FINISHER
(Machine Code:A379)

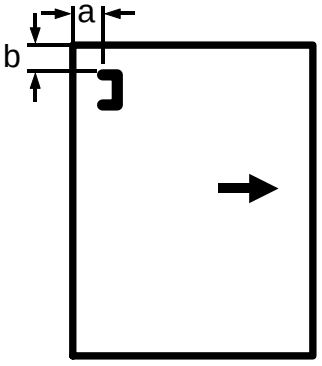
1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

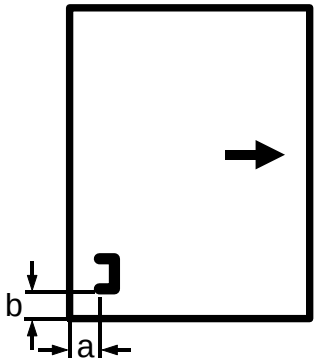
Paper Size:	Maximum: 11" x 17"/A3 Minimum: 5 1/2" x 8 1/2"/A5 sideways
Paper Weight:	Standard copying/Stack mode 14 ~ 42 lb/52 ~ 157 g/m^2 Staple mode 17 ~ 20 lb/64 ~ 80 g/m^2
Paper Capacity:	1,500 sheets: 8 1/2" x 11"/A4 or smaller size (20 lb/80 g/m^2) 1,000 sheets: 8 1/2" x 14"/B4 or larger size (20 lb/80 g/m^2)
Stapler Capacity:	8 1/2" x 11"/A4 or smaller size (20 lb/80 g/m^2): from 2 to 50 sheets 8 1/2" x 14"/B4 or large size (20 lb/80 g/m^2): from 2 to 30 sheets
Staple Replenishment:	Cartridge exchange (5,000 pieces/cartridge)
Power Source:	DC 24 V (from copier)
Power Consumption:	44.4 W (average)
Weight:	34.2 kg (75.4 lb)

Stapling Position:

(1 staple)

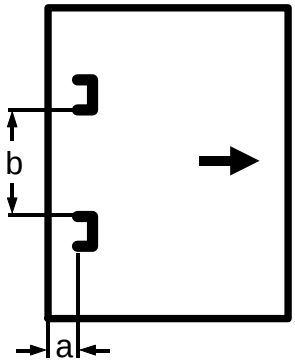


a = 0.24" ± 0.12" (6 ± 3 mm)
b = 0.24" ± 0.12" (6 ± 3 mm)



a = 0.24" ± 0.12" (6 ± 3 mm)
b = 0.24" ± 0.12" (6 ± 3 mm)

(2 staples)

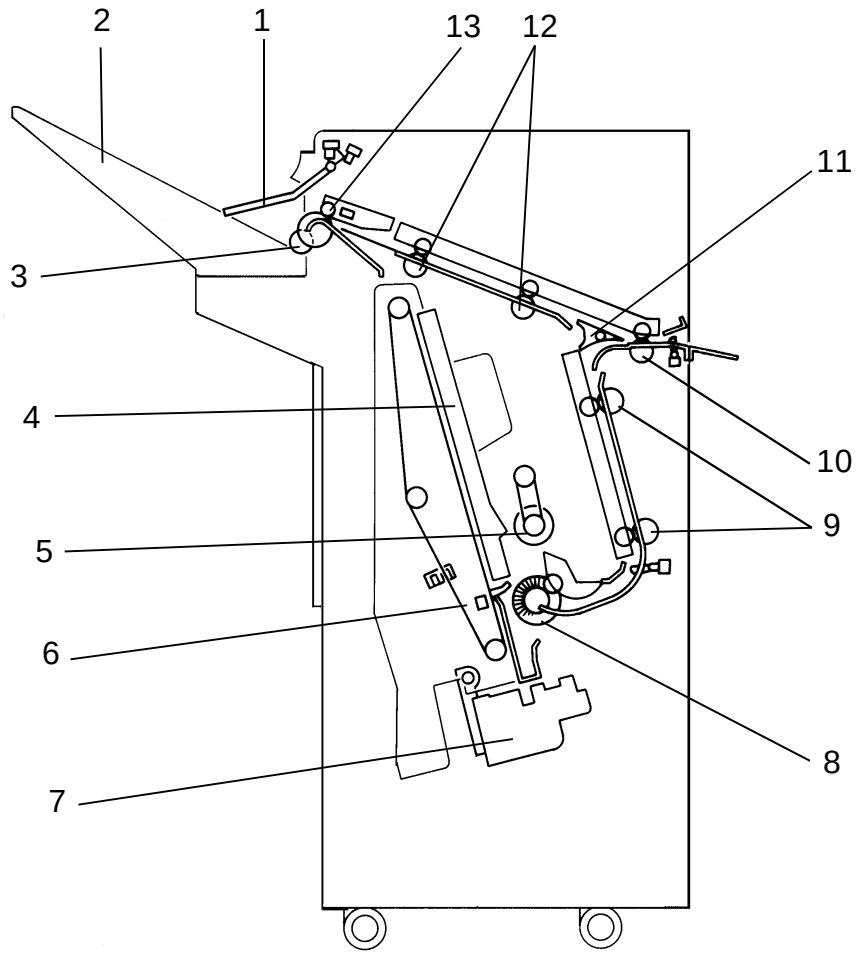


a = 0.24" ± 0.12" (6 ± 3 mm)
b = 5.20" ± 0.12" (13.2 ± 3 mm)

Dimensions: 26.4" x 20.2" x 37.4"
(671 mm x 514 mm x 950 mm)

Weight: 75.2 lb/34.2 kg

1.2 MECHANICAL COMPONENT LAYOUT



1. Stack Height Sensor Feeler
2. Shift Tray
3. Shift Tray Positioning Roller
4. Jogger Unit
5. Positioning Roller
6. Stack Feed-out Belt
7. Stapler Unit
8. Alignment Brush Roller
9. Lower Transport Rollers
10. Entrance Rollers
11. Junction Gate
12. Upper Transport Rollers
13. Exit Rollers

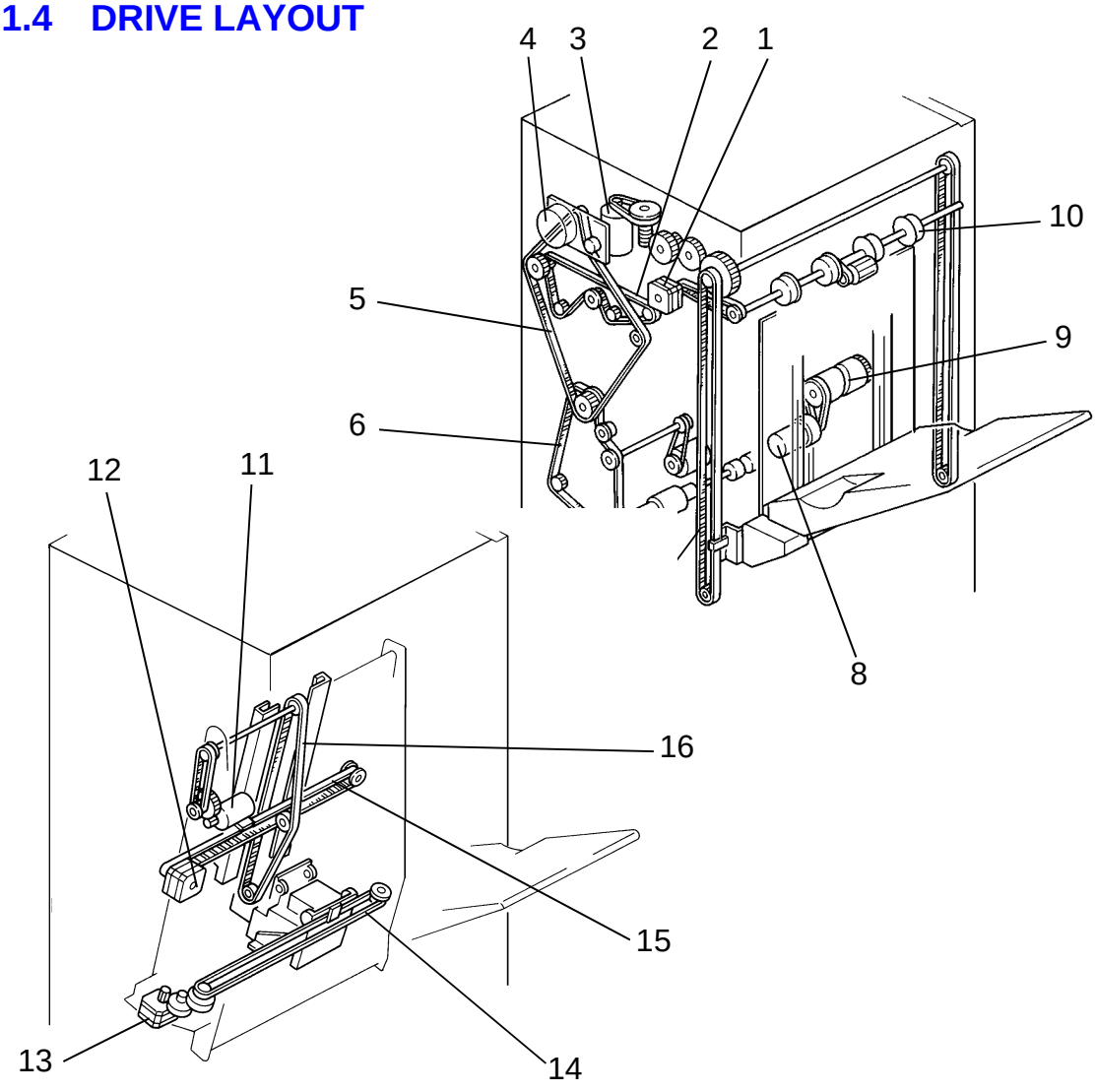
1.3 ELECTRICAL COMPONENT DESCRIPTION

Refer to the electrical component layout on the reverse side of the Point to Point (water proof paper) index numbers.

Symbol	Name	Function	Index No.
Motors			
M1	Transport Drive	Drives transport rollers.	23
M2	Shift Tray Lift	Moves the shift tray up or down.	24
M3	Exit Drive	Drives the exit and shift tray positioning rollers.	22
M4	Stack Feed-out	Drives the stack feed-out belt.	5
M5	Jogger	Moves the jogger fences.	17
M6	Stapler Drive	Moves the stapler unit.	14
M7	Shift	Moves the shift tray side to side.	8
M8	Staple	Drives the staple hammer.	12
Sensors			
S1	Entrance	Detects copy paper entering into the finisher.	25
S2	Jogger Unit Entrance	Detects copy paper entering into the jogger unit.	18
S3	Jogger Unit Paper	Detects copy paper in the jogger unit.	6
S4	Stack Feed-out Belt HP	Detects the home position of the stack feed-out belt.	15
S5	Jogger HP	Detects the jogger home position.	16
S6	Exit	Detects misfeeds in exit area.	3
S7	Stack Height 1	Detects copy paper stack height in staple mode.	2
S8	Stack Height 2	Detects copy paper stack height in sort/stack mode.	1
S9	Shift Tray Lower Limit	Detects the lower limit of the shift tray position.	13
S10	Stapler Hammer HP	Detects the staple hammer home position.	11

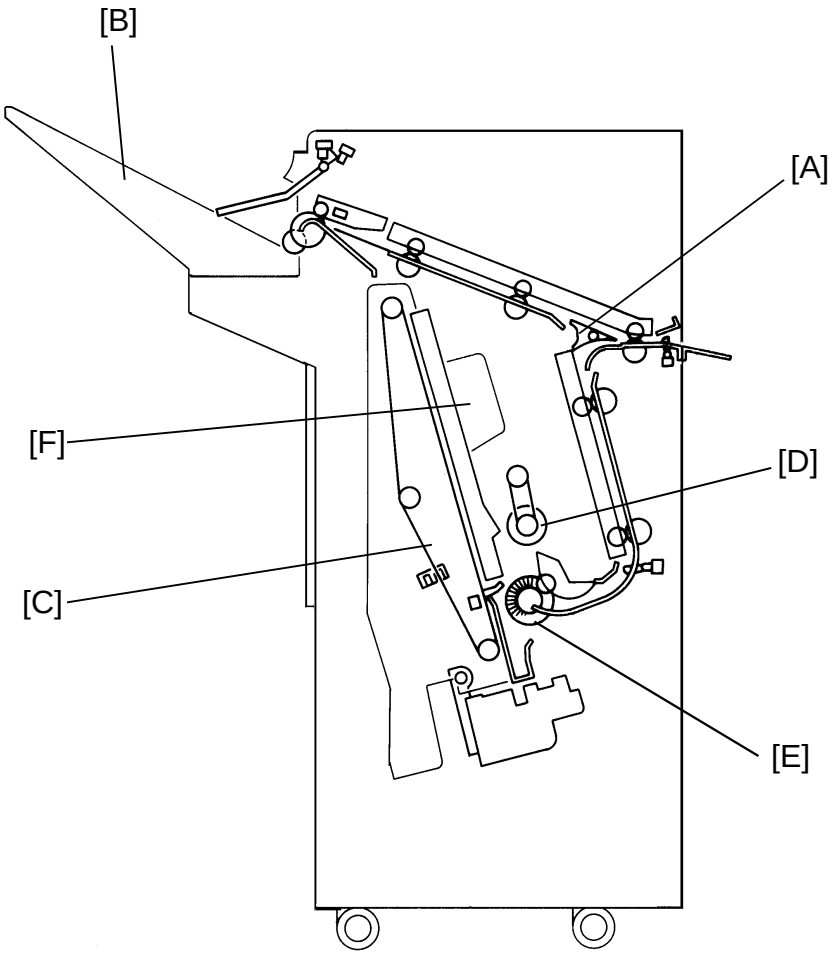
Symbol	Name	Function	Index No.
S11	Shift Tray Half-Turn	Detects shift tray side-to-side position.	7
S12	Stapler Unit HP	Detects the stapler unit home position.	9
S13	Staple End	Detects staples in the cartridge	10
Switches			
SW1	Front Door Safety (Switch)	Cuts dc power when the front door is opened.	26
SW2	Shift Tray Upper Limit (Switch)	Detects the upper limit of the shift tray position.	4
Solenoids			
SOL1	Positioning Roller	Lowers the positioning roller in the jogger unit.	19
SOL2	Junction Gate	Drives the junction gate.	21
PCBs			
PCB1	Main Control	Controls overall finisher operation.	20

1.4 DRIVE LAYOUT



1. Exit Drive Motor
2. Upper Transport Drive Belt
3. Shift Tray Lift Motor
4. Transport Drive Motor
5. Transport Drive Belt
6. Lower Transport Drive Motor
7. Shift Tray Lift Belt
8. Shift Motor
9. Shift Cam
10. Exit Roller
11. Stack Feed-out Motor
12. Jogger Motor
13. Stapler Drive Motor
14. Stapler Drive Belt
15. Jogger Drive Belt
16. Stack Feed-out Belt

1.5 BASIC OPERATION

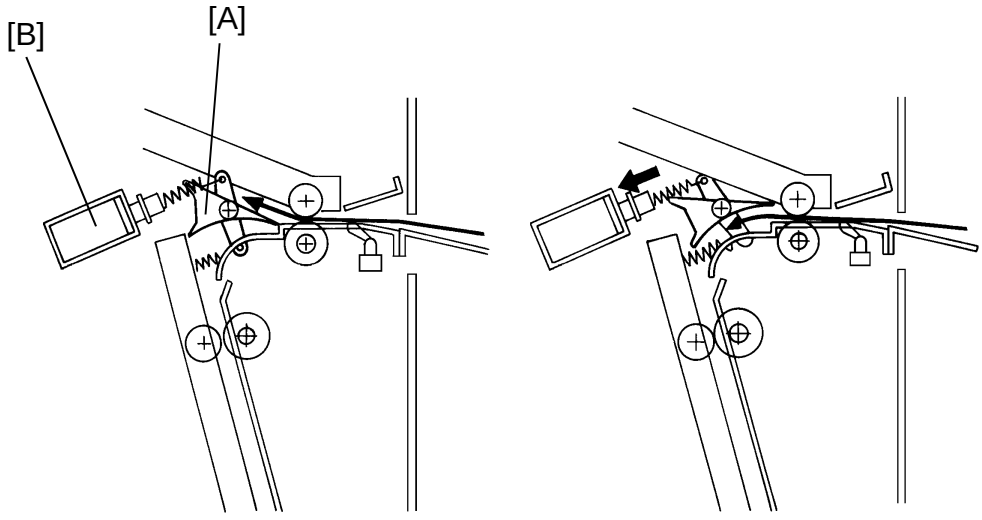


After the copy is completed, the paper is directed to the finisher. If the sort/stack mode is selected, the junction gate [A] directs the paper upwards to transport it to the shift tray [B]. In these modes, the shift tray is shifted from side to side to stagger and separate sets of copies. The amount of shift is approximately 30 mm.

When the staple mode is selected, the junction gate directs the paper below to transport the paper to the jogger unit [C]. Each time a copy is delivered to the jogger unit, the positioning roller [D], the alignment brush roller [E], and the jogger fences [F] square the stack of copies. After the final copy of the set is squared, the set is stapled, and then delivered to the shift tray.

2. SECTIONAL DESCRIPTIONS

2.1 PAPER DELIVERY SWITCHING

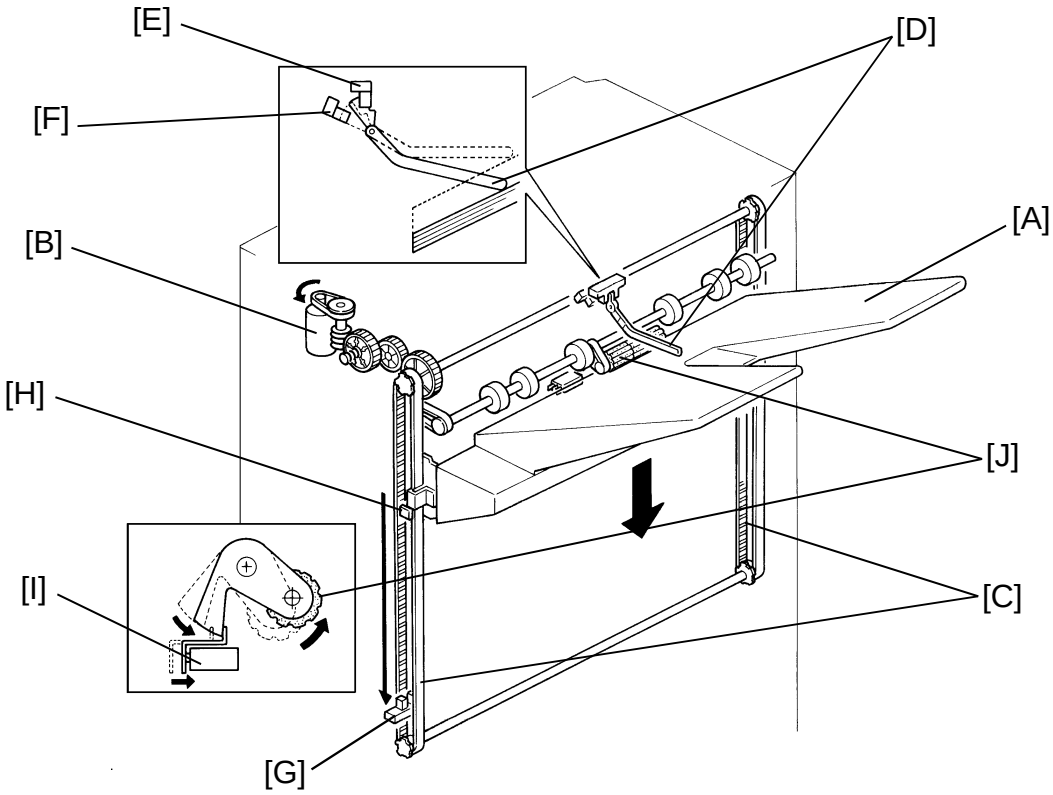


Depending on the selected finishing mode, the copies are directed up or down by the junction gate [A], is controlled by a solenoid.

(1) When the exit sensor of the copier is activated while in staple mode, the solenoid [B] is energized. Then, the junction gate directs the copies down to transport them to the jogger unit.

(2) When the exit sensor of the copier is activated while in the sort/stack mode, the solenoid stays off. The junction gate directs the copies up to deliver them to the shift tray.

2.2 SHIFT TRAY UP/DOWN MECHANISM



The vertical position of the shift tray [A] is controlled by the shift tray lift motor (dc motor) [B] through gears and timing belts [C]. When the main switch is turned on, the tray position is initialized to the upper position. The tray's uppermost position is detected when the shift tray pushes up the actuator [D] to deactuate the stack height sensor 1 [E].

While copying, the actuator [D] is gradually raised as the copy stack grows. In the sort/stack mode, when stack height sensor 2 [F] remains actuated for 4 seconds, the shift tray lift motor [B] rotates, lowering the tray unit for 50 ms.

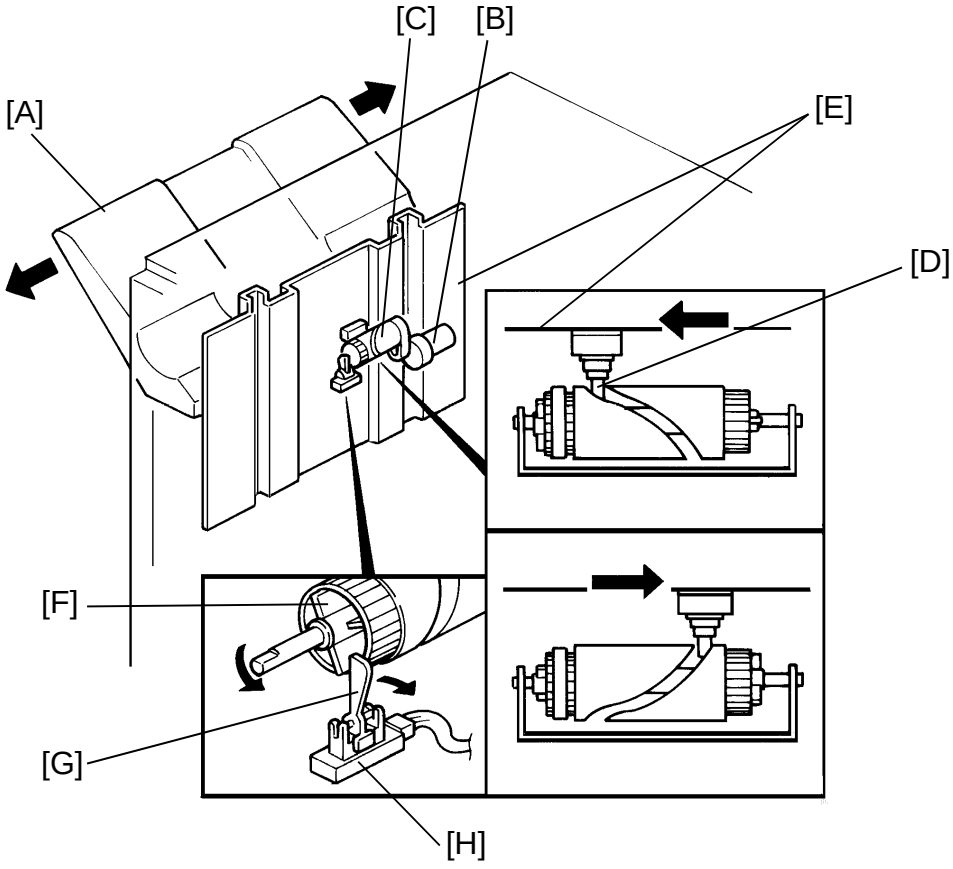
In staple mode, when the stack height sensor 1 remains deactuated for 4 seconds, the motor rotates, lowering the tray until the sensor [E] is actuated.

When the tray reaches its lower limit position, the lower limit sensor [G] is actuated by the actuator [H], and copy operation stops.

After the copy process is finished and the machine stops, the tray is raised to its upper most position 4 seconds after the copies are removed.

A mechanical safety switch [I] is installed to prevent the drive gears from being damaged if the sensor does not work. When the shift tray pushes up the shift tray positioning roller [J], the shift tray lift motor stops.

2.3 SHIFT TRAY SIDE-TO-SIDE SHIFT MECHANISM

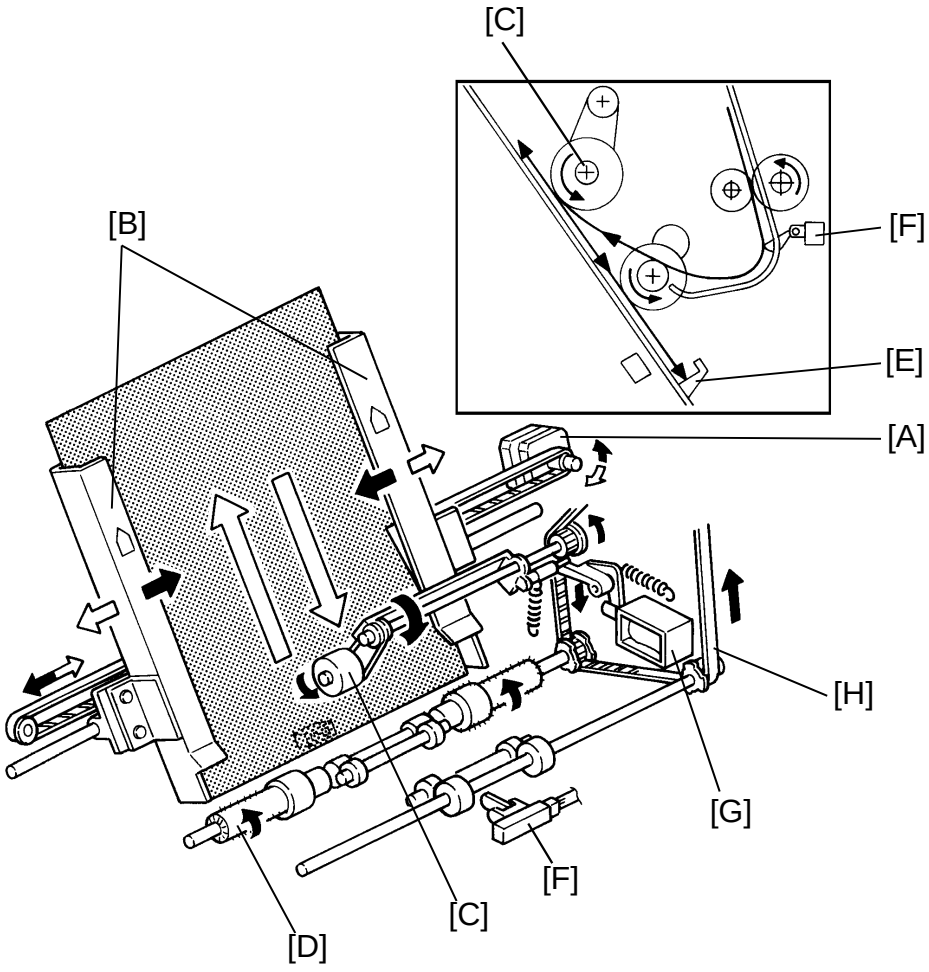


In the sort/stack mode, the shift tray [A] moves from side to side to stagger and separate sets of copies.

The horizontal position of the shift tray is controlled by the shift motor (dc motor) [B] and the shift cam (helical cam) [C]. After one set of originals is copied and delivered to the shift tray, the shift motor [B] starts rotating, driving the shift cam through the timing belt. The pin [D] fixed to the shift tray base plate [E] is positioned in the groove on the shift cam, creating the side-to-side movement required to stagger copies.

When the shift cam rotates 180 degrees (when the tray is fully shifted.), the plate [F] on the shift cam pushes the actuator [G] of the shift tray half-turn sensor [H] and the shift motor stops. The next set of copies is then delivered. The motor rotates repeating the same process and moving the tray back to the previous position.

2.4 STAPLE UNIT PAPER POSITIONING



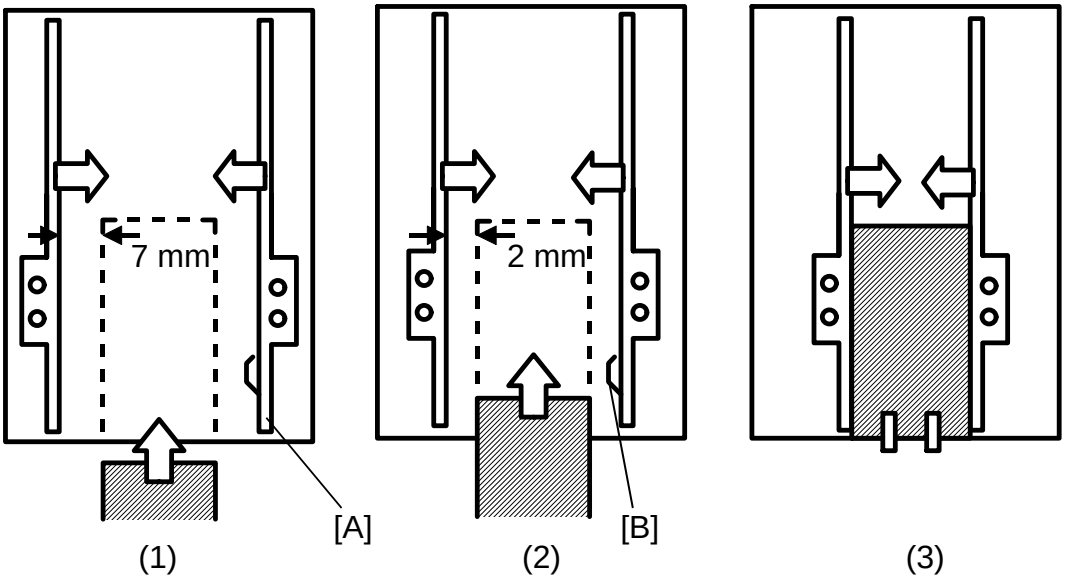
In the staple mode, copies are vertically and horizontally aligned in the jogger unit before being stapled.

For horizontal paper alignment, the jogger motor [A] moves both the front and the rear jogger fences [B] to align the copies.

For vertical paper alignment, the positioning roller [C] and the alignment brush roller [D] push the copy against the stack stopper [E].

After the trailing edge of the copy passes the jogger unit entrance sensor [F], the positioning roller solenoid [G] is energized for 280 ms pushing the positioning roller into contact with the paper. The positioning roller rotates to push the paper back and align the trailing edge of the paper against the stack stopper. Both the positioning roller and the alignment brush roller are driven by the transport drive motor through the timing belt [H].

2.5 JOGGER MOVEMENT



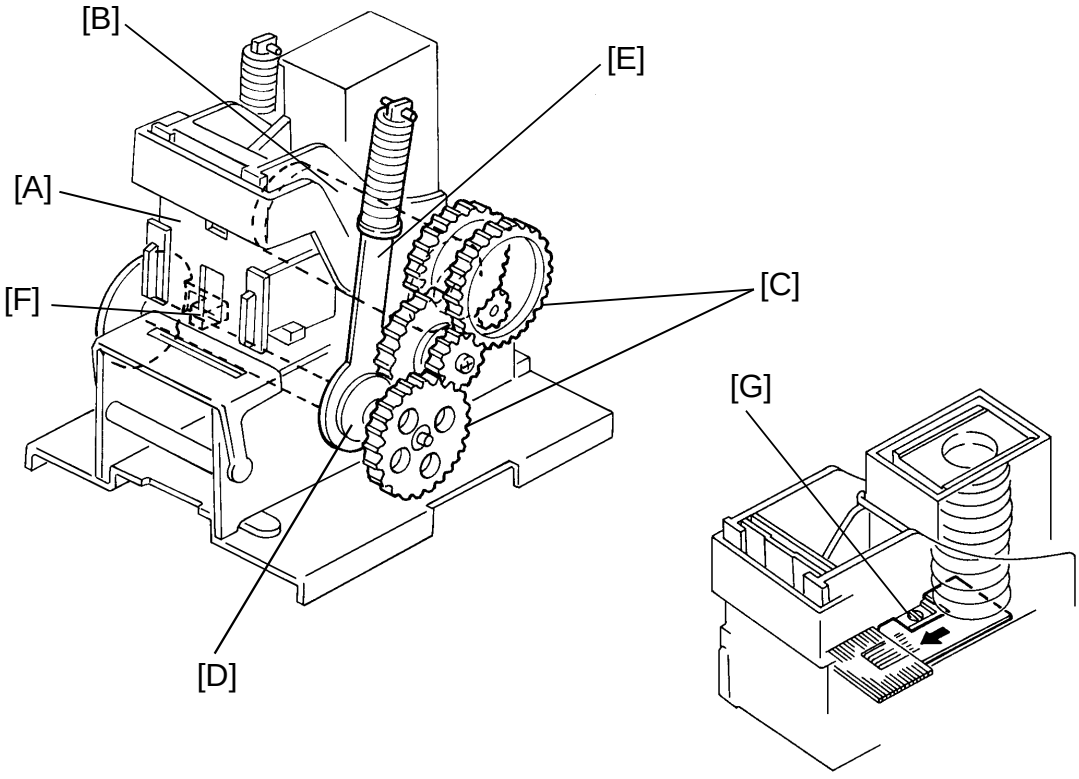
When the Start key is pressed, the copier sends the paper size information to the finisher. In accordance with that data, the jogger motor (stepper motor) starts rotating to position the front and rear jogger fences [A] 7 mm away from the selected paper's edges. (1)

After the trailing edge of the copy passes the jogger unit entrance sensor, each jogger fence moves inward 5 mm. They stop 3 mm away from the paper edges. (2)

Just after the positioning roller pushes the copy back, each jogger fence moves inward 2 mm more so that the leaf spring [B] on the rear jogger fence pushes the copy side edge slightly.

After a copy is stacked in the jogger tray, the jogger fences move back 7 mm from the copy edge for the next copy.

2.6 STAPLER

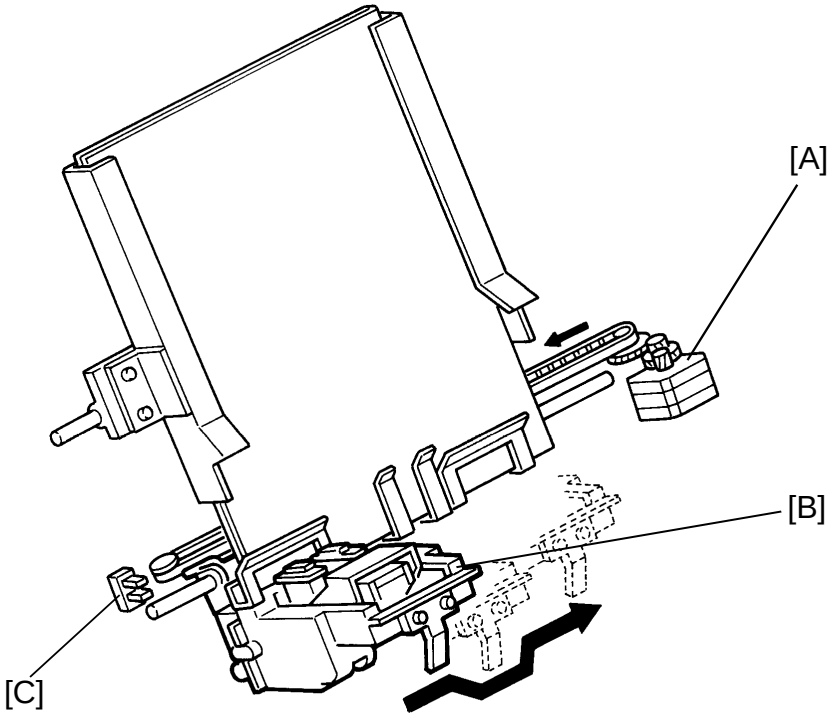


The staple hammer [A] is driven by the staple motor [B] via gears [C], two eccentric cams [D], and two links [E].

When the aligned copies are brought to the staple position by the positioning roller, alignment brush roller, and jogger fences, the stapler motor starts rotating. When the cams complete one rotation, the stapler home position sensor [F] turns on detecting the end of the staple operation. The stapler motor then stops.

There is a reflecting photosensor [G] in the staple unit to detect the staple end condition.

2.7 STAPLER UNIT SIDE-TO-SIDE MOVEMENT



Customers can select one of the following three different staple modes:

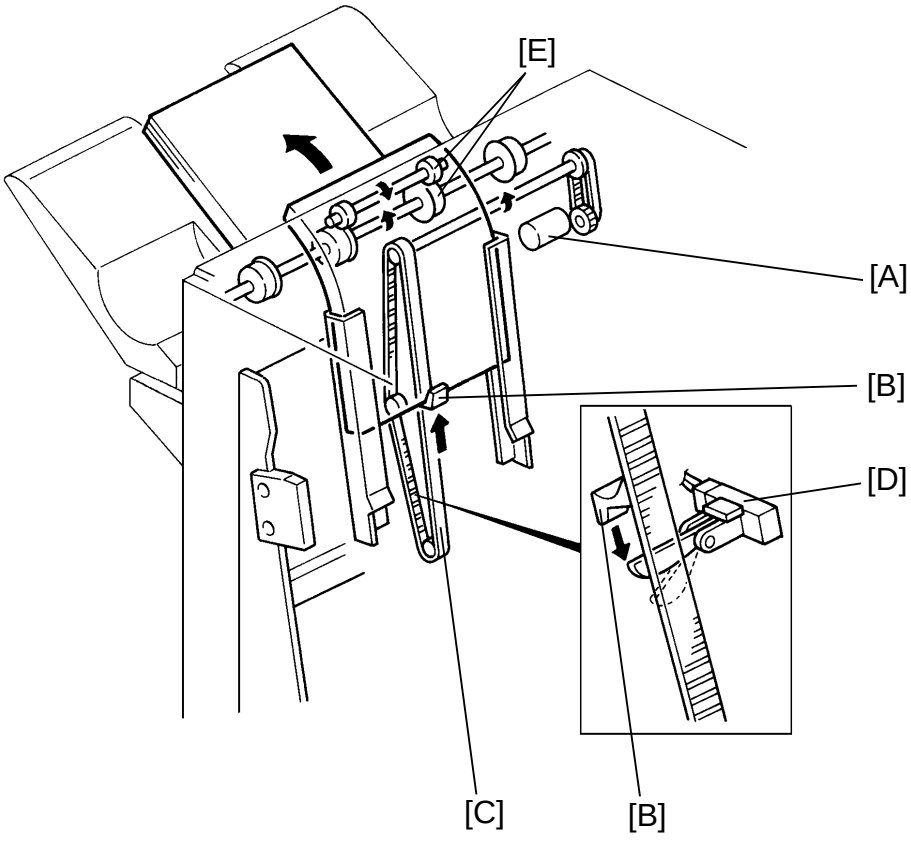
Staple 1:	Top left
Staple 2:	Bottom left
Staple 3:	Top/Bottom left

The stapler drive motor [A] (stepper motor) moves the stapler unit [B] from side to side. When the Start key is pressed, the stapler moves from its home position to the staple position.

If staple mode 3 is selected, the stapler unit moves to the front staple position first, then moves to the rear staple position. However, for the next copy set, it staples in the reverse order; that is, at the rear side first and then at the front.

After the job is completed, the stapler unit moves back to its home position. (The stapler unit home position sensor [C] is actuated.)

2.8 FEED-OUT TO SHIFT TRAY



After being stapled, the stack feed-out motor [A] starts rotating. The pawl [B] on the lift belt [C] transports the set of stapled copies up, and feeds it to the shift tray. Approximately 0.6 second after the stack feed-out motor starts, the motor stops for 400 ms. At this moment, the exit rollers catch the stapled copies to feed them out to the shift tray. Then the motor rotates again until the pawl actuates its home position sensor [D].

The exit drive motor starts rotating to drive the exit rollers [E] when the first copy activates the entrance sensor. The exit drive motor speed is reduced just before each copy paper is completely fed out. This is to ensure an even copy stack.

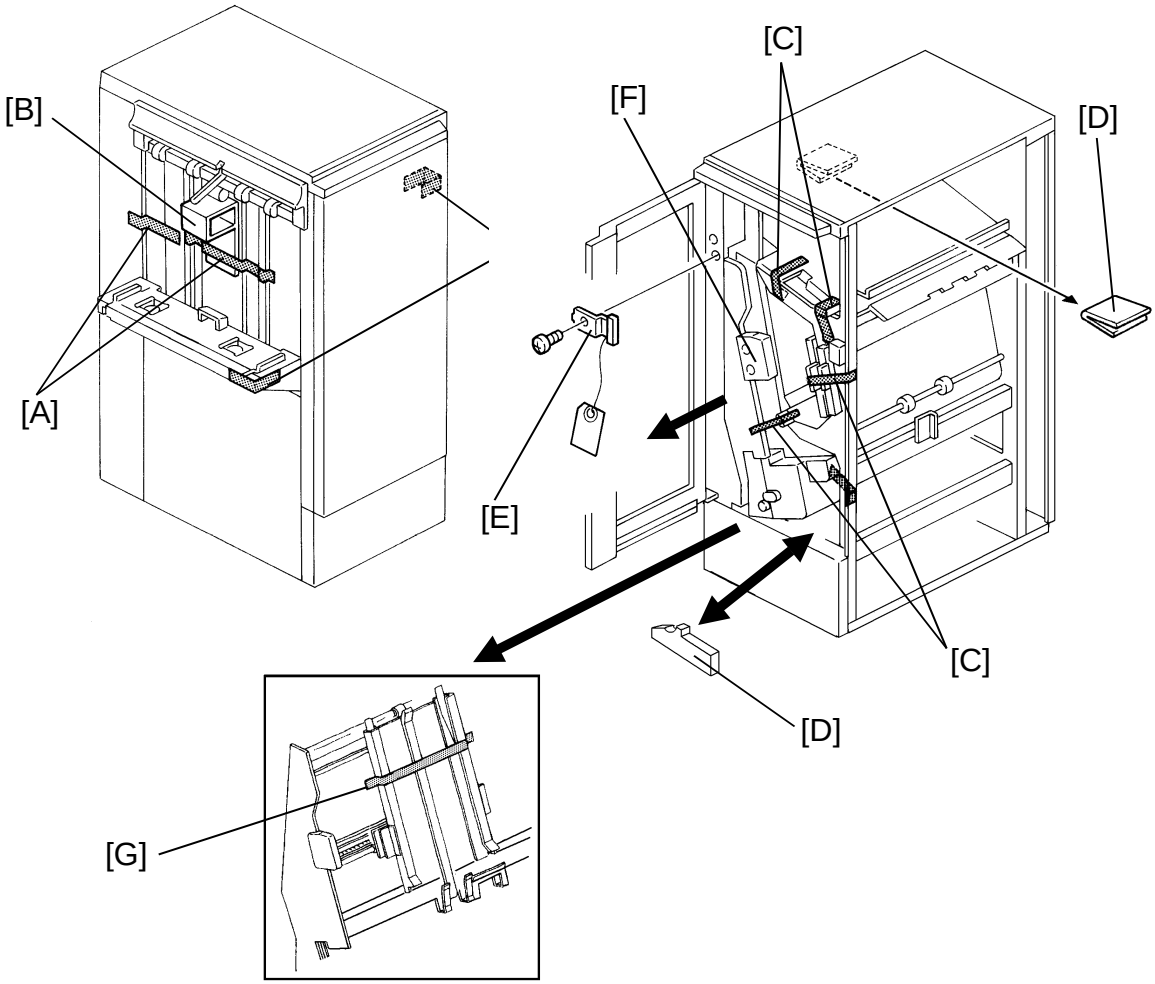
3. INSTALLATION

3.1 ACCESSORY CHECK

Check the accessories in the box according to the following list.

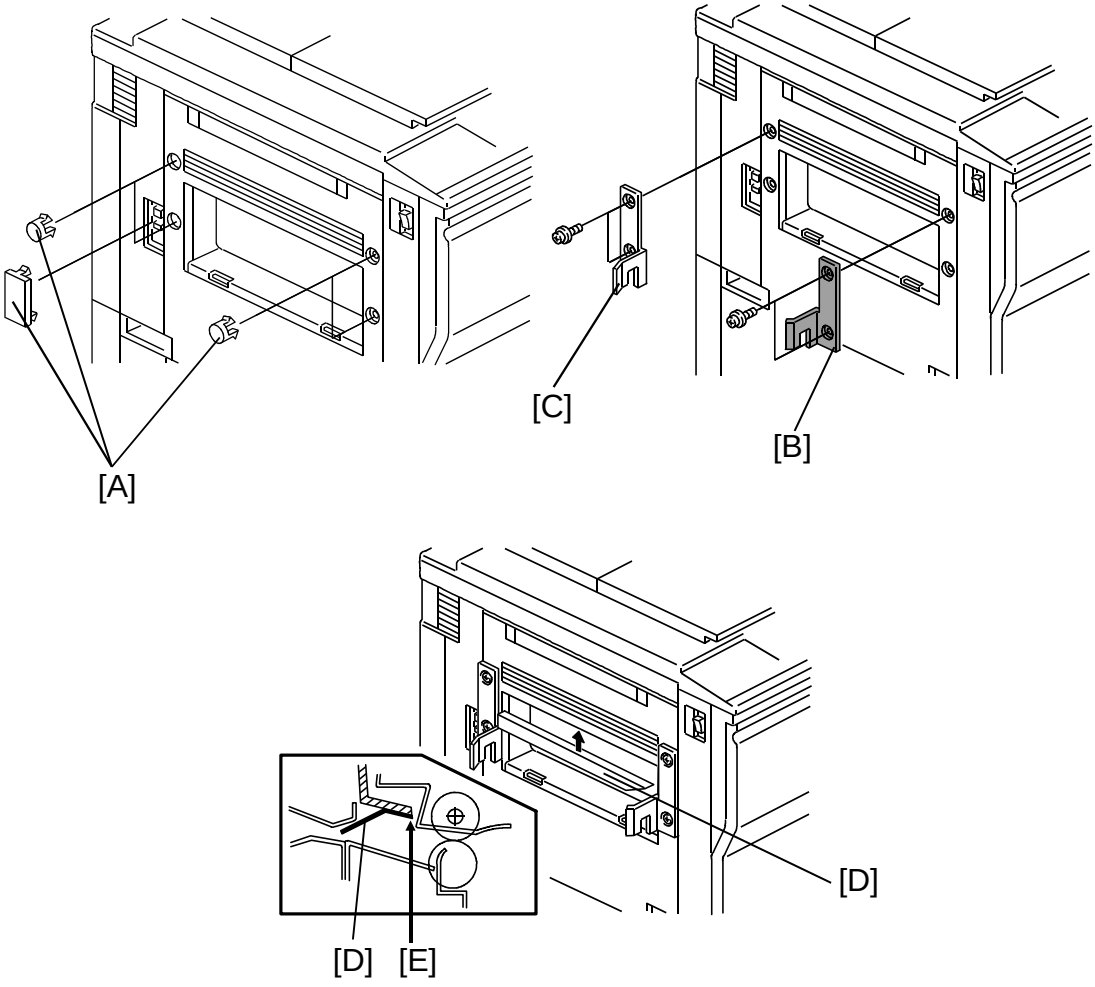
Description	Q'ty
1. Installation Procedure	1
2. Front Connecting Bracket	1
3. Rear Connecting Bracket	1
4. Staple Cartridge	1
5. Entrance Guide	1
6. Shift Tray	1
7. NECR (for -17 machine only)	1
8. Cushion – 5 x 10 x 345	1
9. Cushion – 5 x 10 x 125	1
10. Cushion – 5 x 10 x 637	1
11. Philips Truss Head Screw – M4 x 8	4
12. Philips Pan Head Screw – M4 x 12	4
13. Philips Screw with Flat Washer – M4 x 8	2
14. Envelope – NECR (for -17 machine only)	1

3.2 INSTALLATION PROCEDURE



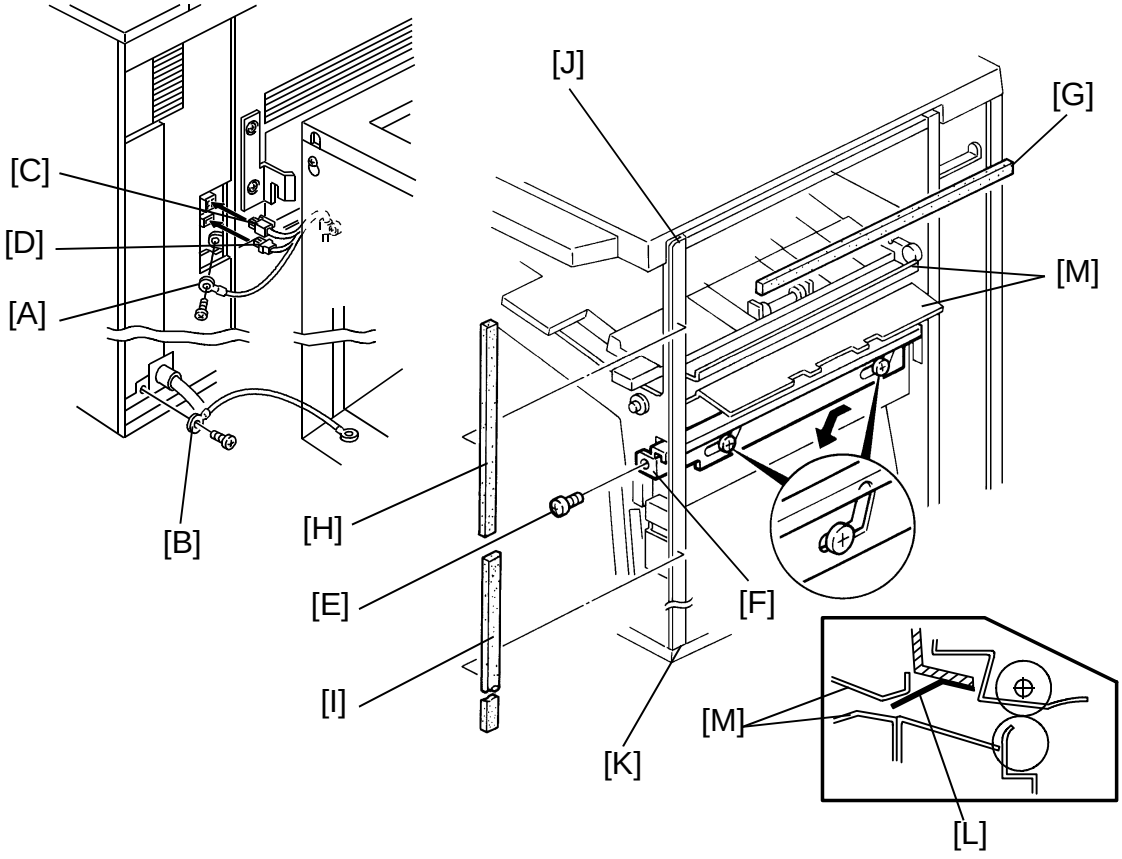
CAUTION: Unplug the copier power cord before starting the following procedure.

1. Remove the strips of tape [A] and the cushion [B].
2. Open the front door and remove the strips of tape [C] and cushions [D].
3. Remove the clamp [E] (1 screw).
4. Slide out the staple unit [F].
5. Remove the strip of tape [G].



6. Remove five plastic caps [A] on the copier's left cover.
7. Install the front connecting bracket [B] (2 screws– M4 x 12) and the rear connecting bracket [C] (2 screws– M4 x 12) on the copier.
8. Stick the entrance guide mylar [D] on the copier exit area as shown.

   NOTE: Align the edge [E] of the cover and the mylar.



9. Secure the protective earth wire [A]* (1 screw with spring washer) and the wire [B] (1 screw with spring washer).

   ***NOTE:** For all models other than those intended for North America, the green wire is meant to be used as a functional earth and should be connected as shown.

10. Connect the fiber optics connector [C] and the 4P connector [D].

11. Open the front door of the finisher and remove the screw [E] fixing the locking lever [F], then lower the locking lever.

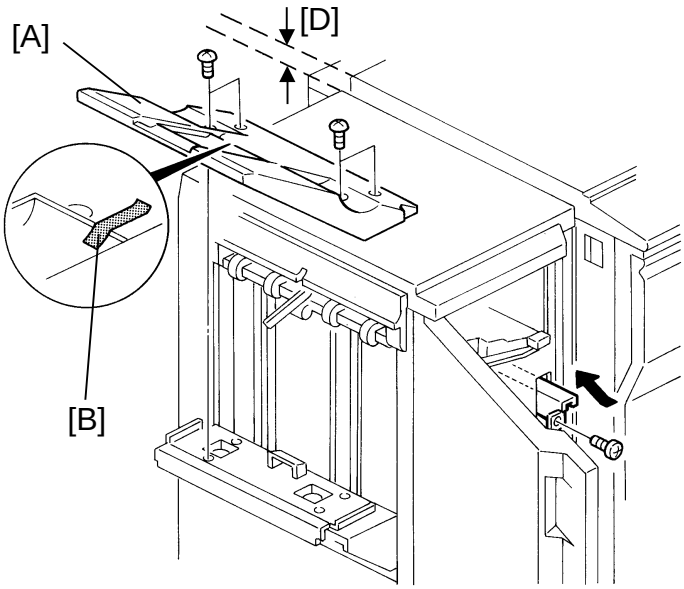
12. Stick the cushions [G] (middle), [H] (short), [I] (long) as shown.

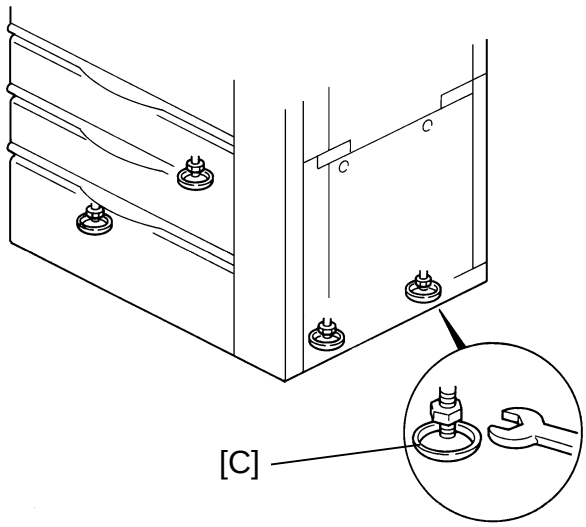
    NOTE: Stick the cushion [G] on the metal stay (not on the cover).
    Align the upper edge of the cushion [H] with the edge of the stay [J].
    Align the lower edge of the cushion [I] with the edge of the stay [K].

13. Align and press the finisher against the copier and fix them by raising the locking lever [F].

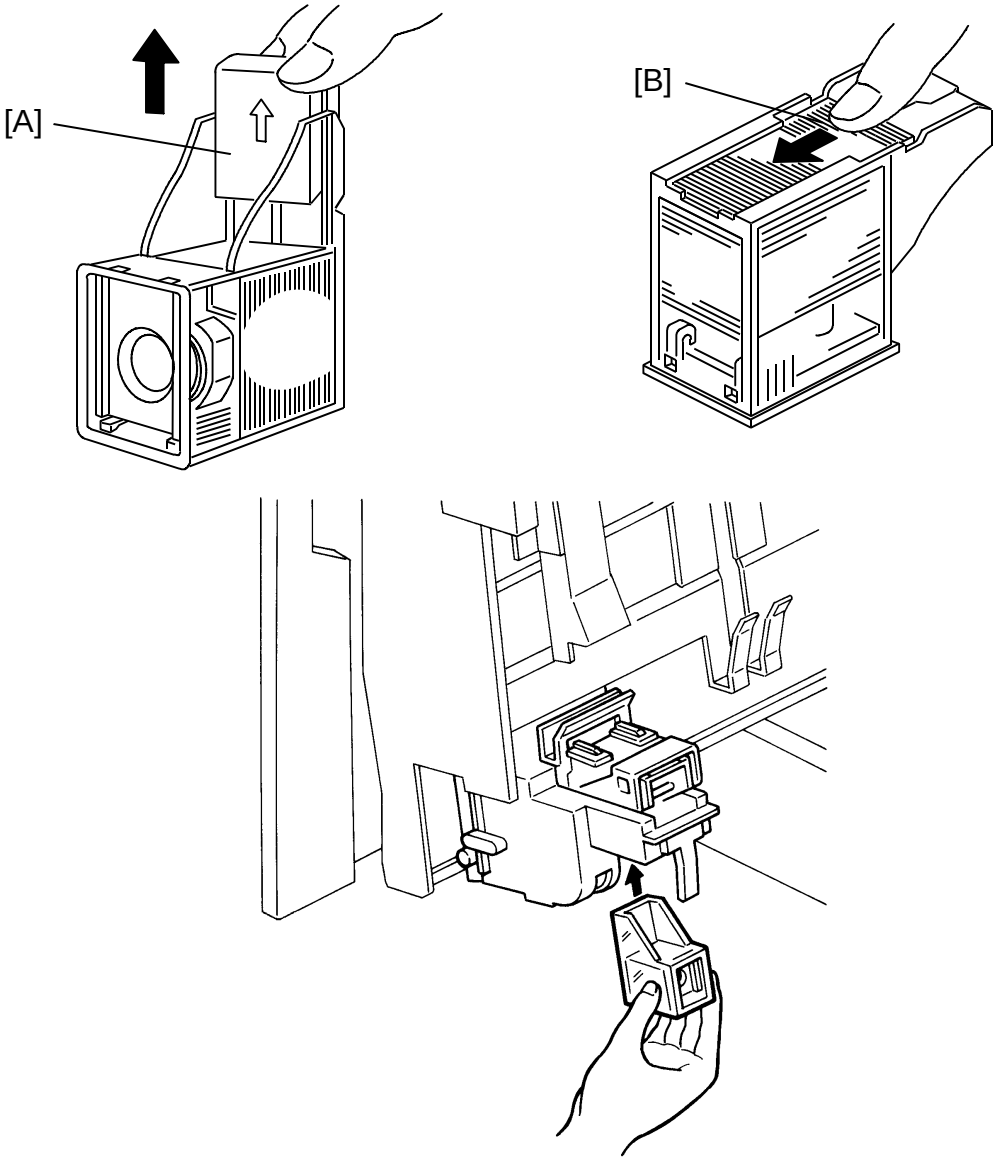
    NOTE: At this time, confirm that the mylar [L] is located between the guides [M].

14. Secure the locking lever (1 screw).





15. Install the shift tray [A] with 4 screws – M4 x 8 (remove tape [B]).
16. Adjust the height of the copier by using the leveling foot [C] so that the difference in level between the copier [D] and the finisher will be 30 ± 1 mm.



17. Remove the green plastic clip [A] from the staple cartridge, and install the cartridge in the stapler.

    NOTE: When installing the staple cartridge, make sure that all the staple sheets [B] are in the initial position.

18. Plug in the copier.

19. Turn on the main switch of the copier and test the operation of the finisher.

    NOTE: The copier recognizes automatically that the finisher is installed.

    The stapler will not be stapling for the first 10 or so copies until the first staple comes to the proper position from the cartridge.

4. SERVICE TABLES

4.1 TEST POINT TABLE (Main Board)

Number	Function
TP3	GND

4.2 FUSE TABLE

Number	Rated Current	Location
Fuse 1	5A	Main PCB

4.3 LED TABLE

LED No.	ON Status
LED1	Motor speed is too high.*
LED3	Motor speed is too low.*

***NOTE:** While each motor is adjusted, if the motor speed is normal, LED 1 and LED 3 light. If the motor speed is too high, only LED 1 lights. If the motor speed is too low, only LED 3 lights. There is no LED 2.

4.4 DIP SW TABLE

4.4.1 Factory Setting

DIP SW101				DIP SW102			
1	2	3	4	1	2	3	4
0	0	0	0	0	0	0	0

4.4.2 Motor Test Mode

DIP SW101				DIP SW102				Motor
1	2	3	4	1	2	3	4	
1	1	0	1	1	0	0	0	Stack Feed-out Motor

After setting DIP SW101, turn on switch 1 of DIP SW102 to start the stack feed-out motor, turn off the DIP SW102 to stop the motor.

4.4.3 Free Run Test Mode Without Paper

DIP SW101				DIP SW102				Function
1	2	3	4	1	2	3	4	
1	1	1	0	1	0	0	0	Shift Tray Mode
1	1	1	0	0	1	0	0	Staple mode - (1)
1	1	1	0	0	0	1	0	Staple mode - (2)
1	1	1	0	0	0	0	1	Staple mode - (3)

Free run test mode starts when SW101 on the main board is pressed, and stop when the push SW102 is pressed.
If in shift tray mode, the finisher works as if 10 sets of 5 LT papers are being sorted. The shift tray is lowered for each of the 2 sets and then returns to its home position to repeat the same operation.

If in staple mode, the finisher works as if 5 sets of 5 LT papers are being stapled and delivered. The machine is then initialized and repeats the same operation.

4.4.4 Off Line Test Mode

DIP SW101				Mode	DIP SW102					
1	2	3	4		1	2	Copy Q'ty	3	4	Paper Size
1	1	0	0	Shift Tray Mode	0	0	2 sheets	0	0	A4 Sideways
1	0	0	1	Staple Mode (1)	1	0	10 sheets	1	0	A4 Length-wise
0	1	1	0	Staple Mode (2)	0	1	30 sheets	0	1	LT Sideways
0	1	0	1	Staple Mode (3)	1	1	50 sheets	1	1	LT Length-wise

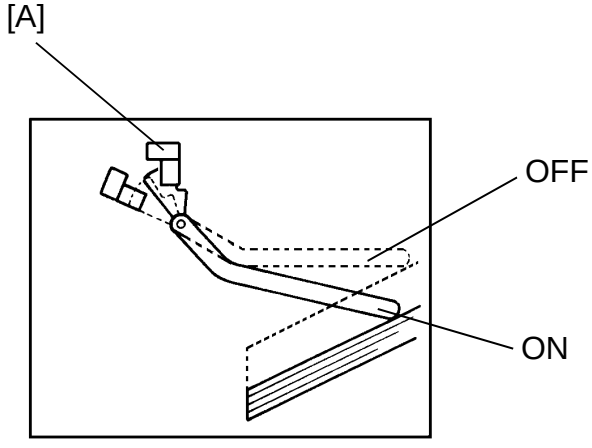
Off line test mode starts when SW101 on the main board is pressed, and stops when SW102 is pressed.
The operation of the finisher can be checked without the main copier.

4.4.5 Shift Tray Rise Mode

DIP101				DIP102			
1	2	3	4	1	2	3	4
1	0	0	0	0	0	0	0

0: OFF 1: ON

In this mode, the shift tray moves to its uppermost position if the copy paper stacked on the tray is removed while staple mode copying.
When the stapling copy mode is used with the shift tray rise mode, the shift tray moves up and down slightly for each stapled copy set delivered to the tray.

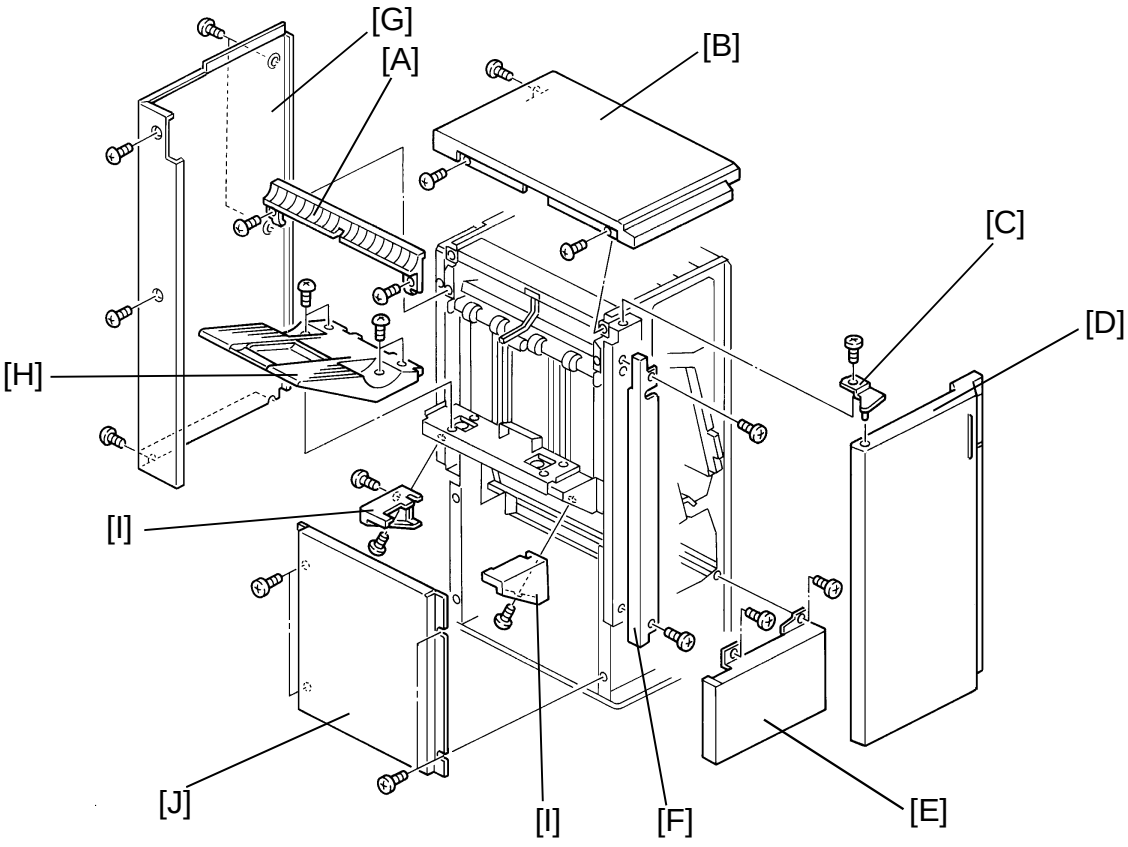


NOTE: In the stapling copy mode (unlike the sort copy mode), the machine cannot detect if the copy stack on the tray is removed. This is because the stack height sensor 1 [A] is always ON while in this copy mode. To counter this, when the shift tray rise mode is selected by turning on DIP switch 101-1 on the finisher main control board, the shift tray slightly moves up just when the stapled copy is delivered. At this time, if the stack height sensor 1 turns off, this means that the tray is in the proper position. The tray moves down soon and returns to the original position (until the sensor turns on again). If the sensor remains ON, this means that the tray position is too low. The tray continuously moves up until the sensor turns off then moves down until the sensor turns on. In this mode the shift tray motor frequently raises or lowers the shift tray to monitor the paper height.

To reduce the load to the shift tray motor, this mode is not enabled as the factory setting.

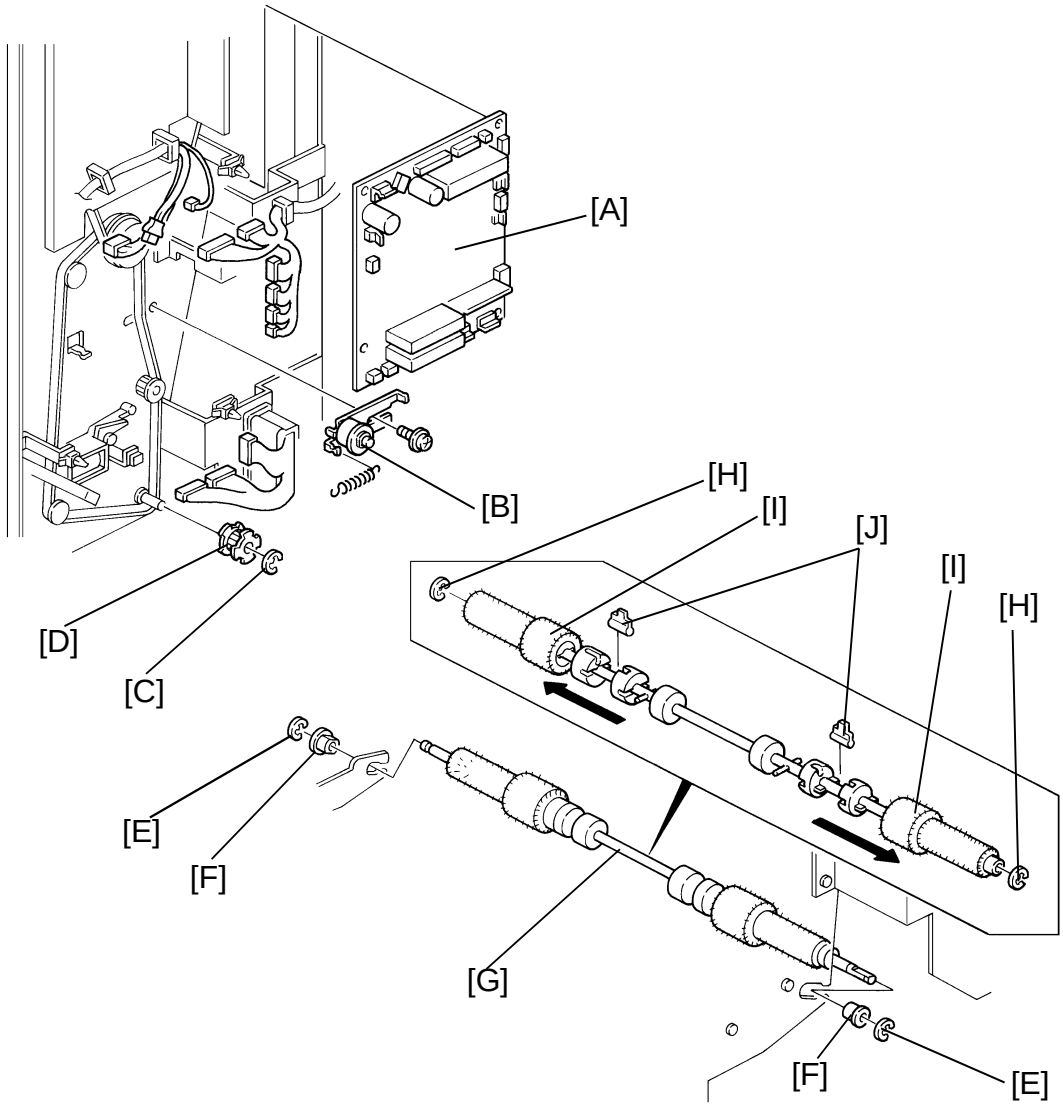
5. REPLACEMENTS AND ADJUSTMENTS

5.1 EXTERIOR REMOVAL



1. Remove the left upper cover [A] (2 screws).
2. Remove the upper cover [B] (3 screws).
3. Remove the upper door bracket [C] (1 screw) and remove the front door [D].
4. Remove the lower front cover [E] (2 screws).
5. Remove the front shift cover [F] (2 screws).
6. Remove the rear cover [G] (5 screws).
7. Remove the shift tray [H] (4 screws).
8. Remove the front and rear tray cover [I] (1 screws at the front, 2 screws at the rear).
9. Remove the left cover [J] (4 screws).

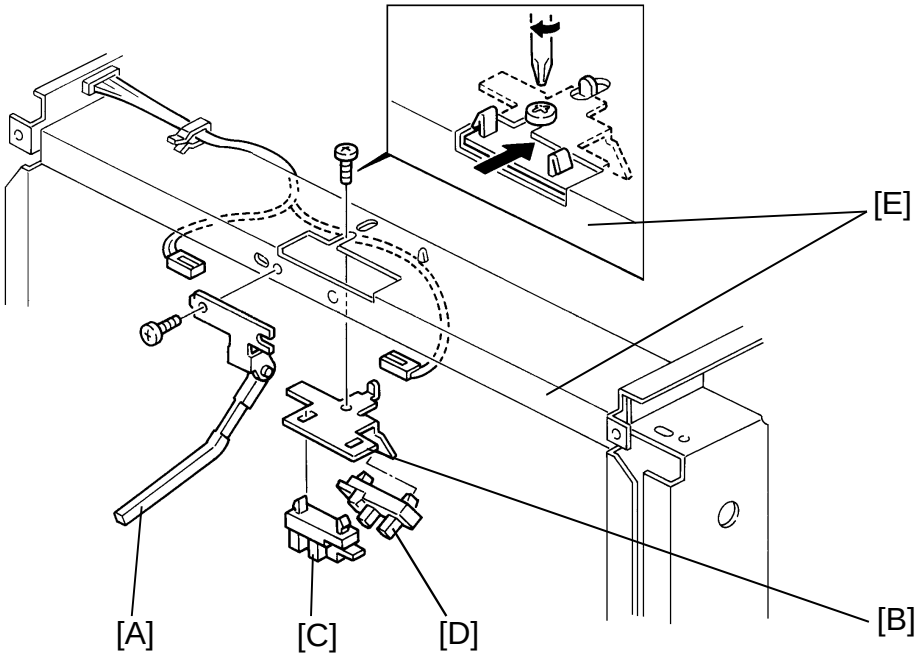
5.2 ALIGNMENT BRUSH ROLLER REPLACEMENT



1. Remove the rear cover.
2. Remove the main board [A] (15 connectors, 1 optics cable).
3. Remove the tension bracket [B] (1 screw and 1 spring).
4. Remove the E-rings [C], slide out the pulleys [D], and remove 2 E-rings [E] , then remove 2 bushings [F].
5. Remove the alignment brush roller assembly [G].
6. Remove the 2 E-ring [H] and remove the brush rollers [I].

   NOTE: Do not lose the link keys [J].

5.3 SENSOR REPLACEMENT

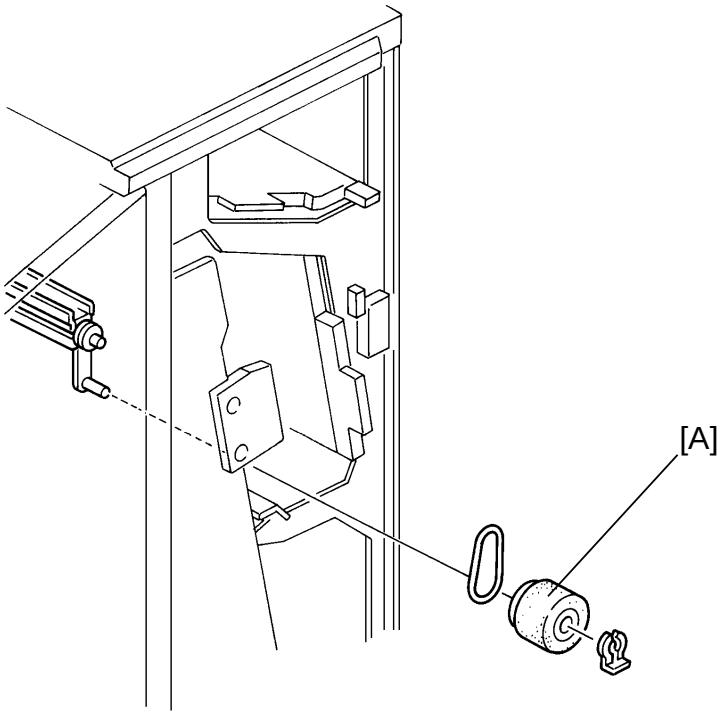


Stack Height Sensors

1. Remove the upper cover.
2. Remove the stack height sensor actuator [A] (1 screw).
3. Remove the bracket [B] (1 screw, 2 connectors).
4. Replace stack height sensor 1 [C] and stack height sensor 2 [D].

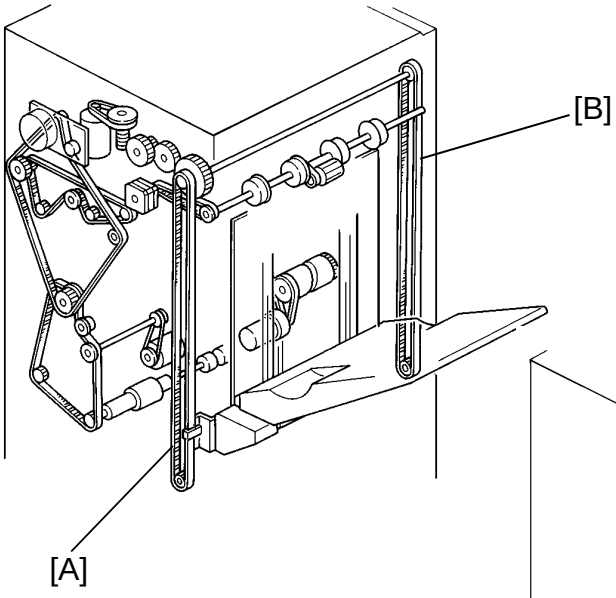
NOTE: When reinstalling the bracket [B], align the edge of the bracket with the stay [E].

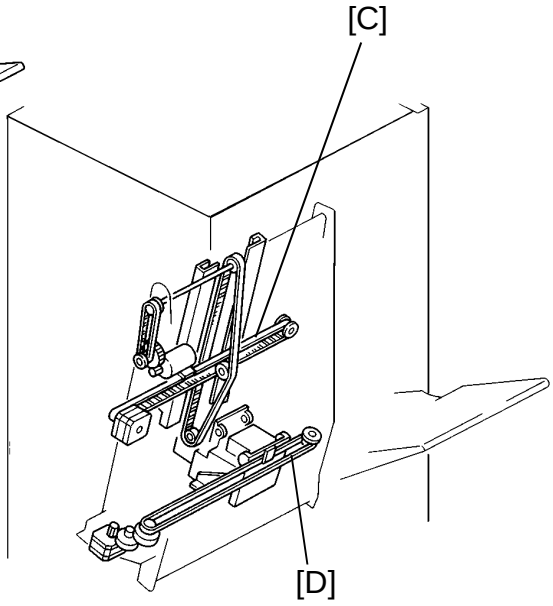
5.4 POSITING ROLLER REPLACEMENT

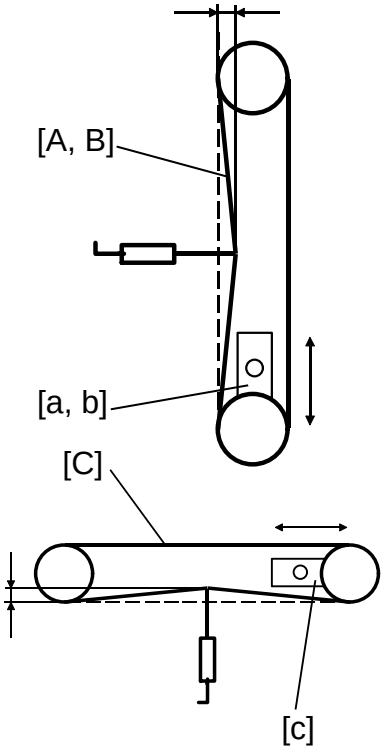


1. Open the front door and slide out the jogger unit.
2. Remove the positioning roller [A] (1 clip).

5.5 BELT TENSION ADJUSTMENT







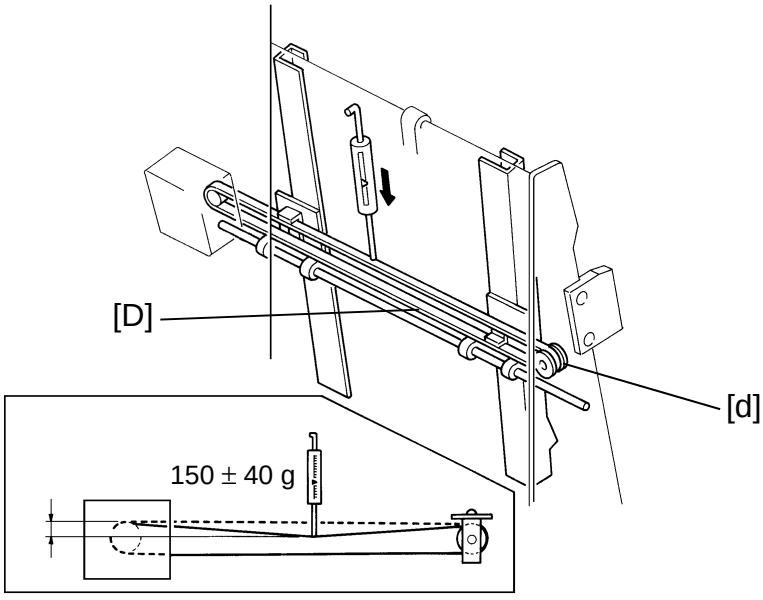
1. Remove the rear cover and adjust the belt [A] tension with tightener [a].
   Remove the left upper cover, the upper cover, the front door, and the front shift cover and the front supporting cover (2 screws).
   Adjust the belt [B] with tightener [b].

   Standard: 6 mm deflection at 50 ± 20 g pressure.

2. Open the front door and slide out the jogger unit. Adjust the belt [C] tension with tightener [c].

   Standard: 8 mm deflection at 100 ± 30 g pressure.

Finisher



3. Open the front door and slide out the jogger unit. Adjust the belt [D] tension with tightener [d].
   Standard: 8 mm deflection at 150 ± 40 g pressure.