TOSHIBA MJ-1015 MJ-1016 FINISHERS – LET'S "FINISH" THE COPY/PRINT JOB (part VII)

By **VLADIMIR KAMENOV**

Here is the continuation of the series of articles about Toshiba MJ-1015 MJ-1016 finishers. In the 2009 February, March, April and May issues of RechargEast Magazine you will get acquainted with the operation principles and description of saddle stitch and punch units in these Toshiba copiers.

The previous articles were published in RechargEast Magazine in October, November, December and January issues. These issues are available upon request. Please forward your requests for past issues of the magazine to nikolai@rechargeast.com

Eng. Vladimir Kamenov, PhD

Vladimir Kamenov, PhD, *is a specialist in maintenance of various models of Toshiba copiers. He holds a master's degree in Precision Mechanics and a PhD degree in Applied Mechanics. His work experience includes part-time and full-time jobs as service engineer. He also lectures at the Sofia Technical University, Precision Mechanics Department, Office Equipment Specialty.*

Contact:

Email:
vladokamenov@tu-sofia.bg
Tel.: +359887730384

V. FOLDING/DELIVERY SYSTEM

1. Outline

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

The guide plate is used to cover the folding rollers while sheets are output as to prevent sheets from coming into contact with the folding rollers during output. Before the stack is folded, the guide plate moves down to enable the folding rollers to operate.

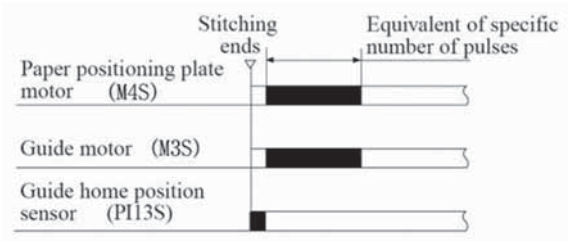
The folding rollers are driven by the paper folding motor (M2S), and the drive of the motor is monitored by the paper folding motor clock sensor (PI4S). The mechanism is also equipped with a paper folding home position sensor (PI21S) for detecting the position of the paper folding rollers. The paper pushing plate is driven by the paper pushing plate motor (M8S), and the drive of the paper pushing plate motor is monitored by the paper pushing plate motor clock sensor (PI1S). The paper pushing plate home position sensor (PI14S) and the paper pushing plate top position sensor (PI15S) are used to detect the position of the paper pushing plate.

After being folded into two by the paper folding rollers, a stack is moved ahead by the delivery roller for delivery. The delivery roller is driven by the paper folding motor. The delivery sensor (PI11S) is mounted to the delivery assembly to detect delivery of paper. The tray paper sensor (PI6S) is used to detect the presence/absence of paper on the tray, but does not detect jams. The vertical path paper sensor (PI17S) serves to detect the presence of paper after jam removal:

2. Controlling the Movement of Stacks

When a stack has been stitched (2 points), the paper positioning plate lowers so that the stack will move to where the paper folding rollers come into contact with the stack and where the paper pushing plate is located. The position of the paper positioning plate is controlled in reference to the number of motor pulses coming from the paper positioning home position sensor (PI7S). At the same time as the paper positioning plate operates, the guide plate lowers so that folding may take place:

01



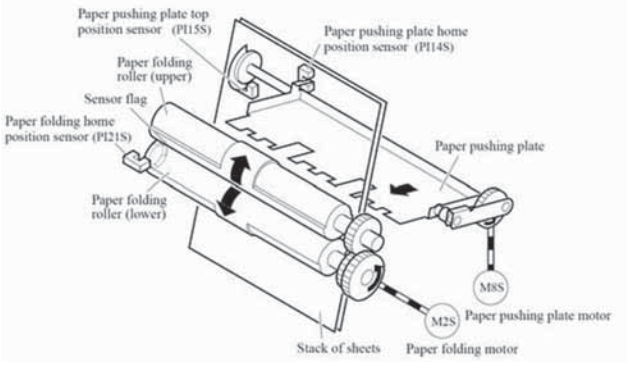
3. Folding a Stack

A stack is folded by the action of the paper folding rollers and the paper pushing plate. The paper pushing plate pushes against the center of a stack toward the roller contact section. The paper pushing plate starts at its home position and waits at the leading edge position until the stack has been drawn to the paper folding roller and is gripped for a length of 10 mm. When the paper folding roller has gripped the stack for a length about 10 mm, the paper pushing plate motor starts to rotate once again, and the paper pushing plate returns to its home position. The stack gripped in this way by the paper folding roller is drawn further by the paper folding roller and then is moved by the delivery roller to the paper tray.

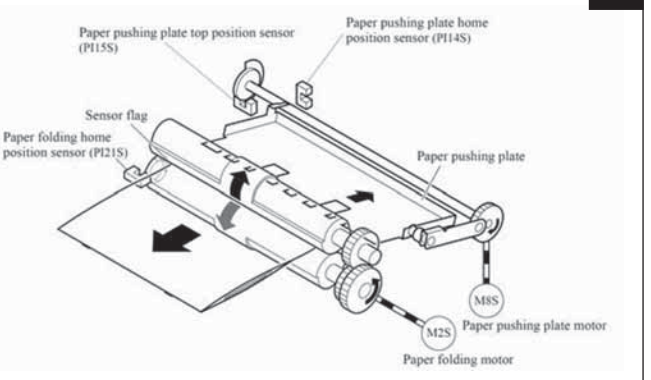
Half of the peripheral area of the paper folding rollers excluding the center part is punched out. This punched out area only feeds the paper as the paper feeding roller (lower) contacts the paper feeding roller (upper) only at the center of the roller to prevent the paper from wrinkling. As the paper feeding roller (lower) contacts the paper feeding roller (upper) at their entire surfaces on the remaining half of the peripheral area, paper folding starts from this half of the peripheral area, and paper is fed while it is being folded. The stop position of the paper folding rollers is in this half of the peripheral area.

The paper folding start and stop positions on the paper folding rollers is controlled according to the motor clock signals from the paper folding home position sensor (PI21S):

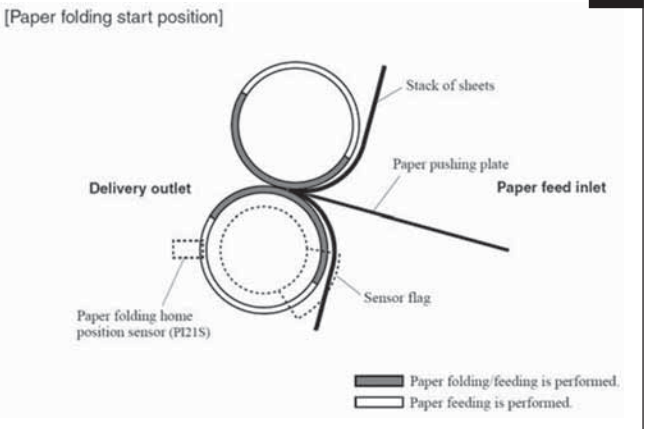
02



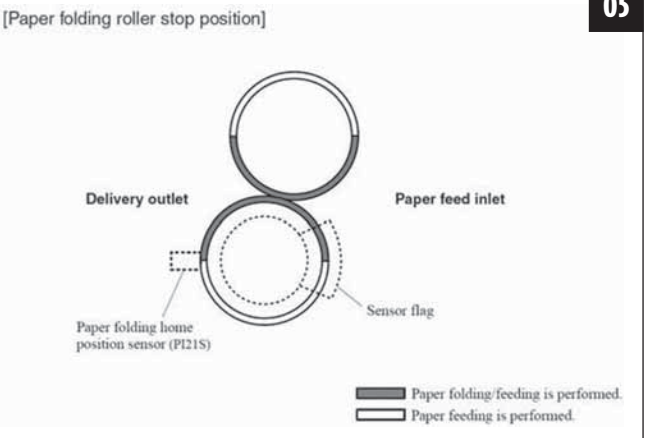
03



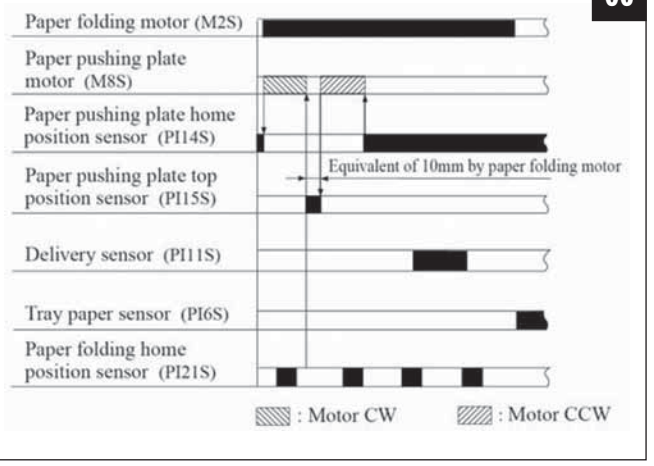
04



05



06

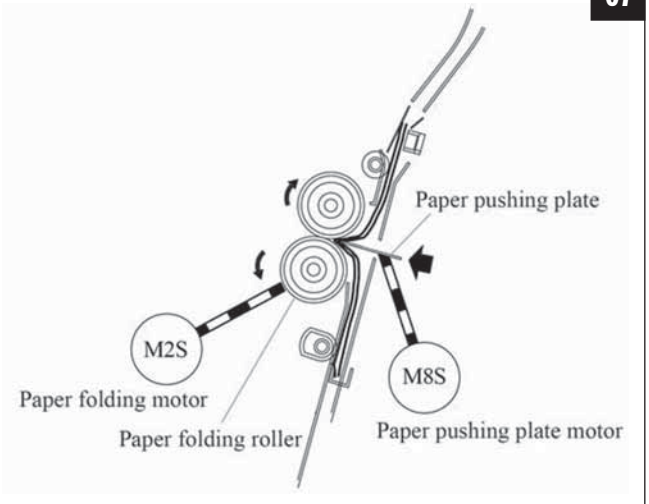


4. Double Folding a Stack

To fold a stack consisting of 10 or more A4-R or LT-R sheets, folding is executed twice for the same sheet. The paper folding rollers rotate in reverse for an equivalent of 20 mm after gripping the stack for a length of 20 mm, enabling the paper folding rollers to apply an increased degree of pressure along the crease on the stack. Then, the paper folding rollers rotate normally, and the paper pushing plate returns to its home position while the stack is being delivered. This way, a stack requiring a large force may properly be folded with less pressure.

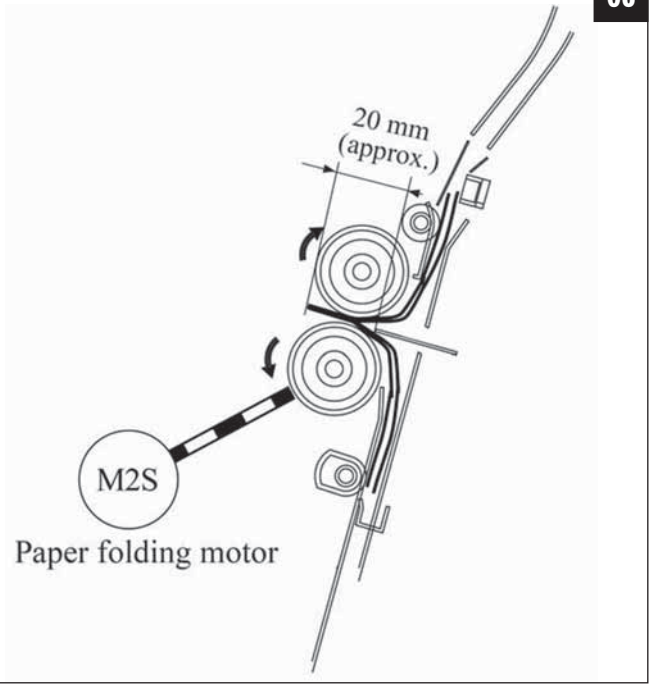
1) The paper pushing plate pushes the stack in the direction of the paper folding rollers:

07



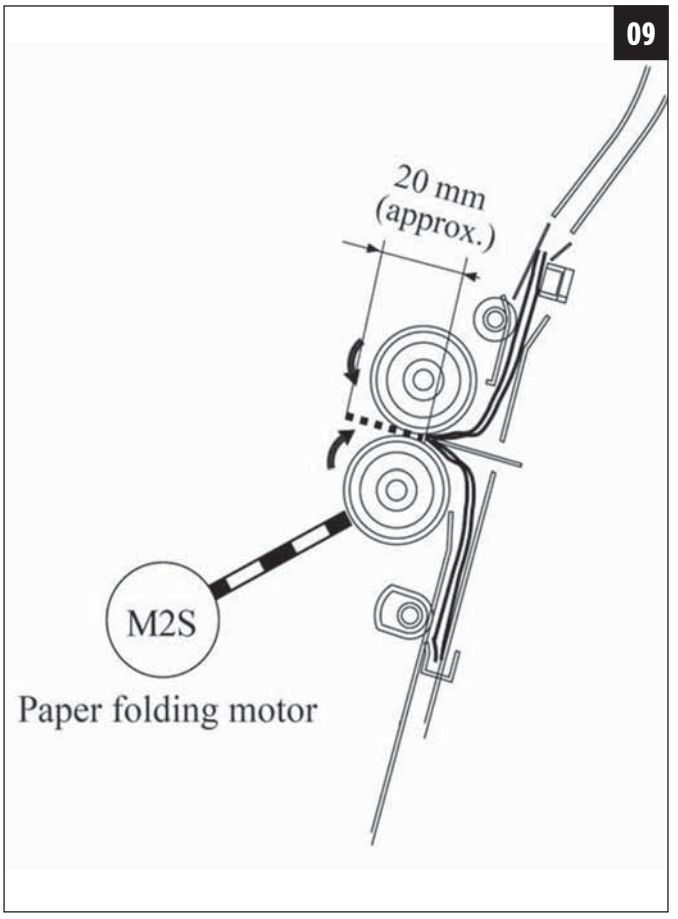
2) The paper folding rollers grip the stack for a length of about 20 mm:

08



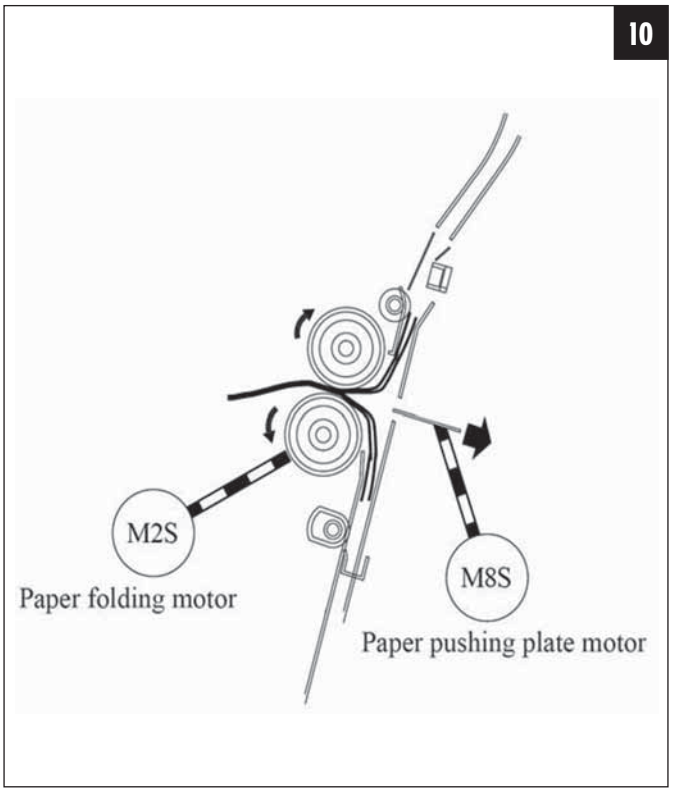
3) The paper folding rollers rotate in reverse, pushing back the stack for a length of about 20 mm (reverse feeding):

09

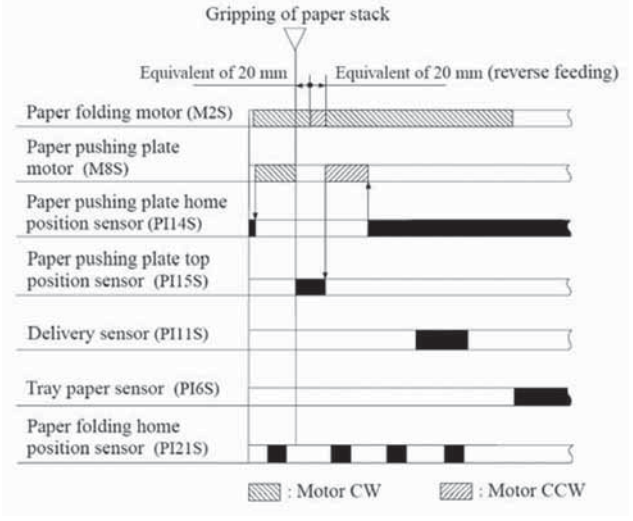


4) The paper folding rollers rotate again, feeding out the stack. The paper pushing plate returns to its home position:

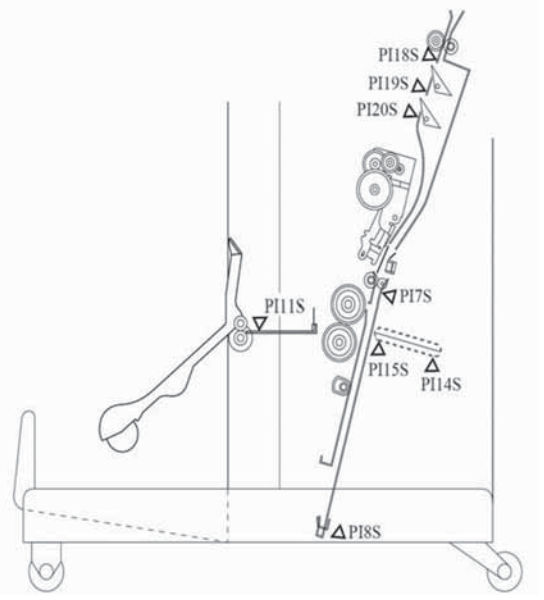
10



11



12



No.	Sensor
PI11S	Delivery sensor
PI14S	Paper pushing plate home position sensor
PI15S	Paper pushing plate top position sensor
PI17S	Vertical path paper sensor
PI18S	No.1 paper sensor
PI19S	No.2 paper sensor
PI20S	No.3 paper sensor
PI8S	Paper positioning plate paper sensor

VI. CHECKING FOR A JAM

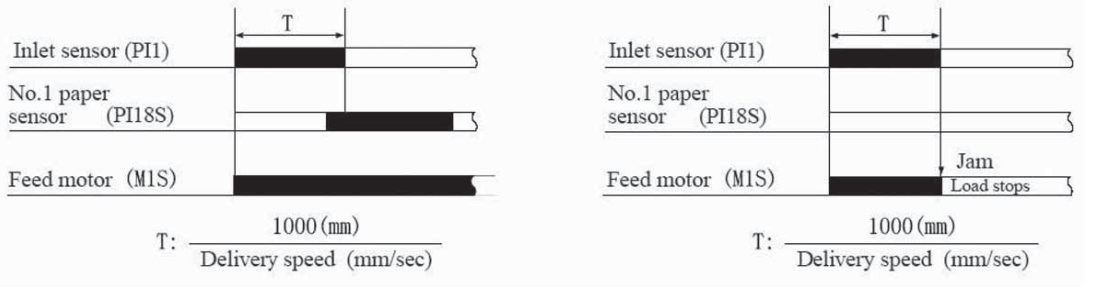
1. Checking for a Jam

The saddle stitcher unit identifies any of the following conditions as a jam, and sends the jam signal to the host machine. In response, the host machine may stop the copying operation and indicate the presence of a jam on its control panel:

2. Inlet Delay Jam

The No.1 paper sensor (PI18S) on the paper sensor PCB does not come ON for a specific period of time after the inlet sensor (PI1) of the finisher has been turned ON:

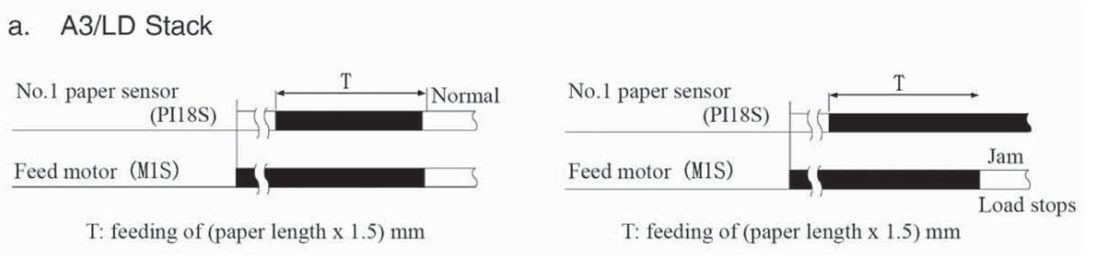
13



3. Inlet Stationary Jam

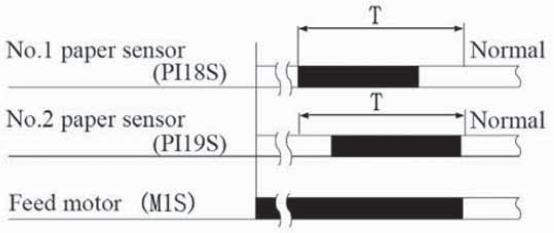
The No.1 paper sensor (PI18S), No.2 paper sensor (PI19S), and No.3 paper sensor (PI20S) on the paper sensor PCB do not go OFF when the stack has been fed for a specific period after the No.1 paper sensor (PI18S) is turned ON. The paper sensor used varies according to the paper size:

14

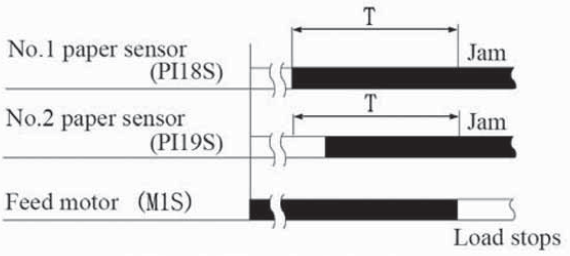


15

b. B4 Stack



T: feeding of (paper length x 1.5) mm

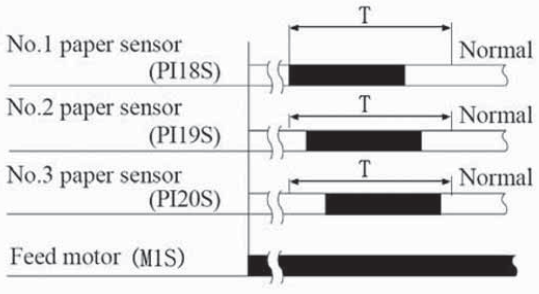


T: feeding of (paper length x 1.5) mm

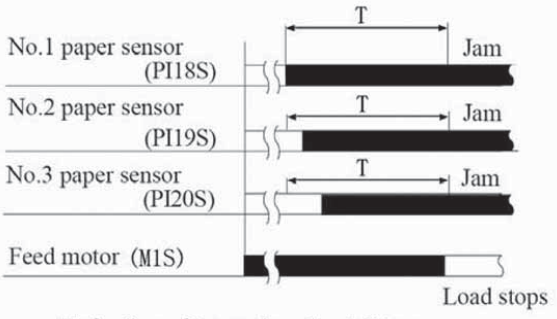
Note: The diagram shows two sensors checking for jams. Single detection, however, uses only one sensor.

16

c. A4-R/LT-R Stack



T: feeding of (paper length x 1.5) mm



T: feeding of (paper length x 1.5) mm

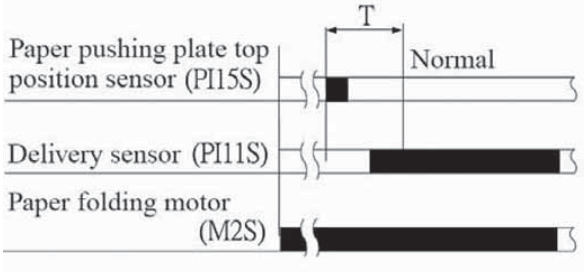
Note: The diagram shows three sensors checking for jams. Single detection, however, uses only one sensor.

4. Delivery Delay Jam

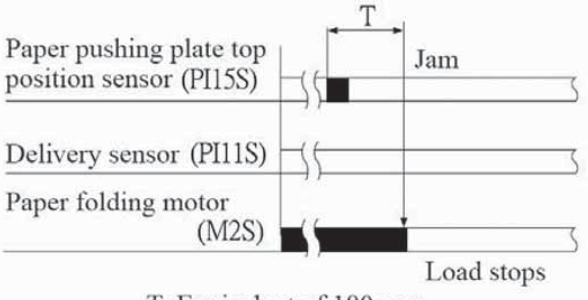
a. By delivery sensor

The delivery sensor (PI11S) does not come ON within a specific period of time after the paper pushing plate top position sensor has been turned ON:

17



T: Equivalent of 180 mm



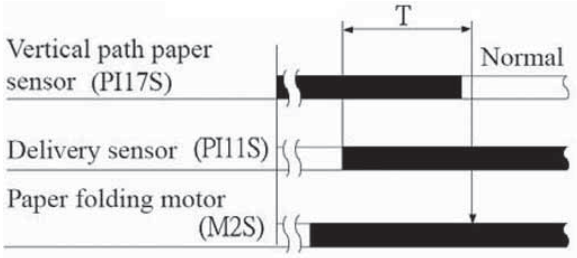
T: Equivalent of 180 mm

5. Delivery Stationary Jam

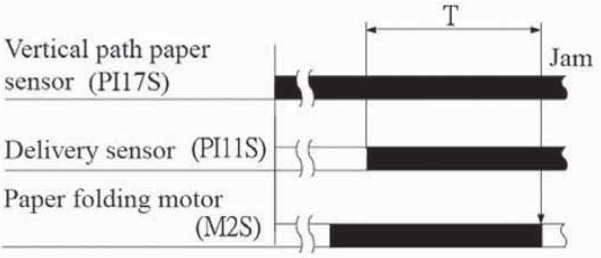
a. By vertical path paper sensor

The vertical path paper sensor (PI17S) does not go OFF within a specific period of time (feeding) after the delivery sensor (PI11S) has been turned ON, i.e., the trailing edge of the stack does not leave the vertical path paper sensor:

18



T: Feeding of $\left(\frac{\text{Paper length}}{2} - 130\right) + 50$ mm



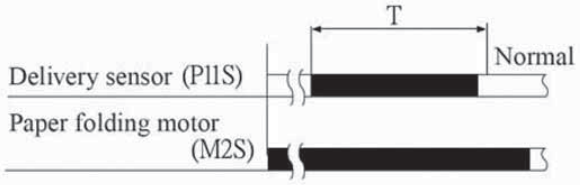
T: Feeding of $\left(\frac{\text{Paper length}}{2} - 130\right) + 50$ mm

Note: The length 130 mm is the length of the feeding path from the vertical path paper sensor to the delivery paper sensor, while the length 50 mm is a margin.

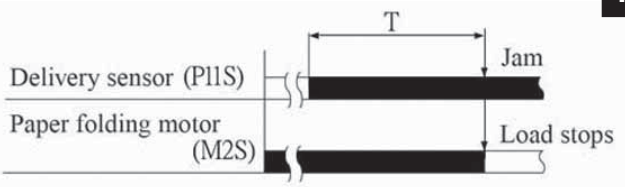
b. By delivery sensor

The delivery sensor (PI11S) does not go OFF within a specific period of time (feeding) after it has been turned ON:

19



T: Feeding of $\left(\frac{\text{Paper length}}{2} \times 1.5\right)$ mm



T: Feeding of $\left(\frac{\text{Paper length}}{2} \times 1.5\right)$ mm

6. Power-ON Jam

Any of the No.1 paper sensor (PI18S), No.2 paper sensor (PI19S), No.3 paper sensor (PI20S), Vertical path paper sensor (PI17S) and delivery sensor (PI11S) on the paper sensor PCB detects paper at power-ON.

7. Door Open Jam

The front door open/closed sensor (PI2S), outlet cover sensor (PI3S), or inlet cover sensor (PI9S) finds that the respective cover is open during operation.

8. Stitcher Staple Jam

When the stitcher motor (M7S/M6S) is rotating clockwise, the stitcher home position sensor (MS7S/MS5S) does not come ON within 0.5 sec after it has been turned OFF. In addition, the sensor is turned ON within 0.5 sec after the motor has been rotated counterclockwise.

Reference:

When all doors are closed after the user has removed the jam, the saddle stitcher unit checks whether the vertical path paper sensor (PI17S) has detected the presence of paper. If the sensor has detected paper, the unit will identify the condition as being faulty jam removal and send the jam signal to the host machine once again.

To be continued.

Read in the May issue of RechargEast Magazine:
--> **Explanation of punch unit operation** RCE