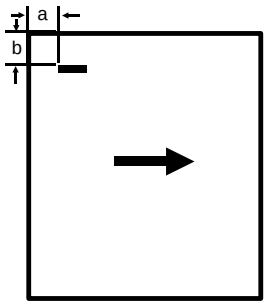
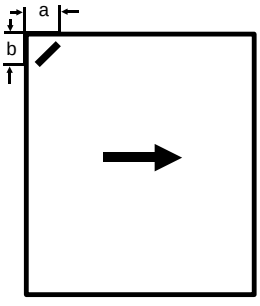
SORTER STAPLER
(Machine Code: A374)

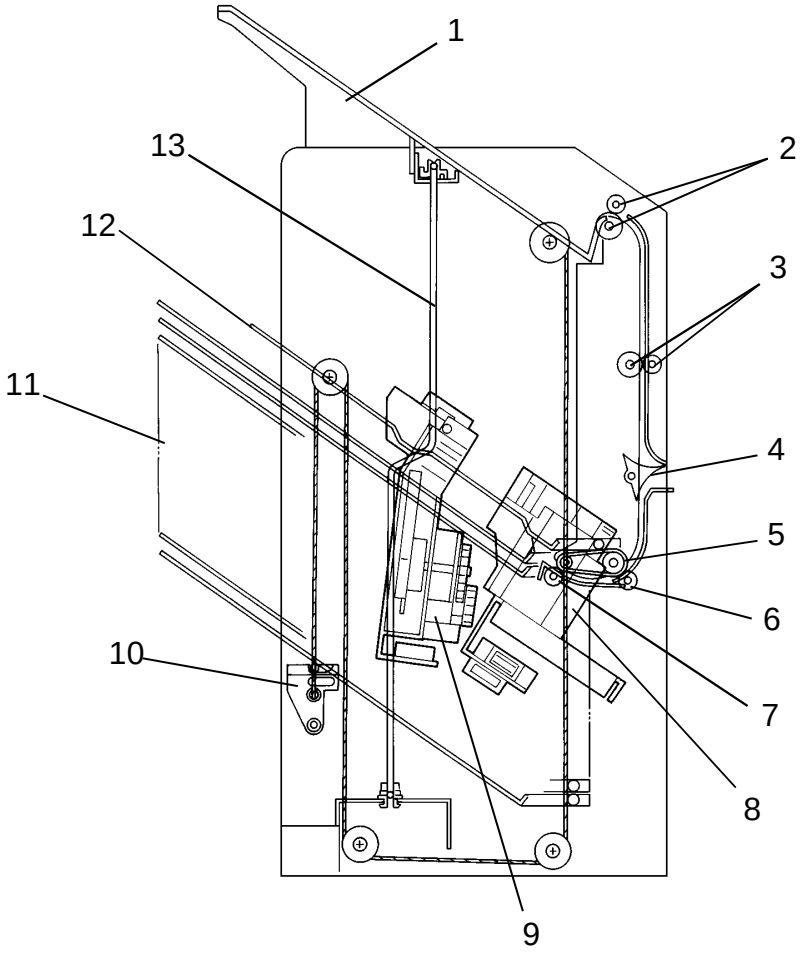
1. SPECIFICATIONS

Paper Size for Bins:	Sort or stack mode: Maximum: A3, 11" x 17" Minimum: A5, 5 1/2" x 8 1/2" lengthwise Staple mode: Maximum: A3, 11" x 17" Minimum: B5, 8 1/2" x 11"
Paper Weight for Bins:	Sort or stack mode: 52 - 93 g/m^2, 14 - 25 lb Staple mode: 52 - 80 g/m^2, 14 - 21 lb
Number of Bins:	20 bins + proof tray
Bin Capacity:	Sort mode: 30 sheets (A4, 8 1/2" x 11") 15 sheets (A3, 11" x 17") Stack mode: 15 sheets Proof tray - 100 sheets (52 – 81 g/m^2, 14 – 22 lb) - 50 sheets (82 – 128 g/m^2, 23 – 34 lb) - 30 sheets (129 – 157 g/m^2, 35 – 42 lb)
Stapler Capacity:	From 2 to 20 sheets (80 g/m^2, 20 lb) (2 to 10 sheets when using A3/11"x17" or B4/8 1/2"x14")
Stapling Position:	(Horizontal)  a = b = 6 ± 2 mm = 0.24" ± 0.08"
	(Diagonal)  a = 10 ± 2 mm = 0.39" ± 0.08" b = 16 ± 2 mm = 0.63" ± 0.08"

Staple Replenishment:	Cartridge exchange (3,000 pieces/cartridge)
Power Source:	DC 24V, 5V (form the copier)
Power Consumption:	50 W
Dimensions: (W x D x H)	412 x 600 x 690 mm (16.2" x 23.6" x 27.1")
Weight:	About 25 kg, 55.1 lb (Main Frame :22 kg, 48.5 lb Mounting Frame: 3 kg, 6.6)

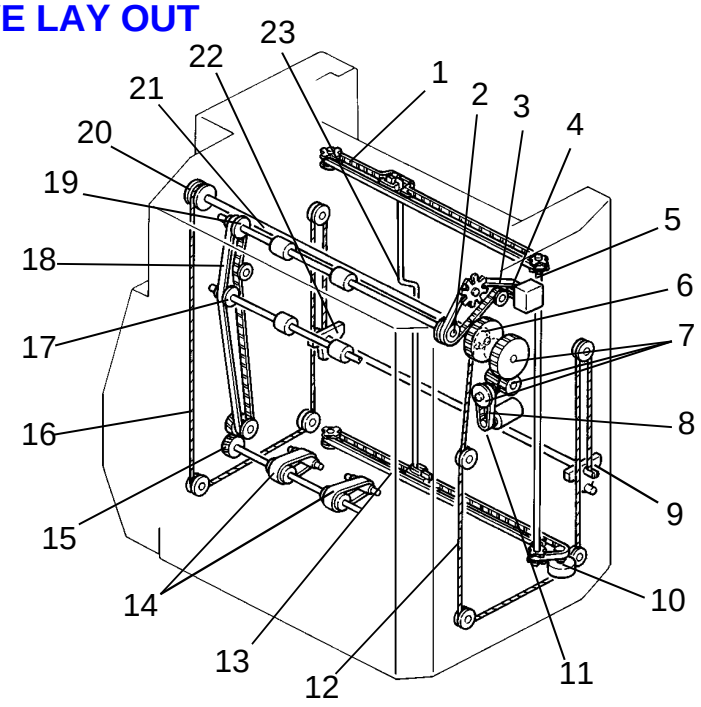
2. COMPONENT LAYOUT

2.1 MECHANICAL COMPONENT LAYOUT



1. Proof Tray
2. Proof Tray Exit Rollers
3. Vertical Transport Rollers
4. Turn Gate
5. Bin Transport Belt
6. Bin Transport roller
7. Bin Exit Roller
8. Stapler
9. Grip Assembly
10. Bin Support Block
11. Bins
12. Support Bin
13. Jogger Bar

2.2 DRIVE LAY OUT



4. Roller Drive Motor Pulley
3. Rear Roller Drive Belt
2. Proof Tray Exit Roller Pulley (Rear)
(Proof Tray Exit Roller)
19. Proof Tray Exit Roller Pulley (Front)
18. Front Roller Drive Belt
17. Vertical Transport Drive Pulley
15. Bin Transport Drive Gear
14. Bin Transport Belts

11. Bin Lift Motor Pulley
8. Bin Lift Drive Belt
7. Bin Lift Gears
6. Bin Lift Gear/Pulley
12. Rear Bin Lift Wire
13. Rear Bin Support Block

21. Bin Drive Shaft
20. Front Bin Lift Pully
16. Front Bin Lift Wire
22. Front Bin Support Block

10. Jogger Motor Pulley
13. Lower Jogger Drive Belt
5. Jogger Drive Shaft
1. Upper Jogger Drive Belt
23. Jogger Bar

2.3 ELECTRICAL COMPONENT DESCRIPTION

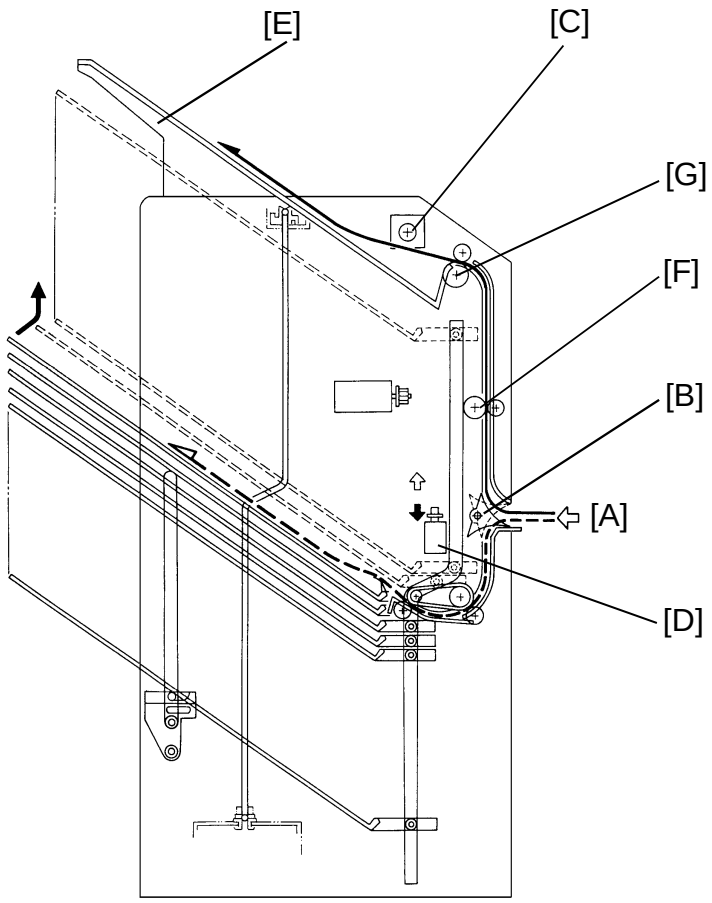
Refer to the electrical component layout on the reverse side of the Point to Point (Water proof paper) for symbols and index numbers.

Symbol	Name	Function	Index No.
Motors			
M1	Bin Lift	Lifts and lowers the bins via a belt, gears, and wires.	23
M2	Jogger	Drives the jogger bar to jog the copies against the front side plate.	20
M3	Grip	Drives the grip assembly forward and backward into the bin to grip the copies and bring them to the stapling position.	13
M4	Stapler	Feeds the staples and drives the stapler hammer.	12
M5	Roller Drive	Drives the proof tray exit and vertical transport rollers, and bin transport belts.	1
Circuit Board			
PCB1	Main Control	Controls all sorter stapler functions.	18
Solenoid			
SOL 1	Turn Gate	Opens and closes the turn gate to direct the copies into either the proof tray or the bins.	6
Sensors			
S1	Bin Lift Timing -1	Monitors the rotation of the bin lift motor by detecting the timing disk.	24 or 25
S2	Bin Lift Timing -2	Controls the stop timing of the bin lift motor so that the bin lift timing sensor -1 can detect the timing disk properly.	24 or 25
S3	Jogger H.P.	Detects if the jogger bar is in the home position.	19
S4	Paper	Detects if copies are under the hammer.	8
S5	Bin (LED)	Detects if there is paper in the bins (light emitting element).	3
S6	Bin (Photo transistor)	Detects if there is paper in the bins (light receiving element).	17
S7	Grip H.P.	Detects if the grip assembly is in the home position.	16
S8	Bin H.P.	Detects if all the bins are in the down (home) position.	15
S9	Bin Exit	Detects paper jams at the bin exit area.	5
S10	Proof Tray Exit	Detects paper jams at the proof tray exit area.	4
S11	Roller Drive Timing	Monitors the roller drive motor speed by detecting the timing disk.	2
Switches			
SW1	Upper Lift Limit	Stops the bin lift motor when this switch detects the upper limit position of the bins.	22
SW2	Wire Tension	Stops the bin lift motor when this switch detects the lower limit position of the bins through the bin lift wire tension.	21

Symbol	Name	Function	Index No.
SW3	Front Door	Cuts the dc 24 V line when the front door is open.	14
SW4	Sorter Stapler Set	Cuts the dc 24 V line when the sorter stapler unit is open.	7
SW5	Staple End	Detects the staple end condition.	10
SW6	Staple Guide	Detects if the staple guide plate is closed.	9
SW7	Staple H.P.	Detects if the staple hammer is in the home position.	11

3. BASIC OPERATION

3.1 NORMAL MODE AND SORT/STACK MODE

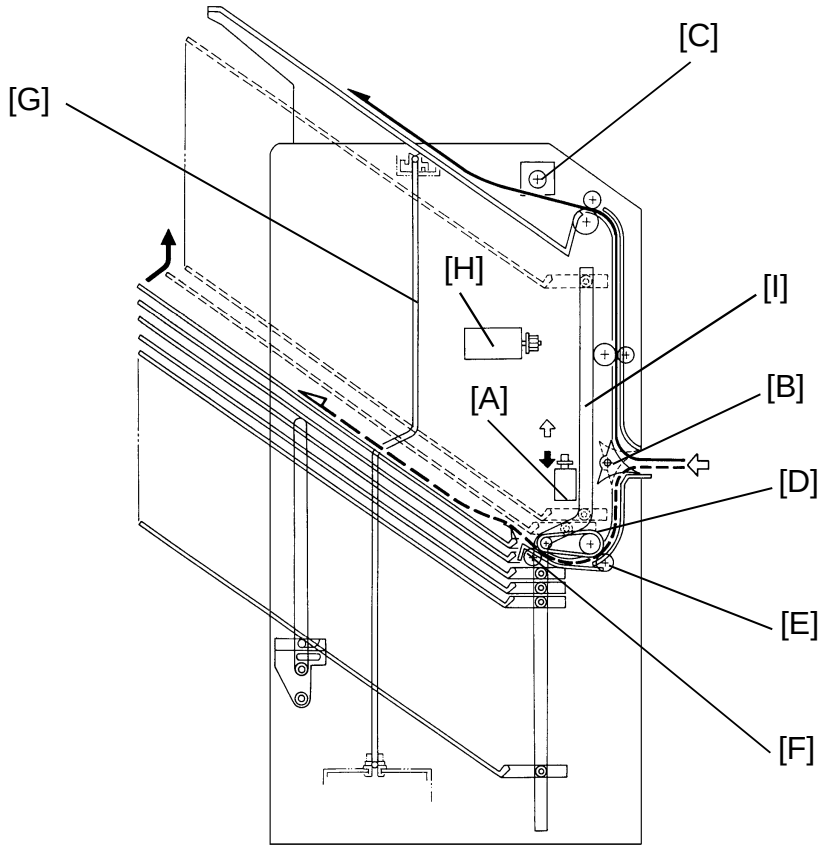


Copies [A] exiting the copier pass through the entrance guide plates to the turn gate section. The turn gate [B] will send copies either to the proof tray or to the bins, depending on the mode.

- Normal mode - (from the turn gate section to the proof tray)

When the S/S CPU receives the motor ON signal from the copier, the roller drive motor [C] rotates all the rollers in the S/S paper path. At the same time, the turn gate solenoid [D] is energized and the turn gate turns clockwise. The turn gate directs copies to the proof tray [E] through the vertical transport and proof tray exit rollers [F,G].

- Sort/Stack mode - (from the turn gate section to the bins)



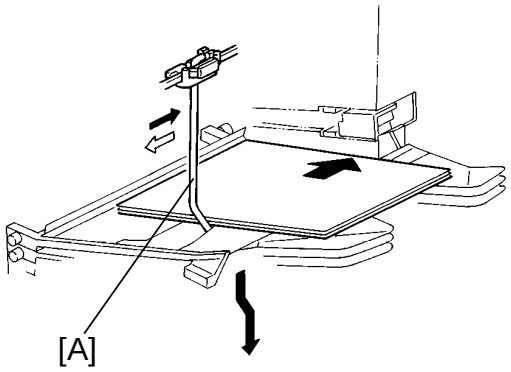
The turn gate solenoid [A] stays off and the turn gate [B] stays up when the S/S roller drive motor [C] starts rotating. The turn gate directs copies downward and the bin transport belt [D] exits copies to the bin through the bin transport and bin exit rollers [E, F].

The jogger bar [G] then moves the copy towards the front and jogs it against the front side plate to square the copies.

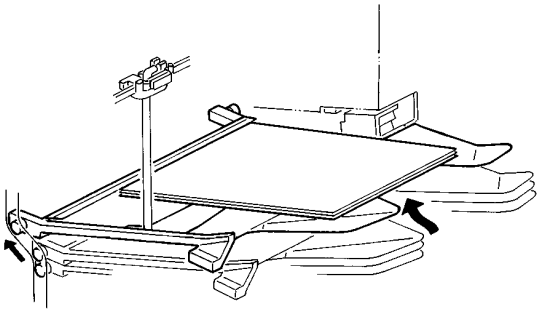
The bin lift motor [H] turns on when this jogging operation is almost finished and advances the bin one step up along the bin cam track [I]. The bin lift motor stops at the proper timing to position the next bin at the bin exit section. This bin movement is done for each copy in the sort mode and for the final copy of each original in the stack mode.

The up and down movement of the bins in both the sort and stack modes is the same as that for other moving bin type sorters.

3.2 STAPLE MODE



(Fig. 1)



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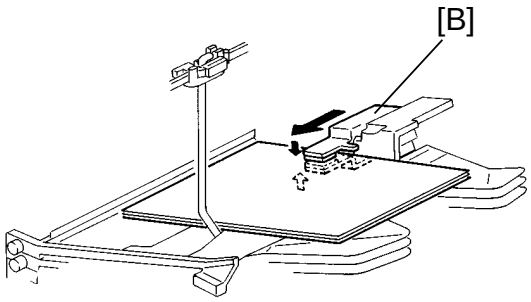
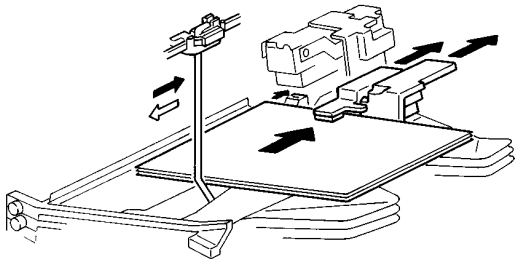


(Fig. 3)



(Fig. 4)

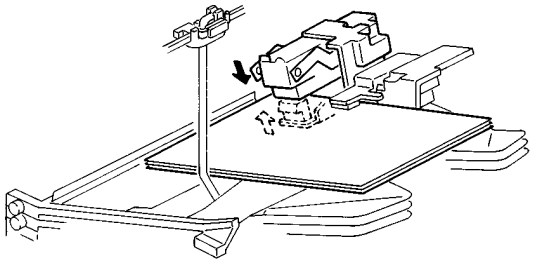
When the final set of copies is jogged in the sort mode, the staple unit staples the stacked copies as follows:

(Figure 1)
If the final copy is exited to a bin other than the first one, all the bins lower to the home position (the first bin is positioned at the bin exit section). The jogger bar [A] moves towards the front to jog the copies stacked in the first bin. Then it stops 15mm away from the paper side edge.

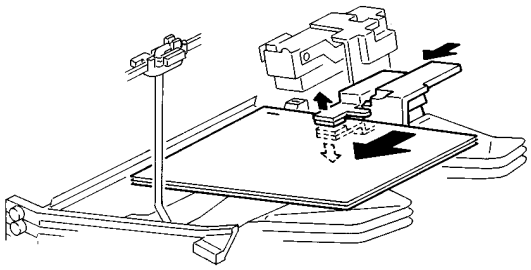
(Figure 2)
The bins move one step up to place the first bin at the stapling section.

(Figure 3)
The grippers [B] move forward, and grip the copies.

(Figure 4)
The grippers bring the copies up underneath the stapler. At the same time, the jogger bar jogs the copies stacked in the second bin as a preparation for the next stapling. Then the jogger bar returns to the position 15mm away from the paper side edge.



(Fig. 5)



(Fig. 6)

(Figure 5)
The stapler staples the copies.

(Figure 6)
The copies are pushed back into the bin. Then the grippers open and return to the home position.

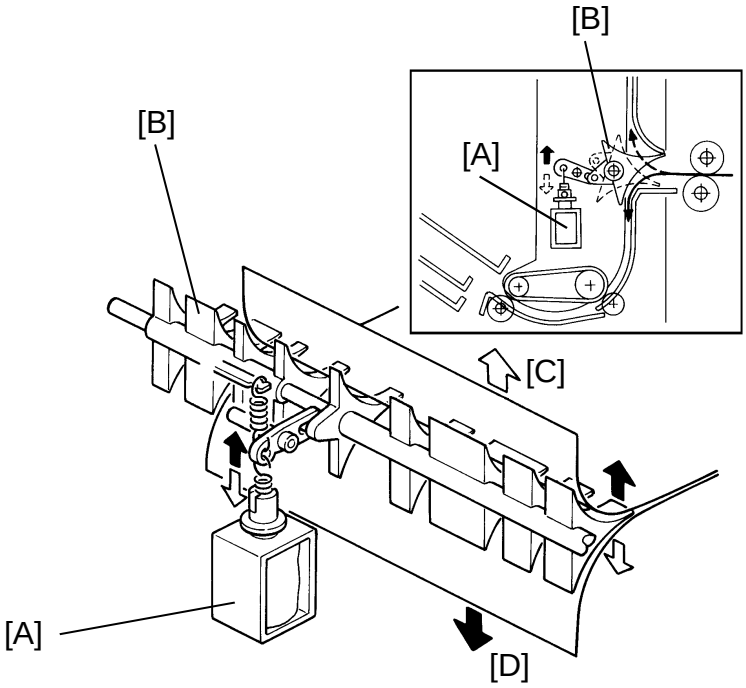
The bins move one step up for the next stapling.
When the final set of copies is stapled, the bins lower and stop when the final bin used just before the stapling operation is positioned at the bin exit section.

There are two staple modes.

1) Automatic stapling:
   In ADF/ARDF mode, when the staple mode is selected before pressing the start key, copies will be delivered to each bin and stapled automatically.

2) Manual stapling:
   In sort mode, after copies are sorted in the bins, the copies will be stapled when the staple key is pressed. In stack mode, manual stapling is impossible.

4. TURN GATE SECTION

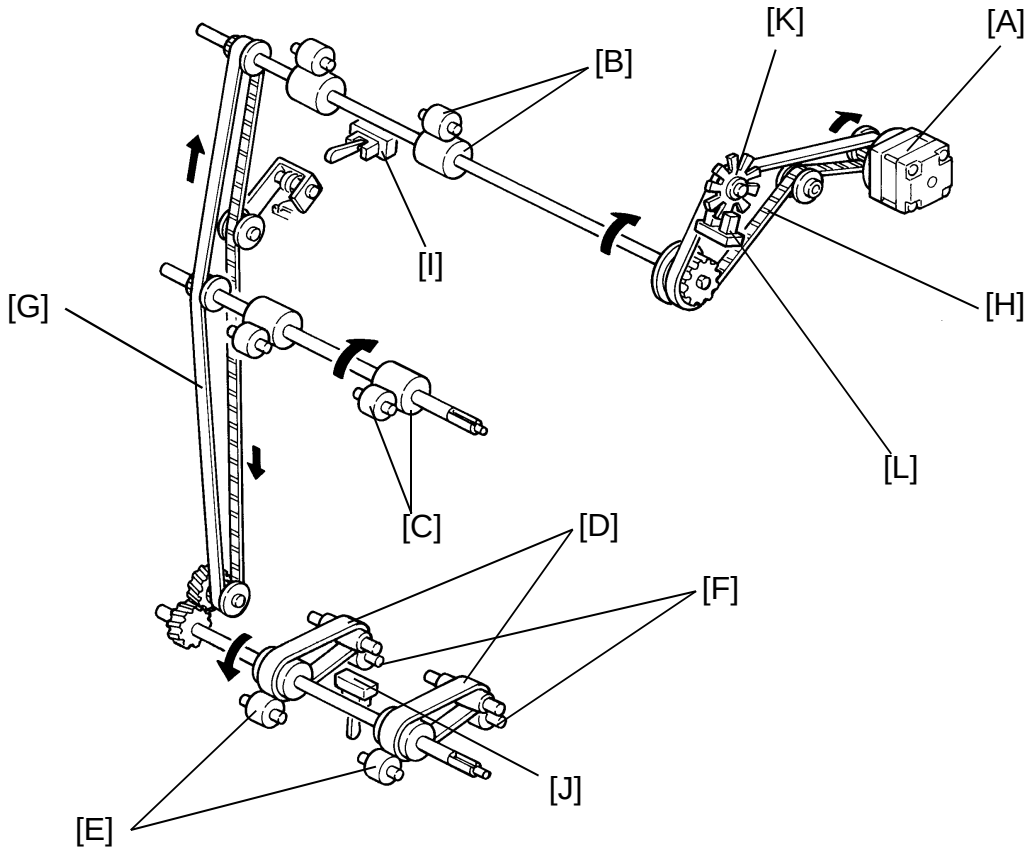


The turn gate directs copies to the proof tray or to the bins depending on the mode.

In the normal mode, the turn gate solenoid [A] turns on together with the roller drive motor when the S/S CPU receives the motor ON signal from the copier. The turn gate [B] rotates clockwise to direct copies upward [C] through the vertical transport section to the proof tray. The turn gate solenoid stays on during the copy cycles, and turns off when the proof tray exit sensor detects the trailing edge of the last copy and the S/S CPU receives the motor OFF signal from the copier.

In the sort, stack, or staple mode, the turn gate solenoid stays off to keep the turn gate up so that copies are directed downward [D] to the bin transport section.
However, a certain number of pulses (depending on the paper size) after the bin exit sensor detects the leading edge of the copy, the turn gate solenoid turns on. When the trailing edge of the copy passes the turn gate (50 msec. after the S/S CPU receives the paper exit signal from the copier), the turn gate solenoid turns off to direct the next copy downward. This turn gate movement is to correct the facecurl of the trailing part of the copy. This will flatten the copy, or give it a slight backcurl, and will help stack and jog copies in the bins smoothly.

5. ROLLER DRIVE AND CONTROL



The roller drive motor (stepper motor) [A] drives the proof tray exit rollers [B], vertical transport rollers [C], bin transport belts [D], bin transport rollers [E], and bin exit rollers [F] via the front and rear roller drive belts [G,H], pulleys, and gears, as shown above.

The roller drive motor turns on when the S/S CPU receives the motor ON signal from the copier. When the proof tray exit sensor [I] (in the normal mode) or the bin exit sensor [J] (in the sort/stack/staple mode) detects the trailing edge of the final copy, the S/S CPU informs the copier through the fiber cable and the interface PCB. Then the copier sends the motor OFF signal to the S/S to stop the roller drive motor.

The S/S CPU monitors the roller drive motor speed by counting pulses of the timing disc [K] through the roller drive timing sensor [L].

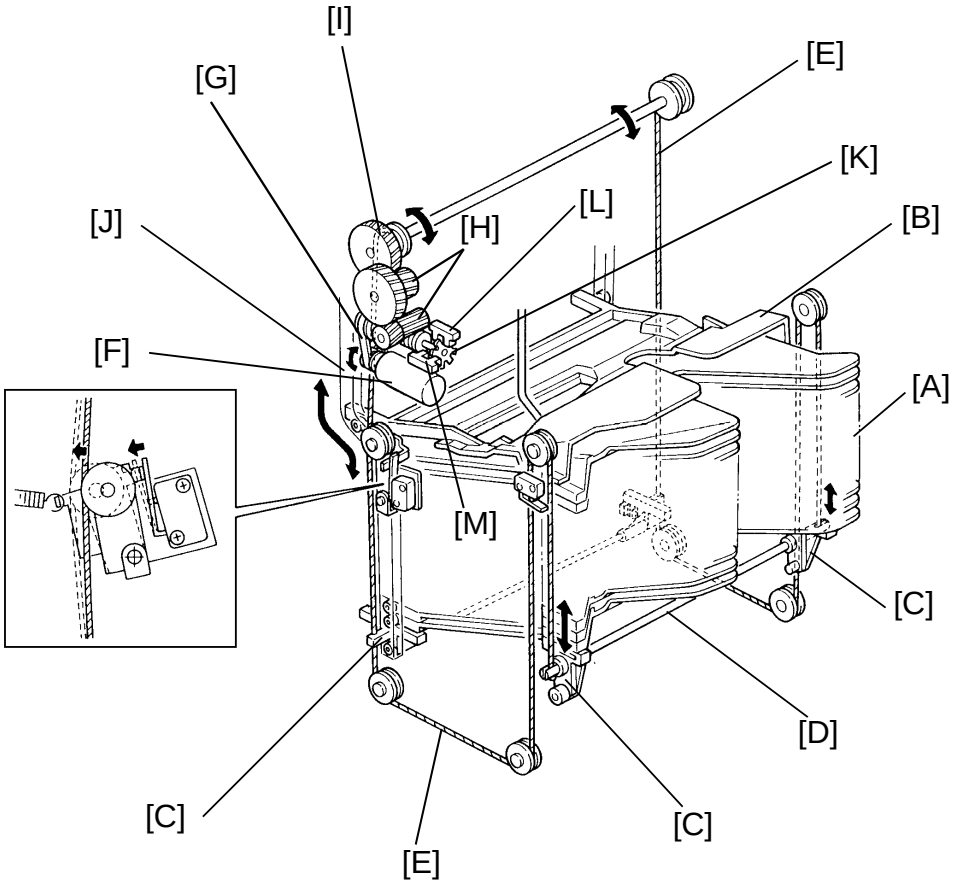
The S/S CPU controls the motor rotation at 2 speeds (normal and high speeds) to exit copies as fast as possible.

The normal speed depends on the copier's paper transport speed. The S/S's paper transport speed is almost the same but is slightly faster than the copier's.

In the normal mode, the roller drive motor changes the paper transport speed from normal to high (500 mm/sec., fixed) when the S/S CPU receives the paper exit signal from the copier. The roller drive motor changes the paper transport speed from high to normal 100 milliseconds after the proof tray exit sensor detects the trailing edge of the copy.

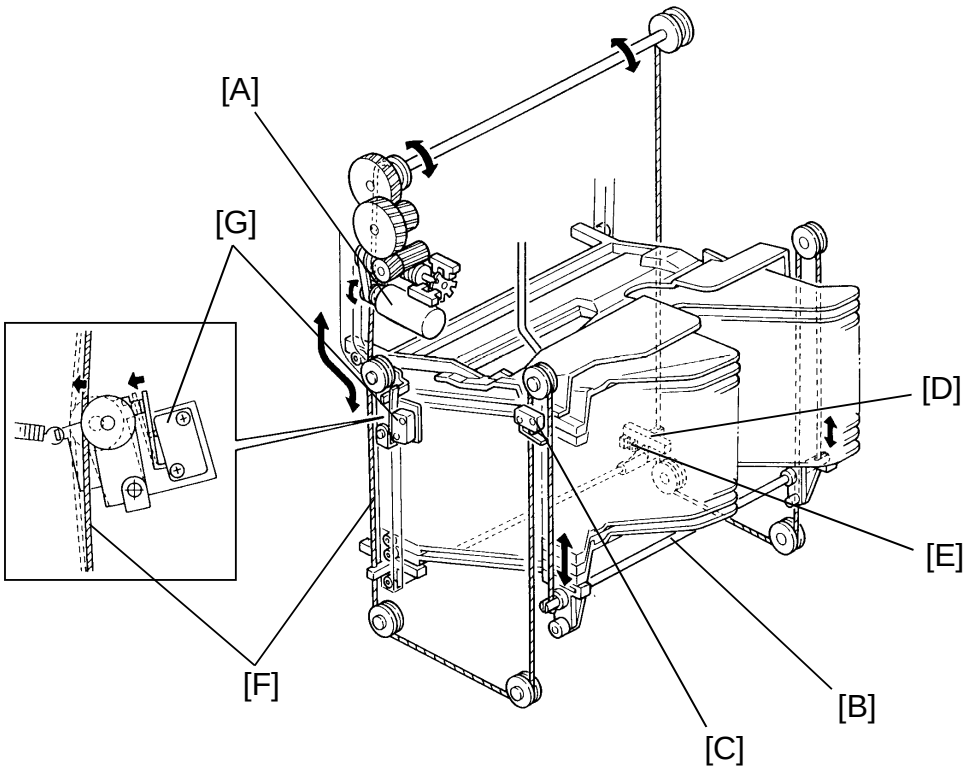
In the sort/stack/staple mode, the roller drive motor also changes the paper transport speed from normal to high and then from high to normal. The timing is the same as in the normal mode, but the bin exit sensor is used to detect the trailing edge instead of the proof tray exit sensor. The high speed is almost double the normal speed, and it changes depending on the paper size (900, 960 , or 1,000 mm/second).

6. BIN DRIVE AND CONTROL



All the 20 bins [A] and the support bin [B] are piled up on the bin support blocks [C]. The front and rear bin support blocks are connected by the bin lift shafts [D] the ends of which are fixed on the bin lift wires [E] as shown. The bin lift motor [F] (dc motor) drives the bin lift wires through the bin lift drive belt [G], bin lift gears [H], and the bin lift gear/pulley [I]. Then the bins are driven up and down along the front and rear bin cam tracks [J].

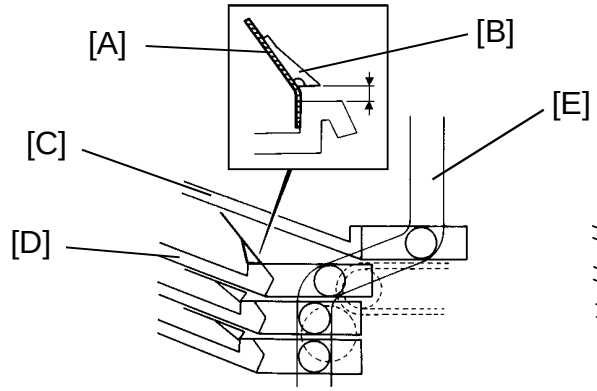
The S/S CPU controls the amount of bin lift motor rotation by monitoring the pulses of the timing disc [K] through the bin lift timing sensors 1 and 2 [L,M]. The bin lift timing sensor 1 is used for counting the timing pulses. The bin lift timing sensor 2 is used to determine the motor stop timing so that the edge of the timing disc slots is not positioned at the timing sensor 1.



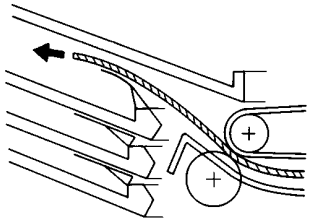
If the bin lift motor [A] fails to stop the bins at the highest position, the rear end of the left bin lift shaft [B] activates the upper lift limit switch [C] (Normal Closed type) to open the dc 24V line of the bin lift motor.

The front right bin support block [D] has an actuator on its underside. When all the bins are lowered and the first bin is positioned at the bin exit section, the actuator activates the bin home position sensor [E] and the bin lift motor turns off.

If the bin lift motor fails to stop lowering the bins at the bin home position, the rear bin lift wire [F] loosens its tension. Then the wire tension switch [G] (Normal Open type) is deactivated to open the dc 24V line of the bin lift motor.



(Fig. 1)



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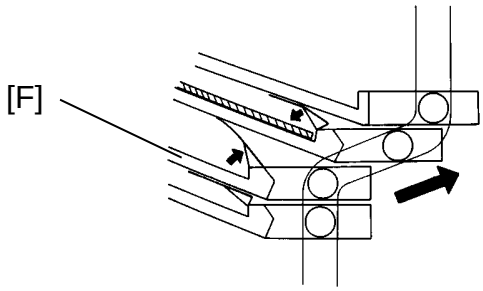

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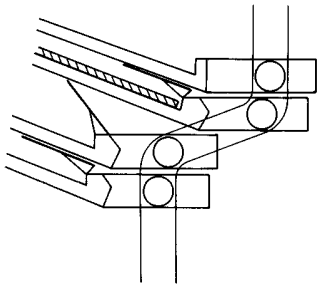


(Fig. 4)

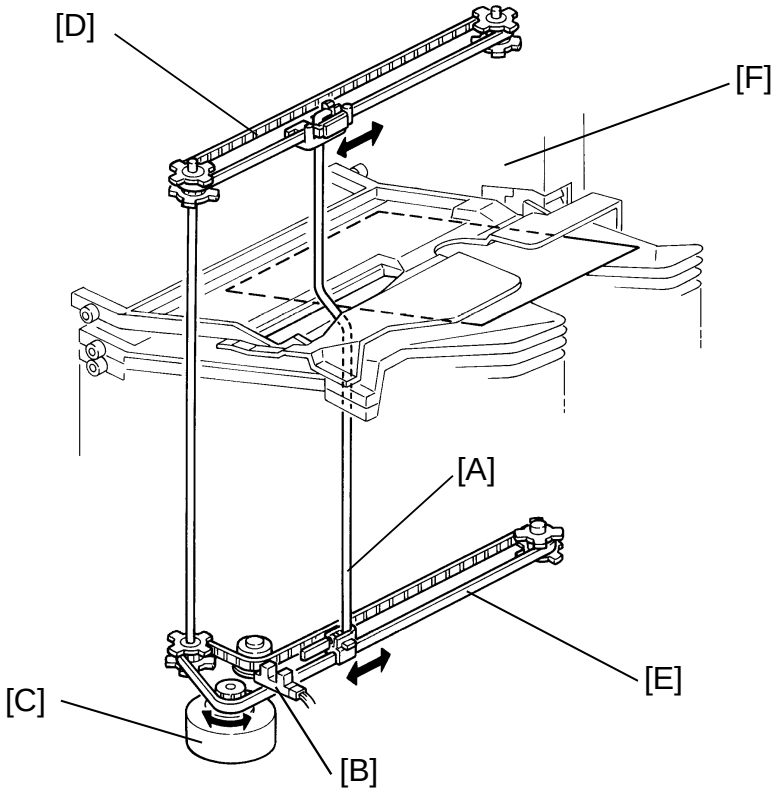
An end fence mylar [A] is stuck on each bin entrance and an end fence block [B] is stuck on the mylar. These are stuck with two-sided tape, as shown in figure 1. There is a twisted spring at the rear end of the bin entrance to raise the end fence block and mylar. When the bins are positioned at the bin home position, the support bin [C] and the first bin [D] are positioned at the bend of the bin cam track [E] as shown. The support and first bins have a space between them so that the end fence mylar can fully rise until the end fence block stops it.

The space between the support and first bins is at the bin entrance section as shown in figure 2. Since the end fence mylar is thin, a copy exits to the first bin over the mylar. The steep angle of the bin helps the exited copy slide by its own weight under the mylar against the bin entrance.

While the bins move up along the bend of the bin cam track, the end fence mylar and block of the first bin are lowered by the support bin. Those of the second bin [F] rise as shown in figure 3.

When the bin lift motor stops, the first and second bins are positioned as shown in figure 4. The copy in the first bin is prevented by the lowered end fence mylar from moving out of the jogged position. The end fence mylar and block of the second bin are ready to receive the next copy.

7. JOGGER SECTION



When the start key is pressed in the sort, stack, or staple mode, the copier sends the paper size information to the sorter stapler. When a copy enters to the sorter stapler entrance, the jogger bar [A] stays at the home position which is detected by the jogger home position sensor [B].

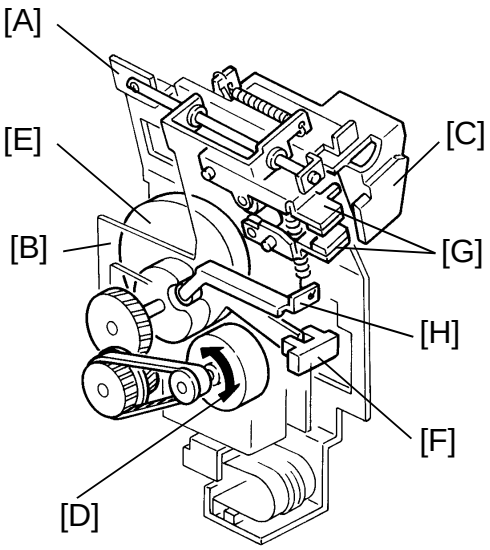
At the appropriate timing for the selected paper size, after the trailing edge of the copy is detected by the bin exit sensor, the jogger motor [C] (stepper motor) rotates and reverses to move the jogger bar via the upper and lower jogger drive belts [D,E]. As the copy is exited into the bin at the center, the jogger bar moves the copy all the way to the front, and pushes the paper side edge by 5 mm (0.2") an against the front side plate [F]. Then the jogger bar moves back to the position which matches the paper width. Shortly after, the jogger bar returns to its home position. This jogger bar movement is performed for each copy to square the copy stack in the exited bin.

In the automatic or manual staple modes, the jogger bar also moves to ensure squaring the stacked copies before stapling. How the jogger moves is described in the Staple Mode section of the Basic Operation instructions.

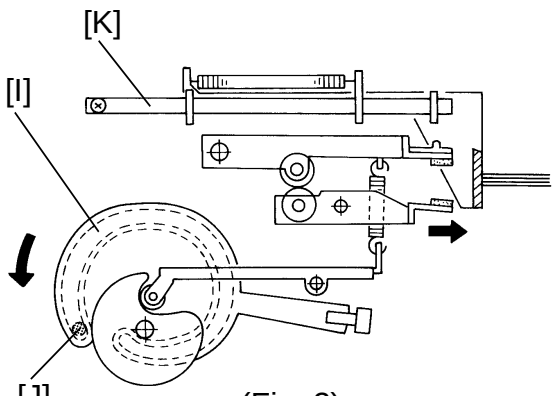
- Jogger off conditions -

1. Under the following conditions, the jogger bar does not jog after a copy is delivered to the bin.
    - If paper is loaded in a bin by hand while the sort/stack, or staple mode is selected.
    - If the selected paper size does not match stapling specifications.
    - If copies of different width are delivered to the bins.
2. If paper is in a bin before the main switch is turned on, the sort/stack mode is disabled when the sorter key is pressed.

8. GRIP ASSEMBLY



(Fig. 1)



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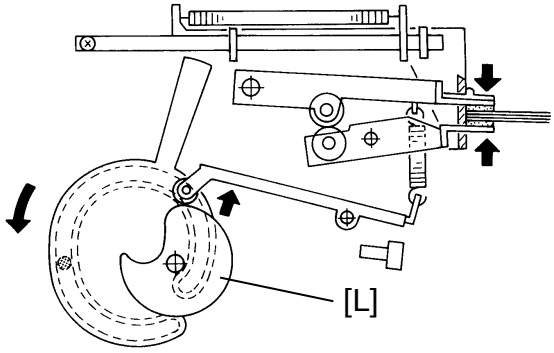


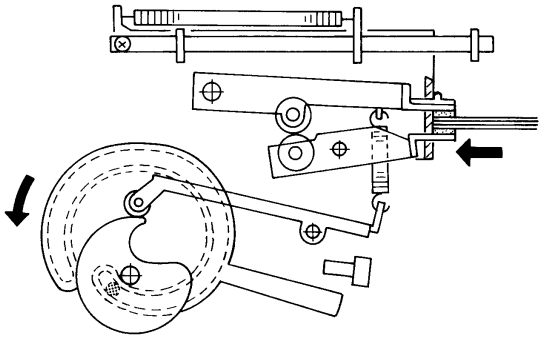
(Fig. 3)

(Figure 1)
The grip assembly consists of the gripper guide bracket [A], the gripper assembly [B], and the bin side plate [C]. The major components of the gripper assembly are the gripper motor [D] (stepper motor), dual cam plate [E], grip home position sensor [F], grippers [G], and grip cam follower [H].

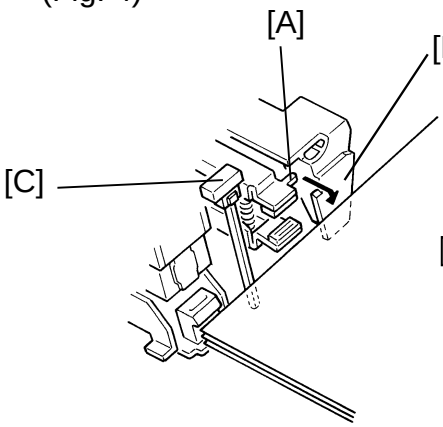
When the copier main switch is turned on, the grip motor rotates and/or reverses to position the whole gripper assembly at the home position. The home position is detected by the grip home position sensor and the sensor actuator on the dual cam plate.

(Figure 2)
When the bin lift motor stops during the automatic or manual stapling cycle, the grip motor starts the rotation. As the dual cam plate turns counter-clockwise, the cam groove [I] and the pin [J] on the gripper guide bracket move the whole gripper assembly along the gripper guide rod [K] into the bin.

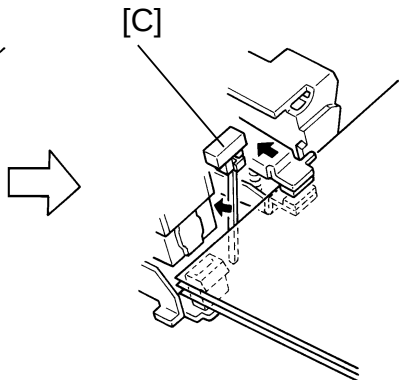
(Figure 3)
When the high portion of the grip cam [L] (small cam of the dual cam plate) pushes up the grip cam follower, the grippers close to grip the stacked copies in the bin.



(Fig. 4)



(Fig. 5)



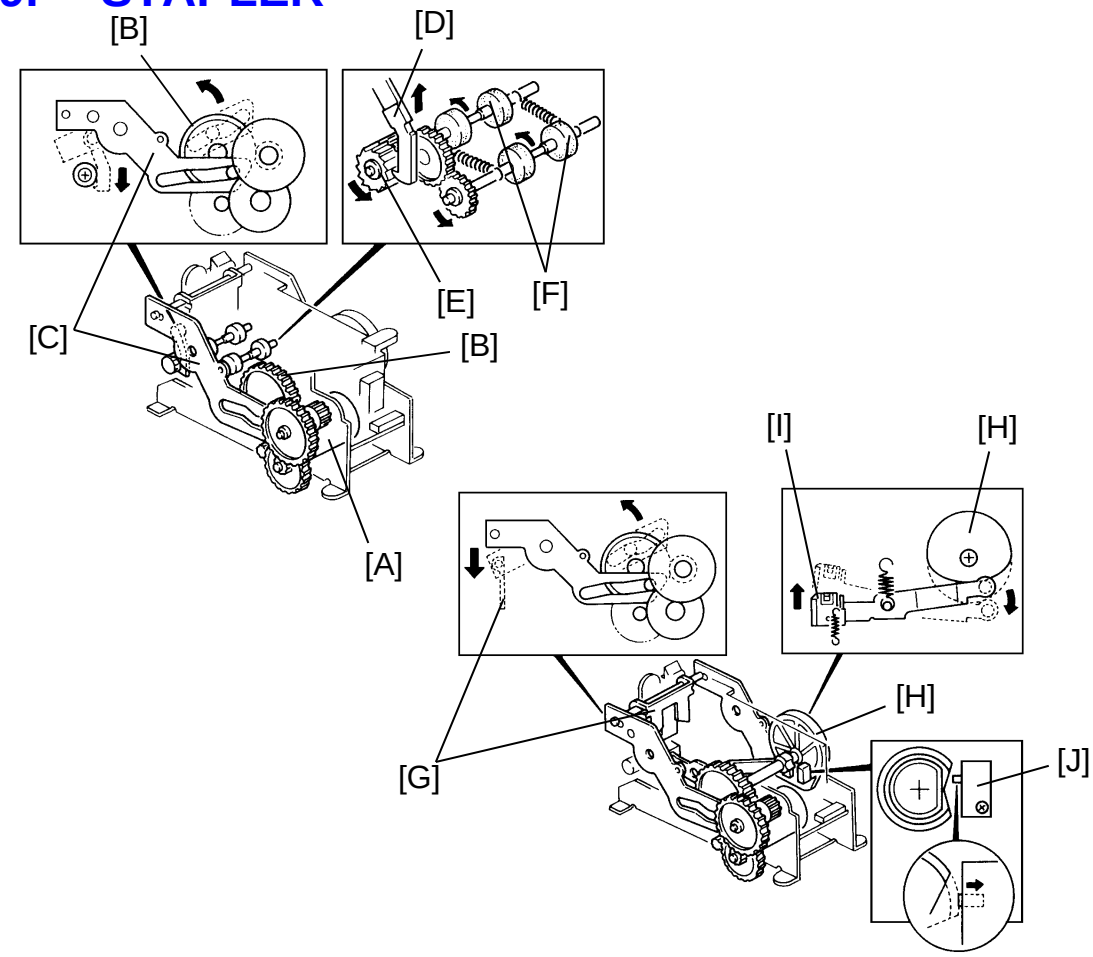
(Fig. 6)

(Figure 4)
As the dual cam plate rotates further, the cam groove and the pin move back the whole gripper assembly with the gripped copies to the stapling position. Then the grip motor stops as programmed.

(Figure 5 and 6)
The upper gripper has a projection [A] to hook the bin side plate [B]. When the gripper moves into the bin, the projection moves over the bin side plate. When the grippers close, the projection hooks the bin side plate. Therefore, the grippers bring the stacked copies together with the bin side plate.
When the grippers move to the stapling position, the S/S CPU checks if there is paper or not through the paper sensor [C]. If the paper sensor is activated, the stapler motor starts rotating.

When the stapler motor stops, the grip motor starts rotating in reverse. Then the gripper assembly brings back the stapled copies into the bin, the grippers open, and the gripper assembly returns to the home position.

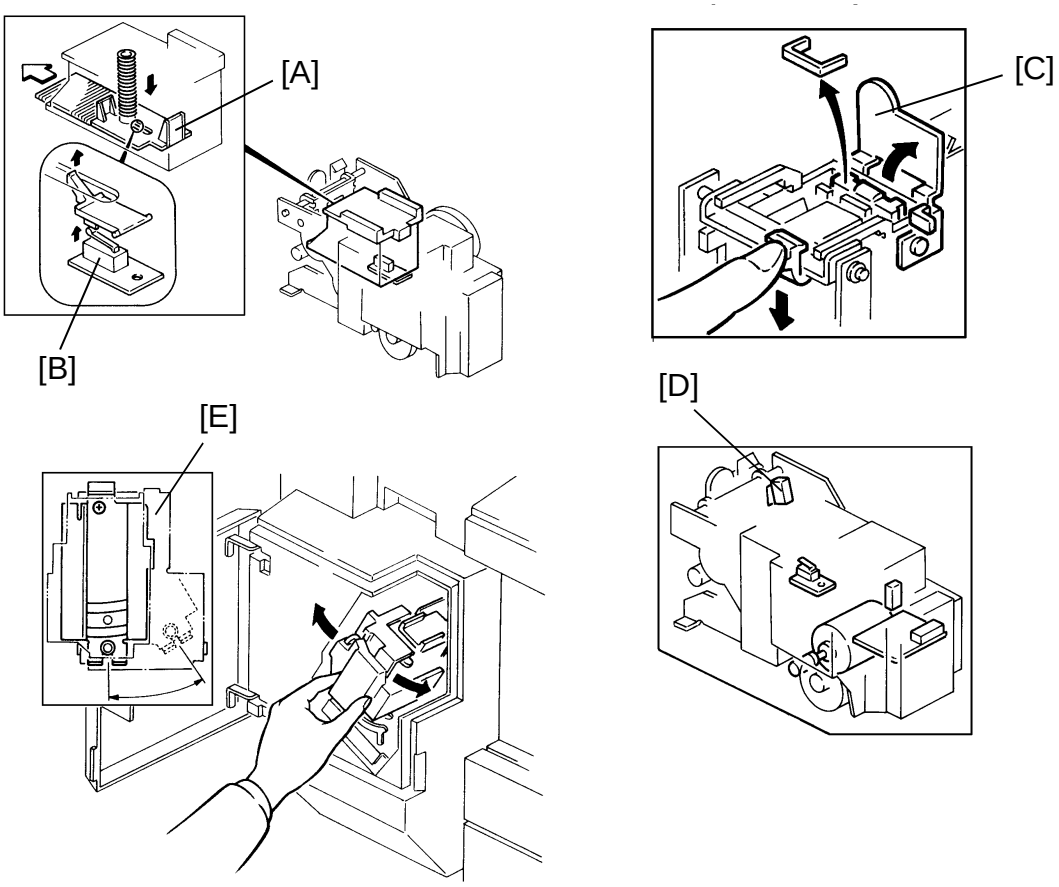
9. STAPLER



In the automatic or manual stapling mode, the stapler motor [A] rotates when the grip motor stops rotating after the grippers bring the stacked copies to the staple position.

The staple gear [B] rotates counterclockwise, and the pin on the gear rotates the staple arm [C] counterclockwise, then clockwise. The ratchet [D] lowers and rises to rotate the ratchet wheel [E] counterclockwise. Then the staple feed rollers [F] turn via gears to feed a staple sheet to the hammer.

While both the front and rear staple arms rotate counterclockwise, the hammer [G] lowers. At the same time, the staple cam plate [H] lifts the clincher [I]. The hammer and the clincher staple the copies. Then, while the staple arms rotate clockwise, the hammer rises and the clincher lowers. When the staple home position switch (Normal Closed type) [J] is deactivated, the stapler motor stops.



When all the staple sheets are fed out of the staple cartridge, a notch cut-in of the staple pressure plate [A] deactivates the staple end switch (Normal Closed type) [B]. The S/S CPU sends the staple end signal to the copier. After the stapling job for all the bins is completed, the Add Staple indicator lights on the copier operation panel and the Ready indicator turns off whenever the staple mode is selected.

Staple jams are easily cleared by opening the staple guide plate [C]. The staple guide switch (Normal Closed type) [D] detects if the staple guide plate is closed or open. When the S/S front door and S/S unit itself are closed with the staple guide plate open, the Add Staple indicator lights on the copier operation panel.

The stapler can be swung on the stapler support bracket [E] and it has two lock positions . One is for horizontal stapling and the other is for diagonal (25 degrees) stapling.

- Staple inoperative conditions -

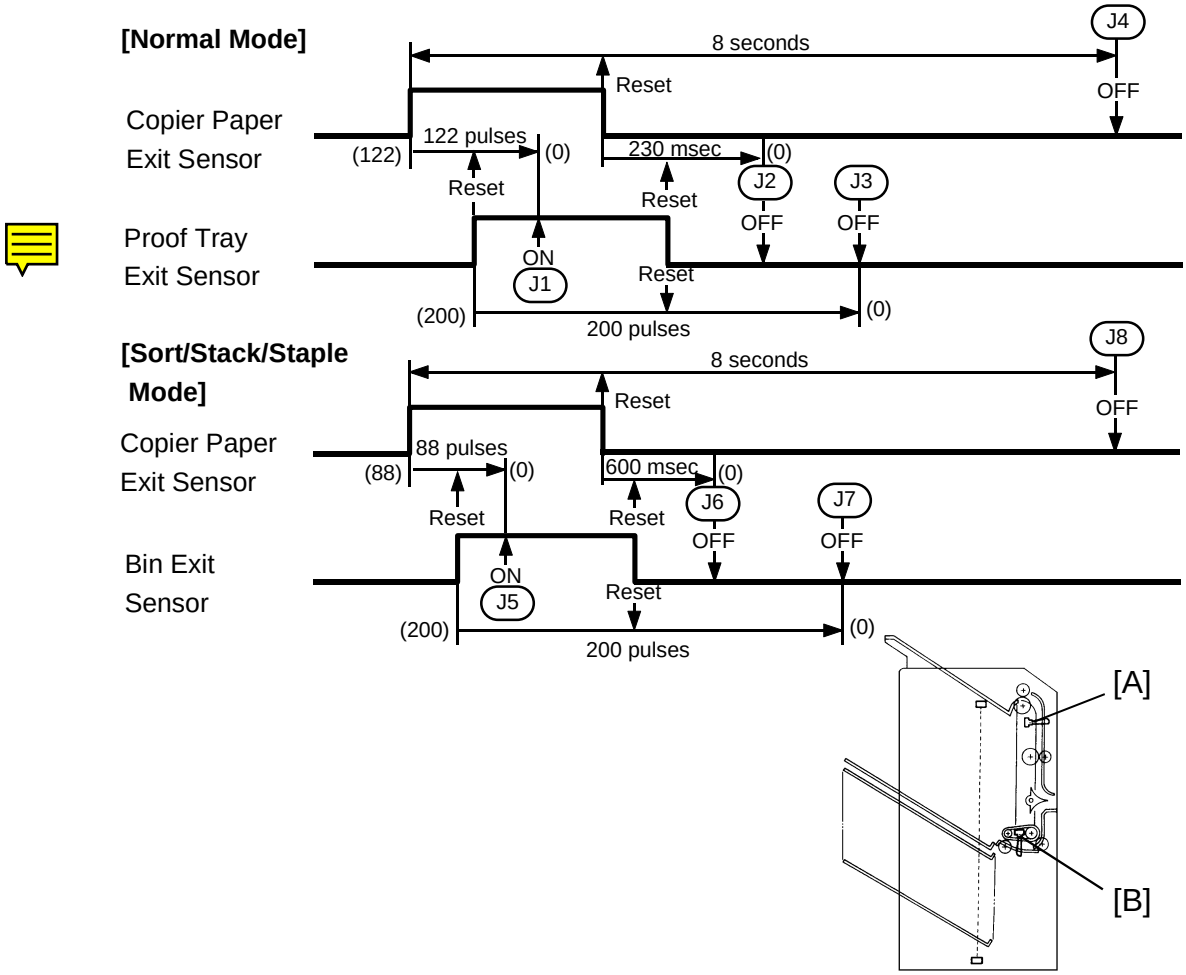
1. Under the following conditions, the staple mode is inoperative when the staple key on the operation panel is pressed.
   - If paper is in a bin before the main switch is turned on.
   - If the selected paper size does not match stapling specifications.

2. Under the following conditions, the staple mode is canceled.
   - If the paper is loaded in a bin by hand while the staple mode is selected.
   - If the only one sheet is delivered to the bin.
   - If the number of sheets delivered to the bin exceeds the stapler capacity.
     Stapler capacity: 2 to 20 sheets for A4, B5, and 8 1/2"X11"
     2 to 10 sheets for B4, A3, 8 1/2"X14", and 11"X17"
     The stapler capacity can be extended up to 25 or 15 by changing the SP mode setting (Staple Limit). (The staple function is not guaranteed.)
   - If jogger operation has not been performed.
   - If copies in all the bins are stapled.

3. Under the following conditions, the manual stapling mode in sort mode is inoperative.
   - If paper is loaded in a bin by hand while the sort mode is selected.
   - If the paper size in the bin does not match stapling specifications.
   - If only one sheet is delivered to the bin.
   - If copies of different width are delivered to the bin.
   - If copies already stapled are left in the bin.

10. JAM DETECTION AND STAPLE ERROR

10.1 SORTER JAMS



The sorter stapler main control board detects paper jams in the sorter stapler, or between the sorter stapler and the copier. The S/S CPU uses the paper exit ON/OFF signal from the copier, and the proof tray exit sensor [A] (in normal mode) or the bin exit sensor [B](in sort/stack/staple mode) to detect the jams.

The actual jam check timings in the normal and sort/stack/staple modes are shown above. There are two time scales: one in seconds and milliseconds, and one in pulses. The pulses are the timing pulses from the roller drive timing sensor. Since the paper transport speed (normal speed) of the sorter stapler depends on that of the copier, the sorter stapler cannot operate on a fixed time scale. Therefore, to match the sorter stapler speed to the copier's, the copier sends a signal to S/S CPU; this controls the normal speed of the roller drive motor (high speed never changes) and this generates the pulse rate.

If the proof tray exit sensor or the bin exit sensor is actuated when the sorter stapler unit or the front door is opened and closed, or when the main switch is turned on, a sorter jam signal is sent to the copier.

Sorter jam conditions are reset by opening and closing the sorter stapler unit or the front door after clearing jammed paper.

When an abnormal condition of the main motor, bin lift motor, or jogger motor is detected for the first time, the copier's operation panel will indicate a sorter jam. When the abnormal condition is detected for the second time, the S/S CPU sends an error signal to the copier. The copier's operation panel will indicate a service call code.

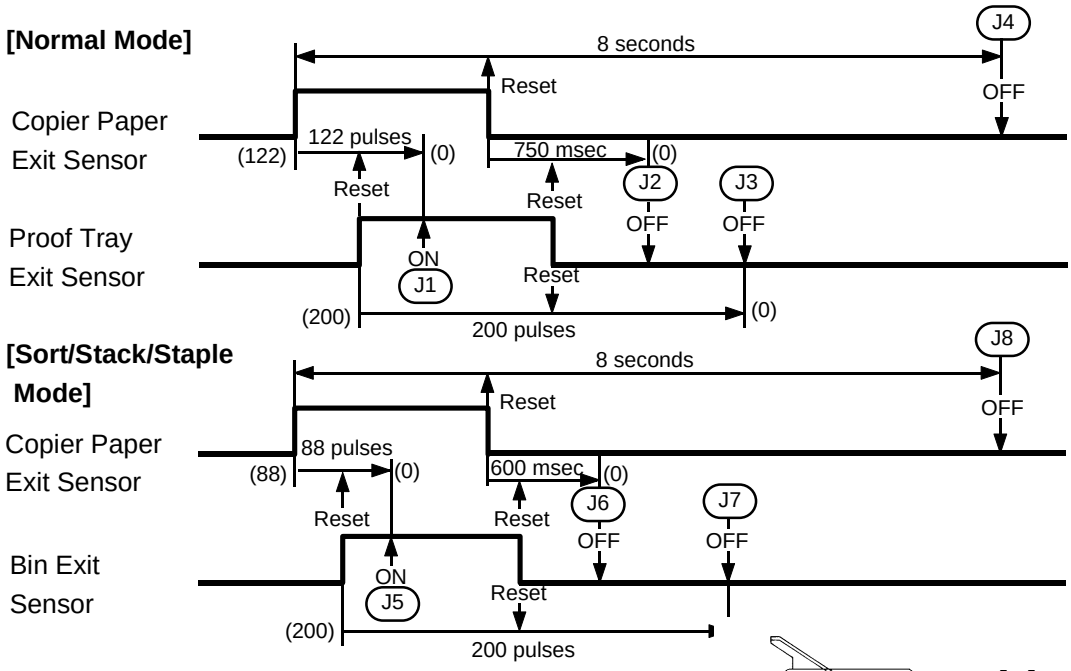
10.2 STAPLE ERROR

The sorter stapler main control board detects a staple error when the following conditions are detected. The copier's operation panel will indicate a sorter jam, and stapling operation will stop in theses cases.

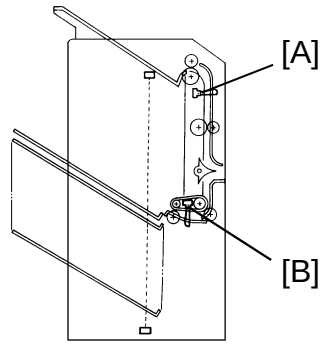
- If the paper sensor is actuated when the sorter stapler or the front door is opened or closed, or when the main switch is turned on.
- If the paper sensor is actuated when the grip assembly returns to the home position after the stapling operation.
- The first time an abnormal condition of the stapler motor or grip motor is detected.
  The second time an abnormal condition is detected, the copier's operation panel will indicate a service call code.

10. JAM DETECTION AND STAPLE ERROR

10.1 SORTER JAMS



NOTE: This timing chart represent the jam check timing when the sorter stapler is installed to the FT6645.



The sorter stapler main control board detects paper jams in the sorter stapler, or between the sorter stapler and the copier. The S/S CPU uses the paper exit ON/OFF signal from the copier, and the proof tray exit sensor [A] (in normal mode) or the bin exit sensor [B](in sort/stack/staple mode) to detect the jams.

The actual jam check timings in the normal and sort/stack/staple modes are shown above. There are two time scales: one in seconds and milliseconds, and one in pulses. The pulses are the timing pulses from the roller drive timing sensor. Since the paper transport speed (normal speed) of the sorter stapler depends on that of the copier, the sorter stapler cannot operate on a fixed time scale. Therefore, to match the sorter stapler speed to the copier's, the copier sends a signal to S/S CPU; this controls the normal speed of the roller drive motor (high speed never changes) and this generates the pulse rate.

If the proof tray exit sensor or the bin exit sensor is actuated when the sorter stapler unit or the front door is opened and closed, or when the main switch is turned on, a sorter jam signal is sent to the copier.

Sorter jam conditions are reset by opening and closing the sorter stapler unit or the front door after clearing jammed paper.

When an abnormal condition of the main motor, bin lift motor, or jogger motor is detected for the first time, the copier's operation panel will indicate a sorter jam. When the abnormal condition is detected for the second time, the S/S CPU sends an error signal to the copier. The copier's operation panel will indicate a service call code.

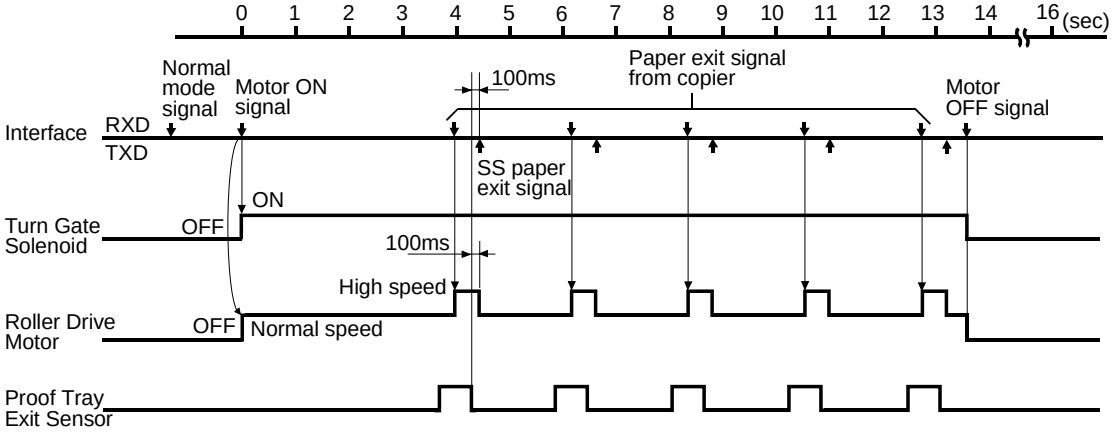
10.2 STAPLE ERROR

The sorter stapler main control board detects a staple error when the following conditions are detected. The copier's operation panel will indicate a sorter jam, and stapling operation will stop in theses cases.

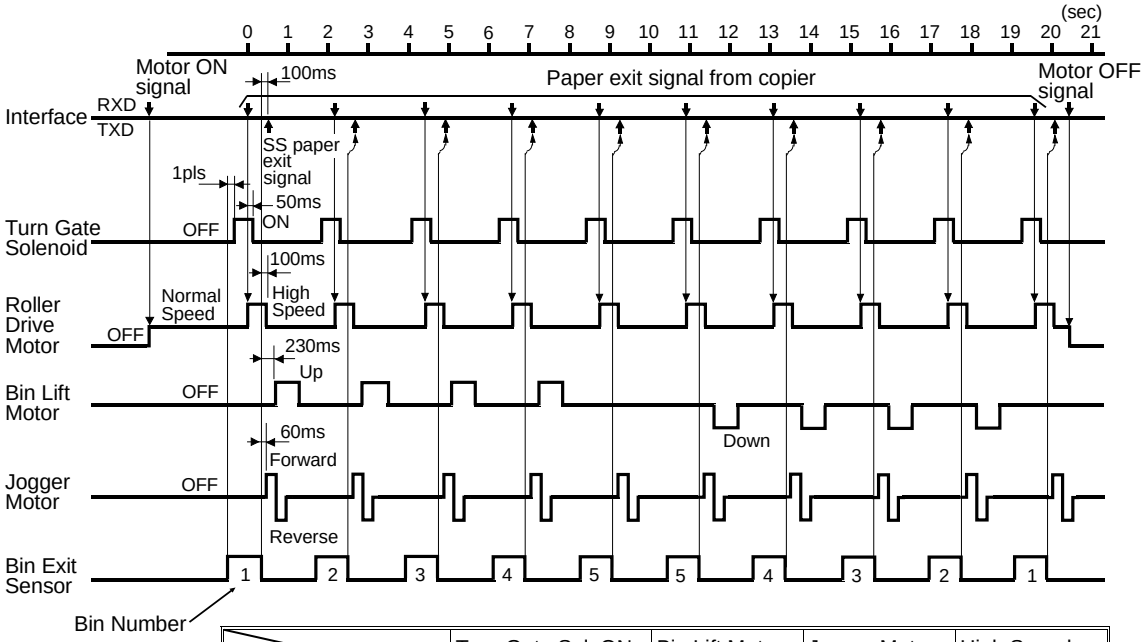
- If the paper sensor is actuated when the sorter stapler or the front door is opened or closed, or when the main switch is turned on.
- If the paper sensor is actuated when the grip assembly returns to the home position after the stapling operation.
- The first time an abnormal condition of the stapler motor or grip motor is detected.
  The second time an abnormal condition is detected, the copier's operation panel will indicate a service call code.

11. TIMING CHARTS (FT4227/5233)

Timing Chart 1: Normal Mode (A4 sideways, 5 copies)

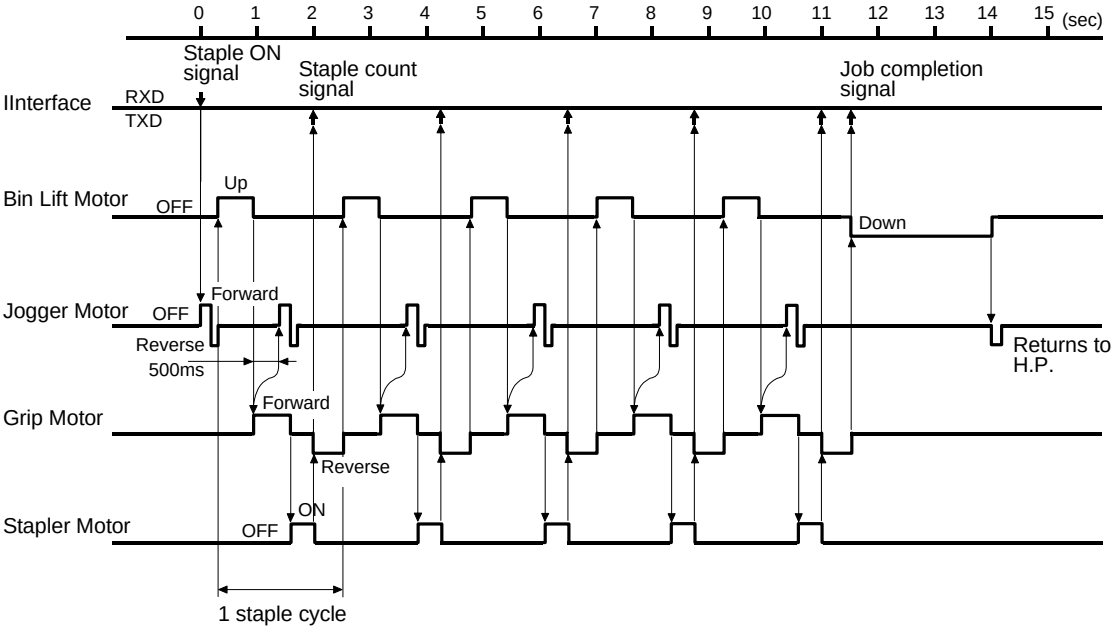


Timing Chart 2: Sort Mode (A4 sideways, 2 copies for 5 bins)



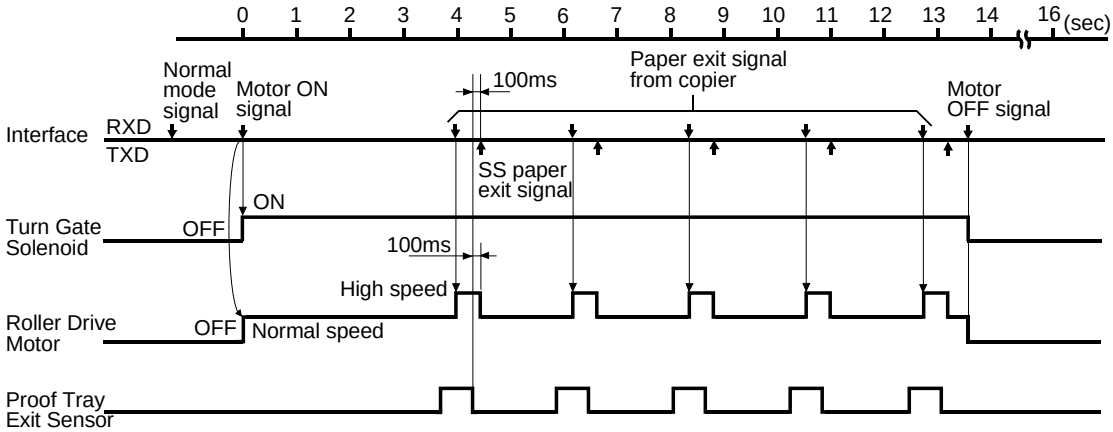
Paper Size	Turn Gate Sol. ON Timing (Pulses)	Bin Lift Motor ON Timing	Jogger Motor ON Timing	High Speed (mm/s)
A3	61	220 ms	40 ms	900
B4	43	225 ms	0 ms	900
A4 sideways	1	230 ms	60 ms	960
A4 lengthwise	21	350 ms	0 ms	900
B5 sideways	1	250 ms	74 ms	1000
B5 lengthwise	8	330 ms	0 ms	900
11" x 17"	65	220 ms	0 ms	900
8 1/2" x 14"	41	525 ms	0 ms	900
8 1/2" x 11" sideways	1	230 ms	265 ms	960
8 1/2" x 11" lengthwise	18	725 ms	0 ms	900

Timing Chart 3: Staple Operation (A4 sideways, 2 copies for 5 bins)

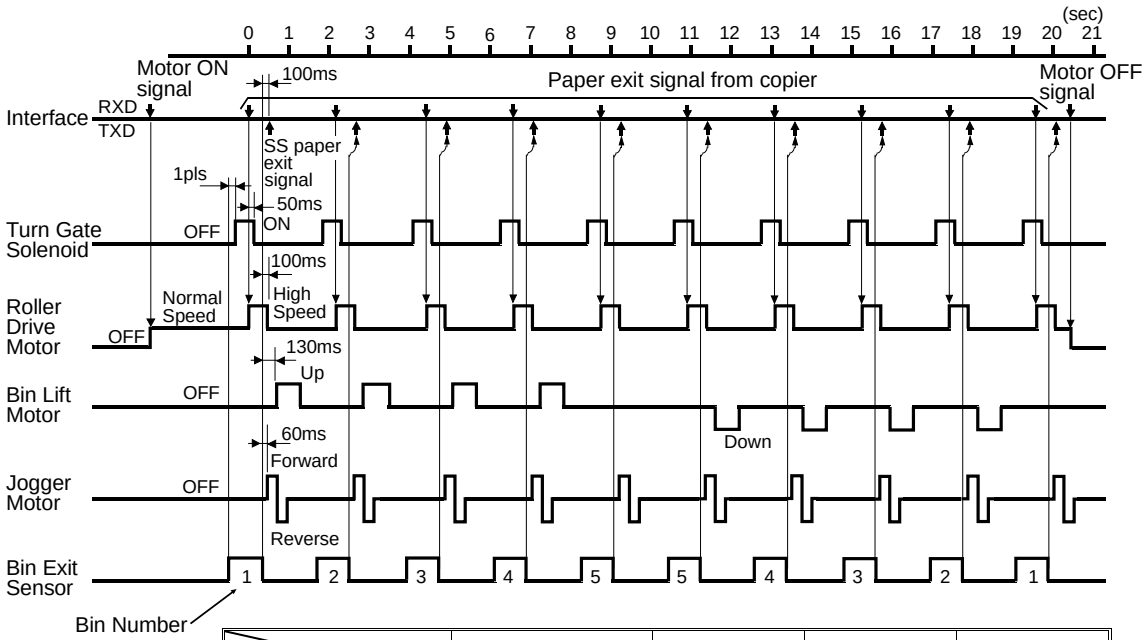


11. TIMING CHART (FT6645)

Timing Chart 1: Normal Mode (A4 sideways, 5 copies)

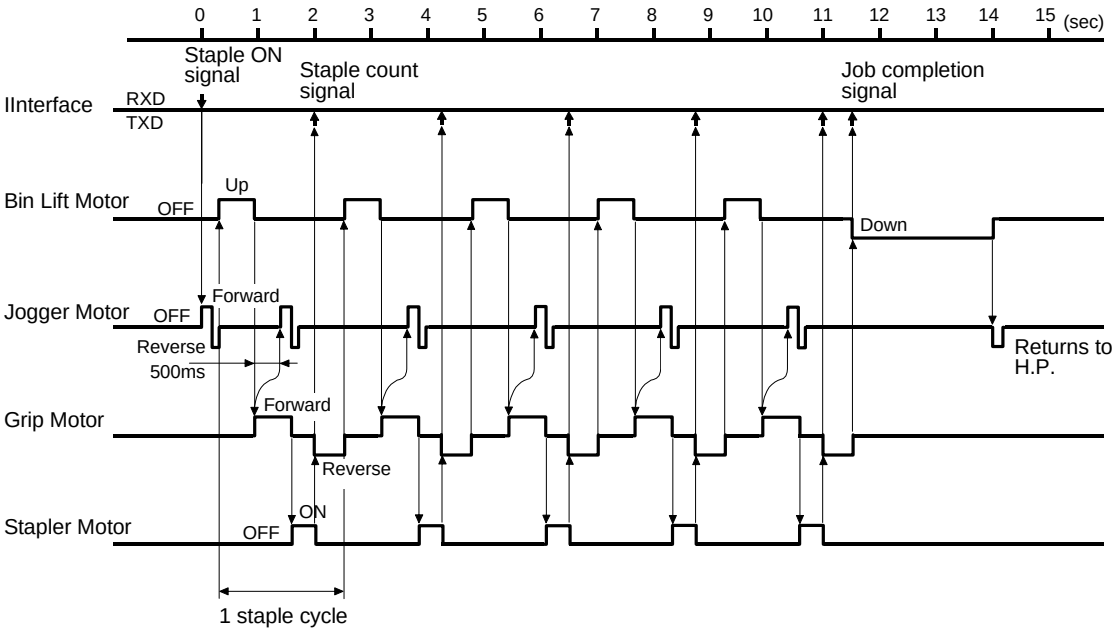


Timing Chart 2: Sort Mode (A4 sideways, 2 copies for 5 bins)



Paper Size	Turn Gate Sol. ON Timing (Pulses)	Bin Lift Motor ON Timing	Jogger Motor ON Timing	High Speed (mm/s)
A3	61	120 ms	40 ms	900
B4	43	125 ms	0 ms	900
A4 sideways	1	130 ms	300 ms	960
A4 lengthwise	21	625 ms	0 ms	900
B5 sideways	1	150 ms	370 ms	966
B5 lengthwise	8	230 ms	0 ms	900
11" x 17"	65	120 ms	0 ms	900
8 1/2" x 14"	41	525 ms	0 ms	900
8 1/2" x 11" sideways	1	130 ms	265 ms	960
8 1/2" x 11" lengthwise	18	625 ms	0 ms	900

Timing Chart 3: Staple Operation (A4 sideways, 2 copies for 5 bins)



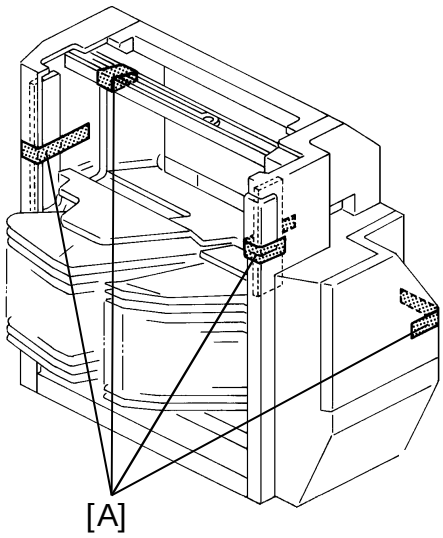
NOTE: All timing charts (Timing chart 1 ~ 3) represents the operation timing when the sorter stapler is installed to FT6645.

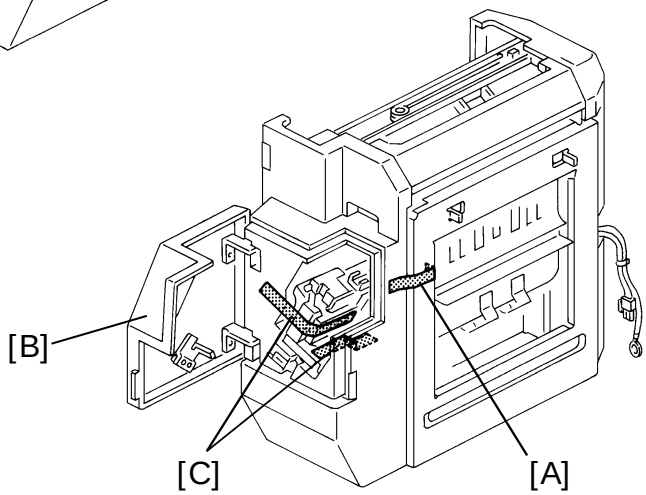
12. ACCESSORY CHECK

Check the quantity and condition of the accessories in the box as listed below:

1. Harness Cover 1
2. Proof Tray 1
3. Staple Cartridge 1
4. Decal Switch 1
5. Fiber Optics Cable 1
6. Staple Position Decal 1
7. Stepped Screw 1
8. Philips Truss Head Screw -M4 x 6..... 3
9. Philips Pan Head Screw -M4 x 12 4
10. Grounding Screw with Toothed Washer –M4 x 8 1
11. New Equipment Condition Report (–17 machine only) 1
12. Envelope for N.E.C.R. (–17 machine only) 1
13. Installation Procedure 1

13. INSTALLATION PROCEDURE (FT4277/5233)



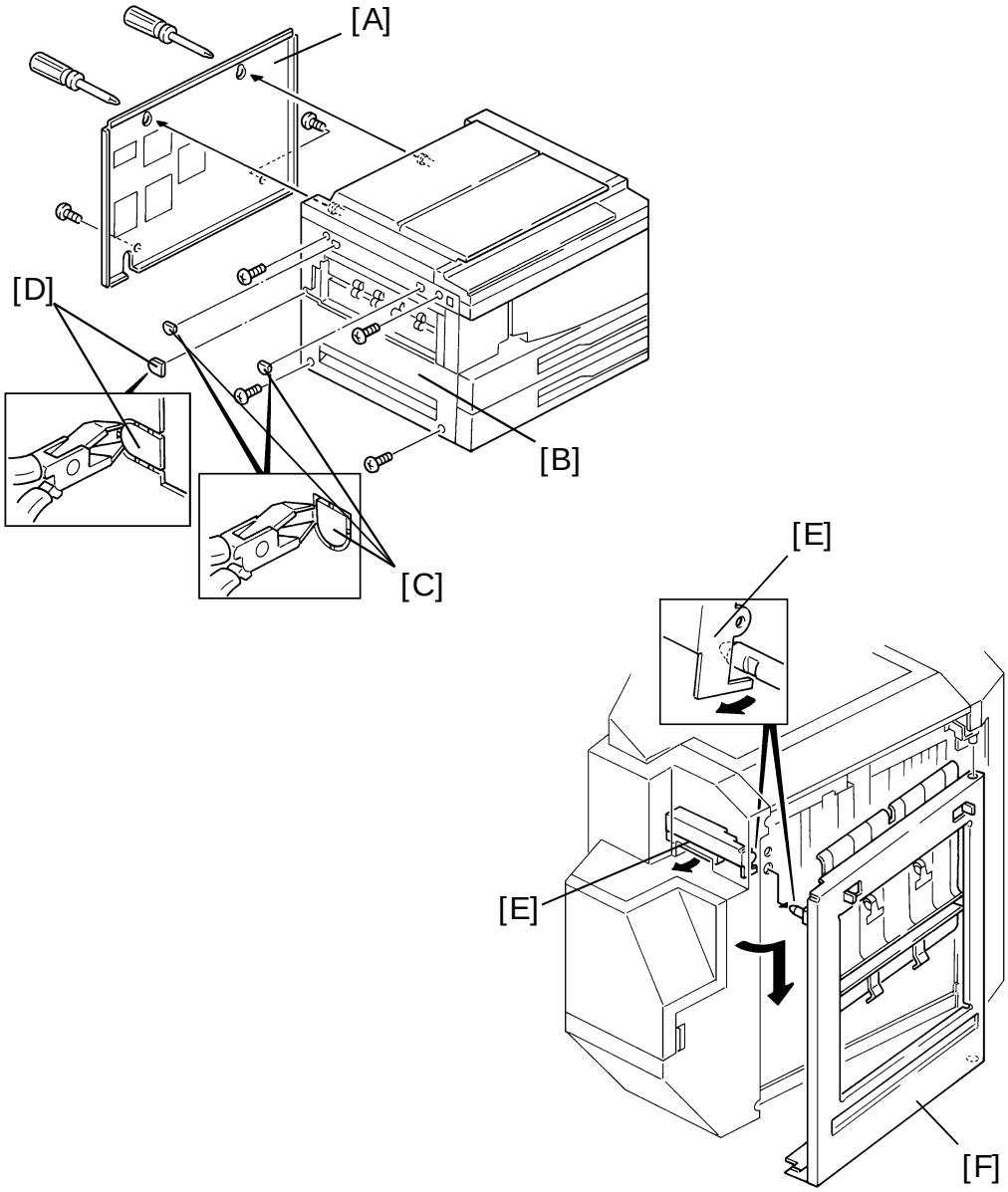


NOTE: The sorter adapter (A328) should be installed before the sorter stapler is.

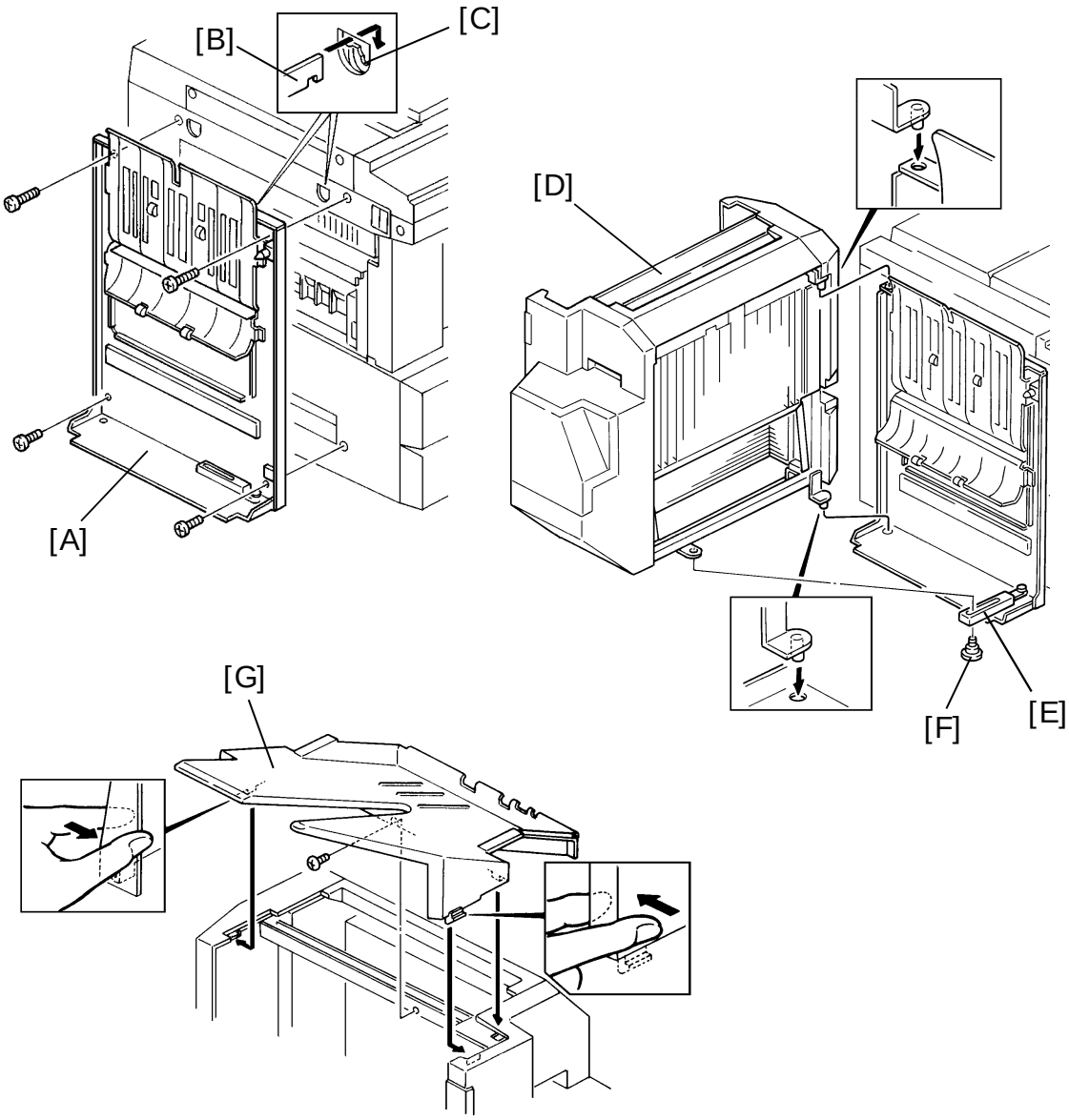
The interface PCB (A344) is necessary for sorter stapler installation.

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

1. Remove the strips of tape [A] and open the front door [B].
2. Remove the strips of tape [C] from the staple unit and close the front door.



3. Remove the copier rear cover [A] (remove 2 screws and loosen 2 screws).
4. Remove the 4 screws securing the copier left cover [B].
5. Remove the cover plates [C,D] from the left cover by cutting them with cutting pliers.
6. Release the lock lever [E] of the sorter stapler and unhook the S/S mounting frame [F] as shown.



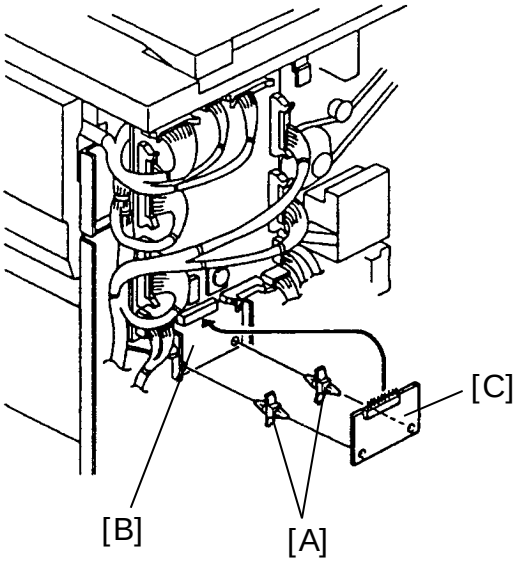
7. Install the S/S mounting frame [A] on the copier as shown (4 screws – M4 x 12).

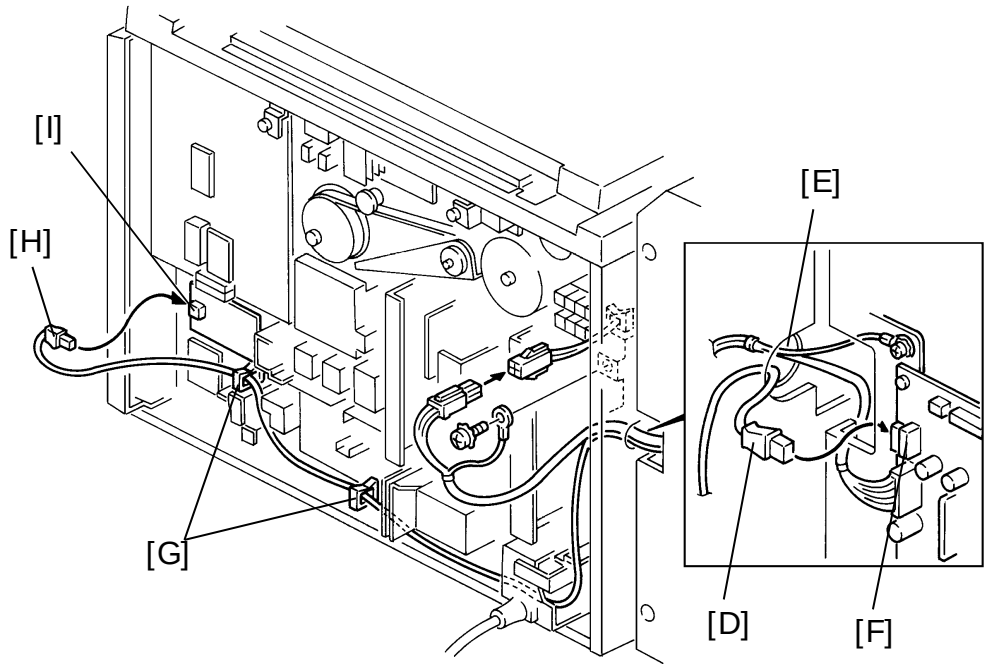
   NOTE: When hooking the S/S mounting frame on the left side of the copier, make sure that the positioning hooks [B] of the frame are properly inserted in the positioning holes [C] of the copier.

8. Install the sorter stapler [D] on the S/S mounting frame (2 hinge pins at the rear).

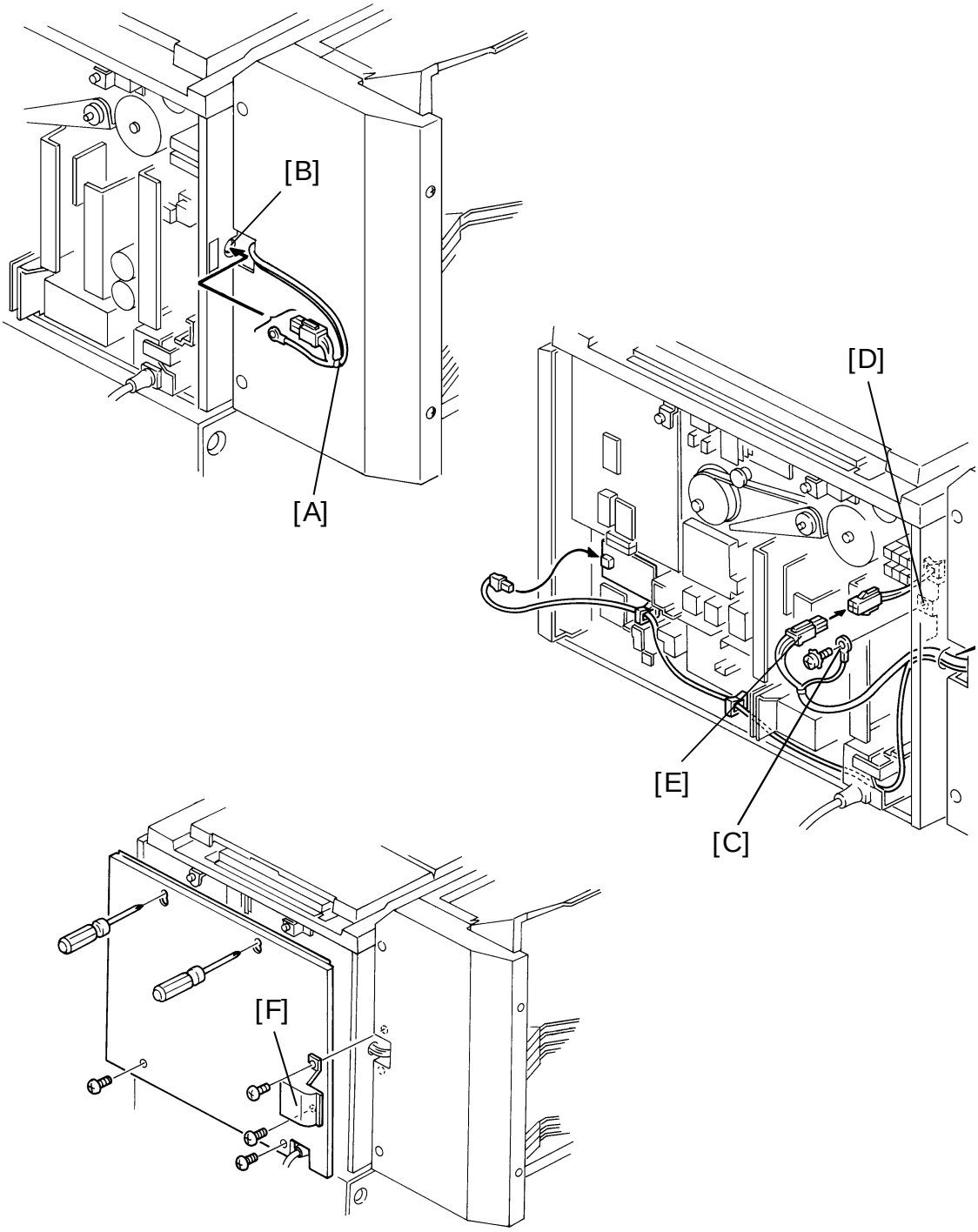
9. Connect the link lever [E] with the sorter stapler by using stepped screw [F], and then close the sorter stapler.

10. Install the proof tray [G] (1 screw) as shown.

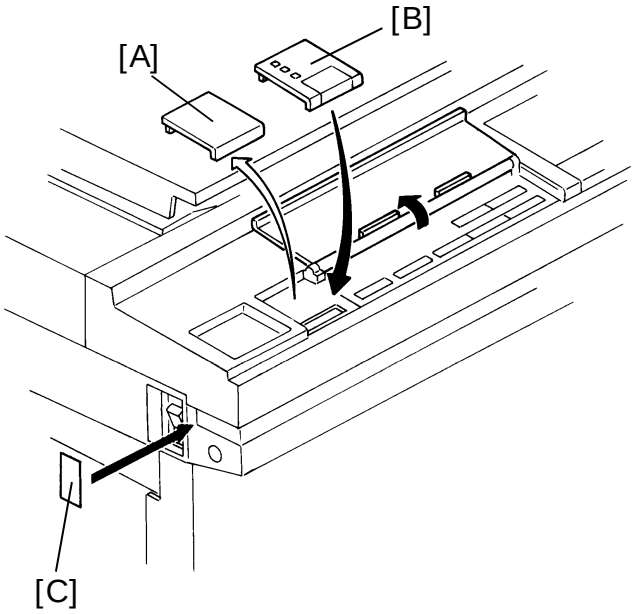


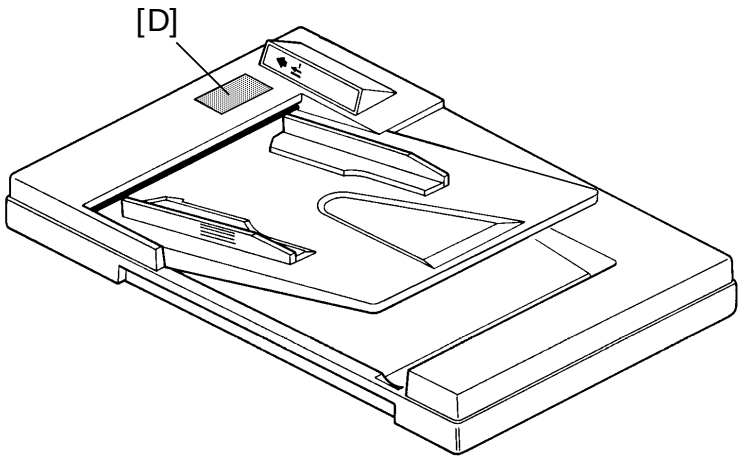


11. Set the 2 locking supports [A] on the copier main board bracket [B] and install the interface PCB [C] onto CN114 on the main board as shown.
12. Pass the fiber optics cable [D] through the access hole [E] and connect to CN110 [F] on the main board of the sorter stapler.
13. Run the fiber optics cable as shown and set it in the wire saddles [G].
14. Connect the other end [H] of the fiber optics cable to CN703 [I] on the interface PCB.

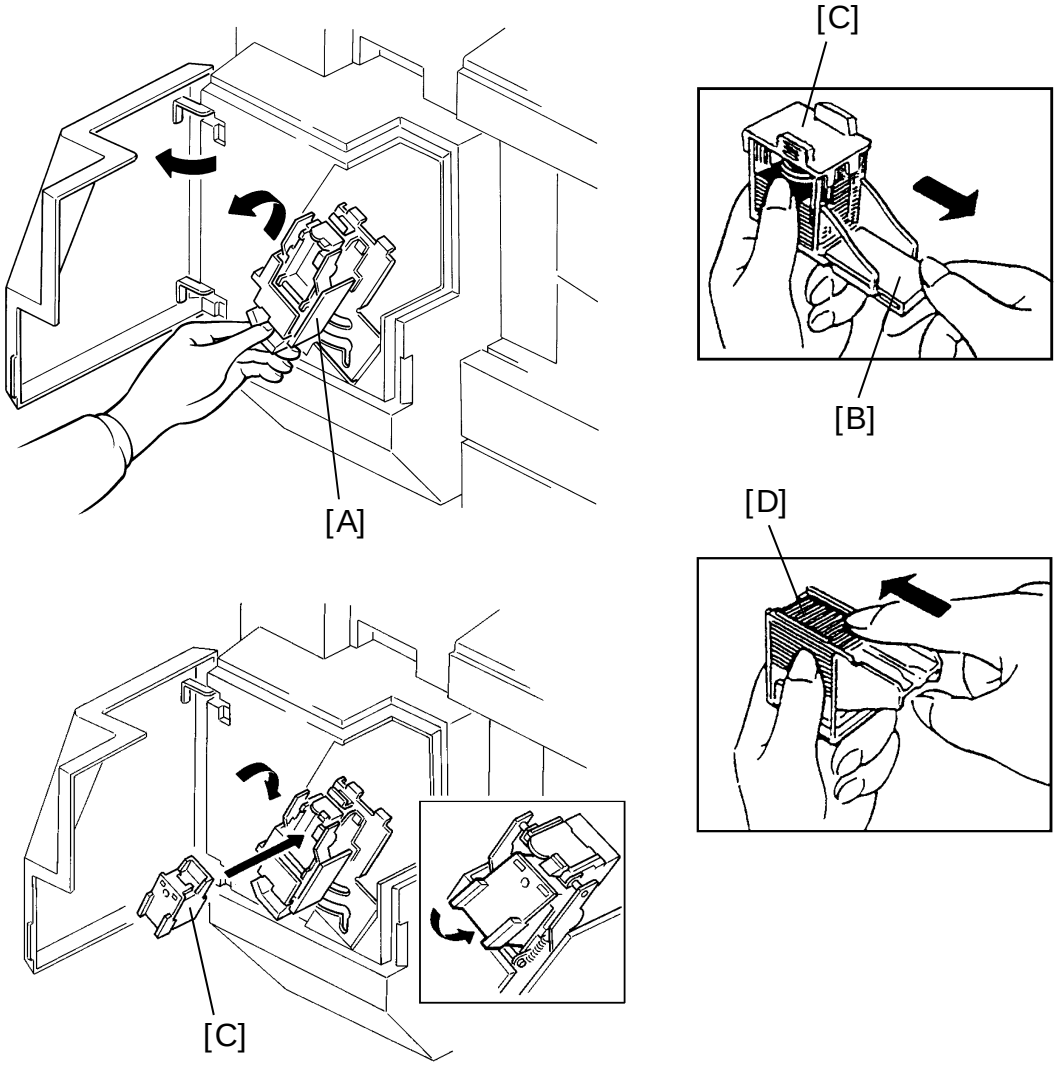


15. Pass the sorter stapler harness [A] through the access hole [B].
16. Secure the protective earth wire [C] on the bracket [D] (1 grounding screw with toothed washer), and couple the connector (4P white) [E].
17. Install the harness cover [F] on the sorter stapler as shown (2 screws).
18. Install the copier rear cover.





19. Remove the left plastic cover [A] on the operation panel and install the sorter key top and cover [B] instead.
    (The sorter key top and cover are provided as accessories for the copier.)
20. Stick the main switch decal [C] on the copier as shown.
21. Stick the staple position decal [D] on the ARDF as shown. (If there is no ARDF, stick it on the corresponding position of the platen cover.)



22. Open the front door of the sorter stapler and swing the staple unit [A] up.
23. Remove the green plastic clip [B] from the staple cartridge [C] and correct the position of the staple sheet [D] if necessary.
24. Install the cartridge in the stapler while holding the staple unit.
25. Set the staple unit at the original position, close the S/S front door, and plug in the copier.
26. Turn on the copier main switch and test the operation of the sorter stapler.

    NOTE: 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.

INSTALLATION PROCEDURE (FT6645)

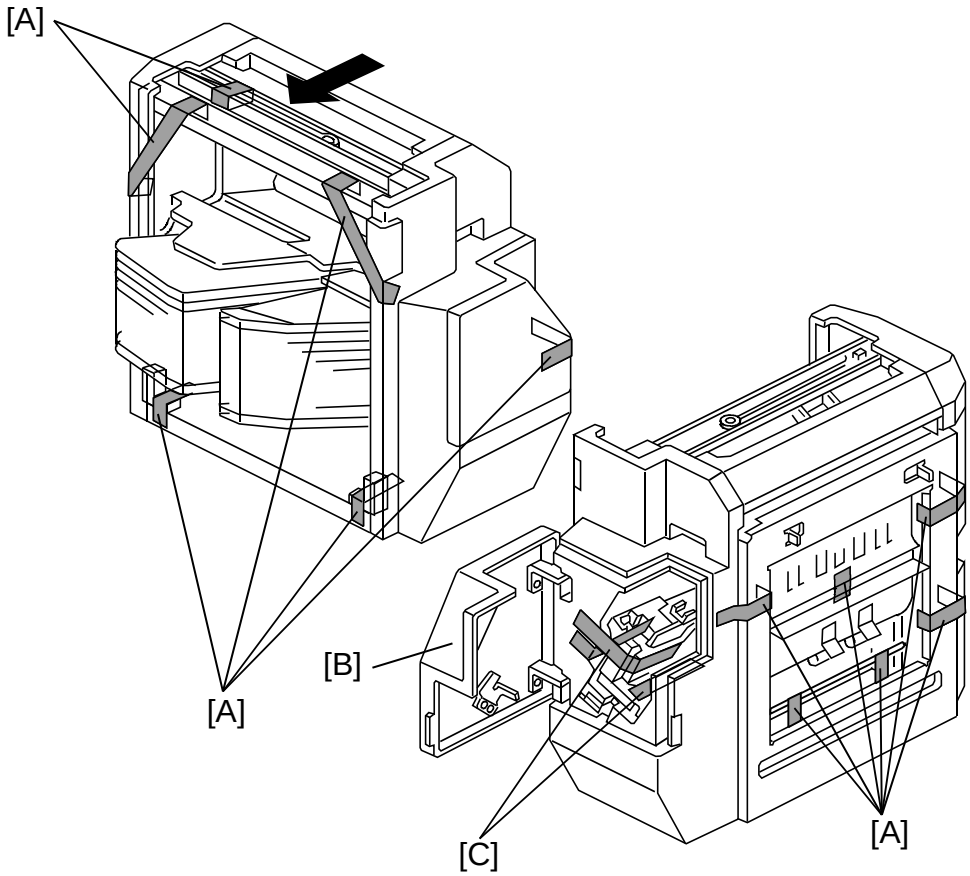
ACCESSORY CHECK

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

1. Harness Cover 1
2. Proof Tray 1
3. Staple Cartridge 1
4. Decal Switch 1
5. Fiber Optics Cable 1
6. Staple Position Decal 1
7. Stepped Screw 1
8. Philips Truss Head Screw – M4 x 6 3
9. Philips Pan Head Screw – M4 x 14 4
10. Grounding Screw with Toothed Washer – M4 x 6 1
11. Envelop – N.E.C.R. (for U.S.A.) 1
12. Installation Procedure 1
13. Upper Entrance Guide 1
14. Lower Entrance Guide 1
15. Philips Pan Head Screw – M4 x 20 4
16. Tapping Screw – M4 x 6 4

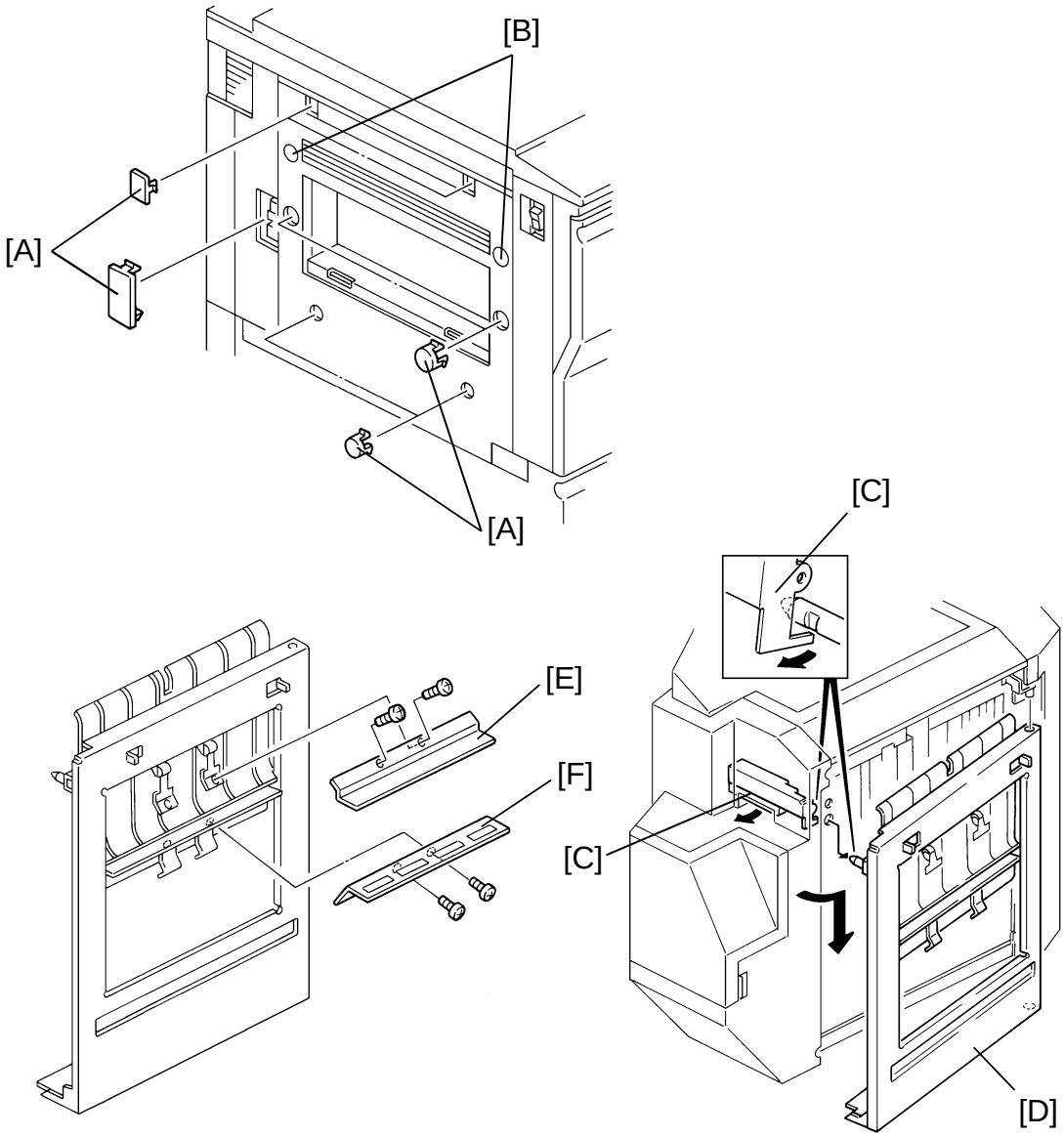
INSTALLATION PROCEDURE
(for Machine Code:A095 copier)

NOTE: This represents the installation the procedure when the sorter is installed to the FT 6645.



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

1. Remove the strips of tape [A] and open the front door [B].
2. Remove the strips of tape [C] from the staple unit and close the front door.

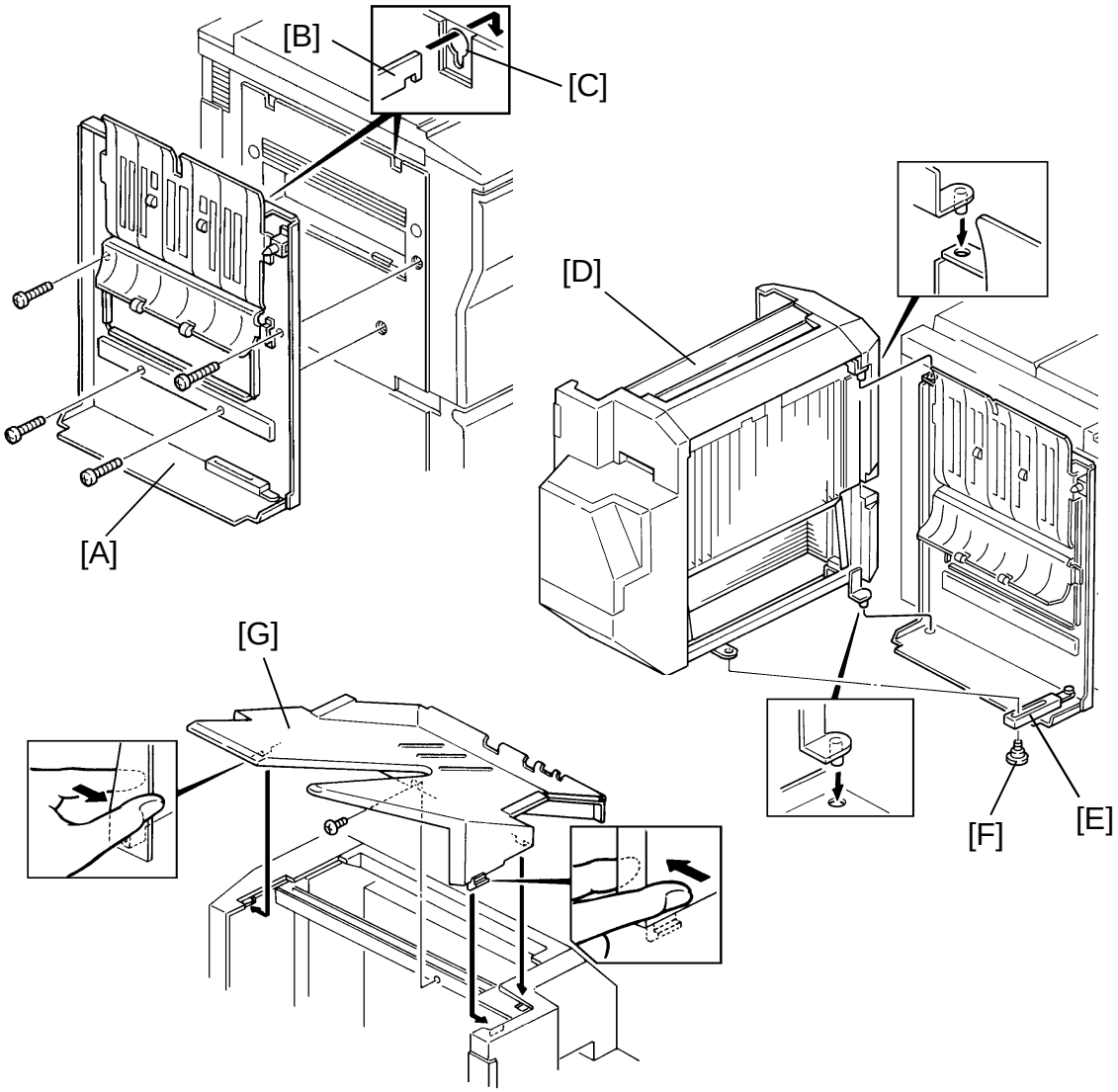


3. Remove the cover plates [A] from the left cover.

   NOTE: Do not remove the cover plates [B].

4. Release the lock lever [C] of the sorter stapler and unhook the S/S mounting frame [D] as shown.

5. Install the upper guide plate [E] (2 screws – M4 x 6) and the lower guide plate [F] (2 screws – M4 x 6).



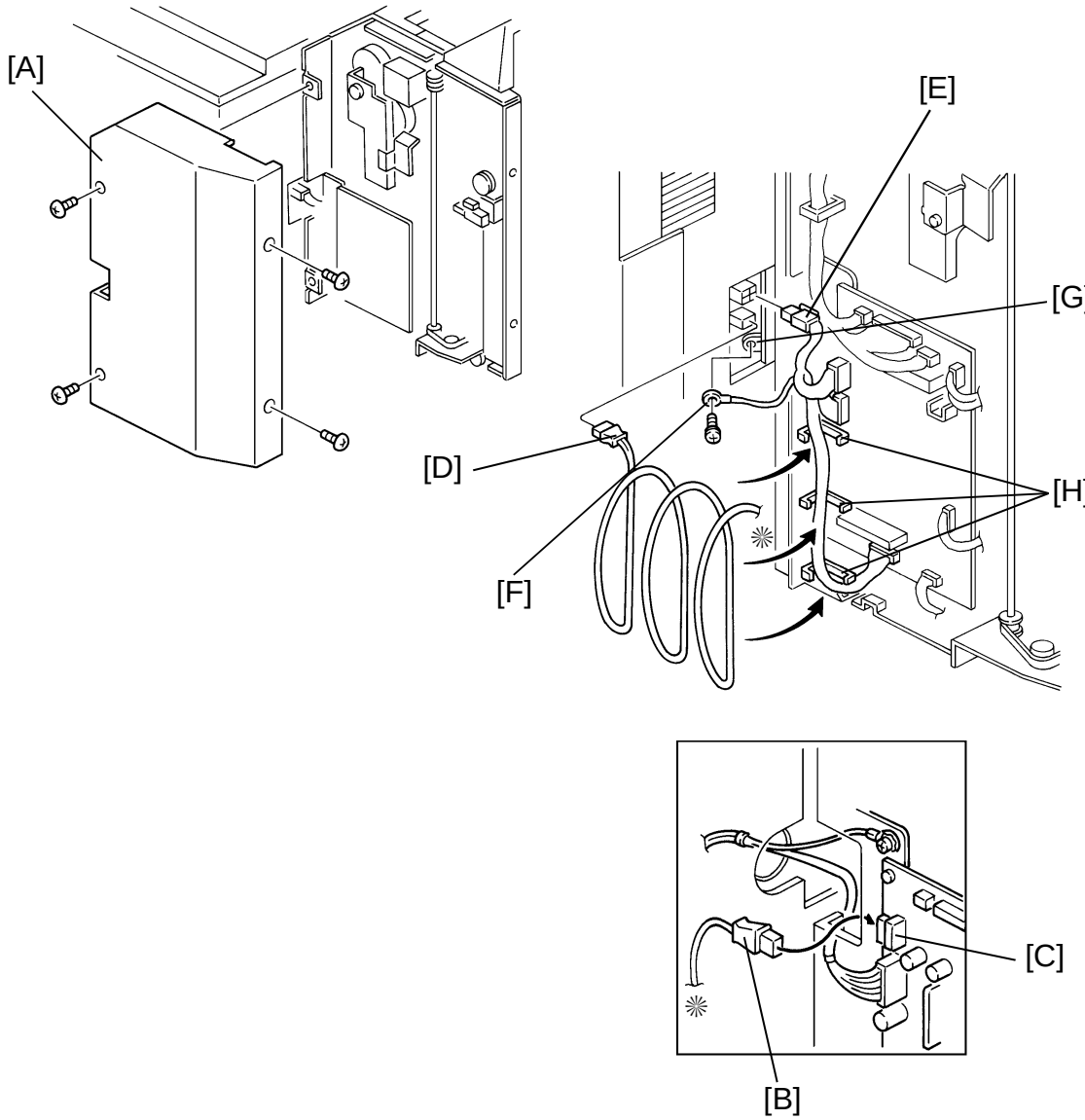
6. Install the S/S mounting frame [A] on the copier as shown (4 screws – M4 x 20).

   NOTE: When hooking the S/S mounting frame on the left side of the copier, make sure that the positioning hooks [B] of the frame are properly inserted in the positioning holes [C] of the copier.

7. Install the sorter stapler [D] on the S/S mounting frame (2 hinge pins at the rear).

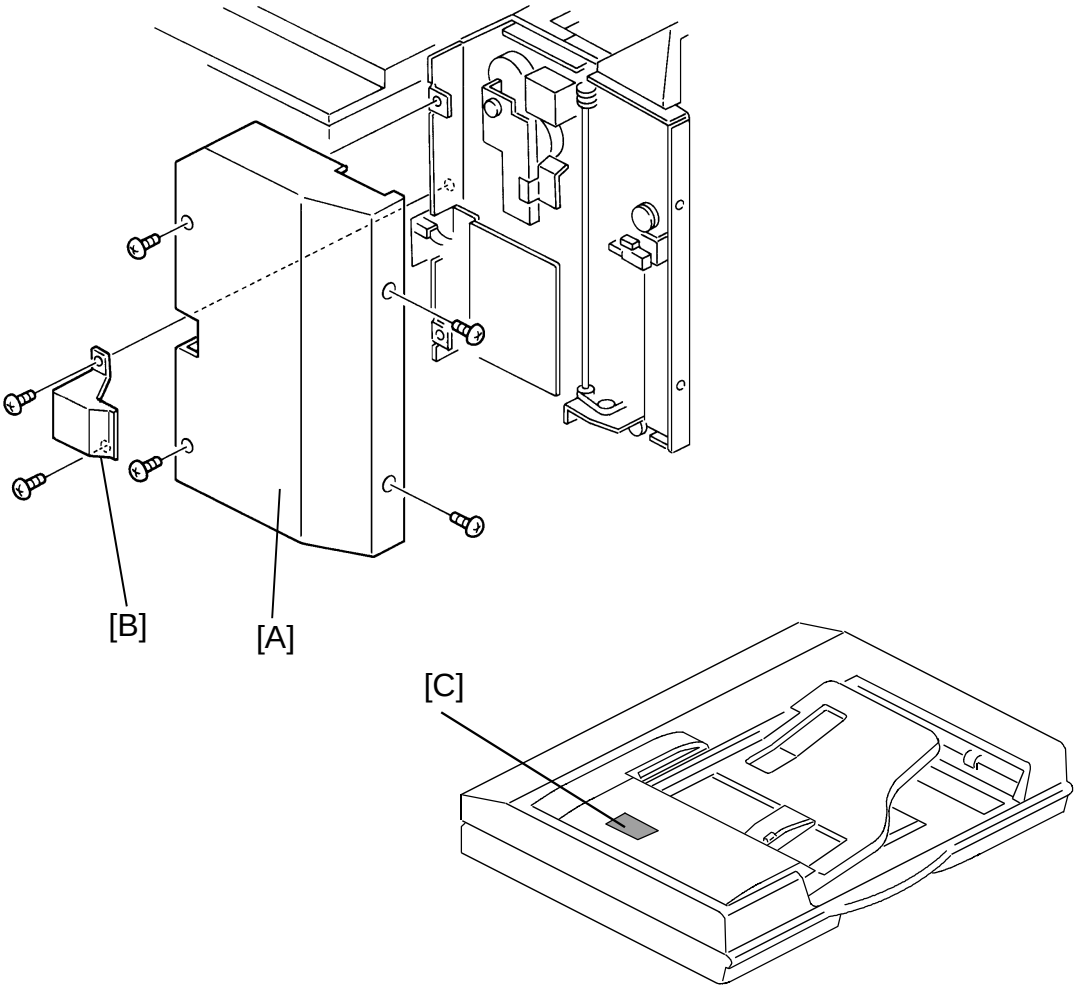
8. Connect the link lever [E] with the sorter stapler by using stepped screw [F], and then close the sorter stapler.

9. Install the proof tray [G] (1 screw – M4 x 6) as shown.

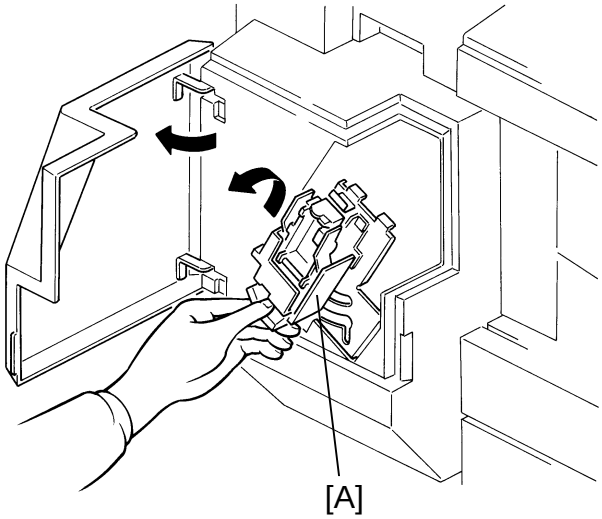


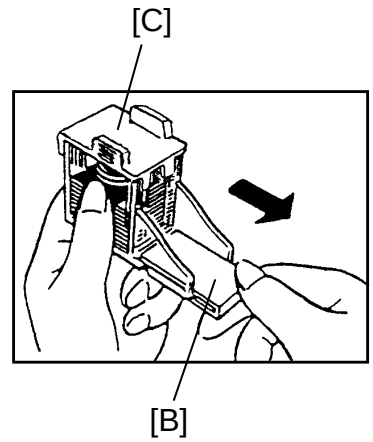
10. Remove the rear cover [A] (4 screws) of the sorter stapler.
11. Couple the fiber optics cable connector [B] to DC1002 [C] on the Sorter Stapler Main PCB.
12. Couple the fiber optics cable connector [D] and the connector [E].
13. Secure the protective earth wire [F] on the bracket [G] (1 protective earth screw with spring washer).
14. To prevent the fiber optic cable being pinched by cover, round the fiber optic cable through the wire saddles [H] three times as shown.

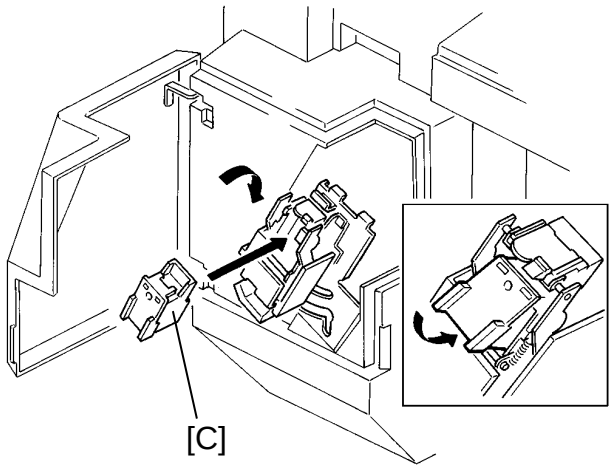
CAUTION: Do not bend the fiber optic cable.

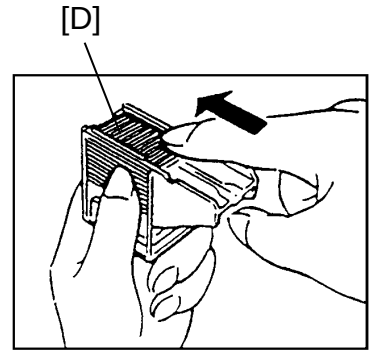


15. Install the sorter stapler rear cover [A] (4 screws).
16. Install the harness cover [B] (2 truss screws – M4 x 6) on the sorter stapler (2 truss head screws)
17. Stick the staple position decal [C] on the Dual Job Feeder (DJF) as shown. (If there is no DJF, stick it on the corresponding position of the platen cover.)









18. Open the front door of the sorter stapler and swing the staple unit [A] up.
19. Remove the green plastic clip [B] from the staple cartridge [C] and correct the position of the staple sheet [D] if necessary.
20. Install the cartridge in the stapler while holding the staple unit.
21. Set the staple unit at the original position, close the S/S front door, and plug in the copier.
22. Turn on the copier main switch and test the operation of the sorter stapler.

    NOTE: 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. The copier automatically recognizes that the sorter stapler has been installed.

14. SERVICE TABLE (MAIN CONTROL BOARD)

14.1 DIP SWITCHES

DIP SW 100

1	2	3	4	5	FUNCTION	Remarks
0	0	0	0	0	Standard	
*1	1	0	0	0	Sorter Free Run	#1
	0	1	0	0	Staple Free Run	#2
	1	1	0	0	Sorter&Staple Free Run	#3
0	0	0	0	1	Bin Sensor Adjustment	

NOTE:*1 Confirm the setting from DIP SW 100 -2 to -5 before turning on DIP SW 100 - 1 (Start SW function).
Turn off DIP SW 100 - 1 to stop the function.

Remarks

#1 The roller drive motor turns on.
The sorting operation is repeated from the 1st bin to the 20th bin.

Operated components:
- Turn gate solenoid
- Bin lift motor
- Jogger motor

#2 The stapling operation is repeated from the 1st bin to the 20th bin. When there is no paper in a bin, the stapling operation is skipped for that bin.

Operated components:
- Bin lift motor
- Grip motor
- Stapler motor

#3 #1 and #2 are repeated together.
Combinations other than those above are used at the factory.

14.2 LED AND VARIABLE RESISTOR

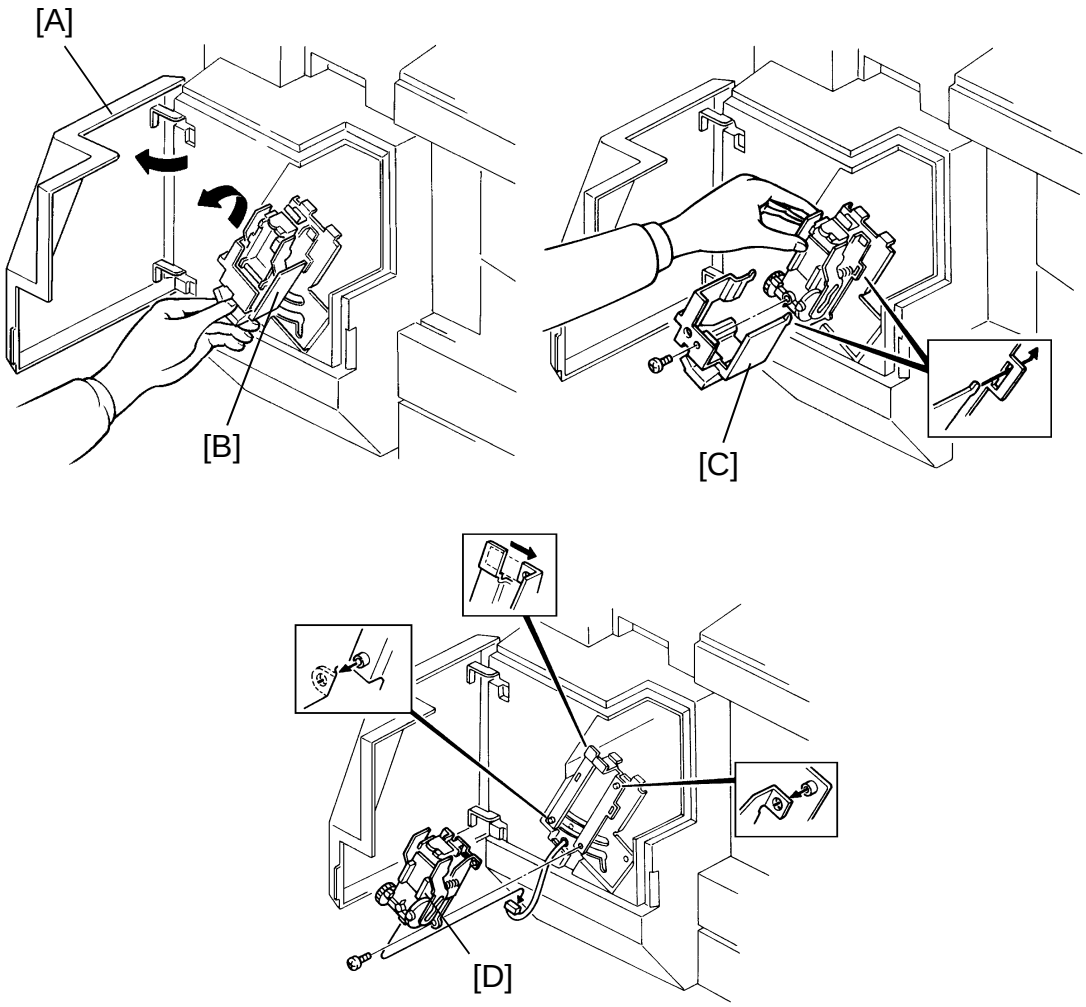
LED No.	VR No.	FUNCTION
100	100	Adjusts bin sensor sensitivity.

14.3 TEST POINTS

Number	FUNCTION
TP100	GND
TP101	+24V
TP102	+5V

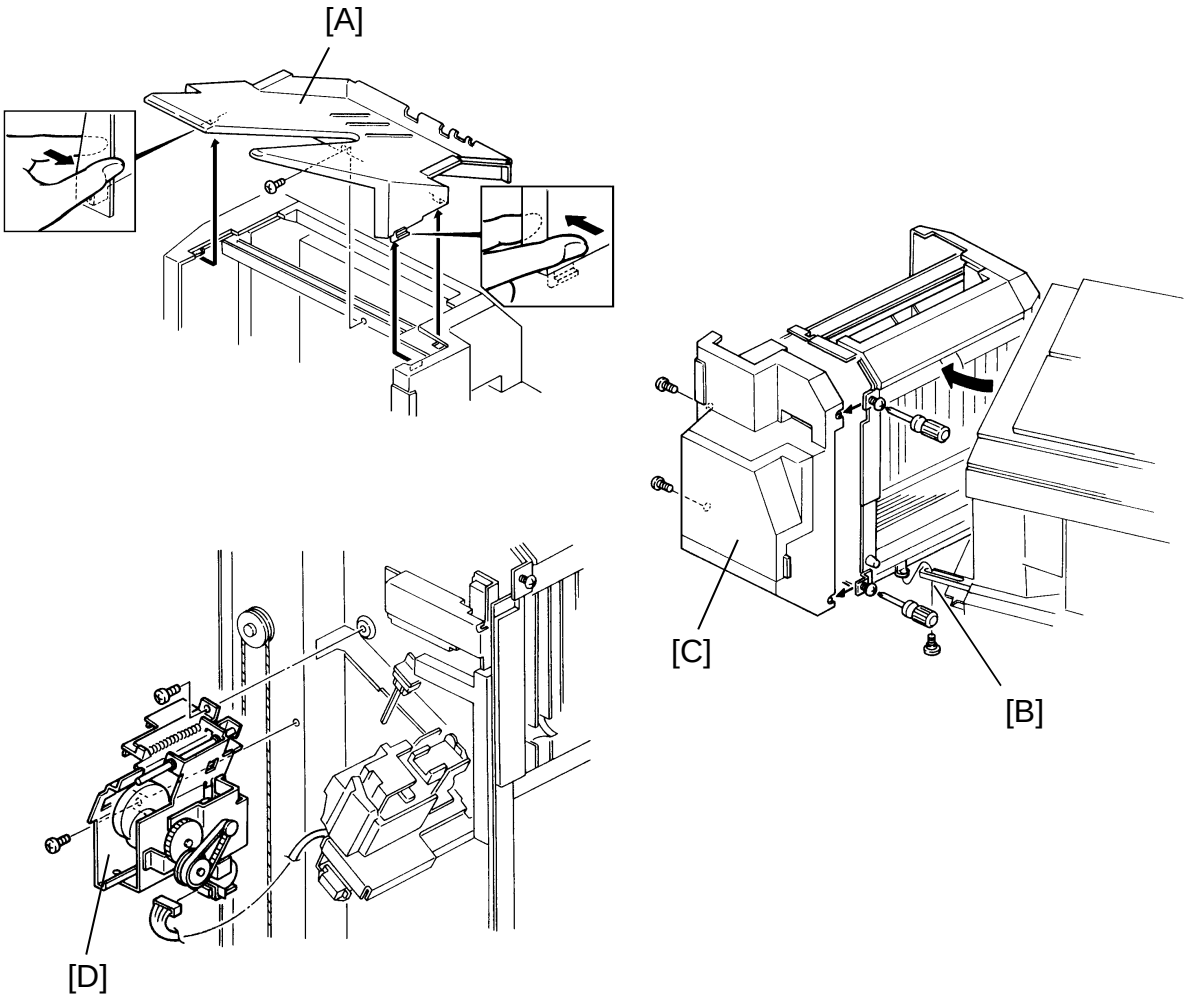
15. REPLACEMENT AND ADJUSTMENT

15.1 STAPLER REMOVAL



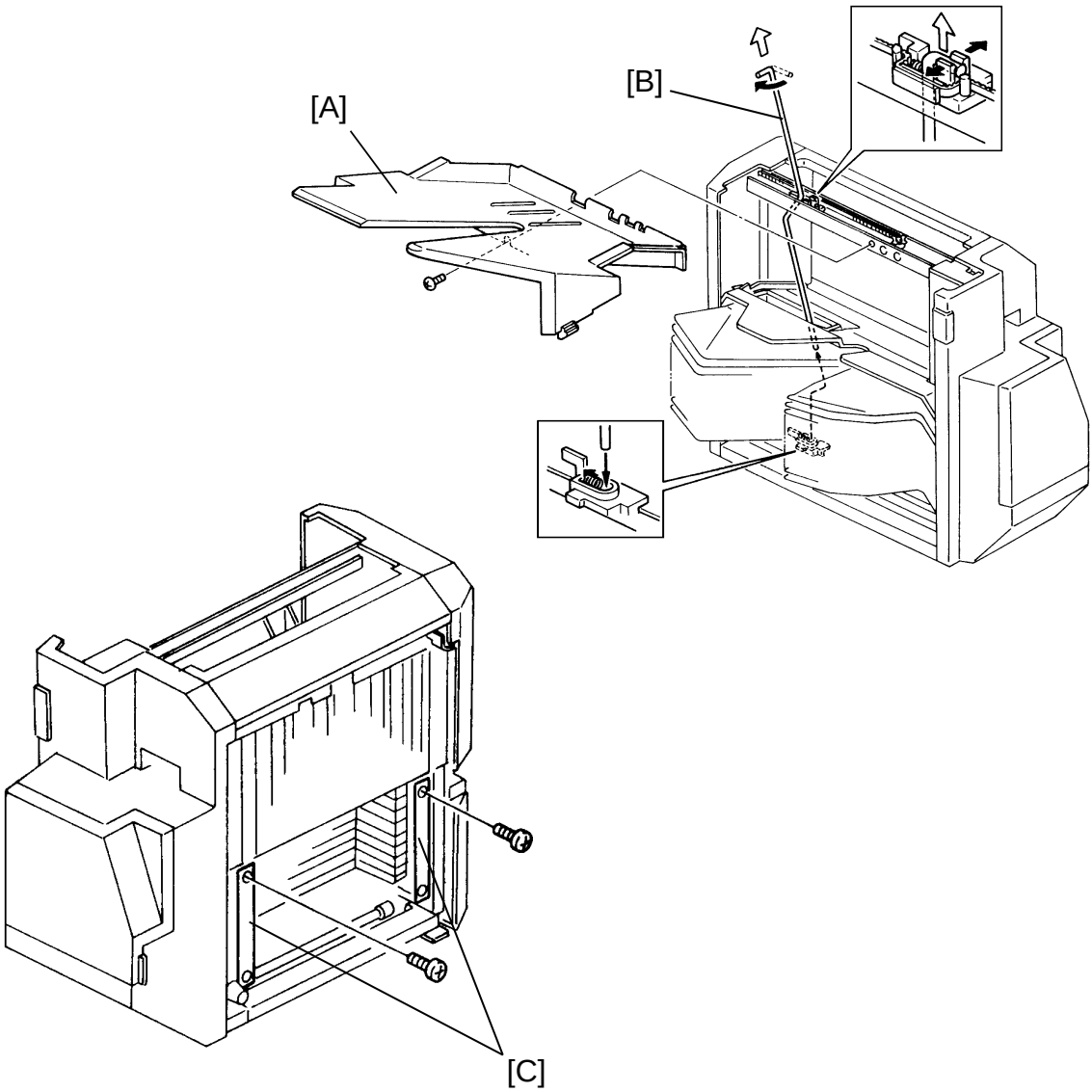
1. Open the front door [A] of the sorter stapler and swing the staple unit [B] up.
2. Remove the staple unit cover [C] (1 screw).
3. Remove the stapler [D] (1 screw and 1 connector).

15.2 GRIP ASSEMBLY REMOVAL

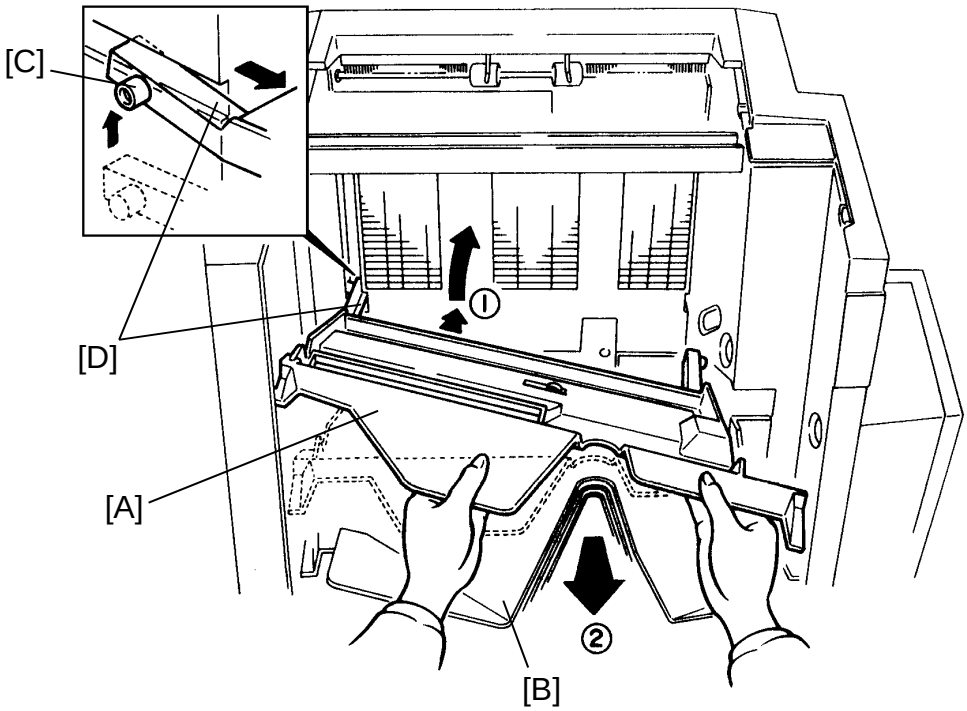


1. Remove the proof tray [A] (1 screw).
2. Swing out the sorter stapler and disconnect the link lever [B] (1 stepped screw).
3. Remove the front cover [C] (remove 2 screws and loosen 2 screws).
4. Remove the grip assembly [D] (2 screws and 1 connector).

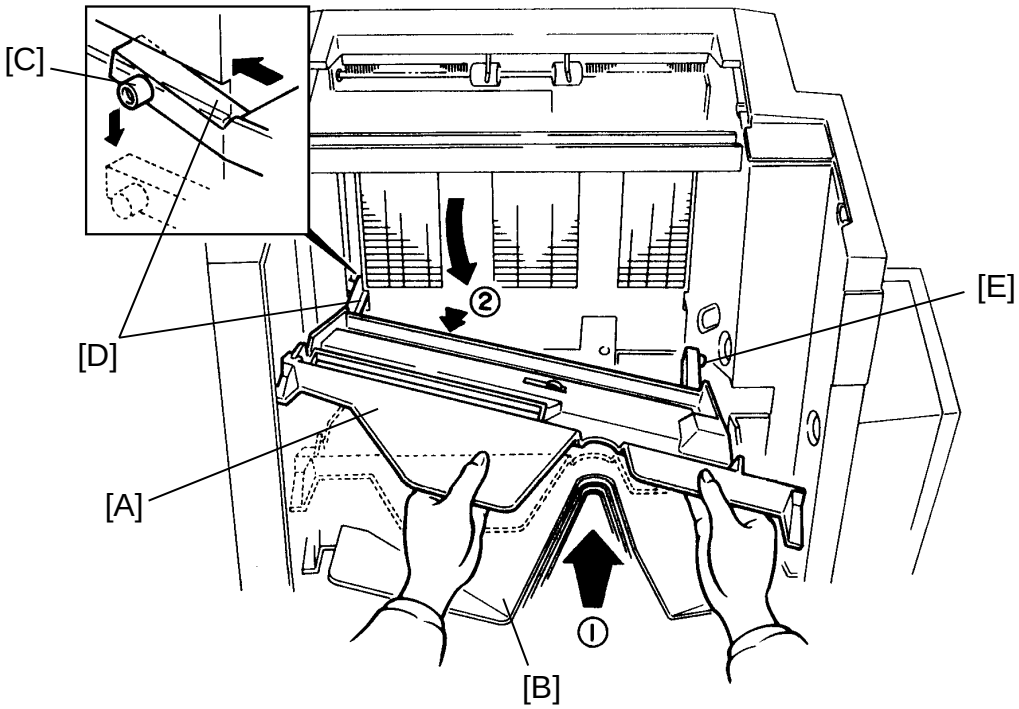
15.3 BIN REPLACEMENT



1. Remove the sorter stapler from the copier.
2. Remove the proof tray [A] (1 screw).
3. Remove the jogger bar [B] as shown.
4. Remove the upper securing screw of the bin link [C] (1 screw each).



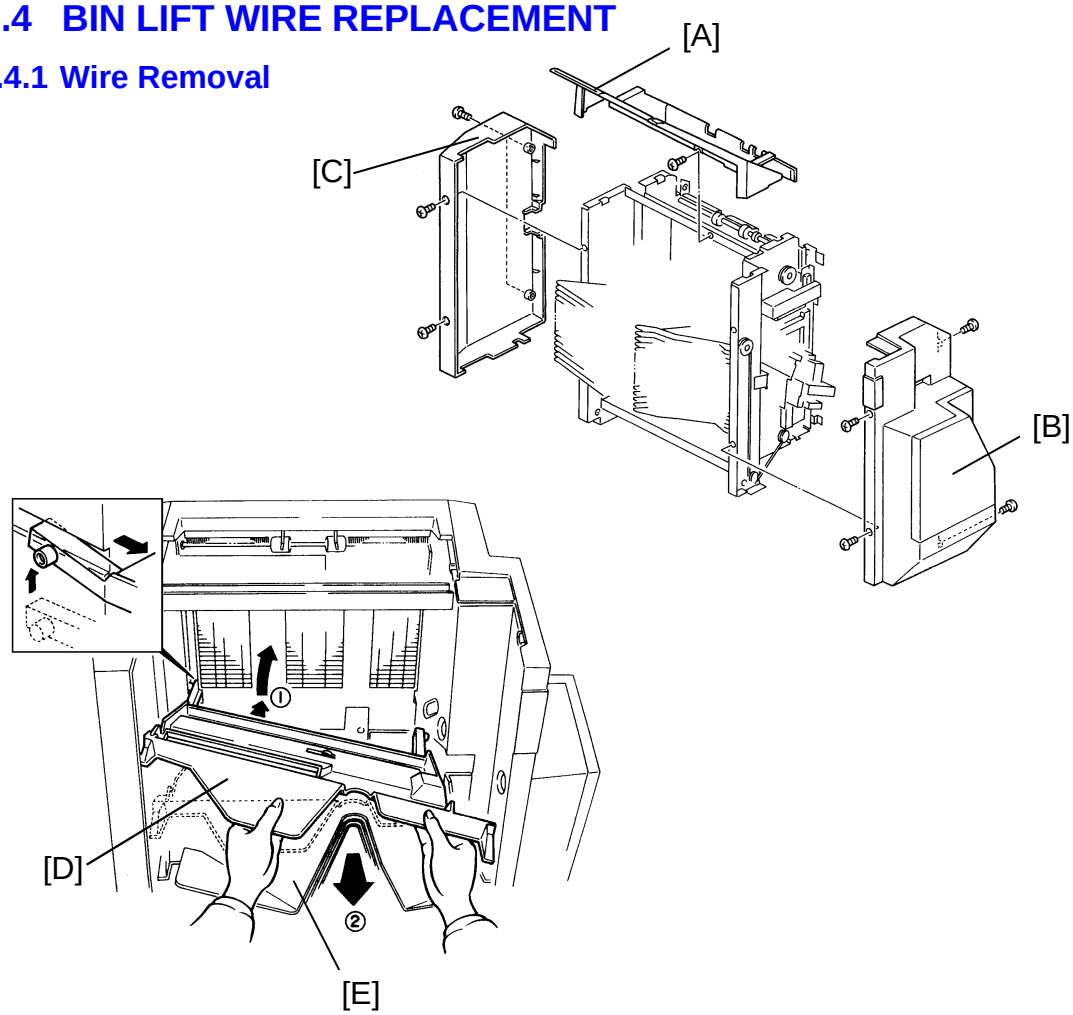
5. Remove the support bin [A] and bins [B].
   (1) Hold the bin [A or B] with both hands.
   (2) Push the bin forward until the wheels [C] reach the bend.
   (3) Push the left side of the bin forward and pull that side up.
   (4) As you pull the left side up, the right wheel will leave its track.
   (5) When the left wheel reaches the slot [D], pull the bin out.



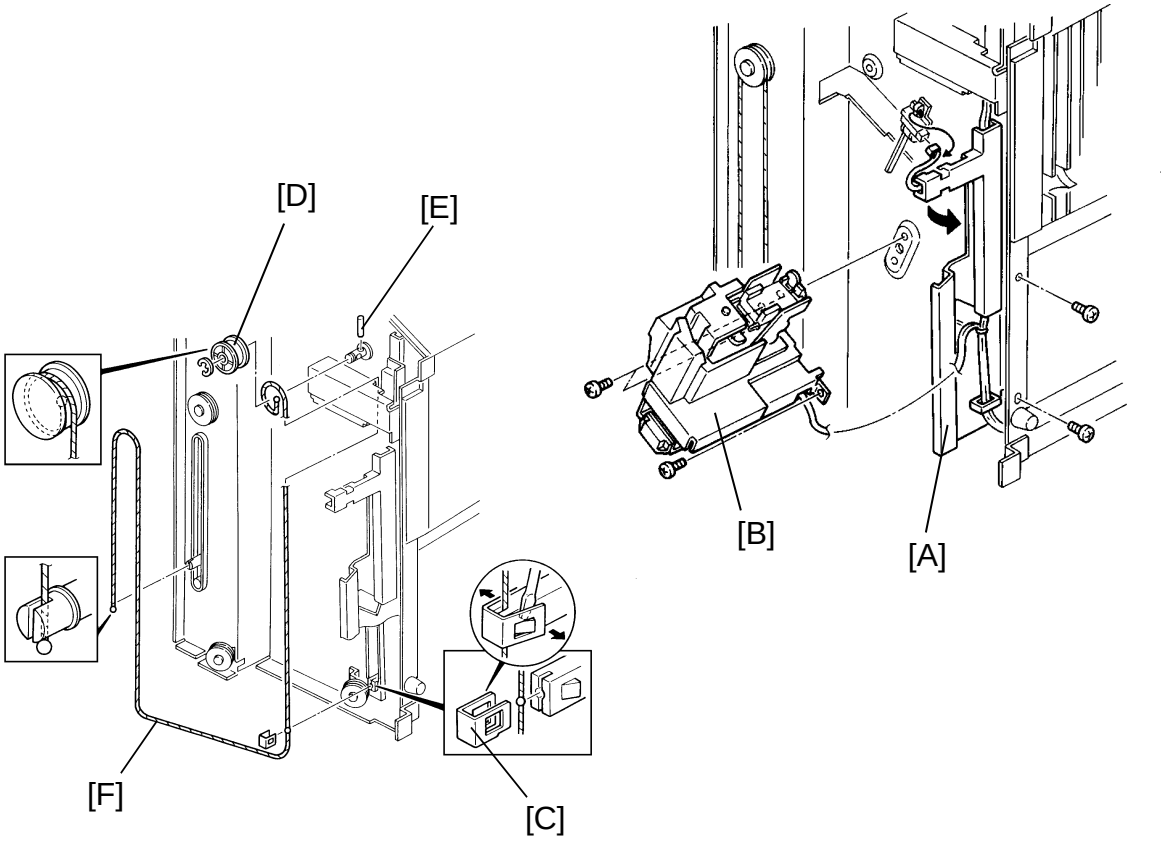
6. Install the support bin [A] and bins [B].
   (1) Hold the bin top side up with both hands.
   (2) Tilt the bin so the left side is higher then the right side.
   (3) Pass the left wheel [C] through the slot [D], at the same time, pass the right wheel [E] just below the stapler opening.
   (4) Set the left wheel into the left track, then push the right wheel into the right track.

15.4 BIN LIFT WIRE REPLACEMENT

15.4.1 Wire Removal

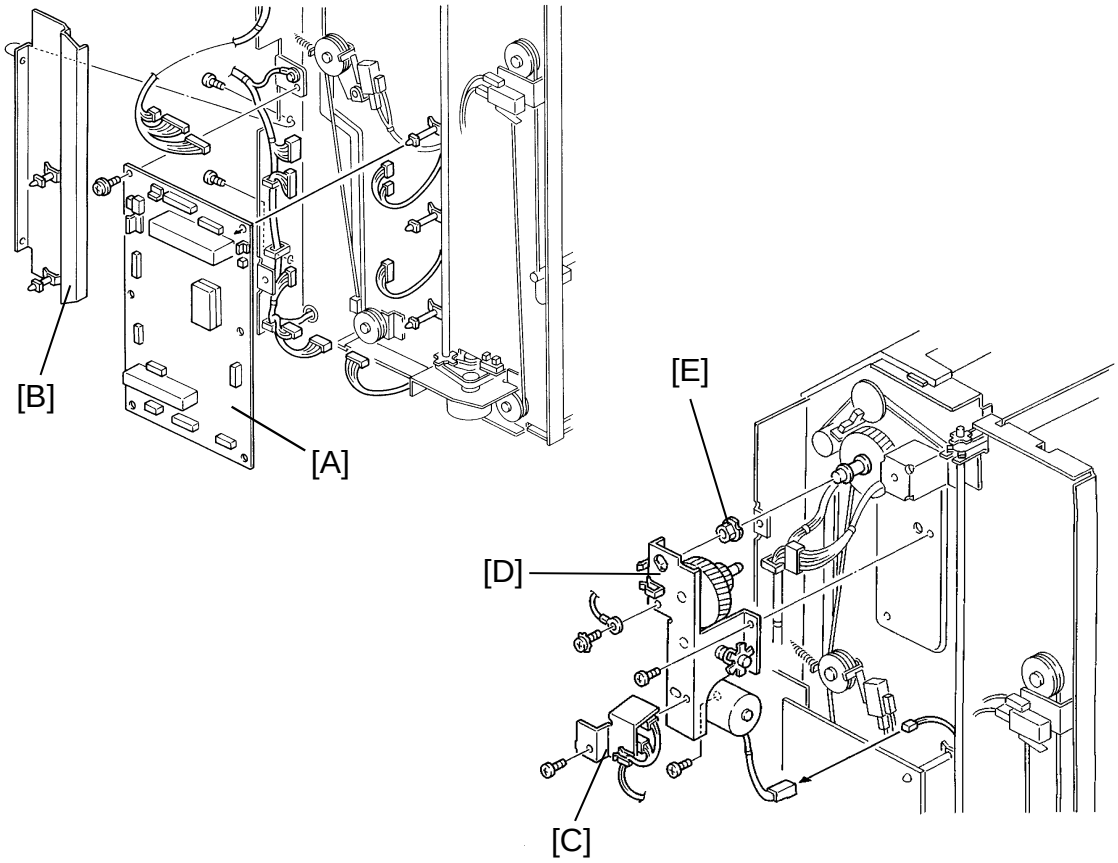


1. Remove the sorter stapler from the copier.
2. Remove the following parts:
   - Proof Tray [A] (1 screw).
   - Front Cover [B] (loosen 2 screws and remove 2 screw)
   - Rear Cover [C] (4 screws)
   - Support Bin [D] (see Bin Replacement)
   - Bins [E] (see Bin Replacement)



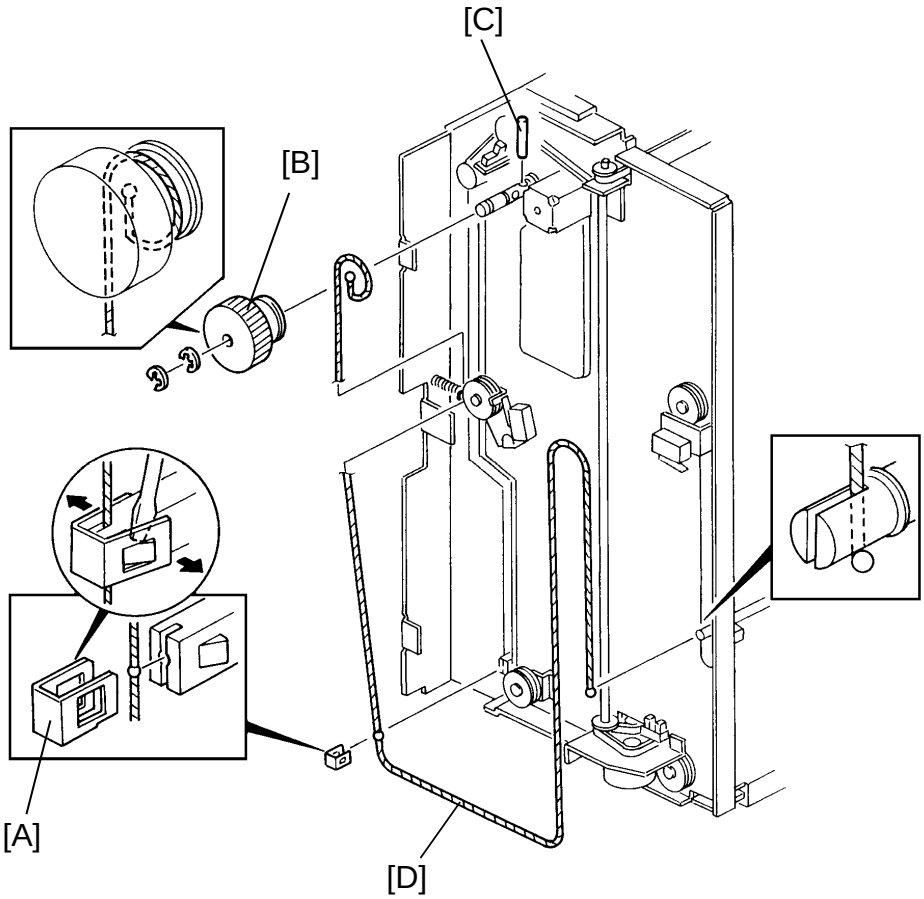
<Front side>

3. Swing the bin shaft cover [A] as shown (2 screws and 1 connector)
4. Remove the 3 fixing screws of the stapler unit [B].
5. Remove the bin support block stopper [C] as shown.
6. Remove the wire pulley [D] (1 E-ring).
   NOTE: Be careful not to lose the parallel pin [E].
7. Remove the bin lift wire [F].



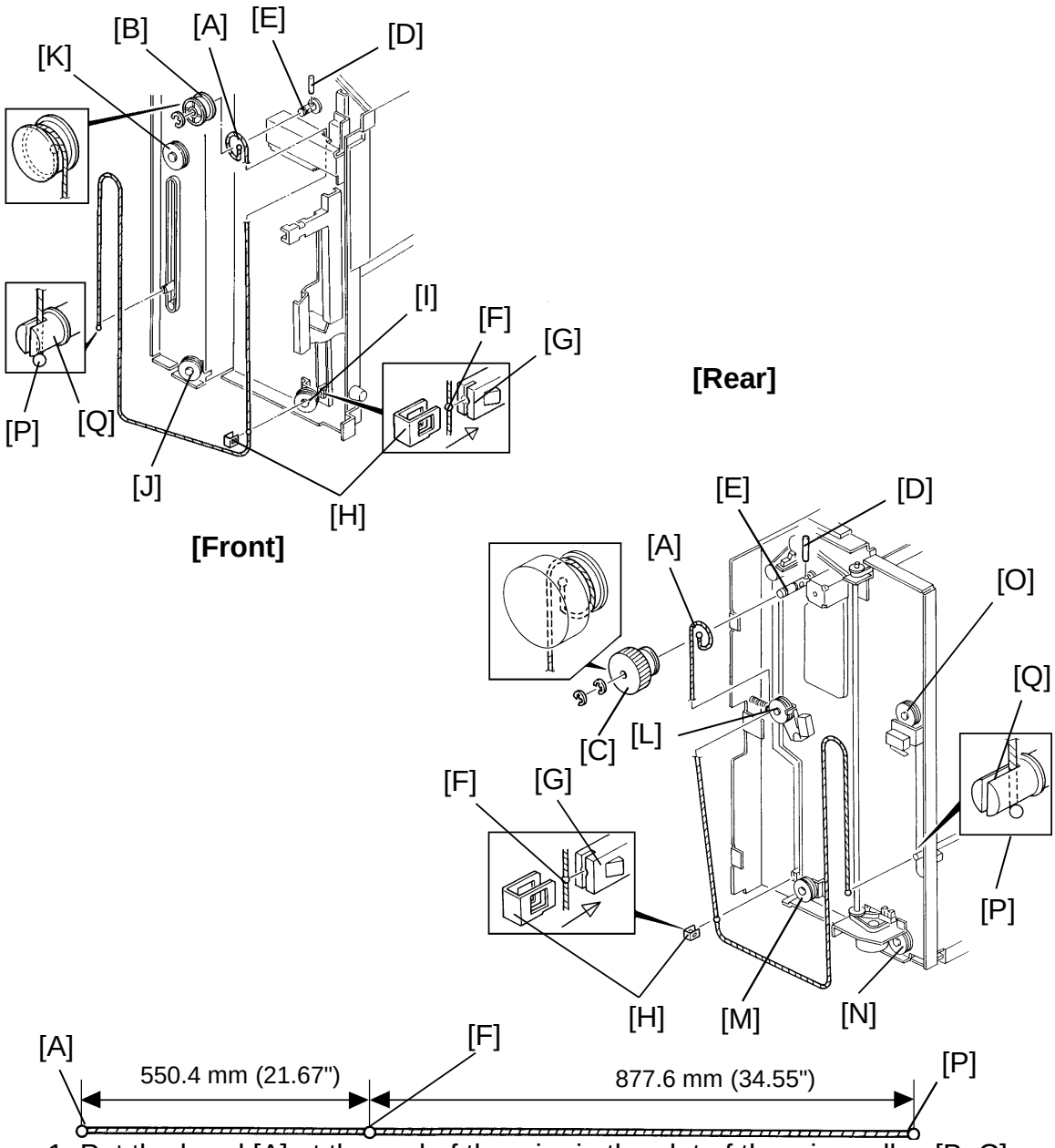
<Rear side>

8. Remove the main control board [A] (1 screw, 13 connectors and 6 locking supports).
9. Remove the bin lift shaft cover [B] (2 screws).
10. Remove the timing sensor bracket [C] (1 screw).
11. Remove the bin drive bracket [D] (1 grounding screw, 1 connector and 2 wire saddles).
12. Remove the bushing [E].



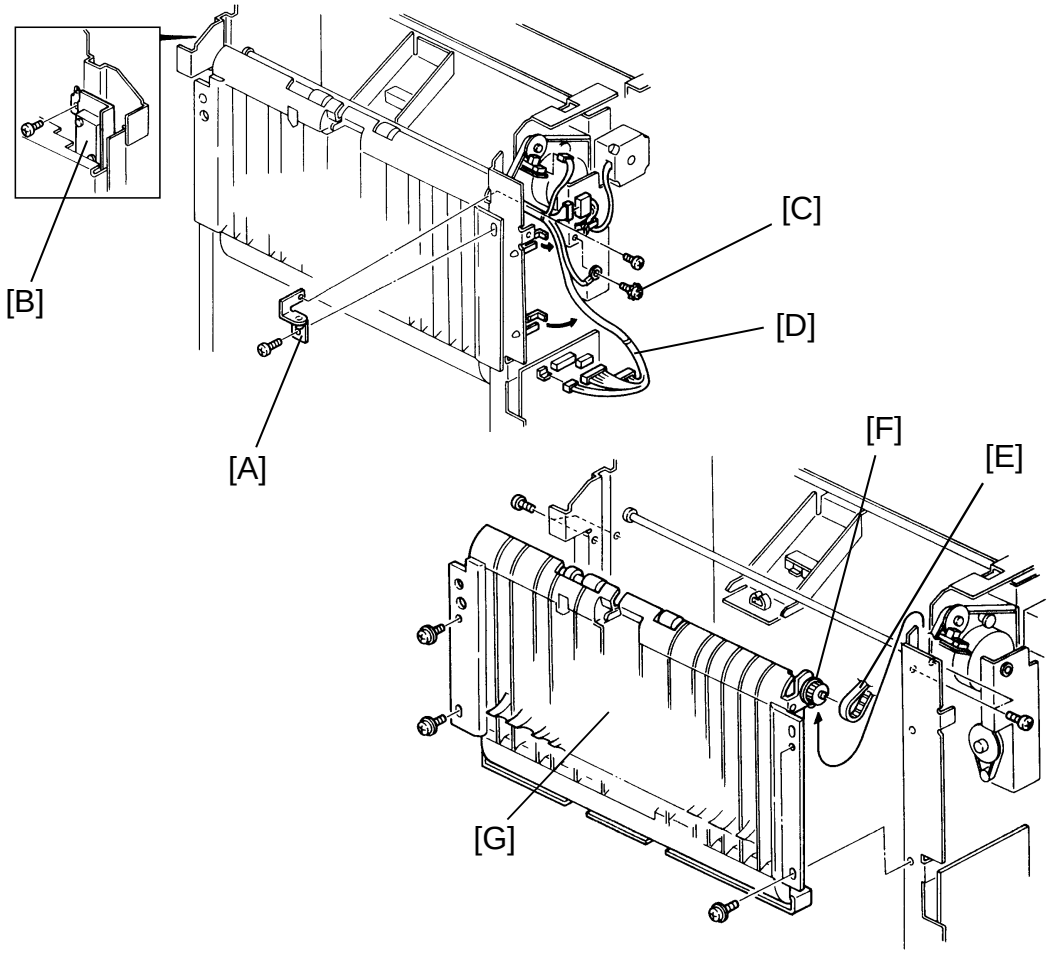
12. Remove the bin lift block stopper [A] as shown.
13. Remove the wire pulley/gear [B] (2 E-rings).
    NOTE: Be careful not to lose the parallel pin [C].
14. Remove the bin lift wire [D].

15.4.2 Wire Installation



1. Put the bead [A] at the end of the wire in the slot of the wire pulley [B, C],
2. Insert the parallel pin [D] into the bin drive shaft [E] and then push in the wire pulleys.
3. Wind the wire once as shown and put the bead [F] in the slot of the bin support block [G].
4. Put the bin support block stopper [H] on the bin support block.
5. Place the wire on the pulleys [I/J/K, L/M/N/O] and put the bead [P] in the slot of the bin lift shaft [Q].

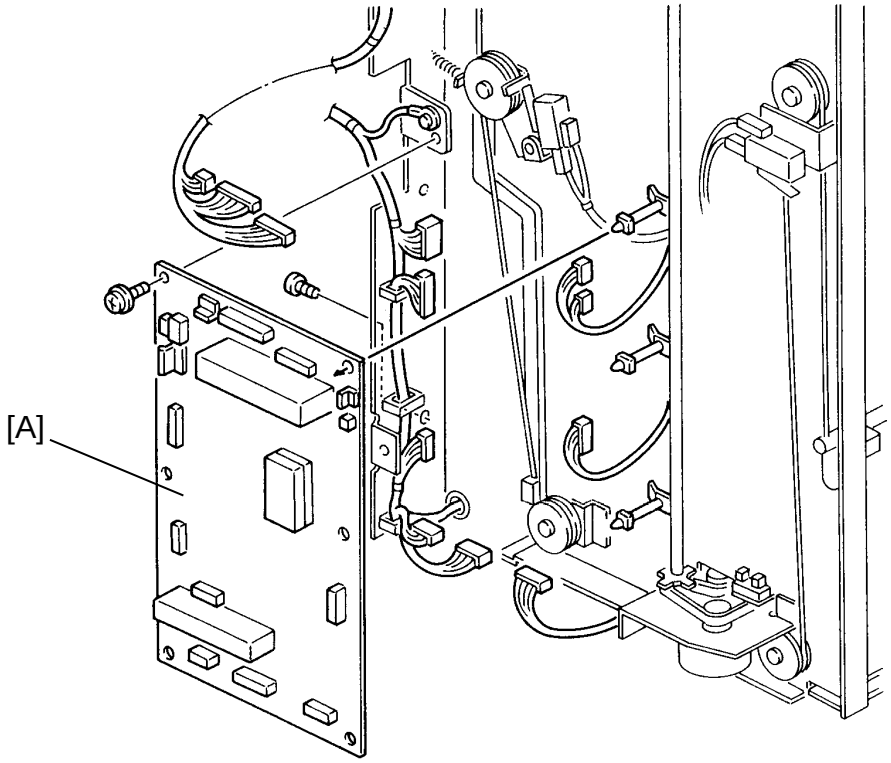
15.5 VERTICAL TRANSPORT UNIT REMOVAL



1. Remove the sorter stapler from the copier.
2. Remove the proof tray, the front cover, the rear cover, and the upper cover.
3. Remove the upper hinge [A] (2 screws) and the sorter stapler set switch bracket [B] (1 screw).
4. Remove the grounding screw [C] and disconnect the main harness [D] (5 connectors and 3 harness clamps).
5. Remove the timing belt [E] from the pulley [F].
6. Remove the vertical transport unit [G] (8 screws).

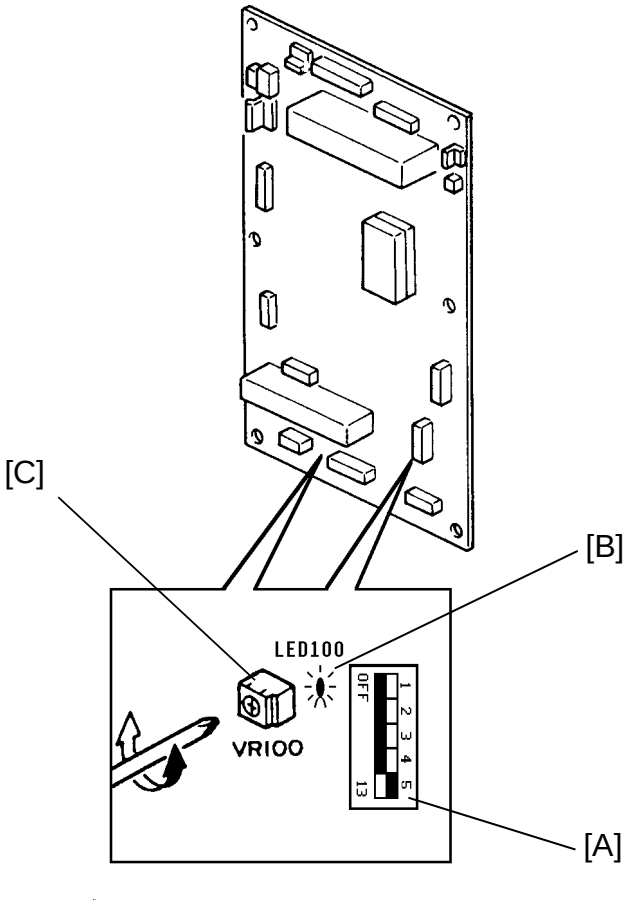
15.6 MAIN CONTROL BOARD REPLACEMENT AND ADJUSTMENT

15.6.1 Main Control Board Replacement



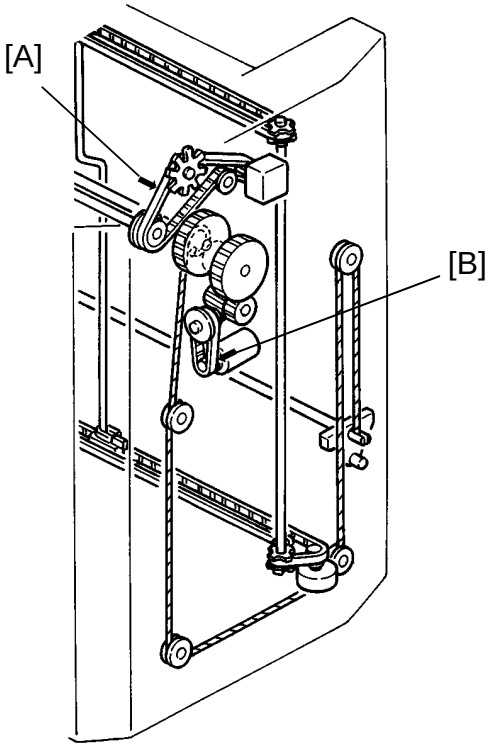
1. Remove the proof tray and the rear cover.
2. Disconnect the main control board connectors and fiber cable.
3. Replace the main control board [A] and connect the connectors.
4. Turn on the copier main switch.
5. Adjust the bin sensor (see next page).
6. Turn off the main switch.

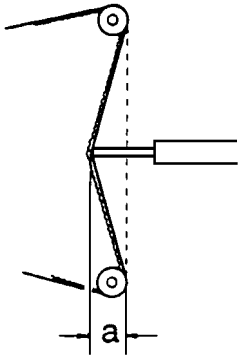
15.6.2 Bin Sensor Adjustment



1. Turn on DIP SW100-5 [A]
2. If LED100 [B] is on, turn VR100 [C] counterclockwise until LED100 turns off.
3. Turn VR100 clockwise until LED100 just turns on.
4. Turn off DIP SW100-5.

15.7 BELT TENSION ADJUSTMENT





a: Bending (mm/inches)

1. Remove the respective covers for the following belt tension adjustment:

   Timing Belt [A]
   (Roller Drive Motor)..... Proof Tray
   Rear Cover

   Timing Belt [B]
   (Grip Motor) ..... Proof Tray
   Front Cover

2. Adjust the timing belt tension as follows:

Timing Belt	Bending	Pressure
A	4 mm (0.16")	250±50 g
B	45 mm (1.77")	250±50 g

16. SERVICE CALL CONDITIONS

16.1 CODE #EH1 - TIMING SENSOR (ROLLER DRIVE) OUTPUT ERROR

-Definition-

When the roller drive motor is turning, the timing sensor takes over 500 msec to change.

-Possible Causes-

- The timing sensor is defective.
- The roller drive motor is defective.
- The main control board is defective.

16.2 CODE #EH2 - TIMING SENSOR (BIN LIFT) OUTPUT ERROR

-Definition-

When the bin lift motor is turning, the timing sensor takes over 250 msec to change.

-Possible Causes-

- The timing sensor is defective.
- The bin lift motor is defective.
- The main control board is defective.

16.3 CODE #EH3 - JOGGER H.P. SENSOR OUTPUT ERROR

- Definition-

- When the jogger bar moves forward, the home position sensor takes over 100 msec to be deactivated.
- When the jogger bar moves backward, the home position sensor takes over 800 msec to be activated.

-Possible Causes-

- The jogger H.P. sensor is defective.
- The jogger motor is defective.
- The main control board is defective.

16.4 CODE #EH5 - GRIP H.P. SENSOR OUTPUT ERROR

- Definition-

- When the grip motor rotates, the grip H.P. sensor takes over 200 msec to be deactivated.
- When the grip motor rotates in reverse, the grip H.P. sensor takes over 2500 msec to be deactivated.

- Possible Causes-

- The grip H.P. sensor is defective.
- The grip motor is defective.
- The main control board is defective.

16.5 CODE #EH6 - STAPLER ERROR

- Definition-

- The stapler motor takes more than 800 msec for one staple operation (from H.P. to H.P.).

- Possible Causes-

- The stapler is defective.
- The main control board is defective.

17. ELECTRICAL COMPONENT DEFECTS

17.1 SENSORS

Component (Symbol)		CN	Condition	Symptom	
				Main SW turns on	Ready condition
Bin Lift Timing -1 (S1)	 ≥ 4.0 V  ≤ 1.0 V	170-8	open (stays High)	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH2)" will be displayed.
			shorted (stays Low)		
Bin Lift Timing -2 (S2)	 ≥ 4.0 V  ≤ 1.0 V	170-5	open (stays High)	–	–
			shorted (stays Low)		
Jogger H.P. (S3)	 ≤ 4.0 V  ≥ 1.0 V	170-2	open (stays High)	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH3)" will be displayed.
			shorted (stays Low)	The jogger motor keeps rotating until "Sorter Jam" indicator starts blinking.	
Paper (S4)	 ≥ 4.0 V  ≤ 1.0 V	140-5	open (stays High)	–	No staple operation even though a set of copies is at the staple position.
			shorted (stays Low)	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode.

Component (Symbol)		CN	Condition	Symptom	
				Main SW turns on	Ready condition
Bin-LED (S5)		140-4	open (stays Low)	"Sorter Jam" indicator starts blinking when sort/stack or staple mode is selected.	
			shorted (stays High)	–	–
Bin-Photo. Tr (S6)	≥ 4.0 V	155-3	open (stays High)	–	No staple operation even though copying has been completed in staple mode.
	≤ 1.0 V		shorted (stays Low)	"Sorter misfeed" location LED starts blinking when sort/stack or staple mode is selected.	
Grip H.P. (S7)	≥ 4.0 V	115-2	open (stays High)	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH5)" will be displayed.
	≤ 1.0 V		shorted (stays Low)	The grip motor keeps rotating until "Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH5)" will be displayed.
Bin H.P. (S8)	≥ 4.0 V	130-11	open (stays High)	–	–
	≤ 1.0 V		shorted (stays Low)	"Sorter Jam" indicator starts blinking.	–

Component (Symbol)		CN	Condition	Symptom	
				Main SW turns on	Ready condition
Bin Exit (S9)	 ≥ 4.0 V  ≤ 1.0 V	150-4	open (stays High)	–	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode.
			shorted (stays Low)	"Sorter Jam" indicator starts blinking.	
Proof Tray Exit (S10)	 ≥ 4.0 V  ≤ 1.0 V	150-7	open (stays High)	–	"Sorter Jam" indicator starts blinking when copies are made in normal mode.
			shorted (stays Low)	"Sorter Jam" indicator starts blinking.	
Roller Drive Timing (S11)	 ≥ 4.0 V  ≤ 1.0 V	150-11	open (stays High)	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking or " SC code (EH1) " is displayed when copies are made.
			shorted (stays Low)		

17.2 SWITCHES

Component (Symbol)	CN No.	Condition	Symptom	
			Main SW turns on	Ready condition
Upper Limit (SW1)	165-1	Open	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH2)" will be displayed.
		Shorted	–	–
Wire Tension (SW2)	165-4	Open	"Sorter Jam" indicator starts blinking.	"Sorter Jam" indicator starts blinking when copies are made in sort/stack or staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH2)" will be displayed.
		Shorted	–	–
Front Door (SW3)	100-3	Open	"C-5" is displayed even if the front door closed.	
		Shorted	"C-5" is not displayed even if the front door opened.	
Sorter Stapler Set (SW4)	100-3	Open	"C-5" is displayed even if the sorter stapler is closed.	
		Shorted	"C-5" is not displayed even if the sorter stapler is opened.	
Staple End (SW5)	130-9	Open	"Add staple" indicator does not light even though the staple cartridge is empty.	
		Shorted	"Add staple" indicator lights even though the staple cartridge is not empty.	
Staple Guide (SW6)	130-8	Open	"Add staple" indicator does not light even though the staple guide is opened.	
		Shorted	"Add staple" indicator lights even though the staple guide is closed.	
Staple H.P. (SW7)	130-6	Open	"Sorter Jam" indicator starts blinking or "SC code (EH6)" is displayed when copies are made in staple mode.	
		Shorted		

17.3 FUSE

Component (Symbol)	Condition	Symptom
FU100 (Main Control Board)	Open	"Sorter Jam" indicator starts blinking when copies are made in staple mode. After the sorter stapler or front door is opened/closed, "SC code (EH6)" will be displayed.