DF-75

SERVICE MANUAL

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5FG70760

CAUTION

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

ATTENTION

IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT INCORRECT DE LA BATTERIE. REMPLACER UNIQUEMENT AVEC UNE BATTERIE DU MÊME TYPE OU D'UN TYPE RECOMMANDÉ PAR LE CONSTRUCTEUR. METTRE AU RÉBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS DU FABRICANT.

Safety precautions

This booklet provides safety warnings and precautions for our service personnel to ensure the safety of their customers, their machines as well as themselves during maintenance activities. Service personnel are advised to read this booklet carefully to familiarize themselves with the warnings and precautions described here before engaging in maintenance activities.

Safety warnings and precautions

Various symbols are used to protect our service personnel and customers from physical danger and to prevent damage to their property. These symbols are described below:

⚠**DANGER**: High risk of serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

⚠**WARNING**:Serious bodily injury or death may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

⚠**CAUTION**: Bodily injury or damage to property may result from insufficient attention to or incorrect compliance with warning messages using this symbol.

Symbols

The triangle (△) symbol indicates a warning including danger and caution. The specific point of attention is shown inside the symbol.

 General warning.

 Warning of risk of electric shock.

 Warning of high temperature.

⃠ indicates a prohibited action. The specific prohibition is shown inside the symbol.

 General prohibited action.

 Disassembly prohibited.

● indicates that action is required. The specific action required is shown inside the symbol.

 General action required.

 Remove the power plug from the wall outlet.

 Always ground the copier.

1. Installation Precautions

⚠WARNING

- Do not use a power supply with a voltage other than that specified. Avoid multiple connections to one outlet: they may cause fire or electric shock. When using an extension cable, always check that it is adequate for the rated current. .....

- Connect the ground wire to a suitable grounding point. Not grounding the copier may cause fire or electric shock. Connecting the earth wire to an object not approved for the purpose may cause explosion or electric shock. Never connect the ground cable to any of the following: gas pipes, lightning rods, ground cables for telephone lines and water pipes or faucets not approved by the proper authorities. .....

⚠CAUTION:

- Do not place the copier on an infirm or angled surface: the copier may tip over, causing injury. .....

- Do not install the copier in a humid or dusty place. This may cause fire or electric shock. .....

- Do not install the copier near a radiator, heater, other heat source or near flammable material. This may cause fire. .....

- Allow sufficient space around the copier to allow the ventilation grills to keep the machine as cool as possible. Insufficient ventilation may cause heat buildup and poor copying performance. .....

- Always handle the machine by the correct locations when moving it. .....

- Always use anti-toppling and locking devices on copiers so equipped. Failure to do this may cause the copier to move unexpectedly or topple, leading to injury. .....

- Avoid inhaling toner or developer excessively. Protect the eyes. If toner or developer is accidentally ingested, drink a lot of water to dilute it in the stomach and obtain medical attention immediately. If it gets into the eyes, rinse immediately with copious amounts of water and obtain medical attention. .....

- Advice customers that they must always follow the safety warnings and precautions in the copier's instruction handbook. .....

2. Precautions for Maintenance

⚠WARNING

- Always remove the power plug from the wall outlet before starting machine disassembly.

- Always follow the procedures for maintenance described in the service manual and other related brochures.

- Under no circumstances attempt to bypass or disable safety features including safety mechanisms and protective circuits.

- Always use parts having the correct specifications.

- Always use the thermostat or thermal fuse specified in the service manual or other related brochure when replacing them. Using a piece of wire, for example, could lead to fire or other serious accident.

- When the service manual or other serious brochure specifies a distance or gap for installation of a part, always use the correct scale and measure carefully.

- Always check that the copier is correctly connected to an outlet with a ground connection.

- Check that the power cable covering is free of damage. Check that the power plug is dust-free. If it is dirty, clean it to remove the risk of fire or electric shock.

- Never attempt to disassemble the optical unit in machines using lasers. Leaking laser light may damage eyesight.

- Handle the charger sections with care. They are charged to high potentials and may cause electric shock if handled improperly.

⚠CAUTION

- Wear safe clothing. If wearing loose clothing or accessories such as ties, make sure they are safely secured so they will not be caught in rotating sections.

- Use utmost caution when working on a powered machine. Keep away from chains and belts.

- Handle the fixing section with care to avoid burns as it can be extremely hot.

- Check that the fixing unit thermistor, heat and press rollers are clean. Dirt on them can cause abnormally high temperatures.

- Do not remove the ozone filter, if any, from the copier except for routine replacement.

• Do not pull on the AC power cord or connector wires on high-voltage components when removing them; always hold the plug itself. .....

• Do not route the power cable where it may be stood on or trapped. If necessary, protect it with a cable cover or other appropriate item. .....

• Treat the ends of the wire carefully when installing a new charger wire to avoid electric leaks. .....

• Remove toner completely from electronic components. .....

• Run wire harnesses carefully so that wires will not be trapped or damaged. .....

• After maintenance, always check that all the parts, screws, connectors and wires that were removed, have been refitted correctly. Special attention should be paid to any forgotten connector, trapped wire and missing screws. .....

• Check that all the caution labels that should be present on the machine according to the instruction handbook are clean and not peeling. Replace with new ones if necessary. .....

• Handle greases and solvents with care by following the instructions below: .....
  · Use only a small amount of solvent at a time, being careful not to spill. Wipe spills off completely.
  · Ventilate the room well while using grease or solvents.
  · Allow applied solvents to evaporate completely before refitting the covers or turning the main switch on.
  · Always wash hands afterwards.

• Never dispose of toner or toner bottles in fire. Toner may cause sparks when exposed directly to fire in a furnace, etc. .....

• Should smoke be seen coming from the copier, remove the power plug from the wall outlet immediately. .....

3. Miscellaneous

⚠WARNING

• Never attempt to heat the drum or expose it to any organic solvents such as alcohol, other than the specified refiner; it may generate toxic gas. .....

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CHAPTER 1

GENERAL DESCRIPTION

1 Features

a. Through-type stapler

Adoption of a through-type stapler allows a stapler to carry out saddle stitching.

b. Three different auto stapling positions

Three different stapling positions (front 1-point stapling, rear 1-point stapling, and middle 2-point stapling) are supported.

c. Saddle stitching

A maximum of ten sheets of paper can be delivered with them stapled and folded in the middle.

d. Punch mechanism (option).

Installation of a puncher unit enables punching holes in sheets before delivery (64 to 90 g/m^2 paper; no transparency).

2 Specifications

2.1 Specifications

2.1.1 Finisher/Saddle Assembly

Item	Specifications	Remarks
Stacking	2 locations (1)Delivery Tray (descending type; 1 tray) Face-down (2)Bind Tray (fixed type)	
Feed reference	Center reference	
Stack paper size	A3, A4, A4R, A5, A5R, B4, B5, B5R, 297mm × 432mm (11" × 17"), LGL, LTR, LTRR, STMT, STMTR	Large-size: A3, B4, 279mm × 432mm (11" × 17"), LGL
Paper weight	Finisher assembly: 64 to 90 g/m^2 Saddle Assembly: 64 to 90 g/m^2	
Mode	Non-sort stack Sort stack Staple stack Bind stack	
Stack height (Note 1)	Non-Sort Staple Large-size: 500 sheets Small-size: 1000 sheets (Note 2) Staple Sort Large-size: 30 sets or 500 sheets Small-size: 30 sets or 1000 sheets Folded stack Stack of 6 to 10 sheets: 10 sets Stack of 1 to 5 sheets: 20 sheets	
Mixed stack	Size mix: 500 sheets (Note 3) Staple mix: 30 sheets (same paper configuration)	
Paper detection	Delivery tray: No Bind tray: Yes	
Control panel	No	

Note 1:
The number of sheets is computed based on 80 g/m^2 paper.
Note 2:
Alignment is not guaranteed if the stack consists of 750 sheets or more.
Note 3:
Alignment is not guaranteed if the stack consists of sheets of different sizes.

Item	Specifications	Remarks
Display	No	
Size	665 (W) × 615 (D) × 555 (H) mm / 26.18(W) × 24.21(D) × 21.85(H) in	(excl. installing kit)
Weight	27 kg / 59.40 lb (approx.)	
Power supply	24 VDC from host machine	
Maximum power consumption	At standby: 13 W In operation: 84 W (staple sort)	
Stapling	Rotary cam type	
Stapling position	See F01-201-01.	
Stapling thickness	Finisher	
	Large-size: 25 sheets	(80 g/m^2 paper)
	Small-size: 50 sheets	(80 g/m^2 paper)
	Saddle: 10 sheets	(80 g/m^2 paper)
Staple supply	Cartridge of special staples (5000 staples)	
Staples	Special staples	
Staple detection	Yes (nearly empty: 40 remaining staples)	
Stapling size	Front 1-Point Stapling: A3, A4R, B4, 279 mm × 432 mm (11” × 17”), LGL, LTRR Rear 1-Point Stapling: A3, A4, A4R, B4, B5, 279 mm × 432 mm (11” × 17”), LGL, LTR, LTRR Middle 2-Point Stapling: A3, A4, A4R, B4, B5, 279 mm × 432 mm (11” × 17”), LGL, LTR, LTRR Middle 2-Point Stapling: A3, A4R, B4, 279 mm × 432 mm (11” × 17”), LTRR	With the saddle in use.
Manual stapling	None	
Folding method	Roller contact	
Folding mode	Double-folding (single-sheet non-stapling available)	
Folding position	Middle of sheet	Requires a margin of ±5mm / ±0.2in from the middle of the sheet as a middle margin.
Saddling size	A3, A4R, B4, 279 mm × 432 mm (11” × 17”), LTRR	No special paper.

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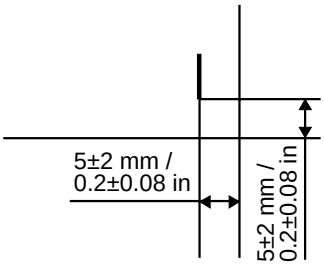
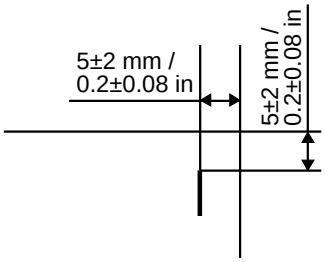
Staple Position

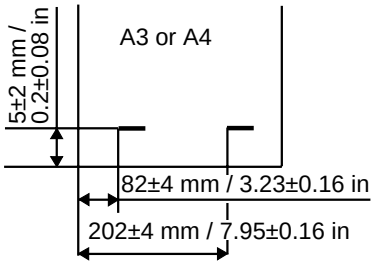
Front 1-point stapling

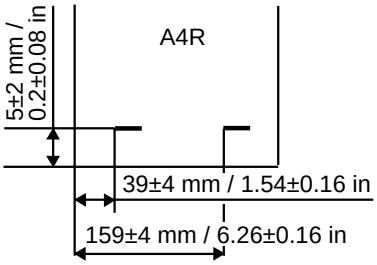


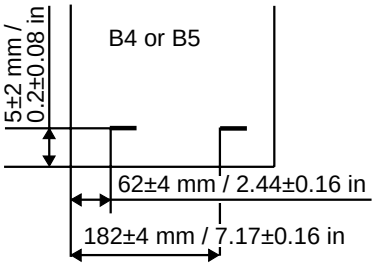
Rear 1-point stapling

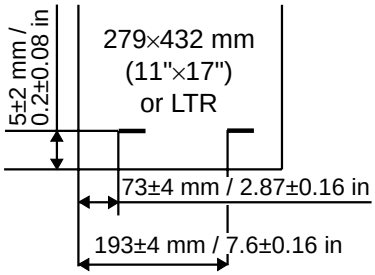


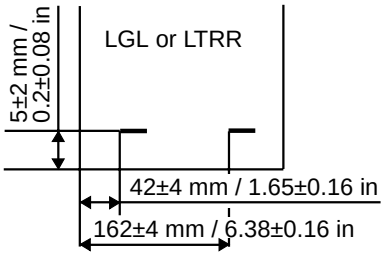
Middle 2-point stapling



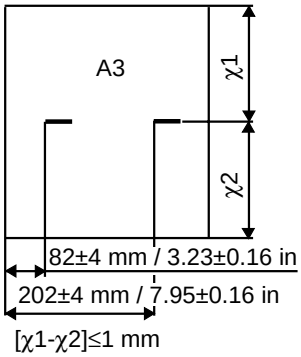


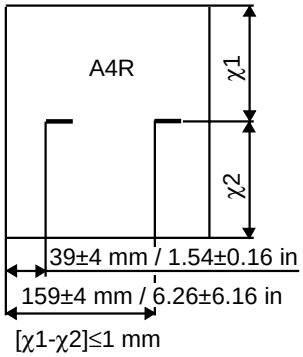


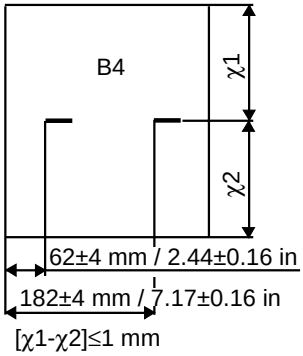


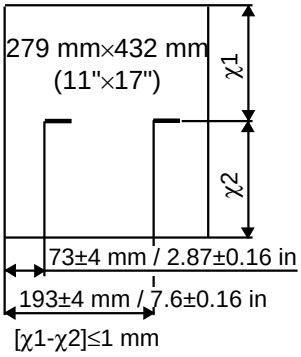


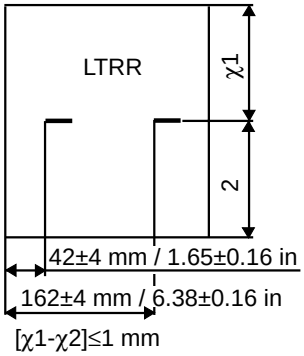
Middle 2-point stapling (w/ saddle in use)











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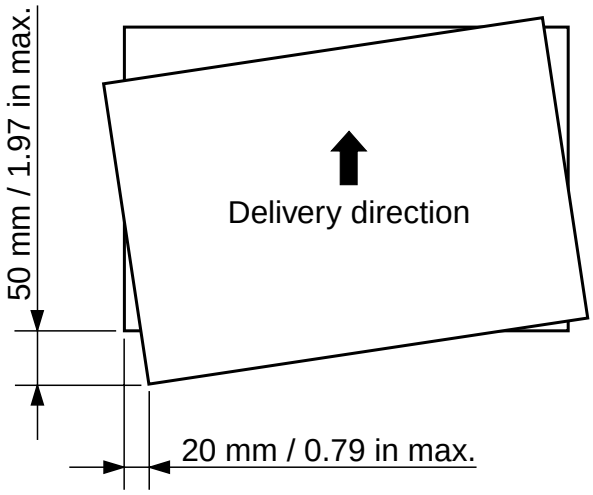
Stacked Paper Alignment



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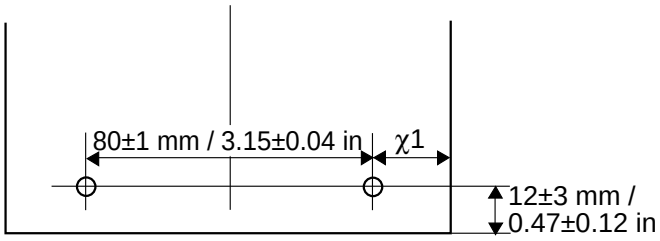
2.1.2 Puncher unit (option)

Item	Specifications	Remarks
Punching method	Reciprocating method (sequential processing method)	
Paper size	2-hole (Puncher Unit-J1): A3, A4, A4R, B4, B5, B5R 2-/3-hole (Puncher Unit-K1): 2-hole/LGL, LTRR 3-hole/279 × 432 mm (11”×17”), LTR 4-hole (Puncher Unit-G1/-H1): A3, A4	
Paper weight	64 g/m^2 ~ 90 g/m^2	No transparencies.
Punch hole diameter	2-hole (Puncher Unit-J1): 6.5 mm / 0.26 in 2-/3-hole (Puncher Unit-K1): 2-hole 8.0 mm / 0.31 in 3-hole 8.0 mm / 0.31 in 4-hole (Puncher Unit-G1/-H1): 6.5 mm / 0.26 in	
Punch waste	2-hole (Puncher Unit-J1): 3000 sheets 2-/3-hole (Puncher Unit-K1): 2-hole/1500 sheets 3-hole/1500 sheets 4-hole (Puncher Unit-G1/H1) : 1500 sheets	 64 g/m^2 paper 75 g/m^2 paper 75 g/m^2 paper 80 g/m^2 paper
Size	90 (W) × 560 (D) × 170 (H) mm / 3.54 (W) × 22.05 (D) × 6.69 (H) in	
Weight	2.5 kg / 5.5 lb (approx.)	
Power supply	24 VDC from finisher unit.	
Power consumption	Standby: 2 W max. Operating: 21 W max (punching)	

T01-201-02

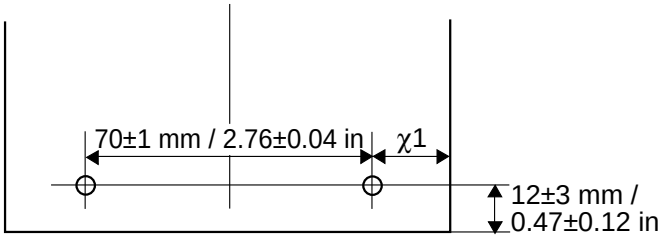
Hole position

[1] 2-Hole (Puncher Unit-J1)

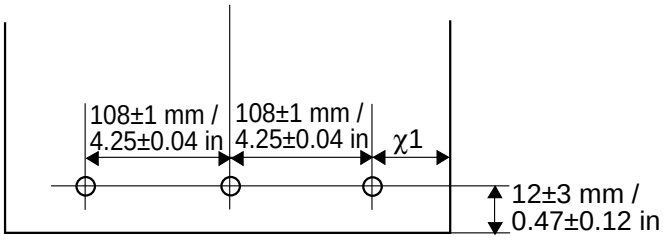


χ1	
A3/A4	108.5±3 mm / 4.27±0.12 in
B5/B4	88.5±3 mm / 3.48±0.12 in
A4R	65±3 mm / 2.56±0.12 in
B5R	51±3 mm / 2.01±0.12 in

[2] 2-/3-Hole (Puncher Unit-K1)

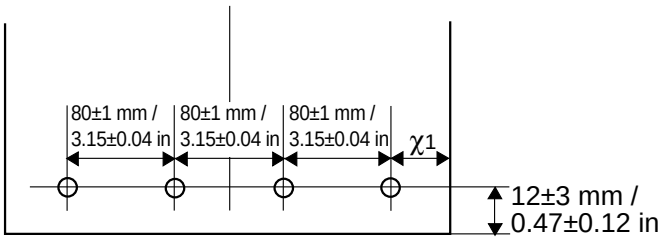


χ1	
LGL/LTRR	73±3 mm / 2.87±0.12 in



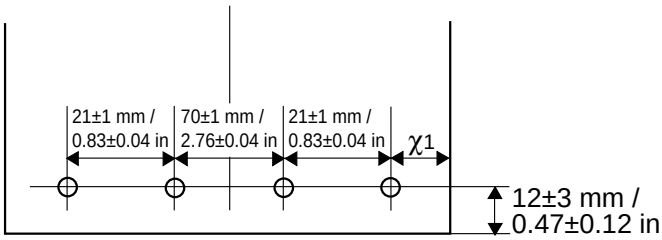
χ1	
279 mm×432 mm (11"×17")/LTR	31.5±3 mm / 1.24±0.12 in

[3] 4-Hole (Puncher Unit-G1)



χ1	
A3/A4	28.5±3 mm / 1.12±0.12 in

[4] 4-Hole (Puncher Unit-H1)



χ1	
A3/A4	92.5±3 mm / 3.64±0.12 in

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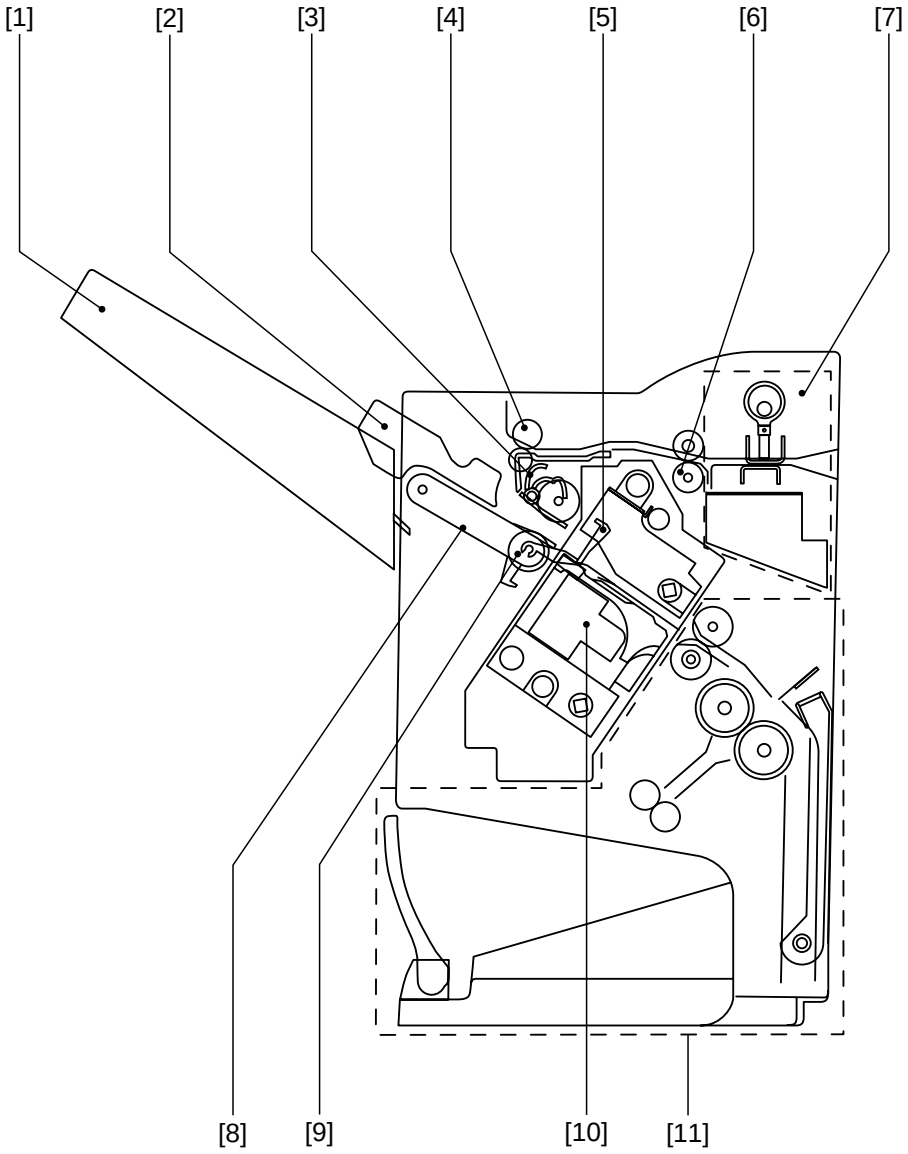
The above specifications are subject to change for product improvement.

3 Names of Parts

3.1 Cross Section

3.1.1 Finisher Unit



[1] Delivery tray
[2] Aligning plate (front, rear)
[3] Paddle
[4] Delivery roller
[5] Processing tray stopper
[6] Feed roller
[7] Puncher unit (option)
[8] Delivery belt
[9] Stack delivery roller
[10] Stapler
[11] Saddle unit

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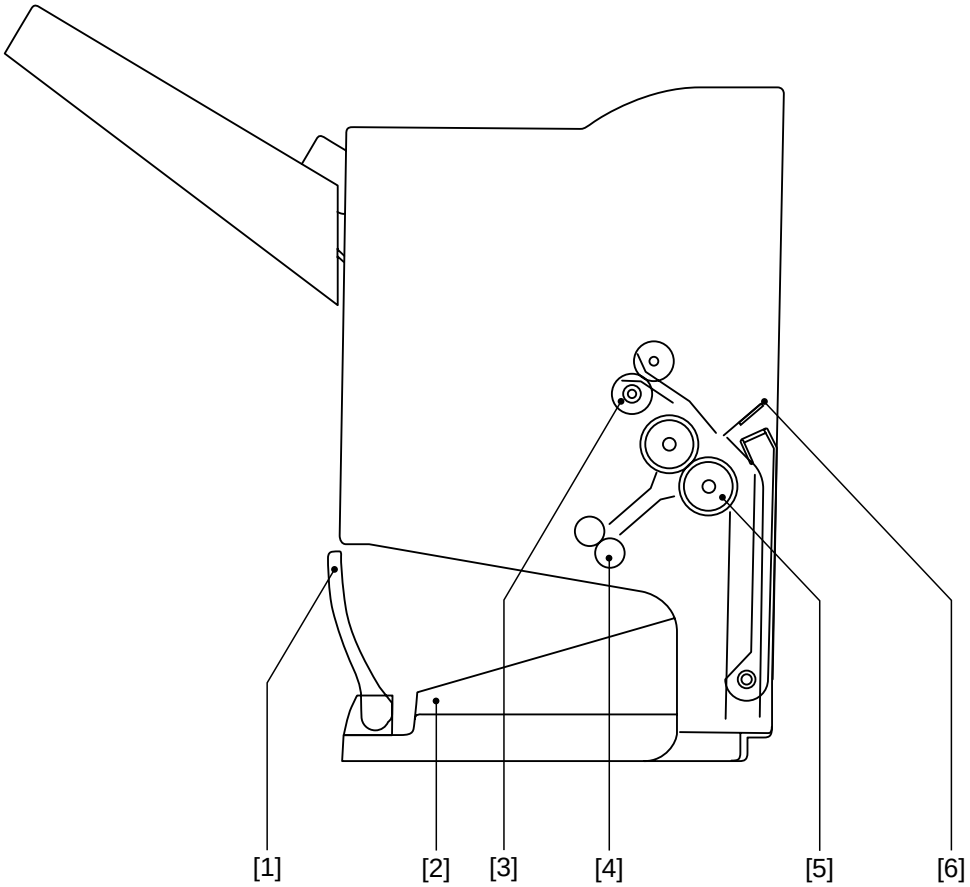
3.1.2 Saddle Unit



[1] Bind stopper
[2] Bind tray
[3] Stack feed roller
[4] Bind delivery roller
[5] Paper fold roller
[6] Paper pushing plate

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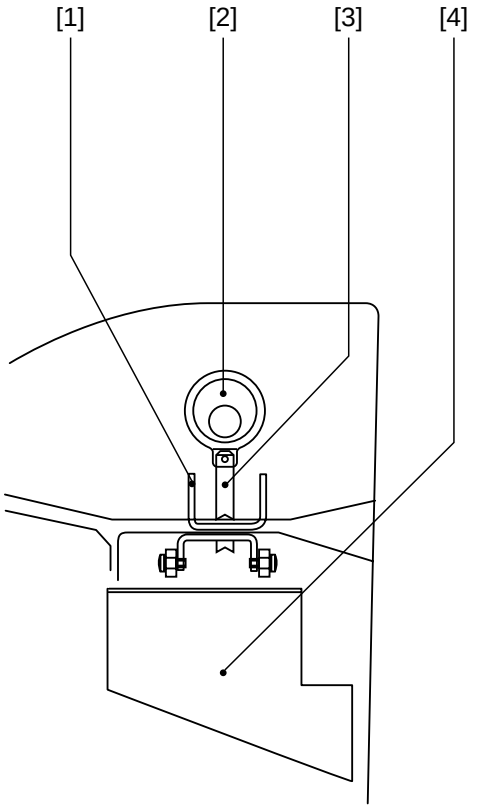
3.1.3 Puncher Unit (option)



[1] Die
[2] Cam
[3] Hole puncher (Punch blade)
[4] Punch waste case

F01-301-03

4 Routine Maintenance by the User

As of February, 2001

No.	Item	Timing
1	Staple cartridge (replacement)	When prompted (indicator on host machine control panel)
2	Punch waste removal (optional)	When prompted (indicator on host machine control panel)

T01-400-01

CHAPTER 2

OUTLINE OF OPERATION

1 Basic Operations

1.1 Specifications

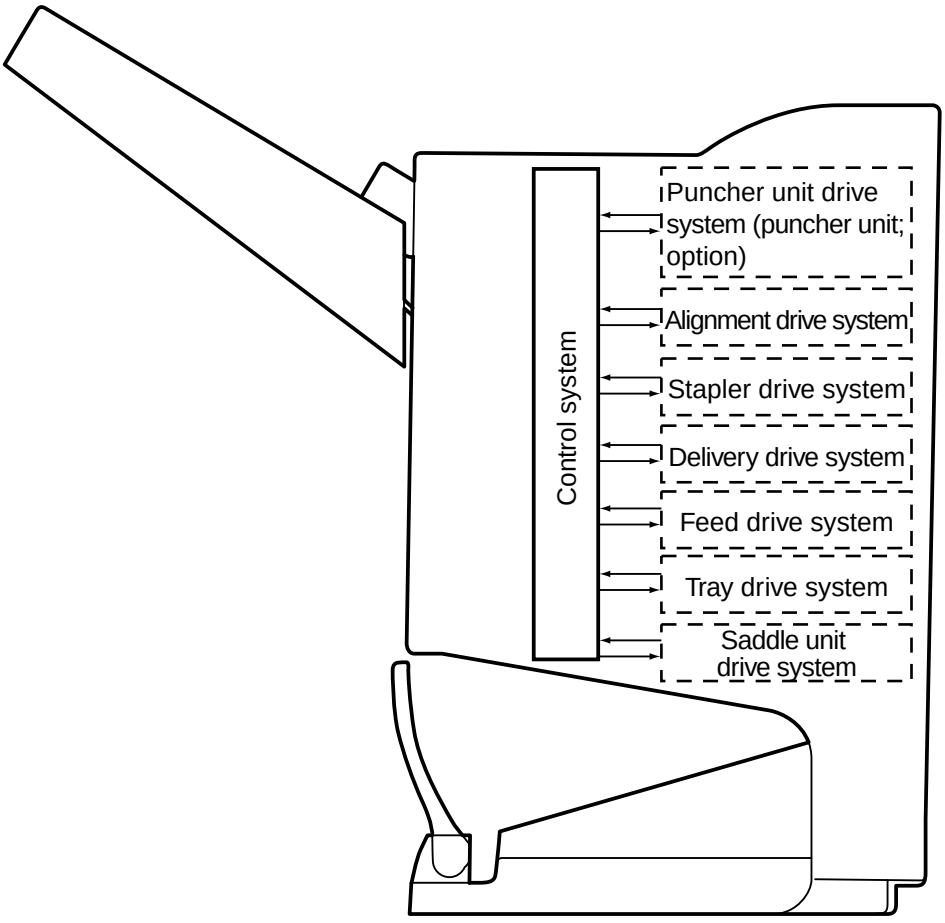
The finisher serves to deliver sheets coming from its host machine. The mode of delivery may be non-sort stack, job offset*, or staple delivery.

The saddle unit built into the finisher is used to fold a stack of sheets coming from the finisher unit in half for delivery.

All these operations are controlled by various commands sent by the host machine in addition to the commands from the finisher controller PCB.

The puncher unit (option) is designed for installation to the pickup assembly of the finisher, and is used to punch holes in sheets coming from the host machine.

The above operations are controlled with various commands from the finisher controller PCB as well as the commands from the punch controller PCB.



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The position of delivery is shifted to the front/rear for each stack to assist sorting.

1.2 Outline of the Electrical Circuitry

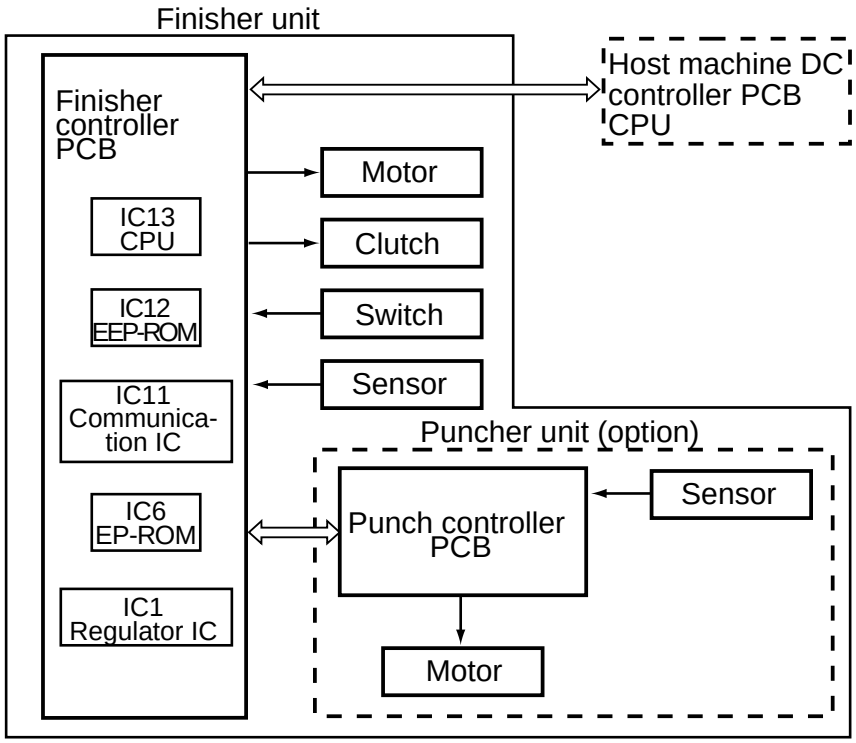
The sequence of finisher operations is controlled by the finisher controller PCB. The finisher controller PCB is a 16-bit microprocessor (CPU), and is also used for combination with the host machine (serial).

The finisher controller PCB drive motors and other loads in response to the various commands from the host machine. It also communicates such data as on the states of various sensors and switches to the host machine by way of the serial communication line.

The ICs mounted to the finisher controller PCB have the following functions:

- IC13 (CPU)
  Controls sequence of operations.
- IC12 (EEP-ROM)
  Backs up adjustment settings.
- IC6 (EP-ROM)
  Stores sequence programs.
- IC11 (communication IC)
  Communicates with the host machine.
- IC1 (regulator IC)
  Generates 5 V.

F02-102-01 shows the flow of signals between finisher and options controller:



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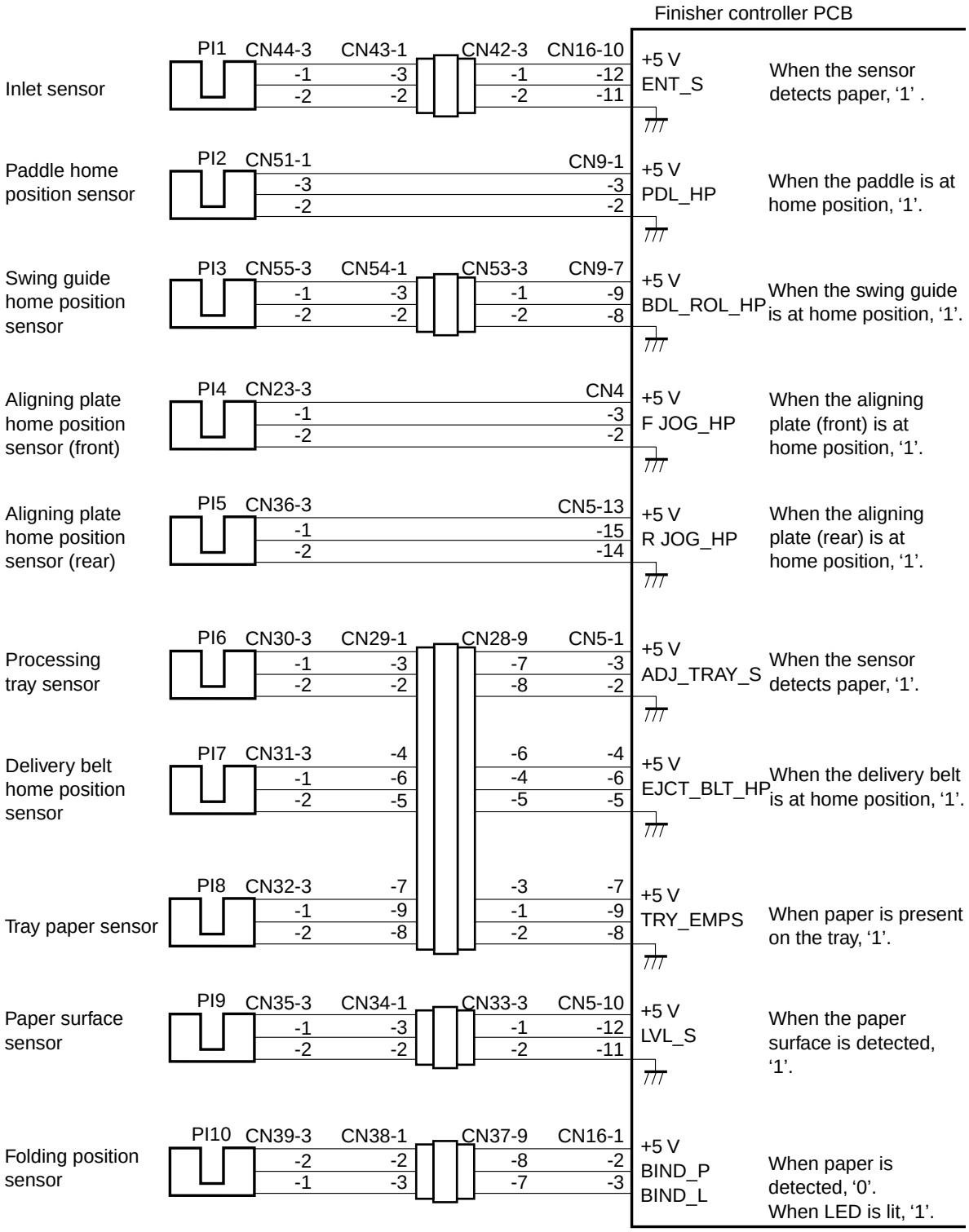
1.3 Inputs to and Outputs from the Finisher Controller PCB

1.3.1 Inputs to the Finisher Controller PCB (1/2)



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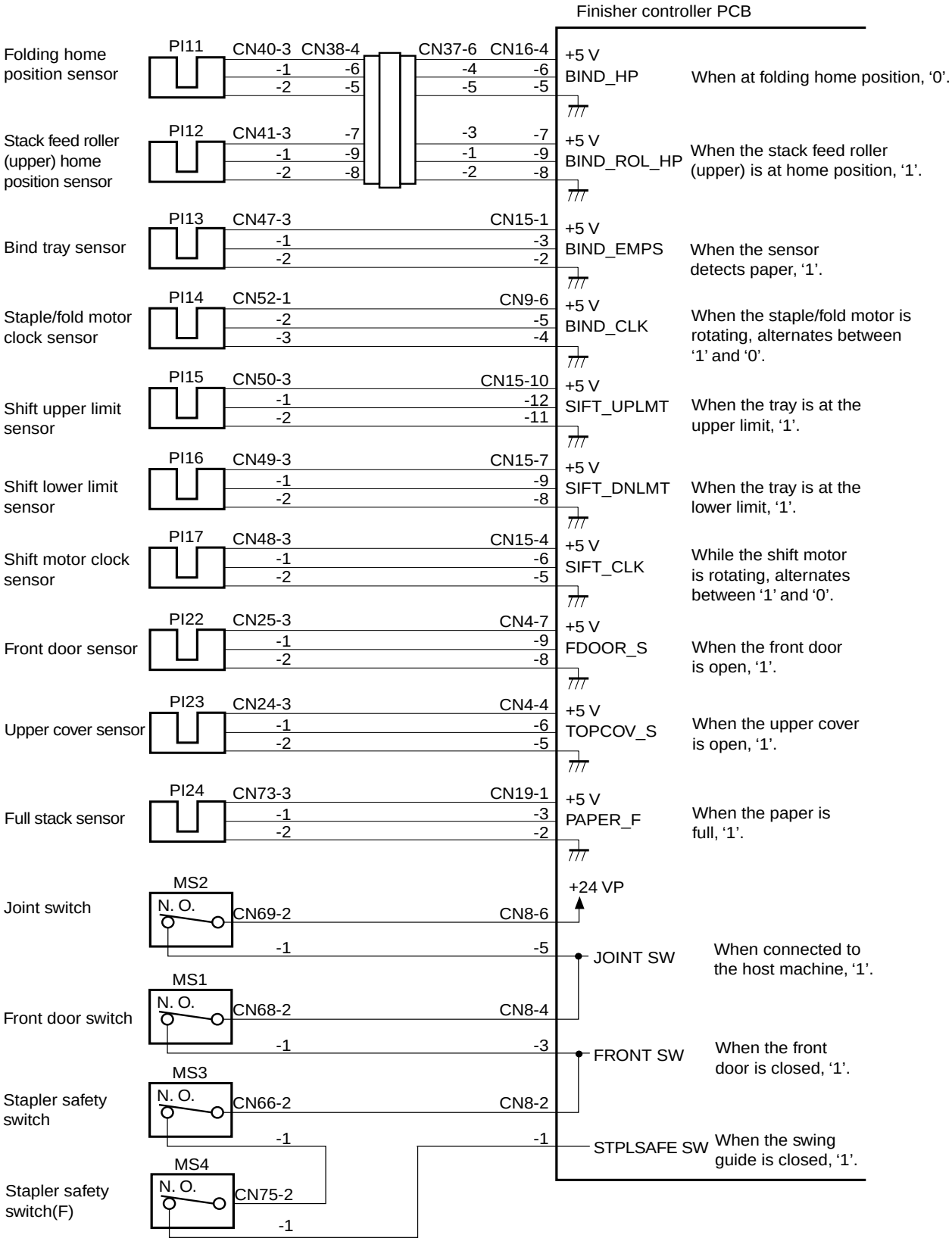
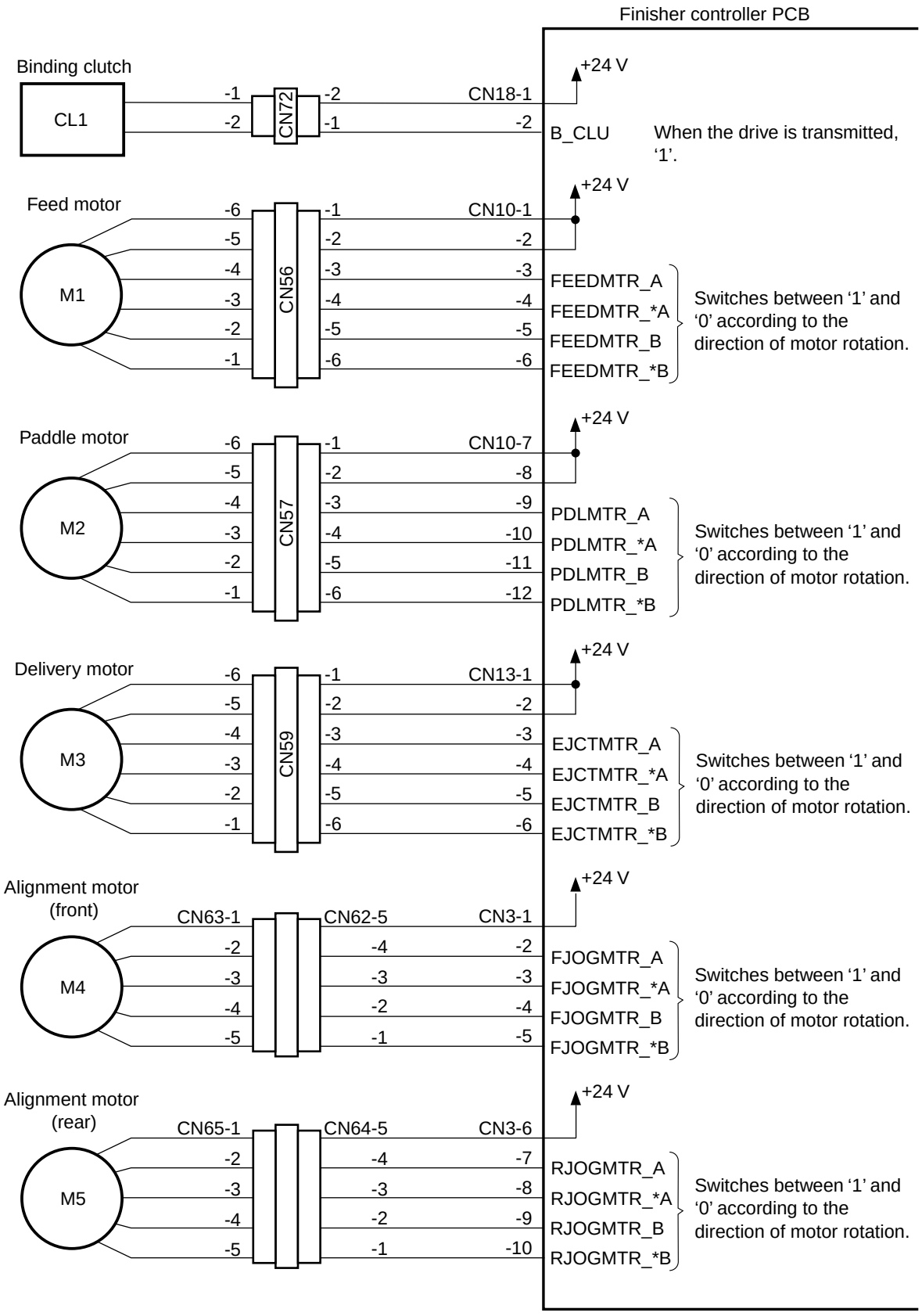
1.3.2 Inputs to the Finisher Controller PCB (2/2)

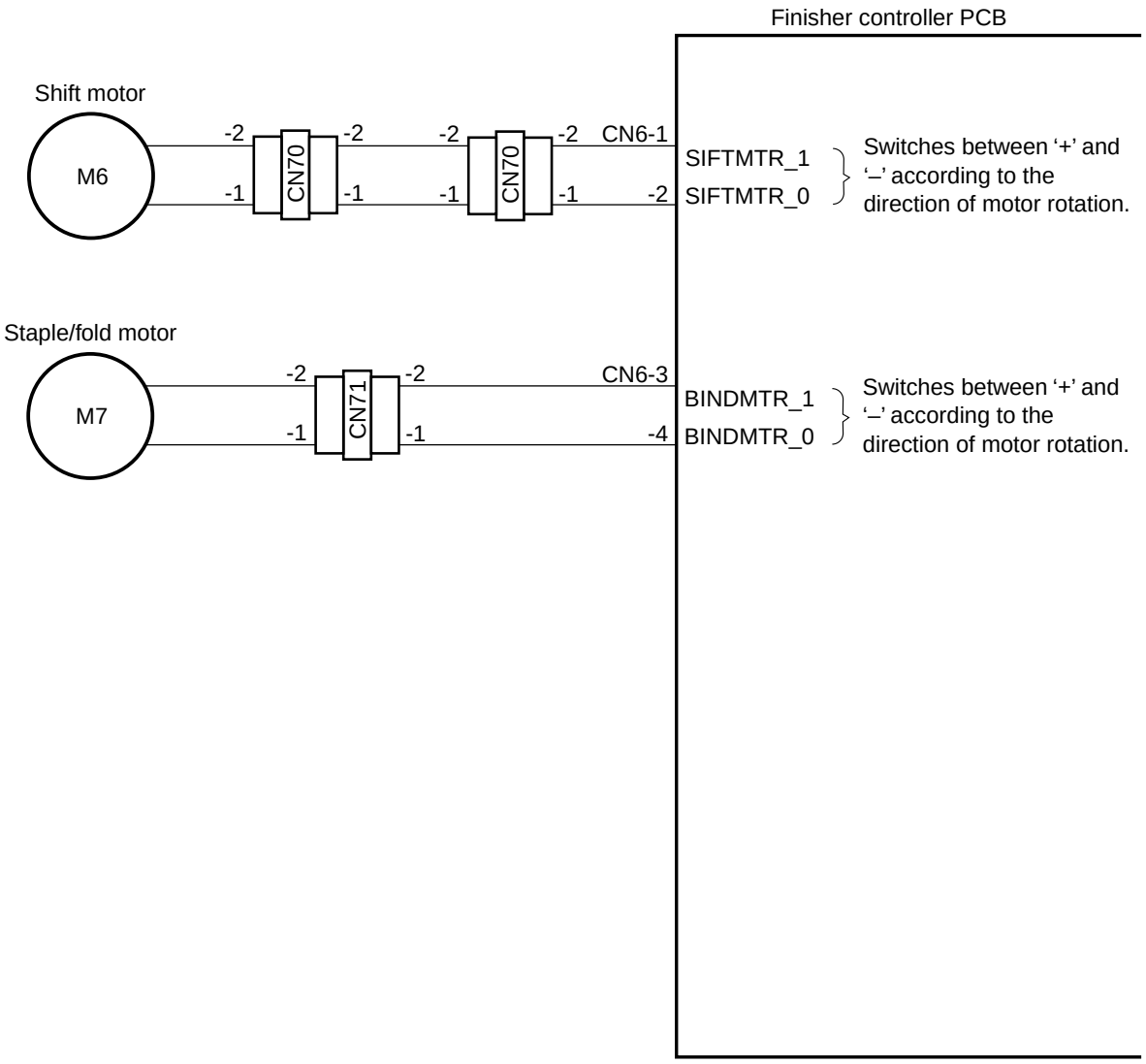


1.3.3 Outputs from the Finisher Controller PCB (1/2)



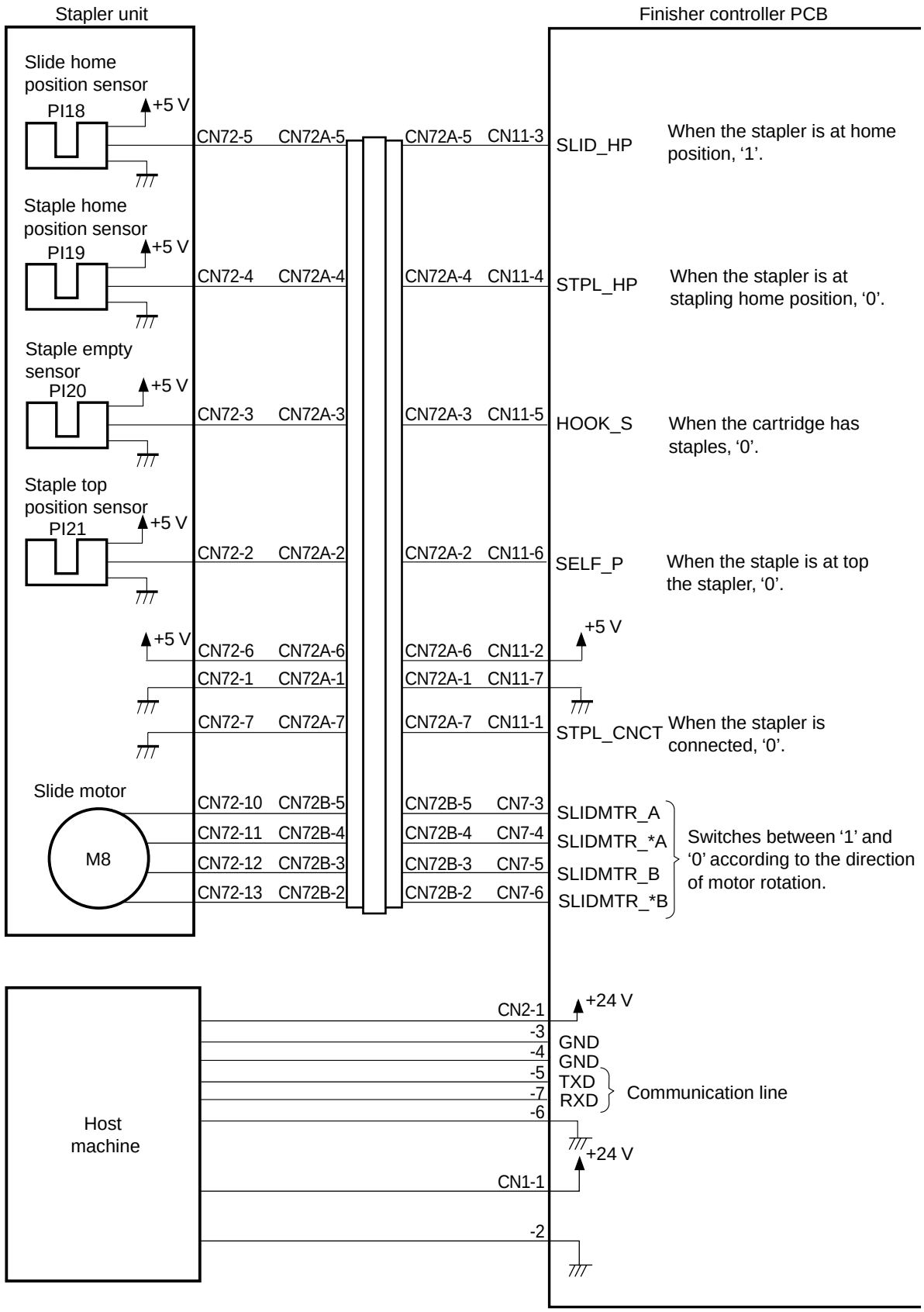
F02-103-03

1.3.4 Outputs from the Finisher Controller PCB (2/2)



F02-103-04

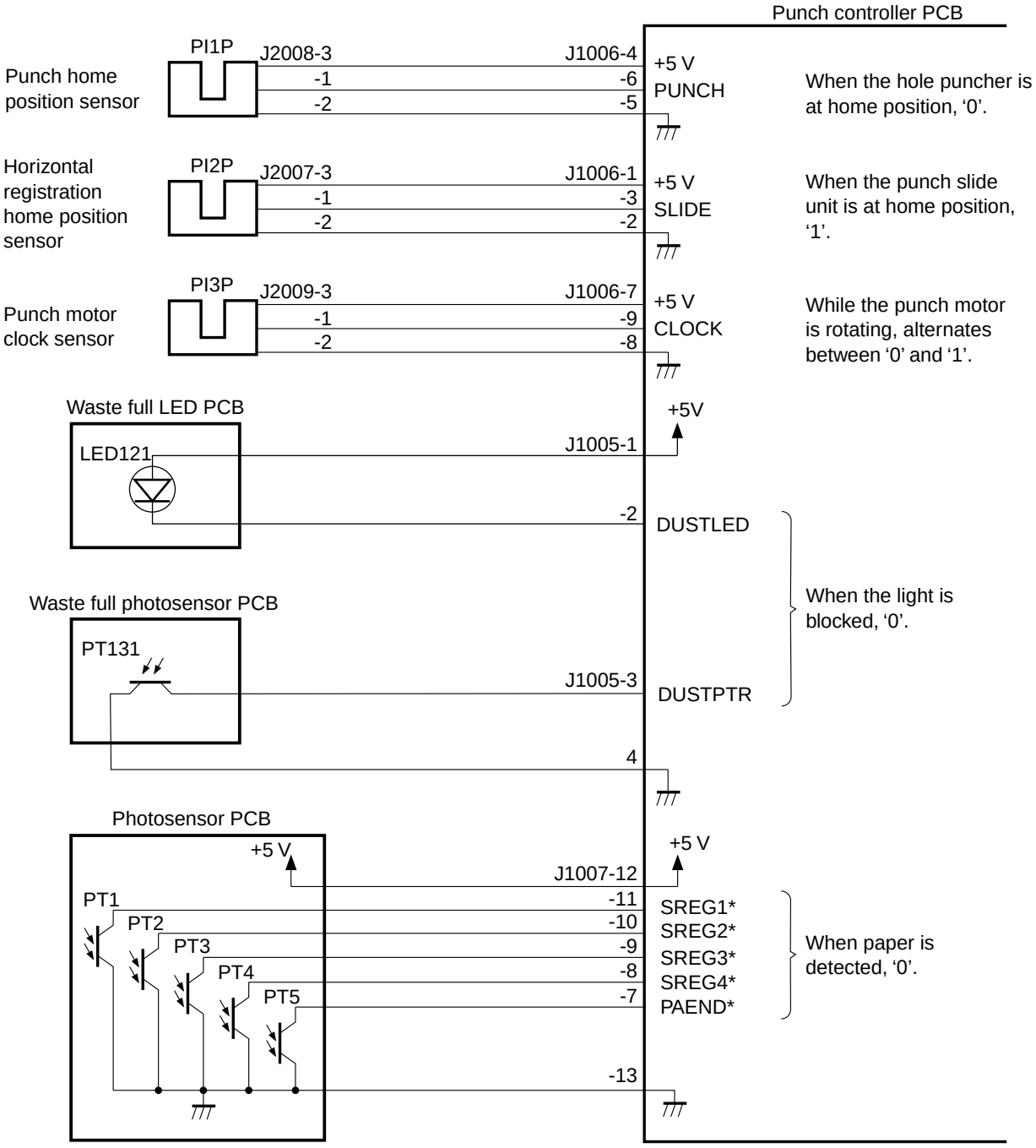
1.3.5 Inputs to and Outputs from the Finisher Controller



F02-103-05

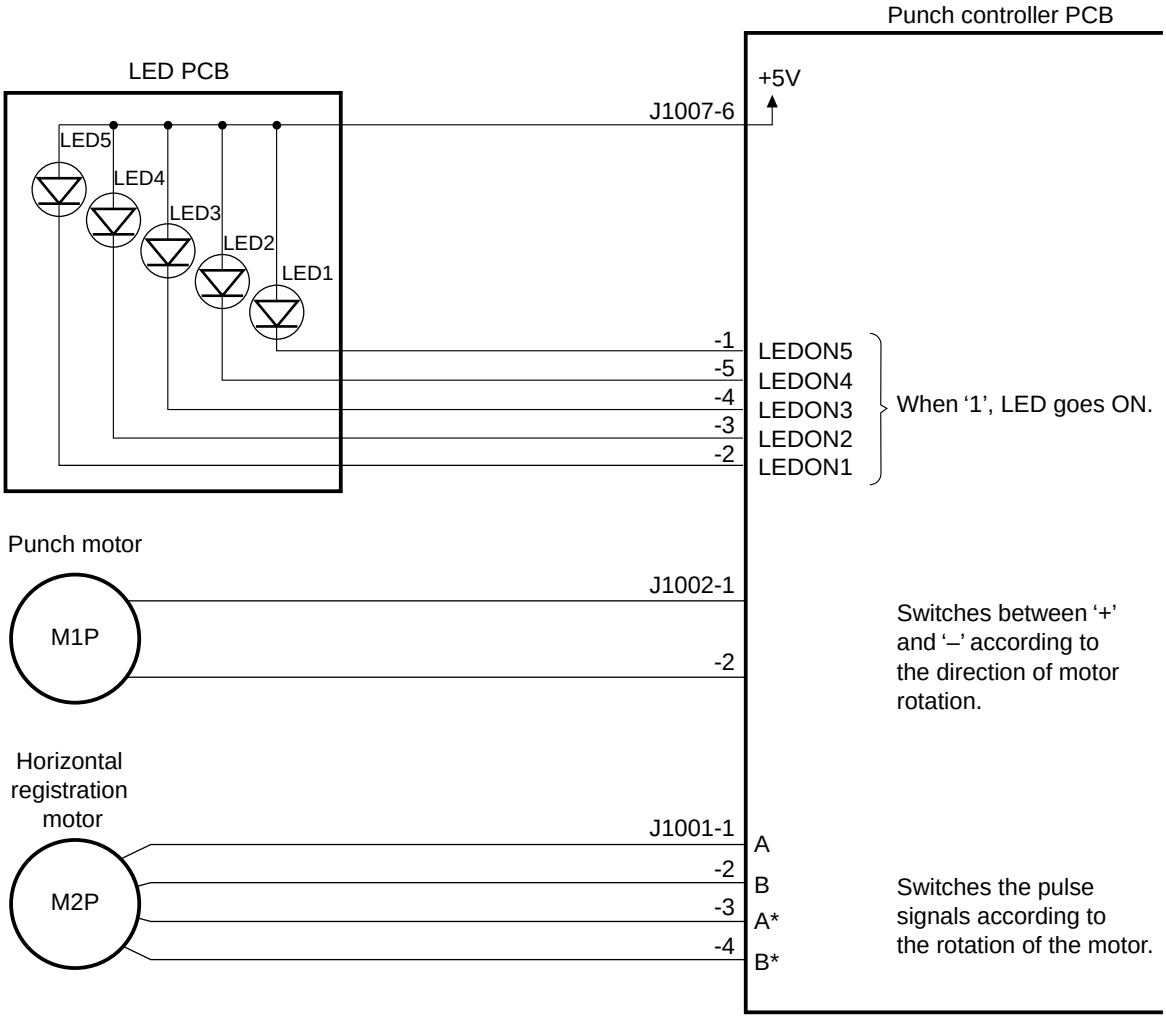
1.4 Inputs to and Outputs from the Punch Controller PCB (option)

1.4.1 Inputs to and Outputs from the Punch Controller PCB



F02-104-01

1.4.2 Outputs from the Punch Controller PCB



F02-104-02

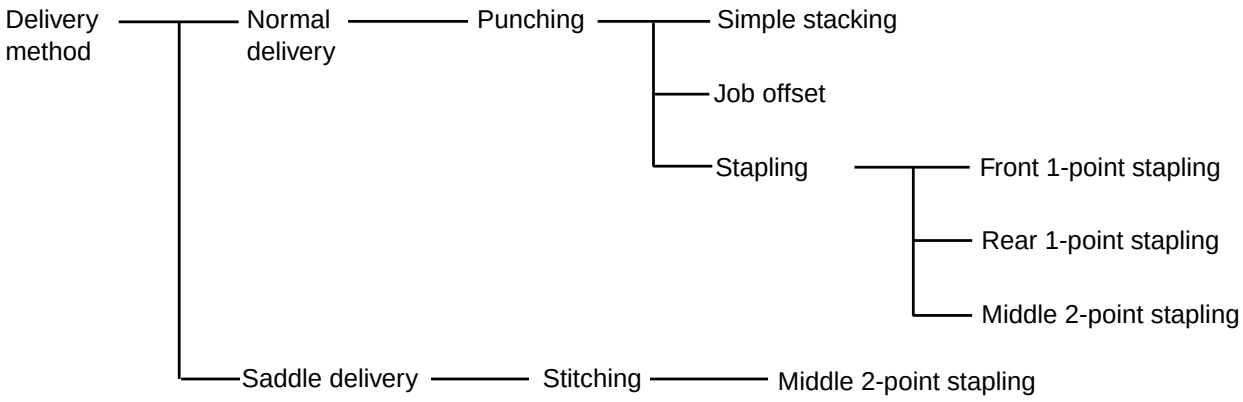
2 Feed/Drive System

2.1 Outline

The machine performs the following in response to the commands coming from its host machine on the sheets arriving from the host machine for delivery: simple stacking, job offset, and stapling or folding (in two).

If a punch unit (option) is installed, the sheets are pouched and delivered to the delivery tray.

Sheets may be delivered in either of five ways (including one for the puncher unit):

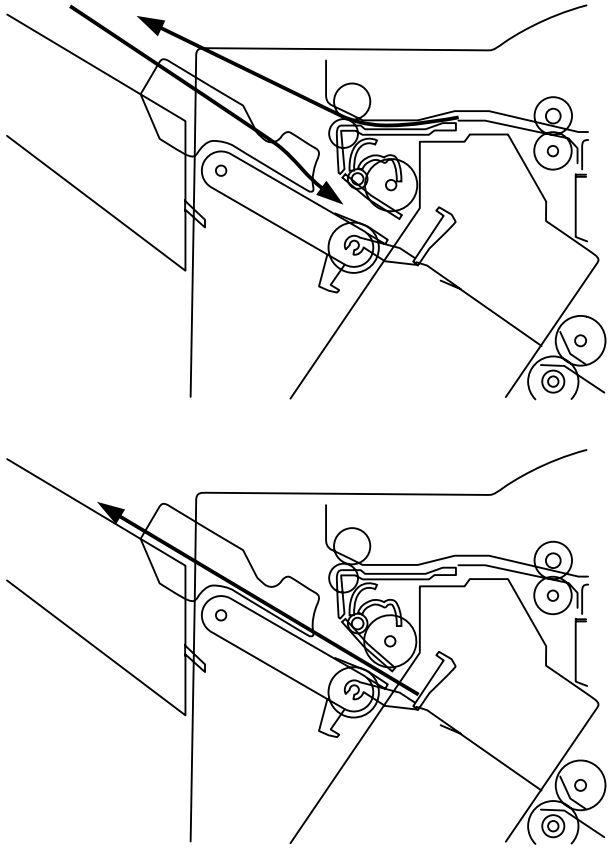


F02-201-01

2.1.1 Normal Delivery

a. Simple Stacking

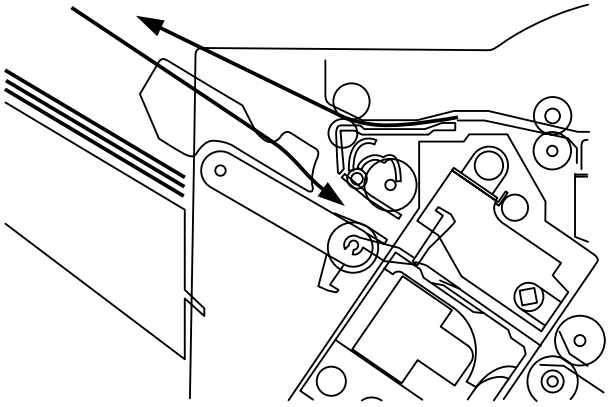
The machine pulls in the sheet once to the processing tray and then delivers it to the delivery tray.

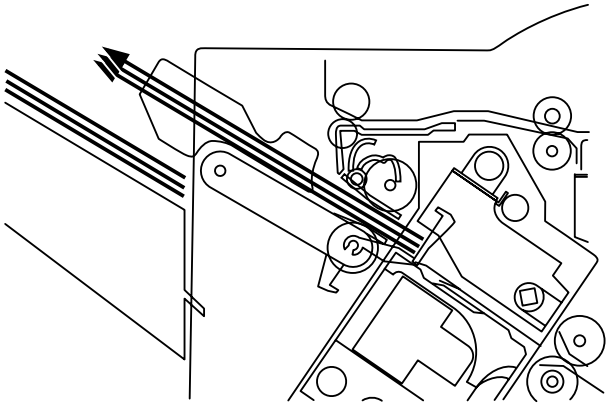


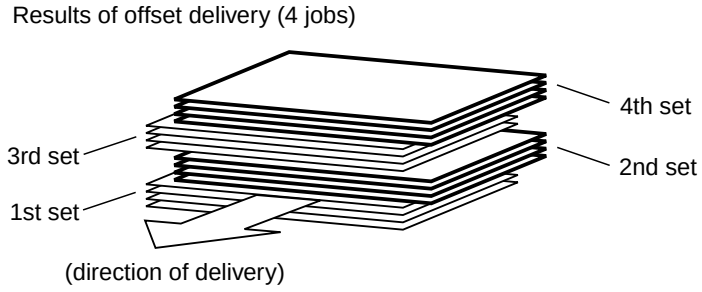
F02-201-02

b. Job Offset

The machine pulls the sheet once to the processing tray. It then moves the sheet to the front or the rear using the aligning plate. When it has deposited a specific number of sheets, it delivers them in the form of a aligning plane. When the number of sheets stacked on the processing tray reaches a specified value, the sheets are delivered in a form of a stack. Even if the specified value is not reached, stacked sheets are temporarily delivered when 10 sheets of large-size paper (300 mm or longer) or 30 sheets of small-size paper (299 mm or shorter) have been stacked. (Less than 182mm: 10 sheets)



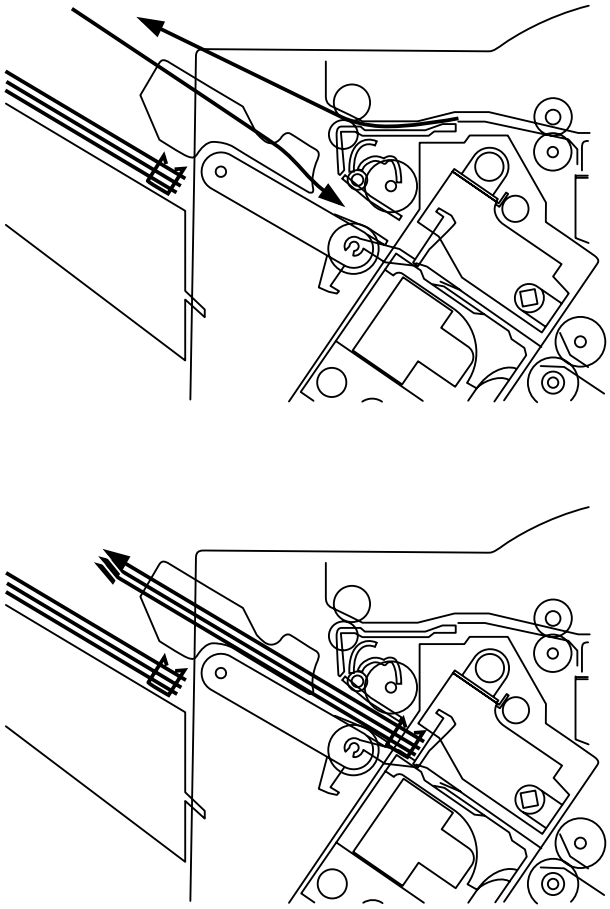




F02-201-03

c. Stapling

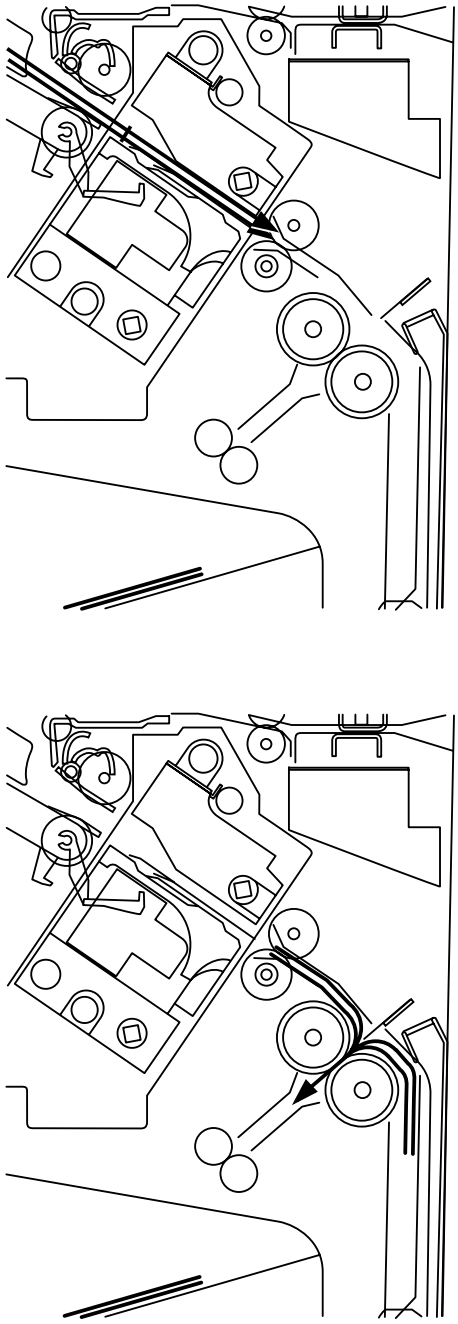
The machine stacks sheets coming from its host machine on the processing tray. When the number of sheets stacked on the processing tray reaches a specified value, the finisher staples them delivers the stapled stack to the delivery tray.



F02-201-04

d. Saddle Delivery

The machine deposits a stack of sheets on the processing tray, staples it (middle 2-point), and then moves it to the saddle unit. The saddle unit folds the stack in two, and delivers it to the bind tray.



F02-201-05

2.2 Feed/Delivery

2.2.1 Outline

The machine forwards the sheets coming from its host machine to the delivery tray, processing tray, or saddle unit according to the type of delivery used. The sheets forwarded to the processing tray or the saddle unit are offset, stapled, or folded.

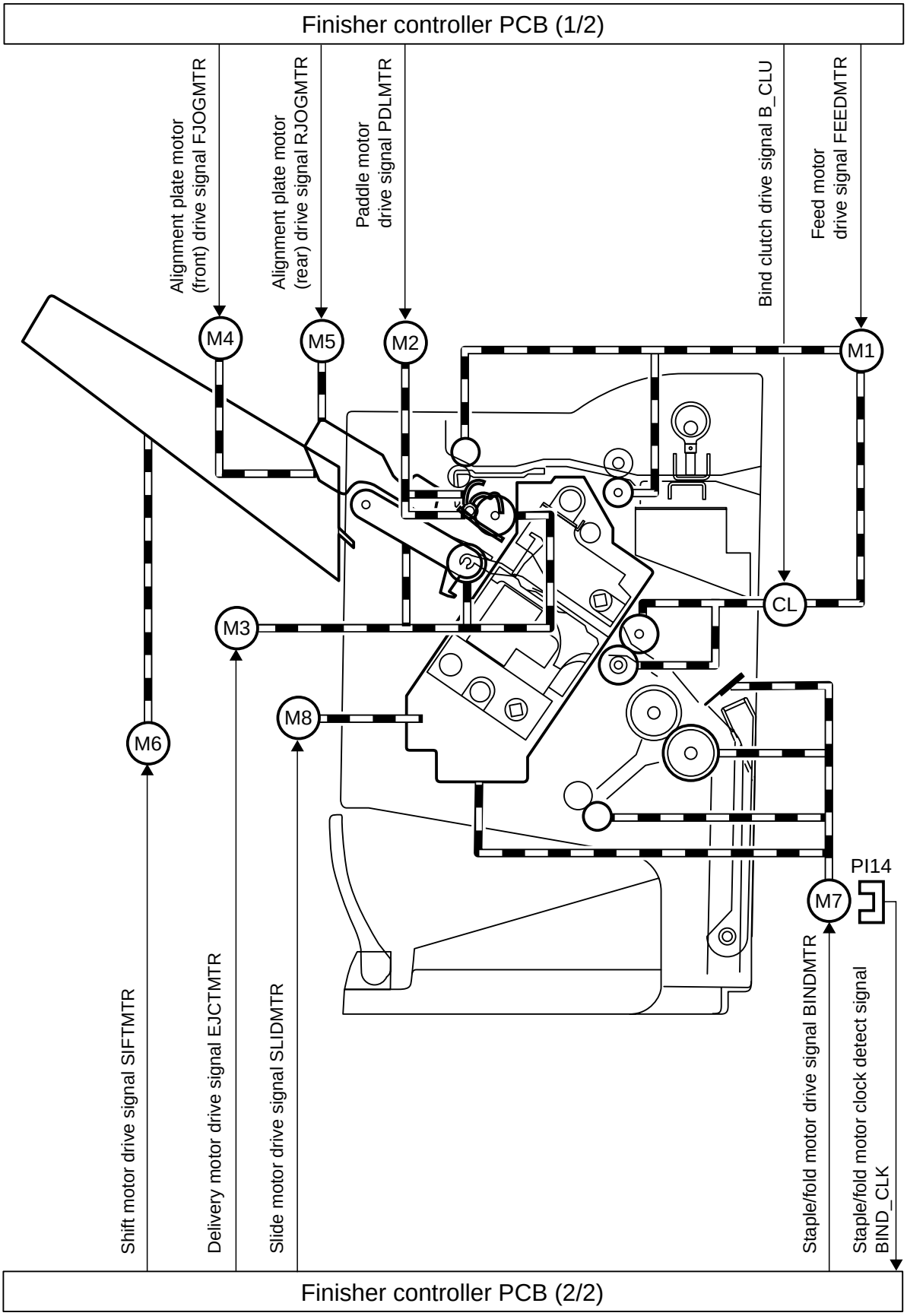
F02-202-01 shows the motors that are associated with moving and aligning sheets. These motors are controlled (rotated clockwise or counterclockwise) by the microprocessor (CPU) on the finisher controller PCB.

The paper path is equipped with the sensors shown in T02-202-02 used to monitor the arrival or passage of sheets.

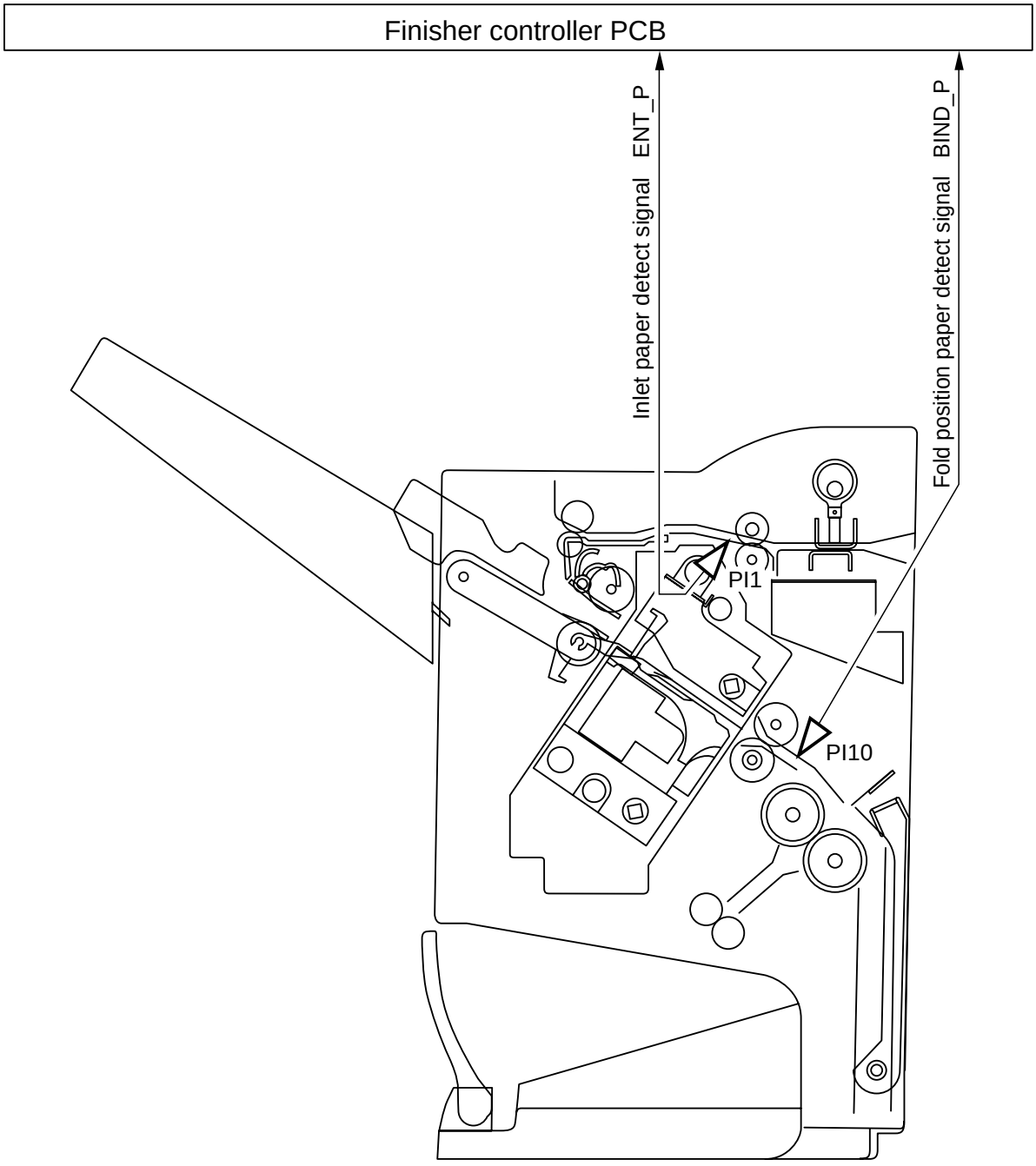
If a sheet fails to arrive at or move past a specific sensor within a specific period of time, the finisher controller will assume a jam, and stops the ongoing operation and, at the same time, communicates the presence of a jam to the host machine.

Notation	Name	Description	Connector on finisher controller PCB
M1	Feed motor	Stepping motor	CN10
M2	Paddle motor	Stepping motor	CN10
M3	Delivery motor	Stepping motor	CN13
M4	Alignment plate motor (front)	Stepping motor	CN3
M5	Alignment plate motor (rear)	Stepping motor	CN3
M7	Staple/fold motor	Brush DC motor	CN6

T02-202-01


Finisher controller PCB (1/2)
Alignment plate motor (front) drive signal FJOGMTR
Alignment plate motor (rear) drive signal RJOGMTR
Paddle motor drive signal PDLMTR
Bind clutch drive signal B_CLU
Feed motor drive signal FEEDMTR
M4
M5
M2
M1
CL
M3
M8
M6
PI14
M7
Shift motor drive signal SIFTMTR
Delivery motor drive signal EJCTMTR
Slide motor drive signal SLIDMTR
Staple/fold motor drive signal BINDMTR
Staple/fold motor clock detect signal BIND_CLK
Finisher controller PCB (2/2)

F02-202-01



F02-202-02

Notation	Name	Description	Connector on finisher controller PCB
PI1	Inlet sensor	Photointerrupter	CN16
PI10	Fold position sensor	Photointerrupter	CN16

T02-202-02

2.3 Job Offset

2.3.1 Outline

"Job offset" refers to the operation by which the machine delivers a set of sheets with them pulled forward or backward for sorting.

Switching between the forward and backward directions is made using an aligning plate (front) and an aligning plate (rear).

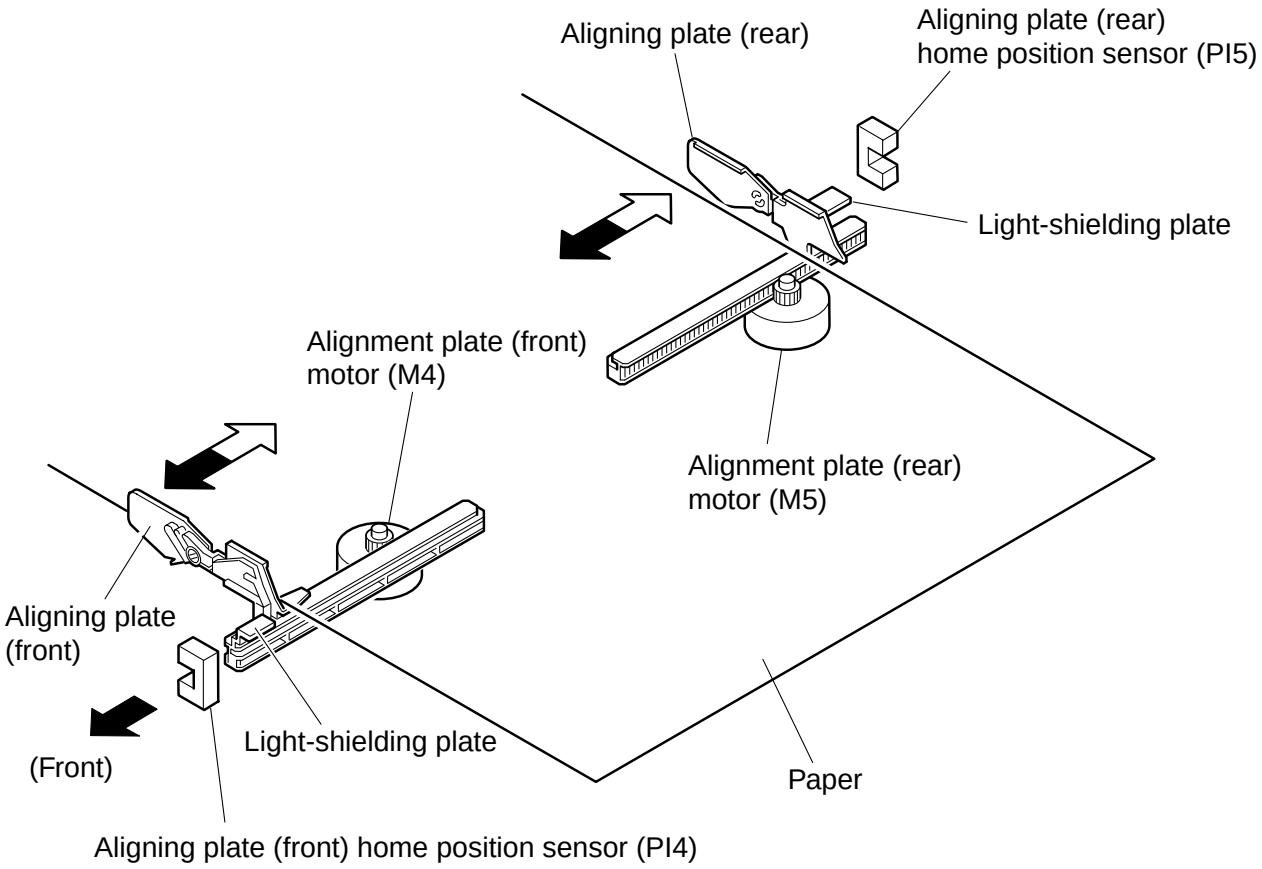
The sheet coming between the delivery rollers is fed onto the processing tray and then fed toward the stopper by the paddle.

A swing guide is at the up position while a sheet is being pulled onto the processing tray or during alignment. It is at the down position during stack feeding, stack delivery, or stapling.

At power-on, the finisher controller PCB drives the aligning plate (front) motor (M4) and the aligning plate (rear) motor (M5) to return the two aligning plates to their home positions.

Sensor	Symbol	Connector	Function	Motor	Simbol
Aligning plate (front) home position sensor	PI4	CN4-3	Drives the aligning plate (front)	Aligning plate (front) motor	M4
Aligning plate (rear) home position sensor	PI5	CN5-15	Drives the aligning plate (rear)	Aligning plate (rear) motor	M5
Swing guide home position sensor	PI3	CN9-9	Drives the swing guide drive.	Paddle motor	M2
Paddle home position sensor	PI2	CN9-3	Drives the paddle (feeds paper).	Paddle motor	M2

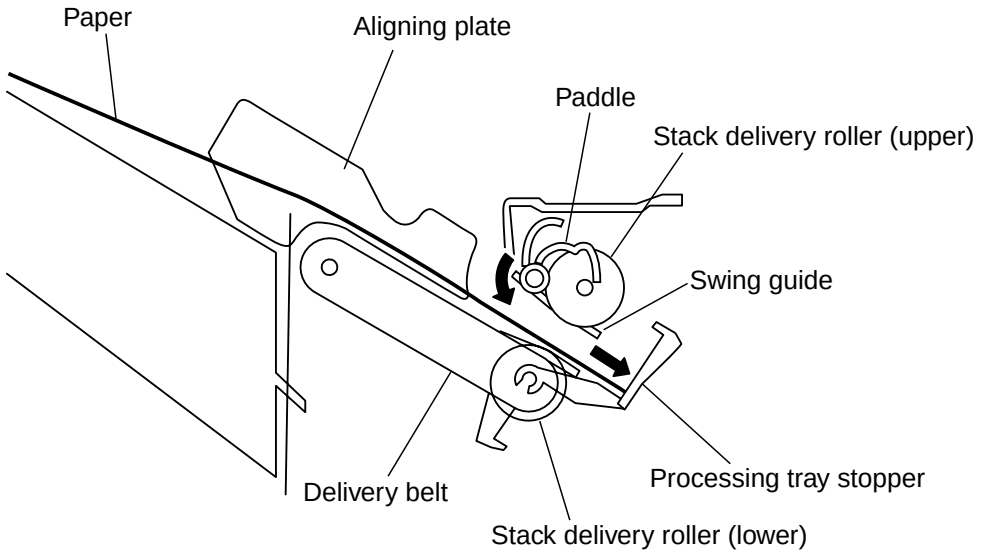
T02-203-01


Aligning plate (rear)
Aligning plate (rear)
home position sensor (PI5)
Light-shielding plate
Alignment plate (front)
motor (M4)
Alignment plate (rear)
motor (M5)
Aligning plate
(front)
(Front)
Light-shielding plate
Paper
Aligning plate (front) home position sensor (PI4)

F02-203-01

2.3.2 Processing Tray Paper Stacking Operation

A sheet coming between the delivery rollers is fed onto the processing tray. Then, the paddle taps on the sheet surface once to locate the sheet against the processing tray stopper.

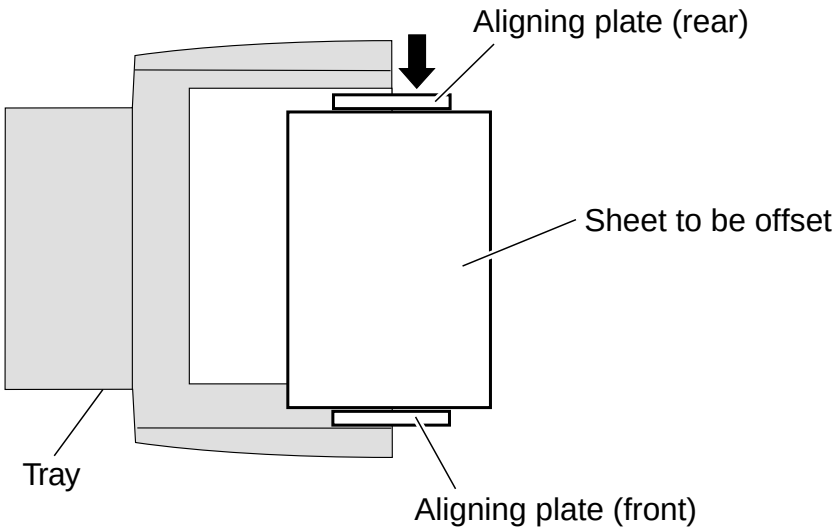


T02-203-02

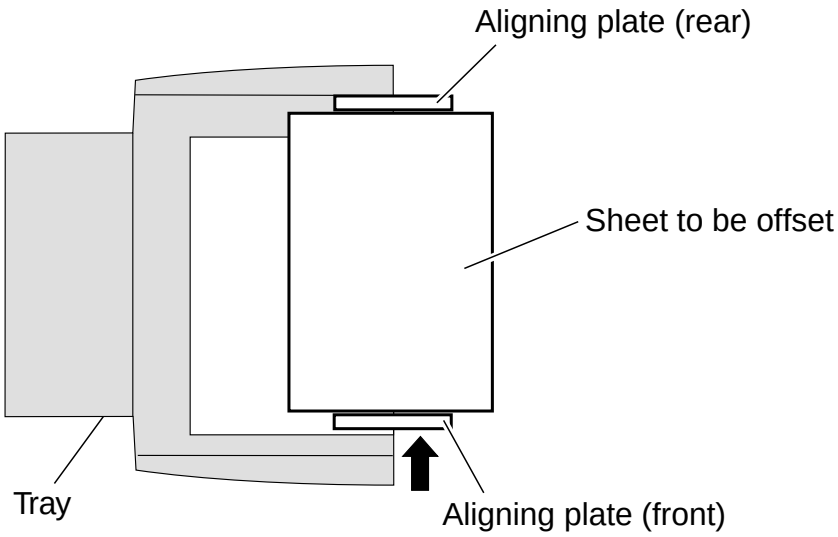
2.3.3 Offset Operation

Each sheet is pulled forward or backward using the aligning plate (front) and the aligning plate (rear).

The offset operation is performed each time a sheet is pulled onto the processing tray.



F02-203-03 Offsetting in the forward direction

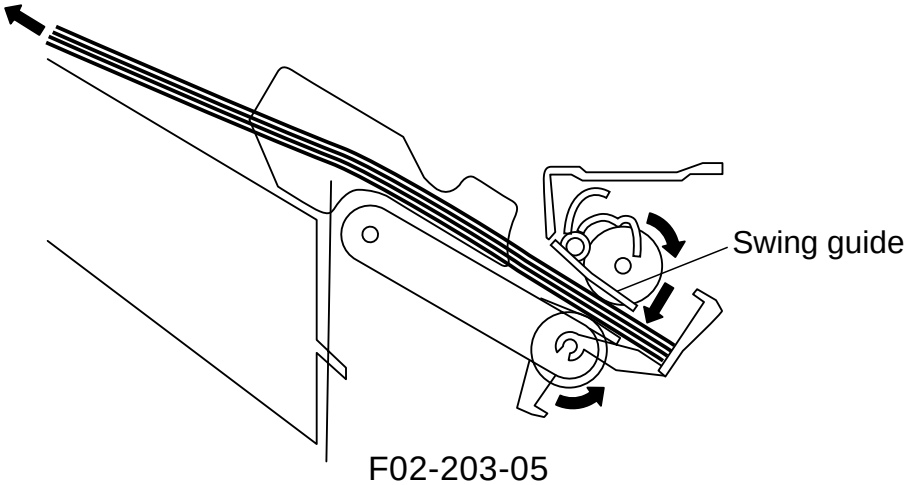


F02-203-04 Offsetting in the backward direction

2.3.4 Stack Delivery Operation

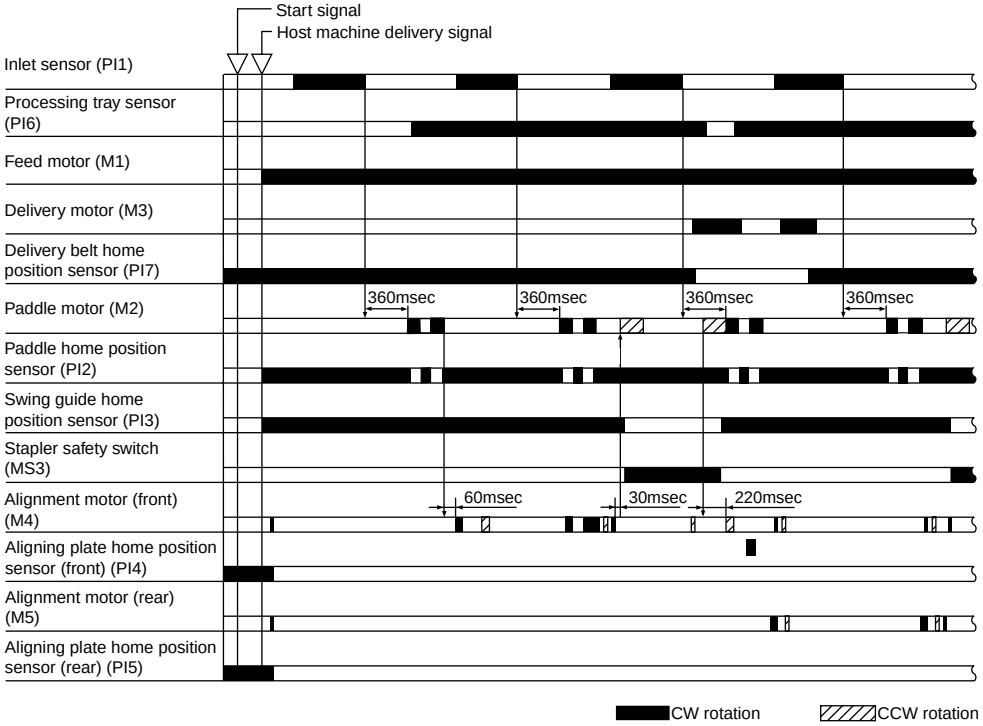
Stack delivery takes place when 10 sheets of large-size paper or 30 sheets of small-size paper (Less than 182mm: 10 sheets) have been stacked on the processing tray with them offset in either direction.

The paddle motor rotates and the swing guide descends to hold the paper stack between the upper and lower stack delivery rollers. The delivery motor rotates in the forward direction to rotate the delivery rollers, feeding the paper stack in the delivery direction. The delivery belt home position sensor is turned OFF. The delivery motor is driven a specified number of pulses, causing the swing guide to ascend. Next, the paper delivery motor is driven. Next, the delivery motor is driven to deliver the paper stack with the nails of the delivery belt that rotates in sync with the stack delivery rollers.



F02-203-05

Job offset sequence(Reverse,Small-size)



F02-203-06

3. Stapling Operation

3.1 Outline

Staple operation is performed to staple a specified sheets of paper using a stapler unit.

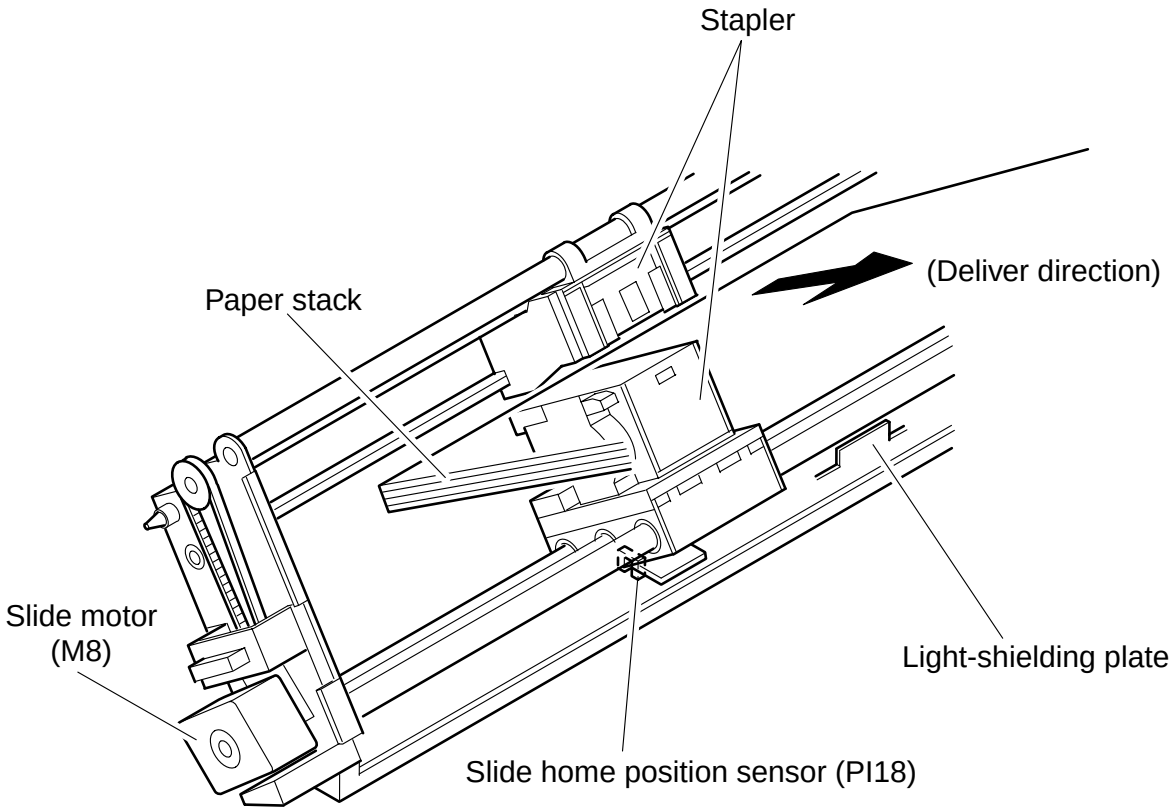
The stapling position depends on the staple mode and paper size.

When the machine starts immediately after power-on, the finisher controller PCB drives the slide motor (M8) to return the stapler unit to the home position. The stapler unit starts moving toward the front of the stapler frame. It stops when the slide home position sensor (PI18) on the slide PCB located under the stapler unit. Next, the slide motor is driven a specified number of pulses. The stapler unit moves to rear standby position at the back of the machine, entering the standby state.

Sensor	Simbol	Connector	Function	Remarks
Slide home position sensor	PI18	CN11-3	Detects the home position for the stapler moving back and forth.	–
Staple home position sensor	PI19	CN11-4	Detects the home position for the stapling operation	In the stapler
Staple empty sensor	PI20	CN11-5	Detects presence or absence of staples in the cartridge.	In the stapler
Staple top position sensor	PI21	CN11-6	Detects the staple top position.	In the stapler

Function	Motor	Symbol	Remarks
Moves the stapler.	Slide motor	M8	–
Performs stapling operation.	Staple/fold motor	M7	–

T02-301-01

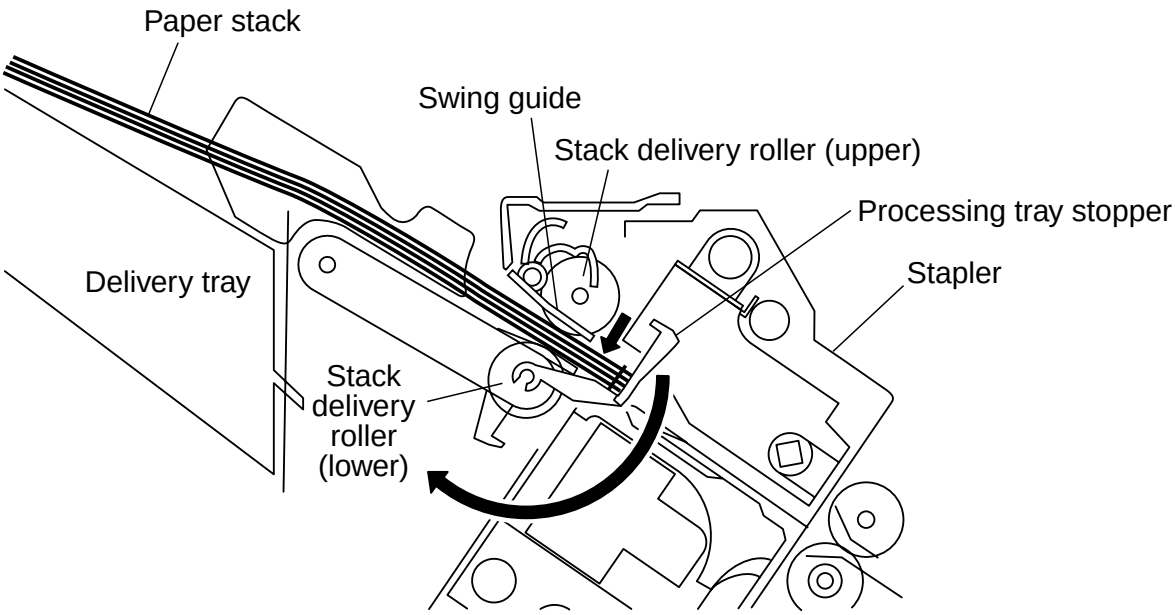

Stapler
(Deliver direction)
Paper stack
Slide motor
(M8)
Light-shielding plate
Slide home position sensor (PI18)

F02-301-01

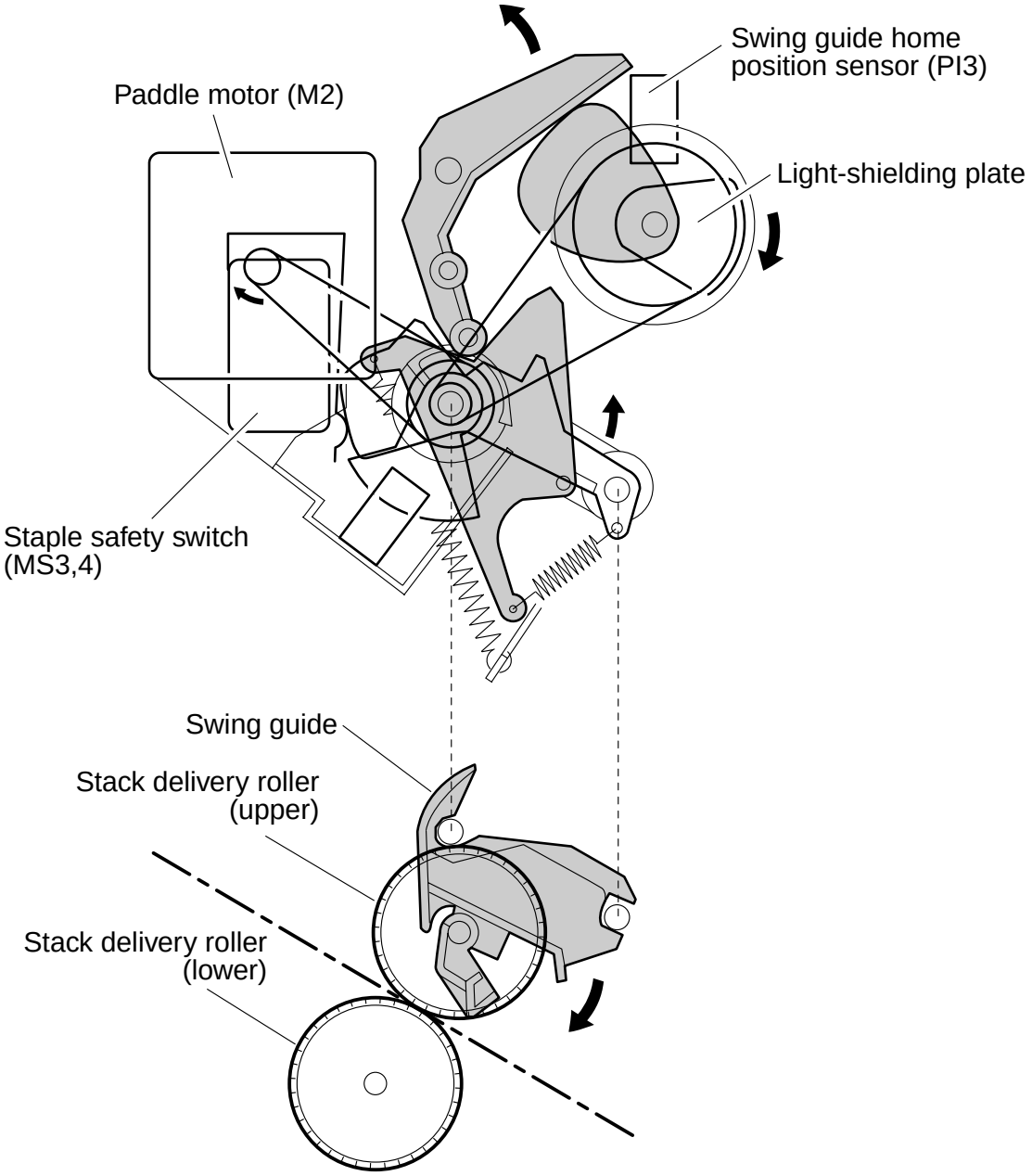
3.2 Stapling Operation

When stacking and alignment of paper on the processing tray are complete, the finisher controller PCB drives the paddle motor (M2) in the reverse direction and lowers the swing guide. When the swing guide descends, the paper stack is sandwiched between the upper and lower stack delivery rollers.

The finisher controller PCB moves the stapler for stapling according to the specified stapling position (when rear 1-point stapling is specified, the stapler does not move but it staples at the standby position). As the stapler moves forward, the processing tray stopper is folded forward.



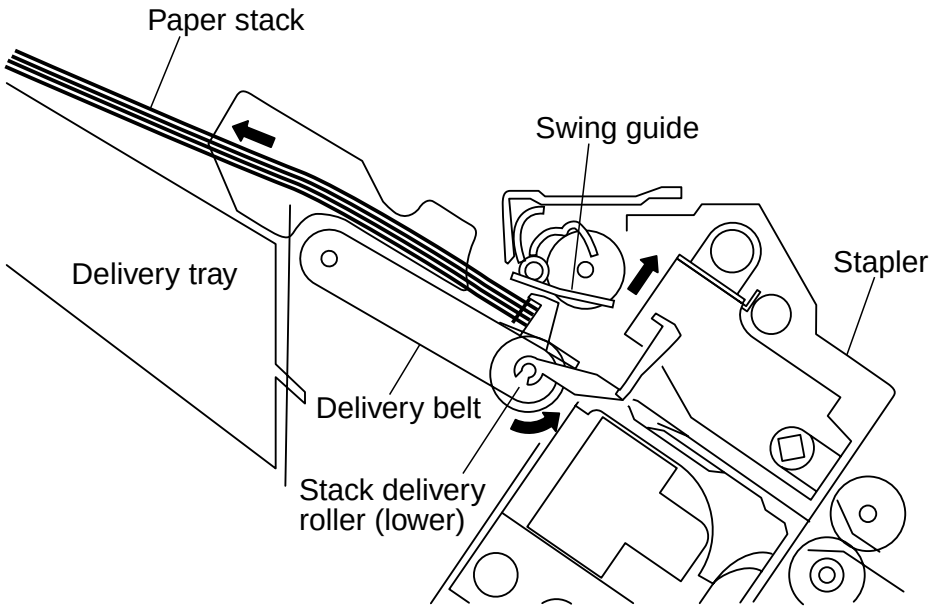
F02-302-01


Swing guide home position sensor (PI3)
Paddle motor (M2)
Light-shielding plate
Staple safety switch (MS3,4)
Swing guide
Stack delivery roller (upper)
Stack delivery roller (lower)

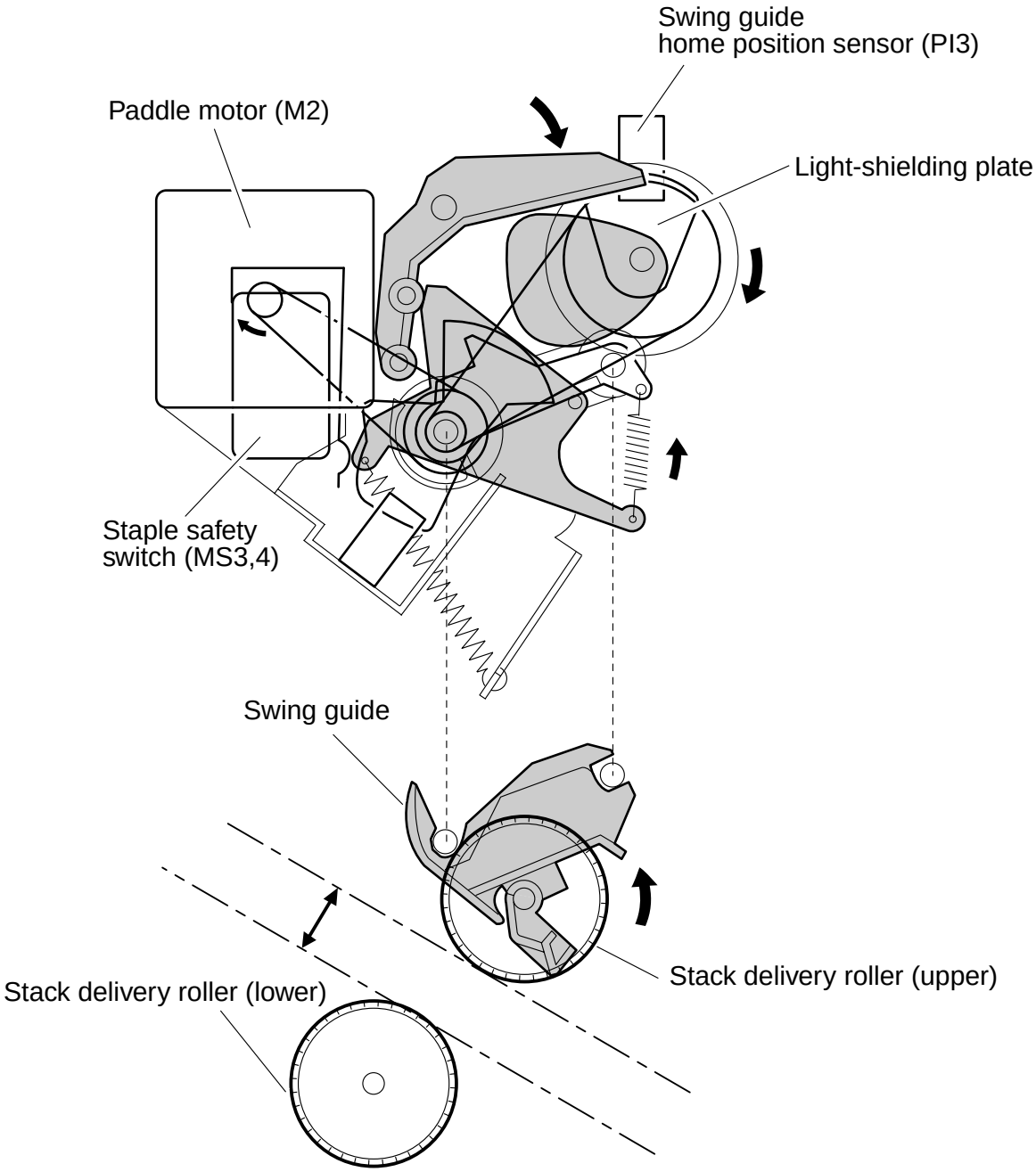
F02-302-02

3.3 Delivery Operation after Stapling

When stapling is complete, the finisher controller PCB drives the deliver motor in the forward direction to feed the paper stack (sandwiched between the stack delivery rollers) in the delivery direction. The delivery belt home position sensor is turned OFF. The delivery motor is driven a specified number of pulses, causing the swing guide to ascend. At the same time, the slide motor is driven to return the stapler back to the standby position, followed by driving of the delivery motor. Then, the paper stack is delivered with the nails of the delivery belt that rotates in sync with the stack delivery rollers.



F02-303-01


Swing guide
home position sensor (PI3)
Paddle motor (M2)
Light-shielding plate
Staple safety
switch (MS3,4)
Swing guide
Stack delivery roller (upper)
Stack delivery roller (lower)

F02-303-02

3.4 Stapler Unit

The staple/fold motor (M7) is used to perform stapling operation. This motor rotates the cam one turn for stapling. The home position of this cam is detected by the staple home position sensor (PI19).

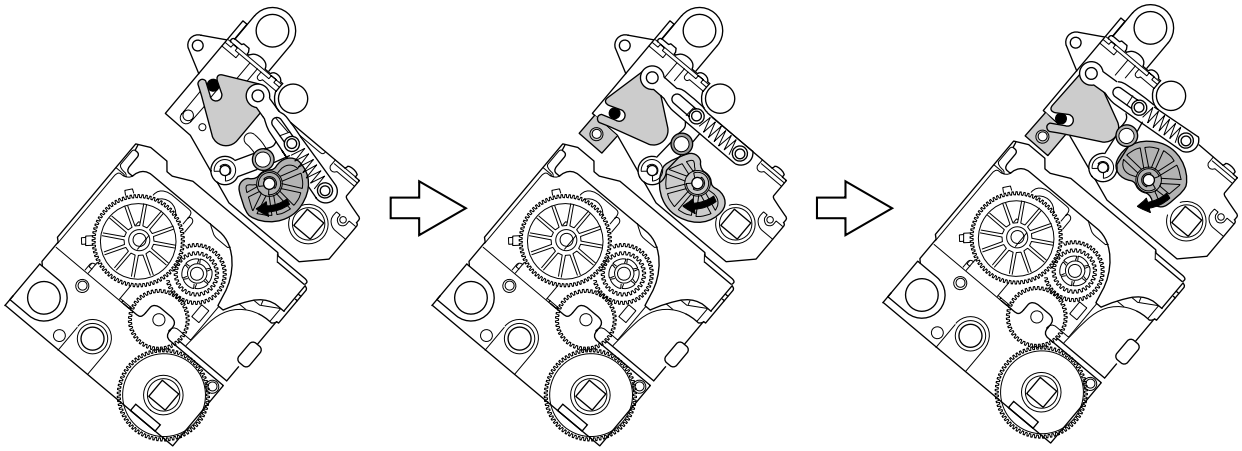
The staple/fold motor is rotated in the forward or reverse direction under the control of the macro computer (IC13) on the finisher controller PCB.

When the staple home position sensor is OFF, the finisher controller PCB rotates the staple/fold motor in the forward direction until the sensor turns ON, allowing the staple cam to the original position.

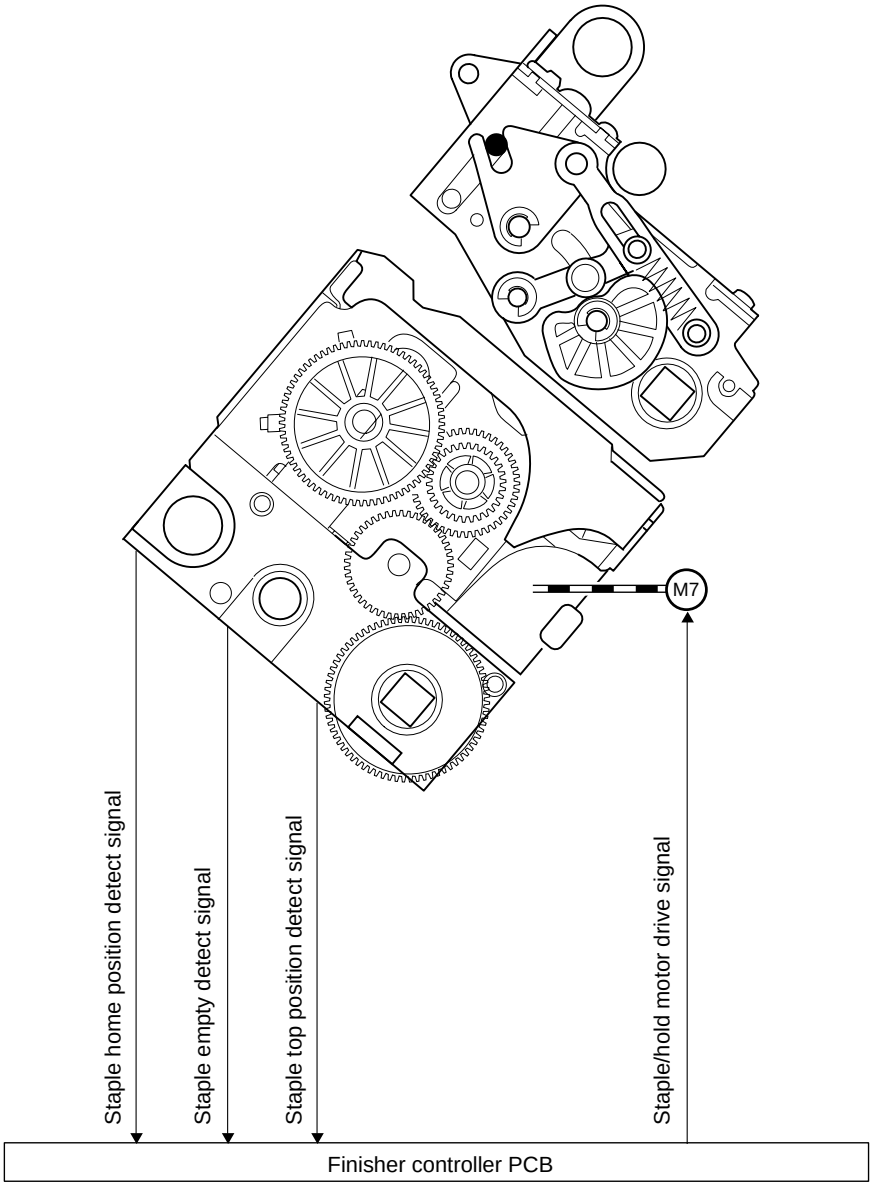
The staple empty sensor (PI20) is used to detect presence/absence of a staple cartridge in the machine and presence/absence of staples in the cartridge.

The stale top position sensor (PI21) is used to determine whether staples are pushed up to the top of the staple cartridge.

The finisher controller circuit does not drive the staple/fold motor (M7) unless the staple safety switch (MS3,4) is ON (the swing guide is close). This assures safety in case where you happen to put your finger in the stapler.



F02-304-01



F02-304-02

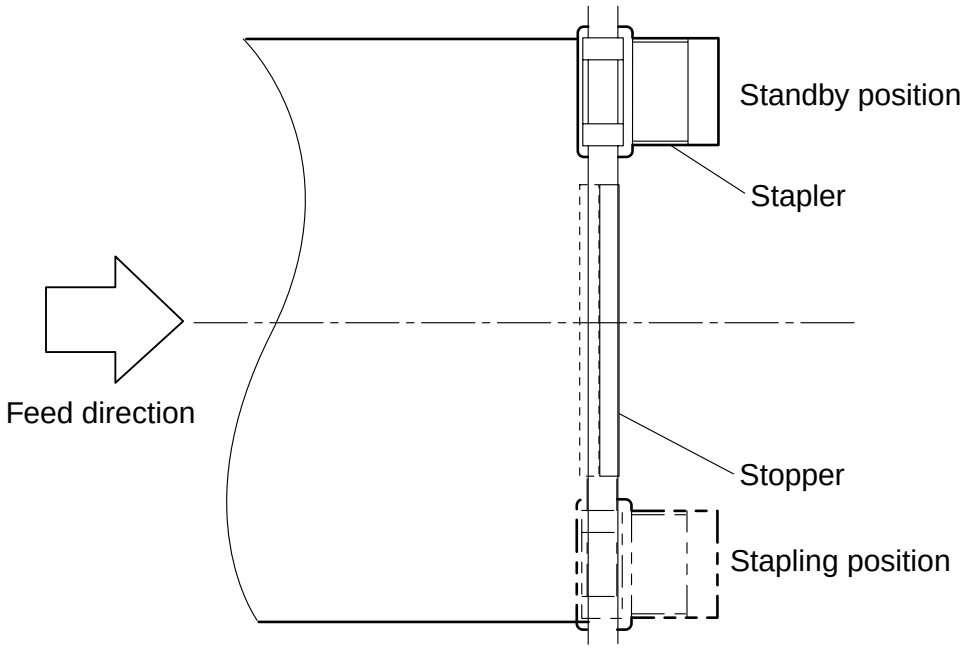
3.4.1 Stapler Movement Controller

The stapler unit is moved by the slide motor (M8). Its home position is detected by the slide home position sensor (PI18). The stapler waits at the back irrespective of the staple mode and paper size. After paper has been stacked on the processing tray, the stapler is moved to the specified stapling position in response to the stapling command from the host machine.

F02-304-03 shows the standby position of the stapler and the stapling position depending on the staple mode.

a. Front 1-point stapling

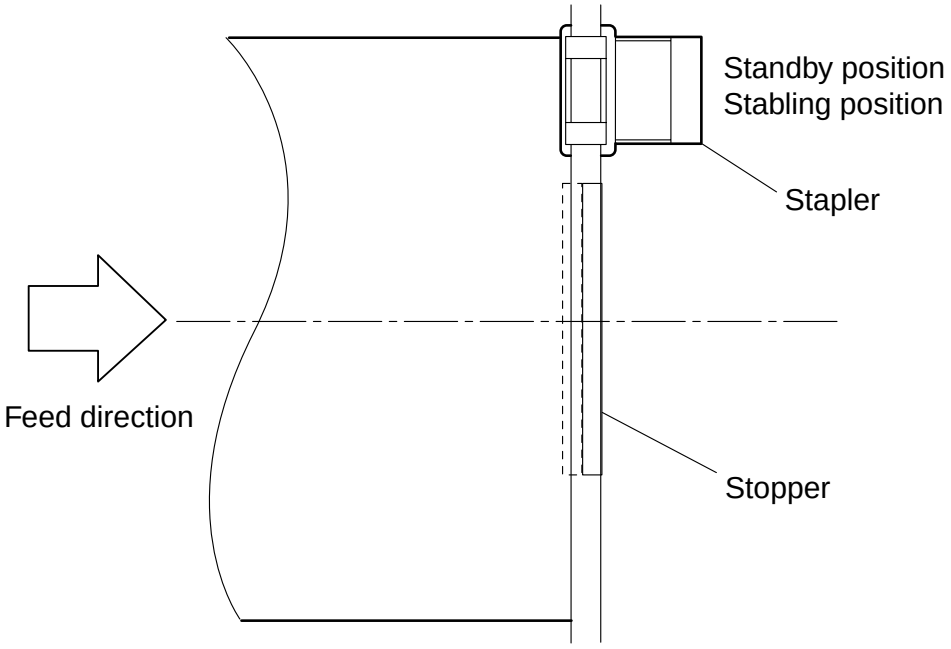
The stapler waits at the back. The stapler moves to and returns from the stapling position for each stapling operation.



F02-304-03

b. Rear 1-point stapling

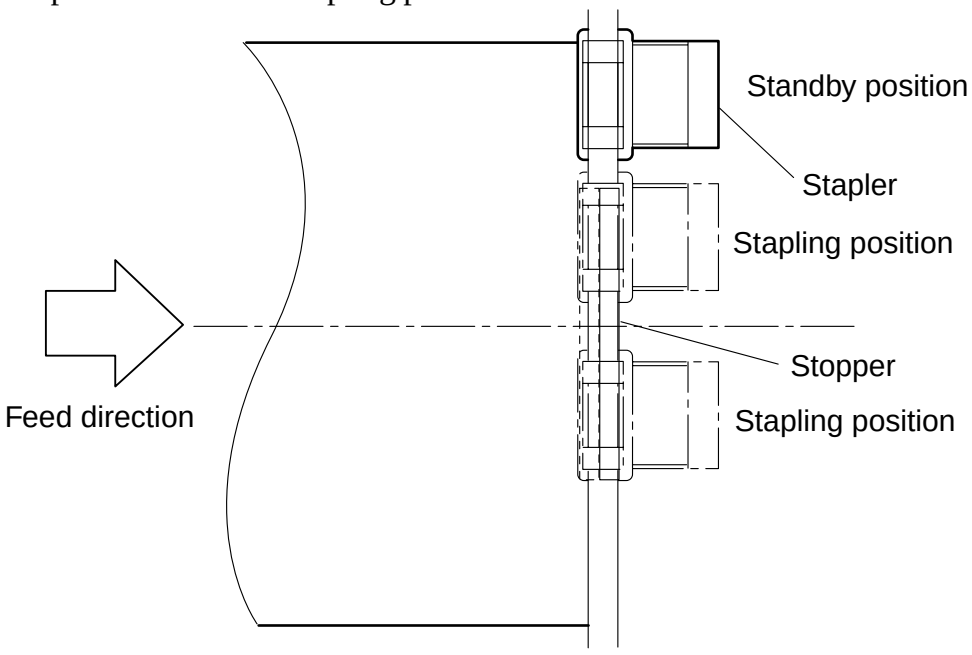
The stapler waits at the back. The stapling position is the same as the standby position



.F02-304-04

c. Middle 2-point stapling

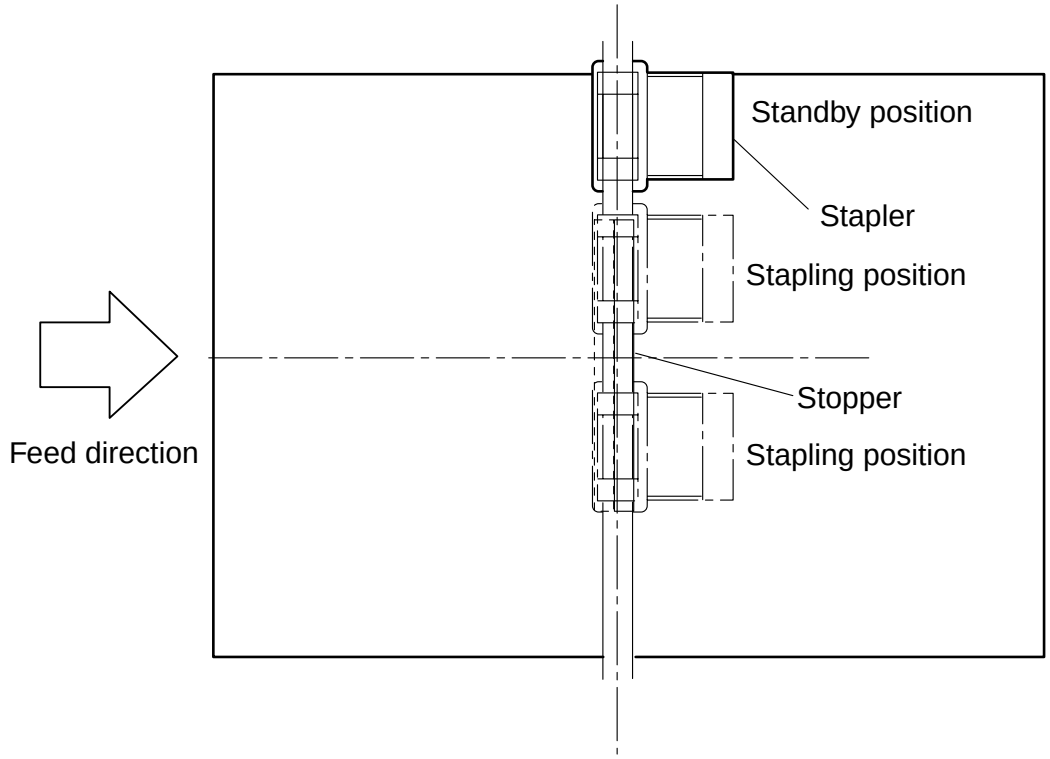
The stapler waits at the back. The stapler moves to and returns from the stapling position for each stapling operation. The stapler first staples a paper stack at the rear stapling position and then staples it at the front stapling position.



F02-304-05

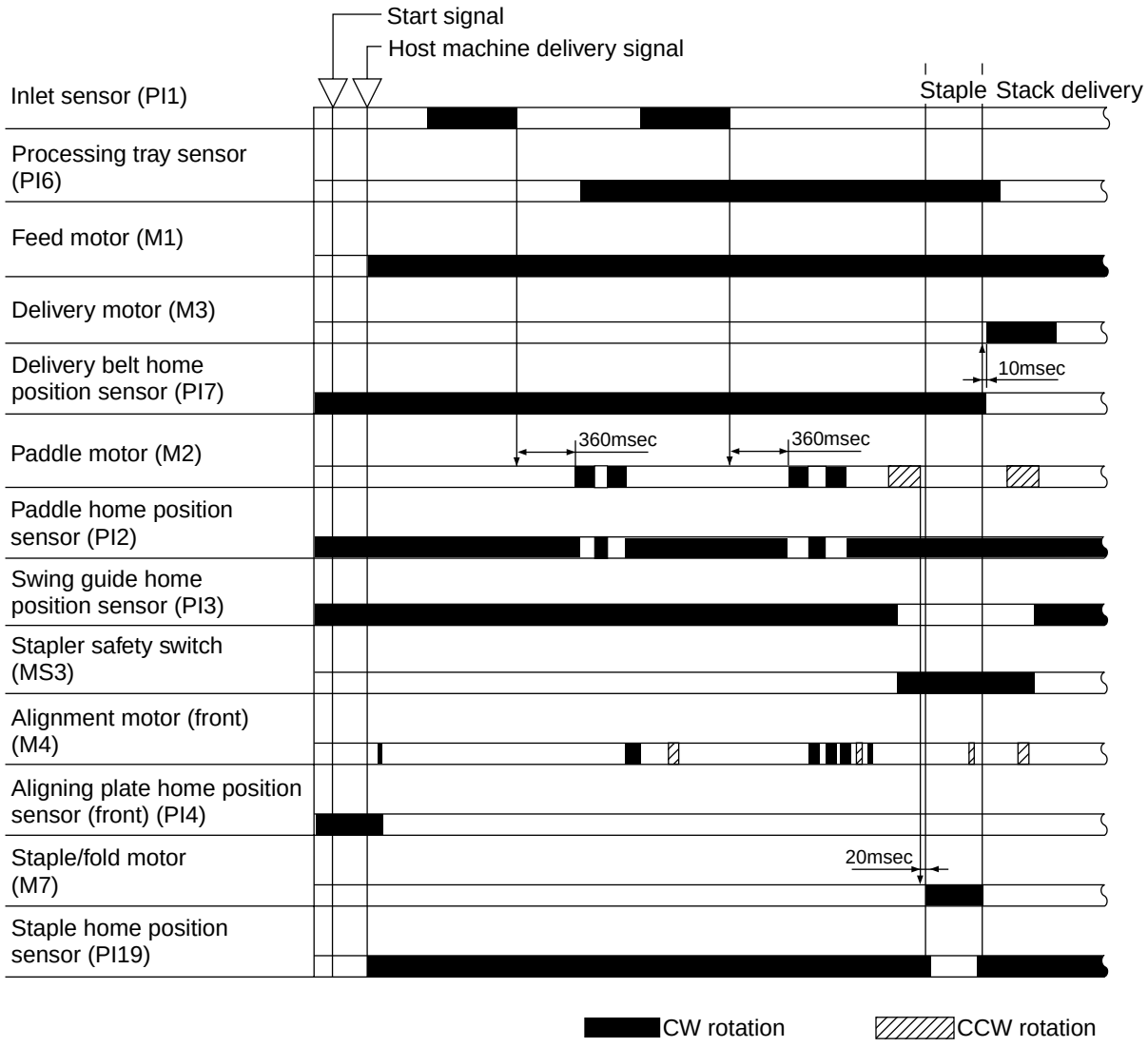
d. Middle 2-point stapling (bind mode)

The stapler waits at the back. The stapler moves to and returns from the stapling position for each stapling operation. The stapler first staples a paper stack at the rear stapling position and then staples it at the front stapling position.



F02-304-06

Stapling Operation Sequence
Rear 1-point Stapling of 2 Sheets(Reverse,Small-size)



F02-304-07

4 Delivery Tray Operation

4.1 Outline

The machine has a delivery tray in the finisher unit and a bind tray in the saddle unit.

The bind tray in the saddle unit is of the fixed type and all the folded paper stacks are delivered to this tray. This tray has a bind tray sensor (PI13) to detect presence/absence of paper.

The delivery tray in the finisher unit is moved up and down using a shift motor (M6).

The finisher has a tray paper sensor (PI8) to detect presence/absence of paper on the stack tray.

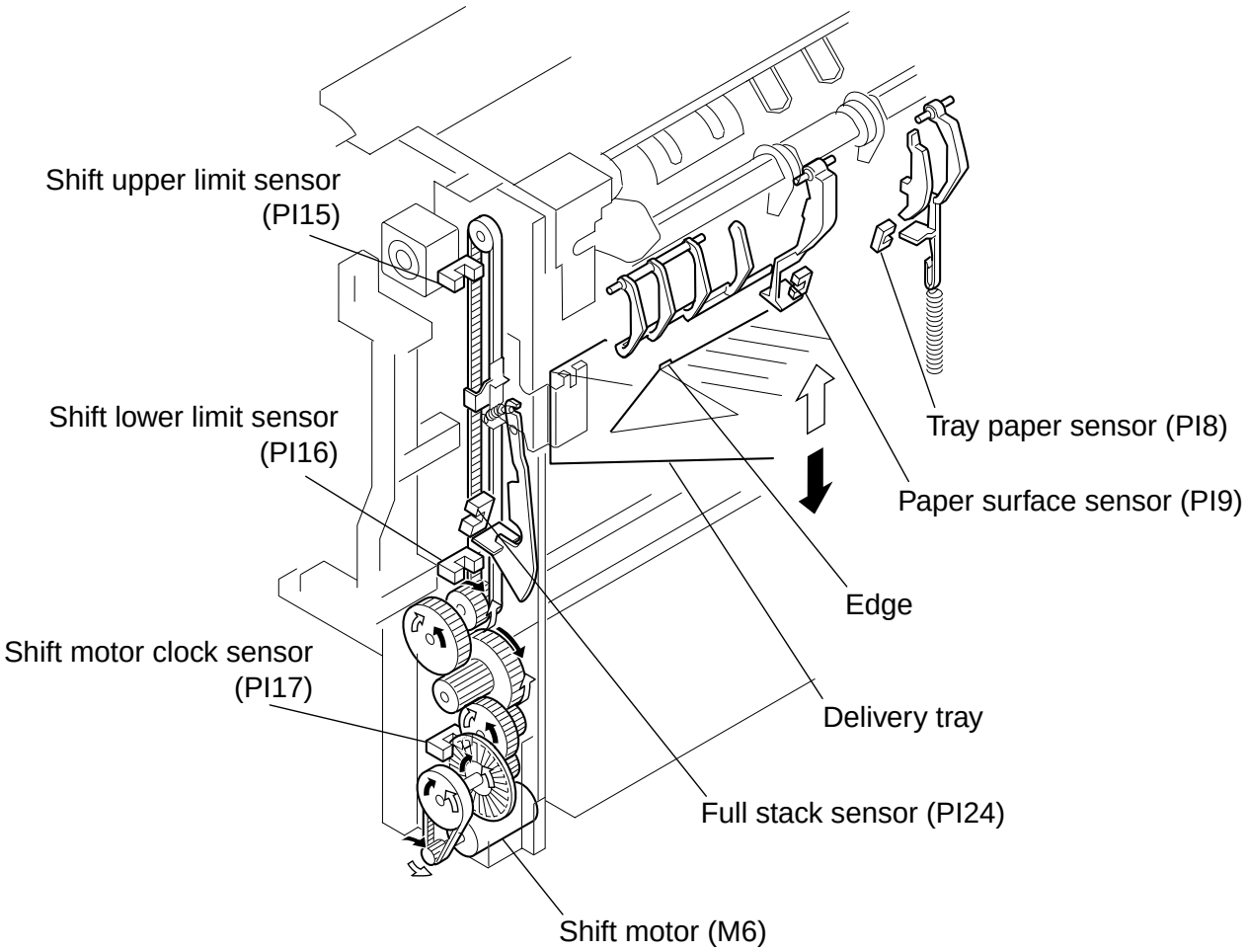
The home position sensor of the delivery tray is detected by the paper surface sensor (PI19). When paper has already been stacked on the delivery tray, the home position is on the top surface of the stacked paper. When paper has not yet been stacked on the delivery tray, the home position is at the position where the edge of the delivery tray is detected. At power-on, the finisher controller PCB drives the shift motor (M6) to return the delivery tray to the home position.

When the paper coming from the processing tray is stacked on the delivery tray, the shift motor is driven a specified number of pulses, causing the delivery tray to descend. Clock pulses are detected by the shift motor clock sensor (PI17). Then, the delivery tray returns to the home position for the next stacking operation.

The upper limit of the delivery tray is detected by the shift upper limit sensor (PI15). When the shift upper limit sensor (PI15) is turned ON, the finisher controller PCB stops the shift motor (M6) that is ascending.

The lower limit of the delivery tray is detected by the shift lower limit sensor (PI16). When the shift lower limit sensor (PI16) is turned ON, the finisher controller PCB stops the shift motor (M6) that is descending.

The finisher unit has a full stack sensor (PI24) to detect overstacking of large-size or mixed paper according to the stack height.


Shift upper limit sensor
(PI15)
Shift lower limit sensor
(PI16)
Shift motor clock sensor
(PI17)
Shift motor (M6)
Full stack sensor (PI24)
Delivery tray
Edge
Paper surface sensor (PI9)
Tray paper sensor (PI8)

F02-401-01

5 Saddle Unit

5.1 Basic Operations

5.1.1 Outline

The machine stitches a stack of sheets (middle 2-point), then folds the stack in two in the finisher. These operations are controlled by the finisher controller PCB.

The finisher controller PCB is controlled by the commands from the host machine.

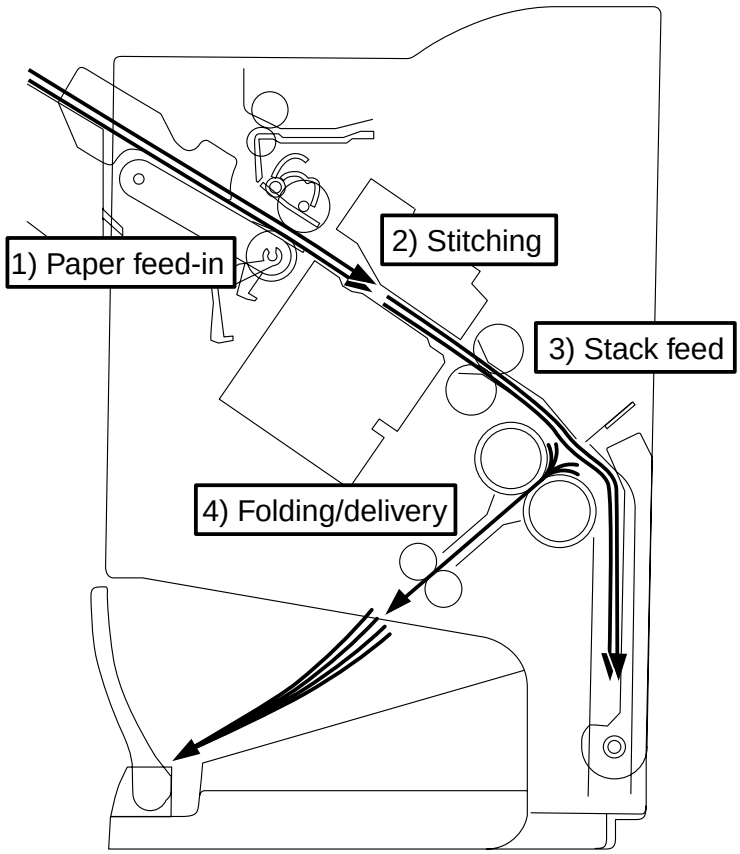
5.2 Feed/Drive System

5.2.1 Outline

This machine stitches the paper stack coming from the finisher, folds it, and delivers it to the bind tray in the saddle unit in response to the commands from the host machine.

That is, the machine performs the following operations:

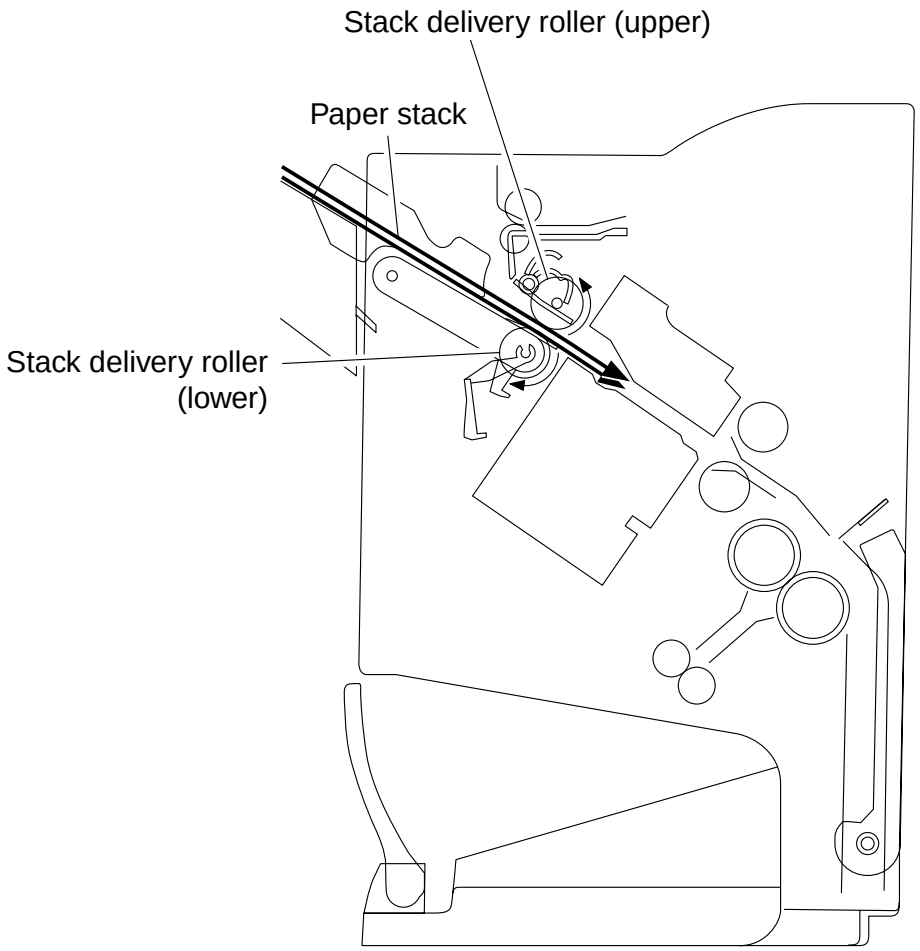
1) Paper feed-in
2) Stitching
3) Stack feed
4) Folding/delivery



F02-502-01

a. Paper feed-in

After being aligned on the processing tray, a stack of sheets is sandwiched between the stack delivery rollers. As the stack delivery rollers rotate, the stack is fed toward the saddle unit.

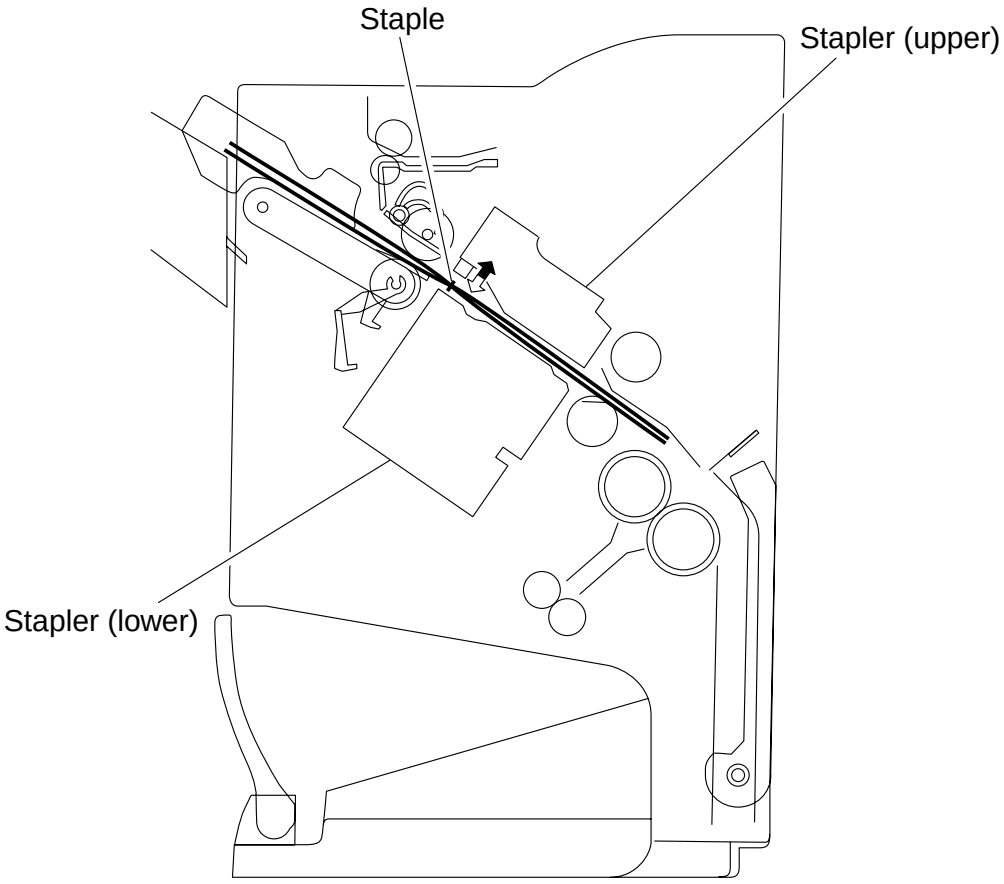


F02-502-02

b. Stitching

When the center of the paper stack (stitching position) reaches the stapler's staple position, the stapler stitches the paper stack.

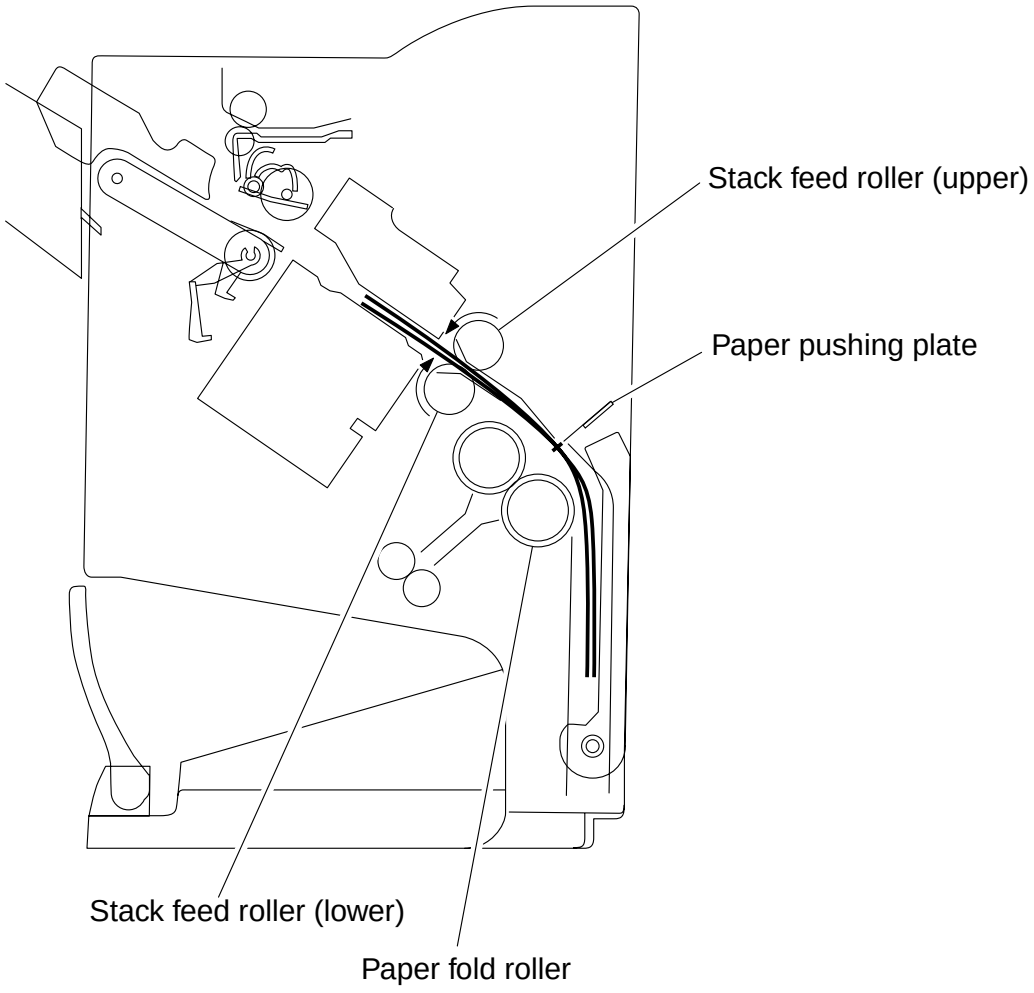
When only one sheet is fed from the host machine, the next step (stack feed) is performed without performing the stitching operation.



F02-502-03

c. Stack feed

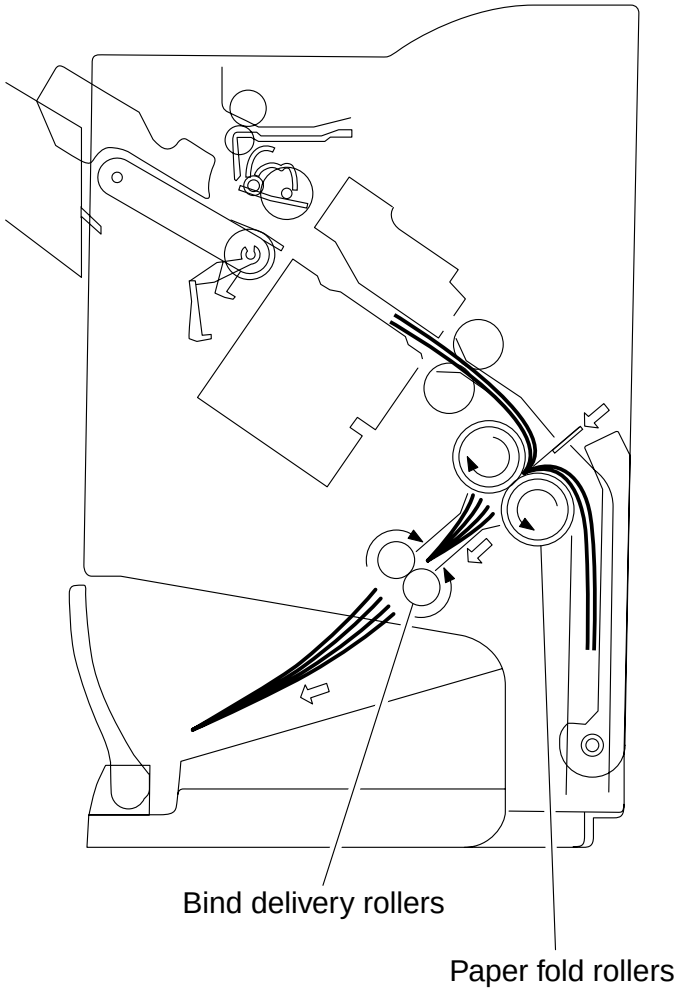
The stack feed rollers feed the paper stack to the stack folding/delivery position where the center of the stack (stitched position) is level with the paper pushing plate and paper folding roller's nip part.



F02-502-04

d. Folding/delivery

The paper pushing plate pushes in the center of the paper stack to feed it toward the paper fold rollers. Then, the paper fold rollers and bind delivery rollers deliver the paper stack to the bind tray.



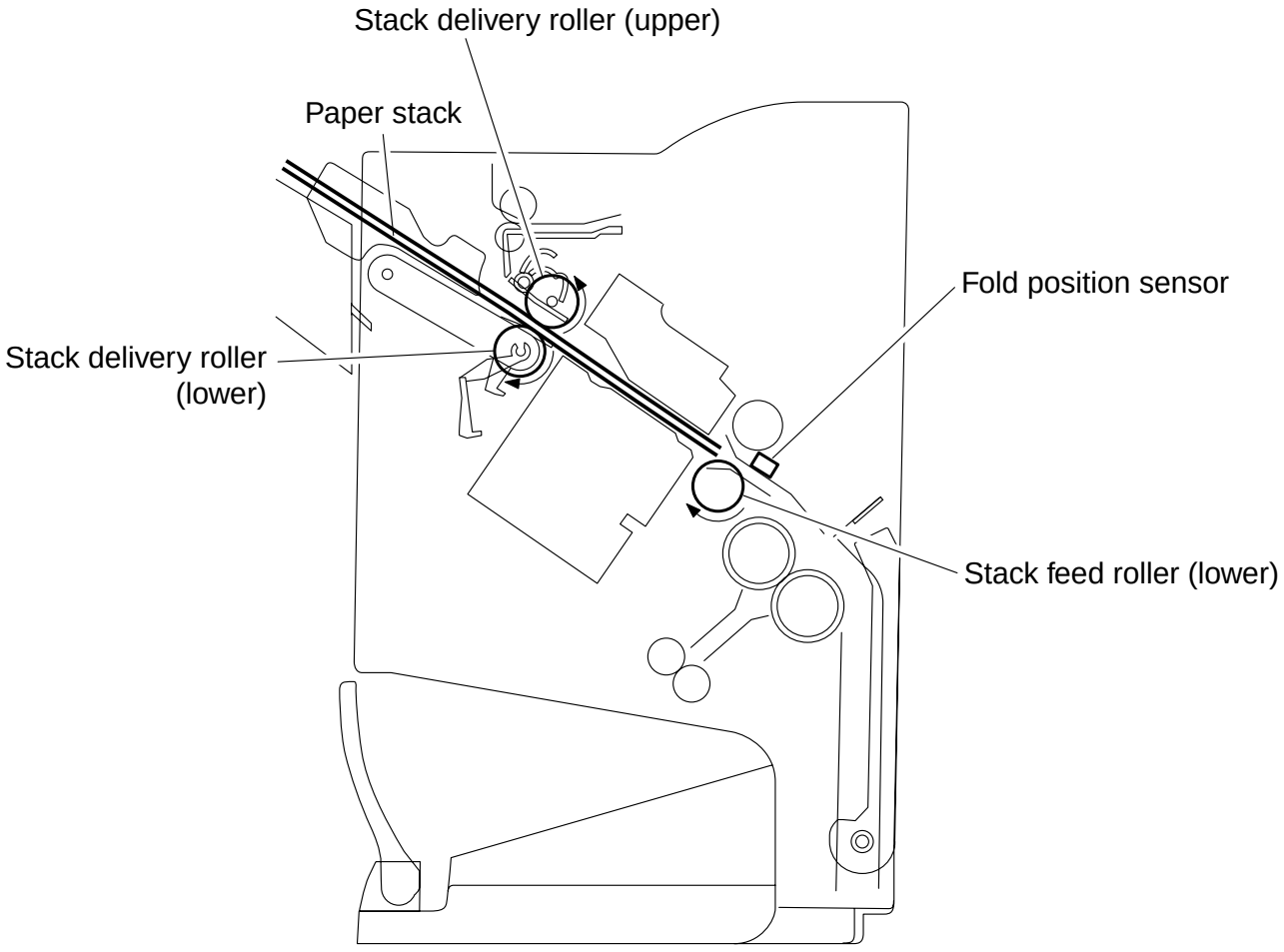
F02-502-05

5.3 Paper Feed System

5.3.1 Outline

The paper feed system feeds a stack of sheets (coming from the finisher) to the position where the center of the paper stack (stitching position) is aligned to the stapler's staple, allowing the next step (stitching and folding) to be performed.

When sheets of paper have been stacked and aligned on the processing tray, the paddle motor (M2) rotates in the reverse direction, causing the swing guide to descend. As the swing guide descends, the paper stack is sandwiched between the upper and lower stack delivery rollers. The delivery motor (M3) rotates in the reverse direction, feeding the paper stack toward the saddle unit. When the leading edge of the paper stack reaches the folding position sensor (PI10), the finisher controller PCB drives the delivery motor a specified number of motor pulses to stop the center of the paper stack (stitching position) at the stapler's staple position. Before the paper stack passes through the stack feed rollers, the feed motor (M1) is driven to rotate the stack feed roller (lower) so that the leading edge of the paper stack is not bent.



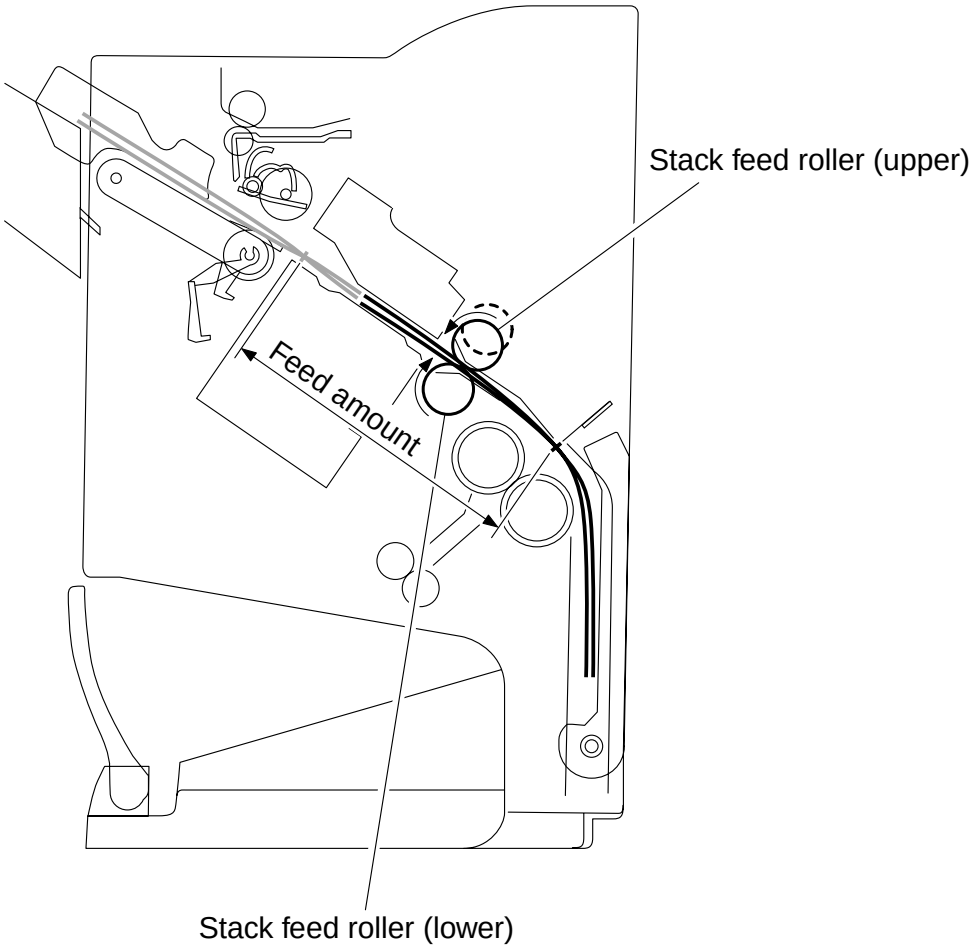
F02-503-01

5.4 Stack Feed System

5.4.1 Outline

The stack feed system feeds the stitched paper stack to the folding position.

When stitching is complete, the feed motor (M1) rotates, causing the stack feed roller (upper) to descend. The paper stack is sandwiched between the stack feed rollers. Then, the bind clutch (CL1) is turned ON to rotate the feed motor (M1) in the forward direction, thus feeding the paper stack to the folding position. The feed amount is equivalent to the number of pulses used to drive the feed motor (M1) until the paper stack reaches the folding position.



F02-504-01

5.5 Fold/Delivery System

5.5.1 Outline

The paper fold mechanism consists of a guide plate, paper fold rollers, and a paper pushing plate.

The guide plate, paper fold rollers, and paper pushing plate are driven by the staple/fold motor (M7). The drive force is transferred with a combination of gears and cams. Motor operation is monitored by the staple/fold motor lock sensor (PI14).

Until the paper stack reaches the folding position, the guide plate covers the paper fold rollers to act as a paper path through which a paper stack is fed to the saddle unit and to prevent a paper stack from touching the rollers.

A folding home position sensor (PI11) is provided to detect the positions of the paper fold rollers and paper pushing plate.

The paper stack folded in two by the paper fold rollers is delivered by bind delivery rollers.

The bind delivery rollers are also driven by the staple/fold motor (M7).

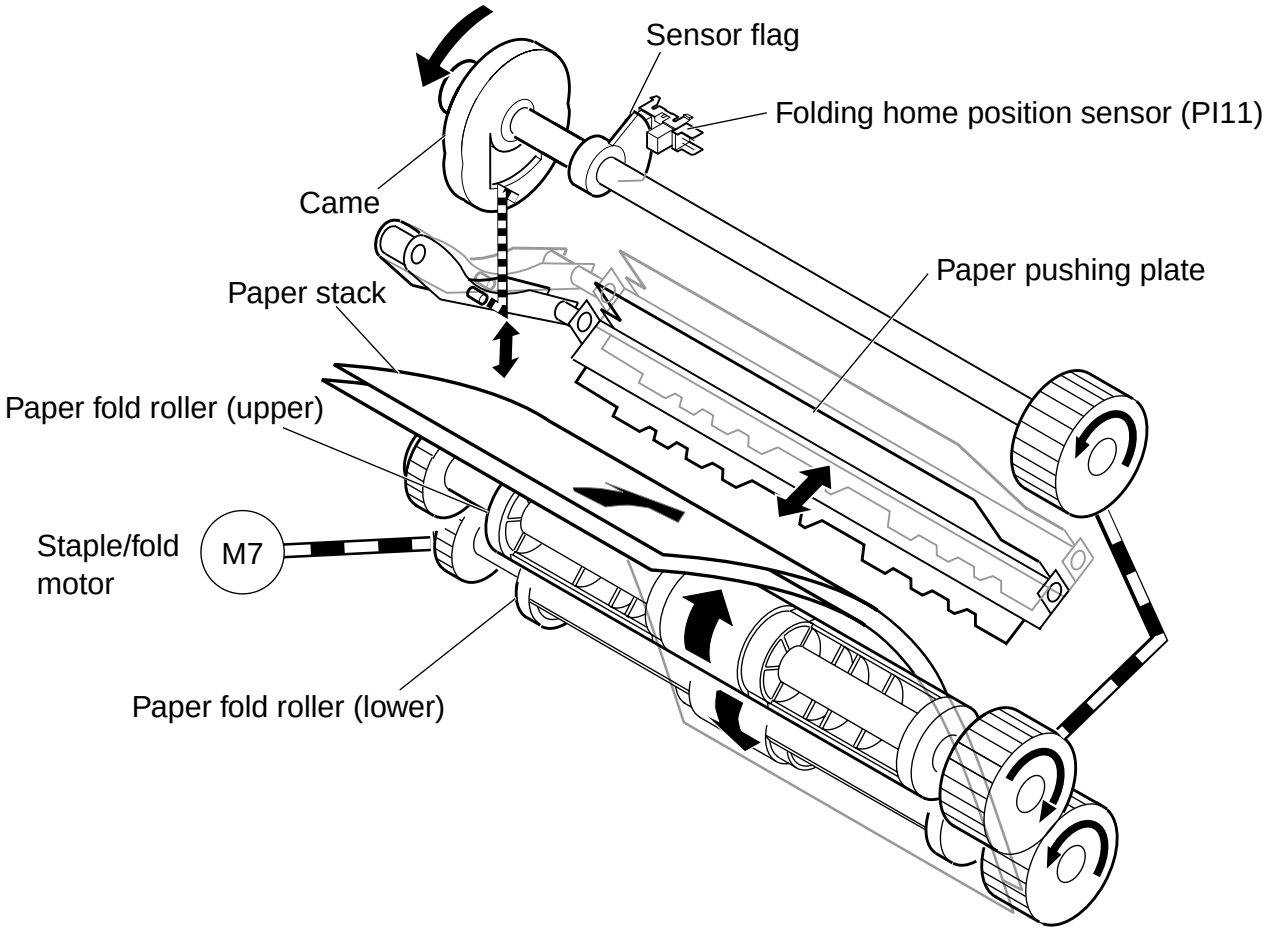
A bind tray sensor (PI13) is provided on the bind tray to detect presence/absence of a paper stack; however, it is not used to detect a jam.

5.5.2 Paper Folding

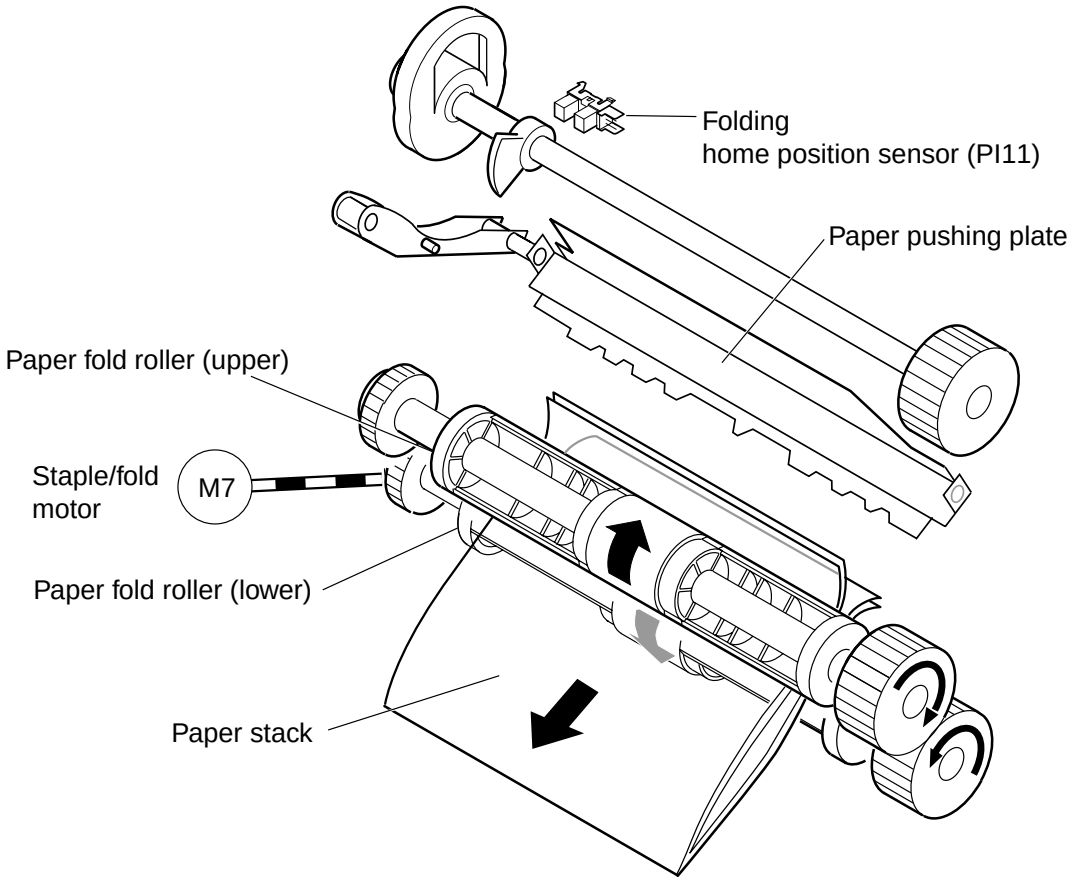
Paper is folded using paper fold rollers and a paper pushing plate.

Almost concurrently with the start of roller rotation, the paper pushing plate starts operating to push the paper stack into the gap between the paper fold rollers. When the paper stack is fed about 10 mm with the rotation of the paper fold rollers, the paper pushing plate returns to the home position. Then, the paper stack is delivered to the bind tray using the paper fold rollers and bind delivery rollers.

Half the entire surface of each paper fold roller is uncovered excluding the central area and the area at the left and right ends. The uncovered surface of the upper paper fold roller comes in touch with the uncovered surface of the lower paper fold roller only at the center and left and right ends, allowing a paper stack to be fed without causing creases. The other half of the upper paper fold roller that is covered comes in touch with the other half of the lower paper fold roller that is also covered, allowing a paper stack to be folded while being fed.

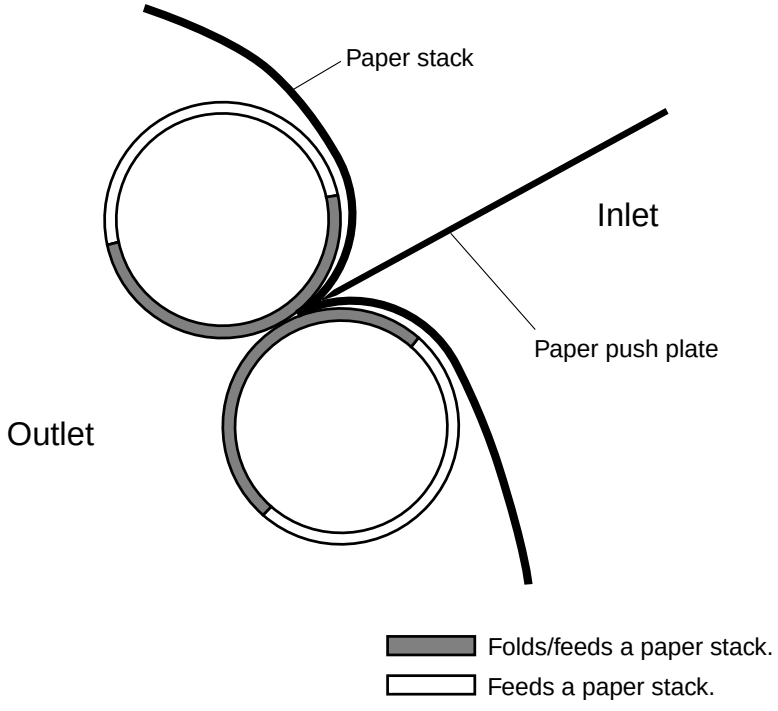


F02-505-01

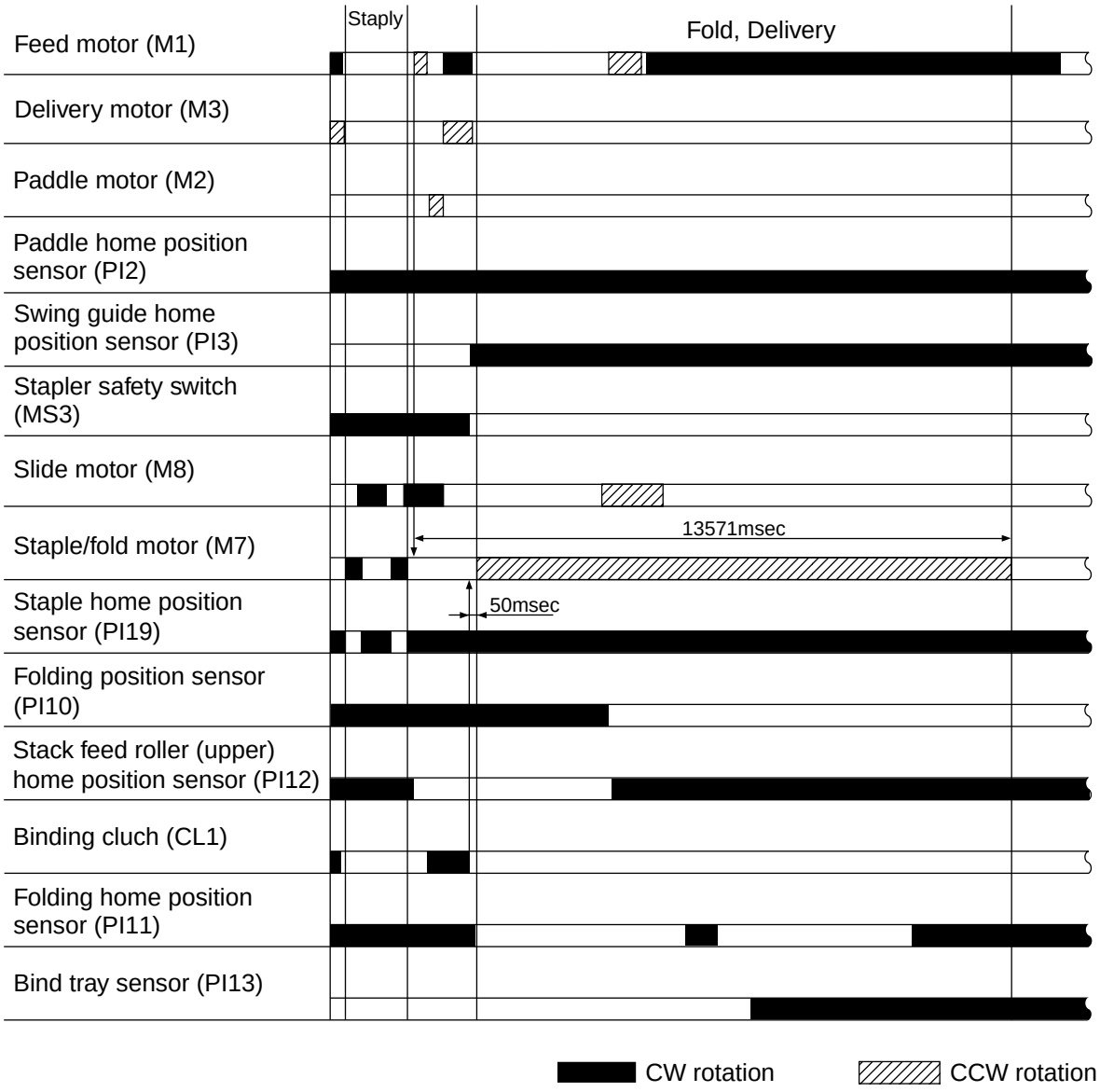


F02-505-02

[Paper folding start position]



F02-505-03


Staply
Fold, Delivery
Feed motor (M1)
Delivery motor (M3)
Paddle motor (M2)
Paddle home position sensor (PI2)
Swing guide home position sensor (PI3)
Stapler safety switch (MS3)
Slide motor (M8)
Staple/fold motor (M7)
13571msec
Staple home position sensor (PI19)
50msec
Folding position sensor (PI10)
Stack feed roller (upper) home position sensor (PI12)
Binding cluch (CL1)
Folding home position sensor (PI11)
Bind tray sensor (PI13)
CW rotation
CCW rotation

F02-505-04

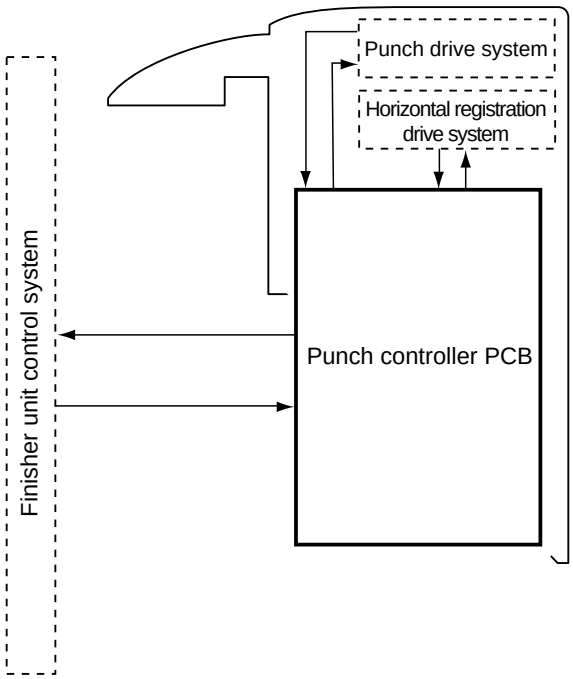
6 Puncher Unit (option)

6.1 Basic Operations

6.1.1 Outline

The puncher unit is an option, and is designed for installation to the pickup assembly of the finisher. The puncher unit is not equipped with a paper feeding mechanism, and the sheets from the host machine move through the puncher unit and then the feed system of the finisher.

When the trailing edge of a sheet from the host machine reaches the puncher unit, the sheet is stopped once, and the punch shaft is rotated to punch a hole along the trailing edge. These operations are controlled with various commands from the finisher controller PCB as well as the commands from the punch controller PCB.



F02-601-01

6.2 Punching Operation

6.2.1 Outline

The puncher unit is located in the pickup assembly of the finisher, and is used to punch holes in sheets that have been sent from the host machine and stopped inside it. When the trailing edge of a sheet reaches the puncher unit, the inlet roller of the finisher assembly stops the sheet to punch a hole along the trailing edge of the sheet.

The punch unit consists of a die and hole puncher (punch blade).

The hole puncher is driven by the punch motor (M1P). It is attached to the eccentric cam of the punch shaft, and the rotation of the punch shaft is converted into reciprocating motion for punching operation.

The punch motor (M1P) is a DC motor. The home position of the punch shaft is detected by the punch home position sensor (PI1P). To make sure that the punch motor, which is a DC motor, stops exactly at its home position, the punch motor is stopped in relation to the count of the clock pulses kept by the punch motor clock sensor (PI3P).

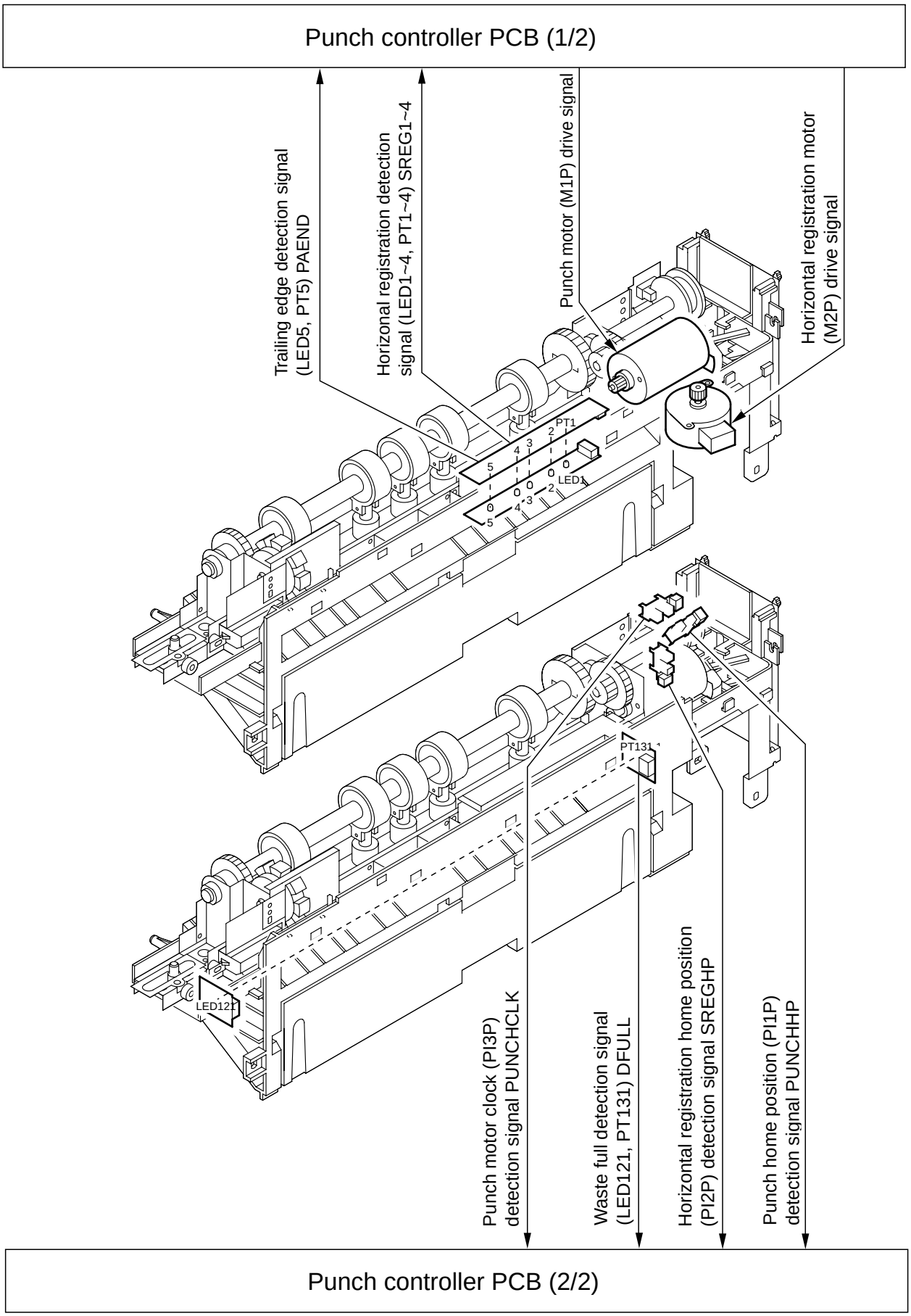
A single punching operation is executed by rotating the punch shaft 180° from its home position.

As many as five light-receiving transistors (photosensor PCB) are mounted over the inlet paper path of the puncher unit; on the other hand, as many as five LEDs (LED PCB) are mounted under the path, together serving as five sensors. The frontmost sensor (LED5, PT5) is used to detect the training edge of sheets, and the remaining four (LED1 through LED4, PT1 through PT4) are used as horizontal registration sensors to detect the rear position of sheets when punching holes.

The punch motor, punch unit, and sensors make up the punch slide unit, which moves to the front/rear to suit the selected paper size. The movement to the front/rear is driven by the horizontal registration motor (M2P). The home position of the punch slide unit is detected by the horizontal registration home position sensor (PI2P), and the horizontal registration motor (M2P) is a stepping motor.

The punch motor and horizontal registration motor are controlled with various commands from the finisher controller PCB as well as the commands from the punch controller PCB.

The waste paper occurring as the result of punching is collected in the waste paper case. The case is monitored by the LED121 on the waste full LED PCB and PT131 on the waste full photosensor PCB.


Punch controller PCB (1/2)
Trailing edge detection signal (LED5, PT5) PAEND
Horizonal registration detection signal (LED1~4, PT1~4) SREG1~4
Punch motor (M1P) drive signal
Horizontal registration motor (M2P) drive signal
PT1
LED1
PT131
LED121
Punch motor clock (PI3P) detection signal PUNCHCLK
Waste full detection signal (LED121, PT131) DFULL
Horizontal registration home position (PI2P) detection signal SREGHP
Punch home position (PI1P) detection signal PUNCHHP
Punch controller PCB (2/2)

F02-602-01

6.2.2 Punching Operation

The hole puncher is driven by the punch motor (M1P). The home position for the hole puncher is detected by the punch home position sensor (PI1P).

The punch unit comes in four types, selected to suit the country of installation: 2-hole (Puncher Unit-J1), 2- and 3-hole (Puncher Unit-K1), or two types of 4-hole (Puncher Unit-G1, Puncher Unit-H1).

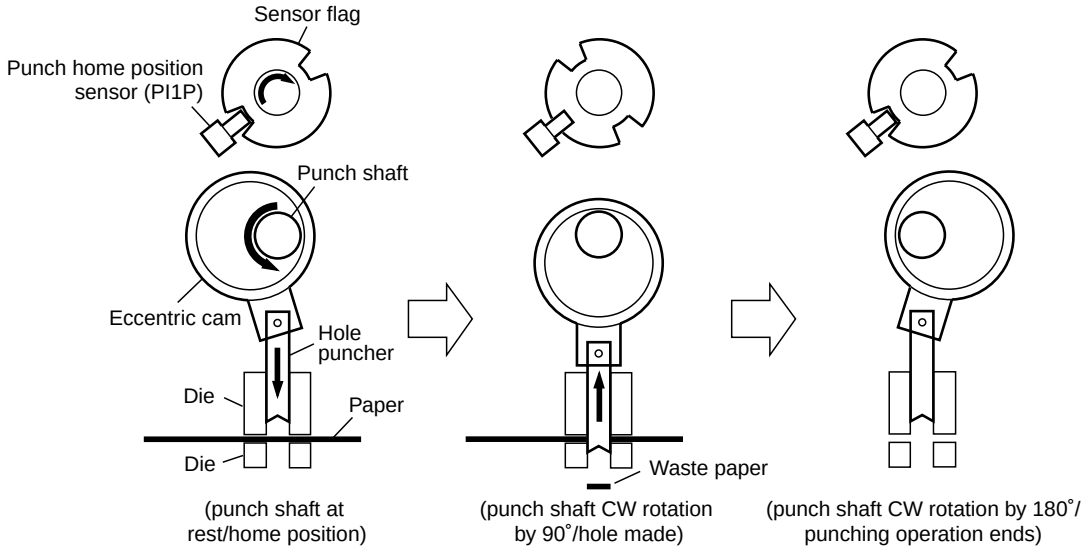
The 2-hole and 4-hole types punch a hole when the punch shaft is rotated 180° from the home position, causing the punch to make a single round trip. The 2-/3-hole type punches a hole, but the circumference of the punch shaft is divided into two (half for 2-hole and the other half for 3-hole).

a. 2-Hole, 4-Hole Type

The home position is identified when the punch home position is ON. The punching operation for the first sheet ends when the punch shaft has rotated 180° and the punch home position sensor goes ON; the punching operation for the second sheet ends when the punch shaft has rotated 180° in reverse and the punch home position sensor goes ON.

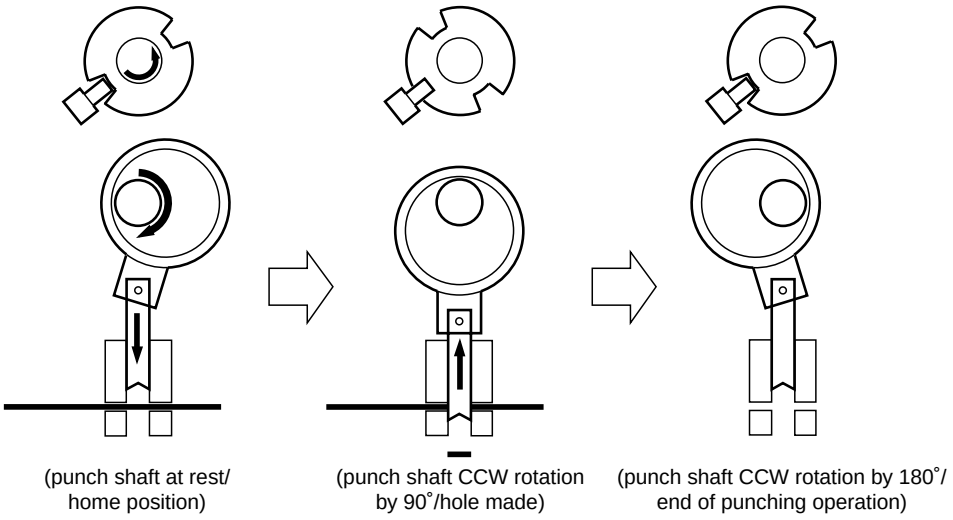
The punching operation takes place as follows when making a hole in two sheets of paper.

1) A hole is punched along the trailing edge of the 1st sheet.



F02-602-02

2) A hole is made along the trailing edge of the 2nd sheet.



F02-602-03

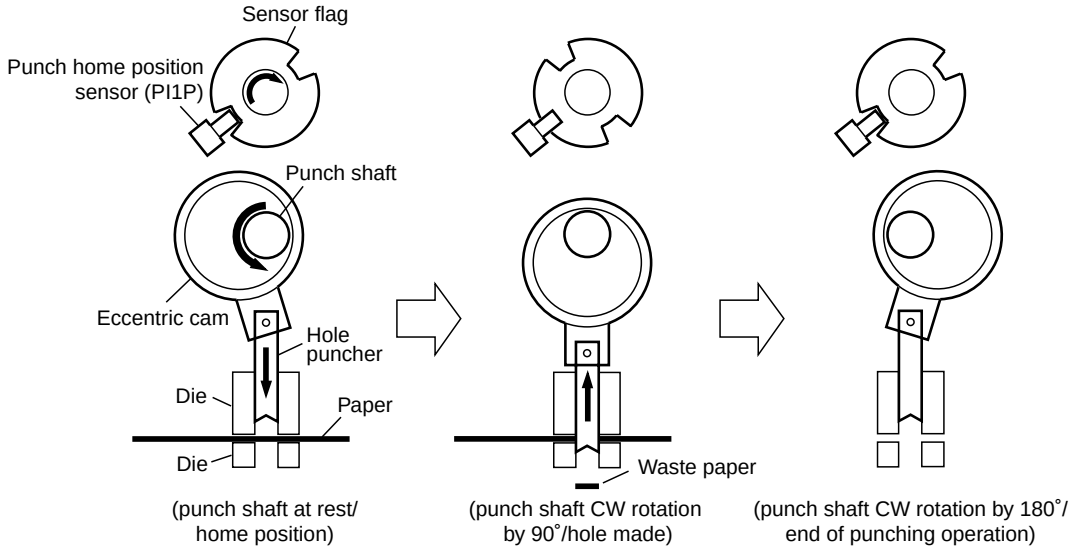
b. 2- /3-Hole Type

The home position is identified when the punch home position sensor is ON. To make two holes, the punching operation for the first sheet ends when the punch shaft rotates 180° (half circumference) and the punch home position sensor goes ON. At this time, the 3-hole puncher makes a single round trip in escape direction (moving up the hole puncher) on a half circumference of the punch shaft.

The punching operation for the second sheet ends when the Punch shaft has rotated 180° counterclockwise and the punch home position sensor goes ON (half circumference). At this time, the 3-hole puncher makes a single round trip in escape direction (moving up the hole puncher) on the other half circumference of the punch shaft.

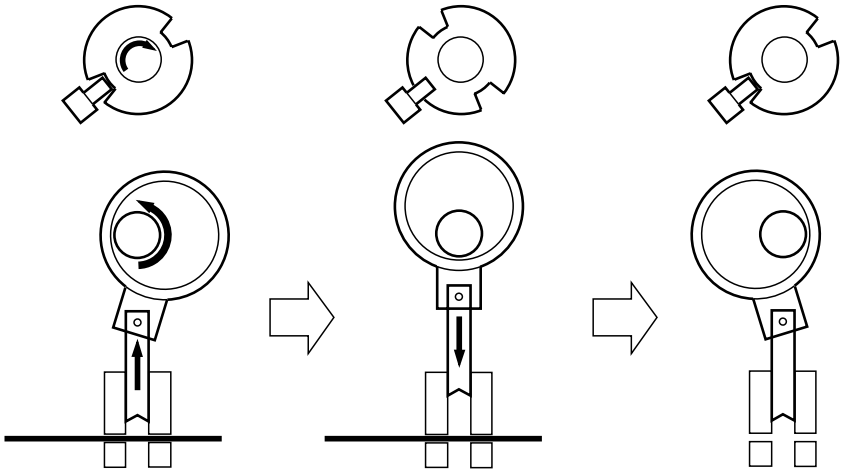
The punching operation takes place as follows when making two holes in two sheets of paper:

1) A hole is made along the trailing edge of the 1st sheet.



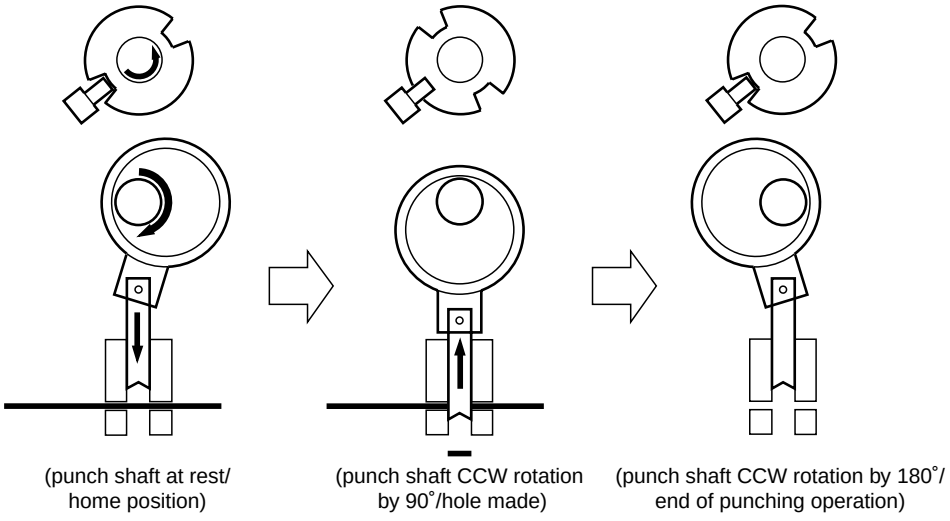
F02-602-04

While two holes are being made, the 3-hole puncher makes a single round trip in escape direction.



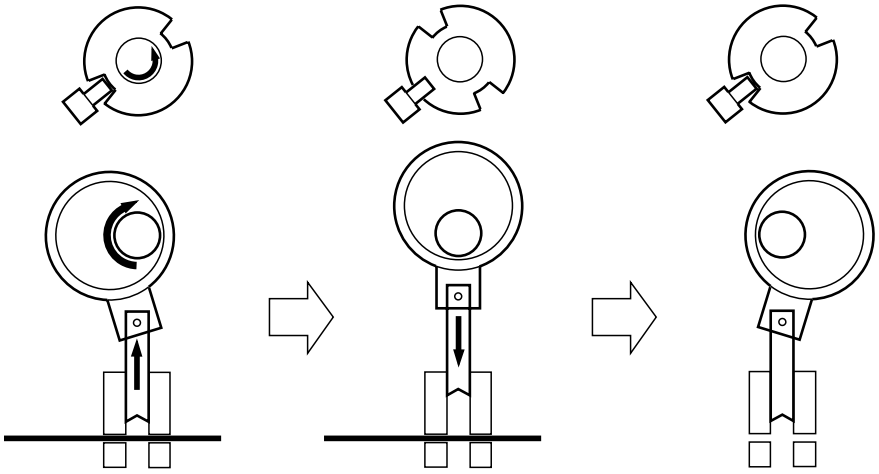
F02-602-05

2) Holes are made along the trailing edge of the 2nd sheet.



F02-602-06

While two hole are being made, the 3-hole puncher makes a single round trip in escape direction (moving up the hole puncher).



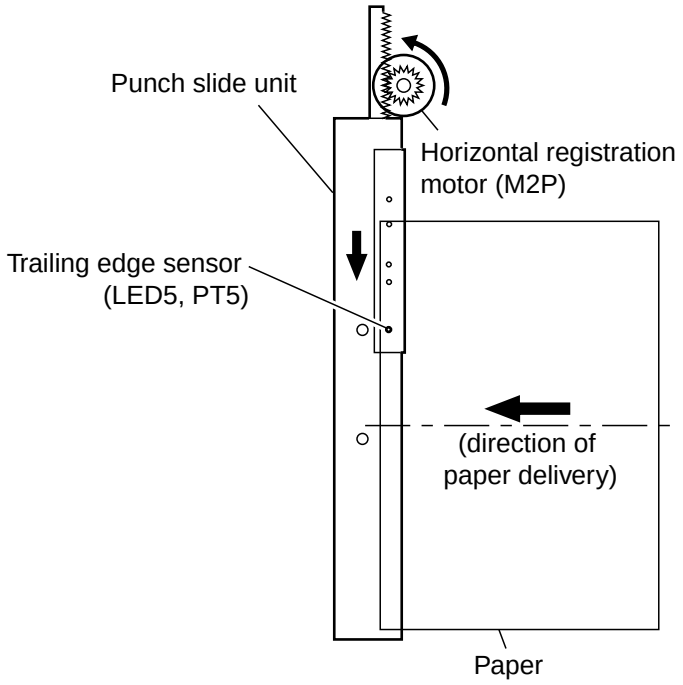
F02-602-07

6.2.3 Horizontal Registration Operation

The horizontal registration drive for the punch slide unit is provided by the horizontal registration motor (M2P). The home position of the punch slide unit is detected by the horizontal registration home position sensor (PI2P). The punch slide unit detects the trailing edge of sheets using the trailing edge sensor (LED5, PT5) and the horizontal registration sensors (LED1 through 4, SREG1 through 4), and causes a move to a specific position matching the trailing edge of each sheet (in relation to the size of the sheet).

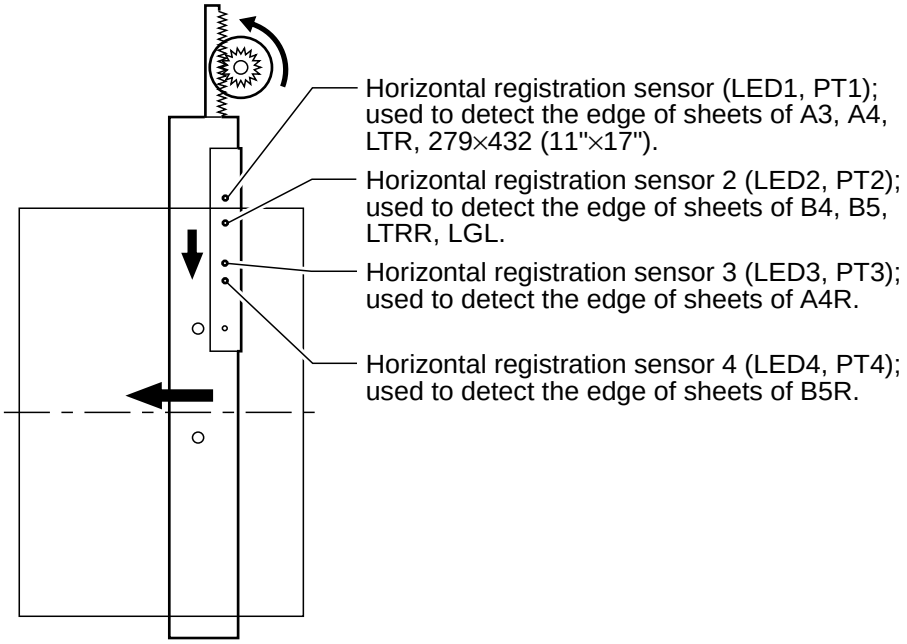
The horizontal registration operation takes place as follows:

1) When the leading edge of a sheet from the host machine is detected by the trailing edge sensor (LED5, PT5), the horizontal registration motor (M2P) starts to move the punch slide unit toward the front.



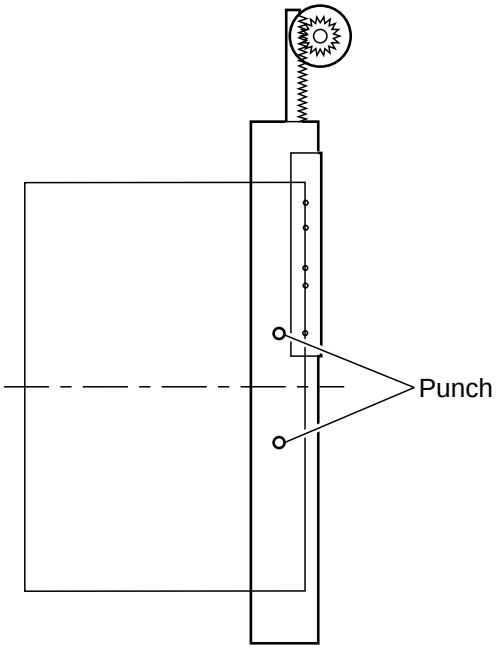
F02-602-08

2) When the horizontal registration sensor (LED1 through 4, PT1 through) suited to the paper size signal from the host machine detects the rear edge of the sheet, the horizontal registration motor (M2P) causes a farther move to a specific position, and stops the punch slide unit.



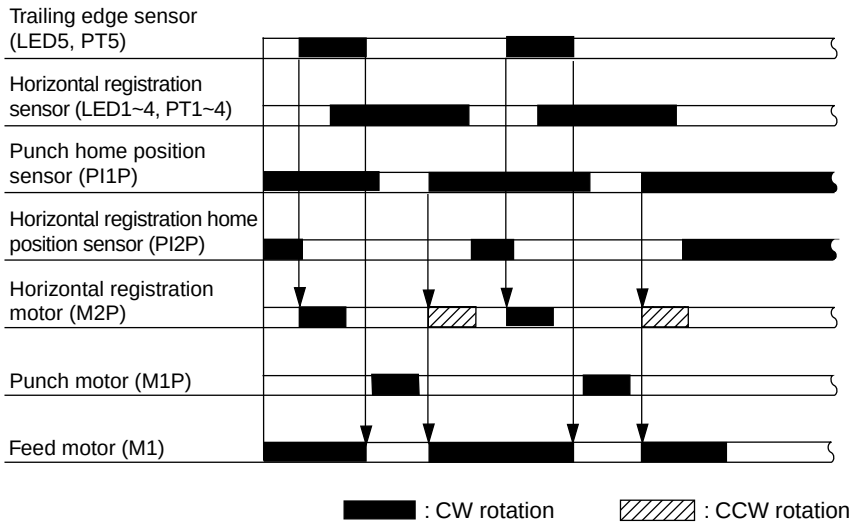
F02-602-09

3) When the trailing edge sensor (LED5, PT5) detects the trailing edge of the sheet, the drive of the feed motor (M1) is stopped, thereby stopping the sheet. Then, the punch motor (M1P) is driven to punch holes in the sheet.



F02-602-10

4) When the punching operation ends, the feed motor (M1) of the fisher unit is driven and, at the same time, the horizontal registration motor (M2P) is rotated in reverse to return the punch slide unit to its home position.
5) For each sheet that arrives in succession, the punch slide unit is returned to its home position, and is caused to repeat steps 1 through 4 .

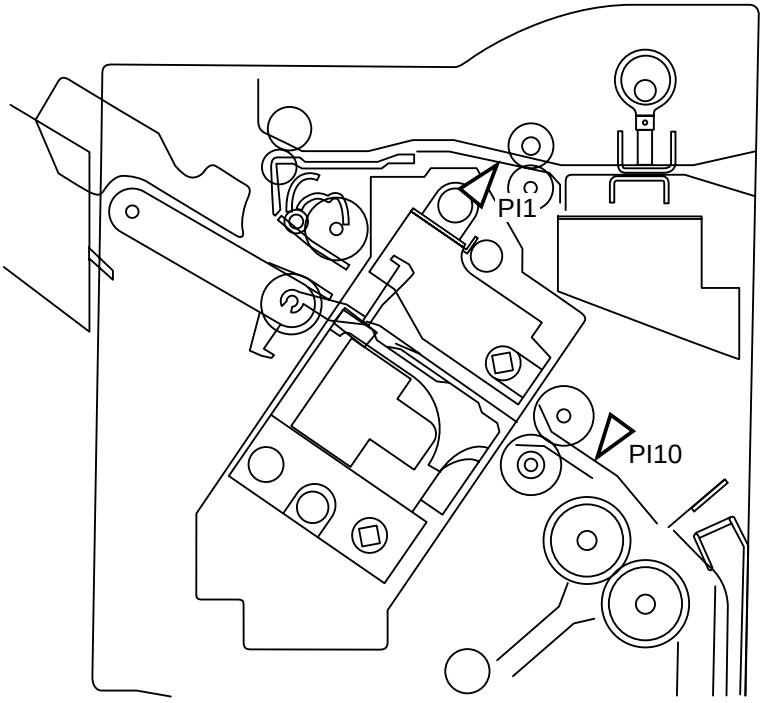


F02-602-11

7 Detecting Jams

7.1 Outline

The microprocessor (CPU) on the finisher controller PCB is programmed to check for jams in the finisher/saddle/puncher (option) at such times as set in advance. It identifies a jam in reference to the presence/absence of paper at a specific sensor. If a jam is found, the finisher controller PCB communicates the nature of the jam to the host machine in the form of a code (which may be checked in service mode of the host machine).

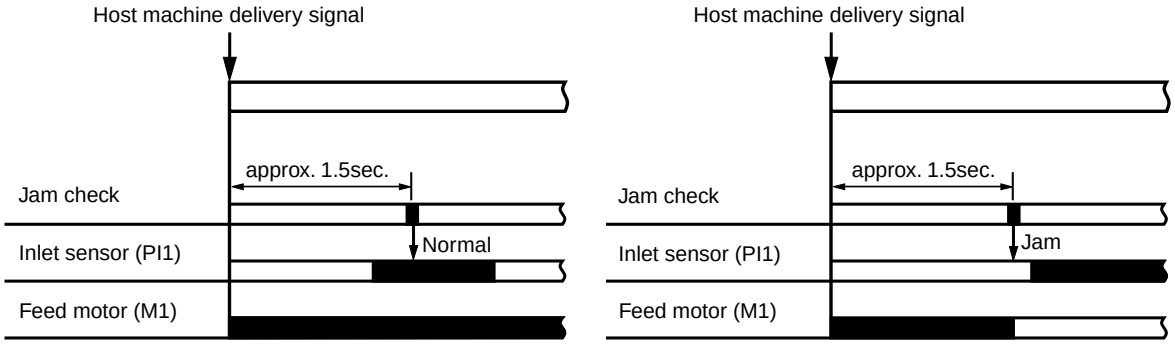


PI1: inlet sensor.
PI10 Folding position sensor

F02-701-01

7.1.1 Inlet Sensor Delay Jam (J80)

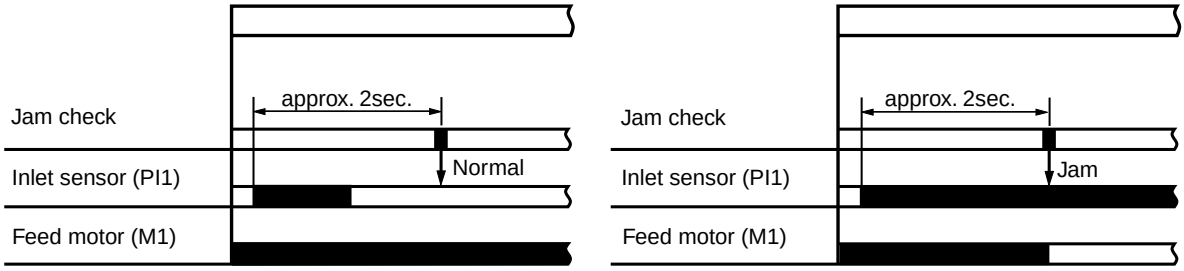
The inlet sensor does not detect paper approximately 1.5 sec after the host machine generates the delivery signal.



F02-701-02

7.1.2 Inlet Sensor Stationary Jam (J81)

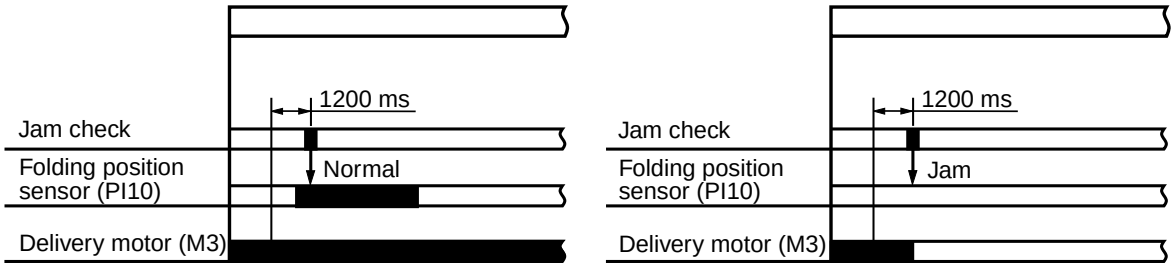
The paper does not leave the inlet sensor approximately 2 sec after the inlet sensor has detected its leading edge.



F02-701-03

7.1.3 Folding Position Sensor Delay Jam (J83)

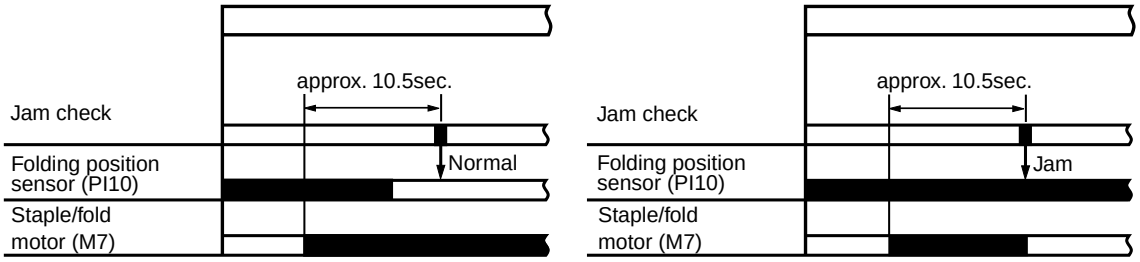
In bind mode, the folding position sensor does not detect paper 1200 msec after the intermediate processing tray starts to send paper to the stapling position.



F02-701-04

7.1.4 Folding Position Sensor Stationary Jam (J84)

In bind mode, paper does not leave the holding position sensor approximately 10.5 sec after the staple/fold motor is driven.



F02-701-05

7.1.5 Power-On Jam (J87)

Paper is detected inside the finisher at power-on.

7.1.6 Door Open Jam (paper present) (J88)

The finisher is disconnected from its host machine or the front door, or the upper cover is opened while the system is in operation (paper on the move).

7.1.7 Staple Jam (J86)

The staple home position sensor (PI19) does not go OFF 600 msec after the stapler is driven. Or, it does not return to its home position (where the sensor goes ON).

8 Power Supply System

8.1 Finisher/Saddle Assembly

8.1.1 Outline

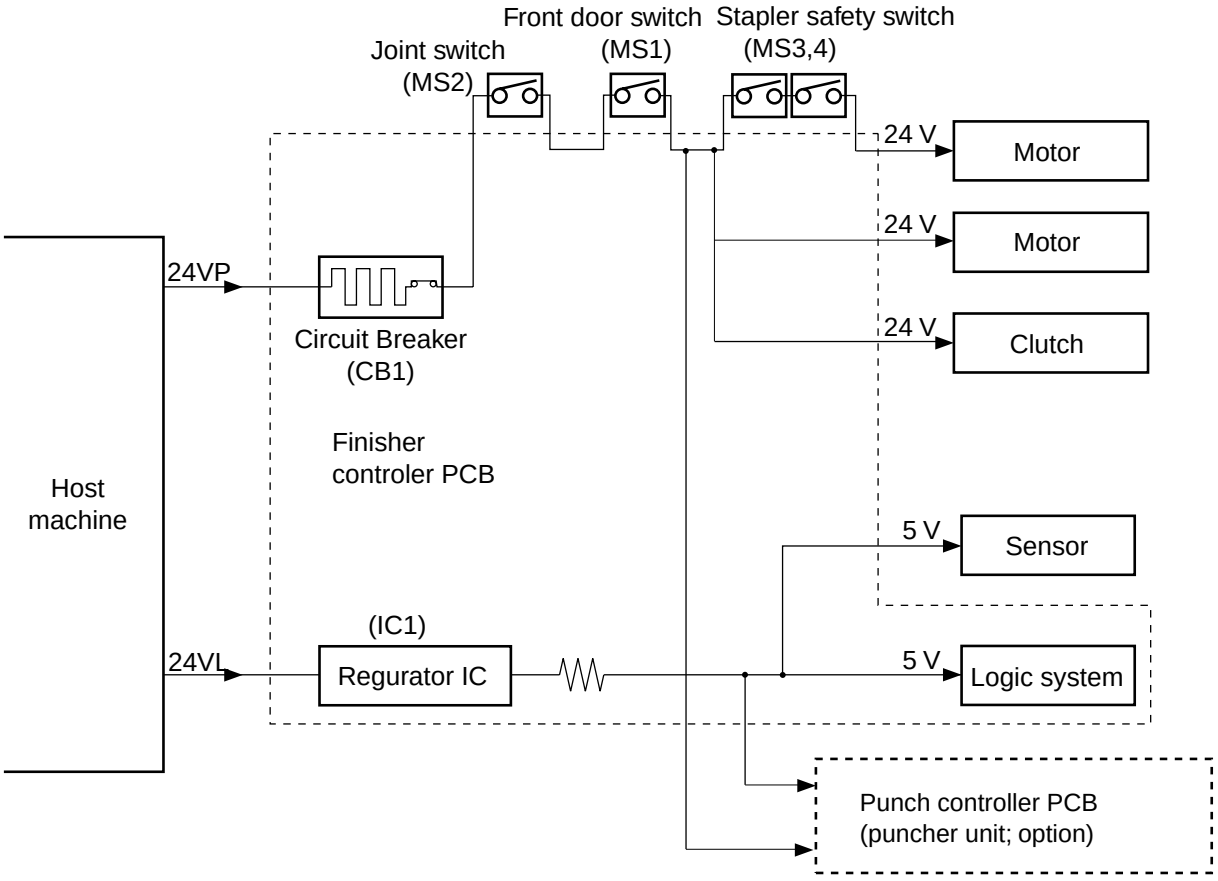
When the host machine is turned on, it supplies the finisher controller PCB with two channels of 24 VDC; one is for the motors and clutches, and the other is turned into 5 VDC by the regulator IC (IC1) of the finisher controller PCB for use by the sensors and ICs on PCBs.

If a punch unit (option) is installed, power is also supplied to the punch controller PCB.

Some of 24 VDC used to drive motors is cut off when the joint switch (MS2), front door switch (MS1), or stapler safety switch (MS3) is open.

F02-801-01 is a block diagram of the power supply system:

F02-801-01



8.1.2 Protective Mechanisms

A circuit breaker (CB1) is monitored to protect the 24 VDC system sued to drive the motors against overcurrent. The 24-V system used to drive the feed motor (M1), paddle motor (M2), and delivery motor (M3) is equipped with a fuse which melts in the presence of overcurrent.

8.2 Puncher Unit (option)

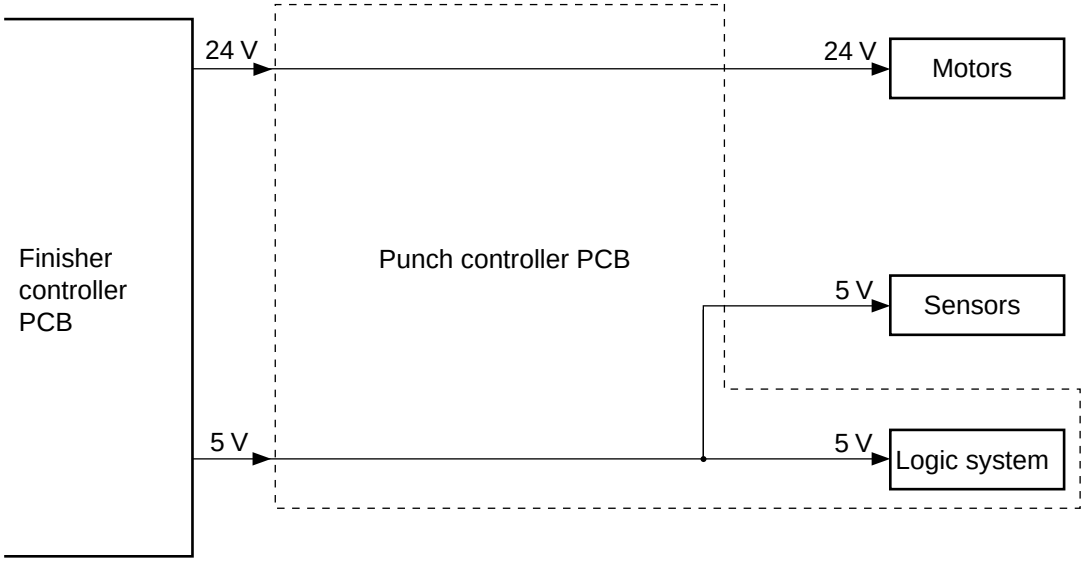
8.2.1 Outline

When the host machine is turned on, the puncher unit is supplied by the finisher controller PCB with 24-V and 5-V power.

The 24-V power is used to drive the motors, while the 5-V power is used by sensors and the ICs on the punch controller PCB.

The 24-V power to the motors will be cut off when the joint switch (MS2) or the front door switch (MS1) of the finisher unit is open.

F02-802-01 is a block diagram for the power supply system:



F02-802-01

8.2.2 Protective Mechanisms

The 24-V system used to drive the punch motor (M1P) and the horizontal registration motor (M2P) is equipped with a built-in fuse which melts in the presence of overcurrent.

CHAPTER 3

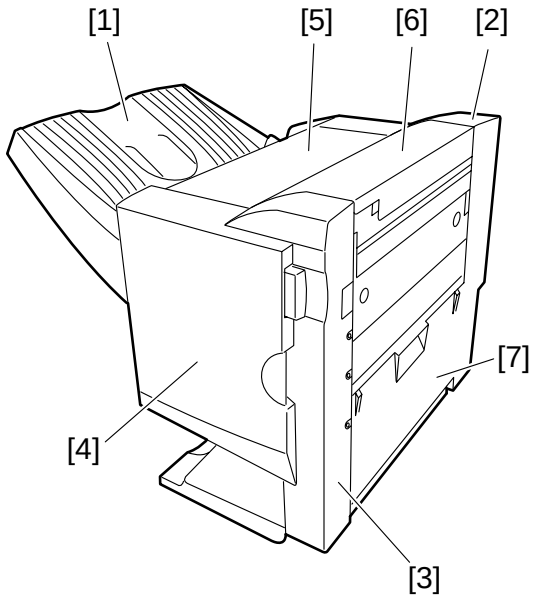
MECHANICAL SYSTEMS

1 Finisher Saddle Unit

1.1 Externals and Controls

[1] Tray (2)
[2] Rear cover (3)
[3] Front cover (5)
[4] Front door
[5] Upper door
[6] Upper right cover assembly (4)
[7] Jam removal cover

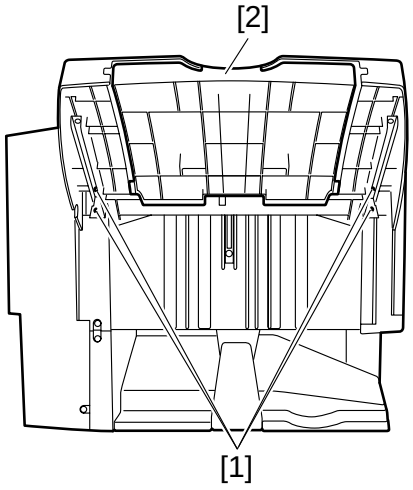
The number in parentheses indicates the number of mounting screws used.



F03-101-01

1.1.1 Removing the Delivery Tray

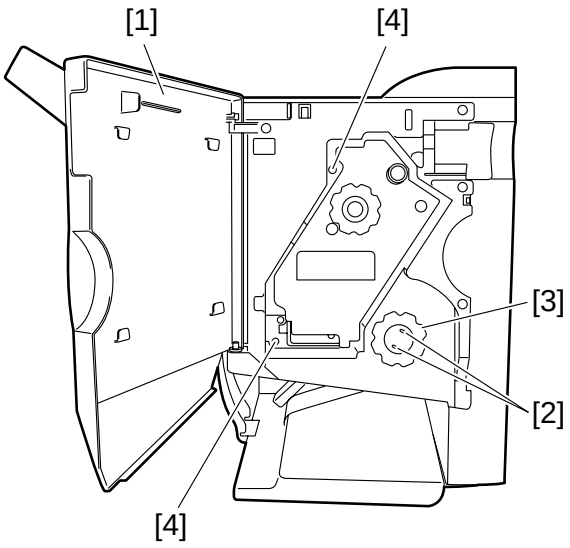
1) Remove the four screw [1], and detach the delivery tray [2].



F03-101-02

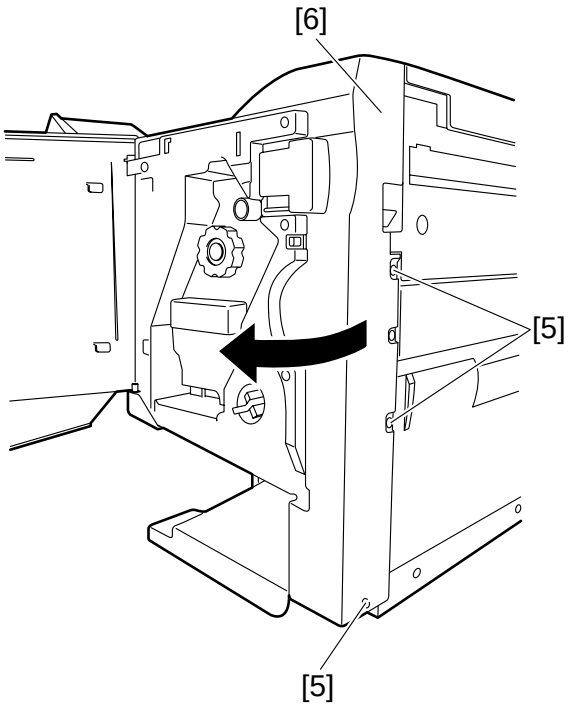
1.1.2 Removing the Front Cover

1) Open the front door [1].
2) While picking the claw [2], detach the fold jam releasing dial [3].
3) Remove the two screws [4].



F03-101-03

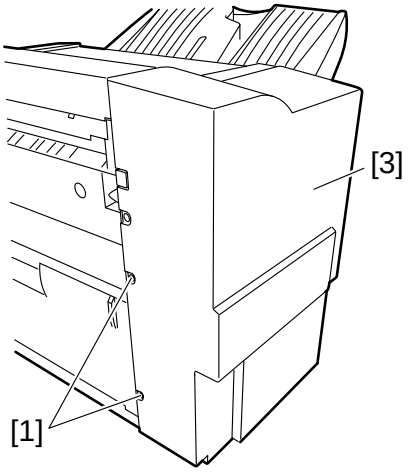
4) Remove the three screws [5], and detach the front cover [6].



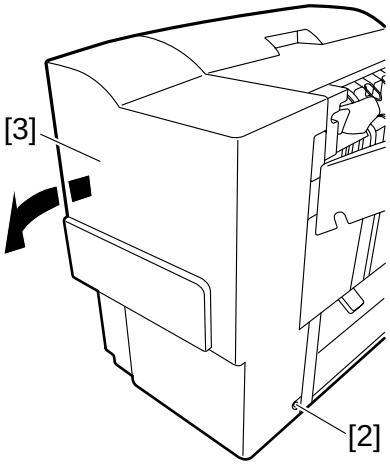
F03-101-04

1.1.3 Removing the Rear Cover

1) Remove the two screws [1] on the pickup side, and remove the screw [2] on the delivery side; then, detach the rear cover [3].



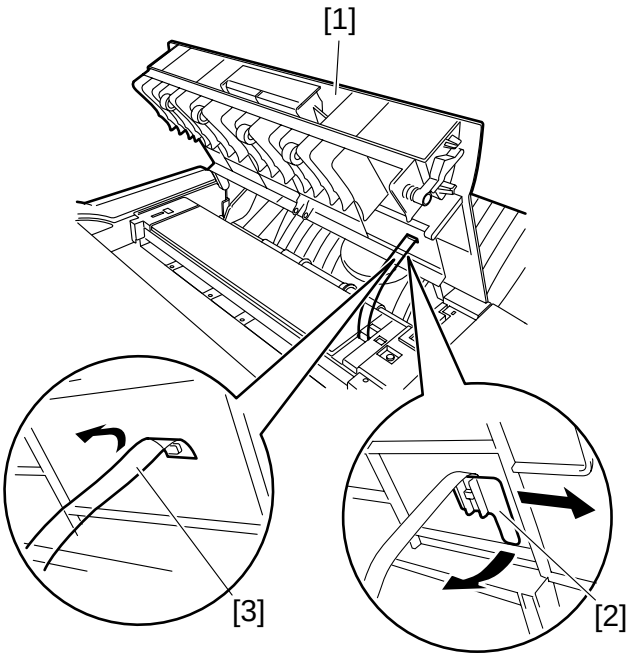
F03-101-05



F03-101-06

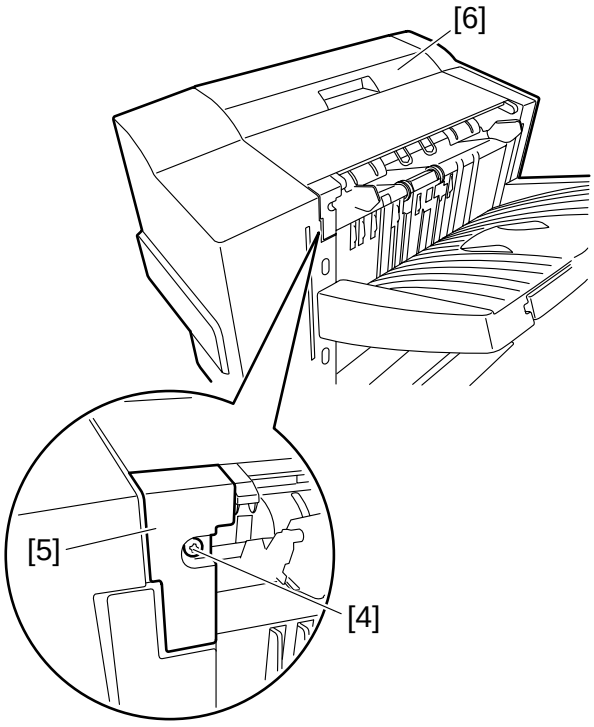
1.1.4 Removing the Upper Cover

1) Open the upper cover [1], and turn the cover band retainer [2] to the left to remove it.
2) Remove the cover band [3].



F03-101-07

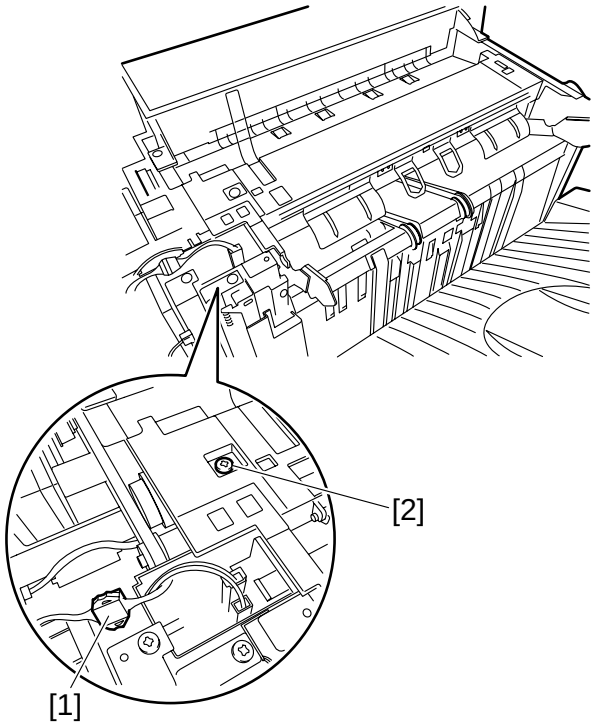
3) Remove the screw [4], and detach the processing tray rear cover [5]; then, detach the upper cover [6].



F03-101-08

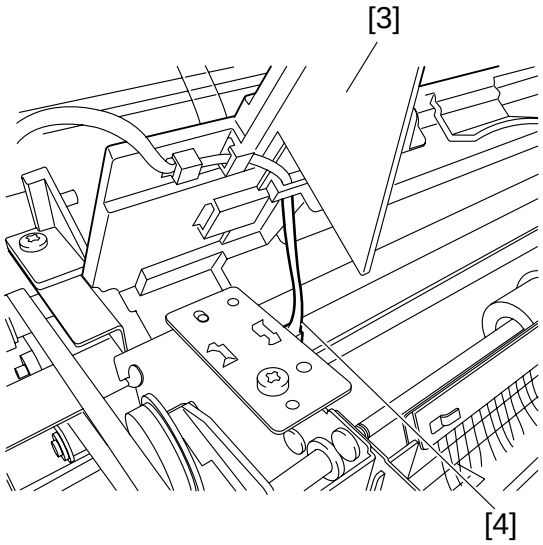
1.1.5 Removing the Processing Tray Upper Cover

1) Remove the front cover. (See 1.1.2.)
2) Remove the rear cover. (See 1.1.3.)
3) Remove the upper cover. (See 1.1.4.)
4) Disconnect the connector [1], and remove the screw [2].



F03-101-09

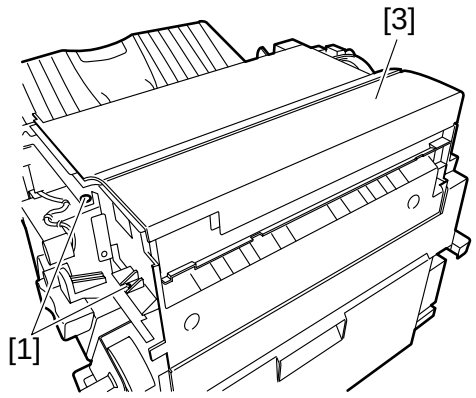
5) While lifting the processing tray upper cover [3], disconnect the connector [4]; then, detach the processing tray upper cover [3].



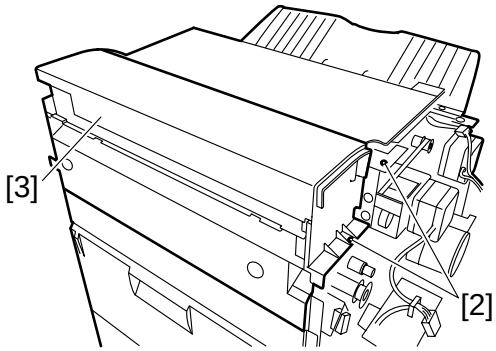
F03-101-10

1.1.6 Removing the Upper Right Cover Assembly

1) Remove the front cover. (See 1.1.2.)
2) Remove the rear cover. (See 1.1.3.)
3) Remove the two screws [1] at the front and the two screws [2] at the rear; then, detach the upper right cover assembly [3].



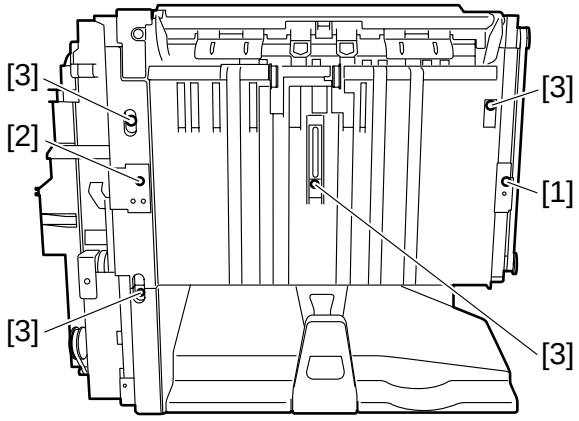
F03-101-11



F03-101-12

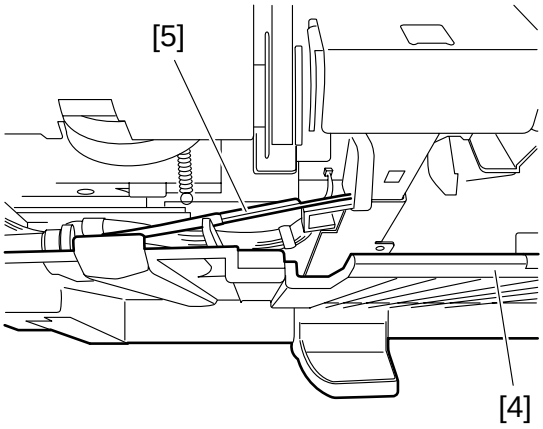
1.1.7 Removing the Saddle Guide

1) Remove the delivery tray. (See 1.1.1.)
2) Remove the front cover. (See 1.1.2.)
3) Remove the rear cover. (See 1.1.3.)
4) Free the delivery tray support plate (front) [1] and the delivery tray support plate (rear) [2] to the outside from the rail grooves.
5) Remove the four screws [3].



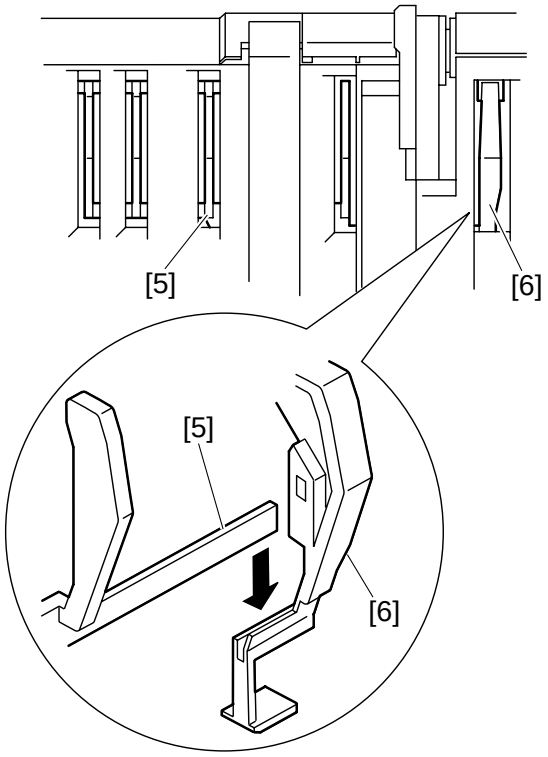
F03-101-13

6) Shift the side guide [4] lightly to the front, and free the engagement of the paper surface detecting lever (rear) [5]; then, detach the side guide [4].



F03-101-14

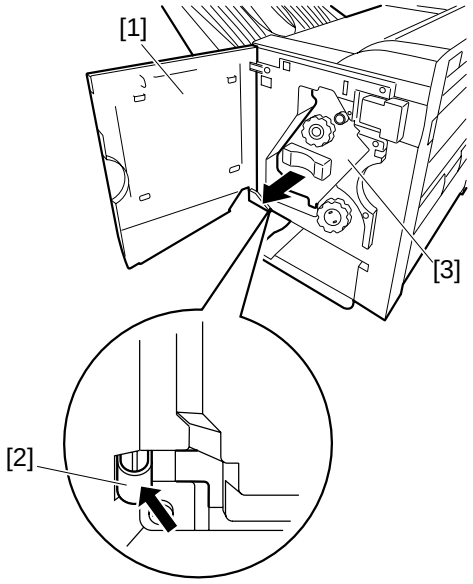
Be sure to mount the side guide after securely fitting the paper surface detecting lever (rear) [5] in the groove of the paper surface detecting lever (middle) [6]. After completion of mounting, push the paper surface detecting lever several times to make sure that side guide is mounted securely.



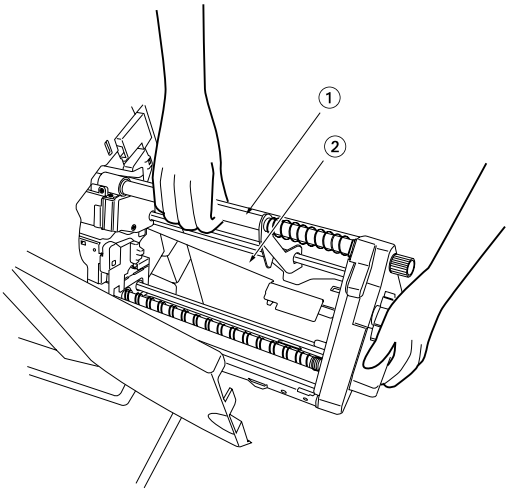
1.2 Feeding System

1.2.1 Removing the Stapler Unit

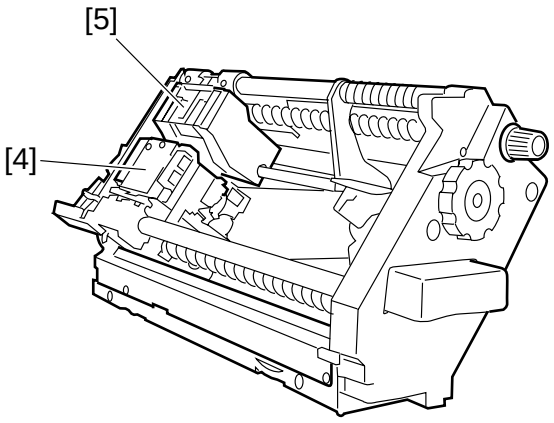
1) Open the front door [1].
2) Slide out the stapler unit [3] while pressing the stopper lever [2].



When removing the stapler unit from the finisher, be sure to grasp the upper portion(shaft) ①, If the stay in the middle portion ② is grasped, the unit may be deformed , resulting in paper jam.

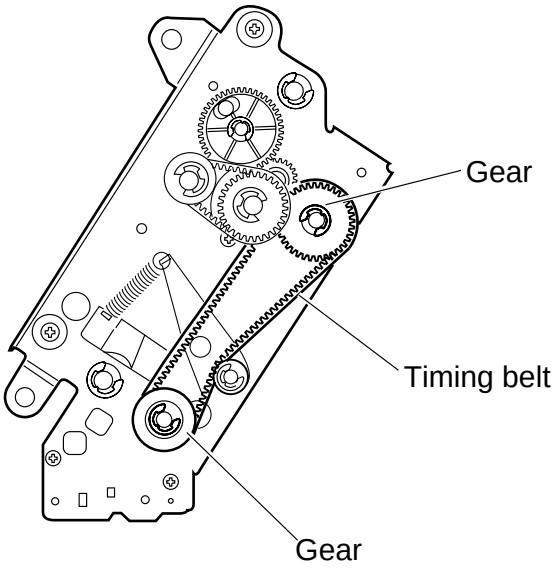


Do not remove the stapler from the stapler frame shaft. If removed, the position where the staple driver (lower unit of the stapler) [4] shoots stables will shift from the position where the staple clincher (upper unit of the stapler) [5] receives staples.



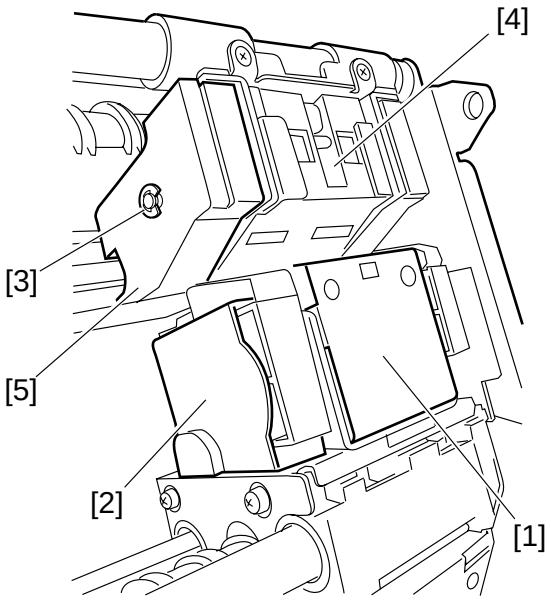
1.2.2 Adjusting the Stapler Phase

When the gears or timing belt at the front of the stapler is replaced or removed for some reason, the staple shooting timing of the staple driver (lower unit of the stapler) does not match the staple bending timing of the staple clincher (upper unit of the stapler). Adjust the stapler phase following the procedure described below.



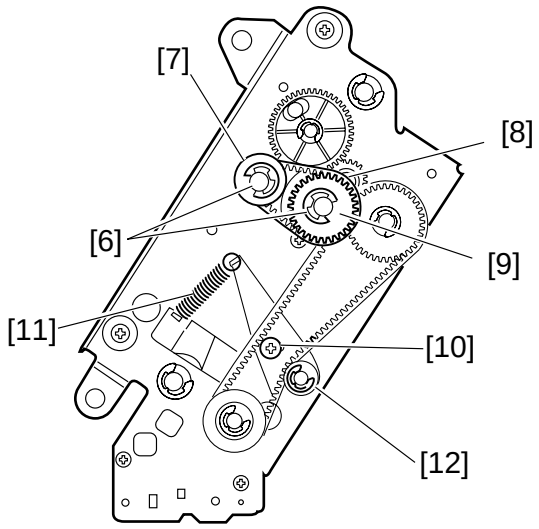
F03-102-03

1) Detach the gear cover [2] from the staple driver [1].
2) Remove the E-ring [3] to detach the side cover [5] of the staple clincher [4].



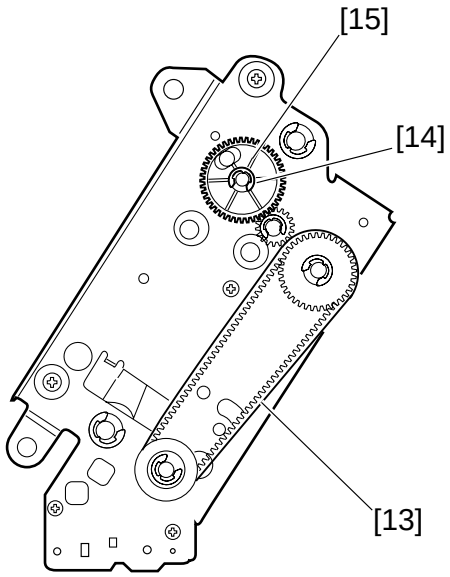
F03-102-04

3) Remove the two E-rings [6] to remove the staple jam releasing gear [7], timing belt [8], and relay gear 1 [9]. Remove the spacer and spring at the back of the staple jam relasing gear.
4) Remove the screw [10] and spring [11] to remove the belt tentioner [12].



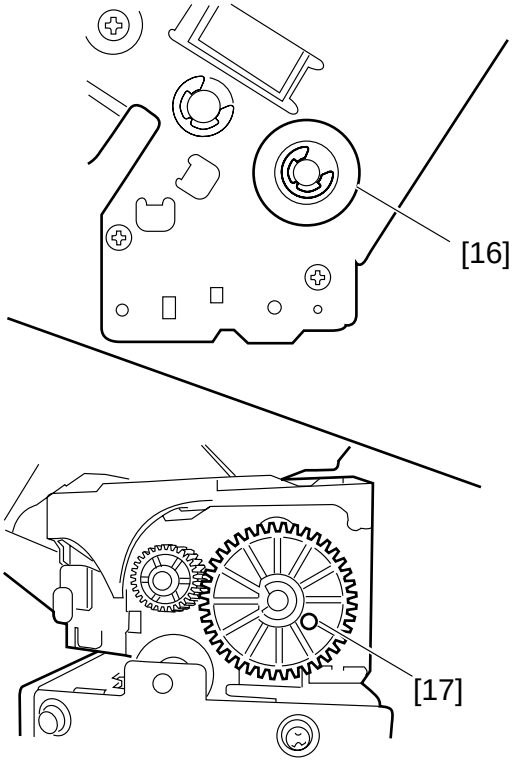
F03-102-05

5) Remove the timing belt [13].
6) Remove the E-ring [14] to remove the staple position check gear [15].



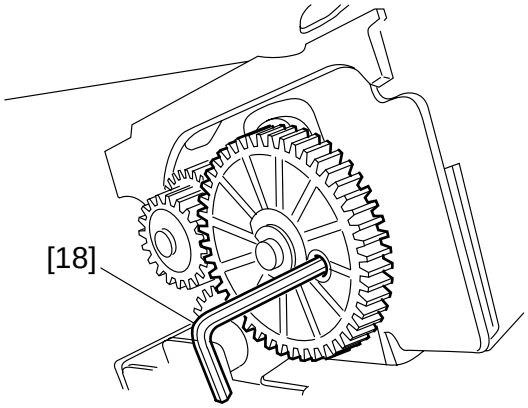
F03-102-06

7) Turn the gear [16] to align the round hole in the staple driver gear with the round hole [17] at the back.



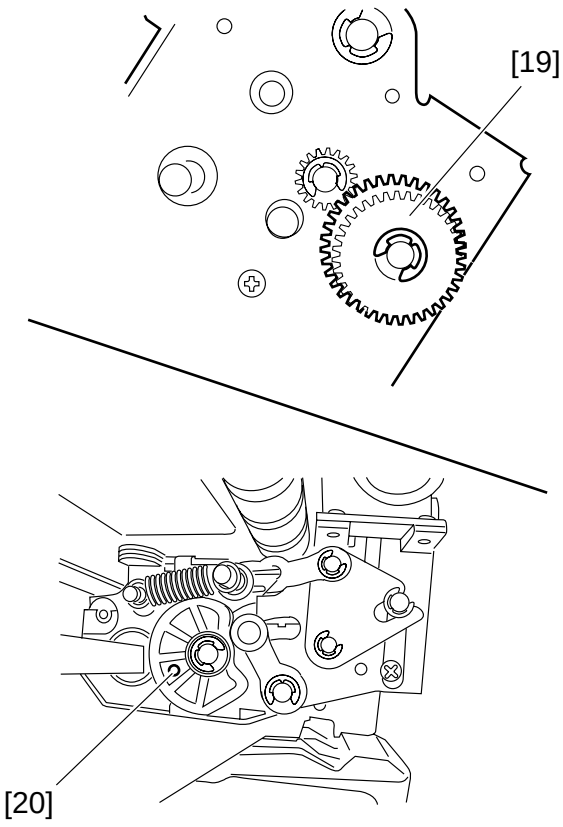
F03-102-07

8) Insert a pin [18] with a diameter of approximately 2 mm (use of a 2 mm Allen wrench is recommended) in the round hole to secure the gear.



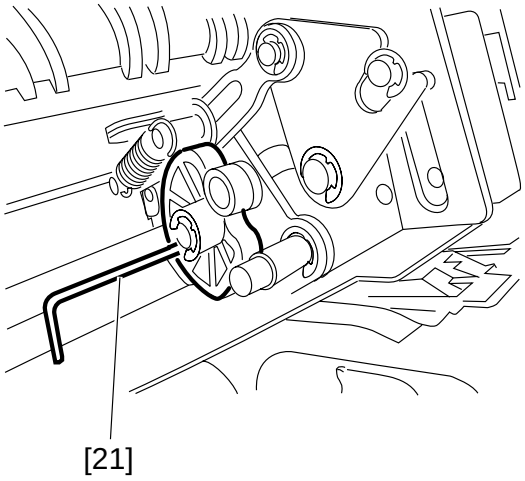
F03-102-08

9) Turn the gear [19] to align the round hole in the staple clincher cam with the round hole [20] at the back.



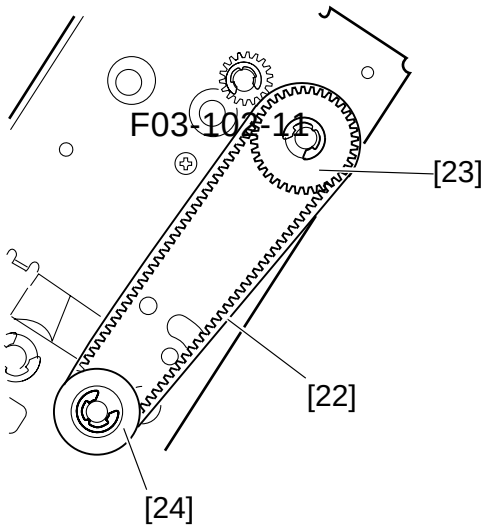
F03-102-09

10) Insert a pin [21] with a diameter of approximately 2 mm (use of a 2 mm Allen wrench is recommended) in the round hole to secure the gear.

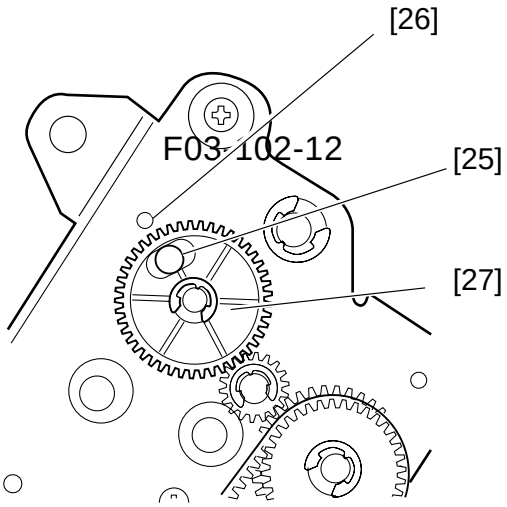


F03-102-10

11) With the gears and cam fixed, install the timing belt [22] on gears [23] and [24].



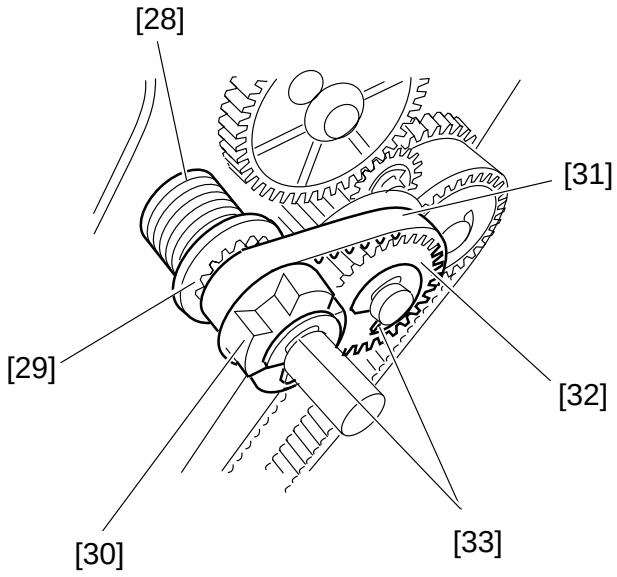
12) Mount the staple position check gear [27] so that the blue mark [25] on the staple position check gear is aligned with the round hole [26] in the frame.



The position where the blue mark is aligned with the round hole is the home position for stapling. If the staple jam cancel dial is turned for some reason, the home position deviates, making it impossible to remove the stapler cartridge. If such a case, the gear can be returned to the home position by checking blue mark position. Therefore, it is necessary to mount the gear at the correct position.

13) Remove the pin securing the gear to the cam.

14) Assemble the spring [28], spacer [29], staple jam releasing gear [30], timing belt [31], and relay gear [32] and secure them with the E-ring [33].

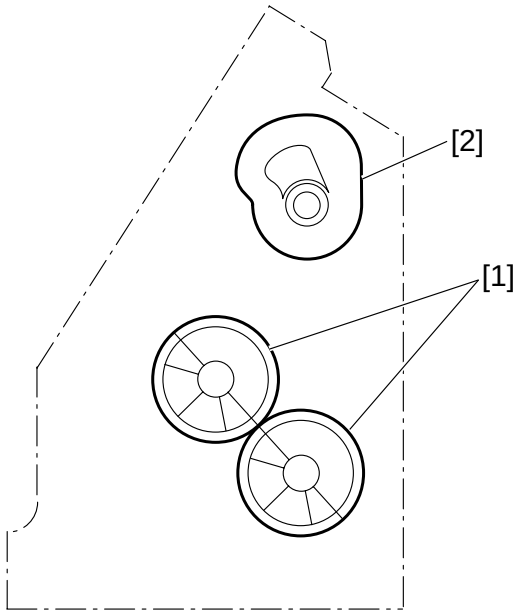


F03-102-13

1.2.3 Adjusting the Phase of the Gear in the Saddle Unit

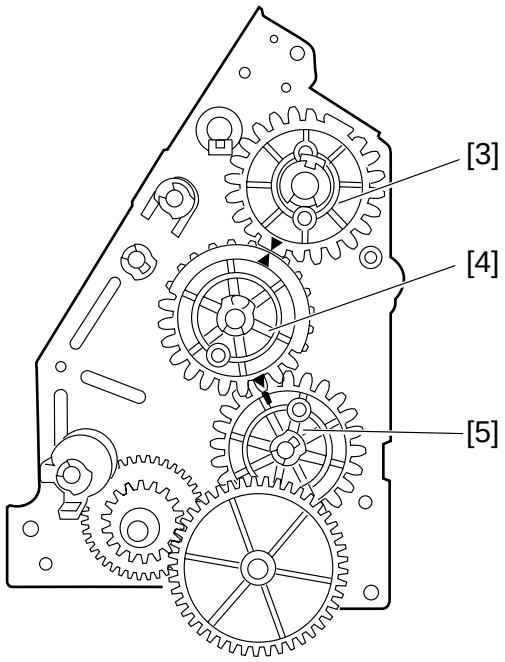
If the gears at the front of the saddle unit or the paper fold rollers in the sale unit are replaced or removed for some reason, adjust the gear phase following the procedure described below.

1) The paper fold rollers [1] and saddle cam [2] must be positioned as shown below.



F03-102-14

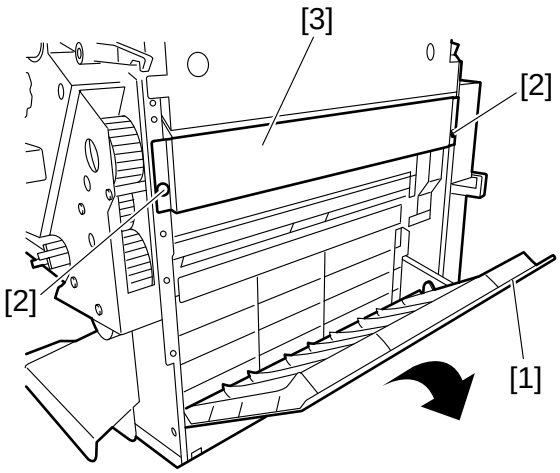
2) With the paper fold rollers and saddle cam positioned as shown in Figure F03-102-14, mount gears as shown in figure F03-102-15.
   - Align the ▲ mark (either of two ▲ marks) on the saddle cam drive gear [3] with the ▲ mark on the relay gear [4] (on the half of the periphery where gears with a smaller face width are arranged).
   - With the ▲ mark on the saddle cam drive gear [3] aligned with the ▲ mark on the relay gear [4], align the other ▲ mark on the relay gear withy the rib of the paper folding roller drive gear [5].



F03-102-15

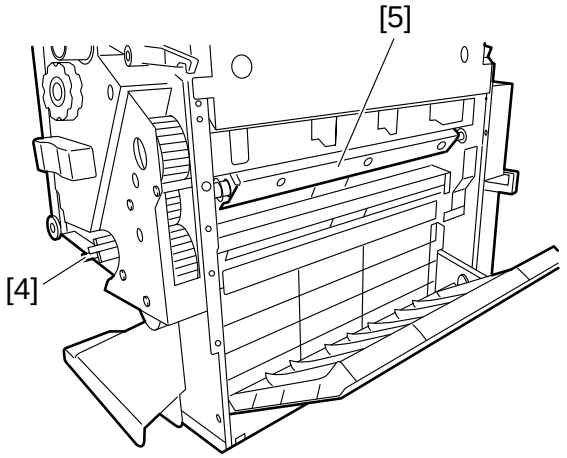
1.2.4 Removing the Saddle Unit

1) Remove the front cover. (See 1.1.2.)
2) Remove the rear cover. (See 1.1.3.)
3) Open the jam removal cover [1]; then, remove the two screws [2] and the right stay [3].



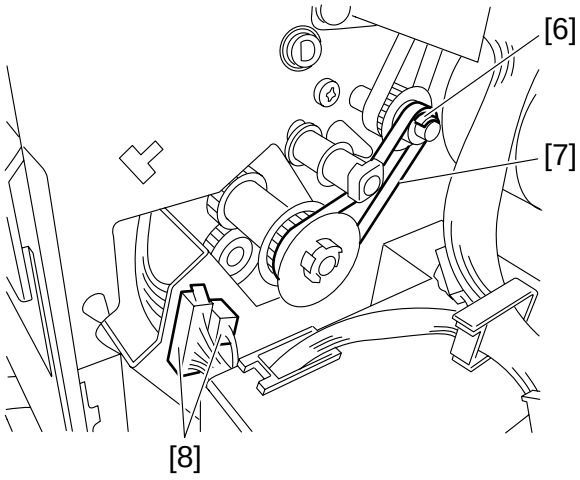
F03-102-16

4) Turn the fold jam releasing dial assembly [4] to move the paper retaining plate assembly [5] to the inside.



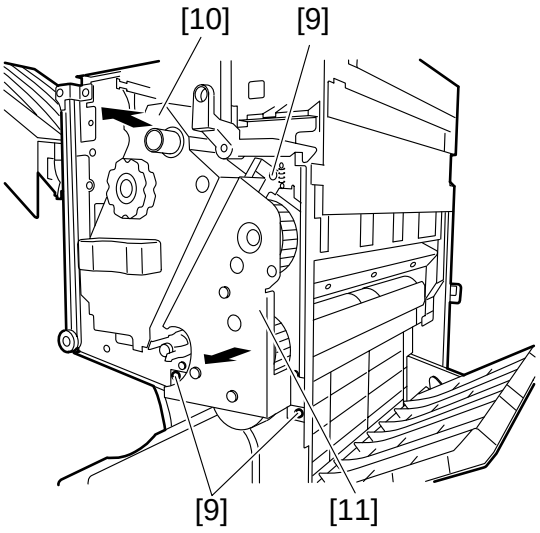
F03-102-17

5) Remove the stop ring [6], and detach the timing belt [7].
6) Disconnect the two connectors [8].



F03-102-18

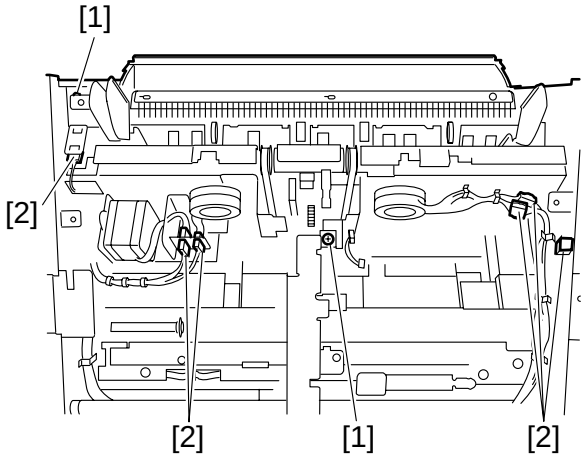
7) Remove the three screws [9], and slide out the stapler unit [10] slightly to the front.
8) Slide out the saddle unit [11] to the front.



F03-102-19

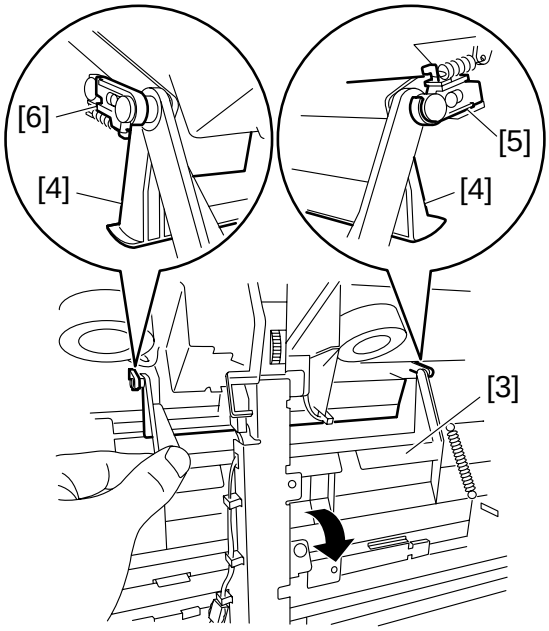
1.2.5 Removing the Processing Tray Assembly

1) Remove the processing tray upper cover. (See 1.1.5.)
2) Remove the side guide. (See 1.1.7.)
3) Remove the two screws [1], and disconnect the six connectors [2].



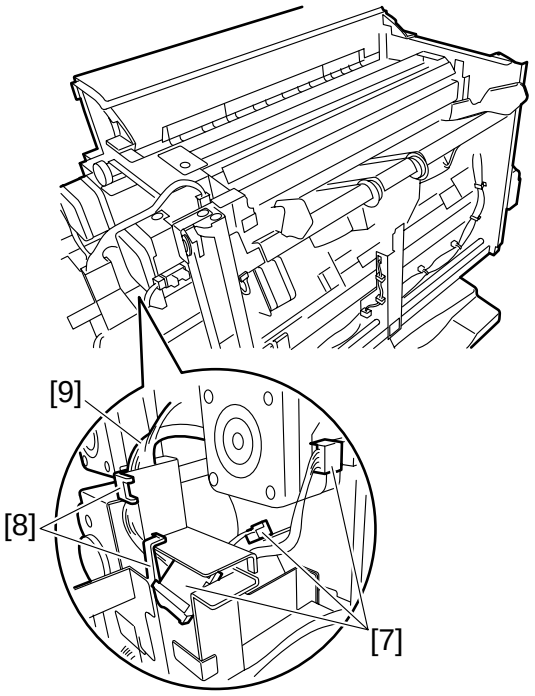
F03-102-20

4) Pull the processing stopper base [3] to the front, and free the claw [5] at the front and the claw [6] at the rear of the processing stopper [4].



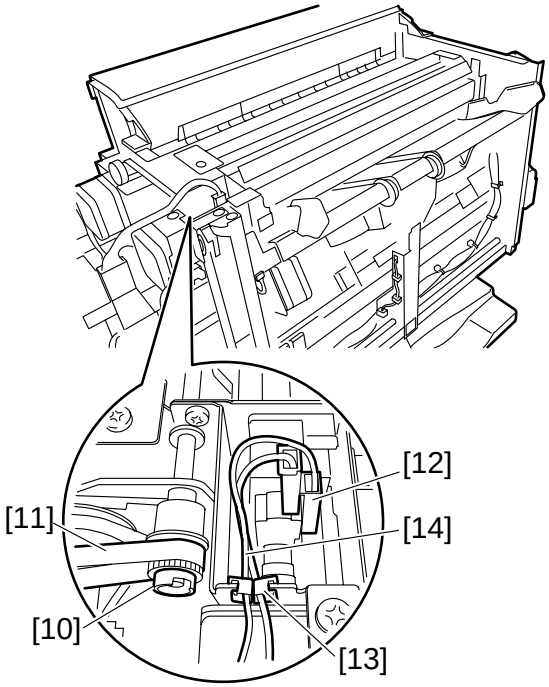
F03-102-21

5) Disconnect the three connectors [7].
6) Release the two claws [8] of the harness retainer, and detach the motor harness [9].



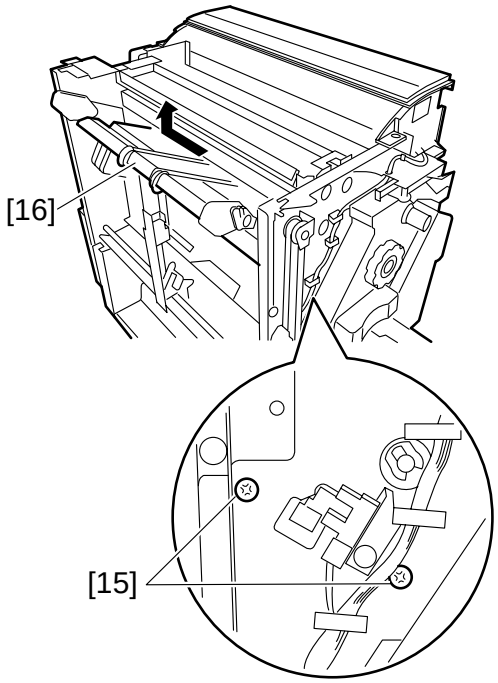
F03-102-22

7) Remove the stop ring [10], and detach the timing belt [11].
8) Disconnect the connector [12], and free the harness [14] from the edge saddle [13].



F03-102-23

9) Remove the two screws [15], and slide the processing tray assembly [16] to the rear; then, lift it to detach.

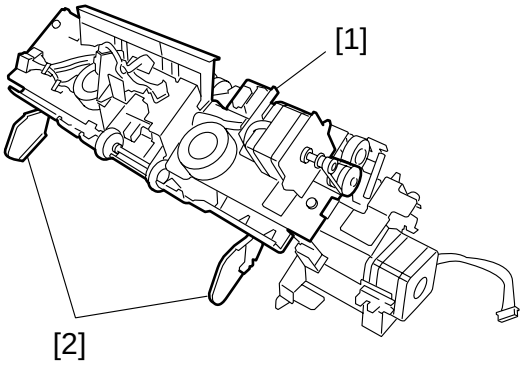


F03-102-24

1.2.6 Removing the Paddle Assembly

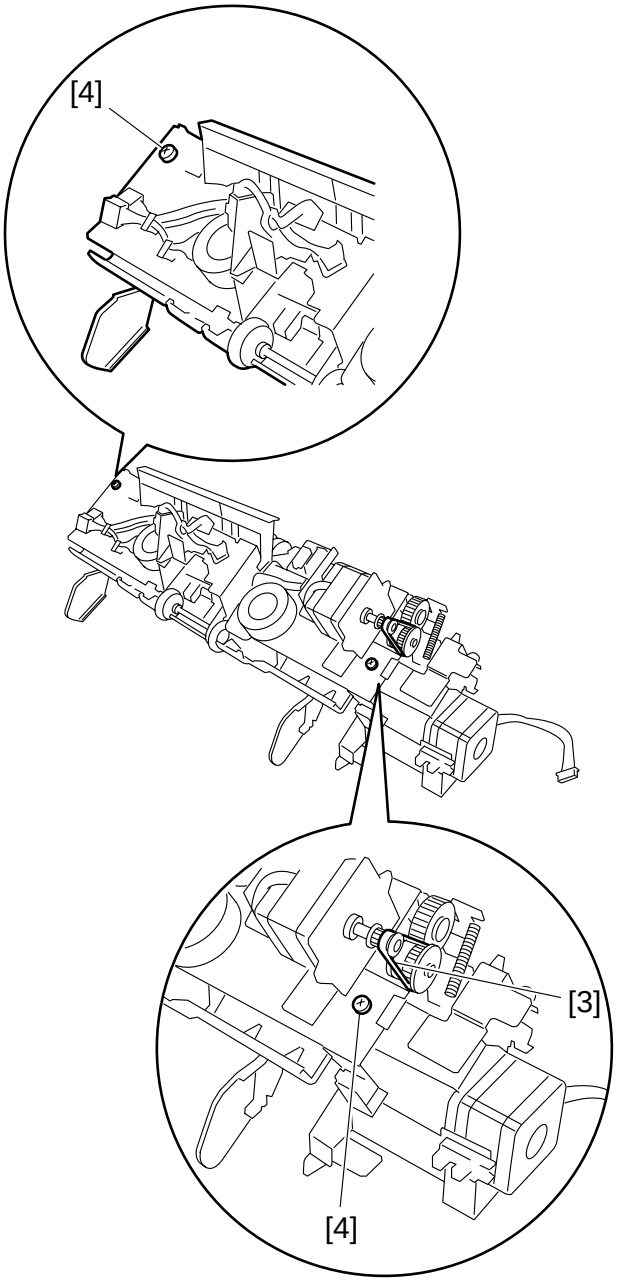
1) Remove the processing tray assembly. (See 1.2.3.)
2) Place the processing tray assembly [1] as shown.

Be sure to take care not to damage the aligning plate [2].



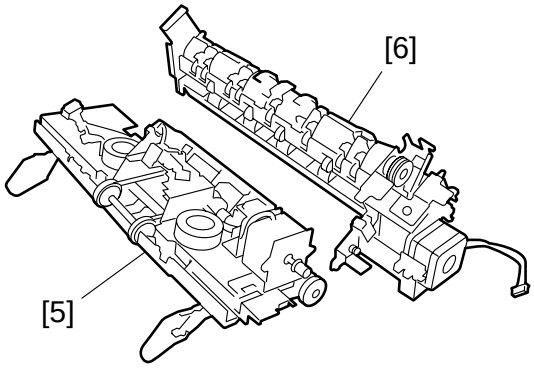
F03-102-25

3) Detach the timing belt [3], and remove the two screws [4].



F03-102-26

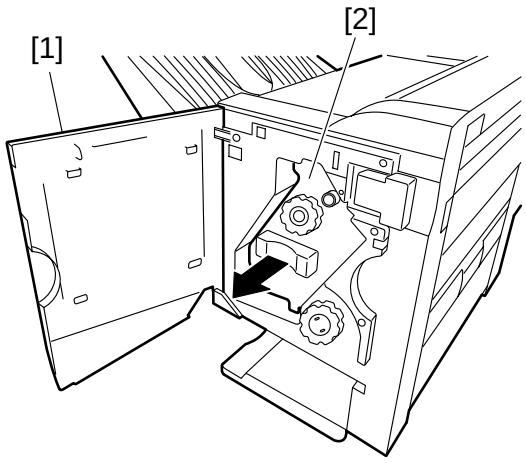
4) Separate the processing tray assembly [5] and the paddle assembly [6] as shown.



F03-102-27

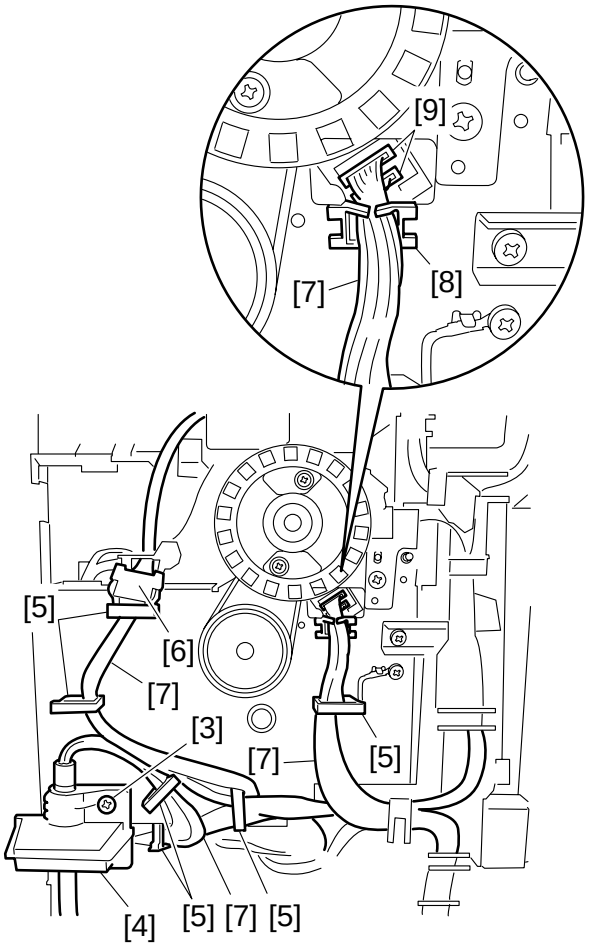
1.2.7 Removing the Staple/Fold Drive Unit

1) Open the front door [1], and slide out the stapler unit [2] slightly to the front.



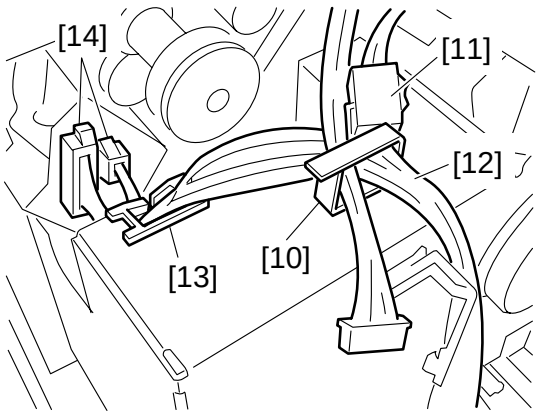
F03-102-28

2) Remove the screw [3], and detach the interface retainer [4].
3) Free the six harness retainers [5], and disconnect the connector [6].
4) Free the harness [7] from the harness retainer [5].
5) Free the harness [7] from the edge saddle [8]; then, disconnect the two connectors [9].



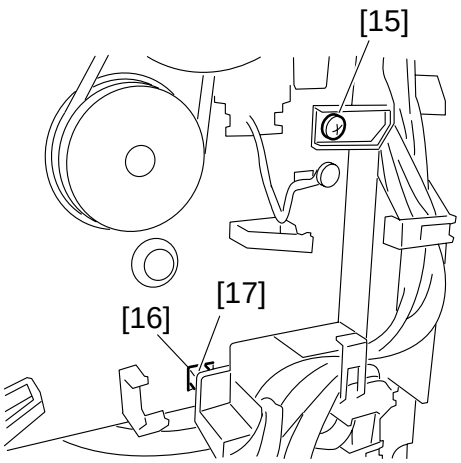
F03-102-29

6) Release the harness retainer [10], and disconnect the connector [11].
7) Free the harness [12] from the harness retainer [10].
8) Free the harness [12] for the edge saddle [13]; and disconnect the two connectors [14].



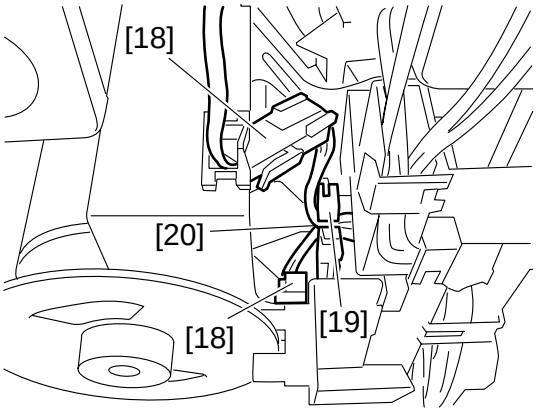
F03-102-30

9) Remove the screw [15], and free the claw [17] of the harness guide from the long angle [16] of the base plate.



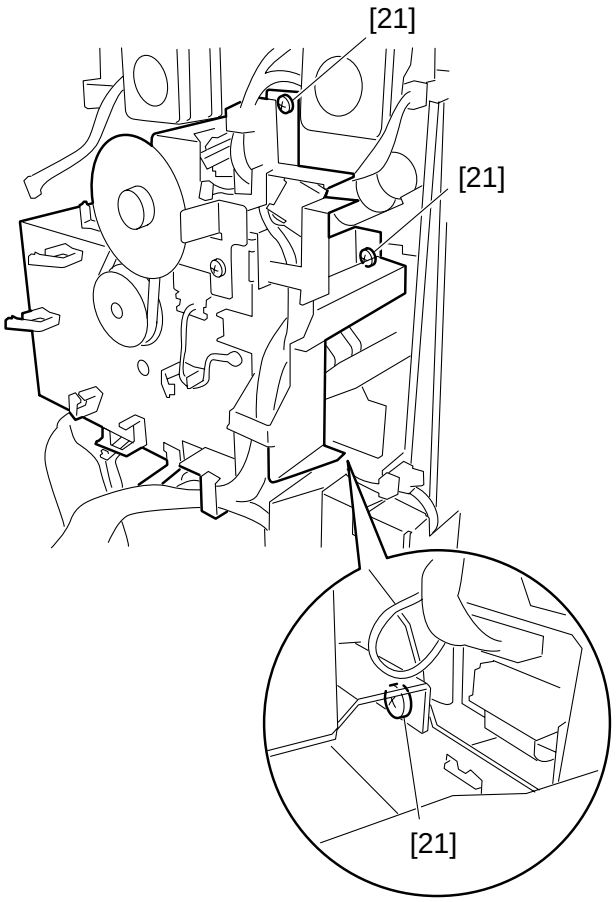
F03-102-31

10) Disconnect the two connectors [18], and free the harness [20] from the edge saddle [19].



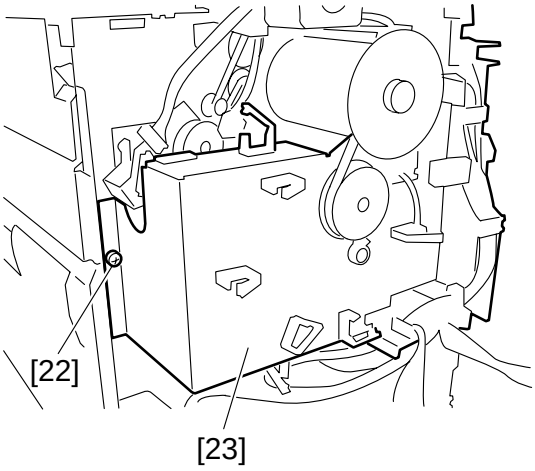
F03-102-32

11) Remove the three screws [21].



F03-102-33

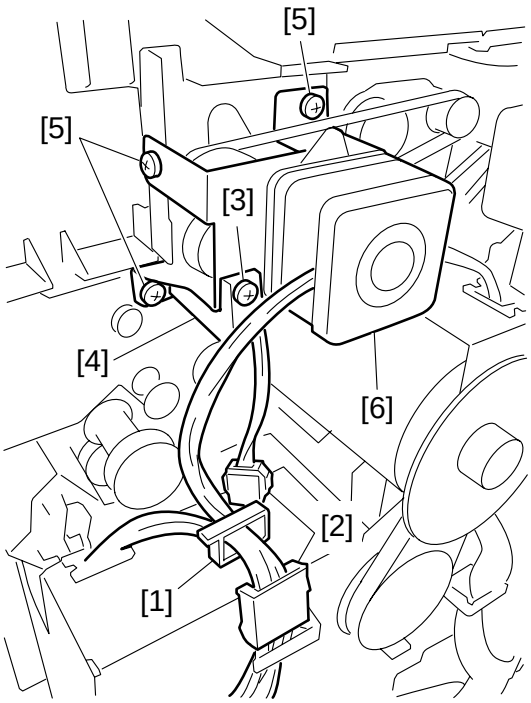
12) Remove the screw [22], and detach the staple/fold drive unit [23].



F03-102-34

1.2.8 Removing the Feed Motor Unit

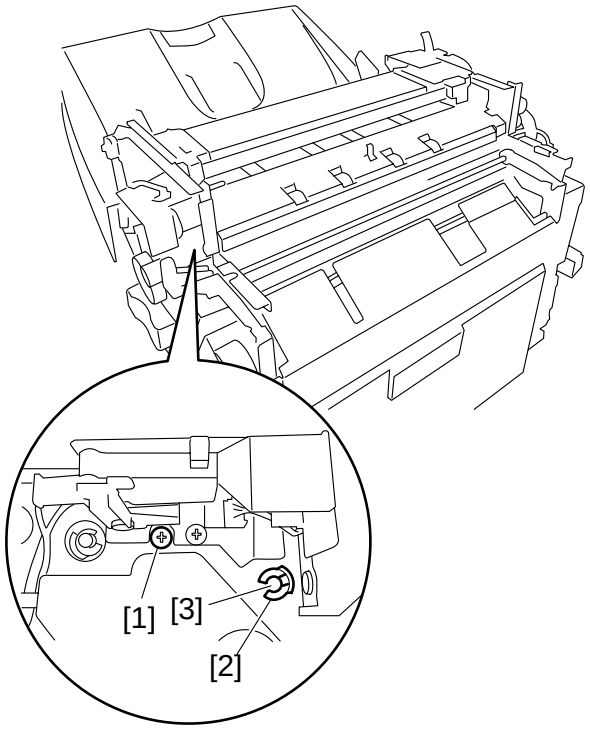
1) Remove the rear cover. (See 1.1.3.)
2) Open the harness retainer [1], and disconnect the two connectors [2].
3) Remove the screw [3], and detach the harness guide [4].
4) Remove the three screws [5], and detach the feed motor unit [6].



F03-102-35

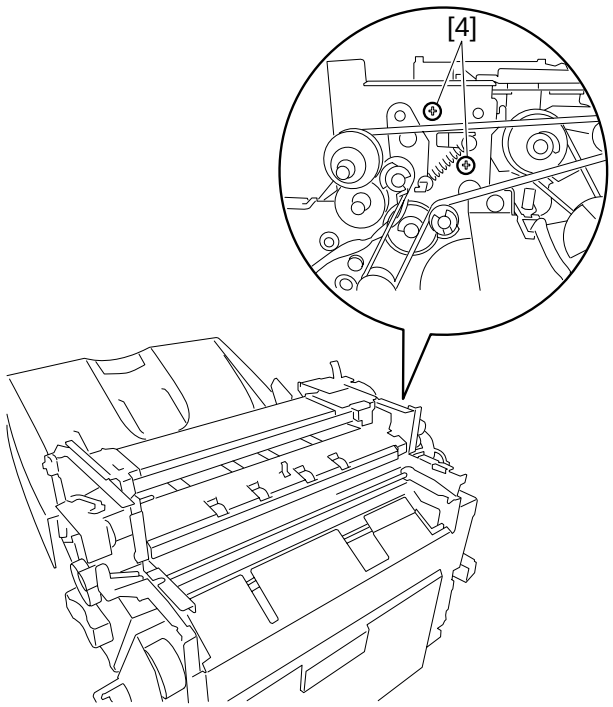
1.2.9 Removing the Feed Roller

1) Remove the upper cover. (See 1.1.4.)
2) Remove the upper right cover assembly. (See 1.1.6.)
3) Remove the feed motor unit. (See 1.2.6.)
4) Remove the screw [1].
5) Remove the stop ring [2], and detach the bushing [3].



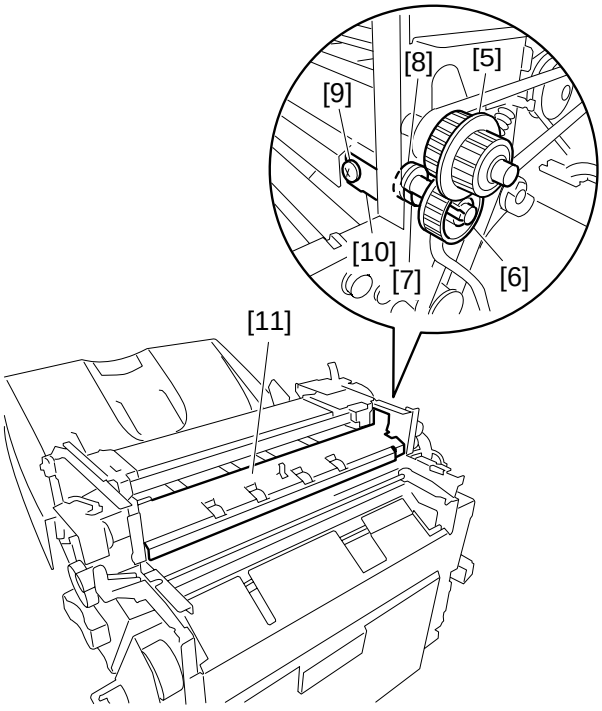
F03-102-36

6) Remove the two screws [4].



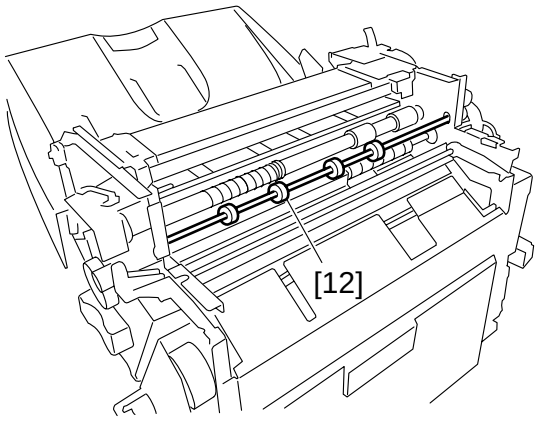
F03-102-37

7) Remove the gear [5], and detach the gear [6] while spreading the claw.
8) Remove the stop ring [7], and detach the bushing [8].
9) Remove the screw [9], and detach the inlet sensor [10].
10) Remove the lower paper guide [11].



F03-102-38

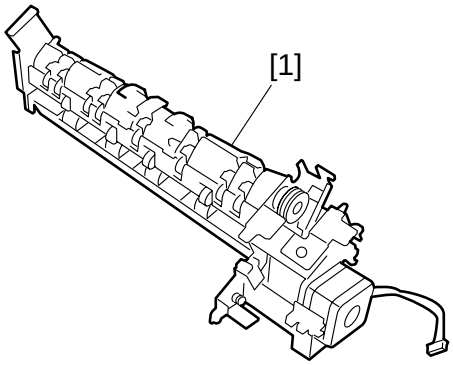
11) Remove the feed roller [12].



F03-102-39

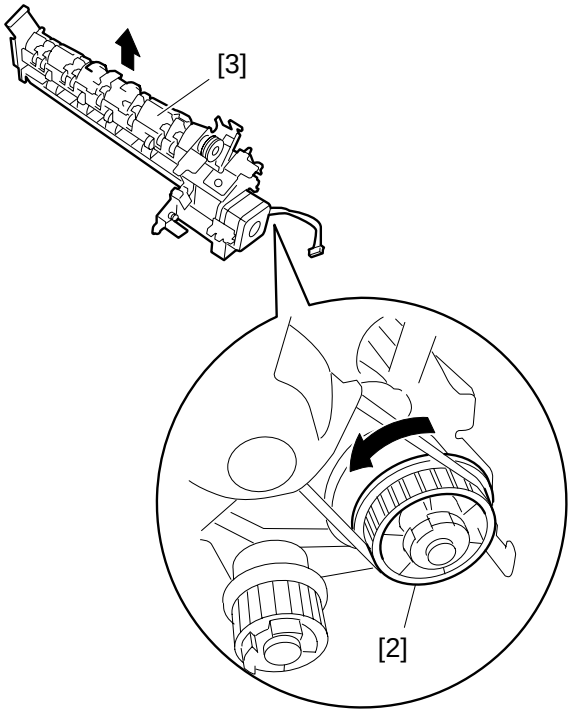
1.2.10 Removing the Stack delivery roller (upper)

1) Remove the paddle assembly. (See 1.2.4.)
2) Place the paddle assembly [1] as shown.



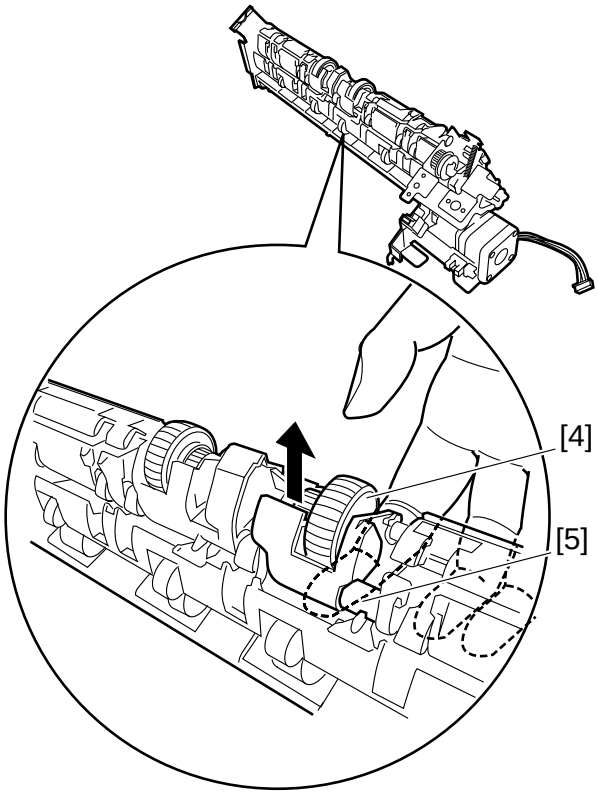
F03-102-40

3) Turn the gear [2] in the direction of the arrow to move up the stack delivery roller assembly (upper) [3].



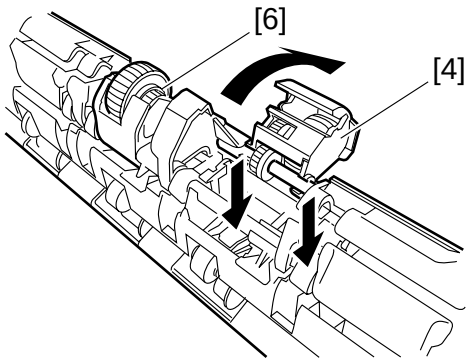
F03-102-41

4) Push up the stack delivery roller (upper) [4] from below to free the stack deliver roller (upper) [4] from the shaft [5].



F03-102-42

5) Shift up the stack delivery roller (upper) [4], and then push it down to detach the stack deliver roller (upper) [4].

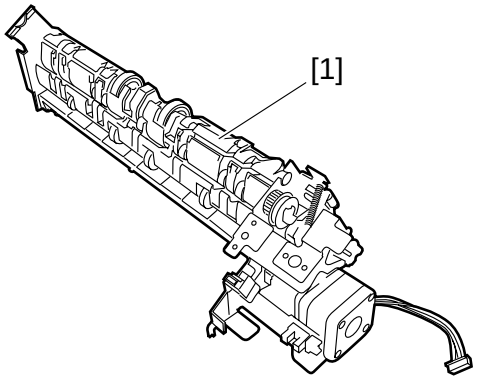


F03-102-43

6) Likewise, remove the stack delivery roller (upper) [6] at the front.

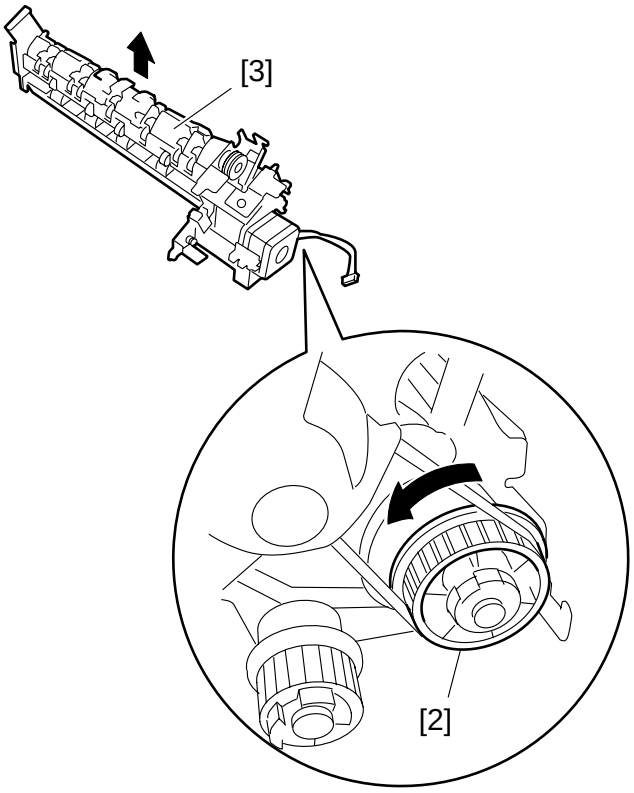
1.2.11 Removing the Paddle

1) Remove the paddle assembly. (See 1.2.4.)
2) Place the paddle assembly [1] as shown.



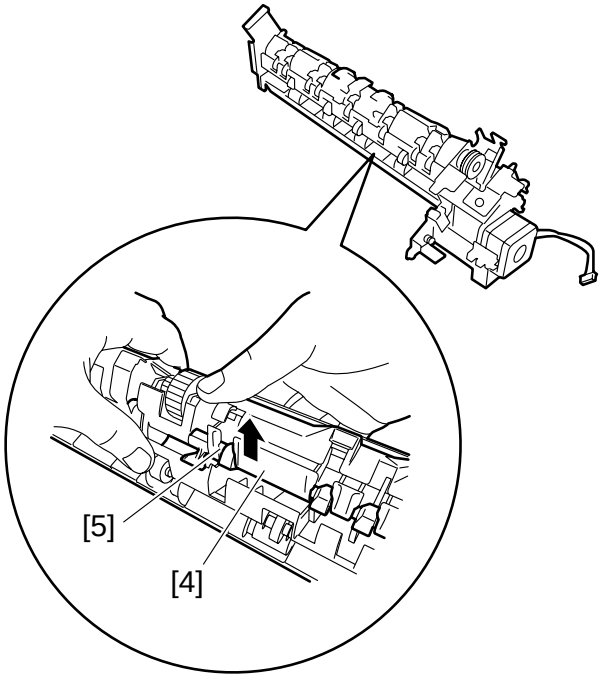
F03-102-44

3) Turn the gear [2] in the direction of the arrow to move up the stack delivery roller assembly (upper) [3].



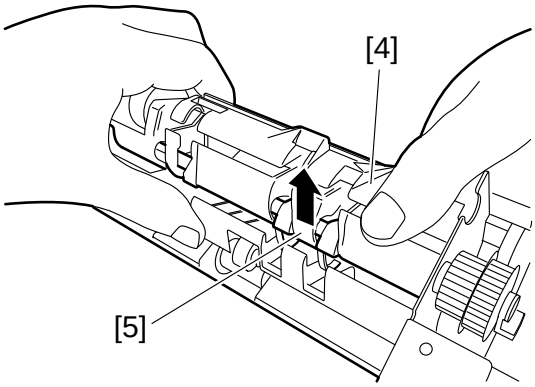
F03-102-45

4) Push up the safety guide [4] from below to free one side of the safety guide [4] from the shaft [5].



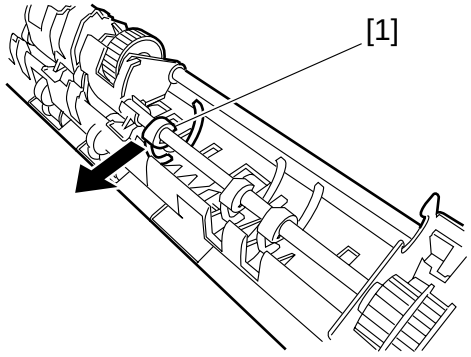
F03-102-46

5) Push up the safety guide [4] from below to free the safety guide [4] from the shaft [5].



F03-102-47

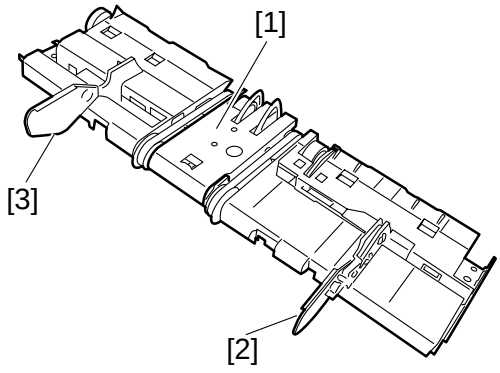
6) Remove the paddle [6] in the direction of the arrow.
7) Likewise, remove the other paddle.



F03-102-48

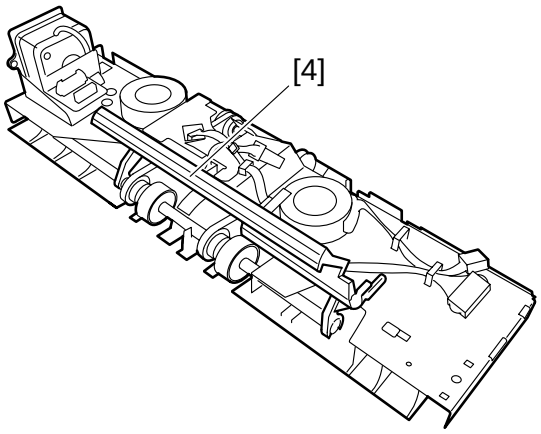
1.2.12 Removing the Stack delivery roller (lower)/Delivery Belt

1) Remove paddle assembly, and separate it from the processing tray assembly. (See 1.2.4.)
2) Slide the aligning plate (front) [2] and the aligning plate (rear) [3] of the processing tray assembly [1] by sliding them to the outside.



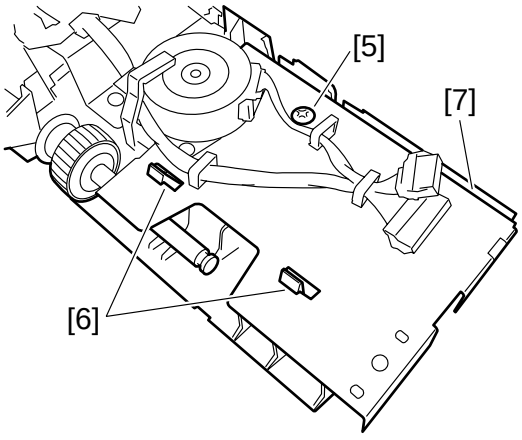
F03-102-49

3) Remove the processing tray stopper [4].



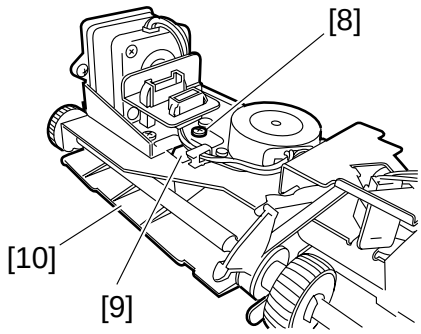
F03-102-50

4) Remove the screw [5], and detach the paper guide (front) [7] while freeing the two claws [6].



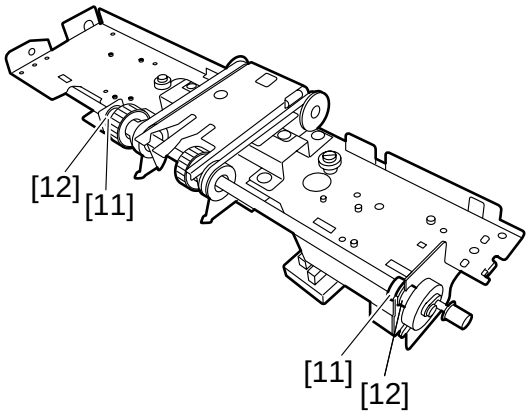
F03-102-51

5) Remove the screw [8]; then, while freeing the claw [9], detach the paper guide (rear) [10].



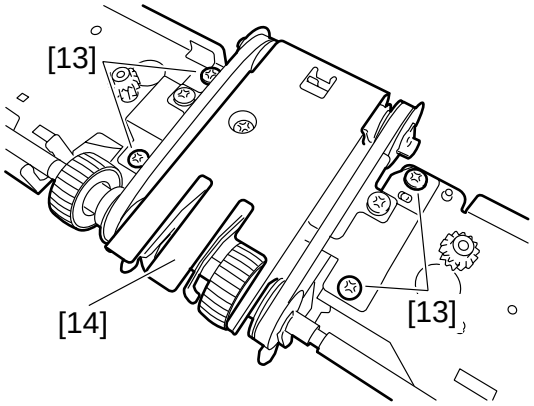
F03-102-52

6) Remove the two stop rings [11]; then, move the two bushings [12] to the inside.



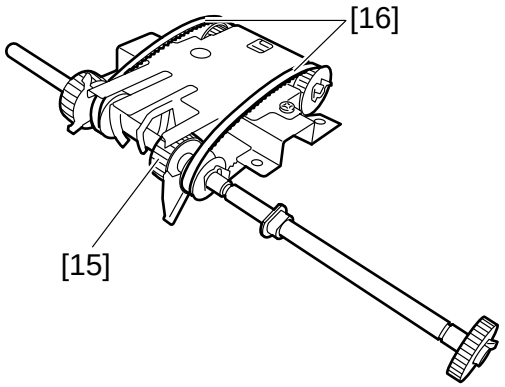
F03-102-53

7) Remove the four screws [13]; then, lift the stack delivery roller assembly (lower) [14] to detach.



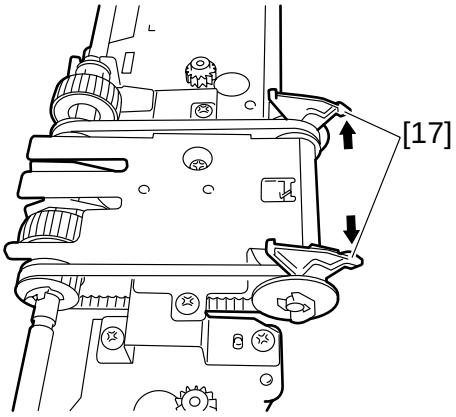
F03-102-54

8) Remove the stack delivery roller (lower) [15] and the two delivery belts [16].



F03-102-55

Be sure to mount them so that the edges [17] of the claws of the delivery belts are flush.

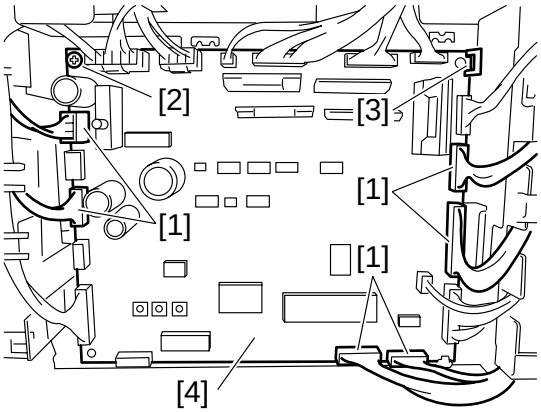


F03-102-56

1.3 PCBs

1.3.1 Removing the Finisher Controller PCB

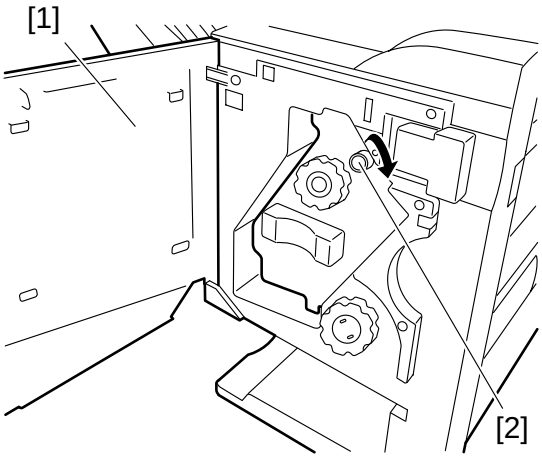
1) Remove the rear cover. (See 1.1.3.)
2) Disconnect the 17 connectors [1], and remove the screw [2].
3) Free the PCB retainer [3], and detach the finisher controller PCB [4].



F03-103-01

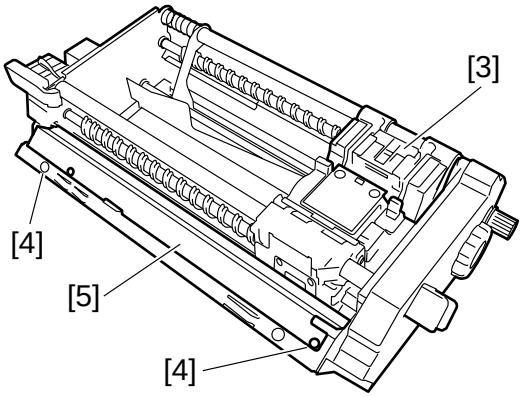
1.3.2 Removing the Slide Home Position PCB

1) Open the front door [1], and turn the tab [2] on the stapler slide in the direction of the arrow to slide the stapler to the frontmost point.
2) Remove the stapler unit. (See 1.2.1.)



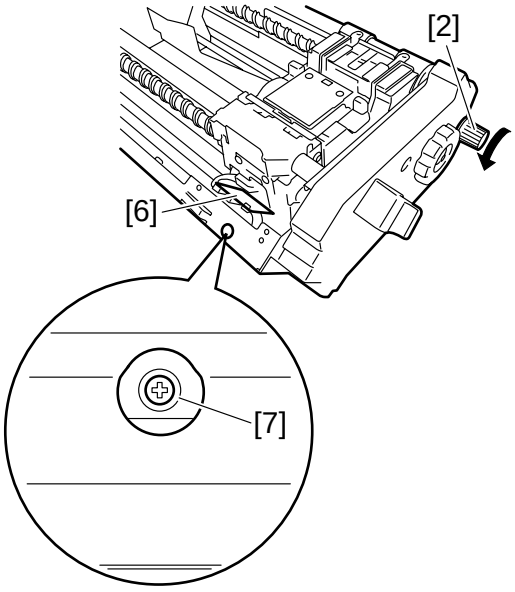
F03-103-02

3) Place the stapler unit [3] as shown.
4) Remove the two screws [4], and detach the guide [5].



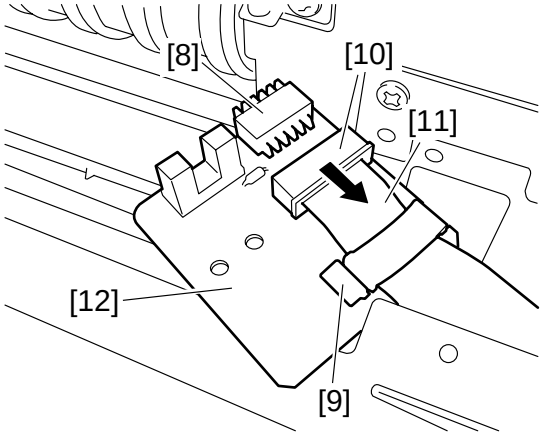
F03-103-03

5) Turn the tab [2] on the stapler side in the direction of the arrow so that that the fixing screw [7] of the slide home position PCB [6] is in view through the round hole.
6) Remove the fixing screw [7].



F03-103-04

7) Disconnect the connector [8].
8) Remove the flexible cable retainer [9].
9) Free the lock [10] of the connector in the direction of the arrow; then, detach the flexible cable [11], and then detach the side home position PCB [12].



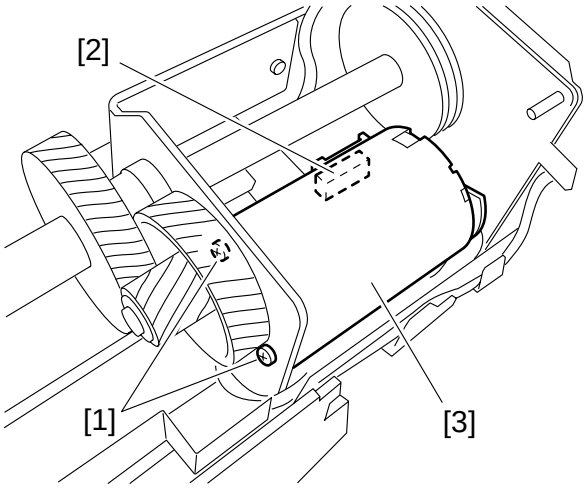
F03-103-05

2. Puncher Unit (option)

2.1 Puncher Driving System

2.1.1 Removing the Punch Motor

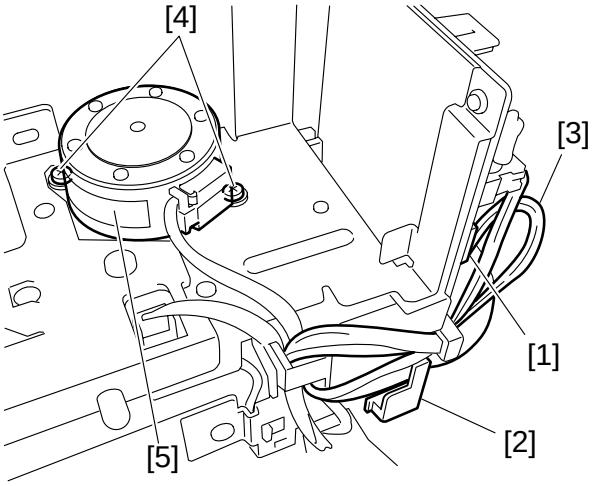
1) Remove the two screws [1].
2) Disconnect the connector [2] to remove the punch motor [3].



F03-201-01

2.1.2 Removing the Horizontal Registration Motor

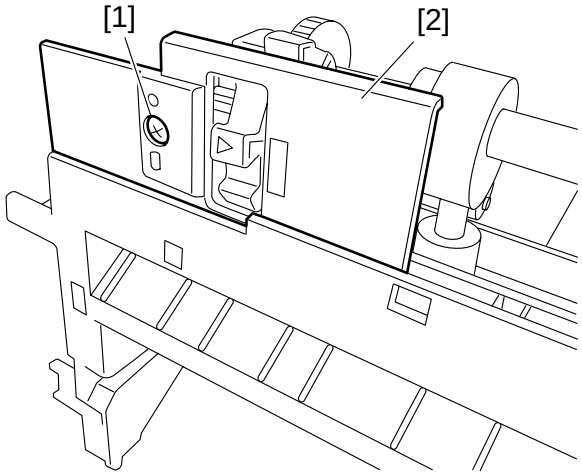
1) Disconnect connector J1001 [1].
2) Remove the harness [3] from the harness guide [2].
3) Remove the two screws [4] to remove the horizontal registration motor [5].



F03-201-02

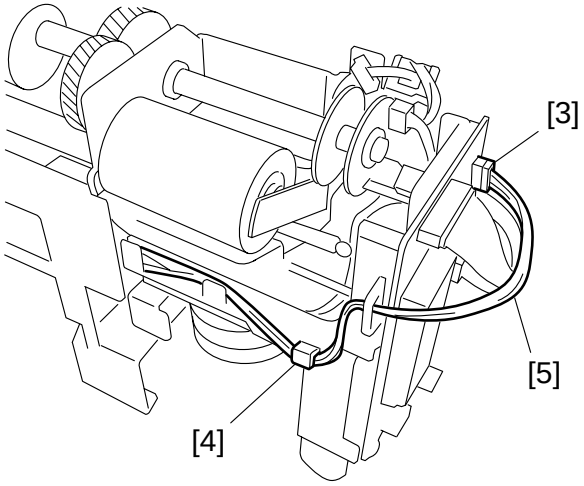
2.1.3 Removing the Punch Unit

1) Remove the waste case.
2) Remove the screw [1] to detach the jam processing cover [2].



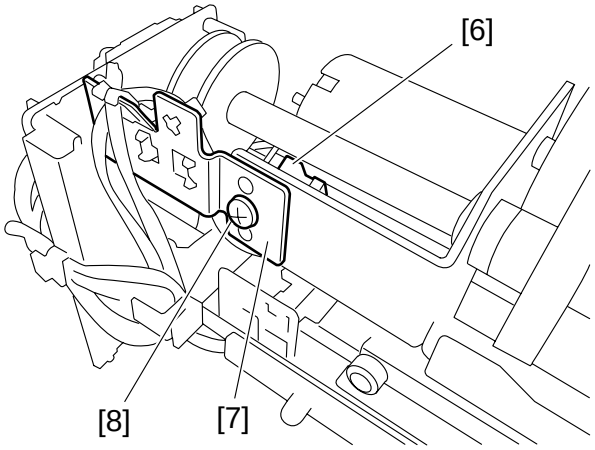
F03-201-03

3) Disconnect the connector J1005 [3]
4) Remove the harness [5] from the harness guide [4].



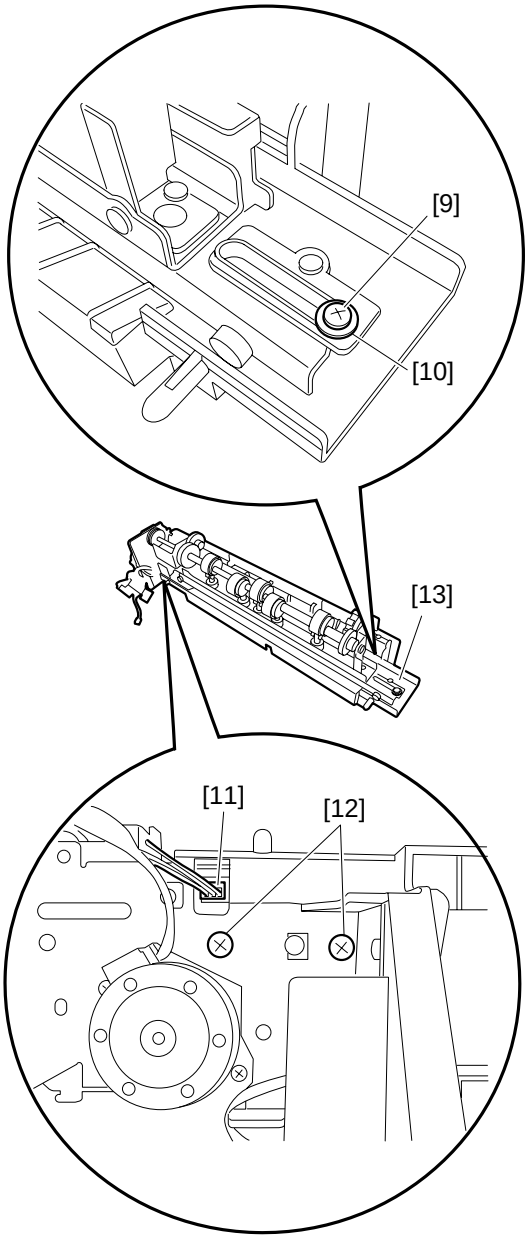
F03-201-04

5) Disconnect the connector [6].
6) Remove the screw [7] and sensor support plate [8].



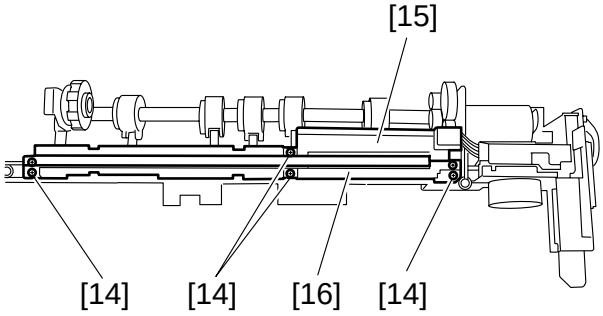
F03-201-05

7) Remove the screw [9] and washer [10].
8) Disconnect the connector [11].
9) Remove the two screws [12] to detach the base cover [13].



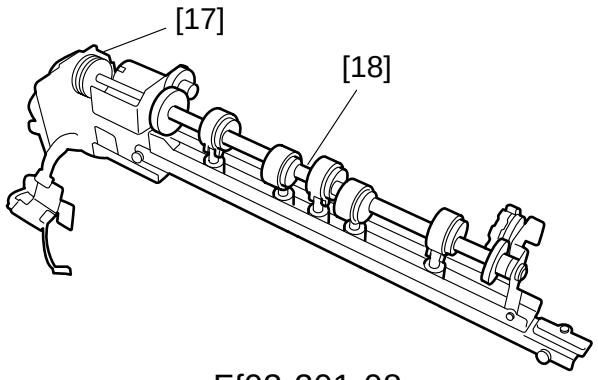
F03-201-06

10) Remove the four screws [14] to remove the upper transmission sensor unit [15] and lower transmission sensor [16].



F03-201-07

11) Remove the punch unit [18] from the horizontal registration motor assembly [17].

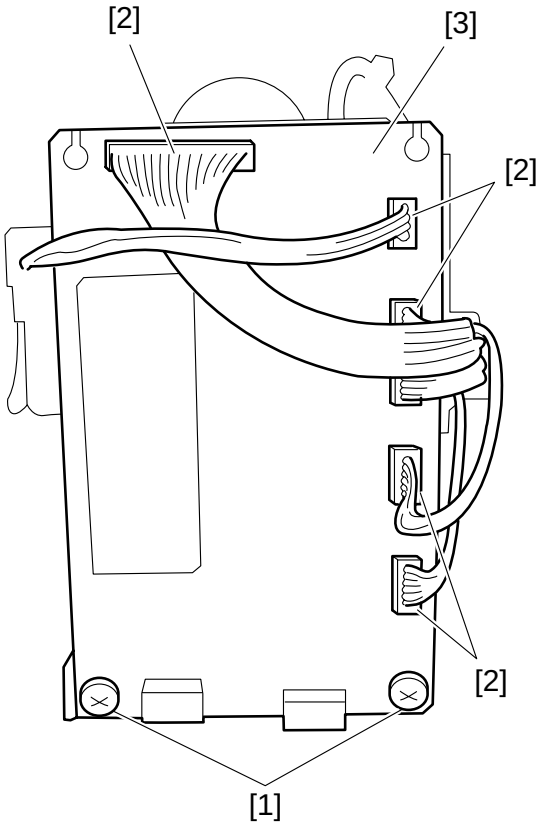


Ff03-201-08

2.2 PCBs

2.2.1 Removing the Punch Controller PCB

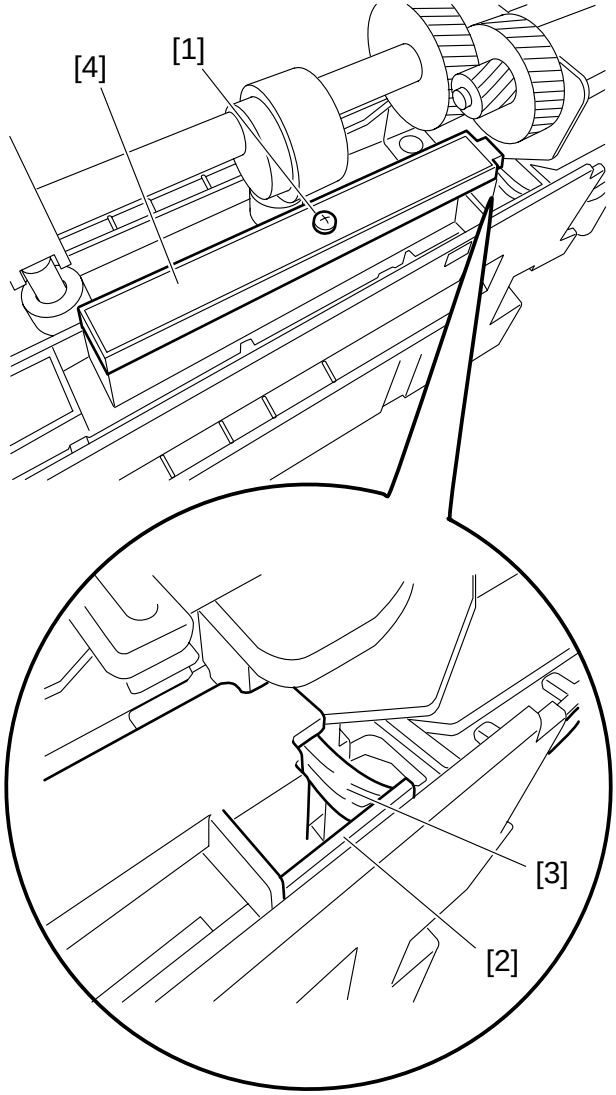
1) Remove the two screws [1].
2) Disconnect the five connectors [2] to remove the punch controller PCB [3].



F03-202-01

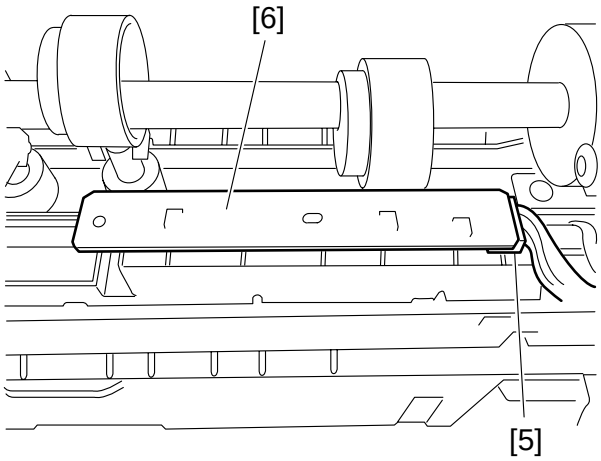
2.2.2 Removing the Photosensor PCB

1) Remove the punch motor. (See 2.1.1.)
2) Remove the screw [1].
3) Remove the harness [3] from the harness guide [2] on the PCB, then detach the PCB cover [4].



F03-202-02

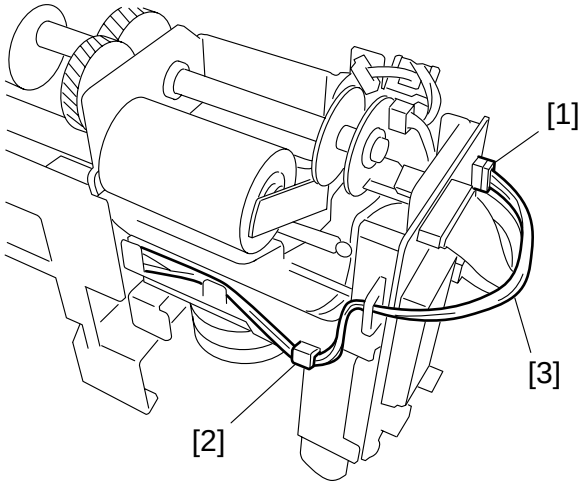
4) Disconnect the connector [5] to remove the photosensor PCB [6].



F03-202-03

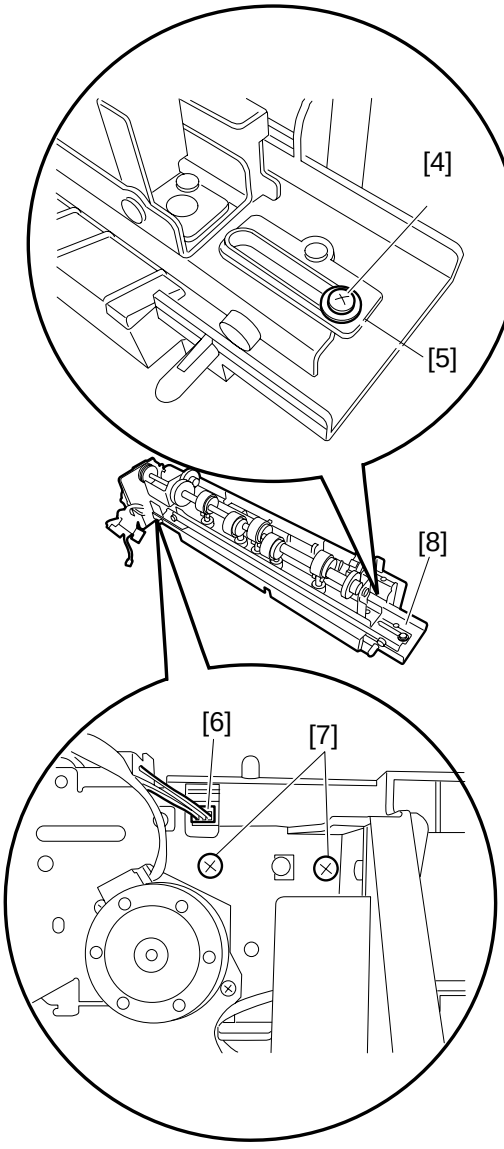
2.2.3 Removing the LED PCB

1) Remove the waste case.
2) Disconnect connector J1005 [1].
3) Remove the harness [3] from the harness guide [2].



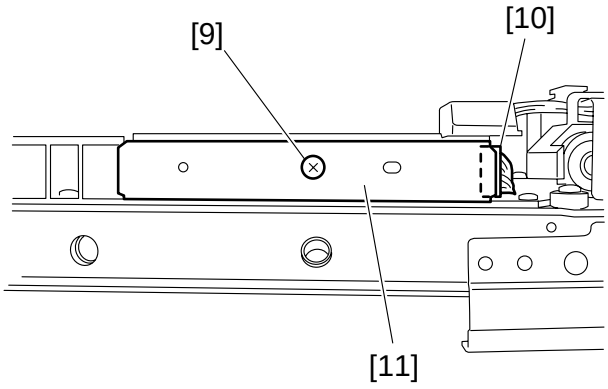
F03-202-04

4) Remove the screw [4] and washer [5].
5) Disconnect the connector [6].
6) Remove the screw [7] to detach the base cover [8].



F03-202-05

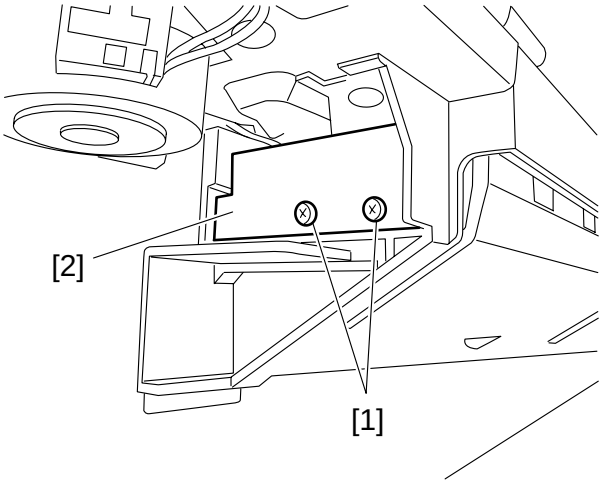
7) Remove the screw [9].
8) Disconnect the connector [10] to remove the LED PCB [11].



F03-202-06

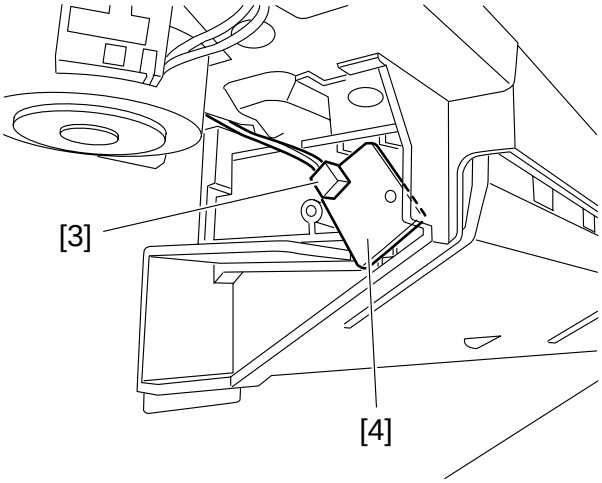
2.2.4 Removing the Waste-Full Photosensor PCB

1) Remove the punch controller PCB. (See 2.2.1.)
2) Remove the two screws [1] to remove the PCB film [2].



F03-202-07

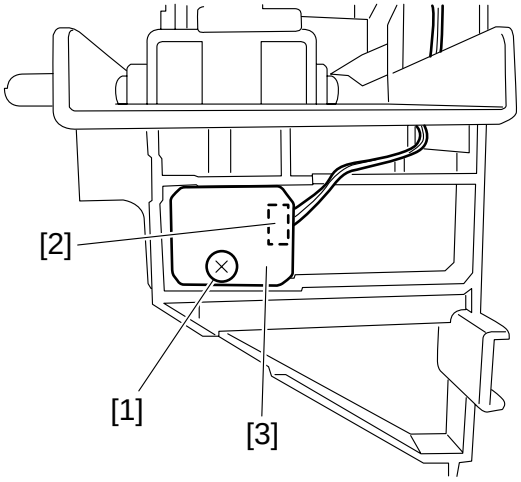
3) Disconnect the connector [3] to remove the waste-full photosensor PCB [4].



F03-202-08

2.2.5 Removing the Waste Full LED PCB

1) Remove the screw [1].
2) Disconnect the connector [2] to remove the waste-full LED PCB [3].



F03-202-09

CHAPTER 4

MAINTENANCE AND INSPECTION

1 Periodically Replaced Parts

1.1 Finisher/Saddle Unit

The unit does not have components that require periodical replacement.

1.2 Puncher Unit (option)

The unit does not have components that require periodical replacement.

2 Consumables and Durables

Some components of the machine may require replacement once or more over the period of machine warranty because of deterioration or damage. Replace them as needed.

2.1 Saddle/Finisher Unit

As of February, 2001

No.	Part name	Part No.	Q'ty	Expected life	Remarks
1	Stapler	4G1-4268-000	1	300,000 operations	A single cartridge is good for about 5000 operations.

T04-201-01

3 Scheduled Maintenance

As of February, 2001

Item	(optional puncher unit)		
Feeding assembly roller	Interval	Description	Remarks
Feeding assembly member	Minimum maintenance intervals of host machine	Cleaning	Wiping with water.
Paper path guide			
Transmission type sensor			
Dry wiping.			

T04-300-01

CHAPTER 5

TROUBLESHOOTING

1 Standards and Adjustments

1.1 Electrical System (finisher/saddle unit)

1.1.1 Adjusting the Folding Position

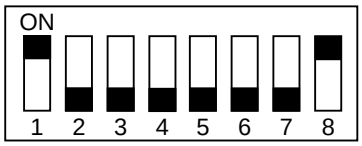
The folding position is adjusted by matching it with the stapling position.

If you have replaced the finisher controller PCB, you must transfer the existing settings to the new PCB. Perform the following if the folding position must be adjusted for some reason.

Both the folding and stapling positions may deviate for some type of paper. In such a case, change the “middle stapling position” in the user mode of the host machine.

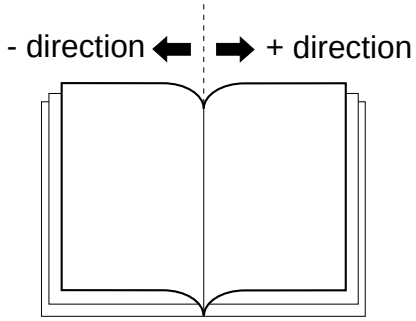
1) Set SW1 on the finisher controller PCB as follows:

F05-101-02



2) Adjust the folding position by pressing the PSW1 or PSW2 on the finisher controller PCB a required number of times. Pressing the switch once moves the folding position about 0.16 mm.

• To move the folding position in the "-" direction, press the PSW1.
• To move the folding position in the "+" direction, press the PSW2.
• Pressing the PSW1 and PSW2 at the same time clears the adjustment value.



F05-101-03

3) When adjustment of the folding position is complete, set all bits of the SW1 on the finisher controller PCB to OFF.
4) Enter the bind mode of the host machine and check whether the folding position is adjusted properly. If adjusted improperly, adjust the folding position again.

1.1.2 Adjusting the Middle 2-Point Stapling Position

The stapling position is adjusted by matching it with the folding position.

If you have replaced the finisher controller PCB, you must transfer the existing settings to the new PCB. Perform the following if the stapling position must be adjusted for some reason.

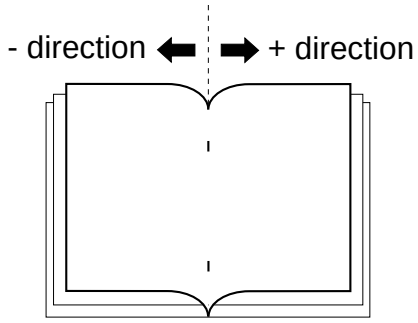
Both the folding and stapling positions may deviate for some type of paper. In such a case, change the “middle stapling position” in the user mode of the host machine.

1) Set SW1 on the finisher controller PCB as follows:

F05-101-04

2) Adjust the stapling position by pressing the PSW1 or PSW2 on the finisher controller PCB a required number of times. Pressing the switch once moves the stapling position about 0.14 mm.

• To move the stapling position in the “-” direction, press the PSW1.
• To move the stapling position in the “+” direction, press the PSW2.
• Pressing the PSW1 and PSW2 at the same time clears the adjustment value.



F05-101-05

3) When adjustment of the stapling position is complete, set all bits of the SW1 on the finisher controller PCB to OFF.
4) Enter the bind mode of the host machine and check whether the stapling position is adjusted properly. If adjusted improperly, adjust the stapling position again.

1.2 Electrical System (puncher unit; option)

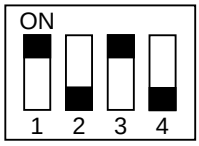
1.2.1 Adjusting the Punch Hole Position

This mode requires operation in service mode. The range of hole displacement is between 3 and -3 in 1-mm increments. A higher setting will move the hole toward the leading edge of sheet. (See the Service Manual of the host machine.)

1.2.2 Adjusting the Sensor Output

Perform the following when the punch controller PCB, horizontal registration sensor (photosensor PCB/LED PCB), or waste full sensor (waste full photosensor PCB/waste full LED PCB) has been replaced.

1) Shift bits 1 through 4 on the punch controller PCB as follows:



F05-102-01

2) Press SW1002 or SW1003 on the punch controller PCB. A press will automatically adjust the sensor output.

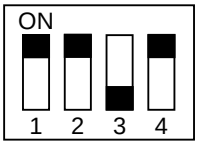
- The adjustment is over when all LEDs on the punch controller PCB are ON: LED1001, LED1002, LED1003.

3) Shift all bits of DIPSW1001 to OFF.

1.2.3 Registering the Number of Punch Hole

Perform the following to register the type of puncher unit (number of holes) used to the IC on the punch controller PCB for identification by the finisher. Be sure to register the type whenever you have replaced the punch controller PCB.

1) Set bits 1 through 4 on the DIPSW1001 on the punch controller PCB as follows:



F05-102-02

2) Press SW1002 on the punch controller PCB to select the appropriate number of punch holes.

- Each press on SW1002 moves the selection through the following (repeatedly from top to bottom).

Number of punch holes	LED1001	LED1002	LED1003
2 holes (Puncher Unit-J1)	ON	OFF	OFF
2/3 holes (Puncher Unit-K1)	ON	ON	OFF
4 holes (Puncher Unit-G1)	OFF	ON	OFF
4 holes (Puncher Unit-H1)	OFF	OFF	ON

T05-102-01

3) Press SW1003 on the punch controller PCB twice. The presses will store the selected number of punch holes on the punch controller PCB.

- A single press on SW1003 will cause the LED indication to flash; another press on SW1003 will cause the indication to remain ON to indicate the end of registration.

4) Shift all bits of DIPSW1001 to OFF.

1.2.4 After Replacing the EEP-ROM (IC1002)

1) Turn off the host machine.
2) Set bits 1 through 4 on the punch controller PCB as follows:

F05-102-03

3) Press SW1002 and SW1003 on the punch controller PCB at the same time.

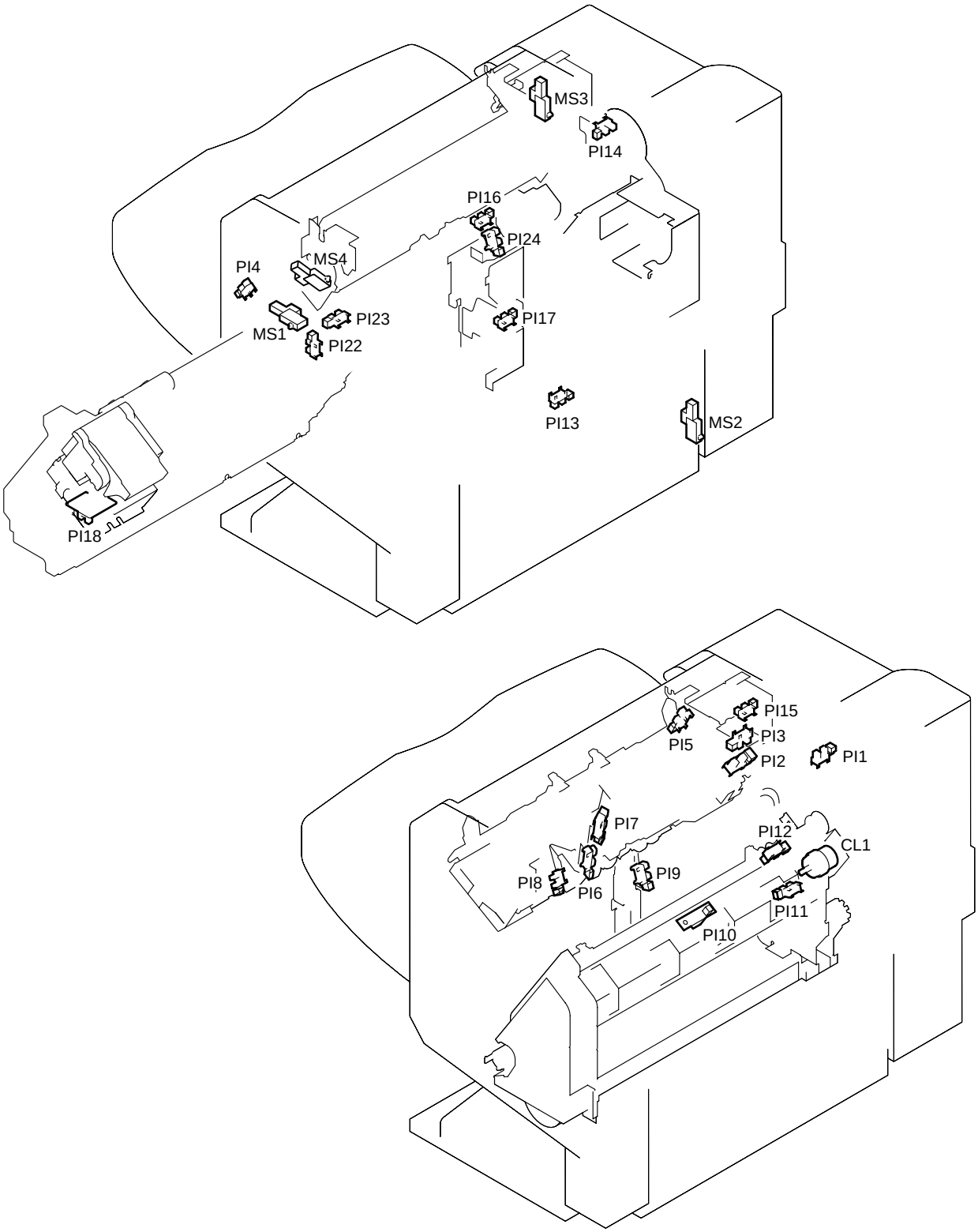
- The presses will initialize the EEP-ROM. At the end, all LEDs (LED1001, LED1002, LED1003) will go ON.

4) Adjust the sensor output, and store the number of punch holes.

2 Arrangement of Electric Components

2.1 Finisher/Saddle Unit

2.1.1 Sensors, Microswitches, and Clutch

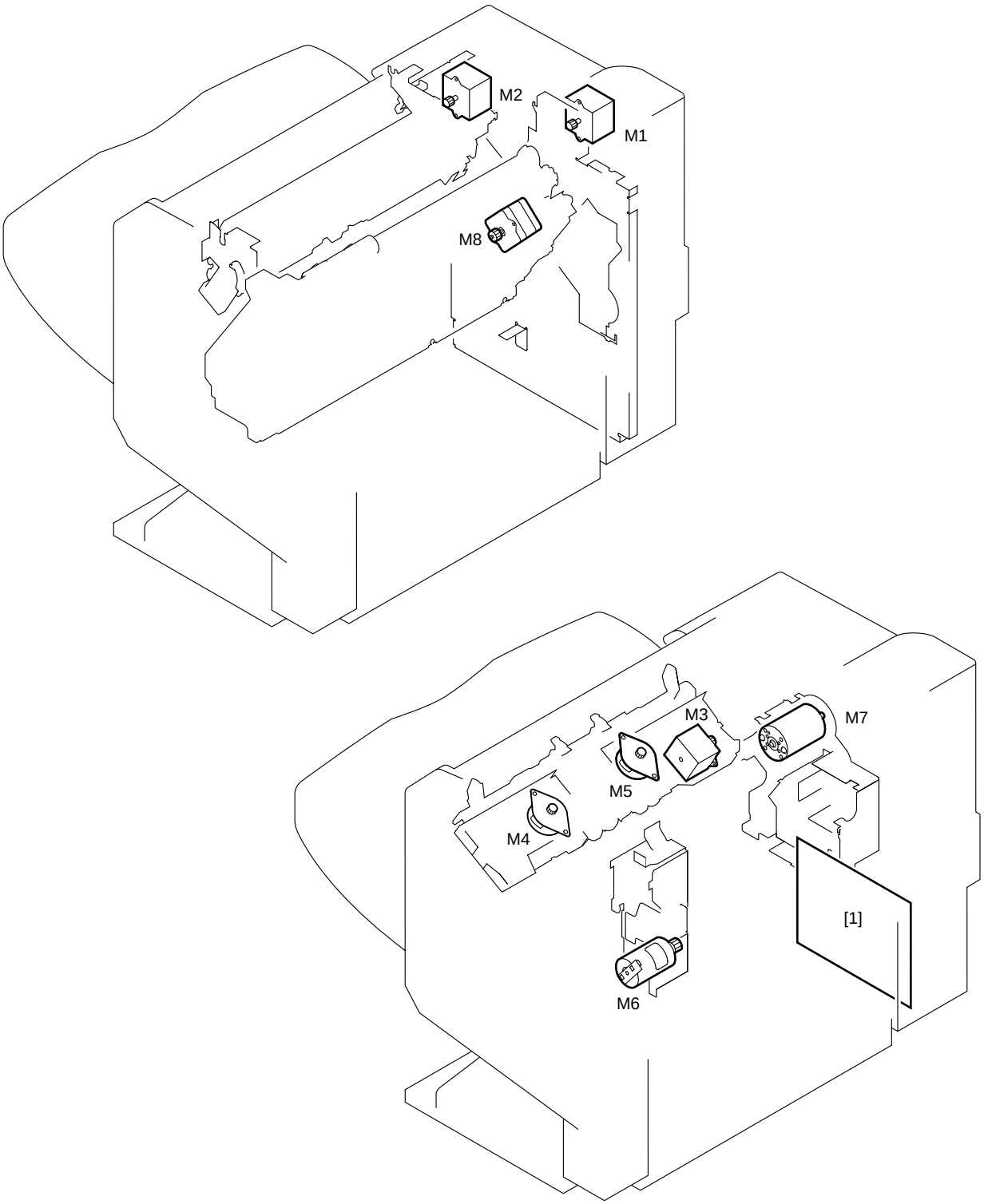


F05-201-01

Name	Notation	Description
Photointerrupters	PI1	Inlet paper detention
	PI2	Paddle home position detection
	PI3	Stack roller home position detection
	PI4	Aligning plate home position (front) detection
	PI5	Aligning plate home position (rear) detection
	PI6	Processing tray paper detection
	PI7	Delivery belt home position detection
	PI8	Tray paper detection
	PI9	Paper surface detection
	PI10	Folding position detection
	PI11	Folding home position detection
	PI12	Folding roller home position detection
	PI13	Bind tray paper detection
	PI14	Stapler/fold motor clock detection
	PI15	Shift upper limit detention
	PI16	Shift lower limit detection
	PI17	Shift motor clock detection
	PI18	Slide home position detection (inside stapler)
	PI19	Stapler drive home position detection (inside stapler)
	PI20	Staple detection (inside stapler)
	PI21	Staple top position detection (in stapler)
	PI22	Front door open detection
	PI23	Upper cover open detection
	PI24	Paper full detection
Micro switch	MS1	Front door open detection
	MS2	Joint open detection
	MS3	Staple safety detection
Clutch	CL1	Bind clutch

T05-201-01

2.1.2 Motor PCBs



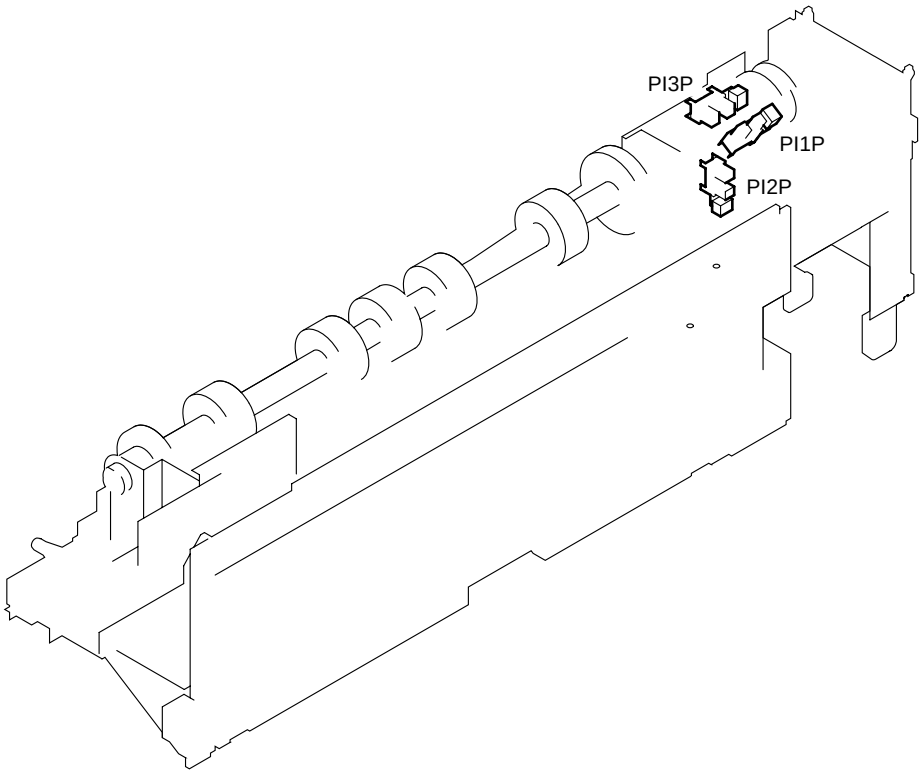
F05-201-02

Name	Notation	Description
Motor	M1	Feed motor
	M2	Paddle motor
	M3	Delivery motor
	M4	Alignment motor (front)
	M5	Alignment motor (rear)
	M6	Shift motor
	M7	Staple/fold motor
	M8	Slide motor
Finisher controller PCB	[1]	Finisher control

T05-201-02

2.2 Puncher Unit (option)

2.2.1 Sensors

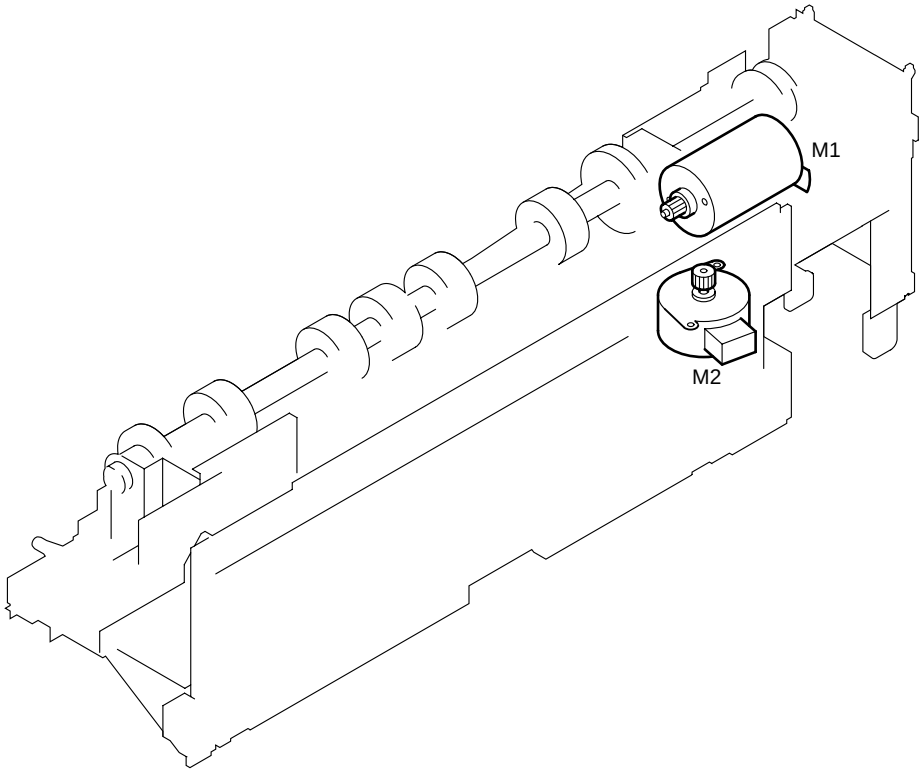


F05-202-01

Name	Notation	Description
Photointerrupters	PI1P	Puncher home position detection
	PI2P	Horizontal registration home position detection
	PI3P	Punch motor clock detection

T05-202-01

2.2.2 Motors

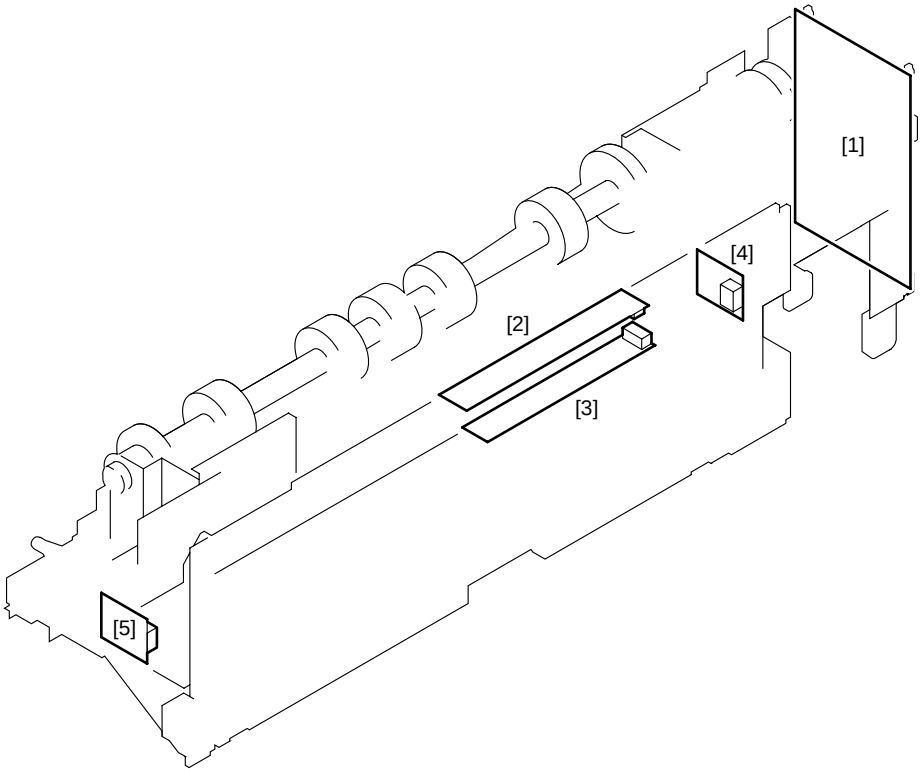


F05-202-02

Name	Notation	Description
Motor	M1P	Punch motor
	M2P	Horizontal registration motor

T05-202-02

2.2.3 PCBs



F05-202-03

Ref.	Name
[1]	Punch controller PCB
[2]	Photosensor PCB
[3]	LED PCB
[4]	Waste full photosensor PCB
[5]	Waste full LED PCB

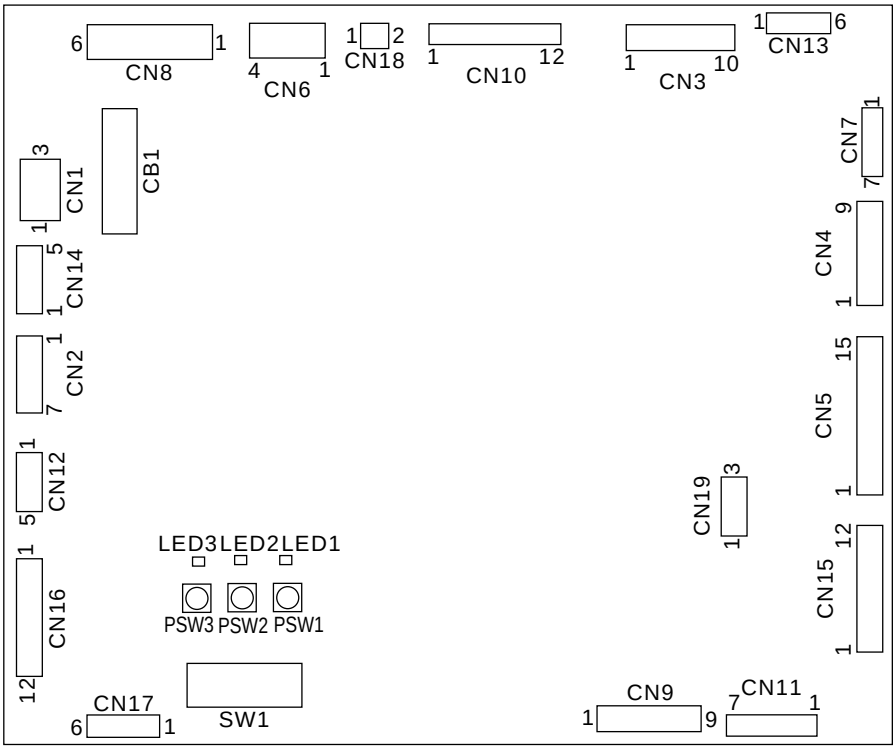
T05-202-03

3 LEDs and Check Pins by PCB

Of the LEDs and check pins used in the machine, those needed during servicing in the field are discussed.

Do not touch the check pins not found in the list herein. They are exclusively for factory use, and require special tools and a high degree of accuracy.

3.1 Finisher Controller PCB

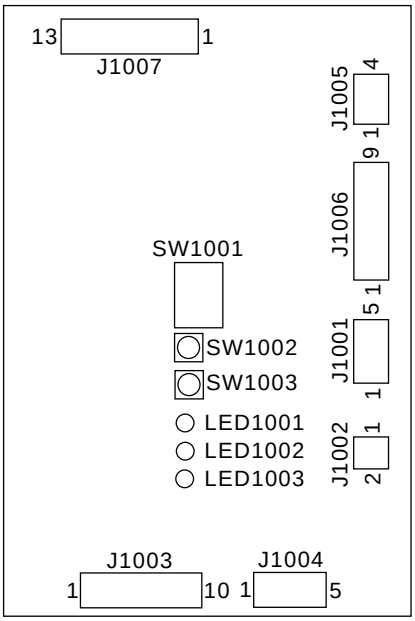


F05-301-01

Switch	Description
SW1	Folding position adjustment, middle 2-point stapling adjustment etc.
PSW1	folding position adjustment, middle 2-point stapling adjustment etc.
PSW2	folding position adjustment, middle 2-point stapling adjustment etc.
PSW3	factory mode

T05-301-01

3.2 Punch Controller PCB



F05-302-01

Switch	Description
SW1001	Punch hole count registration/sensor output adjustment etc.
SW1002	Punch hole count registration/sensor output adjustment etc.
SW1003	Punch hole count registration/sensor output adjustment etc.

T05-302-01

4 Troubleshooting

4.1 Troubleshooting (finisher/saddle unit)

4.1.1 C0440, communication error

Finisher controller PCB, Host machine DC controller PCB

1) Turn off and then on the host machine. Is the problem corrected?

YES: End.

Wiring

2) Is the wiring between the finisher controller PCB and the DC controller PCB of the host machine normal?

NO: Correct the wring.

Finisher controller PCB, Host machine DC controller PCB

3) Try replacing the finisher controller PCB and the host machine DC controller PCB. Is the problem corrected?

YES: End.

T05-401-01

4.1.2 C8390, Finisher Unit Back-Up Memory Fault (detail code: 01)

Finisher controller PCB

1) Turn off and then on the host machine. Is the problem corrected?

YES: End.

NO: Replace the finisher controller PCB.

T05-401-02

4.1.3 C8010, Feed Motor Fault (detail code: 01/02)

Stack feed roller (upper) home position sensor (PI12)

1) Check the stack feed roller (upper) home position sensor. Is it normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the feed motor normal?
   NO: Correct the wiring.

Feed roller

3) Try turning the stack feed roller (upper) shaft by hand. Does the stack feed roller (upper) move up/down normally?
   NO: Correct the mechanical system.

Feed motor (M1), Finisher controller PCB

4) Try replacing the feed motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-03

4.1.4 C8300, Delivery Motor Fault (detail code: 01/02)

Delivery belt home position sensor (PI7)

1) Check the delivery belt home position sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the delivery motor normal?
   NO: Correct the wiring.

Stack delivery roller

3) Try turning the stack delivery roller by hand. Is the rotation smooth?
   NO: Correct the mechanical system.

Delivery motor (M3), Finisher controller PCB

4) Try replacing the delivery motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-04

4.1.5 C8320, Alignment Motor (Rear) Fault (detail code: 01/02)

Aligning plate home position sensor (rear; PI5)

1) Check the aligning plate home position sensor (rear). Is the sensor normal?

NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the rear alignment motor (rear) normal?

NO: Correct the wiring.

Aligning plate (rear)

3) Is there mechanical trapping in the path of the aligning plate?

YES: Correct the mechanical mechanism.

Alignment motor (rear; M5), Finisher controller PCB

4) Try replacing the alignment motor (rear). Is the problem corrected?

YES: End.

NO: Replace the finisher controller PCB.

T05-401-05

4.1.6 C8340, Staple/fold Motor Fault (detail code: 01/02)

Wiring

1) Is the wiring between the finisher controller PCB and the staple/fold motor normal?

NO: Correct the wiring.

Stapler unit

2) Try turning the staple jam releasing dial. Is there mechanical trapping?

YES: Correct the mechanical system.

Staple/fold motor (M7), Finisher controller PCB

3) Try replacing the staple/fold motor. Is the problem corrected?

YES: End.

NO: Replace the finisher controller PCB.

T05-401-06

4.1.7 C8340, Staple/Fold Motor Fault (detail code: 03)

Staple/fold clock sensor (PI14)

1) Check the staple/fold clock sensor. Is the sensor normal?
   NO: Replace the sensor.

Finisher controller PCB, Stapler unit

2) Does the staple/fold motor operate at the appropriate timing?
   YES: Replace the finisher controller PCB.
   NO: Check the stapler unit drive mechanism: if faulty, correct it; if normal, go to step 3.

Staple/fold motor (M7), Finisher controller PCB

3) Try replacing the staple/fold motor. Is the problem corrected?
   YES: End.
   NO: Try replacing the finisher controller PCB.

T05-401-07

4.1.8 C8340, Staple/Fold Motor Fault (detail code: 01/02)

Folding home position sensor (PI11)

1) Check the folding home position sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the staple/fold motor normal?
   NO: Correct the wiring.

Saddle unit

3) Try turning the fold jam releasing dial. Is there mechanical trapping?
   YES: Correct the mechanical mechanism.

Staple/fold motor (M7), Finisher controller PCB

4) Try replacing the staple/fold motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-08

4.1.9 C8340, Staple/Fold Motor Fault (detail code: 03)

Staple/fold clock sensor (PI4)

1) Check the staple/fold clock sensor. Is the sensor normal?
   NO: Replace the sensor.

Finisher controller PCB, Saddle unit

2) Does the staple/fold motor operate at the appropriate timing?
   YES: Replace the finisher controller PCB.
   NO: Check the saddle unit drive mechanism: if faulty, correct it; otherwise, go to step 3.

Staple/fold motor (M7), Finisher controller PCB

3) Try replacing the staple/fold motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-09

4.1.10 C0360, Slide Motor Fault (detail code: 01/02)

Slide home position sensor (PI18)

1) Check the slide home position sensor. Is the sensor normal?
   NO: Replace the sensor PCB.

Wiring

2) Is the wiring between the finisher controller PCB and the slide motor normal?
   NO: Correct the wiring.

Stapler unit

3) Is there mechanical trapping in the stapler path?
   YES: Correct the mechanical system.

Slide motor (M8), Finisher controller PCB

4) Try replacing the slide motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-10

4.1.11 C8330, Alignment Motor (front) Fault (detail code: 01/02)

Aligning plate home position sensor (front; PI4)

1) Check the aligning plate home position sensor (front). Is the sensor normal?

NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the front alignment plate motor (front) normal?

NO: Correct the wiring.

Aligning plate (front)

3) Is there mechanical trapping in the aligning plate path?

YES: Correct the mechanical system.

Alignment motor (front; M4), Finisher controller PCB

4) Try replacing the Alignment motor (front). Is the problem corrected?

YES: End.

NO: Replace the finisher controller PCB.

T05-401-11

4.1.12 C8140, Shift Motor Fault (detail code: 01)

Paper surface sensor (PI9)

1) Check the paper surface sensor. Is the sensor normal?

NO: Replace the sensor.

Tray up/down mechanism

2) Check the tray up/down mechanism. Is the mechanism normal?

NO: Correct the mechanism.

Finisher controller PCB

3) Is 24 VDC supplied from the finisher controller PCB to the shift motor as soon as the tray is driven?

NO: Replace the finisher controller PCB.

Shift motor (M6), Wiring

4) Is the wiring between the finisher controller PCB and the shift motor normal?

YES: Replace the shift motor.

NO: Correct the wiring.

T05-401-12

4.1.13 C8140, Shift Motor Fault (detail code: 02)

Tray position

1) Is the tray as far as the shift upper limit sensor?
   YES: Lower the position of the tray.

Shift upper limit sensor (PI15)

2) Check the shift upper limit sensor. Is the sensor normal?
   NO: Replace the sensor.

Finisher controller PCB, Wiring

3) Check the wiring from the finisher controller PCB to the shift upper limit sensor; is it normal?
   YES: Replace the finisher controller PCB.
   NO: Correct the wiring.

T05-401-13

4.1.14 C8140, Shift Motor Fault (detail code: 03)

1) Is the tray in UP position?
   YES: Go to step 4.
   NO: Go to step 2.

Finisher controller PCB

2) Is power supplied to the finisher controller PCB as soon as the tray is driven?
   YES: Go to step 3.
   NO: Replace the finisher controller PCB.

Tray up/down mechanism, Shift motor (M6)

3) Is there a fault in the tray up/down mechanism?
   YES: Correct the tray up/down mechanism.
   NO: Replace the shift motor.

Shift motor clock (PI17), Finisher controller PCB

4) Check the shift motor clock sensor.
   YES: Replace the finisher controller PCB.
   NO: Replace the sensor.

T05-401-14

4.1.15 C8370, Paddle Motor Fault (detail code: 01/02/03/04)

Paddle home position sensor (PI2)

1) Check the paddle home position sensor. Is the sensor normal?
   NO: Replace the sensor

Swing guide home position sensor (PI3)

2) Check the swing guide home position sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

3) Is the wiring between the finisher controller PCB and the paddle motor normal?
   NO: Correct the wiring.

Paddle, Swing guide assembly

4) Try turning the paddle motor clockwise and counterclockwise by hands. Is there mechanical tapping in the rotation of the paddle or the up/down movement of the swing guide?
   YES: Correct the mechanical mechanism.

Paddle motor (M2), finisher controller PCB

5) Try replacing the paddle motor. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-401-16

4.2 Troubleshooting (puncher unit, option)

4.2.1 C8430, Communication Faulty

Finisher controller PCB, Punch controller PCB

1) Turn off and the on the host machine. Is the problem corrected?
   YES: End.

Wiring

2) Is the wiring between the finisher controller PCB and the punch controller PCB normal?
   NO: Correct the wiring.

Power supply

3) Measure the voltage between CN14-5 (+) and CN14-3 (-) on the finisher controller PCB. Is it 24 VDC?
   NO: Replace the finisher controller PCB.
   YES: Replace the punch controller PCB.

T05-402-01

4.2.2 C8460, Puncher Back-UP Memory Fault (detail code: 20)

EEP-ROM (IC1002)

1) Is the problem corrected by initializing the EEP-ROM on the punch controller PCB?
   YES: End.

Punch controller PCB

2) Turn off and the on the host machine. Is the problem corrected?
   YES: End.
   NO: Replace the punch controller PCB.

T05-402-02

4.2.3 C8480, Puncher Unit Power Supply Fault (detail code:20)

Finisher controller PCB, Host machine DC controller PCB

1) Turn off and then off the host machine. Is the problem corrected?
   YES: End.

Wiring

2) Is the wiring between the finisher controller PCB and the punch controller PCB normal?
   NO: Correct the wiring.

Power supply

3) Measure the voltage between CN14-5 (+) and CN4-3 (-) on the finisher controller PCB. Is it 24 VDC?
   YES: Replace the punch controller PCB.
   NO: Replace the finisher controller PCB.

T05-402-03

4.2.4 C8410, Punch Motor Fault (detail code: 01/02)

Punch motor home position sensor (PI1P)

1) Check the punch home position sensor. Is the sensor normal?
   NO: Replace the sensor.

Punch motor clock sensor (PI3P)

2) Check the punch motor clock sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

3) Is the wiring between the finisher controller PCB and the sensor normal?
   NO: Correct the wiring.

Punch mechanism, Punch motor (M1P)

4) Is there a fault in the punch mechanism?
   YES: Correct the punch mechanism.
   NO: Replace the punch motor.

Punch controller PCB, Finisher controller PCB

5) Try replacing the punch controller PCB. Is the problem corrected?
   YES: End.
   NO: Replace the fisher controller PCB.

T05-402-04

4.2.5 C8450, Punch Sensor (horizontal registration) Fault (detail code: 01 through 05)

Horizontal registration sensor (photosensor PCB/LED PCB)

1) Check the horizontal registration sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the punch controller PCB and the horizontal registration sensor normal?
   NO: Correct the wiring.

Punch controller PCB, Finisher controller PCB

3) Try replacing the punch controller PCB. Is the problem correct?
   YES: End.
   NO: Replace the finisher controller PCB.

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4.2.6 C8470, Punch sensor (waste full) Fault (detail code: 06)

Waste full Sensor (waste full photosensor PCB/waste full LED PCB)

1) Check the waste full sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the punch controller PCB and the waste full sensor normal?
   NO: Correct the wiring.

Punch controller PCB, Finisher controller PCB

3) Try replacing the punch controller PCB. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-402-06

4.2.7 C8420, Horizontal Registration Motor Fault (detail code: 01/02)

Horizontal registration home position sensor (PI2P)

1) Check the horizontal registration home position sensor. Is the sensor normal?
   NO: Replace the sensor.

Wiring

2) Is the wiring between the finisher controller PCB and the horizontal registration home position sensor normal?
   NO: Correct the wiring.

Horizontal registration mechanism, horizontal registration motor (M2P)

3) Is there a fault in the horizontal registration mechanism?
   YES: Correct the horizontal registration mechanism.
   NO: Replace the horizontal registration motor.

Punch controller PCB, Finisher controller PCB

4) Try replacing the punch controller PCB. Is the problem corrected?
   YES: End.
   NO: Replace the finisher controller PCB.

T05-402-07

5 Self Diagnosis

5.1 Outline

The CPU on the machine's finisher controller PCB is equipped with a mechanism to check the machine condition as needed; when it detects a fault, the machine communicates the fact to the host machine in the form of a code and a detail code.

The host machine indicates the code on its control panel. (The detail code may be checked in the host machine's service mode.)

5.2 Errors

5.2.1 Finisher/Saddle Unit

Code	Detail	Error	Timing of detection
C0440	—	• Data communication error	• The communication between the host machine and the finisher is interrupted. This error is detected by the host machine.
C8390	01	• Back-up memory	• The checksum for the finisher controller PCB has an error when the power is turned on.
C8010	01	• Feed motor (M1) • Stack feed roller (upper) home position sensor (PI12)	• The stack feed roller (upper) does not leave the stack feed roller (upper) home position sensor when the feed motor has been driven for 2 sec.
	02		• The stack feed roller (upper) does not return to the stack feed roller (upper) home position sensor when the feed motor has been driven for 2 sec.
C8300	01	• Delivery motor (M3) • Delivery belt home position sensor (PI7)	• The delivery belt does not leave the delivery belt home position sensor when the stack delivery motor has been driven for 3 sec.
	02		• The delivery belt does not return to the delivery belt home position sensor when the stack delivery motor has been driven for 3 sec.
C8320	01	• Alignment motor (rear; M5) • Aligning plate home position sensor (rear; PI5)	• The aligning plate (rear) does not leave the aligning plate home position sensor (rear) when the alignment motor has been driven for 3 sec.
	02		• The aligning plate (rear) does not return to the aligning plate home position sensor (rear) when the alignment motor (rear) has been driven for 3 sec.

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Code	Detail	Error	Timing of detection
C8340	01	• Staple/fold motor (M7) • Staple home position sensor (PI19)	• The stapler does not leave the staple home position sensor when the staple/fold motor has been driven for 0.6 sec.
	02		• The stapler does not return o the staple home position sensor when the staple/fold motor has been driven for 0.6 sec.
	03	• Staple/fold motor (M7) • Staple/fold clock sensor (PI14)	• No clock is detected for 0.1 sec or more while the staple/fold motor is in operation.
C8340	01	• Staple/fold motor (M7) • Folding home position sensor (PI11)	• The folding roller does not leave the folding home position sensor when the staple/fold motor has been driven for 0.6 sec.
	02		• The folding roller does not return to the folding home position sensor when the staple/fold motor has been driven for 19 sec.
	03	• Staple/fold motor (M7) • Staple/fold motor clock sensor (PI14)	• No clock is detected for 1 sec or more while the staple/fold motor is in operation.
C8360	01	• Slide motor (M8) • Slide home position sensor (PI18)	• The stapler unit does not leave the slide home position sensor when the slide motor has been driven for 1 sec.
	02		• The stapler unit does not return to the slide home position when the slide motor has been driven for 6 msec.
C8330	01	• Alignment motor (front; M4) • Aligning plate home position sensor (front; PI4)	• The aligning plate (front) does not leave the aligning plate home position sensor (front) when the alignment motor (front) has been driven for 3 sec.
	02		• The aligning plate (front) does not return to the aligning plate home position sensor (front) when the alignment motor (front) has been driven for 3 sec.
C8140	01	• Shift motor (M6) • Paper surface sensor (PI9)	• The state of the paper surface sensor does not change when the shift motor has been driven for 10 sec or more.

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Code	Detail	Error	Timing of detection
C8140	02	• Shift upper sensor (PI15)	• The shift upper sensor has gone ON while the tray is moving up.
	03	• Shift motor (M6) • Shift motor clock sensor (PI17)	• No clock is detected for 50 msec or more from the shift motor clock sensor when the shift motor has been driven.
8370	01	• Paddle motor (M2) • Paddle home position sensor (PI2)	• The paddle does not leave the paddle home position sensor when the paddle motor has been driven for 2 sec.
	02	• Swing guide home position sensor (PI3)	• The paddle does not return to the paddle home position sensor when the paddle motor has been driven for 2 sec.
	03		• The swing guide does not leave the swing guide home position sensor when the paddle motor has been driven for 2 sec.
	04		• The swing guide does not return to the swing guide home position sensor when the paddle motor has been driven for 2 sec.

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5.2.2 Puncher Unit (option)

Code	Detail	Error	Timing of detection
C8430	FF	• Communication error	• The communication with the puncher unit is disrupted.
C8460	20	• Back-up memory	• The checksum for the puncher controller PCB has an error when the power is turned on.
C8480	20	• Power supply error	• A Start signal has been received although 24 VDC is not supplied from the finisher.
C8410	01	• Punch motor (M1P) • Punch motor home position sensor (PI1P)	• The puncher does not return to the punch motor home position sensor when the punch motor has been driven for 250 msec.
	02	• Punch motor (M1P) • Punch motor clock sensor (PI3P)	• No clock is detected from the punch motor clock sensor for 60 msec when the punch motor has been driven.
C8450	01 02 03 04 05	• Horizontal registration sensor	• The light-receiving voltage is 2.5 V or less when the light-emitting voltage is set to 4.4 V while sensor output auto adjustment is under way. • The light-receiving voltage is 2.5 V or more when the light-emitting voltage is set to 0 while sensor output auto adjustment is under way. • The light-emitting voltage is set to 4.4 V or more after sensor output auto adjustment.
C8470	01	• Waste full sensor	• The light-receiving voltage is 2.5 V or less when the light-emitting voltage is set to 4.4 V while sensor output auto adjustment is under way. • The light-receiving voltage is 2.5 V or more when the light-emitting voltage is set to 0 V while sensor output auto adjustment is under way. • The light-emitting voltage is 4.4 V or more after sensor output auto adjustment.
C8420	01	• Horizontal registration motor (M2P) • Horizontal registration home position sensor (PI2P)	• The puncher does not leave the horizontal registration home position sensor when the horizontal registration motor has been driven for 1000msec.
	02		• The puncher does not return to the horizontal registration home position sensor when the horizontal registration motor has been driven for 1000 msec.

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5.3 Alarm

5.3.1 Finisher/Saddle Unit

Error	Condition	Timing of detection	Operation	Resetting
Staple absent	The staple cartridge has run out of staples.	Monitoring at all times	Normal operation will continue; however, operation is subject to instructions from the host machine.	Replace the staple cartridge; or, set it correctly.
Stack tray overstacking	The number of sheets deposited on the delivery tray has exceeded the limit imposed on the tray (sheets,sets).	When an extra sheet is placed.	Normal operation will continue.	Remove the sheets from the delivery tray.
Saddle overstacking	Remove the stack from the bind tray.More than 10 stacks are deposited on the folded stack tray.	When an extra sheet is placed.	Normal operation will continue.	Remove the stack from the bind tray.

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5.3.2 Puncher Unit (option)

Error	Condition	Timing of detection	Operation	Resetting
Waste case full	The amount of waste paper in the waste case has reached the limit.	During punching.	Normal operation will continue.	Remove the waste paper from the waste case.
Excess water	The amount of waste paper in the waste case has exceeded the limit.	During punching.	Punching will be disabled.	Remove the waste paper from the water case.

T05-503-02

5.4 Host Machine I/O Display

5.4.1 Finisher/Saddle Unit

Address	bit	Indication	Signal	Connector	Remarks
P001 (output)	bit0	Alignment motor (front) phase A output	FJOGMTR_A	CN3-2	L: ON
	bit1	Alignment motor (front) phase B output	FJOGMTR_B	CN3-4	L: ON
	bit2	Slide motor phase A output	SLIDMTR_A	CN7-3	L: ON
	bit3	Slide motor phase B output	SLIDMTR_B	CN7-5	L: ON
	bit4	Delivery motor phase A output	EJCTMTR_A	CN13-3	L: ON
	bit5	Delivery motor phase A* output	EJCTMTR_*A	CN13-4	H: ON
	bit6	Delivery motor phase B output	EJCTMTR_B	CN13-5	L: ON
	bit7	Delivery motor phase B* output	EJCTMTR_*B	CN13-6	H: ON
P002 (output)	bit0	Paddle motor phase A output	PDLMTR_A	CN10-9	L: ON
	bit1	Paddle motor phase A* output	PDLMTR_*A	CN10-10	H: ON
	bit2	Paddle motor phase B output	PDLMTR_B	CN10-11	L: ON
	bit3	Paddle motor phase B* output	PDLMTR_*B	CN10-12	H: ON
	bit4	Shift motor up drive output	SIFTMTR_UP	—	
	bit5	Shift motor down drive output	SIFTMTR_DN	—	
	bit6	Staple/fold motor PWM	BINDMTR_PWM	—	L:ON
	bit7	Staple/fold clock sensor (input)	BIND_CLK	CN9-5	
P003	bit0	Puncher unit transmission signal (output)	PNCH_TXD	—	
	bit1	TDX (output)	TXD2	—	
	bit2	Puncher unit reception signal (input)	PNCH_RXD	—	
	bit3	RXD (input)	RXD2	—	
	bit4	Full stack intermediate sensor (full detection: input)	STACK_FULL_S	—	H:FULL
	bit5	Bind clutch (output)	SDL_CL	—	H:ON
	bit6	—	—	—	
	bit7	—	—	—	
P004 (input)	bit0	—	—	—	
	bit1	Push switch 1, 2	PSW_1_2	—	
	bit2	DIP switch 7, 8	DIPSW7,8	—	
	bit3	DIP switch 5, 6	DIPSW5,6	—	
	bit4	DIP switch 3,4	DIPSW3,4	—	
	bit5	DIP switch 1, 2	DIPSW1,2	—	
	bit6	Folding position sensor (emitted light quantity)(output)	BIND_POS_DA	—	
	bit7	Folding position sensor (analog)	BIND_POS_AD	—	

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Address	bit	Indication	Signal	Connector	Remarks
P005 (output)	bit0	EEPROM chip select	EEPROM_CS	—	H: select
	bit1	EEPROM/DA clock output (used in common)	EEPROM_DA_CK	—	
	bit2	EEPROM/DA data output (used in common)	EEPROM_DA_DO	—	
	bit3	DA load signal output	DA_LD	—	H: load
	bit4	—	—	—	
	bit5	—	—	—	
	bit6	—	—	—	
	bit7	—	—	—	
P006 (input)	bit0	Staple top position sensor	SELF_PRIME	CN11-6	H: READY
	bit1	Staple empty sensor	HOOK_S	CN11-5	H: staple absent
	bit2	Alignment motor (rear) phase A (output)	RJOGMTR_A	CN3-7	L: ON
	bit3	Alignment motor (rear) phase B (output)	RJOGMTR_B	CN3-9	L: ON
	bit4	Staple home position sensor	STPL_HP	CN11-4	L: HP
	bit5	Slide home position sensor	SLID_HP	CN11-3	L: HP
	bit6	Delivery belt home position sensor	EJCT_BLT_HP	CN5-6	H: HP
	bit7	REQ	REQ2	—	
P007 (input)	bit0	—	—	—	
	bit1	—	—	—	
	bit2	—	—	—	
	bit3	—	—	—	
	bit4	—	—	—	
	bit5	Folding position sensor	BIND_POS	CN16-2	H: paper present
	bit6	Shift motor clock sensor	SIFT_CLK	CN15-6	
	bit7	Punch home position sensor	PNCH_TIM_S	CN12-5	L: paper present
P008 (output)	bit0	Feed motor phase A output	FEEDMTR_A	CN10-3	L: ON
	bit1	Feed motor phase A* output	FEEDMTR_*A	CN10-4	H: ON
	bit2	Feed motor phase B output	FEEDMTR_B	CN10-5	L: ON
	bit3	Feed motor phase B* output	FEEDMTR_*B	CN10-6	H: ON
	bit4	Slide/alignment motor current cutting	—	—	
	bit5	—	—	—	
	bit6	—	—	—	
	bit7	Tray paper sensor (input)	TRAY_EMPS	CN5-9	H: paper present
P009 (output)	bit0	Staple/fold motor (CW)	STPLMTR_FWD	—	
	bit1	Staple/fold motor (CCW)	STPLMTR_REV	—	
	bit2	Shift motor enable signal	SIFTMTR_EN	—	
	bit3	—	—	—	
	bit4	—	—	—	
	bit5	—	—	—	
	bit6	—	—	—	
	bit7	—	—	—	

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Address	bit	Indication	Signal	Connector	Remarks
P010 (input)	bit0	Paper surface sensor (input)	LVL_S	CN5-12	H: paper detected
	bit1	Aligning plate home position sensor (front; input)	FJOG_HP	CN9-3	L: HP
	bit2	EEPROM data input	EEPROM_DI	—	
	bit3	—	—	—	
	bit4	—	—	—	
	bit5	—	—	—	
	bit6	—	—	—	
	bit7	—	—	—	
P011 (input)	bit0	Shift lower limit sensor	SIFT_DNLMT	CN15-9	H: LMT
	bit1	Shift upper limit sensor	SIFT_UPLMT	CN15-12	H: LMT
	bit2	Power supply monitor	PWR_S	—	L: ON
	bit3	Alignment tray paper sensor	ADJ_TRAY_S	CN5-3	H: paper present
	bit4	Push switch P3	PUSH_SW3	—	L: ON
	bit5	Stapler safety switch	STPLSAFE_SW	CN8-1	H: open
	bit6	Front door switch	FDOOR_SW	CN8-3	H: open
	bit7	Joint switch	JOINT_SW	CN8-5	H: open
P012 (input)	bit0	Upper cover sensor	TOPCOV_S	CN4-6	H: open
	bit1	Front door sensor	FDOOR_S	CN4-9	H: open
	bit2	Aligning plate home position sensor (rear)	RJOG_HP	CN5-15	L: HP
	bit3	Swing guide home position sensor	BDL_ROL_HP	CN9-9	L: HP
	bit4	Paddle home position sensor	PDL_HP	CN9-3	L: HP
	bit5	Inlet sensor	ENT_S	CN16-12	L: paper present
	bit6	Folding home position sensor	BIND_HP	CN16-6	H: HP
	bit7	Stapler connection signal	STPL_CNCT	CN11-1	H: connected
P013 (output)	bit0	Stack feed roller (upper) home position sensor	BIND_ROL_HO	CN16-9	L: HP
	bit1	Puncher connection signal (input)	PNCH_CNCT	—	L: connected
	bit2	Binding tray sensor (input)	BIND_EMPS	CN15-3	H: paper present
	bit3	Power save switch (input)	PWR_DN	—	H: power save
	bit4	LED1	LED1	—	L: ON
	bit5	LED2	LED2	—	L: ON
	bit6	LED3	LED3	—	L: ON
	bit7	ACK	ACK2	—	H: paper present

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Address	bit	Indication	Signal	Connec-	Remarks
P014	bit0	DIPSW1 bit1	—	tor	L: ON
(input)	bit1	DIPSW1 bit2	—	—	L: ON
	bit2	DIPSW1 bit3	—	—	L: ON
	bit3	DIPSW1 bit4	—	—	L: ON
	bit4	DIPSW1 bit5	—	—	L: ON
	bit5	DIPSW1 bit6	—	—	L: ON
	bit6	DIPSW1 bit7	—	—	L: ON
	bit7	DIPSW1 bit8	—	—	L: ON
P015	bit0	PUSHSW1	—	—	L: ON
(input)	bit1	PUSHSW2	—	—	L: ON
	bit2	PUSHSW3	—	—	L: ON
	bit3	—	—	—	
	bit4	—	—	—	
	bit5	—	—	—	
	bit6	—	—	—	
	bit7	—		—	
P023 (analog port)	—	Folding position sensor (analog)	BIND_POS_AD	—	
P024 (analog port)	—			—	
P025 (analog port)	—	Push switch 1, 2	PSW_1_2	—	
P026 (analog port)	—	DIP switch 7, 8	DIPSW7,8	—	
P027 (analog port)	—	DIP switch 5, 6	DIPSW5,6	—	
P028 (analog port)	—	DIP switch 3, 4	DIPSW3,4	—	
P029 (analog port)	—	DIP switch 1, 2	DIPSW1,2	—	
P030 (analog port)	—	Folding position sensor (emitted light quantity)(output)	BIND_POS_DA	—	

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5.4.2 Puncher Unit (option)

Address	bit	Indication	Signal	Connector	Remarks
P016 (output)	bit0	Ladder circuit 1st bit	—	—	
	bit1	Ladder circuit 2nd bit	—	—	
	bit2	Ladder circuit 3rd bit	—	—	
	bit3	Ladder circuit 4th bit	—	—	
	bit4	Ladder circuit 5th bit	—	—	
	bit5	Ladder circuit 6th bit	—	—	
	bit6	Ladder circuit 7th bit	—	—	
	bit7	Ladder circuit 8th bit	—	—	
P017 (input)	bit0	Punch home position sensor	PUNCH	J1006-6	L: HP
	bit1	Horizontal registration home position sensor	SLIDE	J1006-3	H: HP
	bit2	—	—	—	
	bit3	—	—	—	
	bit4	DIPSW1001 bit1	—	—	L: ON
	bit5	DIPSW1001 bit2	—	—	L: ON
	bit6	DIPSW1001 bit3	—	—	L: ON
	bit7	DIPSW1001 bit4	—	—	L: ON
P018 (input)	bit0	Push SW1	—	—	L: ON
	bit1	Push SW2	—	—	L: ON
	bit2	—	—	—	
	bit3	—	—	—	
	bit4	Power supply detection	—	—	H: power drop
	bit5	LED1 (output)	—	—	
	bit6	LED2 (output)	—	—	
	bit7	LED3 (output)	—	—	
P019 (output)	bit0	Horizontal registration sensor light intensity adjustment	—	—	level up: intensity
	bit1	Registration sensor light intensity adjustment	—	—	up level up:
	bit2	—			intensity
	bit3	—	—	—	up
	bit4	EEPROM D0 (input)	—	—	
	bit5	EEPROM DI	—	—	
	bit6	EEPROM CLK	—	—	
	bit7	EEPROM CS	—	—	

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Address	bit	Indication	Signal	Connector	Remarks
P020 (input)	bit0	—	—	—	
	bit1	—	—	—	
	bit2	Registration interrupt (horizontal registration)	—	—	H: light blocked
	bit3	REQ	—	—	
	bit4	HFS communication RXD	—	—	
	bit5	HFS communication TXD (output)	—	—	
	bit6	—	—	—	
	bit7	ACK (output)	—	—	
P021 (output)	bit0	Horizontal registration motor current setting	—	—	
	bit1	Horizontal registration motor current setting	—	—	
	bit2	Horizontal registration motor phase B output	—	J1001-2	
	bit3	Horizontal registration motor phase A output	—	J1001-1	
	bit4	Punch motor REV	—	—	
	bit5	Punch motor FWD	—	—	
	bit6	Punch motor PWM	—	—	
	bit7	Punch motor encoder (input)	CLOCK	J1006-9	L: light blocked
P022 (input)	bit0	—	—	—	
	bit1	—	—	—	
	bit2	DUST sensor	—	—	H: full
	bit3	Registering sensor 5 (horizontal registration)	—	—	
	bit4	Registration sensor 4 (B5R)	—	—	
	bit5	Registration sensor 3 (A4R)	—	—	
	bit6	Registration sensor 2 (B4)	—	—	
	bit7	Registration sensor 1 (A4)	—	—	
P031 (analogport)	—	DUST sensor	—	—	H: full
P032 (analogport)	—	Registration sensor 5 (horizontal registration)	—	—	
P033 (analogport)	—	Registration sensor 4 (B5R)	—	—	
P034 (analogport)	—	Registration sensor 3 (A4R)	—	—	
P035 (analogport)	—	Registration sensor 2 (B4)	—	—	
P036 (analogport)	—	Registration sensor 1 (A4)	—	—	
P037 (analogport)	—	Horizontal registration sensor light intensity adjustment	—	—	level up: intensity up
P038 (analogport)	—	Registration sensor light intensity adjustment	—	—	level up: intensity up

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APPENDIX

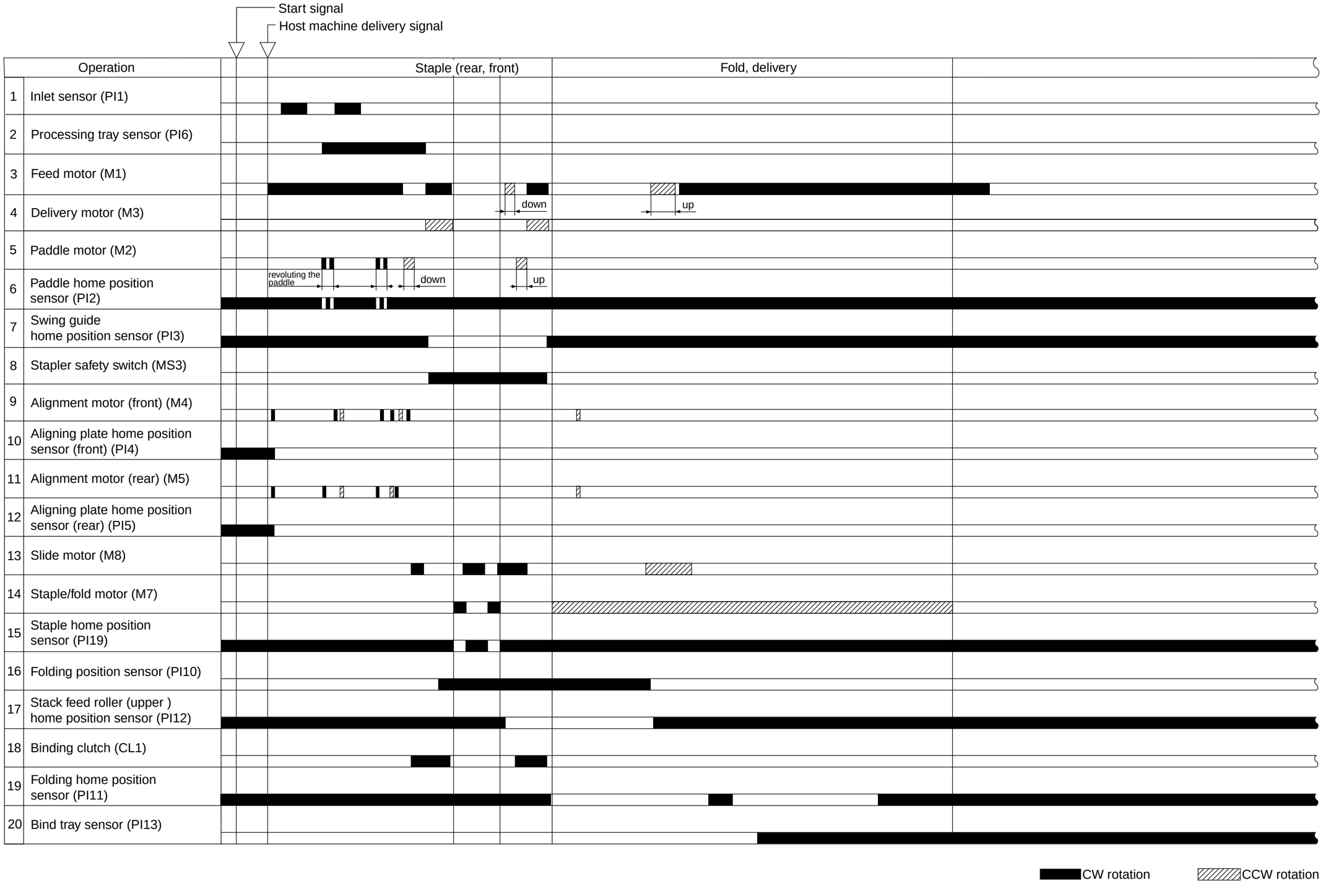
1 General Timing Chart

1.1 Finisher Unit

Stapling: A4 size paper, 2-sheet document, rear 1-point stapling

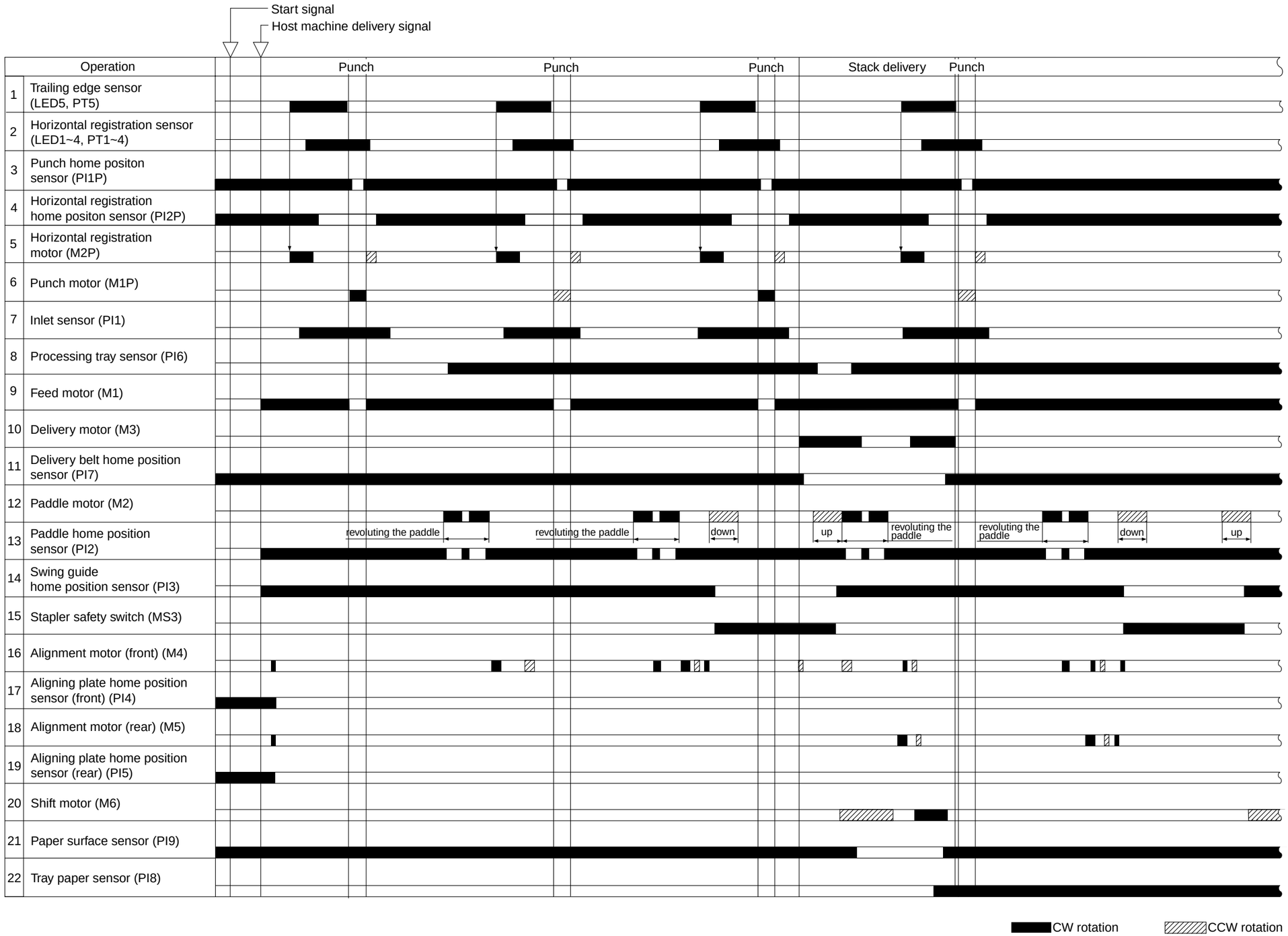
1.2 Saddle Unit

Binding: LTR-size paper, a copy of 2-sheet document



1.3 Puncher Unit (option)

Punching: A4size paper, 2-sheet document, job offset, 2set



2 Signals and Abbreviations

The following presents the abbreviations of signals used in this manual and in drawings, and the meaning of each signal.

Reference: Signals enclosed by brackets [ ] are electrical signals, However, the state “1” or “0” of these analog signals cannot be indicated. Otherwise, the state of digital signals “1” or “0” can be indicated.

2.1 Finisher Saddle Unit

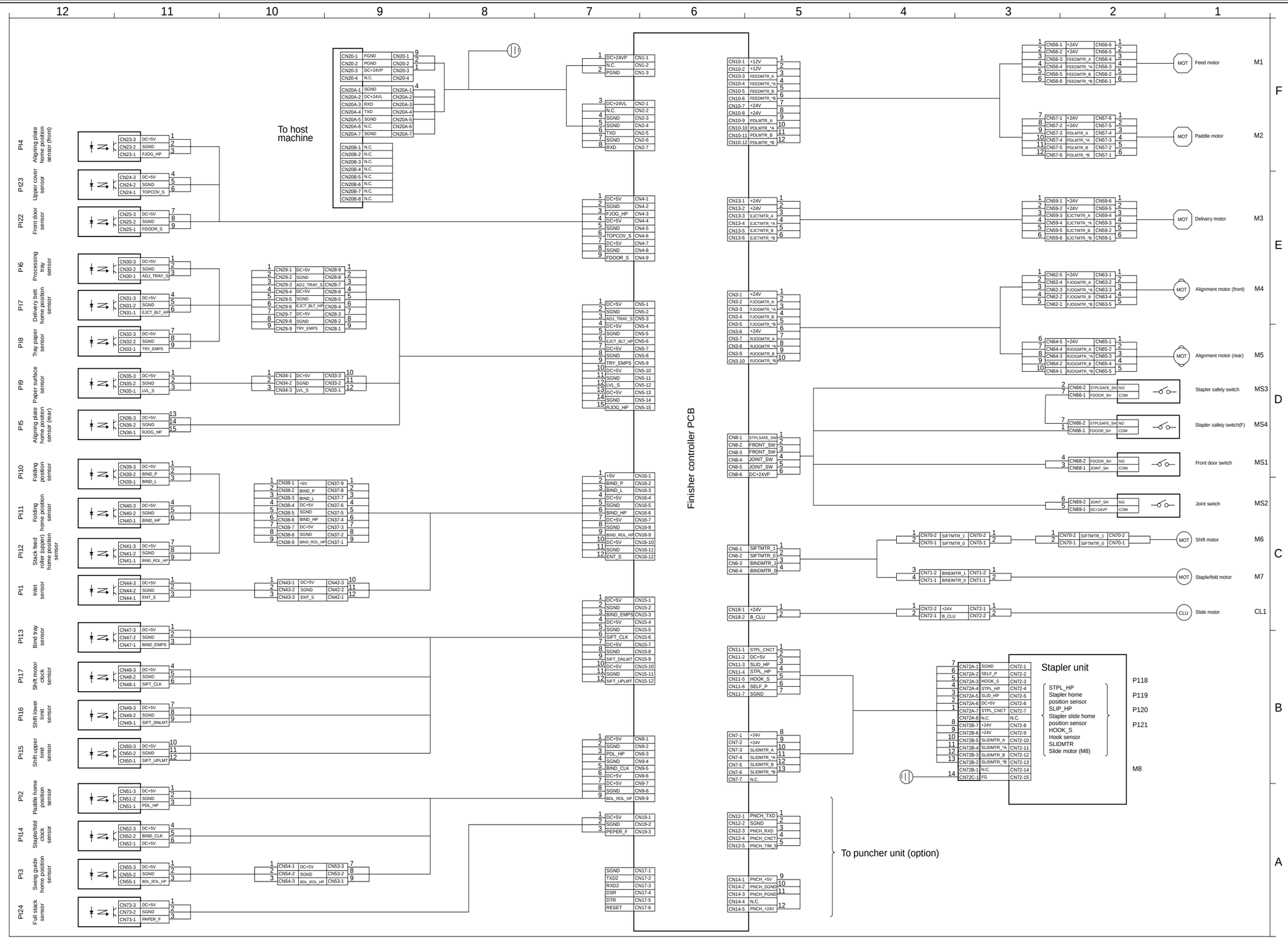
ADJ_TRAY_S	JOG TRAY PAPER DETECT Signal
B_CLU	BIND CLUTCH DRIVE Signal
BDL_ROL_HP	SWING GUIDE HP DETECT Signal
BIND_CLK	STAPLE/FOLD MOTOR CLOCK DETECT Signal
BIND_EMPS	BIND TRAY PAPER DETECT Signal
BIND_HP	FOLDING HP DETECT Signal
BIND_L	FOLD POSITION LED ON Signal
BINDMTR	STAPLE/FOLD MOTOR DRIVE Signal
BIND_P	FOLD POSITION PAPER DETECT Signal
BIND_ROL_HP	BUNDLE FEED ROLLER HP DETECT Signal
EJCT_BLT_HP	EJECT BELT HP DETECT Signal
EJCTMTR	EJECT MOTOR DRIVE Signal
ENT_S	INLET PAPER DETECT Signal
FDOOR_S	FRONT DOOR OPEN DETECT Signal
FEEDMTR	FEED MOTOR DRIVE Signal
FJOG_HP	FRONT JOG PLATE HP DETECT Signal
FJOGMTR	FRONT JOG MOTOR DRIVE Signal
FRONT_SW	FRONT DOOR SWITCH Signal
HOOK_S	HOOK EMPTY DETECT Signal
JOINT_SW	JOINT SWITCH Signal
LVL_S	PAPER SURFACE DETECT Signal
PAPER_F	PAPER FULL DETECT Signal
PDL_HP	PADDLE HP DETECT Signal
PDLMTR	PADDLE MOTOR DRIVE Signal
RJOG_HP	REAR JOG PLATE HP DETECT Signal
RJOGMTR	REAR JOG MOTOR DRIVE Signal

SELF_P	HOOK TOP POSITION DETECT Signal
SIFT_CLK	SIFT MOTOR CLOCK DETECT Signal
SIFT_DNLMT	SIFT DOWN LIMIT DETECT Signal
SIFTMTR	SIFT MOTOR DRIVE Signal
SIFT_UPLMT	SIFT UPPER LIMIT DETECT Signal
SLID_HP	SLIDE HP DETECT Signal
SLIDMTR	SLIDE MOTOR DRIVE Signal
STPL_CNCT	STAPLER CONNECT DETECT Signal
STPL_HP	STAPLE HP DETECT Signal
STPLSAFE_SW	STAPLE SAFETY SWITCH Signal
TOPCOV_S	TOP COVER OPEN DETECT Signal
TRY_EMPS	TRAY PAPER DETECT Signal

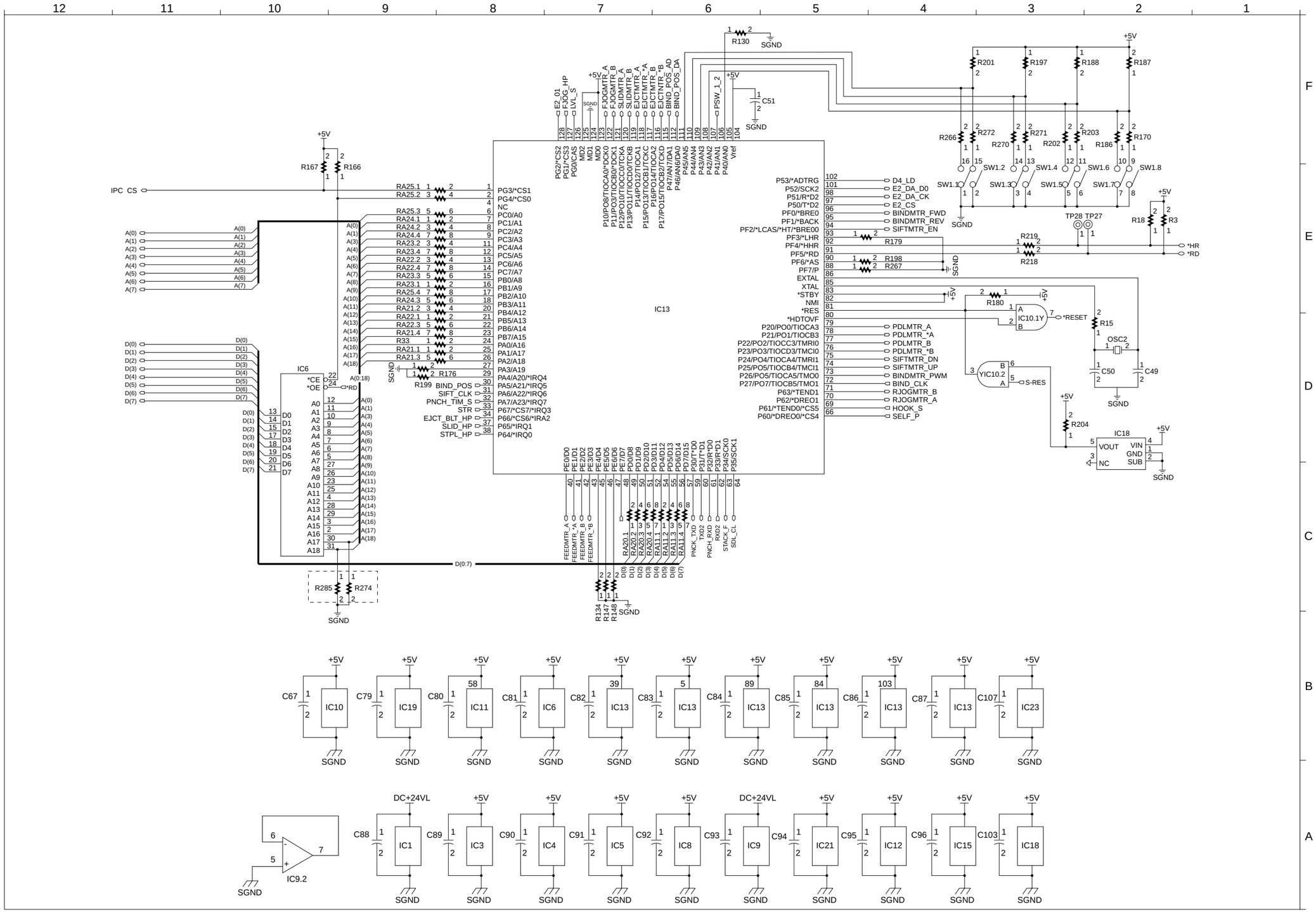
2.2 Puncher Unit (option)

CLOCK	PUNCH MOTOR CLOCK DETECT Signal
DUSTLED	DUST LED ON Signal
DUSTPTR	DUST FULL DETECT Signal
PAEND	PAPER END DETECT Signal
PUNCH	PUNCH HP DETECT Signal
SLIDE	SIDE REGISTRATION HP DETECT Signal
SREG1	SIDE REGISTRATION DETECT Signal 1
SREG2	SIDE REGISTRATION DETECT Signal 2
SREG3	SIDE REGISTRATION DETECT Signal 3
REG4	SIDE REGISTRATION DETECT Signal 4
LEDON1	LED1 ON Signal
LEDON2	LED2 ON Signal
LEDON3	LED3 ON Signal
LEDON4	LED4 ON Signal
LEDON5	LED5 ON Signal

3 Finisher/Saddle Unit General Circuit Diagram

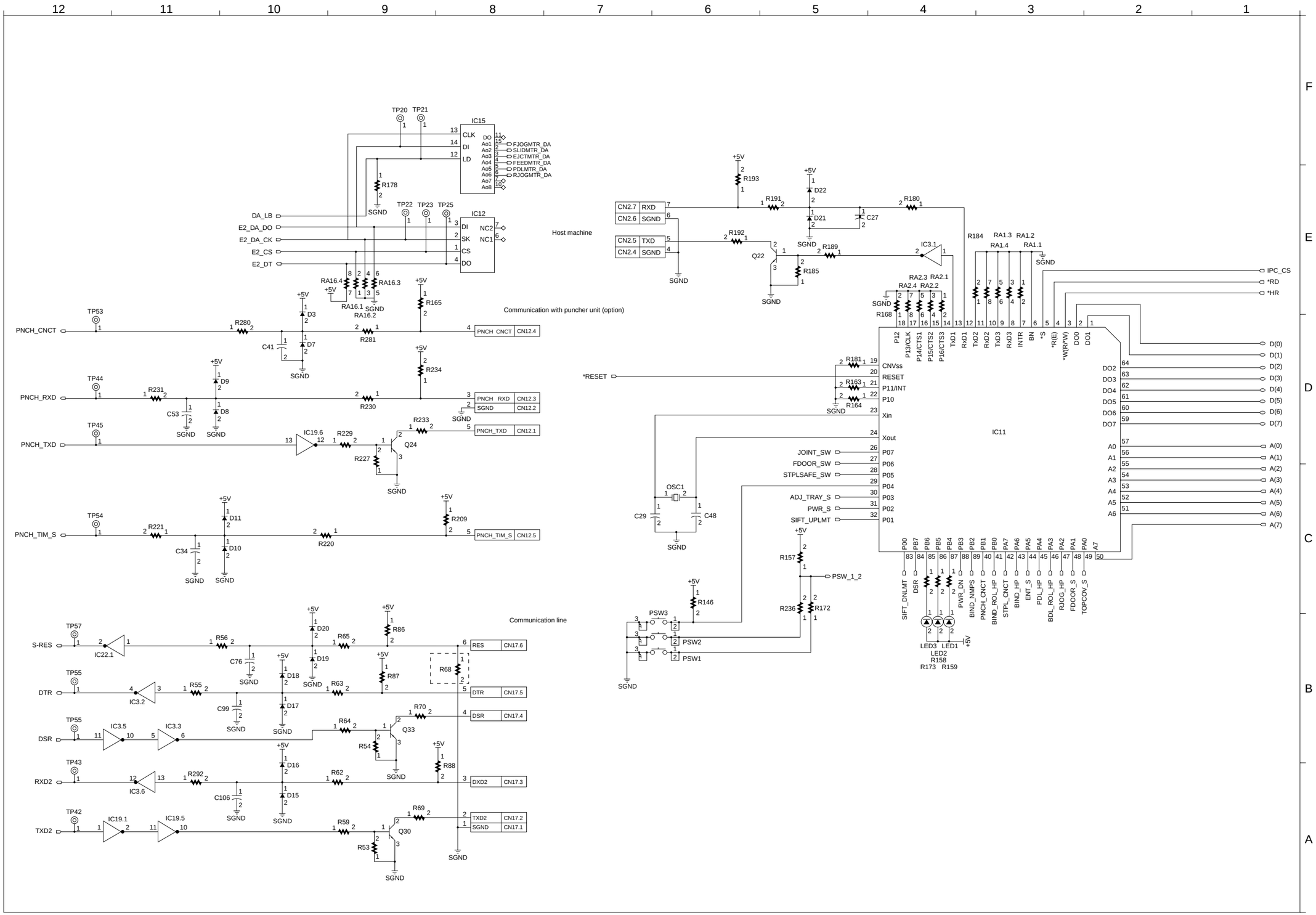


3.1 Finisher Controller PCB (1/8)

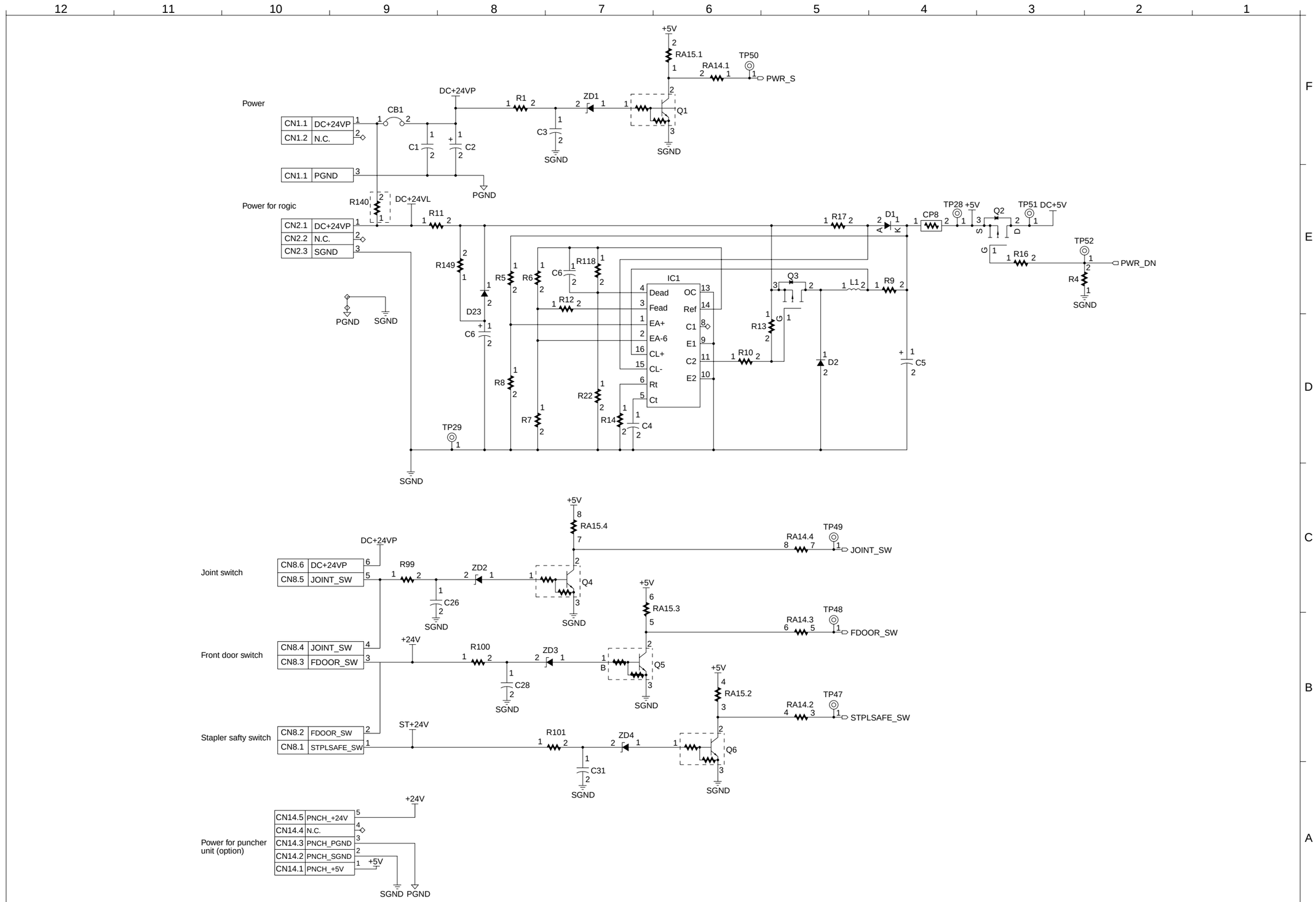


A-10

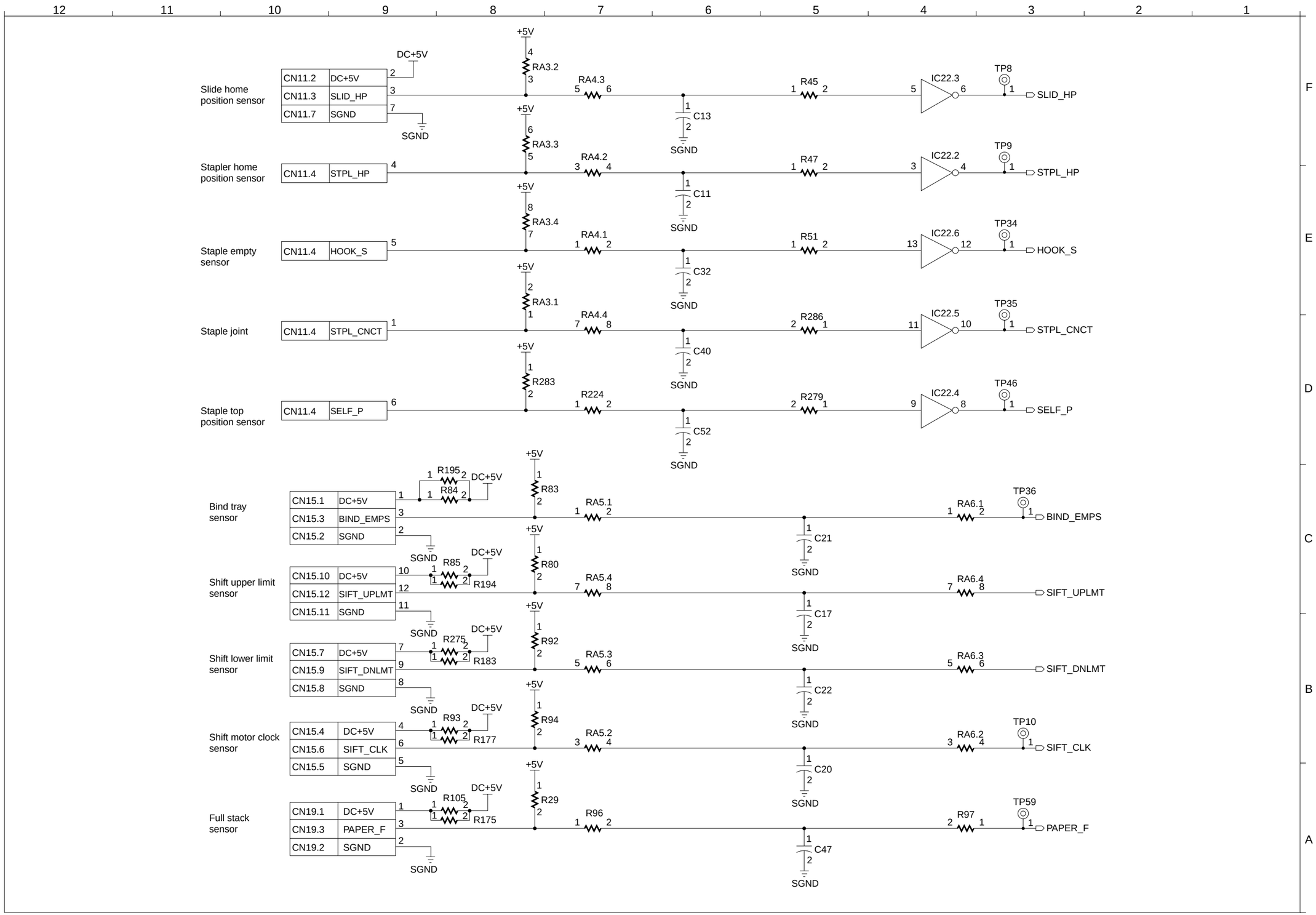
3.2 Finisher Controller PCB (2/8)



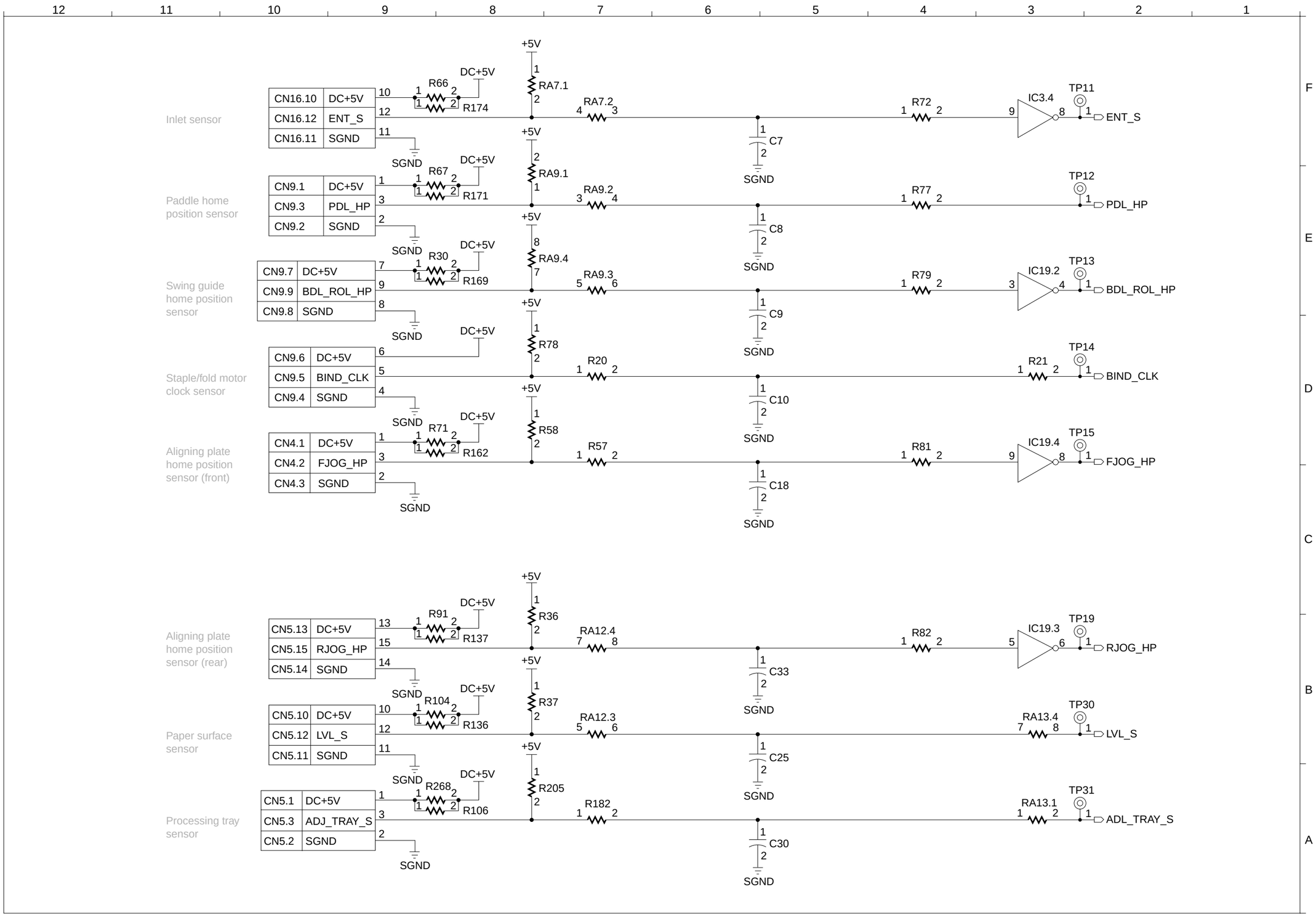
3.3 Finisher Controller PCB (3/8)



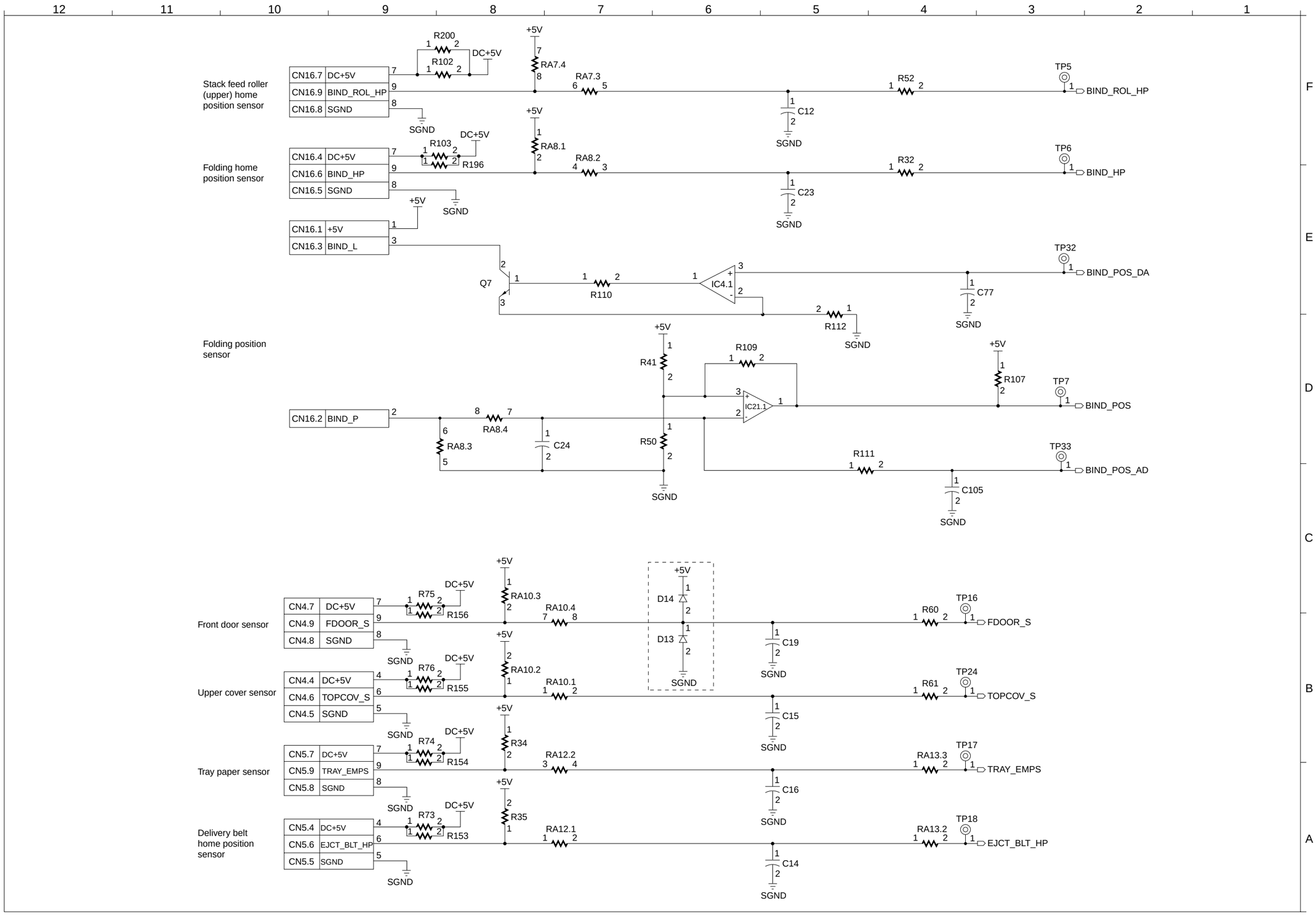
3.4 Finisher Controller PCB (4/8)



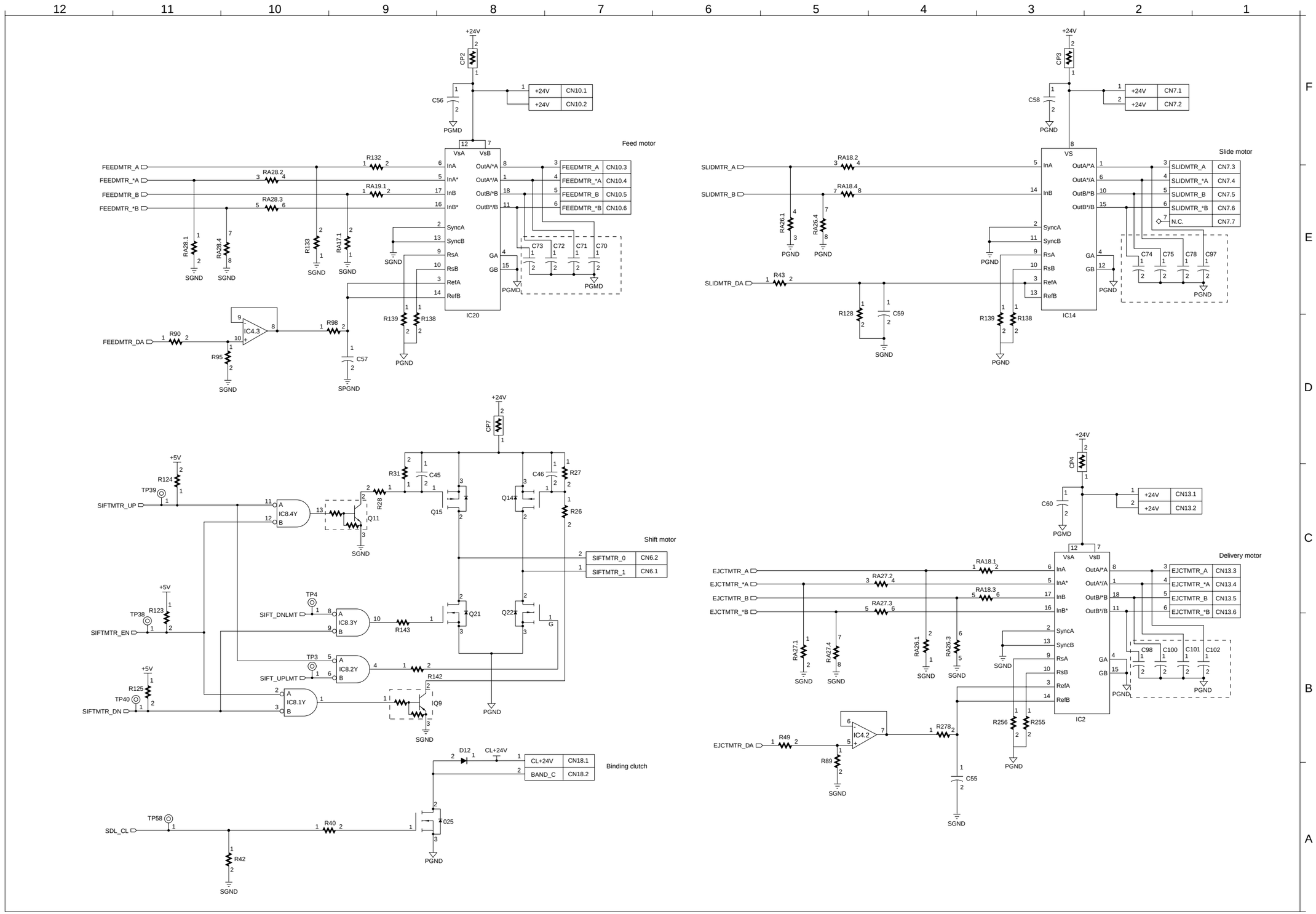
3.5 Finisher Controller PCB (5/8)



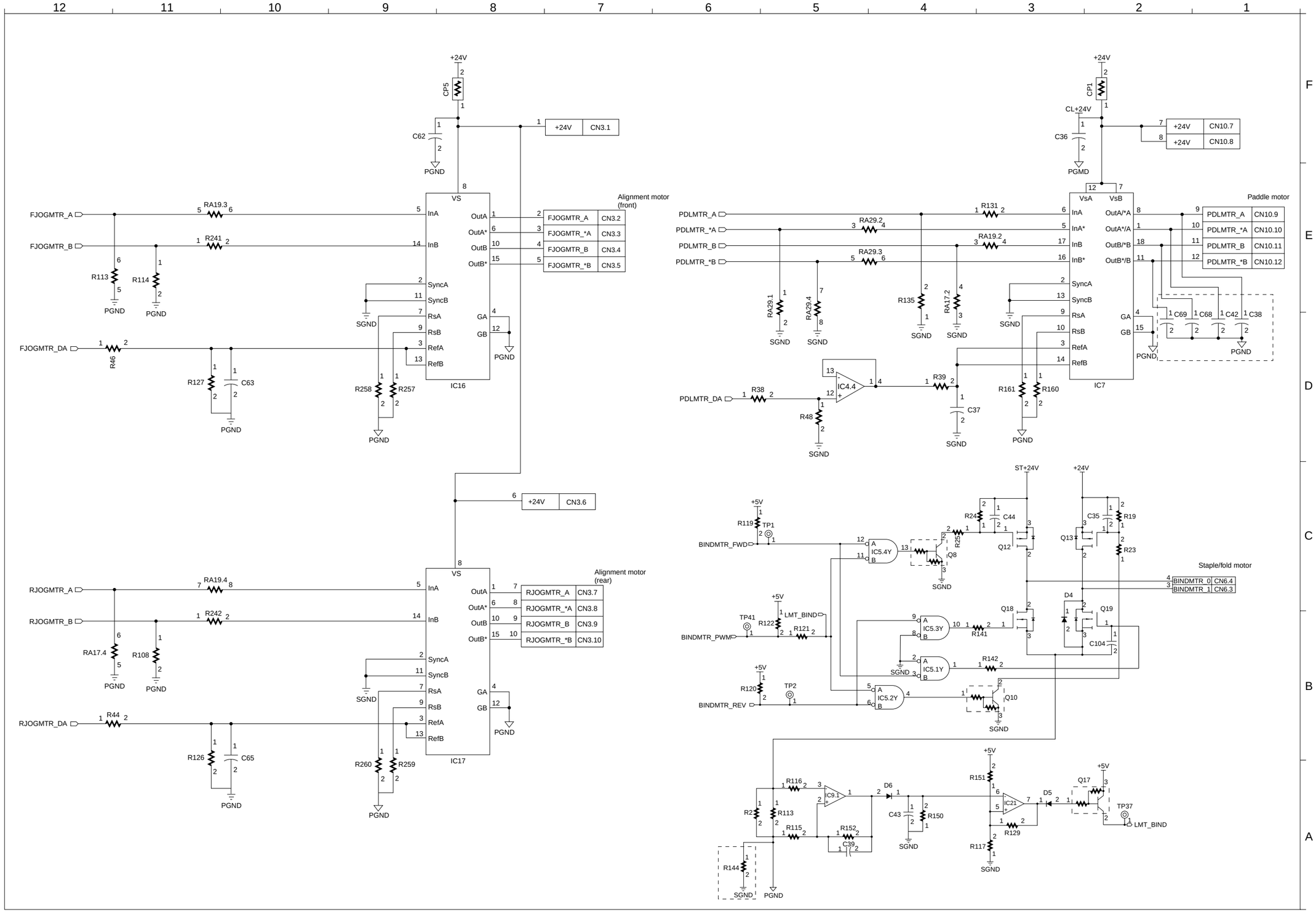
3.6 Finisher Controller PCB (6/8)



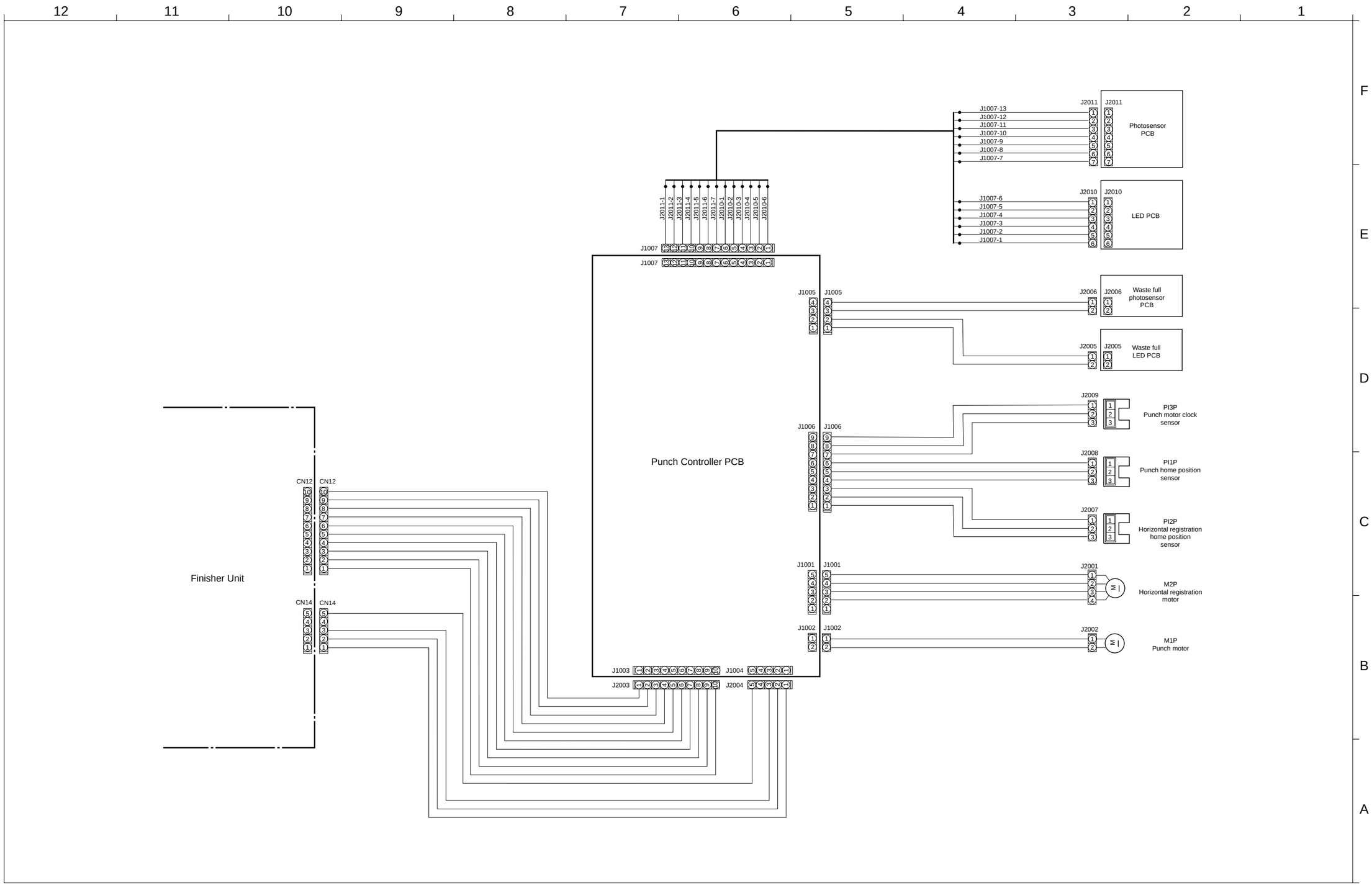
3.7 Finisher Controller PCB (7/8)



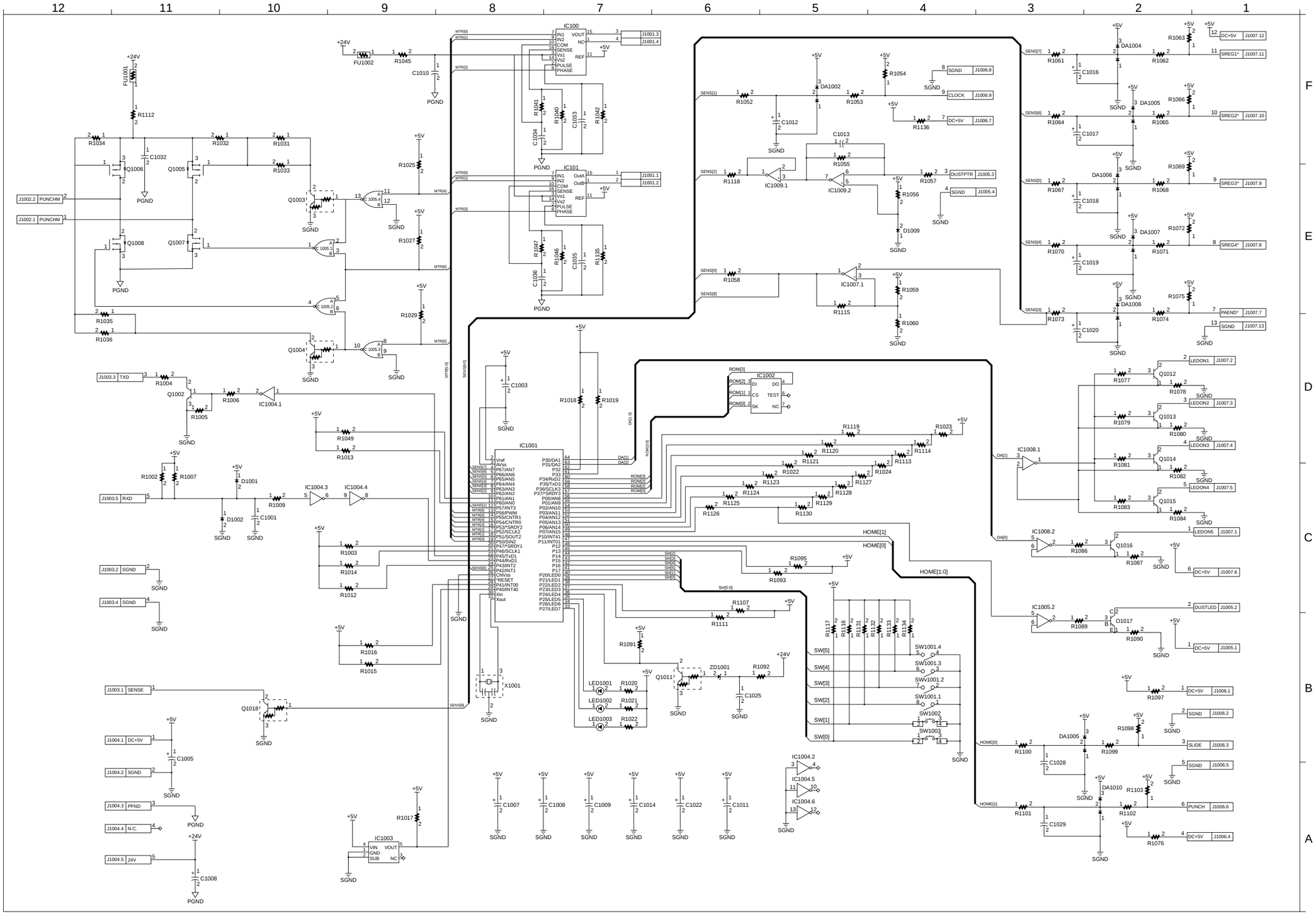
3.8 Finisher Controller PCB (8/8)



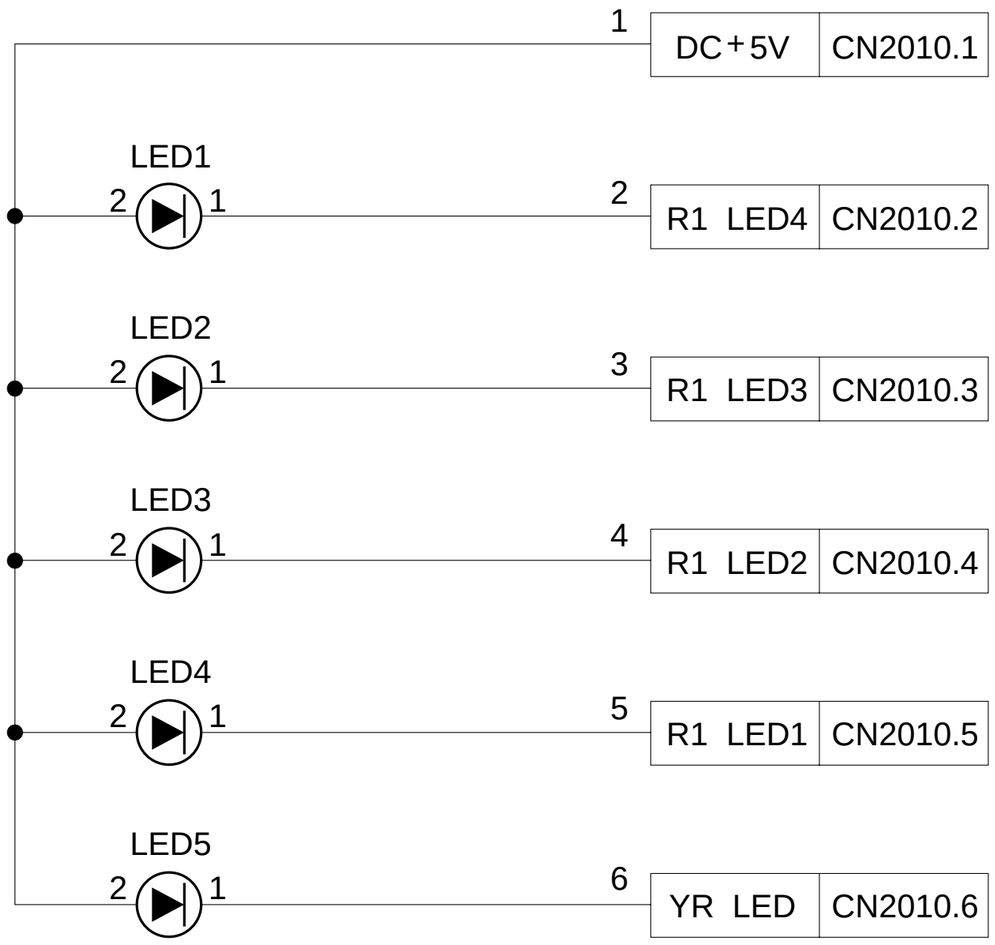
4 Puncher Unit General Circuit Diagram



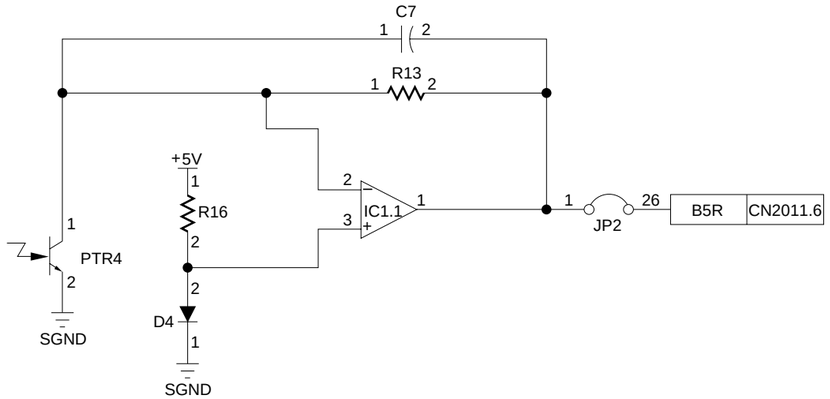
4.1 Punch Controller PCB

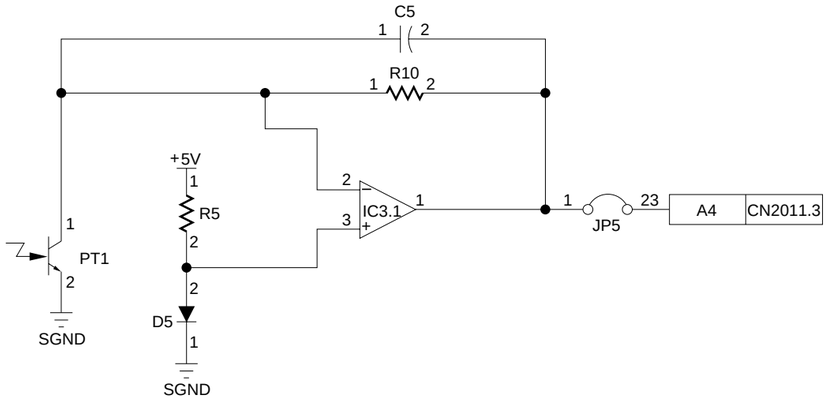


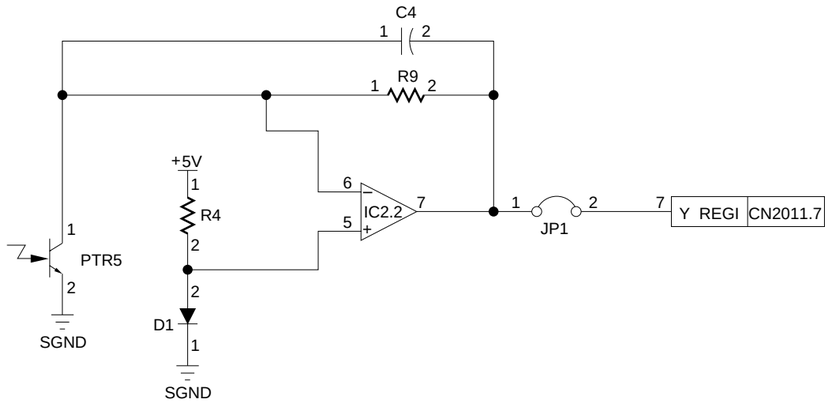
4.2 LED PCB

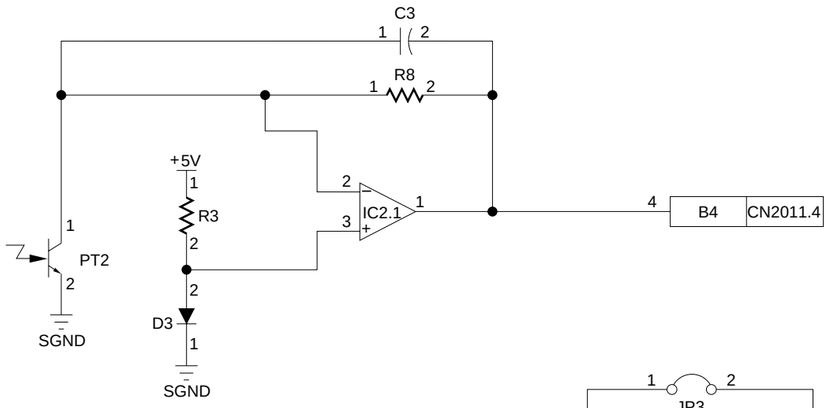

1
DC＋5V
CN2010.1
LED1
2
1
2
R1 LED4
CN2010.2
LED2
2
1
3
R1 LED3
CN2010.3
LED3
2
1
4
R1 LED2
CN2010.4
LED4
2
1
5
R1 LED1
CN2010.5
LED5
2
1
6
YR LED
CN2010.6

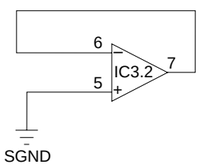
4.3 Photosensor PCB

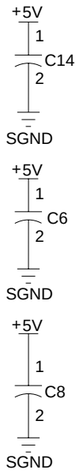


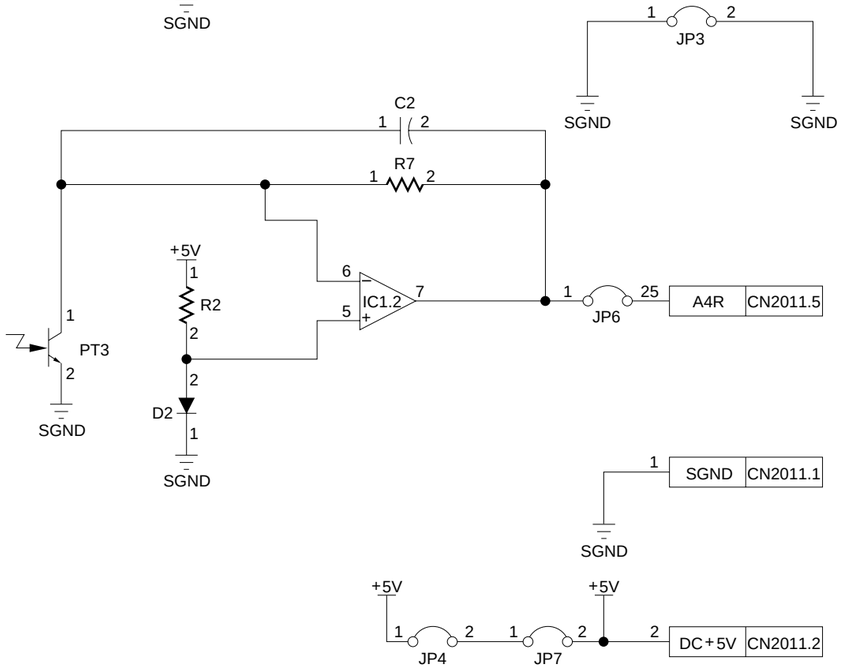












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