SERVICE MANUAL

Folder / Duplo Folder

DF-999/DF-999A

DF-990/DF-990A

Duplo

2019/09 **Revision 1**

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

Purpose

This manual describes technical details of the product for service engineers to understand the operational principles of the product so that they can provide appropriate maintenance and repair services on the market.

As this manual provides information for all regions in which the product is sold in, it may contain information which may not apply to certain regions.

Revision

The information contained in this manual may be subject to change due to product improvement.

In such cases, this manual will be revised as necessary.

Until the revision is completed, please refer to quality service information issued.

Trademark

The product name and company name used in this manual are trademarks or registered trademarks of the respective companies.

Copyrights

CAUTION

Handle this manual with extreme care. In particular, exercise extreme precautions against leakage of technical information.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

PREFACE

Most accidents occur due to failure to observe basic safety rules and precautions. To prevent accidents, it is important to prevent causes of accidents. Engineers performing the servicing of this product on the market (hereafter referred to as SPs) must attend service skill classes before providing servicing, as well as read this manual thoroughly to fully understand safety precautions and appropriate servicing procedures.
Otherwise, servicing the product without adequate knowledge may result in unexpected accidents.
As it is not possible to list all possible hazards which may occur during servicing, SPs must always pay extreme safety precautions during servicing, apart from the precautions described on the product and in this manual.

1 OUTLINE OF THIS MANUAL

1.1 Components of this manual

The information contained in this manual on servicing work for this product is divided into the following chapters.

PREFACE
Describes how to read this manual, safety warning for handling this machine, and environmental considerations.

CHAPTER 1 INTRODUCTION
Mainly describes details to be explained to users such as system configuration, features, specifications, names of parts, user menus, user maintenance, etc.

CHAPTER 2 OPERATIONS
Describes overall operations and mechanisms and control methods of parts.

CHAPTER 3 DISASSEMBLY/ASSEMBLY
Describes disassembly and assembly procedures of parts to be replaced periodically, expendable parts, semi-durable parts, boards, and main units.

CHAPTER 4 MAINTENANCE/INSPECTION
Describes tools, solvents, and lubricants required for servicing, list of parts to be replaced periodically, list of expendables, list of semi-durable parts, and periodic servicing methods.

CHAPTER 5 STANDARDS/ADJUSTMENTS
Describes mechanical and electrical adjustment methods and specification values.

CHAPTER 6 MAINTENANCE MODE
Describes check menus for servicing, simulation mode, operation check of electrical parts, and version upgrade procedures.

CHAPTER 7 TROUBLESHOOTING
Describes troubleshooting methods when the desired results cannot be obtained, when error messages are displayed, and when operations fail.

APPENDIX
Provides menu maps, layout of electrical parts, and layout of boards.

This manual does not describe the disassembly and assembly procedures for all parts.
For details of parts not described in this manual, refer to the separate “Parts Catalogue.”

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

1.2 Electrical parts

Electrical parts are indicated with “symbol + number (two or three digits)” in this manual. While most parts are shown with a sequence number, some parts are organized by categories of functions and units. When only one part exists in a category, the part is indicated only by a symbol without a number.

Note
“Layout of Electrical Parts” in the Parts Catalog uses the same symbols as used in this manual.

Type		Symbol	Comment
Brake		BRK	When a clutch and brake are integrated, “CL/BRK” is used.
Clutch		CL	
Counter		CNT	
Motor	Motor	M	
	Fan motor	FM	
Solenoid		SL	
Sensor	Photo sensor	PS	For a discrete photo sensor, "e" (emitter) or "r" (receiver) is added at the end.
	Thermistor	TM	
	Other sensors	S	Sensors with a particular function For an ultrasonic sensor, “t” (transmitter) or “r” (receiver) is added at the end.
Switch	Power switch	PSW	
	Safety switch	SSW	
	Other switches	SW	
Board	Board	PCB	
Battery		BAT	
Others	Circuit breaker	CB	
	Fuse	F	
	Heater	H	
	Inverter	INV	
	Lamp	LMP	"LED" is used for LED itself and other LEDs on a board.
	Noise filter	NF	
	Resistor	R	A resistor not mounted on the board.
	Relay	RL	
	Transformer	T	
	Temperature fuse	TH	
	Contactor	COT	
	Scanner	SC	
	Inlet	INL	
	Camera	CAM	
	SD card	SDC	

1.3 Abbreviations

In this manual, each destination is written in an abbreviated form as follows.

JPN: JPN is an abbreviation for Japan.
NA: NA is an abbreviation for North America.
EU: EU is an abbreviation for European Union.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

2 SAFETY PRECAUTIONS

This manual indicates and describes operations and uses which are accompanied by safety risks to prevent injuries to users and others as well as damage to property using the following symbols.

⚠ WARNING	Ignoring this mark could result in the possibility of serious injury or even death.
⚠ CAUTION	Ignoring this mark could result in the possibility of injury or physical damage.

△	This symbol indicates "warning" or "caution." Sometimes, it may contain a graphic inside to detail the "warning" or "caution" more specifically.
⊘	This symbol indicates a "forbidden action." Sometimes, it may contain a graphic inside to detail the "forbidden action" more specifically.
●	This symbol indicates an "instruction" which must be followed. Sometimes, it may contain a graphic inside to detail the "instruction" more specifically.

2.1 Power supply

To ensure the stable performance, the power supply certainly has to be capable of the ratings of product as follows.

- Rated voltage and frequency:
  100 V AC 50/60 Hz (JPN)
  100 to 240 V AC 50/60 Hz (NA, EU)
- Rated power consumption:
  100 W (JPN, NA, EU)
- Rated current:
  1.0 A (JPN)
  1.0 to 0.5 A (NA, EU)

A supply disconnecting device in this product is the inlet (the power inlet of this product). When servicing, to avoid various accidents such as unexpected power on, always keep the supply disconnecting device under the immediate supervision of the service person to ensure safety. If there are two or more service persons, share the state of supply disconnecting device and keep it under the immediate supervision of each service person.
Before servicing, disconnect the power cord from the inlet of product and ensure that the product is isolated from the power.
In case that the other instruction is described in the service manual, follow that instruction. Whatever described in the service manual, always keep the supply disconnecting device under the immediate supervision of each service person to ensure safety.

⚠ WARNING

Use only the power supply voltage specified on the main nameplate.
Using other voltages could result in a fire or an electrical shock.

Make sure that the combined power consumption of the appliances to be connected does not exceed the capacity rating of the power outlets or plug receptacles.
Exceeding the capacity rating could cause the power outlets, plug receptacles, or power extension cords to overheat and catch a fire.

⚠ CAUTION

Do not place anything around the socket-outlet to ensure that the power plug can be disconnected anytime.
Failure to disconnect the power plug immediately when the product is working abnormally could result in fire or an electrical shock.

Connect the power plug to a socket-outlet which is easily accessible by hand.
Failure to disconnect the power plug immediately when the product is working abnormally could result in fire or an electrical shock.

2.2 Operating

Use the machine in the following environment.

- Temperature range: 5 to 35°C (–10 to 50°C during storage)/41°F to 95°F (14°F to 122°F during storage)
- Humidity range: 20 to 80%RH (10 to 90%RH during storage, however no condensation)
- Where the outside light does not exceed 1,500 lx
- Which is not subject to direct sunlight
- Which is subject to little or no vibration
- Which is free from air-borne salt
- Where there are no harmful chemicals

⚠WARNING

Keep this unit and the power cord away from heaters and heater vents.
Excessive heat could melt the cover or power cord covering, and result in a fire or an electrical shock.

Do not place metal objects or vessels containing liquids on top of the unit.
The entry of any metal object or liquid could result in a fire or an electrical shock.

Do not insert any metal or easily-combustible object inside this unit.
This could result in a fire or an electrical shock.

⚠CAUTION

Do not install the product in the following places.
Installation in these places could result in fire or electric shock:
○Where temperature is high
○Near fire

Do not install this unit in a location where there is excessive humidity or where contact with water is possible.
Poor choice of location could result in deterioration of the insulation, fire or electrical shock.

Do not install the product near equipment generating strong magnetic force or in magnetic fields.
Doing so could result in erroneous motions and malfunctions.

Install this unit on a level, stable stand or floor, with enough space around it.
Failure to do so could result in the unit overturning and causing injury.

Disconnect the power plug from the power outlet before attempting to move this unit.
Failure to do so could result in power cord damage, fire or electrical shock.

Always disconnect the power plug from the power outlet when the unit is not to be used for an extended period.
Failure to do so could result in fire due to leakage current if the insulation should deteriorate.

2.3 Maintenance/others

⚠ WARNING
Do not damage the power cord or power plug. Do not scratch, alter, bend, twist, pull or place heavy objects on the power cord or power plug. This could result in damage, a fire or an electrical shock.
Do not touch the power plug or power switch with wet hands. This could result in an electrical shock.
Do not use inflammable sprays during cleaning, etc. of internal parts of the machine and in the vicinity of the machine. Doing so could cause build-up of gas inside the machine, which in turn could cause ignition, resulting in fire and explosion. When using alcohol, exercise precaution against fire and ventilate well, and after use, store in a safe place. Use of other solvents may damage the rubber rollers and resin inside the machine, resulting in malfunction.
If any foreign object such as metal or liquid should enter this unit, immediately turn the unit off at the power switch and disconnect the power plug from the power outlet. Failure to do so could result in a fire or an electrical shock.
Before cleaning this unit, turn the unit off at the power switch and disconnect the power plug from the power outlet. Accidental operation of the unit during cleaning could result in injury.
Before beginning servicing work, be sure to turn off the power switch and disconnect the power plug from the socket-outlet. Accidentally operating the product during servicing work could result in injuries. If you have removed a cover when instructed to do so in the service manual, be careful not to get your hands and clothes caught in moving parts while checking operations.
Remove any dust that accumulates on the power plug prongs and the surface of the plug from which the prongs extend. Before removing dust, turn the unit off at the power switch and disconnect the power plug from the power outlet. Accumulated dust could result in a fire.
Always grip the plug when disconnecting the power plug from the power outlet. Forcibly pulling on the power cord could cause damage, resulting in a fire or an electrical shock.
Do not disassemble the product more than necessary. Disassembling parts for which no technical information, etc. is provided in this manual, parts catalogue, technical information guide, etc. could result in fire, electrical shock, and malfunction.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

⚠WARNING

Do no disable the safety function of the product.
The safety function protects the user and product. Do not remodel the product in such a way that it disables the safety function.
Exceptionally, however, the safety function can be disabled temporarily in accordance with the instructions specified in the service manual. If so, it is needed to perform operations carefully.

Do not touch or insert foreign objects into any rotating part during operation.
This could result in injury.

⚠CAUTION

Before beginning servicing work, be sure to check this manual and all technical information provided.

Use the designated tools, solvents, and lubricants as well as safety clothing when performing servicing work.

To prevent electrical damage of electrical parts, before beginning servicing work, touch metal parts which are properly grounded to remove static electricity accumulated in the human body.
Static electricity occurs when clothing rub against each other and this can accumulate in the human body.
This static electricity can damage electrical elements and change the electrical characteristics of devices.

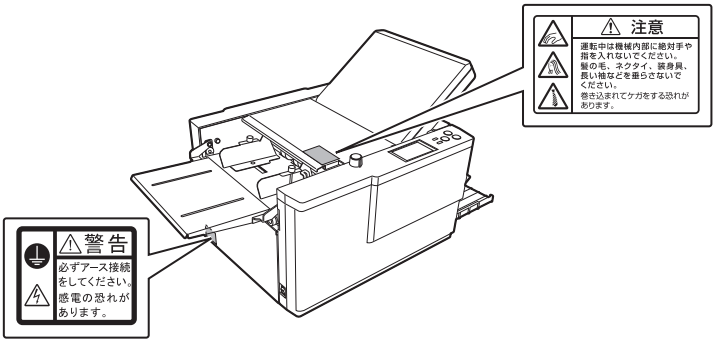
Do not touch the corner or edge section of parts as much as possible when performing service work with the cover of the product removed.
This product also consists of sharp edged parts or sharp pointed parts.
Use gloves when touching pointed parts by necessity.

2.4 WARNING/CAUTION Labels

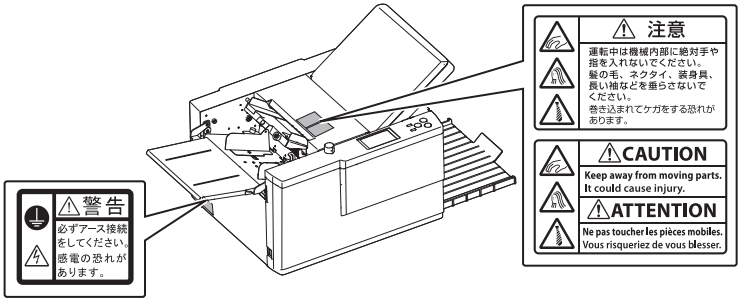
NOTE

"WARNING" and "CAUTION" labels are pasted or printed on the machine to ensure user safety.
Do not remove or change them.
If they become dirty or lost, replace with new ones.

a. For JPN

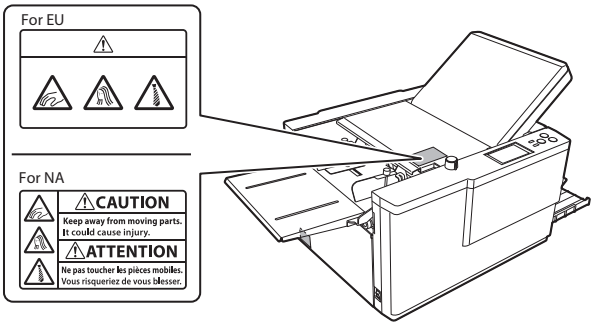


When DF HAND FEED KIT (option) is attached:

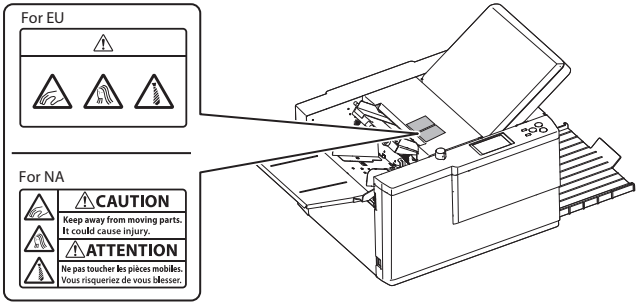


DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

b. For NA and EU



When DF HAND FEED KIT (option) is attached:



3 ENVIRONMENT CONSIDERATION

3.1 Recovery of products

Recover/disassemble and recycle or dispose products which are no longer required in accordance with the regulations of respective countries and regions.

3.2 Recovery of consumables/parts

Recover/disassemble and recycle or dispose consumables/parts which are no longer required in accordance with the regulations of respective countries and regions.
Handle the following parts with particular care as they are subject to restrictions in the respective countries or are difficult to sort by material (complex material).

- Battery
- LCD
- Boards
- Power cords, I/F cables, other cables such as bound-wires, etc.
- Electrical parts such as sensors, switches, motors, clutches, solenoids, etc.

All the electrical parts are followed by symbols in this manual and parts catalog. Refer to these symbols for collection and disassembly of the electrical parts.
☞ PREFACE > 1.2 Electrical parts

Note: This symbol mark is for EU countries only.
This symbol mark is according to the directive 2006/66/EC Article 20 Information for end-users and Annex II.
This symbol means that batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste.
If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows:
Hg: mercury (0.0005%), Cd: cadmium (0.002%), Pb: lead (0.004%)
In the European Union there are separate collection systems for used batteries and accumulators.
Please, dispose of batteries and accumulators correctly at your local community waste collection/recycling centre.

Chapter 1
INTRODUCTION

Chapter 2
OPERATIONS

Chapter 3
DISASSEMBLY/ASSEMBLY

Chapter 4
MAINTENANCE/INSPECTION

Chapter 5
STANDARDS / ADJUSTMENTS

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

Chapter 6
MAINTENANCE MODE

Chapter 7
TROUBLESHOOTING

APPENDIX

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

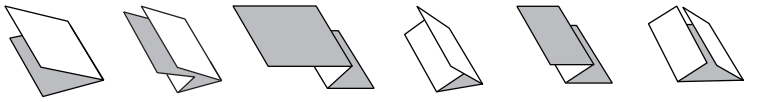
Chapter 1
INTRODUCTION

1 FEATURES

1.1 Main functions

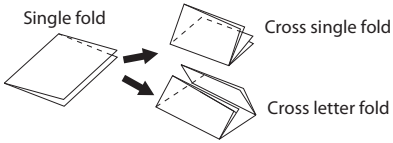
This machine is designed to fold paper into six popular folding modes.

- Single fold
- Double fold
- Irregular accordion fold-out
- Letter fold
- Accordion-fold
- Gate fold



Single fold | Double fold | Irregular accordion fold-out | Letter fold | Accordion-fold | Gate fold

- Use the cross fold lever(*) to fold single folded paper further into standard folding.
  (*): To perform cross fold with the DF-990 (for JPN), the DF CROSS FOLD UNIT (option) is needed.



- Use the DF HAND FEED KIT (option) to bind and fold at maximum three sheets of paper simultaneously.
- The DF COUNTING UNIT (option: JPN) can be used to add the paper counting function to this machine.
- Auxiliary paper guide (option) is can be used to hold down the edge of paper when using large paper.

1.1.1 Machine configuration

Two types of this machine are available, DF-999 (*1) and DF-990 (*2).

Main differences

Item	DF-999/DF-999A	DF-990/DF-990A
Detection of paper size	Automatic	Panel inputting
Paper feed tray up-and-down	Automatic	Operating the paper set lever manually
The number of memories of folding dimension setting value of custom fold	30	15

(*1): The model name is the DF-999A for the destination of NA.
(*2): The model name is the DF-990A for the destination of NA.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

2 SPECIFICATIONS

- Design and specifications are subject to change without notice in order to improve the product.
- The conversion into the number of sheets is based on a reference value applied when using sheets of paper which are not printed.

Symbols and codes in the table
lb: Value converted by Bond Ledger
LEF: Abbreviation of “long edge feed”. No indication of LEF on paper means “short edge feed."

2.1 Basic specifications

2.1.1 Power supply/noise/size/mass

Item			Specifications	
			DF-999/DF-999A	DF-990/DF-990A
Type			Desktop paper folder	
The number of paper-feed shelves			1	
Paper feed tray paper loading capacity		mm	46(*1)	
		inch	1.8	
Usage conditions	Temperature	°C	5 to 35	
		°F	41 to 95	
	Humidity	%RH	20 to 80	
	Outside light	lx	1,500 or less	
	Restrictions		No condensation	
Storage conditions	Temperature	°C	–10 to 50	
		°F	14 to 122	
	Humidity	%RH	10 to 90	
	Restrictions		• No direct sunlight • No condensation • Place with little or no vibration • Free from air-borne salt • Place without harmful chemicals	

(*1) Fine quality paper 64 g/m^2/43.52 lbs (Equivalent to 500 sheets) cross folding shall be 25 mm/0.98 inch or less.

Item			Specifications	
			DF-999/DF-999A	DF-990/DF-990A
Rated power supply	Voltage	V	JPN: 100 V(-10% to +10%) NA, EU: 100 to 240 V(-10% to +10%)	
	Frequency	Hz	50/60	
Current consumption	Maximum value	A	JPN: 1.0 (*2) NA, EU: 1.0 to 0.5 (*2)	
	At normal time		JPN: 0.5 (*3) NA, EU: 0.5 to 0.25 (*3)	
Power consumption	Maximum value	W	100 (*2)	
	At normal time		50 (*3)	
Standby current		A	0.15 (*4)	
Standby power		W	13 (*4)	
Operation sound	Equivalent continuous A-weighted sound pressure level (*L_{Aeq})	dB	DF-999/999A: 71 DF-990/990A: 72 (A-frequency-weighting, F-time-weighting * L_{Aeq} is the value added consideration of the variation with time to the A-weighted sound pressure level L_{pA}.)	
	Sound pressure level at peak (L_{pC})		DF-999/999A: 90 DF-990/990A: 92 (C-frequency-weighting, F-time-weighting)	
	Conditions		・Paper: Fine quality paper 81.4 g/m^2/55.35 lbs, long grain ・Paper size: A4 ・Processing form: Letter fold ・Processing speed: 6 Position of sound collecting microphone ・With the machine placed on the table with the height of 0.6 m/23.62 inches, measured at a distance of 1 m/39.37 inches from the control panel and at a height of 1.55 m/61.03 inches from the floor. Background noise 6 dB below the value of measurement object at least ・Noise test EN13023 J.3.1.1 - Grade 3	

Item			Specifications	
			DF-999/DF-999A	DF-990/DF-990A
Dimensions (W x D x H)	When in use	mm	1046 × 512 × 494	
		inch	41.19 × 20.16 × 19.45	
	Storage space	mm	665 × 512 × 494	
		inch	26.19 × 20.16 × 19.45	
	Set up space	mm	1112 × 512 × 554(*5)	
		inch	43.78×20.16×21.82(*5)	
		mm	1112 × 512 × 582(*6)	
		inch	43.78 × 20.16 × 22.92(*6)	
		mm	1189 × 512 × 554(*7)	
		inch	46.82 × 20.16 × 21.82(*7)	
Weight (mass)		kg	DF-999: 43 (*8) DF-990: 42 (*9)	
		lb	DF-999A: 94.8 (*8) DF-990A: 92.6 (*9)	

(*2) Conditions
Paper: coated paper 127 g/m^2/86.36 lbs, Paper size: 297 × 420 mm/11.69 × 16.54 inches, Processing form: double fold,
Processing speed: 7, Feeding pressure: 6, Separating pressure: 4

(*3) Conditions
Paper: fine quality paper 81.4 g/m^2/55.35 lbs, Paper size: A4, Processing form: single fold, Processing speed: 7, Feeding pressure: 1, Separating pressure: 0.5

(*4) Conditions
100 V 50 Hz

(*5) When DF HAND FEED KIT is not installed, at maximum paper size loading.

(*6) When DF HAND FEED KIT is installed, at maximum paper size loading.

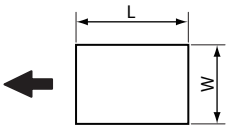
(*7) DF COUNTING UNIT (for JPN only) is installed, at maximum paper size loading.

(*8) Including accessories (1.0 kg/2.2 lb).

(*9) Including accessories (NA, EU: 1.0 kg/2.2 lb, JPN: 0.9 kg/2.0 lb).

2.2 Media

2.2.1 Paper

<table>
<tr><th colspan="3" rowspan="2">Item</th><th colspan="2">Specifications</th></tr>
<tr><th>DF-999/DF-999A</th><th>DF-990/DF-990A</th></tr>
<tr><td rowspan="7">Size (W×L)</td><td rowspan="2">Maximum</td><td>mm</td><td colspan="2">311 x 457.2</td></tr>
<tr><td>inch</td><td colspan="2">12.24 x 18.0</td></tr>
<tr><td rowspan="2">Minimum</td><td>mm</td><td colspan="2">74 x 105</td></tr>
<tr><td>inch</td><td colspan="2">2.91 x 4.13</td></tr>
<tr><td rowspan="2">Standard paper</td><td>mm</td><td colspan="2">A3, A4, A5, B4, B5, B6</td></tr>
<tr><td>inch</td><td colspan="2">LGR, LGL, LTR, STMT, INV</td></tr>
<tr><td colspan="4"> 

Conditions:
Paper of less than 128.0 mm/5.04 inches (length direction) is specified as the following conditions.
・ Paper: 64.0 to 81.4 g/m^2/43.52 to 55.35 lbs
・ Paper jogging at the paper ejection stacker section shall not be considered.
・ Processing speed: 3 to 4 speed</td></tr>
<tr><td colspan="3">Paper type</td><td colspan="2">Sheet
Single fold</td></tr>
<tr><td colspan="3">Curl amount
 
</td><td colspan="2">Curling height (H): 5 mm/0.19 inch or less
Vertical curling volume (R): R130 or more, no surge
NOTE
When using the paper curling more than the values specified above, correct the curl of paper.</td></tr>
<tr><td colspan="3" rowspan="2">Paper quality and paper thickness (ream weight)</td><td>Fine quality paper</td><td>46.5 to 157 g/m^2/31.62 to 106.76 lbs</td></tr>
<tr><td>Art paper
Coated paper</td><td>84.9 to 127.9 g/m^2/57.73 to 86.97 lbs(*1)</td></tr>
</table>

(*1) Stacking height on the paper feed plate: 25 mm/0.98 inch or less

2.3 Mechanism and method

2.3.1 Paper feed/conveyance/paper receiving

Item	Specifications	
	DF-999/DF-999A	DF-990/DF-990A
Control panel	Touch panel LCD display (color 4.3-inch) Start, stop, test feed, paper ejection (folding plate) Button input for paper ejection	
Paper stacking method	Straight stacking	
Separation method	Urethane separation plate	
Paper feed method	Triple ring	
	Friction paper feed	
Paper ejection section paper conveyance method	Stacker roller	
	Flat belt conveyance	
Stacker roller moving method	Motor driving method	
Paper feed tray up-and-down	Automatic motor driving method	Manual method
Paper receiving method	Straight stacking, imbricate stacking method	

2.4 Performance and functions

2.4.1 Processing performance

Item		Specifications	
		DF-999/DF-999A	DF-990/DF-990A
Interlock		Top cover switch	
		Side cover L switch	
		Folding plate switch	
Counter		Maximum 5-digit display(*1)	
Processing speed (maximum)	sets/min.	260(*2)	
Folding mode(*3)		Single fold	
		Double fold	
		Irregular accordion fold-out	
		Letter fold	
		Accordion-fold	
		Gate fold(*4)	
		Specified cross folding(*5)	
		Other deformed folding(*6)	
Automatic moving section		Folding plate 1 stopper position	
		Folding plate 2 stopper position	
		Stacker roller position	

Item				Specifications	
				DF-999/DF-999A	DF-990/DF-990A
Folding position correction	Standard folding (standard paper)		mm	−5.0 to +5.0 (*7)	
			inch	−0.197 to +0.197 (*7)	
		Minimum correction unit	mm	0.1	
			inch	0.004	
		Correction of folding dimension A	mm	−5.0 to +0.6 (*8)	
			inch	−0.197 to +0.024 (*8)	
			mm	−3.8 to +5.0 (*9)	
			inch	−0.150 to +0.197 (*9)	
		Correction of folding dimension B	mm	−5.0 to +0.5 (*8)	
			inch	−0.197 to +0.020 (*8)	
			mm	−0 to +5.0 (*10)	
			inch	−0 to +0.197 (*10)	
			mm	−0.5 to +5.0 (*11)	
			inch	−0.020 to +0.197 (*11)	
		The number of memories of folding dimension correction value		JPN/EU: 36 NA: 30	
	Standard folding (non-standard paper)		mm	−5.0 to +5.0 (*12)	
			inch	−0.197 to 0.197 (*12)	
		Minimum correction unit	mm	0.1	
			inch	0.004	
		The number of memories of folding dimension correction value		0 (*12)	
	Custom fold	Folding dimension A setting	mm	42.0 to 325.0	
			inch	1.654 to 12.795	
		Folding dimension B setting	mm	0, 47.0 to 217.0	
			inch	0, 1.850 to 8.543	
		The number of memories of folding dimension setting value		30	15
Paper length input	Single fold		mm	105.0 to 457.2	
			inch	4.13 to 18.00	
	Double fold		mm	182.0 to 457.2	
			inch	7.17 to 18.00	
	Irregular accordion fold-out		mm	182.0 to 457.2	
			inch	7.17 to 18.00	
	Letter fold		mm	141.0 to 457.2	
			inch	5.55 to 18.00	
	Accordion-fold		mm	141.0 to 457.2	
			inch	5.55 to 18.00	
	Gate fold		mm	128.0 to 432.0	
			inch	5.04 to 17.00	

(*1) Subtraction mode/addition mode can be selected on the user setting screen.
(*2) Paper: Fine quality paper (long grain) of 81.4 g/m^2/55.35 lbs
Paper size: A4 (lengthways)
Processing form: Single fold
(*3) There are limits to the folding form depending on paper quality and paper size.
- Thick paper of 157 g/m^2/106.76 lbs or more exceeding B4 size can be used only in single fold.
- Only 64 g/m^2/43.52 lbs of paper can be used for double fold and irregular accordion fold-out of B6 size paper. (Folding speed : 4 speed more , Folding dimension B: 47 mm/1.85 inches more)
- 157 g/m^2/106.76 lbs of paper in a low temperature environment (20°C/68°F or less) can not be folded except for single fold.

(*4) 64 g/m^2/43.52 lbs or less short grain paper cannot be used for gate fold.
Paper length: 432 mm/17 inch or less
(*5) Fine quality paper of 52.3 to 104.7 g/m^2/35.56 to 71.20 lbs can be used for cross fold.
Single fold finished of paper size: Width 105 to 210 mm/4.13 to 8.27 inches
Length 148 to 311 mm/5.83 to 12.24 inches
(*6) Maximum finished length of custom fold is 230 mm/9.06 inches or less.
(*7) The folding dimension B cannot be changed for single fold.
(*8) Paper size: LGR, Folding form: gate fold
(*9) Paper size: B6, Folding form: irregular accordion fold-out
(*10) Paper size: B6, Folding form: double fold, the folding dimension B less than 47 mm/1.85 inches cannot be set.
(*11) Paper size: B6, Folding form: irregular accordion fold-out, the folding dimension B less than 47 mm/1.85 inches cannot be set.
(*12) The folding dimension B cannot be changed for single fold.
The position of folding stopper must be within the following range.
- Folding dimension A: 42.0 to 325.0 mm/1.65 to 12.8 inches
- Folding dimension B: 47.0 to 217.0 mm/1.85 to 8.54 inches
- Save as a custom fold dimension.

2.4.2 Adjusting functions

<table>
<tr><th colspan="2" rowspan="2">Item</th><th colspan="2">Specifications</th></tr>
<tr><th>DF-999/DF-999A</th><th>DF-990/DF-990A</th></tr>
<tr><td colspan="2">Separating pressure adjustment</td><td colspan="2">Dialing type (no stage adjustment)</td></tr>
<tr><td colspan="2">Paper feed pressure adjustment</td><td colspan="2">Eight stages (-1 to 6)</td></tr>
<tr><td rowspan="2">Folding speed adjustment</td><td rowspan="2">sets/min.</td><td colspan="2">5 speed: 242(*1)</td></tr>
<tr><td colspan="2">6 speed: 260(*1)</td></tr>
<tr><td colspan="2" rowspan="6">Manual adjustment</td><td>—</td><td>Paper feed tray up-and-down</td></tr>
<tr><td colspan="2">Auxiliary paper feed tray opening and closing</td></tr>
<tr><td colspan="2">Paper feed guide</td></tr>
<tr><td colspan="2">Paper feed pressure adjustment</td></tr>
<tr><td colspan="2">Separating pressure adjustment</td></tr>
<tr><td colspan="2">Paper feed tray skew correction</td></tr>
<tr><td colspan="2">Stacker paper receiving plate</td></tr>
</table>

(*1) Conditions
Paper: fine quality paper 81.4 g/m^2/55.35 lbs long grain, Paper size: A4, Processing form: single fold

2.5 Additional function

Item	Specifications	
	DF-999/DF-999A	DF-990/DF-990A
Test folding	1 to 3 sheets	
Entire paper length input mode	Available	
Folding stopper fixing function	Stopper fixed mode, refold mode and normal mode can be switched	
Refold mode function		
Processing speed change function	Eight stages (including thin paper mode and thick paper mode) (*1)	
Paper ejection interval (batch) function	ON/OFF can be switched (*2)	
	The sheet number in the interval can be changed (1 to 999 sheets)	
	The interval time can be changed (3 to 30 seconds)	
Interval settings at the start-up time	ON/OFF can be switched (*3)	
Processing speed settings at the start-up time	ON/OFF can be switched (*3)	
Paper ejection function	Available	
Paper ejection function inside the folding plate	Available	
Buzzer sound settings	ON/OFF can be switched (*4)	
Paper stacking detection switching function	ON/OFF can be switched	
Standard paper size detection switching function	ON/OFF can be switched	—
LCD display energy-saving setting mode	ON/OFF can be switched	
	Time before starting the energy-saving mode can be changed (1 to 120 minutes)	
Alarm function (alarm function for forgetting to turn the power off)	ON/OFF can be switched	—
	Time before starting the energy-saving mode can be changed (5 to 120 minutes)	

(*1) The speed can be changed during folding operation.
(*2) The stopper fixed mode and refold mode will start up by the previous interval settings. Starts up by the interval settings of startup settings at the normal time.
(*3) The function cannot be set when the refold mode and stopper fixed mode are set to ON.
(*4) When an error occurs, the buzzer sounds even if the buzzer sound settings is set to OFF.

2.6 Performance standard

Item			Specifications	
			DF-999/DF-999A	DF-990/DF-990A
Folding performance	Misalignment at long edge feed	mm	0.5 or less (*1)	
		inch	0.02 or less (*1)	
	Misalignment at short edge feed	mm	1.0 or less (*1)	
		inch	0.04 or less (*1)	
Stacking performance at the paper ejection			Paper must be straightly stacked (folded dimension: 148 mm/5.83 inches or more) or imbricately stacked. (*2)	

(*1) Conditions
Paper: fine quality paper 81.4 g/m^2/55.35 lbs long grain, Paper size: A4
Temperature, Humidity: NN environment (20°C/68°F, 50%RH)
The processing speed is limited depending on the folding form.

(*2) Paper alignment on the stacker is excluded under the following conditions.
- Custom folding (irregular folding)
- Double fold of paper ream weight 127.9 g/m^2/86.97 lbs or more
- Gate fold of B4 size or more
- Paper of less than 128 mm/5.04 inches length direction
- Gate fold of legal size 127.9 g/m^2/86.97 lbs or more
- Non-fixed size paper (standard size: A3 to B6, LGR to STMT)
- Cross fold

2.7 Option

2.7.1 SPECIFICATIONS

Name	Specifications					
	DF-999/DF-999A			DF-990/DF-990A		
	JPN	NA	EU	JPN	NA	EU
DF HAND FEED KIT	✓			✓		
DF CROSS FOLD UNIT	(*1)			✓	(*1)	
DF COUNTING UNIT	✓	—		—		
DF ULTRASONIC SENSOR KIT	✓			—		

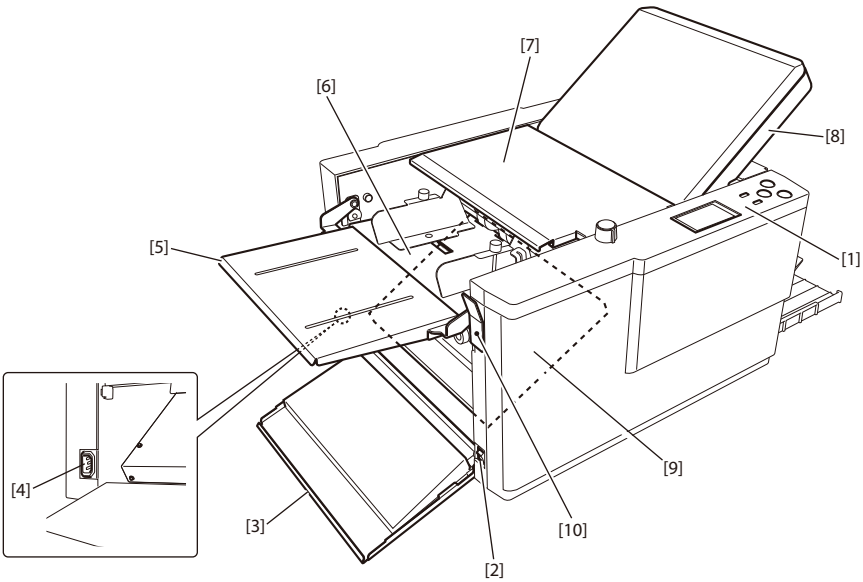
✓ : Available
—: Not available
(*1) Standard accessory

a. DF ULTRASONIC SENSOR KIT

Item		Specifications
Paper quality		Fine quality paper, coated paper
Paper type		Sheet
Paper size (W × L)	mm	100.0 × 148.0 to 311.0 × 457.2
	inch	3.94 × 5.83 to 12.24 × 18.0

3 NAMES OF PARTS

3.1 Exterior

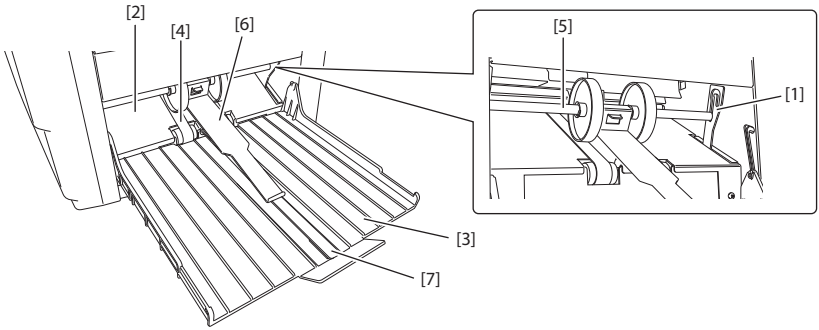


[1] Control panel
[2] Power switch
[3] Side cover
[4] Power inlet
[5] Support paper feed tray
[6] Paper feed tray
[7] Top cover
[8] Folding plate 1
[9] Folding plate 2
[10] Paper set lever (*)

(*): Equipped only for the DF-990/DF-990A

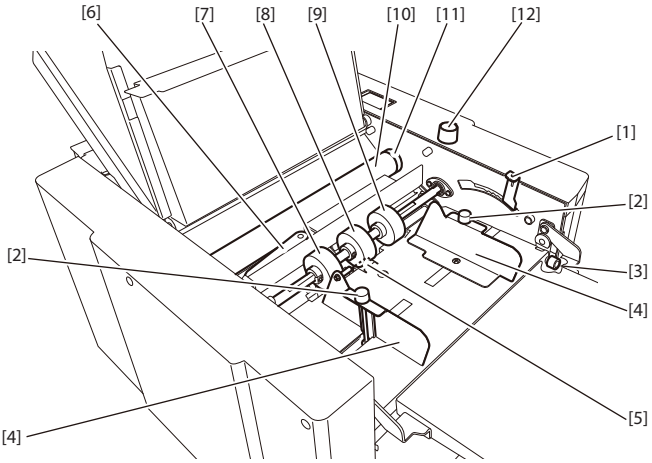
3.2 Internal parts

3.2.1 Paper ejection section



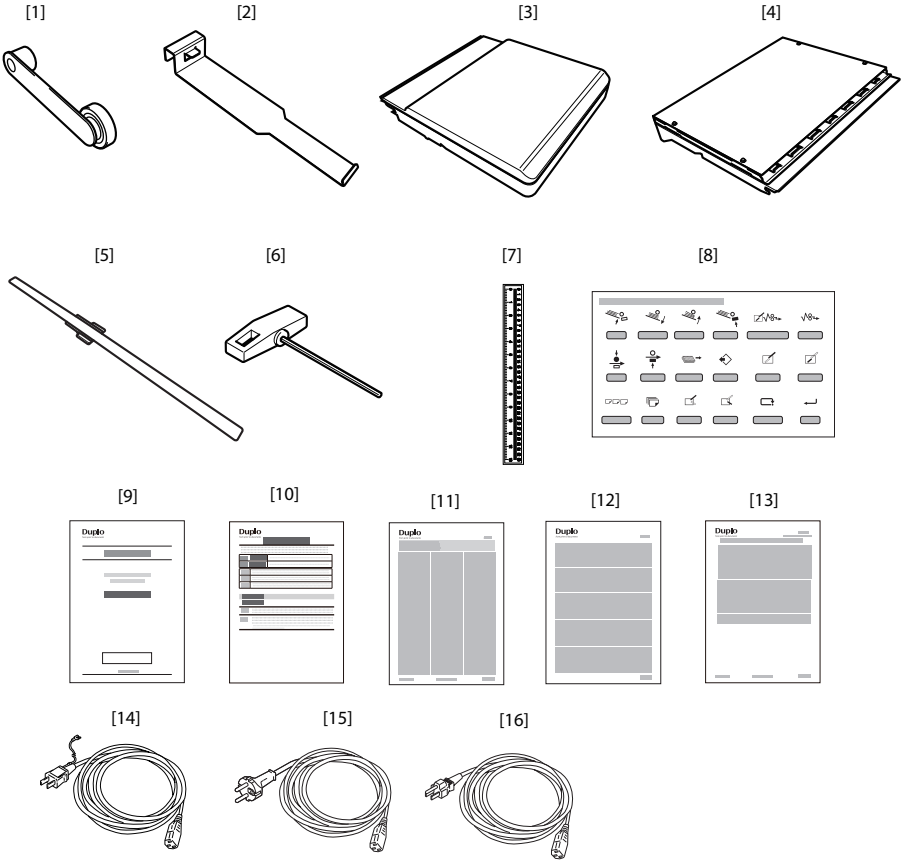
[1] Stacker lever
[2] Eject section
[3] Paper receiving tray
[4] Stacker belt
[5] Stacker roller
[6] Auxiliary paper ejection guide
[7] Paper support guide

3.2.2 Top cover section



[1] Paper feed pressure adjustment lever
[2] Guide fixing screw
[3] Skew correction knob
[4] Paper feed guide
[5] Paper separator
[6] Cross fold lever (*1)
[7] Auxiliary paper feed ring (movable) (*2)
[8] Paper feed ring
[9] Auxiliary paper feed ring
[10] Folding roller
[11] Jam correction knob
[12] Separating pressure adjustment dial
(*1): Optional for the DF-990 (JPN).
(*2): Fixed on the DF-990 (JPN).
This part can be moved by using the optional part.

3.3 Accessories

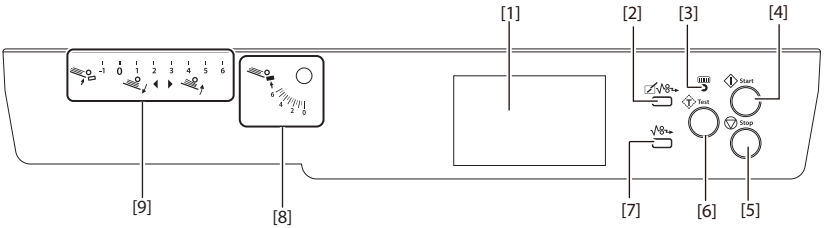


[1] Cross fold lever (*1).....1
[2] Auxiliary paper ejection guide.....1
[3] Folding plate 1.....1
[4] Folding plate 2.....1
[5] Paper support guide.....1
[6] T-handle hexagonal wrench (*1).....1
[7] Scale label.....1
[8] Label, control (*2).....1
[9] Instruction manual.....1
[10] Safety Guide A (*3) (*4).....1
[11] DECLARATION OF CONFORMITY (*3).....1
[12] WEEE Statement (*3).....1
[13] Statement of Electromagnetic Compatibility (EMC) (*4).....1
[14] Power cord unit (*2) 1
[15] Power cord (*3) 1
[16] Power cord (*4) 1

(*1): Optional for the DF-990 (JPN)
(*2): For JPN
(*3): For EU
(*4): For NA

4 CONTROL PANEL

4.1 Control panel

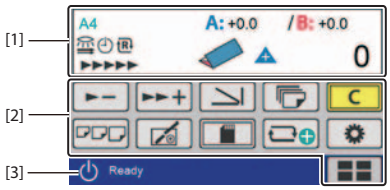


No.	Name	Function
[1]	LCD touch panel	Menu and error messages are displayed. Touch to operate.
[2]	(folding plate paper ejection) key	Press and hold to forcibly eject paper from inside the folding plate.
[3]	Lamp	When the machine is in the power saving mode, the lamp blinks slowly.
[4]	(start) key	Press to start paper folding.
[5]	(stop) key	Press to stop paper folding.
[6]	(test) key	Press to test fold. By testing the paper feed, the machine will remember the thickness of the paper.
[7]	(paper ejection) key	Press and hold to forcibly eject paper from inside the machine.
[8]	Separating pressure adjustment scale	This scale is used when adjusting the separating pressure.
[9]	Paper feed pressure adjustment scale	This scale is used when adjusting the paper feed pressure.

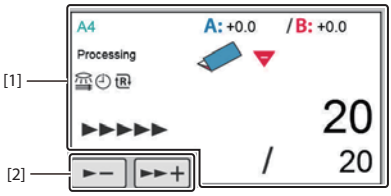
4.2 Ready screen

The following is the first screen displayed when the power is turned on and the processing screen. When the [Initial Screen] setting is other than [Ready], the screen that you set is displayed.

[Ready] screen



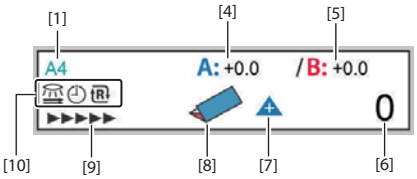
[Processing] screen



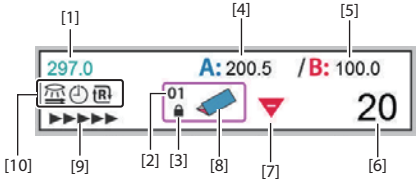
No.	Name	Function
[1]	Touch panel display	Icons and numerical values of set contents are displayed, such as the paper size and folding mode.
[2]	Touch panel operation section	Contains keys to change settings such as processing speed and folding mode.
[3]	Page name	The name of the displayed page. The name is displayed on all the screens except the screen when an error occurs and the processing screen.

4.2.1 Touch panel display

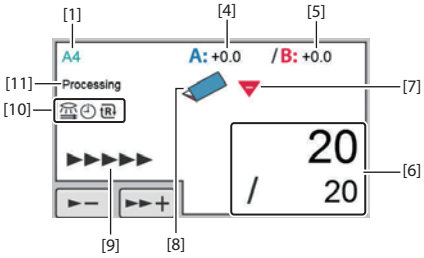
[Ready] screen



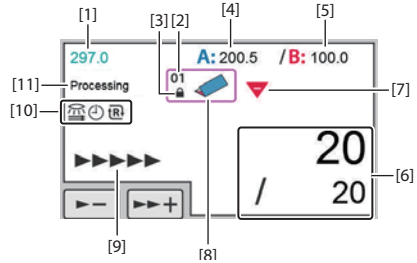
[Ready] screen (custom fold)



[Processing] screen



[Processing] screen (custom fold)



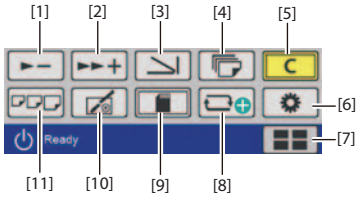
No.	Name	Function
[1]	Paper size	Displays the detected standard paper size. A3/B4/A4/B5/A5/B6 When non-standard paper or custom folding is set, the paper length is displayed.
[2]	Saved data number	Displays the number of saved custom folding data read and used, or the number assigned when custom folding data was newly created and saved. Data is saved with the following numbers: 1 to 30 (*1) 1 to 15 (*2) When data is newly created but not saved, [00] is displayed.
[3]	Saved data lock	Displayed when saved custom folding data is locked.
[4]	Folding plate A position adjustment	Displays the position adjustment value of folding plate A. When in custom folding or stopper fixed mode, folding dimension A is displayed. Setting range: -5.0 to +5.0 (mm)/ -0.197 to +0.197 (inch)
[5]	Folding plate B position adjustment	Displays the position adjustment value of folding plate B. When in custom folding or stopper fixed mode, folding dimension B is displayed. Setting range: -5.0 to +5.0 (mm)/ -0.197 to +0.197 (inch)
[6]	Counter	Displays current counter. Setting range: 0 to 99999 (sheet)
[7]	Count mode	Displays counter mode (addition or subtraction). ▲ Count up ▼ Count down
[8]	Folding mode	Displays the folding mode currently set. When in custom folding or stopper fixed mode, displays a brief shape of the folding form.
[9]	Processing speed	Displays processing speed currently set. The processing speed is not displayed during [Ejecting Paper]. Setting range: 1- to 6+ (speed) ▶ (1-) (thin paper) ▶ (1) ▶▶ (2) ▶▶▶ (3) ▶▶▶▶ (4) ▶▶▶▶▶ (5) ▶▶▶▶▶▶ (6) ▶▶▶▶▶▶ (6+) (thick paper)

No.	Name	Function
[10]	Special function display	Displays special functions currently set.
		Double-feed detection is set. (optical sensor) State where the test folding is not performed.
		Interval function is set.
		The refold mode is set.
		Hand feed is set (*3)
		The stopper fixation mode is set.
		Double-feed detection is set. (ultrasonic sensor) State where the test folding is performed.
		Double-feed detection is set. (ultrasonic sensor) (*1) (*3)
		Double-feed detection is set. (optical sensor) Double-feed detection is not performed because the paper length is 148.0 mm/5.83 inches or less.
[11]	Processing display	Displays current processing content. Testing Processing Idling Ejecting paper

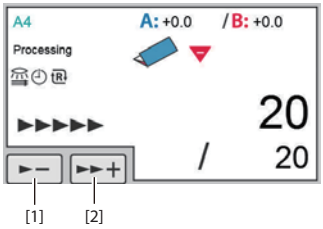
(*1) DF-999/999A
(*2) DF-990/990A
(*3) Option

4.2.2 Touch panel operation section

[Ready] screen



[Processing] screen



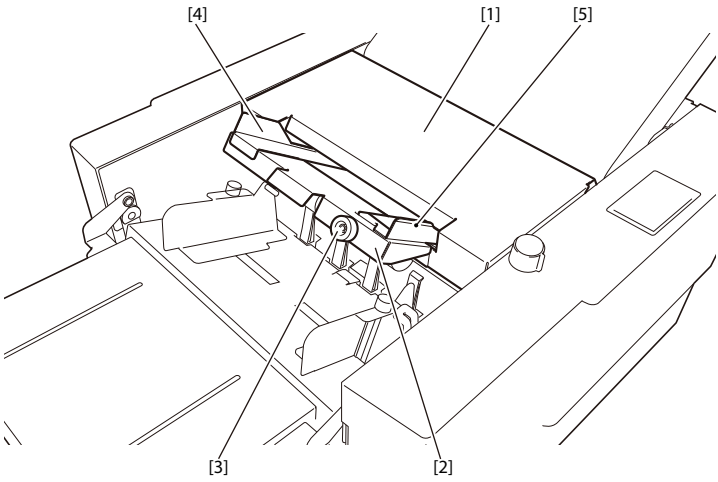
No.	Name	Function
[1]	(Processing speed down) key	The processing speed is slowed each time the key is touched. When processing speed is set to "1-", the key is grayed out and cannot be operated. Adjustable range: 1- to 6+
[2]	(Processing speed up) key	The processing speed is sped up each time the key is touched. When processing speed is set to "6+", the key is grayed out and cannot be operated. Adjustable range: 1- to 6+
[3]	(Folding mode selection) key	When the key is touched, the [Folding Mode] screen is displayed.
[4]	(No. of Sheet setting) key	The [No. of Sheet] screen is displayed when the key is touched.
[5]	(clear) key	Press and hold to clear the counter. When a numerical value is entered, the value is set to the initial value.
[6]	/ / / / (Custom screen) key	Displays icons set in the custom screen. The set screen is displayed when the key is touched. However, it is not displayed when stopper fixed mode, manual feed mode (*) or counting mode (*) or is set. (Standard folding) DF-999/999A: The [Folding Mode] screen of [Standard Fold] is displayed. However, when automatic paper size detection is turned off, the [Standard Size] screen is displayed. DF-990/990A: The [Folding Mode] screen of [Standard Size] is displayed. (Standard folding of non-standard paper) The [Paper Length] input screen of [STD Fold for Non- STD Size] is displayed. (Custom folding) The saved data selection screen of [Custom Fold] is displayed. (Function settings) The [FUNC Setting] screen is displayed. (Language setting) The [Language] setting screen is displayed, and you can change the language displayed on the touch panel. When the [Language] is set on the custom screen, the custom key is displayed in stopper fixed mode, manual feed mode (*), and counting mode (*).

No.	Name	Function
[7]	(Basic settings) key/ (Function settings) key	(Standard folding, Standard folding for non-standard size, Custom folding) The [Basic Settings] screen is displayed when the key is touched. (Stopper fixed mode, manual feed mode (*) and counting mode (*)) The [Function Setting] screen is displayed when the key is touched.
[8]	(Custom folding) key	The [Paper Length] input screen of [Custom Fold] is displayed. However, it is not displayed when stopper fixed mode, manual feed mode (*) or counting mode (*) or is set.
[9]	(Save) key	Settings can be saved such as position adjustment of standard fold, position of stacker roller, new non-standard paper setting and folding setting of custom fold. However, when adjustment values is not changed, the key is grayed out and cannot be operated. However, it is not displayed when stopper fixed mode (*) and counting mode (*) and set.
[10]	(Adjustment) key	The [Fold Position] screen is displayed. Locked custom fold, stopper fixed mode and counting mode (*) can also be adjusted. When automatic paper size detection (DF-999/999A) is turned on, paper size is not detected, and the key is grayed out and cannot be operated.
[11]	(Paper size) key	The [Paper Length] input screen is displayed when the machine is in one of these modes: Standard folding of standard paper (DF-999/999A), standard folding of non-standard paper, custom folding or manual feed (*). However, it is not displayed in custom folding mode. When in standard folding of standard paper (DF-990/-990A), the [Standard Size] screen is displayed.

(*) Option

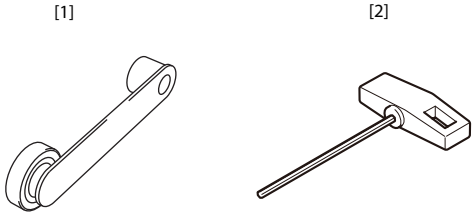
5 OPTION

5.1 DF HAND FEED KIT



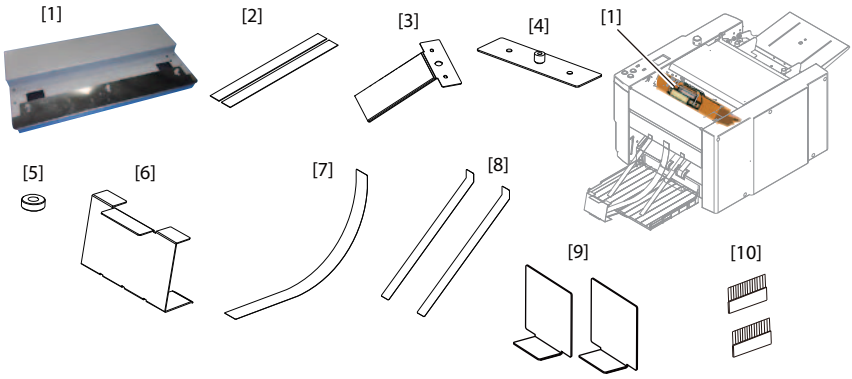
[1] Manual feed top cover
[2] Manual paper feed tray
[3] Manual skew correction knob
[4] Assistant guide
[5] Manual feed guide

5.2 DF CROSS FOLD UNIT



[1] Cross fold lever
[2] T-handle hexagonal wrench

5.3 DF COUNTING UNIT



[1] Guide unit
[2] Magnet sheet
[3] Angle
[4] Plate
[5] Knob screw
[6] Paper receiving stopper
[7] Paper holder 1
[8] Paper holder 2
[9] Paper ejection side guide
[10] Static removal brush

The following options are available.

DF ULTRASONIC SENSOR KIT

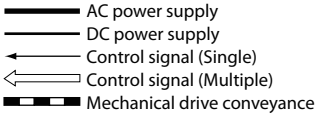
It can be installed on DF-999 (JPN, EU) and DF-999A (NA).

☞ Chap. 2 > 3 PAPER FEED SECTION

Memo

Chapter 2
OPERATIONS

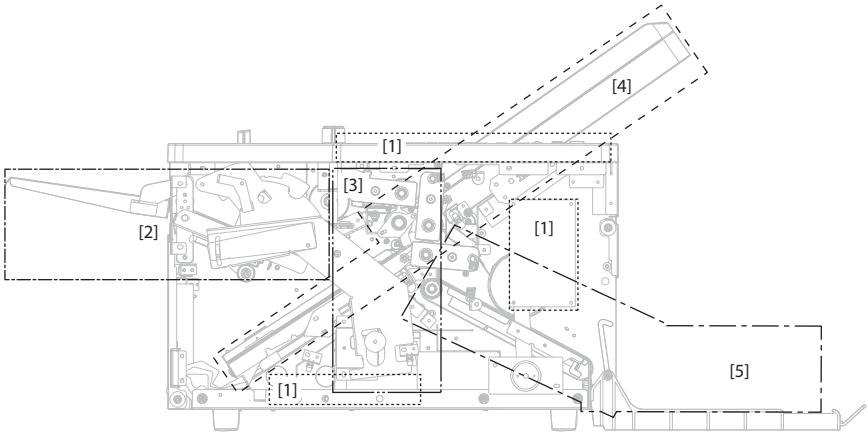
This chapter describes operations and controls for this product, and uses the following symbols to indicate electric circuits and mechanical power transmissions. The arrows provide a general indication of control signals and do not indicate the direction of the flow of electricity.



1 OUTLINE

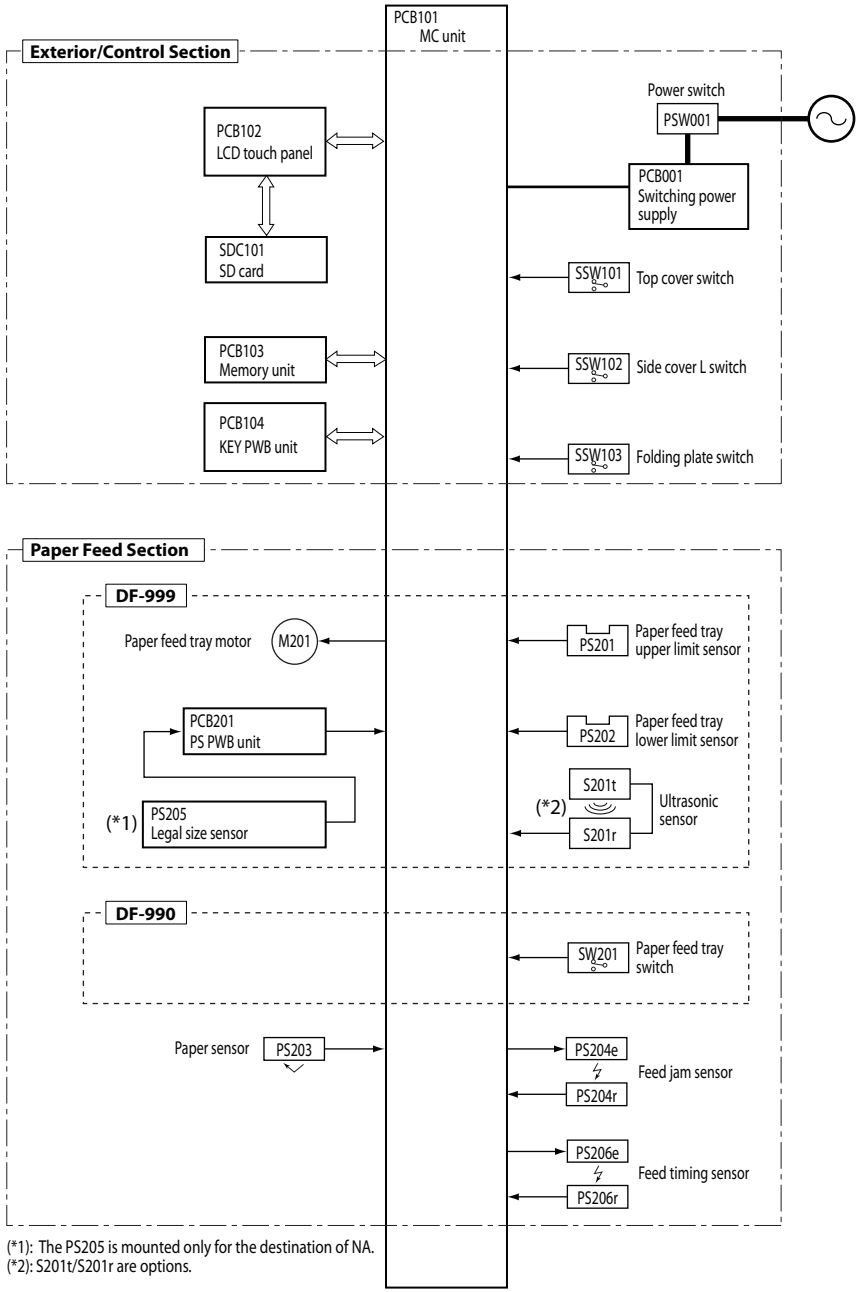
1.1 Functional configuration

The functions of this machine can broadly be divided into the following five types.
[1] Exterior/control section
[2] Paper feed section
[3] Drive section
[4] Folding section
[5] Ejecting section



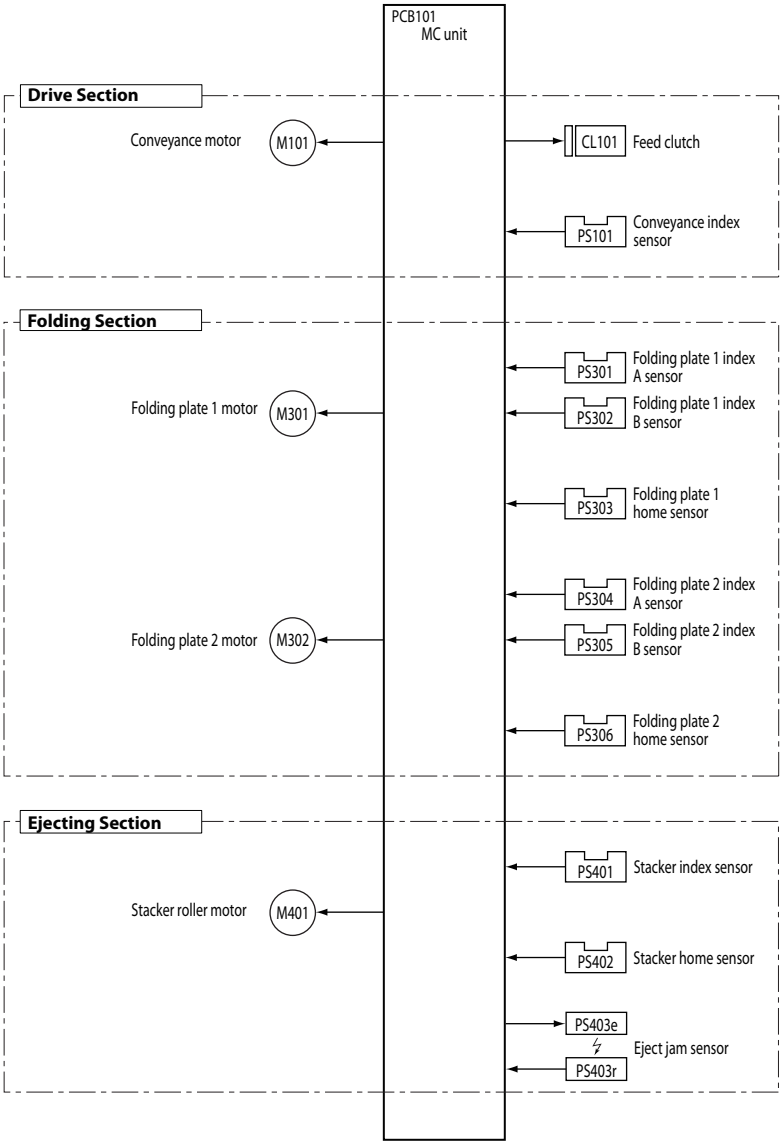
1.2 Outline of electrical circuit

1.2.1 Exterior/control section/paper feed section



(*1): The PS205 is mounted only for the destination of NA.
(*2): S201t/S201r are options.

1.2.2 Drive section/folding section/ejecting section



2 EXTERIOR/CONTROL SECTION

2.1 Power supply

2.1.1 Main parts

Power switch (PSW101)

Turns ON/OFF the AC power.

Switching power supply (PCB001)

Converts the AC power into +24 VDC and supplies it the MC unit (PCB101).
Overvoltage and overcurrent protection circuits have been built-in. If either of these protection circuits operates, all output stops.

Item	Rating	Remarks
Input	85 to 265 VAC 50/60 Hz	
Output	+24 VDC 6.3 A (peak 12.6 A)	
Overvoltage protection circuit	Operates at between +28.8 and +33.6 VDC	
Overcurrent protection circuit	Activated at 12.66 A or more	

2.1.2 Safety function

When it is possible for users to get injured by an accident such that the cover is opened unexpectedly, etc., the machine stops operation immediately to protect the users.
This is a mechanism called "interlock", which stops operation when the cover is opened or when the emergency stop switch is pressed by users, etc.

a. Interlocking system provided with protective switch

In the most critical interlocking system above all safety functions, a protective switch is provided as an actuator.
When the interlocking system is activated, the system will stop the machine operation and forcibly isolate the power to the drive section.

Device to activate the interlock

- Top cover switch (SSW101)
- Side cover L switch (SSW102)
- Folding plate switch (SSW103)

Top cover switch (SSW101)/side cover L switch (SSW102)

An error is displayed on the liquid crystal display (hereinafter referred to as LCD) of the control panel when the top cover or side cover is open during operation, and the relay (RL1) isolate driving power supply (+24 VA).

Folding plate switch (SSW103)

This switch detects the existence or non-existence of the folding plate 1. When the folding plate 1 is removed, an error message is displayed on the LCD, and the relay (RL1) isolate driving power supply (+24 VA).

Device to isolate the power
Relay (RL1)
Mounted on the MC unit (PCB101). When the interlock is activated, the drive power supply (+24 VA) is blocked.

b. Interlocking system provided with exterior cover switch
This machine is not equipped with the interlock where the exterior cover switch is used.

2.2 Control/communication

2.2.1 Main parts

MC unit (PCB101)
Performs overall control of the operations of this machine. It performs two-way serial communications with the LCD touch panel (PCB102).
Its main functions are as follows:

a. Overall control
32-bit microprocessor is mounted and the program is stored in the flash memory of the microprocessor.
The program version in the MC unit can be checked in the maintenance mode. Controls according to the program written in the microprocessor.
☞ Chap. 6 > 3.1 Version check

b. Memory backup
It mounts one memory unit (PCB103) which backs up various setting values.
☞ Chap. 3 > 2.3.2 Memory unit (PCB103)

c. Version upgrade
Version upgrade of the control program can be performed.
☞ Chap. 6 > 4 VERSION UPGRADING

d. Output voltage
Supplies the load-related parts (motor, etc) with +24 VDC supplied from the switching power supply (PCB001) and is partly stepped down by the DC converter circuit.
Generated voltage is used as the power supply of the input-related parts (sensor, etc).

LCD touch panel (PCB102)
Performs two-way serial communications with the PCB101.
Sets the processing details and displays number of sets to be processed or the state of each section.

Memory unit (PCB103)
Mounted on the MC unit and backs up various setting values.

KEY PWB unit (PCB104)
Circuit board to connect to the MC unit.
Delink the keys used with a high frequency such as start/stop and paper ejection from the LCD touch panel, and transmit the instruction to the PCB101.

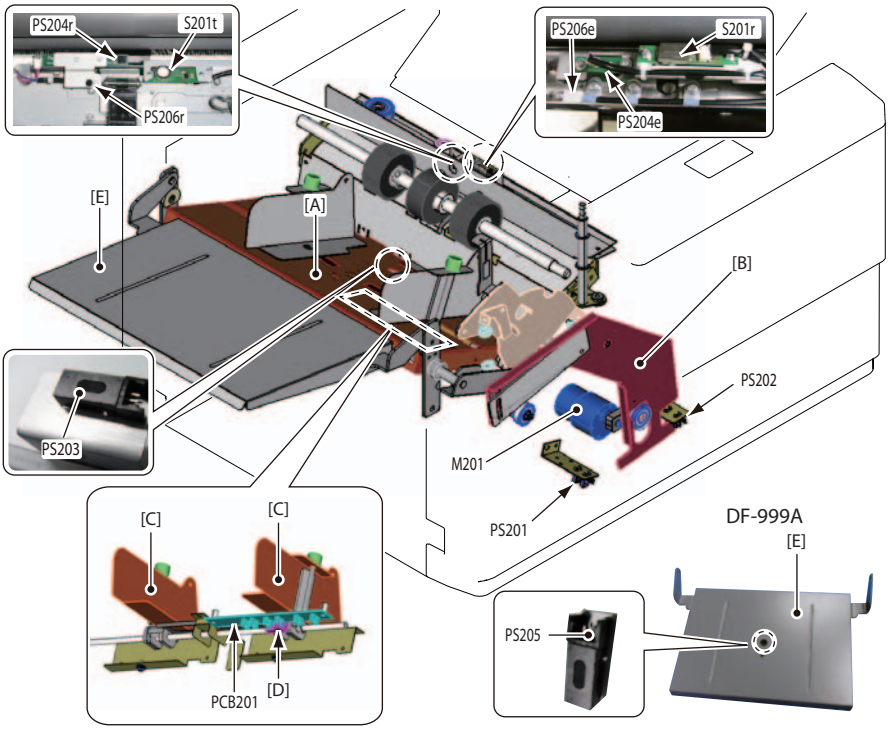
SD card (SDC101)
Mounted in the LCD touch panel to save the image data.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

3 PAPER FEED SECTION

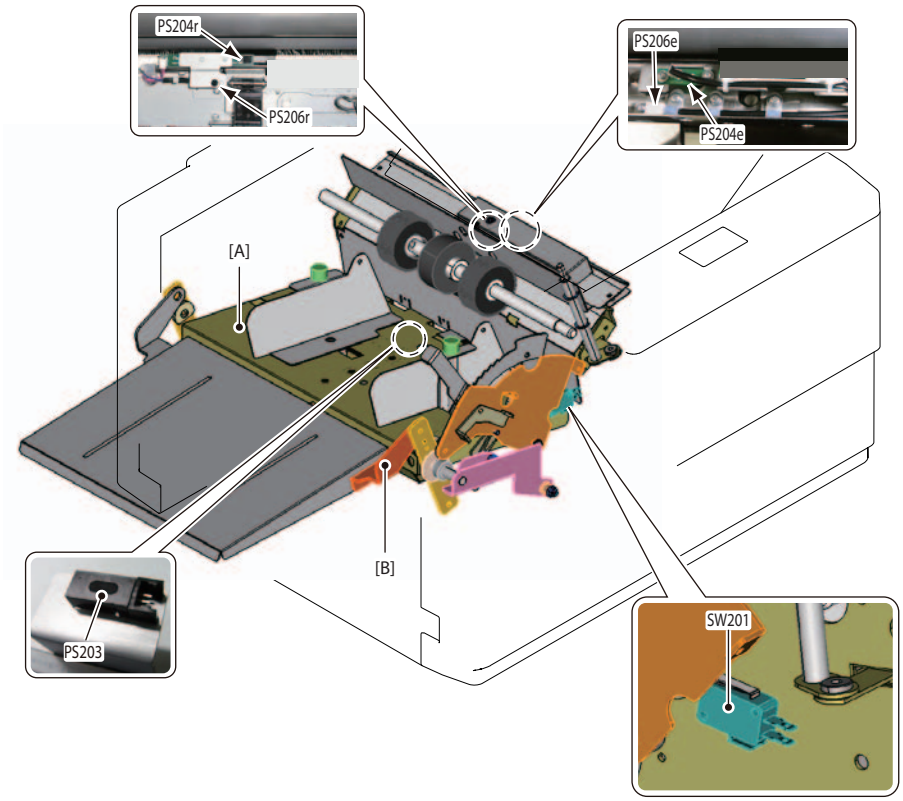
3.1 Outline

a. DF-999/DF-999A



[A] Paper feed tray
[B] Raising and lowering lever
[C] Guide
[D] Shielding plate
[E] Support paper feed tray
M201 Paper feed tray motor
PCB201 PS PWB unit
PS201 Paper feed tray upper limit sensor
PS202 Paper feed tray lower limit sensor
PS203 Paper sensor
PS204e Feed jam sensor (emitter)
PS204r Feed jam sensor (receiver)
PS205 Legal size sensor (Mounted on the DF-999 for the destination of NA)
PS206e Feed timing sensor (emitter)
PS206r Feed timing sensor (receiver)
S201t Ultrasonic sensor (transmitter) (Option mounted only on the DF-999/DF-999A)
S201r Ultrasonic sensor (receiver) (Option mounted only on the DF-999/DF-999A)

b. DF-990/DF-990A



[A]	Paper feed tray
[B]	Paper set lever
PS203	Paper sensor
PS204e	Feed jam sensor (emitter)
PS204r	Feed jam sensor (receiver)
PS206e	Feed timing sensor (emitter)
PS206r	Feed timing sensor (receiver)
SW201	Paper feed tray switch

3.1.1 Operations

a. DF-999/DF-999A

24 V DC motor is used for the M201. The paper feed tray is driven up and down by the raising and lowering lever. The photointerrupter is used for the PS201 and PS202. The PS201 detects the upper limit position of the paper feed tray with the edge of raising and lowering lever, and the PS202 detects the lower limit position of the paper feed tray.
The reflective photointerrupter is used for the PS203, which detects paper empty on the paper feed tray.
The PS204e detects jamming of fed paper with photo diode on the light emitting section, and the PS204r detects jamming of fed paper with photo diode on the light receiving section. A photointerrupter is mounted at the position of the PCB201 according to the paper size.
The shielding plate, synchronized with the guide, detects the paper size by moving between the photointerrupters.
A reflective photointerrupter is used for the PS205, which is mounted on the support paper feed tray of the DF-999 for the destination of NA. It detects the legal size paper.
The PS206e detects paper feed timing with photo sensor on the light emitting section, and the PS206r detects paper feed timing with photo sensor on the light receiving section. The S201t is mounted as option with ultrasonic sensor in the transmitting section of the DF-999, and the S201r is mounted as option with ultrasonic sensor in the receiving section of the DF-999. Detects double-feed of paper.

b. DF-990/DF-990A

The reflective photointerrupter is used for the PS203, which detects paper empty on the paper feed tray. The PS204e detects jamming of fed paper with photo diode on the light emitting section, and the PS204r detects jamming of fed paper with photo diode on the light receiving section. The PS206e detects paper feed timing with photo sensor on the light emitting section, and the PS206r detects paper feed timing with photo sensor on the light receiving section. The micro switch is used for the SW201. The paper feed tray is driven up and down with the paper set lever, the upper limit position of the paper feed tray is detected.

c. Jam detection

J1000, J1001, J1002, J1006

☞ Appendix > 2.1 Jam (Jxxx)

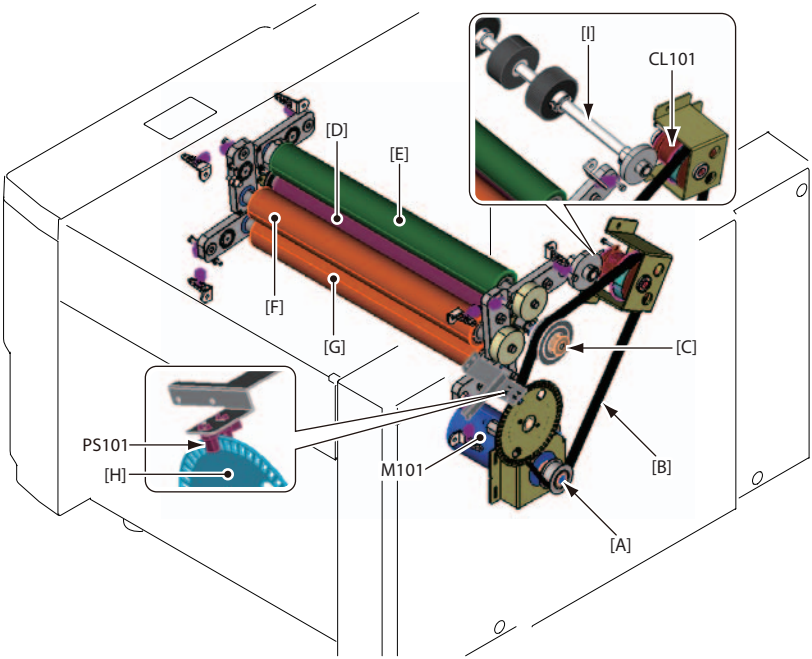
d. Error detection

E1101, E2002, E2003, E2005

☞ Appendix > 2.3 Error (Exxx)

4 DRIVE SECTION

4.1 Outline



[A]	Timing pulley (S3M-30-10)
[B]	STS belt (100S3M666)
[C]	Timing pulley (S3M-48-08)
[D]	Center press roll
[E]	Idler roll
[F], [G]	Folding roller
[H]	Index plate
[I]	Paper feed shaft
CL101	Feed clutch
M101	Conveyance motor
PS101	Conveyance index sensor

4.1.1 Operations

24 V brushless DC motor is used for the M101. It drives the idler roll, center press roll and folding roll through the timing pulley, STS belt, and paper feed clutch.
An excitation actuating electro magnetic clutch is used for the CL101. It drives the paper feed shaft ON/OFF.
A photointerrupter is used for the PS101. It detects the rotation of the index plate.

a. Jam detection

Jamming is not detected on the drive section.

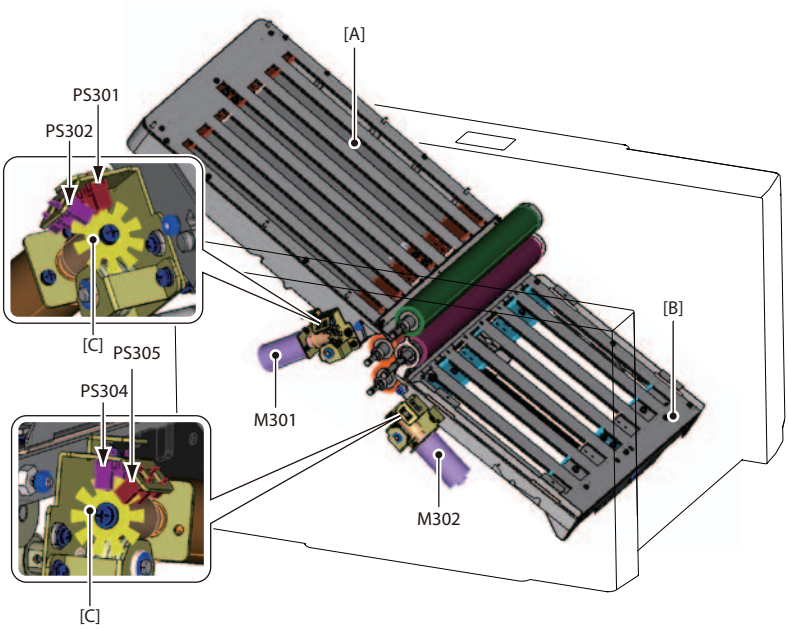
b. Error detection

E2220, E2221

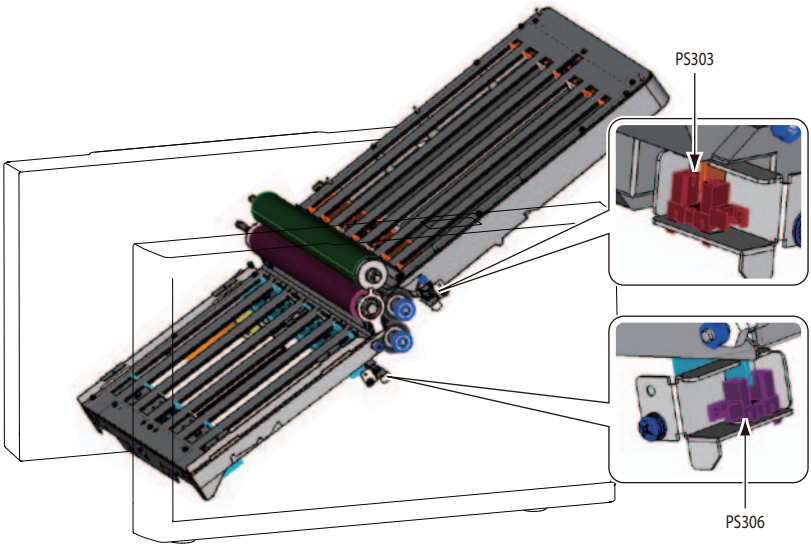
☞ Appendix > 2.3 Error (Exxx)

5 FOLDING SECTION

5.1 Outline



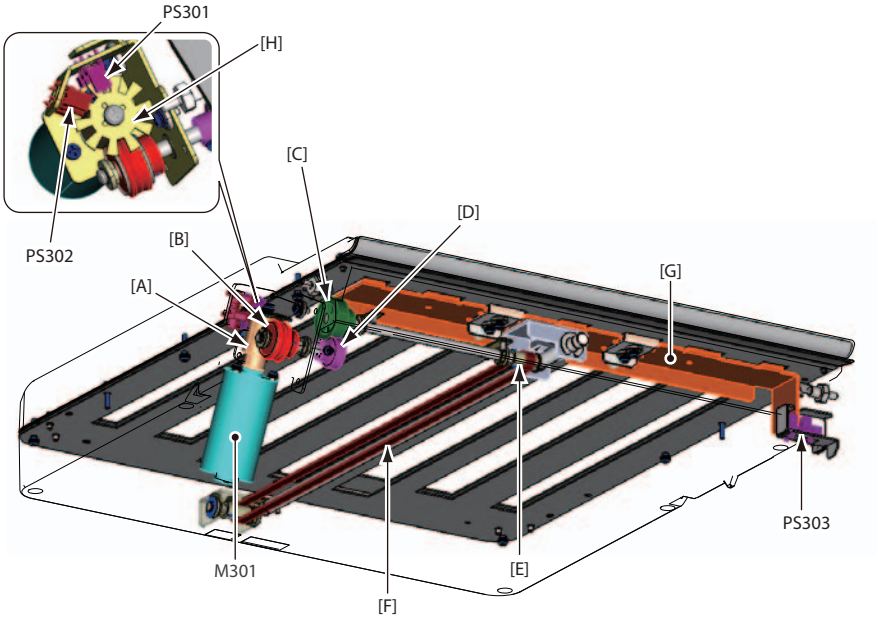
[A]	Folding plate 1
[B]	Folding plate 2
[C]	Index plate
M301	Folding plate 1 motor
M302	Folding plate 2 motor
PS301	Folding plate 1 index A sensor
PS302	Folding plate 1 index B sensor
PS304	Folding plate 2 index A sensor
PS305	Folding plate 2 index B sensor



PS303 Folding plate 1 home sensor
PS306 Folding plate 2 home sensor

5.2 Folding plate 1

5.2.1 Outline



[A]	Worm M100-R-1-06
[B]	Worm wheel M100-R-1-40-60
[C]	Spur gear M100-16-06
[D]	Spur gear M100-24-06
[E]	Timing pulley S2M-16-06
[F]	STS belt
[G]	Folding stopper 1 (home position)
[H]	Index plate
M301	Folding plate 1 motor
PS301	Folding plate 1 index A sensor
PS302	Folding plate 1 index B sensor
PS303	Folding plate 1 home sensor

5.2.2 Operations

24 V DC motor is used for the M301. It drives the folding stopper 1 fixed on the STS belt through the worm, worm wheel, spur gear, and timing pulley.
A photointerrupter is used for the PS301, PS302, and PS303. The PS301 and PS302 detect the rotating direction of the M301 and moving distance of the folding stopper 1.
PS303 detects the home position of the folding stopper 1.

a. Jam detection

Jam detection is not performed on the folding plate 1.

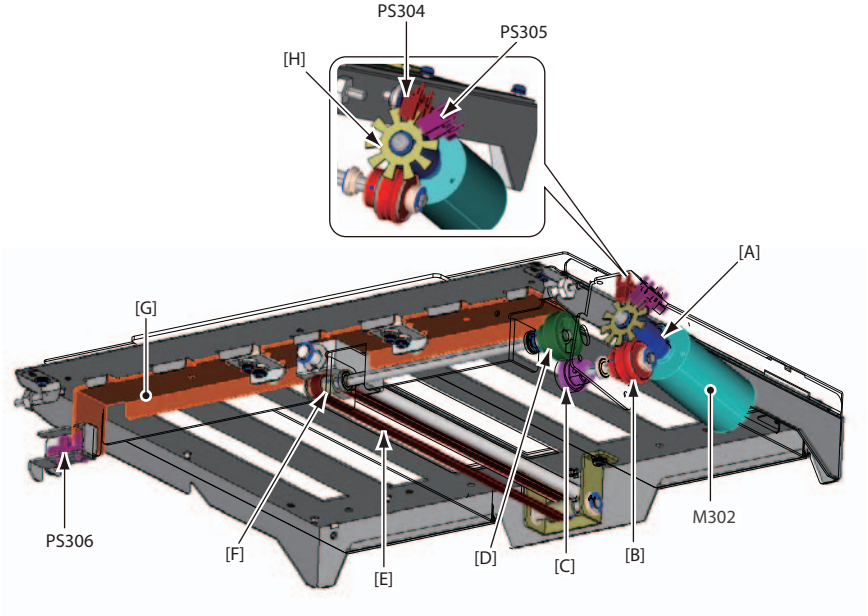
b. Error detection

E2410, E2411, E2412, E2419

☞ Appendix > 2.3 Error (Exxx)

5.3 Folding plate 2

5.3.1 Outline



[A]	Worm M100-R-1-06
[B]	Worm wheel M100-R-1-40-60
[C]	Spur gear M100-16-06
[D]	Spur gear M100-24-06
[E]	STS belt
[F]	Timing pulley S2M-16-06
[G]	Folding stopper 2 (home position)
[H]	Index plate
M302	Folding plate 2 motor
PS304	Folding plate 2 index A sensor
PS305	Folding plate 2 index B sensor
PS306	Folding plate 2 home sensor

5.3.2 Operations

24 V DC motor is used for the M302. It drives the folding stopper 2 fixed on the STS belt through the worm, worm wheel, spur gear, and timing pulley.
A photointerrupter is used for the PS304, PS305, and PS306. The PS304 and PS305 detect the rotating direction of the M302 and moving distance of the folding stopper 2.
PS306 detects the home position of the folding stopper 2.

a. Jam detection

Jam detection is not performed on the folding plate 2.

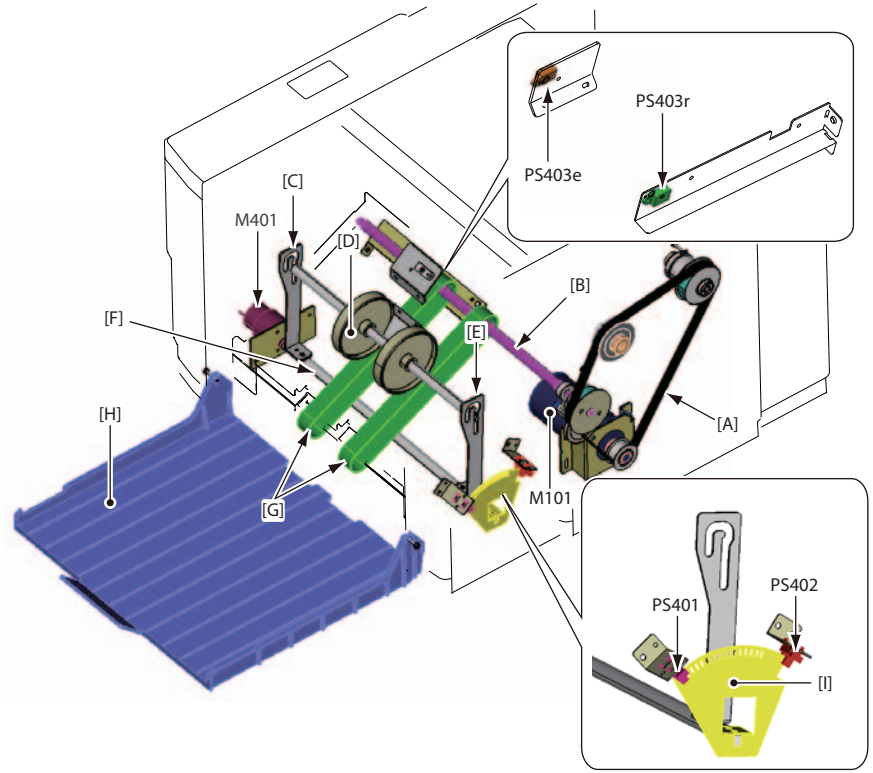
b. Error detection

E2420, E2421, E2422, E2429

☞ Appendix > 2.3 Error (Exxx)

6 EJECTING SECTION

6.1 Outline



[A] STS belt
[B] Paper ejection drive shaft
[C] Lever L
[D] Stacker roller
[E] Lever R
[F] Drive shaft
[G] Flat belt
[H] Paper receiving tray
[I] Index plate
M101 Conveyance motor
PS401 Stacker index sensor
PS402 Stacker home sensor
PS403e Eject jam sensor (e)
PS403r Eject jam sensor (r)

6.1.1 Operations

24 V DC motor is used for the M401. It drives the levers R and L attached to the drive shaft and moves the stacker roller position.
A dust proof photointerrupter is used for the PS401 and PS402.
The PS401 detects the rotation of the index plate.
The PS402 detects the home position of the stacker roller with the edge of the index plate.
A separable photointerrupter is used for the PS403e and PS403r. The PS403e detects jamming of paper ejected to the paper receiving tray on the light emitting side, and the PS403r on the light receiving side.
The paper is ejected by driving the flat belt through the STS belt and paper ejecting drive shaft.

a. Jam detection

J3002, J6002

☞ Appendix > 2.1 Jam (Jxxx)

b. Error detection

E2400, E2401, E2402, E2409

☞ Appendix > 2.3 Error (Exxx)

Memo

Chapter 3
DISASSEMBLY/ASSEMBLY

1 PRECAUTIONS UPON DISASSEMBLY/ASSEMBLY

NOTE

Be sure to turn off the power switch of this machine before starting work, and be sure to disconnect the power plug from the outlet.
If you turn off the power switch without disconnecting the power plug, there will still be points of current inside the machine, so there is a risk of short circuit or electric shock if you touch them.

If there is a need to turn on the power during work, follow the instructions given for that procedure.
Areas requiring care in handling during work due to high temperature, high voltage, sharp edges, etc. are pasted with "WARNING/PRECAUTIONS" labels.
Before starting work, check these labels.
☞ PREFACE > 2.4 WARNING/CAUTION Labels
Unless otherwise designated, attach the parts in reverse order.

1.1 Screw stopping agent

Screw stopping agent is applied to some areas of this machine to prevent screws from loosening.
Screw stopping agent should not be applied to some other areas as it may cause misoperations.
When stopping agent applied parts are disassembled, be sure to apply agent again before re-assembling them.
Do not apply screw stopping agent to areas where it should not be applied.
Refer to the below descriptions for details of types of screw stopping agent used.
☞ Chap. 4 > 3.3 Solvents/oils

1.2 Oiling

Apply small amount of oil to the joints of bearings and shafts when disassembling/assembling.
Refer to the below descriptions for details of types of oils used.
☞ Chap. 4 > 3.3 Solvents/oils

1.3 Machines in the photos

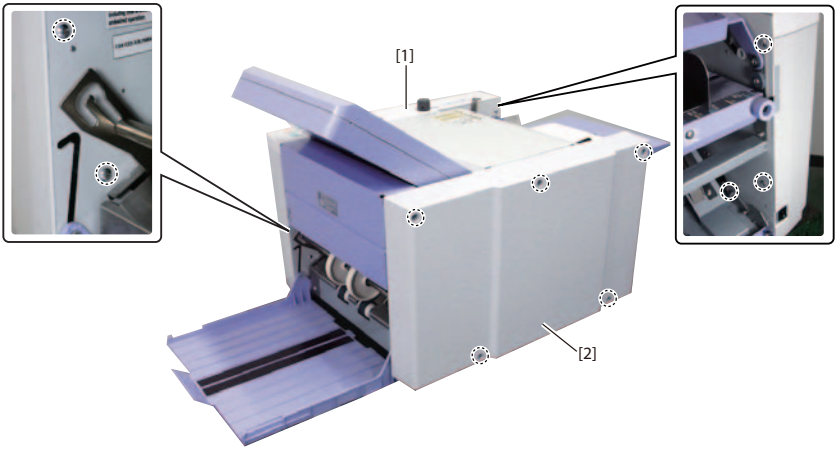
Machines in the photos shown in this manual is a prototype. The colors and forms of the parts, or the types of screws shown in the photos may be different from those of the production model. The wiring of the wire harness and the orientation of the cable clamps may differ on an actual machine. For details on wiring, refer to "DF-999/DF-999A, DF-990/DF-990A WIRING DIAGRAM MANUAL."

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

2 EXTERIOR/CONTROL SECTION

2.1 Exterior section

2.1.1 Exterior cover



No.	Name	Screw	Remarks
[1]	Main cover F	5	Remove the screws from the frame side.
[2]	Main cover B	5	

2.2 Control panel

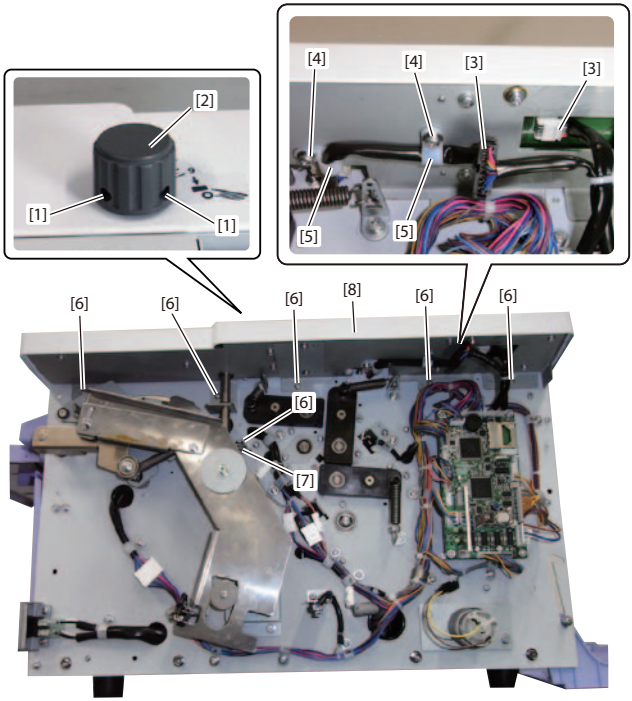
2.2.1 LCD touch panel (PCB102)

1) Remove the main cover F.

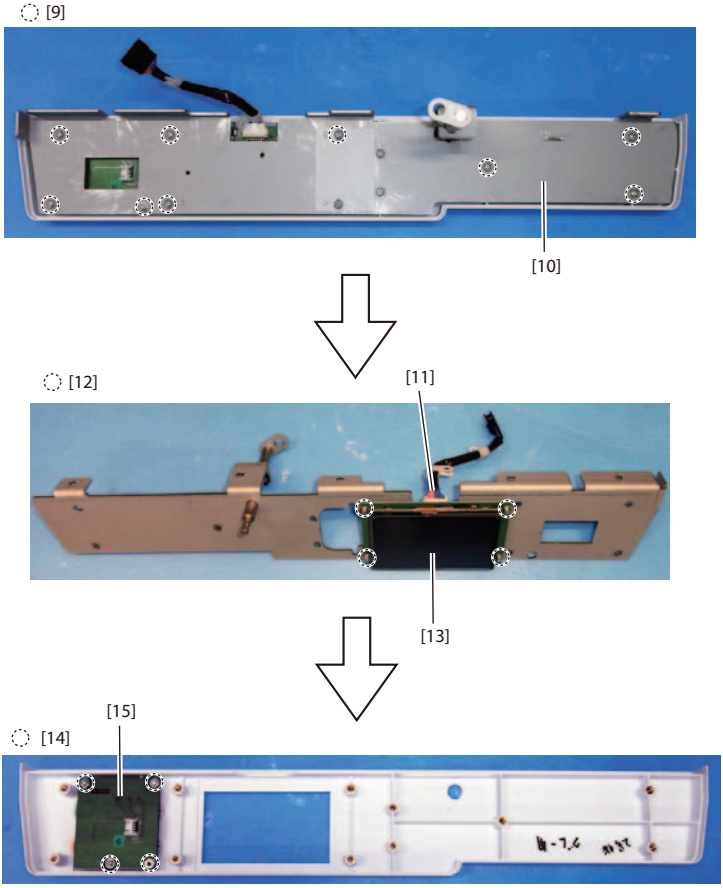
☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.

[1] FR screw (Loosen) 2
[2] Knob 1
[3] Connector 2
[4] Screw 2
[5] Cable clamp 2
[6] Screw 6
[7] Nut 1
[8] Control panel section 1



[9] Screw 9
[10] Panel base 1
[11] Connector 1
[12] Screw 4
[13] LCD touch panel (PCB102) 1
[14] Screw 4
[15] KEY PWB unit (PCB104) 1



2.2.2 KEY PWB unit (PCB104)

☞ Chap. 3 > 2.2.1 LCD touch panel (PCB102)

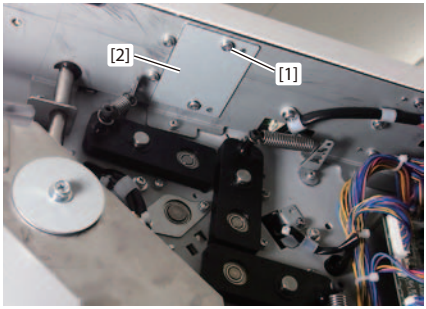
2.2.3 SD card (SDC101)

1) Remove the main cover F.

☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.

[1] Screw 1
[2] Plate 1

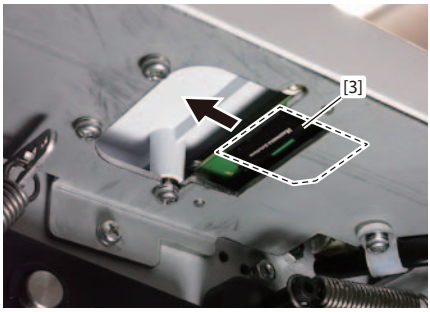


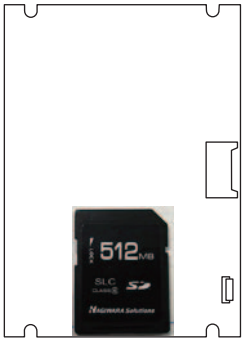
[3] SD card 1

NOTE

- Insert the SD card backward as far as it clicks and pull it out in the direction of an arrow to remove the SD card. Insert the SD card backward as far as it clicks into place to attach.
- Confirm the version of the program, when changing the panel program of the SD card.

☞ Chap. 6 > 3.1 Version check





2.3 Boards

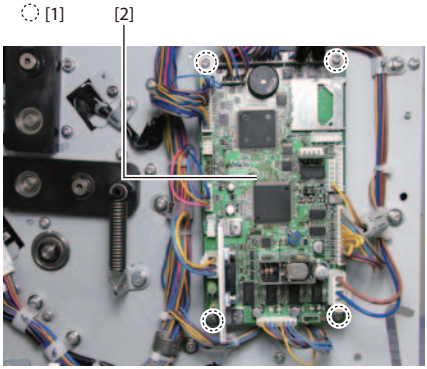
2.3.1 MC unit (PCB101)

1) Remove the main cover F.

☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove all connectors on the board.
3) Remove the parts in numerical order.

[1] Screw 4
[2] MC unit (PCB101) 1



NOTE

- When replacing the MC unit, be sure to remove the memory unit (PCB103) from the MC unit before replacement, and attach it to a new MC unit.
- After replacing the MC unit, adjust the jam sensor.
  ☞ Chap. 5 > 3.3.1 Adjusting the feed jam sensor (PS204e/PS204r)

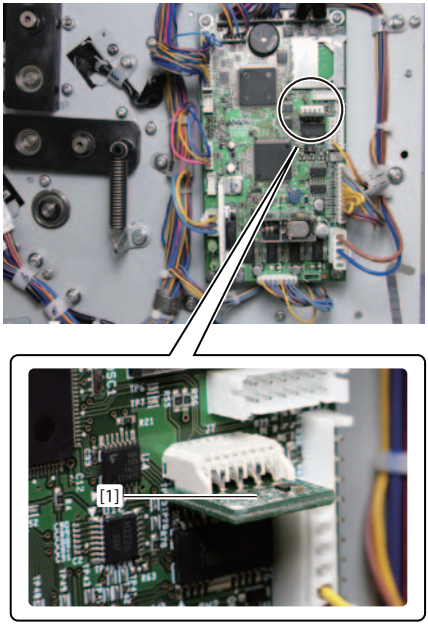
2.3.2 Memory unit (PCB103)

1) Remove the main cover F.

☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.

[1] Memory unit (PCB103) 1



NOTE

Record the following values before replacing the Memory unit (PCB103), and reset them after replacement.

<User Menu>

- Interval function (the number of sheets/time)
- Initial setting (operation mode/double-feed detection method)
- Initial screen setting/custom screen setting
- Idling setting/tone setting
- LCD bright setting/double-feed detection setting
- Number of test sheets setting/manual feed setting/power saving setting
- mm/inch setting/alarm setting/custom folding registration

<Maintenance Menu>

- Language
- Mode
- Area
- Option (M-Feed/Count/U/S)
- Offset data

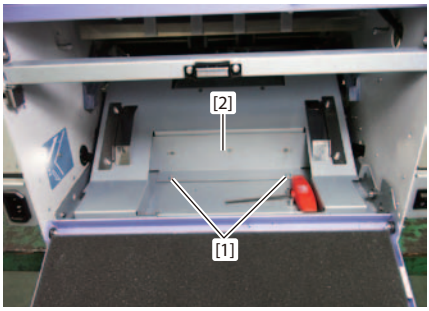
2.4 Power supply/drive/others

2.4.1 Switching power supply (PCB001)

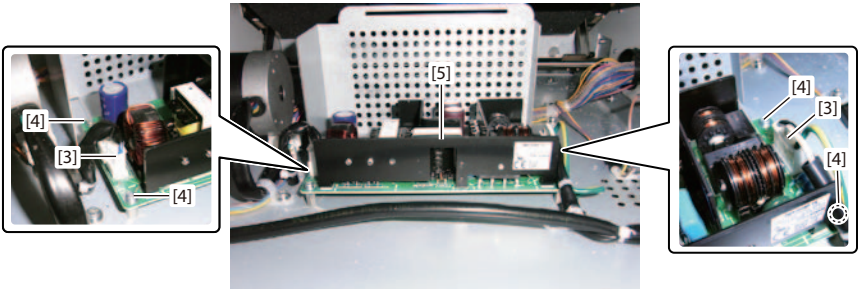
1) Open the side cover and remove the folding plate 2.
☞Refer to "DF-999/990 Instruction Manual".

2) Remove the parts in numerical order.

[1] Screw 2
[2] Electrical parts cover 1

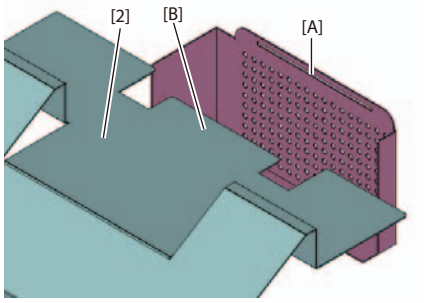


[3] Connector 2
[4] Screw 4
[5] Switching power supply (PCB001) 1



NOTE

When attaching the electrical parts cover [2], insert the end [B] of the electrical parts cover securely into the slit [A] and then secure it with the screw [1].
If you do not install it securely, you may get an electric shock by touching the live parts through the gaps.



3 PAPER FEED SECTION

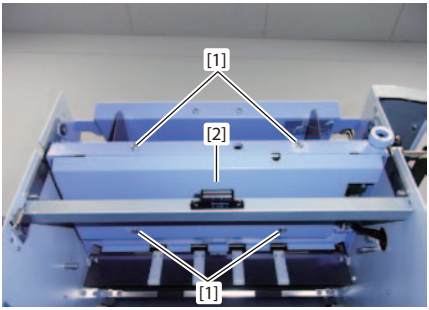
3.1 Paper feed tray

3.1.1 Paper sensor (PS203)

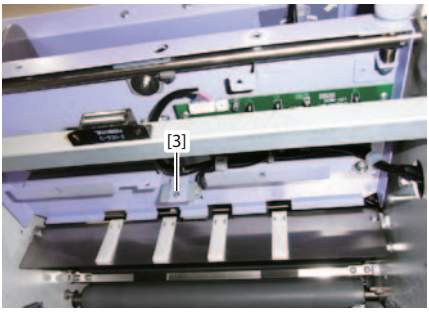
1) Open the side cover and remove the folding plate 2.
☞Refer to “DF-999/990 Instruction Manual”.

2) Remove the parts in numerical order.

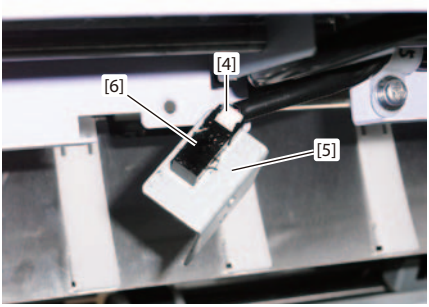
[1] Screw 4
[2] Paper feed tray lower cover 1



[3] Screw 1



[4] Connector 1
[5] Sensor angle 1
[6] Paper sensor(PS203) 1



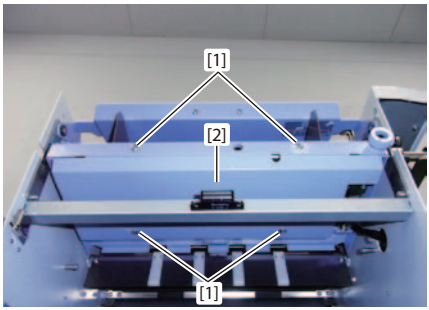
3.1.2 PS PWB unit (PCB201)

Mounted only on the DF-999/DF-999A.

1) Open the side cover and remove the folding plate 2.
☞Refer to "DF-999/990 Instruction Manual".

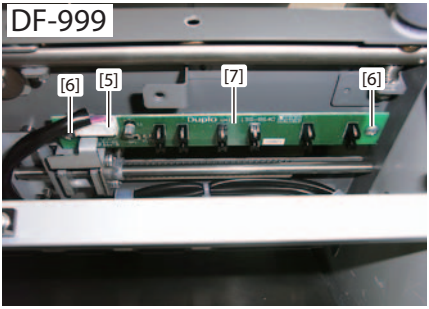
2) Remove the parts in numerical order.

[1] Screw 4
[2] Paper feed tray lower cover 1



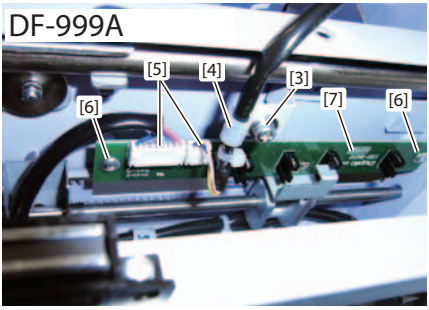
a. DF-999

[5] Connector 1
[6] Screw 2
[7] PS PWB unit (PCB201) 1



a. DF-999A

[3] Screw 1
[4] Cable clamp 1
[5] Connector 2
[6] Screw 2
[7] PS PWB unit (PCB201) 1



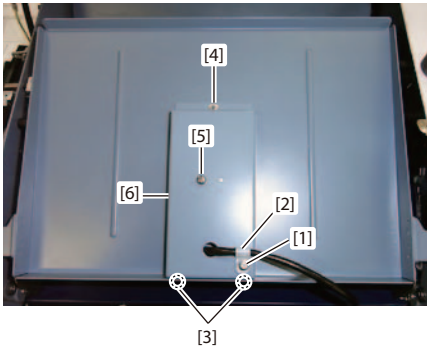
3.1.3 Legal size sensor (PS205)

Mounted only on the DF-999A.

1) Close the support paper feed tray.
☞Refer to "DF-999/990 Instruction Manual".

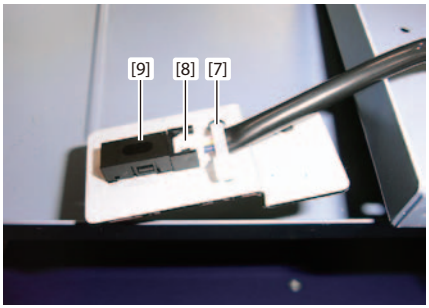
2) Remove the parts in numerical order.

[1] Screw 1
[2] Cable clamp 1
[3] Screw 2
[4] Flange nut 1
[5] Screw 1
[6] Cover 1



[7] Cable band 1
[8] Connector 1
[9] Legal size sensor (PS205) 1

NOTE
When attaching the sensor, use new parts for the cable band.



3.2 Driving the paper feed tray

3.2.1 Paper feed tray motor (M201)

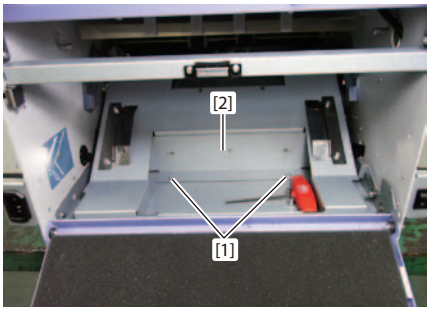
1) Remove the main cover F.

☞ Chap. 3 > 2.1.1 Exterior cover

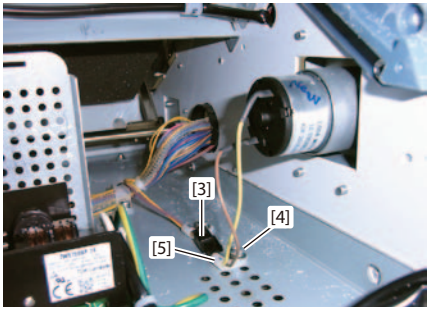
2) Open the side cover L and remove the folding plate 2.
☞Refer to “DF-999/990 Instruction Manual”.

3) Remove the parts in numerical order.

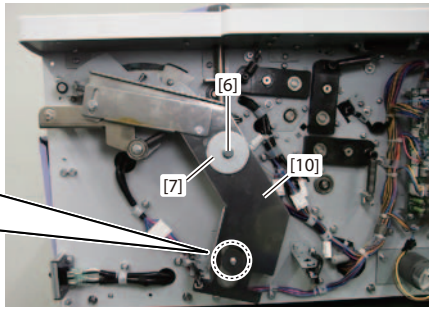
[1] Screw 2
[2] Electrical cover 1

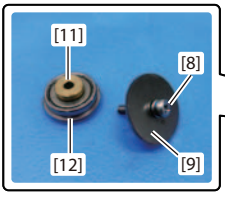


[3] Connector 1
[4] Screw 1
[5] Cable clamp 1

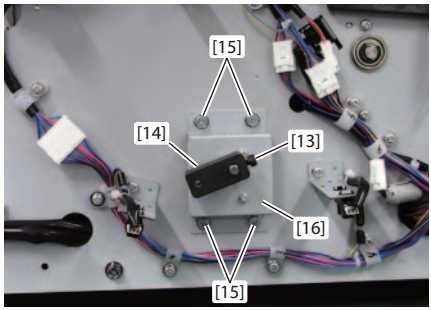


[6] Screw 1
[7] Thrust regulatory plate 1
[8] Screw 1
[9] Thrust regulatory plate 1
[10] Raising and lowering lever section 1
[11] Collar 1
[12] Bearing 1

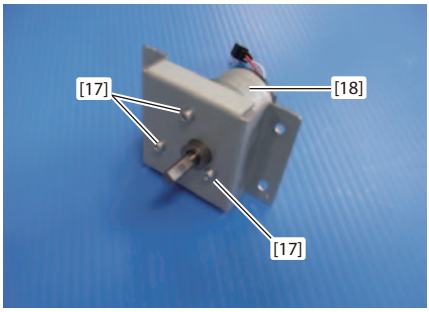




[13] CFR screw (Loosen)..... 1
[14] Link..... 1
[15] Screw..... 4
[16] Motor bracket..... 1



[17] Screw..... 3
[18] Paper feed tray motor (M201)..... 1



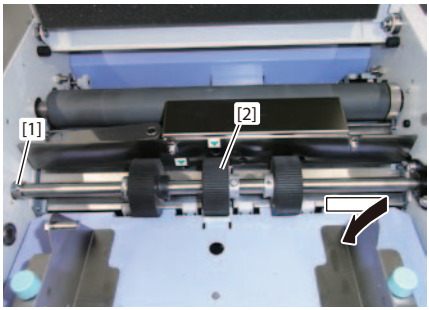
3.3 Paper feed inlet

3.3.1 Feed jam sensor (PS204e/PS204r)

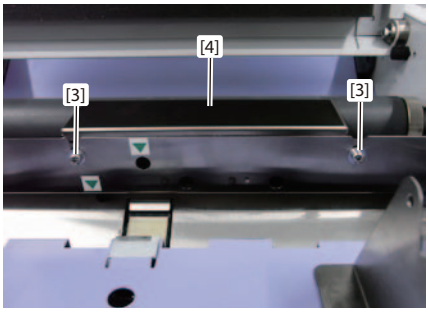
a. Light emitting side (PS401e)

1) Open the top cover.
2) Remove the parts in numerical order.

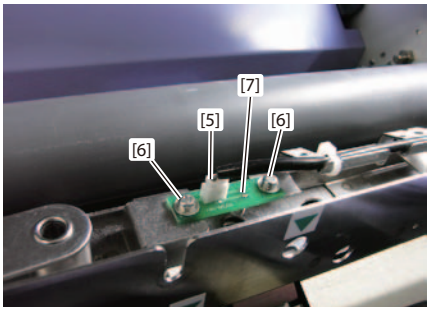
[1] Screw 1
[2] Paper feed ring unit 1
Remove in the direction of an arrow.



[3] Screw 2
[4] Sensor cover 1



[5] Connector 1
[6] Screw 2
[7] Feed jam sensor (PS204e) 1



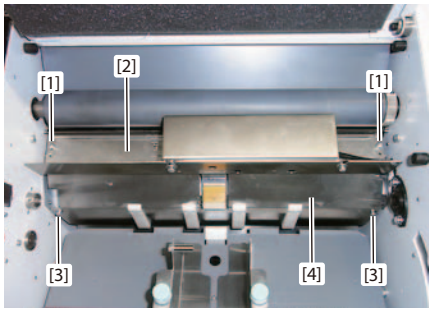
b. Light receiving side (PS204r)

1) Perform as far as the step 2) removing the [2] paper feed ring unit of "3.3.1 Feed JAM sensor (PS204e/PS204r)" a. Light emitting side (PS204e).

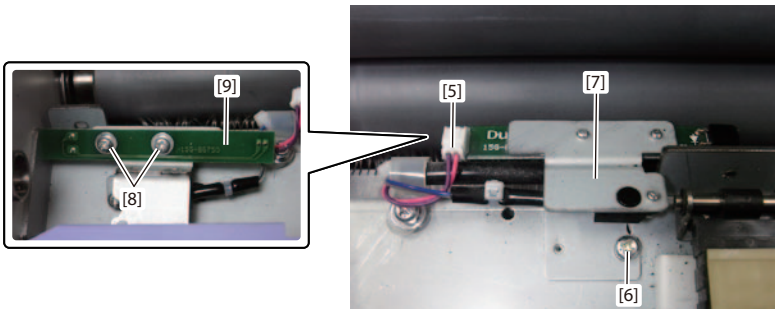
☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] Screw 2
[2] Paper feed inlet upper guide 1
[3] Screw 2
[4] Paper feed inlet lower 1



[5] Connector 1
[6] Screw 1
[7] Sensor bracket 1
[8] Screw 2
[9] Feed jam sensor (PS204r) 1



3.3.2 Feed timing sensor (PS206e/PS206r)

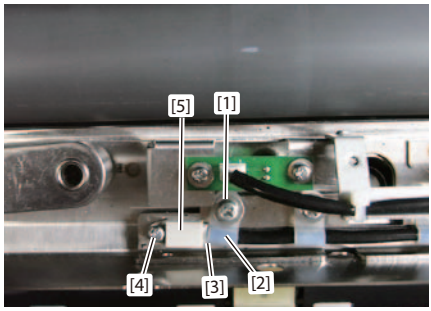
a. Light emitting side (PS206e)

1) Perform as far as the step 2) removing the [4] sensor cover of "3.3.1 Feed JAM sensor (PS204e/PS204r)" a. Light emitting side (PS204e).

☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] Screw 1
[2] Cable clamp 1
[3] Connector 1
[4] Screw 1
[5] Feed timing sensor (PS206e) 1



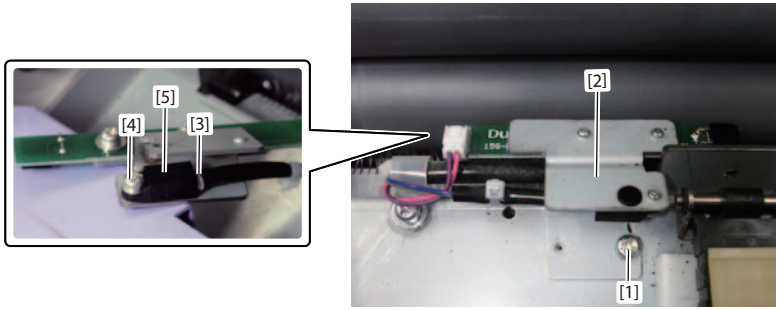
b. Light receiving side (PS206r)

1) Perform as far as the step 2) removing the [4] paper feed inlet lower of "3.3.1 Feed JAM sensor (PS204e/PS204r)" b. Light receiving side (PS204r).

☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] Screw 1
[2] Sensor bracket 1
[3] Connector 1
[4] Screw 1
[5] Feed timing sensor (PS206r) 1



3.3.3 Ultrasonic sensor (S201t/S201r)

The ultrasonic sensor (S201t/S201r) is an option which can be mounted only on the DF-999/DF-999A.

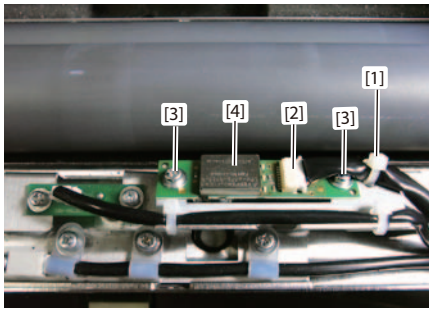
a. Receiver (S201r)

1) Perform as far as the step 2) removing the [4] sensor cover of "3.3.1 Feed JAM sensor (PS204e/PS204r)" a. Light emitting side (PS204e).

☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] Cable band 1
[2] Connector 1
[3] Screw 2
[4] Ultrasonic sensor (S201r) 1



NOTE

When attaching the sensor, use new parts for the cable band.

b. Transmitter (S201t)

1) Perform as far as the step 2) removing the [4] paper feed inlet lower of "3.3.1 Feed JAM sensor (PS204e/PS204r)" b. Light receiving side (PS204r).

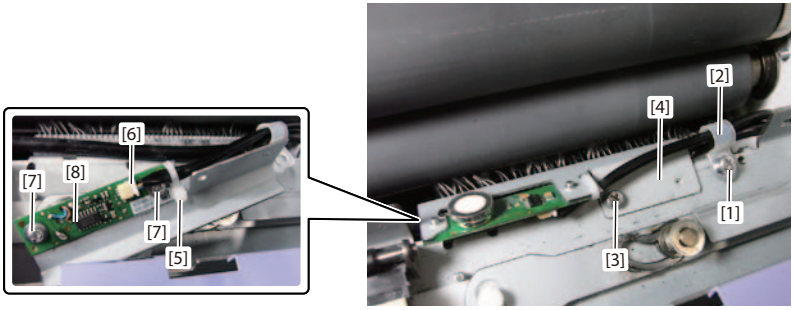
☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] Screw 1
[2] Cable clamp 1
[3] Screw 1
[4] Sensor bracket 1
[5] Cable band 1
[6] Connector 1
[7] Screw 2
[8] Ultrasonic sensor (S201t) 1

NOTE

When attaching the sensor, use new parts for the cable band.

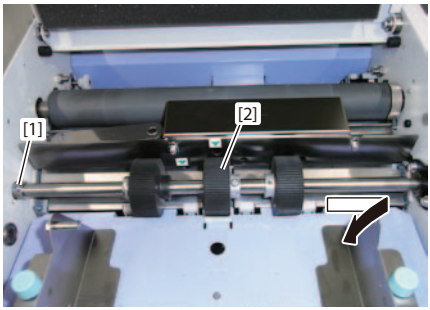


3.3.4 Paper feed ring

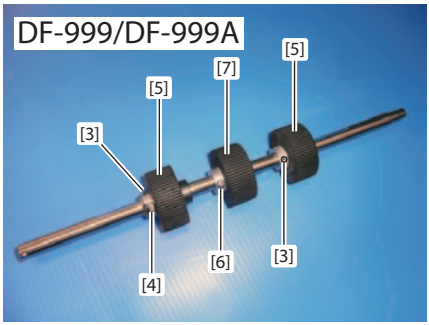
1) Open the top cover.

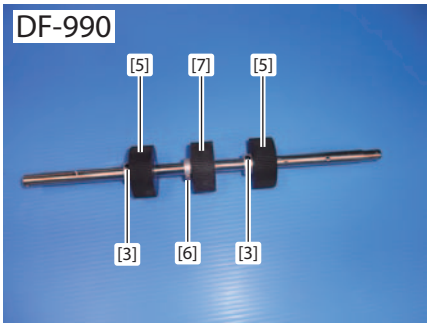
2) Remove the parts in numerical order.

[1] Screw 1
[2] Paper feed ring unit 1
Remove in the direction of an arrow.



[3] FR screw (Loosen) 2
[4] Screw (only for the DF-999/DF-999A) 1
[5] Auxiliary paper feed ring 2
[6] Screw 1
[7] Paper feed ring 1





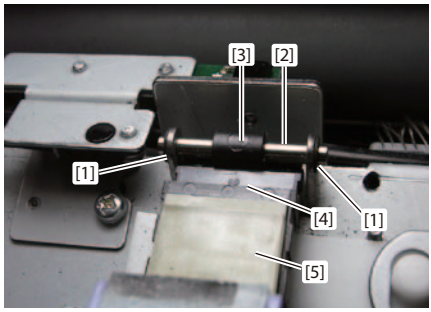
3.3.5 Paper separator base unit

1) Perform as far as the step 2) removing the [2] paper feed inlet upper guide of "3.3.1 Feed JAM sensor (PS204e/PS204r)" b. Light receiving side (PS204r).

☞ Chap. 3 > 3.3.1 Feed jam sensor (PS204e/PS204r)

2) Remove the parts in numerical order.

[1] E type retaining ring..... 2
[2] Shaft..... 1
[3] Separator assembly..... 1
[4] Separator base unit..... 1
[5] Paper separator base unit..... 1



4 DRIVE SECTION

4.1 Conveying the paper

4.1.1 Conveyance motor (M101)

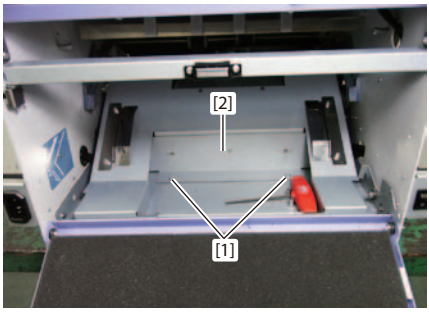
1) Remove the main cover B.

☞ Chap. 3 > 2.1.1 Exterior cover

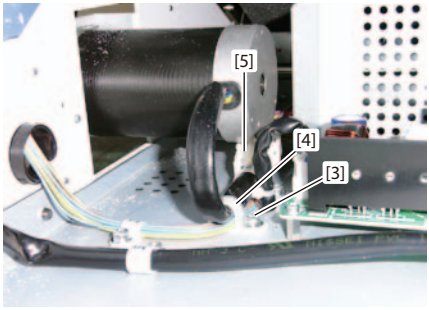
2) Open the side cover and remove the folding plate 2.
☞Refer to “DF-999/990 Instruction Manual”.

3) Remove the parts in numerical order.

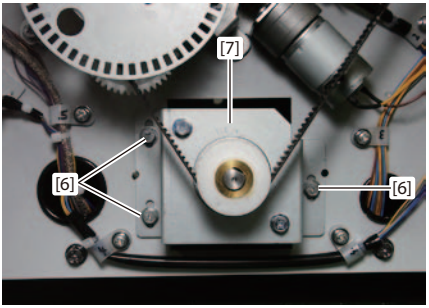
[1] Screw 2
[2] Electrical cover 1



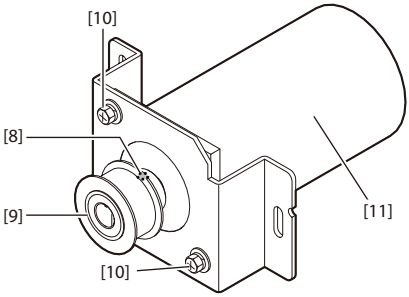
[3] Screw 1
[4] Cable clamp 1
[5] Connector 1



[6] Screw 3
[7] Motor bracket 1



[8] Set screw (Loosen) 1
[9] Timing pulley 1
[10] Screw 2
[11] Conveyance motor (M101) 1

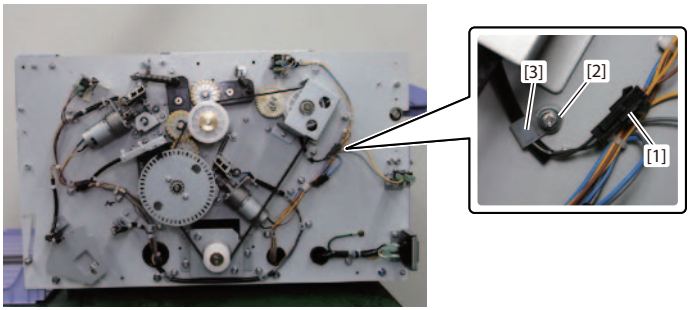


NOTE
Adjust the position of the conveyance motor when attaching it.
☞ Chap. 5 > 4.1.1 Adjustment of the conveyance motor (M101)

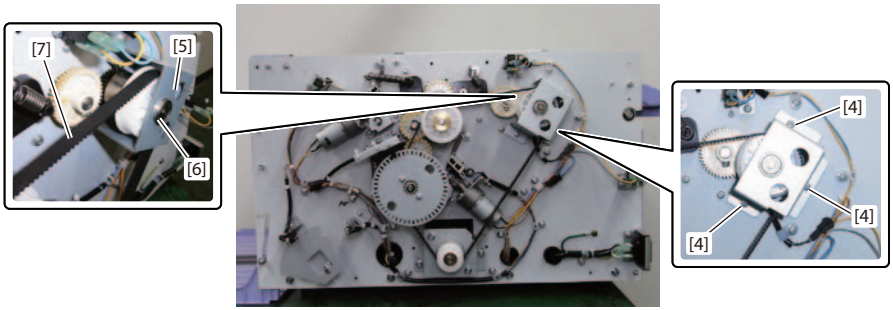
4.1.2 Feed clutch (CL101)

1) Remove the main cover B.
☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.
[1] Connector 1
[2] Screw 1
[3] Cable clamp 1



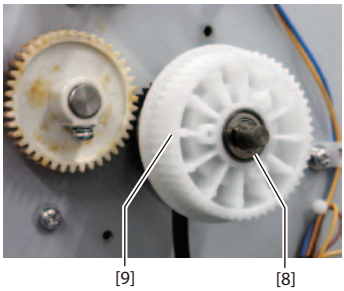
[4] Screw 3
[5] Main bracket 1
[6] Bearing 1
[7] Belt 1



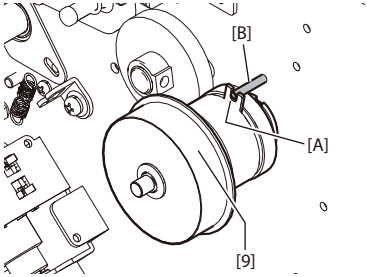
[8] E type retaining ring..... 1
[9] Feed clutch (CL101) 1

NOTE

- Fit the cutout section [A] of the paper feed clutch in the shaft [B], when attaching the feed clutch.
- Adjust the tension of the belt, when attaching it.
  ☞ Chap. 5 > 4.1.3 For adjusting the tension of driving belt
- Adjust the play of the feed clutch, when attaching it.
  ☞ Chap. 5 > 4.1.2 Adjusting the feed clutch (CL101)



[When attaching]



4.1.3 Drive belt

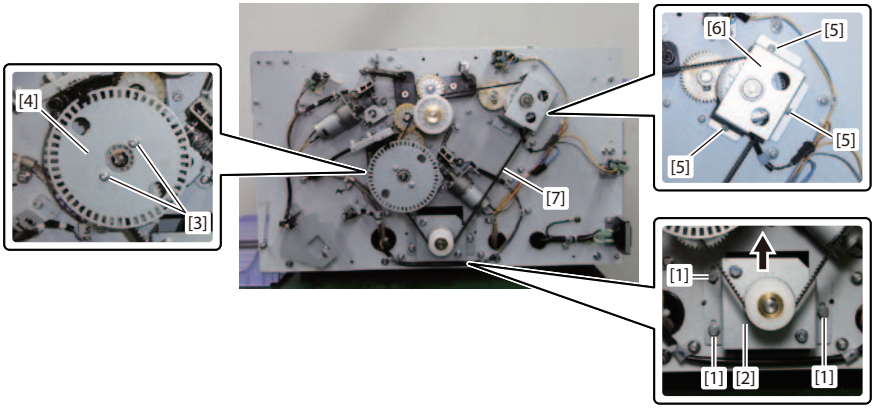
1) Remove the main cover B.
☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.

[1] Screw (Loosen) 3
[2] Motor bracket 1
Slide the motor bracket in the direction of an arrow.
[3] Screw 2
[4] Index plate 1
[5] Screw 3
[6] Main bracket 1
[7] Drive belt 1

NOTE

Adjust the tension of the drive belt when attaching it.
☞ Chap. 5 > 4.1.3 For adjusting the tension of driving belt



5 FOLDING SECTION

5.1 Folding plate 1

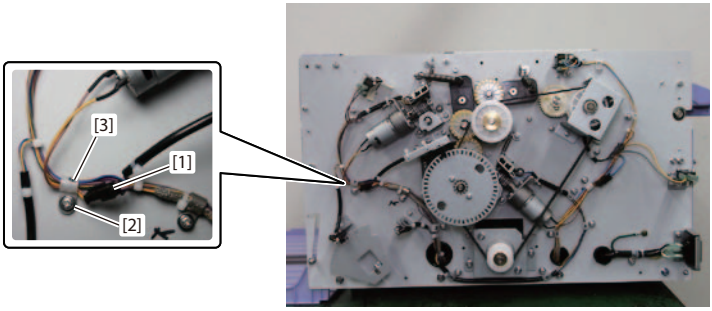
5.1.1 Folding plate 1 motor (M301)

1) Remove the main cover B.

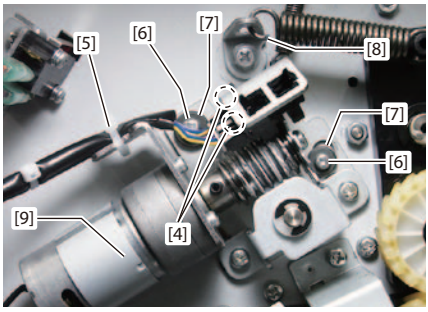
☞ Chap. 3 > 2.1.1 Exterior cover

2) Remove the parts in numerical order.

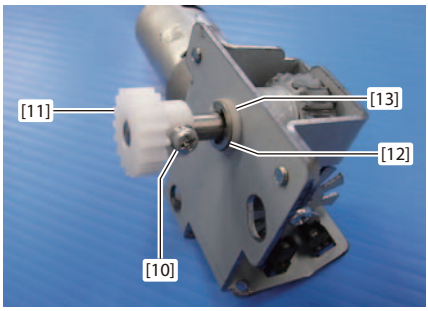
[1] Connector 1
[2] Screw 1
[3] Cable clamp 1



[4] Connector 2
[5] Cable band 1
[6] Screw 2
[7] Z collar 2
[8] Spring T (remove one side) 1
[9] Fold plate motor assembly 1



[10] Screw 1
[11] Spur gear 1
[12] E type retaining ring 1
[13] Bearing 1

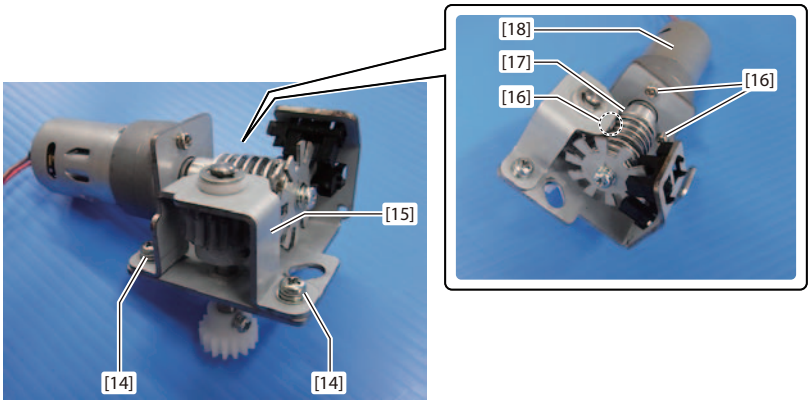


[14] Screw 2
[15] Bracket 1
[16] Screw 3
[17] FR screw (Loosen) 1
[18] Folding plate 1 motor (M301) 1

NOTE

When attaching the cable band, use new parts and adjust the position of the folding plate 1 motor.

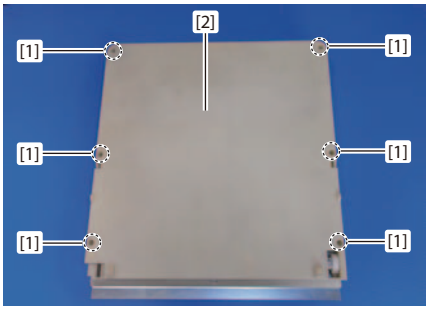
☞ Chap. 5 > 5.1.1 Adjusting the folding plate 1 motor (M301)



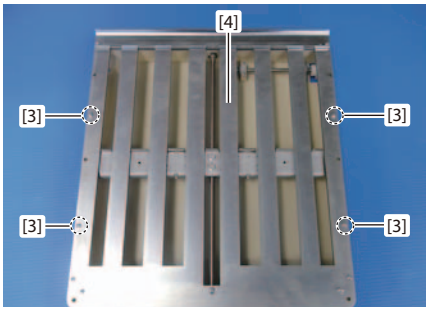
5.1.2 Folding stopper drive belt

1) Remove the parts in numerical order.

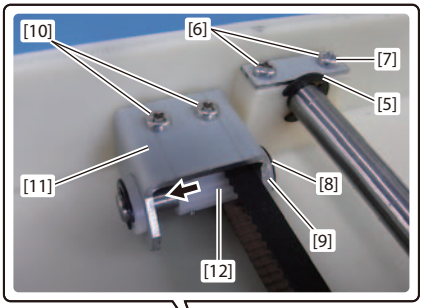
[1] Screw 6
[2] Lower cover 1 1

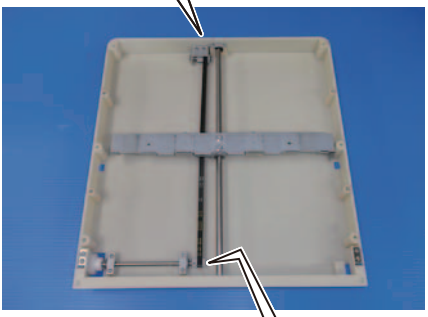


[3] Screw 4
[4] Folding plate 1 1

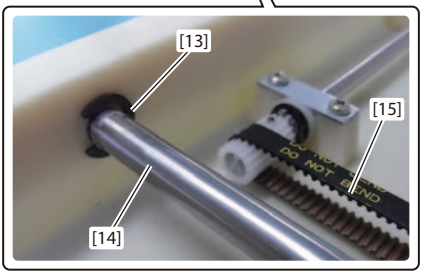


[5] E type retaining ring 1
[6] Screw 2
[7] Plate 1
[8] E type retaining ring 1
[9] Bearing 1
[10] Screw 2
[11] Bracket 1
[12] Stopper driven shaft
(Slide the stopper driven shaft in the direction of an arrow) 1





[13] E type retaining ring 1
[14] Slide shaft 1 1
[15] Belt 1

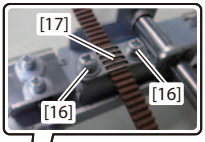


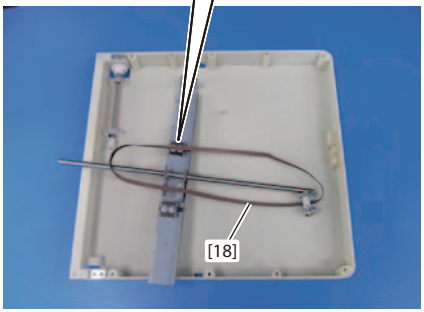
[16] Screw 2
[17] Plate 1
[18] Folding stopper drive belt 1

NOTE

Adjust the tension of the belt, when attaching it.

☞Chap. 5 > 5.1.2 Adjusting the STS belt





5.2 Folding plate 2

5.2.1 Folding plate 2 motor (M302)

1) Remove the main cover B.

☞ Chap. 3 > 2.1.1 Exterior cover

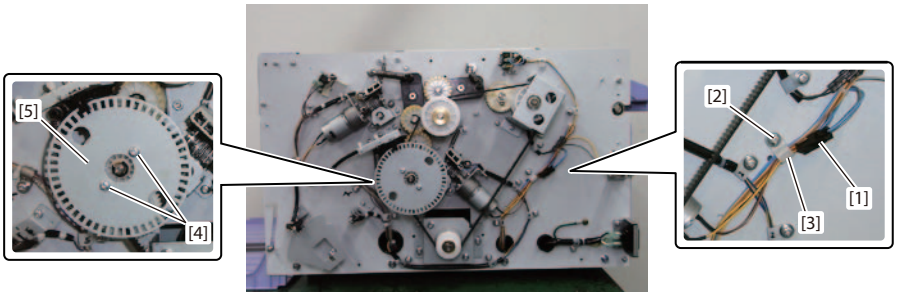
2) Remove the parts in numerical order.

[1] Connector 1
[2] Screw 1
[3] Cable clamp 1
[4] Screw 2
[5] Index plate 1

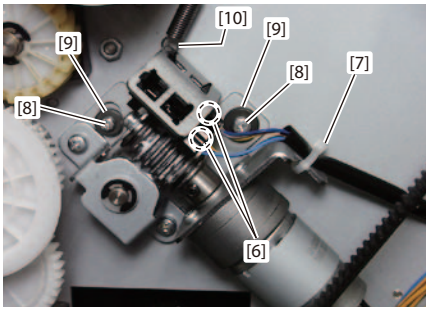
NOTE

Adjust the position of the index plate when attaching it.

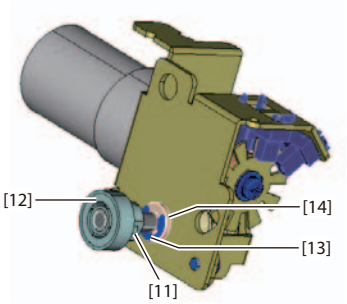
☞ Chap. 5 > 6.1.1 Adjusting the index plate



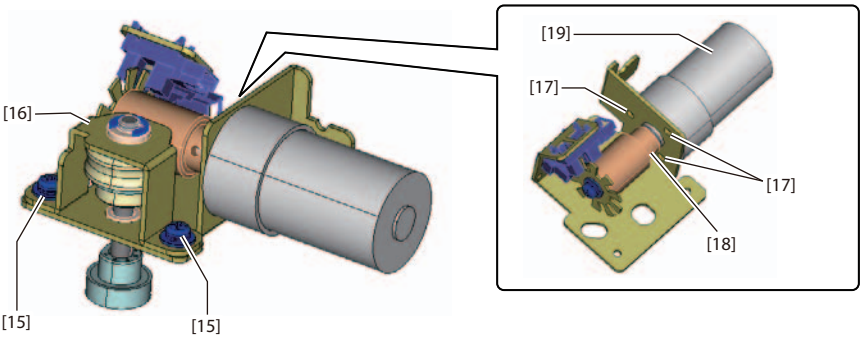
[6] Connector 2
[7] Cable band 1
[8] Screw 2
[9] Z collar 2
[10] Spring T 1



[11] Screw 1
[12] Spur gear 1
[13] E type retaining ring 1
[14] Bearing 1



[15] Screw 2
[16] Bracket 1
[17] Screw 3
[18] FR screw (Loosen) 1
[19] Folding plate 2 motor (M302) 1



NOTE

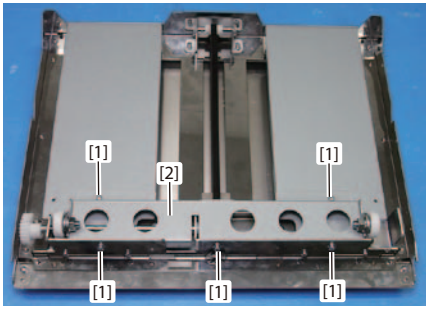
When attaching the cable band, use new parts and adjust the position of the folding plate 2 motor.

☞ Chap. 5 > 5.2.1 Adjusting the folding plate 2 motor (M302)

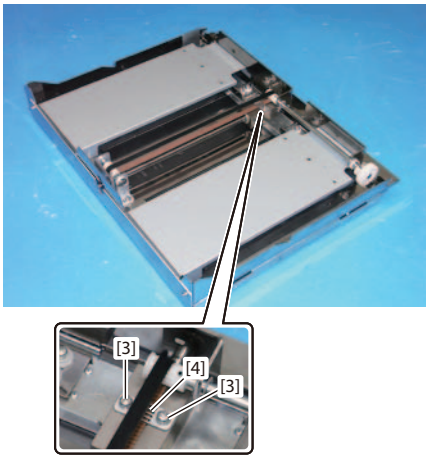
5.2.2 Folding stopper drive belt

1) Remove the parts in numerical order.

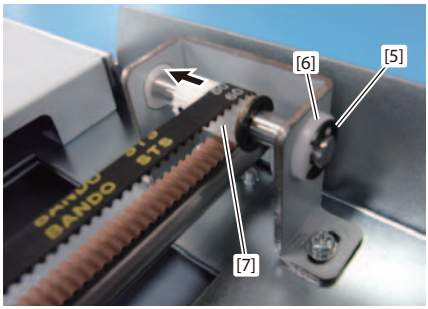
[1] Screw 5
[2] Bracket 1



[3] Screw 2
[4] Plate 1



[5] E type retaining ring 1
[6] Bearing 1
[7] Shaft assembly
(Slide the shaft assembly in the direction of an arrow) 1

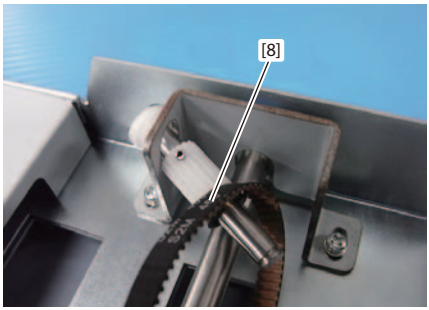


[8] Folding stopper drive belt 1

NOTE

Adjust the tension of the belt, when attaching it.

☞ Chap. 5 > 5.2.2 Adjusting the STS belt



6 EJECTING SECTION

6.1 Stacker drive

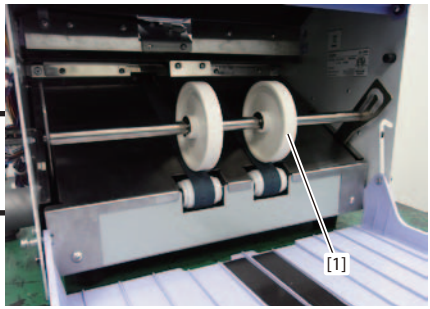
6.1.1 Eject belt

1) Remove the main cover F.
2) Remove the main cover B.

☞ Chap. 3 > 2.1.1 Exterior cover

3) Remove the parts in numerical order.

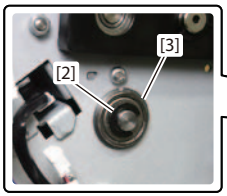
[1] Stacker roller 1

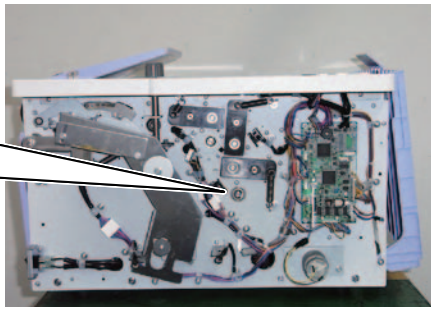


NOTE

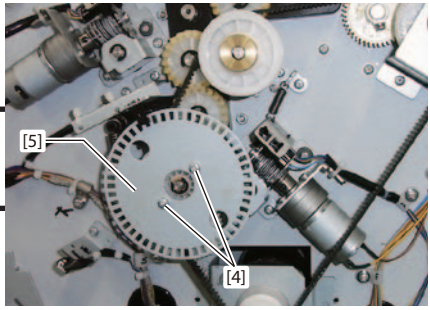
Do not move the stacker roller forcibly back and forth by hand. The stacker roller motor may be broken down.

[2] E type retaining ring 1
[3] Bearing 1





[4] Screw 2
[5] Index plate 1

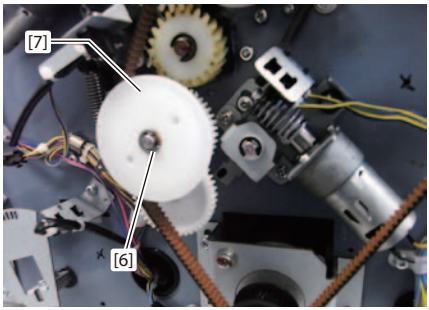


NOTE

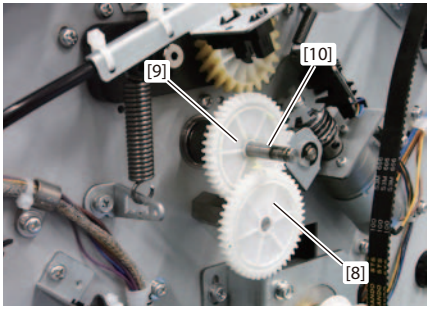
Adjust the position of the index plate when attaching it.

☞ Chap. 5 > 6.1.1 Adjusting the index plate

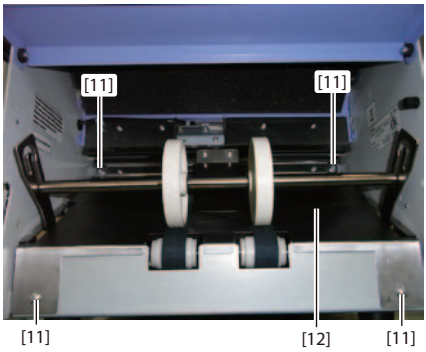
[6] E type retaining ring 1
[7] Gear pulley 1



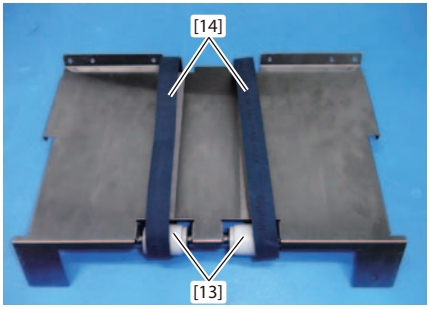
[8] Spur gear 1
[9] Spur gear 1
[10] Shaft unit 1



[11] Screw 4
[12] Stacker plate 1



[13] Roller unit 2
[14] Eject belt 2



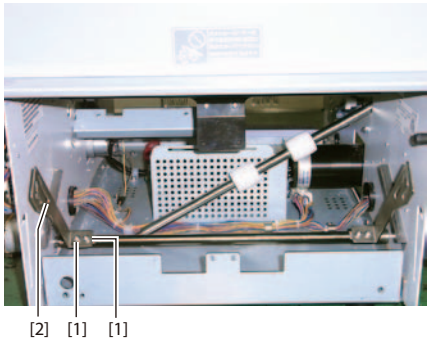
6.1.2 Stacker roller motor (M401)

1) Perform as far as the step 3) removing the [12] stacker plate of "6.1.1 Eject belt".

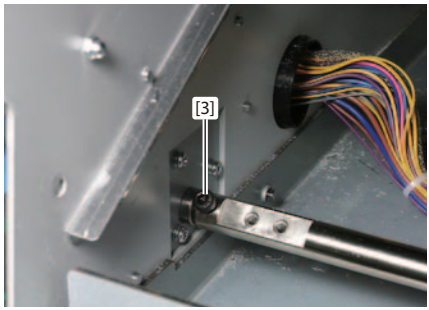
☞ Chap. 3 > 6.1.1 Eject belt

2) Remove the parts in numerical order.

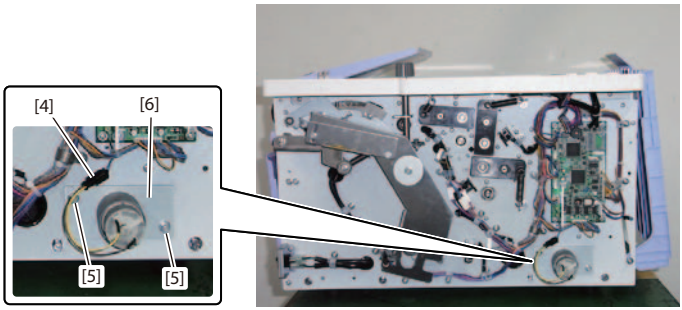
[1] Screw 2
[2] Lever R 1



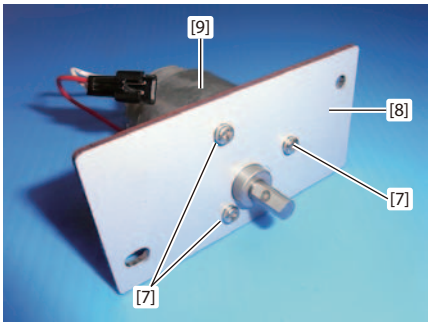
[3] CFR screw 1



[4] Connector 1
[5] Screw 2
[6] Motor assembly 1



[7] Screw 3
[8] Motor plate 1
[18] Stacker roller motor (M401) 1



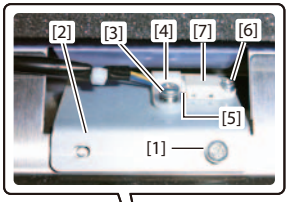
6.2 Paper ejection

6.2.1 Eject jam sensor (PS403e/PS403r)

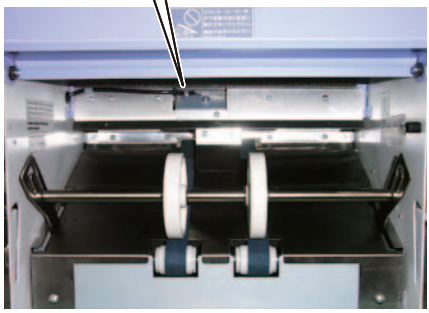
a. Light emitting side (PS403e)

1) Remove the parts in numerical order.

[1] Screw 1
[2] Sensor angle 1
[3] Screw 1
[4] Cable clamp 1
[5] Connector 1
[6] Screw 1
[7] Eject jam sensor (PS403e) 1



NOTE
Do not move the stacker roller forcibly back and forth by hand. The stacker roller motor may be broken down.

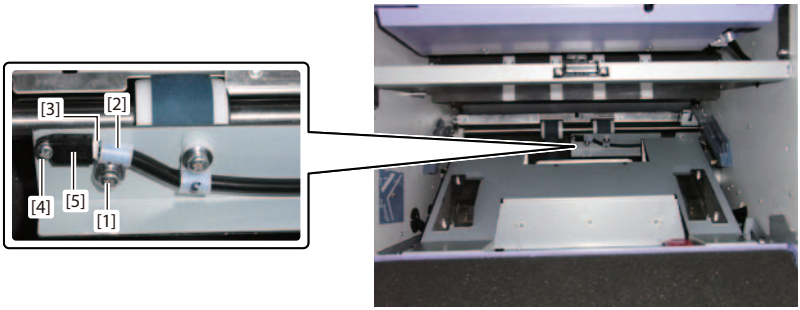


b. Light receiving side (PS403r)

1) Open the side cover and remove the folding plate 2.
☞Refer to "DF-999/990 Instruction Manual".

2) Remove the parts in numerical order.

[1] Screw 1
[2] Cable clamp 1
[3] Connector 1
[4] Screw 1
[5] Eject jam sensor (PS403r) 1



Chapter 4
MAINTENANCE/INSPECTION

1 LIST OF MAINTENANCE TOOLS

1.1 General tools

Tool Name	Main Purpose
Phillips screwdriver No.1 Standard	Overall
Phillips screwdriver No.2 Standard	Overall
Phillips screwdriver No.2 Long	Overall
Phillips screwdriver No.2 Short	Inside machine
Slotted screwdriver Standard	
Slotted screwdriver (small)	For removing E type retaining ring, etc.
Longnose pliers	For attaching E type retaining ring and removing and attaching springs, etc.
Nipper	
Pliers	
Snap ring pliers convertibly used for shaft/slot	For removing and attaching the G type retaining ring
Monkey wrench 300 mm	
Spanner M3 (Opposite side distance 5.5)	
Spanner M4 (Opposite side distance 7.0)	For attaching and removing separator
Spanner M5 (Opposite side distance 8.0)	
Spanner M6 (Opposite side distance 10.0)	
Spanner M8 (Opposite side distance 13.0)	
Spanner M10 (Opposite side distance 17.0)	
Hexagonal wrench (Opposite side distance 1.5)	For attaching pulleys, etc.
Hexagonal wrench (Opposite side distance 2.0)	For attaching pulleys, etc.
Hexagonal wrench (Opposite side distance 2.5)	
Hexagonal wrench (Opposite side distance 3.0)	
Hexagonal wrench (Opposite side distance 4.0)	
Hexagonal wrench (Opposite side distance 5.0)	
Blower brush	For cleaning sensors
Scale	For measuring the parts
Tension gauge (5 N)	For adjusting the tension of driving belt
Multi meter	

1.2 Special tools

For the latest part number, refer to the parts catalogue.

Name	Intended use
AUXILIARY GUIDE UNIT	For holding down the edges of large sheets of paper.

2 PRODUCT LIFE/PARTS LIFE

2.1 Product life

5 years or 5 million sheets

2.2 Parts life

The following describes recommended parts which need to be stocked at service centers to maintain product quality and reduce down time.

2.2.1 Recommended parts A (Expendables)

These are parts which need to be replaced due to consumption/wear in normal use (excluding malfunctions) and which we recommend to be replaced within a year after installation.
For details and the latest part numbers, refer to the parts catalogue.

Used at	(Name in this manual)	Part No.	Qty	Rough standard of endurance	Remarks
Paper feed section	Auxiliary paper feed ring	15S-25111	2	2 hundred thousand times	
	Paper separator base unit	12H-26070	1	3 hundred thousand times	
	Paper feed ring	96V-22072	1	2 hundred thousand times	

2.2.2 Recommended parts B (Functional parts)

These are parts which need to be replaced more than once within the product life in normal use (excluding malfunctions), and mechanical and electrical parts which are unlikely to malfunction accidentally.
For details, refer to the parts catalogue.

2.2.3 Recommended parts C (Drive parts)

These are parts which we recommend to be replaced more than once within the product life in normal use (excluding malfunction), and mechanical and electrical parts which are unlikely to malfunction accidentally.
For details, refer to the parts catalogue.

2.2.4 Recommended parts D (Semi-durable parts)

These are parts which rarely are consumed or wear out in normal use (excluding malfunctions), but may be replaced within the product life.
For details, refer to the parts catalogue.

3 PERIODIC MAINTENANCE

3.1 Maintenance cycle

Perform inspections in the following cycles to maintain the product quality of this machine.
One month after delivery and every six months (100 thousand times or the equivalent)

3.1.1 Outline of the periodic maintenance

1) Confirm the status of use with the user.
2) Record the information on the following items.
   - Model No.
   - Version of the main program
     ☞ Chap. 6 > 3.1 Version check
   - Counter value
     ☞ Chap. 6 > 3.8 Maintenance counter
3) Check the status of operation before carrying out a periodic maintenance.
4) Check the status of the consumable parts and replace them if required.
   ☞ Chap. 4 > 2.2 Parts life
5) Clean the parts.
   ☞ Chap. 4 > 3.2 Cleaning points
6) Apply oil to the parts.
   ☞ Chap. 4 > 3.3.2 Application point of oil
7) Check and adjust the parts.
   ☞ Chap. 5 > 1 BASIC ADJUSTMENT
8) Ask the user to check the operations after periodic maintenance
9) Record the information on the following item if there is no problem.
   - Counter value
     ☞ Chap. 6 > 3.8 Maintenance counter

A periodic maintenance is completed with the above.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

3.2 Cleaning points

3.2.1 List

Cleaning Points		Approx. Cleaning Time	Cleaning Details
Exterior section	Overall inside the cover	Every maintenance cycle	☞ Chap. 4 > Step A
Paper feed section	Paper feed tray upper limit sensor (PS201) (*1)	Every maintenance cycle	☞ Chap. 4 > Step B
	Paper feed tray lower limit sensor (PS202) (*1)		
	Paper sensor (PS203)		
	Legal size sensor (PS205) (*2)		
	Feed jam sensor (PS204e/PS204r)		
	Feed timing sensor (PS206e/PS206r)		
	Ultrasonic sensor (S201t/S201r) (*3)		
	Paper feed ring		☞ Chap. 4 > Step A
	Paper separator		
Drive section	Conveyance index sensor (PS101)	Every maintenance cycle	☞ Chap. 4 > Step B
	Folding roller		☞ Chap. 4 > Step A
Folding plate	Folding plate 1 index A sensor (PS301) Folding plate 2 index A sensor (PS304)	Every maintenance cycle	☞ Chap. 4 > Step B
	Folding plate 1 index B sensor (PS302) Folding plate 2 index B sensor (PS305)		
	Folding plate 1 home sensor (PS303) Folding plate 2 home sensor (PS306)		
Ejecting section	Stacker index sensor (PS401)	Every maintenance cycle	☞ Chap. 4 > Step B
	Stacker home sensor (PS402)		
	Eject jam sensor (PS403e/PS403r)		
	Eject belt		☞ Chap. 4 > Step A

(*1): Mounted only on the DF-999/DF-999A.
(*2): Mounted only when the product is shipped to NA.
(*3): Option mounted only on the DF-999/DF-999A.

3.2.2 Cleaning procedure

NOTE

- Before operation, turn off the power of the machine and disconnect the power plug from the power outlet.
- Before turning on the power, confirm that water or alcohol has completely dried out.

Step A

1) Remove paper bits or dust.
   Use a cleaner as required.
2) Clean off accumulated dust with a cloth dipped in water and twisted well.
   If the dust is not easily cleaned off, use a cloth moistened with alcohol.

Step B

1) Remove dirt, dusts, paper bits adhered to the light-sensing/emitting areas of the sensor using a blower brush etc.

3.3 Solvents/oils

3.3.1 List of recommendation

Type	No.	Recommended Item	Main Purpose
Oils	A	THE ORELUBE CORPORATION G90/140	Joint of the shafts and metal bearings
	B	JX Nippon Oil & Energy Corporation FBK oil RO68	Sliding part of the shafts and bearings
Grease	C	Dow Corning Toray Co., Ltd. MOLYKOTE X5-6020	Sliding part of the separator unit
	D	THE ORELUBE CORPORATION G1650	Tooth surface of the gear/chain/ sprocket
Screw fixing agent	E	Henkel Loctite 242	For fixing the FR screws on the pulley and sprocket

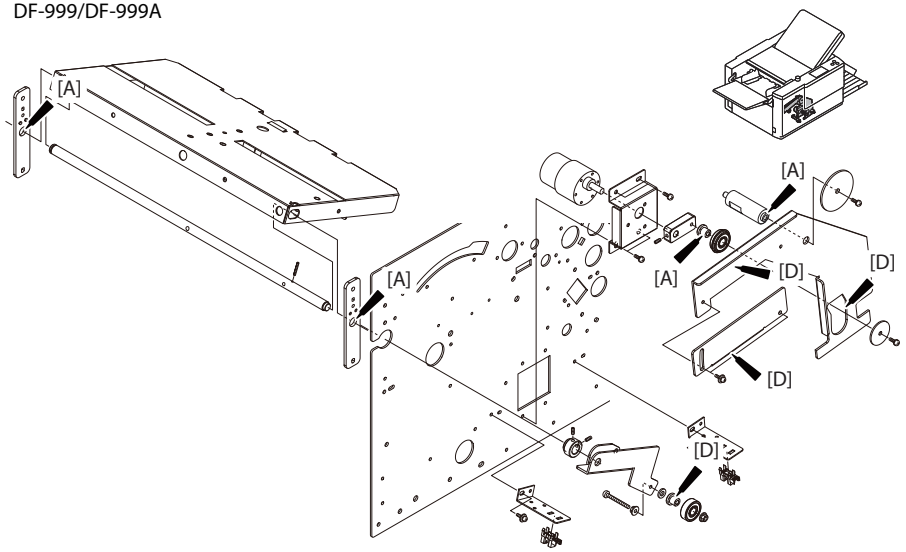
3.3.2 Application point of oil

See below for each recommended product ([A] through [D] in the illustrations).

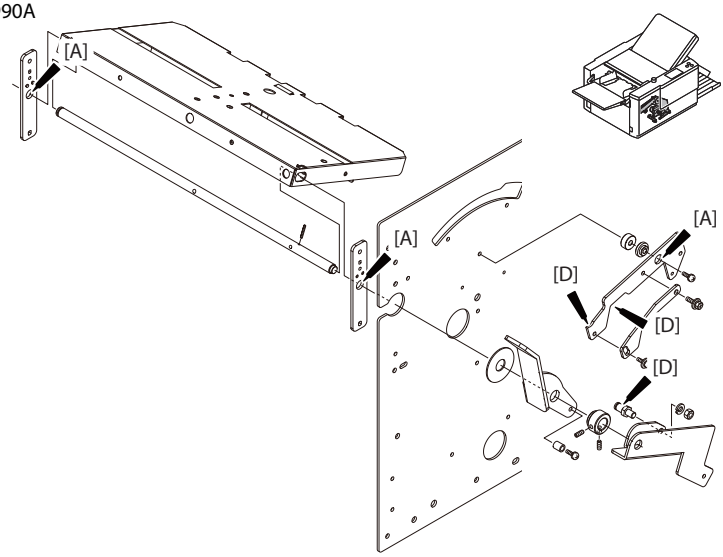
☞ Chap. 4 > 3.3.1 List of recommendation

a. Paper feed tray _ Up and down section

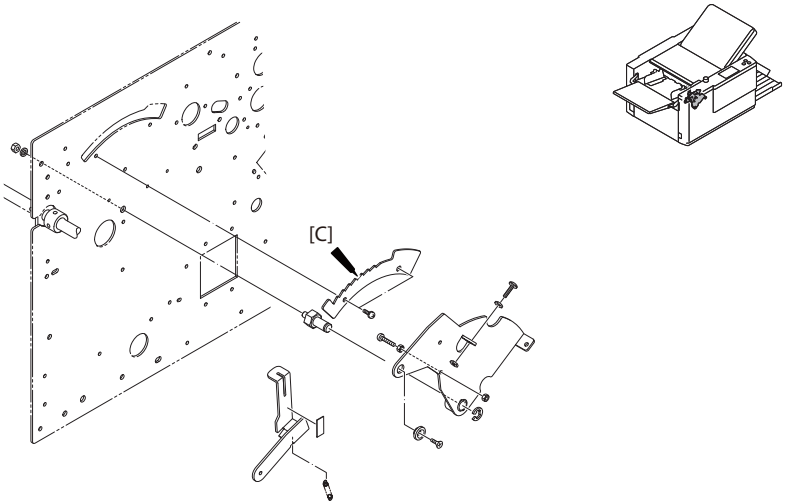
DF-999/DF-999A



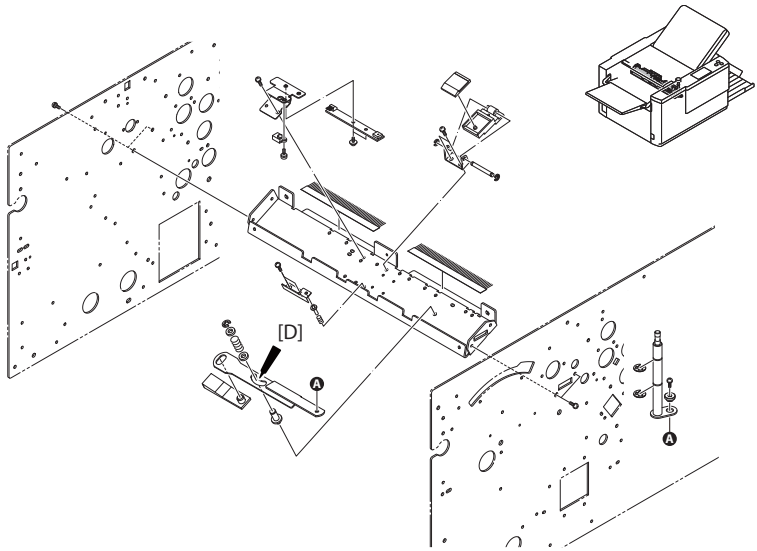
DF-990/DF-990A



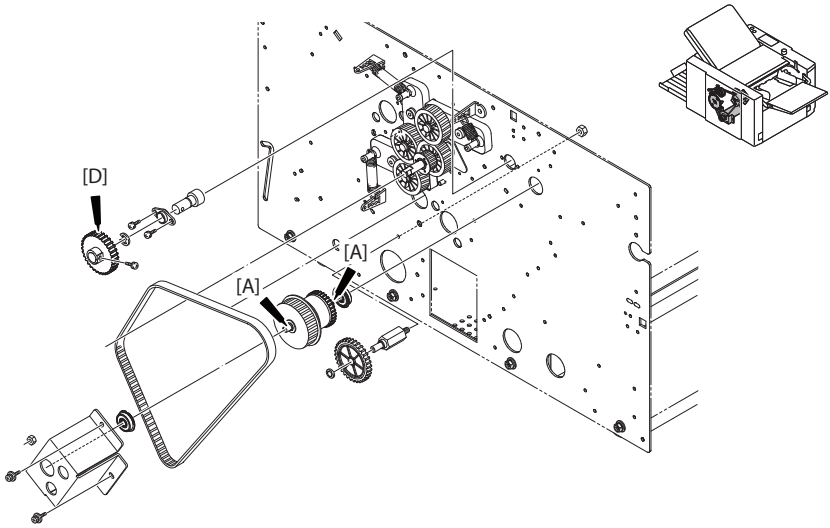
b. Paper feed tray _ Controlling plate ratchet section



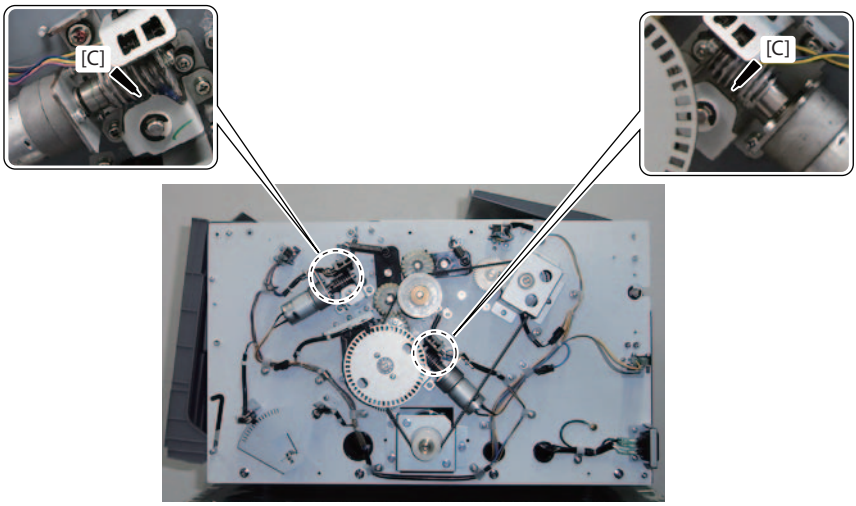
c. Separator mechanical section _ Slide bar



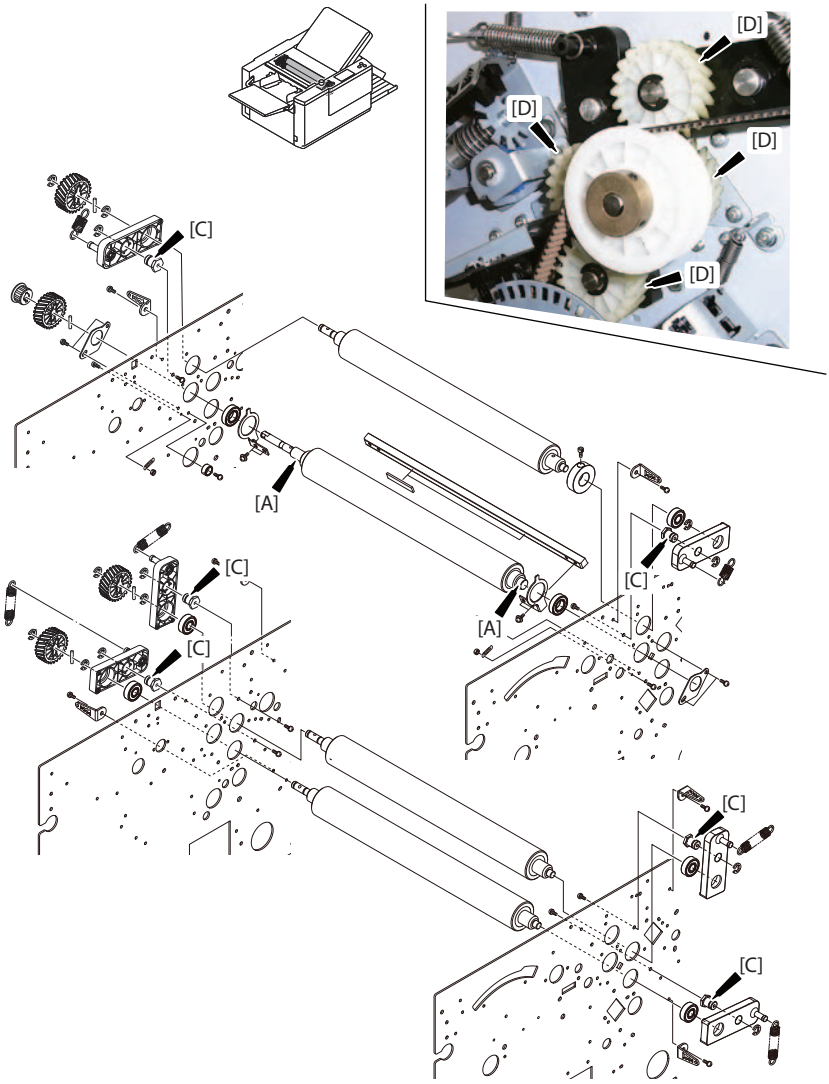
d. Drive section _ Paper feed clutch



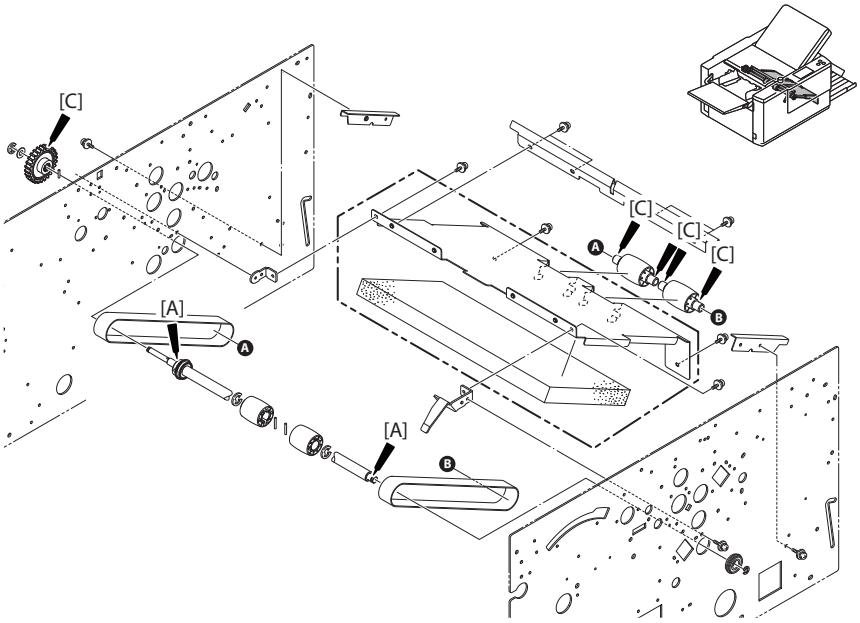
e. Fold plate motor _ Worm and worm wheel



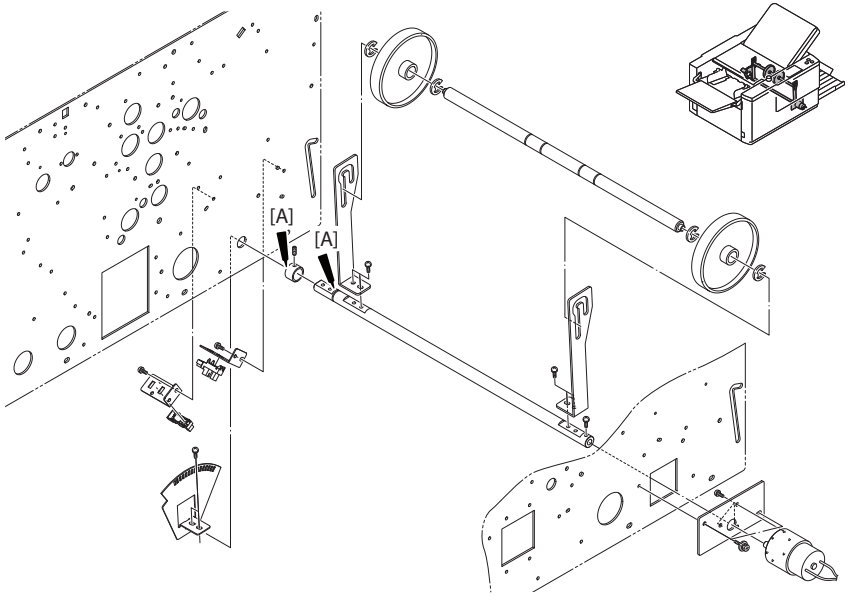
f. Folding roller section



g. Paper ejecting section _ Drive shaft and roller



h. Stacker section _ Drive shaft

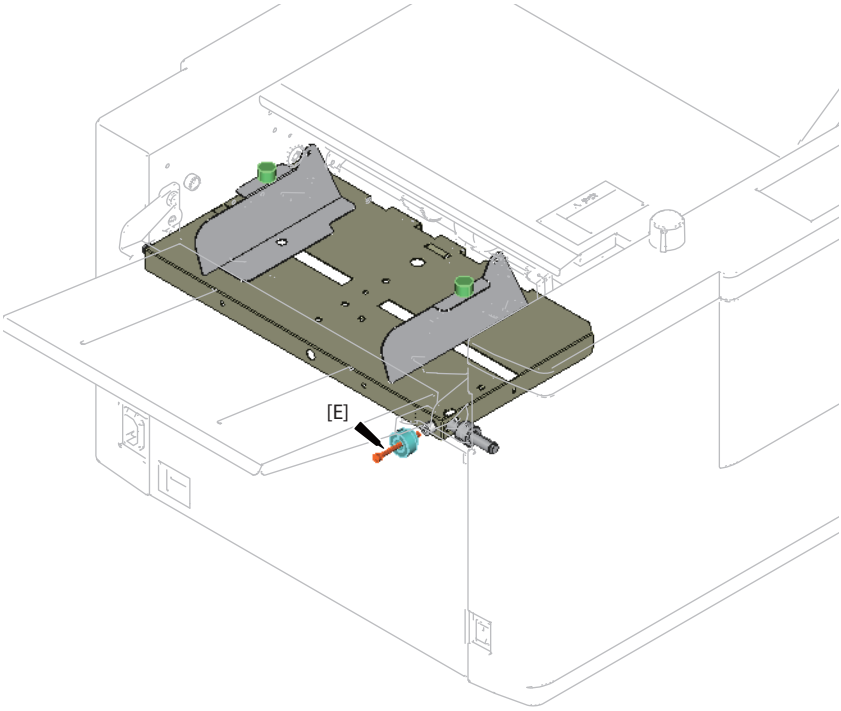


3.3.3 Points to apply screw stopping agent

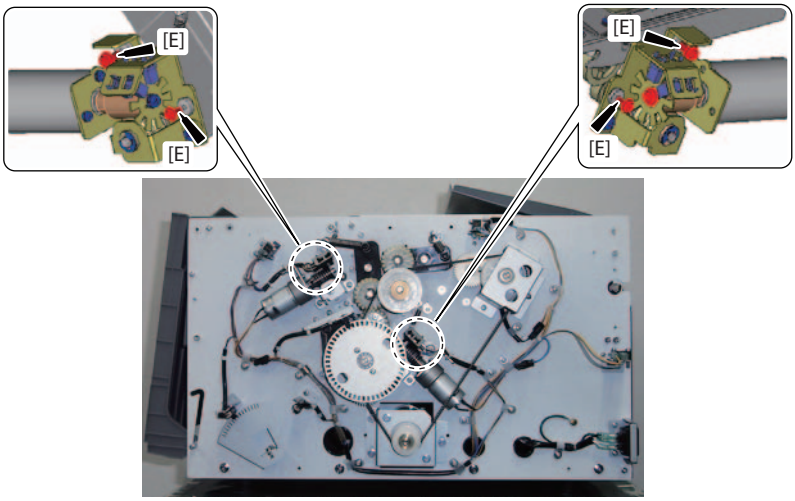
See below for each recommended product ([E] in the illustrations).

☞ Chap. 4 > 3.3.1 List of recommendation

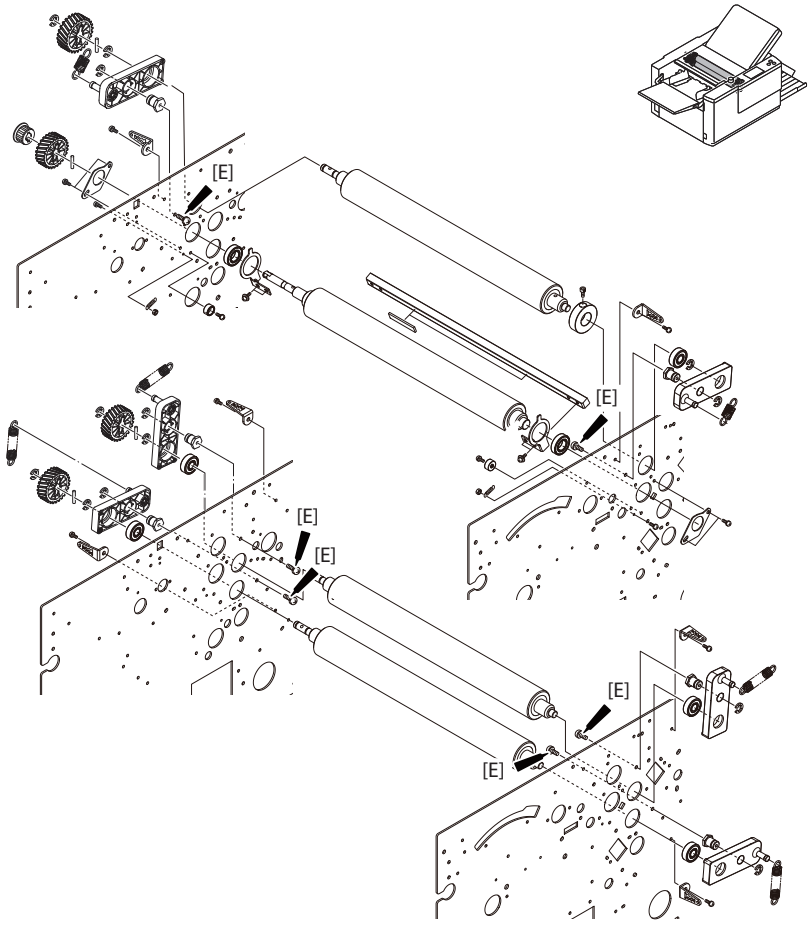
a. Paper feed plate _ Skew correction knob



b. Folding plate _ Motor bracket



c. Folding section _ Press bar



Chapter 5
STANDARDS / ADJUSTMENTS

This chapter instructs you the solvents/oils to be used for adjustments of the parts using symbols.
For details on the types of solvents/oils used, refer to Chapter 4.

1 BASIC ADJUSTMENT

1.1 Adjustment during periodic maintenance

Check and adjust each unit following the steps below after replacing consumable parts, cleaning, or lubricating.

1.1.1 Prior check and adjustment

- Check that the folding stopper and stacker roller operate smoothly.
- Check that the paper feed tray operates up and down smoothly.

1.1.2 Preparations

Remove the external cover and internal cover depending on the adjusting place.

☞ Chap. 3 > 2.1.1 Exterior cover

1.1.3 Operation check

1) Check that the sensors operates normally, after adjusting the sensor shielding plate and installation position.

☞ Chap. 6 > 3.4 Sensor check

2) Check that the mechanism section stops at the specified position, after adjusting the home sensors.

☞ Chap. 1 > 4.1 Control panel
☞ Chap. 6 > 3.3 Motion check

2 EXTERIOR/CONTROL SECTION

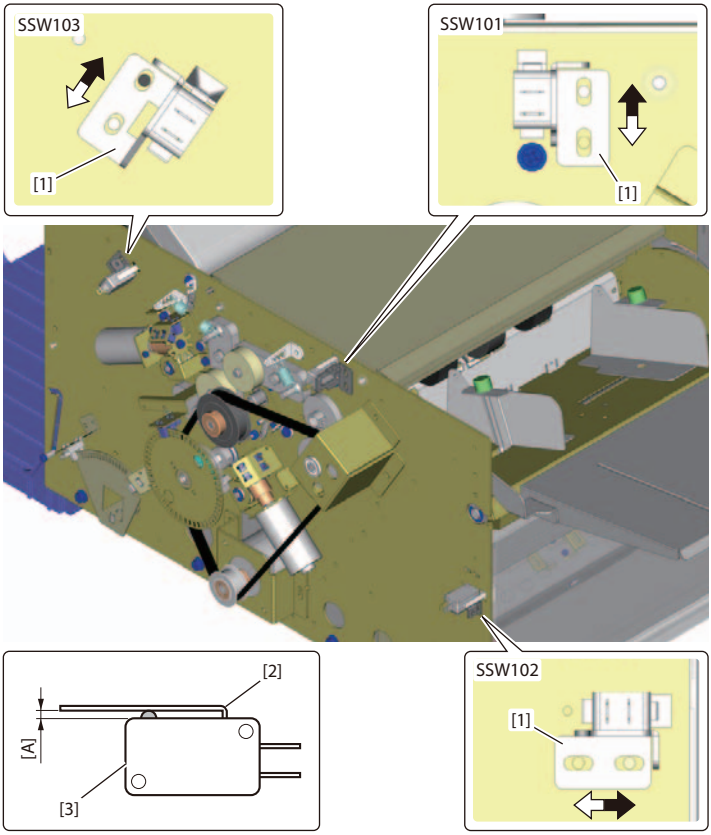
2.1 Exterior section

2.1.1 Adjusting the position of the top cover switch (SSW101)

2.1.2 Adjusting the position of the side cover L switch (SSW102)

2.1.3 Adjusting the position of the folding plate switch (SSW103)

1) Adjust the switch bracket so that the clearance will be [A] as shown in the figure when the switch is turned ON by the actuator.
   [1] Switch bracket ..... 1 each
   [2] Actuator ..... 1 each
   [3] Switch main body ..... 1 each
   [A] Clearance: 1.5 mm/0.06 inch



3 PAPER FEED SECTION

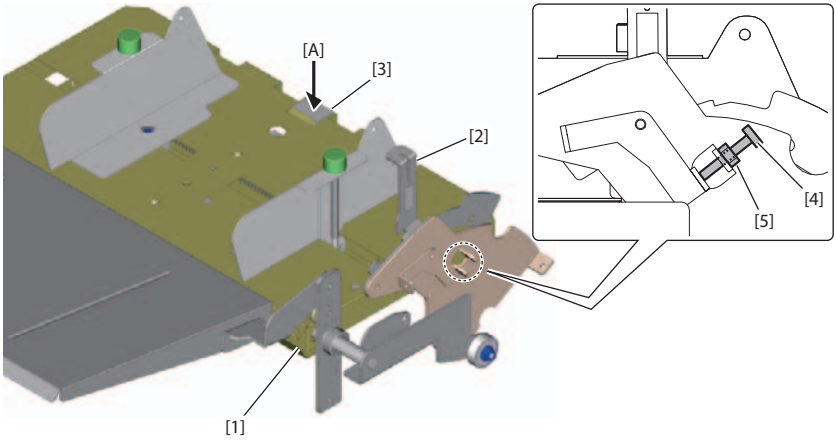
3.1 Paper feed tray

3.1.1 Adjusting the paper feed tray unit

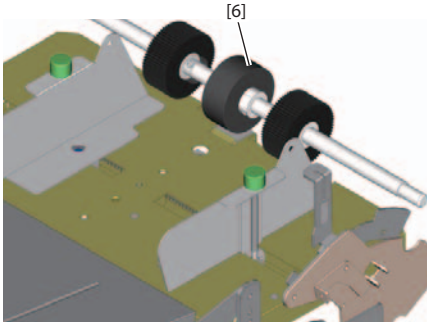
1) Set the paper feed pressure adjustment lever to "0" with the paper feed tray lower cover attached.
   [1] Paper feed tray lower cover 1
   [2] Paper feed pressure adjustment lever..... 1

2) Press the tension gauge (30 N) in the center of the separating plate and rotate the adjustment screw so that it will reach the bottom dead center with the force of 7.5 to 8 N.
   [3] Separating plate 1
   [4] Adjustment screw 1

3) After adjustment, tighten the fixation nut.
   [5] Fixation nut 1



4) Set the paper feed pressure to "-1", and press down the paper feed tray manually. Check that there is no trouble and the separating plate touches the paper feed ring when raising the paper feed tray softly.
   [6] Paper feed ring 3



3.2 Driving the paper feed tray

3.2.1 Adjusting the paper feed tray upper limit sensor (PS201) (DF-999/DF-999A)

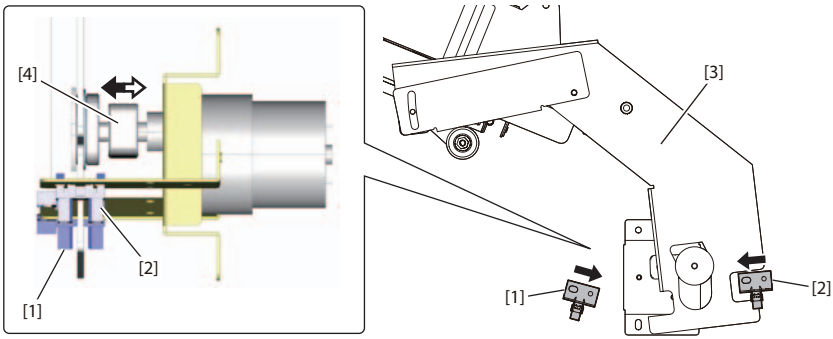
3.2.2 Adjusting the paper feed tray lower limit sensor (PS202) (DF-999/DF-999A)

1) Pull the paper feed tray upper limit and lower limit sensors in the direction of an arrow to attach.

[1] Paper feed tray upper limit sensor (PS201)..... 1
[2] Paper feed tray lower limit sensor (PS202)..... 1

2) Adjust the link so that the automatic feeding up and down lever will be positioned in the center of the paper feed tray upper limit and lower limit sensors.

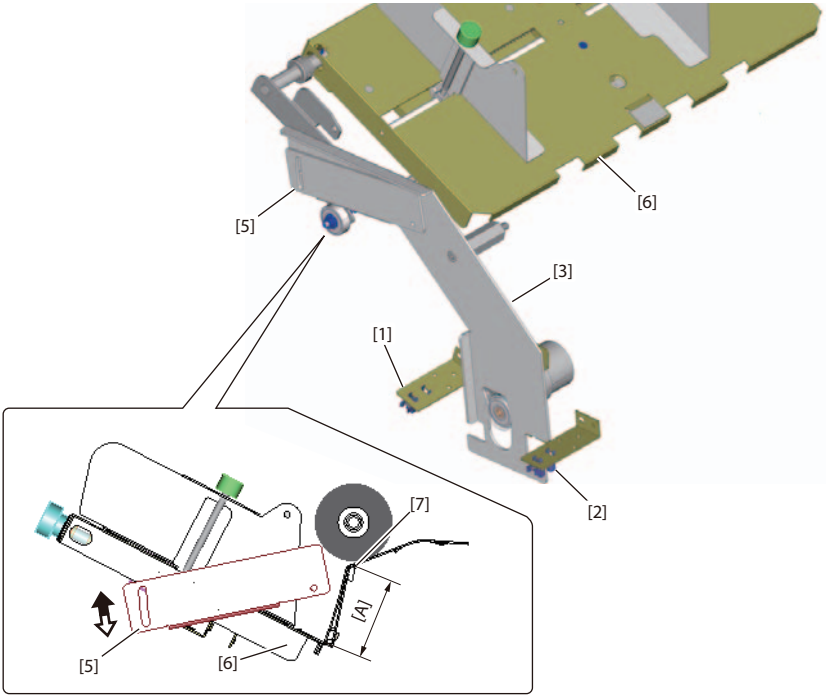
[3] Automatic feeding up and down lever..... 1
[4] Link..... 1



3) Set the paper feed pressure adjustment lever to "0", and drive the paper feed tray motor. Move the feeding up and down lever to the detection position of the paper feed tray lower limit sensor.

4) Adjust the fixing position of the adjustment plate so that the distance between the paper feed tray and rib corner section of paper feed inlet lower will be [A].

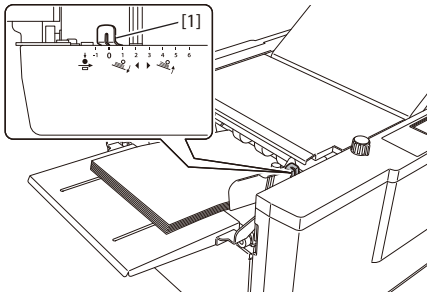
[5] Adjustment plate 1
[6] Paper feed tray 1
[7] Rib 1
[A] Distance: less than 44 to 48 mm/1.73 to 1.89 inches



3.2.3 Adjusting the paper feed tray switch (SW201) (DF-990/DF-990A)

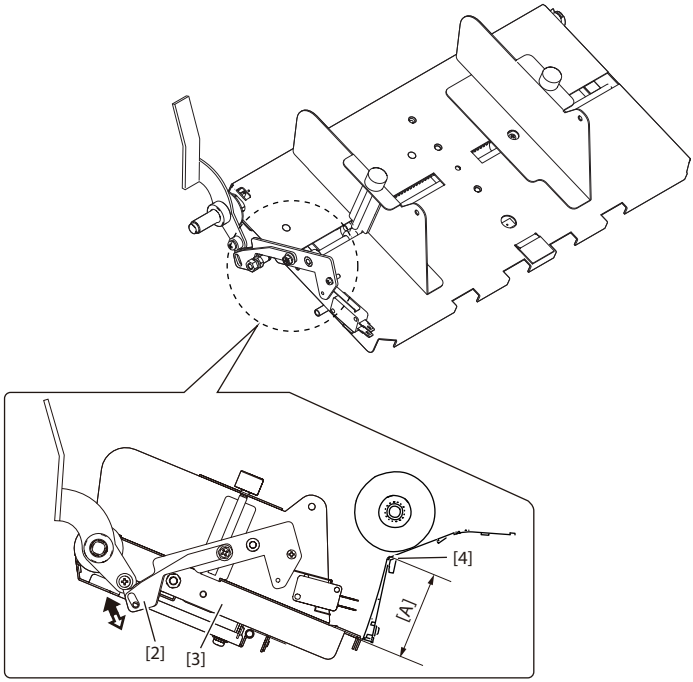
1) Set the paper feed pressure adjustment lever to [0].

[1] Paper feed pressure adjustment lever..... 1



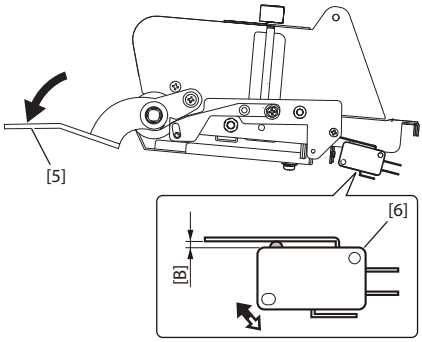
2) Adjust the fixing position of the adjustment plate so that the distance between the paper feed tray and rib corner section of paper feed inlet lower will be [A].

[2] Adjustment plate..... 1
[3] Paper feed tray 1
[4] Rib 1
[A] Distance: less than 44 to 48 mm/1.73 to 1.89 inches



3) Lower the paper set lever.
The paper feed tray will be raised by lowering the paper set lever, and the paper feed tray switch will be turned ON.
[5] Paper set lever..... 1
[6] Paper feed tray switch 1

4) Adjust the position of the switch so that the clearance will be [B] with the switch ON.
[B] Clearance: 0 to 1 mm/0 to 0.04 inch



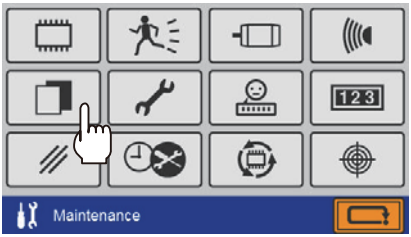
3.3 Paper feed inlet

3.3.1 Adjusting the feed jam sensor (PS204e/PS204r)

1) Enter the maintenance mode.

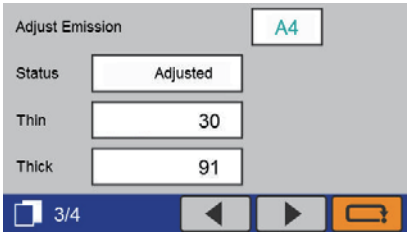
☞ Chap. 6 > 2 MAINTENANCE MODE OPERATIONS

2) Touch the ❒ (Offset) key.
The "Offset" screen will be displayed.



3) Select the [Adjust Emission] screen by touching the ◀ or ▶ key.

4) Stack a sheet of standard size fine quality paper (157 g/m^2/41.0 lbs) on the paper feed tray.
DF-999/DF-999A: Paper size is automatically detected to display the size of the paper stacked on the paper feed tray.
Set to the standard size when the paper stack detection is set to OFF by user.
DF-990/DF-990A: Set the paper size on the [Standard Size] screen.



☞ Chap. 6 > 3.5 Offset

5) Press the "Test" or "Start" key.
The paper will be fed and the light emitting amount of the sensor will be automatically adjusted.

Paper type	Criteria for light emitting amount of the sensor
Thin paper	10 to 50
Thick paper	35 to 160

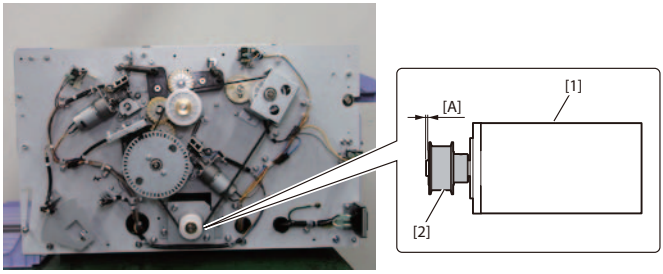
6) When the sensor is adjusted, the display of [Status] will be changed from [No Adjust] to [Adjusted].
7) Press the ⮌ key.
The screen returns to the top screen in the maintenance mode.

4 DRIVE SECTION

4.1 Conveying the paper

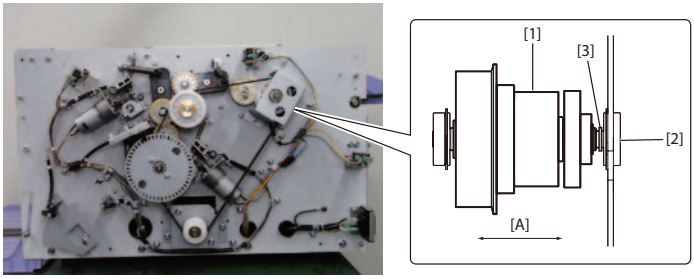
4.1.1 Adjustment of the conveyance motor (M101)

1) Adjust the distance [A] from the edge face of the motor shaft with the pulley.
   [1] Conveyance motor (M101) 1
   [2] Pulley 1
   [A] Distance: 1.5 mm/0.06 inch



4.1.2 Adjusting the feed clutch (CL101)

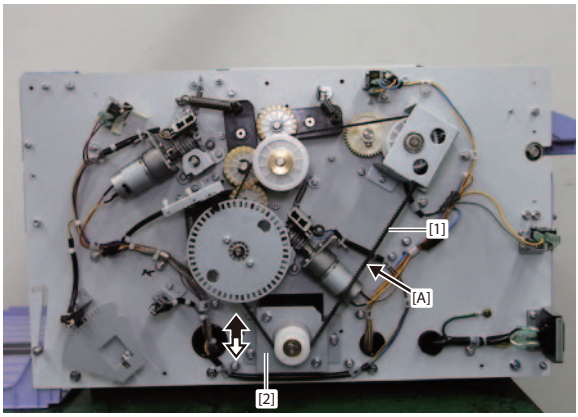
1) Put the adjusting washer between the shaft of the feed clutch and bearing to adjust the thrust play [A].
   [1] Feed clutch (CL101) 1
   [2] Bearing..... 1
   [3] Adjusting washer..... 1
   [A] Thrust play: 0.1 mm/0.004 inch or less



4.1.3 For adjusting the tension of driving belt

1) Press the measuring point [A] with the force of 3 N. Adjust with the motor bracket so that the deflection amount of the drive belt will be [B].

[1] Drive belt 1
[2] Motor bracket 1
[B] Amount of deflection: 3 to 5 mm/0.12 to 0.2 inch

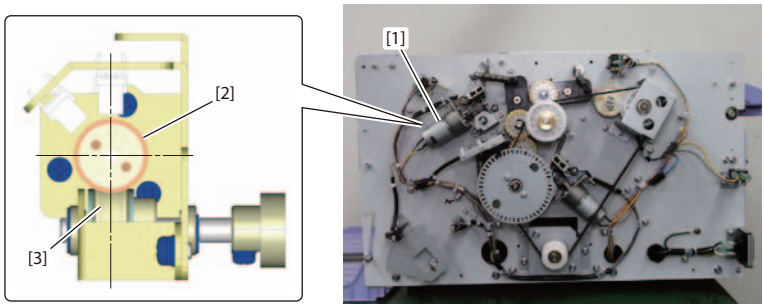


5 FOLDING SECTION

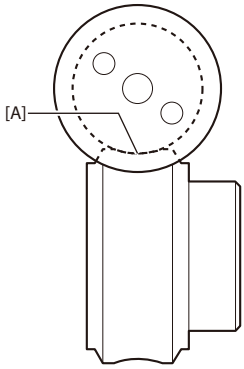
5.1 Folding plate 1

5.1.1 Adjusting the folding plate 1 motor (M301)

1) Attach the folding plate 1 motor so that the centers of the worm wheel and folding plate 1 motor worm are in alignment.
   [1] Folding plate 1 motor (M301) 1
   [2] Worm 1
   [3] Worm wheel 1



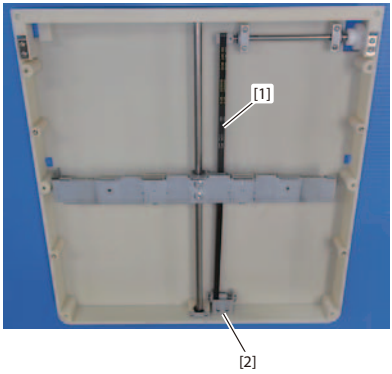
2) Check the backlash of the worm and worm wheel is [A].
   [A] Backlash: 0.1 to 0.2 mm/0.004 to 0.008 inch

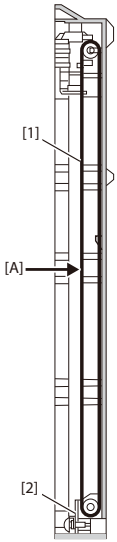


5.1.2 Adjusting the STS belt

1) Press the measuring point [A] with the force of 1 N. Adjust with the bracket so that the deflection amount of the STS belt will be [B].

[1] STS belt..... 1
[2] Bracket..... 1
[B] Amount of deflection: 3 to 5 mm/0.12 to 0.2 inch





5.1.3 Adjusting the parallelism of the folding stopper 1

Adjust the parallelism of the leading edge of the paper fed from the paper feed tray and folding stopper 1 to decrease folding misalignment in the sideway direction and improve the folding accuracy.

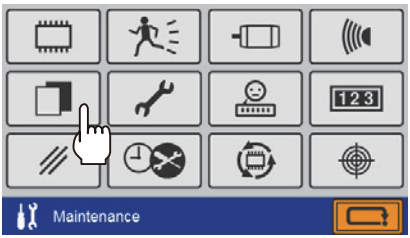
NOTE

Remove the top cover before making adjustments and attach the folding plate 1 to the main body.

1) Enter the maintenance mode.

☞ Chap. 6 > 2 MAINTENANCE MODE OPERATIONS

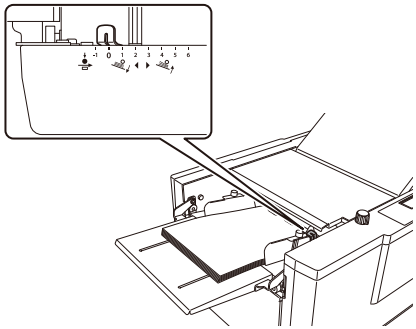
2) Touch the ❒ (Offset) key.
The "Offset" screen will be displayed.



3) Select the [Parallel CK] screen by touching the ◀ or ▶ key.

4) Set the paper feed pressure adjustment lever to "0".

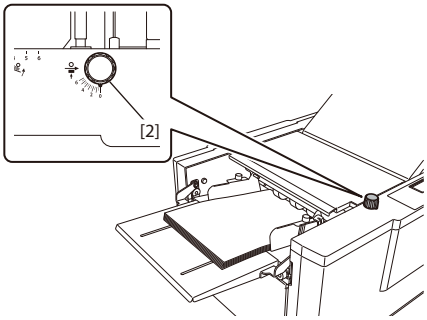
[1] Paper feed pressure adjustment lever..... 1



DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

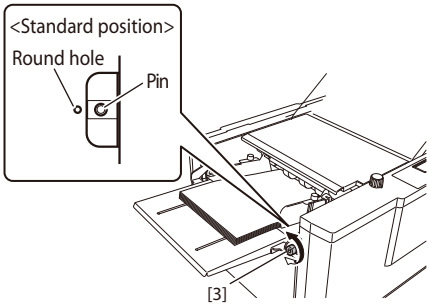
5) Set the separating pressure adjustment dial to "0".

[2] Separating pressure adjustment dial..... 1



6) Rotate the skew correction knob to return the skew correction of the paper feed tray to its standard position.

[3] Skew correction knob 1

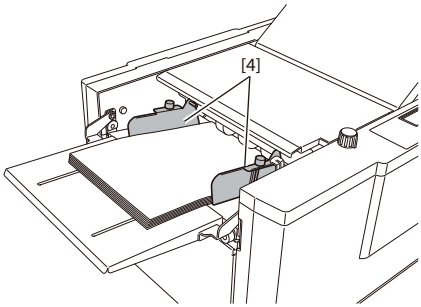


7) Adjust the paper feed guide to match the paper width.
Check that the paper is conveyed straightly on the paper feed section.

[4] Paper feed guide 1

NOTE

Be careful not to leave the paper unstable on the paper feed guide, which may cause sideway misalignment.

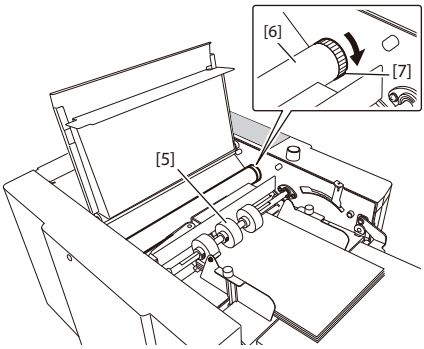


8) Press the start key.
The display will be changed to [Operating], and the paper feed tray will be raised (only for the DF-999/DF-999A).
For the DF-990/DF-990A, lower the paper set lever. (The paper feed tray will be raised.)
The folding stoppers of the folding plate 1 and folding plate 2 will operate.

9) Check that the display will be change to [Stopping].

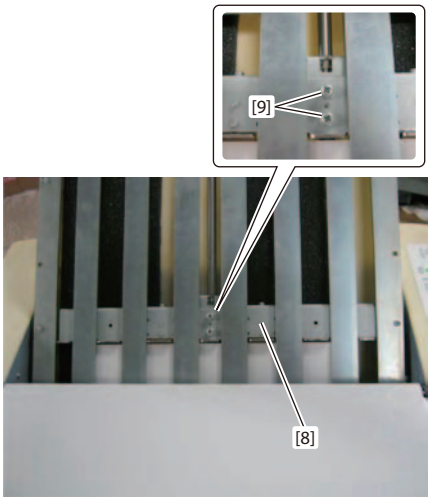
10) Rotate the paper feed ring by hand to feed the leading edge of the paper to the idler roll.
[5] Paper feed ring 3
[6] Idler roll 1

11) Rotate the jam correction knob by hand to feed the leading edge of the paper near the folding stopper 1 on the folding plate 1.
[7] Jam correction knob 1



12) Loosen the fixing screw to adjust so that the leading edge of the paper will be in parallel with the folding stopper 1.
[8] Folding stopper 1 1
[9] Fixing screw 1

13) After adjustment, tighten the fixing screw.
14) Return the top screen in the maintenance mode by pressing the ⇨ key.

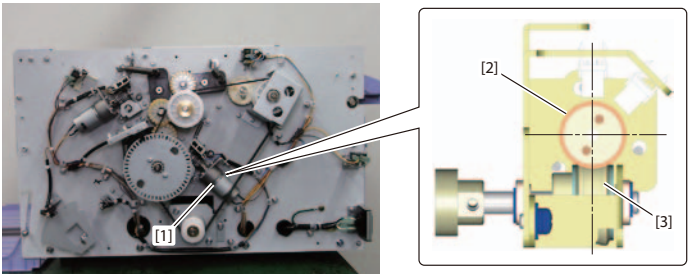


5.2 Folding plate 2

5.2.1 Adjusting the folding plate 2 motor (M302)

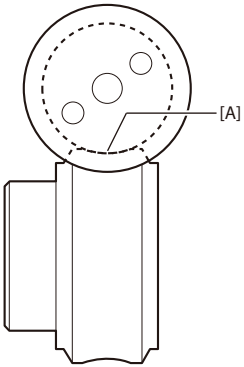
1) Attach the folding plate 2 motor so that the centers of the worm wheel and folding plate 2 motor worm are in alignment.

[1] Folding plate 2 motor (M302) 1
[2] Worm 1
[3] Worm wheel 1



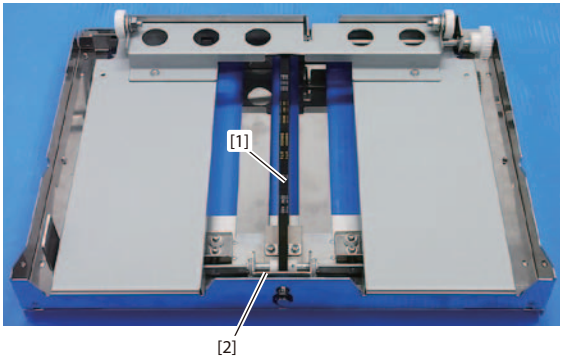
2) Check the backlash of the worm and worm wheel is [A].

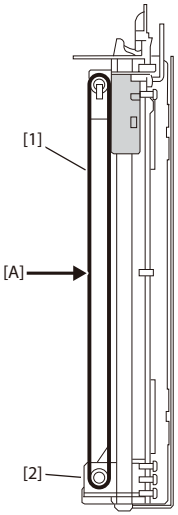
[A] Backlash: 0.1 to 0.2 mm/0.004 to 0.008 inch



5.2.2 Adjusting the STS belt

1) Press the measuring point [A] with the force of 2 N. Adjust with the bracket so that the deflection amount of the STS belt will be [B].
   [1] STS belt..... 1
   [2] Bracket..... 1
   [B] Amount of deflection: 3 to 5 mm/0.12 to 0.2 inch



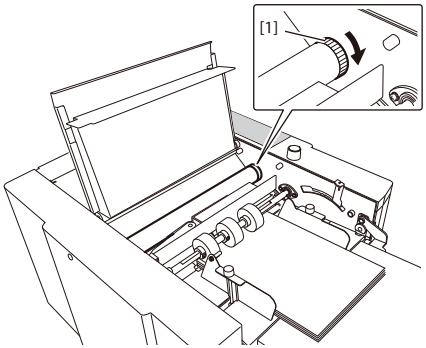


5.2.3 Adjusting the parallelism of the folding stopper 2

Adjust the parallelism of the leading edge of the paper fed from the paper feed tray and folding stopper 2 to decrease folding misalignment in the sideway direction and improve the folding accuracy.

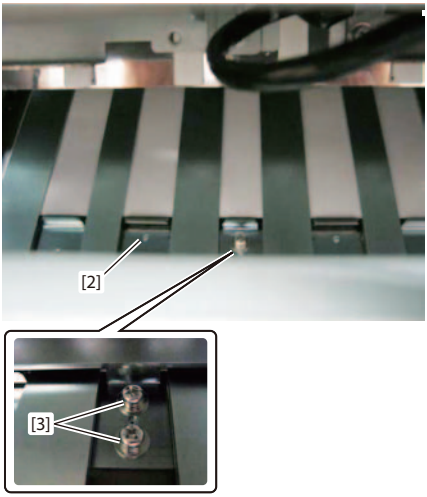
1) Take the steps 1) to 10) of "Adjusting the parallelism of the folding stopper 1".
☞ Chap. 5 > 5.1.3 Adjusting the parallelism of the folding stopper 1

2) Rotate the jam correction knob by hand to feed the leading edge of the paper near the folding stopper 2 on the folding plate 2.
[1] Jam correction knob 1



3) Loosen the fixing screw to adjust so that the leading edge of the paper will be in parallel with the folding stopper 2.
[2] Folding stopper 2 1
[3] Fixing screw 2

4) After adjustment, tighten the fixing screw.



5.2.4 Adjusting the stop position of switching shaft

NOTE

In the section of adjusting the stop position of switching shaft, it is required exceptionally to turn the machine power on during servicing work. The service person shall ensure his/her one-man service for the other service persons to protect against an electric shock and injury. The hazardous moving parts and live parts are exposed because that servicing work also requires to remove the exterior covers. If there are two or more persons, the following accidents are expected:
- the machine is started accidentally and it could result in injury, and
- those persons touch accidentally the live parts exposed and it could result in an electric shock.

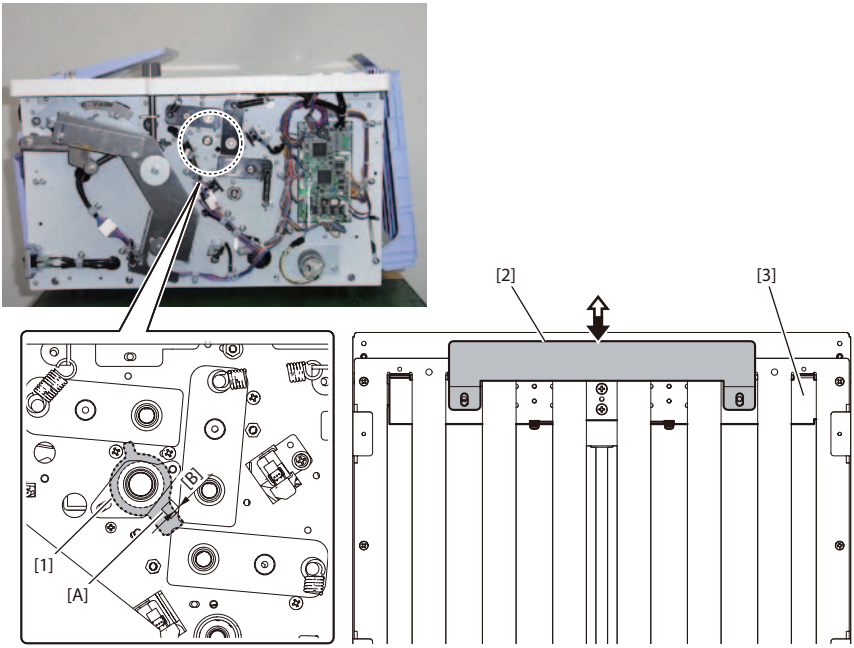
1) Turn the power off and turn it on again to perform initial operations.
Attach the top cover, side cover L, folding plates 1 and 2 in advance.

2) Adjust the switching adjustment plate so that the distance between the square hole edge of the frame F and edge of the switching angle will be [B].

NOTE

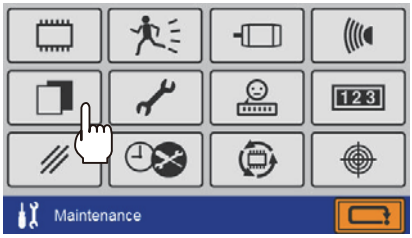
Note that the folding stopper is positioned as shown in the figure.

[1] Switching angle 1
[2] Switching adjustment plate..... 1
[3] Folding stopper..... 1
[A] Square hole of the frame F
[B] Distance: 2 ± 0.5 mm/0.08 ± 0.02 inch



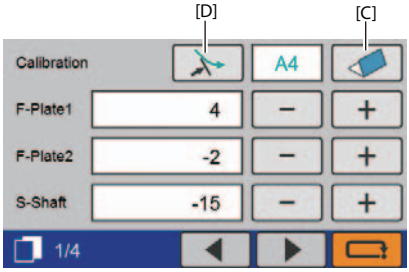
3) Enter the maintenance mode.
☞ Chap. 6 > 2 MAINTENANCE MODE OPERATIONS

4) Touch the ❒ (Offset) key.
The "Offset" screen will be displayed.



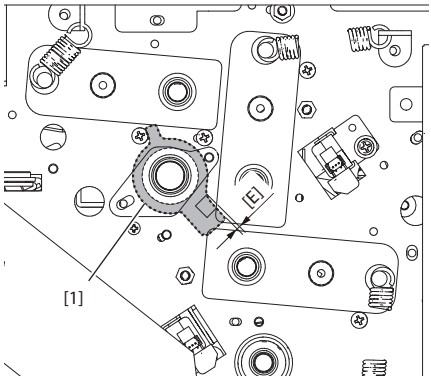
5) Select the [Calibration] screen by touching the ◀ or ▶ key.

6) Perform single folding.
Change the folding mode in the folding mode selection screen, when the single fold (right figure) is not displayed by checking the icon of the folding mode key [C].
☞ Chap. 6 > 3.5 Offset



7) Adjust the switching shaft by touching the switching shaft [D] key.
To move the folding stopper (folding plates 1 and 2) and switching shaft without passing paper.

8) Change the numerical value of [S-Shaft] by touching the [–] or [+] key, and adjust the switching adjustment plate so that the distance between the edge of square hole and edge of switching angle will be [E].
[E] Distance: 0.3 to 0.5 mm/0.012 to 0.02 inch



5.2.5 Adjusting folding sizes

Adjust the sizes so that the sizes folded on the folding plate 1 and 2 stoppers will be regulatory values.

NOTE

Make adjustments of "Adjusting folding sizes" after finishing all other adjustments such as "Adjusting the parallelism of the folding stopper", "Adjusting the stop position of switching shaft", etc.

1) Perform settings and adjustments as follows.

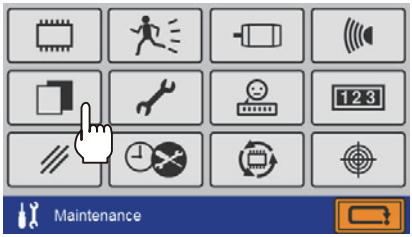
	Conditions		
	JPN	NA	EU
Paper	B4 fine quality paper (with grains of long grain) 64 g/m^2/16 lbs	Letter fine quality paper (with grains of long grain) 81.4 g/m^2/22 lbs	A4 fine quality paper (with grains of long grain) 81.4 g/m^2/22 lbs
Folding mode	Letter fold	Letter fold	Letter fold
Processing speed	5	5	5
Paper feeding pressure	Standard (0)	Standard (0)	Standard (0)
Separating pressure	0	0	0
Skew correction	0	0	0

2) Stack paper on the paper feed tray.
3) Enter the maintenance mode.

☞ Chap. 6 > 2 MAINTENANCE MODE OPERATIONS

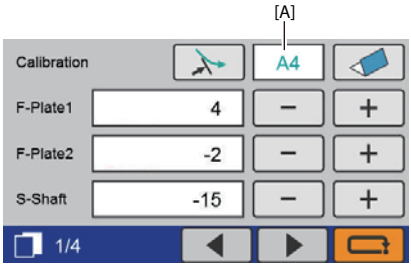
4) Touch the ❒ (Offset) key.
The "Offset" screen will be displayed.

For the DF-990/DF-990A, take the step 5) next.
For the DF-999/DF-999A, the step 5) is not needed. Proceed to the step 7).
However, set the standard size, when the paper stack detection is set to OFF by user.



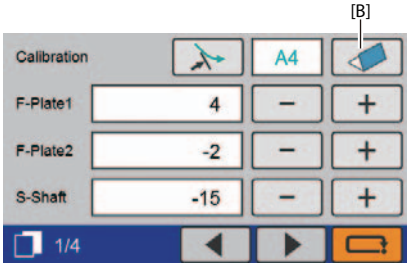
5) Touch the paper size selection key [A] to set the paper size.

☞ Chap. 6 > 3.5 Offset



6) Set the letter fold by touching the folding mode key [B].

☞ Chap. 6 > 3.5 Offset



7) Press the start key or test key.
Two sheets of paper are folded and ejected.
* Two sheets are folded and ejected in this procedure even if the number of sheets for test feed setting is set to other than 2 sheets in the user menu.

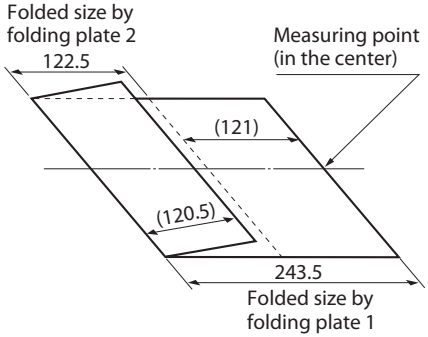
8) Measure the sheet ejected secondly to calculate the value of the difference between the value and standard adjustment value of folding size.

	Standard adjustment vale of folding size		
	JPN	NA	EU
Folding dimension of the folding plate 1	243.5 mm ±0.3 mm 9.59 inches ±0.01 inch	187 mm ±0.3 mm 7.36 inches ±0.01 inch	199 mm ±0.3 mm 7.83 inches ±0.01 inch
Folding dimension of the folding plate 2	122.5 mm ±0.3 mm 4.82 inches ±0.01 inch	94 mm ±0.3 mm 3.70 inches ±0.01 inch	100 mm ±0.3 mm 3.94 inches ±0.01 inch

9) Adjust the values of the folding plate 1 and folding plate 2 by the calculated variance.
The adjustment unit is 0.1 mm/0.004 inch. The folding stopper position is adjusted by 0.1 mm/0.004 inch when the value is increased or decreased by 1.

[Example] When the folding dimension of the folding plate 1 is 243.0 mm/9.57 inches, and folding dimension of the folding plate 2 is 122.9 mm/4.84 inches for the letter fold of B4 paper.
The difference of the first folded size:
243.5 mm – 243.0 mm = +0.5 mm
9.59 inches – 9.57 inches = +0.02 inch
Increase the value of "folding plate 1" by 5.

The difference of the second folded size:
122.5 mm – 122.9 mm = –0.4 mm
4.823 inches – 4.839/ inches = –0.016 inch
Decrease the value of "folding plate 2" by 4.



NOTE
If the value does not meet the standard adjustment values of folding size, repeat the steps 5) to 7).

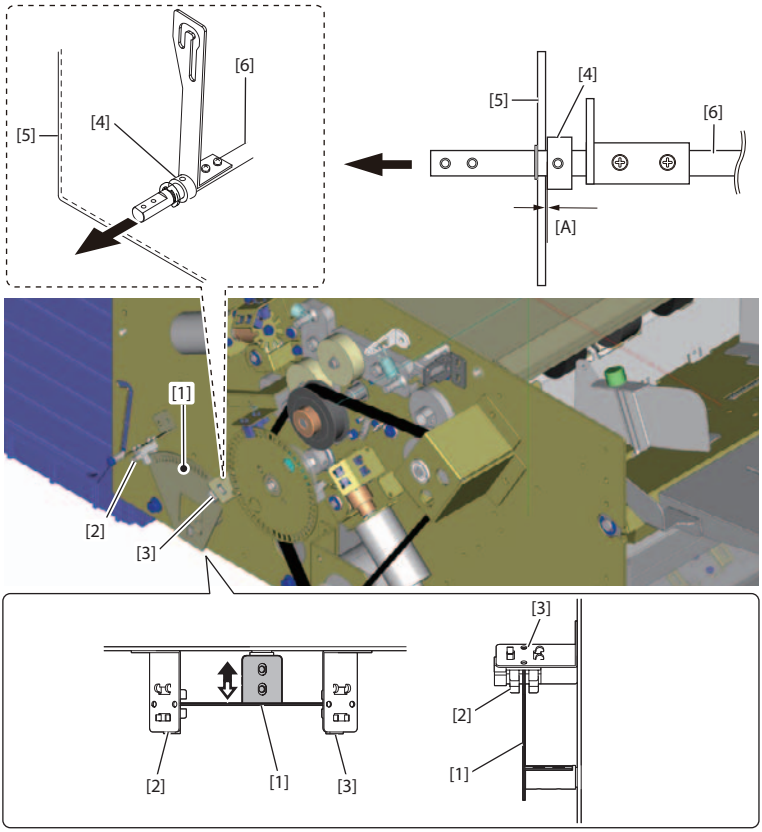
10) Execute "single fold" and check that the folding dimension is within the range of 182 mm ±0.5 mm/7.17 inces ±0.02 inch.

6 EJECTING SECTION

6.1 Stacker drive

6.1.1 Adjusting the index plate

1) Attach the index plate so that the index plate will be positioned in the center of each sensor (PS401 and PS402).
   [1] Index plate 1
   [2] Stacker index sensor (PS401) 1
   [3] Stacker home sensor (PS402) 1
2) Move the shaft in the direction of an arrow, and then put the set collar 120-16-100 at the distance [A] from the frame B.
   [A] Distance: 0.1 mm/0.004 inch
   [4] Set collar 120-16-100 1
   [5] Frame B 1
   [6] Shaft 1



3) After securing the set collar 120-16-100 to the shaft while keeping the condition of 2), check if the shaft is firmly secured.

Chapter 6
MAINTENANCE MODE

1 OUTLINE

1.1 Maintenance mode

This is a mode specified for servicing work, and performs various checking and setting operations.
The maintenance modes of this machine can be divided into the following twelve types.

Menu	Details
Version check	Displays the drawing number of each control program
Simulation	Simulation of folding operation
Motion check	Provides respective operation of the motor, clutch, etc.
Sensor check	Checking operations of the sensors and switches
Offset	For adjusting the original points of folding plate 1, folding plate 2 and switching shaft, parallelism of folding stopper, and automatic setting of light emitting amount of sensors.
Various settings	Various operation settings
Language settings	Display language settings
Maintenance counter	Displays the number of paper feed operations and sets the counter limit
Data reset	Initializes various data
Error history	Displays error history occurred
Version upgrading	Version upgrade of the program
Touch panel adjustment	For adjusting the reacting position of the touch panel.

1.2 Version upgrading

The program installed in this machine can be ungraded to a new version.

To upgrade the version of the programs, obtain the SD card in which the latest version of the program files is saved.

2 MAINTENANCE MODE OPERATIONS

2.1 Entering the maintenance mode

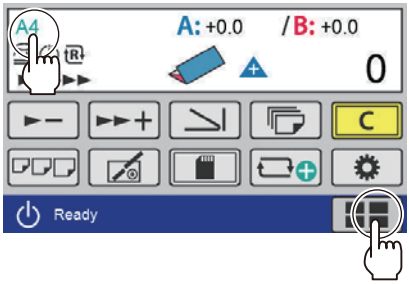
The maintenance mode can be entered only on the ready screen and on the screen where paper jam error occurs.

NOTE

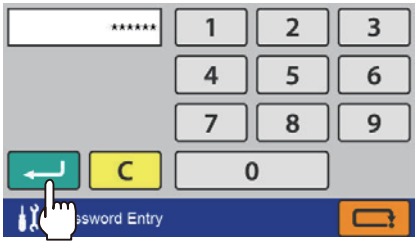
- If an operation mistake is made, repeat operations from Step 1).
- Remove the DF COUNTING UNIT out of the main body, and attach the folding plate 1 before operation, when the counting mode is set.
- Adjust the touch panel first, when touch operation is not performed normally.
  Turn on the power pressing the start key and stop key simultaneously, and keep pressing the start key and stop key for 5 seconds or more after [Stating] is displayed. The screen is switched to the touch panel adjustment screen.
  ☞ Chap. 6 > 3.12Touch panel adjustment

1) Press and hold the top left of the screen (2 seconds or more).
   The buzzer sounds.

2) Press and hold the bottom right of the screen (2 seconds or more).
   The buzzer sounds, and the password input screen is displayed.

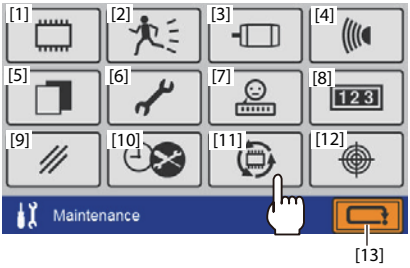


3) Input "753620" on the password input screen, and touch the ↵ (enter) key.



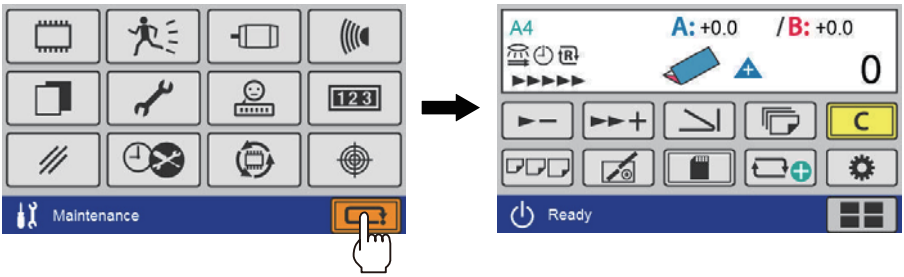
4) Touch the menu key on the top screen in the maintenance mode, and proceed to each menu.

[1] Version check
[2] Simulation
[3] Motion check
[4] Sensor check
[5] Offset
[6] Various settings
[7] Language settings
[8] Maintenance counter
[9] Data reset
[10] Error history
[11] Version upgrading
[12] Touch panel adjustment
[13] Cancel key



2.2 Exiting the maintenance mode

Press and hold the cancel key on the top screen in the maintenance mode (2 seconds or more).
Exit the maintenance mode, and return to the ready screen.



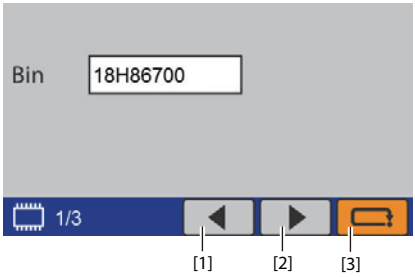
3 MENUS AND FUNCTIONS

3.1 Version check

3.1.1 Operation method

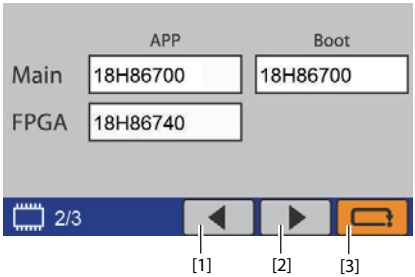
Page 1

[1] To proceed to the screen on page 3.
[2] To proceed to the screen on page 2.
[3] To return to the top screen of the maintenance mode.



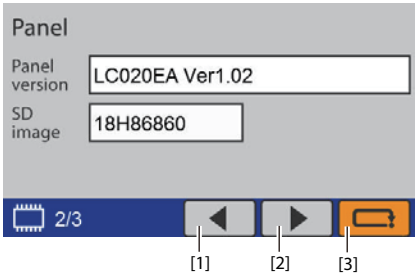
Page 2

[1] To return to the screen on page 1.
[2] To proceed to the screen on page 3.
[3] To return to the top screen of the maintenance mode.



Page 3

[1] To return to the screen on page 2.
[2] To proceed to the screen on page 1.
[3] To return to the top screen of the maintenance mode.



3.1.2 List

"APP" stands for the application section, and "Boot" for the program version of the boot section.

Page	Program	Display			Remarks
1	Bin program	Bin		18H*****	
2	Main program	Main	APP	18H*****	
			Boot	18H*****	
	FPGA program	FPGA	APP	18H*****	
3	Panel program	Panel	Panel version	LC020EA Ver01.02	
			SD image	18H*****	

3.2 Simulation

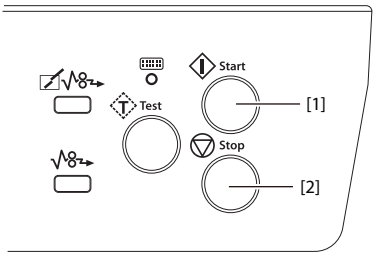
Simulates a folding operation without using paper.

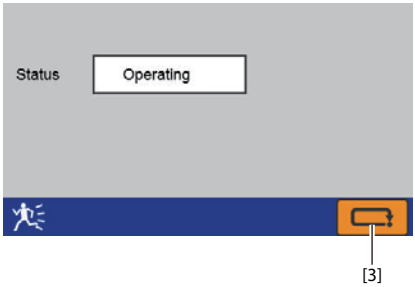
NOTE

Open/set error of "top cover", "side cover" or "folding plate 1" is always detected.
When an error occurs, perform operations after canceling it.

3.2.1 Operation method

[1] Starts operations.
Status: Operating
[2] Stops operations.
Status: Stopping
[3] To return to the top screen of the maintenance mode.





3.2.2 List

Item	Details/remarks
Simulation	• Simulates folding operation without using paper. • To operate cross fold in the folding mode.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

3.3 Motion check

Provides respective operation of the motor and clutch etc..

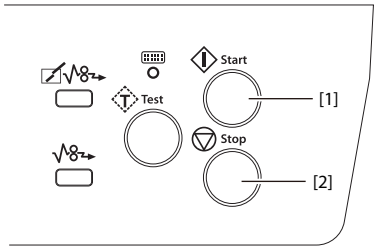
NOTE

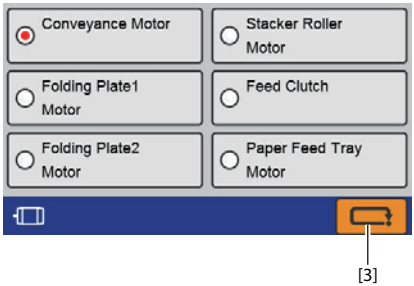
Open/set error of "top cover", "side cover" or "folding plate 1" is always detected.
When an error occurs, perform operations after canceling it.

3.3.1 Operation method

Select an item by touching the key on the screen. The illustration shows the state that the conveyance motor is selected.

[1] Starts operations.
[2] Stops operations.
[3] To return to the top screen of the maintenance mode.





3.3.2 List

Display	Parts name on this manual	Remarks
Conveyance Motor	Conveyance motor (M101)	
Folding Plate1 Motor	Folding plate 1 motor (M301)	
Folding Plate2 Motor	Folding plate 2 motor (M302)	
Stacker Roller Motor	Stacker roller motor (M401)	
Feed Clutch	Feed clutch (CL101)	
Paper Feed Tray Motor	Paper feed tray motor (M201)	Operation can be performed when the [Mode: 999] is set at "3.6 Various settings".

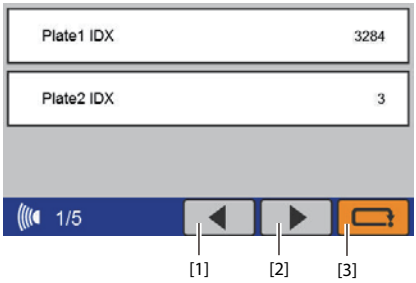
3.4 Sensor check

Checks that the sensors and switches operate normally.

3.4.1 Operation method

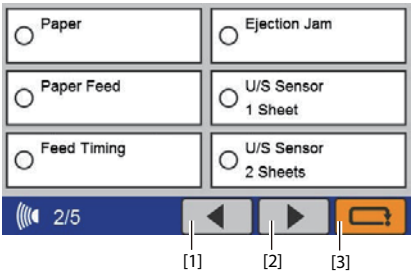
Page 1

[1] DF-999/DF-999A: To proceed to the screen on page 5.
DF-990/DF-990A: To proceed to the screen on page 4.
[2] To proceed to the screen on page 2.
[3] To return to the top screen of the maintenance mode.



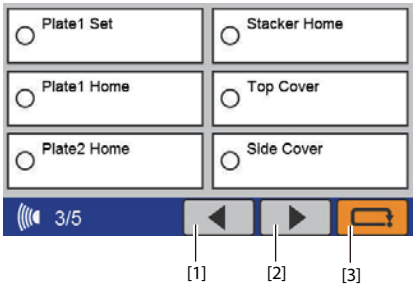
Page 2

[1] To return to the screen on page 1.
[2] To proceed to the screen on page 3.
[3] To return to the top screen of the maintenance mode.



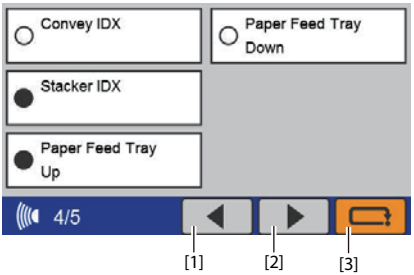
Page 3

[1] To return to the screen on page 2.
[2] To proceed to the screen on page 4.
[3] To return to the top screen of the maintenance mode.



Page 4

[1] To return to the screen on page 3.
[2] DF-999/DF-999A: To proceed to the screen on page 5.
DF-990/DF-990A: To proceed to the screen on page 1.
[3] To return to the top screen of the maintenance mode.



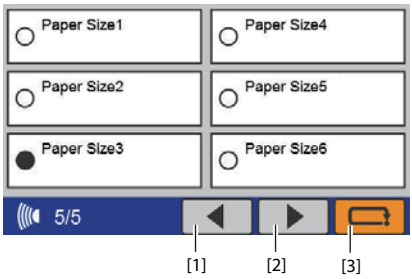
Page 5 (Displayed only on the DF-999/DF-999A)

[1] DF-999/DF-999A: To return to the screen on page 4.
DF-990/DF-990A: No display.

[2] DF-999/DF-999A: To proceed to the screen on page 1.
DF-990/DF-990A: No display.

[3] To return to the top screen of the maintenance mode.

When sensors or switches are switched ON/OFF, ●/○ is switched correspondingly. Buzzer sounds when the status is changed.



3.4.2 List

Page	Display	Parts name on this manual	Remarks
1	Plate1 IDX	Folding plate 1 index A/B sensor (PS301/PS302)	The numeral value increases or decreases according to the rotation direction of the index plate.
	Plate2 IDX	Folding plate 2 index A/B sensor (PS304/PS305)	
2	○ Paper	Paper sensor (PS203)	
	○ Paper Feed	Feed jam sensor (PS204e/PS204r)	
	○ Feed Timing	Feed timing sensor (PS206e/PS206r)	
	○ Ejection Jam	Eject jam sensor (PS403e/PS403r)	
	○ U/S Sensor 1 Sheet	Ultrasonic sensor (S201t/S201r)	Displayed when the settings are effective after mounted on the DF-999/DF-999A.
	○ U/S Sensor 2 Sheets		
3	○ Plate1 Set	Folding plate switch (SSW103)	
	○ Plate1 Home	Folding plate 1 home sensor (PS303)	
	○ Plate2 Home	Folding plate 2 home sensor (PS306)	
	○ Stacker Home	Stacker home sensor (PS402)	
	○ Top Cover	Top cover switch (SSW101)	
	○ Side Cover	Side cover L switch (SSW102)	
4	○ Convey IDX	Conveyance index sensor (PS101)	
	○ Stacker IDX	Stacker index sensor (PS401)	
	○ Paper Feed Tray Up	Paper feed tray upper limit sensor (PS201)	Mounted on the DF-999/DF-999A and displayed.
		Paper feed tray switch (SW201)	Mounted on the DF-990/DF-990A and displayed.
	○ Paper Feed Tray Down	Paper feed tray lower limit sensor (PS202)	Mounted only on the DF-999/DF-999A and displayed.
5	○ Paper Size1	PS PWB unit (PCB201)	
	○ Paper Size2		
	○ Paper Size3		
	○ Paper Size4		
	○ Paper Size5		
	○ Paper Size6		Displayed only on the DF-999.

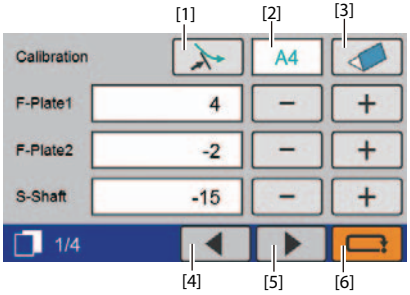
3.5 Offset

The home position of the folding stopper on each folding plate and stop position of the switching shaft are adjusted by using the calibration.
Parallelism is adjusted so that the lead edge of paper will be in parallel with the folding stopper by moving the folding stopper. Adjust the sensors by feeding standard paper to adjust the light emitting amount of feed jam sensor automatically.

NOTE
Be sure to adjust the light emitting amount when the feed jam sensor (PS204e/PS204r) is replaced.

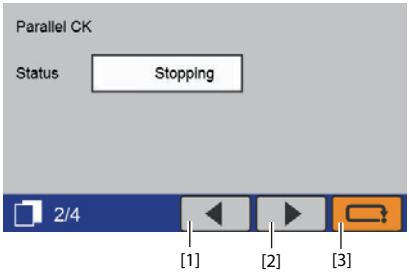
3.5.1 Operation method

Calibration



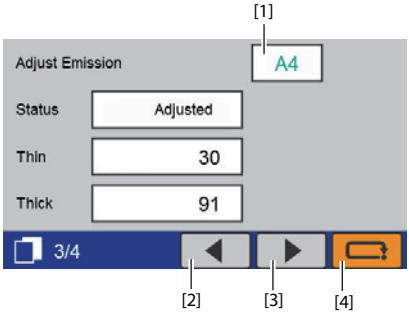
[1] To move the folding stopper (folding plate 1 and folding plate 2) and switching shaft without passing paper. To use for adjusting the switching shaft.
[2] DF-999/DF-999A: To display the paper size after automatically detected.
DF-990/DF-990A: To proceed to the standard paper size selection screen.
[3] To proceed to the folding mode selection screen.
[4] To proceed to the [Light Emit Amt] screen.
[5] To proceed to the [Parallel CK] screen.
[6] To return to the top screen of the maintenance mode.

Parallel CK



[1] To return to the [Calibration] screen.
[2] To proceed to the [Adjust Emission] screen.
[3] To return to the top screen of the maintenance mode.

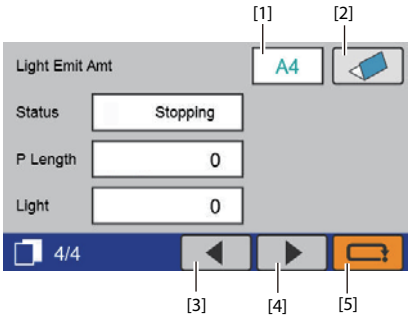
Adjust Emission



[1] DF-999/DF-999A: To display the paper size after automatically detected.
DF-990/DF-990A: To proceed to the standard paper size selection screen.
[2] To return to the [Parallel CK] screen.
[3] To proceed to the [Light Emit Amt] screen.
[4] To return to the top screen of the maintenance mode.

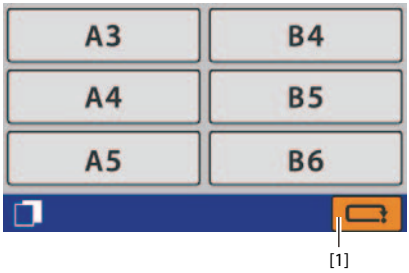
Light Emit Amt

[1] DF-999/DF-999S: To display the paper size after automatically detected.
DF-990/DF-990A: To proceed to the standard paper size selection screen.
[2] To proceed to the folding mode selection screen.
[3] To return to the [Adjust Emission] screen.
[4] To proceed to the [Calibration] screen.
[5] To return to the top screen of the maintenance mode.



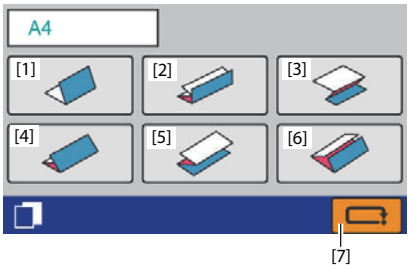
Standard paper size selection (DF-990/DF-990A only)

Select paper size by touching the key on the screen.
To return to the [Calibration] screen, after changing the paper size.
[1] To return to the [Calibration] screen.



Folding mode selection

Select folding mode by touching the key on the screen.
To return to the [Calibration] screen, after changing the folding mode.
[1] Single fold
[2] Double fold
[3] Irregular accordion fold-out
[4] Letter fold
[5] Accordion-fold
[6] Gate fold
[7] To return to the [Calibration] screen.



3.5.2 List

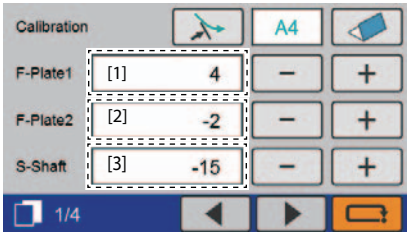
Item		Parts	Default value	Offset range/ operation state	Moving amount per one unit
Calibration		Folding section: Folding plate 1	0	±20	0.1 mm/ 0.004 inch
		Folding section: Folding plate 2	0	±20	0.1 mm/ 0.004 inch
		Folding section: Switching shaft	-10	±50	0.1 mm/ 0.004 inch
Parallel CK	Status	Folding section: Folding plate 1 Folding plate 2		Stopping/Operating Ejecting Paper	
Adjust Emission	Status	Paper feed section: Feed jam sensor (PS204)	–	No Adjust/ Adjusting/Adjusted Ejecting Paper	
	Thin paper		17	****	
	Thick paper		52	****	
Light Emit Amt	Status		–	Stopping/Operating Ejecting Paper	
	P Length		–	0 to 4095	
	Light		–	0 to 4095	

NOTE

Open/set error of "top cover", "side cover" or "folding plate 1" is always detected.
When an error occurs, perform operations after canceling it.

3.5.3 Details of display

a. Calibration

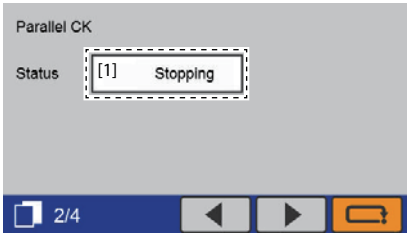


[1] Adjustment value of the folding stopper (folding plate 1)
Value adjusted at the factory setting.
Register the value offsetting the difference between the standard value of the first folding size and actually folded size.

[2] Adjustment value of the folding stopper (folding plate 2)
Value adjusted at the factory setting.
Register the value offsetting the difference between the standard value of the second folding size and actually folded size.

[3] Adjustment value of folding plate 2 switching shaft
Value adjusted at the factory setting.
Adjust the clearance between the first folding roller and switching shaft to the specified value (0.3 to 0.5 mm/0.012 to 0.02 inch).

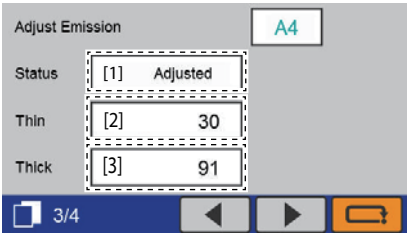
b. Parallel CK



[1] State of folding stopper (folding plates 1 and 2)
[Stopping]: The folding stopper stops
[Ejecting Paper]: Paper is being ejected.
[Operating]: The folding stopper is moved to the specified(*) stop position.

(*) Folding plate 1: Folding position is at the position of 130 mm/5.12 inches.
Folding plate 2: Folding position is at the position of 180 mm/7.09 inches.

c. Adjust Emission

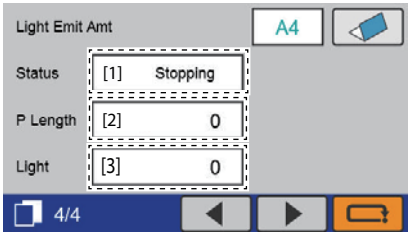


[1] State of feed jam sensor (PS204e: on the light emitting side)
[Adjusted]: The light emitting amount of the PS204e has been adjusted.
[Adjusting]: Adjusting the light emitting amount of the PS204e.
[No Adjust]: The light emitting amount of the PS204e has not been adjusted.
The default value (**) is registered.
[Ejecting Paper]: Paper is being ejected.

[2] Light emitting amount with double-feed detection set to "ON" and paper thickness set to "thin".
The value is adjusted automatically when feeding paper at the shipment.

[3] Light emitting amount with double-feed detection set to "ON" and paper thickness set to "thick".
The value is adjusted automatically when feeding paper at the shipment.

d. Light Emit Amt



[1] State of feed jam sensor (PS204r: on the light emitting side)
[Stopping]: The PS204r stopped measuring.
[Operating]: The PS204e performs measuring when paper is transmitting.
[Ejecting Paper]: Paper is being ejected.

[2] Paper length
The value is calculated by multiplying by 2.45 the number of pulses detected by the conveyance index sensor (PS101) while the paper is passing the feed jam sensor (PS204e and PS204r).
Unit: mm

[3] Light receiving amount
Displays the light receiving amount of paper measured while the feed jam sensor (PS204r: on the light receiving side) is operating.
The range of displayed value is 0 to 4095. The numerical value decreases when using thick paper, and the numerical value increases when using thin paper.

NOTE
Be sure to adjust the sensors when the feed jam sensor (PS204e and PS204r) or memory unit (PCB103) is replaced.

3.5.4 Procedures for adjusting folding plate 1 and folding plate 2

Press the start key or test key to perform test feeding.
For details of procedures for adjustments and feeding conditions, refer to the following.
☞ Chap. 5 > 5.2.5 Adjusting folding sizes

Standard value	JPN	NA	EU	Remarks
First folding size	243.5 mm 9.59 inches	187 mm 7.36 inches	199 mm 7.83 inches	Paper size JPN: B4 NA: Letter size EU: A4
Second folding size	122.5 mm 4.82 inches	94 mm 3.70 inches	100 mm 3.94 inches	

3.5.5 Procedures for adjusting switching shaft

Move the switching shaft by pressing the key on the [Calibration] screen.
For details of procedures for adjustments, refer to the following.
☞ Chap. 5 > 5.2.4 Adjusting the stop position of switching shaft

3.5.6 Procedures for adjusting parallelism (folding stopper and leading edge of paper)

Press the start key or test key to move the folding stopper to the specified position.
For the DF-999/DF-999A, the paper feed tray is raised.
For details of procedures for adjustments, refer to the following.
☞ Chap. 5 > 5.1.3 Adjusting the parallelism of the folding stopper 1
☞ Chap. 5 > 5.2.3 Adjusting the parallelism of the folding stopper 2

3.5.7 Procedures for adjusting sensors

a. Adjust Emission
Press the start key or test key to feed paper to the position of feed jam sensor, and the light emitting amount of the PS204e is adjusted automatically.

b. Light Emit Amt
Press the test key to perform test feeding.
Press the start key to start feeding paper, and the machine stops when paper runs out.

NOTE
Perform test feeding first when double-feed detection is set to "ON". Paper cannot be fed even if the start key is pressed without performing test feeding.

For details of procedures for adjustments, refer to the following.
☞ Chap. 5 > 3.3.1 Adjusting the feed jam sensor (PS204e/PS204r)

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

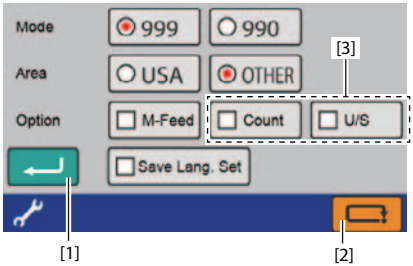
3.6 Various settings

Various settings are performed for operations of this machine.

3.6.1 Operation method

Select an item by touching the key on the screen (Mode/Area/Option). The illustration shows the state that [mode: 999], [Area: OTHER], and [Option: U/S] are selected.

[1] To decide the item to be selected, and the screen returns to the top screen in the maintenance mode.
[2] To return to the top screen of the maintenance mode.
[3] When the [Mode] is set to "999", it is displayed, and when switched to "990", it is not displayed.



3.6.2 List

Item		Setting value	Details	Remarks
Mode		999 (*)	Sets to the DF-999/DF-999A.	**NOTE** The machine is not operated normally when the settings are made for other model than specified.
		990	Sets to the DF-990/DF-990A.	
Area		USA	Sets to the item for NA. "inch" is set for mm/inch.	**NOTE** The machine does not operate normally unless the PS PWB unit is attached according to the destination.
		Others (*)	Sets to the item for JPN and EU. "mm" is set for mm/inch.	
Option	M-Feed	ON	Set to "ON" when the HAND FEED KIT is used.	When set to ON, "Manual feed mode" is added to the user menu. ON/OFF of [M-Feed Mode] and [Timing] can be set on the [Manual Feed Mode] screen.
		OFF (*)	Set to "OFF" when the HAND FEED KIT is not used.	
	Count	ON	Set to "ON" when the DF COUNTING UNIT is used.	
		OFF (*)	Set to "OFF" when the DF COUNTING UNIT is not used.	
	U/S	ON	To set to "ON" when the ultrasonic type double-feed detection is used.	
		OFF (*)	To set to "OFF" when the ultrasonic type double-feed detection is not used.	

Save Lang.Set	ON	Set to “ON” when save the language setting.	When set to ON,the language setting in user menu is saved even when the power is turned off. Default settings JPN: OFF NA, EU: ON
	OFF	Set to “OFF” when not save the language setting.	

(*): Default settings

3.7 Language settings

Sets the language displayed on the panel.

3.7.1 Operation method

Select an item by touching the key on the screen. The illustration shows the state that “English” is selected.

[1] To decide the item to be selected, and the screen returns to the top screen in the maintenance mode.
[2] To return to the top screen of the maintenance mode.

3.7.2 List

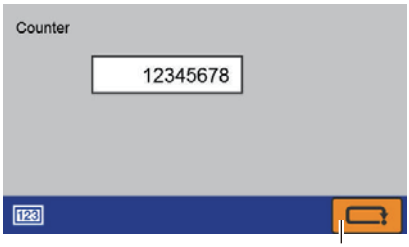
Item	Language	Remarks
English	English	
日本語	Japanese	
Español	Spanish	
Deutsch	German	
Français	French	
Italiano	Italian	
Русский	Russian	
Polski	Polish	
한국어	Korean	
中文	Chinese	

3.8 Maintenance counter

The number of total feeding operations is displayed.

3.8.1 Operation method

[1] To return to the top screen of the maintenance mode.



3.8.2 List

Item	Value	Details/remarks
Maintenance counter	0 to 99999999	The number of total feeding operations after factory shipment is displayed.

3.9 Data reset

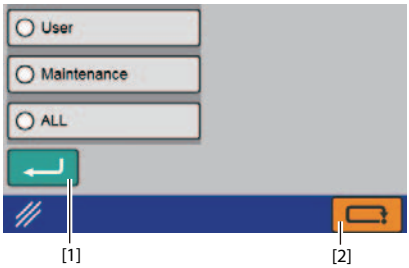
Initializes the setting data.

3.9.1 Operation method

Select an item by touching the key on the screen.

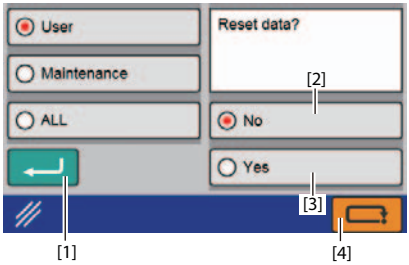
Selecting data reset

[1] To decide the item to be selected, and proceed to the screen for checking data reset.
[2] To return to the top screen of the maintenance mode.



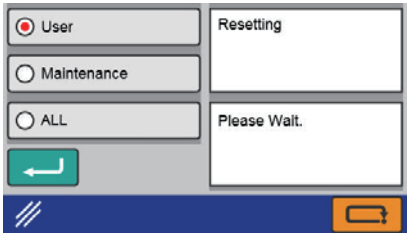
Checking data reset

[1] When "No" is selected, the screen returns to the data reset selection screen. When "Yes" is selected, the screen proceeds to the data reset (in execution) screen.
[2] To stop data reset.
[3] To perform data reset.
[4] To return to the data reset selection screen.



Data reset (in execution)

When data reset is completed, the screen returns to data reset selection screen.



3.9.2 List

Item	Data to be initialized	Remarks
User	Data set by user (Registration of custom fold, double-feed detection setting, and manual feed setting)	mm/inch setting is not applicable.
Maintenance		Not used.
ALL	Details of settings by "User", language, model, area, option, offset data, mm/inch settings (*1)	

(*1) The error history and counter are not reset.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

3.10 Error history

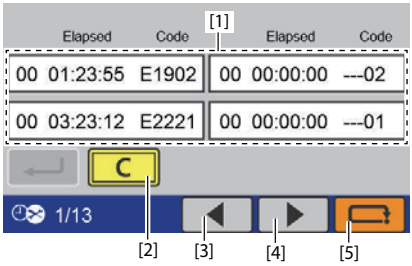
The error history already occurred is displayed.

3.10.1 Operation method

The operation method is common on each page.

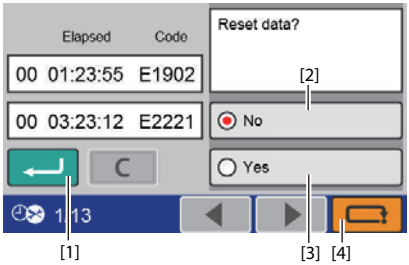
Displaying error history

[1] To display error history.
☞ Chap. 6 > 3.10.2 Details of display
[2] Press and hold it 2 seconds or more to proceed to the error history reset screen.
[3] To return to the previous page.
[4] To proceed to the next page.
[5] To return to the top screen of the maintenance mode.



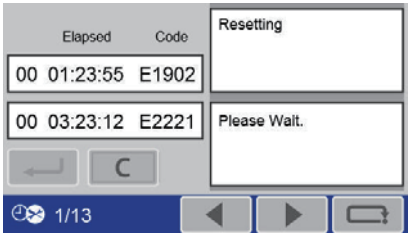
Checking error history reset

[1] When "No" is selected, the screen returns to the error history display screen. When "Yes" is selected, the screen returns to the error history reset (in execution) screen.
[2] To stop error history reset.
[3] To perform error history reset.
[4] To return to error history display screen.



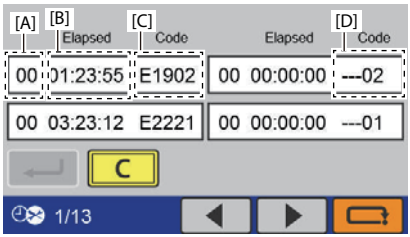
Error history reset (in execution)

When error history reset is completed, the screen returns to the error history display screen.



3.10.2 Details of display

[A] Power ON flag
[B] Elapsed
[C] Error code
[D] The number of 24-hours elapsed



[A] Power ON flag
Displays how many startup times before the error occurred by counting down from the current startup status. 00 is the current startup status.
The power ON flag is not set, if an error has never occurred while starting up. Accordingly, the number of actual times of power starting up may not coincide with the digit of power ON flag.

[B] Elapsed
Time elapsed after turning on the power. When it reaches 24 hours, the display is reset to 00:00:00.

[C] Error code
Error code is displayed corresponding to the type of error occurred.

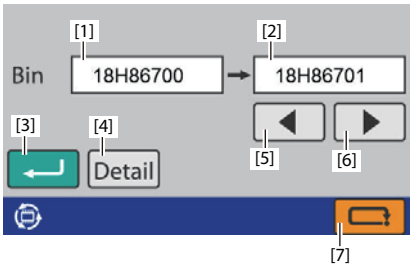
[D] The number of 24-hours elapsed
Displays the number of times of 24-hours elapsed by two digits after turning on the power. In the example shown above, two times of 24-hours elapsed is recorded, and it means that an error (E1902) occurred in 49 hours 23 minutes and 55 seconds after turning on the power.

3.11 Version upgrading

For upgrading Bin program versions.

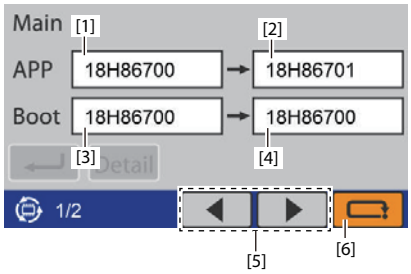
3.11.1 Operation method

Selecting program version



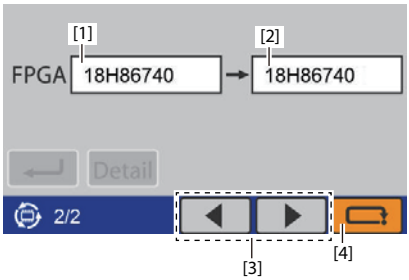
[1] Bin program version before change
[2] Bin program version selected currently
[3] To proceed to the Bin program upgrading screen.
☞ Chap. 6 > Checking Bin program version upgrade
[4] To proceed to the main program details screen.
[5] To return to the previous version of the program.
[6] To proceed to the next version of the program.
[7] To return to the top screen of the maintenance mode.

Details of main program



[1] Main body APP program version before change
[2] Main body APP program version selected currently
[3] Main body Boot program version before change
[4] Main body Boot program version selected currently
[5] To proceed to the FPGA program details screen.
[6] To return to the program version selection screen.

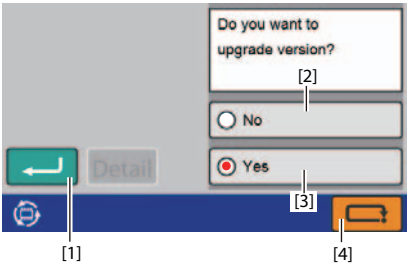
Details of FPGA program



[1] FPGA program version before change
[2] FPGA program version selected currently
[3] To return to the main program details screen.
[4] To return to the program version selection screen.

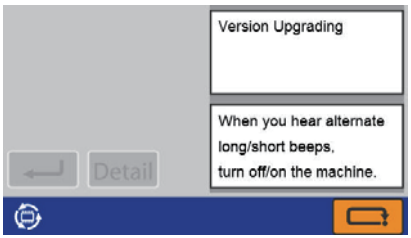
Checking Bin program version upgrade

[1] When "No" is selected, the screen returns to version upgrade selection screen. When "Yes" is selected, the screen proceeds to the Bin program version upgrade (in execution) screen.
[2] To stop upgrading the version.
[3] To perform upgrading the version.
[4] To return to the program version selection screen.



Bin program version upgrade (in execution)

When the version upgrade is completed, the buzzer sounds alternately short or prolonged sound. Restart after the buzzer sounds.



3.11.2 List

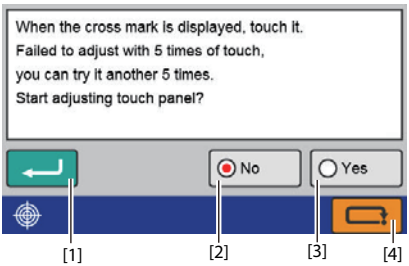
Display		Remarks
Bin	18H8***x	Displays the Bin file saved in the "Duplo" folder of the SD card. Will be upgraded after upgrading the version. x: 0 to 9
APP	18H8***x	
Boot	18H8***x	
FPGA	18H8***x	

3.12 Touch panel adjustment

3.12.1 Operation method

Checking the adjustment of touch panel

[1] When "No" is selected, the screen returns to the top screen in the maintenance mode. When "Yes" is selected, the screen proceeds to the touch panel adjustment screen.
[2] To stop adjusting the touch panel.
[3] To perform adjusting the touch panel.
[4] To return to the top screen of the maintenance mode.



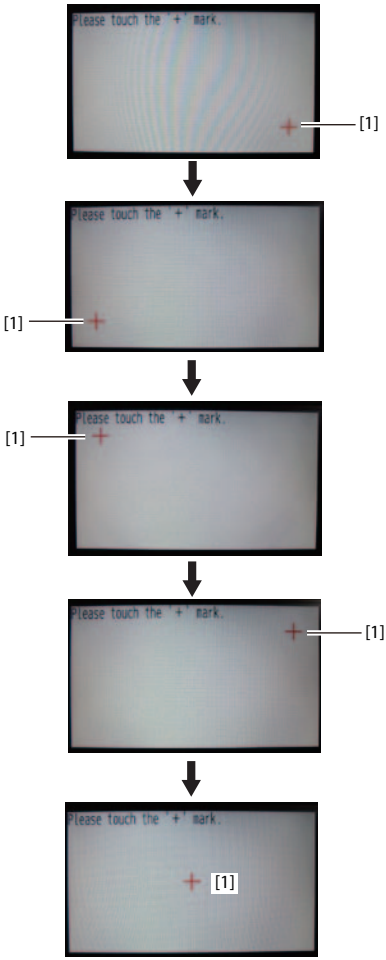
Adjusting touch panel (in execution)

Touch the center of the cross-shaped mark displayed in the four corners and center of the touch panel with pen (leading edge of R0.8 or less).

NOTE

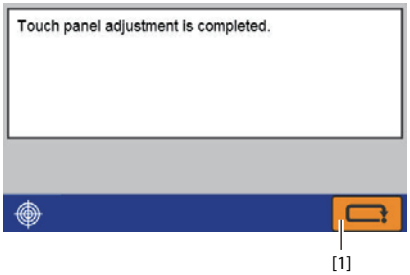
- Do not press the panel strongly with a finger or push it with any sharp objects (such as a fingernail, ball-point pen, and pin).
- When the maintenance mode is not entered by touching operation, turn on the power pressing the start key and stop key simultaneously, and keep pressing the start key and stop for 5 seconds or more even after [Starting] is displayed.

[1] Cross-shaped mark



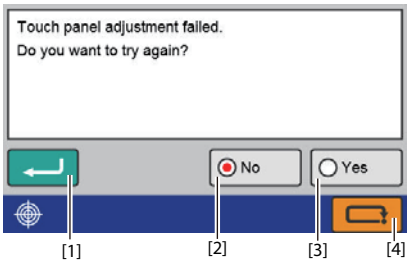
Touch panel adjustment_normally completed

[1] To return to the top screen of the maintenance mode.



Touch panel adjustment_abnormally completed

[1] When “No” is selected, the screen returns to the top screen in the maintenance mode. When “Yes” is selected, the screen proceeds to the touch panel adjustment screen.
[2] To stop adjusting the touch panel.
[3] To perform adjusting the touch panel.
[4] To return to the top screen of the maintenance mode.



4 VERSION UPGRADING

4.1 MC unit

4.1.1 Preparations

In this machine the following program version can be upgraded.

- Program of MC unit (PCB101)

To upgrade the version, obtain the new version of the program file and SD card.

Use the following SD card

- Type: SD (2 GB or less) or SDHC (32 GB or less)
- Format: FAT or FAT 32

4.1.2 Types of program

Obtain the following program.

File name	Program
DF999_18H8****.bin	MC unit main program

4.1.3 Obtain the SD card

1) Create the folder named with "Duplo" in the SD card.
2) Copy the program version to be upgraded to "Duplo" folder

☞ Chap. 6 > 4.1.2 Types of program

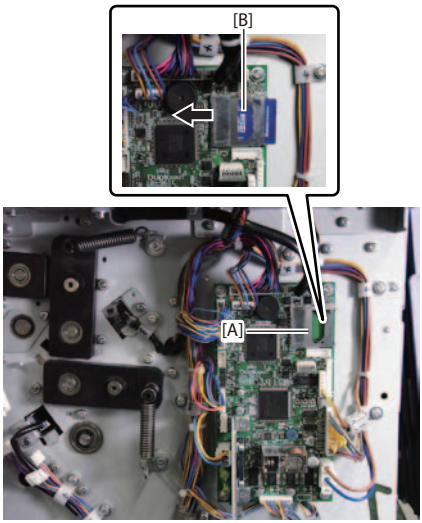
4.2 Upgrading by the SD card

NOTE

- Do not turn off the power while the version is being upgraded.
  The data in the PCB unit on which the upgrade is being executed may be damaged.
- The keys cannot be operated during upgrading the version.
- Restart the power supply after upgrading the version to complete upgrading the program.

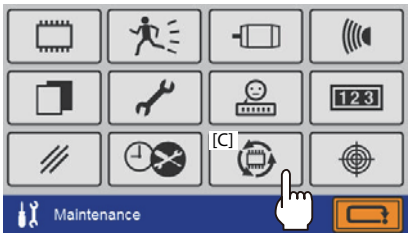
4.2.1 Operational procedures

1) Turning off the power.
2) Remove the cover R.
   ☞ Chap. 3 > 2.1.1 Exterior cover
3) Insert the SD card into the SD card slot of the MC unit.
   Insert the SD card softly in the direction of an arrow until it clicks.
   [A] SD card slot
   [B] SD card
4) Turning on the power.



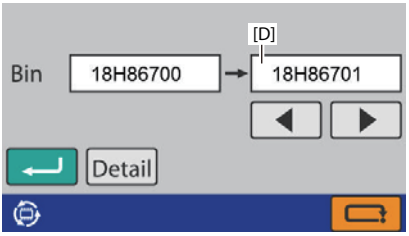
5) Enter the maintenance mode.
☞ Chap. 6 > 2.1 Entering the maintenance mode

6) Touch the version upgrade key.
[C] version upgrade key
The screen is switched to the version upgrade selection screen.

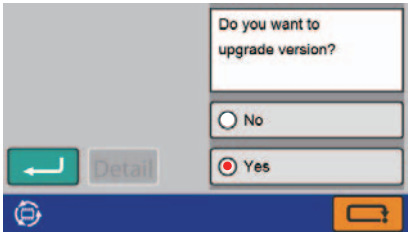


7) Press the ◀ / ▶ key to display the Bin file name to be rewritten.
[D] Bin file name

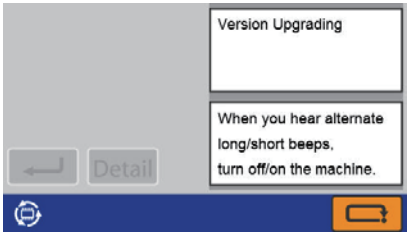
8) Touch the ↵ key.
The screen is switched to the version upgrade checking screen.



9) Touch the [Yes] key.
10) Touch the ↵ key.



Version upgrade starts, and the screen where the version upgrade is in execution is displayed.
When the version upgrade is completed, the buzzer sounds alternately short or prolonged sound.



11) Turn off the power after completing the version upgrade.
12) Remove the SD card out of the MC unit.
13) Attach the cover R.
14) Turning on the power.
15) Enter the maintenance mode.
☞ Chap. 6 > 2.1 Entering the maintenance mode
16) Check the version of the program.
☞ Chap. 6 > 3.1 Version check

4.3 LCD touch panel

4.3.1 Preparations

Remove the SD card out of the LCD touch panel and change the program already saved to upgrade the version of the image data.

- LCD touch panel (PCB102)
- SD card (SDC101)

To upgrade the version, obtain the new version of the program file.

4.3.2 Types of program

Obtain the following program.

File name	Program
ImageData_18H8****.bin	SD image in the panel program

4.3.3 Specification of the SD card

Item		Specification
Manufacturer's name		Hagiwara solutions
Model number		NSD6-512MS (P01SEI)
Data capacity		512 MB
Operation voltage		2.7 to 3.6 V
Transmission speed	Reading	21 MB/s
	Rewriting	15 MB/s
Current consumption	Reading	60 mA
	Rewriting	80 mA

4.3.4 Changing the program

1) Turning off the power.
2) Remove the cover R.
   ☞ Chap. 3 > 2.1.1 Exterior cover
3) Remove the SD card out of the LCD touch panel.
   ☞ Chap. 3 > 2.2.3 SD card (SDC101)
4) Insert the SD card into the SD card slot of the PC.
   Insert the SD card softly until it clicks.
5) Start up the PC, and delete the program in the SD card.
6) Copy the new version of the program file to the SD card.
7) Remove the SD card out of the SD card slot of the PC.
8) Insert the SD card into the SD card slot of the LCD touch panel.
   Insert the SD card softly until it clicks.
9) Attach the cover R.
10) Turning on the power.
11) Enter the maintenance mode.
    ☞ Chap. 6 > 2.1 Entering the maintenance mode
12) Check the version of the program.
    ☞ Chap. 6 > 3.1 Version check

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

Chapter 7
TROUBLESHOOTING

When an error message is displayed

Depending on the type of error, this machine displays an error code and error message on the LCD display.

See “TROUBLESHOOTING INDEX (TROUBLE SHOOTING BY DISPLAY)” on the following page for information on how to deal with each trouble.

When no error message is displayed

If no error information is displayed on the LCD display, you need to check what type of error has occurred.
See “TROUBLESHOOTING INDEX (TROUBLE SHOOTING BY SYMPTOM)” on the following page for information on how to deal with each trouble.

TROUBLESHOOTING INDEX

1 TROUBLESHOOTING BY DISPLAY

1.1 Jam

J1000 Feed Err Misfeed

Main defective parts

Feed jam sensor (PS204e/PS204r)

1) Has a mis-feed occurred on the paper feed tray?
   Yes: Refer to "Mis-feed" of TROUBLESHOOTING BY SYMTOM.
2) Is double-feed detection set to "ON" and thickness to "Thick"?
   Yes: Set the thickness to "Thin."
3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.
6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

J1001 Feed Err Double

Main defective parts

Feed jam sensor (PS204e/PS204r)

1) Does double-feed occur on the paper feed tray?
   Yes: Refer to "Double-feed" of TROUBLESHOOTING BY SYMTOM.
2) Does double-feed occur when performing test feeding?
   Yes: Check the step 3) or later.

   No: Check the step 5) or later.
3) Is double-feed detection thickness set to "Thick"?
   Yes: Set the setting to "Thin."

   No: Check the step 5) or later.
4) Is paper stacked after changed during processing?
   Yes: Perform test feeding every time paper is stacked when changed during processing.
5) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

6) Is the sensor operating correctly?
☞ Chap. 6 > 3.4 Sensor check
Yes: It seems that the sensors operate normally.

7) Is the connection from the sensor to MC unit normal?
No: Connect properly.

8) Is the state recovered by replacing the sensor?
Yes: End.

No: Check the conduction of bound wires from the sensor to MC unit.
If there is no problem, replace the MC unit.

J1002 Adjust paper feed section.

Main defective parts

Feed jam sensor (PS204e/PS204r)

1) Does the next set of paper reach the feed jam sensor while processing the counting machine mode?
Yes: Adjust paper feed section.
☞

2) Is the processing speed set at maximum?
Yes: Reduce the processing speed.

3) Is the problem corrected by cleaning the sensor?
☞ Chap. 4 > 3.2 Cleaning points
Yes: End.

4) Is there any paper or paper scrap around the exit sensor?
Yes: Remove the paper or paper scrap.

5) Is the sensor operating correctly?
☞ Chap. 6 > 3.4 Sensor check
Yes: It seems that the sensors operate normally.

6) Is the connection from the sensor to MC unit normal?
No: Connect properly.

7) Is the state recovered by replacing the sensor?
Yes: End.

No: Check the conduction of bound wires from the sensor to MC unit.
If there is no problem, replace the MC unit.

J1006 Jam Feed Sec

Main defective parts

Feed jam sensor (PS204e/PS204r)

1) Do you use the paper of other size than the size set initially?
   Yes: Set the paper size properly.
2) Did paper jam occur at the paper feed section?
   Yes: Remove the paper.
3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.
6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

J3002 Jam Conveyance Sec

Main defective parts

Eject jam sensor (PS403e/PS403r)

1) Does paper jam occur inside the folding plate?
   Yes: Remove the paper.
2) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
3) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
4) Is the connection from the sensor to MC unit normal?
   No: Connect properly.
5) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

J6002 Jam Paper Eject Sec

Main defective parts

Eject jam sensor (PS403e/PS403r)

1) Has a paper jam occurred on the ejection section?
   Yes: Remove the paper.

2) Is the stacker roller position appropriate?
   No: Refer to “Instruction Manual > Chapter 3 Advanced Operation”.

3) Is the height of the stacker roller position appropriate?
   No: Change the height of the stacker roller.
   Refer to “Instruction Manual > Chapter 3 Advanced Operation”.

4) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

5) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.

6) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

7) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

1.2 User error

U1000 The top cover is open.

Main defective parts

Top cover switch (SSW101)

1) Is the top cover open?
   Yes: Close the top cover.
2) Is the switch detection lever deformed or damaged?
   Yes: Replace the switch.
3) Is the switch adjusted appropriately?
   No: Readjust.
   ☞ Chap. 5 > 2.1.1 Adjusting the position of the top cover switch (SSW101)
4) Is the switch operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: The switch seem to function normally.
5) Is the connection from the switch to MC unit normal?
   No: Connect properly.
6) Is there continuity from the terminals of the switch when the switch is pressed?
   Yes: Check the conduction of bound wires from the switch to MC unit.
   If there is no problem, replace the MC unit.

   No: Replace the switch.

U1300 The side cover is open.

Main defective parts

Side cover L switch (SSW102)

1) Is the side cover open?
   Yes: Close the side cover.
2) Is the switch detection lever deformed or damaged?
   Yes: Replace the switch.
3) Is the switch adjusted appropriately?
   No: Readjust.
   ☞ Chap. 5 > 2.1.2 Adjusting the position of the side cover L switch (SSW102)
4) Is the switch operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: The switch seem to function normally.
5) Is the connection from the switch to MC unit normal?
   No: Connect properly.
6) Is there continuity from the terminals of the switch when the switch is pressed?
   Yes: Check the conduction of bound wires from the switch to MC unit.
   If there is no problem, replace the MC unit.

   No: Replace the switch.

U1500 Mount Err Fold Plate1

Main defective parts

Folding plate switch (SSW103)

1) Is the folding plate 1 set properly?
   No: Attach the folding plate 1 properly.

2) Is the switch detection lever deformed or damaged?
   Yes: Replace the switch.

3) Is the switch adjusted appropriately?
   No: Readjust.
   ☞ Chap. 5 > 2.1.3 Adjusting the position of the folding plate switch (SSW103)

4) Is the switch operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: The switch seem to function normally.

5) Is the connection from the switch to MC unit normal?
   No: Connect properly.

6) Is there continuity from the terminals of the switch when the switch is pressed?
   Yes: Check the conduction of bound wires from the switch to MC unit.
   If there is no problem, replace the MC unit.

   No: Replace the switch.

U1601 Turn on D-feed detection.

Main defective parts

MC unit (PCB101)

1) Is the machine used with the double-feed detection set to OFF when the counting machine mode is set?
   Yes: Set the double-feed detection to ON.

   No: Replace the MC unit.

U1602 Preset Error

Main defective parts

MC unit (PCB101)

1) Is test feeding performed?
   No: Perform test feeding after changing the settings of paper type, paper size, and double-feed detection during operation.

   Yes: Replace the MC unit.

U2001 Paper Empty

Main defective parts

Paper sensor (PS203)

1) Is paper stacked on the paper feed tray?
   No: Stack paper on the paper feed tray.
2) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
3) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
4) Is the connection from the sensor to MC unit normal?
   No: Connect properly.
5) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

U2005 Problem with Paper Load

Main defective parts

Feed jam sensor (PS204e/PS204r)
PS PWB unit (PCB201)

1) Do you use the paper of other size than the size set initially?
   Yes: Set the paper size properly.
2) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
3) Are the sensor and PS PWB unit operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
4) Is the connection from the sensor and PS PWB unit to MC unit normal?
   No: Connect properly.
5) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.
6) Is the state recovered by replacing the PS PWB unit?
   Yes: End.

   No: Check the conduction of bound wires from the PS PWB unit to MC unit.
   If there is no problem, replace the MC unit.

U2007 Position Err Paper Feed Tray

This error is displayed only on the DF-990.

Main defective parts

Paper feed tray switch (SW201)

1) Is the paper set lever lowered?
   No: Lower the paper set lever.

2) Is the installing position of the switch appropriate?
   No: Adjust the installing position of the switch.
   ☞ Chap. 5 > 3.2.3 Adjusting the paper feed tray switch (SW201) (DF-990/DF-990A)

3) Is the switch operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: The switch seem to function normally.

4) Is the connection from the switch to MC unit normal?
   No: Connect properly.

5) Is the state recovered by replacing the switch?
   Yes: End.

   No: Check the conduction of bound wires from the switch to MC unit.
   If there is no problem, replace the MC unit.

1.3 Error

E1101 Sensor Err D-Feed_Ultrasonic

Main defective parts

Ultrasonic sensor (S201t/S201r)
MC unit (PCB101)

1) Is the error released if switching off and on the power?
   Yes: End.
2) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.
3) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.
4) Is the connection from the sensor to MC unit normal?
   No: Connect properly.
5) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

E1902 Wrong Boot Version

Main defective parts

MC unit (PCB101)

1) Is the error released if switching off and on the power?
   Yes: End.
2) Is the state recovered by rewriting the Bin program?
   ☞ Chap. 6 > 4 VERSION UPGRADING
   Yes: End.

   No: Replace the MC unit.

E1903 Download Sec. Broken

Main defective parts

MC unit (PCB101)

☞ Chap. 7 > E1902 Wrong Boot Version

E1904 Wrong SD Version

Main defective parts

MC unit (PCB101)

1) Is the image data in the SD card attached to the LCD touch panel latest?
   ☞ Chap. 6 > 3.1 Version check
   No: Replace the image data in the SD card.
   ☞ Chap. 3 > 2.2.3 SD card (SDC101)

2) Is the version of the main program latest?
   ☞ Chap. 6 > 3.1 Version check
   Yes: Replace the MC unit.

   No: Update the Bin program.
   ☞ Chap. 6 > 4 VERSION UPGRADING

E2002 Motor Err Paper Feed Tray

This error is displayed only on the DF-999/DF-999A.

Main defective parts

Paper feed tray motor (M201)
Paper feed tray upper limit sensor (PS201)
Paper feed tray lower limit sensor (PS202)

1) Are there any parts to which a foreign substance is stuck or which are deformed, among the following sections?
   Paper feed tray motor (M201) drive transmission path
   Yes: Clean or replace the parts.

2) Is the drive section adjusted appropriately?
   ☞ Chap. 5 > 3.2 Driving the paper feed tray
   No: Adjust.

3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: Check the step 7) or later.

5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

7) Is the motor operating correctly?
   ☞ Chap. 6 > 3.3 Motion check
   Yes: End.

8) Is the state recovered by replacing the motor?

Yes: End.

No: Check the conduction of bound wires from the motor to MC unit.
If there is no problem, replace the MC unit.

E2003 Motor Err Paper Feed Tray

This error is displayed only on the DF-999/DF-999A.

☞ Chap. 7 > E2002 Motor Err Paper Feed Tray

E2005 Motor Err Paper Feed Tray

This error is displayed only on the DF-999/DF-999A.

☞ Chap. 7 > E2002 Motor Err Paper Feed Tray

E2220 Motor Err Convey

Main defective parts

Conveyance motor (M101)
Conveyance index sensor (PS101)

1) Are there any parts to which a foreign substance is stuck or which are deformed, among the following sections?
   - Paper feed path
   - Driving path of the conveyance motor (M101)

   Yes: Clean or replace the parts.

2) Is the drive section adjusted appropriately?
   ☞ Chap. 5 > 4.1 Conveying the paper

   No: Adjust.

3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points

   Yes: End.

4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check

   Yes: Check the step 7) or later.

5) Is the connection from the sensor to MC unit normal?

   No: Connect properly.

6) Is the state recovered by replacing the sensor?

   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

7) Is the motor operating correctly?
   ☞ Chap. 6 > 3.3 Motion check

   Yes: End.

8) Is the state recovered by replacing the motor?

   Yes: End.

   No: Check the conduction of bound wires from the motor to MC unit.
   If there is no problem, replace the MC unit.

E2221 Motor Err Convey

☞ Chap. 7 > E2220 Motor Err Convey

E2400 Motor Err Stacker

Main defective parts

Stacker roller motor (M401)
Stacker index sensor (PS401)
Stacker home sensor (PS402)

1) Are there any parts to which a foreign substance is stuck or which are deformed, among the following sections?
   - Driving path of the stacker roller motor (M401)
   - Index plate for stacker index sensor
   - Shielding plate for stacker home sensor

   Yes: Clean or replace the parts.

2) Is the drive section adjusted appropriately?
   ☞ Chap. 5 > 6.1.1 Adjusting the index plate
   No: Adjust.

3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: Check the step 7) or later.

5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

7) Is the motor operating correctly?
   ☞ Chap. 6 > 3.3 Motion check
   Yes: End.

8) Is the state recovered by replacing the motor?
   Yes: End.

   No: Check the conduction of bound wires from the motor to MC unit.
   If there is no problem, replace the MC unit.

E2401 Motor Err Stacker

☞ Chap. 7 > E2400 Motor Err Stacker

E2402 Motor Err Stacker

☞ Chap. 7 > E2400 Motor Err Stacker

E2409 Motor Err Stacker

☞ Chap. 7 > E2400 Motor Err Stacker

E2410 Motor Err Fold Plate1

Main defective parts

Folding plate 1 motor (M301)
Folding plate 1 index A sensor (PS301)
Folding plate 1 index B sensor (PS302)
Folding plate 1 home sensor (PS303)

1) Are there any parts to which a foreign substance is stuck or which are deformed, among the following sections?
   - Driving path of the folding plate 1 motor (M301)
   - Index plate for folding plate 1 index A sensor (PS301)
   - Index plate for folding plate 1 index B sensor (PS302)
   - Shielding plate for folding plate 1 home sensor

   Yes: Clean or replace the parts.

2) Is the drive section adjusted appropriately?
   ☞ Chap. 5 > 5.1.1 Adjusting the folding plate 1 motor (M301)
   No: Adjust.

3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: Check the step 7) or later.

5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

7) Is the motor operating correctly?
   ☞ Chap. 6 > 3.3 Motion check
   Yes: End.

8) Is the state recovered by replacing the motor?
   Yes: End.

   No: Check the conduction of bound wires from the motor to MC unit.
   If there is no problem, replace the MC unit.

E2411 Motor Err Fold Plate1

☞ Chap. 7 > E2410 Motor Err Fold Plate1

E2412 Motor Err Fold Plate1

☞ Chap. 7 > E2410 Motor Err Fold Plate1

E2419 Motor Err Fold Plate1

☞ Chap. 7 > E2410 Motor Err Fold Plate1

E2420 Motor Err Fold Plate2

Main defective parts

Folding plate 2 motor (M302)
Folding plate 2 index A sensor (PS304)
Folding plate 2 index B sensor (PS305)
Folding plate 2 home sensor (PS306)

1) Are there any parts to which a foreign substance is stuck or which are deformed, among the following sections?
   - Driving path of the folding plate 2 motor (M302)
   - Index plate for folding plate 2 index A sensor (PS304)
   - Index plate for folding plate 2 index B sensor (PS305)
   - Shielding plate for folding plate 2 home sensor

   Yes: Clean or replace the parts.

2) Is the drive section adjusted appropriately?
   ☞ Chap. 5 > 5.2.1 Adjusting the folding plate 2 motor (M302)
   No: Adjust.

3) Is the problem corrected by cleaning the sensor?
   ☞ Chap. 4 > 3.2 Cleaning points
   Yes: End.

4) Is the sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: Check the step 7) or later.

5) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

6) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

7) Is the motor operating correctly?
   ☞ Chap. 6 > 3.3 Motion check
   Yes: End.

8) Is the state recovered by replacing the motor?
   Yes: End.

   No: Check the conduction of bound wires from the motor to MC unit.
   If there is no problem, replace the MC unit.

E2421 Motor Err Fold Plate2

☞ Chap. 7 > E2420 Motor Err Fold Plate2

E2422 Motor Err Fold Plate2

☞ Chap. 7 > E2420 Motor Err Fold Plate2

E2429 Motor Err Fold Plate2

☞ Chap. 7 > E2420 Motor Err Fold Plate2

1.4 Others

E4200 Internal Communication Err_D/A

Main defective parts

MC unit (PCB101)

1) Is the error released if switching off and on the power?

Yes: End.

No: Replace the MC unit.

E4210 Int. Comm Error EEPROM ACK

Main defective parts

MC unit (PCB101)
Memory unit (PCB103)

1) Is the error released if switching off and on the power?

Yes: End.

2) Is the memory unit attached to the MC unit?

No: Attach the memory unit to the MC unit.

3) Is the state recovered by replacing the memory unit?

☞ Chap. 3 > 2.3.2 Memory unit (PCB103)

Yes: End.

No: Replace the MC unit.

E4300 Int. Comm Error MC unit FPGA

Main defective parts

MC unit (PCB101)

1) Is the error released if switching off and on the power?

Yes: End.

No: Replace the MC unit.

E4301 Int. Comm Error MC unit FPGA

☞ Chap. 7 > E4300 Int. Comm Error MC unit FPGA

E4302 Int. Comm Error MC unit FPGA

☞ Chap. 7 > E4300 Int. Comm Error MC unit FPGA

E5011 Ext. Comm Error Panel Overrun

Main defective parts

MC unit (PCB101)
LCD touch panel (PCB102)

1) Is the error released if switching off and on the power?
   Yes: End.

2) Is the connection between the MC unit and LCD touch panel normal?
   No: Connect properly.

3) Is the state recovered by replacing the LCD touch panel?
   Yes: End.

   No: Check the conduction of bound wires from the LCD touch panel to MC unit.
   If there is no problem, replace the MC unit.

E5012 Ext. Comm Error Panel Parity

☞ Chap. 7 > E5011 Ext. Comm Error Panel Overrun

E5013 Ext. Comm Error Panel Framing

☞ Chap. 7 > E5011 Ext. Comm Error Panel Overrun

E5015 Ext. Comm Error Panel ACK

☞ Chap. 7 > E5011 Ext. Comm Error Panel Overrun

E5770 Ext. Comm Error SD Card

Main defective parts

LCD touch panel (PCB102)

1) Is the error released if switching off and on the power?
   Yes: End.

2) Is the SD card mounted on the LCD touch panel?
   No: Mount the SD card.
   ☞ Chap. 3 > 2.2.3 SD card (SDC101)

   Yes: Check the SD card program. If there is no problem, replace the LCD touch panel.
   ☞ Chap. 6 > 3.1 Version check

2 TROUBLESHOOTING BY SYMPTOM

2.1 Feeding problems

2.1.1 Mis-feed

1) Is an error detected?
   Yes: Check the display code and check the related item.

2) Is the feeding pressure adjustment lever positioned at "-1"?
   Yes: Switch the feeding pressure adjustment lever to the position of "0 to 6" to adjust the feeding pressure according to the paper.

3) Is the separating pressure adjustment dial positioned at "1 to 6"?
   Yes: Return the separating pressure adjustment dial to "0".

4) Is the paper bend because it is hardly pressed against the paper feed guide?
   Yes: Press the paper feed guide to each side of the paper lightly.

5) Are the paper feed rings dirty?
   Yes: Clean it. Refer to "Instruction Manual > Chapter 5 Cleaning the Machine".

6) Have the paper feed rings reached their end of life?
   ☞ Chap. 4 > 2.2.1 Recommended parts A (Expendables)
   Yes: Replace the paper feed rings.
   ☞ Chap. 3 > 3.3.4 Paper feed ring

7) Are there any parts on the feed clutch to which a foreign substance is stuck or which are deformed?
   Yes: Clean or replace the parts.

8) Is the feed clutch adjusted appropriately?
   No: Readjust.
   ☞ Chap. 5 > 4.1.2 Adjusting the feed clutch (CL101)

9) Is the connection from the feed clutch to MC unit normal?
   No: Connect properly.

10) Is the state recovered by replacing the feed clutch?
    ☞ Chap. 3 > 4.1.2 Feed clutch (CL101)
    Yes: End.

    No: Check the conduction of bound wires from the feed clutch to MC unit.
    If there is no problem, replace the MC unit.

2.1.2 Double-feed and Stream-feed

1) Is the feeding pressure adjustment lever positioned at "1 to 6"?
   Yes: Switch the position of the feeding pressure adjustment lever to "0."

   No: Adjust the paper feed section.
   ☞ Chap. 5 > 3.1 Paper feed tray

2) Is the separating pressure adjustment dial positioned at "0"?
   Yes: Switch the separating pressure adjustment dial to "1 to 6" to adjust the separating pressure according to the paper.

3) Is the paper separator dirty?
   Yes: Clean it. Refer to "Instruction Manual > Chapter 5 Cleaning the Machine".

4) Has the paper separator reached its end of life?
   ☞ Chap. 4 > 2.2.1 Recommended parts A (Expendables)
   Yes: Replace the paper separator.
   ☞ Chap. 3 > 3.3.5 Paper separator base unit

5) Are there any parts on the feed clutch to which a foreign substance is stuck or which are deformed?
   Yes: Clean or replace the parts.

6) Is the feed clutch adjusted appropriately?
   No: Readjust.
   ☞ Chap. 5 > 4.1.2 Adjusting the feed clutch (CL101)

7) Is the connection from the feed clutch to MC unit normal?
   No: Connect properly.

8) Is the state recovered by replacing the feed clutch?
   ☞ Chap. 3 > 4.1.2 Feed clutch (CL101)
   Yes: End.

   No: Check the conduction of bound wires from the feed clutch to MC unit.
   If there is no problem, replace the MC unit.

2.1.3 Skew-feed

1) Is the problem corrected by adjusting the paper feed guide?
   The large clearance between the side guide and paper may cause skew.
   Yes: End.

2) Is the problem corrected by adjusting with the skew correction knob?
   Yes: End.

3) Are the paper feed rings dirty?
   Yes: Clean it. Refer to "Instruction Manual > Chapter 5 Cleaning the Machine".

4) Have the paper feed rings reached their end of life?
   ☞ Chap. 4 > 2.2.1 Recommended parts A (Expendables)
   Yes: Replace the paper feed ring.
   ☞ Chap. 3 > 3.3.4 Paper feed ring

   No: Adjust the folding stopper.
   ☞ Chap. 5 > 5.1.3 Adjusting the parallelism of the folding stopper 1
   ☞ Chap. 5 > 5.2.3 Adjusting the parallelism of the folding stopper 2

2.2 Folding problems

2.2.1 Folding misalignment along vertical length of paper

1) Has the paper size been changed during operation?

Yes: Enter the paper size again if you change the paper size even though the folding pattern remains unchanged.

No: Adjust the folding section.

☞ Chap. 5 > 5 FOLDING SECTION

2.2.2 Folding misalignment along sides of paper

1) Is there clearance between the paper feed guide and paper?

Yes: Align paper neatly and stack on the paper feed tray, then push the paper feed guide lightly against the paper.

2) Is the paper trimmed precisely?

No: If the trimming misalignment of the paper lead edge is large, it cannot be corrected using the skew correction knob alone. Have the user use paper with little trimming misalignment.

3) Is the center press roll dirty or worn out?

Yes: Clean or replace the parts. Refer to "Instruction Manual > Chapter 5 Cleaning the Machine".

No: Adjust the folding section.

☞ Chap. 5 > 5 FOLDING SECTION

2.2.3 When paper is not folded at the normal position

1) Is folding plate set properly?

Yes: Set the folding plate properly.

2) Is a correct size of standard paper used?
If non-standard paper is used, is the size measured correctly?

No: Fine adjust the folding stopper position.
Refer to the "Instruction Manual > Chapter 3 Advanced Operation 1. Correcting Folding Misalignment."

3) Do the paper quality and thickness meet the specifications?

No: Explain to a user that we are unable to guarantee folding performance of the paper which does not meet the specifications.

☞ Chap. 1 > 2 SPECIFICATIONS

4) Has static electricity occurred in the paper?

No: Fan the paper well.

5) Is the center press roll dirty?

Yes: Clean or replace the parts.
Refer to "Instruction Manual > Chapter 5 Cleaning the Machine".

No: Adjust the folding section.

☞ Chap. 5 > 5 FOLDING SECTION

2.3 Ejection problems

2.3.1 When paper ejection is not performed

1) Is an error detected?
   Yes: Check the display code and check the related item.

2) Is the stacker roller position appropriate?
   No: Refer to “Instruction Manual > Chapter 3 Advanced Operation”.

3) Is the height of the stacker roller position appropriate?
   No: Change the height of the stacker roller.
   Refer to “Instruction Manual > Chapter 3 Advanced Operation”.

4) Does the stacker roller motor operate normally?
   ☞ Chap. 6 > 3.3 Motion check
   Yes: End.

5) Is the connection from the motor to MC unit normal?
   No: Connect properly.

6) Is the state recovered by replacing the motor?
   Yes: End.

   No: Check the conduction of bound wires from the motor to MC unit.
   If there is no problem, replace the MC unit.

7) Are the stacker index sensor and stacker home sensor operating correctly?
   ☞ Chap. 6 > 3.4 Sensor check
   Yes: It seems that the sensors operate normally.

8) Is the connection from the sensor to MC unit normal?
   No: Connect properly.

9) Is the state recovered by replacing the sensor?
   Yes: End.

   No: Check the conduction of bound wires from the sensor to MC unit.
   If there is no problem, replace the MC unit.

2.4 Others

2.4.1 The AC power is not turned on

1) Is the rated power supply supplied to the outlet?
   No: Explain the user that this machine is not damaged.
2) Is the power plug connected to the wall socket?
   No: Insert the power plug into the outlet.
3) Is the tab terminal connected to the inlet correctly?
   No: Reconnect the tab terminal.
4) Are the connectors on the switching power supply connected properly?
   No: Reconnect the connector.
5) Is there conduction between the terminals on the switch, when the power switch (PSW001) is turned on?
   Yes: Check the connection and conduction of wire harness from the power plug to power switch.
   No: Replace the power switch.

2.4.2 DC power does not turn on

1) Is the AC power supply supplied to the switching power supply?
   No: Check "2.4.1 AC power does not turn on".
2) Does the switching power supply output DC power, when the power is turned on.
   Yes: Check the connection and conduction of wire harness from the switching power to MC unit. Check the step 2) or after of “2.4.3 LCD touch panel displays nothing”, if there is no problem.
   No: Replace the switching power supply.

2.4.3 LCD touch panel displays nothing

1) Check "2.4.2 DC power does not turn on".
2) Are the LCD touch panel and the MC unit connected properly?
   No: Connect properly.
3) Is the conduction of wire harness connecting the LCD touch panel and the MC unit normal?
   No: Replace the wire harness.
4) Is the state recovered by replacing the LCD touch panel?
   ☞ Chap. 3 > 2.2.1 LCD touch panel (PCB102)
   Yes: End.
   No: Replace the MC unit.

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

2.4.4 LCD touch panel does not respond to key touch

1) Are the LCD touch panel and the MC unit connected properly?
No: Connect properly.

2) Is the conduction of wire harness connecting the LCD touch panel and the MC unit normal?
No: Replace the wire harness.

3) Is the LCD touch panel adjusted?
No: Adjust the LCD touch panel.
☞ Chap. 6 > 3.12 Touch panel adjustment

4) Is the state recovered by replacing the LCD touch panel?
☞ Chap. 3 > 2.2.1 LCD touch panel (PCB102)
Yes: End.

No: Replace the MC unit.

2.4.5 Control panel does not respond to key touch

1) Are the KEY PWB unit and the MC unit connected properly?
No: Connect properly.

2) Is the conduction of wire harness connecting the KEY PWB unit and the MC unit normal?
No: Replace the wire harness.

3) Is the state recovered by replacing the KEY PWB unit?
☞ Chap. 3 > 2.2.2 KEY PWB unit (PCB104)
Yes: End.

No: Replace the MC unit.

2.4.6 [Paper Empty] is not displayed when starting paper feed

1) Is the manual feed setting set to ON?
The paper stack cannot be detected while manual setting is set to ON.
Yes: Set the manual feed setting to OFF.

2) Is the paper sensor (PS203) operating correctly?
☞ Chap. 6 > 3.4 Sensor check
Yes: End.

3) Is the connection from the sensor to MC unit normal?
No: Connect properly.

4) Is the state recovered by replacing the sensor?
☞ Chap. 3 > 3.1.1 Paper sensor (PS203)
Yes: End.

No: Check the conduction of bound wires from the sensor to MC unit.
If there is no problem, replace the MC unit.

2.4.7 Automatic detection of paper size does not operate (DF-999/DF-999A)

1) Is the standard size is set to OFF in the [Detection] of the mode setting?
The paper size is not automatically detected when the standard size is set to OFF.
Yes: Turn the power off and on.

2) Is there any foreign particle, deformation, or damage on the PS PWB unit?
Yes: Clean or replace the parts.

3) Does the PS PWB unit operate normally?
☞ Chap. 6 > 3.4 Sensor check
Yes: End.

4) Is the connection from the PS PWB unit to MC unit normal?
No: Connect properly.

5) Is the state recovered by replacing the PS PWB unit?
☞ Chap. 3 > 3.1.2 PS PWB unit (PCB201)
Yes: End.

No: Check the conduction of bound wires from the sensor to MC unit.
If there is no problem, replace the MC unit.

APPENDIX

1 MENU MAP

1.1 Maintenance menu

Top menu	Setting Item		Settings/checking contents
Version check	Bin		☞ Chap. 6 > 3.1 Version check
	Main	APP	
		Boot	
	FPGA	APP	
	Panel	Panel version	
		SD image	
Simulation		Operating	☞ Chap. 6 > 3.2 Simulation
		Stopping	
Motion check	Conveyance Motor		☞ Chap. 6 > 3.3 Motion check
	Folding Plate 1 Motor		
	Folding Plate 2 Motor		
	Stacker Roller Motor		
	Feed Clutch		
	Paper Feed Tray Motor		
Sensor check	1/5	Plate1 IDX	☞ Chap. 6 > 3.4 Sensor check
		Plate2 IDX	
	2/5	Paper	
		Paper Feed	
		Feed Timing	
		Ejection Jam	
		U/S Sensor 1 Sheet	
		U/S Sensor 2 Sheets	
	3/5	Plate1 Set	
		Plate1 Home	
		Plate2 Home	
		Stacker Home	
		Top Cover	
		Side Cover	
	4/5	Convey IDX	
		Stacker IDX	
		Paper Feed Tray Up	
		Paper Feed Tray Down	
	5/5	Paper Size1	
		Paper Size2	
		Paper Size3	
		Paper Size4	
		Paper Size5	
		Paper Size6	

DUPLO DF-999/DF-999A, DF-990/DF-990A 18H-M12D1

Top menu	Setting Item			Settings/checking contents
Offset	Calibration	F-Plate1: +0 [/0.1 mm]		☞ Chap. 6 > 3.5 Offset
		F-Plate2: +0 [/0.1 mm]		
		S-Shaft: -10 [/0.1 mm]		
	Parallel CK	Operating		
		Stopping		
	Adjust Emission	Status: ***		
		Thin: ***		
		Thick: ***		
	Light Emit Amt	Status: ***		
		P Length: ***		
		Light: ***		
Various settings	Mode	999/990		☞ Chap. 6 > 3.6 Various settings
	Area	USA/Others		
	Option	M-Feed: ON/OFF		
		Count: ON/OFF		
		U/S: ON/OFF		
Language settings		English		☞ Chap. 6 > 3.8 Maintenance counter
		日本語		
		Español		
		Deutsch		
		Français		
		Italiano		
		Русский		
		Polski		
		한국어		
		中文		
Maintenance counter		* * * * * * * * (Eight digits)		☞ Chap. 6 > 3.8 Maintenance counter
Data reset		User		☞ Chap. 6 > 3.9 Data reset
		Maintenance		
		ALL		
Error history		Elapsed		☞ Chap. 6 > 3.10 Error history
		Code		
Version upgrading	Bin	Main	APP	☞ Chap. 6 > 3.11 Version upgrading
			Boot	
		FPGA		
Touch panel adjustment				☞ Chap. 6 > 3.12 Touch panel adjustment

2 LIST OF DISPLAY MESSAGES/CODES

2.1 Jam (Jxxx)

Code	Display	Detecting Section	Error Description
J1000	Feed Err Misfeed	Feed jam sensor (PS204e/PS204r)	During feeding operation, the PS204e and PS204r could not detect paper within the specified time.
J1001	Feed Err Double	Feed jam sensor (PS204e/PS204r)	It was detected that during feeding operation, the light receiving amount of the PS204r (light receiving side) was more than the specified value.
J1002	Adjust paper feed section.	Feed jam sensor (PS204e/PS204r)	The PS204e/PS204r detected the next sheet earlier than the specified time when the counting machine mode was in use.
J1006	Jam Feed Sec	Feed jam sensor (PS204e/PS204r)	After feeding operation, the PS204e and PS204r continued to detect paper for more than specified time.
J3002	Jam Conveyance Sec	Eject jam sensor (PS403e/PS403r)	During paper ejection, the PS403e and PS403r could not detect paper within the specified time.
J6002	Jam Paper Eject Sec	Eject jam sensor (PS403e/PS403r)	During paper ejection, the PS403e and PS403r continued to detect paper for more than specified time.

2.2 User error (Uxxx)

Code	Display	Detecting Section	Error Description
U1000	The top cover is open.	Top cover switch (SSW101)	The SSW101 checked that the top cover was open.
U1300	The side cover is open.	Side cover L switch (SSW102)	The SSW102 checked that the side cover was open.
U1500	Mount Err Fold Plate1	Folding plate switch (SSW103)	The SSW103 could not check the folding plate 1.
U1601	Turn on D-feed detection.	MC unit (PCB101)	The double-feed detection is set to OFF when in the counting machine mode.
U1602	Preset Error	MC unit (PCB101)	The start key is pressed in a state where test paper feeding is not performed when the optical sensor is set for double feed detection.
U2001	Paper Empty	Paper sensor (PS203)	The PS203 checked the state of no paper.
U2005	Problem with Paper Load	MC unit (PCB101) PS PWB unit (PCB201)	• The direction of paper stacked on the paper feed tray is incorrect. • The paper size setting is incorrect. • The paper length setting is incorrect.
U2007	Position Err Paper Feed Tray	DF-999: Paper feed tray upper limit sensor (PS201)	The paper feed tray is not set.
		DF-990/DF-990A: Paper feed tray switch (SW201)	

2.3 Error (Exxx)

Code	Display	Detecting Section	Error Description
E1101	Sensor Err D-Feed_Ultrasonic	MC unit (PCB101)	Double-feed sensor: The combination of ultrasonic input signals is improper.
E1902	Wrong Boot Version	MC unit (PCB101)	The improper BOOT program is detected.
E1903	Download Sec. Broken	MC unit (PCB101)	The improper DL program is detected.
E1904	Wrong SD Version	MC unit (PCB101)	The improper image data is saved in the SD card.
E2002	Motor Err Paper Feed Tray (*1)	MC unit (PCB101)	The PCB101 detected an error signal inside the IC.
E2003		Paper feed tray motor (M201) Paper feed tray upper limit sensor (PS201) Paper feed tray lower limit sensor (PS202)	The paper feed tray did not reach the PS201 or PS202 detection position within the specified time although the M201 was driven.
E2005		Paper feed tray upper limit sensor (PS201) Paper feed tray lower limit sensor (PS202)	The PS201 or PS202 did not detect normally.
E2220	Motor Err Convey	Conveyance motor (M101) Conveyance index sensor (PS101)	The PS101 could not detect the index within the specified time although the M101 is driven.
E2221			The PS101 could not detect the specified number of indexes continuously for more than specified time.
E2400	S-Motor Err	Stacker roller motor (M401) Stacker home sensor (PS402)	The PS402 could not detect within the specified time that the stacker reached the home position even though the M401 was driven.
E2401			The PS402 could not detect within the specified time that the stacker left the home position even though the M401 was driven.
E2402		Stacker roller motor (M401) Stacker index sensor (PS401)	The PS401 could not detect the index within the specified time although the M401 is driven.
E2409		MC unit (PCB101)	The PCB101 detected an error signal inside the IC.

Code	Display	Detecting Section	Error Description
E2410	Motor Err Fold Plate1	Folding plate 1 motor (M301) Folding plate 1 home sensor (PS303)	The PS303 could not detect within the specified time that the folding plate 1 reached the home position even though the M301 was driven.
E2411			The PS303 could not detect within the specified time that the folding plate 1 left the home position even though the M301 was driven.
E2412		Folding plate 1 motor (M301) Folding plate 1 index A sensor (PS301) Folding plate 1 index B sensor (PS302)	The PS301 and PS302 could not detect the index within the specified time although the M301 is driven.
E2419		MC unit (PCB101)	The PCB101 detected an error signal inside the IC.
E2420	Motor Err Fold Plate2	Folding plate 2 motor (M302) Folding plate 2 home sensor (PS306)	The PS306 could not detect within the specified time that the folding plate 2 reached the home position even though the M302 was driven.
E2421			The PS306 could not detect within the specified time that the folding plate 2 left the home position even though the M302 was driven.
E2422		Folding plate 2 motor (M302) Folding plate 2 index A sensor (PS304) Folding plate 2 index B sensor (PS305)	The PS304 and PS305 could not detect the index within the specified time although the M302 is driven.
E2429		MC unit (PCB101)	The PCB101 detected an error signal inside the IC.
E4200	Internal Communication Err D/A	MC unit (PCB101)	The D/A converter's communication error has occurred.
E4210	Int. Comm Error EEPROM ACK		Data of the PCB103 could not be read or written normally.
E4300	Int. Comm Error MC Unit FPGA	MC unit (PCB101)	A problem occurred in the FPGA program.
E4301			
E4302			
E5011	Ext. Comm Error Panel Overrun	LCD touch panel (PCB102) MC unit (PCB101)	Abnormal communication has occurred between the PCB101 and PCB102.
E5012	Ext. Comm Error Panel Parity		
E5013	Ext. Comm Error Panel Framing		
E5015	Ext. Comm Error Panel ACK		
E5770	Ext. Comm Error SD Card	LCD touch panel (PCB102)	The SD card is not attached to the PCB102.

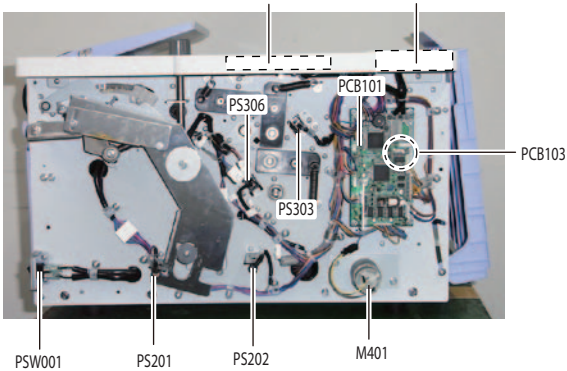
(*1) Displayed only on the DF-999/DF-999A.

3 LAYOUT OF ELECTRICAL PARTS

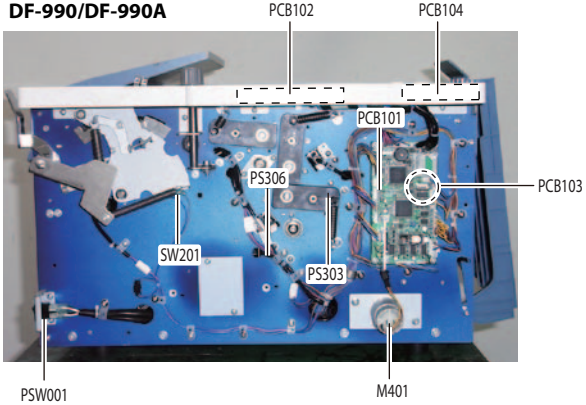
3.1 Frame

3.1.1 Front surface (control panel side)

DF-999/DF-999A



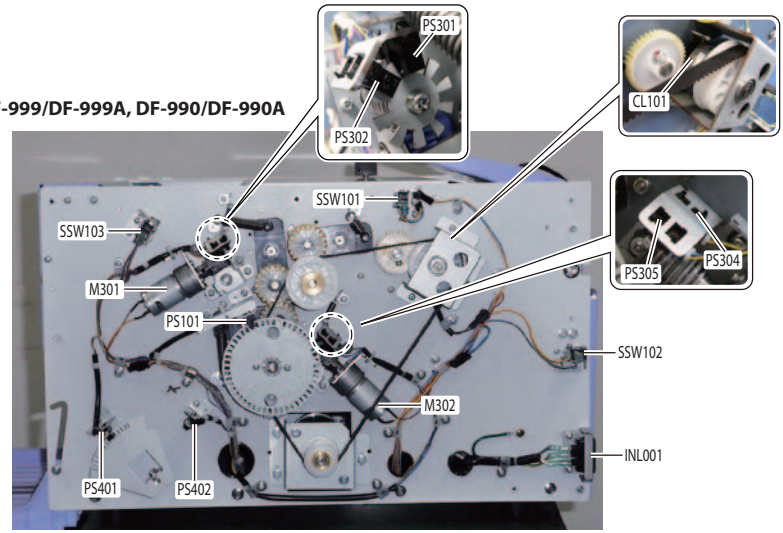
DF-990/DF-990A



Symbol	Name	Remarks
M401	Stacker roller motor	
PCB101	MC unit	
PCB102	LCD touch panel	
PCB103	Memory unit	
PCB104	KEY PWB unit	
PS201	Paper feed tray upper limit sensor	Mounted only on the DF-999/DF-999A.
PS202	Paper feed tray lower limit sensor	Mounted only on the DF-999/DF-999A.
PS303	Folding plate 1 home sensor	
PS306	Folding plate 2 home sensor	
PSW001	Power switch	
RL1	Relay	
SW201	Paper feed tray switch	Mounted only on the DF-990/DF-990A.

3.1.2 Rear surface

DF-999/DF-999A, DF-990/DF-990A

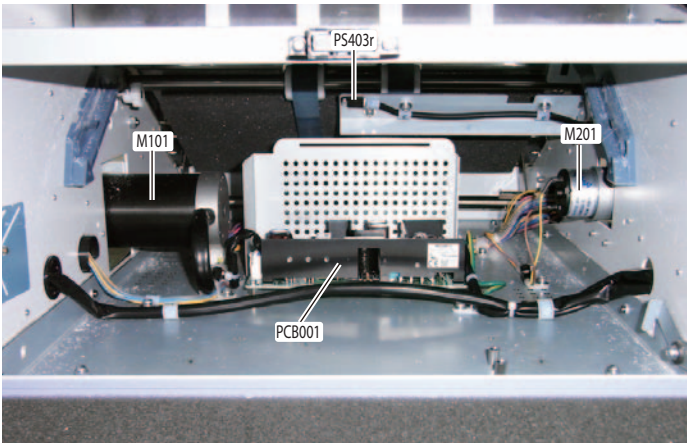


Symbol	Name	Remarks
CL101	Feed clutch	
INL001	Inlet	
M301	Folding plate 1 motor	
M302	Folding plate 2 motor	
PS101	Conveyance index sensor	
PS301	Folding plate 1 index A sensor	
PS302	Folding plate 1 index B sensor	
PS304	Folding plate 2 index A sensor	
PS305	Folding plate 2 index B sensor	
PS401	Stacker index sensor	
PS402	Stacker home sensor	
SSW101	Top cover switch	
SSW102	Side cover L switch	
SSW103	Folding plate switch	

3.2 Internal parts

3.2.1 Paper feeding side

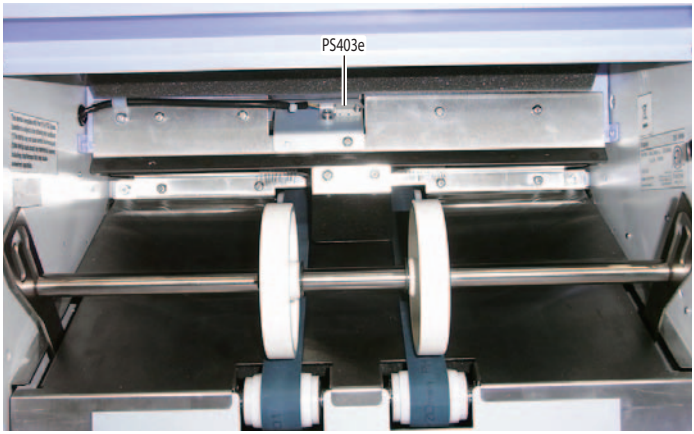
DF-999/DF-999A, DF-990/DF-990A



Symbol	Name	Remarks
M101	Conveyance motor	
M201	Paper feed tray motor	Mounted only on the DF-999/ DF-999A.
PCB001	Switching power supply	
PS403r	Eject jam sensor	(Receiver)

3.2.2 Paper ejecting side

DF-999/DF-999A, DF-990/DF-990A

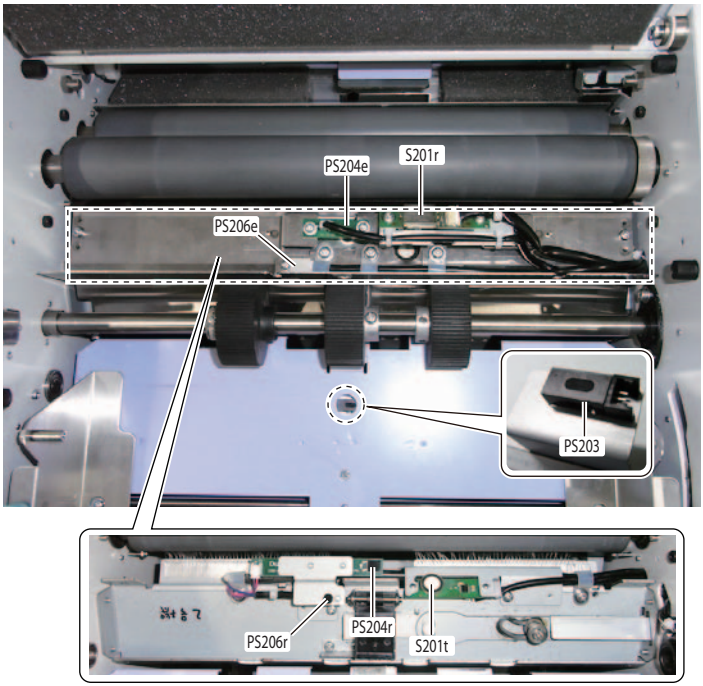


Symbol	Name	Remarks
PS403e	Eject jam sensor	(Emitter)

3.3 Paper feed section

3.3.1 Paper feed inlet

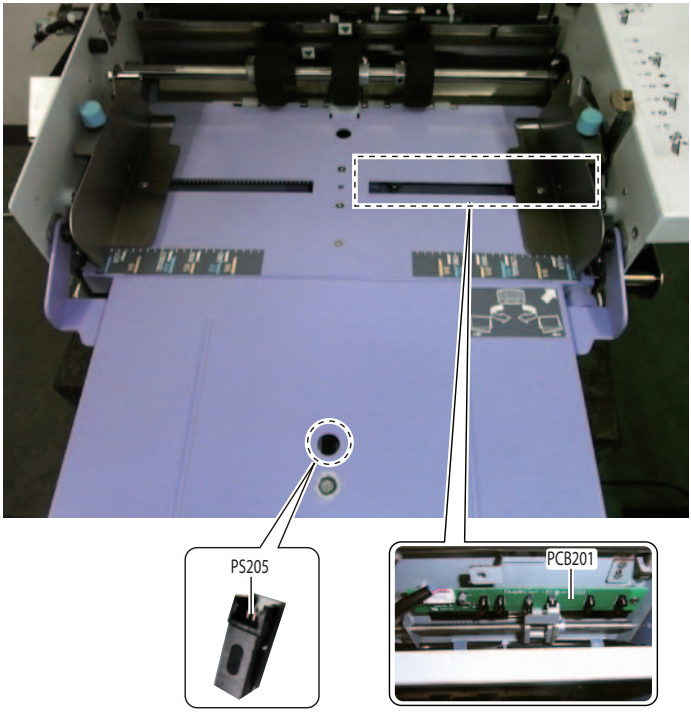
DF-999/DF-999A, DF-990/DF-990A



Symbol	Name	Remarks
PS203	Paper sensor	
PS204e	Feed jam sensor	(Emitter)
PS204r	Feed jam sensor	(Receiver)
PS206e	Feed timing sensor	(Emitter)
PS206r	Feed timing sensor	(Receiver)
S201t	Ultrasonic sensor	(Transmitter) option Mounted only on the DF-999/ DF-999A.
S201r	Ultrasonic sensor	(Receiver) option Mounted only on the DF-999/ DF-999A.

3.3.2 Paper feed tray

DF-999/DF-999A

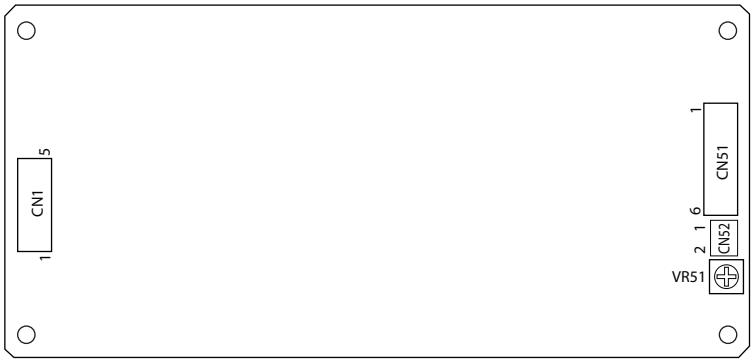


Symbol	Name	Remarks
PCB201	PS PWB unit	Mounted only on the DF-999/ DF-999A.
PS205	Legal size sensor	Mounted only on the DF-999A.

4 LAYOUT OF BOARDS

4.1 Power supply/safety function

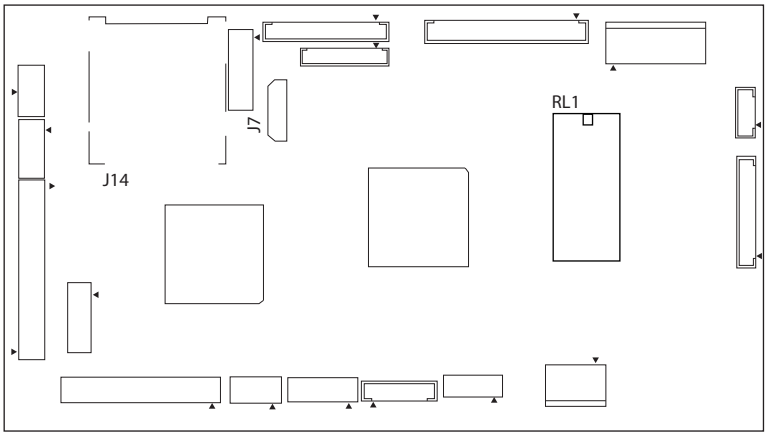
4.1.1 Switching power supply (PCB001)



Symbol	Roles	Remarks
CN1	Input connector	
CN51	Output connector	
VR51		Readjustment after shipment is prohibited.

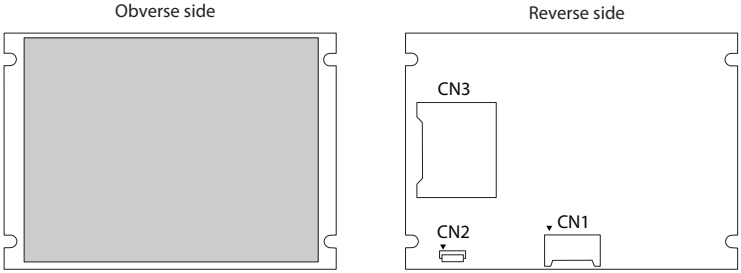
4.2 Control board

4.2.1 MC unit (PCB101)



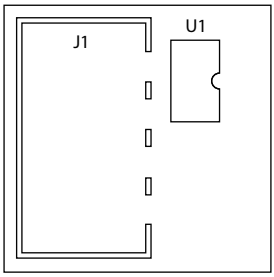
Symbol	Roles	Remarks
J7	Connector for memory unit	
J14	SD card slot	
RL1	Relay	☞ Chap. 2 > 2.1.2 Safety function

4.2.2 LCD touch panel (PCB102)



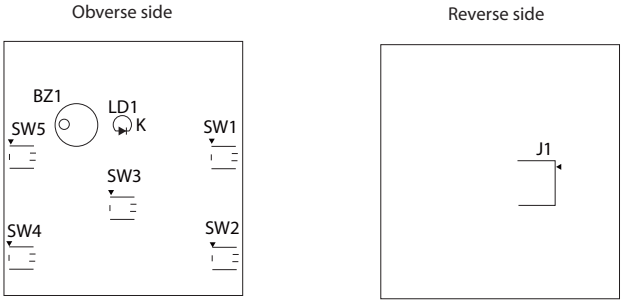
Symbol	Roles	Remarks
CN1	Connector for MC unit	
CN2		Not use
CN3	SD card slot	

4.2.3 Memory unit (PCB103)



Symbol	Roles	Remarks
J1	Connector for MC unit	
U1	EEPROM	

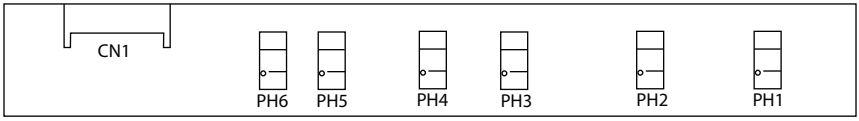
4.2.4 KEY PWB unit (PCB104)



Symbol	Roles	Remarks
J1	Connector for MC unit	
LD1	Lamp	
SW1	(start) key	
SW2	(stop) key	
SW3	(test) key	
SW4	(paper ejection) key	
SW5	(folding plate paper ejection) key	

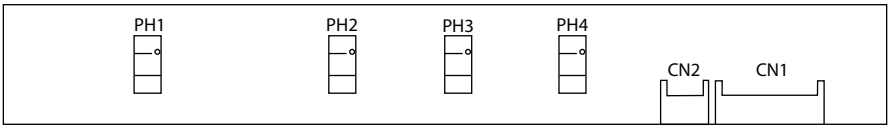
4.2.5 PS PWB unit (PCB201)

a. JPN/EU



Symbol	Roles	Remarks
CN1	Connector for MC unit	
PH1	Photo sensor	
PH2	Photo sensor	
PH3	Photo sensor	
PH4	Photo sensor	
PH5	Photo sensor	
PH6	Photo sensor	

b. NA



Symbol	Roles	Remarks
CN1	Connector for MC unit	
CN2	Connector for legal size sensor	
PH1	Photo sensor	
PH2	Photo sensor	
PH3	Photo sensor	
PH4	Photo sensor	

Memo

-Issued-
DUPLO CORPORATION
4-1-6 Oyama, Chuo-ku, Sagamihara-shi,
Kanagawa, 252-5280, Japan

Revision 1
(2019/09)

Duplo

18H-M12D1