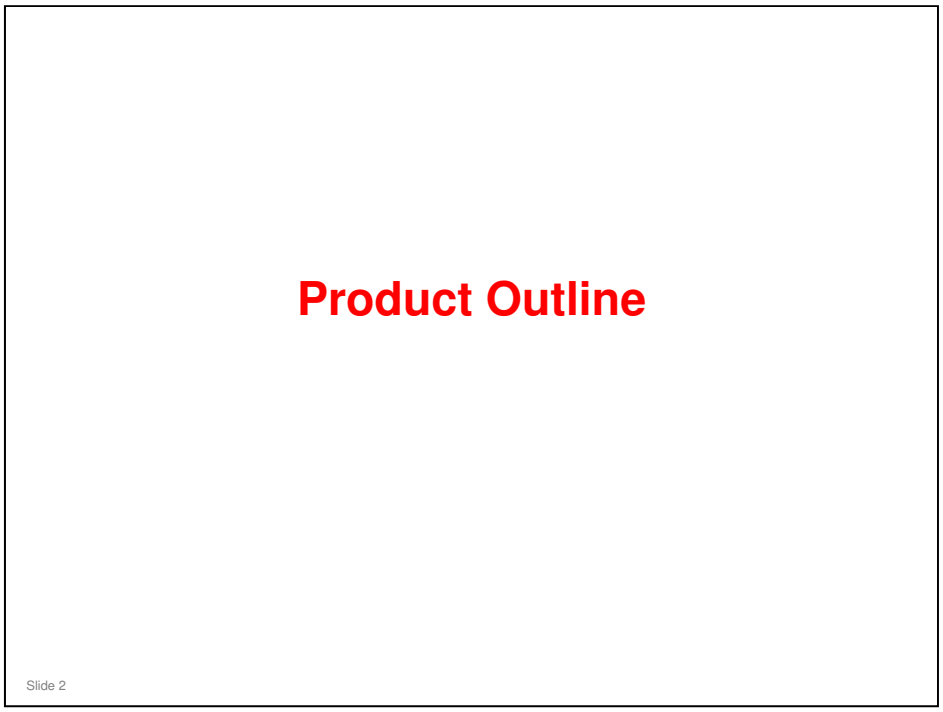
RICOH

D074/D075/M044 Service Training

Slide 1

- This is a complete training course for the D074/D075/M044 series main engine.
- Changes to the peripherals are also covered.

Date of change	Version History	Description
11-03-2011	1.00	Initial version
30-04-2011	1.01	Changes to slides based on previous version's slide numbering: 10, 34, 49, 135, 140, 166, 176, 207, 218, 219, 232, 233, 278, 358, 422, 429, 444, 445, 446, 458, 459, 471, 472, 473, 500, 501 New slide inserted after slide 162, 205, 353, 426, 474 (2 slides inserted here), 500, 501
06-06-2011	1.02	Changes to slides based on previous version's slide numbering: 140 (using the correct screw types) 249 (caution about excessive force) 3 new slides added after 249 (reinstalling a PCDU)
17-08-2011	1.03	Changes based on previous slide numbering: Modified 25 (paper thickness spec for bypass) 26 (output capacity for ring binder) 34 (change to drum PM interval; dev unit not a PM item) 136 (outline of installation – developer already installed in the factory) 147-152 (developer installation procedure) – moved to after slide 352, for PCDU servicing procedures (slide 152 modified: SPs after installing developer) 364 (sponge seals in PCDU) 421 (after replacing parts in the ITB cleaning unit) 428 (after replacing the ITB) Slide added after 252 (re-installing a PCDU) Deleted slide 359 (information about re-installing a PCDU was repeated from an earlier slide) Deleted slides 470-472, 474-476, 478 (fusing unit PM modified) Inserted four new slides after old slide 477 (new slides are now 472-475) – concerns hot roller replacement



No additional notes

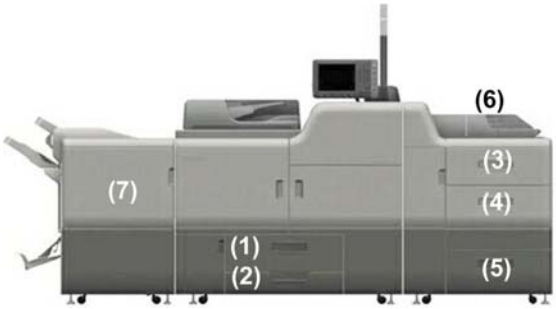
Three Models

- **Taurus-C1a (D074)**
  - 65 ppm (A4/LT LEF, full color, black-and white)
  - Memory: 2.5 GB (GW controller), 2 GB (Fiery controller)
  - HDD: 320 GB (GW controller), 160 GB (Fiery controller)
- **Taurus-C1b (D075)**
  - 75 ppm (A4/LT LEF, full color, black-and white)
  - Memory: Same as Taurus-C1a
  - HDD: Same as Taurus-C1a
- **Taurus-P1 (M044)**
  - 75 ppm (A4/LT LEF, full color, black-and white)
  - Memory: 1.5 GB (GW controller), 2 GB (Fiery controller)
  - HDD: 320 GB (GW controller), 160 GB (Fiery controller)

Slide 3

- Model Names
  - Taurus-C1b: Pro C751EX
  - Taurus-C1a: Pro C651EX
  - Taurus-P1: Pro C751
- HDD capacity for the Fiery controller is less than for the AG series (was 500 GB). In the AG series, the HDD was supplied by Ricoh. In the Taurus series, it is supplied by EFI.
- The process speed is the same for all models (352 mm/s). The difference in the ppm spec is made by a different size of the gap between sheets.

Copier Model – Basic System

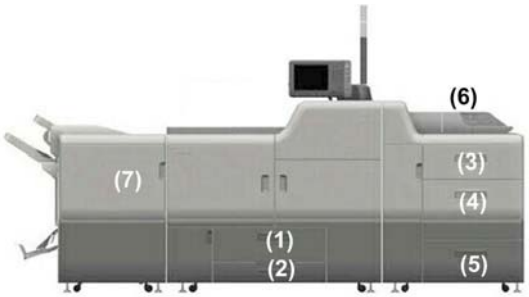


(1): Main Unit 1st Tray (1000 sheets x 2) – Tray 1
(2): Main Unit 2nd Tray (500 sheets) – Tray 2
(3): Optional A3/DLT LCIT 1st Tray (1000 sheets) – Tray 3
(4): Optional A3/DLT LCIT 2nd Tray (2000 sheets) – Tray 4
(5): Optional A3/DLT LCIT 3rd Tray (1000 sheets) – Tray 5
(6): Optional Bypass Tray (500 sheets) – Tray 6
(7): Optional Finisher (two different ones are available)

Slide 4

- This shows the copier model with minimal optional peripherals attached.
- Only one LCIT can be installed.
- There is no A4/LT LCIT option.
- Two finisher models are available: The D512 (corner stapling and booklet stapling), and the D513 (corner stapling only).
  - The finisher (7) in the illustration above is the Booklet Finisher D512 .

Printer Model – Basic System



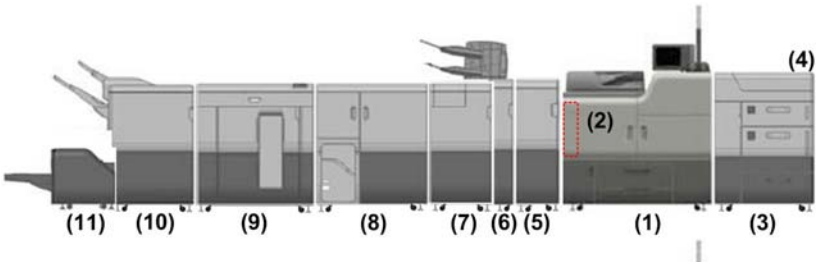
(1): Main Unit 1st Tray (1000 sheets x 2)
(2): Main Unit 2nd Tray (500 sheets)
(3): Optional A3/DLT LCIT 1st Tray (1000 sheets)
(4): Optional A3/DLT LCIT 2nd Tray (2000 sheets)
(5): Optional A3/DLT LCIT 3rd Tray (1000 sheets)
(6): Optional Bypass Tray (500 sheets)
(7): Optional Finisher (two different ones are available)

Slide 5

- This shows the printer model with minimal optional peripherals attached. The only obvious difference from the copier is that there is no ARDF.
- The following are the same as for the copier model:
  - Only one LCIT can be installed.
  - There is no A4/LT LCIT option.
  - Two finisher models are available: The D512 (corner stapling and booklet stapling), and the D513 (corner stapling only).

    The finisher (7) in the illustration above is the Booklet Finisher D512 .

Full System - 1

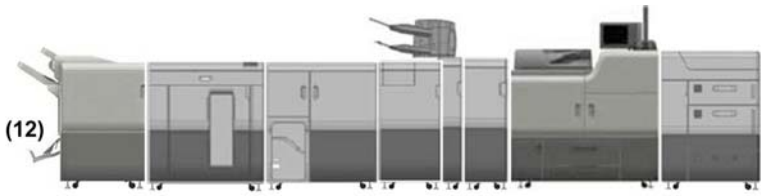


(1) Main machine D074/D075/M044
(2) Decurl Unit
(3) A3/DLT LCIT (D516)
(4) Multi Bypass Tray (D517)
(5) Buffer Pass Unit (D548)
(6) Cover Interposer Tray (D518)
(7) Multi Folding Unit (D521)
(8) Ring Binder (D519)
(9) High Capacity Stacker (D515)
(10) Finisher (D512)
(11) Trimmer Unit (D520)

Slide 6

❒ There will be more details on the peripherals later.

Full System - 2

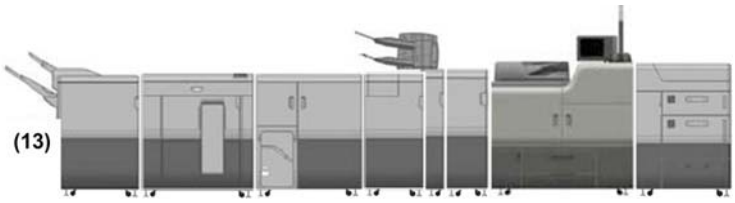


- **If the Trimmer Unit is not installed, the booklet tray (12) for the Booklet Finisher (D512) must be installed to hold stapled booklets.**
  - The booklet tray must be removed from the finisher in order to install the Trimmer Unit.

Slide 7

No additional notes

Full System - 3



- **The other finisher (D513) only does corner and flat stapling (no booklet stapling).**
  - The Trimmer Unit cannot be installed with this finisher (the Trimmer Unit processes booklet-stapled stacks only).

Slide 8

No additional notes

Other Options

- Original Tray
- USB 2.0/SD Slot Type E (TBD)
- A3/11"x17" Tray Unit (B331-12)
- Punch Unit (D449) for Finisher (D512/D513)
- VM Card Type R (with App 2 Me)
- @Remote

Slide 9

No additional notes

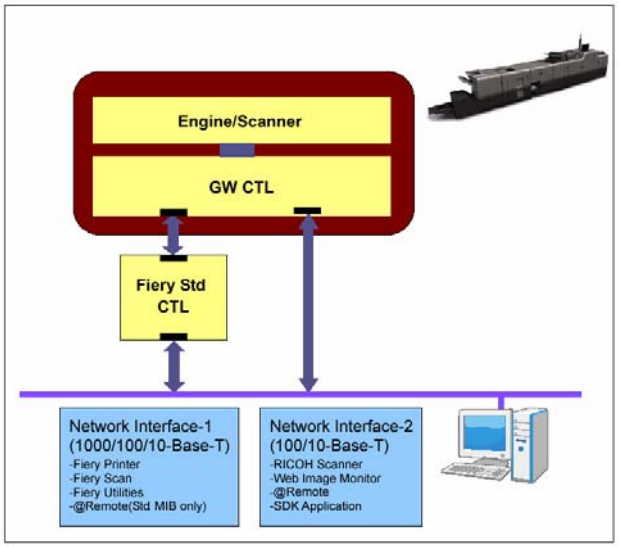
Security and Encryption Card

- The Data Overwrite Security and Data Encryption applications are provided from the factory on one SD card.
- The machine is shipped with this SD card in Slot 1.
- The customer must enable these applications with user tools.

Slide 10

No additional notes

System Layout



Slide 11

❒ This is the same as the AG-C1/P1 and Aries.

New Fiery Controller

Standard Fiery Controller (E-41a)

E-41a with Optional FACI

- **The Color Controller Type E-41a is standard this series. It is an external type controller with the same design concept as the QX100 controller for the AG-series.**

Slide 12

- The E-41a is not compatible with the E-41. Always use the correct controller for the machine.
- The FACI Kit allows the operator to manage jobs more efficiently near the machine.
  - FACI: Fiery Advanced Controller Interface
- The standard controller also has a DVD drive.

Printing

- The machine has a GW controller, but it does not carry the GW printer application.
- All printing features are provided by the external Fiery E-41a controller.

Slide 13

No additional notes

Scanning

- The machine is equipped with a GW (Ricoh) scanner and a Fiery scanner as standard features.
- Both scanner features are available even when GW and Fiery controllers are connected to the network at the same time.

Slide 14

No additional notes

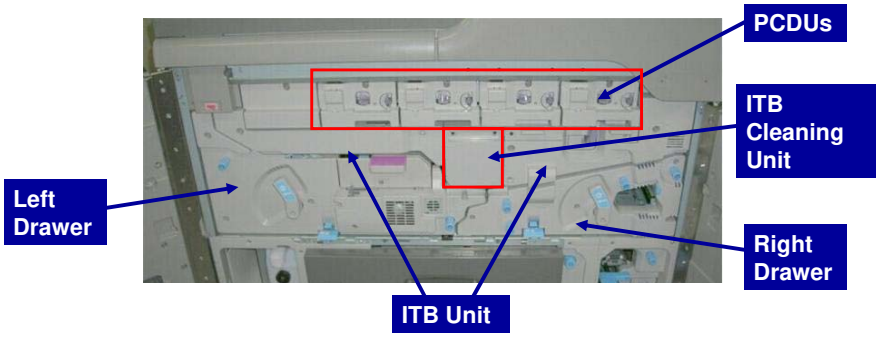
@Remote

- @Remote can acquire only a limited amount of information via the Fiery controller network port.
- For full functionality with @Remote, the system must be connected via the GW controller network as well.
- This means the machine needs two IP addresses for full function support with @Remote.

Slide 15

No additional notes

View with Front Covers Open

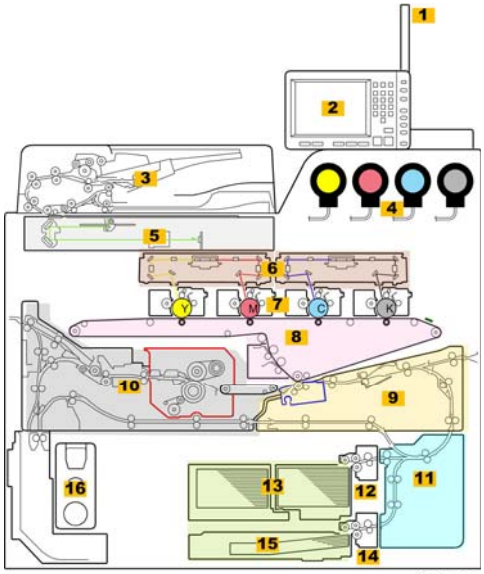


- The left drawer contains the PTB (paper transport belt), fusing unit, paper cooling unit, and the 1st half of the duplex path.
- The right drawer contains the PTR (paper transfer roller) unit, paper registration, and the 2nd half of the duplex path

Slide 16

No additional notes

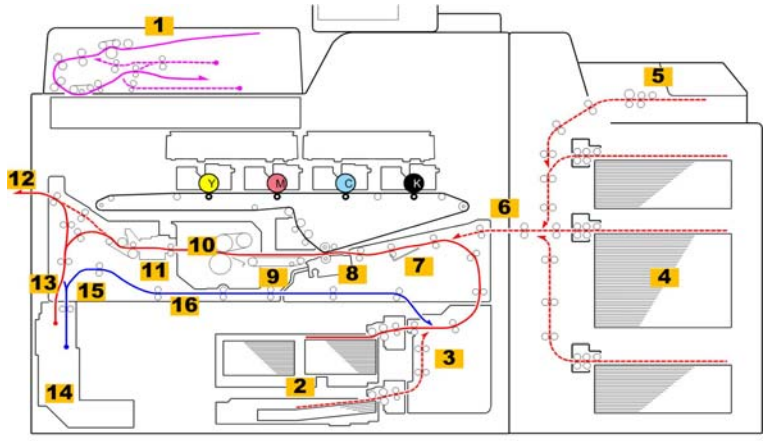
Internal Component Layout



Slide 17

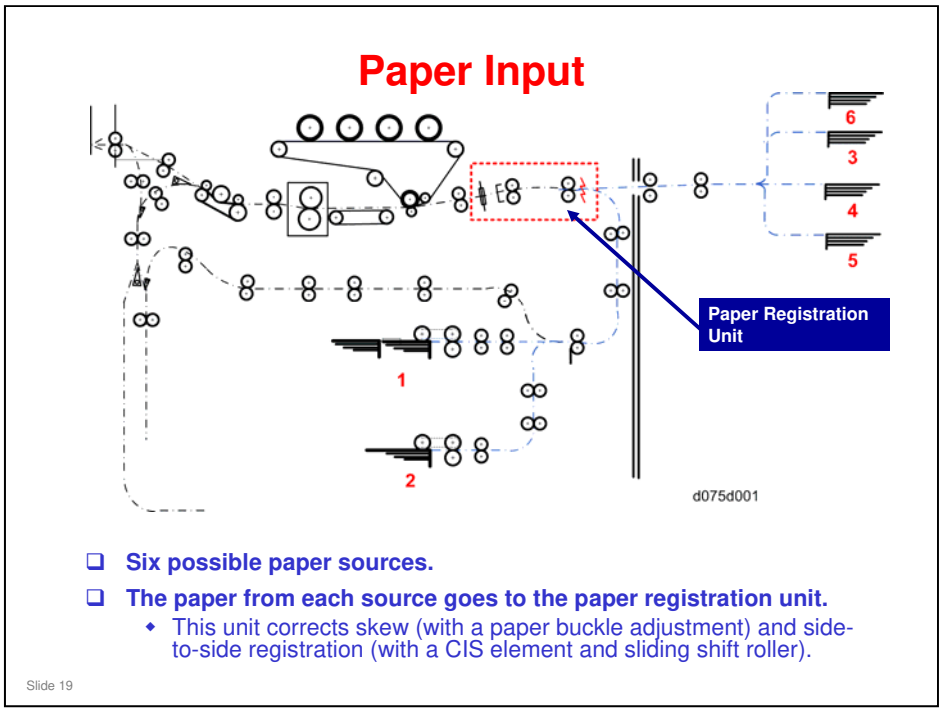
- 1. Attention Light: Not built-in. Must be installed during the installation procedure.
- 2. Operation Panel: Not built-in. Must be installed during the installation procedure.
- 3. ARDF
- 4. Toner Bank
- 5. Scanner Unit
- 6. Laser Units: There are two laser units. Each laser unit handles two colors (YM, CK).
- 7. PCDUs: One for each color (YMCK). Each unit contains the drum (and charge unit), development unit, and cleaning unit.
- 8. ITB Unit
- 9. Right Drawer
- 10. Left Drawer
- 11. Vertical Transport Unit
- 12. Paper Feed Unit (Tray 1)
- 13. Tray 1 (Tandem Tray)
- 14. Paper Feed Unit (Tray 2)
- 15. Tray 2 (Universal Tray)
- 16. Used Toner Bottle: Holds used toner transported from the PCDU development units, PCDU cleaning units, ITB cleaning unit, and PTR cleaning unit. The machine can continue to print while the bottle is removed.

Paper Feed Paths



Slide 18

- 1. Original Path: ARDF (D074/D075 Only)
- 2. Paper Bank: Tray 1 (Tandem: 2,000 sheets), Tray 2 (Universal: 500 sheets)
- 3. Vertical Paper Path
- 4. LCIT: Tray 3 (1,000 sheets), Tray 4 (2,000 sheets), Tray 5 (1,000 sheets)
- 5. Multi Bypass Unit: Tray 6 (500 sheets)
- 6. Paper Entrance: From LCIT and Multi Bypass Unit (options)
- 7. Paper Registration Unit: Corrects paper skew and side-to-side registration for all paper (including paper fed from the LCIT/Multi Bypass Unit)
- 8. Paper Transfer: Toner image transferred from ITB to paper
- 9. Transport Belt: Transports paper between paper transfer roller and fusing unit. Three fans hold the paper in the paper path. Fans (not rollers) are used to hold the paper in the paper path because the toner is not yet fused.
- 10. Fusing Unit: Fuses toner image to paper
- 11. Paper Cooling: Cools paper to reduce curl before it exits or descends to the duplex paper path
- 12. Paper Exit: Common paper exit for all paper
- 13. Inverter/Exit Tray: Paper is fed into this tray, and reverse fed to invert it for face-down output.
- 14. Purge Tray: Bottom of the inverter/exit tray. All paper in the paper path of the main machine is shunted here when a jam occurs downstream.
- 15. Paper Invert/Switchback: Paper is stopped and reverse fed here to feed it into the duplex paper path for printing the 2nd side of the sheet.
- 16. Duplex Paper Path: Transports paper back to the upper horizontal feed path for paper registration and printing on the second side.



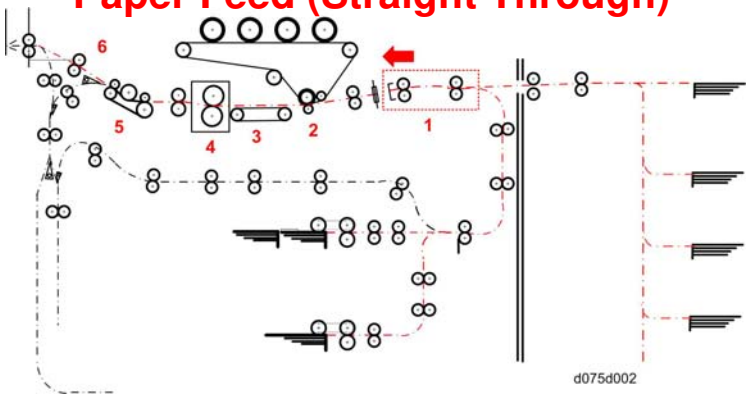
Paper is fed from six possible sources:

- (1): Tray 1 of the paper bank in the main machine, a tandem tray that holds 2,000 sheets of paper.
- (2): Tray 2 of the paper bank in the main machine, a universal tray that holds 500 sheets of paper.
- (3) To (5): The optional LCIT has three trays: (3) Tray 3 (1,000 sheets), (4) Tray 4 (2,000 sheets), (5) Tray 5 (1,000 sheets.)
- (6): Tray 6, the optional Multi Bypass Tray (500 sheets), is installed on top of the LCIT.

The paper from each source is sent to the paper registration unit. The registration unit corrects skew (paper buckle adjustment) and side-to-side registration (with a CIS element and sliding shift roller).

- There is no registration mechanism in the LCIT. All paper registration is performed in the registration unit of the main machine.
- The LCIT has an exit roller lift motor and lift sensor that work together to release the paper so that it can be free during paper registration in the main machine.
  - See the Paper Registration section of the course for more details.
- Due to the shortness of the paper path, solenoids have been added in the paper path between the paper bank (1st Tray, 2nd Tray) of the main machine and the paper registration unit. These solenoids retract the transport rollers to free the paper for paper registration.
  - See the Paper Registration section of the course for more details.

Paper Feed (Straight Through)

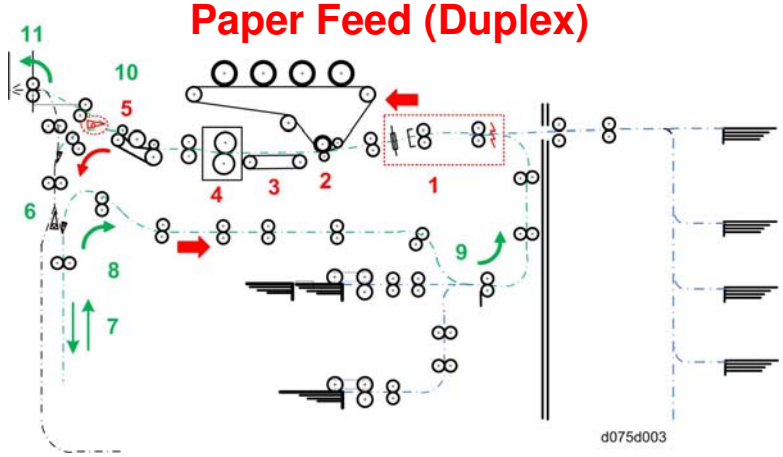


- (1) Paper registration for skew and side-to-side correction
- (2) Toner image transfer to paper
- (3) Transport to the fusing unit via transport belt
- (4) Fusing unit
- (5) Paper cooling unit, and over the exit junction gate
- (6) Paper exit for face-up delivery

Slide 20

No additional notes

Paper Feed (Duplex)



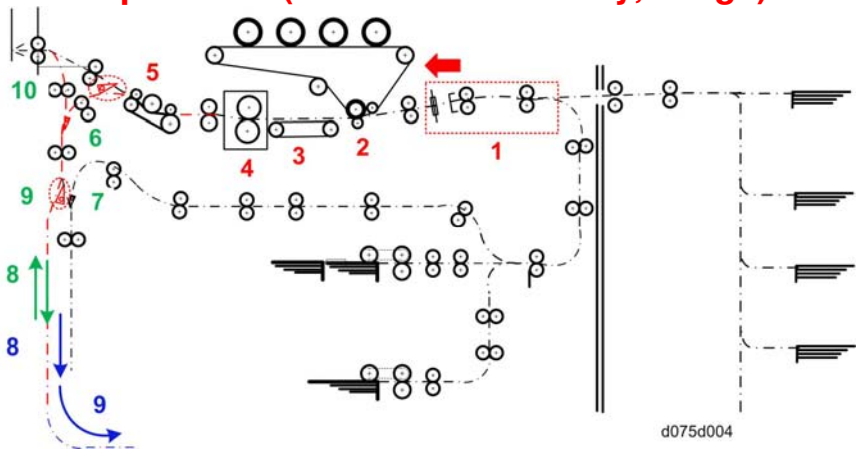
- (6) Inverter junction gate
- (7) Inverter/duplex tray
- (8) Duplex path
- (9) Feed into the vertical transport path

Slide 21

(1) to (5), (10), (11): See the previous slide.

- When the paper exits the paper cooling unit, the exit junction gate opens and directs the paper to the inverter junction gate at (6). This junction gate directs paper to the inverter/duplex tray (7). Here it is stopped and reversed fed into the duplex path (8). (A small one-way junction gate guides it into the duplex transport path.)
- At (9), the paper descends and feeds into the vertical paper path. After registration once again at (1), the back of the paper is printed and fused. After the paper comes out of the paper cooling unit at (10), the exit junction gate remains closed and the paper exits at (11).

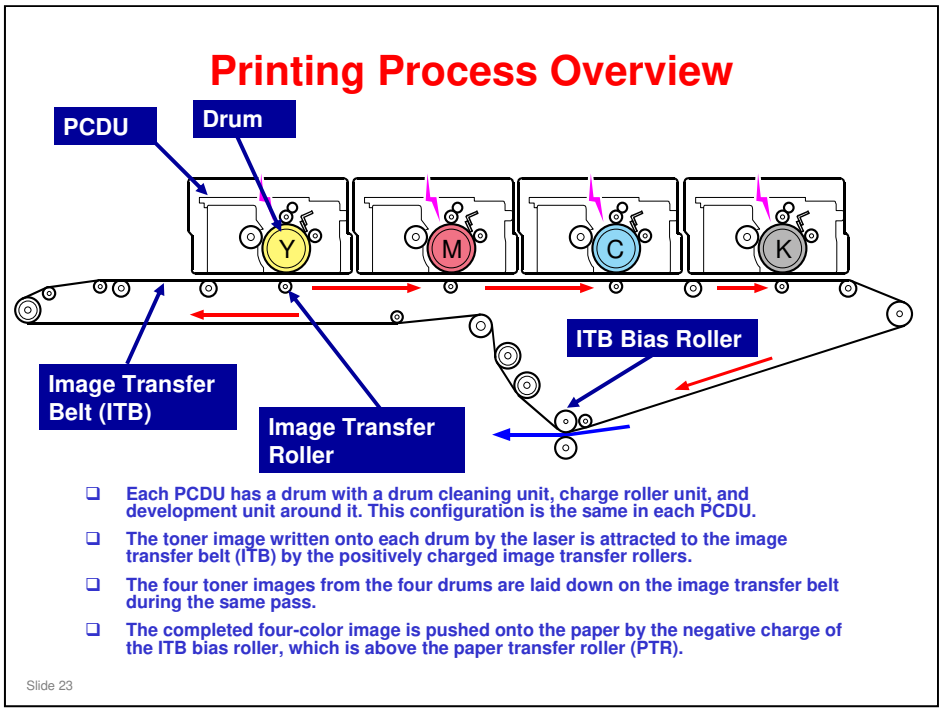
Paper Feed (Face-down Delivery, Purge)



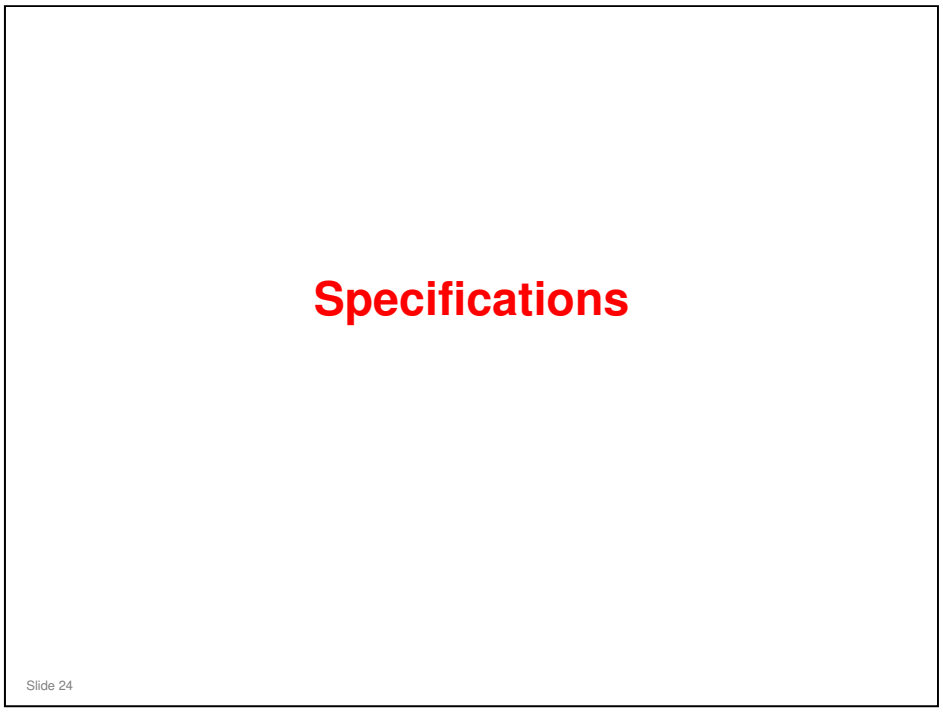
- Green: Inversion
- Blue: Feed to purge tray

Slide 22

No additional notes



❒ A transfer power pack in the ITB unit applies a positive charge to the image transfer rollers and a negative charge to the ITB bias roller.



No additional notes

Main Specifications (1)

	Taurus-C1/P1
Print Speed (A4/LT LEF)	C1a: 65 ppm, C1b/P1: 75 ppm
Toner Type	Chemical Toner
Fusing Type	Oil-less Belt Fusing
Print Resolution	1200 x 4800 dpi
Max Paper Size	13" x 19.2"
Max Paper Thickness	Simplex: 300 g/m^2 Duplex: 256 g/m^2
Paper Thickness by tray (g/m^2)	Mainframe Tray 1: 52.3 - 300 Tray 2: 52.3 - 256 A3/DLT LCT Tray 1: 52.3 - 256 Tray 2: 52.3 - 300 Tray 3: 52.3 - 256 Bypass: 52.3 - 216 Duplex: 60 - 256

Slide 25

- Print speed: The speed is the same for b/w and color. Above 220 gsm, print speed reduces to 45 ppm (C1a) or 52 ppm (C1b/P1).
- ADF 1 to 1 output speed is the same (65/75 ppm).
- Max paper thickness (duplex): AG-C1LT was 220 gsm
- Max paper thickness in the mainframe trays: AG-C1LT was 220 gsm
- Paper thickness: Please note the following limitations of the peripherals
  - Booklet finisher (without Z-folding): 60 - 216 gsm
  - Booklet finisher (with Z-folding): 64 - 105 gsm
  - Stapler (without Z-folding): 64 - 90 gsm
  - Stapler (with Z-folding): 64 - 80 gsm
  - Saddle stitching: 64 - 90 gsm
  - Folder (Single-sheet mode): 64 - 105 gsm
  - Folder (Multiple-sheet mode): 64 - 80 gsm
  - Ring Binder: 64 - 216 gsm
  - Stacker: 52 - 300 gsm
  - Buffer Pass Unit: 52 - 300 gsm
- Paper weight specifications
  - Paper weight 1: 52.3 - 63.0 gsm
  - Paper weight 2: 63.1 - 80.0 gsm
  - Paper weight 3: 80.1 - 105.0 gsm
  - Paper weight 4: 105.1 - 163.0 gsm
  - Paper weight 5: 163.1 - 220.0 gsm
  - Paper weight 6: 220.1 - 256.0 gsm
  - Paper weight 7: 256.1 - 300.0 gsm

Main Specifications (2)

	Taurus-C1/P1
Paper Input Capacity	Mainframe: 2,500 Tray 1: 2,000 (1,000 x 2) Tray 2: 500 Options: 4,500 LCT Tray 1: 1,000 LCT Tray 2: 2,000 LCT Tray 3: 1,000 Bypass: 500
Paper Output Capacity	Finisher Shift Tray 2500 (booklet finisher) 3000 (other finisher) Proof Tray 250 Stacker (D515) Stacker 5000 Proof Tray 250 Ring Binder (D519) 11 Booklets (100 pages each)

Slide 26

- Shift tray capacity and trimmer capacity depend on the number of sheets per set, type of stapling, folding, and paper size. See the specifications section in the service manual for full details.

Main Specifications (3)

	Taurus-C1/P1
Maximum Original Size	A3/DLT
Maximum Printable Area	323 mm x 480 mm, 12.7" x 18.9"
Warm-up Time	Less than 300 seconds
First Copy Output Time	Less than 11 seconds

Slide 27

- Maximum Printable Area: Width can be expanded from 480 mm up to 630 mm (24.8 in.) by setting SP5150-1 to ON.
  - 0: OFF, enables up to the standard 480 mm
  - 1: ON, enables up to 630 mm
- Limitations and Remarks for paper longer than 480 mm
  - Paper must be set one sheet at a time on the feed tray because the end-fence cannot support these paper sizes.
  - Automatic duplex disabled
  - Face-up stacking ONLY
  - Purge function for jams disabled
  - Side-to-side registration correction disabled

Comparison of Controller Specs

	AG-C1/P1 EFI Std.	Aries-C1.5/P1.5, Taurus EFI Std.
Base CTL	**-**	Pro 80
System	**System8R2**	System9R2
Type	**Integrated**	External
CPU	**Core2 Duo 2.16GHz**	Core2 Duo 3.00GHz
Memory	**DDR2/2GB**	**DDR2/2GB**
HDD	**500GB**	**160GB**
DVD Drive	**None**	Yes
Power Supply	**From Mainframe**	**External**
FACI Kit	**None**	Yes

Slide 28

- Enhanced hardware for more powerful processing
- DVD drive: Used for updating firmware

Target Reliability

- **Max Volume: 180k**
  - Recommended monthly volume range
    - » Taurus-C1a: 30k to 110k
    - » Taurus-C1b, Taurus-P1: 50k to 130k
  - Recommended average monthly volume
    - » Taurus-C1a: 50k
    - » Taurus-C1b, Taurus-P1: 70k
- **Max Life: 10,800k or 5 years**

Slide 29

- Aries-P1.5/C1.5: Max Volume 350K, Max Life 21,000K
- AG-P1L/C1L: Max Volume 192K, Max Life 11,520K

TCRU (ORU)

- **A total of eight units can be replaced by TCRU trained operators:**
  - Drum cleaning unit (PCDU)
  - OPC Drum (PCDU)
  - Charge roller unit (PCDU)
  - Fusing unit
  - Fusing cleaning unit
  - Paper transfer unit (contains the paper transfer roller)
  - ITB cleaning unit
  - Paper feed roller sets (one for each tray of the main machine, one for each tray of the LCIT, and one set for the bypass tray on top of the LCIT)

Slide 30

No additional notes

TCRU (ORU)

- **Developer is not a TCRU part for the Taurus series.**
- **The Fusing Unit is much lighter than AG/Aries. One person can replace this fusing unit, while two people are required to replace the AG/Aries fusing unit.**
- **Integrated TCRU firmware with multiple language support**
  - No SD card upgrade is necessary
- **In addition to these TCRU items, Lubricant powder for the drum and Driver TCRU are included in the TCRU kit.**

Slide 31

Replacement Guide: TCRU/ORU

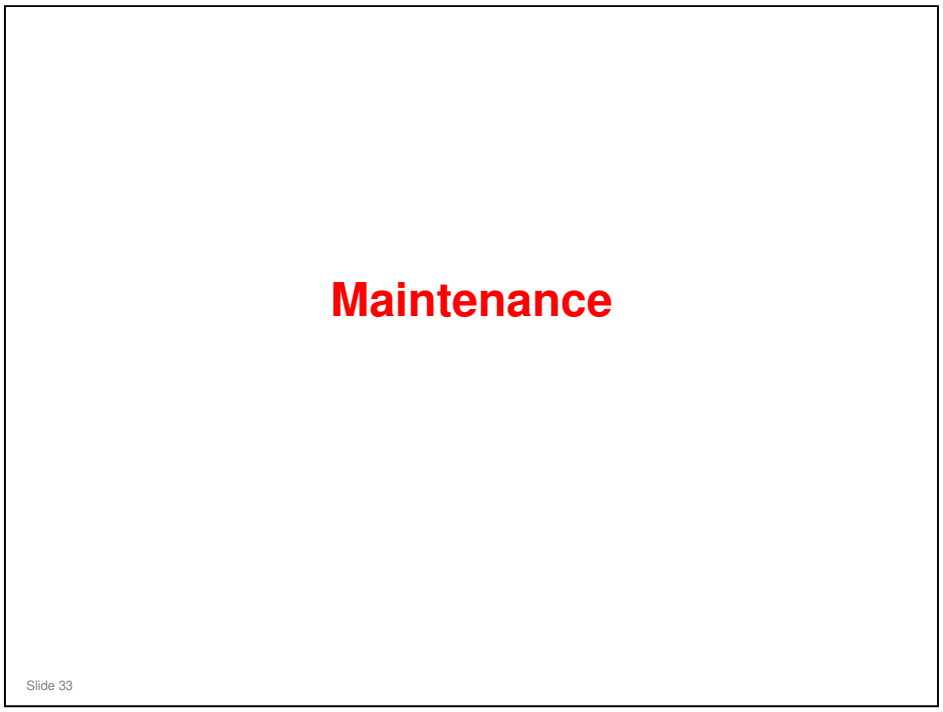
- Driver TCRU: A software tool for TCRU users that is provided with TCRU products.
- Lubricant powder: This is provided with the TCRU kit for use when replacing the drum. The service part for the technician to replace the drum does not have the powder. A bag of setting powder is available as a separate service part (part number G178 3799)

Replacement of Consumables During Printing

- **The following can be replaced during printing, so that operation can continue without interruption:**
  - Paper
  - Toner
  - Waste toner bottle

Slide 32

- This is the first time that a waste toner bottle can be replaced without stopping operation.



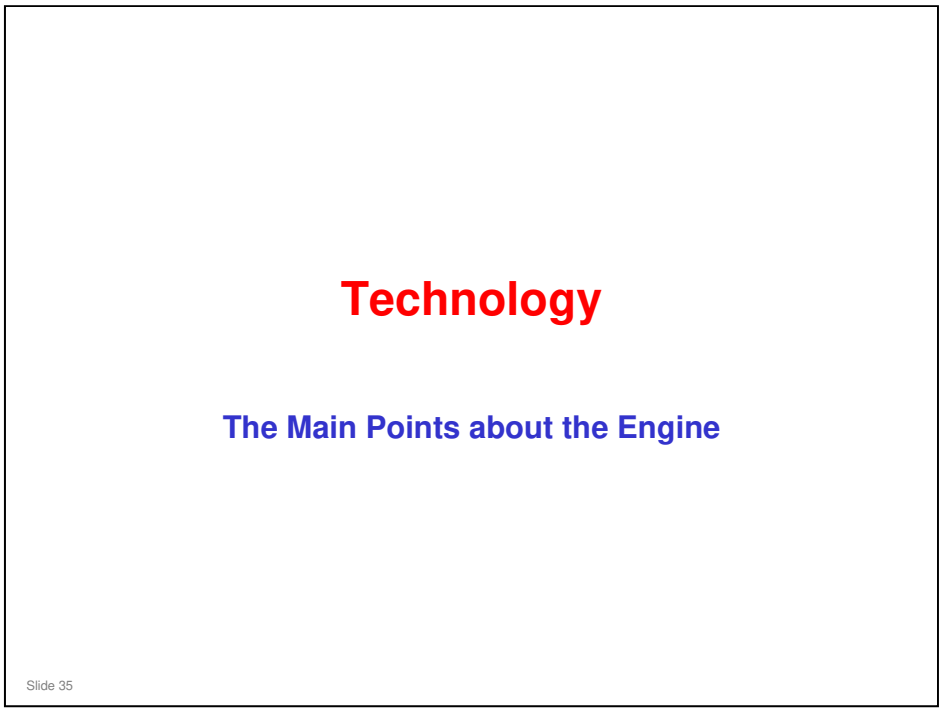
No additional notes

PM Table

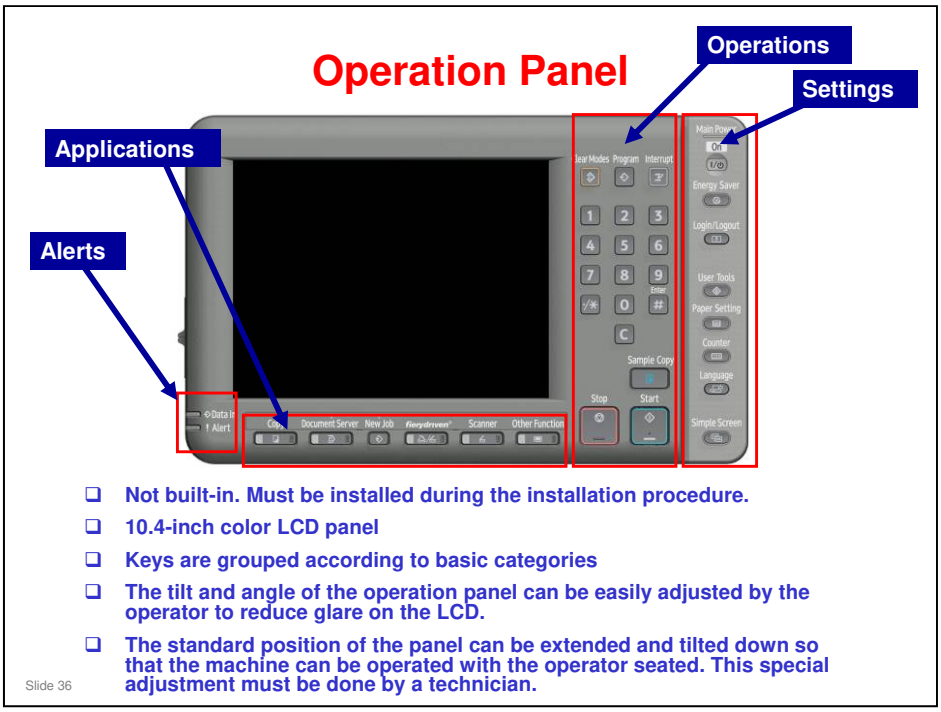
- **The basic PM interval for the main machine is 300k. Many parts are replaced at 300k or at a multiple of 300k. Some important exceptions are:**
  - Developer and development unit filters
    - » D074: 750K
    - » D075, M044: 900K
  - Drum *
    - » D074: 980K
    - » D075, M044: 1100K
  - ITB: 1600K
  - PTR Lubricant Bar *
    - » D074: 450K
    - » D075, M044: 500K
  - Fusing Unit *
    - » Fusing Belt, Hot Roller, Pressure Roller, Bearings, Thermistors, Lubrication of Gears: 650K
  - Web cleaning unit *: 450K
- **Inspection and cleaning of all rollers is recommended every 100k. Replace at 1000k.**
- **Lubrication of fusing unit parts is required. The procedures are in the Replacement and Adjustment section of the service manual.**
- **See the PM tables in the service manual for details of PM intervals for all parts, and for the peripherals, which have different schedules from the main machine.**
- **The development unit is not a PM item.**

Slide 34

- *: These components are part of units that can be replaced by TCRU trained customers.
- There will be more detail about TCRU procedures later in the course.



No additional notes



- Not built-in. Must be installed during the installation procedure.
- 10.4-inch color LCD panel
- Keys are grouped according to basic categories
- The tilt and angle of the operation panel can be easily adjusted by the operator to reduce glare on the LCD.
- The standard position of the panel can be extended and tilted down so that the machine can be operated with the operator seated. This special adjustment must be done by a technician.

Slide 36

- This slide shows the operation panel for the copier model. The printer model is similar, but has fewer keys.
- This is similar to the Aries-C1.5/P1.5 operation panel.

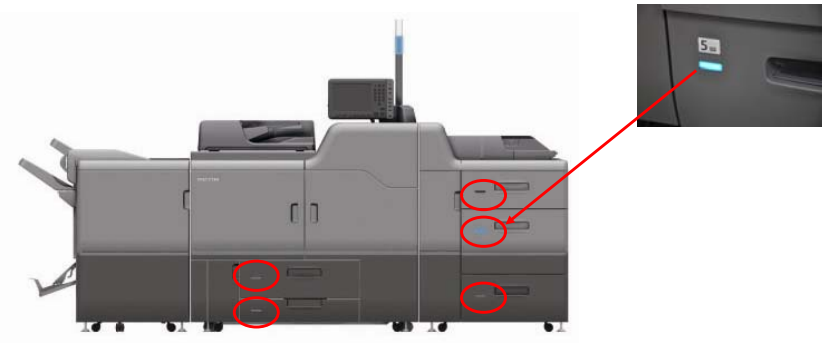
Attention Light

- This new light is taller and can be seen from a long distance.

Slide 37

- This is similar to the attention light for the Aries-C1.5/P1.5.

Active Tray Indicator



- Each tray has an LED lamp. It shows whether paper is being fed from the paper tray.
- This helps the user to avoid opening a tray that is being used to feed paper, preventing some paper jams.
- Also, by knowing which trays are not being used, users can refill paper in trays that are not being used, to prepare for later jobs.

Slide 38

No additional notes

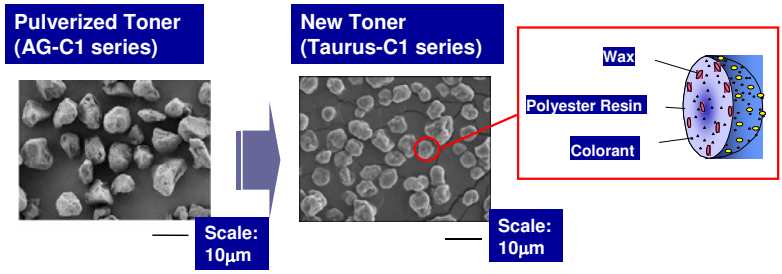
ARDF

- **The ARDF is basically the same as the D014/D015. However, there are some minor differences:**
  - Design changes in the front cover, rear cover, feed cover, and handles.
  - Color of the external covers has changed.
  - Shoulder screws are rounded.
  - Harness routing has changed.
  - Length and color of the interface cable have changed.
  - Speed is faster
  - Magnification range is 66% to 400% (D014/D015 is 50% to 400%)

Slide 39

No additional notes

New Toner (SPR-Ceγ)

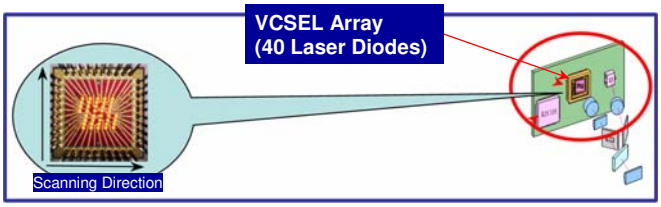


- This toner is an extremely fine oil-less chemical toner of uniform size. This enables a smoother toner surface after fusing, and good adhesion to thick paper.
- This toner achieves the following improvements in comparison with pulverized toner.
  - Sharp dot shape and consistent half tone image due to smaller and uniformly-sized toner particles
  - Reduction of mottled image due to smoother toner surface and optimization of additives.
  - Good adhesion on thick paper and lower toner pile height.
- This new toner has a low melting point. Less energy is consumed by the fusing unit
- No lubricating oil is required in the fusing unit.
- With this toner, the machine can print on a wider range of paper types, such as cotton and linen textured paper.

Slide 40

- This toner was used with Aries-C1.5/P1.5.
- The diameter of the pulverized toner particles is about 7 μm.
- The diameter of the new toner particles is about 5 μm.

New Laser Diode Technology



- This model uses VCSEL (vertical cavity surface emitting laser).
- The VCSEL unit used in this model is a two-dimensional array of laser diodes. This allows high printing speed (up to 75 ppm) and excellent image quality (1200 x 4800 dpi).
- In addition, the machine has a Mechanical Paper Registration Unit to improve image registration.

Slide 41

- 1,200 dpi: Main scan
- 4,800 dpi: Sub scan

Benefits of VCSEL Technology

- When printing duplex, some media/paper may shrink or expand after the front page goes through the fusing unit.
- Such changes in paper size may result in inaccurate registration on the front and back pages.
- VCSEL counteracts these problems.

Slide 42

No additional notes

Other Points about the Laser Unit

- **To correct color registration, the skew motor in the laser unit adjusts the position of the mirrors.**
  - In some other models, a small motor attached to the BTL does this adjustment.
- **The new VCSEL technology also improves mechanical performance by reducing the number of revolutions of the polygon motors.**
  - This extends the service life of the motors and reduces motor noise.
- **Only one SP mode is required after a laser unit is replaced.**
  - The machine automatically detects the parameters of the new laser unit. It is not necessary to input a lot of SP settings.
- **There are no service parts inside the laser unit. If a problem occurs in the field, replace the laser unit.**

Slide 43

No additional notes

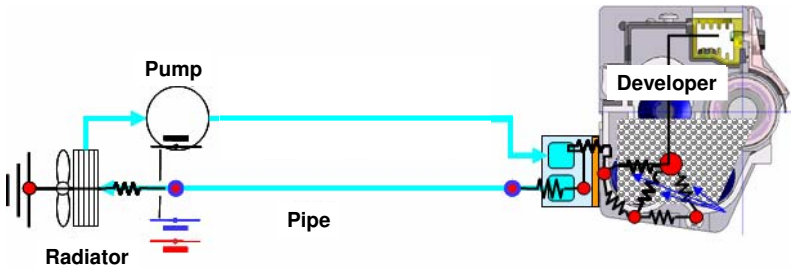
New Type of OPC

- **"Advanced Stabilization OPC"**
  - The Overcoat Layer is more durable. This improves the stability of the charge and produces more stable color during continuous printing jobs.

Slide 44

No additional notes

Liquid Cooling System for Developer (1)

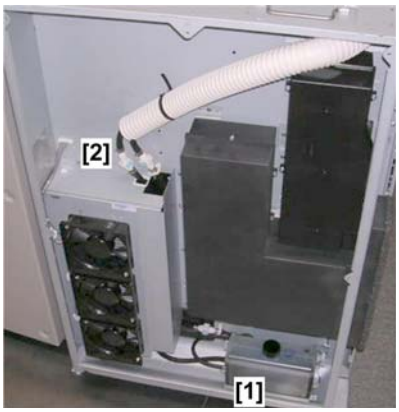


- In addition to the air cooling ducts and fans, this machine has a liquid cooling system for the developer in the PDCU.
- The radiator cools the liquid, which is pumped to the development unit to keep the temperature of the developer at the correct level.
- Compared with an air cooling system, this system has two advantages.
  - It requires less space than an air cooling system.
  - A liquid cooling system makes it possible to maximize operation time, because the machine does not need to stop temporarily for a PCDU to cool if temperature becomes too high.

Slide 45

- This is the first time that a liquid cooling system has been used in a digital cut-sheet product.

Liquid Cooling System for Developer (2)



- **Liquid coolant is pumped from a tank [1] and circulated through the jackets of the development units through two hoses [2].**
- **The rubber tubing is guaranteed for 20 years of use at 70° C (158° F).**
- **Rate of evaporation of coolant:**
  - 150 cc/7 years at 32° C (90° F) running 24 hours/day with FC duplexing.
  - 86 cc/7 years at 25° C (77° F) running 24 hours/day with FC duplexing.

Slide 46

No additional notes

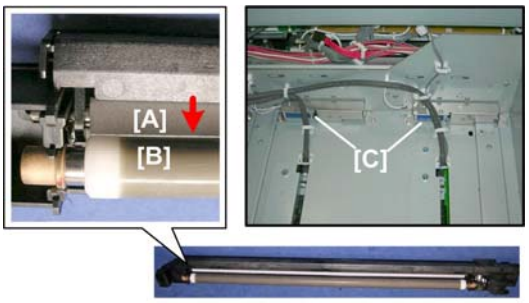
Fresh Toner Contains Developer

- Toner in each toner bottle is pre-mixed with a small amount of developer.
- This prevents density fluctuation during high color coverage and large volume printing.

Slide 47

No additional notes

PCDU (1)

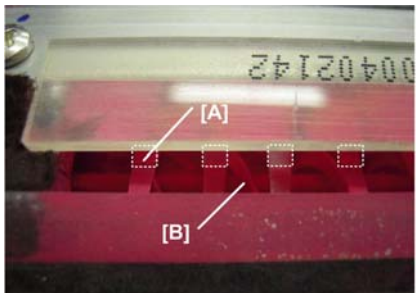


- **Charge Unit**
  - This machine uses charge rollers to charge the drums. There are no charge corona units. This reduces the amount of ozone created by the machine.
  - There is a charge roller cleaning roller [A] above the charge roller [B] in each PCDU. This cleaning roller is lowered to clean the charge roller every 1,000 prints. The solenoids [C] that operate these rollers are mounted behind the laser units.

Slide 48

No additional notes

PDCU (2)

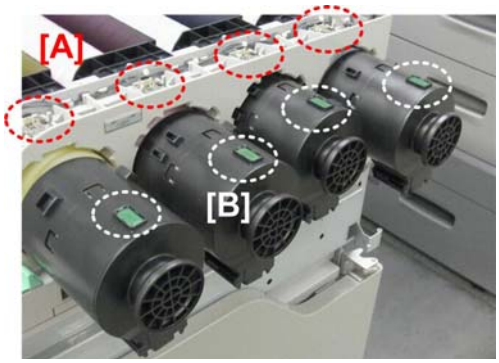


- **Drum Cleaning Unit**
  - There are mylars [A] above the used toner transport coil [B] in each PCDU. The slight vibration set up by the auger turning against the mylar prevents used toner from clumping when it is transported out of the back of the unit .
  - There is no brush cleaning roller in the drum cleaning unit. The drum cleaning unit is comprised of the drum cleaning blade, lubrication bar, lubrication roller, and lubrication blade.

Slide 49

No additional notes

Toner Bottles



- This machine uses RFID (Radio Frequency IDentification) technology.
- Each reader PCB [A] is paired with a tag PCB [B] on top of each toner bottle.

Slide 50

No additional notes

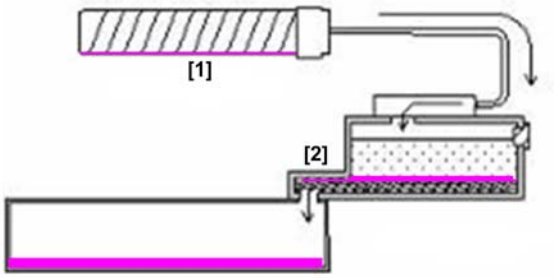
Toner Bottles

- The toner bottles are designed for easy handling and replacement.
- They can be replaced by the operator from a seated position.

Slide 51

No additional notes

Replacing the Toner Bottle



- An empty toner bottle [1] can be replaced while the machine is printing.
- After the machine signals toner end for a bottle, there is still enough toner in the sub hopper [2] for the machine to print 480 sheets (A4 LT @ 5% coverage).
- The gives the operator enough time to replace an empty bottle without shutting down the machine.

Slide 52

No additional notes

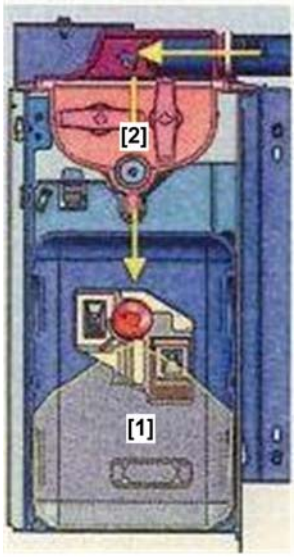
Replacing the Used Toner Bottle

- The used toner bottle is at the lower left corner of the main machine behind the left door.
- Just pull it out by its handle.
- The cap [1] of the used toner bottle has a reverse thread. Turn it clockwise to remove it.
- When the used toner bottle is full, it can be removed and replaced with an empty bottle while the machine is operating.

Slide 53

No additional notes

Replacing the Used Toner Bottle



- When the used toner bottle [1] is full, it can be removed and replaced with an empty bottle while the machine is operating.
- The reservoir [2] above the bottle can continue to receive and hold used toner while the bottle is out of the machine.
  - A spring loaded stopper tightly seals the toner port between the reservoir and bottle when the bottle is removed.
- The bottle replacement is done by the service technician (or an operator if an empty toner bottle is available).
- However, the service technician must remove the full bottle and empty it at the service center.

Slide 54

- If the reservoir starts to get full with the used toner bottle out of the machine, a sensor detects this and the machine stops.

Changes to Process Control

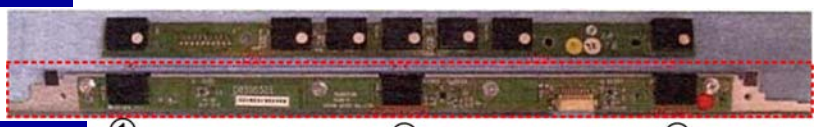
- **New 'active toner control' technology samples the pixel count rapidly at set intervals of time.**
  - Increasing the number of samples ensures even density in filled areas.
  - In previous machines, patterns were sampled during process control after each printed sheet.
  - This new technology also takes into account the time for newly added toner to get from the toner inlet to the development roller/drum interface via the augers.

Slide 55

No additional notes

Components used during Process Control

D016 series

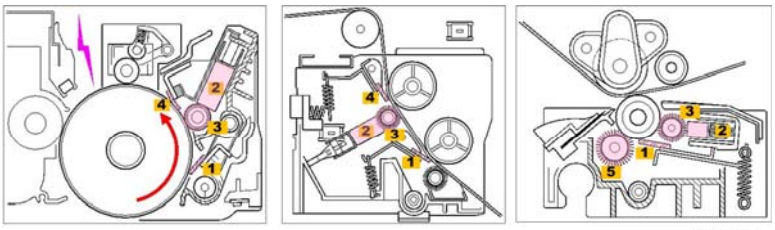


- **This machine has three ITB sensors (see above). Only the middle sensor functions as an ID sensor, but all three sensors are active MUSIC sensors.**
- **Two temperature/humidity sensors are used during process control.**
  - One is located on the left, below the used toner bottle motor. The other is on the right near the K_PCDU.

Slide 56

- The number of sensors in the ITB sensor array has been reduced. The D016, for example, had seven sensors as shown above: three MUSIC sensors and four ID sensors.
- Temperature/humidity sensors: In previous machines, the left sensor was higher and near the Y_PCDU.

Cleaning Units: Common Design



- One basic cleaning and lubrication mechanism is used in key components of the machine.
- A cleaning blade [1], lubricant roller [2], lubricant bar [3], and lubricant blade [4] are the cleaning mechanisms (with some variation) in the following units:
  - [A] Drum cleaning unit
  - [B] ITB cleaning unit
  - [C] PTR cleaning unit
- All of these units use a dry lubricant (Zinc Stearate) supplied by a lubricant bar.
- The fusing unit has a web cleaning mechanism to clean the fusing belt. There is no oil lubrication system for the fusing belt.

Slide 57

The PTR cleaning unit has a cleaning brush roller [5] instead of a blade [4].

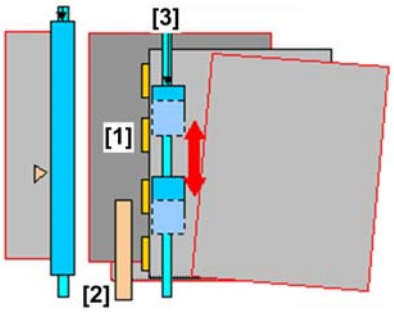
Paper Feed (1)

- **Paper Transport Unit**
  - The paper is held onto the paper transport belt by three fans: Rear, Front, Center.
  - Compared to previous machines:
    - » The paper transport unit frame of this machine is made of plastic, making it lighter for TCRU trained operators to handle.
    - » The unit is easier to remove with its drive in one piece.
- **Paper Cooling Unit**
  - The cooling belt has been reduced from four belts to a single belt.

Slide 58

No additional notes

Paper Feed (2)

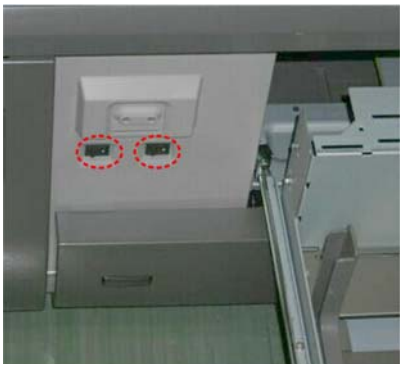


- **Paper Registration**
  - The high-precision paper registration unit used in the D016 has been adopted for use in this machine.
  - The position of the paper in the paper path is corrected twice by the paper registration unit in the main machine, once to correct for skew and once for side-to-side registration.
- **Paper registration is done once in the main machine. There is no paper registration correction mechanism in the optional LCIT.**

Slide 59

- Skew correction. The paper pauses very briefly in the registration unit so that its leading edge hits a raised registration gate [1] to buckle the paper and align it.
- Side-to-side adjustment. After the registration gate lowers, the paper passes through the shift roller unit, where a CIS [2] detects its front edge to determine if the paper has shifted forward or back. If adjustment is needed, the shift roller unit [3] holds the paper and moves forward or back to adjust the paper position before the paper feeds to the paper transfer roller.
- The combination of laser VCSEL technology and paper registration correction ensures that the image is always precisely positioned on the paper.

Paper Tray Heaters



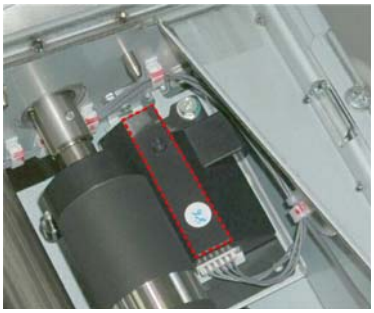
- **The paper tray heaters (x2) can be switched on/off.**
  - Default: OFF.
- **The tray heaters do not require installation or connection at installation.**

Slide 60

- The left switch controls the heaters in the paper trays (paper bank and LCIT). The right switch controls the ITB heaters.
- Details about how to set up the heaters will be explained in the Installation section.

Image Transfer Unit (1)

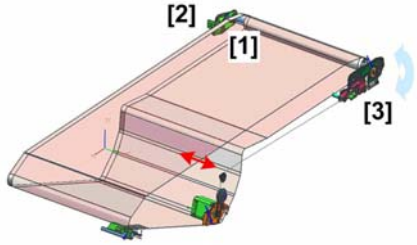
- **Two motors raise and lower the ITB. One motor operates the left tray (contains the components for YMC) and one motor operates the right tray (K).**
- **The belt centering sensor for this machine is simpler than the D016.**
  - The sensor, a small CIS, (shown below with the ITB removed) is mounted below the rear edge of the belt. It monitors the position of the belt directly. The pendulum actuator mechanism of the D016 has been eliminated.



Slide 61

No additional notes

Image Transfer Unit (2)

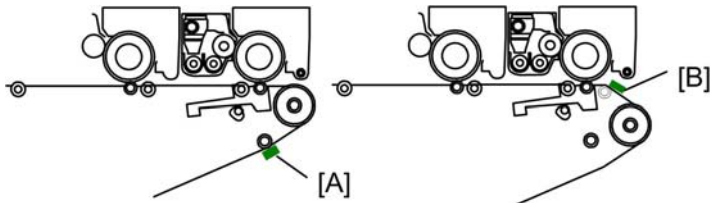


- This machine uses the same steering control mechanism as the D016.
- This mechanism checks and corrects the positioning of the ITB to keep it centered and prevent color offset in images.
- A sensor at the right upper corner [1] of the ITB unit constantly monitors the position of the ITB.
- If the ITB shifts forward or backward, the steering control motor [2] (located on the left front of the ITB unit) corrects the position of the belt with the steering control mechanism [3].
- This system eliminates physical wear on the edge of the belt that would be caused by an ITB guide fence.

Slide 62

No additional notes

Image Transfer Unit (3)

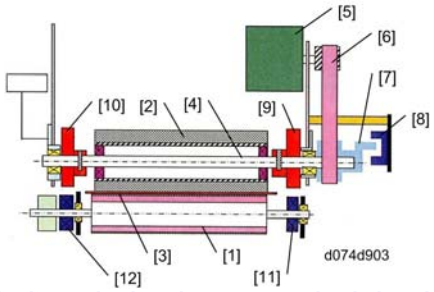


- The location of the ITB sensor array (ID and MUSIC sensors) has changed.
- In previous machines, the ITB sensor array [A] is located farther downstream and below the ITB.
- In this machine, the ITB sensor array [B] is located above the ITB on the right end of the ITB unit below the K_PCDU.

Slide 63

No additional notes

New ITB/PTR Separation Mechanism



- When the right drawer is closed, a strong spring below the PTR unit rotates two cams up that lock the PTR [1] up against the bias roller [2] of the ITB unit.
- The bias roller rotates freely around the cam shaft [4].
- When the PTR separation motor [5] turns on, the belt [6] turns the cam shaft counter-clockwise until the actuator [7] of the PTR separation sensor [8] rotates out of the sensor (this stops the motor). At this time, the front [9] and rear [10] cams are pushing down on the front [11] and rear [12] collars of the PTR. This separates the PTR from the bias roller.
- When the machine switches on the separation motor again, it rotates the cam shaft and cams clockwise and up. This releases the pressure of the cams on the PTR below, and the PTR and bias roller come together.

Slide 64

- This mechanism is unique in that the mechanism that separates the rollers has been moved from the PTR unit to the ITB unit. The PTR separation motor, PTR separation sensor, and cam shaft are in the ITB unit. The PTR separation motor and separation sensor are on the front of the ITB unit.
- There is no PTR lift motor.

New ITB/PTR Separation Mechanism

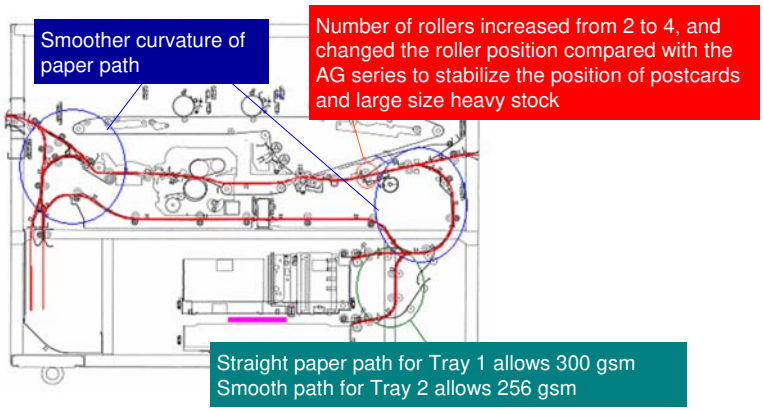
- **The cams are rotated down to separate the bias roller and the PTR at the following times:**
  - Ready mode. After the machine enters Ready mode. This keeps the PTR separated from the bias roller. If the rollers were to remain in contact while the machine is idle, the hard surface of the PTR would deform the shape of the soft bias roller.
  - Thick Paper. Just before thick paper enters the nip of the bias roller and PTR, the cams are rotated down briefly to widen the nip for the thicker paper, and then rotated up again to close the nip. This action eliminates "shock jitter" which can occur when the leading edge of thick paper enters a narrow nip.
  - Belt Lubrication Mode. The cams are rotated down to open the nip for lubrication of the belt after the ITB has been replaced, for example.
- **The cams remain up and the rollers pressed together in all other cases, for color and monochrome printing, process control, and MUSIC adjustments, and so on.**

Slide 65

No additional notes

Printing on 300 gsm Paper (1)

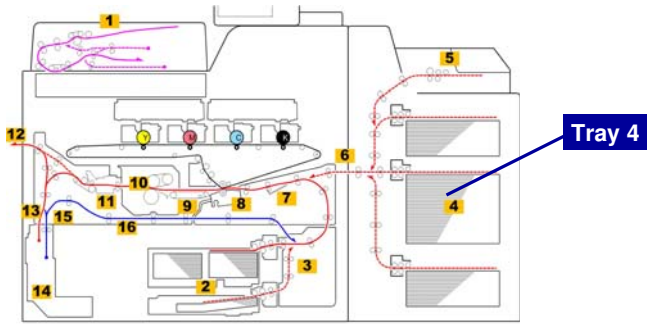
- The paper path was designed to support 300 gsm from Tray 1 (256 gsm for duplex).
- The height of the machine is less than Aries, so the arcs of curvature in the feed path were made wider.



Slide 66

- 300 gsm: 30 grams per square meter
- Supporting 300gsm printing is strongly requested by direct mailers and PFP for post card and business card printing.

Printing on 300 gsm Paper (2)



- **The middle tray of the optional LCIT (Tray 4) can also feed 300 gsm paper.**
- **All trays can feed coated paper, without installing special rollers.**
- **Only the stacker and buffer pass unit can handle 300 gsm paper.**
  - The other peripherals can pass this paper straight through, but cannot carry out finishing operations.

Slide 67

- Refer to the specifications for details on maximum paper weights that can be handled by each unit.

Printing on 300 gsm Paper (3)

- Unlike the AG/Aries series, this machine's printing speed slows down by 30% for paper thicker than 220 gsm.

Slide 68

No additional notes

Improved Fusing Unit

- The fusing unit is lighter than the Aries. It can be lifted and carried by one service technician.
- Even though the fusing unit is light (17 kg), it can exert enough fusing pressure for printing on thick or textured paper.
- The heating roller is more compact. The diameter is less than than Aries, which helps to handle thinner paper without an air separator.
- The D074/D075/M044 machines use the same fusing unit.

Slide 69

No additional notes

Fusing Belt Cleaning

- There is no fusing belt cleaning roller. The cleaning fabric touches the surface of the pressure roller directly.
- There is no oil supply mechanism for lubricating the fusing belt in this machine.
- In this machine, the web end sensor of the fusing cleaning unit is a photo-sensor. It signals web end when it can no longer detect the surface of the fabric. This is a much simpler design.

Slide 70

- The fusing cleaning unit of previous machines had a fusing belt cleaning roller between the fusing belt and the cleaning fabric. The roller scavenged toner, dust, etc. from the surface of the fusing belt.

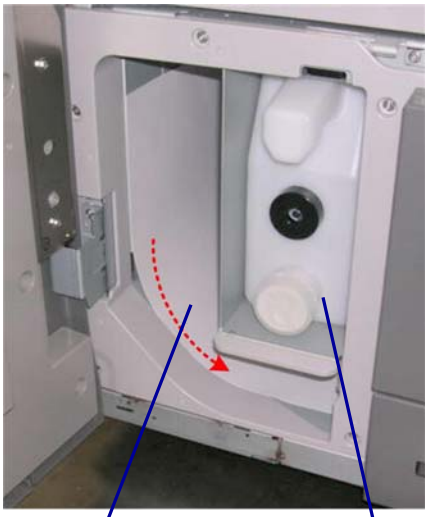
Decurler Unit

- The decurler unit is an option, but it is strongly recommended that you install it.
- This unit fits into the left side of the main machine.
- It has no purge tray (the purge tray is built into the main machine).
- The decurl unit corrects both convex and concave curling, a common problem with thin paper and prints with high toner coverage.
- The decurl unit has two paper paths.
  - The lower paper path [1] corrects face curling (concave curling), and the upper path [2] corrects back curling (convex curling).
  - The decurl unit is raised and lowered with an operator setting to select the paper path, depending on which type of correction is needed.

Slide 71

No additional notes

Purge Tray



- After a jam, paper that has not left the main machine is moved to the purge tray on the left side of the main machine.
- This eliminates the task of searching for every sheet remaining in the main machine or LCIT after a jam occurs downstream.
- The operator can remove the paper at the jam point as instructed and then collect other sheets from the purge tray by opening the left front door.

Slide 72

- When the lower left front door is opened, you can see the purged paper next to the used toner bottle.
- After paper falls into the purged paper path, this triggers a message on the operation panel. The paper must be removed before normal operation can resume.

Reduction of Wear on Components

- As in previous machines, this machine has mechanisms to separate parts where pressure is exerted during normal operation.
- These mechanisms reduce wear on parts and prolong service life of components.
  - ITB lift mechanism
  - ITB/PTR separation mechanism
  - Pressure roller lift mechanism

Slide 73

No additional notes

No additional notes

Basic Points

- The covers of all peripheral units have been re-designed to match the shape and color of the main machine.
- There are no breaker switches in the peripheral units (except for the ring binder).
  - Inspect and test the breaker switches at least once a year.

Slide 75

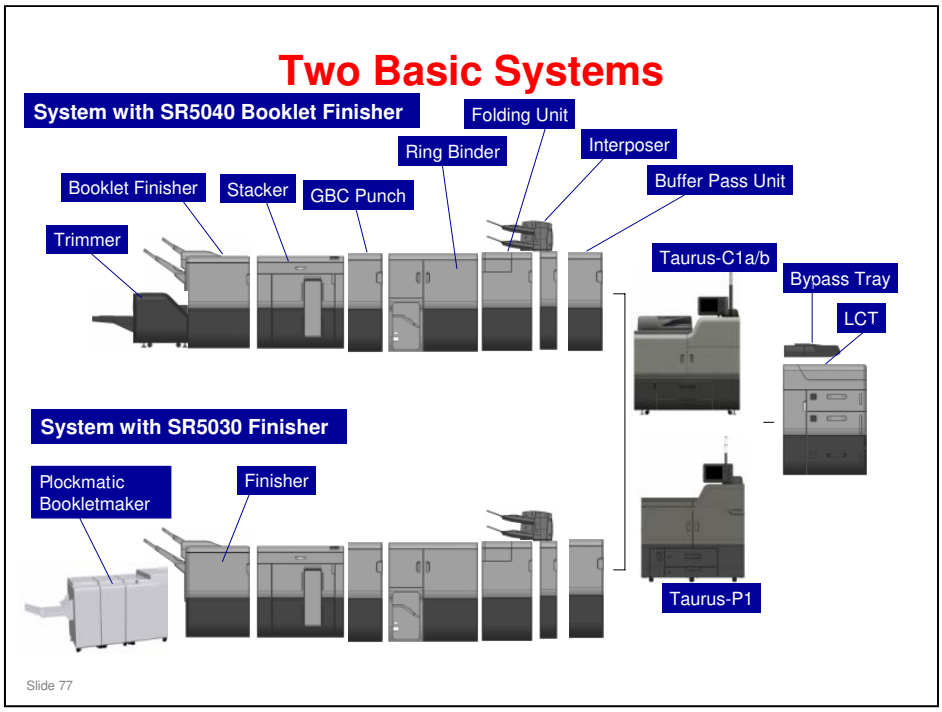
No additional notes

Two Basic Systems

- There are two basic configurations, depending on the type of finisher installed at the end of the line.
  - Standard finisher system
  - Booklet finisher system
- It is also possible to install without either of these finishers, but in this case, a stacker must be installed.
- The standard finisher and the booklet finisher cannot both be installed on the same machine.

Slide 76

No additional notes



- Note that the peripherals are similar to existing models, but they are all new models because of the new two-tone cover coloring for the Taurus series.
- Notes:
  - If the multi-folding unit is installed, the buffer pass unit must be installed.
  - If any of these units are installed, one of the finishers must be installed: Folding unit, cover interposer, buffer pass unit, GBC punch unit, or ring binder are installed. If none of these are installed, then the stacker (SK5020) may be the last finishing option in the configuration if required.
  - The trimmer can only be installed with the booklet finisher.

Peripherals (1)

- **Multi Bypass Tray BY5010: Similar to the Katana-C2**
- **LCIT RT5060: Similar to the Katana-C2 A3/DLT LCT**
  - There is no optional A4/LT LCT.
  - Only one LCT can be installed.
- **A3/11"x17" Tray Unit TK5010 : Similar to the Katana-C2**
- **Decurler Unit DU5010: Similar to the Katana-C2**
- **Buffer Pass Unit Type 5010: Similar to the Aries-C1.5**
- **Cover Interposer Tray CI5020 (two trays): Similar to the Katana-C2**
- **Multi-Folding Unit FD5010: Similar to the Katana-C2**
- **Ring Binder RB5010: Similar to the Katana-C2**
  - Ring Opener Type A

Slide 78

- Note that the peripherals are similar to existing models, but they are all new models because of the new two-tone cover coloring for the Taurus series.
- The LCT has air-assisted feed, like the Aries-C1.5. The paper feed rollers are TCRU items, also like the Aries-C1.5.
- There is no A4/LT LCT for this model.

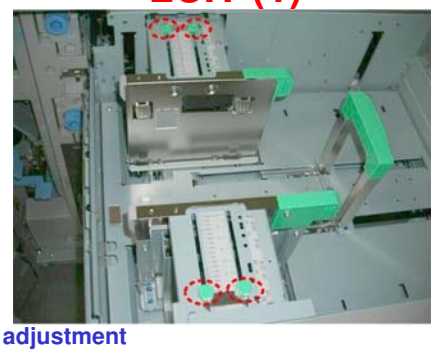
Peripherals (2)

- **High Capacity Stacker SK5020 (5,000-sheet stacker): Similar to the Katana-C2 and Aries-C1.5 (SK5010)**
  - Roll-Away Cart Type 5010: A spare cart for SK5020 (one cart is included with the SK5020)
- **Finisher SR5030 (no saddle stitching): Similar to the Katana-C2 and Aries-C1.5 (SR5020)**
- **Booklet Finisher SR5040 (with saddle stitching): Similar to the Katana-C2 and Aries-C1.5 (SR5020)**
- **Trimmer Unit TR5040 (booklet trimmer for SR5040): Similar to the Katana-C2**
- **Punch Unit: Can be used with either of the two finishers**
- **Optional Counter Interface Unit Type A**
- **Color Controller E-41A (external EFI Fiery controller): Similar to the Aries-C1.5**
- **VM Card Type R**

Slide 79

- The finishers are both based on the SR5020 (D434).
- The booklet finisher can make booklets of up to 20 sheets.

LCIT (1)

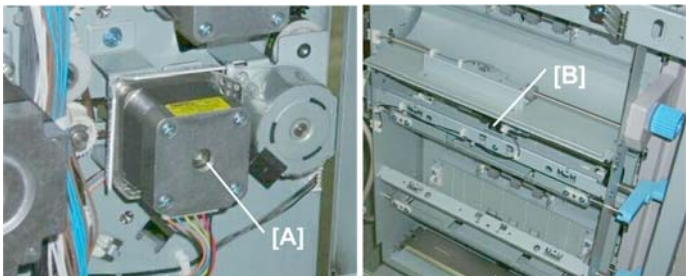


- **Side fence adjustment**
  - The side fence adjustment mechanism of the LCIT has been re-designed to make it easier to change paper sizes. The side fences can be adjusted by loosening the screws and sliding the fences (see above). The screws do not need to be removed.
- **No CIS unit**
  - There is no CIS adjustment at installation. The LCIT does not have a CIS unit for paper registration. Side-to-side registration is performed once with a CIS in the registration unit of the main machine.

Slide 80

No additional notes

LCIT (2)

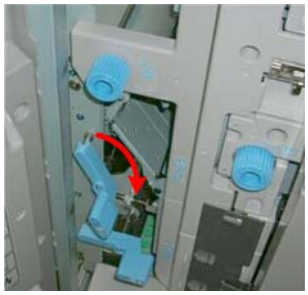


- There is a new mechanism at the paper exit to retract the exit idle roller from the paper. This releases the paper for side-to-side registration in the main machine.
- The mechanism consists of a motor [A] on the back of the unit and the idle roller HP sensor [B] at the LCIT paper exit.

Slide 81

No additional notes

LCIT (3)



- The LCIT jam release mechanism has been re-designed for "one-action" removal.

Slide 82

No additional notes

Buffer Pass Unit

- Installed on the left side of the main unit, this option allows paper and toner to cool before it is fed to downstream peripherals.
- This prevents toner from sticking to other sheets of paper after stacking.
- It contains 8 fans.
- The DC motor is slightly slower than the motor of the previous model.
- This option is recommended for use with the Multi Folding Unit.

Slide 83

No additional notes

Cover Interposer

- **Paper Path**
  - The unit is taller than the previous model.
  - The paper feed path is 20 mm longer but there are no added rollers.
- **Installation**
  - The black mylar is no longer required for connection to the next peripheral unit downstream.
  - The separate joint brackets (x2) for docking have been replaced with a T-bar, like most of the other peripherals.

Slide 84

No additional notes

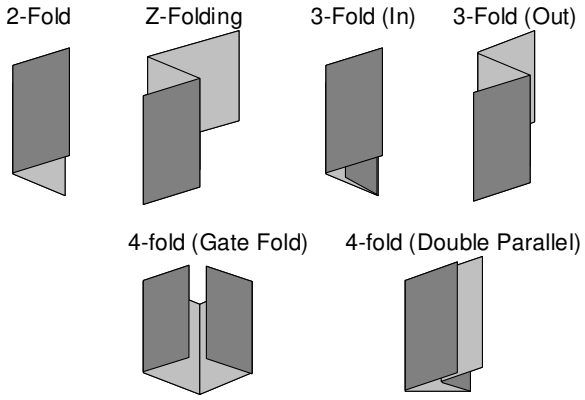
Multi-folding Unit

- **There is a new 'Glossy paper mode' (half speed).**
  - The 1st fold motor and crease motor have been replaced by motors capable of slower speeds to accommodate half-speed mode for glossy paper.
- **Elimination of stripe tracks at the leading edges of folded coated paper.**
  - The ribs of the gate-fold guide plate have been removed and replaced with a smooth surface.
- **Up to 3 sheets of paper can now be folded (64 to 80 g/m2)**
  - Only for three types of folding can be used in this mode: 2-fold, 3-fold in, 3-fold out
- **Coated paper can be folded.**
- **The relay guide is now the same as other peripheral units.**
- **Two accessories have been discarded (proof tray auxiliary trays).**

Slide 85

No additional notes

Multi-folding Unit: Types of Folding



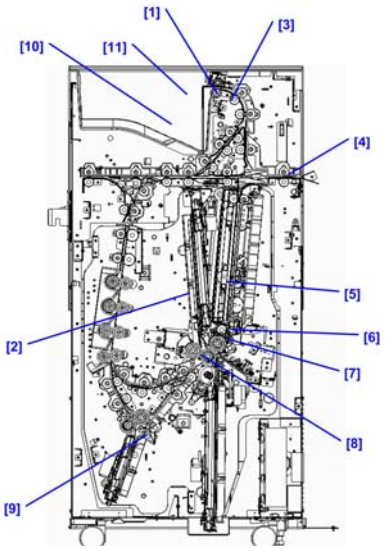
- The types of folding are the same as the previous model.

Slide 86

No additional notes

Multi-folding Unit: Modifications

Overview

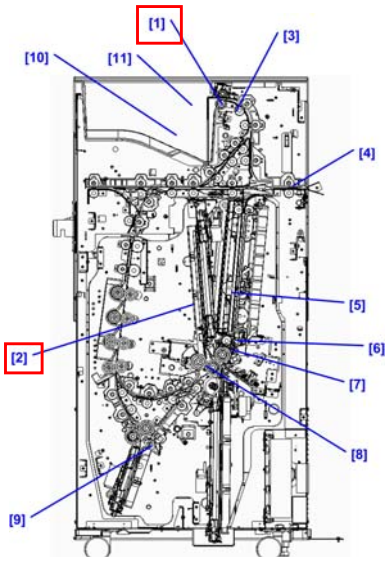


- The diagram shows the locations of the modifications.
- The next few slides explain the modifications.

Slide 87

No additional notes

Multi-folding Unit: Modifications

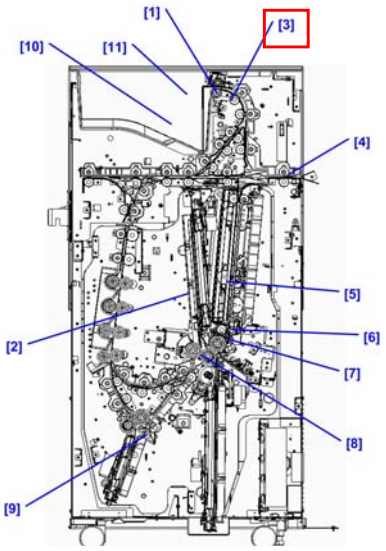


- **[1] Roller marks on coated paper**
  - The exit roller has been replaced with the same type of roller used in the High Capacity Stacker, to reduce roller marks on coated paper.
- **[2] Gate folded (FM6) cloth coated paper fold position**
  - The gap before and after the guide plate of the 2nd stopper has been widened to allow cloth coated paper for gate folding.

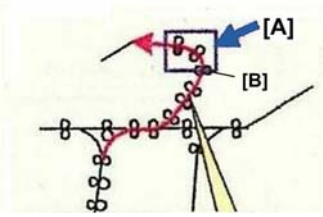
Slide 88

No additional notes

Multi-folding Unit: Modifications



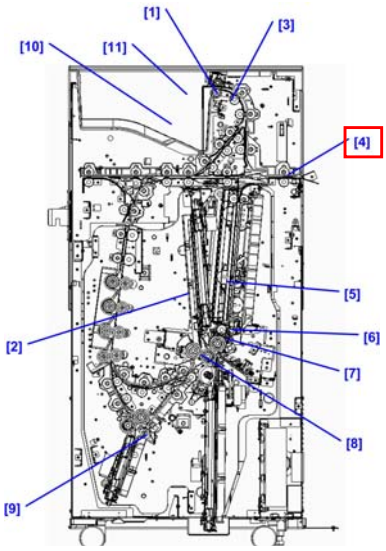
- **[3] Improved feed-out of small Z-folded paper**
  - An extra drive roller [A] above the exit roller [B] at the top tray exit has been added to improve feed-out of small Z-Folded (FM1) paper.



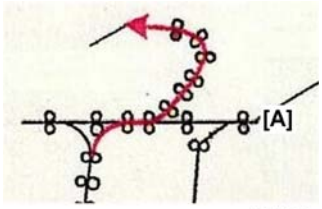
Slide 89

No additional notes

Multi-folding Unit: Modifications



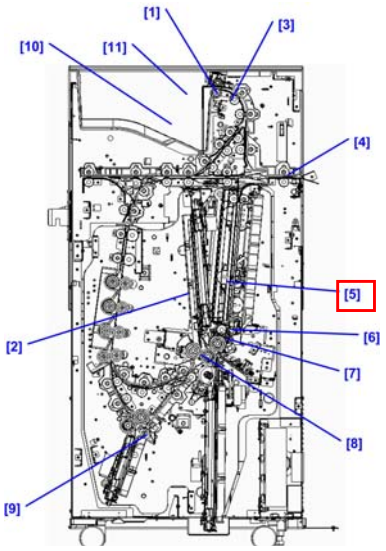
- **[4] Improvement in multiple folding**
  - The entrance roller [A] and other transport rollers are driven independently.
  - This allows effective control of the line speed while paper is fed from the main machine.



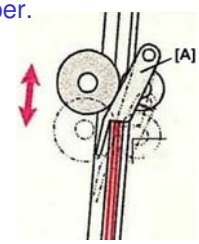
Slide 90

No additional notes

Multi-folding Unit: Modifications



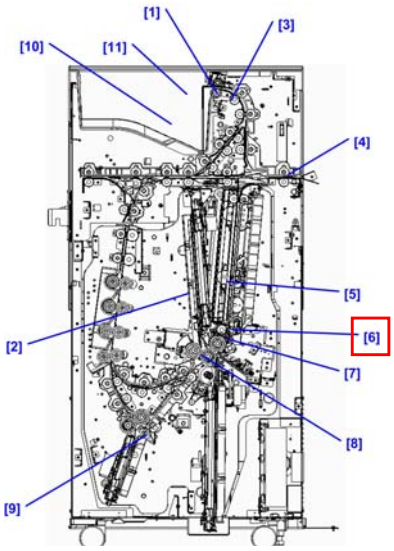
- **[5] Elimination of roller marks during multiple folding**
  - The movement of the TE stop pawl [A] raises and lowers the paper for registration.
  - At the same time, the transport rollers stop rotating, to prevent the rollers from marking the paper.



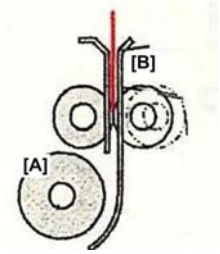
Slide 91

No additional notes

Multi-folding Unit: Modifications



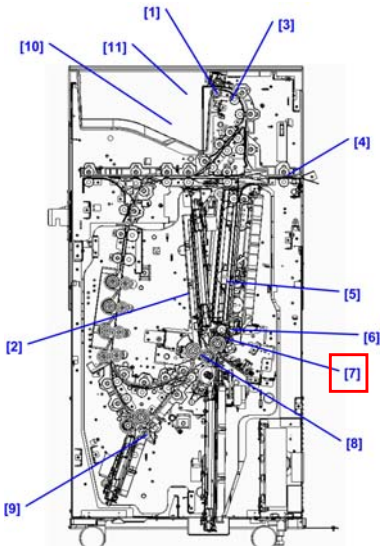
- **[6] Elimination of damage to leading edges of paper**
  - Above the 1st feed roller [A], the guide plate [B] above the nip has been lengthened, and the width of the path has been narrowed, to prevent distortion of the leading edges of paper.



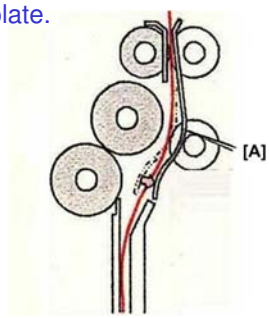
Slide 92

No additional notes

Multi-folding Unit: Modifications



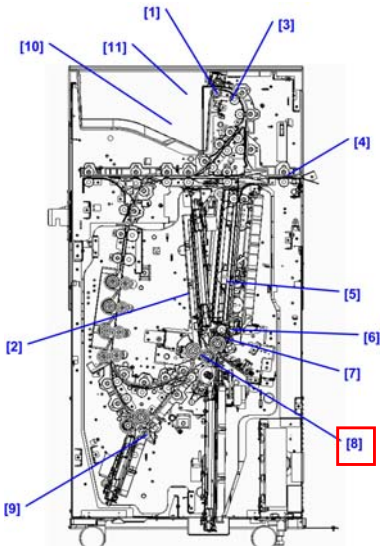
- **[7] Improved folding for coated paper**
  - The guide plate [A] can be moved to widen the space in the turn of the transport path, for easier folding with the fold plate.



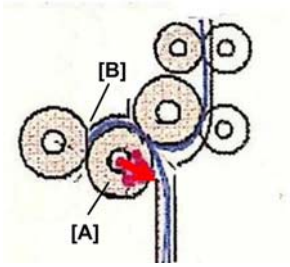
Slide 93

No additional notes

Multi-folding Unit: Modifications



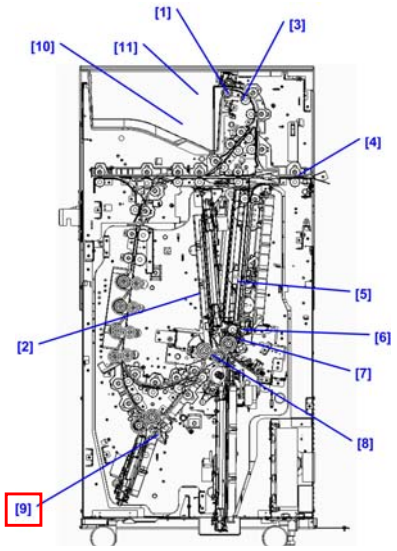
- **[8] Elimination of roller marks when two sheets are folded**
  - When two sheets are folded at the same time, the 2nd fold roller [A] pulls away to widen the 2nd nip [B].



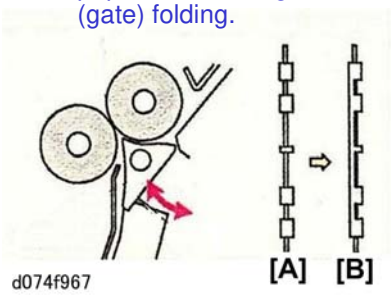
Slide 94

No additional notes

Multi-folding Unit: Modifications



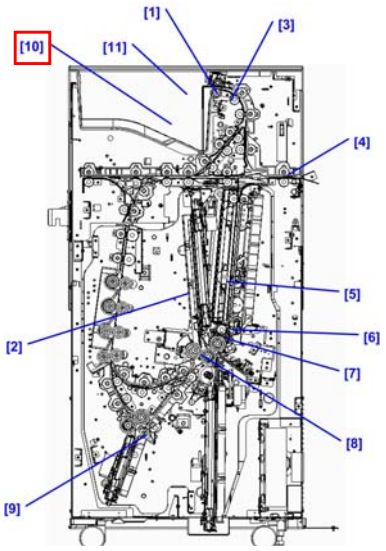
- **[9] Elimination of wrinkling in gate-folded large paper sizes**
  - The shape of the FM6 pawl [A] has been changed [B] to prevent the wrinkling of large paper sizes during FM6 (gate) folding.



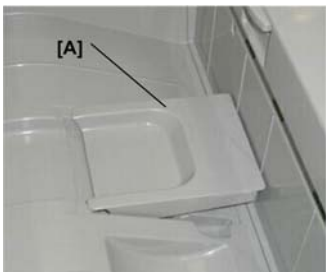
Slide 95

No additional notes

Multi-folding Unit: Modifications



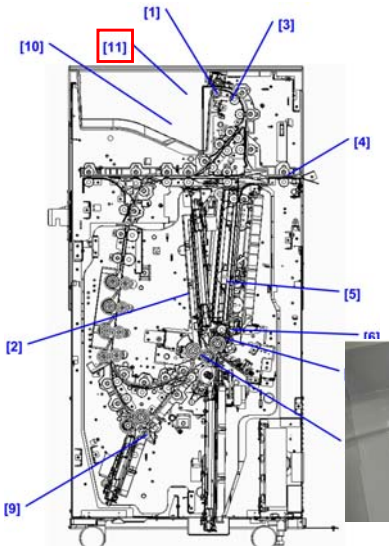
- **[10] Prevention of early top tray full alert with FM1 folding large paper sizes**
  - An auxiliary tray [A] keeps Z-folded paper (FM1) flat in the tray so that a trailing edge does not trigger an early tray-full alert in the top tray.



Slide 96

No additional notes

Multi-folding Unit: Modifications

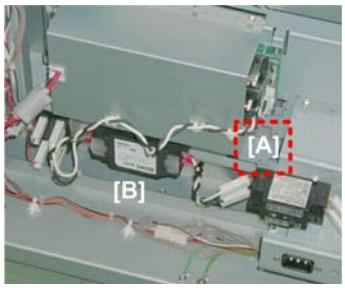


- **[11] Prevention of early top tray full alert with FM3 folding**
  - The trailing edge of a multi-folded sheet can open, and trigger an early top-tray full alert.
  - A flexible page depressor [A] is provided as an accessory, to prevent folded paper (especially FM3 Letter Fold-out sheets) from triggering an early tray full alert in the top tray.

Slide 97

No additional notes

Ring Binder



- The surge PCB [A] has been removed and a noise filter [B] has been added.

Slide 98

No additional notes

Stacker

- **Stacking**
  - The stacker can stack up to 5,000 sheets (SRA3, A4, LT size) on the shift tray and 250 sheets on the proof tray.
- **One roll-away cart is provided with the stacker. Additional carts are available as options.**
- **Only one stacker can be installed.**

Slide 99

No additional notes

Finishers

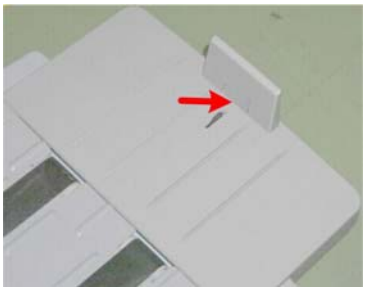
- **Minor changes:**
  - The pre-stacking tray can hold 5 sheets of paper.

Slide 100

No additional notes

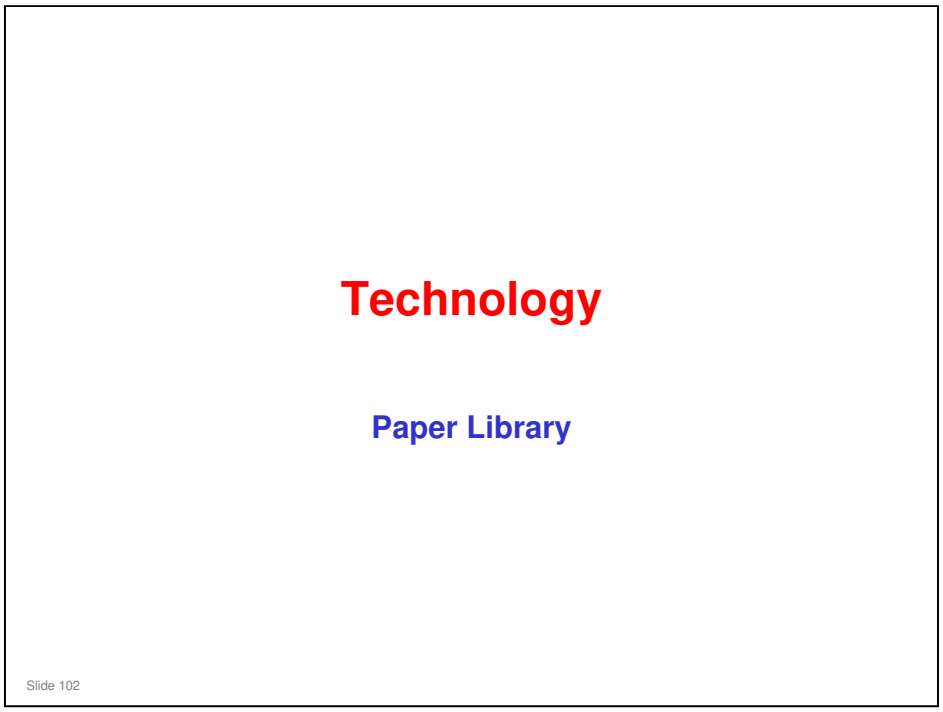
Trimmer

- **Minor changes:**
  - Transport belt. The color of the transport belt changed to white. This prevents dirty images on A3 Full-bleed paper.
  - Entrance guide. The shape of the movable entrance guide has been modified to prevent pages from slipping.
  - New sensor. A new sensor has been added at the end of the booklet tray. It detects when the end stopper (shown below by the red arrow) is installed or removed.



Slide 101

No additional notes



This section will explain the Paper Library feature.

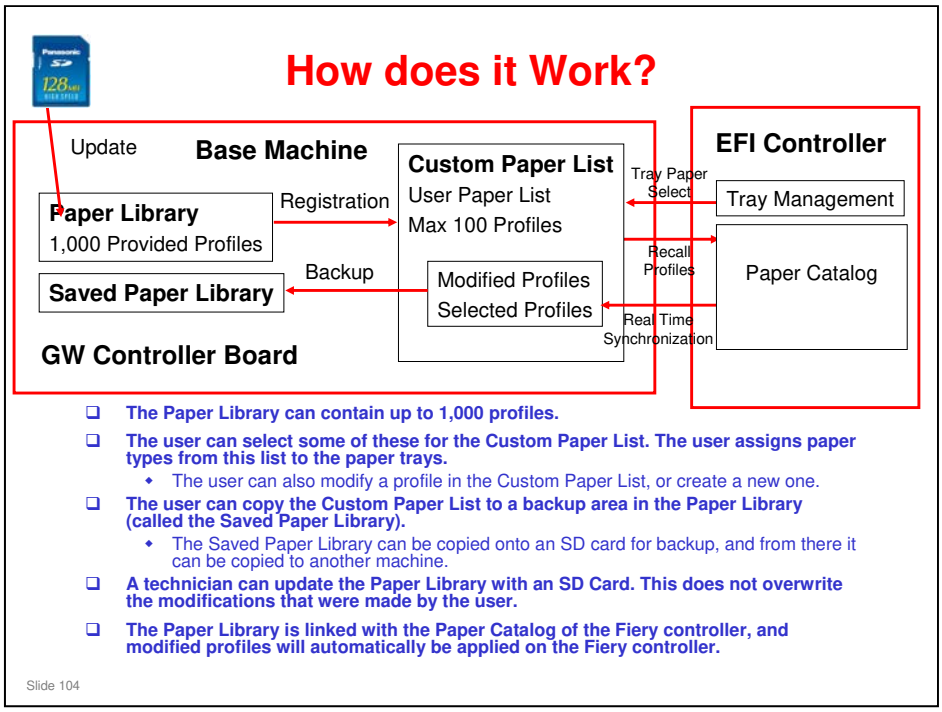
- ❒ It is the same as the Aries series, with a few extra parameters that can be adjusted for each paper type.

What is the Paper Library?

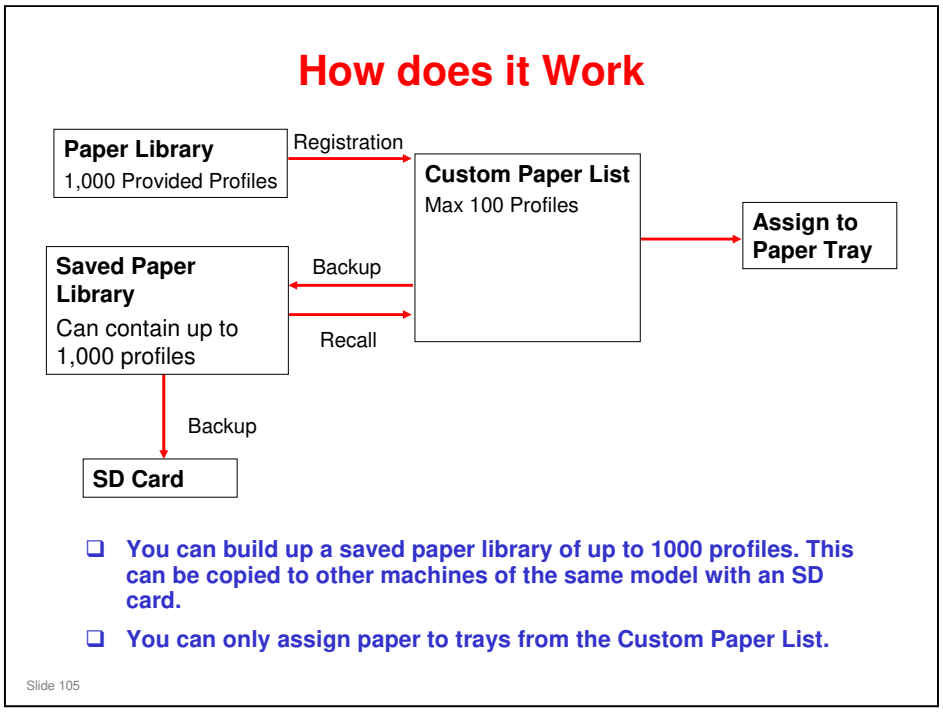
- **This new feature simplifies paper settings at the operation panel.**
- **A wide range of paper profiles are supplied by Ricoh.**
  - The data must be copied to the machine during the installation procedure. It is not installed at the factory. Updates are provided on an SD card.
- **Each profile is for a specific brand and type of paper, and contains various machine settings for that type of paper.**
- **The Paper Library can contain up to 1,000 profiles.**
- **The customer can select up to 100 of these for their Custom Paper List.**
  - The customer or technician can modify the settings in the profiles in their Custom Paper List.
- **In the Tray Paper Settings menu, a profile from the Custom Paper List can be selected for each tray.**
  - The old-style paper setting menu is still available.
- **The Paper Library is linked with the Paper Catalog of the Fiery controller, and modified profiles will automatically be applied on the Fiery controller.**

Slide 103

No additional notes



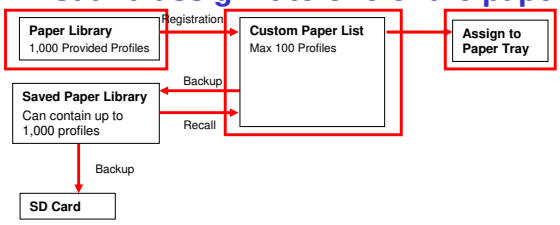
❒ The update by SD Card overwrites the Paper Library only. It does not overwrite the Saved Paper Library or the Custom Paper List, so the user's custom settings and backups are not affected.



No additional notes

Basic Operation
Overview

- Access the Paper Library.
  - This is done from the Tray Paper Settings screen.
- Then select one or more paper profiles from the Paper Library, and register them in the Custom Paper List.
- Go back to the Tray Paper Settings screen.
- Then select the paper type from the Custom Paper List and assign it to one of the paper trays.



Slide 106

No additional notes

Basic Operation

1. To Access the Tray Paper Settings

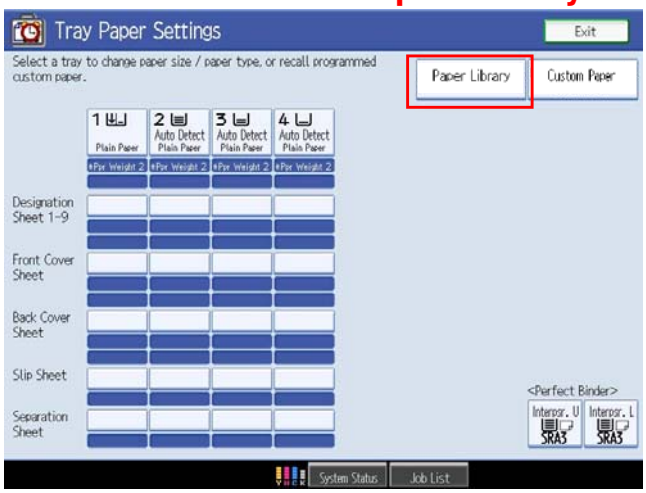
- Press the Tray Paper Settings button on the Operation Panel.

Slide 107

No additional notes

Basic Operation

2. To Access the Paper Library



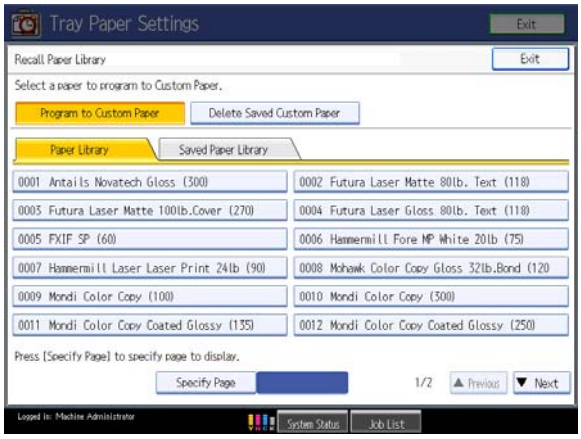
❑ **Access the Tray Paper Settings screen and touch 'Paper Library'.**

Slide 108

- This slide shows the Tray Paper Settings screen for the new series. We will talk about it a bit more later.
- Note that the names of the buttons at the top right of the screen have been changed to Paper Library and Custom Paper.

Basic Operation

3. To Select a Profile from the Paper Library for the Custom Paper List



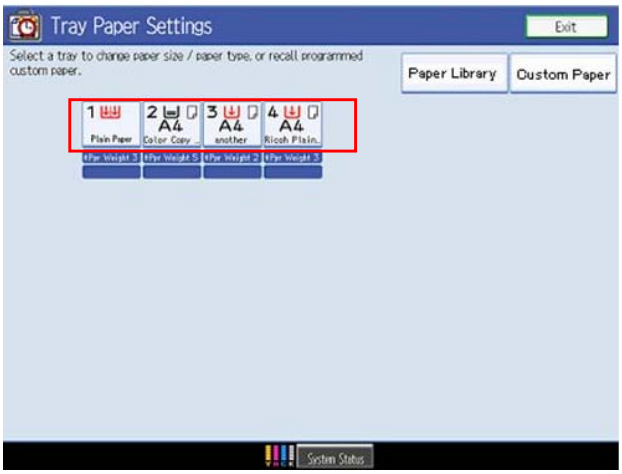
- **To save a profile to the Custom Paper List, touch the paper name on the screen, then touch 'Exit'.**

Slide 109

- Paper Library: This is the data that was copied from the SD card from Ricoh.
- Saved Paper Library: These are the customized paper types that the user has backed up from the Custom Paper List.

Basic Operation

4. To Select a Paper Type for a Tray from the Custom Paper List



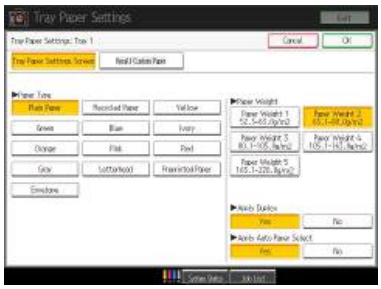
- On the Tray Paper Settings screen, touch the tray that you want to select paper for.

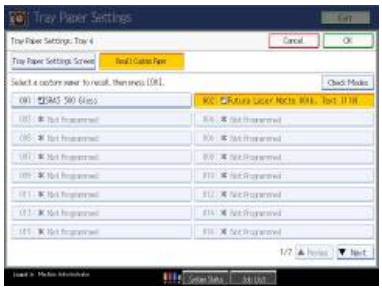
Slide 110

No additional notes

Basic Operation

5. To Select a Paper Type for a Tray from the Custom Paper List





- **There are two windows:**
  - Tray Paper Settings screen: This is the same as in previous models.
  - Recall Custom Paper screen: This allows you to select a paper profile from the Custom Paper List.

Slide 111

No additional notes

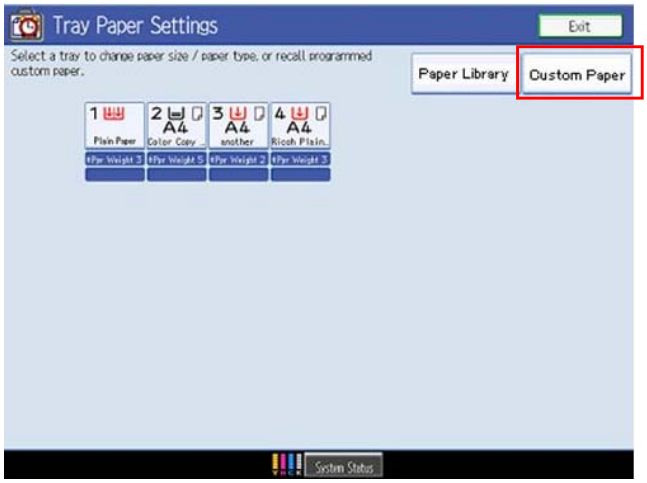
Other Ways to make a Custom Paper Type

- You can register a paper type from the Paper Library, and modify the settings.
- You can make a new Custom Paper Type, starting from nothing.
- You can modify an existing Custom Paper Type.
- You can delete an existing Custom Paper Type.
- Web Image Monitor: The Custom Paper List can be seen, and you can make new paper types, change settings, and assign paper types to the trays. But, you cannot register profiles from the Paper Library to the Custom Paper List, or recall profiles from the Saved Paper Library to the Custom Paper List.

Slide 112

No additional notes

To See the Custom Paper List

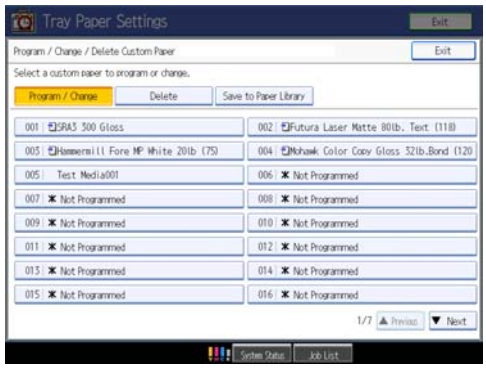


- Access the Tray Paper Settings screen and touch 'Custom Paper'.

Slide 113

No additional notes

Custom Paper List

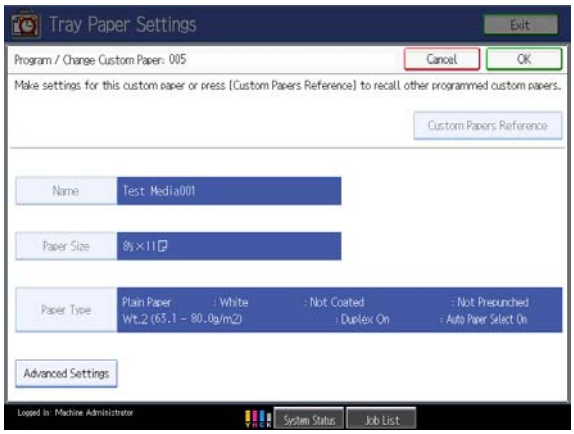


- To edit a profile, use the 'Program/Change' button.
- To delete a profile, use the 'Delete' button.
- None of these functions affect the original data that was copied to the GW controller from the SD card.

Slide 114

No additional notes

Program/Change Custom Paper



- This screen appears if you touch the Program/Change button then a paper type from the Custom Paper List. You can modify some of the settings for the profile.
- TCRU/ORU trained operators can change some advanced settings by pressing the Advanced Settings button at the bottom of the screen.

Slide 115

- Advanced Settings are explained in the 'Adjustment Item Menu Guide: TCRU/ORU' manual (section 4. Details of Menu Items in Advanced Settings).
- Adjustable Parameters for each paper type
  - Not adjustable in profiles provided by Ricoh

    Paper Type, Thickness, Color, Coated/Uncoated, Punch (on/off), Paper Brand Name
  - Adjustable for all profiles

    Custom Paper Name, Paper Size, Duplex/Simplex, Auto Tray Select (on/off)

Other Operations

- **Backing up the Custom Paper List**
  - The user can copy the Custom Paper List to a backup area in the Paper Library.
  - This backup area is called the Saved Paper Library.
  - An administrator can delete items from the Saved Paper Library if memory space is tight.
- **Copying the Saved Paper Library**
  - A technician can copy the Saved Paper Library to another machine of the same model.
  - Customers can back up the Saved Paper Library to the Security SD card that is in SD card slot 1.
- **Updating the Paper Library**
  - A modified Paper Library will sometimes be made available from Ricoh on an SD card.
  - This can then be copied to the machine by a technician.
- **Automatic Synchronization with the Paper Catalog in the Fiery Controller**
  - The Custom Paper List (in the mainframe) is linked with the Paper Catalog (in the Fiery Controller).

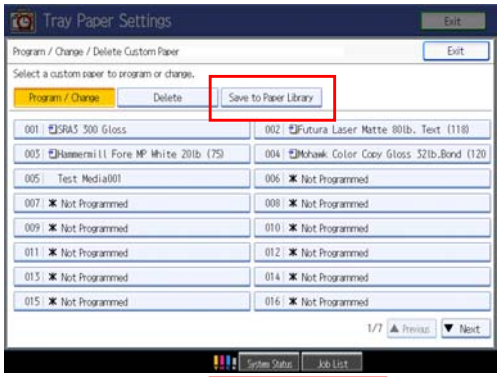
Slide 116

Updating the Paper Library

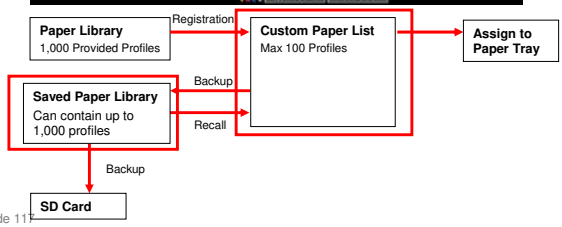
- This will be explained in the section of this course about Installation.

Field Service Manual > Installation > Mainframe > Installation > Paper Library Setting

Backing up the Custom Paper List



- To save a Custom Paper List to a backup area in the paper library area of the GW controller memory, touch 'Save to Paper Library'.
- This includes modifications to paper profiles that were made by the user.



Slide 117

No additional notes

Backing up the Custom Paper List

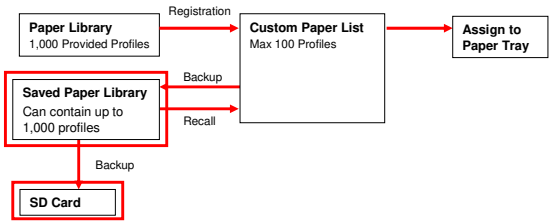
- The Saved Paper Library has space for 1000 paper types, but the Custom Paper List is only 100 paper types.
- So, after backing up the Custom Paper List, you can delete everything and store another 100 paper types, and back these up to the Saved Paper Library. Then you have 200 paper types in the Saved Paper Library.
- You can do this until you have 1000 paper types in the Saved Paper Library.
- Then, to assign a paper type from the Saved Paper Library to a paper tray, you have to copy it to the Custom Paper List first.
  - See the slide: Basic Operation 3. To Select a Profile from the Paper Library for the Custom Paper List. Touch the 'Saved Paper Library' tab instead of the 'Paper Library' tab.

Slide 118

No additional notes

Copying the Saved Paper Library

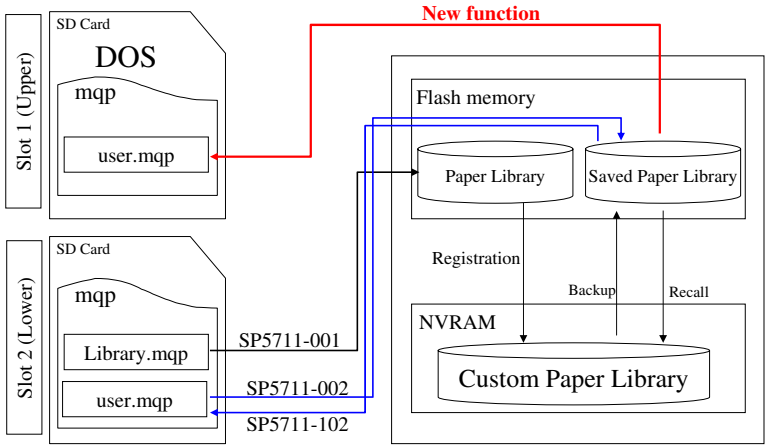
- To copy the Saved Paper Library to an SD card, use SP 5-711-102.
- To copy this data from the SD card to another machine, use SP 5-711-2.



Slide 119

No additional notes

Copying the Saved Paper Library

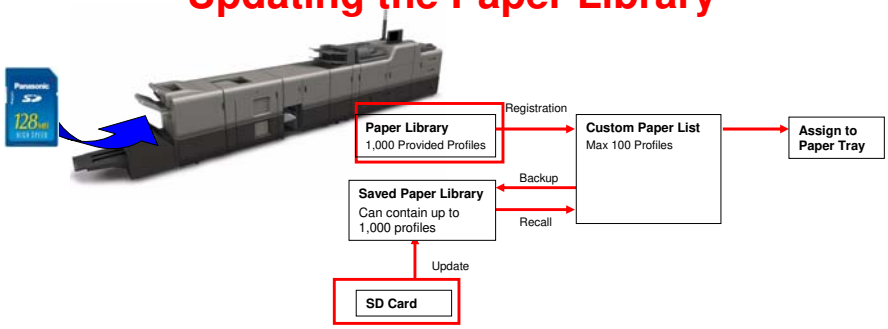


- Customers can back up the Saved Paper Library data onto the SD Card in slot 1 that contains the Data Overwrite Security application.

Slide 120

- This is a new feature, added for this machine.

Updating the Paper Library



- When a SD card with paper profiles is installed in the card slot of the GW controller at the rear of the mainframe, the Paper Library on the flash memory of the GW controller is overwritten by the data in the SD card, so operators can maintain the latest profiles in their machines.
- If profiles are updated by Ricoh, they can be supplied on a new SD card and transferred to the machine.

Slide 121

- The update by SD Card overwrites the Paper Library only. It does not overwrite the Saved Paper Library or the Custom Paper List, so the user's custom settings and backups are not affected.

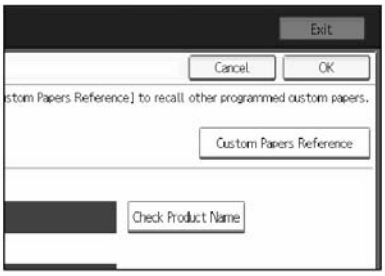
Checking the Version of the Printer Library Data

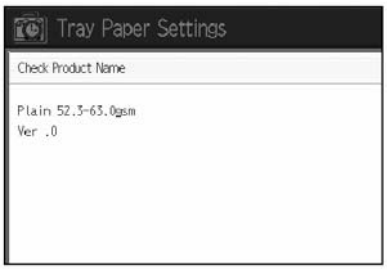
- **Use these SP Modes:**
  - SP5711-201: Version display of Library.mqp on the Flash ROM
  - SP5711-202: Version display of Library.mqp on the SD Card

Slide 122

No additional notes

Checking the Version of a Profile





- In the Tray Paper Settings screen, touch Custom Paper.
- Then touch 'Check Product Name'.
- The name of the paper type and the version of the profile appear.

Slide 123

No additional notes

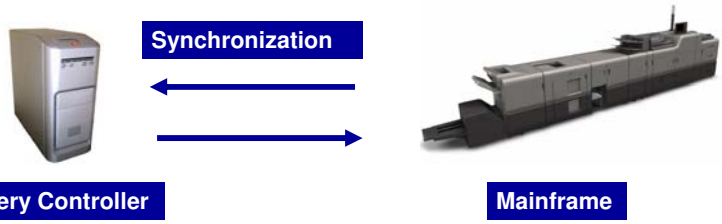
Where is the Data Stored in the Machine?

- **On the GW Controller board**
  - Paper Library, Saved Paper Library: In Flash Memory
    - » If the board is broken, this data is probably all gone.
    - » So, after replacing the board:
      - – Copy the Paper Library data from the SD card (use SP 5-711-1).
      - – If possible, copy the backup of the Saved Paper Library back to the machine from SD card (use SP 5-711-2).
  - Custom Paper List: On the NVRAM.
    - » If the NVRAM is OK, this data can be transferred to the new machine by moving the NVRAM from the old board to the new one.
    - » If the NVRAM is broken, the customer will have to make the Custom Paper List again.

Slide 124

No additional notes

Linkage to the EFI Controller

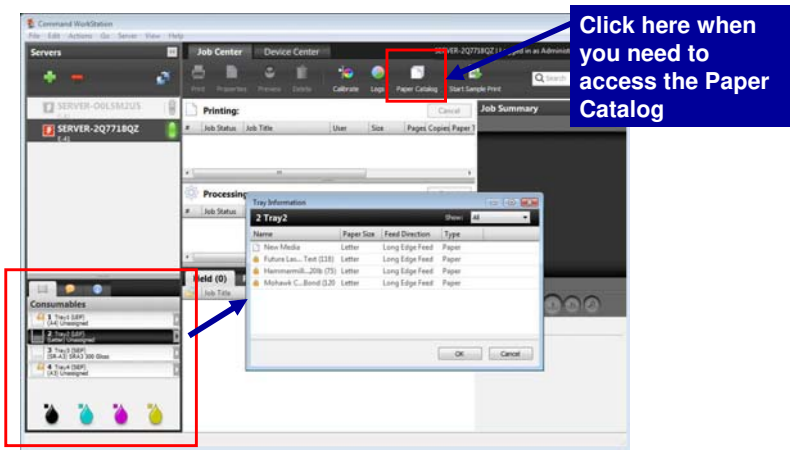


- The Custom Paper List (in the mainframe) is linked with the Paper Catalog (in the Fiery Controller).
- The paper profiles can be managed in either of the above.
- Any changes in one are automatically reflected in the other.

Slide 125

No additional notes

EFI Command Workstation

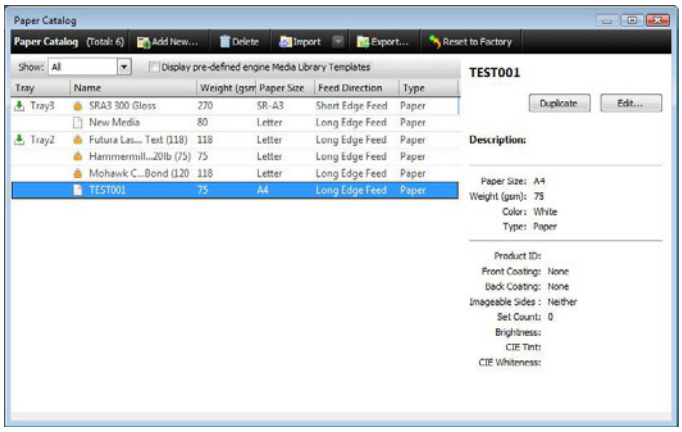


- The Consumables tab shows the paper types that are set for each tray.
- Double-click a tray to change the paper type for that tray.

Slide 126

No additional notes

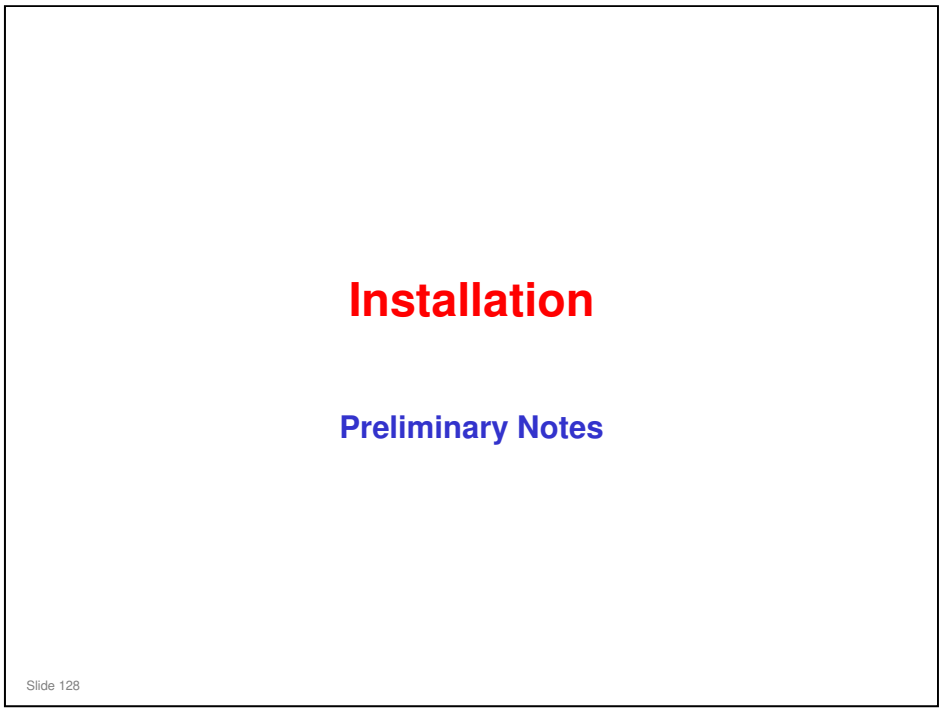
Paper Catalog



- Here, profiles can be edited or added.
- Changes are automatically reflected in the Custom Paper List in the mainframe.

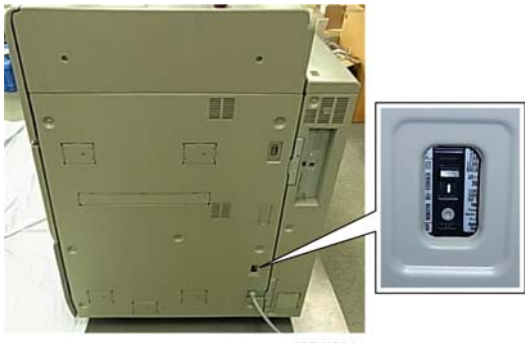
Slide 127

No additional notes



No additional notes

Breaker Switch

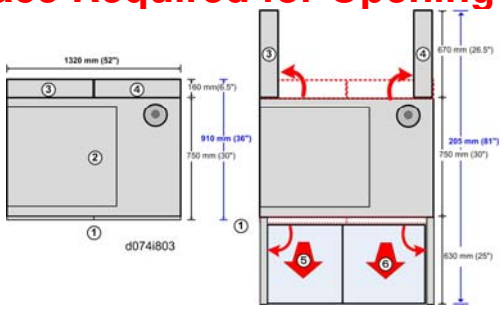


- The machine has a breaker switch at the rear lower right corner.
- Inspect and test the breaker switch at least once a year.

Slide 129

- There are no breaker switches in the peripheral units (except for the ring binder).

Space Required for Opening Covers



(1) Front Doors: Both doors swing open to the front

(2) Main Machine

(3) Cooling Box: Swings open to the rear

(4) Controller Box: Swings open to the rear

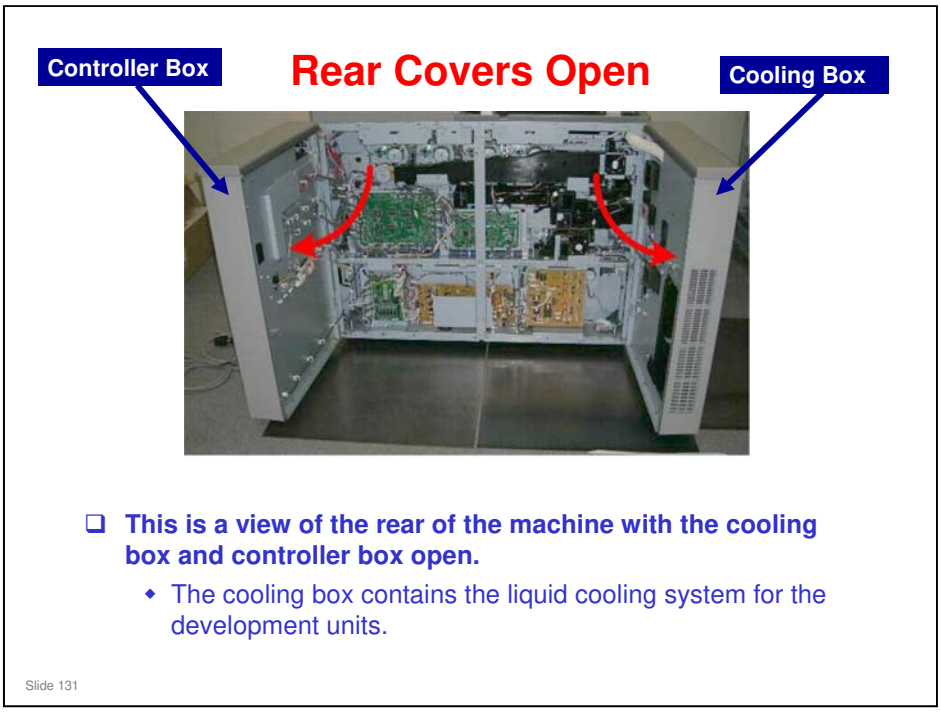
(5) Left Drawer: Slides open to the front for servicing (fusing unit, etc.)

(6) Right Drawer: Slides open to the front for servicing (registration unit, etc.)

- The rear boxes (cooling box and controller box) are on hinges and can be swung open to the rear in order to service parts on the back of the machine (motors, sensors, etc.).
- The front doors swing open to the front, and then the left drawer or right drawer (or the ITB unit) can be pulled out the front of the machine on their rails for servicing.

Slide 130

❒ The diagrams are views from above the machine.



No additional notes

Turning the Machine On

1. **Turn on the main power switch of the main machine.**
2. **Turn on the switch on the back of the Fiery Controller box.**
   - See the top diagram on the left.
3. **Press and turn on the switch on the front of the Fiery Controller box.**
   - See the bottom diagram on the left.

Slide 132

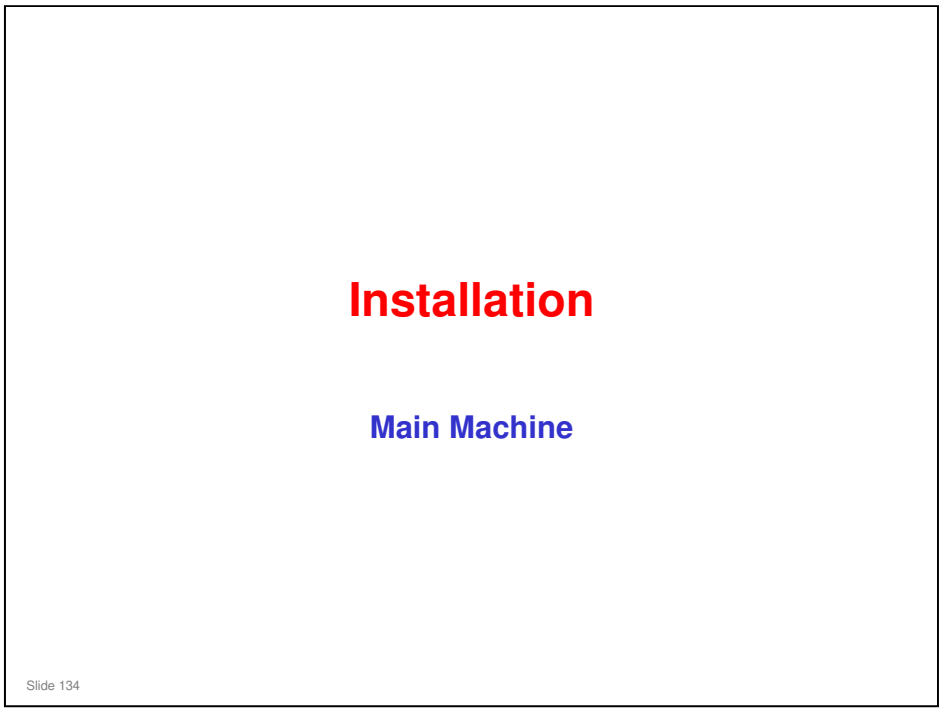
No additional notes

Turning the Machine Off

- **On the Fiery controller operation panel:**
  1. Press the [Fiery] tab.
  2. Press the [Restart Fiery] button.
  3. Press the [Shut Down] button.
- **On the Main Machine**
  1. Push the operation switch on the operation panel to turn the power off.
  2. Wait for the operation switch power LED to stop flashing.
     Important: Never turn off the main power switch when the power LED is lit or flashing.
  3. After the power LED goes off, open the left front door.
  4. Turn the main power switch off.

Slide 133

No additional notes



This section explains only the main points about the installation procedure. For full details, see the field service manual.

Outline of the Installation Procedure (1)

- **Do the following, with the machine's power off.**
  - Unpack the Machine
    - » It is necessary to use a forklift to remove the machine from its pallet.
  - Install the Attention Light
  - Install the Operation Panel
  - Connect the ARDF
    - » The ARDF is already installed when the machine leaves the factory.
  - Attach the Fusing Roller Knob Holder
  - Level the Main Machine
    - » The leveling adjustments are very important. The level of all the peripheral options (LCIT, Finisher, etc.) must be adjusted to match the level adjustment of the main machine.
  - Test the Breaker Switch
  - Install the Toner Bottles

Slide 135

This is an outline of the installation procedure. Important points will be mentioned in the next few slides. See the service manual for full details.

Outline of the Installation Procedure (2)

- **Connect the Main Machine to the Power Source and turn the Power On.**
- **Keep the covers closed.**
  - Note that developer installation and TD sensor initialization are done at the factory before shipping. There is nothing to do with developer during the installation procedure.
- **Transfer Toner to the Toner Hoppers: SP3051-001**
- **Initialize Process Control: SP3020-001**
  - Check that initialization was successful: SP3012-001
- **Exit SP Mode and Turn the Power Off**

Slide 136

This is an outline of the installation procedure. Important points will be mentioned in the next few slides. See the service manual for full details.

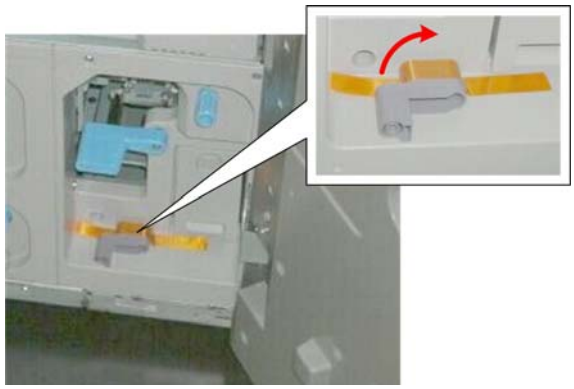
Outline of the Installation Procedure (3)

- Fiery Controller Connection
- Fiery Controller Setup
- Paper Library Data Installation
- Finishing the Installation

Slide 137

This is an outline of the installation procedure. Important points will be mentioned in the next few slides. See the service manual for full details.

ITB Lever (1)

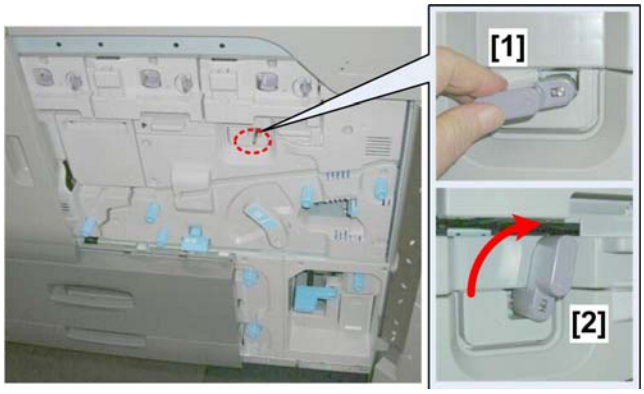


- The ITB lever is shipped in this location, secured by tape.

Slide 138

No additional notes

ITB Lever (2)

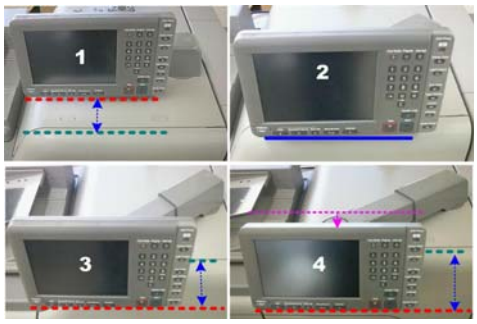


- Attach the ITB lever to the tip of the shaft [1].
- Rotate the lever up [2] to lock the ITB in place.

Slide 139

No additional notes

Installing the Operation Panel

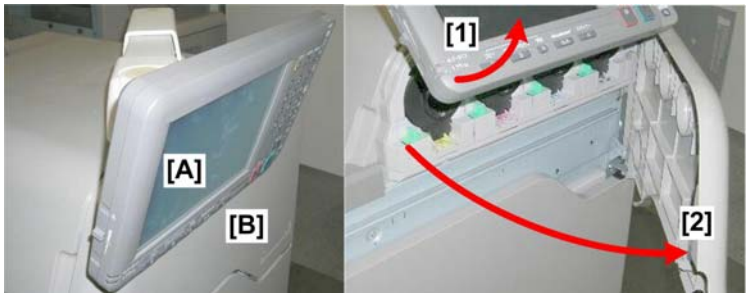


- **There are four ways to install the operation panel:**
  - Positions 1 to 3 (Standard, Standard Diagonal, Standard Diagonal Extended) are for use in a standing position.
  - Position 4 (Easy Access) is for use in a seated position.
- **Installation for positions 1 and 4 is explained in the installation procedure.**
- **Installation for positions 2 and 3 is explained in the Replacement and Adjustment section (Operation Panel, Changing the Operation Panel Position).**
- **Obey the instructions about screw types in these procedures. In some cases, as stated in the manual, if you use the wrong screw type, you could damage the operation panel board**

Slide 140

- 1: Standard. The support arm is perpendicular to the right side of the machine and the operation panel is recessed from the front of the machine.
- 2: Standard Diagonal. The support arm is set at an angle so that the operation panel is flush with the front of the machine.
- 3: Standard Diagonal Extended. The support arm is set an angle (same as Configuration 2) and the arm is extended so that the operation panel extends beyond the front of the machine.
- 4: Easy Access (Sitting Position). This is the same as Configuration 3 but the operation panel is removed and re-hung on lower hooks so it is lower. This allows access to the operation panel from a sitting position.
  - Switching the installation position to the Easy Access position is complicated: (1) Base screw positions must be changed, (2) Operation panel must be removed and hung on different hooks, (3) Operation panel rear plates must be reversed, and (4) Support arm must be extended, among others.

Operation Panel at the 'Seated' Position

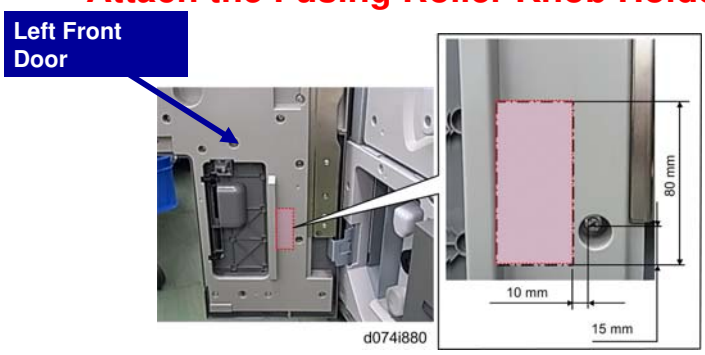


- If the operation panel [A] is fully depressed, the toner bank door [B] cannot be opened.
- To open the toner bank door, swing the operation panel up [1], and then open the door [2].

Slide 141

No additional notes

Attach the Fusing Roller Knob Holder (1)



- This knob can be attached as shown and rotated by hand to feed jammed paper out of the fusing unit.
- This knob is stored in a holder that must be attached to the inside surface of the left front door.
- Clean the above area of the left front door's inner surface with alcohol before you attach the knob holder.

Slide 142

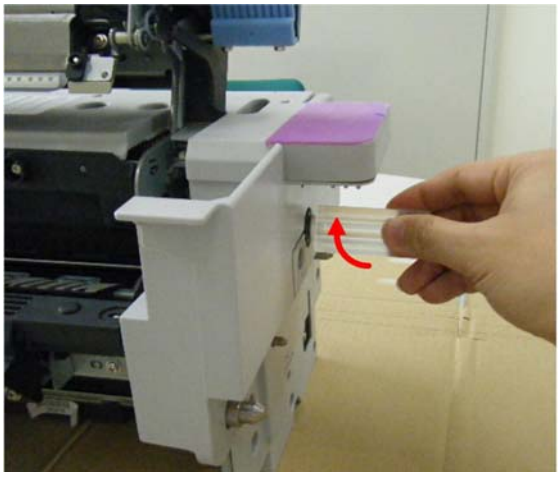
- Basically, the knob is for users to remove jams in the fusing unit.
- When users cannot remove jams in the fusing unit by the normal method, they can pull out the left drawer unit and use this handle to move the paper downwards.
- Also, in theory, technicians can use this handle for lubricating the gears, but if the technician mistakenly rotates the handle in the wrong direction with the web cleaning unit installed, the web will loosen. The web unit would have to be removed, to be safe. So we do not recommend to use this knob for fusing unit lubrication. Just apply the grease at PM, and the next time the machine turns on, the fusing unit gears will turn and lubricate themselves.

Attach the Fusing Roller Knob Holder (2)

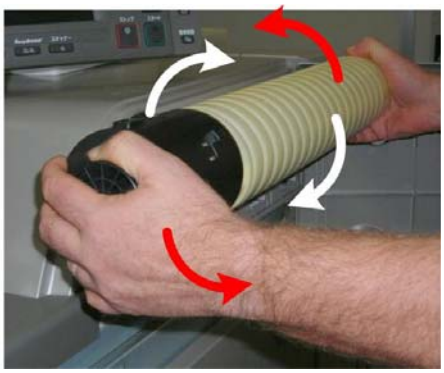
- Attach the holder as shown on the left.
- Insert the knob, which is in the accessories box, in the holder as shown on the right.

Slide 143

- To use the knob, insert in the hole in the fusing unit's front cover and turn clockwise, as shown below.



Install the Toner Bottles (1)

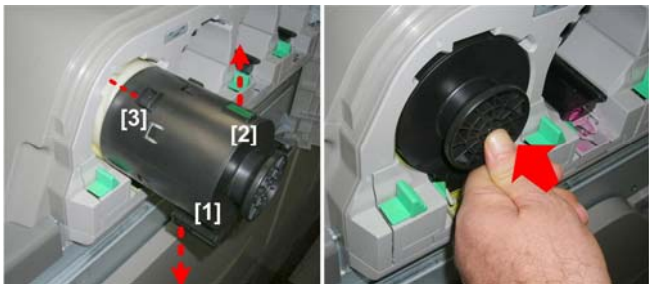


- Rock the bottle gently to loosen the contents of the toner bottle.

Slide 144

No additional notes

Install the Toner Bottles (2)



- **Turn the bottle so that the toner port [1] is down and the RFID chip [2] is up, with the protrusions [3] lined up with the cutouts in the cover.**
  - The front end of each toner bottle has protrusions that fit into cutouts in each color holder. These cutouts have a unique pattern for each color, to prevent installation of a toner bottle accidentally in the wrong position.
  - If a bottle does not slide easily into the holder, make sure that the green RFID chip is facing up and the protrusions on the front end of the bottle match the pattern of the cutouts around the mouth of the holder.
- **Push the bottle in until you hear a click.**

Slide 145

- The order from left to right is Y, M, C, K.

Removing a Toner Bottle

- **To remove a toner bottle, push the lever [1] to the left. The bottle [2] jumps out a short distance.**

- **Grip the bottle by its knob holder and pull it out of the machine.**
  - While holding the bottle by its knob holder at the front, support the end of the bottle with your other hand.

Slide 146

No additional notes

Connecting the Fiery Controller

- You must use the shielded LAN cable provided with the accessories to connect the Fiery Controller box and the main machine.

Slide 147

No additional notes

Fiery Controller Selection

- **Set SP5193-001 to '6' (Fiery controller).**
  - There is no Creo controller.
- **Do the Fiery controller settings.**
  - You must do the Fiery controller settings immediately after you turn the machine on for the first time.

Slide 148

No additional notes

Install the Paper Library Data

- The paper library data is not included in the machine when it is shipped. It must be copied to the machine during the installation procedure.
- Follow the procedure in the service manual.

Slide 149

Installation > Main Machine > Paper Library Data Installation

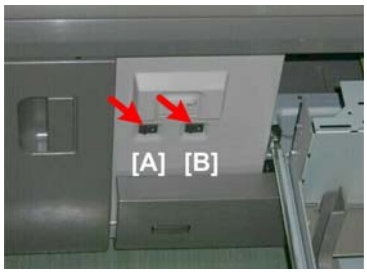
Completing the Installation

- **Load the paper trays.**
  - Make sure that the Tray Paper Settings are set up correctly.
- **Print the SMC Report (SP5990-6).**
- **Make a test copy. Do ACC if necessary.**
- **MUSIC Color Registration Adjustment**
  - 1. Push [User Tools].
  - 2. Touch [Maintenance]> [Color Registration].
  - 3. Touch [OK].
- **Check the Print Quality**
  - There are a number of tests in the installation procedure that you should do before the customer starts to use the machine. See the service manual for details.
- **TCRU Setting**
  - If the customer is participating in the TCRU program, the TCRU feature must be initialized so the TCRU setting menus can be displayed.
  - 1. Go into the SP mode.
  - 2. Execute SP5185-001 (TCRU: Set Machine).

Slide 150

- SMC Report: SP5990-6 prints a list of the non-default SP code settings for future reference.
  - The SP5990-1 (All) printout is about 140 pages single-sided.
  - SP5990-6 (non-default) requires only about 5 sheets.

Concerning the Tray Heaters (1)



- The tray heaters for the main machine are built-in and connected, but they are switched off before the machine leaves the factory.
- The left switch controls the heaters in the paper trays (paper bank and LCIT). The right switch controls the ITB heaters.
- Open the top tray to access these switches.
- Do not turn on the heaters unless they are needed.

Slide 151

- The heaters are recommended for use where the humidity is high.
- The heaters prevent condensation in the paper trays, which can lead to double-feeds and paper jams.
- Please explain to the operator that while the heaters can reduce collection of moisture in the paper trays, they will consume slightly more power.

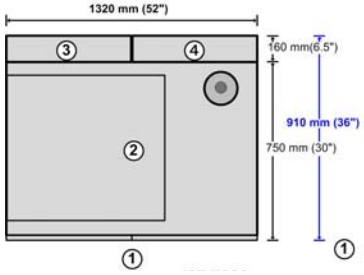
Concerning the Tray Heaters (2)

- **When these switches are ON, the heaters turn on when the main machine is turned off (or enters energy save mode), and then turn off when the main machine is turned on again (or leaves energy save mode).**
- **When these switches are OFF, the heaters do not turn on when the main machine is turned off (or enters energy save mode).**
  - Both heaters are turned OFF before the machine leaves the factory.
- **When these switches are ON and SP5965-1 is set to "1", the heaters always remain on. Use this setting only if the work area is extremely humid.**

Slide 152

No additional notes

Removing the Cooling Box and Controller Box



- If the machine cannot fit through a door, the cooling box (1) and controller box (2) can be removed.
- With both boxes removed, the machine is 750 mm (30 in.) wide.
- There are detailed procedures for removal in the service manual.

Slide 153

- The cooling box weighs about 16 kg (36 lb.).
- The controller box weighs about 21 kg (47 lb.).

Moving the Machine (1)

Front

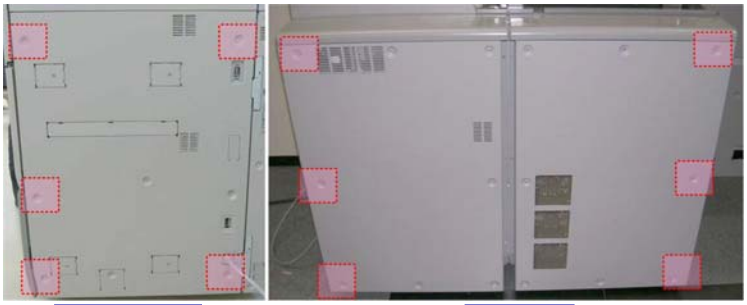
Left Side

- The machine is extremely heavy.
- When it is necessary to move the machine even a short distance to re-locate it, apply pressure only on the areas that are marked with red squares in the illustrations.

Slide 154

No additional notes

Moving the Machine (2)



Right Side

Rear

- The machine is extremely heavy.
- When it is necessary to move the machine even a short distance to re-locate it, apply pressure only on the areas that are marked with red squares in the illustrations.

Slide 155

No additional notes

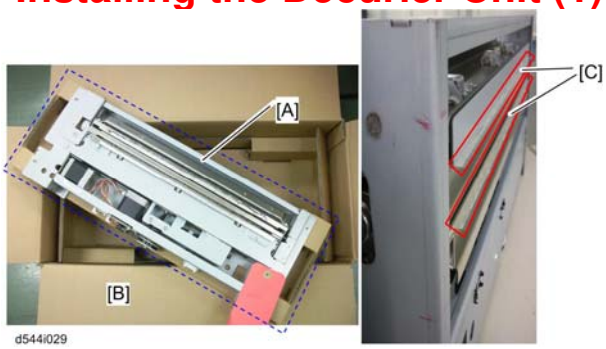
Installation

Peripheral Units: Decurler

Slide 156

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Installing the Decurler Unit (1)



- Lay the Decurler Unit [A] on the carton box [B] as shown above so that the entrance gate of the decurler unit does not touch any object or the floor.
- Keep this position before attaching this unit to the main machine.
- Do not lay the Decurler Unit on the floor with the entrance gate of the decurler unit facing downward. Otherwise, the mylars [C] on the entrance gate may be bent or folded and jams may occur.

Slide 157

No additional notes

Installing the Decurler Unit (2)

- Follow the instructions in the service manual when connecting the harnesses. Some have identical shapes, but different colors, to prevent connection to the wrong place.
- Be careful not to leave slack in the harnesses, or there will be trouble when opening the left drawer.
  - Follow the procedure in the service manual at all times.

Slide 158

No additional notes

Installing the Decurler Unit (3)

- **You must select the correct entrance guide plate to attach to the next peripheral downstream from the decurler unit.**
- **This depends on which peripheral is immediately downstream. Each guide plate is marked to tell you which guide plate to install.**
  - Multi Folding Unit: A
  - Ring Binder: A
  - Cover Interposer Tray: A
  - Finisher (D512 or D513): C
  - High Capacity Stacker: C
  - Buffer Pass Unit: No guide plate required
- **The example below shows guide plate A.**

Slide 159

No additional notes

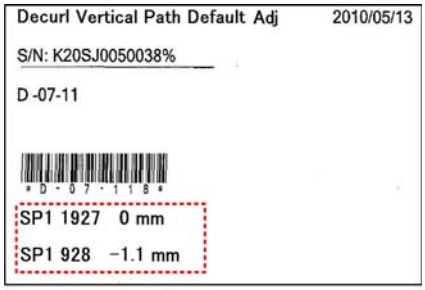
Installing the Decurler Unit (4)

- **When you attach guide plate A to the downstream unit:**
  - There are two sets of holes on guide plate A.
  - Attach the screws to the outer holes (marked above by the red arrows) if the next downstream unit is the Multi Folder unit.
  - Attach the screws to the inner holes (marked by the blue arrows) if the Ring Binder or Cover Interposer Tray is the next downstream unit.

Slide 160

No additional notes

Installing the Decurler Unit (5)



- After installing the decurler, some SP settings must be made.
- Refer to the accessory sheet and enter the settings for SP1927 and SP1928.
- Exit SP mode and turn off the main machine.

Slide 161

No additional notes

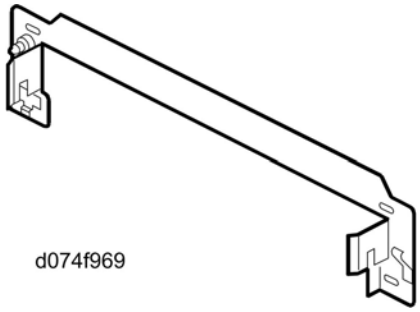
Docking the First Downstream Peripheral

1. **Connect and dock the downstream peripheral unit to the main machine.**
2. **Turn on the main machine.**
3. **Do SP5804-210. This sets the upper path in the decurl unit as the default paper path.**
4. **Turn off the main machine.**
5. **Make sure that the peripheral and the main machine are aligned correctly.**
   - Align the red reference points as shown in the procedure in the service manual.
   - The procedure depends on which is the first downstream peripheral.

Slide 162

Installation > Decurler Unit > Installation > Installing the Guide Plate

Connection Brackets Between Downstream Peripherals



- If the peripheral unit has a single-piece connecting bracket attached at the downstream side, the bracket can be used to adjust side-to-side registration on the unit where it is attached.

Slide 163

No additional notes

Curl Correction

- **Do some test prints and check for excessive curling.**
  - Do test prints with paper feed from each paper tray.
- **Curl correction is done with settings in the SP mode. There are six SP codes for curl correction, one for each paper tray.**
  - 1st Tray of Main Machine: SP1906 001
  - 2nd Tray of Main Machine: SP1906 002
  - Top Tray of LCIT: SP1906 003
  - Middle Tray of LCIT: SP1906 004
  - Bottom Tray of LCIT: SP1906 005
  - Bypass Tray (on top of LCIT): SP1906 006
- **Possible settings**
  - 1: Slight Face Curl
  - 2: Excessive Face Curl
  - 3: None. This is the normal default setting. No pressure is applied by the soft roller.
  - 4: Slight Back Curl
  - 5: Excessive Back Curl

Slide 164

- Face curl: the leading and trailing edges of the sheets curl up
- Back curl: the leading and trailing edges of the sheets curl down

Installation

Peripheral Units: LCIT, Bypass Tray

Slide 165

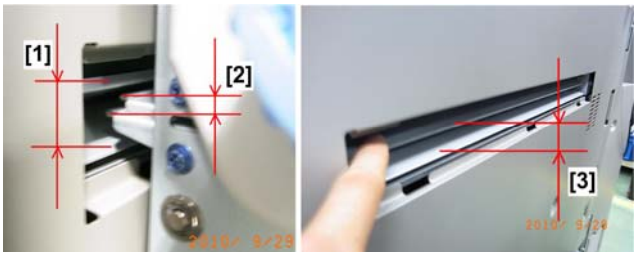
This section explains only the main points about the installation procedures. For full details, see the field service manual.

Before Docking the LCIT

- **If you will install the Multi Bypass Tray or the LCIT tray heaters (or both), do this before you dock the LCIT to the right side of the main machine.**
  - Docking: Carefully follow the procedure in the service manual, to make sure that cables and ground wires are not damaged.

Slide 166

Docking the LCIT to the Machine



- Push the LCIT close to the left side of the main machine.
- On the left side of the main machine [1], check the height of the of the LCIT paper exit [2].
- Move the main machine entrance plate [3] up and down and confirm that it does not contact the paper exit of the LCIT.
- If the main machine entrance plate does touch the LCIT exit, adjust the height of the LCIT.

Slide 167

This is a new procedure.

- Height Adjustment: Service Manual > Installation > Common Adjustments

Special Rollers for Coated Paper

- This LCIT can handle coated paper without replacement of the pick-up, feed, and separation rollers.

Slide 168

No additional notes

Tray Heaters

- These are not included inside the LCIT. They must be installed by the technician.

Slide 169

Installation > A3/DLT LCIT (D516) > LCIT Tray Heaters

Installation

Peripheral Units: Paper Handling Units (General Notes)

Slide 170

No additional notes

Common Procedures

- **Before you dock the peripheral, make sure that you install the correct set of sponges.**
  - If you dock a peripheral directly to the main machine, the procedure is different from when you dock the peripheral to another peripheral.
- **After installing each unit, do the following:**
  - Set the leveling shoes and adjust the height of the unit.
  - Load some B4 paper in the 2nd tray of the main machine, and make several copies.
  - Check paper skew and side-to-side registration and correct if necessary.

Slide 171

Height and Level Adjustment, Skew and Side-to-side Registration: Installation > Common Adjustments

- We will take a look at the common adjustments in more detail later.
- The installation for the sponges is explained in the installation procedures for each peripheral.

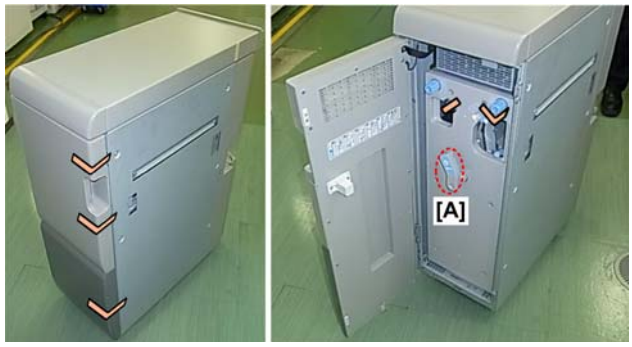
Installation

Peripheral Units: Buffer Pass Unit

Slide 172

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Important Note



- The buffer pass unit is unstable (top-heavy) and can fall over easily.
- To avoid personal injury or damage to the unit, use caution when you pull out the buffer pass unit drawer [A], until the unit has been docked to the main machine.

Slide 173

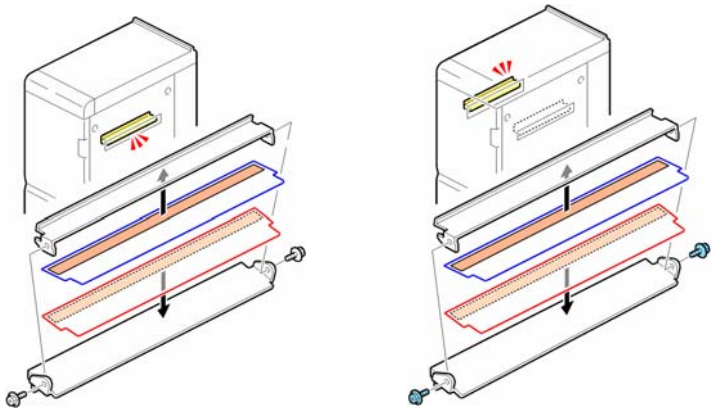
No additional notes

Installation Procedure

- Unpack the unit.
- Remove the shipping brackets.
- Dock it to the main machine.
- Attach the connecting bracket for the next downstream peripheral.

Slide 174

Mylars



- **Mylars must be attached at these locations:**
  - Entrance guide of the buffer pass unit (diagram on the left).
  - Entrance guide of the next downstream peripheral (diagram on the right)

Slide 175

- Full details of how to attach these mylars are shown in the service manual.

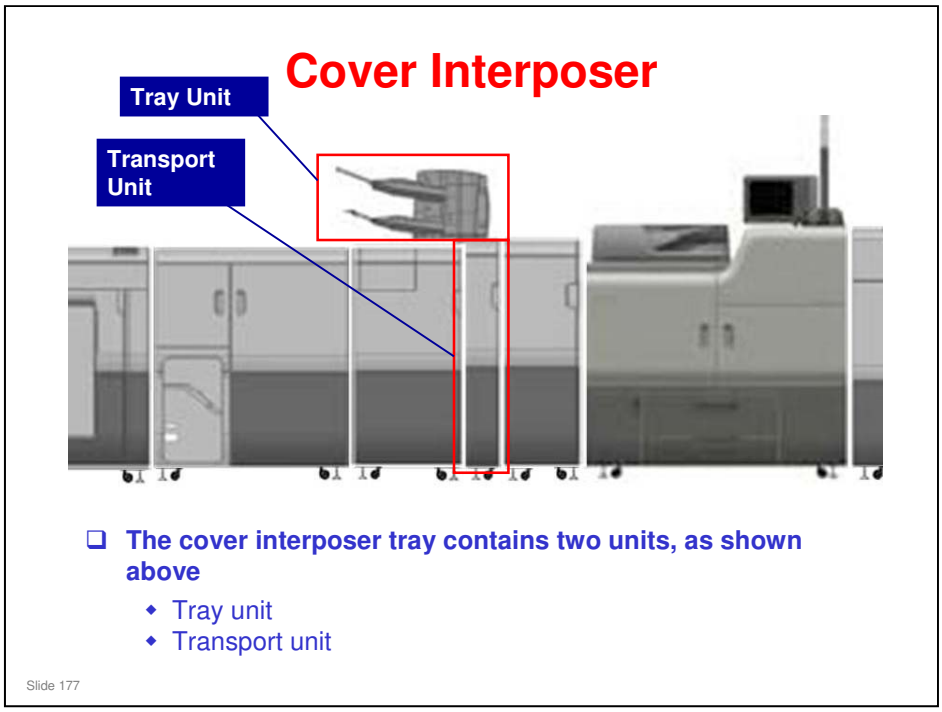
Installation > Buffer Pass Unit

Installation

Peripheral Units: Cover Interposer Unit

Slide 176

This section explains only the main points about the installation procedures. For full details, see the field service manual.



No additional notes

Important Note about the Cover Interposer

- **Always remove the tray unit from the transport unit at the following times:**
  - Before you disconnect either the cover interposer tray or the next peripheral device to the left
  - Before you do any maintenance on either the cover interposer tray or the next peripheral device to the left.
- **Otherwise, you could bend the frame of the tray unit and damage its alignment.**

Slide 178

No additional notes

Installing the Cover Interposer

- **First, dock the transport unit of the cover interposer to the copier.**
  - Important: Do not put the tray unit on the top of the cover interposer at this time.
- **Then, install the next device to the left of the cover interposer.**
- **Finally, attach the tray unit to the top of the cover interposer.**
  - The tray unit is supported by the cover interposer, and the next unit to the left.
  - Do not attach the tray unit to the top of the cover interposer until after you dock the next device to the left of the cover interposer.

Slide 179

Installation > Cover Interposer Tray (D518)

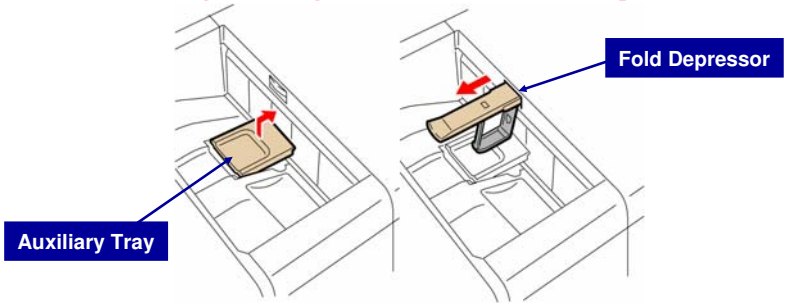
Installation

Peripheral Units: Folder Unit

Slide 180

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Auxiliary Tray and Fold Depressor



- **These items are available, but they are not accessories.**
  - The auxiliary tray keeps Z-folded paper (FM1) flat in the tray, so that the trailing edges do not trigger an early tray full alert in the top tray.
  - The flexible page depressor prevents folded paper (especially Letter Fold-out sheets [FM3]) from opening out and triggering an early tray full alert in the top tray.
  - Both of these can be installed at the same time.

Slide 181

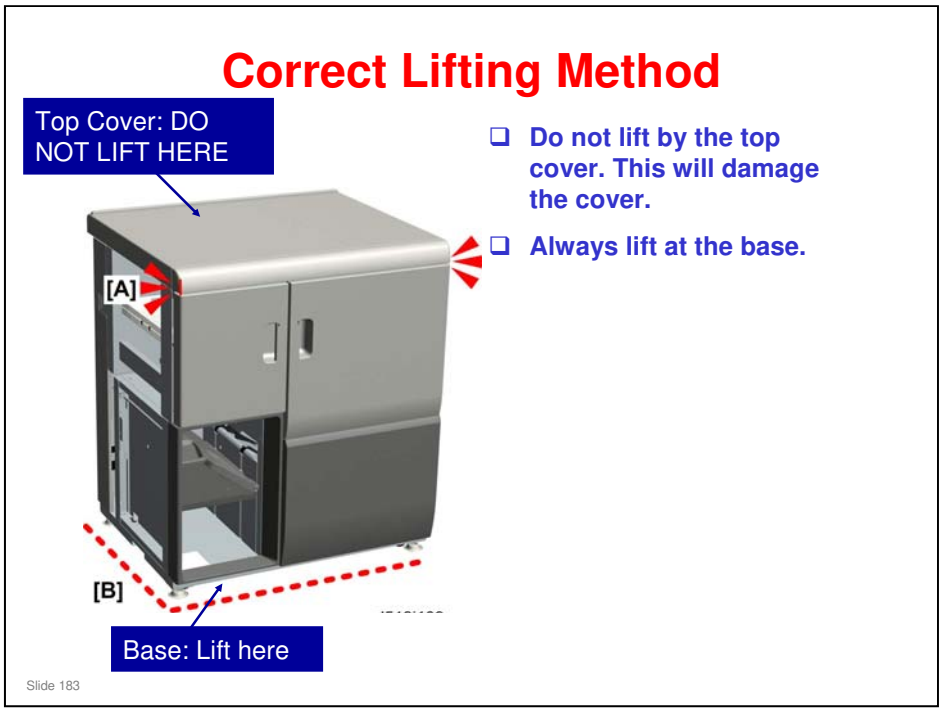
No additional notes

Installation

Peripheral Units: Ring Binder

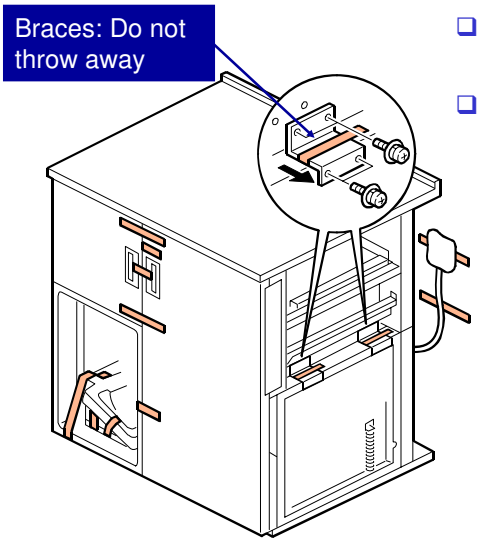
Slide 182

This section explains only the main points about the installation procedures. For full details, see the field service manual.



No additional notes

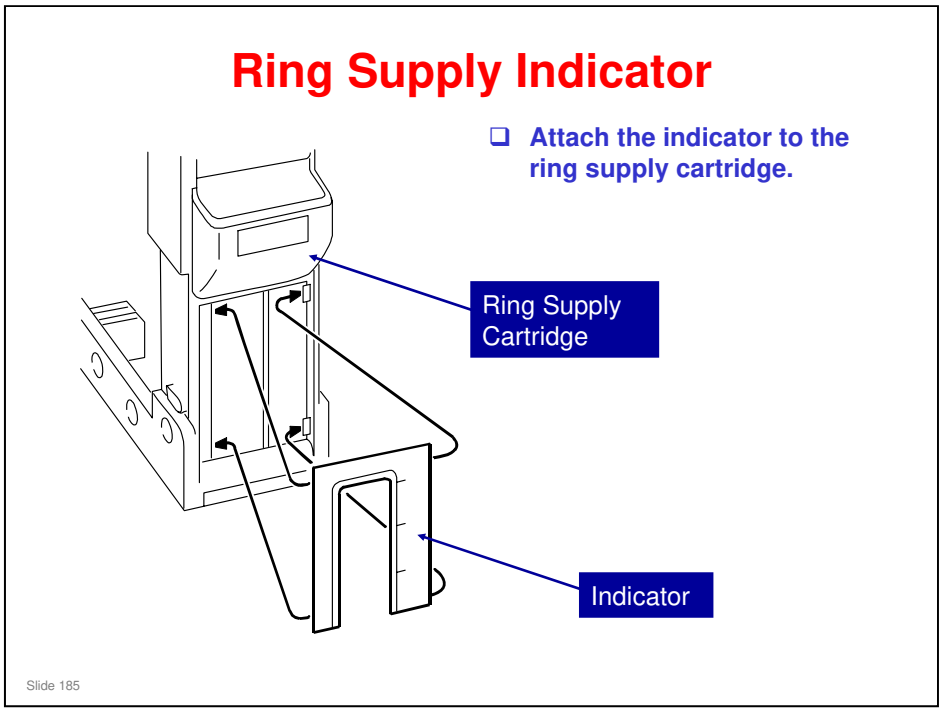
Removing Shipping Materials



- Do not discard these braces.
- They must be reattached to the finisher before it is moved or shipped to another location.

Slide 184

No additional notes



No additional notes

Jams

- Decals attached to the machine that provide guidance for removing paper jams. Point out the decal locations to the customer.
- Detailed instructions on removing ring jams are provided in the operating instructions under "Removing Jammed Ring Combs".

Slide 186

❒ Inform the above to the customer.

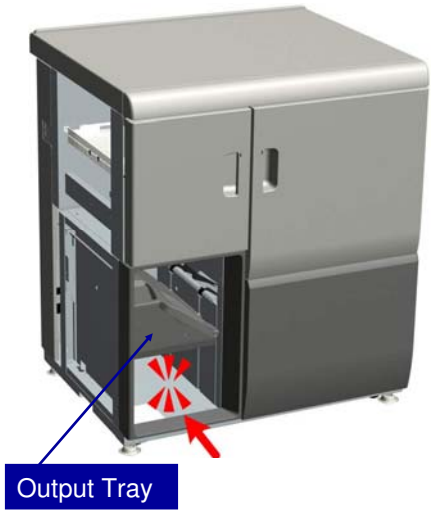
Pulling out/Pushing in the Binder Unit

- Always grip handle Mc8 when pulling out or pushing in the binder unit.
- Never touch any other surface of the binder unit when it is moving.
- To avoid injury the fingers, never push on the top of the binder unit to slide it back into the finisher.

Slide 187

❒ Inform the above to the customer.

Do not Store Things Below the Output Tray



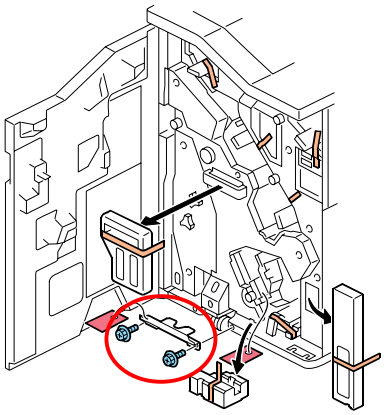
- Do not use the empty space below the output tray as a storage area.

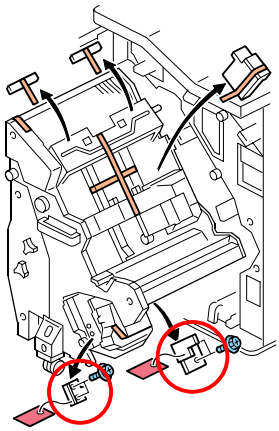
Slide 188

- Obstacles in this area (circled in the illustration) will interfere with the raising and lowering of the tray and cause an error.

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Shipping Plates



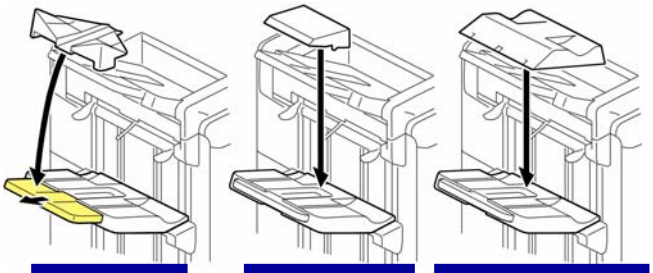


- Do not throw away the shipping plates. You will need these if the customer wants to move the machine to a new location at some time.

Slide 190

No additional notes

Auxiliary Trays

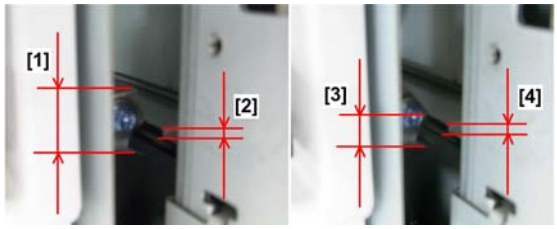


- **There are three auxiliary trays.**
  - Glossy paper auxiliary tray
  - Z-fold auxiliary tray
  - Coated thin paper auxiliary tray
- **Tell the user about how to use these auxiliary trays.**
  - Before feeding glossy paper, pull out the extension of the shift tray and attach the glossy paper auxiliary tray.
  - Before feeding Z-folded paper from the multi-folding unit, attach the Z-fold auxiliary tray to the shift tray.
  - Before feeding coated thin paper from the multi-folding unit, attach the coated thin paper auxiliary tray to the shift tray.

Slide 191

No additional notes

Connecting the Finisher to the Upstream Unit



- Push the finisher close to the side of the upstream unit.
- Confirm that the height of the finisher entrance [1] is at the same height as the upstream unit's paper exit [2].
- Push the finisher closer to the side of the upstream unit, and then once again confirm that the height of the finisher entrance [3] matches the height of the upstream unit exit [4]
- If the exit and entrance are not at the same height, adjust the height of the finisher.
- Push the finisher against the side of the upstream unit.

Slide 192

This is a new procedure.

- Finisher Height Adjustment: Service Manual > Installation > Common Adjustments

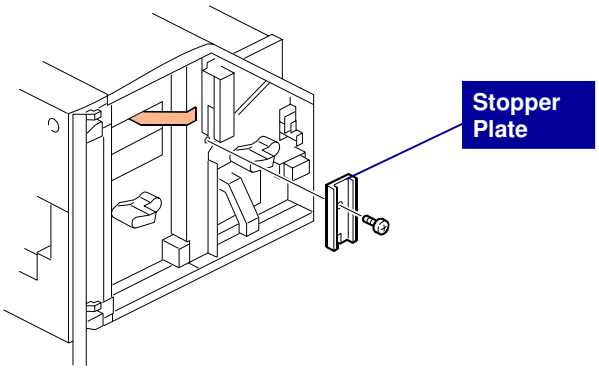
Installation

Peripheral Units: Trimmer

Slide 193

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Stopper Plate

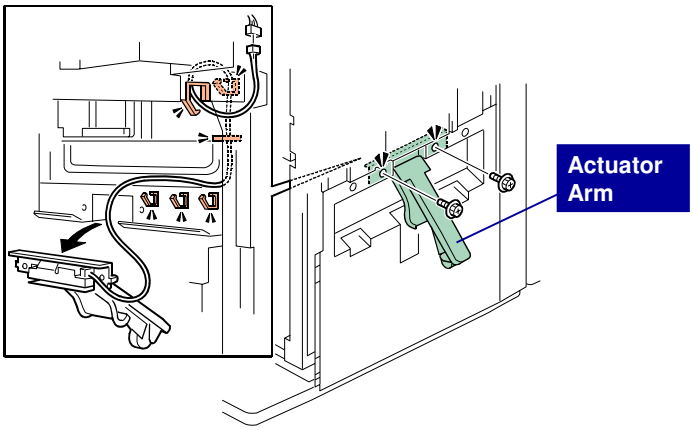


- Keep this stopper plate. You need to attach it before you move the machine to a new location.

Slide 194

No additional notes

Sensor Actuator Arm

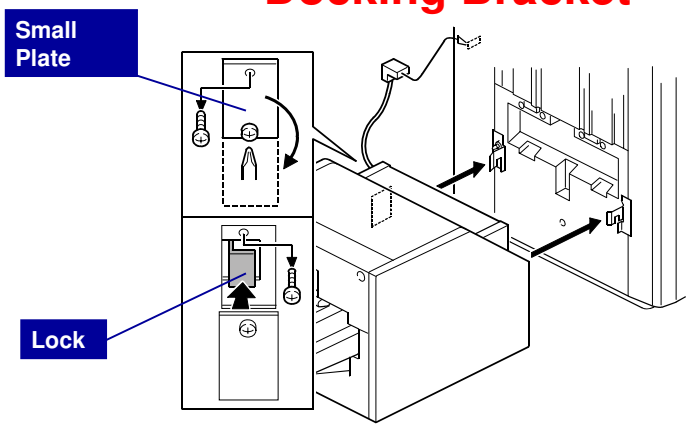


- Disconnect the booklet tray sensor actuator arm. Keep it in a safe location for future use.

Slide 195

No additional notes

Docking Bracket



- **The lock is at the rear.**
  - In the other peripherals, it is at the front.
- **Remove the small plate in the rear cover to access the lock.**

Slide 196

No additional notes

Installation

Common Adjustments (Height, Level, Skew, Side-to-side Registration)

Slide 197

This section explains only the main points about the installation procedures. For full details, see the field service manual.

There are no big changes from previous models. Changes (if any) will be indicated in the text.

However, the text in the service manual has been simplified.

Height and Level Adjustment (1)

- The main machine must be level within 5 mm front-to-back and side-to-side.
- Every peripheral in the paper path must be level. Check after each peripheral is installed.
- Check the level adjustment before you check the skew and side-to-side registration.

Slide 198

- This is the same as other models.

Height and Level Adjustment (2)

- Adjust near each caster that has an adjustable bolt.
- Turn the lower nut to lower the bolt and set a leveling shoe below the bolt.
  - You cannot turn the upper bolt.

Slide 199

No additional notes

Height and Level Adjustment (3)

- Turn the nut until it stops against the shoe.
- Set a level on the front, side, and rear edges of the unit.
- Adjust the height at each corner until the unit is level.

Slide 200

No additional notes

Height and Level Adjustment (4)

- **Check the results of the adjustments.**
  - The top of the first peripheral unit on the left must be at the same height as the left side of the main machine.
  - The tops of the other peripheral units on the left where the units are joined must be at the same height.
  - The top of the LCIT on the right must at the same height as the right side of the main machine.
- **Make sure that the plate at the paper exit on the left side of the main machine [A] moves freely and is not bent. It must be able to move to handle thick paper.**
- **Between the right side of the main machine and the LCIT, make sure that the LCIT guide plate moves freely and does not interfere with the main machine guide plate.**

Slide 201

No additional notes

Skew and Registration Adjustment

- The paper feed path is extremely long when all the finishing options are installed.
- In such a long path, the cumulative effect of paper skew and deviation in side-to-side registration may require adjustment.

Slide 202

No additional notes

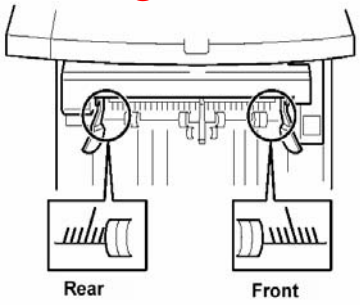
Skew and Registration Adjustment

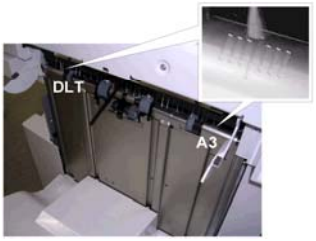
- After installation of each peripheral device, do some test prints and check for the presence of skew, and check that side-to-side registration is correct.
- When you detect a problem with skew or side-to-side registration, do the adjustment on the joint bracket attached to the peripheral unit upstream of the unit where the problem occurred.
  - Side-to-side registration is corrected by shifting the upstream joint bracket left or right.
- Skew is eliminated by inserting spacers (shims) under the rear or front end of the joint bracket. These attached by screws to the peripheral units before they leave the factory.
  - The locations of the spacers are shown in the service manuals.
- Before adjusting skew or registration manually, be sure to enter the SP mode and set SP1206 to "2" (OFF).
  - When you are finished, re-set SP1206 to "1".

Slide 203

No additional notes

Where Skew and Side-to-Side Registration Are Measured





- Use the two scales at the output slot of each peripheral to measure the skew and errors in side-to-side registration, as shown above.
- Important! There are two scales. The one at the rear is for DLT paper (LT LEF for the ring binder), and the one at the front is for A3 paper (A4 LEF for the ring binder). Use the correct scale.

Slide 204

No additional notes

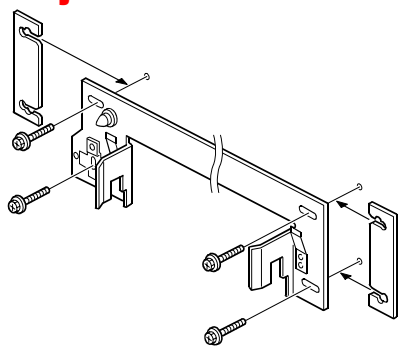
Where to Adjust Skew and Side-to-side Registration?

- **You can adjust at any junction between units except at the following locations:**
  - Input to the Buffer Pass Unit
  - Input to the Trimmer Unit
- **Procedure: Service Manual, Installation, Common Procedures, Skew and Side-to-side Registration**

Slide 205

- The procedure is the same as for the B-C4 series. The locations of the adjustment scales and the spacers are shown in the service manual.
  - Basically, the peripherals which have a connecting bracket for the adjustment need to be adjusted to the upstream machine.
- There are two scales at the exit of the multi-folding unit. One is above the proof tray, and one is at the exit from the folder to the next downstream peripheral.

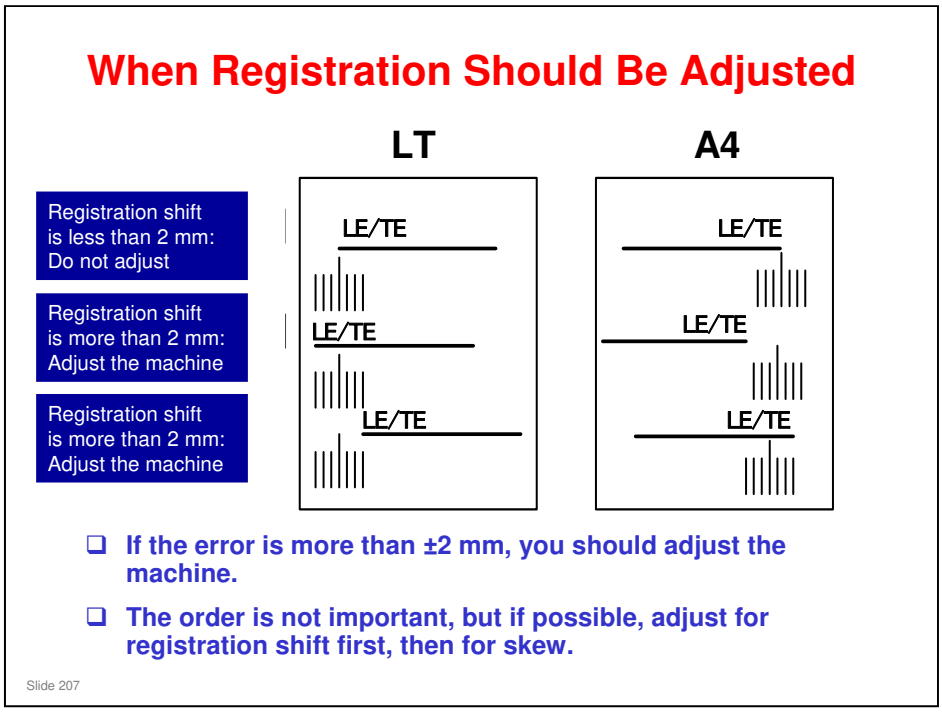
Adjustment Bracket



- There is a bracket like this at the locations mentioned on the previous slide.
- To adjust skew, we can insert spacers under one end of the bracket.
- To adjust registration, we can move the bracket from side to side.

Slide 206

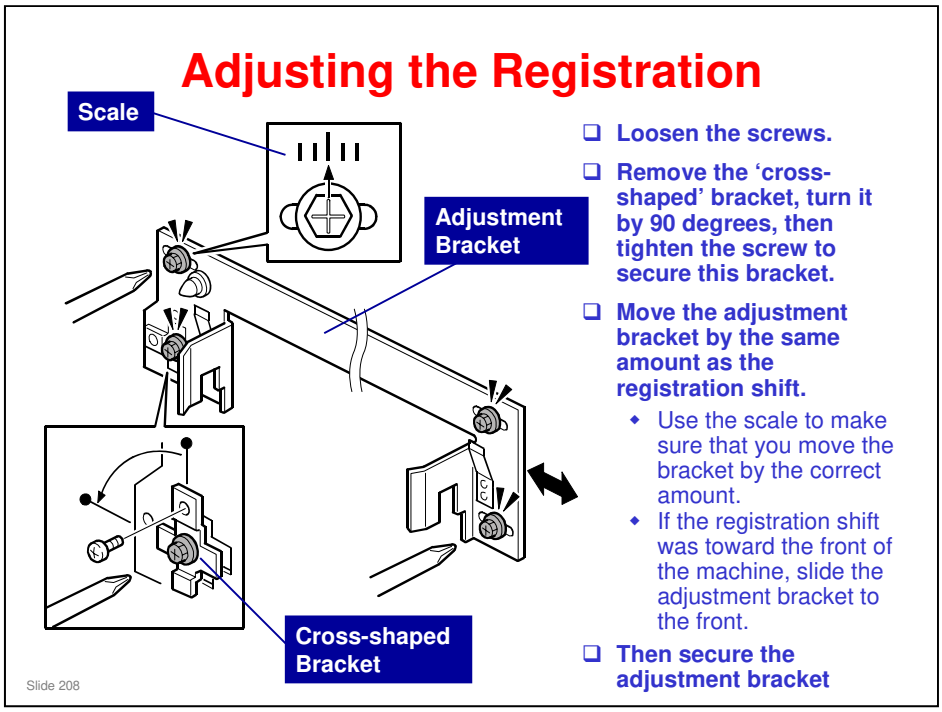
No additional notes



- LE: Leading edge
- TE: Trailing edge

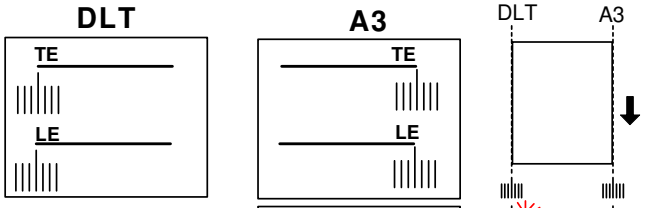
To check for registration shift

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper is within 2 mm of the central line on the scale, there is no registration shift.
- If the side of the paper is more than 2 mm from the central line on the scale, you should adjust the machine.



❒ If you move the adjustment bracket, you cannot turn the small cross-shaped bracket back 90 degrees at the end of the procedure, so do not try it.

When Skew Should Be Adjusted - 1



- Look at the scale when the leading edge comes by and when the trailing edge comes by.
- Check where the side edge of the paper is on the scale.
  - If the side of the paper comes past at the same place on the scale, there is no skew.
  - The above diagram shows an example where no adjustment is necessary.
- If the error is more than ±2 mm, you should adjust the machine.
- Adjust for skew first, then for registration shift.

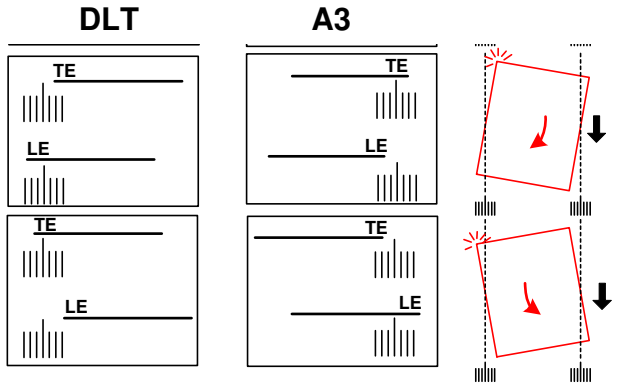
Slide 209

- LE: Leading edge
- TE: Trailing edge

To check for skew

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper comes past at the same place on the scale, there is no skew.
- If the difference is more than 2 mm, you should adjust the machine.

When Skew Should Be Adjusted - 2



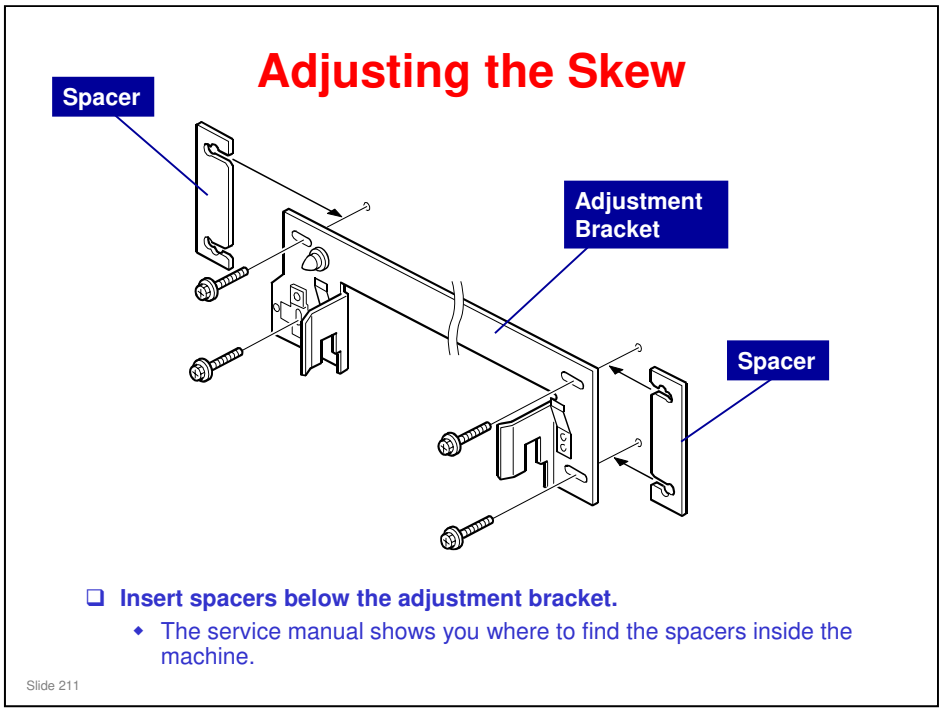
- **In these examples, skew is present. The machine must be adjusted.**
  - The red diagram on the right shows the type of skew.
  - The diagram in the middle shows how this type of skew appears on the A3 scale.
  - The diagram in the middle shows how this type of skew appears on the DLT scale.

Slide 210

- LE: Leading edge
- TE: Trailing edge

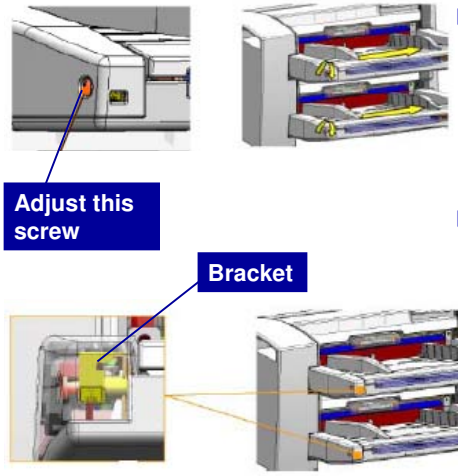
To check for skew

- Look at the scale when the leading edge comes by and when the trailing edge comes by. Check where the side edge of the paper is on the scale.
- If the side of the paper comes past at the same place on the scale, there is no skew.
- If the difference is more than 2 mm, you should adjust the machine.



❒ If the trailing edge skews towards the rear, insert the spacer at the rear side of the machine.

Side-to-side Registration at the Entrance of the Cover Interposer



- **Adjust the screw at the side of the tray**
  - Turn clockwise: The tray moves to the front
  - Turn anti-clockwise: The tray moves to the rear
- **The tray can be moved a maximum of 2 mm in either direction.**
  - To see the current setting, remove the tray cover and look at the scale on the bracket.

Slide 212

- This slide shows how side-to-side registration can be adjusted at the entrance of the cover interposer.
  - The adjustment is made on the trays, not on the bracket between the peripherals.
- There is no skew adjustment here. Skew can only be adjusted at the exit from the cover interposer (see the previous slide)

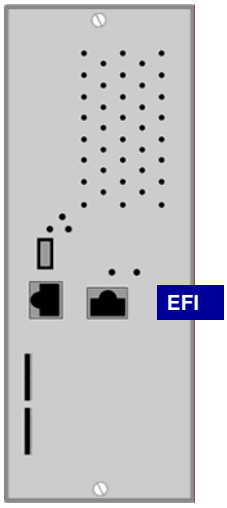
Installation

Controller Options

Slide 213

This section explains only the main points about the installation procedures. For full details, see the field service manual.

Controller Slots



- **The Security and Encryption card is shipped from the factory in SD card slot 1.**
  - The customer must enable these features with user tools.
- **This contains the following:**
  - Data Overwrite Security Unit
  - HDD Encryption Unit

Slide 214

- EFI: This is a Gigabit Ethernet interface for the Fiery controller.

SD Card Slots – Slot 1

- **Slot 1 (upper slot)**
  - Contains the Security SD Card (Security and Encryption Unit) when shipped
    - » The Security SD Card contains the Data Overwrite Security unit and HDD Encryption Unit.
    - » The customer must enable these features with user tools.

Slide 215

No additional notes

SD Card Slots – Slot 2

- **Slot 2 (lower slot)**
  - Empty when shipped; contains the VM card after the machine's installation procedure.
    - » The VM card with App2Me is packed with the machine.
  - Use this slot for service procedures, such as firmware update and NVRAM backup.

Slide 216

No additional notes

Removing the VM Card

- **To remove the VM card with an active application such as App2Me, just turn off the machine in the normal safe way (first operation switch, then main power switch), then pull the card out.**
- **The procedure used for previous models with App2Me (V-C3, AL-C1.5, R-C5.5) is still recommended, but not necessary.**

Slide 217

- Recommended procedure for halting VM card applications such as App2Me before you remove the VM card.
  - Normally, you need to remove the VM card at these times: To update the firmware, To back up the NVRAM, To install the browser unit, To update the App2Me application firmware, To execute application move or undo with SP5873
- To halt the VM card applications, do the following steps:
  - 1. Push the “User/Tools” key.

    If an administrator setting is registered for the machine, step 2 and 3 are required. Otherwise, skip to step 4.
  - 2.Push the “Login/Logout” key.
  - 3.Login with the administrator user name and password.
  - 4.Touch “Extended Feature Settings” twice on the LCD.
  - 5. Touch each application until the status changes to “Stop”.

    You must stop each application before you remove the VM card.
  - 6. Turn off the machine. And then remove the VM Card.
- After the firmware update, NVRAM backup, etc, then you have to enable App2Me and the other extended features again. To do this:
  - 1. Put the VM card in its slot. Then turn the main power on.
  - 2. Press the "User Tools“ key on the operation panel.

    If an administrator setting is registered for the machine, steps 3 and 4 are required. Otherwise, skip to step 5.
  - 3. Push the “Login/Logout” key.
  - 4. Login with the administrator user name and password.
  - 5. Touch the "Extended Feature Settings“ button twice.
  - 6. Touch each application that you use. The status will change to ‘On’.
  - 7. Touch the "Exit“ button. 9. Exit the "User Tools/Counter“ settings.

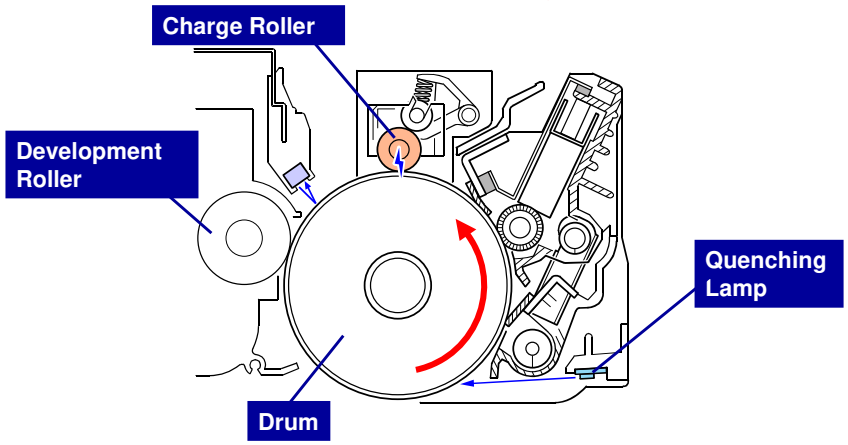
Detailed Section Descriptions

Printing Process Overview

Slide 218

No additional notes

Detailed Summary (1)

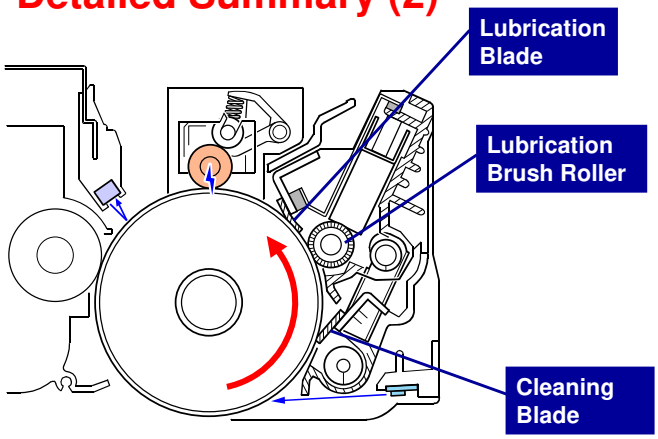


- This machine uses a charge roller, not a charge corona unit.
- The image transfer roller is just below the drum (not shown here).

Slide 219

No additional notes

Detailed Summary (2)

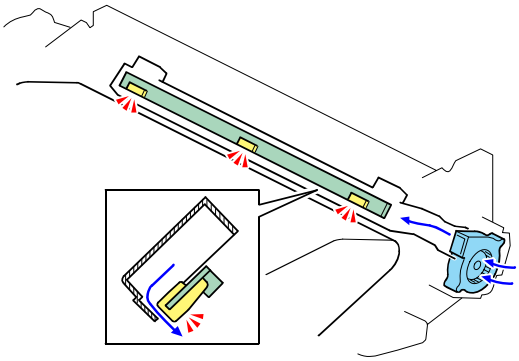


- The drum cleaning unit contains a brush roller and two blades.

Slide 220

No additional notes

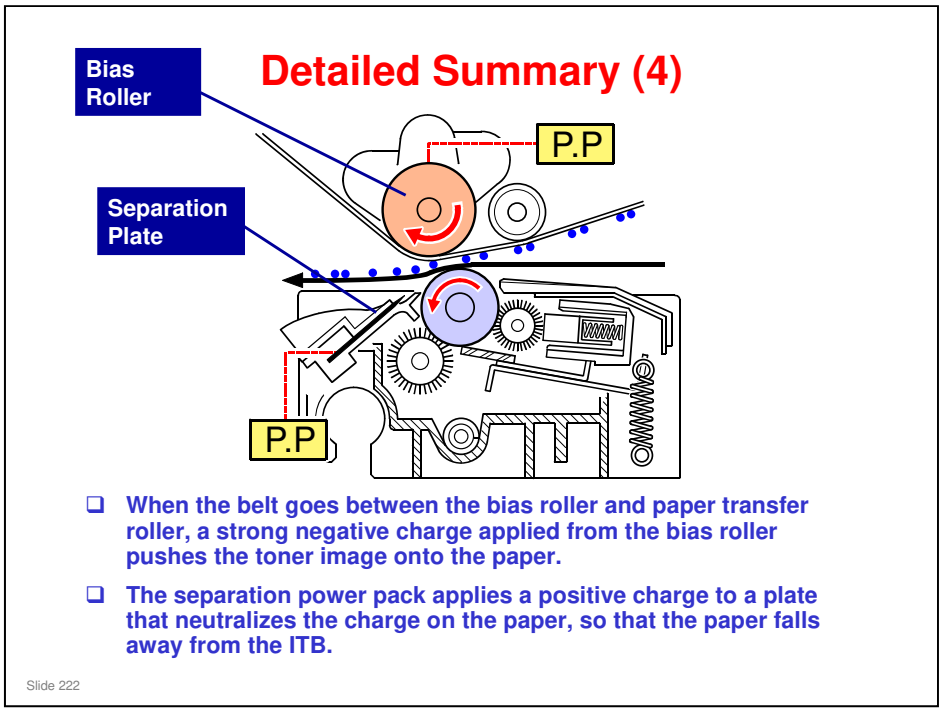
Detailed Summary (3)



- **Three ID sensors are used for process control and MUSIC.**
  - All three sensors are used for MUSIC processing.
  - Only the center sensor is used as an ID sensor for process control.
- **A fan at the right front corner of the ITB unit keeps these sensors clean.**

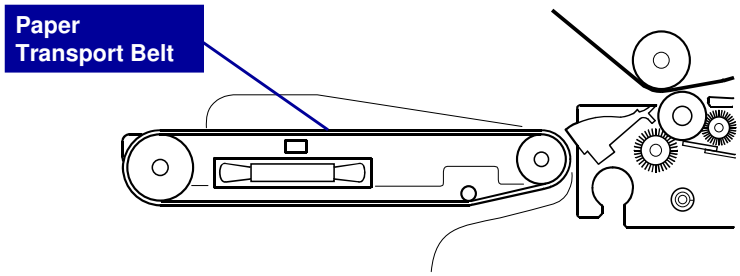
Slide 221

❒ The ID/MUSIC sensor assembly is referred to in some of the SP modes as the TM/P sensor.



No additional notes

Detailed Summary (5)



- After the paper separates from the ITB the paper is transported to the fusing unit by the PTB (paper transport belt).
- The PTB consists of three perforated rubber belts.
- Three suction fans below the perforated belts hold the paper on the belt.
  - The toner is not yet fused to the paper, so fans have to be used to hold the paper on the belt.

Slide 223

No additional notes

Detailed Section Descriptions

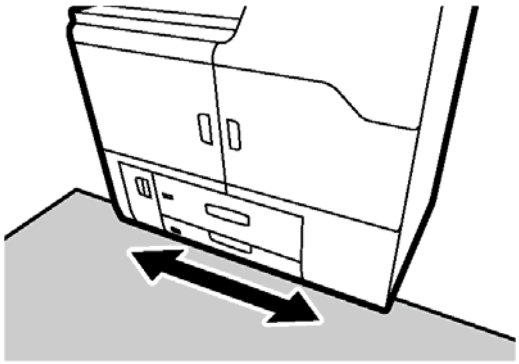
Replacement and Adjustment: General Notes

Slide 224

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Protect the Customer's Floor



- **Spread some paper or a drop cloth in front of the machine before removing any parts.**
  - The cloth or paper will catch small amounts of toner or dry lubricant that may fall out of the PCUs when they are removed.
  - If you work on a customer's table, spread paper or cloth on the table first.

Slide 225

No additional notes

Covers

- Most screws are recessed or hidden with plastic covers that can be easily removed.
- This enhances the smooth appearance of the main machine and peripheral units.

Slide 226

No additional notes

Cautions Relating to the Rear Boxes

- **Exercise caution when operating the machine with the rear boxes open, especially the cooling box:**
  - This machine has many fans and ventilation ducts to expel ozone, paper dust, and hot air from around the PCDUs and other areas inside the machine.
  - If you service the machine and then check printing operation with the rear boxes open, dust or gases may adhere to the OPC drums and cause problems with image output (white block patterns for example).
  - Normally, process control can handle such minor problems, but if you want to recover the print quality as soon as possible, print several sheets with solid color images.

Slide 227

No additional notes

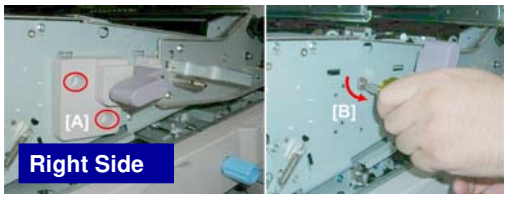
Before Pulling out the ITB Unit or a PCDU (1)

- To avoid damage to the ITB, both sides of the ITB must be down before the ITB or a PCDU can be pulled out of the machine.
- First, lower the ITB lever. This moves the ITB about 5 mm away from the K drum.
- Then, always check the front edge of the ITB at two points [A] before you pull the ITB unit out of the machine.
- If you see either white cap [B] (or both), the ITB lift motors have not lowered the belt to the normal standby position when the machine was powered off. The belt must be lowered manually.

Slide 228

- Normally, this is not a problem because the lift motors will lower the left and right half of the ITB when the machine is turned off.
- However, if the machine has not powered off normally, due to a power failure or removal of the power cord without turning off the power switches, for example (or if a belt lift motor failed), the belt will remain up.
- If you see the belt up as shown at [B], the ITB must be lowered manually.

Before Pulling out the ITB Unit or a PCDU (2)



- To lower the left half of the ITB unit, turn the gear until the left side of the belt is down and you no longer see the left white cap.
- To lower the right half of the ITB unit, remove cover [A]. Then turn screw [B] until the right half of the ITB is down and you no longer see the right white cap.
- If both caps are down, the ITB unit can be pulled out.

Slide 229

No additional notes

Turning the Machine Off

- **The main power switch must always be turned off before you start to service the machine.**
- **On the Fiery controller operation panel:**
  1. Press the [Fiery] tab.
  2. Press the [Restart Fiery] button.
  3. Press the [Shut Down] button.
- **On the Main Machine**
  1. Push the operation switch on the operation panel to turn the power off.
  2. Wait for the operation switch power LED to stop flashing.
     Important: Never turn off the main power switch when the power LED is lit or flashing.
  3. After the power LED goes off, open the left front door.
  4. Turn the main power switch off.

Slide 230

No additional notes

Turning the Machine On

1. Turn on the Fiery controller.
2. Turn on the main switch of the main machine.

Slide 231

No additional notes

Detailed Section Descriptions

Replacement and Adjustment: Common Procedures

Slide 232

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

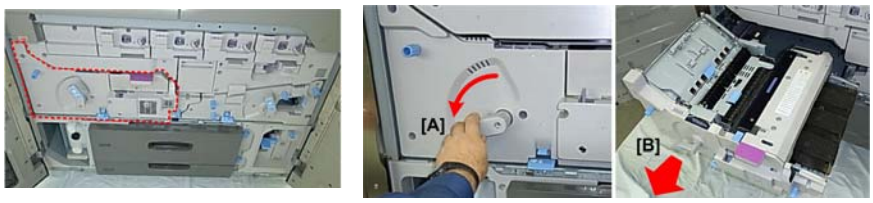
Common Procedures

- **There is a section of the service manual where common procedures (such as removing doors, and sliding out drawers) are given.**
  - Replacement and Adjustment > Common Procedures

Slide 233

No additional notes

Left Drawer: Pulling it Out

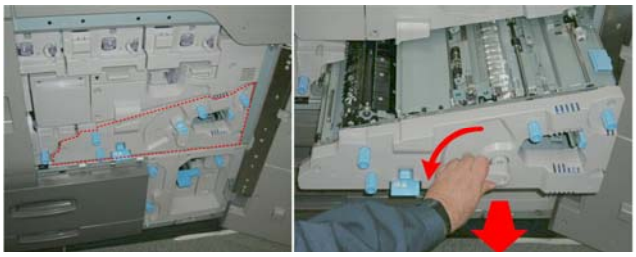


- Lower the lock lever [A].
- Pull the drawer out [B] until it stops.

Slide 234

- The left drawer contains the PTB, fusing unit, paper cooling unit, and the 1st half of the duplex path.

Removing the Right Drawer

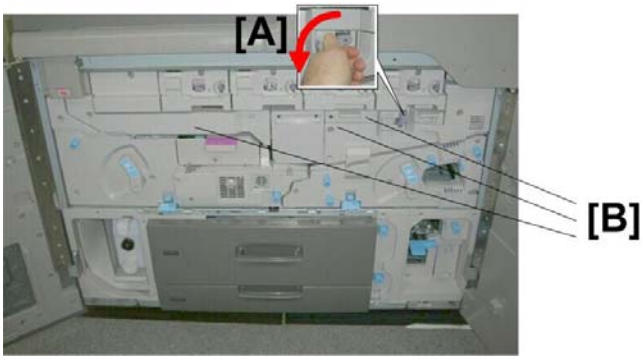


- **The unit is extremely heavy. Two persons are required to lift the unit off the rails (and to re-install it).**

Slide 235

- The right drawer contains the PTR (paper transfer roller) unit, paper registration, and the 2nd half of the duplex path.

ITB Unit: Removal

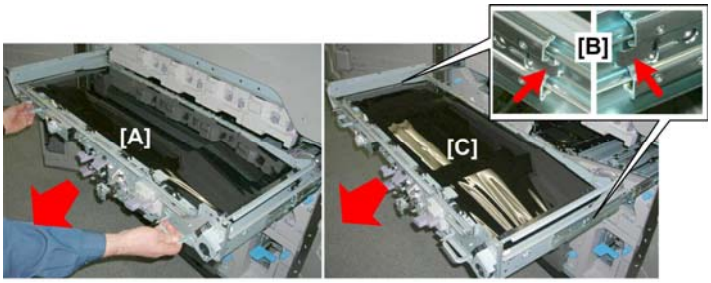


- Lower the ITB lever [A].
- Remove three plates [B].

Slide 236

- After you remove the plates, you remove a screw at each side of the ITB unit, then you can pull it out as shown on the next slide.
- For all the details, see the procedure in the service manual.

ITB Unit: Pulling it Out



- **There are two stop positions, as shown above.**
  - First stop position [A]
  - Second stop position [C]
    - » You must depress the rail release levers [B] on both sides of the ITB unit tray before you can pull it out to the 2nd stop position.

Slide 237

No additional notes

ITB Unit: Re-installation

- **Before you push the ITB unit into the machine:**
  - Make sure handle B3 [A] below the ITB unit tray is down. You cannot push the ITB unit tray into the machine if this lever is up.
  - You must depress the rail lock levers [B] on both sides of the tray. (The rail locks engage automatically when the ITB tray is pulled out completely.

Slide 238

No additional notes

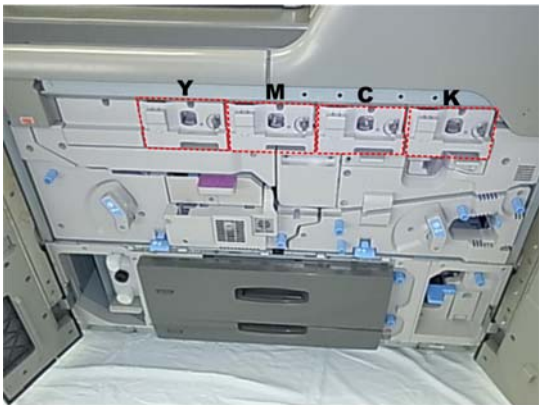
Canopy Cover Removal

- **The procedure for the D074/D075 is different from the procedure for the M044.**
  - D074/D075: The ARDF and some covers around the exposure glass on the left side of the machine.
  - M044: Only three plastic covers need to be removed on the left side of the machine.
- **The toner bank door, attention light, operation panel, and toner bank cover must be removed for all models.**

Slide 239

No additional notes

PCDUs



- The four PCDUs are located above the ITB unit as shown in this photo.

Slide 240

No additional notes

Before Removing a PCDU

- **Lower the ITB release lever.**
  - This separates the ITB from the bottoms of the drums, so that the surface of the ITB or drum will not be scratched when a PCU is removed.
- **When you take out a PCDU:**
  - Place the PCDU upright on a flat clean surface.
  - There is only a small gap between the surface of the drum and the table surface, so the surface must be smooth, flat, and clean.
  - To avoid damage to the surface of the drum, never place the PCDU on a carpet or rough cloth.

Slide 241

No additional notes

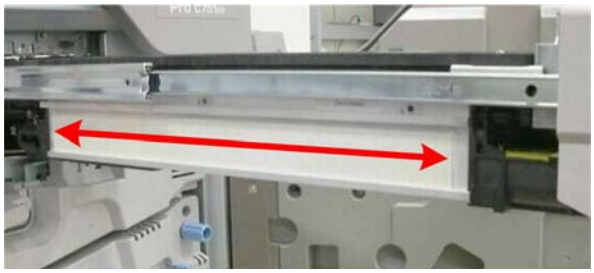
Re-installing a PCDU (1)

- **Before you push the PCDU into the machine, check the following:**
  - Charge unit lock lever [1] must be down and locked
  - Cleaning unit lever [2] must be up and locked.

Slide 242

No additional notes

Re-installing a PCDU (2)

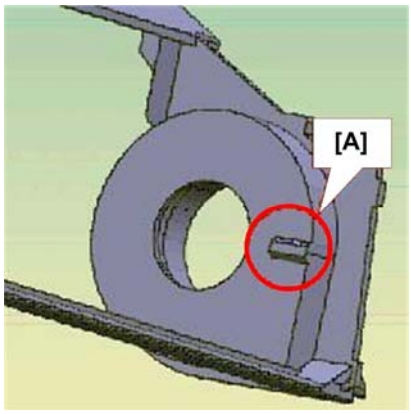


- **Always check the left side of the PCDU before you push it back into the machine.**
  - This is the shield plate that conducts heat away from the development unit.
- **If you see any toner on the plate, wipe it off with a clean dry cloth.**
- **To prevent toner scatter or gear damage, never apply excessive force on the PCDU when you push it into the machine.**

Slide 243

No additional notes

Re-installing a PCDU (3)

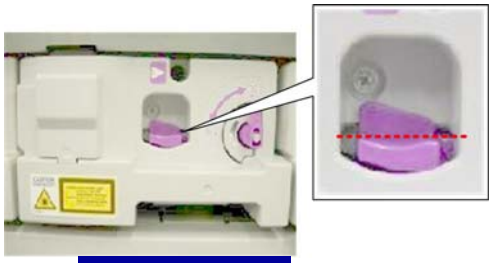


- When a PCDU is re-installed, the back of the PCDU must mesh correctly with the protuberance in the frame shown above [A]

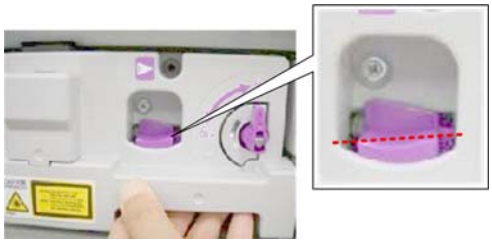
Slide 244

No additional notes

Re-installing a PCDU (4)



Correctly Locked



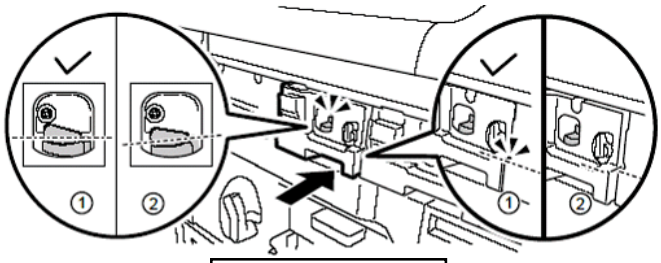
Not Correctly Locked

- **After you push the PCDU into the machine, make sure that PCDU is locked correctly.**
  - When the PCDU is locked correctly, the top of the lock lever is straight as shown above left.
  - If the PCDU is not locked correctly, the top of the lock lever is slanted slightly down to the left as shown below left.
- **If the PCDU lock lever is not locked correctly, the joint on the inner side of the photoconductor may not be properly engaged. Pull the PCDU out about 30 mm (1.5 in.) and push it in again so that the top of the lock lever is level.**

Slide 245

No additional notes

Re-installing a PCDU (5)



(1): Locked Correctly
(2): Not Locked Correctly

Make sure that the PCDU is correctly locked (see the previous slide)

Make sure that the front face of the PCDU is flush with the face plate and the other PCDUs

- **Make sure that the front face of the PCDU is flush with the face plate and the other PCDUs.**

Slide 246

No additional notes

Drum Lubrication

- **Drums must always be coated with the lubricant (p/n B1329700) after doing cleaning maintenance or troubleshooting image quality problems.**
  - Friction due to lack of lubrication may cause the drum cleaning blade to bend and turn inwards against the drum surface.

Slide 247

ITB Cleaning Unit

- The ITB cleaning unit is located below the PCDUs, as shown in this photo.

Slide 248

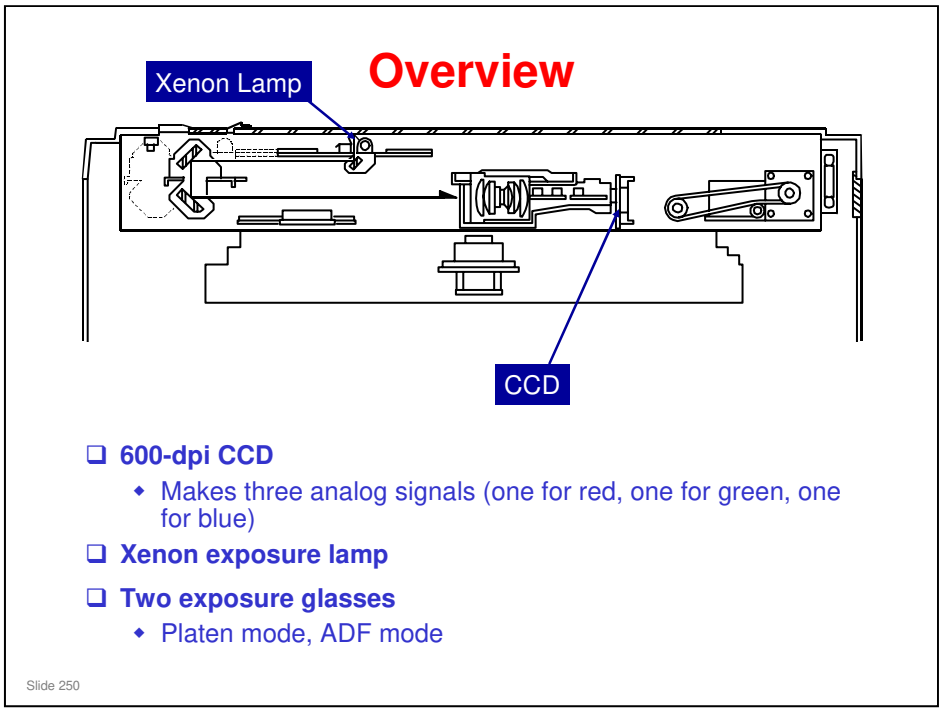
No additional notes

Detailed Section Descriptions

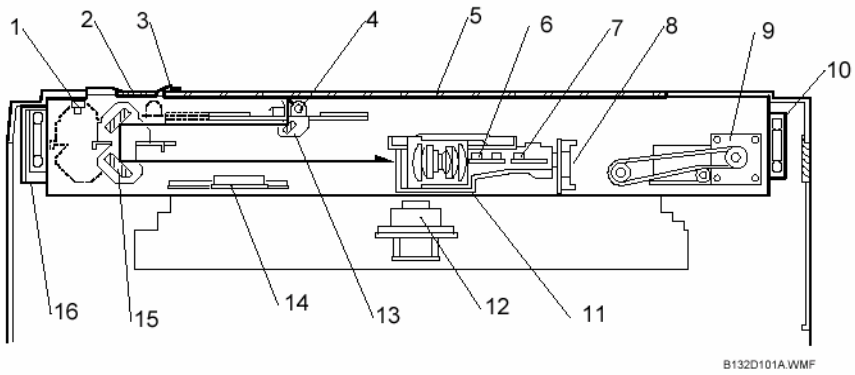
Scanner

Slide 249

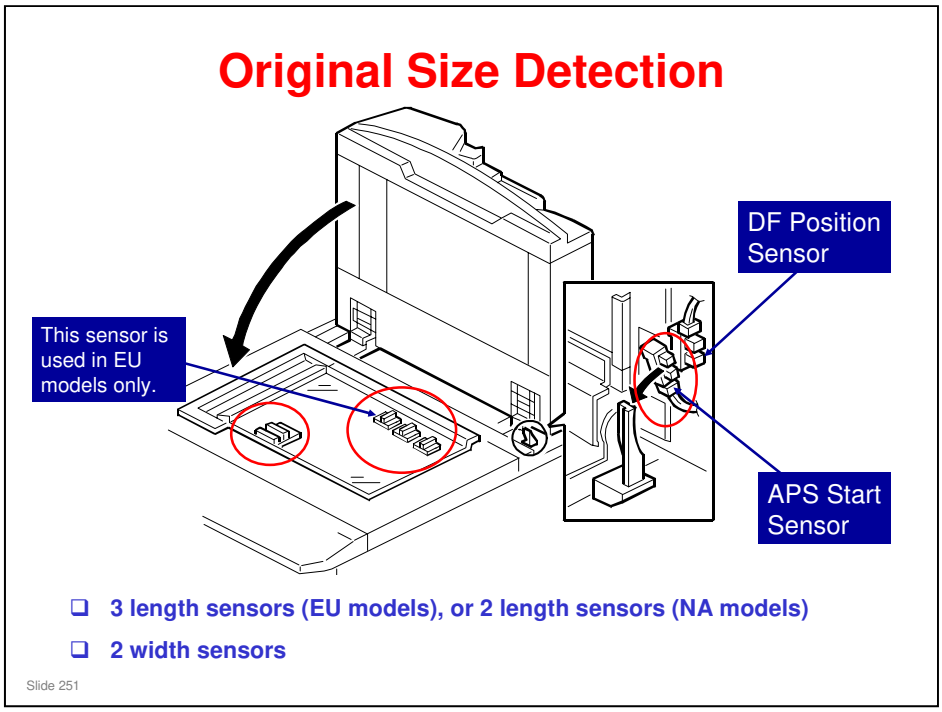
- The scanner mechanism will be discussed in this section. It is similar to the V-C3.
  - It only covers the movable scanner inside the main body of the machine, and not the ADF.



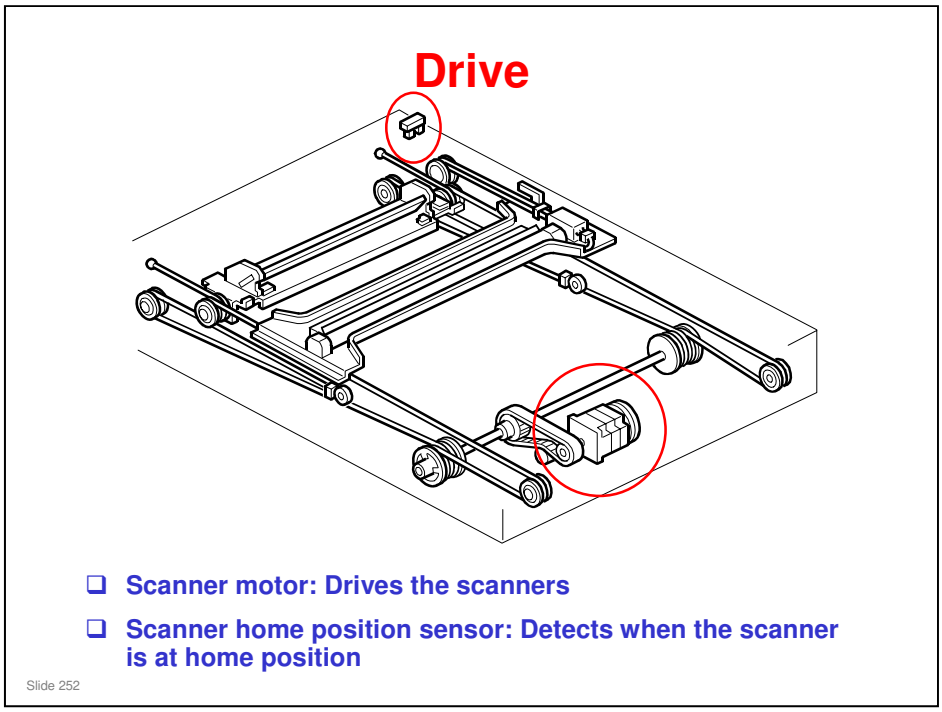
- ❒ This is a typical CCD scanner mechanism.
- ❒ For the main components, see the diagram below.
- ❒ In this machine, there is an ADF exposure glass. In ADF mode, the scanner moves below this glass and scans the original while the ADF feds it past this glass.
- ❒ There is also an optional anti-condensation heater for the scanner.
  - ➢ The heaters for the paper trays and transfer unit are standard equipment.



1. Scanner HP Sensor
2. ARDF Exposure Glass
3. White Plate
4. Exposure Lamp (Xenon)
5. Exposure Glass
6. APS2 (Org. Length Sensors 1, 2)
7. APS3 (Org. Length Sensor 3)
8. SBU (CCD: 600 dpi)
9. Scanner Motor
10. Scanner Fan Motor - Right
11. Lens Block
12. Polygon Mirror Motor
13. 1st Scanner
14. APS1 (Org. Width Sensors 1, 2)
15. 2nd Scanner
16. Scanner Fan Motor - Left

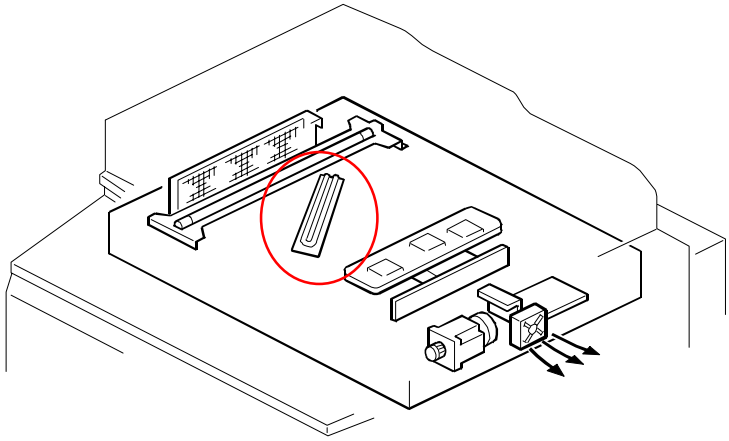


- If the original is small (such as A5-LEF), all sensors are off and the machine shows that the original size cannot be detected. However, you can force the machine to detect A5/HLT in this situation if you adjust SP4303 (there are settings for A5/HLT SEF and A5/HLT LEF).
- When the power is on, the APS sensors are always active, but the CPU checks their signals only after the platen is lowered.
  - The other sensor near the APS start sensor detects when the ADF is open or closed (DF position sensor).
- Book (ADF open): The CPU checks the sensors when the Start key is pressed.
- ADF: The CPU checks the sensors when the cover is lowered (detected by the APS start sensor)
- By-pass Mode: The APS sensors are ignored when copy paper is fed from the by-pass tray, but the by-pass tray can handle a variety of sizes and orientations. To accomplish this:
  - The machine always assumes short-edge feed for paper on the by-pass tray.
  - Width is measured by a sensor inside the by-pass tray.
  - The bypass tray cannot measure length, so the registration sensor determines length of the paper using clock pulses.



- The main points are on the slide.
- The scanner speed depends on the reproduction ratio. The speed is double the normal speed when returning to home position.
- The first scanner contains the exposure lamp, reflectors, and the 1st mirror. The second scanner contains the 2nd and 3rd mirrors.
- The second scanner moves at half the speed of the first scanner. This is to maintain the focal distance between lens and original.
- In this machine, wires are used instead of timing belts. These are more difficult to replace, but copy quality is better (less jitter).

Anti-condensation Heater



❑ This is a service part. Connect this if the user needs it.

Slide 253

- Condensation on the mirrors can cause:
  - Running, smearing and image borders
  - Printing completely black or gray pages
- Fans
  - The scanner cooling fans (front, rear) pull cool air into the scanner unit.
  - The scanner exhaust fan pulls hot air out from the scanner unit
- Anti-condensation heater turns on:
  - When the main power switch is turned off.
  - When the operation switch is turned on.
  - When the machine enters the auto off mode.

Replacement

- After you replace the lens block, you must do some adjustments. See the service manual for details.

Slide 254

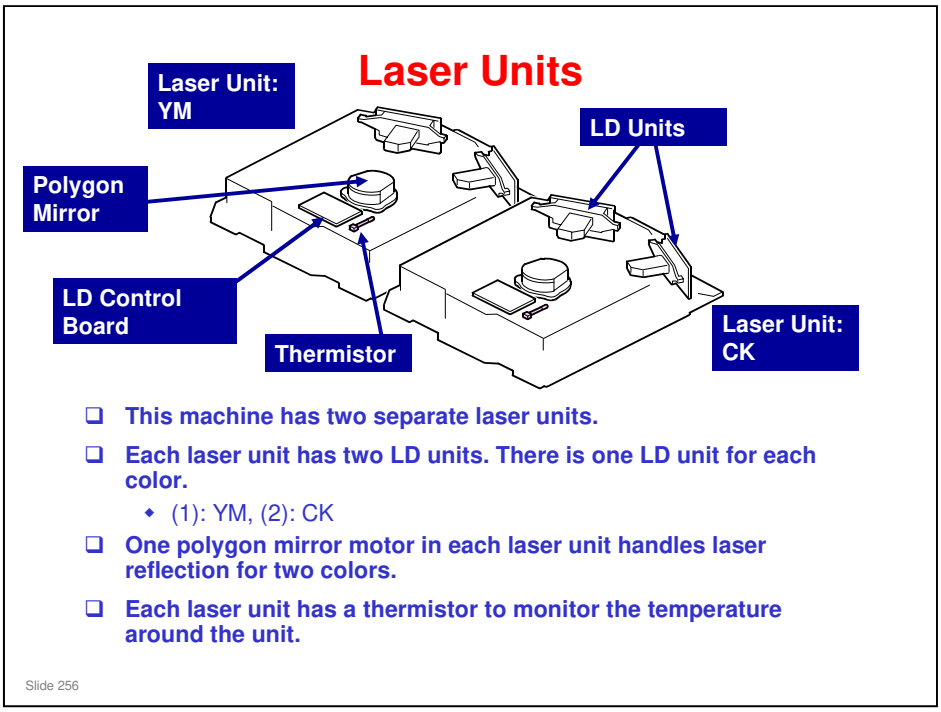
No additional notes

Detailed Section Descriptions

Laser Unit: Description

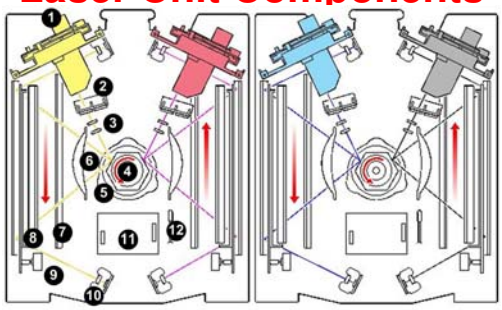
Slide 255

- The laser unit will be discussed in this section. The basics points of the MUSIC adjustments from previous models are used in this model, but there are some significant differences in this laser unit from previous models. So, study this section carefully.



❒ A photo diode for each color detects the emitted light. The output of the photo diode is fed back to the LD control board. The LD control board uses this information to control the amount of light to make sure that it remains at the correct level.

Laser Unit Components



- The only part of the laser unit that requires cleaning is the toner shield glass between the bottom of the laser unit and the drum.
- The polygon motors, LD units, and other components inside the laser unit are not serviced in the field. If a problem occurs, the entire laser unit is replaced.
- After the laser unit is replaced, an SP code must be executed: SP2108-1 for the CK laser unit and SP2108-2 for the YM laser unit.
  - These SP codes set the operation parameters for the laser unit (main scan registration, main scan magnification, shading, and bow skew adjustment).

Slide 257

1. LD Units
2. ND Filter
3. Cylindrical Lenses
4. Polygon Mirror
5. Polygon Mirror Motor
6. Lens 1 (Main Scan)
7. 3rd Mirror
8. 1st, 2nd Mirrors (below)
9. Skew Motor
10. Laser Synchronization Detector
11. Control Board
12. Thermistor

❒ The machine calculates the optimum optic settings for each color and uses an ND filter to modify the light intensity.

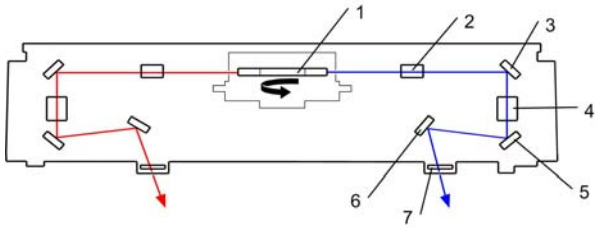
❒ There are four cylindrical lenses in each laser unit, two for each color. The cylindrical lens adjusts the beam path and pitch in the sub scan direction for each color.

❒ Each polygon mirror has six facets. Both mirrors rotate at 16,668 rpm.

❒ The magnification rate can be fine adjusted within a range of ±0.8% in the main scan and sub scan directions for consistent image reproduction during duplexing. It is not necessary to reduce the line speed, as was done with previous machines.

➢ These adjustments can be done with SP2102-41 to SP2102-44 (Magnification Adjustment) to adjust the magnification rate for the front/back pages in duplex print jobs.

Laser Unit Components (Side View)

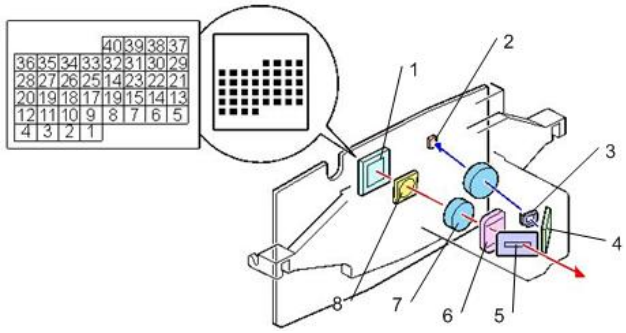


1. Polygon Mirror Motor
2. Lens 1
3. 1st Mirror
4. Lens 2
5. 2nd Mirror
6. 3rd Mirror
7. Toner Shield Glass

Slide 258

No additional notes

LD Unit Components (VCSEL Technology)



- This machine uses a new technology called VCSEL.
- Each VCSEL LD unit has 40 beams in a two-dimensional array.
- VCSEL allows magnification correction and fine adjustment of image position.
- VCSEL also keeps the strength of the laser beams constant by optical waveform correction. This correction is important for reproducing thin diagonal lines.

Slide 259

1. **VCSEL Array**
2. **Photosensor (feedback detection)**
3. **Aperture**
4. **Mirror**
5. **Aperture**
6. **Lens (TCL)**
7. **Collimating Lens**
8. **1/4 Wavelength Board**

"VCSEL" means Vertical Cavity Surface Emitting Laser.

It operates at 1200 x 4800 dpi.

Image Correction

- **Unique points of this machine:**
  - Bow skew correction
  - Magnification correction for both sides of paper
  - Magnification correction settings for the Paper Library to correct for the different amounts of shrinkage for different paper types

Slide 260

No additional notes

Magnification Correction (1)

- During duplexing, some paper may shrink or swell after going through the fusing unit on the first pass.
- This small change in the paper size can cause inaccurate registration on the 2nd side.
- To adjust the magnification, use these SP modes:
  - 2102-041: Side 1 main scan
  - 2102-042: Side 1 sub scan
  - 2102-043: Side 2 main scan
  - 2102-044: Side 2 sub scan
  - Range: -0.8% to +0.8%
- The above settings are used for all paper types except custom paper types selected from the Paper Library.
  - See the next slide for the settings that are used with the Paper Library.

Slide 261

No additional notes

Magnification Correction (2)

- If a custom paper is selected with the paper library, the magnification settings in SP2102 are not used.
- The settings of SP2950 to 2953 are used instead.
- The user can also adjust the magnification using Custom Paper > Advanced Settings, as shown below.
  - 15: Side 1 main scan
  - 16: Side 1 sub scan
  - 17: Side 2 main scan
  - 18: Side 2 sub scan
  - Range: -0.5% to +0.5%

Slide 262

No additional notes

Magnification Correction (3)

- **The SP modes settings for the paper library are:**
  - 2950: Side 1 main scan
  - 2951: Side 1 sub scan
  - 2952: Side 2 main scan
  - 2953: Side 2 sub scan
  - Range: -0.8% to +0.8%
- **There are settings for custom papers 001 to 100.**
- **These settings allow correction for the different amounts of paper shrinkage that occur with different types of paper.**

Slide 263

- Note that the SP has a range of -0.8% to +0.8%. However, the user tool has a range of -0.5% to +0.5%. If the technician adjusts to, for example, 0.6%, this setting will remain unless the customer adjusts it, then it will fall between -0.5% to +0.5%.

Image Position Correction (MUSIC)
What does MUSIC do?

- Three MUSIC sensors above the ITB read MUSIC sensor patterns that the machine makes on the ITB.
- When the alignment of vertical lines (or intervals between lines) in a MUSIC pattern are not correct, this can cause color registration errors.
- The machine adjusts the start timing for the laser at the start of the main scan.
- If skew is detected in the main scan direction (front to rear), the machine can change the angle of Lens 2 with a motor.

Slide 264

- MUSIC is "Mirror Unit for Skew and Interval Correction".

Image Position Correction (MUSIC)
When is MUSIC done? (1)

- **Immediately after the machine is turned on, MUSIC needs time to complete processing. All jobs must wait until MUSIC has finished.**
- **Normally, MUSIC is done when one of the following events occurs:**
  - When the machine initializes, immediately after the machine is turned on or returns from an energy save mode.
  - After one of the front doors is opened and closed.
  - Immediately after process control is done. This feature can be switched off with SP2153-2.
  - Just before printing starts. This feature can be switched off with SP2153-4.
  - During a long print job. MUSIC will execute after the number of pages specified with SP2153-24 have been printed. (This is only done for color printing.)
  - After the machine returns error SC499. This error indicates a problem with either the belt speed sensor at the front edge of the ITB or the ITB drive motor.
  - After color registration with the User Tools: User Tools> Maintenance> Color Registration.

Slide 265

- If a job is started before the MUSIC process has completed, a message ("Now Self Checking") will appear on the operation panel display. The job will not start until after MUSIC adjustment is finished.

Image Position Correction (MUSIC)
When is MUSIC done? (2)

- **When one of the events on the previous slide occurs, the use of MUSIC also depends on temperature readings in the machine at the following locations.**
  - K laser thermistor
  - M laser thermistor
  - Y thermistor
  - ITB speed sensor thermistor
- **At the start of any one of the events mentioned above, two judgments are made:**
  - Judgment 1: If the temperature at any of the thermistors has changed less than a certain amount (set by SP codes) since the previous execution, MUSIC is done one time.
  - Judgment 2: If the temperature at any of the thermistors has changed more than a certain amount (set by SP codes) since the previous execution, MUSIC is done two times.

Slide 266

- The temperature readings are stored in display SP codes: CK laser thermistor (SP2180-10), YM laser thermistor (SP2180-12), Y (SP2180-15), and ITB speed sensor thermistor (SP2180-16).

SP Codes for Low Limit

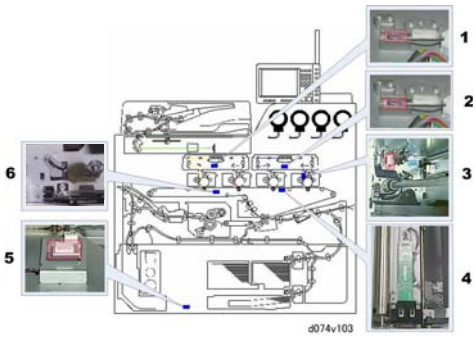
- 2-153-40, Decision Temp: Change K (threshold: 1.5 ˚C)
- 2-153-44, Decision Temp: Change M (threshold: 1.5 ˚C)
- 2-153-50, Decision Temp: Change Y (threshold: 1.5 ˚C)
- 2-153-52, Decision Temp: ITB FB Sensor (threshold: 1 ˚C)

SP Codes for High Limit

- 2-153-041, Decision Temp: Change K2 (threshold: 3.5 ˚C)
- 2-153-045, Decision Temp: Change M2 (threshold: 3.5 ˚C)
- 2-153-051, Decision Temp: Change Y2 (threshold: 3.5 ˚C)
- 2-153-053, Decision Temp: ITB FB Sensor (threshold: 3 ˚C)

Image Position Correction (MUSIC)

Thermistors



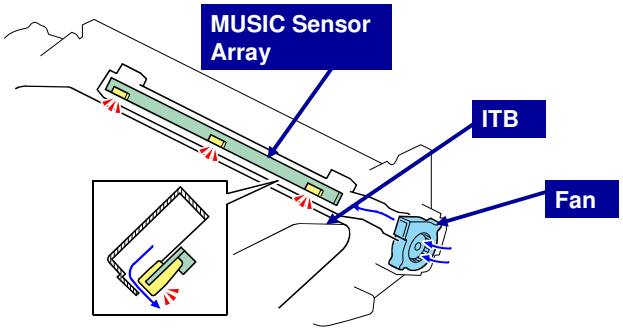
- 1. YM Thermistor: Inside the YM laser unit
- 2. CK Thermistor: Inside the CK laser unit
- 3. K PCDU Temperature/Humidity Sensor: Near the K PCDU
- 4. ITB FB Thermistor : On the belt speed sensor below the front edge of the ITB
- 5. Temperature/Humidity Sensor: Behind the heater switch panel
- 6. Y Thermistor: Behind the ITB Unit

Slide 267

- Only sensors 1, 2, and 4 are used for MUSIC.
- Number 4 is also used for controlling the speed of the ITB.
- Number 3 is used for process control and charge roller voltage control.
- Number 5 is used for fusing lamp control.
- Number 6 monitors the machine's internal temperature. It is also used for liquid coolant pump operation timing.

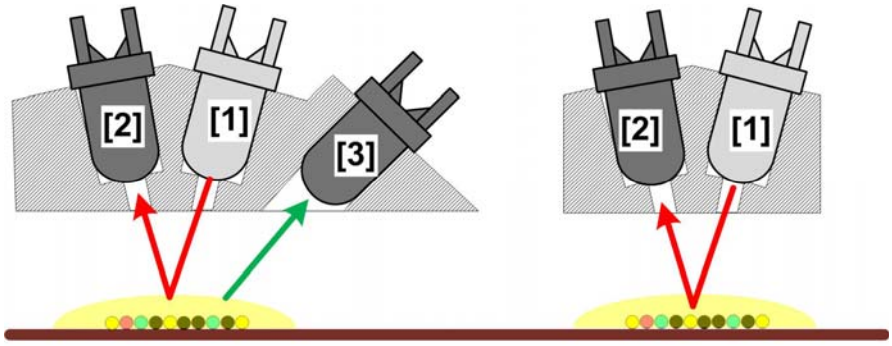
Image Position Correction (MUSIC)

Location of the MUSIC Sensors



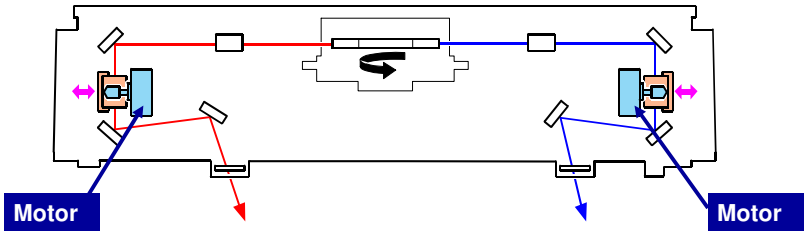
- **The MUSIC sensor array is above the ITB (2), on the right side of the ITB unit below the K_PCDU. The fan (3) keeps these sensors clean.**
  - The rear sensor reads MUSIC patterns only
  - The center sensor reads MUSIC patterns and also functions as the ID sensor.
  - The front sensor reads MUSIC patterns only

Slide 268



- The unit on left shows the configuration of the middle sensor which performs double duty as the ID sensor as well as a MUSIC sensor. The unit on the right shows the configuration of the rear and front sensors in the array that function only as MUSIC sensors.
- The elements in these sensors are:
  - [1] Emitter. Emits light on the patterns.
  - [2] Direct reflector sensor. Gathers light emitted by [1] and reflected directly from the patterns on the ITB.
  - [3] Diffused reflector. Gathers diffuse light from the sides of the patterns to achieve more accurate readings especially for Y, M, C. Only the middle sensor has this extra reflector.

Image Position Correction (MUSIC)
How is MUSIC Done?



- There are two motors in each laser unit (one for each color).
- The motors independently adjust the 2nd lens for each color during MUSIC adjustment. This adjusts image writing in the main scan direction.
- The motor for black is not used, because the K patterns are used as the reference point for MUSIC adjustments for the other three colors.

Slide 269

❒ In the Aries series, the BTL position was adjusted to correct skew.

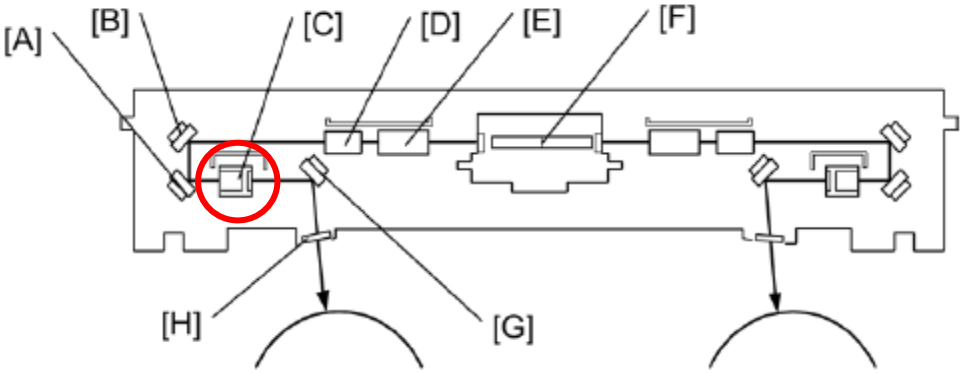
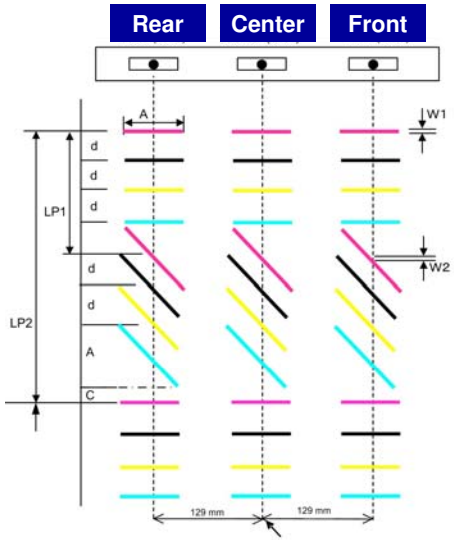


Image Position Correction (MUSIC)

MUSIC Pattern



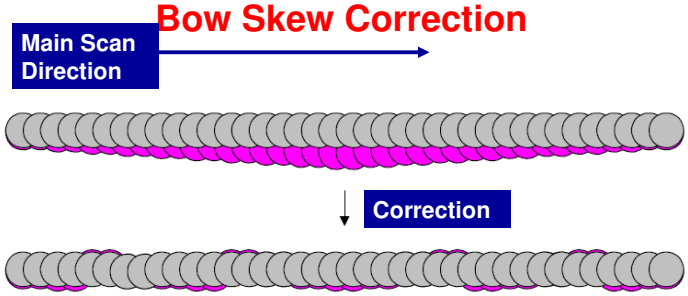
- During MUSIC, these line patterns are created on the ITB.
- There are two types of MUSIC adjustment, rough adjustment and fine adjustment.
  - Normally, fine adjustment is done during the automatic MUSIC adjustment.
  - However, the rough adjustment must be done before the fine adjustment if the fine adjustment fails several times.
- The controller calculates the average of the measurements and adjusts:
  - Sub scan line position for YMC
  - Main scan line position for CMY
  - Skew for CMY
- After the patterns are measured, the ITB cleaning unit erases the patterns.
- SC285 appears if an error is detected four times consecutively.

Slide 270

- The intervals [LP1] [LP2] between the lines (MM, KK, YY, CC, KM, KY, KC) are measured by the front, center, and rear MUSIC sensors.
- There are two types of MUSIC adjustment, rough adjustment and fine adjustment. The line patterns for each MUSIC adjustment are different. (The pattern above is for rough adjustment.)
- The gaps (d and LP1) and line length (A) of the line patterns for the rough adjustment are longer than those gaps and length for the fine adjustment.

Image Position Correction (MUSIC)

Bow Skew Correction



- The two-dimensional VCSEL array of laser diodes allows precise control of image reproduction.
- If the MUSIC sensors detect that lines across the image are bent as shown above, the machine can adjust the image signals that are sent to each of the 40 lasers. This reconstructs the image that would be printed if there was no bow skew.

Slide 271

- This machine has a new phase for MUSIC control called "bow skew", to correct main scan lines that are bent in the middle like a bow.
- The main scan image area for each color (YMC) is divided into 86 areas checked by the MUSIC sensors.

Image Position Correction
Summary of Each Adjustment

- This table shows the improvements made to the MUSIC adjustments, compared with the AG/Aries series.

	Main Scan	Sub Scan
AG/Aries	Adjusts in units of 1/16 dot	Skew motor
Taurus	Adjusts in units of 1/48 dot	Skew motor, and bow skew adjustment

Slide 272

No additional notes

Detailed Section Descriptions

Laser Unit: Replacement and Adjustment

Slide 273

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

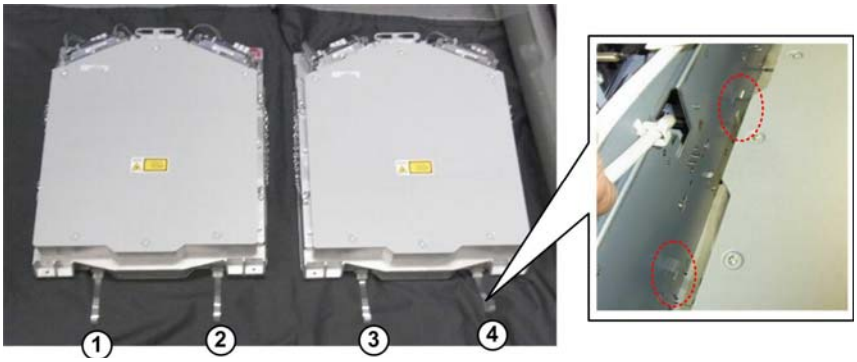
Removal

- **There are two laser units.**
  - The unit on the left is for yellow and magenta (YM).
  - The unit on the right is for cyan and black (CK)
- **The removal procedures for each machine are different.**
  - The D074/D075 has an ARDF that must be removed, and the scanner unit must be propped up with a support rod for servicing.
  - The M044 has no ARDF or scanner unit, so removal of the laser unit is much easier.
- **Never open the laser unit. It is replaced as a complete unit.**

Slide 274

- For the D074/D075, the procedure is very long because a lot of units must be removed.

Laser Unit: Re-installation (1)

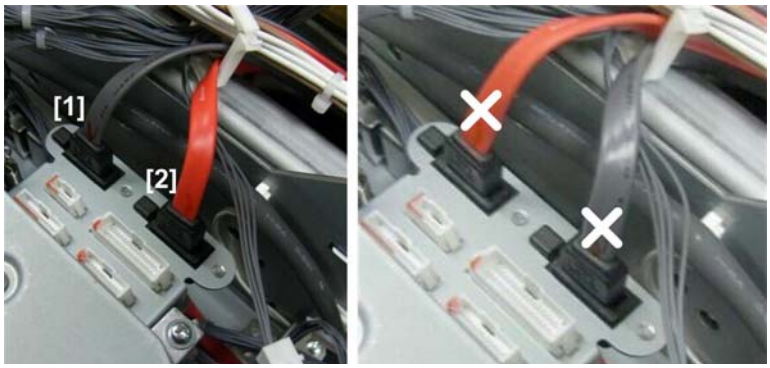


- There are two mylars attached to each laser unit.
- After you re-install a laser unit, confirm that both these mylars are visible and pointing up at the bottom of the laser unit.

Slide 275

No additional notes

Laser Unit: Re-installation (2)



- **When you re-connect a laser unit, check that the rear cables are connected correctly.**
  - The gray cable [1] must be connected on the left, and the red cable [2] must be connected on the right.

Slide 276

- If you connect these the wrong way round, in the case of the Y/M laser unit, the yellow data will go to the magenta drum, and the magenta data will go to the yellow drum.

Laser Unit: After Installing a New One

- After the laser unit is replaced, an SP code must be executed.
  - SP2108-1: Image Parameter - K/C Writing Unit
  - SP2108-2: Image Parameter - Y/M Writing Unit
- These SP codes automatically set the operation parameters for the laser unit (main scan registration, main scan magnification, shading, and bow skew adjustment).
- It is not necessary to input values from a printed sheet of paper.
- Never open a front door or switch the machine off while these SP code settings are in progress.
- If an SC error code is returned, switch the power off and do these SP codes again.

Slide 277

No additional notes

Detailed Section Descriptions

Paper Feed Mechanisms

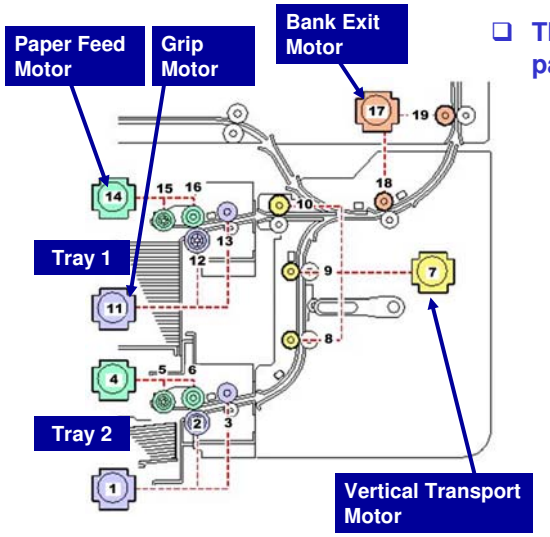
Slide 278

This section of the course explains the paper feed mechanisms.

The service manual has a good section on troubleshooting for paper delivery problems.

Troubleshooting > Troubleshooting for Paper Delivery Problems

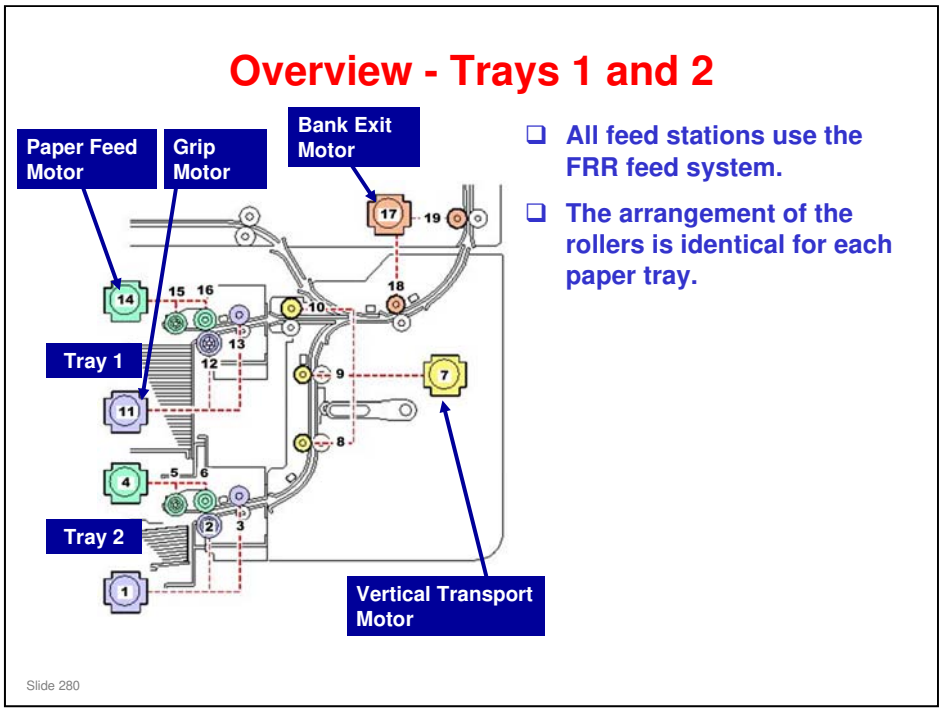
Overview - Trays 1 and 2



- **The main machine has two paper tray feed stations:**
  - Tray 1. The tandem tray holds 2,000 sheets of paper (1,000 sheets x 2 stacks). The tandem tray can be converted to a 1,000-sheet tray for larger paper sizes with the optional A3/DLT Feed Kit (B331).
  - Tray 2 . This is a universal tray. It holds 500 sheets of paper. To allow easy removal, the paper cassette is not fastened to the tray with screws.

Slide 279

1. 2nd Grip Motor
2. 2nd Separation Roller
3. 2nd Grip Rollers
4. 2nd Paper Feed Motor
5. 2nd Pickup Roller
6. 2nd Feed Roller
7. Vertical Transport Motor
8. Lower Transport Rollers
9. Upper Transport Rollers
10. Horizontal Transport Rollers
11. 1st Grip Motor
12. 1st Separation Roller
13. 1st Grip Rollers
14. 1st Paper Feed Motor
15. 1st Pickup Roller
16. 1st Feed Roller
17. Bank Exit Motor
18. Bank Exit Rollers
19. Main Relay Rollers



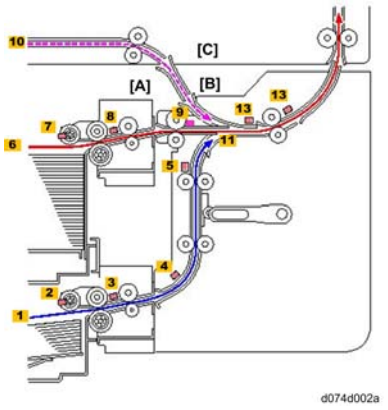
All feed stations use the FRR feed system. The arrangement of the rollers is identical for each paper tray.

- Rotation of the pick-up roller pushes the top sheet of paper to the paper feed roller and separation roller.
- The paper feed rollers and separation rollers feed the paper to the grip rollers.
- Grip rollers feed the sheet to transport rollers.
- The transport rollers feed the paper through the vertical paper path to the registration unit.

The vertical paper path starts where paper is fed from Tray 2.

- The vertical transport motor (7) rotates the lower transport rollers (8), upper transport rollers (9), and bank exit rollers (10) to feed paper to the bank exit rollers (17).
- The bank exit motor (17) drives the bank exit rollers (18) and main relay rollers (19).
- The bank exit rollers feed the paper out of the vertical transport unit to the main relay rollers in the registration unit.

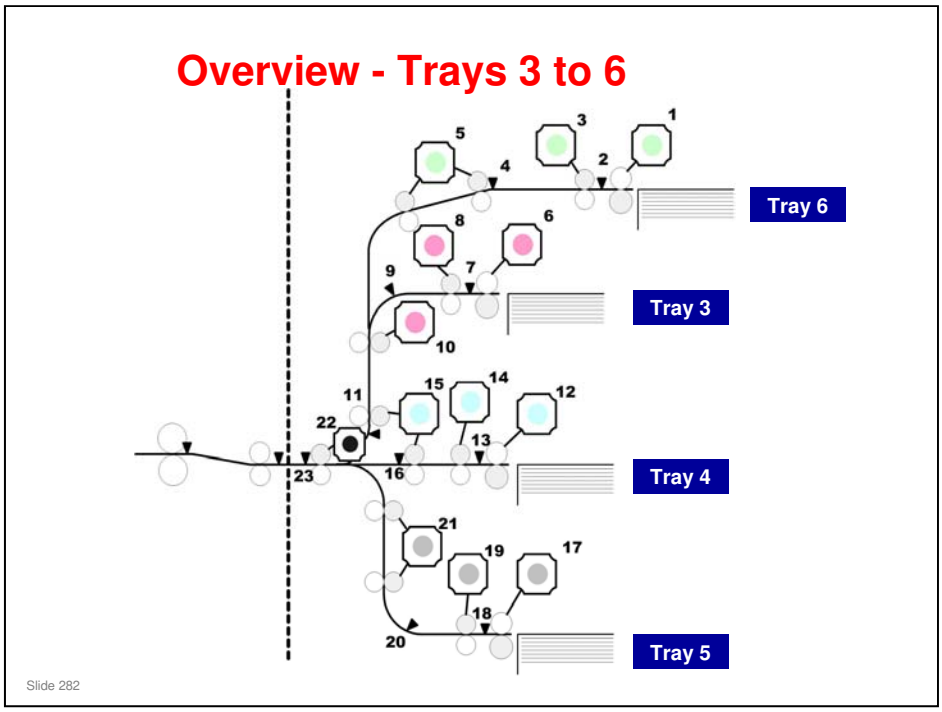
Overview - Sensors



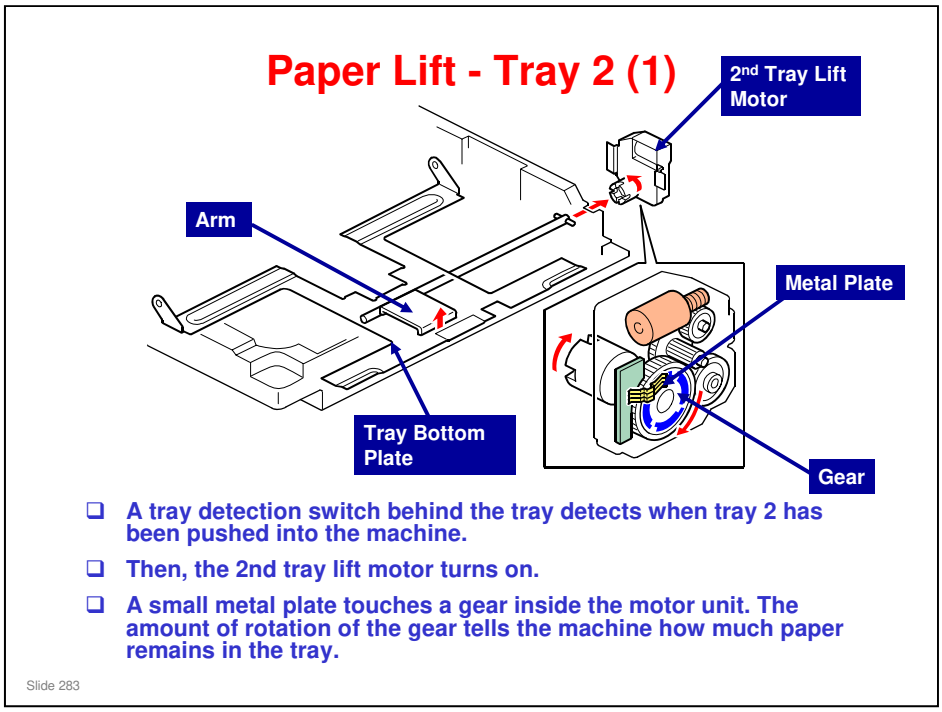
- [A]: Paper bank (Tray 1, Tray 2)
- [B]: Vertical transport unit
- [C]: Paper registration unit (in the right drawer)
- The sensors detect the leading and trailing edges of each sheet.
- If a sheet fails to arrive or leave one of these sensor points within the correct time for the size of paper, the sensor will trigger a paper jam error.
- Sensors are located where the paper path bends: (4) 2nd transport sensor, (5) vertical transport sensor, and (12) main relay sensor.

Slide 281

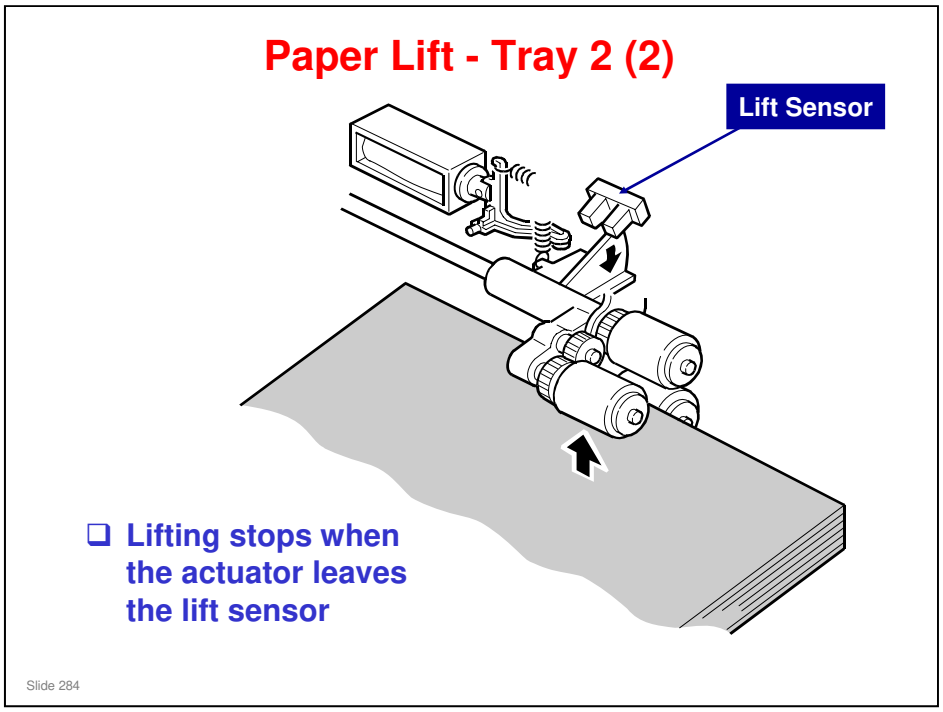
1. Tray 2 Paper Feed Path
2. 2nd Pickup Sensor
3. 2nd Paper Feed Sensor
4. 2nd Transport Sensor
5. Vertical Transport Sensor
6. Tray 1 Feed Path
7. 1st Pickup Sensor
8. 1st Paper Feed Sensor
9. 1st Transport Sensor
10. Duplex Paper Path
11. Bank Exit/Duplex Junction
12. Bank Exit Sensor
13. Main Relay Sensor



1. 6th Paper Feed Motor (Bypass)
2. 6th Paper Feed Sensor (Bypass)
3. 6th Grip Motor (Bypass)
4. 6th Transport Sensor (Bypass)
5. 6th Transport Motor (Bypass)
6. 3rd Paper Feed Motor
7. 3rd Paper Feed Sensor
8. 3rd Grip Motor
9. 3rd Transport Sensor
10. 3rd Transport Motor
11. 3rd Relay Sensor
12. 4th Paper Feed Motor
13. 4th Paper Feed Sensor
14. 4th Grip Motor
15. 4th Transport Motor
16. 4th Transport Sensor
17. 5th Paper Feed Motor
18. 5th Paper Feed Sensor
19. 5th Grip Motor
20. 5th Transport Sensor
21. 5th Transport Motor
22. LCT Exit Motor
23. LCT Exit Sensor

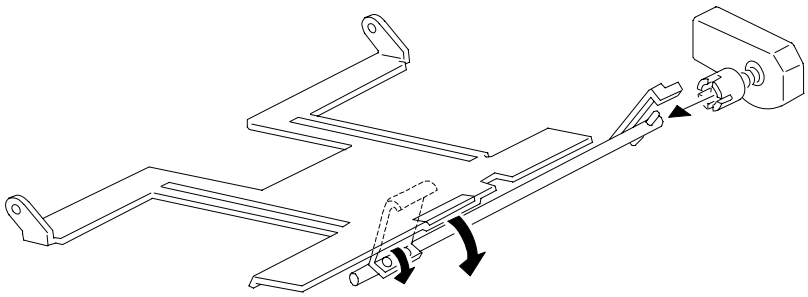


- The coupling of the 2nd tray lift motor rotates the lift arm up against the tray bottom plate, raises it to the paper feed position, and then stops.
- The pickup roller sensor detects when the top of the stack has been raised to the feed position.



- ❒ This is the same as the B234 series (Katana-C1).
- ❒ The lift sensor detects when the paper stack is at the correct height.
- ❒ As paper is used up, the lift sensor and lift motor keep the top of the stack at the correct height for paper feed.
- ❒ There is no paper height sensor in tray 2. However, the cpu calculates the amount of remaining paper from the angle that the lift motor has turned (this is explained again later in Remaining Paper Detection).
  - ➢ Tray 1 has paper height sensors. These will be described later.

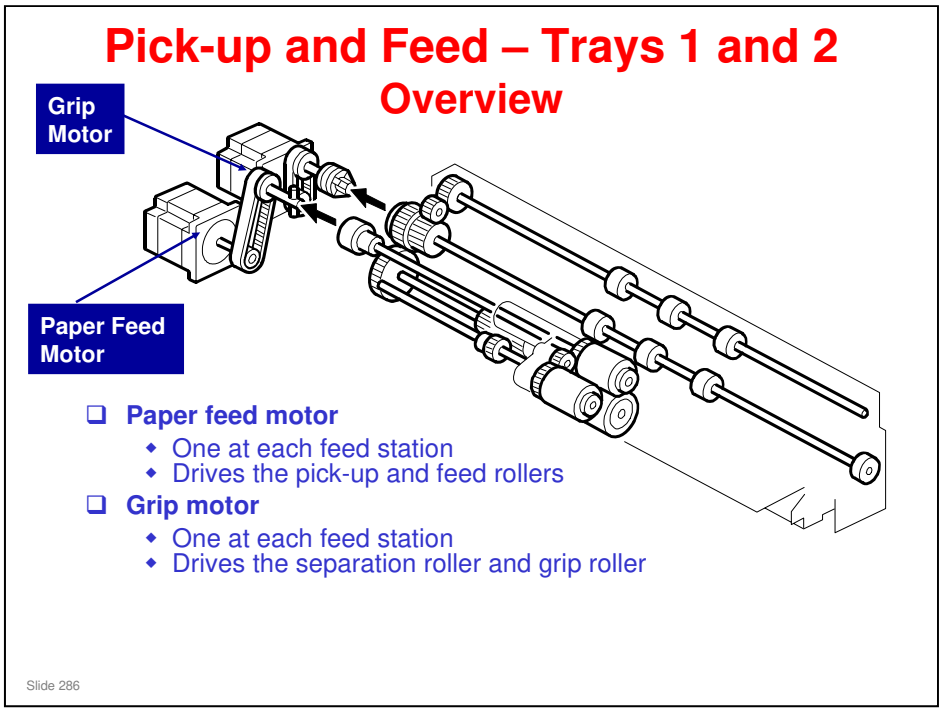
Paper Lift - Tray 2 (3)



- The bottom plate lowers under its own weight when the tray is taken out.

Slide 285

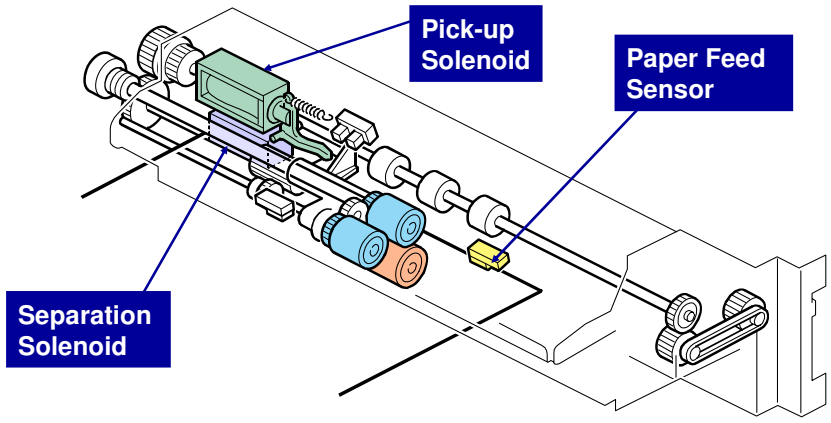
- When the tray is pulled out, the tray bottom plate lowers under its own weight.
  - For the 1st tray, this mechanism is more complex, because of the tandem tray mechanism. A later part of this section will describe this mechanism.



❒ This is the same as the B234 series (Katana-C1).

Pick-up and Feed – Trays 1 and 2

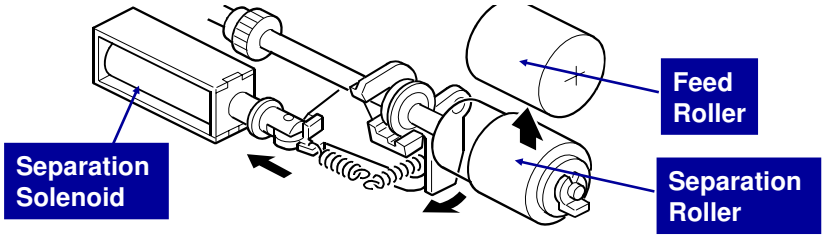
Pick-up and Feed



Slide 287

- To start paper feed, the feed motor, grip motor, separation roller solenoid, and pick-up solenoid all turn on.
- When the feed motor turns on to drive the feed roller, the pick-up roller also turns.
- When the separation roller solenoid turns on, the separation roller contacts the paper feed roller.
- When the pick-up solenoid turns on, the pick-up roller drops onto the top sheet of the paper stack.
- When the paper feed sensor detects the leading edge of the paper, the pick-up roller lifts, and the vertical transport motor and bank exit motor turn on to feed the paper up into the machine.

Pick-up and Feed – Trays 1 and 2
Separation Roller Release



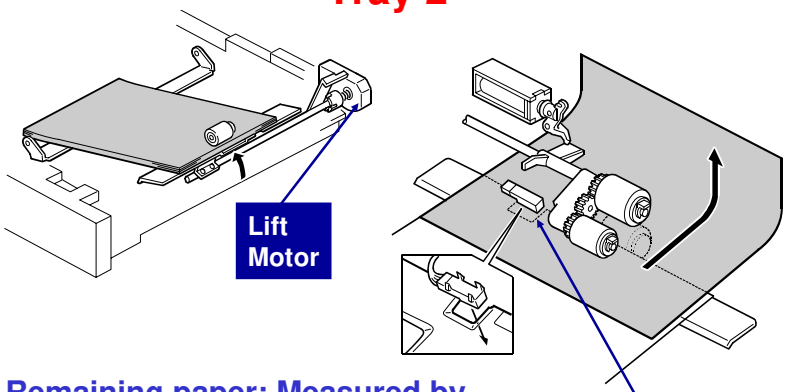
- The separation roller is away from the feed roller, except during the pick-up and feed-in phase
  - Easier removal of jams at the entrance
- When the paper feed station is selected, the separation solenoid pushes the separation roller up so that it touches the paper feed roller.

Slide 288

This contact/release mechanism has the following two advantages:

- After paper feed is completed, paper sometimes remains between the feed and separation rollers. If the feed tray is pulled out in this condition, this paper might be torn. When the separation roller is away from the feed roller, the remaining paper can be removed from between the rollers.
- When paper mis-feeds occur around this area, the operator can easily pull out the jammed paper between the feed and the separation rollers if the separation roller is away from the feed roller.

Remaining Paper/Paper End Detection – Tray 2



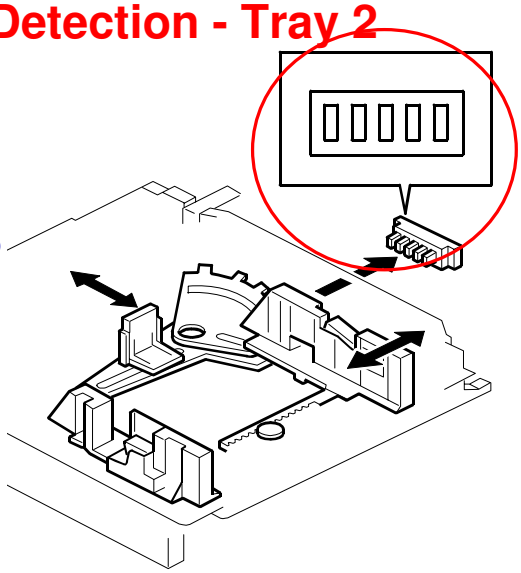
- Remaining paper: Measured by the lift motor rotation angle
- Paper end: When no light is reflected back to the sensor, paper end is detected

Slide 289

- This is the same as the B234 series (Katana-C1).
- As stated previously, the machine detects the amount of remaining paper by counting lift motor pulses. There are 4 levels of output.
- The slide explains what happens when paper runs out.
  - Tray 1 paper end works in a different way. There is a cutout and a sensor – 1st paper end sensor. There is another sensor under the right half of the tandem tray, the right 1st tray paper sensor. This sensor is used when the tray is put in the machine. If it detects paper, the lift motor lifts the tray. This will be described later, in the Tandem Tray section.

Paper Size Detection - Tray 2

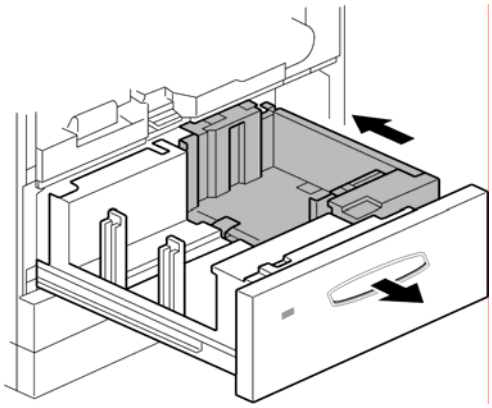
- **Tray 1 does not have a size sensor.**
  - Input the paper size with a user tool.
- **Tray 2: If the user wants to use a paper size that cannot be detected by the sensors, they can select the paper size with the Tray Paper Settings button on the operation panel.**



Slide 290

- This is the same as the B234 series (Katana-C1).
- Tray 1 does not have a size sensor or a dial.
  - The paper size for tray 1 has to be stored with a user tool setting.
- For tray 2, the actuator at the rear of the tray turns on the paper size switches. The machine detects the size by the combination of switches that are turned on.
- Some sizes cannot be detected. The user must use the Tray Paper Settings button on the operation panel.
  - There is no * setting, because there is no dial.
  - The default setting is 'Auto Paper Detect', which means that the machine takes the paper size from the sensor. To use a paper size that is not in the table, use the Tray Paper Settings in the User Tools.
  - If the fence position is incorrect (in the case of Auto Paper Detect) or if the size is not the same as set with the operation panel, jams will occur.
  - Also note that the tray can detect 12 x 18" automatically.

Tandem Feed Tray
Overview

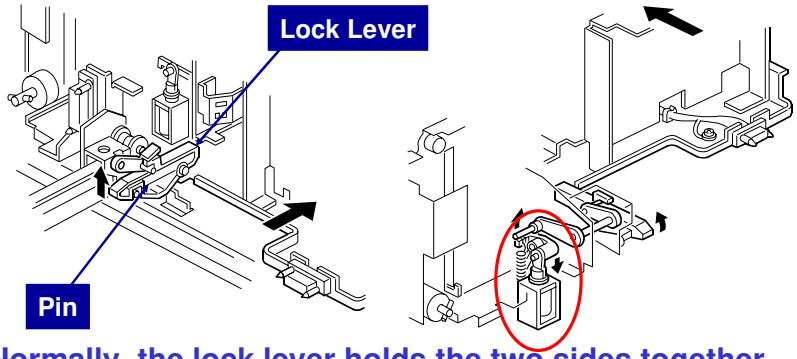


- Two paper stacks in one tray
- Paper feeds from the right tray
- When the paper in the right tray runs out, the stack in the left tray is moved across to the right tray
- After that, paper feed resumes
- The left tray can be pulled out and paper can be added to it without interrupting copying

Slide 291

- This is the same as the B234 series (Katana-C1).
- The next few slides describe the tandem feed tray, in which paper can be fed continuously without the tray ever running out.
- This tray can be converted to an A3/DLT tray if required. In this case, tandem feed is not used (only one stack of paper if larger than A4/LT). The optional tray conversion kit was requested by the USA market for Legal size paper.
- The basic tray mechanisms for the A3/DLT tray are similar to the tandem tray, except for the tray lift and paper detection mechanism (these will be covered in this section).
- The trays lock together until the left-hand paper stack moves across to the right. Then the left tray is released so that paper can be added without interrupting copying.

Tandem Feed Tray
Connecting the Left and Right Sides

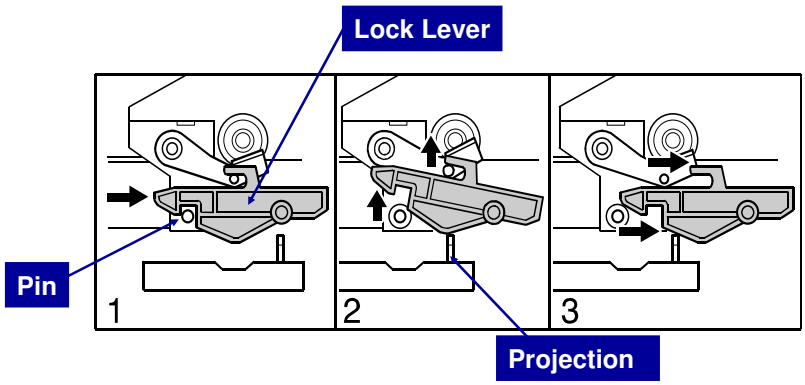


- **Normally, the lock lever holds the two sides together.**
- **If the right tray becomes empty, the tandem tray connect solenoid releases the lock lever.**
  - The left tray can now be pulled out to add more paper.

Slide 292

- The tandem tray connect solenoid releases the left tray when it is empty, so it can be refilled without interrupting copying.
- Normally the left tray lock lever catches the pin in the right tandem tray. During printing, if there is no paper in the left tray, the tandem tray connect solenoid turns on to release the tray lock lever so that the left tray separates from the right tray. Therefore, the left tray can be pulled out to load paper while paper is still being fed into the machine from the right tray.

Tandem Feed Tray
When the Tray is Pulled Out



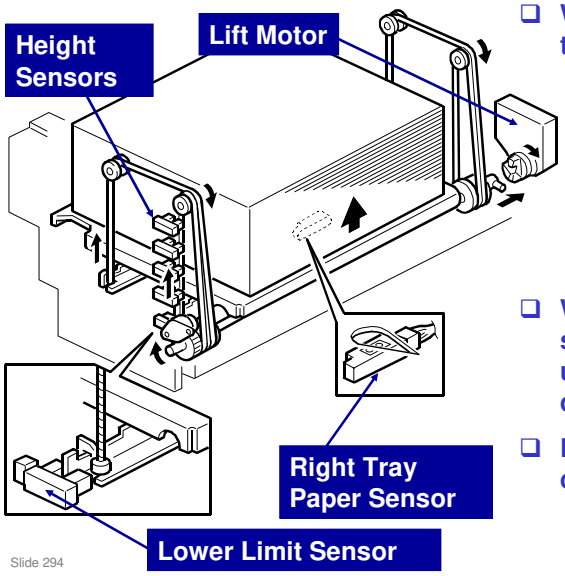
❑ When the tray is pulled out, the lock is released so that paper can be added more easily

Slide 293

❒ The slide shows how the left and right half are disconnected when the tray is pulled.

❒ When the tandem tray is drawn out fully, the projection pushes up the left tray lock lever so that both trays separate for easier paper loading.

Tandem Feed Tray
Paper Lift/Remaining Paper Detection

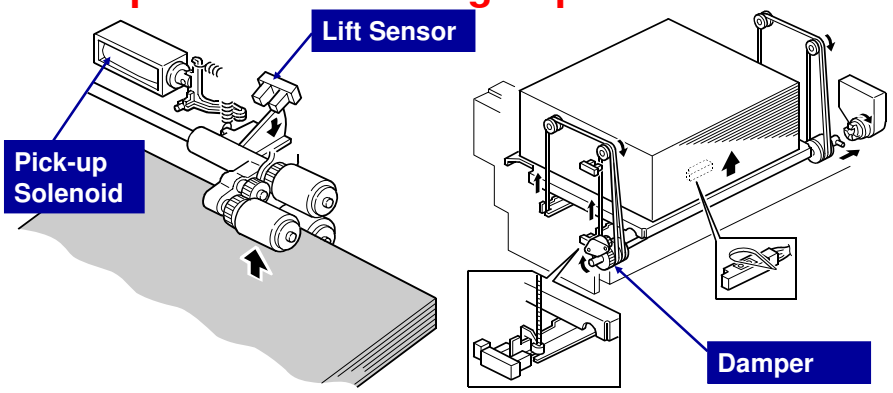


- **When the machine detects the tray:**
  - The right 1st tray paper sensor (under the tray) checks whether there is paper in the right tandem tray.
  - If there is paper, the tray lift motor starts.
- **When the top of the paper stack pushes up the pick-up roller, the lift sensor is deactivated and lift stops**
- **Paper height sensors detect remaining capacity**

Slide 294

- The sensor at the bottom of the tray saves time when checking if the tray has any paper or not before starting to lift the tray to the paper feed position.
- The height sensors provide are five levels of paper height detection: 100%, 75%, 50%, 25%, Near End.
- The right tray paper sensor detects when there is no paper.

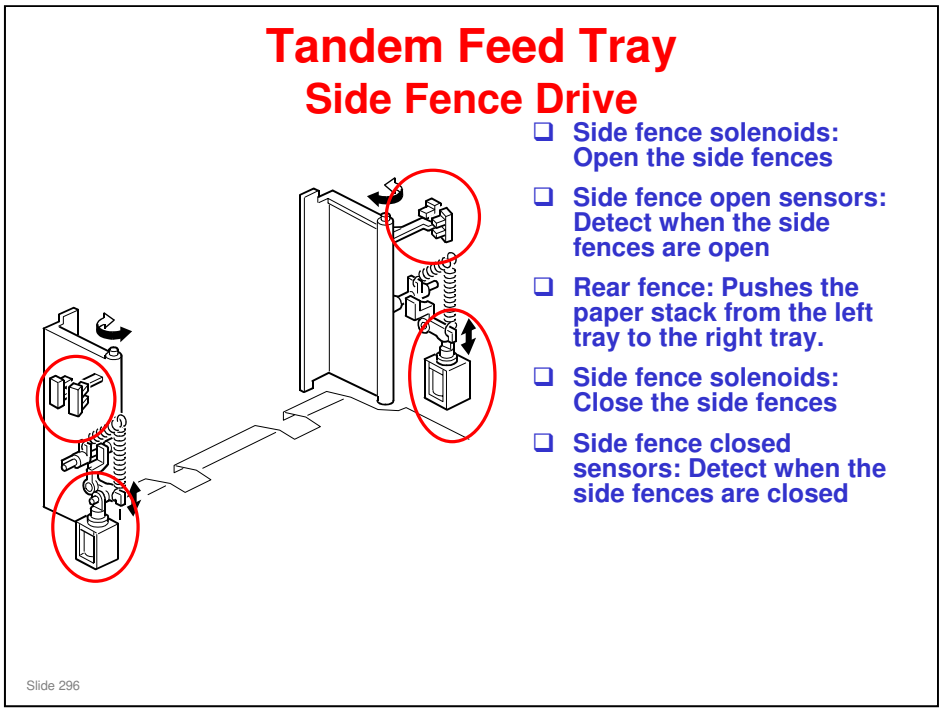
Tandem Feed Tray
Paper Lift/Remaining Paper Detection



- At the same time as the lift motor starts, the pick-up solenoid lowers the pick-up roller.
- When the lift sensor detects the actuator, the lift motor stops
- When the tray is pulled out, the tray falls slowly (there is a damper).

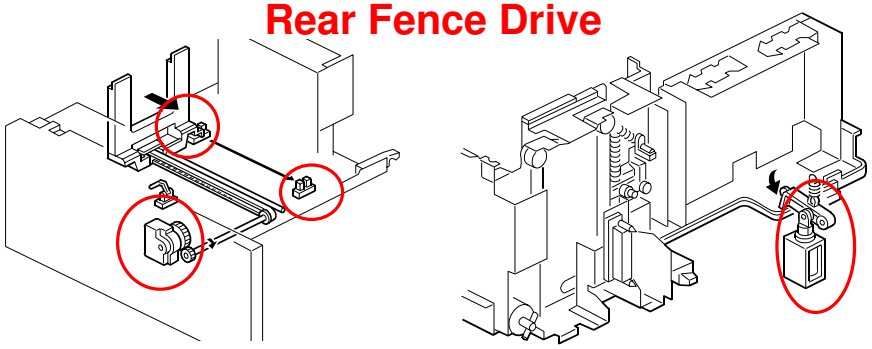
Slide 295

- This slide shows what the pick-up roller mechanism is doing when the lift motor starts up.
- It also shows the base plate lowering mechanism.
- However, it is not sufficient for the bottom plate to just drop under its own weight when the tray is pulled out.
  - The tray bottom plate must lower automatically before the stack in the left side can move across.
- The tray lift motor lowers the plate until the lower limit sensor detects the actuator on the bottom plate.
- Then the stack in the left side can move across.



- The side fences open only when the stack of paper in the left tray is moving across to the right tray.
- The mechanism is described on the slide.
- After the stack of paper has been moved across, the user can then load some paper into the left side of the tandem tray (even during copying).

Tandem Feed Tray
Rear Fence Drive

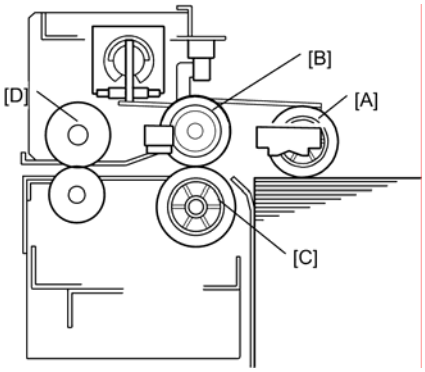


- If the left 1st tray paper sensor detects paper but the right 1st tray paper sensor does not, the stack in the left tray must be moved to the right.
- The rear fence drive motor moves the rear fence, which pushes the stack across.
  - At this time, the left tray lock solenoid prevents the left tray and right tray from being separated
- Rear fence return position sensor: Detects when the stack has been pushed all the way across
- Rear fence home position sensor: Detects when the rear fence is back at home position

Slide 297

- The main points are on the slide.
  - If the right tray is empty but the left tray is full, the paper in the left tray is moved across to the right tray.
  - The rear fence drive motor pushes the paper stack into the right tray.

LCIT Paper Feed Rollers

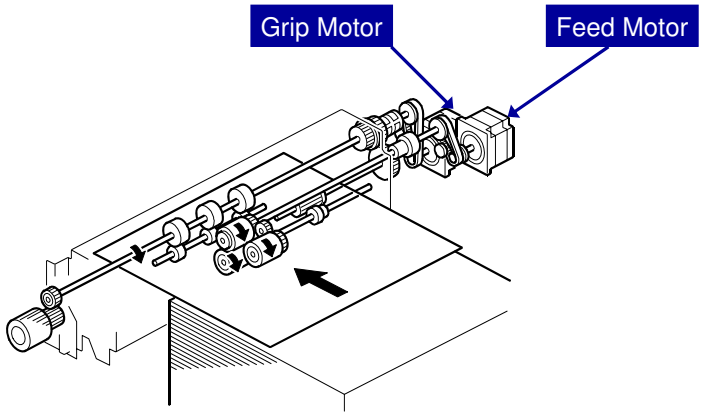


- **This LCIT has two paper trays. Capacity: 4,000 (2,000 x 2) sheets.**
- **Each tray contains four rollers:**
  - [A] Pick-up roller
  - [B] Paper feed roller
  - [C] Separation roller
  - [D] Grip roller
- **The FRR paper feed system is used.**

Slide 298

❒ The LCIT section is basically the same as the AG-C1 series.

LCIT Paper Feed Motors

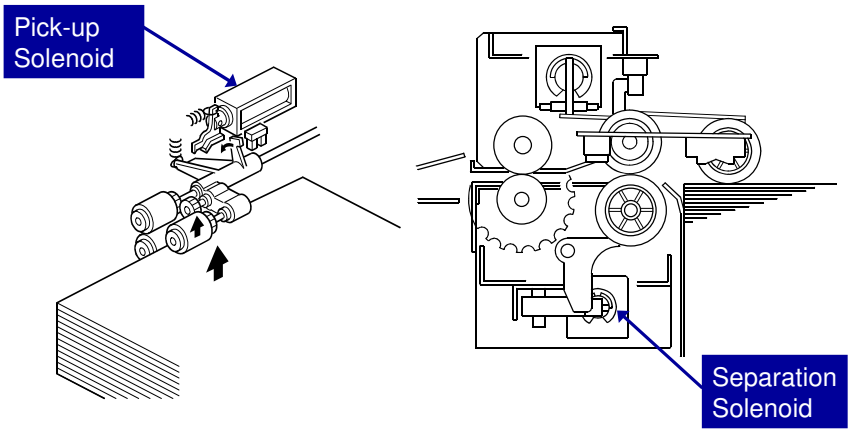


- Paper feed motor: Drives the pick-up roller and the paper feed roller.
- Grip motor: Drives the grip roller and the separation roller.

Slide 299

No additional notes

LCIT Pick-up and Separation Solenoids

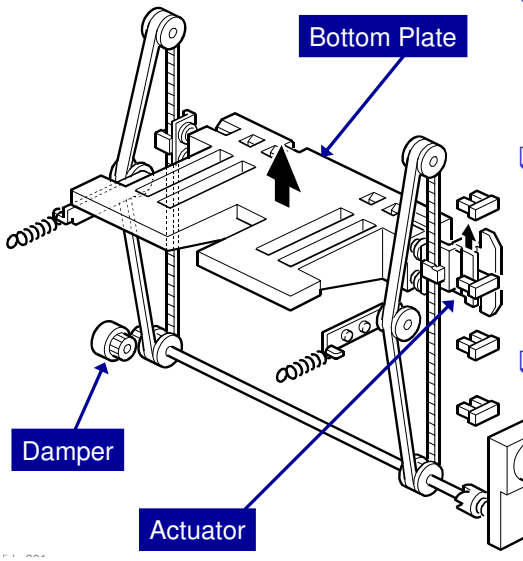


- Separation solenoid: Moves the separation roller into contact with the feed roller
- Pick-up solenoid: Moves the pick-up roller into contact with the top sheet of paper

Slide 300

- When the paper feed station is selected for a job, the paper feed motor [B] and grip motor [C] turn on.
- When the feed motor turns on, it drives the feed roller. It also drives the pick-up roller because the pick-up roller is linked to the feed roller by an idle gear.
- When the paper feed station is set in the mainframe, the separation lift lever rises. As a result, the separation roller contacts the paper feed roller and turns with the feed roller, unless more than one sheet of paper is fed. The two trays of the LCIT unit use the standard FRR mechanism.
- When the paper feed motor turns on after the pick-up solenoid has turned on, the pick-up roller lowers until it contacts the top sheet of the paper stack and then sends it to the paper feed and separation rollers.

LCIT Tray Lift - Lift Mechanism



- **Paper size switch: Detects when the tray is put in (drawer connector)**
- **Tray lift motor: Lifts the bottom plate**
  - Lift stops when the lift sensor is activated
- **Actuator on bottom plate: For the paper height sensors**

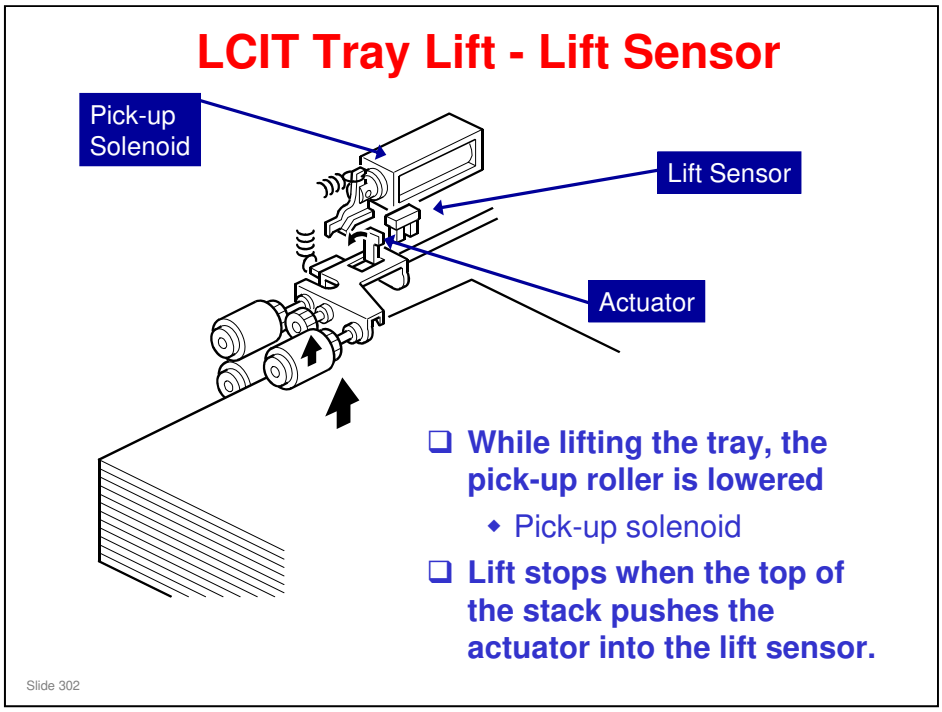
❒ When the machine detects that the paper tray is set in the machine:

- ➢ The tray lift motor rotates forward.
- ➢ The coupling gear on the tray lift motor engages the lift drive shaft.
- ➢ The tray drive belts, connected to the tray bottom plate, are driven by the tray lift motor via the lift drive shaft and tray lift pulleys.
- ➢ When the lift motor rotates forward, the tray bottom plate rises. The tray rises until the top of the paper stack pushes up the pick-up roller and the lift sensor in the feed unit is de-activated.
- ➢ When the actuator on the rear end of the bottom plate activates the paper height sensors, the remaining paper capacity is detected.

❒ When the tray is pulled out:

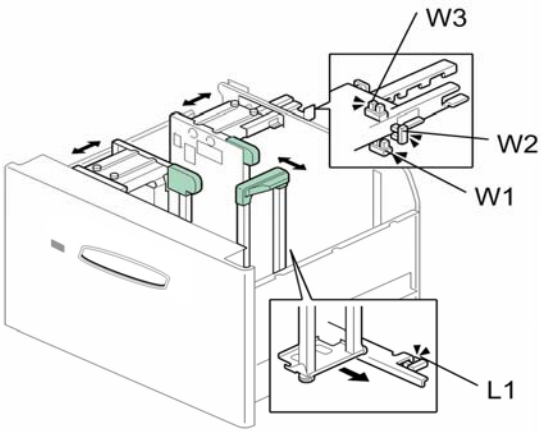
- ➢ The coupling gear separates from the shaft and the tray bottom plate goes down.

❒ Lift sensor: Shown on the next slide.



- When the tray lift motor turns on, the pick-up solenoid activates to lower the pick-up roller. When the top sheet of paper reaches the proper paper feed level, the paper pushes up the pick-up roller and the actuator on the pick-up roller supporter de-activates the lift sensor, to stop the tray lift motor.
- After several paper feeds, the paper level gradually lowers, then the lift sensor is activated and the tray lift motor turns on again until the lift sensor is de-activated again.

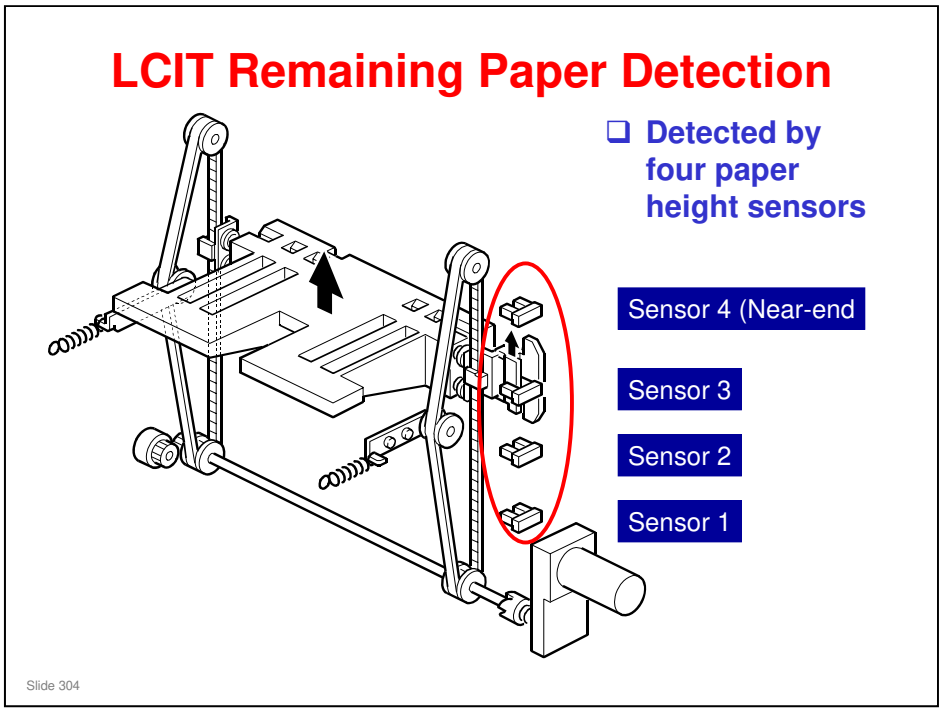
LCIT Paper Size Detection



- **Each tray has three paper width sensors (W1, W2, W3) and one paper length sensor (L1).**

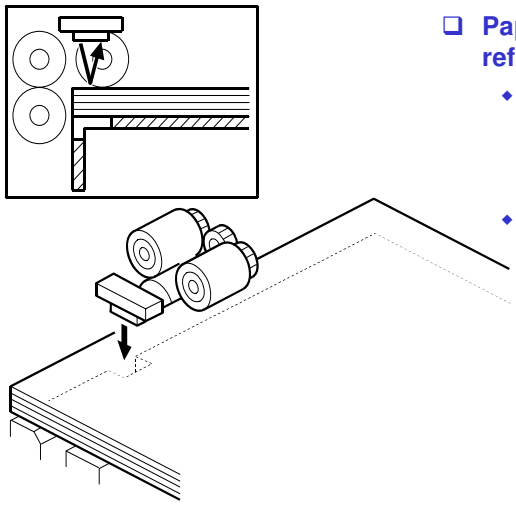
Slide 303

- Some sizes are not detected automatically. They must be selected with the "Tray Paper Settings" on the operation panel.



- The slide shows the four sensors that are used.
- With the actuator below paper height sensor 1, no sensor is actuated and the display indicates 100%.
- When the actuator passes paper height sensor 2, the display indicates 75% of the paper supply remaining.
- When the actuator passes paper height sensor 3, the display indicates 50% of the paper supply remaining.
- When the actuator passes paper height sensor 4, the display indicates 25% of the paper supply remaining.
- When the actuator enters the gap of the near end sensor, and then passes paper height sensor 4, the machine signals near end.
- Finally, when the last sheet feeds, the paper end sensor (a photosensor) signals that the tray is empty.

LCIT Paper End Detection

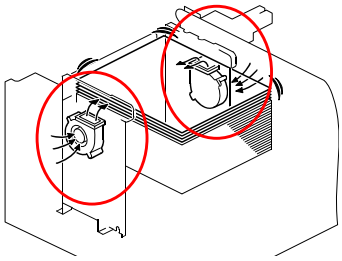


- **Paper end sensor: Detects light reflected from the paper**
  - When the tray is empty, the light goes through the cut-out, and is not reflected back to the sensor.
  - This causes the tray lift motor to reverse and lower the tray bottom plate until the bottom plate reaches the lower limit.

Slide 305

No additional notes

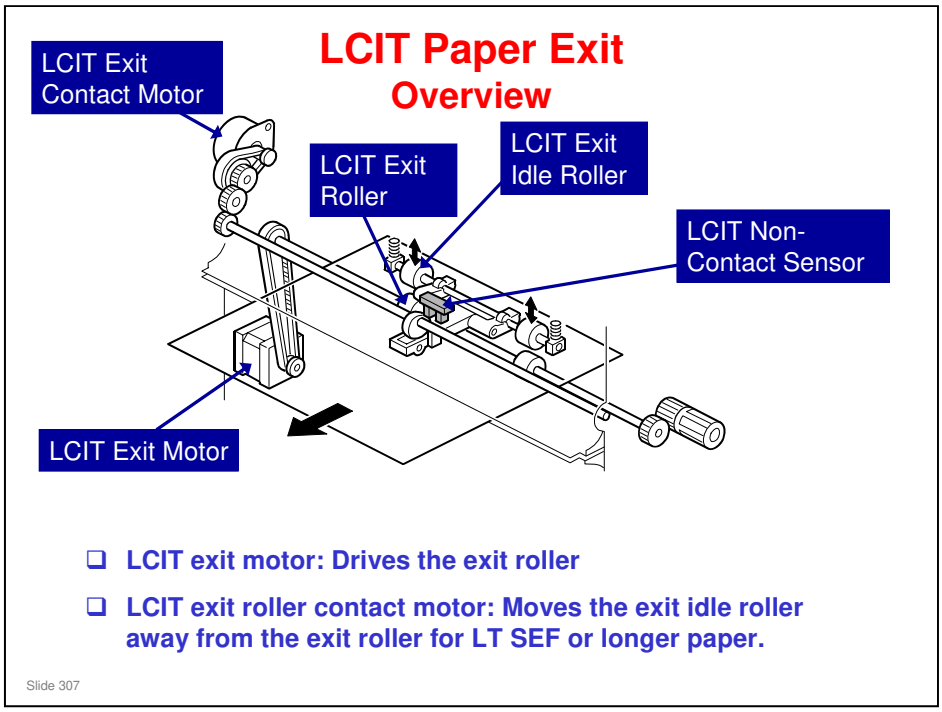
LCIT Air-assisted Feed



- The air flow created by the two fans floats the first sheet off the top of the stack.
- This assists in the separation of the top sheet from the sheet below and prevents double-feeding.
- This only works when feeding the following paper types: Paper weights 5, 6, 7 (paper weight 7 can only be fed from tray 4),
- Air-assisted feed is always on for ”Coated:Glossy”, ”Coated:Matted” and ”Label” paper.

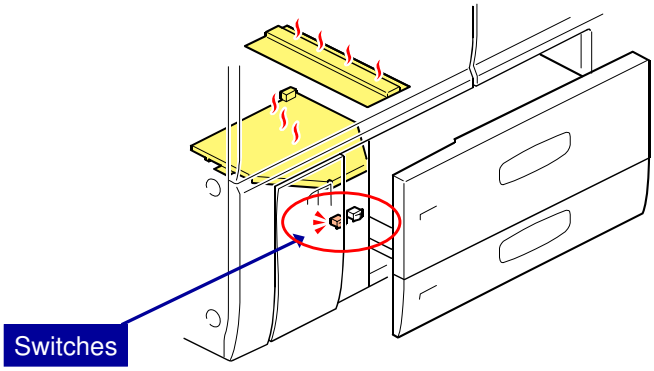
Slide 306

- Paper weight specifications
  - Paper weight 1: 52.3 - 63.0 gsm
  - Paper weight 2: 63.1 - 80.0 gsm
  - Paper weight 3: 80.1 - 105.0 gsm
  - Paper weight 4: 105.1 - 163.0 gsm
  - Paper weight 5: 163.1 - 220.0 gsm
  - Paper weight 6: 220.1 - 256.0 gsm
  - Paper weight 7: 256.1 - 300.0 gsm
- With SP1922-001 to 003, air assisted feed can be turned on/off for trays 4 to 6.



- The LCIT exit motor drives the LCIT exit roller to feed paper to the LCIT entrance roller in the main machine.
- If LT SEF paper or longer is selected for printing, the LCIT exit idle roller keeps away from the LCIT exit roller, corresponding with the registration timing roller in the main machine for the skew adjustment in the main machine.
  - The skew adjustment is done by the registration gate in the registration unit of the main machine. This will be explained in the paper registration section of this course.
  - When paper reaches the registration gate, if LT SEF paper or longer is selected for printing, the trailing edge of paper is still caught between the LCIT exit rollers. For the main machine registration unit to do the skew adjustment correctly, the paper must be free of the LCIT exit rollers as well as the registration timing roller in the main machine.
  - The LCIT exit roller contact motor on the back of the LCIT raises and lowers the LCIT exit roller. It raises the exit roller briefly to free the paper for registration in the main machine, and then lowers the exit roller to feed out the next sheet. The exit roller HP sensor controls the operation of the motor (forward/reverse) as it raises and lowers the exit roller .
- The LCIT exit roller contact motor uses a cam and a lever to move the LCIT exit idle roller between the contact position and non-contact position. The LCIT exit contact sensor detects whether the LCIT exit idle roller is in contact with the LCIT exit roller.

Tray Heaters



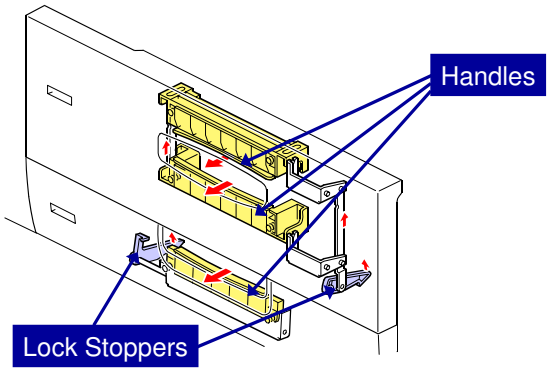
- **The machine has two heaters. They can be turned on/off with two switches on the front of the machine.**
  - The left switch controls the operation of the paper bank heaters of the main machine (and the LCIT heaters, which are not shown here).
  - The right switch controls the operation of the ITB heaters (one of which is shown here).
- **The heaters do not need to be installed or connected by a technician.**

Slide 308

The heaters are shown in yellow in this diagram.

- The operation of the heaters was explained in the Installation section of this course.

Tray Lock Mechanism



- To open Tray 1 or Tray 2, grip a handle and squeeze to disengage the lock stopper.
- Tray 1 has two handle releases. Squeezing and pulling either handle will release the tray lock.

Slide 309

No additional notes

Detailed Section Descriptions

Replacement and Adjustment: Paper Feed

Slide 310

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Feed Rollers

- **The feed rollers of the main machine and LCIT are not interchangeable because they turn in different directions.**
  - However, the LCIT pick-up and separation rollers are interchangeable with those of the main machine.
- **After replacing a feed roller in the main machine, make sure that it turns counter-clockwise in the direction of paper feed.**
- **Avoid touching the surfaces of these rollers with bare hands.**

Slide 311

No additional notes

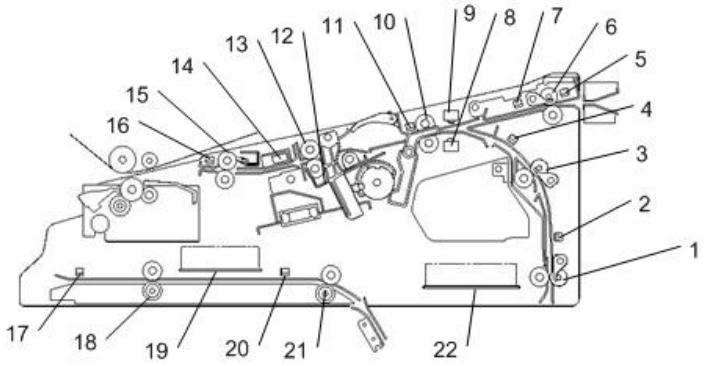
Detailed Section Descriptions

Paper Registration

Slide 312

No additional notes

Overview - Rollers and Sensors



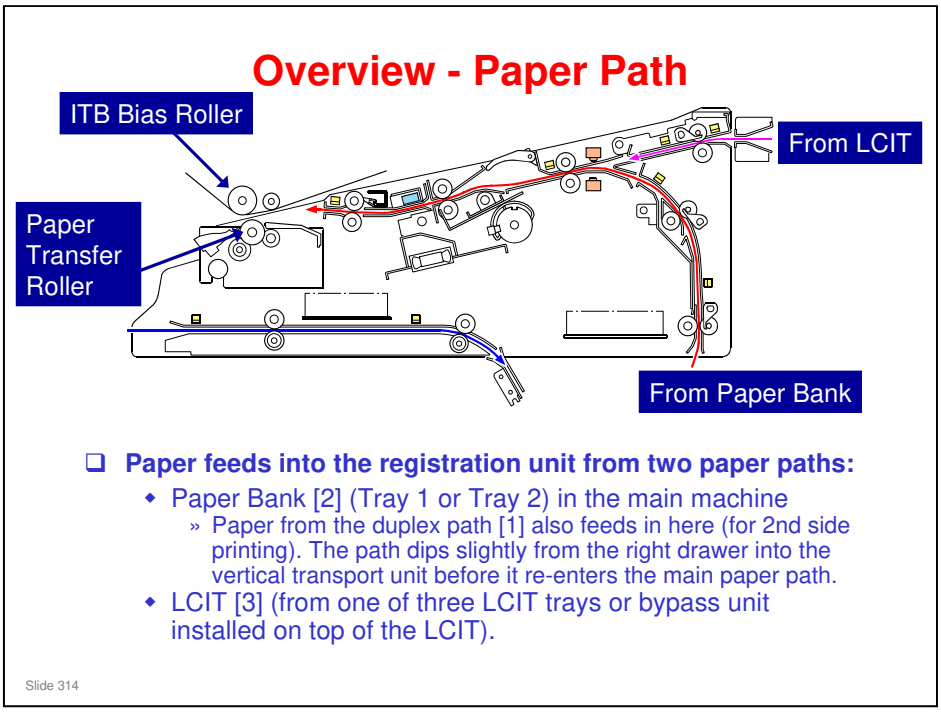
- **The right drawer contains the paper registration unit (items 1-16) and the right half of the duplex paper path (items 17-21). The paper registration unit does the following:**
  - Double-feed detection
  - Skew correction (sub-scan direction)
  - Side-to-side correction (main scan direction)
  - Paper transport timing control

Slide 313

1. **Main Relay Rollers 1**
2. **Main Relay Sensor 2**
3. **Registration Entrance Rollers**
4. **Main Relay Sensor 3**
5. **LCT Relay Sensor 1**
6. **LCT Relay Roller**
7. **LCT Relay Sensor 2**
8. **Double Feed Sensor 1 (Emitter LED)**
9. **Double Feed Sensor 2 (Receptor)**
10. **Registration Timing Roller**
11. **Registration Timing Sensor**
12. **Registration Gate**
13. **Shift Roller**
14. **CIS**
15. **Transfer Timing Roller**
16. **Transfer Timing Sensor**
17. **Duplex Transport Sensor 6**
18. **Duplex Transport Rollers 5**
19. **Separation Power Pack**
20. **Duplex Transport Sensor 7**
21. **Duplex Transport Rollers 6**
22. **DRB**

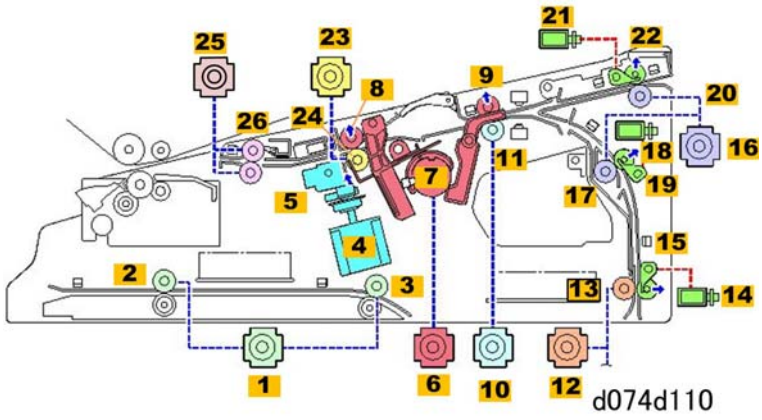
Paper transport timing control is a new feature

- When the paper reaches the transfer timing sensor, it may be slightly early or late, depending on how much time was needed for paper registration.
- When the transfer timing sensor detects the leading edge of the paper, the machine will adjust the speed of the transfer timing motor:
  - If the paper is late at the transfer timing sensor, the motor speeds up and the roller feeds the paper faster.
  - If paper is early at the transfer timing sensor, the motor slows down and the roller feeds the paper slower.



- After each sheet passes through the paper registration unit, it is fed between the ITB bias roller and PTR (paper transfer roller), where the toner image is transferred from the ITB to paper.

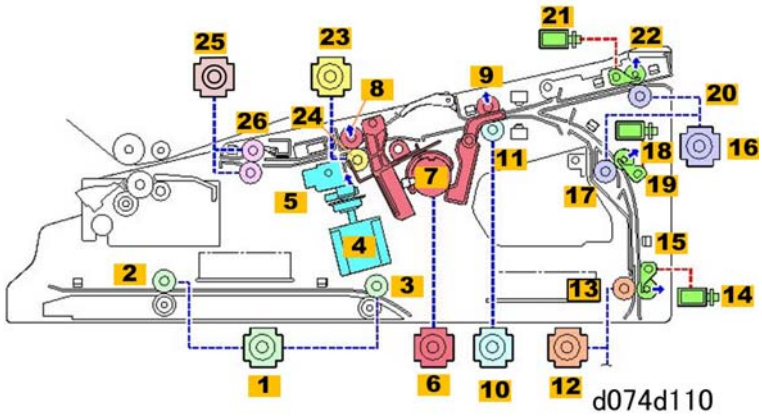
Paper Path Motors (Transport and Registration)



Slide 315

1. Duplex Transport Motor 2
2. Duplex Transport Roller 5
3. Duplex Transport Roller 6
4. Shift Roller Unit Motor
5. Shift Roller Unit
6. Registration Gate Motor
7. Registration Gate Cam and Actuator
8. Shift Roller (Idle)
9. Registration Timing Roller (Idle)
10. Registration Timing Motor
11. Registration Timing Roller (Driven)
12. Bank Exit Motor
13. Main Relay Roller 1
14. Main Relay Roller 1 Solenoid
15. Main Relay Roller 1 (Idle)
16. Registration Entrance Motor
17. Registration Entrance Roller (Driven)
18. Registration Entrance Solenoid
19. Registration Entrance Roller (Idle)
20. LCT Relay Roller (Driven)
21. LCT Relay Roller Solenoid
22. LCT Relay Roller (Idle)
23. Shift Roller Motor
24. Shift Roller (Driven)
25. Transfer Timing Motor
26. Transfer Timing Rollers

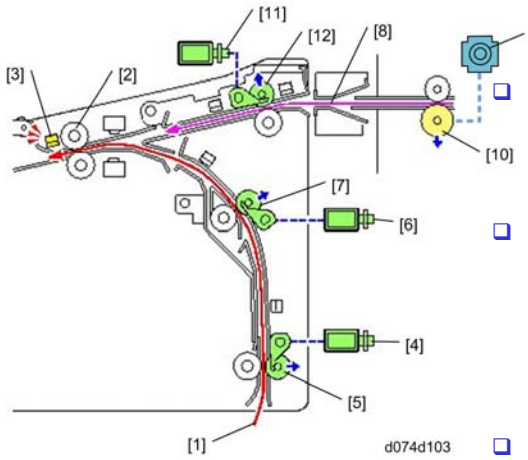
Paper Path Motors (Transport and Registration)



Slide 316

- Duplex transport motor [1]: Drives duplex transport rollers 5 [2] and duplex transport rollers 6 [3].
- Shift roller unit motor [4]: Moves the shift roller unit [5] to the front or rear to correct the position of paper in the main scan direction.
- Registration gate motor [6]: Operates the registration gate cam that raises and lowers the registration gate. This motor also raises and lowers the registration timing idle roller [9] to free the paper for skew correction (this correction is done by buckling the paper against the registration gate).
- Registration timing motor [10]: Drives the registration timing rollers [11].
- Bank exit motor [12]: Drives main relay roller [13].
- Main relay roller 1 solenoid [14]: Raises main relay roller 1 idle roller [15] briefly to release the paper in the registration unit for skew correction (buckle adjustment).
- Registration entrance motor [16]: Drives registration entrance roller [17].
- Registration entrance solenoid [18]: Raises registration entrance idle roller [19] briefly to release the paper in the registration unit for skew correction (buckle adjustment).
- The registration entrance motor also drives LCT relay roller [20].
- LCT relay roller solenoid [21]: Raises LCT relay roller idle roller [22] briefly to release the paper in the registration unit for skew correction (buckle adjustment).
- Shift idle roller [23]: Drives shift roller [24].
- Transfer timing motor [25]: Drives transfer timing rollers [26].

Paper Skew Correction (Sub Scan)
Trays 1 and 2, Duplex

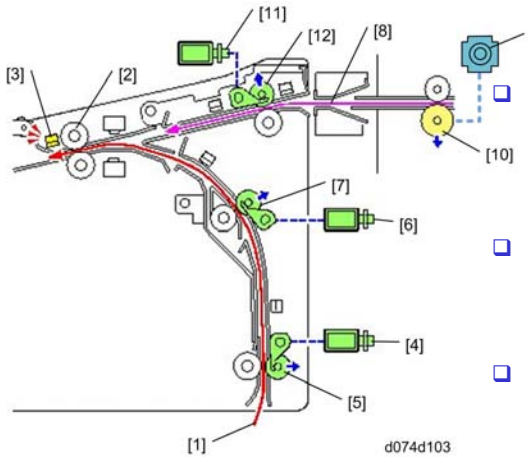


- **When the leading edge of the paper [1] reaches the registration timing rollers [2], the registration timing sensor [3] detects the leading edge.**
- **Then:**
  - The main relay solenoid 1 [4] lifts the main relay idle roller [5]
  - The registration entrance roller solenoid [6] lifts the registration entrance idle roller [7].
- **This frees the paper.**
- **The leading edge is still at the registration gate.**

Slide 317

- This corrects paper skew in the sub scan direction.
- The registration gate was raised by the registration gate motor. This mechanism is explained on a later slide.

Paper Skew Correction (Sub Scan)
LCIT

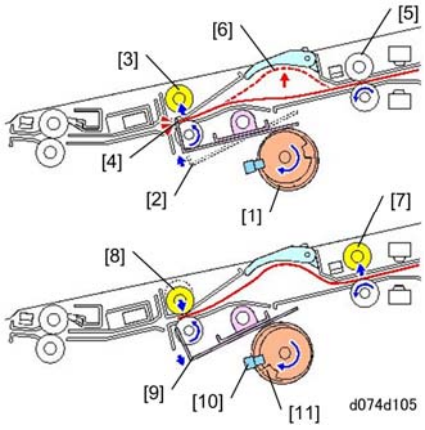


- When the leading edge [8] activates the registration timing sensor [3], the LCIT exit roller lift motor [9] turns on.
- This lowers the exit idle roller [10] to release the paper so that it can strike the registration gate.
- At the same time, inside the machine, the LCT relay roller solenoid [11] raises the LCT relay roller to release the paper at the machine entrance.

Slide 318

- All skew and paper position correction is done by the registration unit in the main machine.
- There is no mechanism in the LCIT to correct the paper position in either the sub scan direction (right-to-left) or the main scan direction (front-to-rear).
  - Some older LCITs have a CIS mechanism for registration correction. This machine does not have this mechanism.

Paper Skew Correction (Sub Scan)
Registration Gate Mechanism (1)

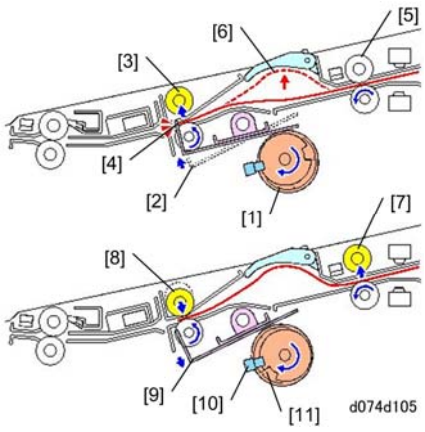


- The registration gate motor turns the cam [1].
- This allows the spring-loaded registration gate [2] to rise and block the paper path.
- The shift roller motor raises the shift idle roller [3], and the leading edge of the paper [4] strikes the gate.
- The paper is still being fed by the registration timing rollers [5], so this forces the paper to buckle at [6].
- Next, the registration timing idle roller [7] is raised by an arm of the registration gate mechanism, so the paper is free for an instant and the leading edge can straighten against the registration gate.

Slide 319

No additional notes

Paper Skew Correction (Sub Scan)
Registration Gate Mechanism (2)

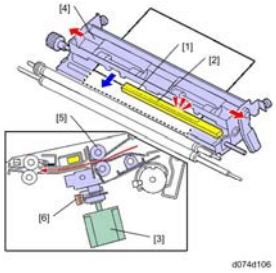


- After registration, the shift roller [8] lowers to catch the paper between the shift rollers, and the shift rollers start to feed the paper.
- At the same time, the registration gate [9] is lowered out of the paper path, by the pressure of the rotating cam [1] on the end of the gate arm.
- When the gap [11] in the actuator reaches the registration gate sensor [10], the registration gate motor stops, and this stops the cam.

Slide 320

No additional notes

Paper Position Correction (Main Scan)

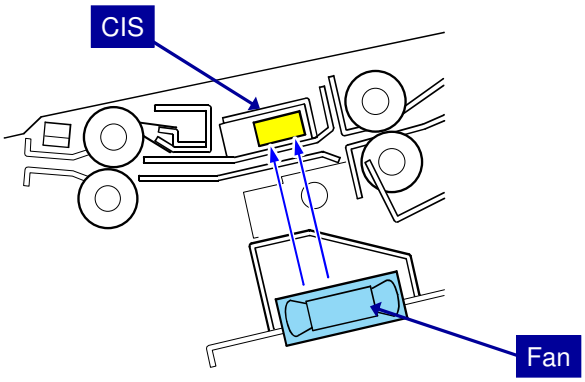


- **A CIS (Contact Image Sensor) [1] reads the position of the paper [2]. If the paper is out of position in the main scan direction (front-to-rear):**
  - The shift roller unit motor [3] turns on and moves the shift unit [4] and the paper to the front or rear to correct the position of the paper.
  - At the correct position, the shift unit motor stops and the shift rollers [5] feed the paper.
  - The shift unit motor turns on again and returns to its home position where it waits for the next sheet. The shift roller HP sensor [6] turns off the motor when the unit reaches home position.

Slide 321

- If the paper is not out of position in the main scan direction (front-to-rear), it continues to feed without adjustment.

CIS Cleaning

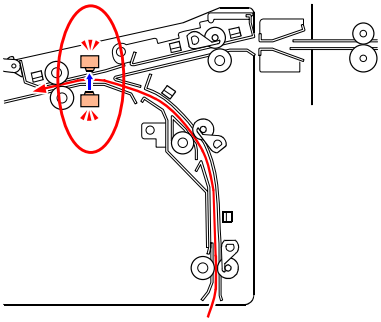


- A fan below the CIS in the paper registration unit keeps the CIS free of dust.

Slide 322

No additional notes

Double-Feed Detection



- The double-feed sensors at the registration timing rollers check how much light can pass through the paper.
- If the reading is less than the value for the type of paper in the current job, or less than the previous sheet, the machine determines that a double-feed has occurred.
- If the machine detects a double-feed, this page and the pages being fed are shunted into the purge tray.
- Next, the machine stops the job and a paper jam error message appears.

Slide 323

- A sensor pair checks the translucence of each sheet.
- Before buckle adjustment, double-feed sensor 1 (an LED) emits light that shines up through the sheet above. The light is received by double-feed sensor 2.
- The machine takes the reading of sensor 2 and compares it to a look-up table that holds the values for the translucence of different paper types.
- This feature can be switched off and on with the User Tools for each paper feed station: [User Tools/Counter] > Adjustment Setting Operators > Double-Feed (Default: ON)

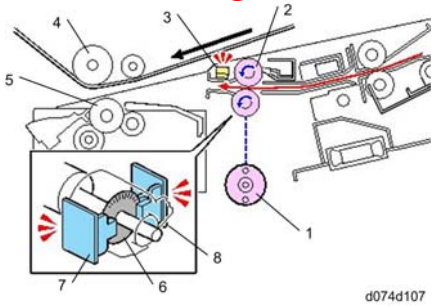
Transfer Timing - Overview

- Skew correction (buckle adjustment) is done for every sheet.
- But, paper positioning correction by the CIS (front-to-rear) and shift unit is only done if the paper is out of position.
- This means there is a very small difference in the amount of time each sheet remains in the shift unit.
- Although this time difference is extremely small, it is crucial to the smooth operation of this high speed machine.
- The transfer timing mechanism ensures that the sheets of paper are transferred to the ITB bias roller/PTR nip at the correct interval.

Slide 324

No additional notes

Transfer Timing - Mechanism

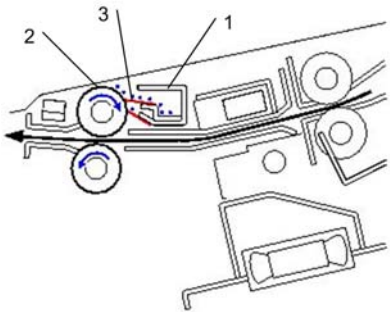


- **The transfer timing motor [1] drives the transfer timing rollers [2].**
- **The transfer timing sensor [3] checks the leading edge of each sheet before it is passed to the ITB bias roller [4] and PTR roller, where the image is transferred from the ITB to paper.**
  - If the leading edge appears at the correct time, it passes directly to the ITB bias roller and PTR.
  - If the transfer timing sensor detects that the leading edge is early, the machine slows the rotation of the transfer timing motor and rollers. This delays the paper so that it arrives at the ITB/PTR at the correct time.
  - If the transfer timing sensor detects that the leading edge is late, the machine speeds up the rotation of the transfer timing motor and rollers.

Slide 325

- The transfer timing sensor has an encoder wheel [6] attached to the end of the transfer timing drive roller. A pair of encoder sensors [7] and [8] are mounted on either side of the rotating wheel.
- The machine uses this device to accurately measure the speed of rotation of the rollers and transfer timing motor, so that it can accurately measure and adjust the motor speed.

Dust Collection Tray



- A dust collection tray [1] is mounted behind the transfer timing idle roller [2].
- Two mylars [3] are attached to the tray. The mylars scrape paper dust from the surface of the roller as it rotates. This dust collects in the tray.
- The dust tray should be removed and emptied every 100K.

Slide 326

- The mylars are like counter blades.

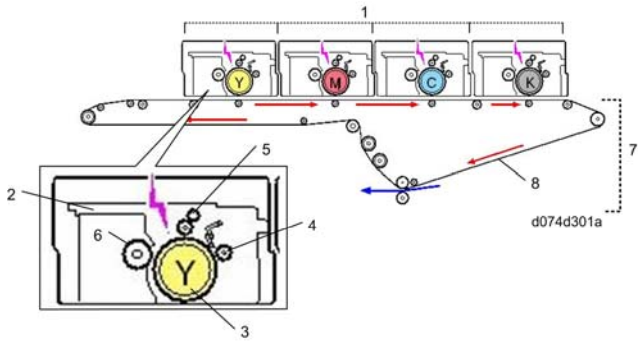
Detailed Section Descriptions

Photoconductor and Development Units (PCDUs)

Slide 327

No additional notes

Overview

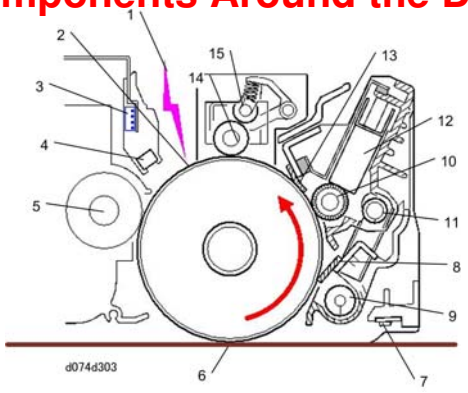


- There is one PCDU for each color.
- The image developed on the drum transfers to the ITB. All four colors transfer during the same rotation of the ITB.
- The color images are transferred from the PCDUs to the ITB in the order Y, M, C, K.
- Each PCDU contains identical components.
- All the PCDUs use a charge roller to charge the drum surfaces. There are no charge corona units. This significantly reduces the amount of ozone produced by the machine.

Slide 328

1. **PCDUs**
2. **Development Unit**
3. **Drum**
4. **Cleaning Unit**
5. **Charge Unit**
6. **Development Roller**
7. **ITB Unit**
8. **ITB**

Components Around the Drum

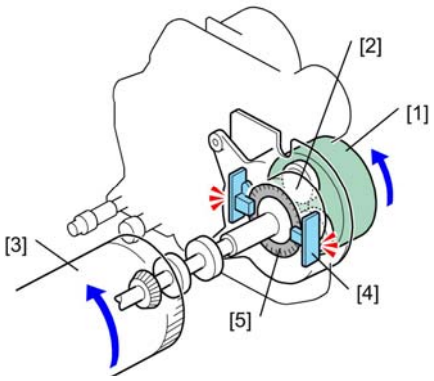


1. Laser	9. Primary Collection Coil
2. Drum	10. Lubrication Cleaning Roller
3. Temperature/Humidity Sensor (K PCDU only)	11. Lubricant Collection Coil
4. Potential Sensor	12. Lubrication Bar
5. Development Roller	13. Lubrication Blade
6. ITB	14. Charge Roller
7. Quenching Lamp	15. Charge Roller Cleaning Roller
8. Drum Cleaning Blade	

Slide 329

- Image Writing. A laser [1] fired from above the drum writes the image on the charged drum.
- Drum drive. The drum [2] for each color is driven by an independent motor.
- Temperature/Humidity. The temperature/humidity sensor [3] measures the temperature and humidity on the right side of the machine. (Only the K PCDU has this sensor. The other PCDUs do not have one.)
- Drum potential sensor. This sensor [4] reads the electrical potential of the surface of the drum. The potential sensors are not part of the PCDUs. They are located above the PCDUs in the main body of the machine.
- Development. The development brush (toner and carrier) on the surface of the development roller [5] applies toner to the drum to form the image.
- Image Transfer Belt. The bottom of the drum touches the ITB [6] moving below and transfers the toner image to the belt.
- Drum Quenching. The quenching lamp [7] LED neutralizes the charge on the drum surface.
- Drum cleaning. The drum cleaning blade [8] cleans the surface of the drum. The toner collection coil [9] catches the toner and carries it out of the unit.
- Lubrication. The lubricant brush roller [10] brushes lubricant onto the surface of the drum. Another collection coil [11] catches any remaining toner and dry lubricant from the brush. A spring-loaded lubricant bar [12] touches the back of the brush and keeps it supplied with dry lubricant (Zinc Stearate). The lubricant blade [13] smoothes the lubricant applied to the drum by the lubricant brush roller.
- Drum charge. The charge roller [14] touches the entire surface of the drum to ensure an even charge. The charge roller applies a high negative charge to start the next print cycle. The charge roller has a cleaning roller [15] mounted above it. Every 1000 prints, the charge roller cleaning roller solenoid activates and lowers the cleaning roller onto the charge roller to pull off residual toner, paper dust, etc.

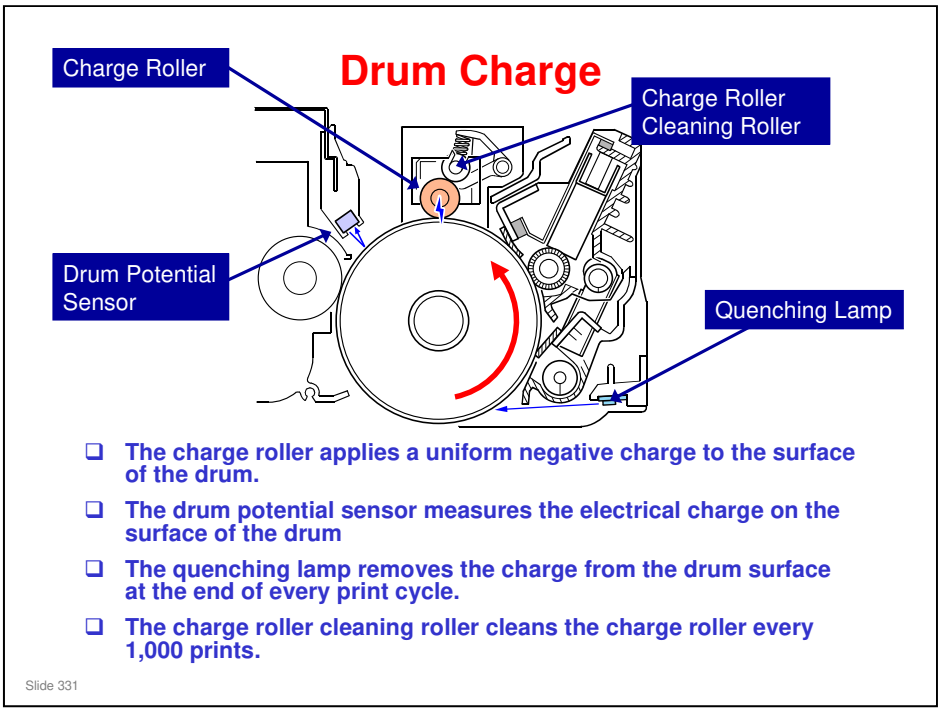
Drum Drive



- **The drum motor [1] rotates the drum shaft gear [2] and drum [3].**
- **Two drum rotation sensors [4] monitor the drum encoder disc [5] on the drum shaft.**
  - The machine uses readings from these sensors to adjust the rotation speed of each drum motor.
  - This adjusts for deviation from the correct speed, to minimize color registration errors and other problems.
- **During black-and-white printing, only the black drum (K) rotates.**
- **The drum motor unit is never disassembled in the field.**

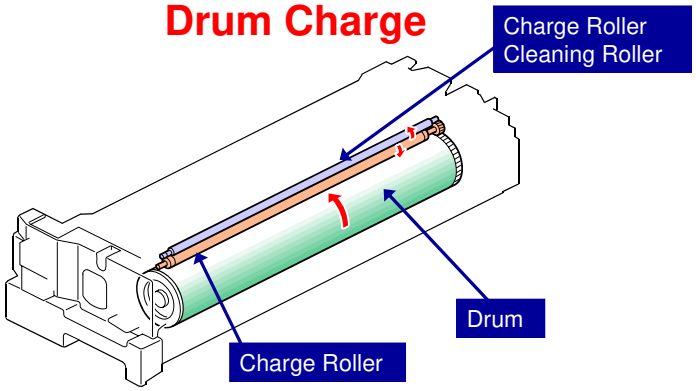
Slide 330

- Each PCDU has an independent drum motor.
- The drum rotation sensors are in the drum shaft gear box.



No additional notes

Drum Charge

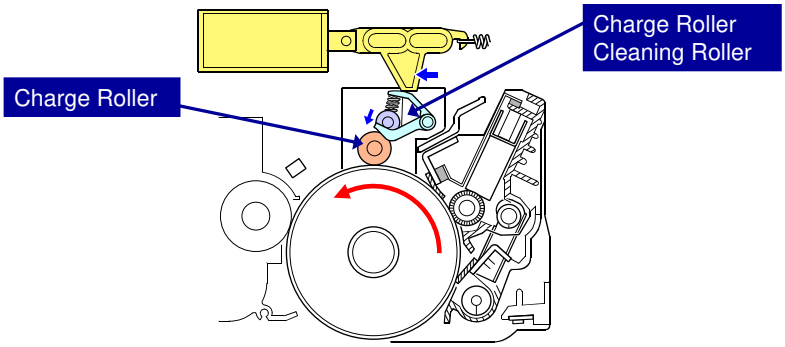


- The charge roller and charge roller cleaning roller are mounted above the drum.
- There is a small gap between the charge roller and the drum.
- Every PCDU has a charge roller to charge the drum.

Slide 332

- There are no charge corona units, so the machine produces less ozone.

Charge Roller Cleaning

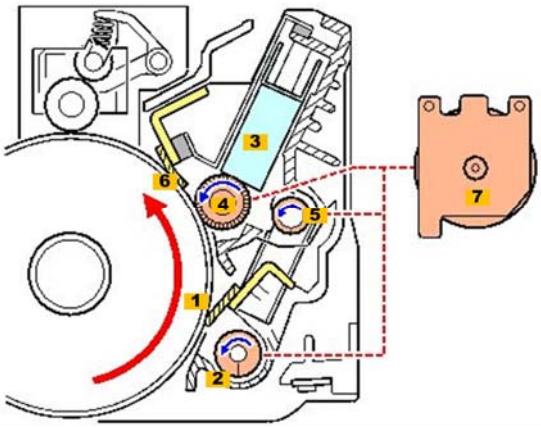


- A spring keeps the charge roller cleaning roller away from the charge roller until the charge roller cleaning roller solenoid activates.
- After every 1,000 sheets, the solenoid activates and pulls its actuator arm to compress the spring. This brings the charge roller cleaning roller into contact with the top of the charge roller.
- The cleaning roller removes small particles, toner, and dust from the charge roller.

Slide 333

- The four solenoids that operate the charge roller cleaning rollers are on top of the machine, behind the laser units.

Drum Cleaning and Lubrication (1)

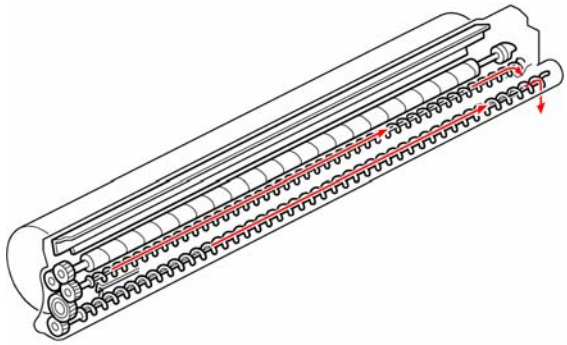


- The drum cleaning blade [1] removes toner from the drum.
- The lubricant brush roller [4] applies lubricant to the drum.
- The drum lubricant blade [6] smoothes the lubricant applied to the drum.
- The drum cleaning motor [7] (one motor for each PCDU) drives the PCDU cleaning unit.
- There are two coils to remove waste toner and lubricant [2, 5].

Slide 334

- To improve the efficiency of cleaning, the drum is lubricated. This cleaning sequence is the same in each PCDU:
  - The drum cleaning blade [1] (a counter blade) removes toner from the drum.
  - The collected toner falls into the primary collection coil [2]. This revolving coil moves the used toner to a port at the rear of the PCDU.
  - The lubricant bar [3] supplies dry lubricant (Zinc Stearate) to the drum lubricant brush roller [4]. The lubricant brush roller rotates and applies the dry lubricant to the drum.
  - The lubricant collection coil [5] collects excess lubricant, or any remaining toner, or paper dust missed by the drum cleaning blade, and moves it toward the rear of the unit.
  - The drum lubricant blade [6] smoothes the lubricant applied to the surface of the drum by the lubricant brush roller.
  - The drum cleaning motor [7] (one motor for each PCDU) drives all the moving components inside the PCDU cleaning unit.

Drum Cleaning and Lubrication (2)

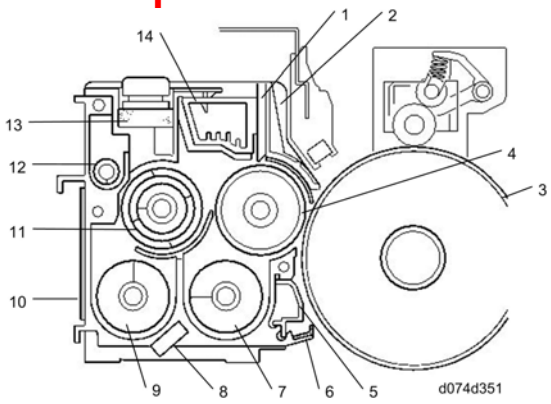


- The coils take material collected from the drum and move it to the rear of the PCDU. The material is dumped through a port at the rear into the used toner transport path.
- There is a mylar above the used toner transport coil in each PCDU. The slight vibration made by the auger when it turns against the mylar prevents used toner from clumping when it is transported out of the back of the unit.

Slide 335

No additional notes

Development Unit Overview



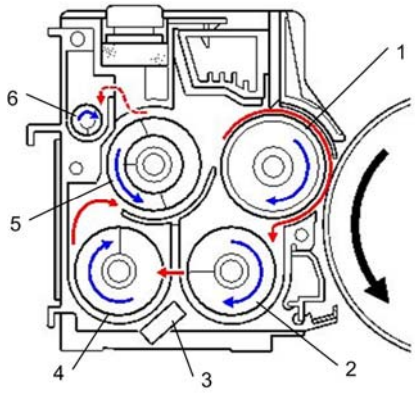
- The development unit is cooled by a cooling plate [10], which is in contact with liquid coolant.
- The toner in the toner cartridges contains developer (about 8% by weight).
- The spill duct [5] and toner catcher [6] below the development roller prevent toner scattering.

Slide 336

1. **Doctor Blade**
2. **Entrance Seal**
3. **Drum**
4. **Development Roller**
5. **Spill Duct**
6. **Toner Catcher**
7. **Right Transport Auger**
8. **TD Sensor**
9. **Left Transport Auger**
10. **Cooling Plate**
11. **Upper Transport Auger**
12. **Developer Collection Coil**
13. **Vent Filter**
14. **Heat Sink**

- Each PCDU has one development roller. Three augers move the toner around inside the unit.
- In addition to the heat sink, a cooling plate on the rear of the unit cools the PCDU to keep the toner-developer mixture at the best temperature.
- The cooling plate is in contact with liquid coolant circulating through tubes behind the PCDUs.
- The vent filter on top of the unit allows air to escape and relieves pressure buildup inside the unit.
- The spill duct and toner catcher are new devices added below the development roller to prevent toner scatter. The duct sucks up small amounts of excess toner fallen from the development roller above and deposits it in the toner catcher.

Developer Agitation



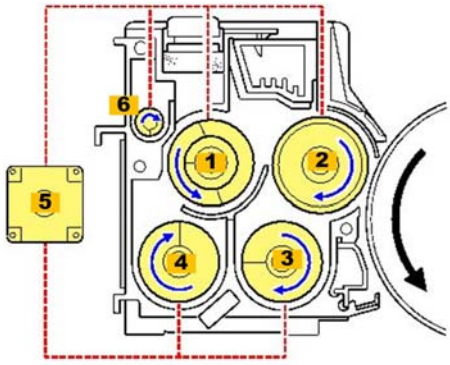
- Three augers [2, 4, 5] agitate the toner-developer mixture and move it around inside the unit.
- The toner supplied from the sub hopper of the toner supply unit above is agitated and moved to the development roller [1].
- At the top of the development roller, the doctor blade cuts and smoothes the developer mixture to the correct uniform thickness.
- If the developer in the unit overflows, the excess is carried away by the developer collection coil [6].
- The TD sensor [3] constantly monitors the density of developer inside the unit.

Slide 337

1. **Development Roller**
2. **Right Transport Auger**
3. **TD Sensor (attached to the right side of the left transport auger)**
4. **Left Transport Auger**
5. **Upper Transport Auger**
6. **Developer Collection Coil**

❒ This system is also known as a ‘single-direction development’ system.

Development Unit Drive

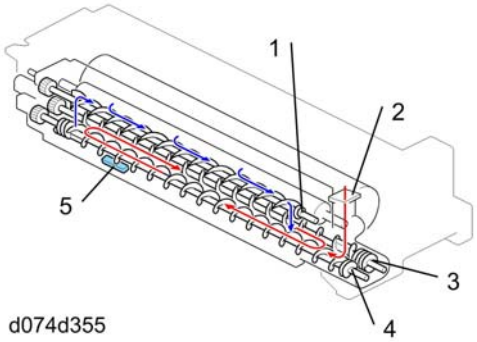


- **The development motor drives the development roller, three transport augers, and the developer collection coil.**
- **Each PCDU (YMCK) has an independent development motor.**
- **There are two power packs on the back of the machine.**
  - One is for the Y and M PCDUs, and the other is for the C and K PCDUs.
  - These power packs supply the charge for both the development roller and the drum charge unit.

Slide 338

1. **Upper Transport Auger**
2. **Development Roller**
3. **Right Transport Auger**
4. **Left Transport Auger**
5. **Development Motor**
6. **Developer Collection Coil**

Toner Density

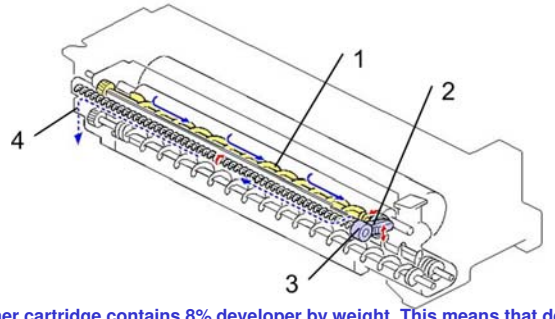


- The toner density sensor [5] under the left transport auger [4] constantly measures the amount of toner in the development unit.
- When the amount of toner in the unit becomes too low, the toner supply clutch in the toner supply unit (above the development unit) switches on and sends more toner to the development unit through the toner supply port [2].

Slide 339

1. **Upper Transport Auger**
2. **Toner Supply Port**
3. **Right Transport Auger**
4. **Left Transport Auger**
5. **TD Sensor**

Developer Replenishment

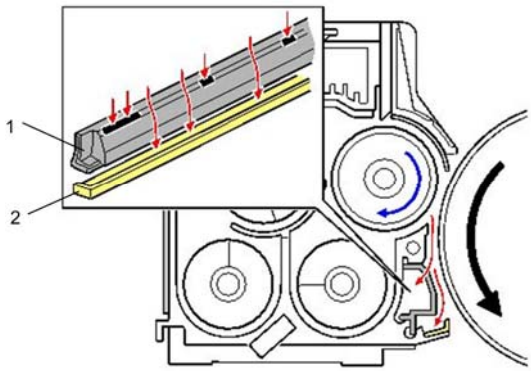


- The toner cartridge contains 8% developer by weight. This means that developer and toner are both periodically supplied to the development unit.
- If the amount of developer and toner in the unit exceeds the correct amount, excess developer is purged at the rear exit port [4].
- A lever with a one-way clutch on the shaft of the developer collection coil [3] is linked to a cam [2] on the front side of the upper transport auger [1].
- The upper transport auger [1] rotates the developer collection coil [3] via the lever.
- While the upper transport auger [1] makes one full revolution, the developer collection coil [3] will only rotate slightly because it is slowed down by the one-way clutch and the cam.
- In this way, excess toner and developer is gradually purged by the rotation of the developer collection coil.

Slide 340

No additional notes

Spill-Catch Mechanism

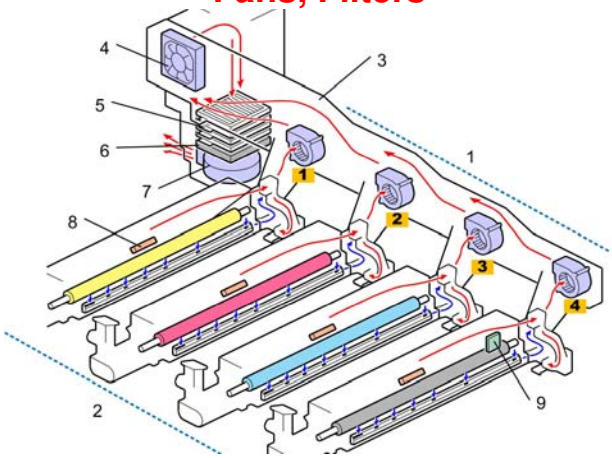


- This mechanism prevents toner scatter from the doctor blade above.
- Toner overflow, attracted by the weak suction of a fan, falls through holes in the spill duct [1].
- The collected toner is caught and held by the toner catcher [2].

Slide 341

No additional notes

PCDU Cooling
Fans, Filters



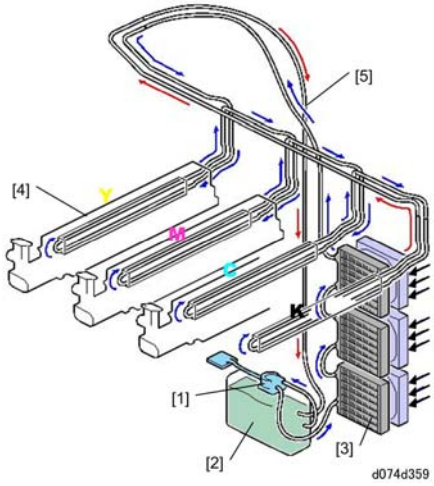
- The dust filters should be replaced every 600K.
- The ozone filters should be replaced every 1200K for the D074 and every 1350K for the D075/M044.

Slide 342

1. **Fans x4**
2. **PCDUs x4**
3. **Air Duct**
4. **Suction Fan**
5. **Air Filters**
6. **Ozone Filter**
7. **Suction Fan**
8. **Potential Sensors x4**
9. **Temperature Sensor (K PCDU only)**

- At the rear, there are four fans (1), one for each PCDU (2). The small fans suck hot air out of the PCDUs and into the air duct (3). This keeps the PCDU units and the potential sensors (8) ventilated.
- A large suction fan (4) at the end of the duct pulls air out and forces it through the stack of air filters (5) and an ozone filter (6).
- Finally another large suction fan (7) pulls the air through the filters and blows it out of the machine.

PCDU Cooling
Liquid Cooling System

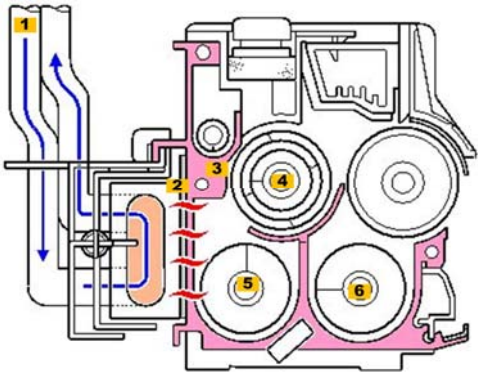


- The liquid cooling system keeps the temperature in the PCDUs at the correct level for optimum performance.
- A small pump [1] pumps coolant from a tank [2] on the back of the machine.
- The coolant is pumped through a tube that passes through the radiators [3].
- The coolant next passes over the cooling plates [4] of the PCDUs.
- After absorbing the heat from the PCDUs, the coolant is drawn back toward the tank through a line [5].

Slide 343

- The pump turns on automatically when the temperature detected by the Y thermistor (behind the ITB Unit) reaches 38 degrees C.
- The pump stops when the machine stops, or when the temperature at the Y thermistor goes below 38 degrees C.
- A sensor at the top of the tank monitors the remaining coolant by detecting the surface, and will alert SC599 if the reading from this sensor exceeds the threshold. Near-end is NOT called. The coolant should last for the machine's life and a replacement of the cooling unit due to evaporation is not expected unless for abnormal problems.

PCDU Cooling
Liquid Cooling System



- The coolant line goes past a cooling plate behind the PCDU.
- This cooling plate is highly conductive metal that absorbs heat from the PCDU jacket.
- The coolant cools this plate as it passes over its surface.
- This mechanism takes most of the heat away from the transport augers, so the toner-developer mixture is cooled.

Slide 344

1. Coolant Line
2. Cooling Plate
3. PCDU Jacket
4. Upper Transport Auger
5. Left Transport Auger
6. Right Transport Auger

PCDU Cooling
Liquid Cooling System

- **This system has two advantages over a circulating air cooling system.**
  - A liquid cooling system requires much less space (additional ducts are not required).
  - A liquid cooling system maximizes operation time because the machine does not need to halt temporarily for a PCDU to cool if temperature is too high.
- **This liquid cooling unit is a robust design. Its rubber tubing is guaranteed for 20 years of use at 70° C (158° F).**
- **Rate of evaporation of coolant:**
  - 150 cc/7 years at 32° C (90° F) running 24 hours/day with full-color duplexing.
  - 86 cc/7 years at 25° C (77° F) running 24 hours/day with full-color duplexing.

Slide 345

No additional notes

Tank and Coolant Disposal

- If replacement is necessary, the entire assembly is replaced. The coolant liquid will not be supplied as a service part.
- Always obey local laws and regulations if you need to dispose of a tank or coolant.
- The tank must never be emptied directly into a local drainage system, river, pond, or lake.
- Contact a professional industrial waste disposal organization and ask them to dispose of the tank.

Slide 346

No additional notes

Detailed Section Descriptions

Replacement and Adjustment: PCDUs

Slide 347

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Replacing Developer

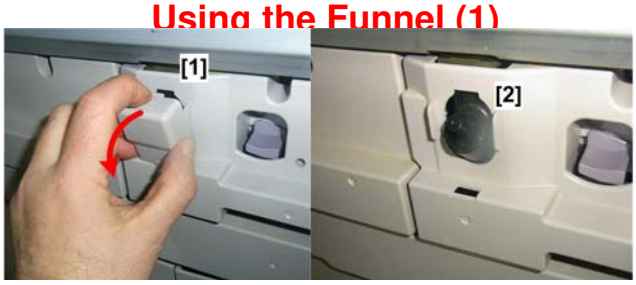
Developer Installation Funnel

- There is a funnel behind the cover [1] at the right lower corner of the machine.
- Remove this cover and take the funnel [2] from the cover.
- You will need this when you install developer.

Slide 348

No additional notes

Replacing Developer
Using the Funnel (1)



- The front of each PCDU has a cap cover [1] that covers the developer port cap [2].

Slide 349

No additional notes

Replacing Developer
Using the Funnel (2)

- When it is time to add developer, remove the port cap [1], and insert the funnel [2] into the port.
- The funnel must be parallel with the top edge of the machine.

Slide 350

No additional notes

Replacing Developer
Installing New Developer (1)

- **OPEN BOTH THE FRONT DOORS.**
- **Connect the machine to the power source and turn on the power.**
- **Outline of the procedure for each developer (see the field service manual for details):**
  - Remove the developer port cap from the PCDU and insert the funnel.
  - Shake the developer pack.
  - Open the developer pack and add developer through the funnel.
  - Do SP 3024-00x to install the developer.
    - This takes about 30 seconds.
    - If a substantial amount of developer did not go into the PCDU from the developer pack, repeat SP3024.
  - Shake the developer pack gently to make sure that all developer enters the machine.
  - Remove the funnel and clean it before using it for the next colour.

Slide 351

- The front doors must remain open at this time.
  - Turning on the machine with the front doors open prevents the machine from performing the initial process control self-check.
  - If the front doors are closed, the drums will start rotating with no toner in the PCDUs.
  - If the drums rotate with no toner in the PCDUs, this can cause the cleaning blades to catch on a dry drum and damage the drum surface.

- Installing developer
  - 3024-004: Y
  - 3024-003: M
  - 3024-002: C
  - 3024-001: K
  - If more than 30 seconds is needed to empty the developer pack into the PCDU, you can increase the run time with SP3024-11.

Replacing Developer
Installing New Developer (2)

- **Do SP3025-1 to check that developer was installed correctly.**
- **A four-digit number appears. Read from left-to-right to see the result for Y, M, C, and K.**
  - If you see 1111, there were no problems.
  - The meanings of the other codes are shown in the installation procedure in the manual.
- **CLOSE THE FRONT DOORS.**
  - The machine warms up and automatically executes the process control sequence. This requires about 6 minutes to complete.
  - The display changes from SP mode to Please Wait, then Ready.
  - When you see "Ready" displayed, the machine is ready for operation.

Slide 352

No additional notes

Replacing Developer
Execute These SPs

- **Do SP3030-001.**
  - This initializes the TD sensor.
  - Do SP3031-001 to check whether initialization was successful.
  - Never do SP3030 with used developer.
- **Do SP3020-001.**
  - This does the initial process control.
  - Do SP3012-001 to check whether initialization was successful.
- **Then, exit SP mode and turn the power off.**

Slide 353

No additional notes

Replacing a Drum

- **The new drum must be lubricated with powder.**
- **There are two different procedures:**
  - After installing a complete new PCDU
  - After replacing the drum inside an existing PCDU

Slide 354

- The service manual contains details of both procedures. The next few slides show the important points.

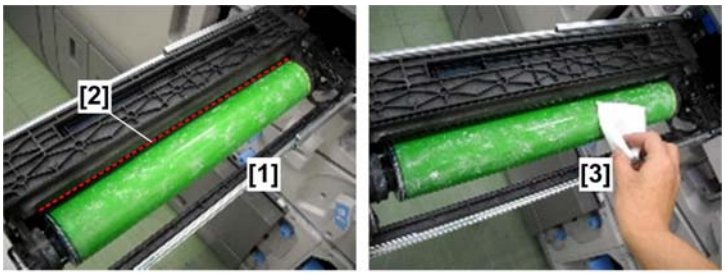
Drum Replacement: New PCDU (1)

- Raise the drum bracket [1], and dust the exposed surface of the drum with the resin pad.
- IMPORTANT: Do not apply powder near the development unit entrance seal [3].

Slide 355

- Lubricant powder: This is provided with the TCRU kit for use when replacing the drum. The service part for the technician to replace the drum does not have the powder. A bag of setting powder is available as a separate service part (part number G178 3799).

Drum Replacement: New PCDU (2)



- [1] shows too much powder on the drum.
- If too much powder enters the development unit entrance seal [2], this can cause poor image reproduction.
- Remove excess powder with a clean dry cloth [3].
- Rotate the drum slowly until the applied powder is no longer visible.

Slide 356

No additional notes

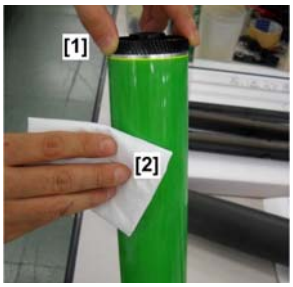
Drum Replacement: Drum Only (1)

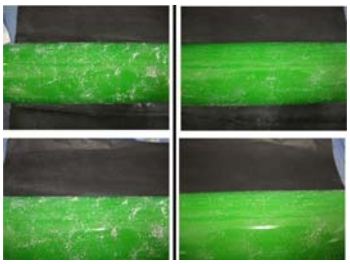
- **Stand the new drum on its end with the drive gear [1] up.**
  - Always hold the drum steady by gripping it at the drum gear [1].
  - Never touch the surface of the drum.

Slide 357

No additional notes

Drum Replacement: Drum Only (2)





Too Much Powder | Correct Amount

- While holding the drum upright by the drive gear [1], use the resin pad [2] to dust the drum lightly.
- Turn the drum as you dust it to make sure that the entire surface is covered.
- Do not apply too much powder to the drum.

Slide 358

No additional notes

After Replacing a Drum, Drum Cleaning Blade, or Drum Charge Unit

1. **Make sure that the machine power is OFF.**
2. **Open both front doors.**
3. **Turn the main power switch ON.**
4. **Enter the SP mode.**
5. **Reset the counter for the replaced drum or drum charge unit.**
6. **Close the front doors.**
7. **Wait for about 5 minutes. When you hear an audible beep and see "Ready" displayed on the operation panel, you are ready to continue.**
8. **Execute these SP codes.**
   - 3032-001 to -006: Drum cleaning and lubrication (Not necessary for drum charge unit)
   - 3020-001: Initializes process control.
   - 3012-001: Confirms successful initialization of process control.
9. **Exit the SP mode.**

Slide 359

No additional notes

After Replacing a PDCU or Development Unit, or Removing Old Developer (1)

- The following is just a summary. For the full procedure, see the service manual.

1. After PCDU replacement: Apply setting powder to the drum.
2. Make sure that the machine is OFF.
3. Open both front doors.
4. Turn the main power switch ON.
5. Enter the SP mode.
6. Reset the counter for the replaced unit or developer.
7. Install developer.
8. Execute the SP code to fill the PCDU with the new developer.
   - Black: SP3024-001(K)
   - Cyan: SP3024-002 (C)
   - Magenta: SP3024-003 (M)
   - Yellow: SP3024-004 (Y)
9. Do SP3025-001 to confirm that each PCDU was filled successfully.

Slide 360

This is just a summary. For the full procedure, see the service manual.

Replacement and Adjustment > PCDU

- Developer replacement was covered a few slides ago (Replacing Developer), so you may be already familiar with some of this information.

After Replacing a PDCU or Development Unit, or Removing Old Developer (2)

10. **Close the front doors.**
    - Wait for about 5 minutes. When you hear an audible beep and see "Ready" displayed on the operation panel, you are ready to continue.
11. **Do one or more of the SP codes listed below, whichever is appropriate, to initialize TD sensors.**
    - IMPORTANT: Choose the correct SP code. Initialize the TD sensor only for the development units that were replaced. Never initialize the TD sensor of a development unit that has not been replaced.
      - All development units replaced: 3030-01
      - CMY development units replaced: 3030-02
      - K development unit replaced: 3030-03
      - C development unit replaced: 3030-04
      - M development unit replaced: 3030-05
      - Y development unit replaced: 3030-06
    - Never do SP3030 with used developer.
12. **Do SP3031-001 to confirm successful TD sensor initialization.**

Slide 361

No additional notes

After Replacing a PDCU or Development Unit, or Removing Old Developer (3)

13. **Execute these SP codes.**
    - 3020-001: Initializes process control.
    - 3012-001: Confirms successful initialization of process control.
14. **Exit the SP mode.**

Slide 362

No additional notes

After Replacing a Drum Cleaning Unit

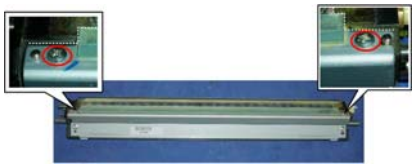
1. **Make sure that the machine is OFF.**
2. **Open both front doors.**
3. **Turn the main power switch ON.**
4. **Reset the counters for the replaced unit or parts.**
5. **Close the front doors.**
6. **Wait for about 5 minutes. When you hear an audible beep and see "Ready" displayed on the operation panel, you are ready to continue.**
7. **Do one or more of the SP codes listed below, whichever is appropriate, to clean and lubricate the drum of the unit where the unit or parts were replaced.**
   - All cleaning units replaced: 3032-01
   - CMY cleaning units replaced: 3032-02
   - K cleaning unit replaced: 3032-03
   - C cleaning unit replaced: 3032-04
   - M cleaning unit replaced: 3032-05
   - Y cleaning unit replaced: 3032-06
8. **Execute these SP codes.**
   - 3020-001: Initializes process control.
   - 3012-001: Confirms successful initialization of process control.
9. **Exit the SP mode.**

Slide 363

No additional notes

Notes about Servicing a PCDU (1)

Drum Cleaning Blade



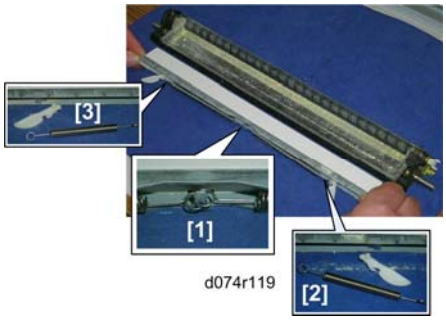
Drum Lubrication Blade

- Please note that if removed, the sponge seals (shown as white lines above) cannot be reused and must be replaced with new sponge seals.
- When installing a new blade, the seals must be replaced with new parts.

Slide 364

- These sponge seals have part numbers, and are service parts.
- The service manual contains procedures for replacing these seals. The name ‘side seal’ is used in the procedure, however.

Notes about Servicing a PCDU (2)



- The lubrication bar should always be removed before the lubrication roller, and re-installed after the lubrication roller.
- Do not discard the springs and arms ([1] to [3] in the diagram above). They are not provided as service parts and must be re-attached to the new lubrication bar.

Slide 365

No additional notes

Drum Cleaning Unit Gears

- Gears 1 to 4 must be replaced every 300k.

Slide 366

No additional notes

Detailed Section Descriptions

Replacement and Adjustment:
Liquid Cooling Unit

Slide 367

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Liquid Cooling Unit

- **Hoses must be disconnected at these two locations.**
  - At the top, there are two hoses. Only disconnect the one on the right.
- **Press the blue release buttons on both sides of the coupling to disconnect.**
- **Use a dry rag to soak up any coolant leakage around the open ends of the couplings.**
  - There should be only a small amount of leakage.
  - If leakage is excessive, connect the hose couplings together and then disconnect them again. This should stop the excessive leaking.

Slide 368

No additional notes

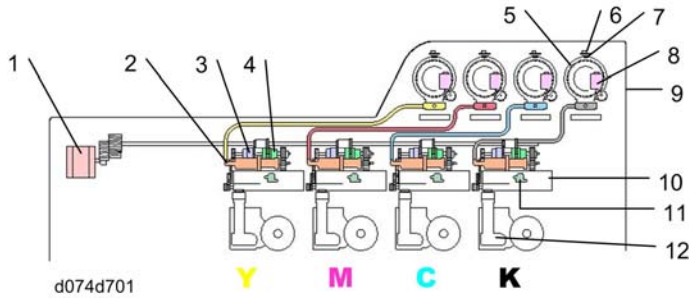
Detailed Section Descriptions

Toner Supply

Slide 369

No additional notes

Overview



- Each PCDU has its own toner bottle and toner supply unit.
- Toner bottle motors: One motor for each bottle.
- Toner supply motor: One motor drives the supply mechanisms of all 4 bottles. There is a toner supply clutch and a toner pump clutch for each bottle.
- Toner pump clutch: Controls the toner pump, which supplies toner from the bottle to the sub hopper.
- Toner supply clutch: Controls the supply of toner from the sub hopper into the development unit.

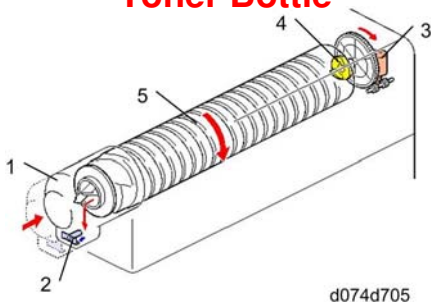
Slide 370

1. **Toner Supply Motor**
2. **Toner Pump**
3. **Toner Supply Clutch**
4. **Toner Pump Clutch**
5. **Toner Bottle**
6. **RFID**
7. **ID Chip (on the toner bottle)**
8. **Toner Bottle Motor (rear)**
9. **Toner Bank**
10. **Sub Hopper**
11. **Toner End Sensor**
12. **Development Unit**

- Toner bottles, toner bottle motors. In the toner bank on top of the right side of the machine, a toner bottle is rotated by a toner bottle motor at the rear. There are four toner bottles (from left to right in this order: Y, M, C, K.)
  - A toner bottle can be easily replaced, even from a sitting position. A bottle can be replaced even while the machine is printing.
  - The toner bottle contains a developer-toner mixture (8% developer by weight).
- Toner bottle supply port. When the bottle is rotated by the motor, small amounts of toner spill out the front through the toner supply port. This toner port closes and seals itself when a toner bottle is removed.
- Toner supply motor. A large toner supply motor drives a long steel shaft that drives the clutches and augers in the four toner supply units. The machine uses clutches to control the flow of toner.
- Toner pump clutch. The toner pump clutch drives the toner supply pump when the machine signals toner end for the sub hopper (toner end sensor in the sub hopper).
  - This pump is a dry impeller which pumps toner from the toner bottle supply line into the sub hopper.
- Toner supply clutch. The toner supply clutch drives the augers that move toner from the sub hopper down to the development unit when the TD sensor (in the development unit) signals toner end.

Toner Supply Mechanism

Toner Bottle



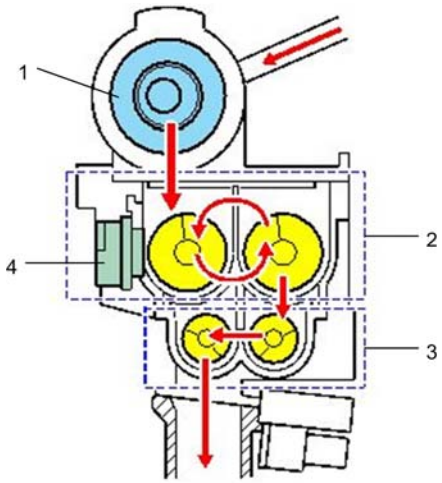
- **When the toner bottle (1) is set, a shutter pin (2) opens the toner supply port.**
  - The port is spring-loaded and closes again automatically when the toner bottle is removed.
- **The toner bottle motor (3) and its coupling (4) rotate the toner bottle.**
- **Each bottle has a spiral groove (5) that rotates as the bottle turns.**
  - This moves the toner to the front of the bottle, where it drops through the toner supply port and into the toner supply tube. This tube is connected to the toner supply unit.

Slide 371

- The toner bottle rotates when these two conditions occur.
  - During the image creation process, process control, forced toner supply, or toner-end/near-end
  - When the sensor in the sub hopper detects a lack of toner.

Toner Supply Mechanism

Sub Hopper



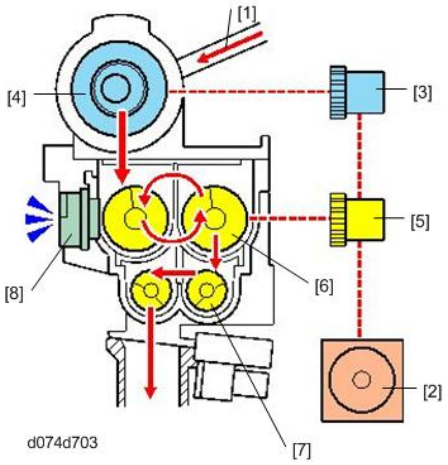
- The toner is pumped from the toner bottle to the sub hopper by the toner pump (1).
- In the top half of the sub hopper (2), the toner is agitated with coils.
- In the bottom half of the sub hopper (3), the toner is sent to the development unit, again using coils.
- A toner end sensor (4) is attached to the side of each sub hopper.
  - The machine uses this to detect when the amount of toner in the sub hopper becomes low.

Slide 372

- The toner pump is a dry pump that uses an impeller to create a vacuum to suck toner from the bottle.
- The toner end sensor touches the toner directly.

Toner Supply Mechanism

Toner Supply Unit Drive (1)

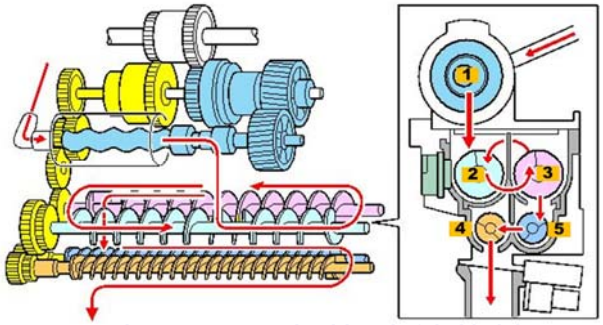


- **Toner [1] flows into the toner supply unit through a soft flexible tube connected to the toner bottle.**
- **The toner supply motor [2] drives all moving parts in the toner supply unit:**
  - Toner pump clutch [3] and toner pump [4].
  - Toner supply clutch [5], agitation augers [6], and supply augers [7].
- **The toner end sensor [8] monitors the level of toner inside the sub hopper.**
  - When this sensor detects that the level of toner in the sub hopper is low, the machine turns on the supply pump clutch to pump more toner into the sub hopper.

Slide 373

No additional notes

Toner Supply Mechanism
Toner Supply Unit Drive (2)



- The toner supply motor rotates the drive shaft behind the toner supply units continuously.
- If there is enough toner in both the sub hopper and the development unit, the clutches remain idle.
- When the level of toner in the sub hopper becomes low, the toner pump clutch activates and the toner pump (1) pulls toner from the toner bottle into the sub hopper.
- When the level of toner in the development unit becomes low, the toner supply clutch activates and the augers (2 to 5) move toner down into the development unit.

Slide 374

1. **Toner Supply Pump**
2. **Agitation Auger**
3. **Agitation Auger**
4. **Supply Auger**
5. **Supply Auger**

- For details, see the next two slides.

Supply from Toner Bottle to Sub Hopper

- When the level of toner in the sub hopper becomes low, the toner end sensor (in the sub hopper) signals toner near-end. The toner pump clutch switches on for 2 seconds.
- During these 2 seconds, the toner supply pump pulls toner from the toner supply line (connected to the toner bottle above) and into the sub hopper.
- If the end sensor detects enough toner in the sub hopper, the clutch does not switch on again.
- If the toner level is not sufficient, the clutch will switch on again for 2 seconds.
- This cycle will continue until the sensor detects sufficient toner in the sub hopper.

Slide 375

No additional notes

Supply from Sub Hopper to Development Unit

- When the level of toner in the development unit becomes low, the toner density sensor below the development unit signals near-end.
- Based on the toner coverage of the previous print, the machine determines how much toner was consumed, compares it with the amount remaining, and then turns on the toner supply clutch.
- The toner supply clutch starts to rotate both sets of augers. The agitation augers move the toner to a drop point where it falls into the supply augers below.
- The supply augers move the toner to another drop point where the toner drops into the development unit below.
- When the TD sensor (in the development unit) detects sufficient toner in the development unit, the toner supply clutch switches off.

Slide 376

No additional notes

What Methods are there?

- **The setting of SP3400-1 to -4 selects the method of toner supply for each color (YMCK).**
- **Three settings are available.**
  - 0: Fixed supply
  - 3: Active toner control (without Vtref correction)
  - 4: Active toner control (with Vtref correction)
    - » The active toner control technology is new.

Slide 377

- Active toner control was explained briefly earlier in the course.

Toner End Alert

- When a toner end sensor detects almost no toner in a sub hopper, the toner pump clutch in that sub hopper engages the toner pump for 2 seconds to supply more toner from the toner bottle to the sub hopper.
- If the toner end sensor cannot detect toner in the sub hopper after 10 consecutive readings, this triggers the toner end alert.

Slide 378

No additional notes

Toner End

- **After the toner end alert, 10 pages are printed. Then, toner end is generated when one of the following occurs:**
  - After 4000 pages have been printed.
  - After an equivalent of 200 A4 pages at 100% coverage have been printed.
  - After 32 seconds of accumulated time that the toner supply clutch operates.

Slide 379

- After a toner end alert is issued, the number of pages that can be printed until toner end is determined by the amount of toner that remains in the sub hopper.
- After the toner end alert has been issued and 10 sheets have been printed, toner end occurs when one of the these three counters goes over the limit first:
  - Page count. After the end alert, the number of pages that can be printed is based on page count regardless of coverage. The default is 4000.
  - Pixel count (coverage). The number of pages that can be printed is determined by a calculation of the coverage (200 A4 pages at 100% coverage).
  - Toner feed count. The amount of supplied toner that can be printed is determined by monitoring the accumulated time that the toner supply clutch is on. The default setting is 32 seconds before toner end occurs.
- The number of pages that actually print after the toner end alert is issued varies, of course, with paper size and amount of coverage on each page.

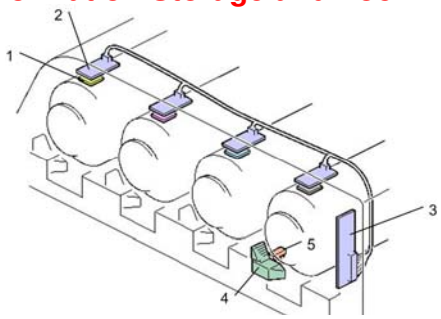
Toner End Recovery

- After a new bottle is installed, the machine supplies toner from the new bottle to the sub hopper.
- If the toner end sensor detects that the toner supply has been replenished, the machine goes out of the toner end condition.

Slide 380

No additional notes

Bottle Information Storage and Lock Detection



- **Each bottle has an ID chip (1) that identifies the bottle.**
  - A reader PCB (2) reads data from the ID chips and relays the information to the RFID CPU (3). The reader PCB is above the tag attached to each bottle.
  - The RFID CPU receives information from the readers and relays this data to the main machine.
- **The toner bottle lever (4) and bottle lock sensor (5) open and close the toner supply port when the toner bottle is installed and removed.**

Slide 381

- This machine uses RFID (Radio Frequency IDentification) technology.
- The RFID chip contains data that records toner consumption, the type and color of toner, name and place of manufacture, and other information.
- The RFID board reads and writes toner bottle information from the ID chip in each toner bottle when:
  - The machine is turned on
  - The toner bank door is closed
  - One the front doors is closed.

Detailed Section Descriptions

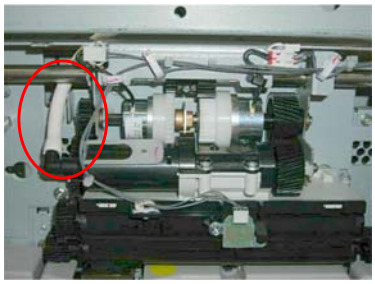
Replacement and Adjustment:
Toner Supply Units

Slide 382

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Toner Supply Unit Removal



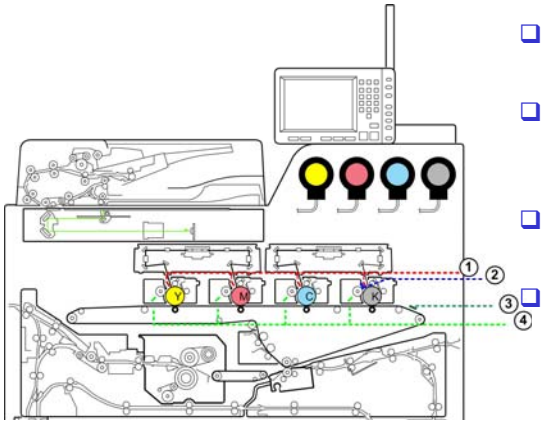
- There is a toner supply unit above each PCDU. If you wish to work on a toner supply unit, the PCDU below it must be removed.
- The toner supply tube must be clamped shut to prevent toner falling out.
- Toner may also leak from the nozzle, so use a cloth to protect the floor or other work areas from toner falling out.

Slide 383

No additional notes

- This section will explain process control briefly. It is very similar to the V-C3 series.
- The course will concentrate on important items, such as the components that are used, and the adjustments that can be made.

Which Components are Used?

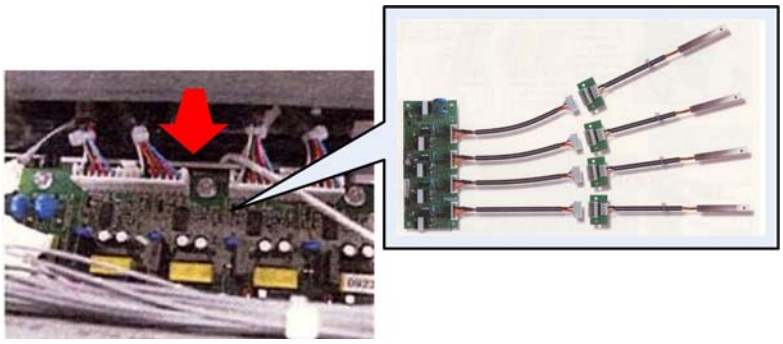


- 1. Potential Sensors: One for each PCU
- 2. Temperature/humidity sensor 1: Behind the K PCU.
- 3. ID Sensor: One sensor, near the ITB
- 4. TD Sensors: One in each development unit

Slide 385

- The readings from the temperature/humidity sensor behind the K PCDU are used in potential control for setting the length of time for developer agitation, calculating target development gamma, and AC charge control.
- The machine contains additional temperature/humidity sensors in other locations. They are not used for process control.

Potential Sensors

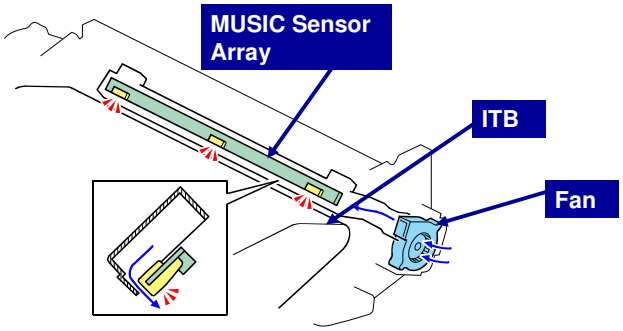


- Each potential sensor is encased in a shield casing and fastened over the top of the drum where it can read the drum potential.
- The potential sensors are connected to the potential sensor power pack, which is mounted at the rear top of the machine in the center, between the two charge bias power packs.

Slide 386

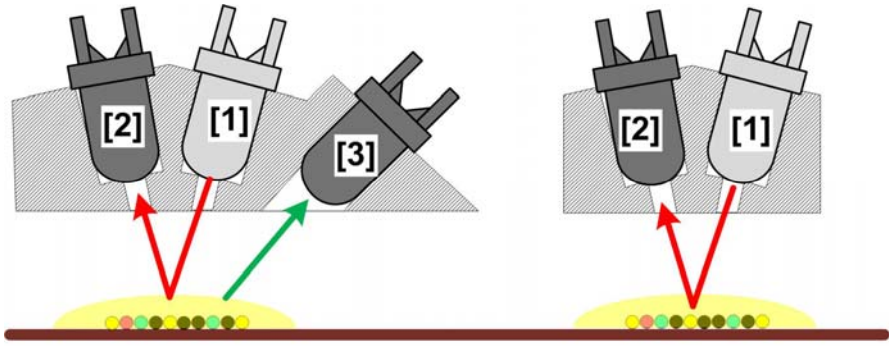
No additional notes

ID Sensors



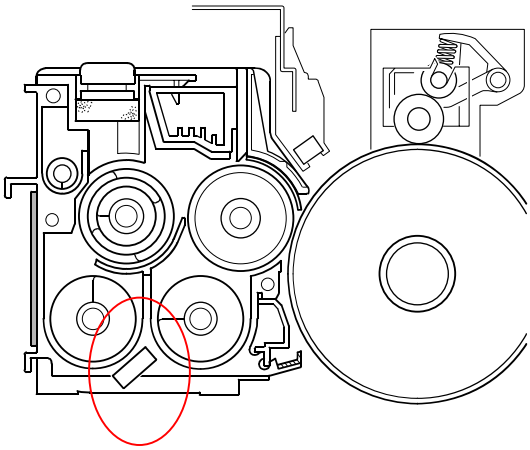
- **The ID/MUSIC sensor array is above the ITB, on the right side of the ITB unit below the K_PCDU. The fan cleans these sensors.**
  - The rear sensor reads MUSIC patterns only
  - The center sensor reads MUSIC patterns and also functions as the ID sensor.
  - The front sensor reads MUSIC patterns only

Slide 387



- The unit on left shows the configuration of the middle sensor which performs double duty as the ID sensor as well as a MUSIC sensor. The unit on the right shows the configuration of the rear and front sensors in the array that function only as MUSIC sensors.
- The elements in these sensors are:
  - [1] Emitter. Emits light on the patterns.
  - [2] Direct reflector sensor. Gathers light emitted by [1] and reflected directly from the patterns on the ITB.
  - [3] Diffused reflector. Gathers diffuse light from the sides of the patterns to achieve more accurate readings especially for Y, M, C. Only the middle sensor has this extra reflector.

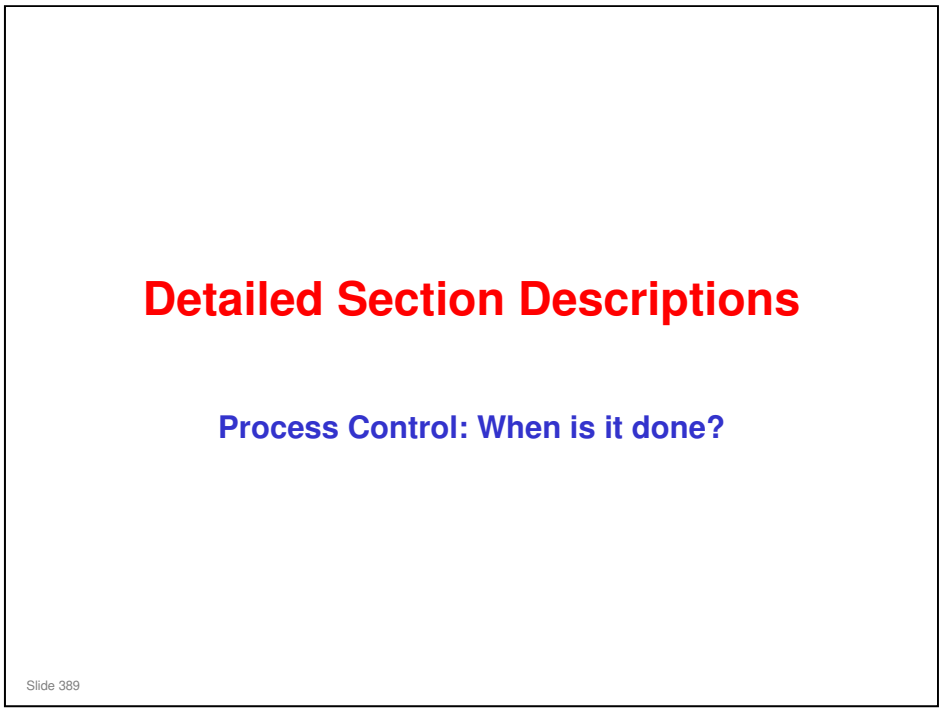
TD Sensors



- Each development unit has a TD sensor.
- It does not contact the developer/toner mixture directly.

Slide 388

No additional notes



No additional notes

Overview

- **Timing**
  - Power On, Returning from Low Power Mode, or Front Door Closed
  - Print Job Start
  - During Printing
  - Job End

Slide 390

No additional notes

When is Process Control Done? - 1

- **Power On, Returning from Low Power Mode, or Front Door Closed**
  - Process control is done if one or more of the following conditions has changed since the last time one of the above occurred:
    - » Idle time > SP3530-1 (min.), and at power on if the page count exceeds the interval count (SP3530-7, -8 ≥ SP3530-5, -6) – these two conditions need to occur simultaneously
    - » Ambient temperature changed ≥ SP3530-2 (° C)
    - » Relative humidity changed ≥ SP3530-3 (%RH)
    - » Absolute humidity changed ≥ SP3530-4 (g/m^3)

Slide 391

No additional notes

When is Process Control Done? - 2

- **Print Job Start**
  - Process control is done at the start of a print job if one or more of the following conditions has changed since the last print job ended.
    - » Idle time ≥ SP3532-1 (min.)
    - » Ambient temperature changed ≥ SP3532-2 (° C)
    - » Relative humidity changed ≥ SP3532-3 (%RH)
    - » Absolute humidity changed ≥ SP3532-4 (g/m^3)
- **During a job**
  - Process control is done if one or more of the following conditions changes during a job.
    - » Page counter for BW exceeds the interval setting for BW: SP3529-6 changed ≥ SP3533-2
    - » Page counter for FC exceeds the interval setting for FC: SP3529-7 changed ≥ SP3533-12
- **At the end of each job**
  - Process control is done if one or more of the following conditions changes since the job started.
    - » Page counter for BW exceeds the interval setting for BW: SP3529-6 changed ≥ SP3534-2
    - » Page counter for FC exceeds the interval setting for FC: SP3529-7 changed ≥ SP3534-12

Slide 392

No additional notes

Process Control Enable/Disable

- **The following SP codes should be set to ON (default).**
  - SP3500-1: ALL
  - SP3500-2: Process control
  - SP3500-3: MUSIC
- **If they are switched off, automatic adjustments for process control will not be done.**

Slide 393

- Also, if one or more of the SP codes that control threshold settings for time, temperature, relative humidity, absolute humidity are set to "0" (OFF), these functions will be disabled and not checked during process control.
- For example, if SP3500-1 (controls the idle time check) is set to "0", the length of time the machine has remained idle will not be checked.

Charge Settings at the Start of a Job

- The following SP codes determine the values used at the start of every job.

Bias/Power	SP3600-1 = 0 (Fixed)	SP3600-1 = 1 (Auto)
Charge AC Bias	SP2202	SP3610
Charge DC Bias	SP2201	SP3611
Development DC Bias	SP2212	SP3612
LD Power	SP2211	SP3613

Slide 394

- SP3600-1 Select Procon: Potential Control

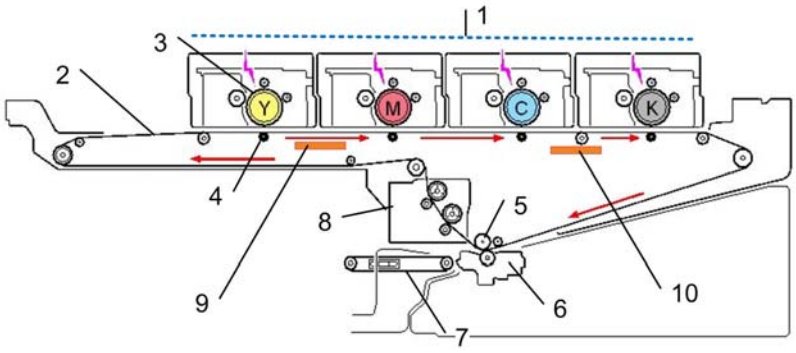
Detailed Section Descriptions

Image Transfer

Slide 395

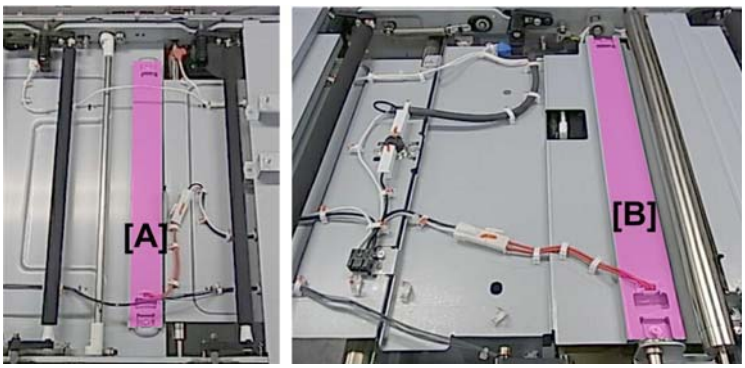
No additional notes

Overview



1. PCDUs (x4)
2. ITB (Image Transfer Belt) Unit
3. Drums (x4)
4. Image Transfer Rollers (x4)
5. ITB Bias Roller
6. PTR (Paper Transfer Roller) Unit
7. PTB (Paper Transport Belt) Unit
8. ITB Cleaning Unit
9. Anti-condensation Heater – Left
10. Anti-condensation Heater – Right

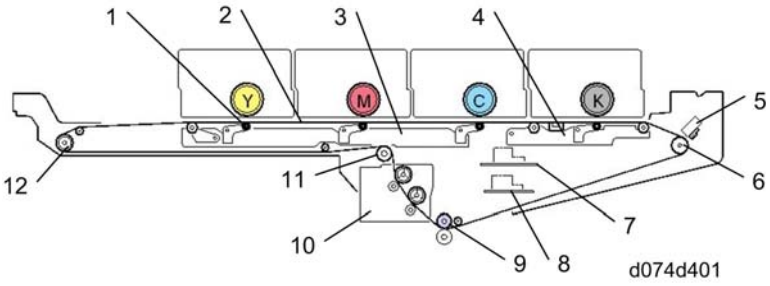
Slide 396



❒ The photos above show the locations of the left heater [A] and right heater [B] with the ITB removed.

ITB Unit

Overview

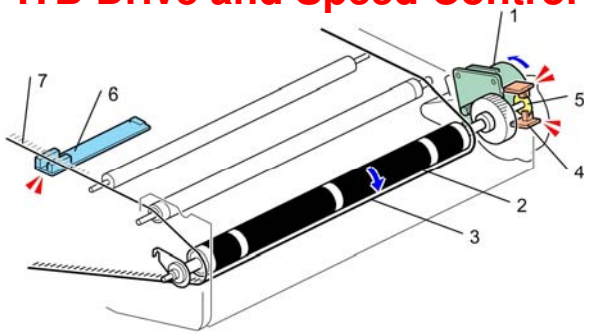


[1] Image Transfer Roller
[2] Image Transfer Belt
[3] 1st Lift Tray (YMC)
[4] 2nd Lift Tray (K)
[5] ID/MUSIC Sensors
[6] ITB Drive Roller
[7] TDRB (Transfer Drive Relay Board)
[8] Transfer Power Pack
[9] ITB Bias Roller
[10] ITB Cleaning Unit
[11] Belt Tension Roller
[12] Belt Centering Roller

Slide 397

- [1] Image Transfer Roller (one for each color). The positive charge applied by the transfer power pack to these sponge rollers (one for each PCDU) pulls the developed images from the drums down onto the ITB.
- [2] Image Transfer Belt. Receives the toner images from the four drums and holds them until they are transferred to paper. During a full-color job, all the drums (YMCK) are in contact with the ITB. During a black-and-white job, the ITB is lowered away from the YMC drums and only the black (K) drum contacts the ITB.
- [3] 1st Lift Tray (YMC). For full color printing, the 1st tray lift motor raises the arm under the color image transfer rollers (YMC) to raise the ITB against the YMC drums. Lowers the arm and rollers during a black-and-white job. The arm and rollers also remain down when the machine is idle. This mechanism reduces wear on the ITB.
- [4] 2nd Lift Tray (K). The 2nd tray lift motor lifts the arm under the black image transfer roller (K) to raise the ITB against the K drum for black-and-white printing and color printing. The arm and roller remain down while the machine is idle. This mechanism reduces wear on the ITB.
- [5] ID/MUSIC Sensors. Positioned above the ITB opposite the ITB drive roller and below the black PCDU, these sensors detect and measure the potential patterns for process control and interval patterns for MUSIC. There are three sensors. All the sensors function as MUSIC sensors but only the center sensor performs double-duty as the ID sensor.
- [6] ITB Drive Roller. Drives the image transfer belt and controls its speed. The machine uses the feedback from two sensors to control the motor; the ITB rotation encoder sensor is used to control motor and roller timing, and the belt speed sensor is used to control the speed of the belt.
- [7] TDRB. Transfer Drive Relay Board. The TDRB is located above the transfer power pack, and controls operation of the components in the ITB unit
- [8] Transfer Power Pack. Performs two functions. First, applies the positive bias to the image transfer rollers to pull the developed toner images off the drums and onto the ITB. Second, applies a negative bias to the ITB bias roller to push the images off the ITB and onto the paper.
- [9] ITB Bias Roller. The transfer power pack applies a negative charge to this roller to push the negatively-charged toner image from the ITB to the paper.
- [10] ITB Cleaning Unit. Cleans and lubricates the ITB.
- [11] Belt Tension Roller. The spring-loaded roller that keeps the ITB at the correct tension.
- [12] Belt Centering Roller. Located on the far left end of the ITB unit and connected by a cable to the transfer belt centering motor. The belt centering roller is moved to correct the belt position to keep the image transfer belt centered over the image transfer rollers.

ITB Drive and Speed Control



- The transfer belt drive motor (1) drives the ITB drive roller (2) on the right end of the ITB unit.
- Two encoder sensors (4) monitor an encoder wheel (5) on the shaft of the drive roller. These sensors monitor the rotation of the drive roller shaft and speed of the motor.
- The ITB speed sensor (6) also monitors the speed of the belt by reading an encoder strip (7) under the front edge of the ITB (3).
- The ITB must be installed with the encoder strip at the front edge of the belt.

Slide 398

Belt Characteristic Correction Control

- This process compensates for unstable ITB rotation speed due to stretching or shrinking of the ITB. The belt speed is measured at two points:
  - Belt speed sensor at the front edge of the belt
  - Encoder sensors on the transfer belt drive motor at the rear right corner of the ITB unit.
- The machine uses the feedback from these sensors to calculate the average speed of the belt and uses the result as a reference for adjusting the speed of the belt.

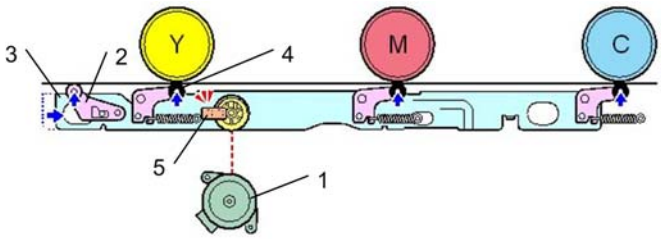
ITB Speed Sensor

- **The belt speed sensor [1] reads an encoder strip under the front edge of the ITB [2] to monitor the speed of the belt.**
  - The photo shows a top view of the sensor with the ITB removed. The red dotted line represents the front edge of the ITB.

Slide 399

- This is not a new mechanism. But in previous machines, the encoder strip was on the back edge of the belt.

ITB Lift
1st Lift Tray (YMC)

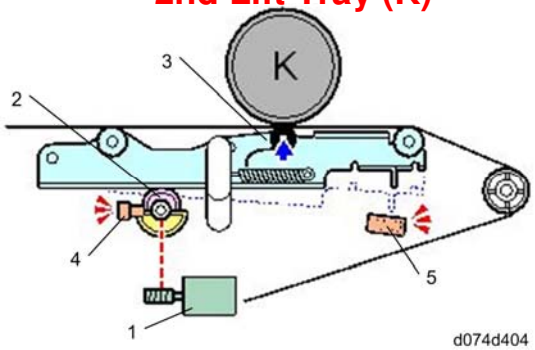


- The YMC drums are mounted on one tray which can be raised and lowered by the 1st lift motor (1).
- The 1st lift motor rotates a cam (2) which slides the tray left and right.
- When the slider (3) moves to the right, it lifts the 1st lift tray, the ITB belt, and three image transfer rollers (4) up against the bottom of the drums (YMC).
- The operation of the 1st lift motor is controlled by the 1st lift motor sensor (5).

Slide 400

- The lift motor is a stepper motor.
- When the image transfer rollers are raised, the ITB touches the bottoms of the YMC drums above it. The machine is ready to operate.
- When the rollers are down, the belt and drums are separated. The machine is idle.

ITB Lift
2nd Lift Tray (K)



- **The 2nd lift motor (1) rotates 2nd lift cam (2) up against the bottom of the tray to raise it.**
  - Even if the ITB lever is up, there is still a small gap between the ITB and the K PCDU. The 2nd lift motor moves the ITB up into contact with the K PCDU.
- **This raises the 2nd lift tray, the ITB belt, and the image transfer roller (3) up against the bottom of the K drum.**
- **The operation of the 2nd lift motor is controlled by two sensors:**
  - 2nd lift motor sensor 1 (4) near the motor
  - 2nd lift motor sensor 2 (5) in the upper right corner of the ITB unit.

Slide 401

- The lift motor is a stepper motor.
- When the image transfer roller is raised, the image transfer belt is in contact with the OPC drum above it. The machine is ready to operate.
- When the image transfer roller is down, the belt and drum are separated. The machine is idle.

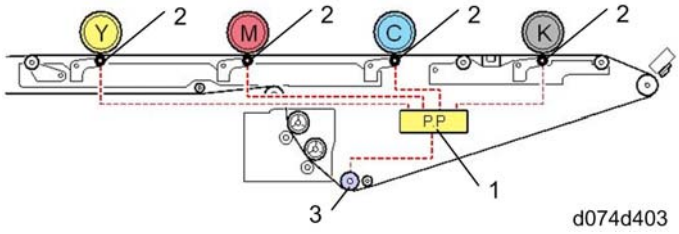
When ACS Mode is Selected

- **If the job has both color and black-and-white pages, the ITB operation is controlled by SP2907-001.**
  - When this SP is set to "1“, the 1st lift arm raises and lowers the belt for each sheet, depending on page content (color or black-and-white).
    - » This makes printing slightly slower, but decreases wear on the color drums.
  - If this SP is set to "0", the 1st lift arm will not lower the belt away from the color drums, regardless of the content of the next page (full color or black-and-white).
    - » This makes printing faster, but increases wear on the belt and drums.
  - You can also set the SP to a value between 2 and 10. For example, if you set the SP to 5 (default), then the ITB changes position in the middle of a color job after 5 black-and-white pages.

Slide 402

- This is also a TCRU setting (Adjustment Settings for Skilled Operators 0207: Auto Color Selection Setting).
- But the value "0" is not available for "Adjustment Settings for Skilled Operators". The value "0" is only for SP mode.

Transfer Power Pack



- The ITB transfer power pack (1) performs two functions.
- It supplies power to charge the image transfer rollers (YMCK) (2) for the image transfer from drum to ITB.
- It supplies power to charge the ITB bias roller (3) for image transfer from ITB to paper.

Slide 403

Image Transfer: Drum to ITB

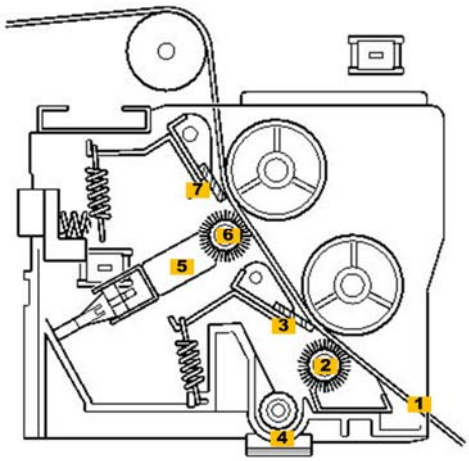
- The ITB transfer power pack supplies a positive charge to the image transfer rollers which apply a charge to the back of the ITB.
- The positively charged ITB pulls the negatively-charged toner off the drums and onto the ITB.

Image Transfer: ITB to Paper

- The ITB transfer power pack supplies a negative charge to the ITB bias roller.
- The high negative charge of the ITB bias roller is applied to the back of the ITB.
- This repulses the low negative charge of the toner on the belt, forcing the toner images onto the paper.
- Temperature/humidity sensors control the amount of the charge applied to the image transfer and ITB bias rollers.

ITB Cleaning Unit

Overview

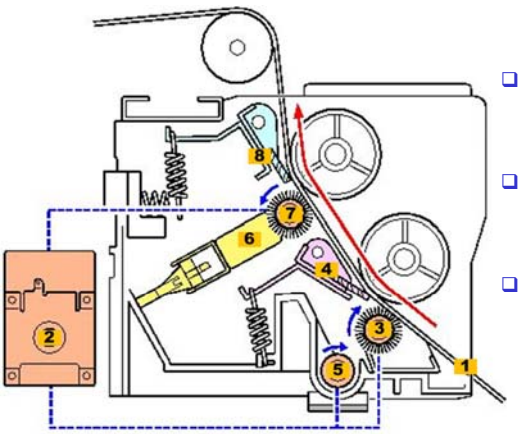


1. ITB
2. ITB Cleaning Brush Roller
3. ITB Cleaning Blade
4. Collection Coil
5. ITB Lubrication Bar
6. ITB Lubrication Roller
7. ITB Lubrication Blade

Slide 404

No additional notes

ITB Cleaning Unit
ITB Cleaning



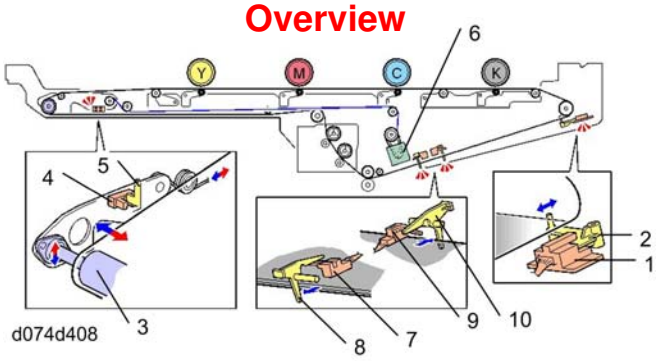
- The PTR/ITB cleaning unit motor (2) rotates the ITB cleaning brush roller (3) against the ITB (1).
- The ITB cleaning blade (4) removes toner and dust that remains on the belt (1) after brush roller cleaning.
- The ITB lubricant brush roller (7) applies lubricant (6) to the belt. This roller also removes any toner remaining on the belt.
- Toner removed from the belt falls into the rotating used toner collection coil (5).
  - The coil moves the toner to the lower used toner transport coil.
  - This coil sends the used toner to the used toner bottle.

Slide 405

- The PTR/ITB cleaning unit motor is behind the cleaning unit.
  - The motor drives the paper transfer roller as well as the ITB cleaning unit.
- The lubricant is Zinc Stearate.

ITB Centering Control

Overview



- The belt centering sensor mechanism (1) keeps the ITB perfectly straight on the image transfer rollers.
- In addition to this steering mechanism, there are two overrun sensors (7, 9) at the rear and front edges of the belt.
- These overrun sensors switch off the machine to prevent damage to the belt if a problem cannot be corrected by the belt steering mechanism.

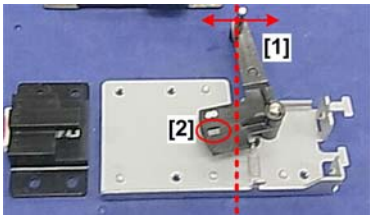
Slide 406

1. **Belt Centering Sensor**
2. **Belt Centering Sensor Actuator Arm**
3. **Belt Centering Roller**
4. **Belt Centering Roller HP Sensor**
5. **Belt Centering Roller Sensor Actuator**
6. **Belt Centering Motor**
7. **Front Overrun Sensor**
8. **Front Overrun Sensor Actuator**
9. **Rear Overrun Sensor**
10. **Rear Overrun Sensor Actuator**

- If the front overrun sensor or rear overrun sensor activates, this will trigger SC475 or SC476.

ITB Centering Control

Belt Centering Sensor



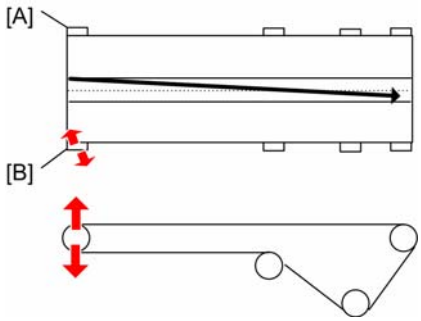
- **The belt centering sensor is at the right rear corner of the ITB unit under the ITB drive roller. A spring-loaded actuator arm holds a vertical peg against the bottom rear edge of the ITB.**
- **The position of the peg [1] changes if the edge of the belt moves forward or backward.**
- **The cutout [2] in the actuator arm moves across the sensor if the belt and peg change position.**
  - The sensor is a CIS. It detects the amount and direction of drift in the actuator position.
  - The belt centering motor will correct the position of the centering roller.
  - When the belt centering sensor detects the belt is in the correct position, the belt centering motor will switch off.

Slide 407

- The cutout in the actuator arm (below the sensor) moves to the left if the belt moves to the rear, or to the right if the belt moves to the front.

ITB Centering Control

Centering the ITB

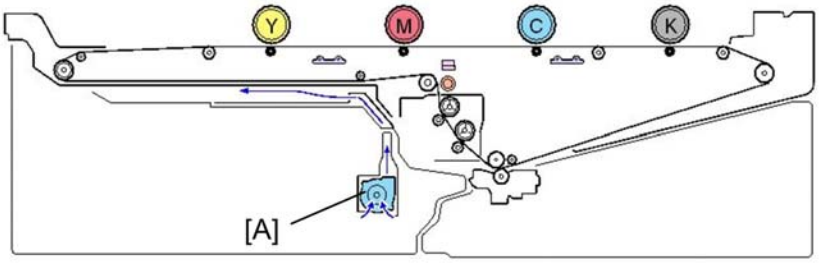


- To keep the ITB at the center position, the machine moves the front end [A] of the belt centering roller up and down. The rear end [B] of the belt centering roller is fixed.
- The belt centering roller sensor at the rear of the roller detects when the belt centering roller is at home position.

Slide 408

- The ITB movement is shown below:
  - Front of the belt centering roller is "Up". ITB moves to the rear
  - Front of the belt centering roller is "Down". ITB moves to the front
- This roller movement is controlled by the belt centering roller motor and a long cable.
- The machine detects the ITB position with the belt centering sensor and determines how much the belt centering roller must be moved up or down.
- The belt centering roller motor moves the roller with a cam and an arm.
- The belt centering roller HP sensor at the rear of the roller detects when the belt centering roller is at home position.
- This sequence is done:
  - At machine power-on
  - Upon recovery from an error
  - When the machine returns from stand-by mode or low power mode.

ITB Ventilation

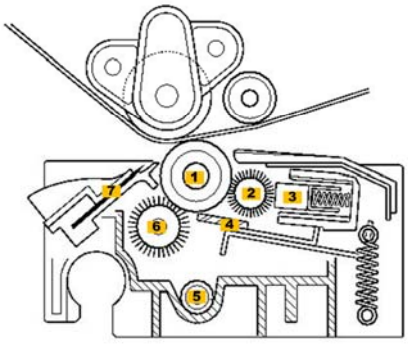


- The ITB fan [A] draws in cool air and blows it across the bottom of the ITB unit.

Slide 409

No additional notes

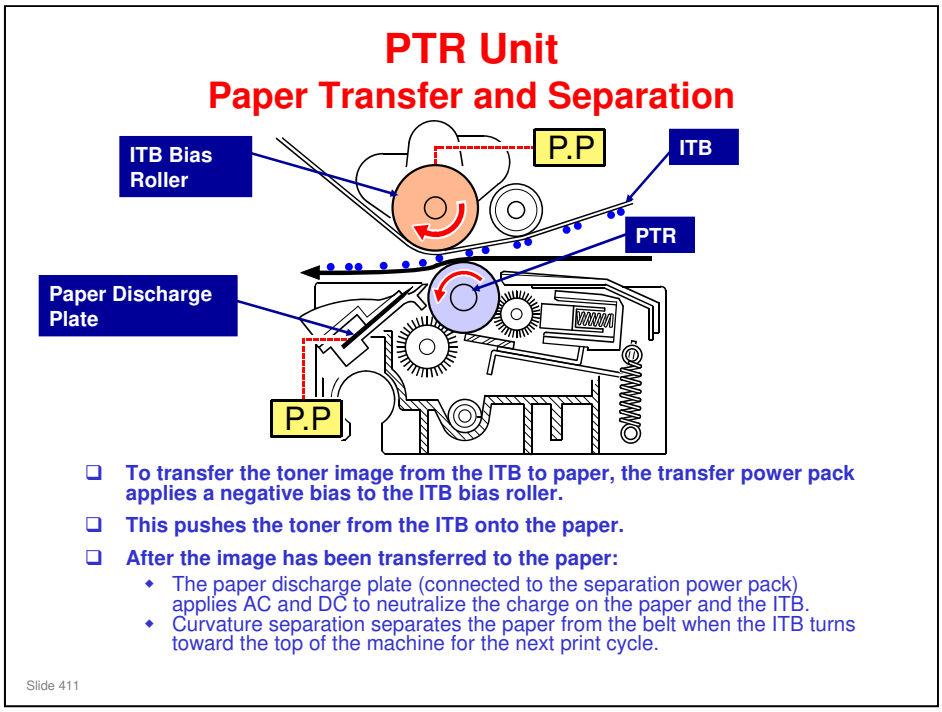
PTR Unit
Overview



1. Paper Transfer Roller (PTR)
2. PTR Lubricant Roller
3. PTR Lubricant Bar
4. PTR Cleaning Blade
5. Used Toner Collection Coil
6. PTR Cleaning Roller
7. Paper Discharge Plate

Slide 410

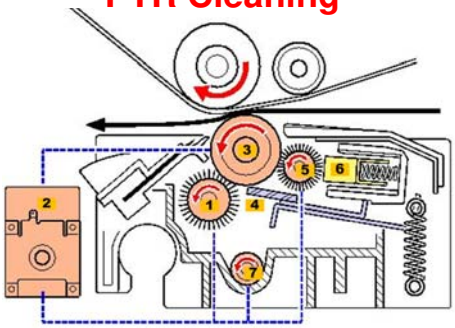
No additional notes



This system has two advantages:

- ❒ Repulsion bias from the front side of the paper is not affected by the moisture in the paper.
- ❒ Because the bias is applied from the front side of the paper, the bias can be applied more effectively, regardless of the level of humidity around the paper.

PTR Unit
PTR Cleaning



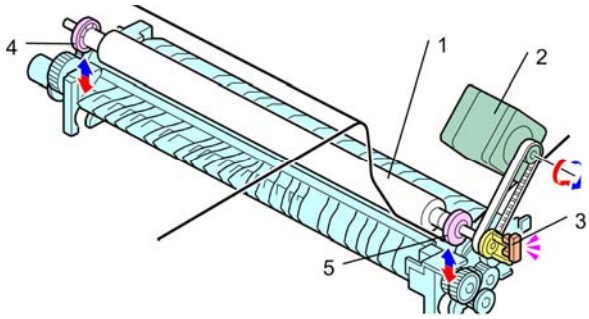
- The cleaning roller (1), driven by the PTR/ITB cleaning unit motor (2), removes toner from the PTR (3).
- The PTR cleaning blade (4) removes any toner that remains.
- The PTR lubricant roller (5) applies lubricant (6) to the surface of the PTR to facilitate cleaning.
- The PTR lubricant roller also removes toner remaining on the PTR. The removed toner falls into the PTR used toner collection coil (7).
- The coils move the toner to the lower used toner transport coil. This coil sends the used toner to the used toner bottle.

Slide 412

- The lubricant is Zinc Stearate.

PTR Unit

PTR Separation Mechanism (1)

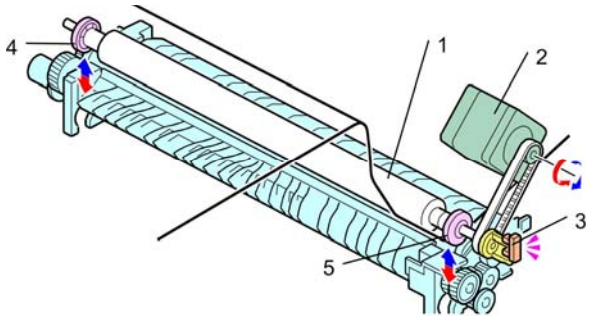


- When the right drawer is closed, a strong spring below the PTR unit rotates up two cams (4, 5) that lock the PTR in the up position under the ITB bias roller (1).
- The cams are on the same shaft as the ITB bias roller, but this roller rotates freely around the cam shaft.
- When the PTR separation motor (2) turns on, the belt turns the cam shaft counter-clockwise until the actuator of the PTR separation sensor (3) rotates out of the sensor gap.

Slide 413

No additional notes

PTR Unit
PTR Separation Mechanism (2)



- At this point, the front and rear cams (4, 5) are pushing down on the front and rear collars of the PTR. This separates the PTR and bias roller.
- When the machine switches on the separation motor again, it rotates the cams clockwise and up.
- This releases the downward pressure on the PTR, and the rollers come together for normal operation.

Slide 414

No additional notes

PTR Unit

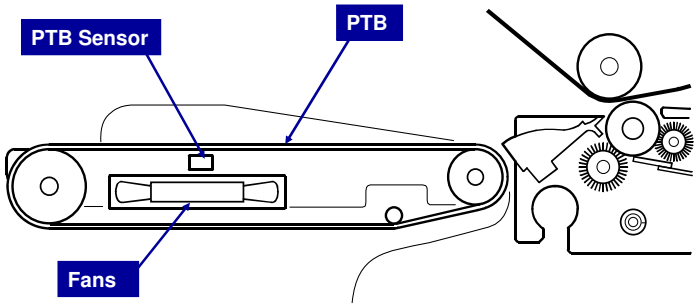
PTR Separation Mechanism Timing

- **The PTR separates from the bias roller at these times:**
  - Ready mode
  - Thick Paper
  - Belt Lubrication mode

Slide 415

- Ready mode. After the machine enters Ready mode, the PTR is kept away from the bias roller. If the rollers remained in contact while the machine is idle, the hard surface of the PTR would deform the soft bias roller.
- Thick Paper. Just before thick paper enters between the bias roller and PTR, the cams are rotated down briefly to widen the nip for the thicker paper, and then rotated up again to close the nip. This action eliminates "shock jitter“ which can occur when the leading edge of thick paper enters a narrow nip.
- Belt Lubrication Mode. The cams are rotated down to open the nip for lubrication of the belt after the ITB has been replaced, for example.
- The cams remain up and the rollers compressed in all other cases, for color and monochrome printing, process control, and MUSIC adjustments, and so on.
- This mechanism is unique in that it has been moved from the PTR unit to the ITB unit. The PTR separation motor, PTR separation sensor, and cam shaft are in the ITB unit. The PTR separation motor and separation sensor are on the front of the ITB unit.
  - In previous machines, this mechanism consisted of a PTR lift motor in the PTR unit below the ITB unit.

Paper Transport Belt (PTB) Unit
Overview

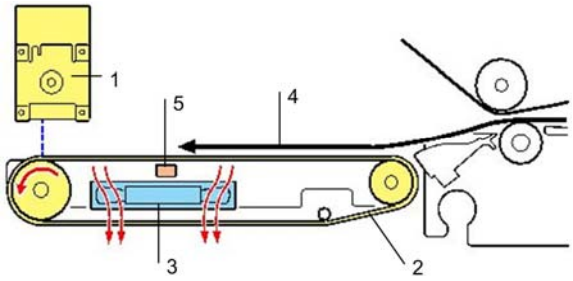


- The PTB unit is located between the paper transfer unit and the fusing unit.
- As the toner has just been applied to the paper and all the charge has been removed from the paper, three fans must be used to hold the paper on the belt.
  - Rollers cannot be used above the paper or the toner will be wiped off.

Slide 416

No additional notes

Paper Transport Belt (PTB) Unit
Mechanism



- The PTB motor [1] drives the paper transport belt [2].
- The three PTB fans [3] draw air through holes in the paper transport belt. This holds the paper [4] on the belt.
- The paper transport belt feeds the paper from the PTR to the fusing unit. The PTB sensor [5] detects paper jams in the PTB unit.
- The PTB sensor should be cleaned with a blower brush every PM visit.

Slide 417

1. **PTB Motor**
2. **PTB (Paper Transfer Belt)**
3. **PTB Fans (x3)**
4. **Paper**
5. **PTB Sensor**

Detailed Section Descriptions

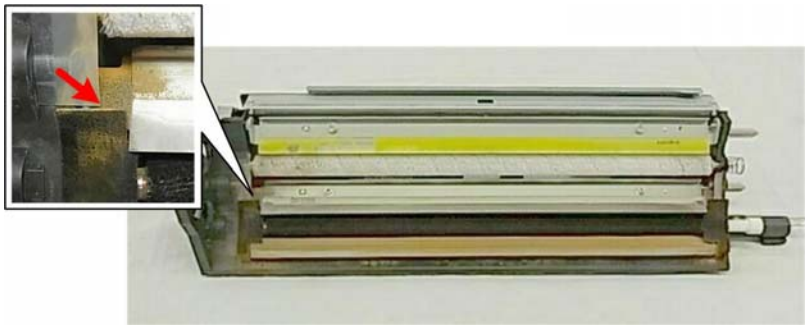
Replacement and Adjustment: ITB Unit

Slide 418

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Cleaning Blades

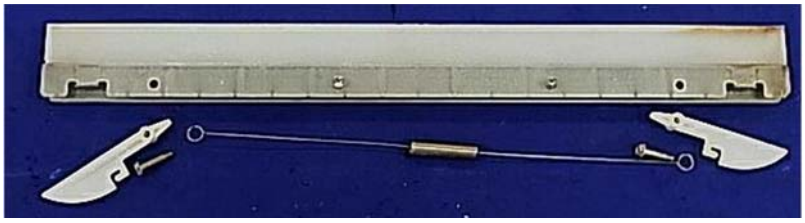


- When removing and re-installing blades, work carefully to avoid damaging the sponge seals at the ends of the blade. These sponge seals cannot be replaced in the field.

Slide 419

- Unlike other cleaning unit seals in the machine, the seals in the ITB cleaning unit are not PM parts. If parts in this cleaning unit have to be replaced, it is not necessary to replace these seals.

Lubrication Bar



- The spring, arms, and screws are not provided with the new lubrication bar. These items must be removed from the used lubrication bar and attached to the new bar.
- This is common for all lubrication bars in the machine (PCDU, ITB, and PTR units).

Slide 420

No additional notes

After Replacing Parts in the ITB Cleaning Unit

- **Do the following:**
  1. Install the cleaning unit. (Keep the levers in the “unlocked” position. Do not attach the cover yet.)
  2. Make sure that the machine power is OFF.
  3. Remove the PTR unit.
  4. Turn the main power switch ON and close both front doors.
  5. Enter the SP mode.
  6. Reset the counter for the replaced unit or parts.
  7. Open the right front door then access SP2310-1 (Force Lubricant - Belt Cleaning).
  8. When you are ready to run the above SP, close the right front door.
  9. Wait for about 5 minutes. When you see “Completed" displayed on the operation panel, you are ready to continue.
  10. Re-install the PTR unit.
  11. Rotate both levers of the ITB cleaning unit counter-clockwise and install the front cover.
  12. Execute these SP codes.
      - » 3020-001: Initializes process control.
      - » 3012-001: Confirms successful initialization of process control.
  13. Exit the SP mode.

Slide 421

No additional notes

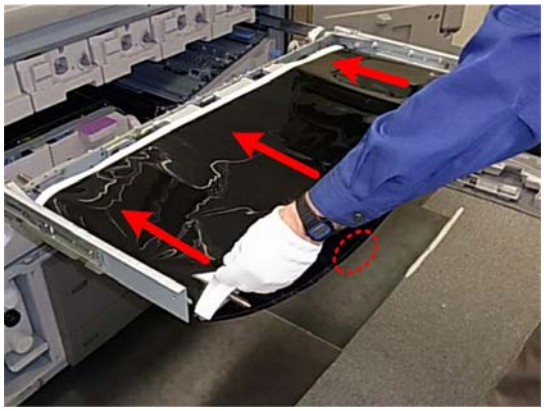
Before Installing a New Transfer Belt

- **Before installing a transfer belt, cover the top of the ITB unit with a long sheet of paper.**
  - A sheet of paper is provided as an accessory with a new transfer belt.
  - If you are re-installing the same transfer belt, you can cover the top of the unit with several sheets of A3 paper.
- **The paper prevents the front edge of the belt from catching on top of the unit.**

Slide 422

No additional notes

Installing a New ITB (1)

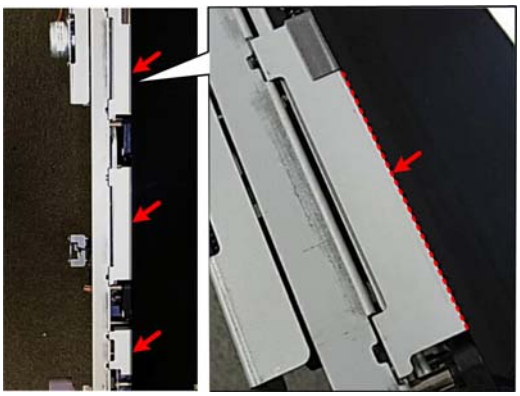


- The encoder sensor is at the front.
- So, the ITB must be installed so that the edge of the belt with the encoder strip is on the front edge.

Slide 423

No additional notes

Installing a New ITB (2)

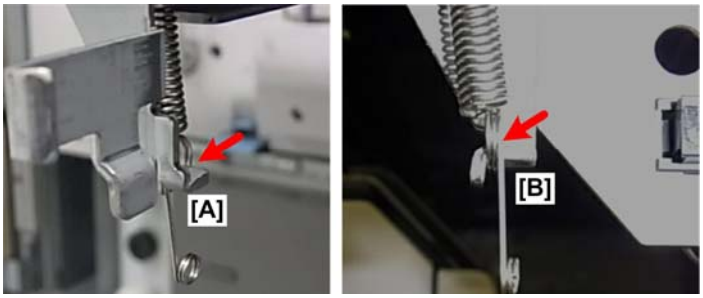


- Make sure that the front edge of the belt is parallel with the straight lines embossed on the plates at three locations.
- This ensures correct alignment of the belt.

Slide 424

No additional notes

Installing a New ITB (3)

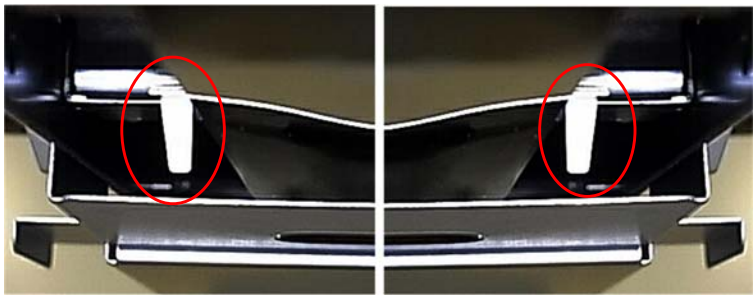


- Re-attach the springs of the tension roller at the front [A] and rear [B] in the correct locations, as shown above.

Slide 425

No additional notes

Installing a New ITB (4)

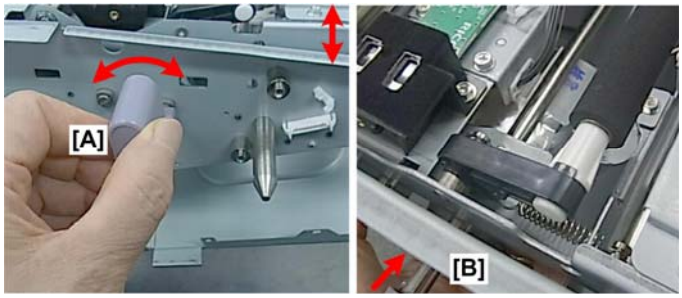


- Check underneath the belt.
- Make sure that the feeler arms of the front and rear overrun sensors are visible near the rear and front edges of the belt.

Slide 426

No additional notes

Installing a New ITB (5)



- **Before you slide the ITB unit into the machine, turn the ITB lever [A] to confirm that the lift plate raises and lowers.**
  - The plate should move up and down smoothly.
  - If the action of the ITB lever is loose and the lift plate does not move, this means the right lift plate is in the up position.
    - » Reach under the unit [B] and turn the white drive gears of the 2nd lift motor (K) to lower the lift plate until it is down.
    - » Turn the ITB lever [A] again to confirm that the lift plate moves up and down smoothly.
    - » Turn the ITB lever [A] to the down position so that the lift plate and transfer belt are down.
- **Never push the ITB unit into the machine with the lift plate in the up position.**

Slide 427

No additional notes

After Installing a New ITB (1)

- **Do the following:**
  1. Make sure that the machine power is OFF.
  2. Open both front doors.
  3. Remove the front cover of the ITB cleaning unit.
  4. Rotate both levers of the ITB cleaning unit clockwise to retract the blades from the ITB.
  5. Remove the PTR unit.
  6. Turn the main power switch ON and close both front doors.
  7. Enter SP mode and reset the counter for the belt.
  8. Open the right door, and access SP2310-001.
  9. When you are ready to run the above SP, close the right front door (the SP then cleans and lubricates the ITB).
  10. Wait for about 5 minutes. When you see “Completed" displayed on the operation panel, you are ready to continue.
      - **Do not open any door or remove the used toner bottle while lubrication is in progress.**
  11. Re-install the PTR unit.
  12. Rotate both levers of the ITB cleaning unit counter-clockwise and install the front cover
  13. Do SP2912-1. This SP adjusts the strength of the LED beam of the ITB feed-back sensors.
  14. Do SP2914-1. This SP code resets the ITB feed-back sensors.

Slide 428

See the service manual for full details of the procedures.

After Installing a New ITB (2)

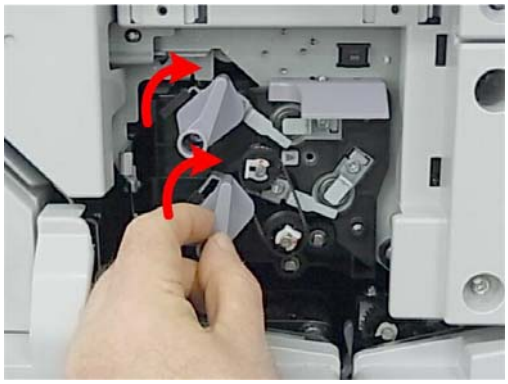
- After a new ITB has been installed, or the original belt re-installed, do the following procedure to check the physical condition of the belt.

1. First, execute SP2310-1 to clean and lubricate the belt.
2. Do SP3011 to manually execute process control.
3. Do SP3012-1 to confirm the successful initialization of process control.
4. Do these SP codes to run the sensor tests.
   - SP2112-15
   - SP2112-16
   - SP2112-17
5. Each SP execution should return a "0". If an SP returns any value other than "0", do the SP again.
6. After repeated executions, if one or more of the SP codes continues to return any value other than "0", the belt is damaged and must be replaced.

Slide 429

- The three ID/MUSIC sensors (Rear, Center, Front) scan the belt to detect nicks and scratches.

Moving the ITB Cleaning Blades Away

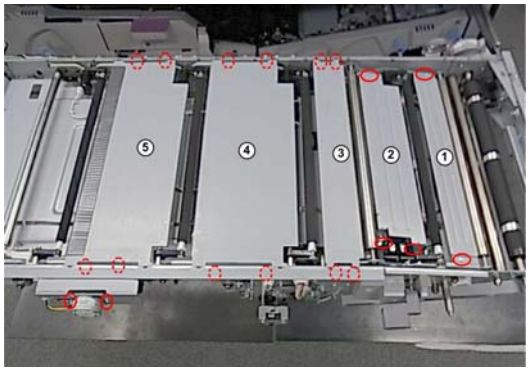


- Turn these two levers clockwise (upwards) to move the cleaning unit blades away from the belt.

Slide 430

No additional notes

Access to Internal Components of the ITB Unit

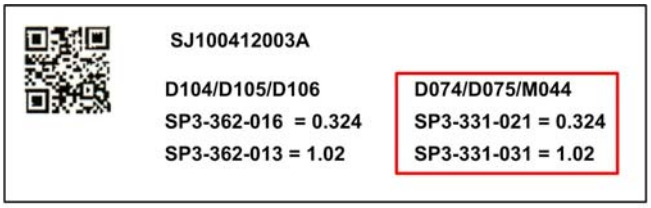


- After the transfer belt has been removed, there are five plates on top of the ITB unit that can be removed for access to other components.

Slide 431

No additional notes

ID/MUSIC Sensor Replacement



- **After replacing the sensor, do the SP codes for D074/D074/M044 on the right side of the sheet (enclosed in the red box in the illustration above).**
  - The numbers on the left are for another machine.
- **Next, do SP3011-1 (Manual Process Control).**
- **Finally, do SP3012-1 to confirm successful complete of process control initialization.**

Slide 432

No additional notes

Transfer Belt Speed Sensor

- This sensor must be cleaned every 300k.
- After replacing or cleaning this sensor, the following SPs must be set to their default settings.
  - SP2920-1
  - SP2912-1
  - SP2914-1

Slide 433

No additional notes

Detailed Section Descriptions

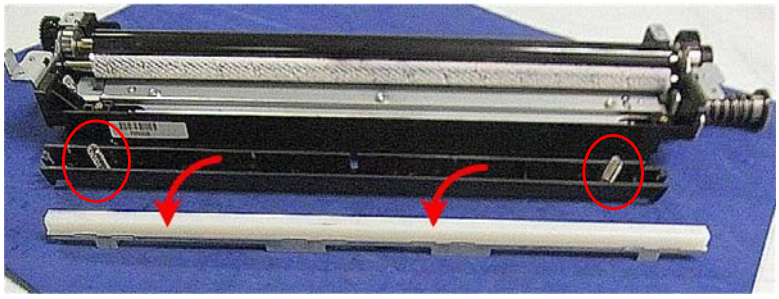
Replacement and Adjustment: PTR Unit

Slide 434

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

Lubrication Bar

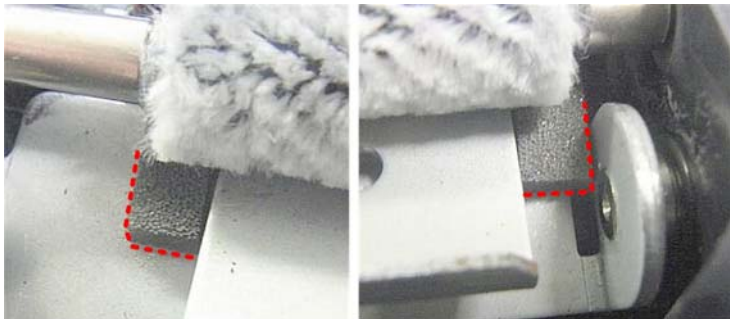


- Do not remove the springs (shown in red circles above).

Slide 435

No additional notes

Cleaning Blade



- When removing and re-installing blades, work carefully to avoid damaging the sponge seals at the ends of the blade.
- These sponge seals are fragile and cannot be replaced in the field.

Slide 436

No additional notes

After Installing a New PTR Unit or Individual Parts

- **Do the following:**
  1. Make sure that the machine power is OFF.
  2. Open both front doors.
  3. Turn the main power switch ON.
  4. Enter the SP mode.
  5. Reset the counter for the replaced unit or parts.
  6. Close the front doors.
  7. Wait for about 5 min. When you hear an audible beep and see "Ready" displayed on the operation panel, you are ready to continue.
  8. Execute these SP codes.
     - » 3020-001: Initializes process control.
     - » 3012-001: Confirms successful initialization of process control.
  9. Exit the SP mode.

Slide 437

No additional notes

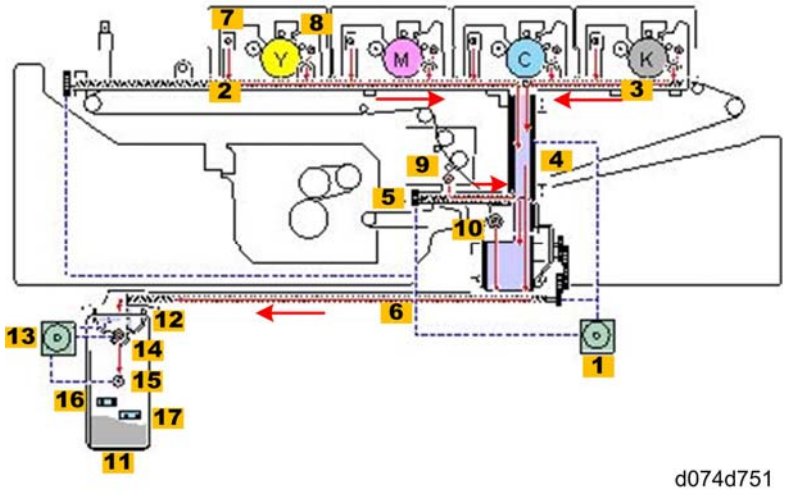
Detailed Section Descriptions

Used Toner Collection

Slide 438

❒ This is basically the same as the G178/D016 series.

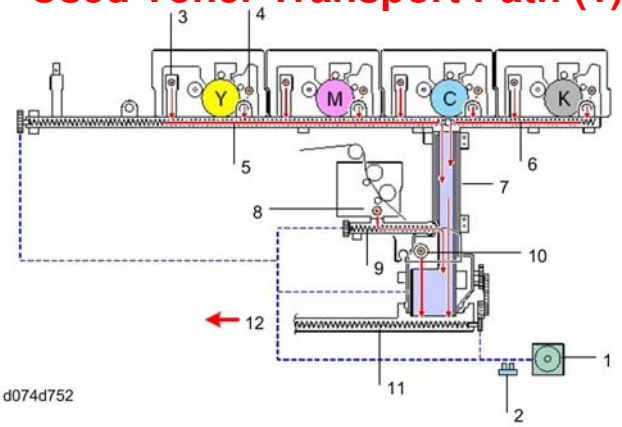
Overview



Slide 439

1. Used Toner Transport Motor
2. Upper Horizontal Path 1
3. Upper Horizontal Path 2
4. Used Toner Chute
5. Middle Horizontal Path
6. Lower Horizontal Path
7. PCDU Cleaning Unit Port
8. PCDU Development Port
9. ITB Port
10. PTR Port
11. Used Toner Bottle
12. Used Toner Bottle Reservoir
13. Used Toner Bottle Motor
14. Reservoir Auger
15. Used Toner Bottle Auger
16. Bottle Full Sensor
17. Bottle Near-Full Sensor

Used Toner Transport Path (1)

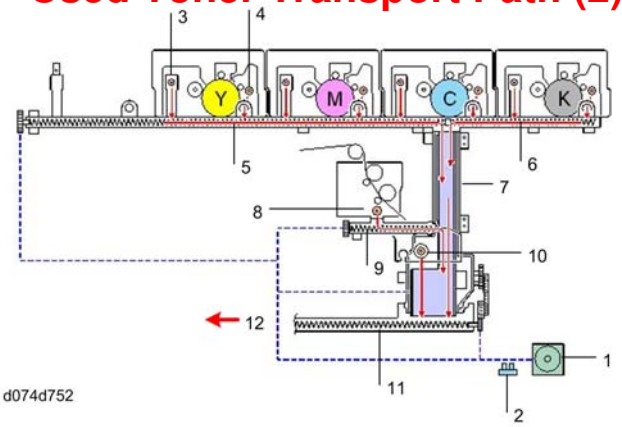


- The used toner transport motor (1) drives all moving parts in the used toner transport paths.
- The used toner motor sensor (2) monitors the rotation of the used toner transport motor. If the rotation stops (due to a blockage in any of the transport paths), SC485 will occur.

Slide 440

1. Used Toner Transport Motor
2. Used Toner Transport Motor Sensor
3. PCDU Development Unit Port
4. PCDU Cleaning Unit Port
5. Upper Horizontal Path 1
6. Upper Horizontal Path 2
7. Used Toner Chute
8. ITB Cleaning Unit Port
9. Middle Horizontal Path
10. PTR Cleaning Unit Port
11. Lower Horizontal Path
12. To the used toner bottle

Used Toner Transport Path (2)



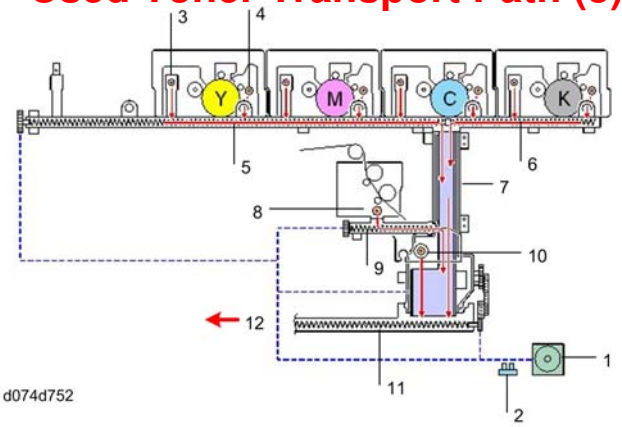
- The development unit collection coils (3) and cleaning unit collection coils (4) of the PCDUs on the left (YM) dump used toner into upper horizontal path 1 (5).
- The coils of the PCDUs on the right (CK) dump into upper horizontal path 2 (6).
- Both coils dump into the vertical used toner chute (7).

Slide 441

❒ These coils (3, 4) are both driven by the used toner transport motor. The coil on the left moves used toner left to right. The coil on the right is reverse threaded, so it moves used toner from right to left.

1. **Used Toner Transport Motor**
2. **Used Toner Transport Motor Sensor**
3. **PCDU Development Unit Port**
4. **PCDU Cleaning Unit Port**
5. **Upper Horizontal Path 1**
6. **Upper Horizontal Path 2**
7. **Used Toner Chute**
8. **ITB Cleaning Unit Port**
9. **Middle Horizontal Path**
10. **PTR Cleaning Unit Port**
11. **Lower Horizontal Path**
12. **To the used toner bottle**

Used Toner Transport Path (3)

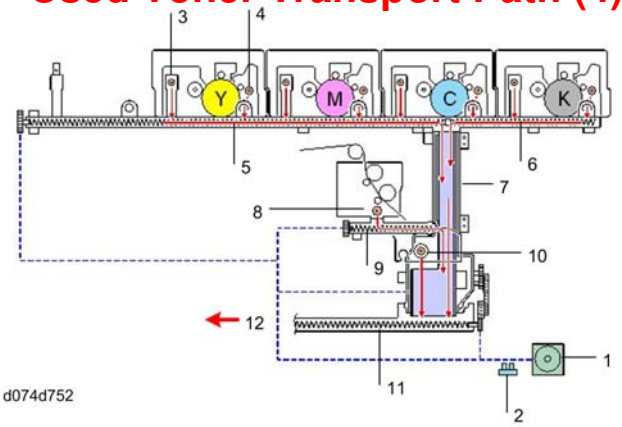


- The used toner transport motor drives a vertical plate in the used toner chute. This vibrates to keep the used toner flowing downward.
- The ITB cleaning unit collection coil dumps its used toner at (8) into the middle horizontal path at (9). This path carries the toner to the right and dumps it into the used toner chute.
- The PTR cleaning unit collection coil dumps its used toner at (10) directly into the wide vent of the used toner chute.

Slide 442

1. Used Toner Transport Motor
2. Used Toner Transport Motor Sensor
3. PCDU Development Unit Port
4. PCDU Cleaning Unit Port
5. Upper Horizontal Path 1
6. Upper Horizontal Path 2
7. Used Toner Chute
8. ITB Cleaning Unit Port
9. Middle Horizontal Path
10. PTR Cleaning Unit Port
11. Lower Horizontal Path
12. To the used toner bottle

Used Toner Transport Path (4)

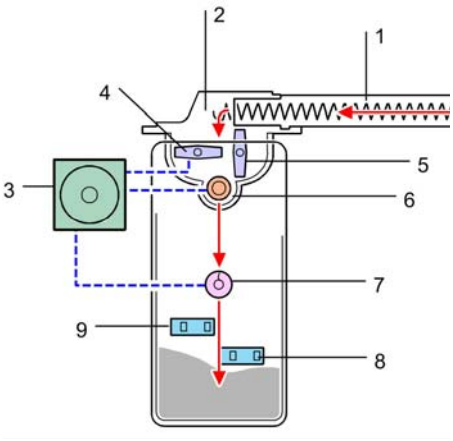


- All toner from the three used toner path coils falls into the lower horizontal path (11). From here the used toner is carried to the used toner bottle (12).

Slide 443

1. Used Toner Transport Motor
2. Used Toner Transport Motor Sensor
3. PCDU Development Unit Port
4. PCDU Cleaning Unit Port
5. Upper Horizontal Path 1
6. Upper Horizontal Path 2
7. Used Toner Chute
8. ITB Cleaning Unit Port
9. Middle Horizontal Path
10. PTR Cleaning Unit Port
11. Lower Horizontal Path
12. To the used toner bottle

Used Toner Bottle
Overview



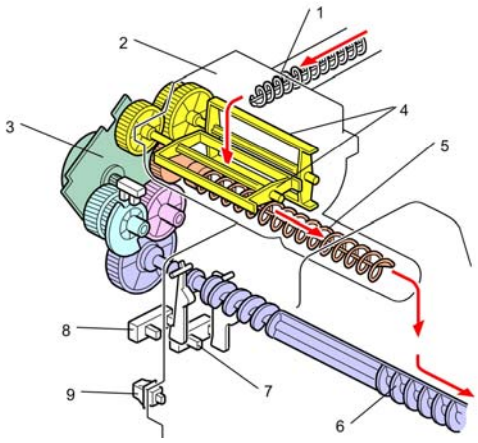
1. Lower Horizontal Transport Coil
2. Used Toner Reservoir
3. Used Toner Bottle Motor
4. Agitator
5. Agitator
6. Reservoir Auger
7. Bottle Auger
8. Bottle Near-Full Sensor
9. Bottle Full Sensor

Slide 444

No additional notes

Used Toner Bottle

Used Toner Bottle Drive (1)



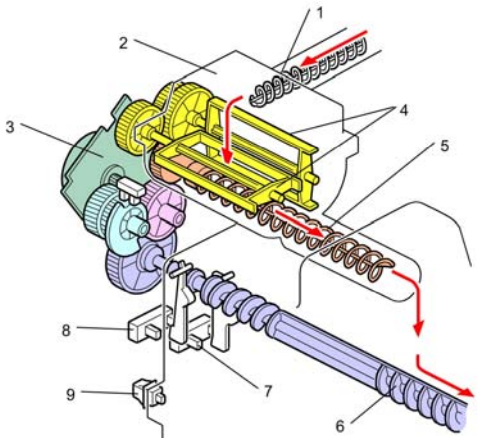
- The coil of the lower transport path (1) dumps toner into the toner bottle reservoir (2).
- The used toner bottle motor (3) drives the reservoir agitators (4), reservoir auger (5) and bottle auger (6).
- The agitators prevent clumping in the toner.
- The reservoir auger carries toner to the bottle auger, and the bottle auger dumps the toner into the bottle.
- The used toner bottle auger distributes the used toner evenly along the length of the bottle, so the toner does not pile up unevenly and trigger a near-full alert prematurely.

Slide 445

No additional notes

Used Toner Bottle

Used Toner Bottle Drive (2)



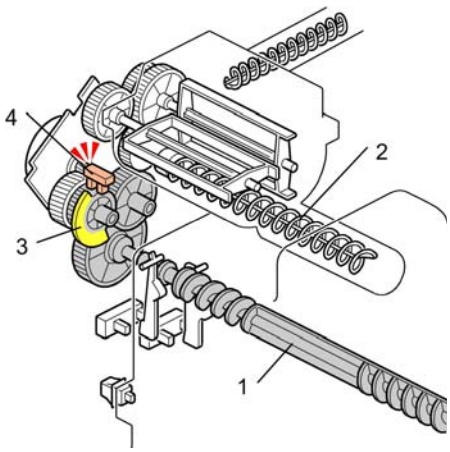
- When accumulated toner pushes up the actuator of the bottle near-full sensor (7), a message alerts the operator that the bottle is almost full.
- When accumulated toner pushes up the actuator of the bottle full sensor (8), a message alerts the operator that the bottle is full and must be emptied or changed.
- The bottle set switch (9) (a push switch) closes when the bottle is set in the machine and signals that the bottle is present and ready.

Slide 446

No additional notes

Used Toner Bottle

Used Toner Bottle Drive (3)



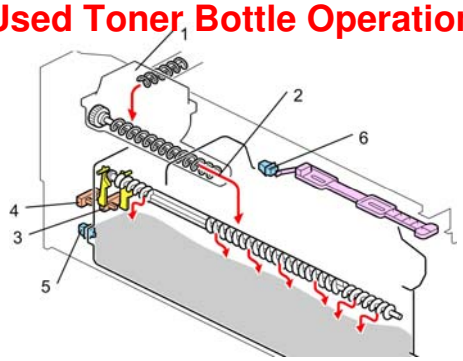
- If the toner bottle auger (1) and reservoir auger (2) operate freely, the used toner bottle motor actuator (3) continues to rotate through the gap in the used toner bottle sensor (4).
- If the torque on the agitator or the augers increases due to an obstruction, the used toner bottle sensor will detect if the rotation of the actuator slows or stops. The machine will issue SC486 (Used Toner Bottle Motor Error).

Slide 447

No additional notes

Used Toner Bottle

Used Toner Bottle Operation (1)



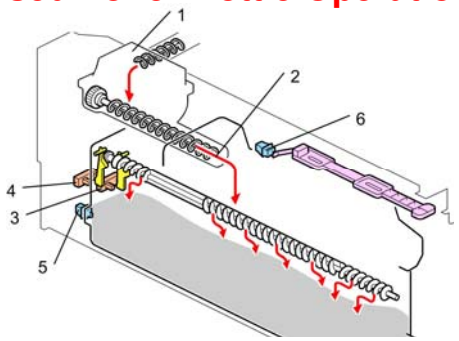
- When the used toner bottle is set in the machine, the bottle set sensor (5) detects when the used toner bottle is correctly set.
- The toner bottle door switch (6) (a push switch) detects when the toner bottle door is closed.
- The used toner reservoir (1) above the bottle can continue to receive and hold used toner while the toner bottle is out of the machine.
  - A spring loaded stopper at (2) automatically seals the toner port between the reservoir and bottle when the bottle is removed.
- To ensure that the top of the stack of used toner inside the bottle remains flat, the toner is spread slowly but the coils from front to back and back to front.

Slide 448

No additional notes

Used Toner Bottle

Used Toner Bottle Operation (2)



- **The used toner bottle near-full sensor (3) detects when the bottle is almost full. Near-full is detected if this sensor detects the actuator for more than 2 seconds.**
  - After the near-full alert appears, the machine can continue to print up to approximately 20 K prints (A4 LEF with 8.75% coverage and 80% color) before the bottle full alert will be issued.
- **The used toner bottle full sensor (4) detects when the bottle is full.**
  - Bottle full is detected if this sensor detects the actuator for more than 2 seconds.

Slide 449

No additional notes

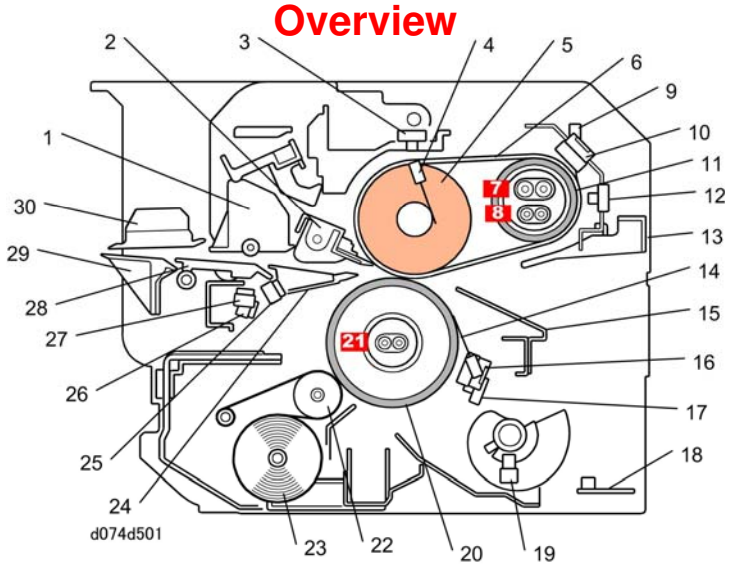
Detailed Section Descriptions

Fusing Unit

Slide 450

No additional notes

Overview



❑ **Fusing belt and pressure roller method**

Slide 451

1. Exit Guide Plate	16. Pressure Roller Thermostat
2. Fusing Belt Separation Plate	17. Pressure Roller NC Sensor
3. Hot Roller NC Sensor	18. Fusing Unit ID Chip
4. Hot Roller Thermistor	19. Pressure Roller Cam Sensor
5. Hot Roller	20. Pressure Roller
6. Fusing Belt	21. Pressure Roller Fusing Lamps *5
7. Heating Roller Fusing Lamps *1	22. Web Pressure Roller
8. Heating Roller Fusing Lamps *2	23. Web Supply Roller
9. Heating Roller Thermistor (Rear)	24. Pressure Roller Separation Plate
10. Heating Roller Thermostats *3	25. Accordion Jam Sensor
11. Heating Roller	26. Pressure Roller Paper Sensor
12. Heating Roller NC Sensors *4	27. Fusing Unit Exit Sensor
13. Entrance Guide Plate (Upper)	28. Exit Guide Plate - Relay
14. Heating Roller Thermistor (Front)	29. Exit Guide Plate - Lower
15. Entrance Guide Plate (Lower)	30. Exit Guide Plate - Upper

- ❒ *1: 1000W/400W
- ❒ *2: 650W/870W
- ❒ *3: Two thermostats, front and rear
- ❒ *4: Two NC sensors, front and center (NC: Non-contact)
- ❒ *5: 400W/400W

- ❒ ID chip (18): Holds the fusing unit serial number, and print volume for that fusing unit (but not for the cleaning web)

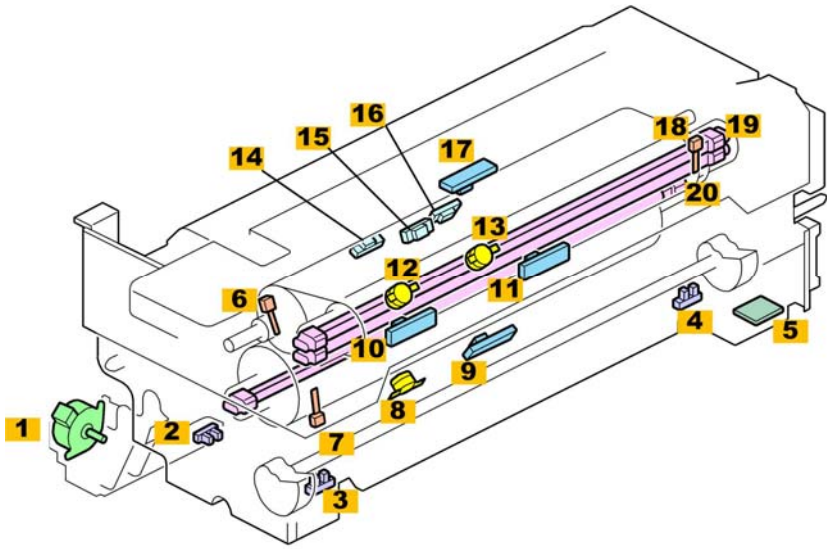
Overview

- **The heating roller is an aluminum roller with two pairs of fusing lamps (1000W/400W, 650W/870W).**
  - The heating roller applies heat to the fusing belt after it passes the hot roller.
  - It also maintains the heat of the fusing belt while the machine is in standby mode.
- **The pressure roller has a metal core to provide rigidity, and is covered with Teflon to prevent toner from adhering to its surface.**
  - It applies heat with one pair of fusing lamps (400W/400W) to maintain the temperature of the pressure roller while the machine is in standby mode.
- **The hot roller is a soft rubber roller that drives the fusing belt.**
- **The accordion jam sensor detects accordion jams where the paper exits between the hot roller and pressure roller.**
- **The fusing exit sensor detects jams at the fusing exit by checking that paper arrives at the fusing exit at the correct time.**

Slide 452

No additional notes

Electrical Components



Slide 453

1. Web Motor	11. Heating Roller NC Sensor - Center
2. Web End Sensor	12. Heating Roller Thermostat - Front
3. Pressure Roller Cam Sensor - Front	13. Heating Roller Thermostat - Rear
4. Pressure Roller Cam Sensor - Rear	14. Fusing Unit Exit Sensor
5. Fusing Unit ID Chip	15. Accordion Jam Sensor
6. Hot Roller Thermistor	16. Pressure Roller Paper Sensor
7. Pressure Roller Thermistor - Front	17. Hot Roller NC Sensor
8. Pressure Roller Thermostat	18. Pressure Roller Thermistor - Rear
9. Pressure Roller NC Sensor	19. Heating Roller Fusing Lamps
10. Heating Roller NC Sensor – Front	20. Pressure Roller Fusing Lamps

Temperature Sensors used in this Machine

- **Thermostats contain bi-metallic elements.**
  - If the fusing unit overheats, these elements warp and cut the power supply to the fusing unit.
  - Thermostats must be replaced after they cut power to the fusing unit.
- **Thermistors contain metal elements whose resistance changes with temperature.**
  - This property is used to monitor hot roller and pressure roller temperature for fusing temperature control.
  - The thermistors also trigger a warning if they detect overheating.
  - Unlike thermostats, thermistors do not need to be replaced if they overheat.
- **An NC Sensor is a remote (non-contact) temperature sensor that contains two precision thermistors and uses infrared technology.**
  - Unlike the metal thermistors, an NC sensor does not touch the rollers or fusing belt.

Slide 454

Component	NC Sensors	Thermistors	Thermostats
Heating Roller	2	0	2
Hot Roller	1	1	0
Pressure Roller	1	2	1

❒ Hot roller NC sensor: Only used in standby mode. Checks belt temperature. If too low, the rollers turn to heat up the belt

Overheat Protection

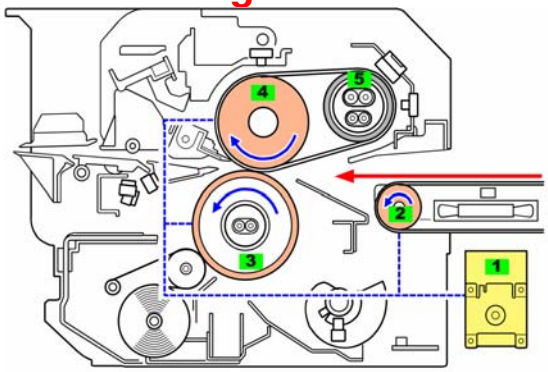
- If a sensor detects overheating, the machine stops and then issues a "fatal" SC5xx error.
- These fatal errors can be cleared only with SP5810-001 (SC Reset).

Slide 455

Overheat Temperatures: See the following table

Detecting device	Software detection	Hardware detection
Heating Roller NC Sensors	250 ˚C	260 ˚C
Heating Roller Thermostats	-	211 ˚C
Heating Roller Thermistor	250 ˚C	260 ˚C
Hot Roller NC Sensor	250 ˚C	260 ˚C
Hot Roller Thermistor	-	-
Pressure Roller NC Sensor	220 ˚C	230 ˚C
Pressure Roller Thermistor	220 ˚C	230 ˚C
Pressure Roller Thermostat	-	150 ˚C

Fusing Unit Drive



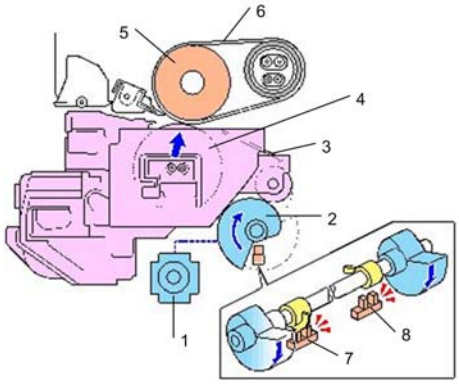
- **The fusing motor (mounted on the back of the machine) drives:**
  - PTB roller (rotates the paper transport belt, which delivers the paper to the fusing unit entrance)
  - Pressure roller
  - Hot Roller
- **The heating roller is not driven directly by the motor; it is an idle roller.**
- **There is no adjustment for the fusing nip width, but there are three pressure settings that can be selected with the user tools, depending on paper type.**

Slide 456

1. **Fusing Motor**
2. **PTB Roller**
3. **Pressure Roller**
4. **Hot Roller**
5. **Heating Roller**

- PTB: Paper Transport Belt
- Application of fusing pressure: See the next slide.

Pressure Roller Lift Mechanism



- The pressure roller lift mechanism lifts the pressure unit and pressure roller against the hot roller and fusing belt and then lowers it at the end of the job.
- The amount of lift depends on paper type and size. (Thick and wide paper requires more pressure than thinner narrow paper.)
  - All pressure roller lift positions can be adjusted in User Program Mode.
- The pressure roller lift motor rotates clockwise to raise the pressure roller and counter-clockwise to lower it.

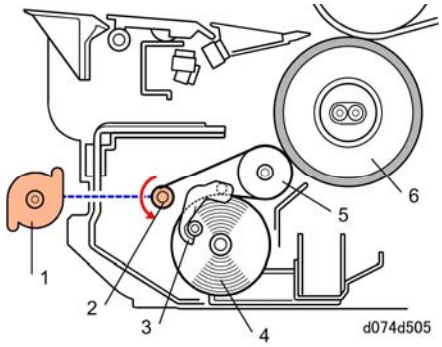
Slide 457

1. **Pressure Roller Lift Motor**
2. **Pressure Roller Cams**
3. **Pressure Roller Unit**
4. **Pressure Roller**
5. **Hot Roller**
6. **Fusing Belt**
7. **Pressure Roller Sensor - Front**
8. **Pressure Roller Sensor - Rear**

- The pressure roller is down (home position) when the machine is idle. It does not touch the hot roller and fusing belt. This prevents the pressure roller from damaging the soft hot roller while the machine is not operating. This prolongs the lives of both rollers.
- When a job starts, the pressure roller lift motor switches on and rotates the cams clockwise.
- The cams lift the pressure roller arms and pressure roller against the hot roller and fusing belt.
- The lift motor (a stepper motor) stops at the correct time for the paper type and remains in the up position until the job is finished. (The time count for the lift motor starts when the actuators enter the gaps in the pressure roller sensors.)
- At the end of the job, the motor reverses, lowers the pressure roller away from the hot roller, and stops after the actuators leave the pressure roller sensors.
- The roller automatically goes to the home position if the fusing unit is pulled out. So, if there is a problem, the customer should pull the fusing unit out immediately to prevent damage to the fusing rollers due to prolonged pressurization.

Fusing Cleaning Unit

Overview



- The web motor rotates the web take-up roller for a short time and then stops.
- The take-up roller pulls the web between the web pressure roller and the pressure roller.
- The fabric, saturated with silicone oil, collects paper dust from the surface of the pressure roller.
- At set intervals during printing, the web motor switches on for a fixed time to pull a fresh section of the web between the rollers.

Slide 458

1. **Web Motor**
2. **Web Take-up Roller**
3. **Web End Actuator Arm**
4. **Web Supply Roller**
5. **Web Pressure Roller**
6. **Pressure Roller**

- SP1902-002 and -003 can be used to adjust the motor rotation time and rotation interval.

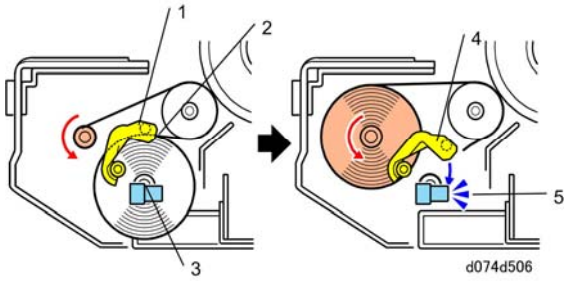
Fusing Cleaning Unit
Web Near-end

- The machine monitors the rotation time of the web motor and calculates the cleaning web consumption.
- When the consumption rate of the cleaning web reaches the set value (default 81%, adjustable with SP1902-004), cleaning web near-end is displayed on the LCD.
- The web lasts for about 450K prints.

Slide 459

- SP1902-001 displays cleaning web consumption. When the consumption exceeds the value set with SP1902-004, the machine indicates near-end on the operation panel display.
- Web near end is counted by software (there is no sensor), so there could be problems if the customer switches webs (installs another partly-used web).

Fusing Cleaning Unit
Web End



- The actuator arm (1) rests on the web fabric (2) if there is fabric stretched between the web supply roller and web pressure roller.
- The machine continues to operate while the actuator remains above the web end sensor (3).
- When the cleaning web runs out, the actuator (4) drops into the web end sensor (5), and this causes the machine to issue the web end message.
- At web end, the fusing cleaning unit must be replaced by the service technician.

Slide 460

Fusing Cleaning Unit Operation

- When the operation power switch is pressed to turn on the machine, the fusing cleaning unit starts to operate as soon as the hot roller starts to idle.
- The web motor operates while the hot roller is idling. After the hot roller has started to idle, the web motor turns on at 12.5 second intervals up to a maximum of 10 times.
- Opening either front door (or both doors) shuts down the fusing cleaning unit.

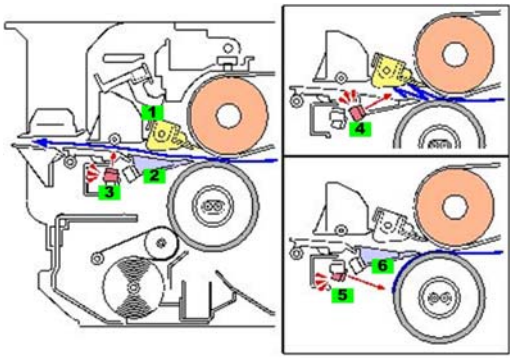
Calculating the Cleaning Fabric Service Life

- The fusing exit sensor measures the length of time that it takes for all the sheets of each job to pass.
- The sensor is on when there is no paper present.
- The sensor turns off when it detects the leading edge of the first sheet of a job, and at that time, the machine starts to measure the job time.
- At 2 seconds after the trailing edge of the last sheet of the job passes below the sensor, the machine stops measuring the job time.
- The length of the job is then added to the accumulated count for the cleaning fabric.
- When this calculated total equals the time prescribed for the service life of the cleaning fabric, the machine issues the fusing fabric near-end alert.

Counts

- When a paper jam occurs, cleaning web operation stops, and the sensor stops measuring paper throughput. These functions resume after the jam has been removed and the job restarted.
- When a job stops temporarily because the fusing temperature has fallen below its lower limit, the machine waits until 2 seconds after the last sheet leaves the cooling pipe exit. Then the paper exit sensors switch on and the machine stops counting (fusing cleaning unit operation also stops).
- When the fusing temperature reaches the operating temperature, the job restarts, the first sheet feed switches off the fabric near-end sensor, and the paper exit sensors resume their count.

Strippers

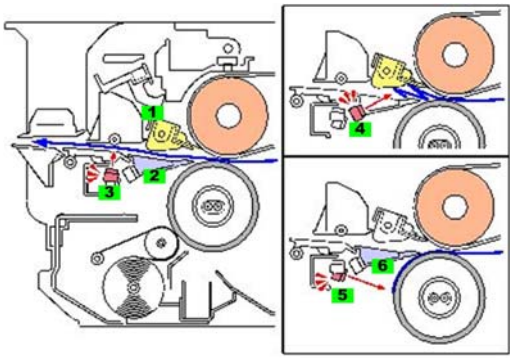


- **The fusing belt strippers (1) and pressure roller strippers (2) are held in place with small springs.**
- **If paper does not separate from the fusing belt or pressure roller, the strippers catch the paper and keep it in the paper path.**
  - This prevents paper from wrapping around the fusing belt or pressure roller.

Slide 461

- The separation plate for the pressure roller does not touch the pressure roller (difference from Aries).
  - The tolerance is between 0 and 0.2 mm so it might touch but this is not a big problem - not adjustable in the field.

Jam Detection



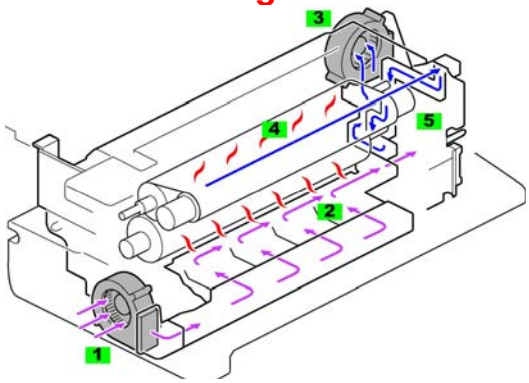
- **The fusing exit sensor (3) detects the leading and trailing edge of each sheet as it passes. If the paper does not arrive or leave this location at the correct time, the machine detects a jam.**
- **The accordion jam sensor (4) detects paper jammed at the fusing belt stripper plate.**
- **The accordion jam sensor always checks for jams at these times:**
  - The machine is turned on
  - Immediately after a front door is opened and closed
- **The pressure roller paper sensor (5) detects paper if it gets past the sensor and wraps around the pressure roller.**

Slide 462

❒ The accordion jam sensor and pressure roller paper sensor are photosensors.

Fusing Unit Cooling

Fusing Unit Fans



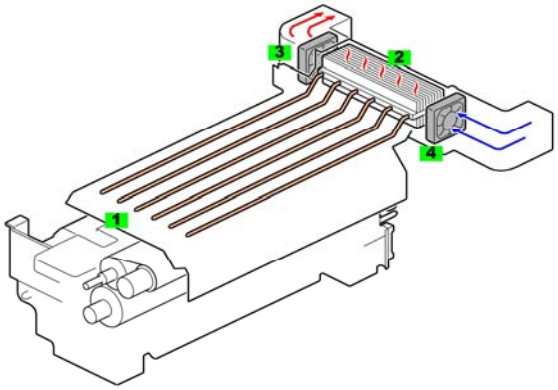
- An intake fan (1) at the front pulls air in and blows it across the left tray below the fusing unit (2) to cool this area.
- An exhaust fan (3) at the rear vents air from the top of the fusing unit (4) and from around the fusing unit drive gears (5).

Slide 463

(1) is the pressure roller fan.

(2) is the fusing exhaust fan.

Fusing Unit Cooling
Fusing Unit Heat Sink



- Heat pipes (1) across the top of the fusing unit absorb heat and transfer it to a heat sink (2) at the rear.
- The heat sink intake fan (4) pulls cool air into the heat sink.
- The heat sink exhaust fan (3) pulls the heated air out of the heat sink.

Slide 464

No additional notes

Detailed Section Descriptions

Replacement and Adjustment: Fusing Unit

Slide 465

This section covers only the main points about replacement and adjustment. Refer to the service manual for full details for replacing and lubricating each component.

Follow all notes and cautions in the service manual when removing and replacing components.

Concerning lubrication, follow the procedures in these sections of the service manual:

- ❒ Preventive Maintenance > Lubrication Points
- ❒ Replacement and Adjustment > Fusing Unit

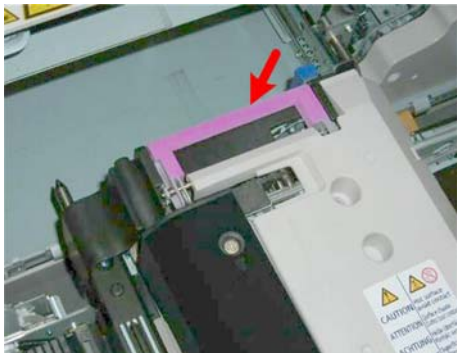
General Notes

- **Periodic Cleaning and Lubrication: The tasks for periodic cleaning and lubrication (300k) can be done after removing the fusing unit. It is not necessary to disassemble the unit.**
  - Fusing Belt Stripper Plate
  - Pressure Roller Stripper Plate
  - Entrance Guide Plate
  - Main Drive Gears
- **Web Cleaning Unit: The web cleaning unit is serviced at 450K. Remove the web cleaning unit and disassemble it. Disassembly of the fusing unit is not required.**
- **Fusing Unit: Full disassembly and servicing of the fusing unit is required at 650K.**

Slide 466

No additional notes

Fusing Unit: Sliding it In

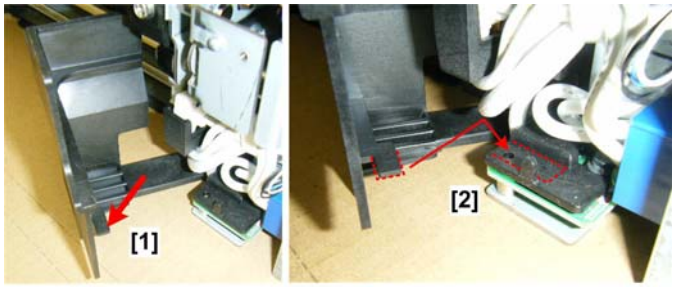


- The rear fusing unit handle is spring loaded to keep it down and completely flat.
- It is not necessary to check the handle before you close the left drawer.

Slide 467

- This slide is necessary because some early prototypes had a handle that did not stay down, and the technician had to be sure to check it when closing the drawer.

Heating Roller Fusing Lamps (1)

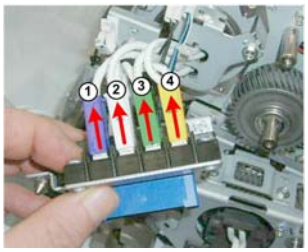


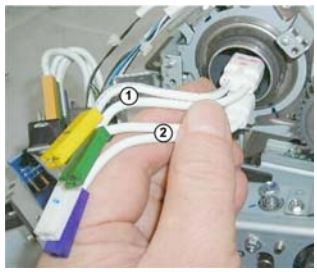
- **Take care with the rear harness cover.**
- **The bottom of the cover is held in place by a tab and post.**
  - The tab [1] is fragile and can break easily.
  - The tab must be positioned behind the post [2] when the cover is re-installed. This positions the cover correctly so that the cover screw can be re-attached.

Slide 468

No additional notes

Heating Roller Fusing Lamps (2)



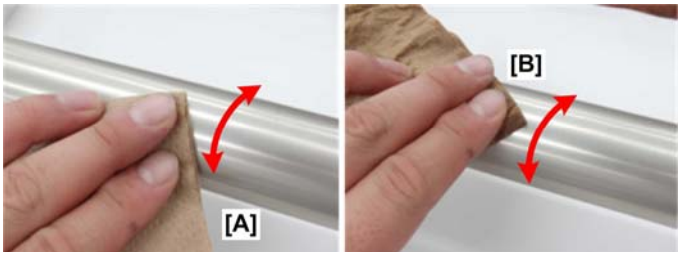


- **Make sure that you install the lamps in the correct position inside the heating roller.**
  - The shape of the cutouts in the bracket helps to ensure that mistakes cannot be made.
- **Also, mark the connectors to make sure that you connect the lamps correctly.**
  - These colours might be different in the actual machines in the field.

Slide 469

No additional notes

Heating Roller

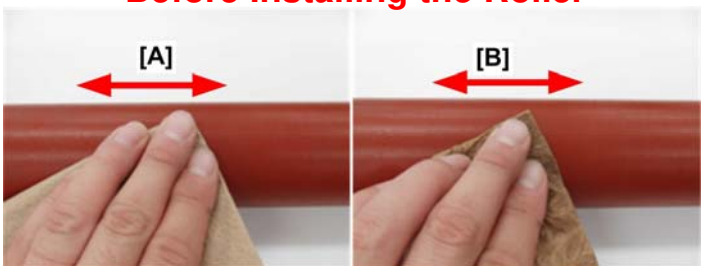


- **Always inspect and clean a heating roller for contamination by grease before re-installing it.**
- **Grease contamination can cause uneven heating on the surface of the roller and cause problems during fusing.**
  - Clean the entire surface of the heating roller with a dry cloth [A].
  - Next, clean the entire surface with a cloth dampened with water (not alcohol) [B].
  - Finally, clean the entire surface once more with a dry cloth.

Slide 470

No additional notes

Hot Roller
Before Installing the Roller



- **Always inspect and clean a hot roller for contamination by grease before re-installing it. This is especially important for a removed roller that is to be re-installed.**
- **Grease on the surface of the hot roller can cause the surface of the roller to peel.**
- **If peeled particles reach the surface of the heating roller, this can cause glossy patches or streaks to appear on prints.**
  - Clean the entire surface of the hot roller with a dry cloth [A].
  - Next, clean the entire surface with a cloth dampened with water (not alcohol) [B].
  - Finally, clean the entire surface once more with a dry cloth.

Slide 471

No additional notes

Hot Roller

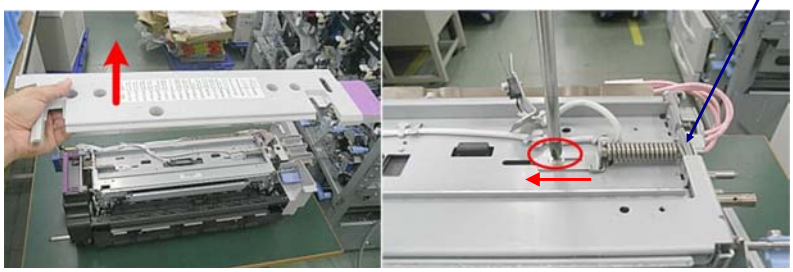
After Installing the Roller (Overview)

- **A new hot roller can catch inside the machine, and cause noise.**
- **To prevent this, do the 'After New Hot Roller Installation' procedure in the service manual.**
  - Replacement and Adjustment > Fusing Unit > Hot Roller, Fusing Belt > After New Hot Roller Installation
  - The procedure includes two mechanical adjustments, followed by some tests using SP mode to check whether noise occurs.

Slide 472

No additional notes

Hot Roller
After Installing the Roller (1)

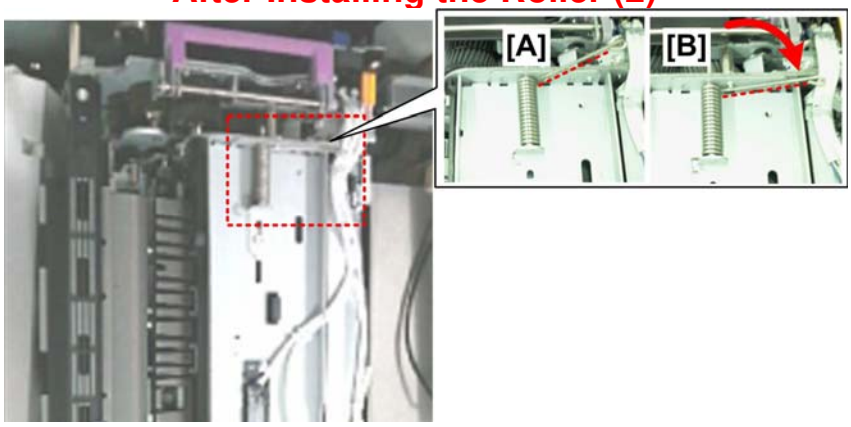


- A small plate must be moved to the rear.
- Slide the plate until its shaft is free from the hole in the bracket.
- Remove the fusing unit top cover to access this plate.

Slide 473

No additional notes

Hot Roller
After Installing the Roller (2)



- Then, remove the paper separation unit.
- Lower the spring arm from position [A] to position [B].

Slide 474

No additional notes

Hot Roller

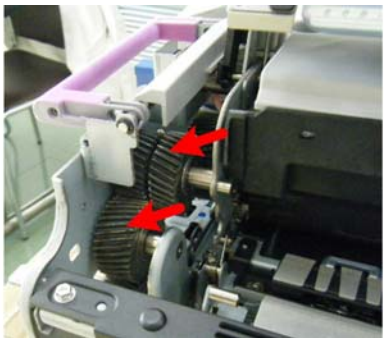
After Installing the Roller (3)

- **Attach the fusing unit top cover but not the separation unit.**
- **Turn the machine on.**
- **Wait a few moments for the pressure roller to move to the start position.**
- **Enter the SP mode.**
  - Switch ON SP5805-102 (Output Check - Press Roller Lift Motor (Up)).
  - If you hear no belt noise, or if the belt makes noise and then stops, switch ON SP5805-101 (Output Check - Press Roller Lift Motor (HP))
  - If the roller noise does not stop, switch ON SP5804-114 (Output Check - Fusing Motor: High Speed) and with SP5804-114 ON do SP5805-102 and then wait for the noise to stop.
  - After the noise stops, switch SP5805-101 ON, switch SP5804-114 OFF, and then exit the SP mode.
- **After doing these SP codes, remove the top cover and reassemble the fusing unit.**

Slide 475

No additional notes

Lubrication
Main Drive Gears



- Remove the rear plate, and apply grease to the two rollers marked by red arrows .
- Apply about 2 g of Fluotribo MG grease at both points.
- Next time that the machine starts to operate, the grease will be distributed evenly on the gears.
- Do not use the fusing unit jam removal knob to turn the gears.

Slide 476

❒ This is explained in detail in the procedure in the manual.

Maintenance > Lubrication Points

After Installing a New Fusing Unit or Fusing Belt Cleaning Unit

- **Do the following:**
  1. Make sure that the machine power is OFF.
  2. Open both front doors.
  3. Turn the main power switch ON.
  4. Enter the SP mode.
  5. Reset the counter for the replaced unit or parts.
  6. Close the front doors.
  7. Wait for about 5 min. When you hear an audible beep and see "Ready" displayed on the operation panel, you are ready to continue.
  8. Exit the SP mode.

Slide 477

No additional notes

Optimizing Productivity for Mixed Paper Size Use

- The fusing temperature is normally adjusted for each paper type and size.
- As a result, down time of the machine may be longer if the machine gets a sequence of jobs in which the paper type changes between jobs.
- If a customer considers that the productivity of the machine has more priority than print quality, do the following:
  - Change the setting of SP1-131-001 from "0" to "1".
- This may get good results in the following cases:
  - Small difference in the target fusing temperature between two jobs
  - Same line speed between two jobs

Slide 478

What does this SP do?

- Normally (set to 0), the machine uses the hot roller NC sensor to monitor the temperature of the fusing belt.
- If the SP is set to 1, the machine uses the contact thermistor at the end of the heating roller shaft. This detects job start temperature much more quickly than the hot roller NC sensor.

Side Effects

- If paper weight is changed from light to heavy; a fusing problem may occur for several prints just after paper weight has been changed due to insufficient fusing temperature.
- If paper weight is changed from heavy to light; a fusing problem (glossy lines) may occur for several prints just after paper weight has been changed due to too much fusing temperature.
- Some troubleshooting by adjusting the heating roller temperature may not be effective after selecting the setting of SP1-131-001 to "1".

Reducing the Waiting Time before Printing

- **After receiving a print job, the machine usually stops to let the fusing temperature reach the correct level for printing.**
- **Before printing on paper types that need a lower temperature than the standby temperature (such as thin paper), the waiting time may be quite long.**
- **To reduce the waiting time, decrease the fusing temperature during standby.**
  - In the [Adjustment Settings for Skilled Operators] menu, decrease the temperature by 10° C in [0206: Adjust Fusing Temperature on Standby].
  - Decrease the value in "Temperature on Standby Mode", "Temperature on Panel Off Mode", and "Temperature Before Performing a Process" by 10° C.
  - When printing on paper other than thin paper, we recommend leaving the above settings unchanged.

Slide 479

No additional notes

When Printing on Paper Weight 6 or 7

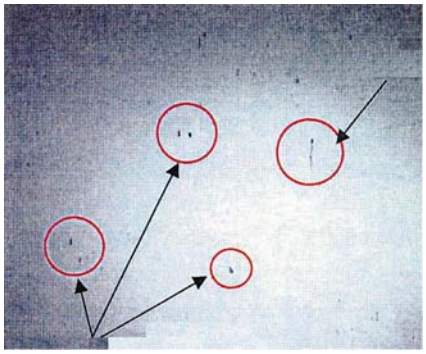
- **When printing on Paper Weight 6 or 7, the machine's copy/print speed must be reduced to 70% of full speed (for A4 paper) so that toner can be fused properly.**
- **However, under the following conditions, you can have the machine print at full speed.**
  - Uncoated paper
  - Printing in black-and-white mode
  - Room temperature
- **Procedure**
  - In [Advanced Settings] for the custom paper in use, increase the value in [19: Process Speed Setting] by one step.
    - » If it is set to [Low], change it to [Middle].
    - » If it is set to [Middle], change it to [High].
  - Set [44: Fusing Heat Roller Temperature Adj] to "180° C".
  - Print the image. If there is a fusing problem, put the settings back to what they were before.

Slide 480

The following list shows the copy/print speed for each item in [19: Process Speed Setting]:

- D074
  - High: 65 cpm (full speed)
  - Middle: 45 cpm (70% of full speed)
  - Low: 32 cpm (50% of full speed)
- D075
  - High: 75 cpm (full speed)
  - Middle: 52 cpm (70% of full speed)
  - Low: 37 cpm (50% of full speed)

Poor Fusing Belt Cleaning



- The web cleaning roller presses the cleaning web against the fusing belt and pressure roller. If fine toner particles slip through the nip where the fabric is in contact with the fusing belt, this can cause defects in images.

Slide 481

- One or more of the following conditions can cause this problem:
  - Type of image data: Half-tone fill areas.
  - Paper selected for the job: Uncoated paper, especially paper that is not smooth.
  - Paper feed mode: Can occur more commonly when duplexing.
  - Amount of toner accumulated on cleaning web: Toner can accumulate at the nip before the cleaning web is refreshed with a clean section of fabric.

Solution

- 1. Adjust the heating roller temperature setting.
  - Raise the temperature setting by 5° C and print again.
  - If this does not solve the problem, raise the heating roller temperature another 5° C.
  - Raising the heating roller temperature can cause stripes to appear in images printed on glossy paper or cause fusing unit paper jams. You may need to reset the heating roller temperature for other print jobs.
- 2. If raising the heating roller by 10° C did not solve the problem, adjust the web feed interval by setting "-60%".
  - Changing this setting shortens the service life of the cleaning web. The setting should be restored to the default setting for other print jobs where this problem does not occur.

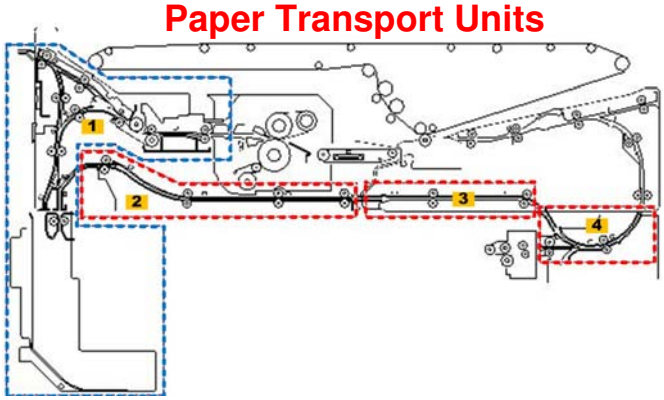
Detailed Section Descriptions

Paper Exit, Inversion, and Duplex

Slide 482

No additional notes

Overview
Paper Transport Units



1. **Exit Unit**
2. **Duplex Path 1 (Left Drawer)**
3. **Duplex Path 2 (Right Drawer)**
4. **Vertical Transport Unit**
   - The paper path dips down into the vertical transport unit [4] and then re-enters the right drawer [3]

Slide 483

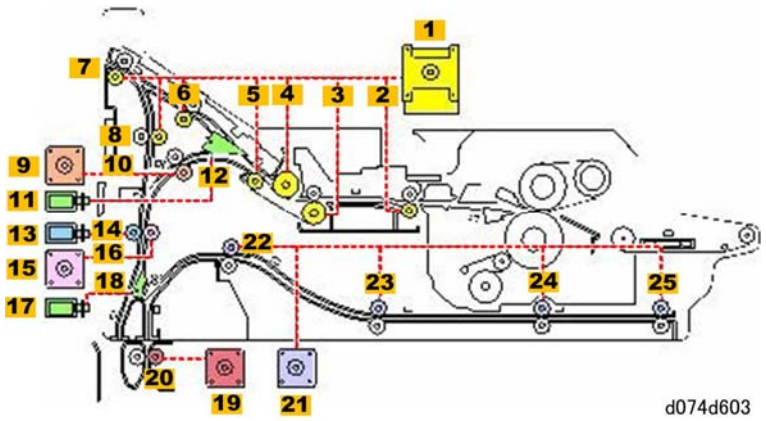
The left drawer contains:

- ❒ PTB (Paper Transport Belt) unit
- ❒ Fusing unit
- ❒ Paper cooling unit
- ❒ Exit unit
- ❒ Duplex path 1

The right drawer contains:

- ❒ Duplex path unit 2
- ❒ Registration unit
- ❒ PTR (Paper Transfer Roller) unit

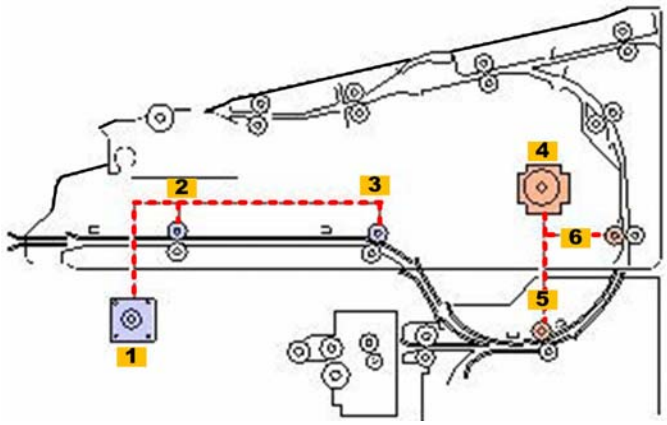
Paper Exit and Duplex Drive
Left Drawer



Slide 484

1. Exit Motor
2. Exit Unit Entrance Rollers
3. Cooling Unit Entrance Roller
4. Cooling Roller
5. Cooling Unit Exit Roller
6. Exit Relay Rollers
7. Exit Rollers
8. Inverter Exit Rollers 2
9. Exit Relay Motor
10. Exit Relay Rollers
11. Exit JG Solenoid
12. Exit JG
13. Inverter Exit Solenoid
14. Inverter Exit Roller (Idle)
15. Inverter Exit Motor
16. Inverter Exit Roller (Drive)
17. Inverter JG Solenoid
18. Inverter JG
19. Duplex Inverter Motor
20. Duplex Inverter Rollers
21. Duplex Transport Motor 1
22. Duplex Transport Roller 1
23. Duplex Transport Roller 2
24. Duplex Transport Roller 3
25. Duplex Transport Roller 4

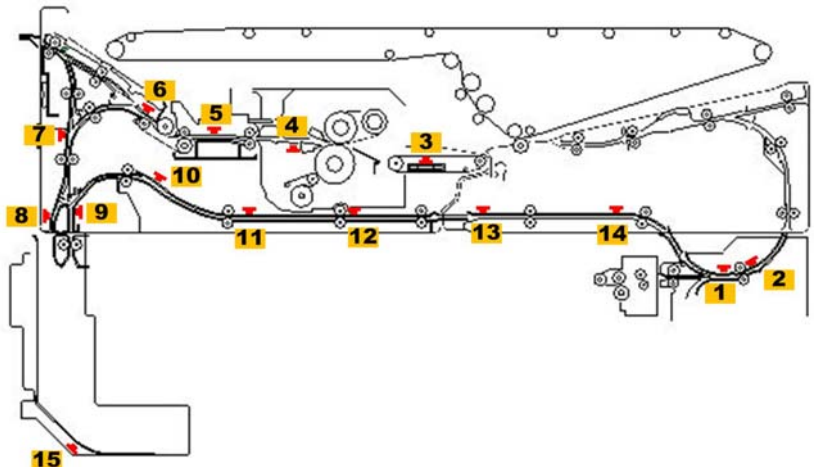
Paper Exit and Duplex Drive
Right Drawer



Slide 485

1. **Duplex Transport Motor 2**
2. **Duplex Transport Roller 5**
3. **Duplex Transport Roller 6**
4. **Bank Exit Motor**
5. **Bank Exit Rollers**
6. **Main Relay Rollers**

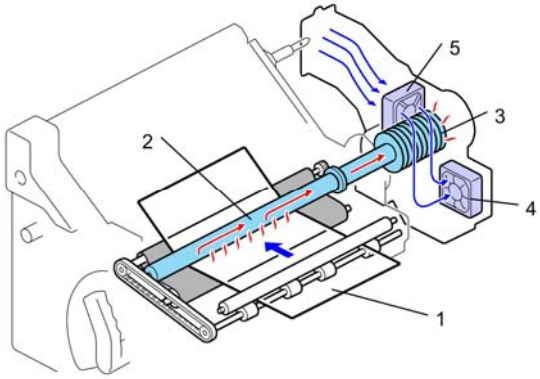
Paper Exit and Duplex Drive Sensors



Slide 486

1. Bank Exit Sensor
2. Main Relay Sensor 1
3. PTB Sensor
4. Fusing Unit Exit Sensor
5. Exit Unit Entrance Sensor
6. Exit JG Sensor
7. Exit Relay Sensor
8. Purge Relay Sensor
9. Duplex Inverter Sensor
10. Duplex Transport Sensor 1
11. Duplex Transport Sensor 2
12. Duplex Transport Sensor 3
13. Duplex Transport Sensor 4
14. Duplex Transport Sensor 5
15. Purged Paper Sensor

Paper Cooling

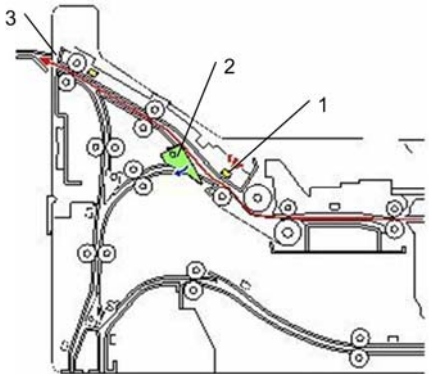


- A paper cooling pipe (2) cools the paper (1) after it exits the fusing unit. This reduces paper curling.
- Paper cooling fan 1 (4) in the duct at the machine rear side cools the fins, and paper cooling fan 2 (5) pulls the air around the fins out of the fusing unit.

Slide 487

- The paper (1) passes under the cooling pipe (2).
- The paper cooling pipe has an intricate system of small capillary tubes filled with water running along the inside of the paper cooling pipe.
- The hot paper heats the parts of the cooling pipe that it touches. This heats the water inside the tubes.
- The heat moves the heated water toward the cooler rear end of the cooling pipe, where a baffle (3) is attached.
- The fins of the baffle conduct heat away from the water in the pipe. Air moving around the fins dissipates the heat.

Straight-Through Printing

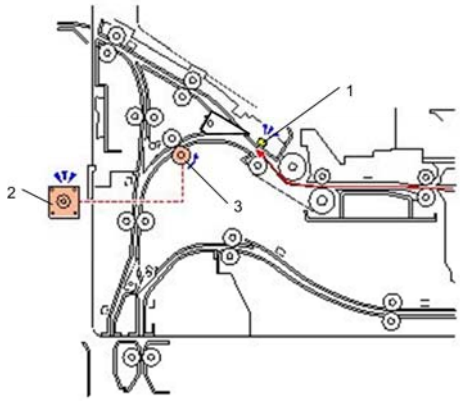


- **During straight-through output (no inversion or duplex printing), or after the second side of the sheet has been printed during duplex printing:**
  - The exit junction gate sensor (1) detects the leading edge of the paper.
  - The junction gate (2) lowers so that the paper can pass over it.
  - The paper passes through the exit rollers (3) and out of the machine.

Slide 488

No additional notes

Invert Printing (Face-down without Duplex) 1

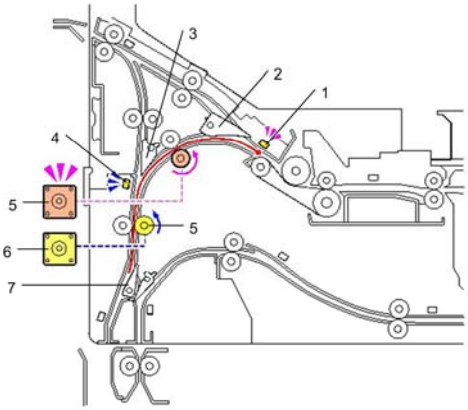


- Printed sheets normally are output face-up. Invert printing inverts sheets printed on one side so that they exit the machine face down.
- The exit JG sensor (1) detects the leading edge of the paper.
- The exit relay motor (2) switches on and rotate the exit relay rollers (3).
- The exit junction gate does not lower.

Slide 489

- JG: Junction Gate

Invert Printing (Face-down without Duplex) 2

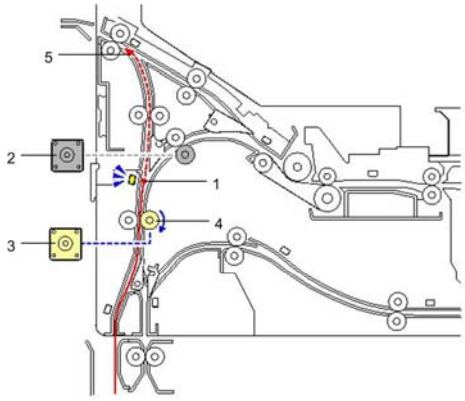


- The exit junction gate (2) guides the paper to the inverter path.
- The exit JG sensor (1) detects the trailing edge of the paper.
- The paper brushes past the vertical exit JG (3).
  - The paper brushes this junction gate aside as it passes. The gate closes automatically after the paper passes.
- When the exit relay sensor (4) detects the leading edge of the paper, the inverter exit motor (6) turns on.
- The inverter exit motor continues to feed the sheet down past the inverter junction gate (7), which remains closed.

Slide 490

No additional notes

Invert Printing (Face-down without Duplex) 3



- When the exit relay sensor (1) detects the trailing edge of the paper, the exit relay motor (2) turns off and the inverter exit motor (3) reverses.
  - The direction of paper feed changes from down to up.
- The inverter exit motor continues to feed the paper to the exit rollers (5).
- When the trailing edge of the paper passes the exit relay sensor (1) again, the invert exit motor (3) turns off.
- The exit rollers (5) (driven by the exit motor) feed the paper out of the machine.

Slide 491

No additional notes

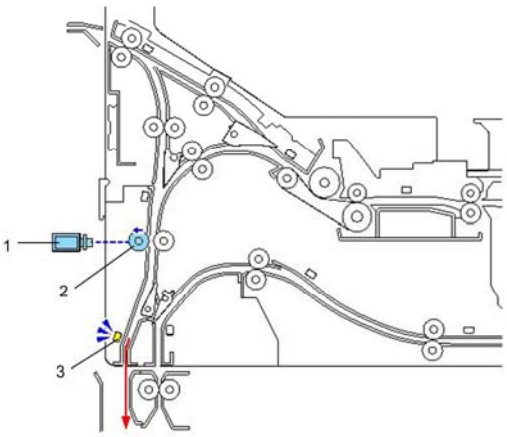
Paper Purge (1)

- **There can be up to 5 sheets in the paper path of the main machine during duplex printing.**
- **If a paper jam occurs in a downstream peripheral device, all the paper in the main machine paper path goes to the paper purge tray before the machine stops.**
  - The user does not need to remove every sheet in the paper path of the main machine.
- **After the machine detects a jam in a peripheral device downstream, all the paper in the paper path of the main machine is fed to the inverter paper path.**
  - This is the same operational sequence as for invert printing (for face-down output) as far as switching on the inverter exit motor.

Slide 492

No additional notes

Paper Purge (2)

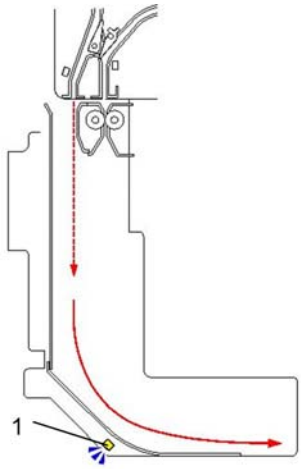


- **To purge paper from the paper path:**
  - The inverter exit motor does not switch on.
  - The inverter exit solenoid (1) switches on and pulls away the inverter exit idle roller (2), so the paper falls free.
  - The purge relay sensor detects the leading and trailing edge of each sheet when it passes.
  - After the trailing edge of the last sheet passes, the inverter exit solenoid is switched off. This closes the inverter exit rollers.

Slide 493

No additional notes

Paper Purge (3)

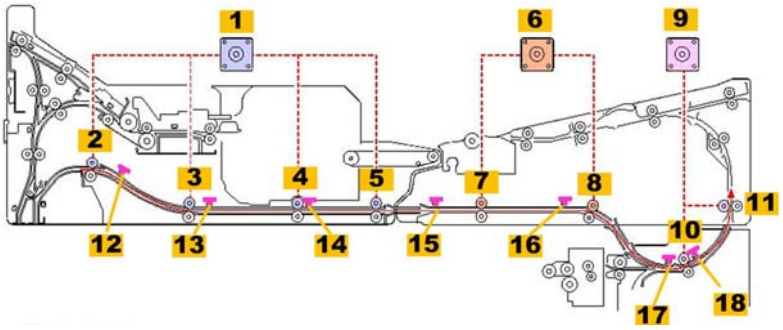


- The purged paper sensor (1) detects the first sheet that falls into the purge tray.
- This triggers a jam alert.
- The purge tray is behind the left front door next to the used toner bottle.
- The purged paper must be removed before the machine can resume normal operation.

Slide 494

No additional notes

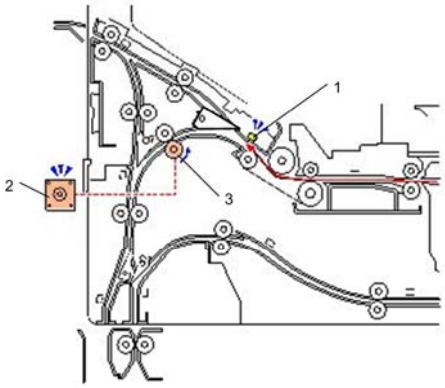
Duplexing
Duplex Drive



Slide 495

1. Duplex Transport Motor 1
2. Duplex Transport Roller 1
3. Duplex Transport Roller 2
4. Duplex Transport Roller 3
5. Duplex Transport Roller 4
6. Duplex Transport Motor 2
7. Duplex Transport Roller 5
8. Duplex Transport Roller 6
9. Bank Exit Motor
10. Bank Exit Rollers
11. Main Relay Rollers
12. Duplex Transport Sensor 1
13. Duplex Transport Sensor 2
14. Duplex Transport Sensor 3
15. Duplex Transport Sensor 4
16. Duplex Transport Sensor 5
17. Bank Exit Sensor
18. Main Relay Sensor 1

Duplex Paper Path (1)

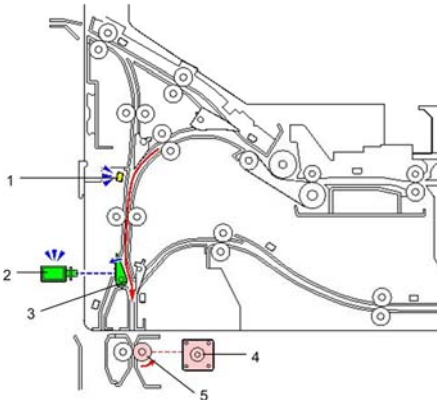


- The exit JG sensor (1) detects the leading edge of the paper.
- Then, the exit relay motor (2) turns on and rotates the exit relay rollers (3).

Slide 496

No additional notes

Duplex Paper Path (2)

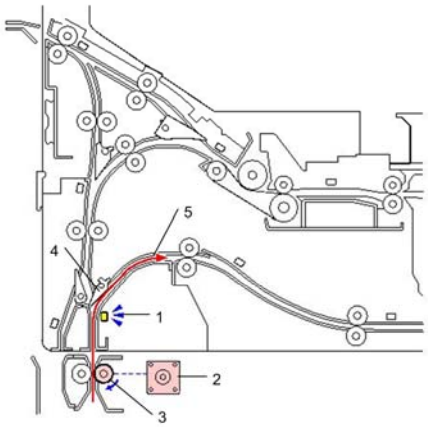


- When the exit relay sensor (1) detects the leading edge of the paper, the inverter JG solenoid (2) turns on and opens the inverter junction gate (3).
- The open junction gate guides the paper into the inverter/duplex path.
- When the exit relay sensor detects the leading edge of the paper, the duplex invert motor (4) turns on and rotates the duplex inverter rollers (5).

Slide 497

No additional notes

Duplex Paper Path (3)

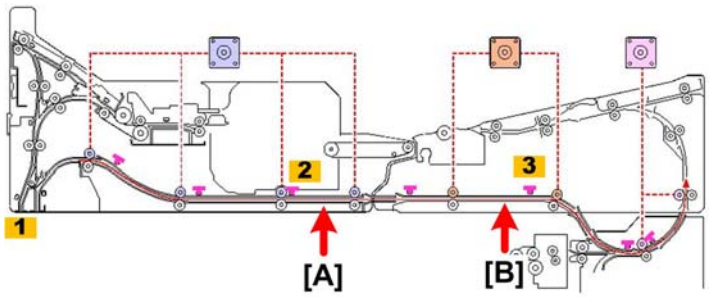


- When the duplex inverter sensor (1) detects the trailing edge of the paper, the duplex inverter motor (2) reverses.
- The duplex inverter rollers (3), now rotating clockwise, feed the paper up past the closed junction (4) into the duplex transport path (5).
- The paper brushes past the junction gate (4). This gate closes automatically after each sheet passes.

Slide 498

- The duplex inverter motor is a stepper motor.

Stop Points During Duplexing



- Before the paper is fed into the duplex transport path at [1], the machine checks ahead to detect whether another sheet of paper has stopped at the next stop point.

Slide 499

Example

- A sheet of paper at [1] cannot be fed if another sheet still remains at check point [A].
- After the sheet at check point [A] has moved ahead, the sheet at [1] is allowed to proceed.
  - Similarly, a sheet at check point [A] will not be allowed to proceed until the sheet of paper at [B] has moved ahead.
- Duplex transport sensor 3 (2) (in the left tray) detects when paper arrives and leaves check point [A].
- Duplex transport sensor 5 (3) (in the right tray) detects when paper arrives and leaves check point [B].

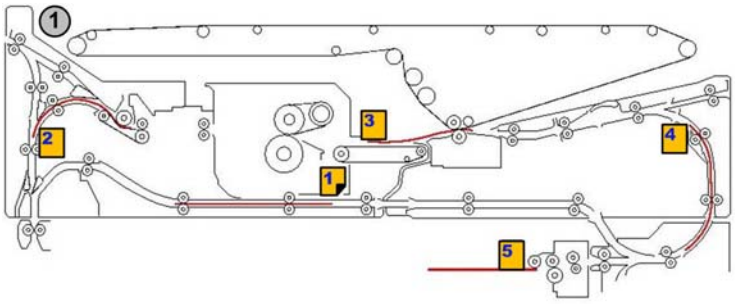
Duplex Interleaving

- **This machine has three types of interleaving. The interleaving type depends on the paper size.**
  - S size paper: 5-sheet interleaving
  - M/ L1/ L2 size paper: 4-sheet interleaving
  - LL size paper: 3-sheet interleaving
- **The paper is fed at one-sheet intervals because the machine needs a one-sheet interval for paper switchback.**

Slide 500

- S: 182 mm (B5 LEF) ≤ Paper length ≤ 215.9 mm (LT LEF)
- M: 215.9mm (LT LEF) < Paper length ≤ 297 mm (A4 SEF)
- L1: 297 mm (A4 SEF) < Paper length ≤ 364 mm (B4 SEF)
- L2: 364 mm (B4 SEF) < Paper length ≤ 431.8 mm [DLT SEF]
- LL: 431.8mm [DLT SEF] < Paper length 488 mm [19.2"]

Duplex Interleaving
Five-sheet Example (1)

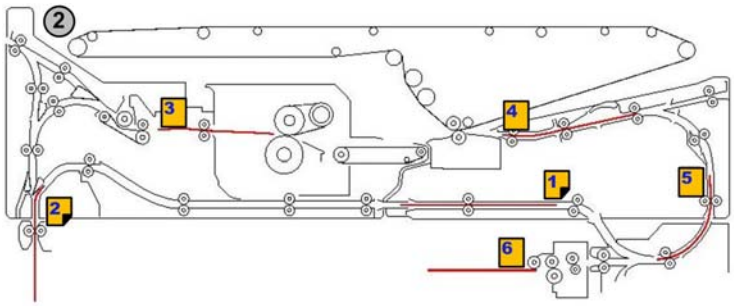


- The 1st sheet enters the duplex path after being inverted. Five sheets are in the paper path.

Slide 501

No additional notes

Duplex Interleaving
Five-sheet Example (2)

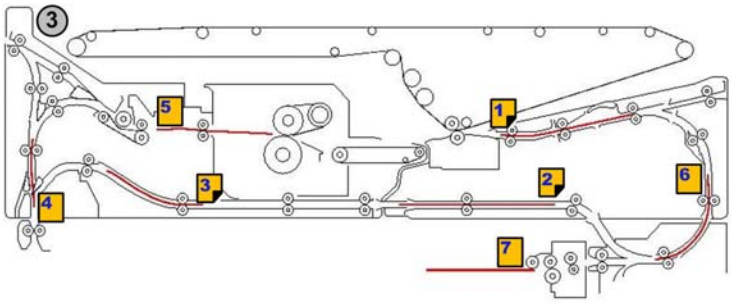


- The 5th sheet enters the registration path and two sheets (1st and 2nd) are now in the duplex transport path. A 6th is about to feed from Tray 1.

Slide 502

No additional notes

Duplex Interleaving
Five-sheet Example (3)

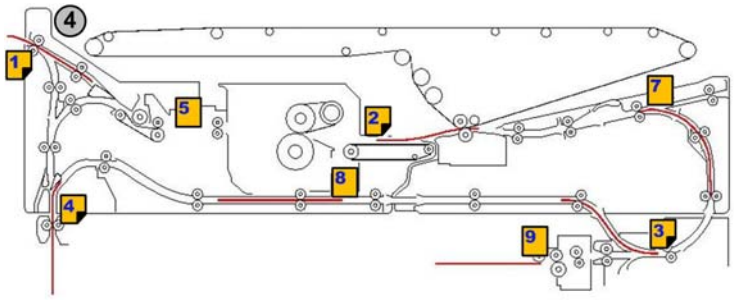


- Four sheets of paper [5th (1st Side) to 2nd (2nd Side)] are now in the duplex transport path. The 6th sheet has entered the paper registration unit, and a 7th sheet is about to feed from Tray 1.

Slide 503

No additional notes

Duplex Interleaving
Five-sheet Example (4)



- Five sheets of paper, 5th sheet (1st side) to 7th sheet (1st Side) are now in the duplex transport path, and the 1st sheet is fed out after duplex printing.

Slide 504

No additional notes

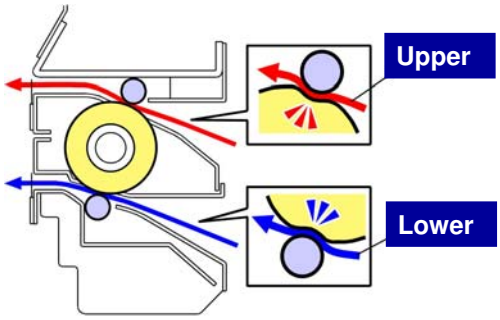
Detailed Section Descriptions

Decurler Unit

Slide 505

❒ This is basically the same as the G178/D016 series.

Decurler Unit



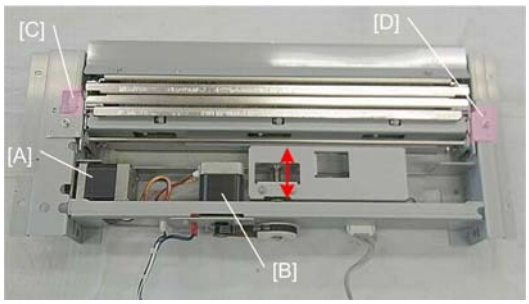
- There are two paths through the de-curler unit.
- The upper path is used for correcting back curl.
- The lower path is used for correcting face curl.
- The upper path is used for all printing modes and paper types (adjustable with SP1906-001).
- The user also can change the setting with a TCRU setting (0116: Adjust Paper Curl).
- There are 'weak' and 'strong' settings for each path.

Slide 506

❒ For the 'strong' setting, the curler unit moves further away from the central position than for the 'weak' setting.

User Setting	Decurl Path	Decurl Roller Nip
Face curl correction (weak)	Lower path	1.5 mm
Face curl correction (strong)	Lower path	1.8 mm
Normal (not selected)	Upper path	0.3 mm
Back curl correction (weak)	Upper path	1.5 mm
Back curl correction (strong)	Upper path	1.8 mm

Decurler Unit Motors

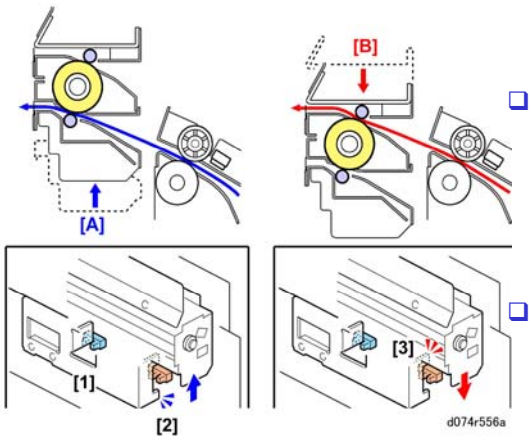


- The decurler feed motor [A] drives the rollers that feed paper through the decurler unit.
- The decurler unit motor [B] drives the timing belt and gear that raise and lower the decurler unit on the paired rack and pinions at the rear [C] and front [D].

Slide 507

No additional notes

Decurler Unit Operation

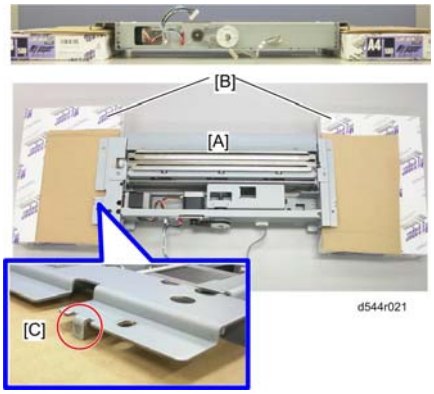


- Before a print job, the de-curler unit HP sensor [1] checks the home position of the de-curler unit.
- [A] To correct back curl, the unit is raised the distance specified by the user. If the decurler unit limit sensor [2] detects the bottom actuator, SC593 occurs.
- [B] To correct front curl, the unit is lowered the distance specified by the user. If the decurler unit limit sensor [3] detects the top actuator, SC593 occurs.

Slide 508

- Moving the decurler roller up or down changes the amount pressure applied to the paper to correct paper curl. The maximum range of the decurler unit movement is ±13.15 mm from the home position of the decurler unit.
- The amount of pressure applied to correct paper curl can be adjusted with the "Adjustment Settings for Skilled Operators".
- 1. Press the [User Tools] button on the operation panel.
- 2. Touch "Adjustment Settings for Skilled Operators" and log in.
- 3. Touch "0116 Adjust Paper Curl".
  - The next screen presents options for adjusting the amount of curl applied (Weak or Strong) for all the trays (Tray 1 to 6).
  - To adjust the amount of pressure applied for "Weak" or "Strong", use SP1906-1 to 6.

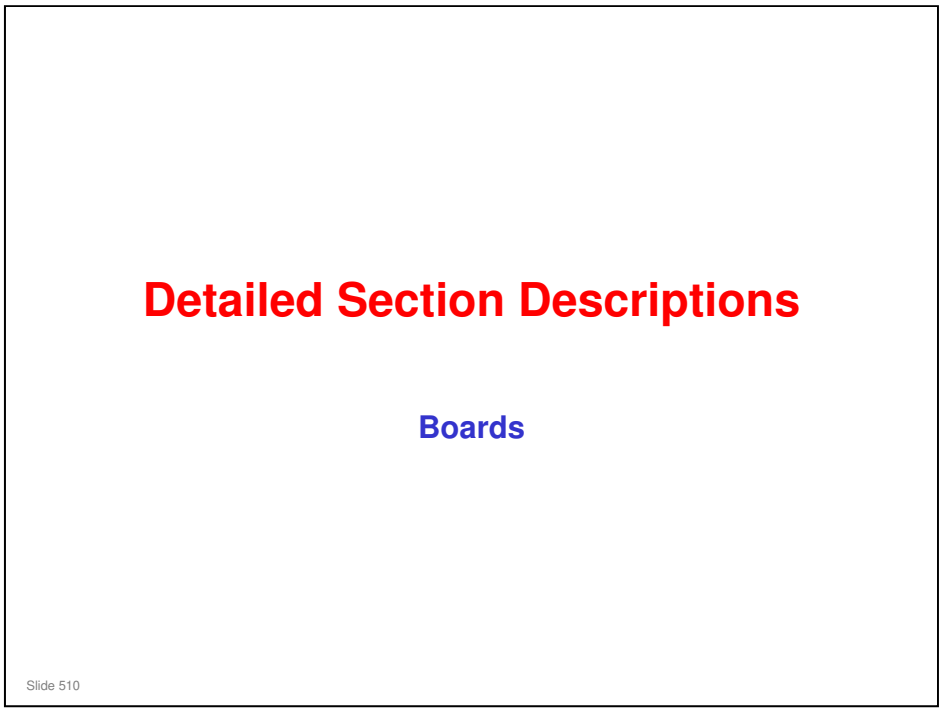
Working on the Decurler



- Lay the Decurler Unit [A] on temporary supports [B] as shown.
- The entrance guide of the decurler unit must not touch the floor or any object. Otherwise, the mylars on the entrance gate may be bent or folded.
- Keep this position during maintenance.
- Place an object like a sheet of cardboard on the supports so that the frame projection [C] does not damage the supports.

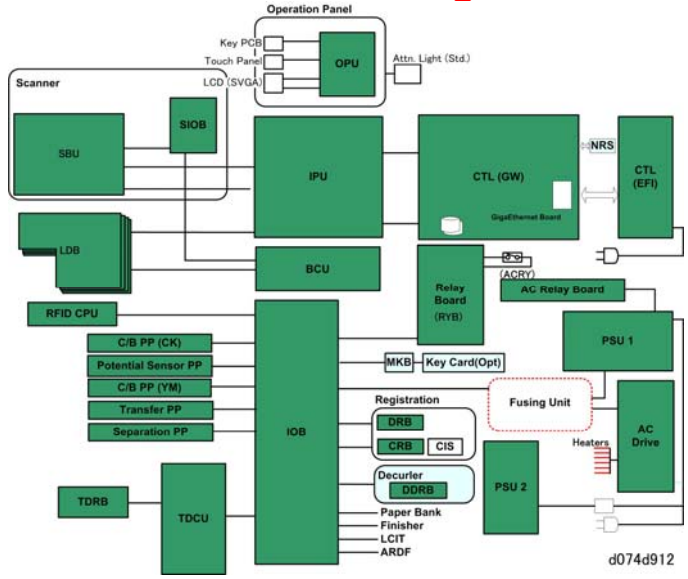
Slide 509

No additional notes



No additional notes

Schematic Diagram



Slide 511

- BCU. Base (Engine) Control Unit. The main control board that controls the engine sequence, timing for peripherals, image processing, and the video data path.
- C/B Power Pack (CK). Charge/Bias Power Pack. This board supplies power to the terminals of the C, K charge rollers (drum charge) and to the terminals of the C, K development rollers (development bias).
- C/B Power Pack (YM). Charge/Bias Power Pack. This board supplies power to the terminals of the Y, M charge rollers (drum charge) and to the terminals of the Y, M development rollers (development bias).
- CRB (CIS Relay Board). Performs waveform correction of the CIS sensors in the paper path that correct paper registration in the main scan direction.
- DDRB. Decurl unit drive board. Installed with the Decurl Unit
- DRB (Drive Board). Located inside the right drawer, controls the operation of the motors in the registration unit.
- IPU. Image Processing Unit. Contains large scale integrated circuits that process the digital data sent from the SBU and other sources.
- LDB. Laser Diode Boards. Powers the laser diodes that fire the lasers at the drums.
- OPU. Operation panel unit PCB. Interfaces with the CPU and runs the operation panel for the user interface.
- PSU 1. Power Supply Unit 1. Located in the controller box, provides DC power to the system and AC power to the fusing lamp and optional heaters.
- PSU 2. Power Supply Unit 2. Located on the back of the main machine, supplies power to the Relay Board (RYB).
- Potential Sensor Power Pack. Supplies power to the four potential sensors. One potential sensor is mounted above each drum to read the charge on the drum.
- Relay Board (RYB). Holds the micro-switches that toggle the power to the laser unit off/on when the doors are open/closed.
- Separation PP. The separation power pack in the right drawer below the registration unit charges the plate that separates the paper from the image transfer belt after the toner image has been transferred from the belt to paper.
- SIOB. Scanner Interface Board. Controls all sensors in the scanner unit and the carriage drive stepper motors.
- TDCU. Transfer Drive Control Unit. Directly controls operation of fusing motor, drum motors, development motor, drum cleaning motor, PTR motor, and transfer timing motor. Also controls via the TDRB: ITB sensor, ITB set sensor, ITB motor.
- TDRB. Transfer Drive Relay Board. Controls operation of the components in the ITB unit.
- Transfer PP. The transfer power pack in the ITB unit charges the image transfer rollers to pull the toner image from the drum to the ITB and it charges the ITB bias roller to push the toner image from the ITB to the paper.

Detailed Section Descriptions

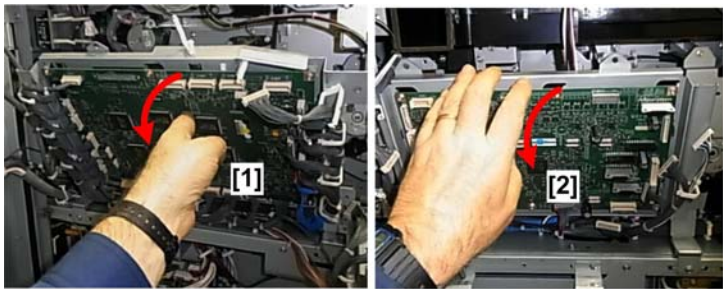
Replacement and Adjustment: Boards

Slide 512

This section covers the main points about replacement and adjustment.

Follow all notes and cautions in the service manual when removing and replacing components.

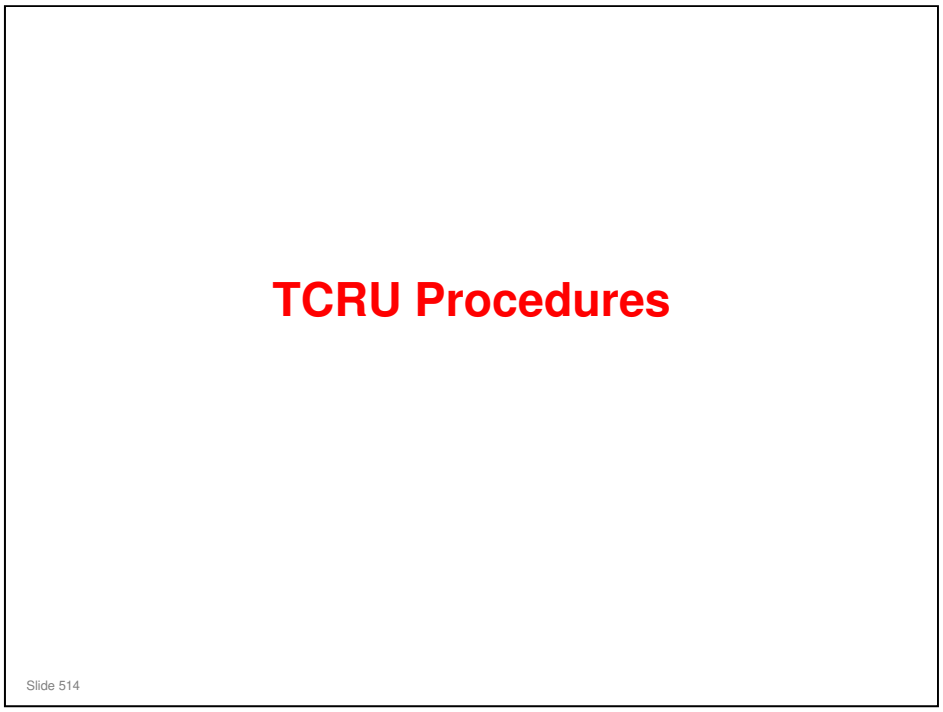
Lowering the IOB and TDCU



- These boards can be lowered on their bottom hinges after the top connectors and clamps are disconnected. You do not need to disconnect all clamps and connectors.
  - [1]: IOB
  - [2]: TDCU
- The BCU board is mounted behind the IOB.

Slide 513

No additional notes



This section covers the main points about TCRU procedures. It tells you the main points about TCRU that customers have to understand before they start.

Details of all procedures are in the TCRU manuals.

Two Levels of TCRU Operators

- **For this model, there will be two types of TCRU operators: Standard, and Advanced.**
- **There is only one menu for TCRU procedures, but some of these procedures should be done by Advanced TCRU operators only.**
  - The procedures for Advanced TCRU operators will be listed in a separate document, to be released by RCL.
  - There is only one set of manuals, and all adjustments are explained. So, TCRU operator training must be done to explain the risks of adjusting the Advanced settings incorrectly.

Slide 515

No additional notes

Risks Concerning the Advanced TCRU Settings
Skilled Operator Adjustment settings

- **0101: Image Position Adj (Paper Feed Direction)**
  - If the blank margin at the leading edge of side 1 is set very low, paper may not exit from the fusing unit (may not separate from the belt/rollers) and result in a jam.
  - If the blank margin at the trailing edge of side 1 is set very low in duplex printing, paper may not exit from the fusing unit (may not separate from the belt/rollers) and result in a jam when fusing the 2nd side.
  - This applies to all paper thickness ranges (from 1 to 7).
- **0203: Maximum Image Density Adj**
  - If the adjustment value is modified to a positive value (to increase image density), fusibility could be reduced.
  - This applies to K, C, M, and Y

Slide 516

No additional notes

Risks Concerning the Advanced TCRU Settings
Custom Paper settings

- **8: 1st Side Image Position Adj: Paper Feed Direction, and 9: 2nd Side Image Position Adj: Paper Feed Direction**
  - If the blank margin at the leading edge of side 1 is set very low, paper may not exit from the fusing unit (may not separate from the belt/rollers) and result in a jam.
  - If the blank margin at the trailing edge of side 1 is set very low in duplex printing, paper may not exit from the fusing unit (may not separate from the belt/rollers) and result in a jam when fusing the 2nd side.
- **19: Process Speed Setting**
  - If the process speed is changed from Low to Middle, or Middle to High, fusibility could be reduced and cause toner to come off the paper.
- **44: Fusing Heat Roller Temp Setting**
  - Setting a low temperature could reduce fusibility and cause toner to come off the paper (cold offset).
  - Setting a high temperature could deform the paper to a large degree and may cause jams and glossy streaks.
- **45: Fusing Pressure Roller Temp Setting**
  - Setting a low temperature could reduce fusibility and cause toner to come off the paper (cold offset).
- **46: Fusing Nip Width Setting**
  - Setting a narrow nip width could reduce fusibility and cause toner to come off the paper (cold offset).

Slide 517

No additional notes

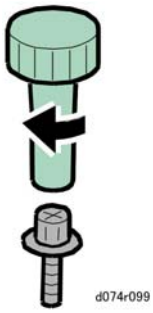
TCRU Replacement Parts

- Paper trays: Pick-up, feed, and separation rollers
- Charge Roller Unit
- PCU Cleaning Unit
- Drum Unit
- ITB Cleaning Unit
- Paper Transfer Unit (PTR Unit)
- Fusing Unit
- Fusing Cleaning Unit

Slide 518

Refer to the TCRU Replacement Guide for details of all procedures.

Tools



- **The only tool needed is the accessory hex screwdriver provided with the main machine.**
- **The components designated for replacement are installed with "TCRU" screws.**
  - These are heavy black screws with large hexagonal heads.
  - Other (non-TCRU) screws are silver or blue with smaller heads.
- **The hex screwdriver tightly grips the head of the of these TCRU screws, so they do not fall down into the machine during removal.**

Slide 519

No additional notes

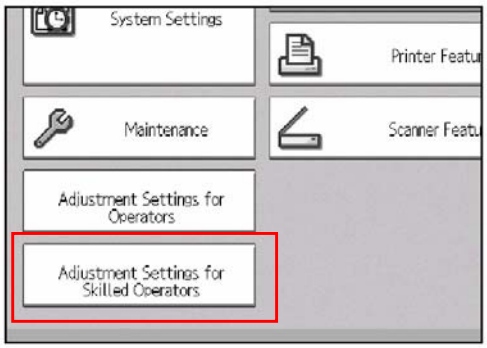
Before you Start

- **To prevent electrical shock, turn off the machine.**
  - Make sure that the data-in lamp on the operation panel is not flashing.
  - Turn off the Fiery controller on the Fiery controller's operation panel, switch off the operation power switch, then the main power switch, and then disconnect the machine from the power supply.
- **Open the left and right front covers and allow the machine to cool for at least 30 minutes before replacing a part.**

Slide 520

No additional notes

Reset Counters After Replacing Parts



- After replacing parts, open the Adjustment Settings for Skilled Operators and reset the counters for the parts that were replaced.
- In addition, if you replace the ITB cleaning unit, you must do the 'ITB Manual Lubrication' procedure.

Slide 521

No additional notes

Reset Counters After Replacing Parts

- **The above diagrams show how to reset the counters.**
  - 0305 Reset Replaceable Parts Counter
  - Press the button for the part that you replaced. There are three pages of buttons.

Slide 522

No additional notes

Rollers in the Paper Feed Trays

- The three rollers are always replaced together as a set.
- Handle new rollers carefully and avoid touching the surface of a roller with bare hands.
- After roller replacement, reset the counters for the rollers.

Slide 523

No additional notes

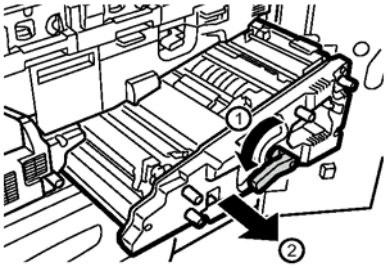
Charge Roller Unit, PCU Cleaning Unit, Drum Unit

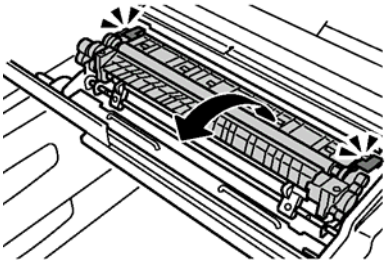
- **These parts are in the PCDU. The procedures for each PCDU are basically the same.**
- **TCRU operators must note the following points:**
  - Lower the intermediate transfer belt (ITB) release lever before pulling out a PCDU.
    - » This separates the ITB from the drums, so the surface of the ITB or drum will not be scratched when a PCDU is removed.
  - Exposure to strong light (especially direct sunlight) can permanently damage the surface of a drum.
  - Never remove a new drum from its package until you are ready to install it.
  - Always install a new drum as soon as you remove it from its package.
  - After replacing a component, the counter must be reset.
  - After you replace the drum unit or PCU cleaning unit, do 0301 (Execute Cleaning Initial Setting) and 0302 (Execute Process Initial Setting).
  - After replacing the charge roller unit, do 0302 (Execute Process Initial Setting).

Slide 524

No additional notes

Transfer Unit





- These diagrams show which part the Transfer Unit is.
- After replacement, do 0302 (Execute Process Initial Setting).

Slide 525

- This is in the left side of the right drawer.

ITB Cleaning Unit

- After replacing the ITB cleaning unit, do 0302 (Execute Process Initial Setting) and 0303 (ITB Manual Lubrication).

Slide 526

No additional notes

Fusing Unit

- **The fusing unit becomes extremely hot during operation. To prevent minor burns, open the front covers and allow the machine to cool for at least 30 minutes before you remove the fusing unit.**
- **The fusing unit is small and weighs about 17 kg (37 lb.), so it can be lifted and carried by one person.**
- **The service life of the fusing unit is about 650K (but the hot roller life is 600K) and the service life of the fusing cleaning unit is about 450K.**
  - You may want to remove the fusing cleaning unit from the old fusing unit and install it on the new fusing unit.

Slide 527

No additional notes

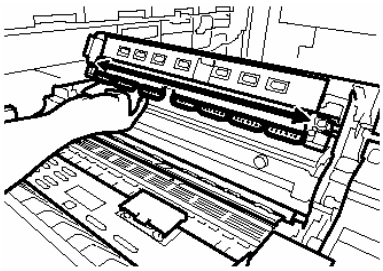
Cleaning by TCRU Operators

- **The following parts should be cleaned at regular intervals.**
  - Fusing belt stripper plate
  - Pressure roller stripper plate
  - Entrance guide plate (fusing unit)
  - Dust catcher (inside the right drawer)
  - Paper feed path
    - » Inspection and cleaning for rollers and sensors.
    - » Use a dry cloth for rollers and a blower brush for sensors.

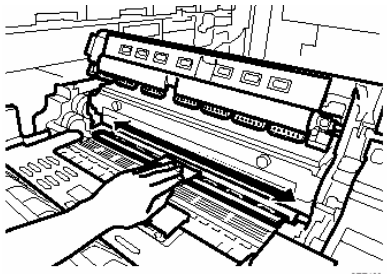
Slide 528

No additional notes

Cleaning – Fusing Unit (1)



Stripper Plate: Fusing Belt



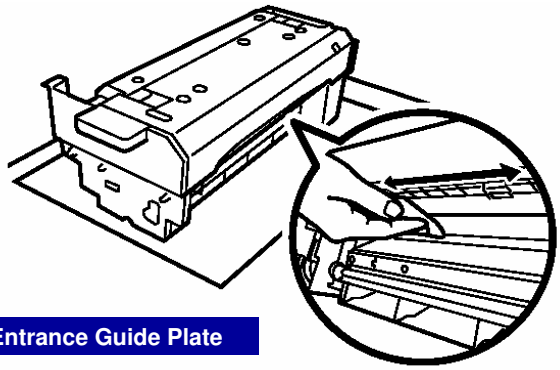
Stripper Plate: Pressure Roller

- Open cover D2 on the fusing unit.
- Use a dry cloth.

Slide 529

No additional notes

Cleaning – Fusing Unit (2)

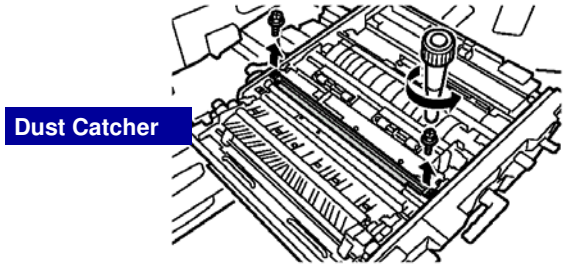


- Remove the fusing unit to clean this part.
- Use a dry cloth.

Slide 530

No additional notes

Cleaning – Dust Catcher



- Empty the dust catcher into a dust bin.
- Use a clean dry cloth to remove any dust remaining in the dust catcher.

Slide 531

- This part is in the right drawer.

Cleaning – Paper Feed Path

- **The TCRU operator must clean sensors and rollers in five areas of the machine.**
  - Paper feed trays 1 and 2
  - Vertical transport unit
  - Right drawer
  - Left drawer
  - Purge tray
- **The TCRU operator must refer to the manual to make sure that the correct cleaning materials are used.**
- **For these procedures, some disassembly is required.**

Slide 532

No additional notes

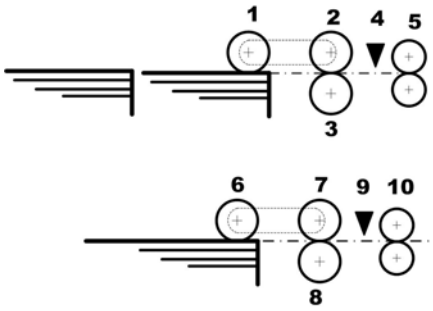
Cleaning – Paper Feed Path

- **Here are some rules to follow for cleaning rollers and sensors.**
  - Roller Cleaning
    - » Clean rollers with a dry cloth.
    - » Do not touch the surfaces of the rollers with bare hands.
  - Sensor Cleaning
    - » Clean sensors with a blower brush. Do not use cloth or tissue paper.
    - » Most of the sensors are below holes in plates, so you may not be able to see them.
    - » Insert the tip of the blower brush into the hole and squeeze it to blow any paper dust off the sensor.

Slide 533

Refer to the TCRU Replacement Guide for details of all procedures.

Cleaning – Paper Feed Path

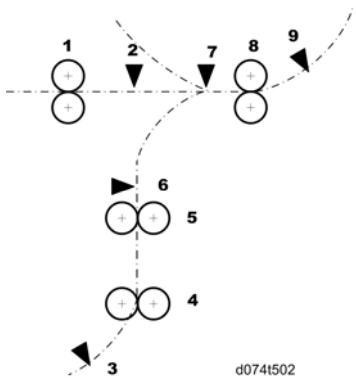


- Paper feed trays 1 and 2

Slide 534

- 1. 1st Pickup Roller
- 2. 1st Paper Feed Roller
- 3. 1st Separation Roller
- 4. 1st Paper Feed Sensor
- 5. 1st Grip Rollers
- 6. 2nd Pickup Roller
- 7. 2nd Paper Feed Roller
- 8. 2nd Separation Roller
- 9. 2nd Paper Feed Sensor
- 10. 2nd Grip Rollers

Cleaning – Paper Feed Path

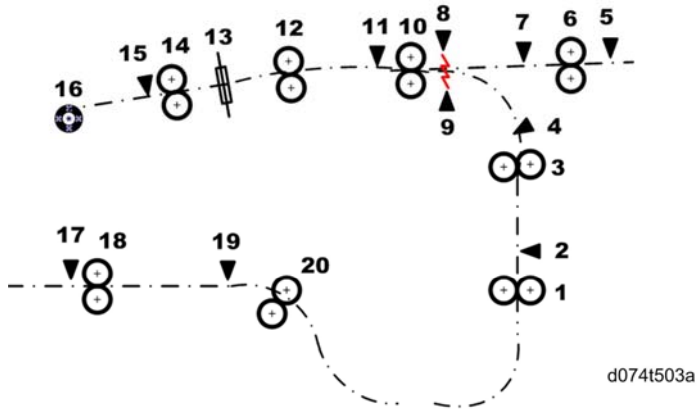


- Vertical transport unit

Slide 535

- 1. Horizontal Transport Rollers
- 2. 1st Transport Sensor
- 3. 2nd Transport Sensor
- 4. Lower Transport Rollers
- 5. Upper Transport Rollers
- 6. Vertical Transport Sensor
- 7. Bank Exit Sensor
- 8. Bank Exit Rollers
- 9. Main Relay Sensor 1

Cleaning – Paper Feed Path

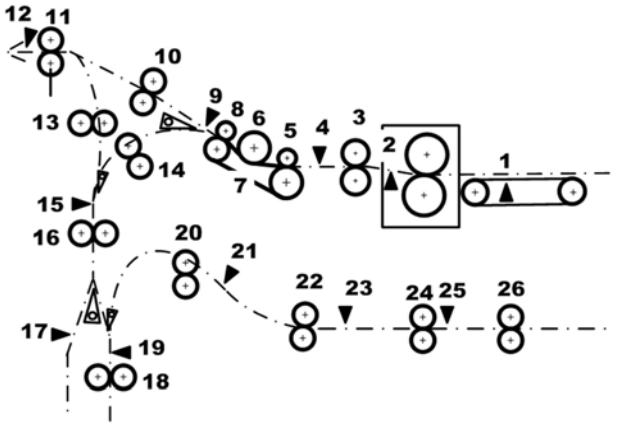


❑ **Right drawer**

Slide 536

- ❒ 1. Main Relay Rollers
- ❒ 2. Main Relay Sensor 2
- ❒ 3. Registration Entrance Rollers
- ❒ 4. Main Relay Sensor 3
- ❒ 5. LCT Relay Sensor 1
- ❒ 6. LCT Relay Rollers
- ❒ 7. LCT Relay Sensor 2
- ❒ 8. Double-Feed Sensor (Emitter)
- ❒ 9. Double-Feed Sensor (Receptor)
- ❒ 10. Registration Timing Rollers
- ❒ 11. Registration Timing Sensor
- ❒ 12. Shift Rollers
  - ➢ Shift drive roller cleaning requires disassembly.
- ❒ 13. CIS (Shift Unit)
- ❒ 14. Transfer Timing Rollers
- ❒ 15. Transfer Timing Sensor
- ❒ 16. PTR (Paper Transfer Roller)
- ❒ 17. Duplex Transport Sensor 6
- ❒ 18. Duplex Transport Rollers 5
- ❒ 19. Duplex Transport Sensor 7
- ❒ 20. Duplex Transport Rollers 6

Cleaning – Paper Feed Path

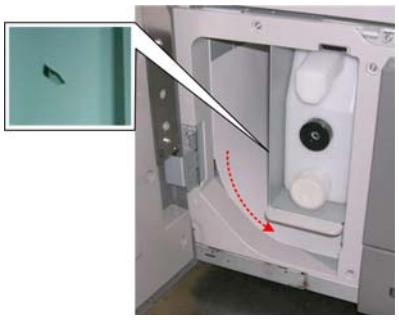


- Left drawer

Slide 537

- 1. PTB Sensor
- 2. Fusing Exit Sensor
- 3. Exit Unit Entrance Rollers
- 4. Cooling Unit Entrance Sensor
- 5. Cooling Unit Entrance Rollers
- 6. Cooling Pipe Roller
- 7. Cooling Belt
- 8. Cooling Belt Idle Rollers
- 9. Exit JG Sensor
- 10. Exit Relay Rollers
- 11. Exit Rollers
- 12. Exit Sensor
- 13. Invert Exit Rollers 2
- 14. Invert Entrance Rollers: Cleaning requires disassembly
- 15. Exit Relay Sensor
- 16. Invert Exit Rollers 1
- 17. Purge Relay Sensor
- 18. Duplex/Invert Rollers: Cleaning requires disassembly
- 19. Duplex/Invert Sensor
- 20. Duplex Transport Rollers 1
- 21. Duplex Transport Sensor 1
- 22. Duplex Transport Rollers 2
- 23. Duplex Transport Sensor 2
- 24. Duplex Transport Rollers 3
- 25. Duplex Transport Sensor 3
- 26. Duplex Transport Rollers 4

Cleaning – Paper Feed Path



- **Purge tray**
  - Clean the purged paper sensor.

Slide 538

No additional notes

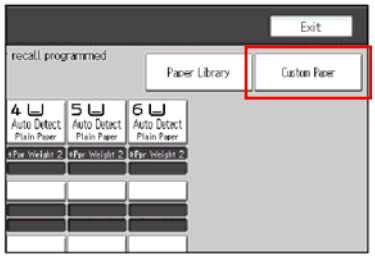
Adjustments for TCRU Operators

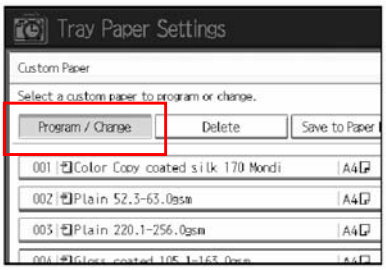
- **Adjustments fall into these categories:**
  - Image shift adjustment
  - Image quality adjustment
  - Paper feed adjustment
  - Monitoring
  - Maintenance
  - Finishing
  - Jogger adjustment
  - Others
- **General note about the names of the functions on the menu display.**
  - 'Across feed' means 'in the main scan direction', perpendicular to the paper feed direction.
  - 'With feed' means 'in the sub scan direction', parallel to the paper feed direction.

Slide 539

❒ See the TCRU Adjustment Item Menu Guide for full details on all procedures.

Advanced Settings for Custom Paper



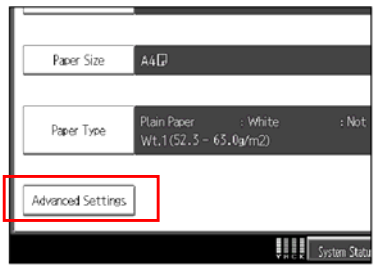


- Login as an administrator.
- Press 'Custom Paper'.
- Select the 'Program/Change' tab.
- Touch the paper type that you want to adjust.

Slide 540

No additional notes

Advanced Settings for Custom Paper



- Press 'Advanced Settings'.
- The advanced settings menu appears.

Slide 541

No additional notes

Advanced Settings for Custom Paper

Paper Icons

Not Adjusted

Adjusted

- Note that the Adjusted icon does not change back to the Not Adjusted icon even when you return all settings to the defaults.

Slide 542

No additional notes