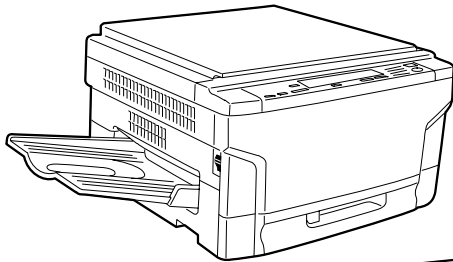
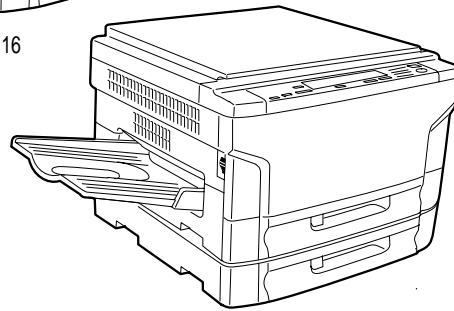


SHARP SERVICE MANUAL

CODE: 00ZSF2118SMRE



SF-2116



SF-2118

SF-2116 MODEL SF-2118

- Option
- Paper tray (SF-UB15)
 - Multi paper feed unit (SF-MF15)
 - Two-step paper feed unit (SF-CM15)
 - Personal counter (SF-71A/71B)
 - 10-bin sorter (SF-S17) ※
 - Reverse document feeder (SF-A15) ※

※ For the options, refer to their service manuals.

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Parts marked with "△" is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

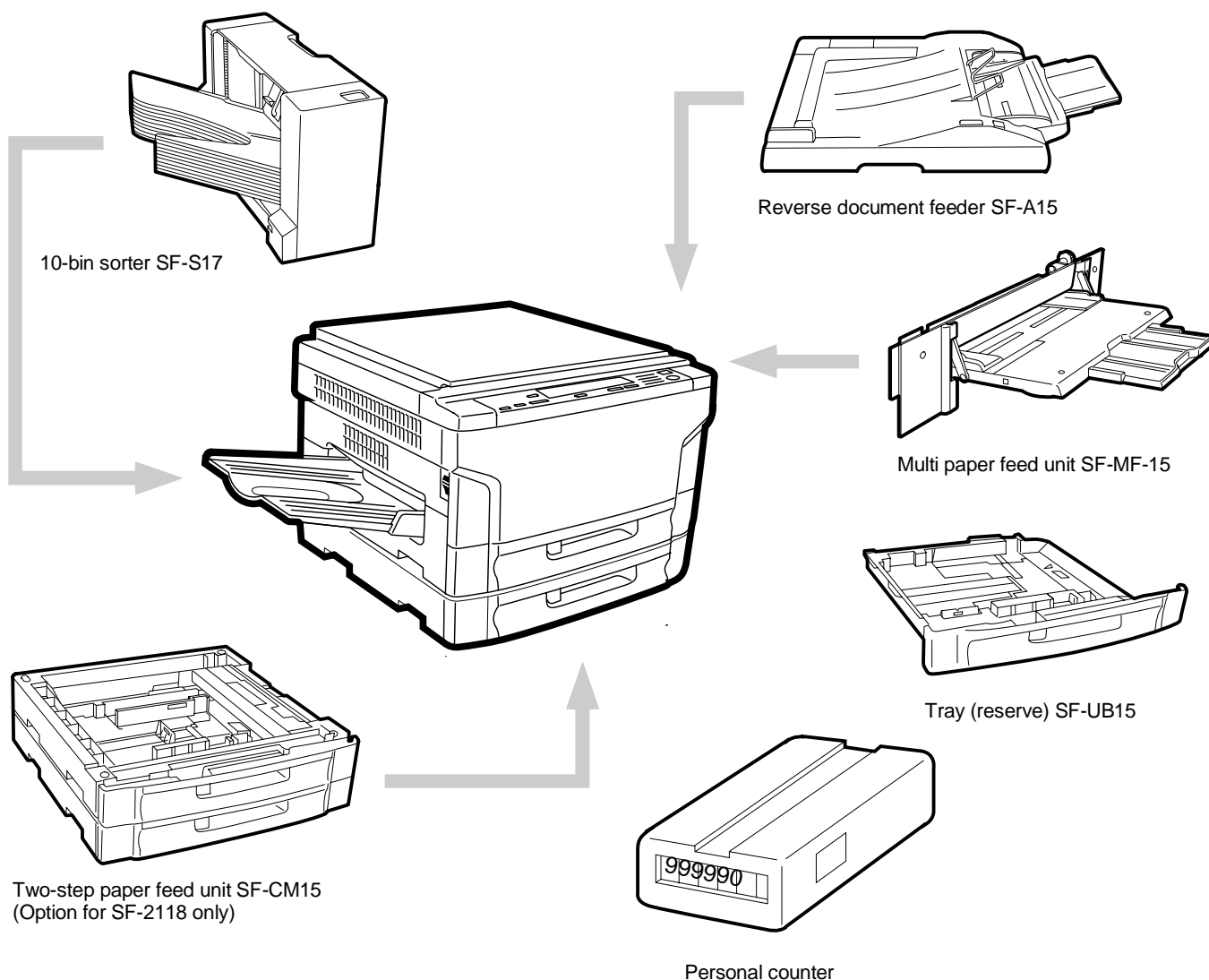
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[1] PRODUCT OUTLINE

1. Product features

- (1) Compact body
 - Compact body size
The body width of 600mm is the smallest in the class.
 - The employment of the front loading tray and the folding-type multi manual paper feed cassette realizes the small occupying area. (Option)
- (2) Clean copy gentle to the environment
 - Silent design of 46dB,
 - Low level of ozone, use of recyclable materials
 - The energy-saving mode reduces the power consumption.
- (3) High capacity of copying
 - Warm-up time is less than 35 sec. The first copy of 5.3 sec is the fastest in the class.
- (4) Fully expandable system. (Refer to "2. System configuration.")

2. System configuration (options)



[2] PRODUCT SPECIFICATIONS

1. Basic specifications

(1) Type: Table top

(2) Copy speed:

<SF-2116>

	Normal	Enlargement (Magnification)	Reduction (Magnification)
A3	9 sheets/min	9 sheets/min (200%)	9 sheets/min (50%)
B4	11 sheets/min	11 sheets/min	11 sheets/min
A4 (Portrait)	16 sheets/min	13 sheets/min	13 sheets/min
A4 (Landscape)	13 sheets/min	13 sheets/min	13 sheets/min
B5 (Portrait)	16 sheets/min	13 sheets/min	13 sheets/min
B5 (Landscape)	13 sheets/min	13 sheets/min	13 sheets/min
W letter	9 sheets/min	9 sheets/min	9 sheets/min
Legal	11 sheets/min	11 sheets/min	11 sheets/min
Letter (Portrait)	16 sheets/min	13 sheets/min	13 sheets/min
Letter (Landscape)	13 sheets/min	13 sheets/min	13 sheets/min

(Note) The copy speeds for enlargement and reduction are the lowest ones.

<SF-2118>

	Normal	Enlargement (Magnification)	Reduction (Magnification)
A3	10 sheets/min	10 sheets/min (200%)	10 sheets/min (50%)
B4	12 sheets/min	12 sheets/min	12 sheets/min
A4 (Portrait)	18 sheets/min	14 sheets/min	14 sheets/min
A4 (Landscape)	14 sheets/min	14 sheets/min	14 sheets/min
B5 (Portrait)	18 sheets/min	14 sheets/min	14 sheets/min
B5 (Landscape)	14 sheets/min	14 sheets/min	14 sheets/min
W letter	10 sheets/min	10 sheets/min	10 sheets/min
Legal	12 sheets/min	12 sheets/min	12 sheets/min
Letter (Portrait)	18 sheets/min	14 sheets/min	14 sheets/min
Letter (Landscape)	14 sheets/min	14 sheets/min	14 sheets/min

(Note) The copy speeds for enlargement and reduction are the lowest ones.

(3) Warm up time: 35 sec or less

(4) First copy time: 5.3 sec (Paper feed port: Upper tray)

First copy time from each paper feed port

Paper feed port	SF-2116	SF-2118
Body tray upper stage	5.3 sec	
Body tray lower stage	NO	5.8 sec
Option paper feed unit first step	NO	6.1 sec
Option paper feed unit second step	NO	6.4 sec

(5) Jam recovery time: 8 sec (Conditions: After leaving the door open for 60 sec, the standard conditions)

(6) Multi copy Max. 99 sheets

(7) Original

	SF-2116	SF-2118
Max. original size	A3/W letter	
Reference original size	Left side/Center	
Original sensing	NO	YES (Japan only)
Sensing size	—	A3 ~ B5R

(8) Copy magnification ratio

Fixed magnification: 200, 141, 122, 115, 100, 86, 81, 70, 50% (9 steps)

Zoom range: 50% ~ 200% (151 steps by the increment of 1%)

(9) Exposure

Exposure mode: Auto/Manual/Photo

No. of manual steps: 9 steps

(10) Void width

Void area: Lead edge/rear edge: 3mm or less

Image loss Normal: 4mm or less

(11) Paper exit/finishing

Paper exit tray capacity: 250 sheets

Finishing: option 10-bin sorter

(12) Additional functions

	Function		Remark
	SF-2116	SF-2118	
Auto Paper Selection	×	○	For the SF-2118 (outside Japan version), original sensing is possible when the ADF (option) is installed.
Auto Magnification ratio Selection	×	○	Inhibited in mixed size paper feed. For outside Japan version, the original size is entered.
Shift	×		
1-set 2-copy	○		Enlargement is impossible.
Edge erase	×	○	
Trimming	×		
Masking	×		
Centering	×		
Move image	×		
Covers/inserts	×		
Overlay	×		
Job memory	×		
Monochrome	×	○	(Red, Blue)

(13) External dimensions

	SF-2116	SF-2118
W x D x H mm	600 x 585 x 375	600 x 585 x 460
Occupying area (W x D)	850 x 585	
Weight	43.5Kg	49.5Kg

(14) Power source

Voltage: 100V 50/60Hz, 110V 50/60Hz, 120V 60Hz, 127V 60Hz, 220 ~ 230V 50/60Hz, 240V 50Hz

Frequency: 50/60Hz common

(15) Power consumption

Max. power consumption	1.5kw
Stand-by power consumption	18W (Heater lamp OFF) 1kW (Heater lamp ON)
Average power consumption during operation	1320W
Preheating	70W
Auto power shut off	15W

2. Description of each section

(1) Paper feed section

	SF-2116	SF-2118
Copying size	A3 ~ A6/W letter ~ Invoice	
Paper feed system	1 tray + Single manual feed	2 trays ~ Single manual feed
Paper feed capacity	250 sheets	250 x 2 sheets

Cassette	Paper size	Paper weight	Paper kind	Remark
Body tray upper stage	AB series: A3 ~ A5	56 ~ 80g/m ²	Standard paper, recycled paper	
	Inch series: W letter ~ Invoice	15 ~ 20 lbs		
Body tray lower stage	AB series: A3 ~ A5	56 ~ 80g/m ²	Standard paper, recycled paper	SF-2118 only
	Inch series: W letter ~ Invoice	15 ~ 20 lbs		
Manual feed	AB series: A3 ~ A6R	52 ~ 128g/m ²	Standard paper, specified paper, special paper, OHP film, Second original paper, postcards (without folding)	
	Inch series: W letter ~ Invoice	14 ~ 34 lbs		
Two-step paper feed unit (Option)	AB series: A3 ~ A5	56 ~ 80g/m ²	Standard paper, recycled paper	
	Inch series: W letter ~ Invoice	15 ~ 20 lbs		
Multi manual paper feed (Option)	Multi	AB series: A3 ~ A6R	Standard paper, specified paper, special paper, OHP film, Second original paper, postcards (without folding)	
		Inch series: W letter ~ Invoice		
	Single	52 ~ 128g/m ²		
		14 ~ 34 lbs		

(2) Optical section

Light source	Halogen lamp
Exposure system	Slit exposure by moving the light source
Zooming system	By changing the lens positions and the scan speed.
Lens	Fixed focus lens

(3) Process

Charging system	(-) DC saw teeth electrode system
Transfer system	(-) tungsten system
Separation system	(AC) separation tungsten system

(4) Developing section

Developing system	Dry, two-component magnetic brush development (developer replacement)
Developing bias voltage	DC-200V ±5V

(5) Fusing section

Fusing system	Heat roller system
Upper heat roller surface temperature	190 degrees
Heater lamp	Halogen lamp 1000W × 1

3. Supply parts

U.S.A., Canada

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner blade x 1 Drum separation pawl x 2	50K	SF-216DR
2	Black developer	Black	Black developer (530g) x 10	50K x 10	SF-216MD1
3	Color developer	Red Blue	Color developer (550g) x 10	10K x 10	SF-780MD2 SF-780MD3
4	Black toner	Black	Black toner cartridge (210g) x 10	5K x 10	SF-216MT1
5	Color toner	Red Blue	Color toner cartridge (210g) x 10	5K x 10	SF-216MT2 SF-216MT3
6	Color developing unit kit	Red Blue	Developing unit x 1 Color developer (550g) x 1 Color toner cartridge (210g) x 1 Storage case x 1		SF-216NK2 SF-216NK3
7	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	SF-216UH
8	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	SF-216LH

Europe/U.K.

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner blade x 1 Drum separation pawl x 2	50K	SF-216DM
2	Black developer	Black	Black developer (530g) x 10	50K x 10	SF-216LD1
3	Color developer	Red Blue	Color developer (550g) x 1	10K	SF-780DV2 SF-780DV3
4	Black toner	Black	Black toner cartridge (210g) x 10	5K x 10	SF-216LT1
5	Color toner	Red Blue	Color toner cartridge (210g) x 1	5K	SF-216T2 SF-216T3
6	Color developing unit kit	Red Blue	Developing unit x 1 Color developer (550g) x 1 Color toner cartridge (210g) x 1 Storage case x 1		SF-216K2 SF-216K3
7	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	SF-216UH
8	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	SF-216LH

Australia/New Zealand

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner blade x 1 Drum separation pawl x 2	50K	SF-216DM
2	Black developer	Black	Black developer (530g) x 10	50K x 10	SF-216LD1
3	Color developer	Red Blue	Color developer (550g) x 10	10K x 10	SF-780LD2 SF-780LD3
4	Black toner	Black	Black toner cartridge (210g) x 10	5K x 10	SF-216LT1
5	Color toner	Red Blue	Color toner cartridge (210g) x 10	5K x 10	SF-216LT2 SF-216LT3
6	Color developing unit kit	Red Blue	Developing unit x 1 Color developer (550g) x 1 Color toner cartridge (210g) x 1 Storage case x 1		SF-216K2 SF-216K3
7	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	SF-216UH
8	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	SF-216LH

Middle and South America/Asia

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner blade x 1 Drum separation pawl x 2	50K	SF-216DR
2	Black developer	Black	Black developer (530g) x 10	50K x 10	SF-216CD1
3	Color developer	Red Blue	Color developer (550g) x 10	10K x 10	SF-780LD2 SF-780LD3
4	Black toner	Black	Black toner cartridge (210g) x 10	5K x 10	SF-216CT1
5	Color toner	Red Blue	Color toner cartridge (210g) x 10	5K x 10	SF-216CT2 SF-216CT3
6	Color developing unit kit	Red Blue	Developing unit x 1 Color developer (550g) x 1 Color toner cartridge (210g) x 1 Storage case x 1		SF-216SK2 SF-216SK3
7	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	SF-216UH
8	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	SF-216LH

Middle East/Africa (excluding Russia)

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner bladex 1 Drum separation pawl x 2	50K	A3SF216DM
2	Black developer	Black	Black developer x 10	50K x 10	A3SF216LD1
3	Black toner	Black	Black toner bottle (250g) x 10	6K x 10	A3SF116LT
4	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	A3SF216UH
5	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	A3SF216LH

Asia (Excluding Taiwan(AURORA)/Hong Kong (SRH))

	Name		Content	Life	Product name
1	Photoconductor kit		Photoconductor drum x 1 Cleaner bladex 1 Drum separation pawl x 2	50K	A3SF216DR
2	Black developer	Black	Black developer x 10	50K x 10	A3SF216CD1
3	Black toner	Black	Black toner bottle (250g) x 10	6K x 10	A3SF116CT
4	Upper heat roller kit		Upper heat roller x 1 Upper fusing separation pawl x 4 Fusing bearing (F) x 1	100K	A3SF216UH
5	Lower heat roller kit		Lower heat roller x 1 Lower fusing separation pawl x 2	50K	A3SF216LH

4. Optional specifications

(1) Automatic document feeder (ADF)

<SF-A15>

Original set direction	Face down
Original set position	Center reference
Original transport system	Belt (half size) system
Remark	For an original of A4 or greater, it is once transported to the paper exit section and switched back to set the next original.
Original feed sequence	Top taking (Face up exit)
Original size	A3 ~ A5/11" x 17" ~ 8 1/2" x 5 1/2"
Original change speed (S → S)	16 sheets/min (SF-2116), 18 sheets/min (SF-2118)
Original weight	35 ~ 128g/m ² Thin paper mode (35 ~ 50g/m ²) Standard mode (50 ~ 128g/m ²)
Original set quantity	50 sheets, 80 ~ 128 g/cm ² , thickness max. 5 mm
Original stop system	Stopper system
Dimensions	586 (W) x 525 (D) x 99 (H) (mm) (Width: when the tray is installed. Height: Excluding the auxiliary guide.)
Weight	About 11kg
Power source	AC100V ~ 200V supplied from the copier's power section.

Functions

Original sensing on the tray	YES (Scanning read for uncertain size originals.)
Tray form	Slide system
Sensing size	Inch series: 11" x 17", 8 1/2" x 14", 8 1/2" x 11", 8 1/2" x 11"R, 8 1/2" x 5 1/2" AB series: A3, B4, A4, A4R, A5
Original mixture	Allowed (However, no linkage with the AMS)
Original reverse	NO

Display section

① Original feed display section	ADF shows the operation valid state. Lighted when an original is set.
② Original remaining display	When the original transport cover is used as the original cover, the LED lights up on completion of the final exposure. When the transport cover is opened, the LED goes off.
SDF mode	Selection between the SDF mode and the ADF mode is possible. (Selectable with the user program.)
Thin paper mode	Selection between the thin paper mode and the standard mode is possible. (Selectable with the user program.)

(2) 10-bin sorter

<Model name: SF-S17>

Type	Copier installation type/Hanging type	
Distribution system	Bin shift by lead screw	
No. of bins	10 bins (The top bin is used also for non-sort.)	
Capacity	30 sheets/bin (L4/letter size), 100 sheets for the top bin only.	
Sorting	30 sheets (A4/letter)	
	15 sheets (B4/legal)	
	15 sheets (A3/W letter)	
Grouping	20 sheets (A4/letter)	
	15 sheets (B4/legal)	
	15 sheets (A3/W letter)	
Paper size	(Non-sort)	A3 ~ A6 (Postcard)R/11" x 17" ~ 8 1/2" x 5 1/2"
	(Sort/group)	A3 ~ A5/11" x 17" ~ 8 1/2" x 11"
Process capacity	16/18 sheets/min	
Paper transport	Center reference	
Paper reception	Face up	
Paper weight	(Non-sort)	52 ~ 128g/m ² (14 ~ 34lbs)
	(Sort/group)	56 ~ 80g/m ² (15 ~ 21lbs)
Power source	Supplied from the copier.	
Dimensions	335 (W) x 493 (D) x 298 (H) (Width: Including the tray.)	
Weight	7kg	

(3) Multi manual feed unit

<Model name: SF-MF15>

Paper size	A3 ~ A6 (Postcard) R 11" x 17" ~ 8 1/2" x 5 1/2"	
Paper weight	52 ~ 128g/m ² , (14 ~ 34lbs)	
Paper feed capacity	Multi paper feed	56 ~ 80g/m ² (15 ~ 21lbs) (50 sheets) Postcard (20 sheets)
	Single paper feed	52 ~ 128g/m ² , (14 ~ 34lbs) and special paper (For paper of 105g/m ² (28lbs) or heavier, A4 size or lower.)
Paper kind	Standard paper, specified paper, special paper, OHP film, Second original paper, postcards (without folding)	
Paper empty sense	NO	
Manual feed size sense	NO	
Paper feed tray	Folding type	
Paper set	Same size only	
Power source	Supplied from the copier.	
Dimensions (W x D x H)	350 (W) x 493 (D) x 185mm (H)	
Weight	About 2kg	

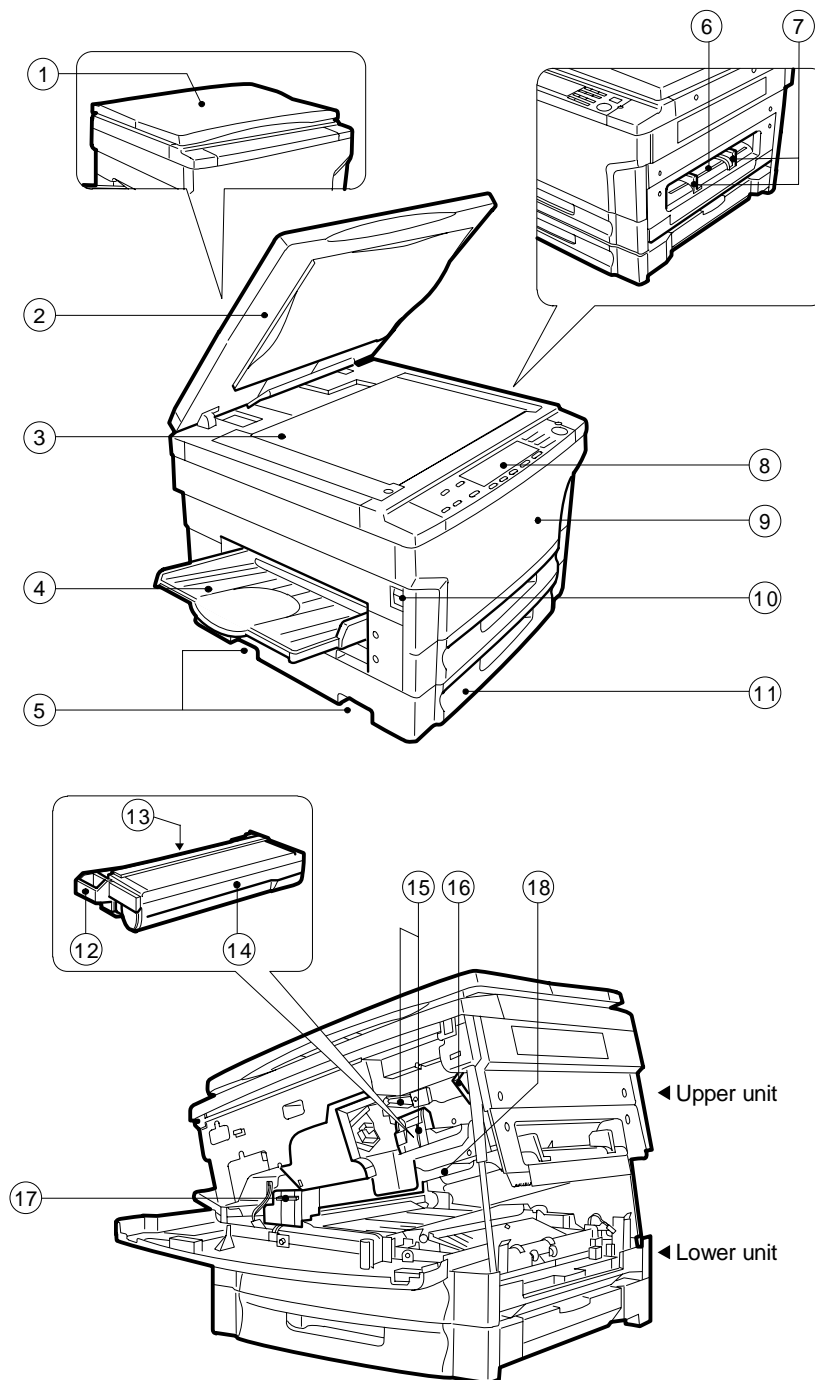
(4) Two-step paper feed unit (SF-2118 only)

<Model name: SF-CM15>

Paper size	A3 ~ A5	
Paper feed capacity	250 sheets x 2 steps	
Paper weight	56 ~ 80g/m ² (15 ~ 21 lbs)	
Paper kind	Standard paper, recycled paper	
Size selection	Tray replacement/user handling	
Power source	Supplied from the copier.	
Dimensions (W x D x H)	570 (W) x 570 (D) x 188mm (H)	
Weight	About 14kg	

[3] PRODUCT VIEWS

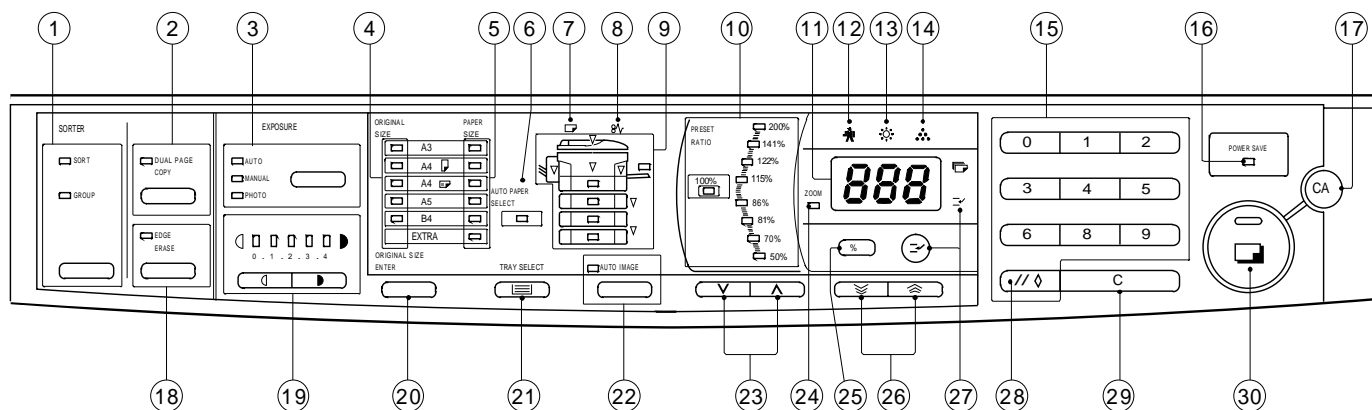
1. External view and internal structure



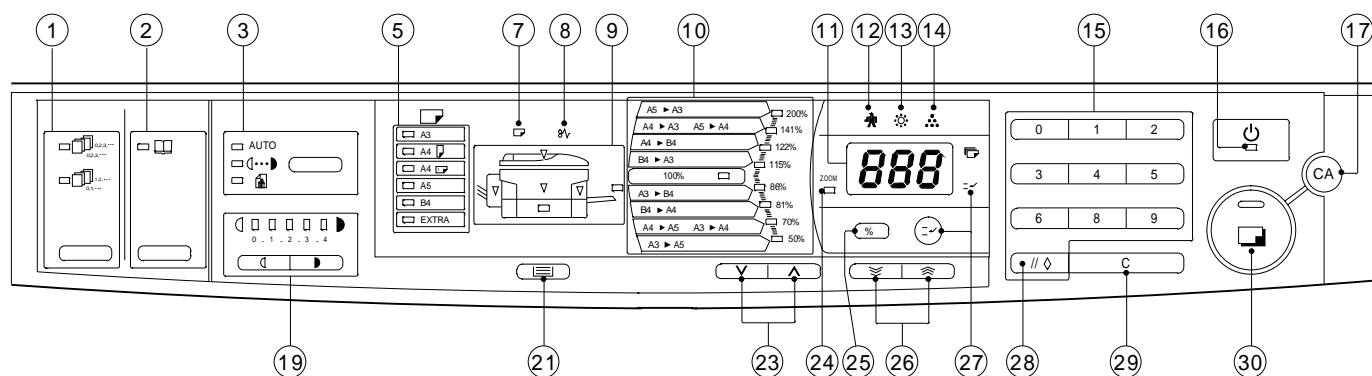
No.	Name	No.	Name	No.	Name
①	Original cover	②	Original table	③	Paper exit tray
④	Grip	⑤	Manual feed unit	⑥	Manual feed original guide
⑦	Operation panel	⑧	Front cover	⑨	Power switch
⑩	Paper tray	⑪	Developing unit grip	⑫	Developing unit strap
⑬	Toner hopper	⑭	Developing unit lock lever	⑮	Release lever
⑯	Fusing unit	⑰	Drum		

2. Operation panel

SF-2118



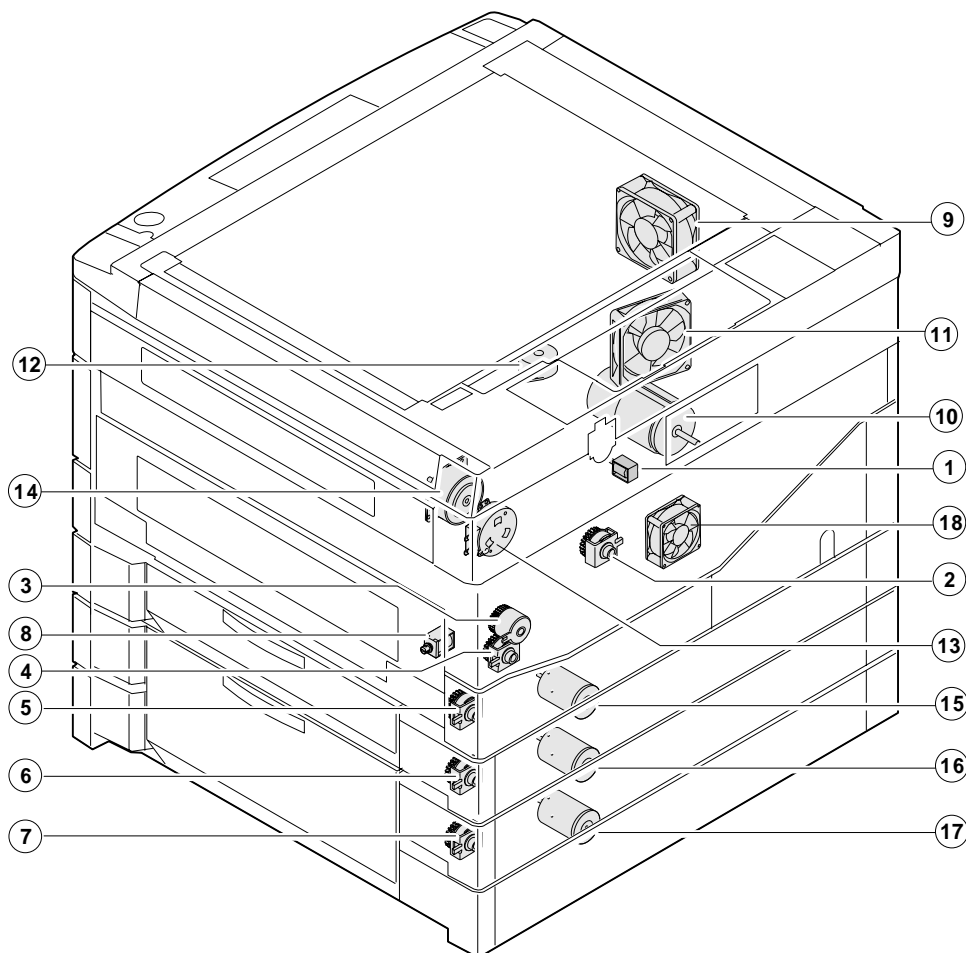
SF-2116



No.	Name	No.	Name	No.	Name
①	Sorter key and indicators	②	Dual page copy key and indicators	③	Auto/Manual/Photo key and indicators
④	Original size indicators	⑤	Paper size indicators	⑥	Auto paper select indicators
⑦	Paper required indicator	⑧	Misfeed indicator	⑨	Paper feed location/misfeed location indicators
⑩	Preset ratio indicators	⑪	Copy quantity display	⑫	Maintenance required indicator
⑬	Developer replacement required indicator	⑭	Toner required indicator	⑮	10-Key pad
⑯	Power save indicator	⑰	Clear all key	⑱	Edge erase
⑲	Light and dark keys and indicator	⑳	Original size enter key	㉑	Tray select key
㉒	Auto image key and indicator	㉓	Copy ratio keys	㉔	Zoom indicator
㉕	Copy ratio display key	㉖	Zoom keys	㉗	Interrupt key and indicator
㉘	Zero/readout key	㉙	Clear key	㉚	Print button and ready indicator

3. Clutches, solenoids, and motors

Clutches and solenoids

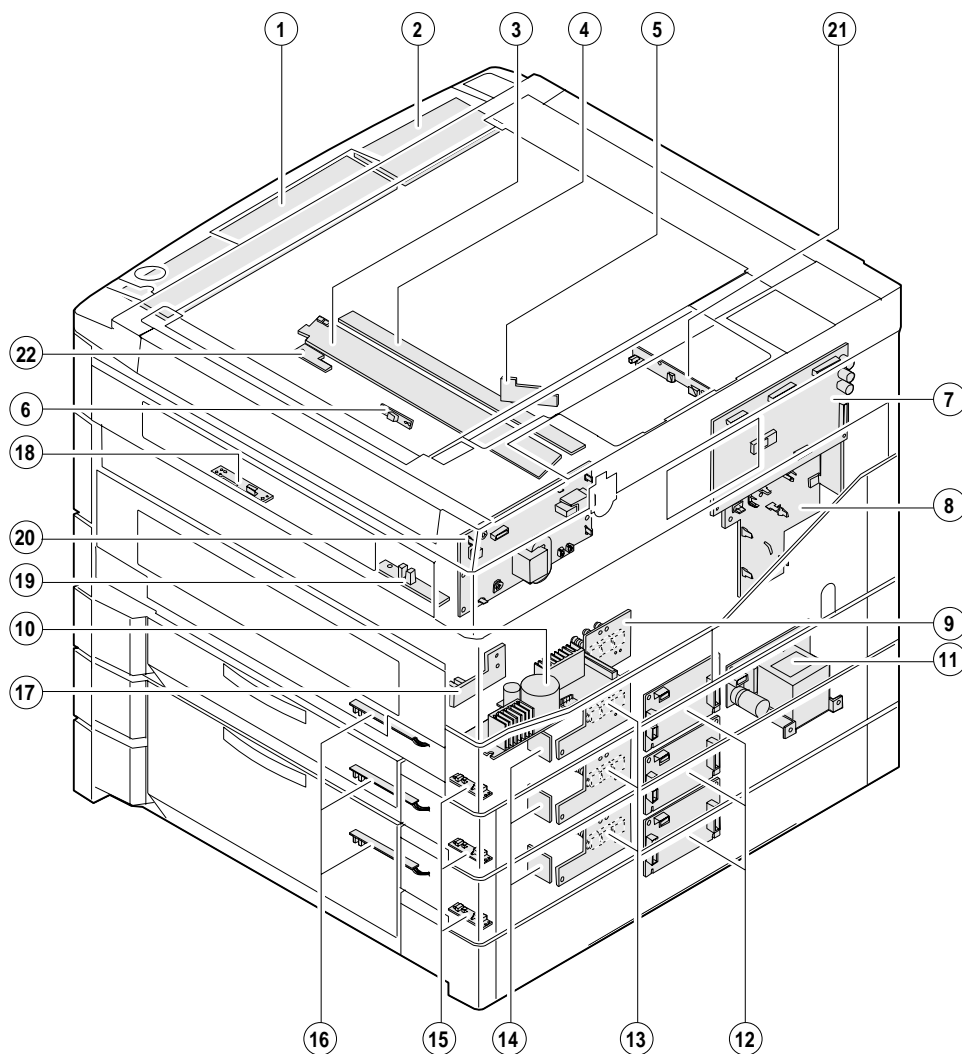


No.	Signal name	Name	Functions, operations
①	PSPS	Paper separation solenoid	Paper separation solenoid drive
②	RRC	Resist roller clutch	For resist roller rotation
③	TRC	Transport roller clutch	For transport roller rotation
④	CPFC1	Tray paper feed clutch	For paper feed roller rotation
⑤	CPFC2	Tray paper feed clutch (SF-2118)	For paper feed roller rotation
⑥	CPFC3	Option tray paper feed clutch	For paper feed roller rotation
⑦	CPFC4	Option tray paper feed clutch	For paper feed roller rotation
⑧	MPFS	Manual paper feed solenoid (Option 2-step paper feed unit: SF-MF15 only)	For pressing take-up roller

Motors

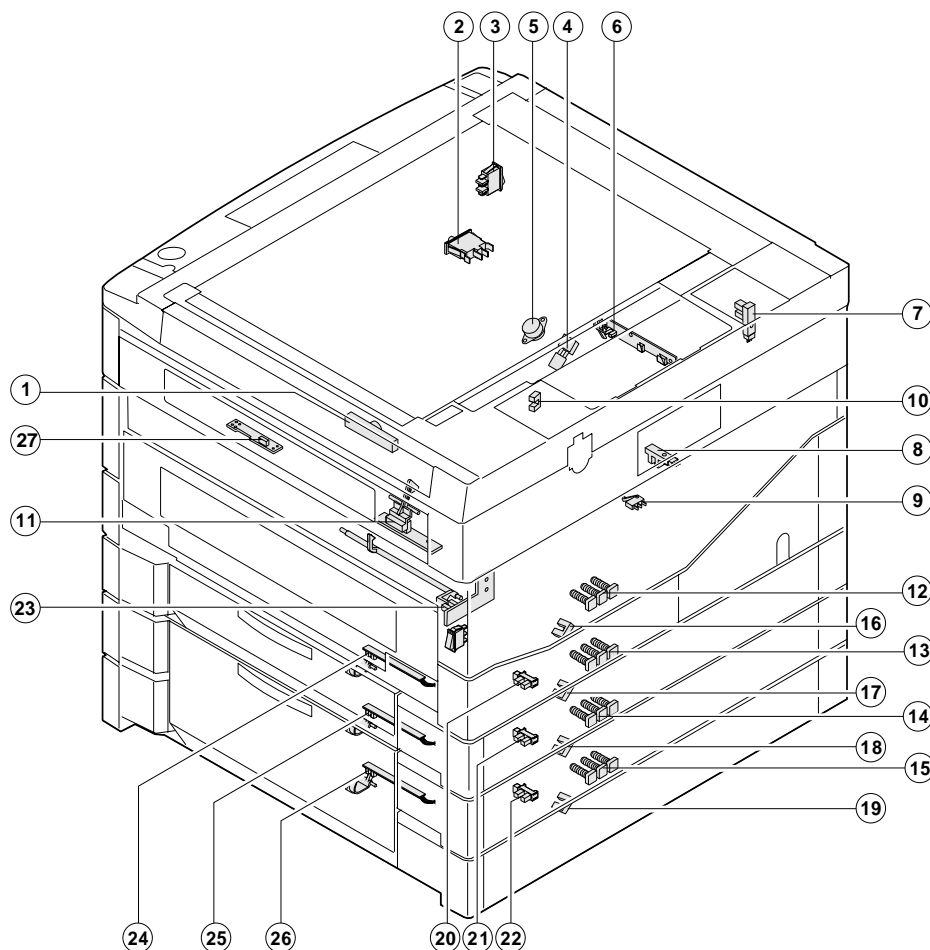
No.	Signal name	Name	Functions, operations	Type
⑨	VFM	Ventilation fan motor	Used to ventilate around the fusing section, cools down the machine, and remove ozone.	DC brushless
⑩	MM	Main motor	Used to drive the body.	DC brush
⑪	CFM	Optical system cooling fan	Used to cool and ventilate the optical system.	DC brushless
⑫	LM	Lens motor	Used to move the optical lens.	DC stepping
⑬	TM	Toner motor	Used to stir toner.	DC synchronous
⑭	MRM	Mirror motor	Used to move the mirror base.	DC stepping
⑮	CS2M	Paper feed motor (SF-2118)	Used to drive the paper feed roller. (SF-2118)	DC brush
⑯	CS3M	Option paper feed motor	Used to drive the option paper feed roller.	DC brush
⑰	CS4M	Option paper feed motor	Used to drive the option paper feed roller.	DC brush
⑱	SMF	Suction fan motor	Used to ventilate the suction section.	DC brushless

4. PWB



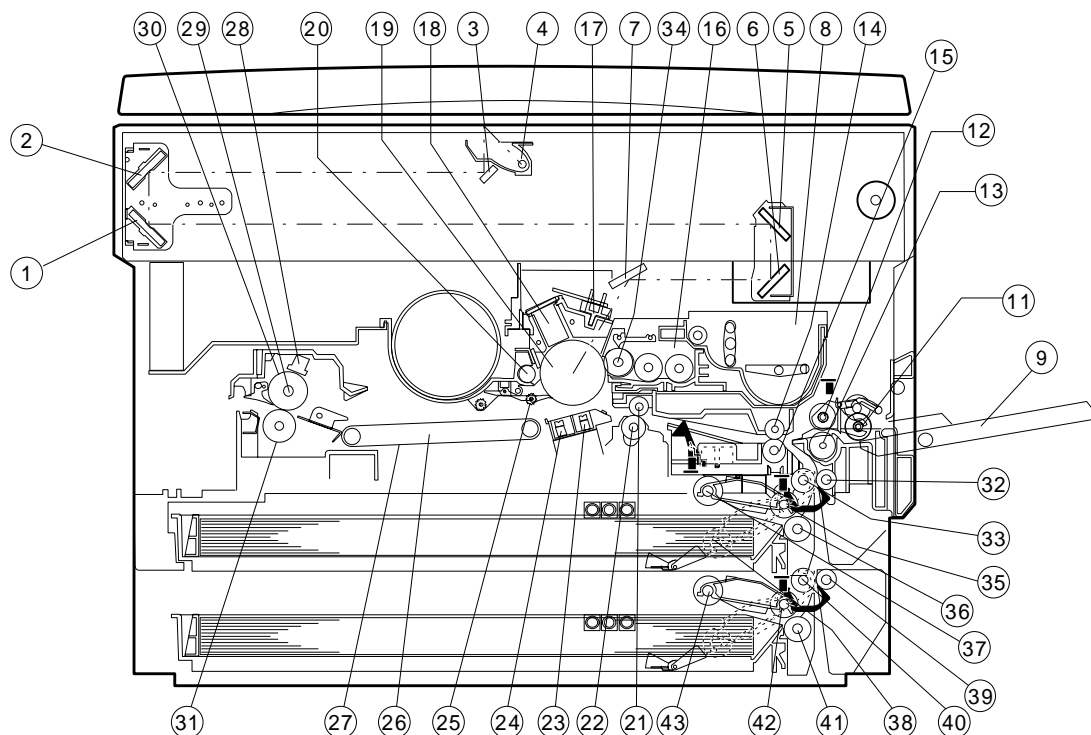
No	Name	Description	No	Name	Description
①	Operation PWB A	Operation input, display control	②	Operation PWB B	Operation input, display control
③	Blank lamp PWB	Used to control the blank lamp.	④	DL PWB	Used to drive the discharge lamp.
⑤	Optical PWB	AE sensor and lens motor interface	⑥	Process control PWB	Used to sense the toner density.
⑦	Main PWB	Used to control the body.	⑧	AC circuit PWB	AC power input
⑨	CSD PWB	Used to sense the body cassette size.	⑩	DC circuit PWB	DC power input
⑪	Paper feed power PWB	Used to supply power to drive the paper feed unit.	⑫	Motor control PWB	Used to drive and control the paper feed motor and the transport motor.
⑬	CSD B PWB	Used to sense the cassette size of 2nd ~ 4th tray.	⑭	Motor sensor PWB	Encoder for 2nd ~ 4th paper feed motor
⑮	Tray module PWB	Vertical transport of 2nd ~ 4th cassette, JAM detection, paper feed clutch interface	⑯	DPPD PWB	Vertical transport of 2nd ~ 4th tray, JAM detection and cover open detection
⑰	Paper feed I/F PWB	Body paper detection, paper feed clutch interface	⑱	PID PWB	Manual paper entry detection
⑲	PPD PWB	Body PR roller JAM detection	⑳	High voltage PWB	Process high voltage, developing bias voltage supply
㉑	PDD PWB	Body paper exit section JAM detection, ventilation fan motor interface	㉒	Mark sensor PWB	Drum marking point detection

5. Sensors and switches



No.	Signal name	Name	Type	Operation, function
①	TCS	Toner density control sensor	Transmission sensor	HIGH when toner density falls.
②	ILSW	Front cabinet open/close switch	Interlock switch	ON when closed.
③	MSW	Power switch	Seesaw switch	
④	TH	Fusing heater thermistor	Thermistor	Greater resistance at low temperature
⑤	TS	Fusing heater thermostat	Thermostat	Contact open at abnormally high temperature
⑥	POD	Paper exit paper sensor	Transmission photo sensor	LOW when paper is present.
⑦	MHPS	Mirror home position sensor	Transmission photo sensor	HIGH when paper is sensed.
⑧	MMRE	Main motor encoder	Transmission photo sensor	Rotation pulse output
⑨	TFD	Waste toner full switch	Lead switch	HIGH when sensed.
⑩	LHPS	Lens home position sensor	Transmission photo sensor	LOW when reduction.
⑪	PPD	Paper transport sensor	Transmission photo sensor	LOW when paper is present.
⑫	1 CSD0 ~ 2	Body upper tray paper size detection	Tact switch	Shorted when the switch is turned on.
⑬	2 CSD0 ~ 2	Body lower tray paper size detection (SF-2118)	Tact switch	Shorted when the switch is turned on.
⑭	3 CSD0 ~ 2	Option upper tray paper size detection	Tact switch	Shorted when the switch is turned on.
⑮	4 CSD0 ~ 2	Option lower tray paper size detection	Tact switch	Shorted when the switch is turned on.
⑯	PED1	Body upper tray paper presence detection	Transmission photo sensor	HIGH when paper is present.
⑰	PED2	Body lower tray paper presence detection (SF-2118)	Transmission photo sensor	HIGH when paper is present.
⑱	PED3	Option upper tray paper presence detection	Transmission photo sensor	HIGH when paper is present.
⑲	PED4	Option lower tray paper presence detection	Transmission photo sensor	HIGH when paper is present.
⑳	Motor sensor 2	Body lower stage paper feed motor encoder sensor (SF-2118)	Transmission photo sensor	Rotation pulse output
㉑	Motor sensor 3	Option upper paper feed motor encoder sensor	Transmission photo sensor	Rotation pulse output
㉒	Motor sensor 4	Option lower paper feed motor encoder sensor	Transmission photo sensor	Rotation pulse output
㉓	DPPD1	Body upper tray paper transport sensor	Transmission photo sensor	LOW when paper is present.
㉔	DPPD2	Body lower tray paper transport sensor (SF-2118)	Transmission photo sensor	LOW when the side door is open and paper is present.
㉕	DPPD3	Option upper tray paper transport sensor	Transmission photo sensor	LOW when the option door is open and paper is present.
㉖	DPPD4	Option lower tray paper transport sensor	Transmission photo sensor	LOW when the option door is open and paper is present.
㉗	PID	Single manual feed paper entry sensor	Transmission photo sensor	HIGH when paper is present.

6. Rollers, mirrors, etc.



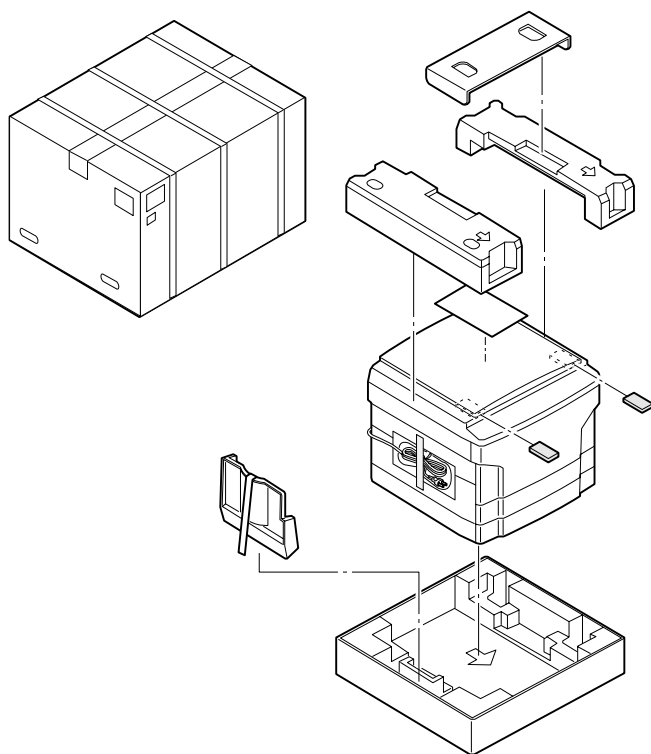
No.	Name	No.	Name	No.	Name
①	No. 3 mirror	②	No. 2 mirror	③	No. 1 mirror
④	Copy lamp	⑤	No. 4 mirror	⑥	No. 5 mirror
⑦	No. 6 mirror	⑧	Developing unit toner box	⑨	Manual tray
⑩	—	⑪	Take-up roller (SF-MF15 only)	⑫	Paper feed roller (SF-MF15 only)
⑬	Reverse roller (SF-MF15 only)	⑭	PS front roller follower roll (SF-MF15 only)	⑮	PS front roller (SF-MF15 only)
⑯	Developing unit	⑰	Blank lamp	⑱	Main charger unit
⑲	Photoconductor drum	⑳	Cleaner unit	㉑	Resist roller follower roll
㉒	Resist roller	㉓	Transfer charger	㉔	Separation charger
㉕	Drum separation pawl	㉖	Suction unit	㉗	Suction belt
㉘	Fusing thermistor	㉙	Heater lamp	㉚	Upper heat roller
㉛	Lower heat roller	㉜	Transport roller (upper) follower roller	㉝	Transport roller (upper)
㉞	Developing magnet roller	㉟	Tray paper feed roller	㊱	Tray paper feed reverse roller
㊲	Tray paper feed take-up roller	㊳	PE actuator	㊴	Transport roller (lower) (SF-2118)
㊵	Transport roller (lower) follower roller (SF-2118)	㊶	Tray paper feed reverse roller (SF-2118)	㊷	Tray paper feed roller (SF-2118)
㊸	Tray paper feed take-up roller (SF-2118)				

※ Since ㉜, ㉝, ㉟ ~ ㊸ are the same as in the SF-CM15 (option), they are omitted.

※ The above figure shows the machine with the SF-MF15 installed.

[4] UNPACKING AND INSTALLATION

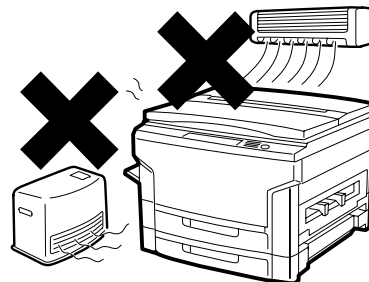
1. Unpacking



Packing material/accessory list

	Name	Q'ty
1	Paper exit tray	1
2	Instruction Manual	1
3	Maintenance card	1
4	Dust cover	1
5	Service contract	1
6	Installation manual	1
7	Magnification select label	1

- ② Avoid high temperature and high humidity, and avoid sudden temperature change. (Avoid installation near a cooler or a heater.)
If not, paper absorbs moisture and dew forms in the machine, causing paper jam or degraded image quality.



(Standard condition):

The best condition to use the machine.

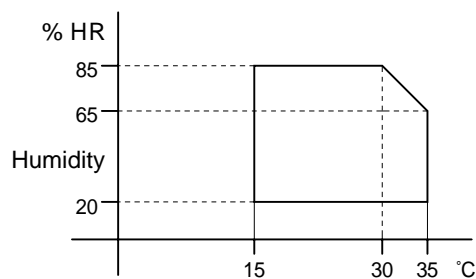
20 ~ 25 °C, 65±5% RH

(Temperature and humidity):

15 ~ 30 °C

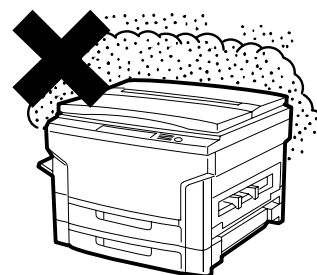
20% ~ 85% RH

35 °C for 65%



- ③ Avoid dusts and vibrations.

If dusts enter the machine, malfunctions may occur.



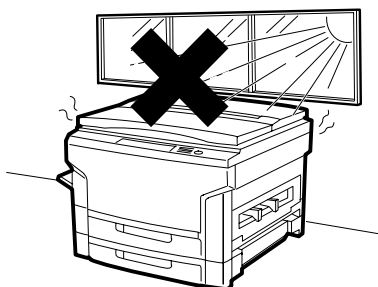
2. Installation

Installation conditions

The surrounding conditions of the machine affect the machine performance greatly. Use great care for the following items:

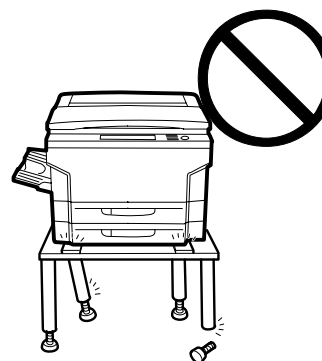
(1) Environment

- ① Avoid direct sunlight, and avoid installation near the window.
(Curtains or blinds must be shut completely.)
If not, the plastic parts and the original cover may be deformed.
Even if the window is of frosted glass, there is no difference.

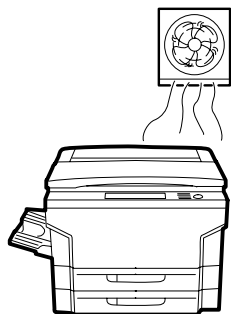


- ④ Avoid installation to an unstable place.

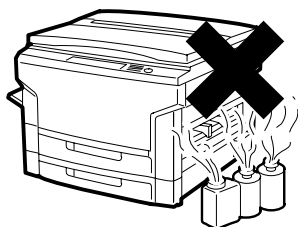
Keep the machine in horizontal state to maintain the performances.



- ⑤ Avoid installation to a poorly ventilated place.



- ⑥ Avoid installation to a place where there are flammable materials or ammonia gas, etc. If the machine is installed near a diazo copier, the picture quality may be degraded and malfunctions may occur.



- ⑦ Install near a power outlet.

(2) Space around the machine

Install the machine with its rear side about 10cm apart from the wall in order to allow space for ventilation by the cooling fan. Also allow enough space around the machine for proper operation.

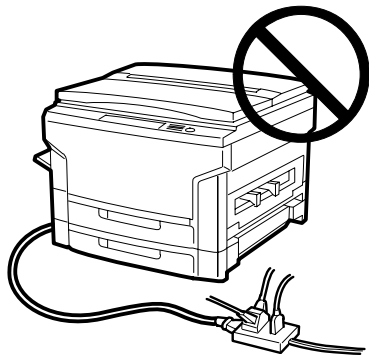
(3) Installation base

Set the machine in horizontal position in the following procedure. Be sure to use a leveling instrument (UKOGM0054CSZZ) to install the machine on a flat, horizontal place.

[Note] If the machine is not in horizontal position, the toner density control function may not work normally, resulting in degraded picture quality.

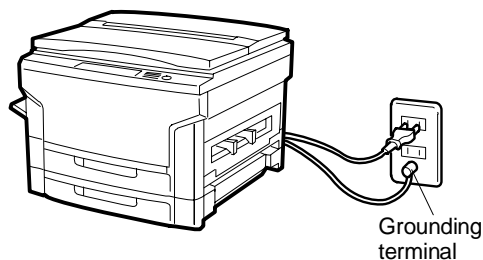
(4) Power source

- ① Use the power source of the rated capacity.
② Avoid complicated wiring. If not, the breaker or the fuse may be blown off to cause a fire.



(5) Grounding wire connection

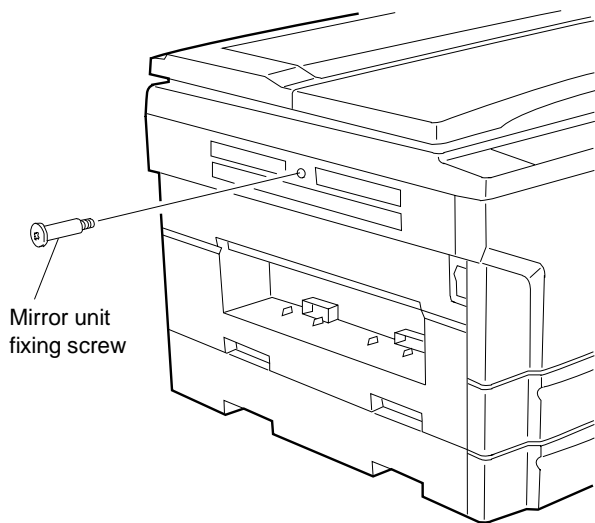
- ① Connect the grounding wire to prevent against a danger.
② When connecting the grounding wire, connect only to the grounding object (the grounding terminal of the power outlet, etc.) and never connect to a gas pipe.



3. Optical system lock release

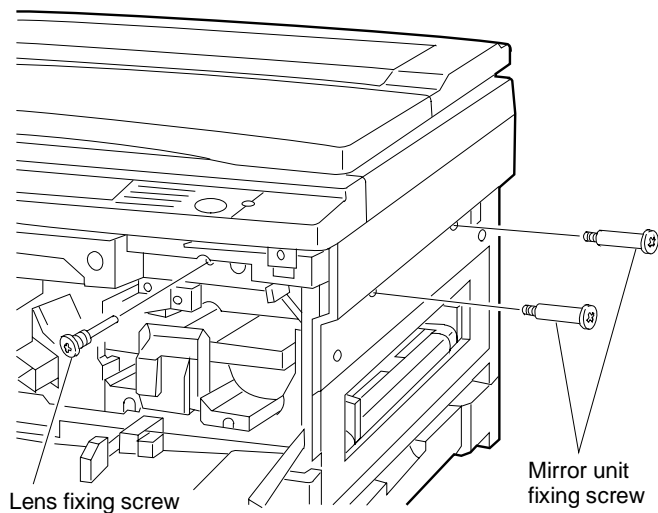
A. No. 2/3 mirror unit lock release

Remove the one fixing screw of the No. 2/3 mirror unit on the left side of the copier.



B. Lens and No. 4/5 mirror unit lock release

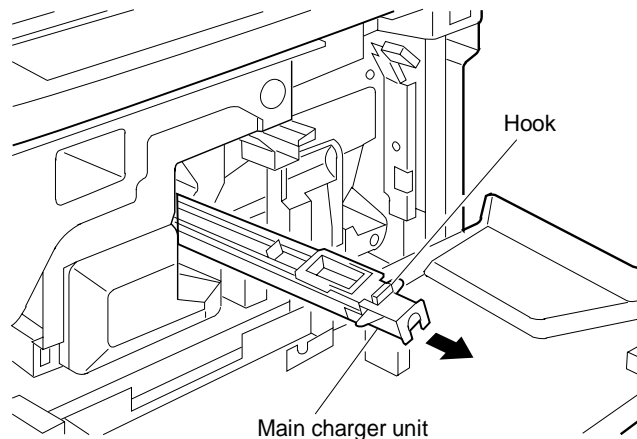
Remove two fixing screws of the No. 4/5 mirror unit on the right side of the copier.
Open the front cabinet and remove one fixing screw of the lens on the lower side of the operation panel.



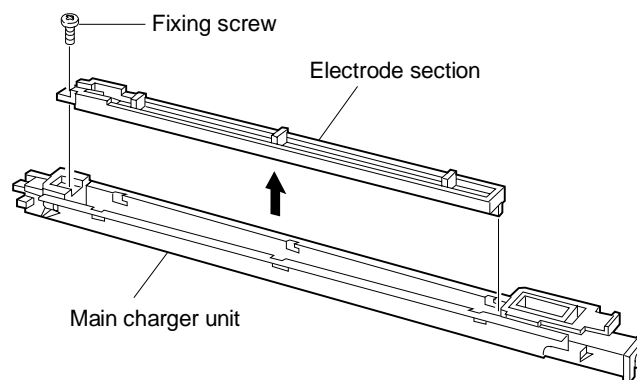
4. Charger cleaning

A. Main charger unit electrode cleaning

① Press the hook section of the main charger unit to release lock, and pull out and remove the main charger unit from the copier.

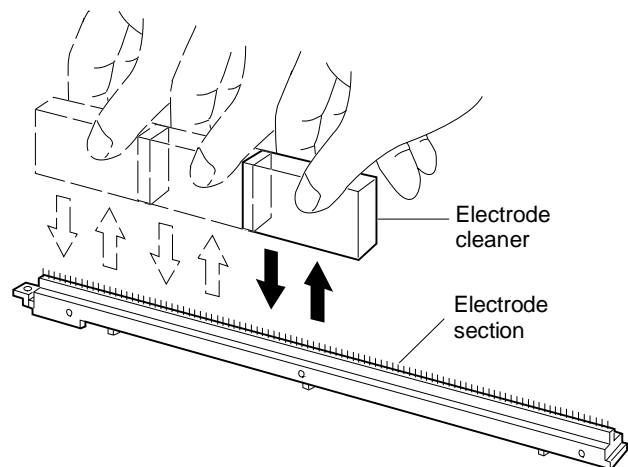


② Remove one fixing screw of the main charger unit (on the back side).

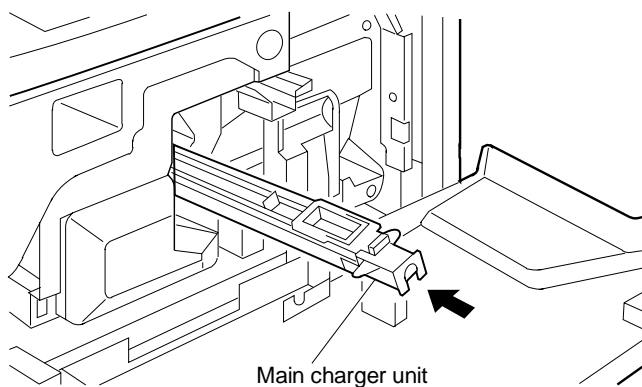


③ Press the electrode cleaner onto the tips of the electrode so that the tips are inserted into the cleaner a few times to clean.

[Note] Do not move the cleaner back and forth with the electrode tips inserted into it.



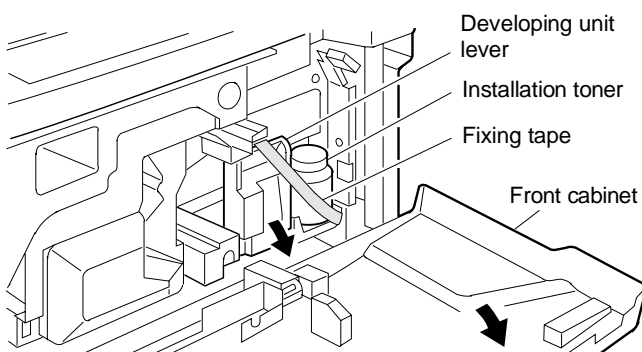
- ④ Return the electrode section to the original position and fix it with a screw.
- ⑤ Insert the main charger unit along the guide groove in the copier fully to the bottom.



5. Developing nit setting

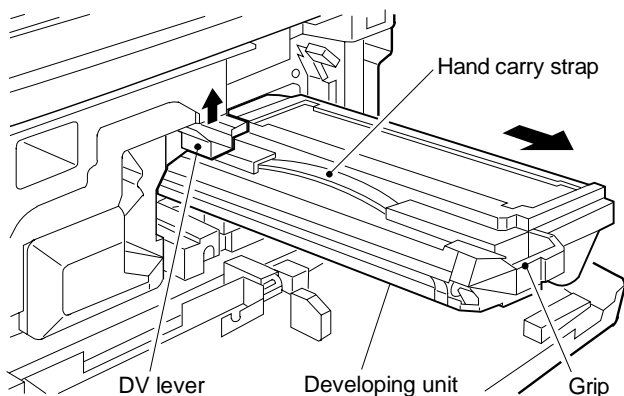
A. Developing unit setting

- ① Open the front cabinet, remove the installation toner fixed to the developing unit lever with tape, and pull the developing unit lever toward you.

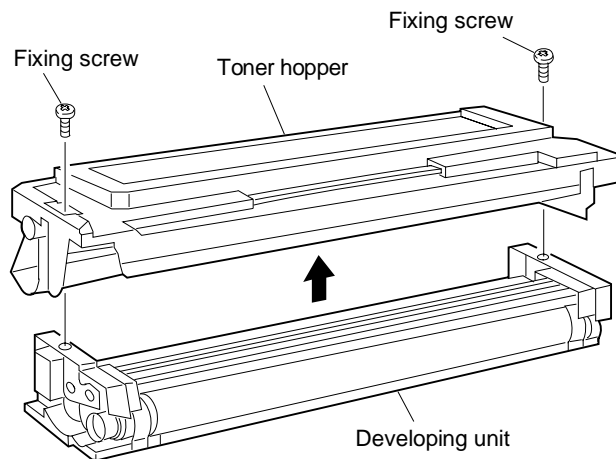


- ② Hold the grip of the developing unit, and slowly pull out the developing unit until it stops.

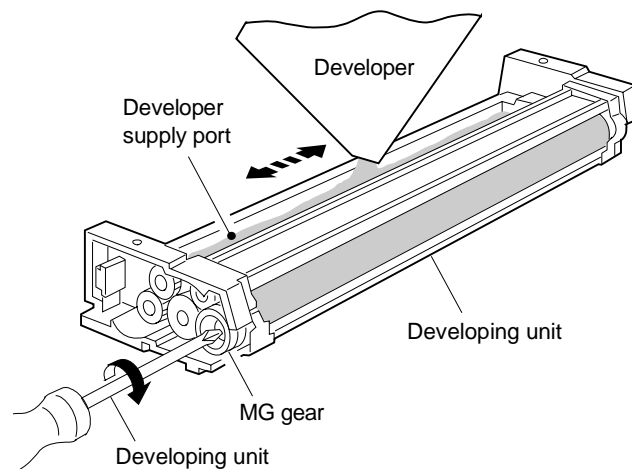
Then hold the hand carry strap and press the developing lever, and remove the developing unit.



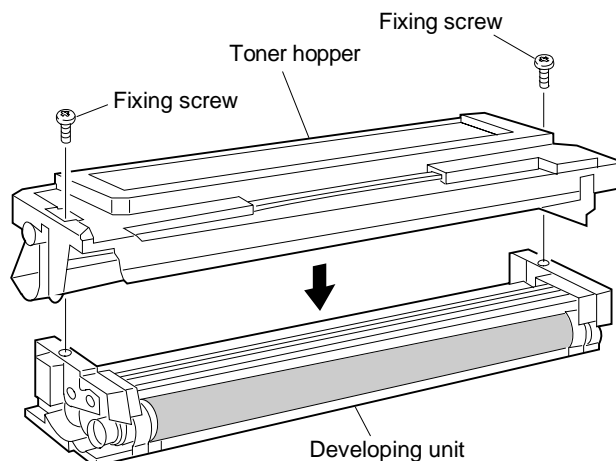
- ③ Remove three fixing screws of the toner hopper of the developing unit, and remove the toner hopper.



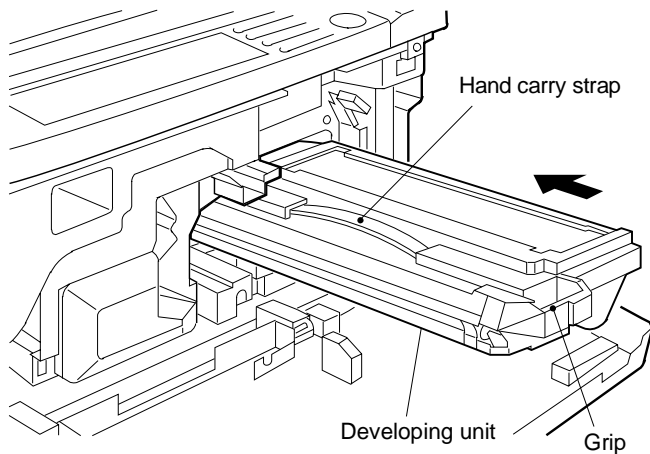
- ④ While supplying developer from the developer supply port of the developing unit, turn the MG gear clockwise with a screwdriver or a scale to supply fully in the developing unit.



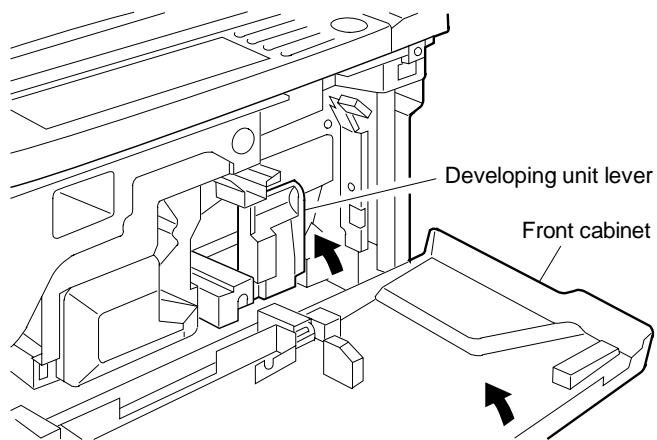
- ⑤ Install the toner hopper to the developing unit and fix it with two screws.



- ⑥ Hold the hand carry strap of the developing unit and insert it into the copier fully to the bottom.



- ⑦ Close the developing unit lever and close the front cabinet.



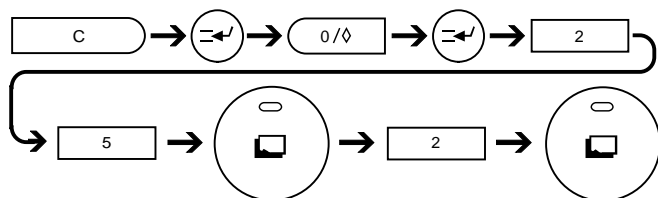
With the above procedure, setting of the developing unit is completed.

6. Toner density sensor level adjustment

Turn on the copier power switch.

A. Developing unit level adjustment

- ① Execute simulation 25.



- ② After 3 minutes, simulation 25 is completed.

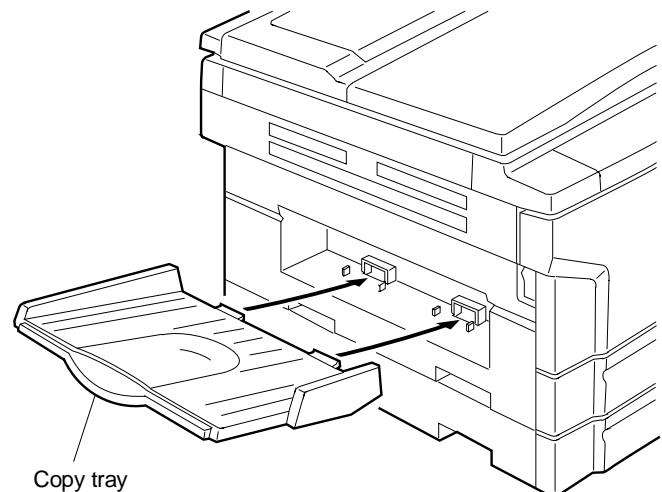
[Note] If the simulation is terminated halfway, automatic reading is not performed. Do not terminate it halfway.

- ③ Cancel simulation 25 with the **CA** key.

7. Accessory installation

A. Copy tray installation

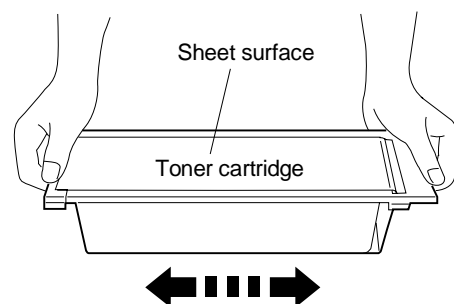
Install the copy tray to the paper exit section on the left side of the copier.



8. Toner supply

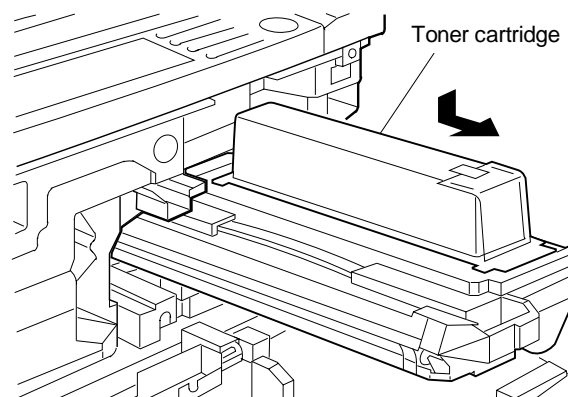
Toner cartridge toner supply

- ① With the sheet surface of the toner cartridge facing upward, shake the cartridge right and left several times.



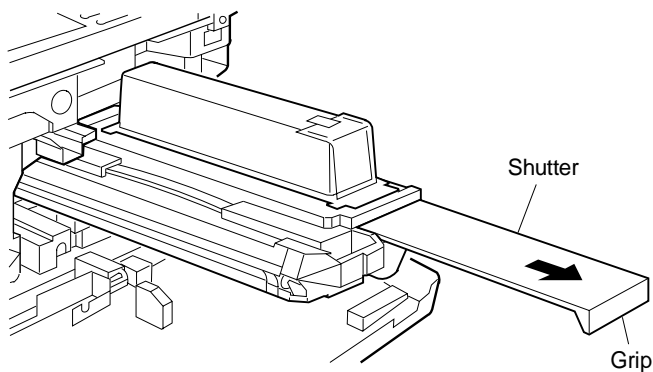
- ② Install the toner cartridge to the toner hopper of the developing unit, and slide it toward you until it clicks.

Be careful not to place toner one-sidedly in the toner cartridge.



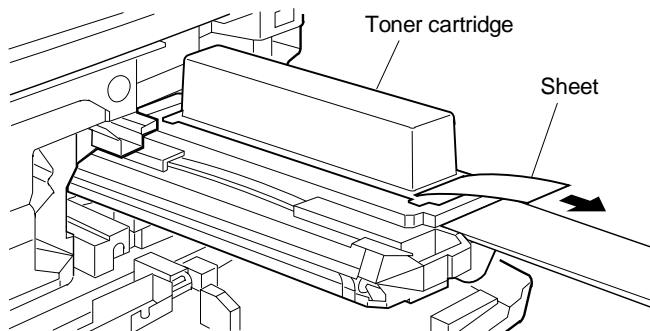
- ③ Hold the grip of the toner hopper shutter, and slowly pull out the shutter fully toward you.

If the shutter won't move, the procedure in ② may have not performed properly. In that case, slide the toner cartridge again toward you until it clicks.

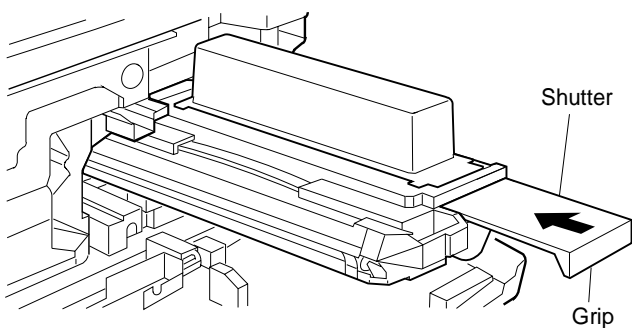


- ④ While pressing the toner cartridge securely, strongly pull the toner cartridge sheet toward you. This will supply toner into the toner hopper. The toner cartridge sheet must be removed completely.

Then tap the top of the toner cartridge several times to feed toner.

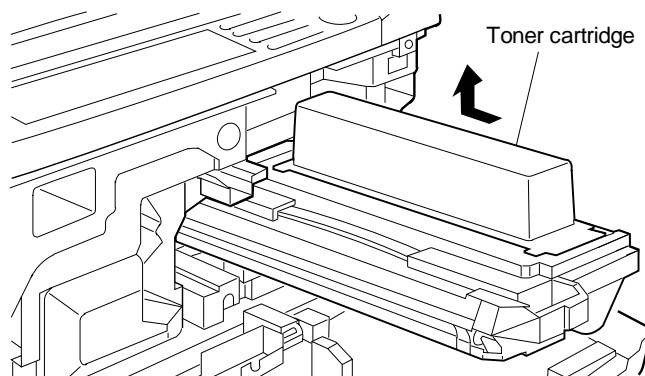


- ⑤ Hold the grip of the toner hopper shutter and slowly push the shutter completely to the bottom.

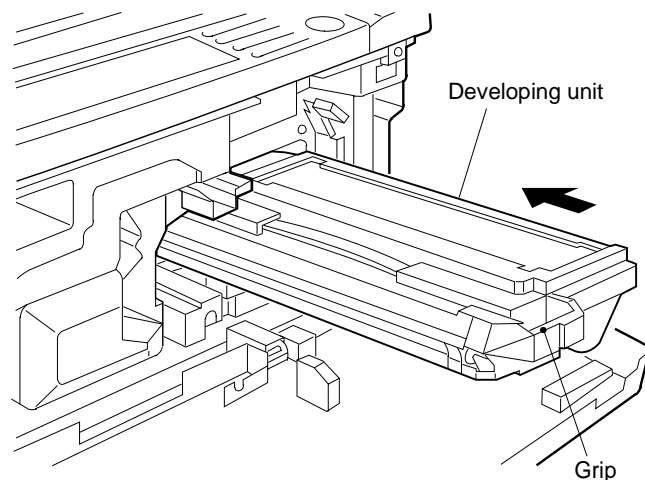


- ⑥ Slide the toner cartridge to the bottom and remove it slowly.

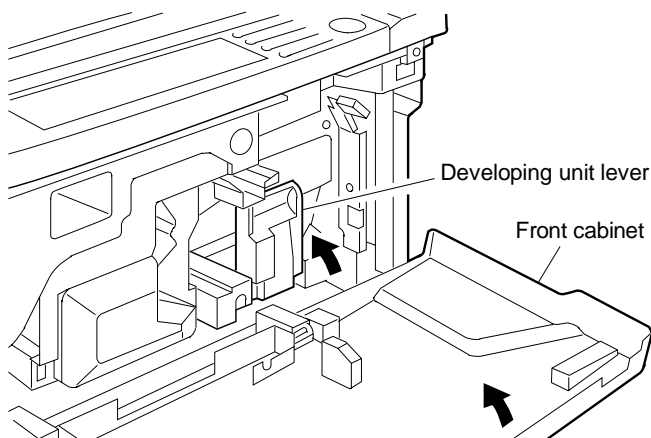
If the shutter have not been pushed completed in procedure ⑤, the toner cartridge cannot be slid. In that case, push the shutter completely and slide and remove the cartridge.



- ⑦ Hold the grip of the developing unit, and insert the developing unit slowly to the bottom.



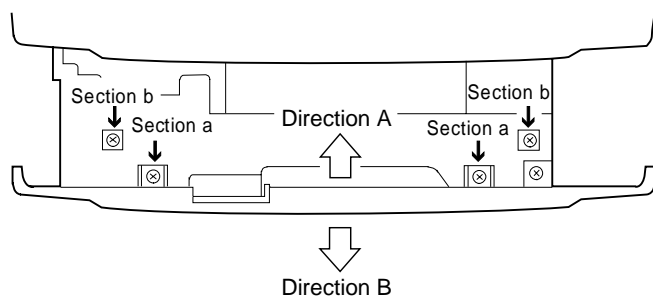
- ⑧ Close the developing unit lever, and close the front cabinet.



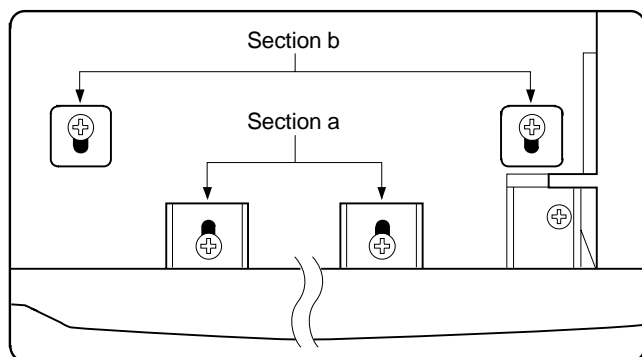
9. Center shift adjustment

There is basically no need to perform the center shift adjustment because it is made when shipping. If the center should be shifted, adjust in the following procedures.

Make a copy. If the center is shifted as shown in Fig. 1 or Fig. 2, loosen the four screws which are fixing the cassette grip cabinet.

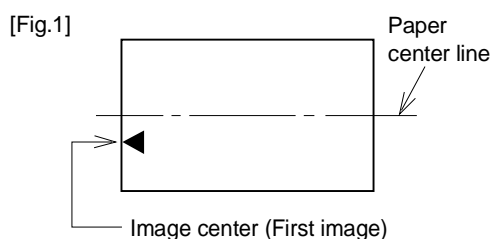


[Note] When fixing the cassette cabinet, the fixing screws and the cabinet clearance a and b are in symmetry.



(1) Fig. 1

Move the cassette grip cabinet in direction A, tighten two fixing screws (a) and two fixing screws (b) in this sequence. Make a copy again and check the center.



(2) Fig. 2

Move the cassette grip cabinet in direction B, tighten two fixing screws (a) and two fixing screws (b) in this sequence. Make a copy again and check the center.

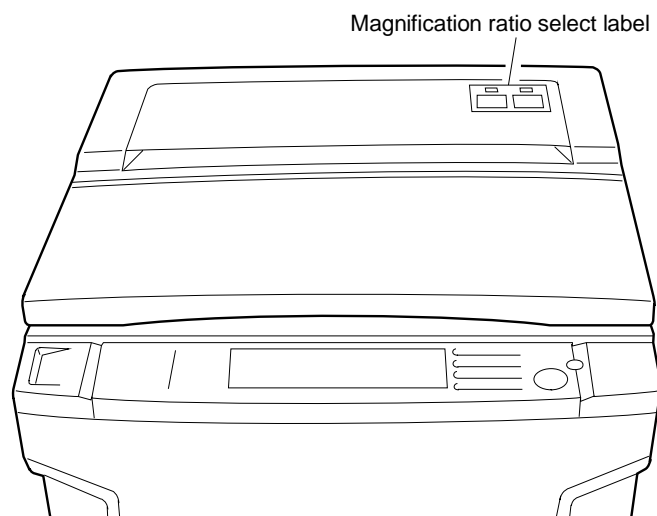


10. Label attachment

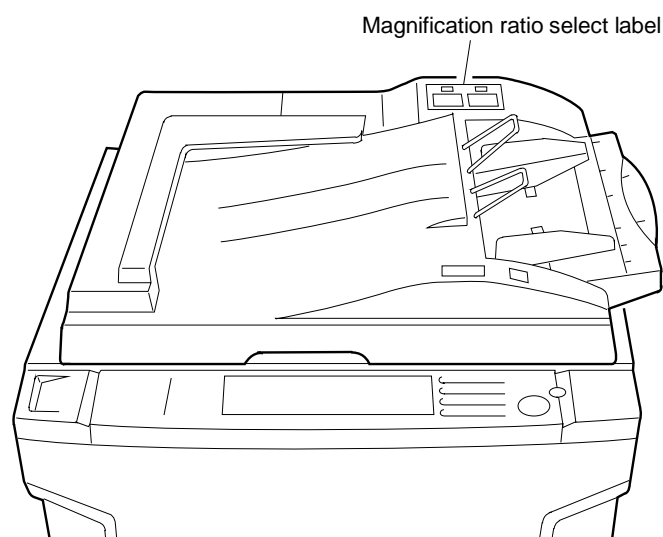
A. Label attachment

Attach the magnification select label packed together with the Operation Manual to the position shown in the figure below.

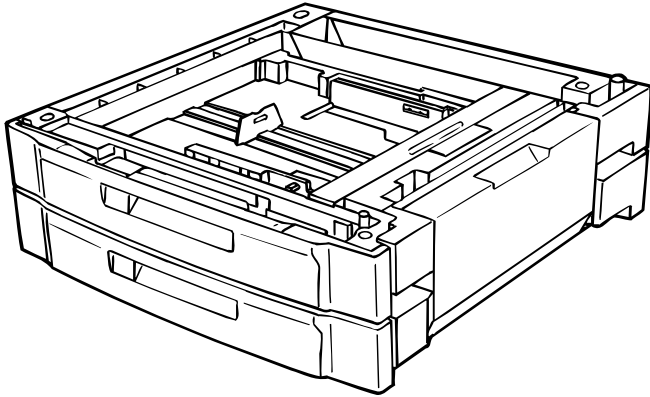
- When attaching the label to the copier with the original cover.



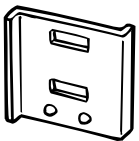
- When attaching the label to automatic original feeder (SF-A15)



11. Optional two-stage paper feed unit (SF-CM15) installation



Parts packed together



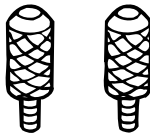
Connection adjustment plate
x 1 pc.



Connection screw A
x 2 pcs.



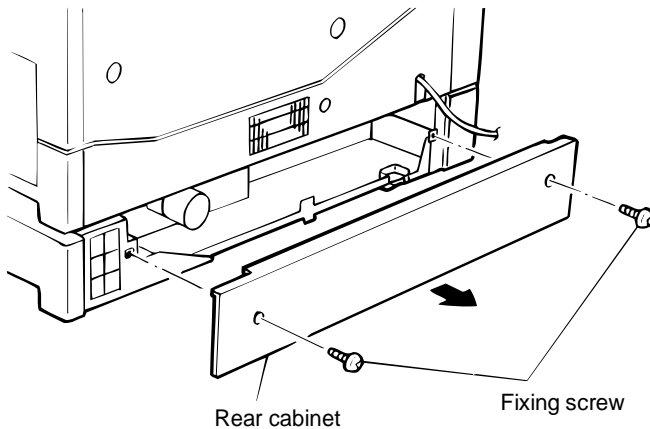
Connection screw B
x 1 pc.



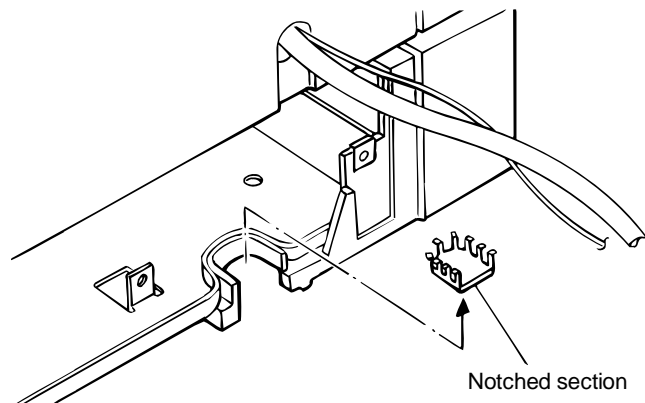
Connection screw C
x 2 pcs.

Disconnect the power plug of the copier and perform the following procedures.

- ① Remove two screws which are fixing the rear cabinet on the lower stage of the copier, and remove the rear cabinet.

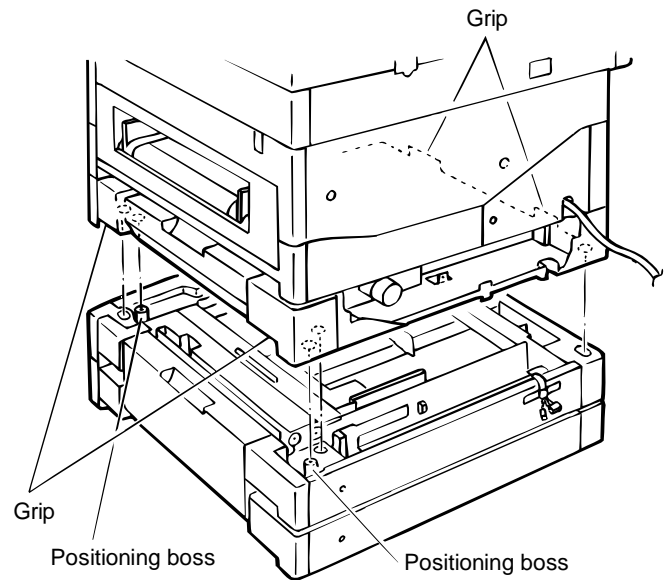


- ② Remove the notched section of the lower stage of the copier.

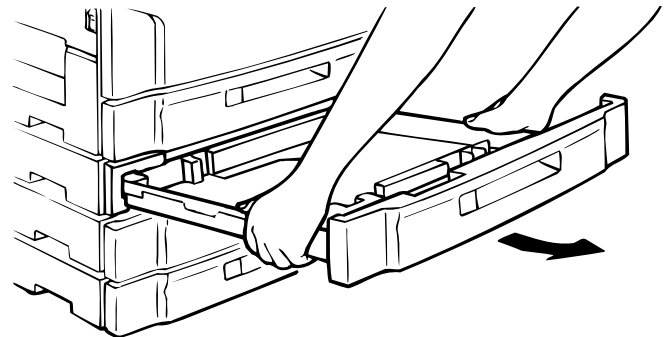


- ③ The following procedure must be performed by two persons.

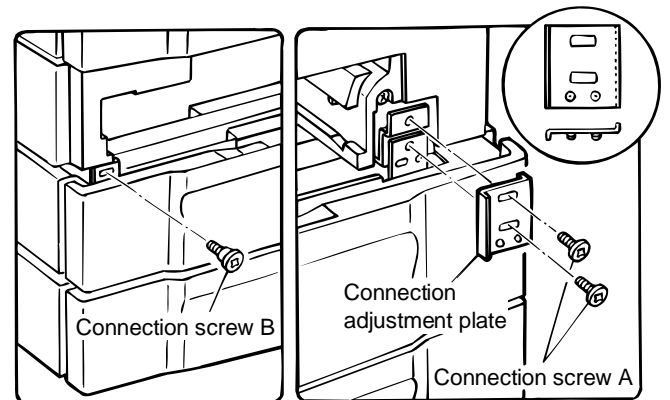
Hold the grips of the copier, and insert the positioning bosses (2 positions) of the two-stage paper feed unit into the positioning holes (2 positions) on the bottom of the copier. Then put the four legs of the copier on the two-stage paper feed unit.



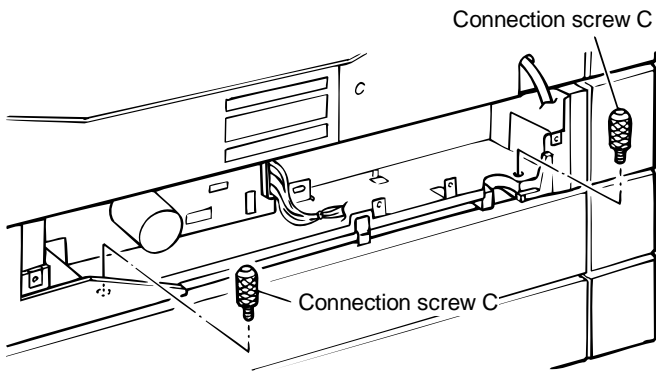
- ④ While lifting the lower stage tray slightly, pull it out until it stops. Then hold the both sides of the tray and lift and remove it.



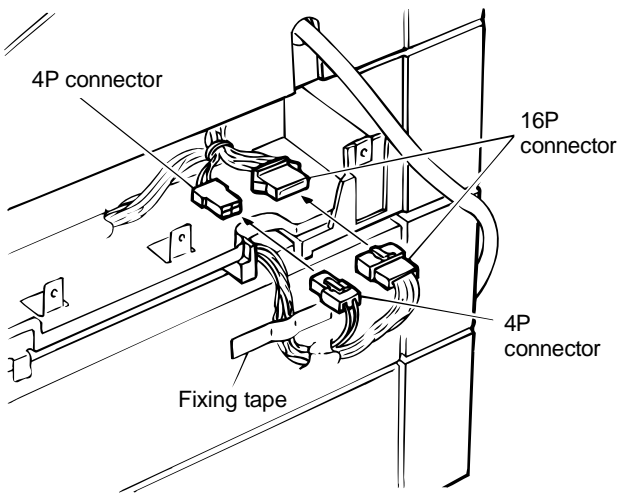
- ⑤ Attach the connection adjustment plate as shown in the figure and fix it with two screws A. Then fix the left side with screw B. Install the paper tray which was removed in procedure 4 to the copier.



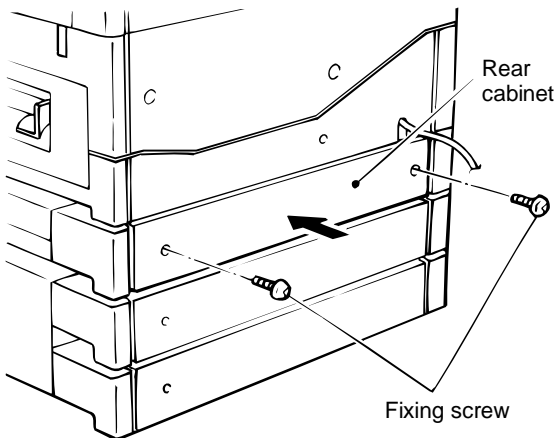
Connect the rear side of the copier with two connection screws C.



- ⑥ Remove the connector which is fixed to the rear cabinet of the two-stage paper feed unit with tape. Connect the 4P connector and 10P connector with the 4P connector and 16P connector of the copier.

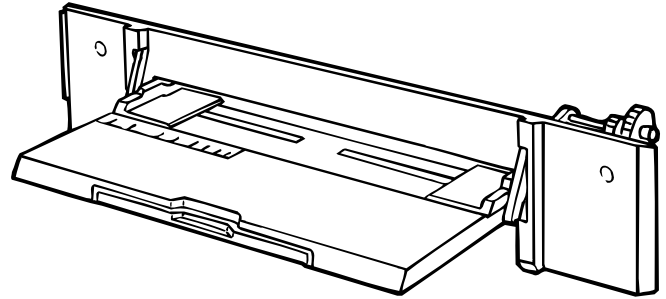


- ⑦ Install the rear cabinet which was removed in procedure 1 to the original position, and fix it with two screws.



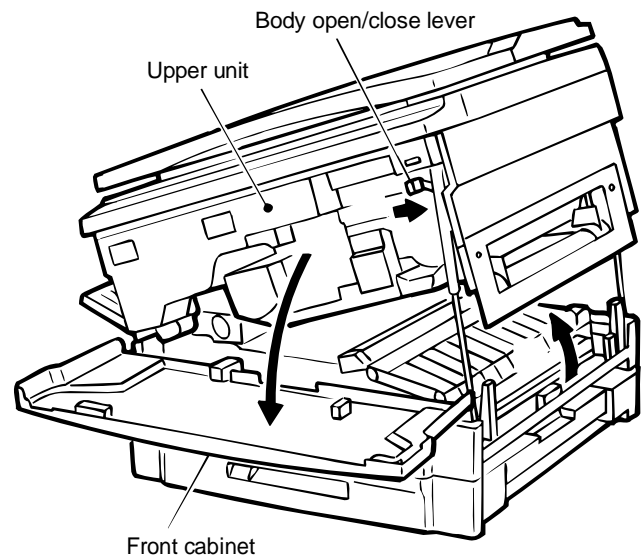
- ⑧ Adjust according to "9. Center shift adjustment" in [4] UNPACKING AND INSTALLATION.

12. Optional multi paper feed unit (SF0MF15) installation

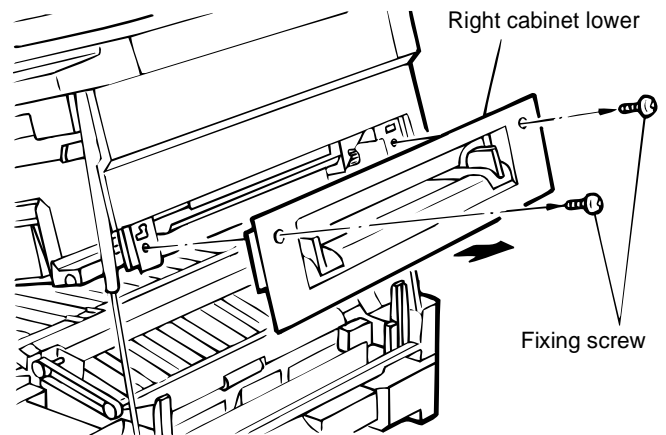


Disconnect the power plug of the copier and perform the following procedures.

- ① Open the front cabinet of the copier and lift the upper unit slowly with the open/close lever.

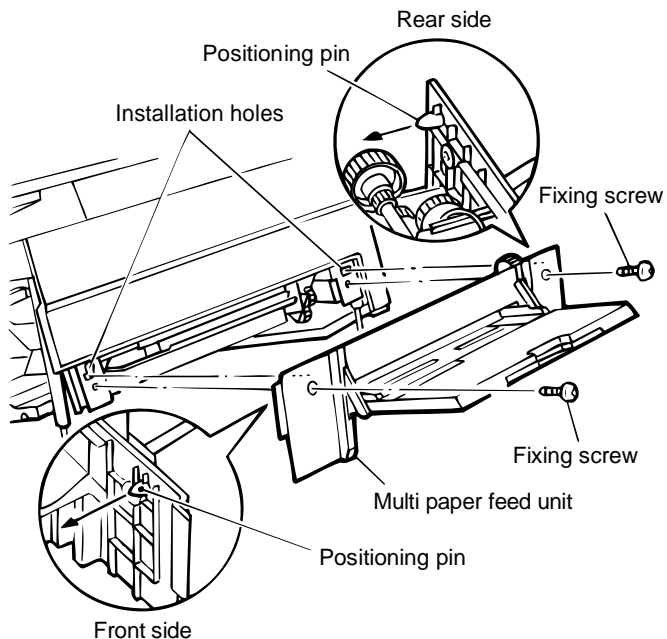


- ② Remove two fixing screws of the right cabinet, and remove the right cabinet. The two removed screws are used for installation of the multi paper feed unit to the copier.



* Keep the right cabinet, which is required when the multi paper feed unit is removed.

- ③ Insert the positioning pins of the multi paper feed unit into the installation holes of the copier.
At that time, first insert the rear pins, then insert the front pins.
(Check that the multi paper feed unit connecting pins are properly connected.)
Then fix the multi paper feed unit with the two screws which were removed in procedure (2).



- ④ With the above procedure, the multi paper feed unit installation is completed.
* Close the upper unit slowly and close the front cabinet. The multi paper feed unit mode is automatically set.

13. Tray paper size selection (Explained with the SF-2118.)

Either of the upper and lower trays allows setting of the paper size as shown in the figure. To select the desired size, follow the procedures below.

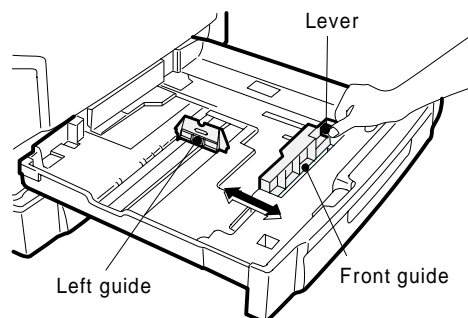
(A5 size is handled as the special size. The factory setting is A3: 11" × 17" size.)

1. Fit partitioning plates A and B in the tray to the vertical and horizontal sizes according to the paper size.

Fit the plates to the scales of the paper size.

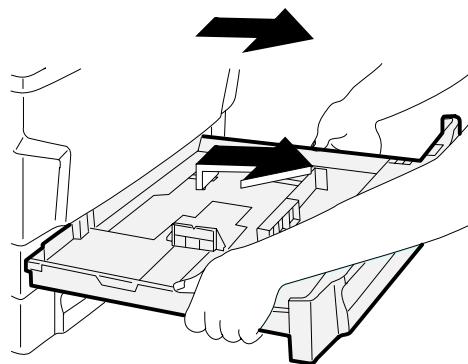
Partitioning plate A is of slide type. Hold the fixing knob and slide partitioning plate A to the scale.

Partitioning plate B is of insertion type. Remove it and insert to the scale position.



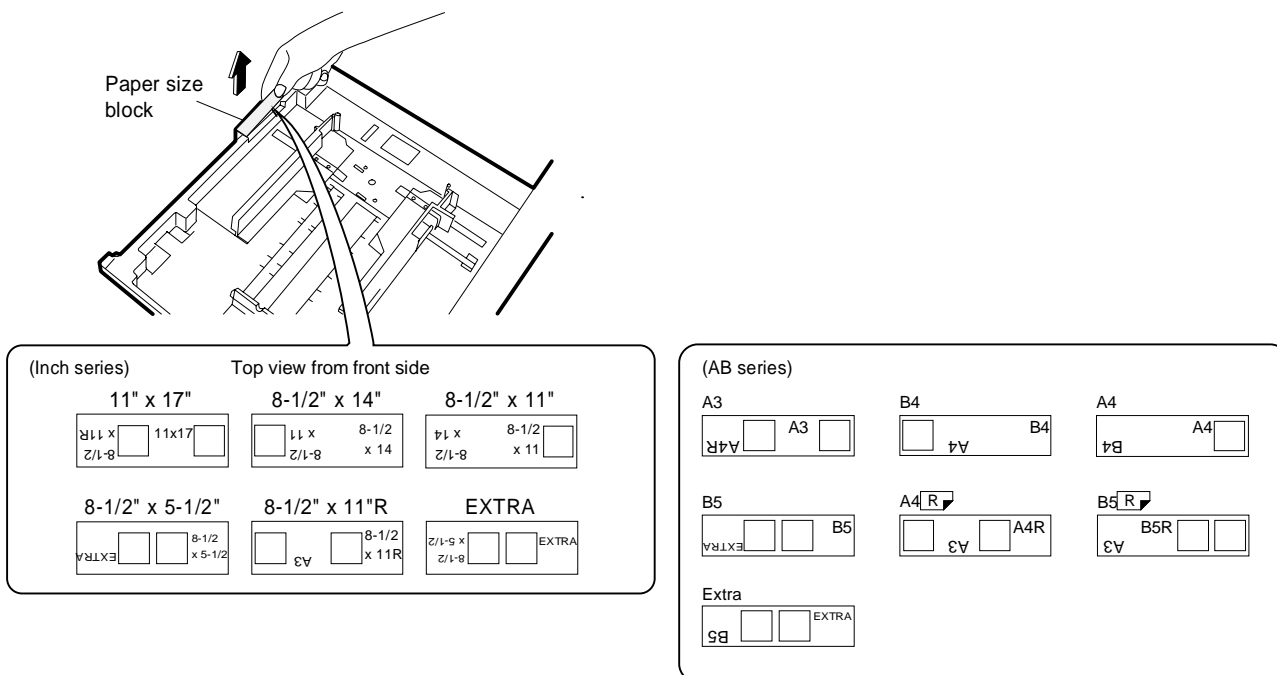
2. Remove the tray.

Pull out the tray fully toward you, and tilt it upward to remove.



3. Remove the size block upward, and attach it to the selected size.

Attach the size block according to the selected size as shown below:

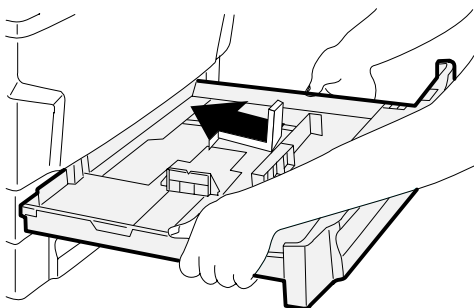


(Note)

- When the tray paper size is changed, be sure to adjust the size block. If not, the paper size display remains unchanged. (The previous size is displayed.)

4. Attach the tray.

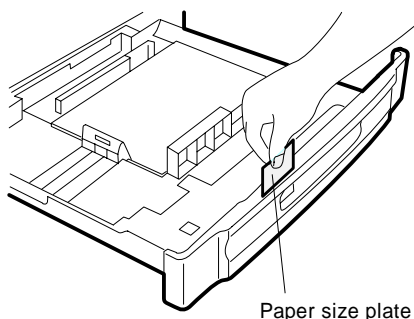
Reverse the removing procedure. That is, tilt the tray upward and insert into the body. Then push it in horizontally.



5. Set the papers on the tray, and select the display of the paper size display slit.

Remove the paper size display plate, and insert it according to the selected paper size so that the paper size indication can be seen from the display slit.

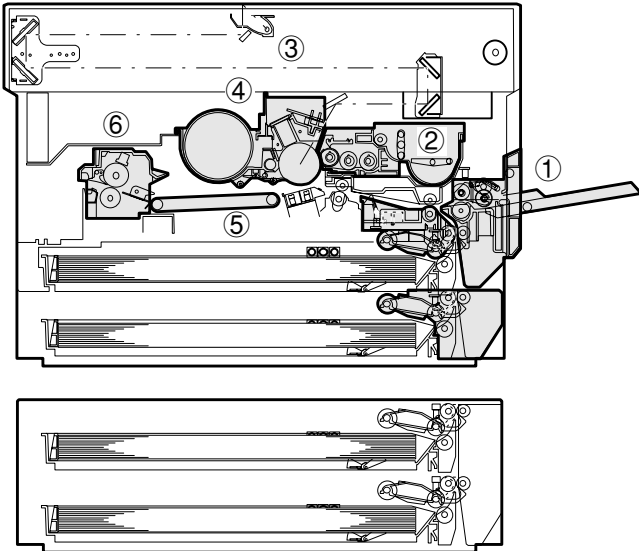
When A5 size is selected, display "Special."



[5] DESCRIPTIONS OF EACH SECTION

Descriptions are made on the following sections:

- ① Paper feed section
- ② Developing section
- ③ Optical section
- ④ Process section
- ⑤ Separation/transport section
- ⑥ Fusing/paper exit section
- ⑦ High voltage section



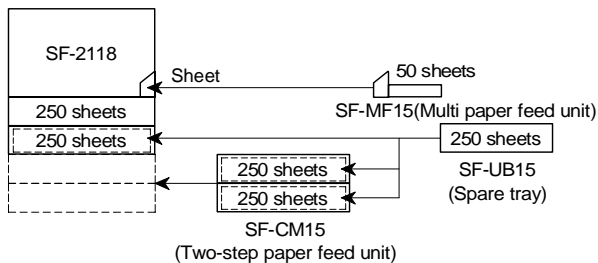
1. Paper feed section

1) General descriptions

To realize the compact design, the front loading system and the foldable multi paper feed unit (option) are employed.

Use of the optional two-stage paper feed unit and the spare tray allows a variety of system configurations.

(System configuration) Example with the SF-2118:



In the case of SF-2118:

The SF-2118 is provided with the three-way paper feed system. The tray is of the universal type and has capacity of 250 sheets. The front loading system allows the tray to be loaded from the lower side of the front cabinet.

(The SF-2116 has the two-way paper feed system with one 250-sheet tray and manual feed.)

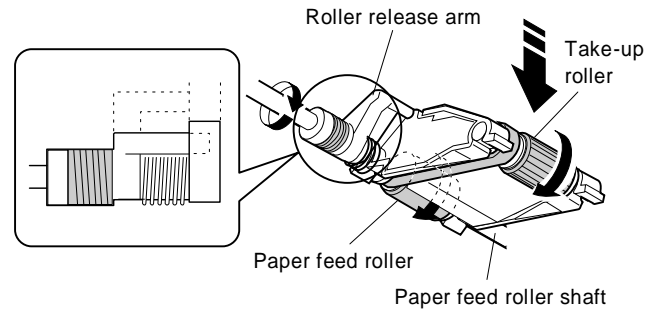
Manual paper feed is in the single mode. The multi paper feed unit (SF-MF15) is an option.

The tray has the capacity of 500 sheets (250 sheets for the SF-2116). In addition to that, the optional paper feed unit allows loading of 500 sheets more.

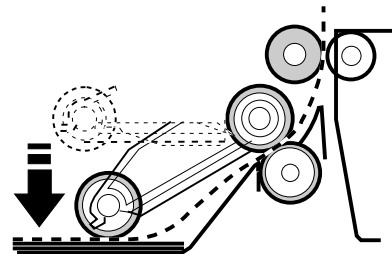
2) Basic operations

(Tray paper feed operation)

When the CPFC (Cassette paper feed clutch) turn on, the paper feed roller shaft, the paper feed roller, and the take-up roller rotate in the direction of A. At the same time, the limiter spring moves down the roller release arm. As a result, the take-up roller falls by its own weight onto the paper surface, starting paper feed.



When the CPFC turns off, rotation stops and the take-up roller is pushed up to the original position by the roller release arm spring.



(Single manual paper feed operation)

There is no special mechanism for manual paper feed other than the manual feed paper sensing actuator and the paper guide.

(Multi manual paper feed operation)

When the MPFS (multi paper feed solenoid) turns on, the spring clutch rotates to press the take-up roller on the paper, feeding the paper.

2. Developing section

1) General descriptions

(1) Two-component developer

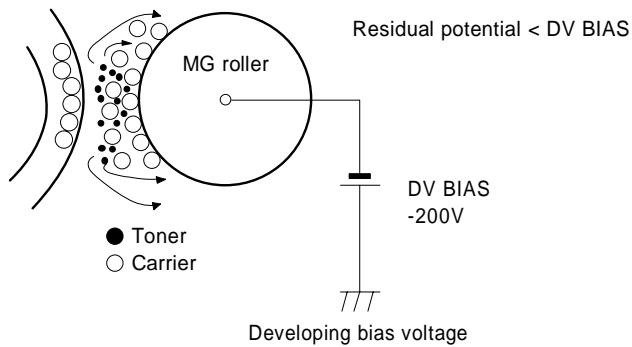
The developer is composed of toner and carrier.
Carrier serves as a medium for attaching toner onto the electrostatic image on the photoconductor drum.
By stirring toner and carrier, they are rubbed to be charged positive (+) and negative (-) respectively.
Since developer will deteriorate to degrade copy quality, it should be replaced regularly.

(2) Two-component magnetic brush development

The rotatable non-magnetic sleeve is provided over the magnet roller and is rotated.
Carrier forms a magnetic brush on the sleeve surface by magnetic force to attach toner onto the electrostatic image on the photoconductor drum.

(3) Developing bias

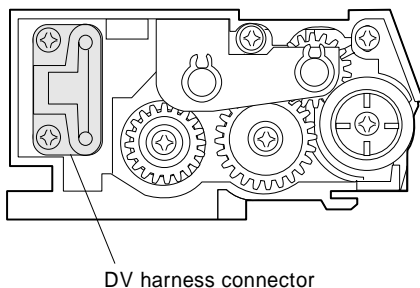
When the photoconductor is charged and exposed to light (exposure), the surface potential (voltage) of the photoconductor will not be lost completely. (The residual potential remains.)
Toner is attracted to the photoconductor by this residual potential, dirtying the photoconductor. As a result, a dirty copy of white background is generated.
To prevent against this, a voltage of the same polarity and higher than the residual potential is applied to the MG roller, preventing toner from being attached to the photoconductor surface.



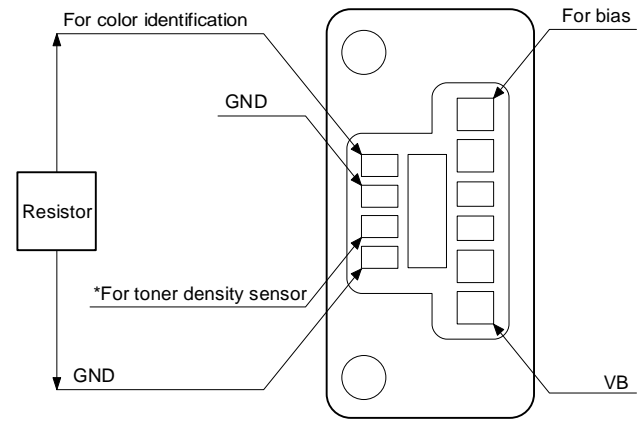
(4) DV harness

The toner density sensor, the developing bias, and the developing unit identification resistance harness.
(For details, refer to [6] DISASSEMBLY AND ASSEMBLY.)

(Viewed from the rear of developing unit)

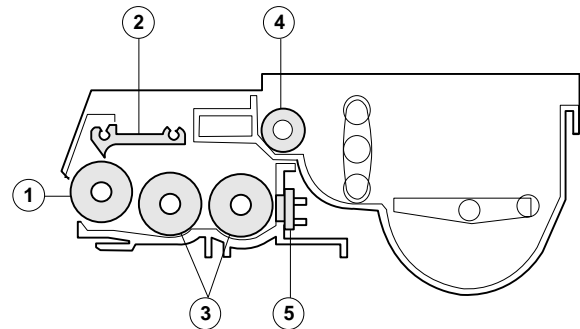


(Details of DV harness connector)



*Resistance value is identified by color

2) Basic composition

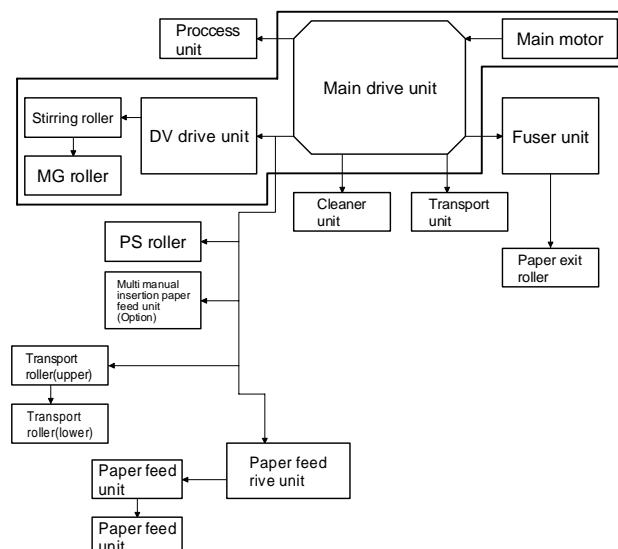


No.	Name	
①	Magnet roller	Forms a magnetic brush of carrier by magnetic force.
②	Developing doctor blade	Limits the height of the magnetic brush.
③	Developing MIX roller	Stirs carrier in the developing unit and distributes toner evenly.
④	Toner transport roller	Transport toner sent from the toner hopper unit to the stirring section.
⑤	Toner density sensor	Senses toner density in developer.

3) Basic operations

(Cassette paper feed)

When the CPFC (cassette paper feed clutch) is turned on, the paper feed roller shaft, the paper feed roller, and the take-up roller rotates in the direction of A, and the roller release arm is moved downward by the limiter spring. As a result, the take-up roller falls by its weight to reach the paper surface, feeding the paper. When the CPFC is turned off, the take-up roller is pushed up to the position by the roller release arm spring.

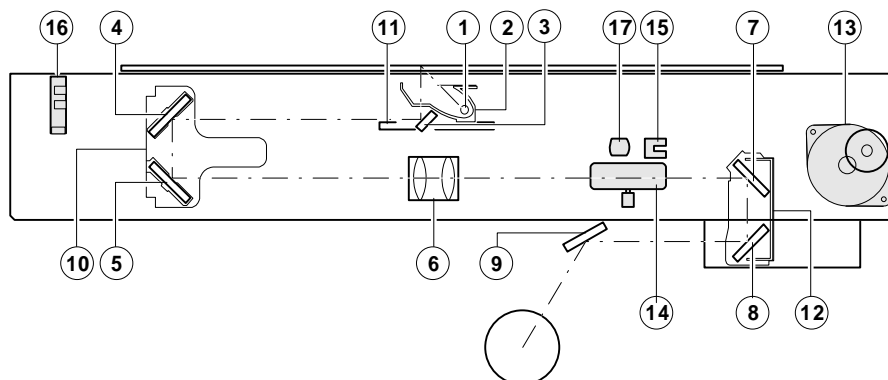


(3) Optical section

1. General description

- The optical section of this model is composed of the fixed focus lens and six mirrors. Since the fixed focus lens is used, No. 4/5 mirror base is shifted according to the shift of the lens to change the distance between the original and the drum (OID, Original Image Distance) in reduction or enlargement copy. The lens and No. 4/5 mirror unit are shifted by driving the stepping motor with the signals from the main control PWB, allowing zooming of 151 steps in 1% increment in the range of 0.50 to 2.00.

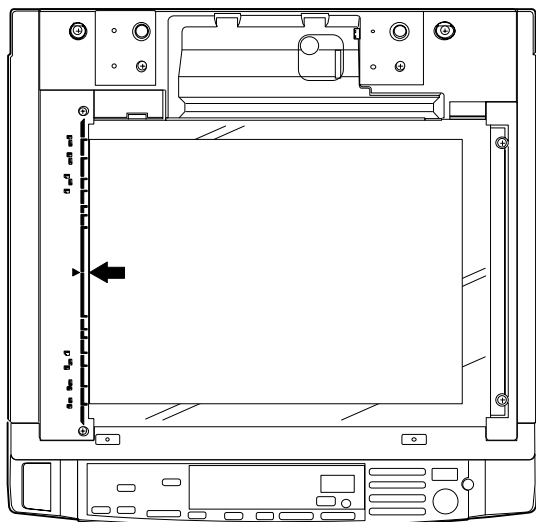
- Exposure is adjusted by changing the copy lamp voltage. The AE sensor is provided in the zoom base to sense the density of the original. The copy lamp light is reflected by the original to the AE sensor, which senses the density of the original and adjust the copy lamp light quantity according to the density.
- The exposure system is the slit exposure system by moving light source.



①	Copy lamp	②	Reflector	③	No. 1 mirror
④	No. 2 mirror	⑤	No. 3 mirror	⑥	Lens
⑦	No. 4 mirror	⑧	No. 5 mirror	⑨	No. 6 mirror
⑩	No. 2/3 mirror base unit	⑪	Copy lamp unit	⑫	No. 4/5 mirror base unit
⑬	Mirror motor	⑭	Lens/No. 4/5 mirror base drive motor	⑮	Lens home position sensor
⑯	Mirror home position sensor	⑰	Automatic exposure (AE) sensor/ Optical system dirt sensor		

(1) Original table

The original table is fixed. The original is set in the left center position.



(2) Copy lamp

100V series: 85V, 275W

200V series: 170V, 310W

(3) Mirror

This model uses six mirrors.

No. 1 mirror is attached to the copy lamp unit, No. 2/3 mirrors are attached to No. 2/3 mirror base, No. 4/5 mirrors are attached to No. 4/5 mirror base.

The copy lamp unit and the No. 2/3 mirror base unit are scanned in copying. The No. 4/5 mirror base is shifted in zoom copying to change the distance between the original and the drum.

(4) Lens (fixed focus lens)

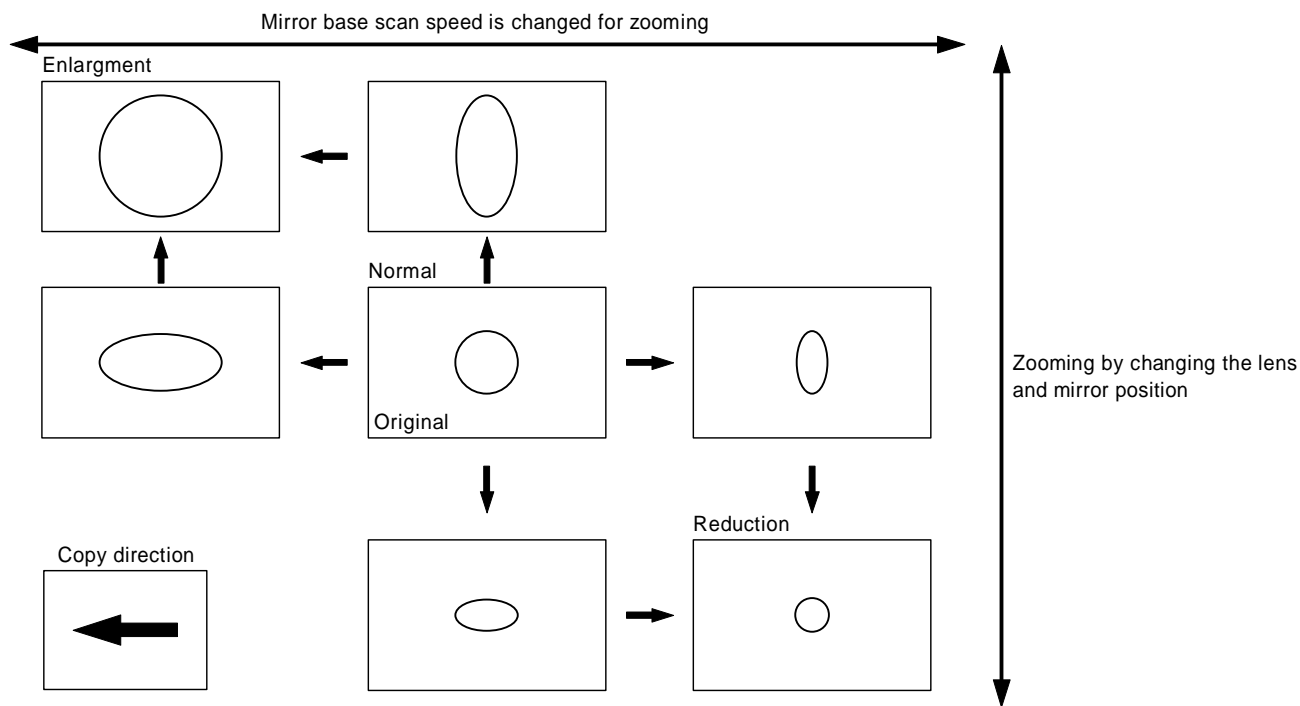
- Construction (1 group 3 lenses)
- Brightness (F8.5)
- Focus: (195mm $\pm 1\%$)

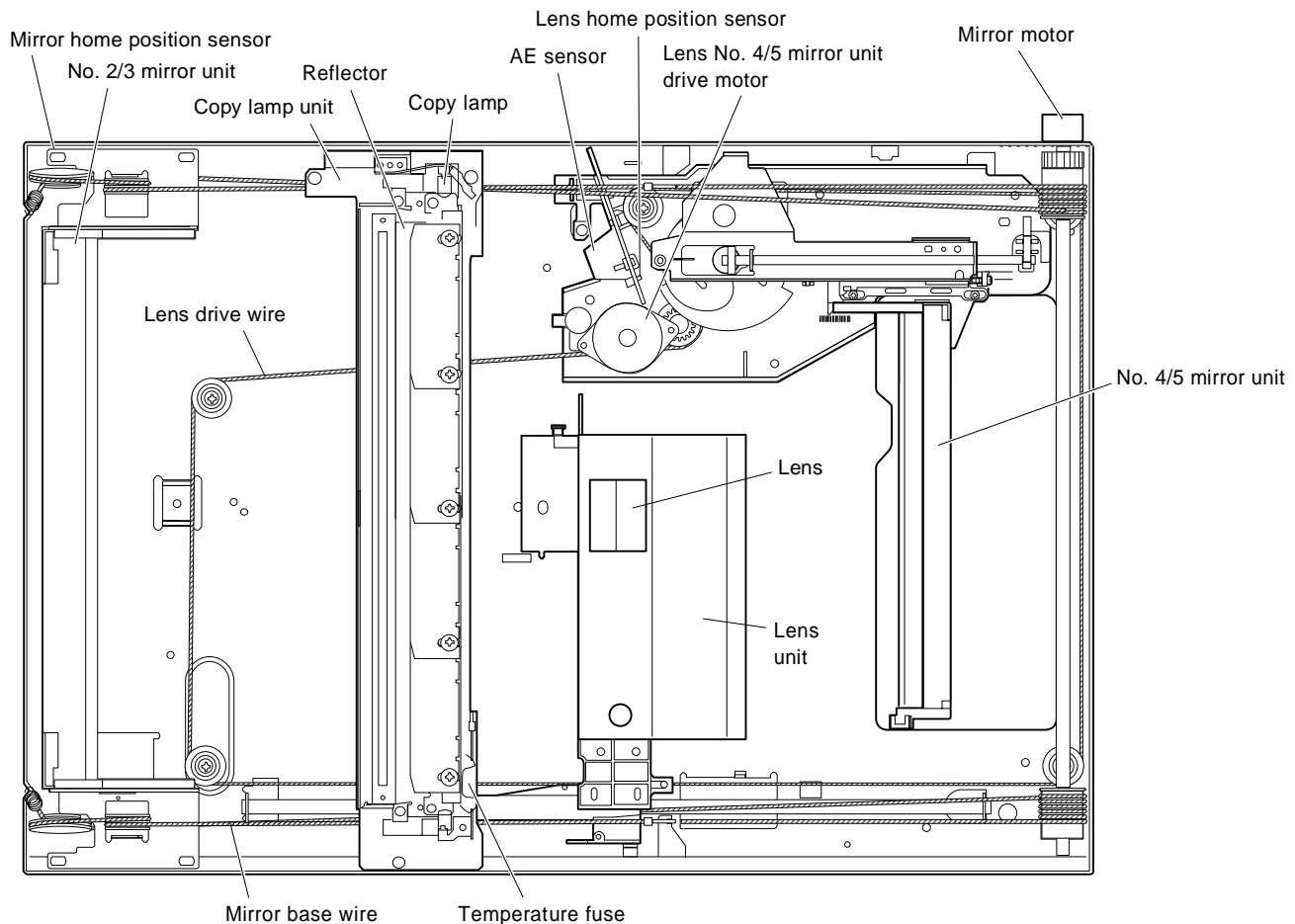
(5) Lens home position sensor (LHPS)

This sensor senses the lens home position. The output signal of this sensor is the basic signal to control the copy magnification ratio.

(6) Lens base

The lens is mounted to the lens base, which is shifted toward the paper feed direction in reduction copy or toward the paper exit direction in enlargement copy by the lens drive motor.





(7) Lens drive shaft

This shaft controls the optical axis of the lens in zoom copy. The lens follows along the slide base shaft.

(8) Lens drive wire

This is to shift the lens unit and the No. 4/5 mirror base.

(9) No. 4/5 mirror unit

No. 4/5 mirrors are attached to this unit. It is shifted by the lens drive motor to change the distance between the original and the drum according to the zooming ratio.

(10) Mirror motor

This stepping motor shifts the copy lamp unit and the No. 2/3 mirror base. It is rotated at the rpm according to each zooming ratio.

(11) Mirror home position sensor (MHPS)

This sensor senses the home position of the copy lamp unit. It is of light transmission type.

(12) No. 2/3 mirror unit

No. 2/3 mirrors are attached to this unit. It is scanned by the mirror motor.

(13) Copy lamp unit

This is composed of No. 1 mirror, the temperature fuse, the copy lamp, the exposure adjustment plate, and the reflector, and scanned by the mirror motor.

(14) Temperature fuse

This is attached closely to the reflector to prevent against abnormal temperature rise in the optical system. If the temperature rises abnormally, it turns off the copy lamp power directly.

100V series (117°C)

200V series (117°C)

(15) Reflector

Light from the copy lamp is reflected by the reflector to the original.

(16) Exposure adjustment plate

Four exposure adjustment plates are attached to the copy lamp unit to adjust exposure balance in back and forth direction of the frame.

(17) Mirror base drive wire

This wire transmits the mirror motor power to the copy lamp unit and the No. 2/3 mirror base to scan the mirror base.

(18) Lens drive motor

This stepping motor drives the lens and the No. 4/5 mirror base.

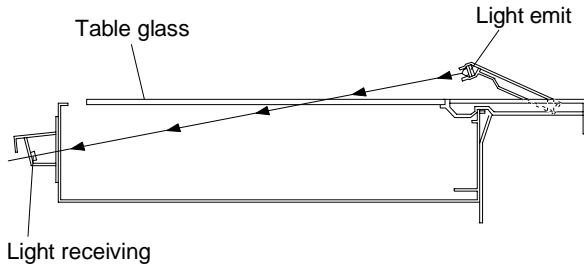
(19) AE sensor

This AE sensor senses the original density by the light emitted from the copy lamp and reflected by the original, controlling the developing bias. The photometric area is about 100mm width at the center and in the mirror base scanning direction.

The element is photo diodes.

(20) Original size sensing

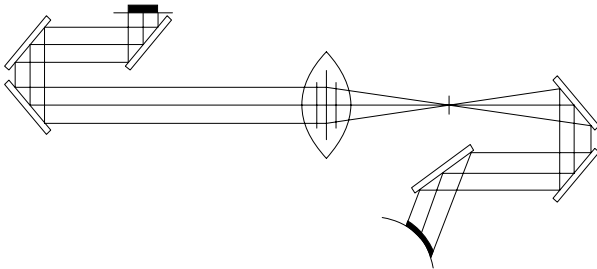
The original size is sensed by the original interruption system.
The LED in the rear frame side emits light to the table glass surface.
The original interrupts this light, and its size is detected.



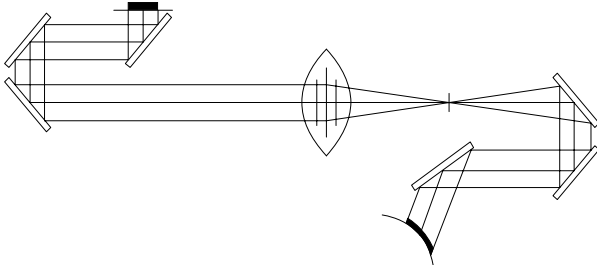
2. Basic operations

(Positions of the original, the lens, and the image in each magnification ratio)

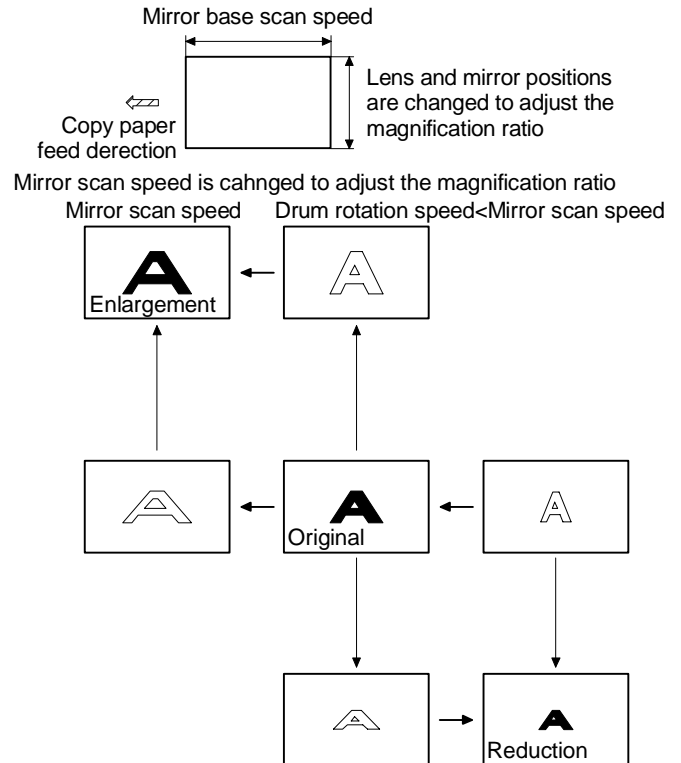
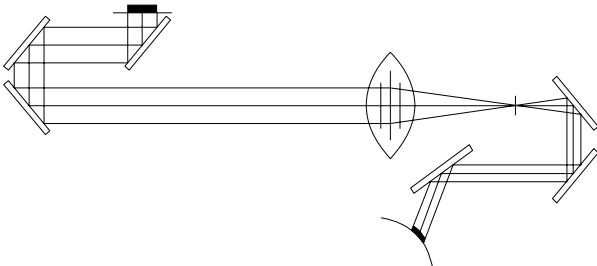
Normal: The distance between the original set on the table glass and the lens is equal to the distance between the lens and the drum, resulting in the equal size of the original and the image.



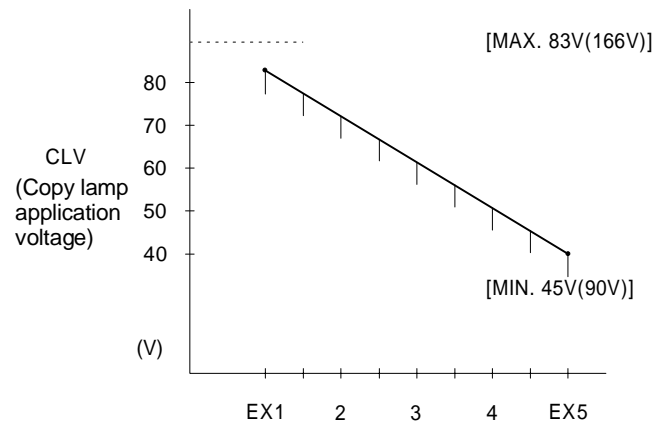
Enlargement: Compared to the normal copy, the lens is nearer to the original and the distance between the original and the lens is shorter.
The distance between the No. 4/5 mirror unit and the lens is greater, and the distance between the lens and the drum is also greater.
The distance between the original and the exposure surface of the drum is greater than that in the normal copy.



Reduction: Compared to the normal copy, the lens is nearer to the drum, and the distance between the original surface and the lens is longer.
The distance between the lens and the exposure surface of the drum is shorter.
The distance between the No. 4/5 mirror unit and the lens is greater.
The distance between the original and the exposure surface of the drum is greater than that in the normal copy.



(Copy lamp control in each copy density)



Execute Sim 46-01 to determine the copy lamp application voltage (CLV) in EX1 and EX5.

Then divide the difference between the voltages of EX1.0 and EX5.0 into nine.

The application voltage of the copy lamp in each exposure level is determined by varying the ON timer duty of the copy lamp ON control signal.

- Photo density copy mode

Make the same control procedures as the manual density copy mode.

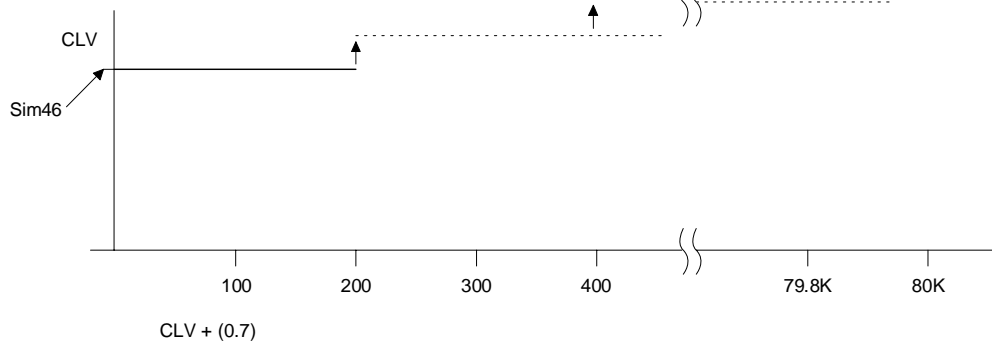
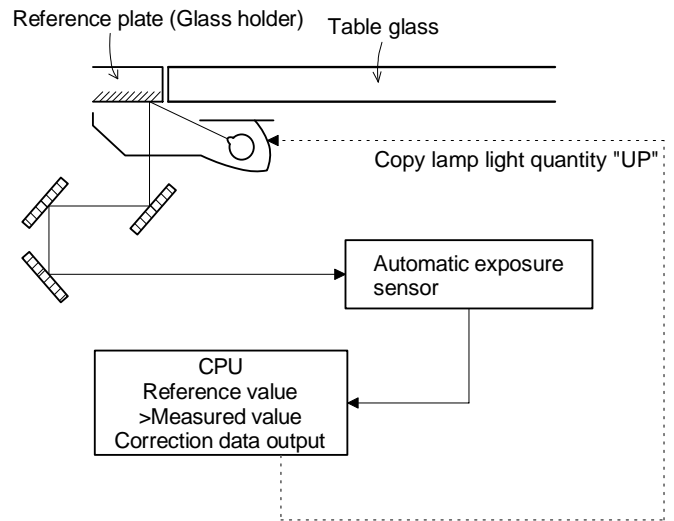
The image density is controlled by lowering the grid bias voltage of the charging charger. To maintain the reproduction quality in half tone, the ON time duty of the copy lamp ON signal is made shorter than in the manual density copy mode. (The application voltage is lower.)

(Optical system dirt correction)

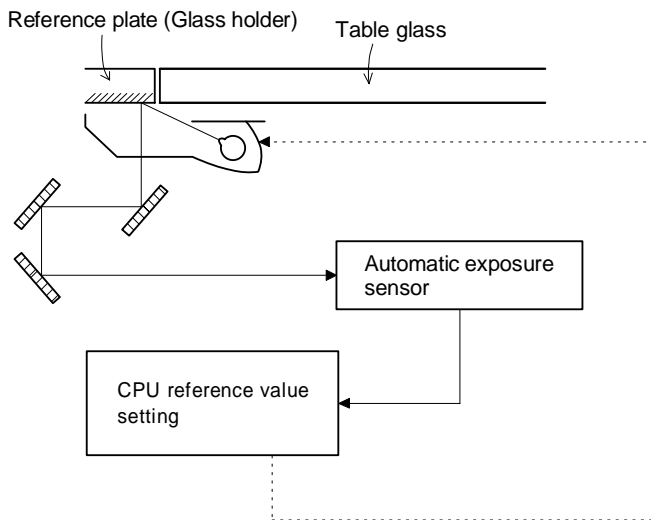
This model perform dirt correction by changing the copy lamp intensity according to the dirt degree in the optical system (the copy lamp unit, No. 1 mirror, No.2 mirror, No.3 mirror) to prevent against remarkable degrading of copy quality.

The reference value is the AE sensor output value which is obtained when the reference plate is exposed with the copy lamp voltage of 67.0V (134.0V) at power ON.

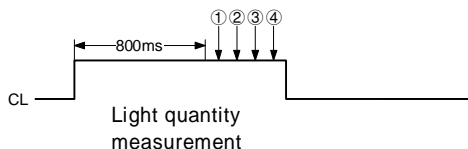
This value is checked with sim 44-08, 09.



(1) Setting the reference value for optical system correction.

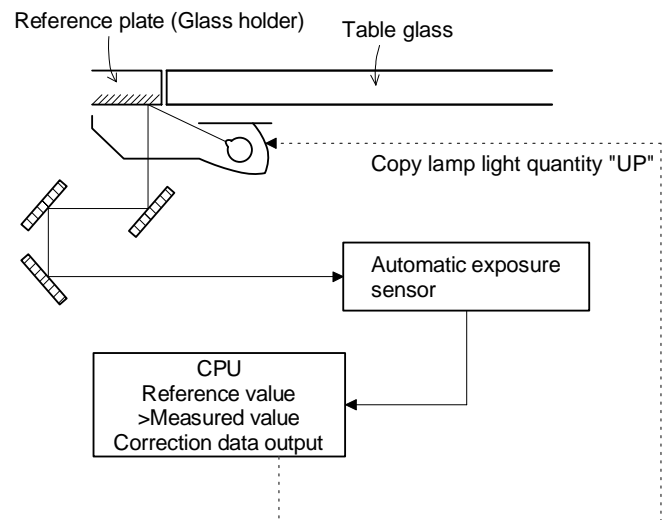


- ① Clean the optical system at every maintenance.
- ② Perform Simulation 46-1.
(The previous data are cleared.)
- ③ After completion of Simulation 46-1, when performing the first mirror initialization, measure light quantity of the copy lamp. Obtain the average value from the four measurement values and use the average value as the reference value for correction.



Obtain the average value of four AE sensor values, and store it.

(2) Dirt correction

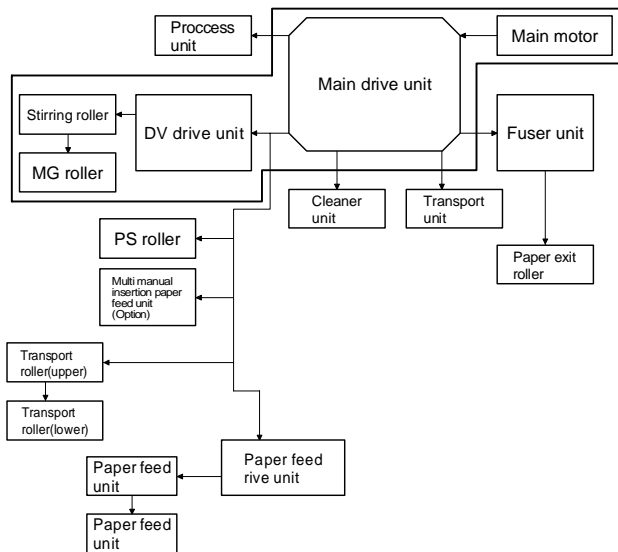


- ① Measure light quantity when performing mirror initialization.
- ② Store the correction data into memory.
- ③ Reset the register inside the CPU.

(4) Copy process

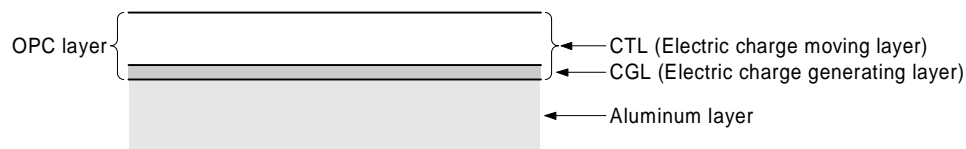
This model basic process and structure

- The Scorotron method is used to evenly charge the photoconductor surface to the given potential in the charge process. The corona wire regularly used is now replaced with a new corona charge mechanism that employs the 0.1mm thick stainless steel saw teeth plate, in order to suppress ozone generated when the oxide molecule in air is ionized.
- Considering the service efficiency, the process separation mechanism is adopted.
- To prevent high voltage leakage by the loose corona charge unit, a one-touch stopper mechanism is adopted.

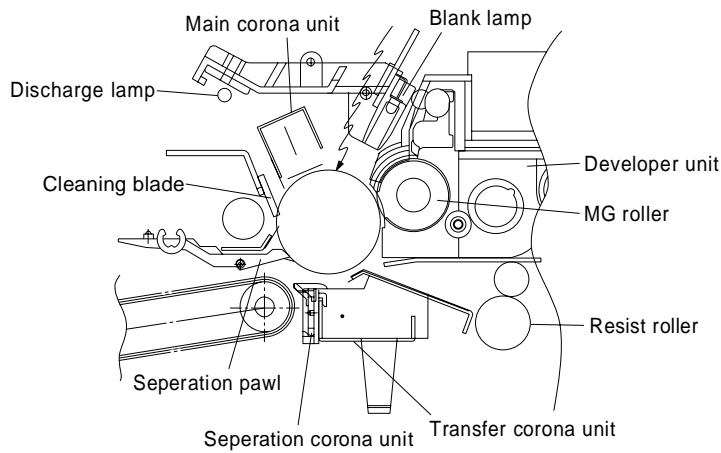
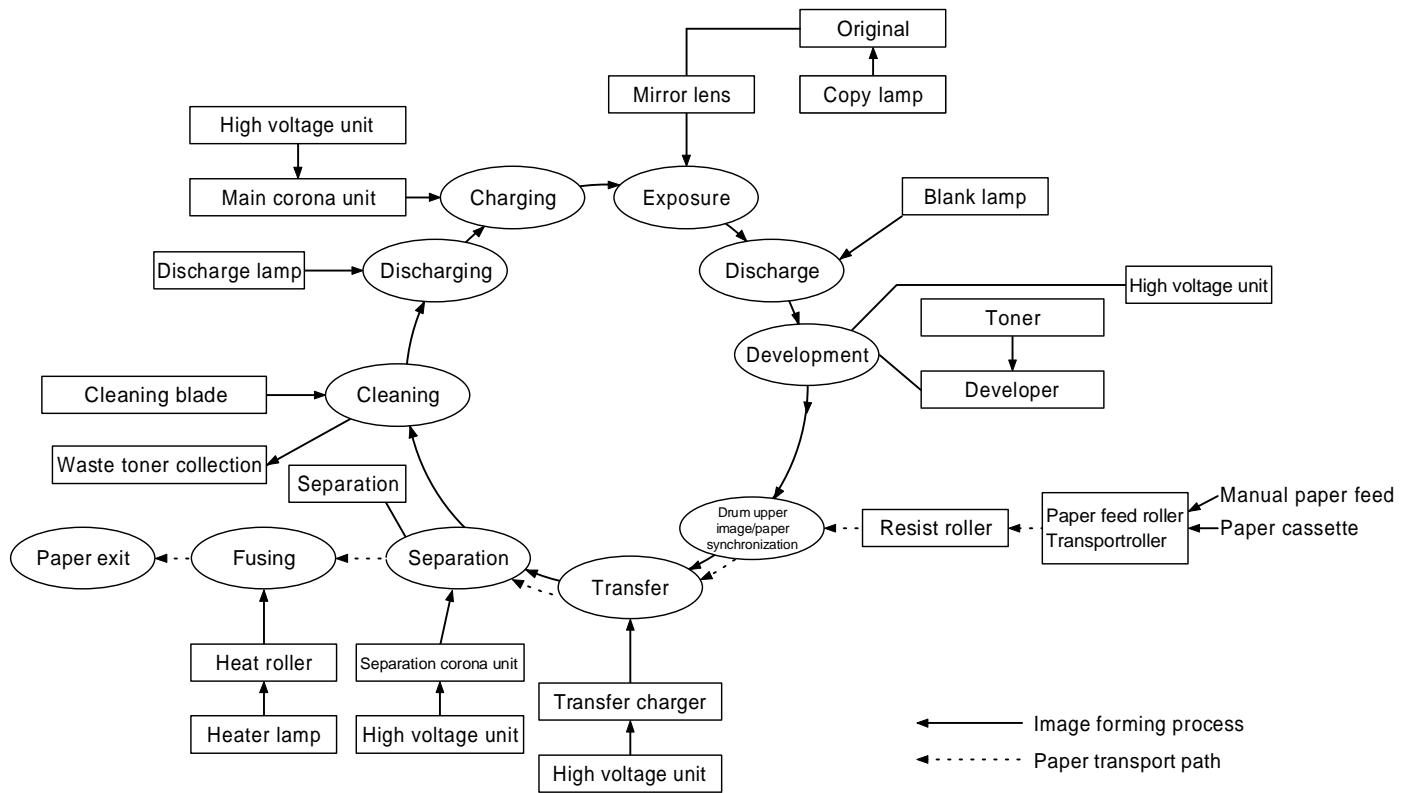


(1) Photoconductor

- This model uses OPC (organic photoconductor) as photoconductive material. (φ50 mm)



(2) Process diagram



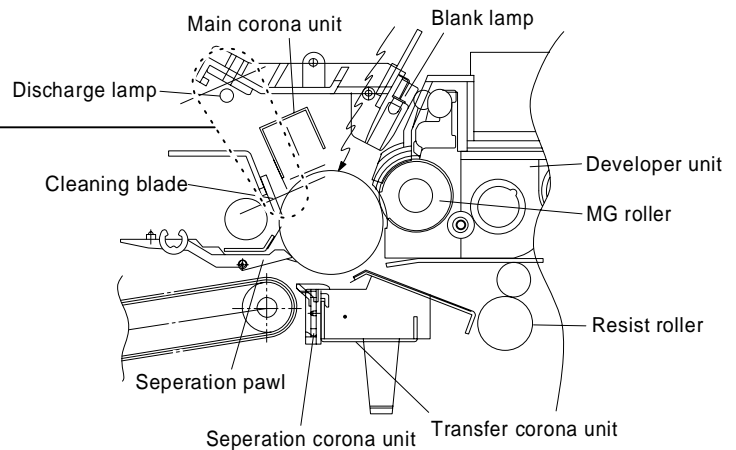
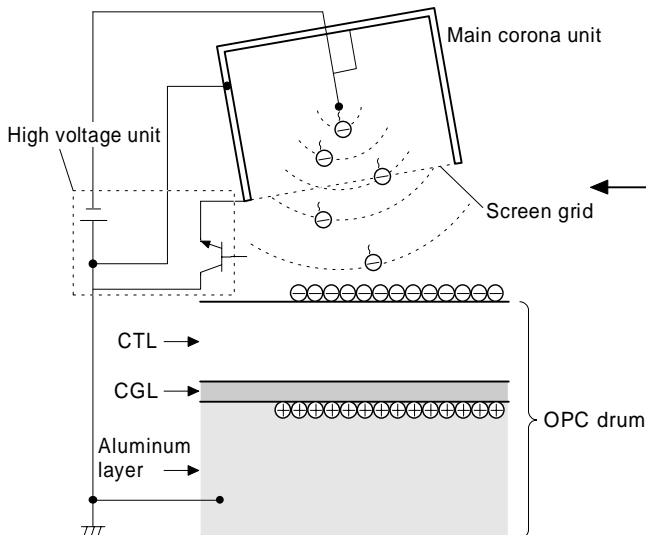
(1) Details of image forming process

Step 1 (Main Charging)

By negative discharging of the main charger, uniform negative charges are applied to the OPC drum surface.

The OPC drum surface potential is controlled by the screen grid voltage to maintain the grid voltage at a constant level.

- When the drum surface potential is lower than the grid voltage, electric charges generated by discharging of the charger go through the screen grid to charge the drum surface potential until it becomes equal to the grid voltage.
- When the drum surface potential virtually reaches the grid potential level, electric charges generated by discharging of the charger flows through the electrode of the screen grid to the high voltage unit grid voltage output circuit, thus always maintaining the drum surface potential at a level virtually equal to the grid voltage.
- The main corona unit employs the scorotron system to charge the photoconductor surface to a certain level uniformly. In addition, the conventional corona wire is replaced with the corona charging mechanism by saw-teeth plate (stainless steel plate of 0.1 mm thick). In corona discharge, oxygen molecules in the air are ionized to generate ozone (O_3). The mechanism restrict the generation of ozone.



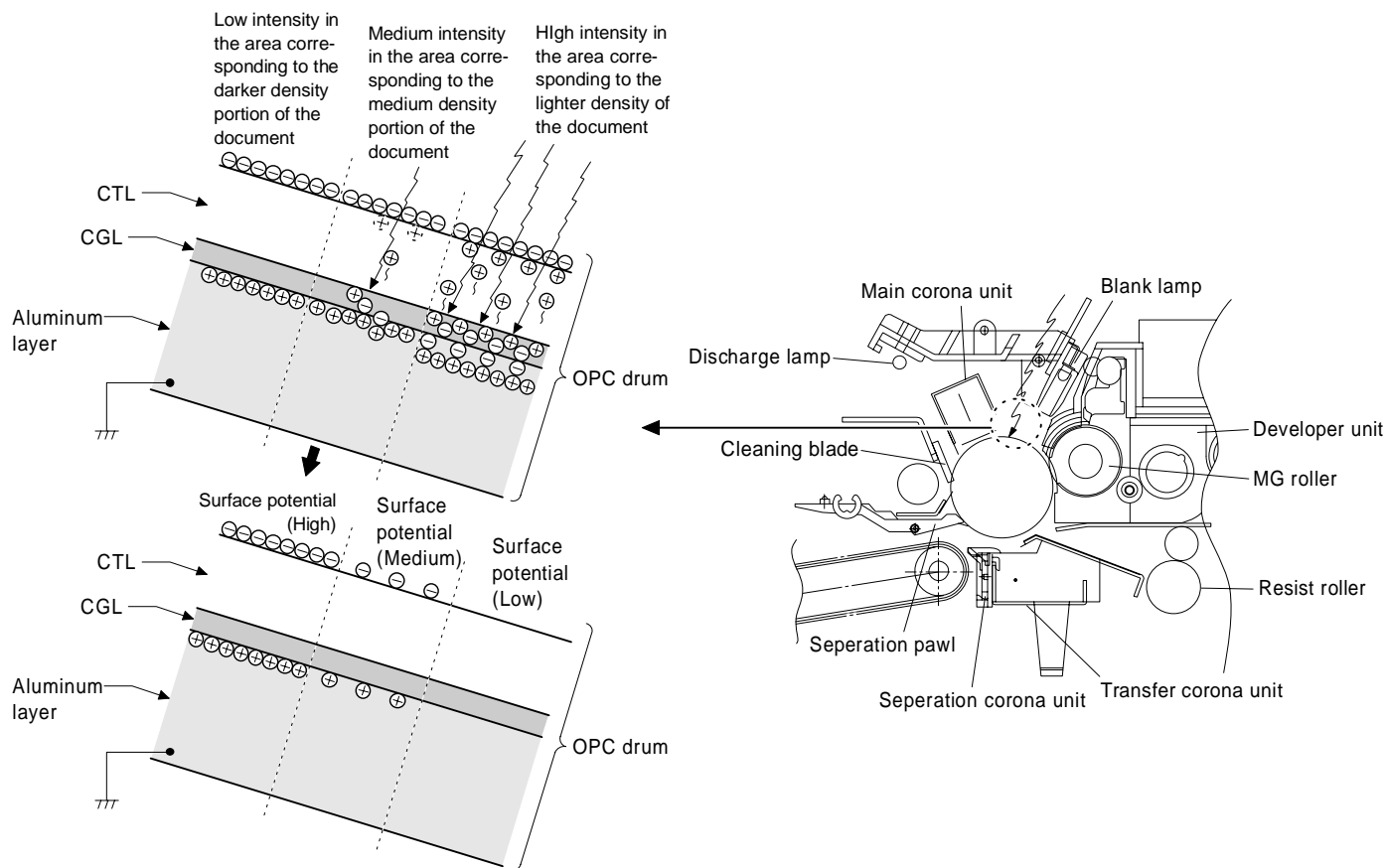
Step 2 (Exposure)

Light from the copy lamp is radiated on the document, and the optical image of the document is reflected by the mirrors and projected through the lens to the OPC drum.

The lighter portion of the document reflects more light (high intensity) to the OPC drum, and the darker portion of the document reflect less light (low intensity) to the OPC drum. Positive or negative charges are generated in the CGL of the OPC drum where lights are radiated.

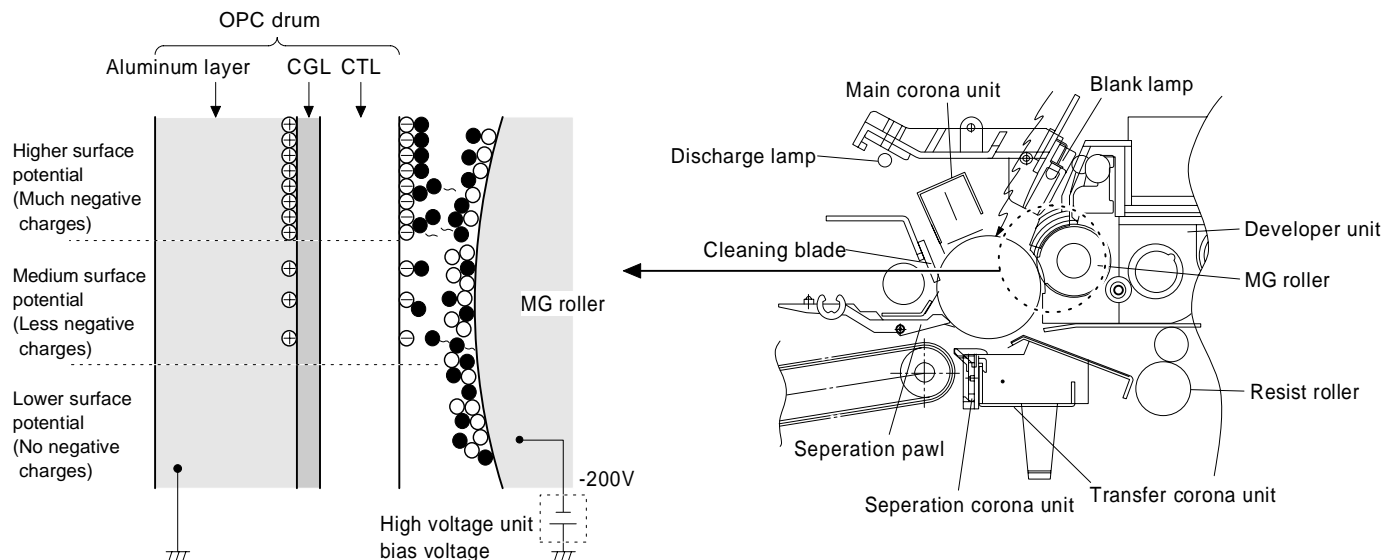
Negative charges generated in the CGL move towards the positive charges in the aluminum layer generated in step 3. While the positive charges in the CGL move towards the negative charges on the CPU drum surface generated in step 3. Therefore, positive charges and negative charges are neutralized in the aluminum layer and the OPC drum surface at the light radiating position, decreasing the OPC drum surface potential. The CGL electric charge generating amount increases in proportion to the document density, that is, reflected light intensity (the OPC drum surface intensity). Therefore, electric charges are generated less in the CGL layer corresponding to the lighter density of document (higher intensity of the OPC drum surface), and a greater quantity of the negative charges on the OPC drum surface is neutralized, decreasing the OPC drum surface potential more.

On the contrary, electric charges are generated more in the CGL layer corresponding to the darker density of document (lower intensity of the OPC drum surface), and less quantity of the negative charges on the CPU drum surface is neutralized, decreasing the OPC drum surface less. Therefore, the OPC drum surface potential corresponding to the lighter portion of the document is lower, and that corresponding to the darker portion of the document is higher. Latent static-electricity images are formed in the above manner.



Step 3 (Development)

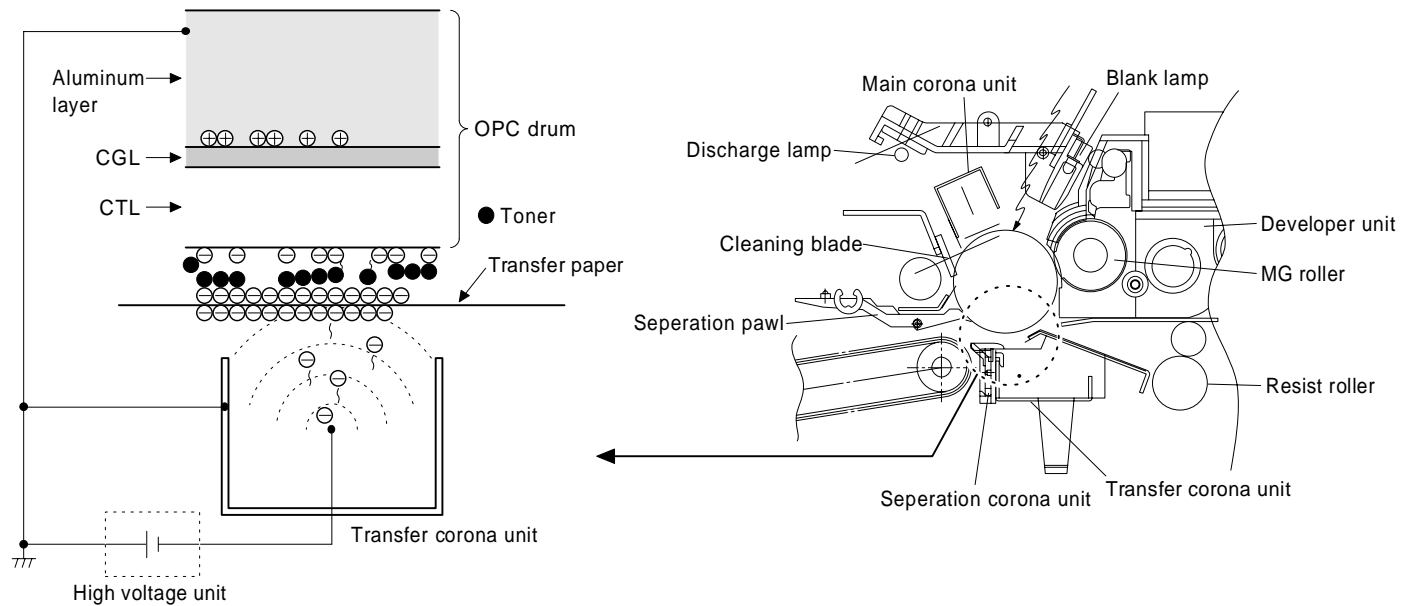
Toner is attached to the latent static-electricity images on the drum surface to change them to visible images. The two-component magnetic brush development system charges toner positively by friction with carriers, and toner is attached to negative charges on the drum surface. The potential in the darker document projecting area (low intensity) is high (much negative charges) and attracts more toner. The potential in the lighter document projecting portion (high intensity) is low (less negative charges), and attracts less toner.



At that time, a bias of -200V is applied to the MG roller (magnet roller), which is provided for preventing toner from being attracted by the residual voltage (about -80V to -100V) in the lighter portion after exposure.

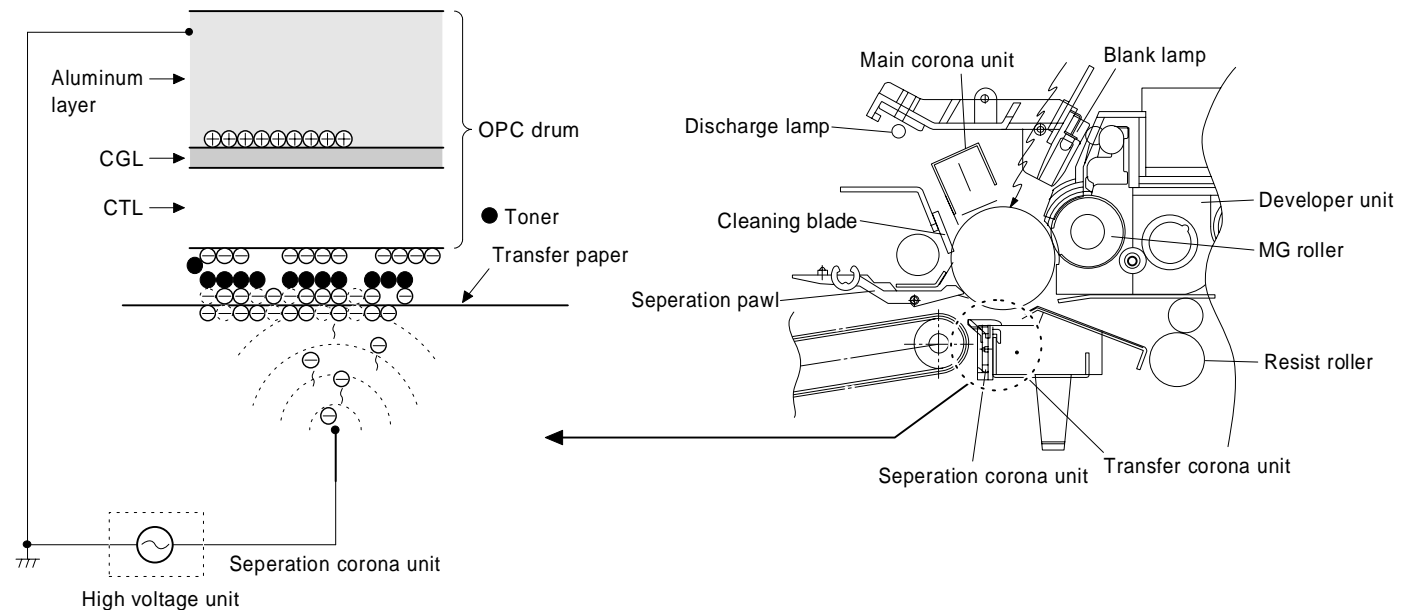
Step 4 (Transfer)

The transfer paper is charged higher than the OPC drum surface potential by strong negative discharge of the transfer charger, making the binding force between the transfer paper and toner stronger than that between the drum and toner, attracting toner to the transfer paper.



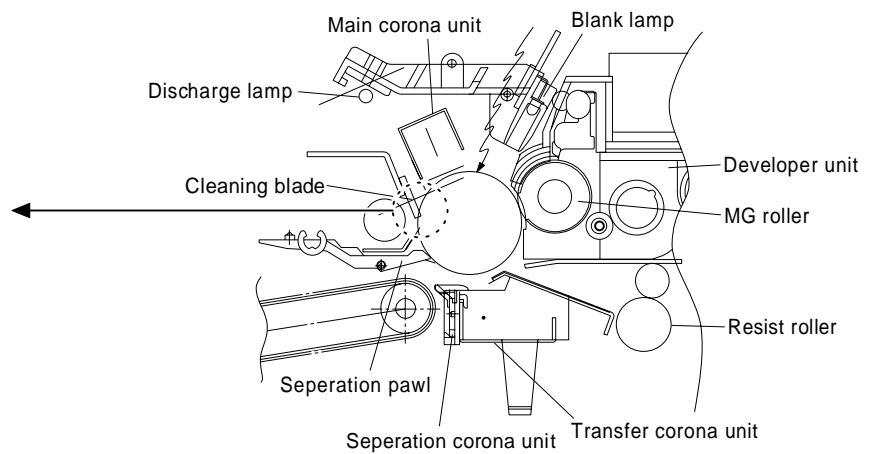
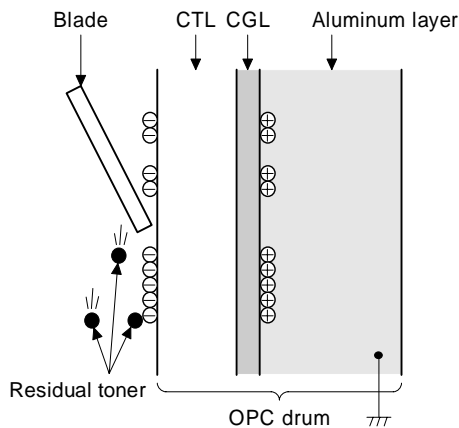
Step 5 (Separation)

After transfer, the copy paper and the drum are negatively charged. Since, however, the negative potential of the copy paper is higher than that of the drum, an attraction force is applied between the drum and the copy paper. To avoid this, AC corona is applied to the copy paper by the separation charger to decrease the copy paper potential to the same level as the drum surface potential. The attraction between the copy paper and the drum is weakened by this, allowing separation of the copy paper by its own extending force. If the copy paper is not separated by the separation charger, it is separated by the separation pawl mechanically.



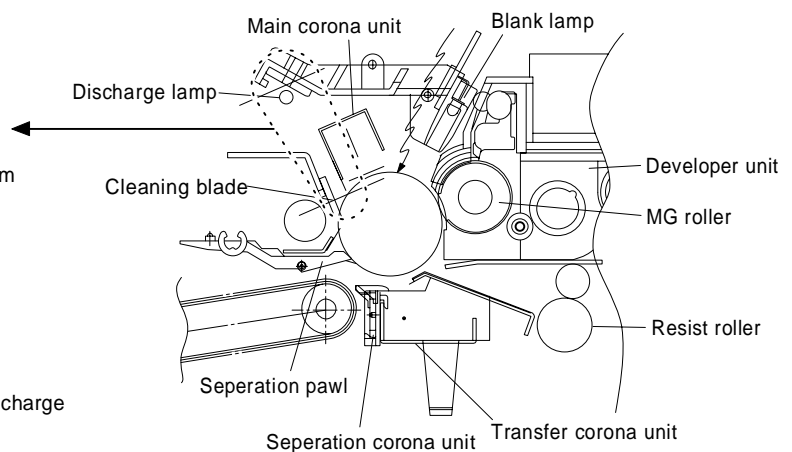
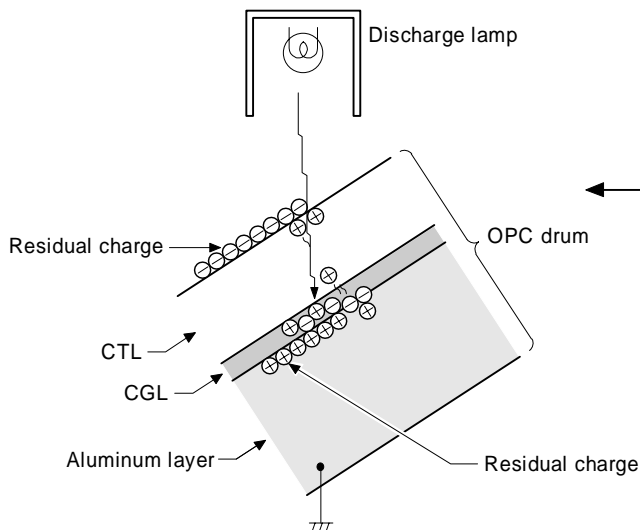
Step 6 (Cleaning)

Residual toner on the drum is removed by the cleaning blade. The removed toner is sent to the waste toner container by the waste toner transport screw.

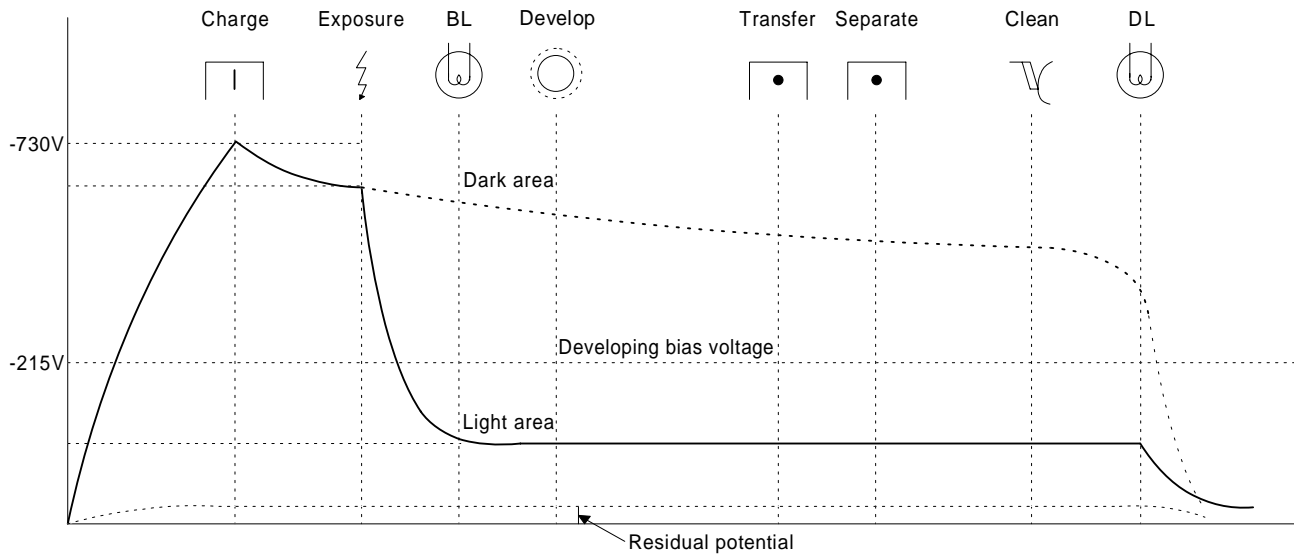


Step 7 (Discharging)

When the OPC drum is exposed to the discharge lamp light, positive and negative charges are generated in the OPC drum CGL. The negative charges generated in the CGL move towards the residual positive charges in the aluminum layer, while the positive charges in the CGL move towards the residual negative charges on the OPC drum surface. Therefore, the positive and the negative charges are neutralized in the aluminum layer and on the OPC drum surface, removing the residual charges on the OPC drum surface. As a result, the OPC drum surface potential becomes 20V ~ 30V.



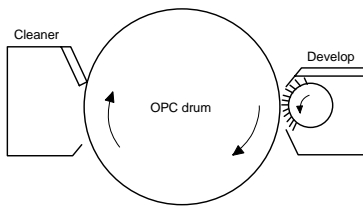
(4) Transition of photoconductor surface potential



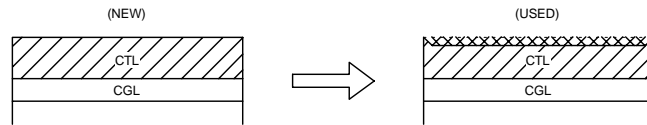
(5) Photoconductor drum sensitivity correction

In this model, fall in sensitivity due to long use of the photoconductor drum is corrected by the copy lamp light intensity to prevent against considerable change in copy quality.

The photoconductor drum sensitivity fall correction is performed as follows:

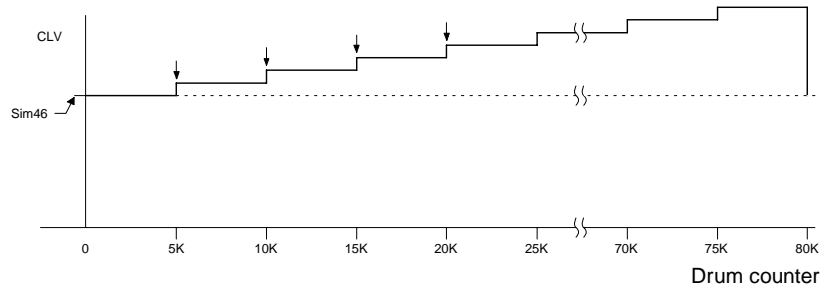


Change the tickness of the carrier transport layer (CTL).
By the developer.
By the cleaner blade.



$$\text{CLV} + 2 \text{ counts} \Rightarrow \text{CL(V)} + (0.33\text{V} \times 2)$$

(Sim46)

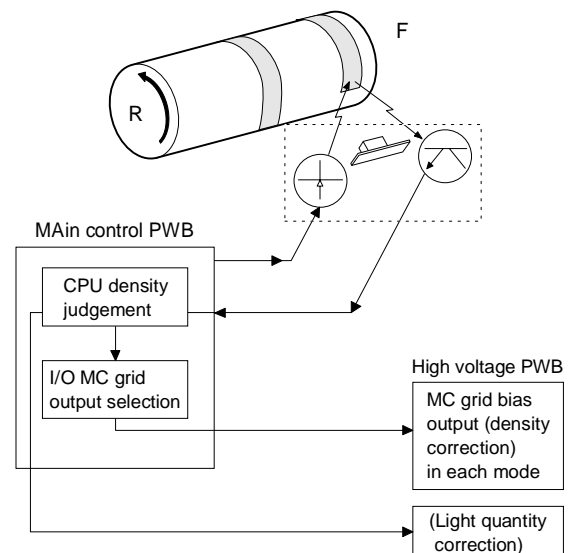


(6) Process control function

[Summary]

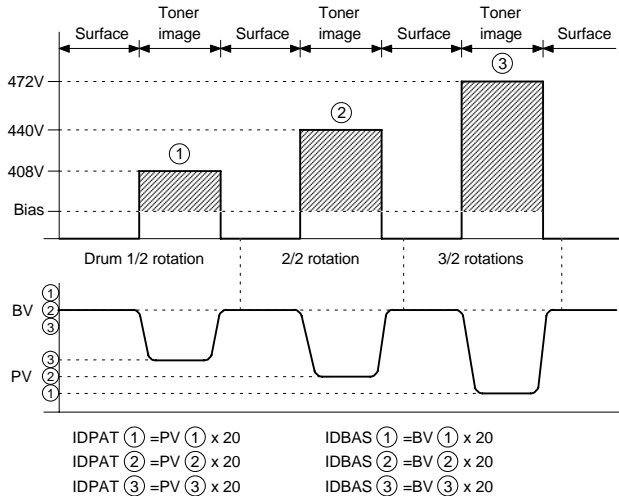
The process control function detects the density of the standard toner image formed on the photoconductor, the density of the initial image and controls the charging grid voltage so that the same level as the initial image density is provided.

That is, the process conditions are established and the high voltage output and exposure level are controlled to stabilize the toner density. In this model, the density sensing level is automatically set.



Process control

- ① Toner patch images are formed on the photoconductor surface under the three process conditions (MC grid bias voltage).
At the first process control, a toner patch image is formed with the reference grid voltage -410V as the center and $\pm 30\text{V}$. At the second or later process control, the MC grid bias voltage determined at the former process control is used as the center, and a toner patch is formed under the process condition of $\pm 32\text{V}$ to the center value.
- ② Measure the three toner patch images formed in the above and the drum surface with the process density sensor to obtain the relations.



BVS: Sensor detection level on the photoconductor drum surface
PVS: Sensor detection level with the toner patch image

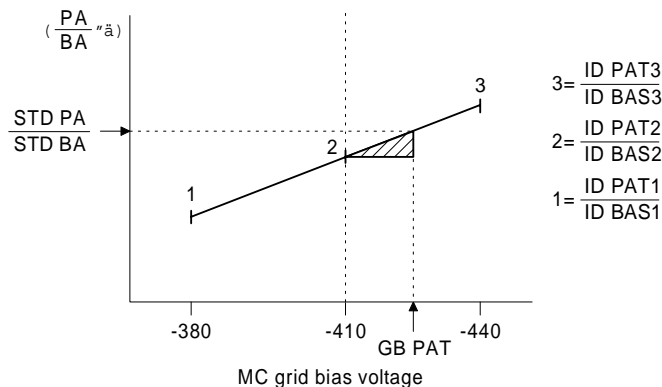
Obtain the above two levels from the calculation formula and record them as the reference values.

A. STD BA: Reference level when detecting the drum surface
→ STD BA = BTS × 20

B. STD PA: Reference level when detecting the toner patch image
→ STD PA = PTS × 20

In the density correction, the process conditions are determined so that the ratio of the reference levels $\left(\frac{\text{STD PA}}{\text{STD BA}}\right)$ set in the above may be maintained at constant.

- ③ Obtain the MC grid bias voltage from the reference level ratio.



In the SF-2214/2118, the absolute value of the output of the density sensor is not directly used for control calculation, but the ratio of the sensor output value (BA) on the drum surface and the sensor output (PA) of the toner patch image is used for control calculation.

* The grid bias value is obtained so that the ratio of the drum surface level and the sensor level when forming patch level and the sensor level when forming patch images is 200:40.

Though, therefore the light quantity of the reflection type sensor is varied by dirt or deterioration, the ratio (PA/PB) will not be affected by change in light quantity to provide stable control.

The grid voltage value where the same density level as the reference level is obtained is displayed by Sim. 44-9 "a". This value is displayed with 50 as the center in the range of 0 ~ 99 in integer numbers. The correction for 50 is 0V (-410V), and the correction for 58 is $+30\text{V}$ (-442V).

- ④ When the MC grid bias voltage is corrected by the process control, the corresponding light quantity is calculated to control the copy lamp.

To correct the MC grid voltage, the delta value of the sensitivity level when the initially recorded reference grid voltage is -440V and the MC grid voltage where the same density is obtained in process control is fed back to the MC grid voltage of each mode.

Process control timing

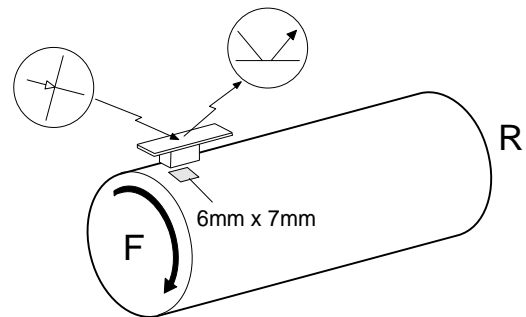
In the SF-2035, the process control is performed in the following timing:

- ① When the main switch is turned on and the first copy is made:
- ② At every specified copy quantity (First copy after 1,000 copies) Judged by the total counter.
The correction is reset by Simulation 25-2.
- ③ After the specified time after turning on the main switch. (First copy after 44, 60, 120, 180 min)

Drum marking

In this model, a toner patch image is formed in the same position on the photoconductor drum surface to improve the accuracy of the process control.

A marking is provided on the drum and the marking is sensed before forming a toner patch image. If the marking level is not sensed, the developing lamp blinks and the trouble code (F2-32) is displayed.

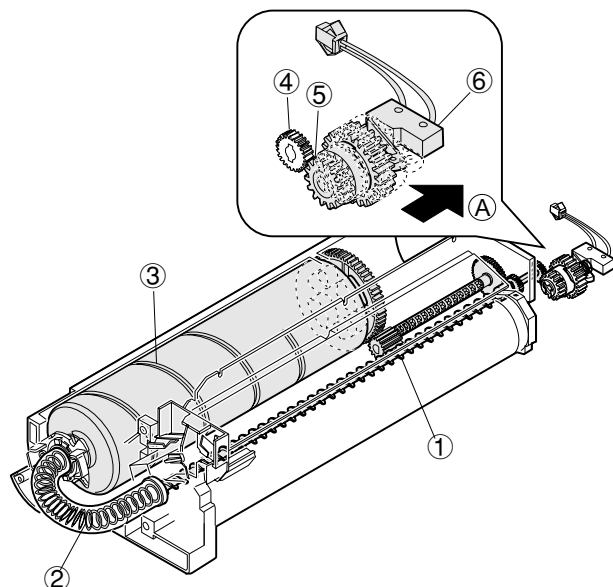


Basic structure

- Photoconductor drum:** The 65mmφ ground plate of the OPC drum is on the rear frame side of the drum unit so that it contacts the drum locator pin.
- Blank lamp:** The non-image area is exposed by the light from the blank lamp to erase the positive potential outside the drum CTL. Use of the latchet simplifies the lamp position adjustment.
- Discharge lamp:** Eight bulbs cast light over the drum surface to erase the positive potential in CTL. Ventilation hole provided in the drum frame releases heat from bulbs.
- Cleaning mechanism:** The cleaning blade removes the toner remaining on the drum surface. The blade always rests on the drum surface.
- Main corona:** The saw teeth corona charge method is used. Use of the screen grid maintains the even charge potential over the photoconductor surface.
- Enforced separation mechanism:** Using two pieces of separation pawl, the copy paper stuck over the drum surface is forced to separate from the drum surface.

Waste toner transport mechanism:

The waste toner is passed through waste toner transport screw ① and waste toner pipe ② to waste toner bottle ③. Waste toner bottle ③ is rotated by the main drive gear via gear ④ to transport toner evenly. When the waste toner bottle is full of waste toner, the rotation torque of gear ④ is increased to escape gear ⑤ in the arrow direction ④, and switch ⑥ is turned on at the same time to light the waste toner replacement lamp.



(5)TRANSPORT/FUSING SECTION

1) General

The SF-2116/2118 allows transport of paper of max. A3 (11" x 17") and min. A5 (8 1/2" x 5 1/2").

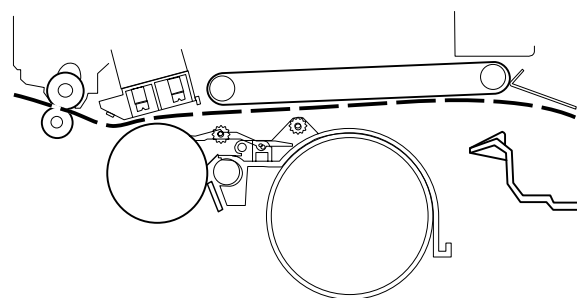
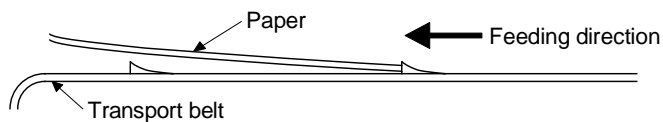
After images are transferred on the paper, the paper is separated from the drum by the separation pawl and transported to the fuser section by rotations of the resist roller and the transport belt.

The drum separation pawl is provided under the process unit. It is made by turning on (separating) the solenoid inside the main drive unit.

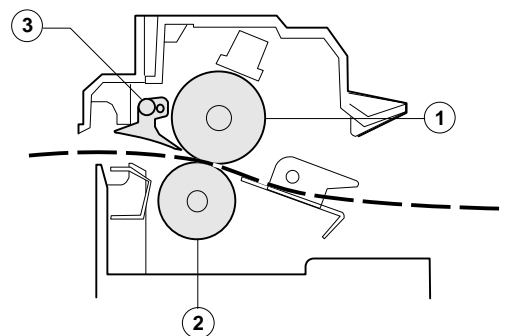
2) Basic composition and functions

① Transport belts (2pcs)

The transport belts are provided with notches to hold paper rear ends.



(6) Fusing paper exit section



① Upper heat roller

The upper heat roller is teflon-coated.

② Lower heat roller

A silicone rubber roller is used.

③ Separation pawl

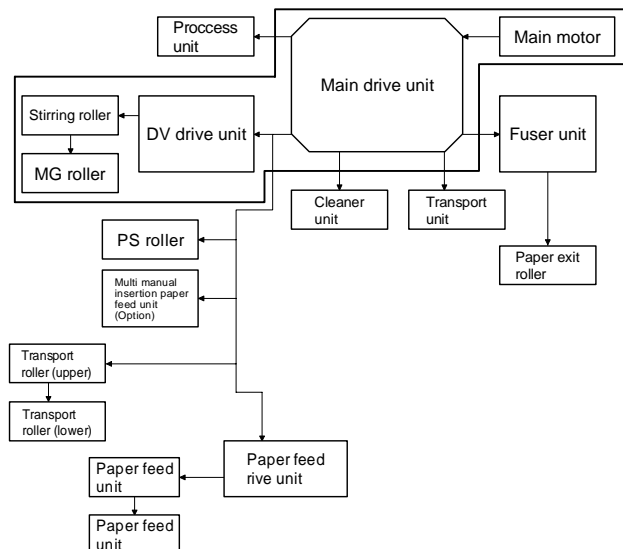
The upper heat roller is equipped with four pawls which are teflon coated to reduce friction. the lower heat roller is equipped with two pawls.

④ Upper/lower separation function

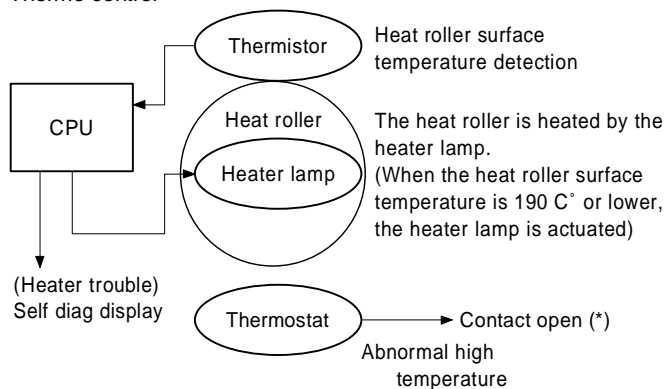
The upper and lower heat roller sections are separated by rotating operations with the transport roller as a fulcrum, providing better serviceability.

⑤ Drive system division

The fuser unit is rotated by the main drive unit. In case of manual rotation of the fuser unit to remove paper jam, however, excessive loads may be applied to the gears. To prevent against this, the pressure of the upper/lower heat rollers is reduced when the machine clamshells are opened. In addition, the fusing gear is so constructed that the drive is not transferred to the drive system.



Thermo control



- Abnormally high temperature (H3) 240°C or upper
- Abnormally low temperature (H4)
- Thermistor disconnection (H2)

* When the thermostat contact is open, it is required to press the reset button in the upper side of the thermostat. (The contact is not reset automatically.)

[8] HIGH VOLTAGE SECTION

1) General

There are three kinds of coronas; the main corona, the transfer corona, and the separation corona. The main corona employs the scorotron system, where the drum surface is evenly charged with negative charges controlled by the screen grid between the corona and the drum. The transfer corona is used to transfer toner images on the drum to the copy paper. A high, negative voltage is applied to the rear side of the paper. The separation corona applies AC corona to the copy paper to eliminate potential difference with the drum to allow separation of the paper.

The output voltage of the main charger and the transfer charger is supplied by transformer 1. The feedback current from the transfer charger is controlled to be constant and outputted to the main charger.

2) Basic composition

(1) Main (charging) corona – High voltage transformer (MHVG)

	Grid voltage	Developing bias voltage
Standard mode	–750V	–200V
Photo mode	–500V	
TSM mode	–650V	

(2) Main transfer corona – High voltage transformer (THVG)

–41μA (Electrode sheet front-rear balance difference: max. 7.0μA)

(3) Separation corona – High voltage transformer (SHVG)

AC4KV ±0.1KV

[6] DISASSEMBLY AND ASSEMBLY

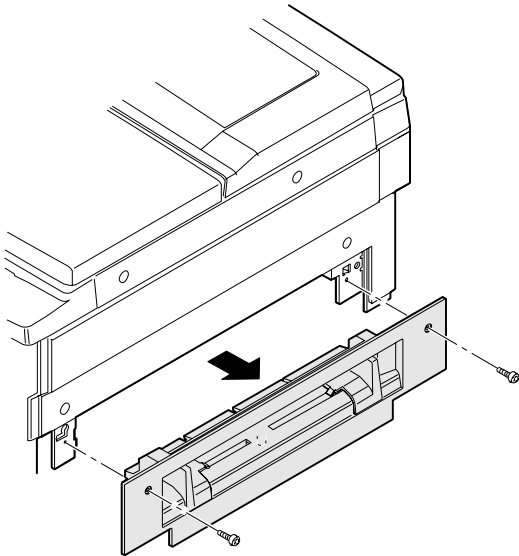
The descriptions are divided into the following sections.

1. Paper feed section
2. Transport section and power section
3. Fusing section
4. Optical system
5. SPF section
6. Drum section
7. Developing section
8. Operation panel section and intermediate cabinet
9. major parts on the frame side
10. Multi paper feed unit (SF-MF15, option)
11. Two-stage paper feed unit (SF-CM15, option)

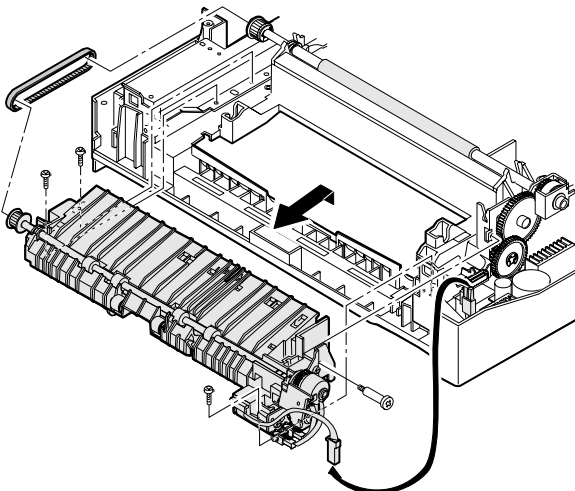
1. Paper feed section, transport section, power section

1-1. Paper feed unit

- ① Open the front cover and lift up the upper clamshell. Remove two fixing screws of the manual paper feed section, and remove the manual paper feed section.



- ② Remove the four fixing screws (M4 x 10 x 1pcs, step screw x 1 pc) of the paper feed unit, and lift the rear frame side of the paper feed unit and remove it. (Since there is the 8-pin connector on the back of the rear frame side, it requires some force to remove. Carefully pull it out straight.)

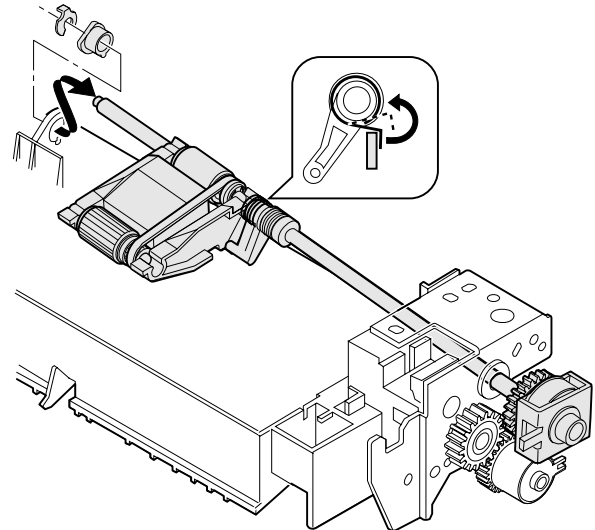


(Note for assembly)

- 1) There is the 8-pin connector on the back of the rear frame side. When assembling it, carefully insert.
- 2) The belt must be on the paper feed unit gear and the resist roller gear.

1-2. Paper feed roller ass'y removal

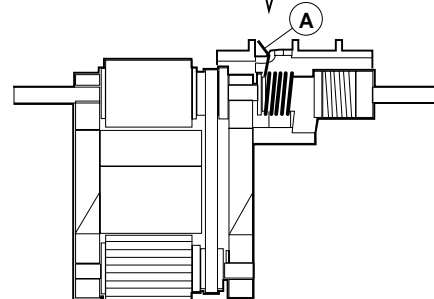
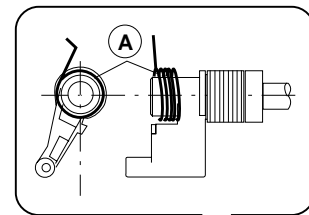
- 1) Remove the rear frame side electromagnetic clutch connector.
- 2) Remove the front frame side stopper and the bearing.
- 3) Remove the roller release arm spring from the paper feed frame.



- 4) Remove the rear frame bearing, and one side of the paper feed roller ass'y will be disengaged. To remove the ass'y completely, remove the E-ring.

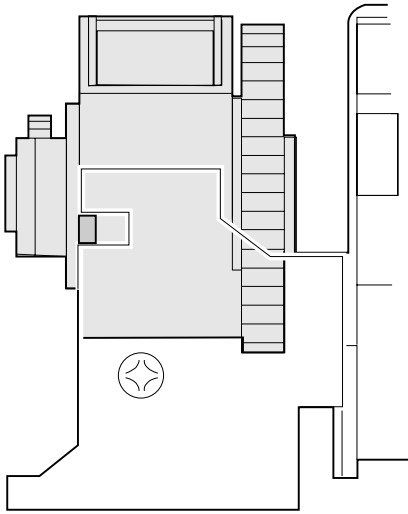
(Note for assembly 1)

With roller release arm spring A hooked on the spring notch, attach the paper feed roller ass'y to the paper feed unit, and hook the spring on the paper feed frame.



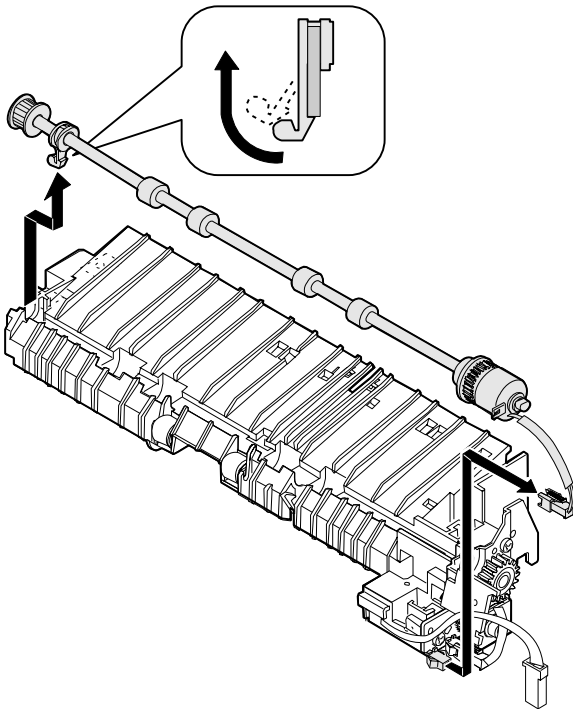
(Note for assembly 2)

When attaching the paper feed section roller ass'y, adjust so that the paper feed roller clutch and the PS front roller ass'y clutch projection face toward the paper feed side.



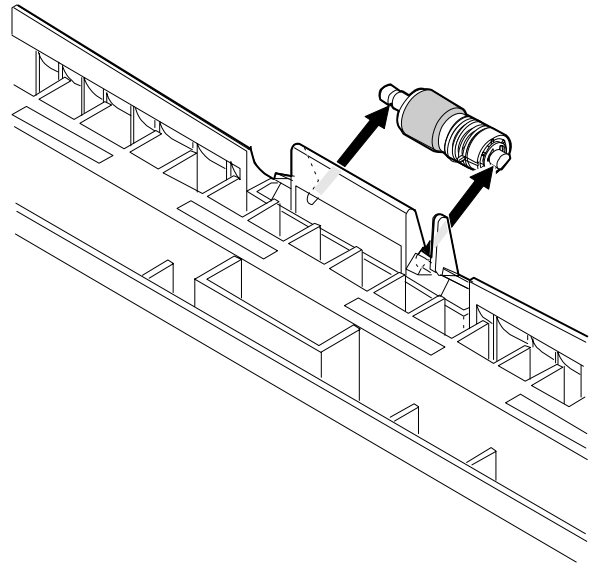
1-3. PS front roller ass'y

- ① Remove the paper feed unit. (For the details, refer to the 1-1.)
- ② Disengage the hook section of the front frame side bearing, remove the connector on the rear frame side, and remove the PS front roller ass'y from the paper feed frame.



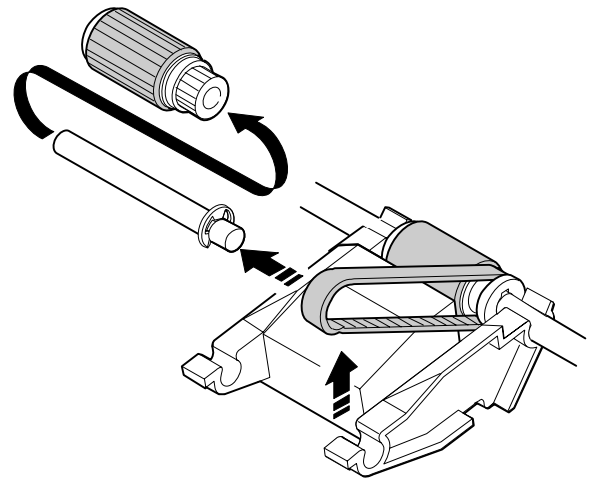
1-4. Separation roller

- ① Remove the paper feed unit and remove the separation roller.

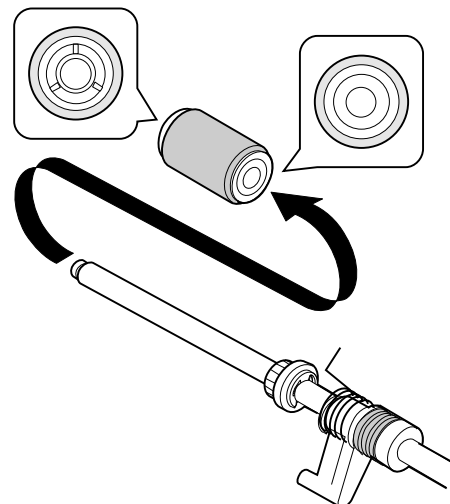


1-5. Paper feed roller, take-up roller

- ① Remove the paper feed roller, and remove the take-up roller.



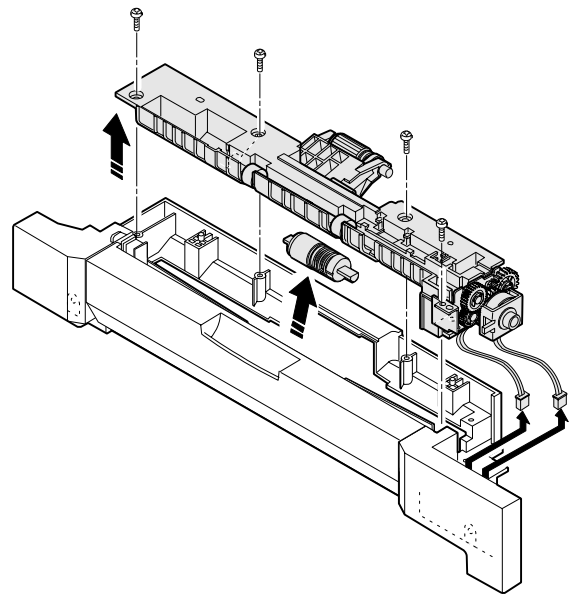
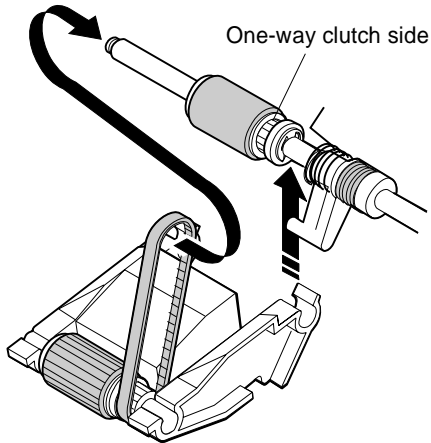
- ② Remove the roller holder, the stop ring, the bearing, and the paper feed roller.



(Note for assembly)

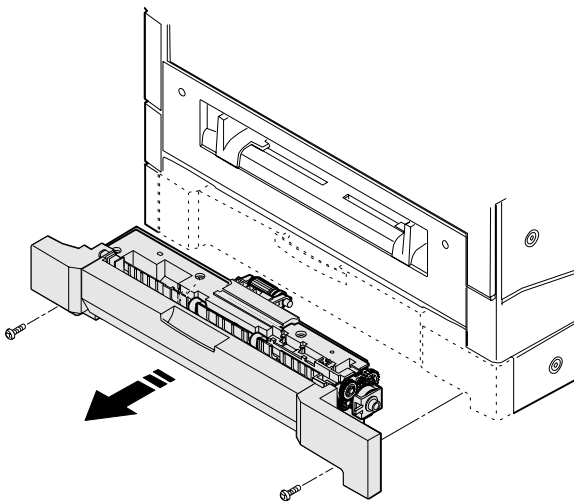
Attach the paper feed roller so that the one-way clutch is on the rear frame side. (Be careful of the direction.)

Attach the roller holder as shown below.

**1-6. Lower paper feed unit**

(SF-2118 only): Perform similarly for the optional two-stage paper feed unit.

Remove two screws and remove the lower paper feed unit.

**1-7. Lower separation roller**

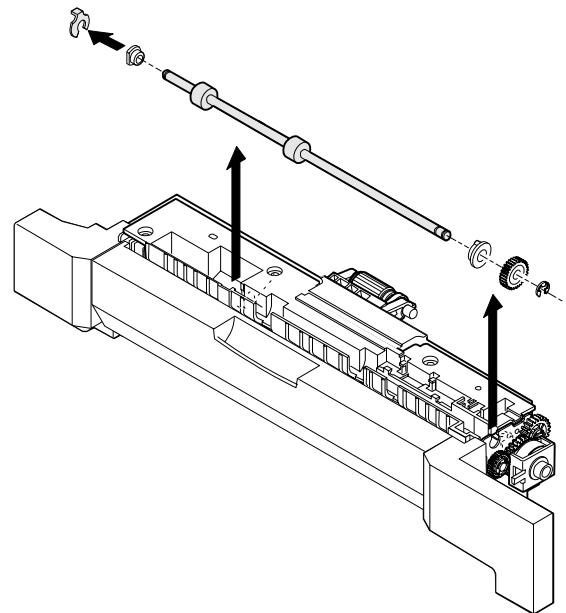
(SF-2118 only): Perform similarly for the optional two-stage paper feed unit.

- ① Remove the lower paper feed unit. Refer to 1-6.)
- ② Remove the paper feed frame. (4 screws, 2 connector)
- ③ Remove the separation roller.

1-8. Transport roller

(SF-2118 only): Perform similarly for the optional two-stage paper feed unit.

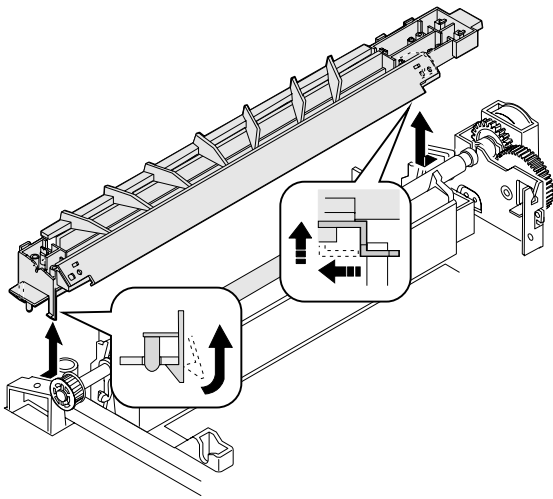
- ① Remove the lower paper feed unit. (Refer to 1-6.)
- ② Remove the stopper, slide the bearing, and remove the transport roller.

**1-9. Lower paper feed roller/take-up roller**

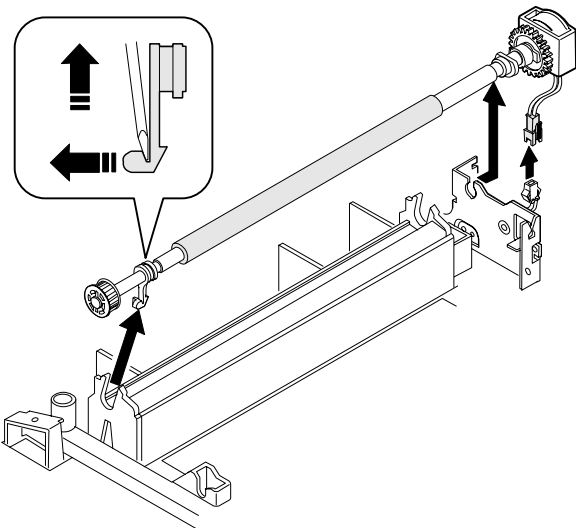
For removal of these rolls, refer to 1-2 (Paper feed roller ass'y) and 1-5 (Paper feed roller, take-up roller).)

2. Transport unit**2-1. Resist roller, transfer roller**

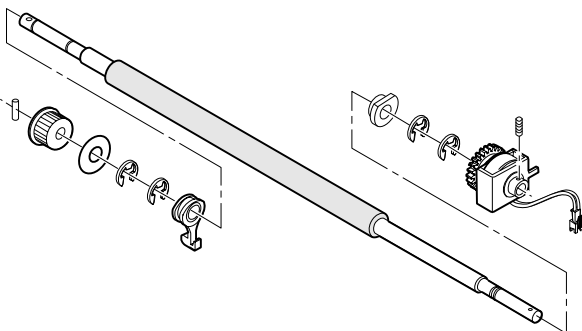
- ① Open the front cover.
- ② Release two lock pawls of the TC case, and lift the front side of the TC case to remove.



- ③ Remove the hook of the front frame side bearing, and lift it up to remove it toward the upper frame side. Remove the rear frame side connector, and slide and remove the resist roller ass'y toward the rear frame side.

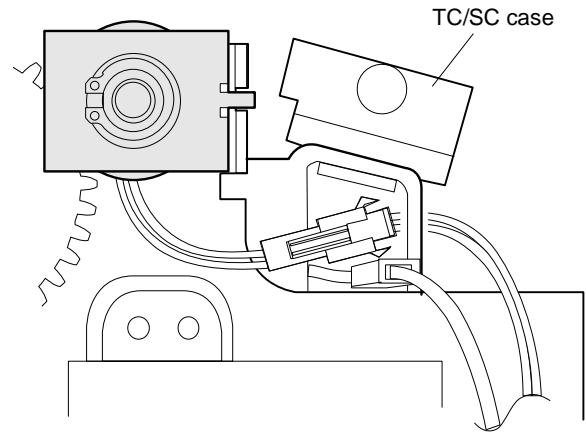


- ④ Remove the clutch and the gears as shown below.

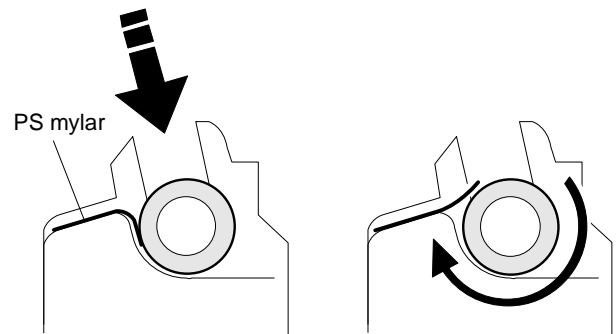


(Note for assembly)

- 1) Attach so that the resist roller clutch projection is on the paper exit side as shown in the figure below.
- 2) Arrange the cable and the power grounding wire from the resist roller clutch as shown in the figure below.
- 3) Hook the hook section of the TC case as shown below.

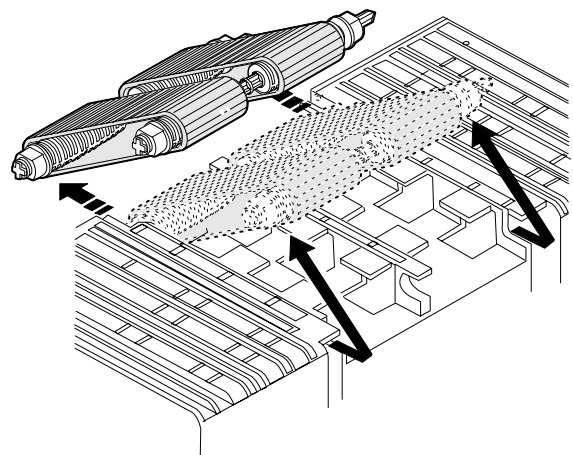


- 4) When attaching the resist roller ass'y to the copier, attach over the upper side of the PS roller lower mylar, then rotate the roller to set the mylar to the normal position. (If the mylar is deformed, it may cause paper jam. Replace it if deformed.)



2-2. Transport belt

- ① Remove the fusing unit.
- ② Remove the TC case.
- ③ Disengage the transport belt drive shaft holder on the TC case side, then disengage the drive shaft on the paper exit side and remove the belt.



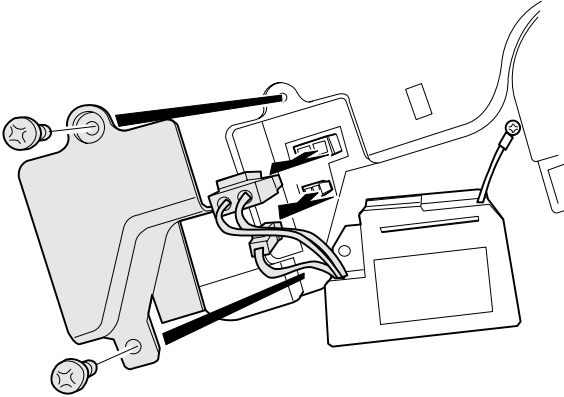
(Note for assembly)

- ① There is a mark (←) on the transport belt. Set so that the tip of the mark faces toward the paper exit direction.
- ② Be careful of the installing direction of the transport belt drive shaft.

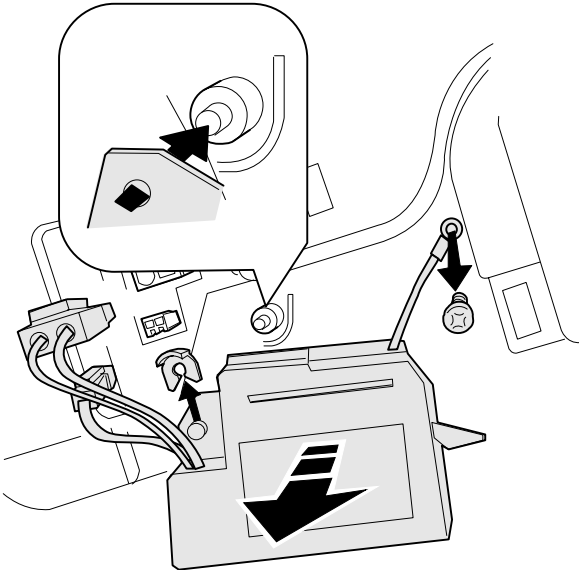
3. Fusing section

3-1. Fusing unit removal

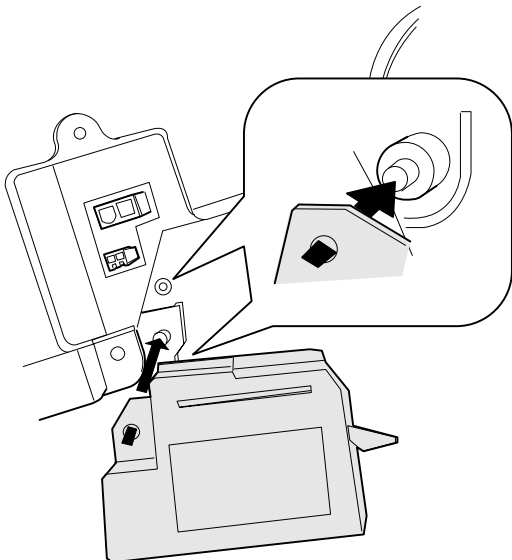
- ① Open the front cover.
- ② Push the open/close lever down to the right side, and slowly open the upper unit.
- ③ Remove the fixing screw of the fusing connector cover and remove the cover.



- ④ Remove the fusing unit hanging wire from the copier frame and remove two connectors from the unit.



- ⑤ Remove the stop ring and remove the unit.

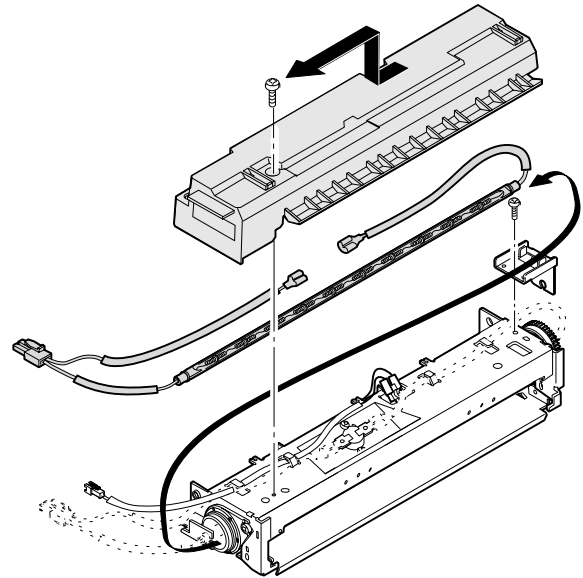


(Note for assembly)

When removing the unit from the copier, be careful not to scratch the photoconductor drum. Be careful not to break the actuator of the paper exit sensor (POD).

3-2. Heater lamp replacement

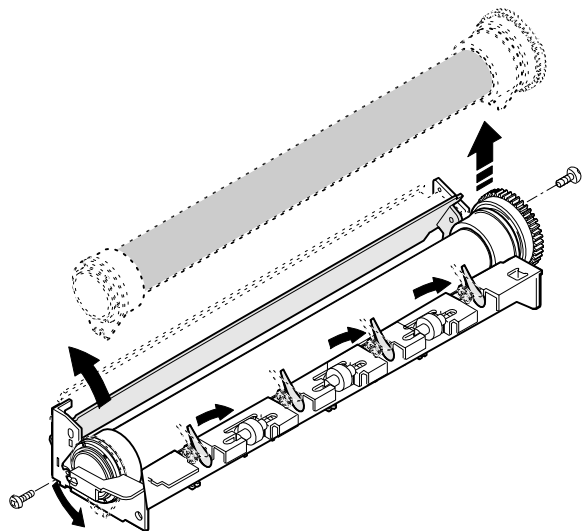
- ① Remove the fusing cover fixing screw (1 pc.), and slide the cover to the front side to remove.
- ② While pressing the Fasten terminal projection connected to the thermostat, remove the lead wire from the connection section.
- ③ Remove the fixing screw of the lamp holder on the upper side of the rear frame, and remove the holder.



- ④ Pull out the heater lamp from the front frame side.
For assembly, reverse the disassembly procedures.

3-3. Upper heat roller ass'y removal

- ① Remove two fixing screws of bearings of the front and the rear frames.
- ② Push the paper guide down to the paper exit side and separate the separation pawl from the roller and fix it.



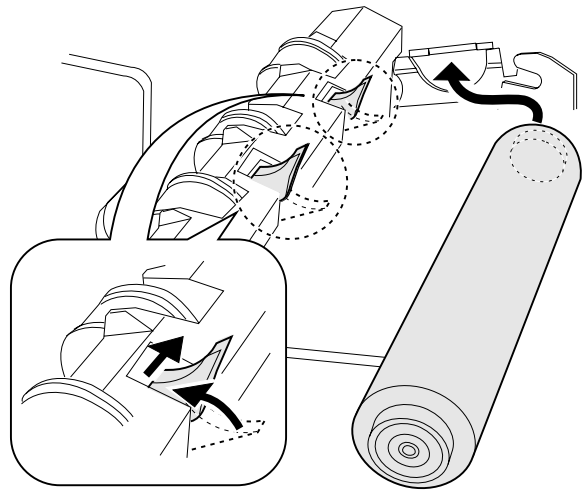
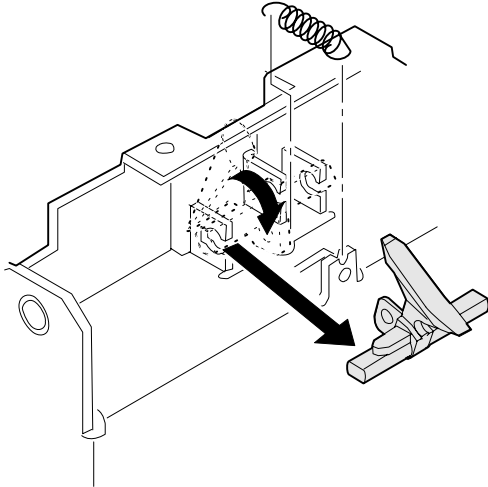
- ③ Rotate the bearing fixing screws about 45 degrees downward and remove the ass'y.

For assembly, reverse the disassembly procedures.

3-4. Upper separation pawl replacement

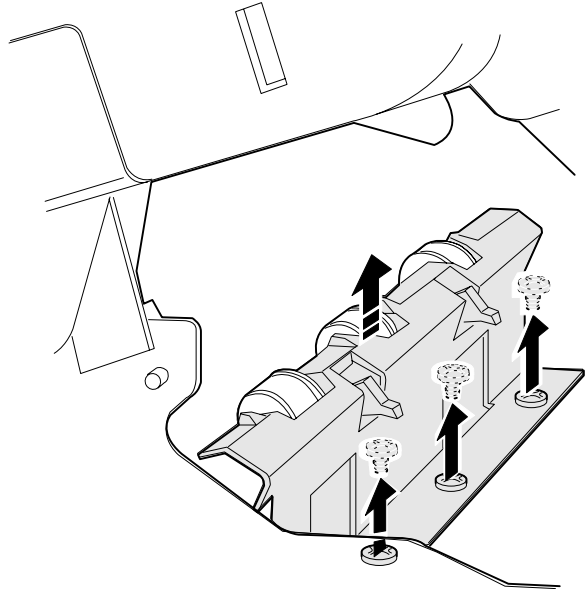
- ① Remove the fusing unit, and remove the cover.
- ② Put the fusing unit so that the paper guide is on the lower side of the fusing unit (the separation pawl is on the upper side).
- ③ Remove the tension spring, hold the separation pawl tip and remove it from the supporting section, and remove it from the unit by tilting.

For assembly, reverse the disassembly procedures.



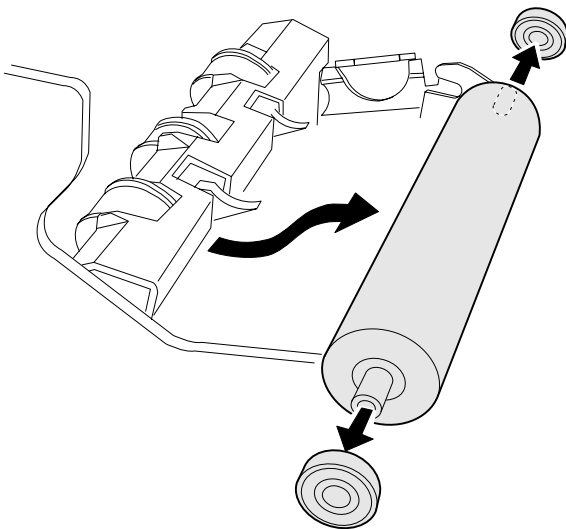
3-6. Lower separation pawl replacement

- ① Remove the fusing unit.
- ② Remove the lower heat roller.
- ③ Remove three screws and remove the lower separation pawl unit.



3-5. Lower heat roller replacement

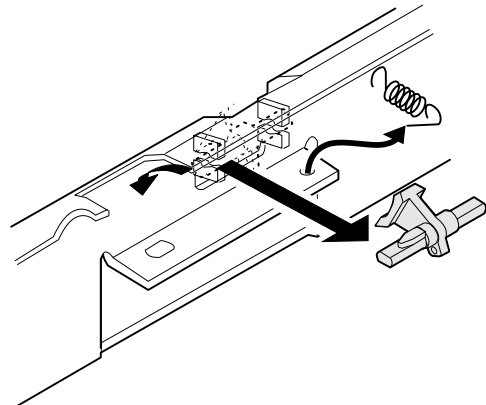
- ① Remove the fusing unit.
 - ② With the lower separation pawl upright, slide it to the rear frame side and keep the lower separation pawl upright.
 - ③ Remove the lower heat roller together with the bearing.
- For assembly, reverse the disassembly procedures.



(Note for assembly)

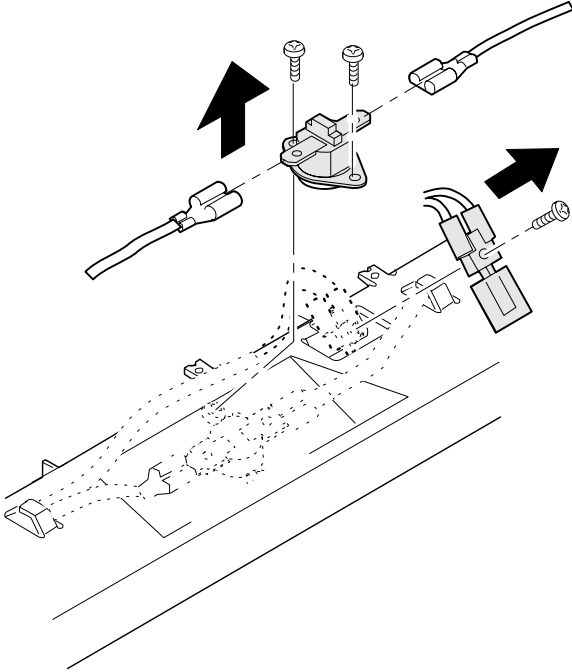
Assemble so that the lower separation pawl is on the upper side of the lower heat roller. (At that time, return the separation pawl which was set upright in procedure (2).)

- ⑤ Remove the tension spring, hold the separation pawl tip to remove it from the supporting section, and remove it by tilting.



3-7. Thermistor/thermostat removal

- ① Remove the fusing unit.
- ② Remove the fusing cover, and remove the thermistor/thermostat.



* Note for assembly

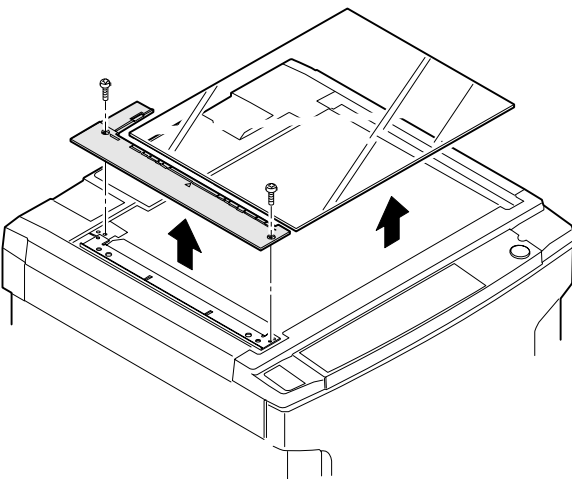
- Check that the thermistor center is in contact with the heat roller.
- Clean the thermistor surface with alcohol to remove foreign materials.

4. Optical system

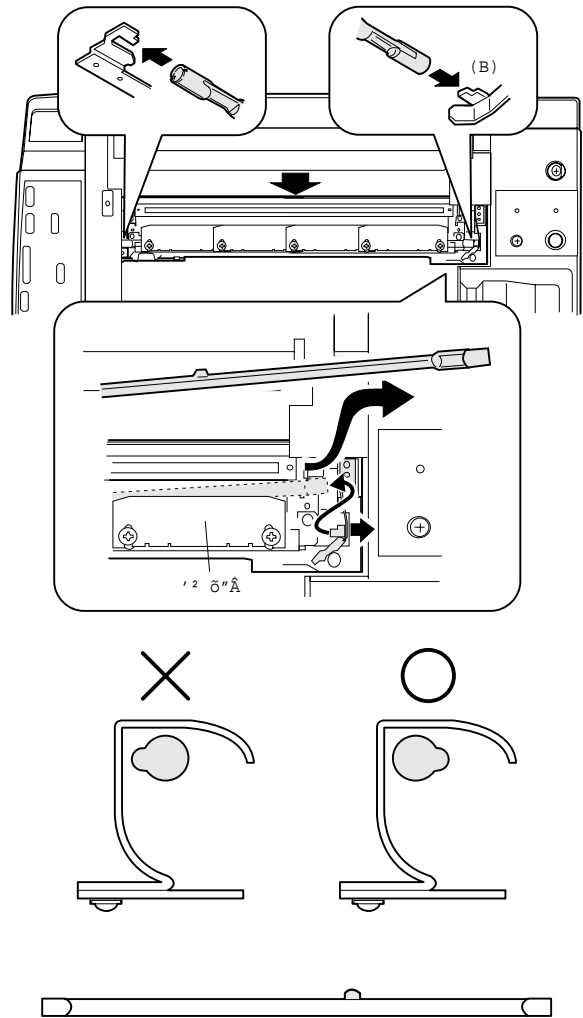
The optical system is an integrated finish product delivered by the maker as stated in the previous section. The replacement procedures for the major parts in the optical system are described here.

1) Copy lamp replacement

- ① Remove the OR guide, and remove the table glass. (2 screws)
- ② Slide the copy lamp unit to the notch at the rear of the upper cabinet. Push the copy lamp electrode (section A) in the arrow direction B, and remove the lamp. Do not move the optical adjustment plate. (If it is moved, the light balance will go wrong.)



Note: Be careful of the installing direction of the copy lamp.

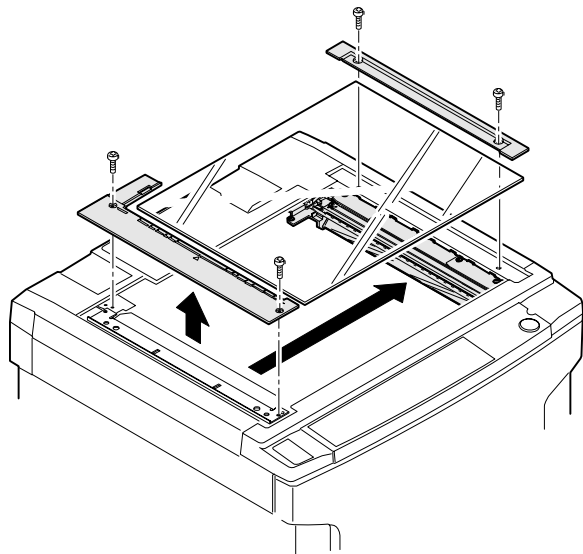


Install so that the projected portion of the copy lamp is near the rear side as shown above.

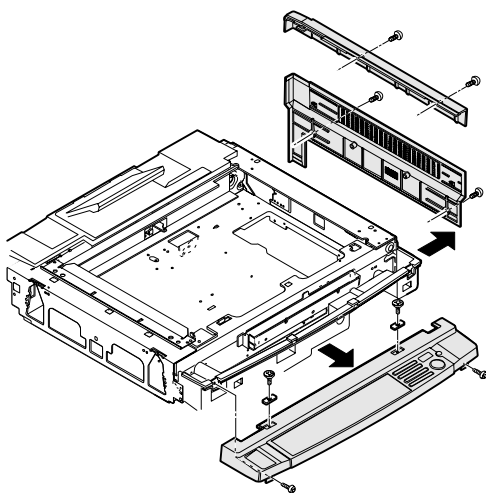
2) Mirror base wire replacement and adjustment

A. Copy lamp unit removal

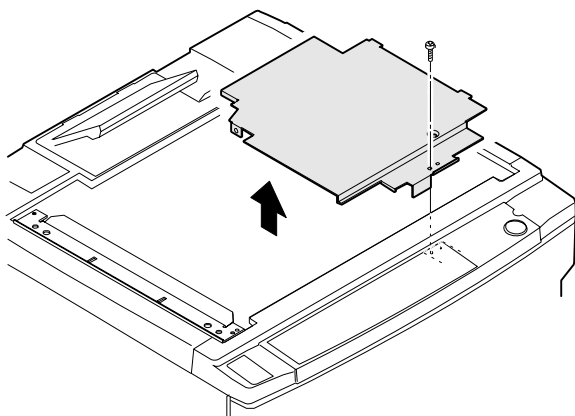
- ① Remove OR guides R/L, and remove the table glass.



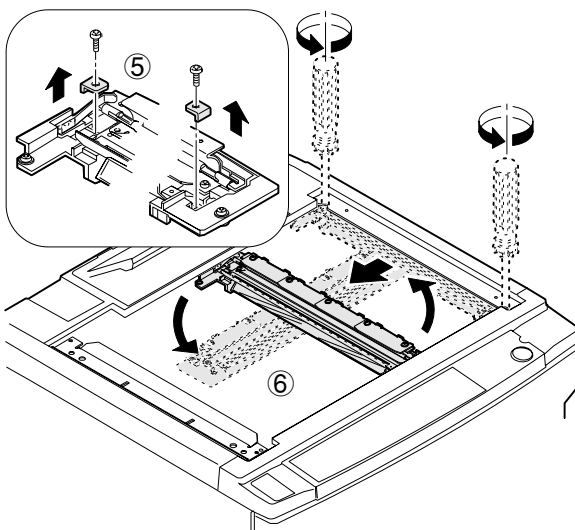
- ② Remove the operation panel, the upper cabinet R, and the right cabinet.



- ③ Remove the dark box cover upper.

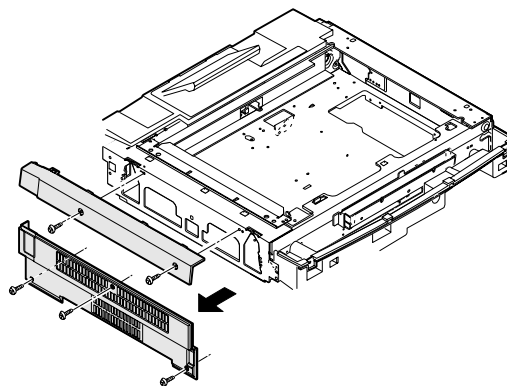


- ④ Manually move mirror base B. (Within the range where the wire fixing plate fixing screw can be removed.)
 ⑤ Remove the wire fixing plate in the front/rear frame side of the copy lamp unit, and remove the wire from the side plates F/R.
 ⑥ Remove the harness from the copy lamp unit.
 ⑦ Rotate the copy lamp unit counterclockwise to remove.

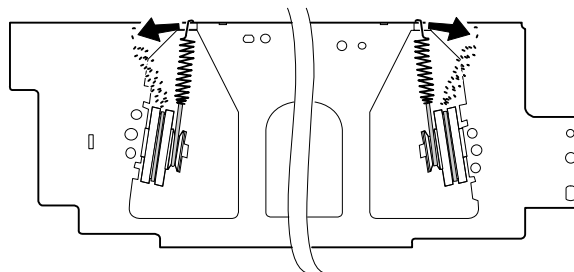


B. Mirror base wire removal

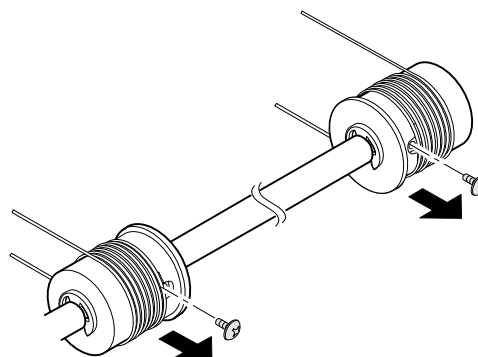
- ① Remove the upper cabinet L, and the left cabinet.



- ② Remove the mirror wire spring from the groove on the left side of the optical base plate.

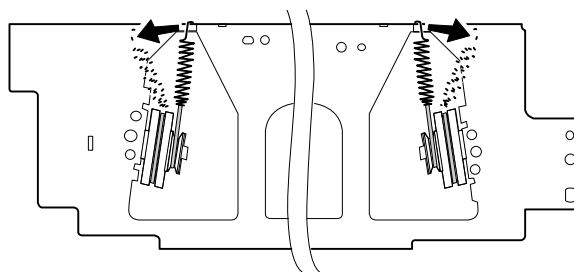


- ③ Remove the mirror base wire from the winding pulley. (Remove the wire fixing screw.)

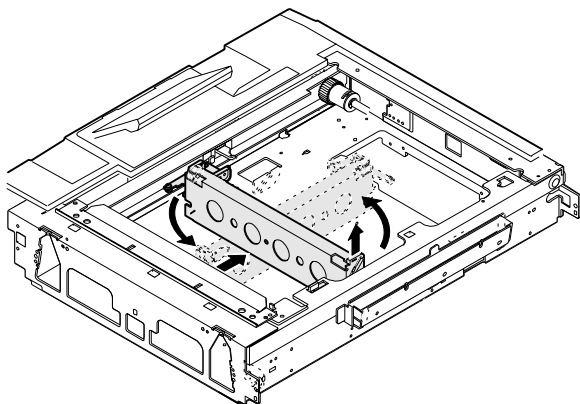


C. No. 2/3 mirror unit (mirror base B) removal

- ① Move the mirror base B to the center between the positioning and the optical base plate left surface.
 ② Lift the front side of mirror base B and separate it from the rail. (The front side only)



- ③ Rotate the mirror base B counterclockwise to remove.
- ④ Disconnect the connector from the copy lamp unit on the rear frame side and from the No. 2/3 mirror unit.
- ⑤ Rotate the No. 2/3 mirror unit counterclockwise and remove.



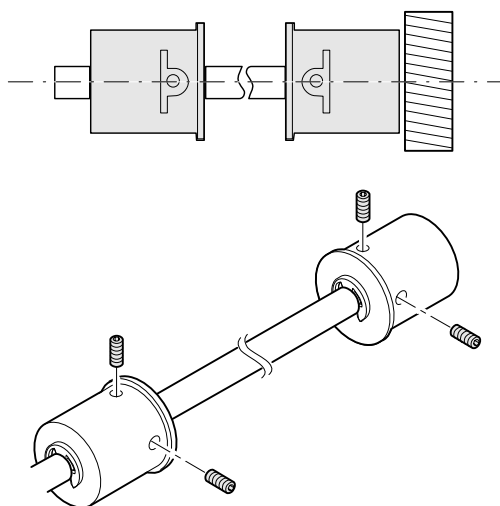
D. No. 2/3 mirror unit (mirror base B) assembly

Reverse the above procedures.

E. Mirror base wire stretching

Check that the wire groove in the front winding pulley is aligned with the wire groove in the rear winding pulley.

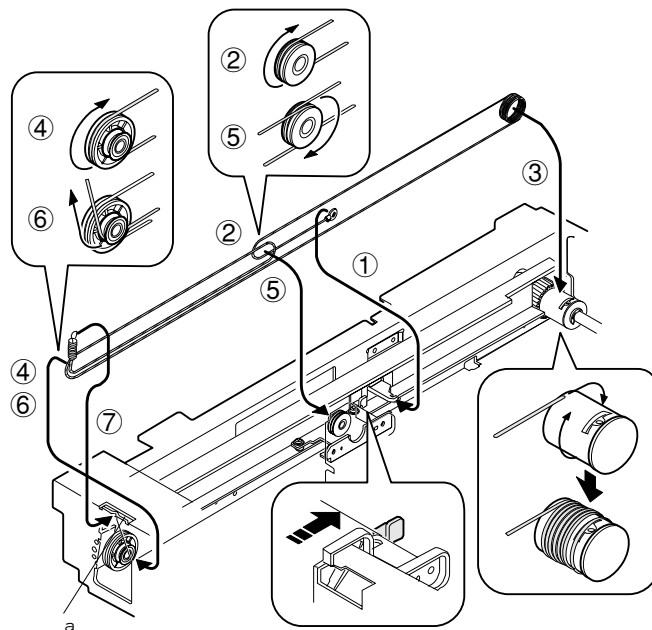
(If there is too much a shift in the circumference, loosen two pulley fixing screws, and visually fit the positions and fix.



- ① Hook the metal fixture of the mirror base wire on the optical base plate hook.
- ② Pass the mirror base wire along the groove outside the double pulley.

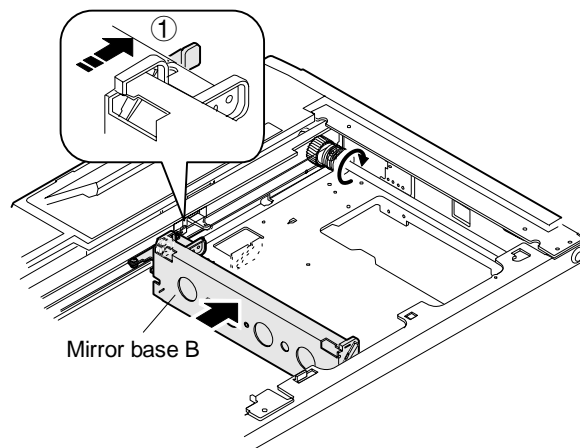
<Note> At the time, put the No. 2/3 mirror unit on the mirror base positioning plate.
Hold it so that the winding pulley groove is on the upper side, and wind the wire.

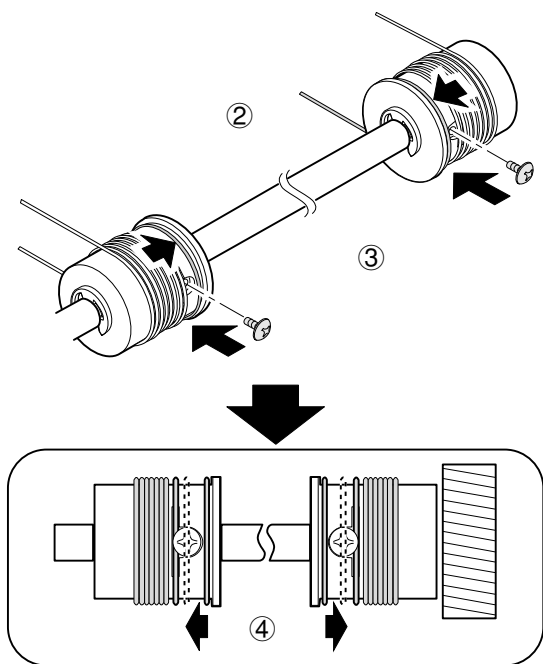
- ④ Pass it under the moving pulley supporting plate and wind it around the fixed pulley.
- ⑤ Pass it along the groove inside the double pulley.
- ⑥ Pass in through the L pulley.
- ⑦ Hook the mirror base wire spring on the groove at the left of the optical base plate.
(Same in the front and the rear side.)



F. Mirror base wire fixing

- ① Manually turn the mirror base drive pulley to bring the mirror base B into contact with the mirror base positioning plate.
- ② Shift the 9th winding tip of the mirror base wire from the pulley screw hole section.





③ Fix the mirror base wire to the pulley with the mirror base wire fixing screw.

④ Return the 9th winding tip of the mirror base wire to the original position. (Perform the same procedure for the front frame side and the rear frame side.)

(Note) After replacing the mirror base drive wire, perform the vertical skew adjustment, the focus adjustment, and the horizontal skew adjustment.

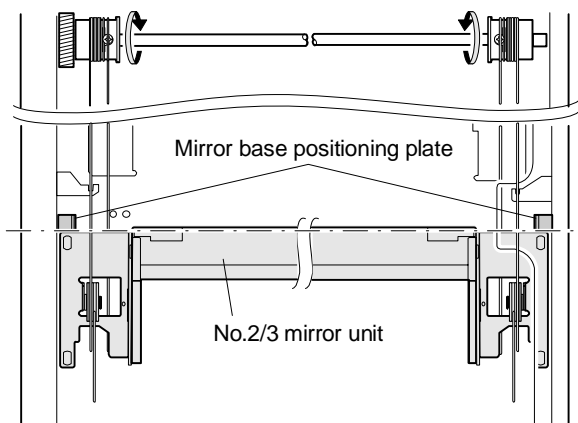
3) No. 2/3 mirror unit (mirror base B) installation (Mirror base B positioning)

This is to adjust the parallelism of mirror base B and the drum surface and the original surface.

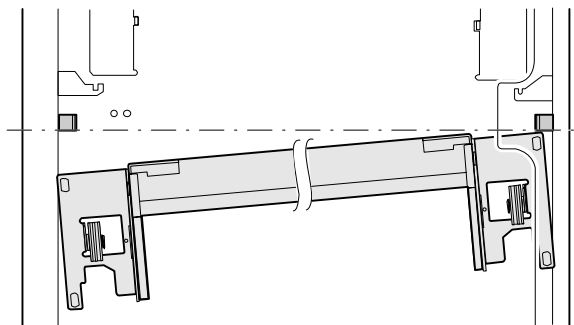
This adjustment must be performed in the following cases:

- When the mirror base drive wire is replaced.
- When mirror base A or mirror base B is replaced.

① Manually turn the mirror base drive pulley to bring the mirror base B in contact with the mirror base positioning plate. If the front side and the rear side of the mirror base B make contact with the mirror base positioning plate simultaneously, the parallelism of the mirror base B is proper, and there is no further adjustment.

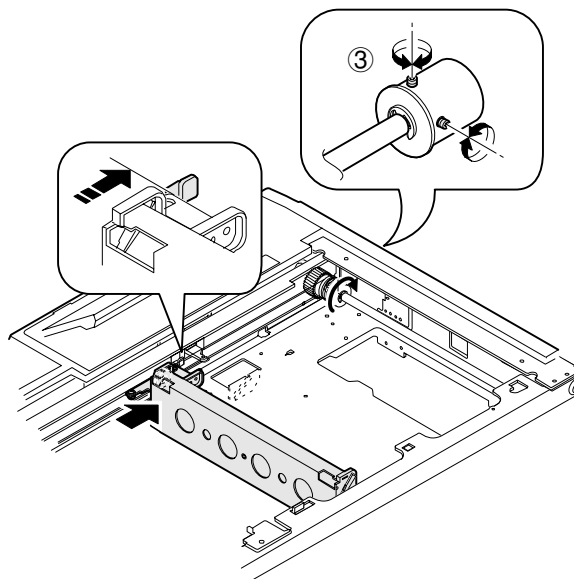


② If the parallelism of the mirror base B is improper as shown in the figure below (one side of the mirror base B is in contact with the positioning plate and the other side is not in contact), perform the following procedure.



③ Loosen the mirror base drive pulley fixing screw on the side where the mirror base B is not in contact with the positioning plate.

④ Manually rotate the mirror base drive pulley on the side where the mirror base B is not in contact with the positioning plate to bring the mirror base B into contact with the positioning plate.



⑤ Tighten the mirror base drive pulley fixing screw.

⑥ Manually rotate the mirror base drive pulley to separate the mirror base B from the mirror base positioning plate once, then bring it into contact with the positioning plate.

Check that the front side and the rear side of the mirror base B make contact with the positioning plate simultaneously.

⑦ If the condition of ⑥ is not satisfied, repeat procedures ③ through ⑥ until the condition is satisfied.

4) Copy lamp unit installation (Mirror base A positioning)

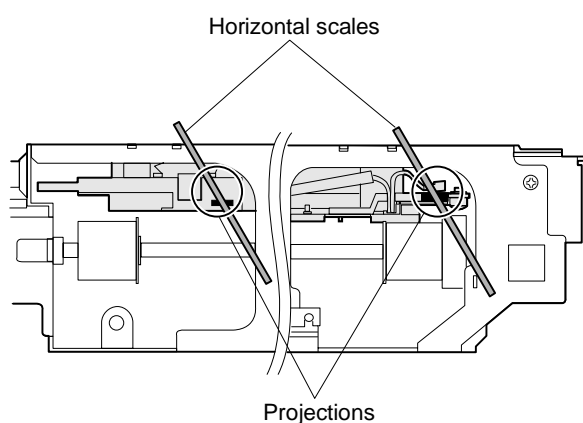
This adjustment must be performed in the following cases:

- When the mirror base drive wire is replaced.
- When the mirror base A or B is replaced.
- When any part in the dark box is replaced.

When installing the mirror base, reverse the removal procedure of (2)-A.

- ① Put the mirror base A in the copier. Pass the mirror base drive wires in the front frame side and the rear frame side through the clearance between the mirror base A and the mirror base wire fixing plate. Do not tighten the mirror base A wire fixing screw at that time.
- ② Bring the mirror base B into contact with the positioning plate, put a flat jig (such as a scale edge) onto the right surface of the optical base plate (paper feed side), press the projection of the copy lamp unit onto the jig and fix it with two screws.

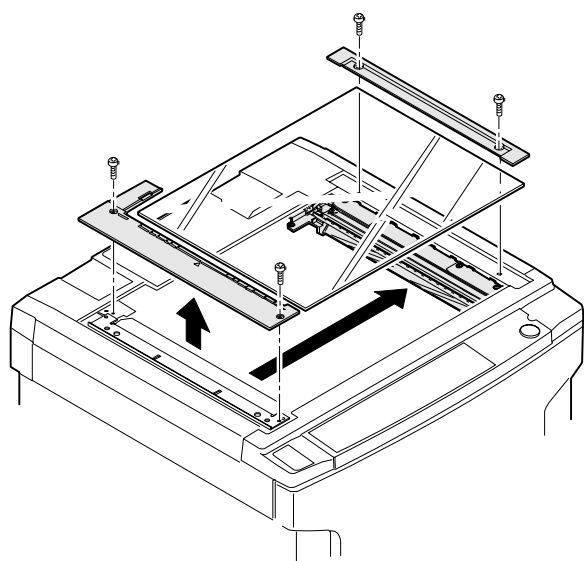
(Note) When tightening the copy lamp unit fixing screws, be sure to press the projection onto the scale.



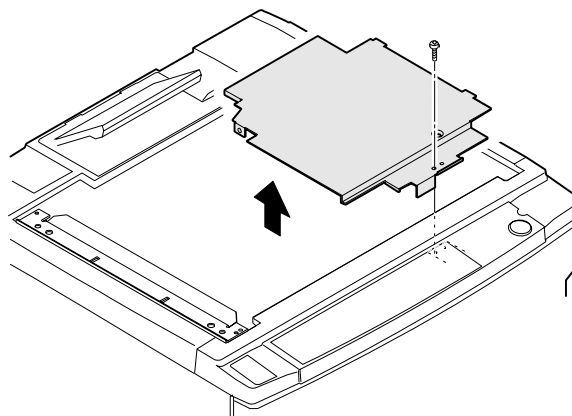
5) No. 4/5 mirror unit (mirror base C) replacement

A. No. 4/5 mirror removal

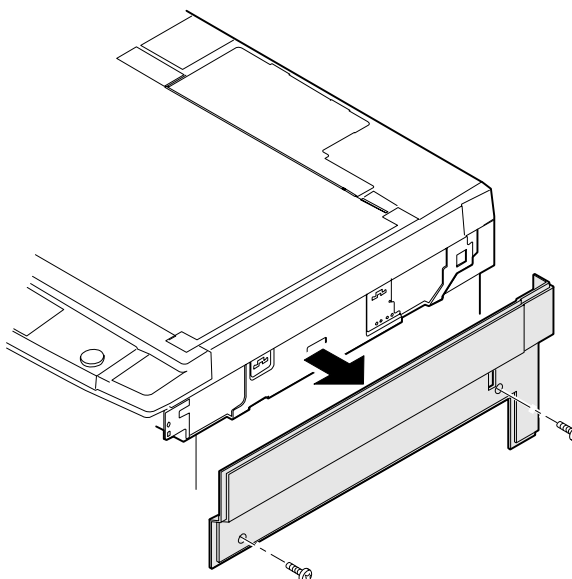
- ① Remove the OR guide L and R, then remove the table glass.



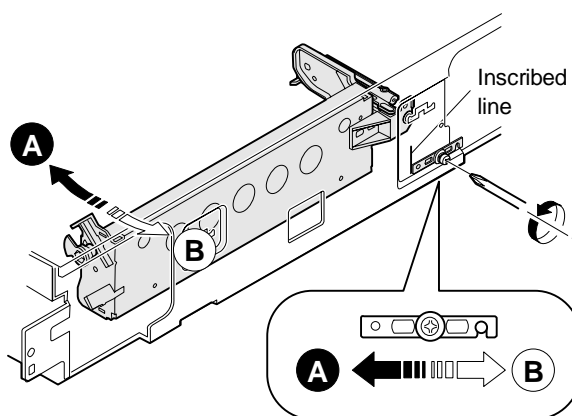
- ② Remove the dark box cover upper.



- ③ Remove the right cabinet.

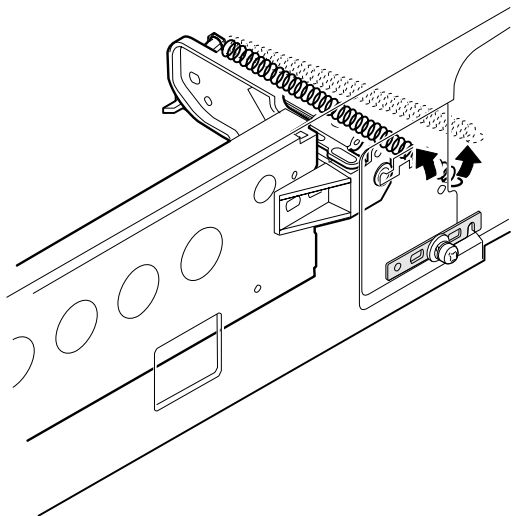


- ④ Remember the positions of the lens drive shaft attachment plate (in the directions of A and B) (Inscribe a line).

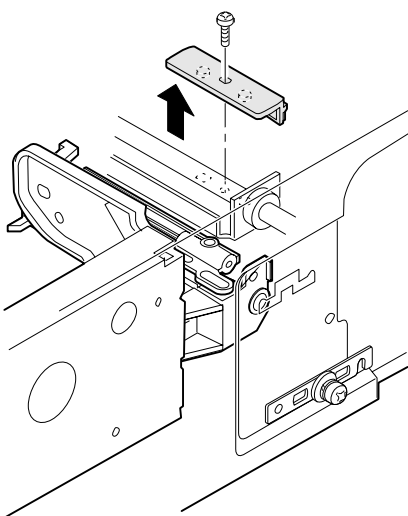


* (IMPORTANT) This is to prevent against defective focusing. (Measurable with a scale.)

- ⑤ Remove the drive springs 4 and 5.

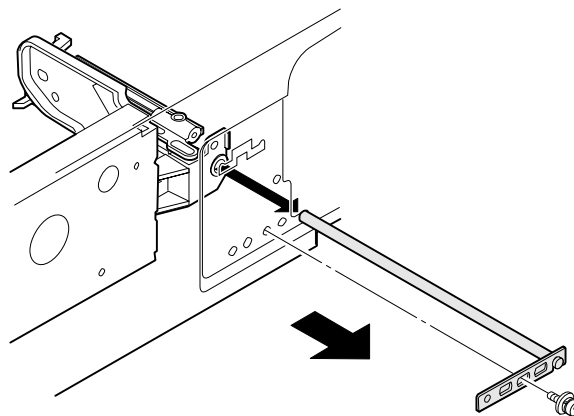


- ⑥ Remove the zooming rack of the roll holder unit.



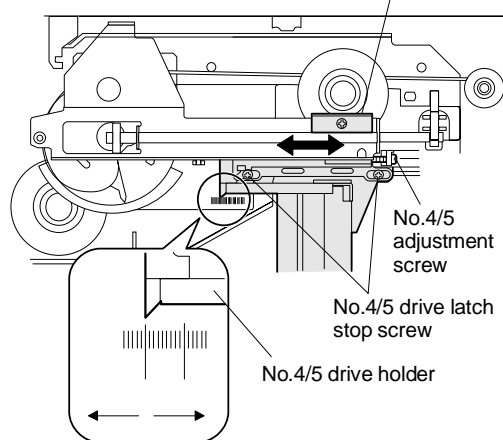
- ⑦ Remove the lens drive shaft attachment plate.

- ⑧ Remove the drive shafts 4 and 5.



* When removing the No. 4/5 mirror unit, remember the positions (scales) of the arrow marks of the drive holder 4 and 5.

Zooming rack



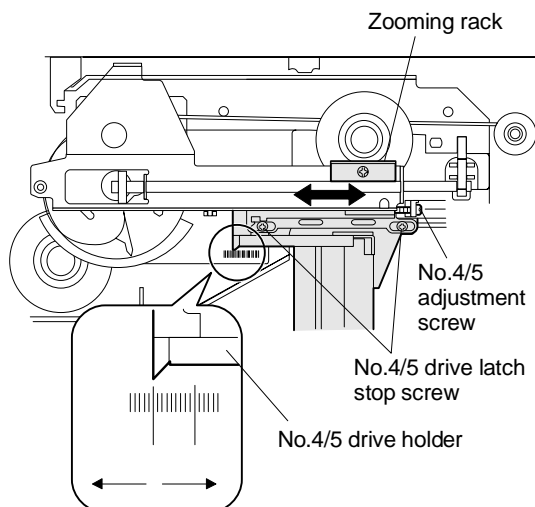
B. No. 4/5 mirror unit assembly

Reverse the above procedures.

<Note>

When attaching the lens drive shaft attachment plate, attach it to position 5 in the above description.

Fit the arrow positions of the drive holder 4 and 5 as the previous state.



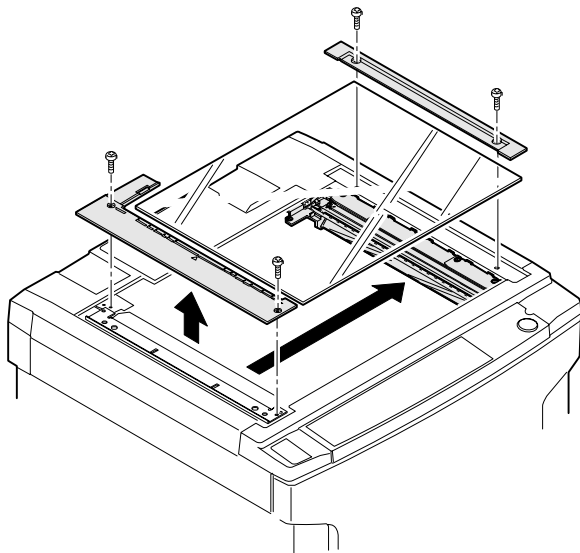
* When the arrow positions cannot be fit:

- ① Loosen the zooming rack screw and slide it to adjust.
- ② Loosen the two screws which are fixing the driver holder 4 and 5 and the drive latch 4 and 5. Adjust with the drive holder 4 and 5. After completion of adjustment, tighten the two screws.

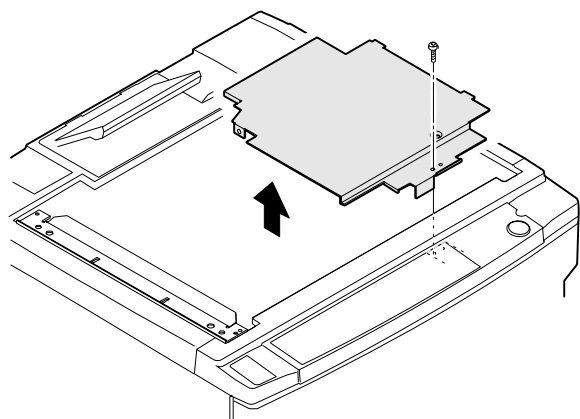
6) Lens wire replacement

A. Lens wire removal

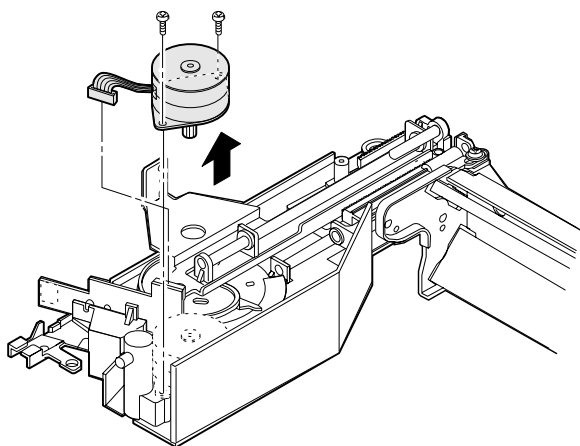
- ① Remove the OR guide L and R, and remove the table glass.



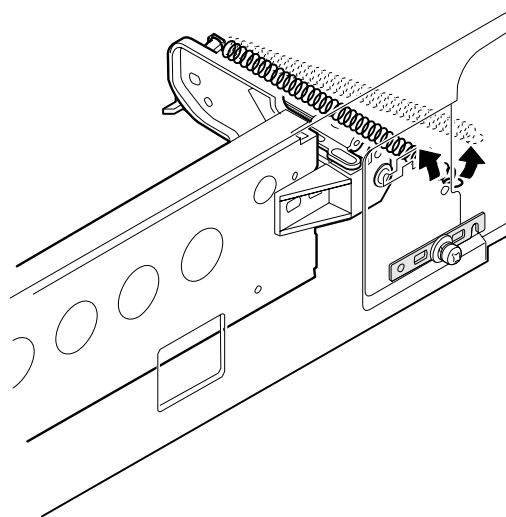
- ② Remove the dark box cover upper.



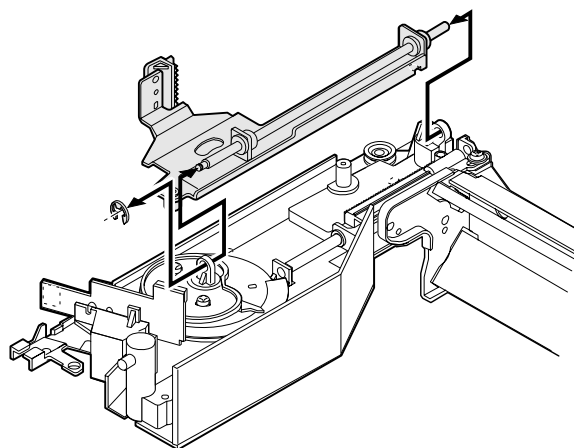
- ③ Remove the lens motor.



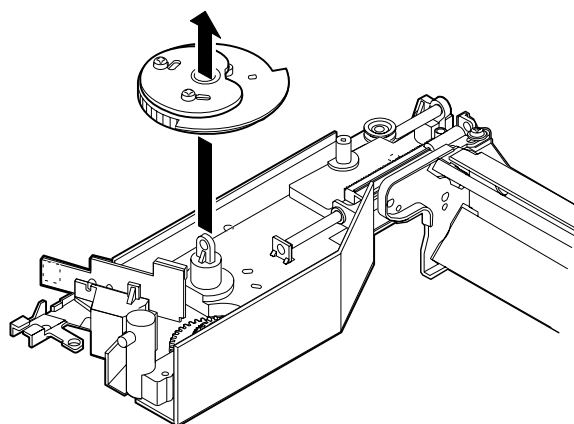
- ④ Remove drive spring 4 and 5.



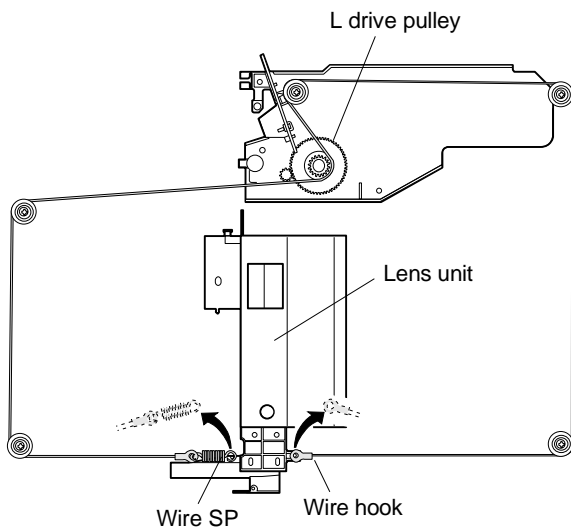
- ⑤ Remove the E-ring which is fixing the roll holder drive shaft, and remove the roll holder unit.



- ⑥ Remove the zooming can and the zooming cam drive gear (which are fixed with screws).



- ⑦ Remove the drive wire spring and the wire hook from the lens carriage boss.



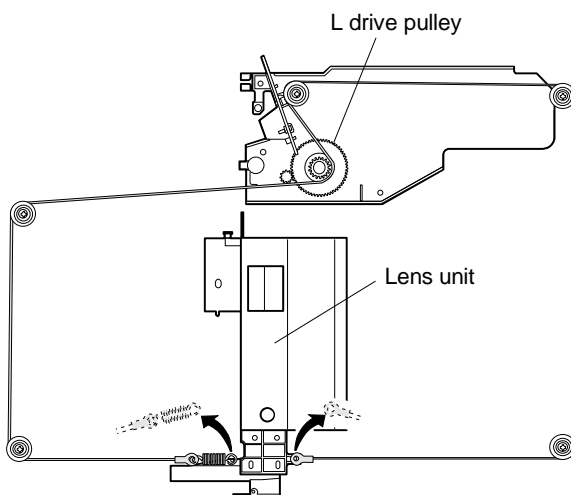
- ⑧ Remove the L pulley and the L drive pulley from the lens wire.

B. Lens wire stretching

1. This procedure is performed in the following case.

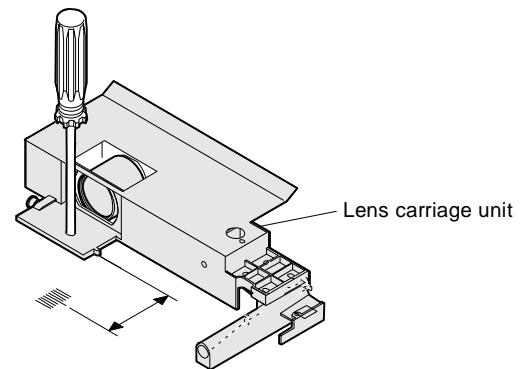
- (1) When the lens unit is removed.
- (2) When No. 4/5 mirror drive unit is disassembled.
- (3) When the copy is out of focus because relative position of the lens unit and No. 4/5 mirror unit is shifted by moving the lens unit itself back and forth without turning the L drive pulley.

* In order to move the lens unit of this machine back and forth in servicing, be sure to turn the L drive pulley. (If the lens unit itself is moved, the wire may slip at the L drive pulley and the relative position of the lens unit and No. 4/5 mirror unit is shifted, resulting in improper focusing.)

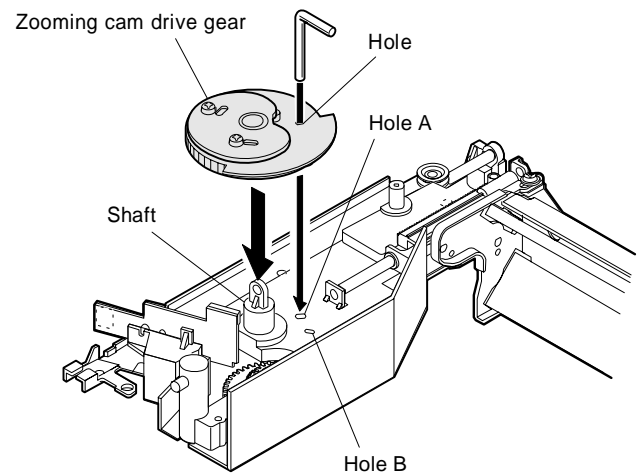


2. Procedures

- ① Manually move the lens carriage unit to fit the lens carriage hole with the optical unit frame hole (which is not the home position hole but the reduction side hole). Insert a pin into the holes, fix the lens unit, and stretch the wire.

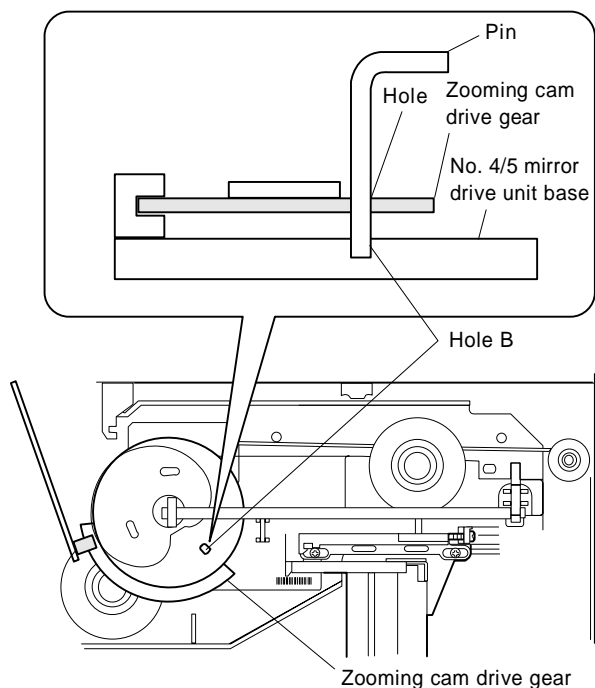


- ② Under the above state, fit the zooming cam drive gear hole with the No. 4/5 drive unit base hole A (by inserting a pin, etc.), and insert the zooming cam drive gear into the shaft.



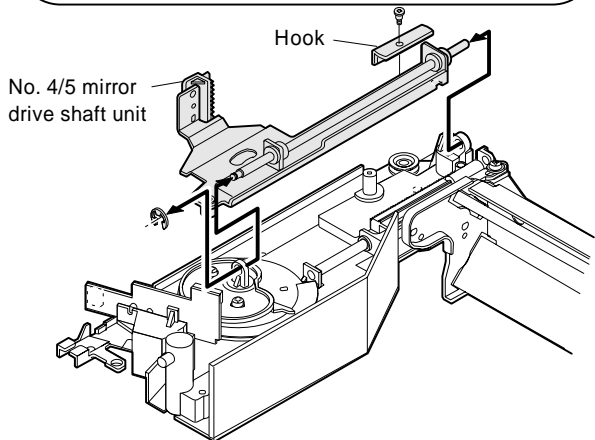
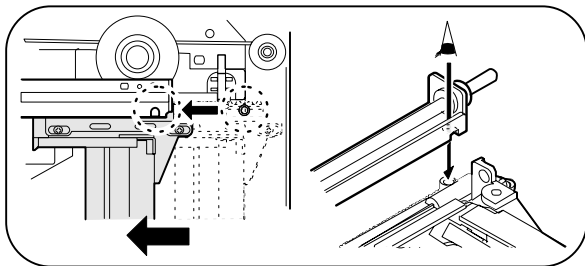
- ③ Remove the pin which fixes the lens unit and the zooming cam.

- ④ Manually turn the zooming cam drive gear to fit the zooming cam drive gear hole and No. 4/5 mirror drive unit base hole B.

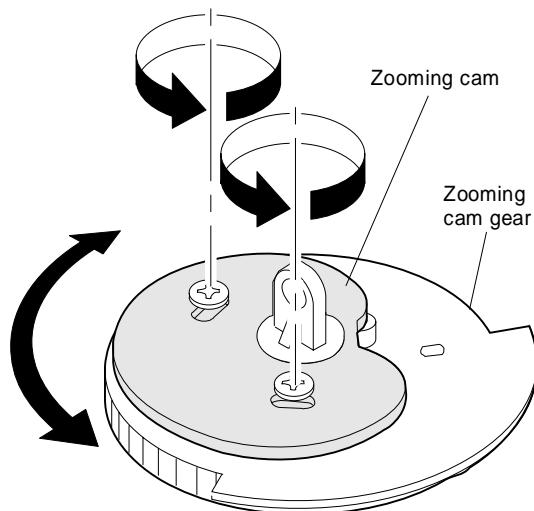


- ⑤ Install No. 4/5 mirror drive shaft unit and the rack.

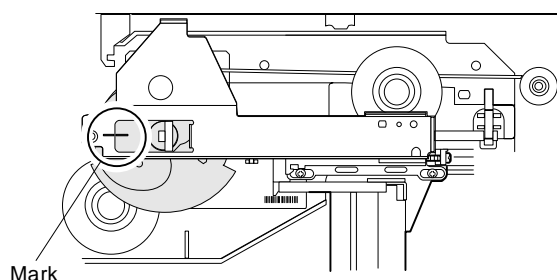
* When installing the rack, be sure to fit No. 4/5 mirror unit projection with No. 4/5 mirror drive shaft unit hole.



- ⑥ Loosen the zooming cam screw, and fit the mark of zooming cam drive gear with the mark of No. 4/5 drive shaft.



*Do not move the zooming cam gear at this time.

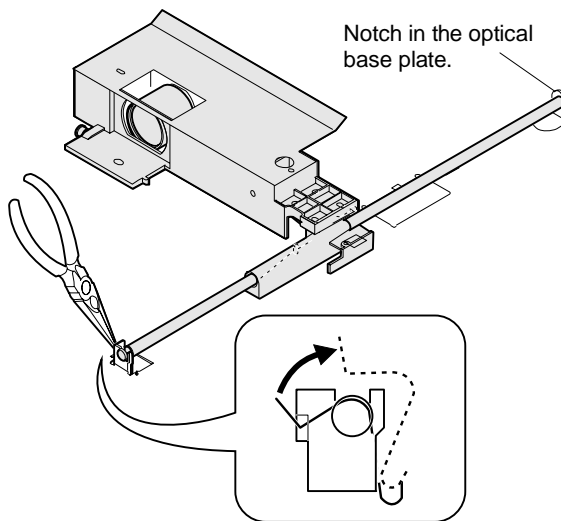


* After this procedure, be sure to perform the optical system adjustments (focus adjustment, etc.). (Refer to [7] ADJUSTMENTS.)

7) Lens unit replacement

A. Lens removal

- ① Remove the lens wire. (Refer to the procedure of "A. Lens wire removal" in 16) Lens wire replacement.)
- ② Hold the lens drive shaft with radio nippers and remove it.



- ③ Remove the lens drive shaft from the notch in the optical base plate. The lens unit is removed at that moment.

B. Lens unit installation

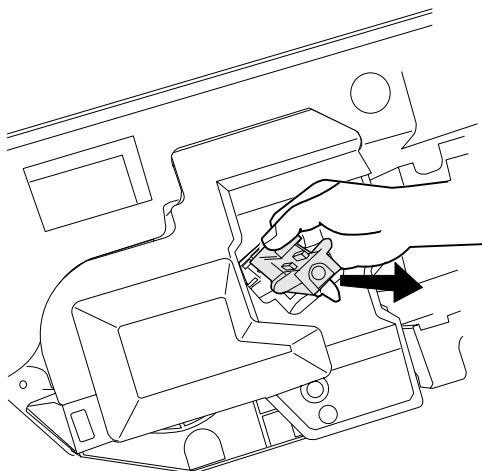
Reverse the disassembly procedures. (Refer to (6)-B. Lens wire stretching.)

5. High voltage section

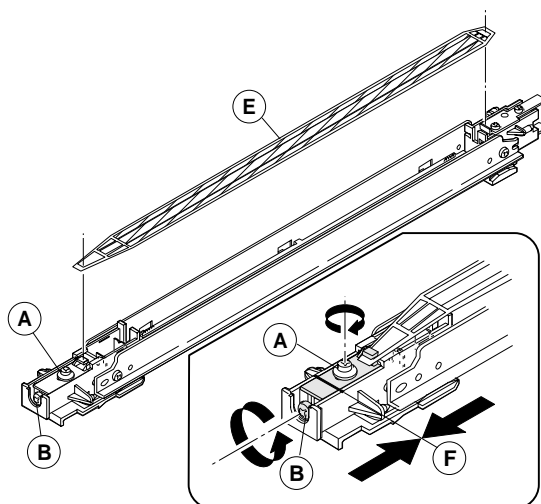
Clean the MC case, and the TC/SC case every 50K copies. Clean the screen grid, the charging plate (saw teeth), and the TC/SC wire every 50K copies, and replace them every 100K copies.

5-1. Main charger (MC) unit

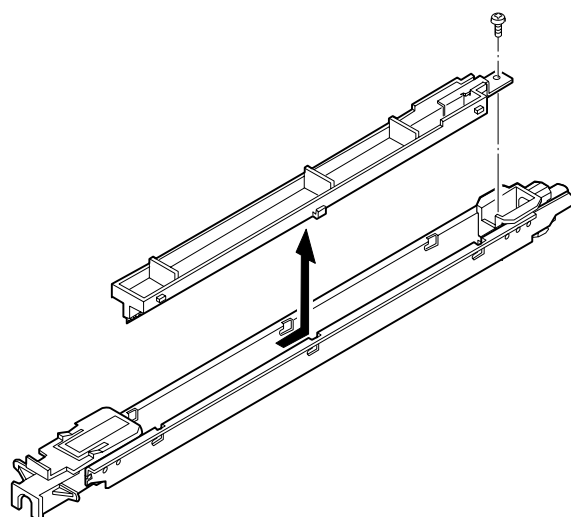
- ① Open the front cover.
- ② Hold the MC unit lock section, and pull out the MC unit.



- ③ Loosen screws (A) and (B), and remove screen grid (E).
(When attaching the screen grid, tighten screw (B) until the marking position (F) of grid holder (C) in the above figure is aligned with marking position (F) of MC holder (D), and tighten screw (A).)

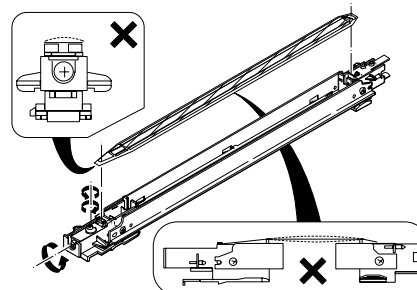


- ④ Remove the screw and remove the charging plate (saw teeth) ass'y.

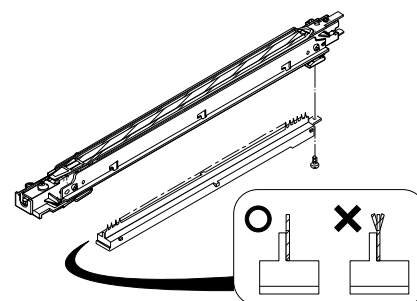


(Cleaning/replacement and note)

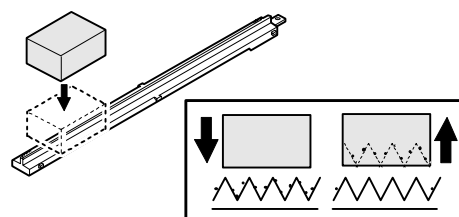
- ① When attaching the screen grid, be careful not to deform and dirt the screen grid. Check that the screen grid is securely in position.



- ② Be careful not to deform the saw teeth edge of the saw teeth ass'y.

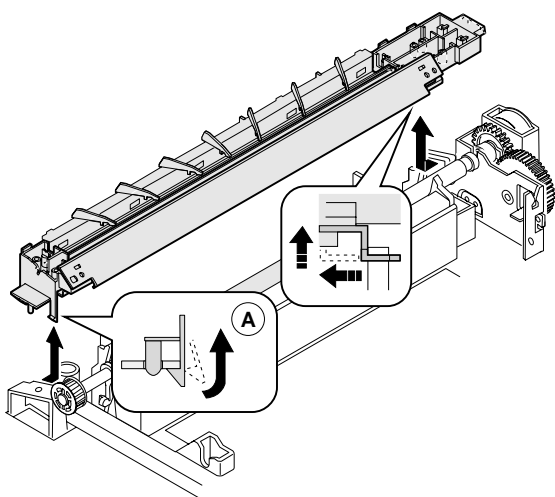


- ③ Do not touch the inside (saw teeth ass'y) of the MC case, the screen grid, and the saw teeth.
- ④ To clean the MC saw teeth, push styrene foam onto the saw teeth at right angles and remove dirt.



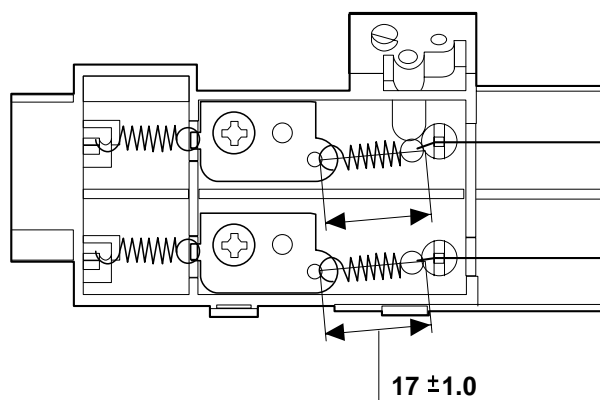
5-2. Transfer/separation charger (TC/SC) unit

- ① Open the front cover, and separate the upper and lower clamshell.
- ② Push two pawl sections (A) of the TC/SC unit, lift the front side and remove.

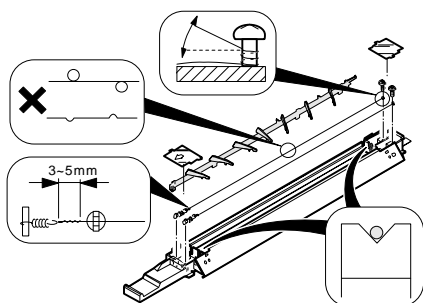


(Cleaning/replacement and note)

- ① The charger spring length must be 17 ± 1.0 mm.

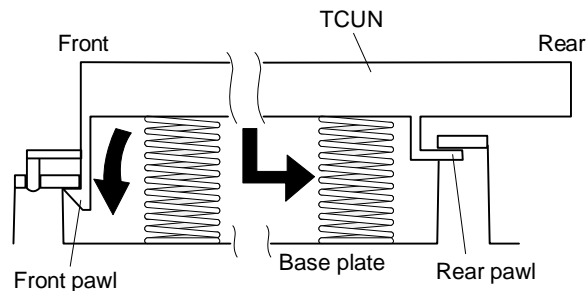


- ② The charger wire must be free from deformation, and must be in the wire positioning groove of each holder.
- ③ The charger case must be free from oil and foreign materials.

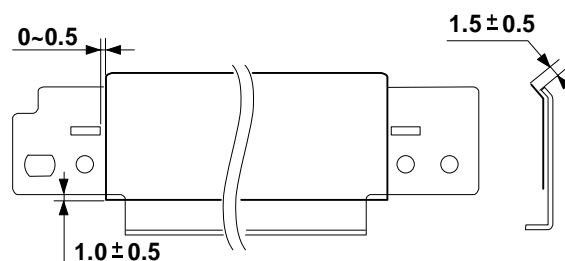


- ④ Clean the wire with alcohol.

- ⑤ When attaching the unit to the copier, check that the grounding springs are in contact with the TC/SC case (metal section) in the front and rear sides. (Visually check, and push the center of the TC/SC unit downward to check that it moves up and down.)



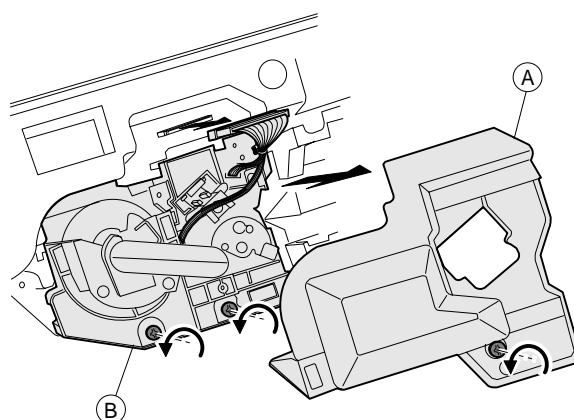
- ⑥ Transfer mylar lower
TC mylar lower attachment reference



6. Process section

6-1. Process unit

- ① Open the front cover and take out the developing unit. Open the upper and the lower clamshells.
- ② Remove the process cover (A) by loosening two screws.
- ③ Loosen two blue screws which are fixing the unit, disconnect one connector, and remove the unit (B). (Do not hold the toner transport pipe.)

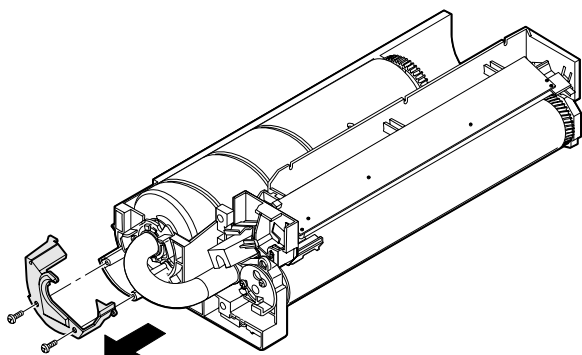


6-2. Waste toner bottle replacement (required when waste toner full detection/maintenance)

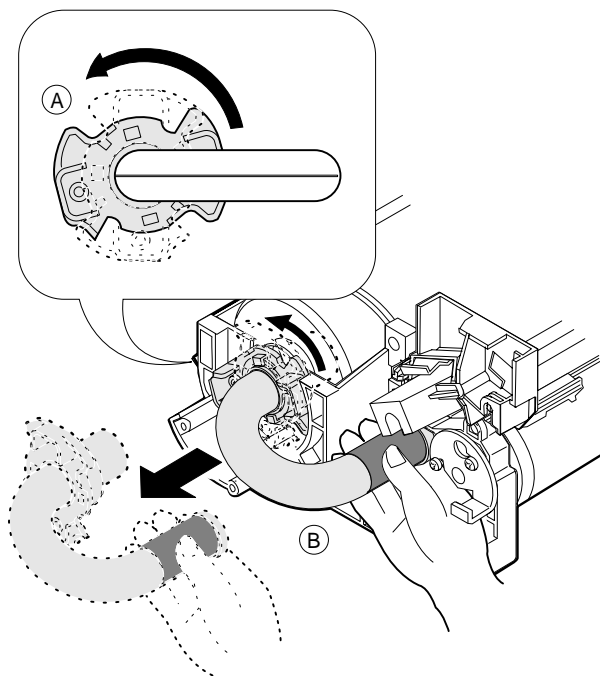
- ① Take out the process unit as shown above,

<Note> If the unit is removed by holding the toner transport pipe, toner is spilled. Avoid this.

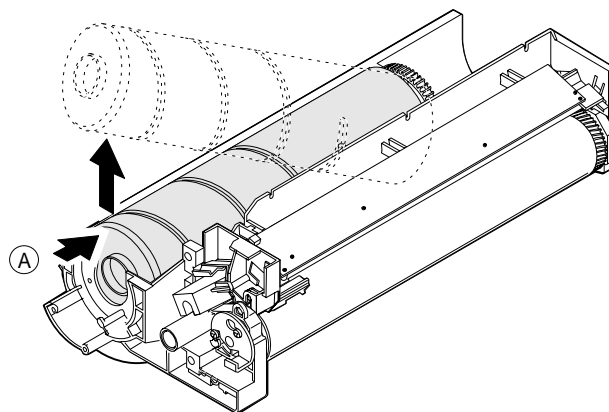
- ② Remove the bottle cover. (2 screws)



- ③ Rotate waste toner bearing 1 (A) 90 degrees counterclockwise. Hold the base of toner transport pipe (B) and pull it out. (At this time, toner may be spilled. Put a sheet under the pipe.)

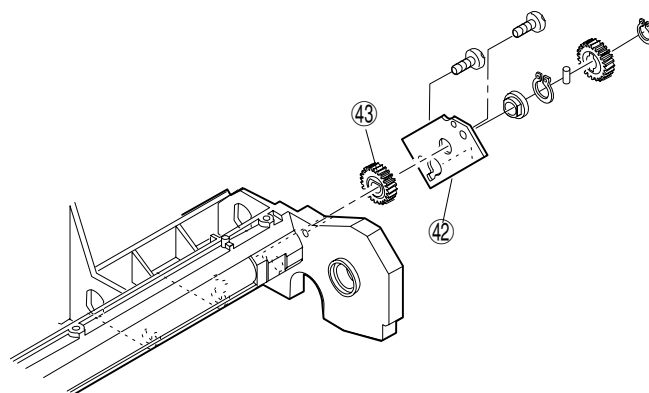


- ④ While pushing waste toner bottle in the direction of (A) and lift it and remove.

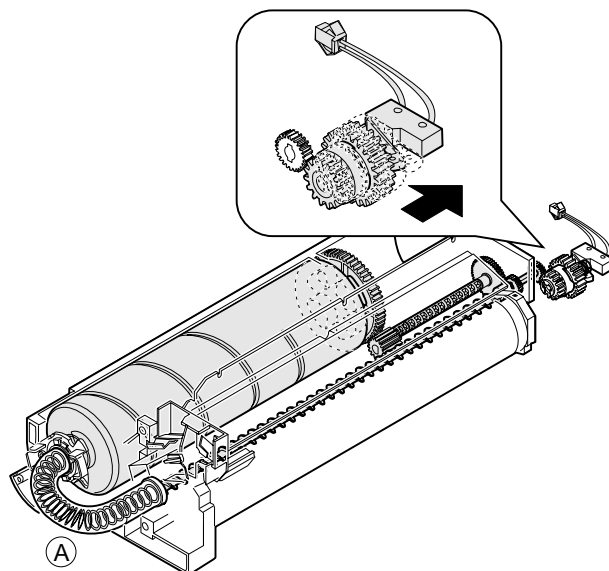


(Note for assembly/maintenance)

- ① As shown in the figure below, attach so that two projections of gear 19T (43) are on the rear frame side (on the screws supporting plate (42) side).



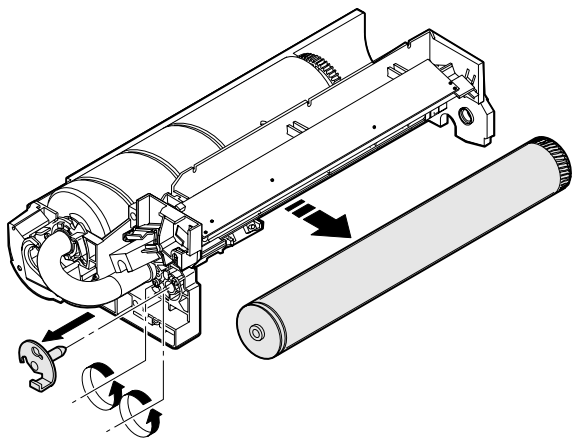
- ② Replace the waste toner bottle when waste toner full is detected or at 50K maintenance. At this time, clean and remove the waste toner from waste toner pipe (A).



6-3. Drum (Replace every 50K copies)

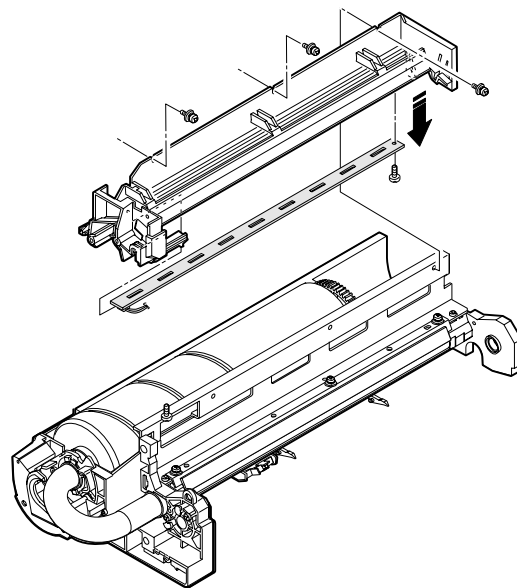
- ① Remove the process unit from the copier. (Refer to 6-1.)
- ② Loosen two blue screws which are fixing the drum, rotate the plate slightly to the right and pull it out.
- ③ Remove the drum.

<Note> Be careful not to scratch the drum.



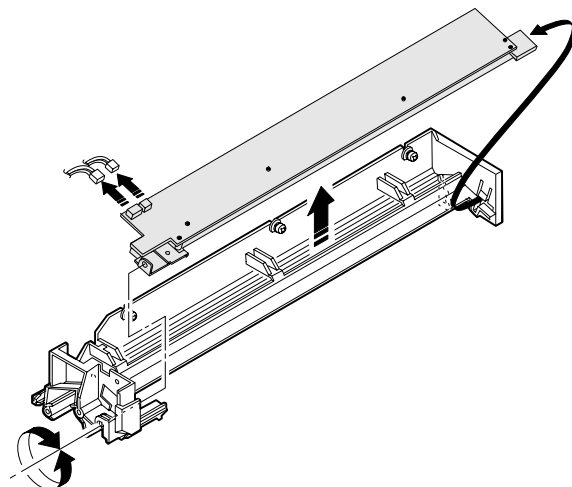
6-5. Discharge lamp unit (Clean every 50K copies.)

- ① Remove three blue screws which are fixing the process unit holder, slide the holder and remove it.
- ② Remove the discharge lamp unit. (one screw, one connector)



6-4. Blank lamp unit (Clean every 50K copies.)

- ① Remove three blue screws which are fixing the process unit holder, slide the holder and remove it.
- ② Tighten the blank lamp unit position adjustment screw completely, and remove the unit rear side, then loosen the screw.

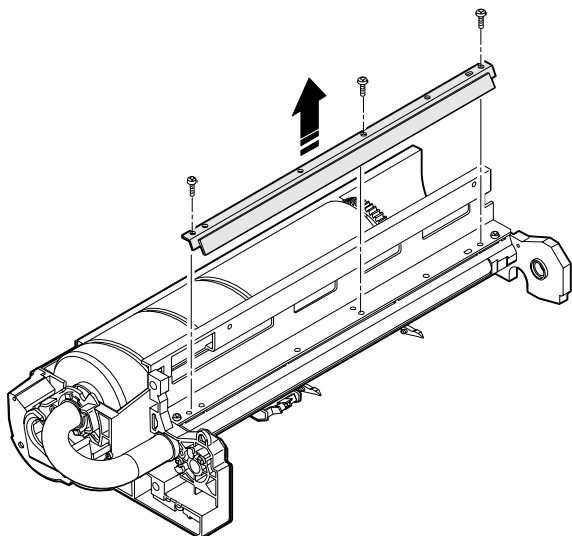


- ③ Remove two connectors of the blank lamp PWB, and remove the blank lamp unit.

<Note> When the unit is installed or replaced, adjust according to "Blank lamp position adjustment" in [7] ADJUSTMENTS.

6-6. Cleaner blade (Replace every 50K copies.)

- ① Remove the holder from the process unit. (3 blue screws)
- ② Remove the cleaning blade. (3 blue screws)



6-7. Drum separation pawl (Replace every 50K copies.)

Slide and remove the blue pin to remove the separation pawl. Replace the star-shape washer with a new one if it is worn down.

6-8. Process control PWB (Clean the sensor section every 50K copies.)

- ① Remove the holder from the process unit (3 blue screws), and remove the connector of the process control PWB.
- ② Remove the holder of the process control PWB (2 screws), and remove the PWB (2 screws).

6-9. Drum mark sensor PWB (Clean the sensor section every 50K copies.)

Remove the holder from the process unit (3 blue screws), and remove the marking sensor PWB. (1 screw).

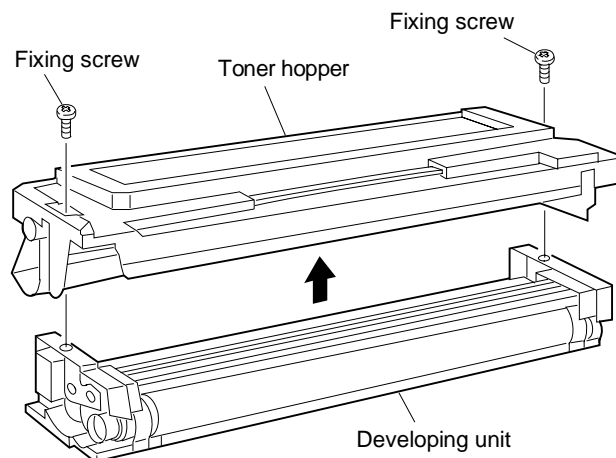
6-10. Toner reception seal (Replace every 50K copies.)

Remove the drum and remove two screws to remove the seal.

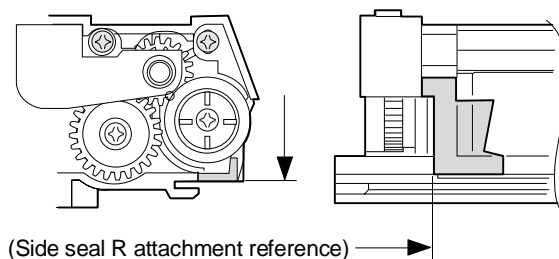
7. Developing section

A. DV side seals F/R replacement (Replace every 120K copies.)

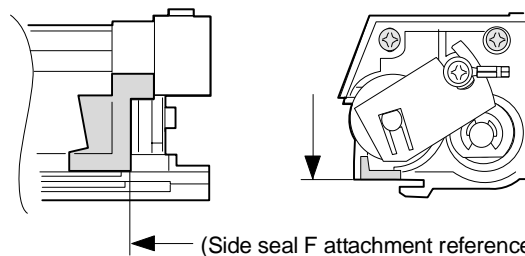
- ① Remove two screws which are connecting the hopper section and the developing unit, and separate them each other.



- ② Replace the developing unit side seals F/R as shown below.



(Side seal R attachment reference) →

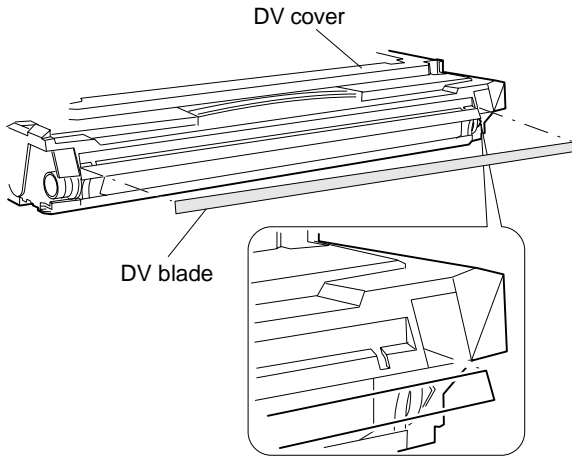


← (Side seal F attachment reference)

Note: Since the developing side seals are in the vicinity of the drum, be careful of peeling off and defective attachment.

B. DB blade replacement (Replace every 120K copies.)

- ① Remove the old DV blade from the DV cover. (Remove the duplex tape.)
- ② Attach the new DV blade with the pasteboard as shown below. (Attach the DV blade to the reference of A and the inscribed line (□0.2). Do not allow extrusion from the edge. Do not allow covering the inscribed line. The allowable reference shift is within 0.5mm from the inscribed line. Attach the sheet without being wavy.)

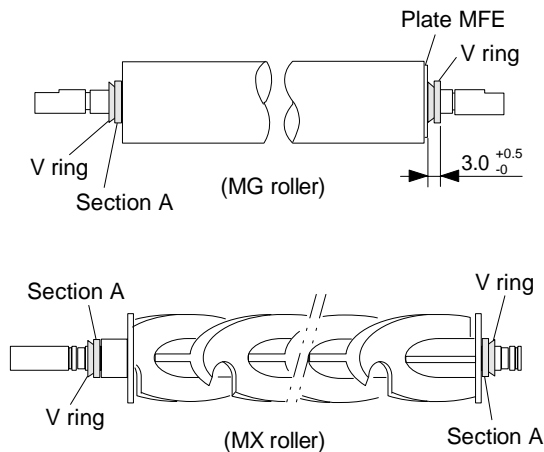


- ③ Remove the base pasteboard from the DV blade.

Note: If the pasteboard is not removed, the drum is scratched.

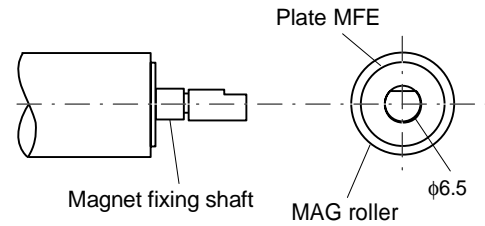
C. V ring attachment

Be careful of the direction of the V ring when attaching it to the MG roller and the MX roller.



- ① As shown above, be careful of the direction of the V ring.
- ② Do not allow clearance at section (A) between the V ring and each roller.
- ③ Attach the MG roller and the right V ring as shown in the figure. (3.0^{+0.5}₋₀)

※ Note: When replacing the MG roller, attach the plate MFE.



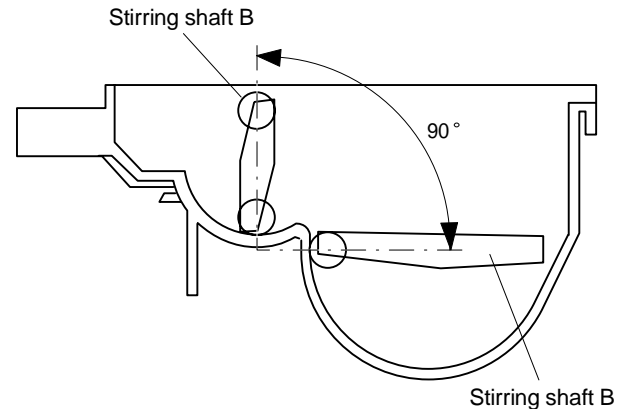
Do not allow contact between $\phi 6.5$ hole in the plate MFE and the magnet fixing shaft.

Remove oil and dirt from the attachment section.

※ Note: When attaching the MG roller, put the milled surface up.

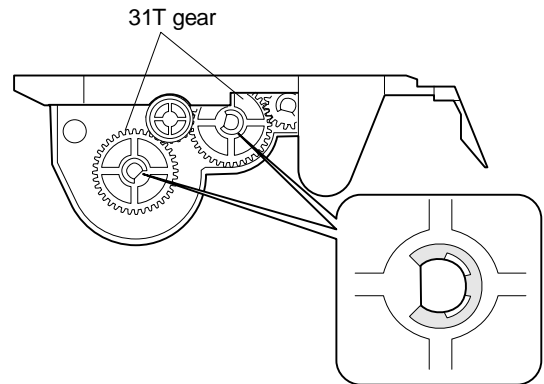
D. Note for toner hopper drive gear (31T) and stirring shaft attachment

- Be careful of the stirring shafts A and B attachment positions.



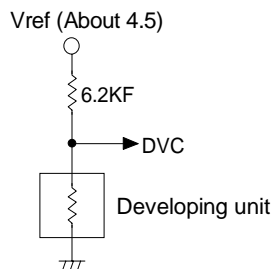
Attach so that the angle between stirring shaft A and B is 90 degrees.

- When attaching the toner hopper drive gear (31T), be careful of the E-ring stop position as shown below. (If the E ring is on the milled surface, it is apt to disengage.)



G. Developing unit color identification

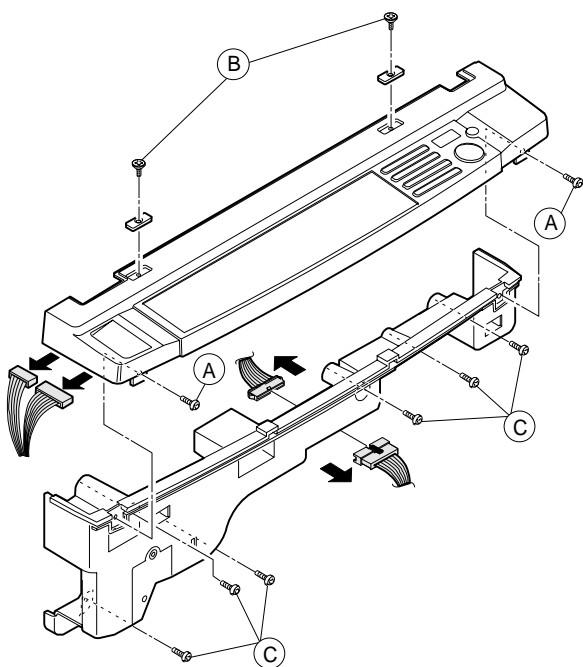
Color identification is made for different resistances of the developing unit.



Color	Resistance (K Ω)	Identification signal voltage (DVC) [V]
Black	0	0
Red	6.2	2.25
Blue	12.0	2.97

8. Operation panel/intermediate cabinet

- ① Open the front cabinet.
- ② Remove two screws (A), two screws (B), and two harnesses connected to the operation panel unit.
- ③ Remove the operation panel unit.
- ④ Remove the process cover unit, remove six screws (C) and two connectors, and remove the intermediate cabinet.

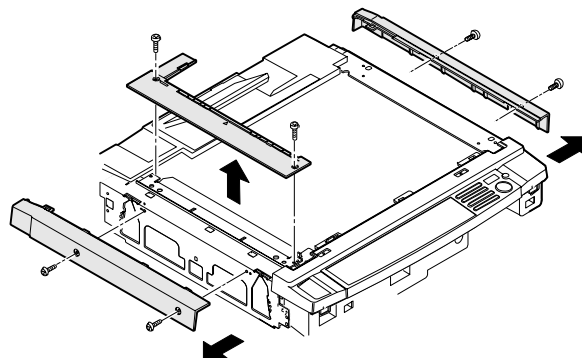


9. Frame major parts

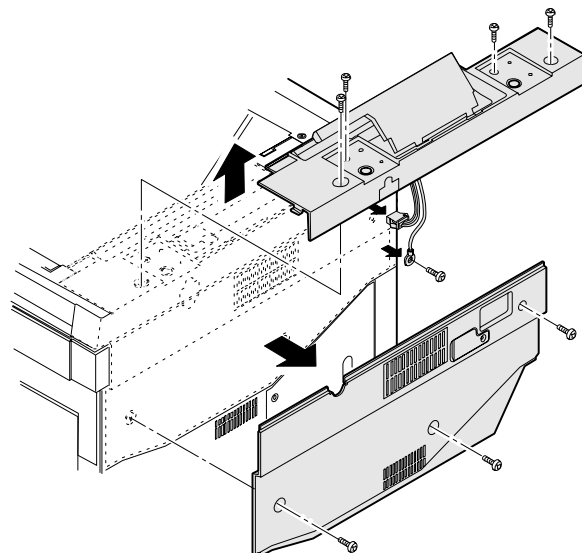
9-1. Cooling fan motor replacement

A. Cooling fan motor removal

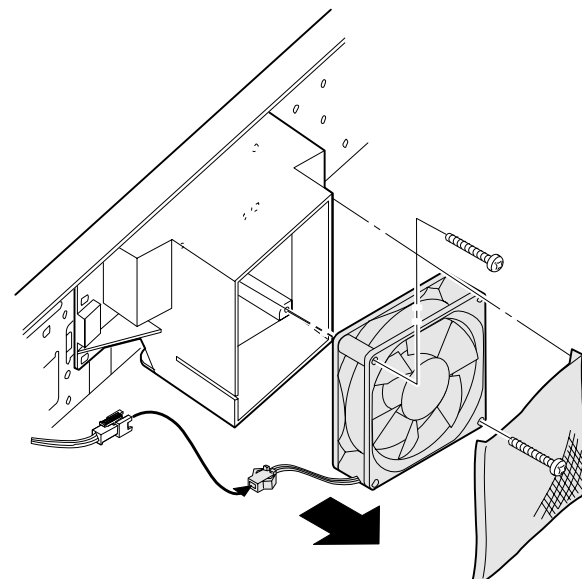
- ① Remove the original cover, the original guide, the upper cabinet left, and the upper cabinet right.



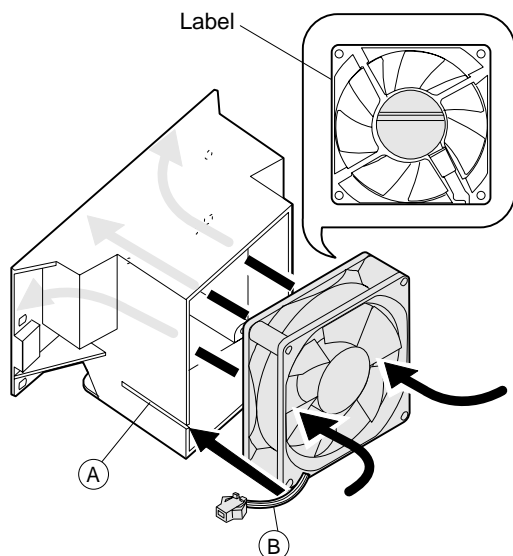
- ② Remove the upper cabinet and the rear cabinet.



- ③ Remove the cooling fan from the CFM duct. (2 screws, 1 connector)



B. Cooling fan motor

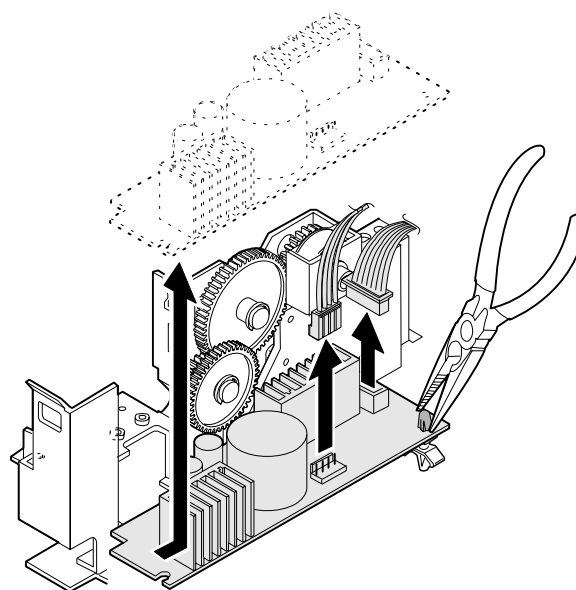


Reverse the removal procedures.

<Note> When attaching the cooling fan motor, put the harness section ② and the CFm duct groove section ① in the same direction, and pass the harness in the groove. Check that the fan center label is on the back when viewed from the rear of the machine. Check that air blows in the arrow direction (toward the machine).

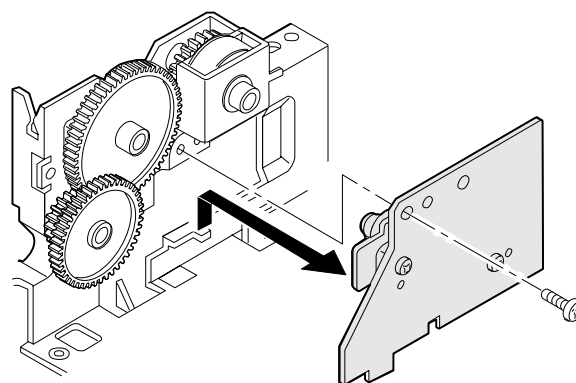
9-2. Power unit

- ① Remove the rear upper and lower cabinets.
- ② Remove two connectors, hold the PWB fixing bush with radio nippers and slide it toward the paper exit side to remove.



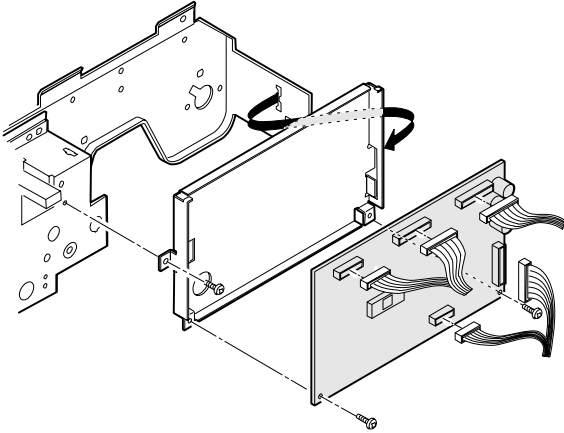
9-3. Tray size detecting PWB

- ① Remove the rear upper/lower cabinets.
- ② Remove the power unit.
- ③ Remove one fixing screw, one connector, and remove the tray size detection PWB.



9-4. Main PWB unit

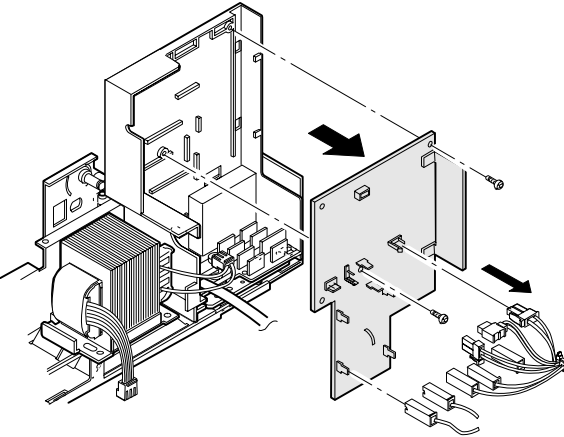
- ① Remove the rear cabinet upper.
- ② Disconnect all the connectors (6 connectors) connected to the main PWB.
- ③ Remove the main PWB plate (one screw).



- ④ Remove the main PWB from the plate. (2 screws)

9-5. AC power PWB

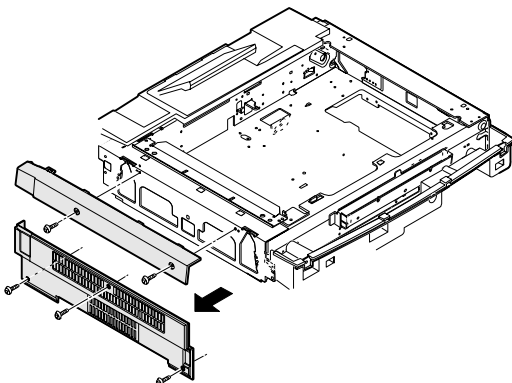
- ① Remove the main PWB unit. (Refer to 9-3.)
- ② Remove the rear cabinet lower.
- ③ Remove all the connectors (11 connectors) of the AC power PWB and remove one grounding wire connected between the AC power PWB and the copier chassis.



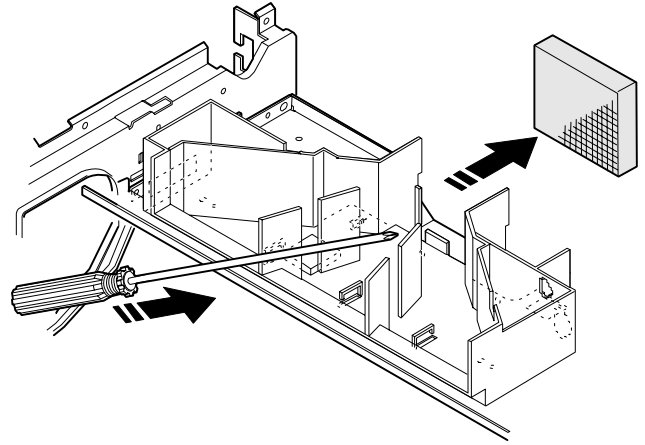
- ④ Remove two screws which are fixing the AC power PWB, and remove the PWB.

9-6. Ozone filter (Check every 50K copies, and clean every 100K copies.)

- ① Remove the upper cabinet left, and the left cabinet. (5 screws)



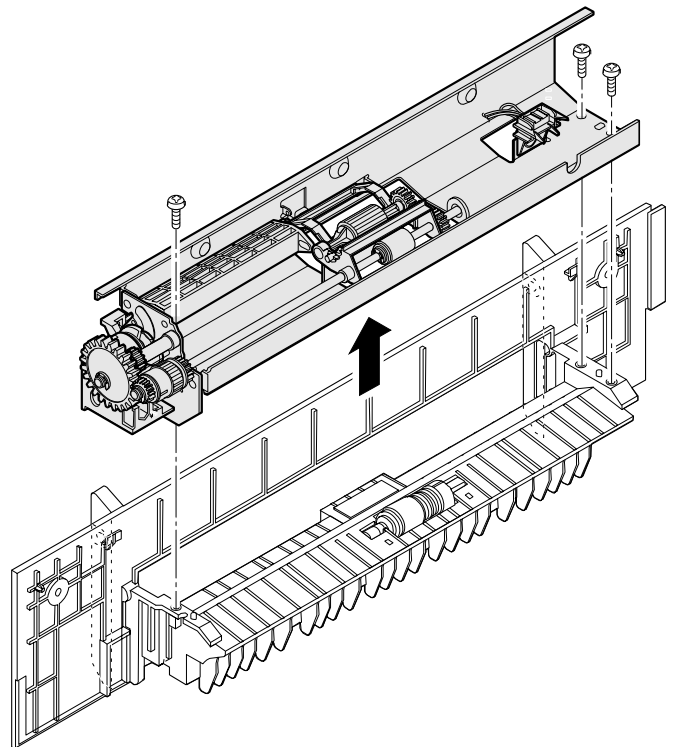
- ② Remove the ventilation fan motor (2 screws).
- ③ Remove the process unit. Insert a screwdriver from the process unit position into the copier to push out the oZone filter.



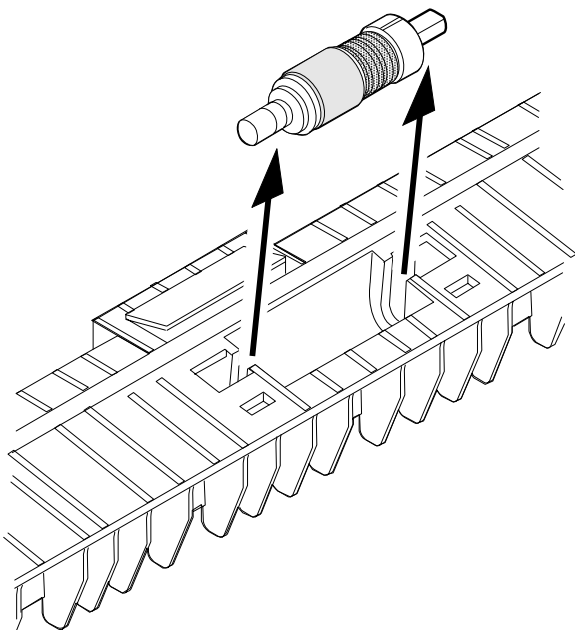
10. Multi paper feed unit (SF-MF15: option)

10-1. Separation roller

- ① Remove three screws and remove the paper feed/take-up roller ass'y.



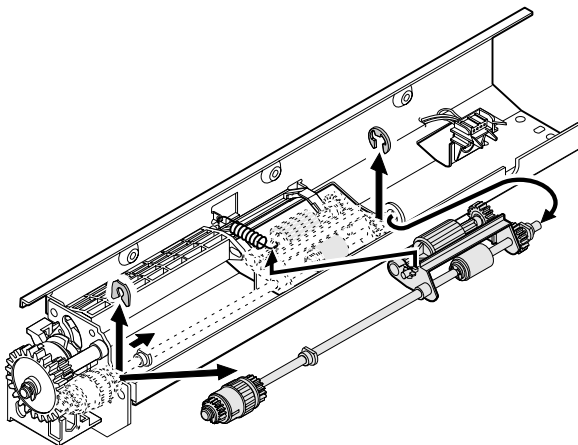
- ② Remove the separation roller.



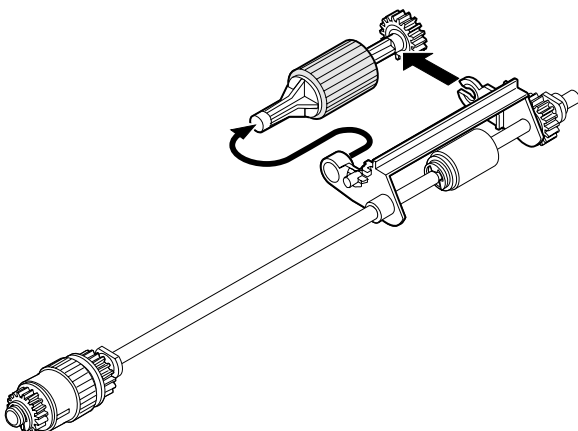
※ When attaching the roller, engage the D-cut section with the groove.

10-2. Take-up roller/paper feed roller

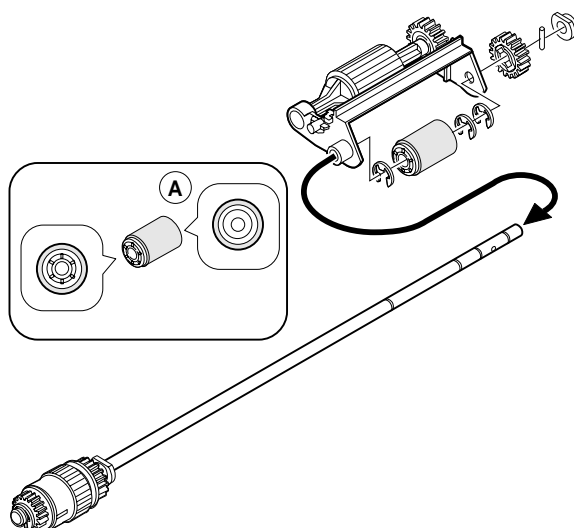
- ① Remove the manual feed arm spring, the bearing stopper, and the E-ring. (At this time, slide the bearing from the guide section in advance.)
- ② Lift the manual feed stopper, and remove the manual feed shaft ass'y.



- ③ Remove the take-up roller.



- ④ Remove three E-rings, and remove the manual feed shaft. then the paper feed roller will come off.



(Note for assembly)

The paper feed roller is provided with the one-way clutch, which must be installed in the proper direction. Attach so that the side where there is the one-way clutch (specified with "LOCK") is on the front frame side.

11. Two-stage paper feed unit (SF-CM15: option)

This unit had two stages of paper feed section of the SF-2118. For disassembly and assembly, refer to [5]-(1) Paper feed section.

[7] ADJUSTMENTS

1. Developing section

1-1. Developing doctor clearance adjustment

a. If the clearance between the developing doctor and the MAG roller is improper, the following trouble may occur.

- Insufficient copy density
- Background copy
- Toner splash

<Adjustment procedure>

- (1) Remove the developing unit from the copier.
- (2) Loosen four screws (A) which hold plate D fixed.
- (3) Insert two clearance gauges of 0.6mm into the clearance between plate D and the MAG roller.

<Note> For insertion of the clearance gauges, refer to the figure below.

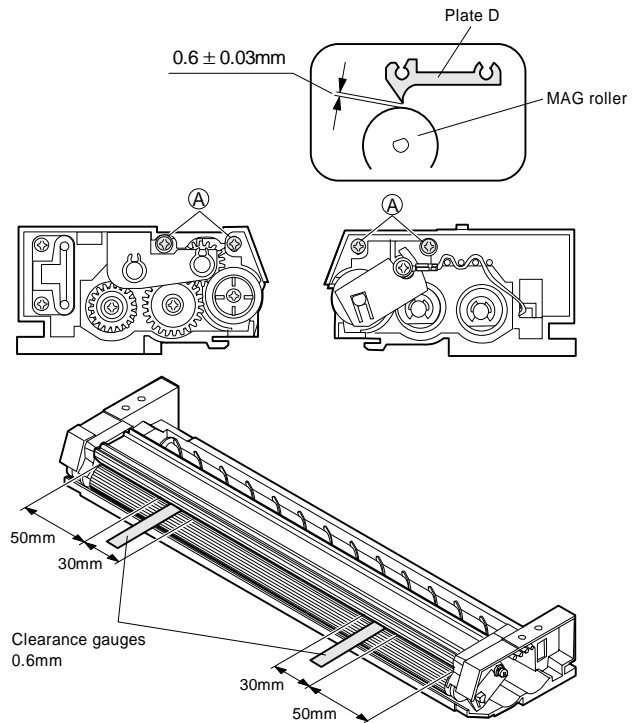
- (4) With two clearance gauges inserted, gently press plate D and tighten four screws (A).
- (5) Check that the clearances at two points 50 ~ 80 mm from the both ends of the developing doctor are within the specified range ($0.6 \pm 0.03\text{mm}$).

<Note 1> When inserting the clearance gauges, be careful not to scratch the plate D and the MAG roller.

<Note 2> When adjusting or checking, be careful not to allow foreign materials (oil, etc.) to attach to the MAG roller sleeve.

- (6) After adjustment, apply screw lock to the four screws (A).

* For color developing unit, use the specified value of $0.7 \pm 0.03\text{mm}$ for adjustment.



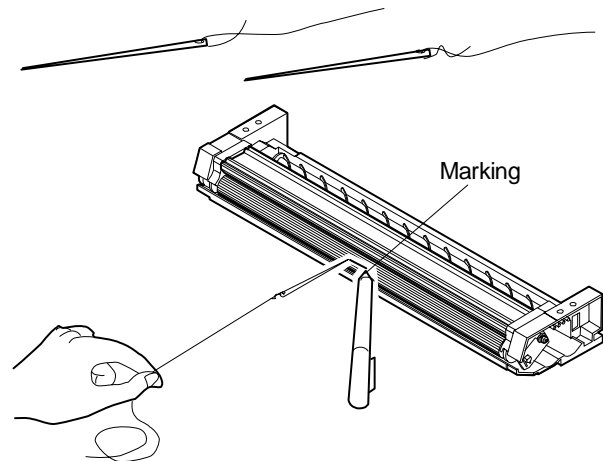
1-2. Developing magnet roller main pole position adjustment

a. If the MAG roller main pole position is improper, the following troubles may occur.

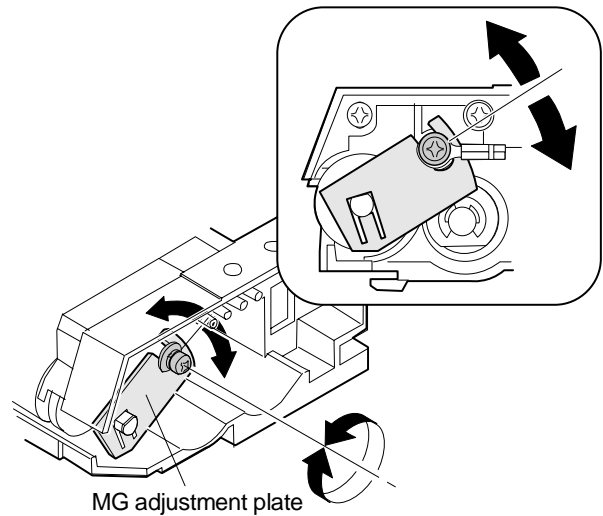
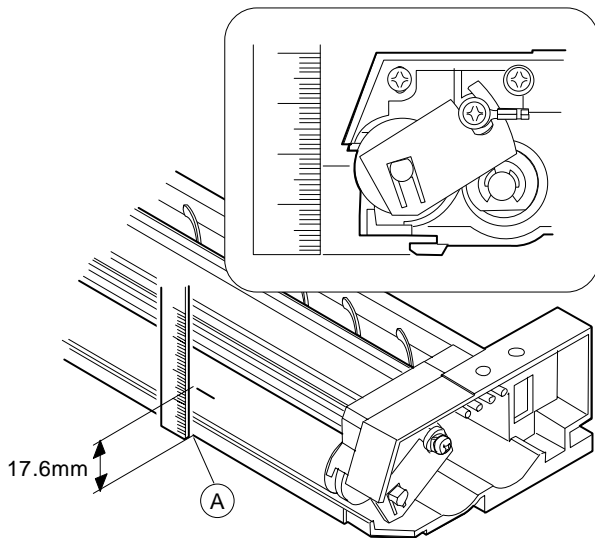
- Insufficient copy density
- Toner splash

<Adjustment procedure>

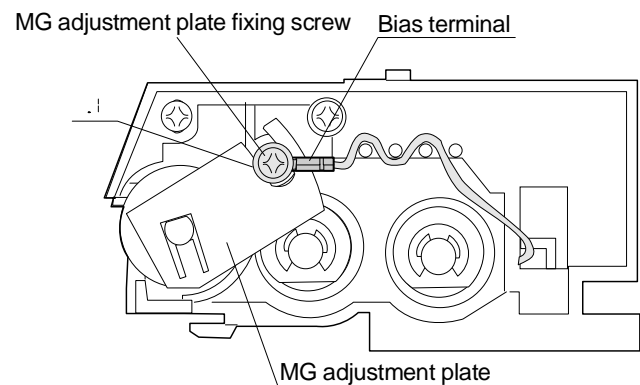
- (1) Remove the developing unit from the copier.
- (2) Tie a thread to a needle as shown below.
- (3) Hold the thread and bring the needle close to the MAG roller.
- (4) Mark the contact point of the thread on the MAG roller sleeve surface.



- (5) Measure the distance from the marking position to the bottom (A) of the developing unit and check that the distance is 17.6mm. If the distance is not as specified above, loosen the MG adjustment plate fixing screw, move the adjustment plate in the arrow directions and perform procedures (3) to (5) again.



- (6) After completion of adjustment, tighten the MG adjustment plate fixing screw. When tightening, check that the bias terminal is as shown below. After tightening the screw, apply screw lock to it.



2. Optical system

2-1. Adjustment items

1. Lens reference position adjustment
2. No. 4/5 mirror reference position adjustment
3. Vertical copy magnification ratio adjustment
4. Resolution adjustment
5. Horizontal copy magnification ratio adjustment
6. Comparison table of lens values and simulation input values
7. Vertical skew adjustment
8. Horizontal skew adjustment
9. Center shift adjustment
10. Exposure balance adjustment
11. Copy lead edge adjustment

2-2. Note for adjustments

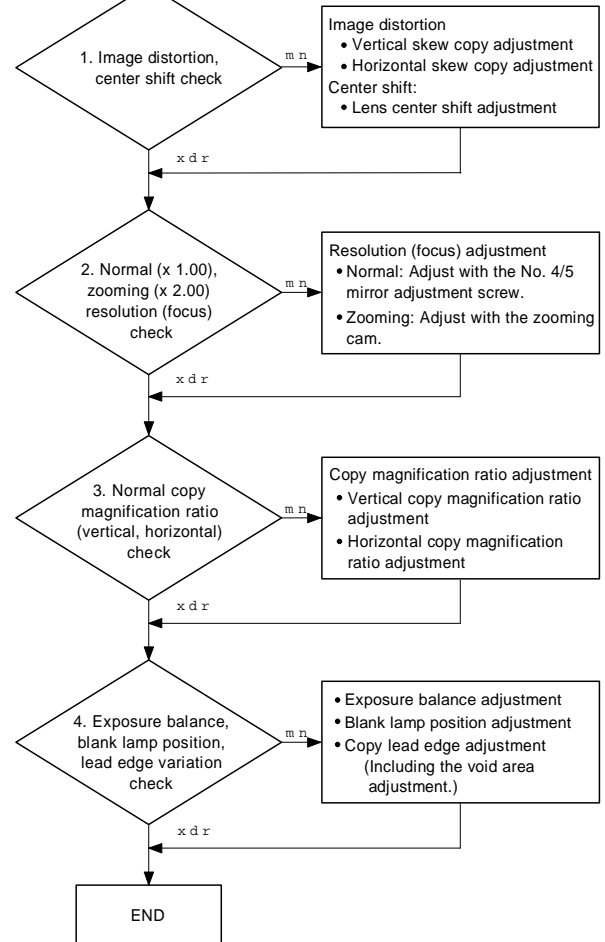
- Only the exposure balance adjustment, the blank lamp adjustment, and the copy lead edge adjustment can be performed individually.

For the other adjustments, follow the flowchart below.

1. Mechanical reference position adjustment (without copying)

- A. No. 2/3 mirror unit parallelism adjustment
- Vertical skew copy adjustment --- Manual adjustment
- B. Check the following preset values according to the lens focus rank.
- Lens reference position adjustment --- SIM 48-01
 - No. 4/5 mirror reference position adjustment --- Manual adjustment

2. Adjustment while copying



2-3. Adjustment of each section

A. Lens reference position adjustment

In this model, the reference value according to each lens characteristics must be entered. With this value, the lens home position is determined.

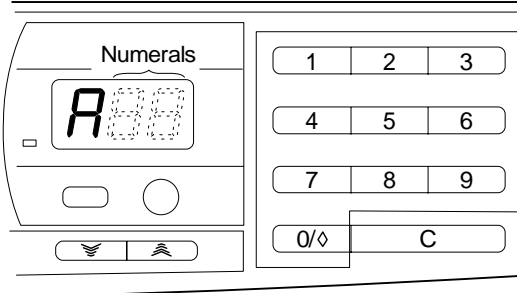
<Procedure>

(1) Execute simulation 48-01

- Perform the following key operation.

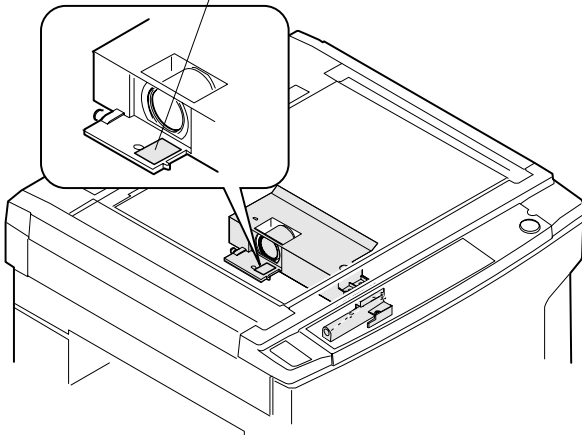
$\boxed{C} - \boxed{=/\diamond} - \boxed{0/\diamond} - \boxed{=/\diamond} - \boxed{4} - \boxed{8}$
 $- \boxed{PSW} - \boxed{1} - \boxed{PSW}$

"A" is displayed on the third digit of the copy quantity display, and the previously set value or 50 is displayed on the second and the first digits.

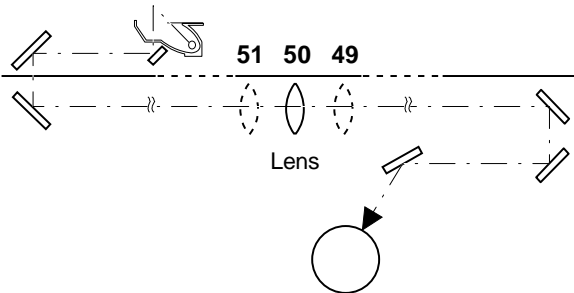


- Substitute the "O - L" value (variation in the distance between the original and the lens) on the lens value label attached to position B shown in the figure below into the following formula, and input the obtained value.

B (Lens value label)



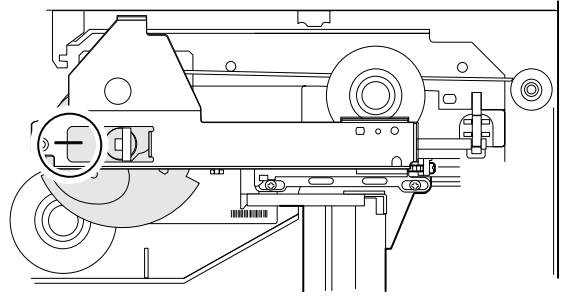
$$50 - \{(O - L \text{ value}) \times 5\} = \text{Correction reference value}$$



<Example> When the lens value is +1.2;
 $50 - (1.2 \times 5) = 44$ (Correction reference value = input value)

<Check after adjustment>

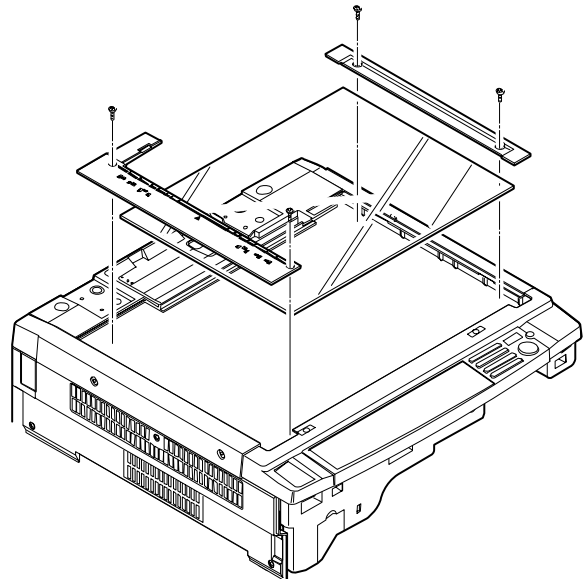
Be sure to check that the magnification ratio cam is at the home position as shown in the figure below.



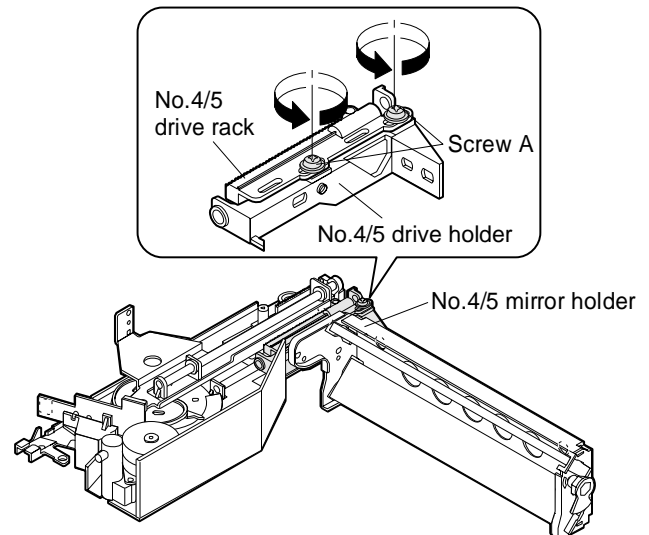
B. No. 4/5 mirror reference position adjustment

<Procedure>

(1) Remove the external fittings.

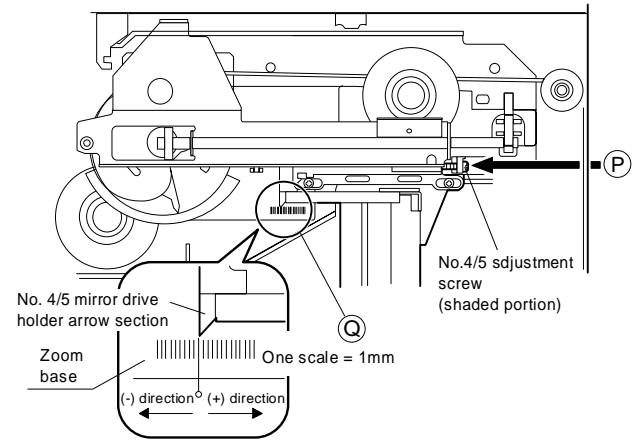


(2) Loosen two screws (A) which are fixing the No. 4/5 mirror and the No. 4/5 mirror drive holder to the No. 4/5 mirror holder.



- (3) Check to confirm the lens value specified on the lens value label.
- (4) Insert a screwdriver into hole (P) in the right rear side (paper feed side) of the optical base plate, and adjust the adjustment screw. The scale on the zoom base at section Q in the figure below determines the position of the No. 4/5 mirror corresponding to the lens value.

<Example> When the lens value is +1.2, loosen the adjustment screw and adjust so that the arrow section of the No. 4/5 mirror drive holder points to the zoom base scale at +1.2.
Turning the adjustment screw clockwise moves the No. 4/5 mirror drive holder arrow section in the (-) direction, and turning it counterclockwise moves the arrow section in the (+) direction.



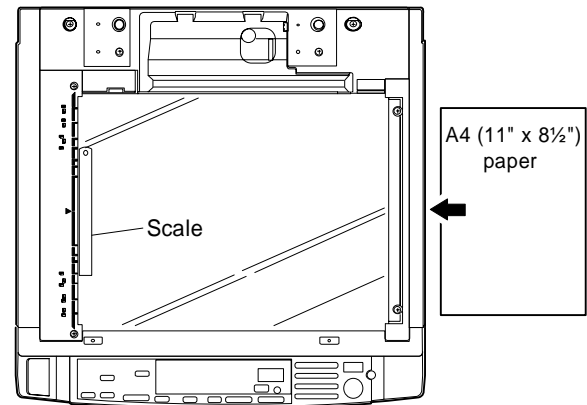
C. Vertical copy magnification ratio adjustment

Be sure to check that mirror bases A, B and C are in parallel and that the focus is proper before executing this adjustment. This adjustment must be performed in the following cases.

- When the lens home position sensor (LHPS) is replaced or its installation position is changed.
- When the lens is replaced.
- When the mirror base is replaced or its installing position is changed.
- When the main PWB is replaced.
- When the EEPROM inside the main PWB is replaced.

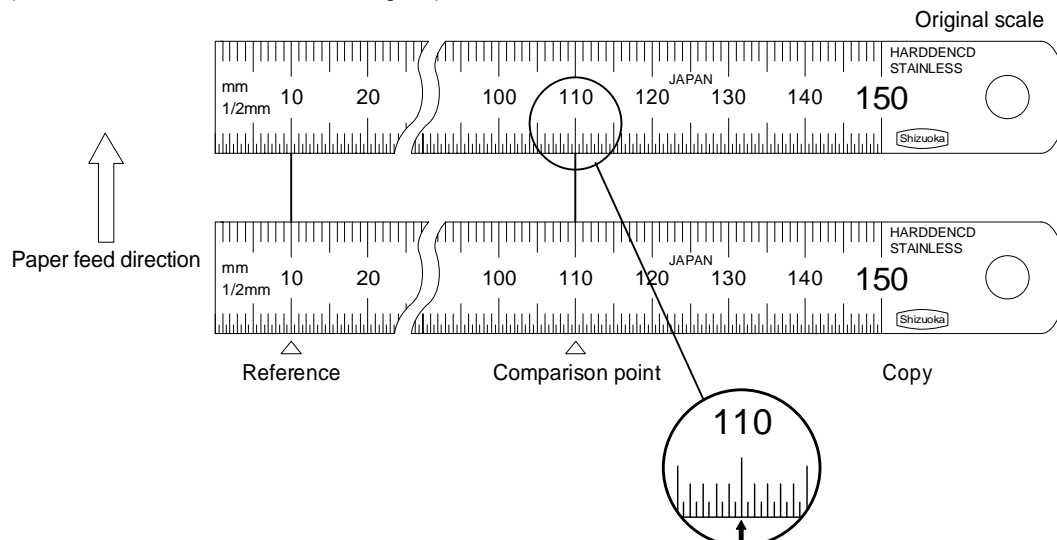
<Procedure>

- (1) Put a scale on the original table as shown in the figure below.



- (2) Make a normal copy (100%) on an A4 (11" x 8½") paper.
- (3) Compare the scale image length and the scale length.

(When a 100mm scale is used as the original.)



- (4) Calculate the copy magnification ratio.

$$\text{Copy magnification ratio} = \frac{\text{Copy image size}}{\text{Original size} \times 100\%}$$

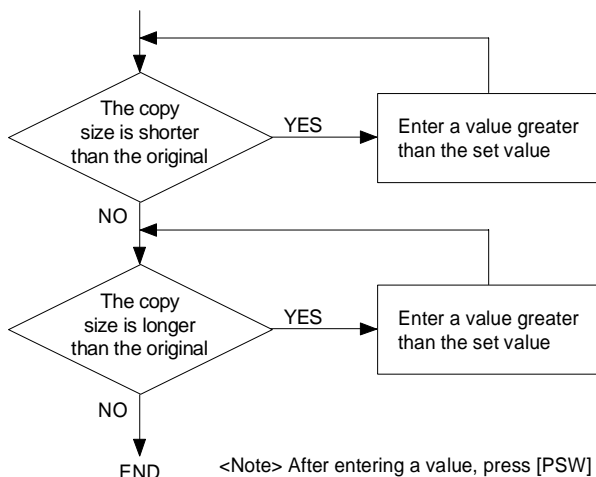
- (5) Check that the obtained copy magnification ratio is within the specified range ($100 \pm 0.8\%$). If it is within the specified range, go to procedure (7). If not, execute simulation 48-1.

- Perform the following key operation.

[C] — [↔] — [0/◇] — [↔] — [4] — [8]
— [PSW] — [1] — [PSW]

"A" is displayed on the third digit of the copy quantity display, and the previously set value or 50 is displayed on the second and the first digits. (Refer to "D-1. Lens reference position adjustment.")

- (6) Perform the magnification ratio adjustment according to the flowchart below.



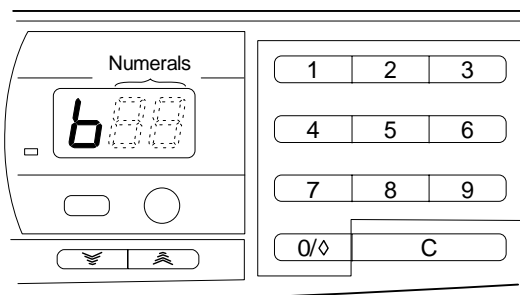
- (7) Copy the scale at 200%.

- (8) Check that the copy magnification ratio is within the specified range ($100 \pm 0.9\%$). If it is within the specified range, go to procedure (9). If not, enter [%] key in simulation 48-1 as follows:

- Perform the following key operation.

[C] — [↔] — [0/◇] — [↔] — [4] — [8]
— [PSW] — [1] — [PSW]

"B" is displayed on the third digit of the copy quantity display, and the previously set value or 50 is displayed on the second and the first digits.



- (9) Adjust the copy magnification ratio according to the flowchart shown in (6).

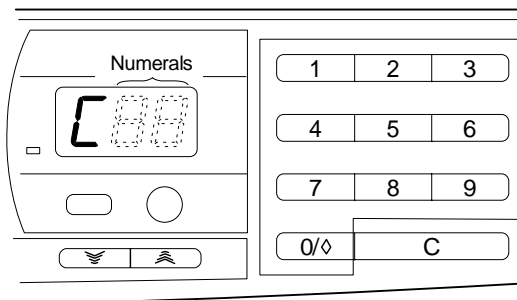
- (10) Make a copy at 50%.

- (11) Check that the copy magnification ratio is within the specified range ($100 \pm 0.9\%$). If it is in the specified range, the vertical copy magnification ratio is completed. If not, enter [%] in simulation 48-1 as follows:

- Perform the following key operation.

[C] — [↔] — [0/◇] — [↔] — [4] — [8]
— [PSW] — [1] — [PSW]

"C" is displayed on the third digit of the copy quantity display, and the previously set value or 50 is displayed on the second and the first digits.

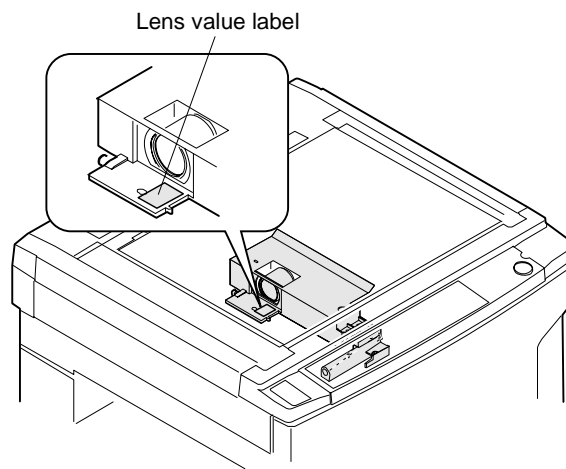


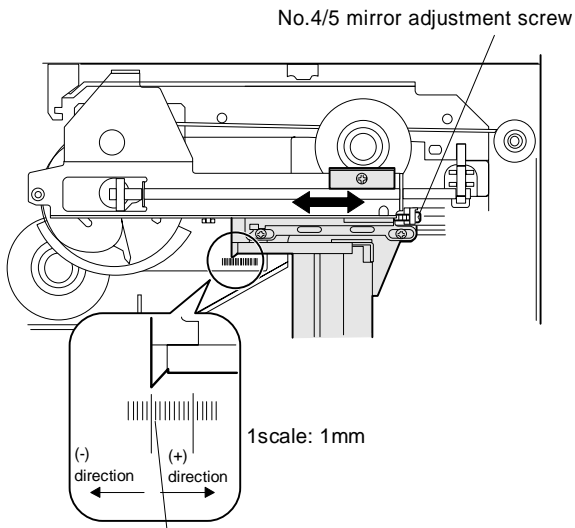
- (12) Adjust the copy magnification ratio according to the flowchart shown in (6).

D. Resolution adjustment (Focus adjustment)

- ① Normal copy ratio focus adjustment

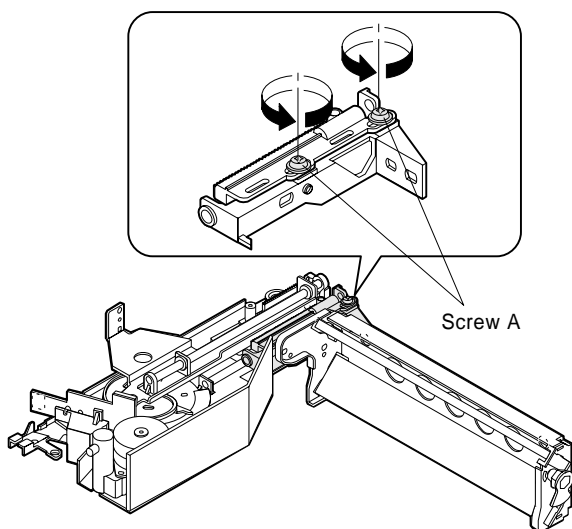
- (1) Check the "O.L value" on the lens value label of the lens unit, and fit the reference position of No. 4/5 mirror. (Use the No. 4/5 mirror adjustment screw for positioning. Loosen screw A at this time.)





Example: In the case of O.L value +1.0, this position is the reference position.

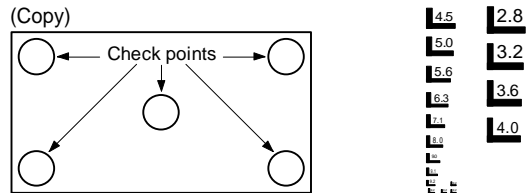
- (2) Turn off/on the power to initialize the lens and No. 4/5 mirror unit. Check the focus in the normal ratio.
- (3) If the focus is improper, perform the focus adjustment of the normal ratio as follows:
 - (3)-1 Make a copy of the test chart on an A4 or 8 1/2" × 11" paper.
 - (3)-2 Check the resolution at the four corners and the center of the copy image. If the resolutions are within the specified range, the adjustment is completed. If not, adjust No. 4/5 mirror adjustment screw. (Loosen screw A at that time.)
 - (3)-3 If the resolutions are not within the specified range, use the No. 4/5 adjustment screw to adjust. (Loosen screw A at this time.)



- (4) Turn off/on the power to initialize the lens and No. 4/5 mirror unit. Check the focus in the normal ratio again.

Resolution standards (Unit: lines/mm)

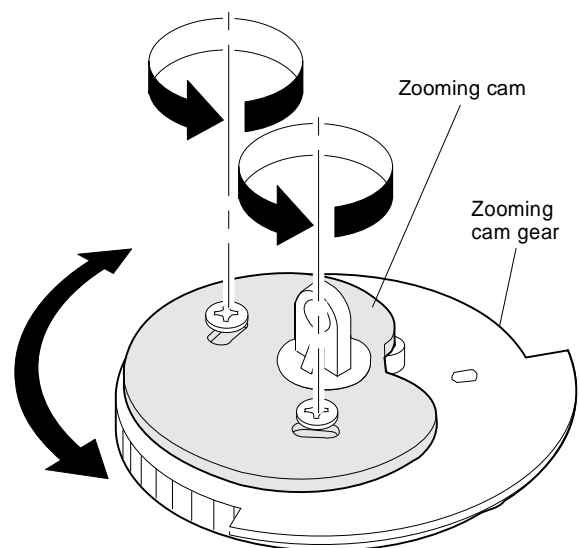
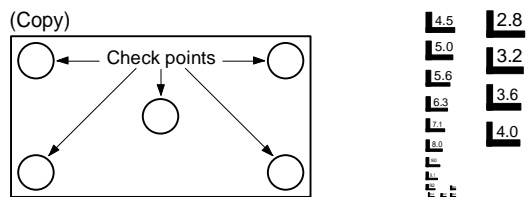
	Copy center	Corners
Normal (100%)	5.0	4.5
Enlargement (200%)	5.0	4.5
Reduction (50%)	3.2	2.8



- (2) Perform the focus adjustment in the enlargement mode (200%).
- (1) Make a copy of the test chart on an A4 or 8 1/2" × 11" paper.
- (2) Check the resolution at the four corners and the center of the copy image. If the resolutions are within the specified range, the adjustment is completed. If not, adjust by shifting the relative position of the zooming can to the drive cam.
- (3) Turn off/on the power to initialize the lens and No. 4/5 mirror unit. Check the focus in the enlargement mode again.

Resolution standards (Unit: lines/mm)

	Copy center	Corners
Normal (100%)	5.0	4.5
Enlargement (200%)	5.0	4.5
Reduction (50%)	3.2	2.8



*Do not move the zooming cam gear at this time.

- (3) When the zooming can position is changed in (2), check the focus in the normal mode again. If the resolutions are out of the specified range, perform the focus adjustment in the normal mode again.
- * Repeat (2) and (3) until the proper focus is obtained in the normal mode and the enlargement mode (200%).

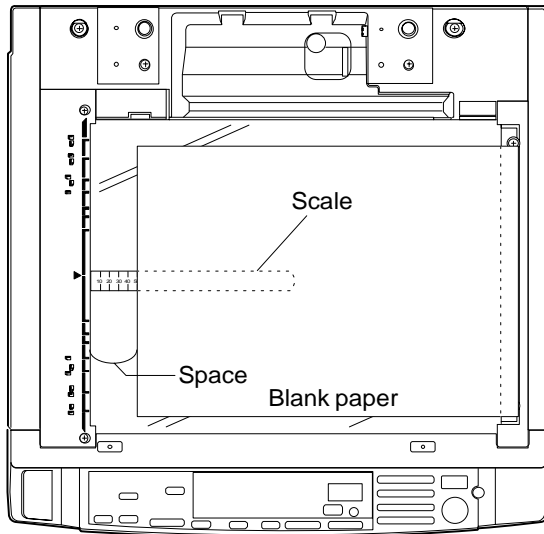
E. Horizontal copy magnification ratio adjustment

- This adjustment is performed to meet the displayed magnification ratio with the actual one.
- This adjustment must be performed in the following cases:
 - When the main PWB is replaced.
 - When the EEPROM in the main PWB is replaced.
 - When the mirror motor is replaced.
 - When self diag. U2 occurs.

The scanning speed of the mirror base is changed to adjust the horizontal (paper transport direction) copy magnification ratio.

<Adjustment procedure>

- Put a scale on the original table as shown in the figure below, and execute simulation 48-02. The machine starts warming up and the ready lamp lights up. At the same time, the previously set value (1 ~ 99) is displayed. Under this state, make a normal copy and calculate the copy magnification ratio.



- Replace the displayed value with the copy magnification ratio correction rate obtained in (1).

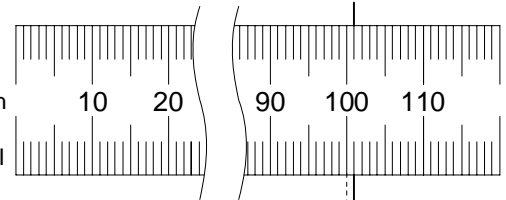
$$(\text{Input value}) = (\text{Previously set value}) / (\text{Copy magnification ratio correction rate [\%]}) \times 10$$

(Example) When the previously set value is 25, the input values of examples 1 and 2 are as follows:

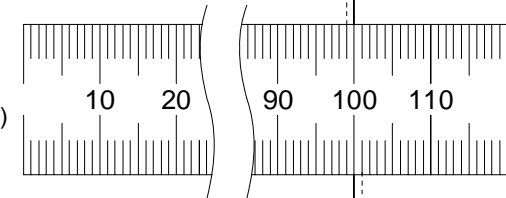
- Example 1: $35 = 25 + (1 \times 10)$
 - Example 2: $15 = 25 + (-1 \times 10)$
- Enter the input value and press the print switch. The value is stored and the ready lamp lights up.

Eg1:

Copy A, of which length is shorter than original

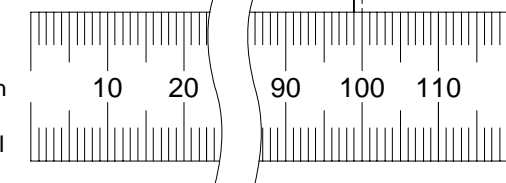


Scale (Original)



Eg2:

Copy B, of which length is longer than original



- Cancel simulation 48-02.

Note: Input correction can be made in the range of 1 - 99 (simulation set range).

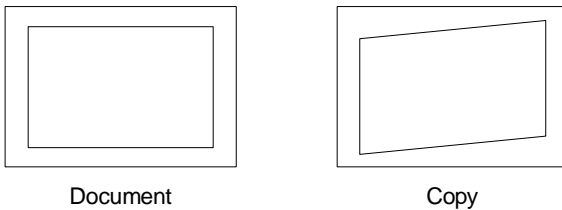
F. Comparison table of lens values and simulation input values

Lens display value	Sim 48-01	Zoom correction (Enlargement) Sim 48-01 — [%]	Zoom correction (Reduction) Sim 48-01 — [%] — [%]
+4.0	30	70	70
+3.9	31	69	69
+3.8	31	69	69
+3.7	32	68	68
+3.6	32	68	68
+3.5	33	67	67
+3.4	33	67	67
+3.3	34	66	66
+3.2	34	66	66
+3.1	35	65	65
+3.0	35	65	65
+2.9	36	64	64
+2.8	36	64	64
+2.7	37	63	63
+2.6	37	63	63
+2.5	38	62	62
+2.4	38	62	62
+2.3	39	61	61
+2.2	39	61	61
+2.1	40	60	60
+2.0	40	60	60
+1.9	41	59	59
+1.8	41	59	59
+1.7	42	58	58
+1.6	42	58	58
+1.5	43	57	57
+1.4	43	57	57
+1.3	44	56	56
+1.2	44	56	56
+1.1	45	55	55
+1.0	45	55	55
+0.9	46	54	54
+0.8	46	54	54
+0.7	47	53	53
+0.6	47	53	53
+0.5	43	52	52
+0.4	48	52	52
+0.3	49	51	51
+0.2	49	51	51
+0.1	50	50	50
0	50	50	50
−0.1	50	50	50
−0.2	51	49	49
−0.3	51	49	49
−0.4	52	48	48
−0.5	52	48	48
−0.6	53	47	47
−0.7	53	47	47

Lens display value	Sim 48-01	Zoom correction (Enlargement) Sim 48-01 — [%]	Zoom correction (Reduction) Sim 48-01 — [%] — [%]
−0.8	54	46	46
−0.9	54	46	46
−1.0	55	45	45
−1.1	55	45	45
−1.2	56	44	44
−1.3	56	44	44
−1.4	57	43	43
−1.5	57	43	43
−1.6	58	42	42
−1.7	58	42	42
−1.8	59	41	41
−1.9	59	41	41
−2.0	60	40	40
−2.1	60	40	40
−2.2	61	39	39
−2.3	61	39	39
−2.4	62	38	38
−2.5	62	38	38
−2.6	63	37	37
−2.7	63	37	37
−2.8	64	36	36
−2.9	64	36	36
−3.0	65	35	35
−3.1	65	35	35
−3.2	66	34	34
−3.3	66	34	34
−3.4	67	33	33
−3.5	67	33	33
−3.6	68	32	32
−3.7	68	32	32
−3.8	69	31	31
−3.9	69	31	31
−4.0	70	30	30

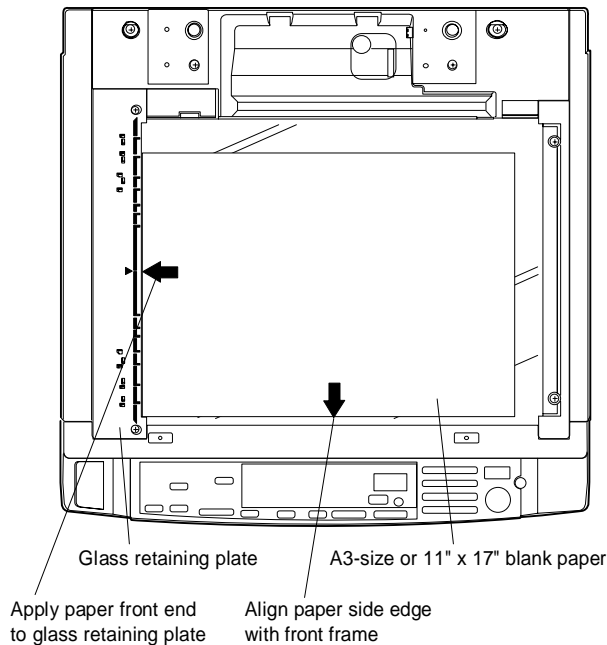
G. Vertical skew adjustment

- a. This adjustment is performed when a skew copy is made as shown below or when a part of the mirror base drive wire or the No. 1/2 mirror base is replaced.

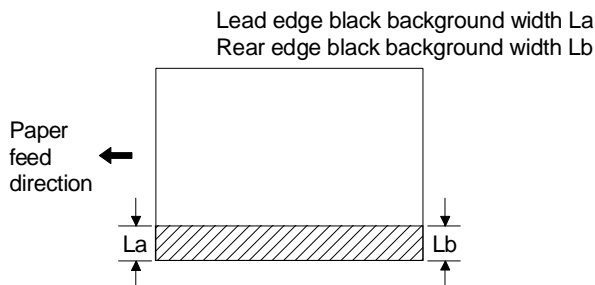


<Adjustment procedure>

- (1) Put an A3 (11" × 17") white paper on the original glass neatly to the glass holding plate and the front frame side as shown below.



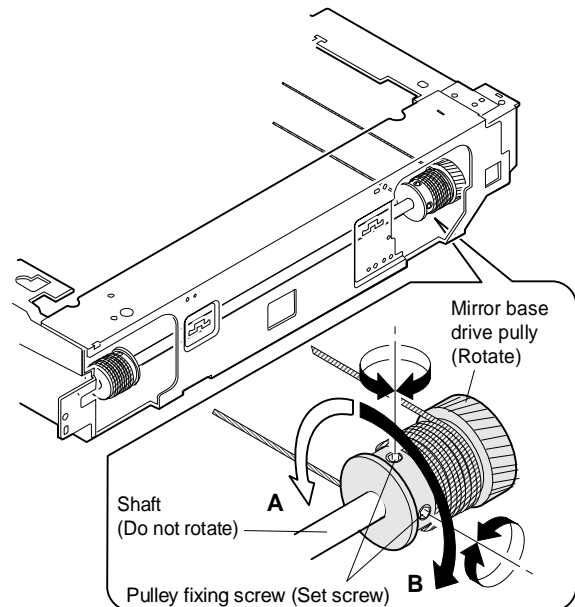
- (2) With the original cover open, make a normal (100%) copy on an A3 (11" × 17") white paper.
- (3) Measure the width of the black background at the front side and the rear side.



- (4) Loosen the fixing screw of the rear frame side mirror base drive pulley.

When $L_a > L_b$, rotate the rear frame side mirror base drive pulley in the arrow direction A. (Do not move the flange and the mirror base drive pulley shaft.)

When $L_a < L_b$, rotate the rear frame side mirror base drive pulley in the arrow direction B. (Do not move the flange and the mirror base drive pulley shaft.)

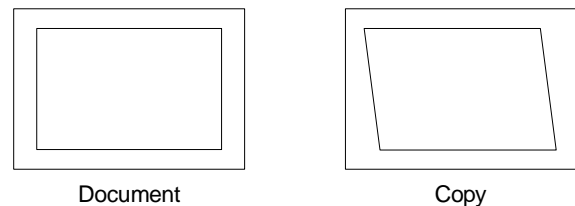


- (5) Tighten the fixing screw of the mirror base drive pulley.
- (6) Perform procedures (1) ~ (3).
- (7) If $L_a = L_b$ is not satisfied, perform procedures (4) and (5). (If $L_a = L_b$, the adjustment is completed.) Repeat procedures (1) ~ (6) until $L_a = L_b$ is satisfied.

H. Horizontal skew adjustment

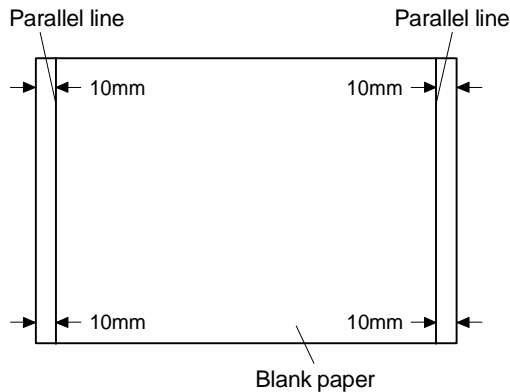
- a. This adjustment is performed in the following cases:

- When a horizontal skew is made.
- When the mirror base drive wire is replaced or its installing position is changed.
- When the No. 1/2 mirror base is replaced or its installing position is changed.
- When the No. 2/3 mirror base rail is replaced or its installing position is changed.

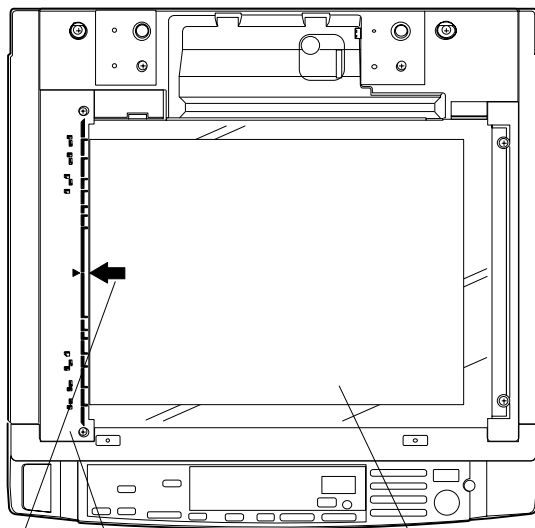


<Adjustment procedure>

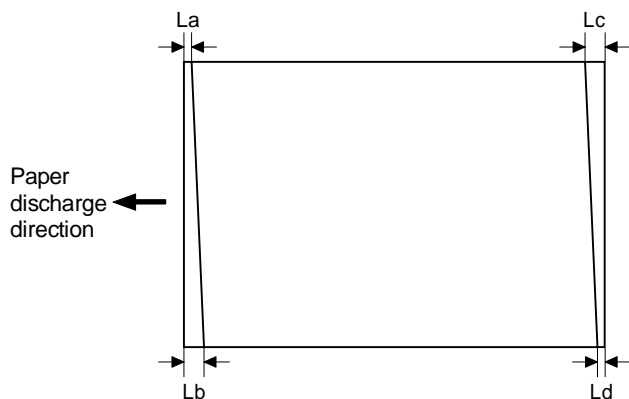
- (1) Make an original for adjustment.
Draw parallel lines at 10cm from the both edges of an A3 or 11" × 17" white paper. (Be careful to draw precisely parallel lines.)



- (2) Set the adjustment original made in (1) as shown below.

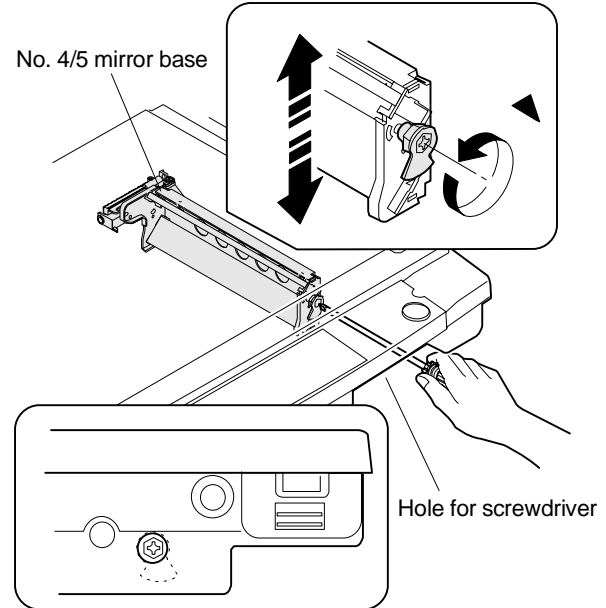


- (3) Make a normal (100%) copy on an A3 or 11" × 17" white paper.
- (4) Measure the distances at four points as shown below:



Adjustment procedure (1)

- When $L_a > L_b$ ($L_c < L_d$): Rotate to increase the height of the front frame side of the No. 4/5 mirror base unit.
- When $L_a < L_b$ ($L_c > L_d$): Rotate to decrease the height of the front frame side of the No. 4/5 mirror base unit.
Open the front cabinet, insert a screwdriver as shown below, and turn the eccentric screw to adjust the height of the No. 4/5 mirror base.



<Note> When turning the eccentric screw, remember how much it is rotated from the original position. When the eccentric screw is turned 36 degrees, the height of the front frame side of the No. 4/5 mirror base is increased or decreased by 2mm and the difference ($L_a - L_b$) is varied by 4mm.

If the above adjustment is not effective, then follow the [Adjustment procedure \(2\)](#).

Adjustment procedure (2)

- ① Move the mirror base rail B up and down in the arrow directions to adjust.
 - When $L_a > L_b$, shift the mirror base B rail upward by half of the difference of $L_a - L_b$.
 - When $L_a < L_b$, shift the mirror base B rail downward by half of the difference of $L_a - L_b$.
- (Example) When $L_a=12\text{mm}$ and $L_b=9\text{mm}$, shift the paper exit side mirror base B rail upward by 1.5mm.
- When $L_c > L_d$, shift the mirror base B rail downward by half of the difference of $L_c - L_d$.
 - When $L_c < L_d$, shift the mirror base B rail upward by half of the difference of $L_c - L_d$.

(When moving the mirror base rail, hold the mirror base rail handle.)

- ② Adjust according to procedure (1) so that $L_a=L_b$ and $L_c=L_d$ are satisfied.
- ③ After completion of the adjustment, turn the mirror base drive pulley manually to full scan mirror base A and mirror base B, and check that the mirror bases are not brought into contact with each other.

(Note) When the mirror bases are moved extremely, they may be brought into contact. Carefully avoid it.

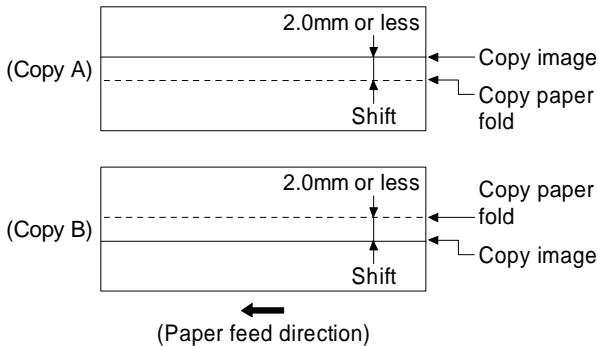
I. Center shift adjustment

a. This adjustment must be performed in the following cases:

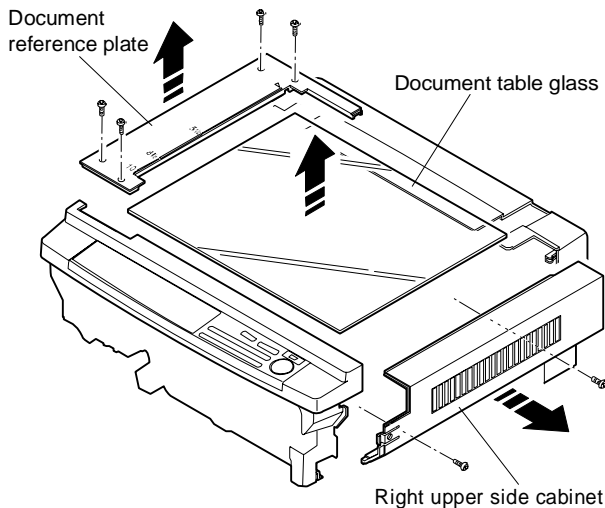
- The copy (100%) center is shifted from the original center more than 2mm.
- When any part of the lens rail or the lens unit is replaced.

<Adjustment procedure>

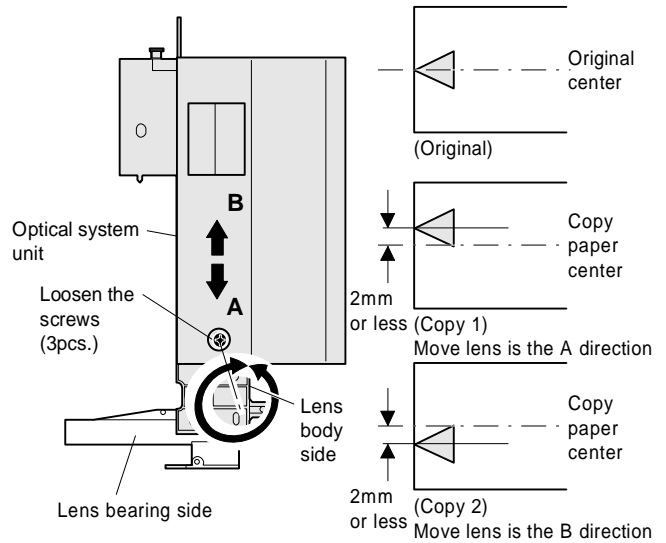
- (1) make a test chart for center position adjustment. (Refer to the figure below.)
- (2) Set the test chart for the center position adjustment to the document reference line, and make a normal (100%) copy with an A4 or 11" × 8½" paper.
- (3) Check that the copied image line is at the center of the copy paper.



- (4) If the error of the copy image line is within the specified range ($0 \pm 2.0\text{mm}$), the adjustment is not required. If not, perform the following procedures.
- (5) Remove the document reference plate and the right upper side cabinet, and remove the document table glass.



- (6) Loosen the three fixing screws of the optical system unit and slide the optical system unit to adjust the center position.



- (7) After adjustment, set the removed parts in the reversed sequence. make a copy of the test chart to check that the center shift is within the specified range ($0 \pm 2.0\text{mm}$). If the center shift is within the specified range, the adjustment is completed. If not, repeat procedures (2) – (7) until it is within the specified range.

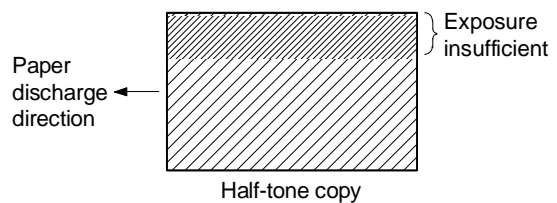
J. Exposure balance adjustment

a. This adjustment is to provide uniform exposure, and must be performed in the following cases:

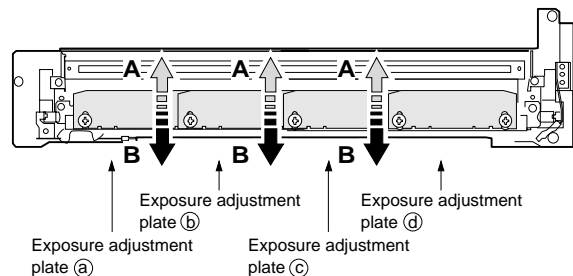
- When the reflector is replaced.
- When the copy lamp is replaced.
- When the exposure adjustment plate is replaced.

<Adjustment procedure>

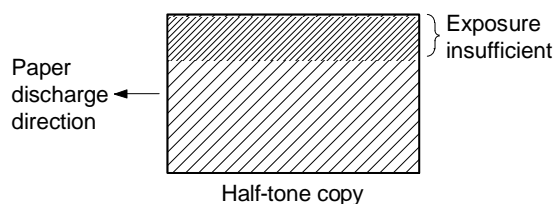
- (1) Set a half tone paper on the original table and make a half tone copy at 100%.
- (2) If the exposure of the half tone copy is uniform, the adjustment is not required. If it is varied as shown below, perform the following procedures.



- (3) Remove the original reference plate and the right upper side cabinet, and remove the original table glass.
- (4) Move the exposure plates a, b, c, and d in arrows directions A and B to adjust exposure. Moving the plates in the direction of arrow A makes the copy darker, and moving in the direction of arrow B makes the copy lighter.



(Example) If the half tone copy is as shown below, move the exposure adjustment plate a in the direction of arrow B to balance exposure.



- (5) After adjustment, set the original table glass. Make a copy to check uniformity of copy density. If the copy exposure is not uniform, repeat procedures (1) – (5).

K. Copy lead edge adjustment

- This adjustment is performed to provide the maximum effective copy size and the proper void area, improving separation in the photoconductor section and the fusing section and reducing dirt in the fusing section pawls.
- This adjustment must be performed in the following cases.
 - When the mirror home position sensor (MHPS) is replaced or its installing position is changed.
 - When the mirror base is replaced.
 - When the resist roller and the resist roller clutch are replaced.
 - When the main control PWB is replaced.
 - When the ADF is installed or disassembled.

<Adjustment procedure>

* The copy lead edge adjustment is performed with simulation 50-01 and 50-02.

When the copy lead edge adjustment is made with simulation 50-01:

In this simulation, the following keys and the display section have special functions.

Reduction key: Makes the magnification ratio 50%.

Enlargement key: Makes the magnification ratio 200%.

- % key:
Pressing the % key changes A → b → d → A → sequentially, and the set value corresponding to the display is displayed on the copy quantity display.
A: RRC-A set value
b: RRC-B set value
C: Lead edge void amount set value
d: Rear edge void amount set value

(The value displayed before pressing the % key is stored in the memory by pressing the zoom up key.)

Display section:

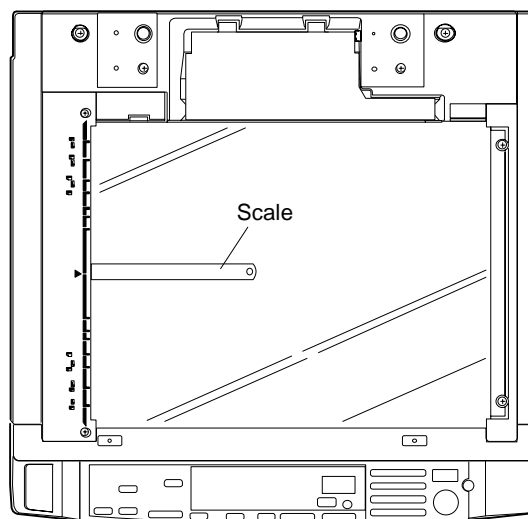
During execution of the simulation, the RRC-A value is displayed on the copy quantity display.

Top digit: Displays A, b, C, d.

Lower two digits: Displays RRC-A value, RRC-B value, or void area value.

<Adjustment procedure>

- Put a scale on the original table.



- Press keys as follows:

$\boxed{C} \rightarrow \boxed{=}$ → $\boxed{0/0} \rightarrow \boxed{=}$ → $\boxed{5} \rightarrow$

$\boxed{0/0} \rightarrow \boxed{PSW} \rightarrow \boxed{1} \rightarrow \boxed{PSW}$

Simulation 50-01 is executed and the ready lamp lights up. The previously set value (1 – 99) is displayed. (RRC-A content)

- Set values A and B to zero, and make copies at 100% and 200%.

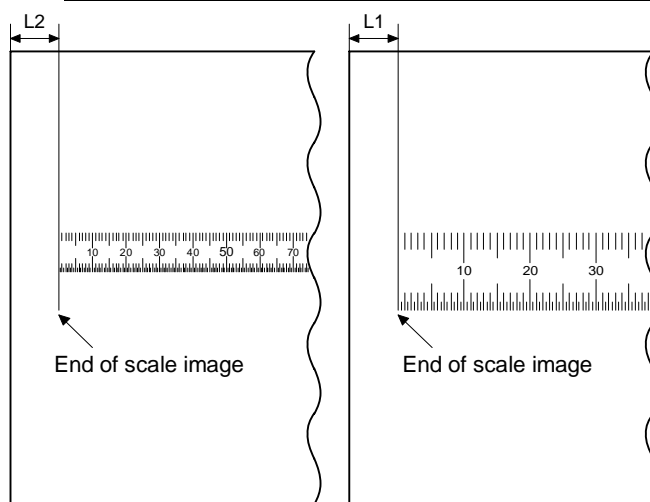
• $\boxed{0/0} \rightarrow \boxed{0/0} \rightarrow \boxed{\% \text{ key}} \rightarrow$

$\boxed{0/0} \rightarrow \boxed{0/0} \rightarrow \boxed{PSW}$ (A copy at 100% is made.)

• $\boxed{\text{Enlargement key}} \rightarrow (\text{Lens shift, ready}) \rightarrow \boxed{PSW}$ (A copy at 200% is made.)

- Measure the distance between the copy paper lead edge and the copy image lead edge in each copy. Obtain RRC-A and RRC-B values from the following formulas.

If the RRC-A preset value is not proper, the lead edge position varies in each magnification ratio. The RRC-B is to adjust the RRC ON timing for fitting the drum image lead edge and the transfer paper lead edge.

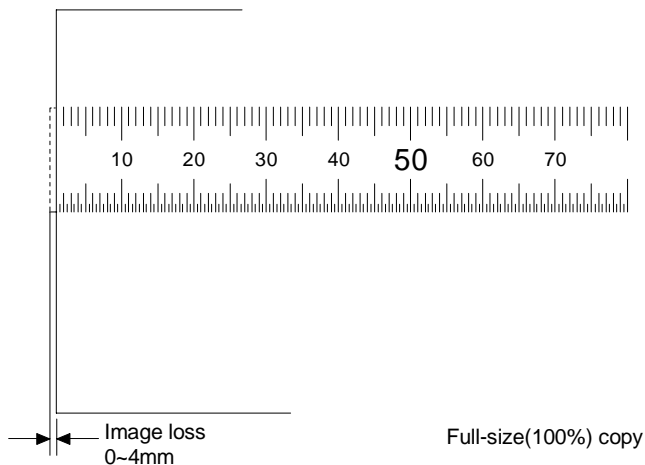


Full-size(100%) copy

Enlarged(200%) copy

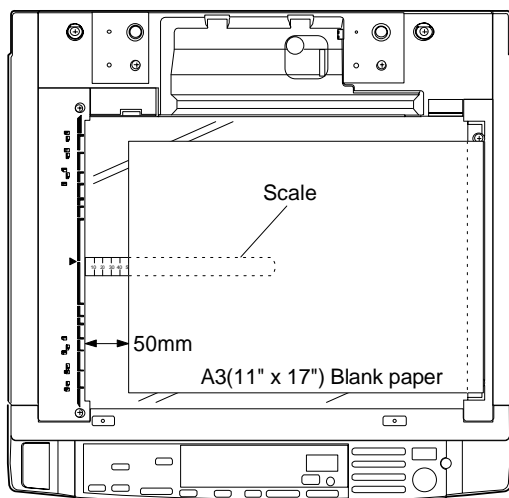
- La: Led edge shift at 200% (mm)
- L2: Lead edge shift at 100% (mm)
- $RRC-A = 6.151 \times (L1 - L2)$
- $RRC-B = 15.385 \times L2 - 7.692 \times L1$

- (5) Enter the RRC-A and RRC-B values obtained from the above formulas with the 10 digit key pad in the same manner as procedure (3).
- (6) Make copies at 200%, 100%, and 50%, and check variations in the magnification ratios. (About 1.0mm)
If there is a considerable variation, repeat from procedure (3).
- (7) Make a normal copy and check that the lead edge image loss is within the range of 0 ~ 4mm. If the image loss is outside the above range, change the RRC-B value and adjust again until the image loss is within the above range.



Note: The above image loss range is effective only for simulation 50-01, and is not the final one.

- (8) Put a scale and an A3 (11" x 17") white paper on the original table as shown below.

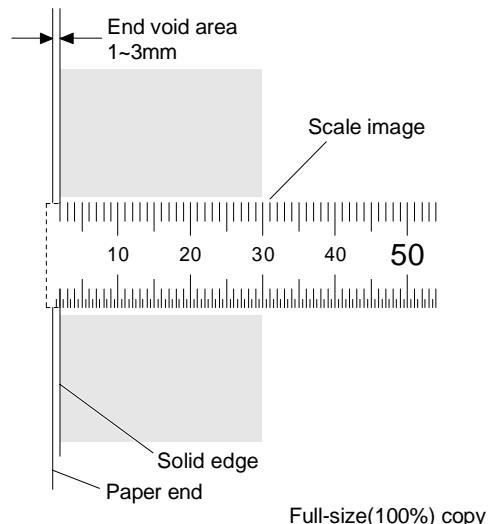


- (9) Press the zoom key to display "C" in the lowest digit of the magnification ratio display. (Void amount adjustment mode)

- (10) Make a copy and enter the normal copy lead edge void area adjustment set value so that the black background edge comes to the scale 1 ~ 3mm of the copy image scale.

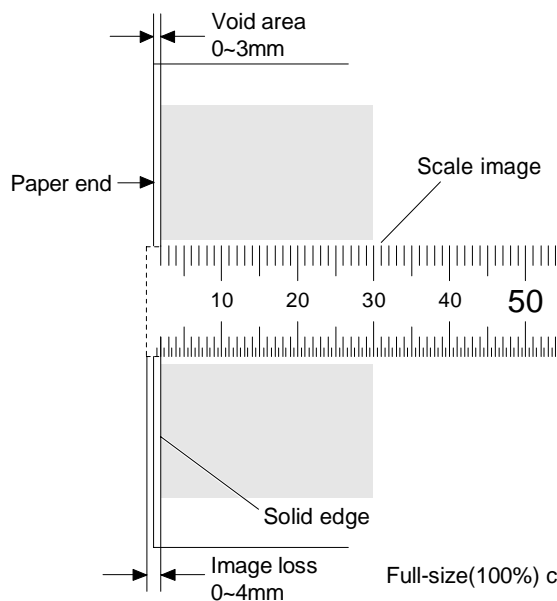
→ → **PSW**

With the above key operation, a copy is made and the adjustment value is inputted. When the adjustment value is changed by 1, the void area is changed by about 0.13mm. The greater the adjustment value is, the greater the void amount is.



- (11) Make a normal copy and check that the image loss and the void amount are within the specified range.
(Specified range)

- Image loss: 0 ~ 4mm
- Void amount: 1 ~ 3mm



- (12) Press the clear key and cancel simulation 50-01.

Note: When the RRC-A and RRC-B values are changed in simulation 50-01, be sure to adjust the copy lead edge void area.

When adjustment is made with simulation 50-02:

<Note> The keys and display functions are the same as simulation 50-01. In simulation 50-02, L1 and L2 values can be directly set. It is easy and simple. The void area adjustment is also the same as simulation 50-01.

[Adjustment procedure]

- (1) Put a scale on the original table.
- (2) $\boxed{C} \rightarrow \boxed{P} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{P} \rightarrow \boxed{5} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{PSW} \rightarrow \boxed{2} \rightarrow \boxed{PSW}$
 With the above key operation, simulation50-02 is performed and the machine starts warming up.
- (3) The lower two digits of L1 value is displayed on the copy quantity display. The top digit is for data identification.
 - L1 : Lead edge shift at 200% (○○○mm, 3 digits)
 - L2 : Lead edge shift at 100% (XXXmm, 3 digits)
 Example of display
 - For 42.5mm, the display is $\boxed{2} \boxed{5}$.

- (4) Use the % key and the 10 digit key pad to set A and b values to zero. Make copies at 100% and 200%.
 - $\boxed{0/\diamond} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{\% \text{ key}} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{0/\diamond} \rightarrow \boxed{PSW}$ (A copy at 100% is made.)
 - $\boxed{\text{Enlargement key}} \rightarrow (\text{Lens shift, ready}) \rightarrow \boxed{PSW}$ (A copy at 200% is made.)
- (5) Measure the distance between the copy paper lead edge and the copy image lead edge in each copy. Enter L1 and L2 values with the zoom key and the 10 digit key pad. With this operation, RRC-A and RRC-B values in simulation 50-01 are automatically calculated and stored.
 Input procedure
 (Example)
 When L1 = 24.5 mm and L2 = 15.0mm:
 Check that the lowest digit of the magnification ratio display is "A," and perform the following key operation.
 $\boxed{2} \rightarrow \boxed{4} \rightarrow \boxed{5}$ ("45" is displayed on the copy quantity display.)
 $\rightarrow \boxed{\% \text{ key}} \rightarrow \boxed{1} \rightarrow \boxed{5} \rightarrow \boxed{0}$ ("50" is displayed.) $\rightarrow \boxed{PSW}$
- (6) After this, check shift and image loss, and void amount in each copy similarly to simulation 50-01.

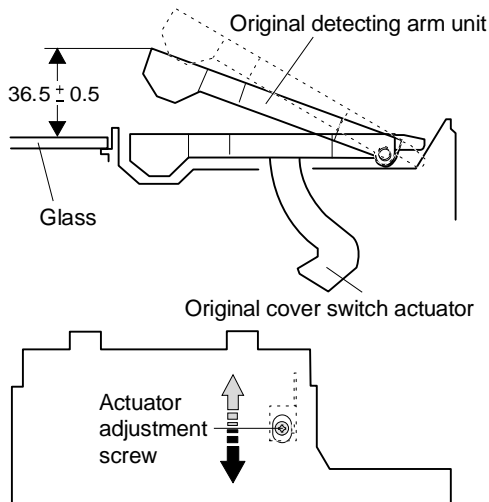
2-4. Original detecting section

A. Original detecting arm unit adjustment

① OC switch ON timing adjustment

Execute simulation 40-01. ($C \rightarrow P \rightarrow 0 \rightarrow P \rightarrow 4 \rightarrow PSW \rightarrow 1 \rightarrow PSW$)

- Slowly tilt down the original detecting arm unit and loosen the original cover switch actuator adjustment screw so that the auto paper selection display lamp turns off when the height from the table glass to the arm unit top is 36.5 ± 0.5 mm. Then slide the actuator to adjust. (If the original cover ON timing is shifted, the original detecting function may malfunction.)

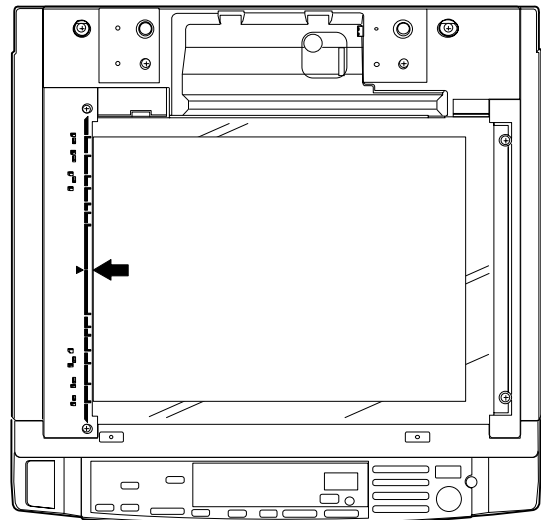


B. Original detecting level adjustment

(Original detecting judgement level input)

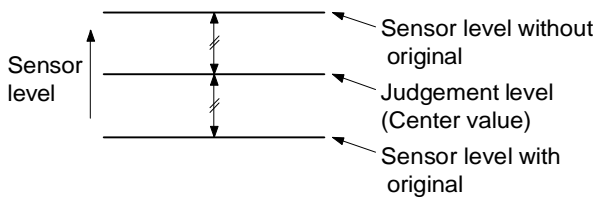
This adjustment is to set the reference value for judgement of presence or absence of an original and to monitor the sensor status.

- ① $\boxed{C} \rightarrow \boxed{= \checkmark} \rightarrow \boxed{0} \rightarrow \boxed{= \checkmark} \rightarrow \boxed{4} \rightarrow \boxed{1} \rightarrow \boxed{PSW} \rightarrow \boxed{2} \rightarrow \boxed{PSW}$
 At that time, the ready lamp lights up and "1" is displayed on the copy quantity display.
- ② With the original cover open without original, press the PRINT button. (The sensor level without original is read.) The copy quantity display is shifted from 1 to 2.
- ③ Place a transfer paper of A3 (11" × 17") on the original table, and press the PRINT switch with the original cover open. (The sensor level with an original is read and the judgement level of original presence or absence is stored.)



<Reference> Detection level setting principle

The sensor level with an original and that without original are read and the average level (the center value) is stored as the judgement level.



<Sensor check mode>

The photo sensor detection check is made by SIM 41-01. (After inputting the original detecting level, the mode is automatically changed to the check mode.)

Photo sensor check procedure

Key operation: C → P → 0 → P → 4 → 1 → PSW → 1 → PSW

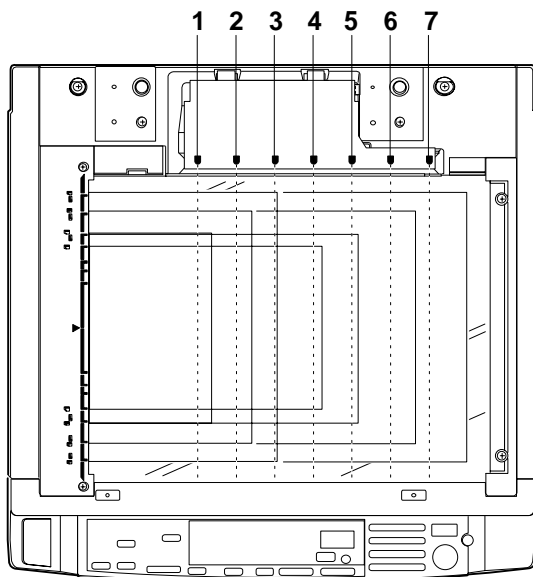
At that time, all the original size display lamps and the manual tray selection lamps are lighted. By interrupting the light emitting section of the original size detection LED, the original size lamps are turned off.

* The photo sensors are arranged as follows:

Reception shaft	Japan AB series	EX AB series	EX inch series
1	—	—	—
2	B5	—	—
3	A4	A4	LT
4	B5R	—	—
5	A4R	A4R	LTR
6	B4	B4	LG
7	A3	A3	17"

The manual paper feed tray selection lamp is used to check open/close of the original cover. It lights up when the original cover is open, and goes off when closed.

When the original cover close is detected, all the original size display lamps go off.



(Light reception level and judgement level check)

① Light reception level display mode

C → [=] → 0 → [=] → 4 → 1 →
PSW → 3 → PSW

- The light reception level during execution of the simulation is displayed on the copy quantity display.
- After execution of the simulation, enter the number corresponding to each sensor with the 10-key pad. The original size display lamp lights up to allow to check the light reception level of the sensor.
- The manual paper feed tray selection lamp is used to check the original cover open/close. The lamp lights up when the original cover is open, and goes off when closed. In the case of 1, when the original cover is closed, the sensor level is fixed to the previous value.

② Setting level display mode

C → [=] → 0 → [=] → 4 → 1 →
PSW → 3 → PSW → Magnification ratio auto select key

- With the above key operation, the pause lamp lights up.
- Each sensor level set with SIM 41-02 is displayed on the copy quantity display.
- After execution of this simulation, enter the number corresponding to each sensor with the 10-key pad. The original size display lamp lights up to allow to check the light reception level of the sensor.

2-5. Copy density adjustment

A. When the copy density adjustment is required:

The copy density adjustment must be performed in the following cases:

- When maintenance is performed.
- When the output current of the main charger and the transfer charger, the separation charger bias voltage, or the grid voltage is adjusted. (When the charger unit or the high voltage unit is replaced.)
- When the developing bias is adjusted.
- When any part of the AC PWB unit is replaced.
- When the AE sensor is replaced.
- When the copy lamp is replaced.
- When the optical unit is replaced.
- When the optical unit is disassembled, repaired, or adjusted.
- When exposure adjustment plate is moved.
- When the drum is replaced.
- When the main PWB is replaced.

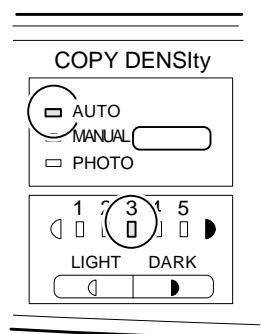
B. Note for copy density adjustment

- The charger output and the developing bias voltage are properly adjusted in advance.
- The half-tone uniformity is within the limit sample range.
- Sim. 44-01 is set to "7."

C. Copy density adjustment procedure

(1) Set the automatic exposure level to "3."

(When the mode select key is pressed for 5 sec in the photo mode, the mode is switched to the automatic exposure mode. In this mode, press the exposure select key to set the exposure level to "3.")



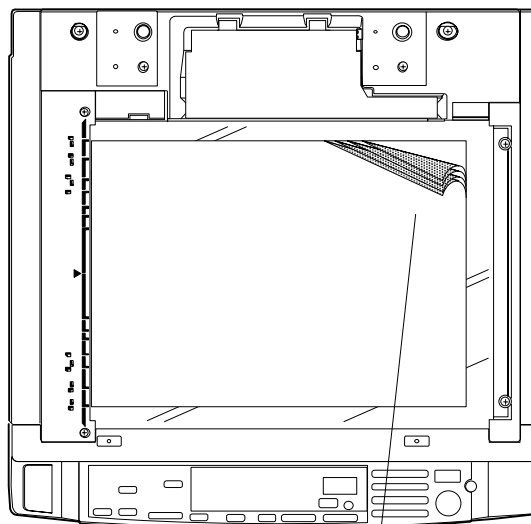
(2) Drum sensitivity setting

- (1) Execute Sim. 26-07, and check that the top digit of the 9-digit drum number printed on the flange in front of the drum is displayed on the copy quantity display.
- (2) If the displayed number is different from the drum number, change the setting with the 10 digit key pad.

(Note) When the 10 digit key pad is used to enter a number, the display shows only in the range of 1 ~ 3.

(3) AE sensor level adjustment

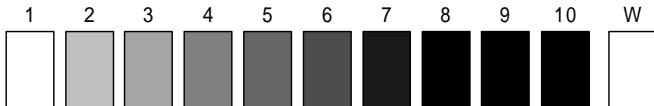
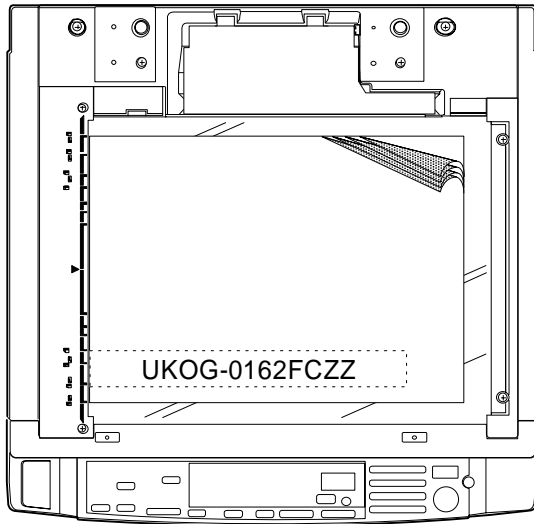
- (1) Execute Sim. 47.
(The mirror base starts scanning and stops at the AE sensor level measurement position.)
- (2) Put several sheets of A3 (11" x 17") paper on the original table.
- (3) Press the PSW again, and the copy lamp will light up and the sensor output will be displayed on the copy quantity display. This output level is stored.



Put several sheets of
A3 (11" x 17") paper

(4) Test chart setting

- Put several sheets of white paper (Sharp specified paper) of about 120mm wide and about 420mm long to the center reference.
- Put the test chart (UKOG-0162FCZZ) as shown below:



Test chart comparison table

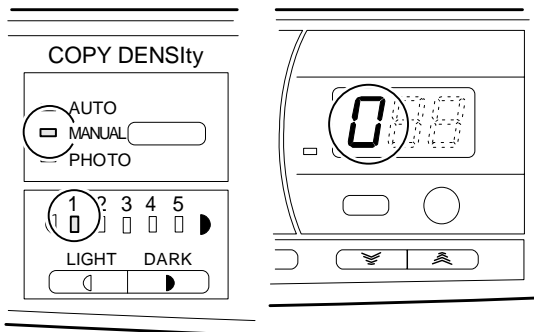
UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10	W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9	0
KODAK GRAY SCALE		1		2		3		4		19	A

SHARP CORPORATION
MODE IN JAPAN

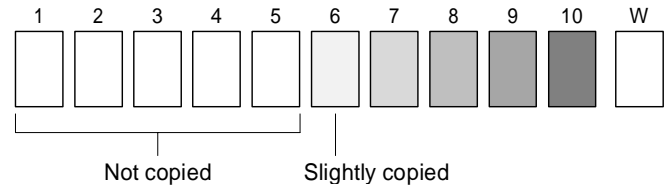
(5) Manual exposure (ME) mode adjustment

1) Normal mode exposure adjustment

- Execute Sim. 46-01.
Exposure "1" in the manual exposure mode is displayed on the exposure display.
"0" of value A is first displayed on the copy quantity display. After sensing the drum mark, the two-digit number corresponding to the sensed mark number is displayed.

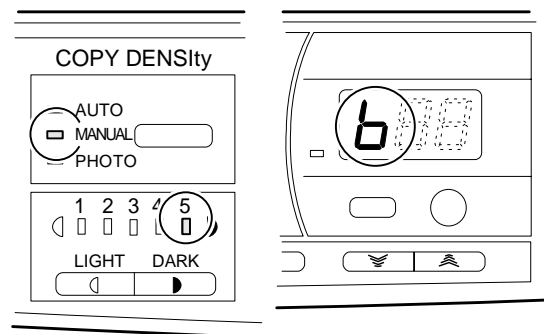


- Make a copy.
Check that "6" of the test chart is slightly displayed.



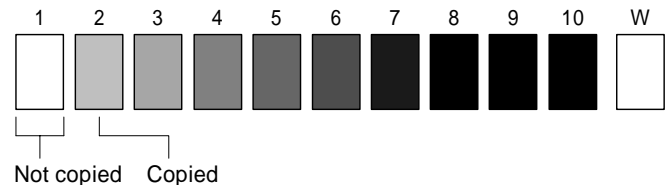
- <When too light> Make the value displayed on the copy quantity display smaller.
- <When too dark> Make the value displayed on the copy quantity display greater.
- * The range of set values is 1 ~ 99.
- * Entry number "1" corresponds to a change of about 0.33V in the copy lamp voltage.

- Make a copy.
When the copy exposure is within the exposure limit sample range, press the DARK exposure key to set to exposure "5." ("b" is displayed on the copy quantity display.)



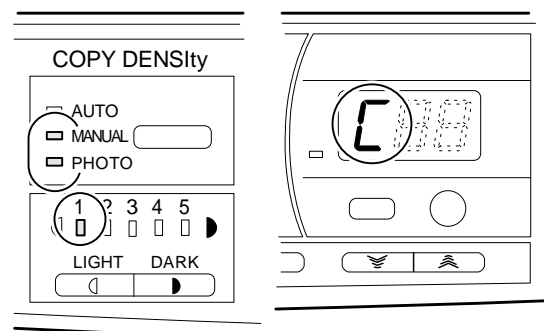
- Make a copy.
Check that "2" of the test chart is clearly copied.

- <When too light> Make the value displayed on the copy quantity display smaller.
- <When too dark> Make the value displayed on the copy quantity display greater.



2) Toner save mode adjustment

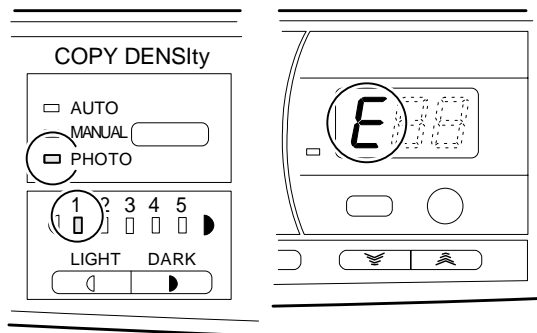
- Press the exposure select key to set to the toner save mode.
The manual mode lamp and the photo mode lamp are simultaneously lighted and exposure "1" is displayed on the exposure display section. "C" is displayed on the copy quantity display.



- (2) Perform the same procedures of (2) through (4) in "1) Normal mode exposure adjustment."

3) Photo mode exposure adjustment

- (1) Press the exposure select key to set to the photo mode.
The photo mode lamp is lighted and exposure "1" is displayed on the exposure display section. "E" is displayed on the copy quantity display.

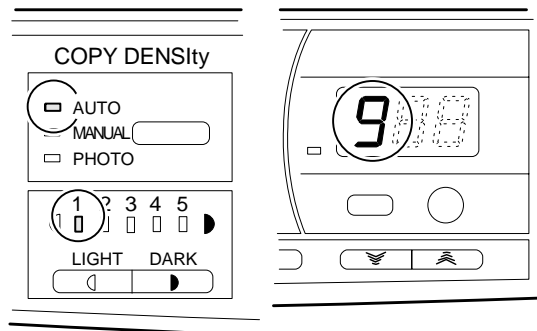


- (2) Perform the same procedures of (2) through (4) in "1) Normal mode exposure adjustment."

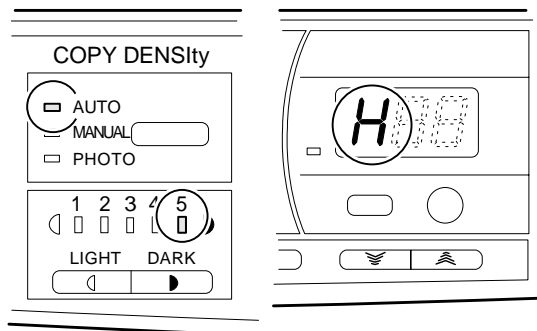
(6) Automatic exposure mode adjustment

1) Automatic exposure (normal mode) adjustment

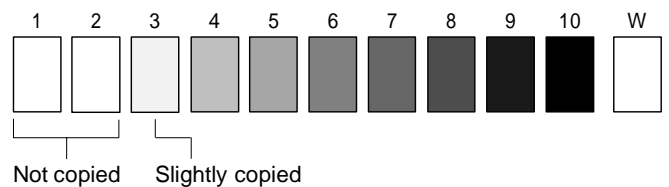
- (1) Press the exposure select key to set to the automatic exposure mode (normal mode).
The automatic exposure mode lamp is lit and exposure "1" is displayed on the exposure display section. "C" is displayed on the copy quantity display.



- (2) Check that "0" is displayed on the copy quantity display.
(3) Press the DARK exposure key to set to exposure "5." ("H" is displayed on the copy quantity display.)



- (4) Make a copy.
Check that "3" of the test chart is slightly copied.

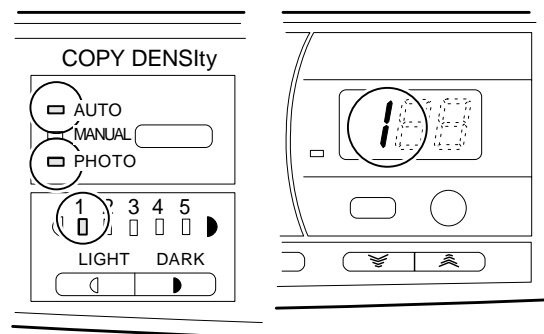


<When too light> Make the value displayed on the copy quantity display smaller.

<When too dark> Make the value displayed on the copy quantity display greater.

2) Automatic exposure (toner save mode) adjustment

- (1) Press the exposure select key to set to the automatic exposure mode (toner save mode).
The automatic exposure mode lamp and the photo mode lamp are lit and exposure "1" is displayed on the exposure display section. "1" is displayed on the copy quantity display.



- (2) Perform the same procedures of (2) through (4) in "1) Normal mode exposure adjustment."

Copy density adjustment

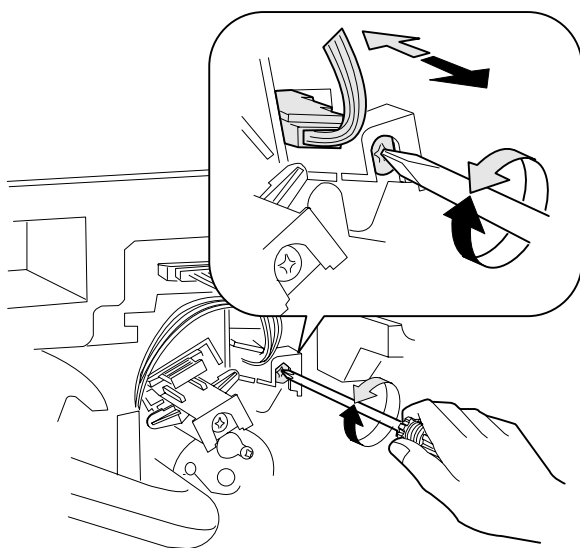
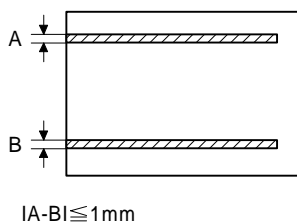
Item	Content																																							
Automatic exposure level initial setting	3 (Standard level)																																							
TSM mode initial setting	5 (Standard mode)																																							
AE sensor level adjustment	Execution of Sim. 47																																							
Drum sensitivity setting	Execution of Sim. 26-07																																							
Test chart setting	Test chart comparison table <table><tr><td>UKOG-0162FCZZ DENSITY No.</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td></td><td>W</td></tr><tr><td>UKOG-0089CSZZ DENSITY No.</td><td>0.1</td><td></td><td>0.2</td><td></td><td>0.3</td><td></td><td></td><td></td><td>0.5</td><td>1.9</td><td></td><td>0</td></tr><tr><td>KODAK GRAY SCALE</td><td></td><td>1</td><td></td><td>2</td><td></td><td>3</td><td></td><td>4</td><td></td><td>19</td><td></td><td>A</td></tr></table> SHARP CORPORATION MADE IN JAPAN	UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10		W	UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9		0	KODAK GRAY SCALE		1		2		3		4		19		A
UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10		W																												
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KODAK GRAY SCALE		1		2		3		4		19		A																												
Copy density adjustment																																								
Developing bias output voltage adjustment	200V (Manual exposure 1) Execution of Sim. 8-01																																							
Manual exposure copy density adjustment	Execution of Sim. 46-01																																							
ME1	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="5">Not copied</td><td colspan="5">Slightly copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied					Slightly copied											
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ME5	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Not copied</td><td colspan="9">Copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied	Copied															
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TSM mode copy density adjustment																																								
TS1	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="5">Not copied</td><td colspan="5">Slightly copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied					Slightly copied											
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TS5	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Not copied</td><td colspan="9">Copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied	Copied															
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Photo mode copy density adjustment																																								
PE1	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="5">Not copied</td><td colspan="5">Slightly copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied					Slightly copied											
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PE5	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>W</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Not copied</td><td colspan="9">Copied</td><td></td></tr></table>	1	2	3	4	5	6	7	8	9	10	W												Not copied	Copied															
1	2	3	4	5	6	7	8	9	10	W																														
Not copied	Copied																																							

Item		Content
	Automatic exposure copy density adjustment	Enter "0" with the 10 digit key pad.
	Normal mode	
	AE1	
	AE5	
	TSM mode	Enter "0" with the 10 digit key pad.
	AE1 (TS)	
	AE5 (TS)	

2-6. Process section adjustment

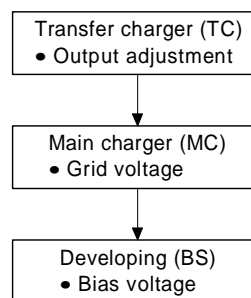
A. Blank lamp (BL) position adjustment

- ① Check that the center shift is within 0.2mm. (If the center shift exceeds 0.2mm, adjust the center shift.)
- ② Set a white original of A3 (11" x 17"), and make a reduction copy (x 0.64) on an A3 paper (11" x 17") with the original cover open.
- ③ Measure the black background sizes on both ends, and slide the blank lamp unit back and forth to adjust so that the size difference is within 1 mm.



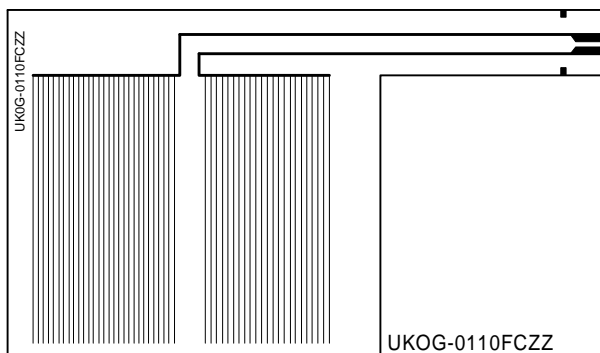
B. High voltage output balance adjustment

This model employs the one transformer system where the output power is common to the charging charger (MC) and the transfer charger (TC). The feedback current from the transfer charger (TC) is constant-current controlled and outputted for charging. For the output adjustment of each high voltage, follow the procedures below.



A. Use of special measurement tools

- Tool: UKOGE0043CS01 (Digital multi meter)
- Electrode sheet (UKOG-0110FCZZ)

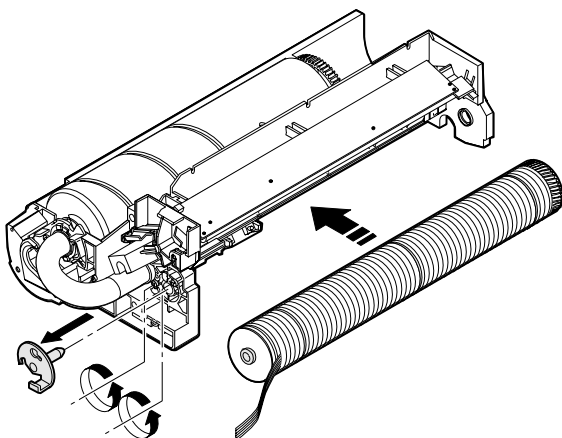


Adjustment output	Sim	Adjustment range	F/R difference	Tester range
TC current	08-02	-41.0 ±4.0 μ A	7.0 μ A	DC1000 μ A
MC grid voltage	44-11	Standard (A) -750 \pm 5V Photo (b) -500 \pm 5V TS (c) -650 \pm 5V	—	DC1000V
SC bias voltage	08-07	0 \pm 5V	—	DC1000V
DV bias voltage	08-01	-200 \pm 5V	—	DC1000V

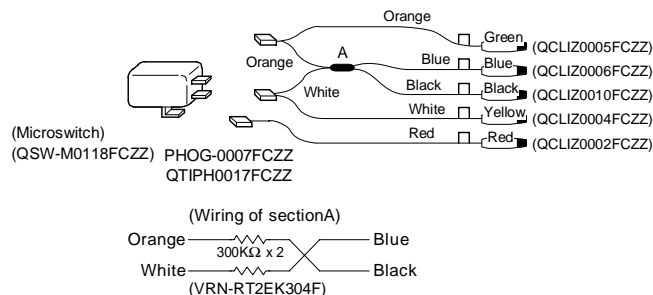
C. Transfer charger output check

1) Transfer charger current adjustment

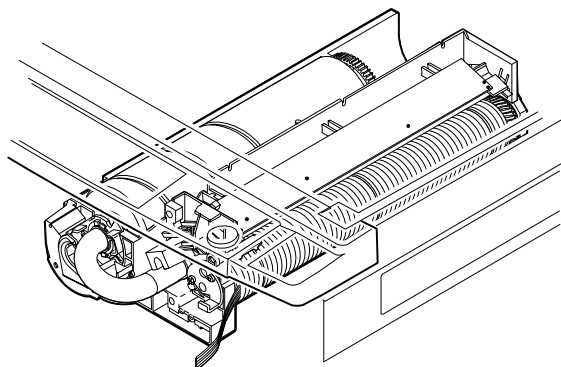
- ① Remove the developing unit, the transfer/separation charger unit, and the main charger unit from the copier.
- ② Remove the process unit from the copier.
When removing (attaching) the process unit from (to) the copier, do not hold the toner transport pipe.
- ③ Remove the photoconductor drum from the process unit, and attach the electrode sheet by using rubber ring and tape.
- ④ Attach the photoconductor drum with the electrode sheet attached to it to the process unit.



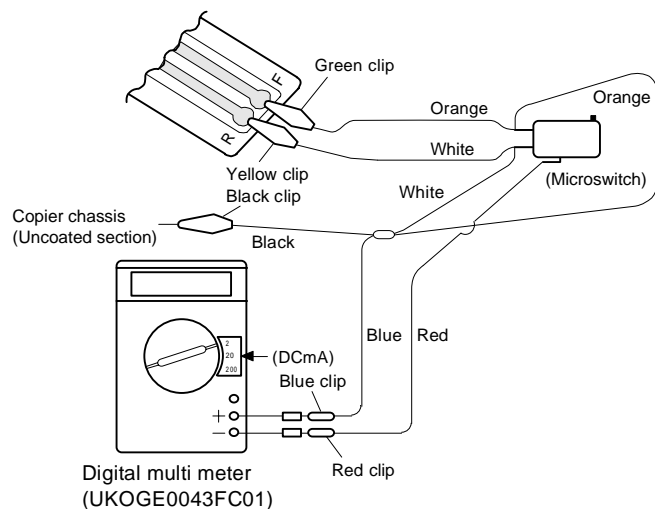
Electrode sheet harness (DHAI-0304FCZZ)



- ⑤ Attach the process unit to the copier. (Attach so that the electrode sheet lead wire extends from the developing unit side.)
- ⑥ Clean the transfer charger wire, and attach the transfer/separation charger unit to the copier.
(Do not install the main charger unit.)

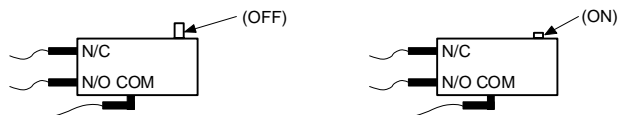


- ⑦ Connect the electrode sheet and the digital multi meter (or an ammeter). Manually turn on the door switch.



(Note) Check that the black clip is firmly grounded to the chassis.
When the UKOGE0043CS01 is used:
Control 1: Set to "2" of DCmA.
Red clip: Connect to \oplus .
Blue clip: Connect to $-$.
When a DC ammeter is used:
Red clip: Connect to $-$ of the DC ammeter.
Blue clip: Connect to \oplus of the DC ammeter.

- ⑧ Transfer charger output current check and adjustment
- Turn on the main switch and execute simulation 8-02. (MTHV is turned on for 30 sec.)
 - Adjust VR102 (MTHV output adjustment control) so that the output current of MTHV is $-41 \pm 4.0 \mu\text{A}$.
- ⑨ Check the drum current in the front frame side and the rear frame side. Difference between the front frame side current and the rear frame side current must be within $7.0 \mu\text{A}$.
- Turn on the main switch and execute simulation 8-02. (MTHV is turned on for about 30 sec.)
 - Measure the drum current in the front frame side and in the rear frame side.
 - When the microswitch is OFF: The drum current in the front frame side is displayed.
 - When the microswitch is ON: The drum current in the rear frame side is displayed.



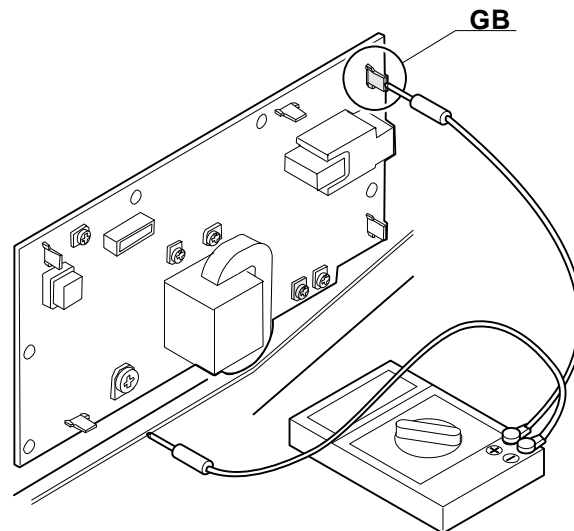
- Check that the difference between the front frame current and the rear frame current is within $7.0 \mu\text{A}$. If the difference exceeds $7.0 \mu\text{A}$, the charger unit is abnormal. Replace the charger unit in that case.

2) Charging grid voltage adjustment

Before this adjustment, check that the photoconductor drum, and developing unit, and the charger (MC/TC) units are attached.

(Measurement and adjustment at the high voltage PWB check point)

- Remove the rear cabinet.
- Set the digital multi meter range to DCV, and connect to the grid voltage output check pin (GB).



- Turn on the copier power and execute simulation 44-11.
- Select the standard mode (A) with the magnification ratio display key on the operation panel. (The mode is displayed on the copy quantity display.)

Execution of simulation 44-11

Select the standard mode (A) with the magnification ratio select key.

(Reference)

Display	Mode	
A	Standard	$-750 \pm 5\text{V}$
b	Photo	$-500 \pm 5\text{V}$
C	TS	$-650 \pm 5\text{V}$
d	GB patch	-410V → GB is not adjustable.

- Use the 10-key pad to adjust so that the measurement value by the tester in the standard mode (A) is $-750 \pm 5\text{V}$. (Input value 1 corresponds to 5V.)

* For the voltage check, enter the value with the IO-key pad and press the PRINT button to store it, and press the PRINT button again and measure the voltage with the tester while copying.

- Adjust similarly in the photo mode (b), and in the toner save mode (C).

Check the GP patch (d) after adjustment of standard (A), photo (b) and TS (c).

- Grid voltage adjustment (Sim 44-11)

Display	Mode	Grid	Input value (Standard)	* ① (Input value 1 corresponds to 5V.) ② d (GB) is fixed.
A	Standard	$-750 \pm 5\text{V}$	48	
b	Photo	$-500 \pm 5\text{V}$	46	
C	TS	$-650 \pm 5\text{V}$	46	
d	GB patch	-410V	41	

- Grid voltage check

Grid voltage

Sim No.	Mode	* Drum marking number: 1	* Drum marking number: 2
8-2	Standard	-740	-770
8-3	Photo	-480	-480
8-4	TS	-630	-650

- * Drum marking number 1 = SHARP
Drum marking number 2 = Mitsubishi
- * This model performs the process correction according to the number of drum mark(s). With Sim 8, the grid voltage after correction can be checked.

3) Developing bias (BS) voltage adjustment

The developing bias voltage is measured and adjusted with the check pin (DV BIAS) on the high voltage PWB and the control knob (VR301).

In advance to this adjustment, check that the photoconductor drum, the developing unit, and the charger (MC/TC) units are installed.

- ① Remove the rear cover.
- ② Set the digital multi meter range to DCV, and connect it to the developing bias output check pin (DV BIAS).
- ③ Turn on the copier power, and execute simulation 8-01.
- ④ During execution of the simulation, check that the developing bias output monitor voltage is $-200 \pm 5V$. If the voltage is outside the range, adjust with the control knob (VR301).

[8] SIMULATION

1. Outline

This model is equipped with the simulations feature which allows the following operations with the keys on the operation panel:

- 1) Adjustments
- 2) Setting of specifications and functions
- 3) Resetting trouble codes
- 4) Checking operations

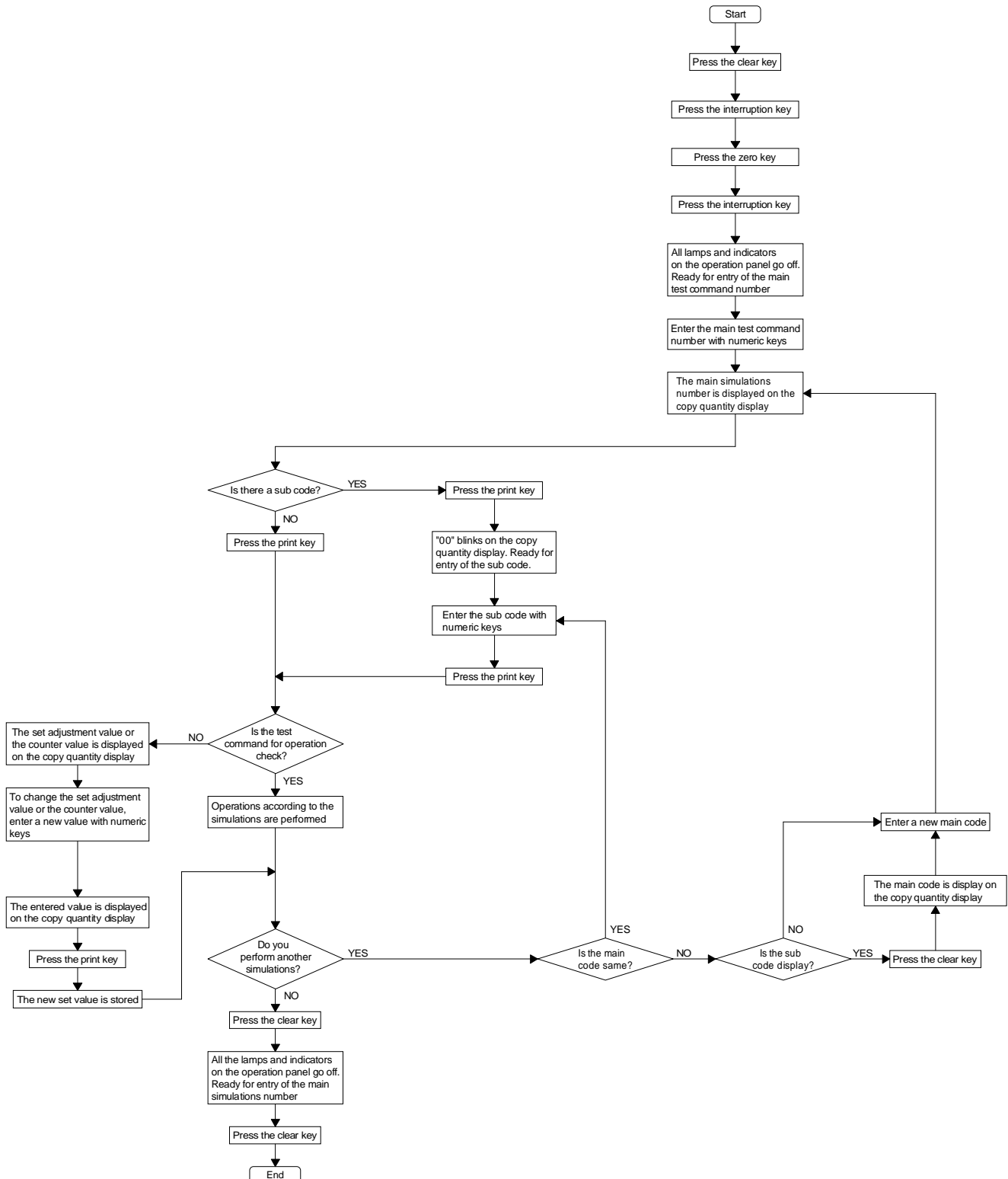
2. Purpose

The purpose of the simulations feature is to improve serviceability in repairs and adjustments.

Since the mechanical adjustments can be performed electrically, the above purpose is achieved with low costs.

3. Operating procedure

Simulations operating procedure



4. List of simulations

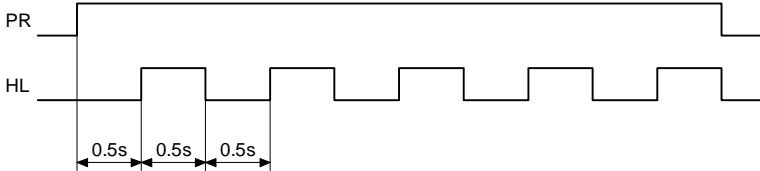
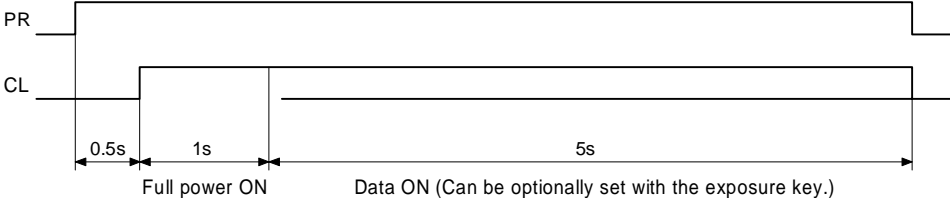
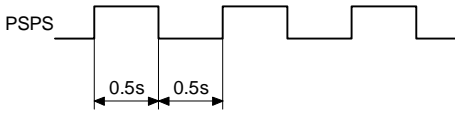
Main code	Sub code	Content
1	01	Mirror scanning
	02	Optical system sensor check
	03	Lens operation check
	04	Lens operation aging
2	01	ADF aging
	02	ADF sensor check
	03	ADF individual load operation check (Paper feed motor forward rotation)
	04	ADF individual load operation check (Paper feed motor reverse rotation)
	05	ADF individual load operation check (Transport motor forward rotation)
	06	ADF individual load operation check (Transport motor reverse rotation)
	07	ADF individual load operation check (Original stopper solenoid ON)
3	02	Sorter sensor check
	03	Sorter individual load operation check (Transport motor)
	04	Sorter individual load operation check (Bin motor)
	05	Sorter individual load operation check (Buzzer)
5	01	Operation panel display check
	02	Heater lamp check
	03	Copy lamp check
	04	DL lighting check
	05	BL lighting check
6	01	Transport system load operation (Clutch/solenoid)
	02	Paper feed motor operation check (SF-2118 only)
7	01	Warm-up time display and aging
	04	Warm-up omitting
	06	Intermittent aging
	08	Warm-up time display
8	01	Developing bias output
	02	Main/transfer charger output/grid check (ME)
	03	Main/transfer charger output/grid check (PE)
	04	Main/transfer charger output/grid check (T/S)
	07	Separation charger output
10	—	Toner motor aging
14	—	Trouble cancel (Excluding U2 trouble)
15	—	Waste toner full (blinking) cancel
16	—	U2 trouble cancel
20	—	Maintenance counter clear
21	01	Maintenance cycle setting
22	01	Maintenance counter display
	02	Maintenance preset counter display
	03	JAM memory display
	04	Total JAM counter display
	05	Total counter display
	06	DV counter display
	07	DV preset counter display
	08	ADF counter display
24	01	JAM memory/total JAM counter clear
	04	ADF counter clear




Main code	Sub code	Content
25	01	Drive system check
	02	Automatic developer adjustment
26	01	Option setting (ADF shadow erase setting)
	05	Counter mode setting
	06	Destination setting
	07	Drum sensitivity setting
	10	AE document density setting
	13	Warm-up mode setting
30	01	Copier sensor check (paper sense)
	02	Tray size switch state display
42	—	Developer
43	01	Fusing temperature setting
44	01	Process control operation setting
	05	Grid voltage correction test
	06	Grid voltage correction compulsive execution
	07	Image density/drum mark sensor operation test
	08	Process control data display
	09	Process control data display (Latest value)
	10	Grid voltage correction (Drum surface/patch) data display
46	01	Initial grid bias setting
	01	Exposure adjustment
47	—	AE sensor characteristics measurement (AE sensor gain automatic adjustment)
48	01	Front/rear magnification ratio adjustment
	02	Paper transport direction magnification ratio adjustment (Mirror speed correction)
50	01	Copy lead edge adjustment
	02	Lead edge adjustment (Simple type)
51	02	Resist amount adjustment
53	01	ADF stop position adjustment value (normal paper) setting
	03	ADF stop position adjustment value (thin paper) setting
	04	ADF resist sensor, width sensor adjustment
	05	ADF paper exit sensor adjustment

5. Details of simulations

Simulation input procedure: C → =↗ → 0 → =↗

Main code	Sub code	Content														
01	01	Mirror operation check When the START key is pressed, scanning is performed at the speed corresponding to the currently set copy magnification ratio. The copy magnification ratio can be set freely.														
	02	Optical system sensor (MHPS,LHPS) state display The ON/OFF state of the optical system sensor can be monitored with the operation panel LED. <table><tr><th>Sensor name</th><th>Operation panel LED</th></tr><tr><td>MHPS</td><td>Paper empty lamp (□)</td></tr><tr><td>LHPS</td><td>JAM lamp (⚡)</td></tr></table>	Sensor name	Operation panel LED	MHPS	Paper empty lamp (□)	LHPS	JAM lamp (⚡)								
	Sensor name	Operation panel LED														
	MHPS	Paper empty lamp (□)														
LHPS	JAM lamp (⚡)															
03	Lens operation check The lens unit moves to the following magnification ratio positions continuously. AB series: 100% → 115% → 122% → 141% → 200% → 86% → 81% → 70% → 50% → 100% Inch series: 100% → 121% → 129% → 141% → 200% → 95% → 77% → 64% → 50% → 100%															
	04	Lens aging Simulation 1-3 operation is repeated continuously.														
02	01	ADF aging ADF document transport operation is performed.														
	02	ADF sensor state display The ON/OFF state of the sensor in the ADF is monitored with the operation panel LED. <table><tr><th>Sensor name</th><th>Operation panel LED</th></tr><tr><td>DF open/close sensor</td><td>JAM lamp (⚡)</td></tr><tr><td>Empty sensor</td><td>Paper empty lamp (□)</td></tr><tr><td>Tray open sensor</td><td>Manual feed select lamp</td></tr><tr><td>Resist sensor</td><td>Resist position JAM lamp (▼)</td></tr><tr><td>Resist width sensor</td><td>Drum position JAM lamp (▼)</td></tr><tr><td>Paper exit sensor</td><td>Paper exit position JAM lamp (▼)</td></tr></table>	Sensor name	Operation panel LED	DF open/close sensor	JAM lamp (⚡)	Empty sensor	Paper empty lamp (□)	Tray open sensor	Manual feed select lamp	Resist sensor	Resist position JAM lamp (▼)	Resist width sensor	Drum position JAM lamp (▼)	Paper exit sensor	Paper exit position JAM lamp (▼)
	Sensor name	Operation panel LED														
	DF open/close sensor	JAM lamp (⚡)														
	Empty sensor	Paper empty lamp (□)														
	Tray open sensor	Manual feed select lamp														
	Resist sensor	Resist position JAM lamp (▼)														
	Resist width sensor	Drum position JAM lamp (▼)														
Paper exit sensor	Paper exit position JAM lamp (▼)															
03	ADF individual load operation check (Paper feed motor forward rotation)															
04	ADF individual load operation check (Paper feed motor reverse rotation)															
05	ADF individual load operation check (Transport motor forward rotation)															
06	ADF individual load operation check (Transport motor reverse rotation)															
07	ADF individual load operation check (Original stopper solenoid ON)															
03	02	Sorter sensor state display ON/OFF state of the sensor in the ADF is monitored with the operation panel LED. <table><tr><th>Sensor name</th><th>Operation panel LED</th></tr><tr><td>Intake sensor</td><td>JAM lamp (⚡)</td></tr><tr><td>Tray paper empty sensor</td><td>Paper empty lamp (□)</td></tr><tr><td>Upper limit sensor</td><td>Manual feed select lamp</td></tr><tr><td>Lower limit sensor</td><td>Resist position JAM lamp (▼)</td></tr><tr><td>Bin home position sensor</td><td>Drum position JAM lamp (▼)</td></tr><tr><td>Take out sensor</td><td>Paper exit position JAM lamp (▼)</td></tr></table>	Sensor name	Operation panel LED	Intake sensor	JAM lamp (⚡)	Tray paper empty sensor	Paper empty lamp (□)	Upper limit sensor	Manual feed select lamp	Lower limit sensor	Resist position JAM lamp (▼)	Bin home position sensor	Drum position JAM lamp (▼)	Take out sensor	Paper exit position JAM lamp (▼)
	Sensor name	Operation panel LED														
	Intake sensor	JAM lamp (⚡)														
	Tray paper empty sensor	Paper empty lamp (□)														
	Upper limit sensor	Manual feed select lamp														
	Lower limit sensor	Resist position JAM lamp (▼)														
Bin home position sensor	Drum position JAM lamp (▼)															
Take out sensor	Paper exit position JAM lamp (▼)															
	03	Sorter individual load operation check (Transport motor)														
	04	Sorter individual load operation check (Bin motor)														
	05	Sorter individual load operation check (Buzzer)														

Main code	Sub code	Content	
05	01	Operation panel display check All LED's on the operation panel are lighted for 5 sec.	
	02	Heater lamp ON check The heater lamp is turned ON/OFF in the sequence shown below. 	
	03	Copy lamp ON check The copy lamp is turned ON/OFF in the sequence shown below. 	
	04	Discharge lamp ON check The discharge lamp is lighted for 30 sec.	
	05	Blank lamp ON check The blank lamp is turned ON/OFF sequentially every 0.5 sec.	
06	01	PSPS operation check The paper separation pawl is turned ON/OFF 30 times in the sequence shown below. 	
	02	Paper feed motor operation check (SF-2118 only) The paper feed motor of the second stage of the main body is turned ON. When the PFU is installed, the paper feed motors of the first and the second stages are turned ON.	
07	01	Warm-up time display and aging After completion of simulation, warm-up is started. The warm-up time is counted every second and displayed on the copy quantity display. When warm-up is completed (RRL ON), time count is stopped. After clearing warm-up time display by pressing the CA key, set the copy quantity and press the START key, and the copier will make the set quantity of copies.	
	04	Warm-up omitting After completion of the simulation, the machine will go to the ready state (RPL ON) directly.	
	06	Intermittent aging After completion of the simulation, warm-up is started. After completion of warm-up, set the copy quantity and press the START key, and the machine will make the set quantity of copies.	
	08	Warm-up time display Same as Simulation 7-1, but without the aging function.	
08	01	Developing bias check The developing bias is turned ON for 30 sec.	
	02	MTH (main, transfer), grid check (ME) The main/transfer charger is turned ON for 30 sec. The grid bias output is the ME value.	The output differs depending on the drum marking number (1 or 2).
	03	MTHV (main, transfer), grid check (PE) The main/transfer charger is turned on for 30 sec. The grid bias of PE value is outputted.	The output differs depending on the drum marking number (1 or 2).
	04	MTHV (main, transfer), grid check (T/S) The main/transfer charger is turned on for 30 sec. The grid bias of T/S value is outputted.	The output differs depending on the drum marking number (1 or 2).
	07	SHV (Separation) check The separation charger is turned on for 30 sec.	
10	—	Toner motor aging The toner motor is turned on.	

Main code	Sub code	Content														
14	—	Cancel of troubles other than U2 Troubles other than U2 are cancelled and the simulation is also cancelled automatically.														
15	—	Waste toner full ( blink) cancel Waste toner full ( blink) is canceled and the simulation is also canceled.														
16	—	U2 trouble cancel U2 trouble is cancelled and the simulation is also cancelled automatically.														
20	(Note)	Maintenance counter clear The maintenance counter is cleared and the maintenance counter value is displayed on the copy quantity display. ("000" is displayed because the counter value is cleared.) (Note) Entering the sub code "01" clears the value.														
21	01	Maintenance cycle setting Used to set the lighting cycle of the maintenance lamp (). When the simulation is executed, the currently set maintenance cycle is displayed on the copy quantity display. After entering the set value, press the START key to memorize the value. <table border="1"><thead><tr><th>Set value</th><th>Maintenance cycle</th></tr></thead><tbody><tr><td>0</td><td>50,000 sheets</td></tr><tr><td>1</td><td>2,500 sheets</td></tr><tr><td>2</td><td>5,000 sheets</td></tr><tr><td>3</td><td>10,000 sheets</td></tr><tr><td>4</td><td>25,000 sheets</td></tr><tr><td>5</td><td>Free (Remains OFF.)</td></tr></tbody></table> ← Initial value	Set value	Maintenance cycle	0	50,000 sheets	1	2,500 sheets	2	5,000 sheets	3	10,000 sheets	4	25,000 sheets	5	Free (Remains OFF.)
Set value	Maintenance cycle															
0	50,000 sheets															
1	2,500 sheets															
2	5,000 sheets															
3	10,000 sheets															
4	25,000 sheets															
5	Free (Remains OFF.)															
22	01	Maintenance counter display Used to display the maintenance counter value on the copy quantity display.														
	02	Maintenance preset counter display Used to set the maintenance cycle value set in simulation 2-1 on the coy quantity display.														
	03	JAM memory display Used to display JAM cause (JAM position) occurred during copying. The JAM cause (JAM position) is displayed on the JAM display position on the operation panel by execution of the simulation, and the JAM cause history is checked by pressing the magnification ratio display key.														
	04	Total JAM counter display Used to display the total JAM counts occurred during copying on the copy quantity display.														
	05	Total counter display Used to display the total counter value on the copy quantity display.														
	06	Developer counter display Used to display the counter value of the currently installed developing unit on the copy quantity display.														
	07	Developer preset counter display Used to display the developer replacement cycle of the currently installed developing unit on the copy quantity display.														
	08	ADF counter display Used to display the number of originals transported by the ADF on the copy quantity display.														
24	01	JAM memory/Total JAM counter clear Used to clear the JAM cause (JAM position) occurred during copying and JAM total counter, and to display the JAM total counter value on the copy quantity display. ("000" is displayed because the counter is cleared.)														
	04	ADF counter clear Used to clear the ADF counter and display the ADF counter value on the coy quantity display. ("000" is displayed because the counter is cleared.)														
25	01	Drive system check Used to turn on the main motor, the developing bias, and the discharge lamp for 3 minutes. The toner density sensor input value is displayed on the copy quantity display during rotation of the main motor. The alphabet on the third digit of the copy quantity display shows the kind of developing unit. A: Black B: Red C: Blue														
	02	Auto developer adjustment Used to perform the same operation as simulation 25-1 and memorize the average value of the toner density sensor input levels after 3 minutes from starting the main motor rotation. The alphabet on the third digit of the copy quantity display shows the kind of developing unit. A: Black B: Red C: Blue														

Main code	Sub code	Content																	
26	01	<p>Option setting (Half belt ADF shadow erase setting)</p> <p>When the simulation is executed, the currently set option is displayed on the copy quantity display. After entering the value, press the START key to memorize the value.</p> <table><tr><th>Set value</th><th>Shade erase</th></tr><tr><td>10</td><td>Yes</td></tr><tr><td>0</td><td>No</td></tr></table> <p>Factory setting: 0</p>	Set value	Shade erase	10	Yes	0	No											
	Set value	Shade erase																	
	10	Yes																	
	0	No																	
	05	<p>Count mode setting</p> <p>Used to set the count up mode of the total counter, the developer counter, and the maintenance counter in A3/WLT copying.</p> <p>When the simulation is executed, the currently set count mode is displayed on the copy quantity display. After entering the value, press the START key to memorize the value.</p> <table><tr><th>Set value</th><th>Total/developer counter</th><th>Maintenance counter</th></tr><tr><td>0</td><td>Double count</td><td>Double count</td></tr><tr><td>1</td><td>Single count</td><td>Double count</td></tr><tr><td>2</td><td>Double count</td><td>Single count</td></tr><tr><td>3</td><td>Single count</td><td>Single count</td></tr></table> <p>← Initial value</p>	Set value	Total/developer counter	Maintenance counter	0	Double count	Double count	1	Single count	Double count	2	Double count	Single count	3	Single count	Single count		
Set value	Total/developer counter	Maintenance counter																	
0	Double count	Double count																	
1	Single count	Double count																	
2	Double count	Single count																	
3	Single count	Single count																	
06	<p>Destination setting</p> <p>Used to set the destination.</p> <p>When the simulation is executed, the currently set destination is displayed on the copy quantity display. After entering the value, press the START key to memorize the value.</p> <table><tr><th>Set value</th><th>Destination</th></tr><tr><td>0</td><td>Japan</td></tr><tr><td>1</td><td>America</td></tr><tr><td>2</td><td>Canada</td></tr><tr><td>3</td><td>Europe except U.K.</td></tr><tr><td>4</td><td>U.K.</td></tr><tr><td>5</td><td>Australia</td></tr><tr><td>6</td><td>Inch series outside JAPAN</td></tr><tr><td>7</td><td>AB series outside JAPAN</td></tr></table>	Set value	Destination	0	Japan	1	America	2	Canada	3	Europe except U.K.	4	U.K.	5	Australia	6	Inch series outside JAPAN	7	AB series outside JAPAN
Set value	Destination																		
0	Japan																		
1	America																		
2	Canada																		
3	Europe except U.K.																		
4	U.K.																		
5	Australia																		
6	Inch series outside JAPAN																		
7	AB series outside JAPAN																		
07	<p>Drum sensitivity setting</p> <p>Used to set the drum sensitivity. The copy lamp output voltage is corrected according tot he set value. After entering the value, press the START key to memorize the value.</p> <table><tr><th>Set value</th><th>Drum sensitivity</th><th>Copy lamp output correction value</th></tr><tr><td>1</td><td>1</td><td>-1V</td></tr><tr><td>2</td><td>2</td><td>±0V</td></tr><tr><td>3</td><td>3</td><td>+1V</td></tr></table> <p>← Initial value</p>	Set value	Drum sensitivity	Copy lamp output correction value	1	1	-1V	2	2	±0V	3	3	+1V						
Set value	Drum sensitivity	Copy lamp output correction value																	
1	1	-1V																	
2	2	±0V																	
3	3	+1V																	
10	<p>AE original density setting</p> <p>Used to set the original density.</p> <p>When this simulation is executed, the currently set value is displayed on the coy quantity display. Set the value and press the PRINT button to store the value.</p> <table><tr><th>Set value</th><th>Original density</th></tr><tr><td>0</td><td>Normal paper</td></tr><tr><td>1</td><td>Thin paper</td></tr></table> <p>← Initial value</p> <p>When a low density original is copied in the AE mode, the lead edge section (about 4mm) is not copied. To copy the lead edge section, select "1."</p>	Set value	Original density	0	Normal paper	1	Thin paper												
Set value	Original density																		
0	Normal paper																		
1	Thin paper																		
13	<p>Warm-up mode setting</p> <p>Used to set the main motor rotation mode in warm-up mode.</p> <p>When this simulation is executed, the currently set value is displayed on the copy quantity display. Set the value and press the PRINT button to store the value.</p> <table><tr><th>Set value</th><th>Warm-up mode</th></tr><tr><td>0</td><td>Normal mode</td></tr><tr><td>1</td><td>Main motor rotation until completion of warm-up.</td></tr></table> <p>← Initial value</p>	Set value	Warm-up mode	0	Normal mode	1	Main motor rotation until completion of warm-up.												
Set value	Warm-up mode																		
0	Normal mode																		
1	Main motor rotation until completion of warm-up.																		

Main code	Sub code	Content																								
26	20	<p>Rear edge void setting Used to set the rear edge void YES/NO of copy paper. When this simulation is executed, the currently set value is displayed on the copy quantity display. Set the value and press the PRINT button to store the value.</p> <table><tr><th>Set value</th><th>Rear edge void</th></tr><tr><td>0</td><td>YES</td></tr><tr><td>1</td><td>NO</td></tr></table> <p>← Initial value</p>	Set value	Rear edge void	0	YES	1	NO																		
Set value	Rear edge void																									
0	YES																									
1	NO																									
30	01	<p>Paper sensor status display Used to monitor the main body sensors ON/OFF state with the LED's on the operation panel.</p> <table><tr><th>Sensor name</th><th>Operation panel LED</th></tr><tr><td>PID</td><td>Manual feed tray select lamp</td></tr><tr><td>PPD</td><td>Drum position JAM lamp (▼)</td></tr><tr><td>DPPD1</td><td>Resist position JAM lamp (▼)</td></tr><tr><td>DPPD2</td><td>Main body lower stage tray position JAM lamp (▼)</td></tr><tr><td>DPPD3</td><td>Paper empty lamp (□)</td></tr><tr><td>DPPD4</td><td>JAM lamp (8√)</td></tr><tr><td>POD</td><td>Paper exit position JAM lamp (▼)</td></tr><tr><td>PED1</td><td>Main body upper stage tray select lamp</td></tr><tr><td>PED2</td><td>Main body lower stage tray select lamp</td></tr><tr><td>PED3</td><td>Option upper stage tray select lamp</td></tr><tr><td>PED4</td><td>Option lower stage tray select lamp</td></tr></table>	Sensor name	Operation panel LED	PID	Manual feed tray select lamp	PPD	Drum position JAM lamp (▼)	DPPD1	Resist position JAM lamp (▼)	DPPD2	Main body lower stage tray position JAM lamp (▼)	DPPD3	Paper empty lamp (□)	DPPD4	JAM lamp (8√)	POD	Paper exit position JAM lamp (▼)	PED1	Main body upper stage tray select lamp	PED2	Main body lower stage tray select lamp	PED3	Option upper stage tray select lamp	PED4	Option lower stage tray select lamp
Sensor name	Operation panel LED																									
PID	Manual feed tray select lamp																									
PPD	Drum position JAM lamp (▼)																									
DPPD1	Resist position JAM lamp (▼)																									
DPPD2	Main body lower stage tray position JAM lamp (▼)																									
DPPD3	Paper empty lamp (□)																									
DPPD4	JAM lamp (8√)																									
POD	Paper exit position JAM lamp (▼)																									
PED1	Main body upper stage tray select lamp																									
PED2	Main body lower stage tray select lamp																									
PED3	Option upper stage tray select lamp																									
PED4	Option lower stage tray select lamp																									
	02	<p>Tray size switch status display Used to monitor the tray size switches ON/OFF state with the LED's on the operation panel. Use the tray select key to select the desired tray.</p> <table><tr><th>Switch name</th><th>Operation panel LED</th></tr><tr><td>SW2</td><td>Paper exit position JAM lamp (▼)</td></tr><tr><td>SW1</td><td>Drum position JAM lamp (▼)</td></tr><tr><td>SW0</td><td>Resist position JAM lamp (▼)</td></tr><tr><td>Tray position</td><td>Each tray select LED</td></tr></table> <p>Switches are arranged in the sequence of SW2, SW1, and SW0 from the paper exit side.</p>	Switch name	Operation panel LED	SW2	Paper exit position JAM lamp (▼)	SW1	Drum position JAM lamp (▼)	SW0	Resist position JAM lamp (▼)	Tray position	Each tray select LED														
Switch name	Operation panel LED																									
SW2	Paper exit position JAM lamp (▼)																									
SW1	Drum position JAM lamp (▼)																									
SW0	Resist position JAM lamp (▼)																									
Tray position	Each tray select LED																									
42	(Note)	<p>Developer counter clear Used to clear the counter of the currently installed developing unit and to display the developer counter value on the copy quantity display. ("000" is displayed because the counter is cleared.) (Note) Entering the sub code "01" clears the input.)</p>																								
43	01	<p>Fusing temperature setting Used to set the fusing control temperature. When the simulation is executed, the currently set fusing temperature is displayed on the copy quantity display. To select the set value, press the magnification ratio display key. After selecting the fusing temperature, press the START key to memorize the temperature.</p>																								
44	01	<p>Process control setting Used to set VALID/INVALID of the grid voltage correction, the optical system dirt correction, and the drum film wear correction. When the simulation is executed, the currently set value is displayed on the copy quantity display. To make correction modes VALID, enter the total value of the codes corresponding to the correction modes. After entering the total value, press the START key to memorize the value.</p> <table><tr><th>Code</th><th>Correction mode</th></tr><tr><td>+1</td><td>Grid voltage correction</td></tr><tr><td>+2</td><td>Optical system dirt correction</td></tr><tr><td>+4</td><td>Drum film wear correction</td></tr></table> <p>The initial value is "1." The grid voltage correction is always valid ("1") regardless of setting. (It is not canceled by setting to "0.")</p>	Code	Correction mode	+1	Grid voltage correction	+2	Optical system dirt correction	+4	Drum film wear correction																
Code	Correction mode																									
+1	Grid voltage correction																									
+2	Optical system dirt correction																									
+4	Drum film wear correction																									

Main code	Sub code	Content																											
44	05	<p>Grid voltage correction operation test</p> <p>Used to operate the grid voltage correction and the measured data is displayed on the copy quantity display. When the simulation is executed, the grid voltage correction is automatically performed. With the latest patch forming grid voltage as the reference, the image density sensor is read when -30V, 0V, or +30V is added to the reference voltage.</p> <p>After completion of the operation, the data is displayed on the copy quantity display.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table><tr><th colspan="2">Copy quantity display</th><th rowspan="2">Display data (Image density sensor A/D input value)</th></tr><tr><th>3rd digit</th><th>2nd/1st digits</th></tr><tr><td>A</td><td rowspan="6">Measured data</td><td>Drum surface data (For applying -30V patch forming grid voltage)</td></tr><tr><td>b</td><td>Drum surface data (For applying patch forming grid voltage)</td></tr><tr><td>C</td><td>Drum surface data (For applying +30V patch forming grid voltage)</td></tr><tr><td>d</td><td>Patch data (For applying -30V patch forming grid voltage)</td></tr><tr><td>E</td><td>Patch data (For applying patch forming grid voltage)</td></tr><tr><td>F</td><td>Patch data (For applying +30V patch forming grid voltage)</td></tr></table> <p>The measured data indicated with the lower two digits is the A/D input value of the image density sensor. It is converted into decimal numbers and displayed. (Display range: 0 ~ 99)</p> <p>After completion of this simulation, the patch forming grid voltage can be checked with simulation 44-9.</p>	Copy quantity display		Display data (Image density sensor A/D input value)	3rd digit	2nd/1st digits	A	Measured data	Drum surface data (For applying -30V patch forming grid voltage)	b	Drum surface data (For applying patch forming grid voltage)	C	Drum surface data (For applying +30V patch forming grid voltage)	d	Patch data (For applying -30V patch forming grid voltage)	E	Patch data (For applying patch forming grid voltage)	F	Patch data (For applying +30V patch forming grid voltage)									
Copy quantity display		Display data (Image density sensor A/D input value)																											
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E		Patch data (For applying patch forming grid voltage)																											
F		Patch data (For applying +30V patch forming grid voltage)																											
	06	<p>Grid voltage correction compulsive execution</p> <p>Used to execute the grid voltage correction compulsively in the simulation.</p> <p>When the simulation is executed, the grid voltage correction is automatically performed.</p> <p>After completion of the operation, the patch forming grid voltage after grid voltage correction is displayed on the copy quantity display. The relationship between the display value and the patch forming grid voltage is as shown in the table below.</p> <table><tr><th>Display value</th><th>Patch forming grid voltage</th></tr><tr><td>8</td><td>200V</td></tr><tr><td>50</td><td>410V</td></tr><tr><td>99</td><td>655V</td></tr></table> <p>Display range: 8 ~ 99 When the display changes by 1, the voltage changes by 5V.</p> <p>After completion of this simulation, the drum surface data and the patch data can be checked with simulation 44-10. (Note) Since the patch forming grid voltage is memorized by execution of the simulation, the grid voltage correction amount may be varied from the patch forming grid voltages before and after the simulation.</p>	Display value	Patch forming grid voltage	8	200V	50	410V	99	655V																			
Display value	Patch forming grid voltage																												
8	200V																												
50	410V																												
99	655V																												
	07	<p>Image density sensor and drum mark sensor operation test</p> <p>Used to read the light reception level of the image density sensor and the drum mark sensor and display them on the copy quantity display.</p> <p>When the simulation is executed, the light quantity of the image density sensor and the drum mark sensor are changed in 5 steps and each light reception level is read.</p> <p>After completion of the operation, the measured data are displayed on the copy quantity display.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table><tr><th colspan="2">Copy quantity display</th><th rowspan="2">Display data</th></tr><tr><th>3rd digit</th><th>2nd/1st digits</th></tr><tr><td>A</td><td rowspan="5">Measured data</td><td>Image density sensor input value lighting when 1V</td></tr><tr><td>b</td><td>Image density sensor input value lighting when 2V</td></tr><tr><td>C</td><td>Image density sensor input value lighting when 3V</td></tr><tr><td>d</td><td>Image density sensor input value lighting when 4V</td></tr><tr><td>E</td><td>Image density sensor input value lighting when 5V</td></tr><tr><td>F</td><td rowspan="5">Judgement data</td><td>Drum mark sensor level value lighting when 1V</td></tr><tr><td>G</td><td>Drum mark sensor level value lighting when 2V</td></tr><tr><td>H</td><td>Drum mark sensor level value lighting when 3V</td></tr><tr><td>I</td><td>Drum mark sensor level value lighting when 4V</td></tr><tr><td>J</td><td>Drum mark sensor level value lighting when 5V</td></tr></table> <p>The data of the lower two digits are:</p> <p>[A] ~ [E]: Image density sensor A/D input. Converted into decimal numbers and displayed. (Display range: 0 ~ 99)</p> <p>[F] ~ [J]: Drum mark sensor level is displayed with "0" or "1."</p> <p>"0" --- Drum mark sensor sensing disabled</p> <p>"1" --- Drum mark sensor sensing enabled</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits	A	Measured data	Image density sensor input value lighting when 1V	b	Image density sensor input value lighting when 2V	C	Image density sensor input value lighting when 3V	d	Image density sensor input value lighting when 4V	E	Image density sensor input value lighting when 5V	F	Judgement data	Drum mark sensor level value lighting when 1V	G	Drum mark sensor level value lighting when 2V	H	Drum mark sensor level value lighting when 3V	I	Drum mark sensor level value lighting when 4V	J	Drum mark sensor level value lighting when 5V
Copy quantity display		Display data																											
3rd digit	2nd/1st digits																												
A	Measured data	Image density sensor input value lighting when 1V																											
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C		Image density sensor input value lighting when 3V																											
d		Image density sensor input value lighting when 4V																											
E		Image density sensor input value lighting when 5V																											
F	Judgement data	Drum mark sensor level value lighting when 1V																											
G		Drum mark sensor level value lighting when 2V																											
H		Drum mark sensor level value lighting when 3V																											
I		Drum mark sensor level value lighting when 4V																											
J		Drum mark sensor level value lighting when 5V																											

Main code	Sub code	Content																					
44	08	<p>Grid voltage correction, optical system dirt correction, and drum film wear correction data display</p> <p>Used to display the correction data of the grid voltage correction, the optical system dirt correction, and the drum film wear correction on the copy quantity display.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th>Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th><th></th></tr> </thead> <tbody> <tr> <td>A</td><td>8 ~ 99</td><td>Patch forming grid voltage (Initial value) When "50" is displayed, the grid voltage is 410V. When the display value is decreased by 1, the grid voltage is decreased by 5V. When the display value is increased by 1, the grid voltage is increased by 5V.</td></tr> <tr> <td>b</td><td>1 ~ 99</td><td>Normal mode grid voltage (Initial value) Display value x 10V = Grid output voltage</td></tr> <tr> <td>C</td><td>0 ~ 99</td><td>Optical system dirt correction reference value AE sensor input value measured after execution of simulation 46-1. (Converted into decimal numbers and displayed.)</td></tr> <tr> <td>d</td><td>0 ~ 99</td><td>Drum rotation time up to the present The display value is increased by 1 when one hour passes.</td></tr> <tr> <td>E</td><td>0 ~ 99</td><td>Developing unit rotation time up to the present The display value is increased by 1 when one hour passes.</td></tr> </tbody> </table>	Copy quantity display		Display data	3rd digit	2nd/1st digits		A	8 ~ 99	Patch forming grid voltage (Initial value) When "50" is displayed, the grid voltage is 410V. When the display value is decreased by 1, the grid voltage is decreased by 5V. When the display value is increased by 1, the grid voltage is increased by 5V.	b	1 ~ 99	Normal mode grid voltage (Initial value) Display value x 10V = Grid output voltage	C	0 ~ 99	Optical system dirt correction reference value AE sensor input value measured after execution of simulation 46-1. (Converted into decimal numbers and displayed.)	d	0 ~ 99	Drum rotation time up to the present The display value is increased by 1 when one hour passes.	E	0 ~ 99	Developing unit rotation time up to the present The display value is increased by 1 when one hour passes.
Copy quantity display		Display data																					
3rd digit	2nd/1st digits																						
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d	0 ~ 99	Drum rotation time up to the present The display value is increased by 1 when one hour passes.																					
E	0 ~ 99	Developing unit rotation time up to the present The display value is increased by 1 when one hour passes.																					
	09	<p>Grid voltage correction, optical system dirt correction, and drum film wear correction data display (Latest value)</p> <p>Used to display the correction data of the grid voltage correction, the optical system dirt correction, and the drum film wear correction on the copy quantity display.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th>Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th><th></th></tr> </thead> <tbody> <tr> <td>A</td><td>8 ~ 99</td><td>Patch forming grid voltage (Initial value) When "50" is displayed, the grid voltage is 410V. When the display value is decreased by 1, the grid voltage is decreased by 5V. When the display value is increased by 1, the grid voltage is increased by 5V.</td></tr> <tr> <td>b</td><td>1 ~ 99</td><td>Normal mode grid voltage (Initial value) Display value x 10V = Grid output voltage</td></tr> <tr> <td>C</td><td>0 ~ 10</td><td>Optical system dirt correction reference value Display value x 0.7V = Copy lamp voltage correction value</td></tr> <tr> <td>d</td><td>0 ~ 20</td><td>Drum file wear correction value Drum film wear correction value when normal mode exp. 1</td></tr> <tr> <td>E</td><td>0 31 ~ 35</td><td>Trouble data display when executing the grid voltage correction 0: No trouble 31 ~ 35: Trouble (The sub code is displayed.)</td></tr> </tbody> </table>	Copy quantity display		Display data	3rd digit	2nd/1st digits		A	8 ~ 99	Patch forming grid voltage (Initial value) When "50" is displayed, the grid voltage is 410V. When the display value is decreased by 1, the grid voltage is decreased by 5V. When the display value is increased by 1, the grid voltage is increased by 5V.	b	1 ~ 99	Normal mode grid voltage (Initial value) Display value x 10V = Grid output voltage	C	0 ~ 10	Optical system dirt correction reference value Display value x 0.7V = Copy lamp voltage correction value	d	0 ~ 20	Drum file wear correction value Drum film wear correction value when normal mode exp. 1	E	0 31 ~ 35	Trouble data display when executing the grid voltage correction 0: No trouble 31 ~ 35: Trouble (The sub code is displayed.)
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E	0 31 ~ 35	Trouble data display when executing the grid voltage correction 0: No trouble 31 ~ 35: Trouble (The sub code is displayed.)																					
	10	<p>Display of drum surface data and patch data in grid voltage correction</p> <p>Used to display the drum surface data and the patch data on the copy quantity display after execution of simulation 44-5, -6, or during the normal operation.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th>Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th><th>(Image density sensor A/D input value)</th></tr> </thead> <tbody> <tr> <td>A</td><td rowspan="6">Measured data</td><td>Drum surface data (When applying -30V patch forming grid voltage)</td></tr> <tr> <td>b</td><td>Drum surface data (When applying patch forming grid voltage)</td></tr> <tr> <td>C</td><td>Drum surface data (When applying +30V patch forming grid voltage)</td></tr> <tr> <td>d</td><td>Patch data (When applying -30V patch forming grid voltage)</td></tr> <tr> <td>E</td><td>Patch data (When applying patch forming grid voltage)</td></tr> <tr> <td>F</td><td>Patch data (When applying +30V patch forming grid voltage)</td></tr> </tbody> </table> <p>The measured data indicated with the lower two digits is the A/D input value of the image density sensor. It is converted into decimal numbers and displayed.</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits	(Image density sensor A/D input value)	A	Measured data	Drum surface data (When applying -30V patch forming grid voltage)	b	Drum surface data (When applying patch forming grid voltage)	C	Drum surface data (When applying +30V patch forming grid voltage)	d	Patch data (When applying -30V patch forming grid voltage)	E	Patch data (When applying patch forming grid voltage)	F	Patch data (When applying +30V patch forming grid voltage)		
Copy quantity display		Display data																					
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E		Patch data (When applying patch forming grid voltage)																					
F		Patch data (When applying +30V patch forming grid voltage)																					

Main code	Sub code	Content																																					
44	11	<p>Initial grid bias setting</p> <p>Used to set the initial grid bias in the norma mode, the photo mode, the toner save mode, and the patch measurement mode.</p> <p>When the simulation is executed, warm up is started and the currently set normal mode initial grid bias is displayed on the copy quantity display.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table><tr><th colspan="2">Copy quantity display</th><th rowspan="2">Display data</th></tr><tr><th>3rd digit</th><th>2nd/1st digits</th></tr><tr><td>A</td><td rowspan="3">8 ~ 99</td><td>Initial grid bias data (Normal mode) Set the grid voltage to 750V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.</td></tr><tr><td>b</td><td>Initial grid bias data (Photo mode) Set the grid voltage to 500V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.</td></tr><tr><td>C</td><td>Initial grid bias data (Toner save mode) Set the grid voltage to 650V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.</td></tr><tr><td>d</td><td>41</td><td>Initial rid bias data (Patch measurement mode) Set the grid voltage to 410V with the display value of 41. Setting cannot be changed.</td></tr></table> <p>After entering the value, press the START key to memorize the value and start copying.</p> <p>After completion of setting, press the CA key to cancel the adjustment mode.</p> <p>(Note) When the drum is replaced, the set value may be changed. (This is because the drum characteristics are corrected.)</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits	A	8 ~ 99	Initial grid bias data (Normal mode) Set the grid voltage to 750V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.	b	Initial grid bias data (Photo mode) Set the grid voltage to 500V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.	C	Initial grid bias data (Toner save mode) Set the grid voltage to 650V. When the display value is decreased by 1, the grid voltage decreases by 5V. When the display value is increased by 1, the grid voltage increases by 5V.	d	41	Initial rid bias data (Patch measurement mode) Set the grid voltage to 410V with the display value of 41. Setting cannot be changed.																						
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d	41	Initial rid bias data (Patch measurement mode) Set the grid voltage to 410V with the display value of 41. Setting cannot be changed.																																					
46	01	<p>Exposure level adjustment</p> <p>Used to set the copy density (copy lamp output voltage) in each exposure mode.</p> <p>When the simulation is executed, warm up is started and the currently set manual upper value (ME) is displayed on the copy quantity display.</p> <p>After completion of warm up, the ready lamp lights up. When the START key is pressed, copying is performed in the currently set exposure mode.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table><tr><th colspan="2">Copy quantity display</th><th rowspan="2">Exposure section display</th><th rowspan="2">Display data</th></tr><tr><th>3rd digit</th><th>2nd/1st digits</th></tr><tr><td>A</td><td rowspan="10">1 ~ 99</td><td>ME exp. 1</td><td>Manual (ME) upper limit value</td></tr><tr><td>b</td><td>ME exp. 5</td><td>Manual (ME) lower limit value</td></tr><tr><td>C</td><td>ME + PE exp. 1</td><td>Manual (ME) toner save upper limit value</td></tr><tr><td>d</td><td>ME + PE exp. 5</td><td>Manual (ME) toner save lower limit value</td></tr><tr><td>E</td><td>PE exp. 1</td><td>Photo (PE) upper limit value</td></tr><tr><td>F</td><td>PE exp. 5</td><td>Photo (PE) lower limit value</td></tr><tr><td>G</td><td>AE exp. 1</td><td>Auto (AE) slant</td></tr><tr><td>H</td><td>AE exp. 5</td><td>Auto (AE) lower limit value</td></tr><tr><td>I</td><td>AE + PE exp. 1</td><td>Auto (AE) toner save slant</td></tr><tr><td>J</td><td>AE + PE exp. 5</td><td>Auto (AE) toner save lower limit value</td></tr></table> <p>The setting range is 1 ~ 99. Increasing the set value will increase the copy density. After completion of adjustment, press the CA key to cancel the adjustment mode.</p> <p>(Note) For the auto (AE) slant and the auto (AE) toner save slant, be sure to set to "0."</p>	Copy quantity display		Exposure section display	Display data	3rd digit	2nd/1st digits	A	1 ~ 99	ME exp. 1	Manual (ME) upper limit value	b	ME exp. 5	Manual (ME) lower limit value	C	ME + PE exp. 1	Manual (ME) toner save upper limit value	d	ME + PE exp. 5	Manual (ME) toner save lower limit value	E	PE exp. 1	Photo (PE) upper limit value	F	PE exp. 5	Photo (PE) lower limit value	G	AE exp. 1	Auto (AE) slant	H	AE exp. 5	Auto (AE) lower limit value	I	AE + PE exp. 1	Auto (AE) toner save slant	J	AE + PE exp. 5	Auto (AE) toner save lower limit value
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H		AE exp. 5	Auto (AE) lower limit value																																				
I		AE + PE exp. 1	Auto (AE) toner save slant																																				
J		AE + PE exp. 5	Auto (AE) toner save lower limit value																																				

Main code	Sub code	Content														
47	—	<p>AE sensor characteristics measurement</p> <p>Used to set the AE sensor input value read and the AE sensor gain when the copy lamp is lighted at the specified voltage.</p> <p>When the simulation is executed, the mirror base is initialized and fed to the measurement position.</p> <p>After completion of feeding, the former measured value of AE sensor input value is displayed on the copy quantity display and the ready lamp is lighted.</p> <p>When the START key is pressed, the copy lamp lights up at the specified voltage interval and the AE sensor input value is and memorized. After completion of reading, the copy lamp is turned off and the newly measured value of the AE sensor input is displayed on the copy quantity display.</p> <p>At the time, the AE sensor gain is automatically adjusted.</p> <p>(Note) When executing this simulation, put 4 or 5 sheets of white originals on the table glass.</p>														
48	01	<p>Front/rear magnification ratio adjustment</p> <p>Used to set the copy magnification ratio in the vertical direction (front/rear)</p> <p>When the simulation is executed, warm up is started and the currently set normal correction value is displayed on the copy quantity display.</p> <p>After completion of warm up, the ready lamp is lighted. When the START key is pressed, the lens is initialized and copying is performed.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th rowspan="2">Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th></tr> </thead> <tbody> <tr> <td>A</td><td>1 ~ 99</td><td>Normal correction value</td></tr> <tr> <td>b</td><td rowspan="2">10 ~ 90</td><td>Zoom correction value (reduction)</td></tr> <tr> <td>C</td><td>Zoom correction value (enlargement)</td></tr> </tbody> </table> <p>Setting range is</p> <p>Normal correction value: 1 ~ 99 (Initial value: 50)</p> <p>Zoom correction value: 10 ~ 90 (Initial value: 50)</p> <p>After completion of setting, press the CA key to cancel the adjustment mode.</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits	A	1 ~ 99	Normal correction value	b	10 ~ 90	Zoom correction value (reduction)	C	Zoom correction value (enlargement)	
Copy quantity display		Display data														
3rd digit	2nd/1st digits															
A	1 ~ 99	Normal correction value														
b	10 ~ 90	Zoom correction value (reduction)														
C		Zoom correction value (enlargement)														
	02	<p>Paper transport direction magnification ratio adjustment</p> <p>Used to set the copy magnification ratio in the paper transport direction.</p> <p>When the simulation is executed, warm up is started and the currently set mirror speed correction value is displayed on the copy quantity display.</p> <p>After completion of warm up, the ready lamp is lighted. When the START key is pressed, the lens is initialized and copying is performed.</p> <p>After completion of setting, press the CA key to cancel the adjustment mode.</p>														
50	01	<p>Lead edge image position adjustment</p> <p>Used to set the lead edge image position (RRC ON) and the lead edge void position (blank lamp ON timing).</p> <p>When the simulation is executed, warm up is started and the currently set normal correction value is displayed on the copy quantity display.</p> <p>After completion of warm up, the ready lamp is lighted. When the START key is pressed, the lens is initialized and copying is performed.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th rowspan="2">Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th></tr> </thead> <tbody> <tr> <td>A</td><td rowspan="4">1 ~ 99</td><td>Resist adjustment A</td></tr> <tr> <td>b</td><td>Resist adjustment B</td></tr> <tr> <td>C</td><td>Lead edge void adjustment</td></tr> <tr> <td>d</td><td>Rear edge void adjustment</td></tr> </tbody> </table> <p>Setting range is 1 ~ 99.</p> <p>After completion of setting, press the START key to cancel the adjustment mode.</p> <p>(Lead edge adjustment procedure)</p> <ol style="list-style-type: none"> Set the resist adjustment A and B to "0" and make copies of 100% and 200%. Measure the distance between the paper lead edge and the image lead edge in each magnification ratio. Calculate the resist adjustment A and B from the measured values and the following formulae. <p>Lead edge shift at 200% --- L1</p> <p>Lead edge shift at 100% --- L2</p> <p>(Resist adjustment A) = $6.151 \times (L1 - L2)$</p> <p>(Resist adjustment B) = $15.385 \times L2 - 7.692 \times L1$</p> Set the obtained values. 	Copy quantity display		Display data	3rd digit	2nd/1st digits	A	1 ~ 99	Resist adjustment A	b	Resist adjustment B	C	Lead edge void adjustment	d	Rear edge void adjustment
Copy quantity display		Display data														
3rd digit	2nd/1st digits															
A	1 ~ 99	Resist adjustment A														
b		Resist adjustment B														
C		Lead edge void adjustment														
d		Rear edge void adjustment														

Main code	Sub code	Content															
50	02	<p>Lead edge image position adjustment (Substitution of measured value)</p> <p>Used to set the lead edge image position and the lead edge void position similarly to the simulation 50-01.</p> <p>This simulation allows setting of the lead edge image position by directly entering the lead edge shift L1 and L2.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th>Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th><th></th></tr> </thead> <tbody> <tr> <td>A</td><td rowspan="4">1 ~ 99</td><td>L1</td></tr> <tr> <td>b</td><td>L2</td></tr> <tr> <td>C</td><td>Lead edge void adjustment</td></tr> <tr> <td>d</td><td>Rear edge void adjustment</td></tr> </tbody> </table> <p>(Example)</p> <p>When L1 = 24.5mm, enter as <input type="text" value="2"/> <input type="text" value="4"/> <input type="text" value="5"/> .</p> <p>After entering the value, the copy quantity display shows "A45."</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits		A	1 ~ 99	L1	b	L2	C	Lead edge void adjustment	d	Rear edge void adjustment
Copy quantity display		Display data															
3rd digit	2nd/1st digits																
A	1 ~ 99	L1															
b		L2															
C		Lead edge void adjustment															
d		Rear edge void adjustment															
51	02	<p>Resist amount adjustment</p> <p>Used to set the paper resist amount in the resist section.</p> <p>When the simulation is executed, warm up is started and the currently set tray resist amount is displayed on the copy quantity display.</p> <p>After completion of warm up, the ready lamp is lighted. When the START key is pressed, the lens is initialized and copying is performed.</p> <p>Since there are several display items, the third digit of the copy quantity display indicates the distinction of light reception level and the original judgement level, and the lower two digits indicates the data.</p> <p>To select the display, press the magnification ratio display key.</p> <table border="1"> <thead> <tr> <th colspan="2">Copy quantity display</th><th>Display data</th></tr> <tr> <th>3rd digit</th><th>2nd/1st digits</th><th></th></tr> </thead> <tbody> <tr> <td>A</td><td rowspan="2">1 ~ 99</td><td>Tray resist amount</td></tr> <tr> <td>b</td><td>Manual feed resist amount</td></tr> </tbody> </table> <p>Setting range is 1 ~ 99.</p> <p>After completion of setting, press the START key to cancel the adjustment mode.</p>	Copy quantity display		Display data	3rd digit	2nd/1st digits		A	1 ~ 99	Tray resist amount	b	Manual feed resist amount				
Copy quantity display		Display data															
3rd digit	2nd/1st digits																
A	1 ~ 99	Tray resist amount															
b		Manual feed resist amount															
53	01	<p>ADF normal paper stop position setting</p> <p>Used to set the stop position of the original (normal paper) transported by the ADF.</p> <p>When the simulation is executed, the currently set stop position data is displayed on the copy quantity display.</p> <p>After entering the set value, press the START key to memorize the value.</p> <p>The setting range is 0 ~ 15.</p>															
	03	<p>ADF thin paper stop position setting</p> <p>Used to set the stop position of the original (thin paper) transported by the ADF.</p> <p>When the simulation is executed, the currently set stop position data is displayed on the copy quantity display.</p> <p>After entering the set value, press the START key to memorize the value.</p> <p>The setting range is 0 ~ 15.</p>															
	04	<p>ADF resist sensor and width sensor adjustment</p> <p>Used to adjust the original judgement level of the ADF resist sensor and the width sensor.</p> <p>When the simulation is executed, the original judgement level of the resist sensor and the width sensor is adjusted.</p> <p>After completion of adjustment, the original judgement level is displayed on the copy quantity display.</p> <p>The display range is 0 ~ FFh (hexadecimal number)</p>															
	05	<p>ADF paper exit sensor adjustment</p> <p>Used to adjust the original judgement level of the ADF paper exit sensor.</p> <p>When the simulation is executed, the original judgement level of the paper exit sensor is adjusted. After completion of adjustment, the original judgement level is displayed on the copy quantity display.</p> <p>The display range is 0 ~ FFh (hexadecimal number)</p>															

6. User programs






The user programs allow the parameters of certain functions to be set, changed, or canceled as desired.


(1) List of user programs

Program No.	Program name	Description
1	Auto clear time	Sets the auto clear time. The copier returns to the initial settings when the auto clear time elapses after the last copy is made.
2	Preheat mode	Sets the time that elapses before the copier enters the preheat mode after any operation is made.
3	Auto power shut-off mode	Sets the time that elapses before the copier enters the auto power shut-off mode after any operation is made.
4	Auto power save control	Enables or disables the automatic power save control function.
5	Stream feeding mode*	Enables the stream feeding mode when an optional automatic document feeder is installed.
7	Sorter bin up/down mode*	Enables or disables the sorter bin up/down mode when an optional sorter is installed.
8	Auto paper select mode	Enables or disables the auto paper select function.

* These programs do not affect the copier functions unless certain optional equipment is installed.

(2) Setting the user programs

Procedures	State	Alarm indicators of paper jam, maintenance, paper supply, toner supply	Entered value display	Print button LED
1. Press and hold the TRAY SELECT key for more than 5 seconds until all the alarm indicators blink and "- -" appears in the copy quantity display.	User program mode	Blink	 -	OFF
2. Enter a program number using the 10-key pad.	Program code selection	Blink	Example  -	ON
3. Press the print button.	Program code determination	Blink	1 	ON
4. Select the desired parameter using the 10-key pad.	Parameter selection	Blink	1 	ON
5. Press the print button.	Parameter determination	BLink	1 2	OFF
6. Press the TRAY SELECT key.	Exit from user program. • When this key is pressed during selection of a parameter, the status returns to 1 (User program mode).	OFF	Returns to the copy quantity display.	—
* Press the clear key.	(Use this key to correct an error in input.) • When this key is pressed after completion of program setting, the input for the next program is allowed.	Blink	 -	OFF

( Blink)

(3) List of parameters

Program	Code	Parameter	Factory setting
Auto clear time	[1]	[0]: OFF [1]: 30 sec [2]: 60 sec [3]: 90 sec [4]: 120 sec	2
Preheat mode	[2]	[0]: OFF [1]: 30 sec [2]: 60 sec [3]: 90 sec [4]: 120 sec	0
Auto power shut-off mode	[3]	[0]: OFF [1]: 2 min [2]: 3 min [3]: 5 min [4]: 10 min [5]: 15 min	0
Auto power save mode	[4]	[0]: OFF [1]: ON	1
Stream feeding mode	[5]	[0]: OFF [1]: ON	0
Sorter bin up/down mode	[7]	[0]: OFF [1]: ON	1
Auto paper select	[8]	[0]: OFF [1]: ON	1

[9] SELF DIAGNOSTICS

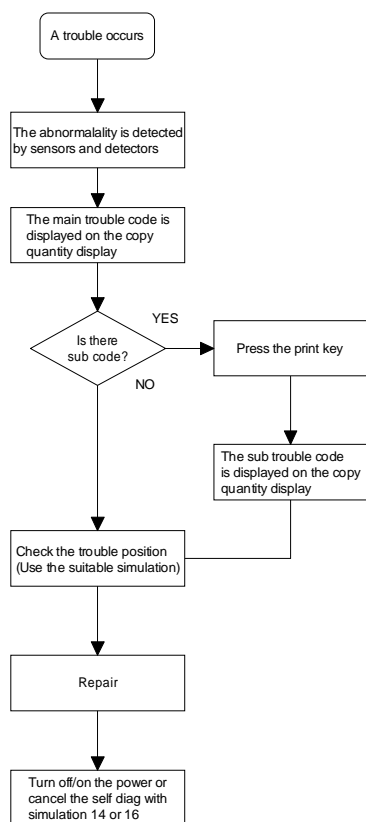
1. Summary/purpose

This model has the self diag function for the following purposes:

- 1) When a trouble occurs in the machine, the machine detects the trouble and displays the trouble content on the copy quantity display to alert the customer and the serviceman.
- 2) When any abnormality is detected, the power supply line is cut off immediately for safety and to protect the machine from damage.

2. Operation

The self diag content is displayed in the following procedure.



3. Clearing the self diag display

After repairing the trouble section, clear the self diag display according to the table below:

Clearing the self diag display

Self diag display	Display clearing procedure
L1, L3, L4, L5, L8	Turn off/on the power.
H3, H4	Execute simulation 14.
U2	Execute simulation 16.
CH, PC	When the trouble is cancelled,, the display is cleared.

Trouble code	Sub code	Content	Condition
L1	00	Mirror feed trouble	<ul style="list-style-type: none"> When initializing, MHPS is not turned off within 1.5 sec from starting feeding of the mirror. When copying, MHPS is not turned off within 0.5 sec from starting feeding of the mirror. When feeding the mirror is started during copying, the mirror is not at the home position (MHPS is turned off).
L3	00	Mirror return trouble	<ul style="list-style-type: none"> When initializing, MHPS is not turned on within 2.5 sec from starting returning of the mirror. When copying, MHPS is not turned on within 2 sec from starting returning of the mirror.
L4	01	Main motor trouble	<ul style="list-style-type: none"> During rotation of the main motor, MMRE (encoder) pulse is not sensed for more than 0.5 sec.
L5	02	Lens trouble	<ul style="list-style-type: none"> The lens shift operation is not completed within 10 sec from starting. When the lens is moving to the home position (normal position), LHPS is not sensed even though the lens is shifted by the specified steps.
L8	01	Zero cross pulse (FW) trouble	<ul style="list-style-type: none"> The zero cross pulse width is shifted more than 10%.
	03	AE sensor trouble	<ul style="list-style-type: none"> When the AE sensor characteristics measurement (simulation 47) is executed, the AE sensor input does not change.
H2	00	Fusing thermistor open detection	<ul style="list-style-type: none"> The thermistor (TH) input value exceeds 3.81V.
H3	00	Fusing high temperature trouble	<ul style="list-style-type: none"> The fusing temperature is sensed as abnormally high as 240 degrees C (thermistor input value 0.36V or less).
H4	00	Fusing low temperature trouble	<ul style="list-style-type: none"> When warming up, the ready temperature is not reached within 70 sec. When controlling the temperature after completion of warm up, the fusing temperature (set temperature) is sensed as -40°C or less.
U2	01	Backup memory trouble	<ul style="list-style-type: none"> The counter addition value and the check sum value are different from each other.
	04	Backup IC (EEPROM) access error	<ul style="list-style-type: none"> Data read/write to the backup IC (EEPROM) cannot be performed.
U5	00	ADF communication error	<ul style="list-style-type: none"> An error occurred in communication of the ADF and the main unit.
	01	Resist sensor, resist width sensor adjustment trouble	<ul style="list-style-type: none"> When executing the resist sensor and the resist width sensor adjustment (simulation 53-4), the adjustment value is outside the specified range.
	02	Paper exit sensor adjustment trouble	<ul style="list-style-type: none"> When executing the paper exit sensor adjustment (simulation 53-3), the adjustment value is outside the specified range.
	11	Paper feed motor trouble	<ul style="list-style-type: none"> During rotation of the paper feed motor, the rotation pulse is not sensed for 0.1 sec or more.
	12	Transport motor trouble	<ul style="list-style-type: none"> During rotation of the transport motor, the rotation pulse is not sensed for 0.1 sec or more.
F1	00	Sorter communication error	<ul style="list-style-type: none"> An error occurred in communication between the sorter and the main unit.
	02	Transport motor trouble	<ul style="list-style-type: none"> During rotation of the transport motor, the rotation pulse is not sensed for 0.5 sec or more.
	04	Bin upper limit/lower limit trouble	<ul style="list-style-type: none"> When shifting the bins, the upper limit or the lower limit is erroneously sensed.
	05	Bin home sensor trouble	<ul style="list-style-type: none"> When initializing the bins, the bin home sensor is not sensed within 1 sec.
	06	Bin motor trouble	<ul style="list-style-type: none"> During rotation of the bin motor, the rotation pulse is not sensed for 0.5 sec or more.
	14	Take-out sensor trouble	<ul style="list-style-type: none"> When the take-out sensor A/D input value is 3V or more.

Trouble code	Sub code	Content	Condition
F2	31	Image density sensor trouble	<ul style="list-style-type: none"> When the light emitting quantity of the image density sensor is increased to the maximum level, the input value does not reach 3.75V. When the light emitting quantity of the image density sensor is decreased to the minimum level, the input value does not fall below 4.5V. During execution of the grid voltage correction, the element level is 3V or lower.
	32	Drum mark sensor trouble	<ul style="list-style-type: none"> Though the light emitting quantity of the drum mark sensor is increased to 1.45V, the sensor input level does not become LOW. During one and a quarter rotations of the drum, the drum mark is not sensed (the sensor input does not become HIGH).
	35	Grid voltage correction trouble	<ul style="list-style-type: none"> When obtaining the grid voltage correction value, the patch voltage is not in the range of 200 ~ 650V. The grid voltage correction cannot be performed properly. (The correction value cannot be obtained.)
EE	EU	Auto developer adjustment under toner detection	<ul style="list-style-type: none"> After completion of the auto developer adjustment (simulation 25-2), the toner density sensor input voltage is over the specified range. (Under toner)
	EL	Auto developer adjustment over toner detection	<ul style="list-style-type: none"> After completion of the auto developer adjustment (simulation 25-2), the toner density sensor input voltage is under the specified range. (Over toner)
CH (ON)	—	Sorter not installed	<ul style="list-style-type: none"> The sorter is not installed to the copier, or the sorter switch is not turned on.
CH (Blink)	—	DV unit not installed	<ul style="list-style-type: none"> The DV unit is not installed or the connector is not connected.
PC	—	Personal counter not installed	<ul style="list-style-type: none"> The counter is not set in the machine to which the personal counter is installed.
All lamps OFF	—	Front door open	<ul style="list-style-type: none"> The front door is open, or the door switch is not turned on.
P (Blink)	—	Multi paper feed unit paper trouble	<ul style="list-style-type: none"> Paper empty or paper jam in the multi paper feed unit, or a paper sensor trouble.

[10] SERVICING AT MEMORY TROUBLE AND MAIN CONTROL PWB RE-PLACEMENT

1. General

The EEPROM in the control PWB and the EEPROM are storing various set values, adjustment values, and counter values.

These data are very important and used for operating the machine properly and for service control.

In the following cases, therefore, various set values, adjustment values and counter values must be set again.

- * When a memory trouble (U2) occurs.
- * When the EEPROM in the main control PWB is replaced.
- * When the main control PWB is replaced.

When "U2" trouble occurs, the data cannot be relied upon, and they must be set properly.

2. Purpose

The purpose is to reset the memory data to operate the machine properly.

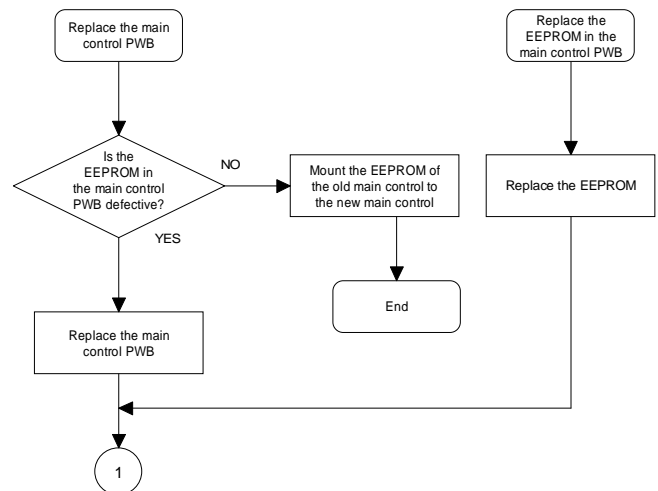
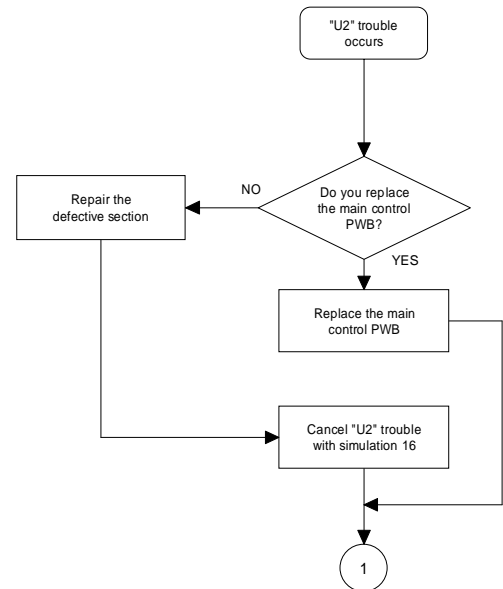
Use the attached service memory data recording sheet to memorize the newest data when servicing in order to cope with the above situations. This improves efficiency in servicing and realizes quick recovery.

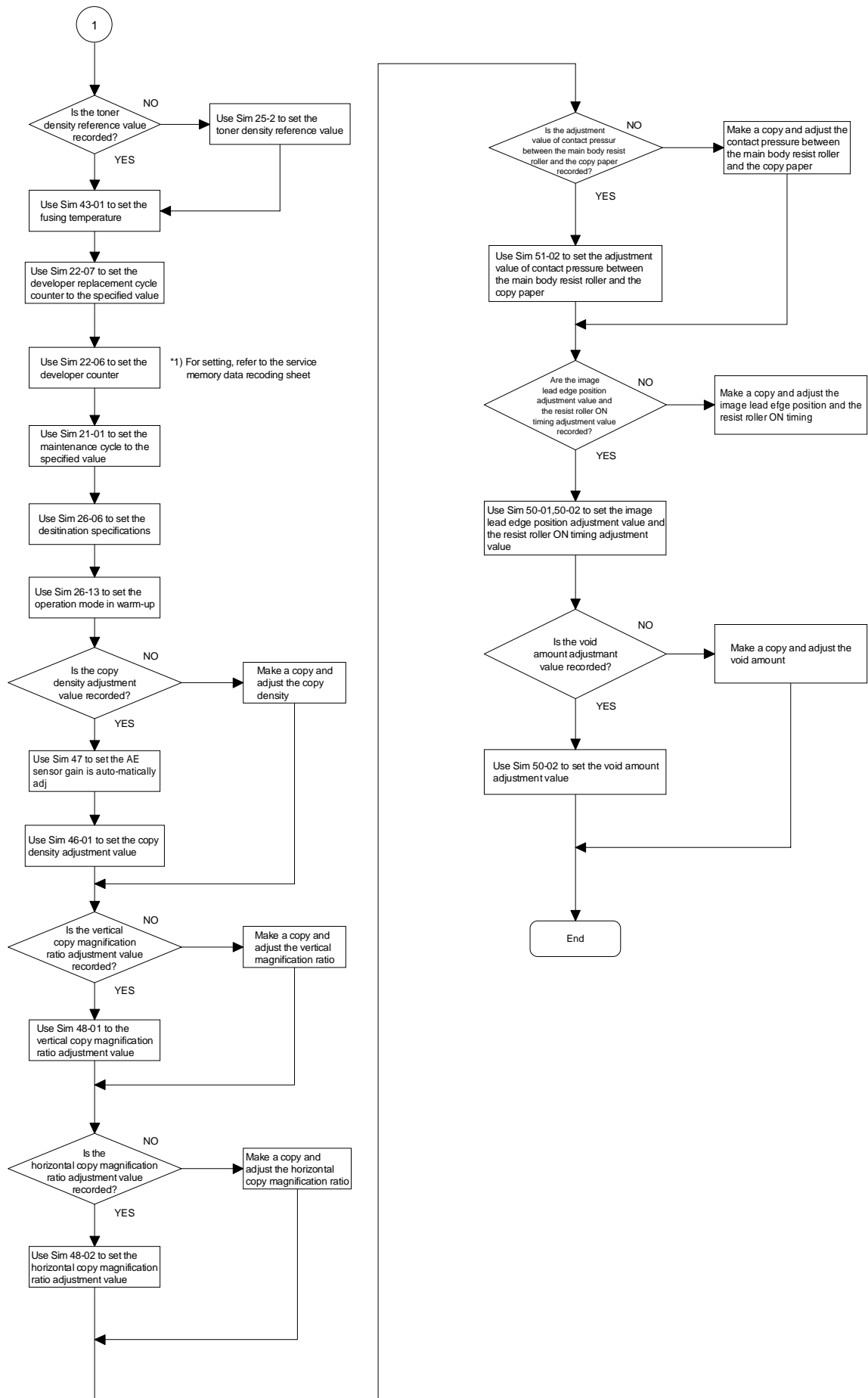
3. Remedies

Perform the procedures according to the following flowcharts. "Sim" in the flowchart means "Simulation."

Memory trouble

Procedures for memory trouble, main control PWB replacement, and main control PWB EEPROM replacement





4. Set value recording sheet

Purpose/kind	Section	Contents			
		Main code	Sub code	Set value	Description
Adjustment	Paper feed section	51	02		Adjustment value of contact pressure of the paper on the main body resist roller
	Optical unit	50	01		Copy paper lead edge void amount adjustment (Resist adjustment A)
					Copy paper lead edge void amount adjustment (Resist adjustment B)
					Copy paper lead edge void amount adjustment (Lead edge void adjustment)
					Copy paper lead edge void amount adjustment (Rear edge void adjustment)
		46	01		Adjustment value of copy density (exposure level) in each copy mode and of copy density gradient (exposure gradient)
					Manual copy mode density level 1
					Manual copy mode density level 5
					Manual copy mode density level 1 (Toner save mode)
					Manual copy mode density level 5 (Toner save mode)
					Auto copy mode density level 1 (Not toner save mode)
					Auto copy mode density level 5 (Not toner save mode)
					Auto copy mode density level 1 (Toner save mode)
					Auto copy mode density level 5 (Toner save mode)
					Photo copy mode density level 1 (Not toner save mode)
					Photo copy mode density level 5 (Not toner save mode)
		47			The AE sensor and the optical section characteristics memory data for the change in the copy lamp application voltage
		48	01		The vertical copy magnification ratio adjustment value
			02		The horizontal copy magnification ratio adjustment value (when the document table is used)
	Developing unit	25	02		Toner density initial set value
Setting	Specifications	26	06		Destination specifications
	Fuser unit	26	13		Setting of the main motor operation mode in warming up
		43	01		The set value of fusing temperature
	Maintenance counter	21	01		Setting of the maintenance cycle
Counter	Developing unit	22	06		The developer count of the installed developer unit can be checked.
			07		The developer replacement cycle of the installed developer unit can be checked.

Memorize set values in the column of "Set value" for efficient servicing when the memory trouble occurs and the EEPROM is replaced.
Make a copy of this sheet and use with the service sheet.

5. Memory simulation list

Purpose/kind	Section	Contents				Ref. page																		
		Main code	Sub code	Default value	Description																			
Adjustment	Paper feed section	51	02	50	Adjustment value of contact pressure of the paper on the main body resist roller	8-12																		
	Optical unit	50	01		Copy paper lead edge void amount adjustment (Resist adjustment A)	8-11																		
					Copy paper lead edge void amount adjustment (Resist adjustment B)																			
					Copy paper lead edge void amount adjustment (Lead edge void adjustment)																			
					Copy paper lead edge void amount adjustment (Rear edge void adjustment)																			
		46	01		Adjustment value of copy density (exposure level) in each copy mode and of copy density gradient (exposure gradient)	8-10																		
					Manual copy mode density level 1 (Not toner save mode)																			
					Manual copy mode density level 5 (Not toner save mode)																			
					Manual copy mode density level 1 (Toner save mode)																			
					Manual copy mode density level 5 (Toner save mode)																			
					Auto copy mode density level 1 (Not toner save mode)																			
					Auto copy mode density level 5 (Not toner save mode)																			
					Auto copy mode density level 1 (Toner save mode)																			
					Auto copy mode density level 5 (Toner save mode)																			
					Photo copy mode density level 1 (Not toner save mode)																			
					Photo copy mode density level 5 (Not toner save mode)																			
47			The AE sensor and the optical section characteristics memory data for the change in the copy lamp application voltage	8-11																				
48	01	50	The vertical copy magnification ratio adjustment value	8-11																				
	02	50	The horizontal copy magnification ratio adjustment value (when the document table is used)	8-11																				
	Developer unit	25	02		Toner density initial set value	8-5																		
Setting	Specifications	26	06		Specifications setting by destination <table><tr><th>Code No.</th><th>Destination</th></tr><tr><td>0</td><td>Japan</td></tr><tr><td>1</td><td>U.S.A.</td></tr><tr><td>2</td><td>Canada</td></tr><tr><td>3</td><td>Europe except U.K.</td></tr><tr><td>4</td><td>U.K.</td></tr><tr><td>5</td><td>Australia</td></tr><tr><td>6</td><td>Inch series outside Japan</td></tr><tr><td>7</td><td>AB series outside Japan</td></tr></table>	Code No.	Destination	0	Japan	1	U.S.A.	2	Canada	3	Europe except U.K.	4	U.K.	5	Australia	6	Inch series outside Japan	7	AB series outside Japan	8-6
	Code No.	Destination																						
	0	Japan																						
	1	U.S.A.																						
	2	Canada																						
	3	Europe except U.K.																						
	4	U.K.																						
5	Australia																							
6	Inch series outside Japan																							
7	AB series outside Japan																							
Fuser unit	26	13	0	Setting of the main motor operation mode in warming up. <table><tr><th>Code No.</th><th>Operation mode</th><th>Operation</th></tr><tr><td>0</td><td>Normal mode</td><td>When the fusing temperature reaches the specified level, the main motor stops.</td></tr><tr><td>1</td><td>Long mode</td><td>The main motor keeps rotating until the completion of the warming up.</td></tr></table>	Code No.	Operation mode	Operation	0	Normal mode	When the fusing temperature reaches the specified level, the main motor stops.	1	Long mode	The main motor keeps rotating until the completion of the warming up.	8-6										
				Code No.	Operation mode	Operation																		
0	Normal mode	When the fusing temperature reaches the specified level, the main motor stops.																						
1	Long mode	The main motor keeps rotating until the completion of the warming up.																						
	43	01	185°C	Fusing temperature set value	8-7																			
Maintenance counter	21	01		Maintenance cycle setting	8-5																			
		02		Mini maintenance cycle setting	8-5																			
Developer unit	22	06		Used to confirm the developer counter value of the installed developer unit.	8-5																			
		07		Used to confirm the developer replacement cycle of the installed developer unit.	8-5																			

[11] MAINTENANCE

1. Maintenance cycle and maintenance items

Maintenance of the SF2116/2118/1016/1018 should be performed at every 50K.

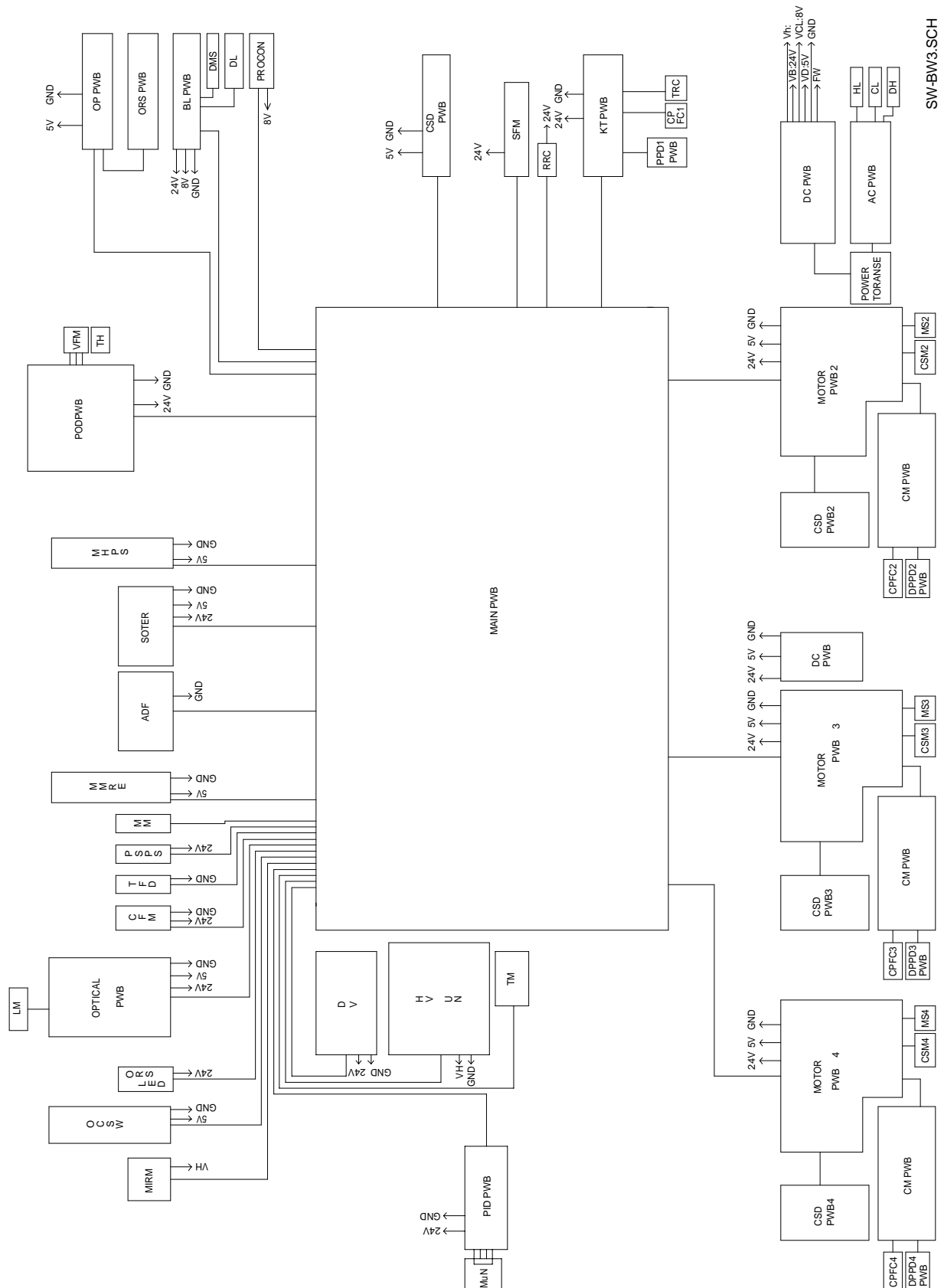
<Content> ★ = Lubricate, ○ = Clean, △ = Adjust, ▲ = Replace/attach, □ = Shift position
 × = Check (Clean, replace, or adjust if necessary.)

* The toner consumption and the waste toner bottle replacement cycle are those when the reference chart is used.

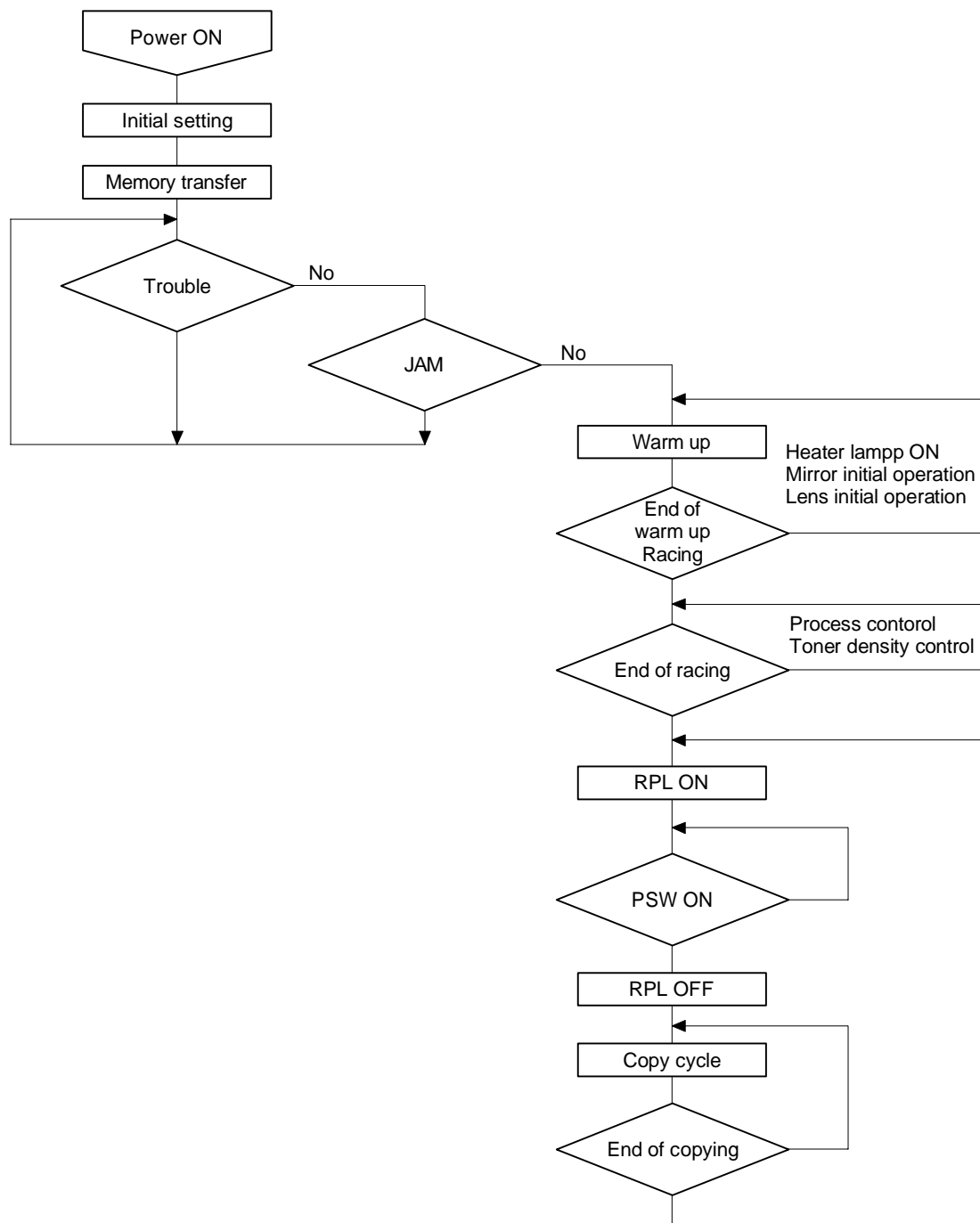
Section	Parts	50K	100K	150K	200K	Same cycle later	Remark
Developing	Developer	▲	▲	▲	▲		
	DV blade	○	▲	○	▲		
	DV side seal (F/R)	○	▲	○	▲		
Process peripheral	Drum	▲	▲	▲	▲		
	Cleaner blade	▲	▲	▲	▲		
	Toner reception seal	▲	▲	▲	▲		
	Drum separation seal	▲	▲	▲	▲		
	Charging plate (saw teeth)	○	▲	○	▲		
	MC case	○	○	○	○		
	Screen grid	○	▲	○	▲		
	Discharge lamp	○	○	○	○		
	Blank lamp	○	○	○	○		
	Drum mark sensor	○	○	○	○		
	Drum density sensor	○	○	○	○		
	Waste toner bottle	▲	▲	▲	▲		
	TC/SC case	○	○	○	○		
	TC/SC wire	○	▲	○	▲		
Suction	Suction belt	○	○	○	○		
Ozone filter	Ozone filter	×	○	×	○		
Fusing	Upper heat roller	×	▲	×	▲		
	Lower heat roller	▲	▲	▲	▲		
	Upper separation pawl	○	▲	○	▲		
	Lower separation pawl	▲	▲	▲	▲		
	Thermistor	○	○	○	○		
	Heat roller gear	★	▲	★	▲		
Optical	Mirror/lens/reflector	○	○	○	○		
	Drive wire/pulley	×	×	×	×		
	Rails	×	★	×	★		
	Table glass	○	○	○	○		
	Dust-proof glass	○	○	○	○		
Paper feed (including multi paper feed section)	Pick-up roller	○ (×)	○ (×)	○ (×)	▲		
	Paper feed roller	○ (×)	○ (×)	○ (×)	▲		
	Separation roller	○ (×)	○ (×)	○ (×)	▲		Do not use alcohol. Wipe with water.
	Torque limiter section	×	×	×	▲		
Transport	PC roller pair	○	○	○	○		
	Transport roller pair	○	○	○	○		
	Transport paper guides	○	○	○	○		
	Transport system sensors	○	○	○	○		
Drive	Belts	○	○	○	○		
	Gears (specified gears only)	★	★	★	★		
Image		△	△	△	△		

[12] ELECTRICAL SECTION

1. System block diagram



System operation when the power is turned on:



[illegible]

(2) CPU (IC6) SC3041K12F

① General

The CPU controls the loads of the main body and controls the system in synchronization with data transmission and reception through the optional controllers and serial data communication line.

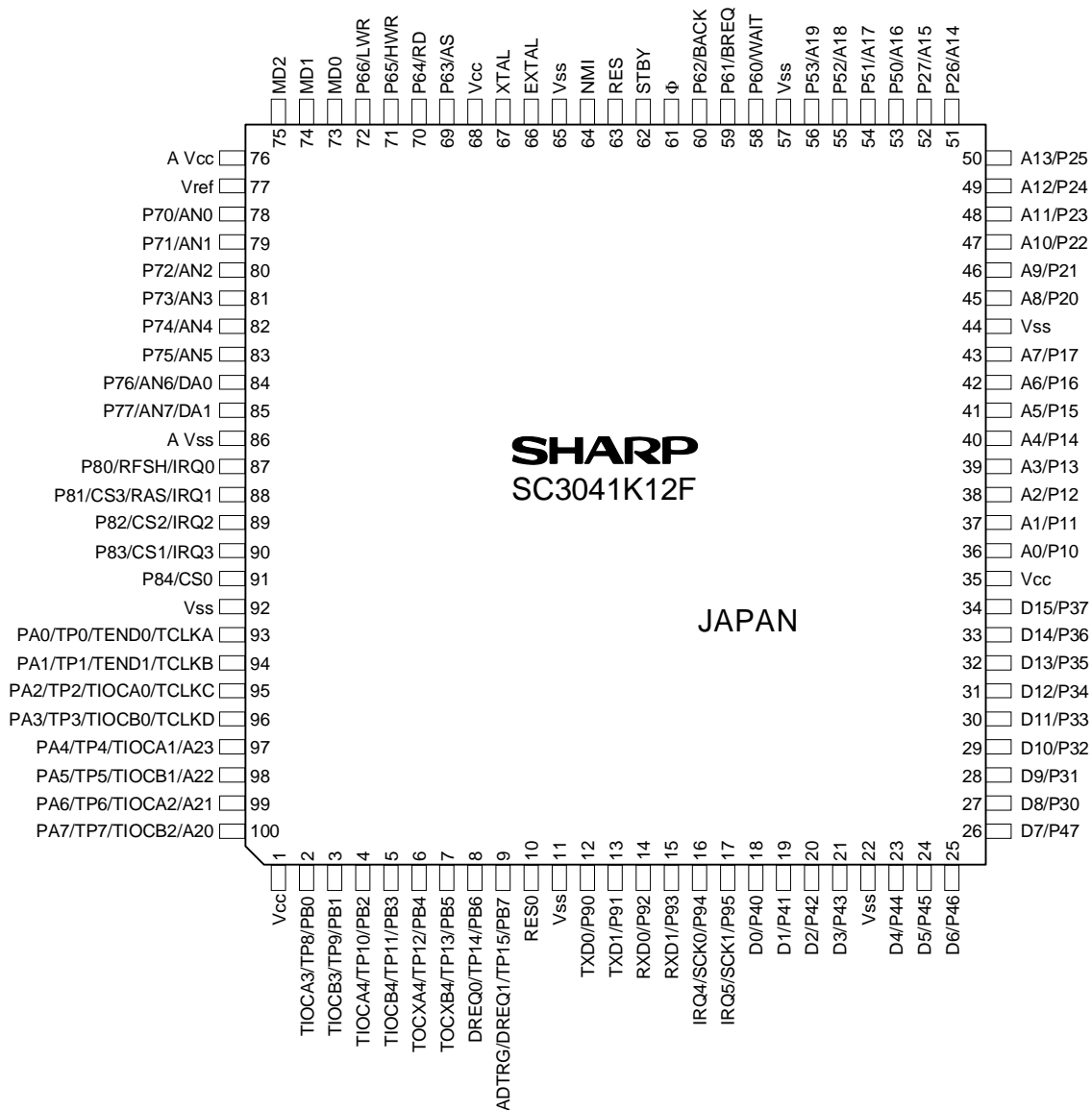
② Features

The SC3041K12F is a high performance single-chip micro computer which is integrated with the necessary peripheral devices as well as the main core of 32-bit H8/300H CPU.

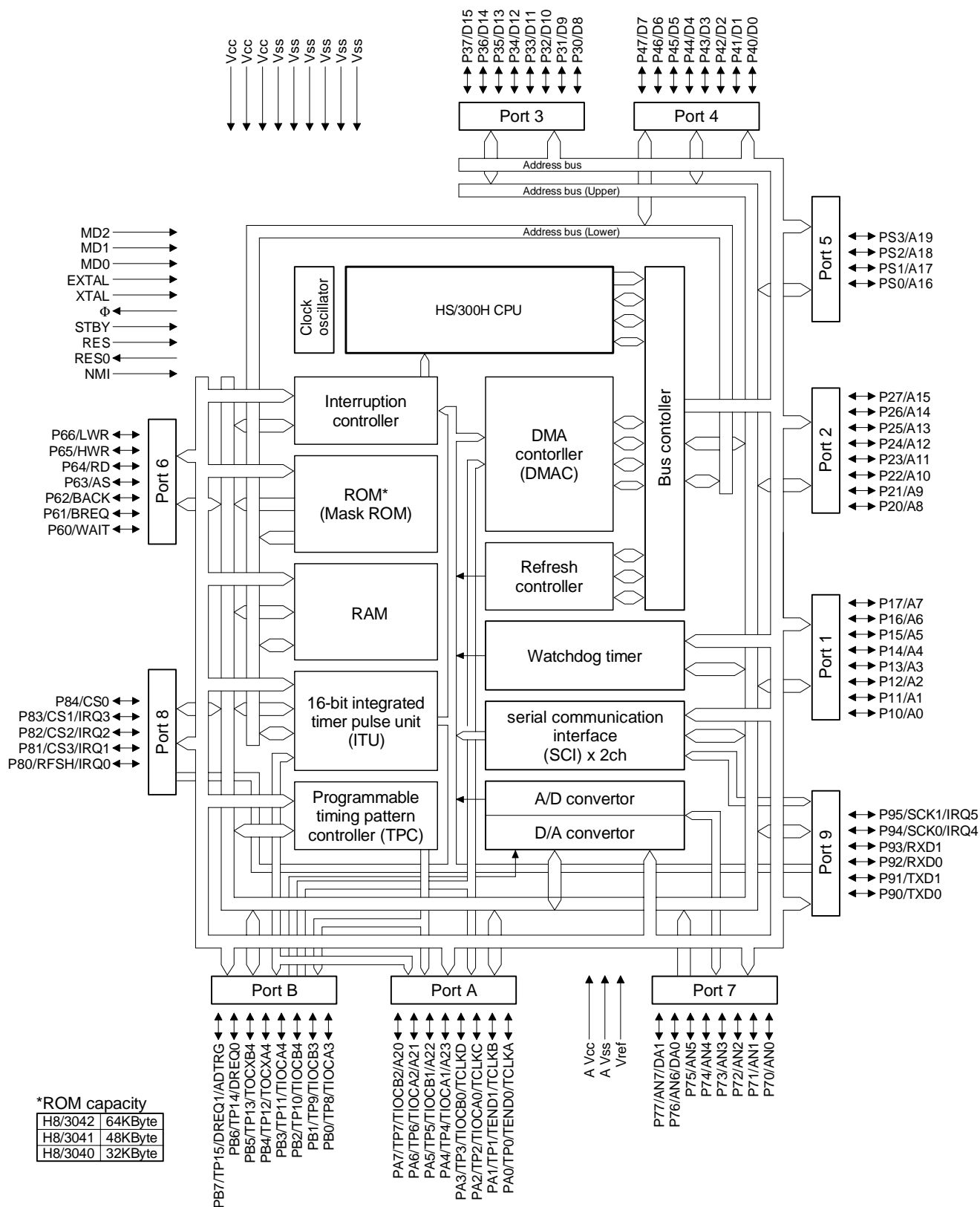
The 32-bit H8/300H CPU is of internal 32-bit composition, and is provided with simple and optimum commands designed for high speed operations with 16 bit x 16 general-purpose registers. It handles 16MB linear address space.

As the peripheral devices, included are the ROM, the RAM, the 16-bit integrated timer unit (ITU), the programmable timing pattern controller (TPC), the watch dog timer (WDT), the serial communication interface (SCI), the A/D convertor, the D/A convertor, the I/O port, the MDA controller (DMAC), and the refresh controller.

③ Pin arrangement



④ Internal block diagram



5 CPU SC3041K12F (IC1) pin signal

Pin No.	Port	Signal name	IN/OUT	H/L	Specifications
1	VCC	VCC			Power (+5V)
2	P60	CVFMPWM	OUT		Fan motor (PWM output) signal
3	PB1	SCL	OUT		Serial clock signal for EEPROM
4	PB2	MMPWM	OUT		Main motor (PWM output) signal
5	PB3	SDA	OUT		Serial data for EEPROM
6	PB4	/MIR-A	OUT	H	Mirror base motor drive signal -A
7	PB5	MIR-A	OUT	H	Mirror base motor drive signal A
8	PB6	/MIR-B	OUT	H	Mirror base motor drive signal -B
9	PB7	MIR-B	OUT	H	Mirror base motor drive signal B
10	/RES0	/RES0	OUT	H	Reset signal for external device (fixed to HIGH)
11	VSS	VSS			Power (GND)
12	P90	DATA	OUT		Operation panel serial data signal
13	P91	TXD	OUT		Option UART input signal
14	P92	HL	OUT	L	Heater lamp control signal (ON at LOW)
15	P93	RXD	IN		Option UART input signal
16	P94	OP-CLK	OUT		Operation panel serial clock input signal
17	P95	OP-LATCH	OUT		Operation panel data latch signal
18	P40	KI0	IN		Key input 0 signal
19	P41	KI1	IN		Key input 1 signal
20	P42	KI2	IN		Key input 2 signal
21	P43	KI3	IN		Key input 3 signal
22	VSS	VSS			Power (GND)
23	P44	S0	IN		Matrix input 0 signal
24	P45	S1	IN		Matrix input 1 signal
25	P46	S2	IN		Matrix input 2 signal
26	P47	MFD	IN	L	Multi manual feed unit sensing signal (Low when the unit is sensed.)
27	P30	D0			Data signal
28	P31	D1			Data signal
29	P32	D2			Data signal
30	P33	D3			Data signal
31	P34	D4			Data signal
32	P35	D5			Data signal
33	P36	D6			Data signal
34	P37	D7			Data signal
35	VCC	VCC			
36	P10	A0			Address signal
37	P11	A1			Address signal
38	P12	A2			Address signal
39	P13	A3			Address signal
40	P14	A4			Address signal
41	P15	A5			Address signal
42	P16	A6			Address signal
43	P17	A7			Address signal
44	VSS	VSS			Power (+5V2)
45	P20	A8			Address signal
46	P21	A9			Address signal
47	P22	A10			Address signal
48	P23	A11			Address signal
49	P24	A12			Address signal
50	P25	A13			Address signal
51	P26	A14			Address signal

Pin No.	Port	Signal name	IN/OUT	H/L	Specifications
52	P27	A15			Address signal
53	P50	A16			Address signal
54	P51	LHPS	IN	L	Lens home position signal (LOW at 100%)
55	P52	PPD	IN	H	Transport pass sensor signal (HIGH when paper is sensed.)
56	P53	MCS	IN	H	Drum marking sensor signal
57	VSS	VSS			Power (GND)
58	P60	DATA0	IN		Matrix input 0 (LSI51)
59	P61	DATA1	IN		Matrix input 1 (LSI51)
60	P62	DATA2	IN		Matrix input 2 (LSI51)
61	S-CLK	S-CLK	OUT	H	System clock (Fixed to HIGH)
62	/STBY	/STBY	IN	H	Standby signal (Fixed to HIGH)
63	/RES	/RESET	IN	L	Reset at LOW.
64	NMI	NMI			Non-maskable interruption (Fixed to LOW.)
65	VSS	VSS			Power (GND)
66	EXTAL	EXTAL	IN		Clock (8MHz)
67	XTEL	XTEL	IN		Clock (8MHz)
68	VCC	VCC			Power (+5V2)
69	P63	/AS	OUT	H	Address strobe signal (Fixed to HIGH.)
70	P64	/RD	OUT	L	ROM. I/O data read signal
71	P65	/HWR	OUT	L	I/O data write signal
72	P66	/LWR	OUT	H	Lower write signal (Fixed to HIGH.)
73	MD0	MD0	IN	H	Mode set signal (Fixed to HIGH.)
74	MD1	MD1	IN	L	Mode set signal (Fixed to LOW.)
75	MD2	MD2	IN	H	Mode set signal (Fixed to HIGH.)
76	AVCC	AVCC			A/D, D/A convertor power
77	VREF	VREF			A/D, D/A convertor reference voltage
78	P70	AES	IN		AE sensor signal (Analog input signal)
79	P71	TH	IN		Thermistor signal (Analog input signal)
80	P72	TCS	IN		Toner density sensor signal (Analog input signal)
81	P73	PROCON	IN		Process control signal (Analog input signal)
82	P74	DVC	IN		Developing unit color detection signal (Analog input signal)
83	P75	PD	IN		Original sensor signal (Analog input signal)
84	P76	BLDATA	OUT		Blank lamp data signal (Analog input signal)
85	P77	PCG	OUT		Process control gain signal
86	AVSS	GND			
87	P80	MHPS	IN	H	Mirror home position sensor signal
88	P81	FWS	IN		Zero cross detection signal
89	P82	/CS2	OUT	L	Chip select signal (I/O) (I/O is selected at LOW.)
90	P83	/CS1	OUT	L	Chip select signal (EPROM) (EPROM is selected at LOW.)
91	P84	TFD	IN	H	Waste toner sensor signal (Toner full at HIGH)
92	VSS	GND			Power (GND)
93	PA0	LED0	OUT	H	Original detection LED lighting signal 0 (ON at HIGH)
94	PA1	LED1	OUT		Original detection LED lighting signal 1 (ON at HIGH)
95	PA2	CLPWM	OUT		Copy lamp control signal (PWM signal)
96	PA3	MMRE	IN		Main motor rotary encoder detection signal
97	PA4	GBPWM	OUT		Grid bias control signal (PWM signal)
98	PA5	PFMCLK	OUT		Paper feed motor clock signal
99	PA6	TM0	OUT	H	Toner supply motor drive signal 0 (ON at HIGH)
100	PA7	TM1	OUT	H	Toner supply motor drive signal 1 (ON at HIGH)

(3) I/O (IC8) CXD1095Q

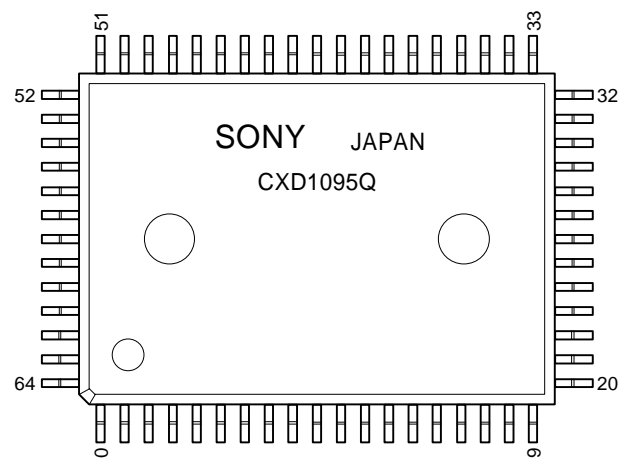
① General

I/O converts data (command) from the CPU into control signals.
The CXD1095Q is a general-purpose interface element, and has 4.5 sets of 8-bit I/O ports to allow setting of input and output operations of parallel data by the program or the hardware.

② Features

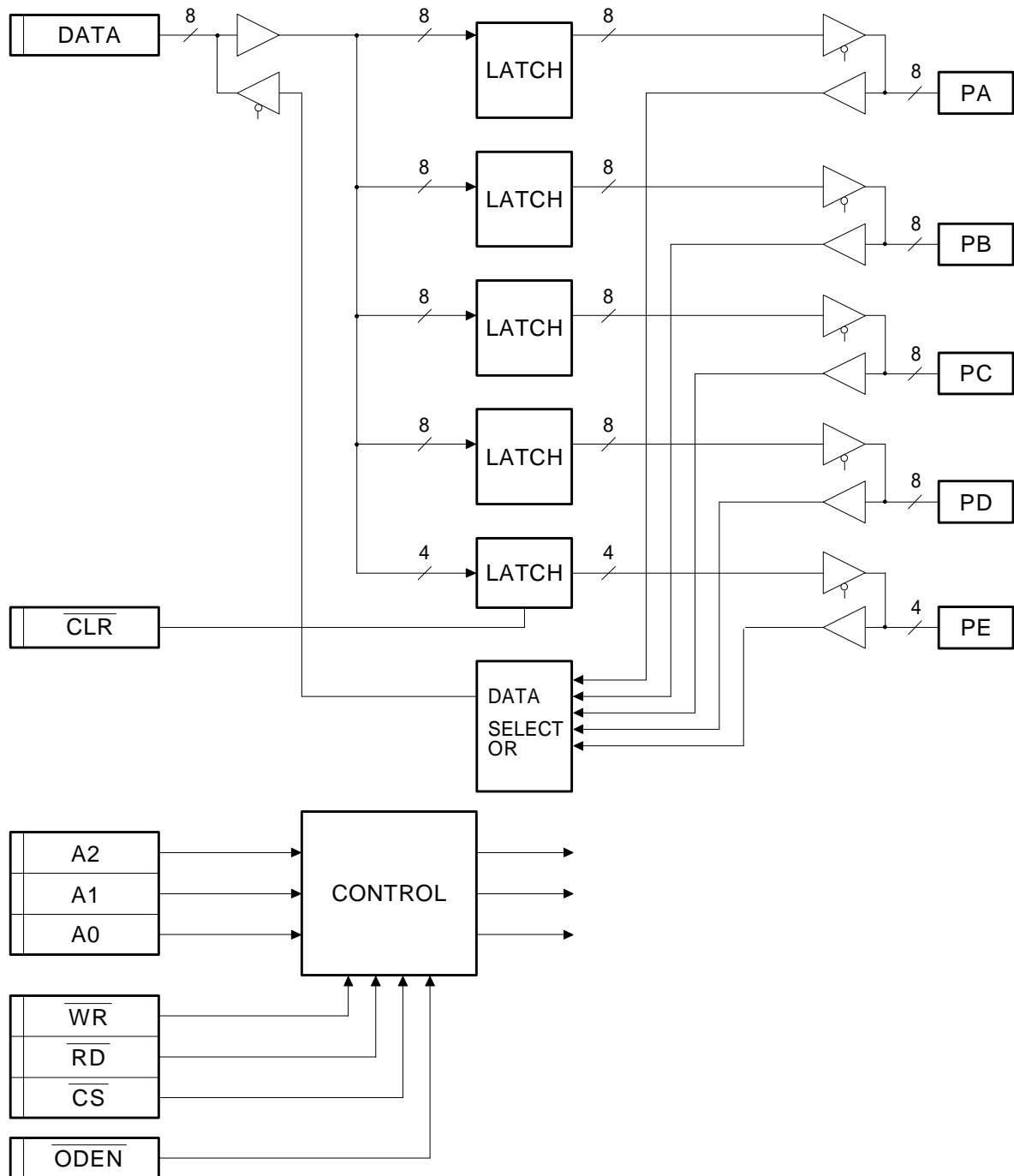
8-bit parallel I/O port x 4.5 ports

③ Pin arrangement



Pin No.	Pin name	I/O	Pin No.	Pin name	I/O	Pin No.	Pin name	I/O	Pin No.	Pin name	I/O
1	N.C	—	17	PC6	I/O	33	N.C	—	49	PE0	I/O
2	N.C	—	18	PC7	I/O	34	N.C	—	50	PE1	I/O
3	PB1	I/O	19	N.C	—	35	D3	I/O	51	N.C	—
4	PB2	I/O	20	PD0	I/O	36	D4	I/O	52	PE2	I/O
5	PB3	I/O	21	PD1	I/O	37	D5	I/O	53	PE3	I/O
6	PB4	I/O	22	PD2	I/O	38	D6	I/O	54	PA0	I/O
7	PB5	I/O	23	PD3	I/O	39	D7	I/O	55	PA1	I/O
8	PB6	I/O	24	PD4	I/O	40	$\overline{\text{CLR}}$	I	56	PA2	I/O
9	PB7	I/O	25	Vss	—	41	$\overline{\text{ODEN}}$	I	57	Vss	—
10	Vss	—	26	VDD	—	42	Vss	—	58	VDD	—
11	PC0	I/O	27	PD5	I/O	43	$\overline{\text{WR}}$	I	59	PA3	I/O
12	PC1	I/O	28	PD6	I/O	44	$\overline{\text{RD}}$	I	60	PA4	I/O
13	PC2	I/O	29	PD7	I/O	45	$\overline{\text{CS}}$	I	61	PA5	I/O
14	PC3	I/O	30	D0	I/O	46	A0	I	62	PA6	I/O
15	PC4	I/O	31	D1	I/O	47	A1	I	63	PA7	I/O
16	PC5	I/O	32	D2	I/O	48	A2	I	64	PB0	I/O

④ Internal block diagram



⑤ I/O: CXD1095Q (IC8) pin signal

Pin No.	Port	Signal name	IN/OUT	H/L	Specifications
1	NC				
2	NC				
3	PB1	DTR	OUT	L	Option receive allow signal
4	PB2	SRES	OUT	H	Option reset signal
5	PB3	TC	OUT	H	Total counter control signal
6	PB4	TRC	OUT	H	Transport clutch control signal
7	PB5	RRC	OUT	H	Resist roller clutch control signal
8	PB6	PR	OUT	H	Power relay control signal
9	PB7	DVBIAS	OUT	H	Developing bias control signal
10	VSS	VSS			Power (GND)
11	PC0	THV/MHV	OUT	H	Transfer/main charger control signal
12	PC1	CPFC1	OUT	H	Tray 1 paper feed clutch control signal

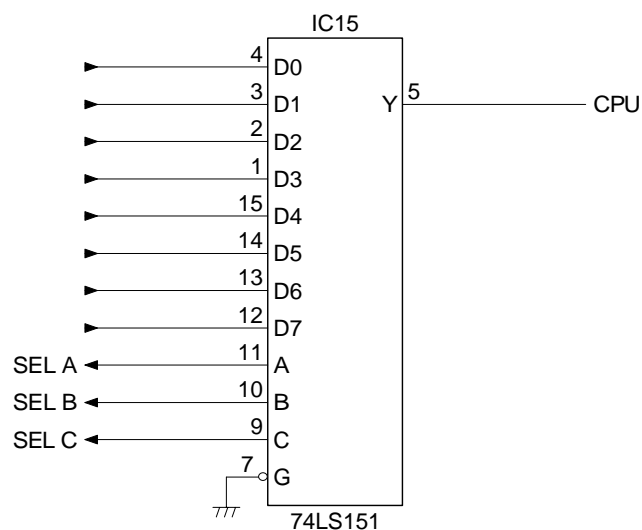
Pin No.	Port	Signal name	IN/OUT	H/L	Specifications
13	PC2	CPEC2	OUT		Tray 2 paper feed clutch control signal
14	PC3	CPFC3	OUT		Tray 3 paper feed clutch control signal
15	PC4	CPFC4	OUT	H	Tray 4 paper feed clutch control signal
16	PC5	CS2M	OUT	H	Tray 2 motor control signal
17	PC6	CS3M	OUT	H	Tray 3 motor control signal
18	PC7	CS4M	OUT	H	Tray 4 motor control signal
19	NC				
20	PD0	SELA	OUT		Matrix input select A signal
21	PD1	SELB	OUT		Matrix input select B signal
22	PD2	SELC	OUT		Matrix input select C signal
23	PD3	SHV	OUT	H	Separation charger control signal
24	PD4	DL	OUT	H	Discharge lamp control signal
25	VSS	VSS			Power (GND)
26	VDD	VDD			Power (+5V2)
27	PD5				
28	PD6	AEG0	OUT		AE sensor gain 0 control signal
29	PD7	AEG1	OUT		AE sensor gain 1 control signal
30	D0	D0	IN		Data signal
31	D1	D1	IN		Data signal
32	D2	D2	IN		Data signal
33	NC				
34	NC				
35	D3	D3	IN		Data signal
36	D4	D4	IN		Data signal
37	D5	D5	IN		Data signal
38	D6	D6	IN		Data signal
39	D7	D7	IN		Data signal
40	/CLR	/RESET	IN	L	Reset at LOW (0V).
41	/ODEN	/RESET	IN	L	Reset at LOW (0V).
42	VSS	VSS			Power (GND)
43	/WR	/WR	IN	L	Data write signal
44	/RD	/RD	IN	L	Data read signal
45	/CS	/CS1	IN	L	Chip select signal
46	A0	A0	IN		Address signal
47	A1	A1	IN		Address signal
48	A2	A2	IN		Address signal
49	PE0	LM-A	OUT	H	Lens motor drive signal A
50	PE1	/LM-A	OUT	H	Lens motor drive signal -A
51	NC				
52	PE2	LM-B	OUT	H	Lens motor drive signal B
53	PE3	/LM-B	OUT	H	Lens motor drive signal -B
54	PA0	MPFC	OUT	H	Multi paper feed clutch control signal
55	PA1	PSPS	OUT	H	Separation solenoid control signal
56	PA2	SFM	OUT	H	Suction fan motor control signal
57	VSS	VSS			Power (GND)
58	VDD	VDD			Power (GND)
59	PA3	P-DOWN	OUT	H	Mirror motor current limit gain signal
60	PA4	DC-OFF	OUT	H	DC24V ON/OFF signal (ON at HIGH)
61	PA5				
62	PA6				
63	PA7				
64	PB0	SEL	OUT	H	Option communication select signal (Sorter at HIGH)

(4) Detector circuit of sensor signal

The LS151 selects one signal of D0 ~ D7 according to the combination of SEL A ~ C signals (H, L) and outputs it to Y.

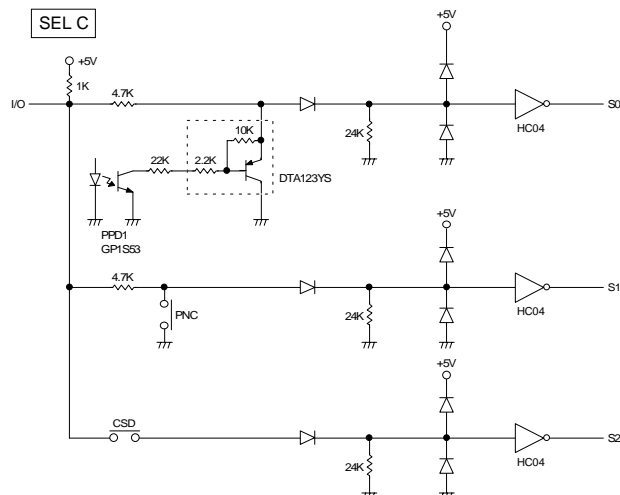
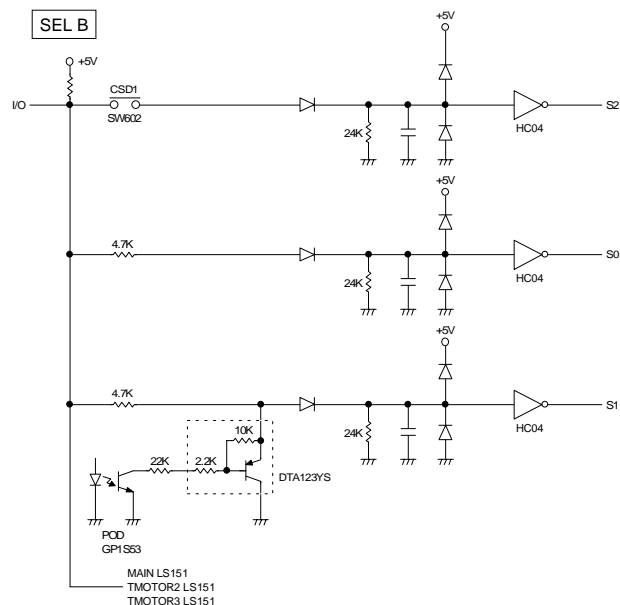
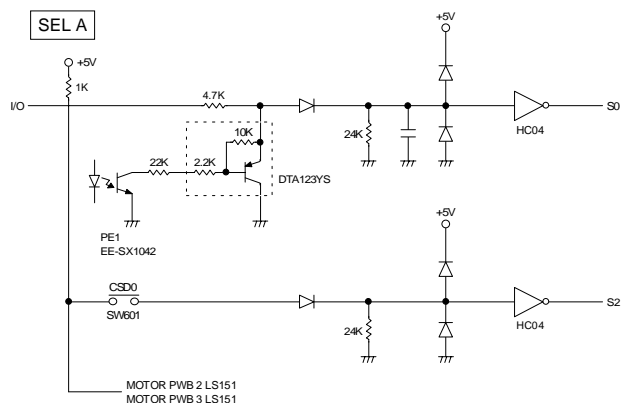
Selection of D0 ~ D7 for SEL A ~ C is made as shown in the table below.

SEL C	SEL B	SEL A	Y
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7



The sensor signal is in the following composition with the matrix of SEL A ~ C and S0 ~ 2.

	S0	S1	S2
SEL A	PED1	—	CSD 0
SEL B	SW A _B	POD	CSD 1
SEL C	PPD1	PNC	CSD 2

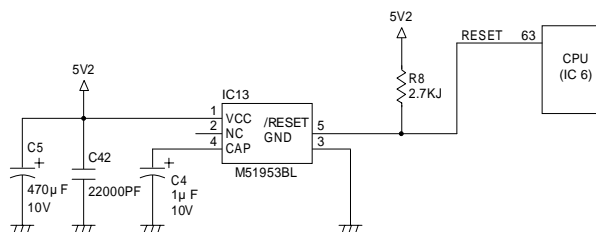


(5) Start/stop control circuit

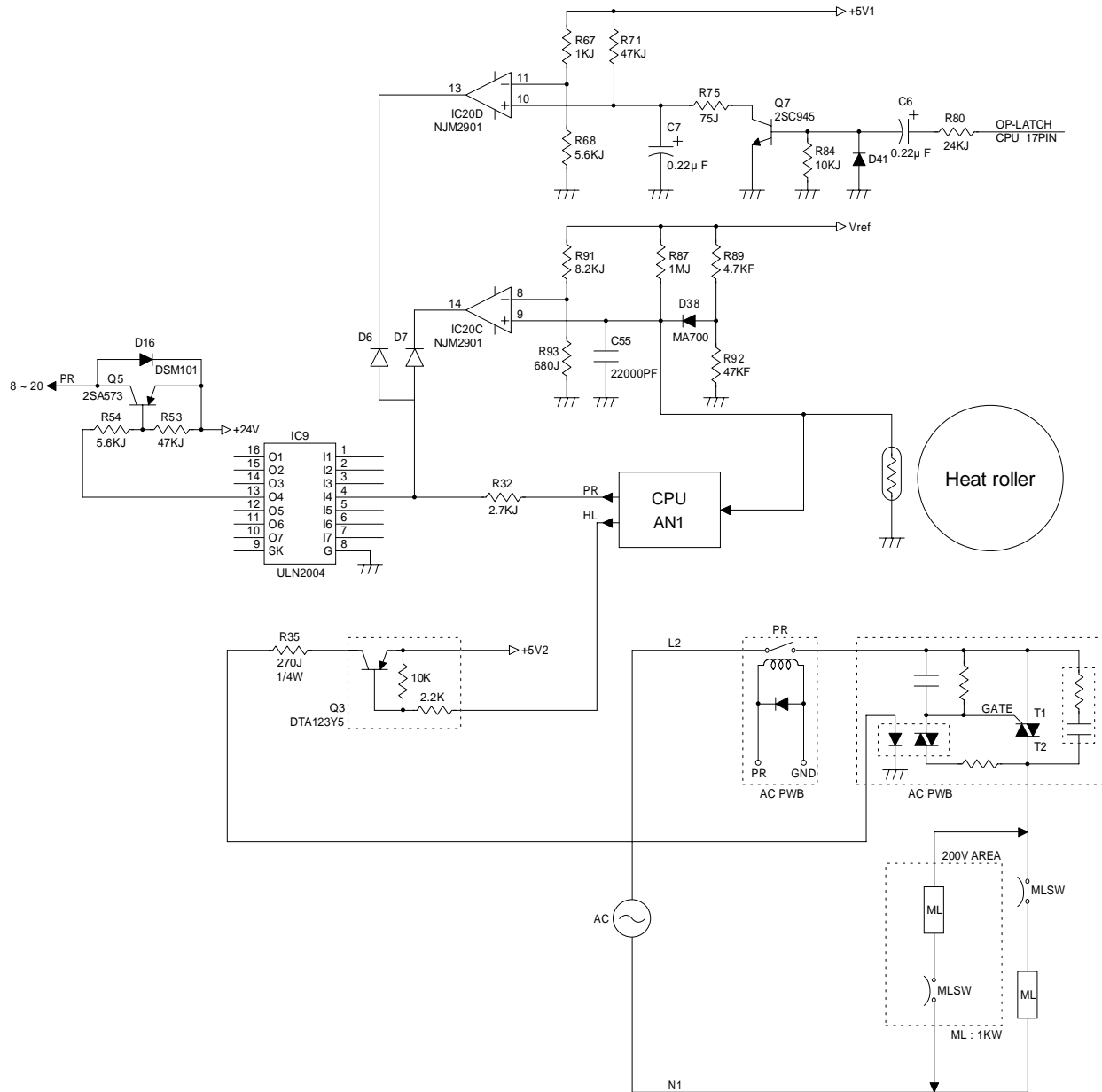
This circuit detects ON/OFF of the power and controls start/stop of the circuits.

The DC power section provides each power voltage ($V_H=+32V$, $+24V$, $V_C=+1-V$, $V_{D1}=5V$, $V_{D2}=5V$).

When the power voltage reaches the specified level, the operation of each circuit is started. Before the paper voltage falls below the specified level, the operation of each circuit is stopped to prevent against malfunctions.



(5) Heater lamp control circuit



① General

The heater lamp control circuit detects the heat roller surface temperature with the thermistor, converts it into a voltage, and outputs it to the CPU analog input pin.

The CPU converts analog signals into digital signals, compares them with the value set by test commands to turn on/off the heater lamp, maintaining the heat roller surface temperature at a constant level.

The higher the heat roller surface temperature is, the greater the thermistor resistance is, and vice versa.

Therefore, the lower the heat roller surface temperature is, the higher the thermistor pin voltage is. The thermistor pin voltage is inputted to the analog port of CPU, which controls ON/OFF of the heater lamp according to the input voltage level.

[High temperature protect circuit when the CPU is hung up (out of control)]

- 1) The IC20 8 pin voltage (reference voltage) is divided by R91 and R93. The thermistor pin voltage is inputted to the IC20 9 pin. When the voltage at 9 pin becomes lower than the voltage at 8 pin (the heat roller surface temperature about 240V), the IC20 14 pin is driven to LOW, pulling down the PR signal to the GND level, turning off the AC power of the heater lamp.
- 2) Since the OP-latch signal is fixed to HIGH or LOW, the collector of Q7 is open. The voltage at IC20 10 pin is higher than the voltage at IC20 11 pin (reference voltage), and IC20 13 pin is driven to LOW.

With the above operations, IC9 13 pin is opened to turn off Q5, turning off the power relay. As a result, the AC power of the heater and the copy lamp is turned off.

* The double protection with 1) and 2) is provided.

[When the heat roller surface temperature is lower than the set temperature]

- Since the thermistor pin voltage is higher than the set level, the output signal HL from the CPU is driven to LOW.
- This HL signal is passed through TR Q3 to the solid state relay (SSR).
When, therefore, the HL signal is LOW, the internal triac turns on.
- When the internal triac turns on, a pulse is applied to the gate of external triac to flow a current from the power through the heater lamp to the triac, lighting the heater lamp.

[When the heat roller surface temperature is higher than the set level]

- Since the thermistor pin voltage is lower than the set level, the output signal HL from the CPU is driven to HIGH.
- HL is driven to LOW, SSR turns off, the external triac turns off, and the heater lamp turns off.

[Q3]

Prevents the heater lamp from being lighted always by the trouble in the heater lamp drive signal harness wiring.

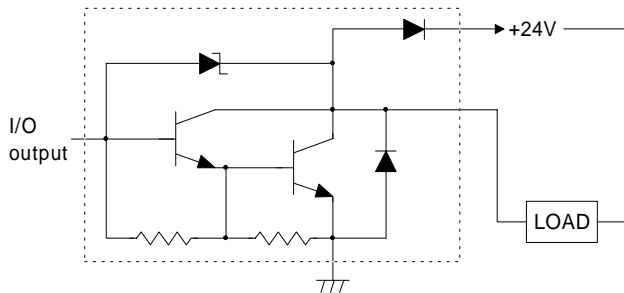
(6) Driver circuit (Solenoid, electromagnetic clutch)

① General

The control signals of each load outputted from the CPU and I/O cannot drive the load directly. The output, therefore, is delivered to the load through the driver IC.

② Operation

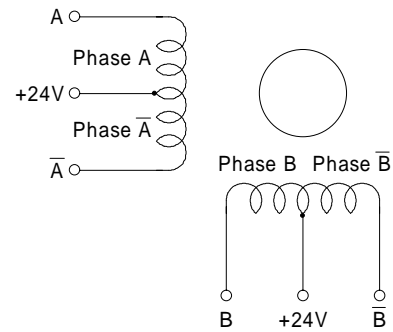
The drive circuit forms a Darlington circuit with two transistors to obtain a large drive current (load current) from a small input current (I/O output current). When the driver input voltage is HIGH (+5V), the transistor is turned on to flow a current in the arrow direction, operating the load. When the driver is turned on, the driver output pin voltage is 0V.



(7) Stepping motor drive circuit

① General

The driver circuit drives the lens drive motor, the mirror base drive motor, the automatic duplex copy tray, the side plate motor, and the rear plate motor.



A: Stepping motor phase A coil drive signal

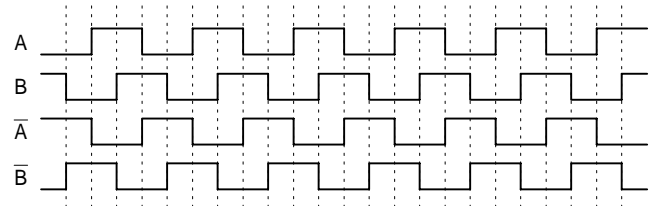
B: Stepping motor phase B coil drive signal

\bar{A} : Stepping motor phase A coil drive signal

\bar{B} : Stepping motor phase B coil drive signal

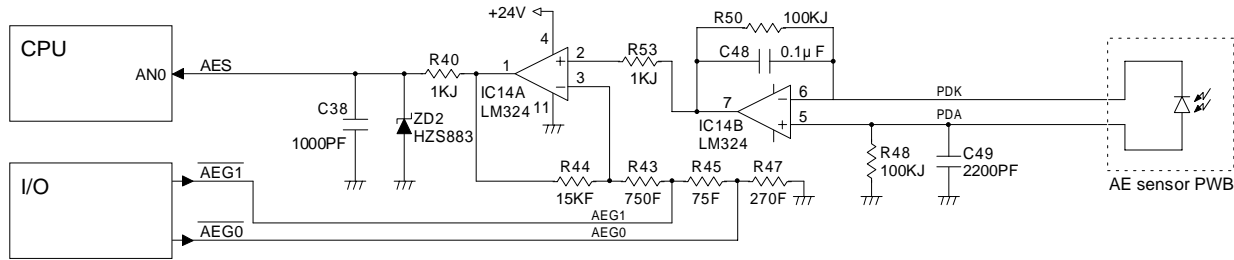
* Mirror base motor power is V_h .

Stepping motor time chart



(8) AE (Auto Exposure) sensor circuit

The AE sensor circuit is composed of the AE sensor PWB; which is composed of the photo diode, the I-V convertor circuit, and the amplifier circuit; and the amplifier circuit on the control PWB.



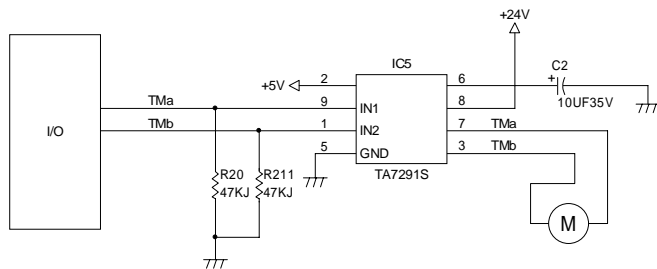
Operation amplifier A performs I-V conversion of the original density level (minute current) from the sensor. Operation amplifiers B and C amplify the output of operation amplifier A to a suitable level for inputting to the CPU.

The amplifying level is automatically set by selecting the AE gain signal (AEG0 ~ AEG2) outputted from the I/O chip when test command SIM 47 is executed.

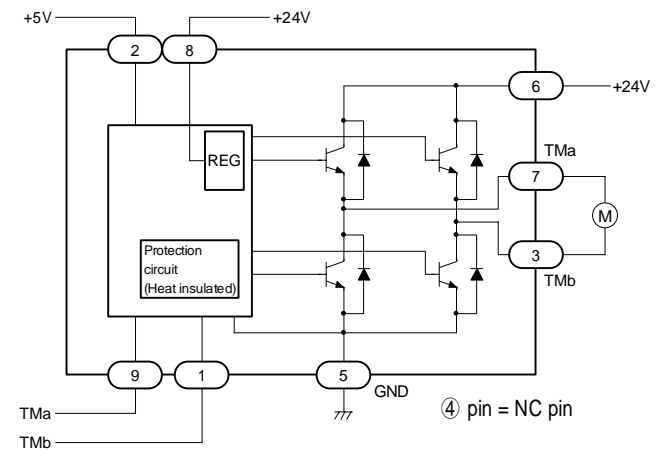
AE operation is performed by the software in the control PWB. When a reflected ray enters the sensor, a voltage corresponding to the light quantity is inputted to the CPU. The CPU compares the input voltage and the copy lamp application voltage and controls the copy lamp voltage so that the exposure level corresponds to the original density.

(9) Toner supply motor drive circuit

IC104 is the motor control IC which drives the toner supply motor with the pulse signals (TMa, TMb) outputted from the I/O chip.



Internal circuit



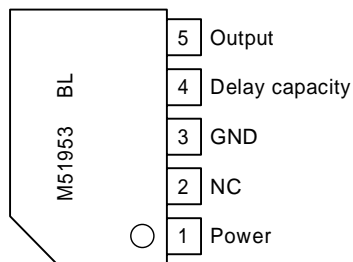
(10) Reset IC (IC13)

① General

The M51953 BL is the semiconductor IC most suitable to detect the power voltage and reset the logic circuit of every type including the CPU.

It is provided with the built-in delay circuit. Delay time is easily obtained by adding external capacity.

Pin connections (Top view)



External view 5P5

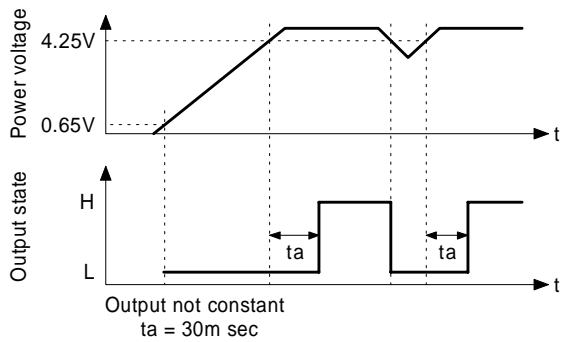
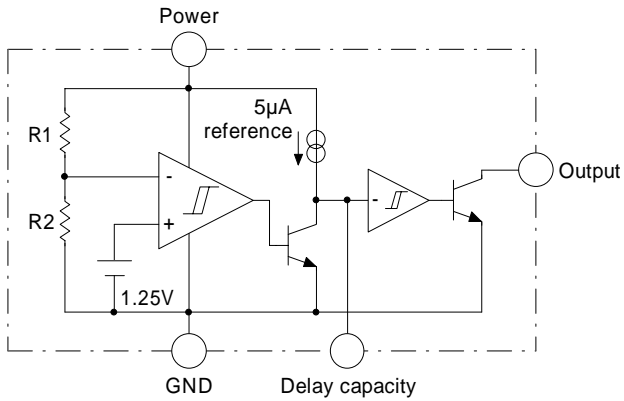
Truth value table

Input		Output		Mode
TMa	TMb	TMa	TMb	
L	L	∞	∞	Stop
H	L	H	L	CW/CCW
L	H	L	H	CCW/CW
H	H	L	L	Break

② Operation

- When "td" (= 30msec) passes after the voltage reaches 4.25V by turning on the power, the output is drive to HIGH.
"td" is set by the external capacitor (C106).

Block diagram



(13) Operation panel

① General

- The operation circuit is composed of the key matrix circuit and the display matrix circuit.
Key detection: With the signal detected by Q1 ~ Q7 and KI0 ~ KI3 signal matrix at LOW (GND) and Q2 ~ Q7 at HIGH (open), the level of KI 0 ~ KI3 is checked to judge whether key matrix 1, 2, and 3 are HIGH or LOW, judging on/off.
For Q2 ~ Q7, switching is made every 2msec to judge each of them.

