4. About Test Chart of TP-J520HD

4-1. Basic Chart

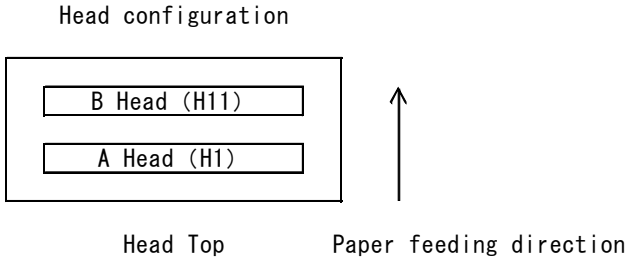
(Test Chart for Head alignment menu and Head cleaning menu)

Basic chart is used, when checking jet out of all inkjet head nozzles, paper skew or head unit mechanical position.

Also when replacing inkjet head or installing machine for mechanical adjustment, this Basic chart is used.

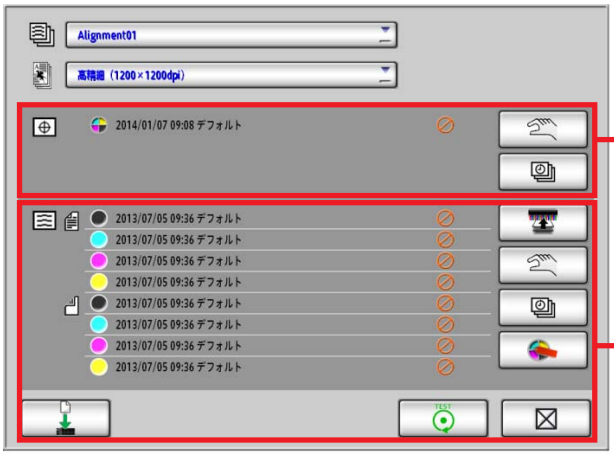
Notes of Basic Chart

- When printer print Basic chart, head alignment data become enable, but registration compensation, DNS compensation, uniformity data and linearize data become disable.
  From this reason, when adjusting registration from GUI, do not use Basic chart.
- When printing test print from [Head alignment adjustment] menu and [Head cleaning] menu, Basic chart is printed.
- In this document, sample of Basic chart is used for 1200 x 1200 dpi. There is some difference in Basic chart for each resolution.
- In this document, when explaining inkjet head, front row head is described [A head] and back row head is described [B head].



Difference with Adjustment Pattern

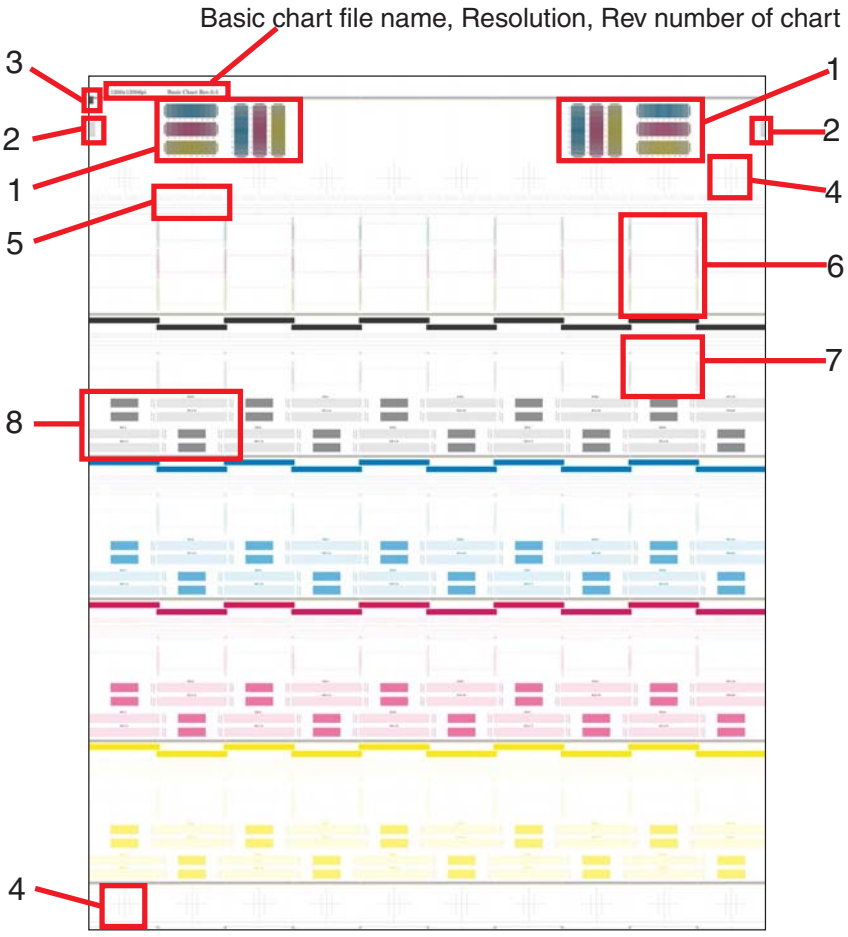
- Adjustment pattern is test print in [Registration adjustment] menu. [Registration adjustment] is one of function in [Head alignment adjustment] menu.
- When printer print Adjustment chart, all positioning compensation data (Head alignment, DNS, Registration and Encoder thermal expand compensation) become enable, but uniformity data and linearize data become disable.



Adjustment Pattern can print from this menu.
All positioning compensation data become enable.

Basic Chart can print from this menu.
Only Head alignment data become enable.

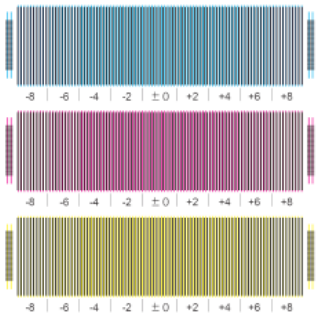
Basic chart sample



1. Registration check pattern
2. Print start position check pattern (Paper width direction)
3. Que mark
4. Registration between front and back check pattern
5-1. Head module Inclination check pattern
5-2. Head alignment check pattern (paper feeding direction)
6. Head overlap check and registration check pattern (Paper width direction)
7. Head condition check pattern (For each color)
8. Nozzle condition Check Pattern

1. Registration check pattern

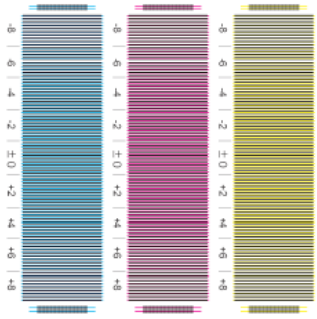
Main direction (Paper width direction)



- This pattern shows registration between Black and other colors (Cyan, Magenta and Yellow). This pattern is used, when adjusting the head unit position, when checking paper skew and wandering.
- If registration between Black and other colors matches, center (+/- area) of this pattern become dark.
- If dark side shift from left side of center, it means that color shift to right side of Black. Also if dark side shift from right side of center, it means that color shift to left side of Black.
  The number underneath of this pattern shows how much pixel that color is shifted from Black.
  For example in case of cyan, if darkest area is on "-2", Cyan is shifted 2 pixels right side of Black. In case 1200x1200 dpi and 1200x600 dpi, 1 pixel is 21 micron, in case 600x600 dpi, 1 pixel is 42 micron.
- Beside of this pattern shows registration between Black and that color roughly.

When printing Basic chart, DNS function become disable.

Sub direction (Paper feeding direction)



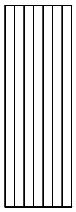
- This pattern shows registration in Sub direction between Black and other colors (Cyan, Magenta and Yellow). This pattern is used to check registration in Sub direction between Black and other colors roughly. About registration in Sub direction, use [5-2. Head alignment check pattern (paper feeding direction)].
- If registration between Black and other colors matches, center (+/- area) of this pattern become dark.
- If dark side shift from upper side of center, it means that color shift to lower side of Black. Also if dark side shifts from lower side of center, it means that color shift to upper side of Black.
  The number underneath of this pattern shows how much pixel that color is shifted from Black.
- Beside of this pattern shows registration between Black and that color roughly.

When printing Basic chart, encoder thermal expand compensation function become disable.

2. Print start position check pattern (Paper width direction)

- This pattern is used when adjusting print start position in paper width direction so that gap between paper edge and this pattern become 0.5mm.

  In case of the TP-J520HD, the que mark is printed from edge of paper, because disable nozzles is used when printing the que mark. From this reason, when adjusting print start position in paper width direction, use this Print star position check pattern.



- Gap between each vertical line in this pattern is 0.5mm. After adjust print start position in paper width direction become 0.5mm, each gape become to equal.
- Left side pattern of Basic chart is for Printer 1, right side pattern is for Printer 2.

3. Que mark

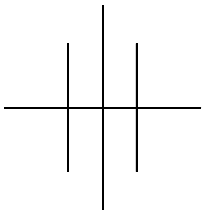
· This mark is printed only Printer 1 side. And this mark becomes trigger for Printer 2 to start printing.

· Printed position of Que mark in paper width direction become edge of paper, if print start position in paper width direction is 0.5mm from paper edge.

4. Registration between front and back check patter

· This pattern is printed only Black.

· This pattern is used when adjusting registration between front and back. When adjusting registration between front and back, see through mark of Printer 2 from Printer 1 side.



! If dry temperature setting is high, Printer 1 side printed length become shorter than Printer 2 in paper width direction by paper shrink. In this case, even though registration at Home side (Printer 1 Head 1 side) matches between front and back, but Away side of Printer 1 side shorter than Printer 2 side.

· This pattern is used in production line as follows.

1) Measure distance between top of this pattern and bottom of this pattern in Basic chart.
2) Adjust parameter (MCPU-Flag No.26) so that the distance becomes 558.16mm.

5. Head module Inclination check pattern and Head alignment check pattern (paper feeding direction)

5-1. Head module Inclination check pattern

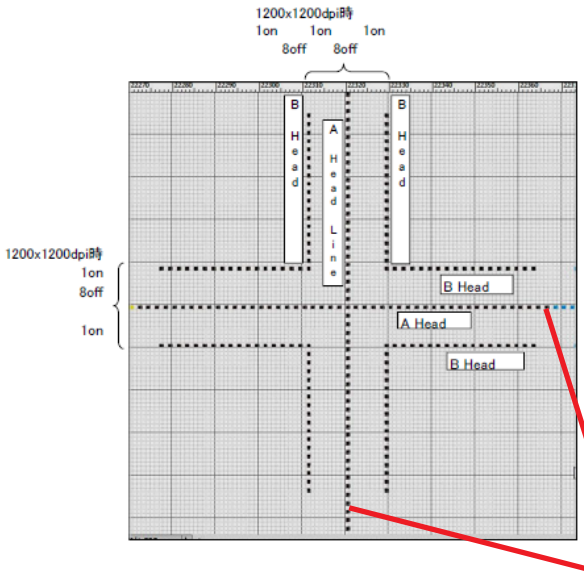
· This pattern shows inclement condition of Head module according to printing position of [Head A] and [Head B].

When gap between vertical lines of [Head A] and [Head B] is equal, it means there is no inclement of this head module. If gap between vertical line of [Head A] and [Head B] is different in all head module, there is possibility the head unit of the color tilt.

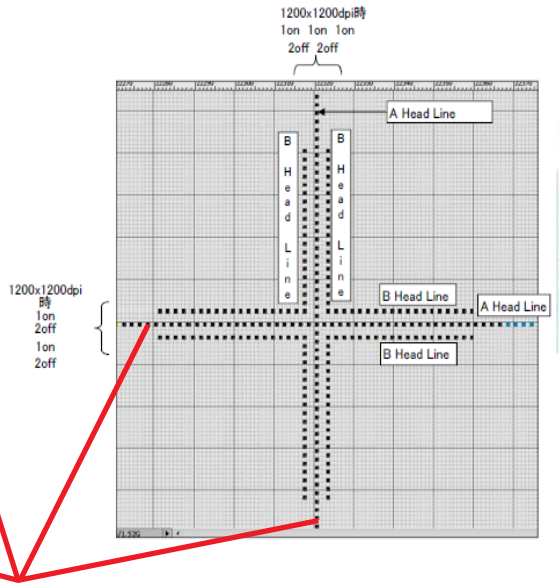
· This pattern shows printing position of [Head A] and [Head B] in paper feeding direction. Usually, this position is adjusted automatic head alignment adjustment. But if [Head A] or [Head B] need to adjust printing position in paper feeding direction independently and manually, this pattern is used to adjust about this.

When gap between horizontal line between [Head A] and [Head B] is equal, it means there is no problem about printing position in a head module.

Detail of upper part pattern



Detail of lower part pattern



Center line of [Head A]

5-2. Head alignment check pattern (paper feeding direction

This pattern shows Head alignment condition in paper feeding direction.

Check head alignment condition with next print head.

Overlap area

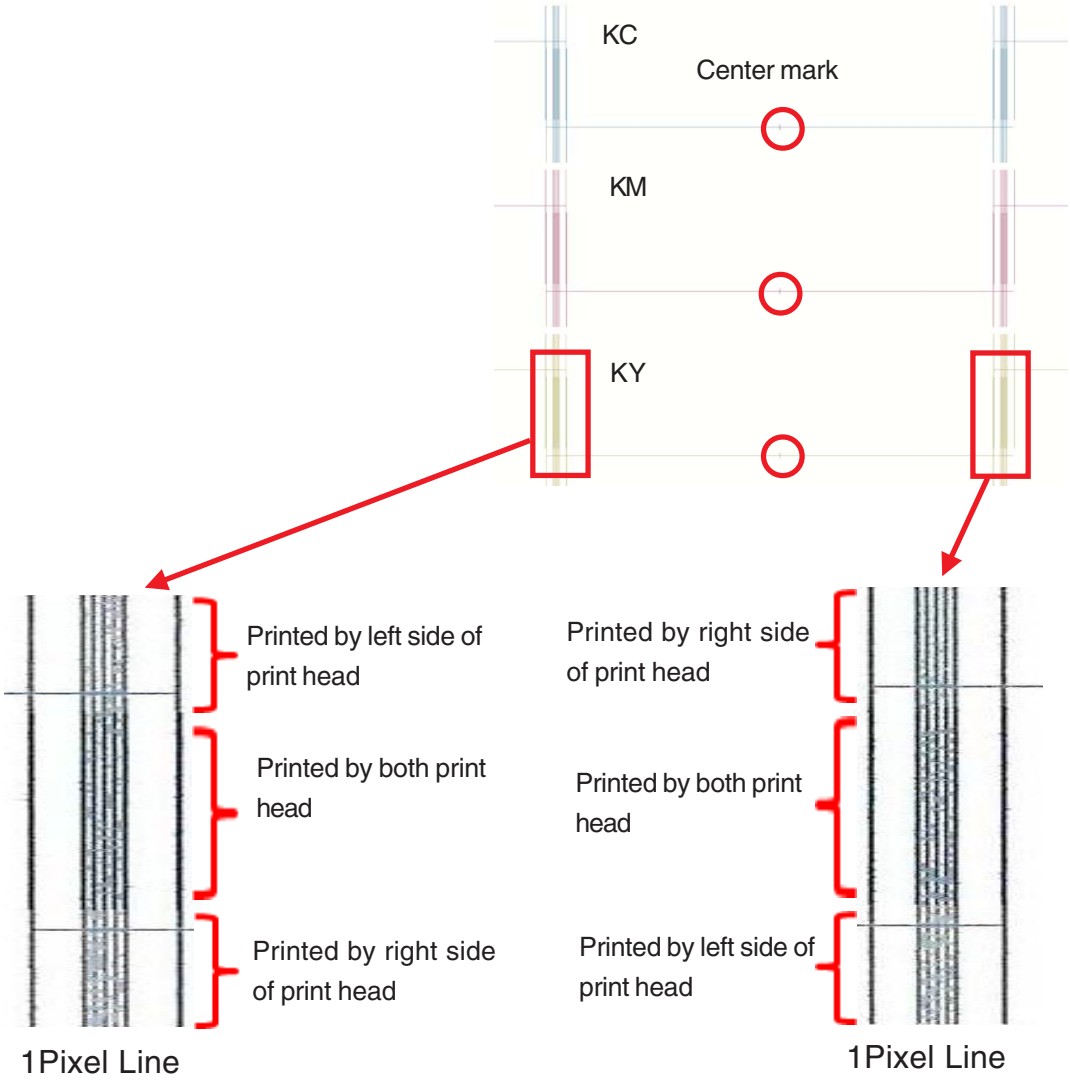
Center mark

Check head alignment condition with next print head.

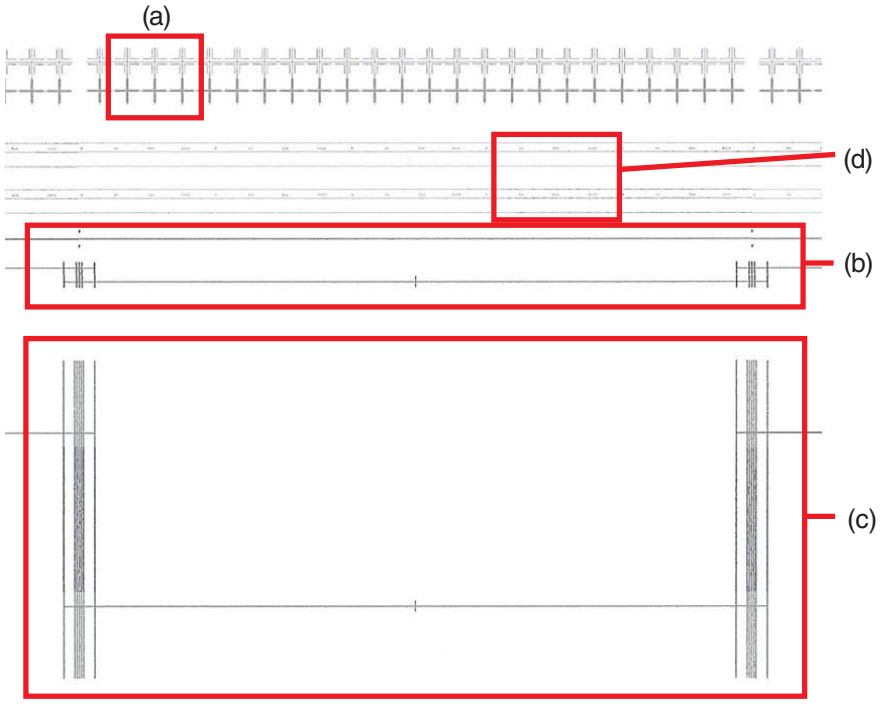
Overlap area

6. Head overlap check and registration check pattern (Paper width direction)

- This pattern shows registration condition in paper width direction between Black and Cyan, Black and Magenta, Black and Yellow. Also this pattern shows print head position in paper width direction.
- In case to check both color registration, check both color are printed same position in all lines. In case to check print head position in paper width direction, check both print head are printed same positions in all lines.

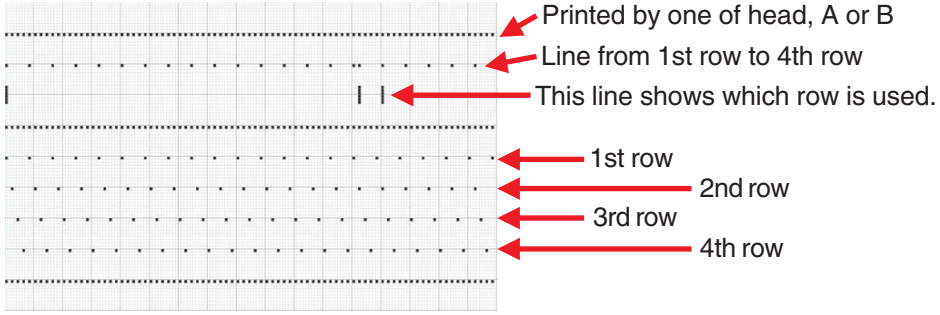


7. Head condition check pattern (For each color)



(a) Head module Inclination check pattern
(b) Head overlap check and registration check pattern (Paper width direction)
(c) Head overlap check and registration check pattern (Paper width direction)
(d) Nozzle row of head printing position check pattern

1st line : Nozzle row of [Head A] printing position check pattern
2nd line : Nozzle row of [Head B] printing position check pattern
Check printing position of 1st row to 4th row are same.



8. Nozzle condition Check Pattern

- Nozzle check pattern are separated printing area by [Head A] and printing area by [Head B] to recognize which head has jet outs easily.
- Solid pattern is used to check density of each head and tilt condition of each head module.

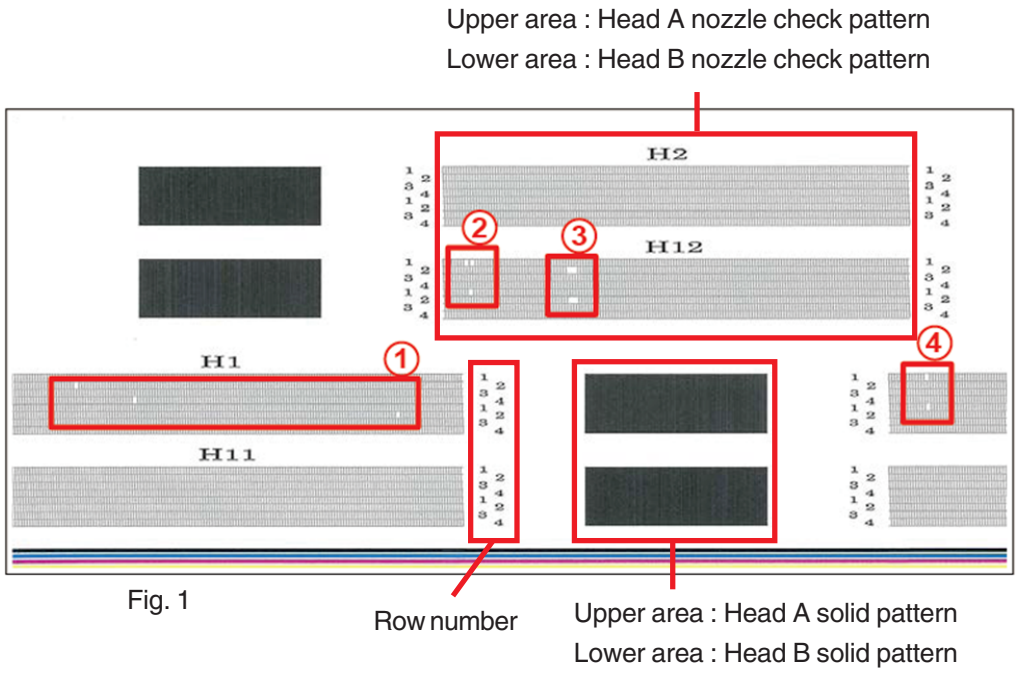


Fig. 1

Nozzle condition Check Pattern

- Ten Head modules per one color are installed in the printer. One Head module consists of two heads. For example, Head module No.2 consists of Head No.2 and Head No.12.
- There are four nozzle rows on a print head.
- Nozzle Condition Check Pattern are separated printing area by [Head A] and printing area by [Head B] to recognize which head has jet outs easily.
- Nozzle number (a), (b) and (c) on first row are printed in Nozzle Condition Check Pattern as shown Fig.2.
- Example of jet out is shown in Fig.1.
  - (1) Jet outs appear at random in Head No.1
  - (2) Jet outs appear in Head No.12 three adjoining nozzles.
  - (3) Many jet outs appear at random in Head No.12
  - (4) Jet outs appear in Head No.3 two adjoining nozzles.

  Fig.3 shows enlarged view of jet out.

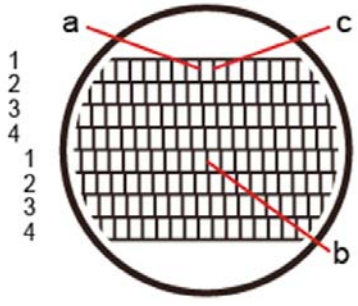


Fig. 2

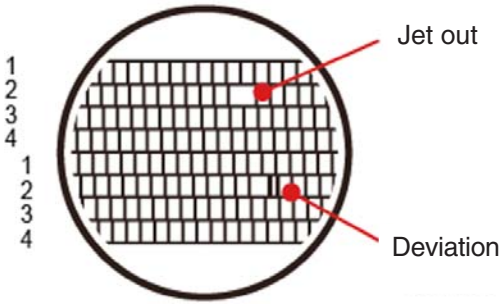


Fig. 3

4-2. About compensation data for print quality and registration

Relation between compensation data and test chart

	Chart	Head alignment data	Registration adjustment data	Uniformity data	DNS compensation	Encoder roller thermal expand compensation	Chart name
Head alignment adjustment screen	Auto adjustment	Enable	Disable	Disable	Disable	Disable	
	Test print	Enable	Disable	Disable	Disable	Disable	Basic Chart
	Head alignment Manual adjustment screen Test print	Enable	Disable	Disable	Disable	Disable	Basic Chart
	Registration adjustment screen Test print	Enable	Enable	Disable	Enable	Enable	Adjustment Pattern
Print head uniformity adjustment screen	Auto adjustment	Enable	Enable	Enable	Disable	Disable	
	Test print	Enable	Enable	Enable	Disable	Disable	Uniformity Check Chart
	Uniformity Manual adjustment screen Test print	Enable	Enable	Enable	Disable	Disable	Uniformity Check Chart
Linearize adjustment screen	Linearize adjustment	Enable	Enable	Enable	Enable	Enable	
	Midtone adjustment	Enable	Enable	Enable	Enable	Enable	
	ICC profile creation chart	Enable	Enable	Enable	Enable	Enable	
Head cleaning screen	Auto Nozzle clogging check	Enable	Disable	Disable	Disable	Disable	
	Test print	Enable	Disable	Disable	Disable	Disable	Basic Chart

- Head alignment data

  Head alignment data compensates each nozzle ink spitting timing to adjust a line in main direction straightly.

  Head alignment data apply to all test charts.

- Registration adjustment data

  Registration adjustment data is compensation data which inputted Registration adjustment screen. TP-J520HD can adjust registration each color manually using Registration adjustment menu both paper feeding direction and paper width direction.

  Registration adjustment data apply to Adjustment pattern, Uniformity check pattern and test print of Linearize adjustment menu.

- Uniformity data

  Uniformity data compensates each head density to equal.

  Uniformity data apply to Uniformity check pattern and test print in Linearize adjustment menu.