SORTER

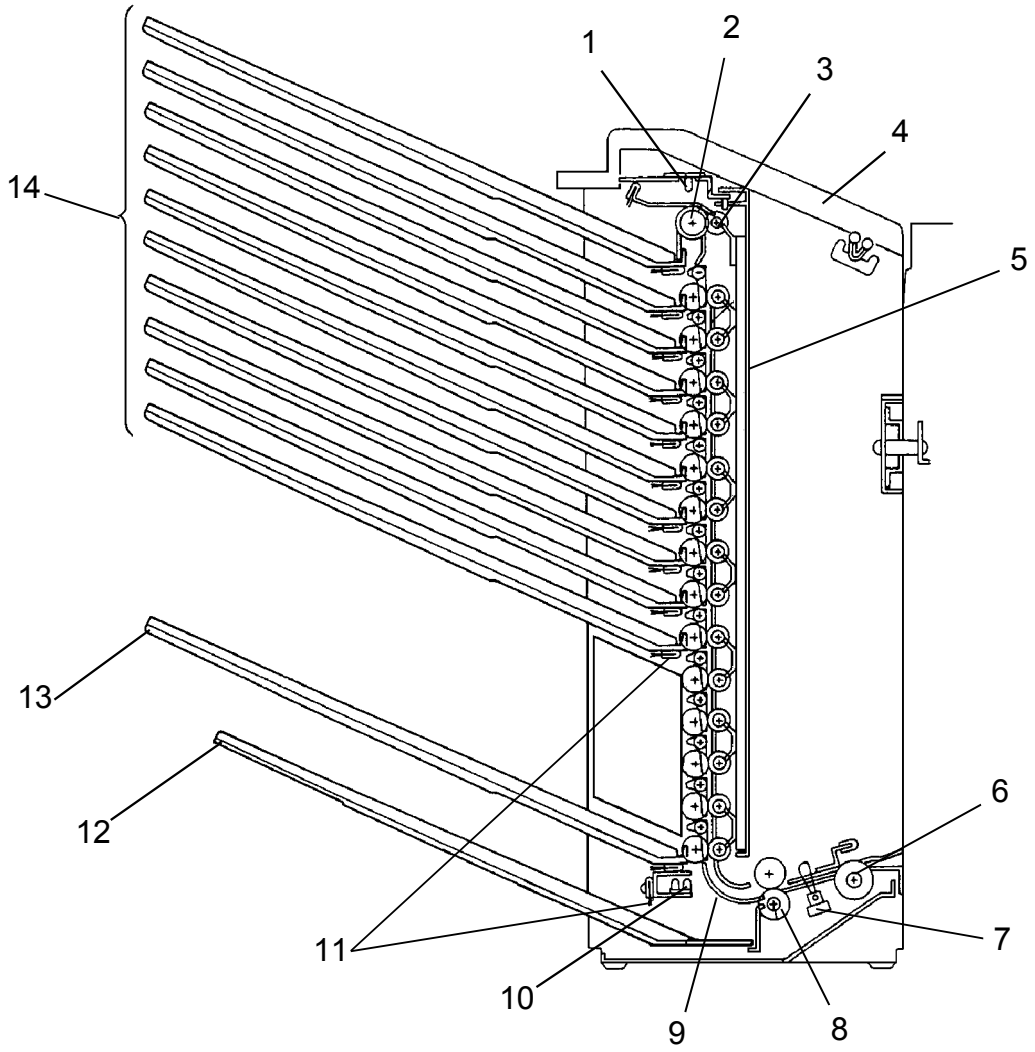
1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

Paper Size for Bins:	Max. 11" x 17"/A3 Min. 5 1/2" x 8 1/2"/A5	
Paper Size for Interrupt/ Top Bins:	Max. 11" x 17"/A3 Min. 5 1/2" x 8 1/2"/A5	
Copy Paper Weight:	14 to 24 lb/52 to 90 g/m^2	
Number of Bins:	10 bins, 1 interrupt bin and 1 print bin	
Bin Capacity:	Sort	50 sheets/bin (20 lb/80 g/m^2, one-sided copies) 30 sheets/bin (20 lb/80 g/m^2, duplex copies)
	Stack	40 sheets/bin (20 lb/80 g/m^2, one-sided copies) 20 sheets/bin (20 lb/80 g/m^2, duplex copies)
Top Bin Capacity (Clear Mode):	150 sheets (20 lb/80 g/m^2, one-sided copies) 100 sheets (20 lb/80 g/m^2, duplex copies)	
Printer Bin Capacity:	500 sheets (20 lb/80 g/m^2, 8 1/2" x 11"/A4) 150 sheets (20 lb/80 g/m^2, other size)	
Interrupt Bin Capacity:	100 sheets (20 lb/80 g/m^2)	
Power Source:	DC 24 V from copier	
Power Consumption:	90 W (Max), 30 W (Average)	
Dimensions (W x D x H):	19.6" x 21.1" x 23.6"/499 x 535 x 600 mm	
Weight:	48.5 lb/22 kg	

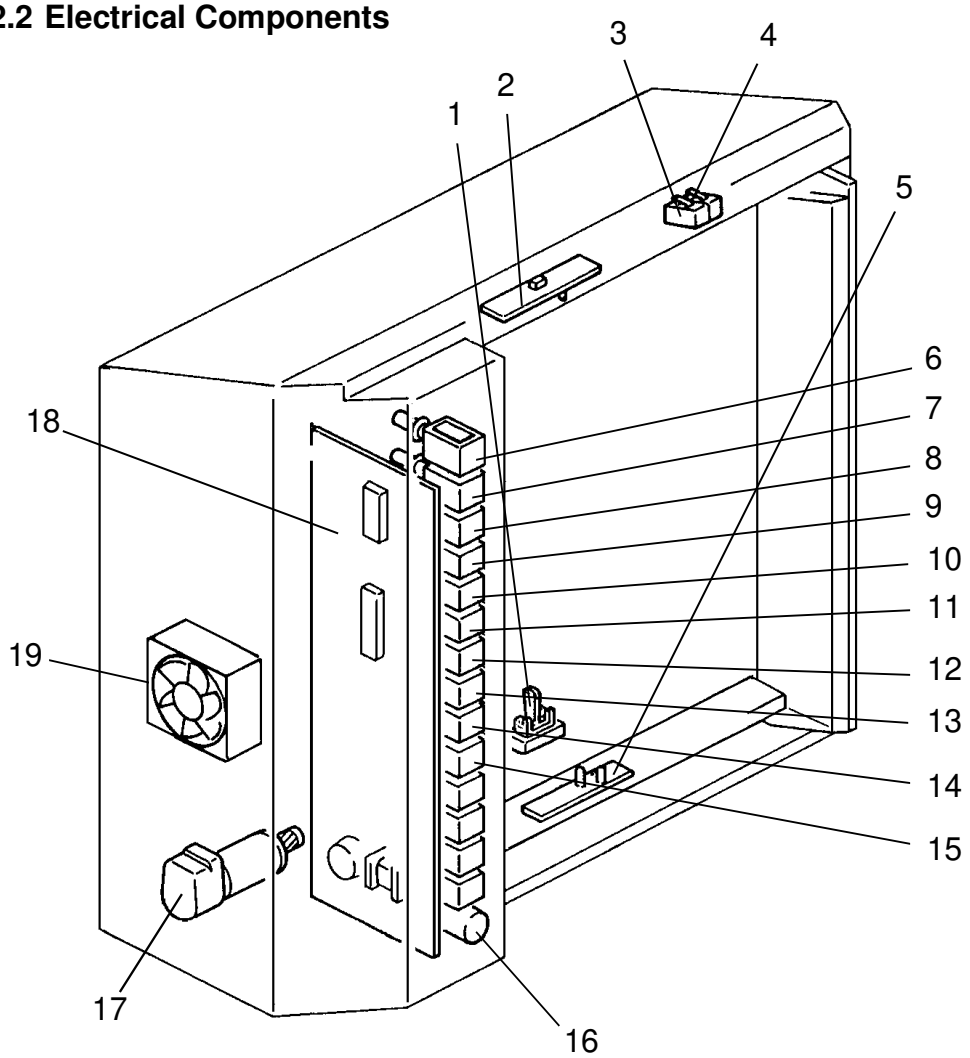
1.2 COMPONENT LAYOUT

1.2.1 Mechanical Components



1. Entry Sensor Photo Transistor
2. Vertical Drive Rollers
3. Pressure Rollers
4. Sorter Cover
5. Vertical Guide Unit
6. Sponge Roller
7. Inlet Sensor
8. Turn Gate Roller
9. Turn Gate
10. Entry Sensor LED
11. Discharge Brush
12. Interrupt Bin
13. Printer Bin
14. Standard Bins

1.2.2 Electrical Components

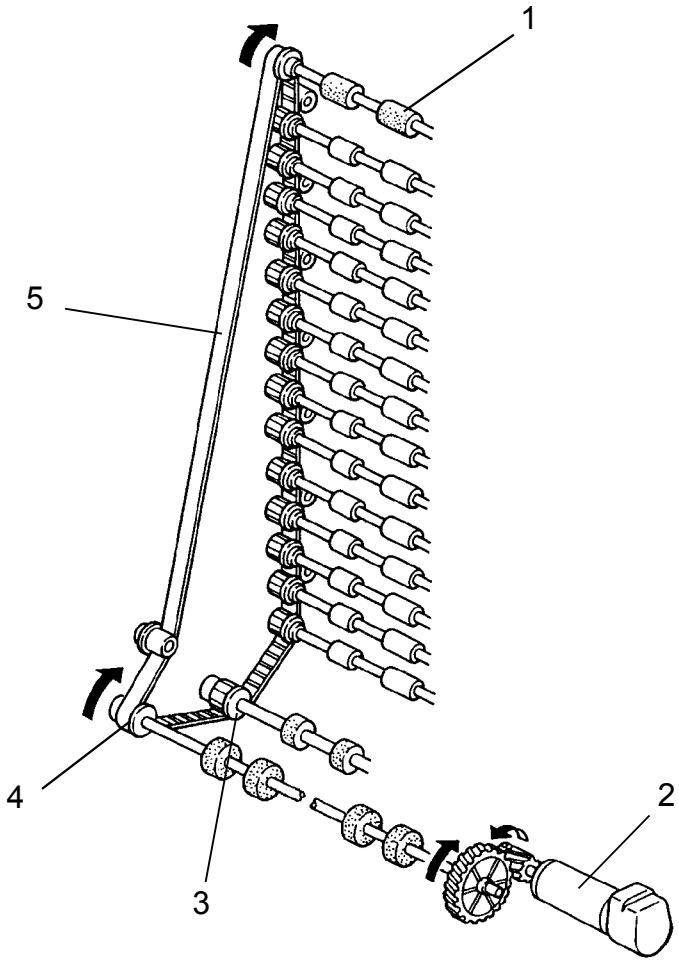


1. Inlet Sensor
2. Entry Sensor Photo Transistor
3. Sorter Cover Safety Switch 1
4. Sorter Cover Safety Switch 2
5. Entry Sensor LED
6. 2nd Bin Solenoid
7. 3rd Bin Solenoid
8. 4th Bin Solenoid
9. 5th Bin Solenoid
10. 6th Bin Solenoid
11. 7th Bin Solenoid
12. 8th Bin Solenoid
13. 9th Bin Solenoid
14. 10th Bin Solenoid
15. Printer Bin Solenoid
16. Interrupt Bin Solenoid
17. Sorter Motor
18. Sorter Main Board
19. Exhaust Fan (A109 copier only)

1.3 ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Index No.
Motors			
M1	Sorter Motor	Drives all the sorter rollers.	17
M2	Exhaust Fan **(A109 copier only)**	Flow the air out from the copier fusing exhaust fan.	19
Solenoids			
SOL1	2nd Bin Solenoid	Open and close the 2nd bin gate.	6
SOL2	3rd Bin Solenoid	Open and close the 3rd bin gate.	7
SOL3	4th Bin Solenoid	Open and close the 4th bin gate.	8
SOL4	5th Bin Solenoid	Open and close the 5th bin gate.	9
SOL5	6th Bin Solenoid	Open and close the 6th bin gate.	10
SOL6	7th Bin Solenoid	Open and close the 7th bin gate.	11
SOL7	8th Bin Solenoid	Open and close the 8th bin gate.	12
SOL8	9th Bin Solenoid	Open and close the 9th bin gate.	13
SOL9	10th Bin Solenoid	Open and close the 10th bin gate.	14
SOL10	Printer Bin Solenoid	Open and close the printer bin gate.	15
SOL11	Interrupt Bin Solenoid	Open and close the interrupt bin gate.	16
Switches			
SW1	Sorter Cover Safety Switch 1	Detects when the sorter cover is opened.	3
SW2	Sorter Cover Safety Switch 2	Cut the +24 volts power line.	4
Sensors			
S1	Entry Sensor	Detects misfeeds and when the copy paper exits.	2 and 5
S2	Inlet Sensor	Detects misfeeds and when the copy paper enters.	1
Printed Circuit Boards			
PCB 1	Sorter Main Board	Controls all sorter functions.	18

1.4 DRIVE LAYOUT



1. Vertical Drive Rollers (10 Rollers)
2. Sorter Motor
3. Turn Gate Roller Pulley
4. Sponge Roller Pulley
5. Timing Belt

1.5 BASIC OPERATION

- Introduction -

Sorter operation begins when the copier exit sensor turns on. At that time, the sorter motor turns on and the rollers start turning.

The sorter has two paper transport speeds. When the sorter motor turns on, it rotates at slow speed of 220 mm/s. This is the slightly faster than the copier's transport speed. When the trailing edge of the paper passes the copier exit sensor, the sorter shifts to high speed which is about 550 mm/s. When the trailing edge of the paper passes the jam sensor, the sorter shifts again to slow speed.

When the copier main motor turns off, the sorter motor also turns off.

- Clear Mode -

The copies pass from the copier's exit through the relay guide plates to the turn gate. The turn gate directs the paper to the vertical guide unit. The vertical drive rollers then move the paper up until it reaches the turn guide. The turn guide directs the paper to the first bin. During transport of the copies in this mode, none of the bin gates are used.

- Sort Mode -

When in sort mode, the first sheet is placed in the first bin in the same way as when in clear mode.

The second and subsequent copies follow the same path but are directed to the bins in order from top to bottom (second copy to second bin, third to the third bin, and so on). The appropriate bin gate solenoid turns on when the leading edge of the paper activates the inlet sensor and turns off when the trailing edge of the paper passes the jam sensor.

If 11 or more is entered while in sort mode, the message display will indicate "Sort max.: 10 sets", the Copy Quantity indicator will display 10, and the Max indicator will blink. (The Start key remains green.)

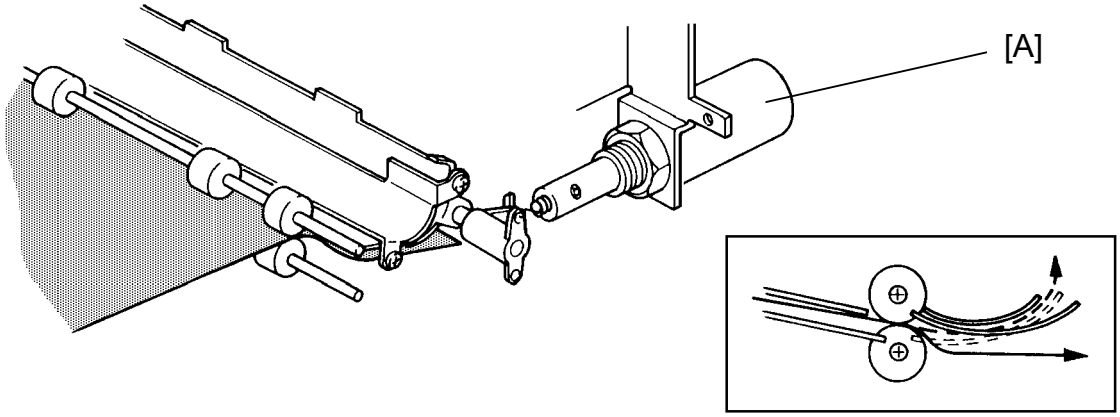
- Stack Mode -

When in stack mode, all sheets of the first copy run go to the top bin just as in clear mode. When the Start key is pressed again, the entire second run is directed to the second bin. Similarly, the third run goes to the third bin, the fourth run to the fourth bin.

If the mode is not changed, the sorter will continue in this way, sending all copies from a single run to one bin and dropping down one bin each run until there are copies in all 10 bins. Upon completion of the copy run to the 10th bin, copying will stop and the guidance display will indicate "Sort max.: 10 sets". The Max indicator will blink. (The Start key remains green.) The operator can copy 11th or more originals continuously when pressing the start key again. These copies run to the top bin and drop down one bin each run, as described above.

If on any single copy run, the operator enters a number greater than 40 (the maximum bin capacity for stack mode), the message display will indicate "Stack max.: 40 sheets", the Copy Quantity indicator will display 10, and the Max indicator will blink. (The Start key remains green.)

- Interrupt Mode -



If the Interrupt key is depressed during a multicopy run, the sorter continues to place copies in the correct bins until that copy run is finished. Which bin the copies go to depends on the mode: sort, stack or clear mode.

Then, the operator presses the Start key to make interrupt copies. As each of the interrupt copies enters the sorter, the sorter CPU energizes the interrupt bin solenoid [A] and the copies are directed to the interrupt bin.

When the interrupt mode is canceled, the previous settings and modes are returned to resume the previous copy run that was interrupted.

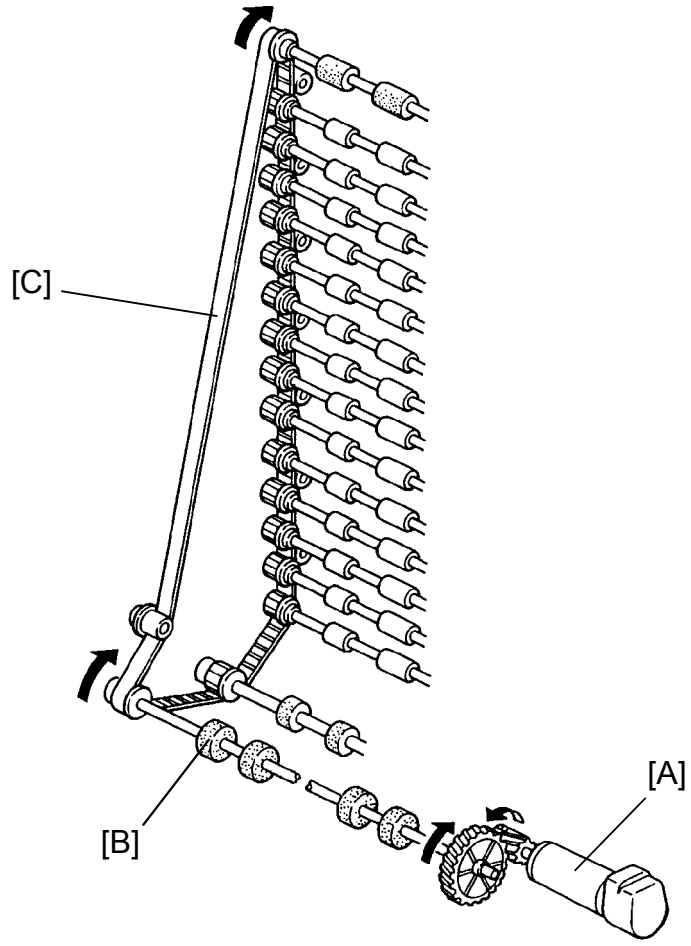
- Sorter Misfeed -

The sorter CPU starts the misfeed timing count when the inlet sensor turns on. If the copy is not fed into the bin within a specified period (different for each bin) the sorter CPU will send a misfeed signal to the copier. The copier will then light the Sorter Misfeed indicator and stop operation. (Any copies in the paper path at the time will be finished first.)

The sorter CPU directs any copies that are being processed in the copier at the time of a sorter misfeed to the interrupt bin. It also corrects the copier Copy Counter indicator so that it displays only the number of copies actually in the top 10 bins. After removing the misfed paper, the misfeed condition is automatically cleared when the sorter cover is opened and closed.

2. DETAILED SECTION DESCRIPTIONS

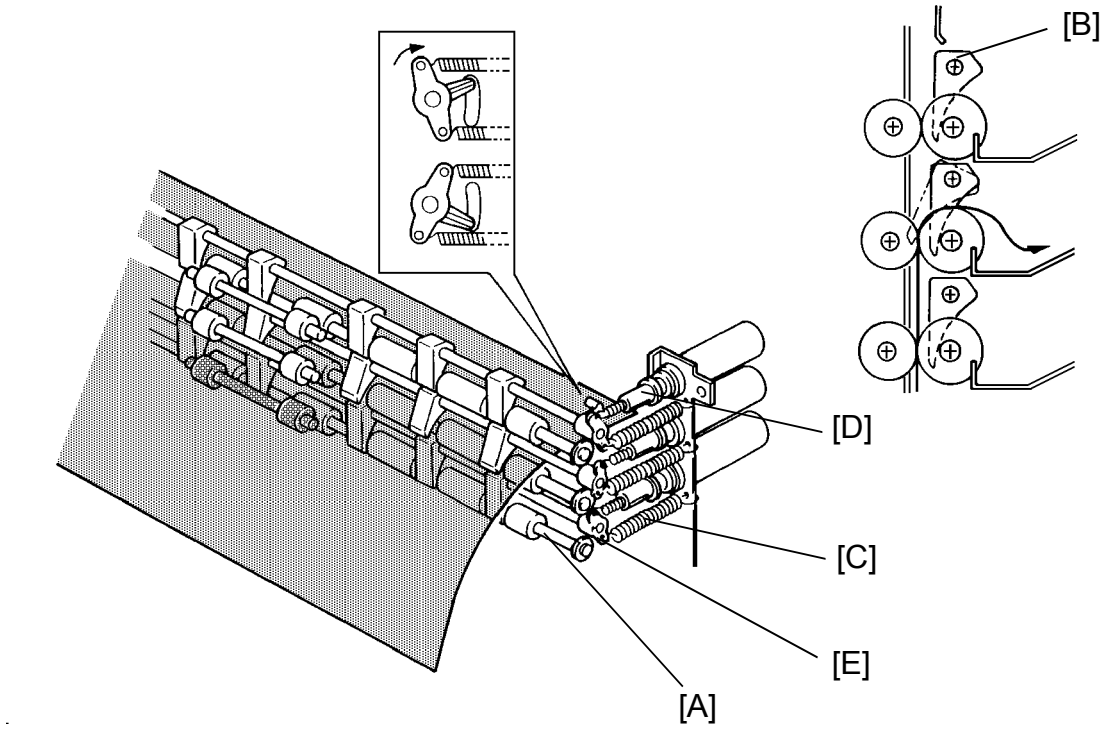
2.1 DRIVE MECHANISM



The sorter motor [A] is a servo motor and it is controled by the sorter CPU. The sorter CPU also controls the motor rotation speeds: slow and high.

The sorter motor drives the sponge roller [B] and the other rollers through a timing belt [C].

2.2 BIN GATE OPERATION

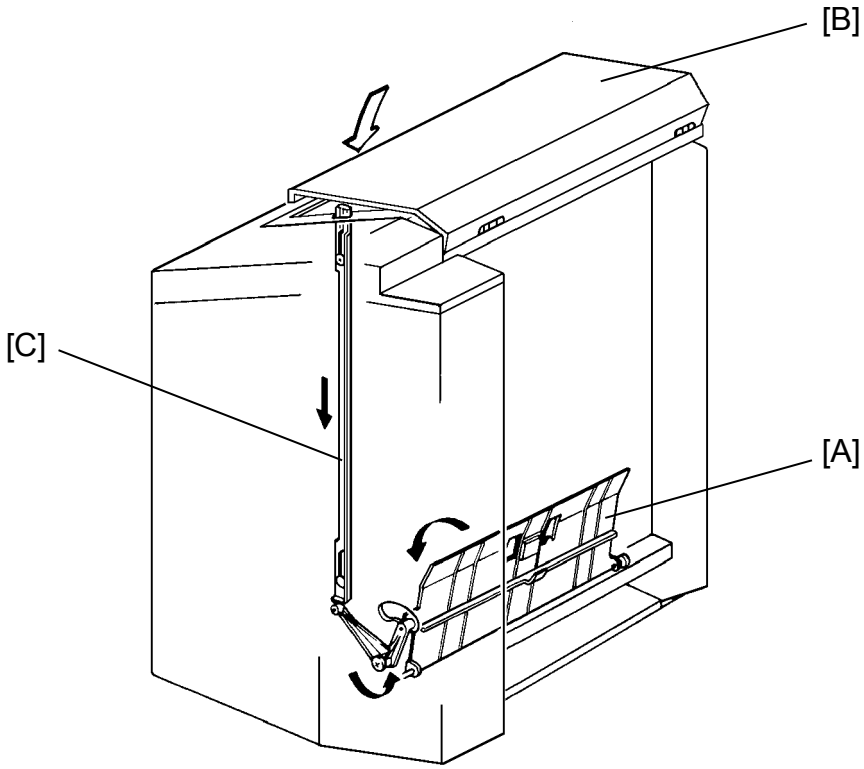


Each bin gate shaft [A] is individually controlled by a solenoid. Normally, the bin gates [B] are held out of the paper path by the return spring [C].

To feed paper into a bin, the sorter CPU energizes the appropriate solenoid. The solenoid plunger [D] then rotates the bin gate lever [E] and opens the gate out into the paper path. The curved inner face of the gate directs the paper into the bin.

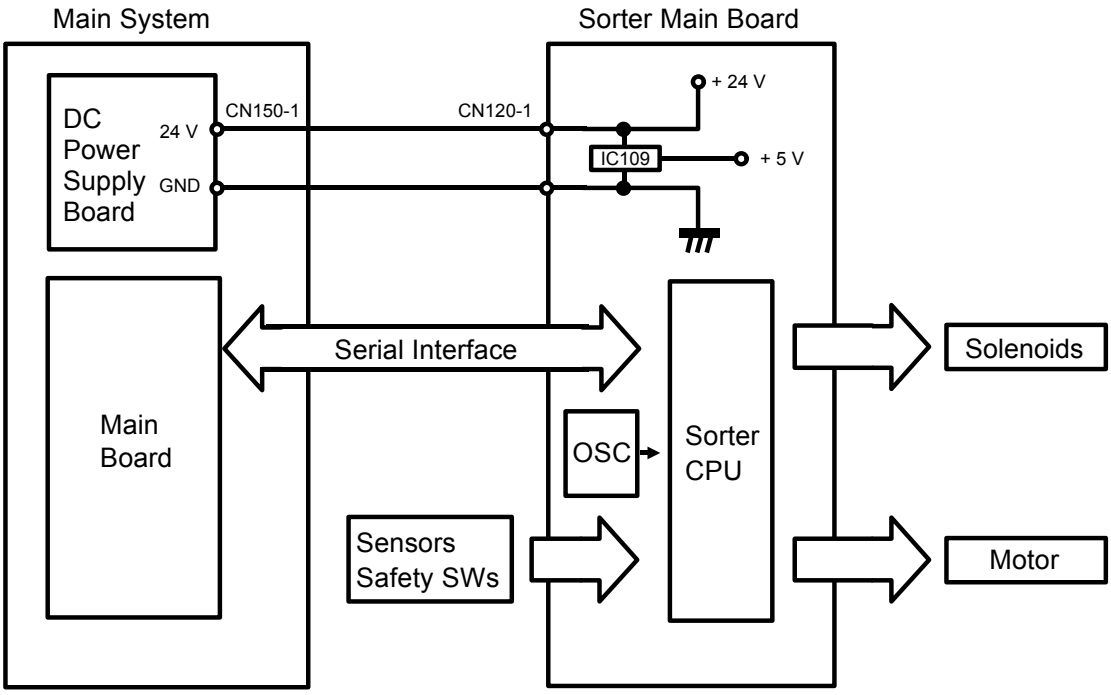
After the paper passes into the bin, the solenoid turns off and the return spring pulls the bin gate lever back to the closed position.

2.3 RELAY GUIDE PLATE RESET MECHANISM



This mechanism prevents the relay guide plate [A] from being left up after misfed paper has been removed from the sorter. When the operator closes the sorter cover [B], the reset lever [C] is pushed down, returning the relay guide plate to the horizontal position.

2.4 ELECTRICAL CONTROL

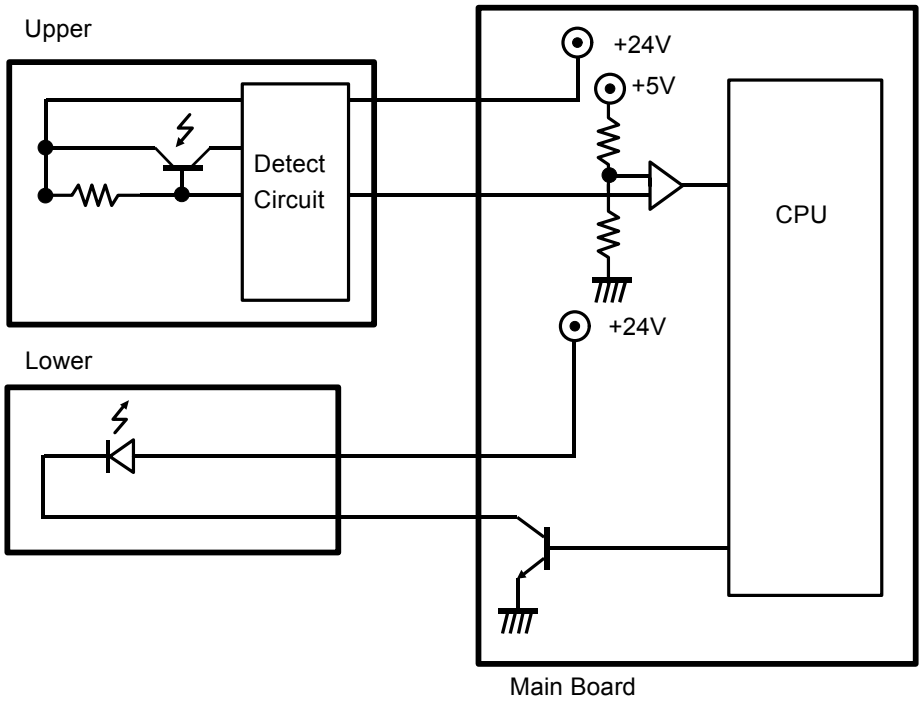


24 V is supplied from the copier, the sorter main board generates a 5 V supply from the 24 V input.

The sorter has its own CPU which controls all the functions of the sorter. The sorter CPU communicates with the copier through a serial interface bus.

Signals from the sensors and the safety switch are sent to the copier main PCB. The copier main PCB sends the command signals for activation of the motor and the solenoids to the sorter CPU.

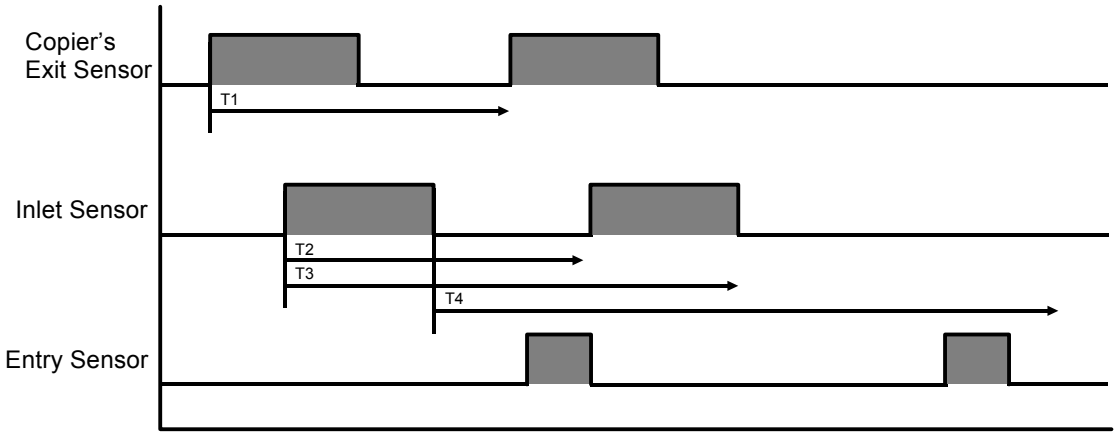
2.5 JAM AND BIN COPY SENSORS



There is a jam sensor on the upper sensor board which detects sorter misfeeds. A LED on the lower sensor board is turned on by a pulse signal which is supplied from the sorter CPU.

When there is paper between either board, this pulse light does not activate the phototransistor on the upper board. In this case, the sorter CPU determines that the vertical drive roller is misfeeding a copy. This pulse signal detection system has an advantage over a photointerruptor system because there is no interference from external light.

2.6 MISFEED SENSING



The three components indicated in the above timing chart are involved in jam detection. There are four jam detection tests, as follows.

T1: The inlet sensor is checked 80 pulses (0.36s) after the copier's exit sensor is turned ON. If the inlet sensor is not on, there is a jam is the copier's exit area.

T2: y pulses (see the table below) after the inlet sensor is turned ON, the inlet sensor turns OFF. If the inlet sensor is not OFF, there is a jam in the sorter entrance area.

T3: z pulses (see the table below) after the inlet sensor is turned ON, the entry sensor turns ON. If the entry sensor is not ON, there is a jam in the vertical transport area.

T4: z pulses after the inlet sensor is turned OFF, the entry sensor turns OFF. If the entry sensor is not OFF, there is a jam in the sorter exit area.

Paper Size	5 1/2 x 8 1/2	8 1/2 x 11	8 1/2 x 14	11 x 17	8 1/2 x 5 1/2	11 x 8 1/2
y pulse	380	484	620	752	240	376

Paper Size	A3	B4	A4(L)	A4(S)	B5(L)	B5(S)	A5(L)	A5(S)
y pulse	732	532	516	364	448	316	364	256

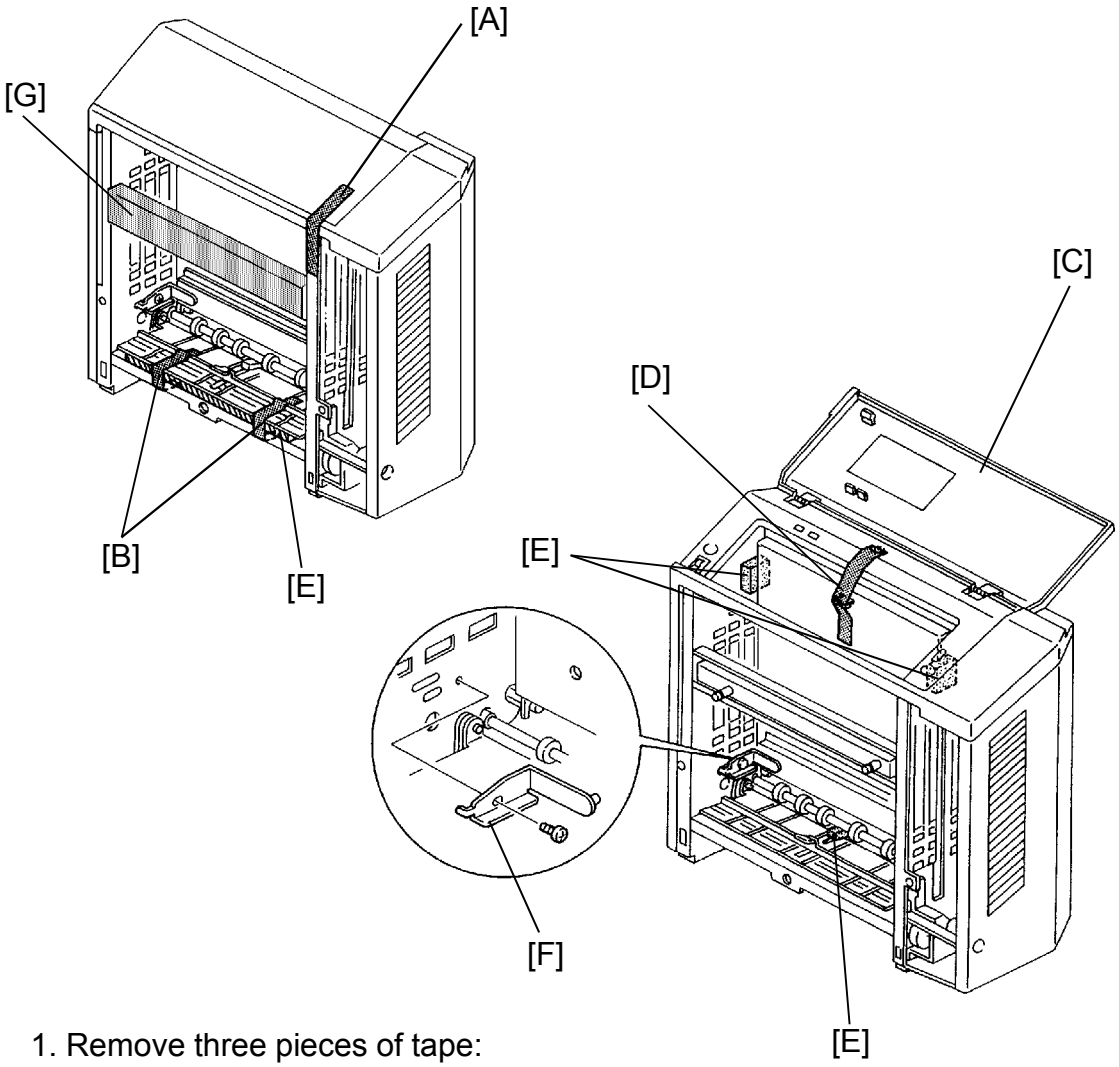
Bin No.	1	2	3	4	5	6	7	8	9	10	Print	Interrupt
z pulse	992	904	860	816	772	724	680	632	588	544	360	316

3. INSTALLATION (DS5330)

3.1 ACCESSORY CHECK

1. Installation Procedure (115 V version only)..... 1 pc
2. NECR (115 V version only) ..... 1 pc
3. Envelope for NECR (115 V version only) ..... 1 pc
4. Stud ..... 2 pcs
5. Knob Screw ..... 2 pcs
6. Sorter Bin..... 11 pcs
7. Interrupt Bin ..... 1 pc
8. Bin Cover ..... 1 pc
9. Grounding Screw ..... 1 pc

3.2 REMOVAL OF SHIPPING RETAINERS AND TAPES



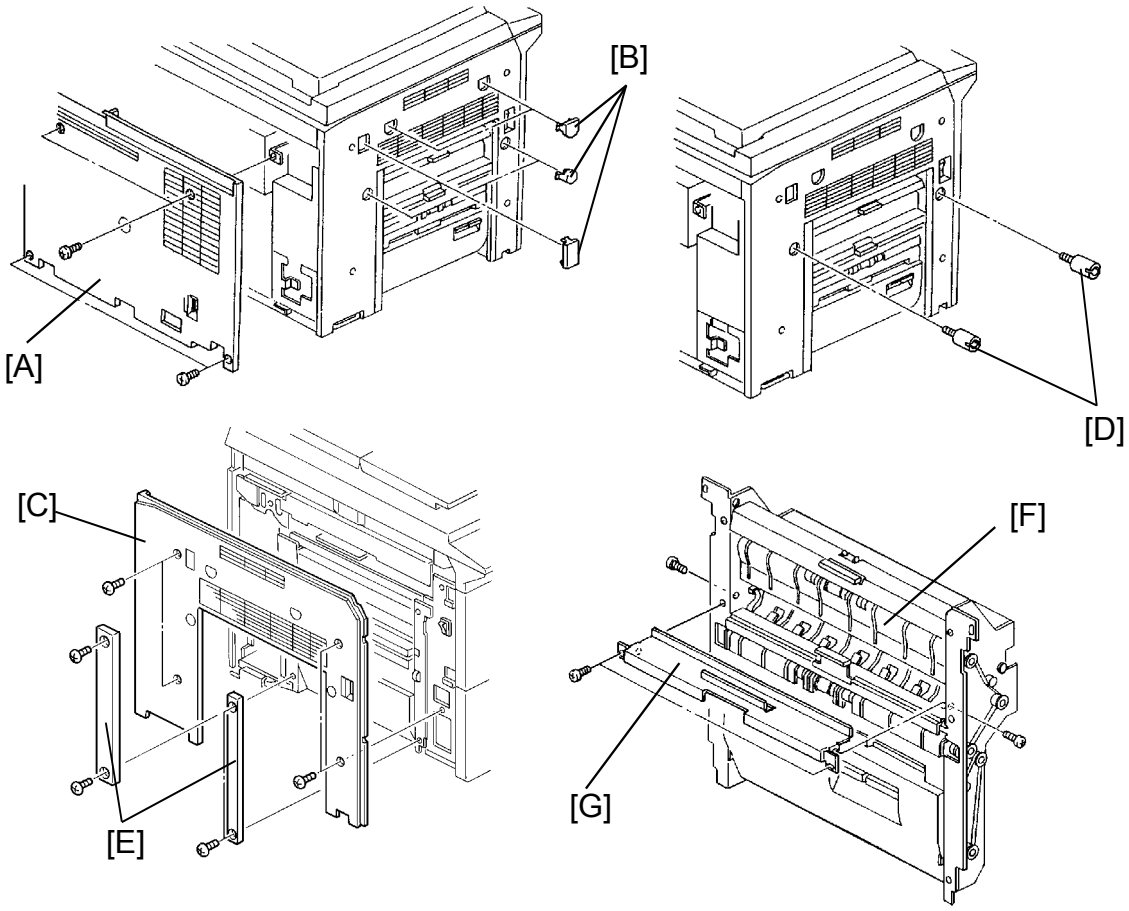
1. Remove three pieces of tape:

   Sorter Top Cover [A] (1 pc)
   Transport Guide [B] (2 pcs)

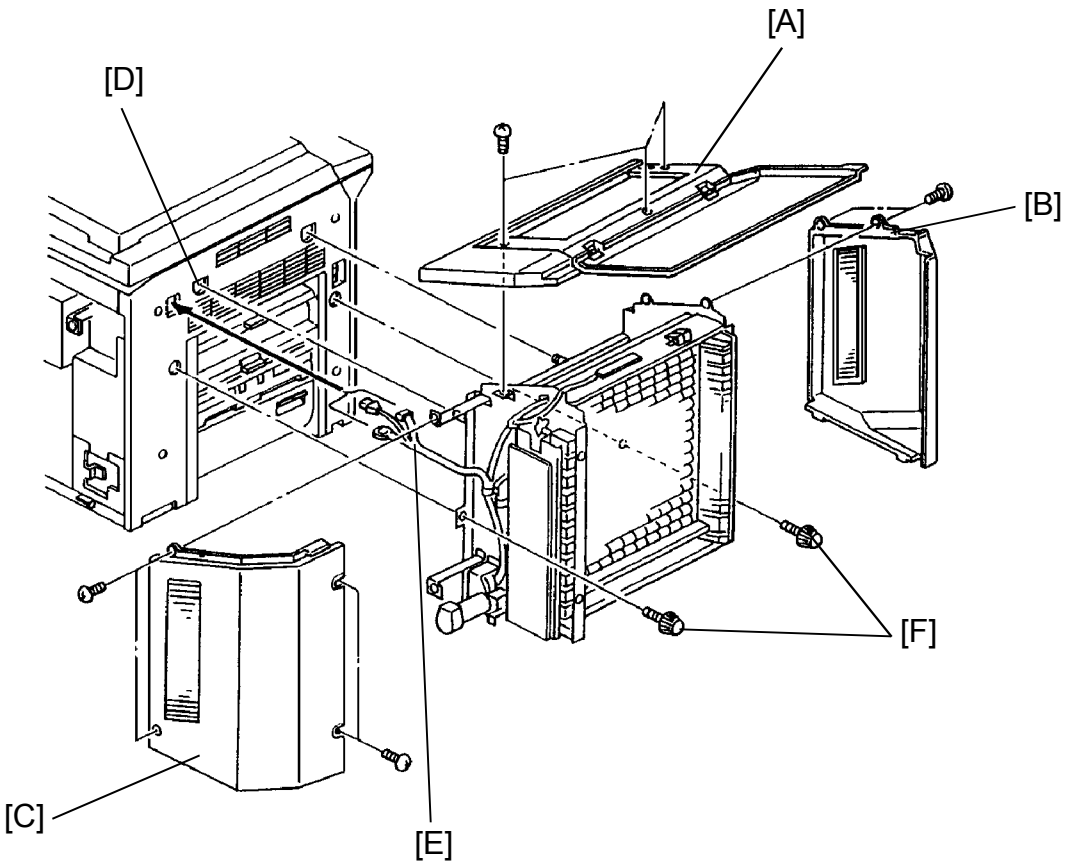
2. Open the top cover [C] and remove the following items:

   Tape [D] (1 pc)
   Cushion [E] (4 pcs)
   Fixing Clamp [F] (1 pc) [1 screw]
   Card Board [G] (1 pc)

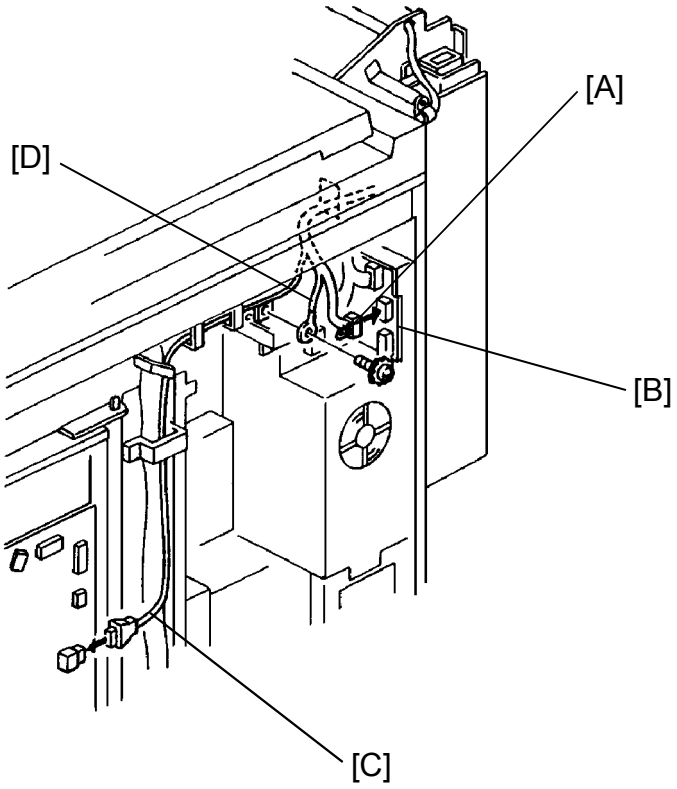
3.3 INSTALLATION PROCEDURE



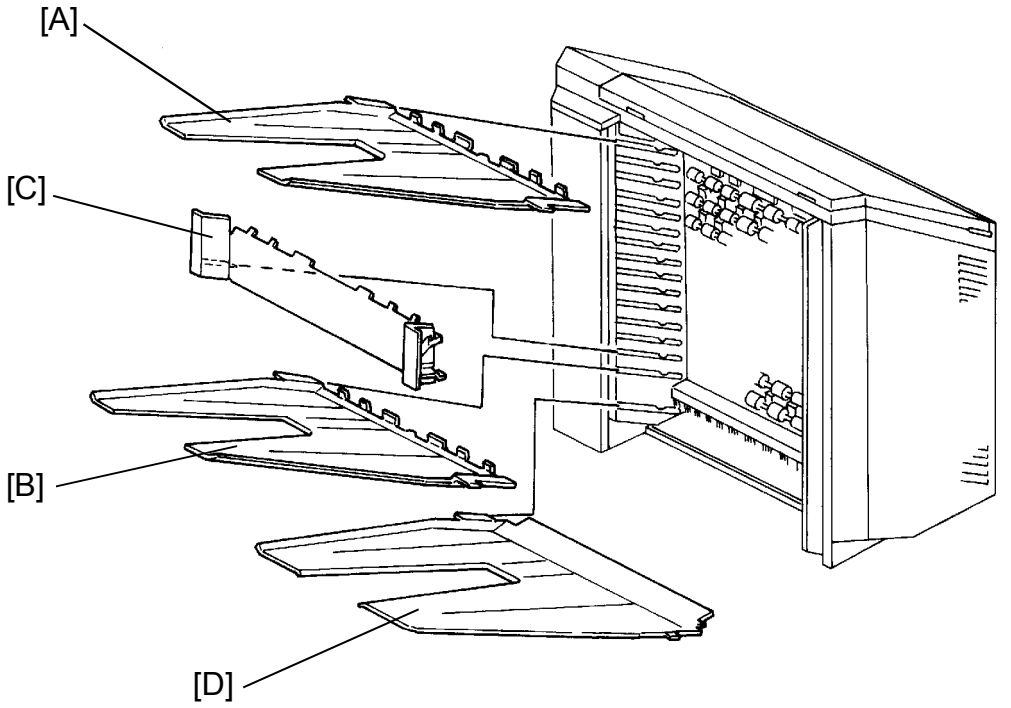
1. Unplug the power supply cord.
2. Remove the rear lower cover [A] (4 screws).
3. Remove the 2 copy trays.
4. Remove the 5 caps [B] from the left cover [C].
5. Install the 2 short studs [D].
6. Remove the copier left cover [C] (4 screws).
7. Remove the inverter unit side covers [E] (2 screws each).
8. Swing down the inverter unit [F] (2 screws).
9. Remove the upper copy tray support bracket [G] (4 screws).
10. Reinstall the following parts:
    - Inverter unit
    - Inverter unit side covers
    - Copier left cover



11. Remove the sorter top cover [A] (3 screws).
12. Remove the sorter front cover [B] (2 screws).
13. Remove the sorter rear cover [C] (4 screws).
14. Install the sorter to the main system using holes [D]. (Connect the 2 studs on the sorter to the machine system's frame.)
15. Insert the sorter harnesses [E] through the hole on the left cover.
16. Fix the sorter to the main system with two screws (2 knob screws [F]).



17. Connect the following harnesses:
    a) 4P connector [A] from the sorter to CN590 on the dc power supply unit [B].
    b) Fiber cable [C] from the sorter to CN157 on the main system's main PCB.
    c) Grounding wire [D] (1 M4 x 8 grounding screw) as shown in the figure.



18. Reinstall all covers.
19. Insert the 10 sorter bins [A].
20. Insert the print tray [B] in the 15th slot, then insert and push the bin cover [C] firmly in the 14th slot.

    NOTE: The print tray is interchangeable with the sorter bins.
21. Insert the interrupt bin [D].
22. Check the machine operation.
23. Confirm the customer's requirements, as the following functions can be selected if necessary:
    - Auto Sort Mode: SP6-3

3. INSTALLATION (NC5006)

3.1 ACCESSORY CHECK

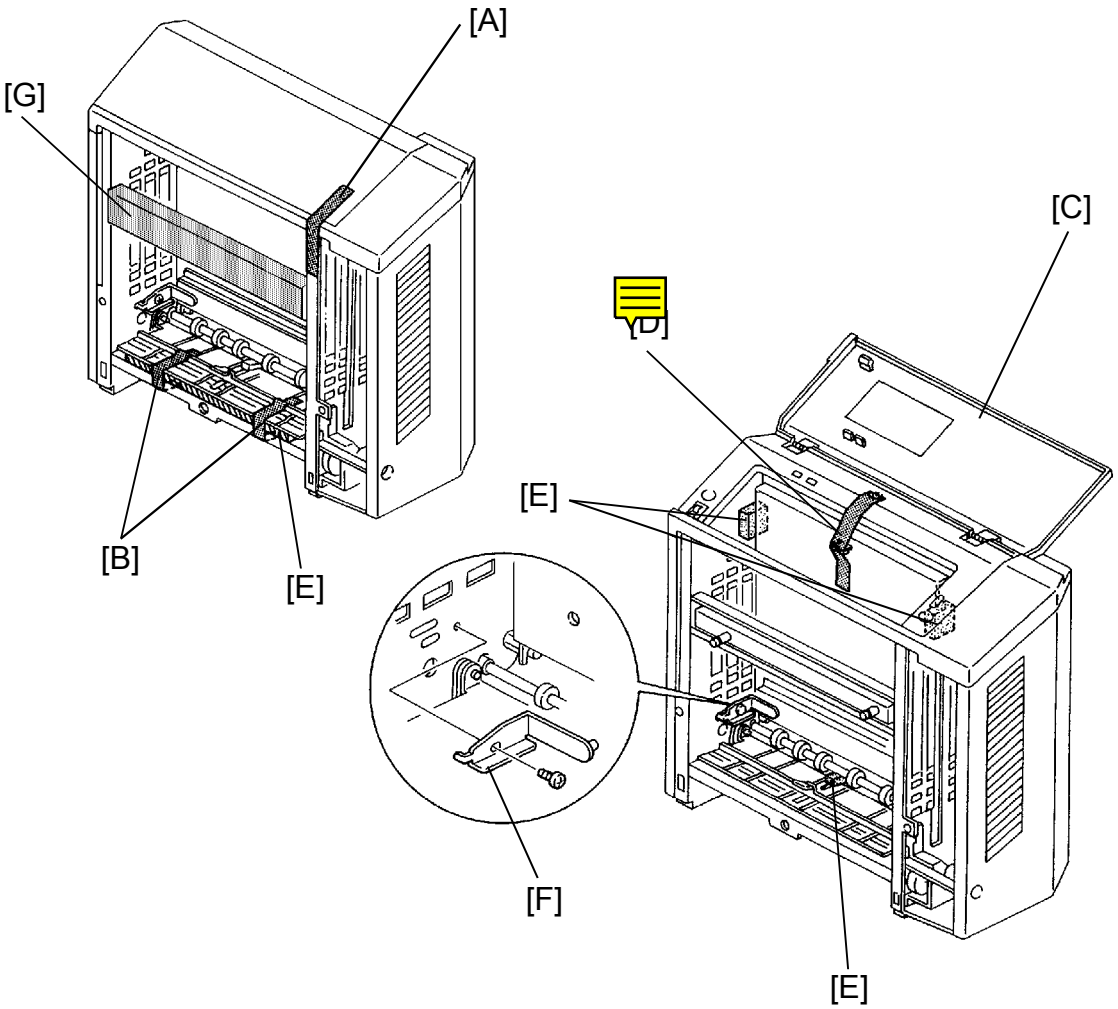
Check the accessories according to the following list:

Description	Q'ty
1. Installation Procedure	1
2. NECR	1
3. Envelope for NECR	1
4. Stud	2
5. Knob Screw	2
6. Sorter Bin	11
7. Interrupt Bin	1
8. Bin Cover	1
9. Grounding Screw	1

Sorter Adapter

Description	Q'ty
1. Fan Motor Assembly	1
2. Air Outlet Plate	1
3. Harness Clamp	2
4. Relay Harness	1
5. Edge Saddle	2
6. Guide Plate Assembly	2
7. Philips Pan Head Screw -M4 x 6	9

3.2 INSTALLATION PROCEDURE



CAUTION: When installing the sorter, make sure that the copier is unplugged.

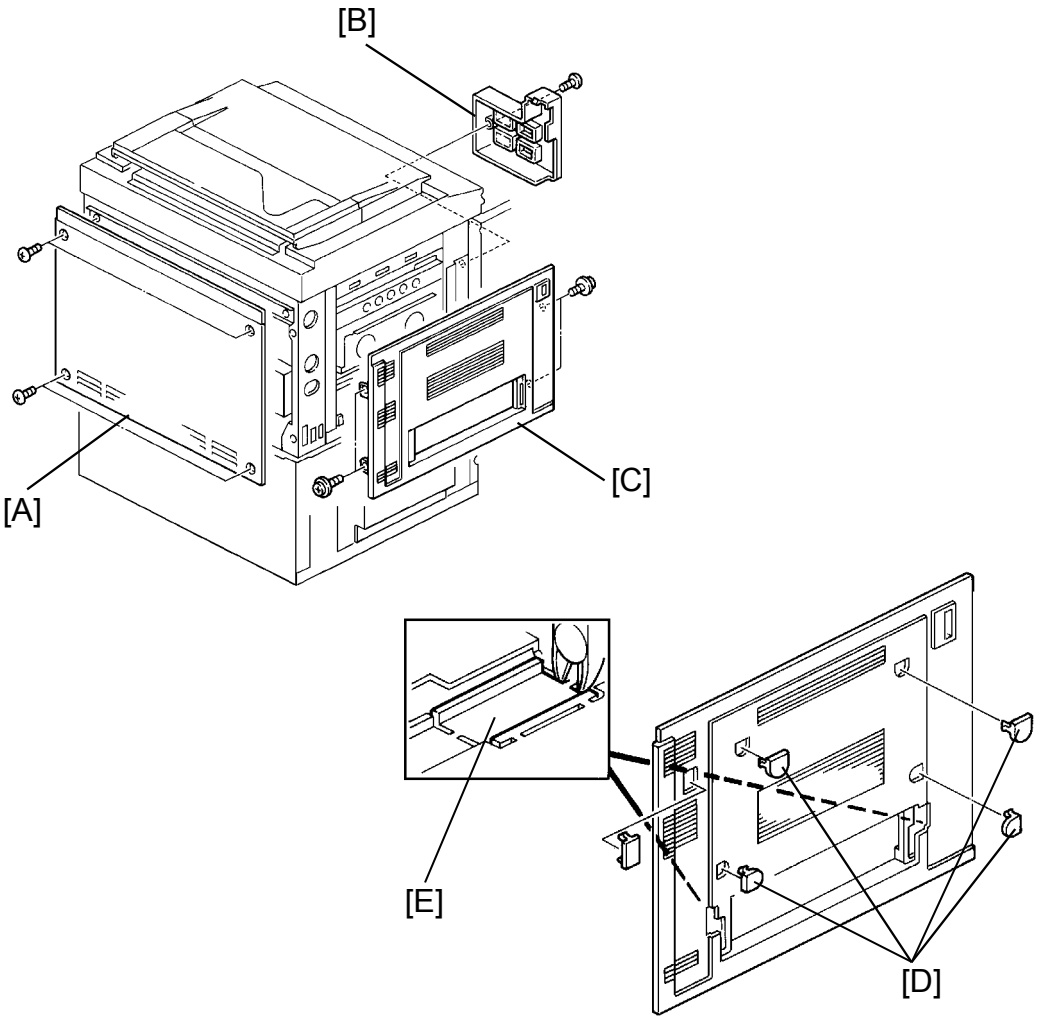
NOTE: To install this sorter to A109 copier, A527 sorter adapter kit (option) is necessary.

1. Remove three pieces of tape:

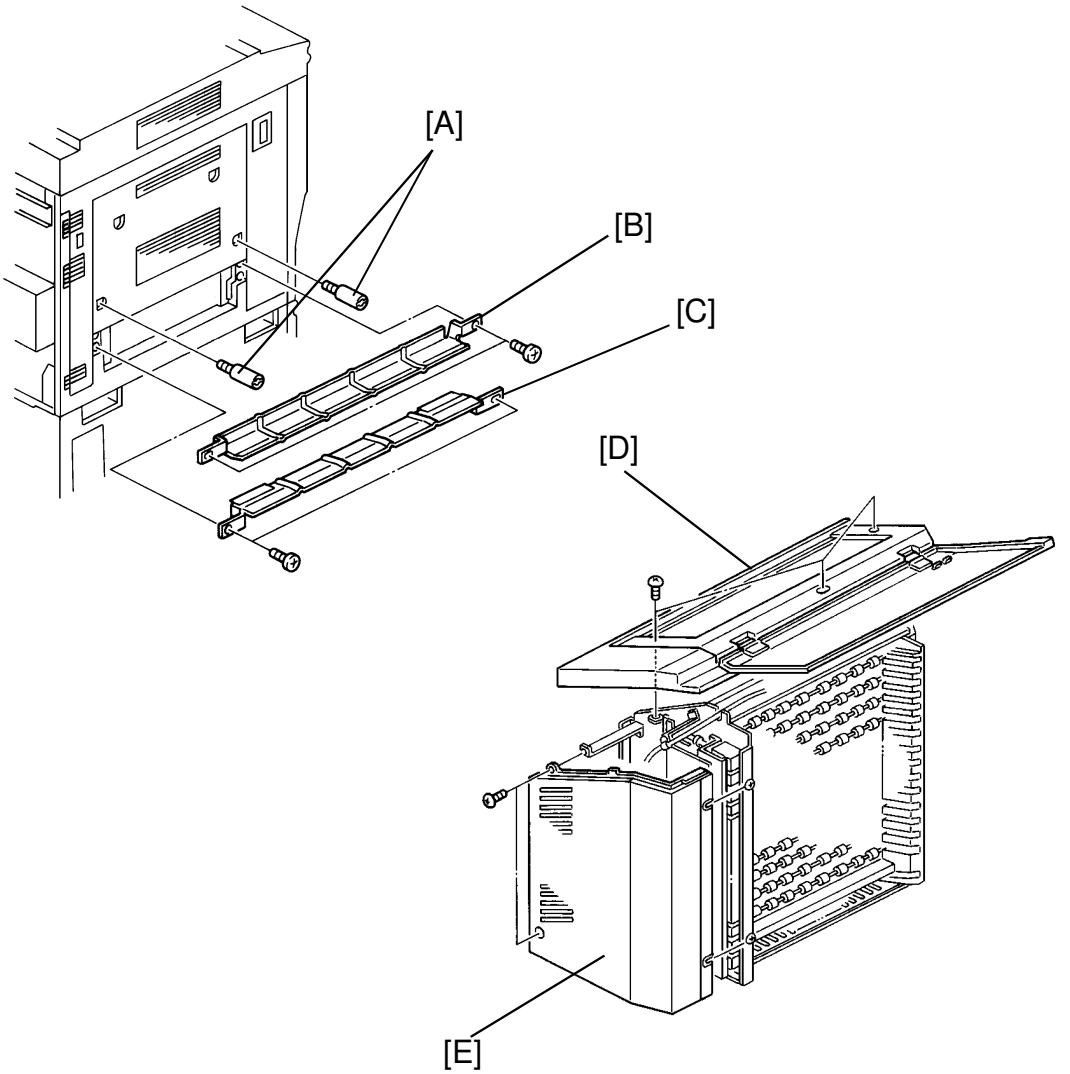
   Sorter Top Cover [A] (1 pc)
   Transport Guide [B] (2 pcs)

2. Open the top cover [C] and remove the following items:

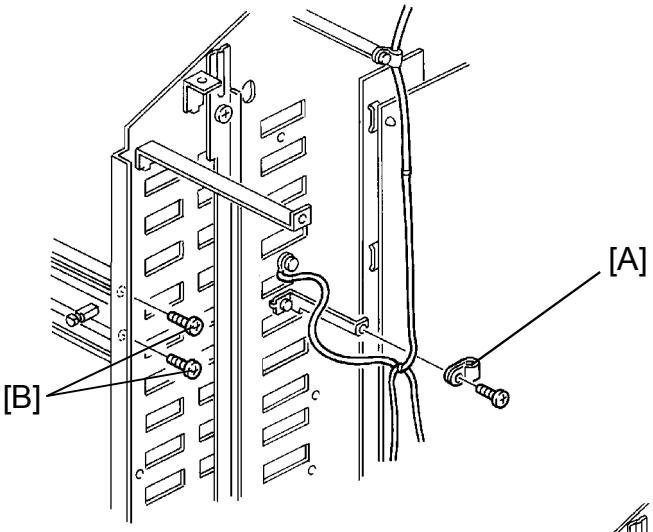
   Tape [D] (1 pc)
   Cushion [E] (4 pcs)
   Fixing Clamp [F] (1 pc) [1 screw]
   Card Board [G] (1 pc)

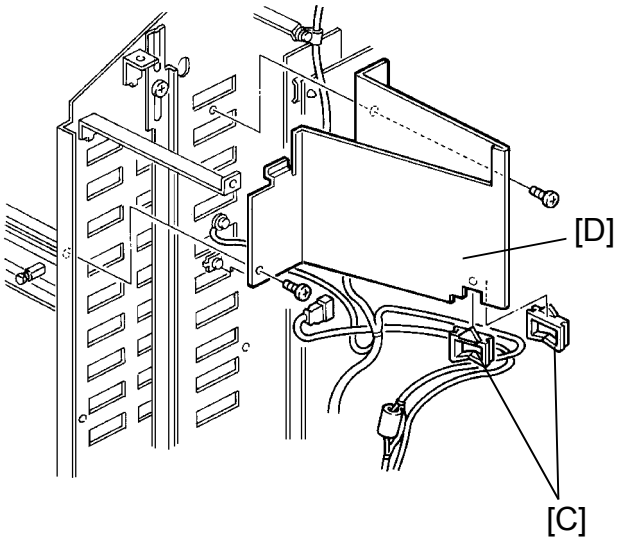


3. Remove the upper rear cover [A] (4 screws).
4. Open the front doors then remove the left inner cover [B] (1 screw).
5. Remove the upper left cover [C].
6. Remove the 5 small caps [D].
7. Remove the 2 portions [E] with cutting pliers as shown.
8. Reinstall the upper left cover [C].

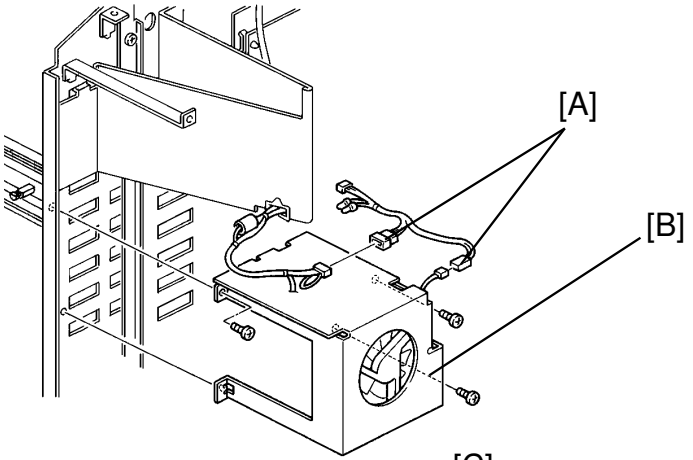


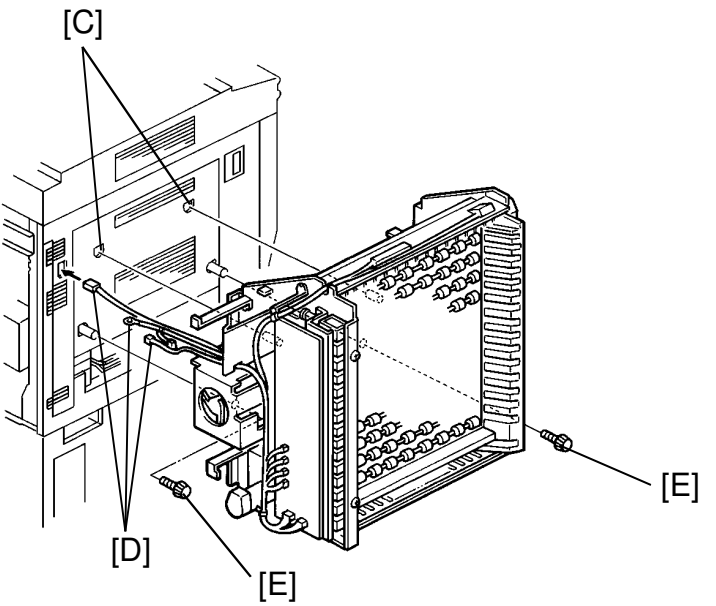
9. Install the studs [A].
10. Install the upper guide plate [B] (2 screws).
11. Install the lower guide plate [C] (2 screws).
12. Remove the sorter top cover [D] (3 screws).
13. Remove the sorter rear cover [E] (4 screws).
14. Remove the sorter front cover (2 screws).



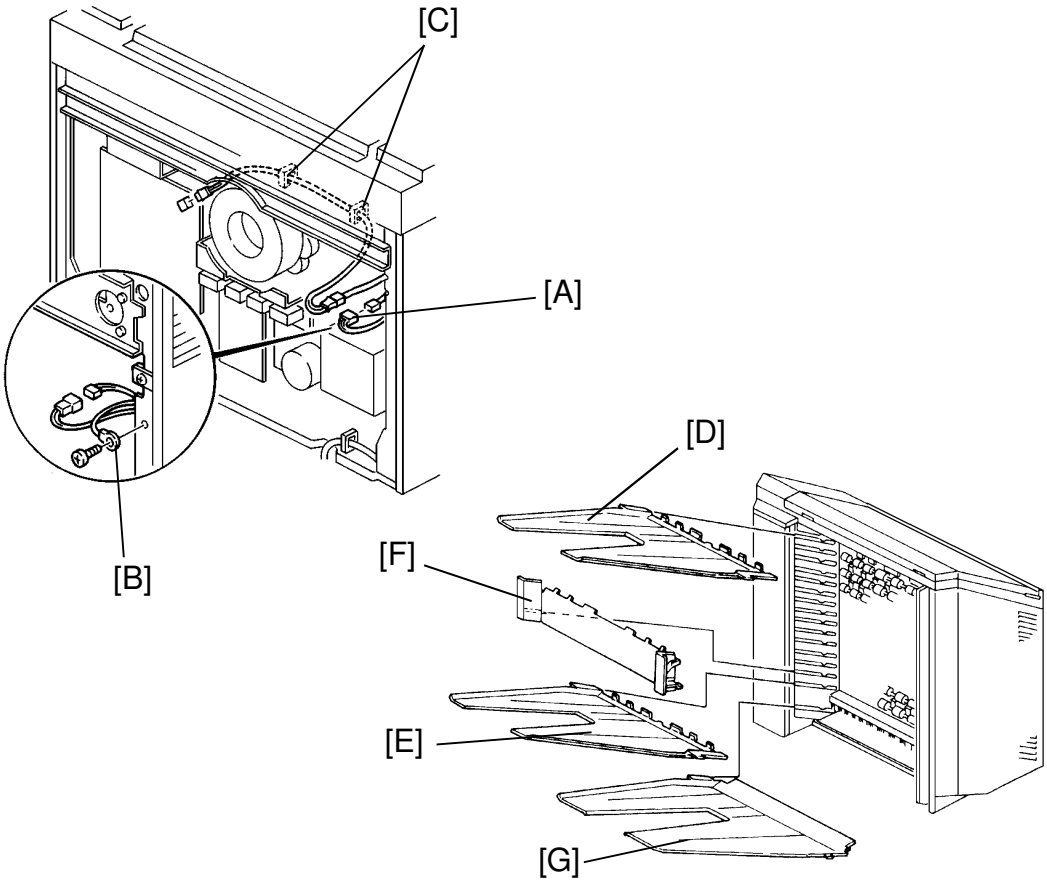


15. Remove the harness clamp [A] (1 screw).
16. Remove the two screws [B].
17. Install the two edge saddles [C] on the air outlet plate [D].
18. Install the plate [D] to the sorter rear frame (2 screws).





19. Connect the connectors [A] of the accessory harness with the connectors from the fan assembly.
20. Install the fan assembly [B] to the sorter rear frame (3 screws and 1 connector).
21. Install the sorter to the main system using holes [C] (Connect the 2 studs of the sorter to the main frame).
22. Insert the sorter harnesses [D] through the hole on the left cover.
23. Fix the sorter to the main frame with two screws (2 knob screws [E]).



24. Remove the protective cover and secure the 4p connector [A].
25. Secure the grounding wire [B]* (1 grounding screw with toothed washer).

    NOTE*: For all models other than those intended for North America, the green wire is intended as a functional earth ans should be connected as shown.
26. Install two wire clamps [C].
27. Connect the fiber optics connector to the CN515 of the main control board.
28. Insert the 10 sorter bins [D].
29. Insert the print tray [E] in the 15th slot, then insert and push the bin cover [F] firmly in the 14th slot.

    NOTE: The print tray is interchangeable with the sorter bins.
30. Insert the interrupt bin [G].
31. Install all covers on the copier and the sorter.
32. Check the machine operation.

4. SERVICE TABLES

4.1 TEST POINT

NUMBER	FUNCTION
TP100	Factory use only
TP101	24 V
TP102	5 V
TP103	0 V (GND)

4.2 LEDs

NUMBER	FUNCTION
LED100	Lights when the inlet sensor is activated.
LED101	Lights when the entry sensor is activated.
LED102	Lights when the sorter motor speed is corrected in speed adjustment

4.3 DIP SWITCH

DPS100				FUNCTION
1	2	3	4	
1	0	0	1	Free run without paper.
1	0	0	0	Free run with paper. (Paper feeding check)
1	0	0	0	
0	1	0	0	Adjusts the motor speed in High Speed mode by VR101.
0	1	0	1	Adjust the motor speed in Slow Speed mode by VR100.

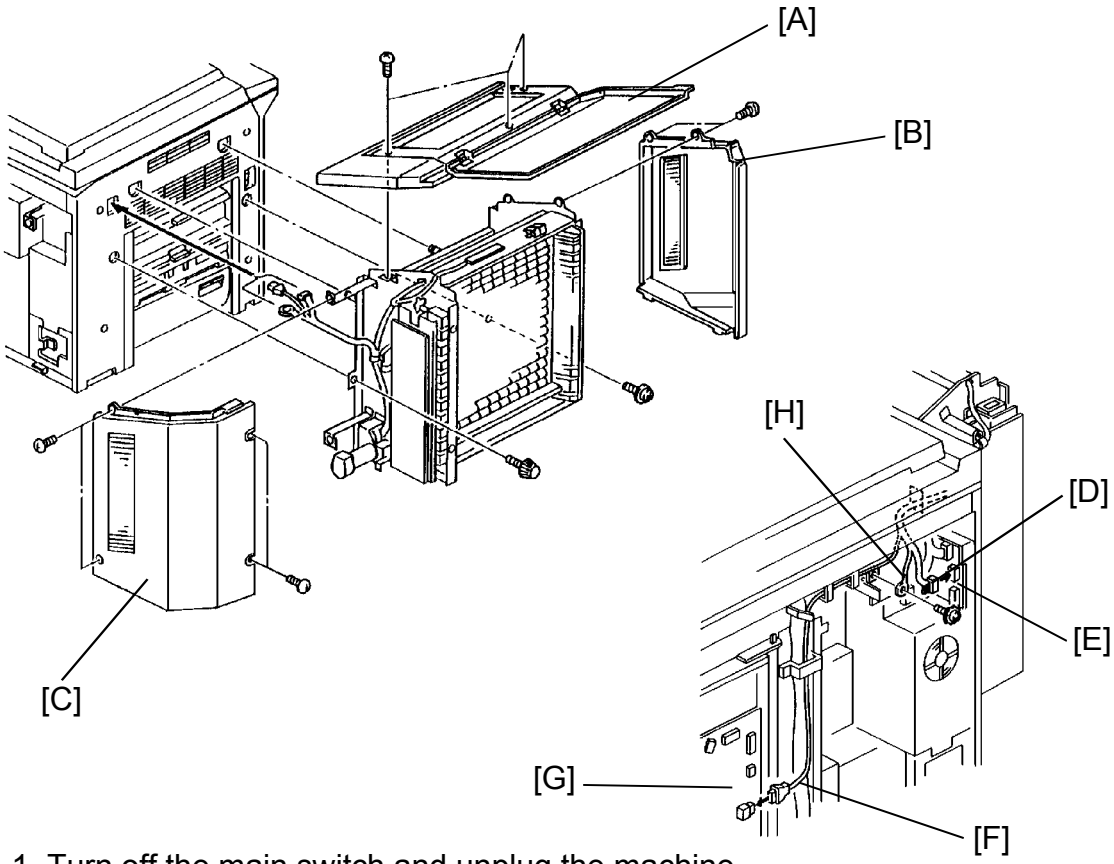
NOTE: DIP switches should all be OFF in normal mode.

4.4 VARIABLE RESISTORS

NUMBER	FUNCTION
VR100	Adjusts slow speed of the motor.
VR101	Adjusts high speed of the motor.

5. REPLACEMENT AND ADJUSTMENTS

5.1 SORTER REMOVAL (DS5330)

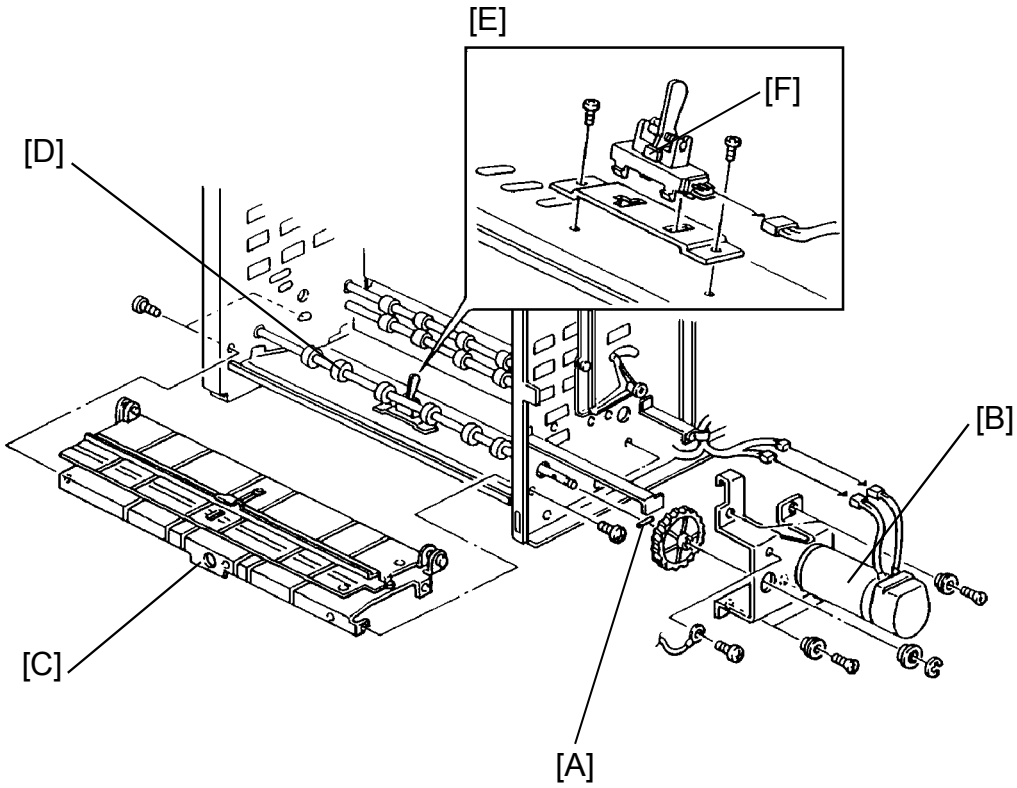


1. Turn off the main switch and unplug the machine.
2. Remove all bins.
3. Remove the rear lower cover of the copier (4 screws).
4. Open the sorter cover and remove the upper cover [A] (3 screws).
5. Remove the front [B] and rear [C] covers of the sorter (6 screws).

CAUTION: Do not remove the signal cable without turning off the main switch.

6. Disconnect the following harnesses from the copier
   a) 4P connector [D] from CN590 on the DC power supply unit [E].
   b) Fiber cable [F] from CN157 on the copier's main PCB [G].
   c) Grounding wire [H] (1 grounding screw).
7. Remove the sorter from the copier (1 screw, 1 knob screws).

5.2 SORTER MOTOR, SPONGE ROLLER, AND INLET SENSOR REPLACEMENT

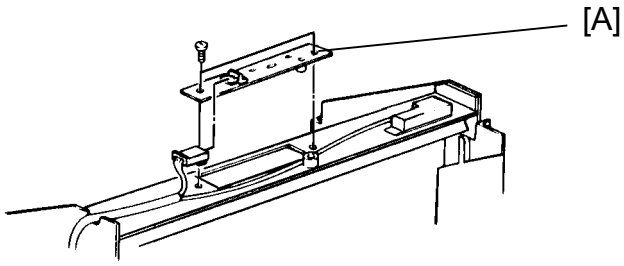


NOTE: Be careful not to lose the positioning pin [A].

1. Remove all sorter bins, then remove the sorter from the copier. (See the Sorter Removal section.)
2. Remove the sorter motor [B] (4 screws, E-ring, ground-wire).
3. Remove the inlet guide board unit [C] (4 screws).
4. Remove the roller drive pulley (1 allen-screw) and replace the sponge roller [D].
5. Remove the inlet sensor with the bracket on [E] (2 screws).
6. Pull out the harness and replace the sensor [F].

5.3 ENTRY SENSOR REPLACEMENT

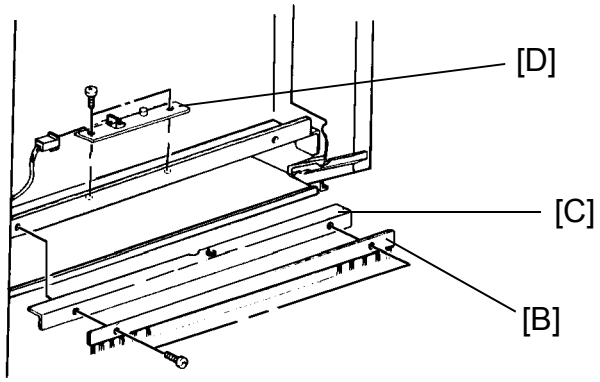
- Entry Sensor Photo-transistor -



1. Turn off the main switch and unplug the machine.
2. Open the sorter cover and remove the upper cover (3 screws).
3. Disconnect the harness from the upper jam sensor board [A].
4. Remove the entry sensor board (2 screws).

CAUTION: Do not touch the variable resistor mounted on the sensor board; it is factory adjusted.

- Entry Sensor LED -



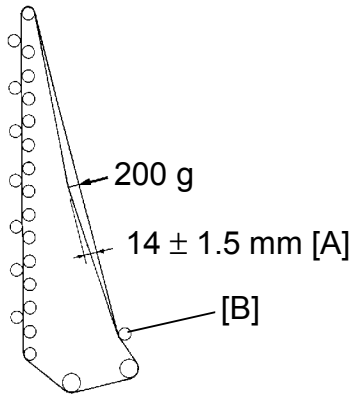
1. Turn off the main switch and unplug the machine.
2. Remove all sorter bins.
3. Remove the antistatic brush [B] and the sensor cover [C] (2 screws).
4. Disconnect the harness from the lower sensor board [D].
5. Remove the entry sensor board (2 screws).

5.4 VERTICAL DRIVE ROLLER TIMING BELT ADJUSTMENT

Standard: 14 ± 1.5 mm reflection at 200 g

Measurement: Take the measurement at the center, between the pulley and the belt tightner roller [A].

Part to adjust: Belt tightner bracket [B] (1 screw)



5.5 SORTER MOTOR SPEED ADJUSTMENT

CAUTION: - Always perform the high motor speed adjustment first.
- Make sure to check the low motor speed after adjusting the high motor speed.
- LED102 takes sometime before responding to the adjustment. Wait 2 to 3 seconds after adjusting the VR, then check LED102.

1. Remove the sorter upper cover (3 screws).
2. Remove the sorter rear cover (4 screws).
3. Turn on DPS100-2, 4 on the sorter main PCB. By using VR100, adjust the high motor speed so that LED 102 lights on.
4. Turn on DPS100-2 on the sorter main PCB. By using VR101, adjust the low motor speed so that LED102 lights on.