

# **AUTOMATIC DOCUMENT FEEDER**

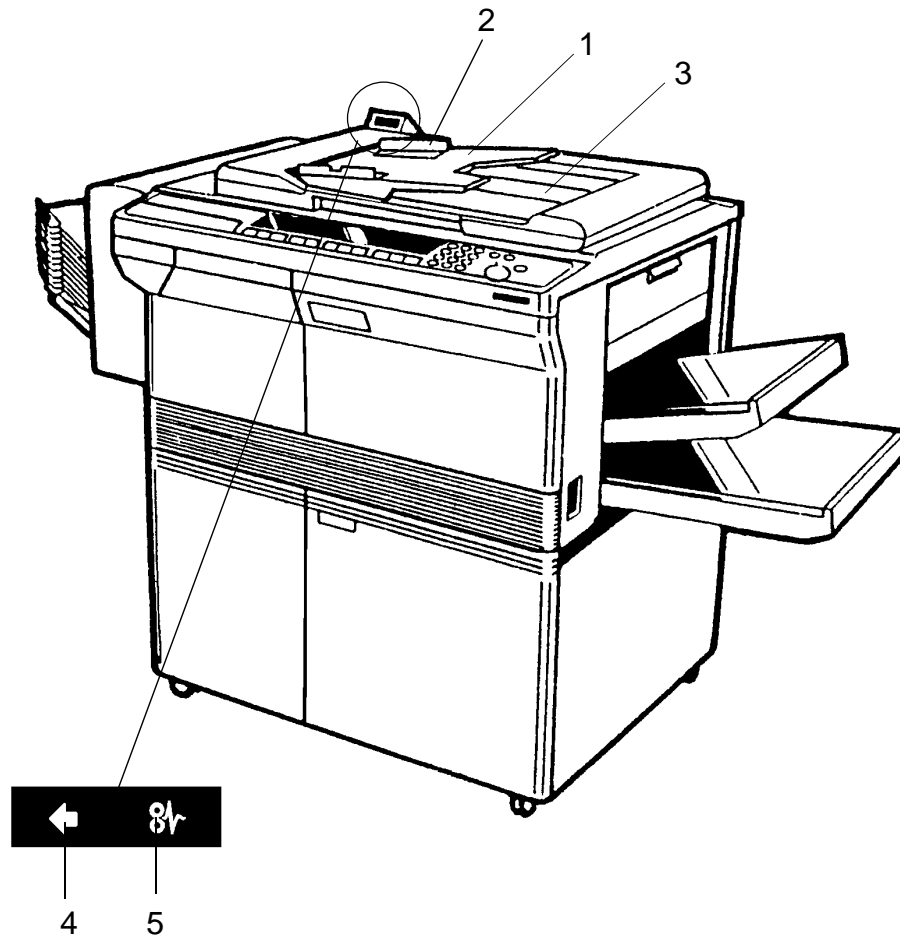
**(ADF)**

**– DF42 –**

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# 1. ADF EXTERIOR



1. Original Table  
Place the originals to be fed into the ADF here.
2. Original Guides  
Adjust these guides to center the originals so that they are correctly fed onto the exposure glass.
3. Original Stacker  
Originals are stacked here after they exit from the ADF.
4. Insert Original Indicator  
The green light is on while it is possible to place originals in the ADF. After an original is set, the light goes out.
5. Original Jam Indicator  
This indicator lights when an original jam occurs.

## **2. INSTALLATION PROCEDURE**

### **2.1 ACCESSORY CHECK**

1. ADF Control Board ..... 1 piece
2. Philips Screw with Flat Washer - M4 x 12 ..... 2 pieces
3. Electric Screw - M4 x 8 ..... 1 piece
4. Plastic Cap ..... 1 piece
5. Stud Screw for Magnet Catch ..... 2 pieces
6. Philips Pan Head Screw - M4 x 8 (round head) ..... 2 pieces
7. Hinge Stud Screw ..... 2 pieces

## 2.2 INSTALLATION PROCEDURE

- Make sure that main switch is turned off.
1. Remove the platen cover, 2 stud screws for the platen cover, and 2 screws fixing the top cover at the rear side.
  2. Remove 2 front screws fixing the top cover and secure 2 stud screws for the magnet catch [A]. (Fig. 1)
  3. Secure 2 hinge stud screws [B] half way and mount the ADF so that the holes in the ADF hinge bracket are aligned with the studs, then slide the ADF to the right. (Fig. 1)
  4. Secure the ADF hinge bracket to the copier optics frame with 2 screws (M4 x 12) [C]. (Fig. 1)
  5. Lower the ADF and tighten the hinge stud screws [B].
  6. Remove the copier rear cover and the plastic cap with no hole [D] (left rear side). (Fig. 2)
  7. Install the ADF control board on the main board as shown. (Fig. 3)
  8. Run the ADF harness [E] through the rear left hole in the top cover and connect it to CN2 on the ADF control board.
  9. Connect the power supply connector (4P white) [F] to CN3 on the ADF control board.
  10. Secure earth wire [G] with a electric screw (M4 x 8). (Fig. 3)
  11. Install the twist band [H] and place the interface harness on it, then twist it tightly. (Fig. 3)
  12. After attaching the plastic cap with a hole [I], attach the copier rear cover. (Fig. 4)

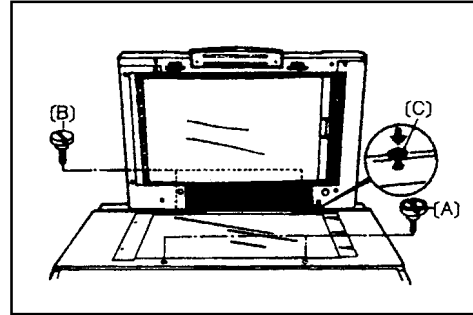


Fig. 1

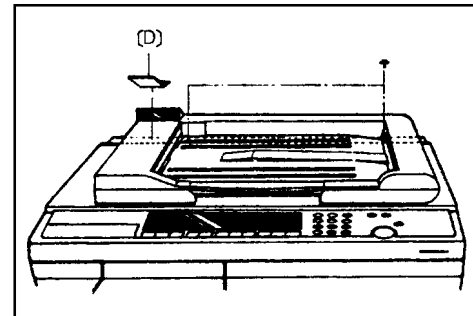


Fig. 2

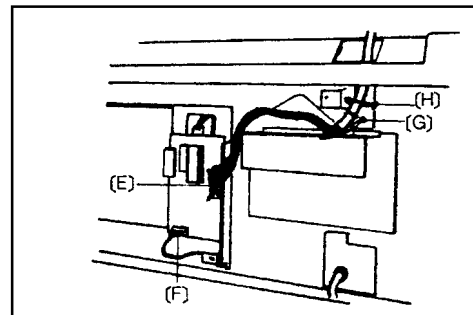


Fig. 3

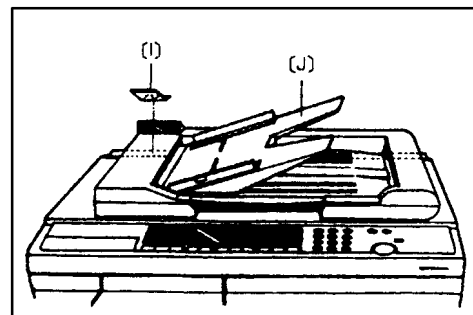



Fig. 4

## 2.3 OPERATION CHECK

1. Turn on the main switch and confirm that the insert original indicator (  ) lights.
2. Wait for the ready condition.  
**NOTE:** It takes about 2 minutes.
3. Square a stack of originals and insert the originals until the insert original indicator goes out.
4. Press the Start key, then the ADF should start operating.
5. Check if the original jam indicator lights when a paper jam is incurred by grabbing the original which is supposed to be fed in.
6. After removing the jammed paper from the ADF, the original jam indicator should go off when the ADF returns to its original position.
7. Square the stack of originals, and reset the originals.

## 2.4 NON-RECOMMENDED TYPES OF ORIGINAL

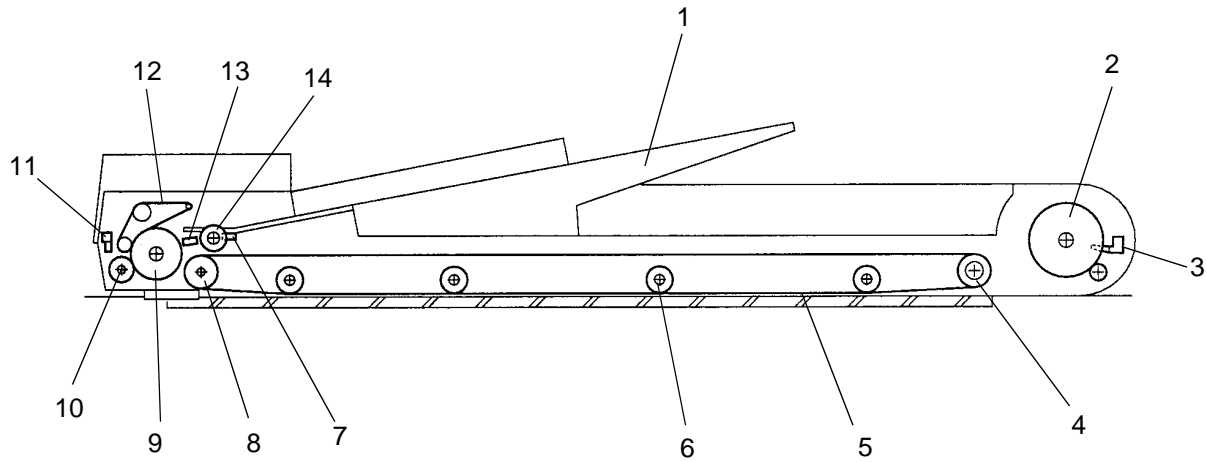
**CAUTION: The following types of originals are not recommended for use with the ADF. Please place them directly on the exposure glass of the copier.**

1. Originals thicker than 105 g/m<sup>2</sup> or thinner than 52 g/m<sup>2</sup>.
2. Paper with any kind of coating (such as carbon) on the back, or originals that are taped together.
3. Folded, curled, creased or damaged originals.
4. Bound, stapled, or clipped originals.
5. Mailing labels, perforated originals, or pasted originals,
6. OHP transparencies.
7. Thermal fax paper.

### **3. SPECIFICATIONS**

Original Size and Weight:	B5 ~ A3 (weight: 52 ~ 105 g/m <sup>2</sup> )
Original Table Capacity:	30 sheets/A4, 15 sheets/A3 (70 g/m <sup>2</sup> )
Copy Speed (1 to 1):	17 copies/minute for A4
Original Set:	Face up, first sheet on top.
Original Separation:	Separation Roller and Separation Belt
Original Set Position:	Center Basis
Original Transportation:	One Flat Belt
Original Detection:	Photointerrupter
Power Source:	DC 24 V, DC 5V (either 50 Hz or 60 Hz can be used) from the copier
Dimensions:	626 (W) x 430 (D) x 56 (H) mm (without the Original Table)
Weight:	5 kg

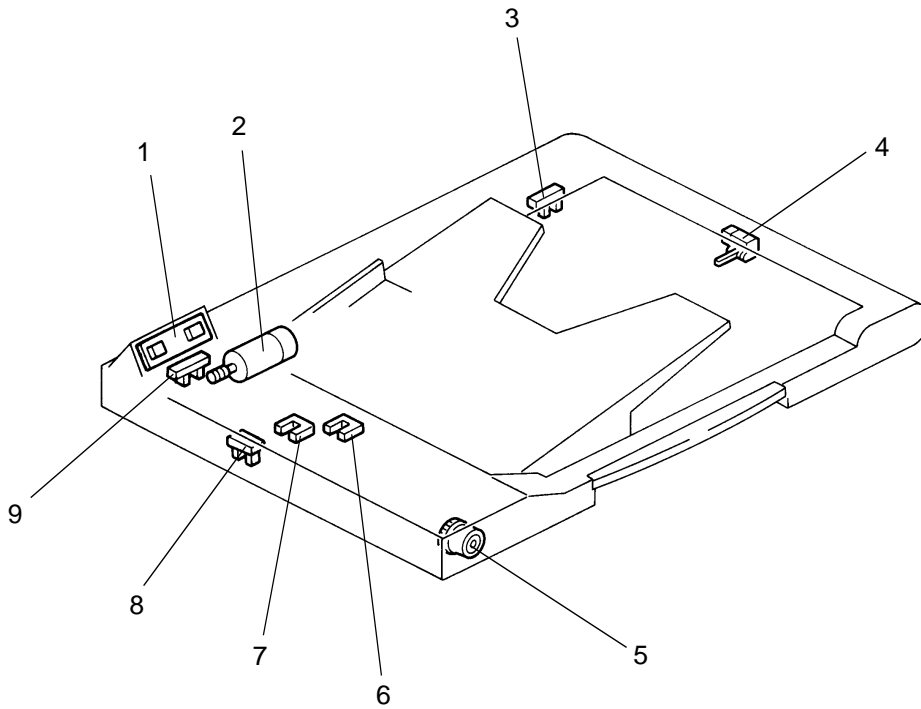
## 4. MECHANICAL COMPONENT LAYOUT



- |                                     |                                |
|-------------------------------------|--------------------------------|
| 1. Original Table                   | 8. Transport Belt Drive Roller |
| 2. Feed-out Roller                  | 9. Feed Roller                 |
| 3. (Feed-out Sensor)                | 10. Registration Roller        |
| 4. Exit Transport Roller            | 11. (Registration Sensor)      |
| 5. Transport Belt                   | 12. Separation Belt            |
| 6. Belt Support Roller              | 13. (Original Set Sensor)      |
| 7. (Pick-up Roller Position Sensor) | 14. Pick-up Roller             |



## 5. ELECTRICAL COMPONENT LAYOUT



1. Indicator Panel

2. ADF Motor

3. ADF Position Sensor

4. Feed-out Sensor

5. Feed-in Clutch

6. Pick-up Roller Position Sensor

7. Original Set Sensor

8. Registration Sensor

9. Pulse Generator Sensor

## 6. FUNCTIONAL OPERATION

### 6.1 SUMMARY

When an original is inserted face-up into the ADF, the insert original indicator goes off.

When the Start key is pressed, the pick-up roller starts turning and advances the bottom original of the stack.

The feed roller and the friction belt are used to feed-in and separate the originals. Only the bottom original is fed because the friction belt prevents any other originals from feeding.

Registration rollers feed the original to the transport belt until slightly after the original trailing edge passes the registration sensor. Then the motor pauses and reverses for a few pulses. This forces the original against the left scale and thus aligns the edge of the original with the scale.

When the scanner reaches the return position at the end of scanning the original, the original is fed out from the ADF.

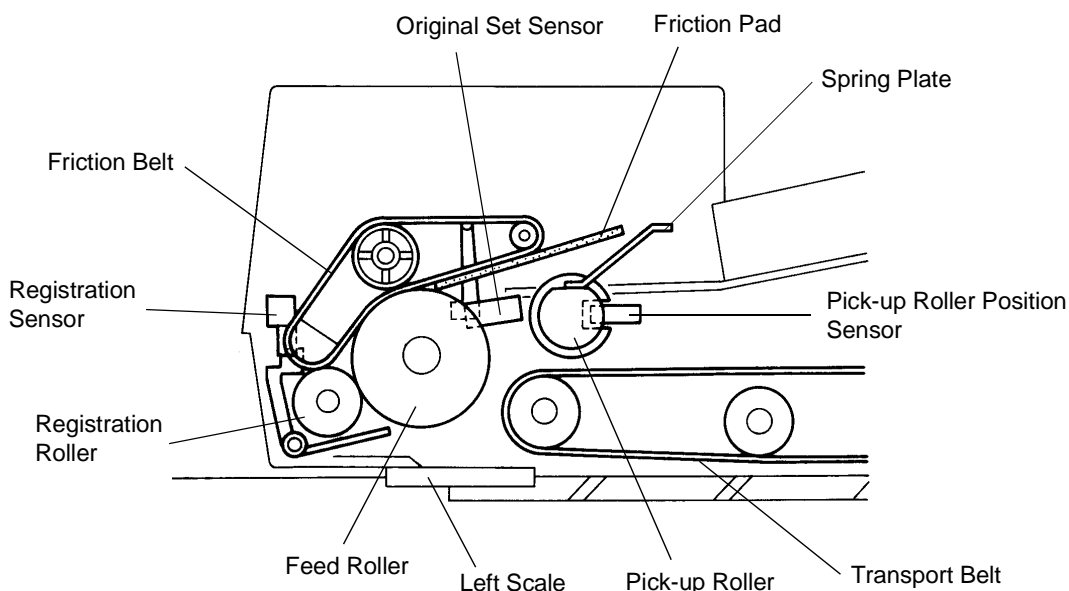
### 6.2 ORIGINAL PICK-UP • SEPARATION • FEED-IN MECHANISM

#### 6.2.1 Original Pick-up

When an original is inserted, the insert original indicator goes off. When the Start key is pressed, the ADF motor and the feed-in clutch are energized. Then the feed roller starts turning.

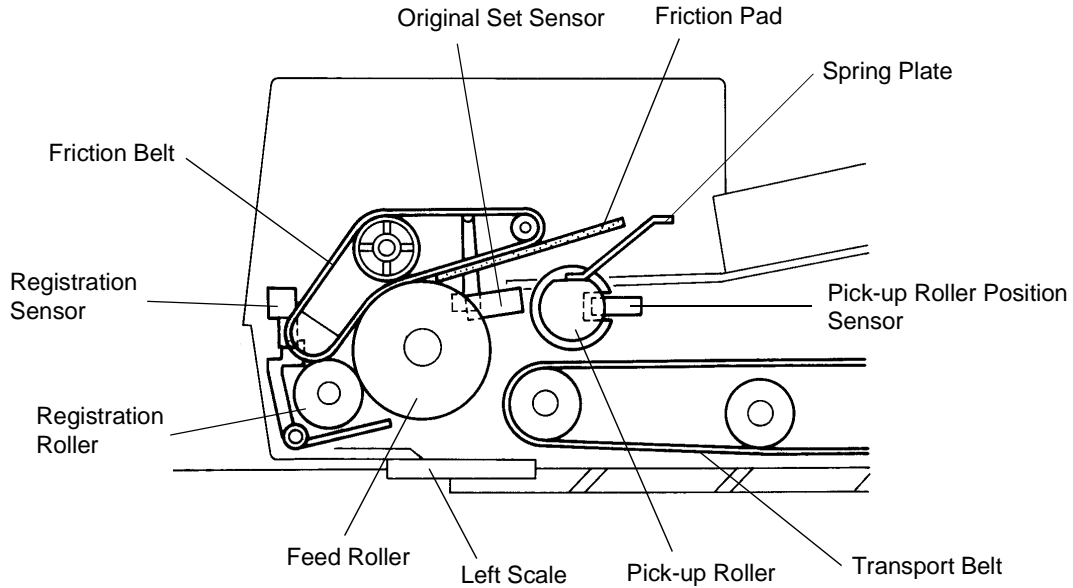
The feed roller and the pick-up roller (a D-shaped roller) are linked by a timing belt. Therefore the pick-up roller starts turning and advances the bottom original while the clutch is on.

A spring plate is installed above the pick-up roller. This plate pushes down the original stack against the pick-up roller to help the roller feed the bottom original.



### 6.2.2 Original Separation

The feed roller and the friction belt separate the originals. The friction pad prevents the uppermost original from being fed in.



$\mu_1$ : Friction coefficient between feed roller and original

$\mu_2$ : Friction coefficient between friction belt and original

$\mu_3$ : Friction coefficient between original sheets.

$$\mu_1 > \mu_2 > \mu_3$$

### 6.2.3 Original Feed-in Mechanism

The bottom original separated by the friction belt is fed to the registration rollers. The registration rollers feed the original to the transport belt, then the original passes the registration sensor.

The ADF determines original size through the use of the registration sensor. The original's length is calculated by counting the number of pulses while the registration sensor is on.

Original size detection is necessary for the ADF's feed-in/feed-out timing.

### **6.3 ORIGINAL TRANSPORTATION MECHANISM**

The transport belt is directly driven by the motor's worm-gear.

The registration rollers feed the original to the transport belt until slightly after the original trailing edge passes the registration sensor. Then the motor pauses and reverses for a few pulses. This forces the original against the left scale and thus aligns the edge of the original with the scale to prevent original skew.

### **6.4 ORIGINAL FEED-OUT MECHANISM**

The feed-out roller is connected to the transport belt by the feed-out roller drive belt (an O-ring belt). At the end of scanning, the ADF motor starts turning again after a feed-out signal from the copier. Then the feed-out roller feeds out the original from the ADF.

### **6.5 NEXT ORIGINAL FEED**

When the trailing edge of the original passes the feed-out sensor, the feed-in clutch turns on to feed the next original. The feed-in clutch on timing depends on the original size.

### **6.6 COMPLETION OF ORIGINAL FEED**

There is a disk with a notch on the pick-up roller shaft. The flat surface of the pick-up roller is positioned upward when the pick-up roller positioning sensor detects the notch.

When the feed-in clutch turns on, the pick-up roller rotates together with the feed roller. During a copy job for a set of originals, the copier disregards the output of the pick-up roller positioning sensor. However, when the last original is fed out from the ADF, the ADF motor keeps turning and the feed-in clutch turns on until the pick-up roller positioning sensor detects the notch in the pick-up roller shaft. This is to position the flat surface of the pick-up roller upward for easy inserting of the next set of originals.

## 6.7 ADF CONTROL BOARD

### 1. LED

- LED1 - When the ADF is lifted, LED1 lights.
- LED2 - When the registration sensor is activated, LED2 lights.
- LED3 - When the feed-out sensor is activated, LED3 lights.

### 2. DPS1

	1	2
ON	Motor Test	ADF free run
OFF	Normal	Normal

- No 1 ON: Use to test the ADF drive without an original.
- No 2 ON: ADF free run while detecting originals.

**NOTE:** The DIP switch settings must be changed when the main switch is off.

### 3. DPS2

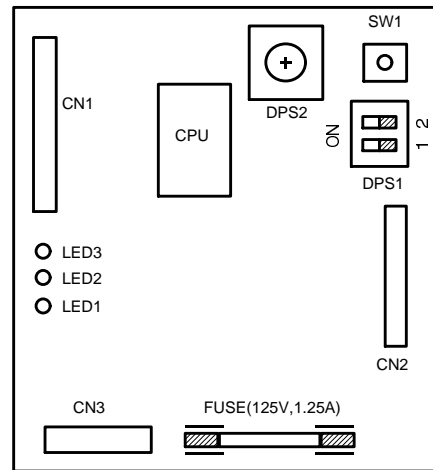
Adjust it when the ADF misdetects the original length.

- If the detected length is less than the actual original length, turn DPS2 clockwise.
- If the detected length is larger than the actual original length, turn counterclockwise.

Ref.) The relation of each paper length is as follows:

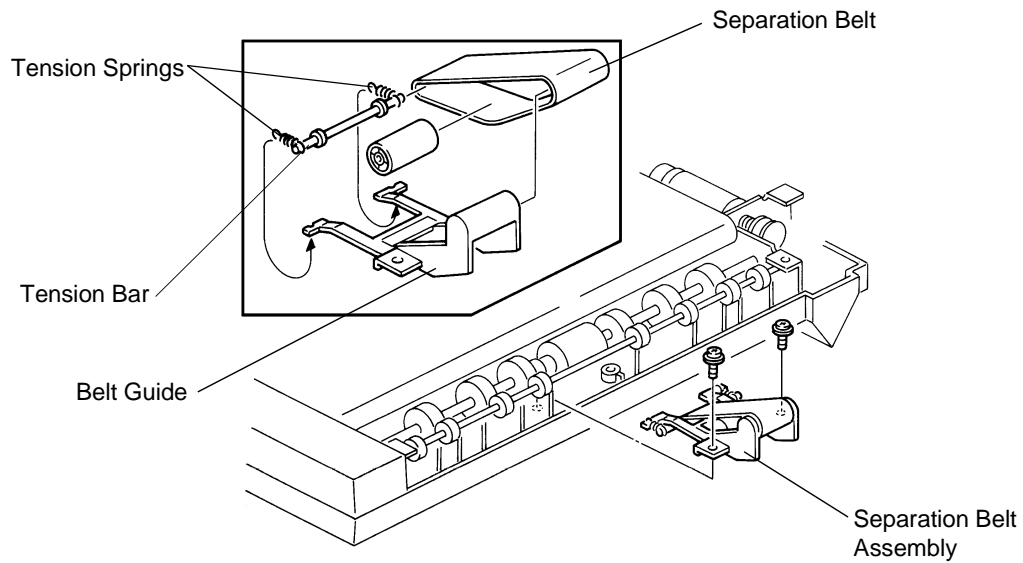
A3 > B4 > A4 lengthwise > B5 lengthwise > A4 sideways > B5 sideways

**NOTE:** Turn the main switch off and on after the adjustment.



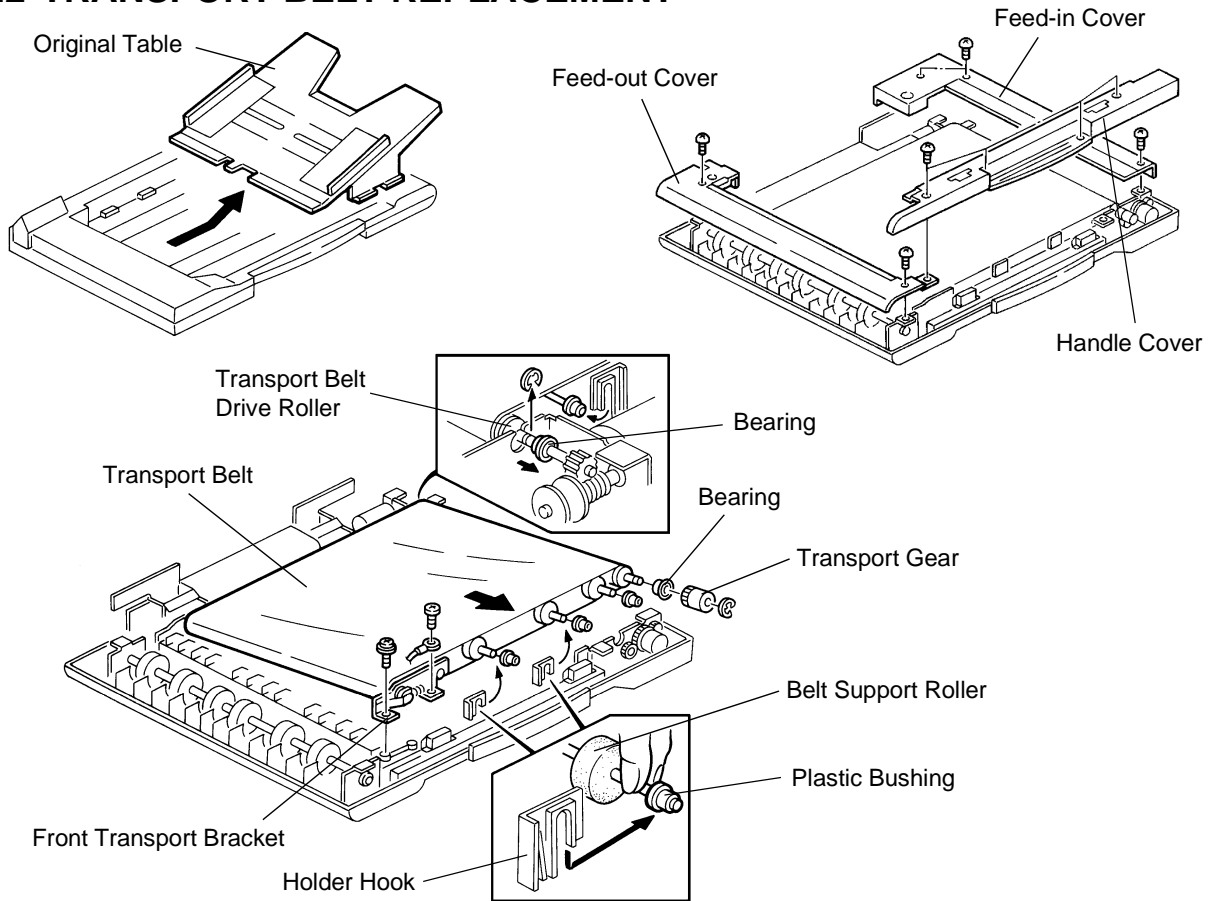
## 7. REPLACEMENT

### 7.1 SEPARATION BELT REPLACEMENT



1. Remove the feed-in cover (3 screws).
2. Remove the separation belt assembly (2 screws).
3. Remove the 2 tension springs and the tension bar.
4. Remove the separation belt from the belt guide.

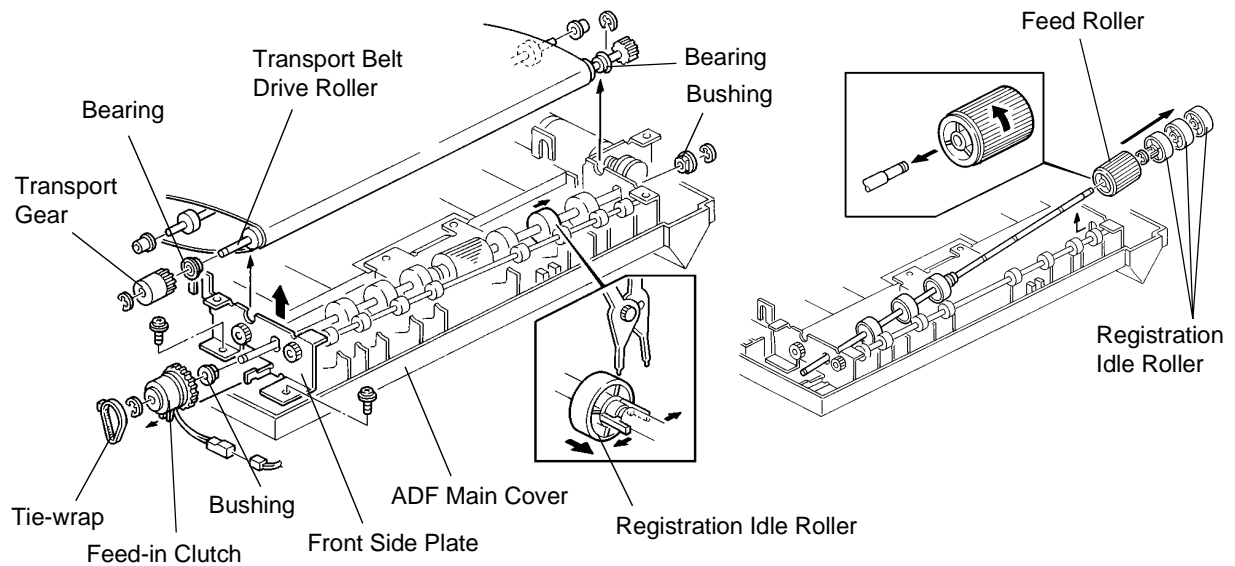
## 7.2 TRANSPORT BELT REPLACEMENT



1. Remove the original table from the ADF by sliding it to the right.
2. Turn off the main switch and remove the ADF from the copier.
3. Place the ADF on a table with the transport belt side up.
4. Remove the feed-in cover (3 screws), the handle cover (4 screws), and the feed-out cover (2 screws).
5. Remove the transport gear and the bearing from the front side (1 E-ring).
6. Slide the other bearing on the transport belt drive roller shaft to the rear (1 E-ring).
7. Free the transport belt drive roller from the ADF frame.
8. Remove the front transport bracket from the ADF main cover (2 screws).
9. For all the belt support rollers, press down the belt support roller shaft to slide out the front end from the holder hook.
10. Take out the transport belt from the rollers.
11. Install a new transport belt and reassemble the ADF.

**NOTE:** Make sure that all the plastic bushings for the belt support roller shaft are properly positioned in the holder hooks (8 bushings for the front and rear).

## 7.3 FEED ROLLER REPLACEMENT

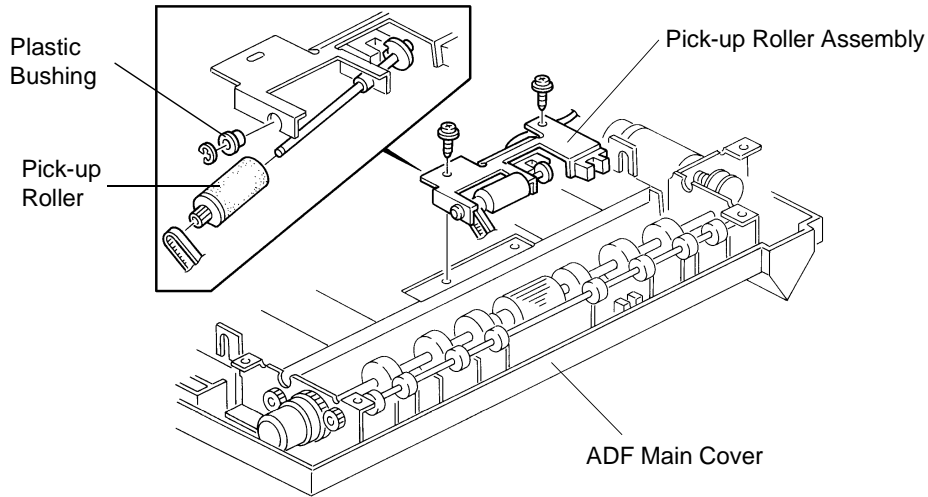


1. Remove the original table from the ADF by sliding it to the right.
2. Turn off the main switch and remove the ADF from the copier.
3. Place the ADF on a table with the transport belt side up.
4. Remove the feed-in cover (3 screws) and the handle cover (4 screws).
5. Remove the transport gear and the bearing from the front side (1 E-ring).
6. Slide the other bearing on the transport belt drive roller shaft to the rear (1 E-ring).
7. Free the transport belt drive roller from the ADF frame.
8. Remove 2 screws securing the front side plate to the ADF main cover.
9. Remove the tie-wrap from the feed-in clutch.
10. Remove the feed-in clutch and the bushing from the feed roller shaft (1 E-ring).
11. Remove the bushing from the rear end of the feed roller shaft (1 E-ring).
12. Slide the registration idle roller (2nd from the rear) to the rear of the shaft as shown.
13. Free the rear end of the feed roller shaft free from the rear side plate by shifting it to the front.
14. Remove the 3 registration idle rollers (at the rear side) from the feed roller shaft.
15. Remove the feed roller from the shaft (1 E-ring).
16. Install a new feed roller on the shaft and reassemble the ADF.

- NOTE:**
- Make sure that the feed roller rotates counterclockwise (as seen from the front) freely on the shaft.
  - When installing the feed-in clutch, make sure that the fork of the clutch is properly engaged with the stopper.



## 7.4 PICK-UP ROLLER REPLACEMENT



1. Perform steps 1 to 7 of the feed roller replacement.
2. Remove the pick-up roller assembly from the ADF main cover (2 screws).
3. Remove the plastic bushing from the pick-up roller shaft (1 E-ring).
4. Slide out the pick-up roller.
5. Install a new pick-up roller and reassemble the ADF.

**NOTE:** Be careful not to damage the screw holes for the pick-up roller assembly as they do not have metal inserts on the main cover.