

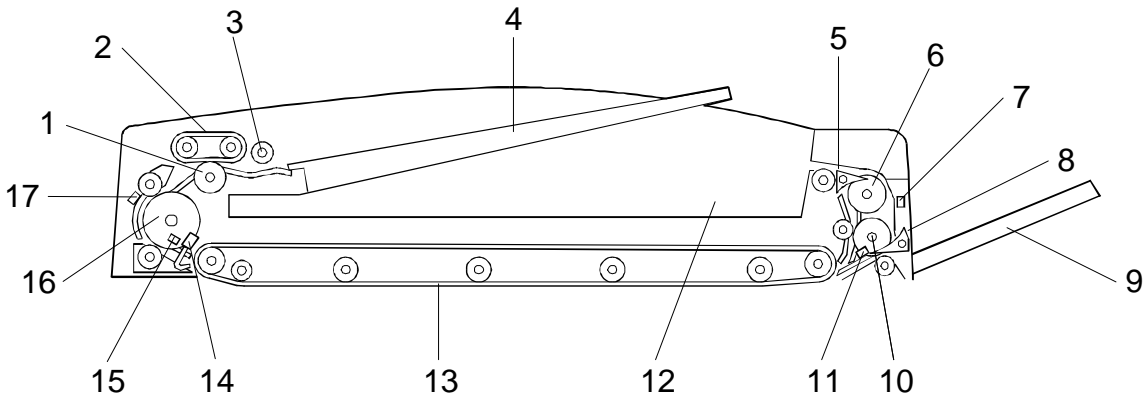
AUTO DOCUMENT FEEDER
(Machine Code: A680)

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

Original Size:	Normal Original Mode: A3 to B6, DLT to HLT Thin Original Mode: A3 to B6 sideways, DLT to HLT Duplex Original Mode: A3 to B5, DLT to HLT
Original Weight:	Normal Original Mode: 52 ~ 128 g/m ² , 14 ~ 34 lb Special Original Mode: 40 ~ 128 g/m ² , 11 ~ 34 lb Duplex Original Mode: 52 ~ 105 g/m ² , 14 ~ 28 lb
Table Capacity:	50 sheets (80 g/m ² , 20 lb)
Original Standard Position:	Rear left corner
Separation:	FRR
Original Transport:	One flat belt
Original Feed Order:	From the top original
Power Source:	DC 24V from the copier
Power Consumption:	50 W
Dimensions (W x D x H):	600 x 580 x 150 mm
Weight:	12 kg

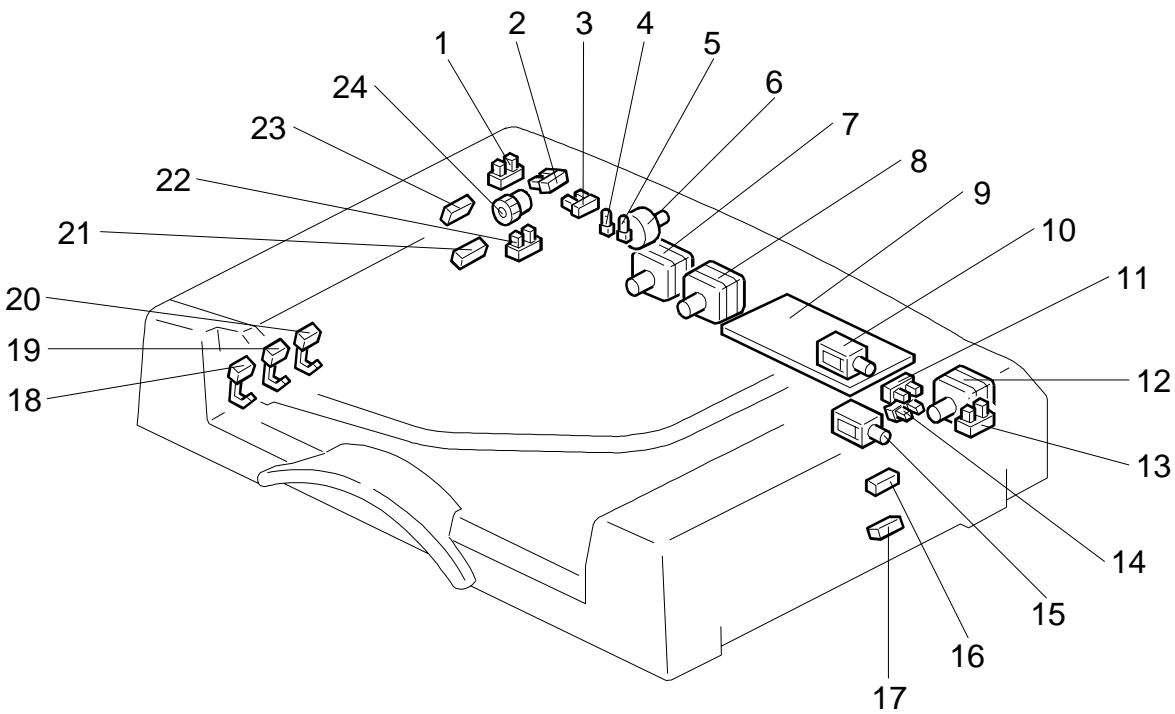
1.2 MECHANICAL COMPONENT LAYOUT



A680V500.WMF

- | | |
|-----------------------------|-------------------------------|
| 1. Separation Roller | 10. Original Exit Roller |
| 2. Feed Belt | 11. Original Exit Sensor |
| 3. Pick-up Roller | 12. Upper Exit Tray |
| 4. Original Tray | 13. Original Transport Belt |
| 5. Original Inverter Gate | 14. Original Width Sensor |
| 6. Original Inverter Roller | 15. Registration Sensor |
| 7. Inverter Sensor | 16. Original Transport Roller |
| 8. Original Exit Gate | 17. Entrance Sensor |
| 9. Right Exit Tray | |

1.3 ELECTRICAL COMPONENT LAYOUT



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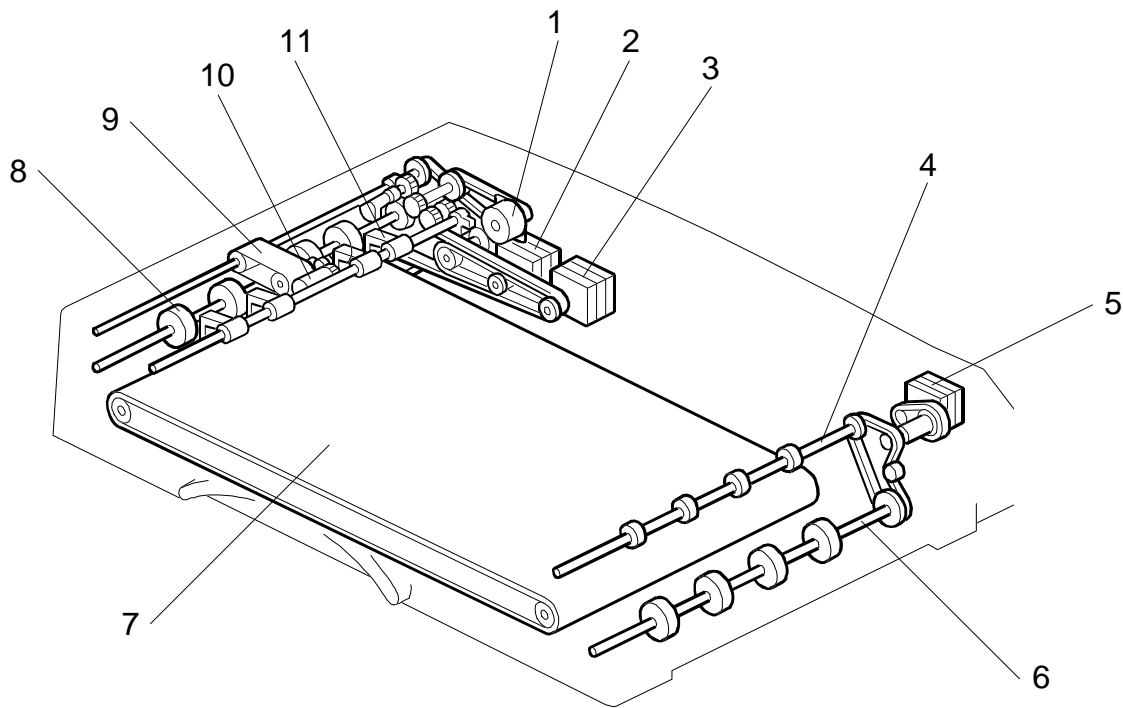
- | | |
|-------------------------------|-----------------------------|
| 1. Feed Cover Sensor | 13. Exit Cover Sensor |
| 2. Pick-up Roller HP Sensor | 14. APS Start Sensor |
| 3. Original Stopper HP Sensor | 15. Exit Gate Solenoid |
| 4. Ready Indicator | 16. Inverter Sensor |
| 5. SADF Indicator | 17. Exit Sensor |
| 6. Pick-up Motor | 18. Original Width 3 Sensor |
| 7. Feed-in Motor | 19. Original Width 2 Sensor |
| 8. Transport Belt Motor | 20. Original Width 1 Sensor |
| 9. DF Main Board | 21. Registration Sensor |
| 10. Inverter Gate Solenoid | 22. Original Set Sensor |
| 11. DF Position Sensor | 23. Entrance Sensor |
| 12. Feed-out Motor | 24. Transport Roller Clutch |

1.4 ELECTRICAL COMPONENT DESCRIPTION

Symbol	Name	Function	Index No.
Motors			
M1	Pick-up	Moves the original stopper and pick-up roller up and down.	6
M2	Feed-in	Drives the feed belt, and the separation, pick-up, and transport rollers.	7
M3	Transport Belt	Drives the transport belt.	8
M4	Feed-out	Drives the exit roller.	12
Sensors			
S1	APS Start	Informs the CPU when the DF is opened and closed (for platen mode) so that the original size sensors in the copier can check the original size.	14
S2	DF Position	Detects whether the DF is lifted or not.	11
S3	Original Set	Detects if an original is on the table.	22
S4	Original Stopper HP	Detects whether the original stopper is closed or not and detects when to change the original feed start motor direction.	3
S5	Pick-up Roller HP	Detects whether the pick-up roller is in the upper position or not.	2
S6	Entrance	Detects when to restart the feed start motor to lift up the pick-up roller, detects when to change the feed motor direction, detects the trailing edge of the original to finish checking the original length, and checks for misfeeds.	23
S7	Registration	Detects the leading edge of the original to check the original length, detects when to stop the original on the exposure glass, and checks for misfeeds.	21
S8	Original Width 1	Detects the original width.	20
S9	Original Width 2	Detects the original width.	19
S10	Original Width 3	Detects the original width.	18
S11	Exit	Detects when to stop the transport belt motor and checks for misfeeds.	17
S12	Inverter	Detects when to turn the inverter gate and exit gate solenoids off and checks for misfeeds.	16
S13	Feed Cover	Detects whether the feed cover is opened or not.	1
S14	Exit Cover	Detects whether the exit cover is opened or not.	13
Solenoids			
SOL1	Exit Gate	Opens and closes the exit gate.	15
SOL2	Inverter Gate	Opens and closes the inverter gate.	10

Symbol	Name	Function	Index No.
Clutches			
MC1	Transport Roller	Transfers drive to the transport roller.	24
PCBs			
PCB1	Main	Controls the DF and communicates with the copier.	9
LEDs			
LED1	Ready	Turns off when an original is inserted.	4
LED2	SADF	Turns on when the ADF is changed to SADF mode.	5

1.5 DRIVE LAYOUT

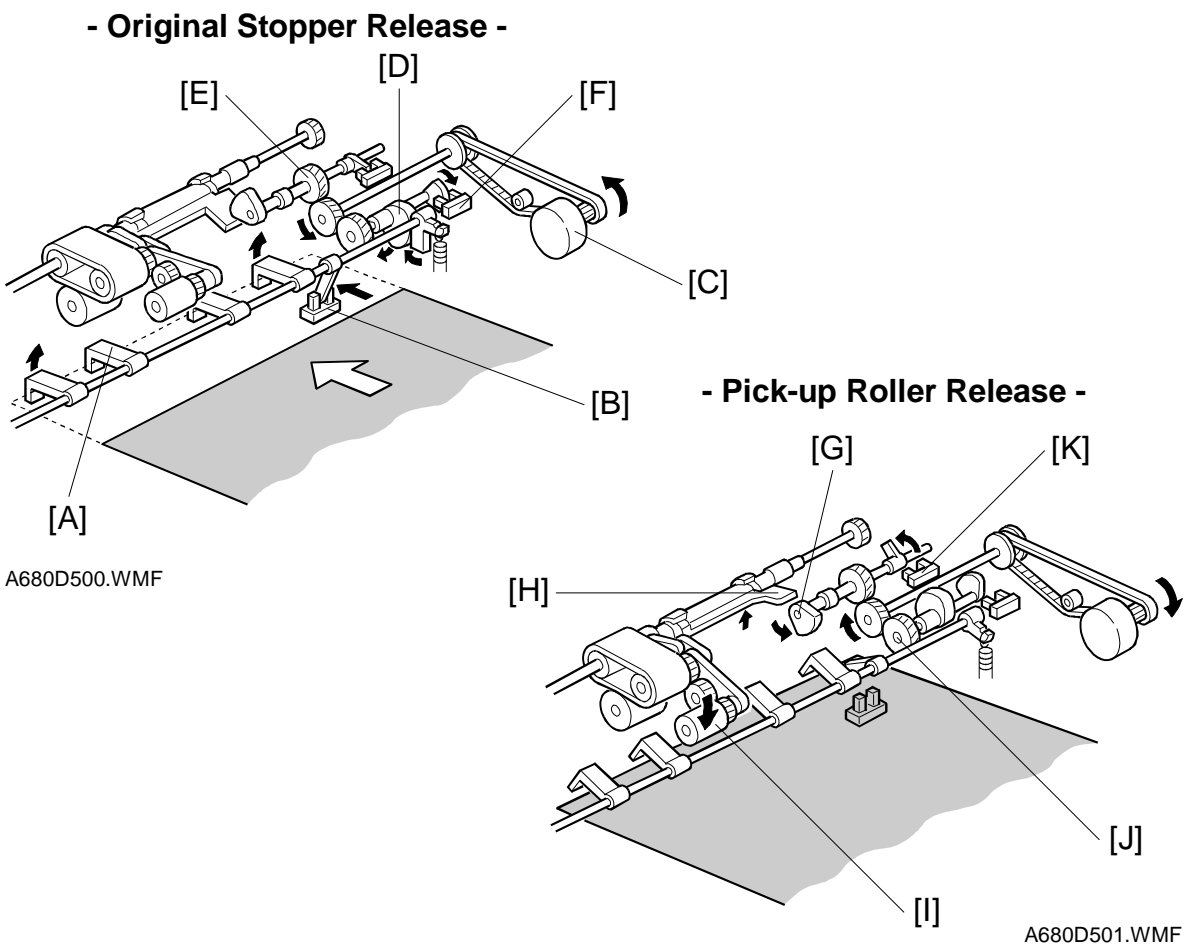


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- | | |
|-------------------------|------------------------------|
| 1. Pick-up Motor | 7. Transport Belt |
| 2. Feed-in Motor | 8. Original Transport Roller |
| 3. Transport Belt Motor | 9. Feed Belt |
| 4. Upper Exit Roller | 10. Pick-up Roller |
| 5. Feed-out Motor | 11. Original Stopper |
| 6. Exit Roller | |

2. DETAILED DESCRIPTION

2.1 ORIGINAL FEED-IN PREPARATION MECHANISM



When an original is inserted, it is stopped at the original stopper [A] and the original set sensor [B] turns on.

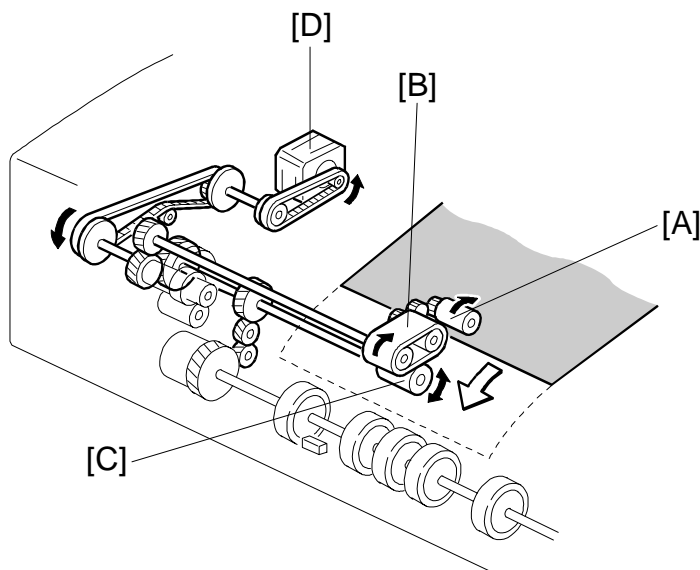
Original Stopper Release (top diagram):

When the print key is pressed, the pick-up motor [C] turns on, the cam [D] turns and the original stopper is lifted to let the original pass. At this time, the one-way clutch in gear [E] prevents the pick-up roller release mechanism from moving, and the pick-up roller remains up.

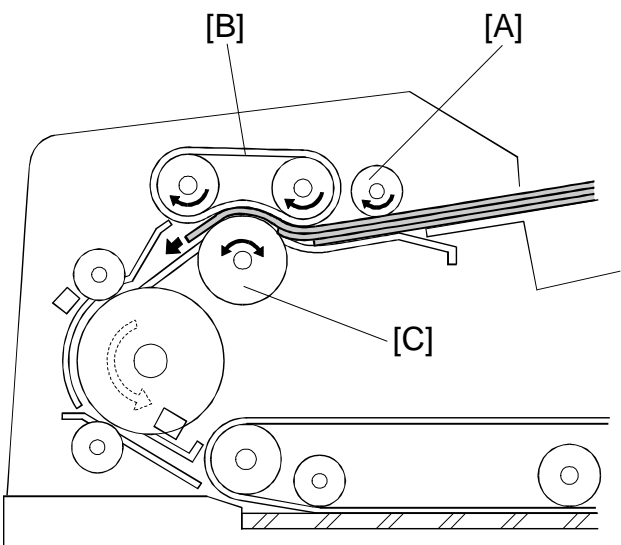
Pick-up Roller Release (bottom diagram):

When cam [D] turns, the original stopper HP sensor [F] is turned on. A short time later, the pick-up motor [C] turns in reverse, the cam [G] rotates away from the pick-up roller release lever [H]. The lever then rises and the pick-up roller [I] drops onto the original. The one-way clutch in gear [J] prevents the original stopper from dropping. When the original reaches the entrance sensor, the pick-up motor reverses again, and the pick-up roller lifts up until the pick-up roller home position sensor [K] detects the actuator.

2.2 PICK-UP AND SEPARATION MECHANISM



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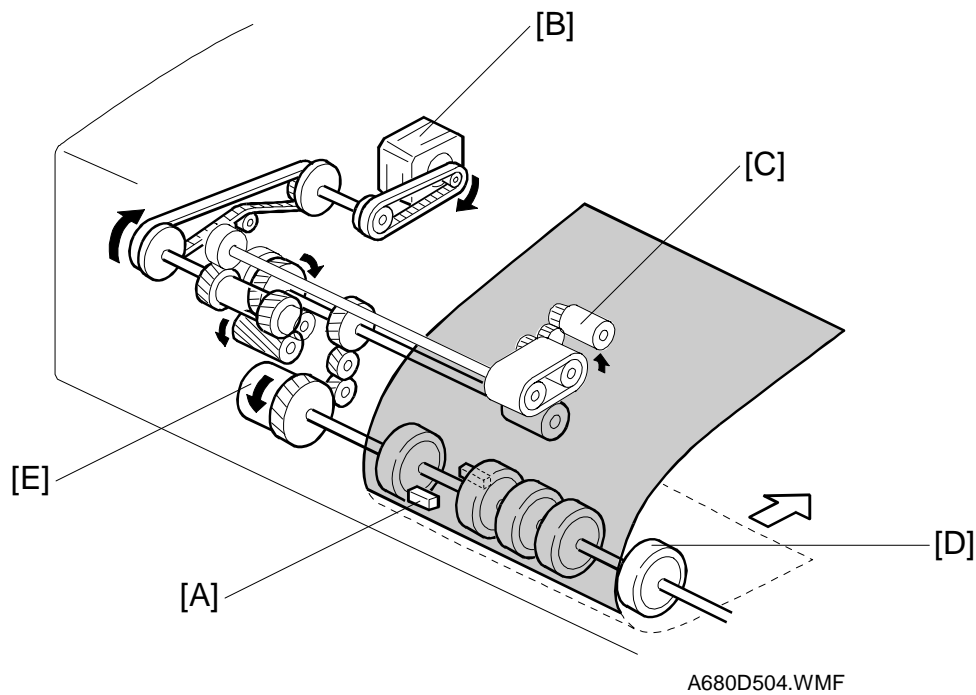
A680D503.WMF

The original separation system uses an FRR system. The pick-up roller [A], feed belt [B], and separation roller [C] are driven by the feed-in motor [D].

To drive this mechanism, the feed-in motor turns in the forward direction.

When two sheets of the original are fed by the pick-up roller, the separation roller turns in the opposite direction to the feed belt and the 2nd sheet is pushed back to the original tray. When there is only one sheet between the feed belt and separation roller, the separation roller rotates in the same direction as the feed belt. This is because the separation roller contains a torque limiter.

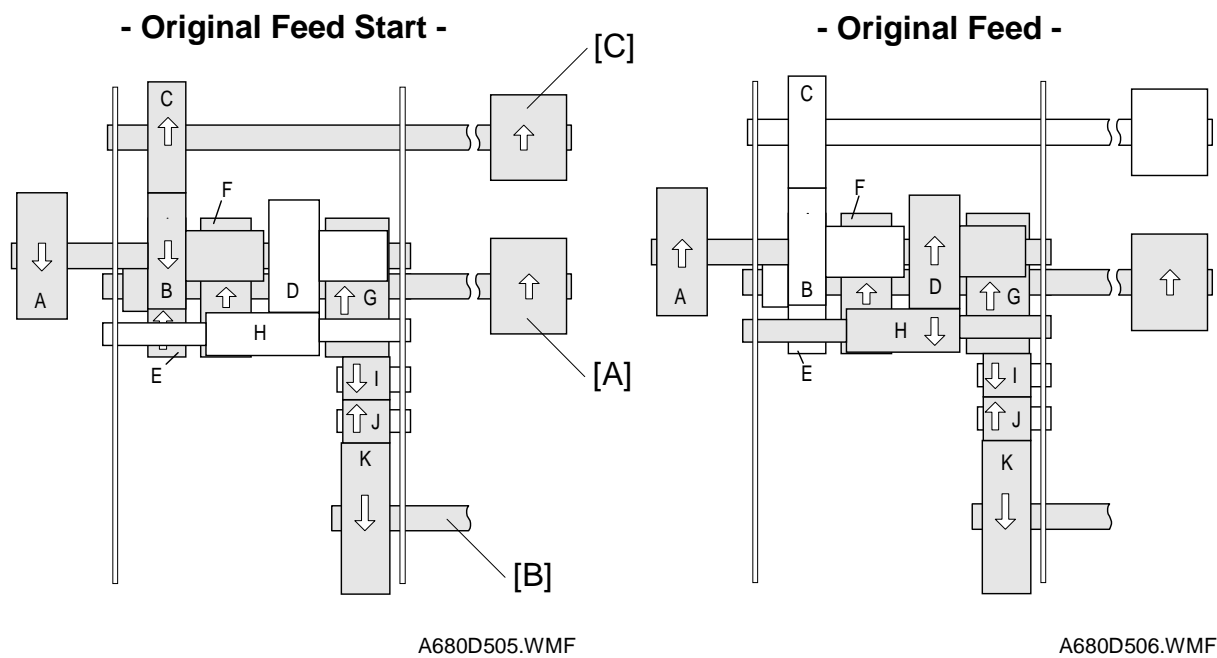
2.3 ORIGINAL FEED MECHANISM



When the leading edge of the original turns the entrance sensor [A] on, the feed-in motor [B] changes direction, and turns in reverse. However, the transport roller [D] keeps turning in the same direction because of a combination of one-way clutches (see the next page). At the same time, the pick-up motor starts again and the pick-up roller [C] is lifted up. When the pick-up roller HP sensor turns on, the pick-up motor stops (see Original Feed-in Preparation for a diagram).

The transport roller clutch [E] transfers drive from the pick-up motor to the transport roller. If there is a jam, the clutch disengages; this makes it easier for the user to remove jams at the transport roller.

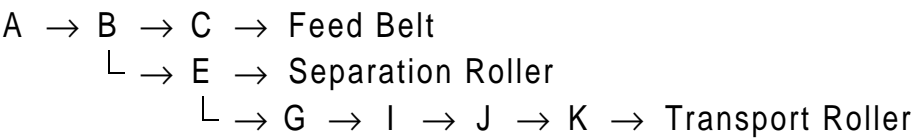
2.4 ORIGINAL FEED DRIVE MECHANISM



The separation roller [A] and transport roller [B] always turn in the same direction because of a combination of gears and one-way clutches, even if the feed-in motor changes direction. However, the feed belt [C] stops during original feed. The gears B, D, E and F each have a one-way clutch.

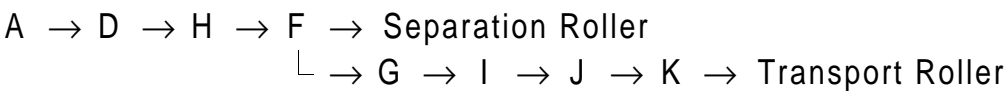
Original Feed Start

When the feed-in motor turns on, the drive is transferred as follows:

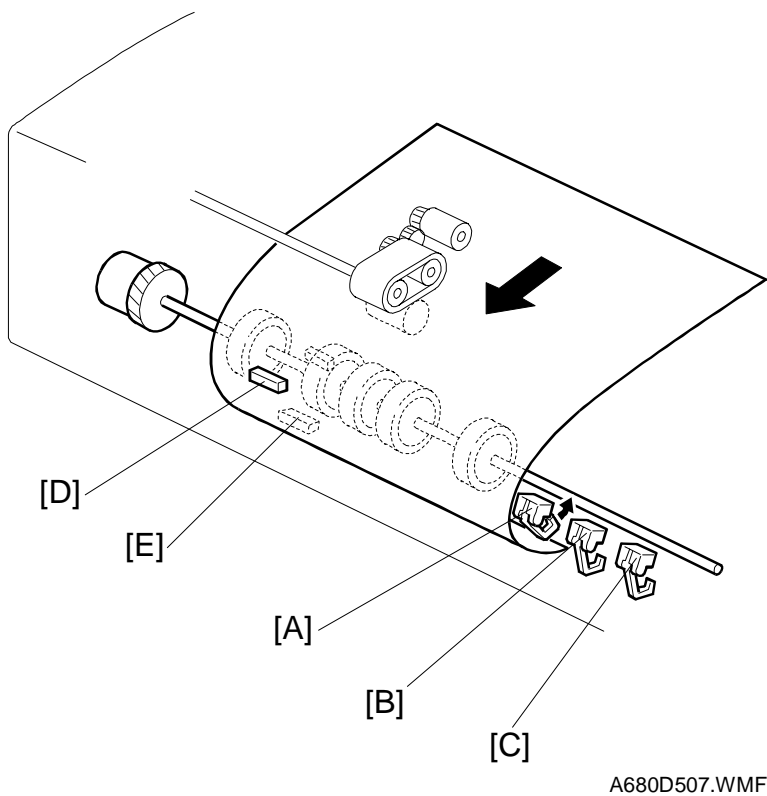


Original Feed

When the leading edge of the original turns on the entrance sensor, the feed-in motor turns in reverse, and the drive is transferred as follows:



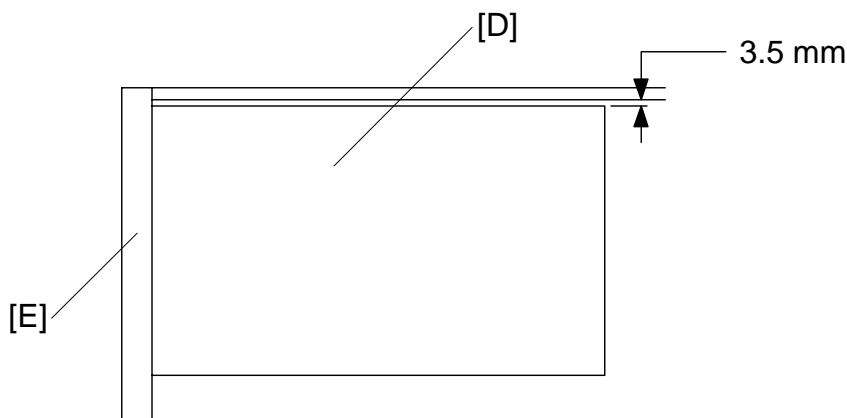
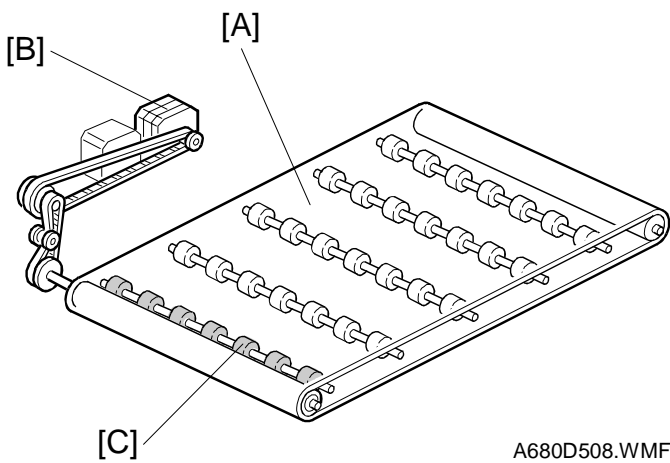
2.5 ORIGINAL SIZE DETECTION



The DF detects original width using three original width sensors-1 [A], -2 [B], -3 [C], and detects original length using entrance sensor [D] and registration sensor [E]. The CPU counts the feed-in motor pulses between when the leading edge of the original turns on the registration sensor and when the trailing edge of the original turns off the entrance sensor.

The machine detects the original size from the combination of readings from all sensors.

2.6 ORIGINAL TRANSPORT MECHANISM



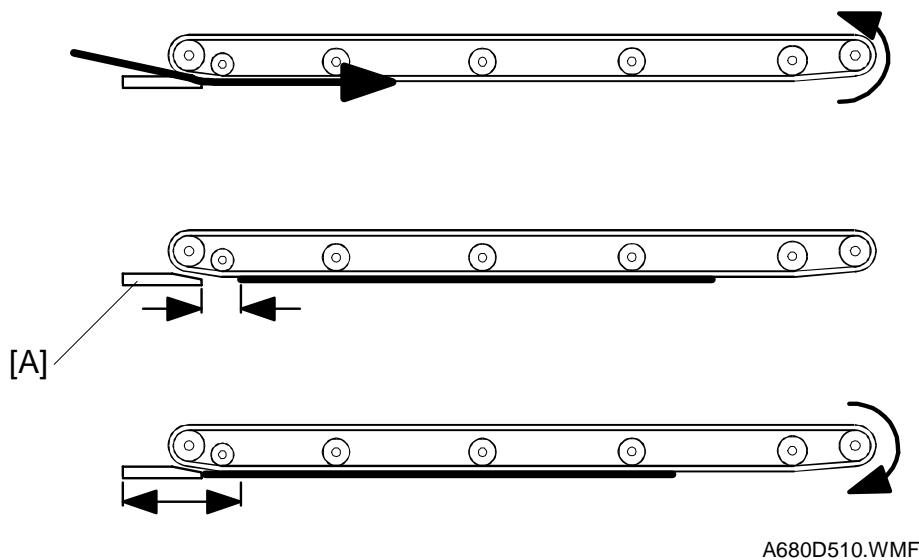
The transport belt [A] is driven by the transport belt motor [B]. The transport belt motor starts when the copier sends an original feed-in signal.

Inside the transport belt are five pressure rollers which give the proper pressure between the belt and original. The pressure roller [C] closest to the left original scale is made of rubber for the stronger pressure needed for thick originals. The other rollers are sponge rollers.

Since the copier's original position is at the left rear corner, the original [D] fed from the DF must also be at this position. But if the original was to be fed along the rear scale [E], original skew, jam, or wrinkling may occur.

To prevent such problems, the original transfer position is set to 3.5 mm away from the rear scale as shown. The 3.5 mm gap is compensated for by changing the starting position of the main scan.

2.7 ORIGINAL SKEW CORRECTION MECHANISM



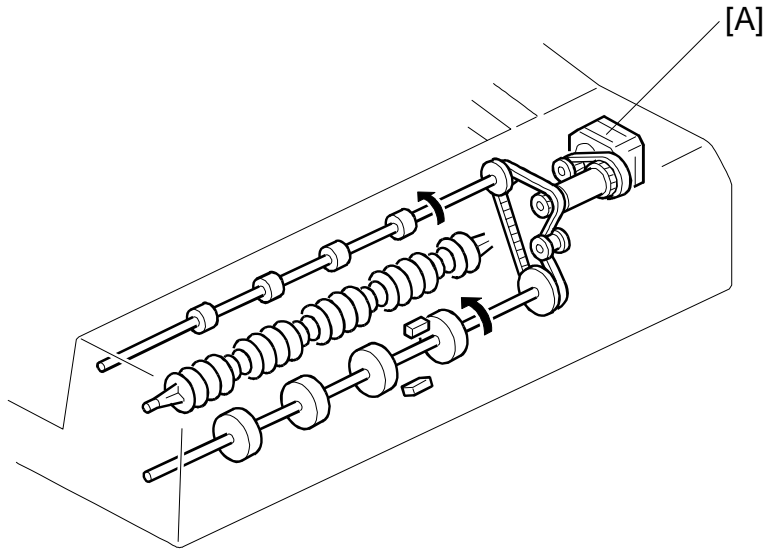
The transport belt motor remains energized to carry the original approximately 5 mm past the left scale [A] (see the middle drawing). Then the motor stops and reverses to feed the original back against the left scale (see the bottom drawing). This forces the original to hit the left scale and this aligns the trailing edge to minimize the original skew on the exposure glass.

After a two-sided original has been inverted to copy the 2nd side, it is fed in from the inverter against the left scale (see the bottom drawing; the top two drawings do not apply in this mode).

The amount of reverse feed against the left scale can be adjusted with SP modes.

2.8 ORIGINAL INVERSION AND FEED-OUT MECHANISM

2.8.1 GENERAL OPERATION



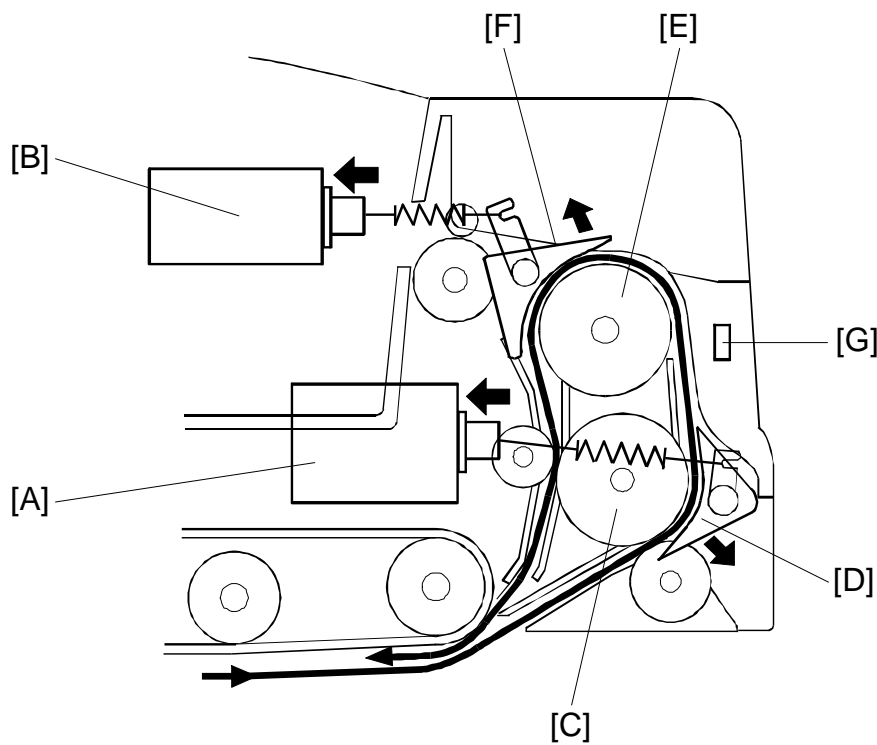
A680D511.WMF

When the scanner reaches the return position, the copier's CPU sends the feed-out signal to the DF. When the DF receives the feed-out signal, the transport belt motor and feed-out motor [A] turn on. The original is then fed out to the exit tray or fed back to the exposure glass after reversing in the inverter section.

This DF has two exit trays. For single-sided original mode, the original is fed out to the right exit tray and for double-sided original mode, the original is fed out to the upper exit tray.

This causes the originals to be fed out in the correct order on the exit trays and allow the best one-to-one copy speed for each mode. The user can change the exit tray to the upper exit tray for single-sided mode (for example, if there is not enough space in the room for the right exit tray to be installed). However, one-to-one copy speed for this mode is reduced.

2.8.2 ORIGINAL INVERSION MECHANISM

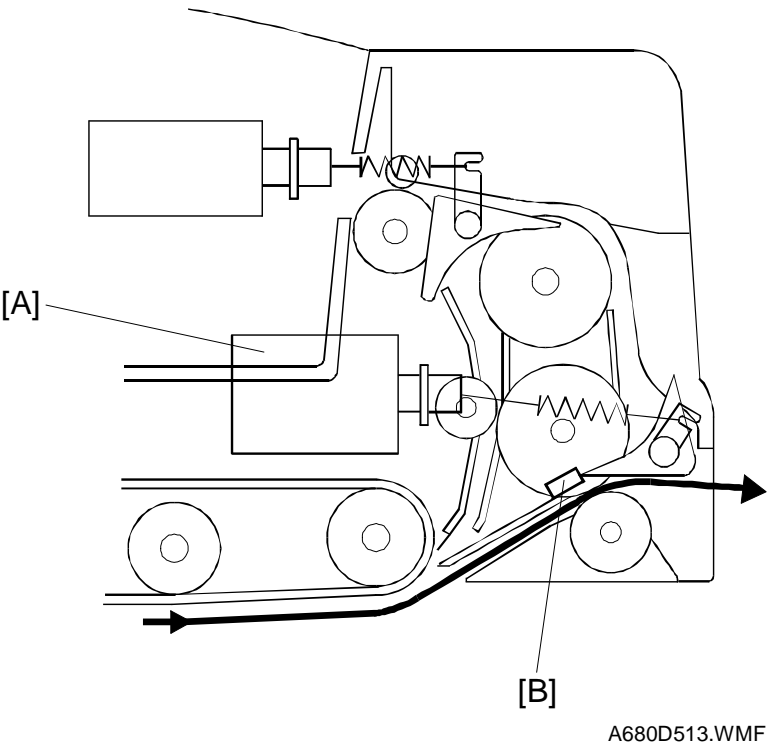


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When the DF receives the original invert signal from the copier, the transport belt motor, feed-out motor, exit gate solenoid [A], and inverter gate solenoid [B] turn on and the original is fed back to the exposure glass through the exit roller [C], exit gate [D], inverter roller [E], inverter gate [F], and exit roller.

The transport belt motor turns in reverse shortly after the leading edge of the original turns on the inverter sensor [G], and feeds the original to the left scale.

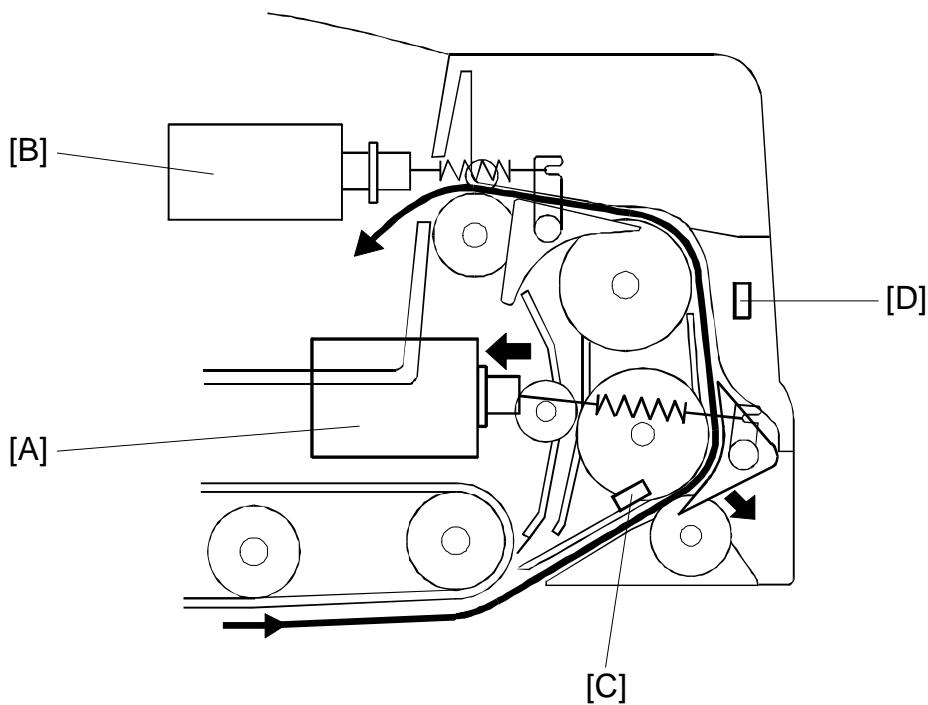
2.8.3 ORIGINAL EXIT MECHANISM (SINGLE-SIDED ORIGINAL MODE)



The exit gate solenoid [A] remains off and the original is fed out to the right exit tray. The transport belt motor turns off after the exit sensor [B] turns on.

To stack the originals neatly on the exit tray, the feed-out motor speed is reduced approximately 15 mm before the trailing edge of the original turns off the exit sensor.

2.8.4 ORIGINAL EXIT MECHANISM (DOUBLE-SIDED ORIGINAL MODE)

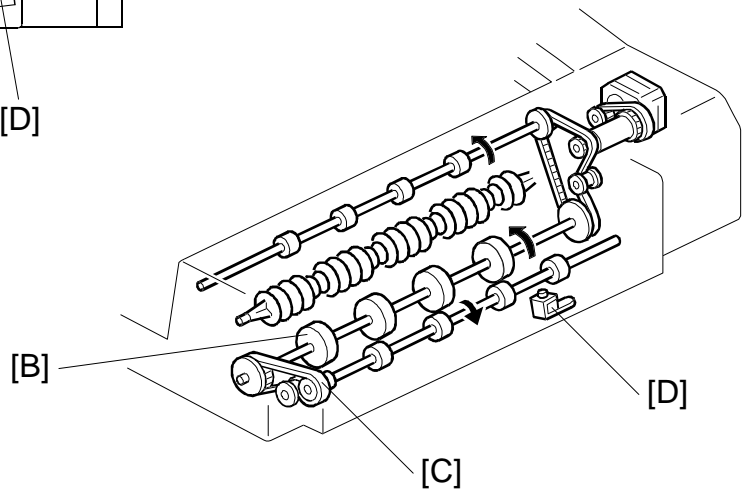
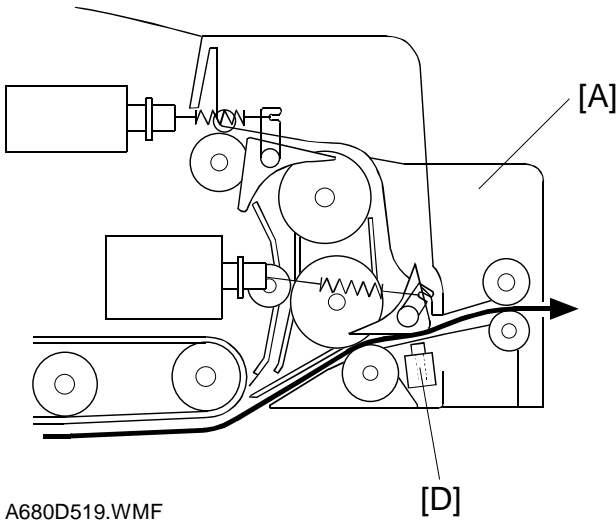


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The exit gate solenoid [A] turns on and the inverter gate solenoid [B] remains off, and the original is fed out to the upper tray. The transport belt motor turns off when the trailing edge of the original passes through the exit sensor [C].

To stack the originals neatly on the upper tray, the feed-out motor speed is reduced approximately 37 mm after the trailing edge of the original turns off the inverter sensor [D].

2.9 STAMP



This function is only for fax mode with the stamp unit option [A].

The stamp unit is driven by ADF exit roller [B] through timing belt [C].

The stamp function does not work when the original is fed out to the upper exit tray, because the paper does not go past the stamp.

In the single-sided original mode, when the original reaches the stamp position (15 mm before its trailing edge), it stops and stamper solenoid [D] turns on if the page was sent successfully (immediate transmission) or stored successfully (memory transmission).

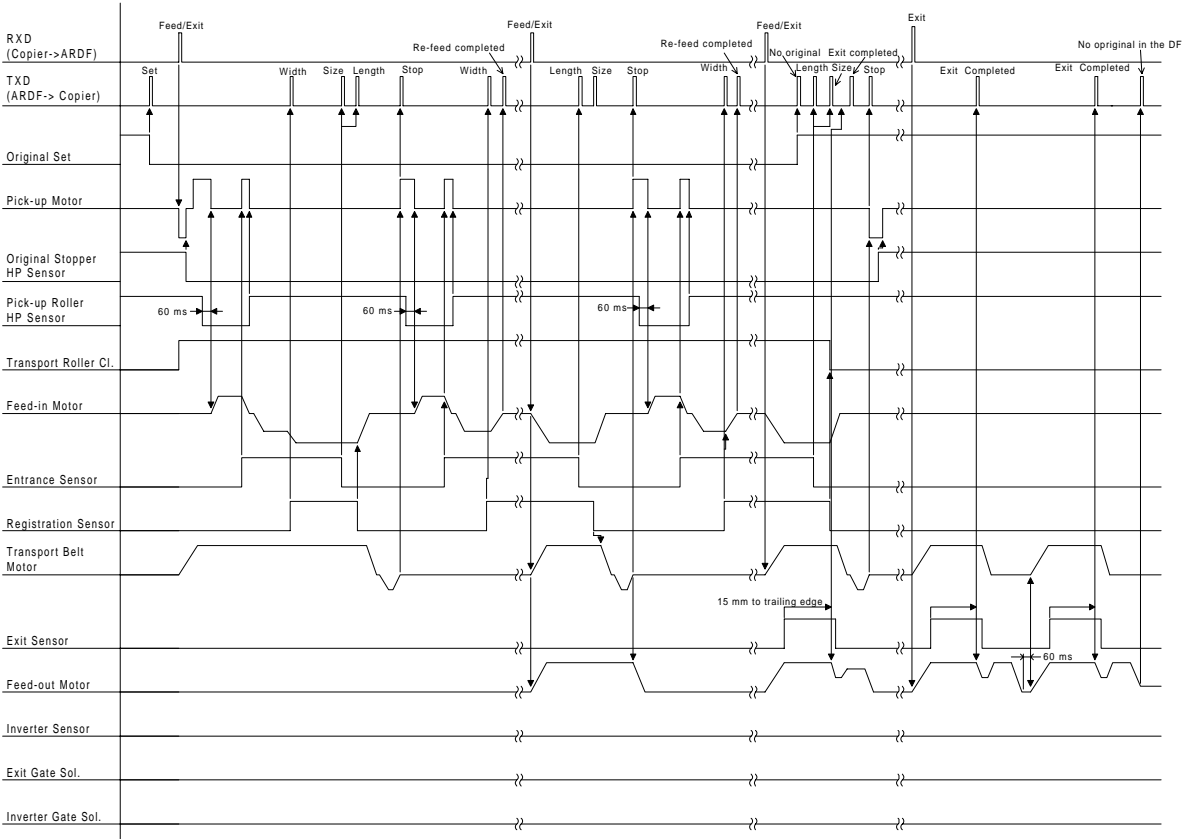
In the two-sided original mode, the stamper solenoid turns on twice. The first time is for the 1st side of the original, and its position is 15 mm from the leading edge. The second is for the 2nd side of the original, and its position is 15 mm before the trailing edge. However, both stamps are made on the 1st side of the original (after side 2 is scanned, the original is inverted again so that side 1 is facing down).

2.10 JAM CONDITIONS

1. The entrance sensor does not turn on within 600 ms after the feed-in motor turns on.
2. The registration sensor does not turn on within 500 ms after the feed-in motor turns on in reverse.
3. The registration sensor does not turn off within 1,250 ms after the registration sensor turns on.
4. The exit sensor turns on before the 1st original is stopped on the exposure glass.
5. When feeding the original away from the exposure glass, the exit sensor does not turn on within 1,000 ms after the transport belt motor turns on.
6. The exit sensor does not turn off within 300 ms after the feed-out motor speed is reduced.
7. In duplex mode, when the inverter sensor does not turn on within 150 ms after the exit sensor turns on.
8. When the original is inverted in duplex mode, the exit sensor does not turn off within 1,250 ms after the exit sensor turns on.
9. The inverter sensor does not turn off within 150 ms of the exit gate solenoid turning off.

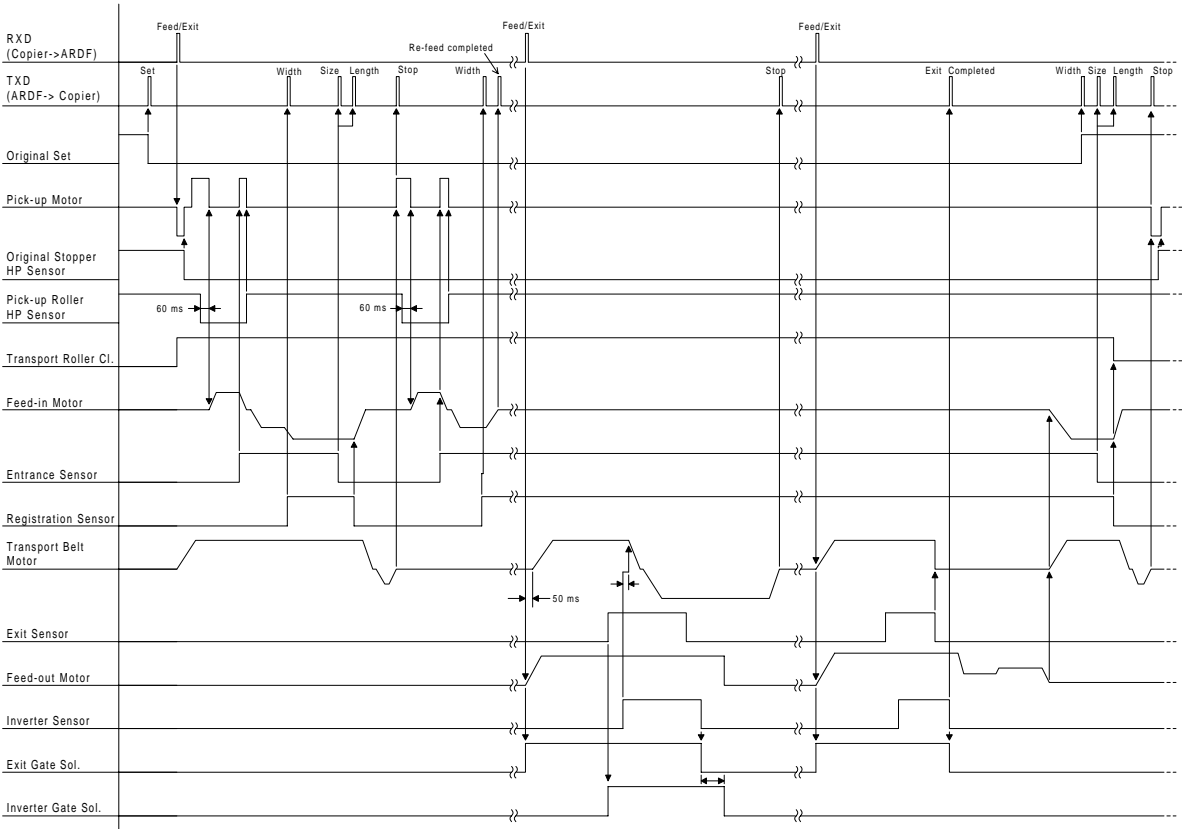
2.11 TIMING CHARTS

2.11.1 A4 SIDEWAYS: ONE-SIDED ORIGINAL (3 ORIGINALS)



A680D517.WMF

2.11.2 A4 SIDEWAYS: TWO-SIDED ORIGINAL (2 ORIGINALS)



A680D518.WMF

3. SERVICE TABLES

3.1 DIP SWITCHES

DPS101				Description
1	2	3	4	
0	0	0	0	Normal operating mode, without stamper
0	0	0	1	Normal operating mode, with stamper
0	0	1	0	Do not select
0	0	1	1	Do not select
0	1	0	0	Original registration adjustment for one-sided originals (VR101)
0	1	0	1	Original registration adjustment for two-sided originals (VR102)
0	1	1	0	Do not select
0	1	1	1	Do not select
1	0	0	0	Free run: one-sided original, thick mode
1	0	0	1	Free run: one-sided original, thick mode, low speed
1	0	1	0	Free run: one-sided original, thin mode
1	0	1	1	Free run: one-sided original, thin mode, low speed
1	1	0	0	Free run: two-sided original, thick mode
1	1	0	1	Free run: two-sided original, thick mode, low speed
1	1	1	0	Free run: one-sided original, stamp
1	1	1	1	Free run: two-sided original, stamp

- In free run mode, the DF automatically starts 3 seconds after the original is placed on the original table.
- The “Auto” LED blinks except in normal mode.

3.2 TEST POINTS

No.	Label	Monitored Signal
TP100	(GND)	Ground
TP101	(Vcc)	+5V
TP103	(TXD)	TXD to the copier
TP104	(RXD)	RXD from the copier

3.3 VARIABLE RESISTORS

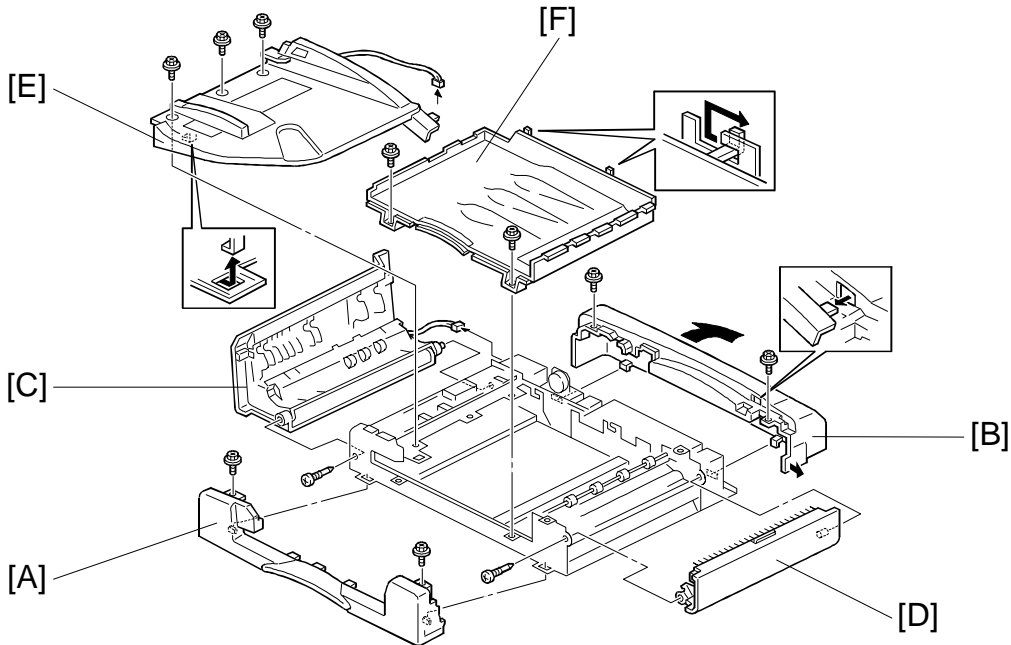
No.	Function
VR101	Adjust the original registration for one-sided originals.
VR102	Adjust the original registration for two-sided originals.

3.4 FUSES

No.	Function
FU101	Protects the 24 V line.

4. REPLACEMENT AND ADJUSTMENT

4.1 COVER REPLACEMENT



A680R500.WMF

Front Cover Removal

1. Remove the front cover [A] (2 screws).

Rear Cover Removal

2. Remove the rear cover [B] (2 screws).

Left Cover Removal

1. Remove the front cover.
2. Remove the left cover [C] (1 screw, 1 connector).

Upper Exit Cover Removal

1. Remove the front cover.
2. Remove the upper exit cover [D] (1 screw).

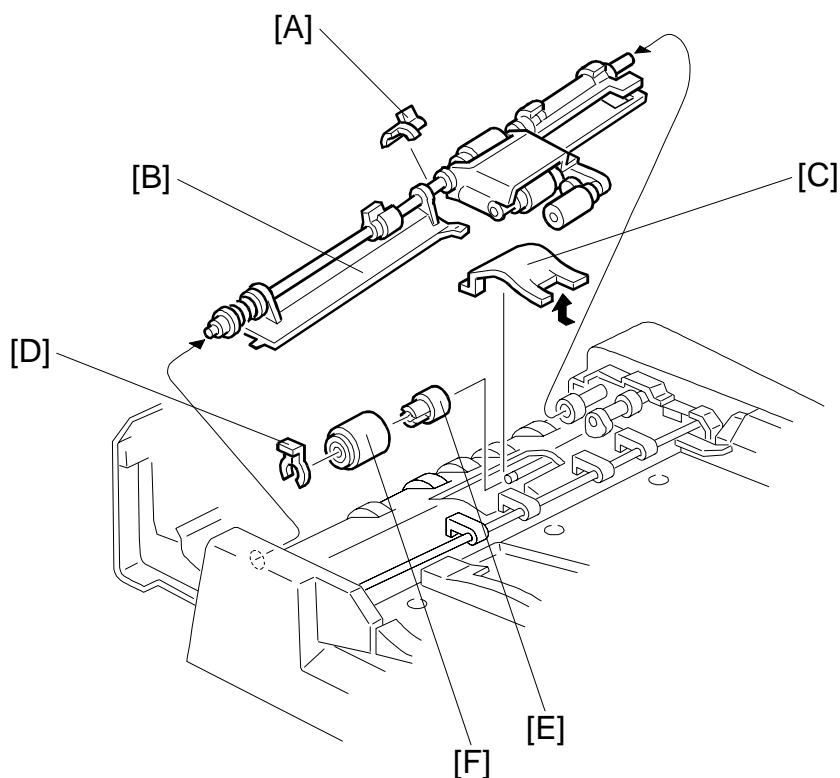
Original Tray Removal

1. Remove the rear cover.
2. Remove the original tray [E] (3 screws, 2 LEDs). When re-installing the LEDs on the original tray, the LED with the short harness is for the ready indicator, and the LED with the long harness is for the SADF indicator.

Upper Cover Removal

1. Remove the front, rear, and upper exit covers.
2. Remove the upper cover [F] (2 screws, 2 hooks).

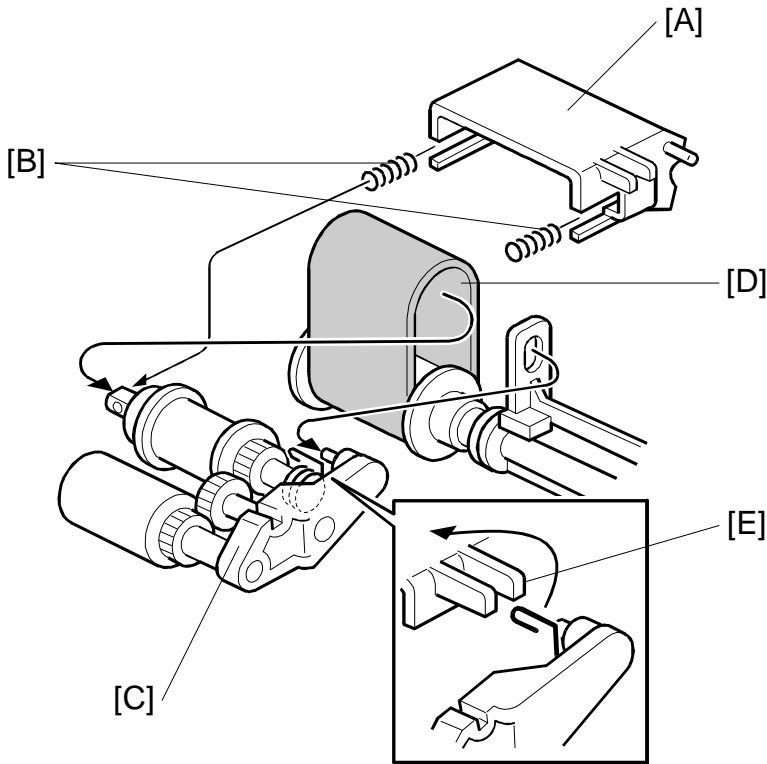
4.2 FEED UNIT REMOVAL AND SEPARATION ROLLER REPLACEMENT



A680R501.WMF

1. Open the left cover.
2. Remove the white clip [A].
3. Remove the feed unit [B].
4. Pull the feed unit to the front, release the shaft at the rear, and release the front bushing.
5. Remove the separation roller cover [C].
6. Remove the snap ring [D].
7. Remove the torque limiter [E] and separation roller [F].
8. Replace the separation roller.

4.3 FEED BELT REPLACEMENT

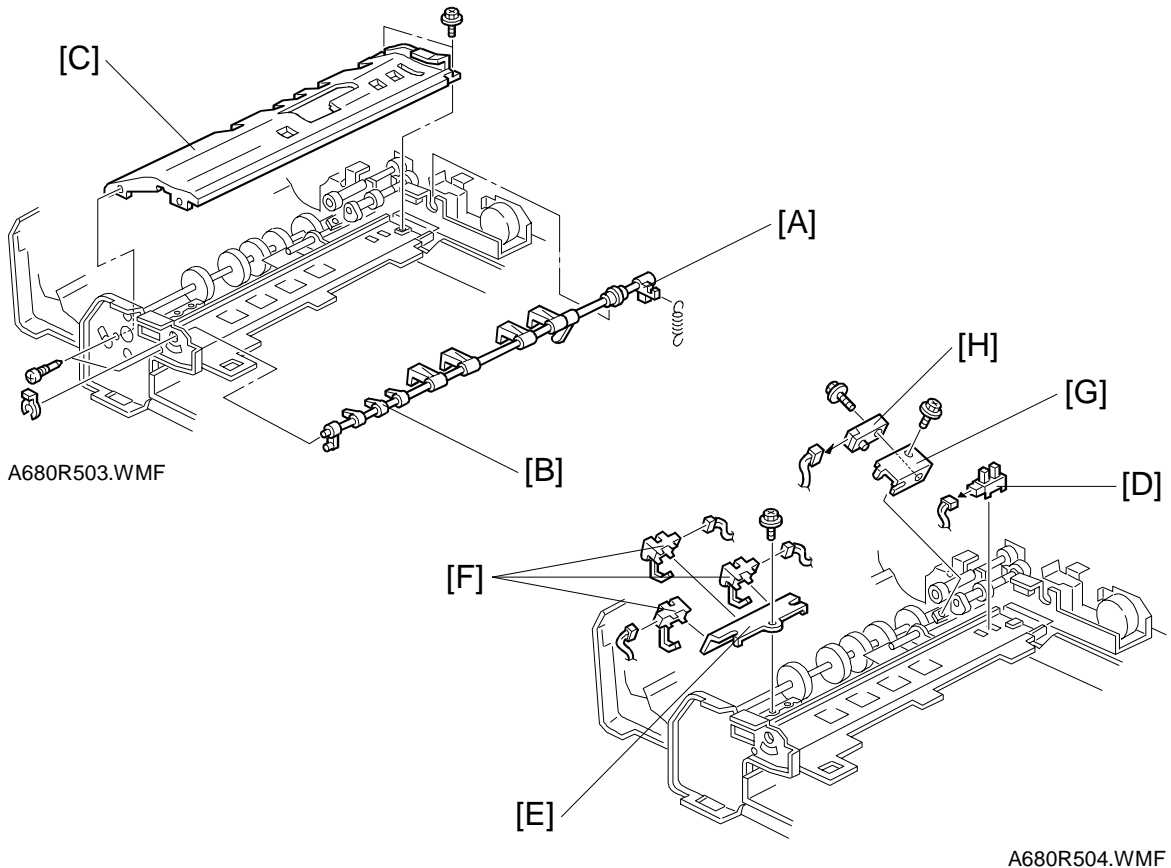


A680R502.WMF

1. Remove the feed unit.
2. Remove the feed belt cover [A].
NOTE: The springs [B] come off the feed belt cover easily.
3. Remove the pick-up roller unit [C].
4. Replace the feed belt [D].
NOTE: When reinstalling the pick-up roller unit, make sure that the pressure spring [E] is on the feed belt cover.

4.4 SENSOR REPLACEMENT

4.4.1 ORIGINAL SET, ORIGINAL WIDTH AND REGISTRATION SENSORS



1. Remove the front cover, rear cover, original tray, and feed unit.
2. Rotate the pick-up motor manually and release the cam from the lever [A] on the original stopper [B].
3. Remove the original stopper (1 snap ring, 1 spring).
4. Remove the upper original guide [C] (4 screws).

Original Set Sensor

5. Replace the original set sensor [D] (1 connector).

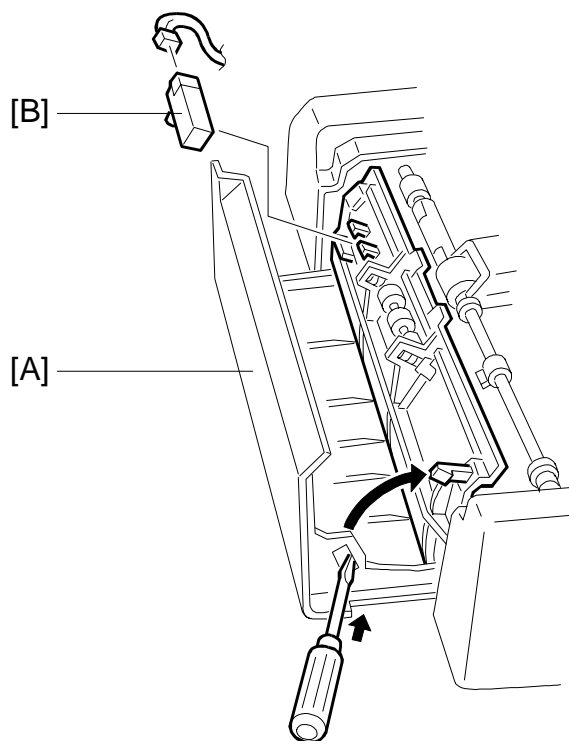
Original Width Sensor

5. Remove the original width sensor bracket [E] (1 screw).
6. Replace the original width sensor(s) [F] (1 connector each).

Registration Sensor

5. Remove the registration sensor bracket [G] (1 screw).
6. Replace the registration sensor [H] (1 connector, 1 screw).

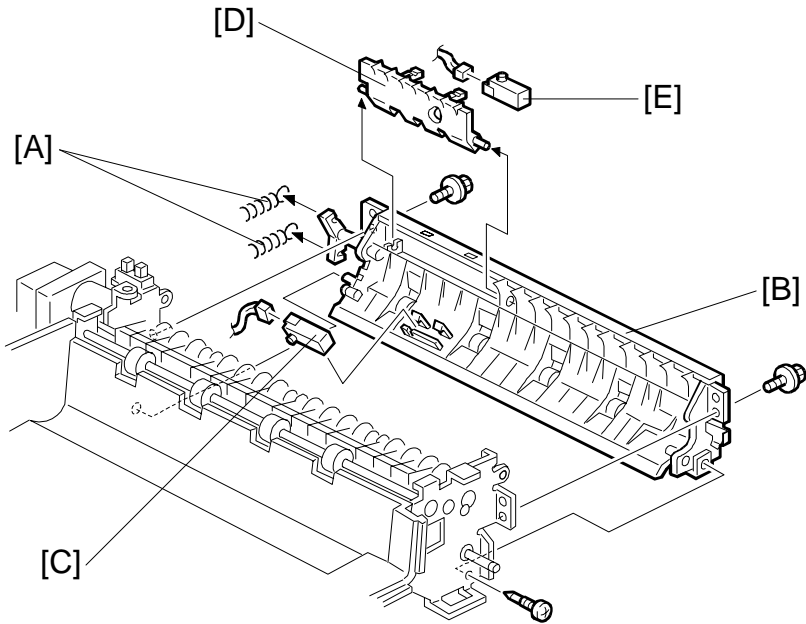
4.4.2 ENTRANCE SENSOR



A680R505.WMF

1. Open the left cover.
2. Release the left original guide [A].
3. Replace the entrance sensor [B].

4.4.3 EXIT SENSOR AND INVERTER SENSOR



A680R509.WMF

1. Remove the front cover and rear cover.
2. Remove the two exit gate springs [A].
3. Remove the right exit cover [B] (3 screws).

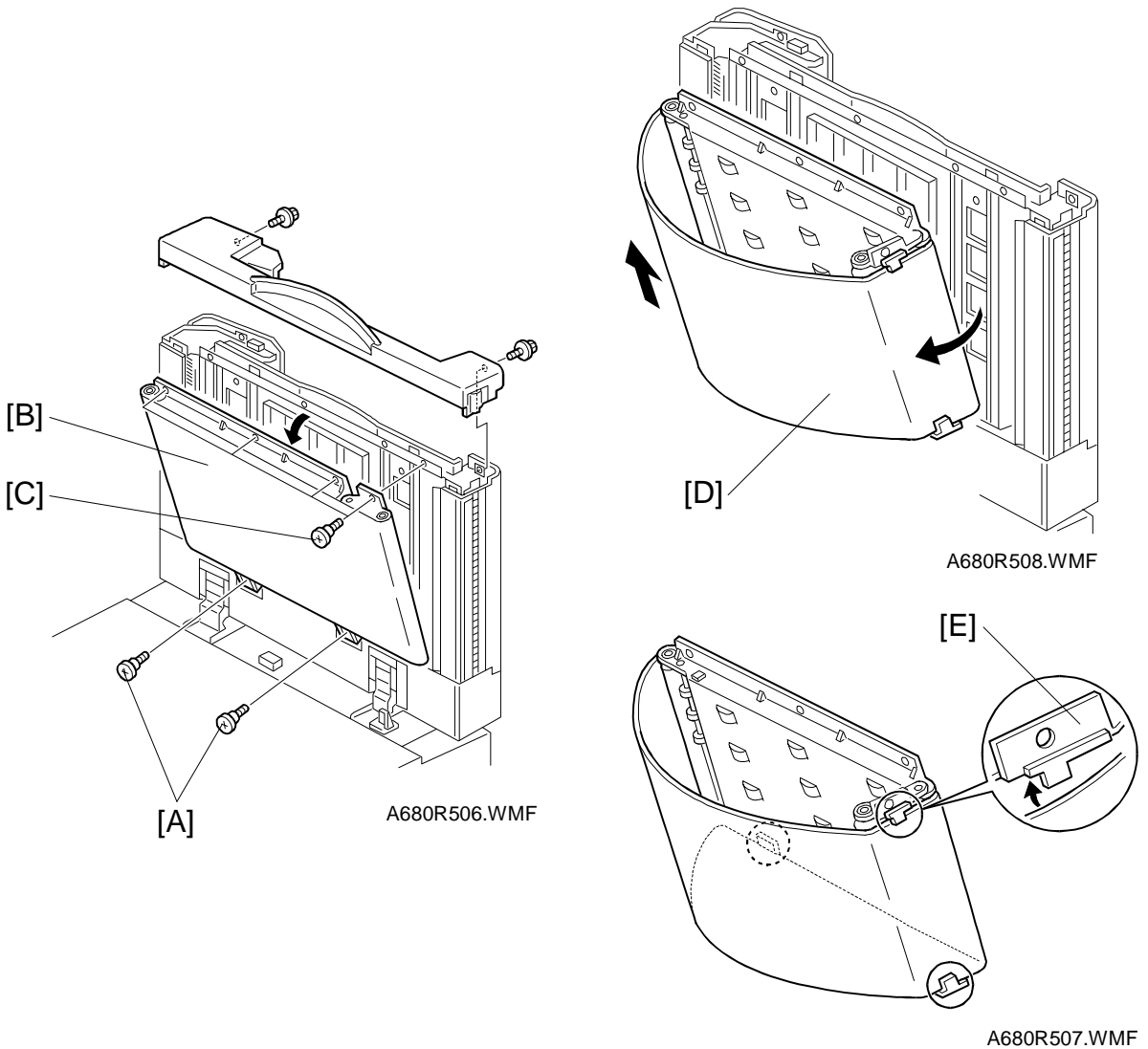
Exit Sensor

4. Replace the exit sensor [C] (1 connector).

Inverter Sensor

4. Remove the inverter sensor guide [D].
5. Replace the inverter sensor [E] (1 connector).

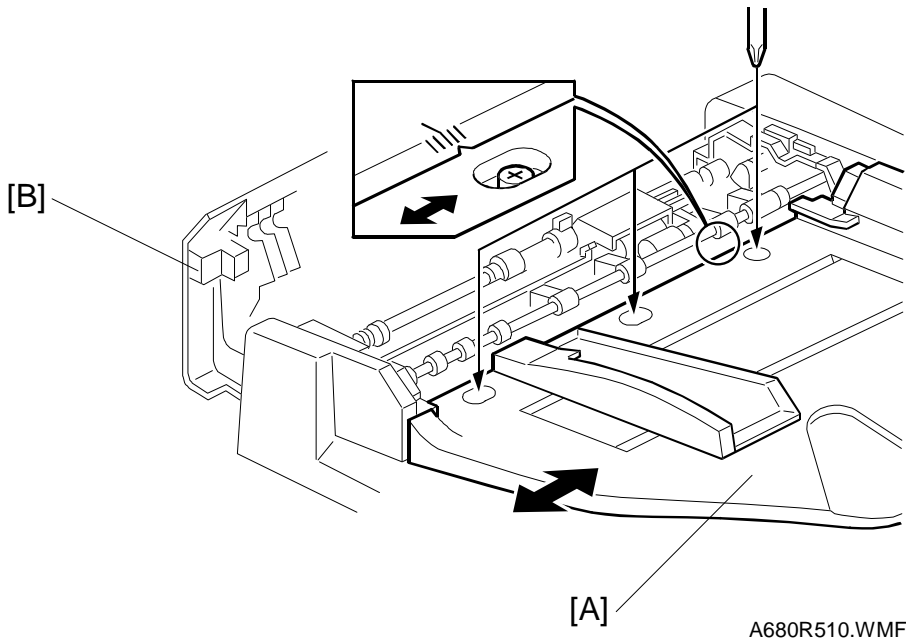
4.5 TRANSPORT BELT REPLACEMENT



1. Remove the front cover.
2. Remove the lower two screws [A] securing the transport belt assembly [B].
3. Remove the upper four screws [C] securing the transport belt assembly.
4. Bend up the transport belt assembly extension.
5. Pull off the transport belt [D] and replace it.

NOTE: 1) When releasing the transport belt assembly, make sure to remove the two lower screws first.
2) When installing the transport belt, make sure that the belt runs under the belt guide spacers [E].
3) When securing the transport belt assembly with the six screws, make sure to secure the four upper screws first.

4.6 SIDE-TO-SIDE REGISTRATION ADJUSTMENT



The side-to-side registration is adjusted as follows.

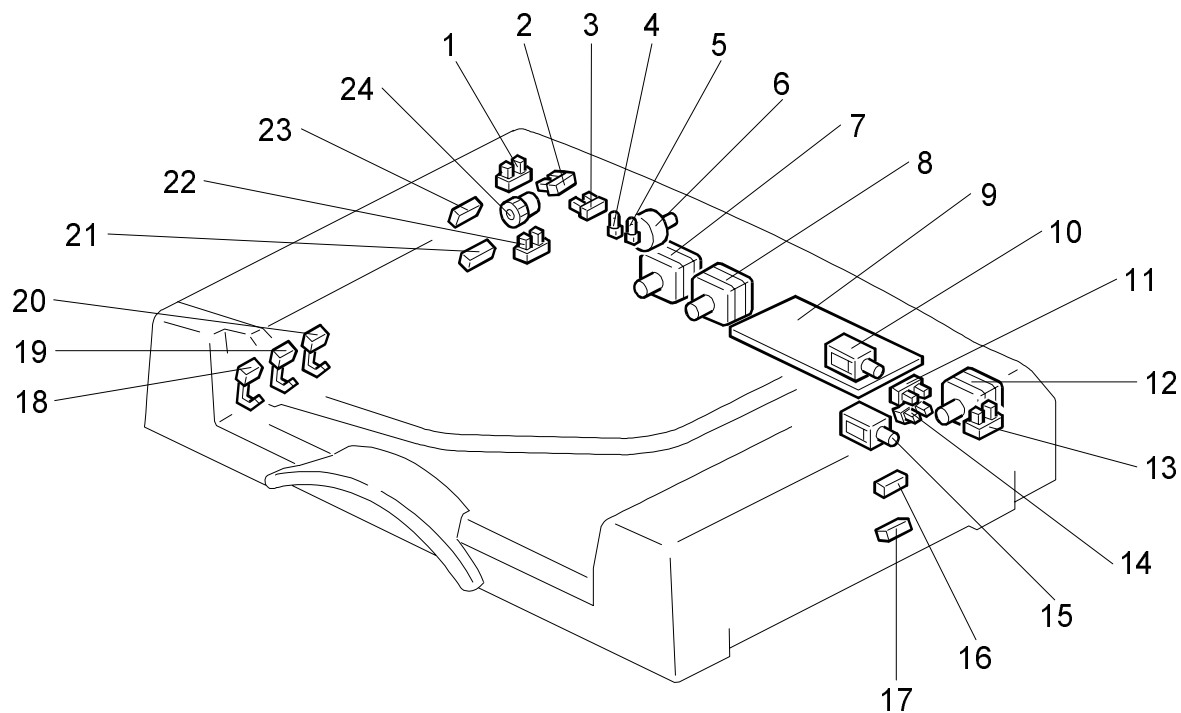
SP Mode

See the copier SP mode table.

Original Table Position

1. Loosen the 3 screws for the original table [A].
2. Move the original table and adjust the original position.
NOTE: When removing the original table for some reason, mark the position on the entrance guide [B].

AUTO DOCUMENT FEEDER (A680) ELECTRICAL COMPONENT LAYOUT



Symbol	Index No.	Description	P to P
Motors			
M1	6	Pick-up	F13
M2	7	Feed-in	H13
M3	8	Transport Belt	I13
M4	12	Feed-out	K13
Sensors			
S1	14	APS Start	J2
S2	11	DF Position	L2
S3	22	Original Set	H2
S4	3	Original Stopper HP	M2
S5	2	Pick-up Roller HP	N2
S6	23	Entrance	S2
S7	21	Registration	Q2
S8	20	Original Width 1	C2
S9	19	Original Width 2	D2
S10	18	Original Width 3	E2
S11	17	Exit	O2
S12	16	Inverter	R2
S13	1	Feed Cover	G2
S14	13	Exit Cover	I2
Solenoids			
SOL1	15	Exit Gate	O13
SOL2	10	Inverter Gate	P13
Clutch			
MC1	24	Transport Roller	N13
PCB			
PCB1	9	Main	B6
LEDs			
LED1	4	Ready	Q13
LED2	5	SADF	R13