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

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

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PART IV: SADDLE STITCH UNIT EXPLANATION OF OPERATION

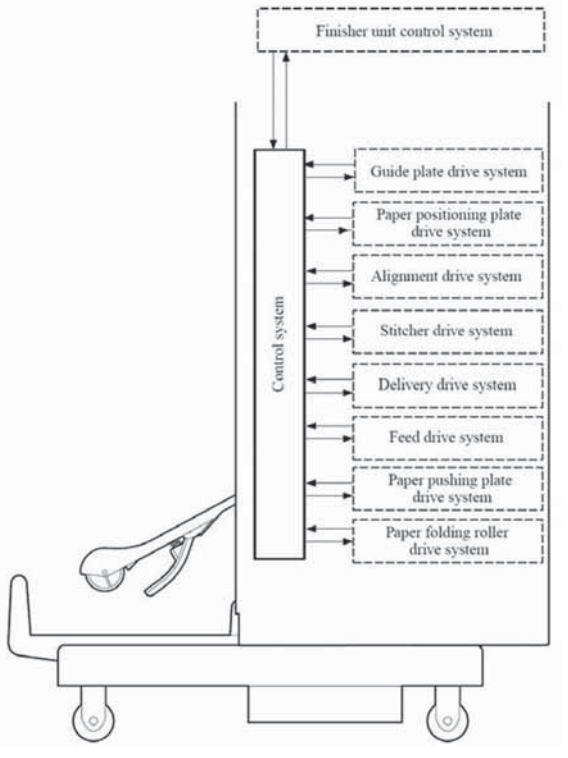
This article discusses the purpose and role of each of the stitcher's functions, and the principles of operation used for the stitcher mechanical and electrical systems. It also explains the timing at which these systems are operated. The symbol in drawings indicates transmission of mechanical drive, and signals marked by together with the signal name, indicates the flow of electrical signals.

I. BASIC OPERATION

A. OUTLINE

The unit "stitches" (2 points) a stack of sheets delivered by the finisher unit and folds it in two for delivery. All these operations are controlled by the saddle stitcher controller PCB in response to commands from the host machine via the finisher unit:

01



II. FEEDING/DRIVE SYSTEM

A. OUTLINE

The stitcher unit aligns the sheets coming from the finisher unit and stitches the resulting stack for delivery to the delivery tray according to the commands coming from the finisher controller PCB. The machine's operation consists of the following:

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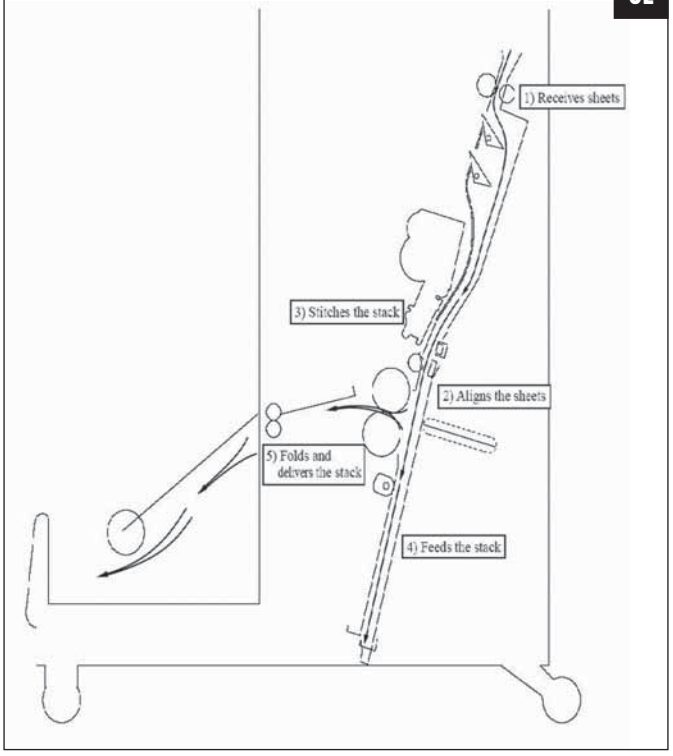


1. Receives sheets.
2. Aligns the sheets
3. Stitches the stack.
4. Feeds the stack.
5. Folds and delivers the stack.

1. Receiving Sheets

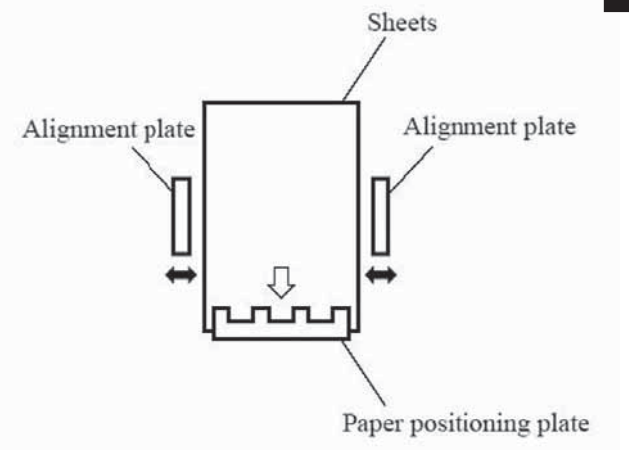
The stitcher unit receives sheets from the finisher unit and outputs them inside the vertical path in vertical orientation. The vertical path while sheets are being output is configured by two paper deflecting plates. The position of the sheets being output is set by the paper positioning plate so that the center of the stack matches the stapling/folding position. Sheets coming later are output closer to the delivery slot, and the volume of paper that may be output is as follows:

• 15 sheets (maximum of 14 sheets of 80 g/m2 + 1 sheet of 200 g/m2)

2. Aligning the Sheets

The alignment plates operate to put the sheets in order each time a sheet of paper is output to the vertical path assembly. The alignment plates are mounted at the edge of the vertical path assembly. The alignment plates also operate after stapling to prepare the stack for delivery:

03



3. Stitching

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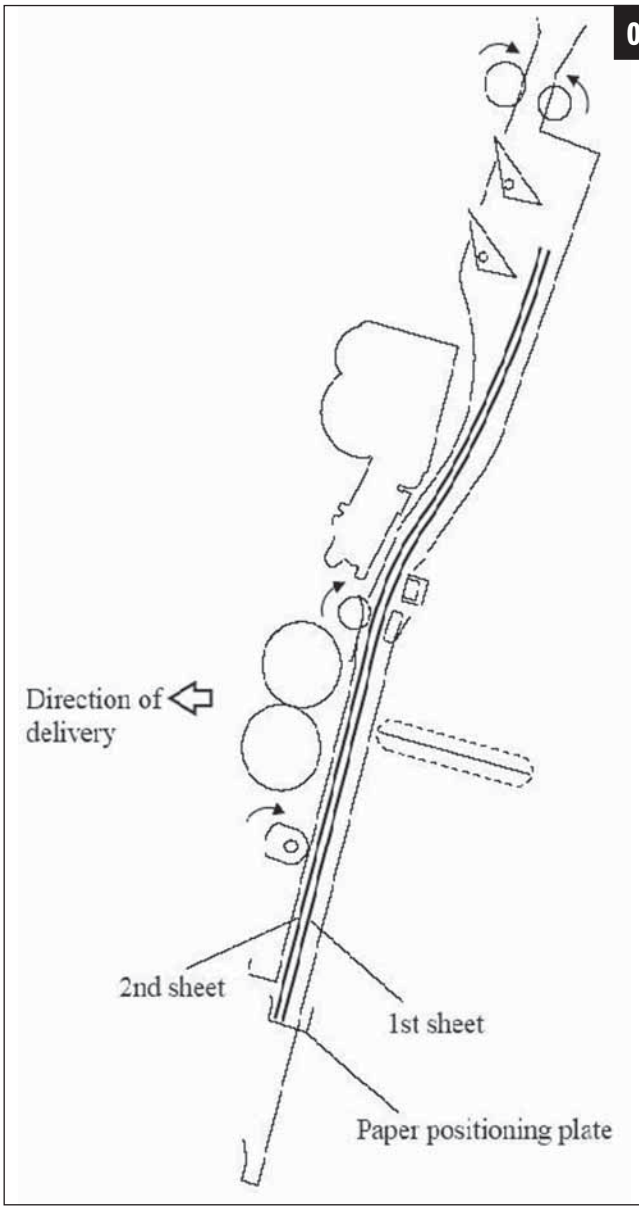
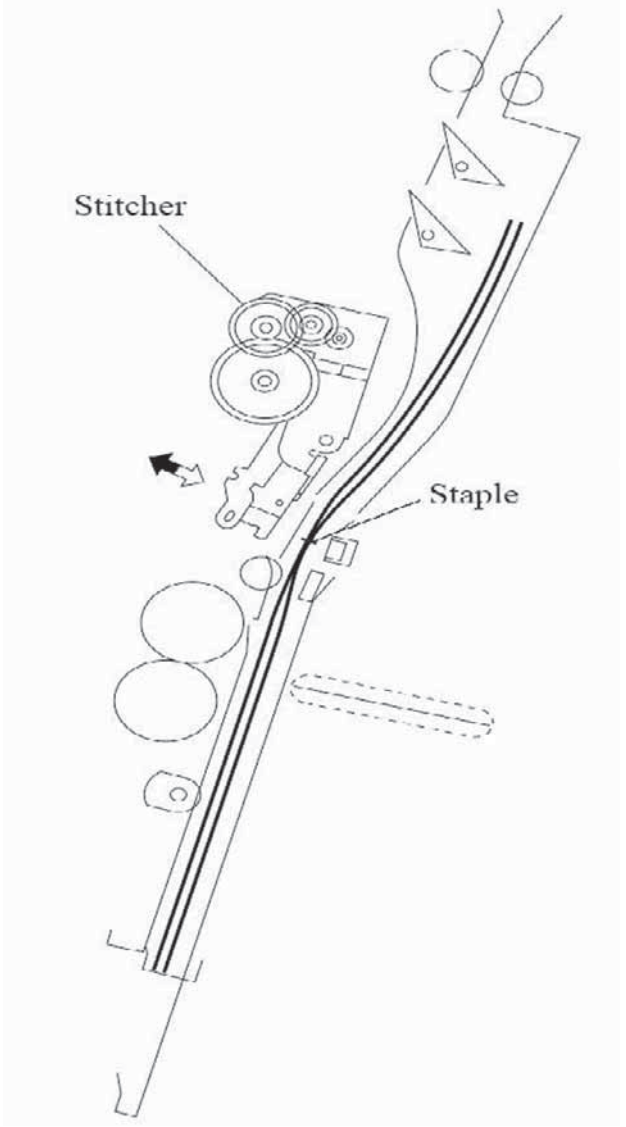


When all sheets have been output, the two stitchers stitch the stack. The stitchers are positioned so that they face the center of a stack. The two stitchers are not operated simultaneously, so as to prevent the paper from wrinkling between two staples and to limit the load on the power supply. If only one sheet of paper arrives from the host machine, stitching does not take place and the sequence goes to the next operation (stack feeding):

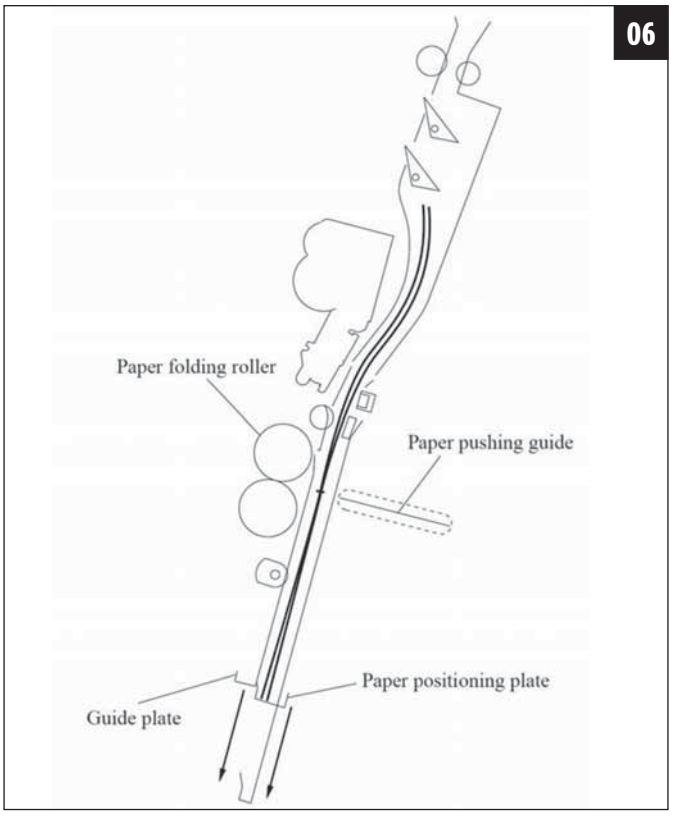
05



4. Feeding the Stack

The unit folds the stitched stack of sheets, and then feeds it to the point of delivery. This point is where the center of the stack, i.e., stapling position, matches the height of the paper pushing plate and the paper folding roller nip. The stack is moved forward by operating the paper positioning plate. When the plate is operated, the guide plate which has been covering the paper folding rollers also moves down, so that the paper folding rollers directly face the stack:

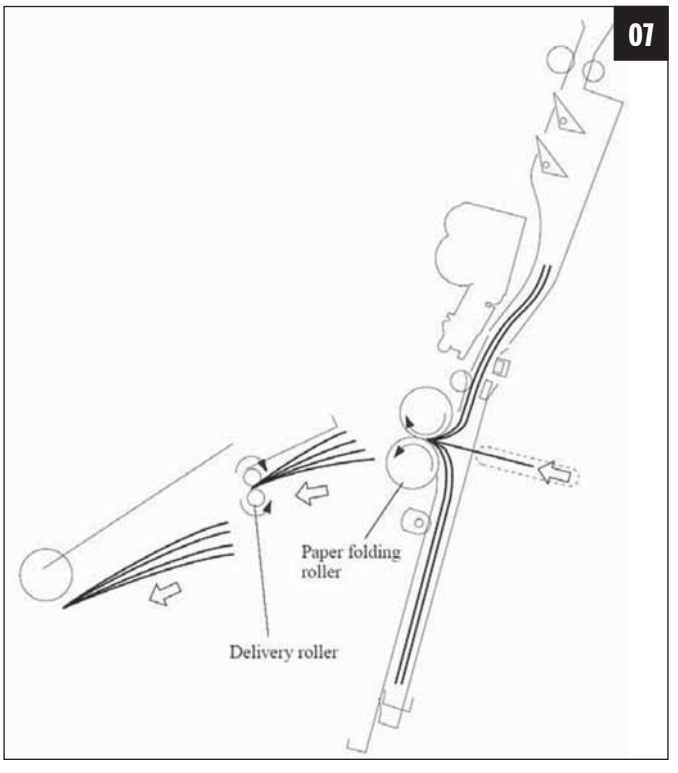
06



5. Folding/Delivering the Stack

The paper pushing plate pushes again the center of the stack to move it in the direction of the paper folding rollers. In response, the paper folding rollers pick the stack along its center and fold it in two. The paper folding rollers together with the delivery roller then move the stack along to output it on the delivery tray:

07



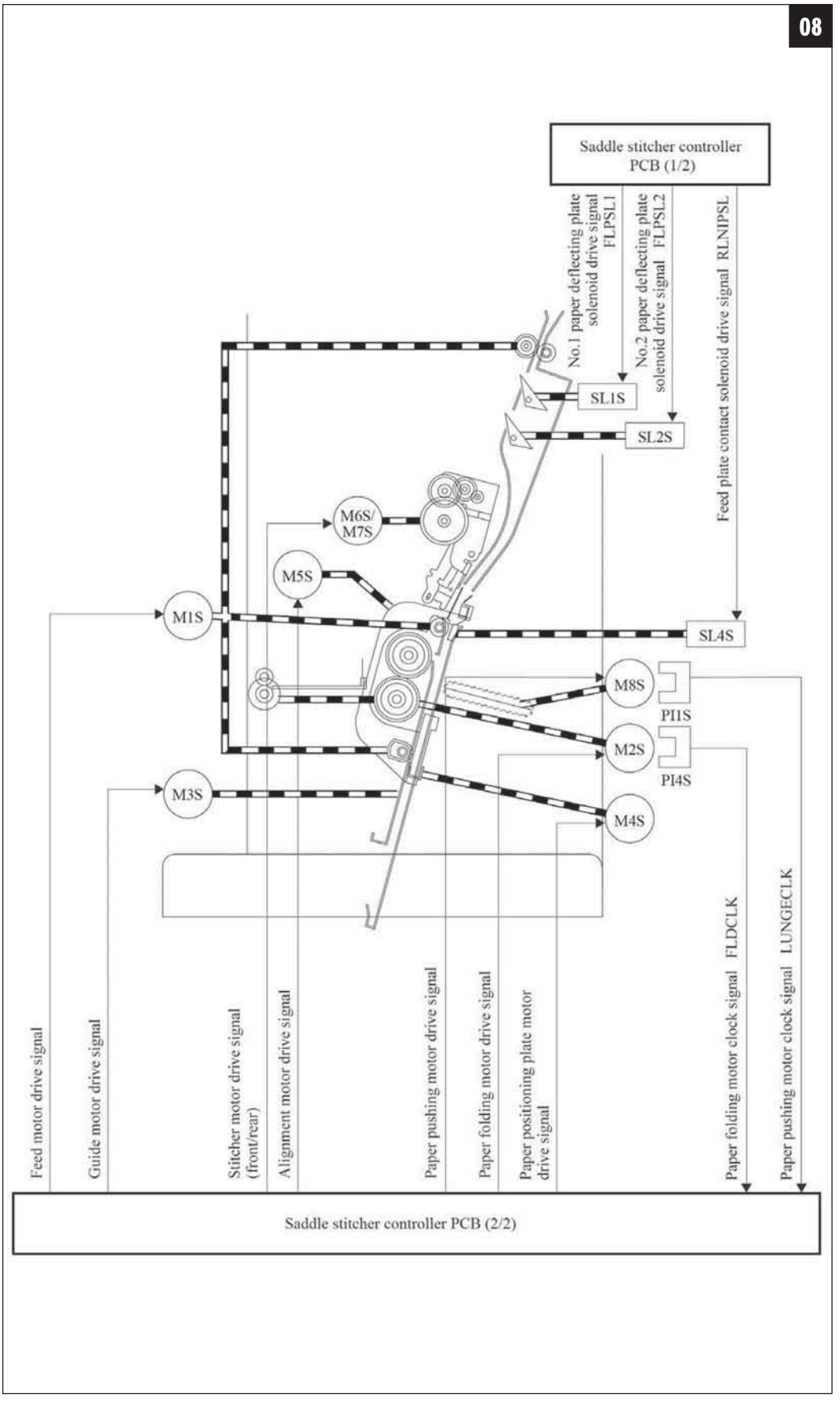
III. PAPER OUTPUT MECHANISM

A. OUTLINE

The paper output mechanism serves to keep a stack of sheets coming from the finisher in place for the next steps (stapling, folding). The paper inlet is equipped with the No.1 flapper and the No.2 flapper, which operate to configure the paper path to suit the size of paper. The paper positioning plate is kept in wait at a predetermined location to suit the size of paper. The paper positioning plate is driven by the paper positioning plate motor (M4S), and the position of the plate is identified in reference to the number of motor pulses coming from the paper positioning plate home position sensor (PI7S). A sheet moved by the inlet roller is handled by the feed rollers and the crescent roller and held in a predetermined position. The feed plate serve to move sheets by coming into contact with or moving away from sheets as needed. The alignment plates put the stack into order each time a sheet is output. The alignment plates are driven by the alignment motor (M5S), whose position is identified in reference to the number of motor pulses coming from the alignment plate home position sensor (PI5S). To prevent interference between paper and the paper folding rollers when the paper is being output, the folding rollers are designed to be covered by a guide plate.

The guide plate moves down before paper is folded so as to expose the paper folding rollers. The inlet is equipped with the No.1, No.2 and No.3 paper sensors (PI18S, PI19S, PI20S) each suited to a specific paper size, and the paper positioning plate is equipped with a paper positioning plate paper sensor (PI8S):

08



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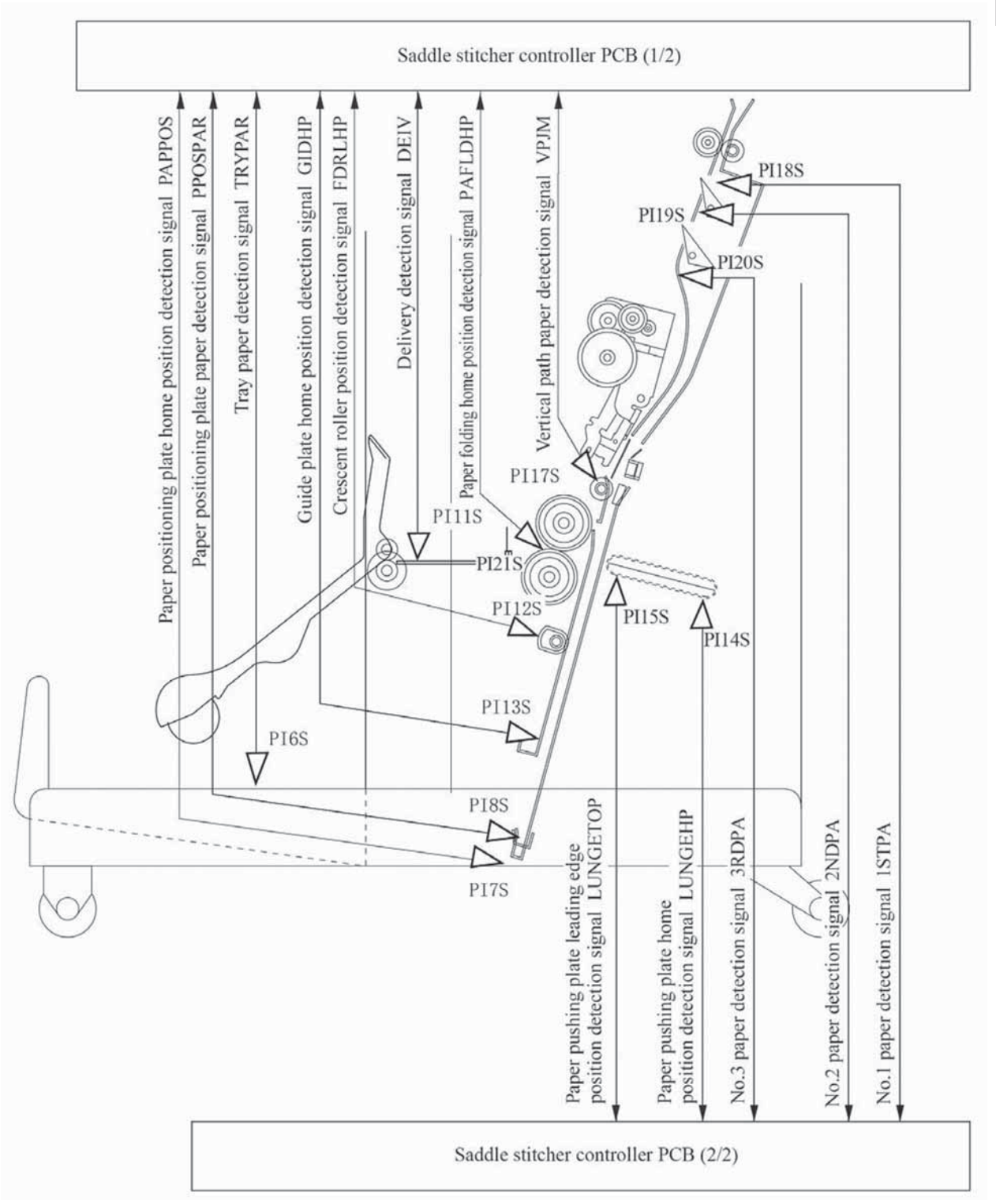

B. CONTROLLING THE INLET FLAPPERS

1. OUTLINE

The two flappers mounted at the paper inlet are operated to configure the feed path according to the size of paper. The flappers are used to enable the following:

1. To detect the passage of the trailing edge of the paper being moved by an appropriate sensor.

2. To prevent the following sheet from butting against the top of the existing stack

Table 1 shows the relationship between sensors and paper sizes:

Sensor	A3/LD	B4	A4-R/LT-R
No.1 paper sensor (PI18S)	Used	Used	Used
No.2 paper sensor (PI19S)	Not used	Used	Used
No.3 paper sensor (PI20S)	Not used	Not used	Used

Each flapper is driven by its own solenoid. Table 2 shows the relationship between solenoids and paper sizes:

Solenoid	A3/LD	B4	A4-R/LT-R
No.1 paper deflecting plate solenoid (SL1S)	OFF	ON	ON
No.2 paper deflecting plate solenoid (SL2S)	OFF	OFF	ON

2. A3/LD Paper Path (3 sheets)

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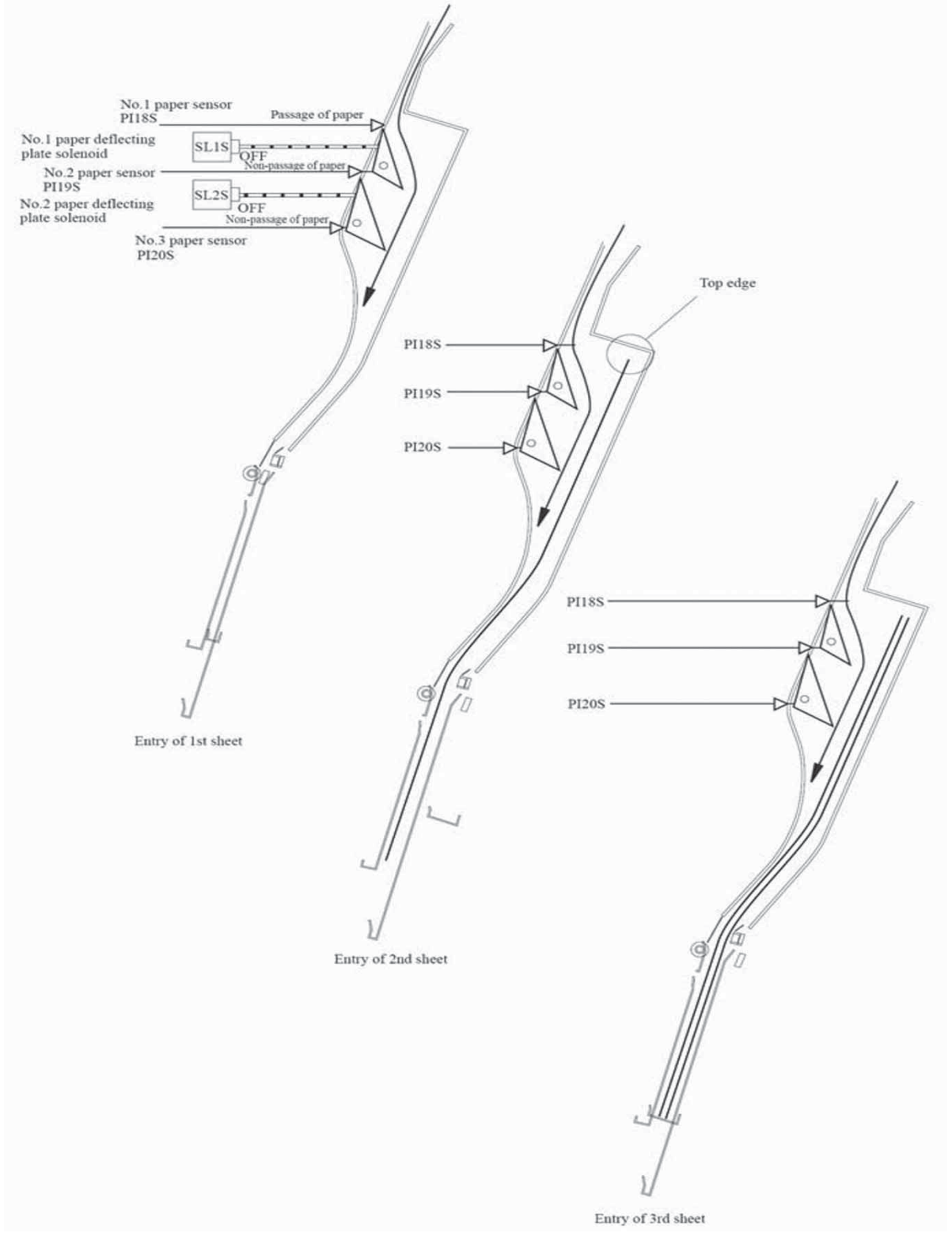
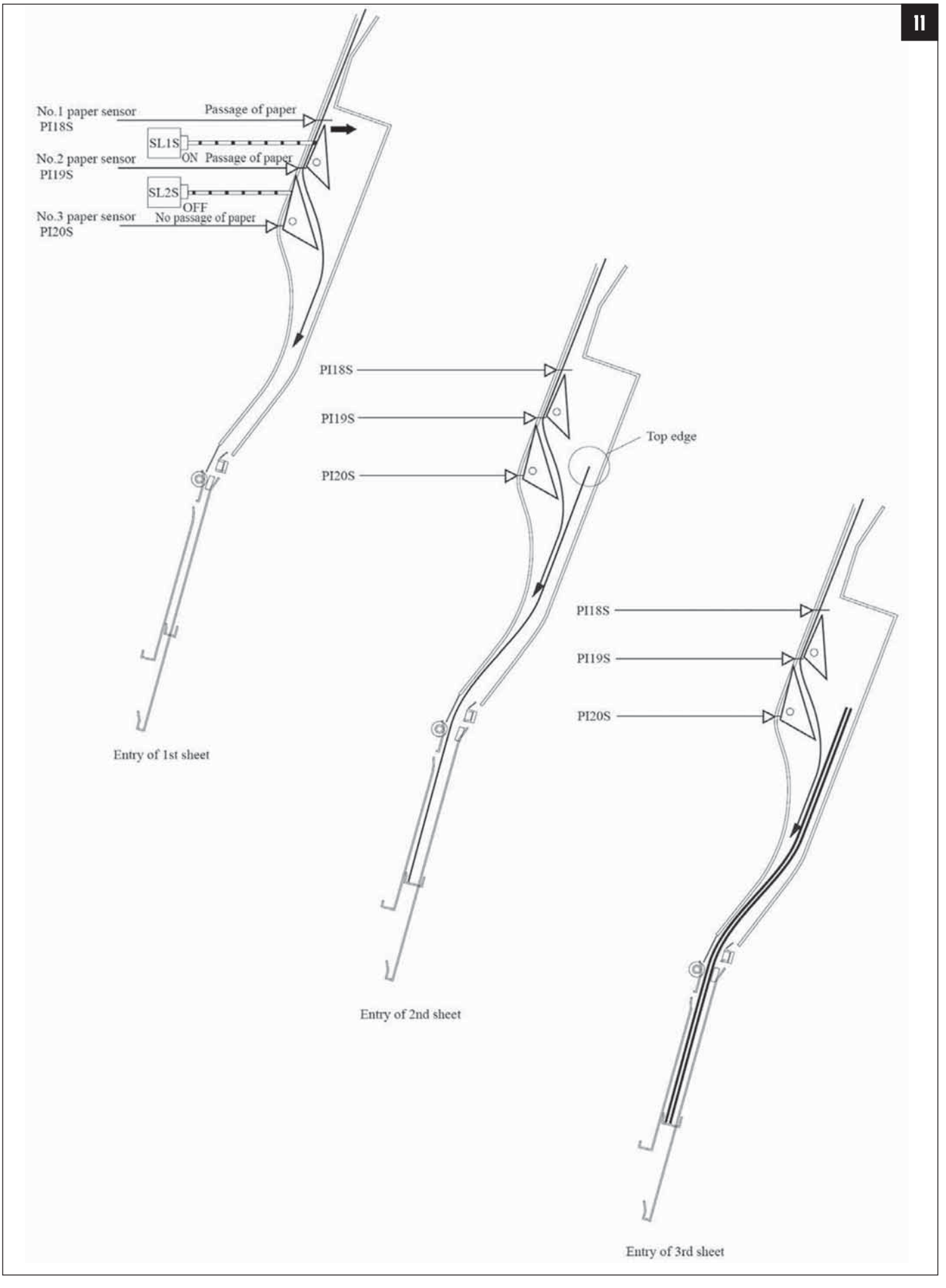
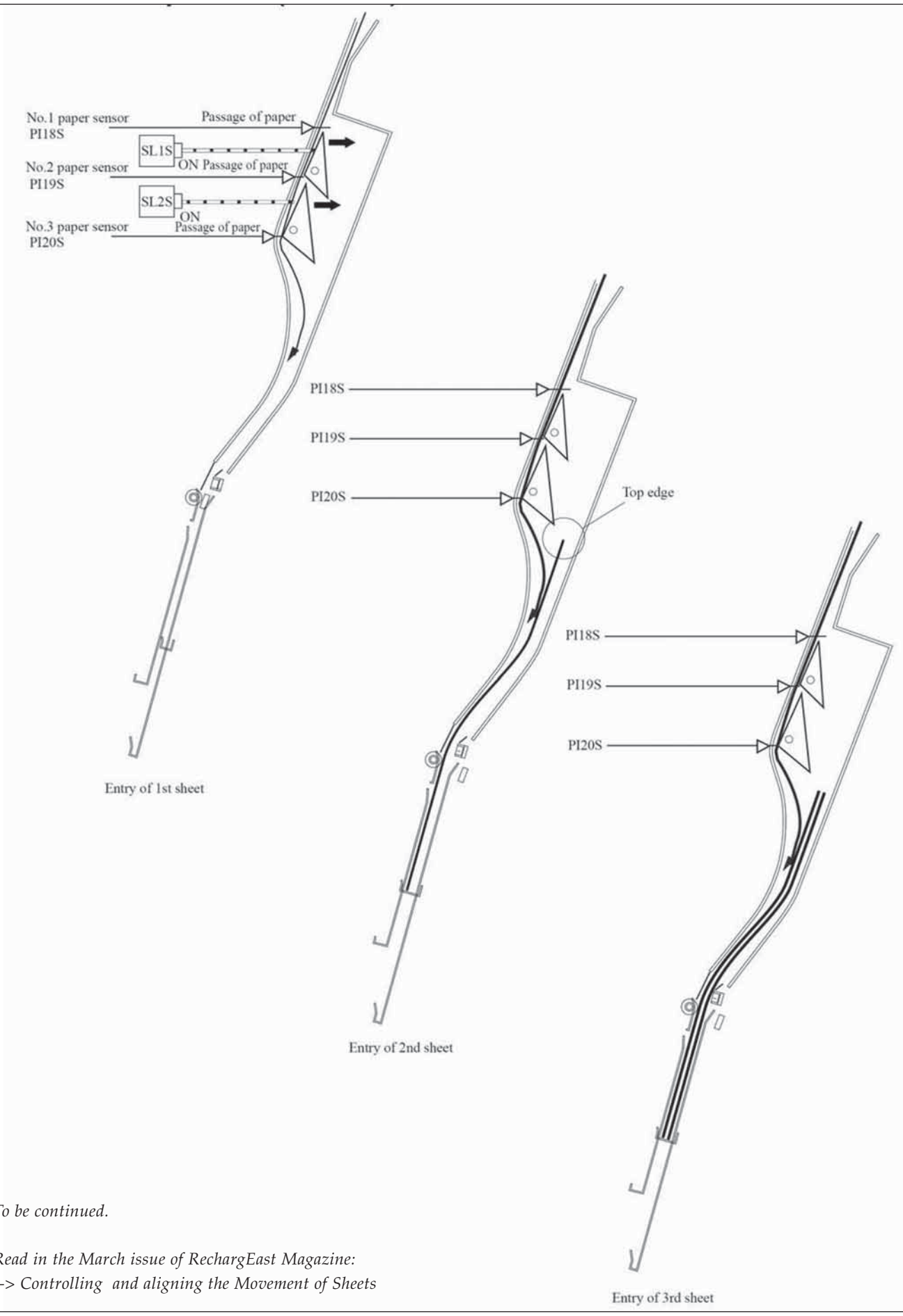


3. B4 Paper Path (3 sheets)



4. A4-R/LT-R Paper Path (3 sheets)



To be continued.

Read in the March issue of RechargEast Magazine:
--> Controlling and aligning the Movement of Sheets