

RICOH

Rinmei-P1 / M012/M013 / P1a/P1b
/ SP 3400N/SP 3410DN

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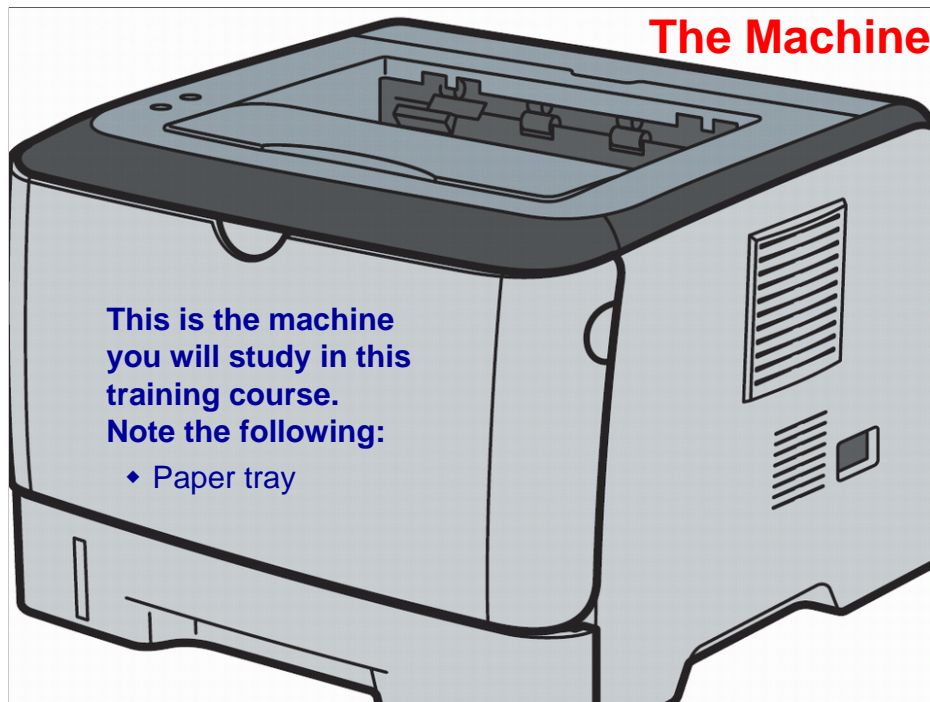
M012/M013
Service Training
Product Outline
RN-P1a / P1b

Slide 1

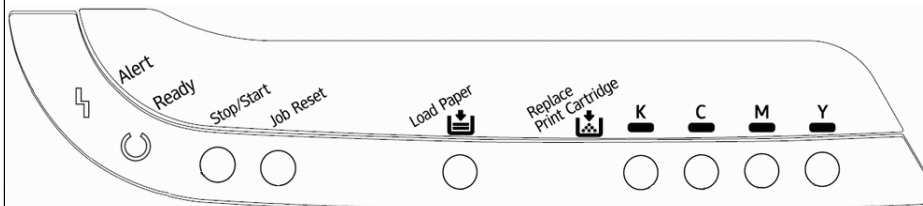
Version - 0.1.5

Most recently updated November 2009

The Machine



Operation Panel

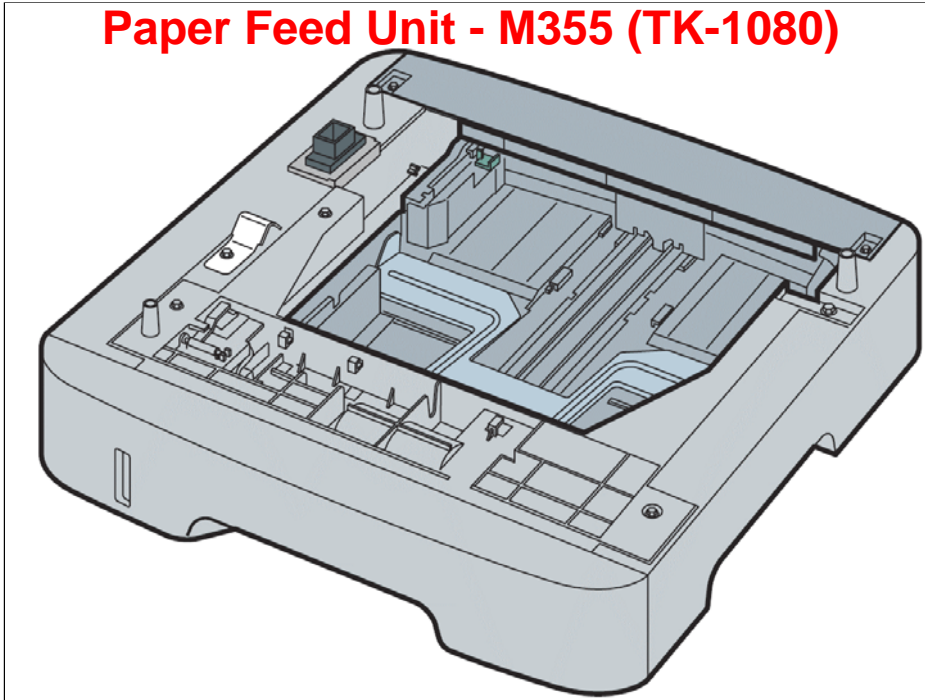


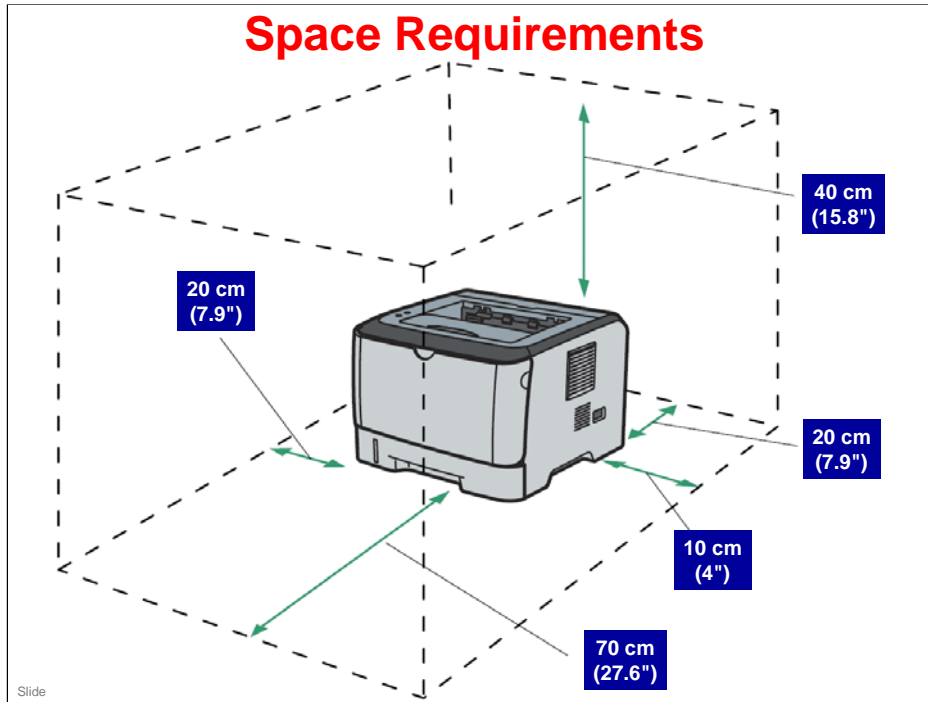
Go to the machine and have a look at the operation panel.

- ◆ (Depending on the region and model, the appearance of the control panel may differ slightly from the above image.)
- ◆ See Operating Instructions (and any other relevant documentation) for more details.

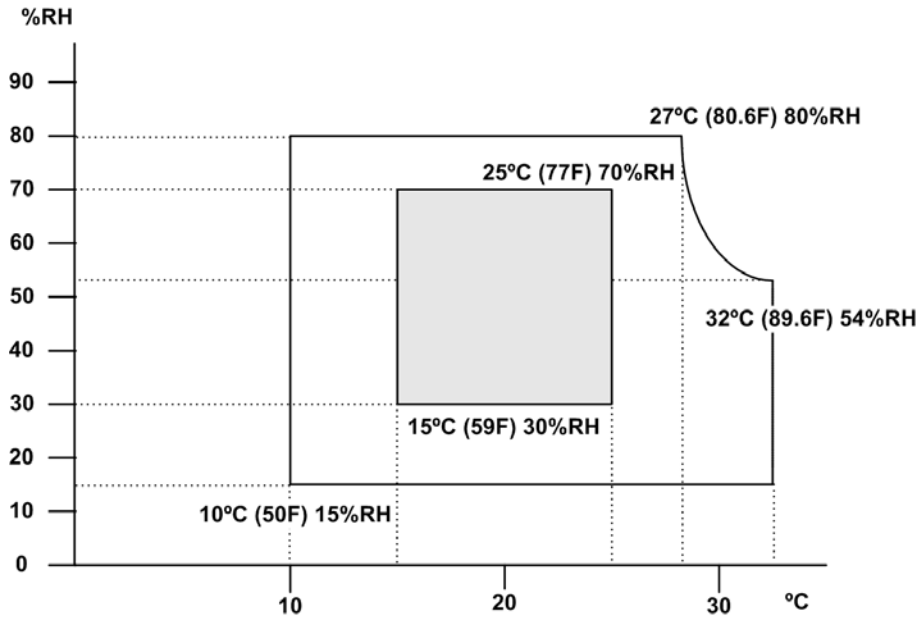
Slide 3

Paper Feed Unit - M355 (TK-1080)



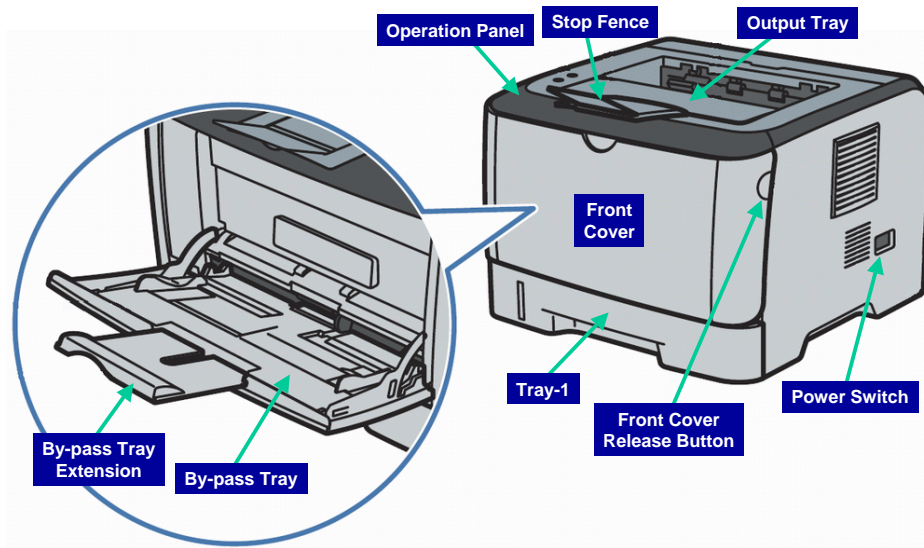


Temperature & Humidity Recommendations



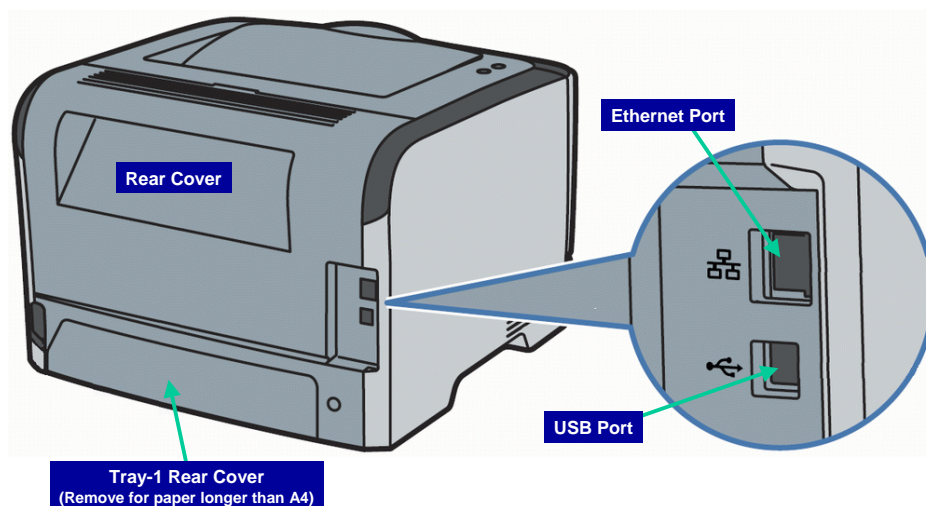
RH – Relative Humidity

Introduction to Machine - 1/3



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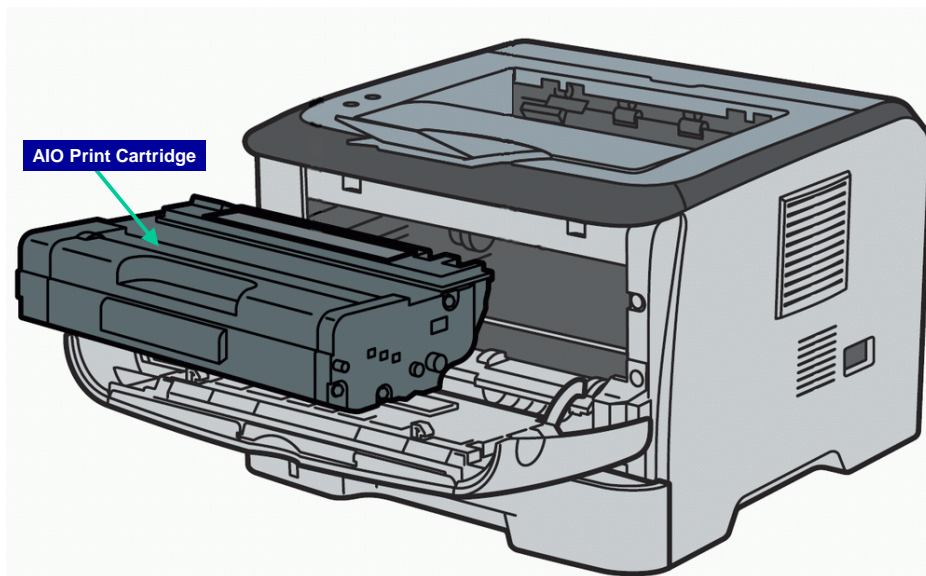
Introduction to Machine - 2/3



- ❑ Rear view of machine.

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Introduction to Machine - 3/3



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M012/M013
Service Training
Specifications

Slide 10

General Specifications - 1/3

- ❑ **Print Process**
 - ◆ Laser electrostatic transfer
- ❑ **Warm-up time**
 - ◆ Less than 30 seconds (23 C / 71.6 F)
- ❑ **Paper Output Capacity**
 - ◆ Standard 125 sheets
- ❑ **Paper Input Capacity**
 - ◆ Tray-1 - 250 sheets (100 postcards)
 - ◆ Tray-2 (optional) - 250 sheets
 - ◆ By-pass tray - 50 sheets (20 postcards, 8 envelopes)
- ❑ **ADF Capacity**
 - ◆ 35 sheets

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General Specifications - 2/3

- ❑ **Memory - 128 MB**
- ❑ **Power Consumption**
 - ◆ Maximum power consumption
 - » NA/TW: Less than 850 W
 - » EU/AP/CN: Less than 880 W
 - Energy Star Compliant
 - ◆ Power Save mode
 - » 70 W (Energy Saver mode 1)
 - » 5 W (Energy Saver mode 2)
 - ◆ Energy Saver mode
 - » 1 to 240 minutes
 - Selectable in 1-minute increments
- ❑ **Machine Dimensions (W x D x H)**
 - ◆ 370 x 392 x 262 mm (14.5 x 15.4 x 10.3 inches)
- ❑ **Weight (machine body with consumables)**
 - ◆ M012 - 11.6 kg (25.6 lb.)
 - ◆ M013 - 12.5 kg (27.6lb.)
 - » Figures for both models not including AIO cartridge.

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General Specifications - 3/3

- ❑ **Printing Speed - (at 600 d.p.i.)**
 - ◆ One-sided
 - » 28 ppm (A4) / 30 ppm (Letter)
 - ◆ Duplex (M013 only):
 - » 14 ppm (A4) / 15 ppm (Letter)
- ❑ **Resolution**
 - ◆ 600 d.p.i.
 - » Maximum: 1200 x 600 d.p.i.
- ❑ **First Print Speed**
 - ◆ Eight seconds or less
 - » A4 / Letter at 600 x 600 d.p.i.
- ❑ **Interface**
 - ◆ Ethernet (10 Base-T, 100 Base-TX)
 - ◆ USB 2.0
- ❑ **Printer Language**
 - ◆ PCL 6, PostScript 3
- ❑ **Network Protocol**
 - ◆ TCP / IP, IPP

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Options

❑ Paper Feed Unit TK1080

- ◆ Paper capacity
 - » 250 sheets
- ◆ Dimensions (W x D x H)
 - » 420 x 397 x 89 mm (16.6 x 18.7 x 3.5 inches)
- ◆ Weight
 - » Less than 2.4 kg (5.3 lbs.)

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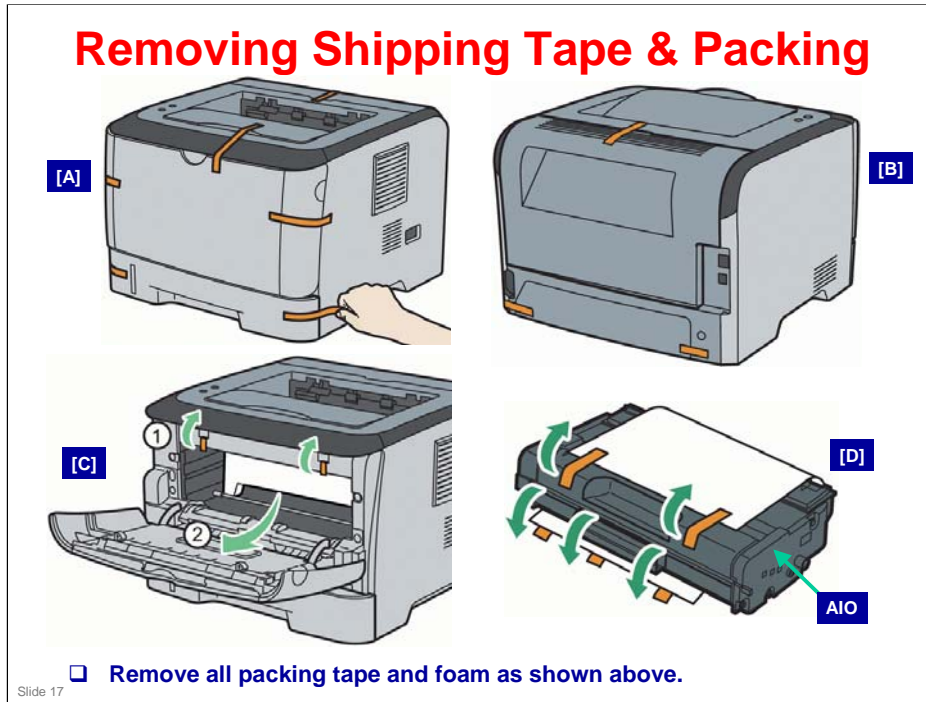
M012/M013
Service Training
Installation

Slide 15

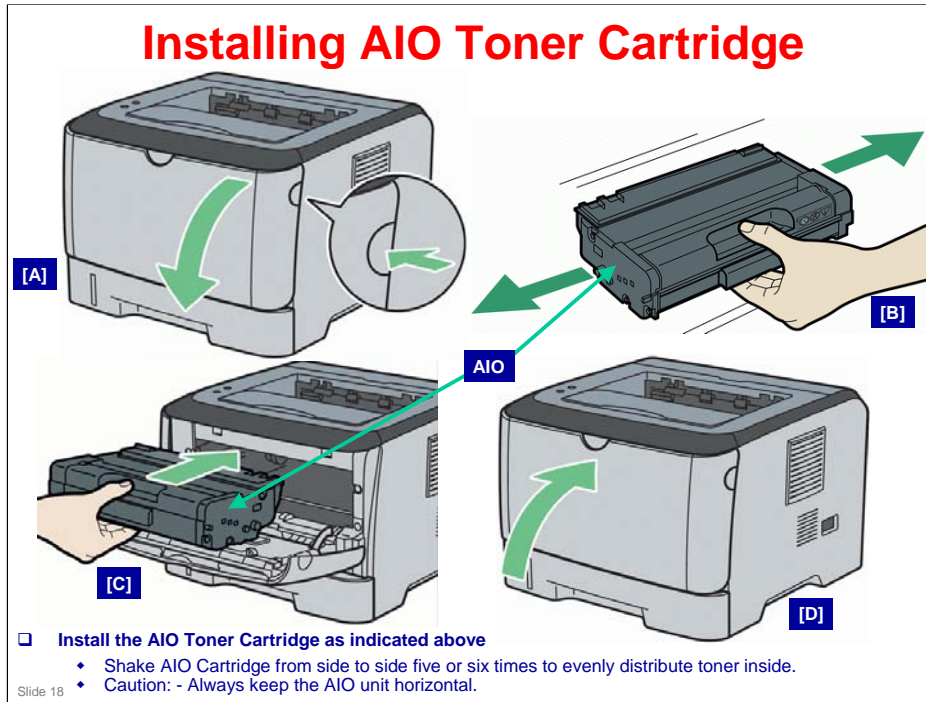
Installation (Warning)

- ❑ As a safety precaution, the power cord should be close to the machine and positioned so that power can be quickly cut by unplugging the machine.
- ❑ Note: For detailed operation of SOM (Smart Organizing Monitor) see: Note to Administrator documentation.

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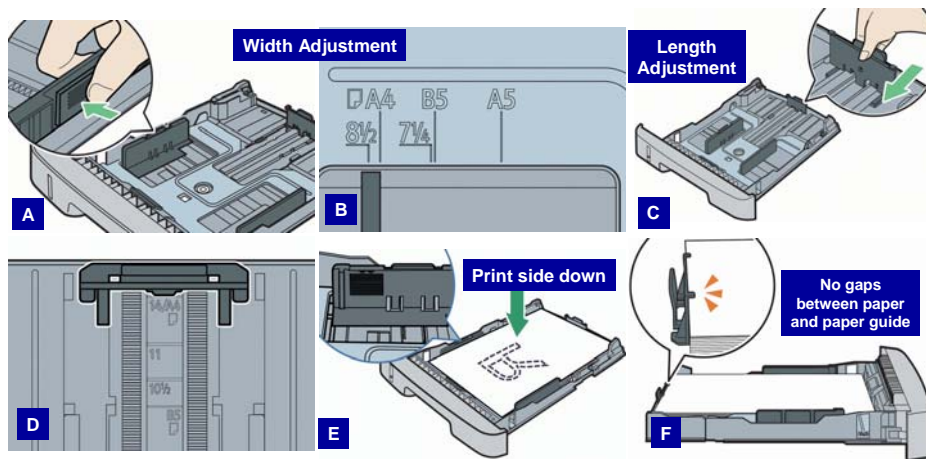


PowerPoint Usage Note: Graphics on this page independently imported, and then grouped. By ungrouping, the individual images can be independently adjusted.
AIO – All In One



PowerPoint Usage Note: Graphics on this page independently imported, and then grouped. By ungrouping, the individual images can be independently adjusted.
AIO – All In One

Loading Paper

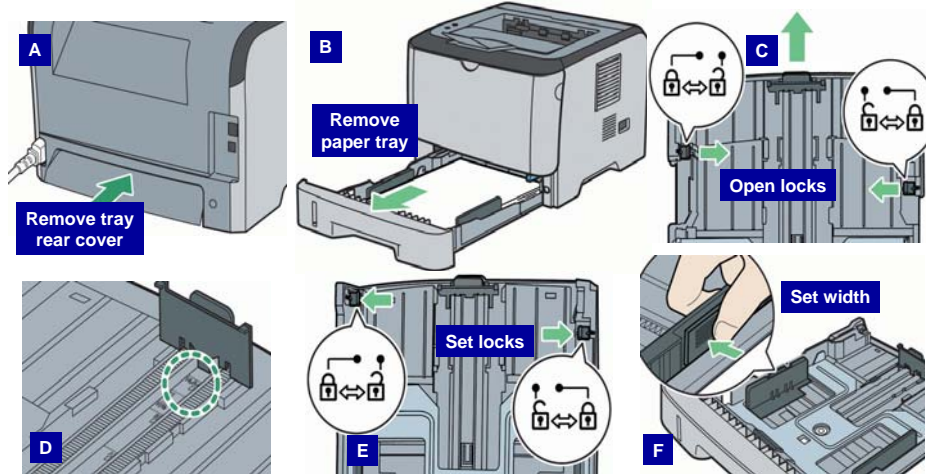


- Set correct width and length adjustments when loading paper into paper tray(s).

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PowerPoint Usage Note: Graphics on this page independently imported, and then grouped. By ungrouping, the individual images can be independently adjusted.

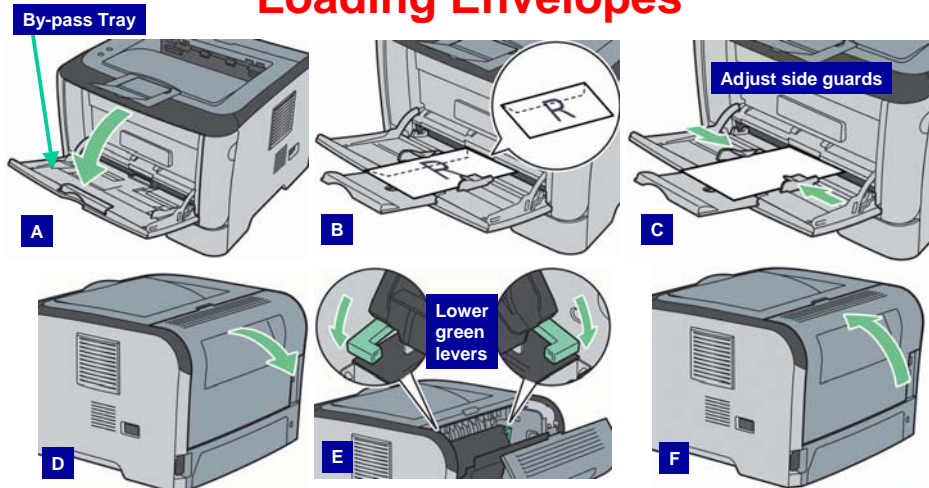
Loading Legal Size Paper



- ❑ [A] - Tray Rear Cover must be removed to accommodate the length of paper tray with Legal size paper loaded.
- ❑ [D] - After extending tray, verify that extender's inner surface and scale are aligned.

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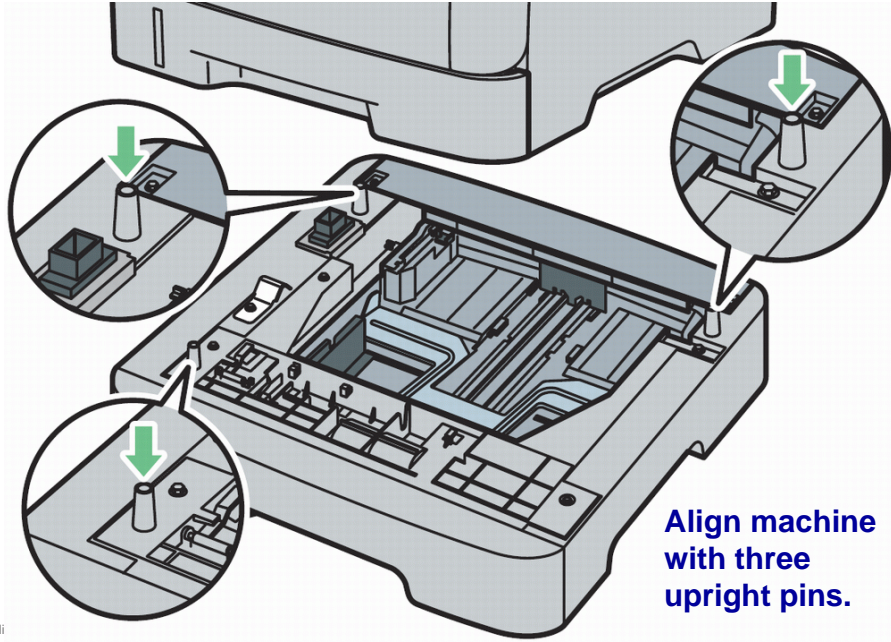
Loading Envelopes



- **Note: When printing on envelopes, lower green levers (inside rear cover) to prevent envelopes from coming out creased.**
 - ◆ Remember to return green levers to original position before printing on regular paper again.

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Paper Feed Unit - M355 (Installation)



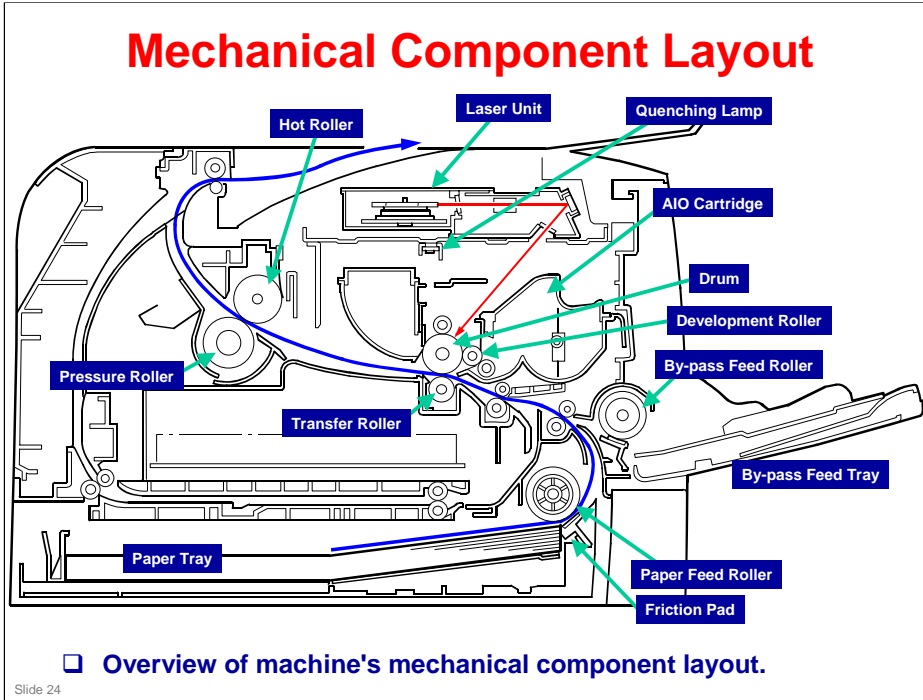
Sli

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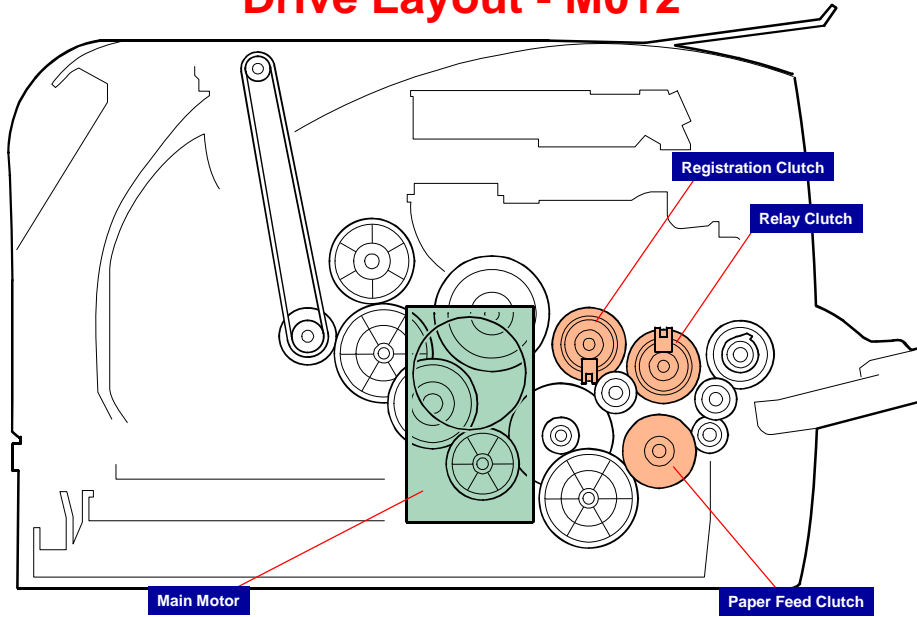
M012/M013
Service Training
Machine Overview

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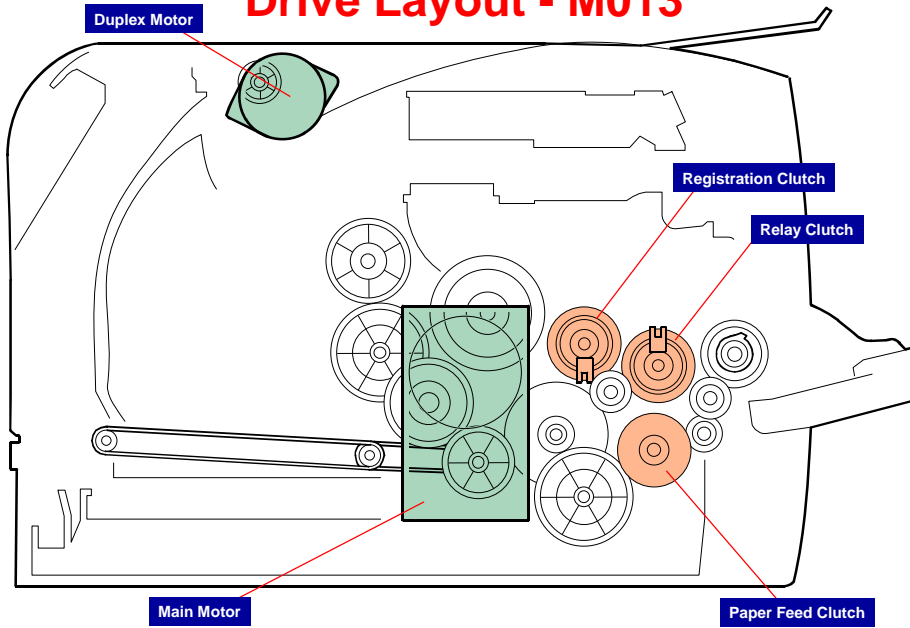
Mechanical Component Layout



Drive Layout - M012

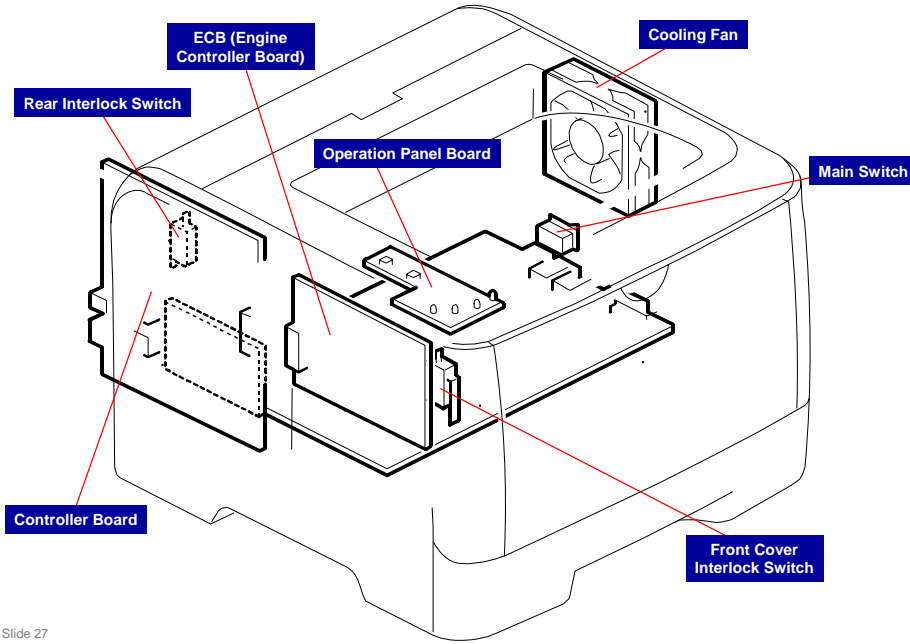


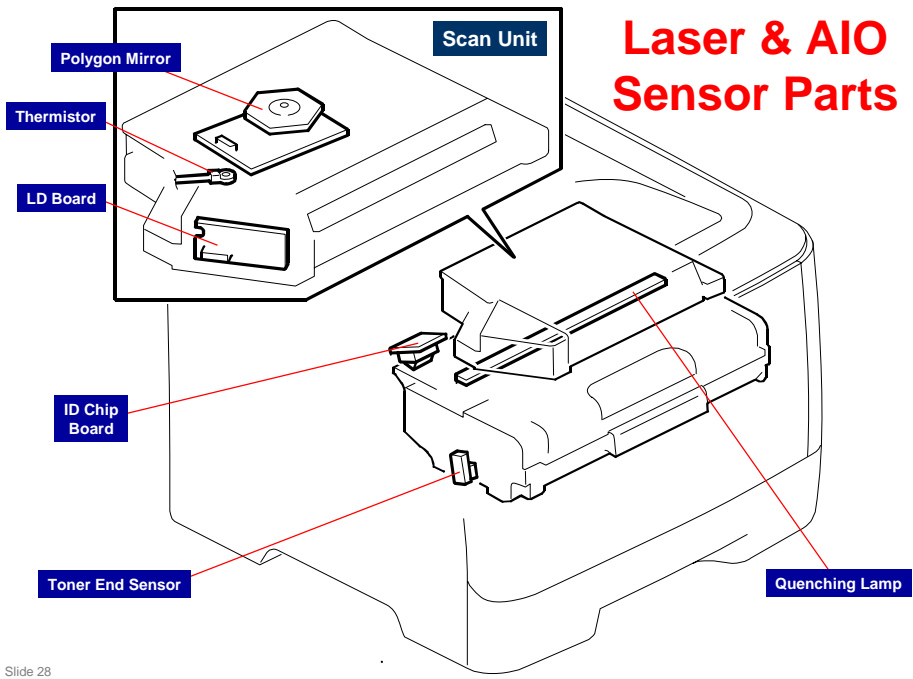
Drive Layout - M013



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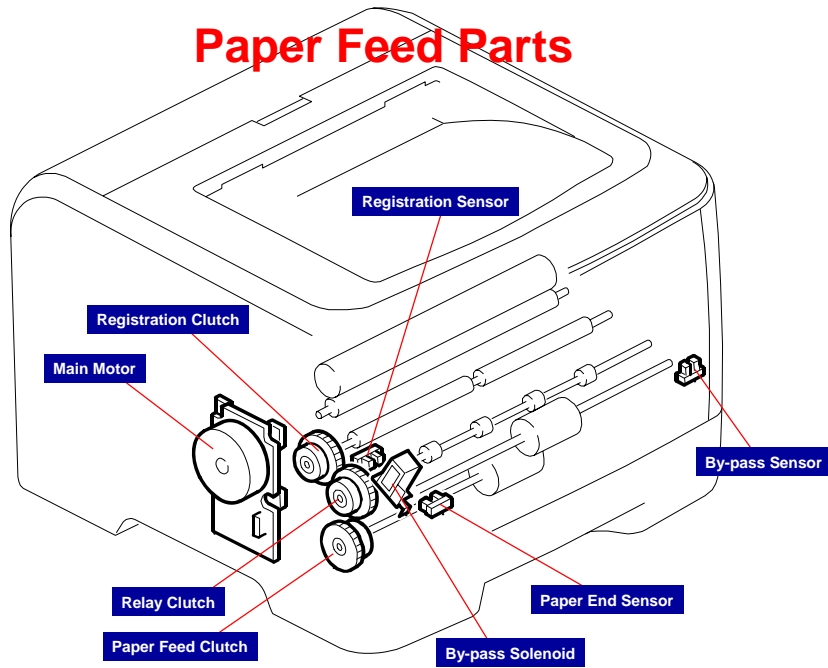
Main Boards





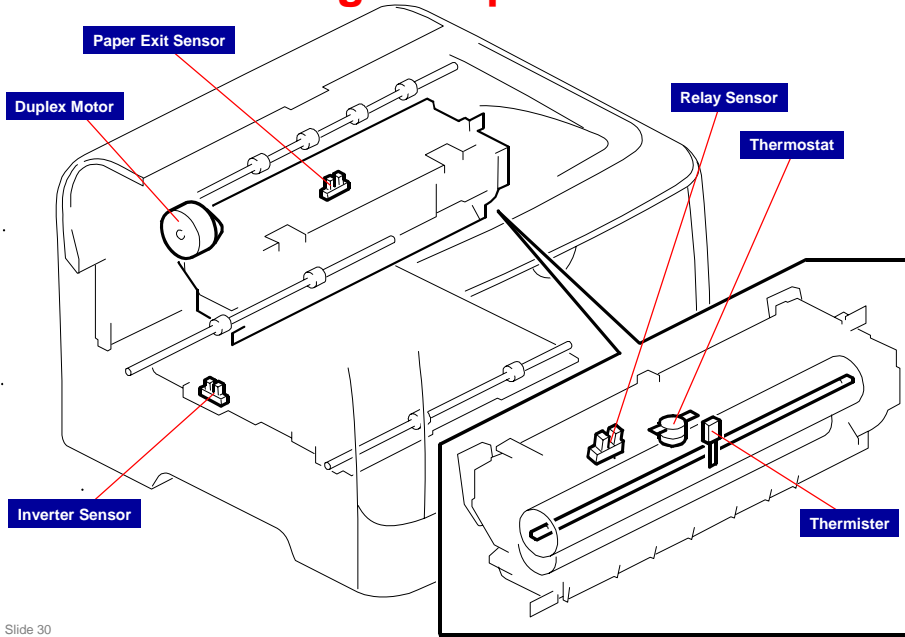
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Paper Feed Parts



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Fusing & Duplex Parts



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Yield Parts

Configuration Page

Print Cartridge	
Transfer Roller	
Paper Feed Roller	
Fuser Unit	

- There are no PM parts for this machine, but there are "yield parts".
- Configuration page printout includes above graph.
- Yield parts are as follows:
 - ◆ Paper Feed Roller
 - » Expected yield: 120 K prints
 - ◆ Transfer Roller
 - » Expected yield: 120 K prints
 - ◆ Fusing Unit
 - » Expected yield: 120 K prints

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Exterior Cover Removal

□ For details on exterior cover removal, see following sections of service manual:

- ◆ Front Cover
- ◆ Left Cover
- ◆ Rear Cover
- ◆ Right Cover
- ◆ Top Cover
 - » When re-installing top cover, always verify that two paperweights are lifted. If not lifted to fit into paper slot, paperweights could be damaged.
 - » Make sure that these paperweights can be moved smoothly (up and down) after installing top cover. If paperweights do not move smoothly, try installing top cover again.
- ◆ Operation Panel

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Paper Feed & Exit

□ For full details on the following, see "Paper Feed and Exit" in FSM.

- ◆ Paper Feed Roller
 - » After installing a new paper feed roller:
 - Enter "Printer Configuration" in SOM.
 - Select "SP Mode 3" tab.
 - Click "Clear Paper Feed Roller EM Counter" and then click "OK".
 - Exit SOM (Smart Organizing Monitor).
- ◆ Friction Pad
- ◆ Paper End Sensor
- ◆ By-pass Feed Roller
- ◆ By-pass Feed Roller Friction Pad
- ◆ By-pass Feed Sensor
- ◆ Paper Feed Clutch
- ◆ Relay Clutch
- ◆ Registration Clutch
- ◆ Toner End Sensor
- ◆ Paper Exit Sensor
- ◆ Relay Sensor
- ◆ Inverter Sensor
- ◆ Registration Roller and Sensor

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SOM - Smart Organizing Monitor

EM - Emergency Maintenance

Paper Transfer

□ For full details on Paper Transfer, see service manual.

◆ Transfer Roller

- » After installing a new transfer roller:
 - Enter "Printer Configuration" in SOM.
 - Select "SP Mode 3" tab.
 - Click "Clear Transfer Roller EM Counter" and then click "OK".
 - Exit SOM (Smart Organizing Monitor).

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SOM - Smart Organizing Monitor

EM - Emergency Maintenance

Fusing

□ For full details on the following Fusing details, see FSM.

- ◆ Fusing Unit
- ◆ Reinstallation
 - » After installing a new fusing unit
 - Enter the "Printer Configuration" in SOM.
 - Select "SP Mode 3" tab.
 - Click "Clear Fusing Unit EM Counter" and then click "OK".
 - Exit the SOM (Smart Organizing Monitor).
- ◆ Thermostat
- ◆ Thermistor
- ◆ Fusing Lamp
 - » When reinstall the fusing lamp
 - Flat terminal side of lamp must be placed on right side of fusing unit (fusing cable side).
- ◆ Hot Roller
- ◆ Pressure Roller
- ◆ Hot Roller Stripper Pawls

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Motors

- For more details on the following, see "Motors" in the service manual.
 - ◆ Main Motor
 - ◆ Duplex Motor (For M013)

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▪

Electrical Components

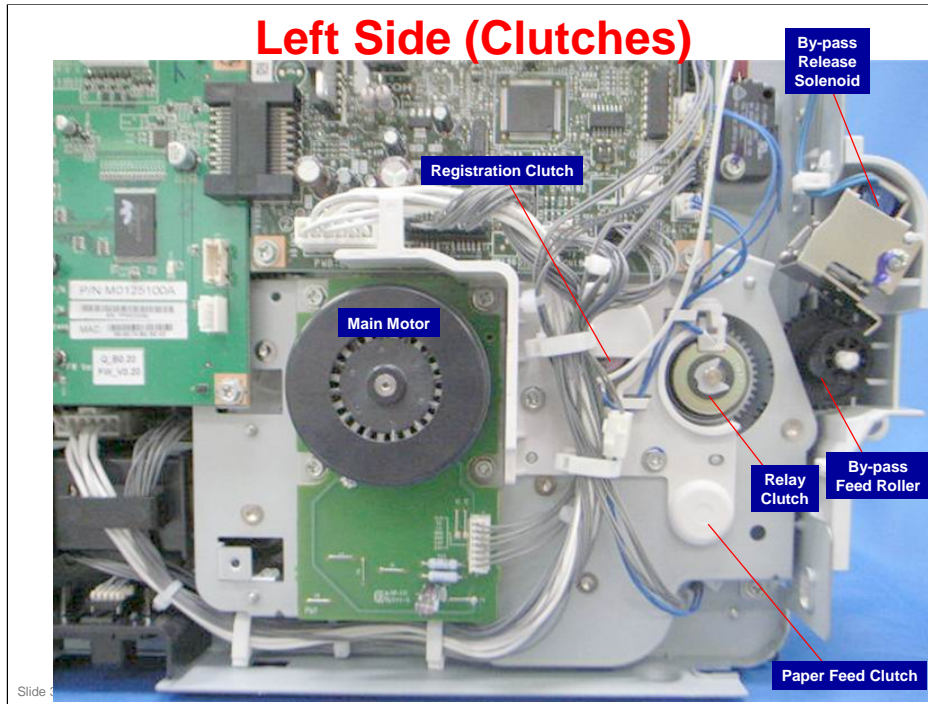
- For more details on the following, see "Electrical Components" in the service manual.
 - ◆ Layout of PC Boards
 - » ECB (Engine Controller Board)
 - » EEPROM
 - » Controller Board
 - ◆ PSU
 - ◆ Charge Terminal Case
 - ◆ Cooling Fan
 - ◆ Quenching Lamp

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SOM - Smart Organizing Monitor

- **For more details on the following, see "Smart Organizing Monitor" in the service manual and also "Note to Administrator" documentation.**
 - ◆ Overview
 - ◆ Printer Driver Installation (USB Connection)
 - ◆ Entering the Printer Configuration
 - ◆ Printer Configuration Menu List
 - » Paper Input
 - » Maintenance
 - » System
 - » Network 1
 - » Network 2
 - » Network 3
 - » Printer
 - » SP Mode 1
 - » SP Mode 2
 - » SP Mode 3

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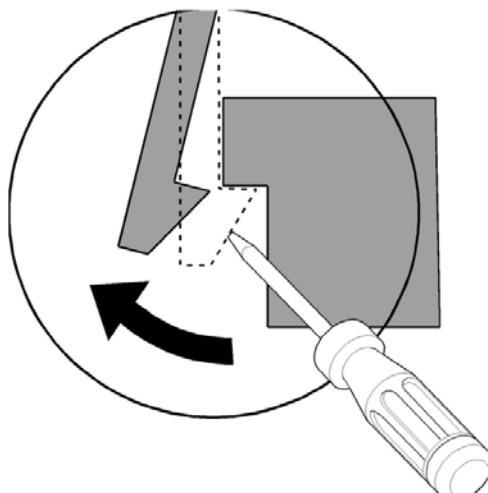
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M012/M013
Service Training
Cover Removal & Part Replacement

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General Precautions

Releasing Plastic Latches

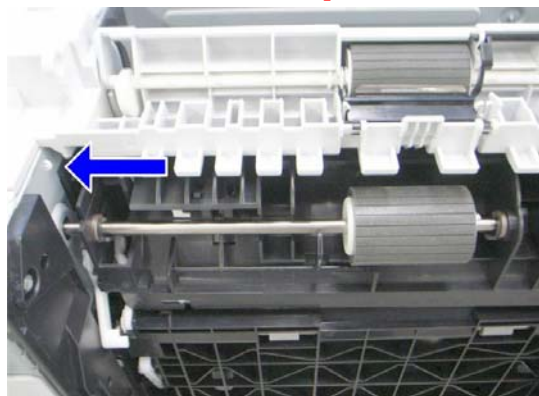


- Many of the parts are held in place with plastic latches which can break easily. Release them carefully, pushing the hook end of the latch away from the part to which it is latched.

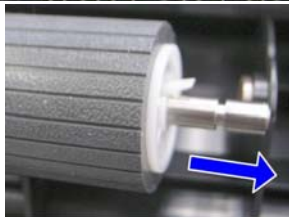
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For more details, see “General Precautions on Disassembly” in the Service Manual.

Paper Feed Roller



□ Slide Paper Feed Shaft to left.



□ Slide Paper Feed Roller to right.

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Paper Transfer Roller



- ❑ First, remove AIO.
- ❑ Then, remove Transfer Roller in direction of arrows.

Transfer Roller

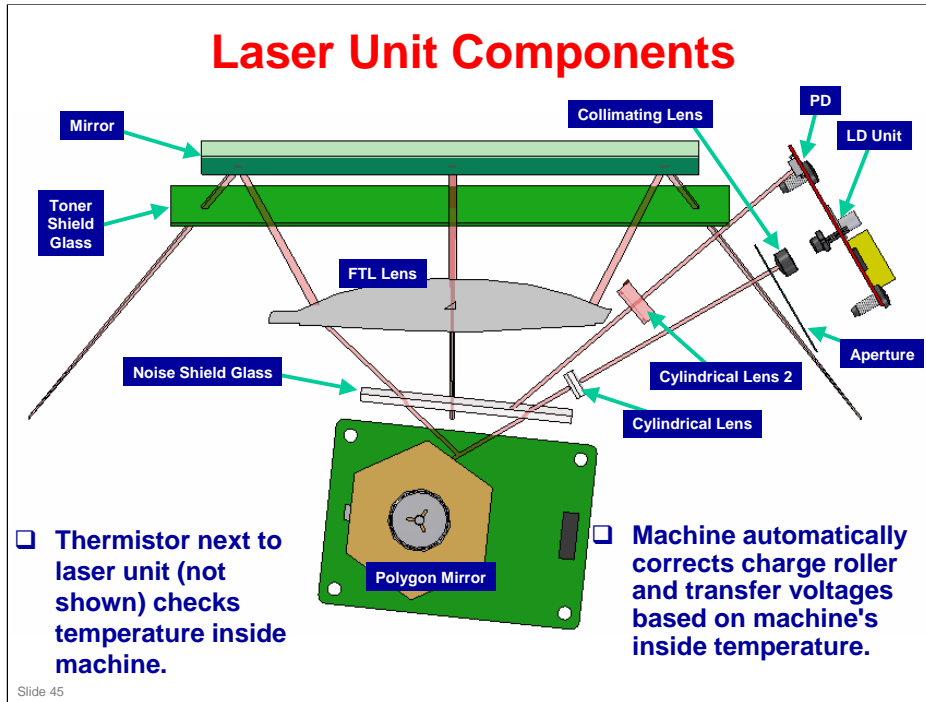


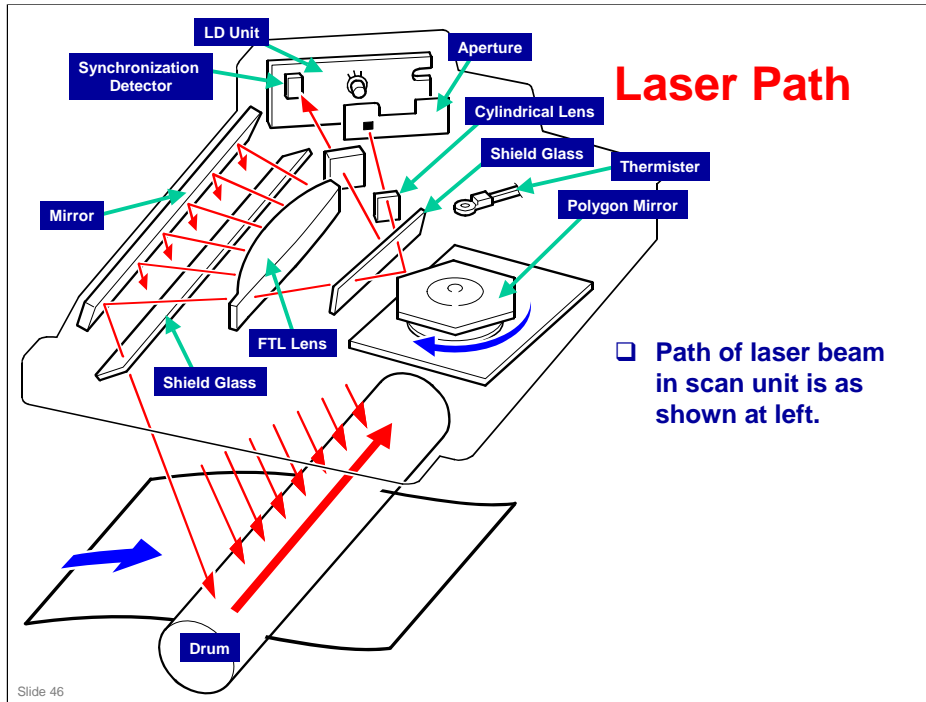
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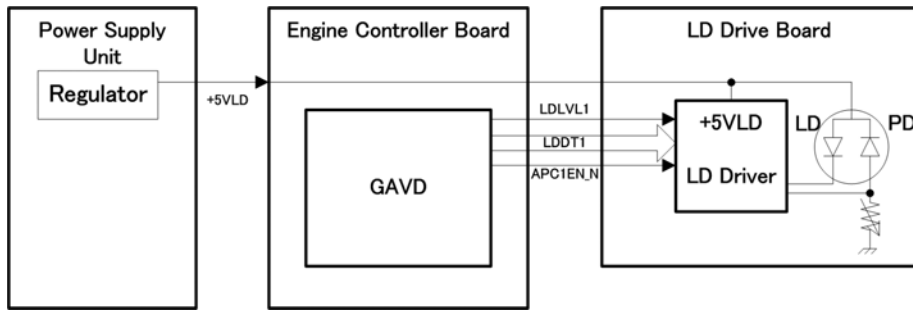
M012/M013
Service Training
Laser Exposure

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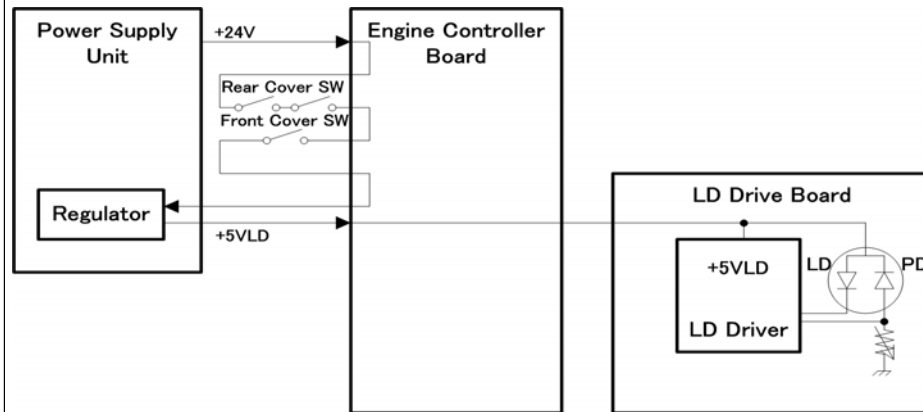
Automatic Power Control (APC)



- ❑ **LD driver on LD drive board automatically controls power for laser diodes.**
 - ◆ Laser diode power is adjusted at factory.
- ❑ **Note: Never touch variable resistors on LD unit in field.**

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LD Safety Mechanisms



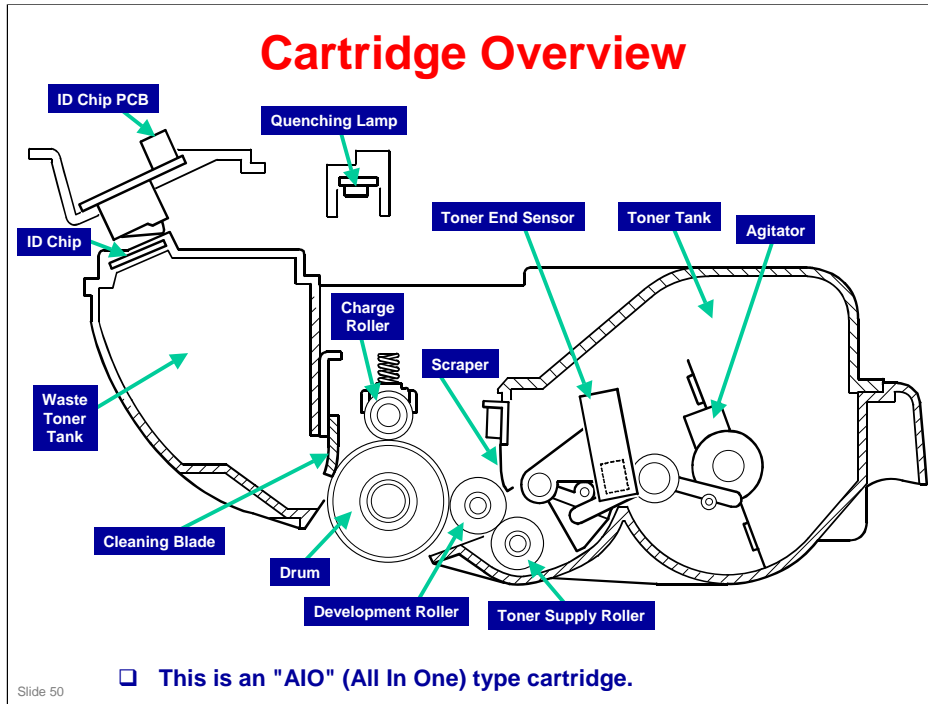
- Laser Safety Switch
- There are safety switches on front and rear covers which stop laser while cover is open.
- If user opens one of these covers, the +5VLD power to laser diodes is stopped.

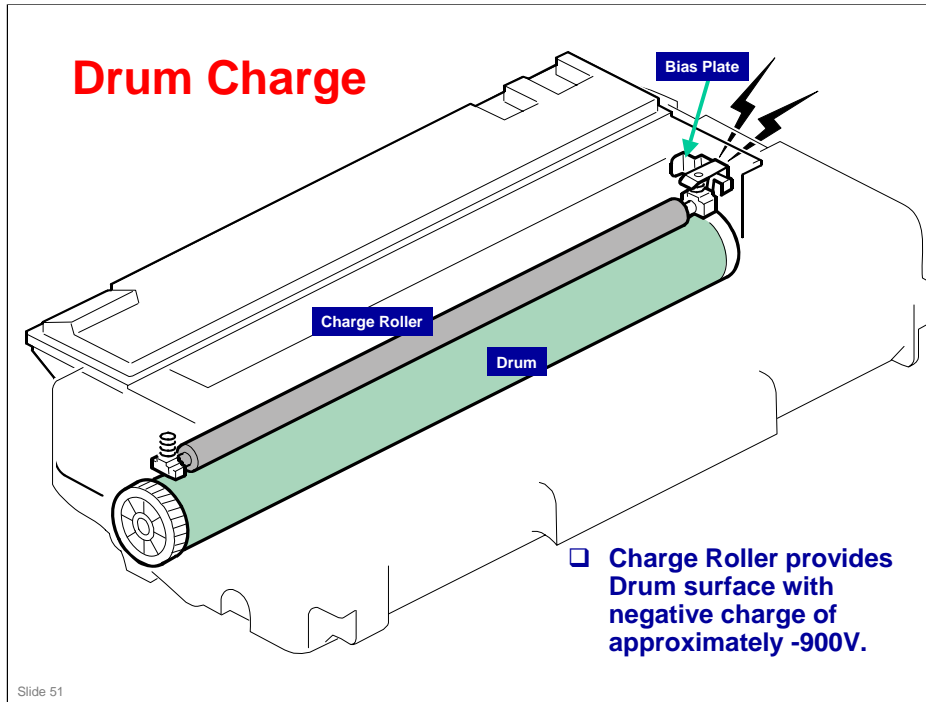
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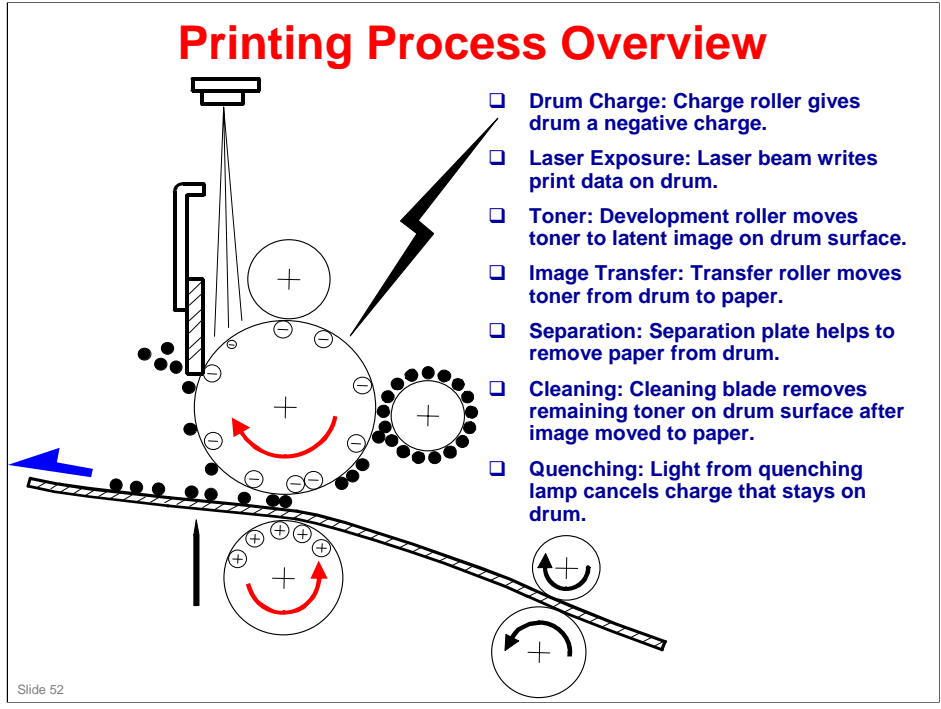
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M012/M013
Service Training
AIO (All In One print cartridge)

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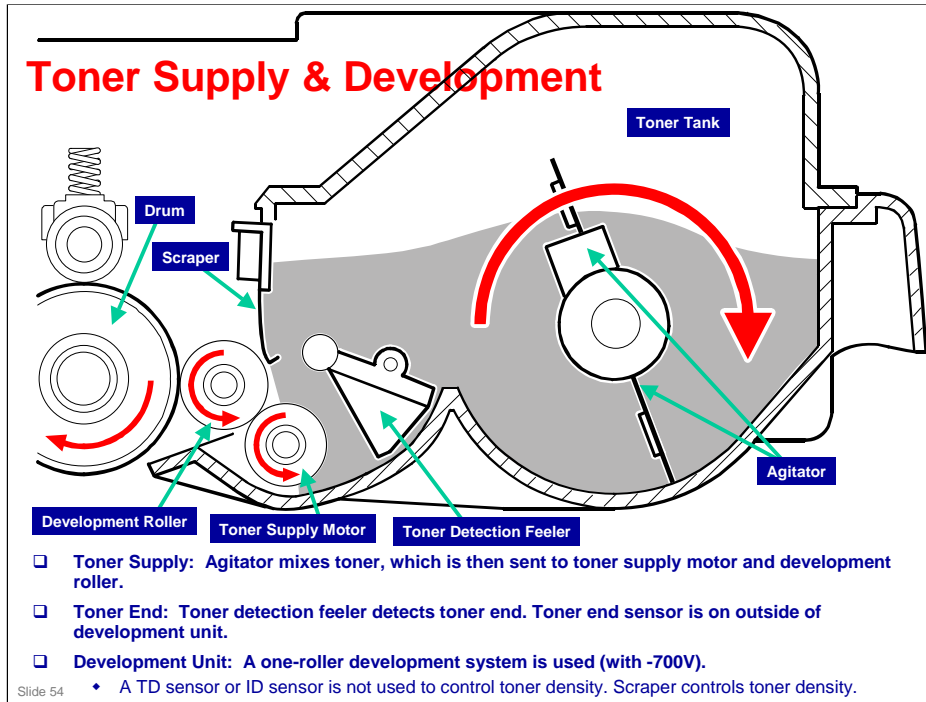


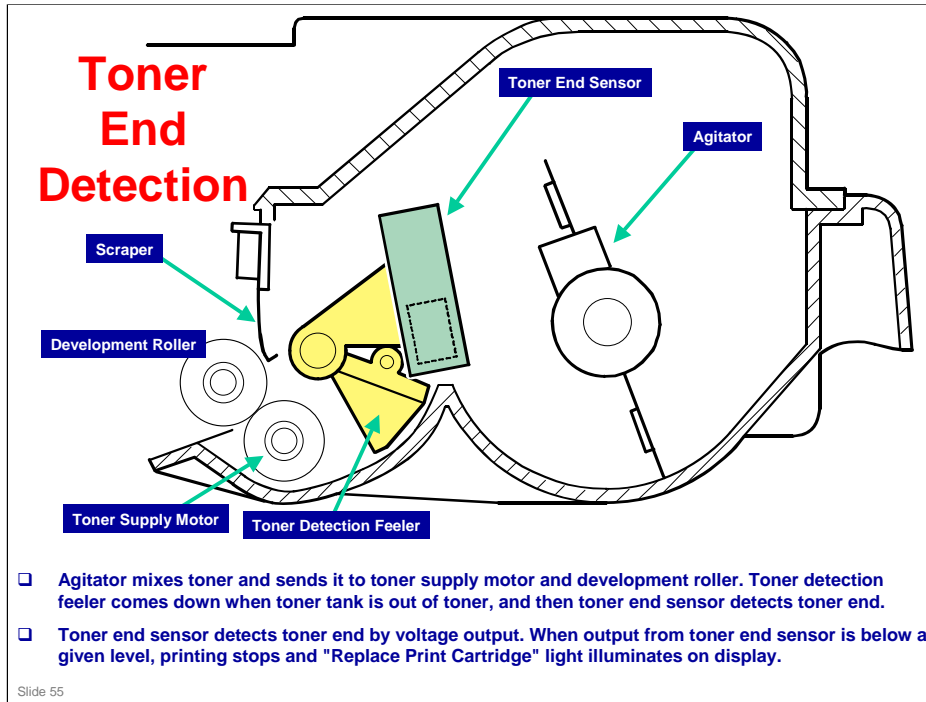


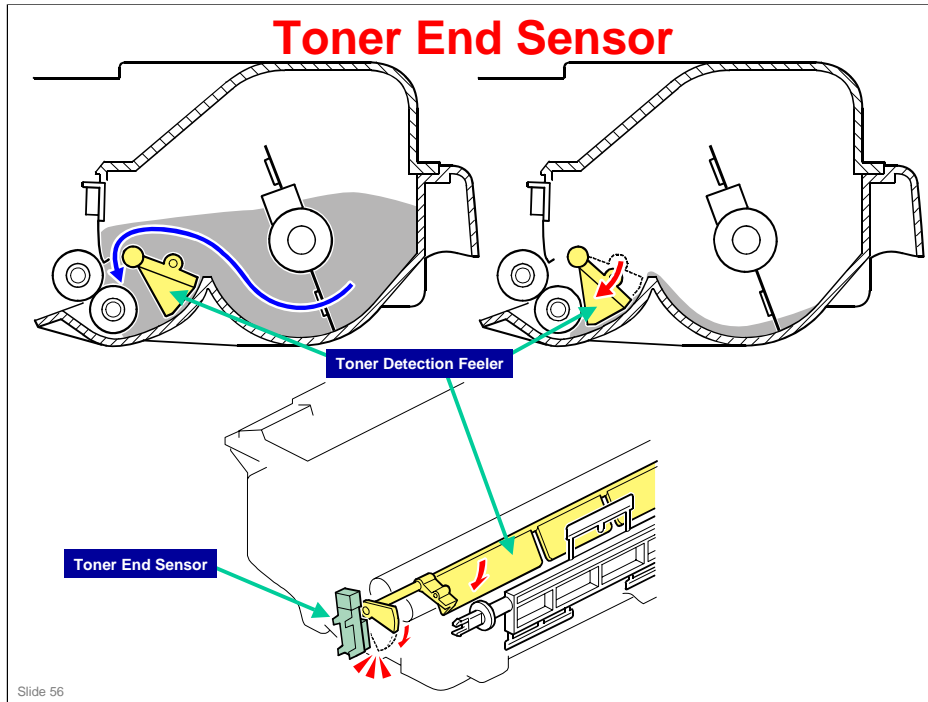
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M012/M013
Service Training
Toner Supply

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Toner Overflow Prevention - 1/2

□ Main Motor Rotation Count

- ◆ Time to replace AIO cartridge can also be determined by length of time main motor has been rotating.
- ◆ When toner end is detected, "Replace Print Cartridge" light illuminates on display.

□ Toner Overflow Prevention

- ◆ With main motor rotation count feature, machine can be set to stop printing after print total exceeds a certain set value.
- ◆ If print count exceeds this value, then "Replace Print Cartridge" light illuminates on display, and remains on until new AIO cartridge is installed.
- ◆ This feature is a safety measure to prevent the used toner tank from becoming full (there is no toner overflow detection mechanism).

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Toner Overflow Prevention - 2/2

- ❑ **Why do we need this feature?**
 - ◆ Normally, AIO is replaced by user at about 2K / 5K. But some users will refill old AIO with toner, and reuse. If this occurs, used toner tank will not be emptied. So there must be a way to stop users from repeatedly filling old AIO with fresh toner.
- ❑ **How does machine know if AIO is a new one?**
 - ◆ AIO has serial number information on a chip. The machine checks this number when AIO is placed in machine.
- ❑ **Why is this feature disabled?**
 - ◆ Ricoh does not support the practice of refilling old AIOs with fresh toner, so this feature is disabled by default. But if field service stations know that this practice occurs in their region, or they know a customer who is doing this, then they can enable this feature.

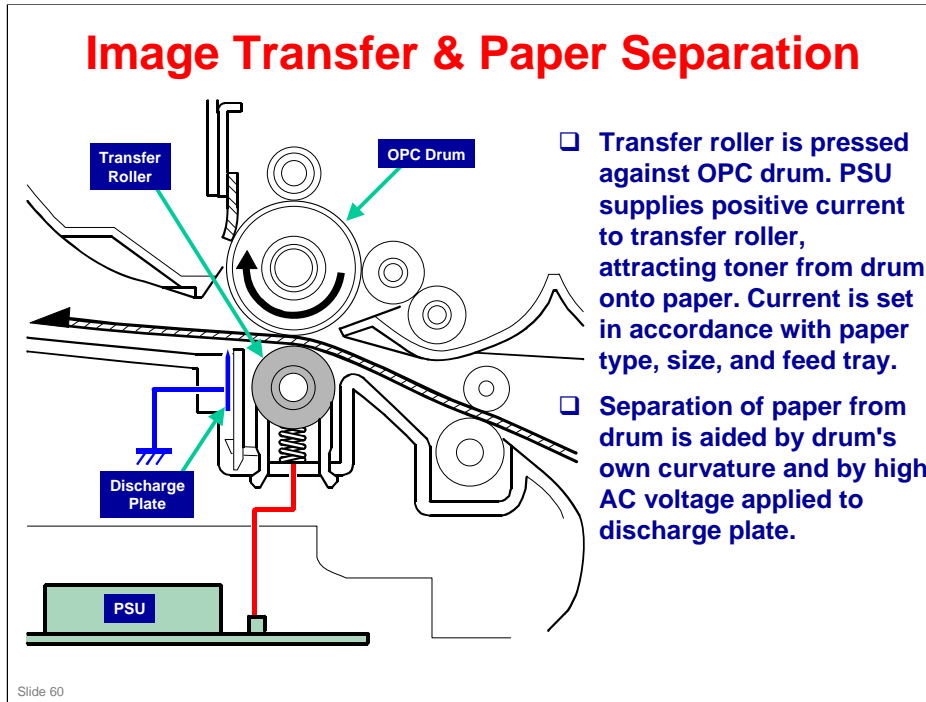
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AIO – All In One print cartridge.

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M012/M013
Service Training
Transfer & Separation

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OPC – Organic Photo-Conductor (drum)

PSU – Power Supply Unit

Image Transfer Current Timing

- ❑ **There are two transfer current levels: low and high.**
 - ◆ Low level: Before image transfer starts, PSU supplies +10uA to transfer roller to prevent positively charged toner from sticking to drum surface.
 - ◆ High level: During image transfer, PSU supplies high level current to transfer roller to prevent transfer roller toner from sticking to paper.
- ❑ **When trailing edge of paper has passed transfer roller, the PSU stops supplying transfer current.**
 - ◆ If machine is printing more pages, PSU supplies low level current.
- ❑ **You can adjust these levels, but when increasing transfer current level, use caution:**
 - ◆ Increasing transfer current level may produce ghost images.
 - ◆ Increasing transfer current level might damage OPC drum.

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Transfer Roller Cleaning

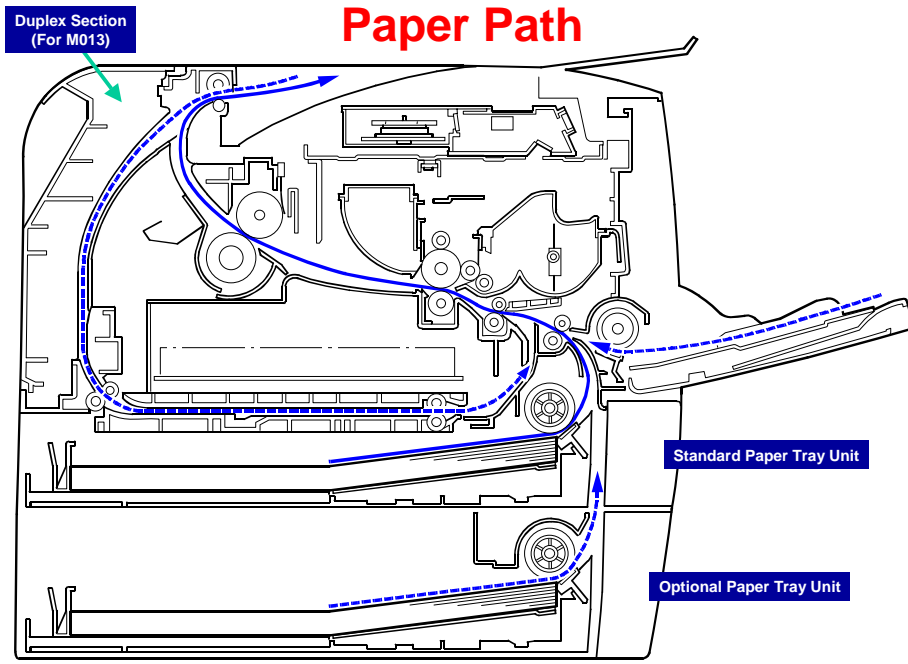
- ❑ **Periodic cleaning of roller is required to prevent toner from transferring to roller surface.**
- ❑ **Roller is cleaned at following times:**
 - ◆ After initial power on
 - ◆ After clearing of a copy jam
 - ◆ At job end (if at least 10 sheets have been printed since last cleaning)
- ❑ **Roller surface is kept clean by PSU supplying...**
 - ◆ negative cleaning current (about -4uA) to transfer roller, causing negatively charged toner on roller to move back to drum.
 - ◆ positive cleaning current (+5uA) to roller, causing any positively charged toner to migrate back to drum.

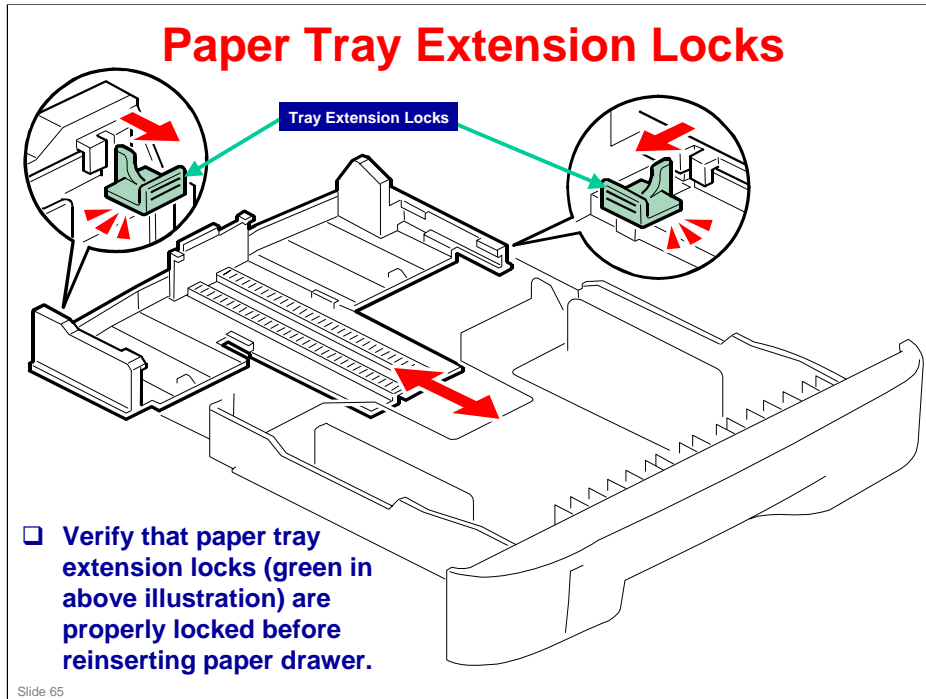
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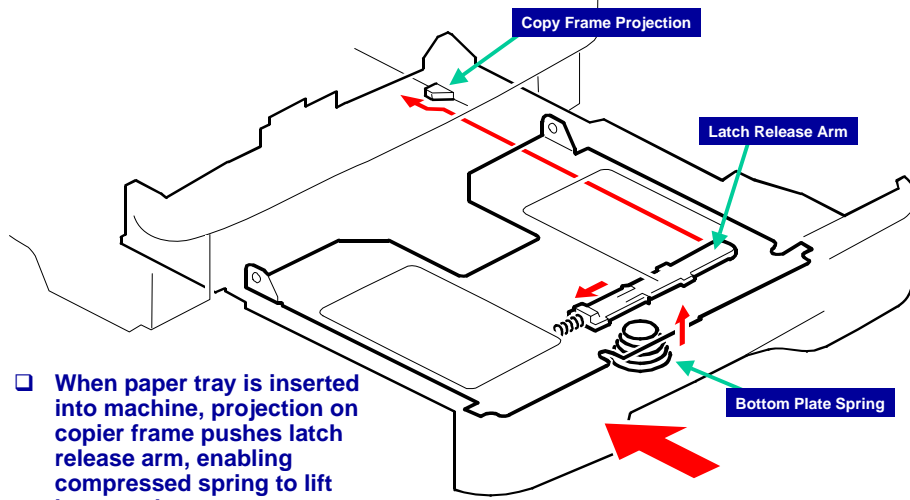
M012/M013
Service Training
Paper Feed

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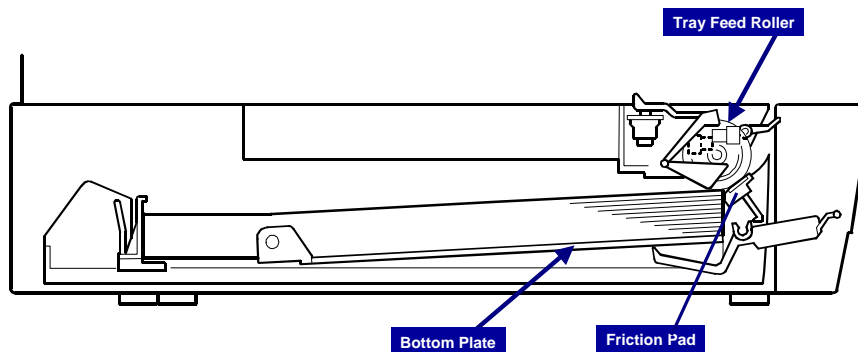
Automatic Bottom Plate Positioning



- ❑ When paper tray is inserted into machine, projection on copier frame pushes latch release arm, enabling compressed spring to lift bottom plate.
- ❑ This machine has a bottom tray that does not need to be locked down when reinserting - it is automatically pushed down.

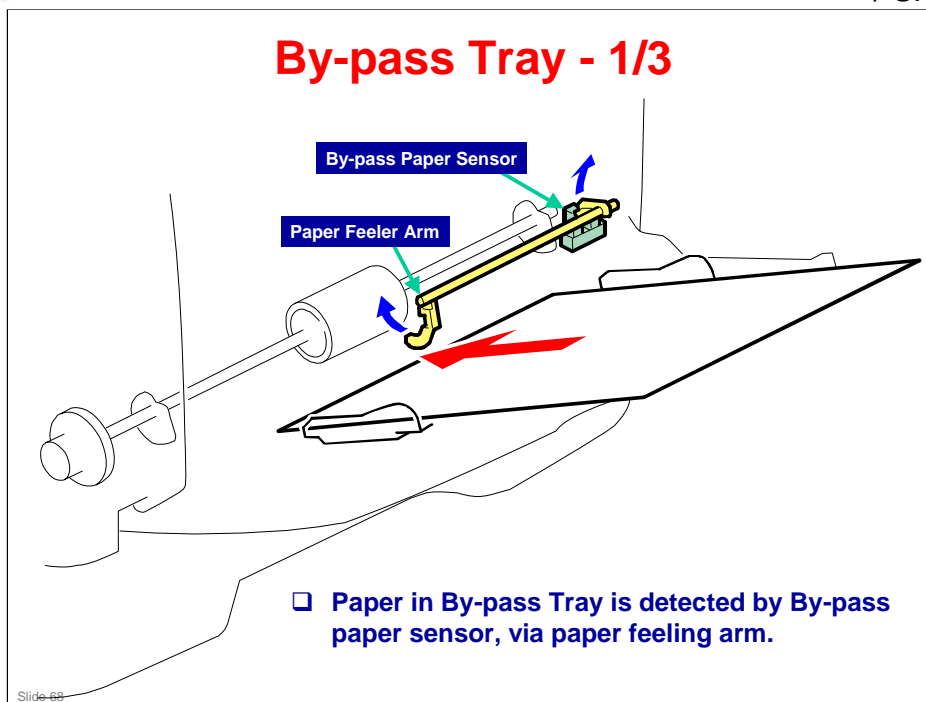
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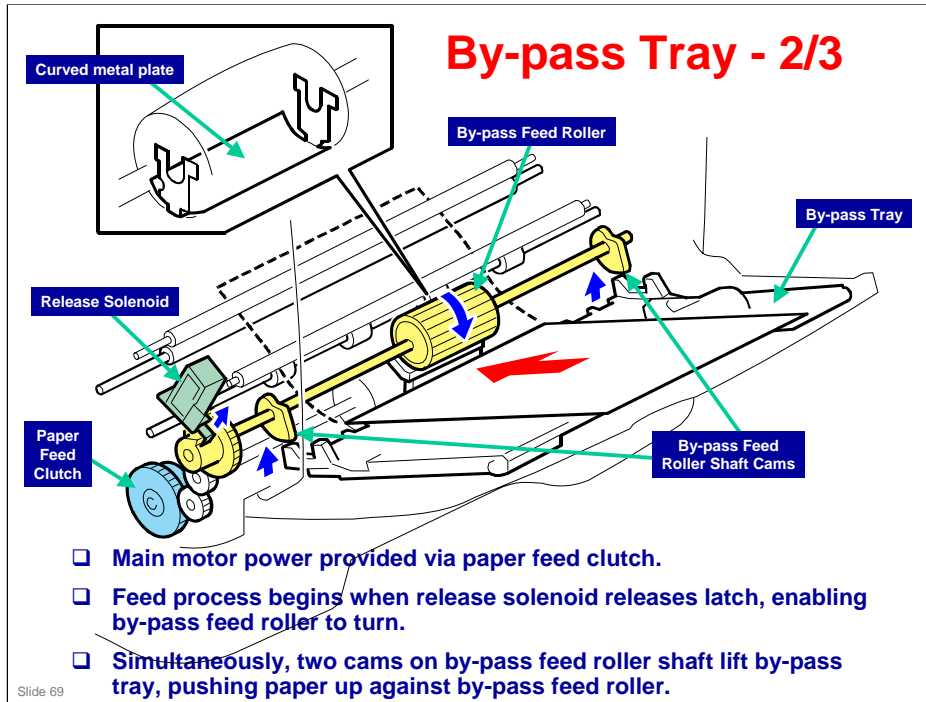
Paper Tray

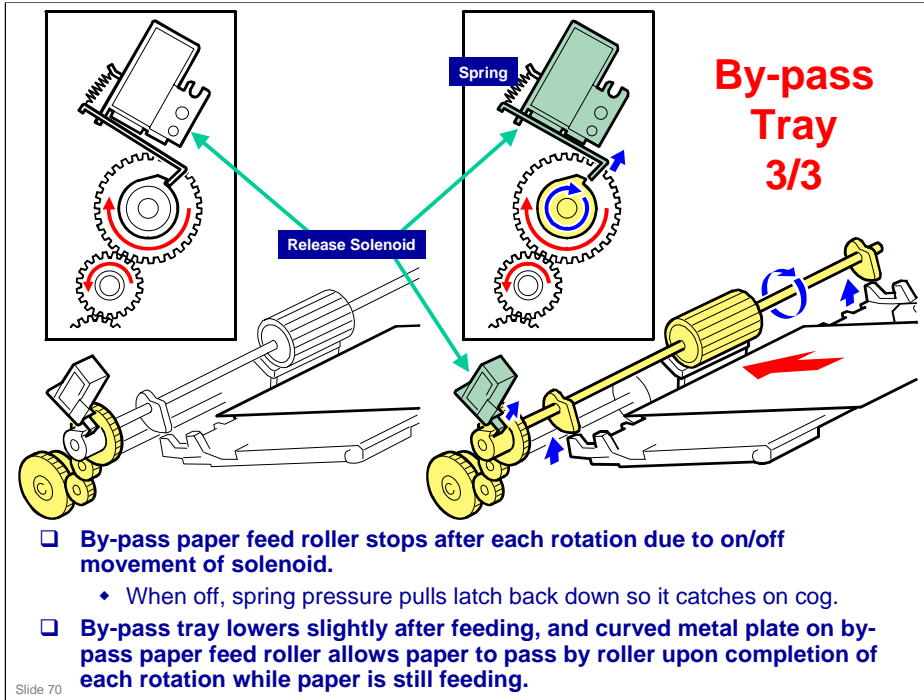


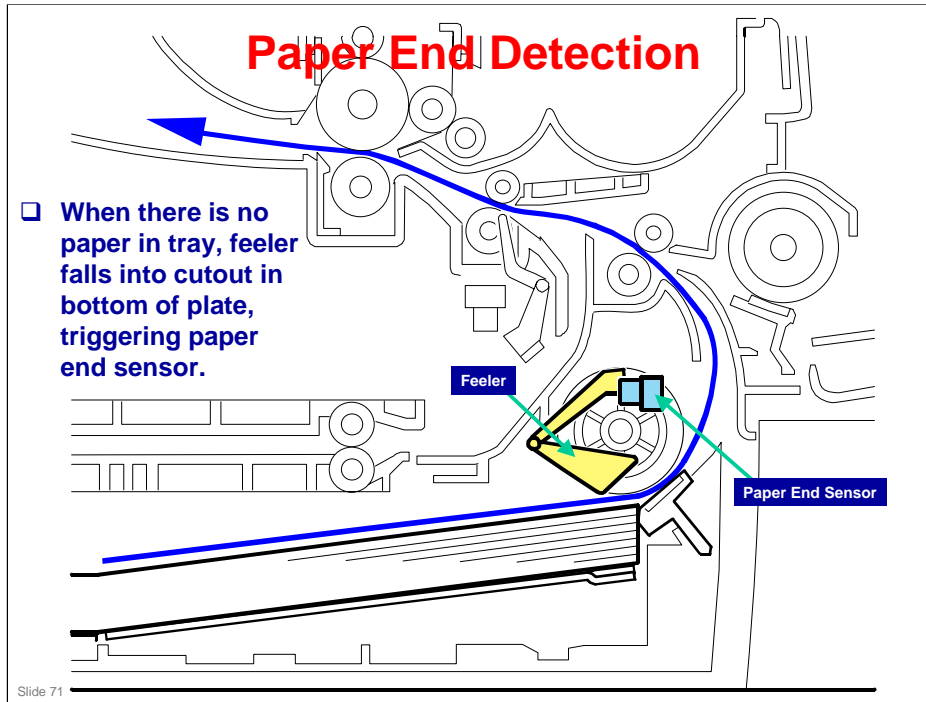
□ Mechanical components of Paper Tray

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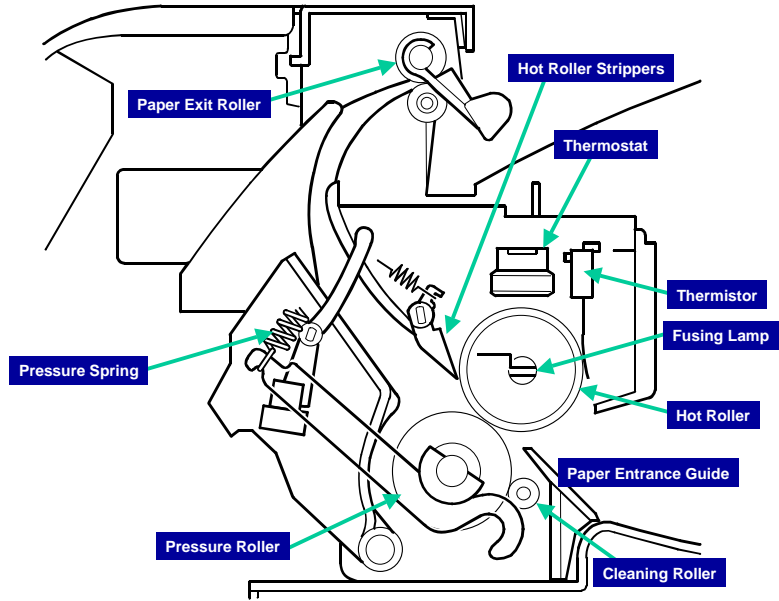


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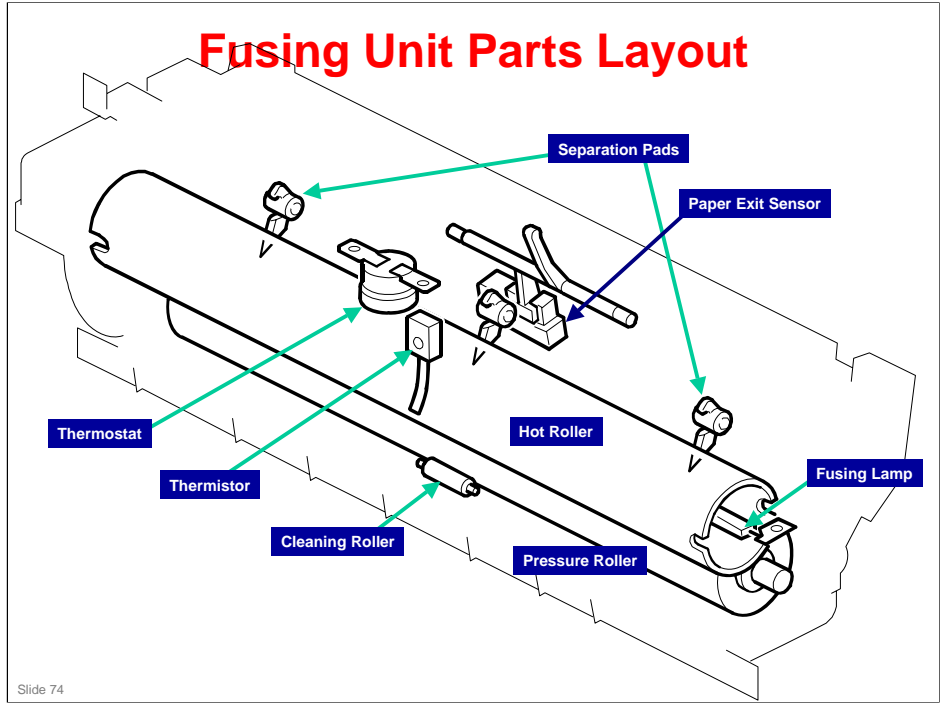
M012/M013
Service Training
Fusing & Paper Exit

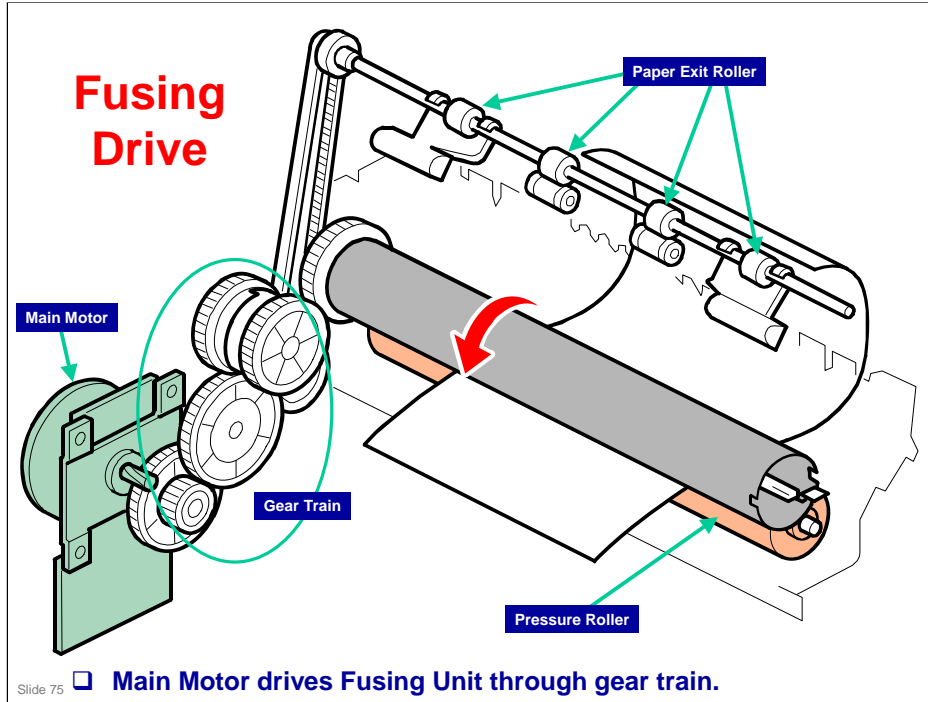
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Image Fusing & Paper Exit Overview

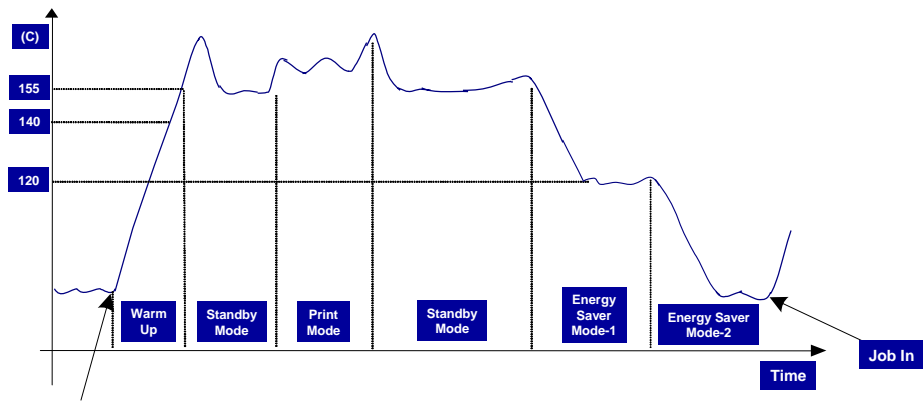


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Fusing Temperature Control



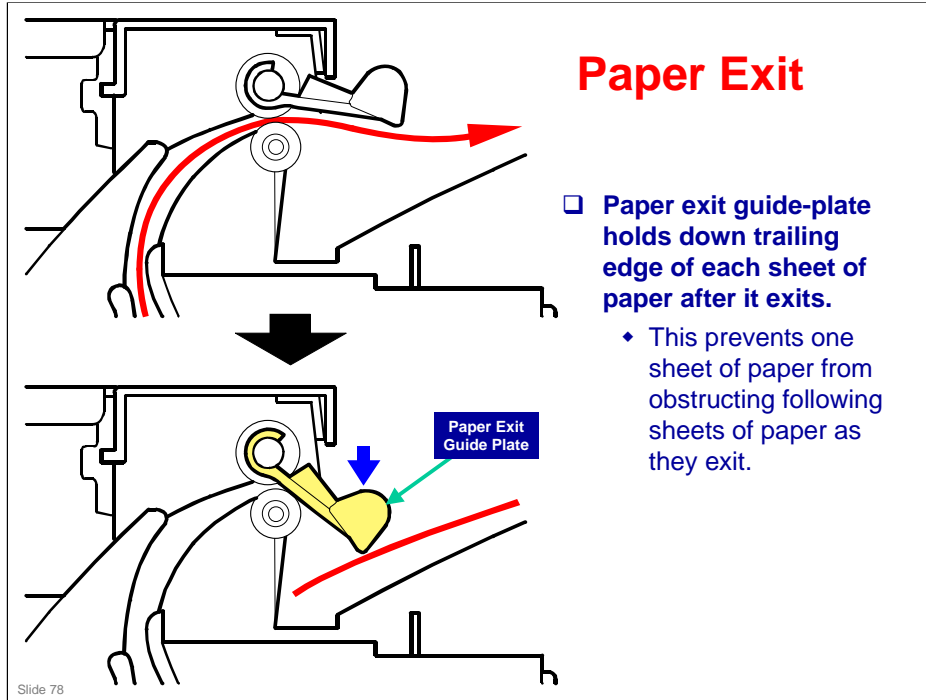
- When main switch is turned on, CPU turns on fusing lamp using soft start process.
 - ◆ Soft start process prevents room lights from flickering.
- Lamp stays on until thermistor detects standby temperature.
- Then CPU maintains this temperature using on-off control.
- To start printing, CPU raises temperature to printing temperature.

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Overheat Protection

- If hot roller temperature becomes greater than 225C, CPU cuts off power to fusing lamp.
- If thermistor overheat protection fails, there is a thermostat in series with the common ground line of fusing lamp.
- If temperature of thermostat becomes greater than 210C, the thermostat opens, removing power from fusing lamp.
- At this time, machine stops operation.

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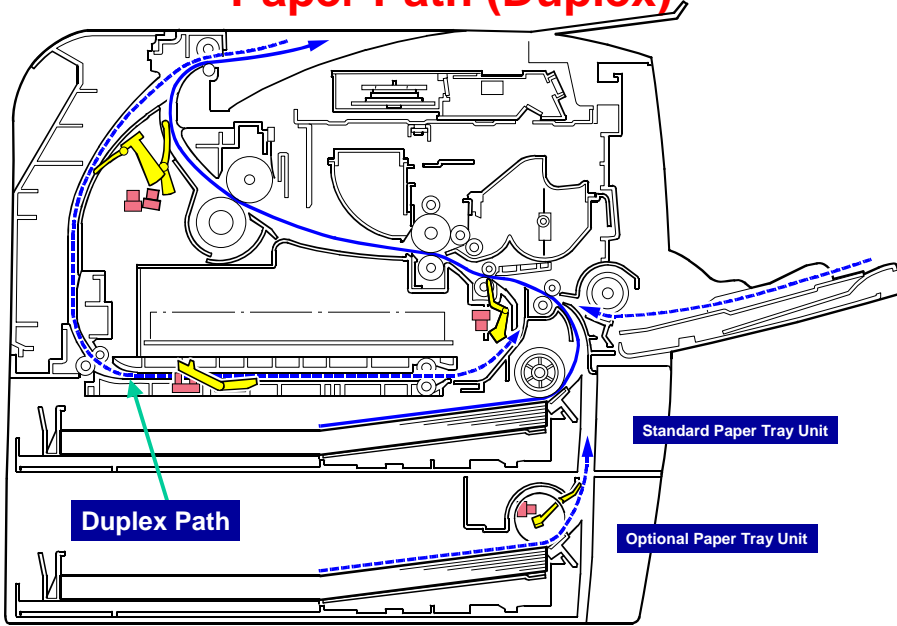


RICOH

**M012/M013
Service Training
Duplex (M013 only)**

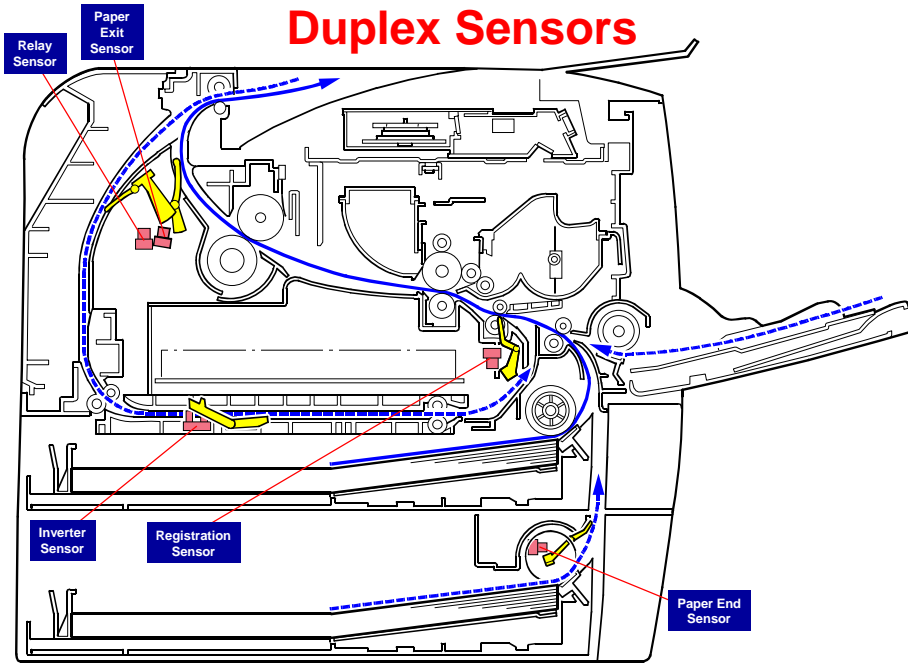
Slide 79

Paper Path (Duplex)

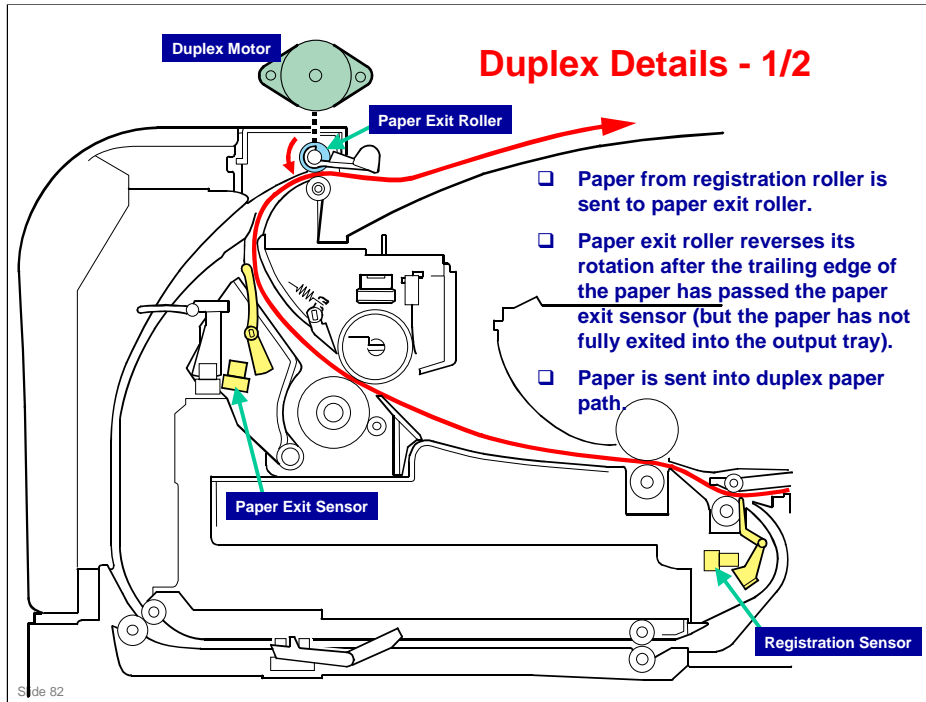


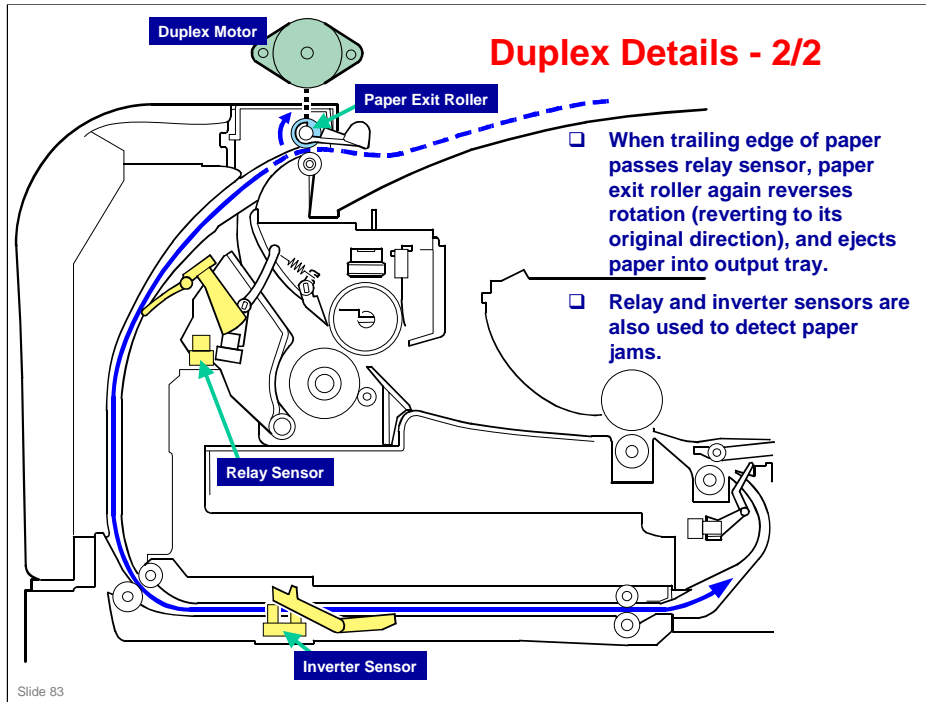
Slide 80

Duplex Sensors



Slide 81



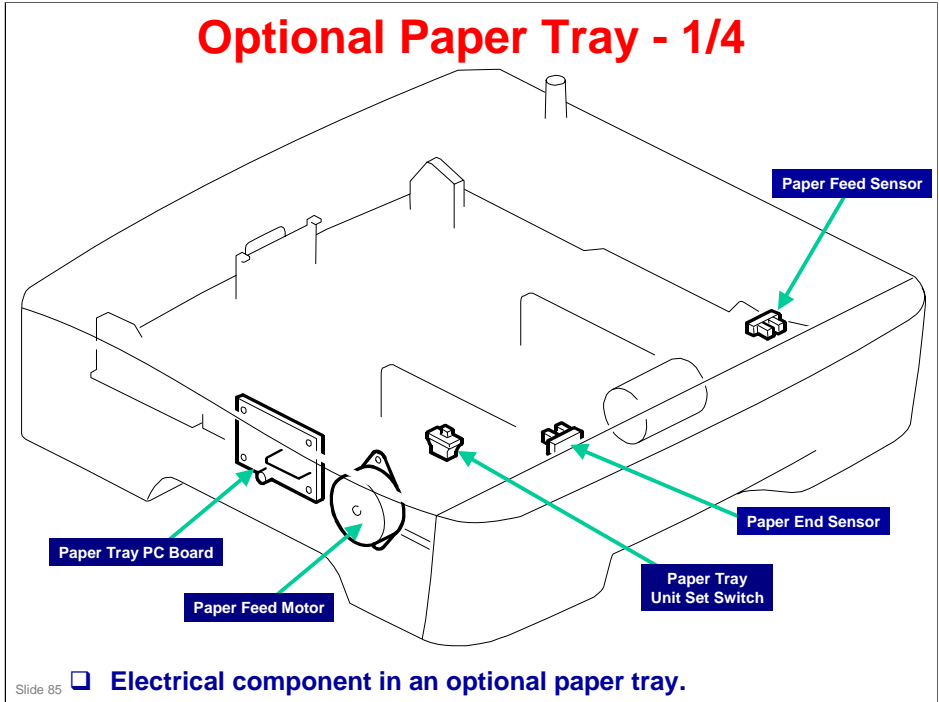


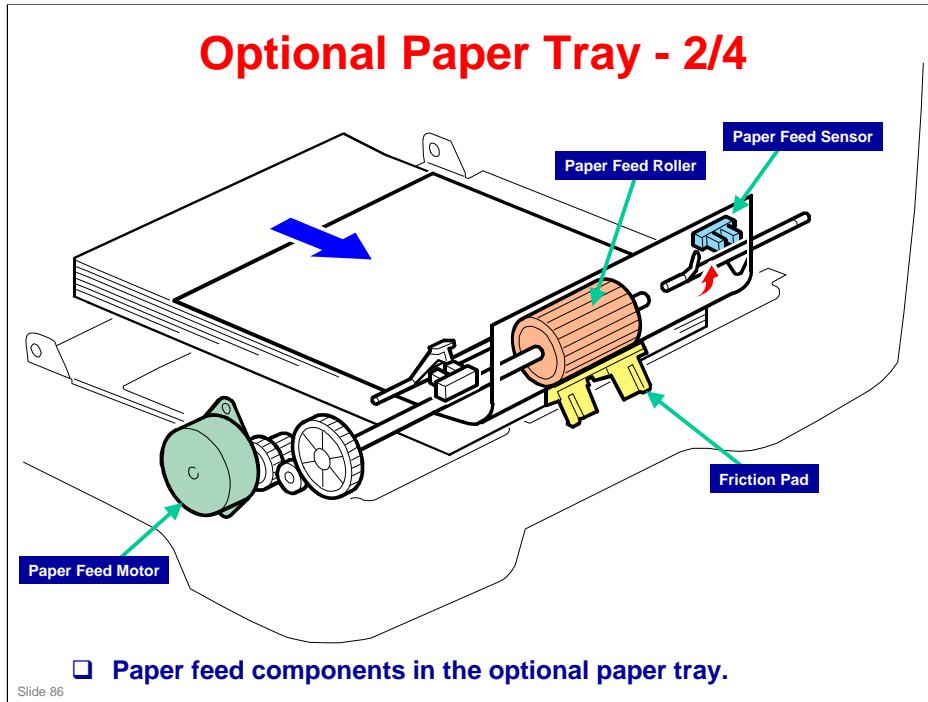
RICOH

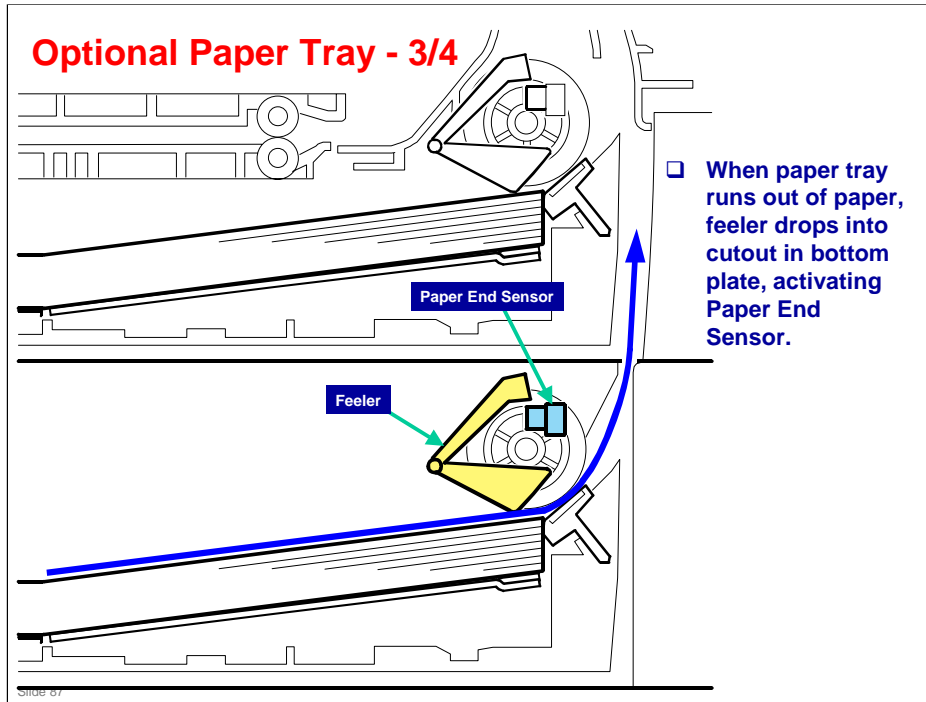
M012/M013
Service Training
Peripheral Devices

Slide 84

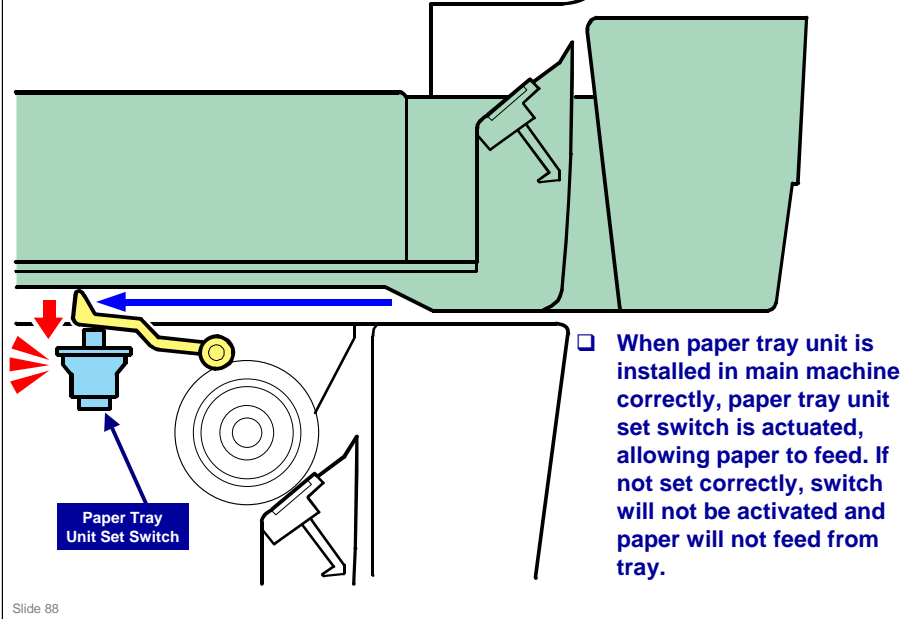
Optional Paper Tray - 1/4







Optional Paper Tray - 4/4



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M012/M013
Service Training
Maintenance

Slide 89

PM Intervals

- There are no official PM parts in this machine.
- There are three "yield parts", but given the ACV (Average Copy Volume) for this machine, these "yield parts" are expected to outlast the life of the machine.
- Yield Parts
 - ◆ Pick-up Roller (120 K)
 - ◆ Transfer Roller (120 K)
 - ◆ Fusing Unit (120 K)
- Amount of yield part usage can be monitored via the following methods (see following slides).

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Web Image Monitor Status Page - 1/2

Display shown on following page is on the Status Page.

Note in particular:

- ◆ Print Cartridge & Replaceable Parts Information"

To reset yield counters:

- ◆ Enter "Printer Configuration" in SOM
 - (SOM - Smart Organizing Monitor)
- ◆ Select "SP Mode 3" tab.
- ◆ Click:
 - » "Clear Fusing Unit EM Counter"
 - (EM - Emergency Maintenance)
 - » "Clear Transfer Roller EM Counter" or
 - » "Clear Paper Feed Roller EM Counter"
- ◆ Click "OK".
- ◆ Exit SOM.

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Web Image Monitor Status Page - 2/2

Home Web Language: English Refresh

Status Counter Machine Information

- Model Name : Aficio SP 3410DN
- Location :
- Contact :
- Host Name : 3410DN-EC3C52
- Status : Power Save

Print Cartridge & Replaceable Parts Information

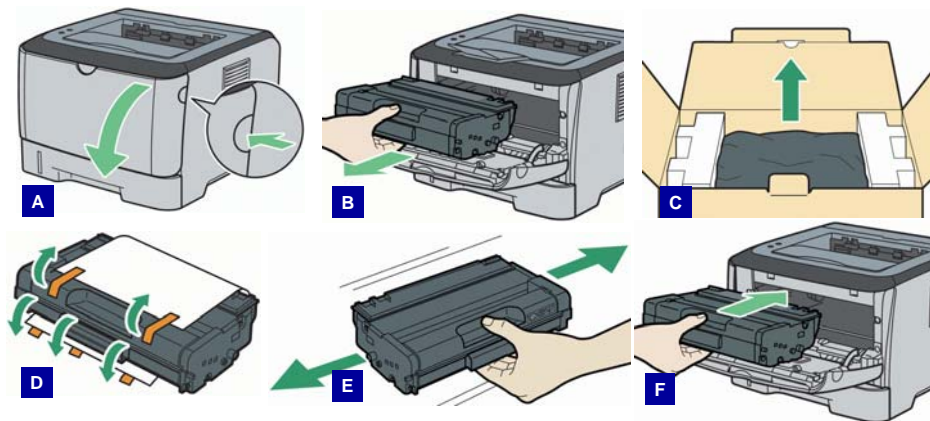
Component	Level/Status	Remaining Level
Black Toner	0 50 100	Remaining Level 5
Fuser Unit		Status OK
Transfer Roller Unit		Status OK
Paper Feed Roller Unit		Status OK

Paper Tray

Tray	Status	Size	Type
Tray 1	Status OK	A4	Plain Paper
Tray 2	Status OK	A4	Plain Paper
Bypass Tray	Out of Paper	A4	Plain Paper

Slide 92 When servicing machine, always note status information.

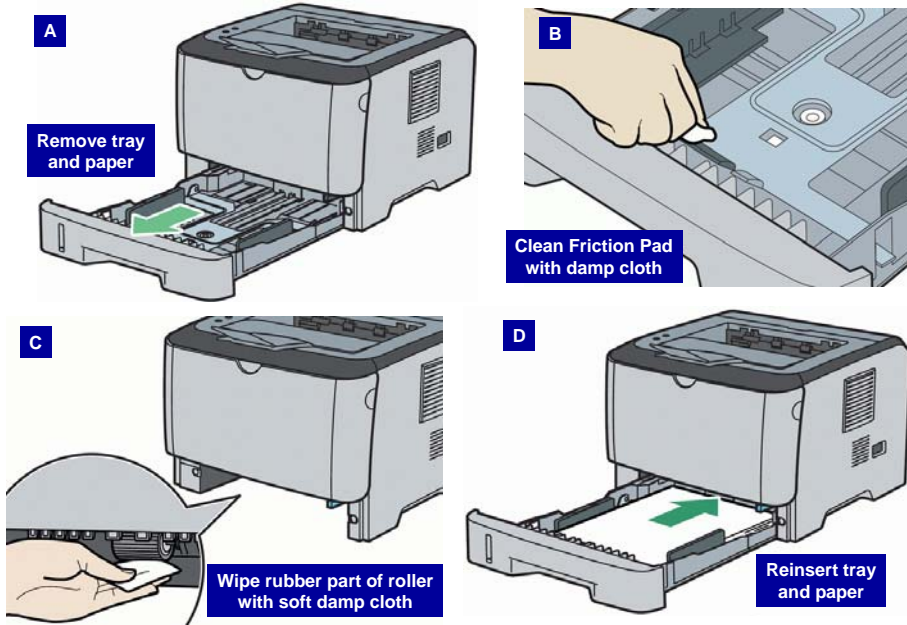
Replacing Print (Toner) Cartridge



- When removing Print Cartridge [B], keep horizontal.
- After taking Print Cartridge out of box [C], place on flat surface and remove protective sheet [D].
- Shake the Print Cartridge from side to side five or six times (keeping horizontal).

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Cleaning Friction Pad & Paper Feed Roller



Note: After wiping the roller with a soft damp cloth [C], always wipe with a dry cloth to remove any moisture.

Note to Service Personnel

- ❑ Yield Parts are rated to last for 120 K, which is expected to be longer than this machine's rated lifespan of five years.
- ❑ For customers who are very heavy users, it may be necessary to change Yield Parts during the life of the machine.
 - ◆ When installing Yield Parts, the machine must be reset.
 - ◆ Reset procedure is not a user function and must be performed by a trained serviceperson.
 - ◆ See FSM (Field Service Manual) for reset procedures.
- ❑ After performing any maintenance procedure, always print out a Configuration Report, and check Yield Parts.

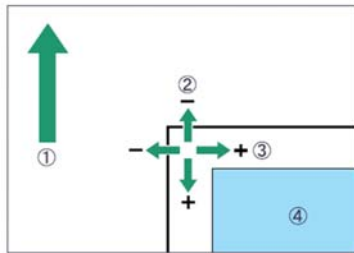
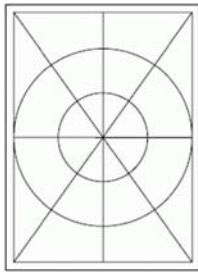
Slide 95

Image Adjustment - 1/2

- ❑ This adjustment can be done by both technicians and users.
- ❑ For more details on the following, see "Image Adjustment" in the service manual.
 - ◆ Registration Adjustment
 - » User Adjustment
 - Paper registration can also be adjusted with SOM "Printer Configuration". (For details, see "Software Guide".)
 - » Service Adjustment
 - See following slide for Service Adjustment details.

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Image Adjustment - 2/2



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- ❑ **Using SOM print out test pattern before changing paper registration setting.**
 - ◆ 1) Feed Direction
 - ◆ 2) Vertical Adjustment
 - ◆ 3) Horizontal Adjustment
 - ◆ 4) Print Area
- ❑ **Click "Up" or "Down" to set registration value (mm).**
 - ◆ Increase value to shift print area in plus direction.
 - ◆ Decrease to shift in minus direction.
- ❑ **Adjust margins of test page so that they are equal in size.**

SOM – Smart Organizing Monitor

Firmware Updating - 1/2

- A computer is necessary for updating the firmware of this machine.**
- Using correct procedures (see service manual for details) to update controller firmware.**
- User can update Firmware by downloading Firmware from the download page of Ricoh websites.**

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Firmware Updating - 2/2

□ For full details on Firmware Updating, see service manual for the following:

- ◆ Checking the Machine Firmware Version
- ◆ Updating the Controller Firmware
 - » Procedure
- ◆ Updating the Engine Firmware
 - » Procedure
- ◆ Updating the Boot Loader Firmware

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M012/M013
Service Training
Troubleshooting

Slide 100

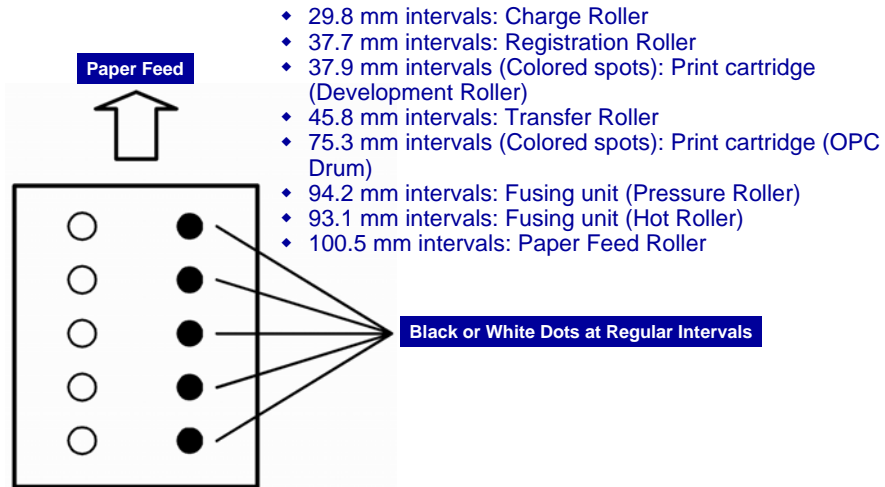
Paper Jams

- ❑ **Various types of paper jams and their causes are detailed in the service manual. Some causes include:**
 - ◆ Use of a non-recommended paper type
 - ◆ End fence set incorrectly
 - ◆ Paper lift mechanism not functioning correctly
 - ◆ Defective paper feed motor
- ❑ **Go over the causes and suggested actions.**
- ❑ **When clearing jams near the fusing unit, use caution to avoid possible burns.**

Slide 101

Printed Image Issues

- When abnormal image (black or white dots) appears at certain intervals, component part causing spots may sometimes be identified (based on circumference of certain components):



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M012/M013
Service Training

Energy Saving

Slide 103

Promote Use of Energy Saving Features

❑ Energy Saver Mode

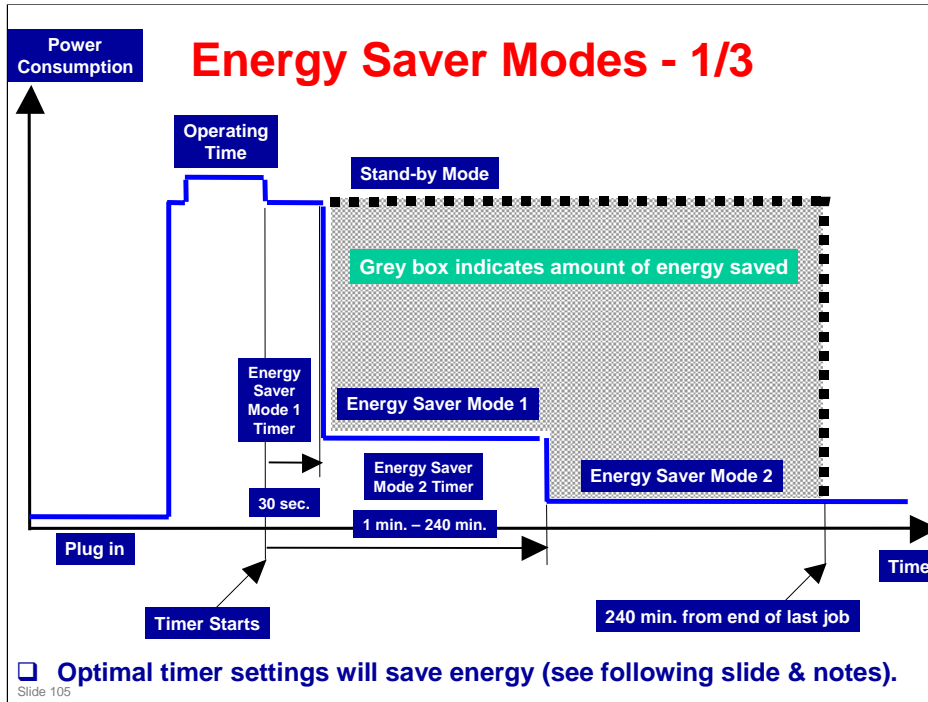
- ◆ Proper use of energy saver modes saves energy and is environmentally friendly.

❑ Duplex Settings

- ◆ Use of Duplex settings reduces amount of paper used, which results in less energy consumption for paper production.

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▪



Energy Saver Modes

Customers should use energy saver modes properly, to save energy and protect the environment.

The area shaded grey in this diagram represents the amount of energy that is saved when the timers are at the default settings. If the timers are changed, then the energy saved will be different. For example, if the timers are all set to 240 min., the grey area will disappear, and no energy is saved before 240 min. expires.

Timer Settings

Energy Saver Modes - 2/3

- **There are four operating modes for this machine:**
 - ◆ Operating mode
 - ◆ Ready mode
 - ◆ Power Save-1 mode
 - ◆ Power Save-2 mode

- **Timer Settings - User can set these timers:**
 - ◆ Energy Saver Mode1 (30 sec.)
 - » Setting is for [On] or [Off].
 - ◆ Energy Saver Mode2 (1 to 240 min.)
 - » Settings are for [On] or [Off] and timer is adjustable (default: 1 min.)

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Energy Saver Modes - 3/3

□ How is energy saved?

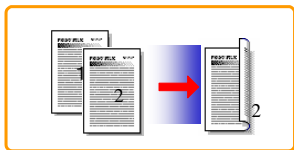
- ◆ Low Energy Mode-1
 - » Less than 70 W

- ◆ Low Energy Mode-2
 - » Less than 5 W
 - » Fusing lamps: Off

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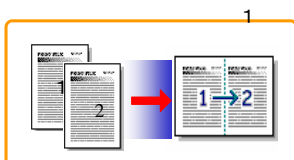
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Paper Saving - 1/2



- ❑ **Duplexing and combine functions reduce amount of paper used.**
 - ◆ Less energy overall is used for paper production, which helps the environment.

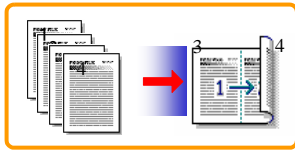
- ❑ **Duplex:**
 - ◆ Reduce paper volume by 50%!



- ❑ **Combine mode:**
 - ◆ Reduce paper volume by 50%!

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Paper Saving - 2/2



- Duplex + Combine:**
- Using both features together can further reduce paper volume by 3/4!**

- To check paper consumption, view total counter and duplex counter.**
 - ◆ For one duplex page, total counter goes up by 2.
 - ◆ For a duplex job of a three-page original, total counter goes up by 3.
- Duplex counter counts pages with images on both sides.**
 - ◆ For one duplex page, duplex counter goes up by 1.
 - ◆ For a duplex job of a three-page original, duplex counter will only increase by 1, even though two sheets are used.
- Recommendation**
 - ◆ Please explain these features to customers so they can reduce their paper usage.

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End of Course

Slide 110