SERVICE MANUAL

SSH010F

EPSON EPL-N4000/EPL-N4000+

OPTIONAL FINISHER STAPI

Notice

- All effort have been made to ensure the accuracy of the contents of this manual. However, should any errors be detected, SEIKO EPSON would greatly appreciate being informed of them.
- The contents of this manual are subject to change without notice.
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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1)Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/ RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, and repair procedures of EPL-N4000/N-400+ Optional Finisher Stapler. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Contents

This manual consists of three chapters and Appendix.

CHAPTER 1. PRODUCT DESCRIPTIONS
Provides a general overview and specifications of the product.

CHAPTER 2. OPERATING PRINCIPLES
Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY
Describes the step-by-step procedures for disassembling and assembling the product.

APPENDIX Provides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Exploded diagram

Symbols Used in This Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read WARNING, CAUTION or NOTE messages.

Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.

Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.

May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

Revision Status

Revision	Issued Date	Description
Rev. A	September 16, 1999	First Release

Contents

Appendix

CHAPTER

1

PRODUCT DESCRIPTION

1.1 Outline

This chapter describes the specification of the Finisher Stapler.

1.1.1 General Specification (TBD)

STRUCTURE

Finisher Stapler is the option of the EPSON EPL-N4000/EPL-N4000+. It is consists of hirizontal transport unit and stack tray unit. Hirizontal transport uit is installed to the face down output tray of the printer, and stack tray is installed to the right side of the printer.

NOTE: *Finisher Stapler cannot be used with 10 pin multipin.*

FUNCTION

- ☐ Stapling at the specified position.
- ☐ Three ejecting paper stack trays

PAPER

Refer to product specification for EPSON EPL-N4000/EPL-N4000+.

ELECTRIC POWER CONSUMPTION (TBD)

55W (110VAC)

NOISE (TBD)

Continuous noise on the job: max. 72.8dB

SIZE AND WEIGHT

- ☐ Dimensions:1,133 x 633 x 658 mm (HxWxD)
- ☐ Weight:58kg

1.1.2 Stapler Specification (TBD)

STAPLE (TBD)

- ☐ Maximum amount of paper:50 sheets (paper: Xerox DP 20lb)
- ☐ Staple position:Front, Rear (Corner), Rear (Straight), Multiple staple

STAPLE CARTRIDGE (TBD)

5000 staples

1.1.3 Compiler Specification (TBD)

COMPILER

Ejected paper is stacked on the Complier Tray, jogged by the tamper to the front, and sent to the Stacker.

MAXIMUM SETTABLE AMOUNT OF PAPER

50 sheets

MINIMUM PAPER WIDTH

210mm

1.1.4 Stacker Specification (TBD)

STACKER

Tray: 3

PAPAER CAPACITY

- ☐ Without Staple:500 sheets/tray
- ☐ With staple:Max. 30 sets or 600 sheets/tray
  - ■ Real Staple Mode:15 sheets (B5 LEF, B5, B4 SEF)
  - ■ Multiple Staple Mode:15 sheets (B5, SEF)

NOTE: *LEF= Long Edge First, SEF= Short Edge First*

1.1.5 Offset Specification (TBD)

OFFSET (TBD)

By shifting the ejecting roller, the Finisher Stapler can eject paper 15mm offset.

CHAPTER

2

OPERATING PRINCIPLES

2.1 Power Supply

The Power Supply of the Finisher Stapler is supplied by the 100V AC via the printer and generated by the LVP PWB in the Finisher Stapler.

2.1.1 Control over the Finisher Stapler

LVPS sends the sensor data in the Finisher Stapler to the MCU of the printer. Commands from the MCU of the printer is transferred to the Finisher PWB and controls over respective components of the Finisher Stapler.

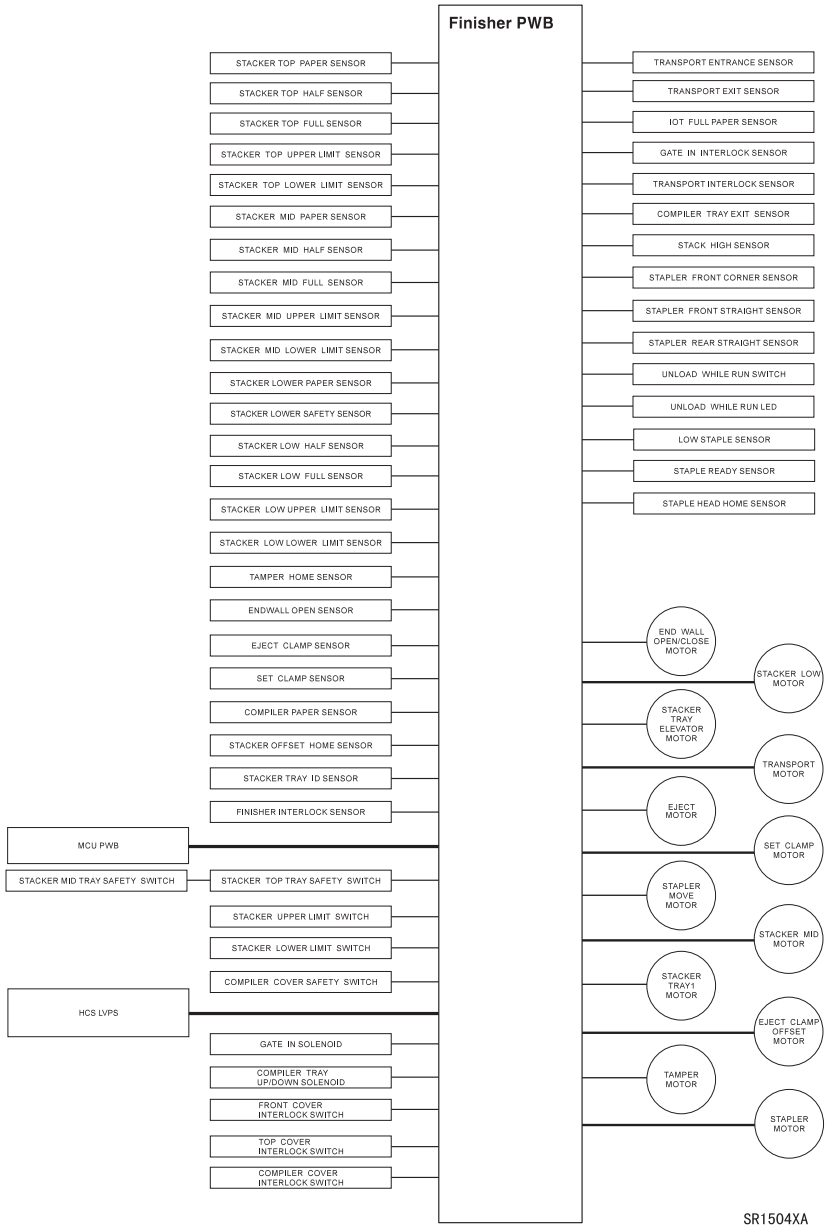

Figure 2-1. Components

2.1.2 Control Main Parts of the Finisher Stapler

- ☐ Finisher PWB
  LVPS PWB sends sensor data in the Finisher Stapler to MCU of the printer. Commands from the MCU of the base engine is transferred to the Finisher PWB and controls over respective components of the Finisher Stapler.
- ☐ HCS Low Voltage Power Supply
  Generates +5VDC and +24VDC from 100VAC.
- ☐ Unload While Run Switch and LED
  This switch is for user to interrupt Finisher Stapler when it is proceeding its job.
  LED flashes when interruption is made.
- ☐ Finisher Interlock Sensor
  Supervises that the door of the Finisher Stapler is not open.
- ☐ Front Cover Interlock Switch
  When Front Cover is open, shut off 24VDC.
- ☐ Compiler Cover Safety Switch
  When Compiler Cover is open, shut off 24VDC.
- ☐ Top Tray Safety Switch
  Detects if there are any obstructions under the Top Tray and shut off +24VDC and stop the Elevator Motor.
- ☐ Middle Tray Safety Switch
  Detects if there are any obstructions under the Middle Tray and shut off +24VDC and stop the Elevator Motor. Top Tray Safety Switch and Middle Tray Safety Switch are connected in series.

2.1.2.1 Transport

Shift paper from DDC to Compiler.

- ☐ IN Gate Solenoid
  Alternate the direction of IN Gate.
- ☐ IN Gate Interlock Sensor
  Supervises the position of IN Gate. (Up/Down)
- ☐ Transport Entrance Sensor
  Supervises paper passing to Transport Assembly.
- ☐ IOT Full Paper Sensor
  Supervises the amount of paper on the eject tray of the printer.
- ☐ Transport Exit Sensor
  Supervises paper passing from Transport Assembly.
- ☐ Transport Interlock Sensor
  Supervises the condition of the Transport Cover.
- ☐ Transport Motor
  Drives Transport Rolls.

2.1.2.2 Compiler

Compiler arranges paper as set.

- ☐ Tamper Motor
  Drives Tamper which pushes paper to the end.
- ☐ Tamper Home Sensor
  Supervises the position of the Tamper.

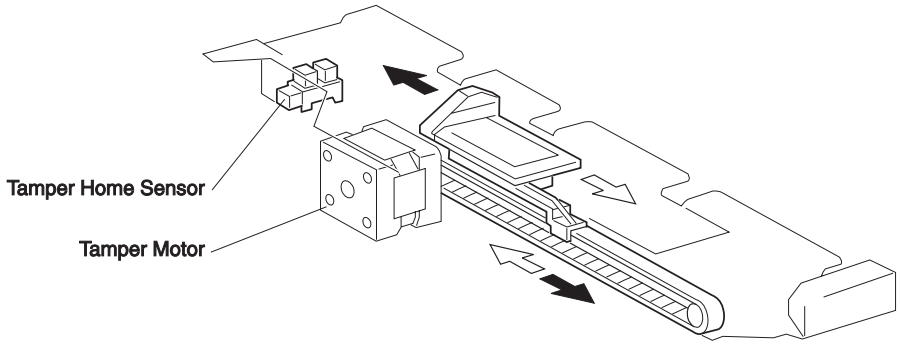

Figure 2-2. Tamper/Tamper Home Sensor

- ☐ Compiler Tray Up/Down Solenoid
  Slant Compiler Tray when the amount of paper has reached twenty five.

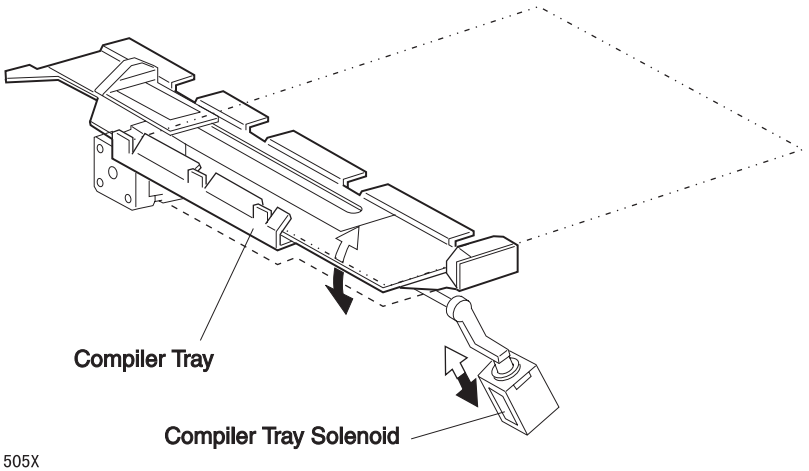

Figure 2-3. Compiler Tray Up / Down Solenoid

- ☐ End Wall Open/Close Motor
  Controls opening and closing of the End Wall.
- ☐ End Wall Open Sensor
  Supervises the position of the End Wall.
- ☐ Compiler Tray Exit Sensor
  Supervises paper ejecting through the entrance of the Compiler. HCS uses the signal from the sensor to determine start and stop of the Transport Motor and Eject Motor.
- ☐ Compiler Paper Sensor
  Supervises paper on the Compiler Tray.
- ☐ Compiler Cover Interlock Switch
  Supervises the position of the Compiler Cover.

2.1.2.3 Stapler

Stapler bundles paper with staple.

- ☐ Stapler Front Corner Sensor
  Commands the position where Stapler Unit staples at the front corner of paper.
- ☐ Stapler Front Straight Sensor
  Commands the position of the Stapler Unit as the Move Motor can drive Stapler until the Stapler Unit comes to the staple position at the front and rear edge of paper.
- ☐ Stapler Rear Straight Sensor
  Commands the position of the Stapler Unit as the Move Motor can drive Stapler until the Stapler Unit comes to the staple position at the rear corner of paper.
- ☐ Stapler Move Motor
  Shift the Stapler Head to the Staple position.

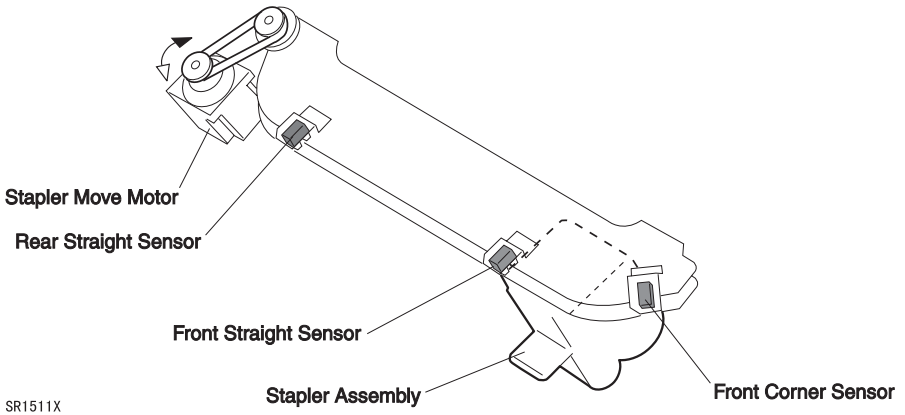

Figure 2-4. Stapler / Sensors

- ☐ Stapler Motor
  Drives Stapler Head during stapler stapling paper.
- ☐ Staple Ready Sensor
  Supervises the existence of the staple in Staple Head.
- ☐ Low Staple Sensor
  Supervises the remaining of the staple in Stapler.
- ☐ Stapler Head Home Sensor
  Supervises if the Stapler Head is at the home position.
- ☐ Set Clamp Home Sensor
  Supervises if the Set Clamp is at the home position.

- Set Clamp Motor
  Drives Set Clamp paddle to clamp paper on the Compiler Tray before stapling.

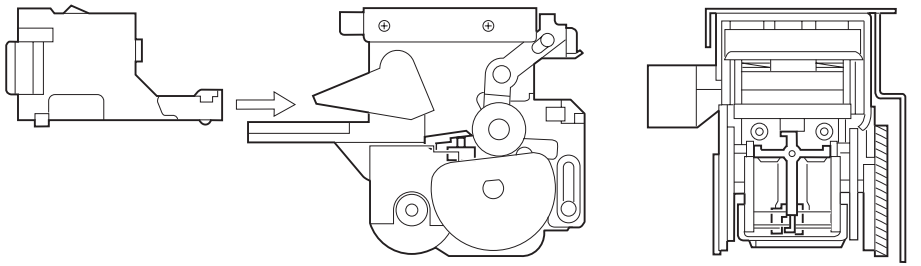

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Figure 2-5. Stapler

2.1.2.4 Eject and Offset

Eject and Offset carries paper compiled on the Stacker Tray and ejects offset paper.

- Eject Clamp and Offset Motor
  Drives Eject Chute and Pinch Roll by shifting Eject Chute and Pinch Roll up and down.
- Eject Clamp Sensor
  Supervises if Eject Roll is at the upper position or at the lower position.
- Stacker Offset Home Sensor
  Supervises if Eject Roll is at the home position.
- Eject Motor
  Drives Eject Shaft Assembly.

2.1.2.5 Stacker Unit

Provides function to shift three Stacker Tray up and down.

- Stacker Tray Elevator Motor
  Revolves Stacker Drive shaft clockwise or counterclockwise and shifts Stacker Tray up and down.
- Stacker Tray ID Sensor
  Supervises the right position of the Tray.
- Stacker Upper Limit Switch
  Detects the upper limit of the Stacker Tray. The switch shut off the DC power supply to the Elevator Motor.
- Stacker Lower Limit Switch
  Detects the lower limit of the Stacker Tray. The switch shut off the DC power supply to the Elevator Motor.
- Stacker Lower Safety Switch
  Supervises the obstruction under the Bottom Tray.
- Stack Height Sensor
  Supervises the Tray position.

2.1.2.6 Stacker Top Tray

Provides function to shift Top Stacker Tray up and down.

- Stacker Tray 1 Motor
  Shifts Top Tray up and down.
- Stacker Top Paper Sensor
  Detects if there are paper on the Top Tray.
- Stacker Top Full Sensor
  Detects if paper on the Top Tray is full.
- Stacker Top Half Sensor
  Detects if paper on the Top Tray is 50% full.
- Stacker Top Upper Limit Sensor
  Detects the upper limit of the Top Tray. The sensor sends signal to Finisher Stacker PWB to shut off the DC power supply to the Stacker Tray 1 Motor.
- Stacker Top Lower Limit Sensor
  Detects the lower limit of the Top Tray. The sensor sends signal to Finisher Stacker PWB to shut off the DC power supply to the Stacker Tray 1 Motor.

2.1.2.7 Stacker Middle Tray

Provides function to shift Middle Stacker Tray up and down.

- ☐ Stacker Middle Motor
  Shifts Middle Tray up and down.
- ☐ Stacker Middle Paper Sensor
  Detects if there are paper on Middle Tray.
- ☐ Stacker Middle Full Sensor
  Detects if paper on Middle Tray is full.
- ☐ Stacker Middle Half Sensor
  Detects if paper on Middle Tray is 50% full.
- ☐ Stacker Middle Upper Limit Sensor
  Detects the upper limit of Middle Tray. The sensor sends signal to Finisher PWB to shut off the DC power supply to the Stacker Middle Motor.
- ☐ Stacker Middle Lower Limit Sensor
  Detects the lower limit of Middle Tray. The sensor sends signal to Finisher PWB to shut off the DC power supply to the Stacker Middle Motor.

2.1.2.8 Stacker Bottom Tray

Provides function to shift Bottom Stacker Tray up and down.

- ☐ Stacker Low Motor
  Shifts the Bottom Tray up and down.
- ☐ Stacker Low Paper Sensor
  Detects if there are paper on the Bottom Tray.
- ☐ Stacker Low Full Sensor
  Detects if paper on the Bottom Tray is full.
- ☐ Stacker Low Half Sensor
  Detects if paper on the Bottom Tray is 50% full.
- ☐ Stacker Low Upper Limit Sensor
  Detects the upper limit of Bottom Tray. The sensor sends signal to Finisher PWB to shut off the DC power supply to the Stacker Bottom Motor.
- ☐ Stacker Low Lower Limit Sensor
  Detects the upper limit of Bottom Tray. The sensor sends signal to Finisher PWB to shut off the DC power supply to the Stacker Bottom Motor.

2.2 Transmission of the Driving Force

2.2.1 Transport Motor

Transport Motor is in the Compiler of the Finisher Stapler.

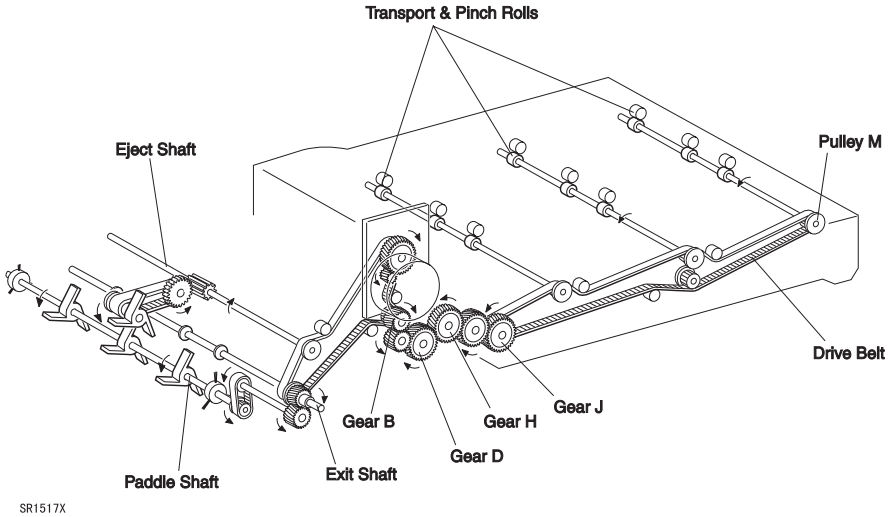

Figure 2-6. Transport Driving Mechanism

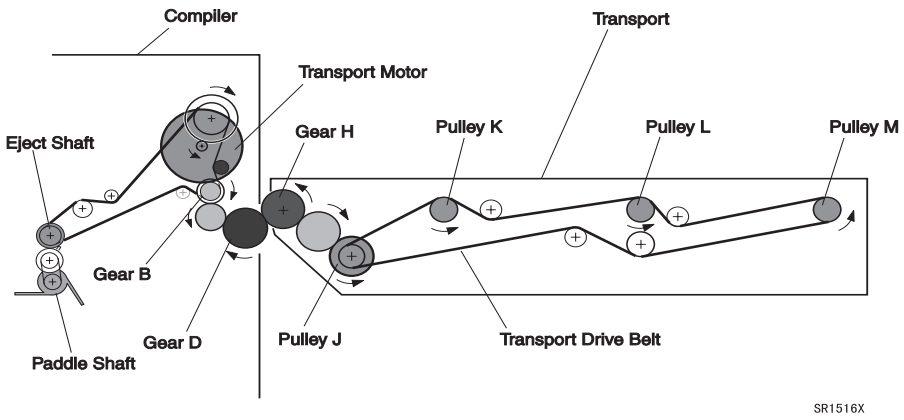

Figure 2-7. Driving Force Transmission Outline

2.2.2 Eject Motor

Finisher PWB revolves the Eject Motor clockwise to eject paper to the Stacker Tray. Finisher PWB also revolves the Eject Motor counterclockwise to pull paper back to the Compiler Tray.

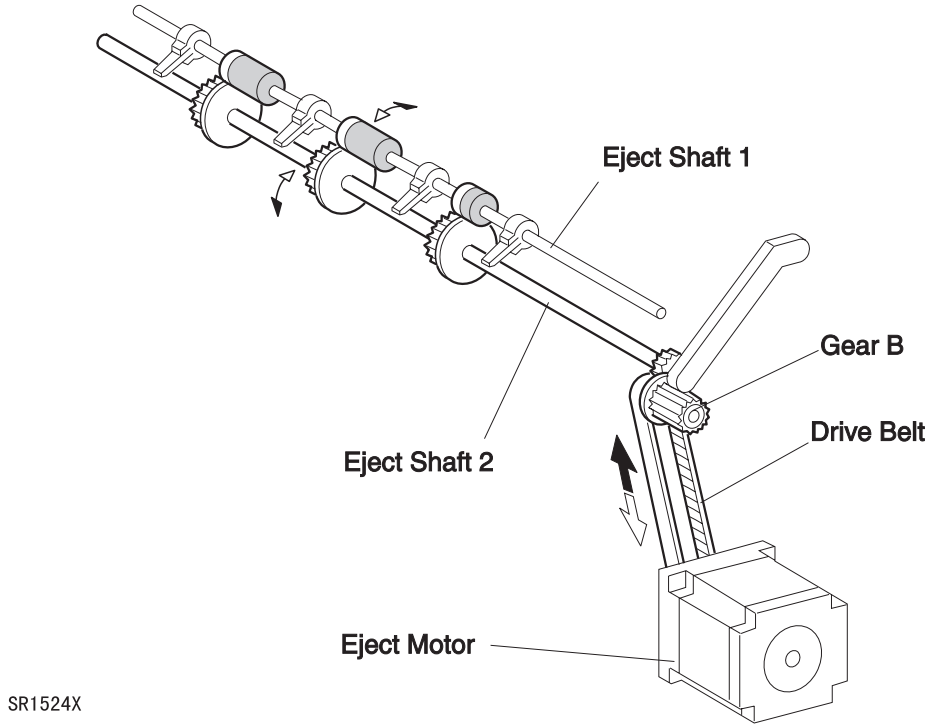

Figure 2-8. Eject Motor

2.2.3 End Wall Motor

End Wall Motor shifts the End Wall of the Compiler Tray. When paper is sent to the Compiler Tray, End Wall Motor shifts up the End Wall. When paper is stapled, End Wall Motor shifts down the End Wall.

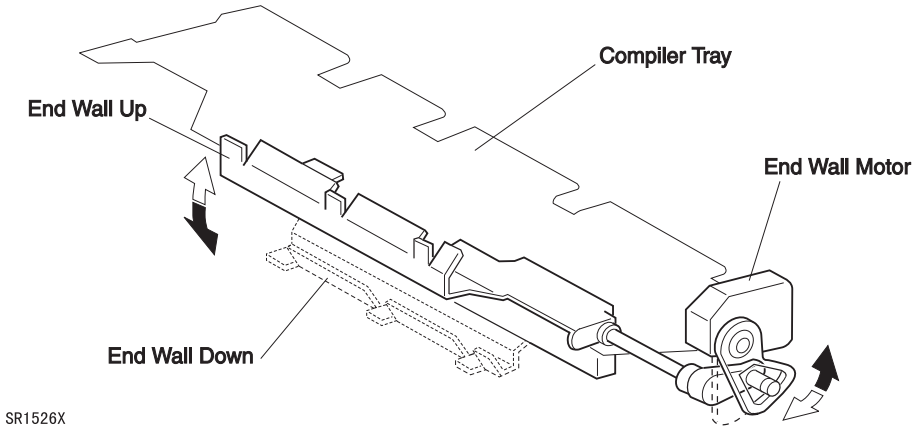

Figure 2-9. End Wall Motor

2.2.4 Tamper Motor

Tamper Motor drives the Tamper.

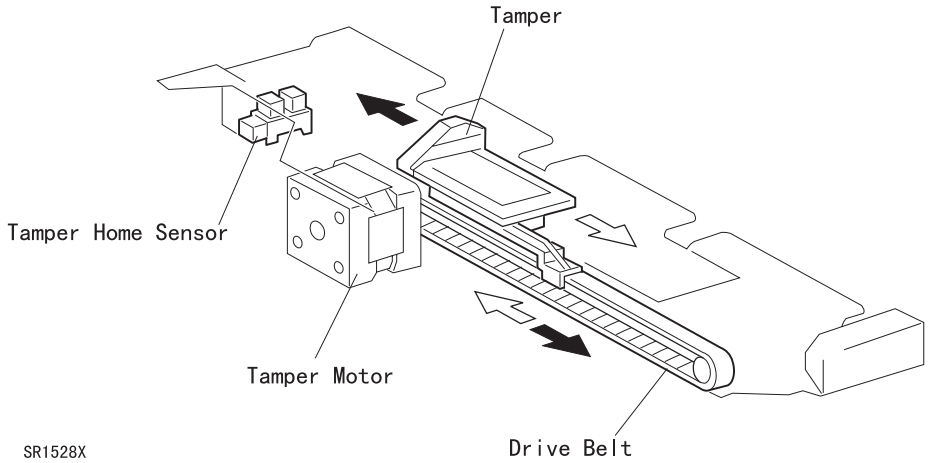

Figure 2-10. Tamper Motor Working Part

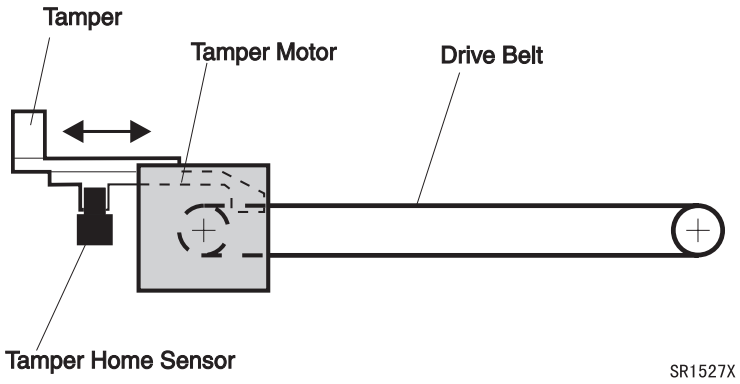

Figure 2-11. Tamper Motor Operational Outline

2.2.5 Set Clamp Motor

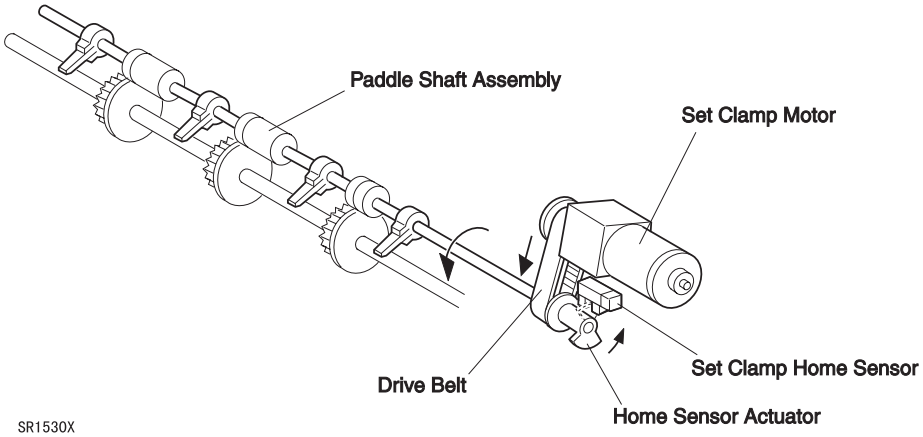

Figure 2-12. Set Clamp Motor Working Part

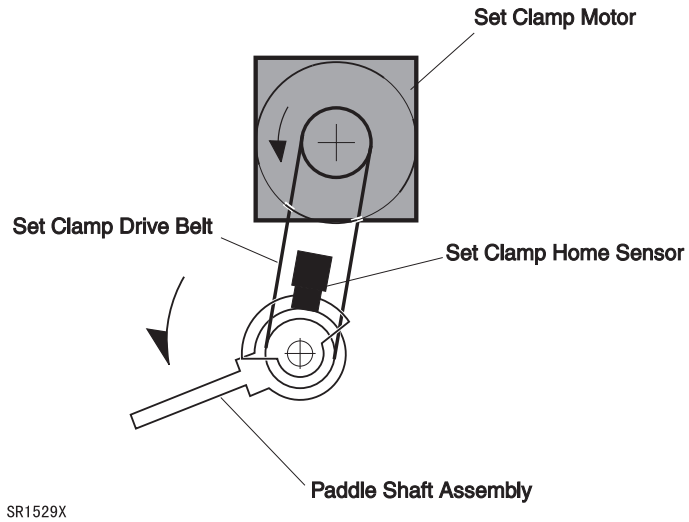

Figure 2-13. Set Clamp Motor Operational Outline

2.2.6 Offset Motor

Eject Clamp Offset Motor drives Offset Cam and Eject Clamp Cam.

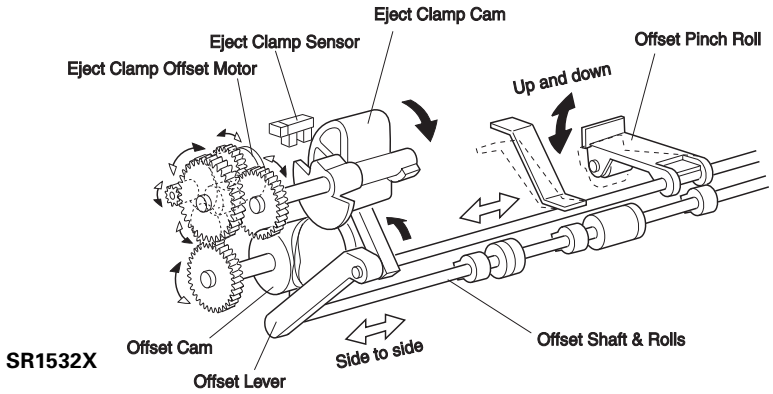

Figure 2-14. Offset Motor Working Part

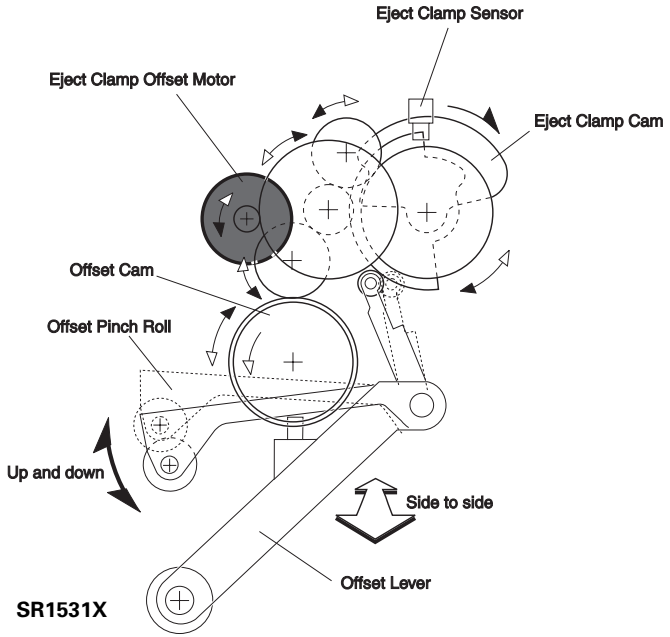

Figure 2-15. Offset motor Operational Outline

2.2.7 Stacker Elevator Motor

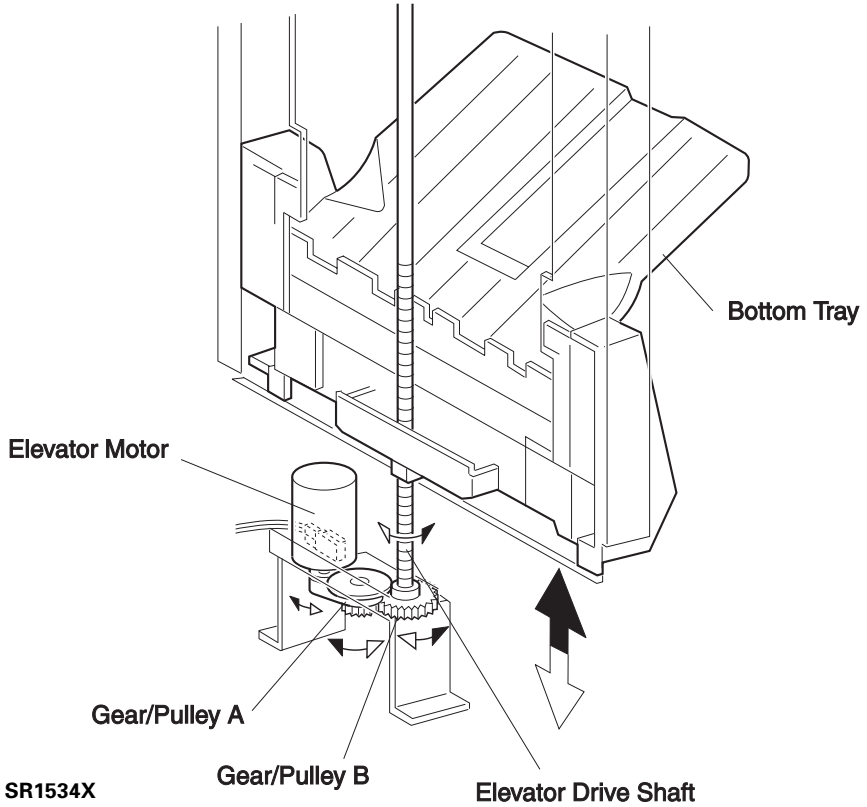

Figure 2-16. Stacker Elevator Motor Working Part

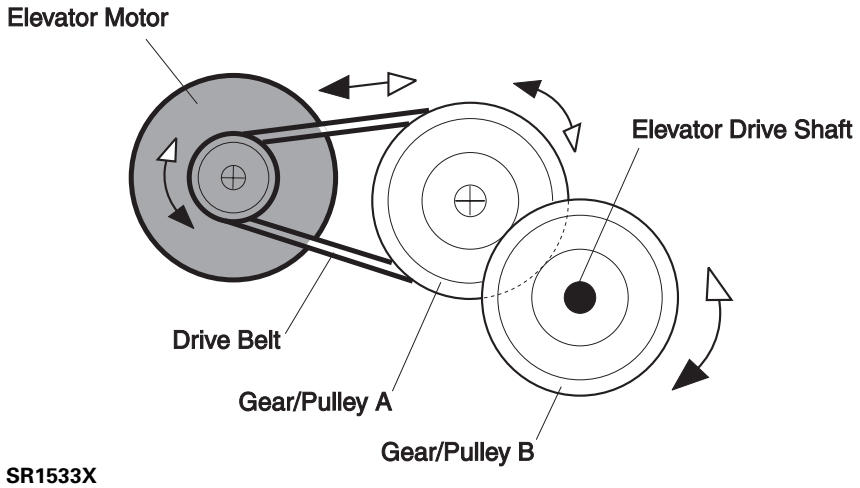

Figure 2-17. Stacker Elevator Motor Operational Outline

2.2.8 Tray Motors

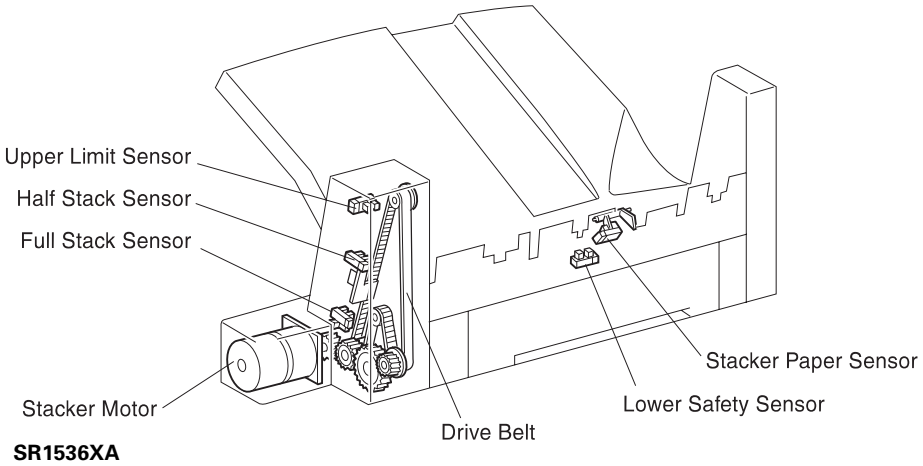

Figure 2-18. Tray Motor Working Part

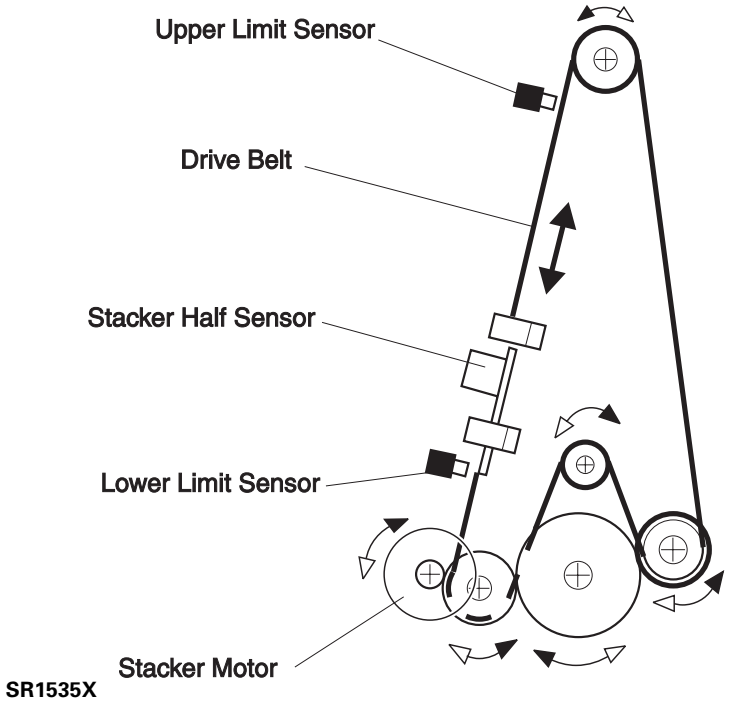

Figure 2-19. Tray Motor Operational Outline

2.3 Paper Path

Paper goes through four main components of DOC, Transport, Compiler, and Stacker Tray.

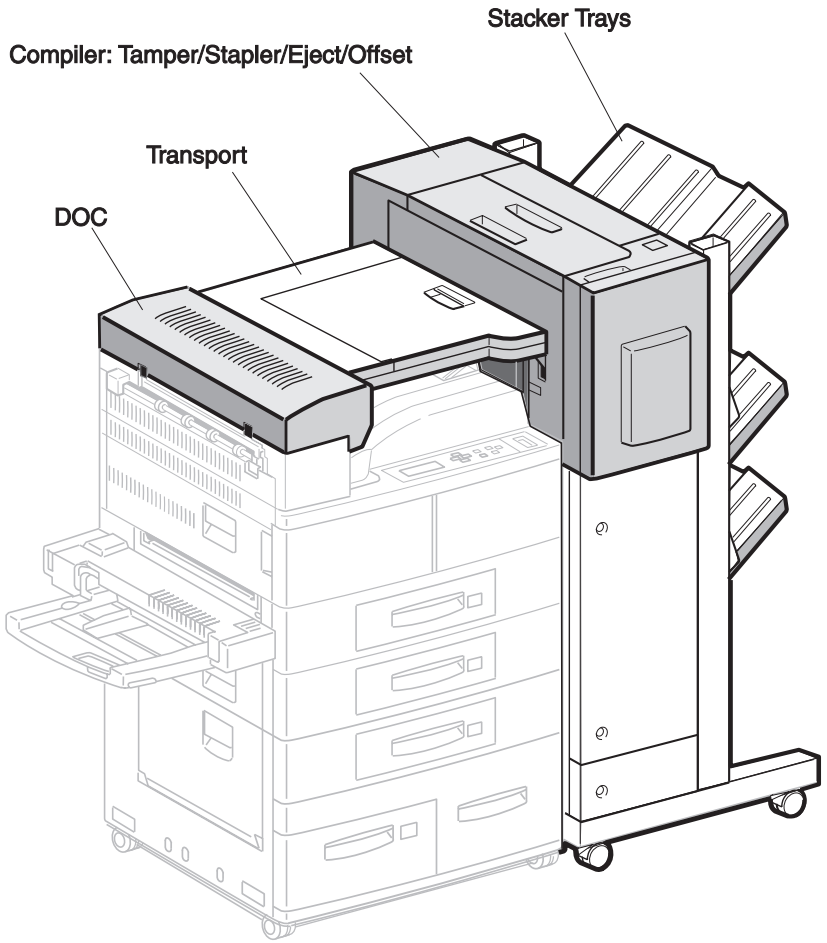

Figure 2-20. Main Components

2.3.1 Paper Path on the Unstaple Mode

2.3.1.1 DOC

DOC is at the exit of the Fuser of the printer. DOC includes IN Gate. When Finisher Stapler is selected, the Finisher PWB drives the IN Gate Solenoid to alternate the direction of the IN Gate and carries paper to the HCS Transport Assembly.

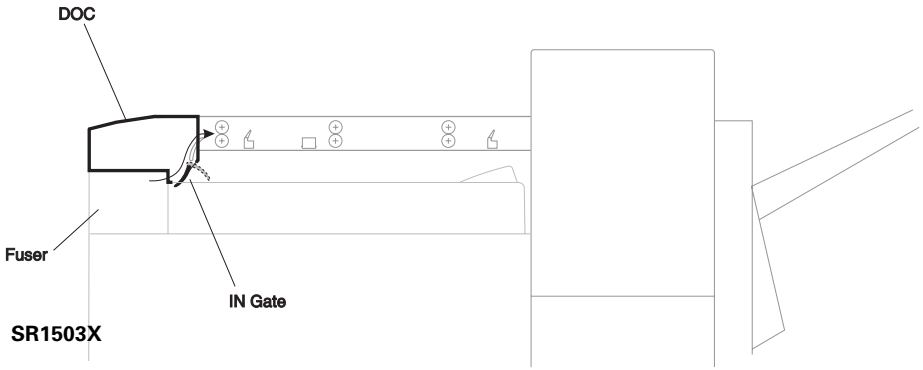

Figure 2-21. DOC

DOC PAPER PATH MAIN COMPONENTS

- ☐ IN Gate
  On normal mode, IN Gate faces up. When selected to send paper to Staple Stacker, IN Gate Solenoid commands IN Gate to face down.
- ☐ Upper Chute
  Carries paper to the Transport Rolls.
- ☐ IN Gate Solenoid
  Controlled by Finisher PWB.

2.3.1.2 Transport

Three sets of Transport Rolls send paper through Transport Assembly to Compiler. Transport Entrance Sensor and Transport Exit Sensor supervises paper passing.

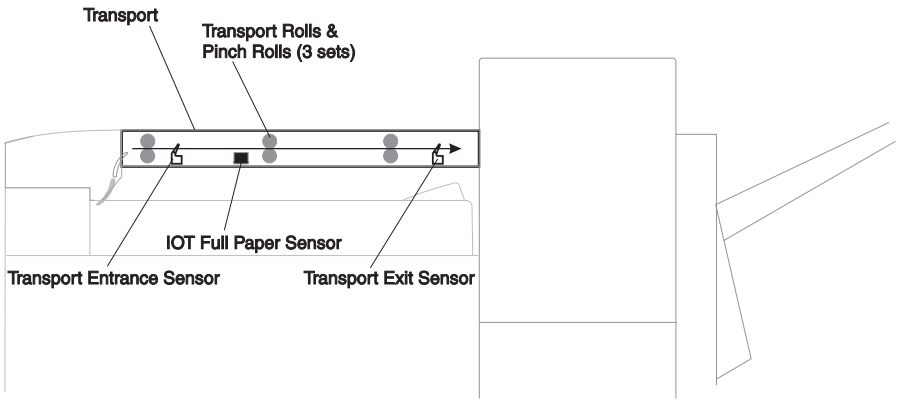

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Figure 2-22. Transport

TRANSPORT PAPER PATH MAIN COMPONENTS

- ☐ Transport Rolls and Pinch Rolls (3 sets)
  Carries paper to the Compiler.
- ☐ Transport Entrance Sensor
  Supervises paper entering to the Transport.
- ☐ Transport Exit Sensor
  Supervises paper exiting from the Transport.
- ☐ IOT Full Paper Sensor
  Supervises the amount of paper on the Face Down Output Tray of the printer. When the Finisher Stapler is installed, IOT Full Paper Sensor supervises on behalf of the printer Full Stack Sensor.

2.3.1.3 Exit/Eject

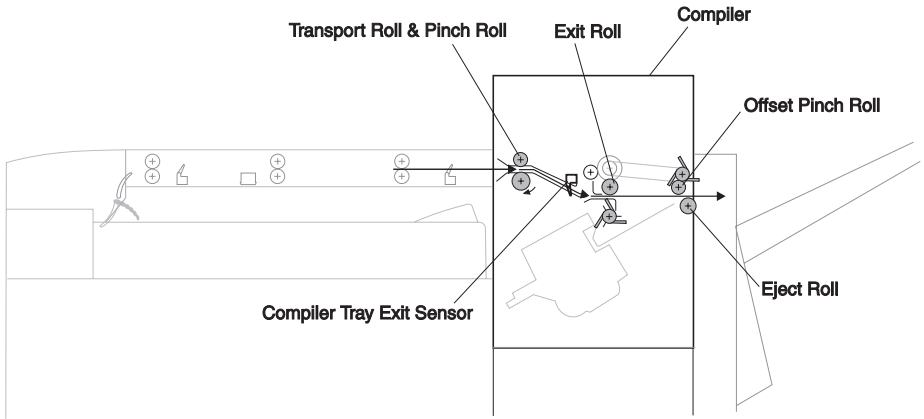

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Figure 2-23. Exit / Eject

EXIT/EJECT PAPER PATH MAIN COMPONENTS

- ☐ Transport Rolls and Pinch Rolls
  Carries paper to the Compiler.
- ☐ Complier Tray Exit Sensor
  Supervises paper passing to the entrance of the Compiler.
- ☐ Exit Roll / Paddle Assembly
  Carries paper to the Offset/Eject Rolls.
- ☐ Eject Roll / Paddle Assembly
  Ejects paper to the Stacker Tray.
- ☐ Offset Pinch Roll
  Offsets and ejects paper to the Stacker Tray.

2.3.1.4 Stacker Trays

Eject Toll and Paddle Assembly ejects paper to the Stacker Tray. Stacker Elevator shifts three Trays up and down as one of the Trays faces Eject Rolls. ID Sensor informs the Finisher PWB that the selected Tray is at the right position. Respective sensors supervise the amount of paper on each Tray.

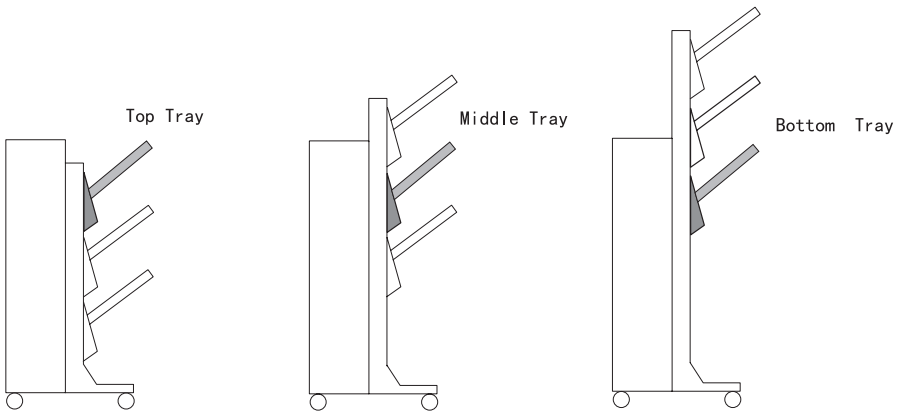

Figure 2-24. Stacker Tray

OFFSET PAPER PATH MAIN COMPONENTS

- ☐ Top, Middle, Bottom Tray
  Shifted up and down as one unit. Selected Tray stops in front of the Eject Rolls.
- ☐ Stacker Motor (Top, Middle, Bottom)
  Shifts each Tray up and down.
- ☐ Stacker Paper Sensor (Top, Middle, Bottom)
  Supervises if there are paper on each Tray.
- ☐ Stacker Full Sensor (Top, Middle, Bottom)
  Supervises if paper on each Tray is 100% full.
- ☐ Stacker Half Full Sensor (Top, Middle, Bottom)
  Supervises if paper on each Tray is 100% full.

2.3.2 Paper Path on the Staple Mode

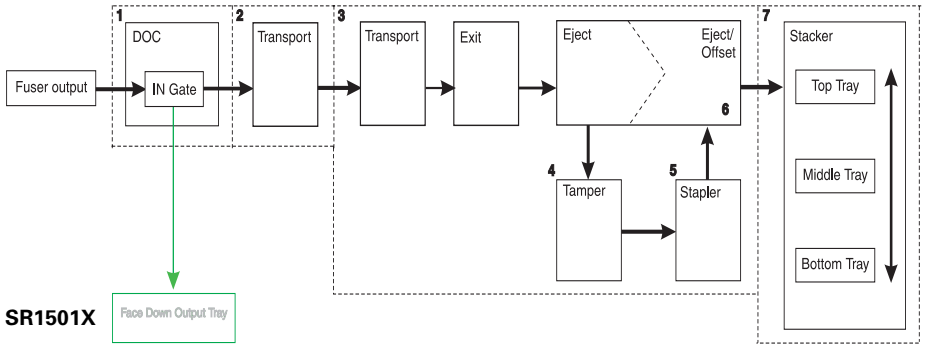

Figure 2-25. Paper Path Outline

2.3.2.1 DOC

Operating principle of DOC on the staple mode is the same as on the unstaple mode. (“DOC” on page 25)

2.3.2.2 Transport

Operating principle of Transport on the staple mode is the same as on the unstaple mode. (“Transport” on page 26)

2.3.2.3 Exit/Eject

Paper sent from the Transport is compiled and jogged on the Compiler Tray by specified amount. Paper is bundled by stapler at the specified corner and is ejected to the Stacker.

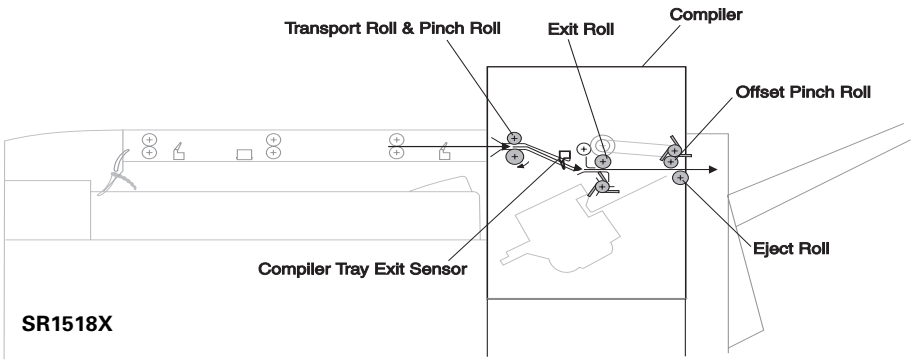

Figure 2-26. Exit/Eject

EXIT/EJECT PAPER PATH MAIN COMPONENTS

- ☐ Transport Rolls and Pinch Rolls
  Carries paper to the Compiler.
- ☐ Complier Tray Exit Sensor
  Supervises paper entering to the Compiler.
- ☐ Exit Roll / Paddle Assembly
  Carries paper to the Offset/Eject Rolls.
- ☐ Eject Roll / Paddle Assembly
  Eject Roll counter-revolves and sends paper to the Compiler Tray.

2.3.2.4 Compiler/Tamper

Eject Roll counter-revolves and sends paper to the Compiler Tray. When paper is sent to the Compiler Tray, End Wall Motor lifts End Wall.

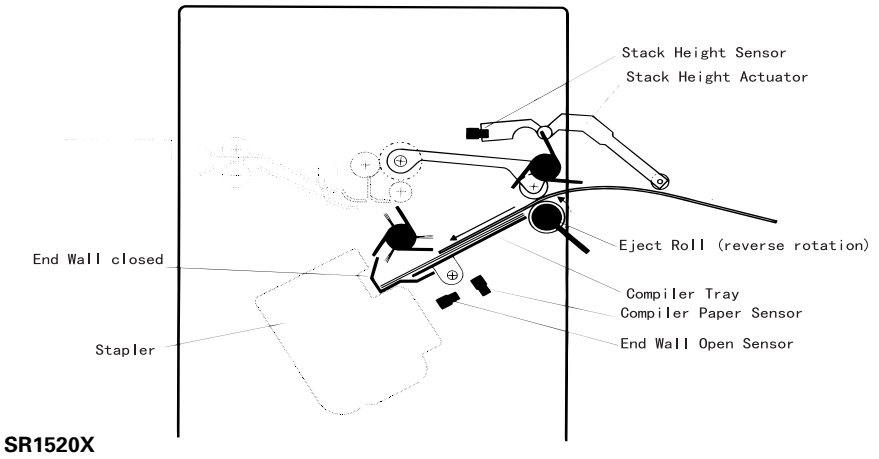

Figure 2-27. Compiler/Tamper

COMPILER /TAMPER PAPER PATH MAIN COMPONENTS

- ☐ Eject Roll
  Eject Roll counter-revolves and sends paper to the Compiler Tray.
- ☐ Compiler Tray
  Paper is compiled and jogged on the Compiler Tray by specified amount.
- ☐ End Wall
  Jogs paper. Lowered when stapling.
- ☐ End Wall Motor
  Shifts End Wall up and down.
- ☐ Tamper
  Tamps paper one by one.
- ☐ Compiler Tray Solenoid
  When amount of paper on the Compiler Tray reaches twenty five, Compiler Tray Solenoid shifts Compiler Tray down.

2.3.2.5 Stapler

End Wall is shifted down when stapling. Stapler Motor shifts Stapler Unit along the rail. Sensors along rail supervises the position of the Stapler Unit.

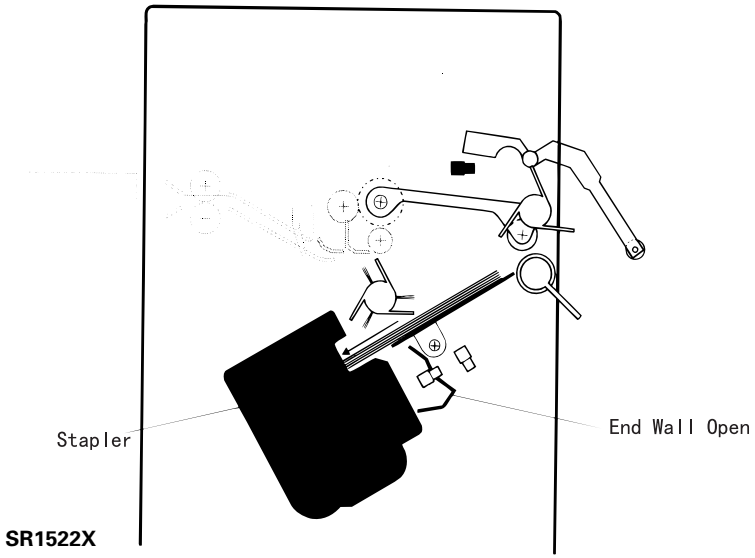

Figure 2-28. Stapler

STAPLER PAPER PATH MAIN COMPONENTS

- ☐ Stapler Front Corner Sensor
  Detects the front corner position of the Stapler Unit.
- ☐ Stapler Front Straight Sensor
  Detects the front straight position of the Stapler Unit.
- ☐ Stapler Rear Straight Sensor
  Detects the rear straight position of the Stapler Unit.
- ☐ Stapler Assembly
  Includes Stapler Head and Stapler Cartridge.

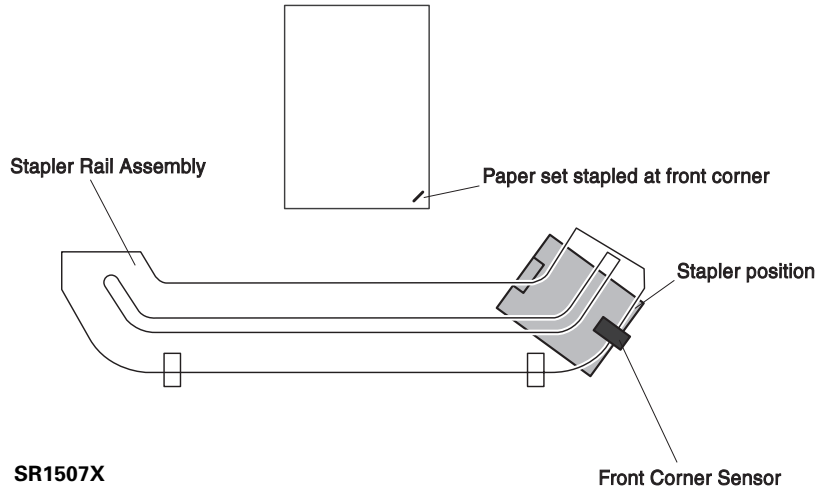

Figure 2-29. Front Corner Staple

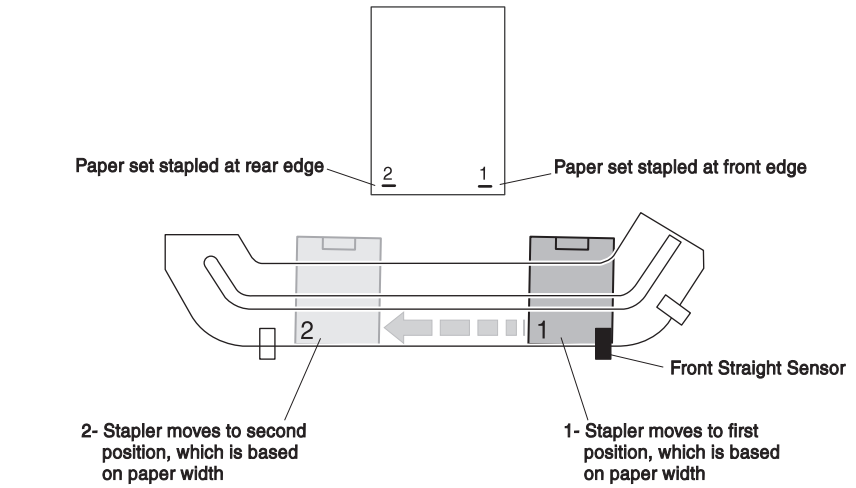

Figure 2-30. Dual (Front and Rear Edge) Staple

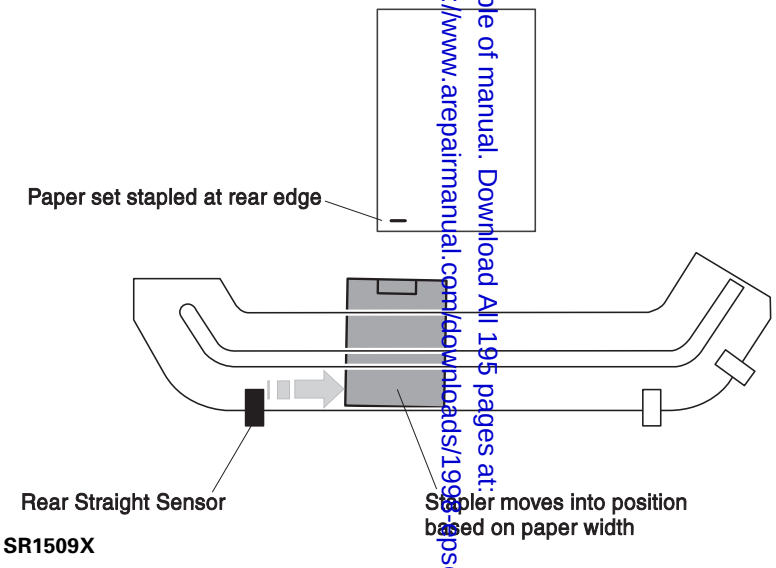

Figure 2-31. Rear Edge Staple

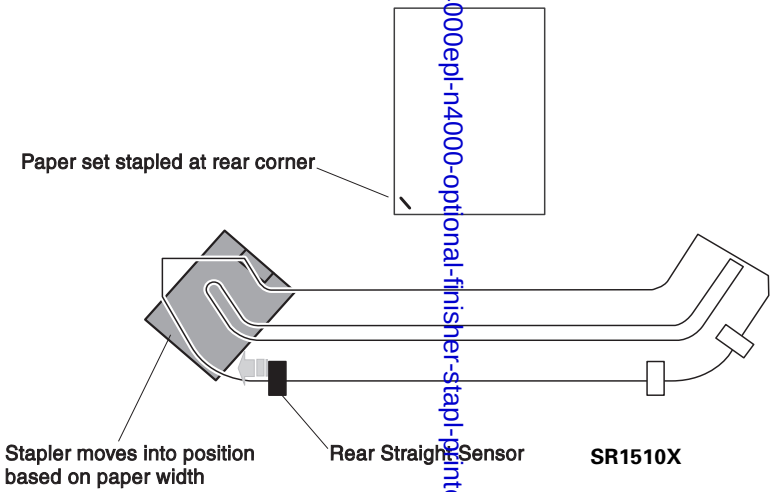

Figure 2-32. Rear Corner Staple

2.3.2.6 Eject/Offset

Eject Roll revolves counterclockwise and Eject Roll and Offset Roll eject paper from the Compiler Tray.

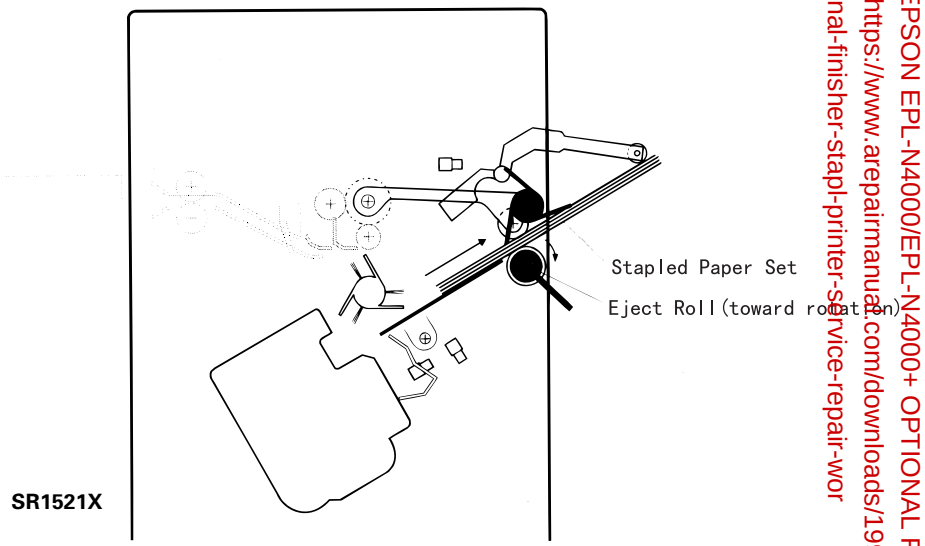

Figure 2-33. Eject/Offset