

## 7.1 Head unit maintenance and inspection checklist

Perform the maintenance operations described in this chapter in accordance with the following implementation schedule.

- (1) Daily at the beginning of the shift
  - Check the printhead nozzle condition (7.2.2 Check the print head clogging nozzles condition)  
Check the print head nozzle condition on the printed Basic Chart.
- (2) Daily at the end of the shift
  - Printhead cleaning (7.2.1 Printhead cleaning operation procedure)  
Select the cleaning level "Normal", and then select all color and all printheads, and then execute the cleaning.
- (3) Every week
  - Replenishing cleaning solution for the wiper cleaning unit pad (7.4 Replenishing cleaning solution for the wiper cleaning unit)  
The color of wiper cleaner pad will become white if liquid evaporates. Please replenish cleaning solution to the wiper cleaning unit pad.
- (4) Every month
  - Cleaning the wiper unit (Ink pan, Wiper, Wiper unit frame) (7.5.1 Cleaning the wipers)  
Wipe off the ink accumulated in the ink pan.  
Wipe off the ink that adheres to the front, tip, and around the wiper.  
Clean the wiper up and down guide shaft.
  - Replacing the waste ink collection pads (7.3 Replacing the waste ink collection pads)  
Please replace the waste ink collection pads.
- (5) Every three month (Every six month)
  - Reattaching or replacing the wiper cleaning ink collection pad (7.5.2 Reattaching or replacing the wiper cleaning ink collection pad)  
Every three month, please rotate the ink collection pad by 180 degrees to change the corner to use. And every six month, please replace the ink collection pad with a new one.
- (6) Every one month and every 1.5 month
  - Printhead cleaning (Extreme cleaning) (7.2.4 Extreme cleaning)  
The effect of printhead deviation may appear in print quality for one month in Black and for one month and half in Magenta. Please check each printhead condition, and please execute "Extreme cleaning" (Printhead cleaning with cleaning level "Extreme") to printhead with a bad condition. When executing "Extreme cleaning" preventively, please execute "Extreme cleaning" to Black and Magenta with the following implementation schedule.  

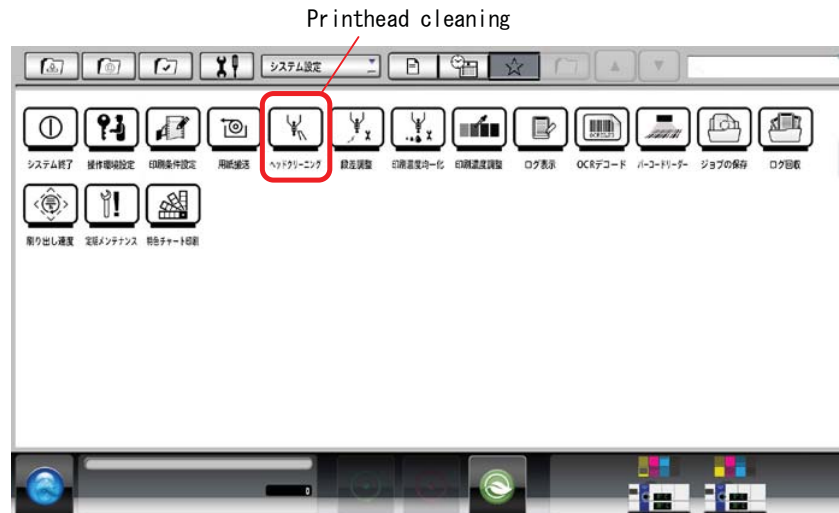
Black:	Every 1.5 month
Magenta:	Every one month

Location	Item	Frequency					Inspection contents Reference section of the procedure is shown in the brackets.
		Daily	Weekly	Monthly	Every 1.5 month	Every three month	
Head unit	Printhead cleaning	√					Executing "Printhead cleaning" with "Nomral" level to all color and all printheads. (7.2.1 Printhead cleaning operation procedure)
				√	√		Executing "Printhead cleaning" with "Extreme" level to Black (every one month) and Magenta (every one month and half. (7.2.4 Extreme cleaning)
	Wiper cleaner		√				Replenishing the cleaning solution in the ink collection pad (7.4 Replenishing cleaning solution for the wiper cleaning unit)
						√	Reattaching or replacing the ink collection pad (7.5.2 Reattaching or replacing the wiper cleaning ink collection pad)
	Wiper blade			√			Cleaning (7.5.1 Cleaning the wiper unit)
	Ink pan			√			Cleaning (7.5.1 Cleaning the wiper unit)
	Waste ink collection pads in the printer			√			Replacement (7.3 Replacing the waste ink collection pads)

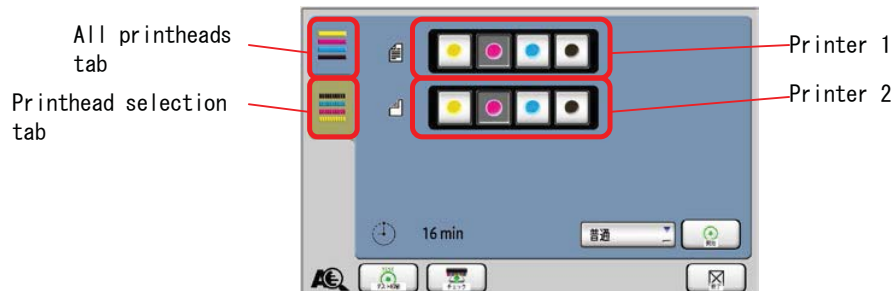
## 7.2 Printhead cleaning

### 7.2.1 Printhead cleaning operation procedure

- (1) Press “Printhead cleaning” icon.



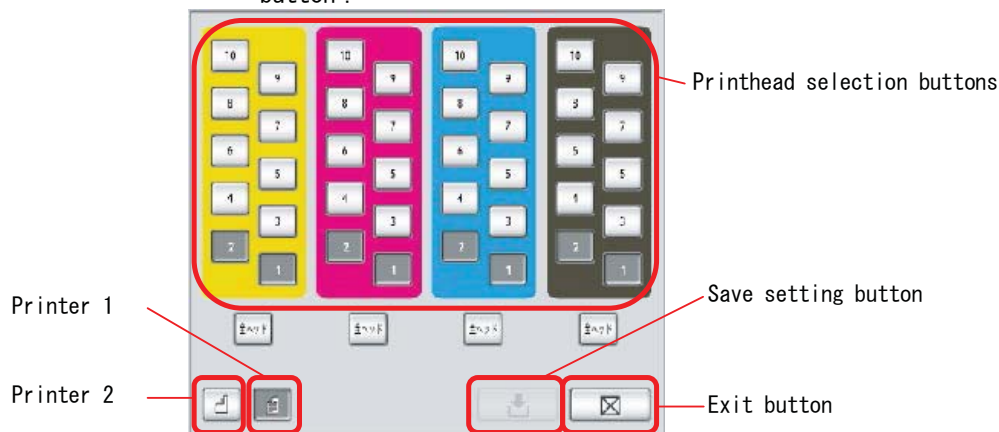
- (2) When cleaning all printheads, select the printer and color in the following screen.



When cleaning a specified printhead, press “Printhead selection tab” and press “Edit button”.



Turn ON the “Printhead selection buttons” of the target side and printhead for the cleaning. Press “Save setting button” and “Exit button”.



(3) Select the cleaning level.



- 1) Flushing  
Ink is flushed from the printheads.
- 2) Normal  
Ink is suctioned from the printhead surface and wipe the printhead surface.  
Please select in the following case, and select “All printheads tab” and select color and execute with this level.
  - Daily at the end of the shift.
  - A few clogging nozzles on most printheads.
- 3) Intense  
Ink is suctioned from the printhead surface and wipe the printhead surface. Ink sucking time is longer than “Normal” level.  
Please select in the following case, and select “Printhead selection tab” and turn ON the printhead for the cleaning and execute with this level.
  - Many clogging nozzles on printheads.
  - Clogging nozzles in adjacent nozzles on printheads.
- 4) Wipe  
Ink adhered to the printhead surface is wiped by the wiper.
- 5) Extreme  
Special printheads cleaning level for nozzle deviation and

nozzle clogging. For detail, please refer to “7.2.4 Extreme cleaning”.

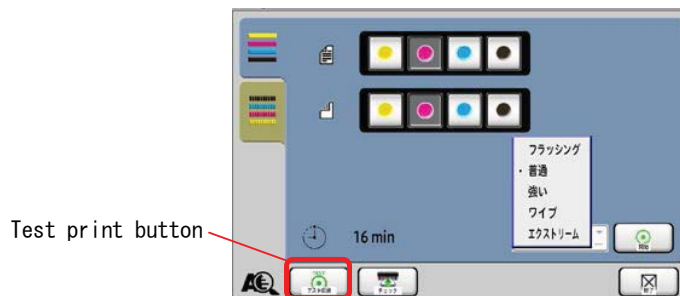
**NOTE**

- Please do not use “Flushing” and “Wipe” level. They are for maintenance for service engineer.
- Please use “Normal” and “Intense” properly in daily maintenance. Since “Intense” requires time rather than “Normal”, please use “Intense”, when cleaning specific printheads. For detail, please refer to “7.2.3 Nozzle clogging maintenance”.

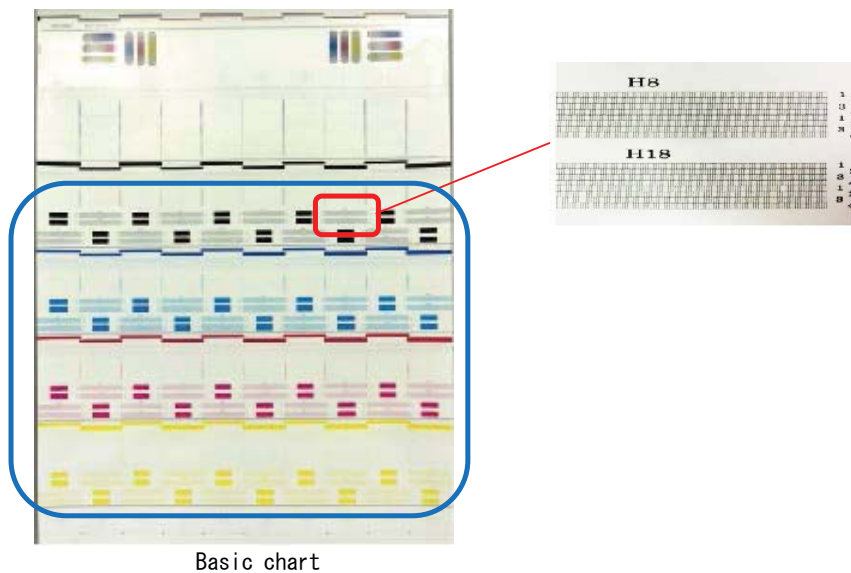
(4) Press “START button”. Printhead cleaning is started.



(5) After finish printhead cleaning, press “Test print button”. Basic chart is printed.



(6) Check whether any dots are missing from the printed Basic Chart.



### 7.2.2 Check the printhead nozzles clogging condition

Daily at the beginning of the shift, please print Basic Chart twice or three times and please check the printhead nozzles clogging condition. Then, please select resolution "600 x 600 dpi" and print Basic chart. Since ink drop size of "600 x 600 dpi" is biggest, this printing is effective in order to resolve nozzle clogging.

### 7.2.3 Nozzle clogging maintenance

When nozzle clogging occurs, please correspond in following order.

(1) Print Basic chart with 600x600dpi

In case of a few nozzle clogging, please print Basic chart repeatedly, normally twice or three times. Nozzle clogging may be dissolved by printing repeatedly.

(2) Execute printhead cleaning

If the nozzle clogging is not resolved by printing Basic chart, execute printhead cleaning.

1) Please select printhead which nozzle clogging has occurred. Then please select cleaning level as follows.

- When there are many printheads which nozzle clogging has occurred.  
Please select cleaning level "Normal" and execute printhead cleaning.
- When the printhead which nozzle clogging has occurred is four or less pieces.  
Please select cleaning level "Intense" and execute printhead cleaning.

Please print Basic Chart and check printhead nozzle clogging condition.

2) If the nozzle clogging is not resolved, please execute printhead cleaning again according to the following procedures.

- a) Nozzle which nozzle clogging has occurred changes.  
Please select cleaning level "Normal" or "Intense" and execute printhead cleaning.
- b) Although the number of nozzle clogging became fewer, it still remains.  
Please select cleaning level "Normal" or "Intense" and execute printhead cleaning.
- c) Nozzle which nozzle clogging has occurred did not change.  
Please select cleaning level "Intense" and execute printhead cleaning.
- d) Nozzle clogging has occurred in adjacent nozzles on printheads.  
Please select cleaning level "Intense" and execute printhead cleaning.
- e) When the printhead which nozzle clogging has occurred

is four or less pieces.

Please select cleaning level "Intense" and execute printhead cleaning.

Please print Basic Chart and check printhead nozzle clogging condition.

- 3) When the nozzle clogging is not resolved, even if it repeats step 2), please check and cleaning wiper and wiper cleaner. And then please select cleaning level "Intense" and execute printhead cleaning again.
- 4) In case "c) Nozzle which nozzle clogging has occurred did not change.", when the nozzle clogging is not resolved, even if it performs step 3), please execute "Extreme cleaning". Please refer to "7.2.4 Extreme cleaning".  
After execute "Extreme cleaning", when nozzle which nozzle clogging has occurred changes, please select cleaning level "Intense" and execute printhead cleaning again.  
However, executing "Extreme cleaning" should limit to 1 time.
- 5) If the nozzle clogging is not resolved, please contact our maintenance service contractor.

- Example of nozzle clogging

A total of 10 inkjet head modules are installed in this machine per one color and an inkjet head module, 2 units of heads are present in one assembly.

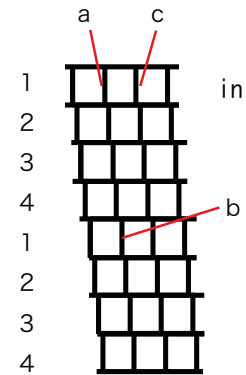
For example, in No.2 inkjet head module, it consists of H2 and H12.

One head consists of nozzles of four rows.

On nozzle clogging check pattern of Basic chart, nozzles are divided into two steps of upper and lower sides, and is printed to see easier.

The right figure is an enlarged view of Basic chart.

Nozzles located in a line in order of a, b, and c is printed as shown in the right figure.



The following figure is a sample of nozzle clogging.

The description of nozzle clogging

- (1) When nozzle clogging has occurred in adjacent nozzles on printheads is three or more.
- (2) When nozzle clogging has occurred in adjacent nozzles on printheads is two or less.
- (3) When the location of nozzle which nozzle clogging has occurred does not adjoin each other.

Case A)

Nozzle clogging occurred on H1 does not adjoin each other.

(Case above (3))

Case B)

Nozzle clogging occurred in adjacent nozzles on H12 is three.

(Case above (1))

Case C)

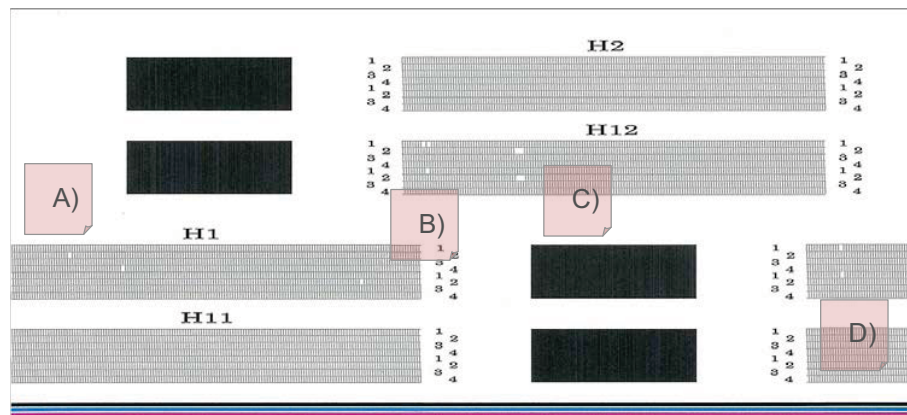
Nozzle clogging occurred in adjacent nozzles on H12 is many.

(Case above (1))

Case D)

Nozzle clogging occurred in adjacent nozzles on H3 is two.

(Case above (2))





### 7.2.4 Extreme cleaning

#### 1. About Extreme cleaning

When executing "Extreme cleaning", please regard the following point.

- 1) After execute "Extreme cleaning", please be sure to execute "Normal" cleaning level printhead cleaning.
- 2) Before and after "Extreme cleaning", it is necessary to perform the usual printhead cleaning. Therefore, the working hours of "Extreme cleaning" are required for about 2 hours.
- 3) When the following phenomena have occurred, please execute "Extreme cleaning" to the printhead.
  - On Basic Chart solid area, when streak has occurred. Or on Basic Chart nozzle clogging check pattern, when nozzle deviation has occurred.
  - When nozzle which nozzle clogging has occurred did not change, even if it executes printhead cleaning with "Intense" level repeatedly.
- 4) The effect of printhead deviation may appear in print quality for one month in Black and for one month and half in Magenta. Please check each printhead condition, and please execute "Extreme cleaning" (Printhead cleaning with cleaning level "Extreme") to printhead with a bad condition.

When executing "Extreme cleaning" preventively, please execute "Extreme cleaning" to Black and Magenta with the following implementation schedule.

Black: Every 1.5 monthf

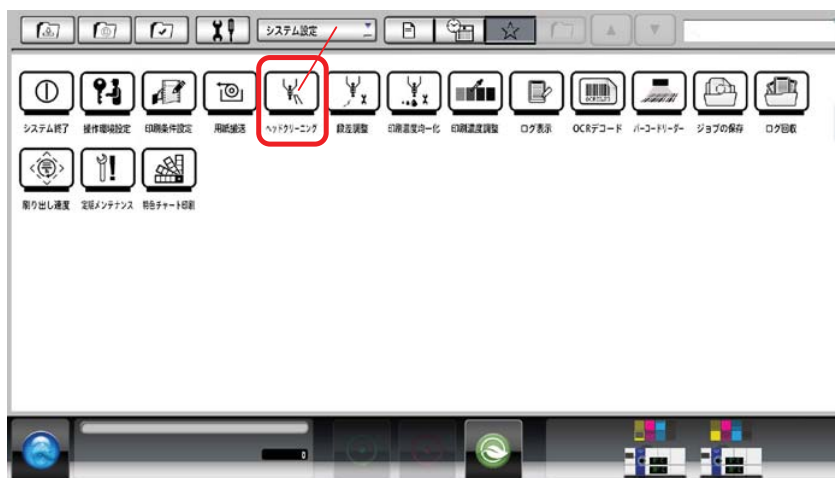
Magenta: Every one month

- 5) If "Extreme cleaning" is executed on the head of all one color, about 600 cc ink will be consumed.

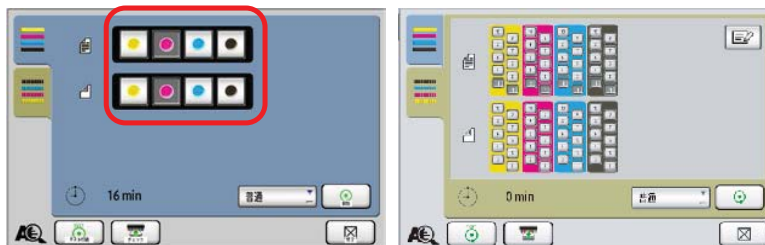
## 2. “Extreme cleaning” operation procedure

- (1) Replenishing cleaning solution for the wiper cleaning unit pad with reference to “7.4 Replenishing cleaning solution for the wiper cleaning unit”
- (2) Please empty a waste liquid tank.
- (3) Please execute printhead cleaning with cleaning level “Normal” to all color and all printhead.
- (4) Please set paper which can check nozzle deviation situation.
- (5) Please print Basic chart with higher resolution (1200x600 dpi or 1200x1200dpi). And please check nozzle deviation situation and please determine the printhead which execute “Extreme cleaning”.
- (6) Press “Printhead cleaning” icon.

Printhead cleaning



- (7) Please choose the color which executes “Extreme cleaning, or printheads.

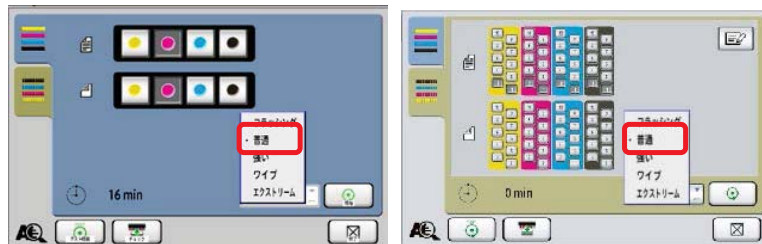


- (8) Please select cleaning level “Extreme” and press start button. “Extreme cleaning” is started.

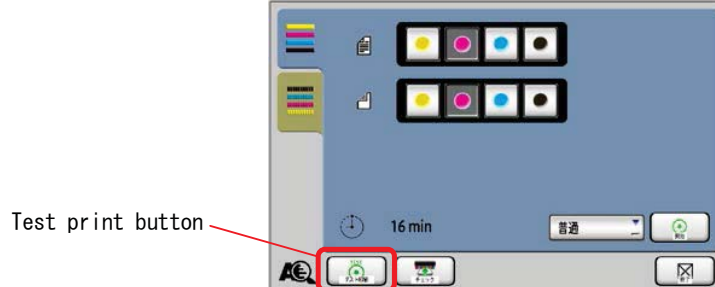
**NOTE** • When all the printheads are chosen, “Extreme cleaning” takes about 20 minutes until it ends from initiation.



- (9) Please check that the color of the printer which performed “Extreme cleaning”, or printheads are chosen, and select cleaning level “Normal” and press Start button. “Normal cleaning” is started.



- (10) Press “Test print button”. Basic chart is printed.



(11) Please check nozzle condition, please correspond according to the following cases.

- 1) When nozzle deviation is not dissolved  
Please execute "Extreme cleaning" to the printhead again according to the step (7) to (9).  
When nozzle deviation does not resolve, even if it executes extreme cleaning twice, please contact our maintenance service contractor.  
If nozzle deviation is improved, please repeat until it is dissolved.  
After execute "Extreme cleaning", when nozzle clogging has occurred, please correspond according to the following procedure 2) and 3).
- 2) When the nozzle clogging has occurred  
Please select cleaning level "Intense" and execute printhead cleaning to the printhead.
- 3) After perform step 2), when nozzle which nozzle clogging has occurred did not change and a few nozzles clogging on a printhead.  
Please execute "Extreme cleaning" to the printhead again according to the step (7) to (9).  
When nozzle clogging has occurred, please execute printhead cleaning with "Intense" level to the printhead.

After perform step 2) and 3), if nozzle clogging is not resolved, please correspond according to the following procedures.

- a) Please set paper which can print 600x600dpi.
- b) Please select cleaning level "Intense" and execute printhead cleaning to the printhead.
- c) Please print Basic Chart with "600x600dpi".
- d) Please repeat step b) and c) until resolve nozzle clogging.

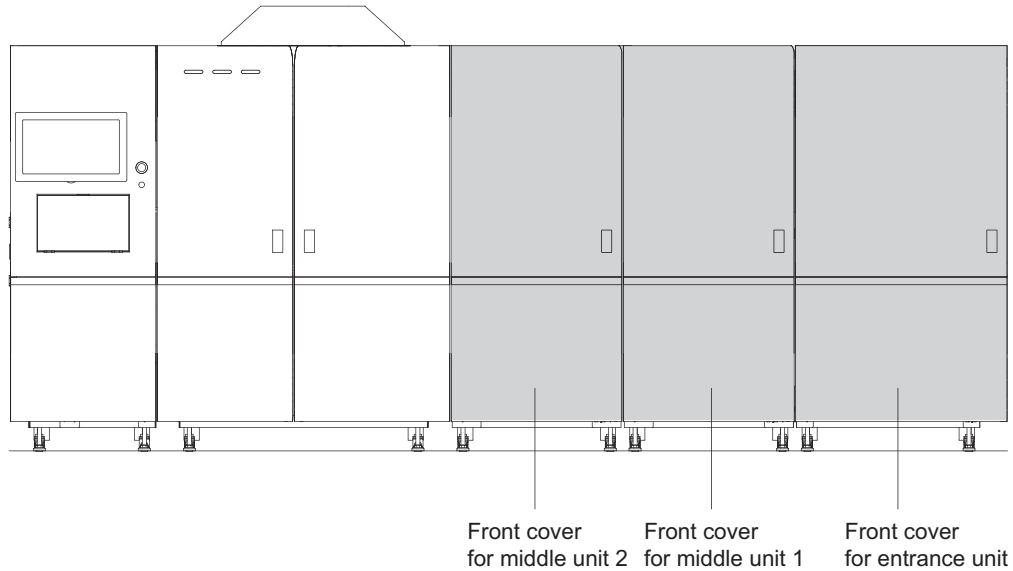
### 7.3 Replacing the waste ink collection pads

Waste ink collection pads are installed in the printer to absorb the ink discharged off the paper.

If the pads become too full of ink, the ink may adhere to the paper. The amount of ink that accumulates in the waste ink collection pads depends on the type of print jobs you run, so make sure you check the pads periodically.

Ensure you wear gloves when replacing the pads.

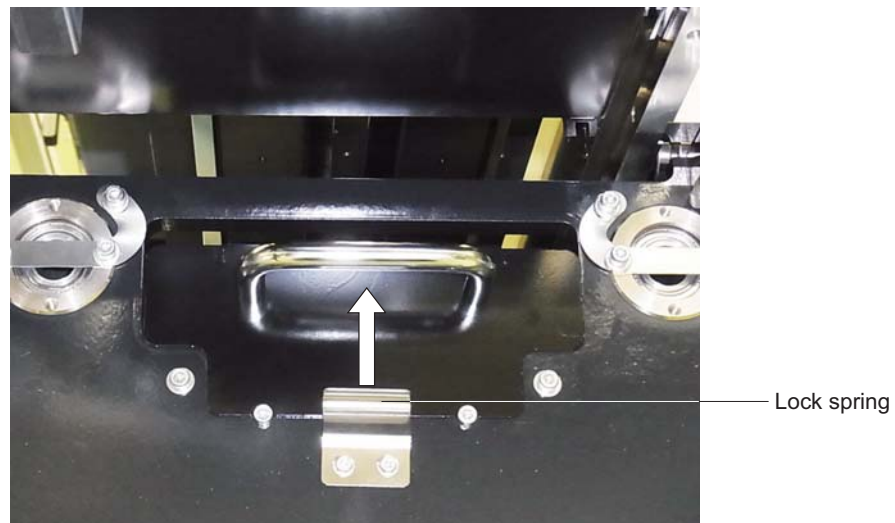
- 1) Open the front cover of the entrance unit and middle unit of the printer.



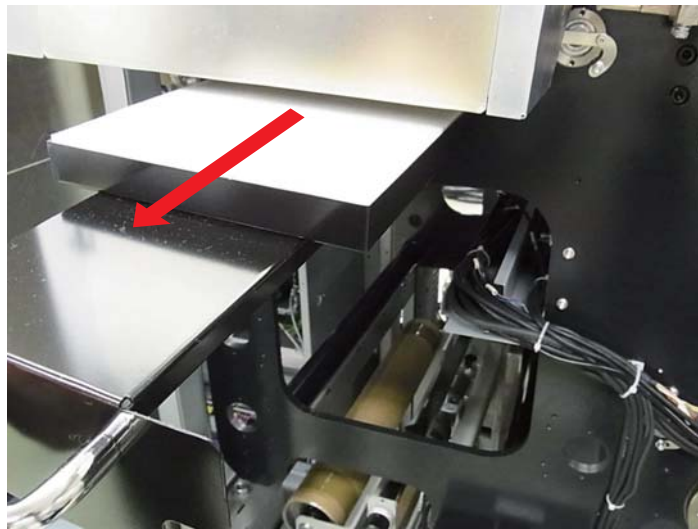
The waste ink collection pads are stored in the trays under each printer and placed between the printing rollers.



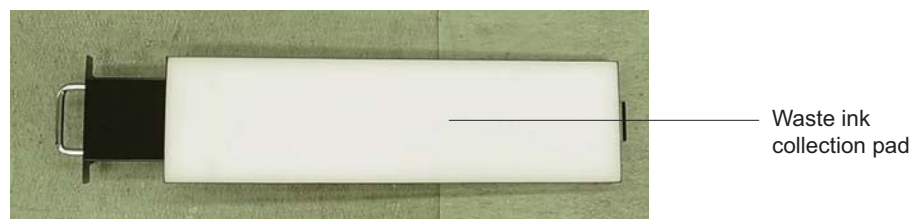
- 2) Grab the tray handle and pull it up to remove the tray from the lock spring.



- 3) Pull the tray straight toward you to remove it.



- 4) Take out the waste ink collection pad to which ink is adhered from the tray.

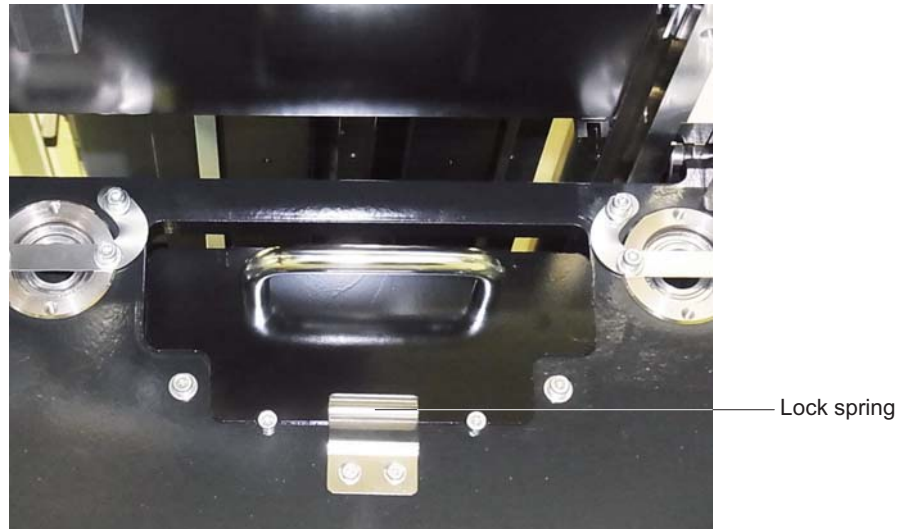


5) Wipe off the ink adhered to the tray using the rag.

**NOTE** Do not reuse the used waste ink collection pads. The used pads must be disposed of in accordance with all the relevant local laws and ordinances.

6) Store a new waste ink collection pad in the tray, and return the tray to its original position.

7) Pull up the tray, and then move it down so that it is caught by the lock spring.



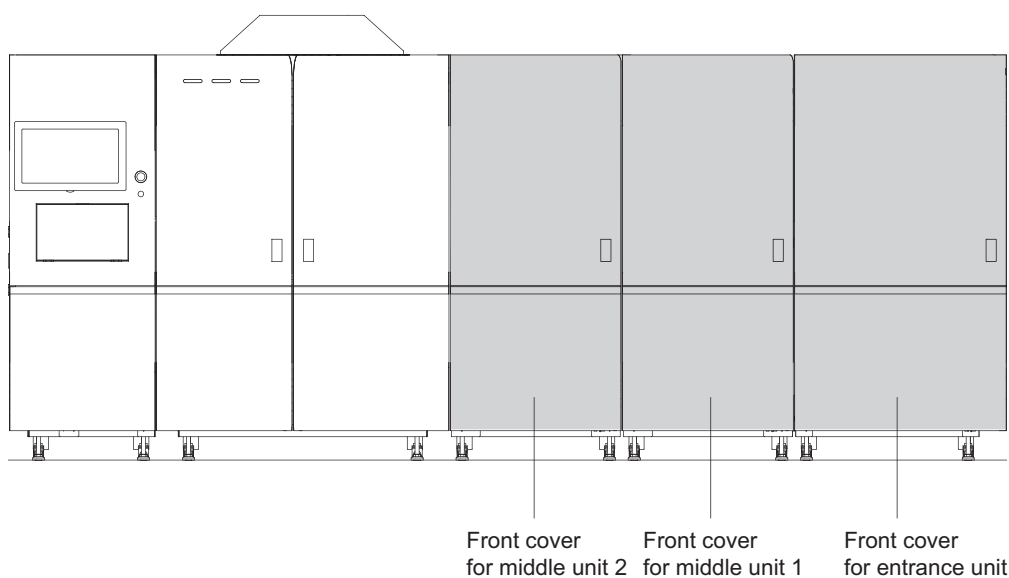
8) Close the front cover.

## 7.4 Replenishing cleaning solution for the wiper cleaning unit

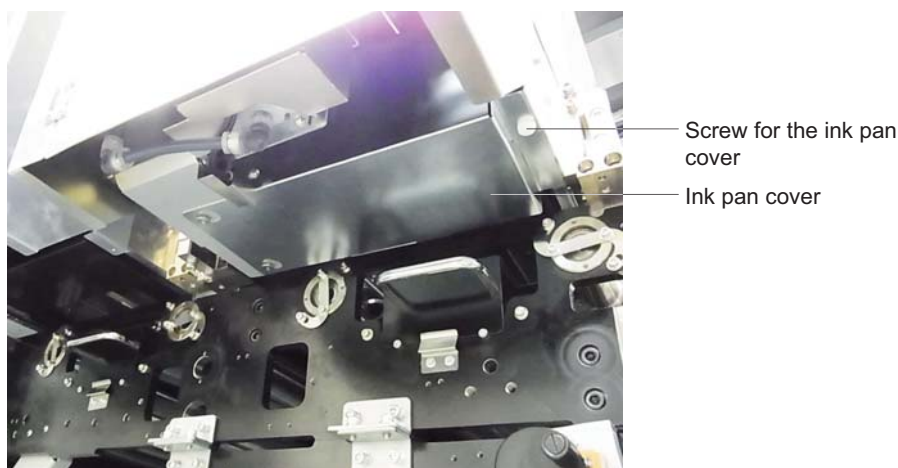
Replenish the cleaning solution to the wiper cleaning unit once a week using the following procedure. Prepare the tools shown below before the cleaning.

- Plastic gloves
- Tray
- Cleaning solution
- Rag

- 1) Turn off the power box main switch.
- 2) Open the front covers of the entrance unit, middle unit 1 and middle unit 2 of the printer.

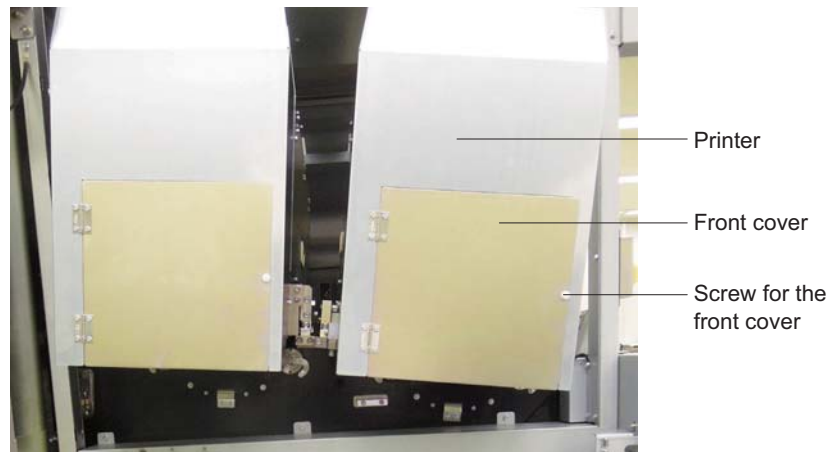


- 3) Remove the screw for the ink pan cover located at the bottom of the printer, and then remove the ink pan cover.

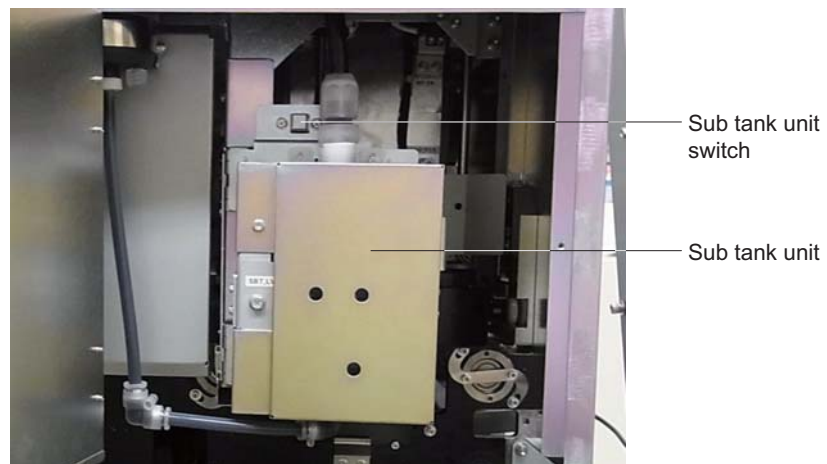




4) Loosen the screw on the front cover of the printer, and then open the front cover.



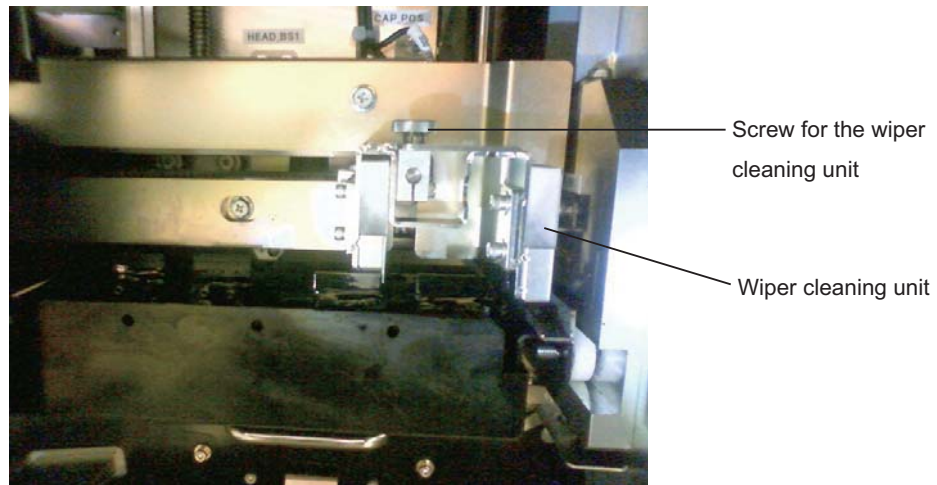
5) Press the switch on the upper sub tank unit to open the unit.



6) Wear gloves.

- 7) Remove the screw for the wiper cleaning unit, and then remove the wiper cleaning unit.

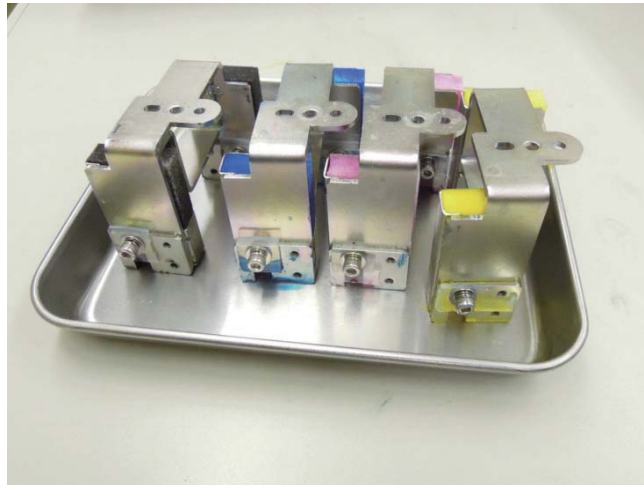
Remove all wiper cleaning units from both Printer 1 and Printer 2.



- 8) Wipe off the ink that adheres to the frames of the removed wiper cleaning unit using a rag.

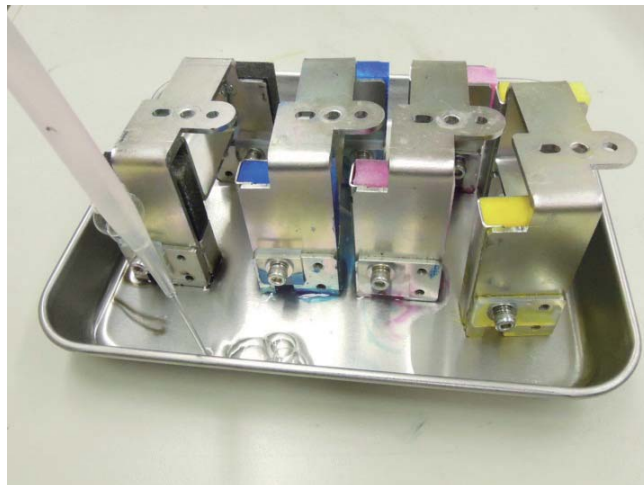


9) Align the wiper cleaning units for the four colors on the tray.



10) Pour the cleaning solution up to a depth of approximately 5 mm from the bottom of the tray, and leave it for a few minutes.

In the meantime, the waste ink collection pads in the wiper cleaning units absorb the cleaning solution.



- 11) Remove a wiper cleaning unit from the tray and lightly wipe the bottom of it using a rag.



- 12) Install the wiper cleaning unit in the system.  
13) Complete the replenishment of the cleaning solution to the rest of the wiper cleaning units by repeating the steps from 9 to 12.  
14) Close the sub tank unit and the front cover.  
15) Attach the ink pan cover.  
Align the two holes of the ink pan cover with the positioning pins located at the bottom of the wiper unit, and then secure the ink pan cover with screws.

Align the positioning pin with the hole of the ink pan cover (2 locations)



- 16) Close the front cover.  
17) Turn ON the power to the system as necessary.

## 7.5 Cleaning the wipers

### 7.5.1 Cleaning the wiper unit

Clean the wiper unit and its surroundings approximately once a month using the following procedure.

Prepare the tools shown below before the cleaning.

- Plastic gloves
- Nonwoven cloth
- Cleaning solution
- Rags

- 1) Remove the wiper cleaning units by following the steps from 1 to 7 of “7.5 Replenishing cleaning solution for the wiper cleaning unit”.
- 2) Pull the ink pan of the wiper unit toward you and remove it.



Ink pan

**NOTE** The ink may drip from the bottom of the wiper unit when the ink pan is removed. Collect the dripping ink by placing a rag under the wiper unit, for example.

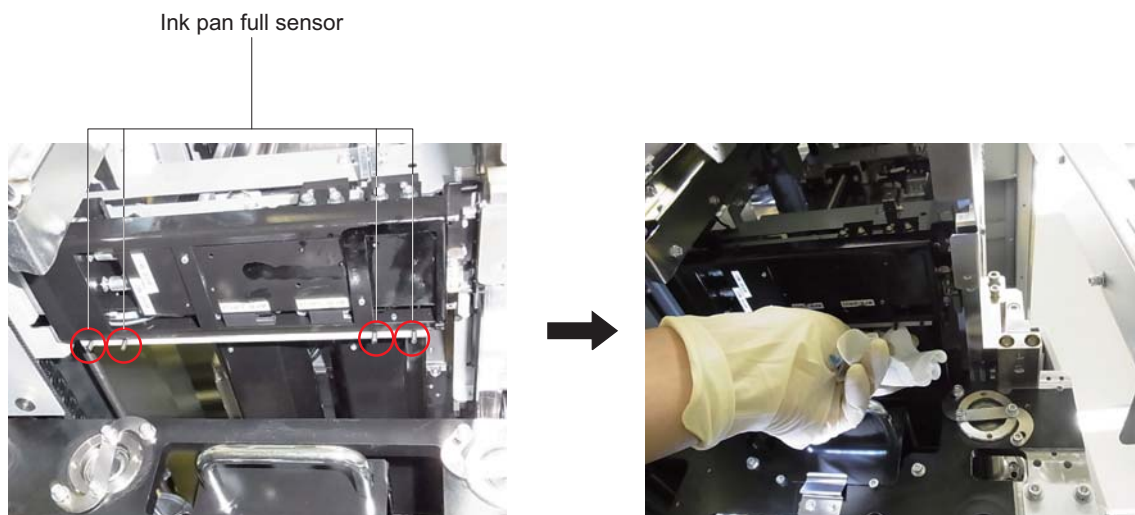
- 3) Wipe off the ink adhered to the bottom of the wiper unit using, for example, a nonwoven cloth.



Wiper unit



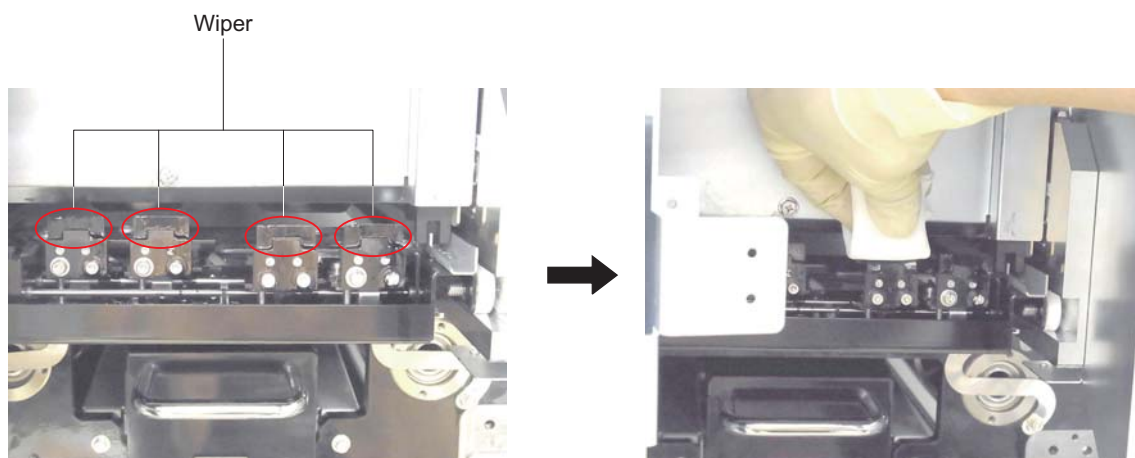
- 4) Wipe off the ink that adheres to the four ink pan full sensors located at the bottom of the wiper unit using a nonwoven cloth moistened with cleaning solution.



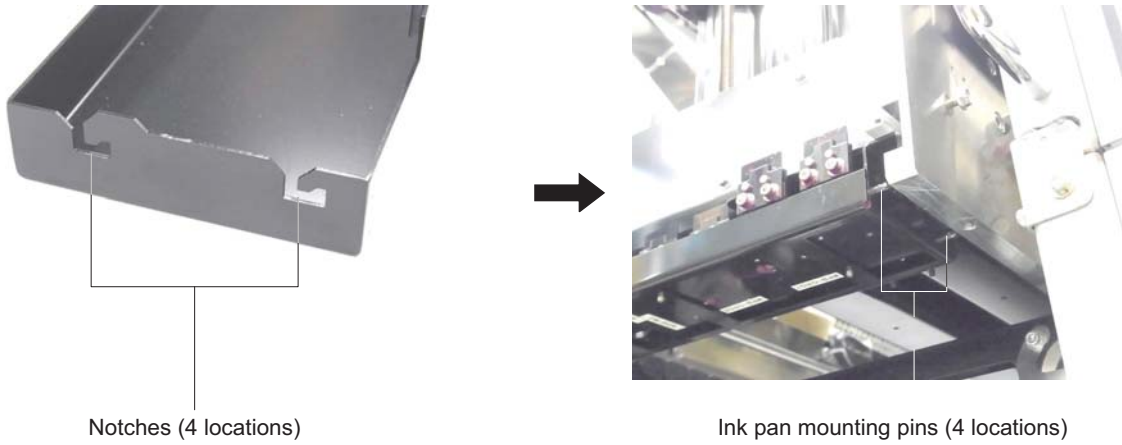
- 5) Wipe off the ink accumulated in the ink pan using, for example, a nonwoven cloth.



- 6) Wipe off the ink that adheres to the front, tip, and around the wiper using a nonwoven cloth moistened with cleaning solution.

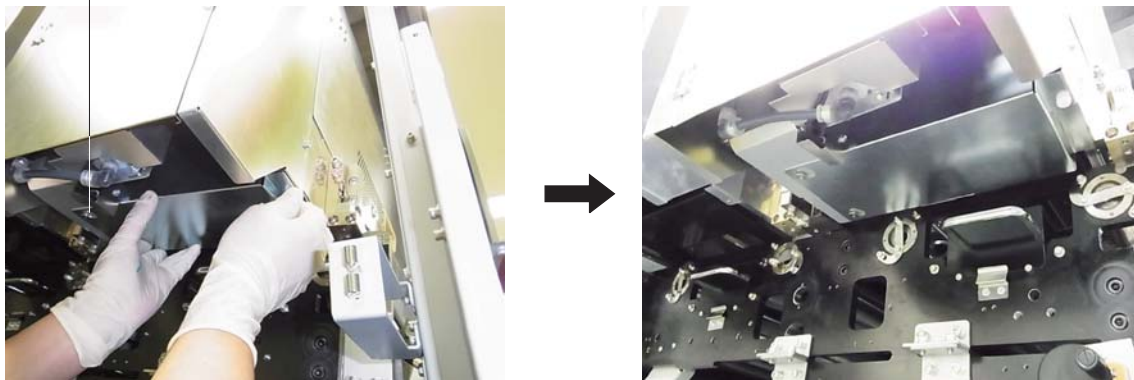


- 7) After the cleaning is complete, set the ink pan to its original position.  
Hook the notches (4 locations) of the ink pan on the pins at the bottom of the wiper unit.



- 8) Install the wiper cleaning units that were removed.  
9) Return the wiper cleaning unit to its original position and secure it with the screw.  
10) Close the front cover of the sub tank unit.  
Attach the ink pan cover.  
Align the two holes of the ink pan cover with the positioning pins located at the bottom of the wiper unit, and then secure the ink pan cover with screws.

Align the positioning pin with the hole of the ink pan cover (2 locations)



- 11) Close the front cover.  
12) Turn ON the power to the system as necessary.

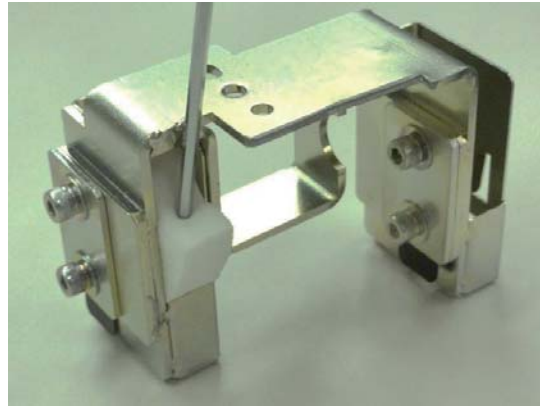
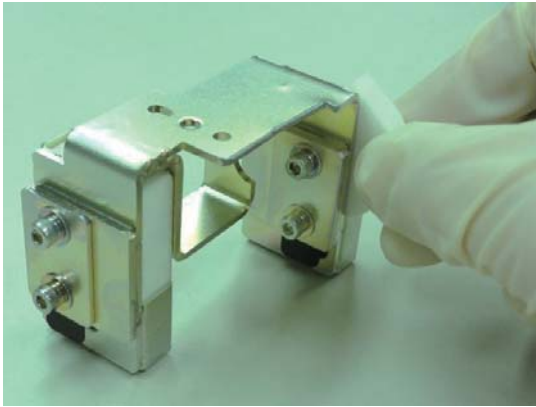
### 7.5.2 Reattaching or replacing the wiper cleaning ink collection pad

Reattach or replace the ink collection pad in the wiper cleaning unit every three months using the following procedure.

Prepare the tools shown below before the cleaning.

- Plastic gloves
- Thin stick

- 1) Remove a wiper cleaning unit by following steps from 1 to 7 of “7.5 Replenishing cleaning solution for the wiper cleaning unit”.
- 2) Remove the ink collection pad from the wiper cleaning unit. If it is difficult to remove it, use a thin stick.



- 3) Perform one of the following procedures depending on the duration of use of the removed ink collection pad.

**When the duration of use of the ink collection pad is 3 months**

Squeeze out the ink from the ink collection pad. Then, rotate the ink collection pad by 180 degrees to change the corner to use.



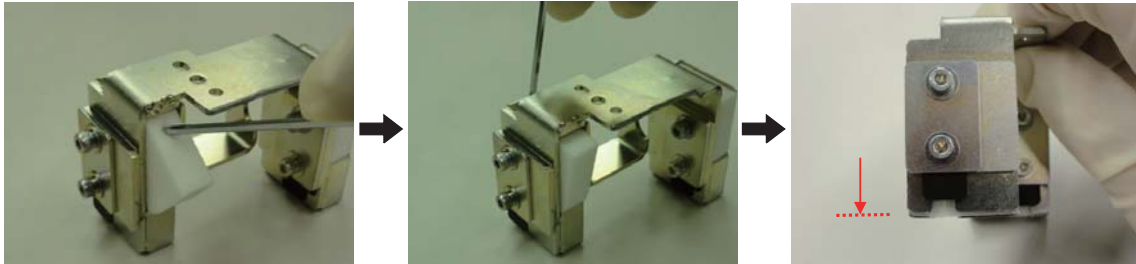
**NOTE** Be careful not to use the corner that was already used by marking the corner, for example.



**When the duration of use of the ink collection pad is 6 months**

Replace the ink collection pad with a new one.

- 4) Insert the ink collection pad into the wiper cleaning unit. Firmly push the ink collection pad to the bottom by using a thin stick.



**NOTE** Check that the ink collection pad is surely inserted in the bottom of the wiper cleaning unit, the ink collection pad is not inclined, and the slit of the ink collection pad is not open.

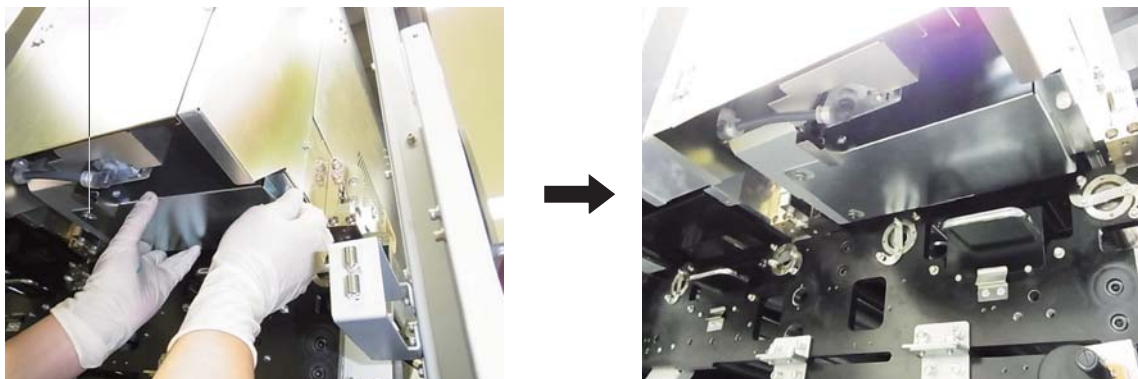


Slit of the ink collection pad

- 5) Replenish the cleaning solution in the ink collection pad by following steps 9 to 11 of "7.5 Replenishing cleaning solution for the wiper cleaning unit".
- 6) Install the wiper cleaning unit to the system.
- 7) Close the sub tank unit and the front cover.
- 8) Attach the ink pan cover.

Align the two holes of the ink pan cover with the positioning pins located at the bottom of the wiper unit, and then secure the ink pan cover with screws.

Align the positioning pin with the hole of the ink pan cover (2 locations)



- 9) Close the front cover.
- 10) Turn ON the power to the system as necessary.

Explanatory document for Basic Chart

SCREEN Graphic and Precision Solutions Co., Ltd.  
Product Development Department 2, Product Development Division

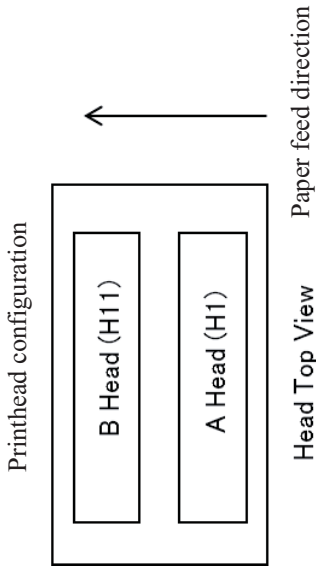
◆ Application

A Basic Chart is used to check the transport adjustment state of the machine, the discharge state of all nozzles for each printhead, and the installation and adjustment states of the printheads.

It can be printed from the printhead alignment screen and the cleaning screen.

◆ Precaution

- In the printing of a Basic Chart, any position correction in the cross-machine direction (paper width direction) will not be reflected.
- Some of the printing patterns described below use printheads A and B. The definitions of these heads are as shown in the following head configuration diagram. In the printing results for the nozzle check pattern, the printing result of printhead A will be printed in the upper area.



◆ Daily check points

	Check item	Referential explanation of pattern
1	Check for the presence of non-discharging nozzles and deviated nozzles	7. Nozzle Check Pattern
2	Check of the paper feed position	2. Print position check mark at the paper edge
3	Check for misalignment between colors	1. Chart for machine direction in the visual judgment chart for misalignment in the cross-machine and machine directions

<Entire image>

Shows the resolution, file name, and revision of the Basic Chart.



<Overview of each

1

Visual judgment chart for misalignment in

This chart shows the misalignment of C, M, and Y with respect to Bk. When the color conditions are ideal, the colors are deepest at the center part of the chart.

The correction amount of each color can be determined based on the value shown at the patch with the deepest color. The same chart is placed

2

Print position check mark at the paper

This check mark is used to adjust the print position to 0.5 mm from the edge of the standard paper.

The mark on the left edge is for the front side and the one on the right edge is for the back side.

3

Cross mark for registration check on

This is a black, single color cross mark used for checking the registration accuracy on both sides.

*During a production adjustment, the magnification setting is registered based on the distance between the identical marks located at the bottom of the data.*

4-1

Cross pattern for checking the inclination and the position

The cross pattern is used to adjust the inclination of each printhead and print timing of printheads A and B.

4-2

Line for checking the misalignment between

The line pattern is used to check the misalignment between printheads and position adjustment between colors in the paper feed direction.

5

Pattern for checking two-color

This pattern is used to check the two-color overlapping and joint section of the printheads between K-C, K-M, and K-Y.

6

Pattern for checking single color

This pattern is used to check the inclination and joint section of the printhead for a single color of K, C, M, and Y.

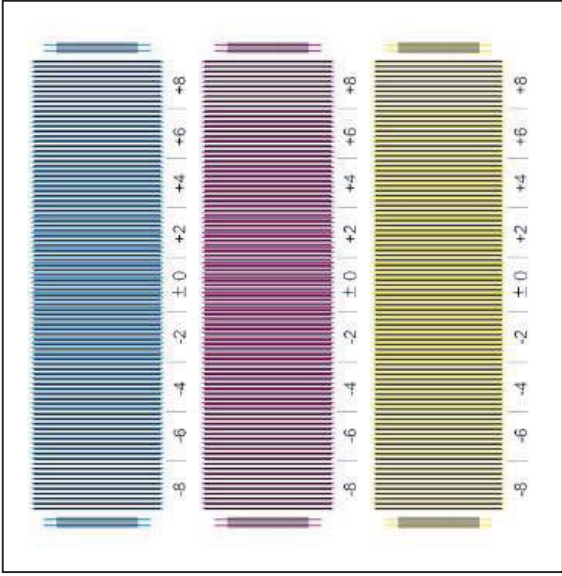
7

Nozzle check pattern

This pattern is used to check for nozzle clogging of each printhead.

The pattern corresponds to the printhead number and row number.

1. Visual judgment chart for misalignment in the cross-machine and machine directions

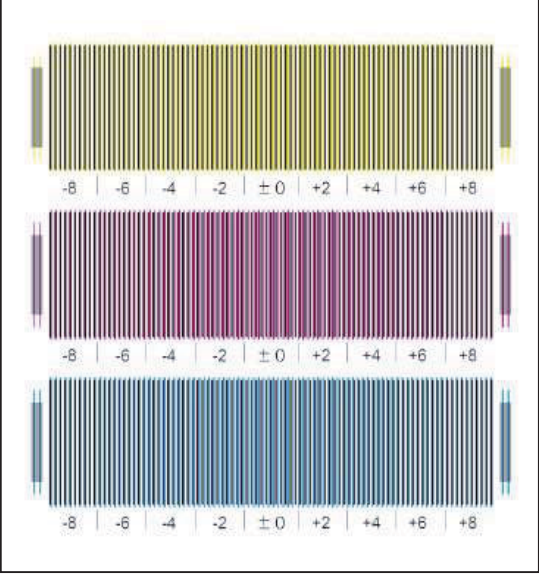


**\* Chart for cross-machine direction**

- The chart for cross-machine direction shows the misalignment of C, M, and Y with respect to black. It is used to check for skewing and web wandering during position adjustment and transport adjustment of the printhead unit for each color.
  - When the color conditions are ideal (with no misalignment), the colors are deepest at the center ( $\pm 0$ ) of the chart.
  - If the color is deeper on the left side of the chart, it indicates that the color is shifted to the right with respect to black. Conversely, if the color is deeper on the right side of the chart, the color is shifted to the left with respect to black.
- In both cases, the value shown below the patch with the deepest color is the number of pixels for correction to the ideal position.
- An overflow marker is applied to both edges of each color chart to identify whether there is any misalignment exceeding the chart area.

Caution

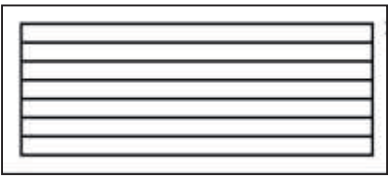
- In the printing of a Basic Chart, the results of any position correction in the cross-machine direction will not be reflected.
- The chart varies with the resolution, and the value shown below the patch also varies according to the resolution.



**\* Chart for machine direction**

- The chart for machine direction is the same as the one for cross-machine direction but it is rotated by 90 degrees. This chart is used to check for misalignment of C, M, and Y with respect to black and make a simplified judgment of the correction amount.
  - When the color conditions are ideal (with no misalignment), the colors are deepest at the center ( $\pm 0$ ) of the chart.
  - If the color is deeper on the upper side of the chart, it indicates that the color is shifted downward with respect to black. Conversely, if the color is deeper on the lower side of the chart, the color is shifted upward with respect to black.
- In both cases, the value shown below the patch with the deepest color is the amount of pixels for correction to the ideal position.
- An overflow marker is attached to both edges of each color chart to identify whether there is any misalignment exceeding the chart area.

2. Print position check mark at the paper edge

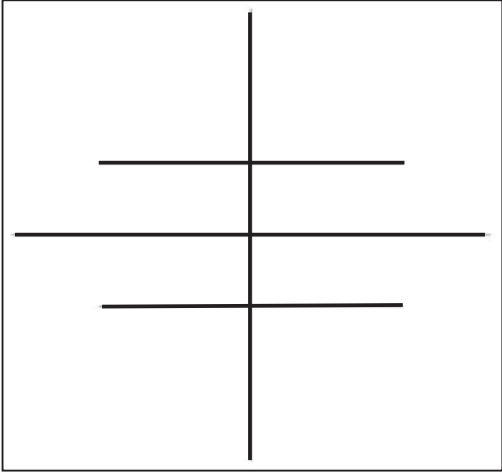


This check mark is used to adjust the print position to 0.5 mm from the edge of the paper.

The ideal print shows the eight vertical line marks arranged at 0.5 mm intervals and the margin from the paper edges is ideal when it is the same as each distance between those lines (0.5 mm).

The mark on the left edge is for the front side and the one on the right edge is for the back side.

3. Cross mark for registration check on both sides



This is a black single color cross mark used for checking the registration accuracy on both sides.

4. Pattern for checking the inclination and the position inside of the module, and line for checking the misalignment between printheads

4-1. Cross pattern for checking the inclination and the position adjustment inside of the module

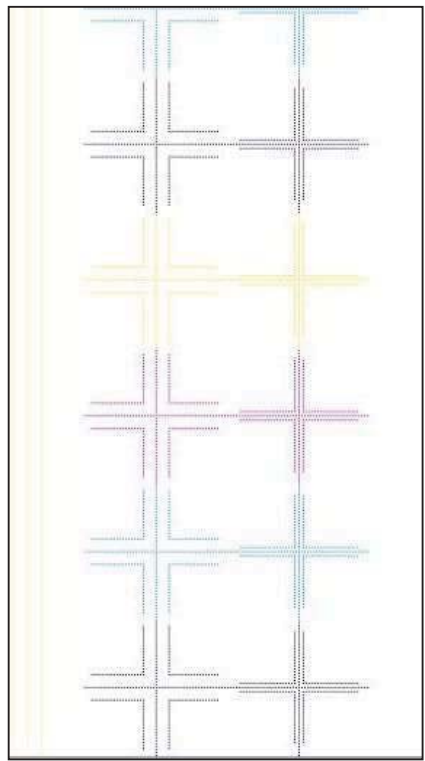
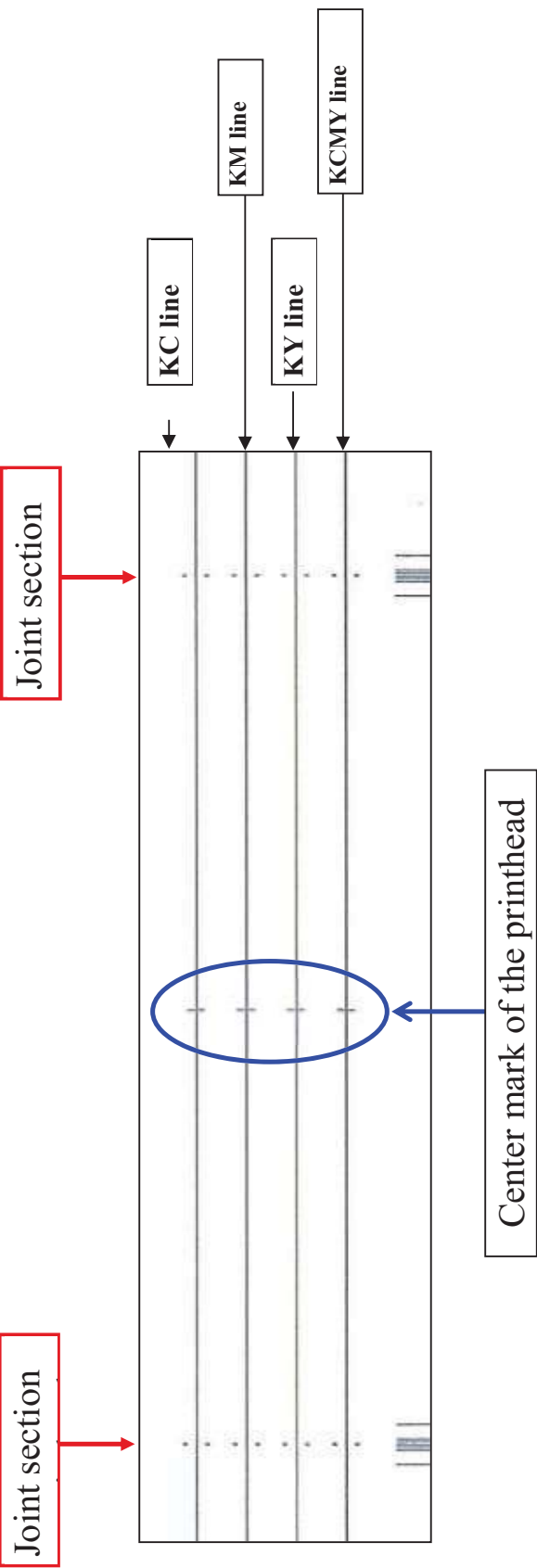


Chart for adjusting the inclination during printhead replacement  
The inner cross lines must be arranged at regular intervals with respect to the outer lines.

4-2. Line for checking the misalignment between printheads

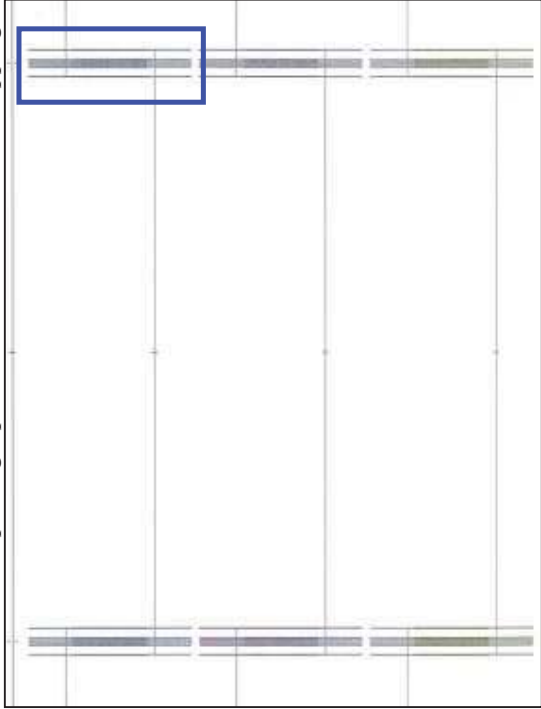
Chart for checking for misalignment of the three colors with respect to black

As the adjustment of a single printhead is available, check for misalignment between the printhead and its left and right printheads, in addition to the registration check with respect to black.





5. Pattern for checking for two-color overlapping at the joint section of printheads (used during production and printhead replacement)  
When replacing a printhead, the two-color overlapping states along the left and right borders of printhead areas are checked at the same time.



KC

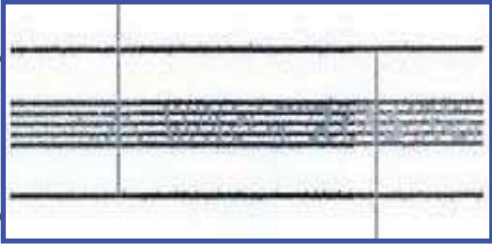
Printing using the right-side printhead only

KM

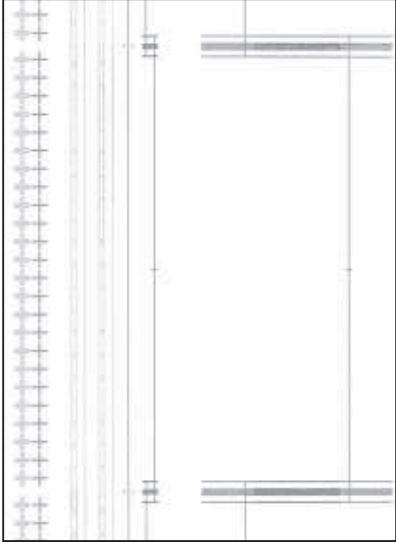
Printing with colors overlapped using the left- and right-side printheads  
The colors must be overlapped.

KY

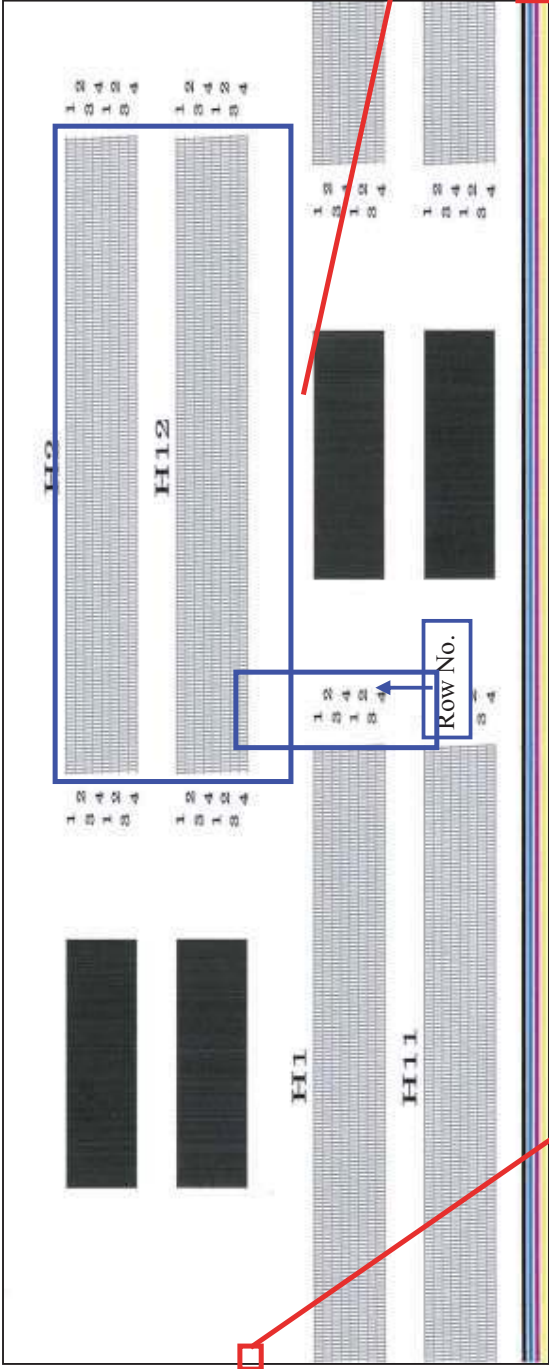
Printing using the left-side printhead only



6. Pattern for checking single color adjustment (used during production and printhead replacement)  
Used for quality check of each printhead

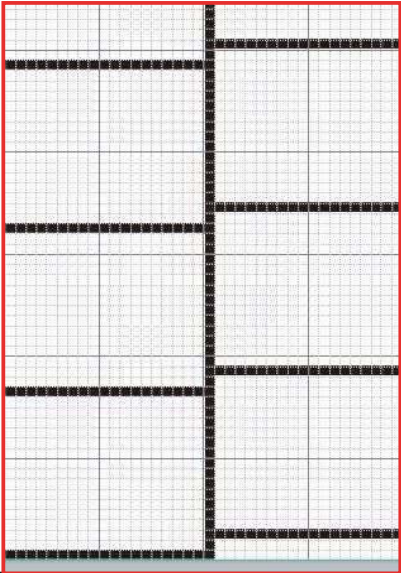


7. Nozzle check pattern



Solid image using printhead A or B only

To improve visibility, each row is printed in two sections.



End of document



## Registration Adjustment Procedure

SCREEN Graphic and Precision Solutions Co., Ltd.

Product Development Department 2

The necessary setting/adjustment to use a new paper is explained in this document. Refer to “User’s Manual” and “Operation Manual” for more information.

### 1. Paper Registration (see User’s Manual for more information)

(1) Measure a paper thickness by a digital caliper.

(2) Register the paper information in reference to “5.3.2 Registration of printing conditions”.

(Note) If you have an adjusted paper setting, which is similar in thickness, copy its compensation data and use to register.

(3) Set the paper tension according to the paper width and the paper weight as shown in the table below.

Paper Width (mm)	Paper Weight (gsm)			
	40 - 64	64 - 81.4	81.4 - 160	160 - 250
330 - 520	3	6	8	10
165 - 330	3	5	6	8

(Note) For a perforated paper, lower a tension “1” than the tension value in the table above.

(Information) Tension setting for unwinder and rewinder

Paper Width (mm)	Paper Weight (gsm)	
	40 - 128	128 - 250
330 - 520	50%	100%
165 - 330	30%	80%

(Note) The percent values shown in the table works for Hunkeler postprocessor with the heavy paper option.

(Note) For a perforated paper, lower a tension 10% - 20% than the tension setting in the table above.

(4) Enable the DNS setting always.

### Printhead alignment and Registration adjustment

Adjust the printhead alignment (in machine direction) and the registration (in cross machine direction) separately.

#### Printhead alignment:

This menu is used to correct the misalignment between printheads or colors. The ink drop landing point is compensated and it makes a cross line straight.

In the alignment program, the built-in scanner read a printed chart and the alignment is adjusted automatically. At the same time, the reference value for a temperature correction is determined in this process. Be sure to perform this automatic alignment for a new paper setting.

After the auto-alignment, verify the test print. If you see still misalignment, use a manual adjustment function.

#### Registration:

In the print start position setting, you can set an offset for both in cross machine direction and in machine direction.

Especially for the cross machine direction, the registration for every paper can be adjusted here. DNS (Dynamic Nozzle Shift) system maintains the registration adjusted here.

Printhead alignment is always enabled.

The print start position offset and DNS are turned on/off depending on printing mode.

### Difference between Basic Chart and Adjustment Pattern

There are 2 test print buttons in the printhead alignment menu, and the functionality is not same.

Basic Chart is printed by the test print button located at the bottom of printhead alignment screen.

- Only printhead alignment is enabled.

Adjustment Pattern is printed by the test print button located in the print start position screen.

- All adjustments for registration are enabled.

## 2. Printhead alignment

Follow the procedure in “5.3.3 Printhead alignment” to correct mis-registration in cross machine direction.

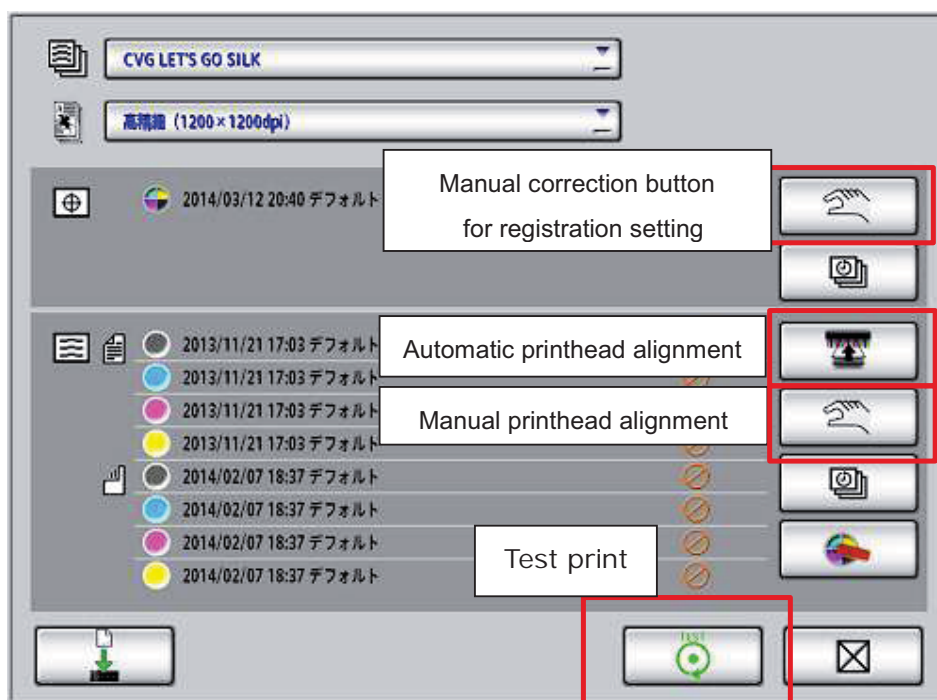
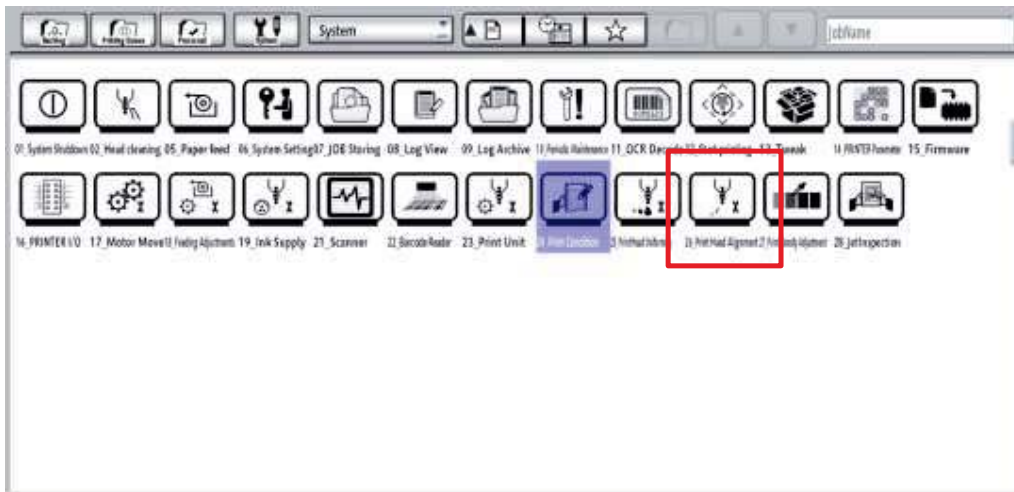
### \*Caution:

- The alignment must be performed after 60 minutes idling time or longer. (Ex. First in the morning, After lunch break) Do not make an alignment soon after a long run.
- Keep a paper roll in the operation room in advance, to fit it into a room temperature.
- Do not use a first 100m of a brand new roll.

1) Keep a paper roll near the printer in advance.

2) Load a new paper roll.

3) Press “Test Print” in the printhead alignment screen, and check if there is any nozzle clogging on the printed BasicChart.



4) Perform “Print & Adjust”.

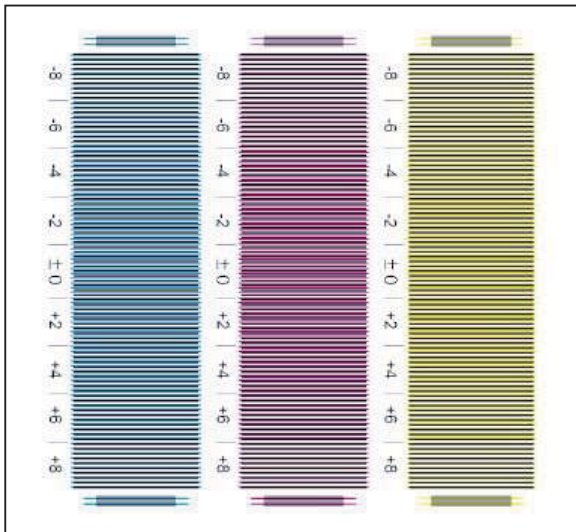
5) Registration check

Press “Test print”, and check a registration in machine direction on the printed BasicChart.

\*The registration adjustment function in cross machine direction is disabled in the printed BasicChart above. You may see a mis-registration of the line in machine direction between colors.

Check the CMY registrations from Bk.

① Check the tendency in the chart for machine direction.



• Ideal condition (zero shift)

The darkest line is at  $\pm 0$  point.

• Shifting lower than Bk

The darkest line is at the minus point (upper chart).

• Shifting higher than Bk

The darkest line is at the plus point (lower chart).

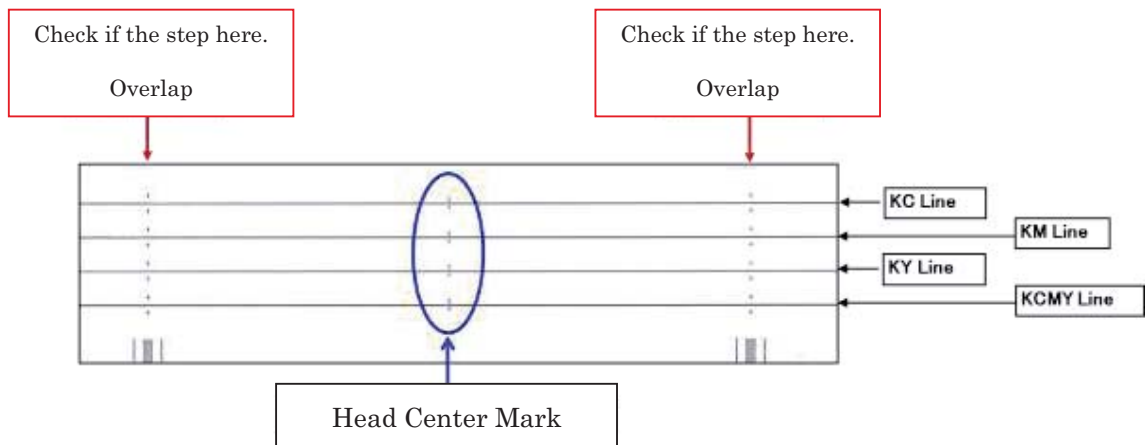
1 point on this scale is equal to the followings.

42 microns (1200x600dpi, 600x600 dpi)

21 microns (1200x1200dpi)

② Check the condition of each head.

Focus on the lines in cross machine direction on the 4-2 part of BasicChart. (See the Basic Chart document) Verify if all 4 colors overlap.



If they do not overlap, measure the gap by the magnifier and adjust them manually.

(Note) Use “manual printhead alignment”. You can adjust it by 1 micron unit.

## 6) Manual printhead alignment (See Operation Screen Manual for more information)

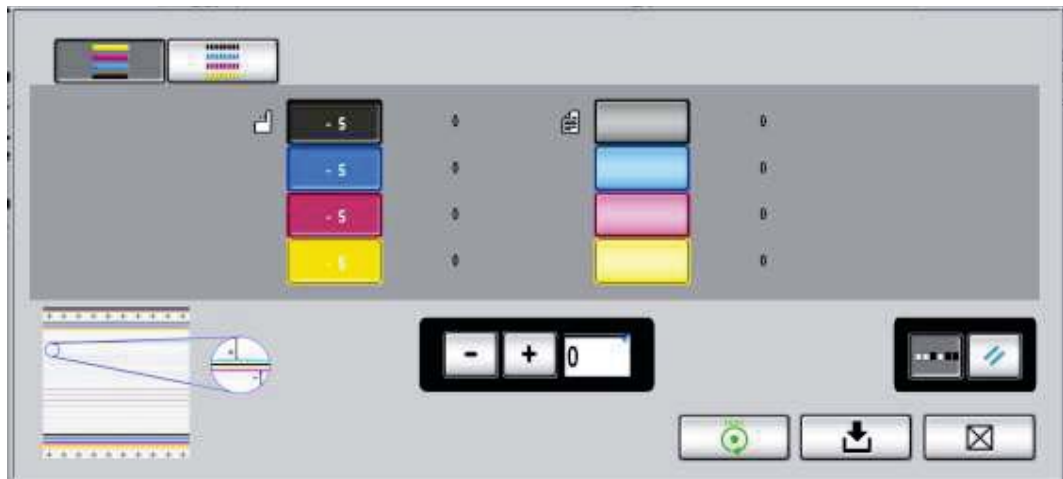
Based on the printed BasicChart, adjust the print position so that the cross line becomes straight, and 4 colors overlaps. There are 2 ways.

- ① Adjustment between colors
- ② Adjustment between printheads

Press “Manual printhead alignment”. The manual printhead alignment screen is displayed.

- ① Adjustment between colors  is selected.

The print position of all heads for one color can be adjusted at the same time.

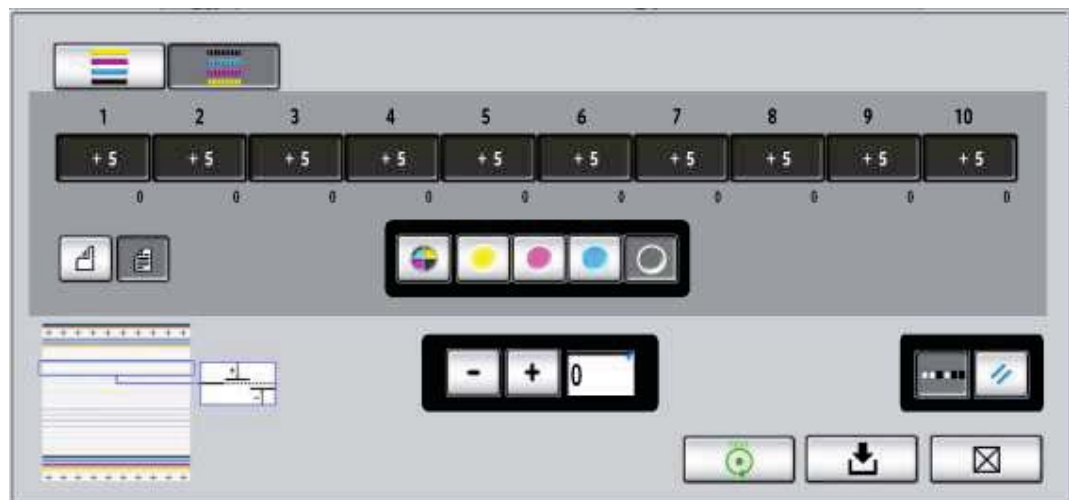


- ② Adjustment between printheads  is selected.

The print position of each head can be adjusted individually.

**Bk :** Adjust the print position of each head, so that there is no step at the printhead overlap area.

**CMY :** Adjust the print position of each head, so that they are aligned with Bk.

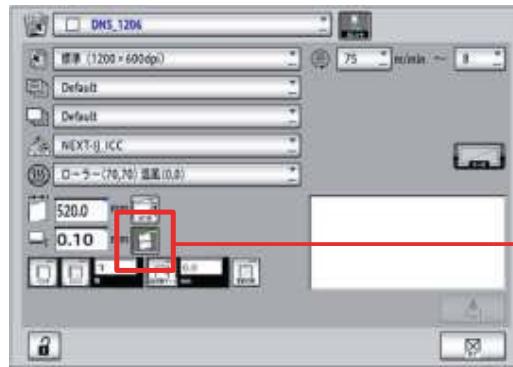


## 3. Registration adjustment in cross machine direction

- 1) Select “Print settings” from “System setting”. Verify if DNS is enabled.



24\_Print setting



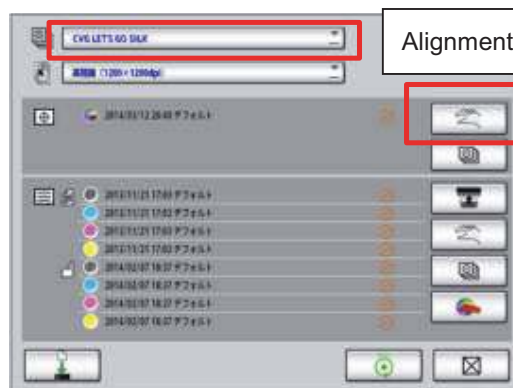
Enable DNS



- 2) Select “Printhead alignment” from “System setting”. Select the alignment/registration setting, and press the manual correction button for registration setting.



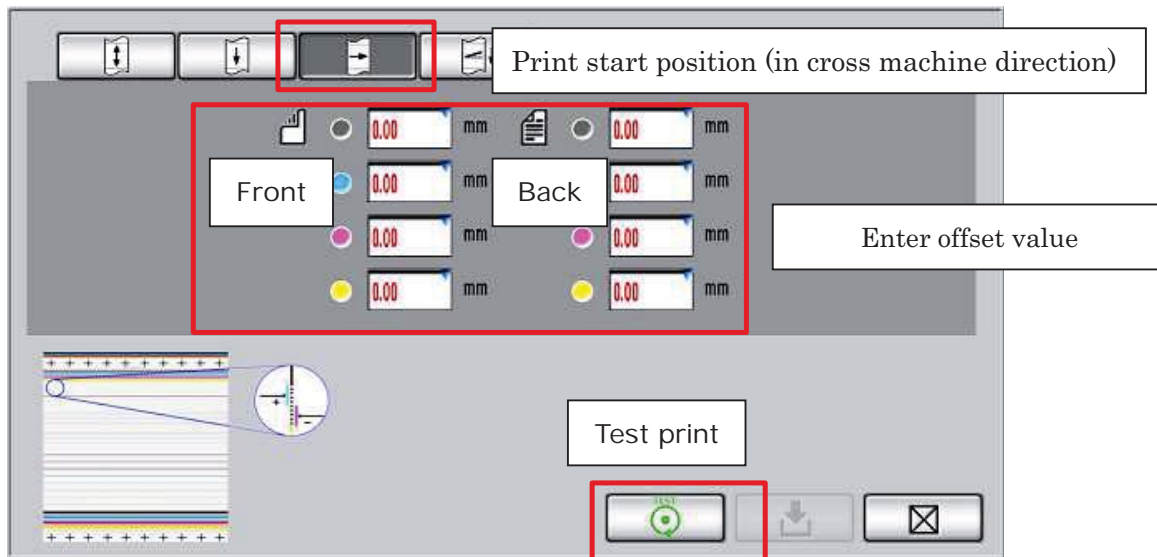
26\_Printhead alignment



Alignment/registration setting

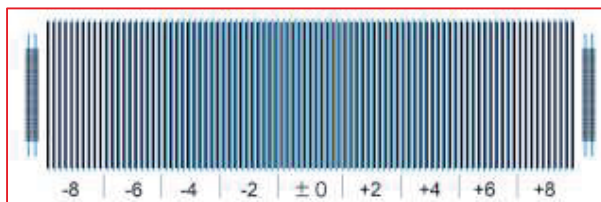
Manual correction button  
for registration setting

## 【Manual correction screen】



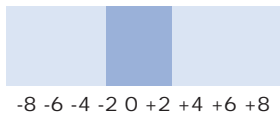
3) Select “Print start position (in cross machine direction)” tab. Press “Test print”, and then the adjustment pattern is printed. Based on the printed pattern, adjust the offset value.

How to find the offset value



The numbers under bars (-8 to +8) indicate the necessary offset amount of nozzles.

Example: in 1200x600 dpi



When the darkest point is at 0, no offset is required.



When the darkest point is at -2, enter -0.04 in Cyan offset.

1 point on this scale is equal to the followings.

21 microns (1200x1200dpi, 1200x600dpi)

42 microns (600x600 dpi)

End of document