RICOH

B890: Folder FD6500B (Cross Folder)

Fan Fold Unit (B890-17/27)

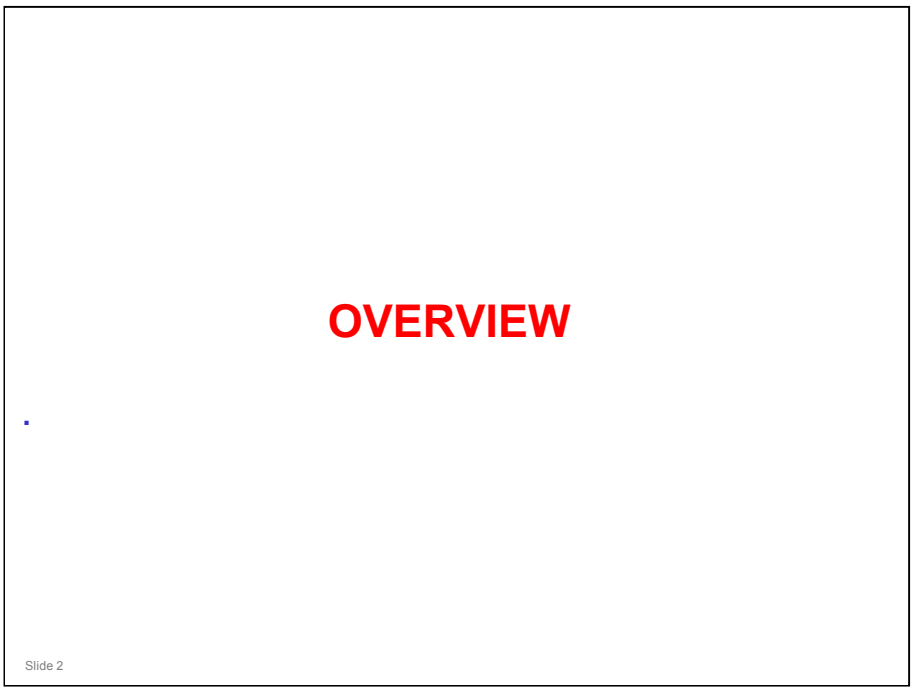
&

Transport Unit & Cross Fold Unit (B890-57)

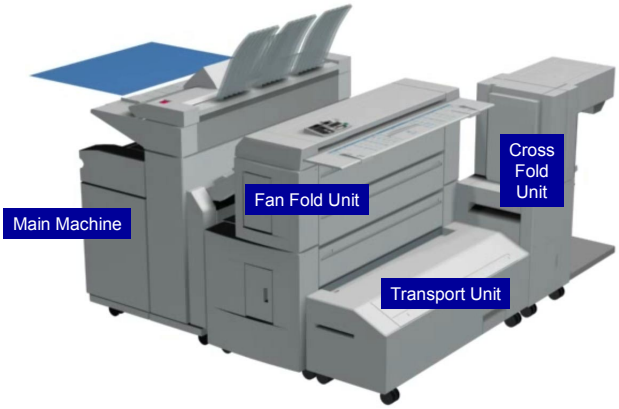
Slide 1

PURPOSE OF THE SECTION

- ❒ The mechanisms of the optional folder unit(s) will be explained.


OVERVIEW
Slide 2

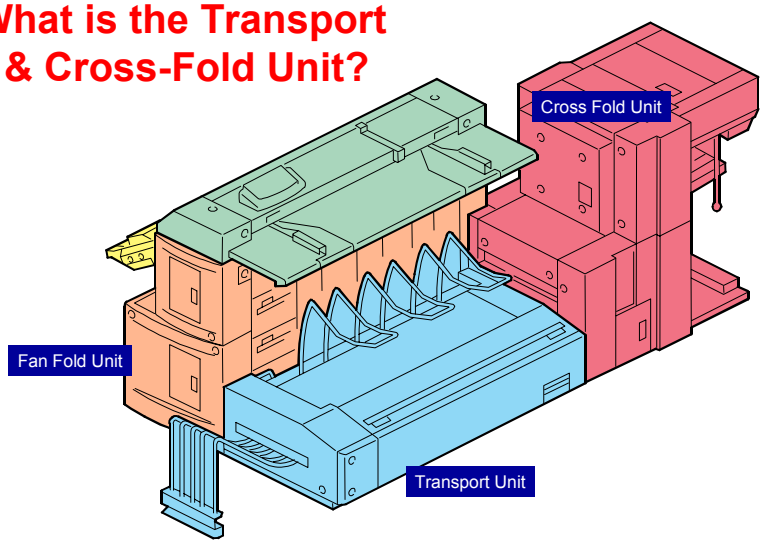
What is the Fan Fold Unit?



- The Fan Fold Unit receives output from Main Machine, fan-folds it, and feeds it out exit at bottom rear of unit and into Transport Unit.
- Outputs can also go straight through without folding, and are fed out at the top exit.
- For details on the Fan Fold Unit, refer to B889: FD6500A (Fan Folder) TTP (Technical Training Package).

Slide 3

What is the Transport & Cross-Fold Unit?



- The Transport Unit takes fan-folded paper from the Fan Fold Unit. Folded paper is then either directly exited from right exit, or transported to Cross Fold Unit, where paper is cross folded, and then exited at the Shift Tray.

Slide 4

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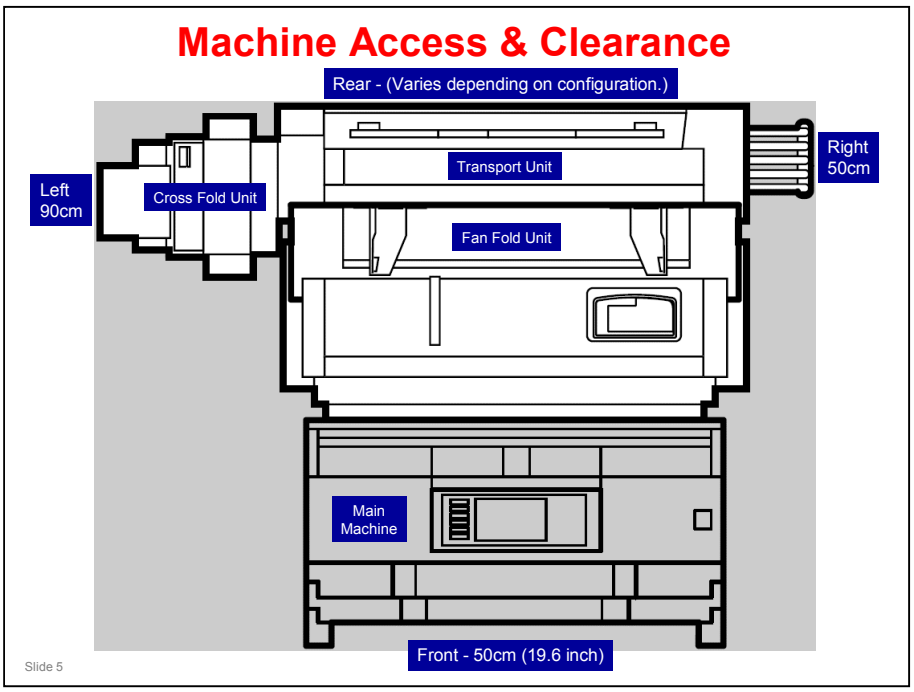
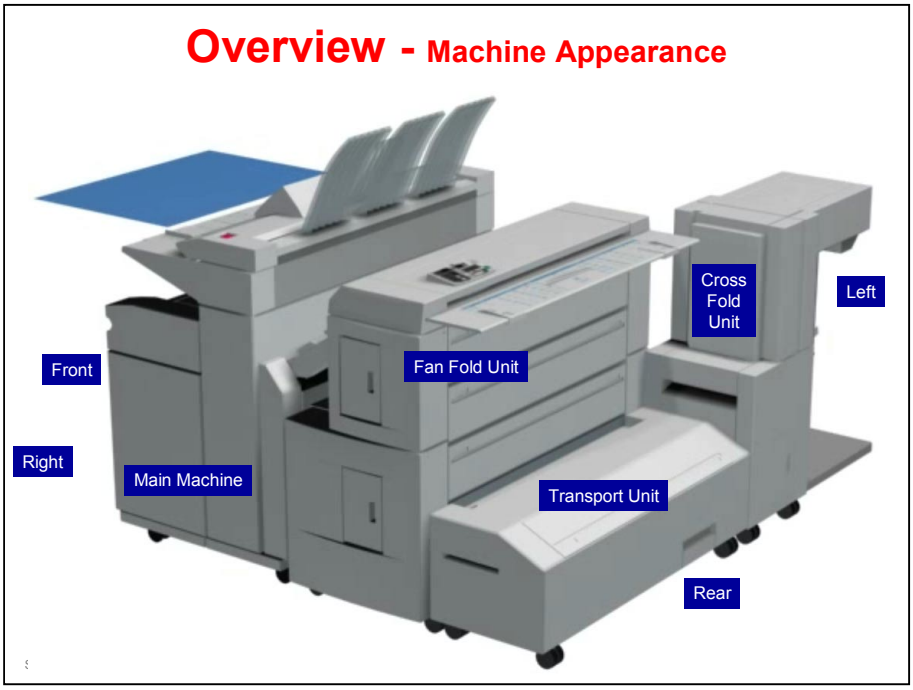


Note:

-When the Fan Fold Unit is attached to the main machine without the Transport Unit & Cross Fold Unit, the rear of the machine is at the back of the Fan Fold Unit.

-When viewing the machine from the rear, keep in mind that “Left” and “Right” maintain their relationship to the point-of-view of the front of the machine.

Overview - Machine Appearance



Note:

-When the Fan Fold Unit is attached to the main machine without the Transport Unit & Cross Fold Unit, the rear of the machine is at the back of the Fan Fold Unit.

-When viewing the machine from the rear, keep in mind that “Left” and “Right” maintain their relationship to the point-of-view of the front of the machine.

Turning on the Power

- **The power on/off sequence is important.**
- **To turn the Cross Folder on**
  - 1. First, switch on the Fan Fold Unit.
  - 2. Next, switch on the main machine.
  - The Fan Fold Unit must be turned on first. Otherwise, the Cross Folder will not recognize the main machine.
- **To turn the Cross Folder off**
  - 1. First, switch off the main machine.
  - 2. Next, switch off the Fan Fold Unit.
  - The main machine must be switched off first.
  - Switching off the folder first will cause an alarm. If this occurs:
    - » 1. Switch the Fan Fold Unit on again.
    - » 2. Switch off the main machine.
    - » 3. Switch off the Fan Fold Unit.

Slide 7

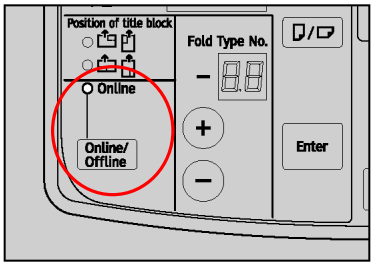
Operation Modes

- **There are three operating modes.**
  - Full operation mode
  - System offline mode
  - Independent offline mode

Slide 8

Full Operation Mode

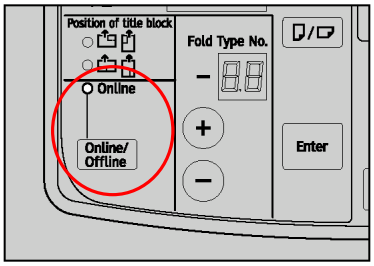
- **The main machine and Cross Folder are both powered on and online.**
  - If the Online indicator is not lit, press the Online/Offline button to put the folder online.
- **Paper feeds from the main machine.**
- **A junction gate inside the Fan Fold Unit determines whether the paper goes straight through, or down to the folder mechanism.**



Slide 9

System Offline Mode

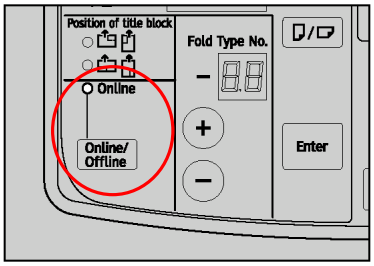
- **The main machine and Cross Folder are both powered on, but the folder is offline.**
  - If the Online indicator is lit, press the Online/Offline button to take the folder offline.
- **Each unit can be used independently of the other.**
- **To use the folder in this mode, feed the paper from the manual feeder.**



Slide 10

Independent Offline Mode

- **The main machine is turned off, but the Cross Folder is turned on.**
  - If the Online indicator is lit, press the Online/Offline button to take the folder offline.
- **To use the folder in this mode, feed the paper from the manual feeder.**
  - This is the same as system offline mode, except that the main machine is turned off.



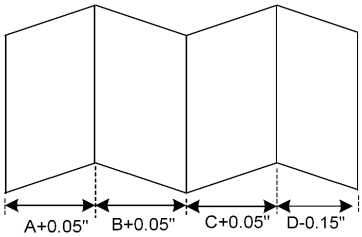
Slide 11

Important Points - 1/2

- **The Cross Folder can handle plain paper only. Do not feed translucent paper or OHP transparencies through the Cross Folder.**
- **If the humidity at the work site is extremely high, turn on the heater switch of the Cross Folder. Otherwise, do not turn this switch on.**
  - The heater remains on, even when the Cross Folder power switch is off.
- **Folding position adjustment done on the operation panel of the manual feeder is applied to each fold.**
  - There cannot be less than 8.5 inches between folds.

Slide 12

Important Points - 2/2

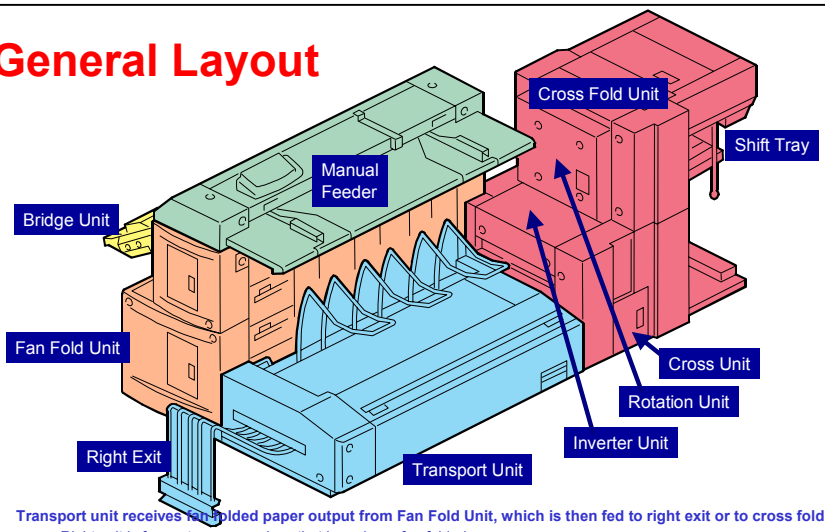


- **When a fan fold is adjusted, the last surface will be shorter than the others, because the lengths of the others have been increased.**
  - For example, if fan folding is increased by +0.05 inches for a job where three folds are done to create four surfaces, +0.5 will be added to the first 3 surfaces but the last surface will be 0.15 shorter.

Slide 13


Details
Slide 14

General Layout

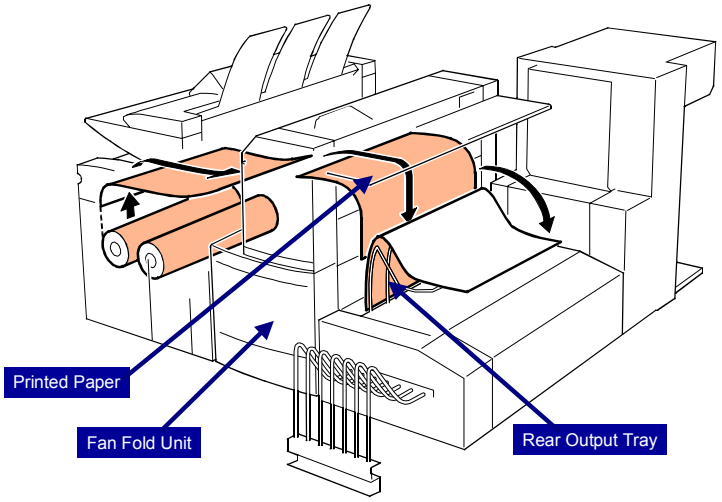


- **Transport unit receives fan folded paper output from Fan Fold Unit, which is then fed to right exit or to cross fold unit.**
  - Right exit is for custom paper sizes that have been fan folded.
  - Only fan folded paper of standard paper sizes can be fed to the cross fold unit.
- **Cross fold unit Includes: cross folder, inverter unit, rotation unit, and shift tray.**
  - Cross unit folds paper as it leaves the transport unit.
- **Inverter unit (after cross-folding), inverts paper so trailing edge becomes leading edge. Rotation unit rotates paper, then feeds it to shift tray.**
- **Shift tray is raised & lowered automatically to accommodate size of accumulating stack as folded sheets are output.**

Slide 15

Paper Feed Paths

Straight-Through Paper Path

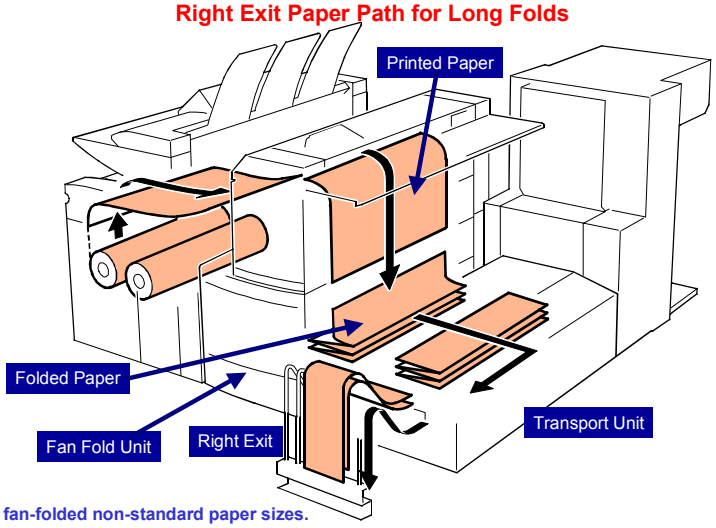


- Paper feeds from roll feeder (or paper cassette).
- Paper printed by machine passes straight through the Fan Fold Unit (no fan folding) and falls onto rear output tray.

Slide 16

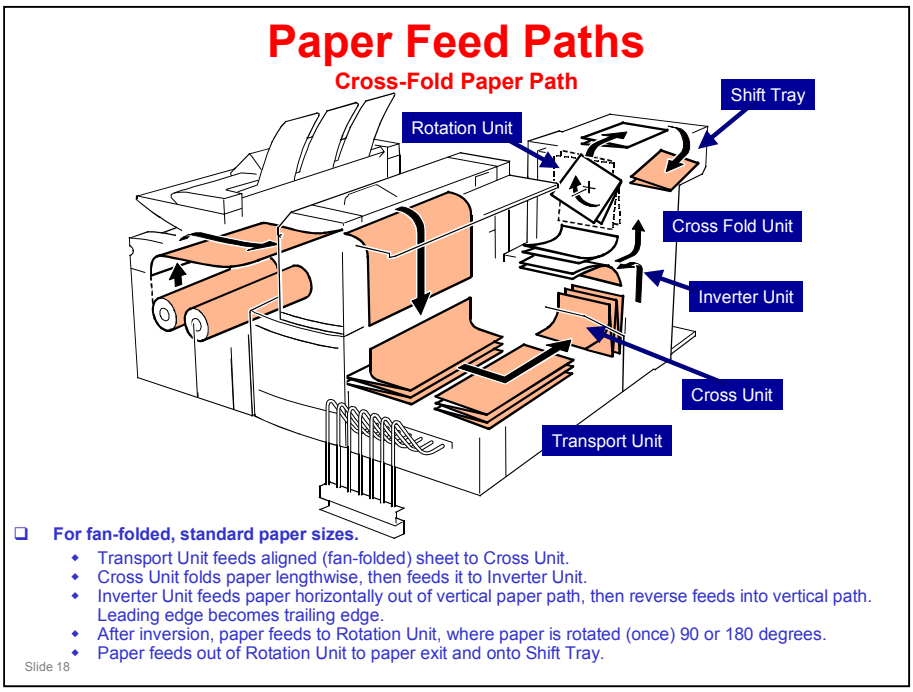
Paper Feed Paths

Right Exit Paper Path for Long Folds



- **For fan-folded non-standard paper sizes.**
  - Paper feeds from roll tray (or paper cassette).
  - Printed paper feeds to Fan Fold Unit
  - Fan Fold Unit folds paper and sends it to Transport Unit.
  - Transport Unit jogs fan-folded sheet into alignment, then feeds it out right exit.

Slide 17



Full explanation:

This operation is for fan-folded, standard paper sizes.

- The paper feeds from the roll tray (or paper cassette).

- The printed paper feeds to the Fan Fold Unit.

- The Fan Fold Unit folds the paper and sends it to the transport unit.

- The transport unit jogs the fan-folded sheet to align it then feeds it to the Cross Fold & Transport Unit.

- The Cross unit folds the fan-folded paper along its length then feeds the paper to the inverter unit.

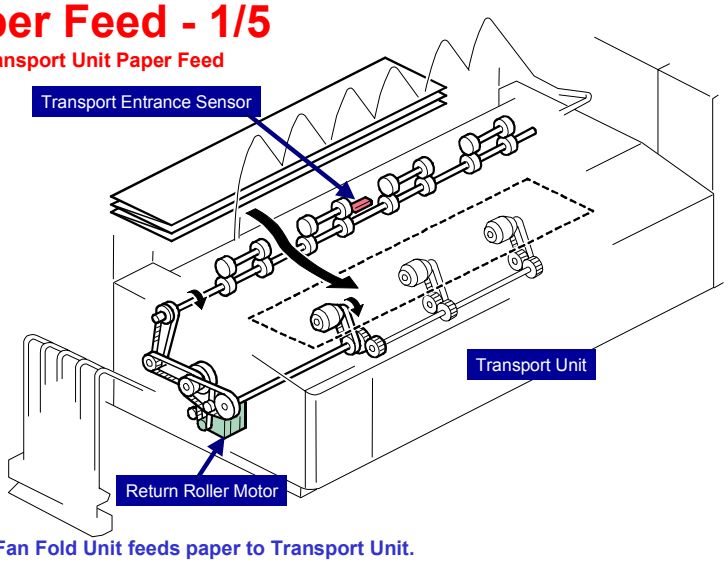
- The inverter feeds the paper horizontally out of the vertical paper path, then reverse feeds the paper back into the vertical paper path. The leading edge of the paper is now the trailing edge.

- After inversion the paper feeds to the rotation unit, where the paper is rotated once 90 degrees or 180 degrees.

- The paper feeds out of the rotation unit to the paper exit and onto the shift tray.

Paper Feed - 1/5

Transport Unit Paper Feed



- Fan Fold Unit feeds paper to Transport Unit.
- Transport Entrance Sensor detects leading and trailing edge of sheet as it enters Transport Unit.
- Return roller motor switches on and feeds paper into Transport Unit.

Slide 19

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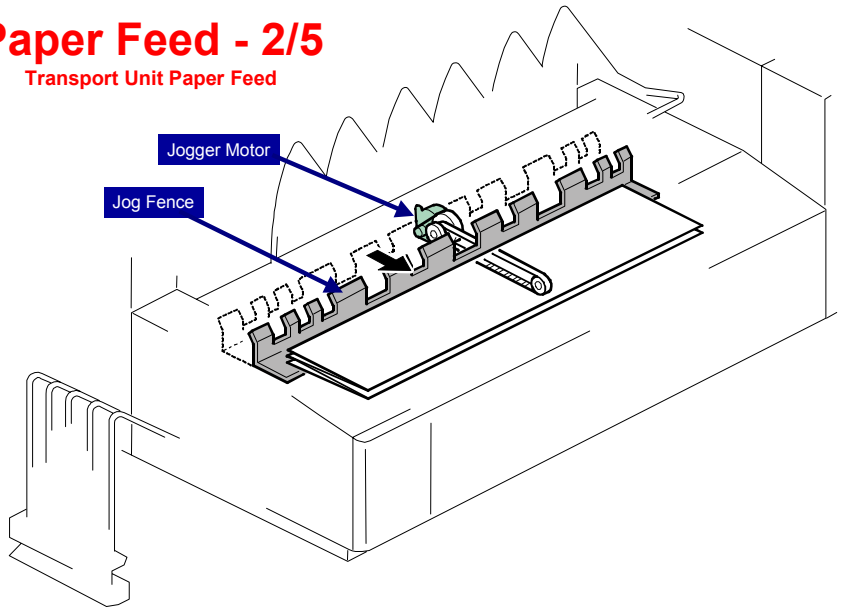
Paper Feed - 2/5

Transport Unit Paper Feed

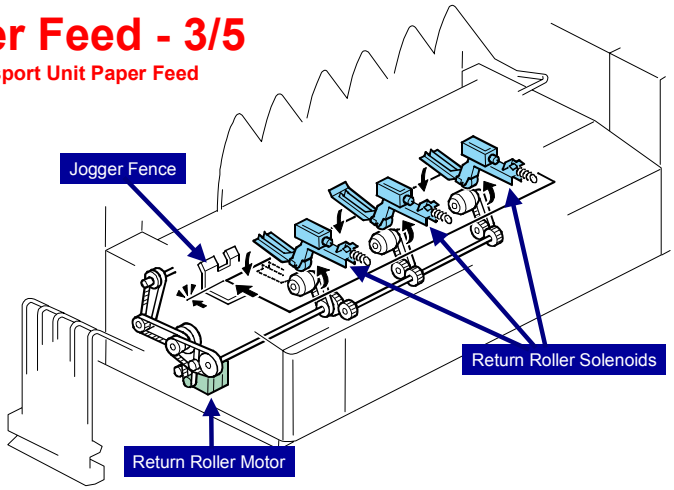


Slide 20

Jogger motor turns on and moves jog fence.

Paper Feed - 3/5

Transport Unit Paper Feed



- Jogger motor and Jogger Fence stop.
- Three Return Roller Solenoids (right, center, & left) switch on, lower idle rollers, and press plates onto paper.
- Return Roller Motor turns on. Rollers feed long edge of paper against Jogger Fence to align paper.
- After paper is aligned against Jogger Fence, motor and solenoids turn off.

Slide 21

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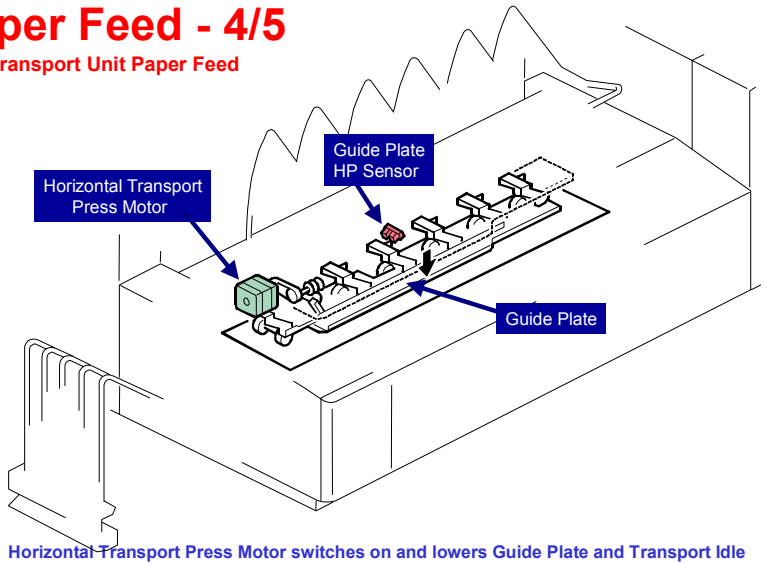
Paper Feed - 4/5

Transport Unit Paper Feed

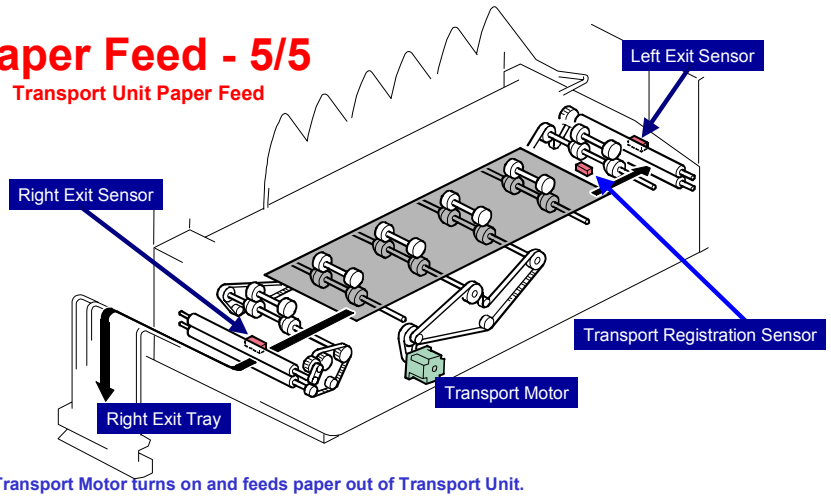


- Horizontal Transport Press Motor switches on and lowers Guide Plate and Transport Idle Rollers onto top of paper (flattening paper).
- After paper feeds to left or right, Press Motor reverses and raises Guide Plate.
- Guide Plate HP Sensor detects home position of Guide Plate (up) and switches off motor.

Slide 22

Paper Feed - 5/5

Transport Unit Paper Feed



- **Transport Motor turns on and feeds paper out of Transport Unit.**
- **If fan-folded paper is a non-standard size:**
  - Transport Motor feeds paper to right toward Right Exit Sensor.
  - Right Exit Sensor detects leading and trailing edges of paper as it is fed onto Right Exit Tray.
- **If fan-folded paper is standard paper size:**
  - Transport Motor feeds paper to left.
  - Transport Registration Sensor switches on and turns on; Press Motor raises and releases Guide Plate.
  - Transport Left Exit Sensor detects leading and trailing edges of paper as it leaves Transport Unit and enters Cross Unit.

Slide 23

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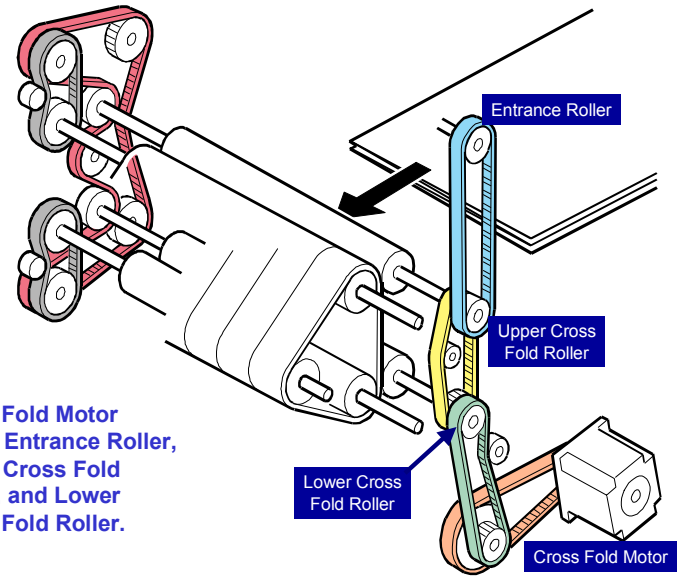
Cross Folding (1/4)

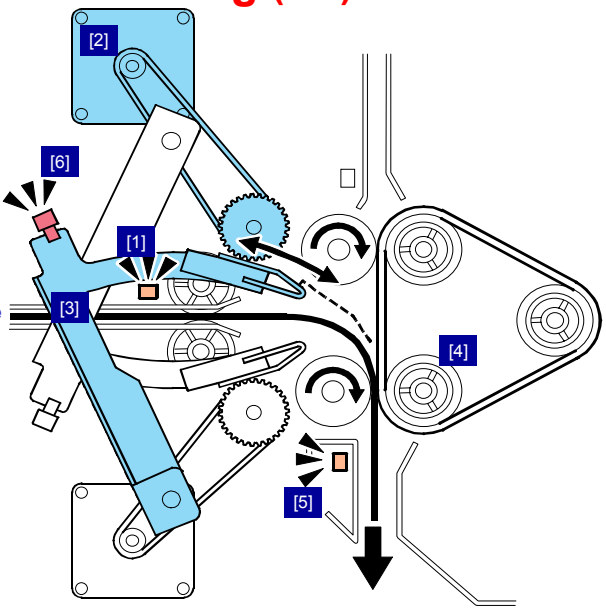


- Cross Fold Motor drives Entrance Roller, Upper Cross Fold Roller, and Lower Cross Fold Roller.

Slide 24

Cross Folding (2/4)

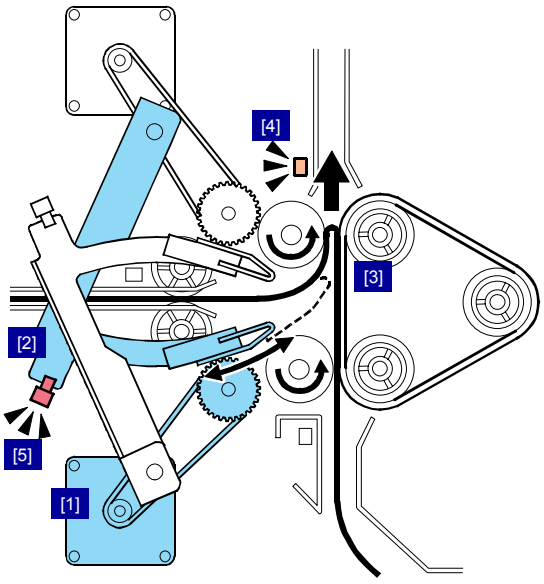
- Cross unit entrance sensor [1] detects leading edge of paper.
- Upper fold plate motor [2] lowers fold plate-1 [3], guiding leading edge down to lower cross fold rollers [4].
- Cross fold motor feeds paper prescribed distance past lower fold length sensor [5].
- Upper fold plate motor and cross fold motor stop and reverse.
- Upper fold plate HP sensor [6] detects home position of fold plate-1, stopping upper fold plate motor.



Slide 25

Cross Folding (3/4)

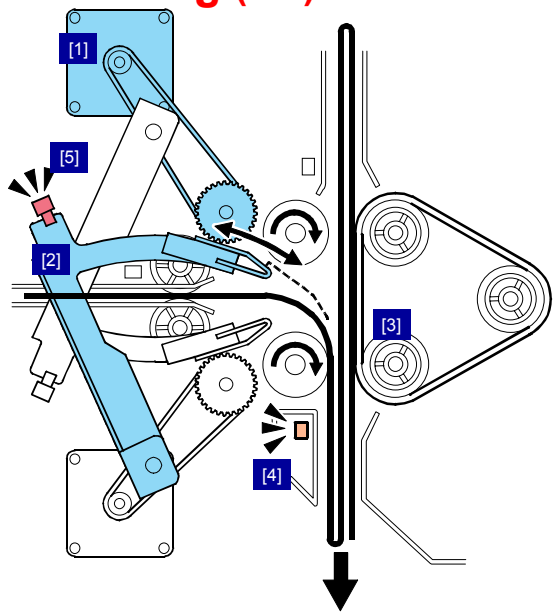
- Lower fold plate motor [1] raises fold plate-2 [2], pushing paper up into nip of upper cross fold rollers [3] to form first peak fold.
- Upper cross folder rollers feed paper prescribed distance past upper fold length sensor [4].
- Lower fold plate motor and cross fold motor stop and reverse.
- Lower fold plate HP sensor [5] detects fold plate-2, and stops lower fold plate motor.



Slide 26

Cross Folding (4/4)

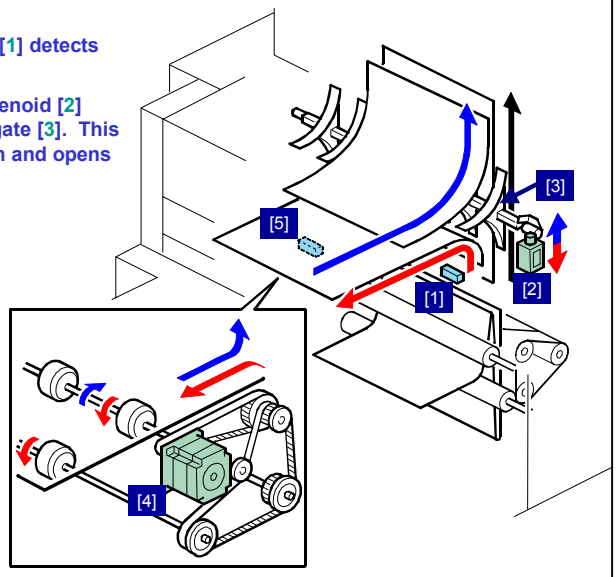
- Upper fold plate motor [1] lowers fold plate-1 [2], pushing paper down to nip of lower cross fold rollers [3] to form 1st valley fold.
- Cross fold rollers feed paper prescribed distance past lower fold length sensor [4].
- Upper fold plate and cross fold motor stop, and then reverse.
- Upper fold plate HP sensor [5] detects fold plate-1 and stops upper fold plate motor.



Slide 27

Inversion

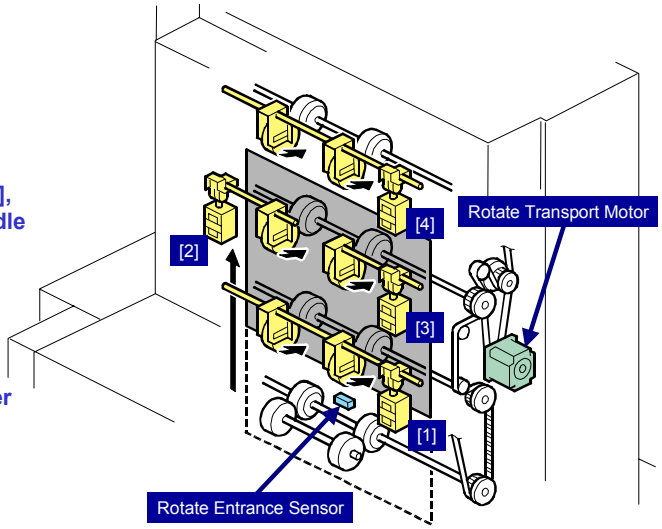
- Inverter entrance sensor [1] detects leading edge of paper.
- Inverter junction gate solenoid [2] closes inverter junction gate [3]. This closes vertical paper path and opens horizontal paper path.
- Invert transport motor [4] switches on and feeds paper toward invert exit sensor [5].
- Motor feeds paper prescribed distance past exit sensor and reverses.
- Paper feeds over top of closed junction gate to rotation unit above.
- Inverter junction gate solenoid opens vertical paper path for next sheet.



Slide 28

Rotation - 1/2

- Rotate Entrance Sensor detects leading edge of paper.
- Rotate Press Solenoids ([1], [2], [3], & [4]) press idle rollers against rotate unit feed rollers, allowing paper to feed.
- Rotate Transport Motor feeds paper prescribed distance past entrance sensor and then stops.



Slide 29

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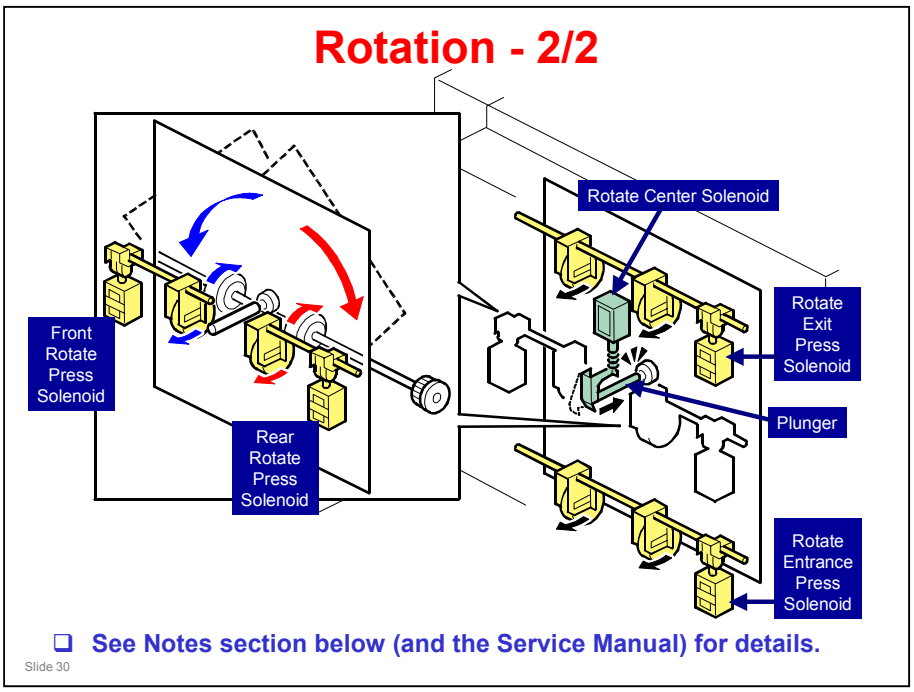


Rotate center solenoid goes ON and pushes plunger into center of paper.

The rotate entrance press solenoid and rotate exit press solenoid go off.

This retracts idle rollers from feed rollers. Paper, held in place by only rotate center solenoid and plunger, is released for rotation.

If paper will be rotated clockwise to front (90 degrees or 180 degrees):

- Front rotate press solenoid goes OFF. This retracts front idle roller from paper.

- Rear rotate press solenoid ON. Paper is in nip of rear idle roller and feed roller.

- Rotate transport motor (not shown) goes ON. Rotation of single rear roller pair rotates paper clockwise (90 degrees or 180 degrees) in direction of red arrow. Then motor goes OFF.

If paper will be rotated counter-clockwise to rear (90 degrees):

- Front rotate press solenoid goes ON. Paper is in nip of front idle roller and feed roller.

- Rear rotate press solenoid goes OFF. This retracts rear idle roller from paper.

- Rotate transport motor (not shown) goes ON. Rotation of single front roller pair rotates paper counter-clockwise (90 degrees) in direction of blue arrow. Then motor goes OFF.

After rotation:

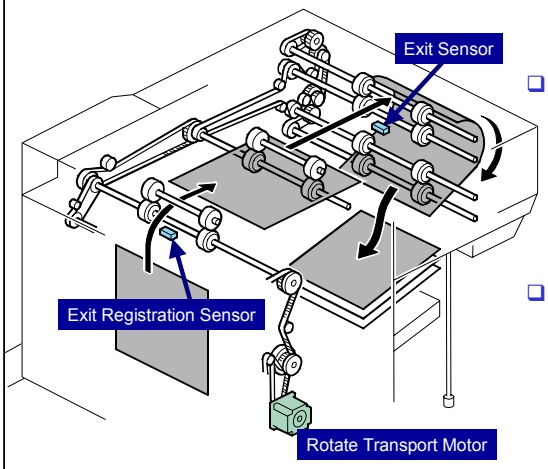
- Other solenoids in rotation unit go ON. This pushes all idle rollers against feed rollers and holds paper for feeding.

- Roll center solenoid goes OFF. This retracts plunger and frees paper for feeding.

- Rotate transport motor (not shown) goes ON. This feeds paper up and out of rotation unit.

Paper Exit and Stacking

Paper Exit



- **Rotate Transport Motor feeds paper out of Rotation Unit, past Exit Registration Sensor.**
- **Exit Registration Sensor detects leading and trailing edge of each sheet as it passes.**
  - This sensor will signal a jam, if paper fails to arrive or pass within prescribed time.
- **Exit Sensor detects leading and trailing edge of each sheet as it is output to shift tray.**
  - This sensor also signals a jam if paper fails to arrive or pass within prescribed time.

Slide 31

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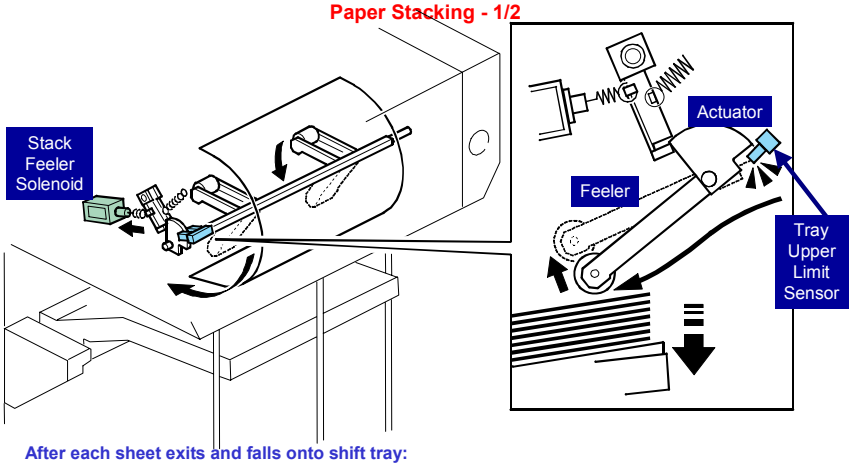
Paper Exit and Stacking

Paper Stacking - 1/2



- **After each sheet exits and falls onto shift tray:**
  - Stack Feeler Solenoid lowers feeler onto top of stack.
  - If Actuator remains up and does not enter gap of Tray Upper Limit Sensor, solenoid goes off and spring retracts feeler.
    - » Retracting the Feeler prevents it from interfering with next feed.
  - This cycle continues until stack is high enough to push Feeler up and Actuator down into gap of sensor, turning sensor on.
  - After sensor goes on, tray lift motor lowers tray 25mm so tray can accept more paper.

Slide 32

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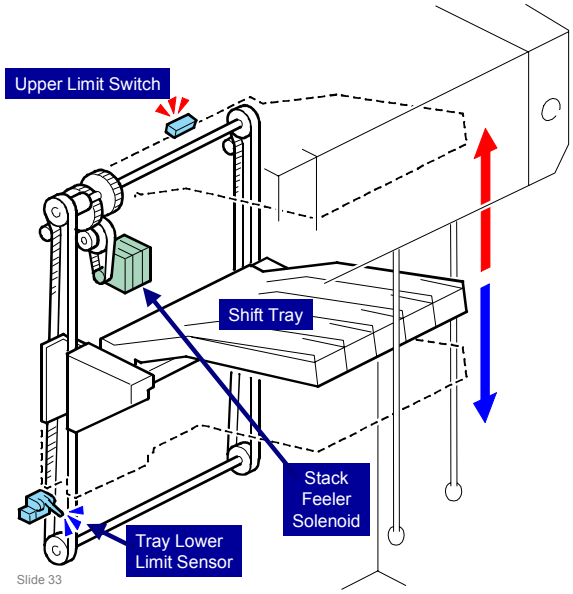
Paper Exit and Stacking

Paper Stacking - 2/2



- **If top of tray reaches Upper Limit Switch, and switches it on, this will cause motor to lower tray 25mm.**
- **If tray descends far enough to depress actuator of Tray Lower Limit Sensor, this signals tray is full and shuts down operation of system until some paper is removed from shift tray.**
  - Operation will resume automatically if a job is in progress.

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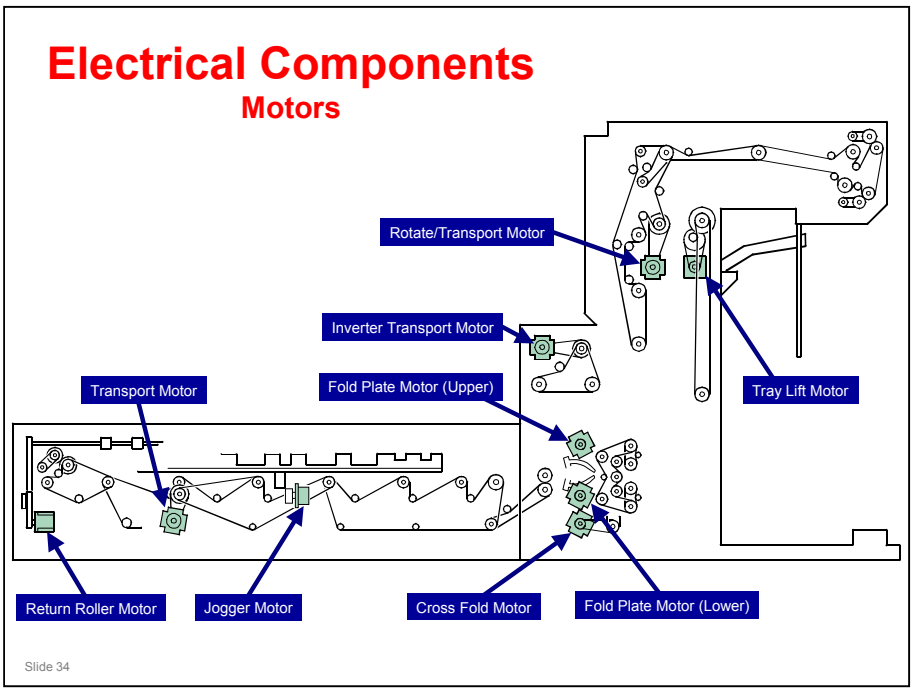
Electrical Components
Motors
Rotate/Transport Motor
Inverter Transport Motor
Transport Motor
Fold Plate Motor (Upper)
Tray Lift Motor
Return Roller Motor
Jogger Motor
Cross Fold Motor
Fold Plate Motor (Lower)
Slide 34

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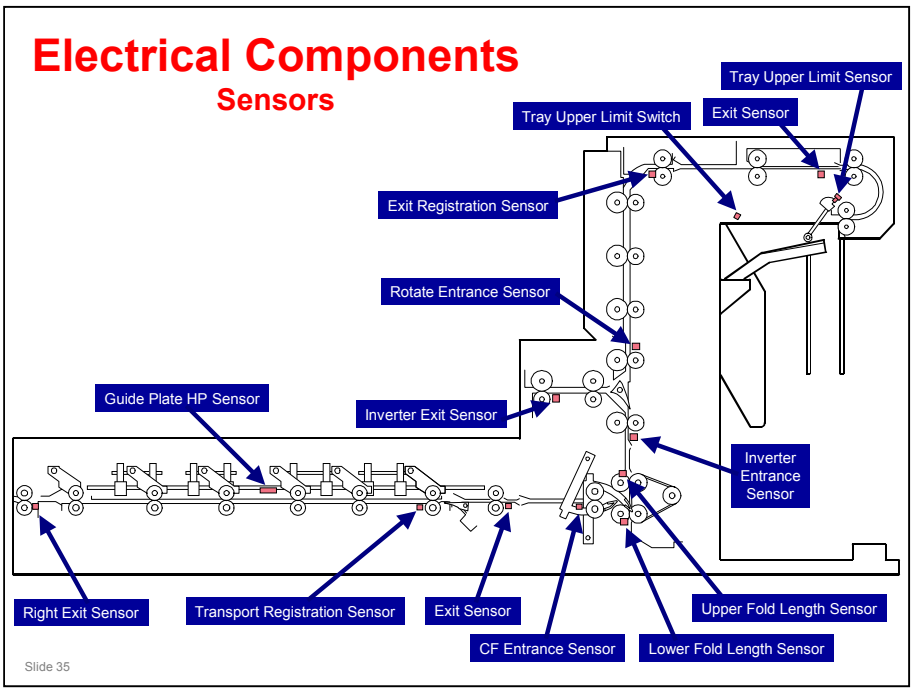
Electrical Components
Sensors
Tray Upper Limit Sensor
Tray Upper Limit Switch
Exit Sensor
Exit Registration Sensor
Rotate Entrance Sensor
Guide Plate HP Sensor
Inverter Exit Sensor
Inverter Entrance Sensor
Right Exit Sensor
Transport Registration Sensor
Exit Sensor
Upper Fold Length Sensor
CF Entrance Sensor
Lower Fold Length Sensor
Slide 35

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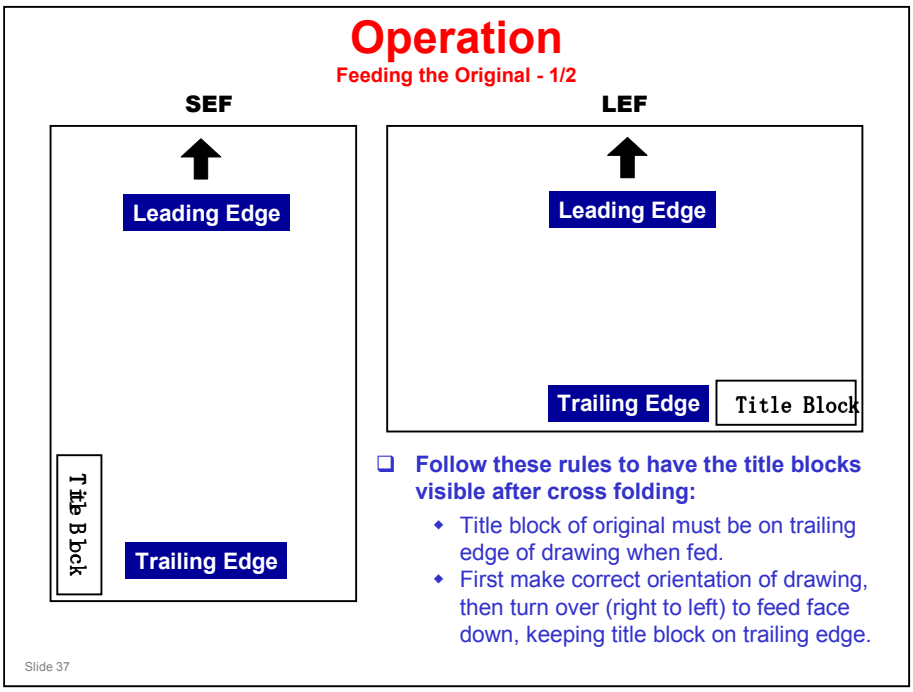
Operation

Slide 36

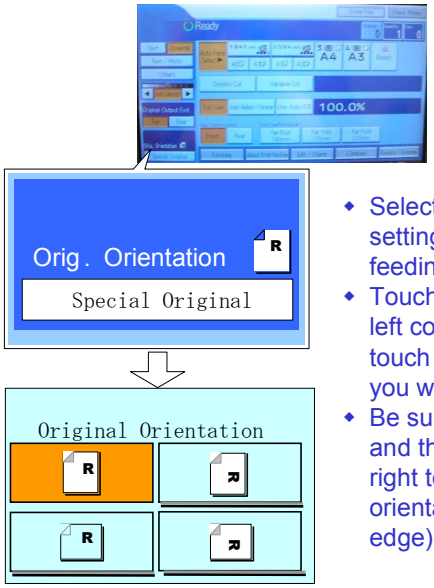


SEF – Short Edge Feed

LEF – Long Edge Feed

Operation

Feeding the Original - 2/2



- Select correct “Original Orientation” setting on operation panel before feeding original.
- Touch “Special Original” in lower left corner of operation panel, then touch the icon for the original that you want to copy.
- Be sure to orient paper face up, and then feed face down, turning right to left (to maintain correct orientation of title block on trailing edge).

Slide 38

Types of Folding

Cross Fold & Transport Unit

- **The machine will calculate the number of folds and orientation necessary for the title block to appear on the outside of the fan-folded and cross-folded output.**
  - Note:
  - You must first set the orientation of the original via Operation Panel (Org. Orientation) and the title block must be on the trailing edge.
  - The drawing must be fed (on feed table) face down.
- **Maximum number of folds for Fan Fold Unit**
  - Max. 30 times
- **Maximum number of folds for Cross Fold & Transport Unit**
  - Max. two folds (for three sections)

Slide 39


Firmware Update
Slide 40

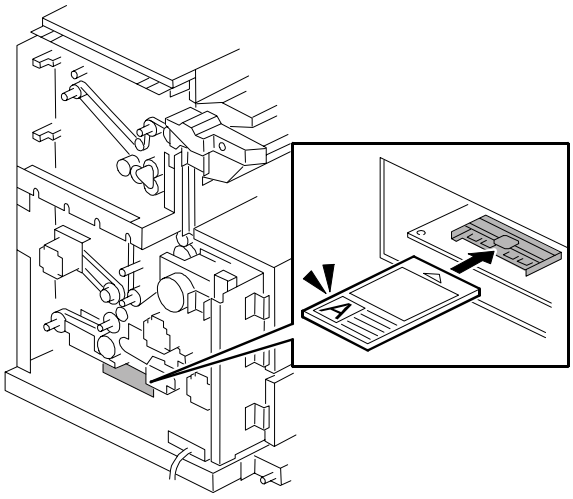
Firmware Update - 1/6

- **Prepare IC cards with update data for Fan Fold Unit and Cross Fold Unit (as there is no MCU board in the Transport Unit, there is no firmware update for it).**
- **Note: The firmware for the Fan Fold Unit and Cross Fold Unit must be on separate cards.**
  - They may be updated simultaneously however, with both cards placed in their respective slots.
- **Fan Fold Unit firmware cannot be updated from MCU slot of Cross Fold Unit, and Cross Fold Unit firmware cannot be updated from MCU slot of Fan Fold Unit.**

Slide 41

Firmware Update - 2/6

(Fan Fold Unit)



- ❑ Prepare IC card with new version of firmware.
- ❑ Switch off main machine.
- ❑ Switch off Cross Folder.
- ❑ Remove left upper cover and lower left cover.
- ❑ Insert IC card into slot of MCU board as shown at left.
- ❑ Switch on Cross Folder to start firmware update.
- ❑ Watch the LEDs on the PCB.

Slide 42

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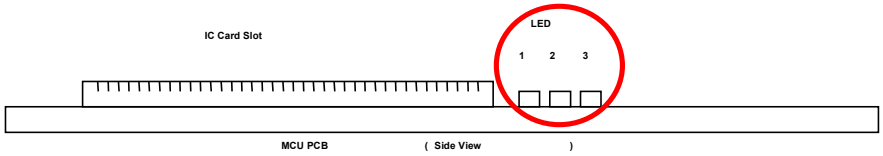
Firmware Update - 3/6
(Fan Fold Unit)

- **During installation:**
  - LED1 - Flashes; LED2 - On; LED3 - Off
- **Installation completed:**
  - LED1 - Flashes; LED2 - Off; LED3 - Off
- **When LED2 goes off, switch off the Cross Folder.**
- **Remove the card from the slot.**
- **During Normal operation:**
  - LED1 - Flashes; LED2 - Off; LED3 - Flashes



Slide 43

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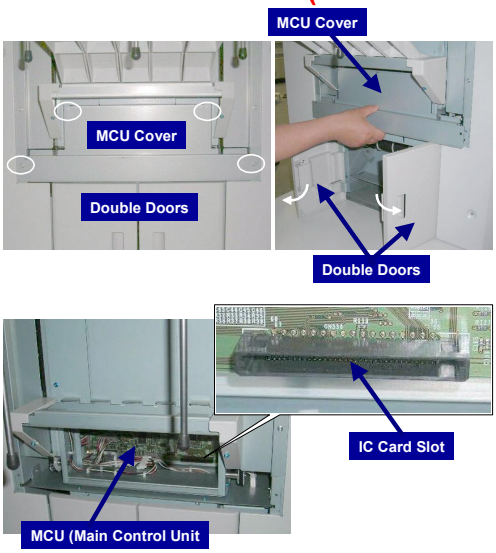
Firmware Update - 4/6

(Cross Fold Unit)



- To remove MCU (Main Control Unit) cover, first remove four screws (circled at left)
- Open double doors
- Remove MCU cover
- The IC card slot is on the MCU

Slide 44

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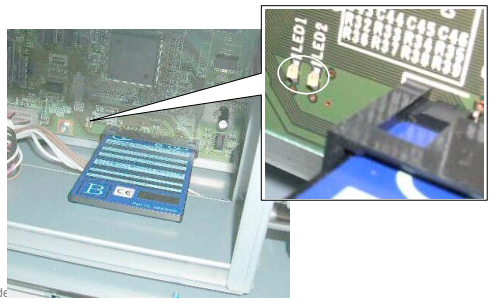
Firmware Update - 5/6

(Cross Fold Unit)



- **Insert IC card into slot with “B” side facing up as shown**
- **Turn on main unit power switch**
- **Firmware download begins**
  - While downloading is in progress LED1 (on left) remains ON and LED2 (on right) flashes rapidly.
  - Download requires about 3 min. to finish.
  - When downloading is finished, left LED goes OFF, and right LED flashes continuously twice rapidly, followed by long pause.

Slide

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Firmware Update - 6/6
(Cross Fold Unit)

- Switch off Cross Folder.
- Remove IC card from its slot.
- Switch Cross Folder on. Left LED will remain ON and right LED will flash slowly. This indicates that unit is in normal mode.
- Switch off Cross Folder and reassemble.

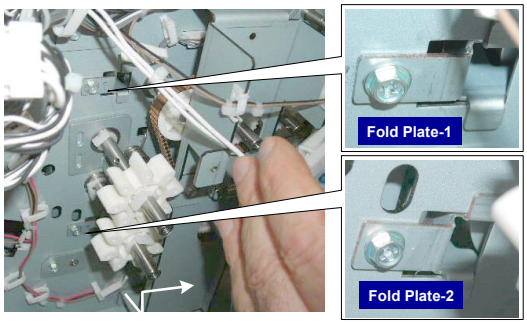
Slide 46

Replacement & Adjustment

Slide 47

PM Parts

Fold Plate Stoppers



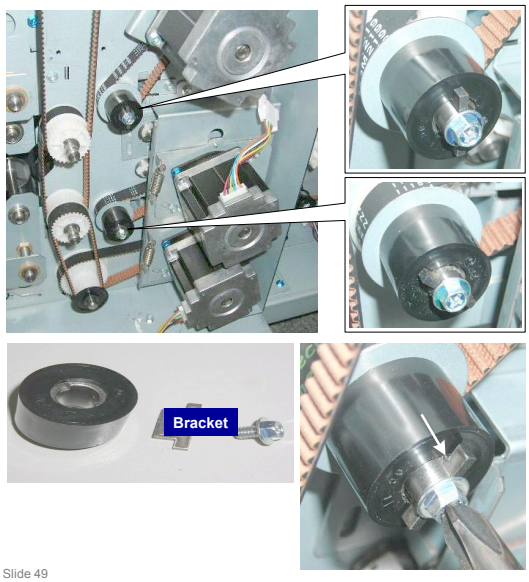
- Fold Plate-1 (upper) stopper bracket
- Fold Plate-2 (lower) stopper bracket
- See FSM for details

Slide 48

Note: You do not need to remove the door unit.

PM Parts

Fold Plate Motor Torque Limiters

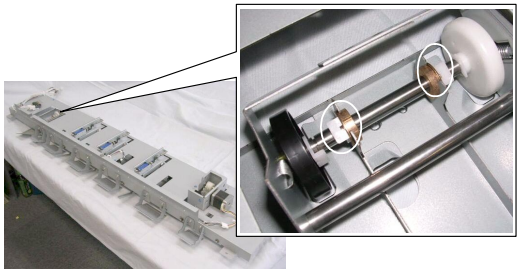


- **Make sure that bracket is flush against top of Torque Limiter**
  - Torque Limiter may need to be rotated to left or right until bracket is seated completely.
- **For details, see FSM**

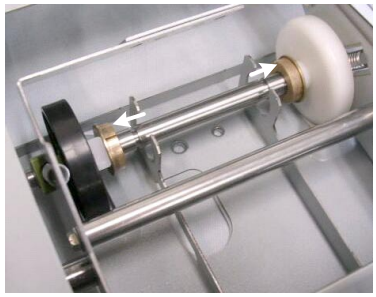
Slide 49

PM Parts

Idle Roller Shafts - 1/4



- Remove guide plate unit and sit it on a clean, flat surface.
- Remove two C-clamps.

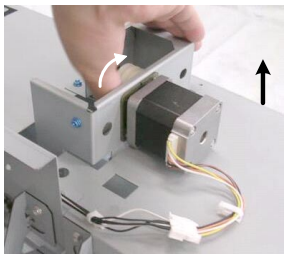


- Push the bushings away from the bracket.

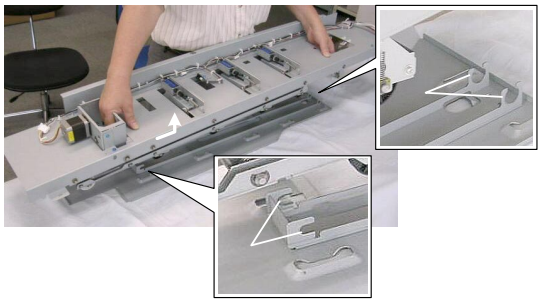
Slide 50

PM Parts

Idle Roller Shafts - 2/4



- Rotate drive gear of motor to raise plate.



- Shift plate slightly to disengage two brackets.
- Lift plate to separate unit.

Slide 51

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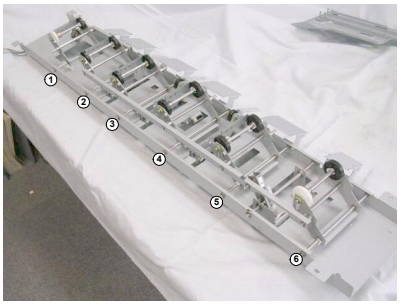
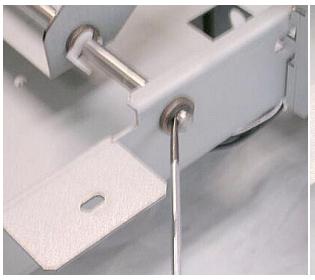
PM Parts

Idle Roller Shafts - 3/4



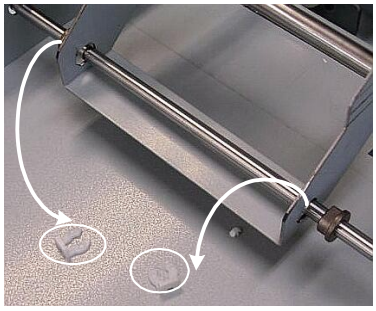
- Six idle roller shafts to be replaced.



- Release one end of shaft.
- Repeat procedure to release other end of shaft.
- Note: Remove only one idle roller shaft at a time in order to maintain overall alignment.

PM Parts

Idle Roller Shafts - 4/4



- Remove C-clamps at each side of bracket.

- Remove shaft.

Slide 53

Note: Remove only one idle roller shaft at a time in order to maintain overall alignment.

PM Parts

- **PM Parts**
  - Fold Plate Stoppers
  - Fold Plate Motor Torque Limiters
  - Idle Roller Shafts
- **See the following slides and the Service Manual for details**

Slide 54

Specifications

- **Fold sizes:**
  - Standard Fold (cross fold)
    - » NA: Four patterns
      - – Fold width: Engineering: 8.5 to 11”
      - – Architecture: 9 to 12”
    - » EU: Five patterns
      - – Fold width: A4
  - NA Patterns
    - » Margin fold
    - » Standard fold
    - » Special fold 1
    - » Special fold 2
  - EU Patters
    - » Standard fold
    - » Narrow standard fold
    - » Margin fold
    - » Special fold 1
    - » Special fold 2
- **For full specifications, see the specifications listed in the FSM (Field Service Manual) Appendix.**

Slide 55

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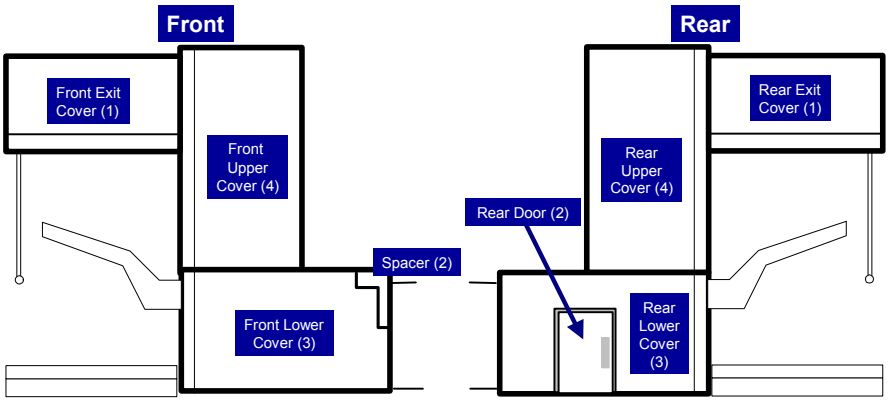
Common Procedures

- **Cross Fold Unit Covers**
  - Rear Covers
  - Front Covers
  - Top Exit Cover
- **Tray Lift Unit**
- **Separating the Cross-Fold Unit and Transport Unit**
- **Transport Unit Covers**
  - Transport Unit Rear Corner Cover
  - Transport Unit Rear Cover
  - Transport Unit Right Cover
  - Connection Cover
  - Top Cover
- **Guide Plate Unit**
- **Transport Entrance Unit**

Slide 56

For details and photos, see the FSM (Field Service Manual).

Cover Removal (Transport Unit & Cross Fold Unit)



- **The front covers must be removed in this order:**
  - 1) Front exit cover
  - 2) Spacer
  - 3) Front lower cover
  - 4) Front upper cover

- **The rear covers must be removed in this order:**
  - 1) Rear exit cover
  - 2) Rear door
  - 3) Rear lower cover
  - 4) Rear upper cover

Slide 57

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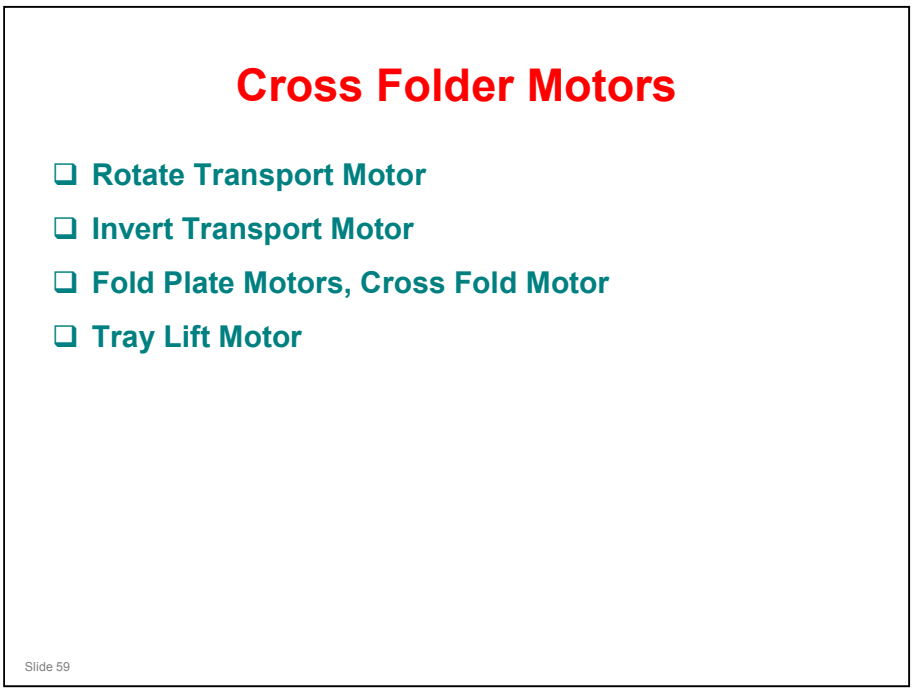
Cross Folder Sensors, Switches

- Exit Safety Switch
- Tray Upper Limit Sensor
- Tray Upper Limit Sensor, Exit Sensor, Top Cover Switches
- Tray Lower Limit Sensor
- Left Double-Door Switches
- Rotate Unit Door Switch
- Exit Registration Sensor
- Inverter Entrance Sensor, Rotate Entrance Sensor
- Inverter Exit Sensor
- Cross Fold Entrance Sensor
- Fold Length Sensor (Upper)
- Fold Length Sensor (Lower)
- Fold Plate Sensors
- Rear Door Switch

Slide 58

For details and procedures, see the Service Manual.



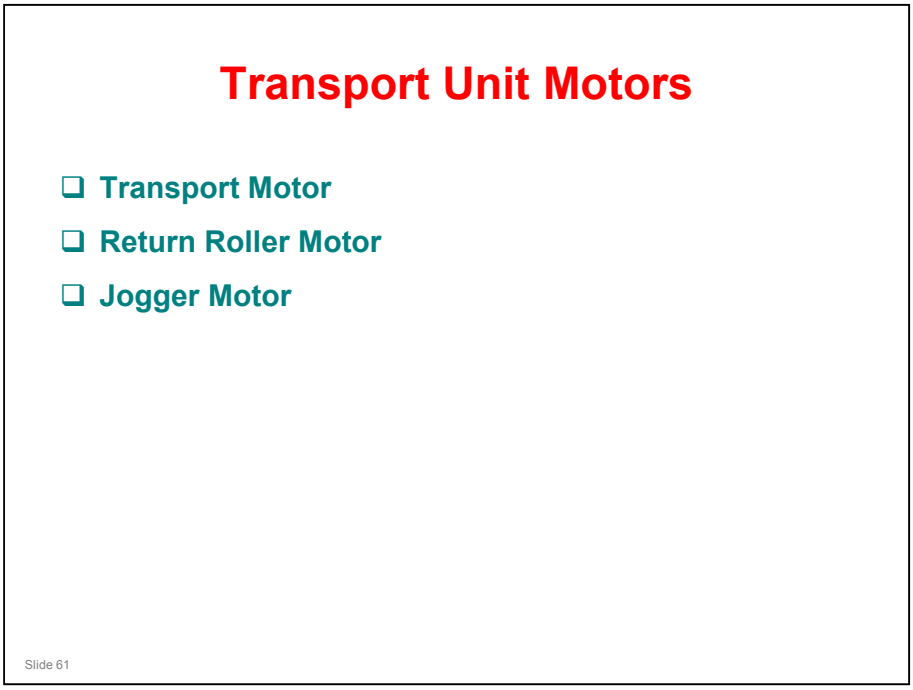
For details and procedures, see the Service Manual.

Transport Unit Sensors, Switches

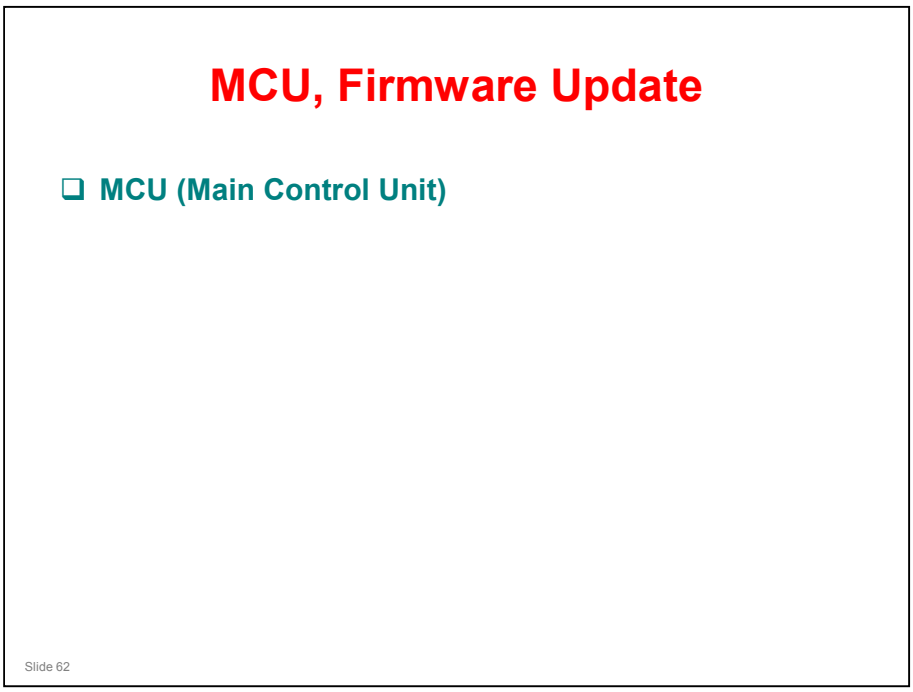
- Transport Exit Sensor
- Rear Upper Door Switches
- Horizontal Guide HP Sensor
- Transport Registration Sensor
- Right Exit Sensor
- Jogger Fence HP Sensor
- Transport Entrance Sensor

Slide 60

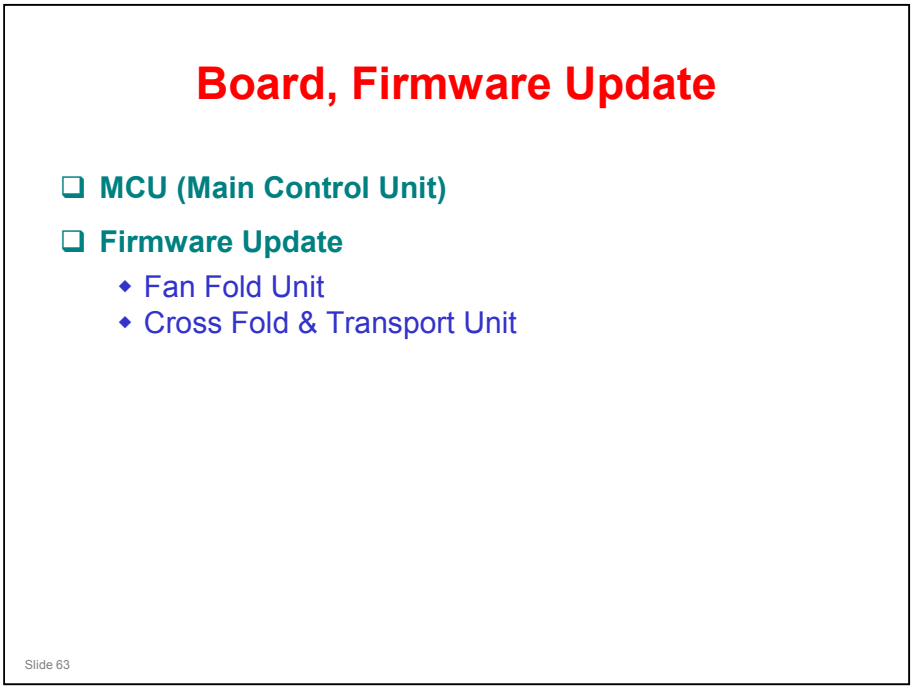
For details and procedures, see the Service Manual.



For details and procedures, see the Service Manual.



For details and procedures, see the Service Manual.

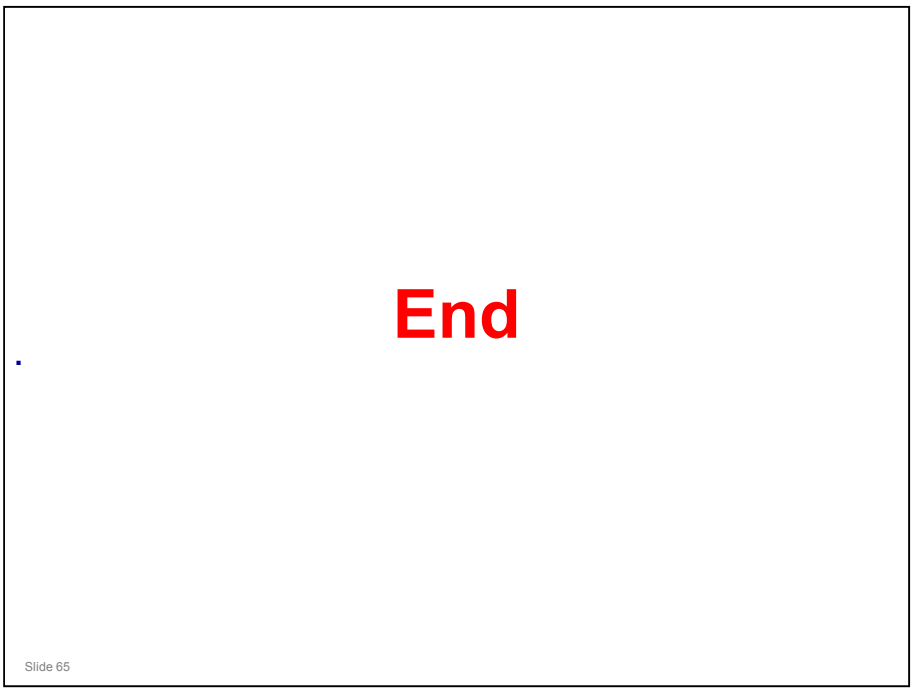


For details and procedures, see the Service Manual.

Reference Material

- **See also the following reference material:**
- **Main Machine Field Service Manual (D046/D049)**
  - Installation
  - Replacement and Adjustment
  - Appendix
- **Operating Instructions**

Slide 64


End
Slide 65

Specifications

- **Following are some examples of the fold sizes available:**
  - Standard Fold
    - » Used for drawings - A4 (81/2" × 11").
  - Narrow Standard Fold
    - » Used for fitting prints into ring binder pouch - 170–297 mm (65/8"–11").
  - Margin Fold
    - » Used for prints with binding margins - A4 (81/2" × 11").
  - Special Fold1, Special Fold2
    - » “Special Fold 1” folds drawings in the normal way. The sheets are folded into A4L size (only with certain sheet sizes).
    - » “Special Fold 2” allows specifying number of cross-folds for Margin Fold, with certain sheet sizes. (However, when folding 48” × 36” sheets, only A4K may be selected as the folded size.)

Slide 66

Overview - What is the Cross-Folder Unit?

- **The machine rotates fan-folded prints and then folds them in the opposite direction to the original folds - creating ready-to-use blueprints, schematics, etc.**
- **Following are some examples of the fold sizes available:**
  - Standard Fold
    - » Used for drawings - A4K (81/2" × 11").
  - Narrow Standard Fold
    - » Used for fitting prints into ring binder pouch - 170–297 mm (65/8"–11").
  - Margin Fold
    - » Used for prints with binding margins - A4 (81/2" × 11").
  - Special Fold1, Special Fold2
    - » “Special Fold 1” folds drawings in the normal way. The sheets are folded into A4L size (only with certain sheet sizes).
    - » “Special Fold 2” allows specifying number of cross-folds for Margin Fold, with certain sheet sizes. (However, when folding 48” × 36” sheets, only A4K may be selected as the folded size.)

Slide 67