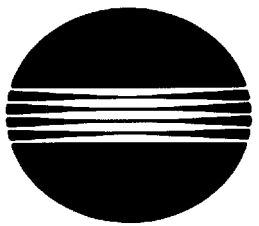
ST–213/ST–1000/ ST–1100,

Plus Additional Information for ST–212/S–209

SERVICE MANUAL



MINOLTA

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GENERAL, MECHANICAL/ ELECTRICAL

1 SPECIFICATIONS

Type : Moving-Bin Multi Staple Sorter (ST-213)
Moving-Bin Stacking Staple Sorter (ST-1000/ST-1100)

Installation : Freestanding

Bins : Non-Sort Bin + 20 Sort Bins

Modes : Non-Sort
Sort
Group
Sort Staple
Hole Punch (with Sort, Group, or Sort Staple)

In the Non-Sort Mode

Copy Medium : Plain paper weighing 60 to 80 g/m^2 or 16 to 22 lbs., translucent paper, transparencies, heavy paper
(91 to 157 g/m^2 or 25 to 41 lbs.)

Size : A4L to A3L, 5-1/2"x8-1/2" L to 11"x17" L

Max. Capacity : Plain paper (80 g/m^2 or 22 lbs.)
Non-Sort Bin: 250 sheets (ST-213)
200 sheets (ST-1000/ST-1100)
150 sheets for A5L (ST-1000/ST-1100)
Total
A4 or 8-1/2"x11" or smaller:
250 sheets + 50 sheets (Sort Bin) x 20 = 1250 sheets
... (ST-213)
200 sheets + 50 sheets (Sort Bin) x 20 = 1200 sheets
... (ST-1000/ST-1100)
Sizes greater than A4 or 8-1/2"x11":
250 sheets + 50 sheets (Sort Bin) x 12 = 850 sheets
... (ST-213)
200 sheets + 50 sheets (Sort Bin) x 12 = 800 sheets
... (ST-1000/ST-1100)
Transparencies : 10 (max. size: A4 or 8-1/2"x11")
Other special paper : 10

In the Sort/Group Mode

Copy Medium	Plain paper weighing 60 to 80 g/m^2 or 16 to 22 lbs.
Size	A5L to A3L, 5-1/2"x8-1/2" to 11"x17"
Max. Capacity	A4 or 8-1/2"x11" or smaller: 1000 sheets (50 sheets x 20 bins) Sizes greater than A4 or 8-1/2"x11": 600 sheets (50 sheets x 12 bins or 30 sheets x 20 bins)

In the Sort Staple Mode

Copy Medium	Plain paper weighing 60 to 80 g/m^2 or 16 to 22 lbs.
Max. Capacity	A4 or 8-1/2"x11" or smaller: 1000 sheets (50 sheets x 20 bins) Sizes greater than A4 or 8-1/2"x11": 600 sheets (50 sheets x 12 bins or 30 sheets x 20 bins)
No. of Copies to be Stapled	2 to 50 copies (for paper weighing 80 g/m^2 or 22 lbs.)
Stapling Position/ Paper Size	Top Slant stapling: A4L/C, A3L 8-1/2"x11" L to 11"x17" L Top stapling: A4L 8-1/2"x14" L, 8-1/2"x11" L Two-Point stapling: A4C, A3L 8-1/2"x11" C, 11"x17" L
Stapling Types	Top Slant: Slant 45° Two-Point: Parallel Top: Parallel

In the Hole Punch Mode : (with Sort, Group, or Sort Staple)
Size : A4L/C, A3L or 8-1/2"x11" L (2-holes only) to 11"x17" L
No. of Holes : Metric areas: 4; inch areas: 2 or 3 selectable

Stacking : ST-1000/ST-1100 only

Stacking Conditions :

Sort Staple, Group	Automatically stacking copies regardless of the number of copy sets involved
Sort	Automatically stacking copies for 21 copy sets or more
Non-Sort	Stacking copies fed to a sort bin when the total number of copies to be made is set to more than 200

Copy Medium : Plain paper weighing 60 to 80 g/m^2 or 16 to 22 lbs.
Size : A4L to A3L, 8-1/2"x11" L to 11"x17" L

Max. Capacity : Sort, Group, Hole Punch (no stapling)
1000 sheets (accommodation height 150 mm or less)
: Sort Staple, Hole Punch Staple

(Reference: Performance value)

No. of Copies to be Stapled	Length 364 mm or 14-1/4" or smaller*1	A3 or 11"x17"*2
2	100 copy sets	40 copy sets
3 to 5	80 copy sets	40 copy sets
6 to 10	60 copy sets	40 copy sets
11 to 20	40 copy sets	40 copy sets
21 to 50	20 copy sets	20 copy sets

*1: For length 364 mm or 14-1/4" or smaller, the capacity is restricted by the accommodation height of 150 mm.

*2: For A3 or 11"x17", the capacity is restricted by the accommodation height of 150 mm or stacking of 40 copy sets, whichever occurs first.

Shift Mode : Shift occurs in the Sort, Group, and Hole Punch mode (no stapling).

Shift Amount : 20 mm

Power Requirements : DC24V (supplied from copier)

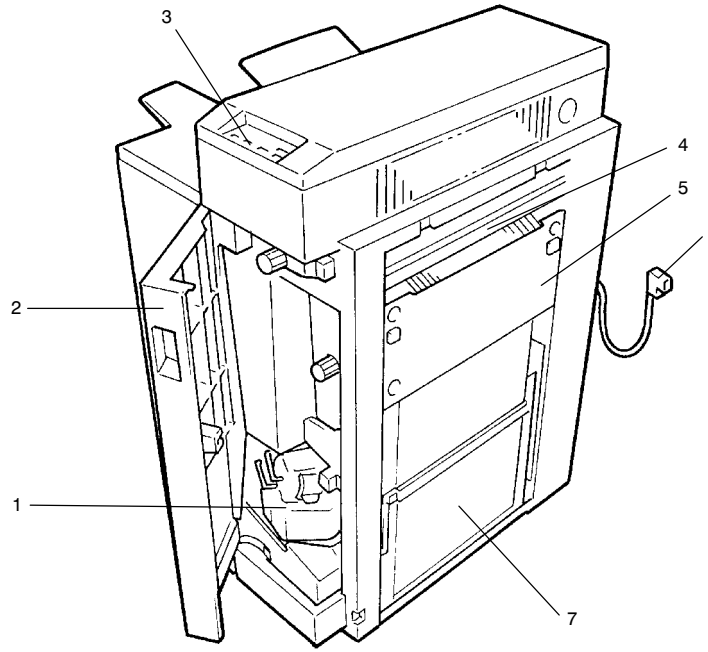
Max. Power Consumption : 72W or less

Dimensions : Width - 575 mm or 22-3/4"
Depth - 638 mm or 25"
Height - 956 mm or 37-3/4"

Weight : ST-213 - 56.4 kg or 124-1/4 lbs. (excl. mounting bracket)
ST-1000/ST-1100 - 56.4 kg or 124-1/4 lbs. (excl. mounting bracket)

Environmental Requirements : Same as copier

2 PARTS IDENTIFICATION



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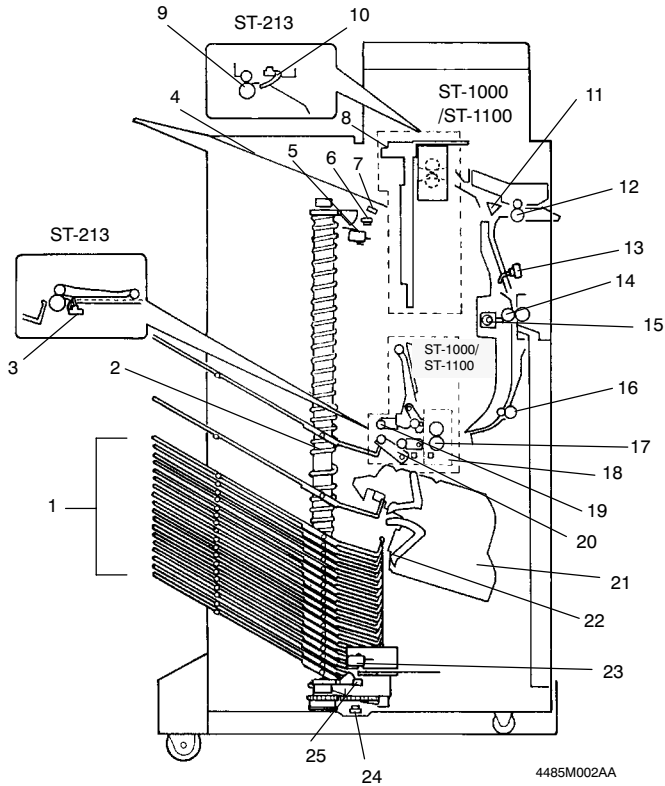
1. Staple Unit
2. Front Door
3. Sorter Control Panel
4. Entrance Guide
5. Right Middle Cover
6. Hookup Connector
7. Punch Trash Box

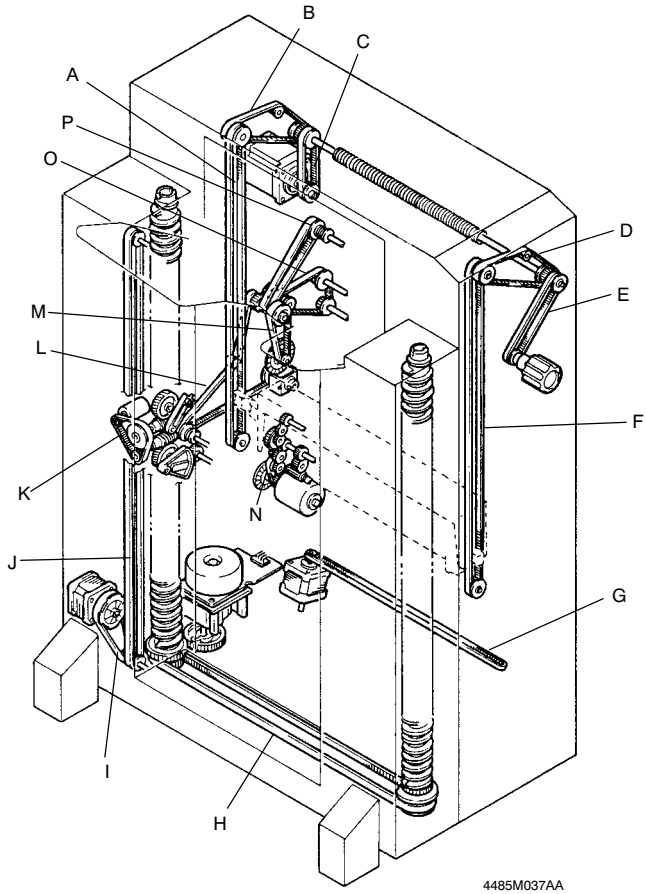
3 CROSS-SECTIONAL VIEW



1. Sort (1st to 20th) Bins
2. Spiral Cam
** 3. Sort Exit Sensor PC11
4. Non-Sort Bin
5. Bin Upper Limit Interlock Switch S1
6. Bin Empty Sensor LED Board PWB-B
7. Non-Sort Bin Empty Detecting Sensor PC10
* 8. Stacking Guide
** 9. Non-Sort Exit Roller
** 10. Non-Sort Exit Sensor PC12
11. Sort/Non-Sort Switching Plate
12. Entrance Roller
13. Punch Registration Sensor PC5
14. Registration Roller
15. Punch Unit
16. Clutch Roller
* 17. Gate Transport Roller
* 18. Gate Unit
* 19. Upper Arm
* 20. Lower Arm
21. Staple Unit
22. Paper Holding Lever
23. Bin Lower Limit Interlock Switch S2
24. Bin Empty Sensor PQ Board PWB-C
25. Bin Lower Limit Position Sensor PC2

*ST-1000/ST-1100 only **ST-213 only

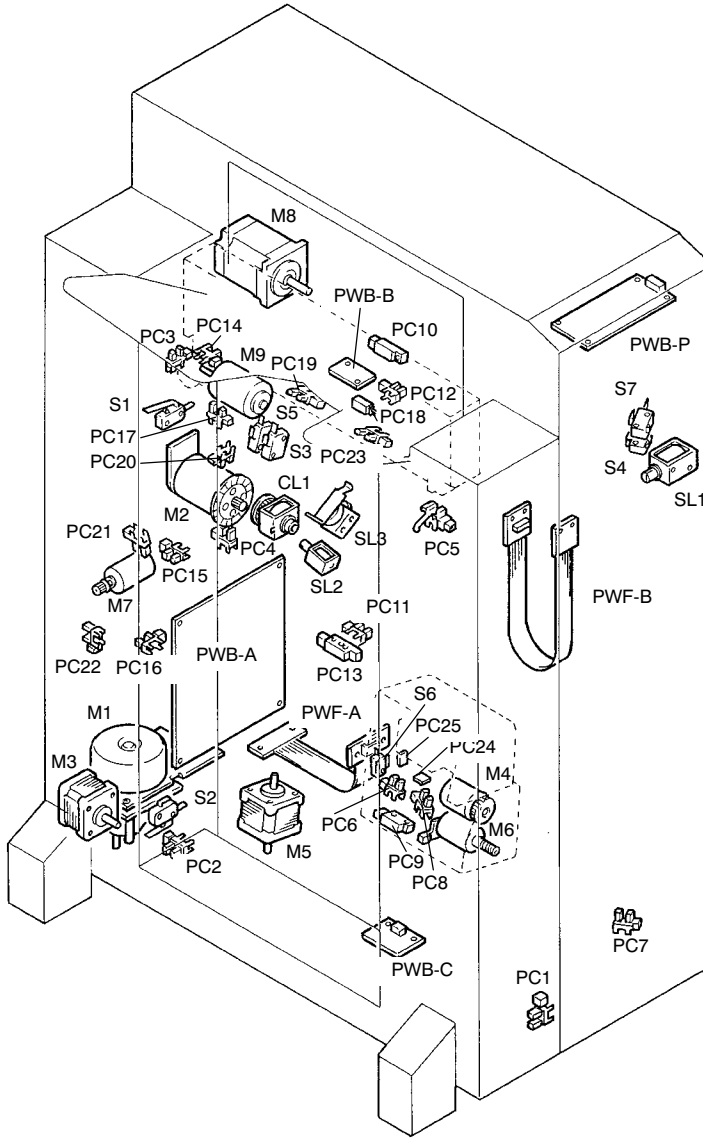
4 DRIVE SYSTEM



Belt Name	Function	Belt Name	Function
*A	Driving the Gate Unit	I	Driving the Paper Aligning Bar
*B	Driving the Gate Unit	J	Driving the Paper Aligning Bar
*C	Driving the Gate Unit	*K	Driving the Upper and Lower Arms
*D	Driving the Gate Unit	*L	Driving the Sort Exit Roller
*E	Driving the Gate Unit	M	Transmitting drive from Transport Motor M2
*F	Driving the Gate Unit		
G	Driving the Staple Unit in the crosswise direction	*N	Driving the Gate Transport Roller
		O	Driving the Punch Unit
H	Driving bins	P	Driving the Entrance Roller/ **Non-Sort Exit Roller

* ST-1000/ST-1100 only
** ST-213 only

5 ELECTRICAL COMPONENTS LAYOUT



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Symbol	Name	Symbol	Name
PWB-A	Control Board	PC8	Stapling Unit FD Home Position Sensor
PWB-C	Bin Empty Sensor LED Board		
PWB-C	Bin Empty Sensor PQ Board	PC9	Stapling Paper Detecting Sensor
PWB-P	Control Panel	PC10	Non-Sort Bin Empty Detecting Sensor
PWF-A	Stapling Unit CD Flexible Board		
* PWF-B	Gate Unit Flexible Board	**PC11	Sort Exit Sensor
M1	Bin Moving Motor	**PC12	Non-Sort Exit Sensor
M2	Transport Motor	* PC13	Sort Exit Sensor
M3	Paper Aligning Motor	* PC14	Gate Unit Home Position Sensor
M4	Stapling Motor	* PC15	Upper Arm Home Position Sensor
M5	Stapling Unit CD Motor	* PC16	Lower Arm Home Position Sensor
M6	Stapling Unit FD Motor	* PC17	Gate Transport Motor Pulse Sensor
* M7	Arm Motor	* PC18	Gate Transport Sensor
* M8	Gate Unit Motor	* PC19	Non-Sort Bin Upper Detecting Sensor 1
* M9	Gate Transport Motor		
SL1	Sort/Non-Sort Switching Solenoid	PC20	Punch Hole Switching Sensor (inch areas only)
* SL2	Gate Path Switching Solenoid		
SL3	Punch Solenoid	* PC21	Upper Arm Pick-Up Position Sensor
CL1	Punch Registration Clutch	* PC22	Lower Arm Pick-Up Position Sensor
PC1	Bin Positioning Sensor	* PC23	Non-Sort Bin Upper Detecting Sensor 2
PC2	Bin Lower Limit Position Sensor		
PC3	Paper Aligning Home Position Sensor	PC24	Staple Empty Detecting Sensor (in Staple Unit)
PC4	Transport Motor Pulse Sensor	PC25	Stapler Home Position Sensor (in Staple Unit)
PC5	Punch Registration Sensor		
PC6	Stapling Unit FD Advanced Position Sensor	S1	Bin Upper Limit Interlock Switch
		S2	Bin Lower Limit Interlock Switch
PC7	Stapling Unit CD Home Position Sensor	* S3	Sorter Set Switch 2
		* S4	Cover Set Switch 2
		S5	Sorter Set Switch 1
		S6	Stapler Interlock Switch
		S7	Cover Set Switch 1

* ST-1000/ST-1100 only
** ST-213 only

6 OPERATION OF EACH MECHANISM

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6-1. Paper Transport Mechanism

● **Paper Transport Path**

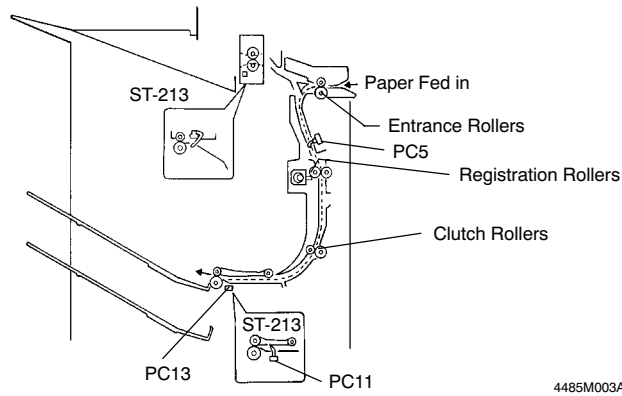
A sheet of paper entering the Sorter from the copier is transported by the rollers driven by Transport Motor M2 and is fed into the corresponding bin. At this time:

For ST-1000 and ST-1100:

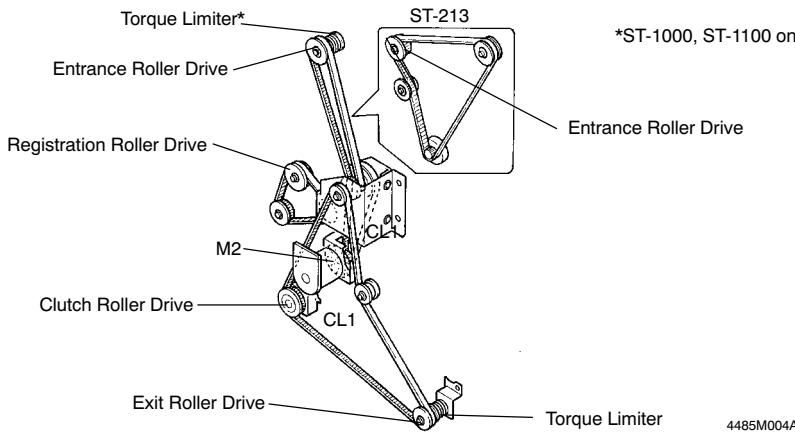
The leading edge of the paper unblocks (H) Punch Registration Sensor PC5 and blocks (L) Sort Exit Sensor PC13 (reflector type sensor). PC13 is then unblocked (H) as the trailing edge moves past it.

For ST-213:

The leading edge of the paper unblocks (H) PC5 and Sort Exit Sensor PC11 in sequence. Each of these two sensors is then blocked (L) as the trailing edge moves past it.



= Drive Section Viewed from the Machine Rear =



● **Control of Transport Motor M2**

The DC motor used as Transport Motor M2 is energized and deenergized by the output from pins 1 and 2 of IC1A.

ST-1000, ST-1100: The direction of rotation of M2 is controlled.

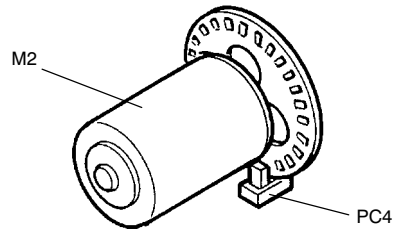
IC1A-1	IC1A-2	Direction of M2 Rotation
H	L	Forward (to feed copies into a bin)
L	H	Backward (to load a copy set/stack into the Gate Unit)
L	L	Deenergized

ST-213: M2 turns in one direction only.

IC1A-1	IC1A-2	M2
H	L	Energized
L	L	Deenergized

The speed of M2 is controlled by the PWM (pulse width modulation) system. (In the PWM system, the width of a voltage pulse applied to the motor is changed to control the motor speed.)

Transport Motor Pulse Sensor PC4 is fitted to the pulse disc of M2 to detect the motor speed according to the cycle of a pulse signal, to which the number of revolutions of the motor shaft has been converted. The drive pulse applied to the motor is controlled in accordance with the output signal from PC4, thereby keeping the speed of M2 constant.



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● **Timing of Energizing M2**

① When the copier Scanner starts a scan motion for the first copy.
② After the lapse of a given period of time after Gate Transport Motor M9 has been energized for loading a copy set/stack into the Gate Unit (ST-1000, ST-1100 only).

● **Timing of Deenergizing M2**

① After a given period of time after the Sort Exit Sensor is unblocked (H) (PC13: ST-1000, ST-1100) or blocked (L) (PC11: ST-213) as the trailing edge of the last copy moves past it.
② M9 is deenergized and, at the same time, M2 is deenergized after a copy set/stack has been loaded into the Gate Unit (ST-1000, ST-1100 only).

6-2. Punch Mechanism

- **A copy being transported through the Sorter is briefly stopped and punched by the Punch Unit.**

- **Paper transport stop mechanism:**
  Stops the copy being transported at the punching position.

Operation

A copy is fed into the Sorter and its trailing edge moves past Punch Registration Sensor PC5.

↓

Punch Registration Clutch CL1 is energized.

=When normally-closed CL1 is energized, it cuts off the drive to the Clutch Rollers, stopping the copy at those rollers. Since the trailing edge of the copy is, however, still being transported by the Registration Rollers, a loop is formed in the copy between the Registration Rollers and Clutch Rollers. When the trailing edge of the copy leaves the area of contact between the two Registration Rollers, the strength of the copy paper itself, together with the elasticity of the loop, causes the trailing edge of the copy to be pressed against the area of contact between the two Registration Rollers. This positions the copy correctly at the punching position.

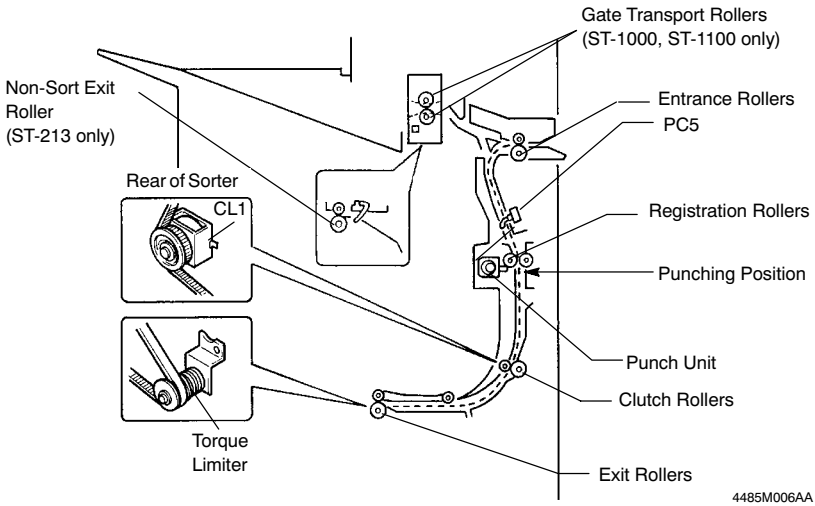
↓

The Punch Unit punches holes in the copy along its trailing edge.

↓

CL1 is deenergized to transmit drive to the Clutch Rollers, causing the copy to be transported and fed into the corresponding bin.

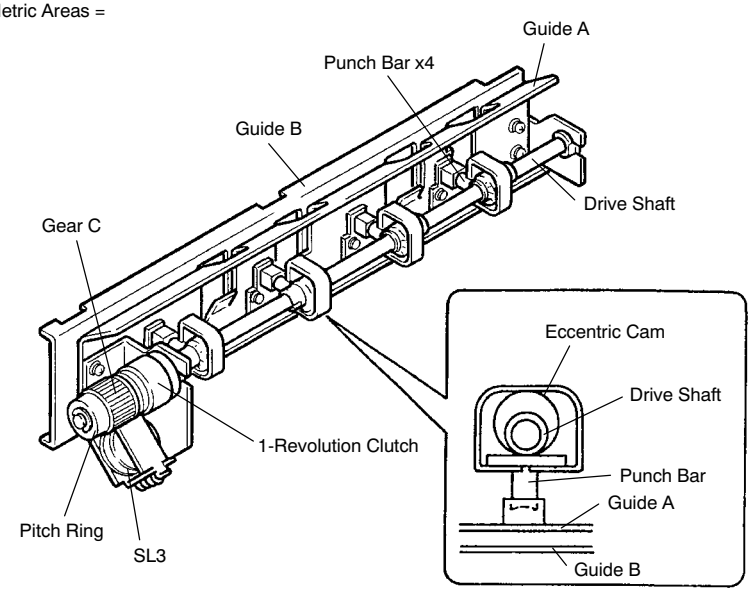
NOTE: For A3 lengthwise or 11"x17" paper, its leading edge has already moved past the area of contact between the two Exit Rollers when CL1 is energized. The Exit Roller Drive Gear is therefore provided with a torque limiter that prevents the rollers from turning idly.



● **Description of the Punch Unit**

The Punch Unit consists of the following parts.

= Metric Areas =



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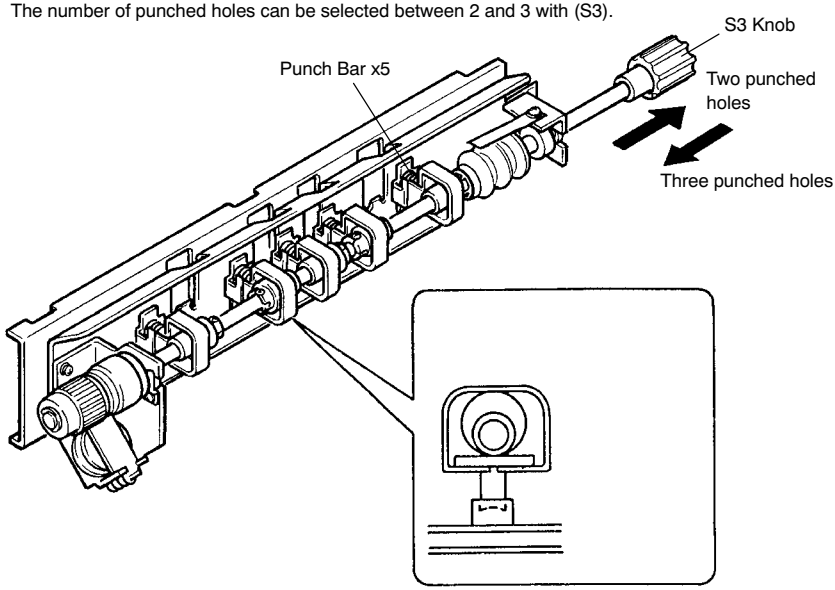
= Inch Areas =

The number of punched holes can be selected between 2 and 3 with (S3).



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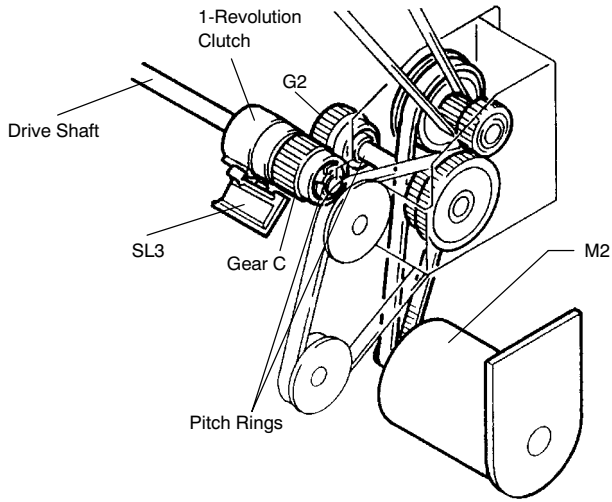
● **Drive of the Punch Unit**

When Transport Motor M2 turns, Gear C of the Punch Unit is turned via Punch Unit Drive Gear G2. Since the 1-Revolution Clutch is locked by Punch Solenoid SL3 which is normally deenergized, however, the motor rotation is not transmitted to the drive shaft. (The engagement gap between G2 and Gear C is determined by the Pitch Rings.)



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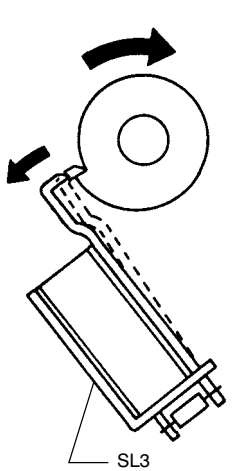
When SL3 is energized, it unlocks the 1-Revolution Clutch, which transmits the rotation of Gear C to the drive shaft. (SL3 is energized only briefly and, when the 1-Revolution Clutch turns one turn, it is deenergized to lock the clutch, stopping the Drive Shaft.)

When the Drive Shaft turns one turn, the Punch Bars are pushed by the eccentric cams, making one crosswise reciprocating motion to make holes in the copy.



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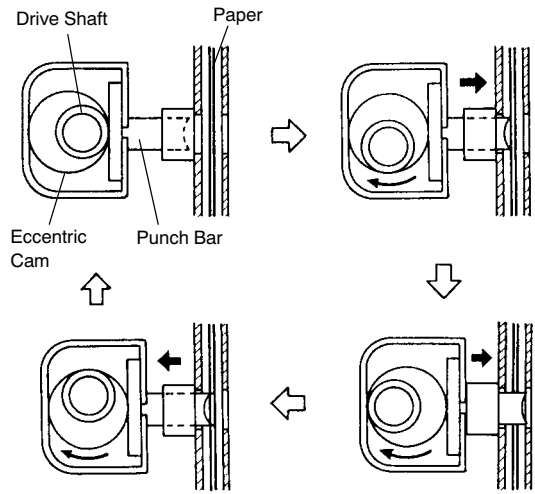

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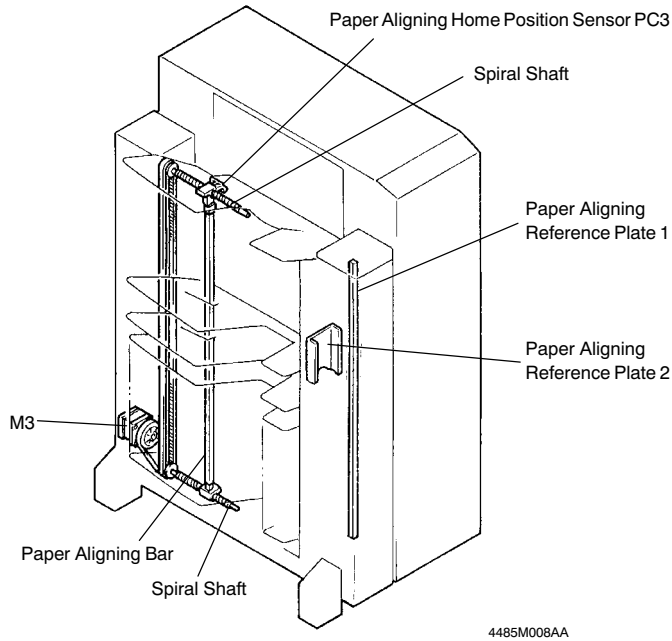
6-3. Paper Aligning Mechanism

- The paper aligning mechanism presses the copies fed into the bins up against the Paper Aligning Reference Plate so that they can be aligned in the crosswise direction. This ensures that a neat set or stack of copies is stapled together.

- The copies are aligned by the Paper Aligning Bar which is moved by Paper Aligning Motor M3 turning forward or backward. The movement of the Paper Aligning Bar differs depending on the paper size.



- **Paper Aligning Motor M3**

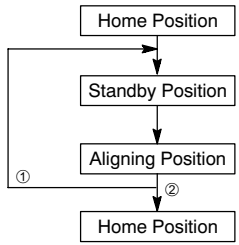
  Paper Aligning Motor M3 is a two-phase stepping motor. The output pulses from pins 16 to 19 of IC1A are applied via IC14A and IC15A to M3. Each output pulse from IC1A turns M3 one angular increment, or a step, which is 1.8°. This is equivalent to the movement of the Paper Aligning Bar to approx. 0.17 mm. The number of output pulses from IC1A therefore controls the distance of movement of the Paper Aligning Bar.

- **Paper Aligning Bar Home Position Detection**

  The home position of the Paper Aligning Bar is where the light blocking plate fitted to the Paper Aligning Bar has just blocked Paper Aligning Home Position Sensor PC3 (L). This position serves as the reference point, based on which the movement of the Paper Aligning Bar for each paper size (the number of output pulses from IC1A) is calculated.

  The home position of the Paper Aligning Bar is detected at any of the following timings:
  - When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON.
  - At the end of each mode (when the last copy has been aligned).

● **Outline of Paper Aligning Bar Operation**



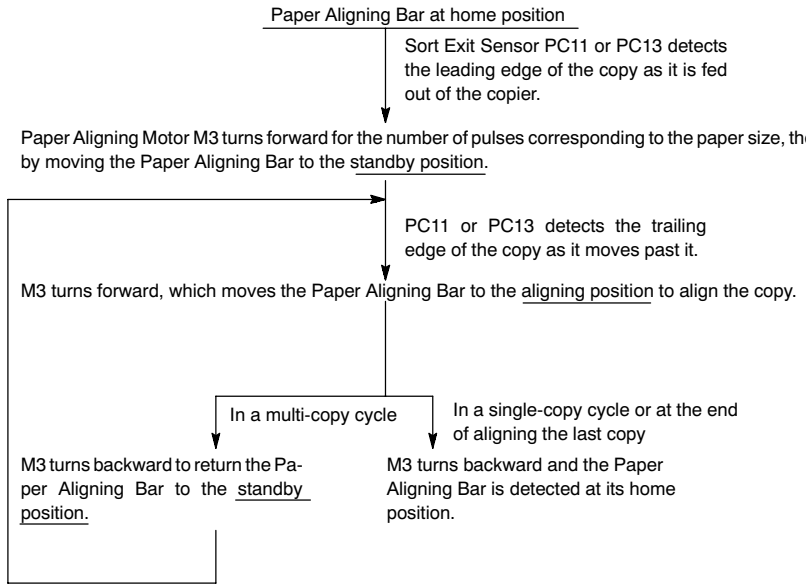
..... The bar is located near, but not in contact with, the copy. (See NOTE below.)

..... The bar presses the copy up against the Aligning Reference Plate. (See NOTE below.)

NOTE: Varies for different paper sizes.

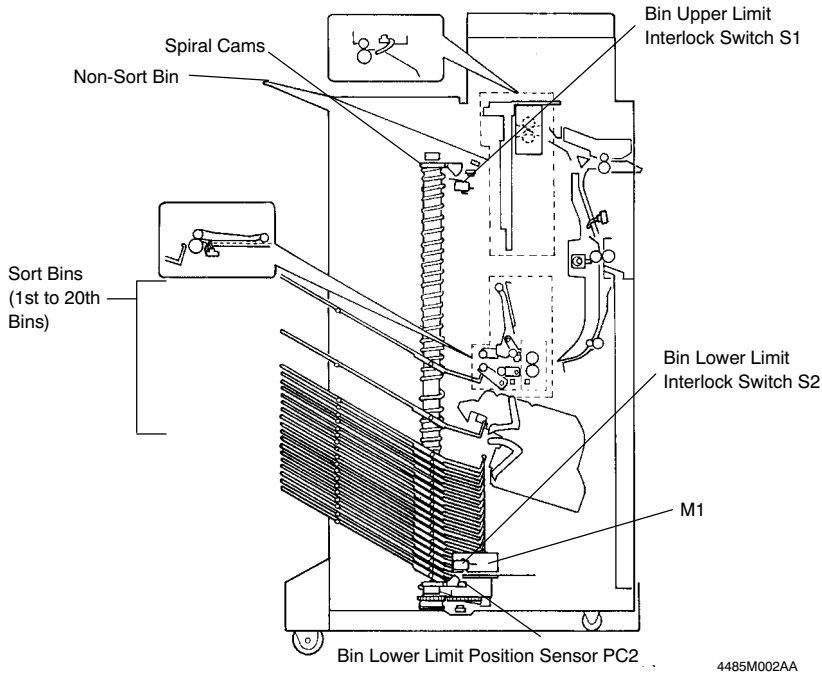
① During a multi-copy cycle, the Paper Aligning Bar repeatedly moves between the standby and aligning position until it completes aligning the last copy.
② The Paper Aligning Bar returns to the home position when it has completed aligning the last copy.

● **Aligning Operation**



6-4. Bin Moving Mechanism

- Each of the Sort Bins (1st to 20th Bins) is held by the grooves of the Side Plate and the channels of the Spiral Cams. When Bin Moving Motor M1 turns the Spiral Cams one turn, all the bins move one step up or down (depending on the direction of Spiral Cam rotation) simultaneously along the channels of the Spiral Cams.



- **Description of Bin Moving Motor M1**

A DC motor is used as Bin Moving Motor M1. The energization/deenergization and rotation direction of M1 is under the control of the output of pins 5 and 6 of IC1A applied to the motor via IC8A.

IC1A-5	IC1A-6	Direction of M1 Rotation
L	L	Forward (Bins move up)
L	H	Backward (Bins move down)
H	—	Stop

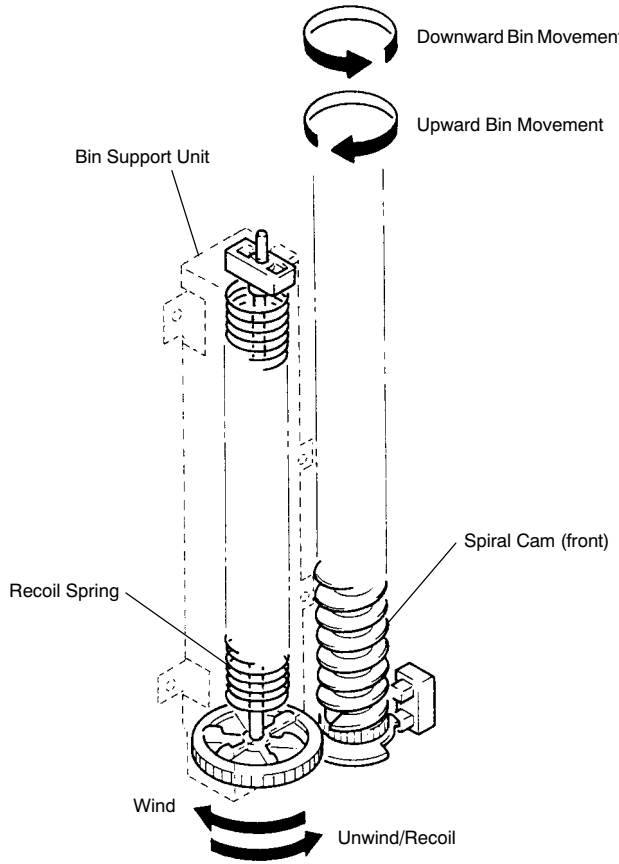
If M1 is run at its maximum speed, the bins oscillate during movement, making operating noise. The PWM system is used to control M1 speed to minimize oscillation and noise during movement. In addition, with a revolution detector built into it, M1 outputs a pulse to pin 73 of IC1A when the motor turns. IC1A then detects the M1 speed according to the cycle of the pulses applied.

● **Bin Support Unit: ..... Auxiliary Bin Moving Mechanism**

As more copies are fed into the bins, the load during the upward movement of the bins increases. To ensure that the bins move smoothly even when the number of copies increases, the auxiliary bin moving mechanism (Bin Support Unit) using a recoil spring is installed.

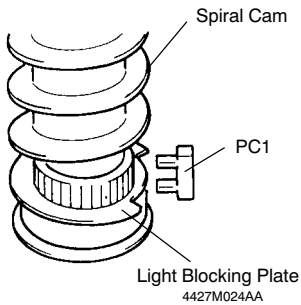
The upper end of the recoil spring is secured to the top of the support unit and its lower end is hooked in a gear. This gear is coupled with a gear of the front Spiral Cam and is set to wind up the recoil spring when the Spiral Cam turns counterclockwise (bins move downward). This means that, when the 1st Bin is in the copy receiving position, the recoil spring is wound tightly. The recoil force of this tightly wound recoil spring supports the load when the bins move upward.

When the bins move downward (the Spiral Cam turns counterclockwise), the reaction force of the recoil spring puts a load against the movement to brake the bins (especially when the number of copies is large).



● **Bin Reference Position Detection**

The reference position of the bins is where the 1st Bin is located to receive copies fed out of the copier. Movement of each bin is controlled with this position as the reference. The bin reference position is detected by Bin Positioning Sensor PC1 and Bin Lower Limit Position Sensor PC2. PC1 is unblocked (H) and blocked (L) by a light blocking plate fitted to the Spiral Cam. It is unblocked when any of the bins is at a position to receive copies. PC2 is normally kept blocked (L) by a light blocking plate. When the 1st Bin is located lower than the level at which the Sort Bin receives copies, the 20th Bin pushes the light blocking plate, which unblocks PC4 (H).



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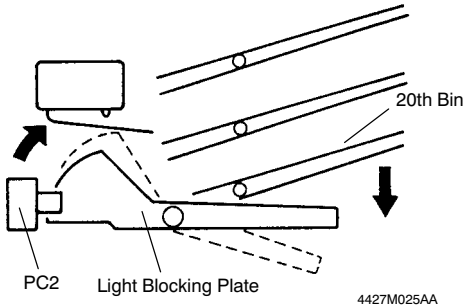

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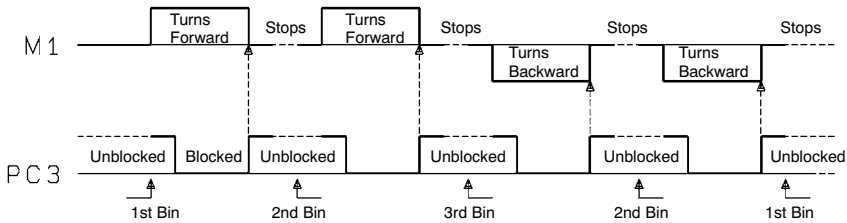
● **Bin Moving Control**

After the bin reference position is detected, at which the 1st Bin is located to receive the copy, movement of the bins is controlled by the direction of M1 rotation and the number of times PC1 is blocked and unblocked.



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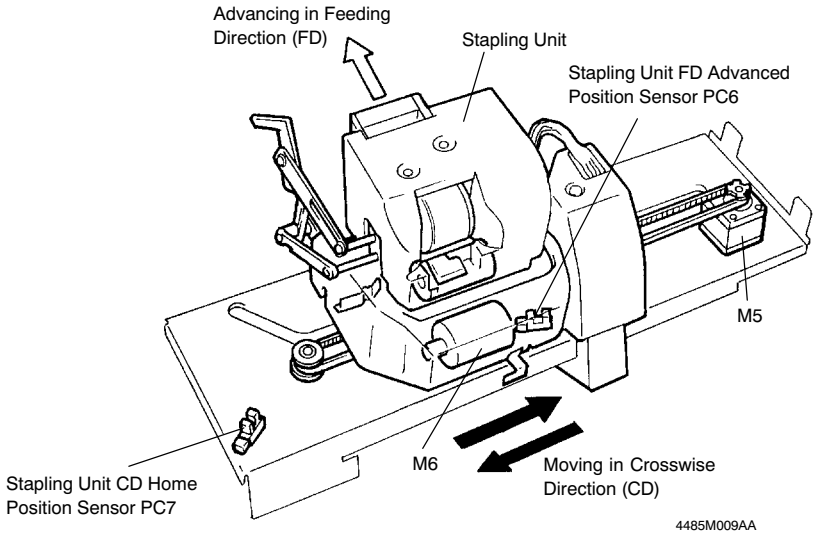
● **Bin Upper Limit Interlock Switch S1 and Bin Lower Limit Interlock Switch S2**

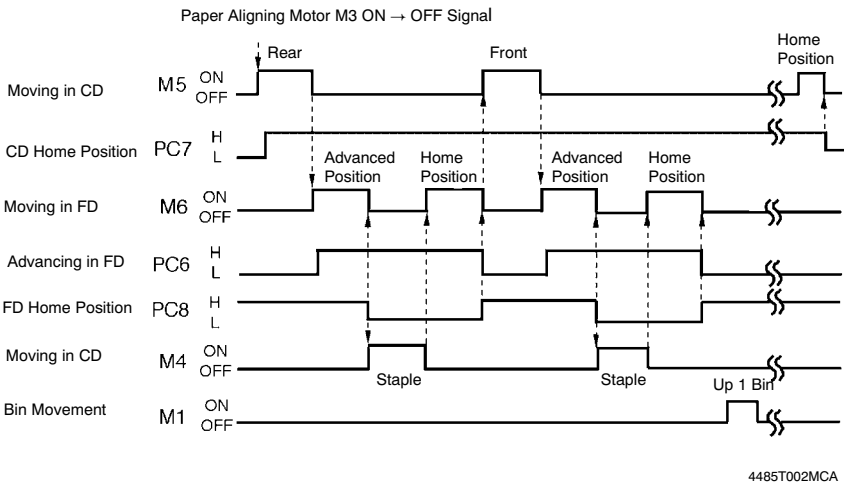
If a mechanical or electrical failure occurs, Bin Moving Motor M1 can keep on turning even when it should remain stationary. Bin Upper Limit Interlock Switch S1 and Bin Lower Limit Interlock Switch S2 are installed to shut down the DC24V power supply to M1, thereby bringing the motor to a stop if such trouble occurs.

6-5. Stapling Unit Moving Mechanism

- The Stapling Unit moving mechanism moves the Stapling Unit in the feeding and crosswise direction (to the predetermined stapling position) to let it perform a stapling action and, after it has completed the stapling sequence, returns it back to the home position.
- The Stapling Unit is moved in the feeding direction by Stapling Unit FD Motor M6. It is moved in the crosswise direction by Stapling Unit CD Motor M5 according to the type of stapling specified for the sequence, either Top Slant, Top, or Two-Point.

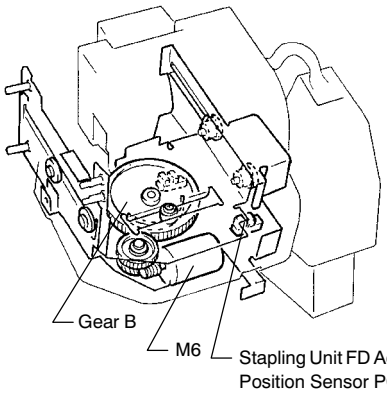


- **Timing Chart for "Two-Point" Stapling**



● **Stapling Unit FD Moving Mechanism**

The Stapling Unit FD (feeding direction) moving mechanism works as follows. When Stapling Unit FD Motor M6 is energized, its drive turns Gear B 1/2 turn via a gear, moving the Stapling Unit from the FD home position to the FD advanced position (55 mm). After the stapling sequence is completed, Gear B is turned 1/2 turn to return the Stapling Unit back from the FD advanced position to the home position.



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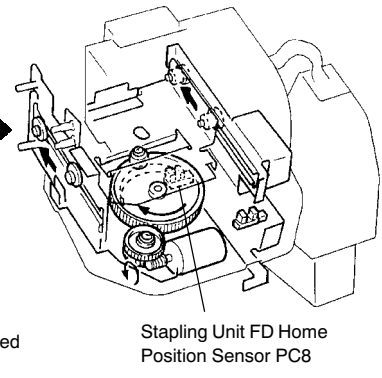

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● **Description of Stapling Unit FD Motor M6**

The DC motor used as M6 is energized and deenergized under the control of the output from pin 82 of IC3A fed via IC16A. M6 turns only in one direction.

IC3A-82	M6
H	ON
L	OFF

● **Stapling Unit FD Home Position Detection**

The Stapling Unit is detected at its home position in the feeding direction (FD home) as follows. When Stapling Unit FD Advanced Position Sensor PC6 is blocked (L) by the light blocking plate fitted to the Stapling Unit guide plate, the PC6 output is applied to pin 96 of IC3A.

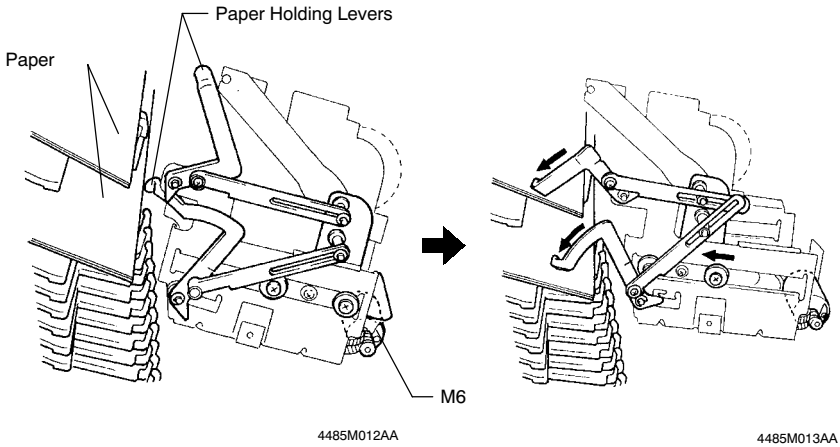
The Sorter attempts to determine if the Stapling Unit is at the FD home position at any of the following timings:

- When the copier is turned ON.
- When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON.
- After a malfunction has been reset.
- At the start and end of a motion [as detected when Stapling Unit FD Home Position Sensor PC8 is unblocked (H) and blocked (L).

● **Paper Holding Mechanism**

- The paper holding mechanism employs two Paper Holding Levers that are pressed against the copy set/stack in the bin to keep the set/stack aligned while the Stapling Unit is moving and during a stapling sequence. The two levers are brought back to the original position after the stapling sequence is completed.
- The paper holding and release motions are in phase with the operation of Stapling Unit FD Motor M6. The levers are pressed against, and released from, the copy set/stack as M6 is energized and deenergized.

● **Paper Holding Motion Illustrated**



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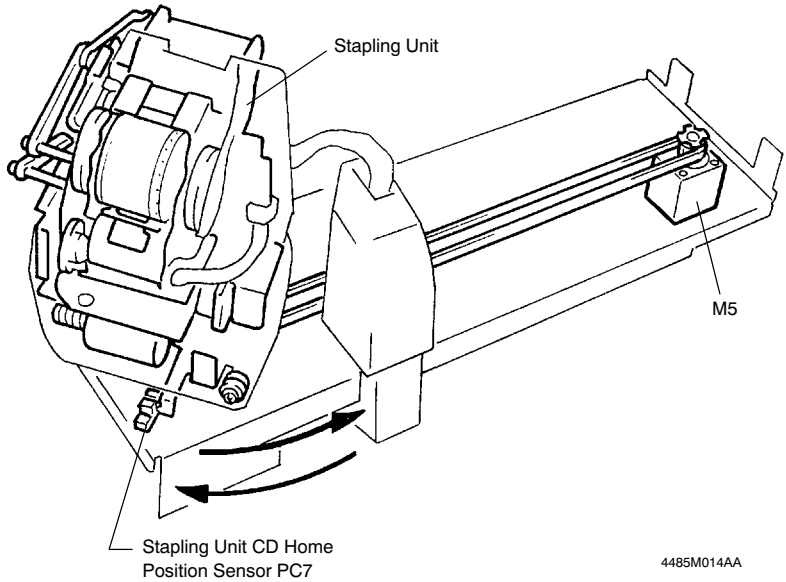
● **Stapling Unit CD Moving Mechanism**

The Stapling Unit CD (crosswise direction) moving mechanism works as follows. The drive from Stapling Unit CD Motor M5 is transmitted to the belt, moving the Stapling Unit from the CD home position to the set stapling position according to the type of stapling (Top Slant, Two-Point, or Top) selected for use. After the stapling sequence is completed, the Stapling Unit returns from the set stapling position to the home position.



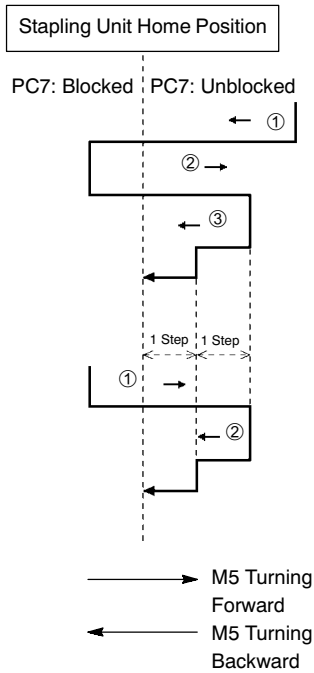
● **Description of Stapling Unit CD Motor M5**

Since it is necessary to stop the Stapling Unit at several different places to accommodate the three different types of stapling, stop position accuracy is at a premium for M5. To ensure good positioning accuracy, a two-phase stepping motor is used for M5 and its direction of rotation and speed are controlled by applying pulse signals output from pins 12 to 15 of IC1A via IC10A to the motor.

*M5 is not energized to effect “Top Slant” stapling.

● **Stapling Unit CD Home Position Detection**

The home position of the Stapling Unit in the crosswise direction (CD home) is where the light blocking plate fitted to the Stapling Unit has just blocked Stapling Unit CD Home Position Sensor PC7 (L). This position serves as the reference point, based on which the movement of the Stapling Unit in the crosswise direction for the specified stapling position for each paper size (the number of output pulses from IC1A applied to M5) is calculated.



When PC7 is unblocked (H)

① M5 is turned backward until PC7 is blocked.

② M5 is turned forward until PC7 is unblocked.

③ M5 is turned backward pulse by pulse until PC7 is blocked, at which time M5 is deenergized. (See NOTE below.)

When PC7 is blocked (L)

① M5 is turned forward until PC7 is unblocked.

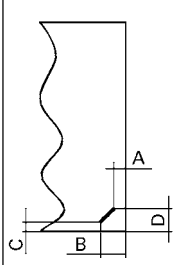
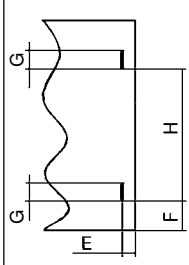
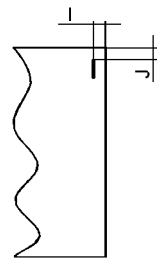
② M5 is turned backward pulse by pulse until PC7 is blocked, at which time M5 is deenergized. (See NOTE below.)

NOTE: The Sorter checks whether PC7 is blocked or unblocked each time M5 is energized for one pulse.

The Sorter attempts to determine if the Stapling Unit is at the CD home position at any of the following timings:

- When the copier is turned ON.
- When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON.
- At the start and end of the Stapling Unit CD movement.
- After a malfunction has been reset.

● **Multiple Stapling Positions**

	Top slant stapling	Two-point stapling	Top stapling
			
Applicable paper sizes	A4L/C, A3L 8-1/2"x11" L to 11"x17" L	A4C, A3L 8-1/2"x11" C, 11"x17" L	A4L 8-1/2"x14" L, 8-1/2"x11" L

● **Stapling Position Allowances in ( )**

① Top slant stapling

	A	B	C	D
Manual Staple[1]	6mm (2 to 10)	14.5mm (10.5 to 18.5)	5.5mm (1.5 to 9.5)	13.5mm (8.5 to 18.5)
Other than Manual Staple	6mm (2 to 10)	14.5mm (10.5 to 18.5)	7mm (3 to 11)	15mm (11 to 19)

② Two-point stapling

E = 6 mm (3 to 8); F = 83 mm (80 to 85); G = 12 mm; H = See table below.

	A4C, A3L	8-1/2"x11" C, 11"x17" L
Manual Staple[1]	119 mm (115 to 123)	
Other than Manual Staple	119 mm (116 to 121)	109 mm (106 to 111)

* Since the Sorter is unable to recognize paper size in the Manual Staple mode, the stapling positions deviate from those in other modes.

③ Top stapling

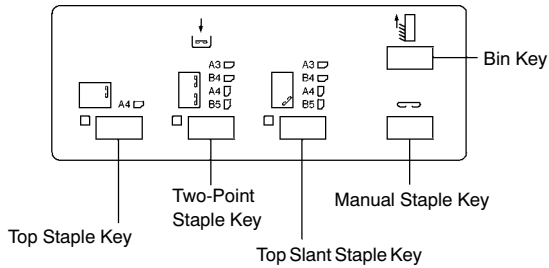
I = 6 mm (3 to 8); J = See table below.

	A4L	8-1/2"x11" L, 8-1/2"x14" L
Manual Staple[1]	7 mm (2 to 12)	13 mm (8 to 18)
Other than Manual Staple	5.5 mm (1.5 to 9.5)	

[1] Specifically for a copy set or set of documents manually placed in the 1st bin for stapling.

● **Sorter Control Panel**

This Sorter is provided with a Sorter Control Panel on top to make easier the operation of the Sorter with even enhanced functions. This control panel is used, instead of the Touch Panel on the copier, for manual stapling.



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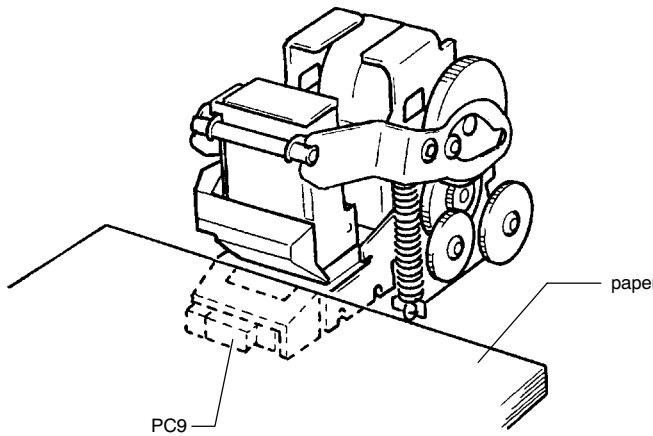
6-6. Stapling Paper Detection

Stapling Paper Detecting Sensor PC9 prevents a staple from being driven idly with no paper placed in position. It detects paper at a point before the stapling position to cope with different stapling types the Sorter offers. PC9 is a reflector type sensor that is to be positioned to detect paper from the bottom surface of the bin. If PC9 is not blocked (L) by paper even though the Stapling Unit has moved to the stapling position, the stapling action for that particular bin is canceled and the sequence is started for the stapling action for the next bin.



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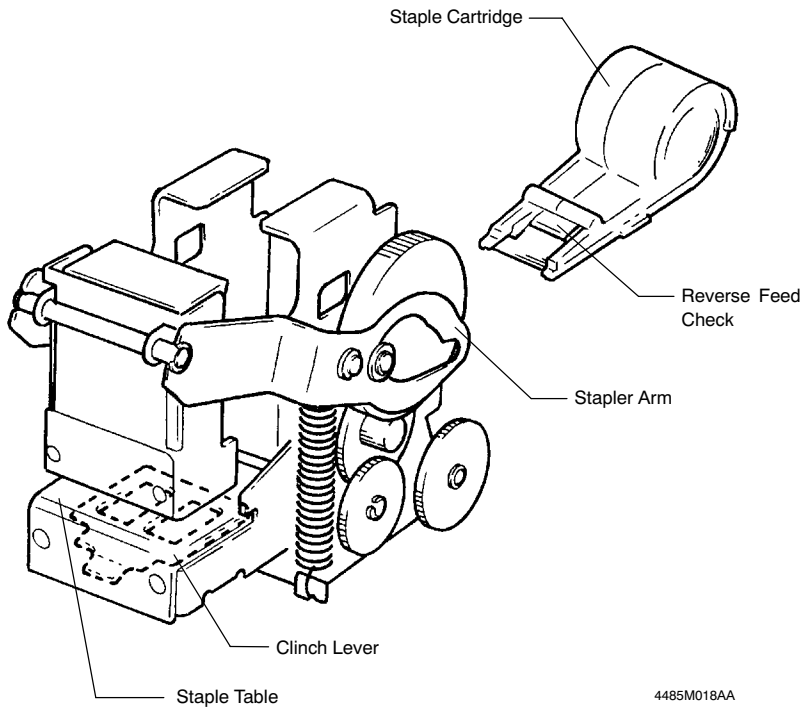
6-7. Stapling Mechanism

- When Stapling Motor M4 turns, the Stapling Unit moves the Stapler Arm up and down to drive a staple into copies and then moves the Clinch Lever up and down to clinch the staple driven.



- **Description of Stapling Motor M4**

  The DC motor used as Stapling Motor M4 is energized and deenergized under the control of the output from pins 31 and 32 of IC3A. M4 turns forward for the stapling action.

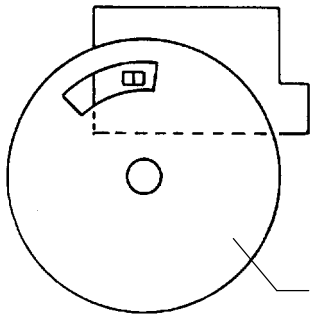
IC3A-31	IC3A-32	Direction of M4 Rotation
L	H	Forward
H	L	Backward*
L	H	Stop

* If staples jam during a stapling sequence and an overload is applied to the drive mechanism, the Stapling Unit is driven backward without driving a staple and returns to the home position, causing a staple jam.

● **Stapler Home Position Detection**

The home position of the Stapler is detected when Stapler Home Position Sensor PC25 is blocked and unblocked by the cutout in Gear A. The output from PC25 is input to pin 36 of IC3A.

— PC25: Unblocked —



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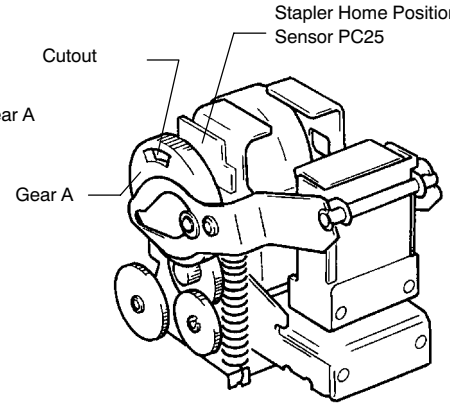
	PC25	IC3A-36
At home position	Being driven	L
Unblocked	Blocked	H



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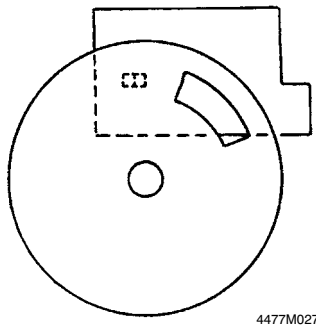
— PC25: Blocked —



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The Sorter attempts to determine if the Stapler is at the home position under the following timing:

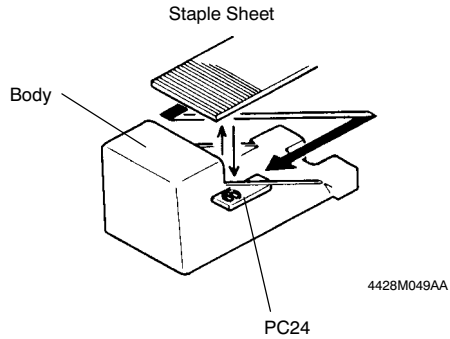
- When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON for the first time after the copier has been turned ON.

If the Stapler is out of the home position (PC25 is blocked), Stapling Motor M4 is energized and, when PC25 is unblocked, it is deenergized. (This is the home position detecting sequence.)

● **Staple Sheet Empty Detection**

Staple Empty Detecting Sensor PC24 is used to detect whether there is a staple sheet or not in the Staple Cartridge. PC24 is a reflector type photosensor. When there is a staple sheet, the light from the PC24 LED is reflected by the staple sheet, turning ON the PC24 phototransistor. This results in a LOW signal being input to pin 60 of IC1A. If there is no staple sheet, the LED light is not reflected, which turns OFF the phototransistor. At this time, a HIGH signal is input to pin 60 of IC1A and the copier and Sorter give a staple-sheet-empty warning.

Staple Sheet	IC1A-60
Present	L
Not present	H



- A staple-sheet-empty condition is detected when there are about 60 staples left in the Staple Cartridge.
- If a staple-sheet-empty condition is detected during a stapling sequence, that particular stapling sequence is continued until it is completed. After the sequence has been completed, the staple-sheet-empty warning is given prompting the operator to change the Staple Cartridge.
- Immediately after a new Staple Cartridge has been installed, the Stapler is operated to complete four consecutive stapling sequences (it is stopped when Stapler Home Position Sensor PC25 is activated a fourth time). This is done to prevent a “dummy run” (an operation of the Stapler without actually driving a staple into the paper) immediately following the replacement of the cartridge.

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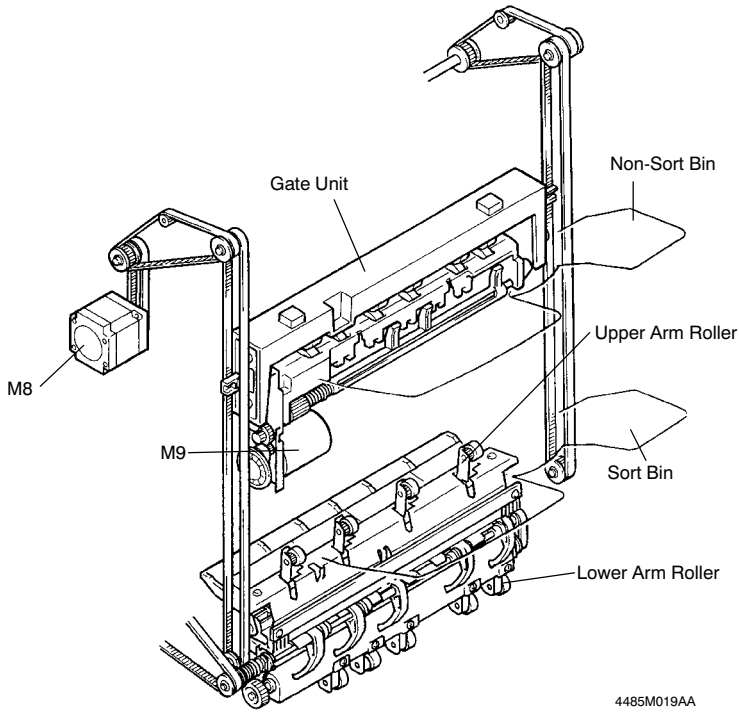
6-8. Stacking Mechanism (ST-1000/ST-1100 only)

- The stacking mechanism picks up the copy set/stack fed into the Sort Bin and moves it to, and stacks it in, the Non-Sort Bin. When combined with an AFR-1000, it enables sorting of copies into 21 or more sets/stacks in a single run. It also makes it easy to remove the copy sets/stacks.



- **Modes Using Stacking Capability**

Sort	:	After 20 copy sets have been made, the Sorter stacks them in a sawtooth manner with a shift of 20 mm to the left or right between each set (only when making 21 or more copy sets).
Group	:	After copies have been made, the Sorter stacks them in a saw tooth manner with a shift of 20 mm to the left or right between each stack.
Non-Sort	:	When copies are fed into the Sort Bins after the capacity of the Non-Sort Bin has been reached, the Sorter stacks the excess copies after the copier completes the copy cycle.
Sort Staple	:	During the auto stapling sequence, following the completion of the copy cycle, the Sorter stacks the stapled copy sets.
Manual Staple	:	During the manual stapling sequence, the Sorter sequentially stacks the stapled copy set/stack.

* The copier automatically continues making the subsequent copies after the Sorter has stacked all copies in the Sort Bins onto the Non-Sort Bin during a multi-copy cycle.

● **Outline of Stacking Operation**

The Upper Arm and Lower Arm pick up the copy set/stack from the Sort Bin and load it into the Gate Unit. With the copy set/stack held in position by the Gate Transport Rollers, the Gate Unit moves upward and then the Gate Transport Rollers unload the set/stack onto the Non-Sort Bin.

The Gate Unit functions also as the exit roller/guide plate when the Sorter is in the Non-Sort mode and is normally located to receive copies in the Non-Sort mode. (This is done to prioritize the first copy time in the Non-Sort mode.)

= Operating Sequence in the Non-Sort Mode =

①The Upper and Lower Arms grasp the copy set/stack on the Sort Bin and, at the same time, the Sort Exit Guide Plate retracts.

②The Gate Unit leaves its home position (at which to receive copies in the Non-Sort mode), moving to the pickup position (at which to receive copies in the Sort mode).

③The Upper and Lower Arms and the Gate Transport Rollers load the copy set/stack from the Sort Bin into the Gate Unit.

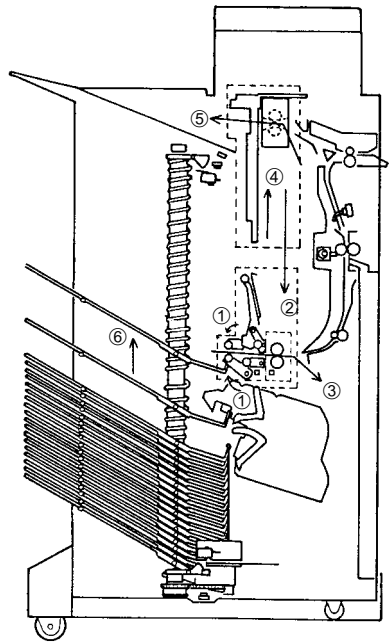
④The Gate Unit, holding the copy set/stack in position, moves to the copy set/stack unloading position*.

*This position varies as more copy sets/stacks are stacked up on the Non-Sort Bin (that is, gradually shifting upward).

⑤The Gate Transport Rollers unload the copy set/stack onto the Non-Sort Bin. (The Gate Unit stacks copy sets/stacks in a sawtooth manner, with the second and subsequent sets/stacks being shifted 20 mm to the left or right from the preceding one.)

⑥The Sort Bins are moved so that the Gate Unit can pick up a copy set/stack from the next bin.

⑦Operations ② through ⑥ are repeated until the Gate Unit completes unloading the last copy set/stack onto the Non-Sort Bin.



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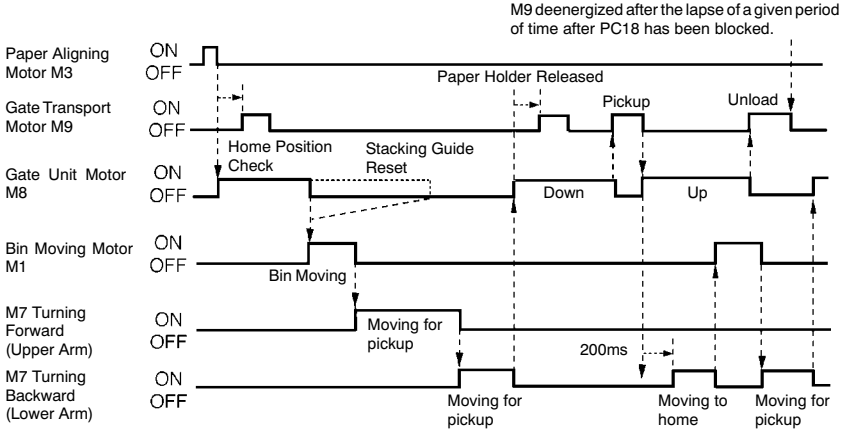
● **Timing Chart**



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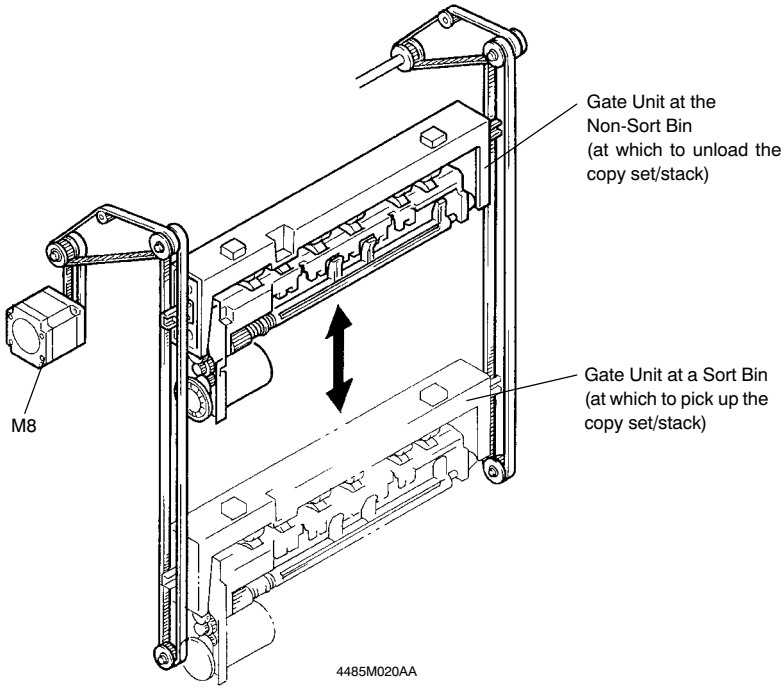
* The pickup and unloading time vary according to the paper length.
When the Stacking Guide is reset by M8, bins are moved after that.

6-9. Gate Unit Moving Mechanism (ST-1000, ST-1100 only)

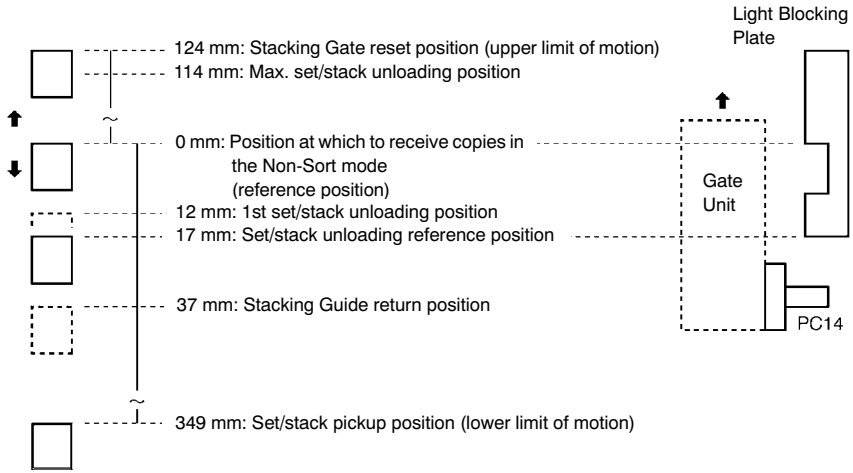
The Gate Unit is moved up and down during the stacking operation to move the copy set/stack from the Sort Bin to the Non-Sort Bin. It is driven via a belt by Gate Unit Motor M8. M8 turns forward to move the Gate Unit downward and backward to move the Gate Unit upward.
The Gate Unit functions also as the guide plate for the Non-Sort Bin.



- **Description of Gate Unit Motor M8**

A two-phase stepping motor is employed as Gate Unit Motor M8 to ensure good stopping accuracy of the Gate Unit. The direction of rotation and speed of M8 are controlled by applying pulse signals output from pins 16 to 19 of IC1A via IC12A and IC13A, respectively, to the motor. M8 is also braked in the Non-Sort mode and during stacking operation to prevent the Gate Unit from deviating from its correct position.

- **Distance of Movement of the Gate Unit**
  - Since the Gate Unit functions also as the exit roller/guide plate when the Sorter is in the Non-Sort mode, it is located at the position to receive copies in the Non-Sort mode (reference position) at the end of the initial operation when power is turned ON.
  - It is located at a position to receive copies in the Sort mode when it picks up the copy set/stack from a Sort Bin.
  - As shown below, the position at which the Gate Unit unloads the copy set/stack as part of the stacking sequence is not the position at which to receive copies in the Non-Sort mode. The 1st set/stack unloading position is 5 mm above the set/stack unloading reference position and, for the 2nd and subsequent set/stack, the position is shifted upward according to the height of the sets/stacks stacked on the Non-Sort Bin.

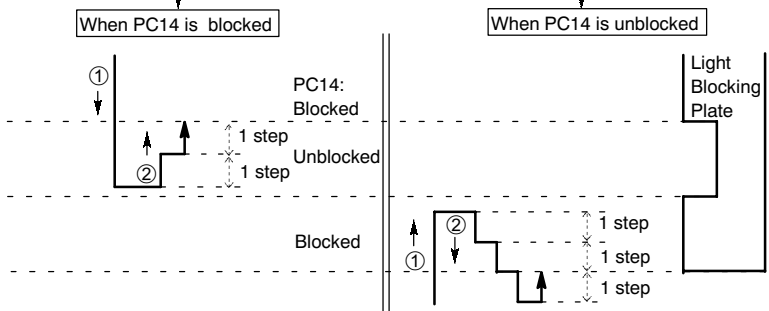


- **Gate Unit Reference Position Detection**

  The position at which to receive copies in the Non-Sort mode and the set/stack unloading reference position are detected on the light-blocking edge of Gate Unit Home Position Sensor PC14. The distance of up or down movement thereafter is controlled by the number of pulses input to M8.

Reference Position Detecting Operation

Sorter Set Switch 1 or 2
(S5 or S3: ST-1000, ST-1100 only): ON



①The Gate Unit is moved downward until PC14 is unblocked.
②The Gate Unit is moved upward pulse by pulse until PC14 is blocked.

①The Gate Unit is moved upward until PC14 is blocked.
②The Gate Unit is moved down and then up pulse by pulse until PC14 is blocked, unblocked, and then blocked.

③The Gate Unit is moved 10 mm downward to unblock and block PC14, thereby letting the Sorter recognize the position of the Gate Unit. (The light blocking plate blocks PC14 when the Gate Unit is located at any level above the position to receive copies in the Non-Sort mode.)

↓

④The position at which to receive copies in the Non-Sort mode or the set/stack unloading reference position

↓

⑤Stacking Guide reset position
Copy present on the Non-Sort Bin: Not to be reset

↓

⑥Stacking Guide return position

↓

⑦The position at which to receive copies in the Non-Sort mode (The set/stack unloading reference position at the start of the stacking sequence.)

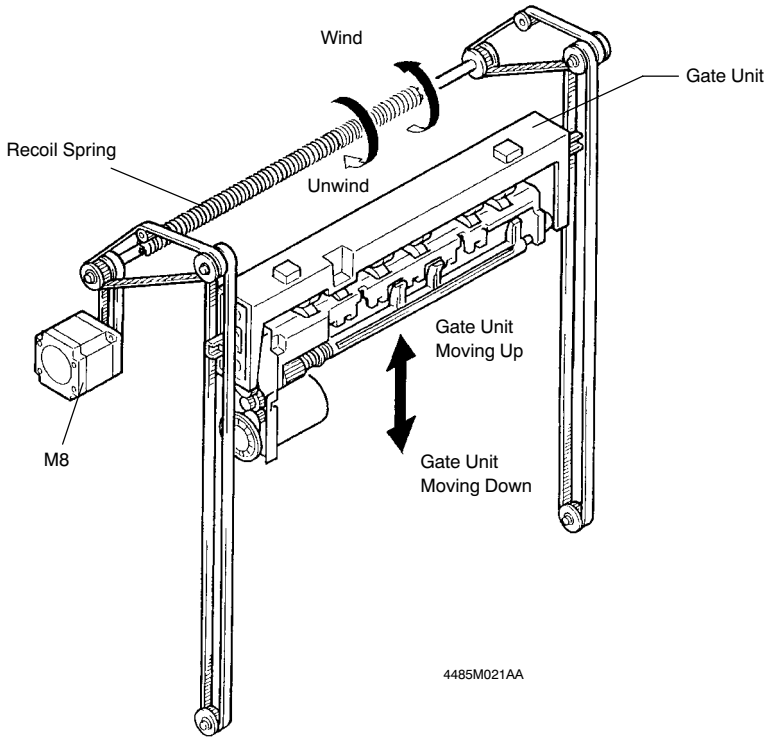
The Sorter attempts to determine if the Gate Unit is at the reference position at any of the following timings:

- When the copier is turned ON.
- When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON.
- At the start of the stacking sequence and at the start of a copy cycle in the Non-Sort mode.
- After a malfunction has been reset.

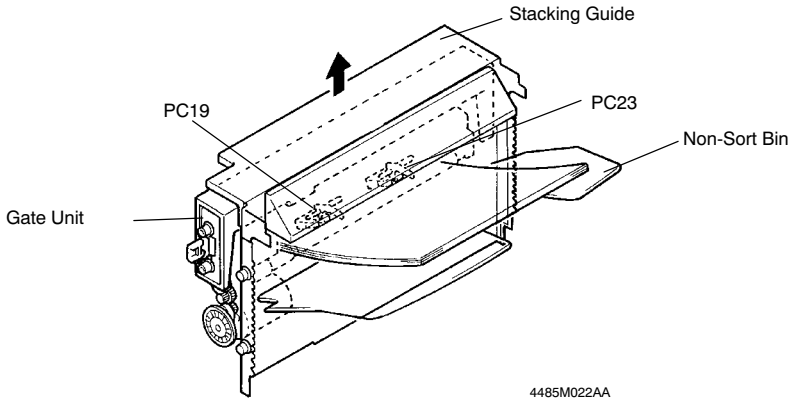
● **Auxiliary Gate Unit Moving Mechanism**

When the Gate Unit is loaded with a copy set/stack, the load becomes greater as it moves upward. To reduce the driving torque for moving the Gate Unit upward and make the moving speed faster for greater productivity in making copies, the auxiliary Gate Unit moving mechanism using a recoil spring is installed. The right end of the recoil spring is secured to the rear frame and its left end is hooked to the shaft of the Gate Unit drive mechanism. This shaft is coupled to the belts on both sides of the Sorter and the recoil spring is designed to be wound when the Gate Unit moves downward. This means that, when the Gate Unit is at the position to pick up a copy set/stack from a Sort Bin, the recoil spring is wound tightly. The recoil force of this tightly wound recoil spring adds torque required to move the Gate Unit upward.

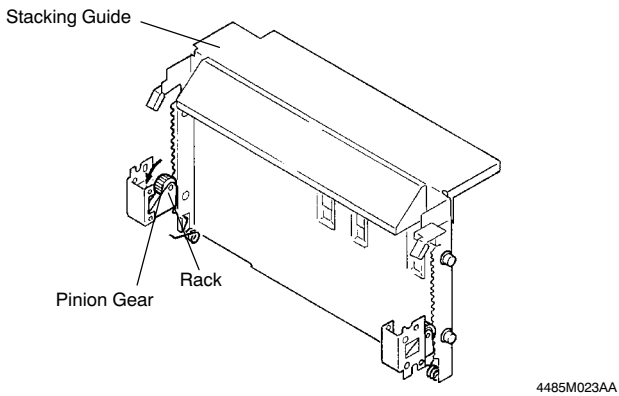
In addition, when the Gate Unit is located at the position to receive copies in the Non-Sort mode, the recoil spring gives supportive force greater than the weight of the Gate Unit, thereby preventing the unit from lowering. When the Gate Unit moves downward, the reactive force of the recoil spring puts a load against the movement to brake the unit.



- **Stacking Guide Moving Mechanism**
  - When a copy set/stack is unloaded onto the Non-Sort Bin, the clearance between the top surface of the set/stack and the unloading port is kept in the range of 20 mm to 40 mm according to the stacking height. This is done to ensure proper alignment of the set/stack.
  - Non-Sort Bin Upper Detecting Sensor 1 PC19 and Non-Sort Bin Upper Detecting Sensor 2 PC23 are installed at the front and rear end, respectively, of the Gate Unit. Each time the copy set/stack unblocks either PC19 or PC23 (H), the Gate Unit raises the Stacking Guide 6 mm upward.
  - When either PC19 or PC23 is unblocked (H) with the set/stack unloading position at its maximum, it results in a condition in which the capacity of the Non-Sort Bin is exceeded.
    * For a stapled copy set/stack of A3 or 11"x17", the sensor at the rear end only is used for detection to prevent an alignment problem from occurring when the set/stack is unloaded.

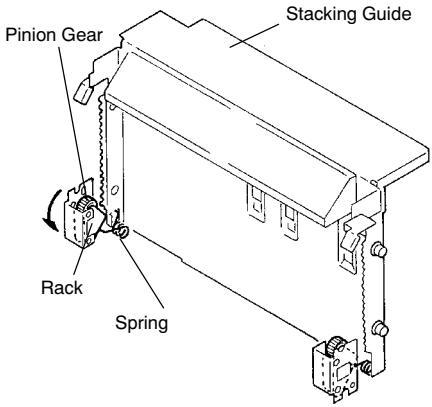


  - The Stacking Guide moving mechanism employs the combination of a pinion gear with a built-in one-way bearing and a rack. When the Gate Unit moves upward, the pinion gear turns to raise the Stacking Guide. When the Gate Unit moves downward, the pinion gear is locked so that the Stacking Guide can be kept at the unloading position.

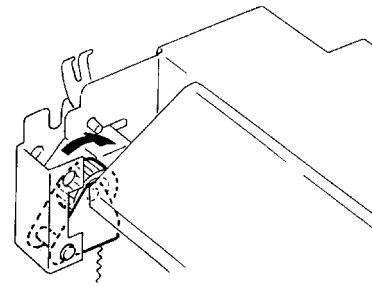


- **Stacking Guide Reset**
  - The Stacking Guide must be reset to move the Gate Unit to the reference position (for the copy receiving position in the Non-Sort mode and the set/stack unloading position) and, at the same time, to move the Stacking Guide to the position at which to receive copies in the Non-Sort mode and the set/stack unloading position.
  - The Stacking Guide resetting operation is done by raising the Stacking Guide with the Gate Unit as driven by M8.
  - The Stacking Guide cannot be lowered because of the one-way bearing built into the pinion that locks the guide in position. To reset the Stacking Guide, a specific position has been established: when the Stacking Guide is moved to this resetting position which is located above the max. unloading position, the pinion gear disengages from the rack.
    The Stacking Guide is then lowered by its own weight to the return position. If this is for resetting during stacking, the Stacking Guide then moves up to the set/stack unloading position; otherwise, it goes up to the position at which to receive copies in the Non-Sort mode.

= Stacking Guide Resetting Position = **= Stacking Guide Return Position =**



4485M024AA

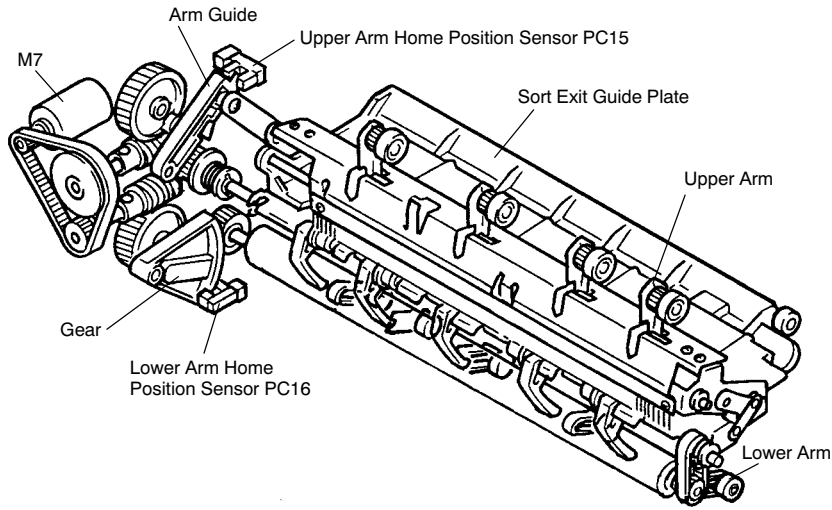


4485M025AA

6-10. Arm Moving Mechanism (ST-1000, ST-1100 only)

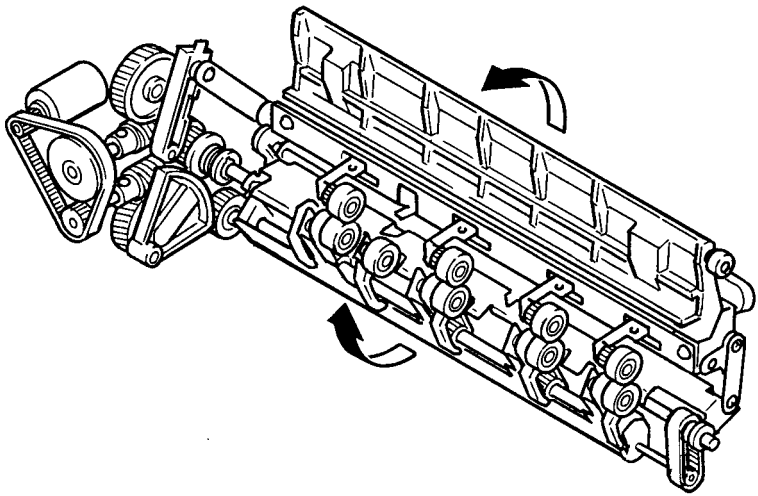
- To move the copy set/stack from the Sort Bin to the Gate Unit, the Upper Arm and Lower Arm are moved to the pickup position.
  The drive comes from Arm Motor M7 and is transmitted via a gear train and belt. M7 turns forward to move the Upper Arm and turns backward to move the Lower Arm.

= Normally =



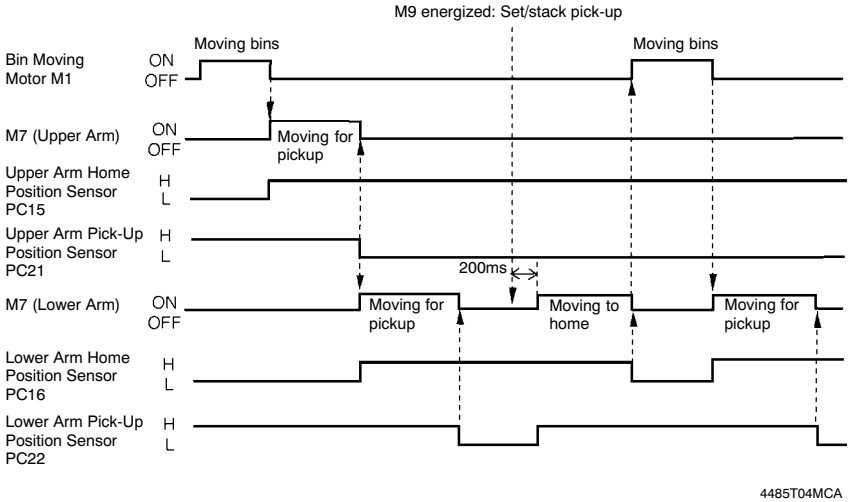
4485M027AA

= At Pickup =



4485M026AA

● **Timing Chart**



4485T04MCA

● **Description of Arm Motor M7**

M7, a DC motor, is energized and deenergized by the signals output from pins 83 and 84 of IC3A applied via IC24A to the motor. The direction of M7 rotation is controlled as follows.

IC3A-83	IC3A-84	Direction of M7 Rotation
H	L	Forward (Upper Arm to pickup and home position)
L	H	Backward (Lower Arm to pickup and home position)
L	L	Stop

● **Upper/Lower Arm Home Position Detection**

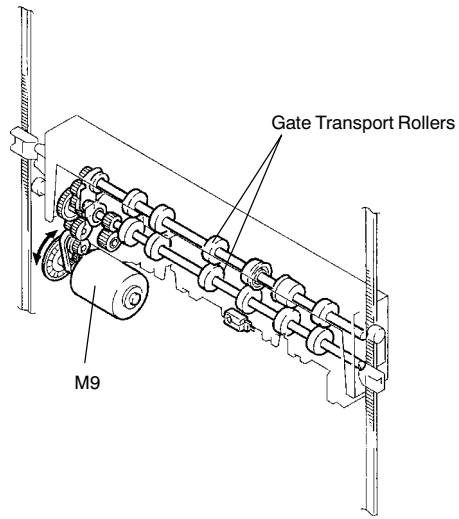
The Upper and Lower Arm are detected at their home positions when Upper Arm Home Position Sensor PC15 and Lower Arm Home Position Sensor PC16 are blocked and unblocked. The outputs from PC15 and PC16 are input to pins 60 and 61, respectively, of IC3A.

The Sorter attempts to determine if the Upper or Lower Arm is at the home position at any of the following timings:

- When the copier is turned ON.
- When Sorter Set Switch 1 or 2 (S5 or S3: ST-1000, ST-1100 only) is turned ON.
- At the start and end of the arm's motion.
- After a malfunction has been reset.

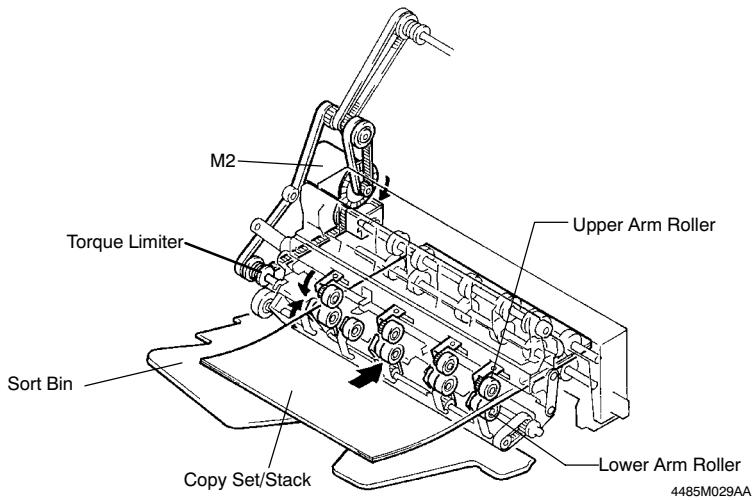
6-11. Gate Transport Mechanism (ST-1000, ST-1100 only)

- A pair of Gate Transport Rollers installed in the Gate Unit ensures that a copy set/stack is properly transported and held in position during the stacking sequence. Gate Transport Motor M9 turns backward to load the copy set/stack into the Gate Unit, remains deenergized to hold it in position, and turns forward to unload it onto the Non-Sort Bin.



= Loading Operation =

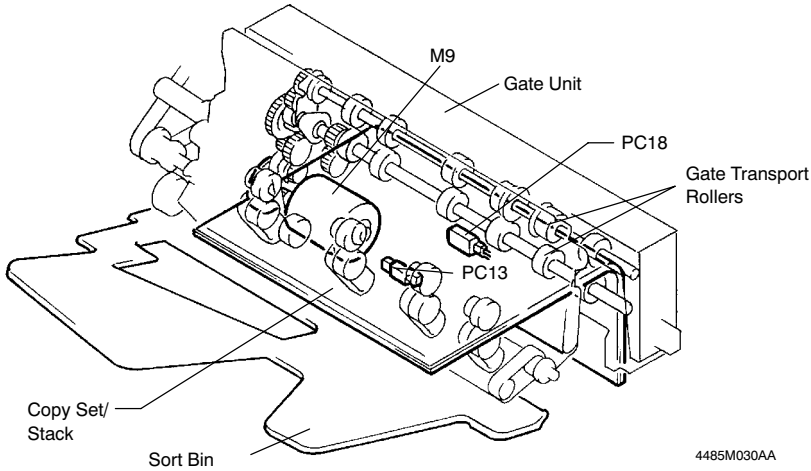
- Backward rotation of M2 is transmitted to the Lower Arm Roller and backward rotation of M9 is transmitted to the Gate Transport Rollers which results in the copy set/stack being loaded into the Gate Unit. The Lower Arm Roller is fitted with a clutch-spring torque limiter and that drives the Lower Arm Roller when a copy set/stack is loaded into the Gate Unit.



= Holding Operation =

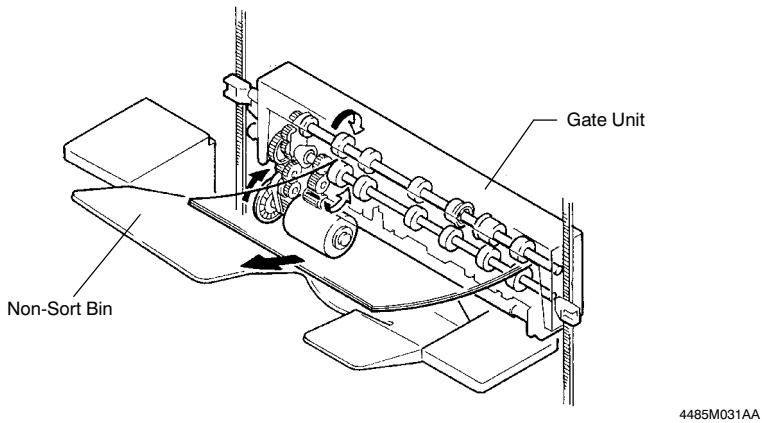
- Considering an unstapled copy set/stack, the following design features have been engineered into the control to ensure good stopping accuracy, thereby preventing the set/stack from slipping out of the area of contact between the Gate Transport Rollers.

  When Gate Transport Sensor PC18 detects the leading edge of the copy set/stack fed from the Sort Bin into the Gate Unit as M9 is turned backward, motor pulse count is started and M9 is decelerated at a point equivalent to the point 150 mm from the trailing edge of the paper size. To bypass the effect of paper size, M9 is deenergized when Sort Exit Sensor PC13 detects the trailing edge of the copy set/stack.

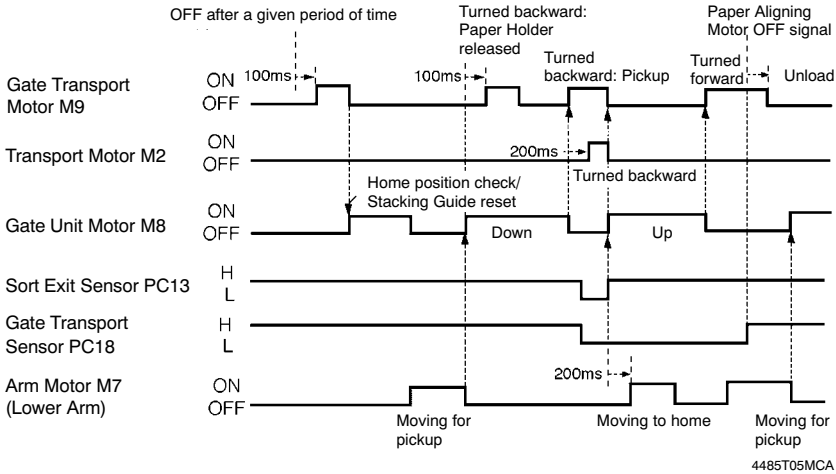


= Unloading Operation =

- The Gate Unit moves to the set/stack unloading position and M9 turns forward to unload the copy set/stack onto the Non-Sort Bin.



● **Gate Transport Timing Chart**



● **Description of Gate Transport Motor M9**

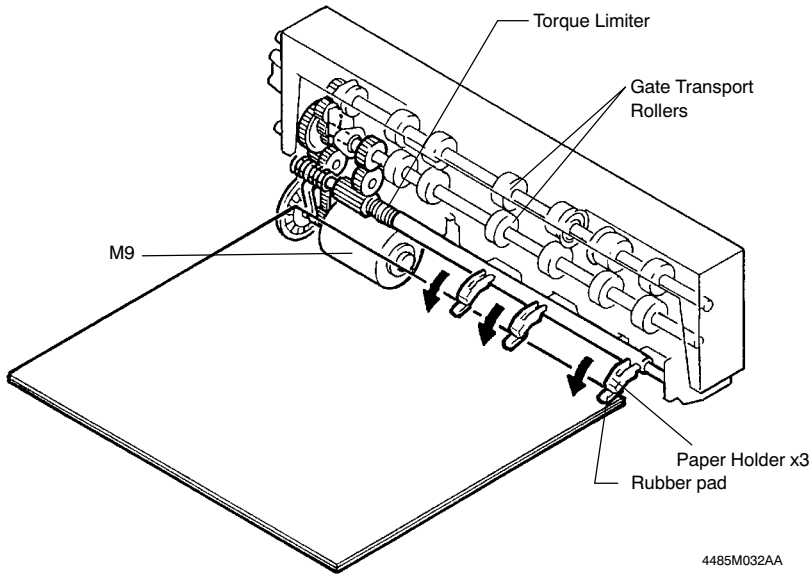
M9, a DC motor, is energized and deenergized by the signals output from pins 20 and 21 of IC1A applied via IC11A to the motor. The direction of rotation and speed of M9 are controlled as follows.

IC1A-20	IC1A-21	Direction of M9 Rotation
L	H	Turned backward (to load set/stack)
H	L	Turned forward (to unload set/stack)
L	L	Deenergized (to hold set/stack)

The PWM system is employed to control the speed of M9. Gate Transport Motor Pulse Sensor PC17 is installed in M9 for the detection of M9 speed.

* When the Sorter is in the Non-Sort mode, M9 is energized (to turn forward) and deenergized at the same timings as Transport Motor M2.

- **Paper Holders**
  - The Paper Holders are installed to ensure that a neat copy set/stack is unloaded onto the Non-Sort Bin. Drive for the Paper Holders comes from M9 via the Gate Transport Rollers to the clutch-spring torque limiter. The torque limiter ensures that the Paper Holders press against the copy set/stack with a constant pressure at the point 15 mm from the end face of the set/stack. A rubber pad is fitted to the end of each Paper Holder and in contact with the paper surface for greater friction resistance.



<When the Copy Set/Stack is Unloaded onto the Non-Sort Bin>

When M9 turns forward to turn the Gate Transport Rollers in the direction to unload the copy set/stack onto the Non-Sort Bin, the Paper Holders are swung down to hold the copy set/stack in position.

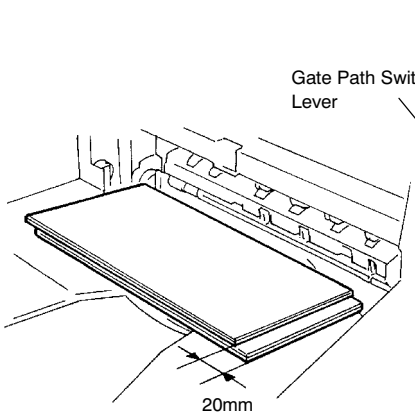
<When the Gate Unit Lowers to the Set/Stack Pickup Position>

When the Gate Unit moves from the set/stack unloading position down to the set/stack pickup position, M9 turns backward to turn the Gate Transport Rollers in the direction to load the copy set/stack into the Gate Unit, which disengages the Paper Holders.

● **Gate Path Switching Mechanism**

When stacking unstapled copy sets/stacks on the Non-Sort Bin, it is necessary to place them in a sawtooth manner so that each set can be identified from the other. Gate Path Switching Solenoid SL2 is used that is energized and deenergized, when the Gate Unit is moved from the pickup to unloading position, to shift a copy set/stack 20 mm in the crosswise direction from the preceding one.

When SL2 is energized, only the Gate Unit is moved 20 mm crosswise with the two shafts used as a guide.



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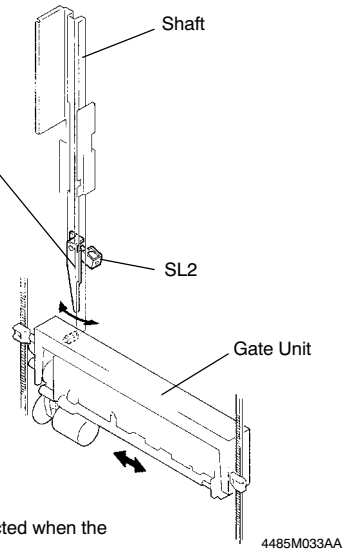
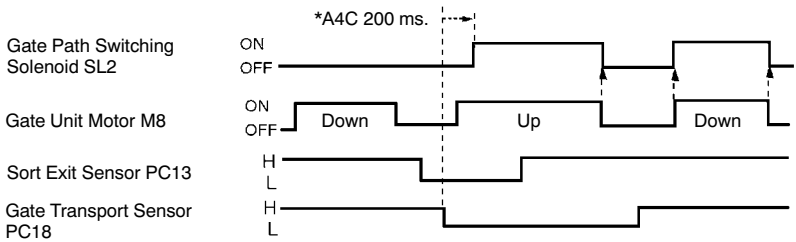


4485M033AA

* This shifting motion is not effected when the Sorter is in the Sort mode.

● **SL2 Timing Chart**



4485T06MCA

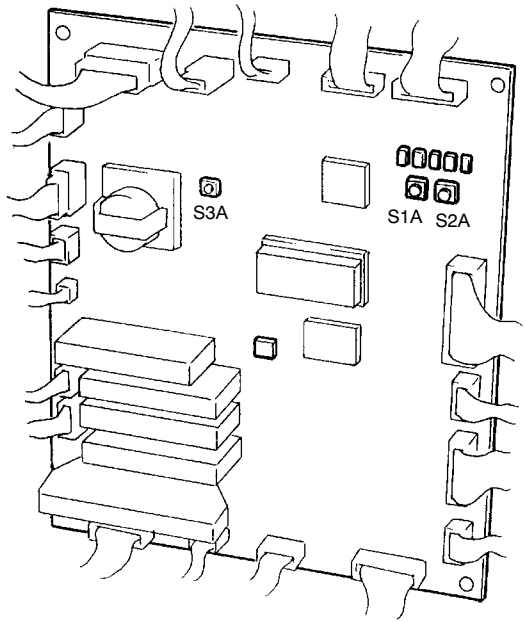
* Varies depending on the paper size.

SWITCHES ON PWB, TEST MODE

* This Sorter requires no Test Mode jigs for performing the Test Mode operations.

4485SBS0100A

1 SWITCHES ON PWB



4485M035AA

S1A, S2A	Test Mode switches (used to set/change the Test Mode operations)
S3A	Reset switch

4485SBS0200A

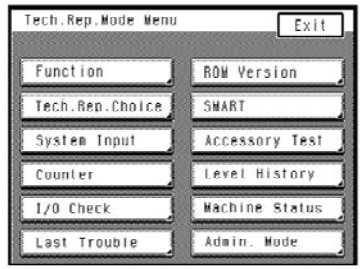
2 TEST MODE

- The test mode for this Sorter can be initiated either by using the Service mode of the copier or by changing the positions of the DIP Switches on PWB-A of the Sorter.

4485SBS0201A

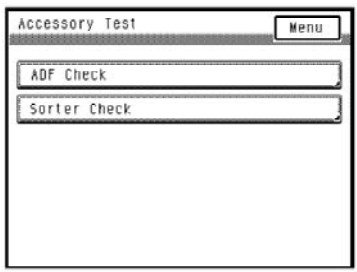
2-1. Test Mode via the Service Mode

1. On the copier control panel, press the Stop key, 0, Stop key, and 1, in that order to show the Service mode menu on the Touch Panel. Then, select “Accessory Test.”

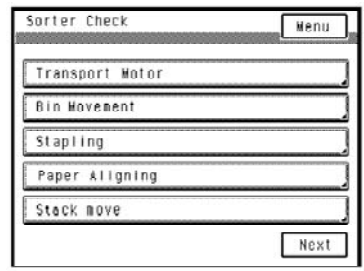


4477S007CA

2. Select “Sorter Check.”



4477S008CA



4477S009CB

3. Select the desired function from among the following and press the Start key to start it.

NOTE: Touch “Next” to show the “Input Check” screen. When the test mode is run with this screen on the Touch Panel, either 1 or 0 is shown after each sensor according to its state.

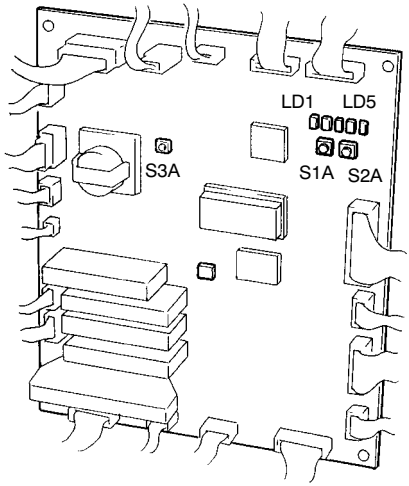
- Transport Motor: Energizes Transport Motor M2 to turn the Transport Rollers.
- Bin Movement: Energizes Bin Moving Motor M1 to move bins up and down sequentially.
- Stapling: Causes a stapling action to occur if paper is loaded in the 1st Bin. If not, it causes only the Stapling Unit to advance in the feeding direction.
- Paper Aligning: Causes a paper aligning motion to occur for the width of the paper currently selected for use.
- Stack Move: Causes the stacking operation to occur for all Sort Bins.

2-2. Test Mode via the DIP Switches

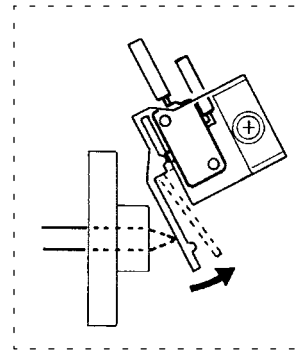
The Sorter can be checked for different operations by using the Test Mode as detailed below. It can be set into each Test Mode operation sequentially by switch operation.

Initial Display	Shows the settings of the Sorter.
↓	
Input Check	Shows the level of input from each sensor to PWB-A by means of an on or off LED.
↓	
Type Setting	Make the necessary setting so that the subsequent operation can be run properly.
↓	
Initial Operation	Performs the initial operation.
↓	
Paper Size Setting	Moves the Paper Aligning Bar to the aligning position for the paper size to be set.
↓	
Sorting	Moves the bins in the Sort mode (for bi-directional sorting) and the paper aligning motion occurs.
↓	
Hole Punch	Performs the Punch mode operation.
↓	
Stapling	Performs the stapling sequence for all Sort Bins.
↓	
Stacking	Performs the stacking sequence for all Sort Bins. (The ST-213 skips this operation and moves onto the next one.)
↓	
Bin Moving	Moves the bins up and down one bin position.
↓	
Stapling Unit Moving	Moves the Stapling Unit in the crosswise and feeding directions.
↓	
Gate Unit Moving	Moves the Gate Unit. (The ST-213 skips this operation and moves onto the next one.)

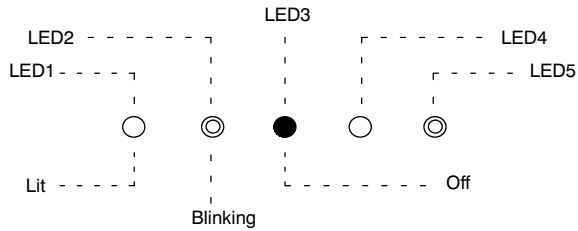
* Switches S1A to S3A on PWB-A are used to set the Sorter into the Test Mode and select each Test Mode operation. (Remove the Rear Cover to access these switches.) Be sure to turn ON Sorter Set Switch 1 S5 and Sorter Set Switch 2 S3 (ST-1000, ST-1100 only).



4485M035AA


4485M036AA

* A particular Test Mode operation can be identified by LED1 through LED5 on PWB-A which may be lit up, blinking, or off. In the text that follows, the following symbols are used to represent a lit, blinking, or off LED.
* When the Sorter has entered the Test Mode, the blinking interval of LED on PWB-A will be changed as follows.



Normally: 1-sec. interval
In Test Mode: 0.5-sec. interval

* Where a particular LED gives a different indication between ST-1000/ST-1100 and ST-213, that for ST-213 is shown in ( ).

Setting Sorter into Test Mode

- Holding down S1A, press S3A briefly, and keep pressing S1A for about 20 sec.
- To quit the Test Mode, press S3A.

Initial Display

(●) (●)

◎ ◎ ◎ ◎ ◎

"●" if Sorter Set Switch 1 S5 and Sorter Set Switch 2 S3 (ST-1000/ST-1100 only), and Cover Set Switch 1 S7 and Cover Set Switch 2 S4 (ST-1000/ST-1100 only) are OFF. Be sure to keep these switches in the ON position to ensure correct subsequent Test Mode operations.

Press S1A.

Input Check

◎ ● ● ● ●

Indicates the state of the input from each sensor or switch to PWB-A by an on or off LED. The following shows the states when the corresponding LED lights up. The indication given in ( ) for ST-213 is for all times.

Press S2A to check the following sensors and switches.

(●)

○ ○ ○ ○ ○

Stapling Unit connection (CN3): Connected
Punch Unit connection (CN12): Connected
Cover Set Switch 1 S7: ON
Sorter Set Switch 2 S3: ON
Sorter Set Switch 1 S5: ON

↓Press S2A to check the following sensors and switches.

○ ○ ○ ○ ○

Bin Moving Motor pulse (Lit at all times)
Bin Positioning Sensor PC1: Unblocked (H)
Bin Upper Limit Interlock Switch S1: ON
Bin Lower Limit Position Sensor PC2: Unblocked (H)
Paper Aligning Home Position Sensor PC3: Blocked (L)

↓Press S2A to check the following Sensors and Switches.

○ ○ ○ ○ ○

Punch Registration Sensor PC5: Unblocked (H)
Sort Exit Sensor PC11 (ST-213): Unblocked (H)
Sort Exit Sensor PC13 (ST-1000/ST-1100): Blocked (L)
Sort Bin empty detection: Empty (H)
Non-Sort Exit Sensor PC12 (ST-213): Unblocked (H)
Gate Transport Sensor PC18 (ST-1000/ST-1100): Blocked (L)
Non-Sort Bin Empty Detecting Sensor PC10: Empty (H)

① ②

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①

②

↓Press S2A to check the following sensors and switches.

○ ● ○ ● ○

Transport Motor Pulse Sensor PC4: Unblocked ([H])
Off at all times
Punch Hole Switching Sensor PC20: Blocked ([L]) Inch Areas Only
Off at all times
Staple Empty Detecting Sensor PC24: Empty ([H])

↓Press S2A to check the following sensors and switches.

○ ○ ○ ○ ○

Stapling Unit FD Advanced Position Sensor PC6: Blocked ([L])
Stapling Unit FD Home Position Sensor PC8: Blocked ([L])
Stapler Home Position Sensor PC25: Unblocked ([L])
Stapling Paper Detecting Sensor PC9: Blocked ([L])
Stapling Unit CD Home Position Sensor PC7: Blocked ([L])

↓Press S2A to check the following sensors and switches.
(With ST-213, the LDs look like ◎ ● ● ● ●)

○ ○ ○ ○ ●

Upper Arm Pick-Up Position Sensor PC21: Blocked ([L])
Upper Arm Home Position Sensor PC15: Blocked ([L])
Lower Arm Pick-Up Position Sensor PC22: Blocked ([L])
Lower Arm Home Position Sensor PC16: Blocked ([L])
Off at all times

↓Press S2A to check the following sensors and switches.

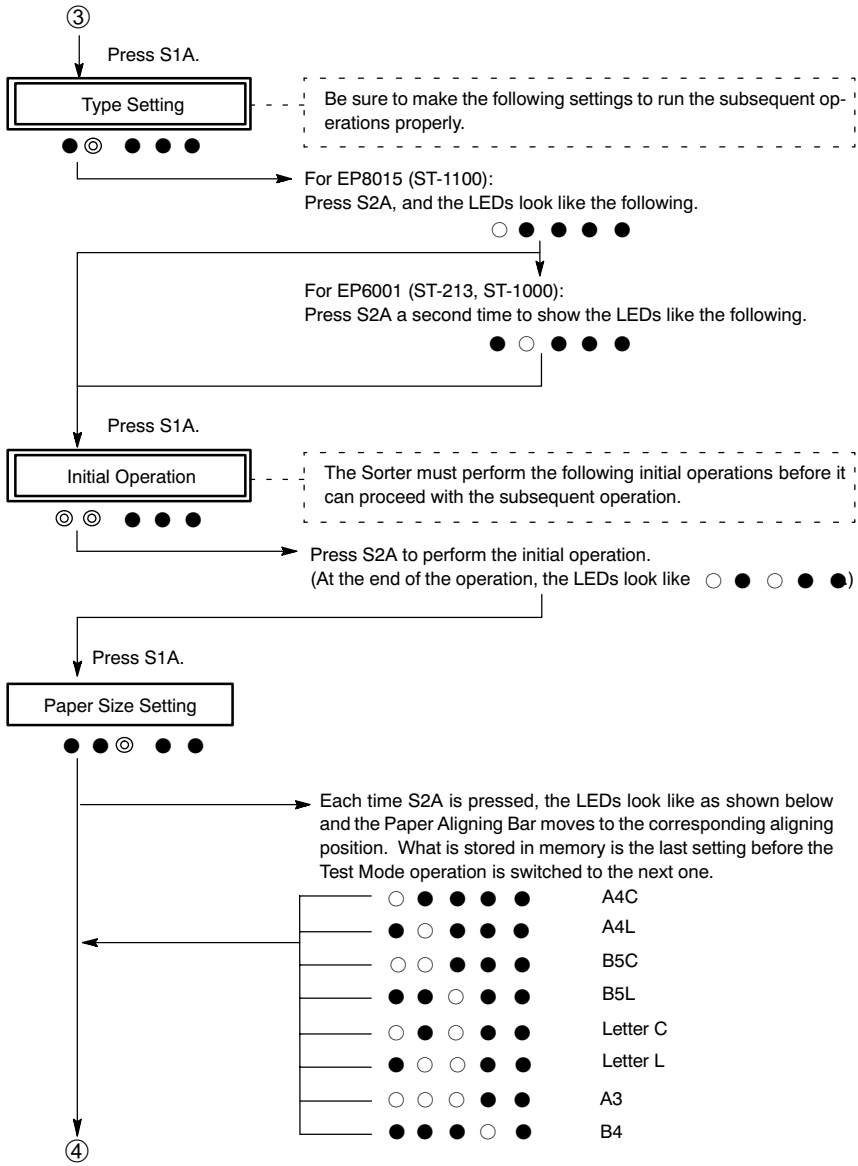
○ ○ ○ ○ ●

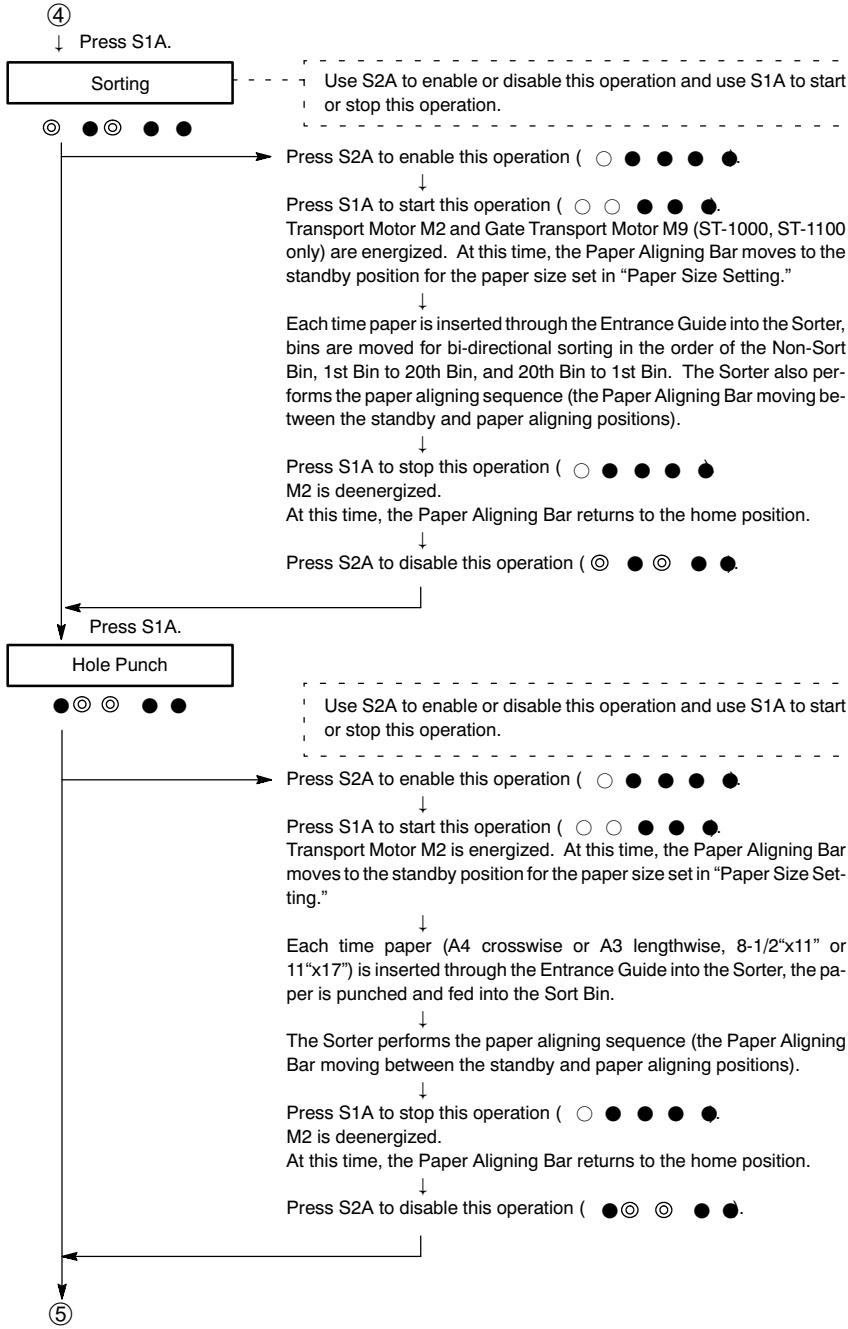
Gate Unit Home Position Sensor PC14: Blocked ([L])
Gate Transport Motor Pulse Sensor PC17: Unblocked ([H])
Non-Sort Bin Upper Detecting Sensor 1 PC19: Unblocked ([H])
Non-Sort Bin Upper Detecting Sensor 2 PC23: Unblocked ([H])
Off at all times

↓Press S2A, and the LEDs look like ◎ ● ● ● ●.

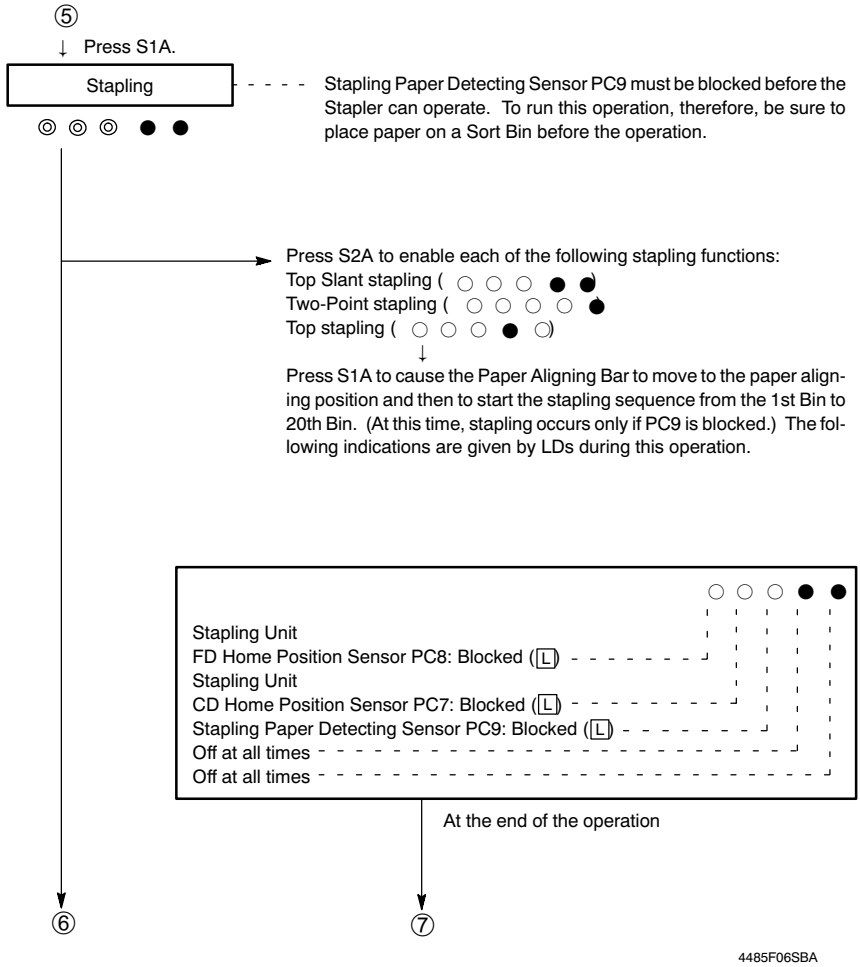
③

4485F03SBA

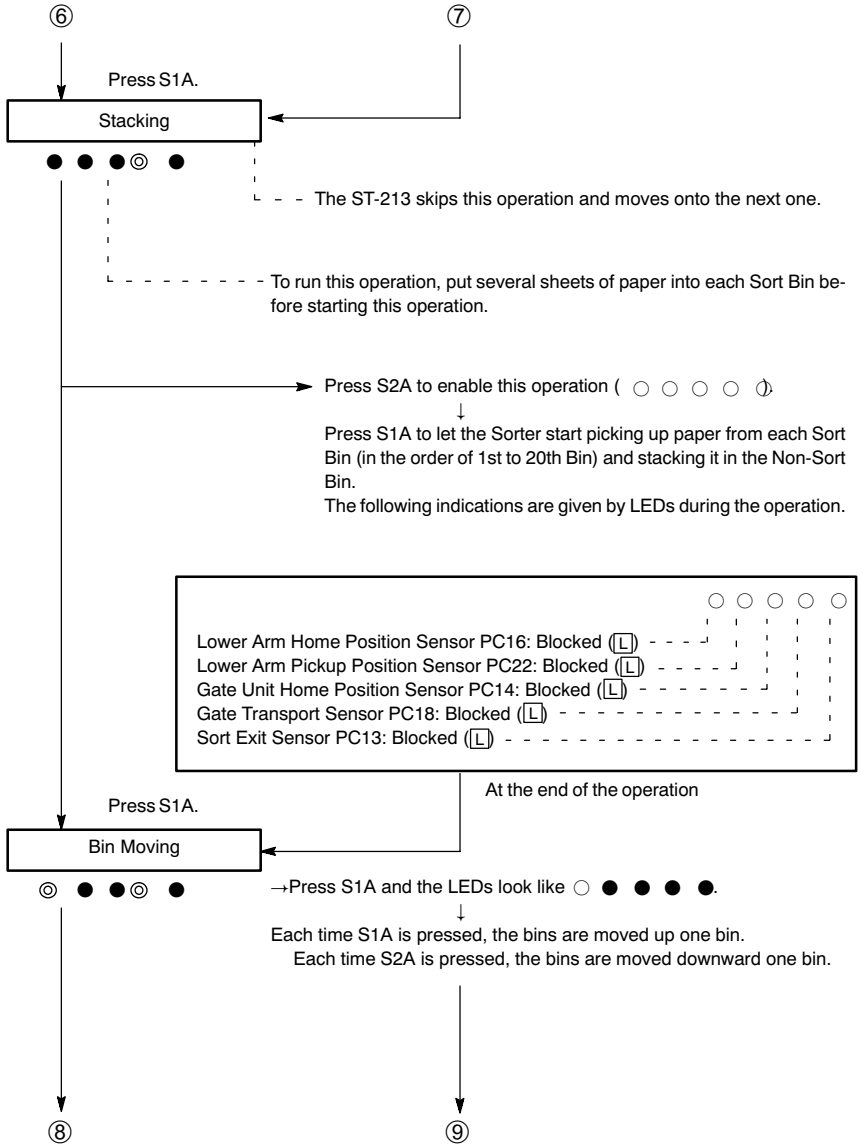

③
Press S1A.
Type Setting
Be sure to make the following settings to run the subsequent operations properly.
For EP8015 (ST-1100):
Press S2A, and the LEDs look like the following.
For EP6001 (ST-213, ST-1000):
Press S2A a second time to show the LEDs like the following.
Press S1A.
Initial Operation
The Sorter must perform the following initial operations before it can proceed with the subsequent operation.
Press S2A to perform the initial operation.
(At the end of the operation, the LEDs look like ○ ● ○ ● ●)
Press S1A.
Paper Size Setting
Each time S2A is pressed, the LEDs look like as shown below and the Paper Aligning Bar moves to the corresponding aligning position. What is stored in memory is the last setting before the Test Mode operation is switched to the next one.
A4C
A4L
B5C
B5L
Letter C
Letter L
A3
B4
④
4485F04SBA

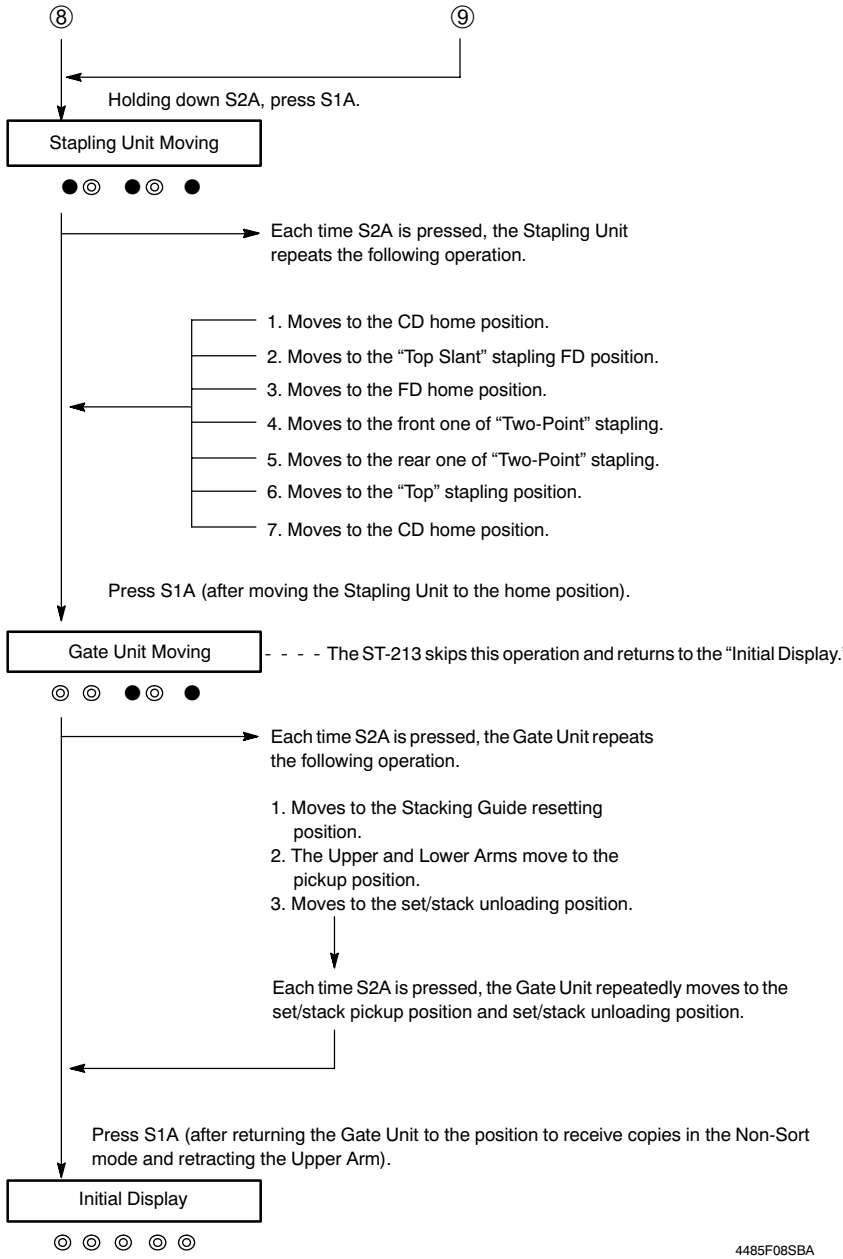

④
Press S1A.
Sorting
Use S2A to enable or disable this operation and use S1A to start or stop this operation.
Press S2A to enable this operation (○ ● ● ● ●.
Press S1A to start this operation (○ ○ ● ● ●.
Transport Motor M2 and Gate Transport Motor M9 (ST-1000, ST-1100 only) are energized. At this time, the Paper Aligning Bar moves to the standby position for the paper size set in "Paper Size Setting."
Each time paper is inserted through the Entrance Guide into the Sorter, bins are moved for bi-directional sorting in the order of the Non-Sort Bin, 1st Bin to 20th Bin, and 20th Bin to 1st Bin. The Sorter also performs the paper aligning sequence (the Paper Aligning Bar moving between the standby and paper aligning positions).
Press S1A to stop this operation (○ ● ● ● ●
M2 is deenergized.
At this time, the Paper Aligning Bar returns to the home position.
Press S2A to disable this operation (◎ ● ◎ ● ●.
Press S1A.
Hole Punch
Use S2A to enable or disable this operation and use S1A to start or stop this operation.
Press S2A to enable this operation (○ ● ● ● ●.
Press S1A to start this operation (○ ○ ● ● ●.
Transport Motor M2 is energized. At this time, the Paper Aligning Bar moves to the standby position for the paper size set in "Paper Size Setting."
Each time paper (A4 crosswise or A3 lengthwise, 8-1/2"x11" or 11"x17") is inserted through the Entrance Guide into the Sorter, the paper is punched and fed into the Sort Bin.
The Sorter performs the paper aligning sequence (the Paper Aligning Bar moving between the standby and paper aligning positions).
Press S1A to stop this operation (○ ● ● ● ●.
M2 is deenergized.
At this time, the Paper Aligning Bar returns to the home position.
Press S2A to disable this operation (●◎ ◎ ● ●.
⑤

4485F05SBA


⑤
↓ Press S1A.
Stapling
◎ ◎ ◎ ● ●
Stapling Paper Detecting Sensor PC9 must be blocked before the Stapler can operate. To run this operation, therefore, be sure to place paper on a Sort Bin before the operation.
Press S2A to enable each of the following stapling functions:
Top Slant stapling (○ ○ ○ ● ●)
Two-Point stapling (○ ○ ○ ○ ●)
Top stapling (○ ○ ○ ● ○)
↓
Press S1A to cause the Paper Aligning Bar to move to the paper aligning position and then to start the stapling sequence from the 1st Bin to 20th Bin. (At this time, stapling occurs only if PC9 is blocked.) The following indications are given by LDs during this operation.
○ ○ ○ ● ●
Stapling Unit
FD Home Position Sensor PC8: Blocked (L)
Stapling Unit
CD Home Position Sensor PC7: Blocked (L)
Stapling Paper Detecting Sensor PC9: Blocked (L)
Off at all times
Off at all times
At the end of the operation
⑥
⑦

4485F06SBA


⑥
⑦
Press S1A.
Stacking
● ● ●◎ ●
The ST-213 skips this operation and moves onto the next one.
To run this operation, put several sheets of paper into each Sort Bin before starting this operation.
Press S2A to enable this operation (○ ○ ○ ○ ◐).
↓
Press S1A to let the Sorter start picking up paper from each Sort Bin (in the order of 1st to 20th Bin) and stacking it in the Non-Sort Bin.
The following indications are given by LEDs during the operation.
○ ○ ○ ○ ○
Lower Arm Home Position Sensor PC16: Blocked (L)
Lower Arm Pickup Position Sensor PC22: Blocked (L)
Gate Unit Home Position Sensor PC14: Blocked (L)
Gate Transport Sensor PC18: Blocked (L)
Sort Exit Sensor PC13: Blocked (L)
At the end of the operation
Press S1A.
Bin Moving
◎ ● ●◎ ●
→Press S1A and the LEDs look like ○ ● ● ● ●.
↓
Each time S1A is pressed, the bins are moved up one bin.
Each time S2A is pressed, the bins are moved downward one bin.
⑧
⑨


⑧
⑨
Holding down S2A, press S1A.
Stapling Unit Moving
●◎ ●◎ ●
Each time S2A is pressed, the Stapling Unit repeats the following operation.
1. Moves to the CD home position.
2. Moves to the “Top Slant” stapling FD position.
3. Moves to the FD home position.
4. Moves to the front one of “Two-Point” stapling.
5. Moves to the rear one of “Two-Point” stapling.
6. Moves to the “Top” stapling position.
7. Moves to the CD home position.
Press S1A (after moving the Stapling Unit to the home position).
Gate Unit Moving
- - - - The ST-213 skips this operation and returns to the “Initial Display.”
◎ ◎ ●◎ ●
Each time S2A is pressed, the Gate Unit repeats the following operation.
1. Moves to the Stacking Guide resetting position.
2. The Upper and Lower Arms move to the pickup position.
3. Moves to the set/stack unloading position.
Each time S2A is pressed, the Gate Unit repeatedly moves to the set/stack pickup position and set/stack unloading position.
Press S1A (after returning the Gate Unit to the position to receive copies in the Non-Sort mode and retracting the Upper Arm).
Initial Display
◎ ◎ ◎ ◎ ◎
4485F08SBA

DIS/REASSEMBLY, ADJUSTMENT

* Precautions for Disassembly, Reassembly, and Adjustment

1. Before attempting to disassemble the Sorter, always make sure that no power is being supplied from the copier.
2. While power is being supplied to the Sorter, do not attempt to remove/install the print jacks from/to the PWBs or unplug/plug in the connectors.
3. If the Sorter is run with its Covers removed, use care not to allow your clothing to be caught in revolving parts such as the Timing Belt.
4. The basic rule is do not run the Sorter any time during dis/reassembly.
5. To reassemble the Sorter, reverse the order of disassembly unless otherwise specified.
6. Do not attempt to loosen or remove the screws to which red paint has been applied.

Purpose of Applying Red Paint

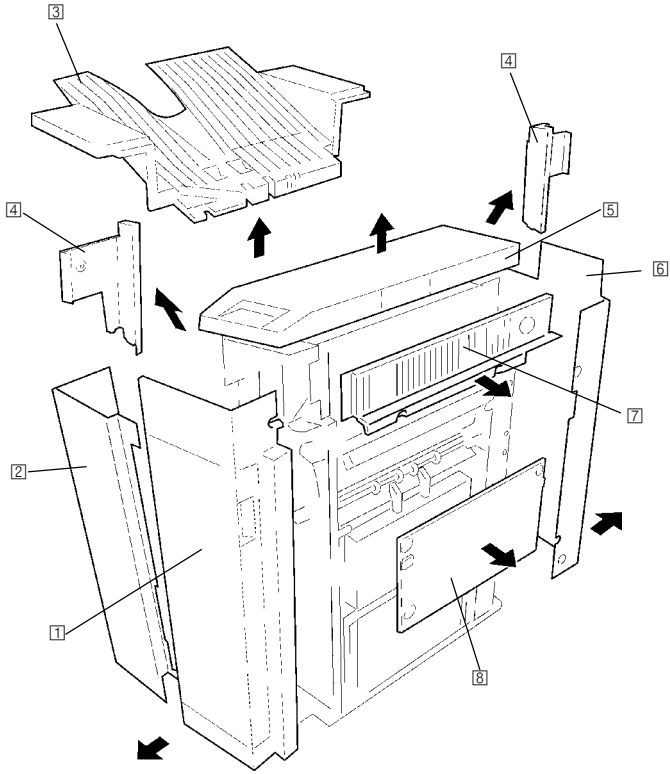
Red paint is applied to those screws that cannot be readjusted or reinstalled in the field.

4485SBD0100A

1 DIS/REASSEMBLY

4485SBD0101A

1-1. Removal of the External Covers

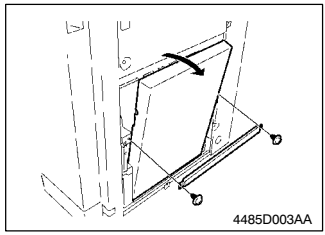


4485D002AA

1. Front Cover: : After removing the Top Cover and S5 Knob (ST-1000, ST-1100 only), remove three screws and slide the Front Cover to the front.
2. Front Left Cover: : After removing the Front Cover, remove four screws and slide the Front Left Cover to the front.
3. Non-Sort Bin: : After removing the Top Cover and Bin Holding Covers, remove two screws and lift the Non-Sort Bin.
4. Bin Holding Covers: : After removing the Top Cover, remove two screws and lift the Bin Holding Cover. (With the rear Bin Holding Cover, remove three screws.)
5. Top Cover: : Remove four screws and lift the Top Cover.
6. Rear Cover: : After removing the Top Cover, remove five screws and slide the Rear Cover to the rear.
7. Upper Right Cover: : Remove four screws and the Upper Right Cover.
8. Middle Right Cover: : Remove four screws and the Middle Right Cover.

4485SBD0102A

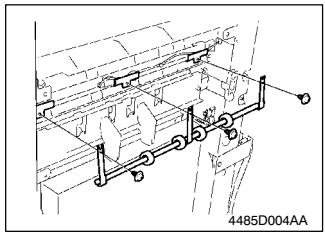
1-2. Removal of the Punch Trash Box



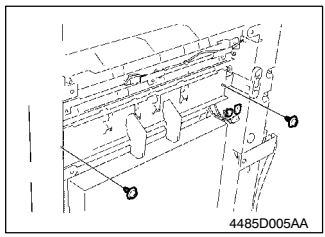
1. Remove two screws and the mounting bracket.
2. Remove the Punch Trash Box.

4485SBD0103A

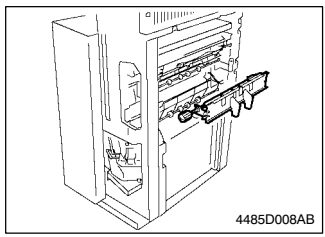
1-3. Removal of the Punch Unit



1. Remove the Top Cover, Front Cover, Rear Cover, and Right Middle Cover.
2. Remove the Punch Trash Box.
3. Remove three screws and the Registration Rolls.



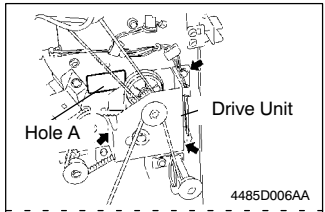
4. Unplug one connector and remove one wiring saddle and two screws.

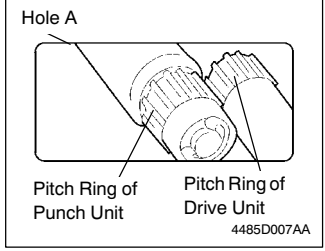


5. Remove the Punch Unit.

* For inch areas, knob S3 must be pulled out to the 2-hole position in order to remove or install the punch unit.
* After the Punch Unit has been reinstalled, re-engage the Punch Unit Drive Gear.

(Re-engaging the Punch Unit Drive Gear)



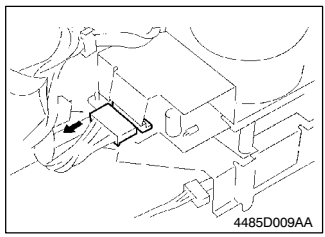


1. Remove the Top and Rear Covers.
2. Loosen the three Drive Unit mounting screws, bring the Pitch Ring of the Drive Unit into contact with the Pitch Ring of the Punch Unit, and tighten the three screws. (Look through hole A into the Drive Unit to check that the Pitch Rings are in contact.)

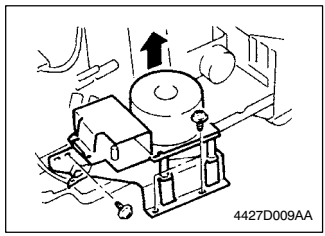
* When the Drive Unit mounting screws have been loosened to re-engage the position, be sure to check and adjust tension in each belt after the screws have been tight-

4485SBD0104A

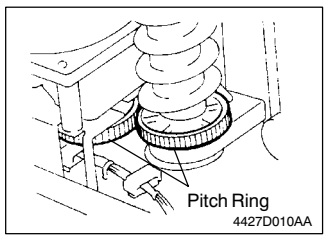
1-4. Removal of Bin Moving Motor M1



1. Remove the Top and Rear Covers.
2. Unplug the connector.



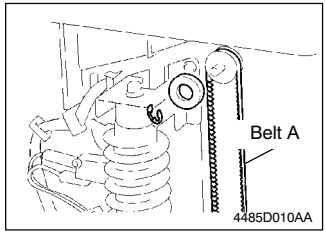
3. Remove three mounting screws and M1.



* When tightening the screws at reinstallation, make sure the Pitch Rings are in contact as shown on the left.

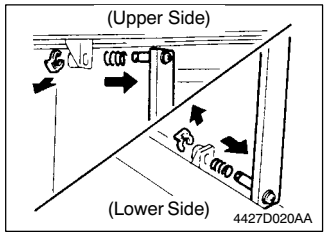
4485SBD0105A

1-5. Removal of the Bins (including the removal of the Paper Aligning Bar and Bin Support Unit)

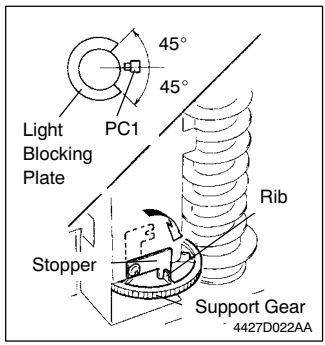


1. Remove the Top, Front, Front Left, and Rear Covers.
2. Remove the Bin Holding Covers and Non-Sort Bin.
3. Snap off one E-ring and remove one washer. Then, remove Drive Transmission Belt A of the Paper Aligning Bar.

* When reinstalling Drive Transmission Belt A, adjust the Paper Aligning Bar for correct position (see ADJUSTMENT).

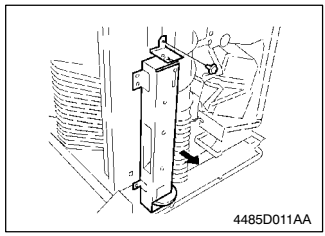


4. Snap off the two C-clips from the top and bottom of the Paper Aligning Bar and remove the Paper Aligning Bar and springs. (When removing the C-clip at the bottom, turn the Spiral Cam to move the bins upward.)



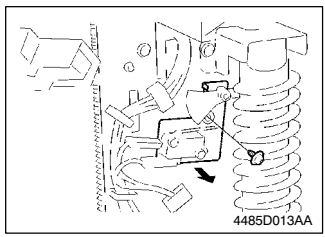
5. Turn the Spiral Cam to move the 20th Bin to the copy receiving position. At this time, Bin Positioning Sensor PC1 must be at the center of the cutout in the light blocking plate.
6. Loosen the lock screw in the stopper of the Bin Support Unit, fit the slot in the stopper over the rib of the Support Gear, and secure the stopper in position. (If the slot of the stopper is not aligned with the rib, turn the Spiral Cam and fit it onto the nearest rib.)

* At reassembly, the stopper must be returned to the original position.

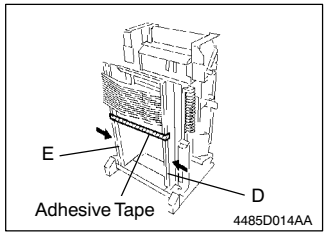


7. Remove one screw and the Bin Support Unit.

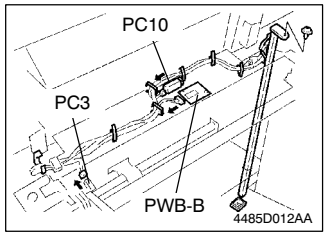
* At reassembly, the bins must be in the same position as in step 5 (the same position as when removed). Before securing, check the bottom of the lower frame to ensure that the shaft is out of the hole in the frame.



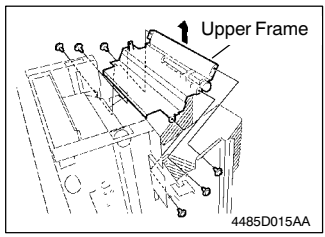
8. Remove one screw and the mounting bracket of Bin Upper Limit Interlock Switch S1.



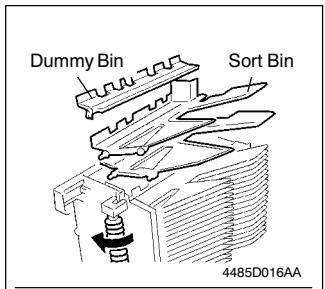
9. If adhesive tape is available, tape front frame D and rear frame E as shown to ensure smooth removal and reinstallation of the bins. (This is done to prevent the front and rear frames from opening after the upper frame has been removed.)



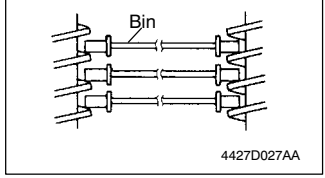
10. Remove one screw and Paper Aligning Reference Plate 1.
11. Unplug three connectors and unlock seven wiring saddles, one cord clamp, and two edge covers.



12. Remove six screws and upper frame.



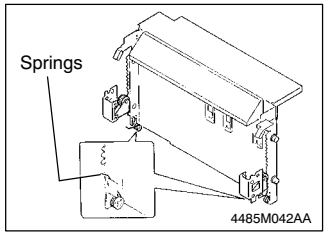
13. Remove the Dummy Bin.
14. Turn the Spiral Cam and remove the bins one by one in sequence, beginning with the 1st Bin.



* At reassembly, make sure that each bin is set into the corresponding steps of the cams as shown on the left.

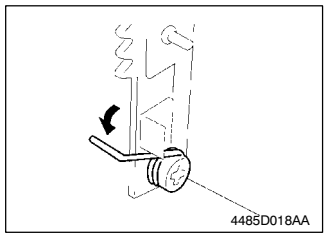
4485SBD0106A

1-6. Removal of the Gate Unit ... ST-1000/ST-1100 only

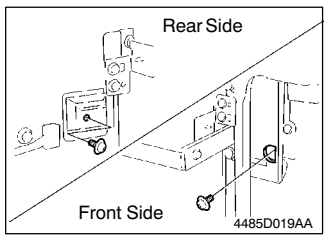


1. Remove the Top, Front Left, Front, Rear, and Bin Holding Covers and the Non-Sort Bin.

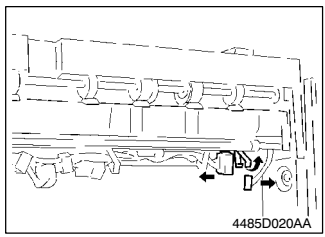
2. Unhook two springs as shown on the left and remove the Stacking Guide.



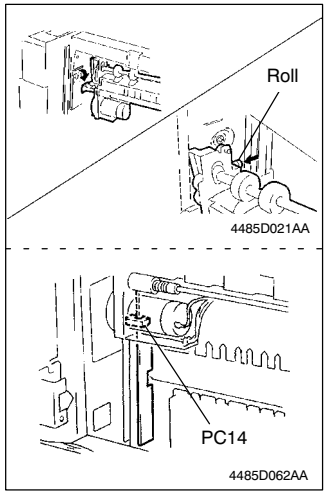
* After the Stacking Guide has been reinstalled, hook the two springs.



3. Remove one screw each from the front and rear end of the Gate Unit

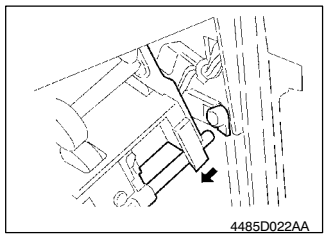


4. Unplug one connector and remove one wiring saddle.



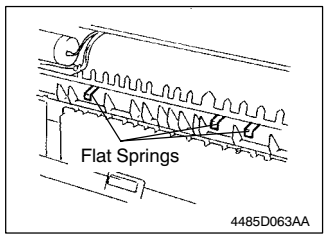
5. Release the Gate Unit shaft mounting bracket in the rear from its lock and move it down.
6. Remove the roll from the rail surface. (During this step, move Gate Unit Home Position Sensor PC14 off its light blocking plate.)

* At reassembly, use care not to allow PC14 to hit against the light blocking plate.

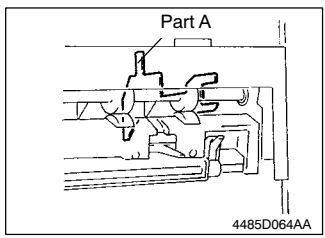


7. Unhook the Gate Unit from the shaft mounting bracket at the front and remove it.

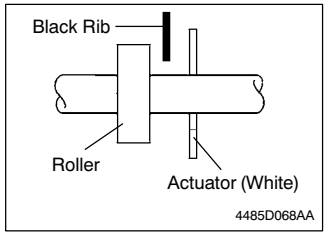
* Use care not to drop the plate nut when the Gate Unit is turned upside down after removal.



* At reassembly, check that the flat springs fitted to the guide plate are not deformed. Correct the springs if deformed.



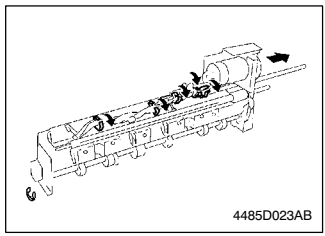
* At reassembly, move part A to check that the actuator is installed at the correct position.



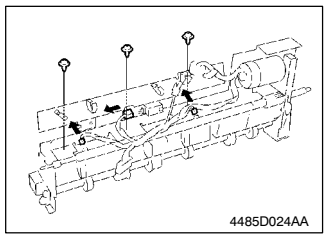
* Make sure that the actuator is located as shown on the left (i.e., it is to the right of the black rib).

4485SBD0107A

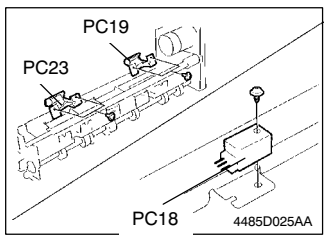
1-7. Removal of Non-Sort Bin Upper Detecting Sensor 1 PC19, Non-Sort Bin Upper Detecting Sensor 2 PC23, and Gate Transport Sensor PC18 ... ST-1000/ST-1100 only



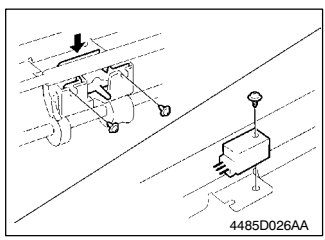
1. Remove the Gate Unit.
2. Snap off one E-ring and remove the shaft.
3. Unlock two wiring saddles, two cord clamps, and one edge cover.



4. Remove three screws, unplug three connectors, and remove the mounting bracket.



5. Remove two screws each to remove PC19 and PC23.
6. Remove one screw and PC18.

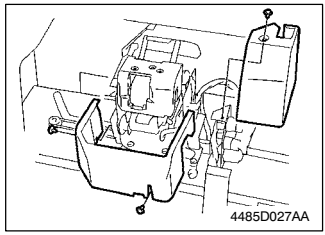


Precautions at Reinstallation

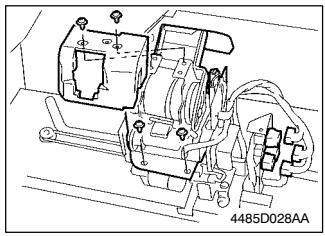
PC19, PC23: Try to press the sensor downward.
PC18 : Clean before mounting. The sensor has a unique orientation for installation.

4485SBD0108A

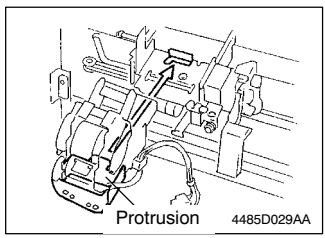
1-8. Removal of the Stapling Unit



1. Unlock and slide the Sorter away from the copier and open the Front Door and S7 Door.
2. Remove two screws and the Stapling Unit Lower Cover.
3. Remove one screw and harness cover.



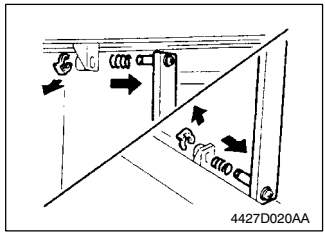
4. Unplug three connectors.
5. Remove two screws and the Stapling Unit.
6. Remove two screws and Stapling Unit Upper Cover.



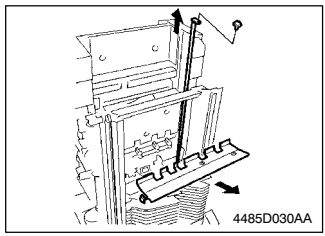
Precautions at Reinstallation

When reinstalling the Stapling Unit, make sure that the rear protrusion passes under the mounting bracket.

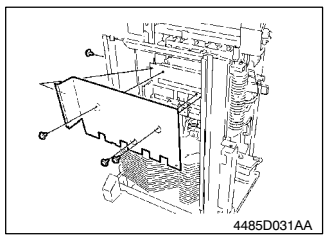
1-9. Removal of the Upper and Lower Arms ... ST-1000/ST-1100 only



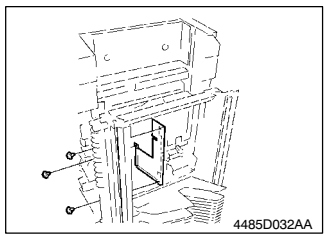
1. Remove the Top, Front Left, Front, Rear, and Bin Holding Covers and the Non-Sort Bin.
2. Snap off two C-clips from the top and bottom of the Paper Aligning Bar and remove the Paper Aligning Bar and springs.



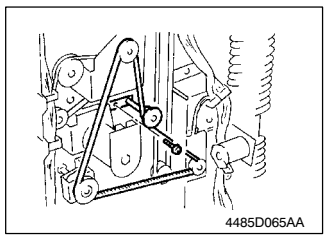
3. Remove one screw, Paper Aligning Reference Plate 1, and the lock plate.
4. Remove the Dummy Bin.



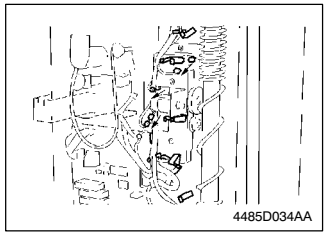
5. Move the Sort Bins downward and remove four screws and the cover plate.



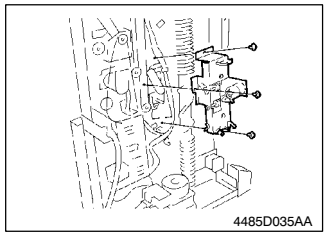
6. Remove three screws and the side cover plate.



7. Loosen one screw and remove the timing belt.

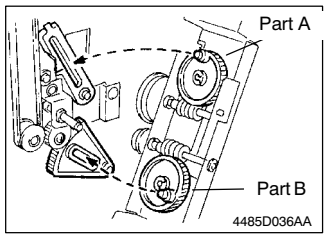

4485D034AA

8. Unlock seven cord clamps and five wiring saddles and unplug three connectors.


4485D035AA

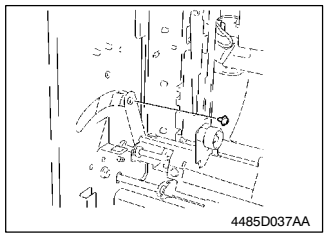
9. Remove three screws and the drive assy.

* After the drive assy has been reinstalled, adjust the Lower Arm pickup position. (See ADJUSTMENT.)

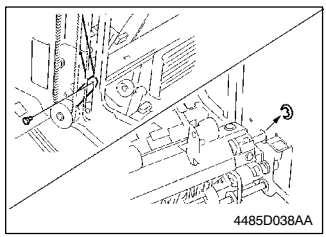


4485D036AA

* At reinstallation, fit parts A and B of the drive assy into the grooves in the Upper Arm guide and sector gear.

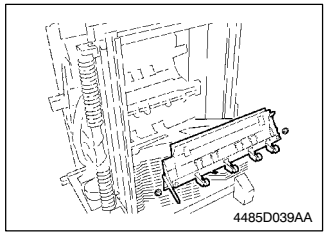

4485D037AA

10. Remove one Upper Arm mounting screw (inside in the rear).

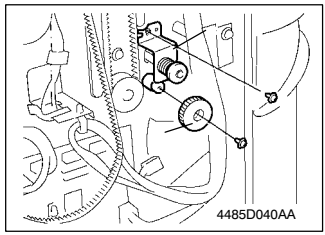

4485D038AA

11. Remove one screw (at the front) and disconnect the connection of the arm.

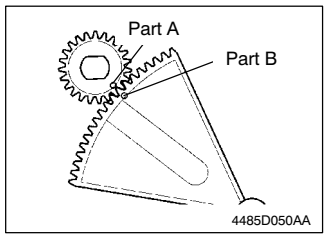
12. Snap off one E-ring (inside at the front).



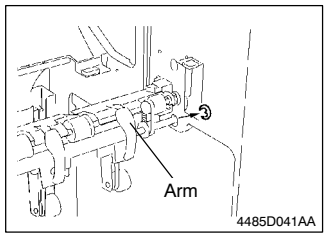
13. Slide the Upper Arm Assy to the front of the Sorter. (Use care not to lose the two bushings.)
    (Remove the shaft in the rear of the Upper Arm from the shaft hole and unhook the shaft from the front end.)



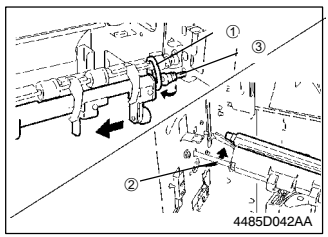
14. Remove one screw to free the mounting bracket.
15. Remove one screw and the Lower Arm gear.



* At reassembly, align part B of the sector gear with part A of the Lower Arm gear.



16. Snap off one E-ring (inside at the front).



17. Remove the Lower Arm Assy.
    ① Remove the timing belt from the gears.
    ② Remove the shaft inside in the rear from the shaft hole.
    ③ Remove the shaft inside at the front.

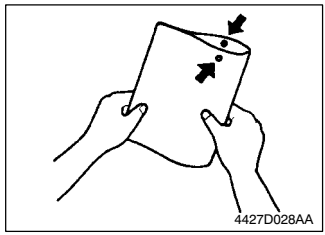
* At reassembly, lift the arm shown in step 16 upward and then install the Lower Arm Assy.

4485SBD0200A

2 ADJUSTMENT

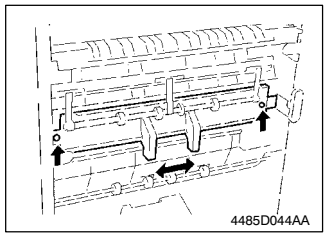
4485SBD0201A

2-1. Check/Adjustment of the Punch Hole Positions



1. Set the copier into the Hole Punch mode and make a copy.
2. Fold the copy fed into the Sorter in two and check to see if the punch holes are aligned (deviation should be within 2 mm).

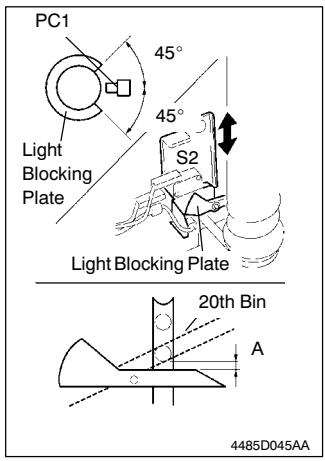
* If the holes are misaligned, follow these steps for adjustment.



3. Slide the Sorter away from the copier, open the Middle Right Cover, and open the S7 Door.
4. Loosen the two Punch Unit mounting screws and slide the Punch Unit left or right as necessary.
5. Tighten the two screws, slide the Sorter back up against the copier, and make a copy to check for the correct punching position.

4485SBD0202A

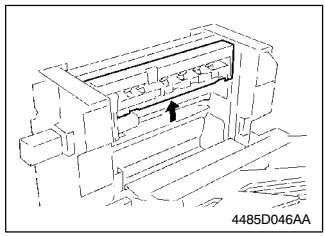
2-2. Adjustment of the Position of the Bin Lower Limit Interlock Switch S2 Mounting Bracket



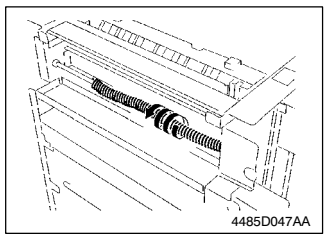
1. Remove Bin Moving Motor M1.
2. Turn the Spiral Cam to move the 1st Bin to the stapling position. At this time, Bin Positioning Sensor PC1 must be located at the center of the cutout in the light blocking plate.
3. Loosen one screw that secures the S2 mounting bracket. Obtain 0 to 1.0 mm for clearance A between the PC2 light blocking plate and the guide roll of the 20th Bin. As soon as the specified clearance is reached, tighten the mounting screw.

4485SBD0203A

2-3. Adjustment of Tension in the Recoil Spring of the Auxiliary Gate Unit Moving Mechanism ... ST-1000/ST-1100 only


4485D046AA

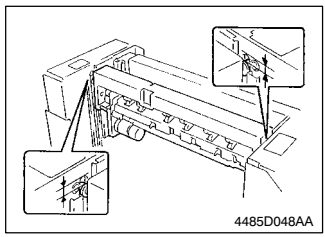
1. Remove the Top, Front, and Bin Holding Covers, Non-Sort Bin, and the Upper Right Cover.
2. Remove the Stacking Guide.
3. Move the Gate Unit to the top position.


4485D047AA

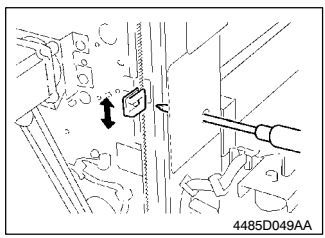
4. Wind the spring eight turns and hook it onto the hook.

4485SBD0204A

2-4. Adjustment of Tilt of the Gate Unit ... ST-1000/ST-1100 only


4485D048AA

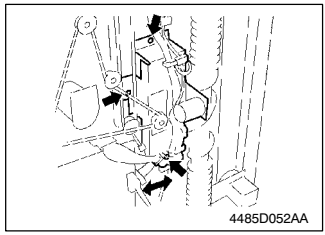
1. Remove the Top, Front, Rear, and Bin Holding Covers and the Non-Sort Bin.
2. Remove the Stacking Guide.
3. Move the Gate Unit to the top position. (Check that the Gate Unit is parallel in the crosswise direction.)


4485D049AA

4. If the Gate Unit is tilted, loosen one mounting screw in the rear of the Gate Unit and adjust so that the unit is parallel at the front and rear. (One tooth of belt/3 mm)

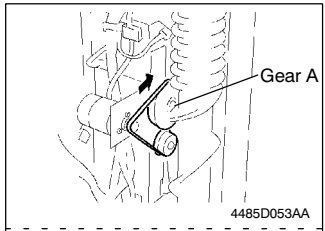
4485SBD0205A

2-5. Adjustment of the Lower Arm Pickup Position ... ST-1000/ST-1100 only


4485D052AA

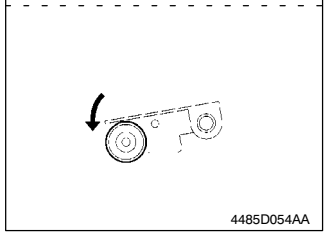
1. Remove the Front, Front Left, and Rear Covers.

2. With the Upper and Lower Arms in the retracted position, loosen three screws and slide the mounting bracket left or right as shown. Then, temporarily tighten the three screws and make the following checks.

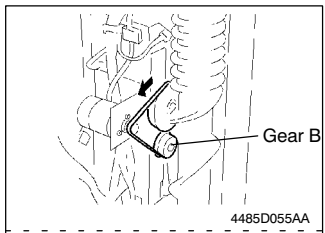


4485D053AA

3. Turn the belt in the direction of the arrow to move the Upper Arm to the pickup position.(Drive of gear A moves the Upper Arm.)

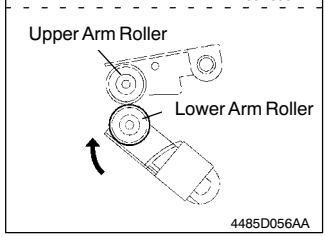

4485D054AA

*Upper Arm pickup position:
Where the Upper Arm Roller is in the bottom position.



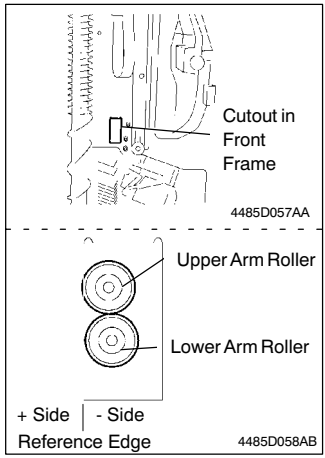
4485D055AA

4. Turn the belt in the direction of the arrow to move the Lower Arm to the pickup position.(Drive of gear B moves the Lower Arm.)



4485D056AA

*Lower Arm pickup position:
Where the Lower Arm Roller pushes the Upper Arm Roller upward a little as shown on the left.



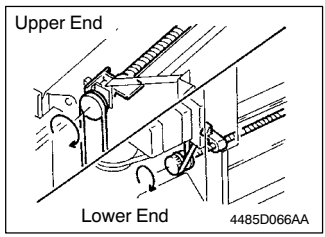
5. With reference to the position of the Upper Arm Roller whose outline of its smaller diameter is properly aligned with the left edge of the cutout in the front frame as shown on the left, the Lower Arm Roller should also be located so that the outline of its larger diameter is properly aligned with the left edge of the cutout in the front frame.

   Specifications: 0 ±1 mm
   If the specifications are not met, repeat steps 2 to 5.

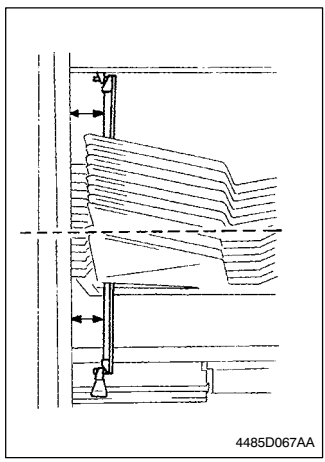
6. After the adjustment has been made, tighten the three mounting screws.

4485SBD0206A

2-6. Adjustment of the Paper Aligning Bar Position



1. Free the belt and turn both the upper and lower drive pulleys of the Paper Aligning Bar clockwise so that the bar fixing brackets are pressed against the front end. Then, refit the belt .



2. Check that the distance between the Paper Aligning Bar and the frame at the upper end equals the distance between the Paper Aligning Bar and the frame at the lower end.
   Deviation: Within ±1 mm

4485SBD0207A

2-7. Belt Tension Adjustment

<Precautions>

- Turn the belt and check that each gear tooth fits into the groove in the belt.
- Each belt should be deflected when it is depressed with a finger at the portion indicated by the arrow.

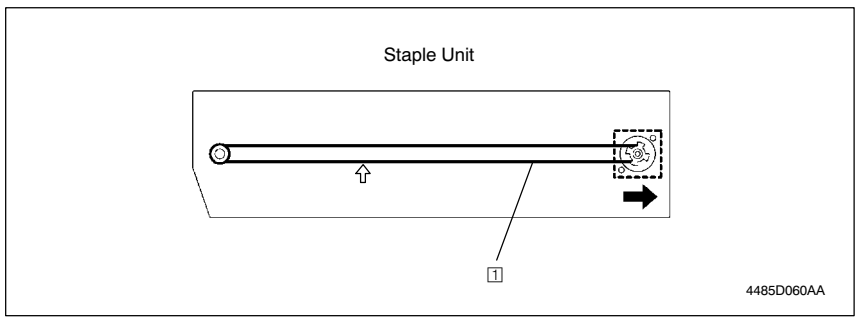
Deflection of Belts for Major Drives

No.	Drive	Deflection (mm) (reference values)
1	Stapling Unit	5
2	Gate Unit moving	5*
3	Gate Unit moving	5*
4	Gate Unit moving	10*
5	Gate Unit moving	5*
6	Gate Unit moving	5*
7	Gate Unit moving	5*
8	Transport through Gate Unit	2
9	Arm	5
10	Paper aligning	5
11	Transport	5
12	Transport	5
13	Transport	5
14	Transport	10
15	Transport	5

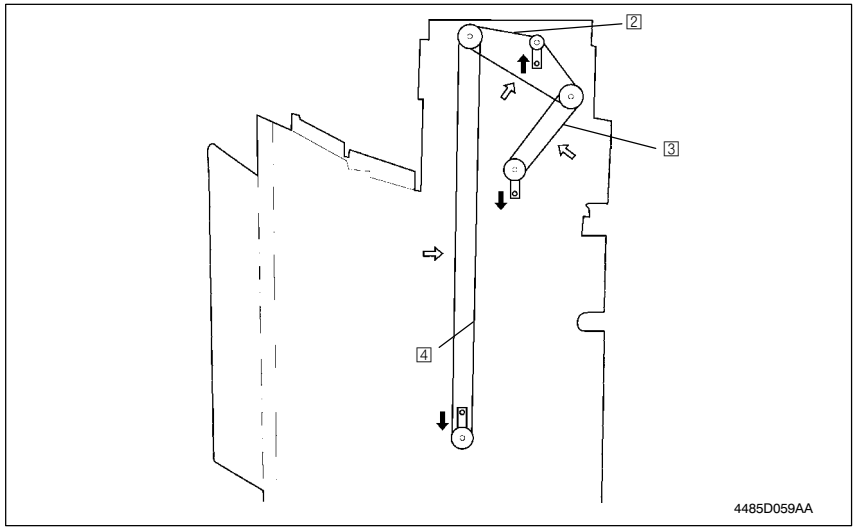
*These figures represent the deflection when the Gate Unit is raised to the top position.

Right View of Sorter

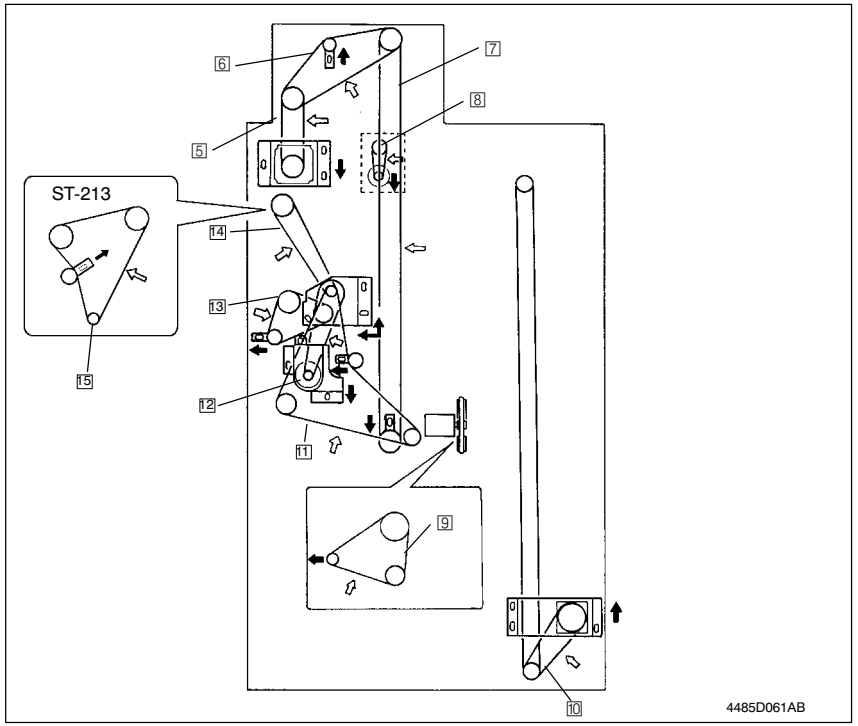
➪ Deflection measurement point
➡ Tension application direction



Front View of Sorter (ST-1000, ST-1100 only)



Rear View of Sorter



TROUBLESHOOTING

1 MISFEED DETECTION/TROUBLESHOOTING PROCEDURES

4485SBT0101A

1-1. Misfeed Detection

Any of the following misfeeds occurring in the Sorter are detected under the corresponding conditions and shown on the copier Touch Panel.

Type	Detection Timing
Paper left in Sorter	When the copier Power Switch is turned ON or a malfunction is reset: For ST-1000/ST-1100: The output of Gate Transport Sensor PC18 is LOW (blocked), that of Punch Registration Sensor PC5 is HIGH (unblocked), and that of Sort Exit Sensor PC13 is LOW (blocked). For ST-213: The output of Non-Sort Exit Sensor PC12, Punch Registration Sensor PC5, and Sort Exit Sensor PC11 is HIGH (unblocked).
Non-sort transport misfeed	The output of PC18 (ST-1000/ST-1100) remains HIGH (unblocked) or that of PC12 (ST-213) remains LOW (blocked) even after the lapse of a given period of time after the copier Exit Sensor has been activated by the leading edge of the paper.
Sort transport misfeed	The output of PC5 remains LOW (blocked) even after the lapse of a given period of time after the copier Exit Sensor has been activated by the leading edge of the paper.
	The output of PC13 (ST-1000/ST-1100) remains HIGH (unblocked) or that of PC11 (ST-213) remains LOW (blocked) even after the lapse of a given period of time after the copier Exit Sensor has been activated by the leading edge of the paper.
Non-sort exit misfeed	For ST-1000/ST-1100: The output of PC18 remains LOW (blocked) even after the lapse of a given period of time (that varies depending on the paper size) after PC18 has been blocked (LOW) by the leading edge of the paper. For ST-213: The output of PC12 remains HIGH (unblocked) even after the lapse of a given period of time (that varies depending on the paper size) after PC12 has been unblocked (HIGH) by the leading edge of the paper.
Sort exit misfeed	For ST-1000/ST-1100: The output of PC13 remains LOW (blocked) even after the lapse of a given period of time (that varies depending on the paper size) after PC13 has been blocked (LOW) by the leading edge of the paper. For ST-213: The output of PC11 remains HIGH (unblocked) even after the lapse of a given period of time (that varies depending on the paper size) after PC11 has been unblocked (HIGH) by the leading edge of the paper.
Staple misfeed	PC25 is unblocked (HIGH) during a stapling sequence (M4 turning forward) and an overload is applied to the drive due to a staple misfeed, causing M4 to turn backward and the output of PC25 to go LOW within a given period of time.

Type	Misfeed Detection Timer Value	
	EP6001	EP8015
Non-sort transport misfeed	700ms	400ms
Sort transport misfeed	700ms	500ms
	1500ms	1000ms
Non-sort exit misfeed	* 1000 to 1700ms	* 600 to 1100ms
Sort exit misfeed	* 1000 to 1700ms	* 600 to 1100ms
Staple misfeed	Within 1500 ms	

* Varies depending on the paper size.

Note: Follow these steps to reset a staple misfeed condition.
1. *Remove the Staple Cartridge.*
2. *Break off the staple sheet at the specified position and reload the cartridge.*
3. *The Sorter resumes the stapling sequence automatically.*
4. *If staples continue to misfeed after doing the resetting procedure, See page T-20.*

ST-1000/ST-1100 only (during stacking sequence)

Type	Detection Timing
Pickup misfeed	The output of PC18 remains HIGH (unblocked) even after the lapse of a given period of time after Gate Transport Motor M9 has been energized.
Copy set/stack transport misfeed	The output of PC13 remains LOW (blocked) even after the lapse of a given period of time (which varies depending on the paper size) after PC18 has been blocked (LOW) by the leading edge of the paper.
Copy set/stack unloading misfeed	The output of PC18 remains LOW (blocked) even after the lapse of a given period of time (which varies depending on the paper size) after Transport Motor M2 has been energized.

Type	Misfeed Detection Timer Value	
	EP6001	EP8015
Pickup misfeed	400ms	300ms
Copy set/stack transport misfeed	* 1100 to 1800ms	* 700 to 1200ms
Copy set/stack unloading misfeed	* 800 to 1500ms	* 500 to 1000ms

* Varies depending on the paper size.

* To reset the misfeed detection, unlock and slide the Sorter away from the copier, remove the misfed paper, and slide the Sorter back against the copier.

1-2. Troubleshooting Procedures

1 Paper left in Sorter

Step	Check Item	Result	Action
1	ST-1000/ST-1100: Is there a sheet of paper in the Sorter Transport Section and is PC18/PC13 blocked? Is PC5 unblocked? ST-213: Is there a sheet of paper in the Sorter Transport Section and is PC12/PC5/PC11 unblocked?	YES	Remove the paper in the Sorter.
2	ST-1000/ST-1100: Are PC18 and PC13 dirty with foreign matter or does the PC5 actuator operate properly? ST-213: Does the actuator of PC12/PC5/PC11 operate properly?	NO	Check if the mounting position of PC18, PC12/PC5/PC13, or PC11 is correct, and check the actuator for deformation, foreign matter, etc.
3	Is the output signal of PC18 (ST-1000/ST-1100) or PC12 (ST-213) applied to PWB-A properly? * ST-1000/ST-1100: Is the voltage across PJ18A-3 and GND DC5V? Does it change to DC0V when PC18 is blocked? * ST-213: Is the voltage across PJ16A-5 and GND DC0V? Does it change to DC5V when PC12 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC18 or PC12 and, if it is intact, change PC18 or PC12.
4	Is the output signal of PC5 applied to PWB-A properly? * Is the voltage across PJ16A-11 and GND DC0V? Does it change to DC5V when PC5 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC5 and, if it is intact, change PC5.
5	Is the output signal of PC13 (ST-1000/ST-1100) or PC11 (ST-213) applied to PWB-A properly? * ST-1000/ST-1100: Is the voltage across PJ16A-8 and GND DC5V? Does it change to 0V when PC13 is blocked? * ST-213: Is the voltage across PJ16A-8 and GND 0V? Does it change to DC5V when PC11 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC13 or PC11 and, if it is intact, change PC13 or PC11.

2 Non-sort transport misfeed, non-sort exit misfeed

Step	Check Item	Result	Action
1	Does the paper being used meet product specifications?	NO	Instruct the user to use paper that meets product specifications.
2	Is the paper curled, waved, or damp?	YES	Change the paper. Instruct the user in how to store the paper.
3	Is the paper transport path (Transport Guide Plate) dirty with foreign matter or deformed?	YES	Remove foreign matter, clean, or correct or change the guide plate.
4	Are the rollers in the transport section dirty, deformed, or worn?	YES	Clean or change the defective roller.
5	ST-1000/ST-1100: Are PC18 dirty with foreign matter? ST-213: Does the PC12 actuator operate properly?	NO	Check PC18 or PC12 for the mounting position and the actuator for deformation and contamination.
6	Is the output signal of PC18 (ST-1000/ST-1100) or PC12 (ST-213) applied to PWB-A properly? * ST-1000/ST-1100: Is the voltage across PJ18A-3 and GND DC5V? Does it change to DC0V when PC18 is blocked? * ST-213: Is the voltage across PJ16A-5 and GND DC0V? Does it change to DC5V when PC12 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC18 or PC12 and, if it is intact, change PC18 or PC12.

3 Sort transport misfeed, sort exit misfeed

Step	Check Item	Result	Action
1	Does the paper being used meet product specifications?	NO	Instruct the user to use paper that meets product specifications.
2	Is the paper curled, waved, or damp?	YES	Change the paper. Instruct the user in how to store the paper.
3	Is the paper transport path (Transport Guide Plate) dirty with foreign matter or deformed?	YES	Remove foreign matter, clean, or correct or change the guide plate.
4	Are the rollers in the transport section dirty, deformed, or worn?	YES	Clean or change the defective roller.
5	ST-1000/ST-1100: Does the PC5 actuator operate properly? Is PC13 dirty with foreign matter? ST-213: Does the PC5/PC11 actuator operate properly?	NO	Check PC5/PC13 or PC11 for the mounting position and the actuator for deformation and contamination.
6	Is the output signal of PC5 applied to PWB-A properly? * Does the voltage across PJ16A-11 and GND change from DC0V to DC5V when PC5 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC5 and, if it is intact, change PC5.
	Is the output signal of PC13 (ST-1000/ST-1100) or PC11 (ST-213) applied to PWB-A properly? * ST-1000/ST-1100: Does the voltage across PJ16A-8 and GND change from DC5V to DC0V when PC13 is blocked? * ST-213: Does the voltage across PJ16A-8 and GND change from DC0V to DC5V when PC11 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC13 or PC11 and, if it is intact, change PC13 or PC11.

3	Copy set/stack pickup misfeed, copy set/stack transport misfeed, copy set/stack unloading misfeed (ST-1000/ST-1100 only)

Step	Check Item	Result	Action
1	Is the paper curled, waved, or damp?	YES	Change the paper. Instruct the user in how to store the paper.
2	Is the Upper Arm Roller dirty, deformed, or worn?	YES	Clean or change the roller.
3	Is the Lower Arm Roller dirty, deformed, or worn?	YES	Clean or change the roller.
4	Is Gate Transport Sensor PC18 dirty with foreign matter?	YES	Check PC18 for contamination with foreign matter.
5	Is the output signal of PC18 applied to PWB-A properly? * Is the voltage across PJ18A-3 and GND DC5V? Does it change to DC0V when PC18 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC18 and, if it is intact, change PC18.
6	Is the transport section inside the Gate Unit dirty with foreign matter or deformed?	YES	Remove foreign matter, clean, or correct or change the guide plate.
7	Is Sort Exit Sensor PC13 dirty with foreign matter?	YES	Check PC13 for contamination with foreign matter.
8	Is the output signal of PC13 applied to PWB-A properly? * Does the voltage across PJ16A-8 and GND change from DC5V to DC0V when PC13 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC13 and, if it is intact, change PC13.
9	Are the rollers in the transport section dirty, deformed, or worn?	YES	Clean or change the defective roller.

2 MALFUNCTION DETECTION/TROUBLESHOOTING PROCEDURES

4485SBT0201A

2-1. Malfunction Detection

Any of the following operation faults can be detected and the corresponding malfunction code is shown on the copier Touch Panel. Note that, for ST-213, the following malfunctions are not detected: "Transport section (C0b03, 04)," "Arm section (C0b18, 19, 1a, 1b, 1c, 1d)," and "Gate Unit (C0b40, 41)."

* The malfunction detection can be reset by sliding the Sorter away from the copier.

Type	Malfunction Code	Main Cause	Detection Timing
Transport Section	C0b00	• Transport Motor M2 • Transport Motor Pulse Sensor PC4 • Overload (no motion)	• In the transport section drive check during the initial operation, the number of pulses output from PC4 is 0. • During transport drive, the number of pulses output from PC4 is 0 for approx. 500 ms.
	C0b01	• Overload • Transport Motor M2	• In the transport section drive check during the initial operation, pulses are output from PC4 at long intervals (the set transport speed is not reached). • During transport drive, the number of pulses output from PC4 is less than the predetermined value (for the set transport speed) for approx. 500 ms.
	C0b03	• Gate Transport Motor M9 • Gate Transport Motor Pulse Sensor PC17 • Overload (no motion)	The number of pulses output from PC17 is 0 for approx. 500 ms after M9 has been energized.
	C0b04	• Overload • Gate Transport Motor M9	The number of pulses output from PC17 is less than the predetermined value (for the set transport speed) for approx. 100 ms while M9 is being energized.
Arm section	C0b18	• Arm Motor M7 • Upper Arm Home Position Sensor PC15 • Upper Arm Pick-Up Position Sensor PC21	• Even after the lapse of approx. 1900 ms after M7 has been energized, the unblocked/blocked edge of PC15 cannot be detected and the output of PC15 is HIGH (unblocked). • Even after the lapse of approx. 2500 ms after M7 has been energized, the unblocked/blocked edge of PC21 cannot be detected and the output of PC21 is HIGH (unblocked).
	C0b19	• Arm Motor M7 • Lower Arm Home Position Sensor PC16 • Lower Arm Pick-Up Position Sensor PC22	• Even after the lapse of approx. 900 ms after M7 has been energized, the unblocked/blocked edge of PC16 cannot be detected and the output of PC16 is HIGH (unblocked). • Even after the lapse of approx. 1100 ms after M7 has been energized, the unblocked/blocked edge of PC22 cannot be detected and the output of PC22 is HIGH (unblocked).

Type	Malfunction Code	Main Cause	Detection Timing
Arm section	C0b1a	• Upper Arm Home Position Sensor PC15	When M7 is energized and the Upper Arm completes moving to the pickup position, the output of PC21 is switched, but that of PC15 remains LOW (blocked).
	C0b1b	• Upper Arm Pick-up Position Sensor PC21	When M7 is energized and the Upper Arm completes moving to the home position, the output of PC15 is switched, but that of PC21 remains LOW (blocked).
	C0b1c	• Lower Arm Home Position Sensor PC16	When M7 is energized and the Lower Arm completes moving to the pickup position, the output of PC22 is switched, but that of PC16 remains LOW (blocked).
	C0b1d	• Lower Arm Pick-up Position Sensor PC22	When M7 is energized and the Lower Arm completes moving to the home position, the output of PC16 is switched, but that of PC22 remains LOW (blocked).
Stapling Unit	C0b20	• Overload • Stapling Unit CD Motor M5	When the Stapling Unit is moved away from its home position pulse by pulse (M5: energized) during the home position detection sequence, PC7 remains LOW (blocked) even after the lapse of approx. 1200 ms.
	C0b21	• Stapling Unit CD Motor M5 • Stapling Unit CD Home Position Sensor PC7	• When the Stapling Unit is moved toward its CD home position (M5: energized) during the initial operation, PC7 remains HIGH (unblocked) even after the lapse of approx. 4100 ms. • When the Stapling Unit is moved toward its home position pulse by pulse (M5: energized) during the home position detection sequence, PC7 remains HIGH (unblocked) even after the lapse of approx. 600 ms.

Type	Malfunction Code	Main Cause	Detection Timing
Stapling Unit	C0b22	• Stapling Unit FD Motor M6 • Stapling Unit FD Home Position Sensor PC8	Even after the lapse of approx. 1400 ms after M6 has been energized, the unblocked/blocked edge of PC8 cannot be detected and the output of PC8 remains HIGH (unblocked).
	C0b23	• Stapling Unit FD Motor M6 • Stapling Unit FD Home Position Sensor PC8	Even after the lapse of approx. 1400 ms after M6 has been energized, the unblocked/blocked edge of PC8 cannot be detected and the output of PC8 remains LOW (blocked).
Paper aligning mechanism	C0b30	• Paper Aligning Motor M3 • Paper Aligning Home Position Sensor PC3	During the Paper Aligning Bar home position detection sequence, the output of PC3 remains LOW (blocked) even when M3 has turned forward for approx. 1000 ms.
	C0b31	• Paper Aligning Motor M3 • Paper Aligning Home Position Sensor PC3	During the Paper Aligning Bar home position detection sequence, the output of PC3 remains HIGH (unblocked) even when M3 has turned forward for approx. 3000 ms.
Gate Unit	C0b40	• Gate Unit Motor M8 • Gate Unit Home Position Sensor PC14	Even after the lapse of approx. 1100 ms after M8 has been energized (for downward motion), the unblocked/blocked edge of PC14 cannot be detected and the output of PC14 remains LOW (blocked).
	C0b41	• Gate Unit Motor M8 • Gate Unit Home Position Sensor PC14	Even after the lapse of approx. 3300 ms after M8 has been energized (for upward motion), the unblocked/blocked edge of PC14 cannot be detected and the output of PC14 remains HIGH (unblocked).

Type	Malfunction Code	Main Cause	Detection Timing
Stapling Unit-related	C0b50	• Stapling Motor M4 • Stapler Home Position Sensor PC25	PC25 remains unblocked (LOW) and is not blocked (HIGH) even after the lapse of approx. 250 ms after M4 has been energized.
	C0b51	• Stapling Motor M4 • Stapler Home Position Sensor PC25	PC25 remains blocked (HIGH) and is not unblocked (LOW) even after the lapse of approx. 750 ms after M4 has been energized.
	C0b52 (To prevent the Stapler from driving without paper)	• Stapling Paper Detecting Sensor PC9	• The output of PC9 is LOW (blocked) at the end of the initial operation. • The output of PC9 immediately before the FD advancing motion is LOW in the Sort Staple or Manual Staple mode.
	C0b53	• Stapling Unit disconnected	CN3 is loose when the copier Power Switch is turned ON or an isolated malfunction is reset.
Bin moving mechanism	C0b60	• Bin Moving Motor M1 • Bin motion overload (no motion)	Even after the lapse of approx. 500 ms after the M1 forward or backward rotation signal has been output, Bin Positioning Sensor PC1 is not blocked (LOW) from the unblocked (HIGH) state, or vice versa, and the number of pulses output from the rotation detector of M1 is 0.
	C0b61	• Bin motion overload • Bin Moving Motor M1	Though the drive pulse applied to M1 is maximum after the lapse of approx. 500 ms after M1 has started turning forward or backward, PC1 is not blocked (LOW) from the unblocked (HIGH) state, or vice versa. (Pulses are output from M1 at long intervals.)
	C0b62	• Bin Positioning Sensor PC1	The output of PC1 does not change, though M1 has turned forward or backward for approx. 500 ms and the pulses output from M1 are normal.
	C0b63	• Bin Lower Limit Position Sensor PC2	When the Bin home position detection sequence is completed, the output of PC2 remains HIGH (unblocked), not going LOW (blocked).
	C0b64	• Bin Moving Motor M1 (rotation detector)	When the Bin home position detection sequence is completed, the number of pulses output from M1 is 0.
	C0b65	• Bin Upper Limit Interlock Switch S1	When the Bin home position detection sequence is completed, S1 is in the actuated position.

Type	Malfunction Code	Main Cause	Detection Timing
Punch Mechanism	C0b70	• Punch Unit (overload)	In the Transport Section drive check during the initial operation, the motor speed when Punch Solenoid SL3 is energized is approx. 80% or less of the speed before SL3 is energized.
	C0b71	• Punch Registration Clutch CL1	In the CL1 operation check performed on the last sheet of paper in the Punch mode, Sort Exit Sensor PC13 (ST-1000/ST-1100) is unblocked (HIGH) or Sort Exit Sensor PC11 (ST-213) is blocked (LOW) before CL1 is deenergized.
	C0b72	• Punch Unit disconnected	CN12 is loose when the copier Power Switch is turned ON or an isolated malfunction is reset.

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2-2. Isolated Malfunctions

• When a malfunction occurs in the Sorter, the malfunction bypass function of the copier puts that malfunction in the isolated status if the following conditions are met.

Conditions

1. The "Machine Status" screen available from the Tech. Rep. mode menu shows five isolated malfunctions or less.
2. The malfunction that occurs will not affect the current copying operation.

a. Isolated malfunction icon

• The " " (wrench) mark appears at the lower left corner on the Touch Panel.

b. To switch from the isolated malfunction icon (wrench mark) to the isolated malfunction code display

Touch " " on the Touch Panel.

• The "Machine Status" screen available from the Tech. Rep. mode menu shows the isolated malfunction codes and descriptions.

c. To reset an isolated malfunction

• Perform the relevant troubleshooting procedures, then, with the Machine Status screen on the display, open and close the Front Door of the copier.

2-3. Troubleshooting Procedures

The initial operation given under “Check Item” below is performed only when the Sorter Set Switch (S5; S3: ST-1000, ST-1100 only) is turned ON the first time after the copier Power Switch has been turned ON. To repeat the initial operation, the Power Switch must be turned OFF, then ON. Note that, when the Rear Cover has been removed, the initial operation can be repeated by pressing S3A on Sorter PWB-A.

1 C0b00

Step	Check Item	Result	Action
1	Does Transport Motor M2 turn in the initial operation?	YES	Check step 4.
2	Is the drive transmission mechanism from M2 faulty?	YES	Check the drive transmission mechanism from M2 for foreign matter, deformation, and damage.
3	Does the voltage across pins 1 and 2 of PJ6A vary during the initial operation? * Since pulse signals are involved, evaluate based on whether the multimeter quickly alternates between different values.	YES	Check the wiring between PWB-A and M2 and, if it is intact, change M2.
		NO	Change PWB-A.
4	Is Transport Motor Pulse Sensor PC4 dirty with foreign matter? Is the pulse disc dirty with foreign matter? * Remove the PC4 mounting bracket for this check.	YES	Remove foreign matter or clean.
	Is the output signal of PC4 applied to PWB-A properly? * Does the voltage across PJ16A-14 and GND change from DC5V to DC0V when PC4 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC4 and, if it is intact, change PC4.

2 C0b01

Step	Check Item	Result	Action
1	Is the drive transmission mechanism from M2 faulty?	YES	Check the drive transmission mechanism from M2 for foreign matter, deformation, and damage.
		NO	Change Transport Motor M2.

3 C0b03

Step	Check Item	Result	Action
1	Does Gate Transport Motor M9 turn in the initial operation?	YES	Check step 4.
2	Is the drive transmission mechanism from M9 faulty?	YES	Check the drive transmission mechanism from M9 for foreign matter, deformation, and damage.
3	Does the voltage across pins 7 and 8 of PJ9A vary during the initial operation? * Since pulse signals are involved, evaluate based on whether the multimeter quickly alternates between different values.	YES	Check the wiring between PWB-A and M9 and, if it is intact, change M9.
		NO	Change PWB-A.
4	Is Gate Transport Motor Pulse Sensor PC17 dirty with foreign matter? Is the pulse disc dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC17 applied to PWB-A properly? * Does the voltage across PJ18A-5 and GND change from DC5V to DC0V when PC17 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC17 and, if it is intact, change PC17.

4 C0b04

Step	Check Item	Result	Action
1	Is the drive transmission mechanism from M9 faulty?	YES	Check the drive transmission mechanism from M9 for foreign matter, deformation, and damage.
		NO	Change Gate Transport Motor M9.

5	C0b18

Step	Check Item	Result	Action
1	Does the Upper Arm move in the initial operation?	YES	Check step 4.
2	Is the drive transmission mechanism from M7 faulty?	YES	Check the drive transmission mechanism from M7 for foreign matter, deformation, and damage.
3	Is an output signal being sent from PWB-A to Arm Motor M7? * Does the voltage across pins 2 and 1 of PJ10A become DC24V during the initial operation?	YES	Check the wiring and connectors between PWB-A and M7 and, if they are intact, change M7.
		NO	Change PWB-A.
4	Are Upper Arm Home Position Sensor PC15 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC15 applied to PWB-A properly? * Does the voltage across PJ16A-23 and GND change from DC0V to DC5V when PC15 is unblocked?	NO	Check the wiring between PWB-A and PC15 and, if it is intact, change PC15.
5	Are Upper Arm Pick-Up Position Sensor PC21 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC21 applied to PWB-A properly? * Does the voltage across PJ16A-20 and GND change from DC5V to DC0V when PC21 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC21 and, if it is intact, change PC21.

6	C0b19

Step	Check Item	Result	Action
1	Does the Lower Arm move in the initial operation?	YES	Check step 4.
2	Is the drive transmission mechanism from M7 faulty?	YES	Check the drive transmission mechanism from M7 for foreign matter, deformation, and damage.
3	Is an output signal being sent from PWB-A to Arm Motor M7? * Does the voltage across pins 1 and 2 of PJ10A become DC24V during the initial operation?	YES	Check the wiring and connectors between PWB-A and M7 and, if they are intact, change M7.
		NO	Change PWB-A.
4	Are Lower Arm Home Position Sensor PC16 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC16 applied to PWB-A properly? * Does the voltage across PJ16A-26 and GND change from DC0V to DC5V when PC16 is unblocked?	NO	Check the wiring between PWB-A and PC16 and, if it is intact, change PC16.
5	Are Lower Arm Pick-Up Position Sensor PC22 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC22 applied to PWB-A properly? * Does the voltage across PJ16A-2 and GND change from DC5V to DC0V when PC22 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC22 and, if it is intact, change PC22.

7 C0b1a

Step	Check Item	Result	Action
1	Are Upper Arm Home Position Sensor PC15 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC15 applied to PWB-A properly? * Does the voltage across PJ16A-23 and GND change from DC0V to DC5V when PC15 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC15 and, if it is intact, change PC15.

8 C0b1b

Step	Check Item	Result	Action
1	Are Upper Arm Pick-Up Position Sensor PC21 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC21 applied to PWB-A properly? * Does the voltage across PJ16A-20 and GND change from DC5V to DC0V when PC21 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC21 and, if it is intact, change PC21.

9 C0b1c

Step	Check Item	Result	Action
1	Are Lower Arm Home Position Sensor PC16 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC16 applied to PWB-A properly? * Does the voltage across PJ16A-26 and GND change from DC0V to DC5V when PC16 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC16 and, if it is intact, change PC16.

10	C0b1d

Step	Check Item	Result	Action
1	Are Lower Arm Pick-Up Position Sensor PC22 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC22 applied to PWB-A properly? * Does the voltage across PJ16A-2 and GND change from DC5V to DC0V when PC22 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC22 and, if it is intact, change PC22.

11	C0b20, C0b21

Step	Check Item	Result	Action
1	Does the Stapling Unit move to the CD home position in the initial operation? * Run the initial operation with Stapling Unit CD Home Position Sensor PC7 unblocked by manually moving the Stapling Unit to the rear in the crosswise direction.	NO	● Check for overload. ● Check the wiring and connectors between PWB-A and M5 and, if they are intact, change M5.
2	Are PC7 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC7 applied to PWB-A properly? * Does the voltage across PJ13A-2 and GND change from DC0V to DC5V when PC7 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC7 and, if it is intact, change PC7.

12	C0b22, C0b23

Step	Check Item	Result	Action
1	Does the Stapling Unit advance in the feeding direction when a manual stapling sequence is carried out with paper placed in a Sort Bin?	YES	Check step 4.
2	Is the drive transmission mechanism from M6 faulty?	YES	Check the drive transmission mechanism from M6 for foreign matter, deformation, and damage.
3	Is an output signal being sent from PWB-A to Stapling Unit FD Motor M6? * Does the voltage across PJ12A-12 and GND become DC24V during a manual stapling sequence carried out with paper placed in a Sort Bin?	YES	Check the wiring and connectors between PWB-A and M6 and, if they are intact, change M6.
		NO	Change PWB-A.
4	Are Lower Stapling Unit FD Home Position Sensor PC8 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC8 applied to PWB-A properly? * Does the voltage across PJ12A-5 and GND change from DC5V to DC0V when PC8 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC8 and, if it is intact, change PC8.

13 C0b30, C0b31

Step	Check Item	Result	Action
1	Is the Paper Aligning Bar deformed?	YES	Change the Paper Aligning Bar.
2	Does the Paper Aligning Bar move smoothly when the drive coupling belt is turned?	NO	Check the spiral shaft for deformation, scratches, and contamination with foreign matter. Check the drive transmission parts including the belt and pulleys.
	Is Paper Aligning Home Position Sensor PC3 dirty with foreign matter?	YES	Remove foreign matter or clean.
3	Does the Paper Aligning Bar move each time Sorter Set Switch 1 S5 and Sorter Set Switch 2 S3 (ST-1000, ST-1100 only) are turned ON?	YES	Check step 5.
4	Is Paper Aligning Motor M3 connected properly to PWB-A?	YES	Change M3 and PWB-A, in that order.
5	Is the output signal of PC3 applied to PWB-A properly? * Does the voltage across PJ16A-17 and GND change from DC5V to DC0V when PC3 is blocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC3 and, if it is intact, change PC3.

14 C0b40, C0b41

Step	Check Item	Result	Action
1	Does Gate Unit Motor M8 turn in the initial operation?	YES	Check step 3.
2	Is the drive transmission mechanism from M8 faulty?	YES	Check the drive transmission mechanism from M8 for foreign matter, deformation, and damage.
		NO	Check the wiring between PWB-A and M8 and, if it is intact, change M8 and PWB-A, in that order.
3	Are Gate Unit Home Position Sensor PC14 and its light blocking plate dirty with foreign matter?	YES	Remove foreign matter or clean.
	Is the output signal of PC14 applied to PWB-A properly? * Does the voltage across PJ18A-6 and GND change from DC0V to DC5V when PC14 is unblocked?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A , PC14 and PWF-B and, if it is intact, change PC14.

15	C0b50, C0b51

Step	Check Item	Result	Action
1	Does the Stapler move smoothly when moved manually by turning the Stapler Knob? (See Note below.)	NO	Check gears for chipping, deformation, and foreign matter.
2	Is an output signal being sent from PWB-A to Stapling Motor M4? * Does the voltage across pins 9 and 10 of PJ12A change from 0V to 24V when the initial operation is carried out with PC25 blocked? (Since the ON signal is as short as approx. 0.5 sec., evaluate based on whether the multimeter quickly alternates between different values.)	YES	Check the wiring, PWF-A, and CN4 between PWB-A and M4 and, if they are intact, change the Stapling Unit. (Change M4.)
		NO	Change PWB-A.
3	Is the output signal of Stapler Home Position Sensor PC25 applied to PWB-A properly? * Does the voltage across PJ12A-2 and GND change from DC0V to DC5V when the Stapler Knob is turned to block PC25?	NO	Check the wiring, PWF-A, and CN4 between PWB-A and PC25 and, if they are intact, change the Stapling Unit. (Change PC25.)
	Is there continuity across pins 9 and 10 of PJ12A in this condition?	YES	Change PWB-A.

Note: Follow these steps to reset a staple misfeed.

1. *Turn OFF the copier Power Switch and remove the Staple Cartridge.*
2. *Remove the Stapling Unit Lower Cover. Turn the Stapler Knob to manually move the Stapler and remove the misfed staple.*
3. *With the Staple Cartridge removed, slide the Sorter back against the copier and turn On the Power Switch. (The initial operation returns the Stapler to its home position.)*
4. *Break off the staple sheet at the specified position and reload the cartridge.*
5. *Check for the correct stapling action using the Manual Staple mode.*

16 C0b52

Step	Check Item	Result	Action
1	Is Stapling Paper Detecting Sensor PC9 dirty or blocked with foreign matter such as paper scraps?	YES	Remove foreign matter or clean.
2	Is the output signal of PC9 applied to PWB-A properly? * Is the voltage across PJ12A-4 and GND DC5V? Does it change to DC0V when PC9 is blocked with a piece of paper?	YES	Change PWB-A.
		NO	Check the wiring, PWF-A, and connector (CN5) between PWB-A and PC9 and, if they are intact, change PC9.

17 C0b53

Step	Check Item	Result	Action
1	Is CN3 loose?	YES	Plug in CN3 properly.
		NO	Change the Staple Unit and PWB-A, in that order.

18 C0b60

Step	Check Item	Result	Action
1	Is any bin out of engagement or damaged to prevent other bins from moving?	YES	Reinstall or change the bin.
2	By visual check, is Bin Upper Limit Interlock Switch S1 or Bin Lower Limit Interlock Switch S2 actuated?	YES	Check the actuator and light blocking plate for operation. If the bins are at the upper/lower limit position to actuate S1/S2, turn the Spiral Cams to deactuate it.
3	Do the Spiral Cams turn smoothly when turned by hand?	NO	Check the coupling between Bin Moving Motor M1 and the rear Spiral Cam, and between the Bin Support Unit and front Spiral Cam for foreign matter, deformation, and damage.
4	With Sorter Set Switch 1 S5 and Sorter Set Switch 2 S3 (ST-1000, ST-1100 only): Is the voltage across PJ3A-5 and GND DC24V?	NO	Check the wiring between PWB-A and S1 and, if it is intact, change S1.
	Is the voltage across PJ4A-4 and GND DC24V?	NO	Change PWB-A.
	Is the voltage across PJ4A-3 and GND DC24V?	NO	Check the wiring between PWB-A and S2 and, if it is intact, change S2.
	Is the voltage across PJ4A-2 and GND DC24V?	NO	Change PWB-A.
5	Does the voltage across PJ5A-3 and GND vary when the initial operation is carried out? * Since pulse signals are involved, evaluate based on whether the multimeter quickly alternates between different values.	YES	Check the wiring between PWB-A and M1 and, if it is intact, change M1.
		NO	Change PWB-A.

19 C0b61

Step	Check Item	Result	Action
1	Do the Spiral Cams turn smoothly when turned by hand?	YES	Change Bin Moving Motor M1.
		NO	Check the coupling between Bin Moving Motor M1 and the rear Spiral Cam, and between the Bin Support Unit and front Spiral Cam for foreign matter, deformation, and damage.

20 C0b62

Step	Check Item	Result	Action
1	Is Bin Positioning Sensor PC1 dirty or blocked with foreign matter?	YES	Remove foreign matter or clean.
2	Is the output signal of PC1 applied to PWB-A properly? * Does the voltage across PJ13A-5 and GND change from DC5V to DC0V when PC1 is blocked? (If PC1 is blocked by the light blocking plate, turn the Spiral Cams to move the light blocking plate.)	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC1 and, if it is intact, change PC1.

21 C0b63

Step	Check Item	Result	Action
1	Does the light blocking plate of Bin Lower Limit Position Sensor PC2 operate properly?	NO	Check the light blocking plate for deformation, installation, and contamination with foreign matter.
	Is PC2 dirty with foreign matter?	YES	Remove foreign matter or clean.
2	Is the output signal of PC2 applied to PWB-A properly? * Does the voltage across PJ17A-6 and GND change from DC5V to DC0V when PC2 is blocked by the light blocking plate?	YES	Change PWB-A.
		NO	Check the wiring between PWB-A and PC2 and, if it is intact, change PC2.

22 C0b64

Step	Check Item	Result	Action
1	Is Bin Moving Motor M1 properly connected to PWB-A?	YES	Change M1 and PWB-A, in that order.

23 C0b65

Step	Check Item	Result	Action
1	Does the actuator of Bin Upper Limit Interlock Switch S1 operate properly?	YES	Check the actuator for installation and deformation.
2	Does the voltage across PJ3A-5 and GND change from DC24V to DC0V when S1 is turned ON?	YES	Change PWB-A.
		NO	Change S1.

24 C0b70

Step	Check Item	Result	Action
1	Is the Punch Unit dirty, blocked with foreign matter, or deformed? * Remove the Punch Unit for this check.	YES	Clean, remove foreign matter, or change the Punch Unit.

25 C0b71

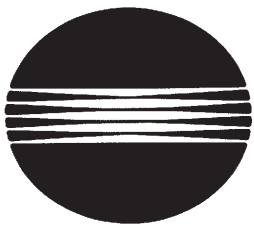
Step	Check Item	Result	Action
1	Does the voltage across pins 3 and 4 of PJ11A vary when a copy is made in the Punch mode? * Since the ON signal is as short as approx. 0.3 sec., evaluate based on whether the multimeter quickly alternates between different values.	YES	Check the wiring between PWB-A and Punch Registration Clutch CL1 and, if it is intact, change CL1.
		NO	Change PWB-A.

26 C0b72

Step	Check Item	Result	Action
1	Is CN12 loose?	YES	Plug in CN12 properly.
		NO	Change the Punch Unit and PWB-A, in that order.

ST-212/S-209

SERVICE MANUAL



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■INTRODUCTION

ST-212/S-209 have been developed and designed based on the corresponding products already on the market.

This service manual therefore covers only those features that are unique to these new units and the option service manual relevant to the the base unit must also be used together with this manual. The new and base units are compared in the following.

*1. The features unique to these new units are shown by shading in the text.

*2. For information on common and non-common parts, see Parts Manual.

	ST-212/S-209
Base Unit	ST-210/S-207

TROUBLESHOOTING

1 MISFEED DETECTION/TROUBLESHOOTING PROCEDURES

4477SBT0101A

1-1. Misfeed Detection

Any of the following misfeeds occurring in the Sorter are detected under the corresponding conditions and shown on the copier Touch Panel.

Type	Detection Condition
Paper left in ST-212/S-209	When the copier Power Switch is turned ON or a malfunction is reset, the output of the Non-Sort Exit Sensor (PC1)/Punch Registration Sensor (PC10)/Sort Exit Sensor (PC2) is High (unblocked).
Non-sort transport misfeed	The output of PC1 remains Low (blocked) even after the lapse of approx. 450ms after the copier Exit Sensor has been activated by the leading edge of the paper.
Sort transport misfeed	● Approx. 470ms after the copier Exit Sensor has been activated by the leading edge of the paper, the output of PC10 remains Low (blocked). ● Approx. 1200ms after PC10 has been unblocked (High) by the leading edge of the paper, the output of PC2 remains Low (blocked).
Sorter exit misfeed	Approx. 970 to 1670ms (depending on the paper size) after PC1/PC2 has been unblocked (High) by the leading edge of the paper, the output of PC1/PC2 remains High.

* To reset the misfeed detection, slide the Sorter away from the copier, remove the misfed paper, and slide the Sorter back against the copier.

2 MALFUNCTION DETECTION/TROUBLESHOOTING PROCEDURES

Type	Malfunction Code	Main Cause	Detection Condition
Related to Stapler Unit	C0b50	● Stapling Motor (M4) ● Stapler Home Position Detecting Sensor (PC12)	Approx. 250ms after M4 is energized, PC12 remains activated.
	C0b51	● Stapling Motor (M4) ● Stapler Home Position Detecting Sensor (PC12)	Approx. 750ms after M4 is energized, PC12 remains deactivated.
	C0b52 (To prevent the Stapler from driving without paper)	● Paper Clamping Sensor (PC8)	● At the end of the initial operation, the output of PC8 is High (blocked). ● In the Sort Staple Mode or Manual Staple Mode, the output of PC8 is High immediately before clamping starts.
	C0b53	● Staple Unit disconnected	When the Main Switch of the copier is turned ON, or an Isolated Malfunction is Reset, the Staple Unit connector (CN10) is disconnected.
Bin Moving Section	C0b60	● Bin Moving Motor (M1) ● Bin movement overload (no motion)	Approx. 500ms after the M1 forward or reverse rotation signal has been output, the unblocked (H) Bin Positioning Sensor (PC3) is not blocked (L) or blocked PC3 is not unblocked, and the number of pulses output from the Speed Detecting Section in M1 is 0.
	C0b61	● Bin movement overload ● Bin Moving Motor (M1)	Though approx. 500ms passes after M1 has started forward or reverse rotation and the drive pulse applied to M1 is maximum, unblocked PC3 is not blocked or blocked PC3 is not unblocked. (The pulses are output from M1 at long intervals.)
	C0b62	● Bin Positioning Sensor (PC3)	Although M1 has turned in the forward or reverse direction for approx. 500ms and the pulses output from M1 are normal, the output of PC3 does not change.
	C0b63	● Bin Lower Limit Position Sensor (PC4)	When the Bin reference position detecting operation has ended, the output of PC4 remains High (unblocked).
	C0b64	● Bin Moving Motor (M1)(Rotation Detecting Section)	When the Bin reference position detecting operation ended, the number of pulses from M1 was 0.
	C0b65	● Bin Upper Limit Interlock Switch (S1)	When the Bin reference position detecting operation ended, S1 was ON.

Type	Malfunction Code	Main Cause	Detection Condition
Punch Mechanism	C0b70	● Punch Unit (Overload)	In the Transport Section Drive check in the initial operation, the Motor speed at the time when the Punch Solenoid (SL2) is activated is approx. 80% or less of the speed at the time before SL2 is activated.
	C0b71	● Punch Registration Clutch (CL1)	In the CL1 operation check performed on the last sheet of paper in the Punch Mode, the Sort Exit Sensor (PC2) has been blocked (L) before CL1 is deactivated.
	C0b72	● Punch Unit disconnected	When the Main Switch of the copier is turned ON, or an Isolated Malfunction is Reset, the Punch Unit connector (CN7) is disconnected.

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2-2. Isolated Malfunctions

● When a malfunction occurs in the ST-212/S-209, the malfunction bypass function of the copier puts that malfunction in the isolated status if the following conditions are met.

Conditions

1. The "Machine Status" screen available from the Tech. Rep. mode menu shows five isolated malfunctions or less.
2. The malfunction that occurs will not affect the current copying operation.

a. Isolated malfunction icon

● The " " (wrench) mark is shown at the lower left corner on the Touch Panel.

b. To switch from the isolated malfunction icon (wrench mark) to the isolated malfunction code display

Touch " " on the Touch Panel.

● The "Machine Status" screen available from the Tech. Rep. mode menu shows the isolated malfunction codes and descriptions.

c. To reset an isolated malfunction

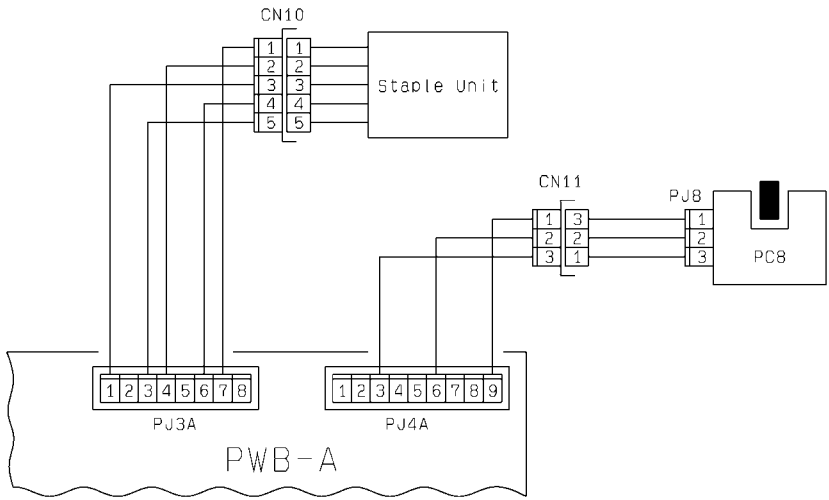
● Perform the relevant troubleshooting procedures, then, with the Machine Status screen on the display, open and close the Front Door or turn OFF and ON the Power Switch of the copier.

9	C0b52

Step	Check Item	Result	Corrective Action
1	Is the Paper Clamping Sensor (PC8) dirty or blocked with foreign matter such as paper scraps?	YES	Clean or remove foreign matter.
2	Is the output signal of PC8 applied to PWB-A properly? * Is the voltage across PJ4A-6 and GND 0VDC? Also, does the voltage change to 5VDC when PC8 is blocked by paper?	YES	Change PWB-A.
		NO	Check the wiring from PWB-A to PC8 and check the connector (CN11). If normal, change PC8.

10	C0b53

Step	Check Item	Result	Corrective Action
1	Is the Staple Unit connector (CN10) disconnected?	YES	Connect CN10.
2	Is the voltage across PJ3A-6 and GND 5VDC?	YES	Change the Staple Unit.
		NO	Change PWB-A.



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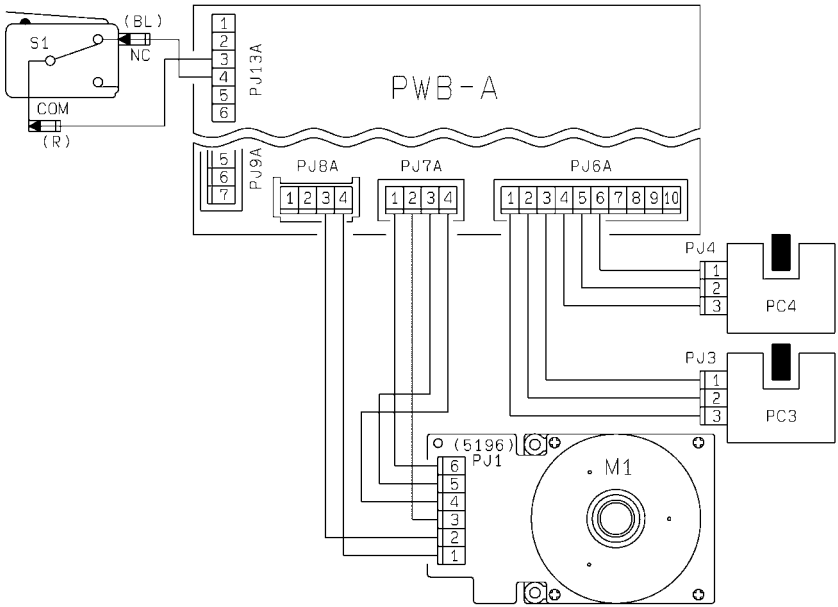
16	C0b65

Step	Check Item	Result	Correction Action
1	Does the actuator of the Bin Upper Limit Interlock Switch (S1) function properly?	NO	Check the mounting for a fault, foreign matter, etc.
2	Is the output signal of S1 applied to PWB-A properly? * When S1 is ON, does the voltage across PJ13A-4 and GND change from 24VDC to 0VDC?	YES	Change PWB-A.
		NO	Change S1.

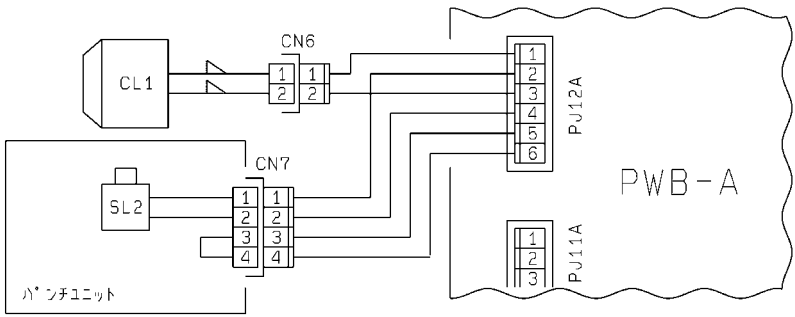


17 C0b70

Step	Check Item	Result	Corrective Action
1	Is the Punch Unit dirty, clogged with foreign matter, deformed, etc.? * Remove and check the Punch Unit.	YES	Clean, remove foreign matter, or change the Punch Unit.

18 C0b71

Step	Check Item	Result	Corrective Action
1	When a copy is made in the Punch Mode, does the voltage across PJ12A-1 and 3 vary? * Since the ON signal is as short as approx. 0.3 seconds, judge whether the tester indicator deflects or not.	YES	Check the wiring from PWB-A to the Punch Registration Clutch (CL1). If normal, change CL1.
		NO	Change PWB-A.



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19 C0b72

Step	Check Item	Result	Correction Action
1	Is the Punch Unit connector (CN7) disconnected?	YES	Connect CN7.
2	Is the voltage across PJ12A-5 and GND 5VDC?	YES	Change the Punch Unit.
		NO	Change PWB-A

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

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