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245-61
Service Training

Product Overview

PD-C3

Slide 1

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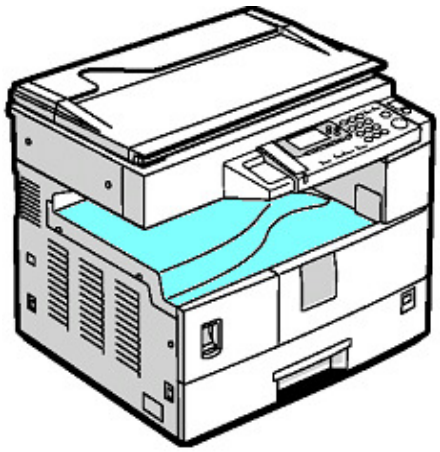
The Machine

This is the machine you will study in this training course. Go to the machine and familiarize yourself with it.



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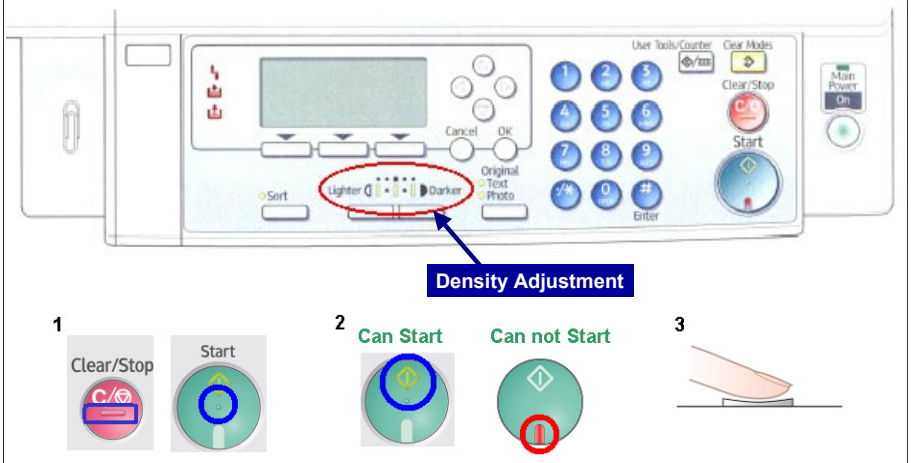
Operation Panel



Familiarize yourself with all the buttons on the operation panel above.

Slide 3

The appearance of the operation panel can vary depending on options.

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Specifications

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Specifications

- **Look over the Specifications section of the FSM for the following - comparing these specifications with the previous machine if you are not already familiar with them.**
- **This machine**
  - General Specifications
  - Paper sizes
  - Machine configuration
  - Optional Equipment
- **Previous machine**
- **Note:**
  - Make sure you examine the Specifications for this machine as you will be tested on this later.

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Installation
Slide 6

Install the Copier

Procedure: *Copier Installation* (see FSM)

- **The machine automatically initializes itself; there are no process controls to do.**
  - After installing the machine and all options, and making all test copies, record the value of the total counter.
    - » This is very important, because this value will be used for billing with Meter Click contracts.
    - » Also, inform the customer of the value along with the reason why the counter does not start from zero.
    - » Do not set to zero.

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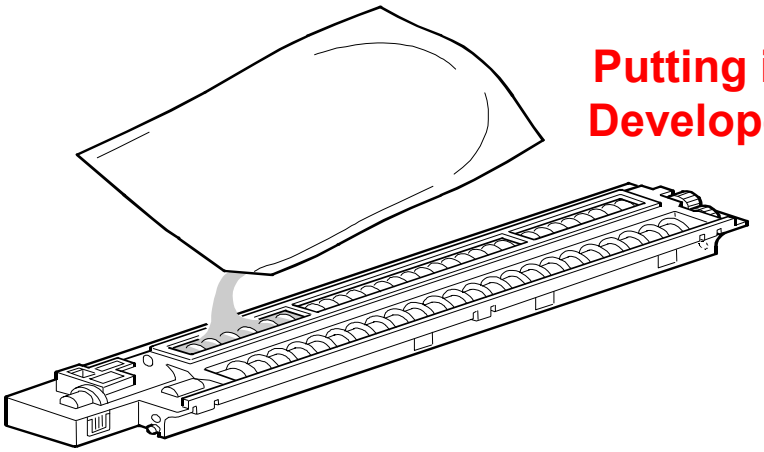

Putting in Developer

- Make only a small cut in top corner of bag for better control when pouring.
- Make sure not to spill developer on gears.
- If you have to turn gear to distribute developer evenly, make sure to do so very slowly and as little as possible. Otherwise developer may spill.
- After pouring in developer, initialize it with SP-2802.

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Upgrade the Firmware

Install the latest firmware for the machine:

See *Firmware Update Procedure* in the FSM

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SP Modes

- SP 5113: Key counter, enable/disable
- SP 5811: Serial number
- SP 5907: Plug and play settings

See *Service Program Mode*, under *Service Tables* section.

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Machine Overview
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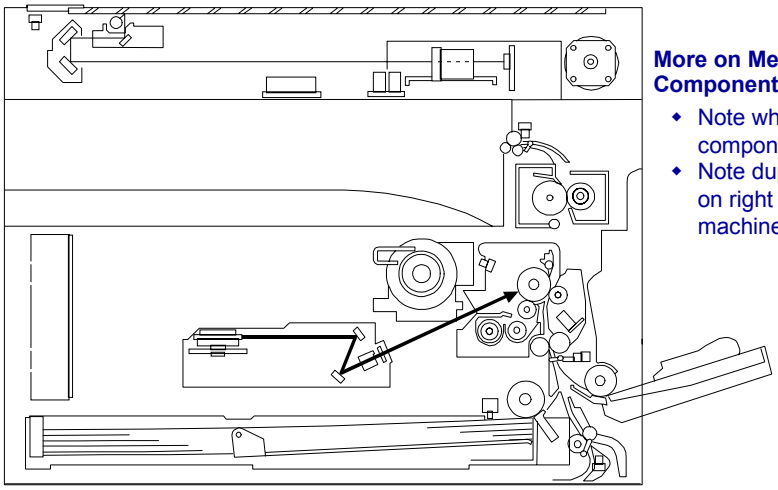
Mechanical Components - Layout



More on Mechanical Components

- Note where major components are:
- Note duplex unit on right side of machine.

For a full list of mechanical components, see *Component Layout* under *Detailed Section Descriptions* in the FSM

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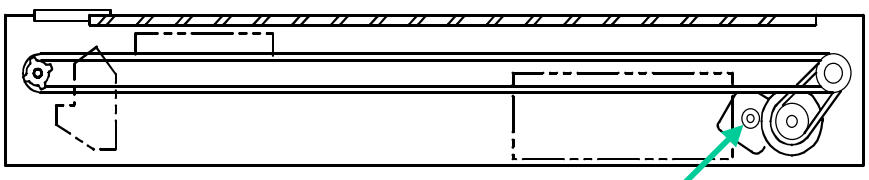
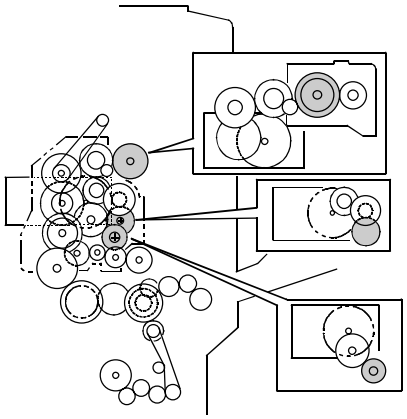
Drive Layout





- Main motor drives fusing unit, PCU and development unit.
- Scanner has one motor.
- Bottom diagram shows how main motor drives fusing unit, PCU, and development unit.
- Main motor also drives paper feed mechanisms via train of gears in lower part of bottom diagram.
- When removing gear box, gears might fall out. The FSM shows how to put the gears back in.

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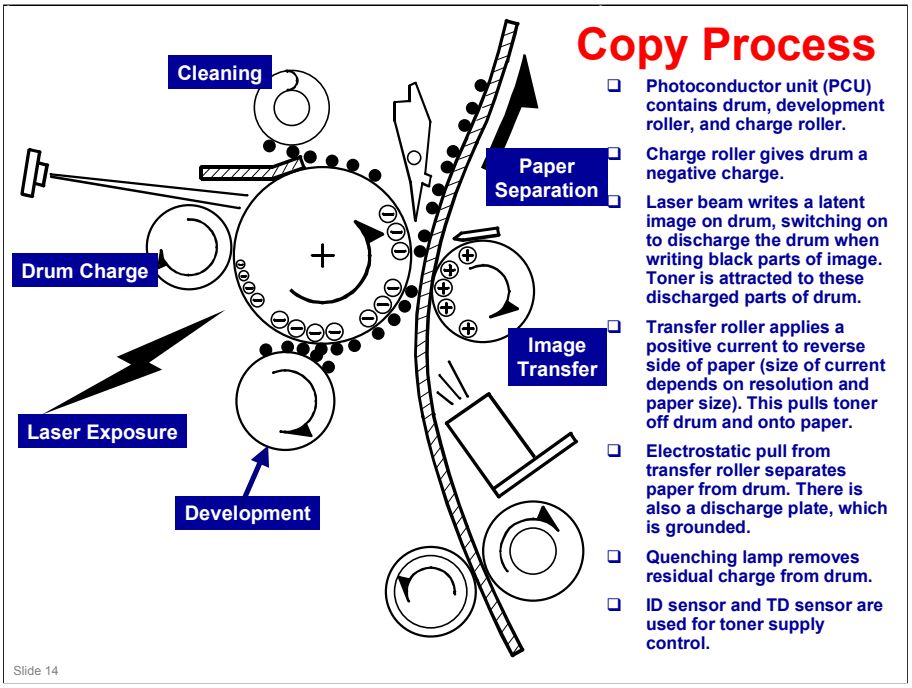
Cleaning
Paper Separation
Drum Charge
Image Transfer
Laser Exposure
Development
Copy Process
Photoconductor unit (PCU) contains drum, development roller, and charge roller.
Charge roller gives drum a negative charge.
Laser beam writes a latent image on drum, switching on to discharge the drum when writing black parts of image. Toner is attracted to these discharged parts of drum.
Transfer roller applies a positive current to reverse side of paper (size of current depends on resolution and paper size). This pulls toner off drum and onto paper.
Electrostatic pull from transfer roller separates paper from drum. There is also a discharge plate, which is grounded.
Quenching lamp removes residual charge from drum.
ID sensor and TD sensor are used for toner supply control.
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PM (Preventive Maintenance)
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Service PM

- **The machine has PM intervals of 60 K, 80 K and 120 K**
- **Reset the PM counter after finishing PM SP 7804 1**

  See ***How to Reset the PM Counter*** in the FSM
- **SP Modes**
  - SP 5501 1: PM alarm (0: No alarm)
  - SP 7803: Current PM counter status

See *PM Tables* in the *Preventive Maintenance* section of the FSM

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Lab Work - PM Procedures

Do the PM for the following (refer to the FSM for details).

- Drum
- Developer
- Charge roller
- Cleaning brush (charge roller)
- Cleaning blade (OPC drum)
- Pick-off pawls
- Transfer roller
- Paper feed roller (each tray)
- Friction pad (each tray)
- Hot roller
- Pressure roller
- Pressure roller cleaning roller
- Pressure roller bushing
- Hot roller stripper pawls

❑ **CAUTION: Let the fusing unit become cool before you start.**

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More on Lab Work – Copier

- ❑ Do the procedures in the PM table.
- ❑ Where it says ‘clean’, or ‘inspect’, locate the part and examine it briefly.
- ❑ Where it says ‘replace’, do the replacement procedure.
- ❑ Where it says ‘lubricate’, examine the component and be sure that you understand where to lubricate.


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Scanner
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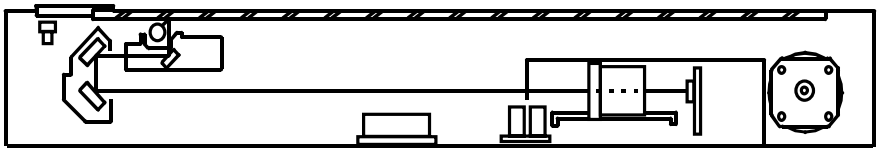
Scanner Unit



- 600 dpi CCD
- Exposure lamp: One xenon lamp
- The reflector reduces shadows on paste-up originals
- Anti-condensation heater available as an option
- See the FSM (Field FSM) for more details.

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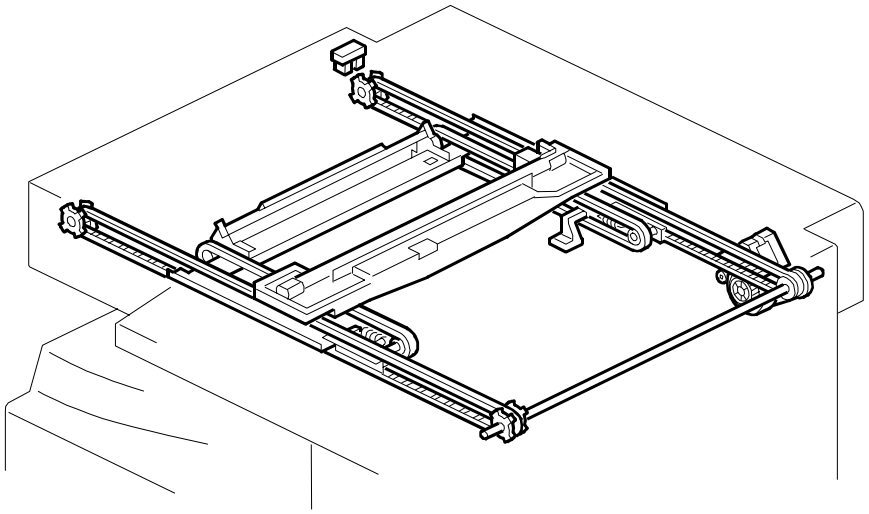
Scanner Drive



- **Scanner drive motor: Drives the scanner (100 mm/s)**
  - Timing belts are used in this model

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Image Processing

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Image Quality Adjustments - 1/3

- **Three basic original types**
  - Text
  - Photo
  - Special (can only be accessed through a user tool)
- **Ten original types in total, selectable with a user tool**
  - Text modes: 2
  - Photo modes: 3
- **Special modes: 5**

See *Image Processing Modes* in the FSM for a description of the various modes available.

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More on Image Quality Adjustments 1

- There are three basic original types: text, photo, special.
- Each of these types has sub-categories, as shown on the slide, to make a total of 10 types that the user can select.
  - Only two are immediately accessible at the operation panel. However, the user can set up the operation panel with a user tool. This will be explained on the next slide.
- The table in the FSM gives details of the uses for each type.
- In the SP tables and other parts of the manual, these modes are also referred to as Text 1, Text 2, Photo 1, etc.
- Text 2 (Sharp) does not use any greyscales for scanning.
- Special 1 (Unneeded background) is similar to Text 2 (Sharp), but stronger. Special 1 only works well in certain cases and was designed for a specific case in the Japanese market (for copying vehicle inspection certificates).

Image Quality Adjustments - 2/3

- **The original mode key on the operation panel has two settings:**
  - Text
  - Photo
- **The default settings are:**
  - Text indicator lit: Normal Text (Text 1)
  - Photo indicator lit: Photo Priority (Photo 1)
- **To allocate an original type:**
  - Light either the Text or Photo indicator
  - Select the required original mode with User Tools - Copier Features - Adjust Original Mode

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More on Image Quality Adjustments 2

- Only two of the 10 settings can be accessed directly from the operation panel.
- In a new machine, these are Text 1 and Photo 1.
- To change to a different two settings, use the user tool indicated on the slide.
- Note that the Text indicator does not have to be allocated to a Text mode and the Photo key does not have to be allocated to a Photo mode.
  - For example, the Text indicator can be allocated to Photo 3, and the Photo indicator can be allocated to Special 4.

Image Quality Adjustments - 3/3

- **SP 4922 to 4932: Image processing adjustments**
  - List: See ***SP Modes for Each Image Processing Step*** in the FSM
  - Table: See page following list of SP modes in the FSM
- **SP 4921: Selects one of the original modes; only one can be adjusted at any one time.**
  - First select a mode with SP 4921. Then adjust it with SP 4922 to 4932.

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More on Image Quality Adjustments 3

- There are some SP modes that can be used to customize these settings. The table in the manual shows the settings that can be changed.
  - We will look at these in more detail later in this section.
- Note that only one original mode setting can be customized at one time.
  - The technician selects this with SP 4921. Then, the image processes for that original mode setting can be adjusted with SP 4922 to 4932.
  - If SP 4921 is changed, the settings of SP 4922 to 4932 change to the defaults for the new original mode setting.

    The settings that were made for the previous original mode are lost.

    The settings of SP 4942 and 4943 are not reset when SP 4921 is changed with.

SP Modes

- **SP 4015: Adjusts the area of the white plate used for auto shading**
- **SP 4903: ADS level**
- **SP 4904: Lower limit for ADS**
- **SP 4905: Determines how much of the image is used for ADS (the whole width or just a narrow strip)**
  - Use SP 4015 to adjust the area of the white plate that is used for auto-shading. Adjust this if there is damage to the white plate causing defective auto shading.

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Lab Work

Look over the following section.

- **White level adjustment: See *SBU White Level Adjustment* in the FSM**
  - Do any of the procedures that you think that you need to practice.
  - Pay attention to all notes, cautions, and warnings in the manual.
  - In addition, if you wish, test the effects of the various original modes and the SP modes used for adjusting the image processing features.

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PCU
PCU (Photo Conductor Unit)
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Overview

- **There is no new PCU detection in this machine. This is due to the PCU not being a user-replaceable part.**
  - Some of the components of the PCU are replaced individually at PM. We saw this already in the Maintenance section of the course.
  - When a new PCU is installed, new developer must also be installed and SP 2214 must be done to reinitialize the TD sensor.

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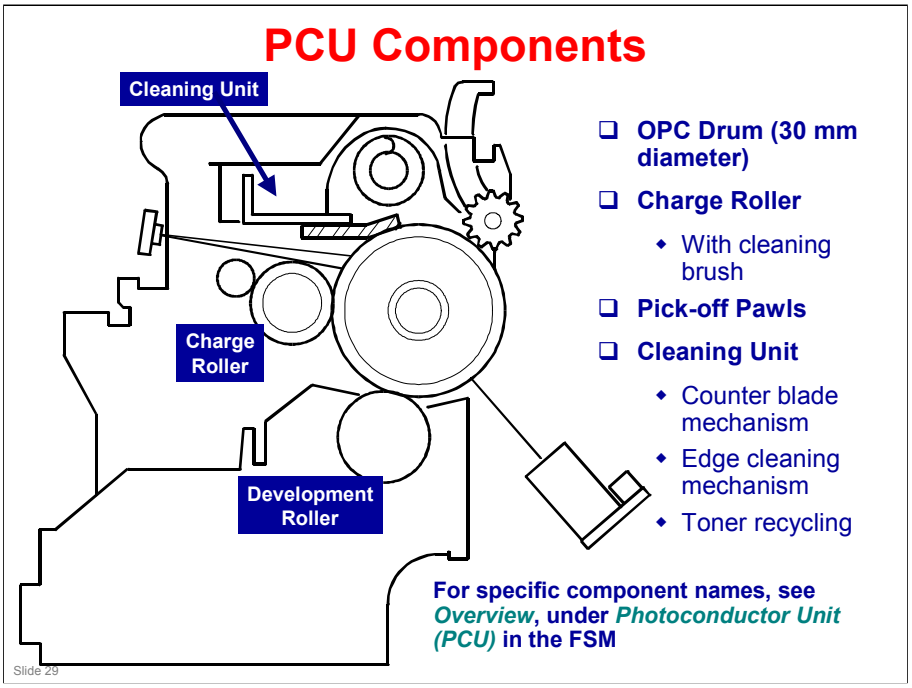
PCU Components
Cleaning Unit
Charge Roller
Development Roller
OPC Drum (30 mm diameter)
Charge Roller
With cleaning brush
Pick-off Pawls
Cleaning Unit
Counter blade mechanism
Edge cleaning mechanism
Toner recycling
For specific component names, see Overview, under Photoconductor Unit (PCU) in the FSM
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PCU Details

- **The PCU contains the following.**
  - OPC drum
  - Development unit (including development roller and TD sensor)
  - Charge roller and charge roller cleaning brush
  - Drum cleaning unit (blade, toner collection coil)
  - Pick-off pawls
- **The PCU does not contain the following.**
  - Transfer roller
  - ID sensor
  - Quenching lamp
  - Toner bottle

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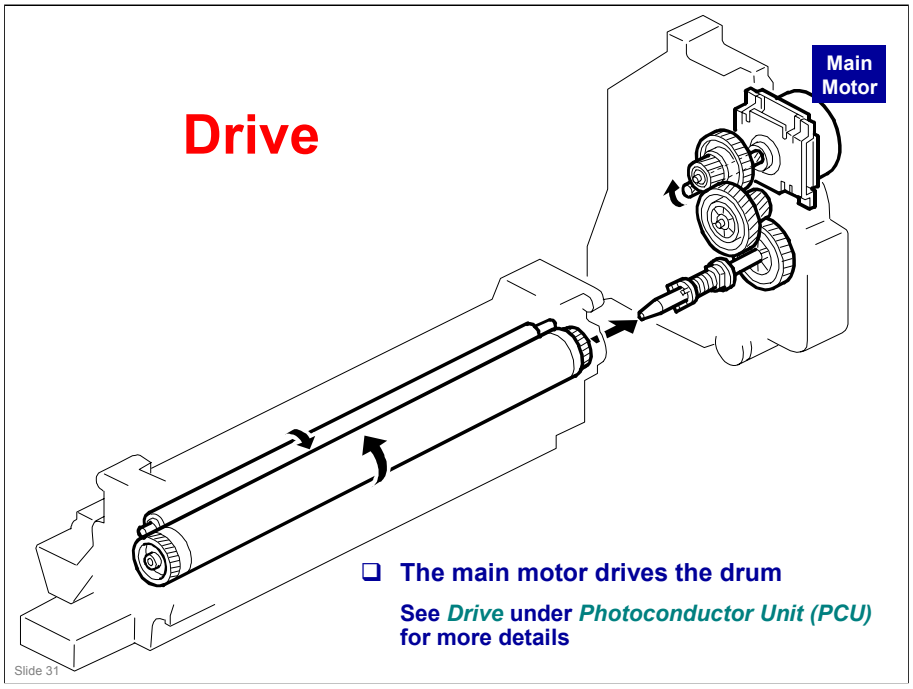
Drive
Main Motor
The main motor drives the drum
See Drive under Photoconductor Unit (PCU) for more details
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Drum Charge
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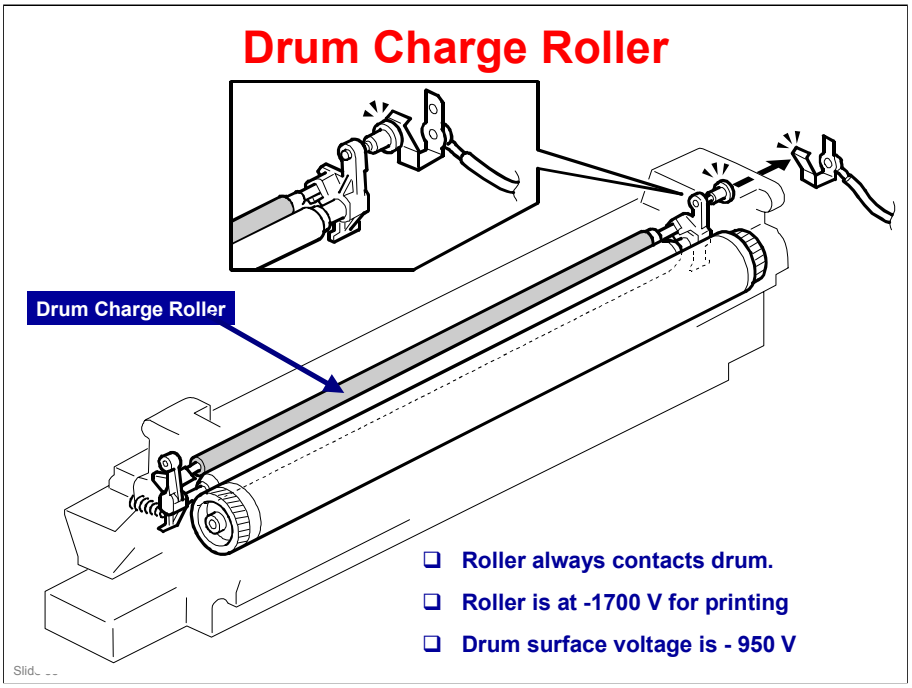

More on Drum Charge Roller

- ❑ The charge roller is part of the PCU unit.
- ❑ The charge roller turns by friction with the drum.
- ❑ A charge roller does not generate much ozone, so there is no ozone filter.

Charge Roller Voltage Correction

Temperature and humidity affect the efficiency of voltage transfer to the drum from the drum charge roller.

- Lower humidity causes a higher drum charge voltage. As a result, less toner is transferred.

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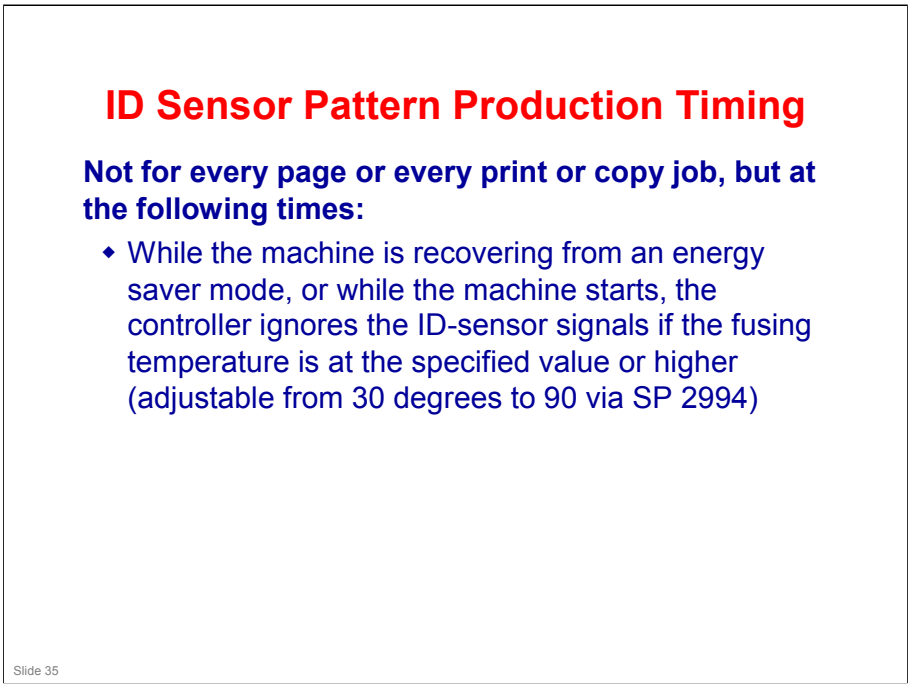
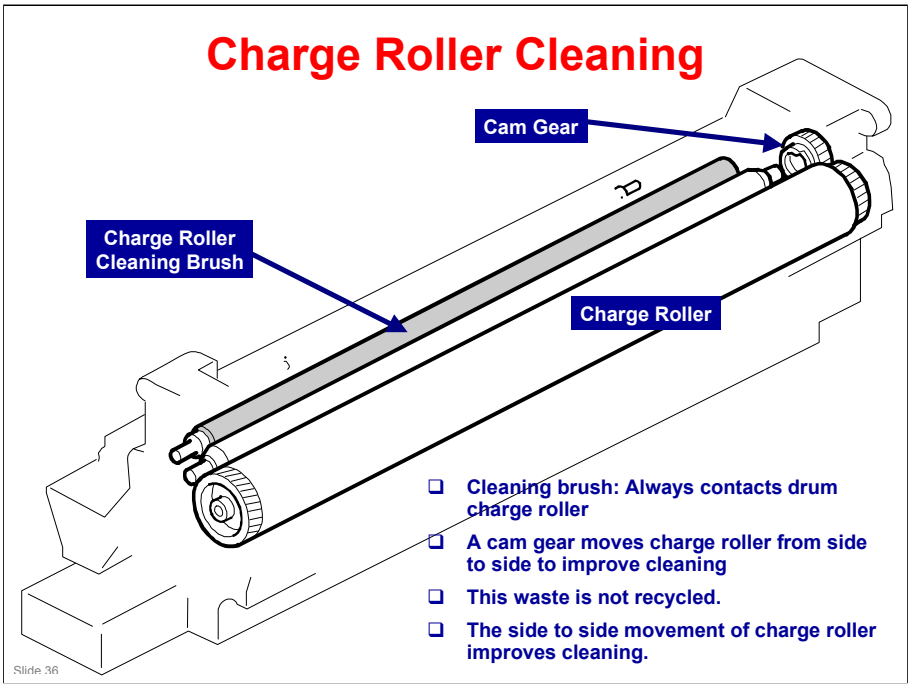


More on ID Sensor Pattern Production Timing

- Note that the ID sensor pattern for toner density control is not made every job. This is mainly to increase the copy speed.
- The transfer roller is always contacting the drum in this model (there is no transfer roller release mechanism), so the roller would have to be cleaned very often to remove the toner from the ID sensor pattern.
  - For details on transfer roller cleaning, see the Transfer section of the course.
  - Also, not doing the ID sensor pattern at the start of a job leads to a faster first copy time.
  - The pattern is made at the times shown on the slide.
  - This means that the charge roller voltage correction is only made at these times.

    However, the Vsp and Vsg made at these times are used for toner supply control for every copy as usual.
  - It also means that for users who keep their machines on all the time and who disable energy saver mode, the machine never makes an ID sensor pattern.

    This will affect copy quality because of toner supply control or charge roller voltage correction.



More on Charge Roller Cleaning

- The roller contacts the drum all the time so is likely to get dirty.
- The cleaning brush contacts the charge roller at all times to keep it clean.
- The side to side movement of the charge roller improves cleaning.

SP Modes

- SP 2001: Charge roller voltage adjustment (for printing and for making an ID sensor pattern)

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Development and Toner Supply
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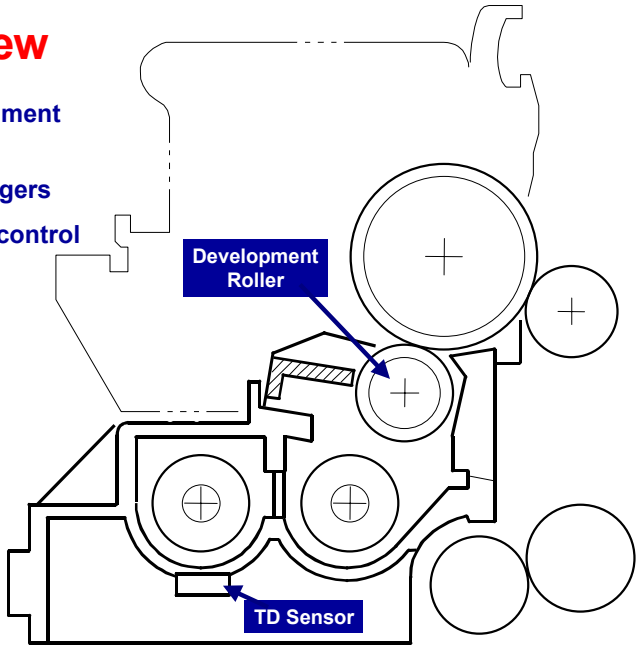
Overview

- Single development roller
- Two mixing augers
- Toner density control
  - TD sensor
  - ID sensor



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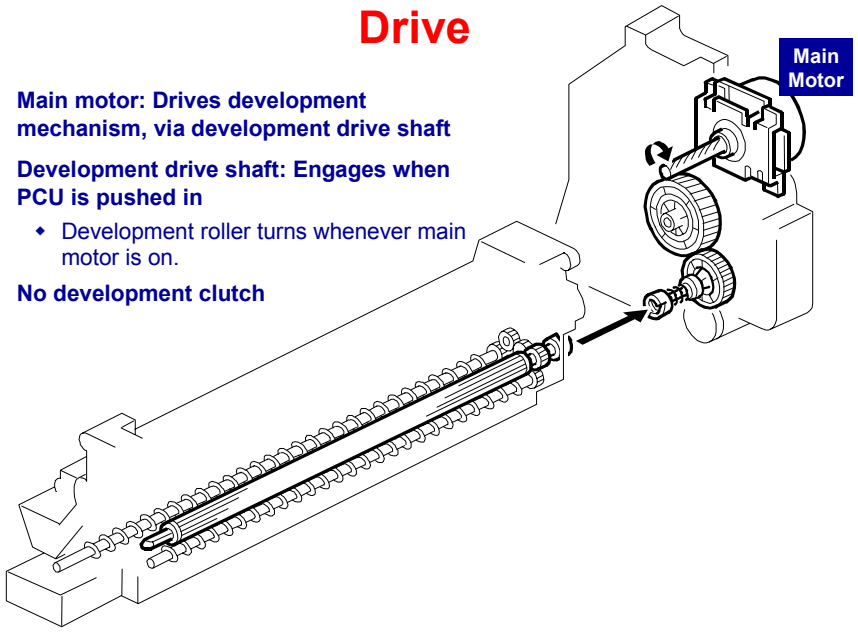
Drive

- **Main motor: Drives development mechanism, via development drive shaft**
- **Development drive shaft: Engages when PCU is pushed in**
  - Development roller turns whenever main motor is on.
- **No development clutch**



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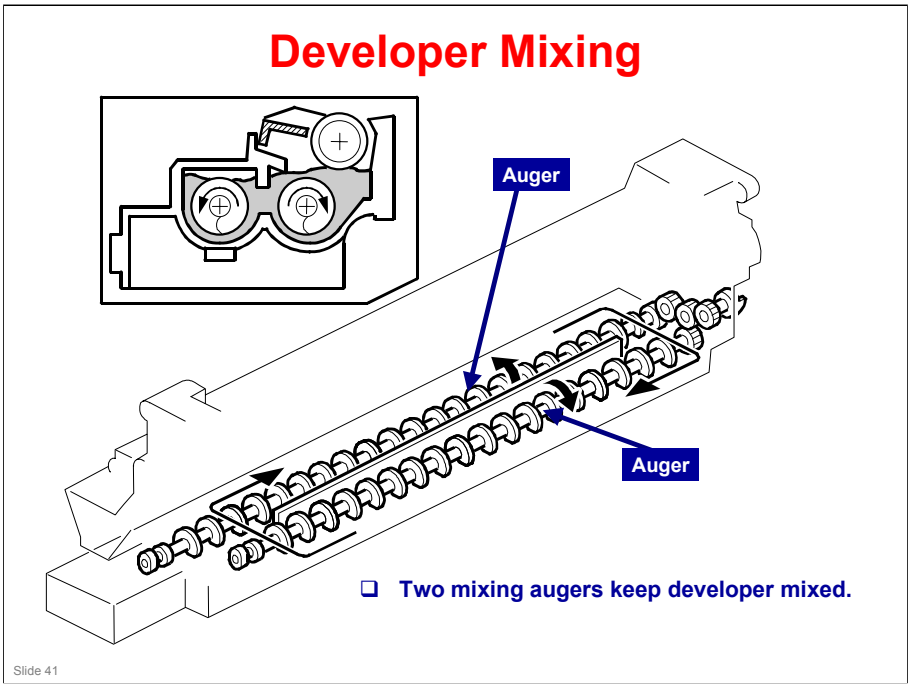
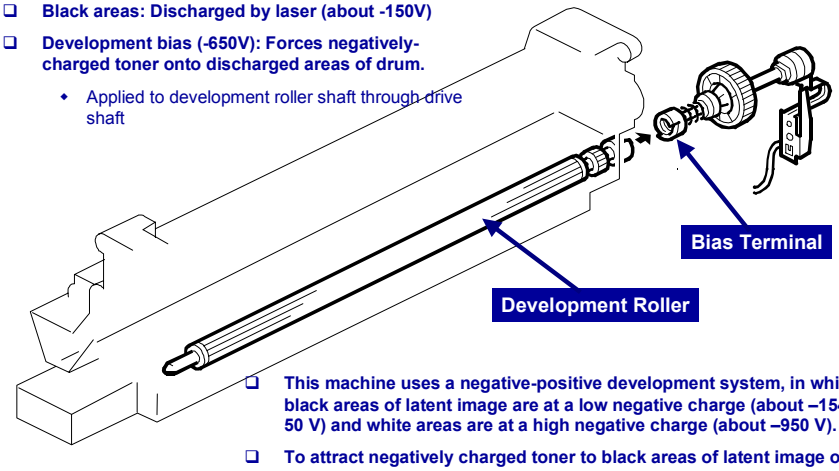


More on Developer Mixing

- Mixing does the following:
  - Keeps the toner and developer evenly mixed
  - Prevents lumps from forming
  - Helps create a triboelectric charge on the toner.
- The doctor blade splits the developer into the following two parts.
  - One part goes to the development roller to form the magnetic brush and the latent image on the drum.
  - The other part is returned to the development unit, where it is mixed with new developer (and recycled toner) and moved back to the development roller.

Development Bias

- White areas: High negative charge (-950V)
- Black areas: Discharged by laser (about -150V)
- Development bias (-650V): Forces negatively-charged toner onto discharged areas of drum.
  - Applied to development roller shaft through drive shaft



- This machine uses a negative-positive development system, in which black areas of latent image are at a low negative charge (about –154 ± 50 V) and white areas are at a high negative charge (about –950 V).
- To attract negatively charged toner to black areas of latent image on drum, high voltage supply board applies a bias of –650 volts to development rollers throughout image development process. Bias is applied to the development roller shaft through the drive shaft.
- Development bias voltage (–650 V) can be adjusted with SP 2201 1.

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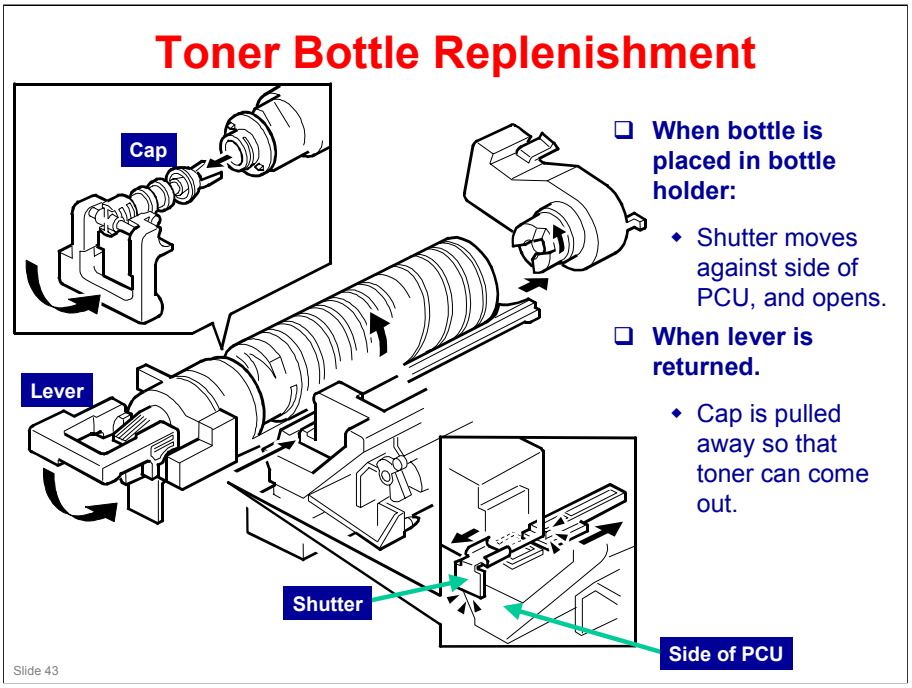

More on Toner Bottle Replenishment

- When the bottle is placed in the machine, the shutter opens to allow toner to go into the development unit.
  - The shutter mechanism is shown in the bottom right part of the diagram.
- Then, when the holder is released, the top of the bottle is pulled out.
  - The holder mechanism is shown in the top left part of the diagram.

Toner Bottle Notes

Study *Toner Supply* in the FSM, noting the following details:

- How the machine opens up a new toner bottle while it is being installed, and closes the toner bottle when the holder unit is pulled out to remove the toner bottle.
- How the bottle drive mechanism moves toner into the development unit.
- How scattering is prevented.
- Study the mechanism while looking at the FSM.

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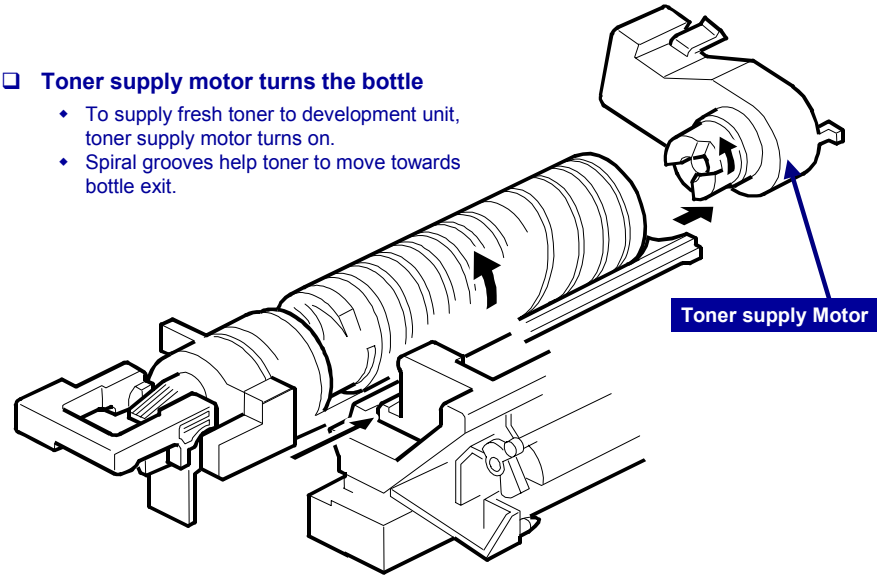
Toner Supply - Bottle Drive

- **Toner supply motor turns the bottle**
  - To supply fresh toner to development unit, toner supply motor turns on.
  - Spiral grooves help toner to move towards bottle exit.



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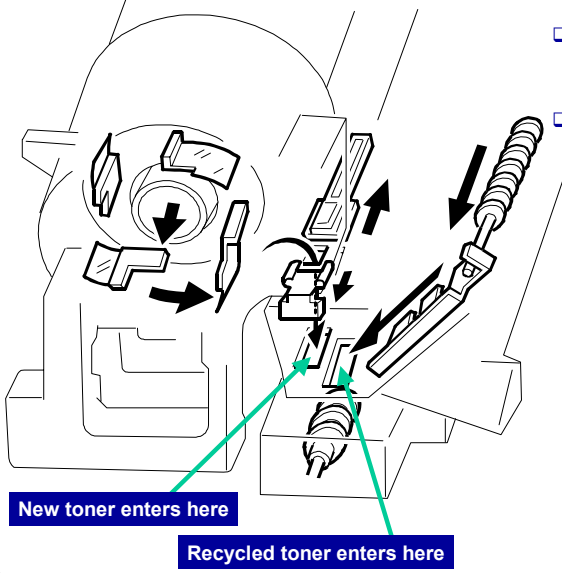
Toner Supply - Input to Development Unit



- **Mylar tabs in bottle unit push toner towards development unit entrance.**
- **Recycled toner from drum also arrives at this entrance.**
  - Toner enters development unit through shutter.
  - Note where new toner enters development unit.
    - » Recycled toner also enters through same opening. Toner collection coil for recycled toner can be seen at top right side of drawing on right side of illustration.
  - Toner recycling is covered in next section of course.

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Toner Supply Control

- **Controlled by the TD and ID sensors.**
- **Four modes**
  - Normally use 'sensor control 1'
  - Use 'fixed control 2' temporarily if the TD sensor needs replacing but no spare is available
  - Do not use the other two.
  - Use SP 2921 to change the mode

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Abnormal Sensor Conditions - 1/2

- **ID sensor**
  - If ID sensor output is out of spec, the machine disregards output from the sensor, and uses a Vref of 2.5 V.
  - After replacing the ID sensor, reset the error counter with SP 7-912
- **Abnormal ID Sensor Conditions**
  - If the ID sensor readings are abnormal, the machine automatically shifts to a type of sensor control that does not use the ID sensor.
  - No SC codes are generated if ID sensor readings are abnormal, and the machine can still be used.
  - If the copy quality is poor and you suspect the ID sensor, check the ID sensor values with SP 2221 to see if an ID sensor error has occurred.

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Abnormal Sensor Conditions - 2/2

- **TD sensor**
  - If TD sensor output is out of spec, the machine changes to fixed supply mode 2
    - » Toner supply motor on always for 200 ms per page
  - Copying/printing can continue until a TD sensor error is detected 10 consecutive times.
  - Then SC 390 is generated and the machine cannot be used.

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Toner Near-end/End Detection

- No near-end or end sensors
- Toner near-end/end are determined by TD sensor output (current and reference voltages).
- If near-end is detected, toner is added for a short period (adjustable with SP 2 923).
- If the toner level does not recover, toner end is after 50 more copies (the number of copies is adjustable with SP 2 213).
- There is no toner end or near-end detection if the machine is in fixed control 2 mode.

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Toner Near-end/End Detection - Details

- **If Vt level 6 is detected 5 consecutive times, near-end is detected.**
- **Toner is added after the copy job:**
  - If supply recovers to Vt level 5, near-end is cancelled.
  - Otherwise, toner end occurs after 50 copies
  - If Vt level 7 is detected 3 consecutive times, toner end is detected immediately.
- **Recovery after adding new toner**
  - The machine must recover to Vt level 5 after a new bottle has been added

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More on Toner Near-end/End Detection

- There is no toner end or near-end sensor. The machine uses the TD sensor outputs (current and reference voltages).
- There is no toner end or near-end detection if the machine is in fixed control 2 mode.

Near-end

- The machine enters the near-end condition if Vt level 6 is detected 5 consecutive times.
- If the machine goes back to Vt level 5 or above twice consecutively during a copy cycle (or during recovery or after opening/closing the front cover), the near-end condition is cancelled.
- If it does not recover during the copy cycle, the machine adds toner intermittently during an interval which can be adjusted with SP 2923.

End

- If near-end recovery does not occur, the near-end condition is kept, and 50 more copies can be made before toner end occurs and copying is disabled.
  - The number of copies can be changed with SP 2213.
- However, if the Vt level goes to 7 three times consecutively at any time during this interval, toner end is detected immediately.

Recovery

- After toner end, recovery is tested every time the front cover is opened for 10 seconds or more (and then closed).

SP Modes - Development

- SP 2201: Development bias (printing, ID sensor pattern creation)
- SP 2802: Forced developer agitation

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More on SP Modes Development

- SP 2802: Developer initialization after adding new developer is done with SP 2214. However, SP 2802 can be used at any time to mix the developer. It checks Vt, but does not initialize the TD sensor or do any Vsp/Vsg adjustment.
  - If the machine has not been used for a long time, prints may have a dirty background because of low Q/m (decreased charge on carrier particles). In this case, use this SP mode to mix the developer.

SP Modes - Toner Supply

- SP 2221: ID sensor error display (Vsg, Vsp, Vt, etc if an ID sensor error occurred)
- SP 2908: Forced toner supply
- SP 2921: Toner supply mode (sensor control, fixed control)
- SP 2922: Toner supply motor on time (sensor control mode)
- SP 2925: Toner supply motor on time
- SP 2926: Adjusts Vts (target for TD sensor initialization
- Sp 2927: Use of the ID sensor, enable/disable

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More on SP Modes – Toner Supply

- SP 2220: This displays Vt and Vref
- SP 2221: This machine has no SC code for ID sensor errors. If imaging problems occur (such as dirty background), use this SP to determine whether the problem is with toner density control.
  - Error conditions are listed in the manual as shown above.
- SP 2927: Normally, do not change this

SP Modes - Toner Near-end/End

- **SP 2213: Number of copies between near-end and end (20 or 50 - default: 50)**
- **SP 2923: Toner supply motor on time during recovery from end/near-end**
- **SP 2928: Clears the toner end condition**
  - Normally, do not use this, for the reasons explained in the SP table.

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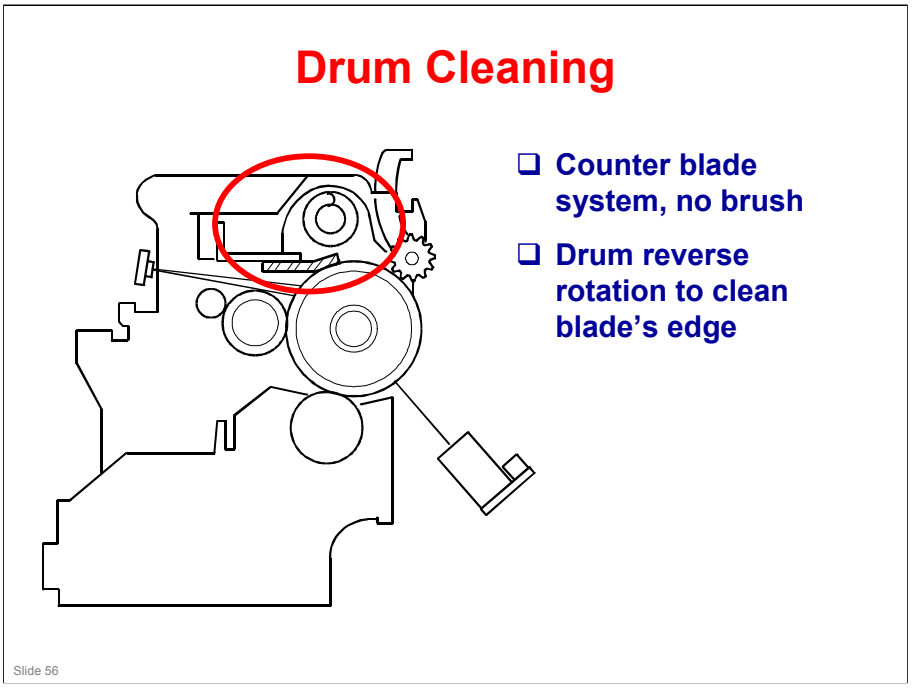
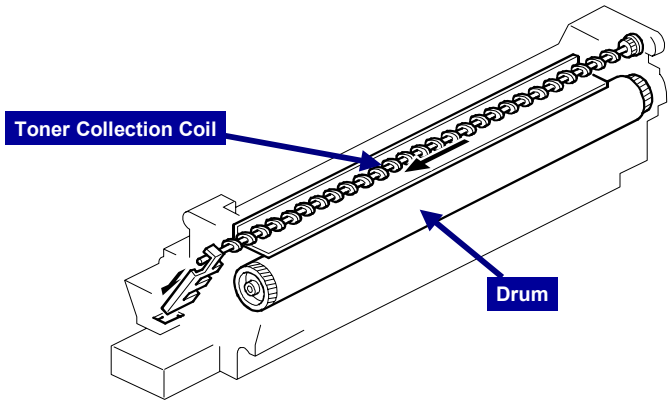
Drum Cleaning and Toner Recycling
Slide 55



More on Drum Cleaning

- This machine uses a counter blade, but no brush.
  - The blade scrapes toner off the drum, and a toner collection coil picks up toner from the top of the pile and carries it back to the development unit.
  - At the end of every copy job, the drum reverses for 5 mm to scrape toner off the edge of the cleaning blade.

Toner Recycling



- **Toner collection coil: Moves toner towards opening in PCU (Photo Conductor Unit)**
  - This is same opening as is used for fresh toner from toner bottle

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More on Toner Recycling

- The slider with the two comb-like appendages on it is always vibrating.
  - The comb-like appendages break up any blockages of toner.
- Note the two slots in the development unit.
  - The one on the left receives fresh toner from the cartridge.
  - The one on the right receives the recycled toner.
  - New and recycled toner are mixed together in the development unit.
- Mixing auger 1 in the development unit mixes the recycled toner with fresh toner from the bottle.
- Toner adhering to the transfer roller is sent back to the drum, as we shall see in the Transfer section of the course. This toner is in turn recycled to the development unit. It may contain some small amounts of paper dust.


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Paper Feed
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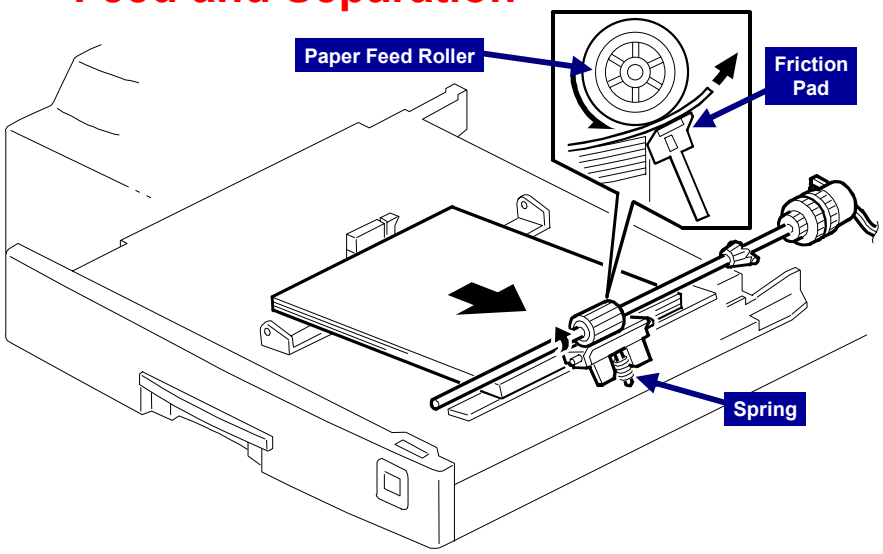
Feed and Separation



- Feed roller and friction pad
- Pressure from friction pad not adjustable.

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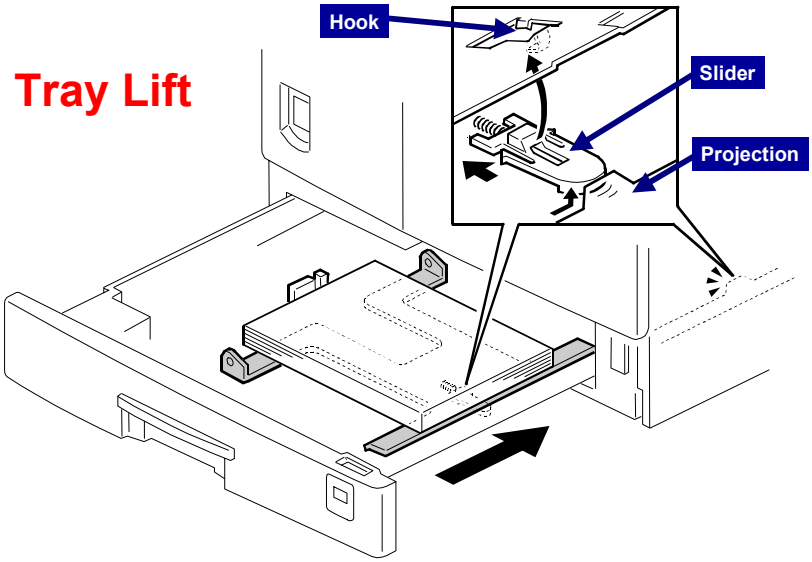
Tray Lift



- **When tray is closed, projection on copier frame pushes slider off bottom plate hook.**
  - Slider is on bottom part of tray.
- **After slider comes off, compressed springs lift bottom plate.**

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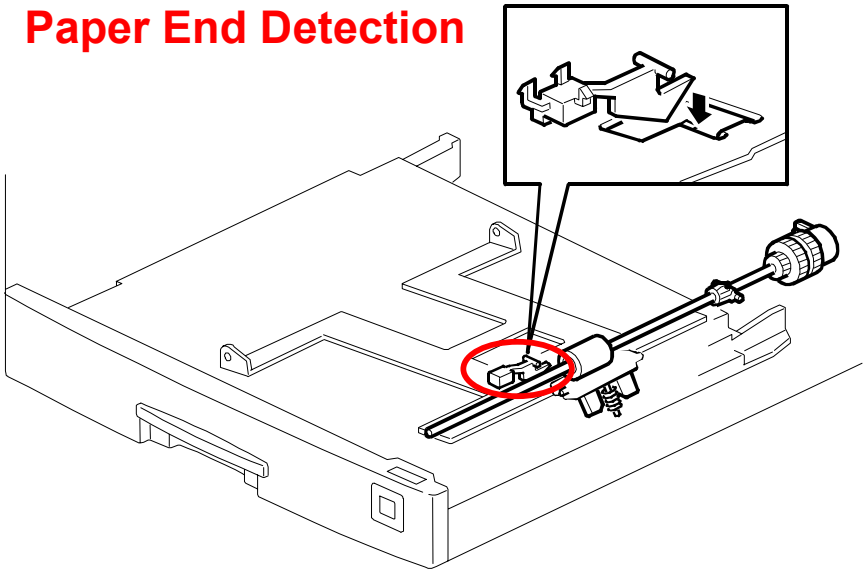
Paper End Detection



- **Paper end sensor feeler: Falls through a slot in the bottom plate when there is no paper.**

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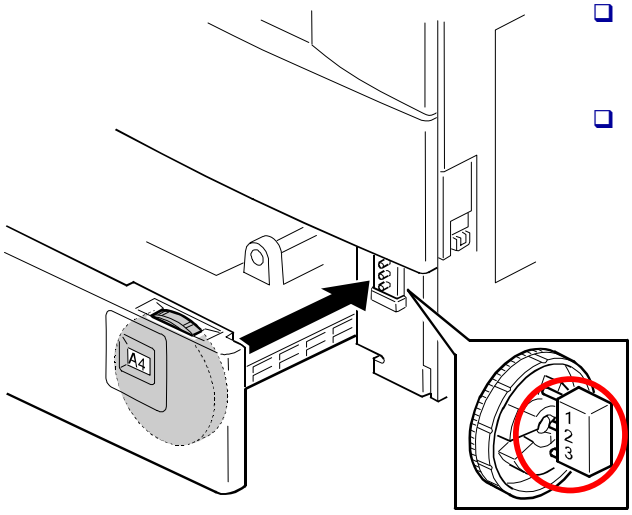
Paper Size Detection - Paper Trays



- **Dial and microswitch mechanism.**
- **Paper size sensor: Detects position of dial selected by user**
  - User must set dial to correct size.

See *Paper Tray* under *Paper Size Detection*

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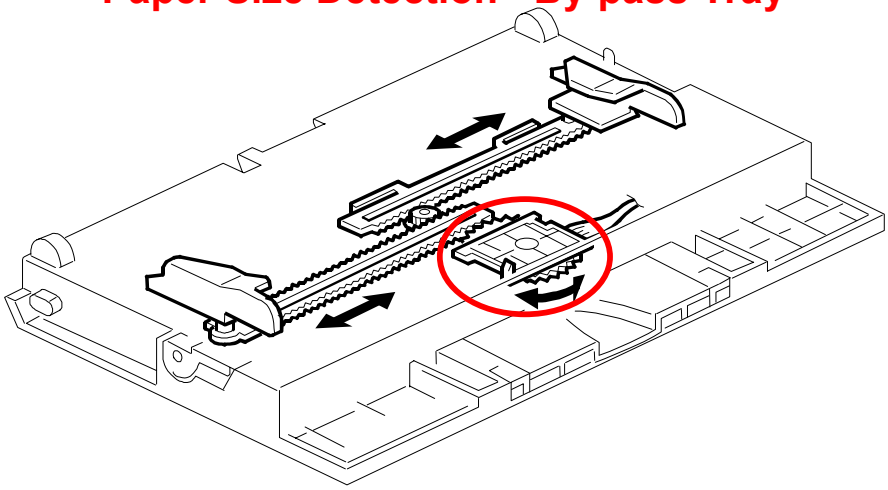
More on Paper Size Detection

Using a non-standard paper size

- To use a non-standard paper size, set the dial to the * mark
- Then, set the size with a User Tool (System Settings – Tray Paper Settings – Tray Paper Size).
- The machine disables paper feed from the tray if the paper size cannot be detected (the paper size cannot be detected if the paper size actuator is broken or if no tray is installed).

Paper Size Detection - By-pass Tray



- Bypass paper size switch monitors paper width.
- Side fences turn a gear wheel that contains sensor terminals.

Study bypass paper size table in *Bypass Tray*, under *Paper Size Detection* in the FSM.

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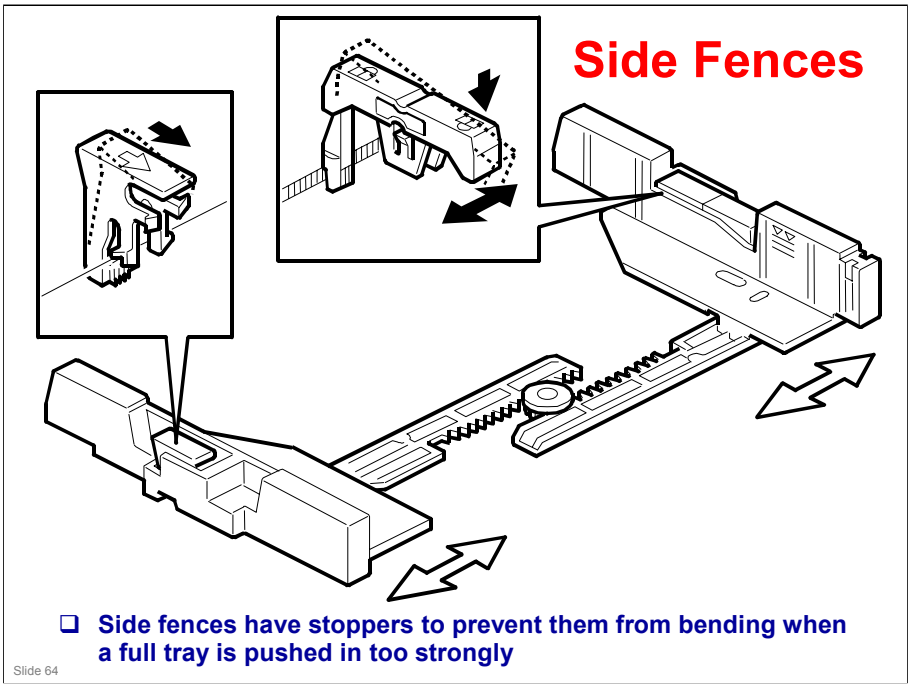
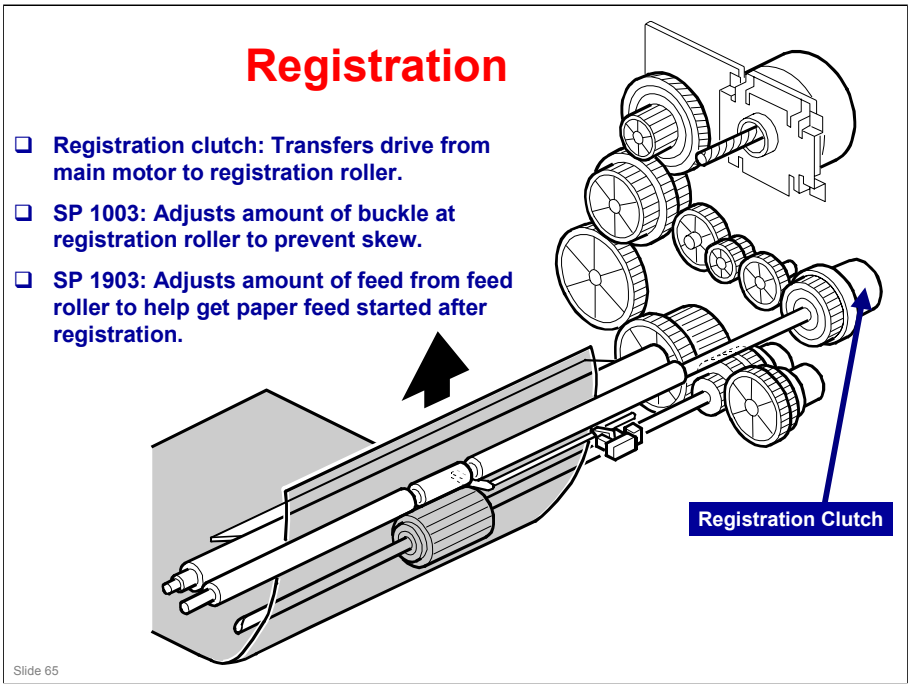
More on Paper Size Detection

- The side guides contain ratchets that turn a gear wheel at the center of the sensor. The gear wheel contains terminals. The output of the sensor changes when the gear wheel rotates over the wiring patterns on the rectangular part of the width sensor.
- The bypass tray hardware only determines the paper width. The base copier hardware determines the length.



More on Side Fences

- ❑ If the tray is full of paper and it is pushed in strongly, the fences may deform or bend. This may cause the paper to skew or the side-to-side registration to be incorrect.
- ❑ Each side fence can be secured with a screw, for customers who do not want to change the paper size



More on Registration

- The paper feed clutch stays on slightly after the registration clutch turns off, so that the paper buckles against the registration roller.
  - SP 1003 can be used to adjust the amount of buckling.
- The paper feed clutch can come on again to help paper feed get started after registration. This is a good idea if there are frequent jams at the registration roller just after registration.
  - These jams occur when the paper jumps over the registration instead of going between them. The clutch comes on again for certain paper types, such as thick paper, to try to push the paper between the rollers.
  - SP 1903 adjusts this feature.
  - In lab tests, this problem was not found when feeding from tray 1. So there is no adjustment for tray 1.

SP Modes

- **SP 1001: Leading edge registration for various paper feed stations**
- **SP 1002: Side-to-side registration for various paper feed stations**
  - SP 4010 - 11: Scanner registration
  - SP 6006: ADF registration
- **SP 1003: Paper feed timing. (Adjusts buckle at the registration roller to prevent skew.)**
- **SP 1903: Feed clutch boost after registration**

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More on SP Modes

- Look at the FSM for details.
- The registration and magnification SPs for the scanner and ADF are shown for reference.
- SP 1002: The SP 1002 1 setting is applied to all trays, not just the 1st Tray. Settings for trays 2 to 4 are offsets relative to the SP 1002 1 setting.
- SP 1903: This was discussed in a previous section.

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Image Transfer and Paper Separation

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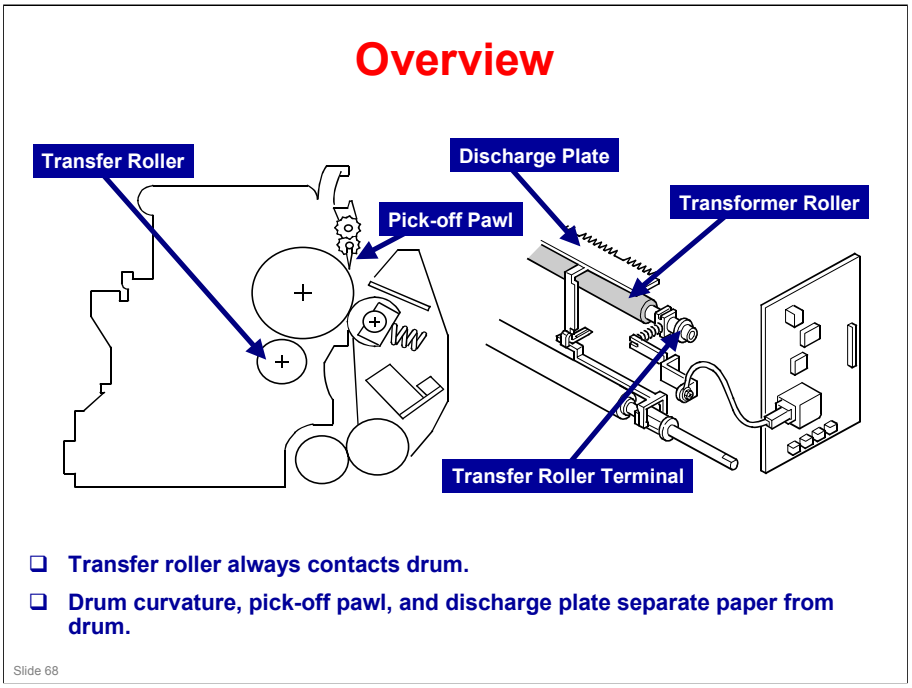
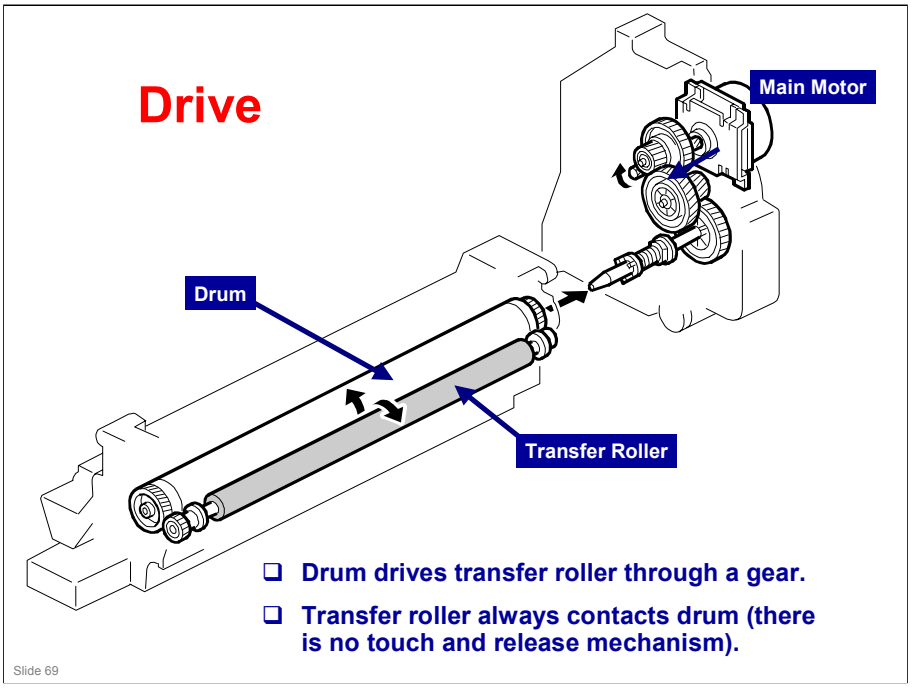


More on Overview

- The pick-off pawl is to the above right of the drum in the drawing, pointing downwards.
- The discharge plate is grounded.


Drive
Main Motor
Drum
Transfer Roller
Drum drives transfer roller through a gear.
Transfer roller always contacts drum (there is no touch and release mechanism).
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Transfer Current

- **First, a low current (10 μA) is supplied at the leading edge (before the print area)**
  - Prevents positively charged toner remaining on the drum from transferring to the roller
- **Then a high current is supplied (the amount depends on paper size and type).**
  - This transfers the toner to the paper
- **Finally, at the trailing edge, either:**
  - Multi-copy mode, between pages: Low current is applied again
  - Final page: Transfer current is switched off

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Transfer Roller Cleaning

- **A negative cleaning current is applied, followed by a positive current**
  - Negatively and positively charged toner particles are both transferred back to the drum
  - The current for the negative-charge phase can be adjusted with SP 2301-4.
- **Three conditions for entering cleaning mode:**
  - Before starting a job
    - » Default: Cleaning is not done before each job, change with SP 2996 if required
  - Just after turning on the power
  - After a copy paper jam has been removed

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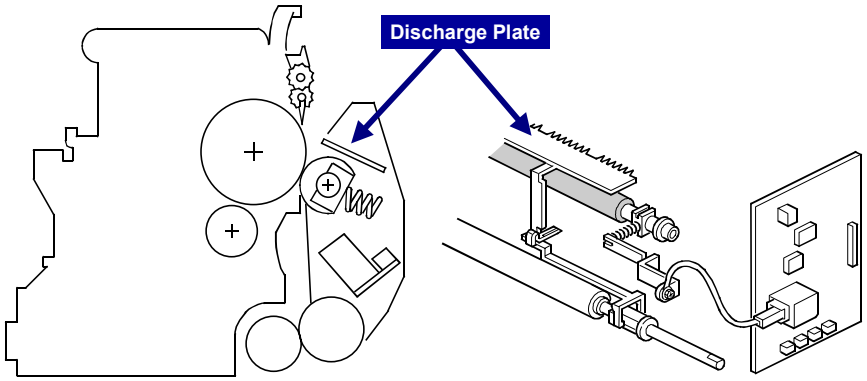
More on Transfer Roller Cleaning

- Toner may transfer from drum to transfer roller if:
  - A paper jam occurred
  - The paper size is smaller than the printed image
- The transfer roller must be cleaned to prevent toner from being transferred from the roller to the back side of copies.
  - There is no mechanism, just the application of positive and negative current to transfer any adhering toner back to the drum.

    The negative current pushes negatively-charged particles back to the drum.

    The positive current pushes positively-charged particles back to the drum.
  - Note that the roller is not cleaned before each job unless the setting of SP2-996 is changed from the default. This is to keep the copy speed as high as possible.
- The toner that transfers back to the drum is recycled with the other unused toner. Paper dust may also find its way into the toner because of this.

Separation



- **Drum curvature and discharge plate separate paper from drum**
  - There is no adjustment for discharge voltage in this machine, because discharge plate is grounded.

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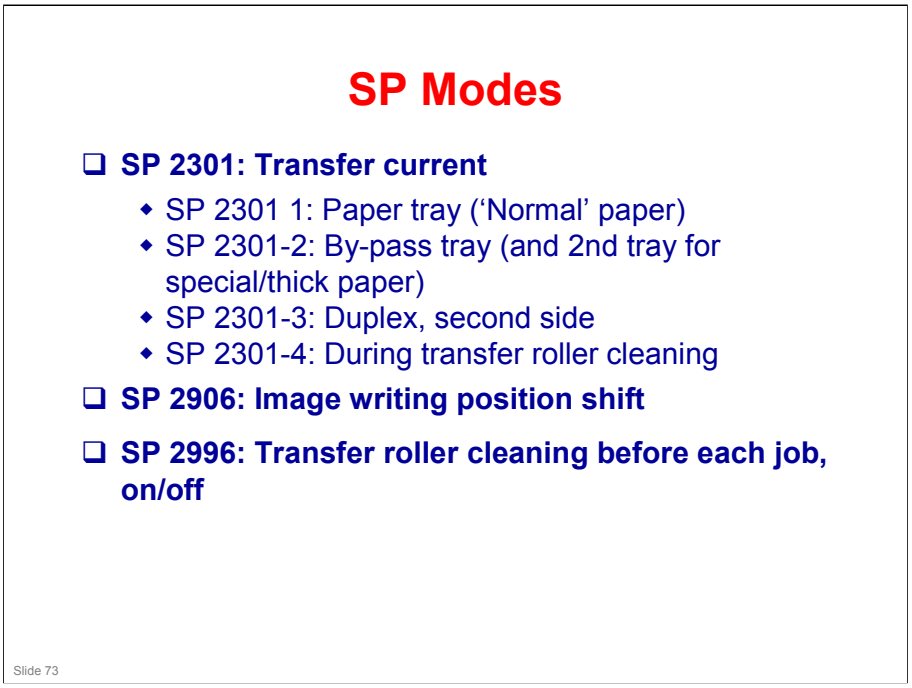

SP MODES

- SP 2301: This was discussed earlier in the section.
- SP 2906: Writing the same image many times on the same part of the drum during a multi-copy job can cause paper separation problems, if the image contains vertical lines. Shifting the position of the latent image slightly at intervals can solve this problem.
- SP 2996: This was discussed earlier in the section.


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Fusing
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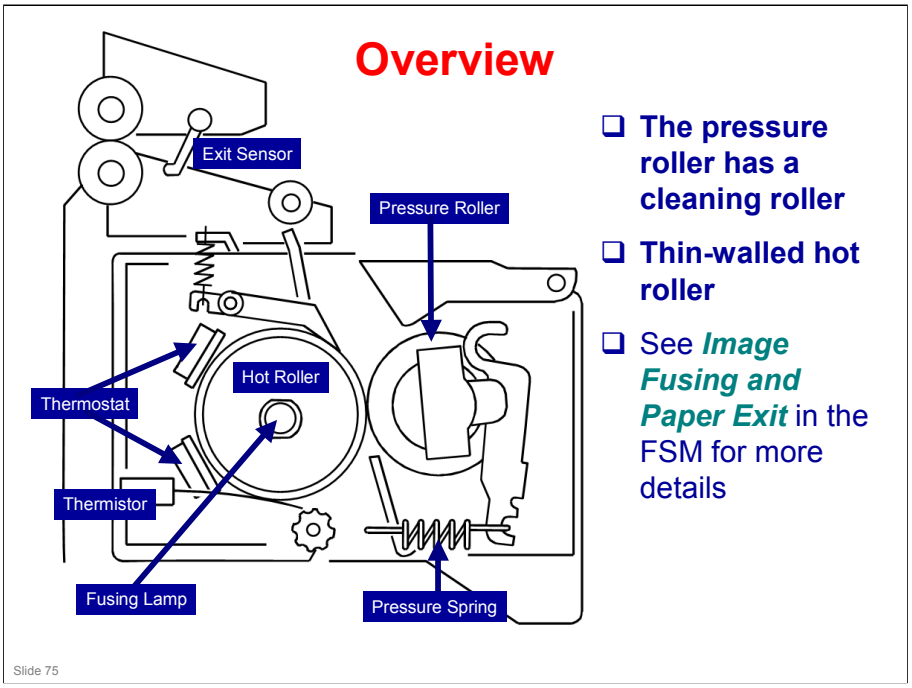
Overview
Exit Sensor
Pressure Roller
Hot Roller
Thermostat
Thermistor
Fusing Lamp
Pressure Spring
The pressure roller has a cleaning roller
Thin-walled hot roller
See Image Fusing and Paper Exit in the FSM for more details
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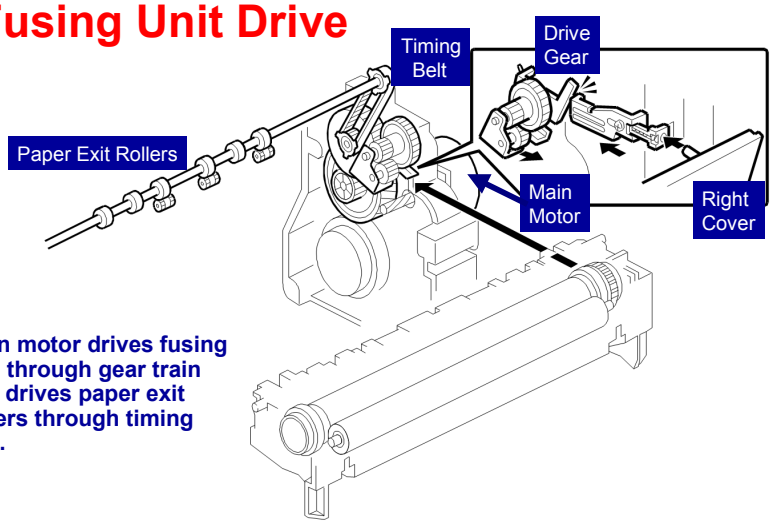
Fusing Unit Drive



- Main motor drives fusing unit through gear train and drives paper exit rollers through timing belt.
  - Fusing unit drive gear disengages when the cover is open for easier jam removal
  - See *Fusing Unit Drive and Release Mechanism* (in the FSM) for details on mechanical components.

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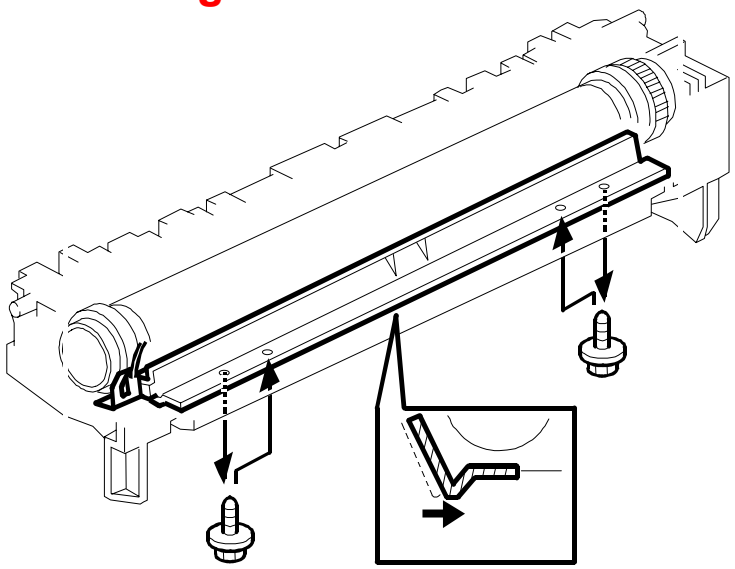
Fusing Entrance Guide Shaft



- If the paper creases in the fusing unit, move the guide to the right.

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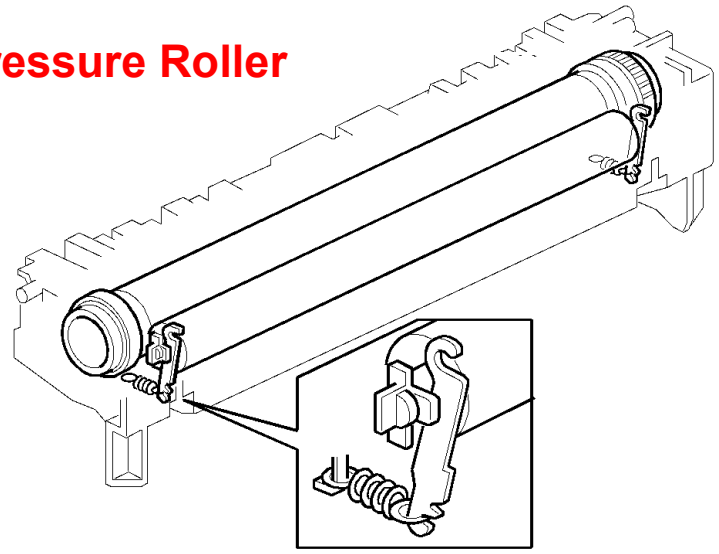
Pressure Roller



- The springs apply pressure between the hot roller and the pressure roller.
- The springs can be moved.
  - The default position is at the end.

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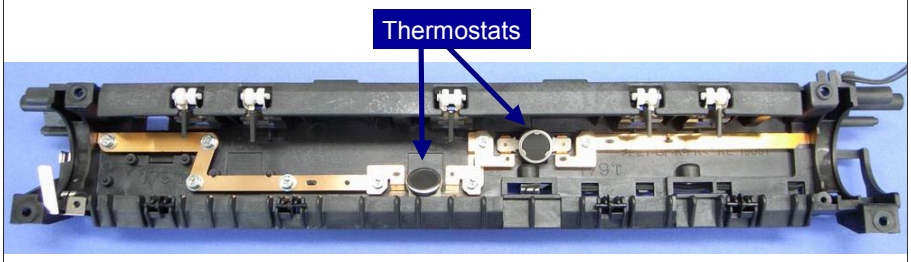
Fusing Temperature Control



- The machine checks the thermistors once every 1.5 seconds.
- The machine compares the current and previous readings, and the target, and decides how long to keep the lamp on during the next second.

See *Fusing Temperature Control* in the FSM for more details.

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Fusing Lamp Power Supply

- **Soft Start: Full power is applied to the fusing lamp gradually, not all at once**
  - The machine gradually allows more power to the fusing lamp over a number of zero-cross cycles of the ac supply.

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Room Lighting Affects

- **Caused by starting and stopping fusing lamp power every second**
  - SP 1108: Reduce room fluorescent light flicker by inputting a larger value.
    - » Note that BICU may be unable to detect fusing lamp errors if the cycle is more than 2 seconds.

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Poor Fusing on the First Few Copies

- If the room is cold, the hot roller may not stay hot for very long after reaching the print ready temperature.
- This program decides the action of the Fusing Drive Release Mechanism. When you select "1," the contact/release control is disabled and the drive power is always transmitted to the fusing unit. As a result, the machine takes a longer time to warm up the fusing unit. Use SP 1103-1 if fusing quality is low even when the room temperature is not very low.

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Offset when Making Many Copies on Narrow Paper

- **Target fusing temperature lowered by 10°C**
  - If the smallest copy paper width detected during a 40-second interval is less than 220 mm.
- **Target fusing temperature lowered by another 5°C**
  - If, during the next 80 seconds, the smallest width detected is again less than 220 mm.

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Overheat Protection

- **This machine has three features to protect the machine from overheating.**
  - The first feature normally protects the hardware.
  - The second feature works as the failsafe feature for the first feature.
  - The third feature works as the failsafe feature for the second feature.

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SP Modes

- **SP 1103: Fusing idling on/off**
- **SP 1105: Fusing unit temperatures**
- **SP 1106: Displays the current fusing unit temperature**
- **SP 1107: Fusing soft start adjustment**
- **SP 1108: Specifies the interval for fusing-temperature control (1, 1.5, or 2 seconds)**
- **SP 1109: Nip band width adjustment**
- **SP 1902: Display-AC Freq.**
  - Displays the fusing lamp power control frequency (as detected by the zero cross signal generator). The displayed value is 1/5 the actual frequency: 10 = 50 Hz, 12 = 60 Hz.

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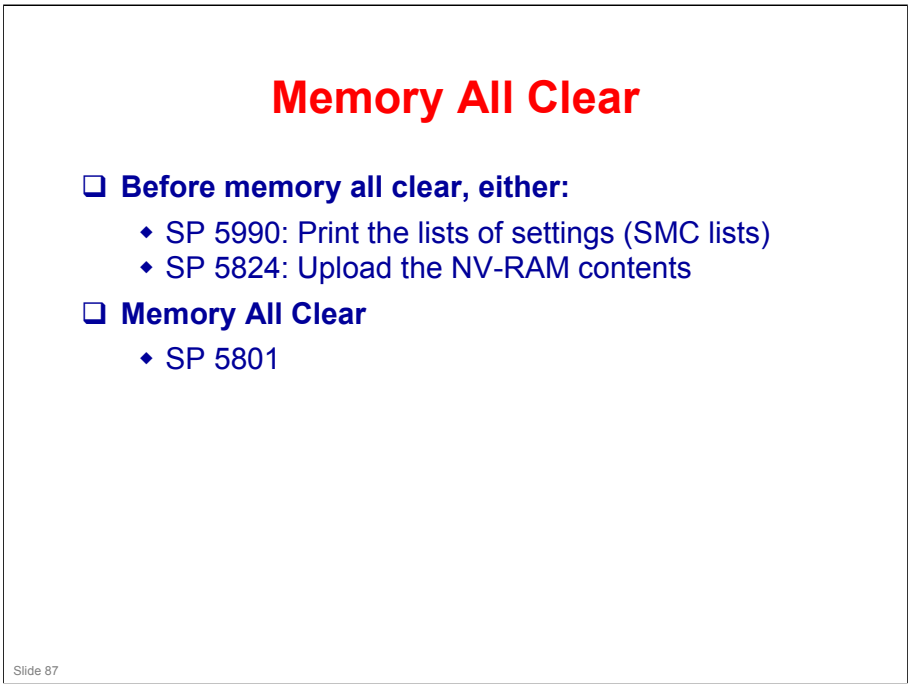
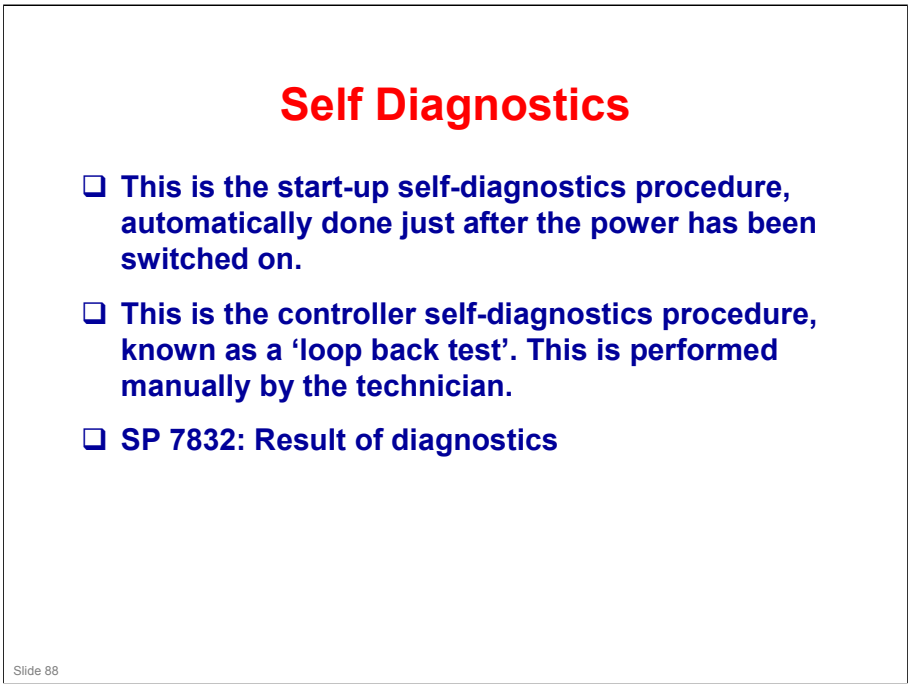


More on Memory Clear

- This is only done after replacing the NVRAM or recovering from NVRAM problems.
  - The NVRAM will have to be replaced if you want to install a new total counter in the machine.
  - Note that after installing a new NVRAM, you can copy the contents of the old NVRAM from a flash memory card using SP 5825.
- The procedures are in the FSM.



More on Self Diagnostics

- Just after the main power is switched on, the machine runs a diagnostic check.
- This test can also be executed at any time, by using the 'loopback test' procedure
- This section shows how the machine carries out the self diagnostic tests, and how the machine behaves if a test fails.
- Power-up Diagnostics: The power-up diagnostics are done automatically every time the machine is switched on.
- Loopback test: The detailed diagnostics require a loopback connector, and must be started by the technician.

System Troubleshooting

Electrical component defect table: See *Electrical Component Defects* in the FSM

Blown fuse table – see: *Blown Fuse Conditions* in the FSM

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SP Modes - Symptom Troubleshooting - 1/3

- **SP 1103: Fusing idling enable/disable**
  - Enable if fusing on the first two copies is incomplete
- **SP 1108: Fusing temperature control cycle**
  - Increase if the user complains about flickering room lights. However, fusing lamp errors may not be detected.
- **SP 1903: Re-energizes the feed clutch**
  - Increase the value if jams occur when feed restarts after registration]
- **SP 2213: Number of copies after near-end**
  - If the user makes a lot of copies with a high proportion of black, reduce this setting.
  - Also you can try increasing the value of SP 2922 and/or SP 2925

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SP Modes - Symptom Troubleshooting - 2/3

- **SP 2301: Transfer current**
  - SP 2301 1-2: Increase if thicker paper than normal is used in the paper trays
  - SP 2301 3: Increase if there is poor image transfer on side 2 of duplex copies
  - SP 2301 4: Increase if there is dirty background on the rear side
    - » SP 2996: Enable this if there is dirty background on the reverse side of the first copy of a job. The transfer roller will be cleaned before each job. The job will take slightly longer.
- **SP 2802: Developer mixing**
  - Use this to prevent dirty background when the machine has not been used for a long time.

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SP Modes - Symptom Troubleshooting - 3/3

- **SP 2906: 'Tailing' correction**
  - Adjust this if there are ghosts of thin vertical lines further down the page from where the vertical lines on the image stop.

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SP Modes - Tests

- SP 1007: By-pass paper size sensor output display
- SP 4902: Exposure lamp on
- SP 5001: Operation panel indicators on
- SP 5803: Input tests
- SP 5804: Output tests
- SP 5902: Test pattern printout

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SP Modes - Free Runs

- SP 4013: Scanner (with lamp on)
- SP 5802: Scanner and printer
- SP 5901: Printer

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More on User Tools

- This is a list of user tools that are related to troubleshooting.
- Prt Err Report, Memory Overflow: If these user tools are enabled, the machine prints error reports if an error occurs during printing.

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End of Course

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