RICOH

M199/M200/M203/M204 DETAILED DESCRIPTIONS MANUAL

M199/M200/M203/M204
DETAILED DESCRIPTIONS

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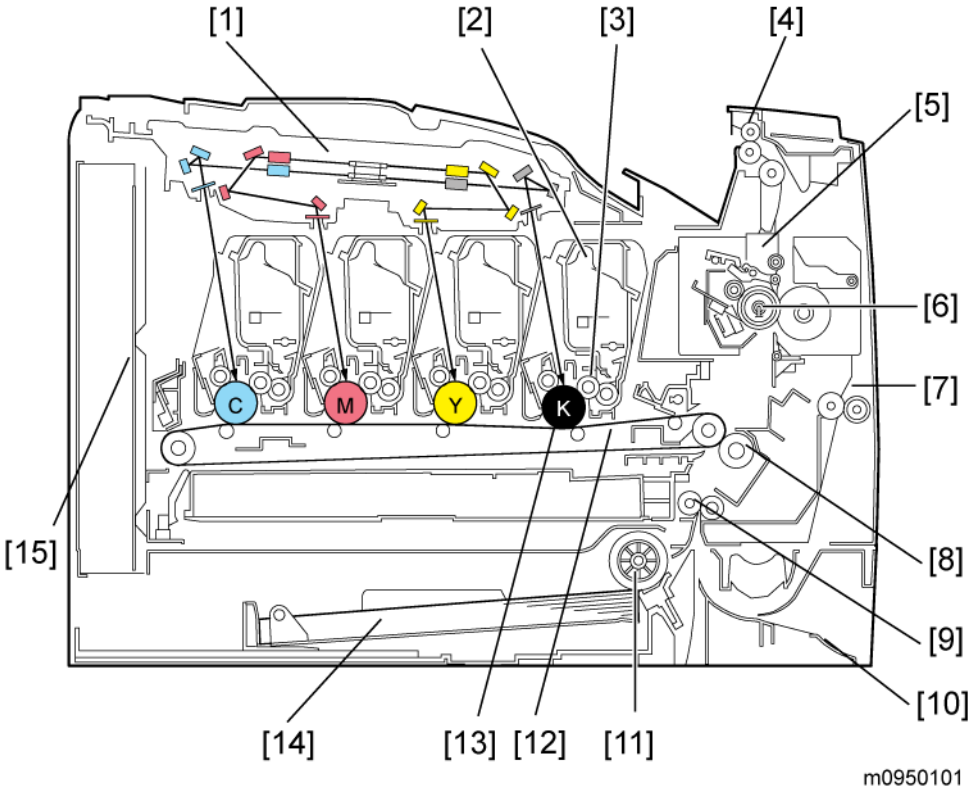

1. Laser Optics Housing Unit	9. Registration Roller
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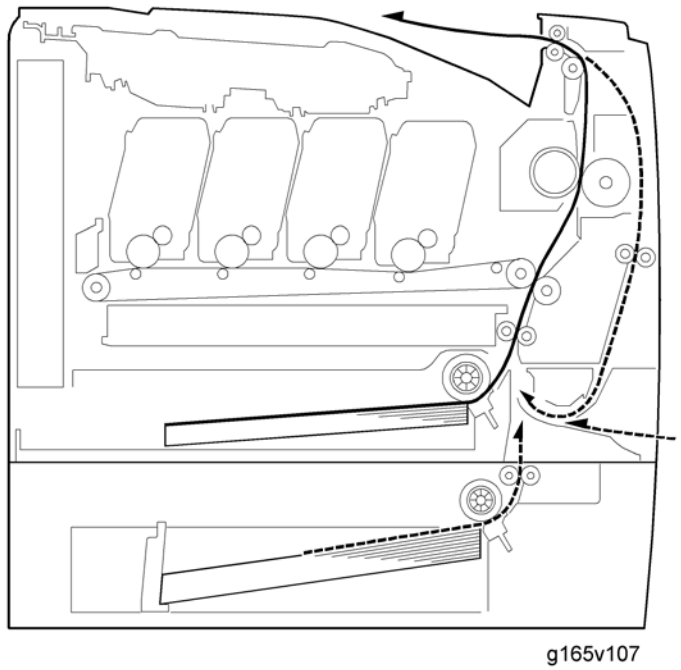

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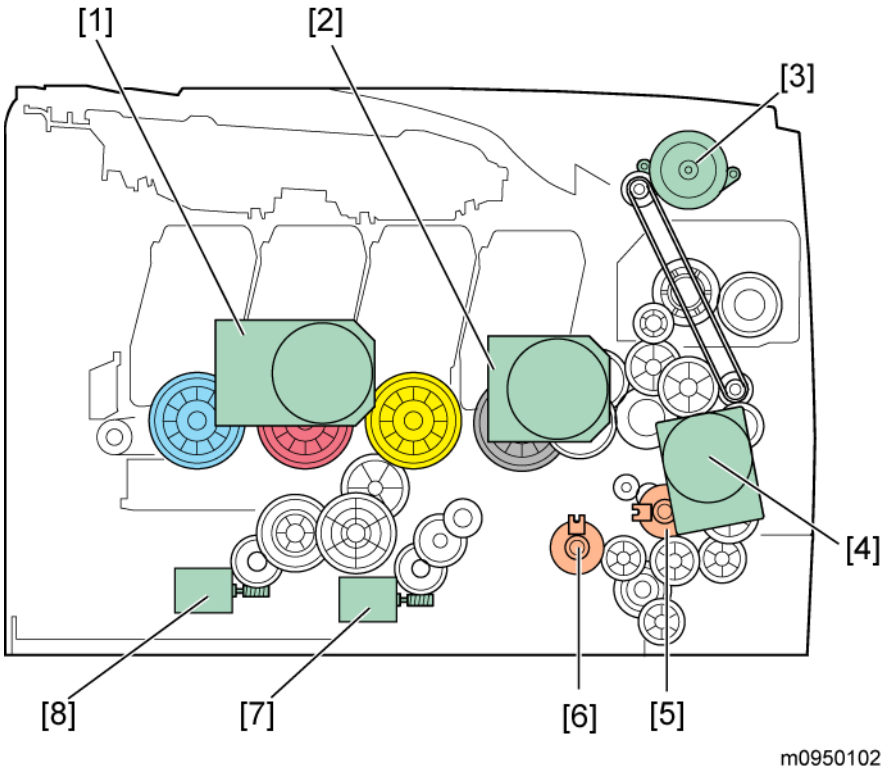
1.3 DRIVE LAYOUT



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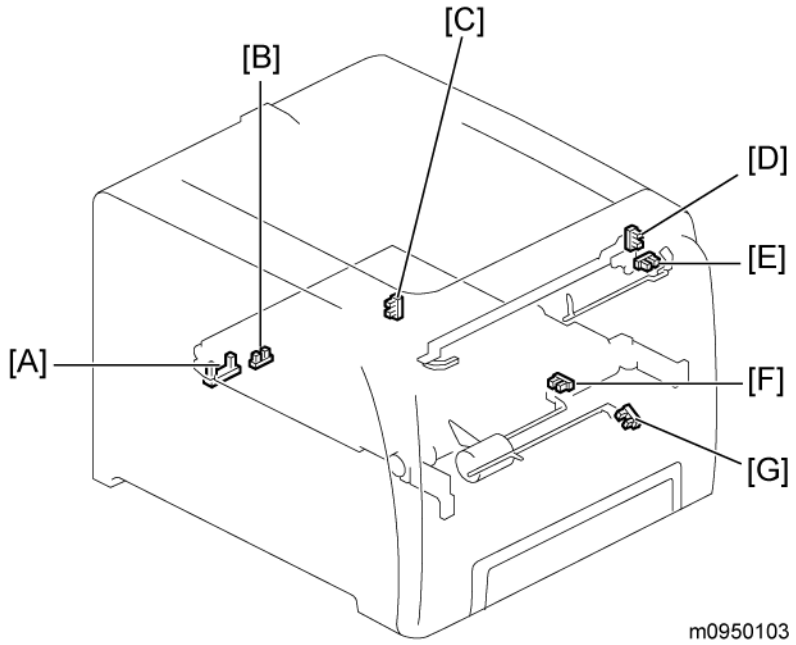
1. Color AIO Motor	5. Registration Clutch
2. Black AIO Motor	6. Paper Feed Clutch
3. Duplex Motor	7. Agitator Motor
4. Transport/Fusing Motor	8. ITB (Image Transfer Belt) Contact Motor

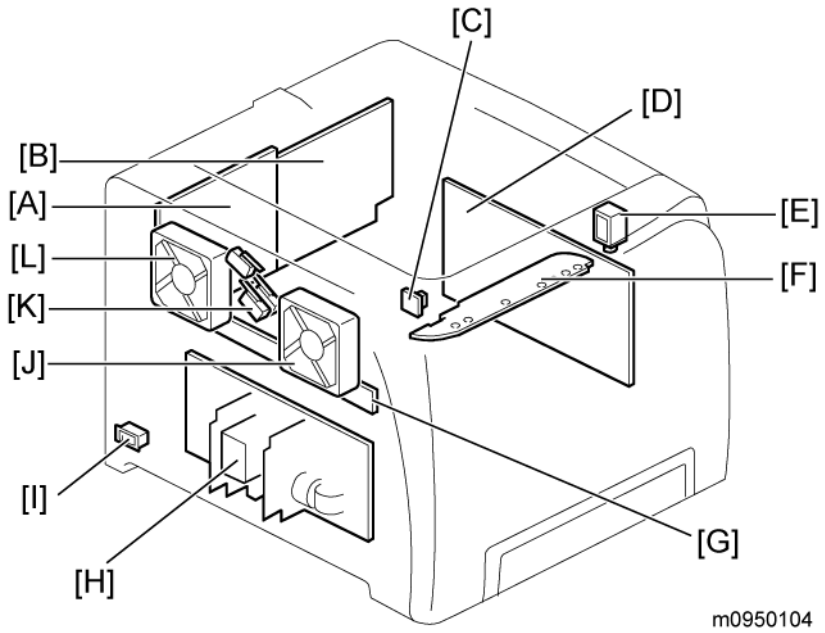
- **Color AIO Motor:**
  This drives the color AIOs (Cyan, Magenta and Yellow)
- **Black AIO Motor:**
  This drives the black AIO and the ITB (Image Transfer Belt).
- **Duplex Motor:**
  This drives the paper exit roller and the duplex roller.
- **Transport/Fusing Motor:**
  This drives the fusing unit, paper feed roller, registration roller and paper exit roller* via the paper feed clutch, registration clutch and gears. (*: This motor only drives the paper exit roller in non-duplex models.)
- **Registration Clutch:**
  This transfers drive from the transport/ fusing motor to the registration roller.
- **Paper Feed Clutch:**
  This transfers drive from the transport/ fusing motor to the paper feed roller.
- **Agitator Motor:**
  This moves the agitators in the waste toner bottle.
- **ITB Contact Motor:**
  This moves the ITB into contact with and away from the color OPCs.

1.4 ELECTRICAL COMPONENT LAYOUT

1.4.1 ENGINE



No.	Parts Name	Description
A	Waste Toner Overflow Sensor	This sensor detects whether the waste toner bottle is full.
B	Waste Toner Bottle Set Sensor	This sensor detects whether the waste toner bottle is set.
C	ITB Contact Sensor	This sensor detects whether the image transfer belt is in contact with the color OPCs (C, M, Y).
D	Fusing Pressure Release Sensor	This sensor detects whether the envelope lever is set to the envelope position.
E	Paper Exit Sensor	This sensor detects a paper jam in the fusing unit, paper exit path and duplex path.
F	Paper End Sensor	This sensor detects paper end and whether the tray is set.
G	Registration Sensor	This sensor detects a paper jam at the paper feed, by-pass feed and registration roller, and also determines the paper size based on the sensor on-off time.

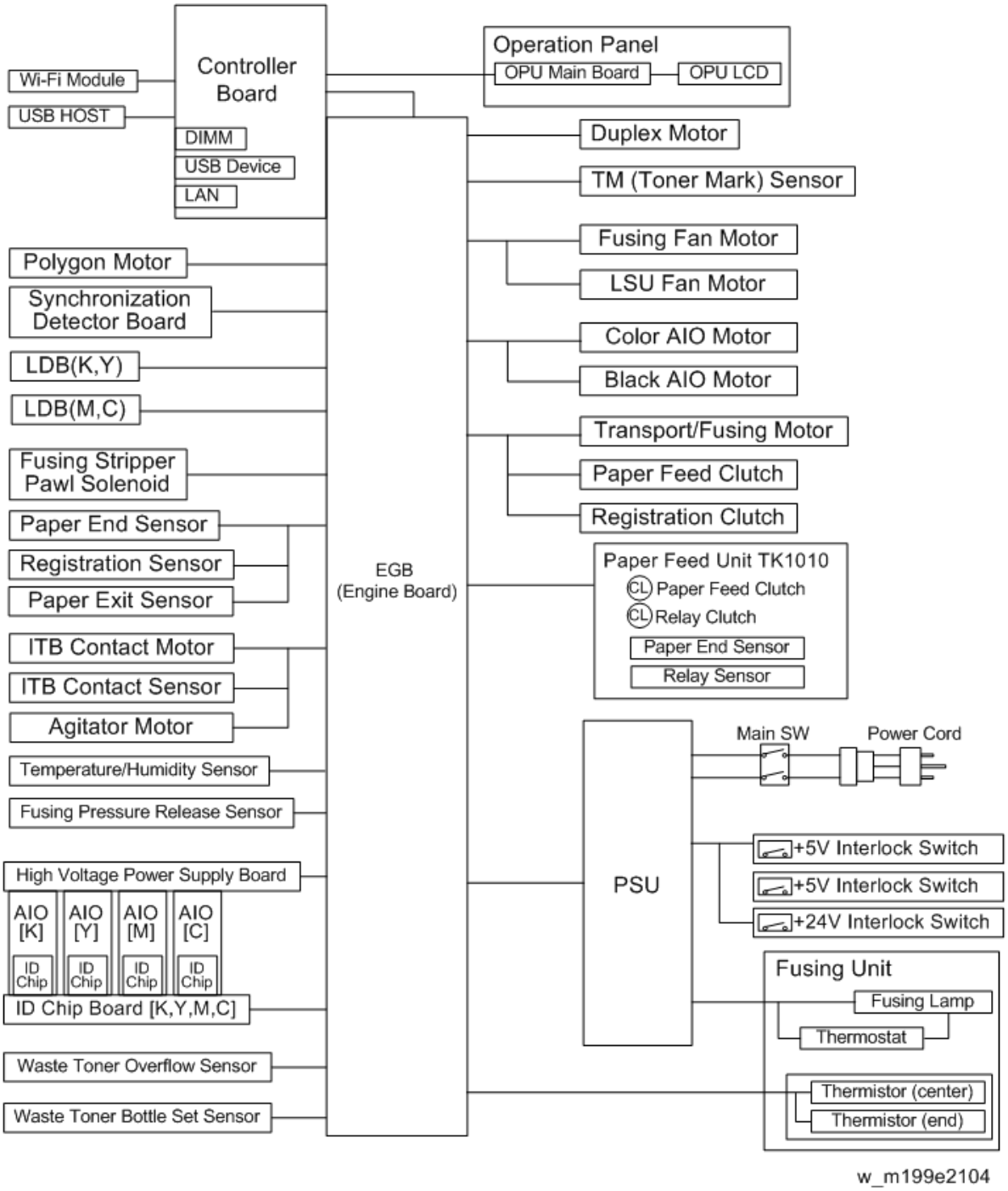


No.	Parts Name	Description
A	EGB (Engine Board)	This board controls all of the machine, input/output, drivers and input/output connections and the handshake with the Controller.
B	Controller Board	This board controls the memory, all applications and all peripheral devices.
C	Temperature/Humidity Sensor	This sensor detects the relative temperature and humidity around the machine.
D	High Voltage Power Supply Board	This board supplies the charge to the image transfer roller and high voltage for the charge roller, transfer roller and the development roller.
E	Fusing stripper pawl solenoid	This solenoid is connected to the stripper pawl, and it detaches the stripper pawl from the hot roller unless it is necessary to contact.
F	Operation Panel Board	This board controls the operation of the operation panel keys, LCD and LEDs.
G	ID Chip Board	This board relays the ID chip data of each AIO from/to the EGB.

H	PSU (Power Supply Unit)	This supplies DC power for the EGB, fusing unit and interlock switches.
I	Main Switch	This switch provides power to the machine.
J	Fusing Fan Motor	This motor exhausts air around the fusing unit.
K	Interlock Switches	These switches turn off DC power when the front cover or top cover is open.
L	LSU Fan Motor	This motor exhausts air around the laser optics housing unit.

1.5 BOARD STRUCTURE

1.5.1 PRINTER MODEL



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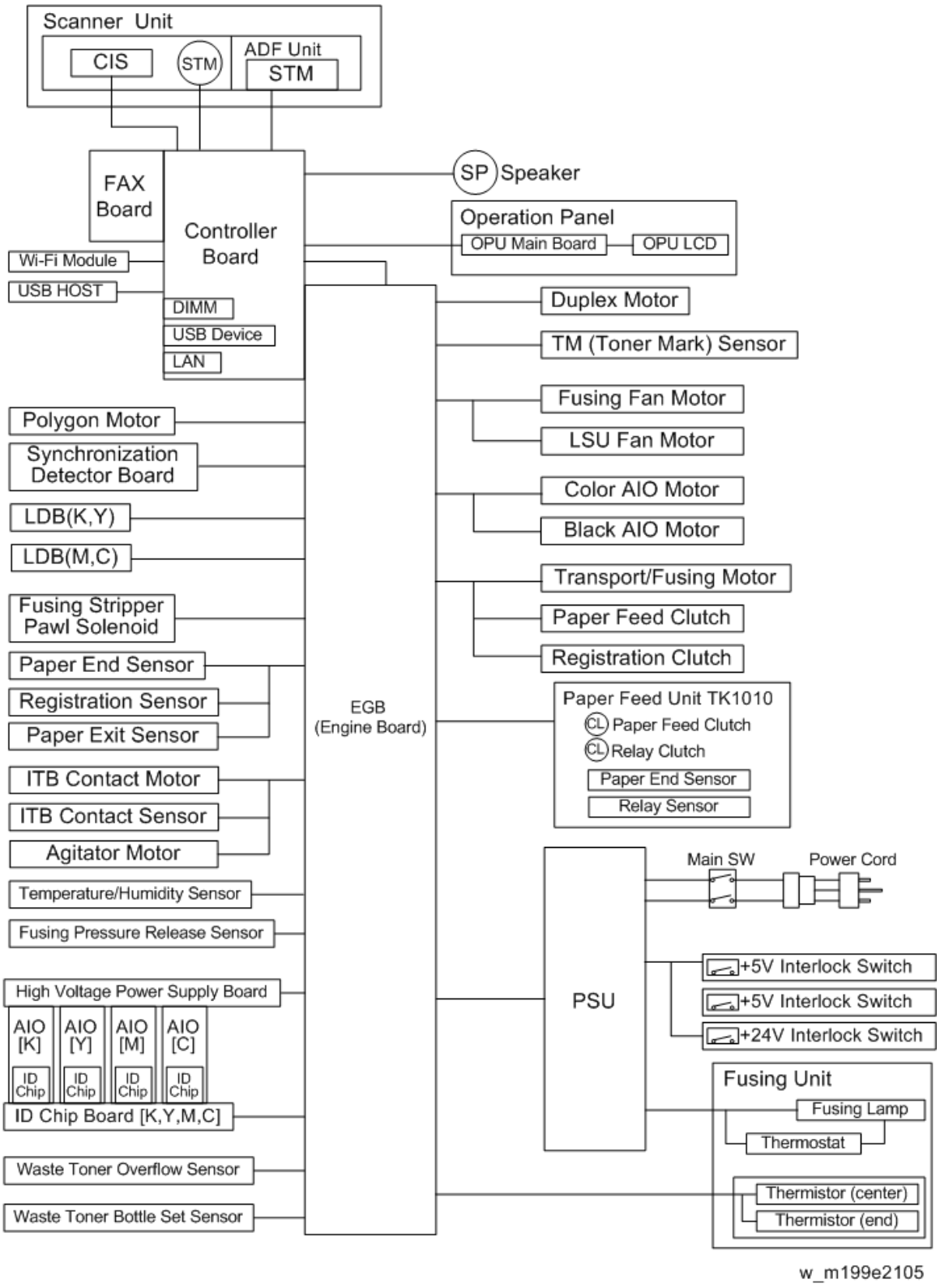
1.5.2 DESCRIPTIONS

- EGB (Engine Board):
  This controls the Engine, the controller interface, image processing, MUSIC (Mirror Unit for Skew and Interval Correction), input/output, interfaces with the optional units. MUSIC is also called Automatic Line Position Adjustment.
- Controller:
  This controls the interface between the OPU and EGB, wireless LAN (IEEE802.11b/g/n) and applications. The controller connects to the EGB through the PCI Bus (Peripheral Component Interconnect Bus).
- LD Drive Board:
  This is the laser diode drive circuit board.
- Memory DIMM: 128MB
  This is for more printer processing memory, and is also used for collation and for soft fonts.
- OPU (Operation Panel Unit):
  This controls the display panel, the LED, and the keypad.

1.5.3 MF MODEL



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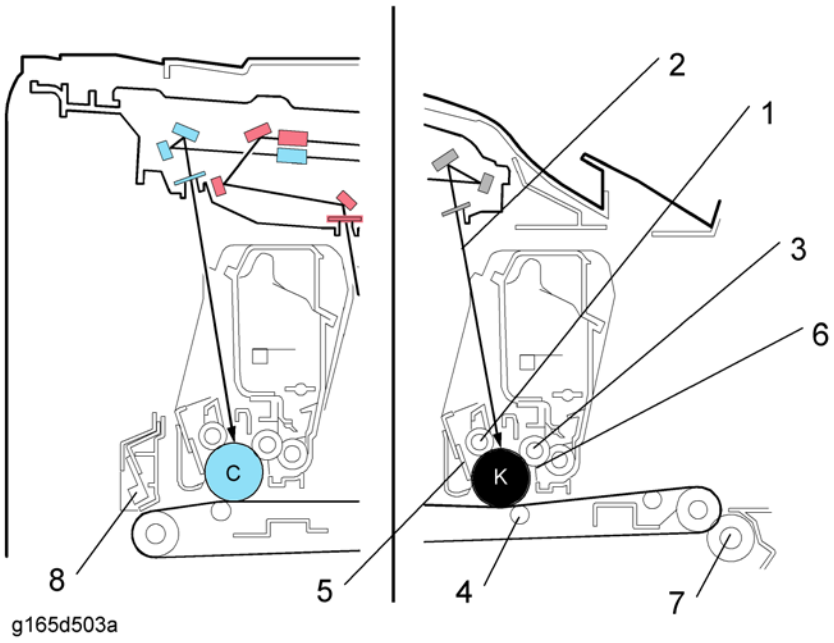
- EGB (Engine Board):
  This controls the Engine, the controller interface, image processing, MUSIC (Mirror Unit for Skew and Interval Correction), input/output, interfaces with the optional units. MUSIC is also called Automatic Line Position Adjustment.
- Controller:
  This controls the interface between the OPU and EGB, wireless LAN (IEEE802.11b/g/n), ADF, Scanner unit and applications. The controller connects to the EGB through the PCI Bus (Peripheral Component Interconnect Bus).
- LD Drive Board:
  This is the laser diode drive circuit board.
- Memory DIMM: 256MB
  This is for more printer processing memory, and is also used for collation and for soft fonts.
- OPU (Operation Panel Unit):
  This controls the display panel, the LED, and the keypad.

1.6 PRINTING PROCESS



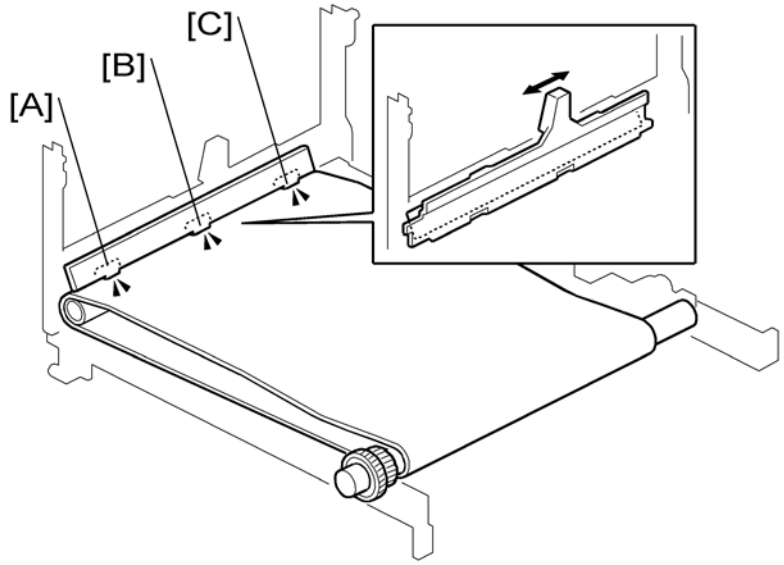
This machine uses four AIOs and four laser beams for color printing. Each AIO contains a drum, charge roller, cleaning brush, blade, development roller and mixing auger.
The toner image on each drum is moved to the image transfer belt. The four colors are put on the belt. All four toners are put on the belt at the same time. Then the completed four-color image is moved to the paper.

1. OPC charge (AIO):
   The charge roller gives the OPC a negative charge.
2. Laser exposure:
   The laser beam from the laser diode (LD) goes through the lens and mirrors and to the drum. To make a latent image on the drum, the machine turns the laser beam on and off.
3. Development (AIO):
   The development roller moves negatively-charged toner to the latent image on the drum surface. This machine uses four development units (one for each color).
4. Image transfer:
   The charge that is applied to the image transfer roller pulls the toner from the drum to the transfer belt. Four toner images are put on the paper at the same time.

5. Cleaning for the OPC:
   The cleaning blade removes remaining toner on the drum surface after image transfer to the paper.
6. Quenching for the Development Roller:
   Charge is removed from the development roller with a quenching sheet in the AIO. There is no quenching for the OPC drum.
7. Paper Transfer and Separation:
   Toner transfers from the image transfer belt to the paper when the paper is fed between the image transfer belt and transfer roller. After transfer, the paper separates from the image transfer belt, because of a discharge plate immediately after the transfer roller.
8. TM (Toner Mark) sensor:
   The TM sensor board contains three TM sensors (one at the left, one at the center, and one at the right). The center TM sensor detects the density of the sensor patterns on the transfer belt. The TM sensor output is used for process control and for automatic line-position adjustment, skew, and color registration adjustments for the latent image.

2. PROCESS CONTROL

2.1 OVERVIEW



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This machine has these two forms of process control:

- Potential control
- Toner supply control

Process control uses these components:

- Three TM (Toner Mark) sensors (left [A], center [B], and right [C]). Only the center TM sensor (direct-reflection and diffusion type) is used for process control. The left and right TM sensors (direct-reflection type) are used for line positioning and other adjustments.
- Temperature/humidity sensor at the rear right of the machine.

2.2 PROCESS CONTROL FLOW

9. TM sensor correction (Vsg adjustment)
   The center TM sensor checks the bare transfer belt's reflectivity and the machine calibrates the TM sensors.
10. Development bias control
    The machine makes a 7-gradation pattern on the transfer belt for each toner color. The pattern has 9 squares (the sequence is as follows: 7 yellow squares, 7 cyan squares, 7 magenta squares and 7 black squares). Each of the squares is 10 mm x 17 mm, and is a solid-color square. To make the squares, the machine changes the development bias and charge roller voltage. The difference between development bias and charge roller voltage is always the same.
    The center TM sensor detects the densities of the 7 solid-color squares for each color. The machine calculates an appropriate development bias from this data.
    This control takes about 33 seconds to be completed.
11. LD power control
    For LD power control, the machine does the same sequence described in "2 Development bias control". Finally, the machine calculates an appropriate LD power.
12. MUSIC (Mirror Unit Skew and Interval Control)
    The machine uses the TM sensors to measure sample lines deposited on the ITB, and corrects color image registration adjustment based on the sensor readings. Sample lines are made on the left, center and right of the ITB.
    This control takes about 22 seconds to be completed.

2.3 PROCESS CONTROL SELF-CHECK

This machine does potential control with a procedure that is known as the process control self-check. This procedure is done at these 7 times.

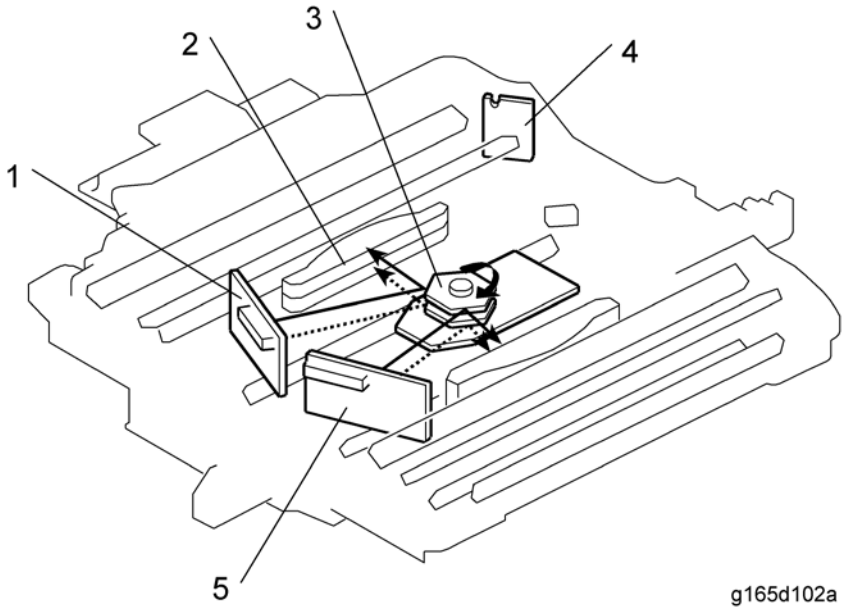
Timing	Execution Mode
1. Initial Power-ON	▪ Development Bias Control and MUSIC (approx. 55 seconds) ▪ MUSIC only (approx. 22 seconds) ▪ No Execution One of the control modes is executed at each timing. What control mode is done depend(s) on some conditions as described in the text that follows this table.
2. Recovery form Sleep Mode	
3. Front or Top Cover Open/Close	
4. Ready Status	
5. Before Job	
6. Page End	
7. Job End	

1. Initial
   - Toner amount control and MUSIC start automatically immediately after the power is turned on, if one of the following conditions occurs.
     1) New AIO detection
     2) New ITB (Image Transfer Belt) unit detection (after transfer unit life counter is reset with SP mode)
     3) Environment (temperature and humidity) change detection.
   - MUSIC starts automatically immediately after the power is turned on (there is toner amount control) if conditions other than described above occur.
2. Recovery from Sleep Mode
   - Toner amount control and MUSIC start automatically when the machine comes back from energy saver mode, if one of following conditions occurs.
     1) New AIO detection
     2) New ITB (Image Transfer Belt) unit detection (after transfer unit life counter is reset with SP mode)
     3) Environment (temperature and humidity) change detection.
   - MUSIC starts automatically (there is toner amount control) when the machine comes back from energy saver mode, if the following condition occurs.
     1) The previous MUSIC was done if there was a high temperature inside the machine.

3. Immediately after the front or top cover is closed
   - No adjustment is done when the front or top cover is closed, if one of following conditions occurs.
     1) After paper jam detection and New AIO detection
     2) New ITB unit detection (after transfer unit life counter is reset with SP mode)
     3) No environment change
   - Toner amount control and MUSIC start automatically when the front or top cover is closed, if conditions other than described above occur.
4. Ready status:
   - Toner amount control and MUSIC start automatically when the machine stays in the ready condition and the environment has changed.
5. Before a job:
   - MUSIC starts automatically before a job if the previous MUSIC was done when there was a high temperature inside the machine and a specified time has elapsed.
   - MUSIC starts automatically before a job if the machine is turned on in a low temperature condition and a specified time has elapsed.
6. Page end:
   - Toner amount control and MUSIC start automatically between pages when the machine detects an environment change.
   - Toner amount control and MUSIC start automatically between pages when the machine has copied/printed 200 pages since the previous process control.
   - Toner amount control and MUSIC interrupt a job and start automatically between pages when the machine has copied/printed 250 pages since the previous process control.
   - MUSIC starts automatically between pages when the machine has copied/printed 100 pages in the same job since the previous process control.
   - MUSIC starts automatically between pages when the polygon motor has been rotating for 180 seconds.
   - MUSIC interrupts a job and starts automatically between pages when the polygon motor has been rotating for 300 seconds.
7. Job end:
   - Toner amount control and MUSIC start automatically after a job when the machine gets a request to execute the toner amount control and MUSIC.
   - MUSIC starts automatically after a job when the machine gets a request to execute MUSIC.

3. LASER EXPOSURE

3.1 OVERVIEW



1. LD unit - C/M	4. Synchronizing Detector Board
2. Fθ Lens	5. LD unit - K/Y
3. Polygon Mirror Motor	

This machine uses two LDB units and one polygon mirror motor to produce latent images on four OPC drums (one drum for each color toner).

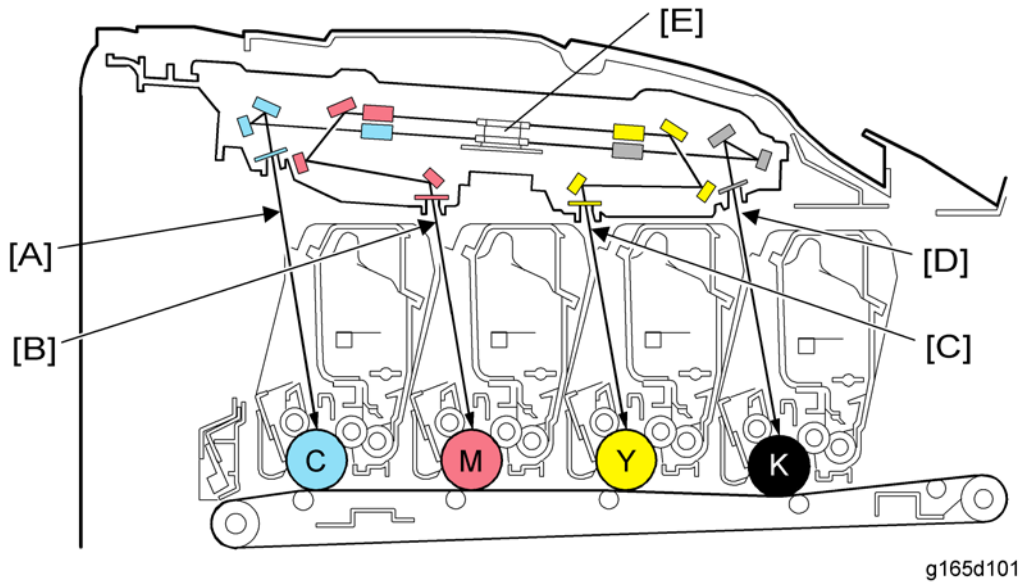
There are two hexagonal mirrors. The polygon mirror motor rotates the mirrors clockwise and each mirror reflects beams from LD unit.

The laser beam from the LD unit - C/M is directed to the Fθ lens at rear side by the polygon mirrors. The laser beam from the LD unit - K/Y is directed to the Fθ lens at front side by the polygon mirrors.

Laser exposure for magenta and cyan starts from the left side of the drum, but for yellow and black it starts from the right side of the drum. This is because the units for magenta and cyan are on the other side of the polygon mirror from the units for yellow and black.

The machine has one laser synchronizing detector board (LSD) as shown above. The board detects four colors. The LSD detects the start of the main scan.

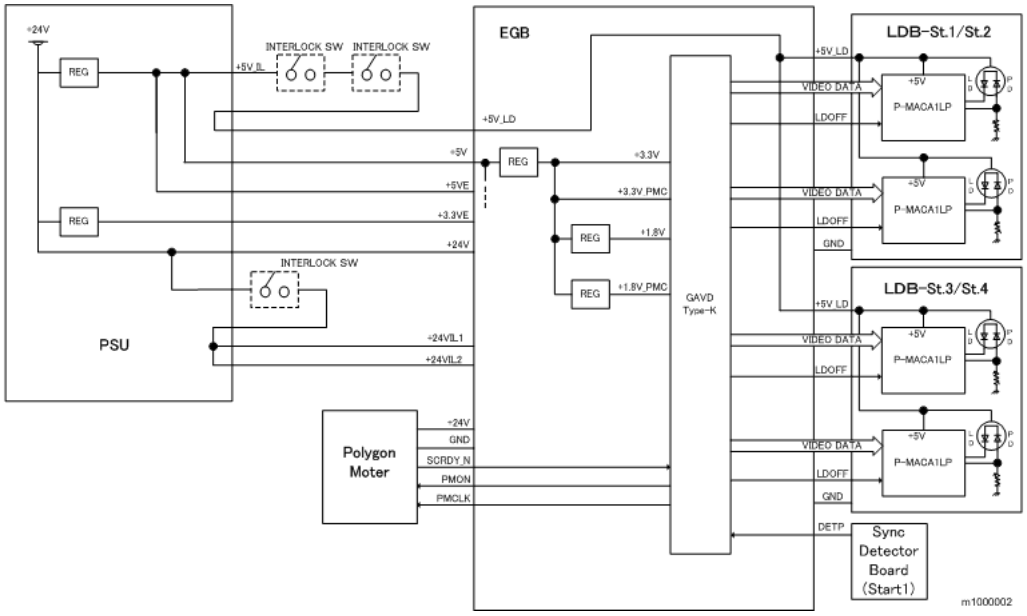
3.2 OPTICAL PATH



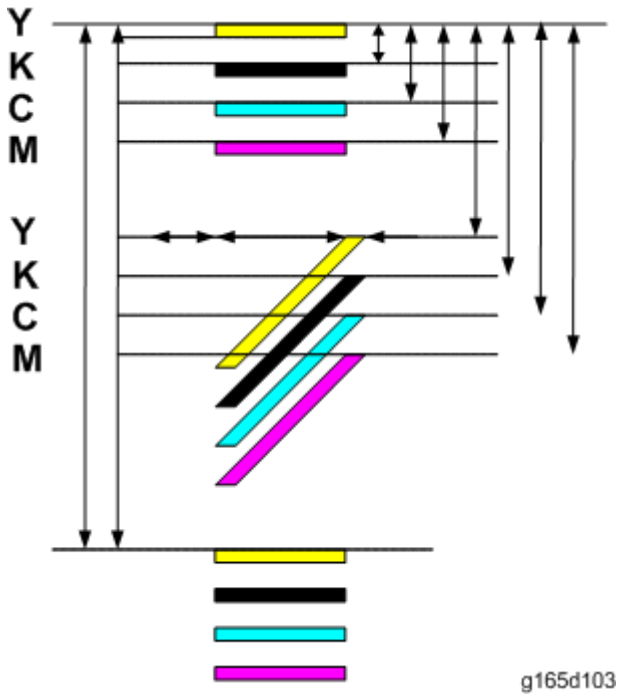
The laser beams for magenta [B] and yellow [C] are sent to the upper part of the polygon mirror [E]. The laser beams for cyan [A] and black [D] are sent to the lower part of the polygon mirror.

3.3 LD SAFETY SWITCH

A safety switch turns off when the front cover or the top cover is opened. As a result, the relay on the PSU cuts off the power supply (+5V) to the two LD boards. (The circuits go through the EGB.) This system prevents unexpected laser emission, and ensures user safety and technician safety.



3.4 MUSIC (MIRROR UNIT SKEW AND INTERVAL CORRECTION)



During MUSIC, the line patterns above are made 16 times for fine adjustment or 8 times for the rough adjustment on the transfer belt. The spaces between the lines (YY, KK, CC, MM, KY, KC, KM) are measured by the front, center, and rear TM sensors. The controller reads the average of the spaces, and adjusts these items:

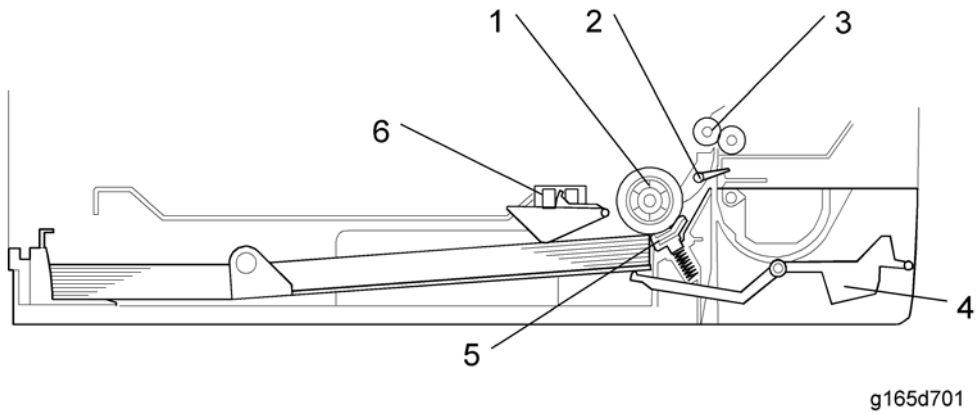
- Sub scan line position for YCM
- Main scan line position for KYCM
- Magnification ratio for KYCM
- Phase control

The transfer-belt-cleaning unit cleans the transfer belt after the patterns are measured.

The execution timing for MUSIC follows the sequence of the process control (☛ "Process Control").

4. PAPER FEED

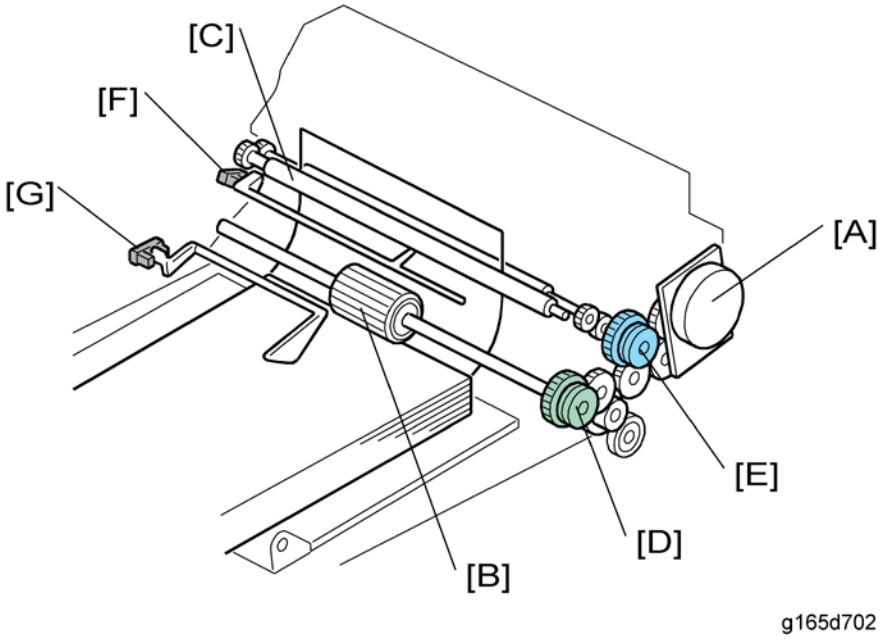
4.1 OVERVIEW



1. Paper Feed Roller	4. Paper Height Lever
2. Registration Sensor	5. Separation Pad
3. Registration Roller	6. Paper End Sensor

This machine has a paper tray (250 sheets) and a by-pass paper feed (single sheet). The paper feed mechanism uses a friction pad system.
The paper end sensor detects whether paper is installed in the tray and whether the tray is set in the machine, because this machine does not have a tray set sensor.
This machine also does not have automatic paper size detection. The machine determines the paper size from the on-off timing of the registration sensor. If the paper type which is selected at the PC does not match the paper size measured by the registration sensor, the machine issues a paper jam alert and stops the motors.

4.2 DRIVE AND PAPER END DETECTION



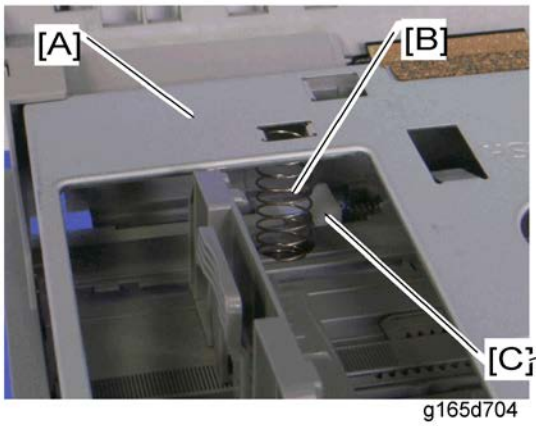
4.2.1 PAPER FEED

The transport/fusing motor [A] controls the paper feed roller [B] and registration roller [C] with the paper feed clutch [D], registration clutch [E] and gears. (The transport/fusing motor also controls the fusing unit and paper exit roller.) The paper feed roller feeds a sheet of paper to the registration roller [C].
When the registration sensor [F] detects a sheet of paper, the machine makes a paper buckle at the registration roller to correct paper skew. After that, the registration clutch turns on, and then the registration roller transports a sheet of paper to the transfer roller unit.

4.2.2 PAPER END DETECTION

There is a paper end sensor [G] in the tray. The feeler drops into the cutout in the bottom plate and the actuator interrupts the paper end sensor. This sensor also detects whether the tray is set.

4.3 TRAY LIFT



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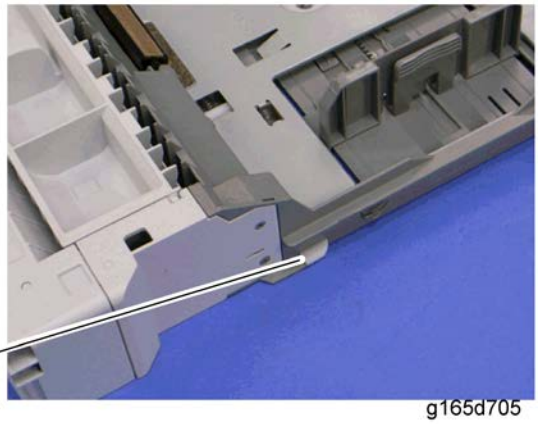

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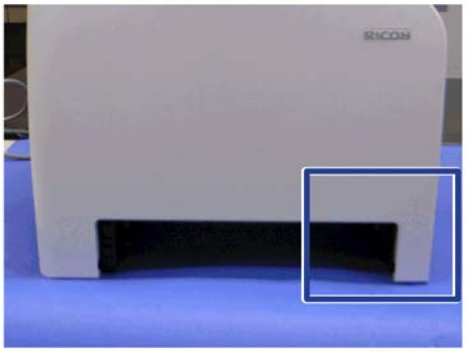

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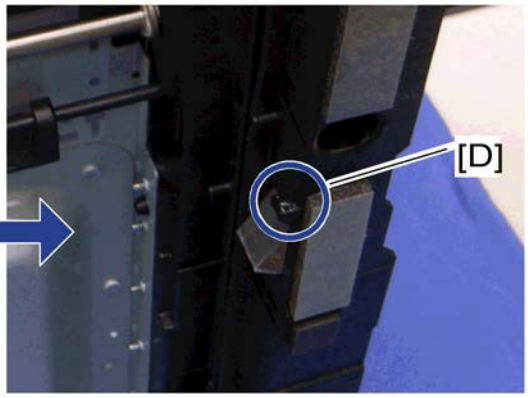

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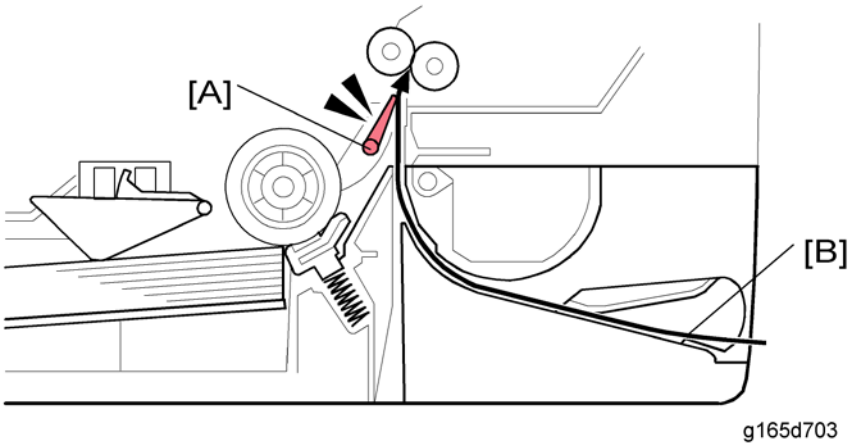
The bottom plate [A] is lifted by the springs [B] in the tray when the tray is inserted in the machine, and the bottom tray lock lever [C] is released by the projection [D] at the right side of the tray set location. There is no tray lowering mechanism for these models. Therefore, you must press down the bottom plate when you insert the tray in the machine.

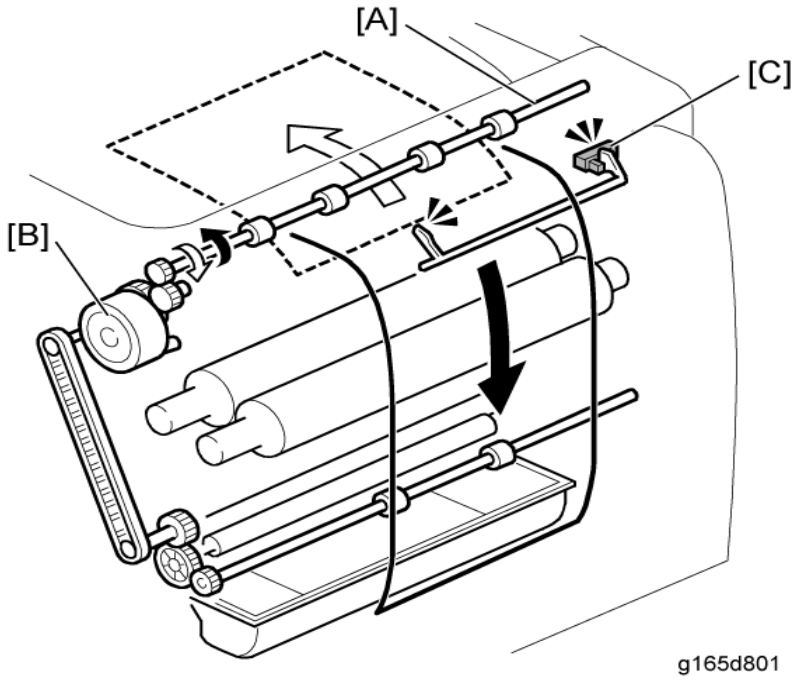
4.4 BY-PASS FEED



This machine uses a manual by-pass feed system. When the registration sensor [A] detects a sheet of paper [B] but no job has come in from a PC, the machine determines that the user has put a sheet of paper in the by-pass tray.

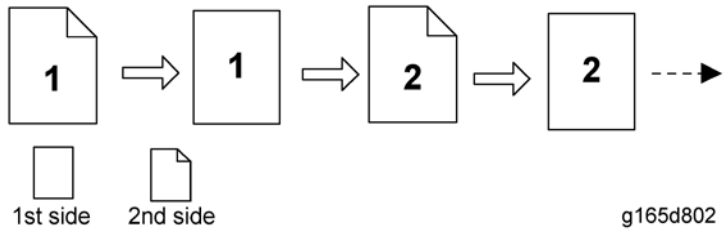
4.5 DUPLEX

4.5.1 DRIVE



The duplex motor [A] feeds out paper to the output tray in single-sided mode and also feeds paper to the duplex path in duplex mode. When a sheet [B] of paper passes through the paper exit sensor [C] in duplex mode, the duplex motor stops and rotates in reverse. The paper exit roller [D] feeds a sheet of paper to the duplex path. The duplex transport roller [E], which is driven by the duplex motor through the timing belt, transports a sheet of paper to the registration roller.

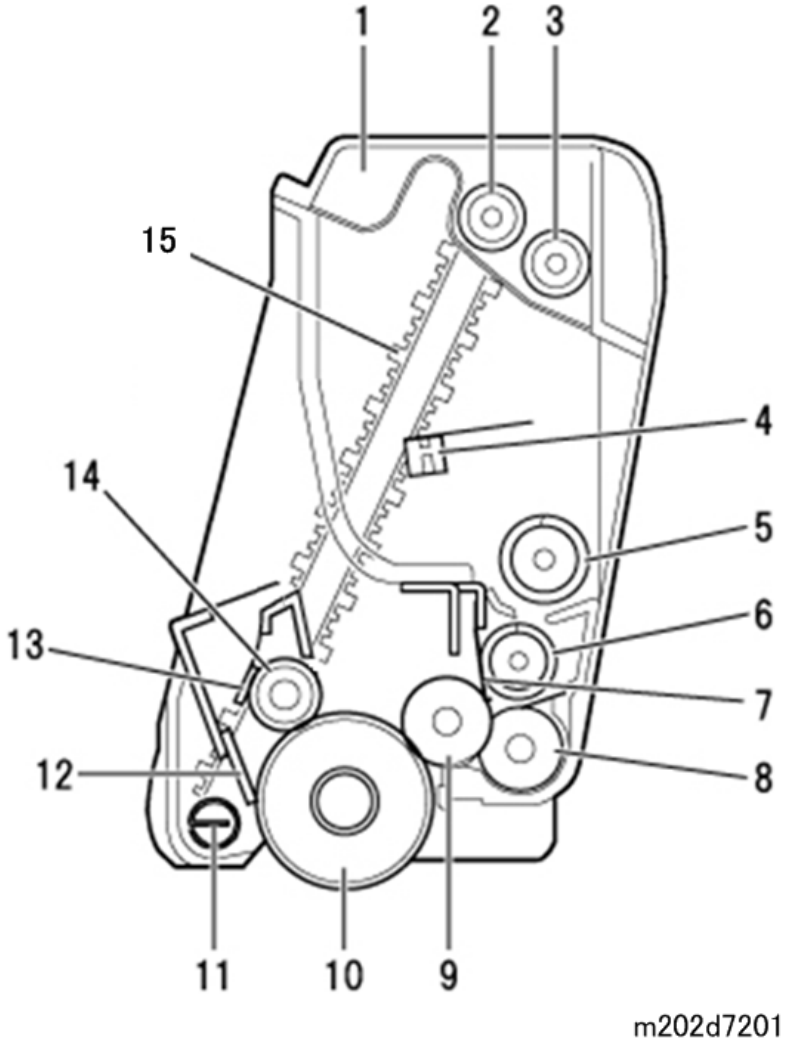
4.5.2 DUPLEX OPERATION



There is no interleaving in the PE-P4/MF4 models. The printing is done as shown above: 2nd side of 1st page → 1st side of 1st page → 2nd side of 2nd page → 1st side of 2nd page → ----.

5. AIO (ALL IN ONE) CARTRIDGE

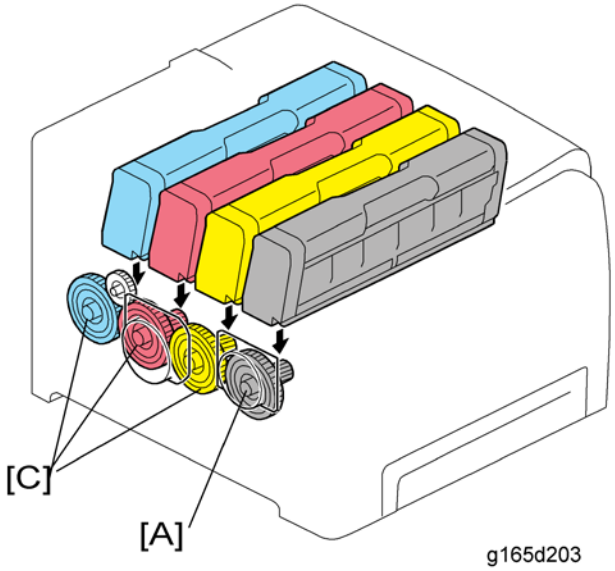
5.1 OVERVIEW



1. Waste Toner Container	9. Development Roller
2. Transport Belt Shaft	10. OPC
3. Waste Toner Collection Coil	11. Waste Toner Collection Coil
4. Toner Agitator	12. OPC Cleaning Blade
5. Upper Mixing Roller	13. Charge Roller Cleaner
6. Development Blade	14. Charge Roller
7. Lower Mixing Roller	15. Waste Toner Transport Belt
8. Toner Supply Roller	

This machine uses the AIO system. Each AIO consists of the waste toner tank, print cartridge part, development unit part, and OPC part. This gives the user easy replacement procedures and helps to make the engine module more compact. The waste toner bottle is smaller than other full-color printers because the waste toner from the OPC is collected in the waste toner tank of each AIO.
The diameter of the OPC is 24 mm and the diameter of the development roller is 12 mm.

5.2 DRIVE



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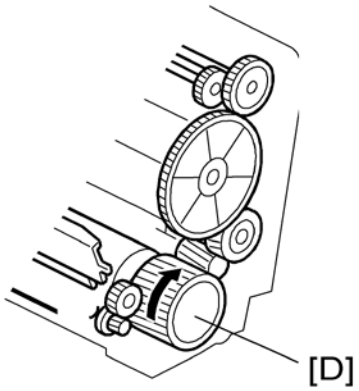
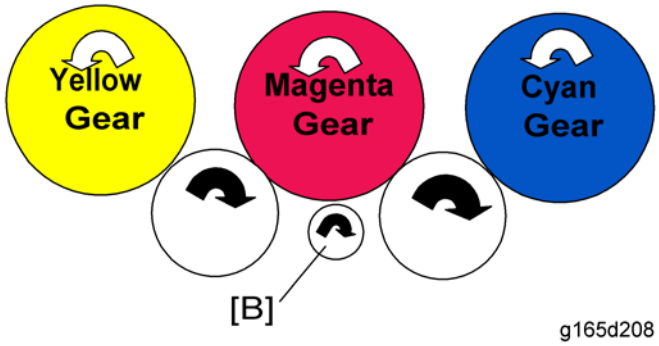


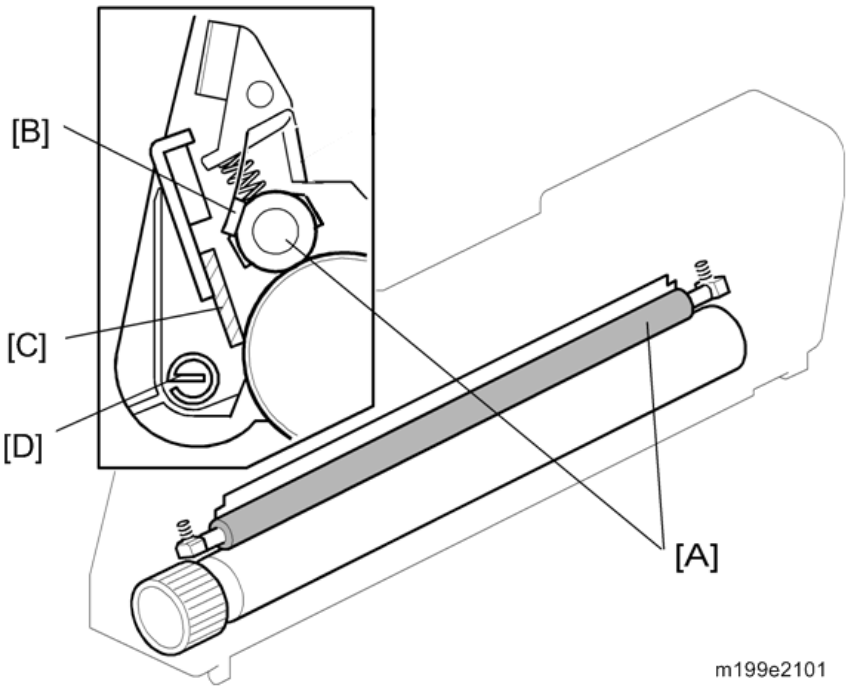
g165d204a



g165d208

The black AIO motor drives the gear [A] for the black AIO. The color AIO motor drives the gears [B] and color gears [C] for the cyan, magenta and yellow AIOs through gears. Each of these gears engages with a gear [D] in the OPC, and this gear drives the rollers in the AIO through other gears.

5.3 OPC CHARGE AND CLEANING

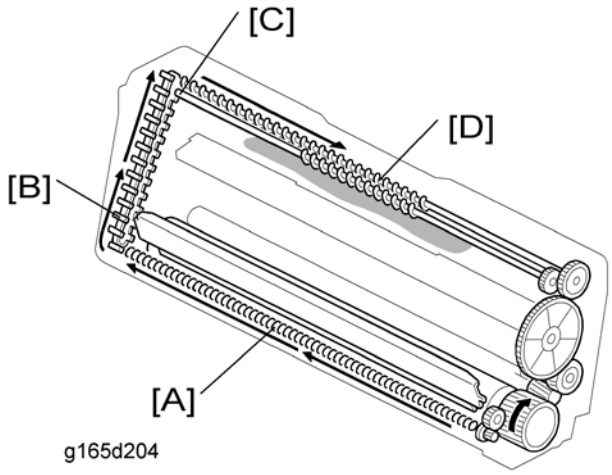


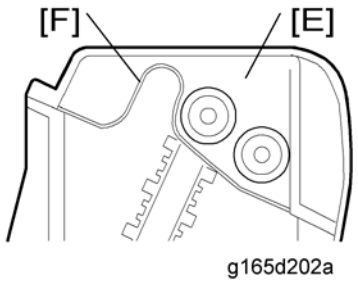
This machine uses a charge roller [A]. The charge roller gives the drum surface a negative charge. The high voltage supply board, which is at the left side of the machine, applies a dc and ac voltage (at a constant current) to the roller. The ac voltage helps to make sure that the charge given to the drum is as constant as possible.

The machine automatically controls the charge roller voltage when process control is done.

The charge roller cleaner [B], which always touch the charge roller, clean the charge roller. The OPC cleaning blade [C] removes the waste toner on the OPC. The toner collection coil [D] moves the toner to the waste toner transport belt.

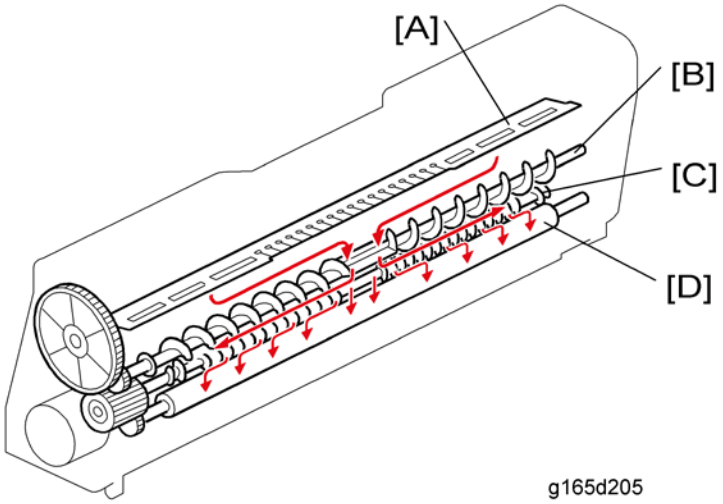
5.4 WASTE TONER COLLECTION FROM THE OPC





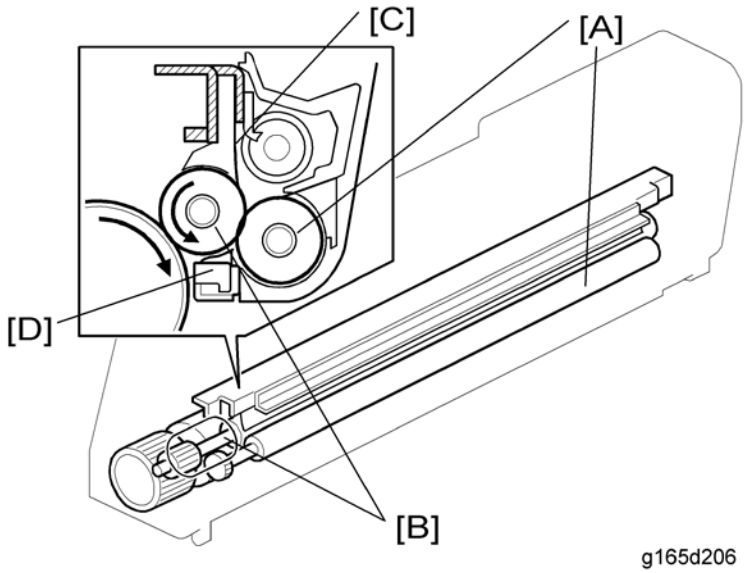
The waste toner collection coil [A] transports waste toner from the OPC to the right side of the AIO. After that, the waste toner transport belt [B], which is driven by the transport belt shaft [C], lifts waste toner up to the waste toner tank [E].
The collected waste toner is moved to the left side of the AIO by the waste toner collection coil [D] and transport belt shaft [C].
A flexible sheet [F] separates the unused toner area from the waste toner area. The waste toner area becomes larger when toner is consumed.

5.5 TONER MIXING AND TRANSPORT



The toner moves as shown in the above drawing. The toner agitator [A] mixes the toner so that it is transported evenly to the mixing rollers. The upper mixing roller [B] moves toner to the center, then the lower mixing roller [C] moves toner to the right and left sides. Finally, the toner supply roller [D] supplies toner to the development roller. This mixing mechanism prevents toner hardening and uneven image density in the outputs.

5.6 DEVELOPMENT MECHANISM



This machine does not use developer, so a TD sensor is not necessary. In each AIO unit, the toner supply roller [A] supplies toner to the development roller [B]. Electrostatic attraction generated by the friction between the toner supply roller and development roller moves toner to the surface of the development roller, and the development blade [C] makes sure that the layer of toner on the development roller has an even thickness.
The discharge sheet [D] removes development roller bias.

5.7 TONER NEAR END AND END DETECTION

5.7.1 TONER NEAR END AND TONER END

To detect the toner near-end and the toner end, the machine uses:

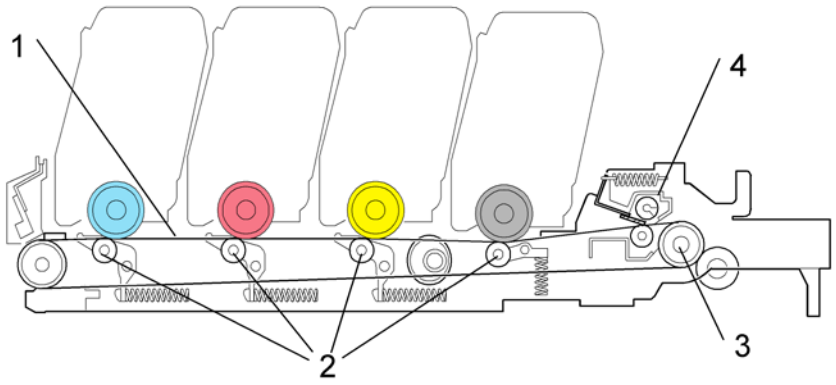
- Pixel count (memory chip on the AIO)
- AIO rotation distance (memory chip on the AIO)

5.7.2 TONER END

After near-end, it is estimated that 200 pages (A4, 5% coverage) can be printed until toner end occurs.

6. IMAGE TRANSFER

6.1 OVERVIEW

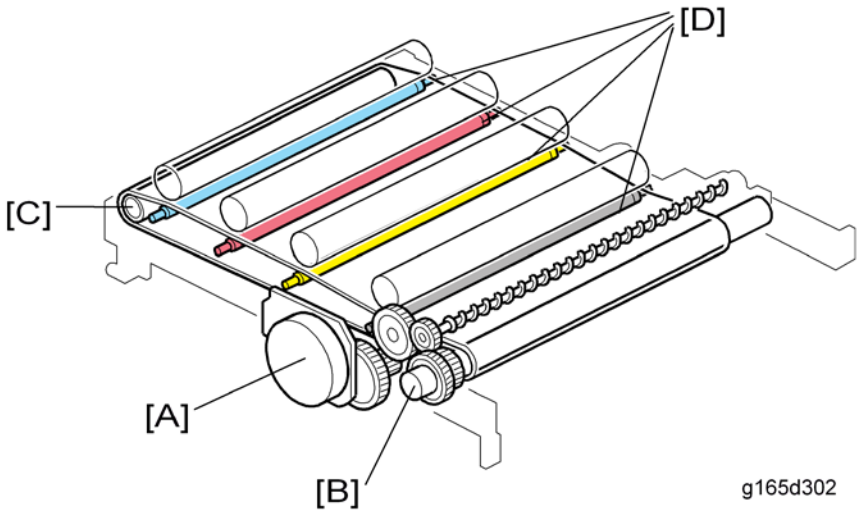


1. Image Transfer Belt	3. ITB Drive Roller
2. ITB (Image Transfer Belt) Roller	4. ITB Cleaning Unit

The toner is moved from the four OPC drums to the image transfer belt. For a full color print, all four colors are moved from the OPCs to the transfer belt at the same time. The transfer roller then moves the four-color toner image from the transfer belt to the paper.

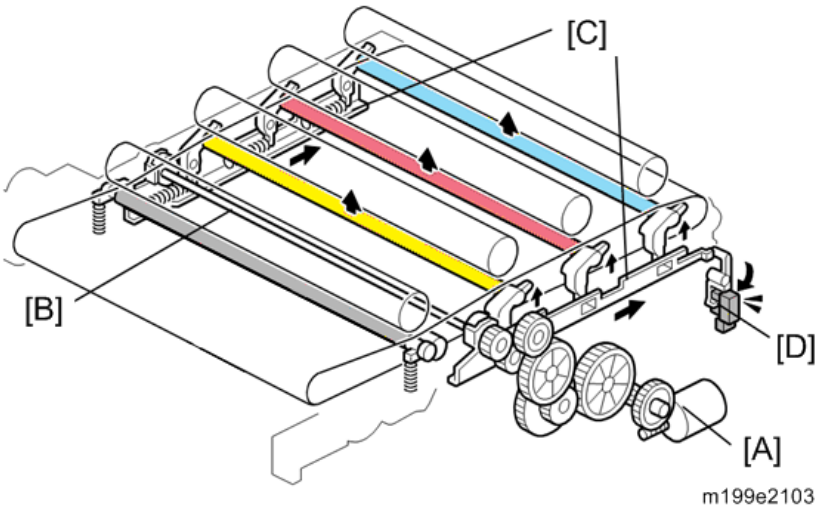
The ITB cleaning unit removes remaining toner from the surface of the ITB after image transfer.

6.2 DRIVE AND TRANSFER BELT ROLLER BIAS



The black AIO motor [A] controls the transfer belt drive roller [B]. The belt tension roller [C] adds tension to the transfer belt to help to turn this belt.
The image transfer belt rollers [D] are charged from terminal plates to move the toner from the OPCs to the image transfer belt.

6.3 TRANSFER BELT CONTACT



The transfer belt does not touch the color OPC drums (cyan, magenta and yellow) when the machine makes a black and white print.

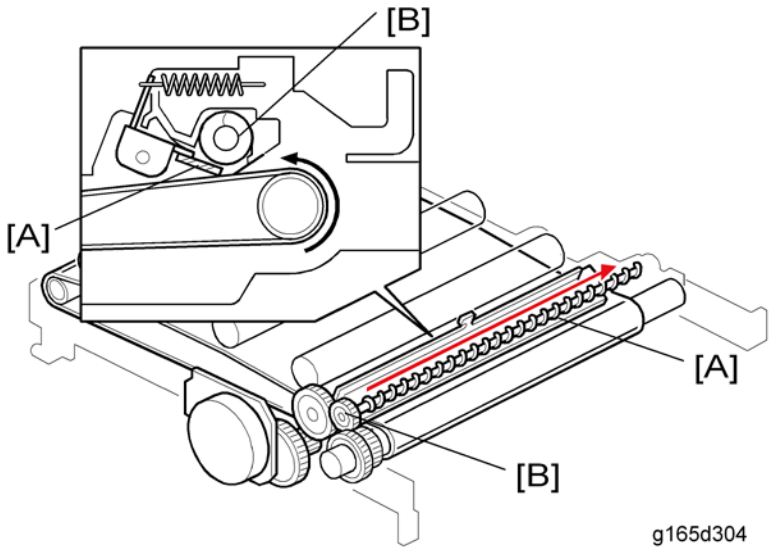
The transfer belt contact motor [A] turns the CMY contact cam shaft [B] when the machine starts to make a color print. The CMY contact cams slide the right and left sliders [C] and these sliders lift the belt transfer rollers for each OPC drum (CMY) to the transfer belt. Because of this mechanism, the life of the transfer belt is longer (it is not necessary for the transfer belt to touch the color OPC drums when the machine makes a black and white print). However, if the customer selects "Off" with the "ACS" setting, the four OPC drums always touch the image transfer belt.

The ITB (image transfer belt) contact sensor [D] detects if the image transfer rollers for each OPC drum (CMY) touch the transfer belt.

If one of the following problems with transfer belt contact occur, SC445 is displayed.

- Home position shift abnormality (ITB contact sensor does not detect the home position at the time of power on / cover opening and shutting)
- Spaced position shift abnormality (ITB contact sensor does not detect that the transfer belt moves away from the color OPC drums when the machine makes a black and white print)
- Contact position shift abnormality (ITB contact sensor does not detect that the transfer belt touches the color OPC drums when the machine makes a color print)

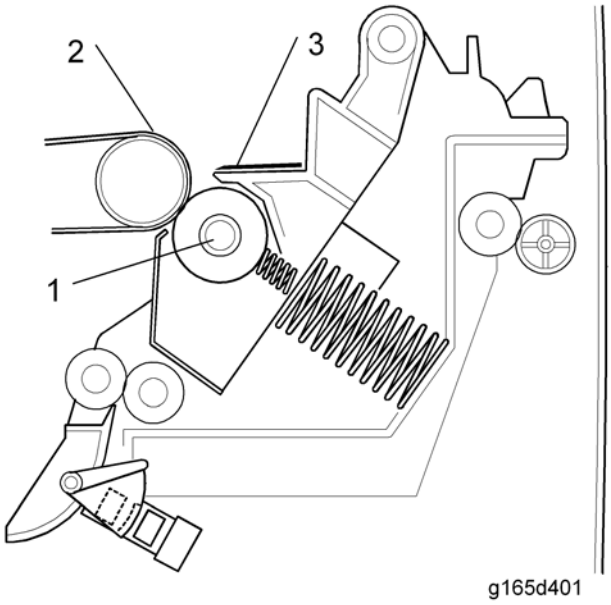
6.4 ITB (IMAGE TRANSFER BELT) CLEANING UNIT



The ITB cleaning blade [A] in the cleaning unit removes remaining toner on the image transfer belt after image transfer to the paper. The toner collection coil [B] moves the collected waste toner to the outlet for the waste toner bottle.

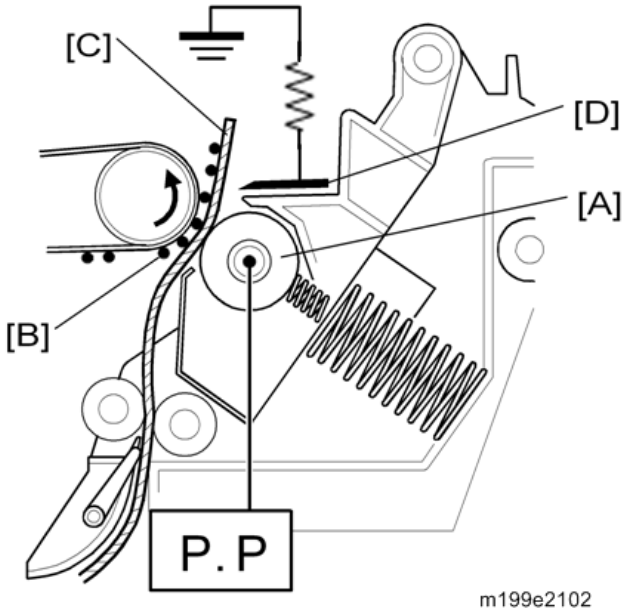
The ITB cleaning unit has a shutter mechanism at the outlet for the waste toner bottle. When the ITB unit is removed, the shutter closes the outlet to prevent waste toner from falling.

6.5 TRANSFER ROLLER OVERVIEW



1. Transfer Roller
2. Image Transfer Belt
3. Discharge Plate

6.6 PAPER TRANSFER AND DISCHARGE



6.6.1 TRANSFER ROLLER

The transfer roller [A] is always pressed against the image transfer belt by pressure from a spring. The transfer roller moves toner images [B] from the transfer belt to the paper. When a sheet of paper [C] goes between the transfer roller and the transfer belt, the transfer roller turns with the paper.

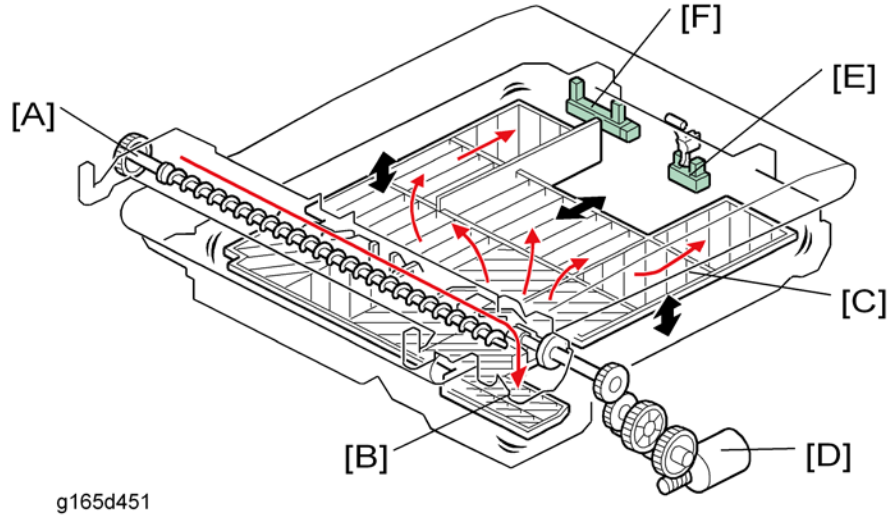
6.6.2 PAPER TRANSFER BIAS

The high voltage power supply (HVPS) supplies electricity to the transfer roller. The transfer roller is positively charged. The right end of the transfer unit is attached to the terminal from the HVPS when you close the front cover.

6.6.3 DISCHARGE PLATE

The transfer unit has a discharge plate [D] above the transfer roller. The discharge plate removes charge that was applied to the paper during paper transfer. This helps paper move away from the transfer roller.

6.7 WASTE TONER COLLECTION



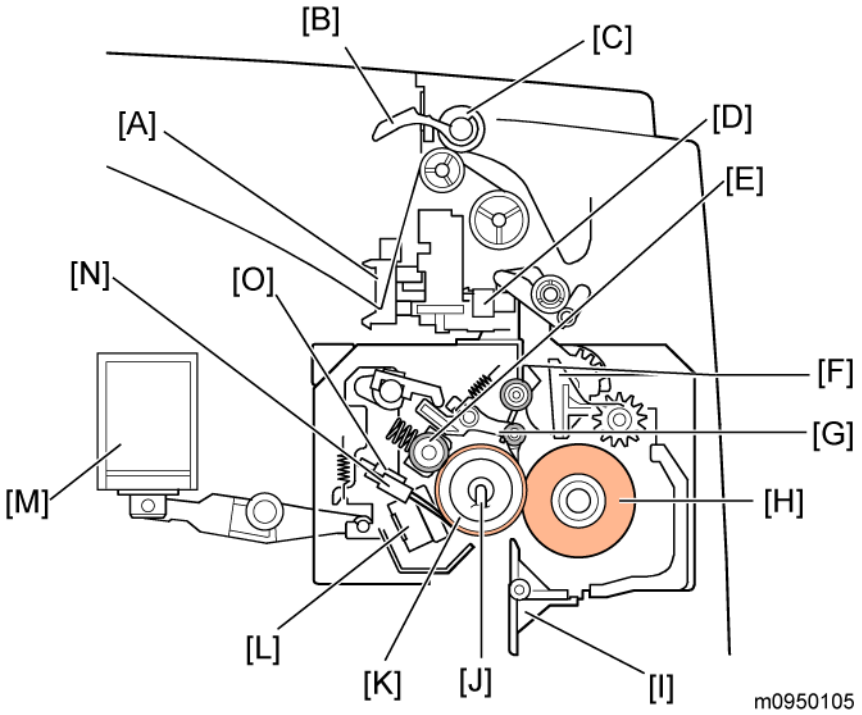
The waste toner collection coil [A] moves collected waste toner from the ITB (image transfer belt) unit to the entrance [B] of the waste toner bottle. The agitator plate [C] levels the collected waste toner in the waste toner bottle. It is driven by the agitator motor [D].

The waste toner bottle set sensor [E] detects whether the waste toner bottle is set. If it is not set, "Waste Toner Bottle" appears on the LCD on the machine.

The waste toner overflow sensor [F] detects whether the waste toner bottle is full. If is full, "Replace the Waste Toner Bottle" appears on the LCD on the machine. 400 more pages can be printed, then the machine stops.

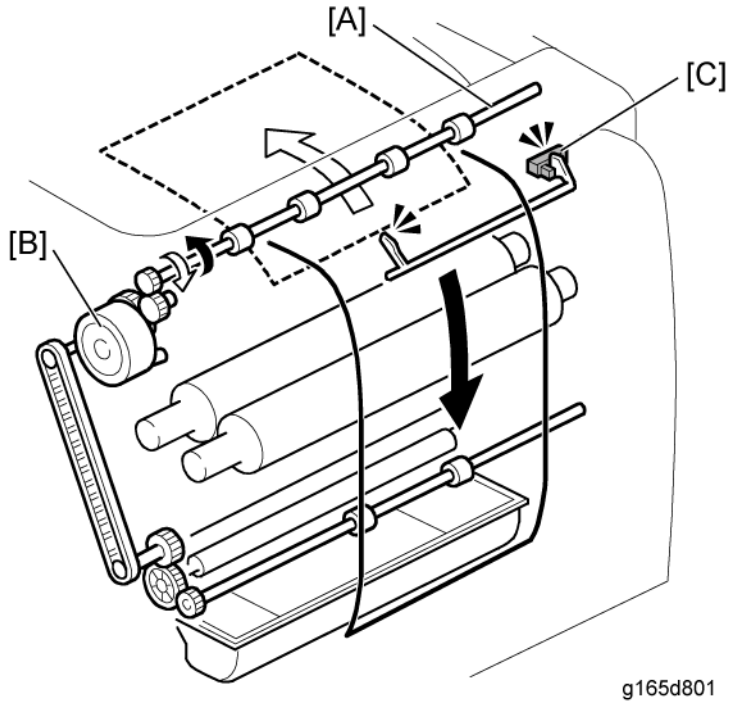
7. FUSING AND EXIT

7.1 OVERVIEW



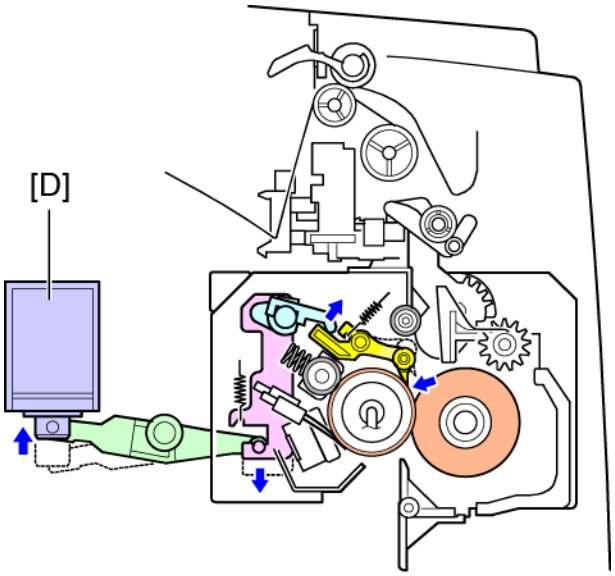
A. Fusing Stripper Pawl Solenoid	H. Pressure Roller
B. Paper Exit Pressure Guide	I. Fusing Entrance Guide Plate
C. Paper Exit Roller	J. Fusing Lamp
D. Paper Exit Sensor	K. Hot Roller
E. Cleaning Roller	L. Thermostat
F. Fusing Exit Guide Plate	M. Fusing Pressure Release Sensor
G. Stripper Pawl	N. Thermistor (Left)
	O. Thermistor (Center)

7.2 DRIVE



The transport/fusing motor drives the hot roller. However, the paper exit roller [A] is controlled by the duplex motor [B]. This is because the duplex motor controls paper exit and feed in the duplex.

The paper exit sensor [C] detects the trailing edge of the paper to determine the stop timing for the transport/fusing motor, reverse timing, and stop timing for the duplex motor. It also checks whether a paper jam occurs at the fusing unit or paper exit.



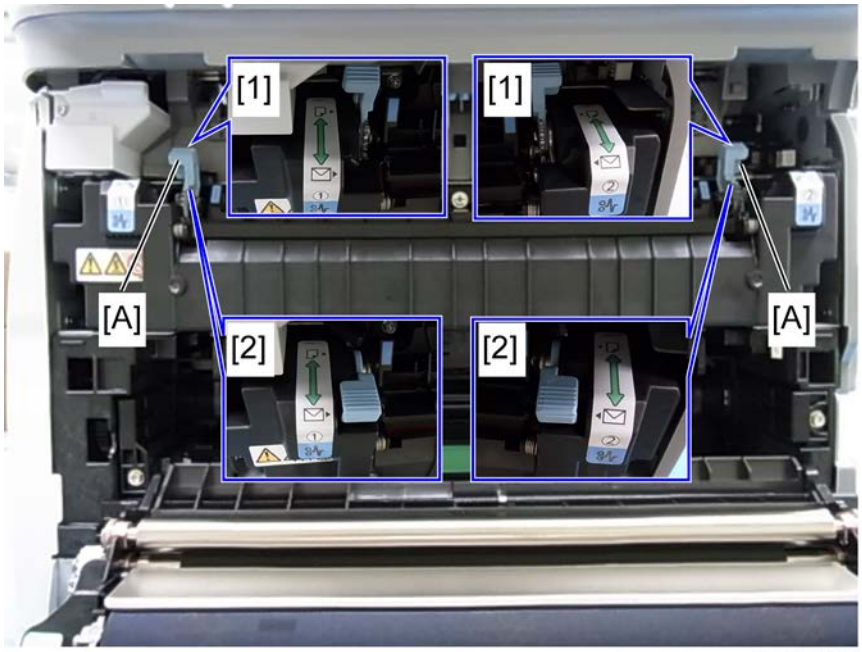
m0950106

The fusing stripper pawl solenoid [D] is connected to the stripper pawl, and it detaches the stripper pawl from the hot roller unless it is necessary to contact. This function makes the warm-up time shorter because the fusing lamp does not have to heat up both the hot roller and the fusing stripper pawl. At the same time, this solenoid and pawl can decrease the probability that a paper twists about the hot roller because the stripper pawl can detach the paper from the hot roller steady due to the fusing pawl solenoid operation.

7.3 PRESSURE RELEASE MECHANISM

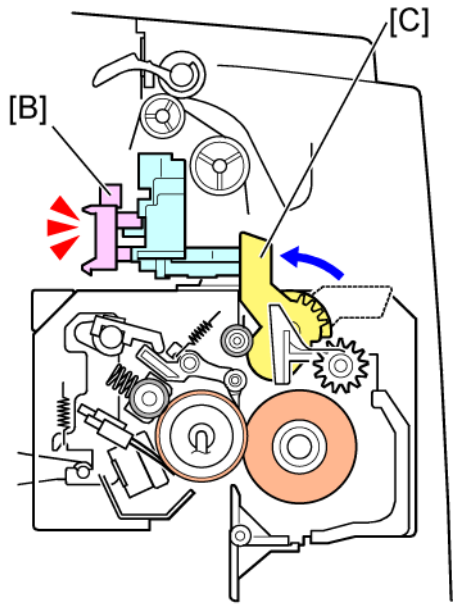
The springs always apply the correct pressure to the nip between the pressure roller and hot roller. When releasing the pressure release levers (same as the envelope lever in this model), the pressure roller moves away from the hot roller. If a paper jam occurs in the fusing unit, releasing these levers make it easy to remove jammed paper.

7.4 ENVELOPE LEVER (PRESSURE RELEASE LEVER)



m0990007

The envelope lever (Pressure release lever) [A] is also used by the operator to adjust the size of the gap between the pressure roller and hot roller. A larger gap is needed for envelopes, which are thicker than paper.



m0950107

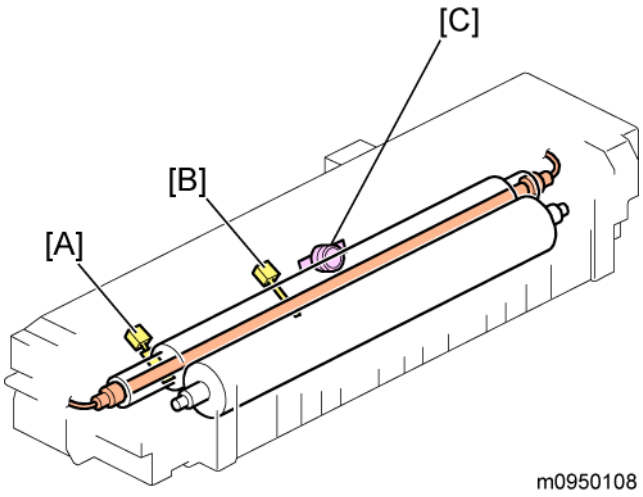
The fusing pressure release sensor [B] detects whether the envelope lever [C] is set to the envelope position. A warning will be shown on the LCD if the envelope lever is set when normal paper is being fed, and vice versa.

- Lower the lever [2] to increase the size of the gap between the hot roller and pressure roller. This prevents jams and wrinkling when printing on envelopes.
- Raise the lever [1] to reduce the gap for all other print jobs. Normally this lever should be up.
-

Note

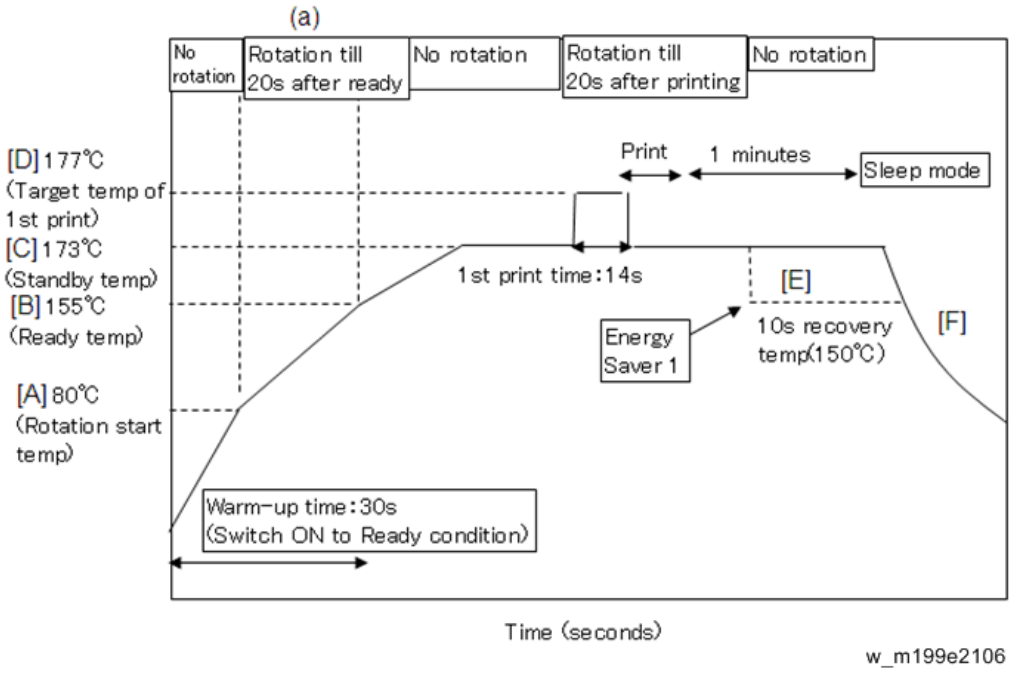
Both envelope levers should be set to the same position at the same time, Otherwise a warning will be shown on the LCD to prevent paper jams.

7.5 TEMPERATURE CONTROL



The fusing unit has these components for temperature control:

- The fusing thermistors [A] [B] send a signal when the fusing temperature goes past the threshold.
- The central thermistor [B] is the one that is used for fusing temperature control.
- The fusing thermostat [C] breaks the electric circuit when the fusing temperature goes past the threshold. The thermostat is on the same electrical circuit as the fusing lamp, so the fusing lamp goes off if the fusing thermostat breaks the electrical circuit.



- [A]: Idling ready temperature (80°C)
  The fusing unit starts to rotate (idling) until 3 seconds after stand by (a).
- [B]: Ready temperature (155°C)
  This is the temperature finish warm-up condition.
- [C]: Standby temperature (173°C)
  This is the temperature to wait for a print job.
- [D]: target temperature of 1st print (This depends on the target temperature of each paper type; see the table below)
  The machine keeps this temperature during printing.
- [E]: 10 seconds recovery temperature (150°C)
  This is the low power mode for printing. This temperature is lower than the stand by temperature [C] and saves power.
- [F]: Sleep mode
  The machine turns off power to the engine unit for sleep mode after the machine has not got a print job for 10 minutes (at the default setting).

7.5.1 TARGET TEMPERATURE FOR EACH PAPER TYPE

Paper	Speed	Temp
Thin (60 to 65g/m^2)	1	170°C
Plain (60 to 74g/m^2)	1	173°C
Middle thick (75 to 90g/m^2)	1	177°C
Recycled	1	177°C
Plain /Middle thick/ recycled	1	177°C
Color paper	1	177°C
Preprinted	1	177°C
Letterhead	1	177°C
Prepunched	1	177°C
Thick 1 (91 to 105g/m^2)	1/2	160°C
Thick 2 (106 to 160g/m^2)	1/2	165°C
Cardstock	1/2	165°C
Bond	1/2	160°C
Envelope	1/2	196°C

7.5.2 FUSING UNIT RELATED SC CODES

If one of the fusing unit components (such as thermistors, thermostat, fusing lamp etc.) is defective, the following SC codes may be issued. For details, refer to the SC code list in the chapter "Troubleshooting".

- SC541, 542, 543 and 545

If one of these SC codes is issued:

- Enter the "Engine Maintenance" mode.
- Press “O.K” in “Fuser SC Reset” with engine maintenance mode, and then turn the main power switch off and on.

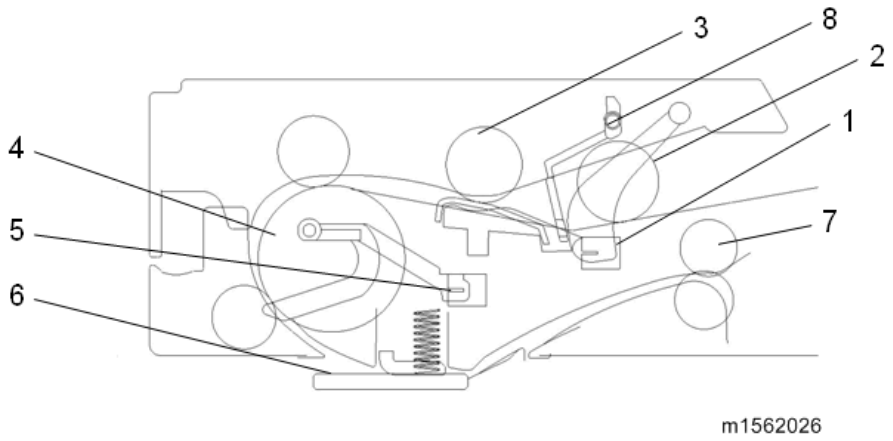
7.5.3 ANTI-HUMIDITY MODE

To reduce paper curl in high temperature and humidity environments, the fusing unit does idle rotation before a job, if the customer enables this function in the user mode.

- Mode 1: No fusing idling, transfer roller voltage is increased
- Mode 2: Fusing unit rotates for 30 seconds before a job, transfer roller voltage is increased.
- Mode 3: Fusing unit rotates for 60 seconds before a job, transfer roller voltage is increased.

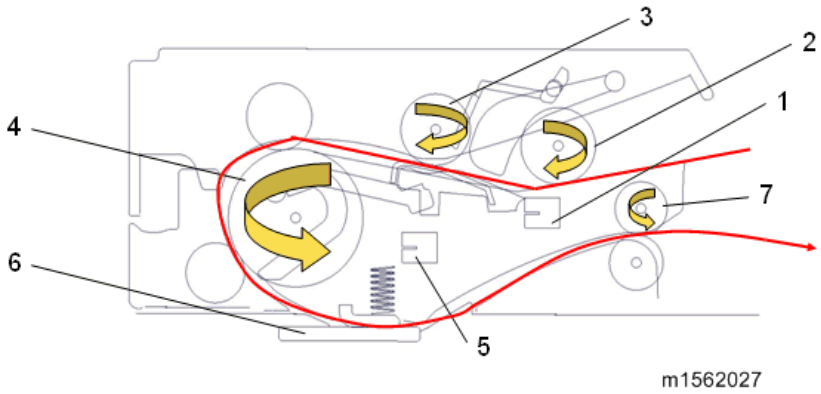
8. ADF (ONLY FOR MF MODELS)

8.1 OVERVIEW



1. Document Sensor	5. Feed Sensor
2. Pick-up Roller	6. DF Exposure Glass
3. Separation Roller	7. Output Roller
4. Feed Roller	8. Media Stopper

8.2 PAPER PATH

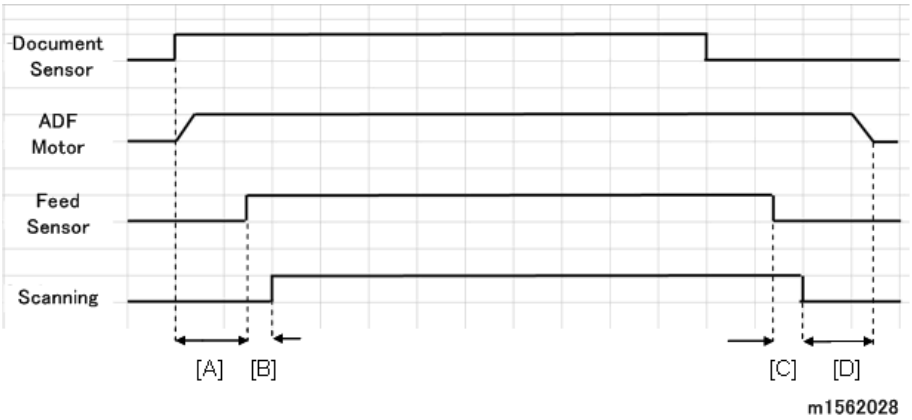


When the document sensor [1] detects an original and the machine has a copying or scanning job, the ADF motor rotates to drive the pick-up roller [2], separation roller [3] and feed roller [4] to feed the original to the feed sensor [5]. If the feed sensor [5] does not detect paper after this sequence, the machine determines that an original jam has occurred. If the feed sensor [5] detects paper, then scanning starts by the CIS through the DF exposure glass [6]. After scanning, the output roller [7] will eject the paper and finish the job.

8.3 TIMING CHART

8.3.1 SINGLE PAGE

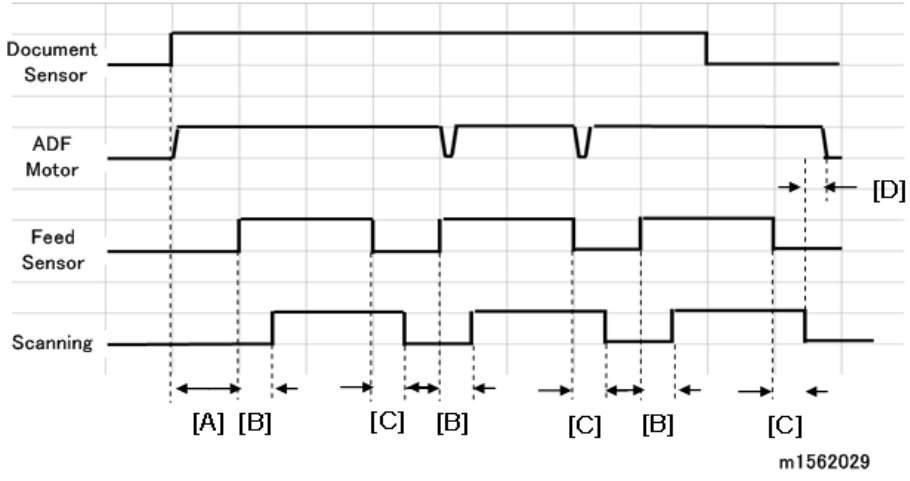
(Upper line: ON, Lower line: OFF)



- [A]: Check for Feed-in jam
- [B]: Number of pulses for motor start to Start Scanning
- [C]: Number of pulses for Feed Sensor off to Stop Scanning
- [D]: Number of pulses for Paper feed out

8.3.2 MULTI PAGE

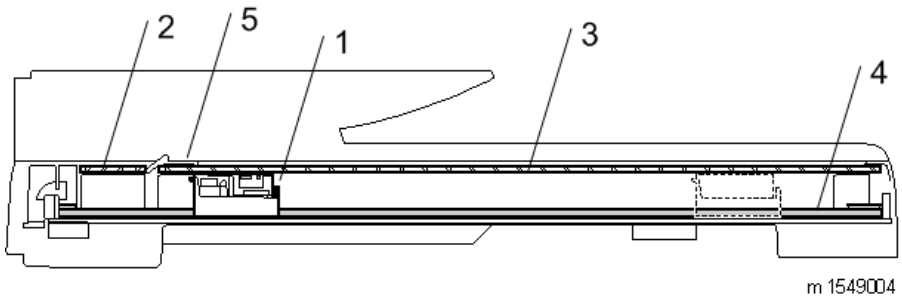
(Upper line: ON, Lower line: OFF)



- [A]: Check for Feed-in jam
- [B]: Number of pulses for motor start to Start Scanning
- [C]: Number of pulses for Feed Sensor off to Stop Scanning
- [D]: Number of pulses for last Paper feed out

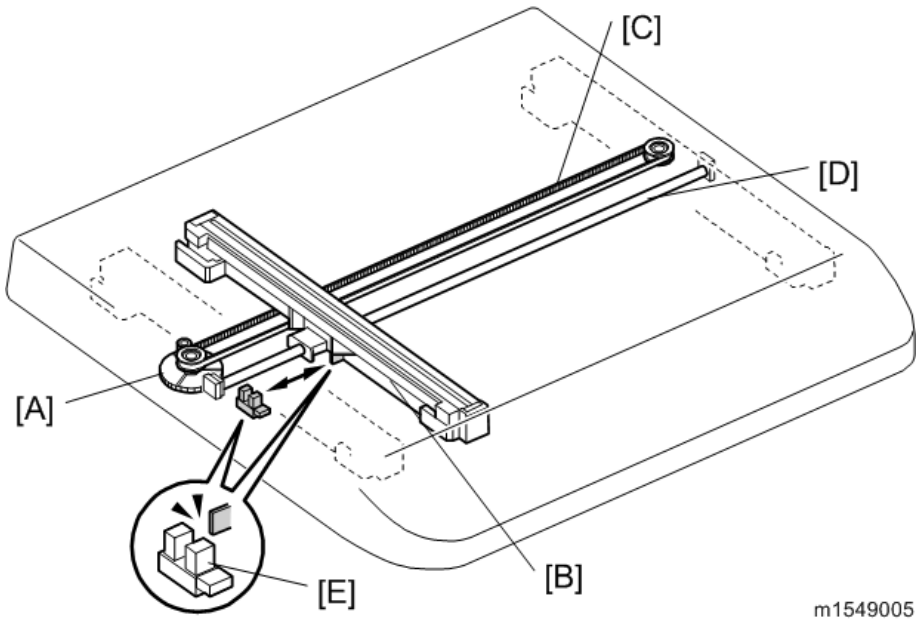
9. SCANNER (ONLY FOR MF MODELS)

9.1 OVERVIEW



1. CIS Carriage Unit	4. Carriage Drive Shaft
2. DF Exposure Glass	5. White Sheet
3. Scanner Exposure Glass	

9.2 DRIVE



The scanner motor [A] drives the CIS carriage unit [B] through gears and a timing belt [C]. The CIS carriage unit moves along the carriage drive shaft [D]. The carriage home position sensor [E] in the scanner detects the home position of carriage unit when initializing the scanner or before/after scanning. The CIS carriage unit moves to read the white sheet before every scan mode to adjust white level.