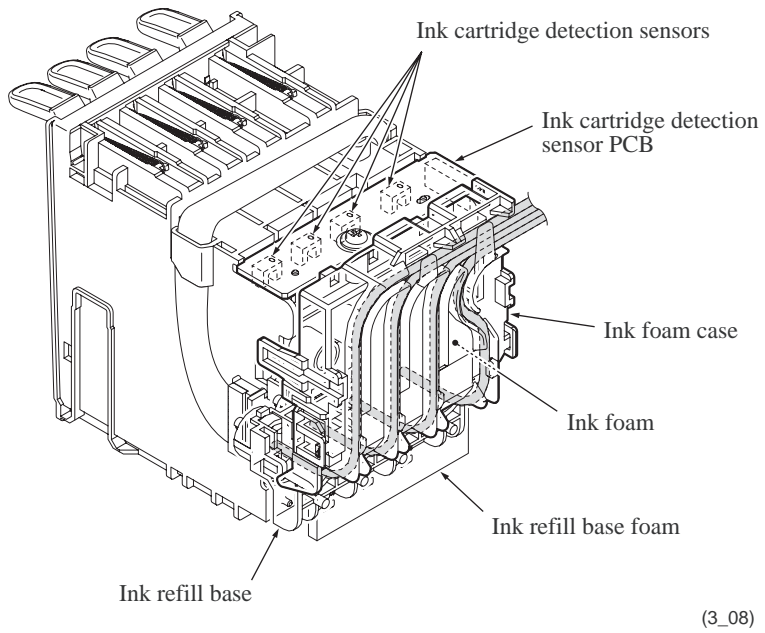
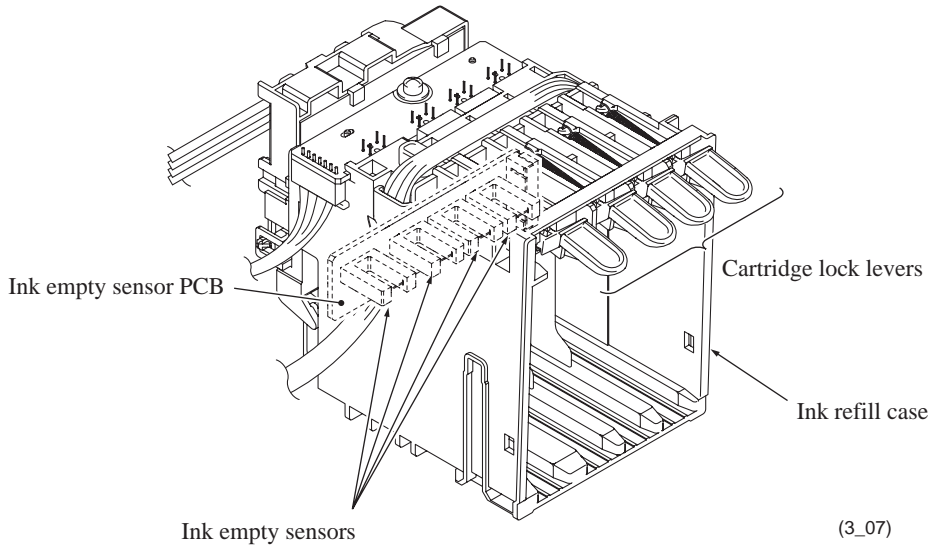


Attached to one end of the sensor actuator is a float. When there is ink in the cartridge, buoyancy lifts the float, rotating the sensor actuator about a pivot near the center of the actuator to block the light beam to the ink empty sensor, indicating that there is ink.

As the ink level in the ink cartridge drops, however, the float falls, eventually moving the sensor actuator out of the beam.

Light hitting the sensor outputs the "ink near-empty" signal to the controller that shows the "Ink low" message and activates a firmware counter tracking ink usage during ink-jet printing, purges, and other operations. When this counter reaches a predetermined limit, the firmware regards it as "ink empty" and shows the "Cannot Print" message to prompts the user to replace it.

[5] Ink refill assembly



Ink refill assembly components and their main roles

- Ink refill case
- Cartridge lock levers
- Ink refill base and its foam
- Ink cartridge detection sensors (on the ink cartridge detection sensor PCB)
- Ink empty sensors (on the ink empty sensor PCB)
- Ink foam and its case

Inserting the ink cartridges into the ink refill case and securing them with the cartridge lock levers forces the cartridges' ink supply ports into close contact with the ink refill base to prevent ink leakage.

The ink from the ink cartridges flows through the ink flow channels provided in the ink refill base into the ink supply tubes. As the ink level in an ink cartridge drops, the pressure inside falls, drawing air in the ink cartridge.

The ink cartridge detection sensors detect ink cartridges inserted when the machine is powered ON and the ink cartridge cover is opened.

The ink empty sensors detect ink remaining in the ink cartridges loaded. An ink empty sensor actuator blocking the light beam to an ink empty sensor indicates that there is ink in the ink cartridge. When ink runs low, the actuator moves out of the beam, activating the sensor ("Ink near-empty") and showing the "Ink low" message.

If any of the ink cartridges is replaced with the one having different ink volume when the machine power is OFF, the corresponding ink cartridge detection sensor and ink empty sensor issue different signals when the power is turned ON next time so that the controller prompts the user to reload the ink cartridge.

At the back of the ink refill case is an ink foam that absorbs any ink that leaks from the air intake ports of the ink cartridges loaded when the machine is tilted during transportation or in storage, preventing ink spread in the machine.

[6] Ink supply tubes

These are made of low-density polyethylene (LDPE) providing a highly impermeable barrier against air ingress and drying out of the ink during extended periods of nonuse. This material is also soft and highly flexible to better withstand the sharp and frequent bending associated with high-speed head operation repeatedly over extended periods.

3.2.2.2 Head maintenance mechanism

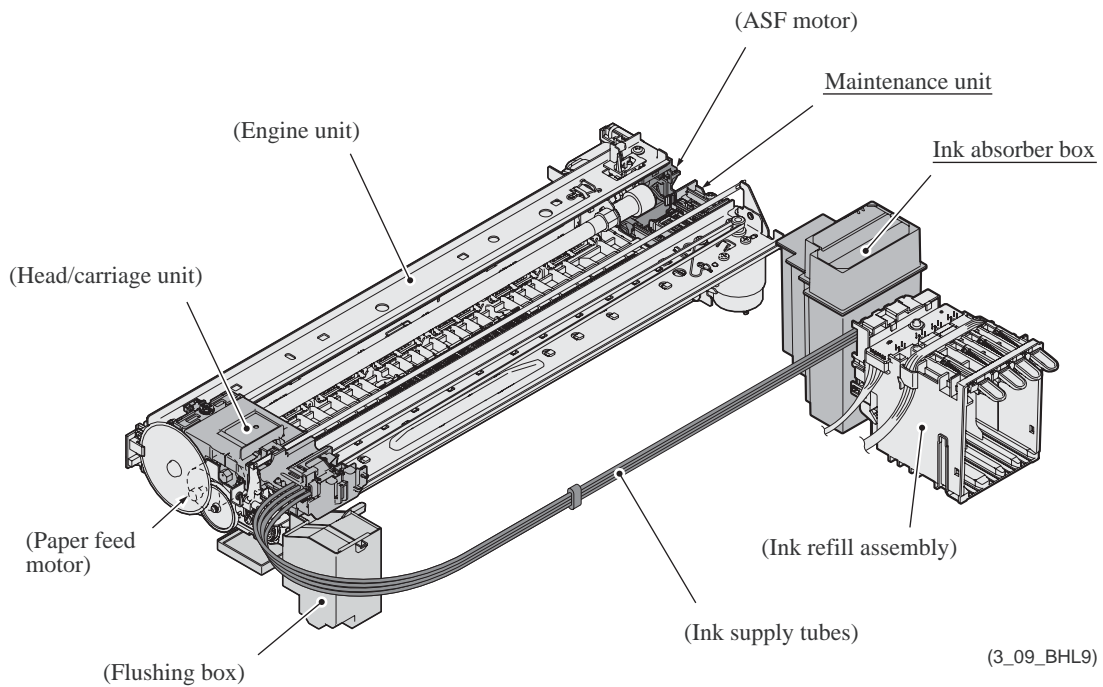
[1] Overview

The head maintenance mechanism, which keeps the optimum head performance, consists of the maintenance unit and the ink absorber box. (See the illustration below.)

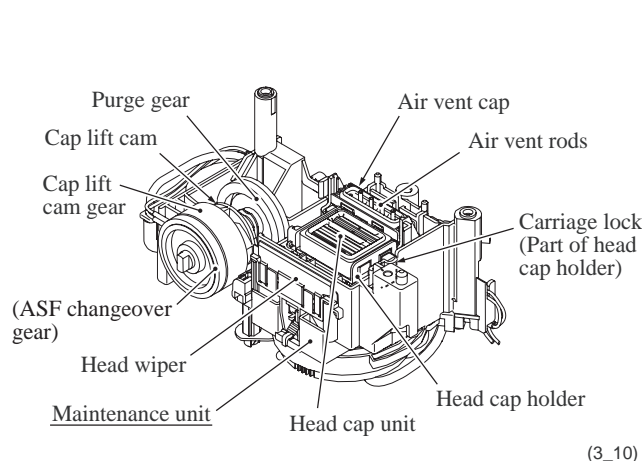
The maintenance unit has the following mechanisms.

- Head capping mechanism (See [page 3-27.](#))
- Carriage lock mechanism (See [page 3-27.](#))
- Purge mechanism (See [page 3-28.](#))
- Air removing mechanism (See [page 3-30.](#))
- Head wiper mechanism (See [page 3-31.](#))

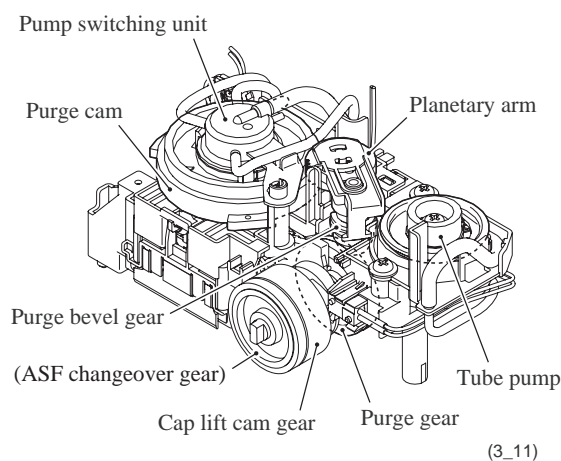
The ink absorber box absorbs the ink sucked out by purge operations.



[2] Maintenance unit components



Viewed from the top



Viewed from the bottom

- Cap lift cam and its gear

These parts transmit the rotational torque of the ASF motor transmitted via the clutch gear L to the head cap holder. (See [4] "[Power transmission route to the head maintenance mechanism and motor rotational direction.](#)")

- Head cap unit

When the power is off or the machine is not printing, the head cap unit fits tightly over the print head to prevent the head nozzles from drying up and to seal the head nozzles for purge operations to suck up old ink.

- Head cap holder

This lifts up the head cap unit to fit it tightly over the print head to seal the head nozzles. (The head cap holder is driven by the ASF motor.)

- Carriage lock

This is a part of the head cap holder. It locks the head/carriage unit in its home position so that the head cap unit protects the head nozzles.

- Purge gear and purge bevel gear

These gears transmit the rotational torque of the paper feed motor via the clutch gear R to the planetary arm. (See [4] "[Power transmission route to the head maintenance mechanism and motor rotational direction.](#)")

- Planetary arm

This switches the rotational torque of the paper feed motor (transmitted via the purge gear and purge bevel gear) to the pump switching unit or tube pump depending on the direction of paper feed motor rotation.

- Purge cam

This rotating cam drives the pump switching unit, the air vent rods, and the head wiper. Each drive position of the purge cam is detected by the purge cam switch. (See [Section 3.2.3.](#))

- Pump switching unit

This switches the application target of the negative pressure generated by the tube pump between the head cap for black ink, the one for color ink, and the air vent cap. Usually the pump switching unit is switched to the opening tube to the atmospheric air so that the pressure in the head caps and air vent cap is equal to the normal atmospheric pressure.

- Air vent cap and rods

The air vent cap and rods remove air bubbles trapped in the damper assemblies in the back end of the head/carriage unit.

During air venting with the tube pump, the air vent cap fits tightly over the air vent unit in the head/carriage unit so that the negative pressure applies to the air vent unit. Pushing up the air vent rods opens the shut-off valves inside the air vent unit, removing air bubbles trapped in the damper assemblies. (For the air vent unit, see [Section 3.2.2.1, \[3 \]](#).)

- Head wiper

As the head/carriage unit moves, this wipes off any ink remaining on the head nozzle surface.

- Tube pump

A roller squeezes the main drain tube looped inside, forcing their contents toward the ink absorber box and creating negative pressure.

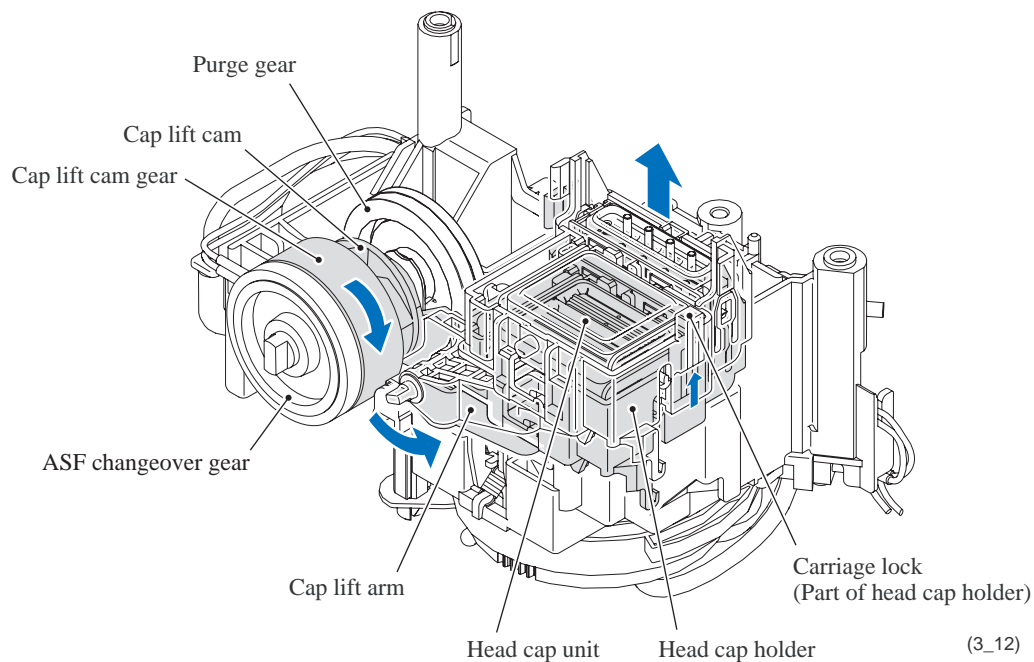
[3] Mechanisms constituting the head maintenance mechanism

(1) Head capping mechanism

The ASF motor drives the head capping mechanism. When the power is off or the machine is not printing, this mechanism fits the head cap unit (which contains two head caps) tightly over the print head to prevent the head nozzles from drying up and to keep dust off the head nozzle surface.

The head cap unit is mounted on the head cap holder and supported by the spring.

When the head/carriage unit returns to its home position, it presses the mode switching lever (shown on pages 3-33 and 3-34) to the right so that the clutch gear L engages with the cap lift cam gear (purge mode). Driving the ASF motor rotates the cap lift cam so that the cap lift arm raises the head cap holder, fitting it tightly over the head nozzle surface.



(2) Carriage lock mechanism

This mechanism locks the head/carriage unit to prevent the head nozzles from getting out of the head cap unit accidentally due to external vibration or impact when the machine is not printing, when the power is off, or during transport.

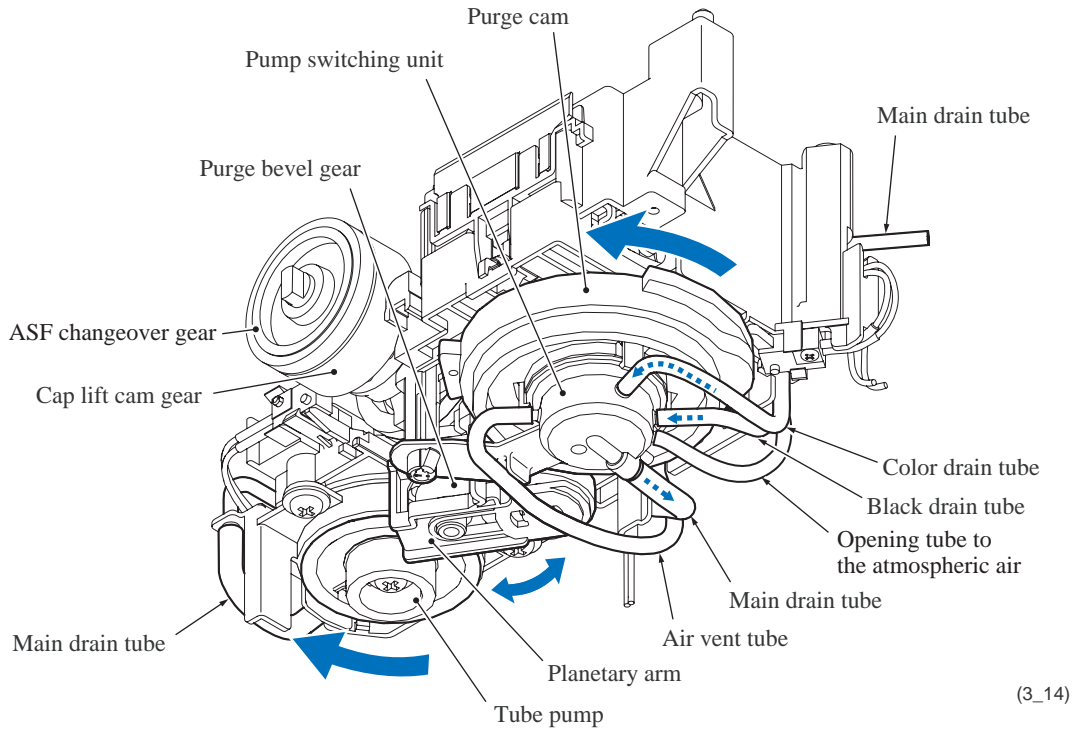
A part of the head cap holder acts as a carriage lock. When the head cap holder rises in head capping operation, the carriage lock also comes up to lock the head/carriage unit.

(3) Purge mechanism

The paper feed motor drives the purge mechanism.

The counterclockwise rotation of the paper feed motor drives the purge cam that aligns the pump switching unit with either the black or color ink drain position.

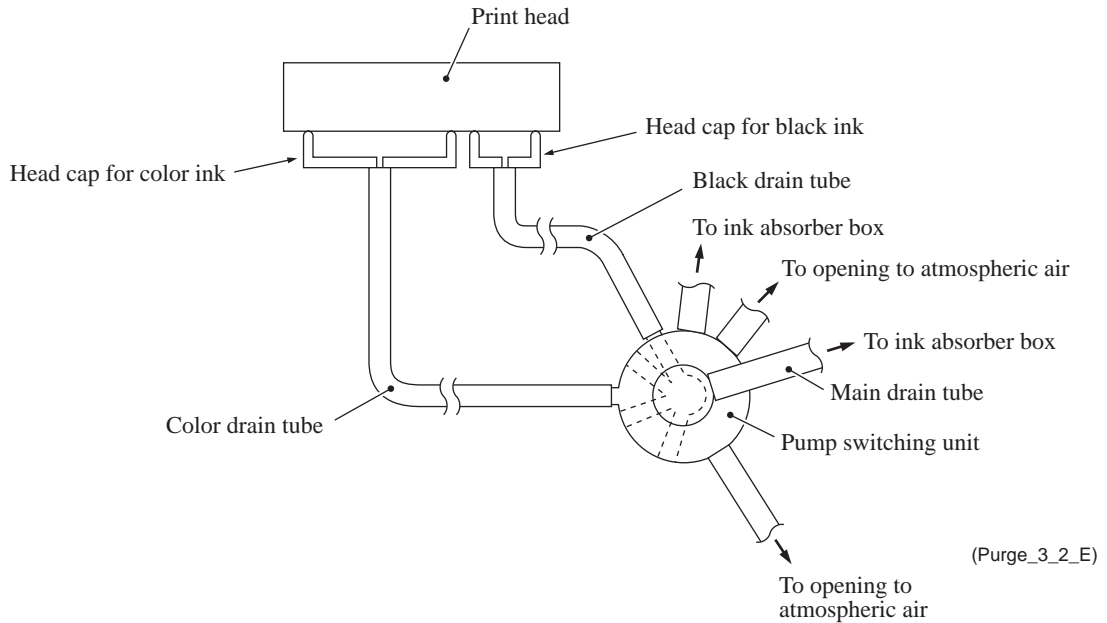
Next, the paper feed motor reverses to activate the tube pump, producing negative pressure to drain the air and old ink from the head nozzles and channels into the ink absorber box.



(3.1) Switching pump

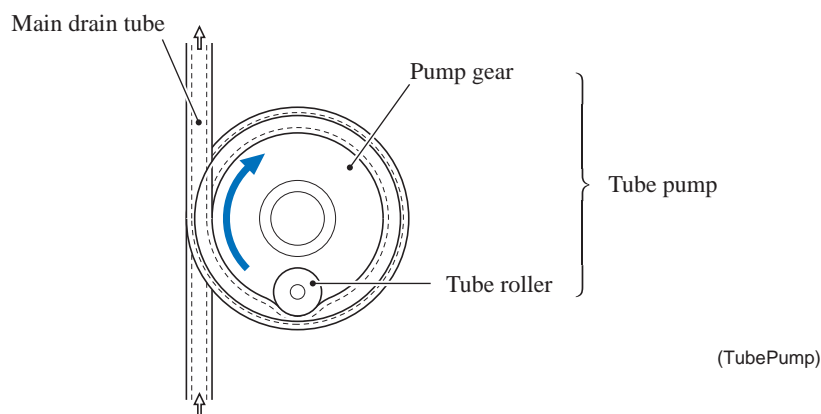
The pump switching unit switches the application target of the negative pressure generated by the pump between the head cap for black ink, the one for color ink, and the air vent cap.

When the purge cam is in a head capping position and the head cap unit fits tightly over the print head, the pump switching unit is switched to the opening tube to the atmospheric air so that the pressure in the head caps and air vent cap returns to the normal atmospheric pressure.



(3.2) Draining ink

The tube pump consists of a pump gear and tube roller. As the pump gear rotates, the tube roller on its circumference squeezes the main drain tube looped around the pump gear, forcing its content toward the ink absorber box and creating negative pressure.

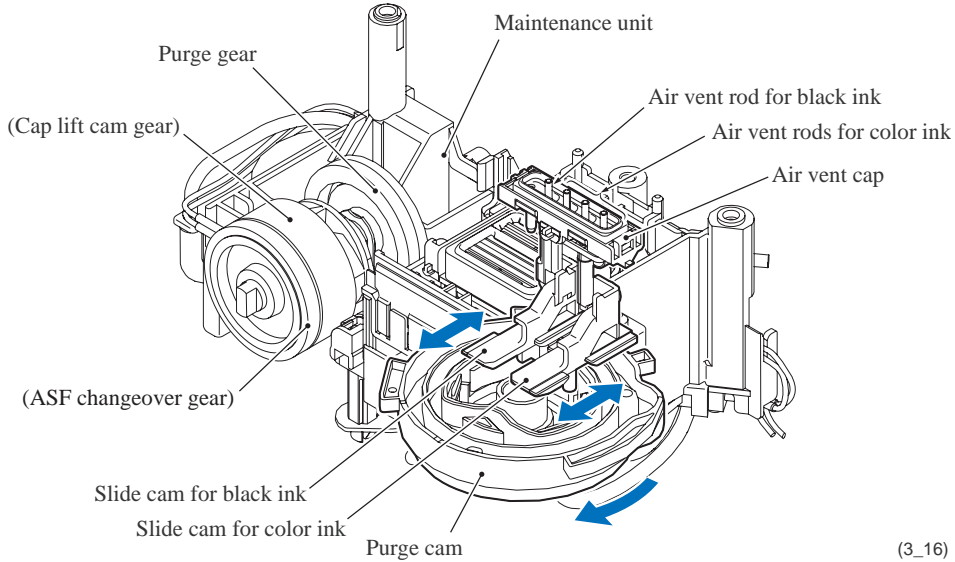


For details about the power transmission route to the head maintenance mechanism, see [4] below.

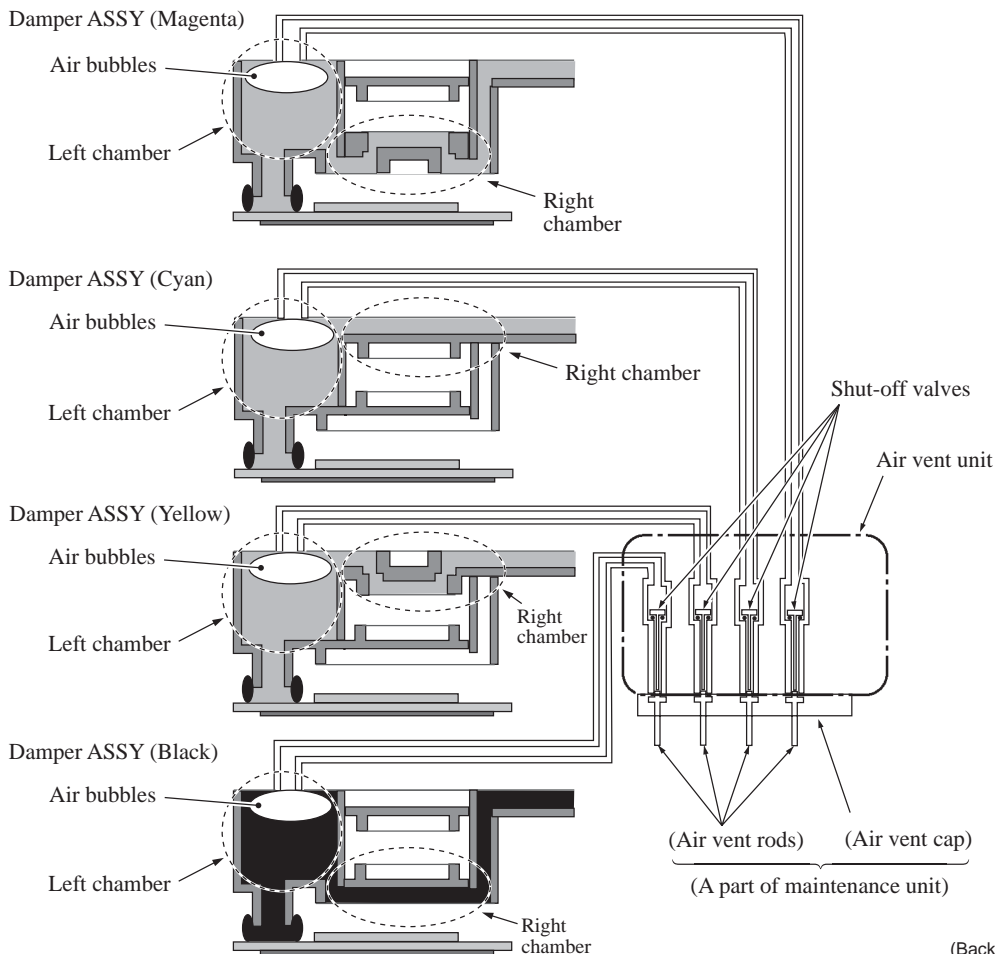
(4) Air removing mechanism

Other two positions of the purge cam shift two slide cams--one for black ink, the other for color inks, producing vertical motion of a single air vent rod for black ink and three air vent rods for color ink, respectively.

Pushing up the air vent rods opens the shut-off valves inside the air vent unit of the head/ carriage unit. Simultaneously adding negative pressure from the tube pump removes air trapped in the damper assemblies.



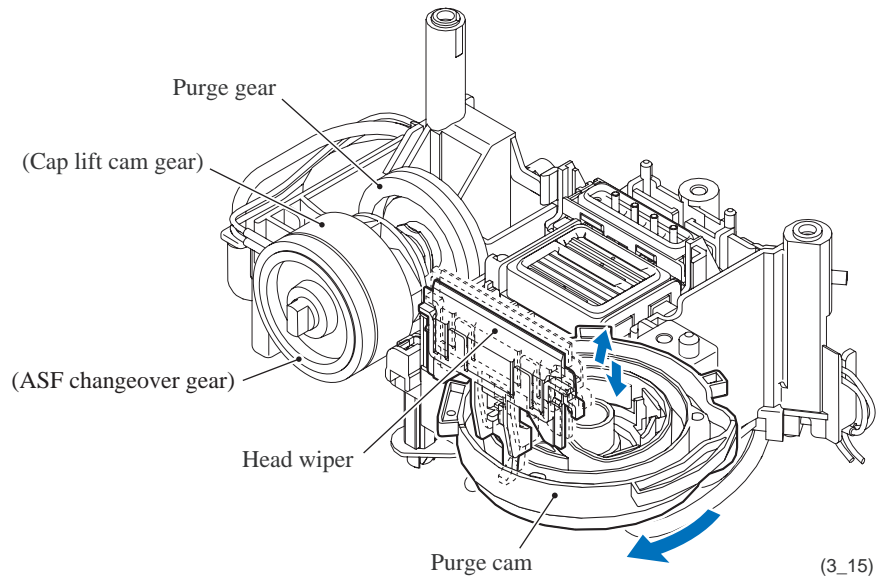
(3_16)



(BackEnd_E)

(5) Head wiper mechanism

After the purge operation, the purge cam pushes up the head wiper, wiping off any ink remaining on the head nozzle surface as the head/carriage unit moves from right to left.



[4] Power transmission route to the head maintenance mechanism and motor rotational direction

This mechanism draws its power from two motors--the ASF motor (DC motor) in the right rear corner of the engine chassis and the paper feed motor (DC motor) on the left side. The ASF motor is mounted in the ASF motor holder combined with the maintenance unit.

The power transmission route and operation mode switching are detailed in [Section 3.2.2.4](#).

ASF motor → Maintenance unit (head capping and carriage lock mechanisms)

As shown on the next page, the rotational torque of the ASF motor is always transmitted via the ASF/maintenance drive gear and idle gear 16 to the clutch gear L.

When the mode switching lever is in the left position (ASF mode), the clutch gear L also meshes with the ASF changeover gear.

When the head/carriage unit moves to the right end of its travel, a tab on the carriage rear panel pushes the mode switching lever to the right (purge mode). The clutch gear spring pushes the clutch gear L to the right, away from the ASF changeover gear, to mesh with the cap lift cam gear. This way, the ASF motor drives the head capping and carriage lock mechanisms. (See [page 3-34](#) for the related components.)

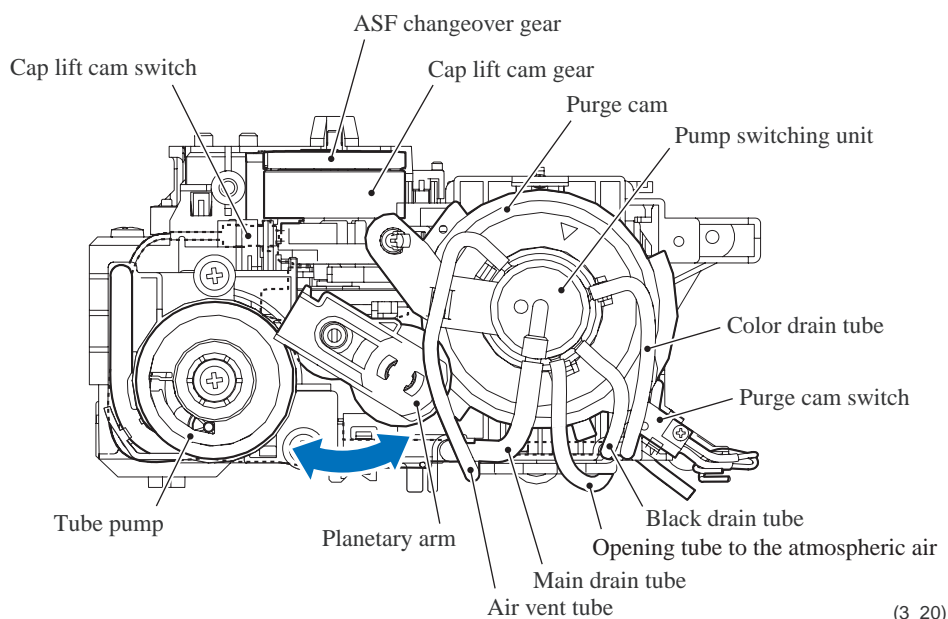
Paper feed motor → Maintenance unit (purge, air removing and head wiper mechanisms)

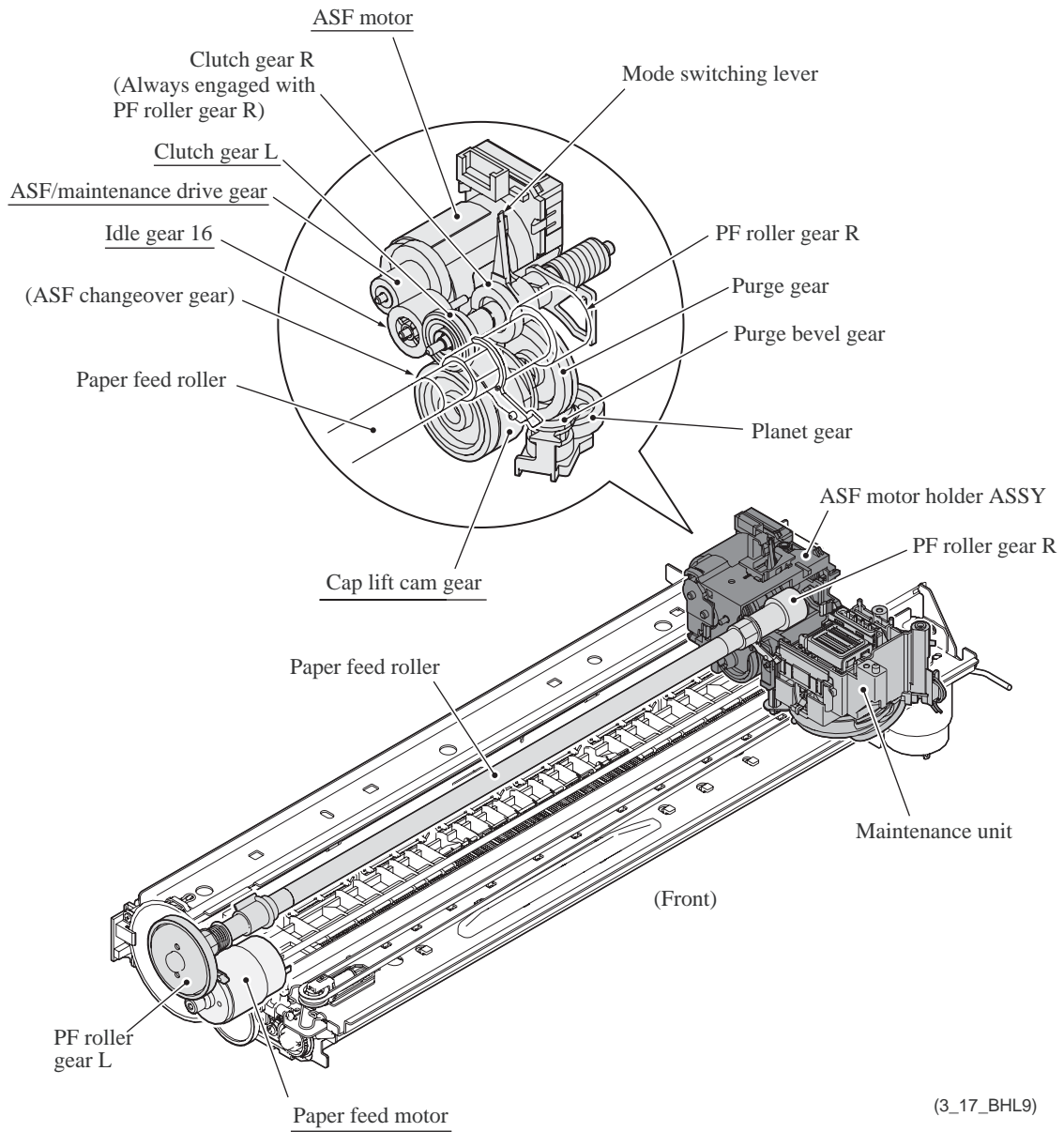
As shown on the next page, the paper feed motor drives the PF roller gear L that rotates the paper feed roller. At the right end of the roller is the PF roller gear R that always meshes with the clutch gear R.

When the mode switching lever is in the left position (ASF mode), the clutch gear R does not mesh with the purge gear but it is just idling.

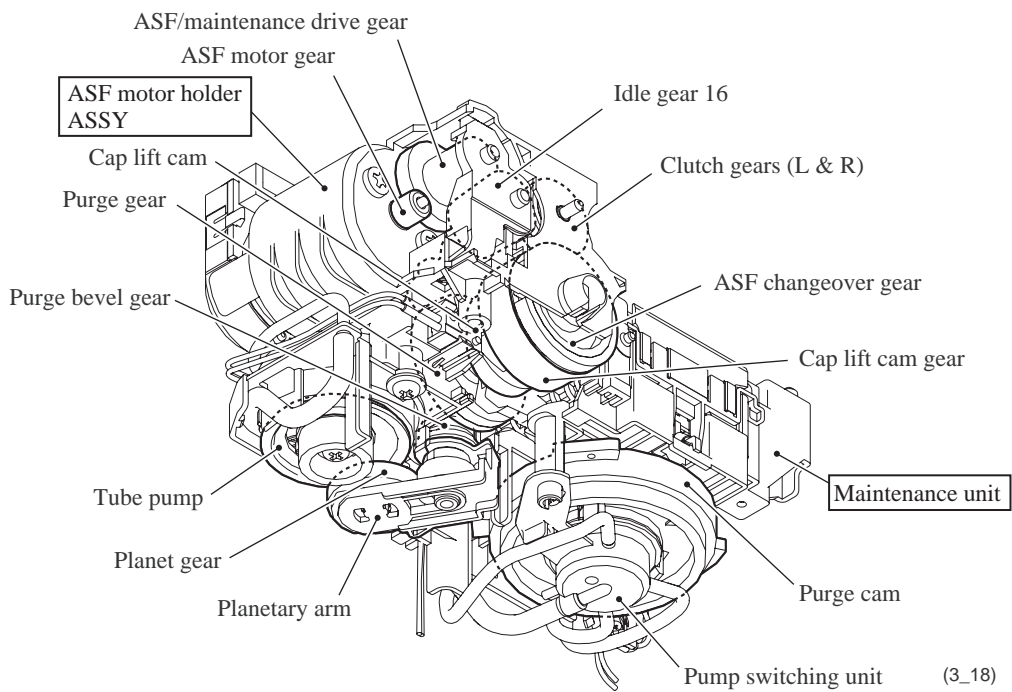
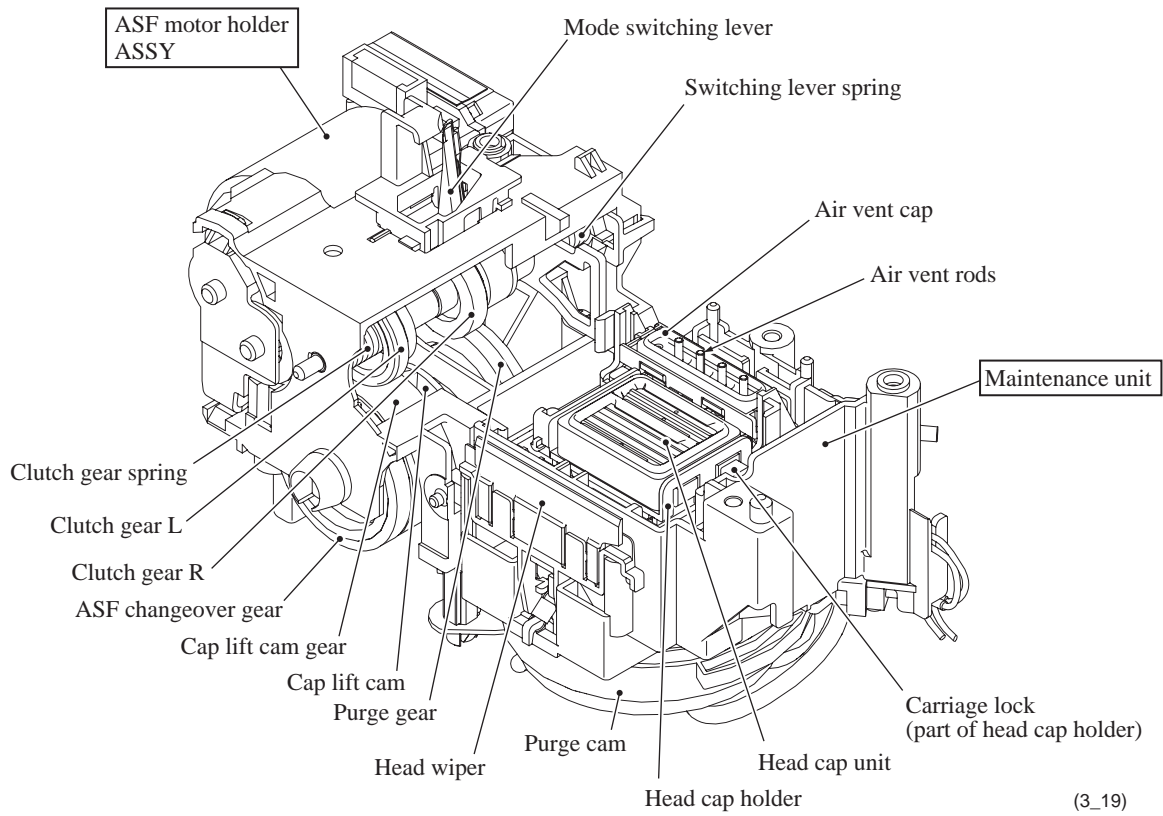
When the head/carriage unit moves to the right end of its travel, a tab on the carriage rear panel pushes the mode switching lever to the right (purge mode). The clutch gear spring pushes the clutch gear R to the right to mesh with the purge gear.

As the paper feed motor rotates counterclockwise, the planetary arm meshes with the purge cam (as shown below), driving the purge mechanism (pump switching unit), air removing mechanism and head wiper mechanism. On the contrary, the clockwise motor rotation causes the planetary arm to mesh with the tube pump gear, driving the purge mechanism (tube pump). (See [page 3-34](#) for the related components.)





(3_17_BHL9)



[5] Purge types, ink usage, purge counts, and purge codes

Purge Types	Description	Ink Usage	Purge Counts	Purge Codes (In the maintenance mode, Function code 76)
Head replacement purge (See Note below.)	This is a specially prepared purge for eradicating mixed color inks.	Black: 2.697 ml Per color: 2.620 ml	Black: 122 3 colors: 366	0
Normal purge	This purge operation removes dried ink sticking to the head nozzles.	Black: 0.150 ml Per color: 0.130 ml	Black: 7 3 colors: 19	1
Periodical reset purge	This purge operation removes air bubbles that have accumulated in the ink supply tubes.	Black: 0.471 ml Per color: 0.320 ml	Black: 22 3 colors: 45	2
Power purge	More powerful than a periodical reset purge, this purge operation is for removing stubborn clogging from the head nozzles and ink supply tubes.	Black: 0.531 ml Per color: 0.380 ml	Black: 25 3 colors: 54	3
Initial purge (See Note below.)	When the user loads ink cartridges for the first time, this purge operation automatically runs to refill the ink supply tubes and print head with fresh ink.	Black: 2.907 ml Per color: 2.290 ml	Black: 133 3 colors: 316	4
User reset purge	This purge operation should be performed if the print quality problem persists after a user has performed the purge operation repeatedly by pressing the Ink (Ink Management) key.	Black: 0.471 ml Per color: 0.320 ml	Black: 22 3 colors: 45	5
Engine setup purge	This purge operation refills the ink supply tubes with ink when there is no ink in those tubes.	Black: 2.907 ml Per color: 2.290 ml	Black: 133 3 colors: 316	6

The above information is as of May 14, 2008.

(Note) If the head/carriage unit is replaced with a spare part having a round, blue seal on its left side (shown in [Appendix 1, "\(2\) Head property labels"](#)), perform the head replacement purge. If it is replaced with the one having no seal, perform the initial purge.

This machine counts all purge operations and flushing operations performed since produced in order to prevent the ink absorber box and flushing box from overflowing with drained and flushed ink, respectively. An initial purge, for example, advances the counter by $133 + 316 = 449$.

When the purge or flushing counter approaches 7360 or 568181818, respectively, the "MACHINE ERROR 46" appears, and further purge or flushing operations are prohibited. Replace the ink absorber box and flushing box, and then reset their counters. (Refer to [Chapter 9, Section 9.4.24 "Purge Operation \(Function code 76\) \(User-accessible\)"](#), for the reset procedure.)

[6] Ink cartridge capacities and the number of printable pages per ink cartridge

Ink cartridge capacities

Ink Cartridge Type		Contents	Usable Portion*1
Starter and bundled cartridges	Black ink cartridge	Standard type	11.7 ml
	Color ink cartridges		6.65 ml
Spare ink cartridges	Black ink cartridge		12.4 ml
	Color ink cartridges		5.5 ml

*1 These are the values measured with an actual machine, not the guaranteed ones.

Number of printable pages per ink cartridge

Print conditions: 600 x 600 dpi ("Normal" print quality), continuous printing, ISO/IEC24711 (See [Chapter 2, Section 2.2 "SPECIFICATIONS LIST."](#))

Ink Cartridge Type		Number of Printable pages per Ink Cartridge*2	
Starter and bundled cartridges	Black ink cartridge	Standard type	
	Color ink cartridges		
Spare ink cartridges	Black ink cartridge		Approx. 300 pages
	Color ink cartridges		Approx. 240 pages

*2 When no initial purge or head replacement purge is performed.

- The contents and usable portion of ink cartridges are subject to change without notice.
- The ink consumption differs depending on individual machines and ambient environmental conditions. The numbers of printable pages per ink cartridge listed above are typical values under ordinary conditions.

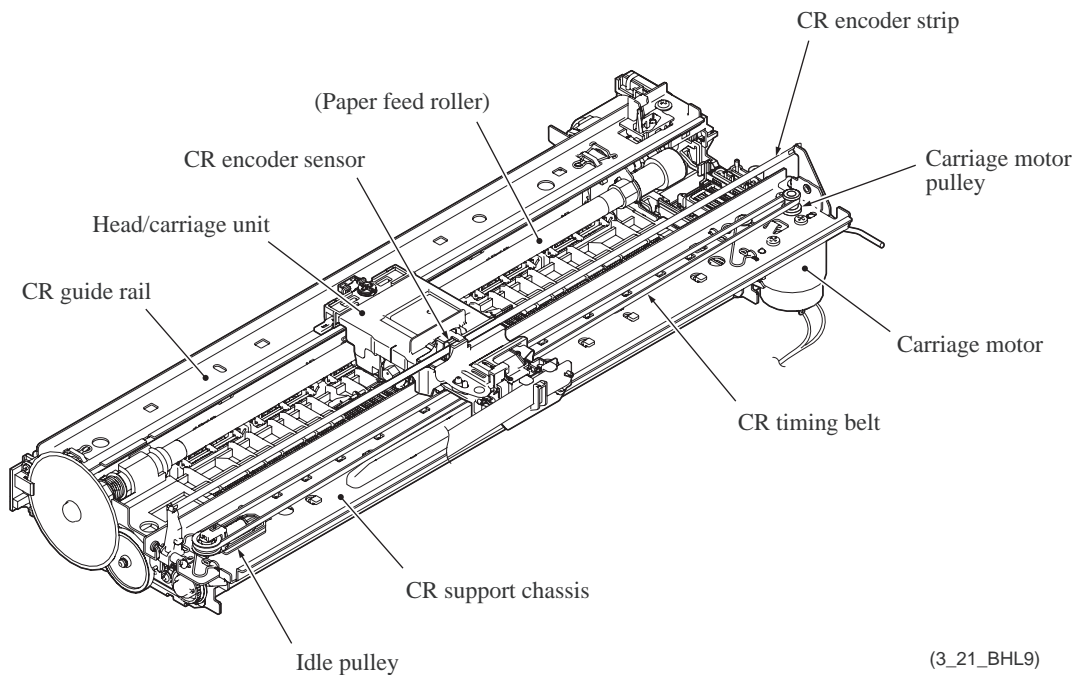
Note: Values given in the above tables are as of June 2008.

3.2.2.3 Carriage drive mechanism

The head/carriage unit, which integrates the print head unit and carriage, is supported and guided by the CR guide rail and CR support chassis. The CR timing belt transmits the carriage motor rotation to the head/carriage unit. Clockwise motor rotations move the head/carriage unit to the right; counterclockwise ones to the left.

The CR encoder sensor on the top of the head/carriage unit scans the CR encoder strip above the CR support chassis to monitor the current head position relative to the home position. The controller uses this signal for robust control ensuring uniform speed.

The CR encoder strip is a clear film striped in a 1/150 inch cycle. It offers a choice of three travel speeds of the head/carriage unit, 57.7, 43.3 and 21.7 ips, to match the print resolution.



Adjusting the print head angle relative to carriage

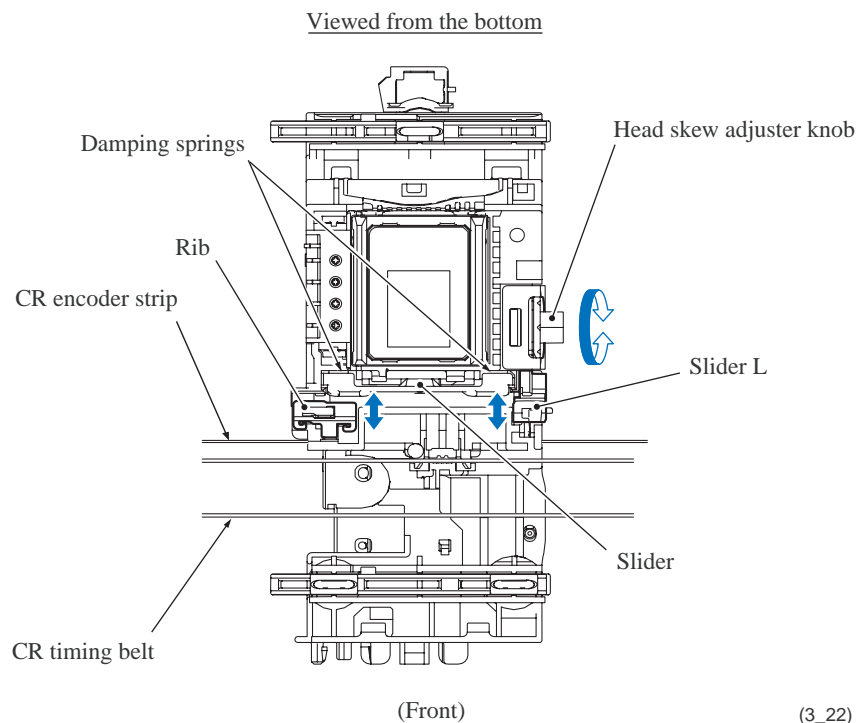
For optimal image printing, the print head nozzle array must be perpendicular to the head/carriage unit's line of travel. Manufacturing limitations, however, make perfect alignment impossible during mass production. The angle must be adjusted at the individual machine level.

The following describes this adjustment mechanism's components and their roles.

Slider L, the slider, and the rib attach the head/carriage unit to the CR support chassis. The rib acts as a pivot for the slider's damping springs pressing the head/carriage unit to the rear. Slider L has a head skew adjuster knob that shifts the slider back and forth, adjusting the angle of this backward pressure. Rotating the head skew adjuster knob tilts the entire head/carriage unit, thus adjusting the head nozzle vertical angle relative to the carriage unit's line of travel.

This knob offers 11 settings, from -5 to +5.

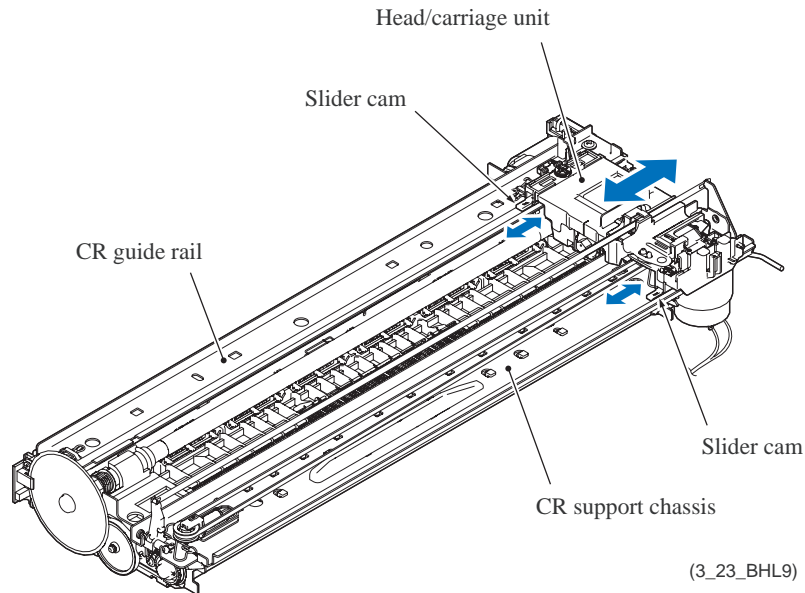
For the adjustment procedure, refer to [Chapter 7, Section 7.2, \[4 \]](#).



Height adjustment of the head/carriage unit

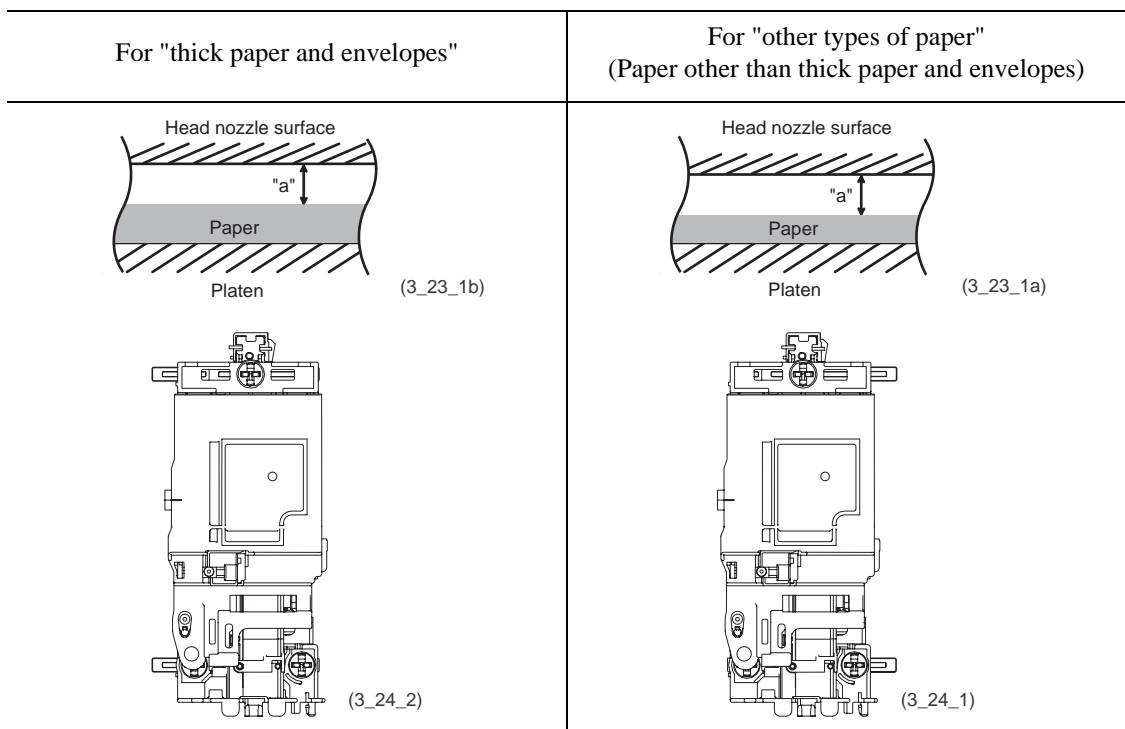
For optimal image printing, a pair of slider cams mounted on the head/carriage unit switches the height of the head/carriage unit against the CR guide rail and support chassis between two levels--2.3 mm (for thick paper and envelopes) and 1.6 mm (for other types of paper) in order to bring the optimum distance between the head nozzle surface and paper.

The slider cams can be switched by hitting against the stoppers at the right and left ends of the CR guide rail and CR support chassis.



For "thick paper and envelopes" and "other types of paper":

The machine adjusts the distance from the platen to the head/carriage unit to 2.3 mm for "thick paper and envelopes" and 1.6 mm for "other types of paper" in order to keep the distance ("a") constant.



As listed below, the printer driver on the connected PC or the paper type setting on the machine controls the slider cams to determine the height of the head/carriage unit.

Controlled by:	Adjustment for:	
	Thick paper and envelopes	Other types of paper
Printer driver (in printing from the PC)	Yes	Yes
Paper type setting (in copying and printing via PhotoCapture Center)	No	Yes

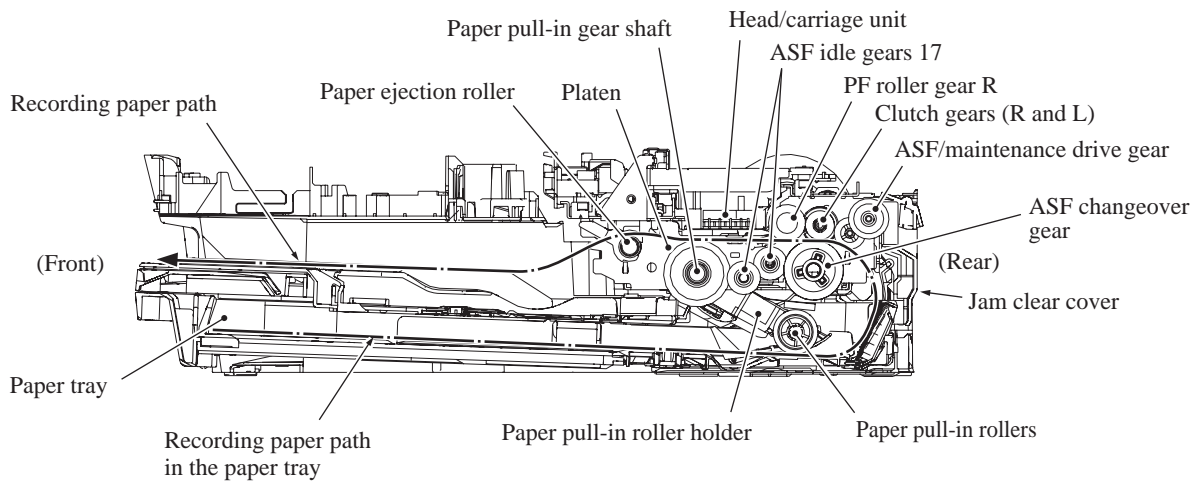
3.2.2.4 Paper pulling-in, registration, feeding and ejecting mechanisms

These mechanisms are driven via a gear train by two motors--paper feed motor located on the left side of the engine chassis and ASF motor in the right rear corner. (See the illustration on the next page.)

The following illustration is a cross-sectional view of the machine viewed from the right. Place the recording paper *face down* in the paper tray. This paper first proceeds to the rear, bends upward, heads back toward the front, passes under the head/carriage unit for printing, and finally comes out onto the top of the paper tray cover.

The machine supports two paper feed modes--"normal SF mode" and "high-speed feed mode." Depending upon the selected print quality, either of these two modes applies as listed below.

Print Quality	Fast, Normal	Other quality
Paper Feed Mode	High-speed feed mode	Normal SF mode



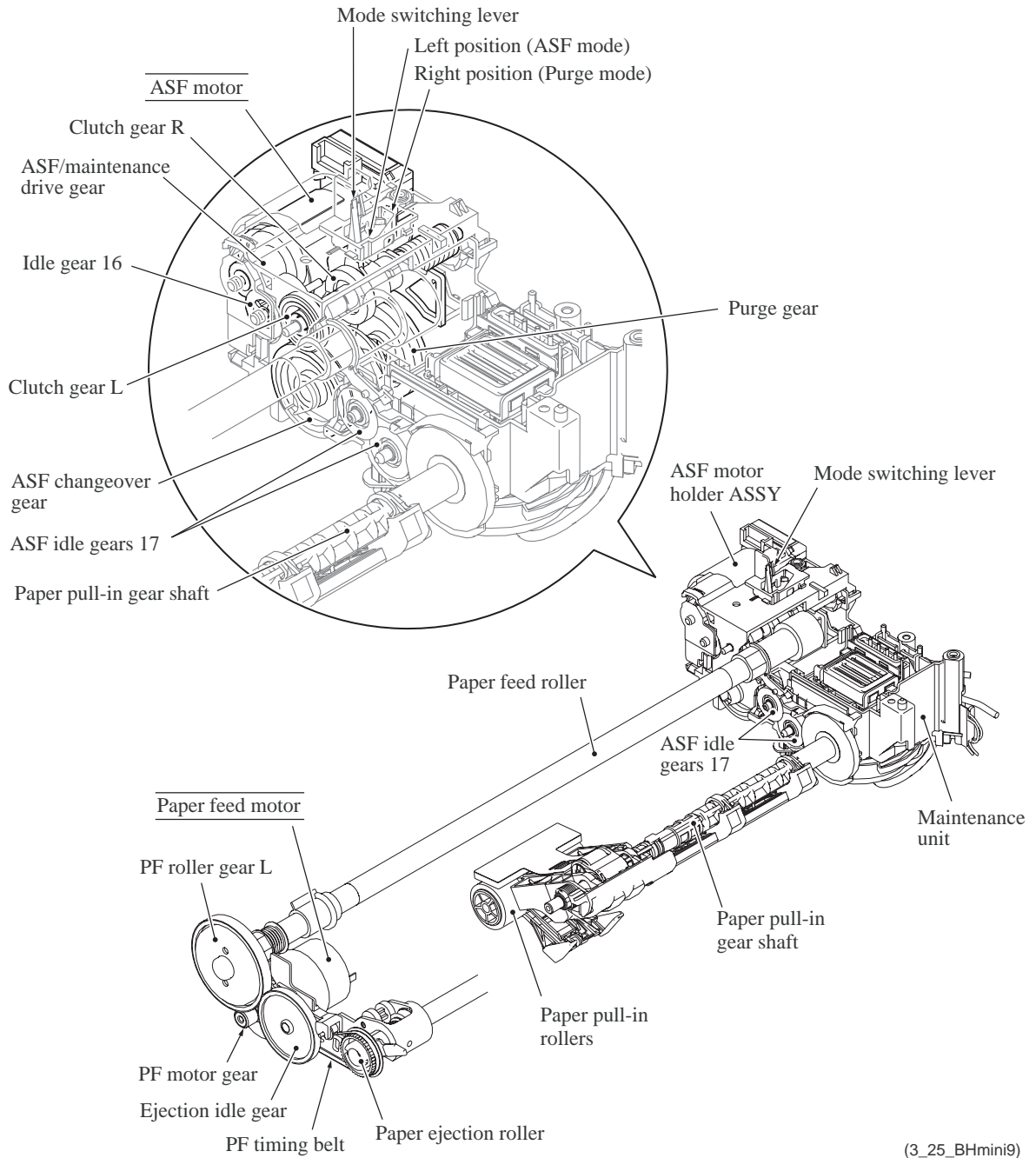
(3_02_1_BHmini9)

Power transmission routes of the ASF motor and paper feed motor

The rotational torque of the ASF motor is transmitted to the ASF/maintenance drive gear which always meshes with the clutch gear L, as described in [Section 3.2.2.2, \[4 \]](#).

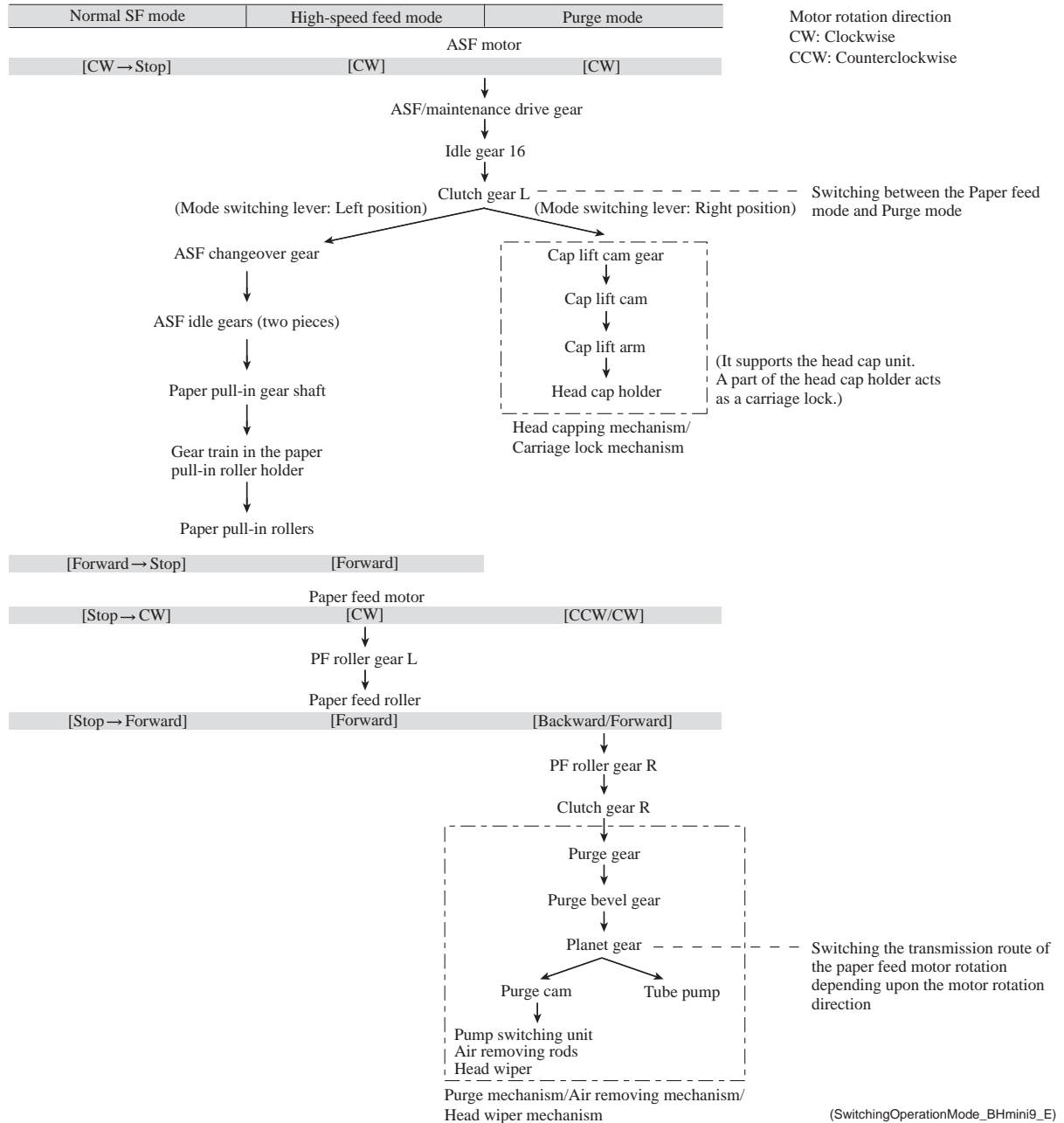
When the mode switching lever is in the left position (normal SF or high-speed feed mode), the clutch gear L also meshes with the ASF changeover gear which transmits the ASF motor rotation via a gear train to the paper pull-in rollers.

The rotational torque of the paper feed motor is transmitted via the PF roller gear L to the paper feed roller that advances paper to the printing start position.



Switching operation modes--Normal SF, high-speed feed, and purge modes

The table below shows the relationship between the position of the mode switching lever, the rotational directions of the ASF motor and paper pull-in rollers, the cap lift cam, the rotational directions of the paper feed motor and paper feed roller, and the maintenance unit components driven.



Mode switching lever	Operation mode	ASF motor (Viewed from the output gear side)	Paper pull-in rollers	Cap lift cam	Paper feed motor (viewed from the output gear side)	Paper feed roller	Component driven in maintenance unit
Left position	Normal SF mode	CW → Stop	Forward → Stop	---	Stop → CW	Stop → Forward	---
	High-speed feed mode	CW	Forward	---	CW	Forward	---
Right position	Purge mode	CW	---	Rotate	---	---	Head cap holder
		---	---	---	CCW	Backward	Purge cam
					CW	Forward	Tube pump

Normal SF mode

1st stage The ASF motor rotates *clockwise* (when viewed from the output gear side) and its rotational torque is transmitted to the ASF/maintenance drive gear that is always connected via the idle gear 16 to the clutch gear L. When the mode switching lever is placed in the left position, the clutch gear L also meshes with the ASF changeover gear.

The rotational torque is further transmitted from the ASF changeover gear via the two ASF idle gears 17, paper pull-in gear shaft and the gear train in the paper pull-in roller holder. Consequently, the paper pull-in rollers turn in the *forward* direction to pull in a sheet of paper loaded in the paper tray.

2nd stage After the pulled-in paper pushes the registration sensor actuator to turn the sensor on, the ASF motor further rotates *clockwise* for the predetermined period to align (register) the leading edge of the paper with the paper feed roller. (Registration)

3rd stage The ASF motor stops and the paper feed motor starts rotating *clockwise* to rotate the PF roller gear L that rotates the paper feed roller in the *forward* direction to advance the paper to the printing start position.

The rotational torque of the PF roller gear L is also transmitted via the ejection idle gear and PF timing belt to the paper ejection roller that rotates in the *forward* direction to eject the paper printed.

High-speed feed mode

1st stage Just as in the normal SF mode, the *clockwise* rotation of the ASF motor pulls in a sheet of paper loaded in the paper tray.

The difference from the normal SF mode is that the paper feed motor also rotates *clockwise* at the same time as the ASF motor. The paper feed roller rotates in the *forward* direction.

2nd stage When the paper fed by the paper pull-in rollers reaches the paper feed roller, the roller is already rotating in the *forward* direction; therefore, the paper continues to advance to the printing start position.

Registration sensor activation has no effect on the paper feeding operation in the high-speed feed mode.

Even during printing of the first sheet of paper, the ASF motor keeps rotating *clockwise* to rotate the paper pull-in rollers in the *forward* direction. Immediately after the first sheet leaves the paper tray, the paper pull-in rollers continuously pull in paper sheet by sheet. After the last sheet of paper advances to the printing start position, the ASF motor stops.

The paper feed roller always rotates faster than the paper pull-in rollers; therefore, the trailing edge of the preceding sheet will not overlap with the leading edge of the subsequent one

Just as in the normal SF mode, the rotational torque of the PF roller gear L is also transmitted via the ejection idle gear and PF timing belt to the paper ejection roller that rotates in the *forward* direction to eject the paper printed.

Movable platen

The movable platen has movable ribs that move in synchronization with the leading or trailing edge of advancing paper. It realizes the following.

- Increased printing speed in borderless printing
- Eliminating paper deflection that could occur in printing on the trailing edge of paper

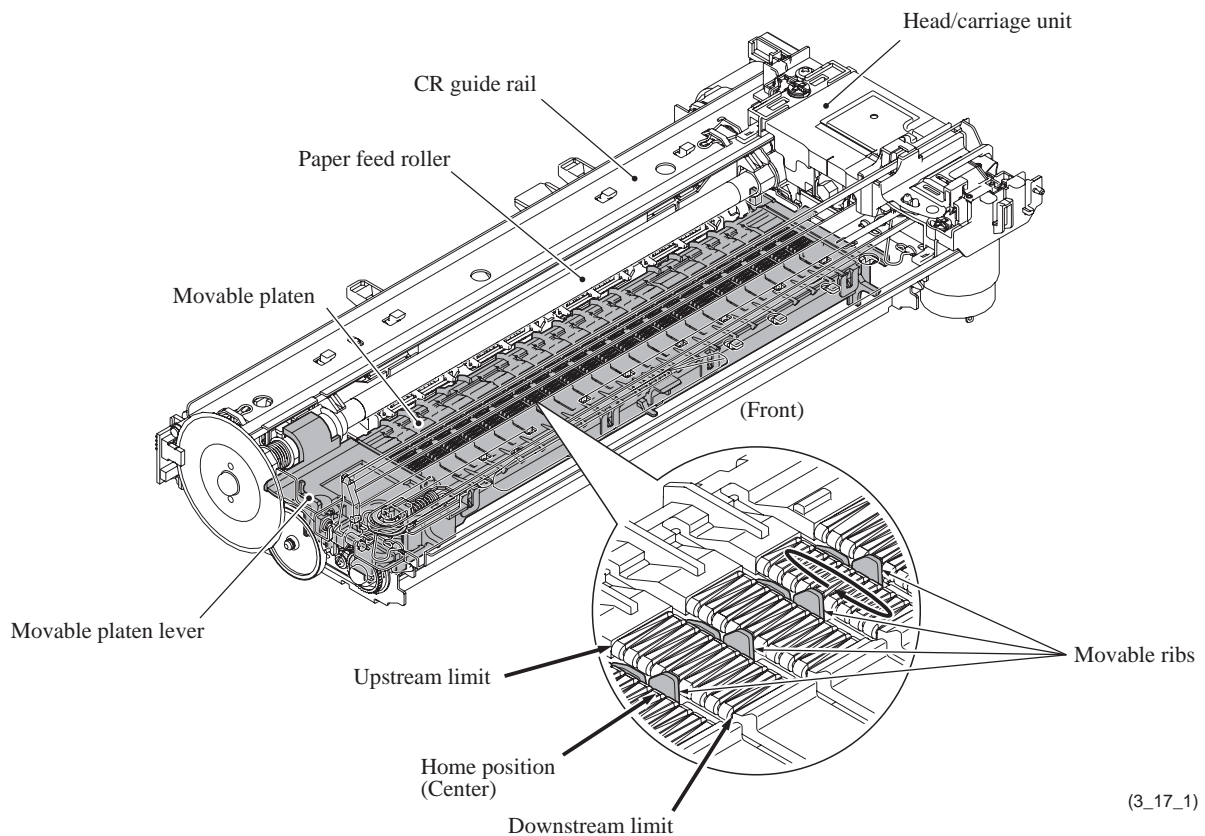
Synchronization with leading edge of paper

When the leading edge of the paper reaches the movable rib drive position, the head/carriage unit moves to the left end of its travel and pushes the upper end of the movable platen lever, releasing its lower end that blocks the rotation of the movable platen cam gear. This triggers driving the movable platen mechanism.

The mechanism transmits the paper feed motor rotation to the movable ribs. They move from the home position (center) to the upstream limit of the movable range to wait for the leading edge of the paper to come. They move in synchronization with the leading edge of the paper advancing. When they reach the downstream limit, they return to the home position. This is a sequence of the movable rib operation.

Synchronization with trailing edge of paper

When the registration sensor detects the trailing edge of the paper, the motor further feeds the paper for the predetermined amount. After that, the head/carriage unit pushes the upper end of movable platen lever again. Just as for the leading edge of paper, the movable ribs move to the upstream limit of the movable range to wait for the trailing edge of the paper advancing to come and then move in synchronization with the trailing edge. When the movable ribs have reached the downstream limit and the printing operation has completed, they return to the home position.



Other controls

Paper feed position and speed control

A PF encoder disk with the resolution of 300 dpi (0.084 mm pitch) is mounted on the PF roller gear L. The PF encoder sensor uses it to generate a signal indicating the gear rotation speed--in other words, the paper feed roller speed--to the controller for use in controlling paper feed position and speed.

Paper stop position control

The controller uses the PF encoder signal for proportional, integration, differential (PID) control of the paper feed motor to produce high-resolution precision paper positioning during printing. This signal also determines the motor parameters for rapidly and precisely positioning the paper.

Fixed-speed paper feed

This operation rotates the paper feed roller to feed the paper at a constant speed regardless of load fluctuations. The primary application is ejecting paper when printing is complete--in other words, in situations where precision stop position control is not needed.

Paper feeding amount control

There is variation in the head nozzle pitch of individual head/carriage units, as well as in the shape of the paper feed and ejection rollers. To make those parts match each other, therefore, updating the paper feeding correction value (Function code 58) is necessary (see [Chapter 9, Section 9.4.15](#)).

3.2.3 Sensors and Actuators

This machine uses the following sensors and thermistors.

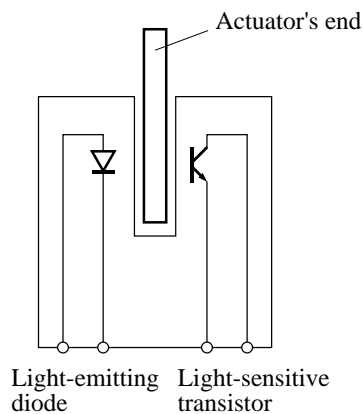
Sensor Name	Sensor Type	Location
Document front sensor	Photosensor	On the document front sensor PCB in the ADF unit
Document rear sensor	Photosensor	On the document rear sensor PCB in the ADF unit
Scanner cover sensor	Carbon switch	On the control panel PCB
Ink cartridge cover sensor	Carbon switch	
Registration sensor	Photosensor	On the registration sensor PCB
Paper width sensor (media sensor)	Photosensor	On the carriage PCB
Head thermistor	Thermistor	
CR encoder sensor	Photosensor	
PF encoder sensor	Photosensor	On the PF encoder PCB
ASF encoder sensor	Photosensor	In the ASF motor unit
Purge cam switch	Mechanical switch	On the maintenance unit
Cap lift cam switch	Mechanical switch	
Casing internal temperature thermistor	Thermistor	On the ink empty sensor PCB inside the ink refill assembly
Ink empty sensors (four)	Photosensor	
Ink cartridge detection sensors (four)	Photosensor	On the ink cartridge detection sensor PCB on the ink refill assembly

- The document front sensor detects whether there is a document in the ADF.
- The document rear sensor detects the leading and trailing edges of document pages, indicating to the control circuitry the point at which to start reading and when page scanning is complete.
- The scanner cover sensor detects whether the scanner cover (scanner unit) is properly closed.
- The ink cartridge cover sensor detects whether the ink cartridge cover is properly closed.
- The registration sensor detects the leading and trailing edges of paper for use in determining print start and end timings and detecting paper jams.
- The paper width (media) sensor checks whether recording paper is A4 or greater in width at the start of recording of FAX data received. With this sensor signal, the controller prevents the print head from printing on the outside of paper in borderless printing. It also protects the platen from no-paper printing when a paper jam occurs, preventing stains on the platen and the back side of paper.
- The head thermistor detects the temperature inside the head/carriage unit. According to the sensor information, the controller adjusts the head driver to compensate for changes in ink viscosity.

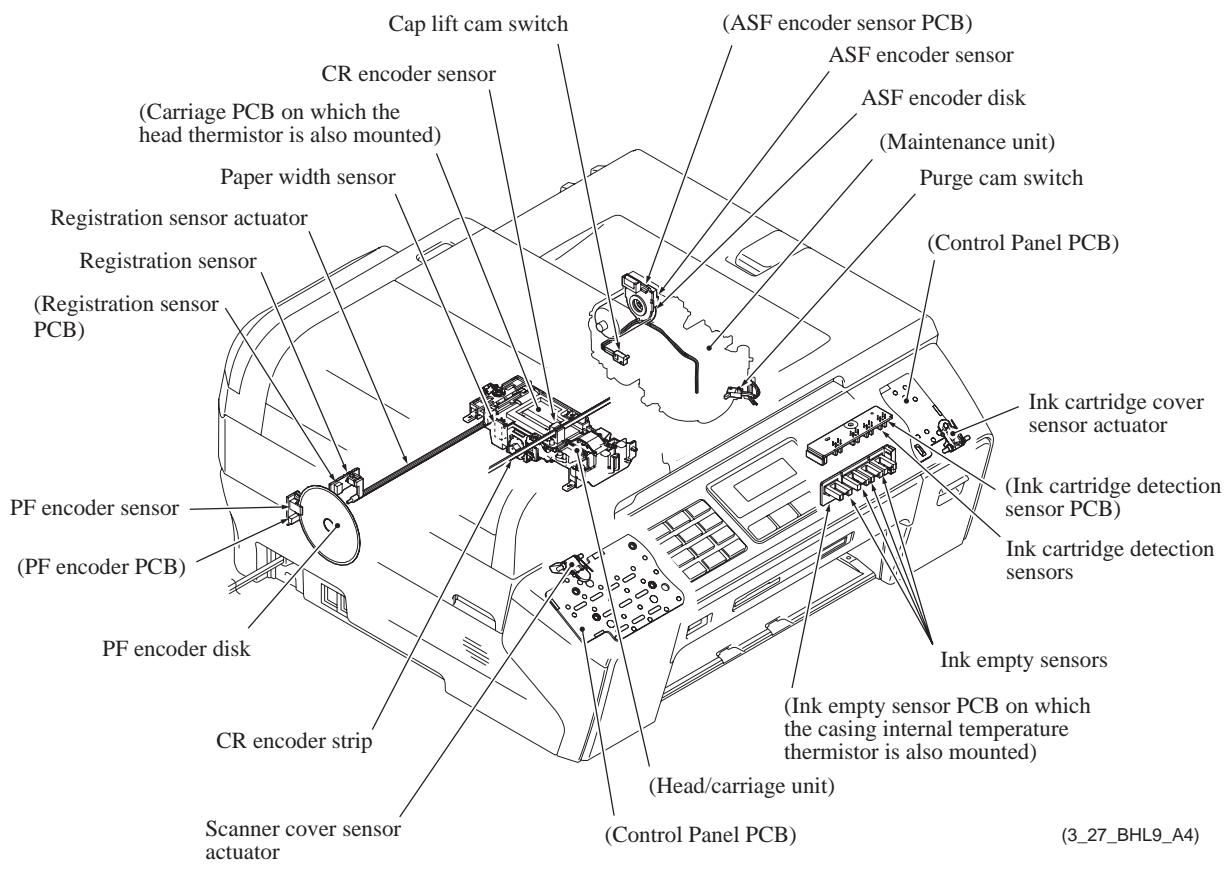
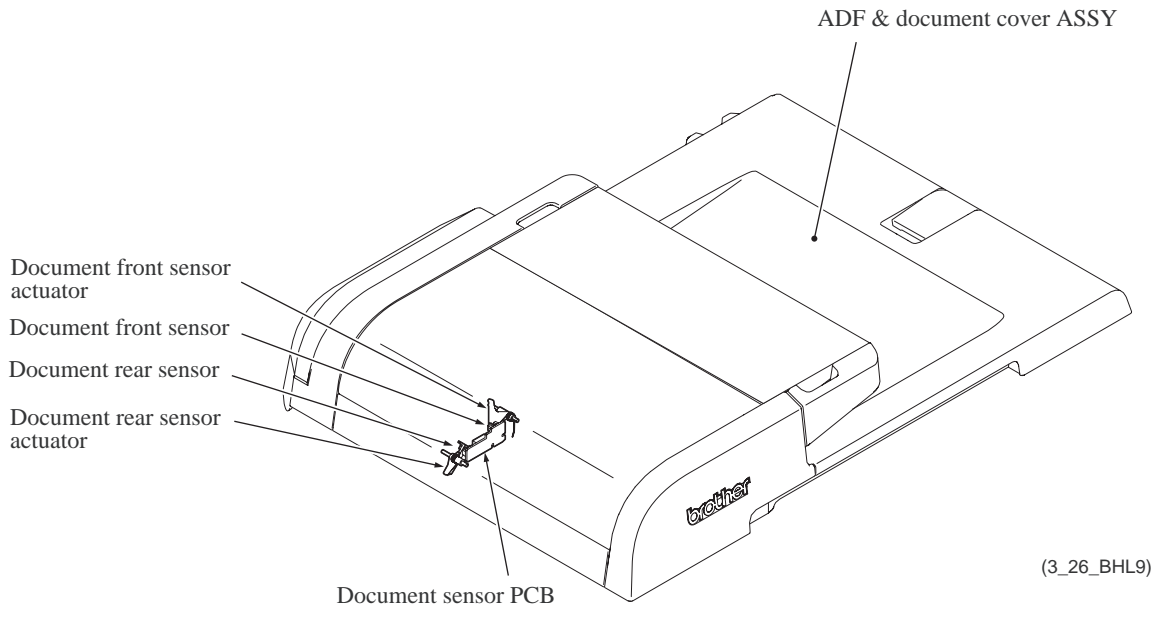
- The carriage motor (CR) encoder sensor monitors the current position and speed of the head/ carriage unit. If the controller detects a head's travel speed error, it interprets the error state as a paper jam or any foreign material getting into the carriage travel path and stops the operation.
- The paper feed motor (PF) encoder sensor monitors the PF roller rotation angle and speed for use in optimizing paper feed amount and speed.
- The Auto Sheet Feeder motor (ASF) encoder sensor monitors the rotation angle and speed of the ASF motor shaft for use in optimizing paper pull-in amount and speed.
- The purge cam switch detects the drive positions of the purge cam.
- The cap lift cam switch detects the drive positions of the cap lift cam.
- The casing internal temperature thermistor monitors the temperature inside the machine. With this thermistor signal, the controller determines the periodical automatic purge interval since the casing internal temperature is almost equal to the ambient temperature of ink inside the ink cartridges.
- There are four ink empty sensors, one for each color. The sensor actuator inside the ink cartridge usually blocks the light path to indicate the presence of ink. When ink runs low (near-empty state), the arm moves out of the beam, activating the sensor. The "Ink low" message appears.
- There are four ink cartridge detection sensors, one for each color. The sensor detects whether an ink cartridge is loaded.

The ON timing of the ink cartridge detection sensor and ink empty sensor enables the controller to discriminate between a standard and large-volume ink cartridges.

Most sensors are photointerrupters consisting of a light-emitting diode and a light-sensitive transistor as shown below. The only exception is the paper width sensor, which uses reflective type. The illustration on the next page gives the sensor and actuator locations.



The scanner cover sensor and the ink cartridge cover sensor use a carbon switch that consists of a carbon on the rubber keypad and a carbon contact printed on the control panel PCB. Opening the scanner cover or the ink cartridge cover releases the corresponding sensor actuator so that the actuator is pressed against the rubber keypad by the spring force. Accordingly, the carbon on the rubber keypad comes into contact with the carbon contact on the control panel PCB. The conduction results in a voltage level change of the IC port, signaling the cover open.

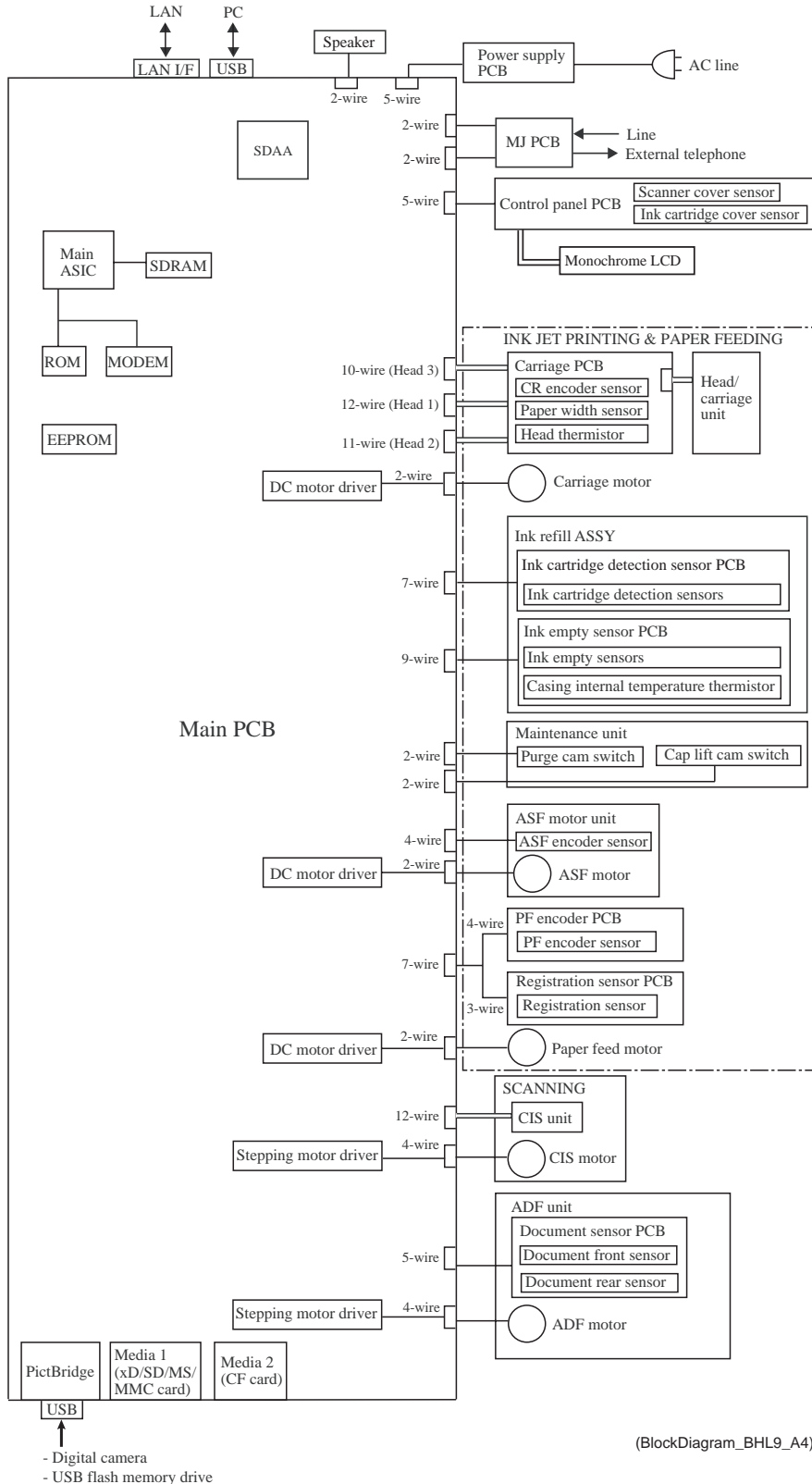


Sensors and Actuators Locations

3.3 CONTROL ELECTRONICS

3.3.1 Components

The following illustration shows the hardware components. The corresponding wiring diagrams appear in [Appendix 5](#).



CHAPTER 4 ERROR INDICATION AND TROUBLESHOOTING

CHAPTER 4 ERROR INDICATION AND TROUBLESHOOTING

This chapter details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.

The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

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4.1 ERROR INDICATION

To help the user or the service personnel promptly locate the cause of a problem (if any), the machine incorporates the self-diagnostic functions which display error messages for equipment errors.

4.1.1 Equipment Errors

If an equipment error occurs, the machine emits an audible alarm (five short beeps twice) and shows the error message on the LCD. For the error messages, see [1] below.

To display detailed error information, use Function code 82 described in [Chapter 9, Section 9.4.26](#) (that is, make the machine enter the maintenance mode and then press the **8** and **2** keys). Following the MACHINE ERROR, one of the error codes listed in [2] will appear on the LCD.

[1] Error messages appearing on the LCD

Error Message	Cause	Action
B&W Print Only	<p>One or more of the color ink cartridges are empty.</p> <p>While this message appears on the LCD, each operation works in the following way:</p> <p>Printing If you click Grayscale in the Advanced tab of the printer driver you can use the machine as a black & white printer for approximately four weeks depending on the number of pages you print.</p> <p>Copying If the paper type is set to Plain Paper or Inkjet Paper you can make copies in black & white.</p> <p>Faxing If the paper type is set to Plain Paper, Inkjet Paper or Transparency, the machine will receive and print faxes in black & white.</p> <p>If a sending machine has a color fax, the machine's 'handshake' will ask that the fax be sent as black & white.</p> <p>If the paper type is set to Other Glossy or Brother BP71, the machine will stop all print operations. If you unplug the machine, or take out the empty ink cartridge, you cannot use the machine until you change to a new ink cartridge.</p>	Replace the empty ink cartridge.

Error Message	Cause	Action
Cannot Detect	You installed a new ink too quickly and the machine did not detect it.	Take out the new ink cartridge and re-install it slowly until it clicks.
	If you are not using genuine Brother Innobella™ ink the machine may not detect the ink cartridge.	Use a new Genuine Brother Innobella™ ink cartridge. If the error message is not cleared, call Brother Customer Service.
	An ink cartridge is not installed properly.	Take out the new ink cartridge and re-install it slowly until it clicks.
Cannot Print Replace XX Ink	One or more of the ink cartridges are empty. The machine will stop all print operations. While memory is available, black & white faxes will be stored in the memory. If a sending machine has a color fax, the machine's 'handshake' will ask that the fax be sent as black & white. If the sending machine has the ability to convert it, the color fax will be stored in the memory as a black & white fax.	Replace the empty ink cartridges.
Clean Unable XX	The machine has a mechanical problem. —OR— A foreign object such as a clip or ripped paper is in the machine.	Open the scanner cover and look inside the machine for foreign objects and paper scraps. If the error message continues, transfer your faxes or Fax Journal report before disconnecting the machine so you will not lose any important messages. Then, disconnect the machine from the power for several minutes, then reconnect it.
Close Ink Cover	The ink cartridge cover is not completely closed.	Firmly close the ink cartridge cover until it clicks.
Comm.Error	Poor telephone line quality caused a communication error.	Send the fax again or connect the machine to another telephone line. If the problem continues, call the telephone company and ask them to check your telephone line.
Cover is Open	The scanner cover is not closed completely.	Lift the scanner cover and then close it again.
Data Remaining	Print data is left in the machine's memory.	Press Stop/Exit . The machine will cancel the job and clear it from the memory. Try to print again.
Disconnected	The other person or other person's fax machine stopped the call.	Try to send or receive again.
Document Jam	The document was not inserted or fed properly, or the document scanned from the ADF was too long.	Take out any paper from the ADF that is not jammed. If document is jammed in the top of the ADF unit, open the ADF cover. If document is jammed inside the ADF unit, lift the document cover. Then, pull the jammed document out to the right.
DR Mode in Use	The machine is set to Distinctive Ring mode. You cannot change the Receive Mode from Manual to another mode.	Set Distinctive Ring to off.

Error Message	Cause	Action
High Temperature	The print head is too warm.	Allow the machine to cool down.
Hub is Unusable.	A Hub or USB Flash memory drive with Hub has been connected to the USB direct interface.	A Hub or USB Flash memory drive with Hub are not supported. Unplug the device from the USB direct interface.
Init Unable XX	The machine has a mechanical problem. —OR— A foreign object such as a clip or ripped paper is in the machine.	Open the scanner cover and look inside the machine for foreign objects and paper scraps. If the error message continues, transfer your faxes or Fax Journal report before disconnecting the machine so you will not lose any important messages. Then, disconnect the machine from the power for several minutes, then reconnect it.
Ink Low Black Ink Low Yellow Ink Low Cyan Ink Low Magenta	One or more ink cartridges are running out of ink. If a sending machine has a color fax, your machine's 'handshake' will ask that the fax is sent as black & white. If the sending machine has the ability to convert it, the color fax will be printed at your machine as a black & white fax.	Order a new ink cartridge. You can continue printing until the LCD shows Cannot Print.
Low Temperature	The print head is too cold.	Allow the machine to warm up.
Media Error	The memory card is either corrupted, improperly formatted, or there is a problem with the memory card.	Put the card firmly into the slot again to make sure it is in the correct position. If the error remains, check the media drive (slot) of the machine by putting in another memory card that you know is working.
Media is Full.	The memory card or USB flash memory drive you are using already contains 999 files.	Your machine can only save to your memory card or USB flash memory drive if it contains less than 999 files. Try deleting unused files to free some space and try again.
No Caller ID	There is no incoming call history. You did not receive calls or you have not subscribed to the Caller ID service from your telephone company.	If you want to use the Caller ID feature call your telephone company.
No Cartridge	An ink cartridge is not installed properly.	Take out the new ink cartridge and re-install it slowly until it clicks.
No File	The memory card or USB Flash memory drive in the media drive does not contain a .JPG file.	Put the correct memory card or USB Flash memory drive into the slot again.

Error Message	Cause	Action
No Paper Fed	The machine is out of paper or paper is not properly loaded in the paper tray.	Do one of the following: Refill the paper in the paper tray, and then press Black Start or Color Start . Remove the paper and load it again and then press Black Start or Color Start .
	The Jam Clear Cover is not closed properly.	Check that the Jam Clear Cover is closed evenly at both ends.
	The paper is jammed in the machine.	Remove the jammed paper.
No Response/Busy	The number you dialed does not answer or is busy.	Verify the number and try again.
Not Registered	You tried to access a Speed Dial number that is not programmed.	Set up the Speed Dial number.
Out of Memory	The machine's memory is full.	Fax sending or copy operation in progress Press Stop/Exit and wait until the other operations in progress finish and then try again.
	The memory card or USB Flash memory drive you are using does not have enough free space to scan the documents.	Delete unused files from your memory card or USB Flash memory drive to make some free space and then try again.
Paper Jam	Paper is jammed in the machine.	Remove the jammed paper.
		Make sure the paper length guide is set to the paper size.
Print Unable XX	The machine has a mechanical problem. —OR— A foreign object such as a clip or ripped paper is in the machine.	Open the scanner cover and look inside the machine for foreign objects and paper scraps. If the error message continues, transfer your faxes or Fax Journal report before disconnecting the machine so you will not lose any important messages. Then, disconnect the machine from the power for several minutes, then reconnect it.
Scan Unable XX	The machine has a mechanical problem. —OR— A foreign object such as a clip or ripped paper is in the machine.	Open the scanner cover and look inside the machine for foreign objects and paper scraps. If the error message continues, transfer your faxes or Fax Journal report before disconnecting the machine so you will not lose any important messages. Then, disconnect the machine from the power for several minutes, then reconnect it.

Error Message	Cause	Action
Unusable Device Disconnect device from front connector. Turn the machine off & on by pressing On/Off button on control panel.	A broken device has been connected to the USB direct interface.	Unplug the device from the USB direct interface, then press On/Off to turn the machine off and then on again.
Unusable Device Please Disconnect USB Device.	A USB device or USB Flash memory drive that is not supported has been connected to the USB direct interface. (For more information, visit us at http://solutions.brother.com .)	Unplug the device from the USB direct interface.
Wrong Paper Size	Paper is not the correct size.	Check that the machine's Paper Size setting matches the size of paper in the tray.

[2] Error codes contained in "MACHINE ERROR X X" messages

Using Function code 82 (described in [Chapter 9, Section 9.4.26](#)) displays the most recent error in the format of "MACHINE ERROR XX." The XX represents one of the error codes listed in this section.

Note: When checking a PCB as instructed in the "Solution" column, also check its harness.

Note: To check sensors, use Function code 32 described in [Chapter 9, Section 9.4.9](#) (that is, press the **3** and **2** keys in the maintenance mode).

Error Code (Hex)	Symptom	Probable Cause	Solution
20 21 22 23	Cannot identify the ink cartridge loaded because the signal values detected by the corresponding ink empty sensor and ink cartridge detection sensor are different from the specified values.	Ink cartridge not loaded correctly	Reload the corresponding ink cartridge.
		- Ink cartridge loaded after the ink cartridge cover has been left open for 10 minutes or more	
		- Ink cartridge replaced when the power is OFF	
		- Ink cartridge loaded very quickly	
		- Ink cartridge halfway taken in and out	
		Ink cartridge partially broken	
		The ink cartridge loaded is not the specified one	Load the specified ink cartridge.
		Ink empty sensor defective	Replace the ink refill ASSY.
		Ink empty sensor PCB defective	
		Main PCB defective	Replace the main PCB.
24, 25	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
26 27 28 29	Running out of ink.	Running out of ink 26: Black ink 27: Yellow ink 28: Cyan ink 29: Magenta ink	Replace or reload the ink cartridge.
		Ink empty sensor PCB defective	Replace the ink refill ASSY.
		Main PCB defective	Replace the main PCB.
2A 2B 2C 2D	Cannot detect ink cartridges.	Ink cartridge not loaded 2A: Black ink 2B: Yellow ink 2C: Cyan ink 2D: Magenta ink	Replace or reload the ink cartridge.
		Ink cartridge broken	Replace the ink cartridge.
		Ink cartridge detection sensor defective	Replace the ink refill ASSY.
		Ink cartridge detection sensor PCB defective	
		Main PCB defective	Replace the main PCB.
2E	Not used.		
2F	Ink cartridge cover opened.	Ink cartridge cover sensor (carbon switch) defective	Replace the control panel PCB.
		Ink cartridge cover's tab broken	Replace the ink cartridge cover.
		Ink cartridge cover sensor actuator unhooked	Set the ink cartridge cover sensor actuator into place.
		Rubber keypad defective	Replace the rubber keypad.
		Control panel PCB defective	Replace the control panel PCB.
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
3* (except 3E)	Head/carriage unit travel error.	Software malfunction	Open and close the scanner cover. Unplug and plug the AC cord.
		Any obstacles on the travel path of the head/carriage unit	Clean and lubricate the CR guide rail and CR support chassis.
		CR timing belt come off	Set the CR timing belt into place.
		CR encoder strip stained or scratched	Replace the CR encoder strip.
		Carriage PCB defective	Replace the carriage PCB ASSY.
		Head/carriage unit broken	Replace the head/carriage unit.
		Carriage motor defective	Replace the carriage motor.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
		Maintenance unit defective	Replace the maintenance unit.
3E	Recording error related to ASF motor, paper feed motor, and carriage motor.	ASF encoder disk, PF encoder disk, or CR encoder strip stained or scratched	Replace the ASF motor ASSY, PF encoder disk, or CR encoder strip.
		ASF, PF, or CR encoder defective	Replace the ASF motor ASSY, PF encoder PCB, or carriage PCB.
		ASF, PF, or CR motor defective	Check the ASF motor, paper feed motor, and carriage motor, then replace the defective one(s).
		Main PCB defective	Replace the main PCB.
40	The casing internal temperature thermistor has detected abnormal temperature in the machine.	Main PCB defective	Replace the main PCB.
		Casing internal temperature thermistor defective	Replace the ink refill ASSY.
41	Not used.		
42	The head drive voltage has not dropped from the high to low level within the specified period.	Piezoelectric ceramic actuator or head driver defective	Replace the head/carriage unit.
		Carriage PCB defective	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
43	The head thermistor has been opened or shorted abnormally.	Head flat cables not connected correctly	Correct those flat cables.
		Head flat cables broken	Replace the carriage PCB ASSY.
		Carriage PCB defective	
		Main PCB defective	Replace the main PCB.
44	The temperature of the print head driver has risen abnormally. The head driver chip temperature sensor in the head driver detects abnormally high temperature.	Head property parameters incorrect in the EEPROM	Enter the correct parameter values.
		Air bubbles in the head/carriage unit	Perform the initial purge.
		Head flat cables and carriage-head flat cable not connected correctly	Correct those flat cables.
		Head flat cables broken	Replace the carriage PCB ASSY.
		Carriage-head flat cable broken	Replace the head/carriage unit.
		Head/carriage unit broken	
		Main PCB defective	Replace the main PCB.
45	Not used.		
46	The number of performed purge sequences has reached the limit. The ink absorber box may be filled with drained ink.	Purge counter overflown	Replace both the ink absorber box and flushing box and reset their counters. (When you need to replace the ink absorber box or flushing box, replace both.) (Refer to page 7-35 or page 9-48 .)
	The number of flushing operations has reached the limit. The flushing box may be filled with drained ink.	Flushing counter overflown	
47	Not used.		
48	Weak connection of the head flat cables.	Head flat cables or carriage-head flat cable broken or not connected	Correct the connection of the head flat cables.
			Replace the carriage PCB ASSY.
			Replace the head/carriage unit.
			Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
49	The head drive voltage has not risen to the specified level.	Head flat cables and carriage-head flat cable not connected correctly	Correct those flat cables.
		Head/carriage unit defective	Replace the carriage PCB ASSY.
			Replace the head/carriage unit.
		Main PCB defective	Replace the main PCB.
Power supply PCB defective	Replace the power supply PCB.		
4A-4E	Not used.		
4F	The head drive voltage has dropped from the high to low level in an abnormally short period. The head drive voltage has not risen to the specified level within the specified period in the self-diagnosis.	Piezoelectric ceramic actuator defective (Cracks or rare short)	Replace the carriage PCB ASSY.
			Replace the head/carriage unit.
		Main PCB defective	Replace the main PCB.
50 51	The purge cam switch does not come ON or OFF even after the purge cam has been driven by the specified number of pulses.	Planetary arm assembly not engaged correctly	Set the maintenance unit into place.
			If the planetary arm does not move smoothly, clean it.
		Purge cam switch harness not connected correctly	Correct the connection.
		Purge cam switch broken	Replace the maintenance unit.
		Gear(s) on the maintenance unit broken	
		Paper feed motor defective	Replace the engine unit.
		Power supply PCB defective	Replace the power supply PCB.
Main PCB defective	Replace the main PCB.		

Error Code (Hex)	Symptom	Probable Cause	Solution
52	The purge cam switch does not come ON at each detection point.	Planetary arm assembly not engaged correctly	Set the maintenance unit into place. If the planetary arm does not move smoothly, clean it.
		Purge cam switch harness not connected correctly	Correct the connection to the main PCB.
		PF encoder sensor defective	Replace the PF encoder/ registration sensor harness unit.
		ASF motor defective	Replace the ASF motor.
		Purge cam switch broken	Replace the maintenance unit.
		Gear(s) on the maintenance unit broken Abnormal load applied to the purge cam	
		Paper feed motor broken	Replace the engine unit.
		Main PCB defective	Replace the main PCB.
		53-56	Not used.
57	The head/carriage unit does not return to the home position (capping position).	Head cap unit, head wiper or other parts on the maintenance unit interfering with the head/carriage unit	Set these parts back into place. If any part on the maintenance unit does not operate smoothly, replace the unit.
		ASF motor defective	Replace the ASF motor.
		CR encoder strip stained	Replace the CR encoder strip.
		Any obstacles on the travel path of the head/carriage unit	Clean the CR guide rail and CR support chassis.
		Carriage PCB ASSY defective	Replace the carriage PCB ASSY.
		Carriage motor defective	Replace the carriage motor.
		Head/carriage unit defective	Replace the head/carriage unit.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.

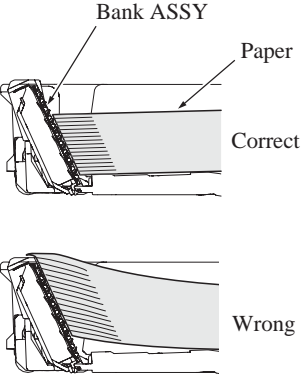
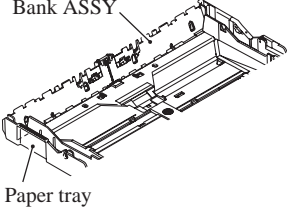
Error Code (Hex)	Symptom	Probable Cause	Solution
58, 59	Not used.		
5A 5B	Abnormal stop of purge cam being driven	Foreign materials in the machine	Remove foreign materials.
		PF encoder disk being in contact with the upper cover and deformed	Replace the PF encoder disk.
		PF encoder PCB defective	Replace the PF encoder PCB.
		Main drain tube bent	Replace the ink absorber box.
		Clutch gear broken	Replace the maintenance unit.
		Purge cam gear broken	
		Abnormal load applied to the purge cam	
		Planetary arm assembly broken	
		Paper feed motor defective	Replace the engine unit.
		PF roller gear L broken	
		Engine unit defective	
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
		5C	Not used.
5D	Current protection for the driver IC activated when the purge cam was being driven.	The driving current has exceeded the limit due to an abnormal load applied to the maintenance unit.	Remove foreign materials.
			Replace the clutch gear.
			Replace the PF encoder disk.
			Replace the PF encoder PCB.
			Replace the ink absorber box.
5E	Current protection for the driver IC activated when the pump was in operation.		Replace the maintenance unit.
			Replace the main PCB.
			Replace the power supply PCB.
			Replace the engine unit.

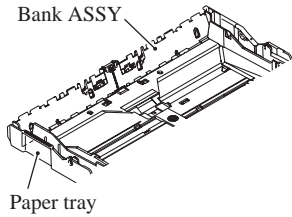
Error Code (Hex)	Symptom	Probable Cause	Solution
5F	Not used.		
60 62	Paper width sensor (media sensor) error.	Paper width sensor (media sensor) adjustment failure	Readjust the left and right margins.
		Paper width sensor defective	Replace the carriage PCB ASSY.
		Head flat cables broken	
		Main PCB defective	Replace the main PCB.
61, 63-6B	Not used.		
6C	Current protection activated due to an overload applied to the paper feed motor.	Foreign materials in the paper path	Remove foreign materials and close the scanner cover (scanner unit).
		Paper feed motor defective	Replace the engine unit.
		Main PCB defective	Replace the main PCB.
6D, 6E	Not used.		
6F	ASF motor does not stop at the intended timing.	Malfunction caused by overload	Open and close the scanner cover (scanner unit). Unplug and plug the AC cord.
		Relevant motor harness not connected correctly	Correct the connection.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Main PCB defective	Replace the main PCB.
70 71	Cannot detect the ON/OFF state of cap lift cam switch.	Cap lift cam switch defective	Replace the maintenance unit.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
72	Cannot detect the origin of the cap lift cam.	Cap lift cam switch defective	Replace the maintenance unit.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Main PCB defective	Replace the main PCB.
73	Fails to switch the cap lift cam positions.	Cap lift cam switch defective	Replace the maintenance unit.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Main PCB defective	Replace the main PCB.
74-79	Not used.		
7A	Abnormal stop of cap lift cam.	Foreign materials in the head capping mechanism	Remove foreign materials and clean the mechanism.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Cap lift cam switch defective	Replace the maintenance unit.
		Main PCB defective	Replace the main PCB.
7B-7C	Not used.		
7D	Current protection for the driver IC activated when the cap lift cam was being driven.	Foreign materials in the head capping mechanism.	Remove foreign materials and clean the mechanism.
		ASF encoder sensor defective	Replace the ASF motor ASSY.
		ASF motor defective	
		Cap lift cam switch defective	Replace the maintenance unit.
		Main PCB defective	Replace the main PCB.
7E	No head parameters stored in the EEPROM. (This code may appear only in the maintenance mode.)	No head property data has been entered	Enter the head property data.
		Main PCB defective	Replace the main PCB.
7F	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
80	At the start of FAX message printing, the controller detects that paper is smaller than A4 size in width.*	Paper smaller than the specified size loaded in the paper tray	Load the correct size of paper.
		Paper width sensor (media sensor) not adjusted	Adjust the margin for borderless printing with Function code 66 in the maintenance mode.
		Paper width sensor defective	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.
81	In printing except FAX and list printing, the controller detects that paper is smaller than the specified size in width.	Paper smaller than the specified size loaded in the paper tray	<ul style="list-style-type: none"> - Load the correct size of paper. - Press the Color Start or Black Start key.
		Paper width sensor not adjusted	Adjust the margin for borderless printing with Function code 66 in the maintenance mode.
		Paper width sensor defective	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.
82	Recording paper jam in paper pull-in operation. (Although the registration sensor detects the paper, the paper width sensor fails to detect the leading edge of paper.)	Foreign materials in the paper path	Remove foreign materials.
		Paper printed or paper with blackish leading edge fed	Replace the paper with blank paper.
		Head flat cable connection failure	Insert the head flat cables correctly.
		Paper width sensor defective	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.

* For MFC only

Error Code (Hex)	Symptom	Probable Cause	Solution
83	Recording paper jam. (At the start of paper feeding, the registration sensor is already ON.)	Paper double feeding caused by incorrect loading in the paper tray 	Reload paper.
		Bank ASSY deformed 	Replace the bank ASSY.
		Registration sensor actuator unhooked	Set the registration sensor actuator into place.
		Registration sensor actuator defective	Replace the registration sensor actuator.
		Main PCB defective	Replace the main PCB.
		Registration sensor defective	Replace the PF encoder/ registration sensor harness unit.

Error Code (Hex)	Symptom	Probable Cause	Solution
84	Recording paper jam. (The registration sensor sticks to ON after completion of paper ejection operation.)	Foreign materials in the paper path	Remove foreign materials.
		Registration sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Registration sensor actuator defective	Replace the registration sensor actuator.
		Registration sensor defective	Replace the PF encoder/ registration sensor harness unit.
		PF timing belt come off	Set the PF timing belt into place.
		Paper feed motor defective	Replace the engine unit.
		The paper ejection roller does not rotate correctly	
		Main PCB defective	Replace the main PCB.
85-87	Not used.		
88	Recording paper jam. (Even after paper pulling-in operation, the registration sensor is still OFF.)	Jam clear cover not closed correctly	Close the jam clear cover correctly.
		Registration sensor harness not connected correctly	Correct the connection.
		Bank ASSY deformed  <p>Bank ASSY Paper tray</p>	Replace the bank ASSY.
		Paper pull-in rollers defective	Replace the paper pull-in rollers.
		Mode switching lever (at the right end of CR guide rail) not sliding smoothly	Clean the mode switching lever.
		At the ends of the paper feed roller shaft, any gear(s) damaged	Replace the engine unit.
		Paper feed motor defective	
		Main PCB defective	Replace the main PCB.
89	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
8A	The paper feed motor does not rotate.	Foreign materials in the machine	Remove foreign materials.
		Paper feed motor harness not connected correctly	Reconnect the paper feed motor harness.
		Abnormal load applied to the paper feed roller PF-related gear(s) broken	Replace the PF-related gear(s).
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF encoder/ registration sensor harness unit.
		Paper feed motor defective	Replace the engine unit.
		Main PCB defective	Replace the main PCB.
8B	The paper feed motor stops suddenly.	Abnormal load applied to the paper feed roller PF-related gear(s) broken	Replace the PF-related gear(s).
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF encoder/ registration sensor harness unit.
		Paper feed motor defective	Replace the engine unit.
		Main PCB defective	Replace the main PCB.
8C	Current protection for the driver IC activated in paper feeding operation.	The driving current has exceeded the limit due to an abnormal load applied to the PF-related gears and rollers.	Replace the PF encoder disk. Replace the engine unit. Replace the main PCB.
8D	The paper feed motor rotates in the reverse direction.	PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder disk dislocated	
		PF encoder sensor defective	Replace the PF encoder/ registration sensor harness unit.
		Paper feed motor defective	Replace the engine unit.
		Abnormal load applied to the paper feed roller	Check the PF roller gear and its related gears.
		Main PCB defective	Replace the main PCB.
8E	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
8F	The paper feed motor is being driven and cannot be stopped.	Software malfunction	Open and close the scanner cover. Unplug and plug the AC cord.
		Paper feed motor harness not connected correctly	Correct the connection.
		Main PCB defective	Replace the main PCB.
90-A0	Not used.		
A1	Scanner cover (scanner unit) opened	Scanner cover sensor (carbon switch) broken	Replace the control panel PCB.
		Scanner cover sensor actuator unhooked	Set the scanner cover sensor actuator into place.
		Rubber keypad defective	Replace the rubber keypad.
		Control panel PCB defective	Replace the control panel PCB.
		Main PCB defective	Replace the main PCB.
A2	During scanning or ejecting, a document of 90 cm* or longer is detected.	Document jam	Remove the jammed document.
		Foreign materials in the machine	Remove foreign materials.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document sensor PCB.
		Document ejection roller defective or not rotating	Replace the ADF unit.
		Main PCB defective	Replace the main PCB.
A3	The document rear sensor does not come ON during document pull-in operation.	Document jam	Remove the jammed document.
		Foreign materials in the machine	Remove foreign materials.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document sensor PCB.
		ADF motor defective	Replace the ADF motor.
		ADF-related gear(s) broken	Replace the ADF unit.
		Main PCB defective	Replace the main PCB.

* This value is default and can be modified by WSW16, selector 7.

Error Code (Hex)	Symptom	Probable Cause	Solution
A4	Not used.		
A5	FAX scanning failure (1st time).	CIS defective White reference film stained in the scanner cover	Replace the scanner cover (scanner unit).
A6	FAX scanning failure (retry).	Main PCB defective	Replace the main PCB.
A7	Mismatch between the type of the CIS mounted and EEPROM data.	Scanner cover containing the improper CIS type mounted at repair.	Check the CIS type mounted and enter the new CIS type into the EEPROM with Function code 59 in the maintenance mode. (Refer to Chapter 9, Section 9.4.16.)
A8	Color parameter matching error. (Used for monitoring bugs at the factory.)	---	Install the latest firmware.
A9-AE	Not used.		
AF	CIS positioning error.	CIS flat cable broken or not connected properly	- Correct the cable connection. - Replace the scanner cover (scanner unit).
		CIS motor harness not connected properly	Correct the harness connection.
		CIS motor defective	Replace the scanner cover (scanner unit).
		CIS drive unit defective	
		CIS defective	
		Main PCB defective	Replace the main PCB.
B0-BC	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
BD	Black level data error.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BE-DE	Not used.		
DF, E0	Modem error.* ¹	SDAA chip defective	Turn the machine off and then on.
		Main PCB defective	Replace the main PCB.
E1	Not used.		
E2	Wired LAN MAC address not registered.* ²	MAC address not registered correctly	Replace the main PCB.
E3	Wireless LAN MAC address not registered.* ³	MAC address not registered correctly	Transfer MAC address from the WLAN PCB to the main PCB.
E4	Not used.		
E5	Write error in EEPROM on the cordless PCB.* ⁴	The base ID code and cordless handset ID code registered are mismatched.	Reregister the cordless handset ID code.
			Replace the cordless handset.
			Replace the cordless PCB.
E6	Write error in EEPROM.	Main PCB defective	Replace the main PCB.
E7	No communication between cordless PCB and cordless handset.* ⁴	The base ID code and cordless handset ID code registered are mismatched.	Reregister the cordless handset ID code.
			Replace the cordless handset.
			Replace the cordless PCB.
E8, E9	Not used.		
EA	Document removed at phase B.* ⁵	Document front sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document front sensor defective	Replace the document sensor PCB.
		Main PCB defective	Replace the main PCB.

*1 For MFC only

*2 For wired LAN-enabled models

*3 For wireless LAN-enabled models

*4 For models with cordless handsets

*5 Phase B: FAX negotiation stage between sending machine and receiving machine

Error Code (Hex)	Symptom	Probable Cause	Solution
EB	Not used.		
EC	LCD connection detection failure.	LCD flat cable not connected correctly	Correct the connection.
		LCD unit defective	Replace the LCD unit.
		Main PCB defective	Replace the main PCB.
ED	Touch panel initialization failure at the time of power ON. *1	Touch panel in contact with something during initialization at the time of power ON.	Clean the touch panel, then turn the machine off and then on again.
		Touch panel defective	Replace the LCD unit.
		Touch panel PCB defective	
		Main PCB defective	Replace the main PCB.
EE-F6	Not used.		
F7	Media module detection failure. *2	Main PCB defective	Replace the main PCB.
F8	Battery harness connection failure. *3 (Available in the maintenance mode only)	Battery harness not connected correctly	Correct the connection.
F9-FF	Not used.		

*1 For models with touch panel

*2 For models with PhotoCapture Center

*3 For models with backup battery

4.1.2 Communications Errors

If a communications error occurs, the machine:

- ① emits an audible alarm (intermittent beeping) for approximately 4 seconds,
- ② displays the corresponding error message, and
- ③ prints out the transmission verification report if the machine is in sending operation.

■ **Definition of Error Codes on the Communications List**

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected.*
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	Unobtainable tone detected after dialing.
17	07	No response from the calling station in receiving.

* Available in German models only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 milliseconds or longer.
20	03	Abort detected ("1" in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answerback.
20	07	Error command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error.
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mailbox function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.
32	18	Remote terminal not equipped with color function.

(4) Instructions received from the remote terminal [checking the NSC, DTC, NSS, and DCS]

Code 1	Code 2	Causes
40	02	Illegal coding system requested.
40	03	Illegal recording width requested.
40	05	ECM requested although not allowed.
40	06	Polled while not ready.
40	07	No document to send when polled.
40	10	Nation code or manufacturer code not coincident.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.
40	20	Invalid full-color mode requested.

(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

(6) ID checking

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not coincident.
63	02	Password not coincident.
63	03	Polling ID not coincident.

(7) DCN reception

Code 1	Code 2	Causes
74		DCN received.

(8) TCF transmission/reception

Code 1	Code 2	Causes
80	01	Fallback impossible.

(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: 13 seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found but no command detected for 60 seconds.
AA	18	Receive buffer full during receiving into memory.
A0	19	No video data to be sent.
A0	20	Unable to continue to receive color FAX. (Remaining ink insufficient)
A8	01	RTN, PIN, or ERR received at the calling terminal.*
A9	01	RTN, PIN, or ERR received at the called terminal.*

* Available in German models only

(11) General communications-related

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.
BF	01	Communication canceled by pressing the STOP key <i>before</i> establishment of FAX communication*.
BF	02	Communication canceled by pressing the STOP key <i>after</i> establishment of FAX communication*.
BF	03	Transmission canceled due to a scanning error caused by no document or document feed problem in ADF scanning in real time transmission.

* Establishment of FAX communication

FAX communication is established when the calling station receives a DIS (reception capability) signal from the called station and the called station receives an NSS or DCS (communications test) signal from the calling station.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	<u>X</u> <u>X</u>	Equipment error. (For <u>X</u> <u>X</u> , refer to Section 4.1.1 [2] .)

4.2 TROUBLESHOOTING

4.2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the machine. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

4.2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:
(Refer to [Chapter 6, Section 6.1 "■ Safety Precautions."](#))

- (1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.
- (2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.
- (3) Static electricity charged in your body may damage electronic parts.

Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body. When transporting PCBs, be sure to wrap them in conductive sheets.

When replacing the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

4.2.3 Checking Prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures given in [Section 4.2.4](#), make the following initial checks:

Environmental conditions

Check that:

- (1) The machine is placed on a flat, firm surface.
- (2) The machine is used in a clean environment at or near normal room temperature (10°C to 35°C) with normal relative humidity (20 to 80%).
- (3) The machine is not exposed to direct sunlight or harmful gases.

Power requirements

Check that:

- (1) The power supply specified on the rating plate on the machine is used. The supply voltage stays within the rating $\pm 10\%$.
- (2) Each voltage level on AC input lines and DC lines is correct.
- (3) All cables and harnesses are firmly connected.

Recording paper

Check that:

- (1) A recommended type of recording paper is used.
- (2) The recording paper is not dampened.

Ink cartridges

- (1) Check that all of four ink cartridges are loaded.

Head/carriage unit

- (1) Repeat the purge operation (Function code 76) several times. (Refer to [Chapter 9, Section 9.4.24.](#))
- (2) Clean the print surface of the head/carriage unit.

4.2.4 Troubleshooting Based on Problem Type

[1] Control panel and LCD problems

Problem	Check:
(1) LCD shows nothing.	<ul style="list-style-type: none"> • LCD and its flat cable • Panel-main harness • Control panel PCB • Power supply PCB • Main PCB
(2) Control panel inoperative.	<ul style="list-style-type: none"> • Panel-main harness • Control panel PCB • Rubber keypads • Main PCB

[2] FAX problems

Problem	Check:
(1) No faxes will be able to be sent.	<ul style="list-style-type: none"> • Rubber keypads • Control panel PCB • Main PCB • MJ PCB
(2) Speed dialing will not work.	<ul style="list-style-type: none"> • Ordinary dialing function <p>If it works normally, check the main PCB; if not, refer to item (1) above.</p>
(3) Dial does not switch between tone and pulse.	<ul style="list-style-type: none"> • Main PCB
(4) The ringer does not sound.	<ul style="list-style-type: none"> • Speaker • Main PCB • MJ PCB

[3] Communications problems

Problem	Check:
(1) No tone is transmitted.	<ul style="list-style-type: none"> • Main PCB • MJ PCB

[4] Paper/document feeding problems

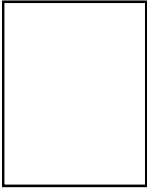


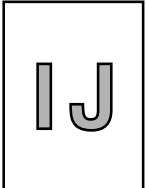
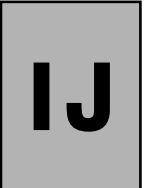
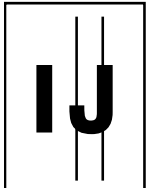
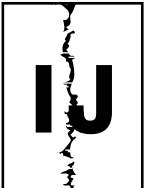
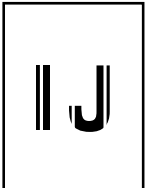
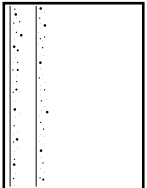
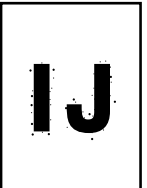
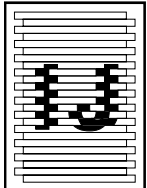

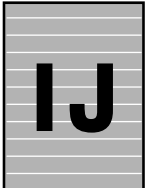
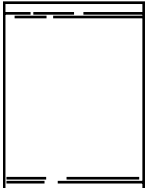

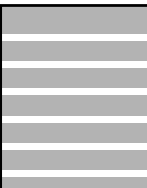
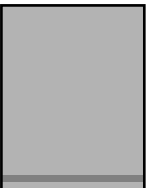
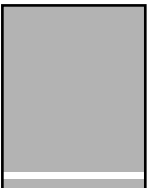
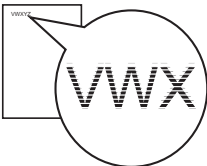
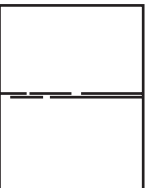
Problem	Check:
(1) The "Enter Fax No." message does not appear although documents are set.	<ul style="list-style-type: none"> • Sensors by using Function code 32 in the maintenance mode (Refer to Chapter 9, Section 9.4.9.) • Document front sensor actuator • Document sensor PCB • Main PCB
(2) Document not fed.	<ul style="list-style-type: none"> • ADF and its related sections • Foreign materials in the document path • ADF motor and its harness • Document feed roller and its related gears • Document sensor PCB • Main PCB
(3) Document double feeding	<ul style="list-style-type: none"> • ADF parts
(4) Document jam	<ul style="list-style-type: none"> • Document rear sensor actuator • Foreign materials in the document path • Sensors by using Function code 32 in the maintenance mode (Refer to Chapter 9, Section 9.4.9.) • ADF motor • Main PCB
(5) Recording paper not fed.	<ul style="list-style-type: none"> • Paper pull-in roller holder • Base pad in the paper tray • Jam clear cover • PF-related gears • Main PCB • Paper feed motor • Paper tray • ASF-related gears • ASF motor
(6) Recording paper jam	<ul style="list-style-type: none"> • Paper feeding mechanism • Foreign materials in the paper path • Check that the carriage-head flat cable is connected to the carriage PCB. • Carriage PCB • Main PCB

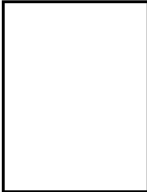
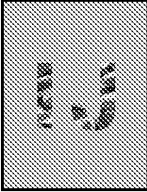
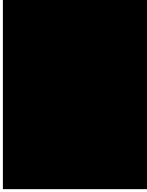
[5] Print-image problems

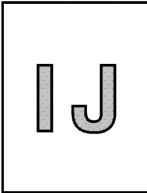
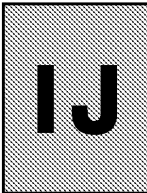
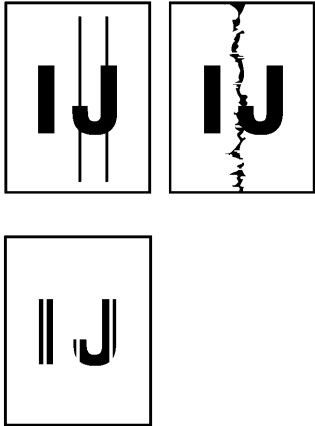
If there is any problem with any image printed, first make a copy using the machine.

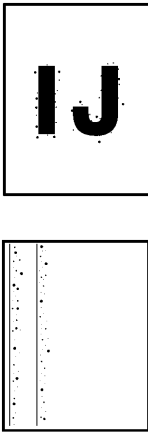
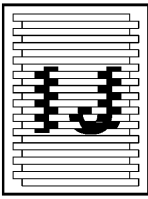

If the copied image is normal, the cause of the problem may be the sending station (e.g., PC and digital camera) or the memory card inserted; if it is abnormal, proceed with the following checks:

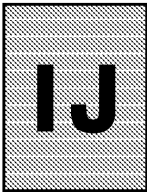
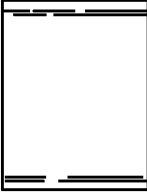
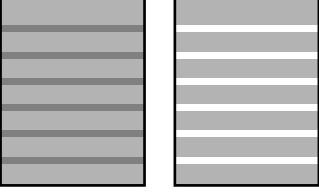
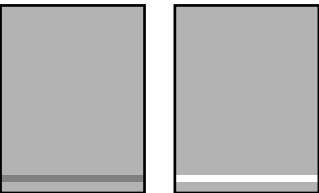
Examples of Defective Images

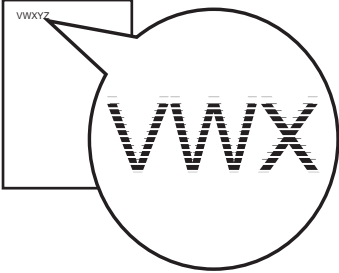

Completely blank	All black	Random color	Light	Dark
				
Straight vertical stripes	Blurred vertical stripes	White vertical streaks	Ink splash	Ink splash
				
Print edges not aligned	Random missing dots	White horizontal streaks	Stained leading edge of recording paper	Overlapping lines over the whole page
				
Separated lines over the whole page	Overlapping lines at the trailing edge of the recording paper	Separated lines at the trailing edge of the recording paper	Characters having shadows (ghost)	Stains in the center of, or over the whole page of, the recording paper
				

Problem	Action to be taken
<p>(1) Completely blank</p> 	<p><u>At the scanner</u></p> <p>Check that the document is placed facing in the correct direction. In ADF scanning, is the document placed <i>face up</i> in the document tray? In flat-bed scanning, is the document placed <i>face down</i> on the scanner glass?</p> <p>Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS flat cable) - Main PCB
<p>(2) Random color</p> 	<p><u>At the printer</u></p> <ul style="list-style-type: none"> • Check the ink cartridges. If any cartridges have run out of ink, replace them. • Perform a head cleaning operation. • Check the connection of the head flat cables on the main PCB. (If either of those cables is broken or damaged, replace it.) • Check the head property data. (Refer to Chapter 9, Section 9.4.20.) • Replace the head/carriage unit. • Replace the main PCB. • Clean the head caps and wiper of the maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 8, Section 8.2 "CLEANING THE MAINTENANCE UNIT." • Replace the maintenance unit. • Check that the drain tubes are not bent.
<p>(3) All black</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS flat cable) - Main PCB <p><u>At the printer</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - Head/carriage unit and carriage PCB ASSY - Main PCB

Problem	Action to be taken
<p>(4) Light</p> 	<p><u>At the scanner</u> Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS unit) - Main PCB <p><u>At the printer</u> Check the following components:</p> <ul style="list-style-type: none"> - Ink cartridges - Head/carriage unit and carriage PCB ASSY - Main PCB - Power supply PCB - Head property data (Refer to Chapter 9, Section 9.4.20.) - Maintenance unit
<p>(5) Dark</p> 	<p><u>At the scanner</u> Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS unit) - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> • Perform the purge operation (Function code 76) several times to remove dust or air bubbles from its nozzles. If the problem persists, replace the head/carriage unit. (Refer to Chapter 9, Section 9.4.24.) <p>Check the following components:</p> <ul style="list-style-type: none"> - Ink cartridges - Head/carriage unit and carriage PCB ASSY - Main PCB - Power supply PCB - Head property data (Refer to Chapter 9, Section 9.4.20.) - Maintenance unit
<p>(6) Straight or blurred, black or white, vertical stripes</p> 	<p><u>Scanner</u> Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS unit) - Scanner glass <p><u>Printer</u></p> <ul style="list-style-type: none"> • Check whether paper is coming into contact with any components other than the ones it should during ejecting. • Check the CR encoder strip for stains or scratches. (If the CR encoder strip is not hooked properly, correct it.)

Problem	Action to be taken
<p>(7) Ink splash</p> 	<p><u>Printer</u></p> <ul style="list-style-type: none"> • Perform the purge operation (Function code 76) several times to remove dust or air bubbles from its nozzles. (Refer to Chapter 9, Section 9.4.24.) • Check the ink cartridges. Any of them has run out of ink or the ink viscosity has been increased, so replace it. • Check the head property data (Refer to Chapter 9, Section 9.4.20.) • Check that the main drain tube is not bent. • Replace the head/carriage unit. • Replace the main PCB. • Replace the power supply PCB. • Replace the maintenance unit.
<p>(8) Print edges not aligned</p> 	<p><u>Printer</u></p> <ul style="list-style-type: none"> • Check the alignment of vertical print lines with Function code 65 in the maintenance mode. (Refer to Chapter 9, Section 9.4.18.) • Perform the print head skew compensation with the head skew adjuster knob. Refer to Chapter 7, Section 7.2, [4]. • Check the head/carriage unit. • Check the CR encoder strip for stains or scratches. (If the CR encoder strip is not hooked properly, correct it.) • Correct the positioning error of the head/carriage unit. (Refer to Chapter 7, Section 7.2, [4].) • Check the height adjustment mechanism of the head/carriage unit (Refer to Chapter 3, Section 3.2.2.3.) • If the "head-platen gap offset" is enabled with assurance mode switch AMS 02 (Function code 88), align the vertical print lines (Function code 65). (Refer to Chapter 9, Sections 9.4.28 and 9.4.18.)
<p>(9) Random missing dots</p> 	<p><u>Printer</u></p> <ul style="list-style-type: none"> • Perform the purge operation (Function code 76) several times to remove dust or air bubbles from its nozzles. (Refer to Chapter 9, Section 9.4.24.) • Check the ink cartridges. If any cartridges have run out of ink, replace them. • Check that the carriage-head flat cable is connected to the carriage PCB. • Replace the head/carriage unit. • Check the connection of the head flat cables on the main PCB. (If either of those cables is broken or damaged, replace it.) • Replace the main PCB. • Clean the head caps and wiper of the maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 8, Section 8.2 "CLEANING THE MAINTENANCE UNIT." • Replace the maintenance unit.

Problem	Action to be taken
<p>(10) White horizontal streaks</p> 	<ul style="list-style-type: none"> • Perform the purge operation (Function code 76) several times to remove dust or air bubbles from its nozzles. (Refer to Chapter 9, Section 9.4.24.) • Replace the head/carriage unit. • Check the paper feed-related rollers. • Perform the print head skew compensation with the head skew adjuster knob. Refer to Chapter 7, Section 7.2, [4]. • Clean the head caps and wiper of the maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 8, Section 8.2 "CLEANING THE MAINTENANCE UNIT."
<p>(11) Stained leading edge of recording paper</p> 	<p><u>Printer</u></p> <ul style="list-style-type: none"> • Perform a head cleaning operation. • Check that the head/carriage unit is set into place. • Check the height adjustment mechanism of the head/carriage unit (Refer to Chapter 3, Section 3.2.2.3.) • If the "head-platen gap offset" is enabled with assurance mode switch AMS 02 (Function code 88), align the vertical print lines (Function code 65). (Refer to Chapter 9, Sections 9.4.28 and 9.4.18.)
<p>(12) Overlapping or separated lines over the whole page</p> 	<ul style="list-style-type: none"> • Adjust the paper feeding correction value of the paper feed roller with Function code 58 in the maintenance mode. (Refer to Chapter 7, Section 7.2, [5].) • Perform the print head skew compensation with the head skew adjuster knob. Refer to Chapter 7, Section 7.2, [4].
<p>(13) Overlapping or separated lines at the trailing edge of the recording paper</p> 	<ul style="list-style-type: none"> • Adjust the paper feeding correction value of the paper ejection roller with Function code 58 in the maintenance mode. (Refer to Chapter 7, Section 7.2, [5].)

Problem	Action to be taken
<p>(14) Characters having shadows (ghost)</p> 	<ul style="list-style-type: none"> • Adjust the paper feeding correction values of the paper feed roller and paper ejection roller with Function code 58 in the maintenance mode. (Refer to Chapter 7, Section 7.2, [5].) • Correct the positioning error of the head/carriage unit with Function code 63 in the maintenance mode. (Refer to Chapter 7, Section 7.2, [4].) • Replace the PF encoder disk. • Replace the PF encoder PCB.
<p>(15) Stains in the center of, or over the whole page of, the recording paper</p> 	<ul style="list-style-type: none"> • Use the specified type of paper. (Do not use short grain paper.) • Enable the "secure paper feed mode" referring to the USER'S GUIDE.

[6] PC-driven printing problems

Problem	Action to be taken
<p>(1) PC-driven printing is impossible.</p>	<ul style="list-style-type: none"> • Interface with the host computer • PC interface cable • Main PCB • USB interface • Network interface

[7] Printing from memory cards--Compact Flash, Memory Stick, SD Memory Card, xD-Picture Card and USB flash memory drive

Problem	Action to be taken
(1) No image data can be read.	<ul style="list-style-type: none"> • Insertion direction of memory cards <ul style="list-style-type: none"> - Insert a Compact Flash card, SD Memory Card, or xD-Picture Card with the label side facing up. - Insert a Memory Stick card with the cutout corner leading and facing towards the left. • Memory cards <ul style="list-style-type: none"> - Formatted? - Any data in the memory card? - Images stored in the memory card are in EXIF2.0-compliant JPEG file format (having extension .JPG)? • Main PCB
(2) More than one memory card cannot be recognized.	<ul style="list-style-type: none"> • The machine can recognize only a single memory card at a time even if it has two cards in the two slots. Only the first inserted one can be recognized. <p>If only a single memory card is inserted, refer to item (1) above.</p>
(3) Media printing is impossible.	<ul style="list-style-type: none"> • Check whether the memory is full.

[8] Others

Problem	Action to be taken
(1) When the power is turned on (when the AC power cord is plugged into an electrical outlet), the scanner makes a grating noise.	<p>Check the following components:</p> <ul style="list-style-type: none"> - Scanner cover (CIS flat cable) - Main PCB

4.2.5 Problems Encountered Frequently in the Past

This section lists the four problems most frequently encountered during on-site service in the past.

- Paper jams
- Error message "MACHINE ERROR 4F"
- Ink-related problems
- Auto document feeder (ADF) failure

[1] Paper jams

A paper jam may occur not only due to machine malfunction but also to the user's actions.

NOTE: In some cases, foreign material that has found its way into the machine without the user realizing can be the cause of a paper jam. Instruct the user to place nothing on top of the machine that might fall into it.

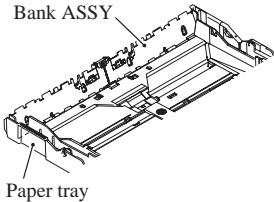
NOTE: When removing foreign materials from the machine, take special care not to contaminate or scratch the CR encoder strip. If the encoder strip is contaminated or scratched, replace it. (Refer to [Chapter 6, Section 6.1.11.](#))

NOTE: After removing jammed paper from the machine, be sure to check that no fragment of paper remains in the machine.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Recording paper	Paper not suited to use with the machine was used.	Paper with labels attached, for example, may leave labels inside the machine.
For foreign materials	Fragments of paper that were left behind when previous paper jams occurred. Foreign materials such as tacks have found their way into the machine.	Foreign materials can hinder the paper feed.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
Star wheels on star wheel support	Star wheels became dislocated when paper jam occurred.	Dislocated star wheels can hinder paper feed.
Sensors and actuators	Any sensor(s) not working.	If a sensor does not turn on, the related roller(s) will not rotate.
Bank ASSY	The bank ASSY is deformed. 	A deformed section on the bank ASSY can cause double-feeding.
CR encoder strip	The CR encoder strip is stained.	A stained CR encoder strip can cause a carriage drive error during printing that will stop the printing operation.

[2] "MACHINE ERROR 4F" error message

The error message "MACHINE ERROR 4F" appears if the head drive voltage drops from the high to low level in an abnormally short period. The source of the problem is mainly the head/carriage unit.

Check	Possible causes	Problems that may result
Head/carriage unit	<ul style="list-style-type: none"> - The carriage-head flat cable is disconnected from the carriage PCB. - Piezoelectric ceramic actuator defective. (Cracks or rare short) 	At the start of printing or head cleaning operation, correct voltage will not be applied to the electrodes on the surface of the piezoelectric ceramic actuator (described in Chapter 3, Section 3.2.2.1).
Main PCB	<ul style="list-style-type: none"> - A power failure when the machine was in operation resulted in a damaged part. - The drive voltage and current supplied are too low to drive the head/carriage unit. - Voltage detection circuit defective. 	<p>The head drive voltage drops from the high to low level in an abnormally short period.</p> <p>The head drive voltage becomes too high or low.</p>
Carriage PCB	<ul style="list-style-type: none"> - Head power circuit insulation failure. 	

[3] Ink-related problems

Problems of this nature may arise not only due to machine malfunction but also to the user's actions.

IMPORTANT: In many cases, the user fails to set ink cartridges in place.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Ink cartridges	<ul style="list-style-type: none"> - Ink cartridges are not inserted fully into the ink refill ASSY. - One or more of the ink cartridges are not loaded. - One or more of the ink cartridges has run out of ink. 	The machine will not be able to print.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
Head/carriage unit	<ul style="list-style-type: none"> - Air bubbles, high viscosity ink, or foreign materials have found their way into the head/carriage unit. - Head flat cables are broken. - The carriage-head flat cable has not been inserted into the carriage PCB. 	<p>Dot missing occurs on the printout.</p> <p>The machine will not be able to print or drive the head/carriage unit.</p>
Maintenance unit	<ul style="list-style-type: none"> - Air bubbles, high viscosity ink, or foreign materials get into the maintenance unit. - Torque not transmitted. - Drain tube bent or pinched. 	Head cleaning operation will not be possible and/or the maintenance unit will not work.
CIS unit	The CIS unit is weak in identifying colors.	The quality of print colors in copying operation will be low.

[4] Auto document feeder (ADF) malfunction

An ADF failure may occur not only due to machine malfunction but also to the user's actions.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Document guides	The document guides are not positioned to match the width of document(s) loaded.	Documents will skew.
Inside the ADF	<ul style="list-style-type: none"> - Foreign materials have found their way into ADF. - The size of the document loaded is smaller than the specified size. 	Foreign materials can hinder document feeding. The document will jam inside the ADF.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
ADF	The spring plates of the ADF parts are deformed.	A document will stop halfway through feeding.
	The ADF parts are deformed or worn.	Two or more sheets of documents will be fed through at once.
Document front sensor	<ul style="list-style-type: none"> - The document front sensor is defective. - The document front sensor actuator is deformed. 	No document will be drawn in or recognized by the machine. Even placing a document in the ADF cannot switch to "ADF scanning."
Document rear sensor	<ul style="list-style-type: none"> - The document rear sensor is defective. - The document rear sensor actuator is deformed. 	A document will stop halfway through feeding or will not be recognized by the machine.
ADF motor	The ADF motor does not rotate.	No document will be drawn in.
Main PCB	The motor driver IC is defective.	No document will be drawn in.

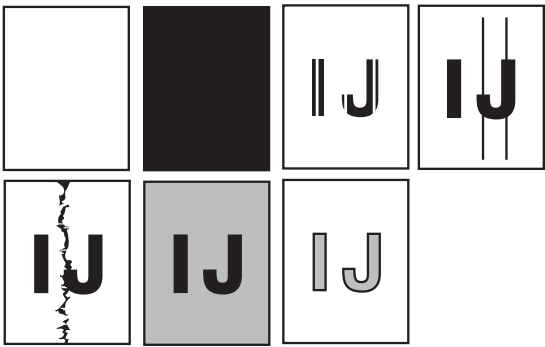
4.2.6 Possible Component Defects and Resulting Problems

This section lists possible component defects and what happens due to them. It also describes what happens if the necessary adjustments or data settings into the memories is not made.

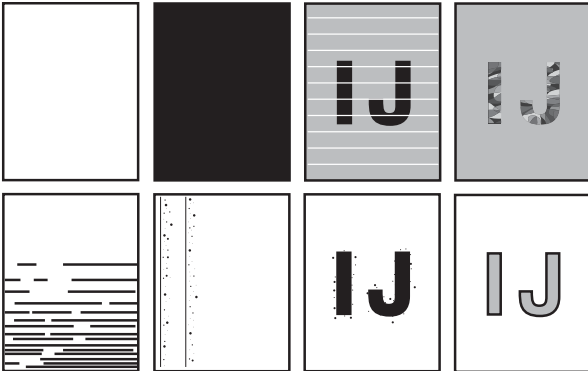
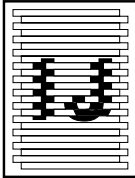
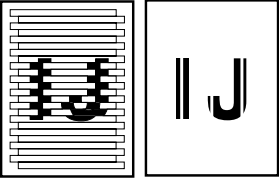
[1] ADF mechanism

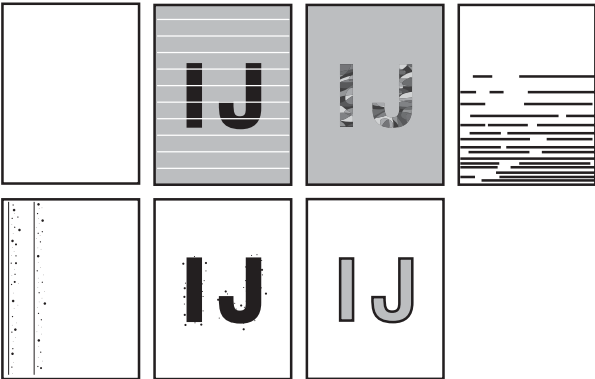
Defective component	Result	Error codes
ADF motor	- Document will not be able to be fed.	---
Document feed roller	- Documents will jam. - Documents will skew. - Documents will not be able to be fed.	A2, A3
Separation pad	- Two or more sheets of documents will be fed at once.	---
Document front sensor actuator	- Document draw-in operation will not start even though documents have been set.	A3
Document rear sensor actuator	- Document draw-in operation will continue even though all documents have been fed into the machine.	A2, A3

[2] Scanner mechanism

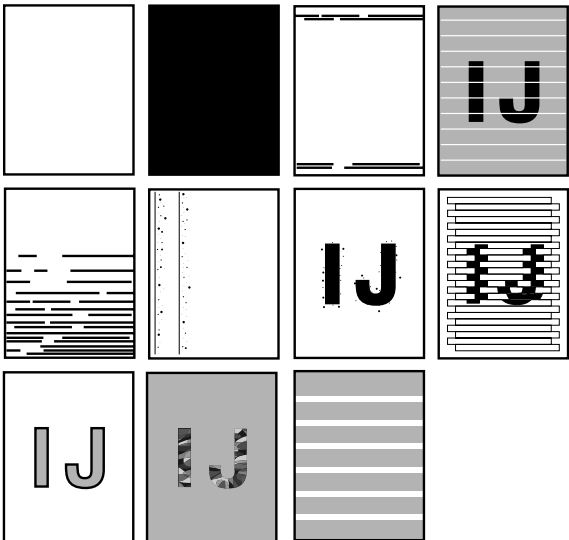
Defective component	Result	Error codes
CIS unit	<p>- Any of the following images may appear on the printout:</p>  <p>- When the power is turned on, abnormal noises will be heard from the machine.</p> <p>- Any of the following errors occurs:</p> <ul style="list-style-type: none"> - Dark level offset data level error for scanning - Gain control data level error for scanning - Scan area right/left edge detection error - Horizontal scanning edge reduction/enlargement detection error in scanning area setting - White/black level data error - Scan starting edge detection error 	BD, AF
CIS flat cable	<p>- When the power is turned on, the "Init Unable AF" appears on the LCD.</p>	AF
Scanner drive unit	<p>- When the power is turned on, abnormal noises will be heard from the machine.</p>	---

[3] Head/carriage unit drive and purge mechanisms

Defective component	Result	Error codes
Head/carriage unit	<p>- Any of the following images may appear on the printout:</p> 	---
Carriage motor	<p>- The head/carriage unit will not be able to travel normally.</p> <p>- When the power is turned on, the "Init Unable 3*" appears on the LCD.</p> <p>- The following image may appear on the printout:</p> 	30, 31, 32, 33
CR encoder strip	<p>- The head/carriage unit will not be able to travel normally.</p> <p>- Any of the following images may appear on the printout:</p> 	30, 31, 32, 33
Ink cartridge PCB	<p>- The "Cannot Print" message will appear even though there is ink.</p> <p>- Even though the ink has run out, the "Cannot Print" message will not appear.</p>	26, 27, 28, 29
Paper width sensor (Media sensor)	- A paper jam will occur.	80, 82
	- Print on the platen without paper.	---

Defective component	Result	Error codes
Maintenance unit Head caps or wiper	- Any of the following images may appear on the printout: 	---
Tube pump	- The tube pump will not draw out ink from the head nozzles.	---
Purge cam switch	- The purge cam switch will not detect the purge cam ON/OFF timing.	50, 51, 52
Cap lift cam switch	- The cap lift cam switch will not detect the ON/OFF timing of the cap lift cam.	70, 71, 72

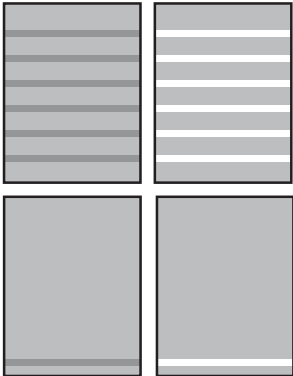
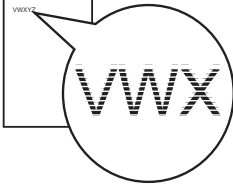
[4] Print head mechanism

Defective component	Result	Error codes
Head/carriage unit and carriage PCB ASSY	- Any of the following images may appear on the printout: 	---

[5] Sheet feeder (SF) mechanism

Defective component	Result	Error codes
Bank ASSY (shown on page 4-42)	<ul style="list-style-type: none"> - Two or more sheets of paper will be fed at once. - No paper will be fed. 	82, 83, 88

[6] Paper feeding mechanism

Defective component	Result	Error codes
Paper feed roller Paper ejection roller (If the paper feed roller or paper ejection roller is defective, it is necessary to replace the engine unit.)	<ul style="list-style-type: none"> - Any of the following images may appear on the printout: 	---
PF encoder disk PF encoder sensor	<ul style="list-style-type: none"> - The following image may appear on the printout: 	---

[7] Speaker

Defective component	Result	Error codes
Speaker	<ul style="list-style-type: none"> - No key clicks will be heard. - The ringer will not sound. - No tone will be transmitted. 	---

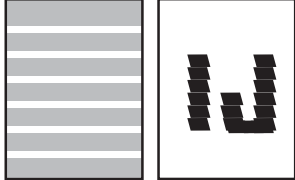
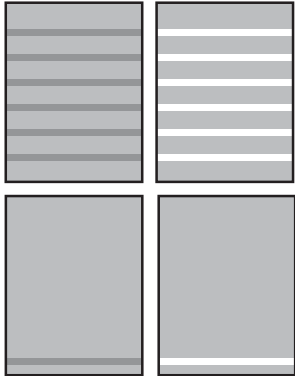
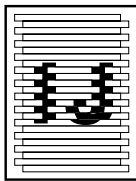
[8] Control panel

Defective component	Result	Error codes
Rubber keypad	- Keys will not work.	---
Control panel PCB	- The monochrome LCD will show nothing. - Keys will not work. - The LEDs will not light.	---

[9] PCBs

Defective component	Result	Error codes
Main PCB	<ul style="list-style-type: none"> - No faxes will be able to be sent. - No phone calls will be able to be made. - Copying will not be possible. - PC-driven printing will not be possible. - Scanning will not be possible. - The machine will not be able to be turned on. - Any of the following images may appear on the printout: <div style="display: flex; justify-content: space-around; align-items: center; margin: 10px 0;"> <div style="border: 1px solid black; width: 40px; height: 40px; background-color: white;"></div> <div style="border: 1px solid black; width: 40px; height: 40px; background-color: black;"></div> <div style="border: 1px solid black; width: 40px; height: 40px; background-color: gray; display: flex; align-items: center; justify-content: center;"> IJ </div> <div style="border: 1px solid black; width: 40px; height: 40px; background-color: white; display: flex; align-items: center; justify-content: center;"> IJ </div> </div> <ul style="list-style-type: none"> - The ringer will not sound. 	---
MJ PCB	<ul style="list-style-type: none"> - No faxes will be able to be sent. - No phone calls will be able to be made. - The ringer will not sound. - No tone will be detected. - The machine will not be able to switch to the external telephone. 	D*
Power supply PCB	<ul style="list-style-type: none"> - The machine will not be able to be turned on. - The LED will not light. - The LCD will show nothing. 	---

[10] Adjustments/data in the memories

Adjustment/data setting error in the following components:	Result	Refer to:	Error codes
EEPROM customizing code	- The machine will not work as specified for that model or that shipping destination.	- Chapter 9, Section 9.4.22 - Appendix 3	
ID code	- The machine will not be able to be identified by the PC connected to it via USB.	- Chapter 7, Section 7.3, [8]	
Head property data (in the EEPROM)	- The print quality will deteriorate.	- Chapter 7, Section 7.2, [1] - Chapter 9, Section 9.4.20	
Correction of head positioning error	- Any of the following images may appear on the printout: 	- Chapter 7, Section 7.2, [4]	
Updating of the paper feeding correction value for the paper feed roller/paper ejection roller (Function code 58)	- Any of the following images may appear on the printout: 	- Chapter 7, Section 7.2, [5] - Chapter 9, Section 9.4.15	
Setting of the CIS scanner area	- The white and black level data will not be compensated properly. - The scanning center position will not be centered. - The enlargement/reduction ratio of copies will go wrong.	- Chapter 9, Section 9.4.14	
Alignment of vertical print lines	- The following image may appear on the printout: 	- Chapter 7, Section 7.2, [6] - Chapter 9, Section 9.4.18	

CHAPTER 5

HANDLING DATA HELD IN THE MACHINE

PRIOR TO REPAIR

CHAPTER 5 HANDLING DATA HELD IN THE MACHINE PRIOR TO REPAIR

This chapter describes how to handle data held in the machine to be repaired.

At the user site, if the machine cannot print FAX data received and left in the machine due to the printing mechanism defective, the service personnel should instruct the end user to follow the transfer procedure given in this chapter to transfer the FAX data to another machine before sending the machine for repair.

At the service site, the service personnel should back up the machine information and user data held in the machine into an external memory for restoration after repair, using the backup procedure given in this chapter.

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- 5.2 AT THE SERVICE SITE 5-4
 - 5.2.1 Backing up Machine Information 5-4

5.1 AT THE USER SITE

5.1.1 Transferring Received FAX Data

When the machine at the user site requires to be repaired, unplugging the power cord from the electrical outlet for sending the machine for repair will lose received FAX data if left in the machine.

To prevent such data loss, the service personnel should instruct end users (e.g., by telephone) to transfer data to another facsimile machine using the procedure below.

Note: The number of files that can be transferred at a time is 99. To transfer 100 files or more, carry out the following procedure more than one time.

Tip: If there are both color and monochrome data in a file to be transferred, the monochrome data will be transferred first. If the receiver machine does not support the color function, the sender machine cannot transfer color data, resulting in an error.

■ Operating Procedure

- (1) Connect the machine (that has received data in the memory) to be repaired to the telephone line.
- (2) Switch the machine on.
- (3) Press the **Menu**, **Black Start (Mono Start)**, **Menu**, and **Black Start (Mono Start)** keys in this order.

The "MAINTENANCE 10" appears on the LCD.

- (4) Call up the "MAINTENANCE 53" using the ▲ and ▼ keys and press the **OK** key.

The "FAX TRANSFER" appears on the LCD.

- (5) To check the number of received files, press the **1** key.

The "1.NO. OF JOBS" appears on the LCD.

Press the **OK** key, and the number of received files appears, just as "NO. OF JOBS: 10."

Pressing the **Stop/Exit** key returns the machine to the "FAX TRANSFER" state.

- (6) Select data to transfer as follows.

To transfer the activity report only, press the **2** key.

The "2.ACTIVITY" appears.

To transfer received files together with the activity report, press the **3** key.

The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.

To transfer the communication list for the latest communication, press the **4** key.

The "4.COM.LIST (NEW)" appears.

To transfer the communication list for last three errors, press the **5** key.

The "5.COM.LIST (ERR3)" appears.

- (7) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed in step (6), press the **OK** key.

The "ENTER NO. &SET" appears.

- (8) Enter the telephone number of the receiver machine and press the **OK** key again.

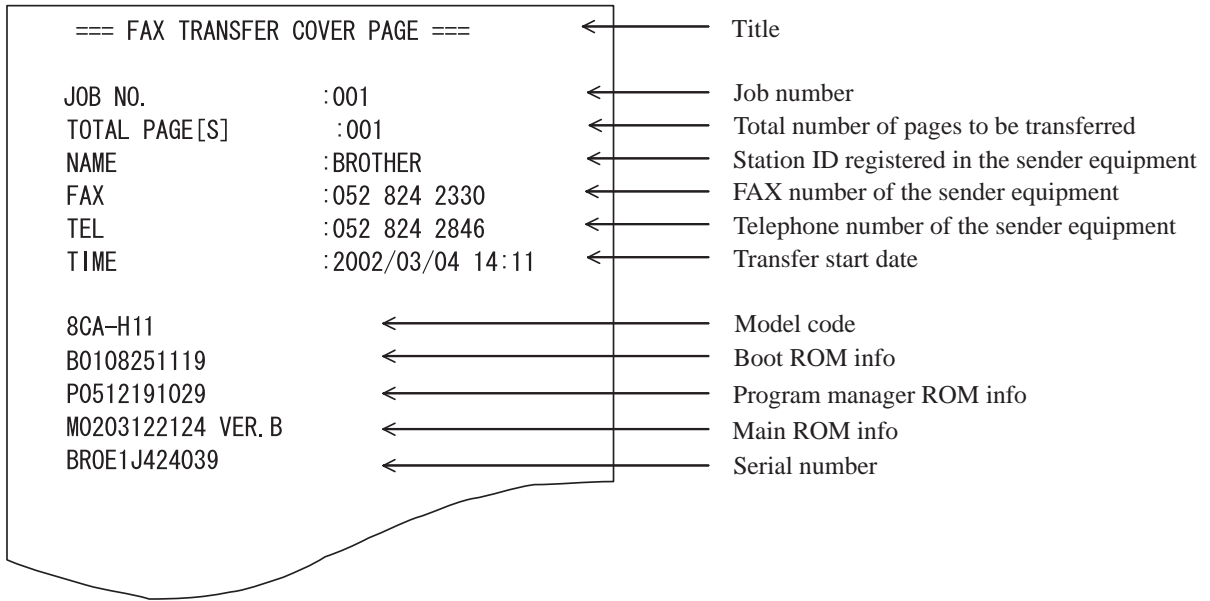
Note: Be sure to type the telephone number with the numerical keys. No speed dialing is allowed in this procedure.

The machine displays the "ACCEPTED" for approx. two seconds and starts dialing to transfer data.

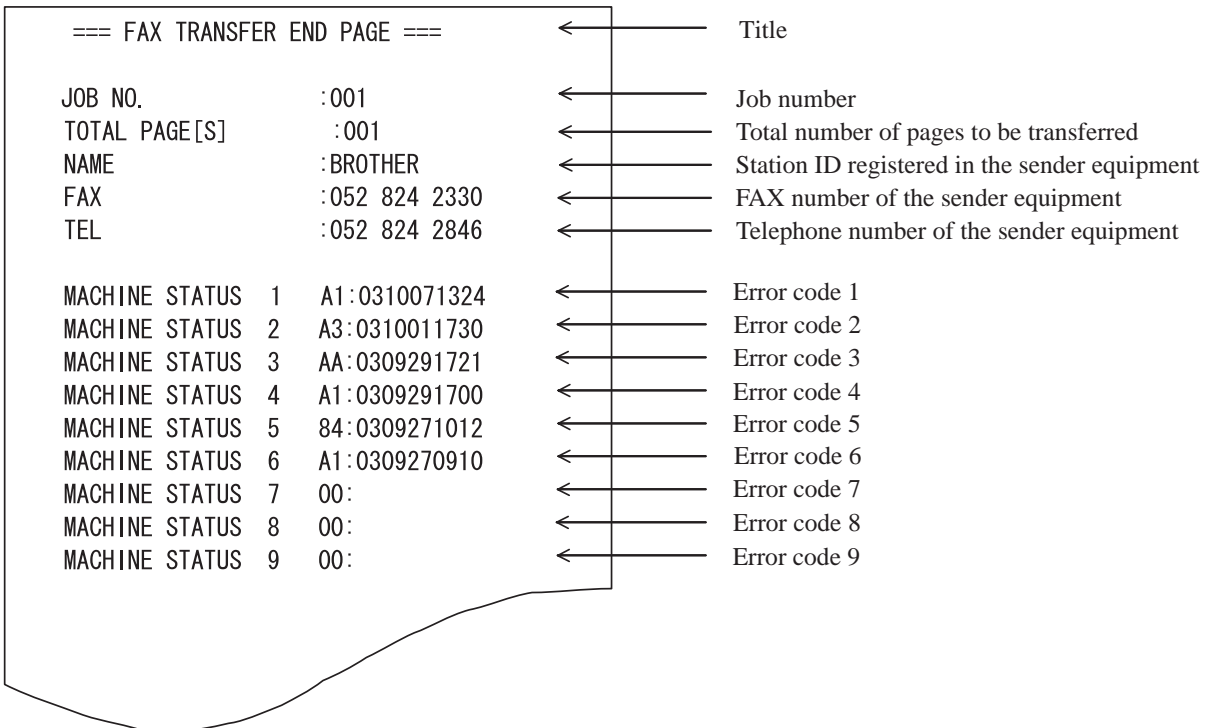
The machine automatically returns to the standby state.

No station ID will be attached. A cover page and end page as shown on the next page will be automatically attached, instead.

Cover page sample



End page sample



5.2 AT THE SERVICE SITE

5.2.1 Backing up Machine Information

Before starting repair, the service personnel should back up the following machine information and user data into an external memory (memory card or USB flash memory).

- Machine information (Preset values, counter values, error information, machine specifications data, etc.)
- User data (telephone directory, password, station ID, transfer information, information specified by the user, telephone area code, user settings, etc.)
- Other data (Received fax data, ICM/OGM data, etc.)

■ Operating Procedure

- (1) On the PC, create a "Brother" folder in an external memory to be used for saving backup data.
- (2) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (3) Insert the external memory into the slot of the machine.

The "**** Active" appears on the LCD. (**** shows the name of the external memory inserted.)

NOTE: Do not insert more than one external memory at a time.

NOTE: If an external memory already containing backup data of the same model is inserted, the following backup procedure will overwrite the existing data with new one.

- (4) Press the **4** and **6** keys in this order.

The "Export to Card" appears on the LCD.

- (5) Press the **Black Start (Mono Start)** key.

The "*****.msd" appears on the LCD. (The "*****" is unique to each model.)

- (6) Press the **Black Start (Mono Start)** key.

The "Export to Card" appears again on the LCD.

- (7) Press the **Black Start (Mono Start)** key.

The "Please wait" appears on the LCD.

NOTE: Never remove the external memory from the machine when the exporting is in progress.

- (8) The machine automatically returns to the initial stage of the maintenance mode.

Remove the external memory from the machine and place it in a safe place.

NOTE: If any of the error messages listed below appears, press the **Stop/Exit** key, and the machine returns to the initial stage of the maintenance mode.

Error Message	Cause
Card is used	The external memory is being used by another operation.
Insert Card	No external memory is inserted.
No file	- No "BROTHER" folder in the external memory - Invalid file name
Card Error	Failed to open the file.
Machine ID Error	Mismatch of serial numbers between the machine and the backup data (which is detected only in data restoration).
Write Error	Writing to an external memory failed due to insufficient capacity.

CHAPTER 6

DISASSEMBLY/REASSEMBLY AND

LUBRICATION

CHAPTER 6 DISASSEMBLY/REASSEMBLY AND LUBRICATION

This chapter details procedures for disassembling and reassembling the machine together with related notes. The disassembly order flow provided enables you to see at a glance the quickest way to get to component(s) involved.

At the start of a disassembly job, you check the disassembly order flow that guides you through a shortcut to the target components.

This chapter also covers screw tightening torques and lubrication points to which the specified lubricants should be applied during reassembly jobs.

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6.1 DISASSEMBLY/REASSEMBLY

■ Safety Precautions

To prevent the creation of secondary problems by mishandling, observe the following precautions during maintenance work.

- (1) Before replacing parts or units, unplug the power cord and telephone line.

In particular, when having access to the power supply inside the machine, make sure that the power cord is unplugged from the electrical outlet; when having access to the main PCB or MJ PCB, make sure that both the power cord and telephone line are unplugged from the electrical outlet.

- (2) Be careful not to lose screws, washers, or other parts removed for parts replacement.
- (3) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.
- (4) Static electricity charged in your body may damage electronic parts.

Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body. When transporting PCBs, be sure to wrap them in conductive sheets.

When replacing the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

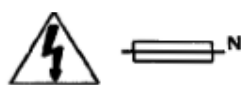
- (5) Be sure to reinsert self-tapping screws correctly, if removed.
- (6) Tighten screws to the torque values listed on the next page.
- (7) When connecting or disconnecting cable connectors, hold the connector bodies not the wires. If the connector has a lock, always slide the connector lock to unlock it.
- (8) Before reassembly, apply the specified lubricant to the specified points. (Refer to [Section 6.2](#) in this chapter.)
- (9) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.
- (10) Once the head/carriage unit prints, it will start head locking operation after five seconds from the end of printing. The head locking operation will take 5 to 10 seconds. NEVER unplug the power cord before the machine completes the head locking operation; doing so will make the head/carriage unit unusable and require replacement with a new head/carriage unit.

When you receive the machine from the user or when you pack it for sending it back to the user, check the head locking state.

- (11) After disconnecting flat cables, check that each cable is not damaged at its end or short-circuited.

When connecting flat cables, do not insert them at an angle. After insertion, check again that the cables are not at an angle.

- (12)



CAUTION
DOUBLE POLE/NEUTRAL FUSING

■ Tightening Torque

Location of screw	Screw type	Qty	Tightening torque Nm (kgfcm)
Grounding wire (for ADF drive unit and CIS motor)	Taptite, cup S M3x6	1	0.40±0.1 (4±1)
ADF & document cover ASSY	Taptite, bind B M4x12	1	0.80±0.1 (8±1)
Hinge arm L	Taptite, bind B M4x12	3	0.80±0.1 (8±1)
Upper ADF chute	Taptite, cup B M3x10	4	0.60±0.1 (6±1)
Lower ADF chute	Taptite, cup B M3x10	2	0.60±0.1 (6±1)
Grounding wire (for ADF drive unit)	Taptite, cup S M3x6	1	0.80±0.1 (8±1)
ADF drive unit	Taptite, cup B M3x10	2	0.60±0.1 (6±1)
ADF motor	Screw, pan (s/p washer) M3x6	1	0.60±0.1 (6±1)
Control panel ASSY	Taptite, cup B M3x10	3	0.40±0.1 (4±1)
Edge covers (L and R)	Taptite, bind B M4x12	4	0.70±0.1 (7±1)
Side covers (L and R)	Taptite, bind B M4x12	2	0.70±0.1 (7±1)
Upper cover	Taptite, bind B M4x12	5	0.70±0.1 (7±1)
Rear under cover	Taptite, cup B M3x10	2	0.40±0.1 (4±1)
Main PCB shield	Taptite, cup S M3x6	2	0.40±0.1 (4±1)
	Taptite, cup B M3x10	1	0.40±0.1 (4±1)
Main PCB	Taptite, cup B M3x10	4	0.40±0.1 (4±1)
Main PCB shield frame (Together with MJ/PS shield unit)	Screw, pan (s/p washer) M3x8	1	0.40±0.1 (4±1)
MJ/PS shield unit (Together with engine unit)	Screw, pan (s/p washer) M3x8	1	0.40±0.1 (4±1)
	Taptite, cup S M3x6	1	0.40±0.1 (4±1)
Power supply PCB	Taptite, cup S M3x8	3	0.40±0.1 (4±1)
MJ shield	Screw, pan (s/p washer) M3x8	1	0.40±0.1 (4±1)
MJ PCB	Taptite, cup S M3x6	1	0.40±0.1 (4±1)
Grounding wire (for power cord)*1	Screw, pan (washer) M4x8DB	1	0.60±0.1 (6±1)
Chassis support	Taptite, cup B M3x12	1	0.60±0.1 (6±1)
Engine unit	Taptite, cup B M3x12	1	0.60±0.1 (6±1)
Maintenance unit	Taptite, cup B M3x10	3	0.60±0.1 (6±1)
ASF motor*2	Screw, pan (s/p washer) M3x5	2	0.70±0.1 (7±1)
Carriage motor	Screw, bind M3x6	2	0.60±0.1 (6±1)
PF encoder PCB	Screw, bind M2x12	1	0.15±0.05 (1.5±0.5)

*1 For 200 V series only

*2 ASF motor: Auto Sheet Feeder motor

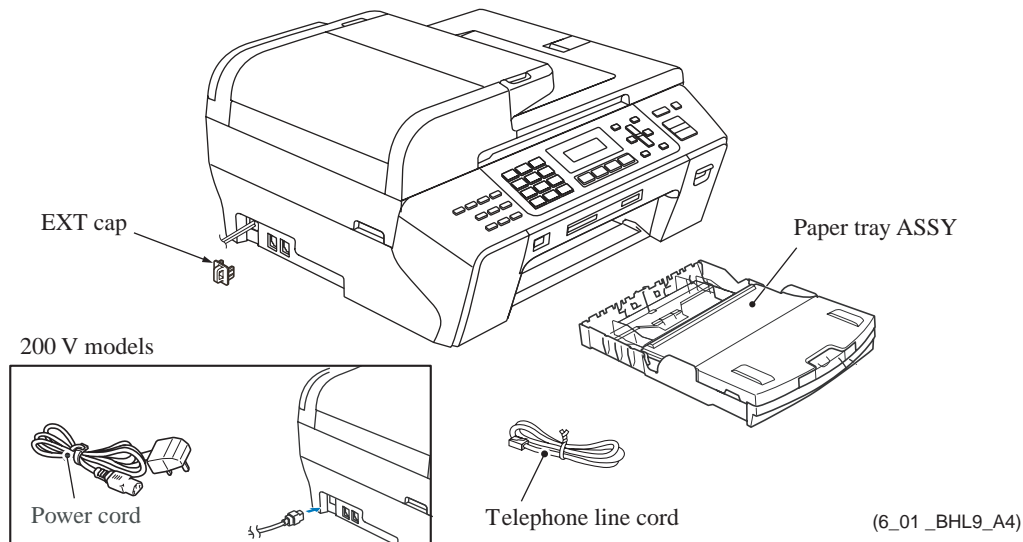
■ Preparation

Prior to proceeding with the disassembly procedure,

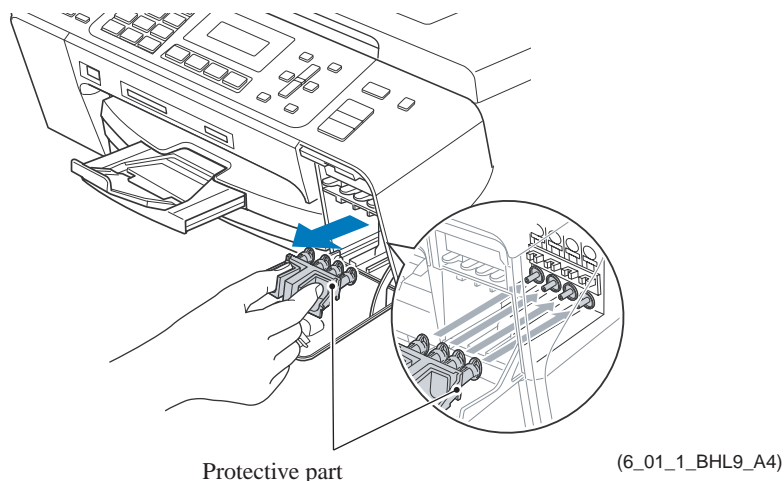
- (1) Be sure to back up the machine information and user data into an external memory. If the main PCB is replaced, restore the backup data to the new main PCB after completion of reassembling. Failure to back up the machine information requires the ink absorber box and flushing box to be replaced after replacement of the main PCB.

For detailed backup and restoration procedures, refer to [Chapter 9, Section 9.4.10 "Backup of Machine Information \(Function code 46\)."](#)

- (2) Unplug the following:
 - Power cord from the electrical outlet (or from the machine in the case of 200 V series)
 - Modular jack of the telephone line
 - USB cable, if connected
 - LAN cable, if connected
 - USB digital camera cable or USB flash memory drive, if connected
 - Modular jack of the external telephone set from the external telephone line jack, if connected (if not, remove the EXT cap)
- (3) Remove the paper tray ASSY.
- (4) Remove memory cards if inserted in the machine.



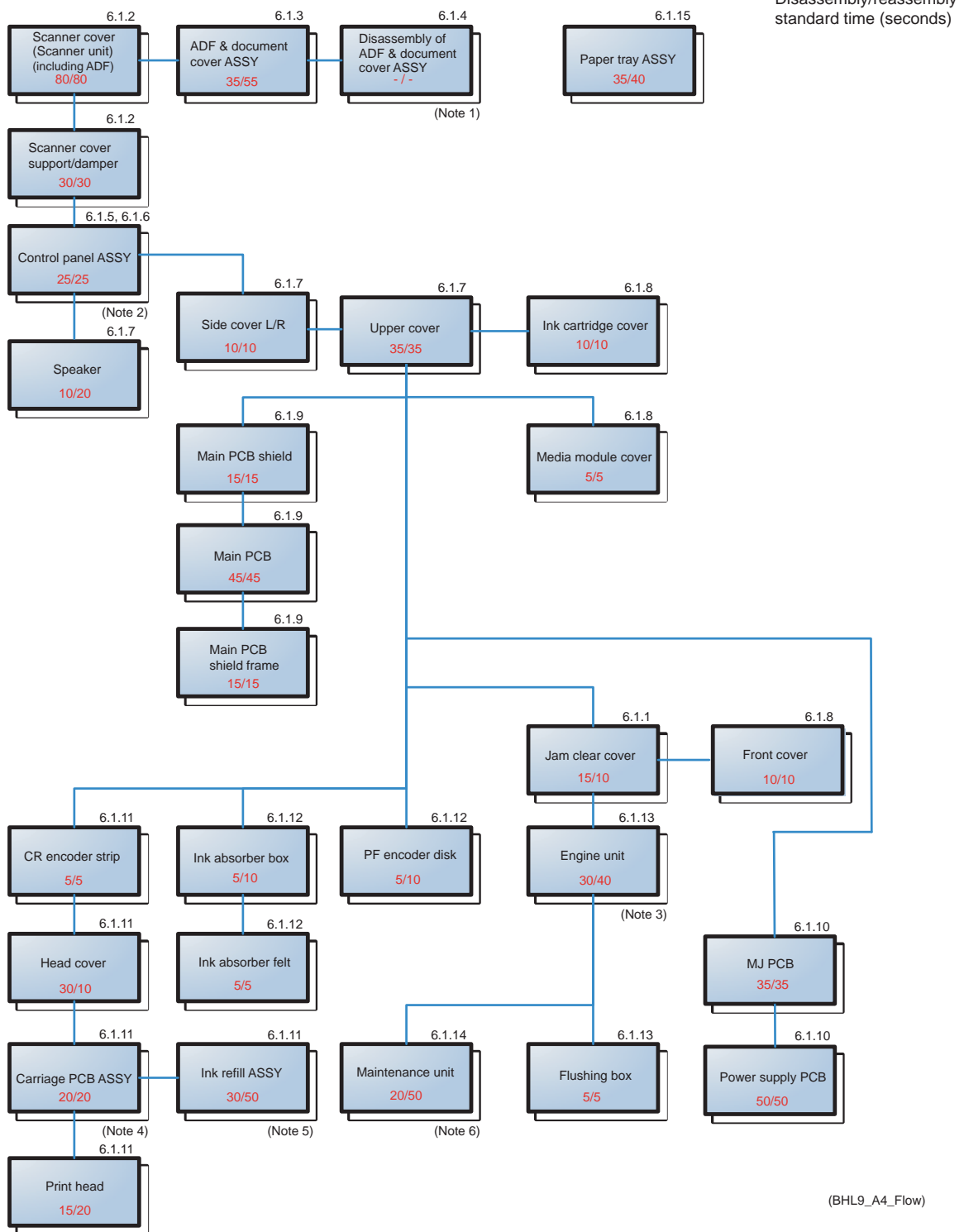
- (5) Remove all four ink cartridges and set the protective part instead. Check that the small tabs on both sides of the protective part fit in the holes provided in the ink refill ASSY.



■ How to Access the Target Component

- On the next page is a disassembly flowchart which helps you access the target components. To remove the maintenance unit, first find it on the flowchart and note its section number (Section 6.1.14 in this case). To access it, you need to remove all the parts above the maintenance unit on the flowchart (Section 6.1.1, 6.1.2, 6.1.5, 6.1.6, 6.1.7, and 6.1.13 in this case) before the unit itself can be removed.
- Unless otherwise specified, all parts should be replaced in the opposite order to which they were removed to reassemble the machine.

■ Disassembly Flowchart



Sensors, encoders, and thermistors

(Note 1) The ADF unit has the document sensor PCB.

(Note 2) The control panel PCB has the scanner cover sensor and ink cartridge cover sensor.

(Note 3) The engine unit has the registration sensor PCB and PF encoder PCB (having PF encoder sensor).

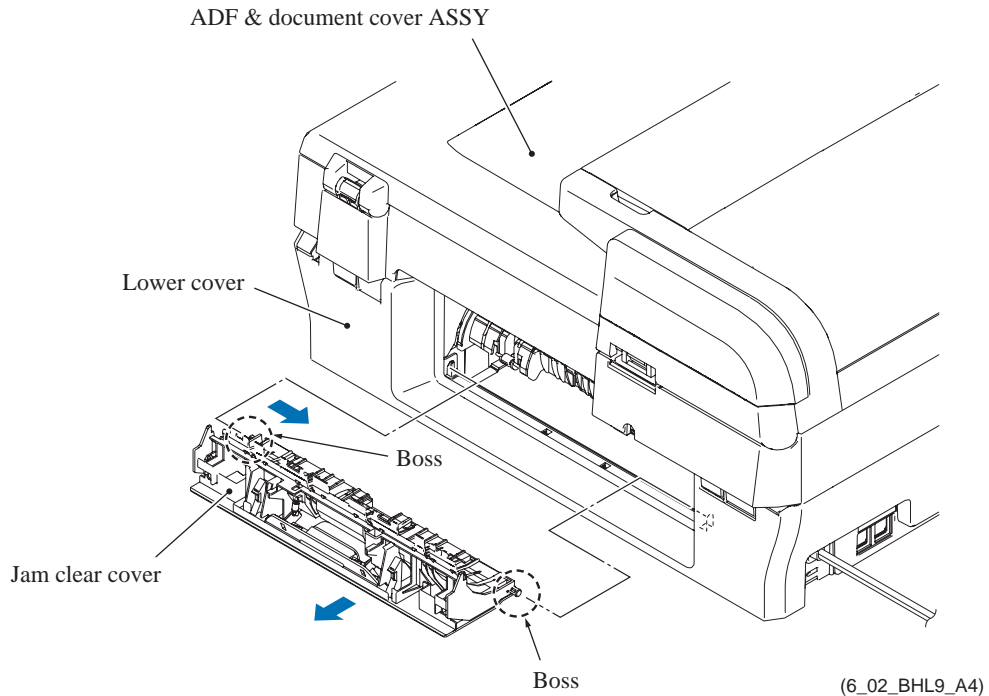
(Note 4) The carriage PCB in the head/carriage unit has the paper width sensor, head thermistor, and CR encoder sensor.

(Note 5) The ink refill ASSY has the ink cartridge detection sensor PCB (having four ink cartridge detection sensors) and ink empty sensor PCB (having four ink empty sensors and the casing internal temperature thermistor).

(Note 6) The maintenance unit has the purge cam switch and cap lift cam switch. The ASF motor unit has the ASF encoder sensor.

6.1.1 Jam Clear Cover

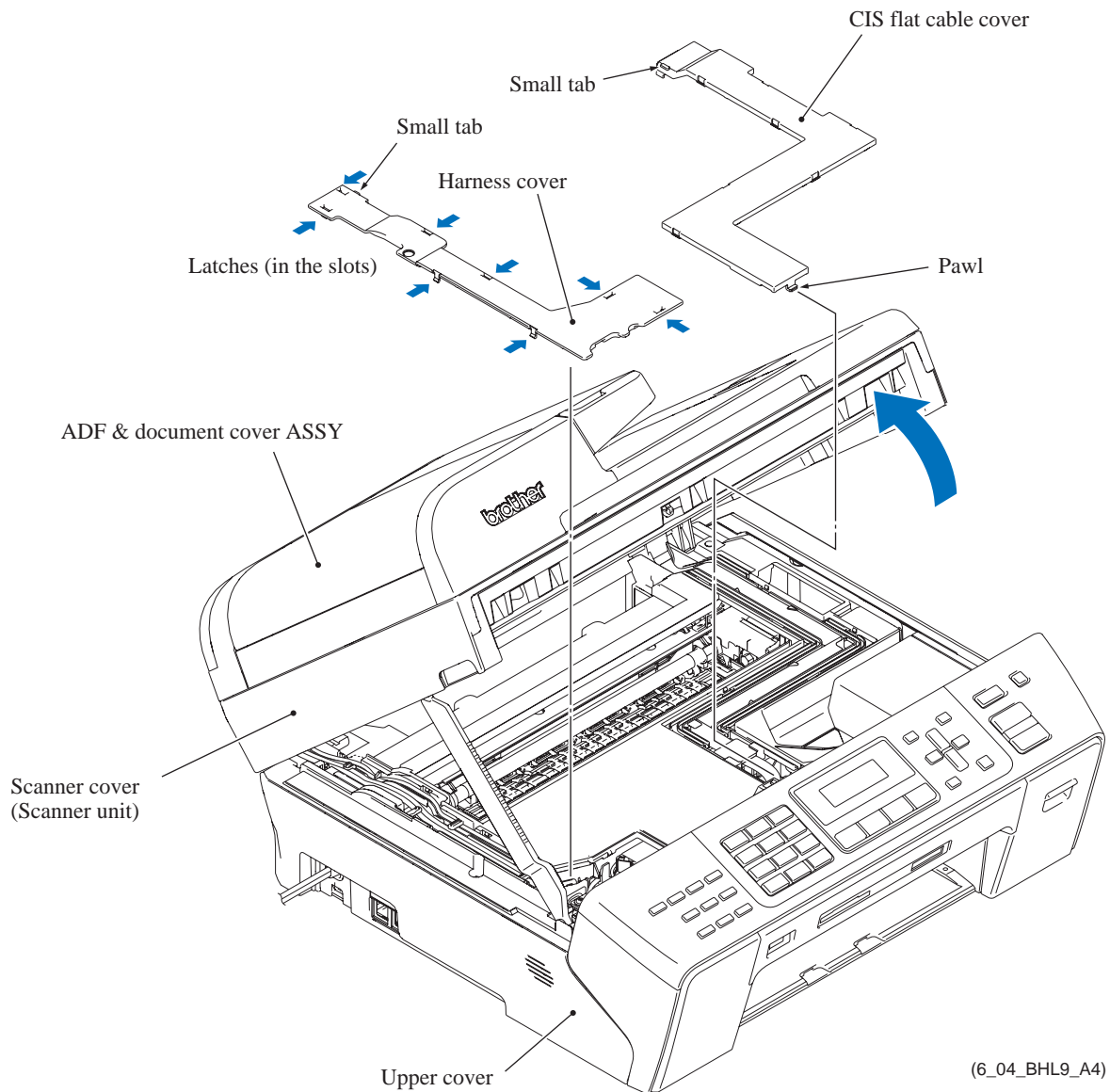
- (1) Open the jam clear cover.
- (2) Press the left end of the jam clear cover inwards with the tip of a flat screwdriver to release the *left* boss from the lower cover.



6.1.2 Scanner Cover (Scanner Unit)

The scanner cover should be removed together with the ADF & document cover ASSY whose removal procedure is given in [Section 6.1.3](#). The disassembly of the ADF & document cover ASSY is detailed in [Section 6.1.4](#).

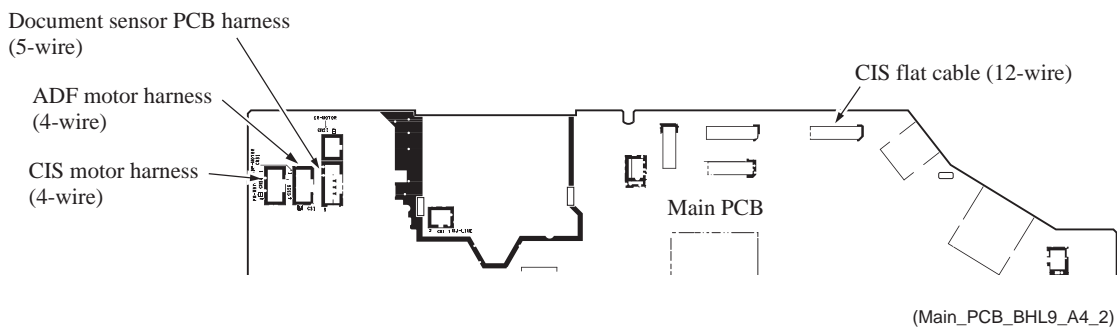
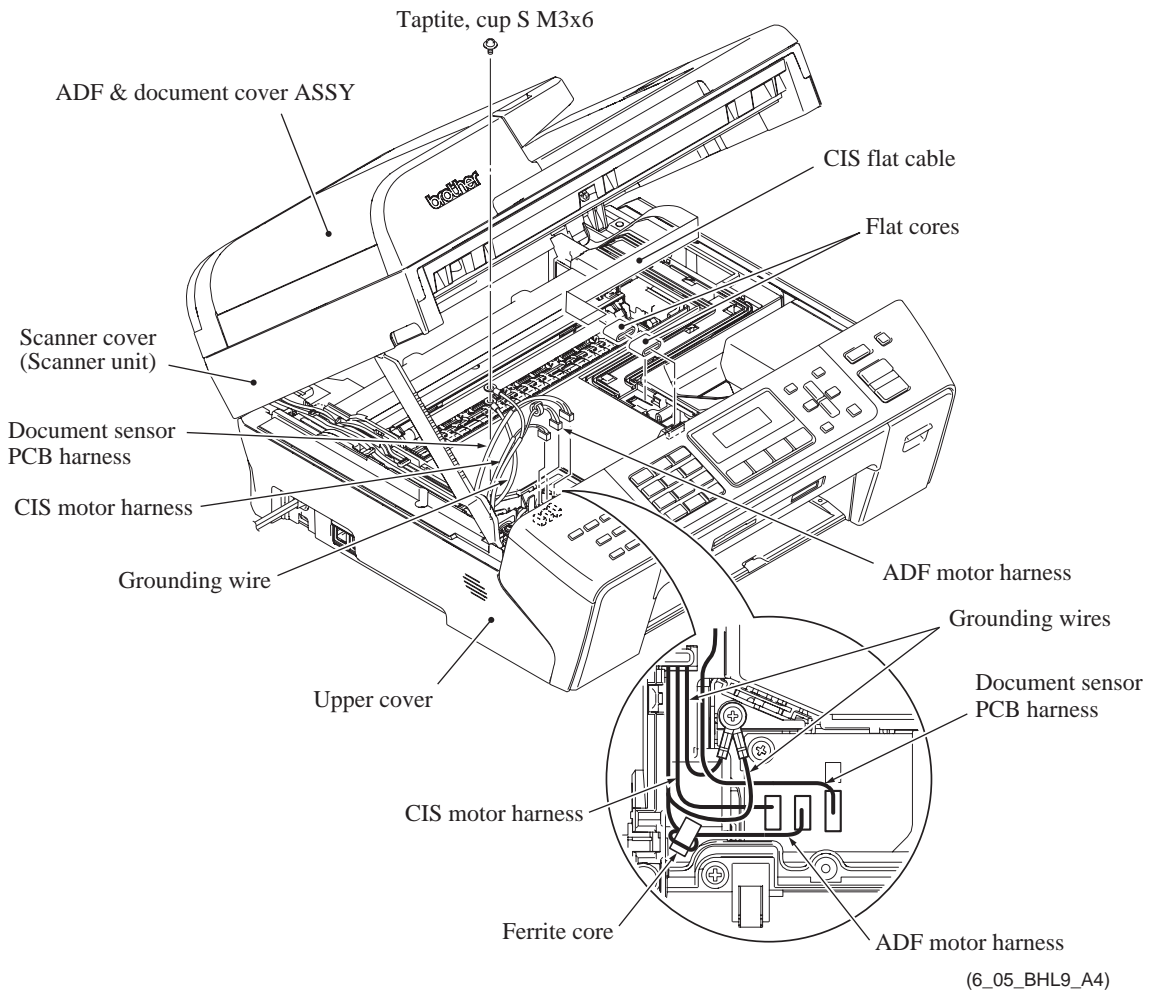
- (1) Open the scanner cover until it locks.
- (2) Remove the CIS flat cable cover by pulling up the small tab.
Remove the harness cover by pulling up the small tab to release the latches.



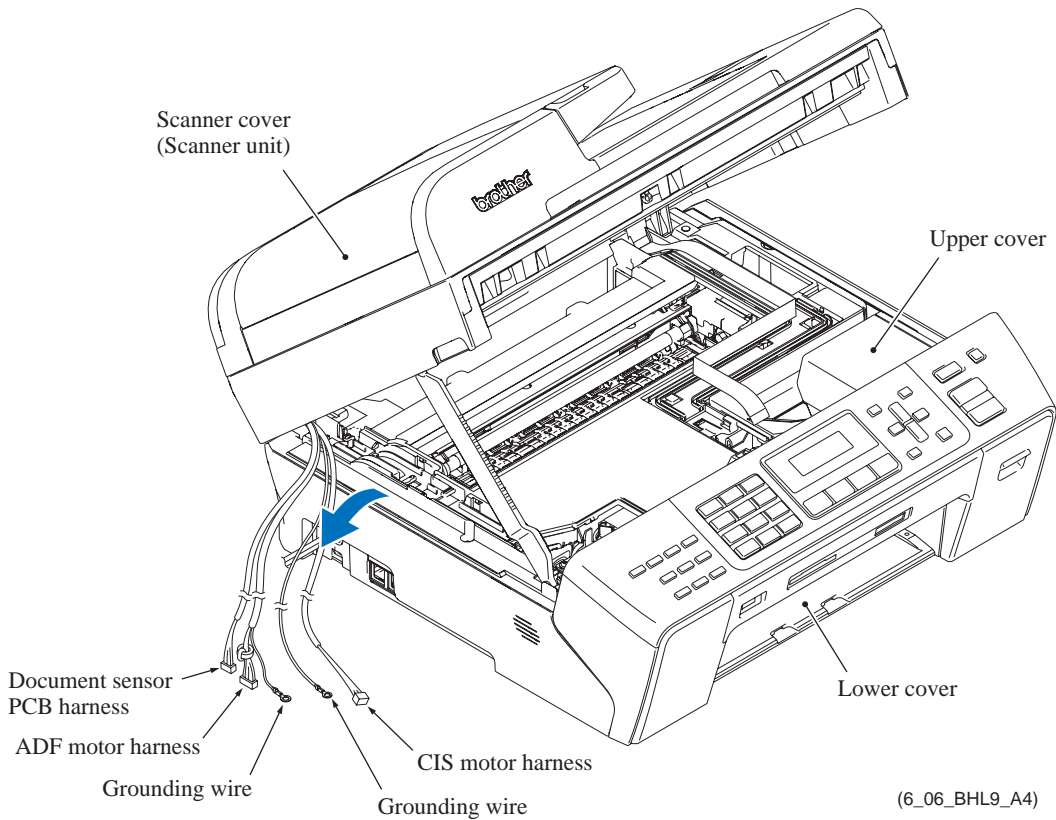
- (3) Disconnect the CIS flat cable from the main PCB, pull it to the rear through the two flat cores, and then release it from the cable guides. Unlatch the flat cores and take them out of the upper cover.

NOTE: After disconnecting the flat cable(s), check that each cable is not damaged at its end or short-circuited. When connecting the flat cable(s), do not insert it at an angle. After insertion, check again that it is not at an angle.

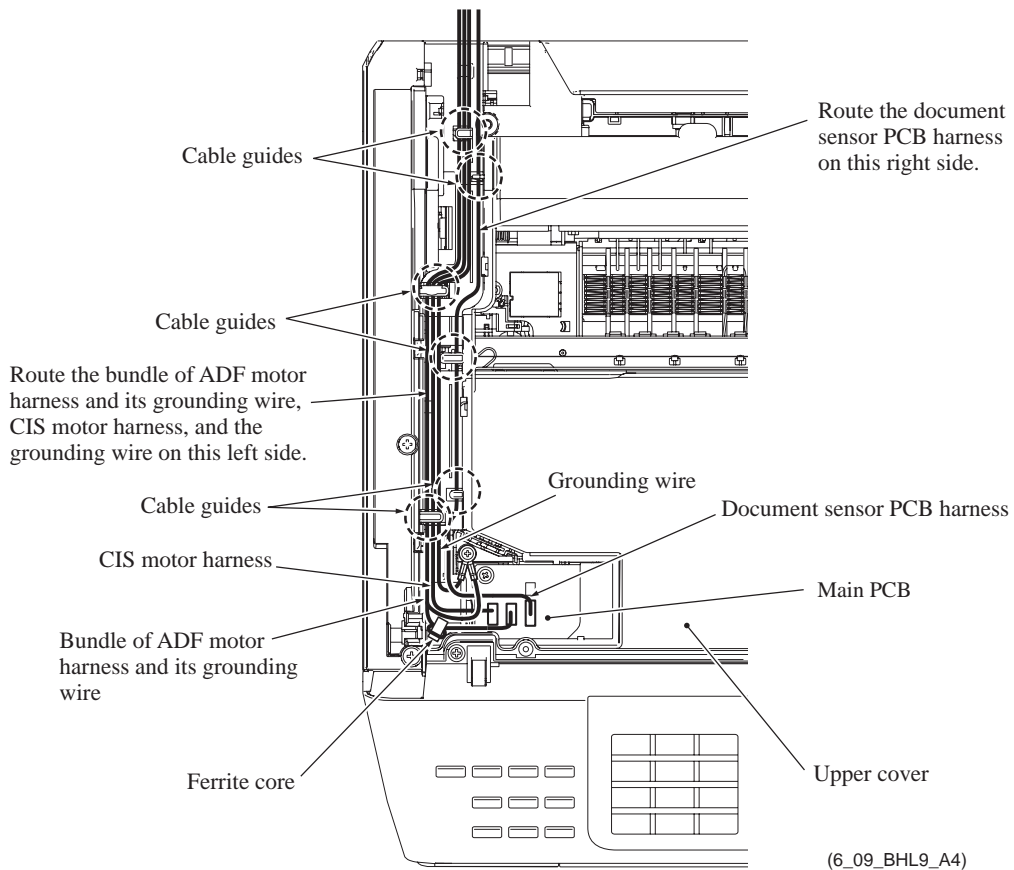
- (4) Release the two grounding wires by removing the screw.
- (5) Disconnect the following harnesses from the main PCB.
 - ADF motor harness (4-wire)
 - CIS motor harness (4-wire)
 - Document sensor PCB harness (5-wire)



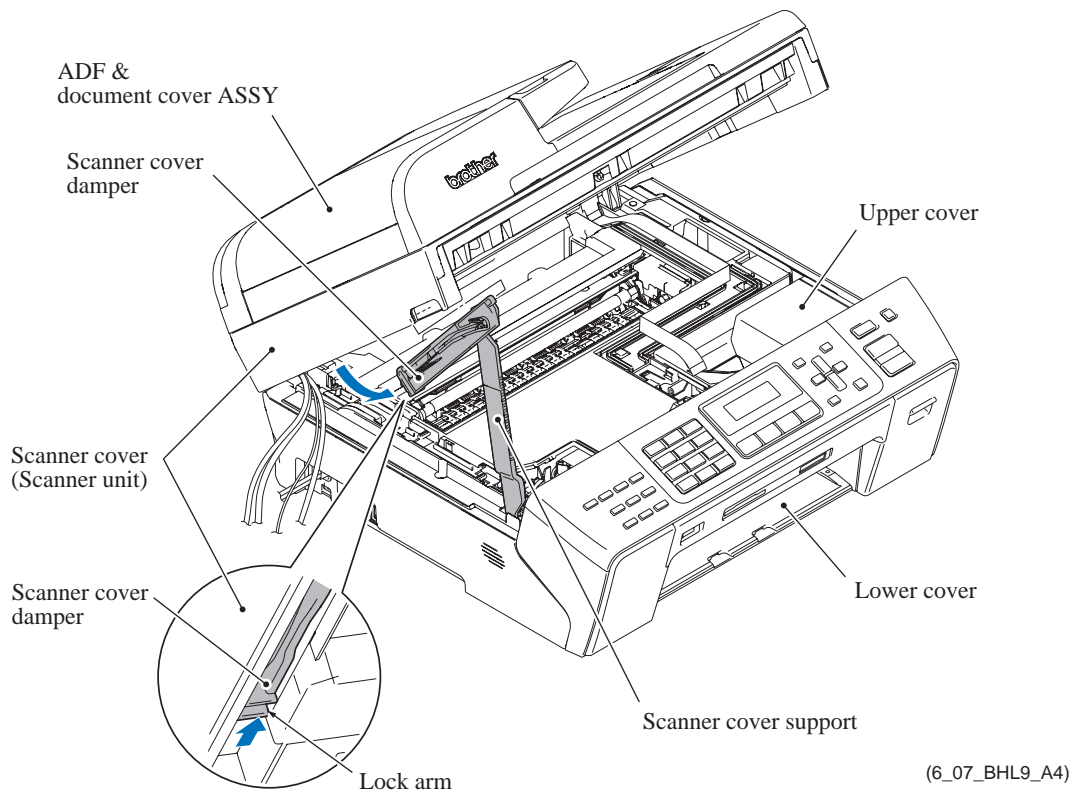
- (6) Release the harnesses and grounding wire from the cable guides provided at the left end of the upper cover.



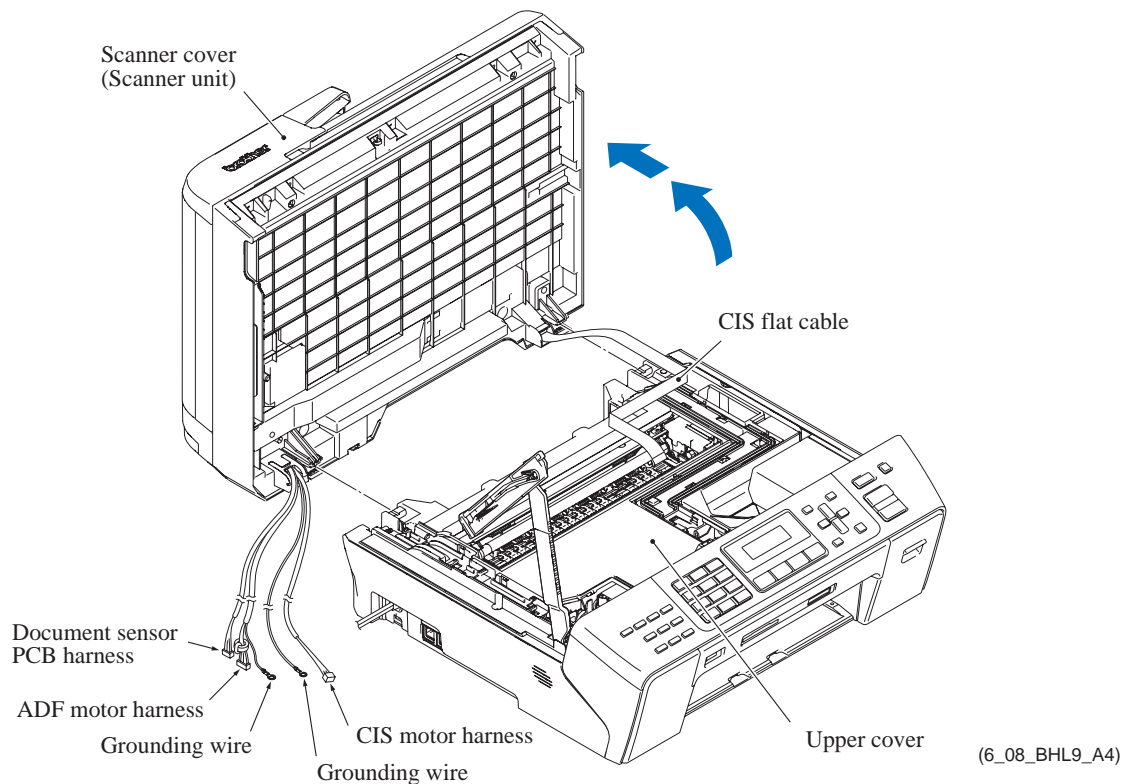
Assembling Note: Route the document sensor PCB harnesses, ADF motor harness, CIS motor harness, and grounding wires as shown below.



- (7) While supporting the scanner cover by hand, pull the lock arm provided on the rear of the scanner cover damper and release the damper from the scanner cover.

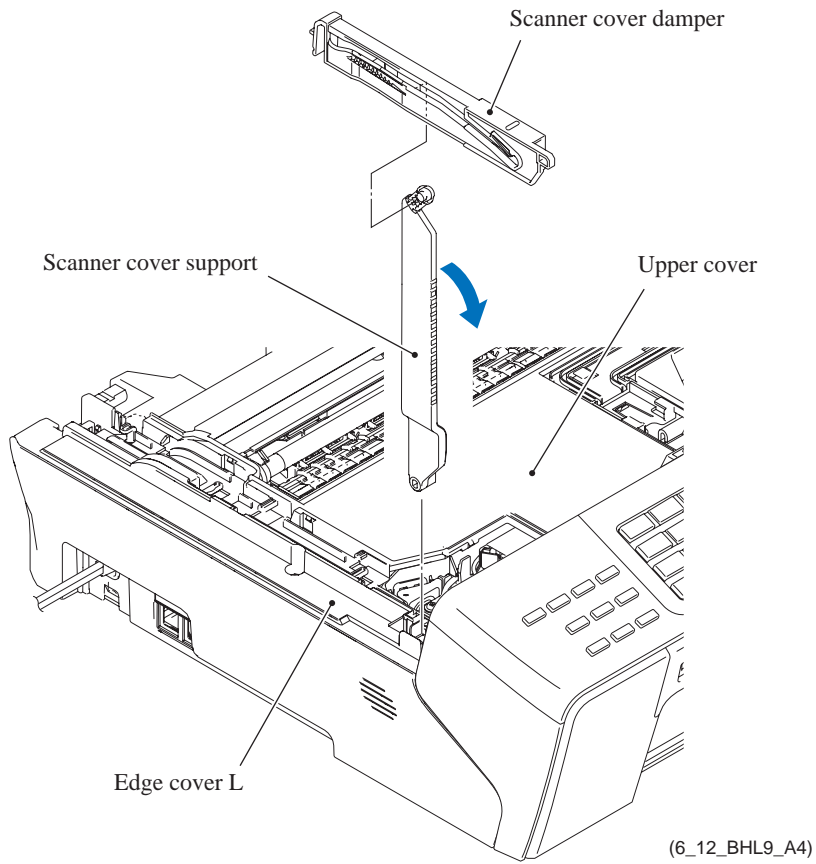


- (8) Fully open the scanner cover and pull it to the rear and off the machine.



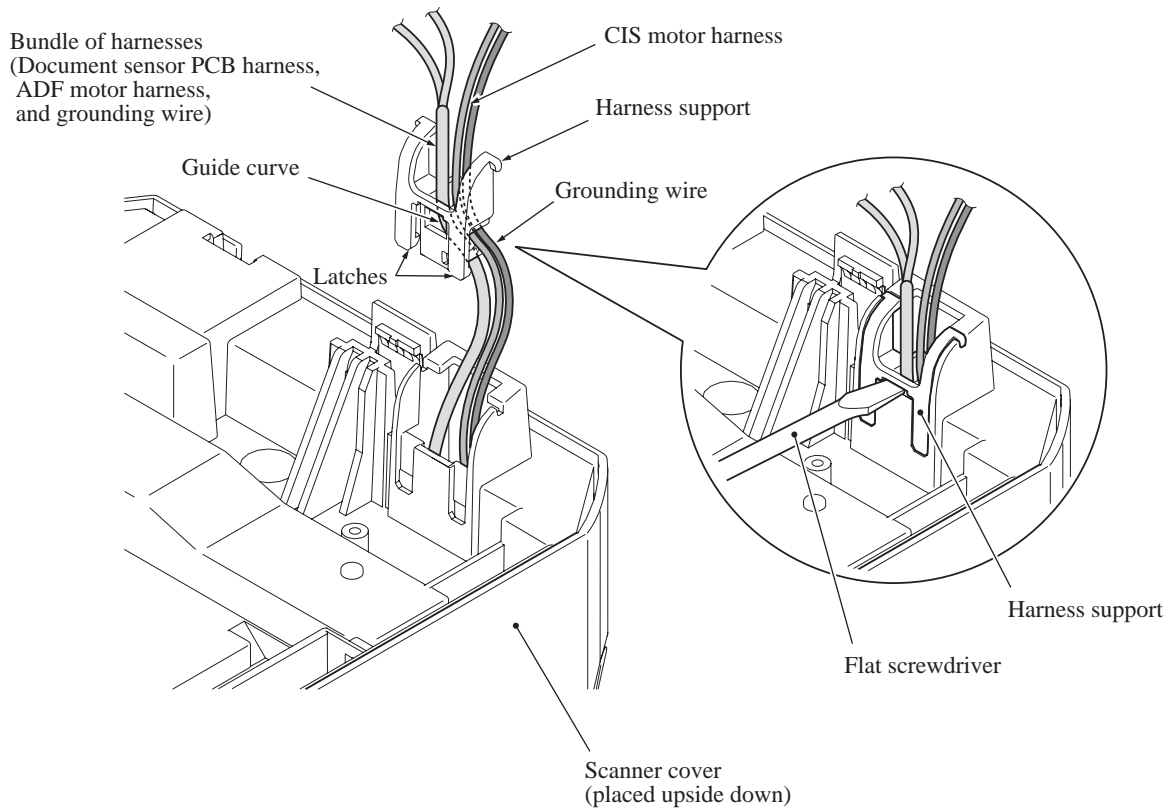
Assembling Note: If you replace the scanner cover, specify the CIS type into the EEPROM in the maintenance mode (Function code 59), referring to [Chapter 9, Section 9.4.16](#). After that, acquire the white level data and set the CIS scanner area in the maintenance mode (Function code 55), referring to [Chapter 9, Section 9.4.14](#).

- (9) Turn the scanner cover support upright and pull it out of the edge cover L together with the scanner cover damper.
- (10) Remove the scanner cover damper from the scanner cover support.



6.1.3 ADF & Document Cover ASSY

- (1) Place the scanner cover upside down.
- (2) Insert the tip of a flat screwdriver into the slit provided in the harness support and twist it to release the two latches and then take the harness support out of the scanner cover.



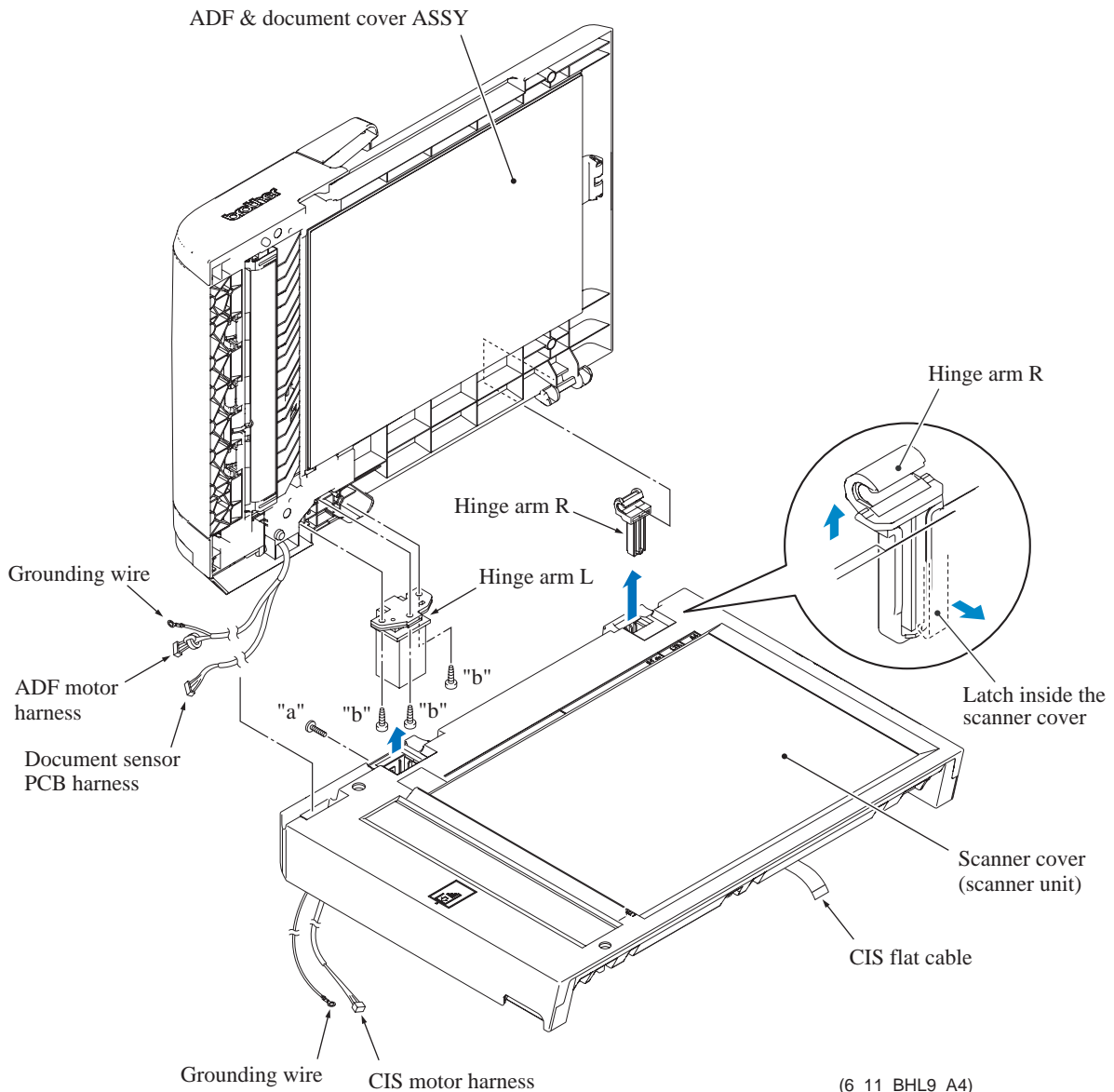
(6_10_BHL9_A4)

Assembling Note: Before fitting the harness support (shown above) into the scanner cover, route the document sensor PCB harnesses and the bundle of ADF motor harness and its grounding wire through the guide curve provided in the harness support. The CIS motor harness and the grounding wire should be placed at the rightmost position (viewed from the bottom) in the square opening in the scanner cover.

- (3) Turn the scanner cover right side up.
- (4) Remove the screw "a" from the rear of the scanner cover.
- (5) Fully open the ADF & document cover ASSY.

Note: Lifting up the ASSY without fully opening it in step (6) opens the hinge arm L suddenly and unexpectedly with great force. It is DANGEROUS!

- (6) Slightly lift up the ADF & document cover ASSY, insert the tip of a flat screwdriver into the slit at the front of the hinge arm R, and push the latch provided inside the scanner cover to the front to release the hinge arm R. Then pull the ADF & document cover ASSY up and off the scanner cover.
- (7) Slightly turn the hinge arm R inwards and remove it from the ADF & document cover ASSY.
- (8) Remove the three screws "b" from the hinge arm L and release it from the ADF & document cover ASSY.



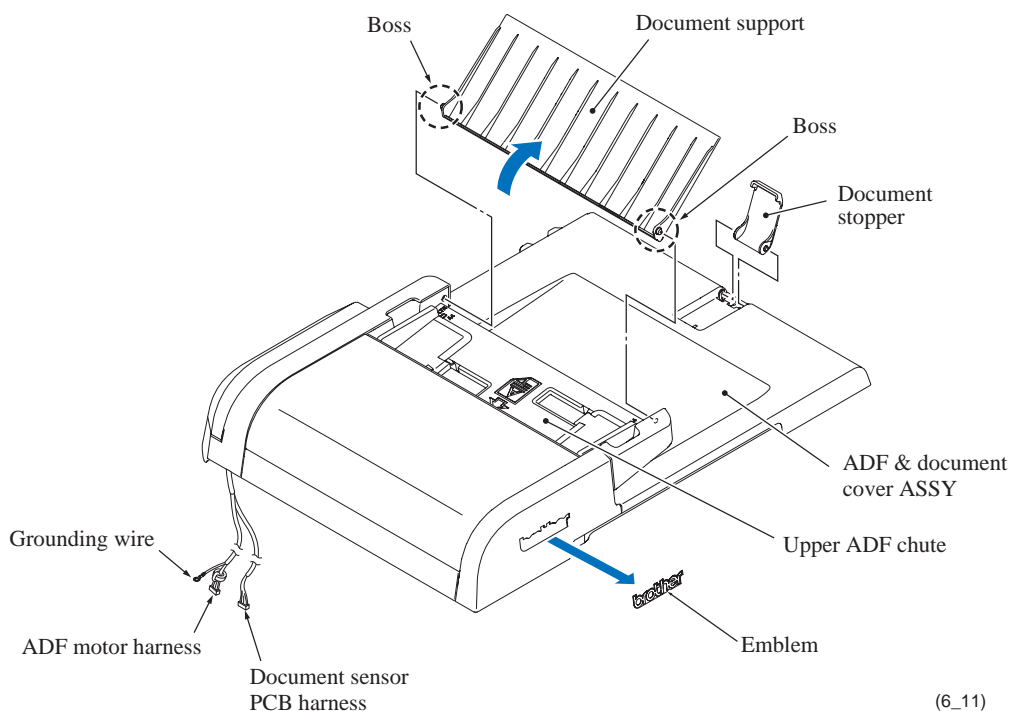
(6_11_BHL9_A4)

"a" and "b": Taptite, bind B M4x12

6.1.4 Disassembly of ADF & Document Cover ASSY

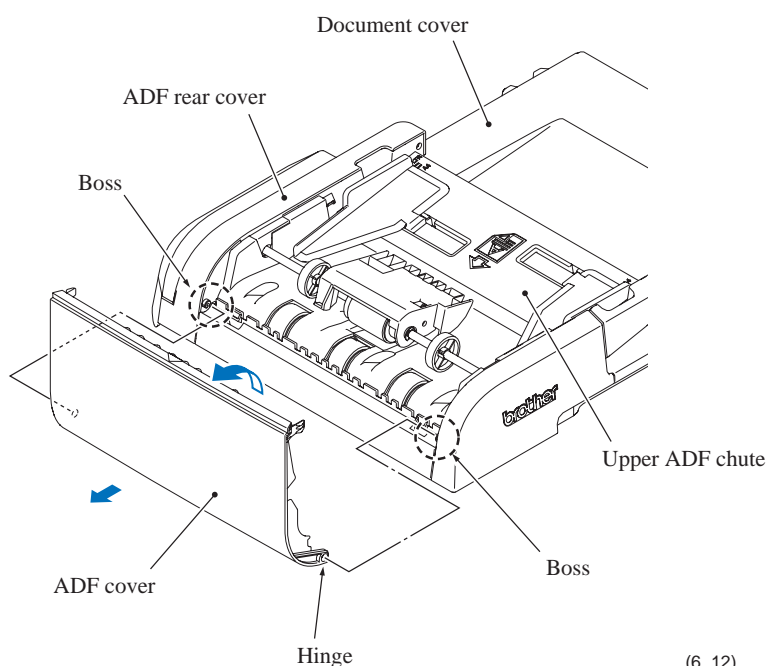
Brother emblem, document support, and document stopper

- (1) Remove the brother emblem from the upper ADF chute.
Note: Remove the brother emblem only when it should be replaced. Once removed, it will become unusable and a new one will have to be put back in.
- (2) Open the document support, warp it slightly, and remove its front and rear bosses from the holes provided in the upper ADF chute.
- (3) Remove the document stopper.



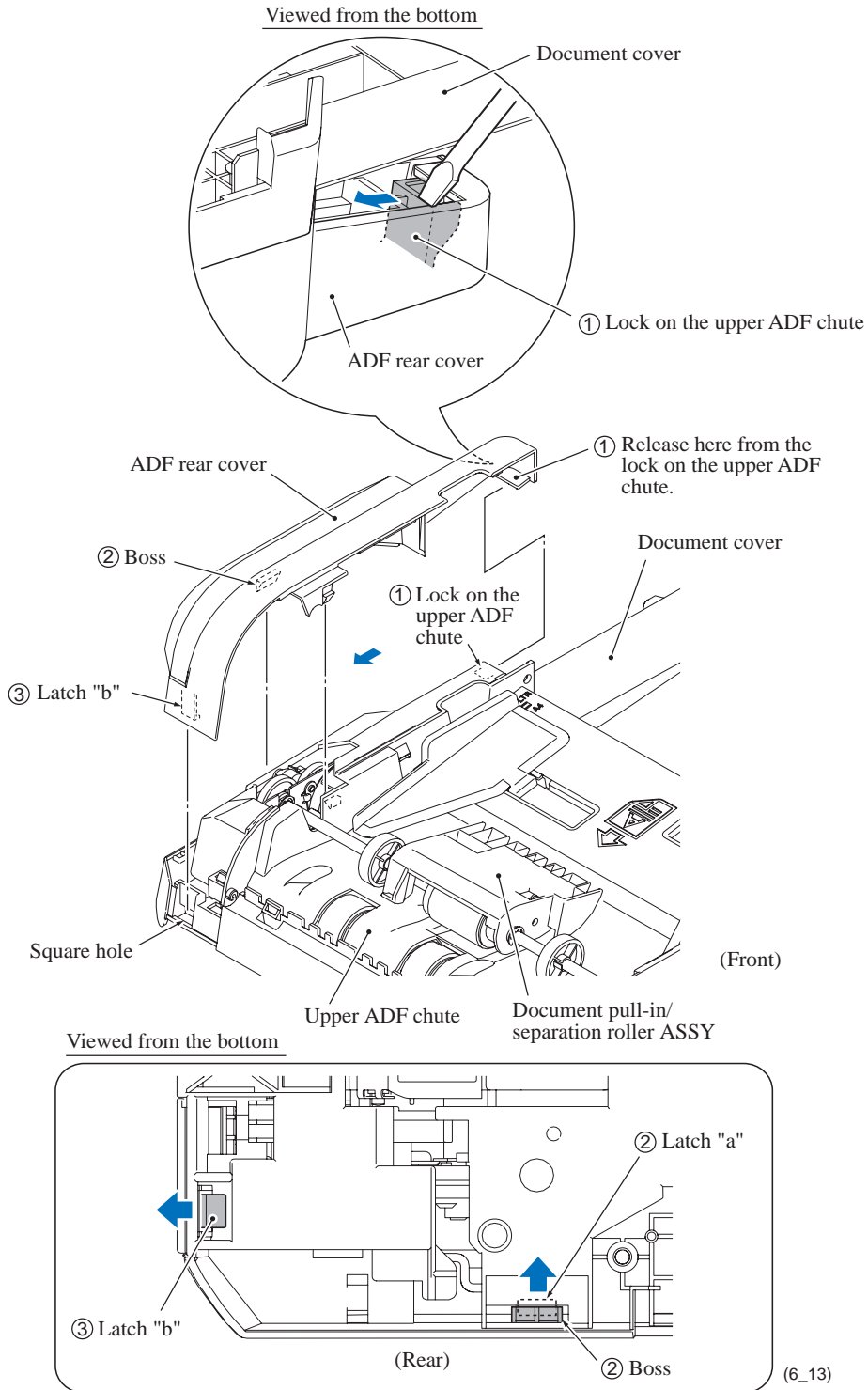
ADF cover

- (4) Open the ADF cover, warp it slightly, and remove it from the front and rear bosses provided on the upper ADF chute.



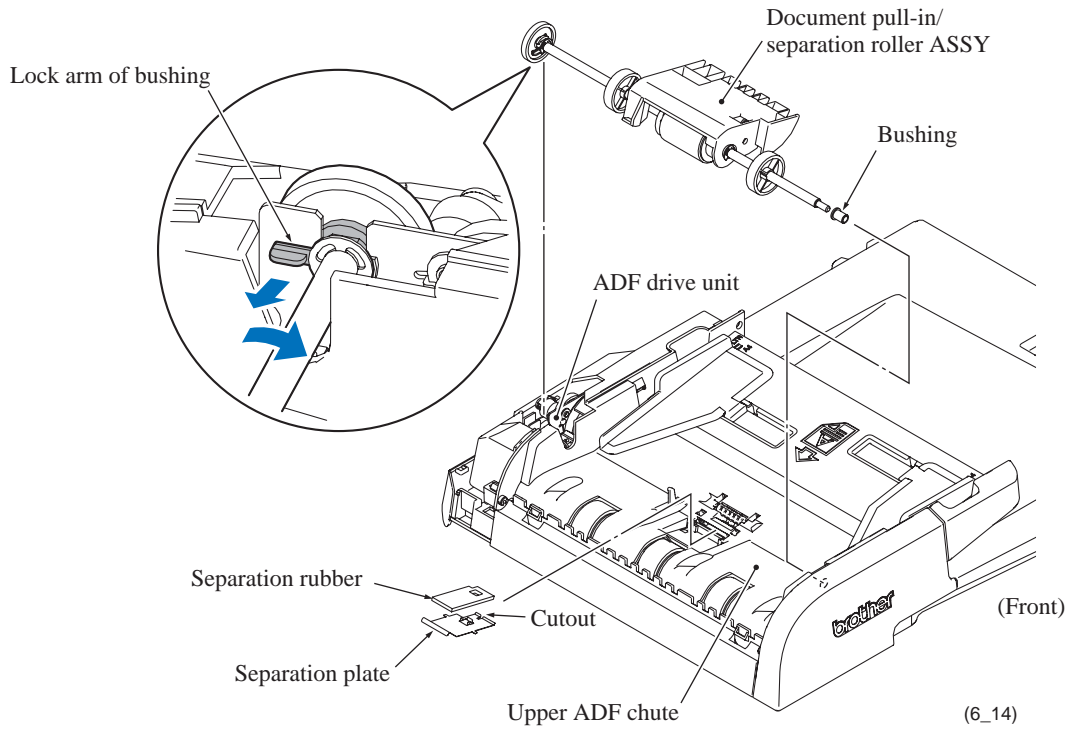
ADF rear cover

- (5) Turn the ADF & document cover ASSY upside down with the ADF unit facing to the left.
- (6) As shown below, press the lock on the upper ADF chute to the left with the tip of a flat screwdriver to release the right rear corner of the ADF rear cover (①). Next, release latch "a" on the document cover inwards (②) and latch "b" on the ADF rear cover outwards (③) through the square openings provided in the document cover, using the tip of a flat screwdriver.



Document pull-in/separation roller ASSY, separation rubber and plate

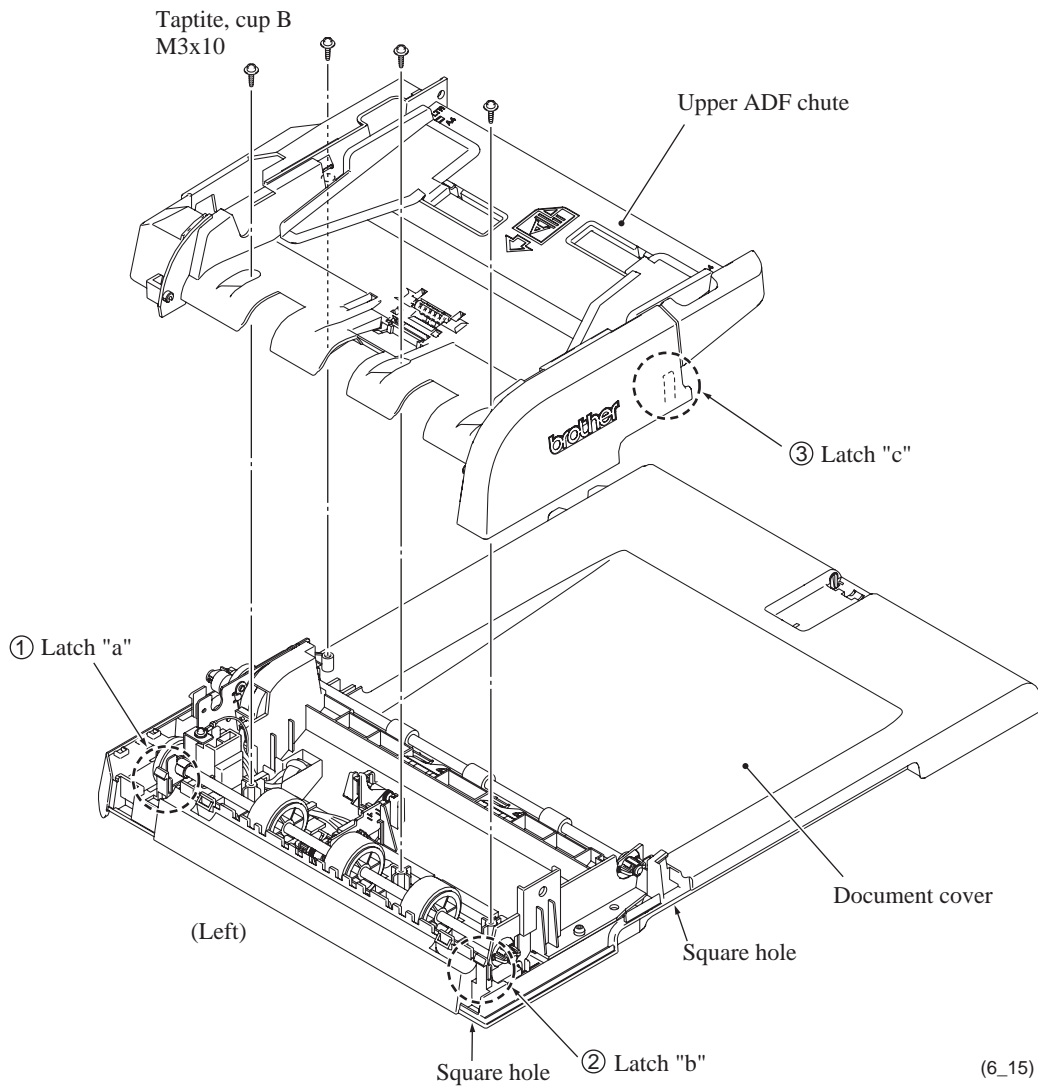
- (7) At the rear end of the shaft of the document pull-in/separation roller ASSY, release the lock arm of the bushing from the hole provided in the ADF drive unit and turn it up. Pull the document pull-in/separation roller ASSY up and out of the upper ADF chute.
NOTE: Take care not to drop the bushing at the front end of the roller shaft.
- (8) Lightly pull up the left end of the separation pad and out of the upper ADF chute together with the separation rubber.



Assembling Note: When putting the separation plate and its rubber back into place, fully insert the plate until the cutout becomes fitted over the boss on the upper ADF chute.

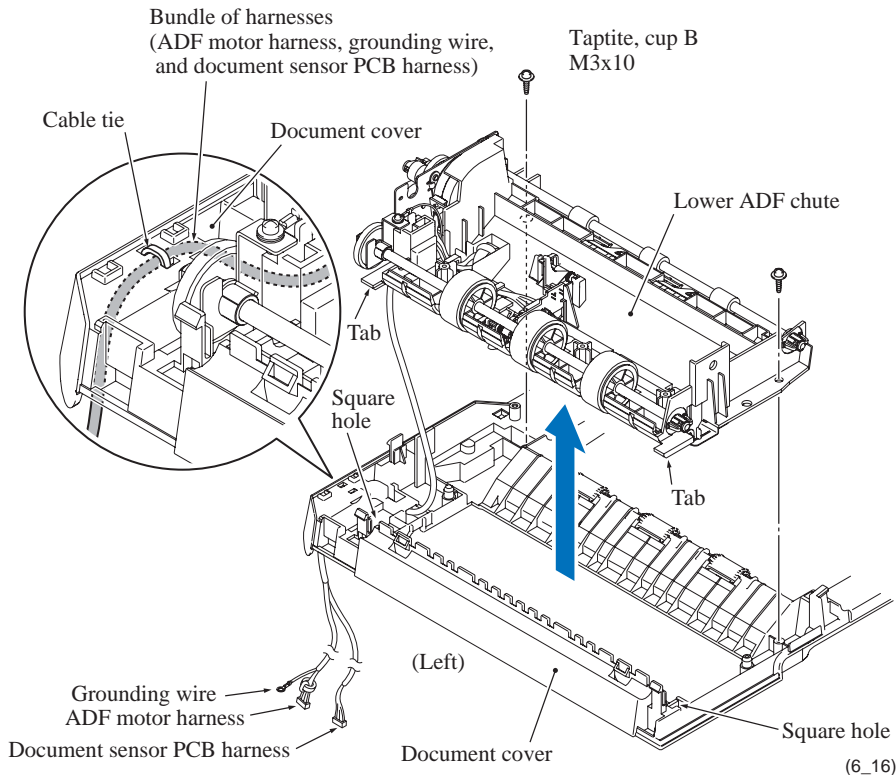
Upper ADF chute

- (9) Remove the four screws from the upper ADF chute.
- (10) Release the latch "a" on the left rear of the document cover (①), insert the tip of a flat screwdriver from the two square holes provided on the bottom of the document cover to release the latches "b" (②) and "c" (③) and lift the upper ADF chute up and off the document cover.



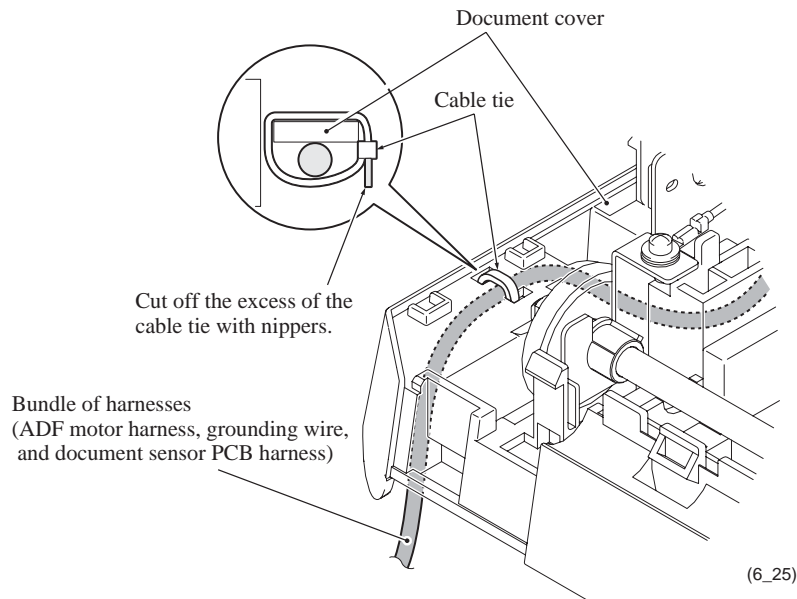
Lower ADF chute

- (11) Cut off the cable tie that binds a bundle of harnesses (ADF motor harness and its grounding wire, and document sensor PCB harness) to the document cover.
- (12) Remove the two screws from the lower ADF chute, and take the lower ADF chute off the document cover.



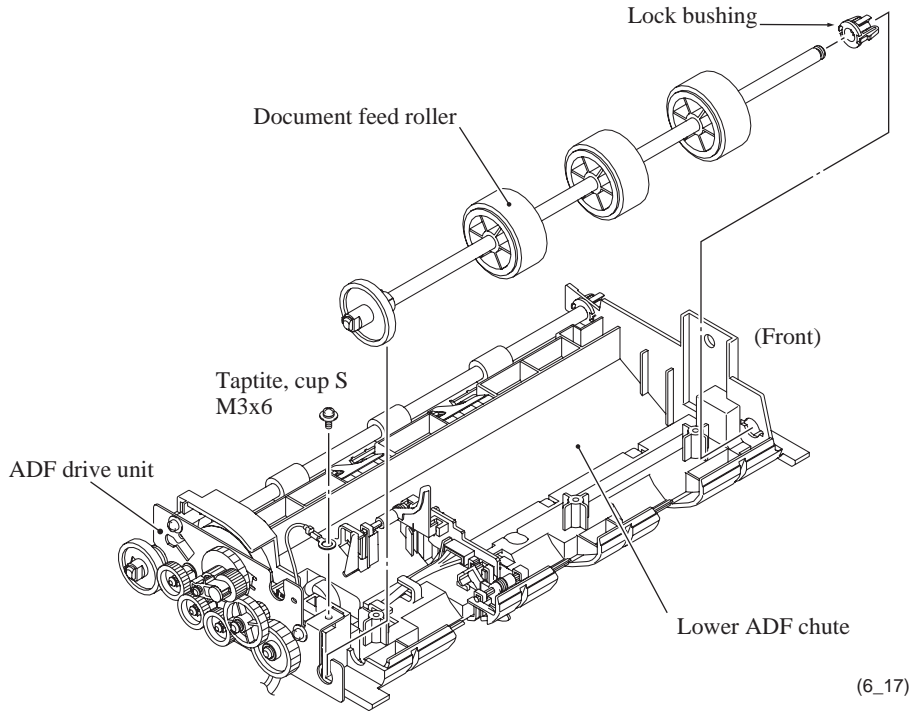
Assembling Notes:

- When mounting the lower ADF chute on the document cover, insert the two tabs provided on the left side of the lower ADF chute into the square holes in the document cover.
- After mounting the lower ADF chute, be sure to route a bundle of harnesses (ADF motor harness and its grounding wire, and document sensor PCB harness) on the underside of the document cover and secure the bundle with a cable tie as shown below. After binding, cut off the excess of the cable tie with nippers.



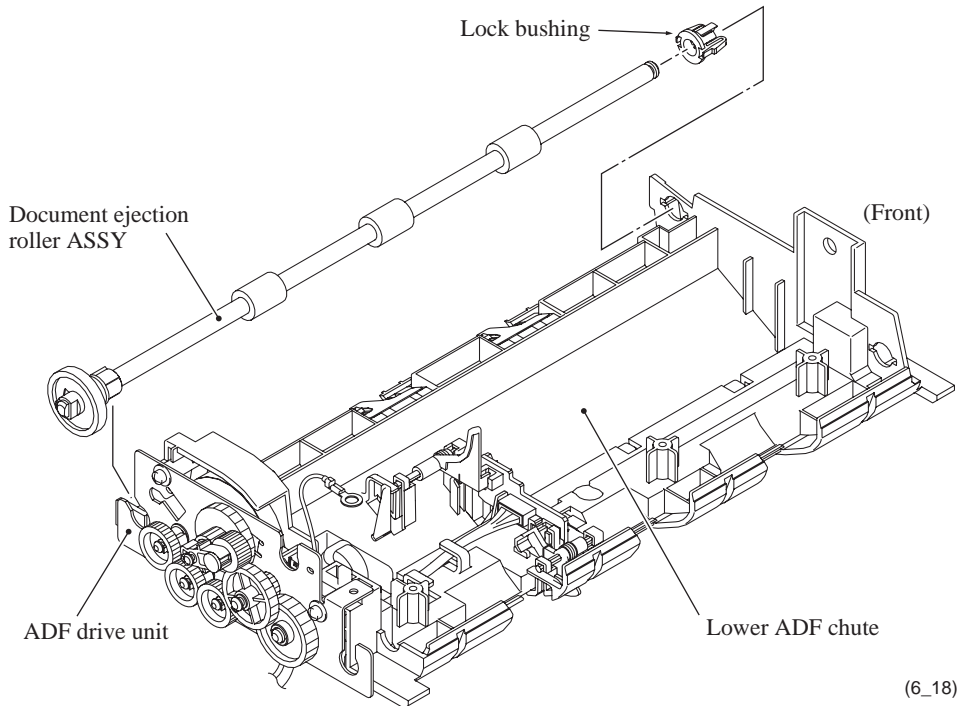
Document feed roller

- (13) At the front end of the document feed roller shaft, squeeze the lock bushing and slide the shaft to the rear. Then slide the rear bushing to the rear.
- (14) At the rear end of the document feed roller shaft, slightly lift up the shaft and slide it to the rear until its front end comes off the lower ADF chute.
- (15) Release the grounding wire from the ADF drive unit by removing the screw.



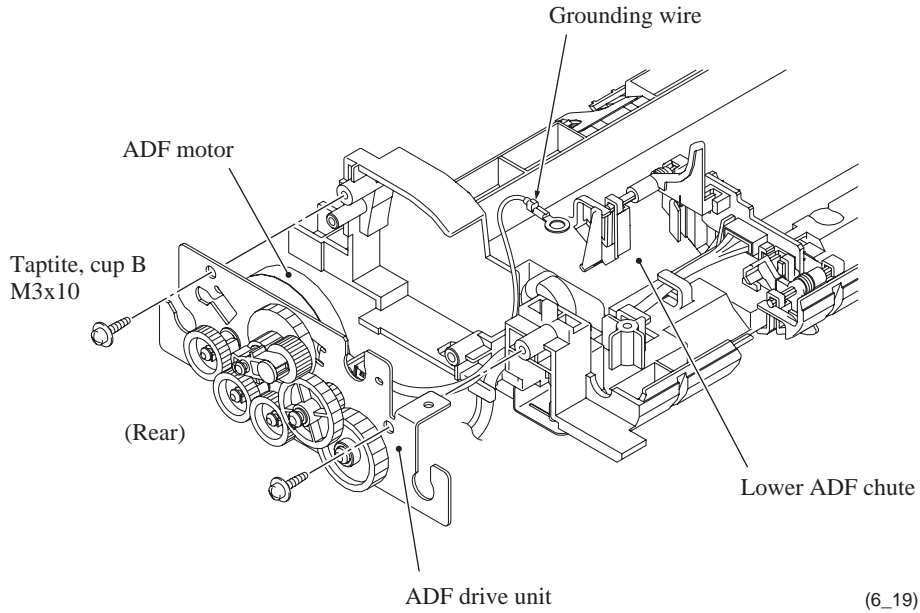
Document ejection roller ASSY

- (16) At the front end of the document ejection roller ASSY, squeeze the lock bushing and slide the ASSY to the rear. Then slide the rear bushing to the rear.
- (17) At the rear end of the document ejection roller ASSY, slightly lift up the ASSY and slide it to the rear until its front end comes off the lower ADF chute.



ADF drive unit and ADF motor

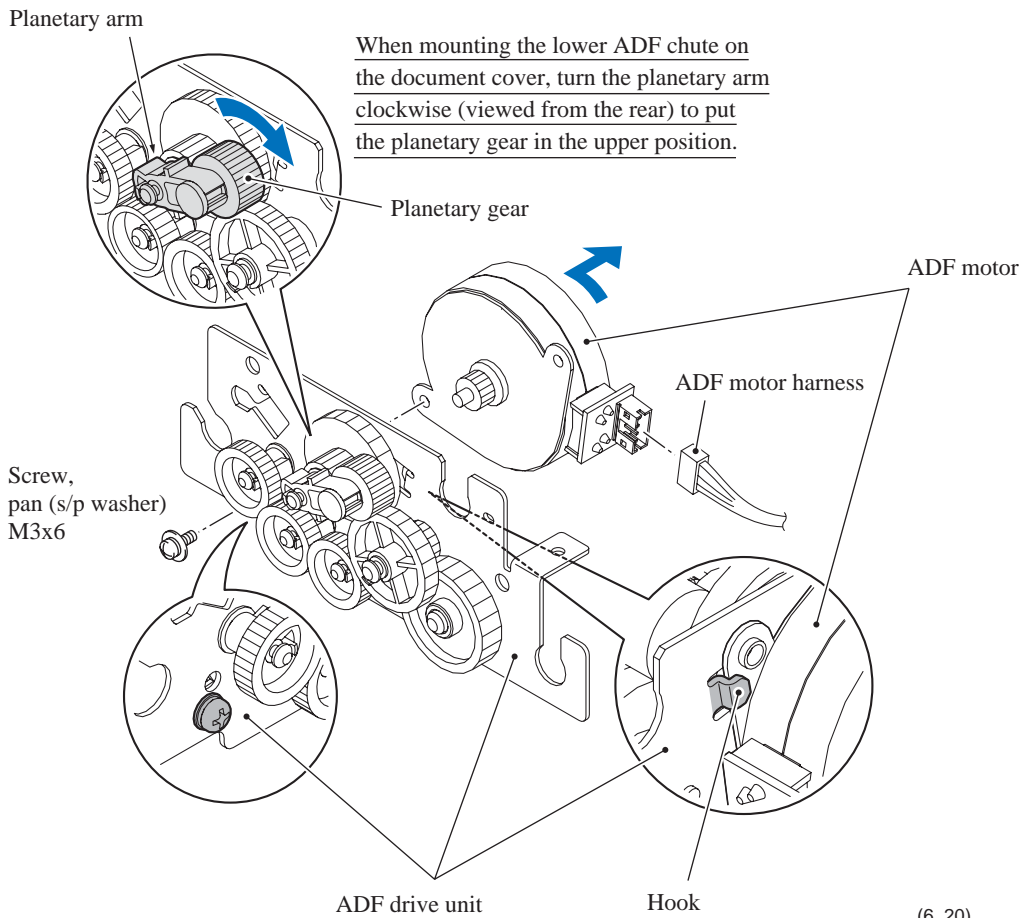
(18) Remove the two screws from the ADF drive unit and take it off the lower ADF chute.



(6_19)

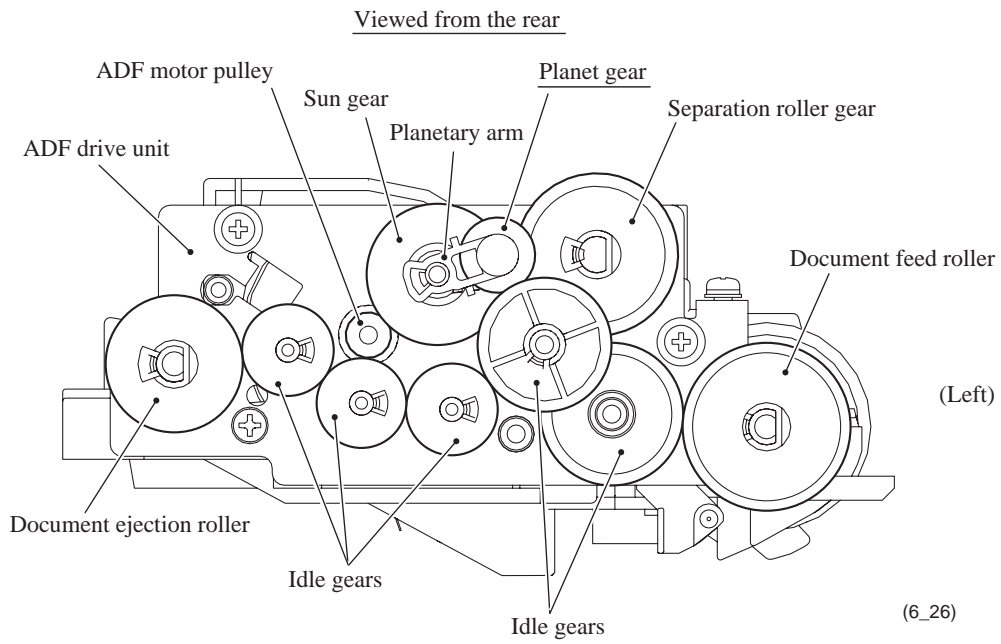
(19) Disconnect the ADF motor harness from the motor.

(20) Release the ADF motor from the drive unit by removing the screw.



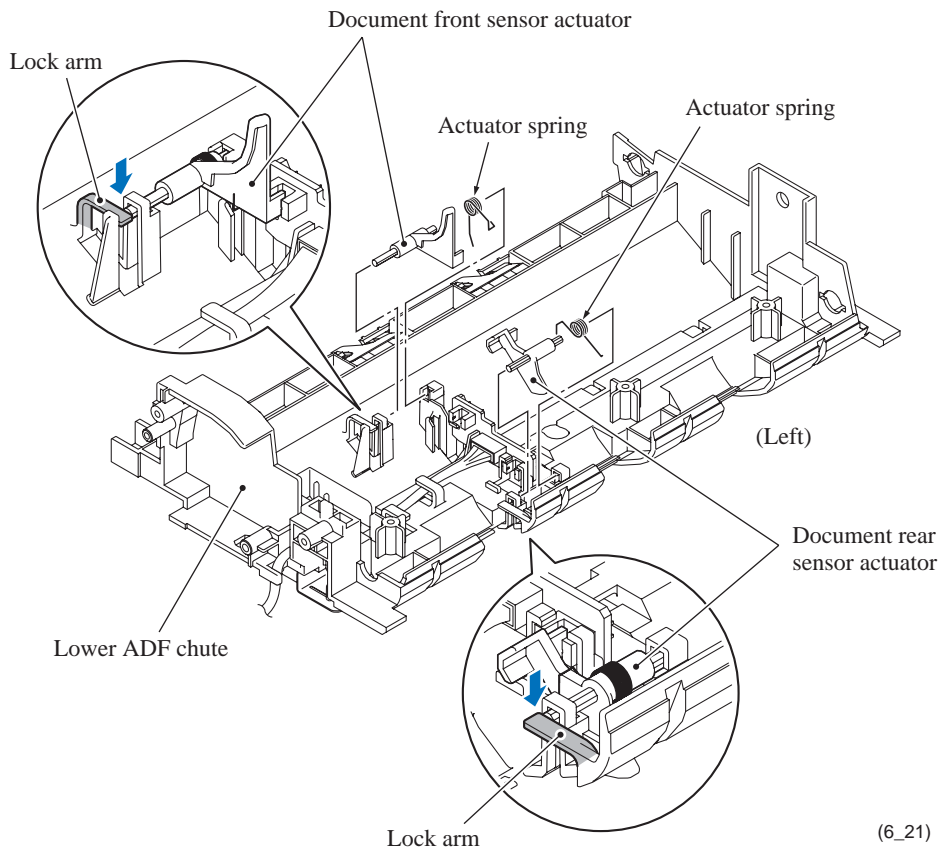
(6_20)

Assembling Note: When mounting the lower document chute on the document cover, turn the planet gear clockwise (viewed from the rear) to put it in the upper position beforehand. (See the illustration below.)

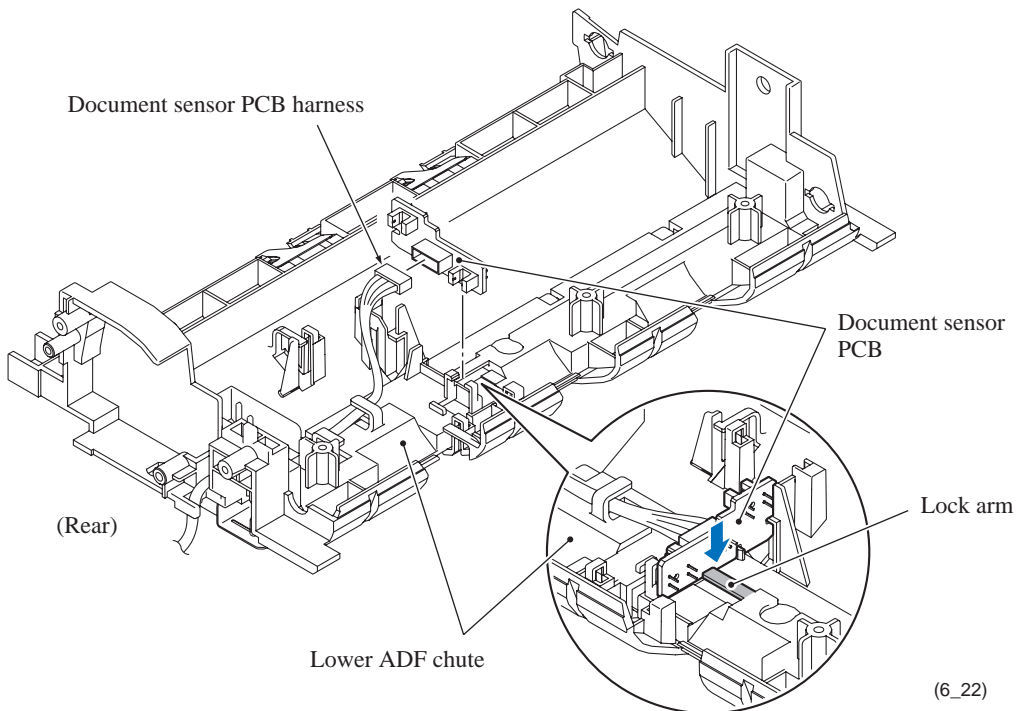


Document front and rear sensor actuators and document sensor PCB

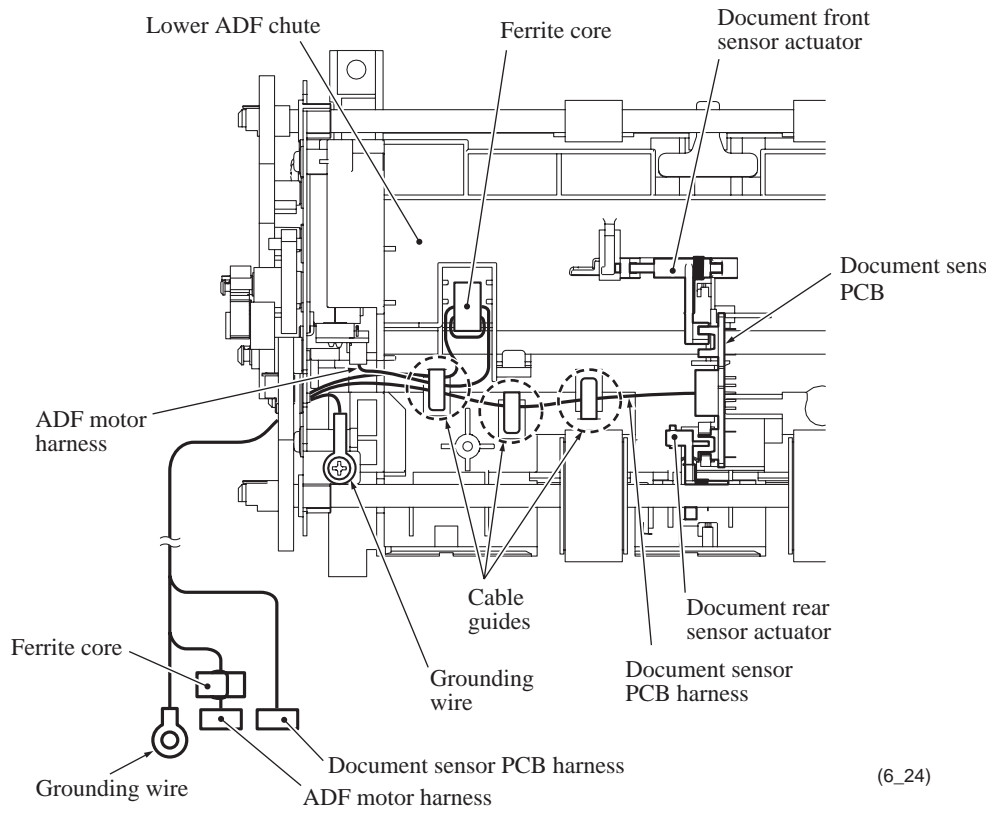
(21) At each of the document front and rear sensor actuators, lightly press the corresponding lock arm, slide the actuator towards the lock arm, and remove it together with the corresponding actuator spring.



(22) Press the lock arm and pull the left edge of the document sensor PCB to the front and upwards to remove the PCB. Then disconnect the document sensor PCB harness from the PCB.



Assembling Note: Route the ADF motor harness and its grounding wire, and document sensor PCB harness through the cable guides on the lower ADF chute as shown below.

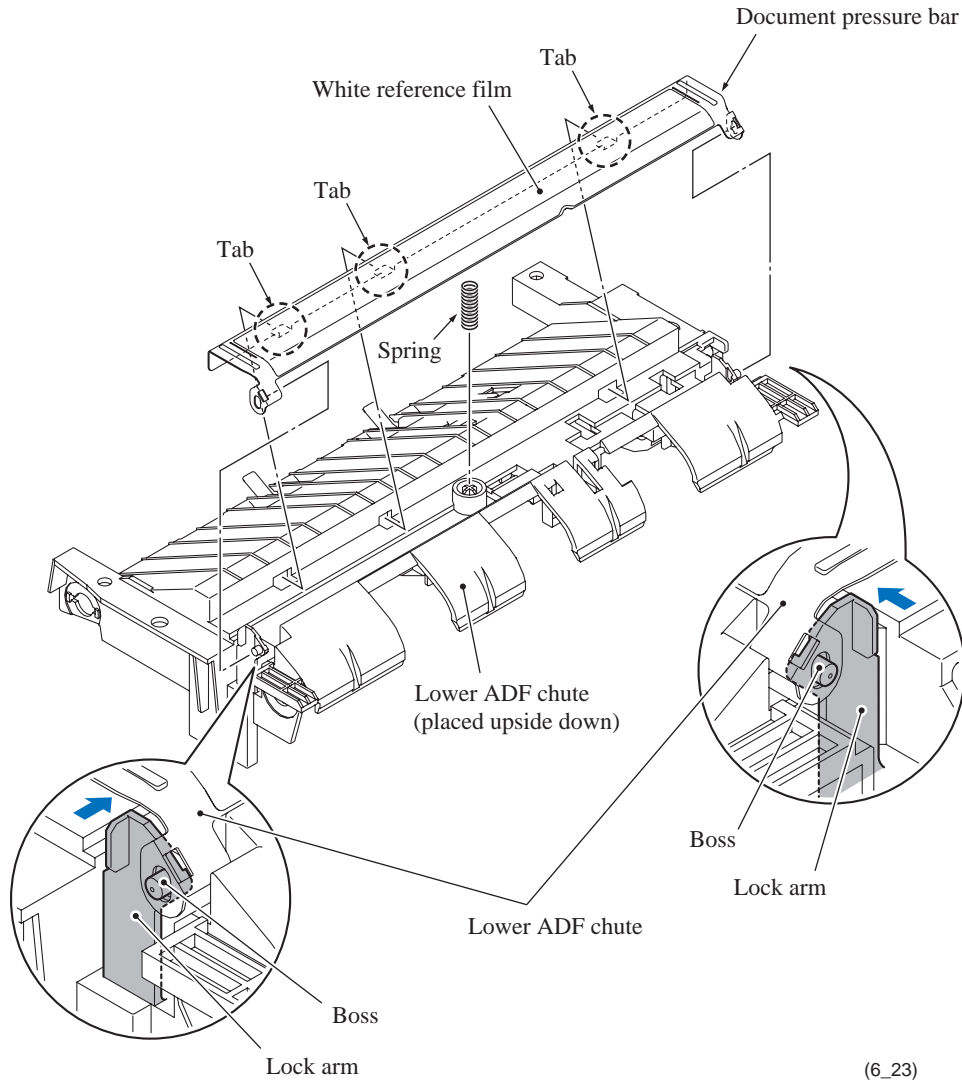


(6_24)

Document pressure bar

(23) Turn the lower ADF chute upside down.

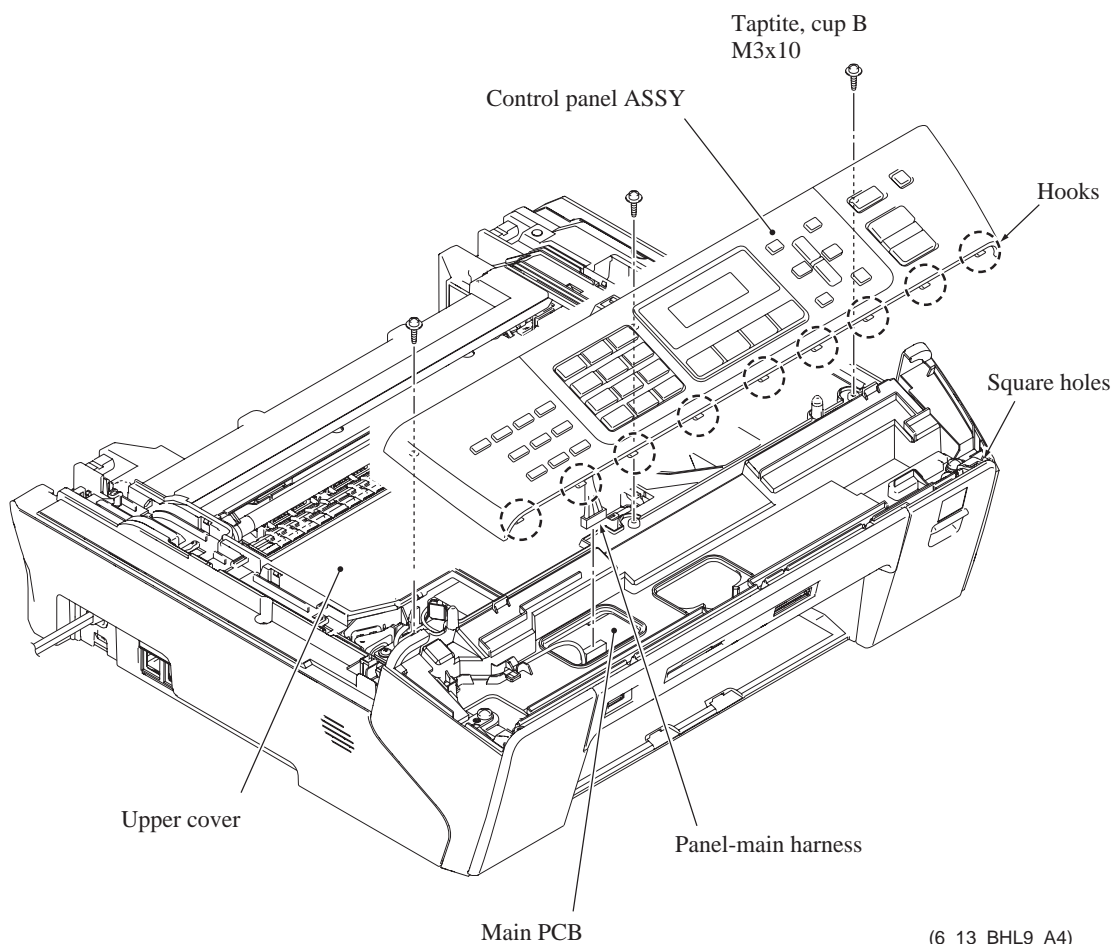
(24) Pull either one of the lock arms on the underside of the lower ADF chute inwards and release the document pressure bar. The pressure bar spring also comes off.



(6_23)

6.1.5 Control Panel ASSY

- (1) Remove three screws from the control panel ASSY.
- (2) Pull up the rear end of the control panel ASSY and turn it up slightly.
NOTE: Do not pull the control panel ASSY away from the machine since it is connected to the machine with the panel-main harness.
- (3) While holding the control panel ASSY at an angle of approx. 45°, disconnect the panel-main harness from the main PCB.



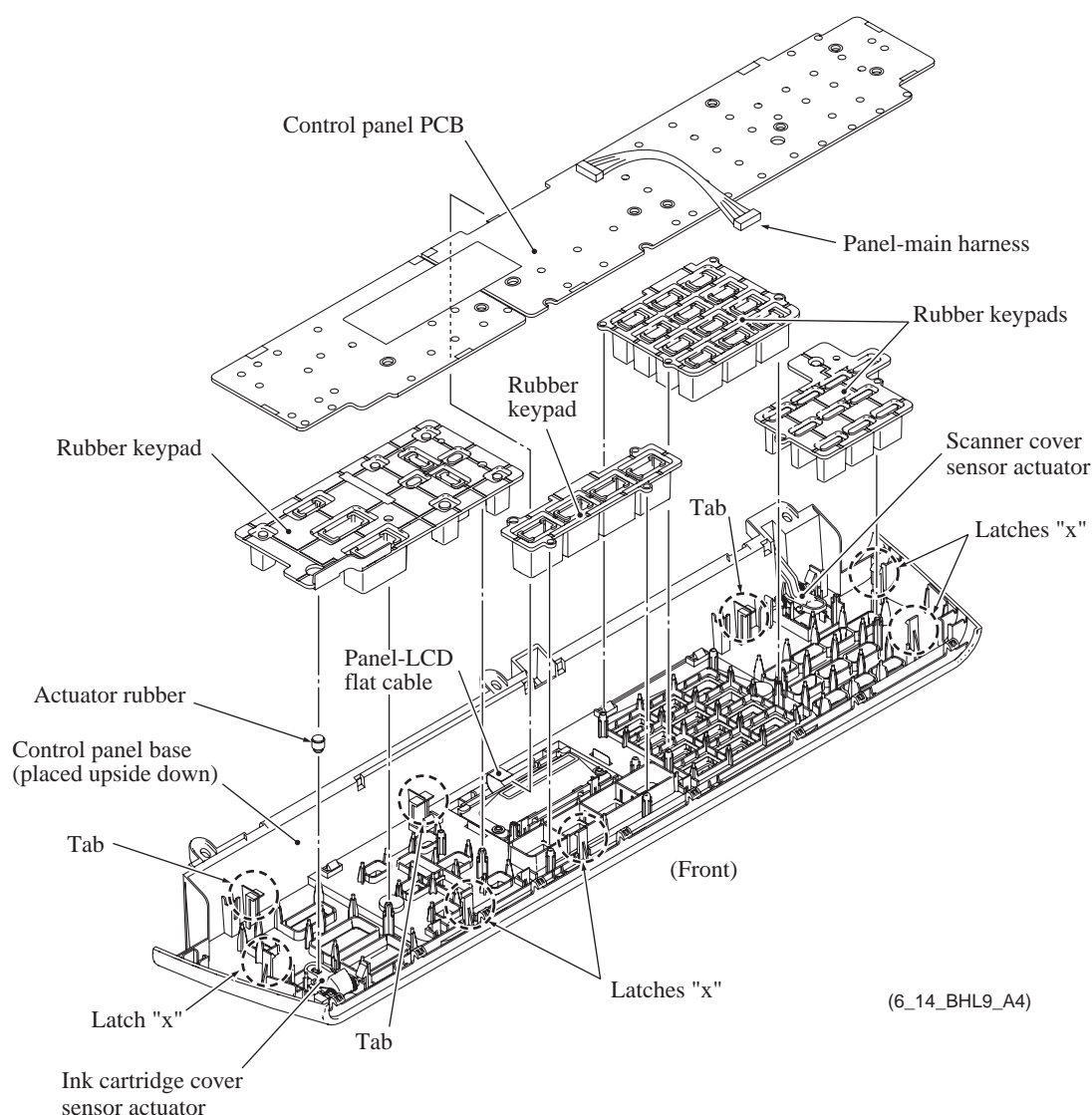
Assembling Note: When mounting the control panel ASSY on the upper cover, first fit the nine front hooks into the square holes provided in the front top of the upper cover.

6.1.6 Disassembly of Control Panel ASSY

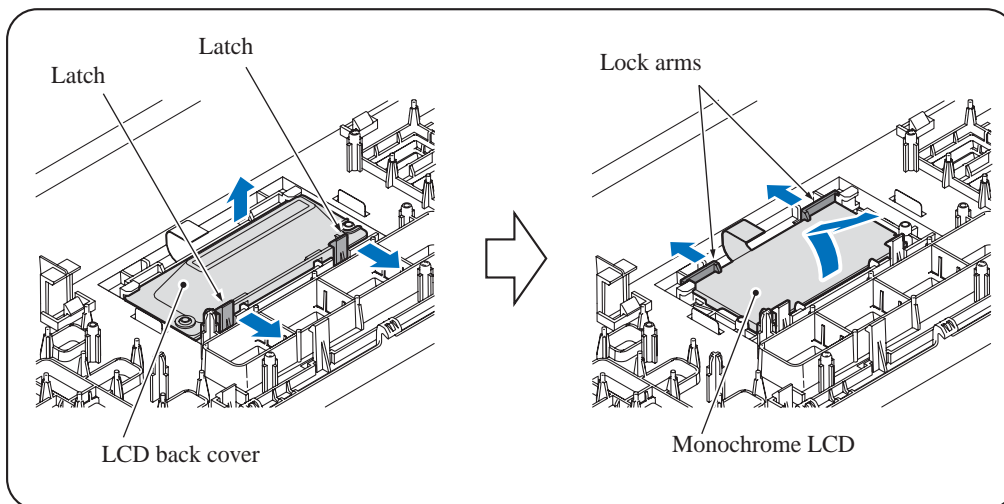
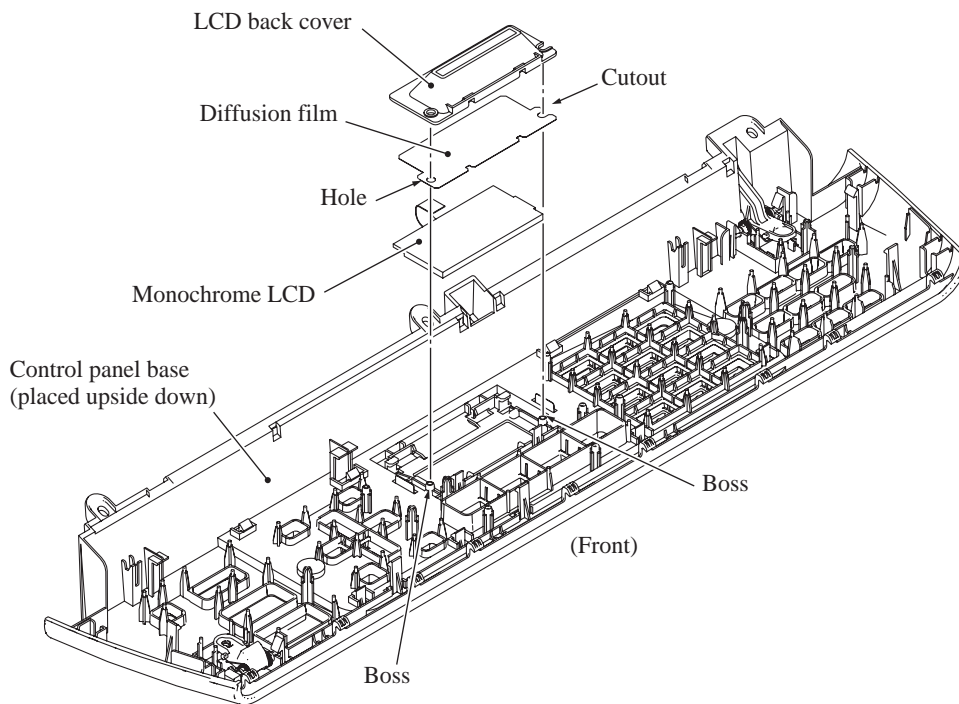
- (1) Place the control panel ASSY upside down.
- (2) Pull the five "x" latches and remove the control panel PCB.

NOTE: Do not pull the control panel PCB away from the control panel ASSY since it is connected to the monochrome LCD mounted on the control panel base with a short panel-LCD flat cable.
- (3) Disconnect the panel-LCD flat cable from the control panel PCB after releasing the connector lock.

NOTE: After disconnecting the flat cable(s), check that each cable is not damaged at its end or short-circuited. When connecting the flat cable(s), do not insert it at an angle. After insertion, check again that it is not at an angle.
- (4) Remove the four rubber keypads.
- (5) Remove the actuator rubber from the ink cartridge cover sensor actuator.



- (6) Lightly pull the two latches as shown below and remove the LCD back cover.
- (7) Remove the diffusion film.
- (8) Lightly press the two lock arms as shown below and remove the monochrome LCD.

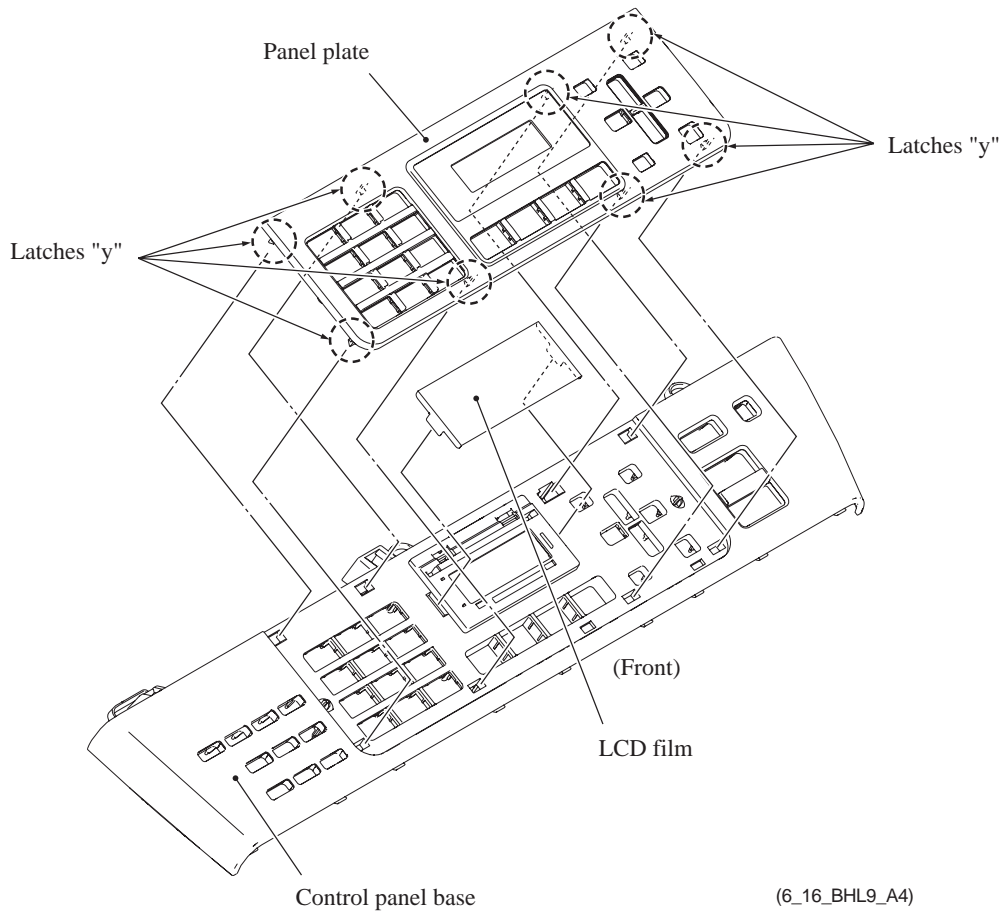


(6_15_BHL9_A4)

Assembling Notes:

- Before setting the LCD back into place, wipe fingerprints or dust off the LCD surface and control panel window with a soft cloth.
- A new LCD is covered with a protection sheet. Before setting it, remove the protection sheet.
- When setting the diffusion film into place, fit the hole and cutout provided in the film over the left and right bosses on the inside of the control panel base.

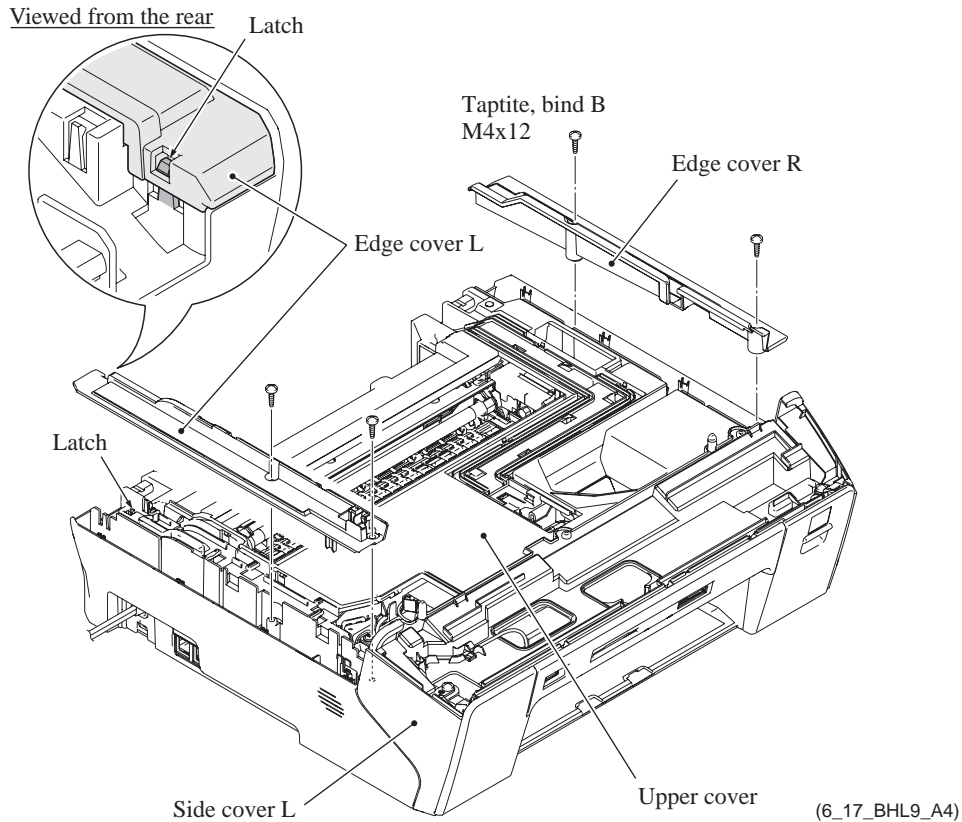
- (9) Release the eight "y" latches and remove the panel plate from the control panel base. The LCD film also comes off.



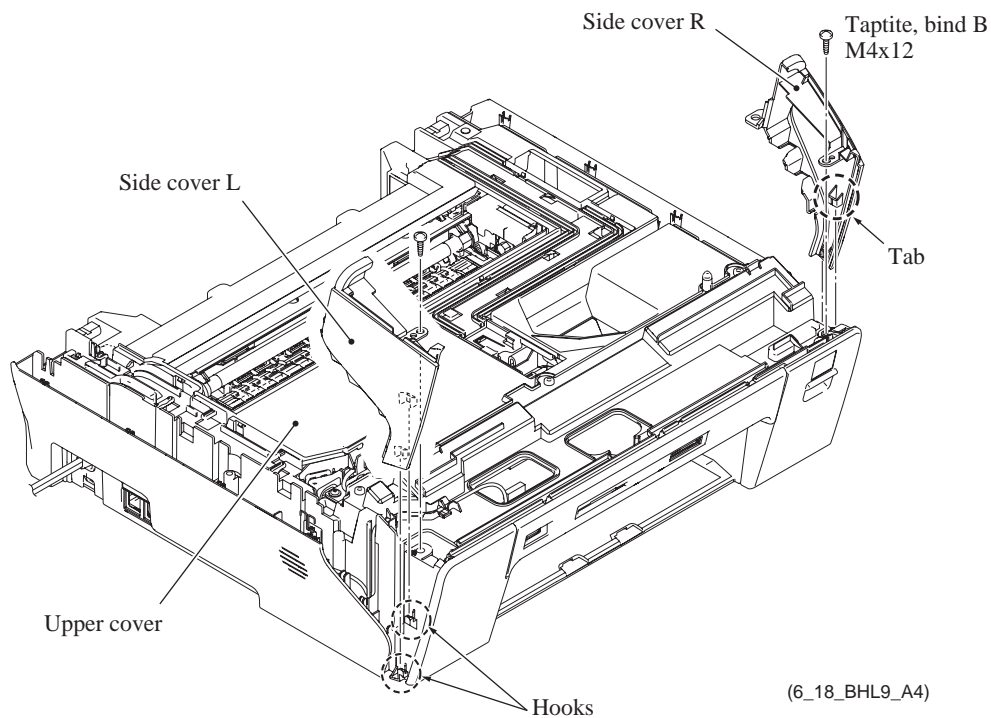
6.1.7 Edge Covers, Side Covers, Speaker, Upper Cover, Encoder Guard Film, and Rear Under Cover

NOTE: Make sure that the jam clear cover has been removed.

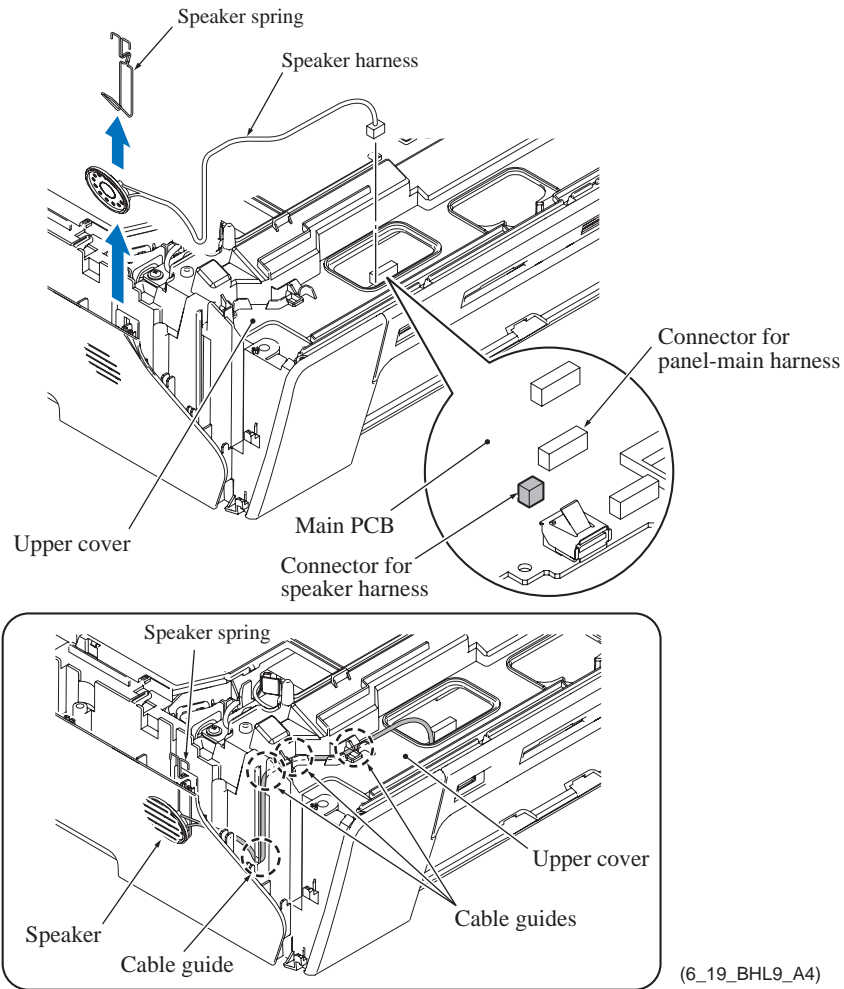
- (1) At the left end of the machine, remove the two screws from the edge cover L. Then release the latch that holds the rear end of the edge cover L and lift the cover up.
- (2) At the right end of the machine, remove the two screws from the edge cover R and lift it up.



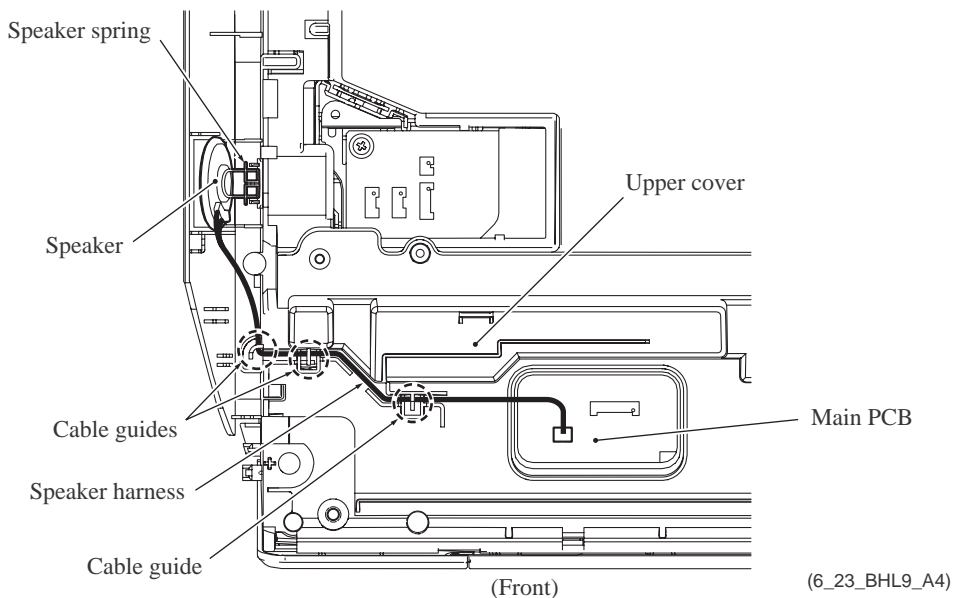
- (3) Remove the screw from each of the side covers L and R and lift those covers up.



- (4) Disconnect the speaker harness from the main PCB and release it from the cable guides provided on the upper cover.
- (5) Remove the speaker spring (wire spring) and the speaker from the pocket provided on the upper cover.

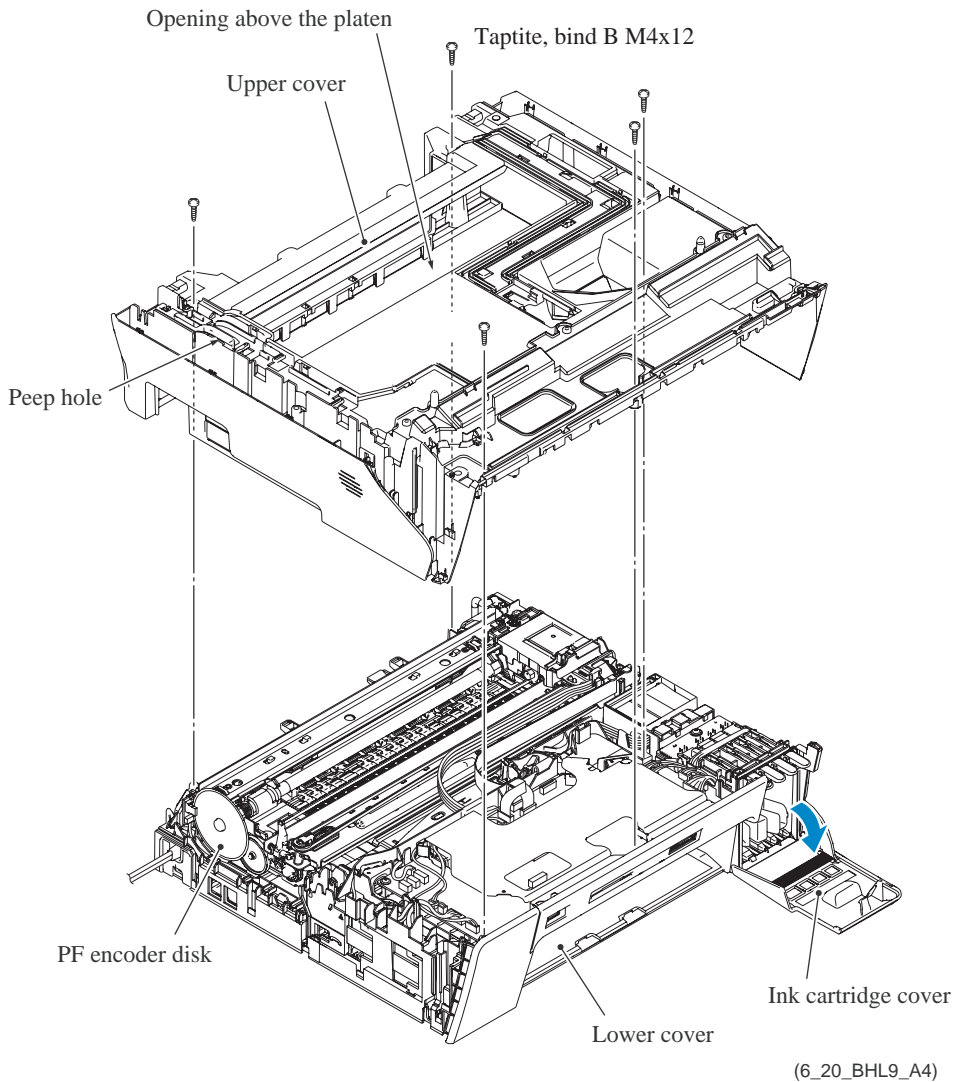


Assembling Note: After mounting the speaker and its spring into the pocket provided on the upper cover, route the speaker harness through the cable guides on the upper cover as shown below.



- (6) Open the ink cartridge cover.
- (7) Remove the five screws from the upper cover.
- (8) Lift the upper cover up and off the lower cover.

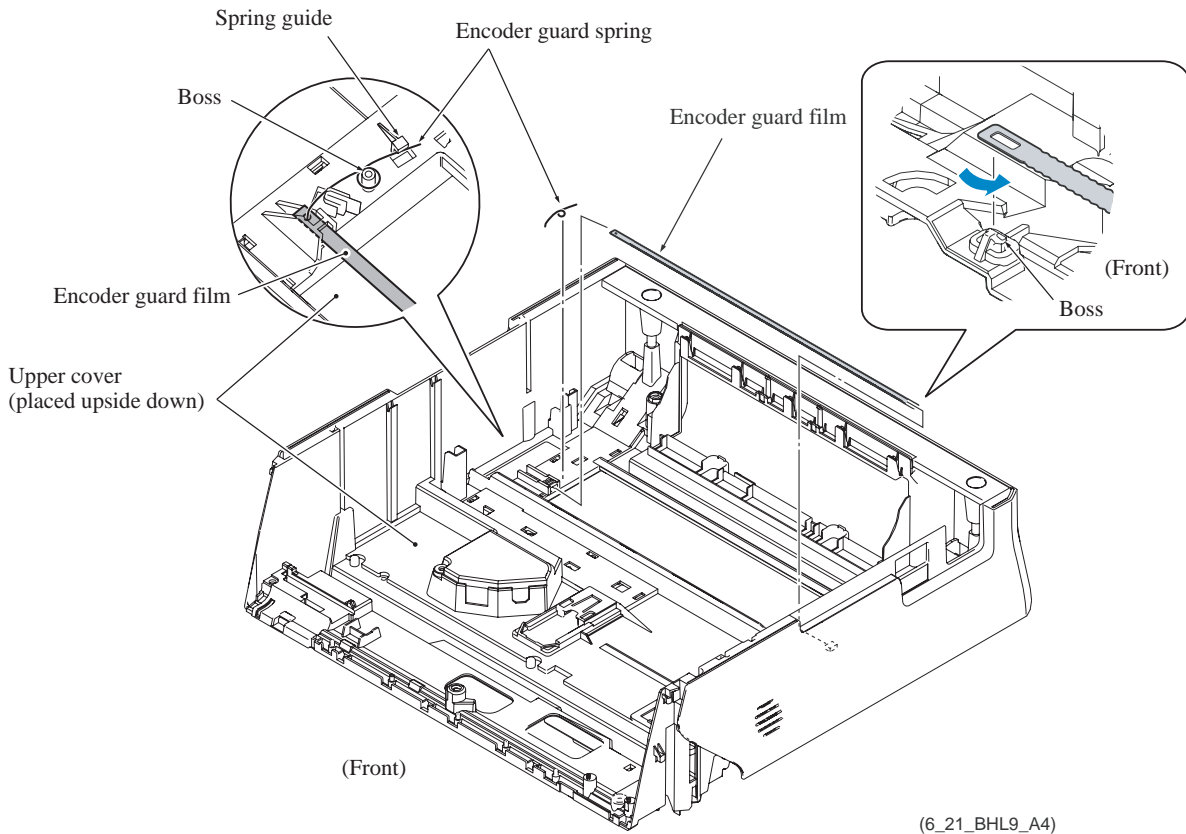
NOTE: When lifting up the upper cover, do not put your hands in the opening above the platen (shown below). Doing so may damage or stain the CR encoder strip inside.



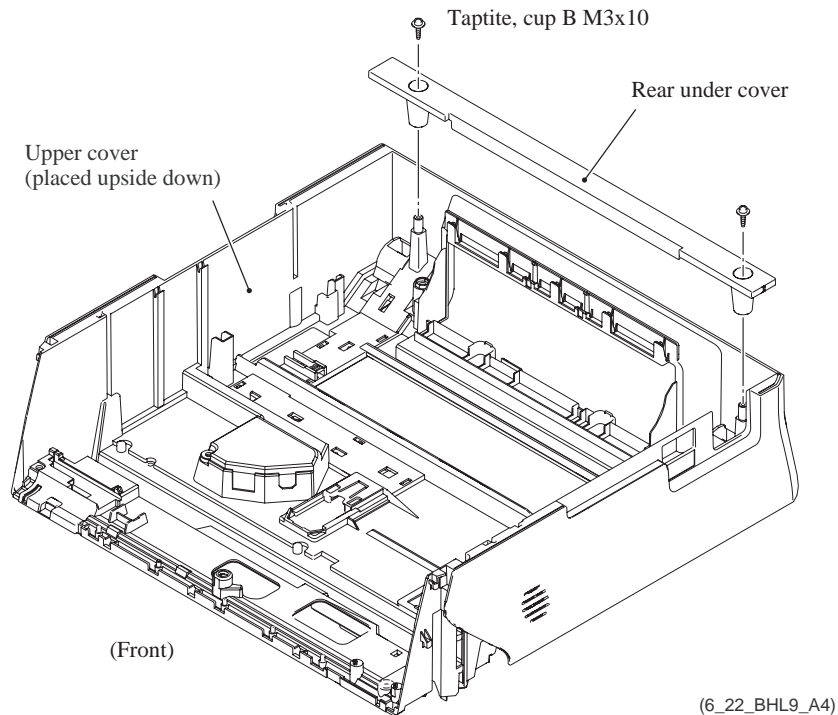
Assembling Notes:

- When mounting the upper cover:
 - Make sure that the jam clear cover is not mounted.
 - Make sure that the ink cartridge cover is open
 - Make sure that the head/carriage unit is placed in the head capping position (home position). This prevents the ink supply tubes from getting crushed between the upper and lower covers.
 - Take care not to deform the PF encoder disk
- After mounting the upper cover, check that the PF encoder disk is not bent or deformed through the peep hole. (See the illustration above.)

- (9) Place the upper cover upside down.
- (10) Release the rear end and the loop of the encoder guard spring from the spring guide and boss on the upper cover, respectively.
- (11) Unhook the encoder guard spring from the encoder guard film.
- (12) Slide the film inwards, turn it to the front by 90°, and release the opposite end (no spring) of the film from the boss on the upper cover.

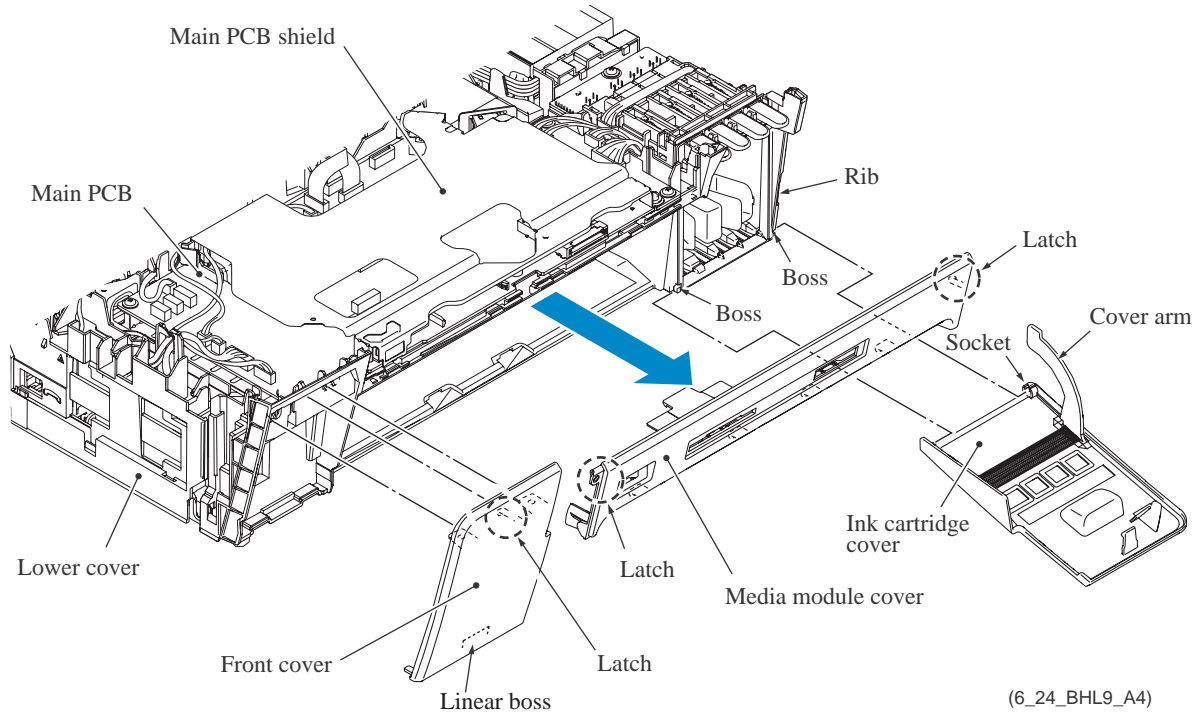


- (13) Remove two screws from the rear under cover and lift the cover up.



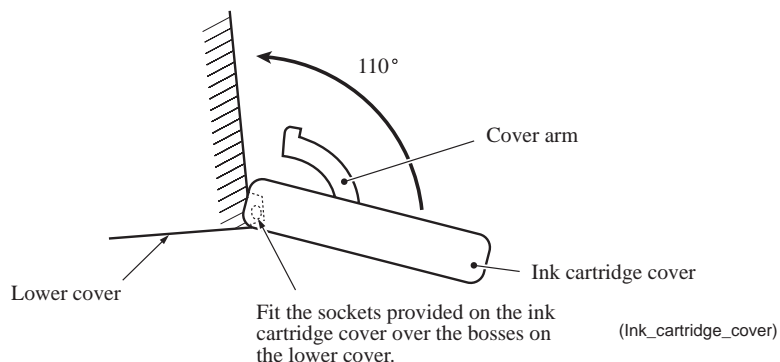
6.1.8 Ink Cartridge Cover, Media Module Cover, and Front Cover

- (1) Lightly lift up the front end of the lower cover and remove the ink cartridge cover by releasing its arm from the lower cover.
- (2) Lightly pull up the latch on the inside of the front cover to release it from the lower cover. Then lightly lift up the front end of the lower cover and remove the front cover.
- (3) Release the left and right latches of the media module cover and pull the cover to the front.



Assembling Notes:

- When mounting the ink cartridge cover, lightly lift up the front end of the lower cover, fit the two sockets over the bosses on the lower cover at the angle shown below and rotate the ink cartridge cover. Then, set the cover arm on the rib on the right side of the lower cover (see the illustration above).



- When mounting the front cover, lightly lift up the front end of the lower cover and fit the linear boss provided on the inside bottom of the front cover over the bottom of the lower cover.

6.1.9 Main PCB

Caution: Before replacing the main PCB, make sure that the machine information has been backed up in an external memory. Failure to back up the machine information requires the ink absorber box and flushing box to be replaced after replacement of the main PCB.

For detailed backup and restoration procedures, refer to [Chapter 9, Section 9.4.10 "Backup of Machine Information \(Function code 46\)."](#)

Caution: Before accessing the main PCB, make sure that the power cord is unplugged from the electrical outlet and the telephone line is disconnected; otherwise, an electric shock could occur.

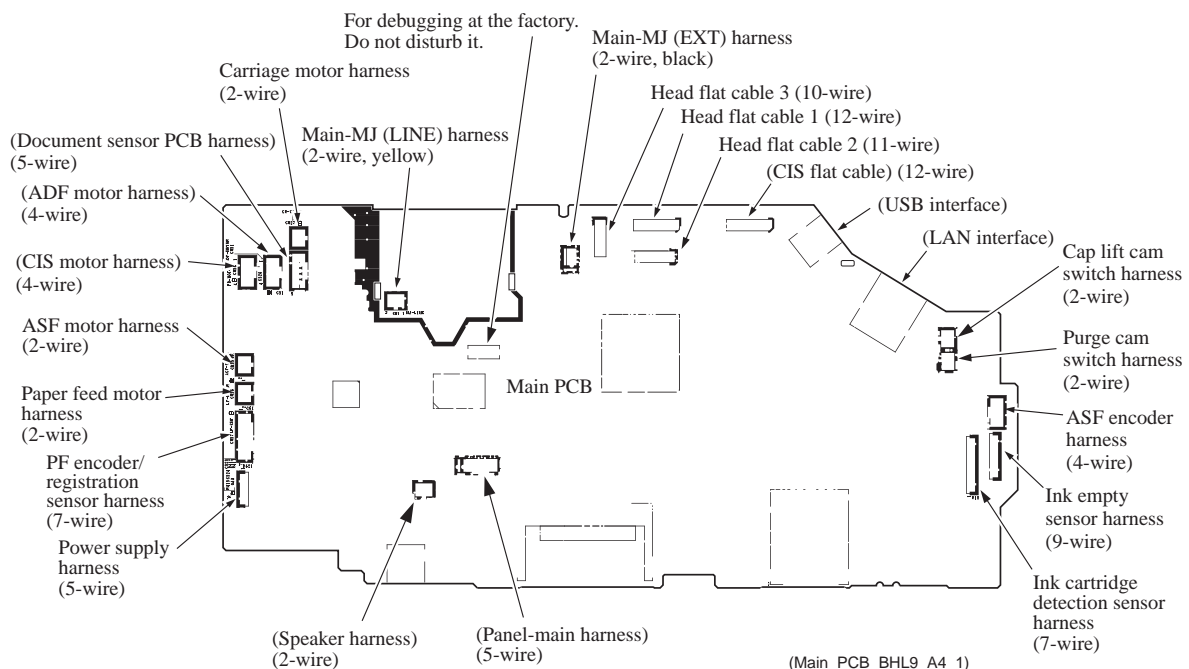
Caution: At the time of removal of the main PCB, untightening screws should be preceded by disconnection of the harnesses and flat cables, and at the time of installation, connection of the harnesses and flat cables, by tightening of screws. Observing this sequence prevents harnesses and flat cables from getting crushed or damaged by screws or screwdrivers.

(1) Disconnect the following harnesses and flat cables from the main PCB.

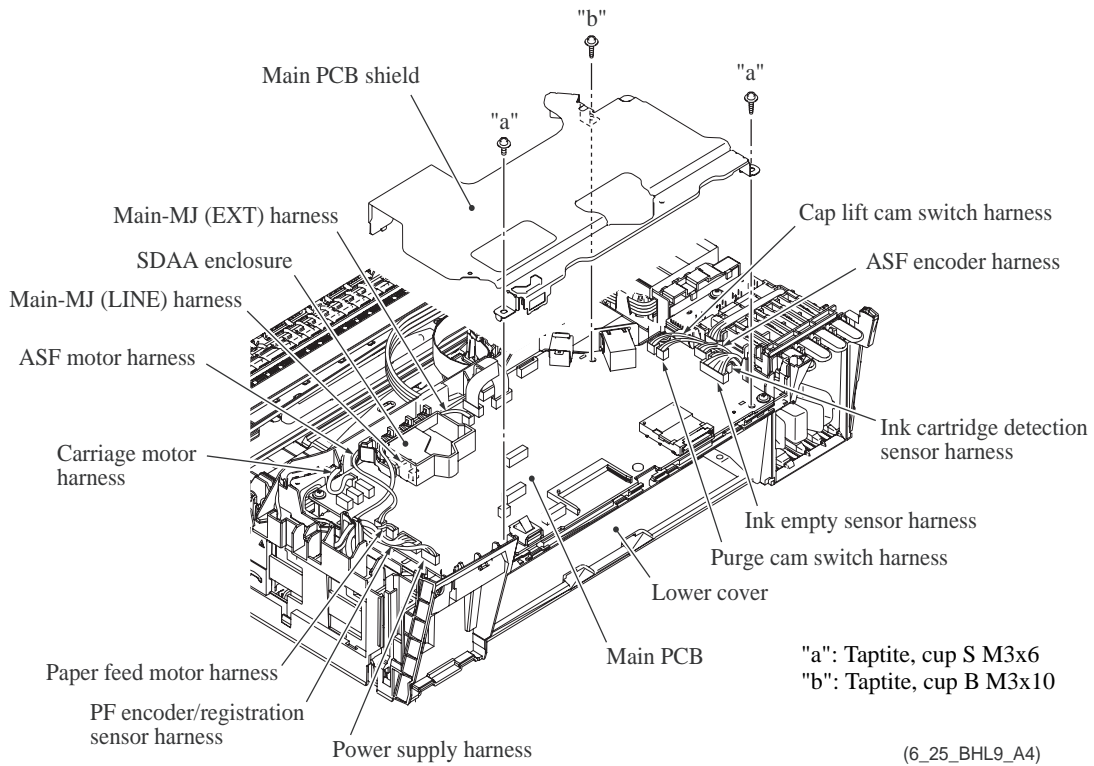
Caution: Do not remove the screws from the main PCB before disconnecting harnesses and flat cables.

Note: After disconnecting the flat cables, check that each cable is not damaged at its end or short-circuited. When connecting the flat cables, do not insert them at an angle. After insertion, check again that they are not at an angle.

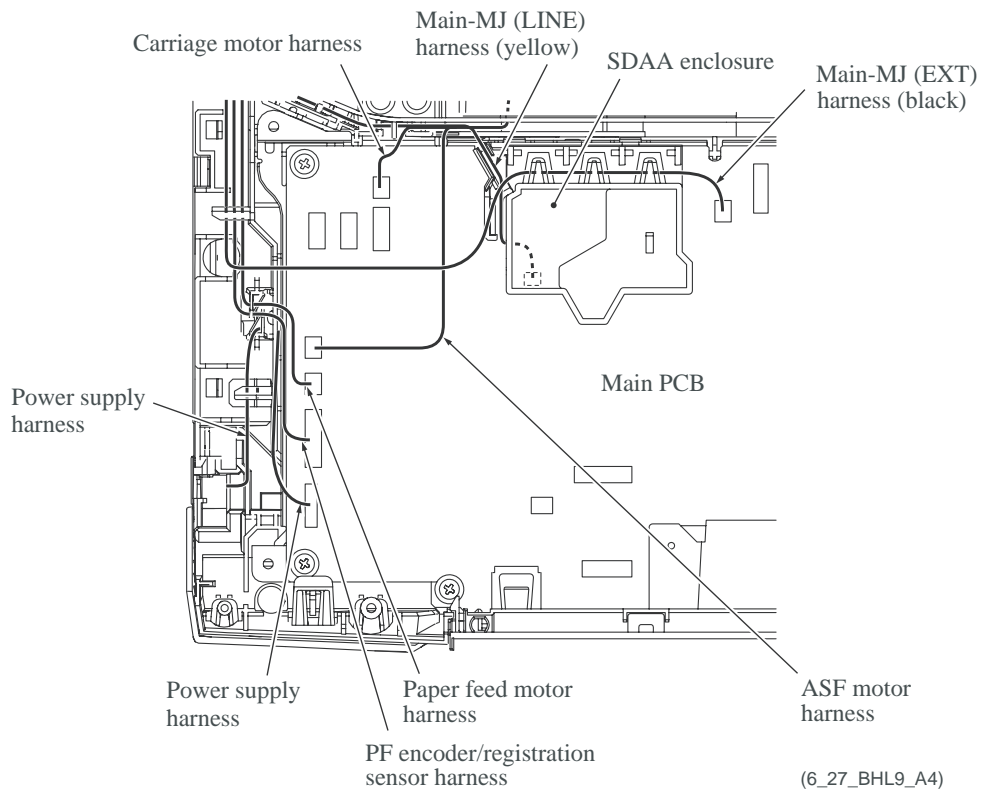
- Ink cartridge detection sensor harness (7-wire)
- Ink empty sensor harness (9-wire)
- ASF* encoder harness (4-wire) (*Auto Sheet Feeder)
- Purge cam switch harness (2-wire)
- Cap lift cam switch harness (2-wire)
- Power supply harness (5-wire)
- PF encoder/registration sensor harness (7-wire)
- Paper feed motor harness (2-wire)
- ASF* motor harness (2-wire)
- Carriage motor harness (2-wire)
- Head flat cable 1 (12-wire)
- Head flat cable 2 (11-wire)
- Head flat cable 3 (10-wire)



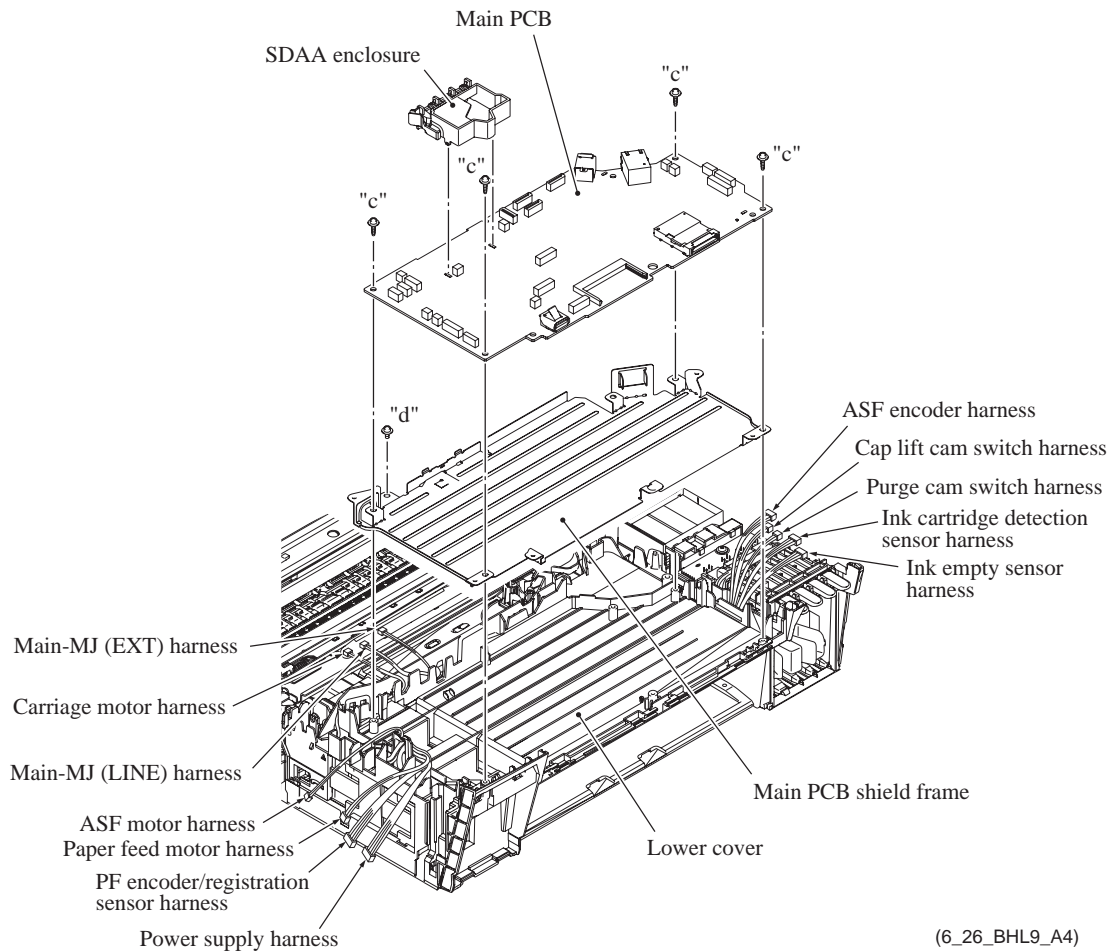
- (2) Remove the three screws (two "a" and one "b" screws) from the main PCB shield and lift it up.



Assembling Notes: Before securing the main PCB shield, route the harnesses on the top of the lower cover as shown below. Make sure that the main-MJ (EXT) harness and main-MJ (LINE) harness are routed through the SDAA enclosure. (See the illustration given on [page 6-38](#) for the routing of those harnesses on the left side of the lower cover.)



- (3) Disconnect the main-MJ (EXT) harness from the main PCB and release it from the cable guides provided on the SDAA enclosure.
- (4) Press the right and left ends of the SDAA enclosure inwards and remove it from the main PCB.
- (5) Disconnect the main-MJ (LINE) harness (2-wire, yellow) from the main PCB.
- (6) Remove four "c" screws from the main PCB, then lift up the PCB.
- (7) Remove screw "d" from the main PCB shield frame, then lift up the shield frame. (The screw "d" also secures the MJ/PS shield unit.)



(6_26_BHL9_A4)

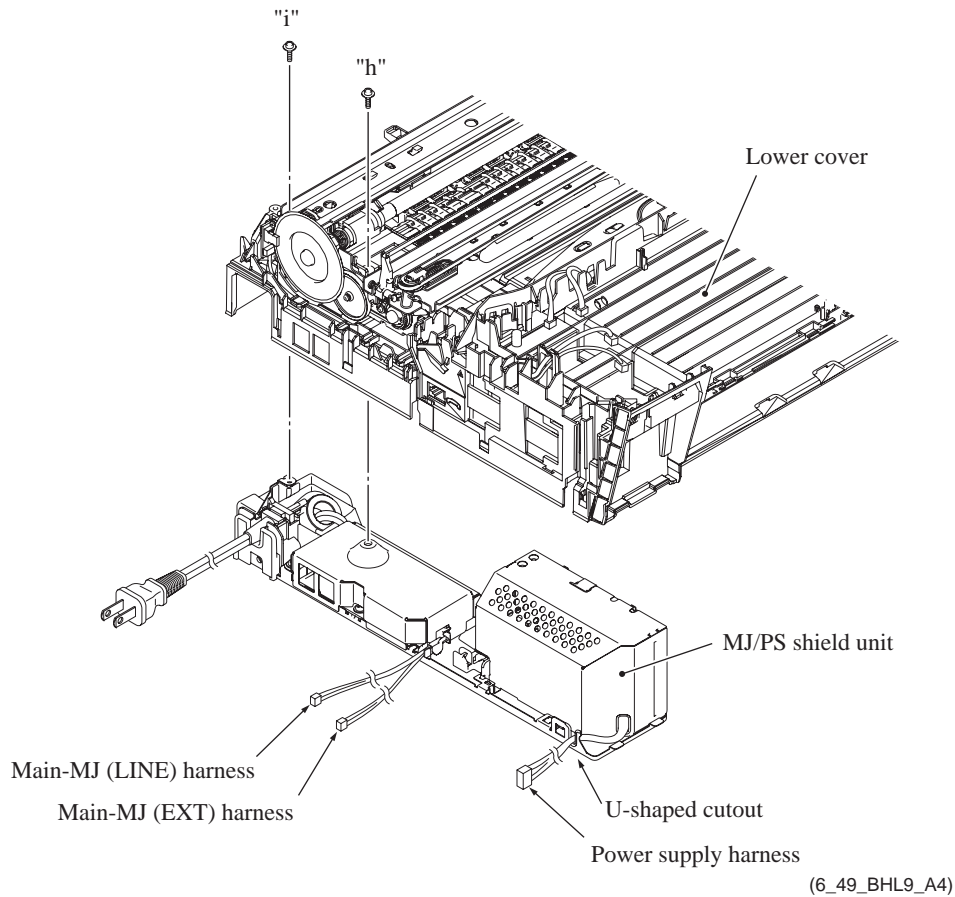
"c": Taptite, cup B M3x10

"d": Screw, pan (s/p washer) M3x8

Assembling Note: If you replace the main PCB, you need to load programs onto the flash ROM, restore the machine information that has been backed up in an external memory (refer to [Chapter 9, Section 9.4.10](#)), and make specified adjustments of various settings (refer to [Chapter 7, Section 7.3](#)). Make sure beforehand that the head/carriage unit is mounted.

6.1.10 MJ/PS Shield Unit (MJ PCB and Power Supply PCB)

- (1) If the main PCB shield frame has not been removed, disconnect the power supply harness, main-MJ (LINE) harness and main-MJ (EXT) harness from the main PCB, then remove screw "d" (shown on the previous page) from the main PCB shield frame.
- (2) Remove the two screws ("h" and "i") as shown below.
- (3) Release the harnesses from the cable guides provided on the lower cover and remove the MJ/PS shield unit from underside of the lower cover.

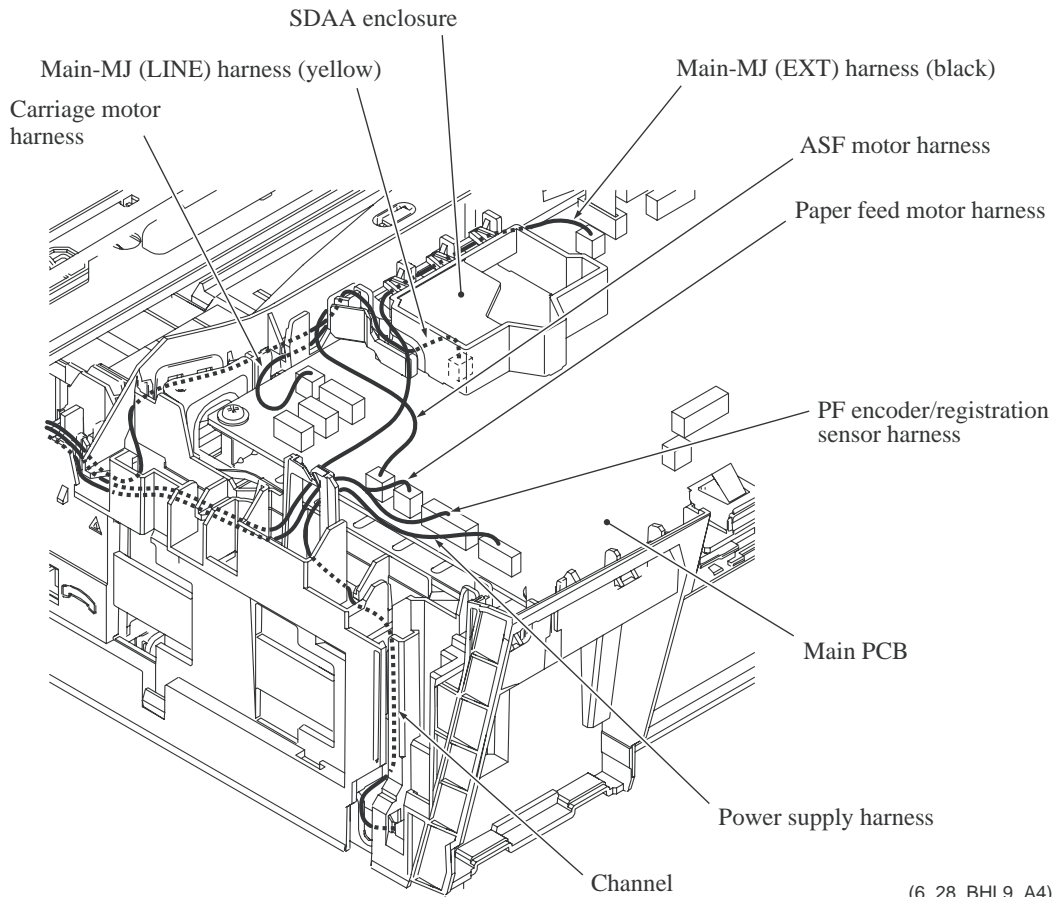


"h": Screw, pan (s/p washer) M3x8

"i": Taptite, cup S M3x6

Assembling Notes:

- When mounting the MJ/PS shield unit onto the lower cover, route the power supply harness through the U-shaped cutout (shown on the previous page) provided in the lower MJ/PS shield.
- After mounting the MJ/PS shield unit, route the power supply harness through the channel and route the main-MJ (EXT) harness and main-MJ (LINE) harness on the left side of the lower cover as shown below.

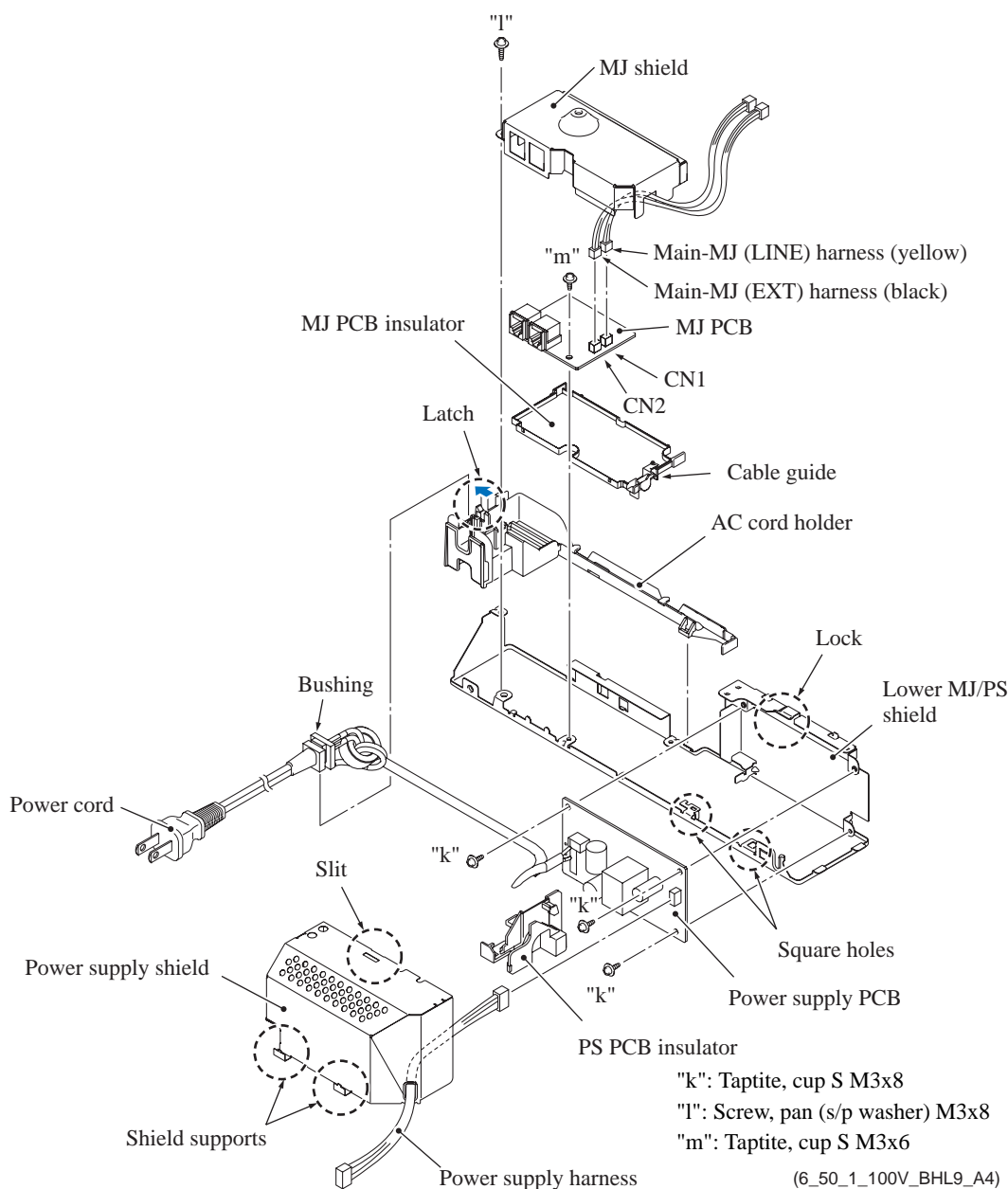


(6_28_BHL9_A4)

The subsequent procedure for the 100 V series is given on pages 6-39 to 6-41, and that for the 200 V, on pages 6-42 to 6-44.

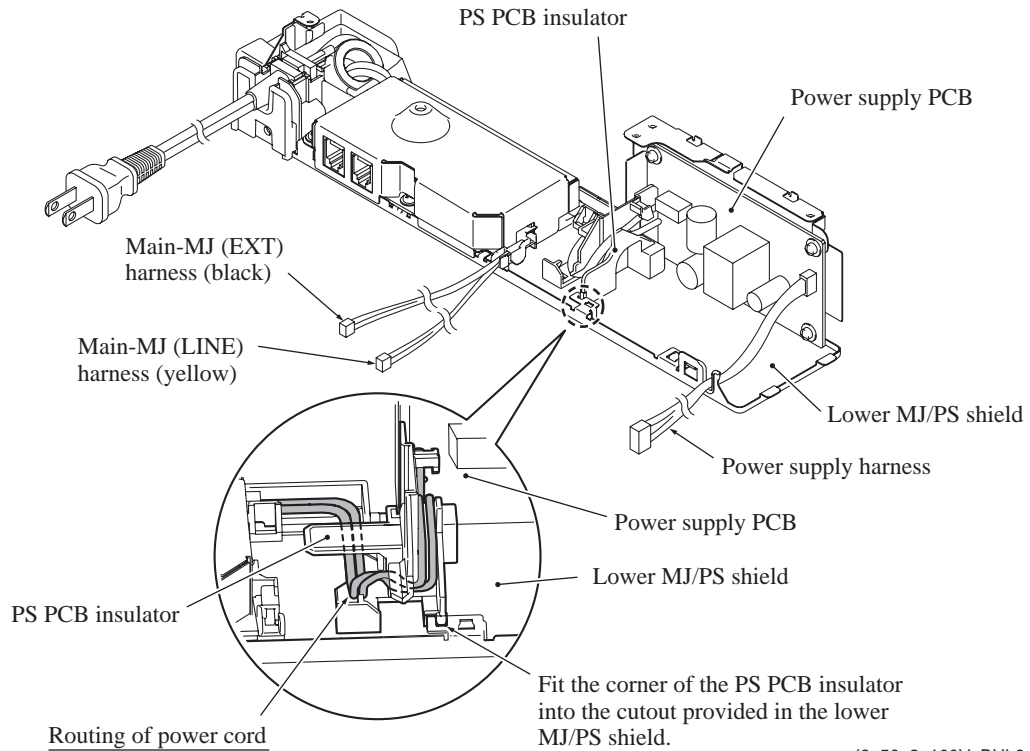
For 100 V series

- (4) Unlatch the power cord bushing and pull it up from the AC cord holder. Then release the power cord from the cable guides provided on the AC cord holder (shown on page 6-41).
- (5) Remove the power supply shield from the lower MJ/PS shield.
- (6) Remove three screws "k" from the power supply PCB.
- (7) Detach the PS PCB insulator from the power cord.
- (8) Remove the AC cord holder from the lower MJ/PS shield.
- (9) Remove screw "l" and remove the MJ shield from the lower MJ/PS shield.
- (10) Remove screw "m" from the MJ PCB and take it off the lower MJ/PS shield.
- (11) Remove the MJ PCB insulator from the lower MJ/PS shield.

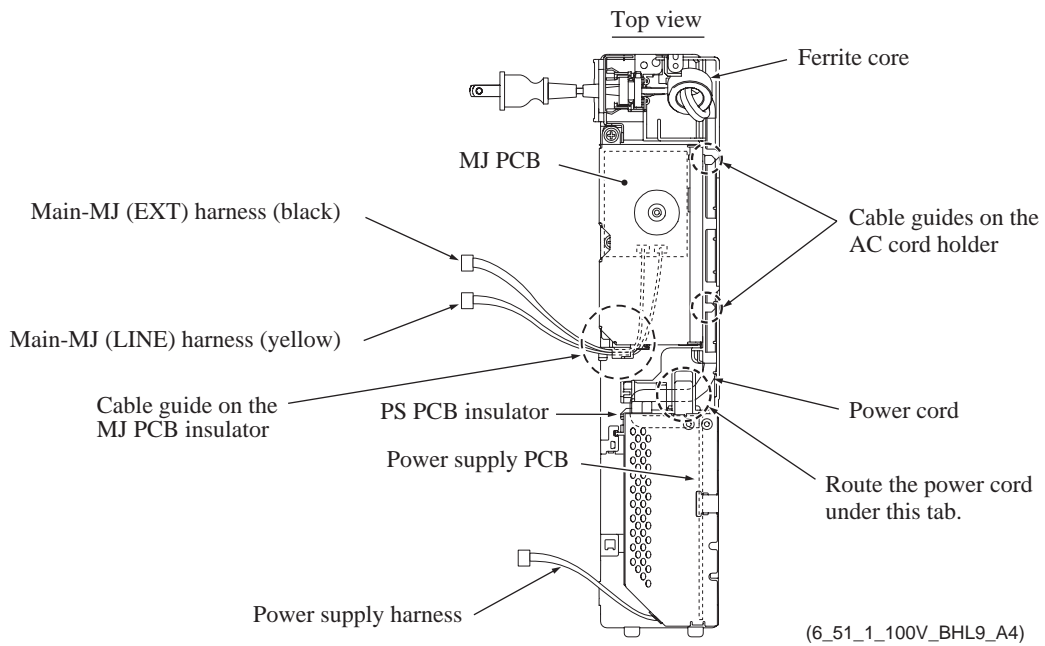
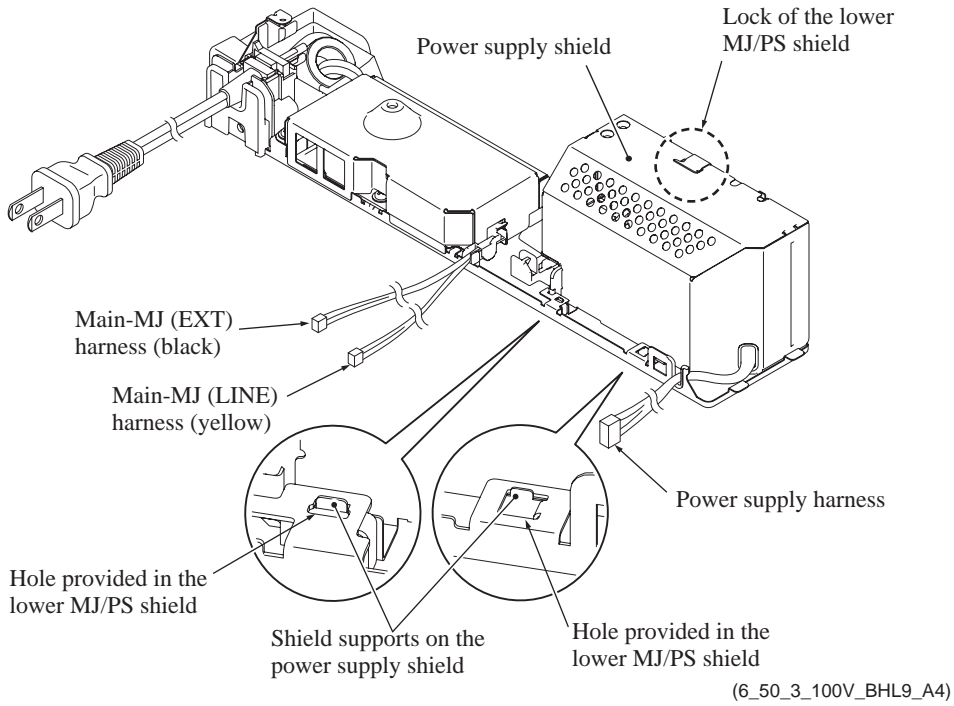


Assembling Notes:

- Before mounting the MJ shield, route the main-MJ (LINE) and (EXT) harnesses through the cable guide provided on the MJ PCB insulator. (See the previous page.)
- Route the power cord through the PS PCB insulator (see below) and the cable guides provided on the AC cord holder (see the next page). Fit the corner of the PS PCB insulator into the cutout provided in the lower MJ/PS shield as shown below.
- When mounting the power supply shield on the lower MJ/PS shield, insert two shield supports of the power supply shield into the two square holes provided in the lower MJ/PS shield. Make sure that the lock of the lower MJ/PS shield (as shown on the next page) fits in the slit provided in the top of power supply shield. (See the previous page.)

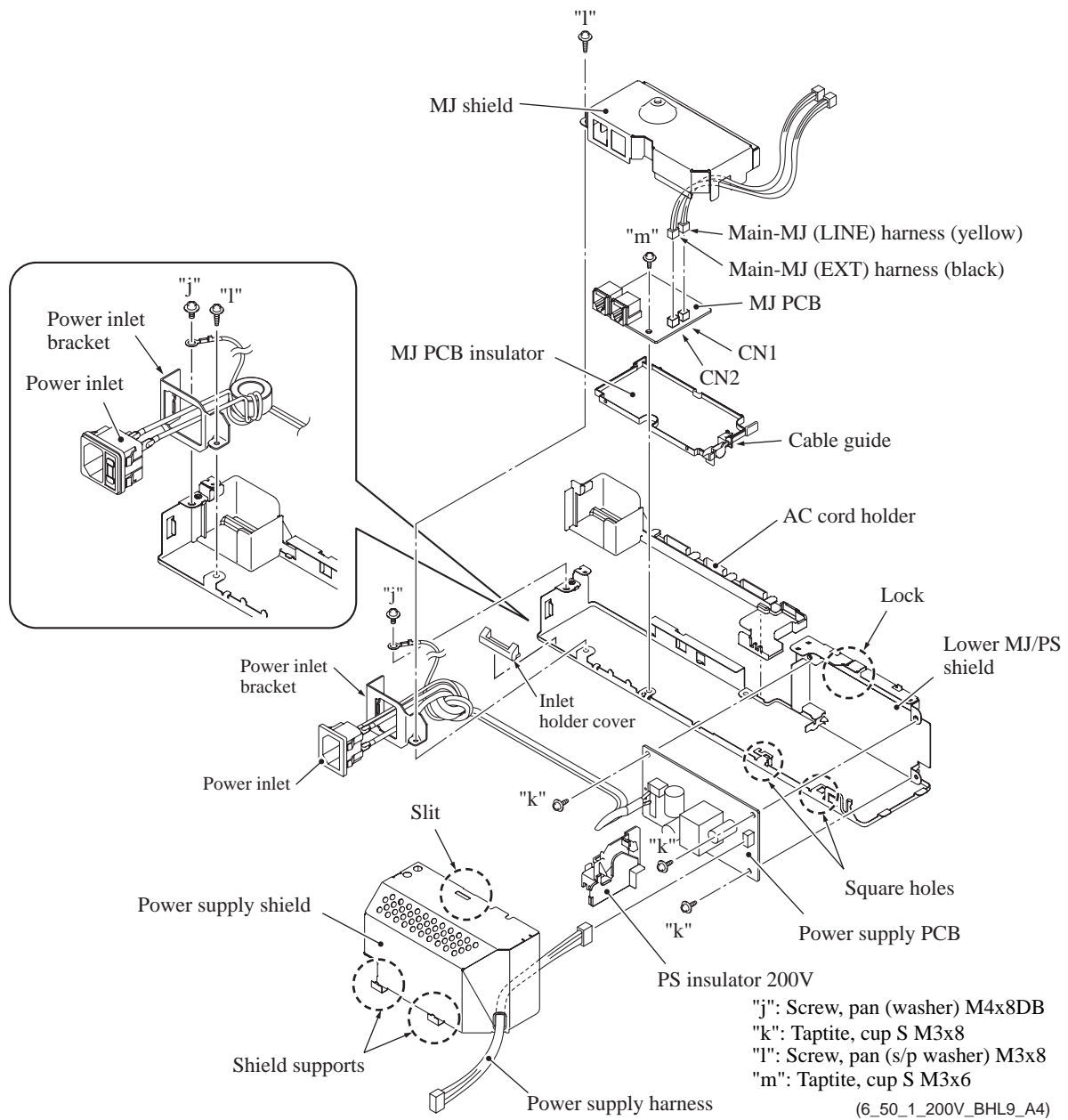


(6_50_2_100V_BHL9_A4)



For 200 V series

- (4) Remove screw "j" and remove the inlet holder cover and the power inlet together with its bracket. Release the power cord from the cable guides. (See page 6-44.)
- (5) Remove the power supply shield from the lower MJ/PS shield.
- (6) Remove three screws "k" from the power supply PCB.
- (7) Detach the PS insulator 200 V from the power cord.
- (8) Remove the AC cord holder from the lower MJ/PS shield.
- (9) Remove screw "l" and remove the MJ shield from the lower MJ/PS shield.
- (10) Remove screw "m" from the MJ PCB and take it off the lower MJ/PS shield.
- (11) Remove the MJ PCB insulator from the lower MJ/PS shield.

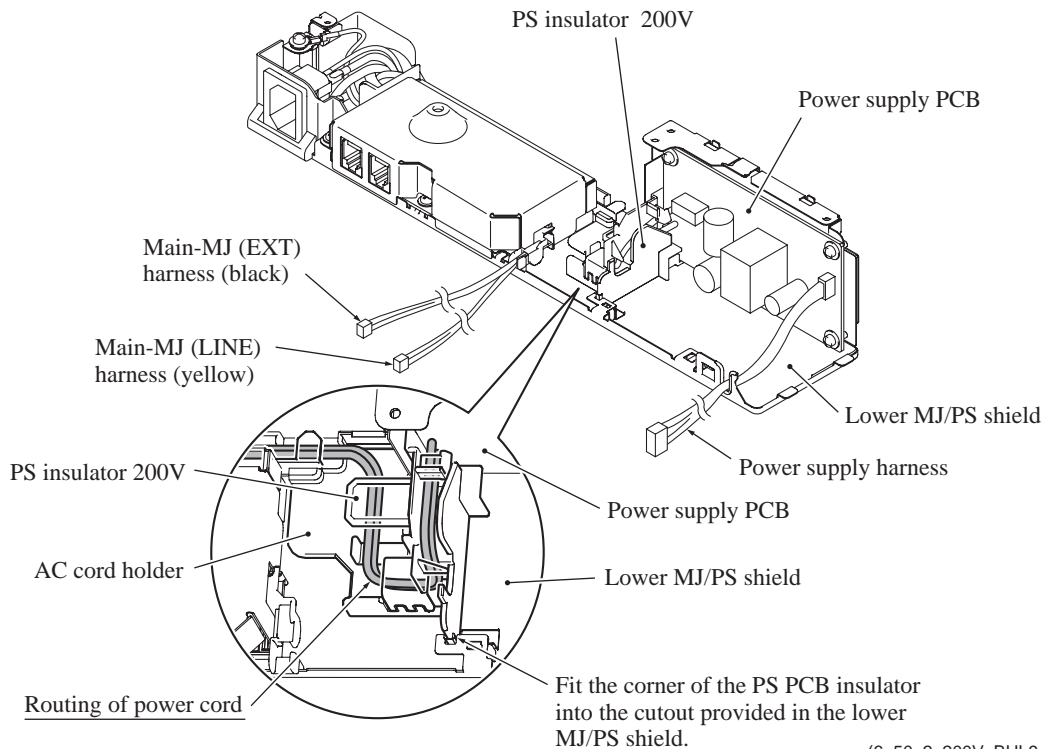


Note for models with a power inlet having a built-in fuse

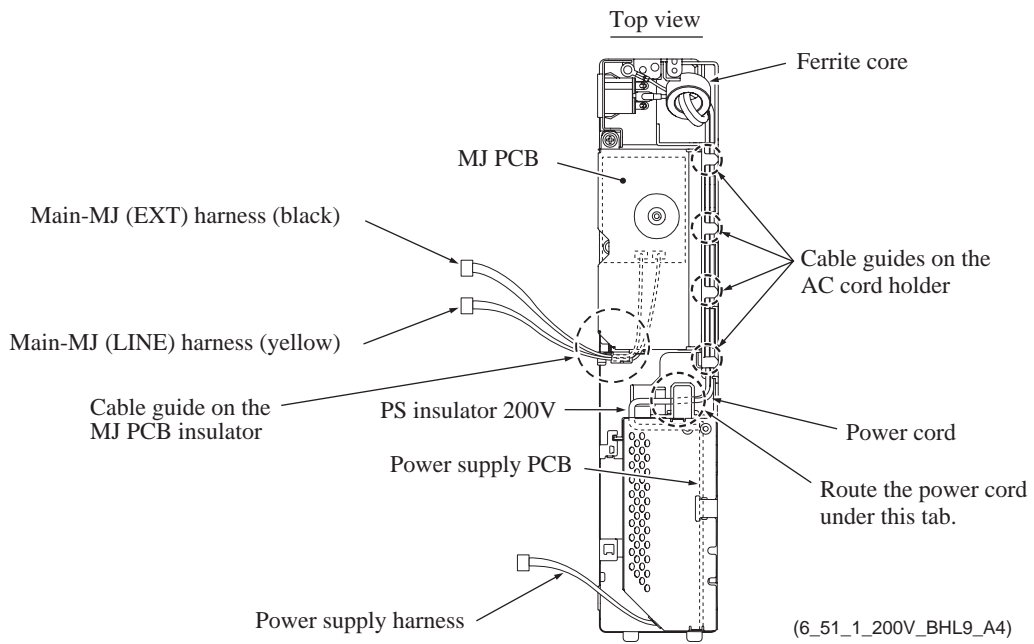
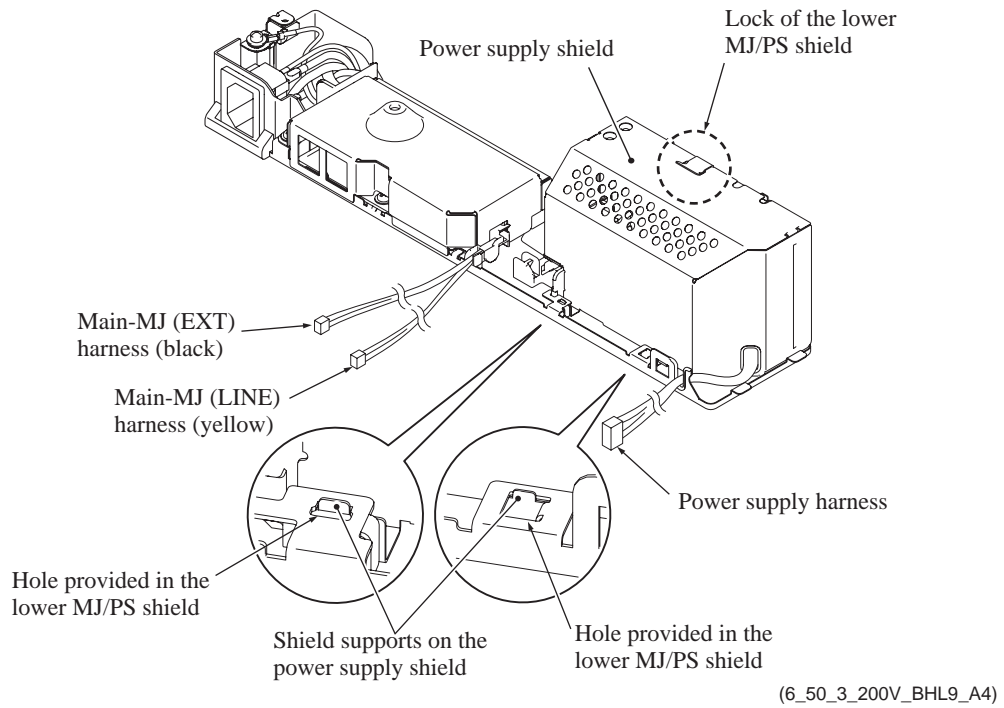
If the fuse built in the power inlet has blown, the power supply PCB could also be damaged. Be sure to replace the whole power supply PCB ASSY, not just the fuse. Never use any substitute or short-circuit the fuse terminals with conductors. Using a power inlet with an unauthorized fuse will cause a fire or accident.

Assembling Notes:

- Before mounting the MJ shield, route the main-MJ (LINE) and (EXT) harnesses through the cable guide provided on the MJ PCB insulator. (See the previous page.)
- Route the power cord through the PS insulator 200 V (see below) and the cable guides provided on the AC cord holder (see the next page). Fit the corner of the PS PCB insulator into the cutout provided in the lower MJ/PS shield as shown below.
- When mounting the power supply shield on the lower MJ/PS shield, insert two shield supports of the power supply shield into the two square holes provided in the lower MJ/PS shield. Make sure that the lock of the lower MJ/PS shield (as shown on the next page) fits in the slit provided in the top of power supply shield. (See the previous page.)



(6_50_2_200V_BHL9_A4)



6.1.11 Head/Carriage Unit and Ink Refill ASSY

During disassembly jobs, except when removing the ink refill ASSY or engine unit (including the maintenance unit), leave the head/carriage unit in the machine.

Before removing the head/carriage unit, ink refill ASSY or engine unit, you need to remove all four ink cartridges and set the protective part instead (see page 6-3). Be sure to insert the protective part into place to prevent ink remaining in the ink supply tubes from leaking and the machine from getting stained with leaked ink. (Check that the small tabs on both sides of the protective part fit in the holes provided in the ink refill ASSY.)

Note: Make sure that the power cord is unplugged from the electrical outlet.

Note: When replacing the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

Note: During the removal or installation job for the head/carriage unit, take care not to contaminate the CR encoder strip, PF encoder disk, or ASF encoder disk (in the ASF motor unit) with ink or grease.

Note: If you replace the head/carriage unit, also replace the ink cartridges. This is because sufficient ink volume is necessary for refilling the ink supply tubes after replacement of the head/carriage unit.

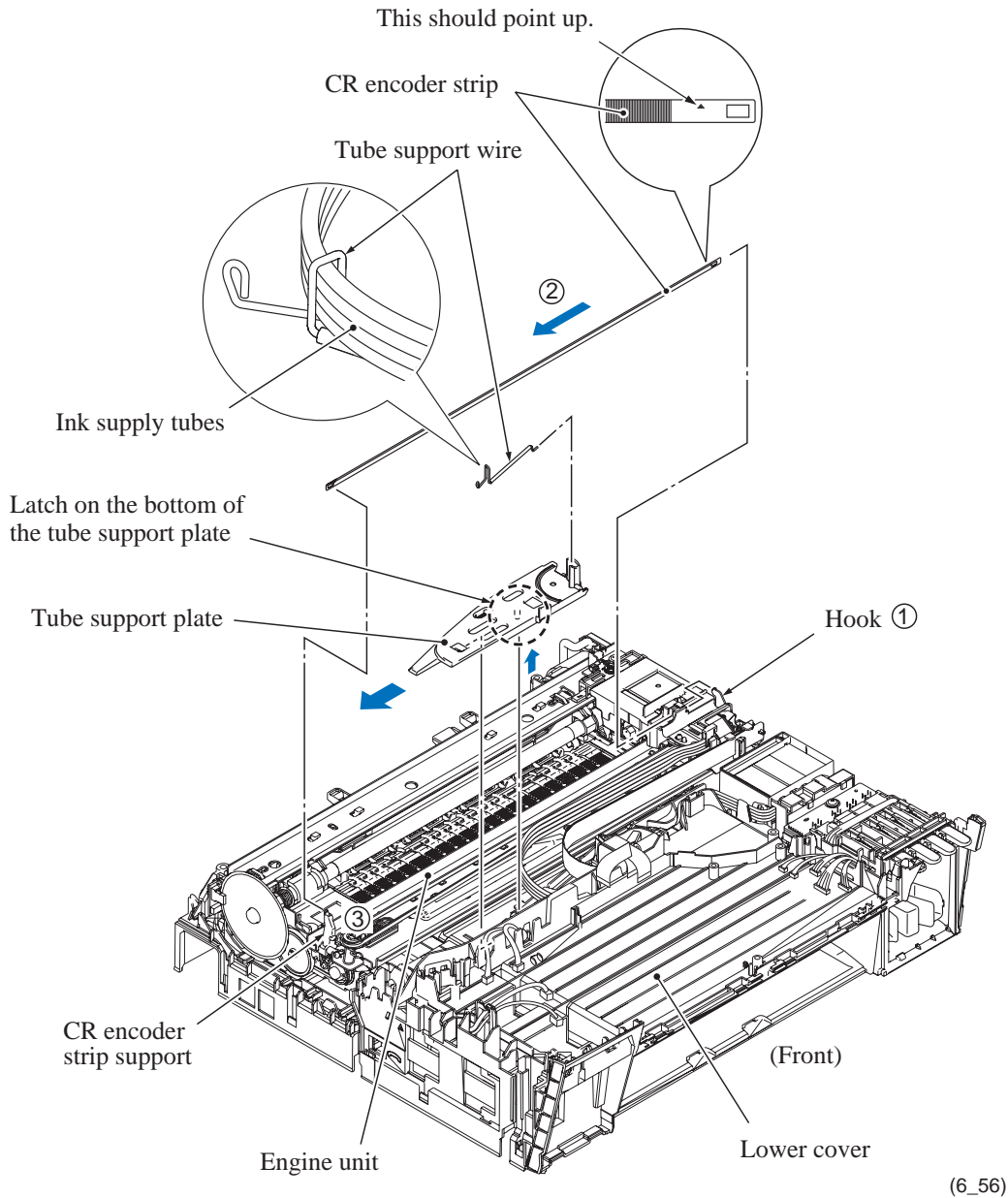
CR encoder strip

- (1) While lightly pushing the CR encoder strip support on the left end of the engine unit inwards, unhook the right end of the CR encoder strip from the hook (①). (See the illustration on the next page.)
- (2) Slide the CR encoder strip to the left (②) and out of the head cover. At the left end of the CR encoder strip, align the rectangular hole in the strip with the boss of the strip support (③) and take the strip off.

Note: Take care not to scratch or damage the encoder strip. If it is stained or damaged, replace it with a new one.

Tube support plate and tube support wire

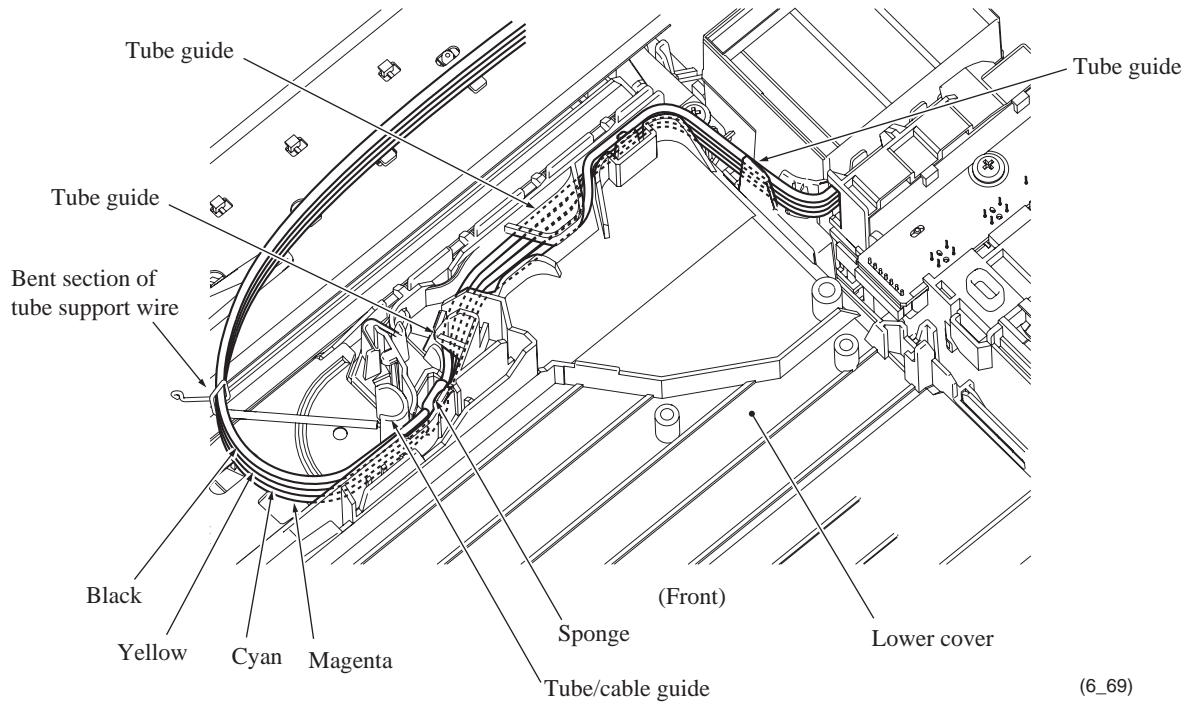
- (3) Release the four ink supply tubes from the tube support wire.
- (4) Pull up the latch and slide the tube support plate to the left, and then take the plate out of the lower cover together with the tube support wire.
- (5) Remove the tube support wire from the tube support plate.



Assembling Note: After mounting the head cover, set the CR encoder strip so that the ▲-marked end is to the right (carriage motor side) and the mark points upwards as shown above, using the following steps.

- 1) Hook the left end of the CR encoder strip on the left-hand strip support, aligning the rectangular hole provided in the strip with the boss of the strip support.
- 2) Pass the strip through the CR encoder sensor located on the head/carriage unit by inserting it into the opening of the head cover from left to right.
- 3) Hook the right end of the strip while pushing the left-hand strip support inwards.

Assembling Note: After making sure that the ink supply tubes are routed between the tube/cable guide and the lower cover, pass the ink supply tubes through the bent section of the tube support wire as shown below.



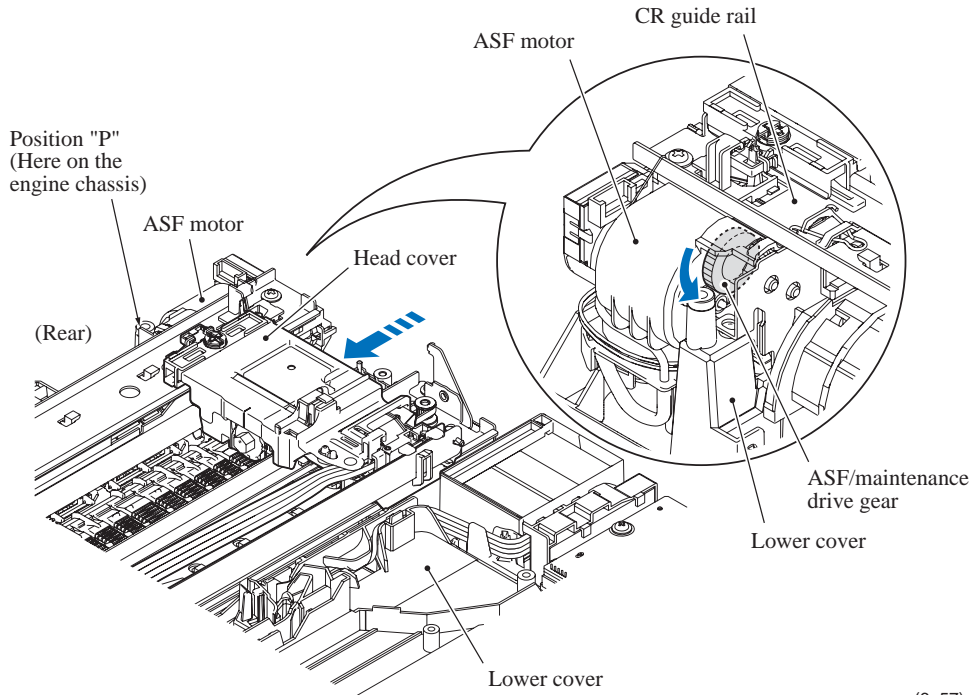
(6_69)

Head cover

- (6) Move the head/carriage unit to position "P" (shown below) by hand.

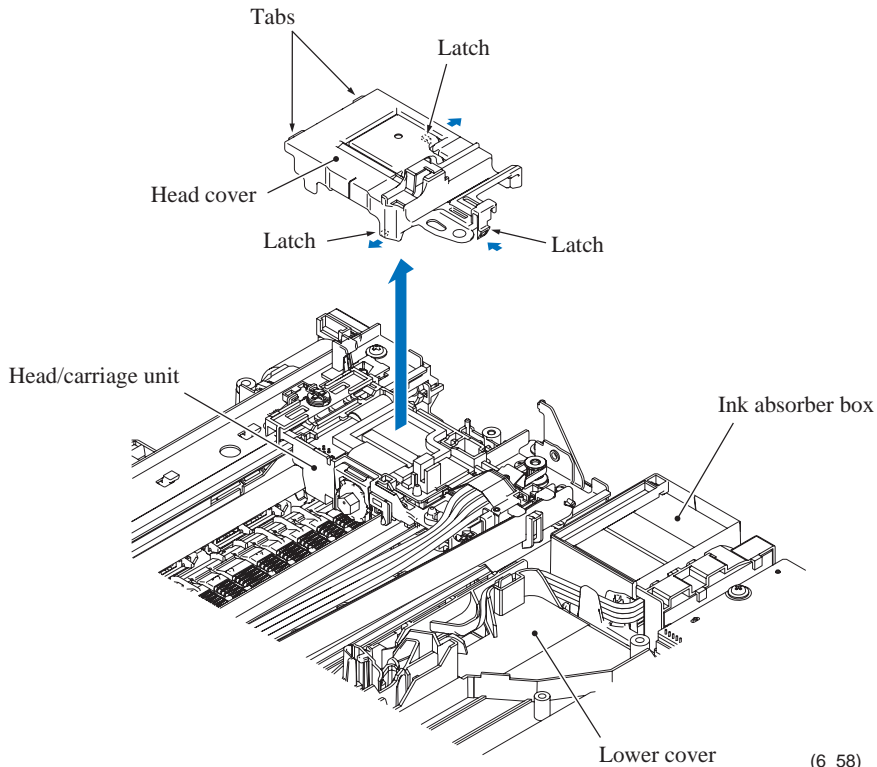
Assembling Note: When accessing the head/carriage unit placed on the engine unit, put the head/carriage unit in position "P" (on the right edge of the engine chassis).

Note: If the head/carriage unit does not move, rotate the ASF/maintenance drive gear counterclockwise (viewed from the left) by hand to unlock the head/carriage unit and move it to position "P."



(6_57)

- (7) Unlatch the head cover from the head/carriage unit and pull it up.



(6_58)

Carriage PCB ASSY (carriage PCB with head flat cables)

- (8) Unlock the connector on the carriage PCB and disconnect the carriage-head flat cable.

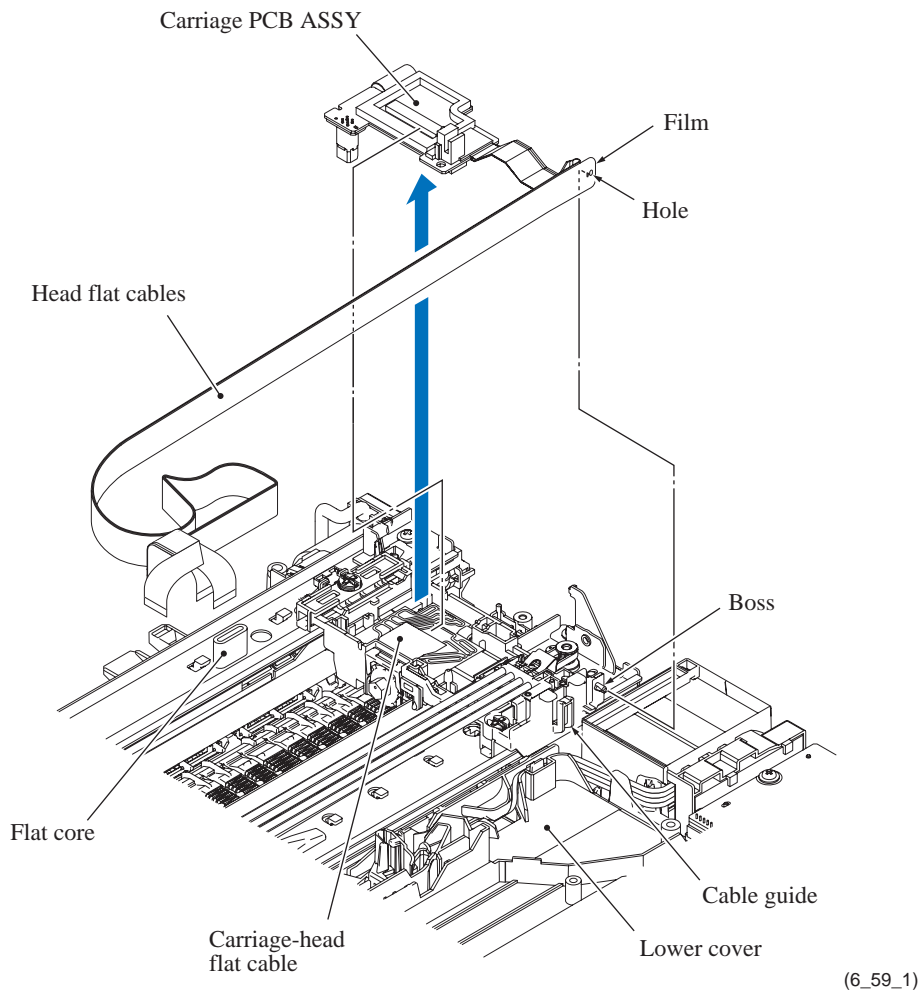
Note: After disconnecting the flat cable, check that it is not damaged at its end or short-circuited. When connecting the flat cable, do not insert it at an angle. After insertion, check again that it is not at an angle.

- (9) Release the head flat cables from the cable guides provided on the upper cover and take them out together with the flat core.

Note: When replacing the carriage PCB ASSY, remove the flat core from the old head flat cables and set it to the new ones.

- (10) Release the head flat cables from the cable guide provided on the head/carriage unit and release the film from the boss.

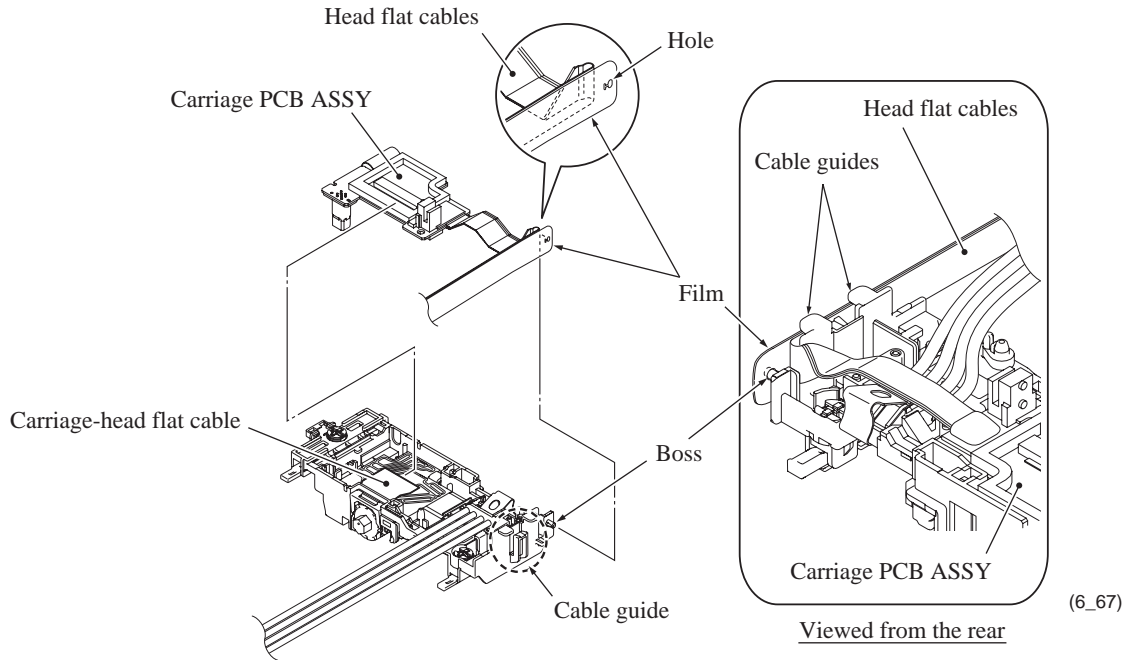
- (11) Lift up the carriage PCB ASSY.



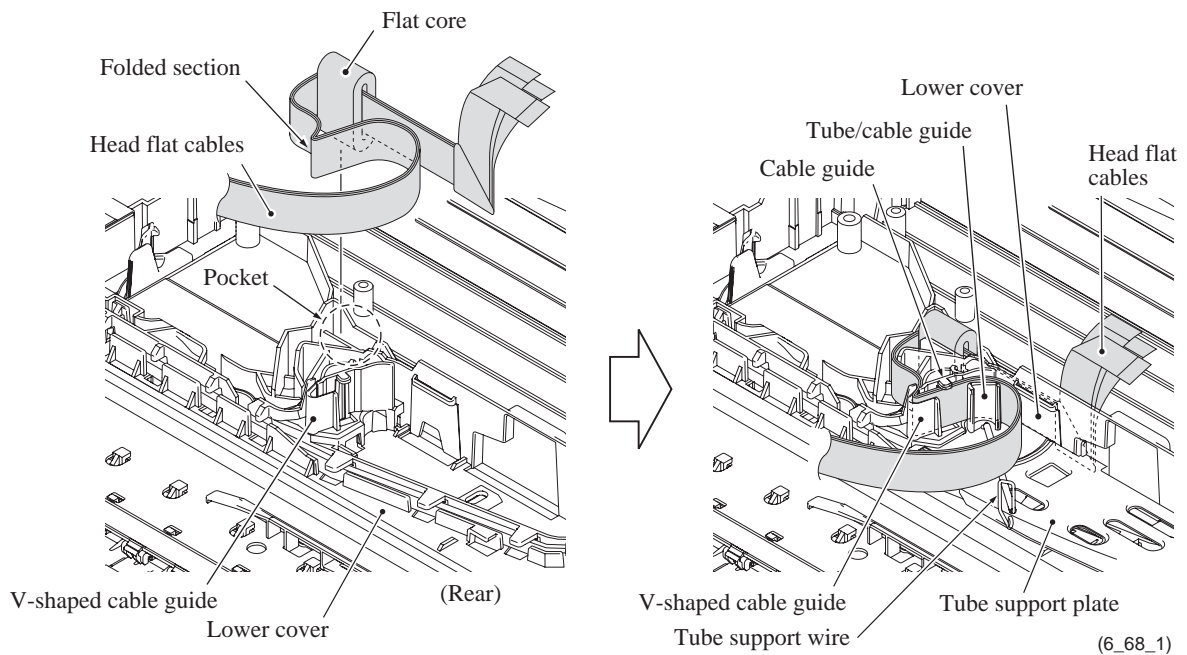
Assembling Note: When mounting the carriage PCB ASSY, route the head flat cables, observing instructions given on the next page.

Routing the Head Flat Cables When Mounting the Carriage PCB ASSY

- 1) Mount the carriage PCB ASSY on the head/carriage unit (see the previous page).
- 2) On the head/carriage unit, route the head flat cables through the cable guide and fit the hole in the film over the boss as shown below.



- 3) Pass the head flat cables through the flat core, fit the folded section of them (with film) over the V-shaped cable guide and set the flat core in the pocket on the lower cover.
- 4) Set the tube support wire onto the tube support plate. Then, mount the tube support plate so that the head flat cables (and ink supply tubes) pass between the tube/cable guide on the support plate and the lower cover.



Head joint and ink refill ASSY

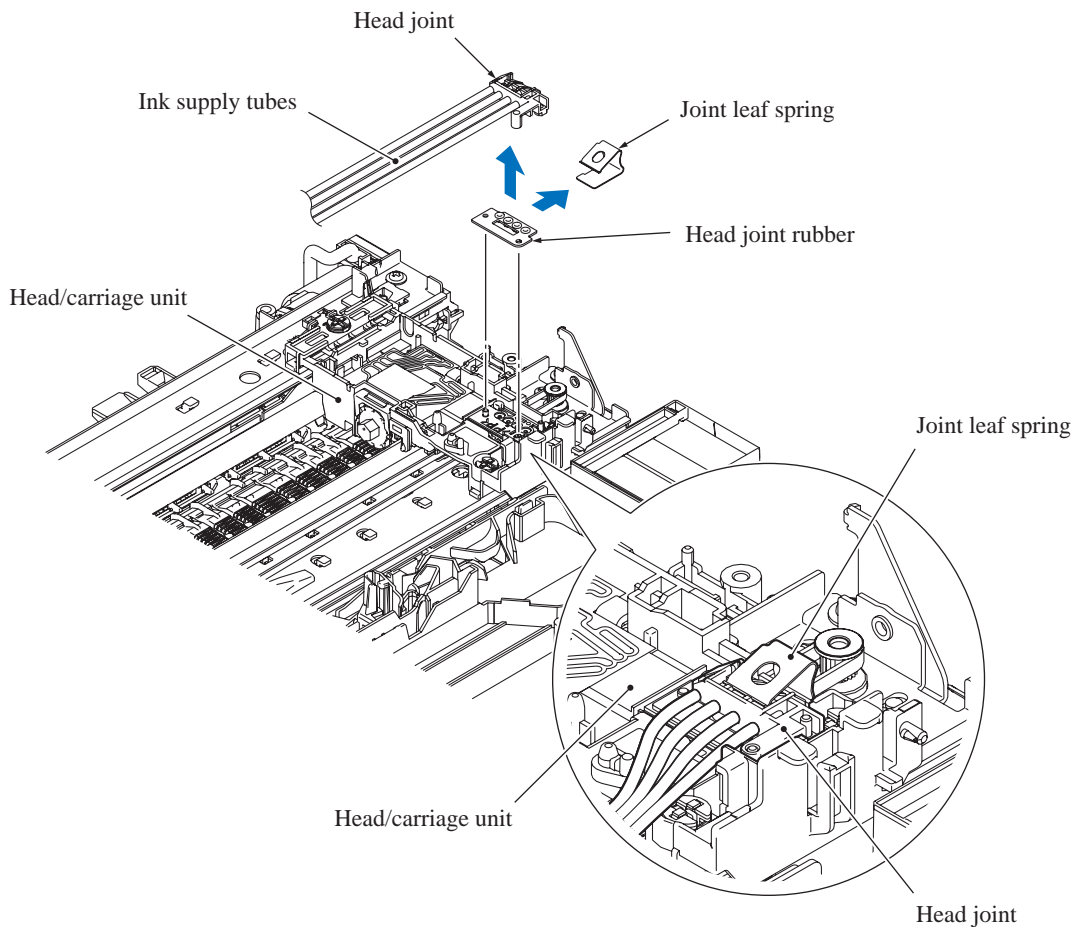
(12) Pull out the joint leaf spring to the right to release the head joint.

(13) Pull the head joint up and off the head/carriage unit.

Remove the head joint rubber (that is a part of the head/carriage unit but may come off with the head joint) and put it on a clean vinyl sheet while taking care not to contaminate it.

Note: Wipe off the ink remaining on the section where the head joint was mounted with a clean, lint-free cloth.

Note: Wrap the head joint in a clean, lint-free cloth and keep it higher than the ink supply tubes to prevent ink remaining in the ink supply tubes from leaking and the machine from getting stained with leaked ink.

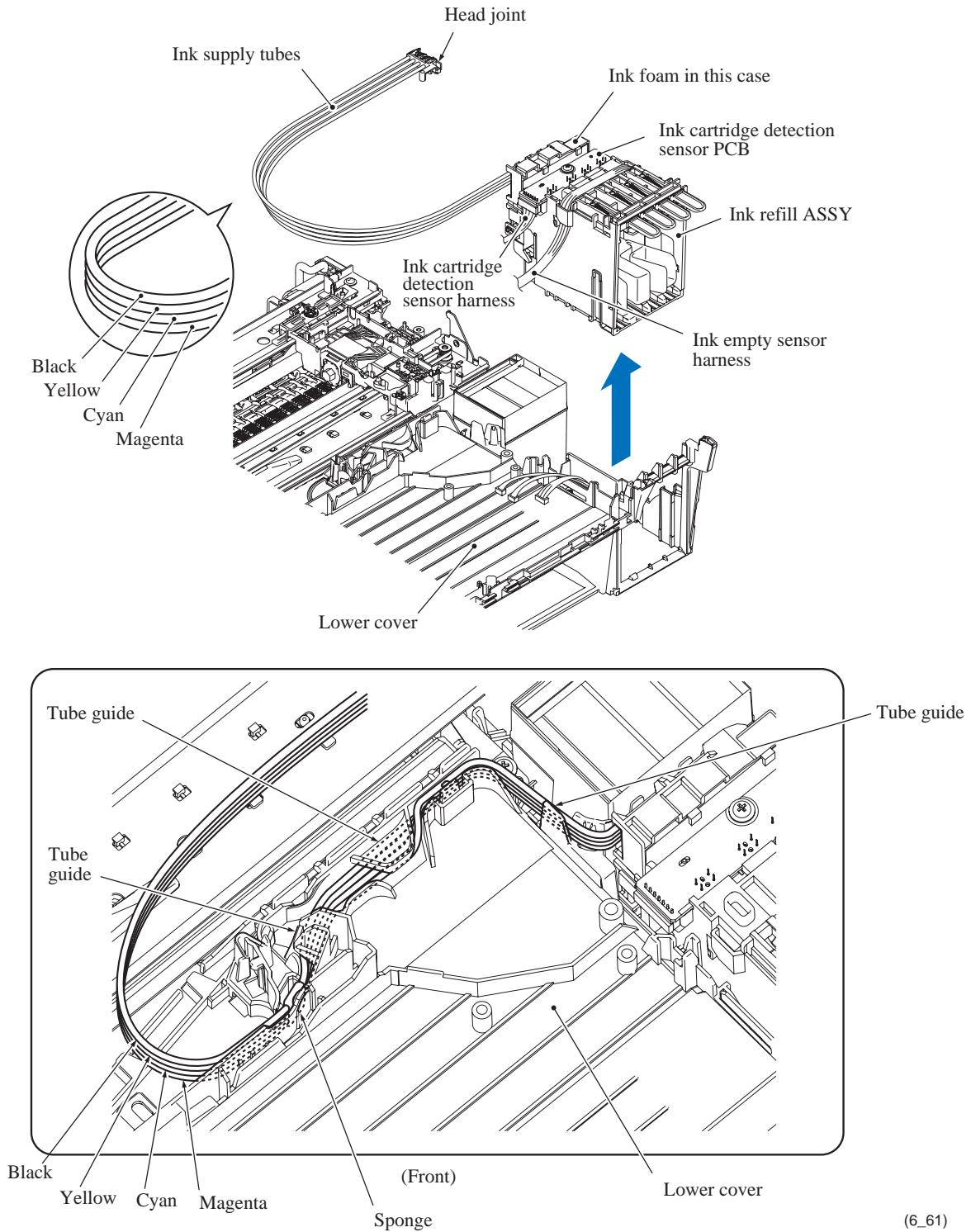


(6_60_1)

Assembling Note: Before setting the head joint, make sure that the head joint rubber is set on the head/carriage unit as shown above. Then secure the head joint to the head/carriage unit with the joint leaf spring.

- (14) Take out the ink supply tubes routed on the lower cover.
- (15) If the main PCB has not been removed, disconnect the ink cartridge detection sensor harness and the ink empty sensor harness from the main PCB.
- (16) Lift the ink refill ASSY up and out of the lower cover.

Note: On the back of the ink refill ASSY is an ink foam that may be stained with ink. If it is excessively stained, replace it.



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Assembling Note: After mounting the ink refill ASSY, route the ink supply tubes on the lower cover, aligning the four colors in the order as shown above.

Head/carriage unit and CR timing belt

Note: During the removal or installation of the head/carriage unit, take care not to contaminate the PF encoder disk with ink or grease.

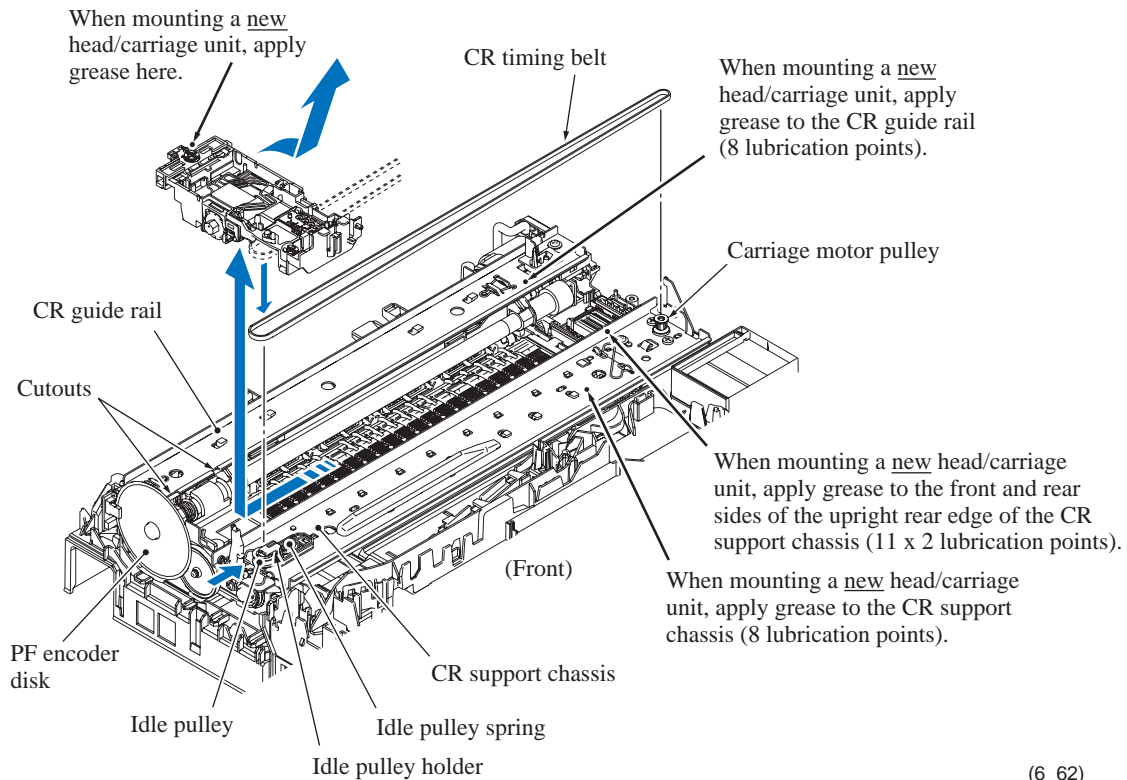
(17) While pressing the idle pulley holder to the right, remove the CR timing belt from the carriage motor pulley and idle pulley.

(18) Move the head/carriage unit to the left end of its travel by hand.

(19) Lift the head/carriage unit (with the CR timing belt) up and off the engine unit in the direction of the arrow shown below.

(20) Remove the CR timing belt from the head/carriage unit.

Note: Do not touch the head nozzles (the printing ends) or ink supply ports (to which ink supply tubes are connected) of the head/carriage unit; doing so will not only stain your hands with ink but also damage the nozzles and supply ports. If you do touch them though, clean them with a special-purpose cleaning stick and liquid.

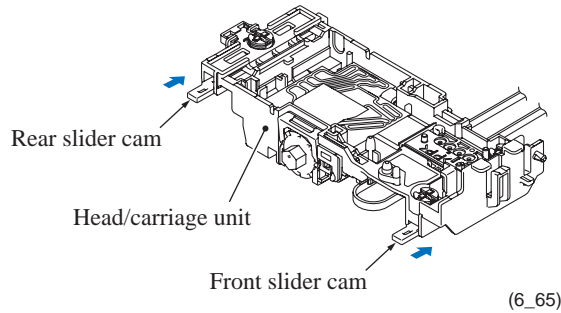


(6_62)

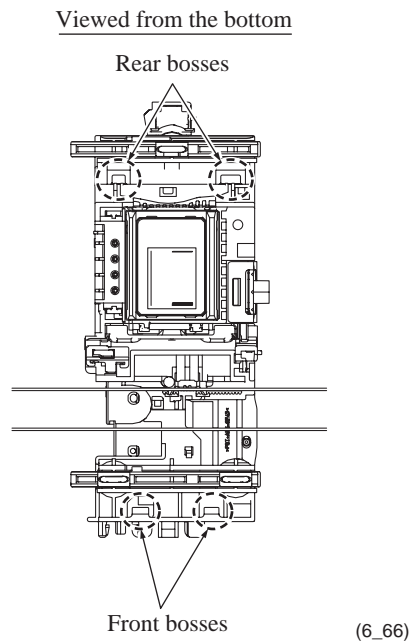
Assembling Notes:

- When handling the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.
- When replacing the CR timing belt, insert it fully into the slit provided in the head/carriage unit.

- When mounting a new head/carriage unit, apply the specified lubricant to the specified points, referring to [Section 6.2](#).
Also, after mounting a new head/carriage unit, apply the specified lubricant to the specified points on the sliding surfaces of the CR guide rail and CR support chassis, referring to [Section 6.2](#).
- Before mounting the head/carriage unit on the engine unit, be sure to move the front and rear slider cams to the rightmost position to prevent them from scratching or damaging the PF encoder disk.



- When mounting the head/carriage unit on the left end of the engine unit, first fit the front end over the CR support chassis (shown on the previous page) and then set the rear end onto the CR guide rail. Make sure that the two front bosses (see below) provided on the bottom of the head/carriage unit catch the front edge of the CR support chassis and the two rear bosses are fitted in the two cutouts (shown on the previous page) in the CR guide rail.

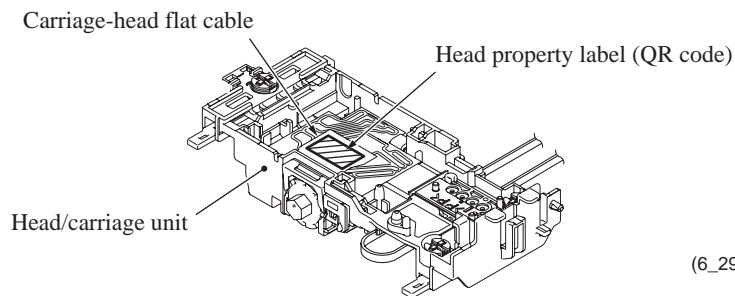
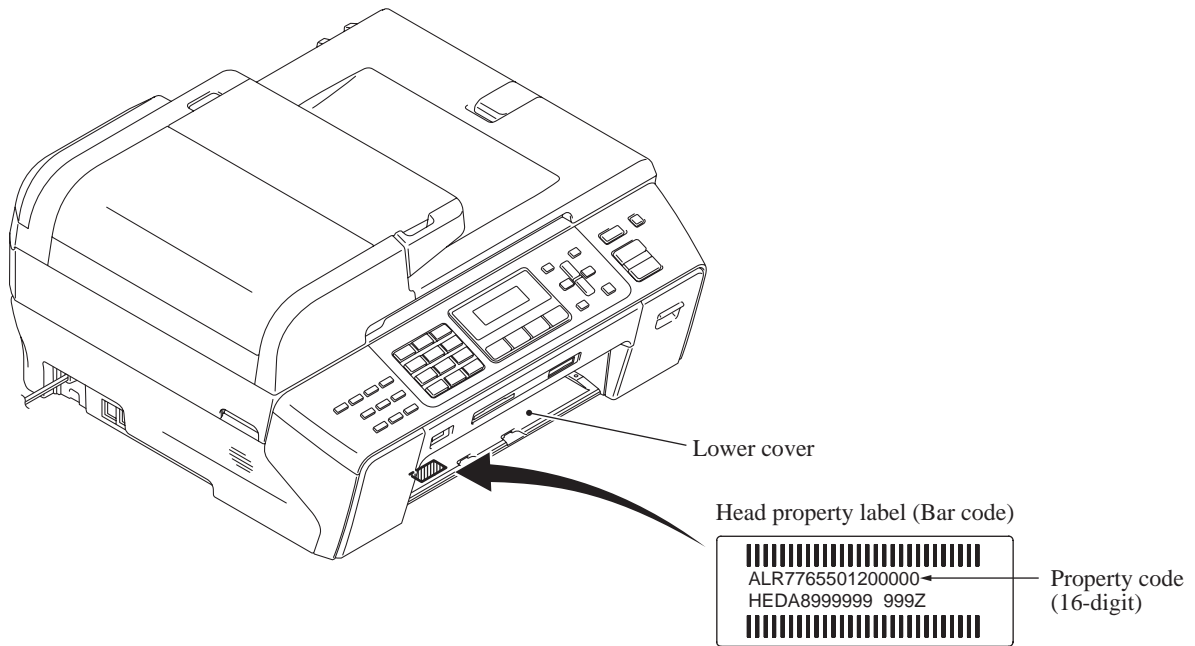


- After mounting the head/carriage unit, slide it by hand to check that it smoothly moves to the right and left ends of its travel.
- After replacement of the head/carriage unit, check that the CR encoder strip and PF encoder disk are free of grease and ink. If they are stained with grease or ink, replace them.

(21) A head/carriage unit is assigned a property code that represents the properties unique to that head/carriage unit. The property code is printed on head property labels--bar code label and QR code label, each of which is attached to the lower cover and carriage-head flat cable, respectively.

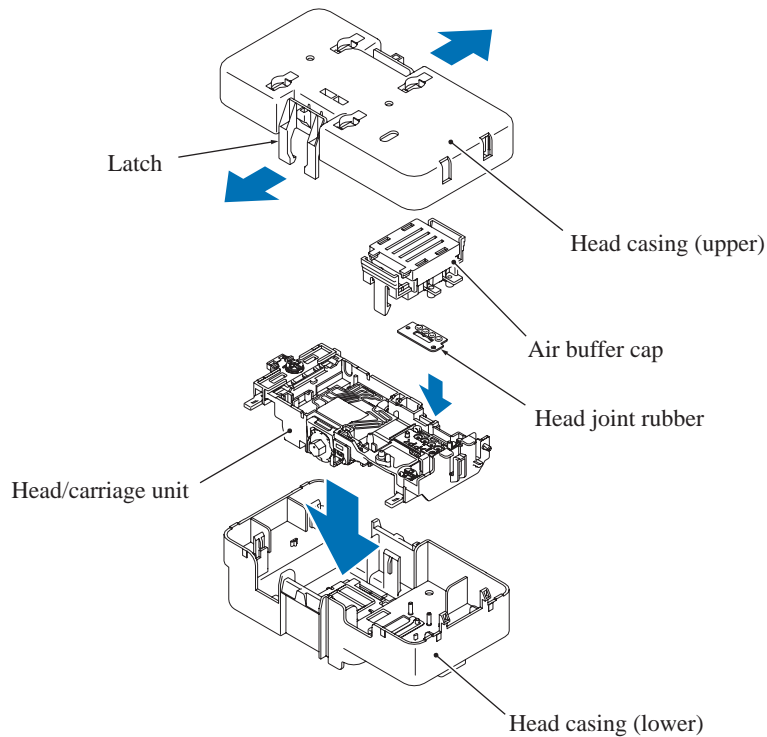
When you remove the head/carriage unit and store it separately from the machine, remove the property label (bar code label) from the lower cover and store it together with the head/carriage unit.

If you replace the head/carriage unit, attach the property label (bar code label) that comes with the new head/carriage unit to the lower cover as shown below.



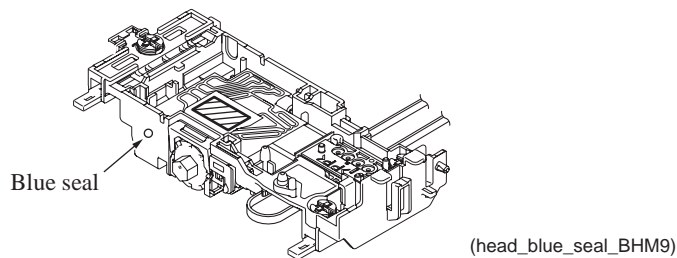
(6_29_BHL9_A4)

Note: When storing the head/carriage unit for a long period, be sure to put a head joint rubber and an air buffer cap on the head/carriage unit and store the unit in the head casing, as shown below. Leaving the head/carriage unit out of the casing will cause the head nozzles and ink supply ports to dry up, resulting in a damaged head.



(6_64)

Assembling Note: After replacement of the head/carriage unit, make adjustments specified in [Chapter 7, Section 7.2](#). (For the head/carriage unit having a round, blue seal, perform the head replacement purge; for the unit having no seal, perform the initial purge. See [Section 7.2, \[2 \]](#).)



6.1.12 Ink Absorber Box, Ink Absorber Felt, and PF Encoder Disk

Note: Do not remove the ink absorber box unless it needs to be replaced.

Note: If the main PCB is replaced without backing up the machine information, the ink absorber box (and flushing box) should also be replaced.

Note: Once the main drain tube is removed from the ink absorber box for the replacement of the ink absorber box, it will become unusable and new part will have to be put back in. Using the removed tube again may result in an ink leakage.

- (1) Pull out the main drain tube from the ink absorber box.

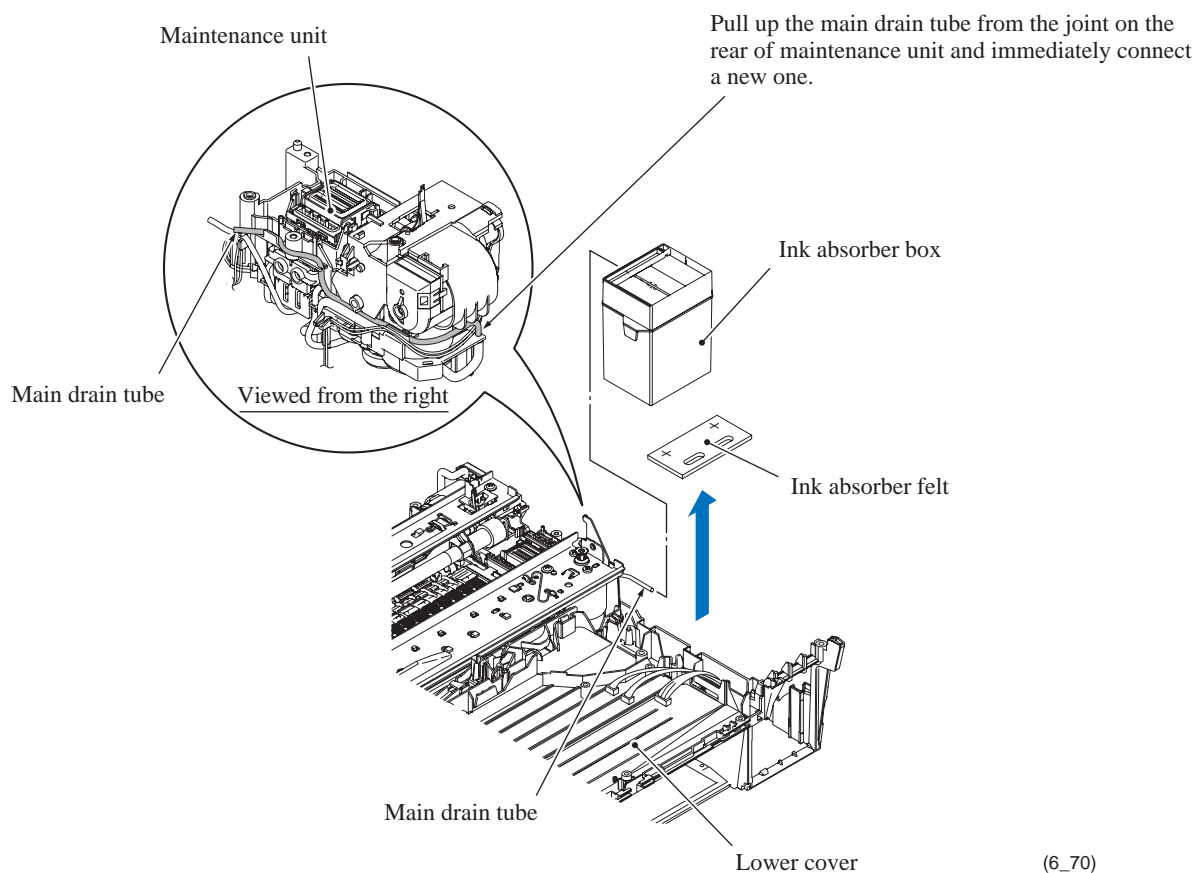
Note: Pinch the end of the main drain tube with a clip in order to prevent drained ink from leaking and the machine from getting stained with leaked ink.

Note: Do not place the main drain tube that has been pulled out on the main PCB. If the PCB is stained with leaked ink, wipe it off with a dry cloth.

- (2) Pull the ink absorber box up and out of the lower cover.
- (3) Immediately set a new ink absorber box. Then replace the tube; that is, pull it off the joint on the rear of the maintenance unit and connect a new tube to the joint and new ink absorber box as shown below.

Note: If the ink absorber box or its surroundings are stained with ink, wipe them off with a cloth.

- (4) Take the ink absorber felt out of the lower cover.

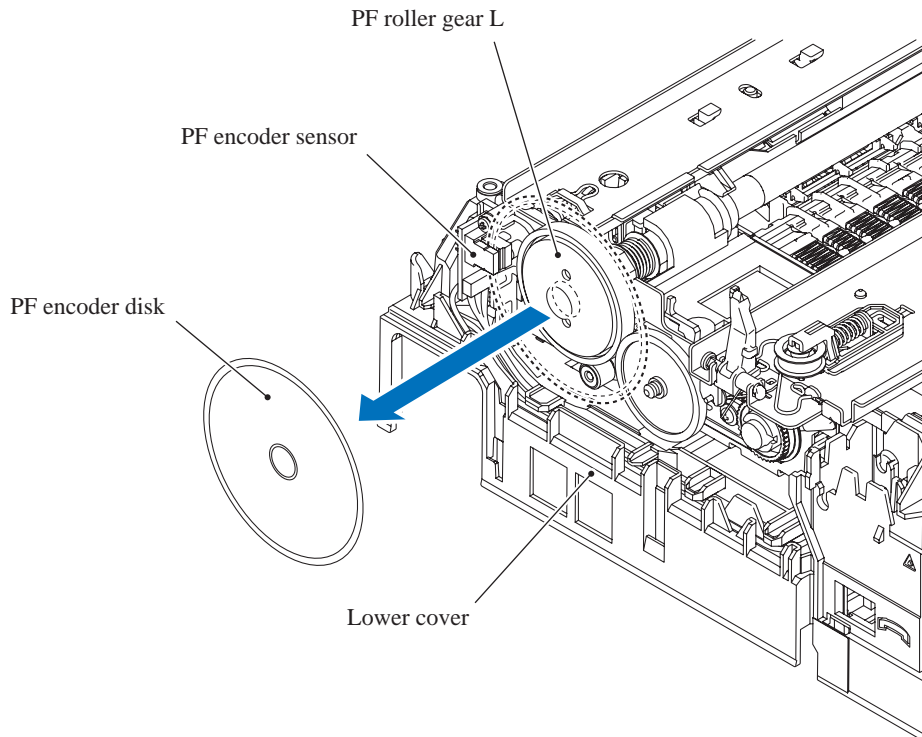


Assembling Note: If you replace the ink absorber box (without replacing the main PCB), you also need to replace the flushing box (see [Section 6.1.13](#)) and reset both the purge and flushing counters as specified in [Chapter 7, Section 7.5](#).

(5) Peel off the PF encoder disk from the PF roller gear L only when it should be replaced.

Note: Once removed, the PF encoder disk will become unusable and a new disk will have to be put back in.

Note: Remove any adhesive remaining left on the PF roller gear L.



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Assembling Note: When attaching the PF encoder disk to the PF roller gear L, using a spatular tool makes the job easier. Put on clean gloves to protect the disk surface from dust or fingerprints.

6.1.13 Engine Unit and Flushing Box

During disassembly jobs, except when removing the ink refill ASSY or engine unit (including the maintenance unit), leave the head/carriage unit in the machine.

Before removing the head/carriage unit, ink refill ASSY or engine unit, you need to replace all four ink cartridges with the protective part (see [page 6-3](#)).

Note: If the main PCB is replaced without backing up the machine information, the flushing box (and ink absorber box) should also be replaced.

Assembling Note: If you replace the engine unit, make adjustments specified in [Chapter 7, Section 7.2](#).

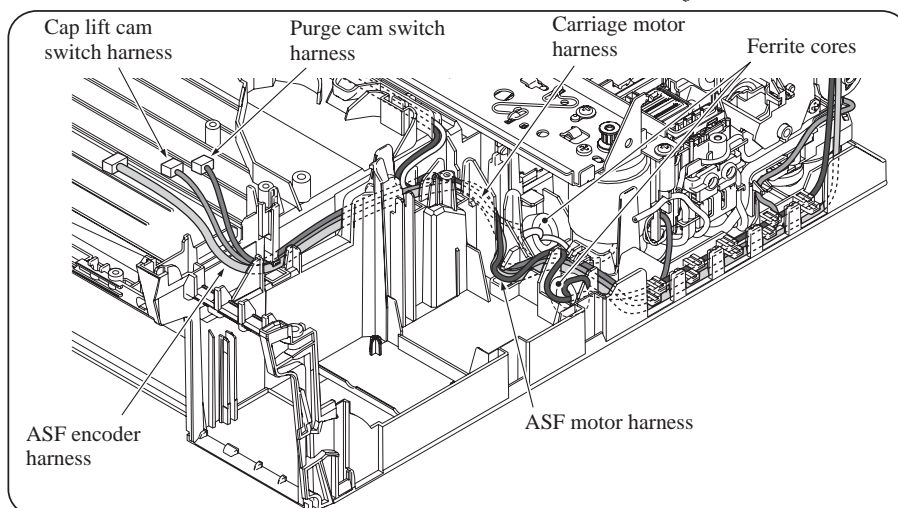
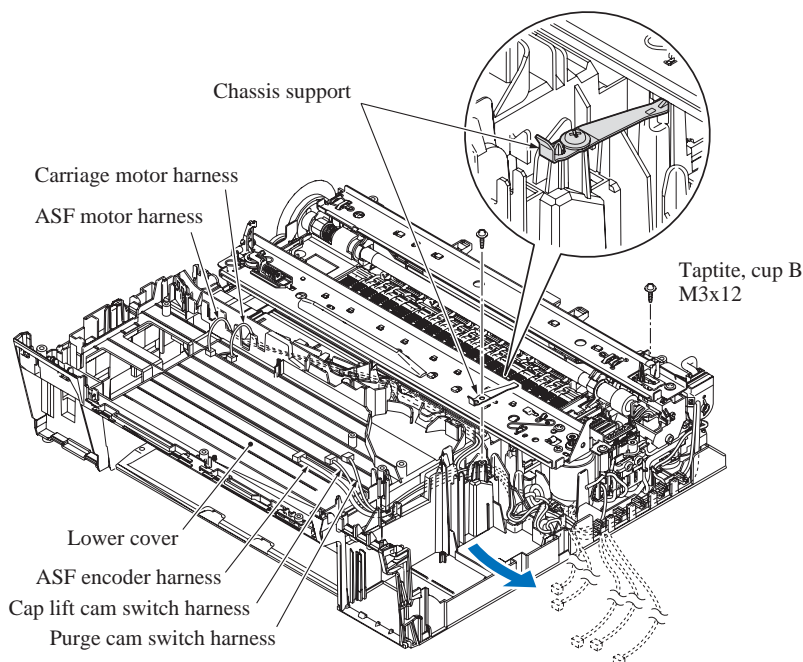
(1) If the MJ/PS shield unit has not been removed, you need to remove screw "h" shown on [page 6-37](#).

(2) Remove the chassis support by removing the screw.

Assembling Note: Insert the chassis support into the cutout provided in the right end of the engine chassis as shown below.

(3) Remove the screw from the rear of the engine unit.

(4) Take the carriage motor harness, ASF motor harness, purge cam switch harness, and cap lift cam switch harness out of the harness guides provided on the lower cover.



(6_72_1)

- (5) Take the paper feed motor harness and PF encoder/registration sensor harness out of the harness guides provided on the lower cover.

Assembling Note: Route the harnesses as shown on the next page.

- (6) Lift the engine unit up and out of the lower cover in the direction of the arrow shown below, holding the inner chute located beneath the CR guide rail.

Note: Do not hold the CR guide rail.

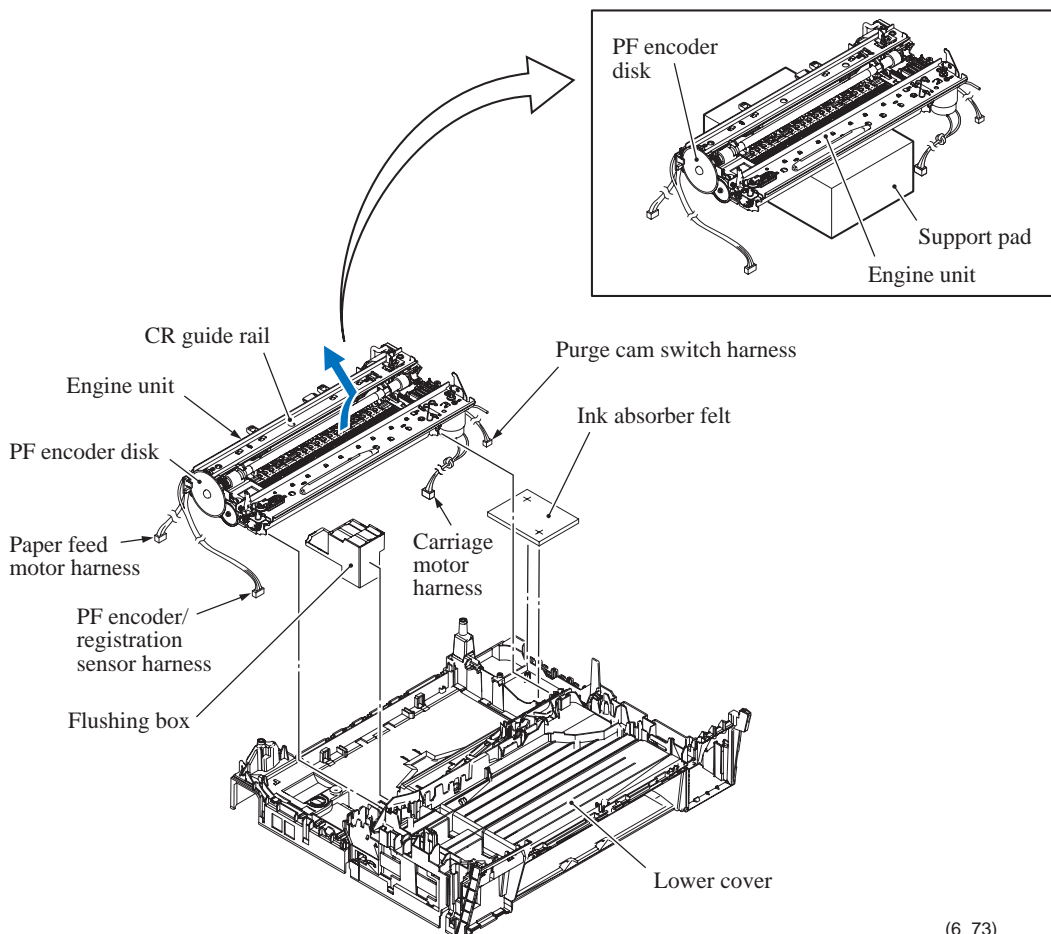
Note: If the ink absorber box does not need to be replaced, be sure to take it out of the lower cover together with the engine unit. Do not disconnect the main drain tube from the ink absorber box. Once disconnected, the tube will become unusable and a new part will have to be put back in.

Note: Do not place the engine unit directly on a flat surface; doing so may break the PF encoder disk and gears. Be sure to place a support pad under the engine unit as shown below.

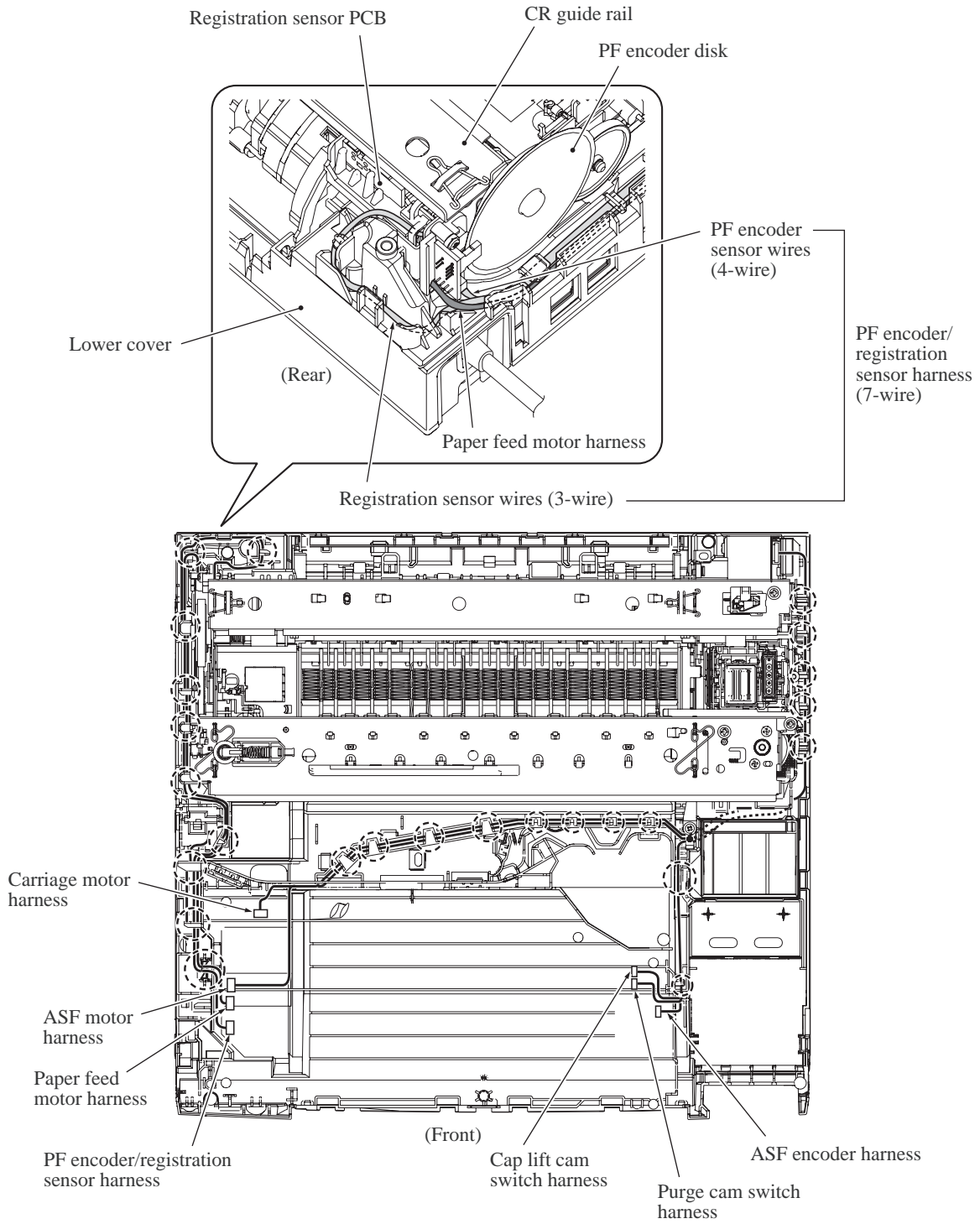
Assembling Notes:

- Before mounting the engine unit on the lower cover, make sure that the PF encoder/registration sensor harness is routed through the cable guides on the inner chute as shown on the next page and [page 6-68](#).
 - When mounting the engine unit on the lower cover, be careful not to crush the harnesses between the unit and the cover. Mount the engine unit parallel to the lower cover so that the screws are tightened securely.
- (7) Take the flushing box and ink absorber felt out of the lower cover.

Assembling Note: If you replace the flushing box (without replacing the main PCB), you also need to replace the ink absorber box (see [Section 6.1.12](#)) and reset both the flushing and purge counters as specified in [Chapter 7, Section 7.5](#).



(6_73)



(6_74_1)

6.1.14 Components on the Engine Unit

(Earth spring, Maintenance unit, ASF motor*, Carriage motor, Star wheel holder, Paper ejection roller, Platen, Inner chute ASSY, Registration sensor actuator, Registration sensor PCB, PF encoder PCB, Paper pull-in rollers, and ASF gear shaft outer)

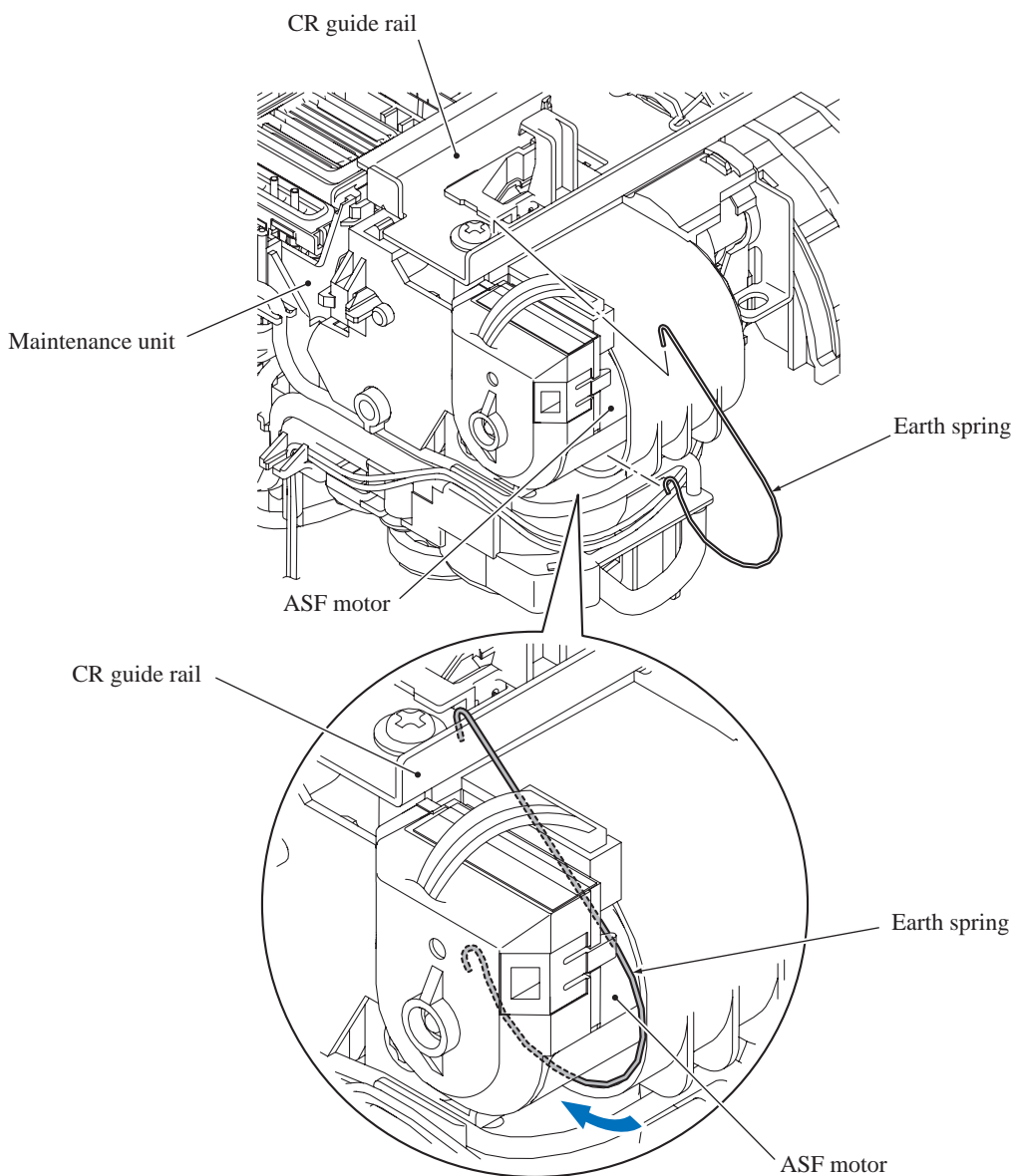
*ASF motor: Auto Sheet Feeder motor

Earth spring

- (1) Release the upper and lower ends of the earth spring from the CR guide rail and the ASF motor holder, respectively.

Assembling Note: When mounting the earth spring, take care not to contaminate it with grease.

First hook the upper end on the CR guide rail and insert the lower end under the ASF motor. The earth spring twines around the ASF motor by itself with the spring force. After mounting it, check that the earth spring is in contact with the metal part of the ASF motor.



(6_75)

Maintenance unit

- (2) Release the right end of the switching lever guide from the maintenance unit and remove it.

Assembling Notes:

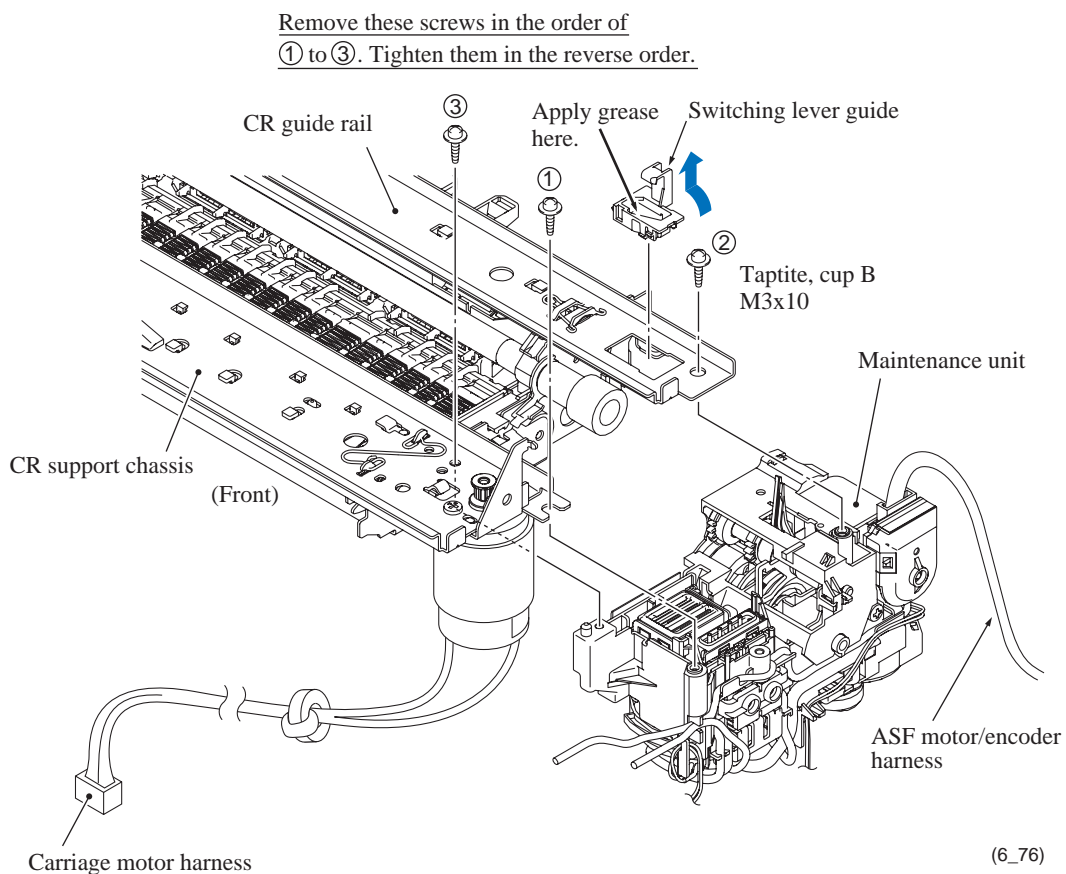
- When mounting the switching lever guide on the maintenance unit, apply the specified lubricant to the specified point, referring to [Section 6.2](#).
 - When mounting the switching lever guide on the maintenance unit, put it on the CR guide rail and then lightly press it.
- (3) If the ink absorber box has not been removed, pull out the main drain tube from the ink absorber box.

Note: Pinch the end of the main drain tube with a clip in order to prevent drained ink from leaking and the machine from getting stained with leaked ink.

- (4) Remove the three screws in the order of ① to ③ (as shown below) from the maintenance unit and detach the maintenance unit from the engine unit.

Assembling Notes:

- When mounting the maintenance unit on the engine unit, fit the two bosses of the shaft holder (on the left side of the maintenance unit) into the two holes under the CR guide rail.
- When securing the maintenance unit with three screws, tighten these screws in the order of ③→②→① as shown below.

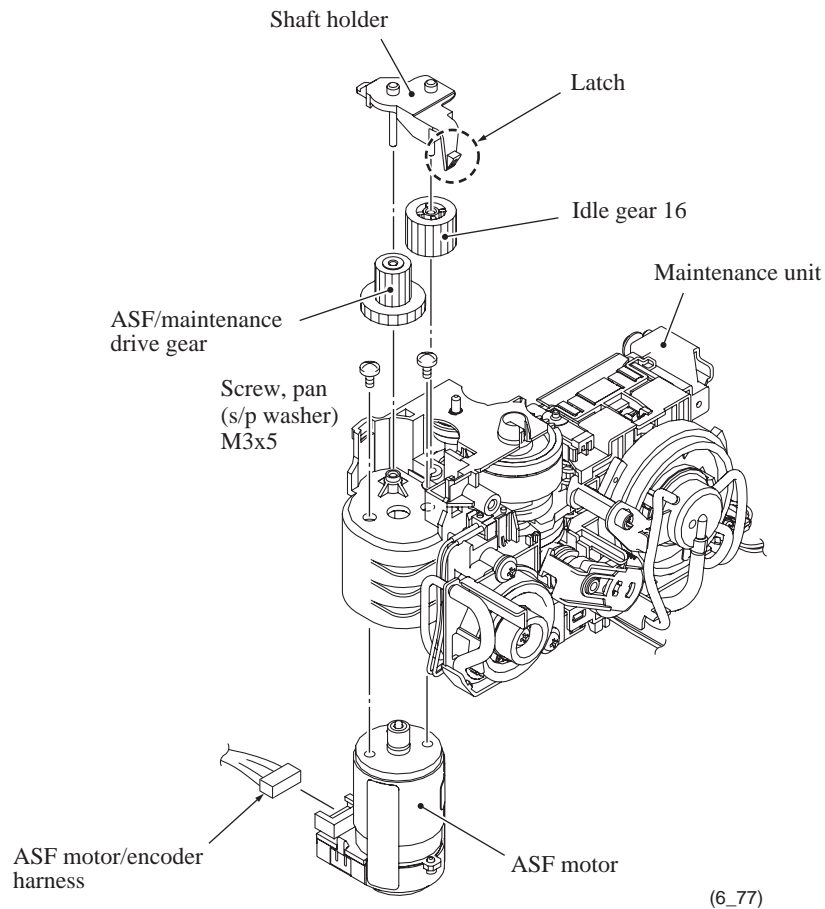


ASF motor

- (5) Unlatch the shaft holder and remove it from the maintenance unit.
- (6) Remove the idle gear 16 and the ASF/maintenance drive gear.
- (7) Remove the ASF motor from the maintenance unit by removing the two screws.

Assembling Note: When mounting the ASF motor on the maintenance unit, first fit the small hole of the ASF motor on the small boss inside the ASF motor holder, then secure the motor with the two screws.

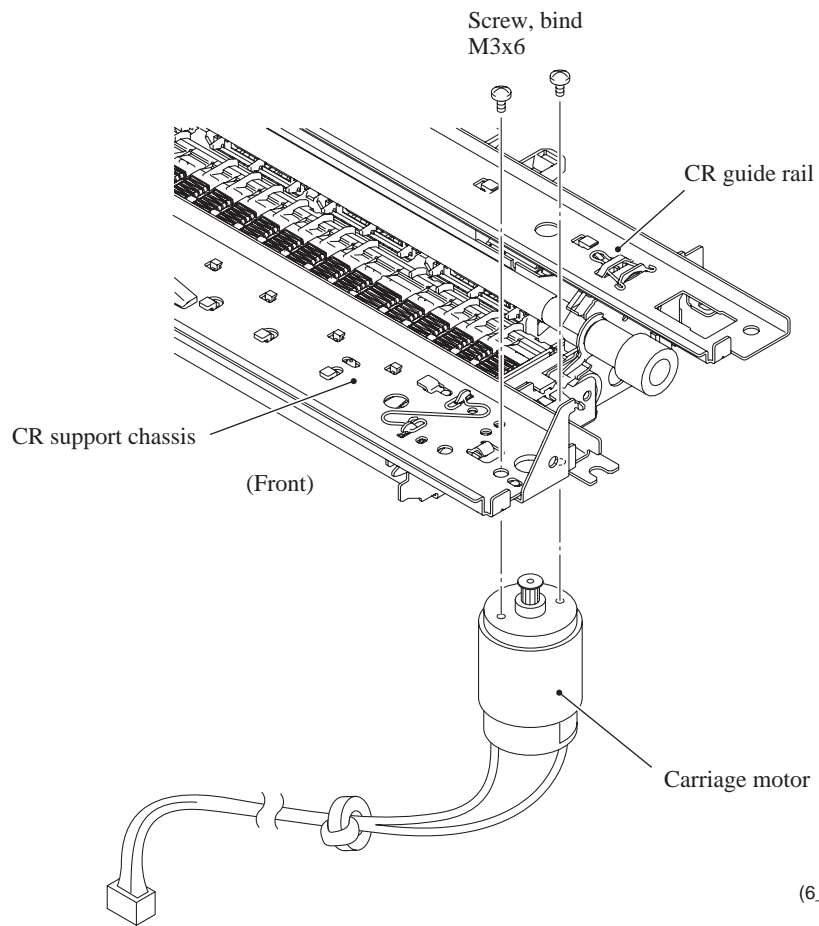
- (8) Disconnect the ASF motor/encoder harness from the ASF motor.



(6_77)

Carriage motor

- (9) Remove the carriage motor from the engine unit by removing the two screws.



(6_78)

Star wheel holder

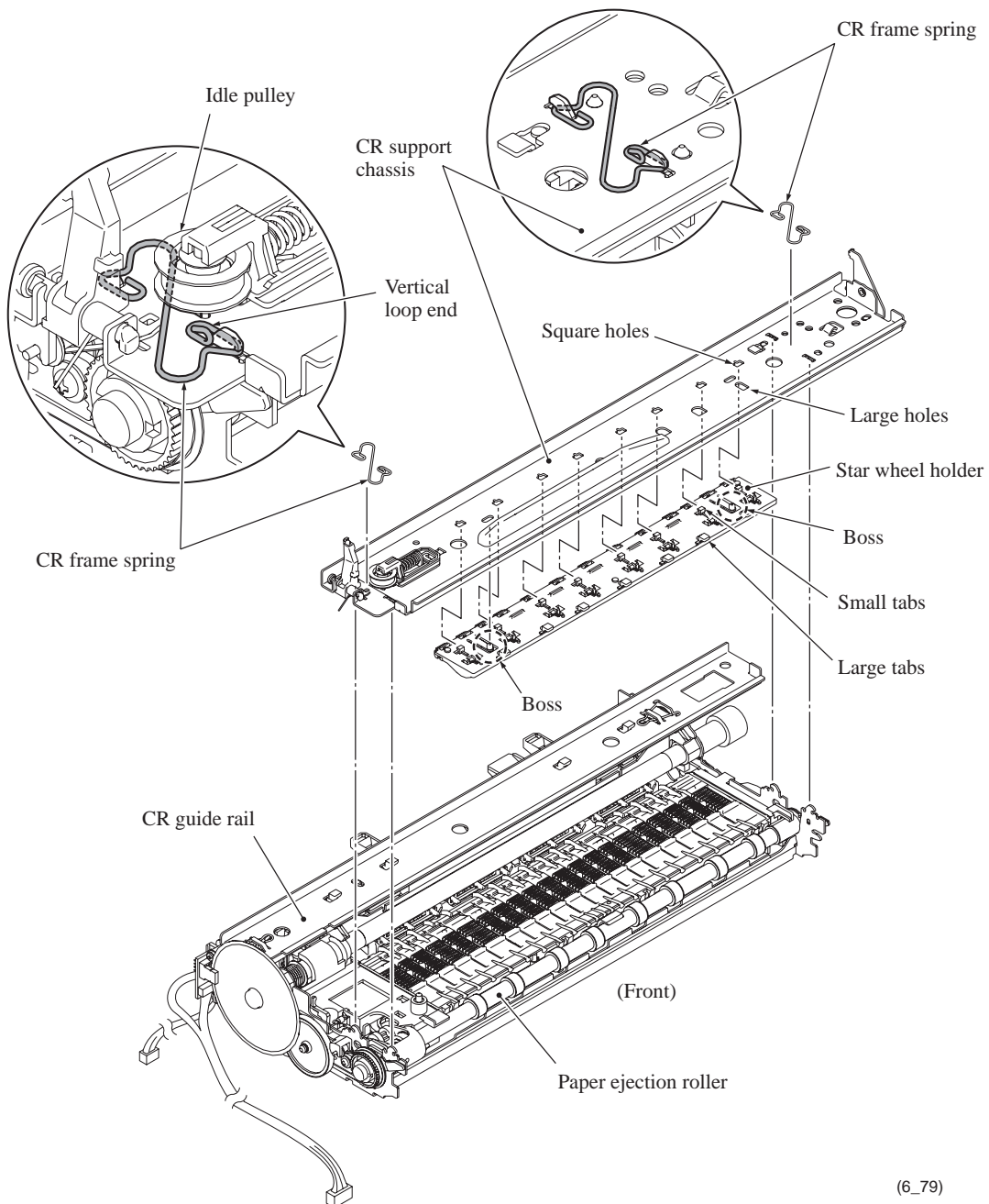
(10) Remove two CR frame springs from the CR support chassis.

(11) Lift up the CR support chassis.

(12) While lightly pressing down the two bosses that fit in the oval holes provided in the CR support chassis, slide the star wheel holder to the front to release the small tabs from the square holes of the CR support chassis and remove it.

Assembling Notes:

- When mounting the star wheel holder under the CR support chassis, first set the large tabs on the star wheel holder in the large holes provided in the CR support chassis, then slide the star wheel holder to the rear to set the small tabs in the square holes provided in the CR support chassis.
- When securing the CR support chassis to the engine unit with the CR frame springs, set those springs so that their vertical loop ends come to the front. Pass the left spring under the idle pulley.

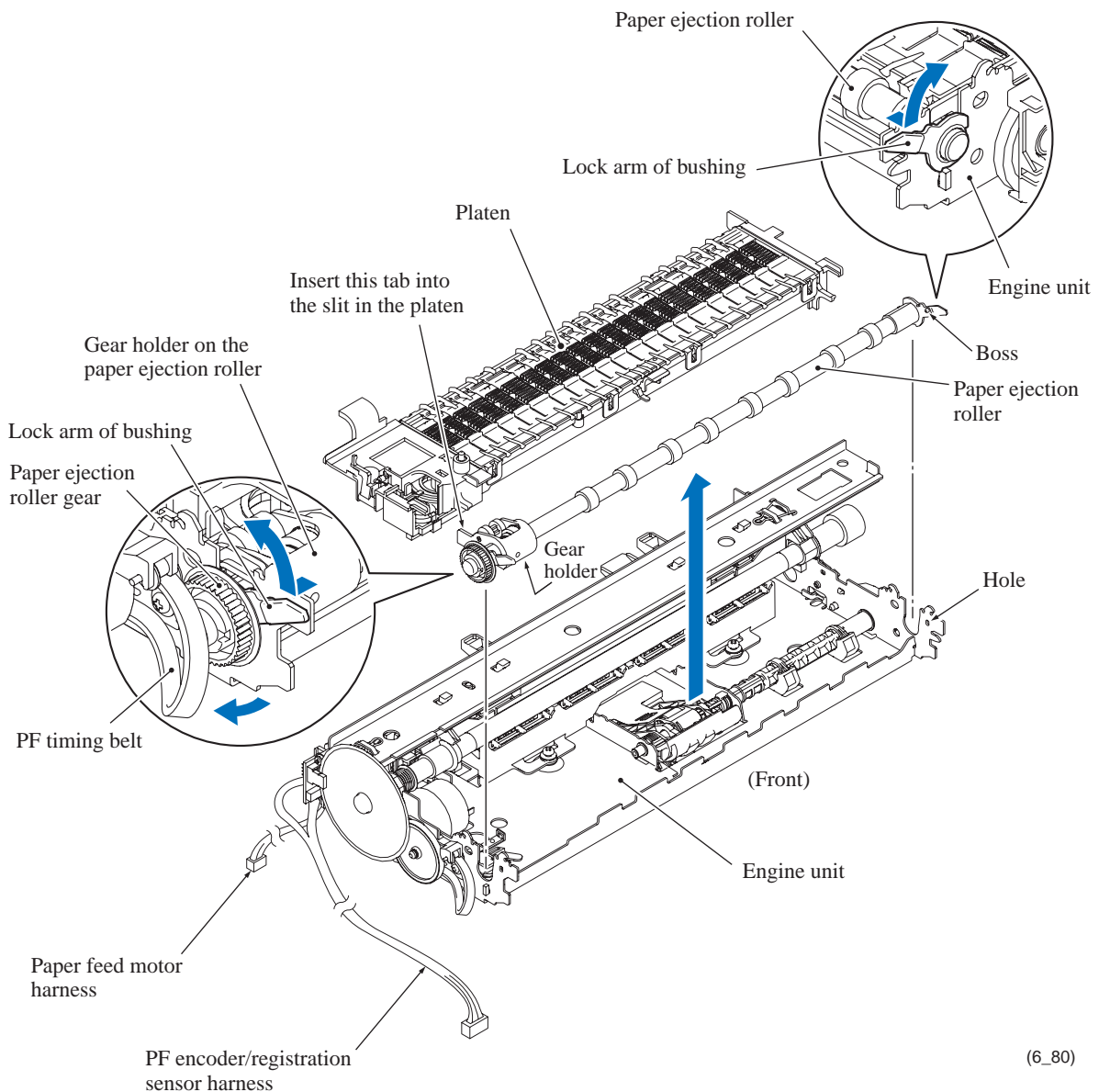


(6_79)

Paper ejection roller and platen

- (13) Release the PF timing belt from the paper ejection roller gear.
- (14) Pull the lock arm of the bushing at each end of the paper ejection roller outwards and turn it upright.
- (15) Lift the paper ejection roller and remove the platen from the engine unit.

Assembling Note: When mounting the paper ejection roller, first insert the tab of the gear holder on its left side into the slit in the platen, set the roller's bushings into the engine chassis, and then fit the bosses on the lock arms of the bushings into the holes provided in the engine chassis as shown below.



(6_80)

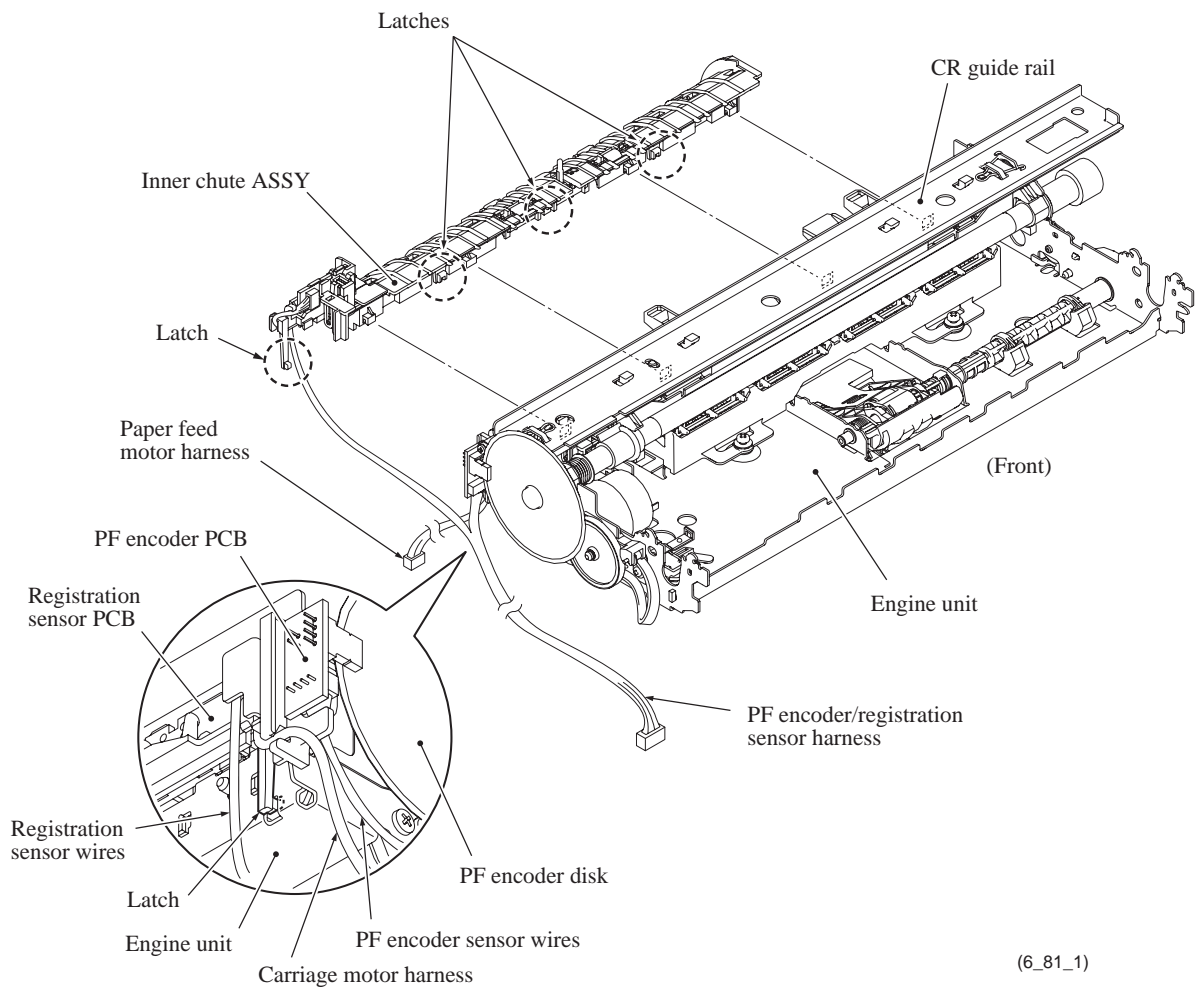
Inner chute ASSY, registration sensor actuator, registration sensor PCB, and PF encoder PCB

(16) Release the three latches of the inner chute ASSY from the engine unit. First pull and release the rightmost latch (viewed from the rear) and then the remaining two ones.

Note: Do not pull the inner chute ASSY away from the engine unit since it is connected to the engine unit with the PF encoder/registration sensor harness.

Assembling Note: When mounting the inner chute on the engine unit, first set the left two latches and then the rightmost one.

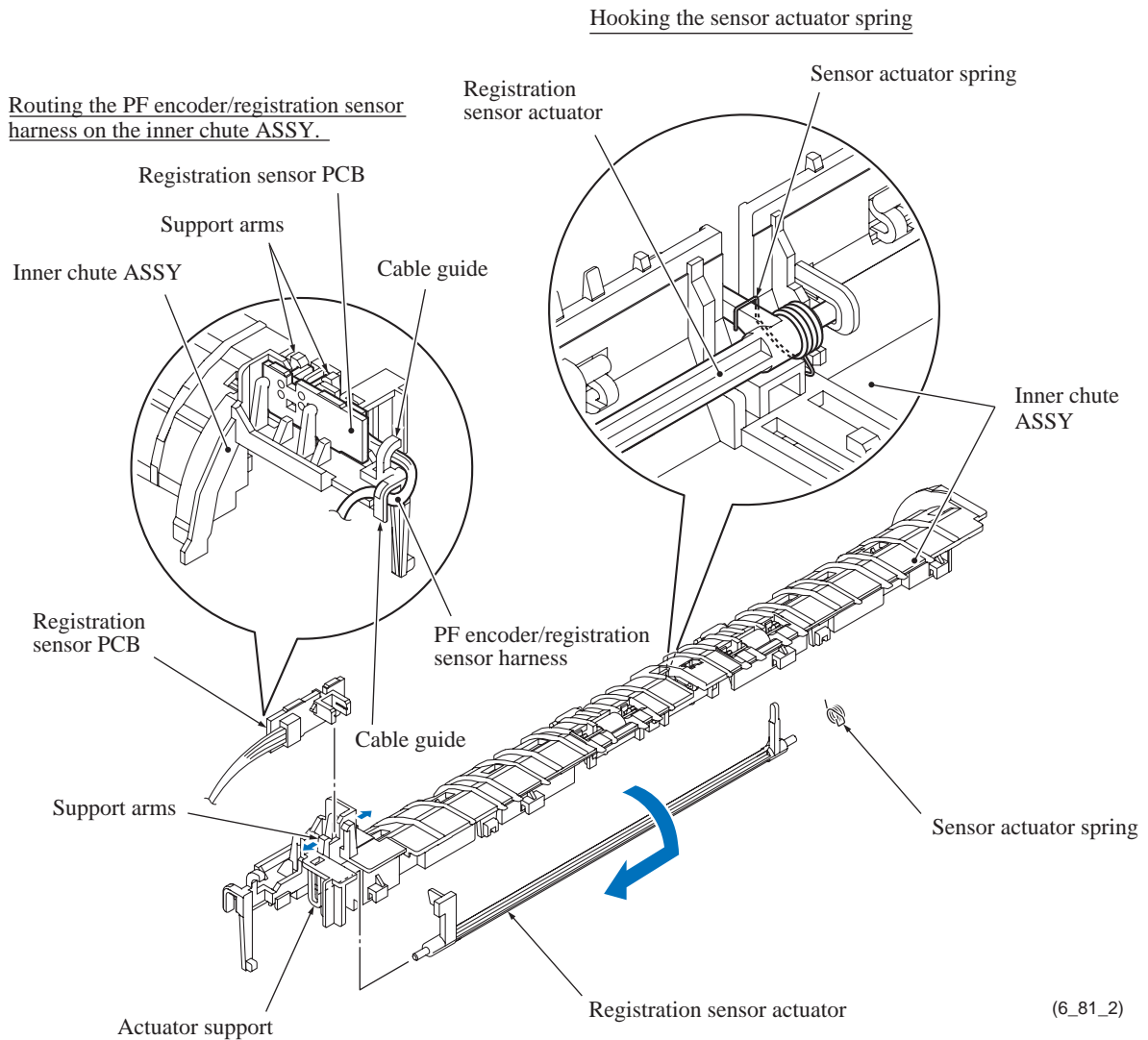
(17) Release the PF encoder/registration sensor harness from the cable guides on the inner chute ASSY. (The routing detail is shown on the next page.)



- (18) Turn the registration sensor actuator in the direction of the arrow shown below and take it off the inner chute ASSY. The sensor actuator spring comes off.
- (19) Take the registration sensor PCB out of the support arms.

Note: The registration sensor PCB and the PF encoder PCB are assembled with their harnesses. To completely release the registration sensor PCB from the engine unit, therefore, you need to remove the PF encoder PCB at the next step.

Assembling Note: Before mounting the inner chute on the engine unit, set the registration sensor actuator and its spring. Also set the registration sensor PCB and route the PF encoder/registration sensor harness. See the illustration below.



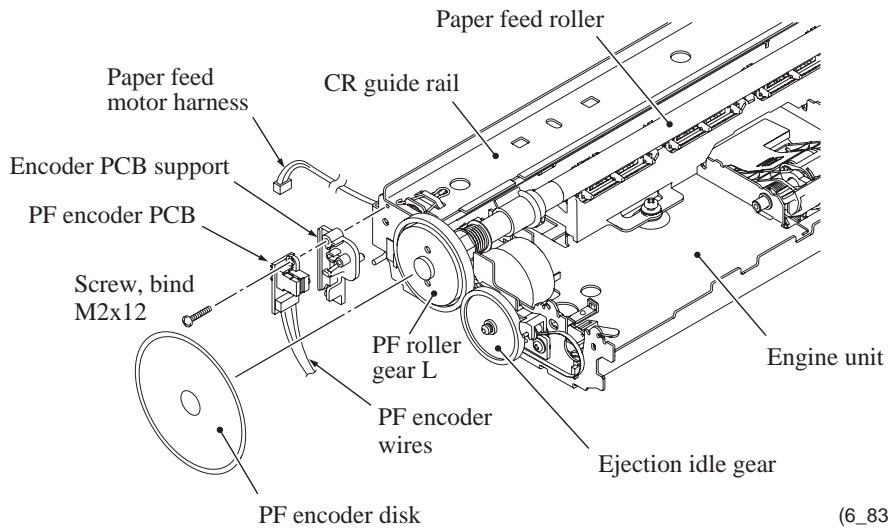
(20) At the left end of the engine unit, remove the screw that secures the PF encoder PCB and its support to the engine unit, taking care not to touch the PF encoder disk (if it has not been removed in [Section 6.1.12](#)).

(21) If the PF encoder disk needs to be replaced, peel it off from the PF roller gear L.

Note: Once removed, the PF encoder disk will become unusable and a new disk will have to be put back in.

Note: Remove any adhesive remaining left on the PF roller gear L.

Assembling Note: When attaching the PF encoder disk to the PF roller gear L, using a spatular tool makes the job easier. Put on clean gloves to protect the disk surface from dust or fingerprints.



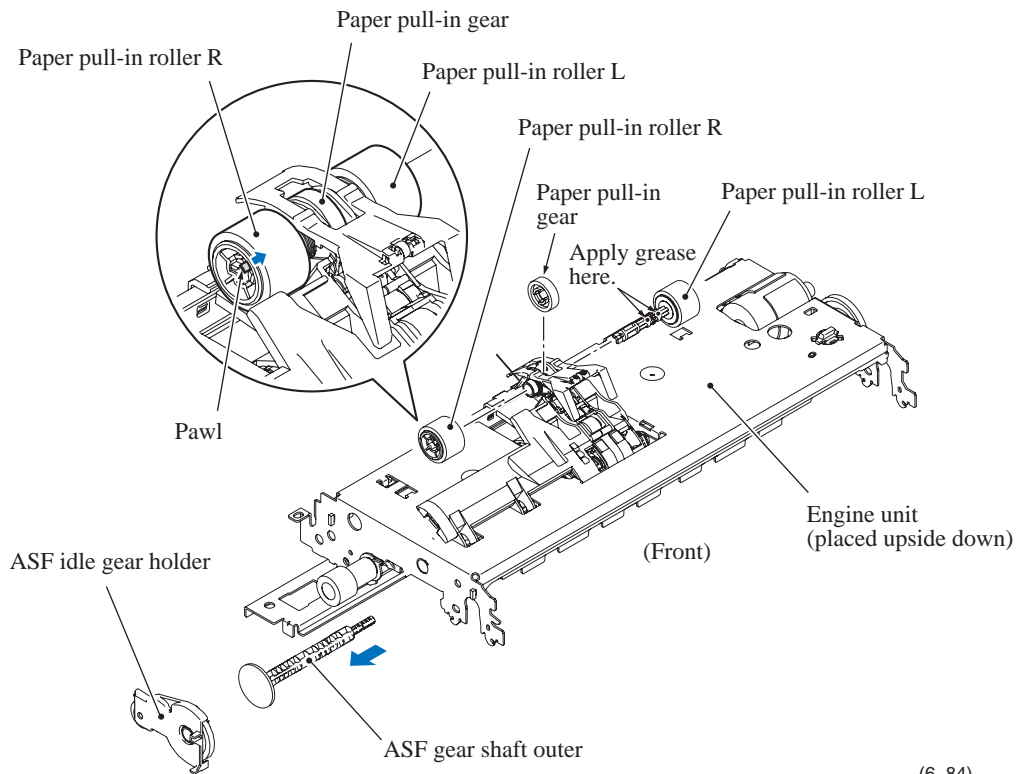
Paper pull-in rollers R and L, and ASF gear shaft outer

(22) Pull the pawl outwards and remove the paper pull-in roller R. Then pull out the paper pull-in roller L while turning it. The paper pull-in gear also comes off.

Assembling Note: Before mounting the paper pull-in roller L, apply the specified lubricant to the specified points, referring to [Section 6.2](#).

(23) Remove the ASF idle gear holder from the right side of the engine unit.

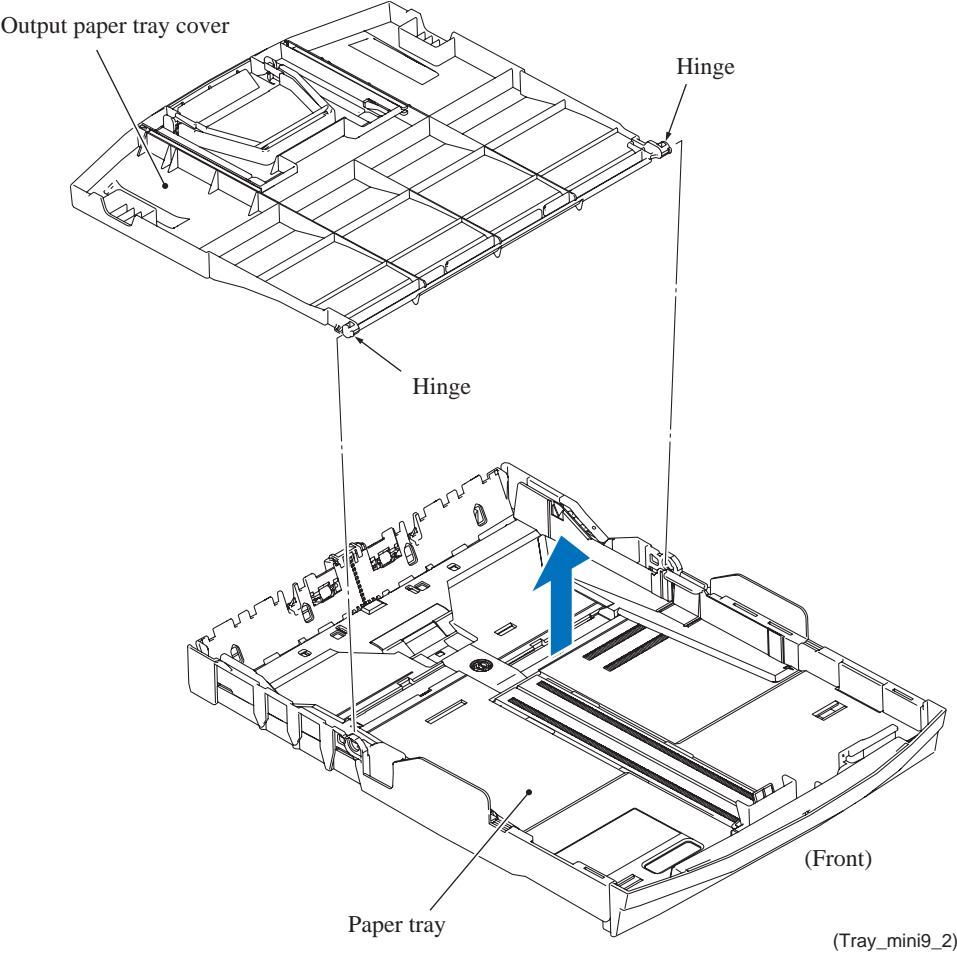
(24) Pull the ASF gear shaft outer to the right and out of the engine unit.



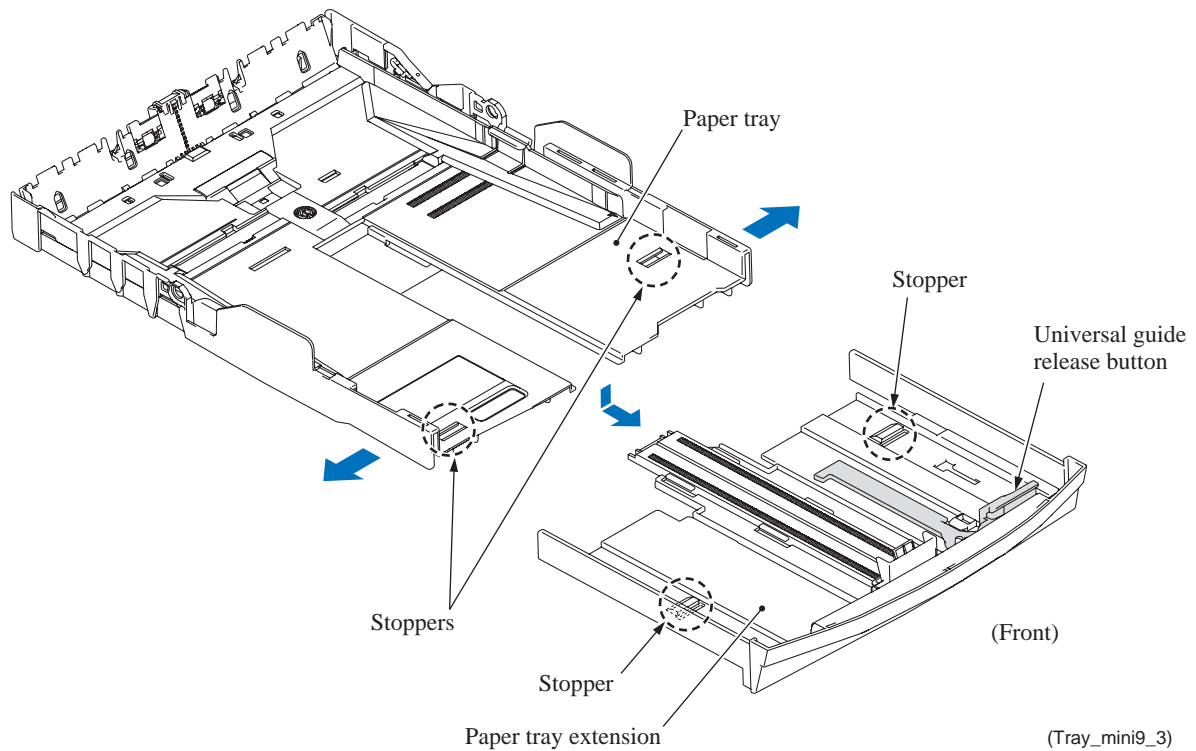
(6_84)

6.1.15 Paper Tray ASSY

- (1) Fully open the output paper tray cover and remove it from the paper tray by releasing the right hinge first and then the left one.



- (2) While pressing the universal guide release button (shown below), slide the paper tray extension to the front until it clicks. (The stoppers of the paper tray extension come into contact with those of the paper tray.)
- (3) Pull both sides of the paper tray outwards and press down the paper tray extension so that the extension's stoppers disengage with those of the paper tray, then slide the extension out of the paper tray while pressing the universal guide release button.



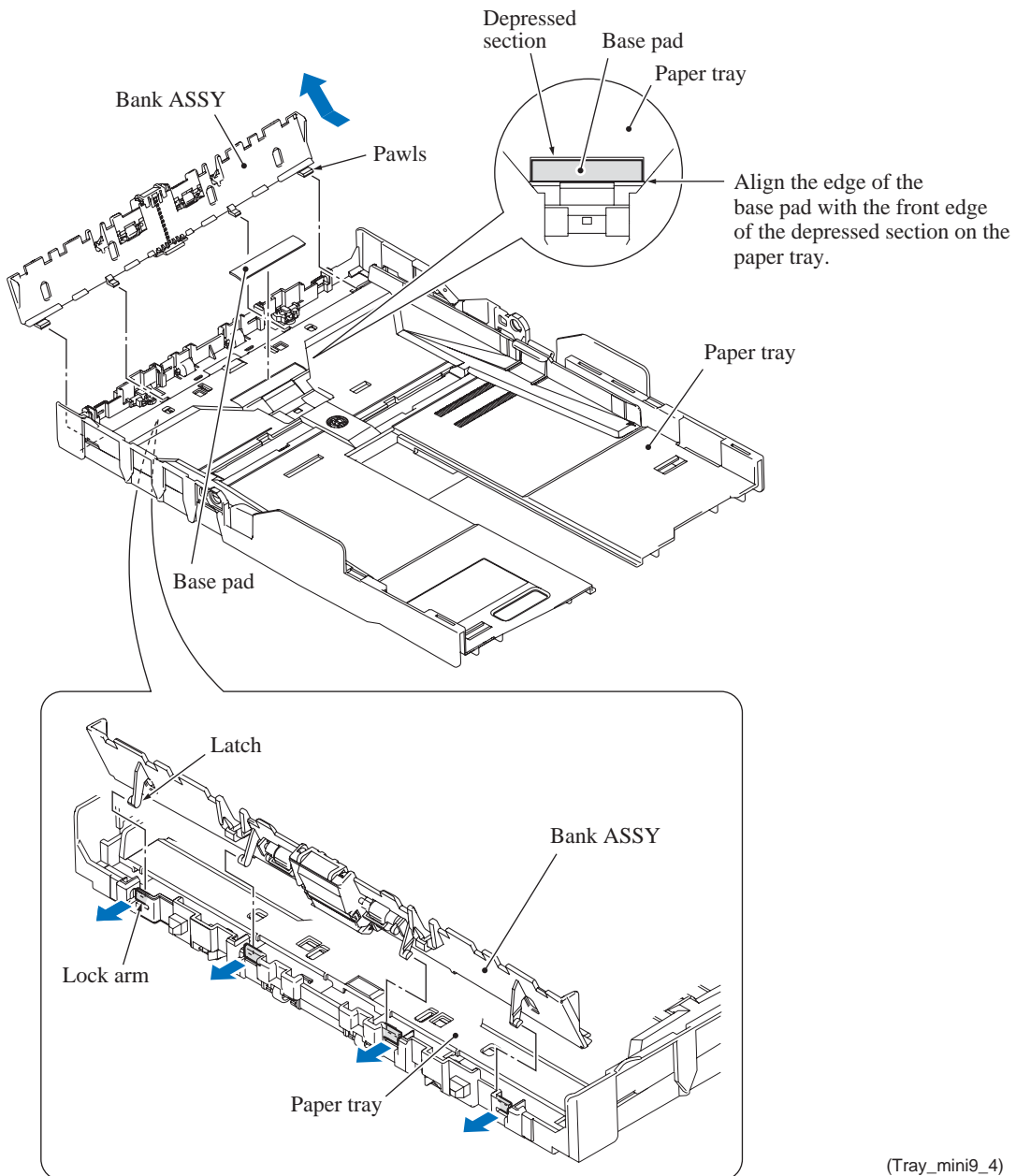
- (4) Pull the four lock arms on the rear of the paper tray outwards and release the four latches of the bank ASSY. Then pull the bank ASSY up and out of the paper tray.

Assembling Note: When mounting the bank ASSY, first insert the four pawls into the openings in the paper tray and then press the inside of the bank ASSY so that the latches snap into place.

- (5) If the base pad needs to be replaced, peel it off the bottom of the paper tray.

Note: Once removed, the base pad will become unusable and a new pad will have to be put back in.

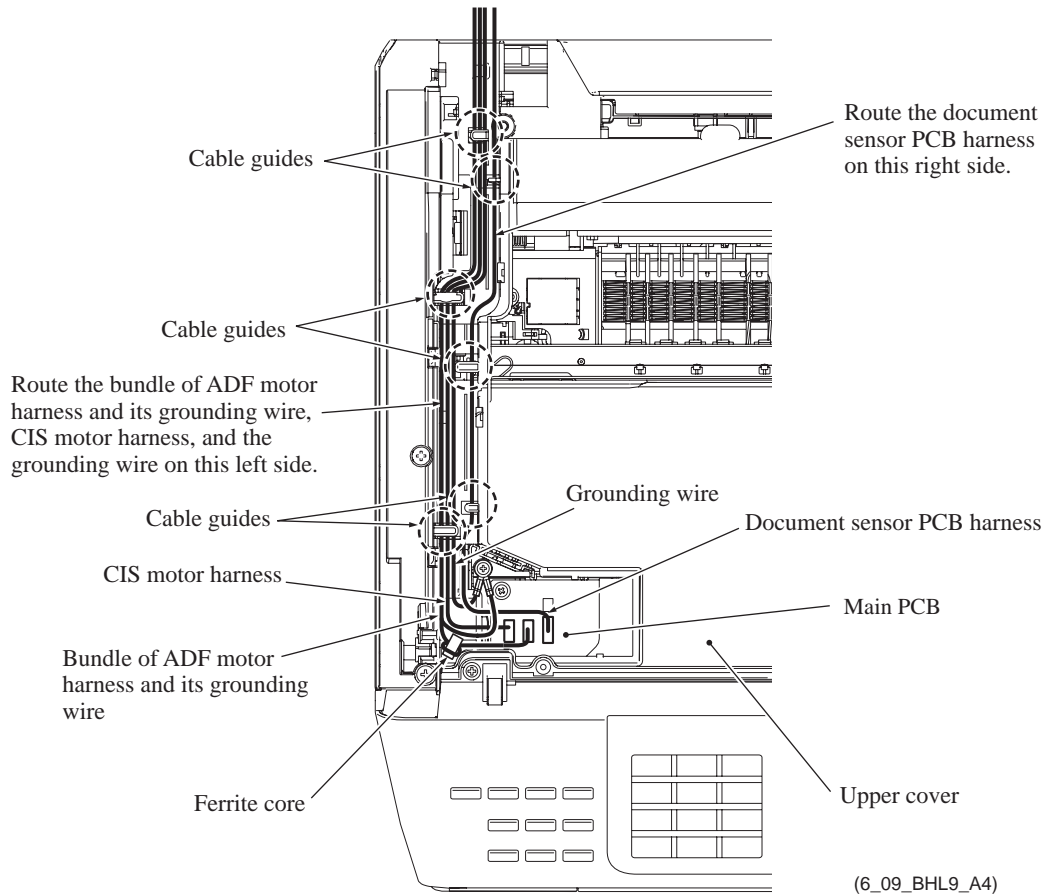
Assembling Note: When attaching a new base pad to the paper tray, align the edge of the base pad with the front edge of the depressed section on the paper tray as shown below.



(Tray_mini9_4)

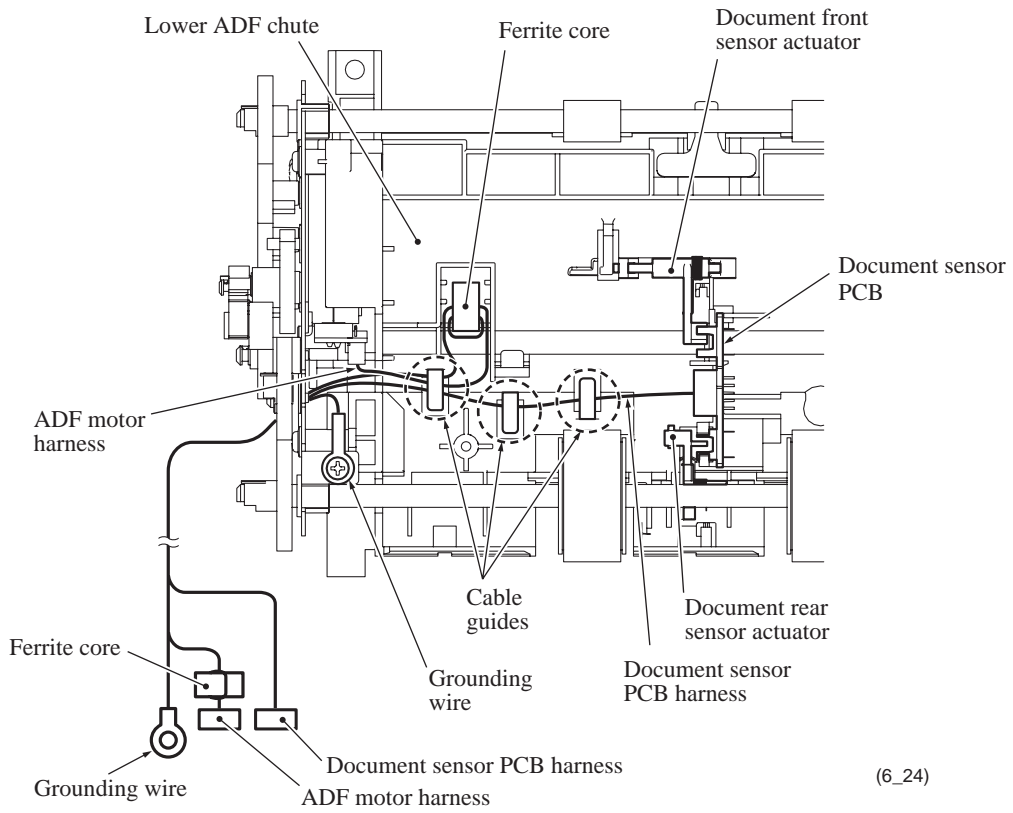
6.1.16 Routing of the Harnesses, Flat Cables, and Ink Supply Tubes

Routing A: Document sensor PCB harness, CIS motor harness, ADF motor harness, and grounding wires on the upper cover

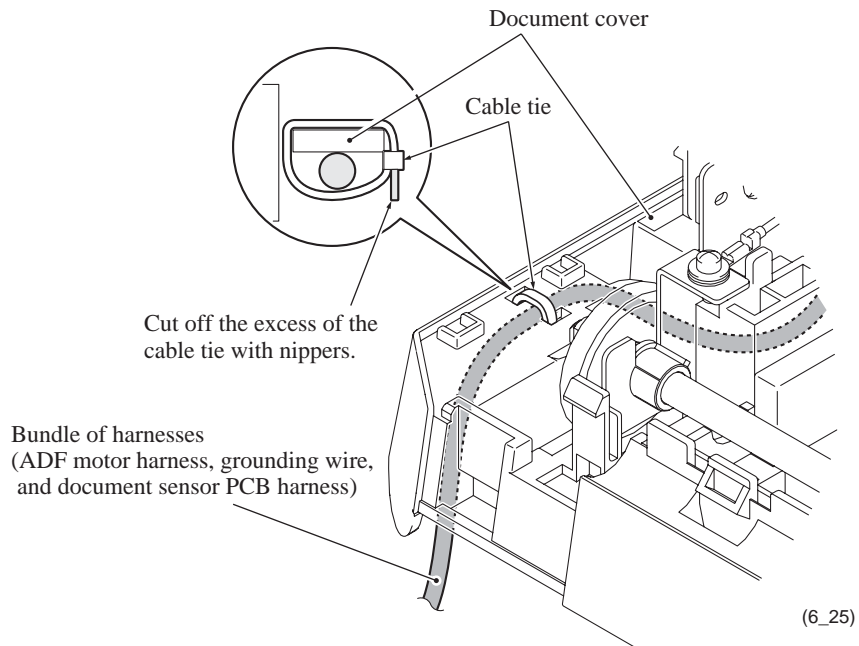


Routing B: Document sensor PCB harness, ADF motor harness, and grounding wire

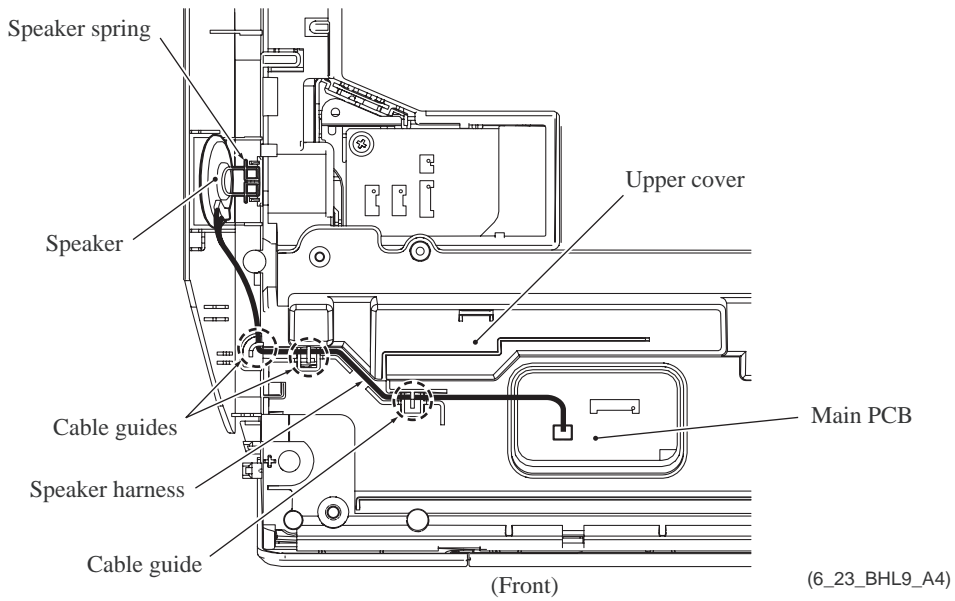
■ **On the lower ADF chute**



■ **On the document cover**

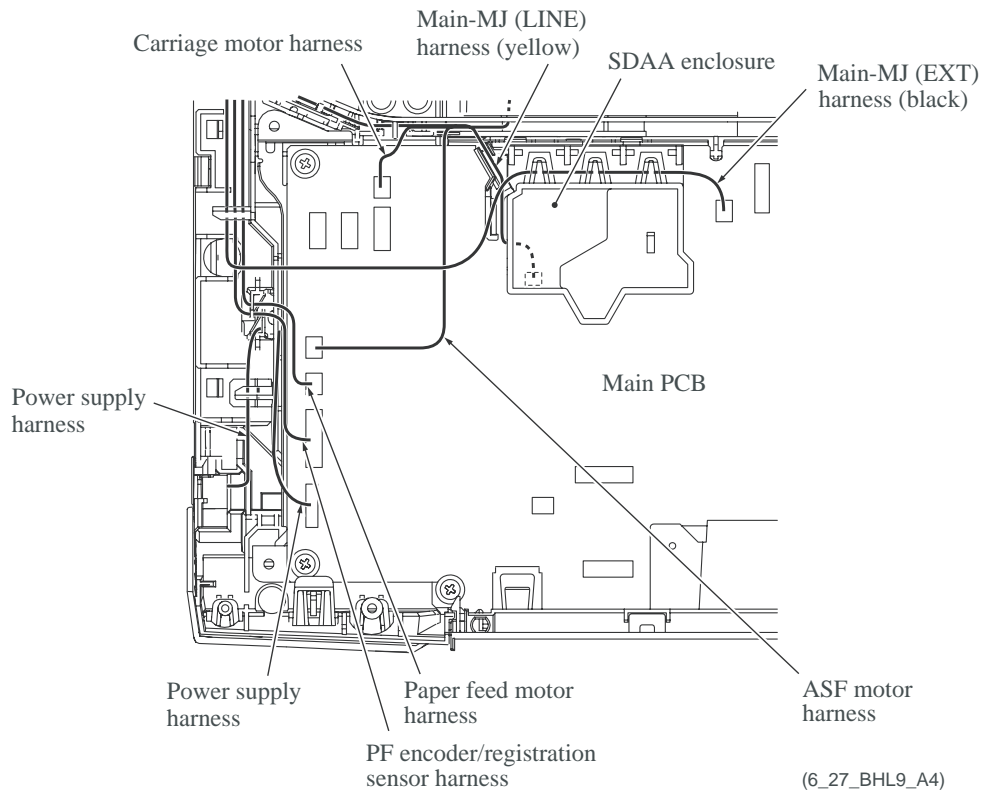


Routing C: Speaker harness on the upper cover

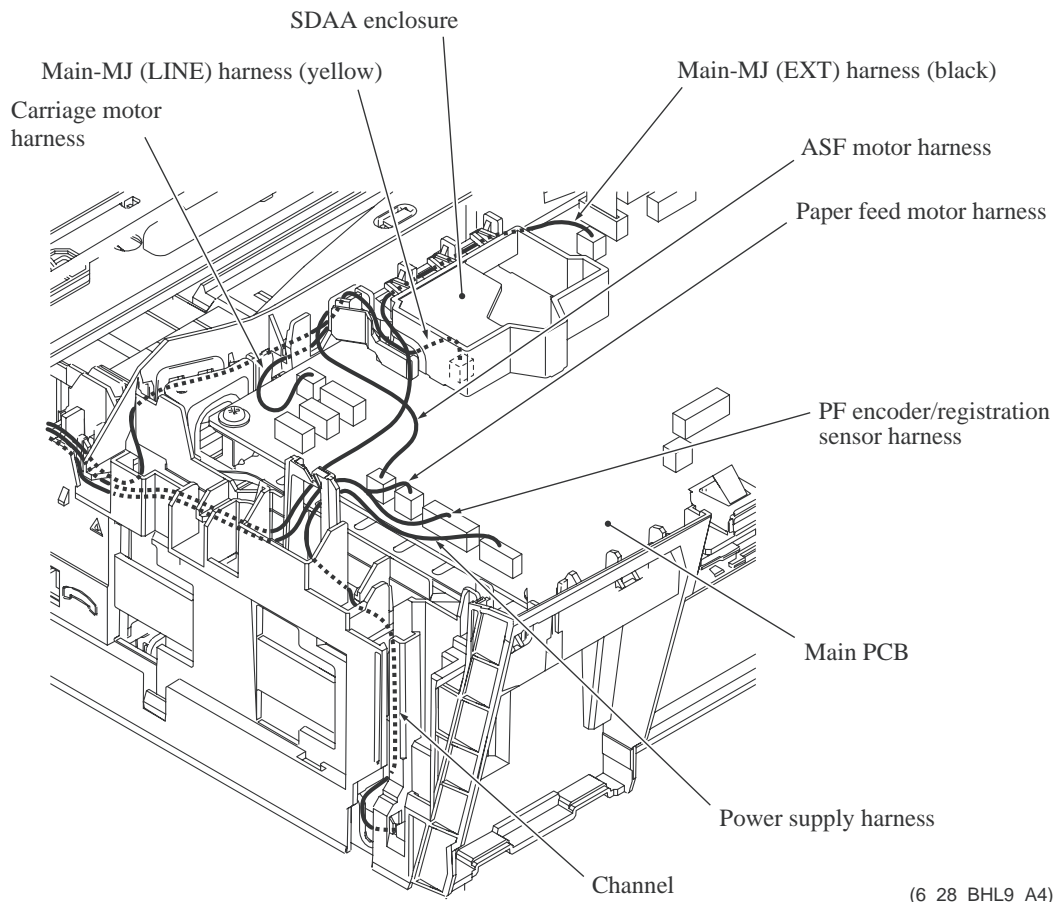


Routing D: Carriage motor harness, ASF motor harness, paper feed motor harness, PF encoder/registration sensor harness, power supply harness, main-MJ (EXT) harness, and main-MJ (LINE) harness on the lower cover

■ On the SDAA enclosure

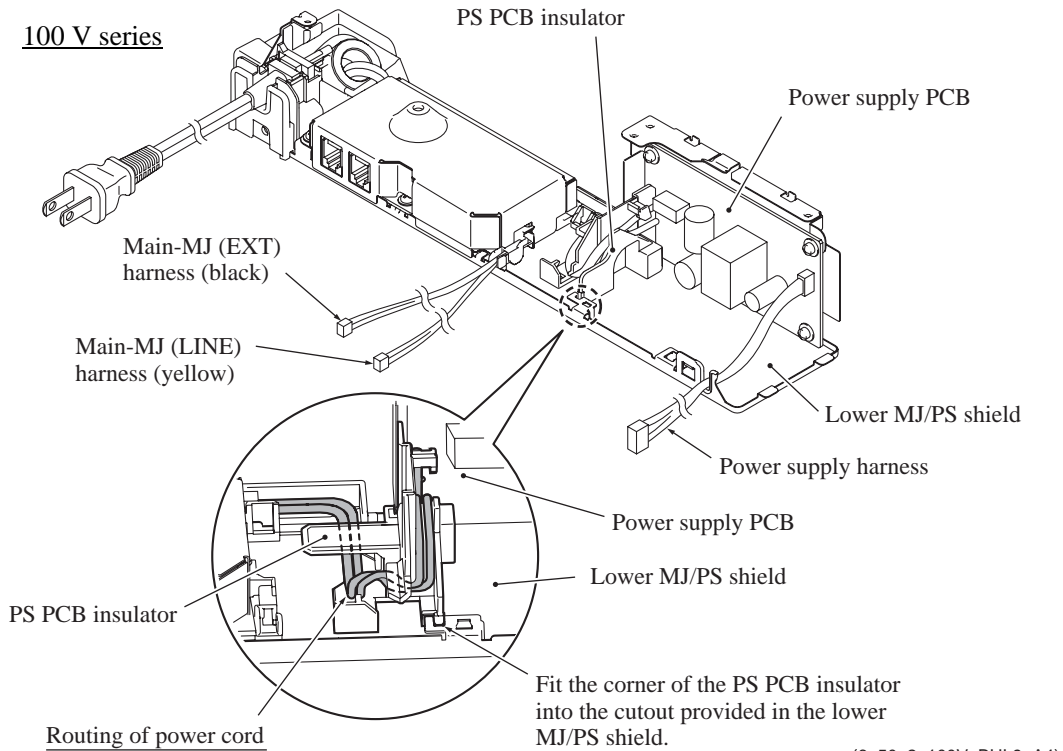


■ On the lower cover

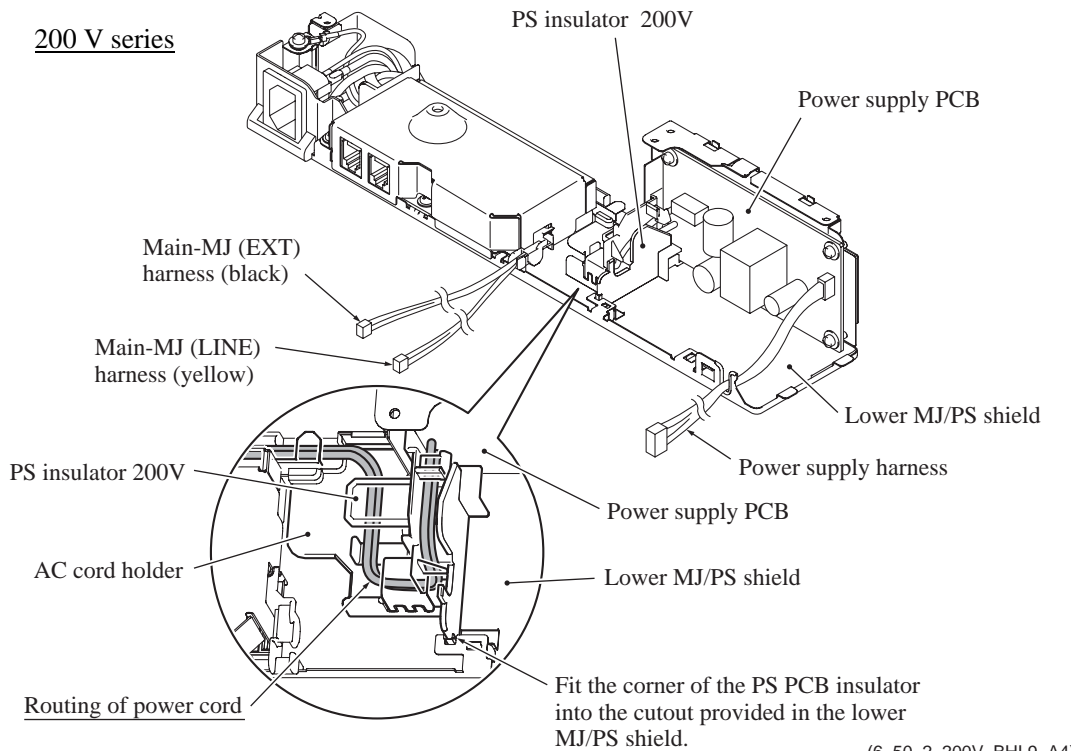


(6_28_BHL9_A4)

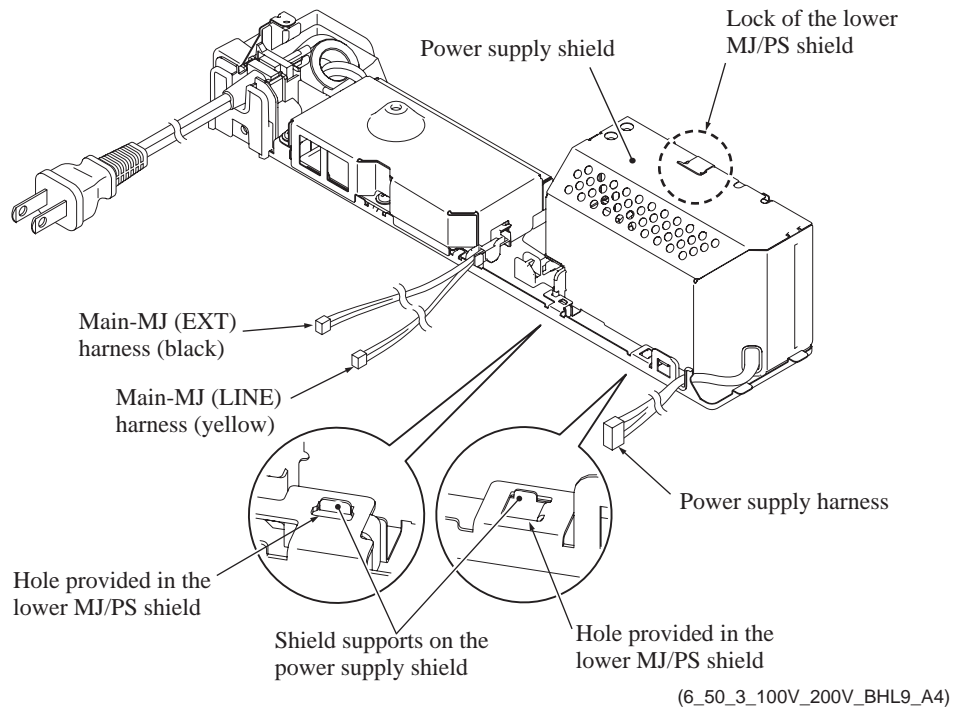
Routing E: Power supply harness, power cord, main-MJ (LINE) harness, and main-MJ (EXT) harness in the MJ/PS shield unit



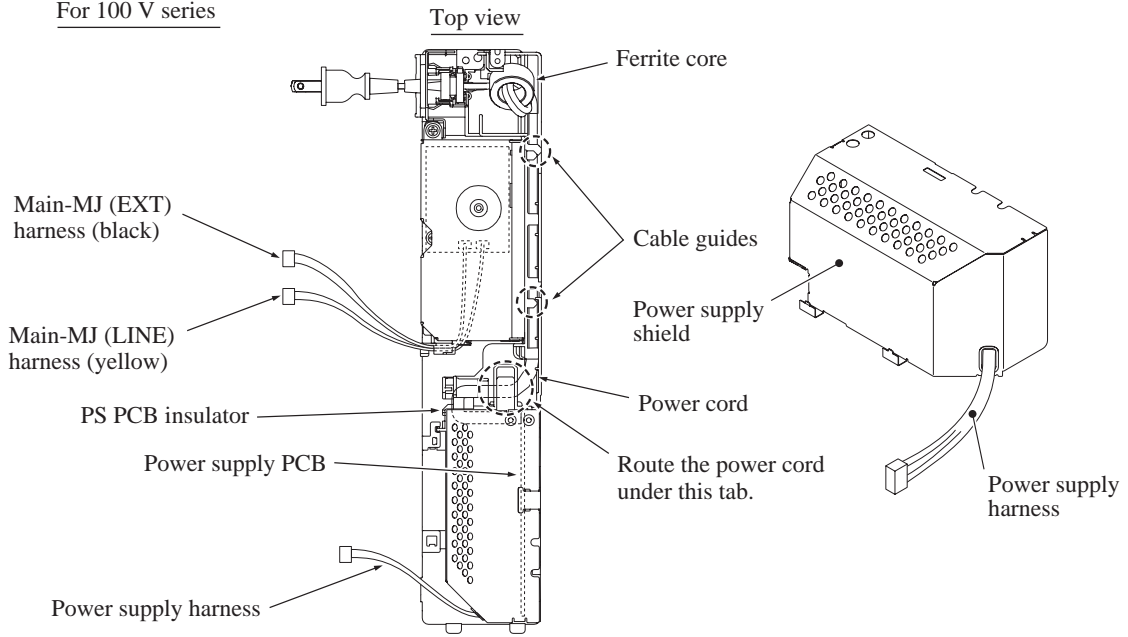
(6_50_2_100V_BHL9_A4)



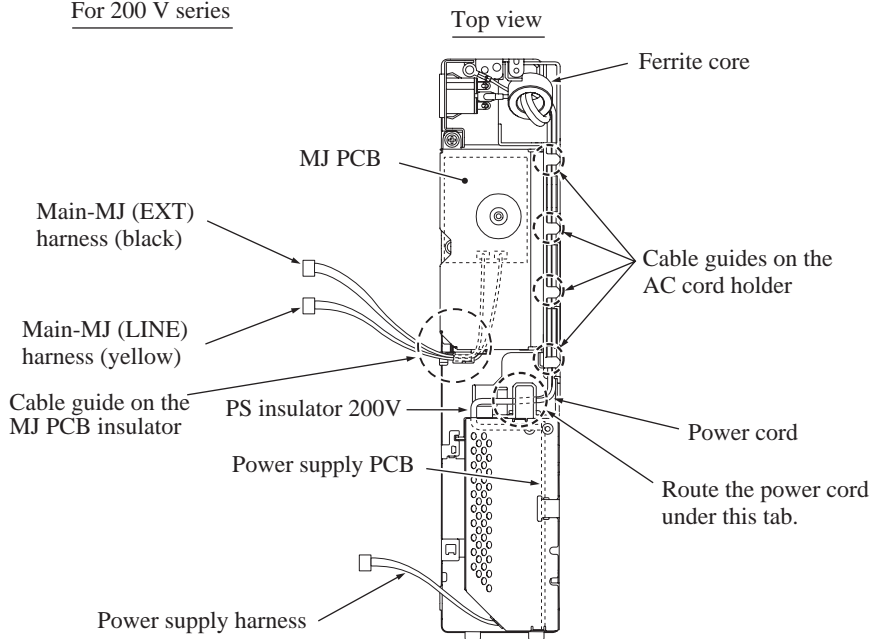
(6_50_2_200V_BHL9_A4)



For 100 V series

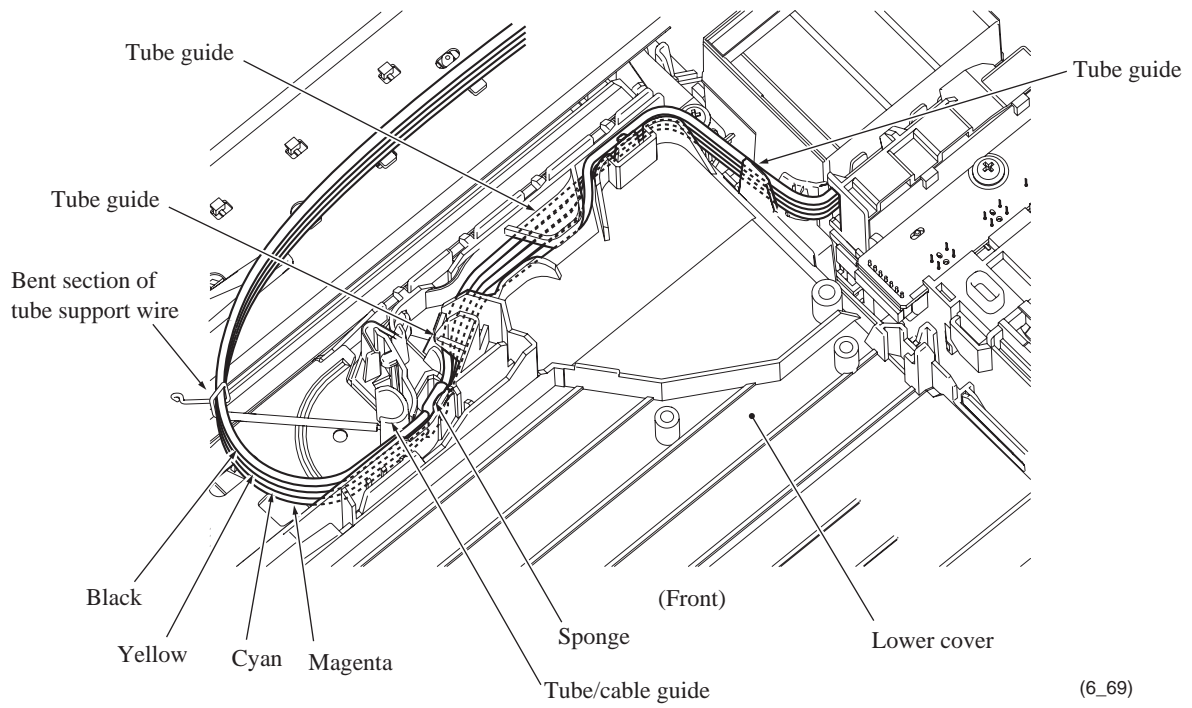


For 200 V series

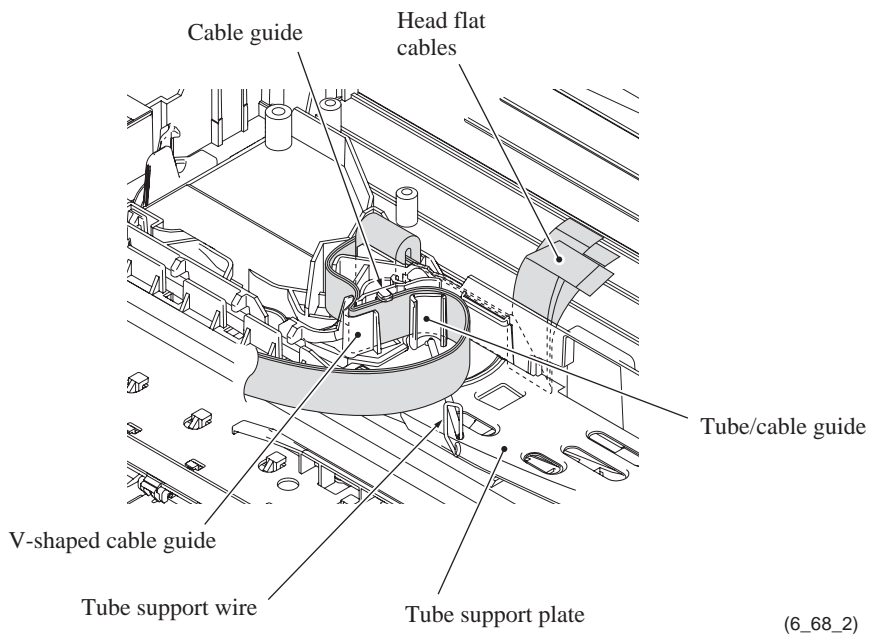


(6_51_2_BHL9_A4)

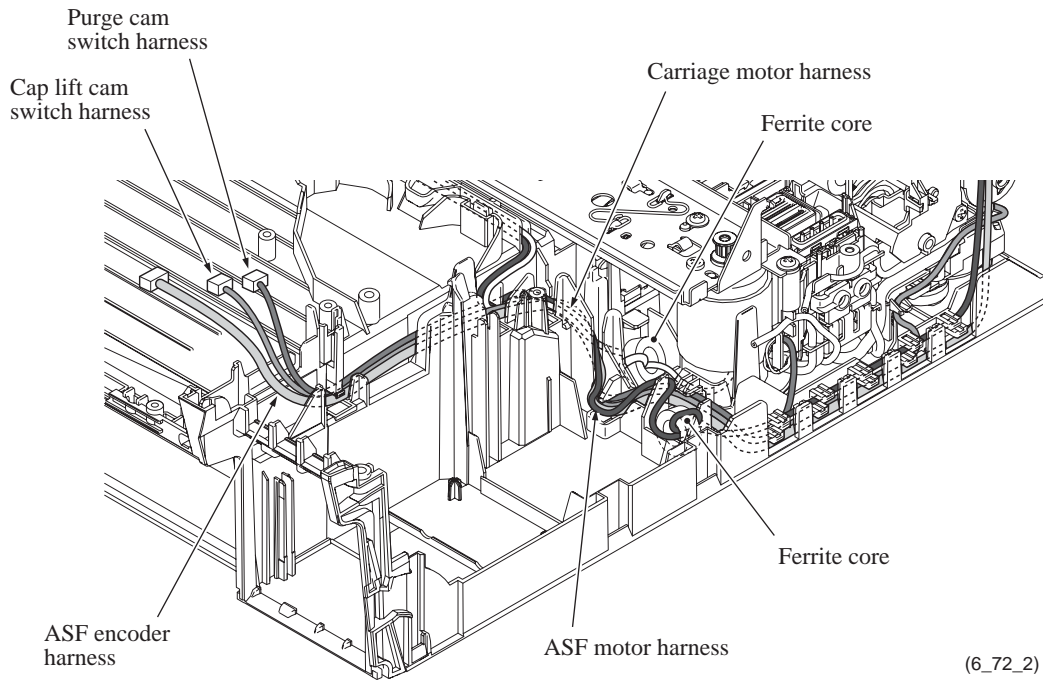
Routing F: Ink supply tubes



Routing G: Head flat cables

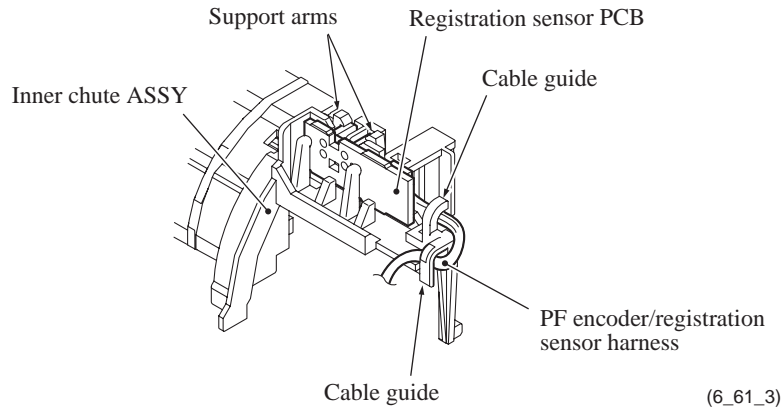


Routing H: Purge cam switch harness, cap lift cam switch harness, carriage motor harness, and ASF motor/encoder harness on the lower cover

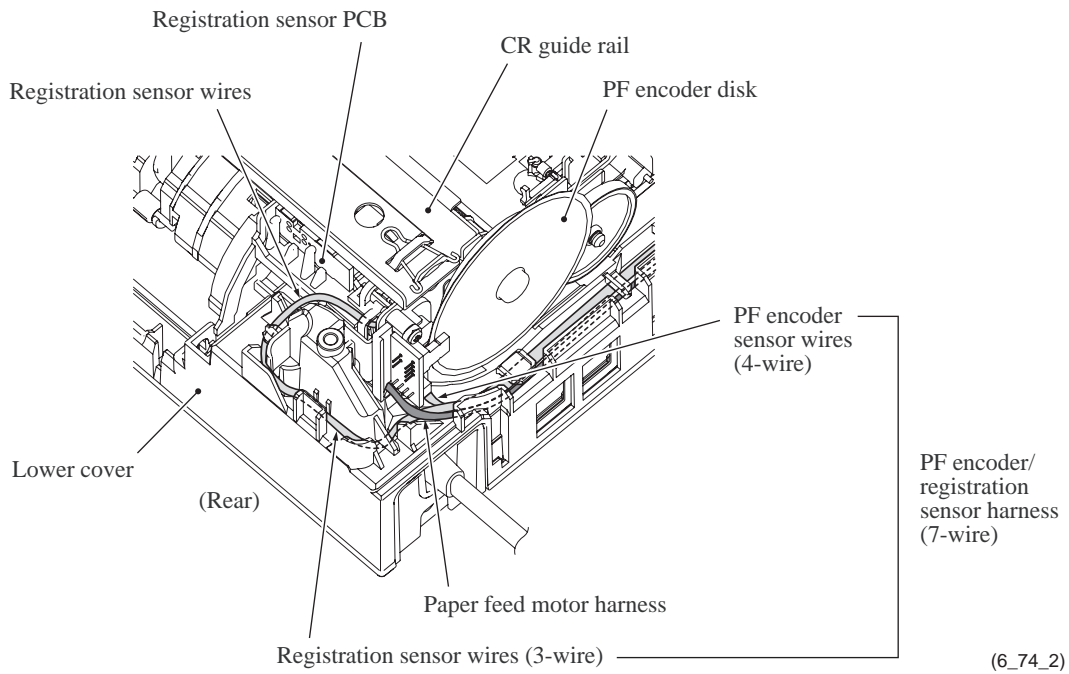


Routing I: PF encoder/registration sensor harness

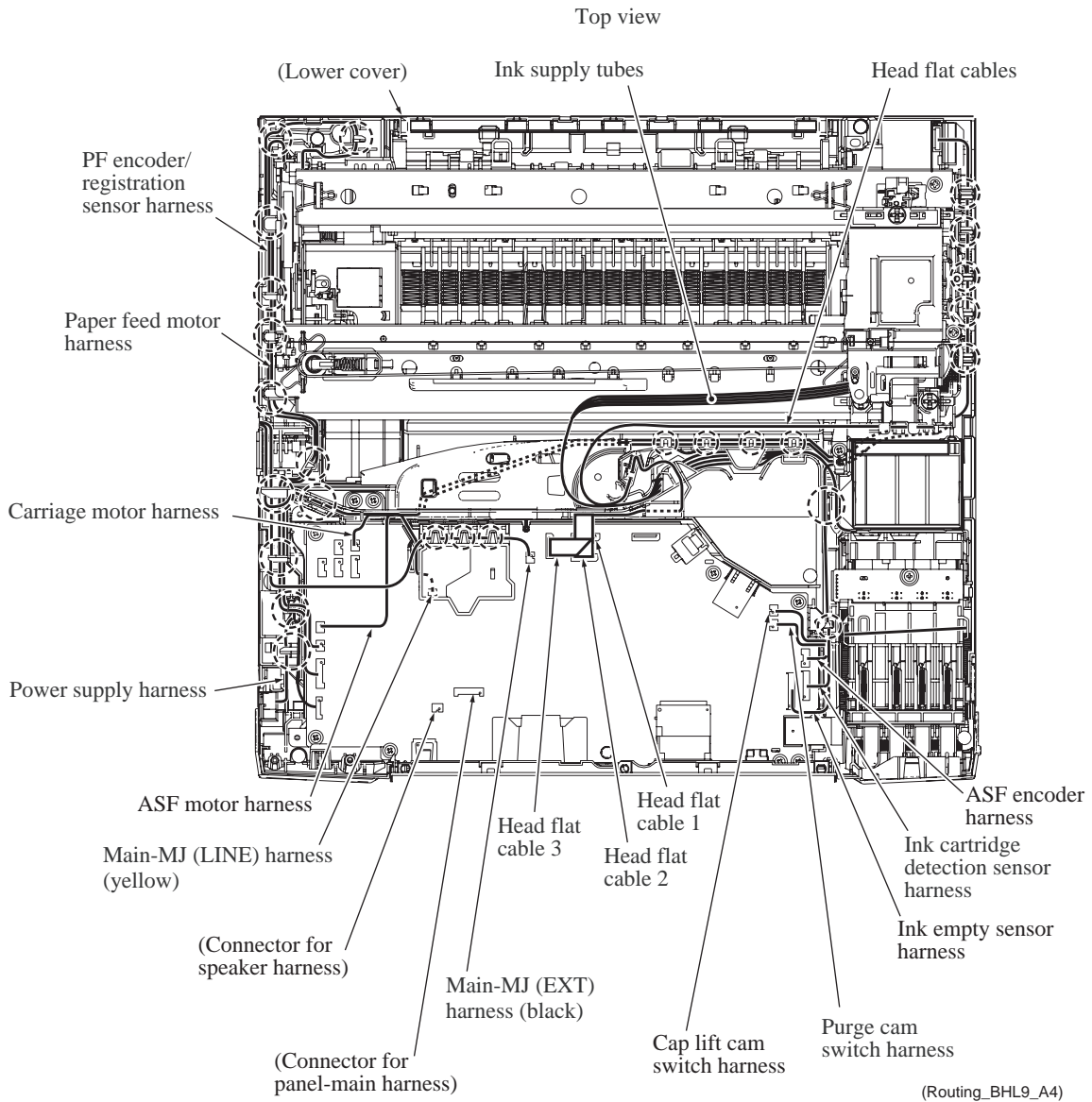
■ **On the inner chute ASSY**



■ **On the lower cover**



Routing J: Harnesses, flat cables and ink tubes on the lower cover



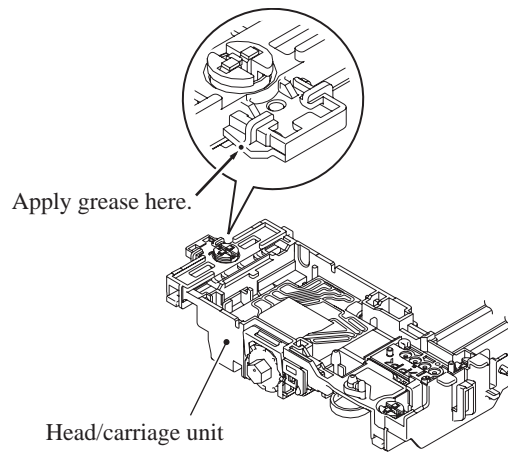
6.2 LUBRICATION

Apply the specified lubricants to the lubrication points as shown below.

Lubricant type (Manufacturer)	Lubrication points		Lubricant amount per point
Permalub BAN-5 (Nippon Koyu)	Head/carriage unit	1	1.5 mm diameter ball
	Motor plate and CR guide rail (bottom edges)	4	1 mm diameter ball
	Switching lever guide	1	3 mm diameter ball
FLOIL BG1319 (Kanto Kasei)	CR guide rail (upper face)	8	2 mm diameter ball
	CR support chassis (upper face)	8	
	CR support chassis (front and rear sides of upright rear edge)	22	
Molykote EM-30LP (Dow Corning)	Paper pull-in roller L	2	1 mm diameter ball

■ Head/carriage unit

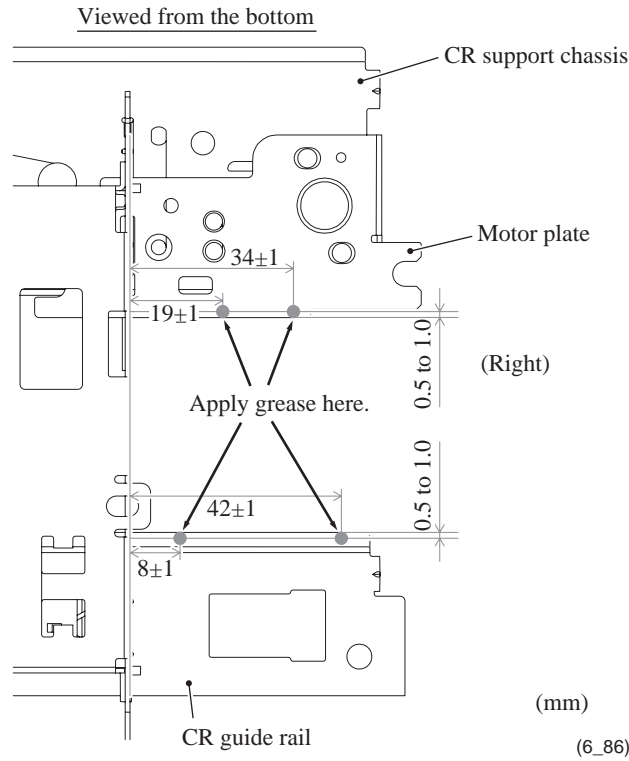
Apply a 1.5 mm diameter ball of grease (Permalub BAN-5) to the lubrication points below.



(6_90)

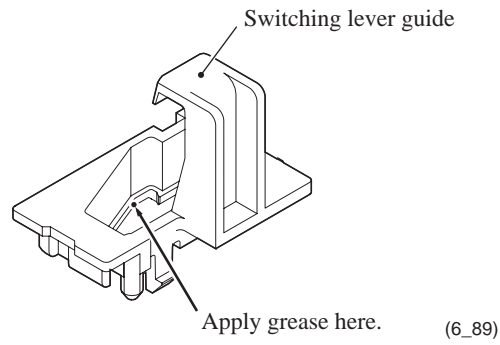
■ **Motor plate and CR guide rail (bottom edges)**

Apply a 1 mm diameter ball of grease (Permalub BAN-5) to the lubrication points below.



■ **Switching lever guide**

Apply a 3 mm diameter ball of grease (Permalub BAN-5) to the lubrication point below.

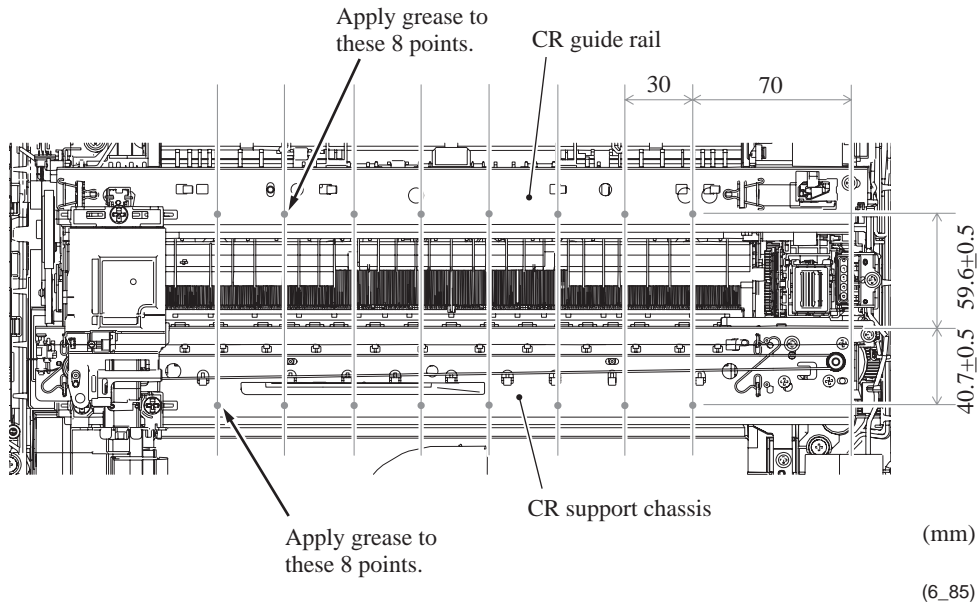


■ CR guide rail and CR support chassis (upper face)

Apply a 2 mm diameter ball of grease (FLOIL BG1319) to each of the 16 lubrication points below.

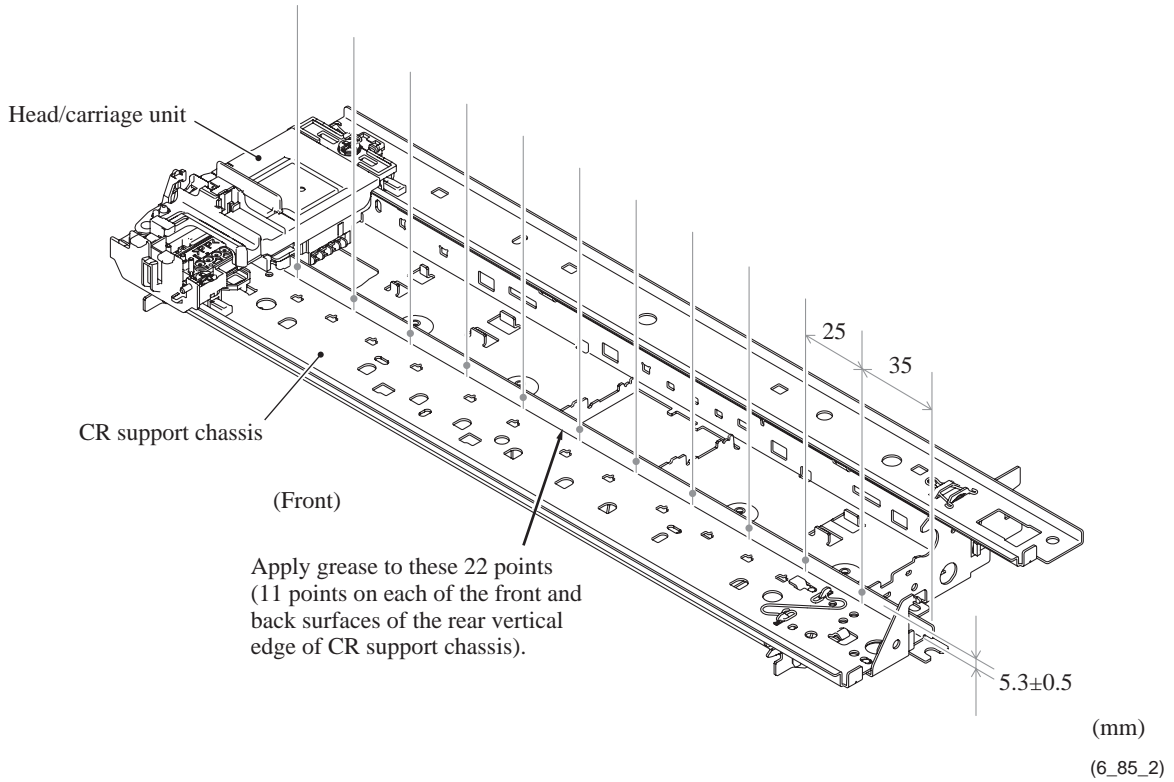
Lubrication procedure

- (1) Move the head/carriage unit to the left end of its travel and hit it against the stoppers provided at the left end of the CR guide rail and support chassis. This is to make the pair of slider cams protrude to the right from the head/carriage unit, making the gap between the head and the platen 1.6 mm.
- (2) Before applying grease, wipe dirt or dusts off the lubrication area with an alcohol soaked cloth.
- (3) Apply grease to the 16 lubrication points on the CR guide rail and support chassis as specified below, with the head/carriage unit placed on the left end of its travel.
- (4) Move the head/carriage unit from the left to the right ends of its travel to spread the applied grease on the CR guide rail and chassis.



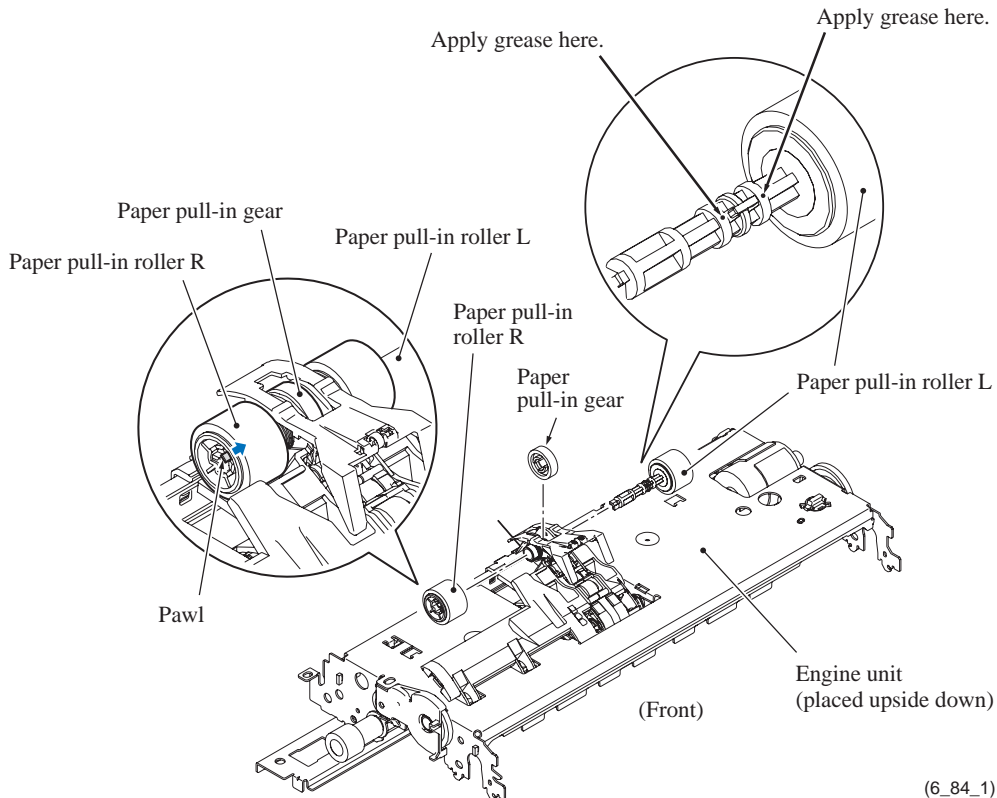
■ **CR support chassis (front and rear sides of upright rear edge)**

Apply a 2 mm diameter ball of grease (FLOIL BG1319) to each of the 22 lubrication points (front and back surfaces of the rear vertical edge of CR support chassis) as shown below.



■ **Paper pull-in roller L**

Apply a 1 mm diameter ball of grease (Molykote EM-30LP) to the two lubrication points on the paper pull-in roller L as shown below.



CHAPTER 7
ADJUSTMENTS AND UPDATING OF SETTINGS,
REQUIRED AFTER PARTS REPLACEMENT

CHAPTER 7 ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

This chapter details adjustments and updating of settings, which are required if the head/carriage unit, main PCB and some other parts have been replaced.

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7.1 PREPARATION

7.1.1 Requirements

Before proceeding to perform any adjustments or update any settings, you need the executables, data files, spare parts and supplies (provided by Brother Industries) and must set up your PC.

Note: Before starting any operation involving printing of check patterns, be sure to set A4-size recording paper.

Note: Data files having the extension .prn in the table below are provided with actual names ****_a3.prn or ****_a4.prn. When printing check patterns for adjustment, use a file suitable for the allowable maximum print size (A3 or A4) of the machine.

Note: Executables and data files listed below should be saved in an arbitrary folder in your PC beforehand.

Executables and Data Files Required for Adjustments and Updating of Settings

	Brother Maintenance USB Printer driver	brusbsn.exe	brusbsn.ini	filedg32.exe	incline.prn
Head/carriage unit, Engine unit (Section 7.2)	√	√	√	√	√
Main PCB (Section 7.3)	√	√	√	√	√
ADF unit, ADF-related parts (Section 7.4)	√			√	
Ink absorber box, Flushing box (Section 7.5)					
Control panel ASSY, Control panel PCB (Section 7.6)					
Scanner cover (Section 7.7)				√	

	pfadj.prn	exitadj.prn	media.prn	bottomadj.prn	qualbh9.prn	chart.prn
Head/carriage unit, Engine unit (Section 7.2)	√	√	√	√	√	
Main PCB (Section 7.3)	√	√	√	√	√	√
ADF unit, ADF-related parts (Section 7.4)					√	√
Ink absorber box, Flushing box (Section 7.5)						
Control panel ASSY, Control panel PCB (Section 7.6)						
Scanner cover (Section 7.7)					√	√

Spare Parts and Supplies Required for Adjustments and Updating of Settings

	Recording paper	Ink cartridges	Protective part
Head/carriage unit, Engine unit (Section 7.2)	√	√	√
Main PCB (Section 7.3)	√	√	
ADF unit, ADF-related parts (Section 7.4)	√	√	
Ink absorber box, Flushing box (Section 7.5)			
Control panel ASSY, Control panel PCB (Section 7.6)			
Scanner cover (Section 7.7)	√	√	

Note: Use a PC/AT-compatible computer running Windows 98SE/Me, Windows 2000 Professional, Windows XP Home/Professional, or Windows Vista.

7.1.2 Installing the Maintenance USB Printer Driver

If you want to change the programs stored in the flash ROM on the main PCB or after you replace the main PCB, load the desired programs to the flash ROM.

Loading requires a PC/AT-compatible computer running Windows 98SE/Me, Windows 2000 Professional, Windows XP Home/Professional, or Windows Vista.

Caution: During loading, never turn off your PC or the machine, unplug the USB interface cable, interrupt loading, or load invalid data. If you do so, loading will fail, causing the PCB to be unusable. You will have to replace the main PCB and load programs to a new PCB.

Preparation

You need the Brother Maintenance USB Printer driver and filedg32.exe (provided by Brother Industries). Save them in an arbitrary folder in your PC.

Installing the Brother Maintenance USB Printer driver

To identify machines connected via USB direct interface, the PC requires the corresponding driver for the virtual USB device. If you connect any number of machines to your PC, the same number of virtual USB devices will be automatically configured on your PC. To prevent many virtual USB devices from being configured, use the unique driver installation procedure described below that enables your PC to identify terminals via one single virtual USB device.

NOTES:

- Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify machines. If the Brother Maintenance USB Printer driver has been already installed to your PC according to this procedure, skip this section.

- Before proceeding to the procedure given below, make sure that the Brother Maintenance USB Printer driver is stored in your PC.

- (1) Check that the power switch of the machine is turned off. Disconnect the USB cable that connects the machine with your PC.
- (2) Turn on your PC.
- (3) Turn on the power switch of the machine.
- (4) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (5) Connect the machine to your PC using the USB cable.

The following window appears.



- (6) The following screen appears, indicating the detection of new hardware device by the system. Select "No, not this time." And click **Next**.



- (7) Select "Install the software automatically (Recommended)" and click **Next**.



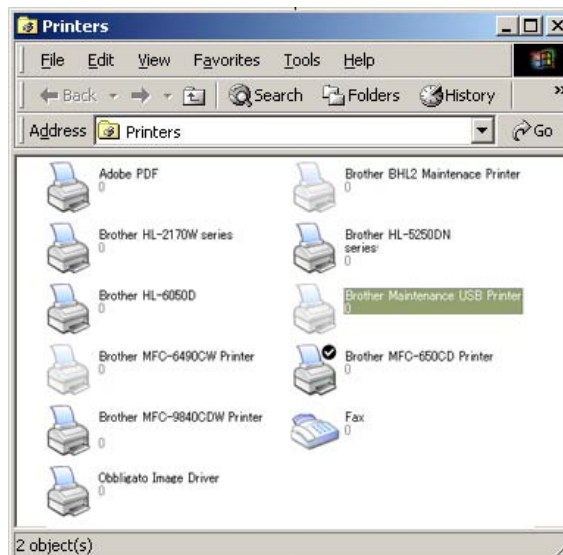
(8) Alert warning message of WHQL appears. Click **Continue Anyway** to proceed.



- (9) Repeat steps (6) to (8) three times. Installation is completed.
- (10) If the Brother Maintenance USB Printer driver is successfully installed, the following message screen appears. Click **Finish** to return.



NOTE: In order to check whether the printer driver is successfully installed, click **Start | Settings | Printers** to call up the Printers window. Then, check that the Brother Maintenance USB Printer icon is shown.



7.2 IF YOU REPLACE THE HEAD/CARRIAGE UNIT OR ENGINE UNIT

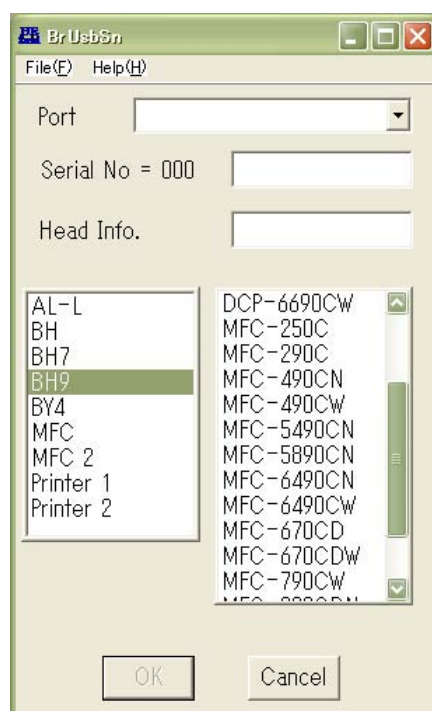
[1] Update the head property information stored in the EEPROM on the main PCB

- (1) Make sure that the machine's power cord is unplugged from an electrical outlet.
If the machine is connected to a PC, unplug the USB cable.
- (2) Switch on the PC.
- (3) Plug the machine's power cord into an electrical outlet.
- (4) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

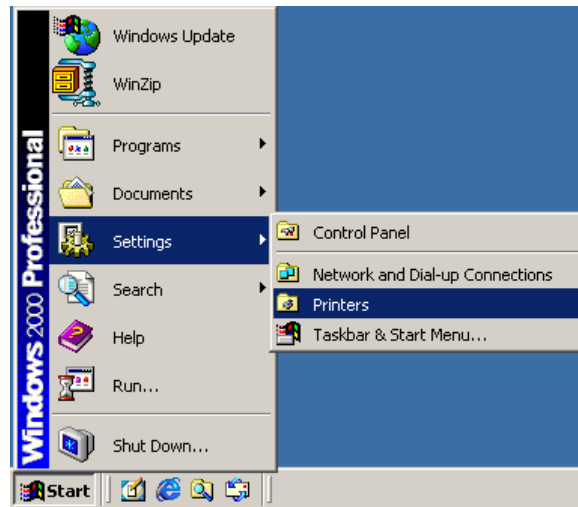
- (5) Connect the machine to the PC using a USB cable.
- (6) On the PC, run the ID/head property setup utility (brusbsn.exe) in the folder created. The following window appears.



- (7) On the model menu, click **BH9**.

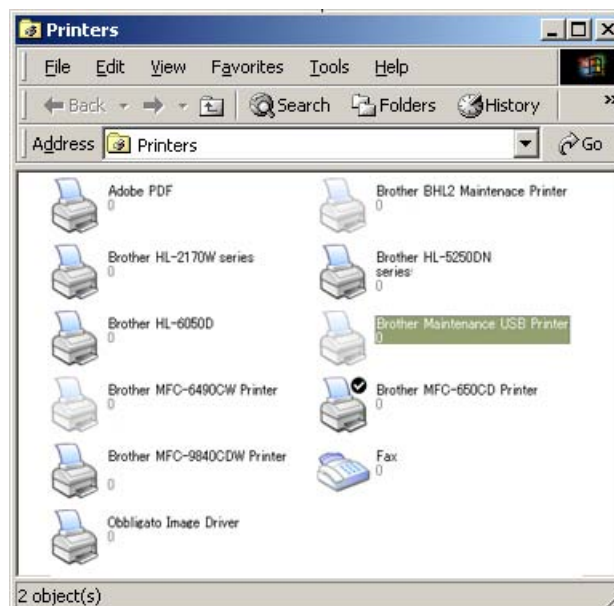
- (8) In **Port** on the BrUsbSn screen, select the port number assigned to the Brother Maintenance USB Printer. If the port number is unknown, follow steps 1) through 4) below.

- 1) Click **Start | Settings | Printers**.

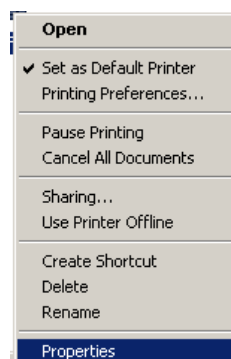


The Printers window appears as shown below.

- 2) Right-click the Brother Maintenance USB Printer icon.

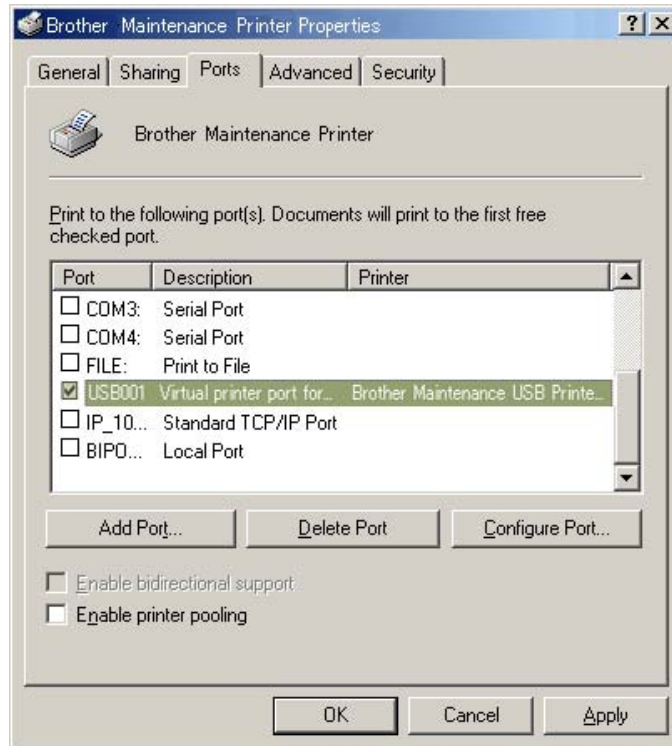


- 3) Click **Properties**.



The Brother Maintenance USB Printer Properties window appears as shown below.

- 4) Click the **Ports** tab.



In this example, the port number assigned to the Brother Maintenance USB Printer is USB001.

- (9) In the **Head Info.** box on the BrUsbSn screen (page 7-6), type the 16-digit property code (e.g., ALR7765501200000) which is printed on the bar code label attached to the lower cover. Click the **OK** button.
- (10) To check that the entered head property code is correct (using function code 68 in Chapter 9, Section 9.4.20), press the **6** and **8** keys in this order. Then press the **2**, **5**, **8**, and **0** keys in this order.

The LCD shows the current head property information (16-digit code) stored in the EEPROM on the main PCB.

- (11) Check that the character string entered in step (9) appears.

If it is OK, press the **Stop/Exit** key.

If something other than that appears, check the connection between the PC and machine and go back to step (6).

[2] Clean the new head/carriage unit (Function code 76)

- (1) Open the ink cartridge cover, set new ink cartridges into the ink refill ASSY, and close the ink cartridge cover.
- (2) Carry out a purge operation (with function code 76) using the steps below. (See [Chapter 9, Section 9.4.24.](#))

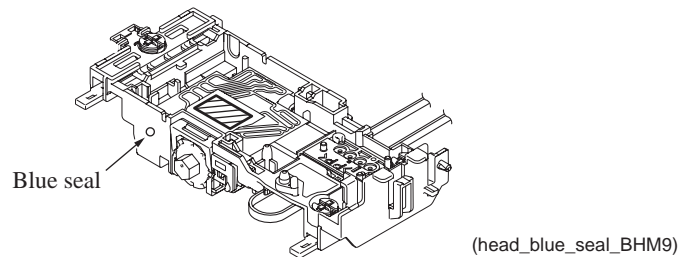
Press the **7** and **6** keys in this order.

The machine displays "CLEANING ALL" on the LCD and enters the purge mode.

For the head/carriage unit having a round, blue seal*, press the **0** and **Black Start (Mono Start)** keys in this order to start the head replacement purge.

For the one having no seal, press the **4** and **Black Start (Mono Start)** keys in this order to start the initial purge.

* Some spare head/carriage units have a round, blue seal on their left sides as shown below.



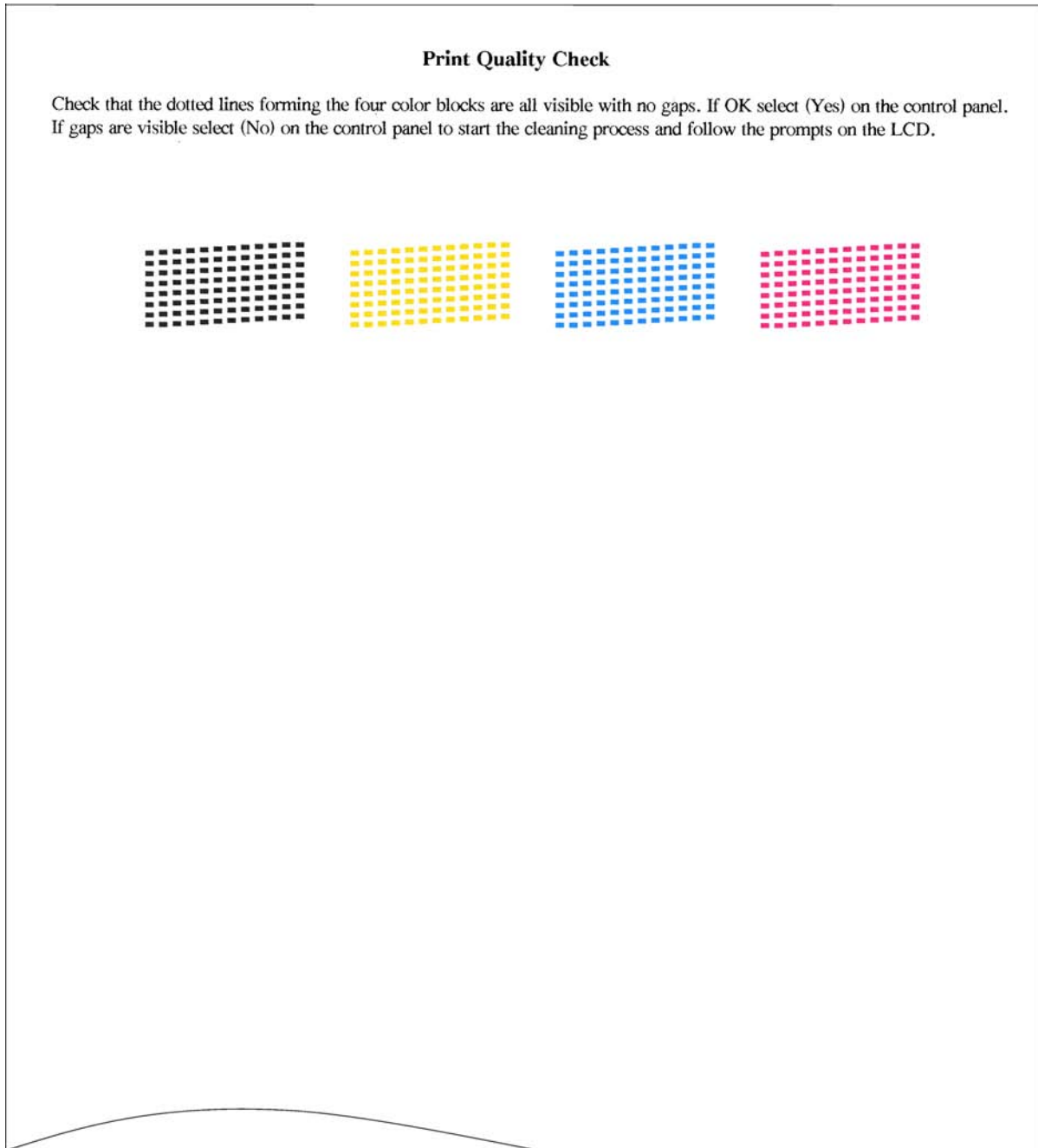
The machine starts a head replacement purge or an initial purge that refills the ink supply tubes and the new print head with fresh ink.

[3] Print out a test pattern (Function code 09)

To check that the head/carriage unit normally sprays ink droplets from *all* head nozzles, print out a test pattern with function code 09 (see [Chapter 9, Section 9.4.4](#)) with the following steps.

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) Press the **0** and **9** keys in this order.
- (2) If a missing dot or any other print problem is found, go back to [2] above to clean the head/carriage unit again.



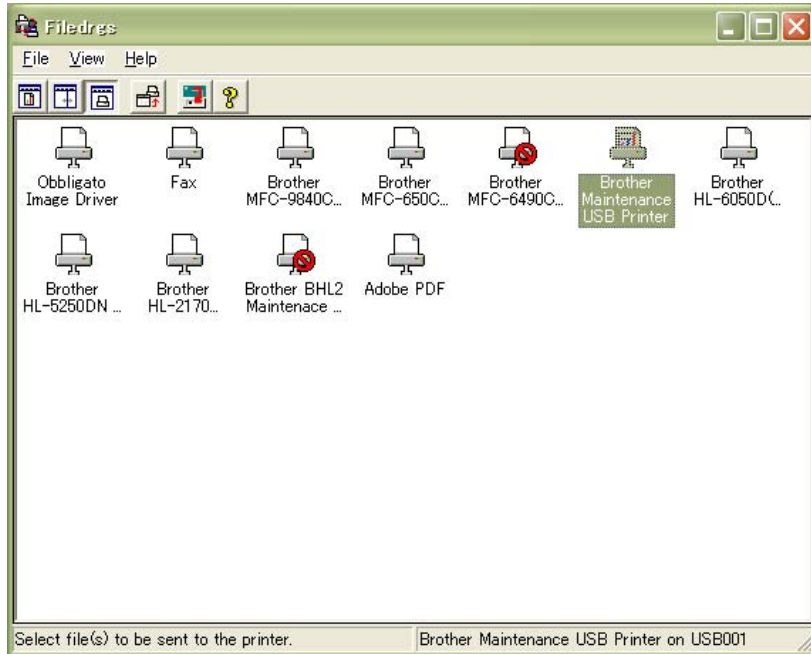
Test Pattern

[4] Correct the positioning error of the head/carriage unit

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) Run "filedrgs.exe" in the folder created.

The Filedrgs window appears as shown below.

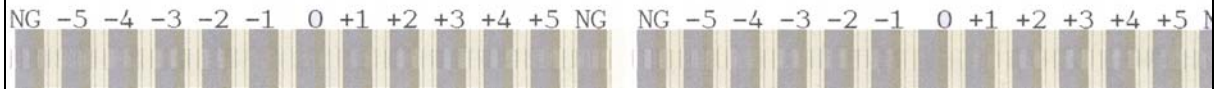
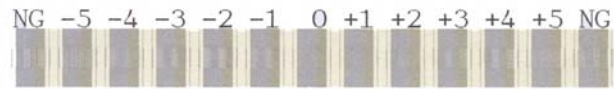
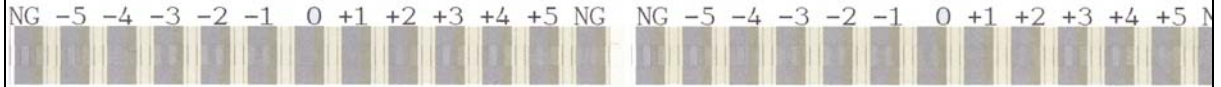


- (2) Drag and drop the "incline.prn" icon onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "Incline Adjust" test pattern shown on the next page.

- (3) Out of the three rows of the "Incline Adjust" test pattern (on the next page), check the middle row and select the block that is the least uneven print. Make a note of that block number.

* BH9 INCLINE adjust check - Ver 005 *



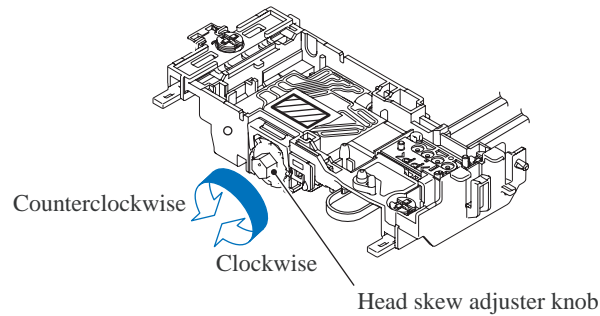
Head Positioning Test Pattern

- (4) Move the head/carriage unit to the center of its travel with function code 63 (see [Chapter 9, Section 9.4.17](#)) using the following key operation.

Press the **6**, **3**, and **Black Start (Mono Start)** keys in this order to display "START 63?" on the LCD. Next, press the * key.

- (5) Turn the head skew adjuster knob by the number of divisions specified by the pattern number you recorded in step (3), using a spanner.

If block +1 is the least uneven print, for example, turn the head skew adjuster knob clockwise by one division; if block -1, turn it counterclockwise by one division.



(head_skew_adjuster_knob_BHM9)

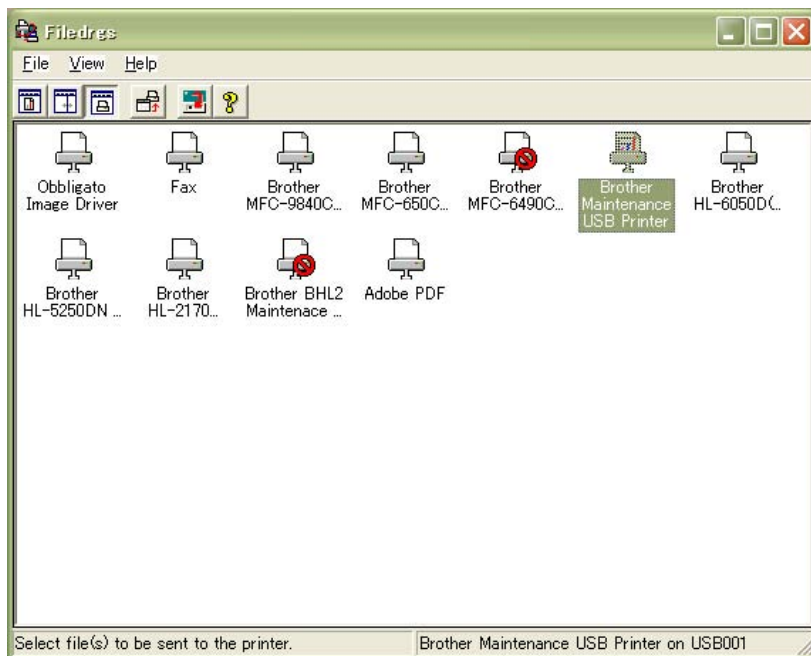
- (6) After completion of the adjustment, press the **Stop/Exit** key. The head/carriage unit returns to the home position (head capping position).

[5] Update the paper feeding correction value (Function code 58)

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) On your PC, run "filedrg32.exe" in the folder created in [Section 7.1.1](#).

The Filedrgs window appears as shown below.



For the paper feed roller adjustment

- (2) Drag and drop the "pfadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out "PF adjust check" pattern (see [page 7-16](#) for a sample printout).

- (3) On the machine, press the **5** and **8** keys in this order.

The "1.PF 2.EXIT" appears on the LCD.

- (4) To select the paper feed roller adjustment, press the **1** key.

The "PF ADJ NO. +0" appears on the LCD.

- (5) Out of the three rows of the "PF adjust check" pattern (on [page 7-16](#)), check the middle row and select the block that is the least uneven print. Make a note of that block number.

If the least unevenness seems to be far to the left of -8, regard it as -8; if it seems to be far to the right of +8, regard it as +8. In this case, you need to check whether the paper feed roller and head/carriage unit are set into place.

- (6) Enter the number of the least uneven block found in step (5).

For example, if the number of the least uneven block is +4, press the **4** key when the "PF ADJ NO. +0" is displayed on the LCD.

If the number is -4, press the **▼** key to display the "PF ADJ NO. -0" and press the **4** key.

Then press the **OK** key, and the machine returns to the initial stage of the maintenance mode.

For the paper ejection roller adjustment

- (7) On your PC, drag and drop the "exitadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "EXIT adjust check" pattern (see [page 7-17](#) for a sample printout).

- (8) On the machine, press the **5** and **8** keys in this order.

The "1.PF 2.EXIT" appears on the LCD.

- (9) To select the paper ejection roller adjustment, press the **2** key.

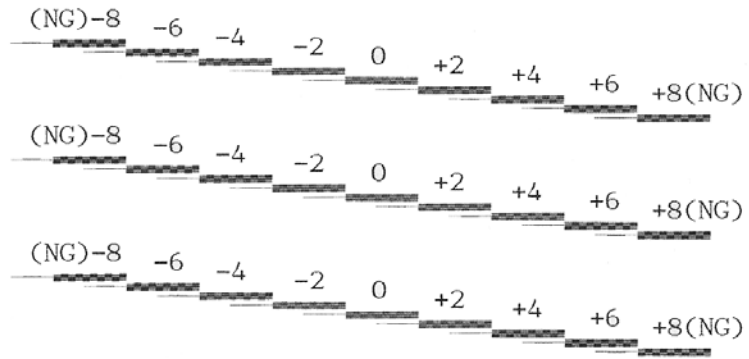
The "EXIT ADJ NO. +0" appears on the LCD.

- (10) Select the block that is the least uneven print on the "EXIT adjust check" pattern (on [page 7-17](#)). Make a note of that block number.

- (11) Enter the number of the least uneven block found in step (10) in the same way as in step (6).

Then press the **OK** key, and the machine returns to the initial stage of the maintenance mode.

* mini9 PF adjust check - Ver 002 *



Paper Feeding Check Pattern for the Paper Feed Roller

* BH9 EXIT adjust check - Ver 006 *

(NG) -8 -6 -4 -2 0 +2 +4 +6 +8(NG)

(NG) -8 -6 -4 -2 0 +2 +4 +6 +8(NG)

Paper Feeding Check Pattern for the Paper Ejection Roller

[6] Align vertical print lines (Function code 65)

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) Press the **6**, **5** and **1** keys in this order.

The machine displays the "PRINTING" on the LCD and prints three sets of vertical alignment check patterns (see below and the next page) in monochrome for 450 dpi, 600 dpi and 1200 dpi, each of which consists of #0 through #8 blocks. If the vertical alignment is ON, #5 block shows vertically aligned lines.

The "450DPI NO. (1-8)" appears on the LCD.

- (2) For 450 dpi, check the printed vertical alignment check patterns and find which number block shows full alignment.

If the full alignment block is other than #5, enter that block number, using the numerical keys.

The "600DPI NO. (1-8)" appears on the LCD.

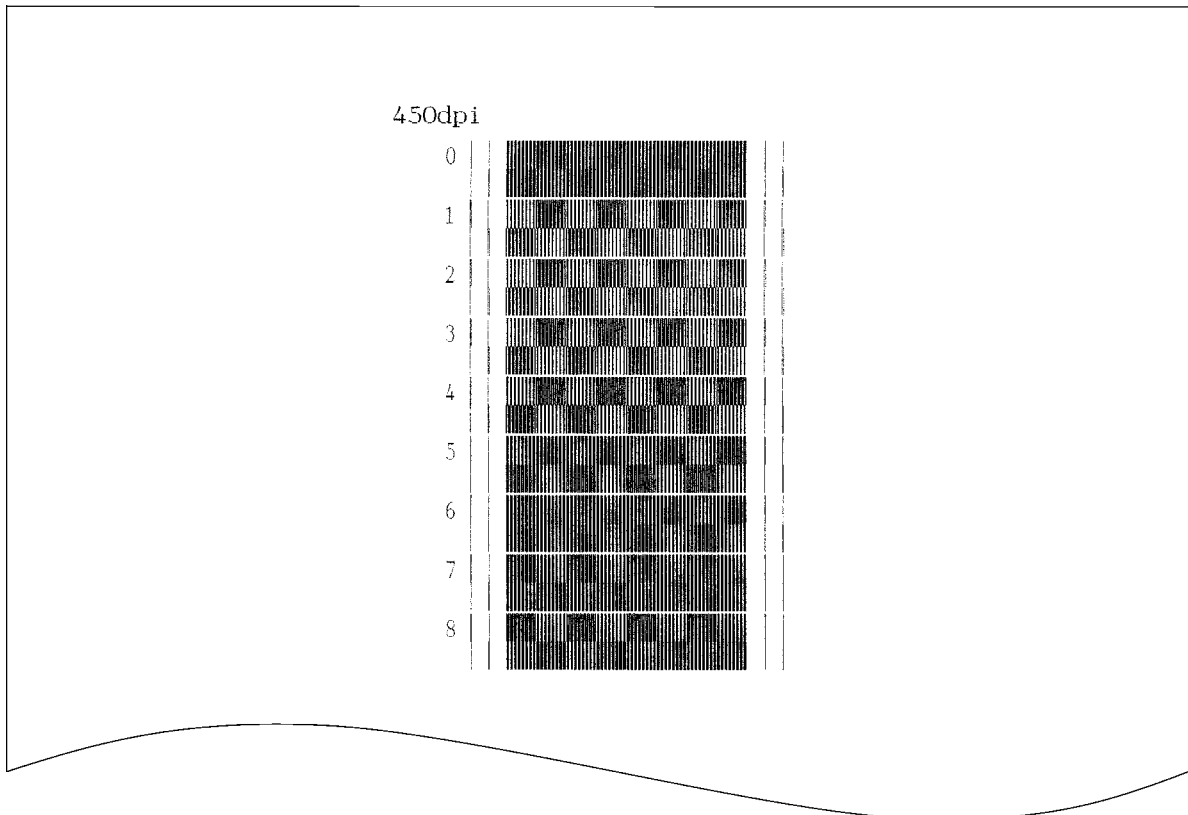
- (3) For 600 dpi, perform the same operation as in step (2).

The "1200DPI NO. (1-8)" appears on the LCD.

- (4) For 1200 dpi, perform the same operation as in step (2).

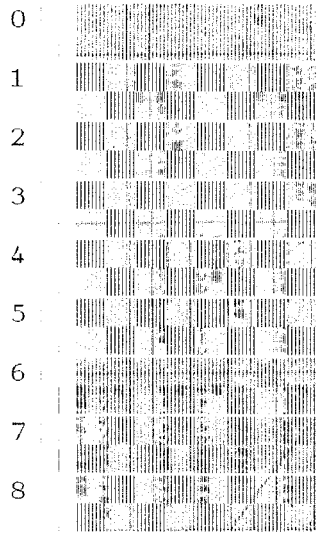
The machine automatically returns to the initial stage of the maintenance mode.

NOTE: If #1 or #8 block is fully aligned so that you press the **1** or **8** key in the above procedure, then go back to step (1) to confirm that #5 block becomes aligned.

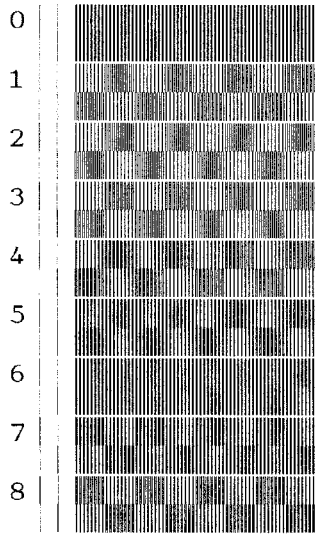


Vertical Alignment Check Patterns (1/2)

600dpi



1200dpi



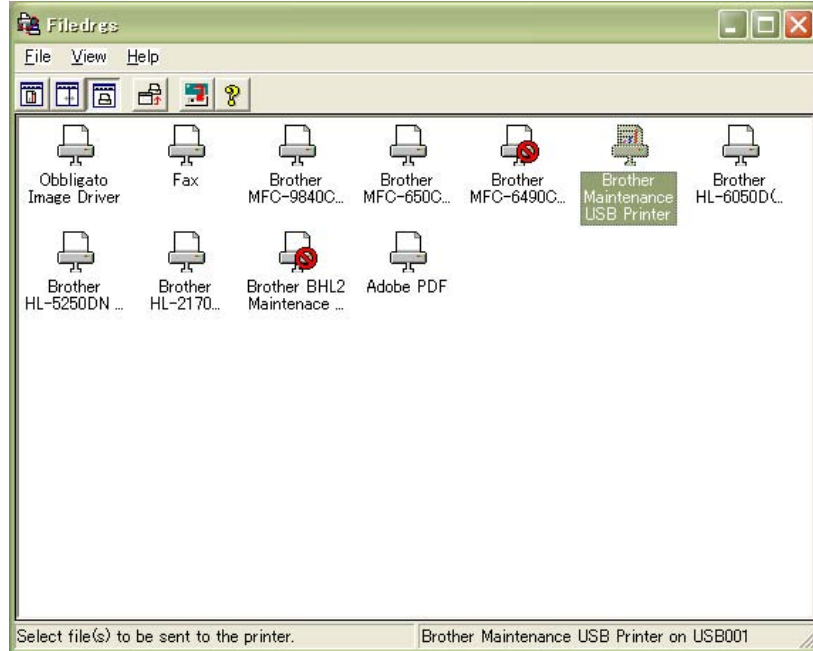
Vertical Alignment Check Patterns (2/2)

[7] Adjust margins in borderless printing (Function code 66)

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) On the PC, run "filedrg32.exe" in the folder created in [Section 7.1.1](#).

The Filedrgs window appears as shown below.



Left and right margin adjustment

- (2) Drag and drop the "media.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "MEDIA CHECK" pattern (see [page 7-23](#) for a sample printout). This is for checking the left and right margins.

- (3) Measure the left and right margins on the printed pattern.

The upper row is printed in 600 dpi, and the lower row, in 1200 dpi.

(Example) 600 dpi Left: 0.8 mm, Right: 1.1 mm
 1200 dpi Left: 0.9 mm, Right: 1.2 mm

If both of the left and right margins are within the range from 0.9 to 1.1 mm, no adjustment is required. If not, go to step (4).

- (4) If either of the left and right margins is out of the specified range, press the **6** key twice and the ***** key on the machine.

The "LEFT: 10" appears on the LCD.

- (5) To adjust the left margin in 600 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the left margin measured in step (3) is 0.8 mm, so press the **0, 8**, and **OK** keys.
NOTE: In models having no **OK** key on the control panel, press the **Photo Capture** key.
The "RIGHT1: 10" appears on the LCD.
- (6) To adjust the right margin in 600 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (3) is 1.1 mm, so press the **1, 1**, and **OK** keys.
The "LEFT2: 10" appears on the LCD.
- (7) To adjust the left margin in 1200 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (3) is 0.9 mm, so press the **0, 9**, and **OK** keys.
The "RIGHT2: 10" appears on the LCD.
- (8) To adjust the right margin in 1200 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (3) is 1.2 mm, so press the **1, 2**, and **OK** keys.
Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.
- (9) Go back to step (2) and print out the left and right margin check pattern again.
- (10) Measure the left and right margins on the printed pattern.
If both of the left and right margins are within the range from 0.9 to 1.1 mm, the adjustment is completed.

Bottom margin adjustment

- (11) Drag and drop the "bottomadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown on the previous page.
The machine displays the "RECEIVING DATA" on the LCD and prints out the "BOTTOM Adjust" pattern (see [page 7-23](#) for a sample printout). This is for checking the bottom margin.
- (12) Measure the bottom margin on the printed pattern.
(Example) Bottom margin: 3.1 mm
If it is within the range from 2.9 to 3.1 mm, no adjustment is required. If not, go to step (13).
- (13) If the bottom margin is out of the specified range, press the **6** key twice and the **#** key on the machine.
The "BOTTOM: 30" appears on the LCD.

(14) To adjust the bottom margin, enter the measured value (in units of 0.1 mm) multiplied by 10.

In this example, the bottom margin measured in step (12) is 3.1 mm, so press the **3**, **1**, and **OK** keys.

Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.

(15) Go back to step (11) and print out the bottom margin check pattern again.

(16) Measure the bottom margin on the printed pattern.

If it is within the range from 2.9 to 3.1 mm, the adjustment is completed.

600dpi LEFT:0.9-1.1mm

600dpi RIGHT:0.9-1.1mm

1200dpi LEFT:0.9-1.1mm

1200dpi RIGHT:0.9-1.1mm

Left and Right Margin Check Pattern

* BH9 BOTTOM Adjust - Ver. 002Ltr *



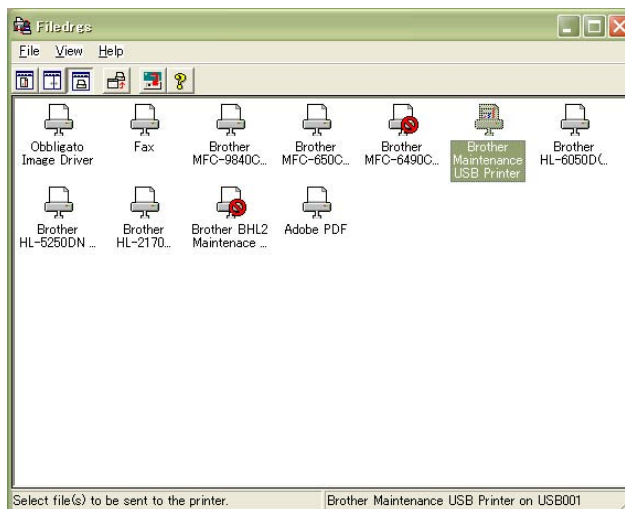
Bottom Margin Check Pattern

[8] Print out a total check pattern

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) On your PC, run "filedrg32.exe" in the folder created in [Section 7.1.1](#).

The Filedrgs window appears as shown below.



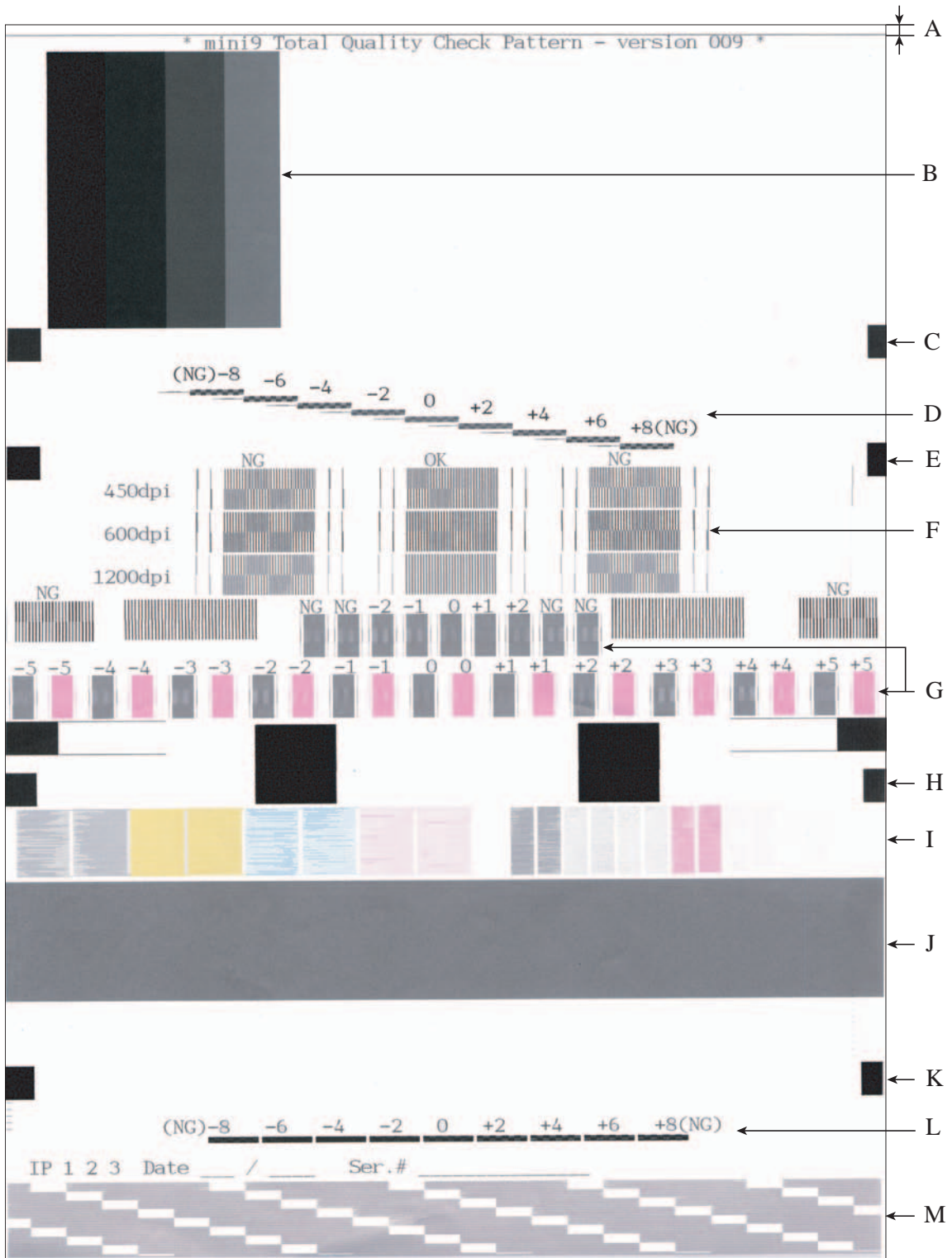
- (2) Drag and drop the "qualbh9.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "Total Quality Check Pattern" (see the next page for a sample printout).

- (3) Check the printed check pattern. If any problem is found, go back to the related item (any of [4] through [7] above) and make adjustments again.

A: Leading-edge print start position	Check that the top margin is within 3 ± 1 mm and the first printed line is not inclined.
B: Checking for horizontal streaks	Check for no banding or black/white horizontal streaks.
C: Margin adjustment for borderless printing (600 dpi)	Check that there is no left or right margin in 600 dpi. Go back to Section 7.2 [7] .
D: Paper feed roller adjustment	Check the result of PF roller compensation. Check that the section number with the lightest checkered pattern is within ± 2 . Go back to Section 7.2 [5] .
E: Margin adjustment for borderless printing (1200 dpi)	Check that there is no left or right margin in 1200 dpi. Go back to Section 7.2 [7] .
F: Adjustment of vertical print lines (450 dpi, 600 dpi, and 1200 dpi)	Check that #2 block with "OK" shows full alignment in each of 450 dpi, 600 dpi, and 1200 dpi. Go back to Section 7.2 [6] .
G: Head positioning adjustment	Check the result of the head skew adjustment. Check that the section number with the lightest checkered pattern is within ± 2 . Go back to Section 7.2 [4] .
H: Margin adjustment for borderless printing (600 dpi)	Check that there is no left or right margin in 600 dpi. Go back to Section 7.2 [7] .
I: Adjustment of discharging conditions of all nozzles	Check that all nozzles discharge ink normally.
J: Checking for vertical streaks	Check for no white/black vertical streaks.
K: Margin adjustment for borderless printing (1200 dpi)	Check that there is no left or right margin in 1200 dpi. Go back to Section 7.2 [7] .
L: Paper ejection roller adjustment	Check the result of the exit roller compensation. Check that the section number with the lightest checkered pattern is within ± 2 . Go back to Section 7.2 [5] .
M: Margin adjustment for borderless printing (trailing edge)	Check that the bottom margin is within 5 ± 2 mm. Go back to Section 7.2 [7] .

- (4) Repeat steps (2) and (3) until no problem is found.



Total Check Pattern

- A: Leading-edge print start position
- B: Checking for horizontal streaks
- C, E, H, K, M: Margin adjustments for borderless printing
- D: Paper feed roller adjustment
- F: Adjustment of vertical print lines
- G: Head positioning adjustment
- I: Adjustment of discharging conditions of all nozzles
- J: Checking for vertical streaks
- L: Paper ejection roller adjustment

[9] Switch back to standby

After completion of the adjustment, disconnect the USB cable.

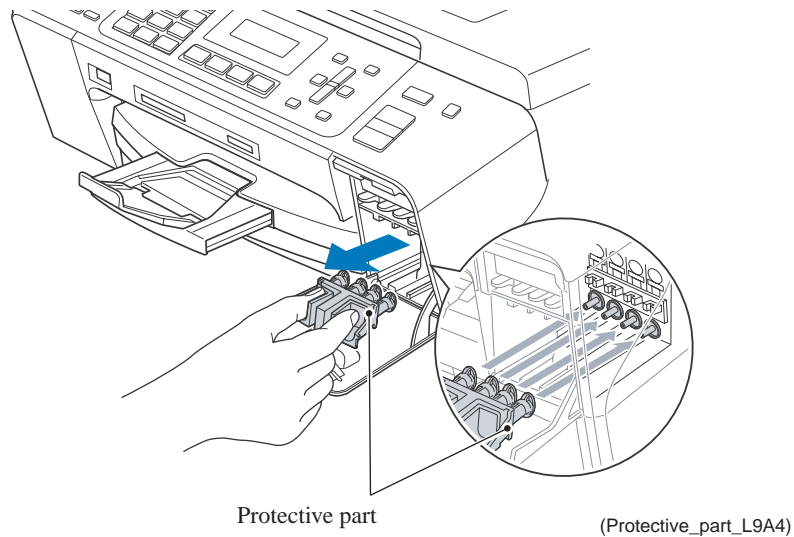
Then press the **9** key twice to return to the standby state.

Note: Be sure to disconnect the USB cable first. Returning to standby without disconnecting the USB cable runs "Found New Hardware Wizard" that starts USB driver installation (as described in [Section 7.1.2](#)).

Note: Enable the initial setup mode (Function code 63). (See [Chapter 9, Section 9.4.17](#))

[10] Replace the ink cartridges with the protective part

Remove all four ink cartridges and set the protective part instead. Check that the small tabs on both sides of the protective part fit in the holes inside the ink refill ASSY.



7.3 IF YOU REPLACE THE MAIN PCB

Note: If you replace the main PCB, it is necessary to make a backup of the machine information and user data into an external memory before starting disassembly of the machine. After the completion of reassembling jobs, restore the backup data to the new main PCB. For detailed procedure of the backup and restoration, refer to [Chapter 9, Section 9.4.10 "Backup of Machine Information \(Function code 46\)."](#)

[1] Load update programs/data

- If the main PCB is replaced with a new one:

Load the desired programs onto the flash ROM. Refer to [Appendix 2, page App. 2-5.](#)

- If the main PCB is replaced with the one used for any other machine:

Change the firmware stored in the flash ROM. Refer to [Appendix 2, page App. 2-7.](#)

[2] Initialize the EEPROM on the main PCB (Function code 01)

Refer to [Chapter 9, Section 9.4.1.](#)

[3] Customize the EEPROM on the main PCB (Function code 74)

Refer to [Chapter 9, Section 9.4.22.](#)

[4] Specify the CIS type (Function code 59)

Refer to [Chapter 9, Section 9.4.16.](#)

[5] Check the control panel PCB for normal operation (Function code 13)

Refer to [Chapter 9, Section 9.4.7.](#)

[6] Check the sensor operation (Function code 32)

Refer to [Chapter 9, Section 9.4.9.](#)

[7] Acquire white level data and set CIS scanner area (Function code 55)

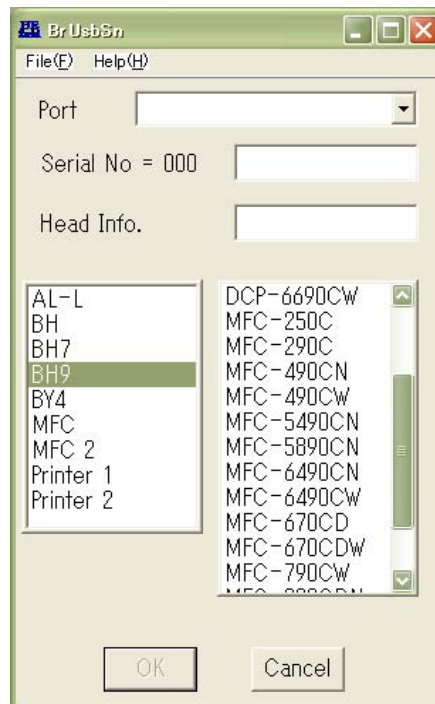
Refer to [Chapter 9, Section 9.4.14.](#)

[8] Set an ID code and update the head property information

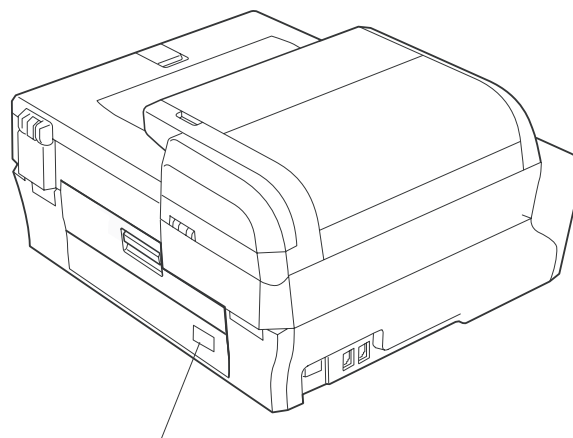
Note: Make sure that the Brother Maintenance USB Printer driver has been installed to your PC. To do it, click **Start | Settings | Printers** to call up the Printers window and confirm that the Brother Maintenance USB Printer icon (shown on the sample window on [page 7-7](#)) is displayed. If the driver has not been installed, install it referring to [Section 7.1.2.](#)

- (1) Make sure that your PC is turned off, then connect the machine to your PC using a USB cable.
- (2) Switch your PC on.

- (3) On your PC, run the ID/head property utility (brusbnsn.exe) in the folder created in [Section 7.1.1](#). The following window appears.



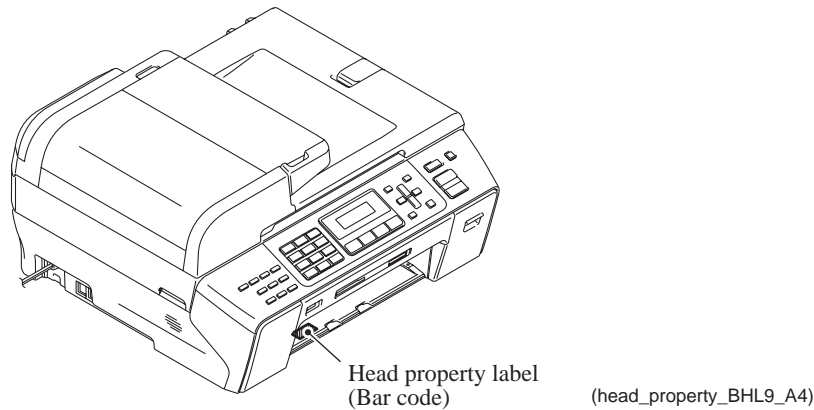
- (4) On the model menu, click **BH9**.
- (5) In **Port** on the BrUsbSn screen, select the port number assigned to the Brother Maintenance USB Printer. If the port number is unknown, follow the instructions given in [Section 7.2 \[1 \], step \(8\)](#).
- (6) In the **Serial No** box on the BrUsbSn screen, type the 9-digit serial number (e.g., D6F111101) printed on the nameplate labeled to the machine as an ID code.



Serial number label

(app01b)

- (7) In the **Head Info.** box, type the 16-digit property code (e.g., ALR7765501200000) which is printed on the bar code label attached to the lower cover. Click the **OK** button.



- (8) Check whether the entered character strings (ID code and head property information) are correct with the following procedure.

In the initial stage of the maintenance mode, press the **8** and **0** keys in this order to call up the log information on the LCD.

Then press the **Black Start (Mono Start)** key several times until the ID code appears on the LCD. Check that the displayed code is that string entered in step (6).

Next, press the **6** and **8** keys in this order to call up the property data on the LCD.

Then press the **2, 5, 8,** and **0** keys in this order, and the head property code appears on the LCD. Check that the displayed code is that string entered in step (7).

- (9) If both are OK, proceed to [9] below.

If something wrong is displayed, check the connection between the PC and machine and go back to step (2).

[9] Back up machine information (Function code 46)

Restore the machine information and user data that have been saved in an external memory, referring to [Chapter 9, Section 9.4.10](#).

If the machine has failed to back up the machine information into an external memory at the start of repair, reset each of the purge and flushing counters with the following procedure.

- (1) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (2) Press the **8** and **0** keys in this order.
- (3) Press the **Black Start (Mono Start)** key several times until the purge (or flushing) count appears on the LCD.
- (4) Press the **2, 7, 8,** and **3** keys in this order to reset the purge (or flushing) count.

- (5) Press the **Stop/Exit** key to return to the initial stage of the maintenance mode.
- (6) Press the **9** key twice to exit from the maintenance mode.

[10] Update the paper feeding correction value (Function code 58)

Refer to [Section 7.2, \[5 \]](#).

[11] Align vertical print lines (Function code 65)

Refer to [Section 7.2, \[6 \]](#).

[12] Adjust margins in borderless printing (Function code 66)

Refer to [Section 7.2, \[7 \]](#).

[13] Print out an ADF copy chart and make a copy of that chart in ADF scanning

Refer to [Section 7.4, \[2 \]](#).

[14] Check LCD operation (Function code 12)

Refer to [Chapter 9, Section 9.4.6](#).

[15] Switch back to standby

Refer to [Section 7.2, \[9 \]](#).

7.4 IF YOU REPLACE THE ADF UNIT OR ADF-RELATED PARTS

[1] Check the "Total Quality Check Pattern"

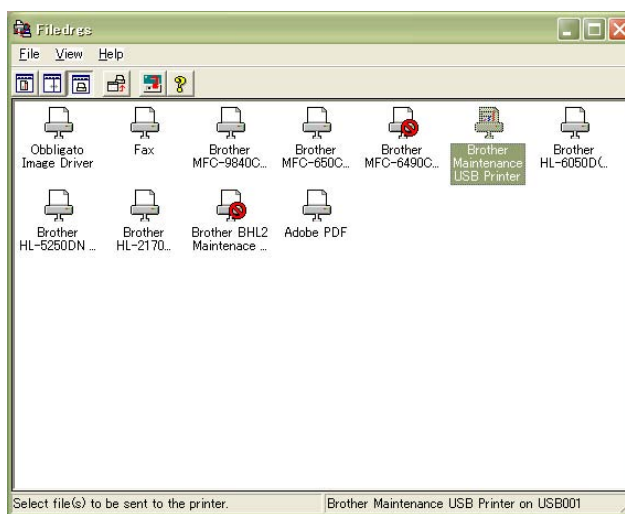
Refer to [Section 7.2, \[8 \]](#).

[2] Print out an ADF copy chart and make a copy of that chart in ADF scanning

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing and making a copy of the check pattern. To get the accurate print data, we suggest using the Brother genuine plain paper PB60 or other higher quality one (DO NOT USE glossy paper).

- (1) On your PC, run "filedrg32.exe" in the folder created in [Section 7.1.1](#).

The Filedrgrs window appears as shown below.



- (2) Drag and drop the "chart.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgrs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "ADF COPY CHART" (see [page 7-34](#) for a sample printout).

- (3) Fully insert the top edge of the printed "ADF COPY CHART" *with face up* into the ADF, then fit the document guides to the document size.

Set the copy quality mode to "**Best**" and press the **Copy** key to make a copy.

Note: Check that the document does not skew.

Note: During copying, do not touch the document to prevent printed images from displacement.

- (4) Check the copied chart referring to the "Check Items on the ADF COPY CHART" given on the next page.

If any problem is found, remove the newly mounted ADF unit or ADF-related parts once and set it (them) into place, or check and correct the connection of ADF-related harnesses.

Check Items on the ADF COPY CHART

Check that the copied chart has none of the following defects.

A: Contrast chart 1

- Black or white vertical streaks
- Patchy color
- Missing dots

B: Color blocks

- Patchy color
 - Second black block printed in yellow or red
 - Area expansion of block(s)
 - Third blocks printed too light
 - Frames of white blocks missing or discolored
- Note:** Vertical streaks in color blocks are negligible.

C: Contrast chart 2

- Vertical streaks in 0.3 to 0.5 blocks
(Vertical streaks only in 0.2 block is negligible.)
- Patchy color in 0.3 to 0.5 blocks
(Patchy color only in 0.2 block is negligible.)
- Missing dots in 0.2 to 0.5 blocks

D: Resolution chart

- Overlapping lines (diagonal or horizontal) in 4 to 6 mm blocks
- Curved lines in 4 to 6 mm blocks
- Black or color vertical streaks in 4 to 6 mm blocks
- Discoloration in 4 to 6 mm blocks

E: Whole page

- Ghost (image printed on the blank area)
- Color horizontal streaks
- Black vertical band



ADF COPY CHART No.2

DATE :

2008.03.26

IPAPPROVE

SERIAL NO :

0.2



0.3



} A



} B

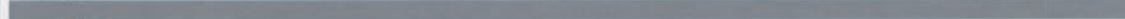
0.2



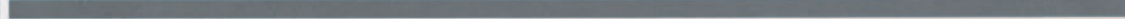
0.3



0.4



0.5



} C

4



5



6



8



} D

7.5 IF YOU REPLACE THE INK ABSORBER BOX OR FLUSHING BOX

When either the ink absorber box or flushing box is replaced, you should replace both of them.

[1] Reset each of the purge and flushing counters

- (1) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.
- (3) Press the **Black Start (Mono Start)** key several times until the purge (or flushing) count appears on the LCD.
- (4) Press the **2**, **7**, **8**, and **3** keys in this order to reset the purge (or flushing) count.
- (5) Press the **Stop/Exit** key to return to the initial stage of the maintenance mode.
- (6) Press the **9** key twice to exit from the maintenance mode.

Tip: This machine counts all purge operations and flushing operations performed since produced in order to prevent the ink absorber box and flushing box from overflowing with drained and flushed ink, respectively. An initial purge, for example, advances the counter by $133 + 316 = 449$.

When the purge or flushing counter approaches 7360 or 568181818, respectively, the "MACHINE ERROR 46" appears, and further purge or flushing operations are prohibited. Replace the ink absorber box and flushing box, and then reset their counters.

7.6 IF YOU REPLACE THE CONTROL PANEL ASSY OR CONTROL PANEL PCB

[1] Check LCD operation (Function code 12)

Refer to [Chapter 9, Section 9.4.6](#).

[2] Check the operation of the control panel PCB (Function code 13)

Refer to [Chapter 9, Section 9.4.7](#).

7.7 IF YOU REPLACE THE SCANNER COVER (SCANNER UNIT)

[1] Specify the CIS Type (Function code 59)

Refer to [Chapter 9, Section 9.4.16](#).

[2] Acquire white level data and set CIS scanner area (Function code 55)

Refer to [Chapter 9, Section 9.4.14](#).

[3] Check the "Total Quality Check Pattern"

Refer to [Section 7.2, \[8 \]](#).

[4] Print out an ADF copy chart and make a copy of that chart in ADF scanning

Refer to [Section 7.4, \[2 \]](#).

CHAPTER 8

CLEANING

CHAPTER 8 CLEANING

This chapter provides cleaning procedures not covered by the User's Guide. Before starting any repair work, clean the machine as it may solve the problem concerned.

For the cleaning procedures of the head/carriage unit, scanner unit, and platen, refer to the User's Guide.

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8.2	CLEANING THE MAINTENANCE UNIT	8-2

8.1 CLEANING THE EXTERNAL AND INTERNAL SURFACE OF THE MACHINE

- (1) If the external surface of the machine is stained, clean it with a soft, clean and lint-free cloth.

Note: Do not use isopropyl alcohol (IPA) to remove dirt or stains from the molding parts. Doing so may cause cracks in those parts.

- (2) If the inside of the machine is stained, first unplug the power cord from the electrical outlet and then clean it with a soft, clean and lint-free cloth.

Note: Do not use liquid or aerosol cleaners.

- (3) If the PF encoder disk or CR encoder strip is stained, replace it with a new one. Do not try to clean it.

8.2 CLEANING THE MAINTENANCE UNIT

- (1) Plug the power cord of the machine into an electrical outlet.
- (2) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

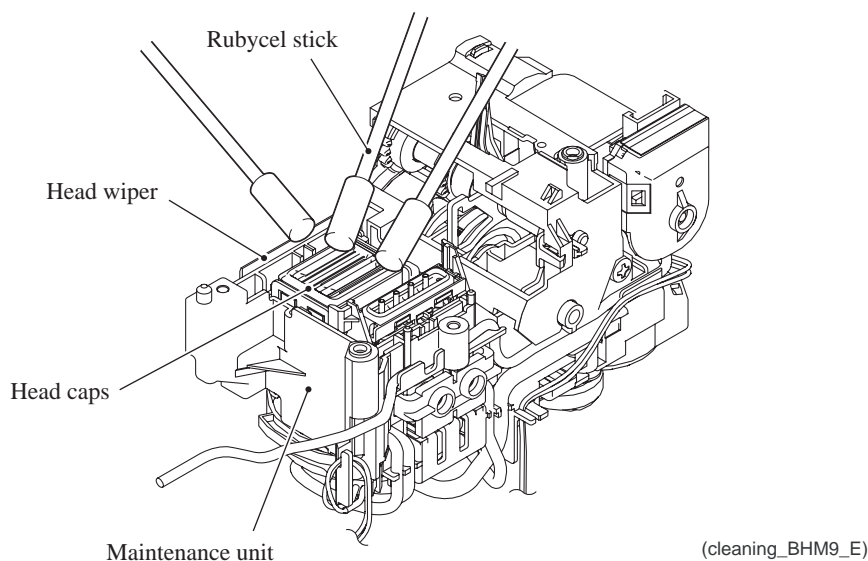
- (3) Move the head/carriage unit to the center of its travel (function code 63 in [Chapter 9, Section 9.4.17](#)) by pressing the **6**, **3**, **Black Start (Mono Start)**, and ***** keys in this sequence.
- (4) Unplug the power cord of the machine from the electrical outlet.
- (5) Open the scanner cover (scanner unit).
- (6) Clean the two head caps and wiper of the maintenance unit with a "Rubycel" stick that is a head cleaner stick provided as a spare part.

Note: Do not use a cotton swab that may leave lint on the cleaned sections. Lint left on the maintenance unit will affect the print performance.

Note: Use a new Rubycel stick and do not use the used one for any other maintenance units.

Note: During the cleaning jobs, take care not to touch the head caps or wiper directly by hand or scratch their surfaces. Do not remove them from the head cap holder.

- (7) Close the scanner cover.
- (8) Plug the power cord of the machine into an electrical outlet.
- (9) Hear the head/carriage unit moving. After the moving sound stops, unplug the machine's power cord from the electrical outlet.



CHAPTER 9

MAINTENANCE MODE

CHAPTER 9 MAINTENANCE MODE

This chapter describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments of the machine using the keys on the control panel.

In the maintenance mode, you can update memory (EEPROM: electrically erasable programmable read-only memory) contents for optimizing the drive conditions of the head/carriage unit or the paper feed roller and paper ejection roller in the engine unit, if those units have been replaced, or for setting the CIS scanner area, for example. You can also customize the EEPROM according to the shipment destination of the machine concerned. In addition, you can perform operational checks of the LCD, control panel PCB or sensors, perform a print test, display the log information or error codes, and modify firmware switches (WSW).

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9.1 ENTRY INTO THE MAINTENANCE MODE

- (1) Press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to switch the machine to the maintenance mode.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

TIP: Models with numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *, **2**, **8**, **6** and **4** keys in this order.

- (2) To select one of the maintenance-mode functions listed in [Section 9.2](#), enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in [Section 9.4](#).)

NOTES • To exit from the maintenance mode and switch to standby, press the **9** key twice in the initial stage of the maintenance mode.

- Pressing the **Stop/Exit** key after entering only one digit restores the machine to the initial stage of the maintenance mode.
- If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.

9.2 LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Section (Page)
01	EEPROM Parameter Initialization	9.4.1 (9-4)
05	Printout of Scanning Compensation Data	9.4.2 (9-5)
08	ADF Performance Test	9.4.3 (9-7)
09	Test Pattern	9.4.4 (9-8)
10	Firmware Switch Setting	9.4.5 (9-10)
11	Printout of Firmware Switch Data	9.4.5 (9-13)
12	Operational Check of LCD	9.4.6 (9-15)
13	Operational Check of Control Panel PCB (Check of Keys)	9.4.7 (9-16)
28	Updating of Firmware Using an External Memory	9.4.8 (9-17)
32	Sensor Operational Check	9.4.9 (9-18)
46	Backup of Machine Information	9.4.10 (9-20)
52	Setting of Country/Language	9.4.11 (9-22)
53	Transfer of Received FAX Data and/or Equipment's Log	9.4.12 (9-23)
54	Fine Adjustment of Scanning Start/End Position	9.4.13 (9-25)
55	Acquisition of White Level Data and CIS Scanner Area Setting	9.4.14 (9-26)
58	Updating of Paper Feeding Correction Value	9.4.15 (9-27)
59	Checking of CIS Travel and Specifying of CIS Type	9.4.16 (9-31)
63	Travel Check of the Head/Carriage Unit and Initial Setup Mode	9.4.17 (9-33)
65	Alignment of Vertical Print Lines in Monochrome	9.4.18 (9-34)
66	Margin Adjustment in Borderless Printing	9.4.19 (9-37)
68	Updating of Property Data	9.4.20 (9-42)
69	Head/Carriage Unit Traveling Speed Check	9.4.21 (9-43)
74	EEPROM Customizing	9.4.22 (9-44)
75	Travel of Head/Carriage Unit (for removing paper particles and dust accumulated on the maintenance unit)	9.4.23 (9-46)
76	Purge Operation	9.4.24 (9-47)
80	Display of the Equipment's Log	9.4.25 (9-50)
82	Equipment Error Code Indication	9.4.26 (9-52)
87	Output of Transmission Log to the Telephone Line	9.4.27 (9-52)
88	Assurance Mode Switch Setting	9.4.28 (9-53)
91	EEPROM Parameter Initialization (except the telephone number storage area)	9.4.1 (9-4)
99	Exit from the Maintenance Mode	----- (9-1)
(Menu + #, 2, 7, 9, 0, 0)	Cancellation of the Pin TX Lock Mode (Not applicable to Japanese and U.S.A. models)	9.4.29 (9-63)

: A function that the end user can use. (Refer to [Section 9.3.](#))

9.3 USER-ACCESS TO THE MAINTENANCE MODE

Basically, the maintenance-mode functions listed on the previous page should be accessed by service personnel only. However, you can allow end users to access some of these under the guidance of service personnel (e.g., by telephone).

The user-accessible functions (codes 10 to 12, 52, 53, 66, 75, 76, 80, 82, 87, 88, and 91) are *shaded* in the table given on the previous page. Function code 10 accesses the firmware switches, each of which has eight selectors. You should not allow end users to access all of those selectors, but you can allow them to access user-accessible selectors which are *shaded* in the firmware switch tables in [Appendix 4](#).

The service personnel should instruct end users to follow the procedure given below.

- (1) Press the **Menu**, **Black Start (Mono Start)**, **Menu**, and **Black Start (Mono Start)** keys in this order.

The "MAINTENANCE 10" appears on the LCD.

TIP: For models with numerical keypad, you may press the **Menu**, **Black Start (Mono Start)**, and **0** keys instead in the same way as conventional models. Then pressing **1** and **0** keys, for example, calls up the setting screen for Function code 10.

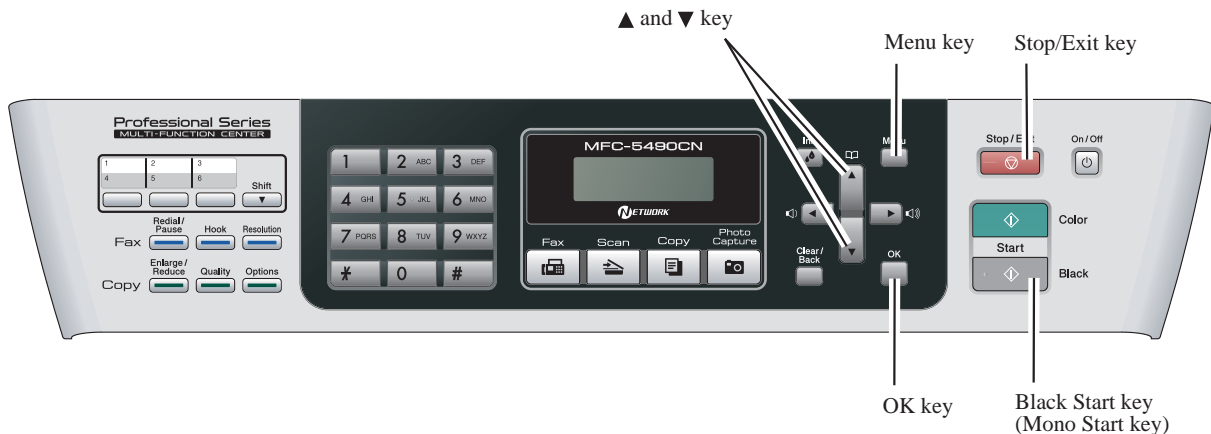
- (2) To access function code 10, press the **OK** key.

To access any other function code, call up the desired code using the ▲ and ▼ keys or numerical keys.

Then press the **OK** key.

For function code 10, access the desired firmware switch according to the operating procedure described in [Appendix 4](#).

- (3) To make the machine return to standby, press the **Stop/Exit** key. When each of the user-accessible functions is completed, the machine automatically returns to standby.



9.4 DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

9.4.1 EEPROM Parameter Initialization (Function code 01, 91)

■ Function

The machine initializes the parameters, user switches, firmware switches and assurance mode switch settings registered in the EEPROM, to the initial values. Entering function code 01 initializes almost all of the EEPROM areas, but entering 91 does not initialize some areas, as listed below.

Function code	01	91
Data item		
Maintenance-mode functions User switches Firmware switches Remote activation code Assurance mode switch settings	} All of these will be initialized.	} These will be initialized.
Activity report Station ID data Outside line number Telephone function registration Speed dialing Group dialing Call transfer data		} These will <u>not</u> be initialized.
EEPROM customizing code (4-digit)	This will <u>not</u> be initialized. (Note that the first digit of the 4-digit code will be initialized to "0." If the code is <u>1</u> 001, for example, it will be initialized to <u>0</u> 001.)	

NOTE: If you replace the main PCB with the one used for any other machine, carry out this procedure and then customize the EEPROM (function code 74 in [Section 9.4.22](#)).

■ Operating Procedure

- (1) Press the **0** and **1** keys (or the **9** and **1** keys according to your need) in this order in the initial stage of the maintenance mode.
The "SELECT 01?" ("SELECT 91?") appears on the LCD.
- (2) Press the **Black Start (Mono Start)** key.
The "PARAMETER INIT" appears on the LCD.
- (3) Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

9.4.2 Printout of Scanning Compensation Data (Function code 05)

■ Function

The machine prints out the white and black level data for scanning compensation.

■ Operating Procedure

Do not start this function merely after powering on the machine but start it after carrying out a sequence of scanning operation. Unless the machine has carried out any scanning operation, this function cannot print out correct scanning compensation data. This is because at the start of scanning operation, the machine initializes white and black level data and takes in the scanning compensation reference data.

NOTE: If this function is used after monochrome scanning, only the green data is valid.

NOTE: Be sure to disconnect the USB cable from the machine before proceeding to the procedure below.

- (1) Press the **0** and **5** keys in this order in the initial stage of the maintenance mode.

The "PRINTING" appears on the LCD.

- (2) The machine prints out the scanning compensation data list containing the following:

- a) Black/white data graph
- b) LED light intensity PWM data for color image (1 byte)
- c) LED light intensity PWM data for monochrome image (1 byte)
- d) LED light intensity pulse data for green image (2 bytes)
- e) LED light intensity pulse data for blue image (2 bytes)
- f) LED light intensity pulse data for red image (2 bytes)
- g) LED light intensity pulse data for monochrome image (2 bytes)
- h) AFE RLCV*1 data (1 byte)
- i) AFE offset data (1 byte)
- j) AFE gain data (1 byte)
- k) Background color compensation data*2 (1 byte)
- l) Black level data*3
- m) White level data for red image*3
- n) White level data for green image*3
- o) White level data for blue image*3

*1 AFE: Analog Front End

RLCV: Reset Level Clamp Voltage

*2 Data for background color compensation (filtering out background color) to be performed in monochrome copying of a document printed on colored paper.

*3 Last scanned data, any of the 2592 bytes in 300 dpi, 5184 bytes in 600 dpi, or 10368 bytes in 1200 dpi.

- (3) Upon completion of recording of the compensation data list, the machine returns to the initial stage of the maintenance mode.

NOTE: If any data is abnormal, its code will be printed in inline style.

9.4.3 ADF Performance Test (Function code 08)

■ Function

The machine counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD for checking the ADF performance.

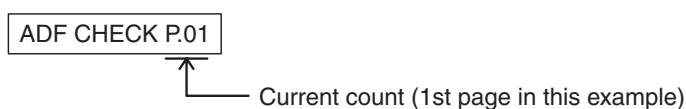
■ Operating Procedure

- (1) Set documents. (Allowable up to the ADF capacity.)

The "DOC. READY" appears on the LCD.

- (2) Press **0** and **8** keys in this order in the initial stage of the maintenance mode.

The machine feeds the documents in and out while counting them and displaying the current count on the LCD as shown below.



- (3) After counting all documents, the machine shows the final count. To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

9.4.4 Test Pattern (Function code 09)

■ Function

This function prints out a test pattern (Print Quality Check sheet) to allow the service personnel to check the print quality.

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

■ Operating Procedure

Press the **0** and **9** keys in this order in the initial stage of the maintenance mode.

The figure on the next page shows a test pattern which is printed on the Print Quality Check sheet. According to the instructions printed on the sheet, you can check or correct the print quality.

Print Quality Check

Check that the dotted lines forming the four color blocks are all visible with no gaps. If OK select (Yes) on the control panel. If gaps are visible select (No) on the control panel to start the cleaning process and follow the prompts on the LCD.



Test Pattern

9.4.5 Firmware Switch Setting and Printout (Function codes 10 and 11) (User-accessible)

[A] Firmware switch setting

■ Function

The machine incorporates the following firmware switch functions which can be activated with the procedures using the control panel keys.

The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW60)

WSW No.	Function	
WSW01	Dial pulse setting	
WSW02	Tone signal setting	
WSW03	PBX mode setting	
WSW04	TRANSFER facility setting	
WSW05	1st dial tone and busy tone detection	
WSW06	Pause key setting and 2nd dial tone detection	
WSW07	Dial tone setting 1	
WSW08	Dial tone setting 2	
WSW09	Protocol definition 1	
WSW10	Protocol definition 2	
WSW11	Busy tone setting	
WSW12	Signal detection condition setting	
WSW13	Modem setting	
WSW14	AUTO ANS facility setting	
WSW15	REDIAL facility setting	
WSW16	Function setting 1	
WSW17	Function setting 2	
WSW18	Function setting 3	
WSW19	Transmission speed setting	
WSW20	Overseas communications mode setting	
WSW21	TAD setting 1	
WSW22	ECM and call waiting caller ID	
WSW23	Communications setting	
WSW24	TAD setting 2	
WSW25	TAD setting 3	
WSW26	Function setting 4	
WSW27	Function setting 5	
WSW28	Function setting 6	
WSW29	Function setting 7	<i>(Not used.)</i>
WSW30	Function setting 8	<i>(Not used.)</i>
WSW31	Function setting 9	
WSW32	Function setting 10	
WSW33	Function setting 11	

Firmware Switches (WSW01 through WSW60) *Continued*

WSW No.	Function
WSW34	Function setting 12
WSW35	Function setting 13 <i>(Not used.)</i>
WSW36	Function setting 14
WSW37	Function setting 15
WSW38	V.34 transmission settings
WSW39	V.34 transmission speed
WSW40	V.34 modem settings
WSW41	ON-duration of the scanning light source
WSW42	Internet mail settings <i>(Not used.)</i>
WSW43	Function setting 21
WSW44	Speeding up scanning-1
WSW45	Speeding up scanning-2 <i>(Not used.)</i>
WSW46	Monitor of power ON/OFF state and parallel port kept at high
WSW47	Switching between high- and full-speed USB
WSW48	USB setup latency
WSW49	End-of-copying beep and black ink print mode
WSW50	SDAA settings
WSW51	Function setting 16
WSW52	Function setting 17
WSW53	Function setting 18
WSW54	Function setting 19
WSW55	Function setting 20 <i>(Not used.)</i>
WSW56	Function setting 21
WSW57	Function setting 22
WSW58	Function setting 23
WSW59	Function setting 24
WSW60	Function setting 25

■ Operating Procedure

- (1) Press the **1** and **0** keys in this order in the initial stage of the maintenance mode.

The machine displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

- (2) Enter the desired number from the firmware switch numbers (01 through 60).

The following appears on the LCD:

```

      Selector 1      Selector 8
        ↓             ↓
WSWXX = 0 0 0 0 0 0 0 0
```

- (3) Use the ◀ and ▶ keys to move the cursor to the selector position to be modified.
- (4) Enter the desired number using the **0** and **1** keys.
- (5) Press the **OK** key. This operation saves the newly entered selector values onto the EEPROM and readies the machine for accepting a firmware switch number.
- (6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.
- (7) Press the **Stop/Exit** key to return the machine to the initial stage of the maintenance mode.

NOTES

- To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** key.
- If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.

■ Details of Firmware Switches

The details of the firmware switches are described in [Appendix 4](#) in which the user-accessible selectors of the firmware switches are *shaded*.

[B] Printout of firmware switch data

■ Function

The machine prints out the setting items of the firmware switches and their contents specified.

■ Operating Procedure

- (1) Press the **1** key twice in the initial stage of the maintenance mode.

The "PRINTING" appears on the LCD.

- (2) The machine prints out the configuration list as shown on the next page.
- (3) Upon completion of printing, the machine returns to the initial stage of the maintenance mode.

CONFIGURATION LIST

MODEL : 8CA-H11-001
 TIME : 01/22/2016 01:55
 REV. : U0711290926VER.T
 PCI : 5.00
 SUM : 1616
 SER.# : BR0L7F000233

WSW01	= 00000000	1-2. DIAL FORMAT	:	NORMAL
		3-4. BREAK TIME	:	60 MS
		5-6. INTERDIGIT PAUSE	:	800 MS
		7. DP/PB CHANGE IN USER SW	:	YES
		DP/PB FIXING SELECTION	:	PB
WSW02	= 1111010	1-2. ON TIME	:	100 MS
		3-4. OFF TIME	:	140 MS
WSW14		5-8. LINE BEEP ATTENUATOR	:	10 DB
WSW03	= 10110000	1. PARA. CNG DETECTION1	:	B
		2-4. NOT USED	:	
WSW15		5. PARA. CNG DETECTION2	:	A
		5-8. NOT USED	:	
WSW04	= 00010110	1-4. NOT USED	:	
		5. ADDITIONAL DELAY OF CML ON-OGM	:	0 SEC
WSW16		5-8. FLASHING TIME	:	500 MS
WSW05	= 00000110	1-3. DIAL TONE DETECTION	:	3.5 SEC WAITING
		4. REMOTE ID DETECTION TIMEOUT	:	2 SEC
		5-6. BUSY TONE DETECTION (CALLING)	:	AFTER DIALING
		7. BUSY TONE DETECTION (CALLED)	:	OFF
		8. NOT USED	:	
WSW06	= 00101100	1-3. PAUSE KEY	:	3.5 SEC WAITING
		4-6. 2ND DT DETECTION TIME	:	800 MS
		7. 2ND DT DETECTION CYCLE	:	1 CYCLE
		8. 2ND DT INTERRUPT DETECTION TIME	:	30 MS
WSW07	= 01001100	1-2. FREQUENCY RANGE	:	INITIAL DATA
		3. NOT USED	:	
		4-5. 2ND DT DETECTION LEVEL	:	-30 DBM
		7. 1ST DT INTERRUPT DETECTION TIME	:	30 MS
		8. NOT USED	:	
WSW08	= 01100111	1-3. 1ST DT DETECTION TIME	:	800 MS
		4-5. 1ST/2ND DT TIME OUT	:	10 SEC
		6-8. 1ST DT DETECTION LEVEL	:	-42 DBM
WSW09	= 00000000	1. EOM FRAME	:	256 OCTET
		2. NON STANDARD FACILITIES	:	ON
		3-4. TIMES OF FALL BACK	:	4
		5. T5 TIMER	:	300 SEC
		6. T1 TIMER	:	95 SEC
		7-8. CALLING TIMEOUT	:	55 SEC
WSW10	= 00010100	1. NOT USED	:	
		2. TIMING OF LAST DIGIT-MODEM CHANGE	:	100 MS
		3. TIMING OF CML ON CNG TRANSMISSION	:	2 SEC
		4. TIMING OF CML ON CED TRANSMISSION	:	2 SEC
		5-6. TRAINING RETRIES	:	2
		7. CODING METHOD MR	:	ON
		8. CODING METHOD MMR	:	ON
WSW11	= 01011000	1-2. FREQUENCY RANGE	:	INITIAL DATA
		3-8. ON/OFF TIME	:	175 - 600 / 175 - 600 MS
WSW12	= 10011001	1-2. OFF DETECTION TIME	:	700 MS
		3-4. AUTO ANS OFF DETECTION TIME	:	7 SEC
		5-6. ON DETECTION TIME	:	250 MS
		7-8. NOT USED	:	
WSW24		1-2. NOT USED	:	
		3-4. DELAY OF CML ON-OGM	:	4 SEC
		5-8. NOT USED	:	
WSW50		3. PHASE2 GUARD TONE LEVEL	:	-7DB OF NOMINAL POWER
		4. V.34 FALLBACK SPEED	:	EVERY 4800BPS
		5-6. V.34 EQM GAIN	:	NORMAL
		7. COMERR REDIAL	:	ON
		8. CED DETECT FOR CNG STOP	:	ON
WSW60		5-6. DETECT RING VOLT THRESHOLD(IN USE DAA)	:	19 V
		7-8. DETECT RING VOLT THRESHOLD(IN USE DAA)	:	19 V

Configuration List

9.4.6 Operational Check of LCD (Function code 12) (User-accessible)

■ **Function**

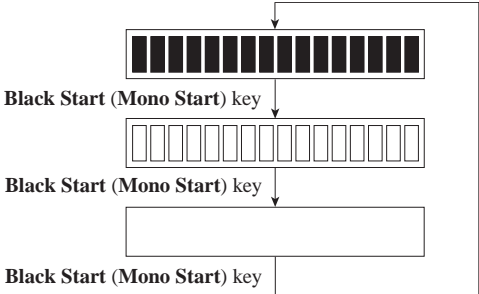
This function allows you to check whether the LCD works normally.

■ **Operating Procedure**

- (1) Press the **1** and **2** keys in this order in the initial stage of the maintenance mode.
- (2) Press the **Black Start (Mono Start)** key. The LCD shows the screen given below.



- (3) Each time you press the **Black Start (Mono Start)** key, the LCD cycles through the displays as shown below.



- (4) Press the **Stop/Exit** key in any process of the above display cycle. The machine returns to the initial stage of the maintenance mode.

9.4.7 Operational Check of Control Panel PCB (Function code 13)

■ Function

This function allows you to check the control panel PCB for normal operation.

■ Operating Procedure

- (1) Press the **1** and **3** keys in this order in the initial stage of the maintenance mode.

The "00 " will appear on the LCD.

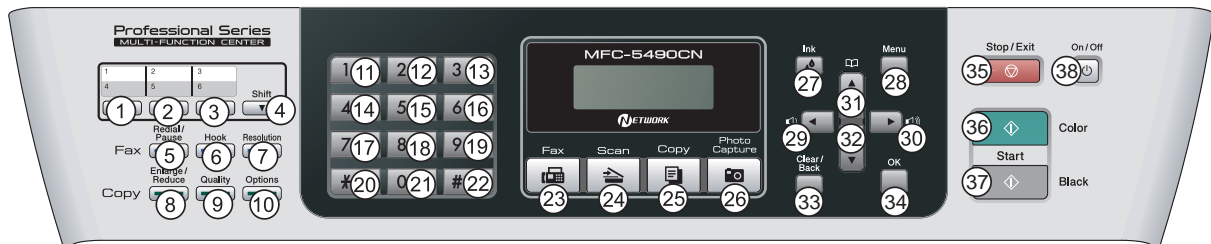
- (2) Press the keys in the order designated in the illustration shown below.

The LCD shows the corresponding number in decimal notation each time a key is pressed. Check that the displayed number is correct by referring to the illustration below.

If a key is pressed out of order, the machine beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key entry for operational check, press the **Stop/Exit** key.

- (3) After the last number key is pressed, the machine beeps and returns to the initial stage of the maintenance mode.

To terminate this operation, press the **Stop/Exit** key. The machine returns to the initial stage of the maintenance mode.



Key Entry Order

9.4.8 Updating of Firmware Using an External Memory (Function code 28)

■ Function

This function updates firmware stored in the flash ROM on the main PCB using an external memory (memory card or USB flash memory). It enables updating of firmware without connecting the machine to a PC.

TIP: For how to update firmware when the main PCB has been replaced or for operations using a PC, refer to [Appendix 2 "Firmware Installation."](#)

■ Operating Procedure

- (1) Switch your PC ON and insert an external memory.
- (2) Create a folder named "BROTHER" in the top layer of the external memory's directory and copy the firmware file having the extension .pjl into that folder.

NOTE: Before copying, check that the file name of the firmware matches with your machine. Be sure to save only one firmware file having the extension .pjl in the "BROTHER" folder. Otherwise, the firmware cannot be updated correctly.

TIP: If a firmware file not matching the machine is used, the firmware cannot be updated, but note that you can superficially continue the operation until step (5) below without any error.

TIP: For how to obtain the firmware file, refer to [Appendix 2 "Firmware Installation."](#)

- (3) Remove the external memory from the PC and insert it into the machine in the initial stage of the maintenance mode.

NOTE: Do not insert more than one external memory at a time.

- (4) On the machine, press the **2** and **8** keys in this order.

The file name *****.pjl appears on the LCD. Check that ***** is identical with the file name that has been copied into the external memory.

- (5) Press the **Black Start (Mono Start)** key.

The "Receiving Data" appears on the LCD, and after a while, "Program Updating" appears.

NOTE: Pressing the **Color Start** key does not start updating.

NOTE: Never remove the external memory from the machine when the updating is in progress.

- (6) Updating will complete in a few minutes, and the machine automatically restarts and returns to the standby state.

Remove the external memory from the machine and store it in a safe place.

NOTE 1: If any of the error messages listed below appears, press the **Stop/Exit** key, and the machine returns to the initial stage of the maintenance mode.

Error Message	Cause
Card is used	The external memory is being used by another operation.
Insert Card	No external memory is inserted.
No file	- No "BROTHER" folder in the external memory - Invalid file name
Too many files	There is more than one file having the extension .pjl in the folder.
Card Error	External memory defective

NOTE 2: After the completion of firmware updating, a file named "mfu-send.log" (which stores the execution log) is created in the layer right below the "BROTHER" folder.

9.4.9 Sensor Operational Check (Function code 32)

■ Function

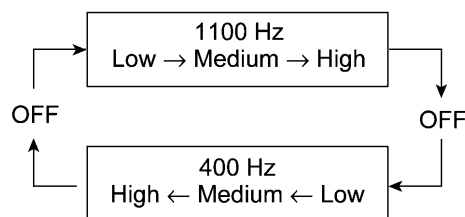
This function allows you to check the following:

- Document front sensor
- Document rear sensor
- Scanner cover sensor
- Registration sensor
- Ink cartridge cover sensor
- Purge cam switch
- Cap lift cam switch
- Ink cartridge detection sensors (black, yellow, cyan, and magenta)
- Ink empty sensors (black, yellow, cyan, and magenta)
- Head thermistor (in the head driver chip)
- Casing internal temperature thermistor

■ Operating Procedure

- (1) Press the **3** and **2** keys in this order in the initial stage of the maintenance mode.

The machine sounds 1100 Hz and 400 Hz tones cyclically through the following volumes for testing the speaker:



NOTE: To stop beeping, press the **Menu** or **OK** key.

If the sensing statuses are as listed on the next page, the LCD will show "DFDRCVRSCCP1CP**," "IKIYICIMEKEYECEM," and "*****VT CRTH," which can be switched by pressing the **Black Start (Mono Start)** key.

Given below is the relationship between the LCD indication, sensor name and sensor status.

LCD	Sensors	Sensing status
DF	Document front sensor	No document detected.
DR	Document rear sensor	No document detected.
CV	Scanner cover sensor	Scanner cover closed.
RS	Registration sensor	No recording paper detected.
CC	Ink cartridge cover sensor	Ink cartridge cover closed.
P1	Purge cam switch	Any of the cam driving positions
CP	Cap lift cam switch	Any of the cam driving positions
IK	Black ink cartridge detection sensor	Black ink cartridge loaded.
IY	Yellow ink cartridge detection sensor	Yellow ink cartridge loaded.
IC	Cyan ink cartridge detection sensor	Cyan ink cartridge loaded.
IM	Magenta ink cartridge detection sensor	Magenta ink cartridge loaded.
EK	Black ink empty sensor	Black ink remaining
EY	Yellow ink empty sensor	Yellow ink remaining
EC	Cyan ink empty sensor	Cyan ink remaining
EM	Magenta ink empty sensor	Magenta ink remaining
VT	Head thermistor	Driver chip temperature within the allowable range.
CR	Carriage motor driver thermistor*	Normal temperature detected.
TH	Casing internal temperature thermistor	Normal temperature detected.

* The "CR" is always displayed even on models not equipped with a carriage motor driver thermistor.

- (2) Change the detecting conditions (e.g., open the scanner cover or insert paper through the registration sensor or remove the ink cartridges), and then check that the indication on the LCD changes according to the sensor states.
- (3) To stop this operation and return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

9.4.10 Backup of Machine Information (Function code 46)

■ Function

This function backs up the following machine information and user data into an external memory (memory card or USB flash memory) and restores it when necessary. It also allows you to transfer machine information and user data stored in a machine to another one.

- Machine information (Preset values, counter values, error information, machine specifications data, etc.)
- User data (telephone directory, password, station ID, transfer information, information specified by the user, telephone area code, user settings, etc.)
- Other data (Received fax data, ICM/OGM data, etc.)

■ Backup Procedure

- (1) On the PC, create a "Brother" folder in an external memory to be used for saving backup data.
- (2) Insert the external memory into the slot of the machine in the initial stage of the maintenance mode.

The "**** Active" appears on the LCD. (**** shows the name of the external memory inserted.)

NOTE: Do not insert more than one external memory at a time.

NOTE: If an external memory already containing backup data of the same model is inserted, the following backup procedure will overwrite the existing data with new data.

- (3) Press the **4** and **6** keys in this order.
The "Export to Card" appears on the LCD.
- (4) Press the **Black Start (Mono Start)** key.
The "*****.msd" appears on the LCD. The "*****" is unique to each model.
- (5) Press the **Black Start (Mono Start)** key.
The "Export to Card" appears again on the LCD.
- (6) Press the **Black Start (Mono Start)** key.
The "Please wait" appears on the LCD.
NOTE: Never remove the external memory from the machine when the exporting is in progress.
- (7) Wait for the machine to automatically return to the initial stage of the maintenance mode and show "**** Active" on the LCD.

Remove the external memory from the machine and keep it in a safe place.

NOTE: If any of the error messages listed below appears, press the **Stop/Exit** key, and the machine returns to the initial stage of the maintenance mode.

Error Message	Cause
Card is used	The external memory is being used by another operation.
Insert Card	No external memory is inserted.
No file	- No "BROTHER" folder in the external memory - Invalid file name
Card Error	Failed to open the file.
Machine ID Error	Mismatch of serial numbers between the machine and the backup data (which is detected only in data restoration).
Write Error	Writing to an external memory failed due to insufficient capacity.

■ Restoration Procedure

- (1) Insert the external memory containing the backup data into the slot of the machine in the initial stage of the maintenance mode.

The "**** Active" appears on the LCD.

NOTE: Do not insert more than one external memory at a time.

NOTE: If the serial number in the backup data stored in the external memory does not match that of the machine, data restoration cannot be performed.

- (2) Press the **4** and **6** keys in this order.

The "Export to Card" appears on the LCD.

- (3) Press the **▲** or **▼** key until the desired item, any of the following, appears on the LCD.

"Import from Card" for restoring only user data

"Import all" for restoring all backup data including machine information

- (4) Press the **Black Start (Mono Start)** key.

The "*****.msd" appears on the LCD. The "*****" is unique to each model.

- (5) Press the **Black Start (Mono Start)** key.

The "Import from Card" or "Import all" appears again on the LCD.

- (6) Press the **Black Start (Mono Start)** key.

The "Please wait" appears on the LCD.

NOTE: Never remove the external memory from the machine when the exporting is in progress.

- (7) Wait for the machine to automatically return to the initial stage of the maintenance mode and show "**** Active" on the LCD.

Remove the external memory from the machine and keep it in a safe place.

NOTE: If any of the error messages shown on the previous page appears, press the **Stop/Exit** key, and the machine returns to the initial stage of the maintenance mode.

9.4.11 Setting of Country/Language (Function code 52) (User-accessible)

■ Function

Machines have been customized for their destination countries with the corresponding EEPROM customizing codes (see [Section 9.4.22](#), Function code 74). However, some customizing codes are shared by two or more destination countries, so the machines customized by these codes require further specifying individual destination countries or languages.

Usually, the user specifies the destination country or language on the LCD screen called up automatically when turning the machine on first after purchase. In the same way, the service personnel also specifies it if the main PCB is replaced; however, if he/she skips the specification process at that timing, be sure to perform the procedure given below.

EEPROM Customizing Code	Countries
0057	Norway, Sweden, Finland, and Denmark
0056	Australia and New Zealand

■ Operating Procedure

- (1) Press the **5** and **2** keys in this order in the initial stage of the maintenance mode.

The "Set Country" appears on the LCD.

NOTE: If an EEPROM customizing code other than those listed above has been specified, the machine automatically returns to the initial stage of the maintenance mode without displaying the country/language menu.

NOTE: The messages shown during this procedure are in US English.

- (2) Use the **▲** and **▼** keys to display the desired country or language.

NOTE: For selectable countries, refer to the table shown above.

- (3) Press the **OK** key, and the machine saves the new setting and returns to the initial stage of the maintenance mode. This completes the setting procedure.

9.4.12 Transfer of Received FAX Data and/or Equipment's Log (Function code 53) (User-accessible)

■ Function

This function transfers received FAX data to another machine. It is useful when the machine cannot print received data due to the printing mechanism defective.

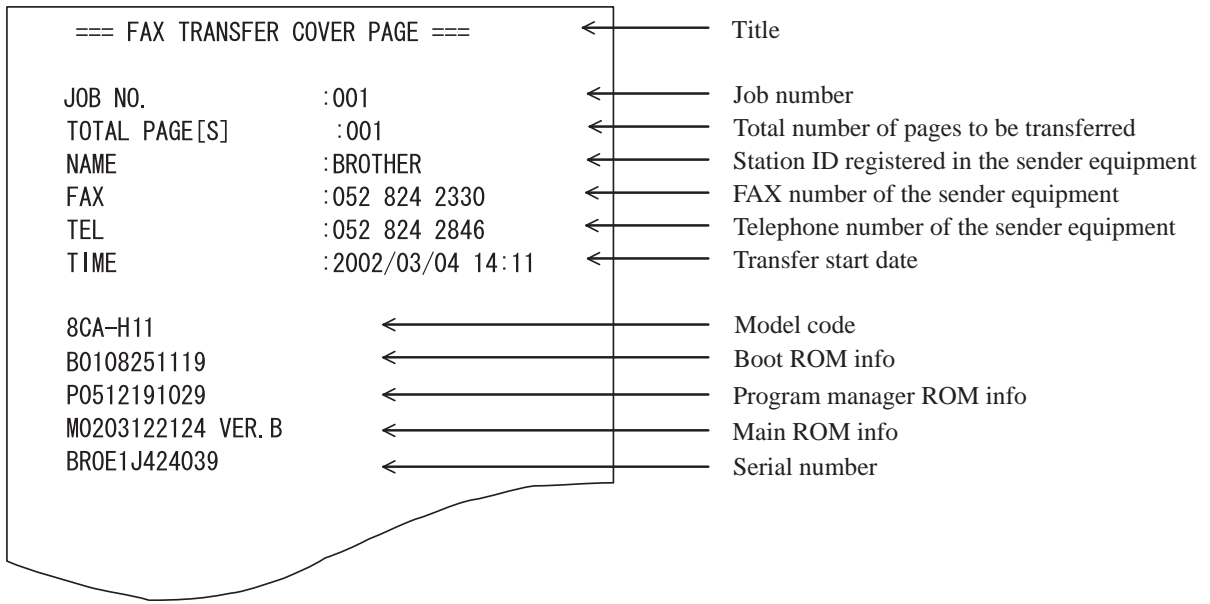
NOTE: The number of files that can be transferred at a time is 99. To transfer 100 files or more, carry out the following procedure more than one time.

TIP: If there are both color and monochrome data in a file to be transferred, the monochrome data will be transferred first. If the receiver machine does not support the color function, the sender machine cannot transfer color data, resulting in an error.

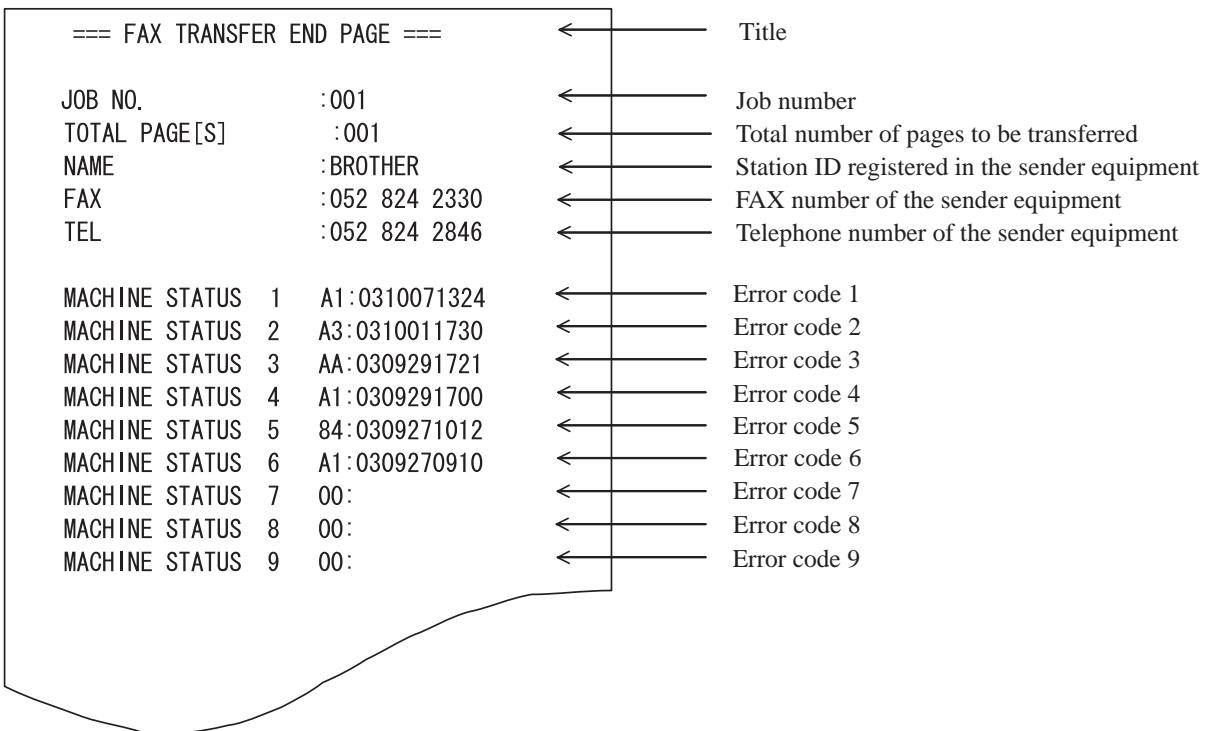
■ Operating Procedure

- (1) Press the **5** and **3** keys in this order in the initial stage of the maintenance mode.
The "FAX TRANSFER" appears on the LCD.
- (2) To check the number of received files, press the **1** key.
The "1.NO. OF JOBS" appears on the LCD.
Press the **OK** key, and the number of received files appears, just as "NO. OF. JOBS: 10."
Pressing the **Stop/Exit** key returns the machine to the "FAX TRANSFER" state.
- (3) Select data to transfer as follows.
To transfer the activity report only, press the **2** key.
The "2.ACTIVITY" appears.
To transfer received files (together with the activity report), press the **3** key.
The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.
To transfer the communication list for the latest communication, press the **4** key.
The "4.COM.LIST (NEW)" appears.
To transfer the communication list for the last three errors, press the **5** key.
The "5.COM.LIST (ERR3)" appears.
- (4) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed in step (3), press the **OK** key.
The "ENTER NO. &SET" appears.
- (5) Enter the telephone number of the receiver machine and press the **OK** key again.
NOTE: Be sure to type the telephone number with the numerical keys. No one-touch dialing is allowed in this procedure.
The machine displays the "ACCEPTED" for approx. two seconds and starts dialing to transfer data.
No station ID will be attached. A cover page and end page as shown on the next page will be automatically attached, instead.

Cover page sample



End page sample



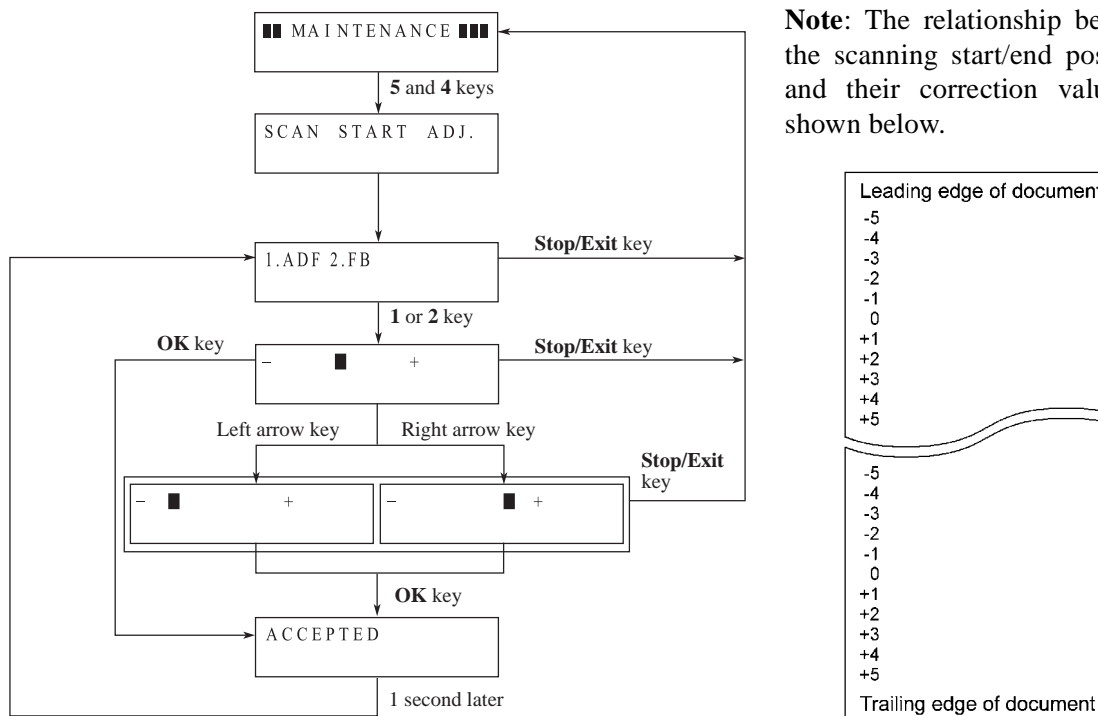
9.4.13 Fine Adjustment of Scanning Start/End Position (Function code 54)

■ Function

This function allows you to adjust the scanning start/end position.

■ Operating Procedure

- (1) Press the **5** and **4** keys in this order in the initial stage of the maintenance mode.
The "SCAN START ADJ." appears on the LCD.
- (2) Wait for the LCD to display the "1.ADF 2.FB."
- (3) Press the **1** or **2** key. The current scanning position correction value appears.
You can adjust the correction value to 11 levels from +5 to -5 (mm).
- (4) To increase the correction value, press the **▶** key; to decrease it, press the **◀** key.
If you press the **Stop/Exit** key, the machine returns to the initial stage of the maintenance mode without making change of the correction value.
- (5) Press the **OK** key.
The "ACCEPTED" appears on the LCD. After one second, the LCD returns to the "1.ADF 2.FB" screen.
- (6) Press the **Stop/Exit** key to return to the initial stage of the maintenance mode.



9.4.14 Acquisition of White Level Data and CIS Scanner Area Setting (Function code 55)

■ Function

This function allows the machine to obtain white level data for the CIS scanner and save it together with the CIS scanner area into the EEPROM on the main PCB.

■ Operating Procedure

- (1) Press the **5** key twice in the initial stage of the maintenance mode.

The "SCANNER AREA SET" appears on the LCD.

The machine automatically obtains white level data.

- (2) If this operation completes normally, the machine returns to the initial stage of the maintenance mode.

If any error is detected, the "SCANNER ERROR" appears on the LCD. To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

9.4.15 Updating of Paper Feeding Correction Value (Function code 58)

■ Function

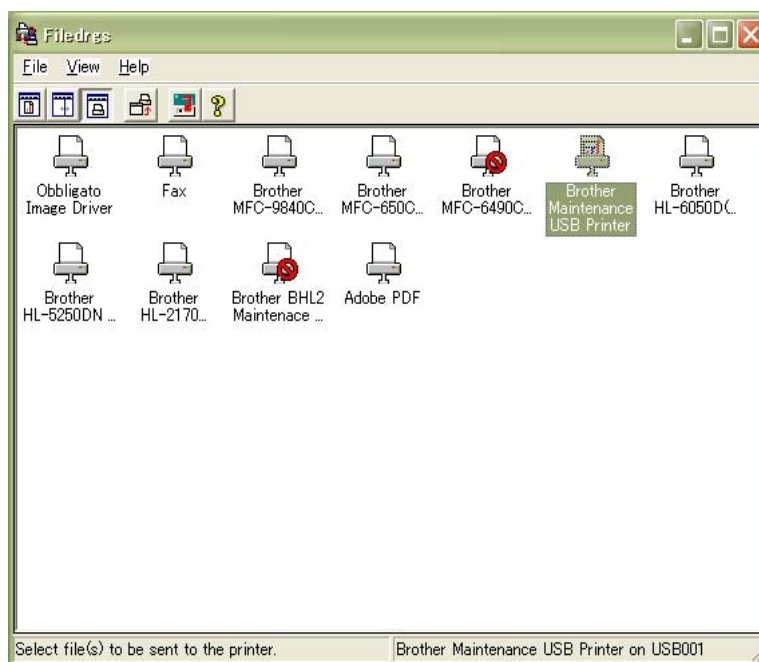
To keep the paper feeding performance in the best condition for quality print, the controller optimizes the rotation of the paper feed roller, using the correction value stored in the EEPROM on the main PCB.

If you replace the engine unit or head/carriage unit, you need to update the paper feeding correction value according to the procedure given here.

■ Operating Procedure

- (1) Switch on your PC.
- (2) Place the machine in the maintenance mode (see [Section 9.1](#)) and set A4-size paper in the paper tray to print check patterns.
- (3) Connect the machine to your PC using a USB cable.
- (4) On your PC, run "filedrgs32.exe" in the folder created in [Section 7.1.1](#).

The Filedrgs window appears as shown below.



For the paper feed roller adjustment

- (5) Drag and drop the "pfadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out "PF adjust check" pattern (see [page 9-29](#) for a sample printout).

- (6) On the machine, press the **5** and **8** keys in this order.
The "1.PF 2.EXIT" appears on the LCD.
- (7) To select the paper feed roller adjustment, press the **1** key.
The "PF ADJ NO. +0" appears on the LCD.

- (8) Out of the three rows of the "PF adjust check" pattern (on [page 9-29](#)), check the middle row and select the block that is the least uneven print. Make a note of that block number.

If the least unevenness seems to be far to the left of -8, regard it as -8; if it seems to be far to the right of +8, regard it as +8. In this case, you need to check whether the paper feed roller and head/carriage unit are set into place.

- (9) Enter the number of the least uneven block found in step (8).

For example, if the number of the least uneven block is +4, press the **4** key while the "PF ADJ NO. +0" is displayed on the LCD.

If the number is -4, press the **▼** key to display the "PF ADJ NO. -0" and press the **4** key.

Then press the **OK** key, and the machine returns to the initial stage of the maintenance mode.

For the paper ejection roller adjustment

- (10) On your PC, drag and drop the "exitadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "EXIT adjust check" pattern (see [page 9-30](#) for a sample printout).

- (11) On the machine, press the **5** and **8** keys in this order.

The "1.PF 2.EXIT" appears on the LCD.

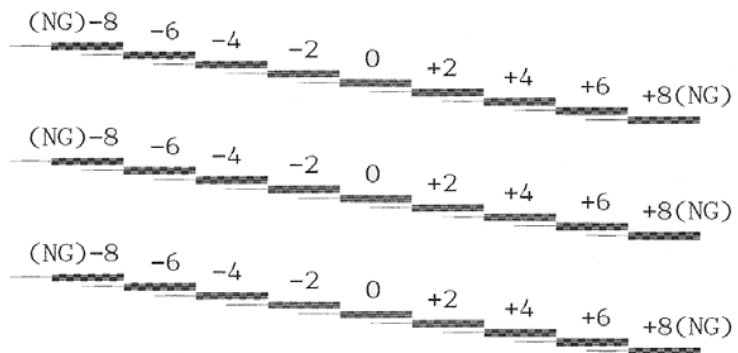
- (12) To select the paper ejection roller adjustment, press the **2** key.

The "EXIT ADJ NO. +0" appears on the LCD.

- (13) Select the block that is the least uneven print on the "EXIT adjust check" pattern (on [page 9-30](#)). Make a note of that block number.

- (14) Enter the number of the least uneven block found in step (13) in the same way as in step (9).

Then press the **OK** key, and the machine returns to the initial stage of the maintenance mode.



Paper Feeding Check Pattern for the Paper Feed Roller

* BH9 EXIT adjust check - Ver 006 *

(NG) -8 -6 -4 -2 0 +2 +4 +6 +8(NG)

(NG) -8 -6 -4 -2 0 +2 +4 +6 +8(NG)

Paper Feeding Check Pattern for the Paper Ejection Roller

9.4.16 Checking of CIS Travel and Specifying of CIS Type (Function code 59)

■ Function

This procedure allows you to check the movement of the CIS unit integrated in the scanner cover (scanner unit). The CIS unit travels to the three positions--the white reference film position, scanning start and end positions.

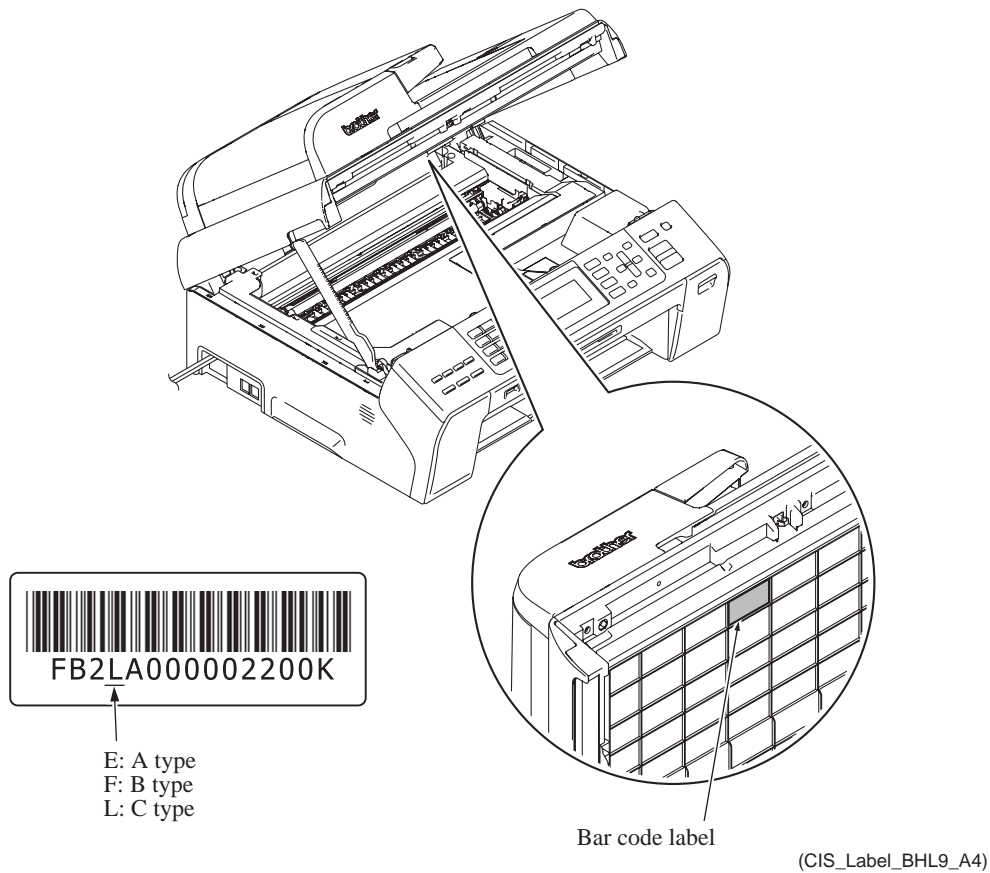
It also allows you to specify the CIS type into the EEPROM on the main PCB. If you replace the scanner cover or the main PCB, you need to specify the CIS type according to the procedure given below.

■ Operating Procedure

-- Check the movement of the CIS unit --

- (1) Press the **5** and **9** keys in this order in the initial stage of the maintenance mode.
The "1:MO 2:CO 3:CHG?" appears on the LCD.
- (2) To call up the CIS travel menu, press the **1** key.
(The "3:CHG" is for specifying the CIS type, as described on the next page. The "2:CO" is for checking scanning clocks at the factory, so do not access it.)
The "0:30 1:60 2:12 1" appears on the LCD.
- (3) Press the **OK** key.
The "LED PWM : 20" appears on the LCD.
- (4) Press the **OK** key.
The "G PULSE : " appears on the LCD.
- (5) Press the **OK** key.
The "1:WHT 2:FRT 3:MV" appears.
- (6) Press the **3**, **1**, or **2** key, then press the **OK** key.
The CIS unit moves to the scanning end position, white reference film position, or scanning start position, respectively.
- (7) Press the **Stop/Exit** key, and the CIS unit returns to the home position.
The machine returns to the initial stage of the maintenance mode.

-- Specify the CIS type --



- (1) Press the **5** and **9** keys in this order in the initial stage of the maintenance mode.
The "1:MO 2:CO 3: 3:CHG?" appears on the LCD.
- (2) To call up the CIS type menu, press the **3** key.
(The "1:MO" is for checking the CIS travel, as described on the previous page. The "2:CO" is for checking scanning clocks at the factory, so do not access it.)
The "CIS TYPE SET" appears on the LCD.
- (3) If the CIS type is "E" (A type), press the **0** key; if "F" (B type), press the **2** key; if "L" (C type), press the **1** key.
Upon completion of the entry, the machine returns to the initial stage of the maintenance mode.

9.4.17 Travel Check of the Head/Carriage Unit and Initial Setup Mode (Function code 63)

■ Function

This procedure moves the head/carriage unit to the center of its travel (Function code 63 + *).

It can also enable or disable the initial setup mode when the power is applied at the next time (Function code 63 + 1 or Function code 63 +3).

■ Operating Procedure

- (1) Press the **6** and **3** keys in this order in the initial stage of the maintenance mode.

The "SELECT 63?" appears on the LCD.

- (2) Press the **Black Start (Mono Start)** key.

The "START 63?" appears on the LCD.

- (3) To make the head/carriage unit travel to the center of its travel, press the * key.

After completion of head replacement or adjustment jobs, press the **Stop/Exit** key. The head/carriage unit returns to the home position and then locks itself.

- (4) To enable or disable the initial setup mode when the power is applied at the next time, perform steps (1) and (2) again and then press the **1** or **3** key, respectively.

If you enable the initial setup mode, wait until the "INIT" appears on the LCD and the head/carriage unit becomes locked. When the "HEAD LOCKED" appears, turn the power off.

NOTE: Enabling the initial setup mode resets all counts which can be displayed with Function code 80 (described in [Section 9.4.25 "Display of the Equipment's Log \(Function code 80\) \(User-accessible\)"](#)).

If you disable the initial setup mode, the machine displays the "NOT INIT" on the LCD and returns to the initial stage of the maintenance mode.

9.4.18 Alignment of Vertical Print Lines in Monochrome (Function code 65)

■ Function

This function allows you to align vertical lines printed in the forward and backward direction of the head/carriage unit.

If the head/carriage unit or main PCB is replaced with a new one, you need to make the adjustment given in this section.

NOTE: If the head/carriage unit is replaced, you need to make other adjustments in addition. Refer to [Chapter 7, Section 7.2 \[4 \]](#).

■ Operating Procedure

Before starting the operation below, be sure to set A4-size paper in the paper tray for printing check patterns.

- (1) Press the **6** and **5** keys in this order in the initial stage of the maintenance mode. Then press the **1** key.

The machine displays the "PRINTING" on the LCD and prints three sets of vertical alignment check patterns (shown on the following pages) in monochrome for 450 dpi, 600 dpi and 1200 dpi, each of which consists of #0 through #8 blocks. If the vertical alignment is ON, #5 block shows vertically aligned lines.

The "450DPI NO. (1-8)" appears on the LCD.

- (2) For 450 dpi, check the printed vertical alignment check patterns and find which number block shows full alignment. If the full alignment block is other than #5, enter that block number by using the numerical keys. The "600DPI NO. (1-8)" appears on the LCD.
- (3) For 600 dpi, perform the same operation as in step (2).

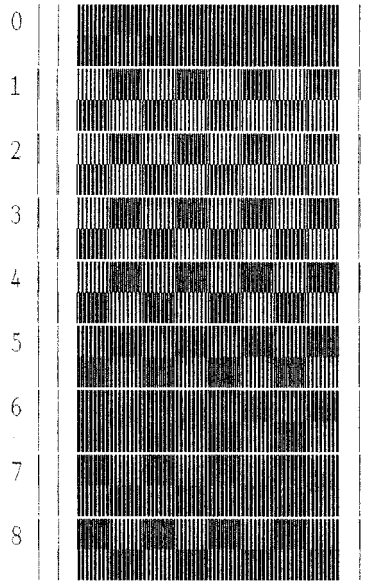
The "1200DPI NO. (1-8)" appears on the LCD.

- (4) For 1200 dpi, perform the same operation as in step (2).

The machine automatically returns to the initial stage of the maintenance mode.

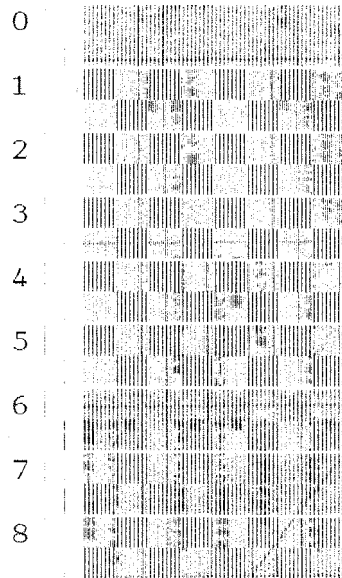
NOTE: If #1 or #8 block is fully aligned so that you press the **1** or **8** key in the above procedure, then go back to step (1) to confirm that #5 block becomes aligned.

450dpi

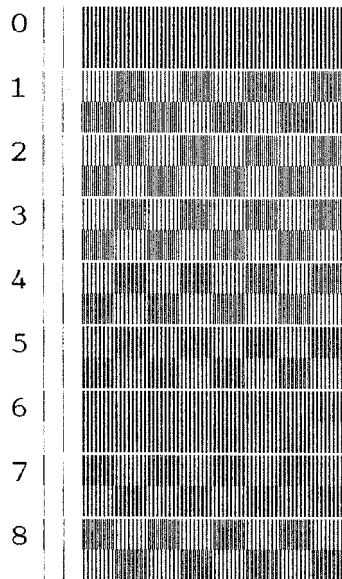


Vertical Alignment Check Patterns (1/2)

600dpi



1200dpi



Vertical Alignment Check Patterns (2/2)

9.4.19 Margin Adjustment in Borderless Printing (Function code 66) (User-accessible)

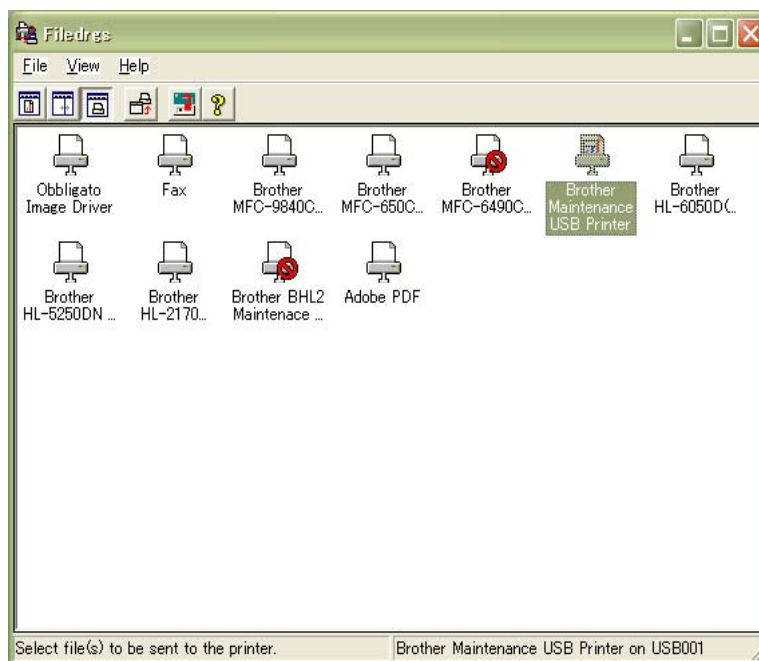
■ Function

This function allows you to adjust the left, right and bottom margins for borderless printing. You print out a margin check pattern, measure each margin, and enter the correction values.

■ Operating Procedure

- (1) Switch on your PC.
- (2) Place the machine in the maintenance mode (see [Section 9.1](#)) and set A4-size paper in the paper tray to print margin check patterns.
- (3) Connect the machine to your PC using a USB cable.
- (4) On the PC, run "filedrgs.exe" in the folder created in [Section 7.1.1](#).

The Filedrgs window appears as shown below.



Left and right margin adjustment

- (5) Drag and drop the "media.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the "MEDIA CHECK" patterns (see [page 9-40](#) for a sample printout). This is for checking the left and right margins.

- (6) Measure the left and right margins on the printed pattern.

The upper row is printed in 600 dpi, and the lower row, in 1200 dpi.

(Example) 600 dpi Left: 0.8 mm, Right: 1.1 mm
 1200 dpi Left: 0.9 mm, Right: 1.2 mm

If both of the left and right margins are within the range from 0.9 to 1.1 mm, no adjustment is required. If not, go to step (7).

- (7) If either of the left and right margins is out of the specified range, press the **6** key twice and the ***** key on the machine.
The "LEFT: 10" appears on the LCD.
- (8) To adjust the left margin in 600 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the left margin measured in step (6) is 0.8 mm, so press the **0, 8**, and **OK** keys.
- (9) To adjust the right margin in 600 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (6) is 1.1 mm, so press the **1, 1**, and **OK** keys.
The "LEFT2: 10" appears on the LCD.
- (10) To adjust the left margin in 1200 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (6) is 0.9 mm, so press the **0, 9**, and **OK** keys.
The "RIGHT2: 10" appears on the LCD.
- (11) To adjust the right margin in 1200 dpi, enter the measured value (in units of 0.1 mm) multiplied by 10.
In this example, the right margin measured in step (6) is 1.2 mm, so press the **1, 2**, and **OK** keys.
Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.
- (12) Go back to step (5) and print out the left and right margin check pattern again.
- (13) Measure the left and right margins on the printed pattern.
If both of the left and right margins are within the range from 0.9 to 1.1 mm, the adjustment is completed.

Bottom margin adjustment

- (14) Drag and drop the "bottomadj.prn" onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown on the previous page.
The machine displays the "RECEIVING DATA" on the LCD and prints out the "BOTTOM adjust" pattern (see [page 9-41](#) for a sample printout). This is for checking the bottom margin.
- (15) Measure the bottom margin on the printed pattern.
(Example) Bottom margin: 3.1 mm
If it is within the range from 2.9 to 3.1 mm, no adjustment is required. If not, go to step (16).

(16) If the bottom margin is out of the specified range, press the **6** key twice and the **#** key on the machine.

The "BOTTOM: 30" appears on the LCD.

(17) To adjust the bottom margin, enter the measured value (in units of 0.1 mm) multiplied by 10.

In this example, the bottom margin measured in step (15) is 3.1 mm, so press the **3**, **1**, and **OK** keys.

Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.

(18) Go back to step (14) and print out the bottom margin check pattern again.

(19) Measure the bottom margin on the printed pattern.

If it is within the range from 2.9 to 3.1 mm, the adjustment is completed.

600dpi LEFT:0.9-1.1mm

600dpi RIGHT:0.9-1.1mm

1200dpi LEFT:0.9-1.1mm

1200dpi RIGHT:0.9-1.1mm

Left and Right Margin Check Pattern

* BH9 BOTTOM Adjust - Ver. 002Ltr *



Bottom Margin Check Pattern

9.4.20 Updating of Property Data (Function code 68)

■ Function

To keep the print quality, the controller optimizes the drive conditions of individual head/carriage units according to the property data. For instance, the controller optimizes the head drive strength, ink jet-out timing and other drive conditions according to the electromechanical properties unique to individual head/carriage units and ambient temperature.

The property data is stored in the EEPROM on the main PCB and its property code is printed on the property labels attached to the machine and the head/carriage unit.

If you replace the head/carriage unit with a new spare part, you need to enter its property code printed on the property label (that comes with the new spare part) and replace the old property label on the machine (see [Appendix 1](#) for the label location) with the new one. If the old part may be used in future, store the old property label also with the old part.

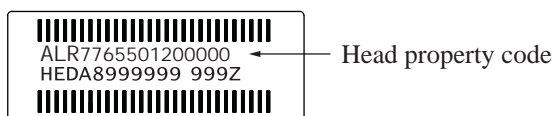
■ Operating Procedure

- (1) Press the **6** and **8** keys in this order in the initial stage of the maintenance mode.
- (2) Press the **2**, **5**, **8**, and **0** keys in this order.

The current property data stored in the EEPROM appears on the LCD and the machine is ready for entry.

- (3) Check the property label that comes with a new head/carriage unit and then enter the property code.

The code to be entered is 13 digits excluding the heading alphabets.



If the customizing code contains letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

- (4) Press the **OK** key.

The machine beeps, shows the "INPUT ACCEPTED" on the LCD, and writes the entered property code into the EEPROM. Then it returns to the initial stage of the maintenance mode.

NOTE: If the entered data contains any checksum error, the machine beeps, shows the "INPUT ERROR" and returns to the ready-to-enter state. Go back to step (3).

9.4.21 Head/Carriage Unit Traveling Speed Check (Function code 69)

■ Function

This function checks whether or not the traveling speed of the head/carriage unit is within the specified range.

This procedure should be performed when you replace the head/carriage unit or carriage motor, or when you loosen the CR timing belt.

■ Operating Procedure

- (1) Press the **6** and **9** keys in this order in the initial stage of the maintenance mode.

The machine starts aging the head/carriage unit, showing the "CR AGING" on the LCD.

In each of travel speeds 57.7, 43.3, and 21.7 inches/sec, the machine checks whether the maximum and minimum speeds are within the specified range.

- If the maximum and minimum speeds in all of the three travel speeds are within the range, the "57O 43O 21O" appears on the LCD.
- If any one is out of the range, the machine shows some message, e.g., "57O 43O 21X" on the LCD. This sample message indicates that the speed variation is within the allowable range when the head/carriage unit travels at 57.7 and 43.3 inches/sec.; however, it is out of the range at 21.7 inches/sec.

- (2) Press the **Stop/Exit** key to return to the initial stage of the maintenance mode.

9.4.22 EEPROM Customizing (Function code 74)

The "EEPROM Customizing Codes List" is given on the following pages.

■ Function

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

NOTE: If you replace the main PCB, be sure to carry out this procedure.

■ Operating Procedure

- (1) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

The "SELECT 74?" appears on the LCD.

- (2) Press the **Black Start (Mono Start)** key, and the current customizing code appears.

- (3) Enter the desired customizing code. (See the list on the following page.)

If the customizing code contains letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

The newly entered code appears.

NOTE: *If a wrong 4-digit code is entered, the machine will malfunction.*

- (4) Press the **Black Start (Mono Start)** key.

The machine saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

■ **EEPROM Customizing Codes List**

US Mexico	Canada	Chile, Argentina	UK, Ireland	Germany	France, French Polynesia, Ivory Coast, Morocco, New Caledonia, Reunion, Senegal, Tunisia
0001	0002	0040	0004	0003	0005

Italy, San Marino	Spain	Portugal	Netherlands	Belgium, Luxemburg	Sweden
0016	0015	0018	0009	0008	0057 (0007/0026/0012/0013)

Finland	Denmark	Iceland	Austria
0057 (0007/0026/0012/0013)	0057 (0007/0026/0012/0013)	0057 (0007/0026/0012/0013)	0003

Ireland	Czech, Hungary, Poland, Rumania, Bulgaria, Cyprus, Malta, Nigeria, Estonia, Latvia	Israel	Singapore, Malaysia, Philippines, Indonesia, Vietnam, U.A.E., India, Thailand, Brunei, Laos, Cambodia, Myanmar, Jordan, Egypt, Lebanon, Mauritius, Yemen, Qatar, Pakistan, Kenya, Iran, Iraq, Libya, Syria
0004	0054	0054	0040

Saudi Arabia	Turkey	Hong Kong	Australia, New Zealand, Fiji, Papua New Guinea, Samoa, Tonga
0054	0054	0040	0056 (0006)(0027)

The above information is as of July 2008. The up-to-date information is available from your local Brother Customer Service.

9.4.23 Travel of Head/Carriage Unit (for removing paper particles and dust accumulated on the maintenance unit) (Function code 75) (User-accessible)

■ Function

This function is used to remove paper particles and dust accumulated between the maintenance unit and head/carriage unit. Using this function moves the head/carriage unit to the center of its travel, allowing you to easily remove the paper particles and dust accumulated.

■ Operating Procedure

- (1) Press the **7** and **5** keys in this order in the initial stage of the maintenance mode.

The "PLS OPEN COVER" appears on the LCD.

- (2) Open the scanner cover.

The head/carriage unit moves to the center of its travel.

- (3) Remove the paper particles and dust accumulated.

- (4) Close the scanner cover.

The head/carriage unit moves back to the home position and the machine returns to the initial stage of the maintenance mode.

TIP: Holding down the **Stop/Exit** key with the scanner cover opened for more than five seconds can also move the head/carriage unit in the same manner as above.

9.4.24 Purge Operation (Function code 76) (User-accessible)

■ Function

The machine can carry out several types of purge operations--head replacement purge, normal purge, periodical reset purge, power purge, initial purge, user reset purge, and engine setup purge. This function allows you to select the desired purge type and carry it out.

TIP: The purge types and their details are described on the next page.

■ Operating Procedure

- (1) Press the **7** and **6** keys in this order in the initial stage of the maintenance mode.

The machine displays the "CLEANING ALL" on the LCD and enters the purge mode.

- (2) Press the ◀ or ▶ key to display the target color for purge.

Each time the ◀ or ▶ key is pressed, the "CLEANING ALL," "CLEANING BLACK," "CLEANING MAGENTA," "CLEANING CYAN," or "CLEANING YELLOW" appears cyclically.

"CLEANING ALL": Purge for all four color inks

"CLEANING BLACK": Purge for black ink

"CLEANING MAGENTA" / "CLEANING CYAN" / "CLEANING YELLOW": Any color choice performs purge for all three color inks.

- (3) Enter the purge code according to the table on the next page.
- (4) Press the **Black Start (Mono Start)** key.

Upon completion of purging, the machine automatically returns to the initial stage of the maintenance mode.

Purge types, ink usage, purge counts, and purge codes

Purge Types	Description	Ink Usage	Purge Counts	Purge Codes (In the maintenance mode, Function code 76)
Head replacement purge (See Note below.)	This is a specially prepared purge for eradicating mixed color inks.	Black: 2.697 ml Per color: 2.620 ml	Black: 122 3 colors: 366	0
Normal purge	This purge operation removes dried ink sticking to the head nozzles.	Black: 0.150 ml Per color: 0.130 ml	Black: 7 3 colors: 19	1
Periodical reset purge	This purge operation removes air bubbles that have accumulated in the ink supply tubes.	Black: 0.471 ml Per color: 0.320 ml	Black: 22 3 colors: 45	2
Power purge	More powerful than a periodical reset purge, this purge operation is for removing stubborn clogging from the head nozzles and ink supply tubes.	Black: 0.531 ml Per color: 0.380 ml	Black: 25 3 colors: 54	3
Initial purge (See Note below.)	When the user loads ink cartridges for the first time, this purge operation automatically runs to refill the ink supply tubes and print head with fresh ink.	Black: 2.907 ml Per color: 2.290 ml	Black: 133 3 colors: 316	4
User reset purge	This purge operation should be performed if the print quality problem persists after a user has performed the purge operation repeatedly by pressing the Ink (Ink Management) key.	Black: 0.471 ml Per color: 0.320 ml	Black: 22 3 colors: 45	5
Engine setup purge	This purge operation refills the ink supply tubes with ink when there is no ink in those tubes.	Black: 2.907 ml Per color: 2.290 ml	Black: 133 3 colors: 316	6

The above information is as of May 14, 2008.

(Note) If the head/carriage unit is replaced with a spare part having a round, blue seal on its left side (shown in [Appendix 1, "\(2\) Head property labels"](#)), perform the head replacement purge. If it is replaced with the one having no seal, perform the initial purge.

This machine counts all purge operations and flushing operations performed since produced in order to prevent the ink absorber box and flushing box from overflowing with drained and flushed ink, respectively. An initial purge, for example, advances the counter by 133 + 316 = 449.

When the purge or flushing counter approaches 7360 or 568181818, respectively, the "MACHINE ERROR 46" appears, and further purge or flushing operations are prohibited. Replace the ink absorber box and flushing box, and then reset their counters. (Refer to the next page for the reset procedure.)

■ Resetting purge or flushing counter

- 1) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode.

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- 2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode to call up the machine's log information. (Function code 80. Refer to [Section 9.4.26.](#))
- 3) Press the **Black Start (Mono Start)** key several times until the purge or flushing count appears on the LCD.
- 4) Press the **2**, **7**, **8**, and **3** keys in this order to reset the purge or flushing count.
- 5) Press the **Stop/Exit** key to return the machine to the initial stage of the maintenance mode.
- 6) Press the **9** key twice to return to the standby state.

9.4.25 Display of the Equipment's Log (Function code 80) (User-accessible)

■ Function

The machine can display its log information on the LCD.

This procedure allows you to reset the purge count. It is necessary to reset the purge count when the ink absorber box is replaced with a new one without replacing the main PCB.

■ Operating Procedure

- (1) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.

The calendar clock appears on the LCD.

- (2) Press the **Black Start (Mono Start)** key. Pressing the key more than ten times calls up the following log information items on the LCD, one by one. (The following list does not include all items.)

- Head property code
- PictBridge information
- Ink drop count, indicating how many droplets have been jetted out from each of the ink cartridges*¹
- Ink drop count after ink near-empty, indicating how many droplets have been jetted out from each of the ink cartridges*¹ after the ink empty sensor detects near-empty.
- Total ink drop count, indicating how many droplets the machine has jetted out from each of the ink cartridges*¹ since produced
- Ink cartridge change count, indicating how many times ink cartridge replacement has been made for each color*¹
- Jam count, indicating how many times a paper jam has occurred
- Total page count, indicating how many pages have been printed since the machine was produced
- PC print page count, indicating how many pages the machine has been printed as an output device of the connected PC
- Color copy page count, indicating how many copies in color have been made
- Black copy page count, indicating how many copies in monochrome have been made
- Memory card print page count, indicating how many pages have been printed from the memory card data
- FAX page count, indicating how many received FAX pages have been printed
- Purge count, indicating how many times the purge operation has been carried out (With the purge count being displayed, pressing the **2**, **7**, **8** and **3** keys in this order resets the purge count.)
- Purge history for purge types of black ink*²
- Purge history for purge types of color inks*²
- Wiper count, indicating how many times the wiper operation has been carried out

- Flushing count, indicating how many times the flushing operation has been carried out (With the flushing count displayed, pressing the **2**, **7**, **8** and **3** keys in this order resets the flushing count.)
- Printing history for paper sizes and types*³
- Total power-ON time
- Error code of the most recent machine error*⁴
- ADF paper jam count, indicating how many times a paper jam has occurred
- ADF page count, indicating how many pages the ADF has fed
- Flat-bed page count, indicating how many documents have been scanned
- Error code of the most recent communications error*⁵

After all of the log information items above are displayed, pressing the **Black Start (Mono Start)** key returns the screen to the calendar clock in step (1) above.

- (3) To stop this operation and return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

*¹ To check each of the four ink cartridges, press the **OK** key. Pressing the key cycles through black, yellow, cyan, and magenta.

*² To check each of the purge types, press the **OK** key.

*³ To check each of the paper sizes or types, press the **OK** key.

*⁴ When a machine error code is displayed, pressing the **OK** key cycles through recent nine errors that have occurred.

*⁵ When a communications error code is displayed, pressing the **OK** key cycles through the latest error, 2nd latest error, and 3rd latest error.

9.4.26 Equipment Error Code Indication (Function code 82) (User-accessible)

■ Function

This function displays an error code of the last error on the LCD.

■ Operating Procedure

- (1) Press the **8** and **2** keys in this order in the initial stage of the maintenance mode.
The LCD shows the "MACHINE ERROR X X."
- (2) To stop this operation and return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

9.4.27 Output of Transmission Log to the Telephone Line (Function code 87) (User-accessible)

■ Function

This function outputs the transmission log (that the machine has stored about the latest transmission) to the telephone line. It allows the service personnel to receive the transmission log of the user's machine at a remote location and use it for analyzing problems arising in the user's machine.

■ Operating Procedure

- (1) If the user's machine has a transmission-related problem, call the user's machine at a remote location from your machine.
- (2) If the line is connected, have the user perform the following:
 - 1) Press the **Menu**, **Black Start (Mono Start)**, and **0** keys in this order.
 - 2) Press the **8** and **7** keys in this order.
The above operation makes the user's machine send CNG to your machine for sending the transmission log.
- (3) If you hear the CNG sent from the user's machine, press the **Black Start (Mono Start)** key of your machine.

Your machine will start to receive the transmission log from the user's machine.

9.4.28 Assurance Mode Switch Setting (Function code 88) (User-accessible)

■ Function

The machine incorporates five assurance mode switches (AMS01 through AMS05) that are firmware switches just as the ones described in [Section 9.4.5](#).

When the machine does not function normally because the usage environments or operating conditions are not usual, the assurance mode switches provide workarounds to make the machine usable by changing the machine settings to untypical ones.

The user is allowed to access the assurance mode switches under the guidance of service personnel (e.g., by telephone).

The details about AMS01 through AMS05 are described on the following pages.

■ Operating Procedure

- (1) Press the **8** key twice in the initial stage of the maintenance mode.

The machine displays "AMS00" on the LCD and becomes ready to accept an assurance mode switch number.

- (2) Enter the desired number from the assurance mode switch numbers (01 through 05).

The following appears on the LCD:

Selector 1	Selector 8
↓	↓
AMSXX = <u>0</u> 0 0 0 0 0 0	

- (3) Use the right and left arrow keys to move the cursor to the selector position to be modified.
- (4) Enter the desired number (0 or 1) using the **0** and **1** keys.
- (5) Press the **OK** key. This operation saves the newly entered selector values onto the EEPROM and readies the machine for accepting an assurance mode switch number.
- (6) Repeat steps (2) through (5) until the modification for the desired assurance mode switches is completed.
- (7) Press the **Stop/Exit** key to return the machine to the initial stage of the maintenance mode.

- NOTES:**
- To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** key.
 - If there is a pause of more than one minute after a single-digit number is entered for double-digit assurance mode switch numbers, the machine will automatically return to the initial stage of the maintenance mode.
 - Initializing the EEPROM with Function code 01 or 91 initializes the AMS switch settings.

AMS01 (Printing assurance 1)

Selector No.	Function	Setting and Specifications
1	Prevention of stains on back side of leading edge of paper in borderless printing	0: Disable (default) 1: Enable
2	Not used.	
3 4	Protection of platen from no-paper printing to prevent stains (Functional restriction on the paper width sensor)	No. 3 4 0 0 : Enable (Determine the sensor function depending upon the print resolution selected) (default) 0 1 : Enable (Detect the leading edge plus right and left edges of paper) 1 0 : Enable (Detect the leading edge of paper) 1 1 : Disable (No paper detection)
5	Assurance print 1 (Printing with black and cyan inks in monochrome copy)	0: Disable (default) 1: Enable
6	Assurance print 2 (Printing with black and cyan inks in monochrome FAX reception and in list output)	0: Disable (default) 1: Enable
7 8	Workaround for false jam detection (Functional restriction on the paper width sensor)	No. 7 8 0 0 : Detect both the leading edge and width of paper (default) 0 1 : Detect both the leading edge and width of paper 1 0 : Detect only the leading edge of paper 1 1 : No detection

- **Selector 1: Prevention of stains on back side of leading edge of paper in borderless printing**

Setting this selector to "1" reduces the protruding amount of the leading edge of recording paper to the platen groove to minimize stains that could be caused by ink mist on the back side of the leading edge. Enabling this function reduces the throughput than disabling it.

- **Selectors 3 and 4: Protection of platen from no-paper printing to prevent stains (Functional restriction on the paper width sensor)**

The setting made by these selectors applies to such printing that is assumed to be at a high resolution, that is, printing from a PC or memory card, copying, and printing via PictBridge.

If these selectors are set to "0, 0," the machine automatically determines the functions of the paper width sensor depending upon the print resolution selected. Therefore, in low resolution printing, e.g. when the "Fast" print quality is selected, the paper width sensor is automatically disabled. On the contrary, in high resolution printing, e.g. when the "Highest" print quality is selected, the sensor is automatically enabled.

Setting these selectors to "1, 1" disables the paper width sensor to save the sensing time for higher throughput.

- **Selectors 5 and 6: Assurance print 1 and 2**

Enabling assurance print 1 or 2 causes the machine to mix black ink (pigment-based) and a little of cyan ink (dye-based) to use in monochrome copy or in monochrome FAX reception and list output, respectively.

If black ink is not jetted out normally, cyan ink can be substituted for black ink in printing. This ensures that in list printing (in which data once printed will be deleted) the data will be preserved as a printout.

- **Selectors 7 and 8: Workaround for false jam detection (Functional restriction on the paper width sensor)**

The setting made by these selectors applies to the list and index printing and test printing.

When logo printed recording paper is used, for example, the paper width sensor might misdetect the paper present state as "no paper loaded" due to the logo's color. Limiting the paper width sensor functions with these selectors avoids detecting such a false paper jam.

AMS02 (Printing assurance 2)

Selector No.	Function	Setting and Specifications
1	Head-platen gap offset for prevention of stains on recording paper	For glossy paper 0: Disable (default) 1: Enable
2		For recording paper except glossy paper 0: Disable (default) 1: Enable
3 5	Paper feed amount compensation (for preventing banding at the leading edge of recording paper fed from the photo tray)	No. 3 4 5 0 0 0: Enable for 4 x 6 postcards (default) 1 0 0: Enable for Photo L-size paper in Japan Others: Disable
6	Registration time offset to slipping in plain paper feeding	0: Disable (default) 1: Enable
7	Unidirectional print for higher print quality	0: Disable (default) 1: Enable
8	Improvement of paper feeding reliability	0: Disable (default) 1: Enable

- **Selectors 1 and 2: Head-platen gap offset for prevention of stains on recording paper**

If using curled or thick recording paper results in a stained print face of the paper, increase the gap between the head nozzles and the platen with these selectors to reduce stains.

Enabling the head-platen gap offset increases the gap from 1.6 to 2.3 mm. (The details are given in the table on the next page.)

Selectors 3 and 4 on AMS05 specifies whether to enable or disable the settings made here when borderless printing is enabled or disabled. By default, the head-platen gap offset function is enabled only when borderless printing is disabled. For the head-platen gap offset for A3, B4, and ledger-sized plain paper, see selector 6 on AMS05.

Recording paper	Print quality selected	Head-platen gap offset		
		OFF	ON for glossy paper (Selector 1 = "1")	ON for recording paper except glossy paper (ink jet paper, plain paper, or transparency) (Selector 2 = "1")
Brother premium glossy photo paper	"Highest"	1.6 mm	2.3 mm	---
	"Photo"			
	"Fine"			
Other glossy paper	"Highest"			
	"Photo"			
	"Fine"			
Inkjet paper	"Photo"	1.6 mm	---	2.3 mm
	"Fine"			
Plain paper (except the above)	"Fine"			
	"Normal"			
	"Fast Normal"			
	"Fast"			

- **Selectors 3 to 5: Paper feed amount compensation (for preventing banding at the leading edge of recording paper fed from the photo tray)**

This compensation function is usually enabled for preventing banding (horizontal streaks) from occurring at the leading edge of recording paper fed from the photo tray.

When postcards or small size paper are fed from the standard paper tray, however, this compensation function can be counterproductive. If so, disable the function, and the print quality may be improved.

- **Selector 6: Registration time offset to slipping in plain paper feeding**

Enabling the registration time offset with this selector increases the registration time (during which the paper feed roller rotates in the reverse direction), avoiding the occurrence of a paper feeding timeout error even if the paper cannot reach the registration sensor actuator within the predetermined registration time due to slipping of the paper pull-in rollers against paper in the paper tray.

Selecting the "Fast" print quality disables the registration time offset even if it is enabled with this selector.

NOTE: Selecting the "Glossy paper" automatically enables the registration time offset.

- **Selector 7: Unidirectional print for higher print quality**

The machine prints bidirectionally by default. To get higher print quality, set this selector to "1" to switch to the unidirectional print mode in which printing is performed only when the head/carriage unit travels from left to right. Note that the unidirectional print mode sacrifices the print speed.

Print object	Unidirectional print
Print FAX message received	Yes
Copy	Yes
Print from PC	No
Print from memory cards or via PictBridge	Yes
Print memory card index or PictBridge index	Yes
Print a list	Yes
Print a test pattern	No

- **Selector 8: Improvement of paper feeding reliability**

Setting this selector to "1" improves the paper feeding reliability, sacrificing the print speed.

AMS03 (Maintenance assurance 1)

Selector No.	Function	Setting and Specifications
1	Protection of head caps from drying	0: Disable (default) 1: Enable
2 3	Auto capping start time	No. 2 3 0 0 : 30 seconds (default) 0 1 : 5 seconds 1 0 : 15 seconds 1 1 : 300 seconds
4	Purge more powerful than normal purge	0: Disable (default) 1: Enable
5 6	Not used.	
7	Automatic purging interval programmed for matching the ambient temperature (for color ink)	0: Enable (default) 1: Disable
8	Automatic purging interval programmed for matching the ambient temperature (for black ink)	0: Enable (default) 1: Disable

- **Selector 1: Protection of head caps from drying**

If the protection function is enabled with this selector, the head/carriage unit automatically returns to the home position (head capping position) for flushing each time the machine prints the specified number of pages in order to protect the inside of the head caps from drying up. This function is useful in a dry environment or for heavy duty print per printing cycle.

- **Selectors 2 and 3: Auto capping start time**

If data transfer from the PC stops midway through printing for some reason in the PC, the head/carriage unit automatically returns to the home position (head capping position) after the specified auto capping start time (default: 30 seconds) to prevent the head surface from drying up. At the restart of printing after the auto capping operation, print image unevenness could occur. To avoid it, increase the auto capping start time with these selectors.

- **Selector 4: Purge more powerful than normal purge**

Setting this selector to "1" automatically selects a purge more powerful than the normal purge from the first if the purge is initiated immediately after printing.

- **Selectors 7 and 8: Automatic purging interval programmed for matching the ambient temperature**

The "automatic purging interval programmed for matching the ambient temperature" is enabled by default. If the machine is set in an excessively hot or cold place, therefore, the automatic purging interval becomes short, resulting in increased ink waste.

Disabling this interval enables the one programmed for the ordinary temperature. In the first printing after a long no-print period, however, the print quality may lower.

AMS04 (Maintenance assurance 2)

Selector No.	Function	Setting and Specifications
1	Line monitor volume	0: Normal (default) 1: Extra-high
2	Not used.	
3	Black ink print mode	0: Printable with black ink only for a certain amount after detection of ink empty state 1: Printable with black ink only regardless of color ink remaining.
4	Automatic purging for color ink	0: Enable (default) 1: Disable
5	Not used.	
6 7	Automatic purging interval	No. 6 7 0 0 : 30 days (black and color) 0 1 : 20 days (black), 30 days (color) 1 0 : 30 days (black), no purge (color) 1 1 : No purge (black and color)
8	Automatic purging for black ink	0: Enable (default) 1: Disable

- **Selector 3: Black ink print mode**

If any color ink runs out, printing is no longer possible by default. Setting this selector to "1" allows the machine to function as a monochrome printer, making it possible to print with black ink only even in an ink empty state as listed below.

Printing FAX message received	Monochrome printing only possible. (A color FAX message will be printed in monochrome.)
Printing from a PC	Monochrome printing only possible.
Copying	Monochrome printing only possible. The Black Start (Mono Start) key is enabled, but the Color Start key is disabled.
Printing from memory cards	No printing possible.
Printing via PictBridge	No printing possible.
Printing lists	Monochrome printing only possible.
Purge operation	Purge operation possible for black ink only, not possible for all-color or any specific color.

TIP: Difference between selector 3 on AMS04 and selector 8 on WSW49 (See [page App. 4-52.](#))

Both selector 3 on AMS04 and selector 8 on WSW49 specify the similar black ink print mode that applies if any color ink runs out. The difference is that the former allows the machine to print all data received as a monochrome printer with black ink only; the latter to ignore the ink empty state, receive both color and black data, and print it, resulting in a printout missing color components.

- **Selectors 4 and 8: Automatic purging for color ink and for black ink**

The machine periodically performs an automatic purge by default. The automatic purge, however, wastes ink when no printing has occurred. To avoid it, disable the automatic purge with these selectors. In the first printing after a long no-print period, disabling it may lower the print quality.

Setting selector 4 or 8 to "1" disables the setting made by selectors 6 and 7.

- **Selectors 6 and 7: Automatic purging interval**

These selectors allow you to select the automatic purge interval to reduce ink consumption. Setting these selectors to "1, 1" (No purge) disables the setting made by selectors 4 and 8.

AMS05 (Printing assurance 3)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 4	Enabling/disabling the head-platen gap offset settings (made by selectors 1 and 2 on AMS02 and selector 6 on AMS05)	No. 3 4 0 0 : Enable (when borderless printing is disabled) (default) 0 1 : Enable (when borderless printing is enabled) 1 0 : Disable (regardless of borderless printing) 1 1 : Enable (regardless of borderless printing)
5	Reduction of occurrences of paper jams	0: Disable (default) 1: Enable
6	Head-platen gap offset for prevention of stains on recording paper (For A3, B4, and ledger-sized plain paper)	0: Disable 1: Enable (Only when borderless printing is disabled) (default)
7 8	Reduction of banding in borderless printing (Limit of the number of head nozzles to be used)	No. 7 8 0 0 : Disable for all paper sizes (without limit) 0 1 : Enable for all paper sizes (with limit) 1 0 : Enable for paper in a size larger than 4 x 6 (with limit), Disable for paper in 4 x 6 size or smaller (without limit) 1 1 : Enable for all paper sizes (with limit)

- **Selectors 3 and 4: Enabling/disabling the head-platen gap offset settings (made by selectors 1 and 2 on AMS02 and selector 6 on AMS05)**

These selectors specify whether to enable or disable the head-platen gap offset settings made by selectors 1 and 2 on AMS02 and selector 6 on AMS05, depending upon whether borderless printing is disabled or enabled.

The combination of selectors 1 and 2 on AMS02 and selectors 3, 4 and 6 on AMS05 provides 12 types of settings (see the following pages) for preventing stains from being produced due to paper friction against the print head in high-duty printing.

- **Selector 5: Reduction of occurrences of paper jams**

Enable this function when paper jams occur. This function reduces occurrences of paper jams by slowing down the paper feeding speed. It is effective only for plain paper.

- **Selector 6: Head-platen gap offset for prevention of stains on recording paper (For A3, B4, and ledger-sized plain paper)**

If using A3, B4, or ledger-sized plain paper results in a stained print face due to warped paper, increase the gap between the head nozzles and the platen with this selector to reduce stains.

If this function is enabled, the machine prints unidirectionally.

Selectors 3 and 4 on AMS05 specifies whether to enable or disable the settings made here when borderless printing is enabled or disabled. By default, the head-platen gap offset function is enabled only when borderless printing is disabled. For the head-platen gap offset for glossy paper or small-sized plain paper, see selectors 1 and 2 on AMS02.

Combination of AMS02 and AMS05

	Assurance mode switch	Enable head-platen gap offset					
		when borderless printing is disabled		when borderless printing is enabled		Regardless of borderless printing setting	
Enable only for glossy paper (in any size)	AMS02	10*****	(1)	10*****	(2)	10*****	(3)
	AMS05	**00****		**01****		**11****	
Enable for plain paper, inkjet paper, or transparency (in any size)	AMS02	01*****	(4)	01*****	(5)	01*****	(6)
	AMS05	**00****		**01****		**11****	
Enable for any type of paper (in any size)	AMS02	11*****	(7)	11*****	(8)	11*****	(9)
	AMS05	**00****		**01****		**11****	
Enable only for plain paper (in A3, B4, and ledger sizes)	AMS02	00*****	(10)	00*****	(11)	00*****	(12)
	AMS05	**00*1**		**01*1**		**11*1**	
Disable	AMS02	00*****					
	AMS05	**00*0**					

Users' problems/requests and 12 combination patterns of AMS02 and AMS05 settings

Users' problems and requests	Enable head-platen gap offset (for desired target paper and borderless printing)	Combination pattern of AMS02 and AMS05 settings
Stains on glossy paper. Minor stains acceptable, rather than taking longer print time with borderless printing enabled.	Enable only for glossy paper (in any size). Enable only when borderless printing is disabled.	(1)
Stains on glossy paper. Minor stains acceptable in printing with borderless printing disabled. But not acceptable with borderless printing enabled.	Enable only for glossy paper (in any size). Enable only when borderless printing is enabled.	(2)
Stains on glossy paper. Stains not acceptable, regardless of borderless printing setting.	Enable only for glossy paper (in any size). Enable regardless of borderless printing setting.	(3)
Stains on paper except glossy paper. Minor stains acceptable, rather than taking longer print time with borderless printing enabled.	Enable for plain paper, inkjet paper, or transparency (in any size). Enable only when borderless printing is disabled	(4)
Stains on paper except glossy paper. Minor stains acceptable in printing with borderless printing disabled. But not acceptable with borderless printing enabled.	Enable for plain paper, inkjet paper, or transparency (in any size). Enable only when borderless printing is enabled.	(5)
Stains on paper except glossy paper. Stains not acceptable, regardless of borderless printing setting.	Enable for plain paper, inkjet paper, or transparency (in any size). Enable regardless of borderless printing setting.	(6)
Stains on any type of paper. Minor stains acceptable, rather than taking longer print time with borderless printing enabled.	Enable for any type of paper (in any size). Enable only when borderless printing is disabled.	(7)

Users' problems and requests	Enable head-platen gap offset (for desired target paper and borderless printing)	Combination pattern of AMS02 and AMS05 settings
Stains on any type of paper. Minor stains acceptable in printing with borderless printing disabled. But not acceptable with borderless printing enabled.	Enable for any type of paper (in any size). Enable only when borderless printing is enabled.	(8)
Stains on any type of paper. Stains not acceptable, regardless of borderless printing setting.	Enable for any type of paper (in any size). Enable regardless of borderless printing setting.	(9)
Stains on A3, B4, or ledger sized plain paper. Minor stains acceptable, rather than taking longer print time with borderless printing enabled.	Enable for A3, B4, and ledger plain paper. Enable only when borderless printing is disabled.	(10)
Stains on A3, B4, or ledger sized plain paper. Minor stains acceptable in printing with borderless printing disabled. But not acceptable with borderless printing enabled.	Enable for A3, B4, and ledger plain paper. Enable only when borderless printing is enabled.	(11)
Stains on A3, B4, or ledger sized plain paper. Stains not acceptable, regardless of borderless printing setting.	Enable for A3, B4, and ledger plain paper. Enable regardless of whether borderless printing setting.	(12)

- **Selectors 7 and 8: Reduction of banding in borderless printing (Limit of the number of head nozzles to be used)**

Enabling this function limits the number of head nozzles to be used in borderless printing to reduce banding.

The default is "0, 0" for models with movable platen and "1, 1" for other models.

9.4.29 Cancellation of the Pin TX Lock Mode (Not applicable to Japanese and U.S.A. models)

■ Function

This procedure can cancel the Pin TX lock mode. Use this procedure if the user forgets his/her password entered when setting the Pin TX lock mode so as not to exit from the mode.

NOTE: Carrying out this procedure will lose passwords previously entered but retain FAX messages received in the Pin TX lock mode.

NOTE: The DCP does not support this function.

■ Operating Procedure

- (1) When the PIN TX LOCK is displayed on the LCD, press the **Menu** and **#** keys *at the same time*. Within two seconds, start to press the **2**, **7**, **9**, **0**, and **0** keys.

The Pin TX lock mode will be canceled and the machine returns to the calendar clock screen.

Appendix 1. Reading Labels

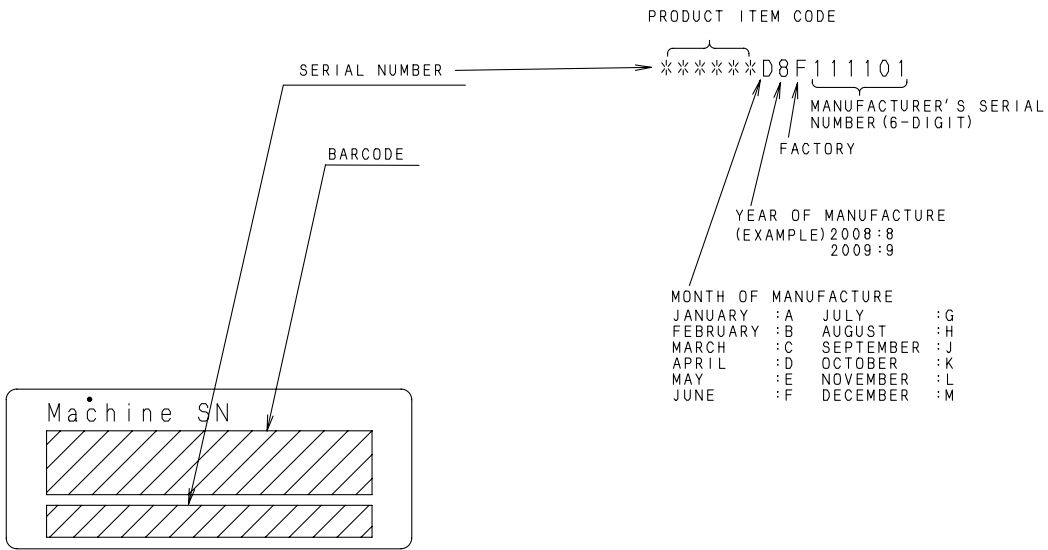
This appendix shows the location of labels put on some parts and describes the coding information for serial number, property data, and manufacturing information.

Reading Labels

An individual machine has a "serial number label" for the machine itself and "property labels" for the head/carriage unit. An individual ink cartridge also has a "manufacturing information label."

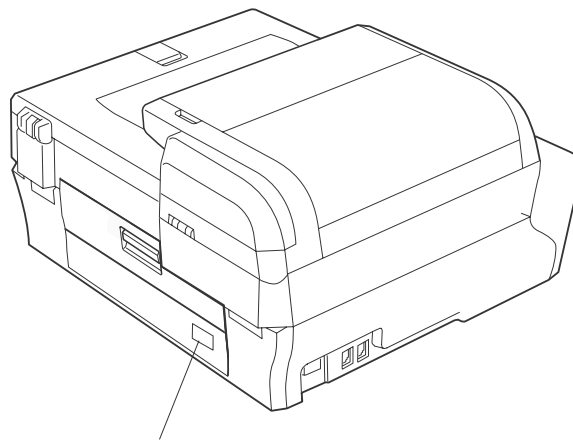
This section lists the coding information for those serial number, property data, and manufacturing information.

(1) Serial number label for the machine itself



(app01a)

Location



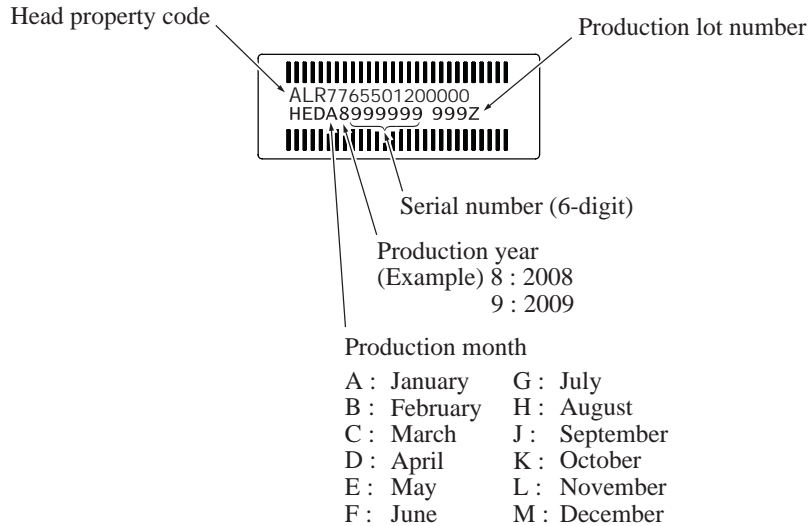
Serial number label

(app01b)

(2) Head property labels

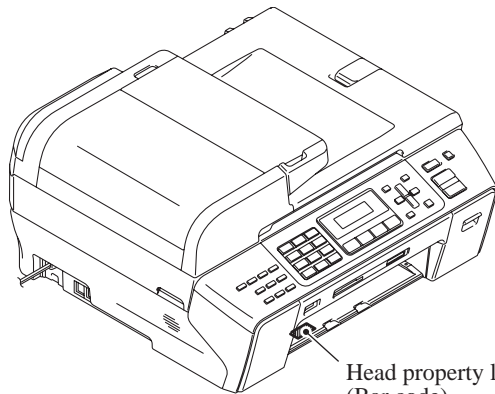
The property code of the head/carriage unit is printed on head property labels--bar code label and QR code label, each of which is attached to the lower cover and the head/carriage unit, respectively.

■ On the lower cover



(bar_code_label)

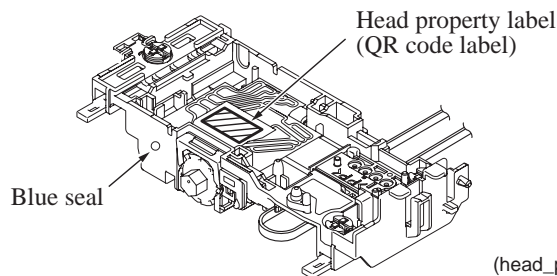
Location



(head_property_BHL9_A4)

■ On the head/carriage unit

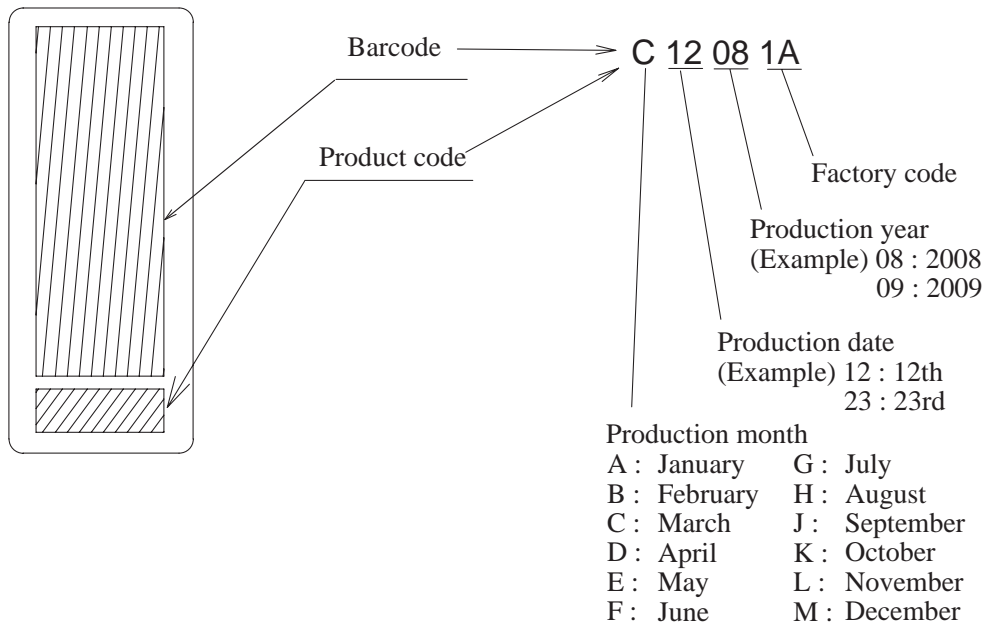
Location



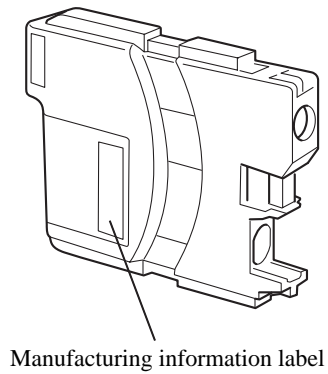
(head_property_label_BHM9)

Note: Depending on whether the head/carriage unit has a round, blue seal on its left side, the purge type to be performed differs. Refer to [Chapter 7, Section 7.2 \[2 \]](#).

(3) Manufacturing information label for an ink cartridge



Location



Appendix 2. Firmware Installation

This appendix provides instructions on how to change firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.

A2.1 Loading the Programs to the Flash ROM	App. 2-1
--	----------

A2.1 Loading the Programs to the Flash ROM

If you want to change the programs stored in the flash ROM on the main PCB or after you replace the main PCB, load the desired programs to the flash ROM.

Loading requires a PC/AT-compatible computer running Windows 98SE/Me, Windows 2000 Professional, Windows XP Home/Professional, or Windows Vista.

Caution: During loading, never turn off your PC or the machine, unplug the USB interface cable, interrupt loading or load invalid data. If you do so, loading will fail, causing the PCB to be unusable. You will have to replace the main PCB and load programs to a new PCB.

Preparation

You need the Brother Maintenance USB Printer driver and filedg32.exe (provided by Brother Industries). Save them in an arbitrary folder in your PC.

Installing the Brother Maintenance USB Printer driver

To identify machines connected via USB direct interface, the PC requires the corresponding driver for the virtual USB device. If you connect any number of machines to your PC, the same number of virtual USB devices will be automatically configured on your PC. To prevent many virtual USB devices from being configured, use the unique driver installation procedure described below that enables your PC to identify terminals via one single virtual USB device.

NOTES:

- Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify machines. If the Brother Maintenance USB Printer driver has been already installed to your PC according to this procedure, skip this section.

- Before proceeding to the procedure given below, make sure that the Brother Maintenance USB Printer driver (listed in [Chapter 7, Section 7.1.1](#)) is stored in your PC.

- (1) Check that the power switch of the machine is turned off. Disconnect the USB cable that connects the machine with your PC.
- (2) Turn on your PC.
- (3) Turn on the power switch of the machine.
- (4) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (5) Connect the machine to your PC using a USB cable.

The following window appears.



- (6) The following screen appears, indicating the detection of new hardware device by the system. Select "No, not this time." And click **Next**.



- (7) Select "Install the software automatically (Recommended)" and click **Next**.



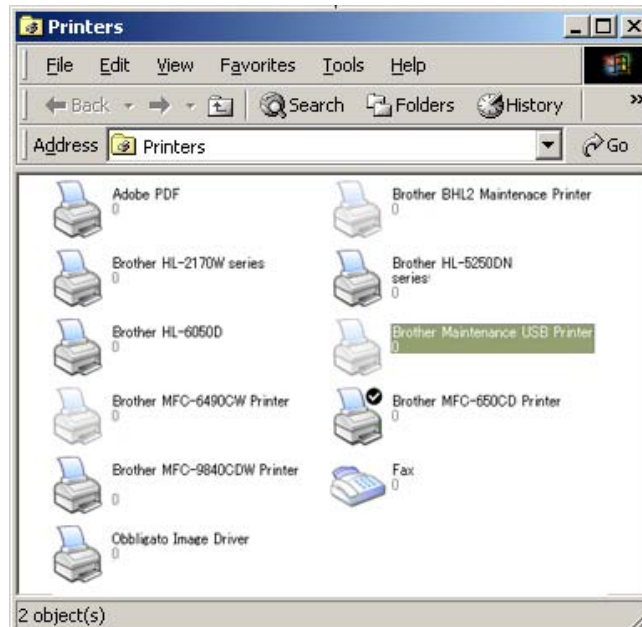
(8) Alert warning message of WHQL appears. Click **Continue Anyway** to proceed.



- (9) Repeat steps (6) to (8) three times. Installation is completed.
- (10) If the Brother Maintenance USB Printer driver is successfully installed, the following message screen appears. Click **Finish** to return.



NOTE: In order to check whether the printer driver is successfully installed, click **Start | Settings | Printers** to select the Printers window. Then, check that the Brother Maintenance USB Printer icon is shown.



Loading the programs onto the flash ROM of the machine

■ After replacing the main PCB with a new one

Unplug the power cord of the machine from the electrical outlet and disconnect the USB cable that connects the machine with your PC.

(1) On the machine, follow the steps below to enter the firmware loading mode.

- 1) Plug the power cord into an electrical outlet with the **0** key held down and keep holding it down until the following appears on the LCD. While the **0** key is held down, the machine beeps.



- 2) Hold down the **1** key until the following appears on the LCD. While the **1** key is held down, the machine beeps.



- 3) Hold down the **2** key until the following appears on the LCD. While the **2** key is held down, the machine beeps.



- 4) Hold down the **3** key until the following appears on the LCD. While the **3** key is held down, the machine beeps.



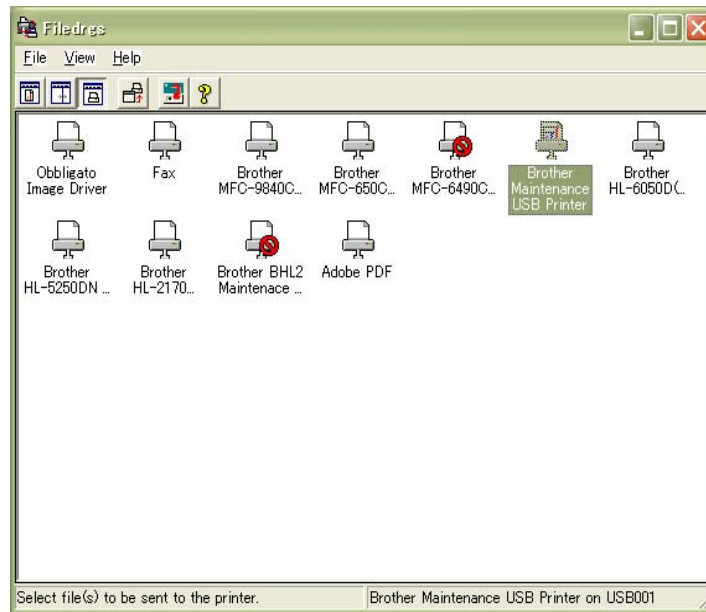
When the black and white pattern shown above is displayed, the machine is ready to receive programs or data for firmware installation from the connected PC.

Note: Pressing a wrong key or no key within the specified time in steps 1) through 4) above causes an error. If it happens, unplug the power cord and go back to step 1) above.

(2) Connect the machine to your PC using a USB cable.

- (3) On your PC, run "filedrg32.exe."

The Filedrgs window will appear as shown below.



- (4) Drag and drop the firmware (e.g., lz0023_a.pmu) onto the Brother Maintenance USB Printer driver icon in the Filedrgs window.

Note: To use a firmware file, extract it beforehand by double-clicking. It is a self-extracting file having the extension .exe.

After approx. 2 to 5 minutes, the loading operation is complete and the machine automatically reboots and returns to the standby state.

- (5) Display the version of the firmware installed on the LCD by simultaneously pressing the * and # keys to check it.

Sample version number shown on the LCD: A0307252244:CF30

If the displayed version number is identical with the firmware version you installed, the loading operation has been successfully finished.

Note: If loading operation ends abnormally, turn the machine off and on. Wait for the machine to emit a long beep and automatically enter the firmware loading mode, and then perform the loading procedure above again.

- **After replacing the main PCB with the one used for any other machine or when changing programs**

Unplug the power cord from the electrical outlet and make sure that the machine is connected with your PC using a USB cable.

While holding down the **5** key, plug the power cord into an electrical outlet.

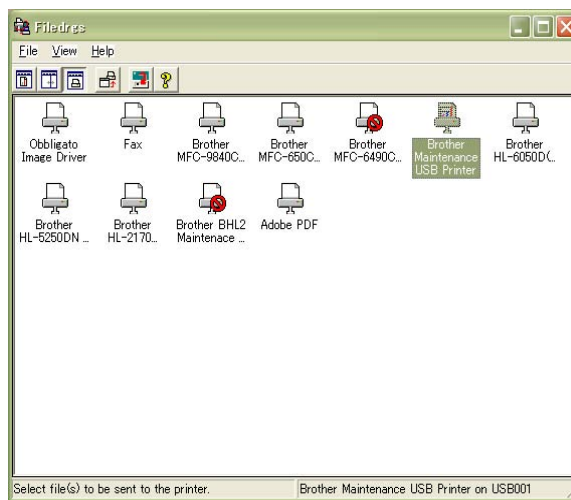
Then press the **Mono Start** key (**Black Start** key).

The black and white pattern appears on the LCD as shown on the previous page. The machine is ready to receive programs or data for firmware installation from the connected PC.

< To load programs from the PC >

- (1) On your PC, run "fileldg32.exe."

The Filedrgs window will appear as shown below.



- (2) Drag and drop the firmware (e.g., lz0023_a.pmu) onto the Brother Maintenance USB Printer driver icon in the Filedrgs window shown above.

Note: To use a firmware file, extract it beforehand by double-clicking. It is a self-extracting file having the extension .exe.

After approx. 2 to 5 minutes, the loading operation is complete and the machine automatically reboots and returns to the standby state.

- (3) On the machine, display the version of the firmware installed on the LCD by simultaneously pressing the * and # keys to check it.

Sample version number shown on the LCD: A0307252244:CF30

- (4) If the displayed version number is identical with the firmware version you installed, the loading operation has been successfully finished.

Note: If loading operation ends abnormally, turn the machine off and on. Wait for the machine to emit a long beep and automatically enter the firmware loading mode, and then perform the loading procedure above again.

< To load programs using an external memory >

- (1) Insert an external memory to your PC.
- (2) Create a folder named "BROTHER" in the top layer of the external memory's directory and copy the firmware file having the extension .pjl into that folder.

NOTE: Before copying, check that the file name of the firmware matches with your machine. Be sure to save only one firmware file having the extension .pjl in the "BROTHER" folder. Otherwise, the firmware cannot be updated correctly.

TIP: If a firmware file not matching the machine is used, the firmware cannot be updated, but note that you can superficially continue the operation until step (5) below without any error.

- (3) Remove the external memory from the PC and insert it into the machine in the initial stage of the maintenance mode.

NOTE: Do not insert more than one external memory at a time.

- (4) On the machine, press the **2** and **8** keys in this order. For the models without numerical keypad on the control panel, enter 2 and 8 in this order using the **▲**, **▼** and **OK** keys.

The file name *****.pjl appears on the LCD. Check that ***** is identical with the file name that has been copied into the external memory.

- (5) Press the **Black Start (Mono Start)** key.

The "Receiving Data" appears on the LCD, and after a while, "Program Updating" appears.

NOTE: Pressing the **Color Start** key does not start updating.

NOTE: Never remove the external memory from the machine when the updating is in progress.

- (6) Updating will complete in a few minutes, and the machine automatically restarts and returns to the standby state.

Remove the external memory from the machine and store it in a safe place.

NOTE 1: If any of the error messages listed below appears, press the **Stop/Exit** key, and the machine returns to the initial stage of the maintenance mode.

Error Message	Cause
Card is used	The external memory is being used by another operation.
Insert Card	No external memory is inserted.
No file	- No "BROTHER" folder in the external memory - Invalid file name
Too many files	There is more than one file having the extension .pjl in the folder.
Card Error	External memory defective

NOTE 2: After the completion of firmware updating, a file named "mfu-send.log" (which stores the execution log) is created in the layer right below the "BROTHER" folder.

NOTE 3: If program loading with an external memory fails, load programs from the PC following the instructions given on the previous page.

Appendix 3. EEPROM Customizing Codes

This appendix provides instructions on how to set up the EEPROM customizing codes for the various preferences exclusively designed for each destination. The specified customizing code is stored in the EEPROM mounted on the main PCB. If the main PCB is replaced, therefore, you need to set up the proper customizing code with the machine in the maintenance mode.

Note: Customizing codes customize firmware for individual models, enabling the common firmware to be used for various models. A list of EEPROM customizing codes comes with the firmware data provided by Brother Industries.

EEPROM Customizing Codes

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

Refer to the "EEPROM Customizing Codes List" on the next page.

■ Operating Procedure

- (1) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

The "SELECT 74?" appears on the LCD.

- (3) Press the **Black Start (Mono Start)** key, and the current customizing code appears.

- (4) Enter the desired customizing code.

If the customizing code contains letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

The newly entered code appears.

NOTE: *If a wrong 4-digit code is entered, the machine will malfunction.*

- (5) Press the **Black Start (Mono Start)** key.

The machine saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

■ EEPROM Customizing Codes List

US Mexico	Canada	Chile, Argentina	UK, Ireland	Germany	France, French Polynesia, Ivory Coast, Morocco, New Caledonia, Reunion, Senegal, Tunisia
0001	0002	0040	0004	0003	0005

Italy, San Marino	Spain	Portugal	Netherlands	Belgium, Luxemburg	Sweden
0016	0015	0018	0009	0008	0057 (0007/0026/0012/0013)

Finland	Denmark	Iceland	Austria
0057 (0007/0026/0012/0013)	0057 (0007/0026/0012/0013)	0057 (0007/0026/0012/0013)	0003

Ireland	Czech, Hungary, Poland, Rumania, Bulgaria, Cyprus, Malta, Nigeria, Estonia, Latvia	Israel	Singapore, Malaysia, Philippines, Indonesia, Vietnam, U.A.E., India, Thailand, Brunei, Laos, Cambodia, Myanmar, Jordan, Egypt, Lebanon, Mauritius, Yemen, Qatar, Pakistan, Kenya, Iran, Iraq, Libya, Syria
0004	0054	0054	0040

Saudi Arabia	Turkey	Hong Kong	Australia, New Zealand, Fiji, Papua New Guinea, Samoa, Tonga
0054	0054	0040	0056 (0006)(0027)

The above information is as of July 2008. The up-to-date information is available from your local Brother Customer Service.

Appendix 4. Firmware Switches (WSW)

This appendix describes the functions of the firmware switches, which can be divided into two groups: one is for customizing preferences designed for the shipping destination (as described in [Appendix 3](#)) and the other is for modifying preferences that match the machine to the environmental conditions. Use the latter group if the machine malfunctions due to mismatching.

Note: Each of the firmware switches has eight selectors. You should not allow end users to access all of those selectors, but you can allow them to access user-accessible selectors which are *shaded* in the firmware switch tables in this appendix.

Note: The firmware switch setting procedure is given in [Chapter 9, Section 9.4.5](#) (Function code 10).

WSW No.	Function	Refer to:
WSW01	Dial pulse setting	App. 4-3
WSW02	Tone signal setting	App. 4-5
WSW03	PBX mode setting	App. 4-6
WSW04	TRANSFER facility setting	App. 4-7
WSW05	1st dial tone and busy tone detection	App. 4-8
WSW06	Pause key setting and 2nd dial tone detection	App. 4-10
WSW07	Dial tone setting 1	App. 4-12
WSW08	Dial tone setting 2	App. 4-13
WSW09	Protocol definition 1	App. 4-14
WSW10	Protocol definition 2	App. 4-15
WSW11	Busy tone setting	App. 4-16
WSW12	Signal detection condition setting	App. 4-17
WSW13	Modem setting	App. 4-18
WSW14	AUTO ANS facility setting	App. 4-19
WSW15	REDIAL facility setting	App. 4-20
WSW16	Function setting 1	App. 4-21
WSW17	Function setting 2	App. 4-22
WSW18	Function setting 3	App. 4-23
WSW19	Transmission speed setting	App. 4-24
WSW20	Overseas communications mode setting	App. 4-25
WSW21	TAD setting 1	App. 4-26
WSW22	ECM and call waiting caller ID	App. 4-27
WSW23	Communications setting	App. 4-28
WSW24	TAD setting 2	App. 4-29
WSW25	TAD setting 3	App. 4-30
WSW26	Function setting 4	App. 4-31
WSW27	Function setting 5	App. 4-32
WSW28	Function setting 6	App. 4-33
WSW29	Function setting 7	(Not used.) App. 4-34
WSW30	Function setting 8	(Not used.) App. 4-35
WSW31	Function setting 9	App. 4-36
WSW32	Function setting 10	App. 4-37
WSW33	Function setting 11	App. 4-38
WSW34	Function setting 12	App. 4-39
WSW35	Function setting 13	(Not used.) App. 4-40
WSW36	Function setting 14	App. 4-41
WSW37	Function setting 15	App. 4-42
WSW38	V.34 transmission setting	App. 4-43
WSW39	V.34 transmission speed	App. 4-44
WSW40	V.34 modem settings	App. 4-45
WSW41	ON-duration of the scanning light source	App. 4-46
WSW42	Internet mail settings	(Not used.) App. 4-47
WSW43	Function setting 21	App. 4-47
WSW44	Speeding up scanning-1	App. 4-48
WSW45	Speeding up scanning-2	(Not used.) App. 4-49
WSW46	Monitor of power ON/OFF state and parallel port kept at high	App. 4-50

WSW47	Switching between high- and full-speed USB	App. 4-51
WSW48	USB setup latency	App. 4-52
WSW49	End-of-copying beep and black ink print mode	App. 4-52
WSW50	SDAA settings	App. 4-53
WSW51	Function setting 16	App. 4-54
WSW52	Function setting 17	App. 4-55
WSW53	Function setting 18	App. 4-56
WSW54	Function setting 19	App. 4-57
WSW55	Function setting 20 <i>(Not used.)</i>	App. 4-58
WSW56	Function setting 21	App. 4-58
WSW57	Function setting 22	App. 4-59
WSW58	Function setting 23	App. 4-60
WSW59	Function setting 24	App. 4-62
WSW60	Function setting 25	App. 4-63

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms (at 106-ms intervals)
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

ms: millisecond(s)

• **Selectors 1 and 2: Dial pulse generation mode**

These selectors set the number of pulses to be generated in pulse dialing.

N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)

N + 1: Dialing "N" generates "N + 1" pulses.

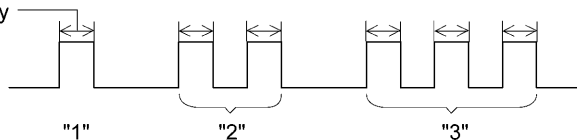
10 - N: Dialing "N" generates "10 - N" pulses.

• **Selectors 3 and 4: Break time length in pulse dialing**

These selectors set the break time length in pulse dialing.

(Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)

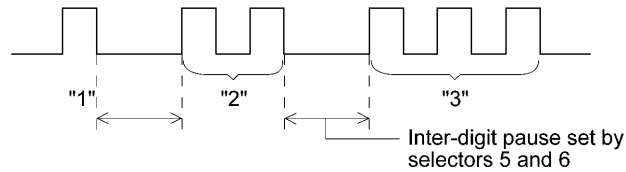
Break time length set by selectors 3 and 4



- **Selectors 5 and 6: Inter-digit pause**

These selectors set the inter-digit pause in pulse dialing.

(Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

This selector determines whether or not the dialing mode can be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

This selector sets the default dialing mode (pulse dialing or tone dialing) which can be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

WSW02 (Tone signal setting)

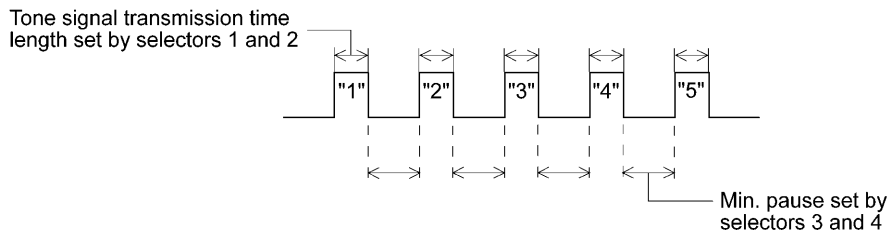
Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB, in 1 dB increments)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

ms: millisecond(s)

• **Selectors 1 through 4: Tone signal transmission time length and Min. pause in tone dialing**

These selectors set the tone signal transmission time length and minimum pause in tone dialing.

(Example: If "1," "2," "3," "4," and "5" are dialed.)



• **Selectors 5 through 8: Attenuator for pseudo ring backtone to the line**

These selectors are used to adjust the sound volume of a ring backtone in the F/T mode, an on-hold sound, or a beep generated as a signal during remote control operation or at the start of ICM recording.

The larger the value specified by these selectors, the greater the attenuation.

WSW03 (PBX* mode setting)

Selector No.	Function	Setting and Specifications
1	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
2 4	Detection time length of PBX* dial tone, required for starting dialing (<i>Not used.</i>)	No. 2 3 4 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
5	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
6 7	Dial tone detection in PBX* (<i>Not used.</i>)	No. 6 7 0 0 : No detection (3.5 sec. WAIT) 0 1 : No detection (5 sec. WAIT) 1 0 : No detection (7 sec. WAIT) 1 1 : Detection (Frequency only)
8	Not used.	

sec.: second(s), ms: millisecond(s)

* PBX: Private branch exchange

Note: Selectors 2 through 4, 6 and 7 are not applicable where no PBX is installed.

• **Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone**

These selectors determine whether or not the machine detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the machine. Upon detection of CNG signals by the number of cycles specified by these selectors, the machine interprets CNG as an effective signal and then starts FAX reception.

Selector		Cycle
No. 1	No. 5	
0 (A)	0 (A)	0.5 cycle
0 (A)	1 (B)	1.0 cycle
1 (B)	0 (A)	1.5 cycles
1 (B)	1 (B)	2.0 cycles

• **Selectors 2 through 4: Detection time length of PBX dial tone, required for starting dialing**
(*Not used.*)

Upon detection of the PBX dial tone for the time length set by these selectors, the machine starts dialing.

These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

- **Selectors 6 and 7: Dial tone detection in PBX** (*Not used.*)

These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PBX.

Setting both of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected.

Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 5.0, or 7.0 seconds) without detection of a dial tone when a line is connected.

WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility (<i>Not used.</i>)	0: Provided 1: Not provided
2 3	Dual tone detection frequency in ICM recording (<i>Not used.</i>)	No. 2 3 0 0 : 350 and 440 Hz (A) 0 1 : 440 and 480 Hz (B) 1 0 : 480 and 620 Hz (C) 1 1 : 480 and 620 Hz (C)
4	Dual tone detection sensitivity in ICM recording (<i>Not used.</i>)	0: Normal 1: High
5	Time to be added to the setting specified by selectors 3 and 4 of WSW24 (Time length from CML ON to start of pseudo ring backtone transmission)	0: Not added 1: +4 seconds added
6 8	Break time length for flash function	No. 6 7 8 0 0 0 : 80 ms 0 0 1 : 100 ms 0 1 0 : 110 ms 0 1 1 : 120 ms 1 0 0 : 200 ms 1 0 1 : 250 ms 1 1 0 : 500 ms 1 1 1 : 700 ms

ms: millisecond(s)

Note: Selectors 6 through 8 are not applicable in those countries where no transfer facility is supported.

Note: Selectors 2 through 4 are applicable to models with built-in TAD.

- **Selector 1: Earth function in transfer facility** (*Not used.*)

This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

- **Selectors 2 and 3: Dual tone detection frequency in ICM recording** (*Not used.*)

If the machine detects either of the frequencies set by these selectors in ICM recording, it disconnects the line. For example, if these selectors are set to "0, 0," the machine disconnects the line upon detection of 350 Hz or 440 Hz.

- **Selector 4: Dual tone detection sensitivity in ICM recording** (*Not used.*)

Setting this selector to "1" increases the tone detection sensitivity in ICM recording.

- **Selectors 6 through 8: Break time length for flash function**

These selectors set the break time length.

This setting is effective only when the flash function is selected for the Speed Dial key by using the function switch.

WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1 3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0: 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0: Yes 1: No
8	Not used.	

sec.: second(s)

Note: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported.

- **Selectors 1 through 3: 1st dial tone detection**

These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the machine start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

These selectors determine whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic sending mode.

Setting selector 6 to "0" ignores a busy tone so that the machine does not disconnect the line.

Setting selectors 5 and 6 to "0" and "1," respectively, makes the machine detect a busy tone only after dialing and disconnect the line.

Setting both of selectors 5 and 6 to "1" makes the machine detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

This selector determines whether or not the machine automatically disconnects the line upon detection of a busy tone in automatic receiving mode.

WSW06 (Pause key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 3	Pause key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 0 1 : 2nd dial tone detection both in DP and push-button (PB) dialing system 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 1 1 : 2nd dial tone detection both in DP and push-button (PB) dialing system
4 6	Detection of international tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of 2nd dial tone detection cycles	0: 1 cycle 1: 2 cycles
8	Allowable instantaneous interrupt during reception of 2nd dial tone	0: 30 ms 1: 50 ms

sec.: second(s), ms: millisecond(s)

Note: Selectors 4 through 8 are not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: Pause key setting and 2nd dial tone detection**

Selectors			
1	2	3	
0	0	0	No WAIT is inserted even if the Pause key is pressed.
0	0	1	If you press the Pause key during dialing, the machine will insert WAIT as defined in the above table.
0	1	0	
0	1	1	If the Pause key is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
0	0	0	
1	0	1	When these selectors are set to "1, 0, 1":
1	1	0	Each time you press the Pause key in dialing, the machine will wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. When these selectors are set to "1, 1, 0": If you press the Pause key in pulse dialing, the machine will first wait for the 2nd dial tone to be sent via the communications line. After that, pressing the Pause key will cause the machine to insert a WAIT of 3.5 seconds. In tone dialing, the machine will insert a WAIT of 3.5 seconds.
1	1	1	
			When these selectors are set to "1, 1, 1": If you press the Pause key, the machine will first wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. After that, pressing the Pause key will cause the machine to insert a WAIT of 3.5 seconds. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 0, 1," "1, 1, 0," or "1, 1, 1" inserts a WAIT of 3.5 seconds.)

- **Selectors 4 through 6: Detection of international tone**

Upon detection of the 2nd dial tone for the time length specified by these selectors, the machine starts dialing.

This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).

This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of 2nd dial tone detection cycles**

This selector sets the number of dial tone detection cycles required for starting dialing.

- **Selector 8: Allowable instantaneous interrupt during reception of 2nd dial tone**

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 2nd dial tone.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Dial tone frequency band control	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 0 : Widens by 10 Hz 1 1 : Widens by 10 Hz
3	Line current detection (<i>Not used.</i>)	0: No 1: Yes
4 6	2nd dial tone detection level (Z = 600Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	Allowable instantaneous interrupt during reception of 1st dial tone	0: 30 ms 1: 50 ms
8	Not used.	

ms: millisecond(s)

Note: Selectors 1, 2, 4 through 7 are not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

Note: Selector 3 is not applicable to those models having no loop current detection function.

• **Selectors 1 and 2: Dial tone frequency band control**

These selectors set the frequency band for the 1st dial tone and busy tone (before dialing) to be detected.

This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1."

• **Selector 3: Line current detection** (*Not used.*)

This selector determines whether or not to detect a line current before starting dialing.

• **Selectors 4 through 6: 2nd dial tone detection level**

These selectors set the detection level of the 2nd dial tone.

• **Selector 7: Allowable instantaneous interrupt during reception of 1st dial tone**

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 1st dial tone.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

sec.: second(s), ms: millisecond(s)

Note: The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

• **Selectors 1 through 3: 1st dial tone detection time length**

Upon detection of the 1st dial tone for the time length set by these selectors, the machine starts dialing.

This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1."

• **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

These selectors set the time-out length for the 1st and 2nd dial tone detection so that the machine waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited
3 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5		T5 timer
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Timeout for response from the called station in automatic sending mode	No. 7 8 0 0 : 55 sec. (in U.S.A. and Canadian models) 60 sec. (in other models) 0 1 : 140 sec. 1 0 : 90 sec. 1 1 : 35 sec.

sec.: second(s)

Note: Selectors 1 through 5 are not applicable in those models which do not support ECM.

• **Selector 1: Frame length selection**

Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the machine can divide a message into 64-octet frames.

Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the machine divides a message into frames for transmission so that if any data error occurs on the transmission line, the machine retransmits only those frames containing the error data.

• **Selector 2: Use of non-standard commands**

If this selector is set to "0," the machine can use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the machine will use standard commands only.

• **Selectors 3 and 4: No. of retries**

These selectors set the number of retries in each specified modem transmission speed.

• **Selector 5: T5 timer**

This selector sets the time length for the T5 timer.

• **Selector 6: T1 timer**

This selector sets the time length for the T1 timer.

• **Selectors 7 and 8: Timeout for response from the called station in automatic sending mode**

If the machine (calling station) receives no response (no G3 command) from the called terminal in automatic sending mode for the period specified by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries	No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7	Encoding system (Compression)	MR 0: Allowed 1: Not allowed
8		MMR 0: Allowed 1: Not allowed

sec.: second(s), ms: millisecond(s)

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

This selector sets the time length from when the machine transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

This selector sets the time length until the machine transmits a CNG after it turns on the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

This selector sets the time length until the machine transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

These selectors set the number of training retries to be repeated before automatic fallback.

- **Selectors 7 and 8: Encoding system (Compression)**

This selector determines whether or not to allow the use of the MR/MMR coding system.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Busy tone frequency band control	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 0 : Widens by 10 Hz 1 1 : Widens by 10 Hz
3	ON/OFF time length ranges for busy tone (More than one setting allowed)	1: 250-750/250-750 ms
4		1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 100-1000 ms/17-660 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

ms: millisecond(s)

Note: WSW11 is not applicable in those countries where no busy tone detection is supported.

Note: The setting of WSW11 is effective only when selectors 5 and 6 on WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

- **Selectors 1 and 2: Busy tone frequency band control**

These selectors set the frequency band for busy tone to be detected.

- **Selectors 3 through 8: ON/OFF time length ranges for busy tone**

These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1," the ranges become wider. For example, if selectors 4 and 5 are set to "1," the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications
1 2	Min. detection period required for interpreting incoming calling signal (CI) as OFF	No. 1 2 0 0 : 1500 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. detection period for incoming calling signal (CI) being OFF	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Min. detection period required for acknowledging incoming calling signal (CI) as ON	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7	Line connection timing (<i>Not used.</i>)	0: Ringer-OFF period (default) 1: Ringer-ON period
8	Not used.	

sec.: second(s), ms: millisecond(s)
*1000 milliseconds in Chinese models.

• **Selectors 1 through 4: Min. detection period required for interpreting incoming calling signal (CI) as OFF**

Max. detection period for incoming calling signal (CI) being OFF

If the machine detects the OFF state of a CI signal for the period greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the CI signal as OFF.

• **Selectors 5 and 6: Min. detection period required for acknowledging incoming calling signal (CI) as ON**

These selectors set the period required to make the machine acknowledge itself to be called. That is, if the machine continuously detects a CI signal with the frequency set by selectors 1 through 4 on WSW14 during the period set by these selectors 5 and 6, then it acknowledges the call.

• **Selector 7: Line connection timing (*Not used.*)**

If a line is connected in a ringer-ON period, FAX models equipped with an SDAA circuit may malfunction due to the ringer voltage. To make the line connection stable, this selector should be set to "0" so that a line is connected in a ringer-OFF period.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

Set these selectors according to the distance from the telephone switchboard to the machine.

- **Selectors 3 and 4: Reception level**

These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

These selectors are used to adjust the transmitting level attenuation of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.

Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

If selector 8 on WSW23 is set to "0," this setting is so limited that 10 dB (1 dB in France) or higher setting only is effective. Note that in Japan and China, 9 dB or higher and 2 dB or higher settings only are effective, respectively, regardless of whether selector 8 on WSW23 is set to "0."

WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (lower limit) for incoming calling signal (CI)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (upper limit) for incoming calling signal (CI)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 200 Hz
5 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : 1 to 6 times 0 0 1 0 : 1 to 8 times 0 0 1 1 : 2 to 8 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

• **Selectors 1 through 4: Frequency band selection for incoming calling signal (CI)**

These selectors are used to select the frequency band of CI for activating the AUTO ANS facility.

In the French models, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

• **Selectors 5 through 8: No. of rings in AUTO ANS mode**

These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Redial interval	No. 1 2 0 0 : 5 minutes 0 1 : 1 minute 1 0 : 2 minutes 1 1 : 3 minutes
3 6	No. of redialings	No. 3 4 5 6 0 0 0 0 : 16 times 0 0 0 1 : 1 times 0 0 1 0 : 2 times 0 0 1 1 : 3 times 1 1 1 1 : 15 times
7	Redialing to the called station on the other end sending no response	0: Yes 1: No
8	CRP option	0: Disable 1: Enable

- **Selectors 1 through 6: Redial interval and No. of redialings**

The machine redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

- **Selector 8: CRP option**

If a command error occurs in the machine (calling station), the machine usually waits for three seconds and then makes a retry three times. This CRP option is a request command that can be sent from the called station for requesting the calling station to retry the failed command immediately.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	ITU-T (CCITT) superfine recommendation	0: OFF 1: ON
3 6	Not used.	
7	Max. document length limitation	0: 400 cm 1: 90 cm
8	Stop key pressed during reception	0: Not functional 1: Functional

Note: Selector 7 is applicable to models with ADF unit.

- **Selector 2: ITU-T (CCITT) superfine recommendation**

If this selector is set to "1," the machine communicates in ITU-T (CCITT) recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 7: Max. document length limitation**

This selector is used to select the maximum length of a document to be sent.

- **Selector 8: Stop key pressed during reception**

If this selector is set to "1," pressing the **Stop** key can stop the current receiving operation. The received data will be lost.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 0 : Valid except when 'call reservation' is selected. 1 1 : Valid except when 'call reservation' is selected.
3 4	Not used.	
5	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

- **Selectors 1 and 2: Off-hook alarm**

These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off the hook.

- **Selector 5: Calendar clock type**

If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 7: Non-ring reception**

Setting this selector to "1" makes the machine receive calls without ringer sound if the Ring Delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	Registration of station IDs of PCs sharing a FAX machine	0: Permitted 1: Prohibited
2 3	Detection enabled time for CNG or "no tone"	No. 2 3 0 0 : 40 sec. 0 1 : 0 sec. (No detection) 1 0 : 5 sec. 1 1 : 80 sec.
4 5	Not used.	
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 0 : No monitoring 0 1 : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

sec.: second(s)

• **Selectors 2 and 3: Detection enabled time for CNG or "no tone"**

After the line is connected via the external telephone or by picking up the handset of the machine, the machine can detect a CNG signal or "no tone" for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 on WSW20 is set to "1."

• **Selector 6: Registration of station ID**

Setting this selector to "0" permits the registration of station ID for Austrian and Czech models.

• **Selectors 7 and 8: Tone sound monitoring**

These selectors set monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1 3	First transmission speed choice for fallback	No. 1 2 3 No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps
4 6	Last transmission speed choice for fallback	0 1 1 : 9,600 bps 1 0 0 : 12,000 bps 1 0 1 : 14,400 bps 1 1 0 : 14,400 bps 1 1 1 : 14,400 bps
7	V.34 mode	0: Permitted 1: Prohibited
8	V.17 mode	0: Permitted 1: Prohibited

Note: Selector 7 takes effect only in models supporting V.34 mode.

• **Selectors 1 through 6: First and last choices of transmission speed for fallback**

These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the MODEM. If the establishment fails, the machine automatically steps down to the next lowest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

Generally, to save the transmission time, set the last transmission speed choice to a higher one.

• **Selector 7: V.34 mode**

Permitting the V.34 mode with this selector makes WSW38 to WSW40, and WSW41 (selectors 5 to 8) effective.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5
		0 0 : 100 ms
		0 1 : 200 ms
		1 0 : 300 ms
		1 1 : 400 ms
6 7	At CNG detection, elimination of chattering noise	No. 6 7
		0 0 : Yes, at both ON/OFF timings
		0 1 : Yes, at OFF timing
		1 0 : No
		1 1 : No
8	Limitation on CNG detection	0: OFF 1: ON

ms: millisecond(s)

* EP: Echo protection

Note: Selectors 6 and 7 are applicable to models equipped with an SDAA circuit.

- **Selector 1: EP tone prefix**

Setting this selector to "1" makes the machine transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

Prefixing an EP tone is useful when the machine fails to transmit at the V.29 modem speed and always has to fall back to 4,800 bps transmission.

The setting made by this selector takes effect only when the Overseas Mode is set to ON.

- **Selectors 2 and 3: Overseas communications mode**

These selectors should be used if the machine malfunctions in overseas communications. According to the communications error state, select the signal specifications.

Setting selector 2 to "1" allows the machine to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

Setting selector 3 to "1" allows the machine to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

The setting made by selector 3 takes effect only when the Overseas Communications Mode is set to ON. (The setting made by selector 2 is always effective.)

• **Selector 8: Limitation on CNG detection**

If this selector is set to "1," the machine detects a CNG signal according to the condition preset by selectors 2 and 3 on WSW18 after a line is connected. If it is set to "0," the machine detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 5	"No tone" detection period during recording of ICM (Max. waiting time for voice signal) (Not used.)	No. 1 2 3 4 5 0 0 0 0 0 : No detection 0 0 0 0 1 : 1 sec. 0 0 0 1 0 : 2 sec. 0 0 0 1 1 : 3 sec. 0 0 1 1 0 : 6 sec. (default) 1 1 1 1 1 : 31 sec.
6 7	Taping the call (Not used.)	No. 6 7 0 0 : Enable (signaling for U.S.A.) 0 1 : Enable (signaling for countries except U.S.A.) 1 0 : Enable (without signaling) 1 1 : Disable
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

sec.: second(s)

Note: Selectors 1 through 5 are applicable to models equipped with ICM recorder.

Note: Selectors 6 through 8 are applicable to models with a built-in TAD.

• **Selectors 1 through 5: "No tone" detection period during recording of ICM (Max. waiting time for voice signal) (Not used.)**

If the machine detects "no tone"* during recording of ICM for the time length specified by these selectors, it automatically stops recording ICM and disconnects the line. (*Tone whose level is less than the threshold specified by selectors 1 through 3 on WSW33 is interpreted as "no tone.")

• **Selectors 6 and 7: Taping the call (Not used.)**

These selectors select whether or not to tape the call. Setting them to "1, 0" enables taping the call without signaling to the calling station that the call is being taped.

• **Selector 8: Erasure of message stored in the memory after the message transfer**

Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (ECM and call waiting caller ID)

Selector No.	Function	Setting and Specifications	
1	ECM* in sending	0: ON	1: OFF
2	ECM* in receiving	0: ON	1: OFF
3	Call Waiting Caller ID	0: ON	1: OFF
4	Not used.		
5	Acceptable TCF bit error rate (%) (Only at 4,800 bps) (<i>Not used.</i>)	0: 0%	1: 8%
		0: 0%	1: 4%
8		0: 0%	1: 2%
		0: 0%	1: 1%

* ECM: Error correction mode

Note: Selector 3 is applicable to the American models.

Note: Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian models only.

• **Selector 3: Call Waiting Caller ID**

Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call on the LCD.

• **Selectors 5 through 8: Acceptable TCF bit error rate (%) (*Not used.*)**

Setting two or more selectors to "1" produces addition of percent assigned to each selector. If you set selectors 7 and 8 to "1," the acceptable TCF bit error rate will be 3%.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6 7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

Note: Selector 8 is not applicable to the French models.

• **Selector 1: Starting point of training check (TCF)**

At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 milliseconds after the head of a series of zeros is detected.

If it is set to "1," the called station starts counting zeros upon detection of 10-millisecond successive zeros 50 milliseconds after the head of a series of zeros is detected. In this case, if the detection of 10-millisecond successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

• **Selectors 2 and 3: Allowable training error rate**

The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

• **Selectors 4 and 5: Decoding error rate for transmission of RTN**

The machine checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

• **Selector 8: Limitation of attenuation level**

Setting this selector to "0" limits the transmitting level of the modem to 10 dB (1 dB in France).

This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Maximum OGM recording time (<i>Not used.</i>)	No. 1 2 0 0 : 15 sec. 0 1 : 20 sec. 1 0 : 30 sec. 1 1 : 50 sec.
3 4	Time length from CML ON to start of pseudo ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB) (<i>Not used.</i>)	No. 5 6 7 8 0 0 0 0 : 0 dB 0 0 0 1 : 1 dB 0 0 1 0 : 2 dB 1 1 1 1 : 15 dB

sec.: second(s)

- **Selectors 1 and 2: Maximum OGM recording time** (*Not used.*)
These selectors specify the allowable maximum recording time for an OGM.

- **Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission**
These selectors specify the length of time from CML-ON up to the start of pseudo ring backtone transmission.

In models with an OGM facility, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

- **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line** (*Not used.*)
Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

This setting is not limited by selector 8 on WSW23.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 2	Delay time for starting "no tone" detection in the external TAD mode (<i>Not used.</i>)	No. 1 2 0 0: 0 sec. 0 1: 8 sec. 1 0: 16 sec. 1 1: 24 sec.
3 4	Threshold level of "no tone" detection in the external TAD mode (<i>Not used.</i>)	No. 3 4 0 0: -43 dB (A) 0 1: -46 dB (B) 1 0: -49 dB (C) 1 1: -51 dB (D)
5 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Not used.	

sec.: second(s)

Note: Selectors 1 through 4 are not applicable to the U.S.A. models, models without "no tone" detecting function in the external TAD mode, or models with Rockwell modem V24.

Note: Selectors 5 through 7 are applicable to the U.S.A. models only.

- **Selectors 1 and 2: Delay time for starting "no tone" detection in the external TAD mode**
(*Not used.*)

These selectors take effect only in the external TAD mode. The machine delays starting detection of "no tone" by the time length specified by these selectors.

The total length of the delay time specified by these selectors and the maximum waiting time specified by WSW21 (selectors 1 through 5) should not exceed 40 seconds.

- **Selectors 3 and 4: Threshold level of "no tone" detection in the external TAD mode** (*Not used.*)

These selectors specify the threshold level of "no tone" detection in the external TAD mode.

- **Selectors 5 through 7: Pause between paging number and PIN**

These selectors set the pause time between a telephone number being paged and PIN (personal identification number) for the paging feature.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disable 1: Enable
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

- **Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission**

If this selector is set to "0," the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

- **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)**

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone.

- **Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)**

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Automatic playback of OGM when switched to the TAD mode <i>(Not used.)</i>	0: No 1: Yes
4	Detection of distinctive ringing pattern	0: Yes 1: No
5	Not used.	
6	Recording quality <i>(Not used.)</i>	0: Normal 1: High
7	Recording time for high recording quality <i>(Not used.)</i>	0: Short (9.6 kbps) 1: Long (8.8 kbps)
8	Not used.	

Note: Selectors 4 and 5 are applicable to the U.S.A. models only.

- **Selector 2: Ringer OFF setting**

This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM when switched to the TAD mode** *(Not used.)*

This selector determines whether or not to automatically play back an OGM the moment the machine switches to the TAD mode.

- **Selector 4: Detection of distinctive ringing pattern**

If this selector is set to "1," the machine detects only the number of rings; if it is set to "0," the machine detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 6: Recording quality** *(Not used.)*

This selector determines the recording quality for the OGM and ICM. Selecting "1" (High) increases the quality, sacrificing the recording time.

- **Selector 7: Recording time for high recording quality** *(Not used.)*

This setting takes effect when selector 6 is set to "1" (High). Setting this selector to "0" (Short) further increases the recording quality, sacrificing the recording time.

The recording quality and time to be applied when this selector is set to "1" (Long) are higher and shorter than the ones to be applied when selector 6 is set to "0" (Normal).

The recording quality and time determined by this selector being set to "1" (Long) are higher and shorter than the ones determined by selector 6 being set to "0" (Normal).

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
4 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
7 8	Not used.	

• **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

These selectors are intended for the manufacturer who tests the machine for the Standard. Never access them.

WSW29 (Function setting 7) (Not used.)

Selector No.	Function	Setting and Specifications
1 3	Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation	No. 1 2 3 0 0 0 : -47.0 dBm (A) 0 0 1 : -48.5 dBm (B) 0 1 0 : -50.0 dBm (C) 0 1 1 : -51.5 dBm (D) 1 0 0 : -53.0 dBm (E) 1 0 1 : -54.5 dBm (F) 1 1 0 : -56.0 dBm (G) 1 1 1 : OFF (H)
4 6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4 5 6 0 0 0 : -44.0 dBm (A) 0 0 1 : -45.5 dBm (B) 0 1 0 : -47.0 dBm (C) 0 1 1 : -48.5 dBm (D) 1 0 0 : -50.0 dBm (E) 1 0 1 : -51.5 dBm (F) 1 1 0 : -53.0 dBm (G) 1 1 1 : OFF (H)
7	Impedance switching control in pulse dialing	0: OFF 1: ON
8	Prompt beep when the memory area for the activity report becomes full	0: No 1: Yes

Note: Selectors 1 through 6 are applicable to models with built-in TAD.

Note: Selectors 7 and 8 are applicable only to the European versions.

• **Selectors 1 through 6: Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation**

If voice signals inputted via the telephone line are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

• **Selector 8: Prompt beep for activity report**

This selector determines whether or not to beep if the memory area for the activity report becomes full, for prompting you to print out the report. (Printing it out will clear the memory area.)

WSW30 (Function setting 8) (Not used.)

Selector No.	Function	Setting and Specifications
1 3	Dial tone/busy tone detection level during recording of ICM	No. 1 2 3 0 0 0 : -38.0 dBm (A) 0 0 1 : -39.5 dBm (B) 0 1 0 : -41.0 dBm (C) 0 1 1 : -42.5 dBm (D) 1 0 0 : -44.0 dBm (E) 1 0 1 : -45.5 dBm (F) 1 1 0 : -47.0 dBm (G) 1 1 1 : -48.5 dBm (H)
4 8	Not used.	

Note: Selectors 1 through 3 are applicable to models with built-in TAD.

• **Selectors 1 through 3: Dial tone/busy tone detection level during recording of ICM**

If the machine (called station) detects dial tone (400 Hz continuously) or busy tone (400 Hz intermittently) exceeding the detection level specified by these selectors for the period specified by selectors 1 through 4 on WSW35, then it interprets the calling station as being disconnected. The machine stops TAD recording and disconnects the line.

WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Limitation of reduction ratio in copying	0: Yes 1: No
3	Not used.	
4	(Do not disturb this selector.)	
5	Minimum ON and OFF duration of ringer signals effective in distinctive ringing	0: 130 ms 1: 90 ms
6 8	Not used.	

ms: millisecond(s)

Note: Selector 5 is applicable only to the U.S.A. models.

• **Selector 2: Limitation of reduction ratio in copying**

When the user selects a ratio less than 70%, if the reduction ratio is limited ("0"), the machine prints in 70% (fixed); if not limited ("1"), the machine prints in the reduction ratio matching the horizontal scanning width of recording paper.

• **Selector 5: Minimum ON and OFF duration of ringer signals effective in distinctive ringing**

The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum ON and OFF duration of ringer signals that are required for the machine to interpret ringer signals as being ON or OFF. This is to prevent components of a ringer pattern from being misinterpreted due to chattering in distinctive ringing.

The machine monitors ringer signals at 10-millisecond intervals. If the signal is ON, the machine counts +1; if it is OFF, it counts -1. If the counter increments up to +5 or +13 when this selector is set to "1" (90 milliseconds) or "0" (130 milliseconds), respectively, the machine interprets the current signal as being ON.

If the counter returns to zero, the machine interprets the signal as being OFF.

If the Distinctive Ring is set to OFF, this selector is not effective.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 4	Not used.	
5 6	Default resolution	No. 5 6 0 0 : Standard 0 1 : Fine 1 0 : Super fine 1 1 : Photo
7 8	Default contrast	No. 7 8 0 0 : Automatic 0 1 : Automatic 1 0 : Super light 1 1 : Super dark

- **Selectors 5 and 6: Default resolution**

These selectors set the default resolution which applies when the machine is turned on or completes a transaction.

- **Selectors 7 and 8: Default contrast**

These selectors set the default contrast which applies when the machine is turned on or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 3	Threshold level of "no tone" detection during recording of ICM (<i>Not used.</i>)	No. 1 2 3 0 0 0 : -48 dBm (A) 0 0 1 : -50 dBm (B) 0 1 0 : -52 dBm (C) 0 1 1 : -54 dBm (D) 1 0 0 : -56 dBm (E) 1 0 1 : -58 dBm (F) 1 1 0 : -60 dBm (G) (default) 1 1 1 : -62 dBm (H)
4 5	FAX receiving speed to be kept within the transmission speed limit to the PC (<i>Not used.</i>)	No. 4 5 0 0 : 14,400 bps 0 1 : 12,000 bps 1 0 : 9,600 bps 1 1 : 7,200 bps
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Comfortable noise level (<i>Not used.</i>)	No. 7 8 0 0 : OFF 0 1 : Low (A) 1 0 : Medium (B) 1 1 : High (C)

Note: Selectors 1 through 3 are applicable to models with built-in TAD.

- **Selectors 1 through 3: Threshold level of "no tone" detection during recording of ICM** (*Not used.*)
If the tone level during recording of ICM is less than the threshold setting made by these selectors, the tone is interpreted as "no tone." When the "no tone" state is kept for the period specified by selectors 1 through 5 on WSW21, the machine stops recording of ICM and disconnects the line.

- **Selectors 4 and 5: FAX receiving speed to be kept within the transmission speed limit to the PC** (*Not used.*)
To transmit FAX data being received from other machine to the connected PC, you may need to keep the FAX receiving speed within the transmission speed limit specified for the PC. In an initial negotiation sequence for transmission, the machine responds to the calling station with the allowable FAX receiving speed specified by these selectors.

- **Selectors 7 and 8: Comfortable noise level** (*Not used.*)
These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression.
If they are set to "0, 0," no noise will be added.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 3	Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received (<i>Not used.</i>)	No. 1 2 3 0 0 0 : 0 sec. 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode) (<i>Not used.</i>)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

sec.: second(s)

Note: Selectors 1 through 5 are applicable to models with built-in TAD.

- **Selectors 1 through 3: Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received** (*Not used.*)

If the machine has disconnected the line after detection of disconnection tone in ICM recording, it erases tone recorded preceding the tone detection starting point for the time length set by these selectors.

- **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)** (*Not used.*)

The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode.

- **Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

If the machine receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

If these selectors are set to "1, 1," the CNG detection will not be inhibited.

WSW35 (Function setting 13) (Not used.)

Selector No.	Function	Setting and Specifications
1 4	Max. detection period of dial tone/ busy tone during recording of ICM	No. 1 2 3 4 0 0 0 0 : No detection 0 0 0 1 : 1 sec. 0 0 1 0 : 2 sec. 0 1 0 0 : 4 sec. 1 1 1 1 : 15 sec.
5 8	Not used.	

sec.: second(s)

Note: Selectors 1 through 4 are applicable to models with built-in TAD.

• **Selectors 1 through 4: Max. detection period of dial tone/busy tone during recording of ICM**

If the machine (called station) detects dial tone or busy tone exceeding the detection level specified by selectors 1 through 3 on WSW30 for the period specified by these selectors, then it interprets the state as the calling station's breaking the connection, stops recording the ICM, and disconnects the line.

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
1	ECP mode*	0: ON 1: OFF
2	Recovery from Inactive PC Interface	0: Disable 1: Enable
3	PC Power-off Recognition Time	0: Normal 1: Long
4	Not used.	
5	Escape from phase C	0: Yes 1: No
6 8	Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14	No. 6 7 8 0 0 0 : 0 (Ignored) 0 0 1 : 4 (448 Hz) 0 1 0 : 8 (244 Hz) 0 1 1 : 12 (162 Hz) 1 0 0 : 16 (122 Hz) 1 0 1 : 20 (97 Hz) 1 1 0 : 24 (81 Hz) 1 1 1 : 28 (69 Hz)

*ECP (Enhanced Capabilities Port)

Note: Selectors 2 and 3 on WSW36 take effect only when the "Monitoring the PC ON/OFF state" is enabled with selectors 1 and 2 on WSW46.

• **Selector 1: ECP mode***

The ECP mode enhances the normal bidirectional communications between the machine and the connected PC for higher transmission speed.

• **Selector 2: Recovery from Inactive PC Interface**

If the machine recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the machine.

This selector determines whether or not the machine should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

• **Selector 3: PC Power-off Recognition Time**

This selector sets the time length from when the machine detects the PC powered off until it recognizes the detected state as power-off.

If selector 2 is set to "0," it is recommended that selector 3 be set to "1"; otherwise, the machine may mistakenly detect PC powered off.

• **Selector 5: Escape from phase C**

This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

- **Selectors 6 through 8: Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14**

At the start of reception, if the machine detects the frequency of a CI signal specified by selectors 1 through 4 on WSW14, it starts the ringer sounding. However, the machine may fail to detect the CI signal normally due to noise superimposed at the time of reception. To prevent it, use selectors 6 through 8 on WSW36.

If the machine detects higher frequencies than the setting made here, it regards them as noise and interprets the detecting state as being normal, allowing the ringer to keep sounding according to the preset number of ringers (until it starts automatic reception of FAX data in the FAX mode or enters the TAD mode in the TEL mode).

WSW37 (Function setting 15)

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto an error report	0: No 1: Yes
2	Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No 1: Yes
3 8	Not used.	

- **Selector 1: Printout of the stored image data of an unsent document onto an error report**

This selector determines whether or not to print out the 1st-page image data of a document onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

- **Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission**

If in-memory message transmission fails repeatedly when selector 1 is set to "1," the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

WSW38 (V.34 transmission settings)

Selector No.	Function	Setting and Specifications
1 2	Setting of the equalizer	No. 1 2 0 0 : Automatic 0 1 : Automatic 1 0 : Fixed to 4 points 1 1 : Fixed to 16 points
3	Sending level of guard tone at phase 2	0: Normal - 7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2,400 bps 1: 4,800 bps
5 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5 6 0 0 : For higher transmission speed than the current setting 0 1 : No change from the current setting 1 0 : For lower transmission speed than the current setting 1 1 : For further lower transmission than the setting made by 1, 0
7	Redialing when a communications error occurs	0: ON 1: OFF
8	Detection of CED for stopping CNG	0: ON 1: OFF

Note: WSW38 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

• **Selectors 1 and 2: Setting of the equalizer**

These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, 0" or "0, 1," the modem will automatically set the appropriate training level.

• **Selector 3: Sending level of guard tone at phase 2**

This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V.34 mode.

• **Selector 4: Stepping down the transmission speed at fallback each**

This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1," the modem may step down the transmission speed from 33,600 bps to 28,800 bps by one-time fallback.

• **Selectors 5 and 6: Automatic control of modem's EQM gain for proper transmission speed choice**

These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

• **Selector 8: Detection of CED for stopping CNG**

If this selector is set to "0," the detection time of CED specified by WSW43, selectors 4 and 5 will apply.

WSW39 (V.34 transmission speed)

Selector No.	Function	Setting and Specifications
1 4	First transmission speed choice for fallback	No. 1 2 3 4 No. 5 6 7 8 0 0 0 0 : 2,400 bps 0 0 0 1 : 4,800 bps 0 0 1 0 : 7,200 bps 0 0 1 1 : 9,600 bps 0 1 0 0 : 12,000 bps 0 1 0 1 : 14,400 bps 0 1 1 0 : 16,800 bps 0 1 1 1 : 19,200 bps
5 8	Last transmission speed choice for fallback	1 0 0 0 : 21,600 bps 1 0 0 1 : 24,000 bps 1 0 1 0 : 26,400 bps 1 0 1 1 : 28,800 bps 1 1 0 0 : 31,200 bps 1 1 0 1 : 33,600 bps 1 1 1 0 : 33,600 bps 1 1 1 1 : 33,600 bps

Note: WSW39 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode. For the transmission speed setting in other modes, refer to WSW19.

• **Selectors 1 through 8: First and last choices of transmission speed for fallback**

These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.

If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

WSW39 will be limited by selectors 3 through 8 on WSW40.

WSW40 (V.34 modem settings)

Selector No.	Function	Setting and Specifications			
1 2	Not used.				
3 8	Masking of symbol rate(s)	Not masking		Masking	
		No. 3	0	1	3429 symbols/sec
		No. 4	0	1	3200 symbols/sec
		No. 5	0	1	3000 symbols/sec
		No. 6	0	1	2800 symbols/sec
		No. 7	-	-	Not used.
		No. 8	0	1	2400 symbols/sec

sec.: second(s)

Note: WSW40 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

• **Selectors 3 through 8: Masking of symbol rate(s)**

These selectors allow you to limit the transmission speed range in V.34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed on the next page. The setting made by these selectors will limit the setting made by selectors 1 through 4 on WSW39.

If selector 3 is set to "1" to mask the 3429 symbols/second when the first transmission speed choice is 33,600 bps (specified by selectors 1 through 4 of WSW39), for example, then the allowable maximum transmission speed will be limited to 31,200 bps. If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 33,600 bps, then the allowable maximum transmission speed remains 33,600 bps.

If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 21,600 bps (specified by selectors 1 through 4 on WSW39), then the allowable maximum transmission speed remains 21,600 bps but the minimum transmission speed will be limited to 4,800 bps.

Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)
2400	2,400	3000	4,800	3429	4,800
	4,800		7,200		7,200
	7,200		9,600		9,600
	9,600		12,000		12,000
	12,000		14,400		14,400
	14,400		16,800		16,800
	16,800		19,200		19,200
	19,200		21,600		21,600
	21,600		24,000		24,000
	2800		4,800		3200
7,200		7,200	31,200		
9,600		9,600	33,600		
12,000		12,000			
14,400		14,400			
16,800		16,800			
19,200		19,200			
21,600		21,600			
24,000		24,000			
26,400		26,400			
		28,800			
	31,200				

WSW41 (ON-duration of the scanning light source)

Selector No.	Function	Setting and Specifications
1 3	ON-duration of the scanning light source at room temperature <i>(Not used.)</i>	No. 1 2 3 0 0 0 : 16 hours 0 0 1 : 24 hours 0 1 0 : 12 hours 0 1 1 : 8 hours 1 0 0 : 4 hours 1 0 1 : 2 hours 1 1 0 : 10 minutes 1 1 1 : 0 minute
4	I-FAX Relay Report	0: ON 1: OFF
5 8	Modem attenuator	No. 5 6 7 8 0 0 0 0 : -10 dBm 0 0 0 1 : -11 dBm 0 0 1 0 : -12 dBm 0 0 1 1 : -13 dBm 0 1 0 0 : -14 dBm 1 1 1 1 : -25 dBm

Note: Selectors 1 through 3 are applicable to CCD models.

- Selectors 1 through 3: ON-duration of the scanning light source at room temperature** *(Not used.)*

If the scanning operation is started when the scanning light source is off, then it will come on for scanning. These selectors determine how long the light source is ON after scanning.

If these selectors are set to "1, 1, 1," the light source goes off immediately after the scanning sequence.
- Selectors 5 through 8: Modem attenuator**

These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

WSW42 (Internet mail settings) (Not used.)

Selector No.	Function	Setting and Specifications
1	Access to the incoming mail (POP3) server (Periodical or on-demand)	0: Disable 1: Enable
2	Access to the outgoing mail (SMTP) server	0: Disable 1: Enable
3	I-FAX relay	0: Disable 1: Enable
4 8	Not used.	

Note: WSW42 is applicable to models equipped with LAN interface.

WSW43 (Function setting 21)

Selector No.	Function	Setting and Specifications
1	Insertion of mail header into outgoing mails	0: Yes 1: No
2 3	Wait time for PC-Fax reception (Class 2) and FPTS command transmission	No. 2 3 0 0 : 50 ms 0 1 : 100 ms 1 0 : 150 ms 1 1 : 0 ms
4 5	Detection time of 2100 Hz CED or ANSam	No. 4 5 0 0 : 200 ms 0 1 : 300 ms 1 0 : 400 ms 1 1 : 500 ms
6	Not used.	
7	Automatic start of remote maintenance	0: No 1: Yes
8	JPEG coding	0: Disable 1: Enable

ms: millisecond(s)

Note: Selector 1 is applicable to models equipped with LAN interface.

- **Selector 1: Insertion of mail header into outgoing mails**

Setting this selector to "1" inserts the station ID as a header into outgoing mails.

- **Selector 8: JPEG coding**

Setting this selector to "0" disables the machine from sending/receiving JPEG color images and from receiving JPEG monochrome images.

WSW44 (Speeding up scanning-1)

Selector No.	Function	Setting and Specifications
1 5	Not used.	
6 8	Effective time length of the white level compensation data obtained beforehand	No. 6 7 8 0 0 0 : Obtained compensation data ineffective 0 0 1 : 1 min. 0 1 0 : 3 min. 0 1 1 : 5 min. 1 0 0 : 10 min. 1 0 1 : 15 min. 1 1 0 : 20 min. 1 1 1 : 30 min.

min.: minute(s)

• **Selectors 6 through 8: Effective time length of the white level compensation data obtained beforehand**

If you set documents in the ADF and the document front sensor detects them, the controller will make correction of the reference voltage to be applied to white level compensation for document scanning before the **Copy** key is pressed.

These selectors determine how long compensation data obtained beforehand will keep effective.

WSW45 (Speeding up scanning-2) (Not used.)

Selector No.	Function	Setting and Specifications
1 3	Delay time from when documents are set until the ADF starts drawing them in	No. 1 2 3 0 0 0 : No automatic drawing-in 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 6	Periodical correction intervals of the reference voltage to be applied to white level compensation for document scanning, during standby	No. 4 5 6 0 0 0 : No correction of reference voltage during standby 0 0 1 : 10 sec. 0 1 0 : 30 sec. 0 1 1 : 1 min. 1 0 0 : 3 min. 1 0 1 : 5 min. 1 1 0 : 10 min. 1 1 1 : 30 min.
7	Standby position of the CIS unit	0: CIS home position 1: Location of the white reference film
8	Line polarity reversal detector	0: Disable 1: Enable

sec.: second(s), min.: minute(s)

• **Selectors 1 through 3: Delay time from when documents are set until the ADF starts drawing them in**

These selectors determine how long the ADF will delay automatic drawing-in of documents (to the scanning standby position) after you set them in the ADF, as well as determining whether or not the ADF automatically draws in documents.

• **Selectors 4 through 6: Periodical correction intervals of the reference voltage applied to white level compensation for document scanning, during standby**

These selectors set the correction intervals (in seconds) of the reference voltage to be applied to white level compensation for document scanning during standby, as well as determining whether or not the controller makes the reference voltage correction during standby. (Conventionally, the correction has been made immediately before the start of actual scanning)

This function takes effect in copying. Making the correction during standby may shorten the preparation time for copying.

Note: Do not access these selectors.

• **Selector 7: Standby position of the CIS unit**

This selector determines whether the standby position of the CIS unit should be the home position or the location of the white reference film (attached to the inside of the scanner top cover). If the location of the reference film is selected, the CIS unit will not return to the home position so as to shorten the travel time, decreasing the preparation time for copying.

• **Selector 8: Line polarity reversal detector**

When the remote station breaks the connection, a line polarity reversal occurs. Enabling the polarity reversal detector with this selector allows the machine to detect the polarity reversal if detected when the user is leaving a message on the station's answering machine.

WSW46 (Monitor of power ON/OFF state and parallel port kept at high)

Selector No.	Function	Setting and Specifications
1 2	Monitoring the PC ON/OFF state	No. 1 2 0 0 : Disable 0 1 : Monitor SELECT IN 1 0 : Monitor STROBE 1 1 : Monitor both SELECT IN and STROBE
3	Parallel port output pins kept at high level	0: Enable 1: Disable
4	Previous filtering parameters for white level compensation	0: Enable 1: Disable
5	Prevention of ink splashing in ink near-empty state	0: Enable 1: Disable
6 8	Waiting time for scanning for a single copy (Not used.)	No. 6 7 8 0 0 0 : Without WAIT 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.

sec.: second(s)

Note: Selector 4 is not applicable to models equipped with flat-bed scanner.

• **Selectors 1 and 2: Monitoring the PC ON/OFF state**

For the related functions, refer to WSW36, selectors 2 and 3.

• **Selector 3: Parallel port output pins kept at high level**

Setting this selector to "0" will keep all parallel output pins of the machine at high level. Use this setting if Resource Manager (bundled with MFC models) installed to WindowsNT running on the connected PC fails to monitor the power ON/OFF state of the machine.

• **Selector 4: Previous filtering parameters for white level compensation**

At the start of scanning operation, the machine usually initializes white and black level data stored in the EEPROM by scanning the white reference film attached to the inside of the scanner top cover. After long use of the machine, however, the film may be contaminated with dust or dirt. Accordingly, incorrect white level data will be set up so that white vertical streaks will be brought on the scanning result.

Setting this selector to "0" (Enable) will apply previously saved white level data instead of new incorrect compensation.

• **Selector 5: Prevention of ink splashing in ink near-empty state**

Setting this selector to "0" (Enable) prevents ink splashing by decreasing the head drive voltage when the "Ink near-empty state" is detected.

WSW47 (Switching between high- and full-speed USB)

Selector No.	Function	Setting and Specifications
1	Handling paper at the occurrence of a paper feed timing error <i>(Not used.)</i>	0: Eject paper w/o print 1: Print on the current paper
2	Reduction of document size in real-time transmission <i>(Not used.)</i>	0: No 1: Yes
3 4	Delay of FAX line disconnection when switching to the pseudo-ringing external telephone <i>(Not used.)</i>	No. 3 4 0 0 : 200 ms 0 1 : 400 ms 1 0 : 700 ms 1 1 : 1000 ms
5	Disable the ringer of external telephone at non-ring reception <i>(Not used.)</i>	0: No 1: Yes
6	Not used.	
7	Disable the ringer of external telephone with CAR signal when caller ID service is available <i>(Not used.)</i>	0: No 1: Yes
8	Switching between high-speed USB and full-speed USB	0: Auto switching between high-speed USB (ver. 2.0) and full-speed USB (ver. 1.1) 1: Fixed to full-speed USB (ver. 1.1)

Note: Selector 1 is applicable only to models equipped with flat-bed scanner.

Note: Selectors 3 and 4 are applicable only to models supporting pseudo-ringing of a connected external telephone.

• **Selector 1: Handling paper at the occurrence of a paper feed timing error** *(Not used.)*

When feeding paper to the print start position, the machine might cause a feed timing error so that the registration sensor goes ON signaling the presence of paper. This selector determines whether the machine prints on the current paper or ejects the current paper without printing and prints on the next paper.

• **Selector 2: Reduction of document size in real-time transmission** *(Not used.)*

Setting this selector to "1" reduces the document size from B4 to A4 in real-time transmission.

• **Selectors 3 and 4: Delay of FAX line disconnection when switching to the pseudo-ringing external telephone** *(Not used.)*

When the machine receives a phone call, it can make the connected external telephone ring (so called pseudo-ringing). During pseudo-ringing, if you pick up the handset of the external telephone, the line might be disconnected due to cut-off of the line current.

To hold the line, the machine may supply line current by making use of the pulse generator circuit that forms a parallel loop. This way the FAX line disconnection may be delayed. These selectors determine the delay period.

WSW48 (USB setup latency)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 5	Number of PCs registrable to each of TWAIN-enabled applications over a network	No. 3 4 5 0 0 0 : 25 0 0 1 : 50 0 1 0 : 75 0 1 1 : 100 1 0 0 : 125 1 0 1 : 150 1 1 0 : 175 1 1 1 : 200
6 8	USB setup latency (<i>Not used.</i>)	No. 6 7 8 0 0 0 : Default period 0 0 1 : Shorter 1 0 1 0 : Longer 1 0 1 1 : Longer 2 1 0 0 : Longer 3 1 0 1 : Longer 4 1 1 0 : Shorter 2 1 1 1 : Shorter 3

- **Selectors 6 through 8: USB setup latency** (*Not used.*)

These selectors should not be disturbed.

WSW49 (End-of-copying beep and black ink print mode)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	End-of-copying beep (<i>Not used.</i>)	0: Yes 1: No
4 5	Command flag detection time	No. 4 5 0 0 : 150 ms 0 1 : 350 ms 1 0 : 550 ms 1 1 : 750 ms
6 7	CCD warmup time adjustment (<i>Not used.</i>)	No. 6 7 0 0 : No adjustment 0 1 : 80% 1 0 : 120% 1 1 : 150%
8	Black ink print mode	0: Disable (default) 1: Enable

ms: millisecond(s)

- **Selectors 4 and 5: Command flag detection time**

After receiving a command flag, the machine will wait for the command that should follow for the time length specified by these selectors.

- **Selector 8: Black ink print mode**

If any color ink runs out, printing is no longer possible by default. Setting this selector to "1" allows the machine to ignore the ink empty state and print data with black ink only, resulting in a printout missing color components.

Note: The assurance mode switch setting made by Selector 3 on AMS04 (triggered with function code 88 described in [Chapter 9, Section 9.4.28](#)) allows the machine to print all color and black data as a monochrome printer with black ink only.

WSW50 (SDAA settings)

Selector No.	Function	Setting and Specifications
1 2	Percentage voltage for interpreting the external telephone as being hooked up (based on the network's standard voltage)	No. 1 2 0 0 : 50% 0 1 : 80% 1 0 : 30% 1 1 : No detection
3	DC mask curve table to be applied when the line is connected	0: Apply the initial value specified by local regulations 1: Apply table DC5 prepared specially
4	AC impedance to be applied when the line is connected	0: 600Ω termination 1: ZR termination
5 6	Current control to be applied immediately after connection of the line	No. 5 6 0 0 : Standard 0 1 : Increase start-up current for termination 1 0 : Fine current control for termination 1 1 : Not used. (equal to "0, 0")
7 8	AC voltage threshold for detection of ring	No. 7 8 0 0 : 19 V 0 1 : 11 V 1 0 : 25 V 1 1 : 31 V

Note: WSW50 is applicable to models equipped with an SDAA circuit.

- **Selectors 5 and 6: Current control to be applied immediately after connection of the line**

FAX models equipped with an SDAA circuit (on which an NTU chip is mounted) might not be connected to a broad band line such as an ADSL (Asynchronous Digital Subscriber Line) in a stable condition. If those models fail to connect to such a line, try to change the current control to be applied immediately after connection of the line by using selectors 5 and 6.

If selectors 5 and 6 are set to "0" and "1," respectively, the SDAA draws more current, decreasing the period required to terminate the current control. If they are set to "1" and "0," the SDAA finely controls precision of the termination current against the voltage to approach nearer to the specified DC curve that specifies the current vs. voltage characteristics of the network termination. Selecting either control may solve an unstable connection problem.

WSW51 (Function setting 16)

Selector No.	Function	Setting and Specifications
1	Output of communications error report when transmission verification report is disabled	0: Enable 1: Disable
2	CR motor control for reducing torque fluctuation (<i>Not used.</i>)	0: Activate 1: Deactivate
3 4	Cordless handset transmitter volume (<i>Not used.</i>)	No. 3 4 0 0 : Middle (default) 0 1 : Low 1 0 : High 1 1 : Very high
5 7	Transmitter level and echo suppression	No. 5 6 7 0 0 0 : Transmitter level 0 & echo suppression OFF 0 0 1 : Transmitter level 1 & echo suppression ON 0 1 0 : Transmitter level 2 & echo suppression ON 0 1 1 : Transmitter level 3 & echo suppression ON
8	Switching from ink near-empty state (if detected) to ink empty when opening the scanner cover (<i>Not used.</i>)	0: Yes 1: No (No change from ink near-empty)

Note: Selectors 3 and 4 are applicable to models equipped with cordless handset.

• **Selector 2: CR motor control for reducing torque fluctuation** (*Not used.*)

When the CR motor runs, the motor torque may vary so as to cause the head/carriage unit travel velocity to fluctuate, affecting the print quality. Setting this selector to "0" activates the CR motor control that regulates the motor drive current to reduce torque fluctuation, running the CR motor smoothly.

• **Selectors 5 through 7: Transmitter level and echo suppression**

Transmitter level 0 sets the transmitter volume to a maximum. As the level increases, the volume decreases. The transmitter level can also be changed by the user switch and its setting is interlocked with the setting made by these selectors.

Enabling the echo suppression suppresses echoes in both the receiver and transmitter.

• **Selector 8: Switching from ink near-empty state (if detected) to ink empty when opening the scanner cover** (*Not used.*)

If this selector is set to "0," opening the scanner cover in the ink near-empty state ("Ink low" message) switches to the ink empty state ("Cannot print" message), prompting the user to replace ink cartridges.

WSW52 (Function setting 17)

Selector No.	Function	Setting and Specifications
1 3	Transmitter level and echo suppression for cordless handsets <i>(Not used.)</i>	No. 1 2 3 0 0 0 : Transmitter level 0 & echo suppression OFF 0 0 1 : Transmitter level 1 & echo suppression ON 0 1 0 : Transmitter level 2 & echo suppression ON 0 1 1 : Transmitter level 3 & echo suppression ON
4 6	External telephone pseudo ring signal frequency <i>(Not used.)</i>	No. 4 5 6 0 0 0 : 16 Hz 0 0 1 : 20 Hz 0 1 0 : 24 Hz 0 1 1 : 28 Hz 1 0 0 : 32 Hz 1 0 1 : 16 Hz 1 1 0 : 16 Hz 1 1 1 : 16 Hz
7	Caller ID display (number display) being kept ON even after switching back to TEL from FAX mode	0: Enable 1: Disable
8	Dial number being displayed during faxing	0: Enable 1: Disable

- **Selectors 4 through 6: External telephone pseudo ring signal frequency** *(Not used.)*
 These selectors provide a choice of pseudo ring sounds of the external telephone.
- **Selector 7: Caller ID display (number display) being kept ON even after switching back to TEL from FAX mode**
 Enabling this function keeps the caller ID display ON even after the machine switches back to the TEL mode from the FAX mode.
- **Selector 8: Dial number being displayed during faxing**
 Setting this selector to "0" enables the machine to keep displaying the dial number of the FAX receiver on the LCD until the end of faxing.

WSW53 (Function setting 18)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 4	FSK receive timing delay for caller ID (<i>Not used.</i>)	No. 3 4 0 0 : 0 ms 0 1 : 100 ms 1 0 : 150 ms 1 1 : 200 ms
5 6	Allowable instantaneous interrupt period during reception of caller ID (<i>Not used.</i>)	No. 5 6 0 0 : 20 ms 0 1 : 10 ms 1 0 : 30 ms 1 1 : 0 ms
7	CNG detection retry after detection of invalid CNG	0: Yes 1: No
8	JPEG decompressor (<i>Not used.</i>)	0: ASIC (default) 1: Software

Note: Selectors 3 through 6 are applicable to Japanese models when caller ID service is available.

Note: Selector 8 is applicable to models equipped with PhotoCapture Center.

- **Selectors 3 through 6: FSK receive timing delay for caller ID**
Allowable instantaneous interrupt period during reception of caller ID
(*Not used.*)

If a communications error occurs during a telephone conversation when the user has subscribed to the caller ID service, change the settings of these selectors, and it may improve the communications state. First, change the settings of selectors 3 and 4. If the error persists, change the settings of selectors 5 and 6.

- **Selector 8: JPEG decompressor** (*Not used.*)

By default, the ASIC (Application specified integrated circuit) in the machine decompresses the compressed JPEG data in a memory card inserted. If it fails to decompress the data and reproduce the image normally, switch from the ASIC to any proven decompressor software with this selector.

WSW54 (Function setting 19)

Selector No.	Function	Setting and Specifications
1 2	PictBridge command delay time	No. 1 2 0 0 : 100 ms (default) 0 1 : 0 ms 1 0 : 50 ms 1 1 : 200 ms
3	Extension of the "No. of CNG cycles to be detected" for Easy Receive mode	0: No 1: + 2 cycles
4	Recovery of cordless handset ID (<i>Not used.</i>)	0: Enable 1: Disable
5 6	Caller ID tone alert detection period	No. 5 6 0 0 : 10 ms (default) 0 1 : 20 ms 1 0 : 30 ms 1 1 : 40 ms
7	Transmission of caller ID wetting pulse	0: Enable 1: Disable (default)
8	Switching between DTMF and FSK for caller ID	0: DTMF 1: FSK (default)

ms: millisecond(s)

Note: Selectors 1 and 2 are applicable to PictBridge-enabled models.

Note: Selector 4 is applicable to models with cordless handset.

Note: Selectors 5 through 7 are applicable to the UK models.

Note: Selector 8 is applicable to the Chinese models.

• **Selectors 1 and 2: PictBridge command delay time**

These selectors specify the PictBridge command delay time that applies when the machine responds to the digital camera connected via PictBridge during negotiation. If the machine fails to receive data from the digital camera, change the delay time.

• **Selector 3: Extension of the "No. of CNG cycles to be detected" for Easy Receive mode**

In Easy Receive mode, if the machine fails to detect the CNG even after the setting made by selectors 4 and 5 on WSW26, extend the "No. of CNG cycles to be detected" by two cycles.

• **Selector 4: Recovery of cordless handset ID (*Not used.*)**

Enabling this function automatically writes the cordless handset ID registered on the main PCB onto the cordless PCB when the power is turned on if the ID on the cordless PCB is discrepant with the one on the main PCB.

• **Selectors 5 and 6: Caller ID tone alert detection period**

If the machine misdetects a tone alert for a caller ID, adjust the detection period with these selectors.

- **Selector 7: Transmission of caller ID wetting pulse**

If the machine fails to display a caller ID due to a wetting pulse transmitted after the detection of a tone alert, disable the transmission of caller ID wetting pulse.

- **Selector 8: Switching between DTMF and FSK for caller ID**

If the machine fails to receive a caller ID, switch from DTMF to FSK. This setting is equivalent to the DTMF/FSK setting made from the menu.

WSW55 (Function setting 20) (Not used.)

Selector No.	Function	Setting and Specifications
1 8	---	

WSW56 (Function setting 21) (Not used.)

Selector No.	Function	Setting and Specifications
1	PS emulation	0: Disable 1: Enable
2	Not used.	
3	Reprinting	0: Disable 1: Enable
4	Wireless LAN functions	0: Enable (default) 1: Disable
5 8	Not used.	

Note: Selector 4 is applicable to wireless LAN-enabled models.

- **Selector 4: Wireless LAN functions**

To disable the wireless LAN (WLAN) functions, set this selector to "1" and turn the machine power off and then on.

WSW57 (Function setting 22)

Selector No.	Function	Setting and Specifications
1 3	Caller ID judgment voltage level to discriminate caller ID event from ring event	No. 1 2 3 0 0 0 : 0 V 0 0 1 : 5 V (default) 0 1 0 : 10 V 0 1 1 : 15 V 1 0 0 : 20 V 1 0 1 : 25 V 1 1 0 : 30 V 1 1 1 : Maximum
4 6	Caller ID judgment voltage level to detect line polarity reversal	No. 4 5 6 0 0 0 : 0 V 0 0 1 : 5 V (default) 0 1 0 : 10 V 0 1 1 : 15 V 1 0 0 : 20 V 1 0 1 : 25 V 1 1 0 : 30 V 1 1 1 : Maximum
7	Time limit for judging a caller ID burst ring (<i>Not used.</i>)	0: Enable (default) 1: Disable
8	Start key on the machine after dialing with cordless handset (<i>Not used.</i>)	0: Disable (default) 1: Enable

Note: Selectors 1 through 7 are applicable to the European models.

Note: Selector 8 is applicable to models with a cordless handset.

• **Selectors 1 through 3: Caller ID judgment voltage level to discriminate caller ID event from ring event**

If the machine misdetects a caller ID event as a ring event due to voltage variation, it fails to display a caller ID. If it happens, increase the judgment voltage level provided that the setting made by these selectors is equal to or more than the setting made by selectors 4 through 6.

• **Selectors 4 through 6: Caller ID judgment voltage level to detect line polarity reversal**

If the machine fails to detect a line polarity reversal for a caller ID due to a great difference between the line voltage when a polarity reversal occurs and the one at the steady state, it fails to display a caller ID. If it happens, increase the judgment voltage level provided that the setting made by these selectors is equal to or less than the setting made by selectors 1 through 3.

• **Selector 7: Time limit for judging a caller ID burst ring (*Not used.*)**

The time limit for judging a caller ID burst ring is enabled by default so that receiving a burst ring out of the specified time limit causes the machine to interpret it as an ordinary call involving no caller ID signal, resulting in no caller ID display.

When the machine fails to display a caller ID if you have the caller ID subscriber service from your telephone company, disable the time limit with this selector to receive a caller ID burst ring independent of the burst ring time.

• **Selector 8: Start key on the machine after dialing with cordless handset (*Not used.*)**

Pressing the **Start** key on the machine to send a fax during a telephone conversation with the cordless handset cannot start a sending operation by default. Setting this selector to "1" enables the **Start** key pressed even after dialing with cordless handset.

WSW58 (Function setting 23)

Selector No.	Function	Setting and Specifications
1 3	Prevention against line disconnection during ICM recording (Percentage of guard tone response time relative to end-of-call tone ON time) (<i>Not used.</i>)	No. 1 2 3 0 0 0 : Disable 0 0 1 : 10% 0 1 0 : 20% 0 1 1 : 30% (default) 1 0 0 : 40% 1 0 1 : 50% 1 1 0 : 60% 1 1 1 : 70%
4	Trimming of R key signal issued from cordless handset--For connection to base unit with PBX OFF (<i>Not used.</i>)	0: Disable (default) 1: Enable
5	Call transfer to cordless handset from telephone(s) connected in parallel with the machine (base unit) (<i>Not used.</i>)	0: Enable (default) 1: Disable
6	Extension of the "No. of CNG cycles to be detected" (which allows two cycles to be added to the cycles specified by selectors 6 and 7 on WSW26 and selectors 4 and 5 on WSW34)	0: No 1: +2 cycles
7 8	No. of busy tone detection cycles	No. 7 8 0 0 : -1 cycle 0 1 : +0 cycles (default) 1 0 : +1 cycle 1 1 : +2 cycles

Note: Selectors 1 through 3 are applicable to models equipped with TAD.

Note: Selector 4 is applicable to European models with a cordless handset.

Note: Selector 5 is applicable to U.S.A. models with a cordless handset.

- **Selectors 1 through 3: Prevention against line disconnection during ICM recording (Percentage of guard tone response time relative to end-of-call tone ON time)**
(*Not used.*)

If the machine misdetects an ICM tone as an end-of-call tone, it disconnects the line even during recording of the ICM. If it happens, change the percentage of the guard tone response time relative to the end-of-call tone ON time with these selectors.

If the percentage of the actual guard tone response time is more than the setting made by these selectors, the machine interprets it as no detection of end-of-call tone, continuing recording the ICM.

- **Selector 4: Trimming of R key signal issued from cordless handset--For connection to base unit with PBX OFF** (*Not used.*)

For European models, a cordless handset can be registered to up to four base units.

On the cordless handset registered to more than one base unit, if you have programmed an **R** key press as part of a number stored in a Speed-Dial location, you can dial using a Speed-Dial location stored in the handset when connected to the base unit in which *PBX is set to ON*.

When the cordless handset is connected to any other base unit in which *PBX is set to OFF*, however, using a Speed-Dial location may dial an unintended telephone number or cause a malfunction due to the programmed **R** key signal preceding the intended number. To avoid such problems, enable the **R** key signal trimming function with this selector so that the base unit dials trimming the received **R** key signal.

- **Selector 5: Call transfer to cordless handset from telephone(s) connected in parallel with the machine (base unit)** (*Not used.*)

Enabling this function allows the machine (base unit) to transfer a call transferred from telephone(s) connected in parallel with the machine to the cordless handset.

WSW59 (Function setting 24)

Selector No.	Function	Setting and Specifications																																																																																																		
1	Transmission of USB serial number to PC	0: Enable (default) 1: Disable																																																																																																		
2	Extension of the waiting time between ANSam and DIS	0: Enable (default) 1: Disable																																																																																																		
3 7	Checking of the specified character code set when displaying or printing the folder/file names stored in memory cards or USB flash memory drives	<table border="0"> <tr> <td>No.</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0: ASCII (default for U.S.A/ European models)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1: Latin1 (CP1252)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0: Latin2 (CP1250)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1: Cyrillic (CP1251)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0: SJIS (CP932) (default for Japanese models)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>1: Thai (CP874)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0: Korean (CP949)</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1: Traditional Chinese (CP950)</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0: Simplified Chinese (CP936) (default for Chinese and Asia & Pacific models)</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1: Arabic (CP1256)</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Reserved.</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1 1 1 1 1</td> </tr> </table>	No.	3	4	5	6	7			0	0	0	0	0	0: ASCII (default for U.S.A/ European models)		0	0	0	0	1	1: Latin1 (CP1252)		0	0	0	1	0	0: Latin2 (CP1250)		0	0	0	1	1	1: Cyrillic (CP1251)		0	0	1	0	0	0: SJIS (CP932) (default for Japanese models)		0	0	1	0	1	1: Thai (CP874)		0	0	1	1	0	0: Korean (CP949)		0	0	1	1	1	1: Traditional Chinese (CP950)		0	1	0	0	0	0: Simplified Chinese (CP936) (default for Chinese and Asia & Pacific models)		0	1	0	0	1	1: Arabic (CP1256)		0	1	0	1	0								Reserved.							1 1 1 1 1
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8	Improvement of DTMF detection function (to minimize the effects of momentary power failure or noise)	0: Disable 1: Enable (default)																																																																																																		

Note: Selector 2 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

• **Selector 1: Transmission of USB serial number to PC**

By default, the machine transmits the USB serial number to the connected PC.

If Windows Vista is running on the PC, the transmission of the USB serial number to the PC might cause a problem. If it happens, disable the transmission with this selector.

• **Selector 2: Extension of the waiting time between ANSam and DIS**

Setting this selector to "0" extends the waiting time between the ANSam and DIS in order to secure the time required for switching the calling machine's echo suppressor in transmission from a G3 to G4 FAX machine.

- **Selectors 3 through 7: Checking of the specified character code set when displaying or printing the folder/file names stored in memory cards or USB flash memory drives**

Setting these selectors to "0, 0, 0, 0, 0" does not check any character code set. When folder/file names stored in memory cards or USB flash memory drives contain Chinese characters, for example, those characters may get garbled in displaying on the color LCD or printing indexes. If it happens, select the character code set of the language in use with these selectors.

- **Selector 8: Improvement of DTMF detection function (to minimize the effects of momentary power failure or noise)**

When DTMF cannot be detected due to a momentary power failure or noise, try to use this selector.

WSW60 (Function setting 25)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Key repeat start time and interval for the touch panel (<i>Not used.</i>)	No. 2 3 0 0 : 0.5 sec. 0 1 : 1.0 sec. 1 0 : 1.5 sec. 1 1 : 2.0 sec.
4 5	Adjustment of temporary connection timing of Caller ID (<i>Not used.</i>)	No. 4 5 0 0 : No adjustment (default) 0 1 : Fast 1 0 : Standard 1 1 : Slow
6	Output of CNG detection result to the activity report	0: Disable 1: Enable (default)
7 8	Delay time from detection of a line polarity reversal until permission of polarity reversal interrupt	No. 7 8 0 0 : 500 ms 0 1 : 750 ms 1 0 : 1000 ms 1 1 : 1500 ms

sec.: second(s), ms: millisecond(s)

Note: Selectors 2 and 3 are applicable to models with touch panel.

Note: Selectors 4 and 5 are applicable to Japanese models when caller ID service is available.

- **Selectors 2 and 3: Key repeat start time and interval for the touch panel (*Not used.*)**

These selectors specify the key repeat start time and interval for the touch panel.

The time (in seconds) specified by these selectors apply to both the key repeat start time and interval. If these selectors are set to "0, 0," however, the key repeat start time is 0.5 second, but the interval is changed from 0.5 second that applies to the first 2.5 seconds to 0.2 second that applies after the first 2.5 seconds.

- **Selectors 4 and 5: Adjustment of temporary connection timing of Caller ID** (*Not used.*)

If the machine cannot receive Caller ID, try to adjust the temporary connection timing of Caller ID with these selectors.

- **Selector 6: Output of CNG detection result to the activity report**

Setting this selector to "1" (Enable) changes the items to be listed in the activity report as follows.

- FAX NO./NAME → CNG DETECTION STATE (Tone detection status, calling/called status)
- DURATION → RCV MODE (FAX receive mode setting)
- PAGE(S) → EASY RCV (Easy Receive setting)
- RESULT → TRIGGER (FAX receive trigger)

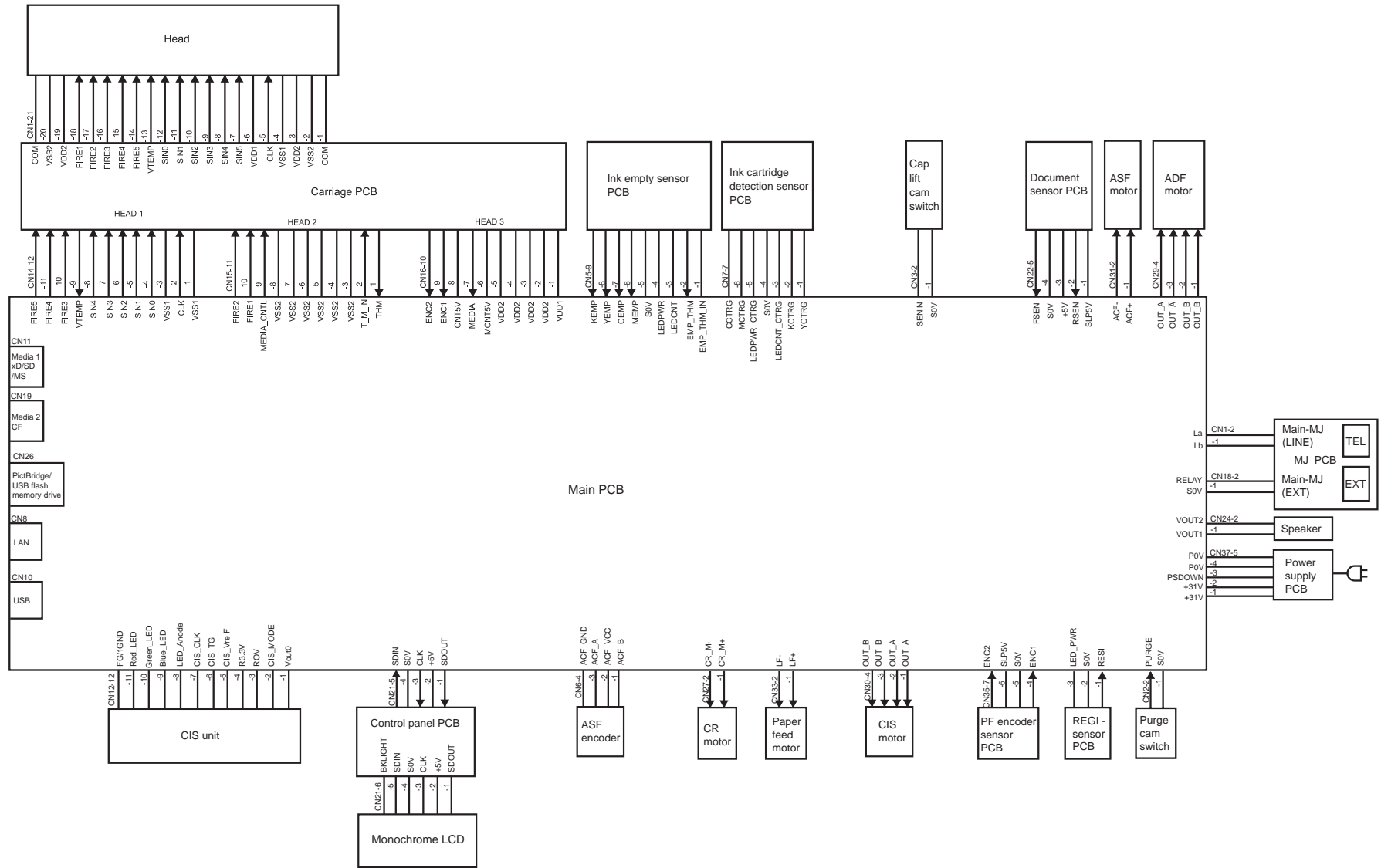
- **Selectors 7 and 8: Delay time from detection of a line polarity reversal until permission of polarity reversal interrupt**

If the machine cannot receive Caller ID due to switching noises from the telephone switchboard, adjust the delay time from the detection of a line polarity reversal until permission of polarity reversal interrupt with these selectors.

Appendix 5. Wiring Diagrams

This appendix provides the wiring diagrams that help you understand the connections between PCBs.

MFC5490CN



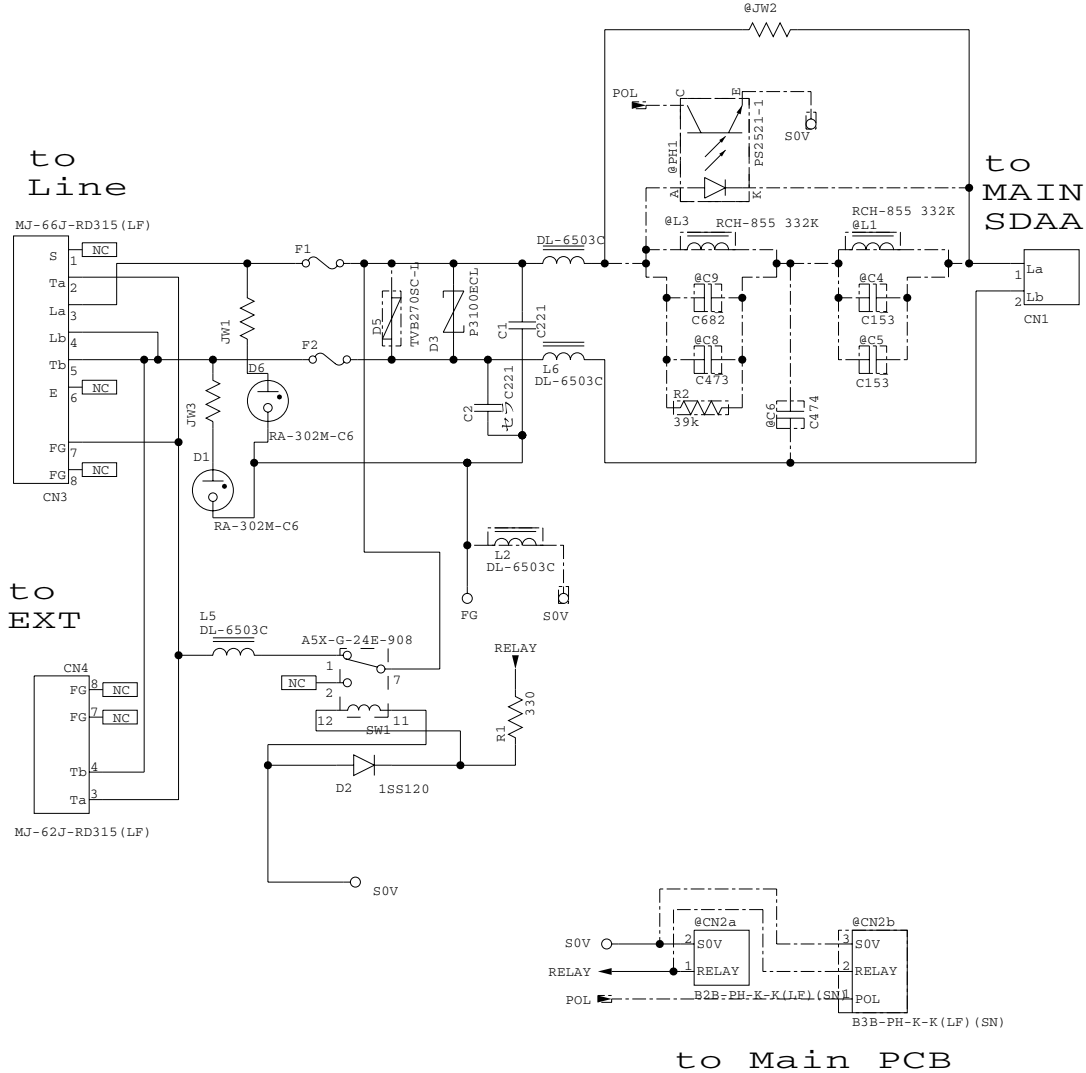
Appendix 6. Circuit Diagrams

This appendix provides the circuit diagrams of the MJ PCB and power supply PCB.

- A. MJ PCB (U.S.A., Canadian, Asian, and Oceanian models)
- A. MJ PCB (European models)
- A. MJ PCB (S. African models)
- B. Power supply PCB (100 V series)
- B. Power supply PCB (200 V series)

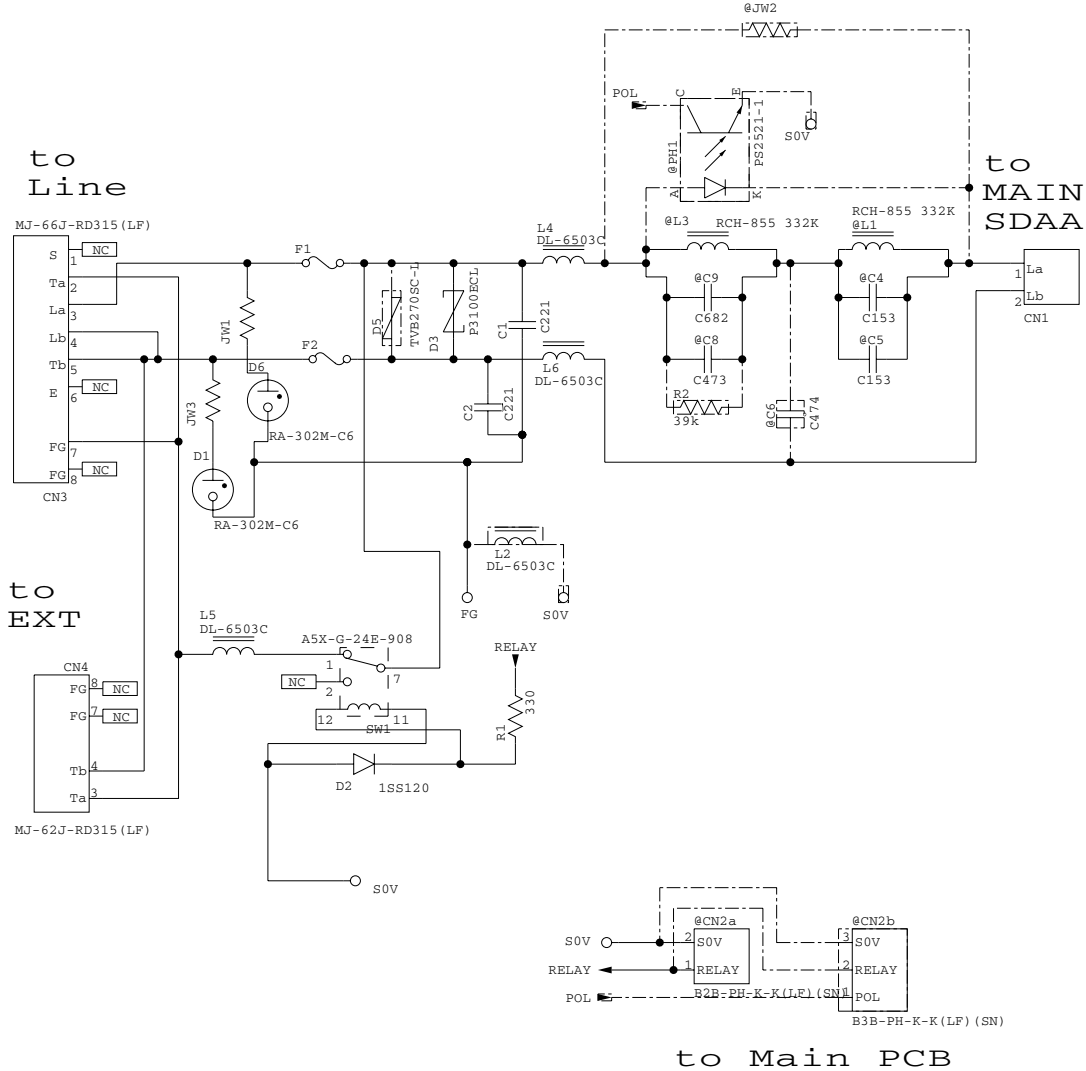
A. MJ PCB (U.S.A., Canadian, Asian, and Oceanian models)

MJ PCB



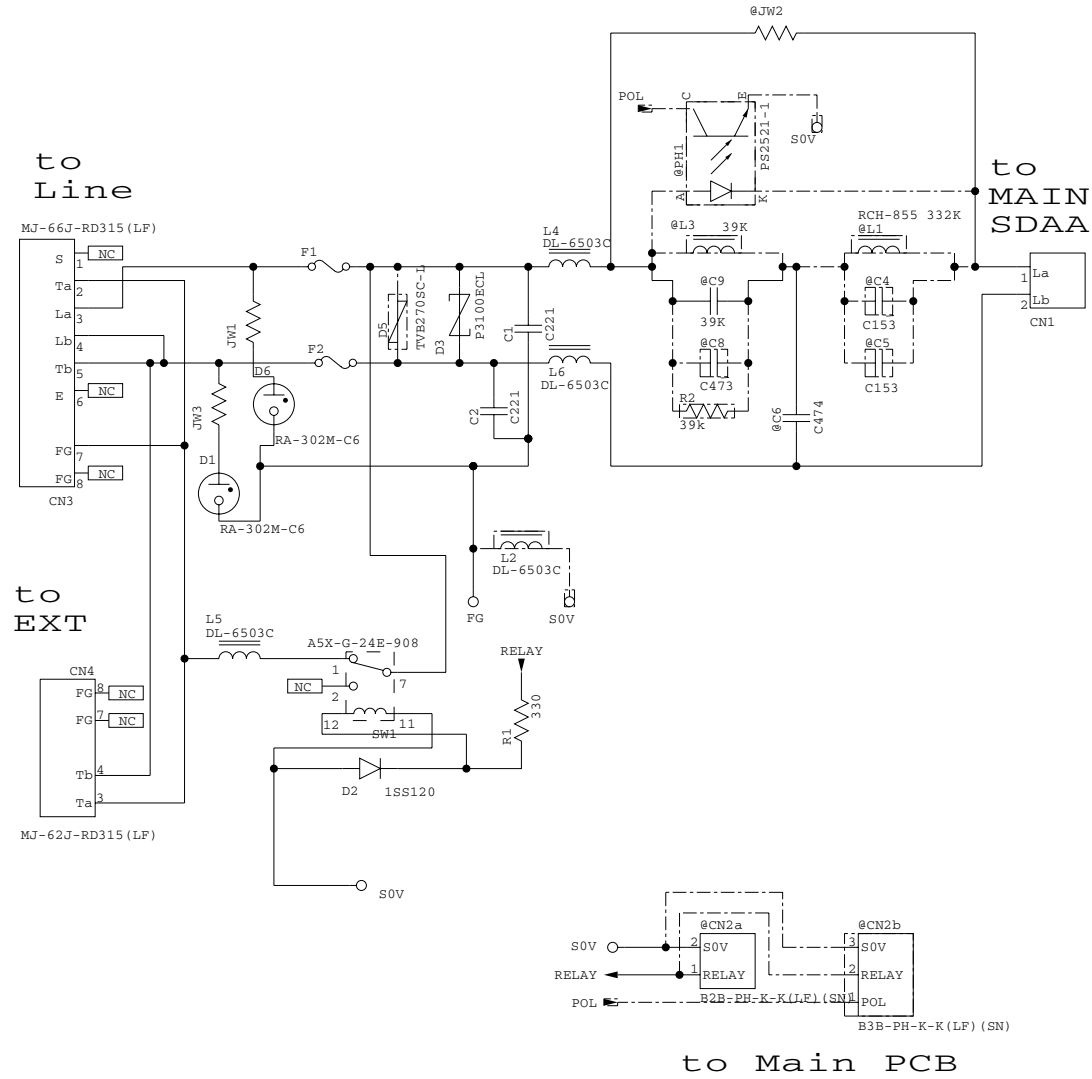
A. MJ PCB (European models)

MJ PCB



A. MJ PCB (S. African models)

MJ PCB



Appendix 7. Deletion of Personal Information

This appendix provides instructions on how to delete personal information (user data) recorded in the machine.

A7.1 Deleting Personal Info from the Machine App. 7-1

A7.1 Deleting Personal Info from the Machine

The personal information (user data) in the machine is recorded in the EEPROM on the main PCB. It cannot be deleted all by a single operation. Use Function code 01 in the maintenance mode and then unplug the power cord from the electrical outlet.

[1] Using Function code 01

Using Function code 01 (EEPROM parameter initialization) in the maintenance mode deletes the following data that have been recorded in the main PCB:

- Activity report
- Station ID data
- Outside line number
- One-touch dialing
- Speed dialing
- Group dialing
- Call transfer data

■ Operating Procedure

- (1) On the machine, press the **Menu** and **Black Start (Mono Start)** keys in this order. Next press the **▲** key four times to make the machine enter the maintenance mode. (Refer to [Chapter 9](#).)

TIP: Models equipped with a numerical keypad on the control panel can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu**, *****, **2**, **8**, **6** and **4** keys in this sequence.

The machine beeps for approx. one second and displays "■■ MAINTENANCE ■■■" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

- (2) Press the **0** and **1** keys in this order in the initial stage of the maintenance mode.
The "SELECT 01?" appears on the LCD.
- (3) Press the **Black Start (Mono Start)** key.
Parameter initialization starts and the "PARAMETER INIT" appears on the LCD.
- (4) Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

[2] Unplugging the power cord from the electrical outlet

Unplugging the power cord from the electrical outlet deletes the Caller ID list, fax data received into memory, transmission verification report (for image), broadcasting report and batch transmission data (in the memory.)

■ Operating Procedure

- (1) Unplug the power cord from the electrical outlet.
- (2) Leave the machine for approx. 24 hours.