Print Head Alignment

This is to describe the proper procedure in aligning the Print heads.

1.1 Test print (Nozzles Test)

Before alignment ensure the nozzle test is perfect!

- Perform Ink Prime by activating the toggle switch. Do ink bleeding one print head at one time to remove air bubbles trapped inside the print head and the tube.
- Clean the print heads with clean cloth by manually.
- Send Test Print head to see if all print heads prints a shown below;

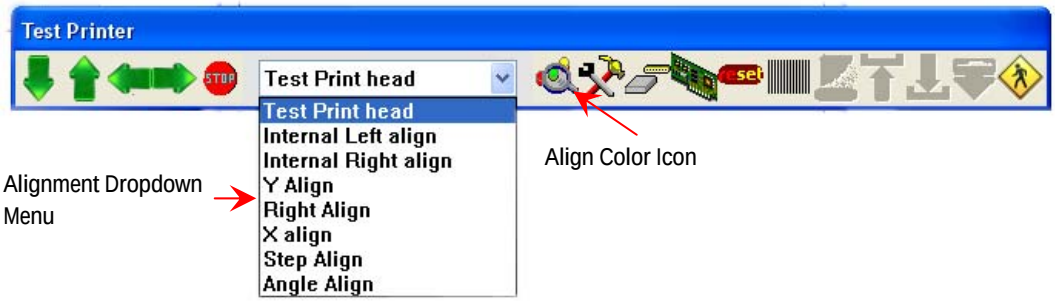

Fig.1.1-1 Test Print Tools

1) Angle Alignment
2) Internal Y alignment
3) Y alignment
4) Internal Left Alignment
5) Internal Right Alignment
6) Right Alignment
7) X Alignment
8) Step Alignment

Fig.1.1-3 Nozzles Test

1.2 Voltage and Temperature Setting

This section will describe the necessity to calibrate the Voltage and Temperature settings for each print head.

For the purpose of getting the best dot print quality, it needs patience. All you can do is play with temperature and voltage settings.

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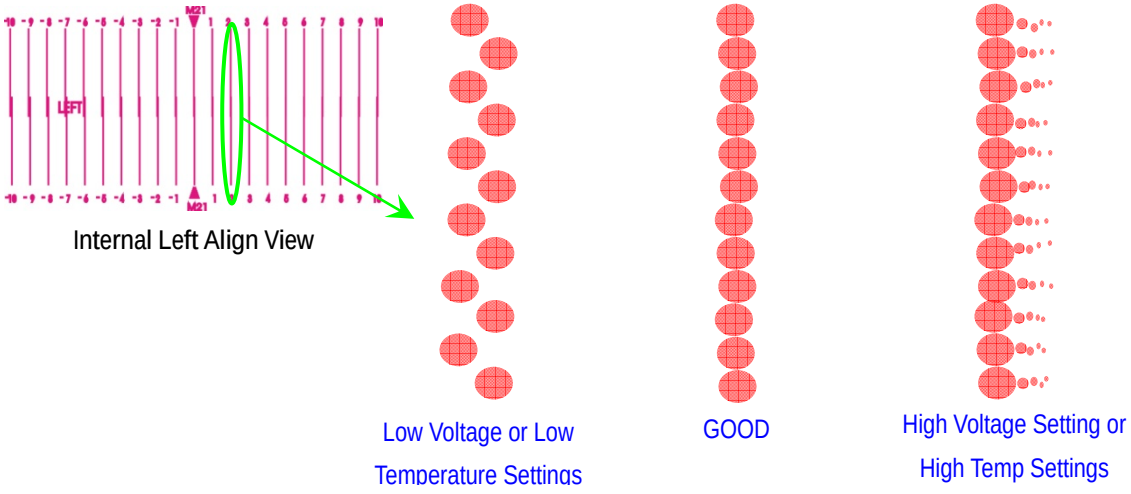


Fig.1.2-1 Dots Illustration

The recommended Voltage setting range is controlled by Flora driver software so there's no chance for you to set the voltage beyond the recommended range.

The recommended voltage is 70~75V, While the recommended temperature setting is 30-35ºC in most cases. The procedure is as below:

Recommend Voltage(V)	Recommend Temp.(° C)	Recommend Pulse(us)
70~75	30~35	7
Adjustable Range	**Adjustable Range**	**Adjustable Range**
50~120	10~60	5~10

1. Change the voltage / temperature in the textbox
2. Click ***"Write"*** Button
3. Check the value, click "Read" Button

Notice:

Every ink manufacturer has its own recommended temperature and voltage settings. The recommended setting applies to Flora ink!

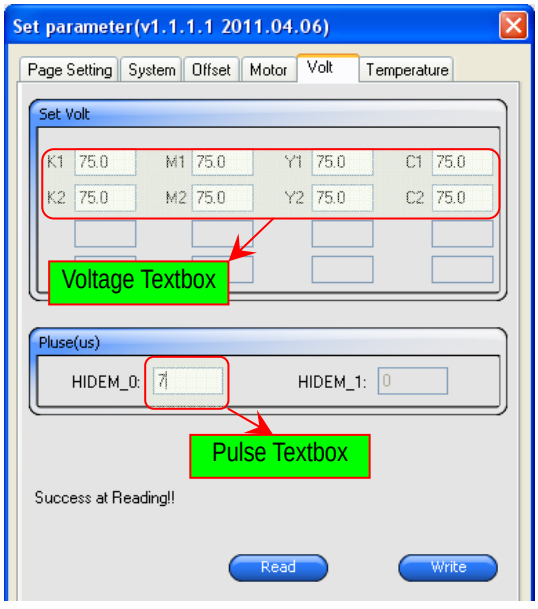


Fig.1.2-2 Voltage Tag

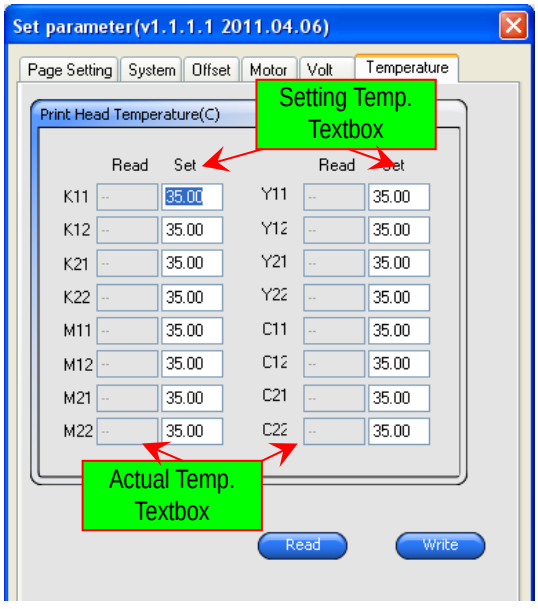


Fig.1.2-3 Temperature

Other factors than can influence print quality are:

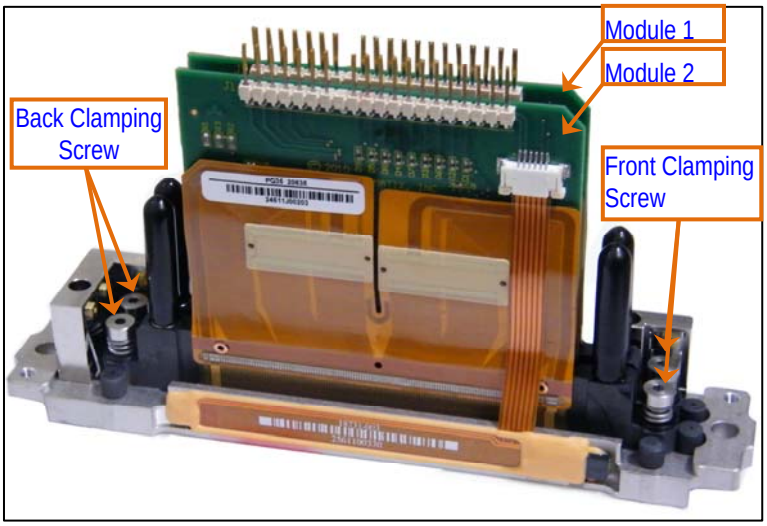
- Room Temperature
- Humidity
- Ink Viscosity
- Negative Pressure Settings
- Carriage Printing Speed

Note:

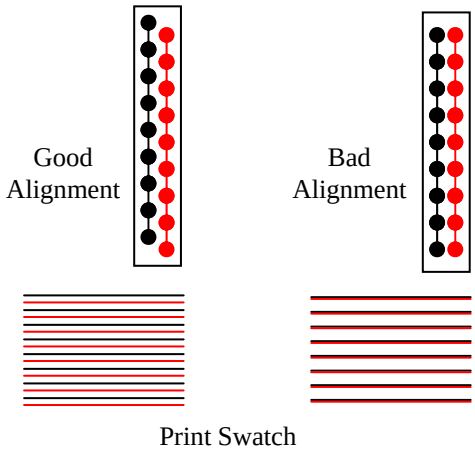
In most difficult cases playing with Uni-direction and at low speed can help improve the print quality significantly.

1.3 Print head Internal Y Alignment

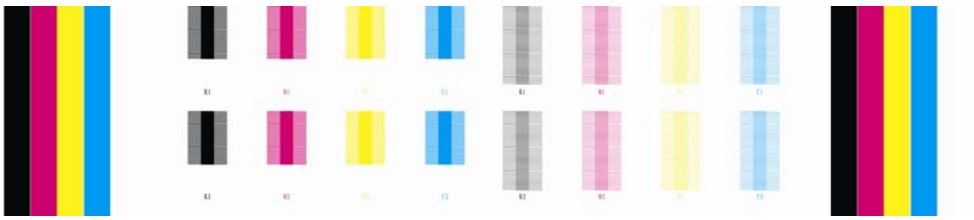
This alignment makes two modules of the print head aligned perfect. It will enhance the physical precision of the print head.

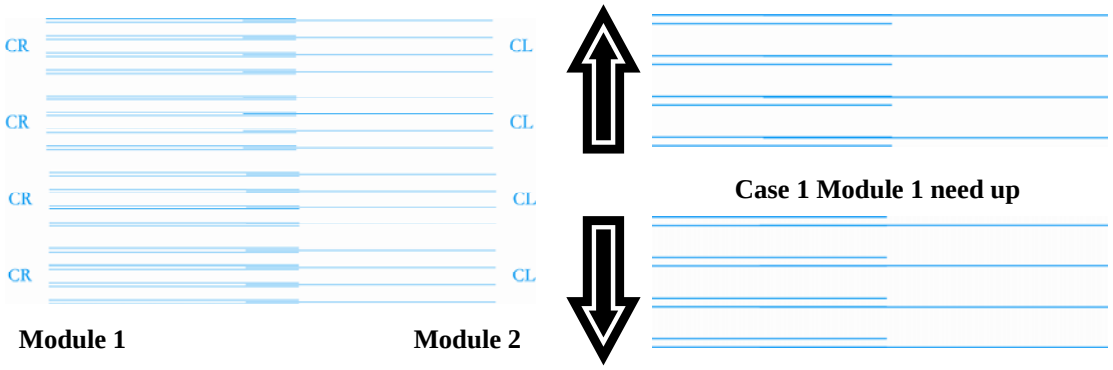


Every print head has two modules, which has 256 nozzles each module. Bad alignment may cause color different issue! The performance of output job is horizontal banding.



1. Select Internal-Y alignment from test print drop down list, send it. You will get swatch as below:





2. If the two modules alignment is not good, then it should be adjust as below procedure:
   a) Loose both front and back clamping screw;
      - 🕮 The back clamping screw mustn't be locked (Before install print head, anti-clockwise rotate the back clamping screw half a lap) but gently locked. So the module can be adjusted with the alignment screw!
   b) Rotate the alignment screw:
      - ➢ If the swatch is like case 1, clockwise rotate the screw
      - ➢ Else, anti-clockwise rotate the screw
      - 🕮 Module 1 is adjustable, which can be adjusted with the Y-alignment Screw. Module 2 is reference module, which can't be adjusted.

1.4 Print head Y Alignment

Print head installation must ensure the print head is perpendicular to Y-axis, and in parallel with X-axis. For this machine, there are 8 print heads in total, and divided into 2 two rows. Unaligned print head will affect ink composition a picture.

For one row print heads, the first nozzle of every print head must be on the same coordinate at Y-axis.

For two rows, the gap between two rows should be same with the gap between two nozzles.

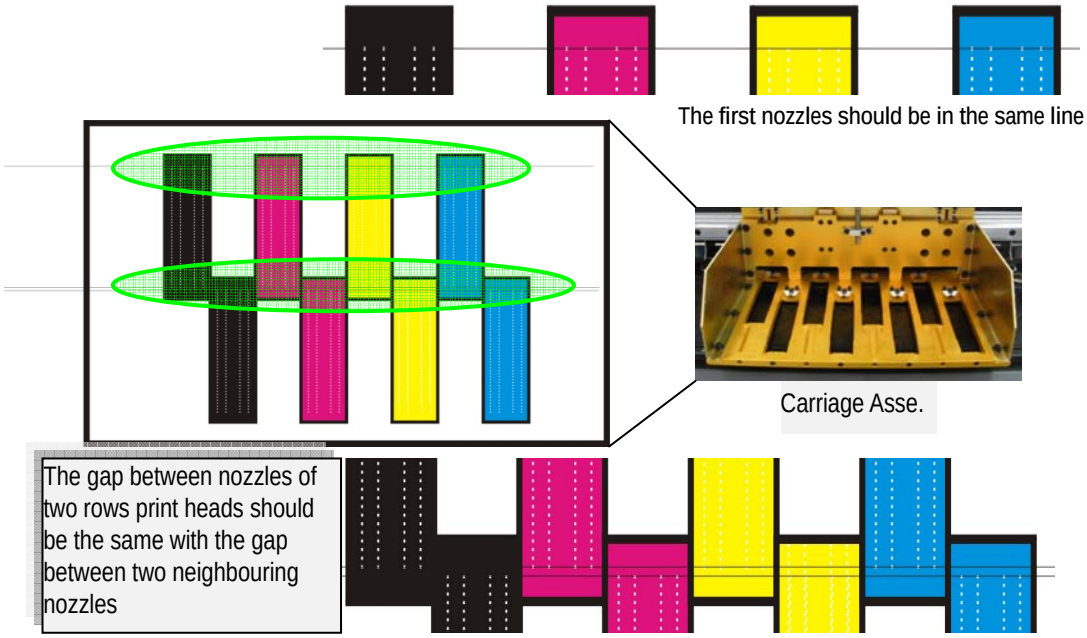


Fig.1.3-1 PH align on Carriage

3. Highlight Y Align from test drop list, and send to print by click send print icon;

Fig.1.3-2 Y Align

4. Y Align procedure should be as below:

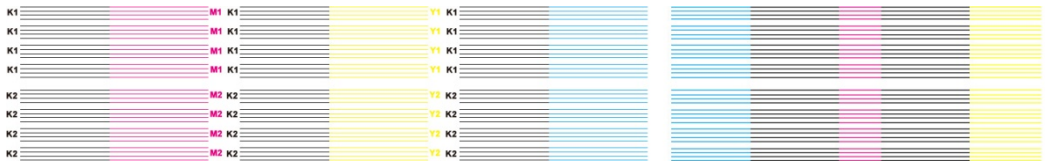


Fig.1.3-3 Y Align Drawing

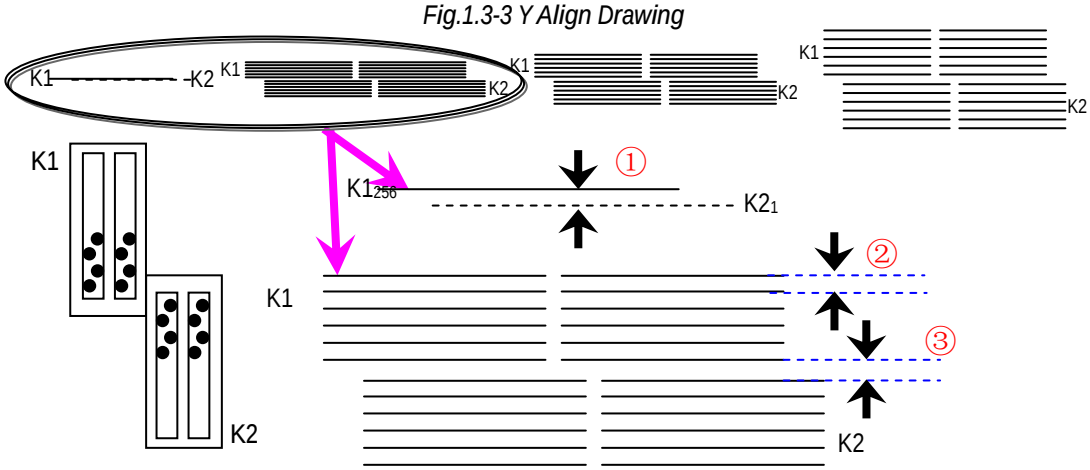


Fig.1.3-4 Illustration for Align K2

c) Align K2 with K1. The gap between 256th nozzle of K1 and 1st one of K2（① or ③） must be equal to the gap between two nozzles(②).

✧ If ③ > ②, push print head K2 go upward.(K1 is basic print head, you mustn't adjust K2)

✧ If ③ < ②,pull print head K2 downward.

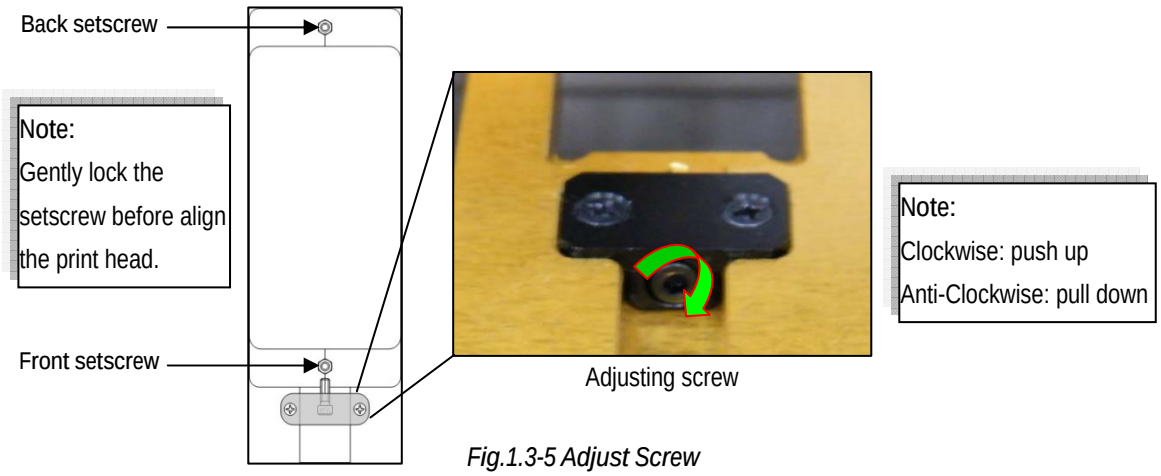


Fig.1.3-5 Adjust Screw

Note:

Carful and gradual adjustment should be taken in to consideration when doing Y Align.
It will take several prints and adjustments before you are able to get perfect alignments.

d) Align C, M and Y print heads refer to K print head. The line of C, M or Y should overlap the K line perfectly.

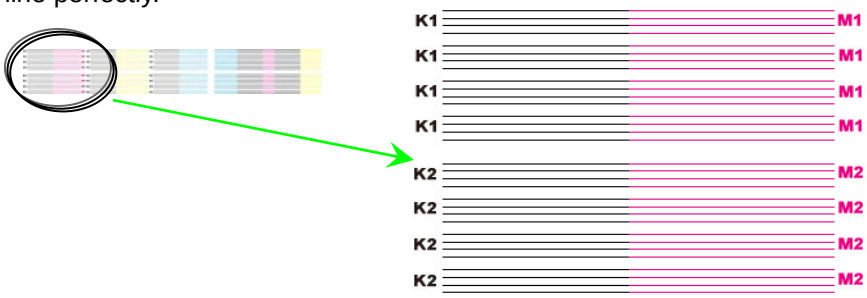


Fig.1.3-6 Enlarge view of Darwing

- ✧ If K1 print head is above C1, M1 or Y1, pull the C1, M1 or Y1 down.
- ✧ If K1 print head is below C1, M1 and Y1.push the C1, M1 or Y1 up.

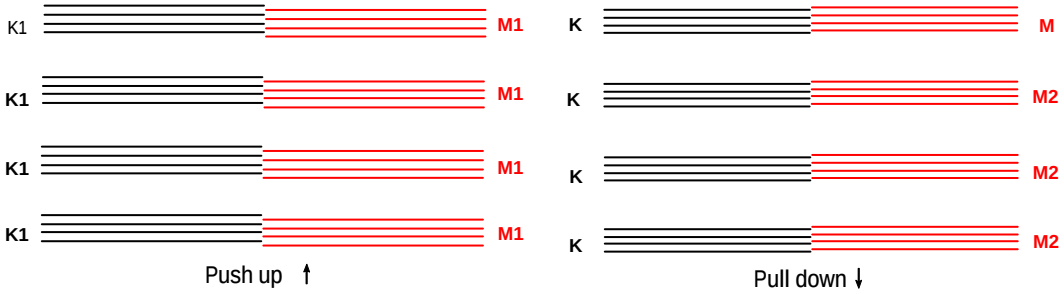


Fig.1.3-7 Illustration for Align C, M Y

Note:

- ◆ *K1 is the reference print for 1# print heads, while K2 is the reference for 2# print heads.*
- ◆ *When perform Y alignment, K1 and K2 print head mustn't be adjusted unless C, M or Y heads were in maximum position. If on this occasion, K1 and K2 should be aligned again!!*

e) After finishing all the alignment, double check if all print heads are aligned perfectly referring to below figure.

Or you can align the print heads through it also. Just keep C, M or Y lines are overlap the K lines perfectly.

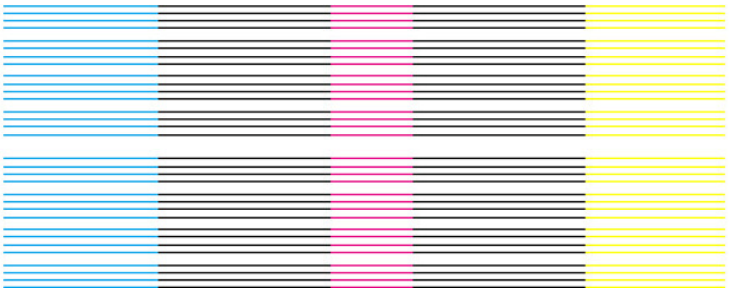


Fig.1.3-8 Check Align

1.5 Internal Right Align

Internal right align is necessary for Polaris heads because the Polaris head nozzles are made wherein the 512 nozzles are divided into 2 parallel rows of 256 nozzles.

Due to some uncontrollable manufacturing errors (tolerances) perfect alignment is not guaranteed. The internal align is required for both printing directions, especially for monochrome.

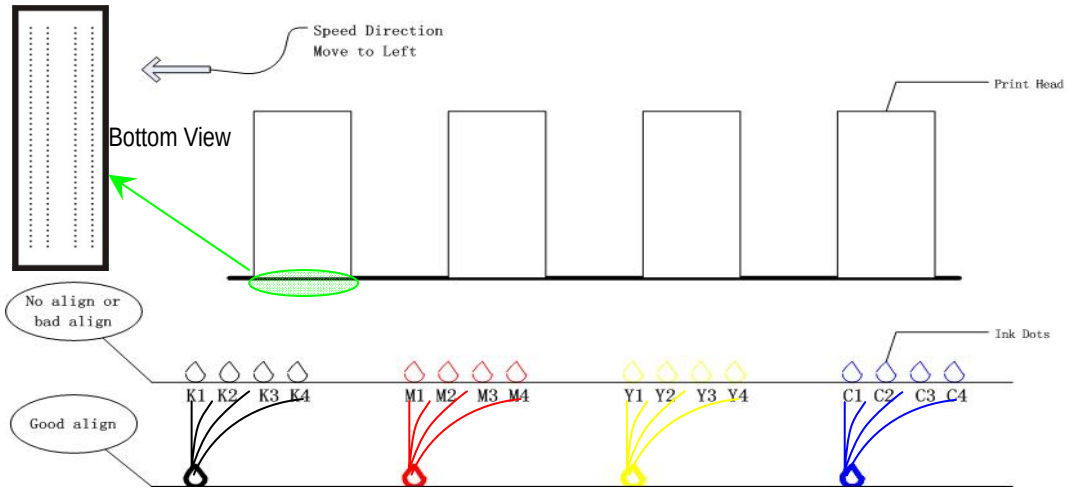


Fig.1.4-1 Illustration for Align C, M Y

1. Highlight Internal Right Align from test drop list, and send print by click align color icon; you will get prints as below. Every color will have three units of prints, take K for example:

Fig.1.4-2 Send Internal Right Align

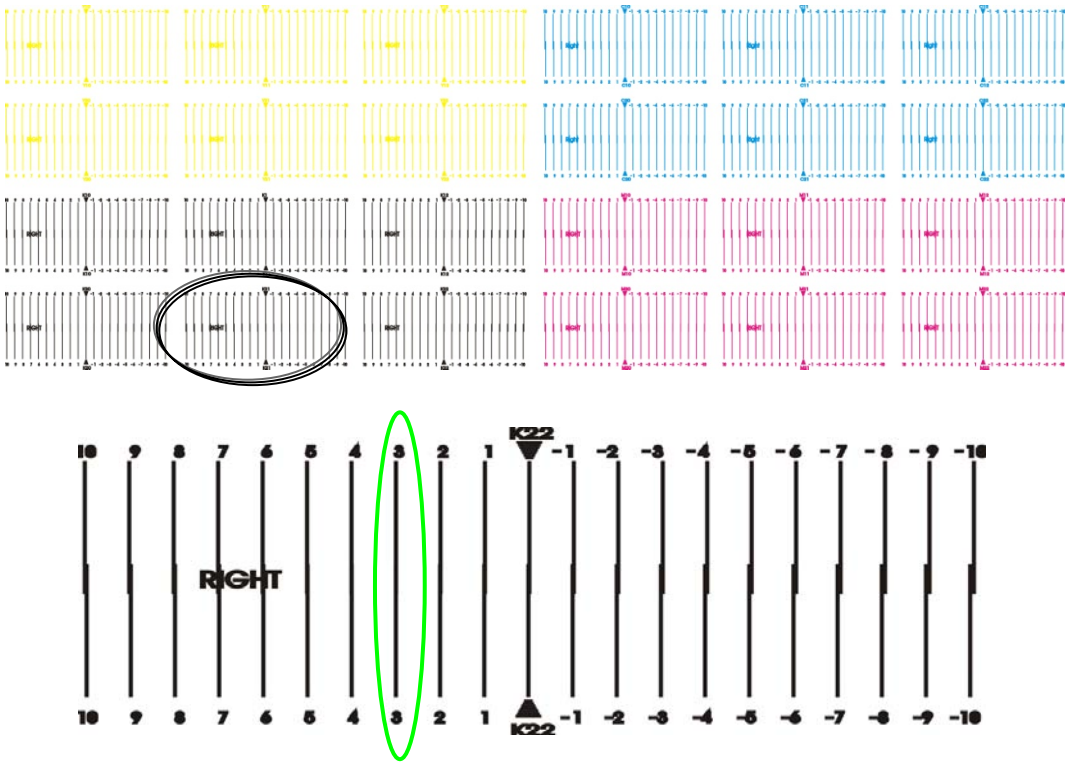


Fig.1.4-3 Internal Right Align Drawing

2. The “0 position” of the top K22 must be aligned with “0 position” of down K22. In illustration Fig., K22 meets at “3 position” (in green circle), and the default value of K22 is 0. So the K22 should be 0+3=3.

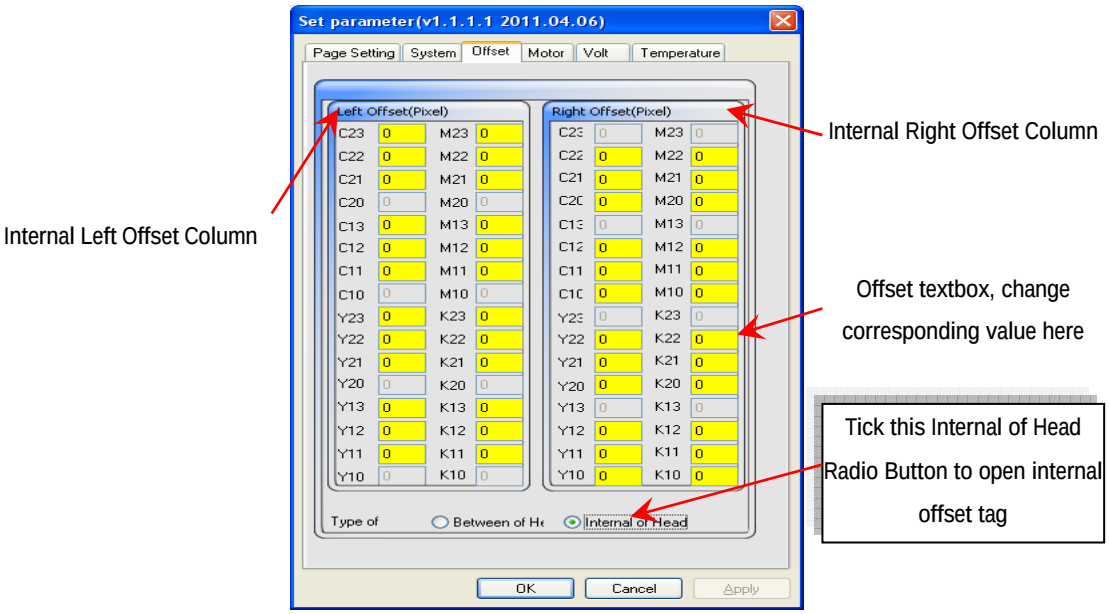


Fig.1.4-4 Internal Right Align Drawing

- **Path for setting Internal Left alignment:**

  Print Option Tag → Advanced (Test Print Tools Bar → Parameter Setting Icon) → Offset Tab → Internal of Head

1.6 Internal Left Align

Internal left align is similar with internal right alignment, only the moving direction is different. Because of opposite direction, the inkjet position from bi-direction is different, that is why bi-direction alignment is in need.

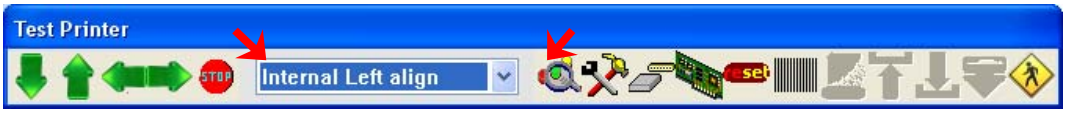


Fig.1.5-1 Send Internal Left Align

1. The procedure for Internal Left Align is the same with Internal Right Align, please refer to 1.4.

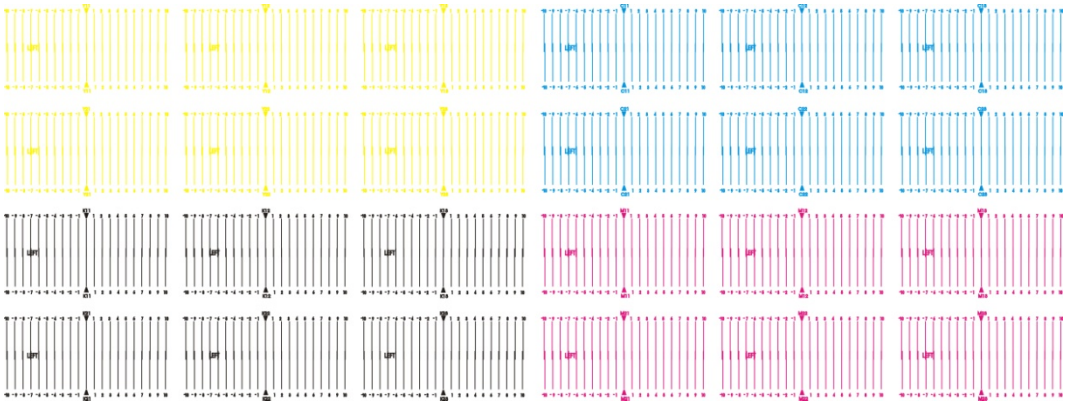


Fig.1.5-2 Internal Left Align Drawing

1.7 Right Align

There are 8 print heads in 4 colors in total. As they are fixed in different physical position, it is necessary to do Right Alignment for secondary colors, otherwise the secondary color will be fuzzy and the output picture will be rough.

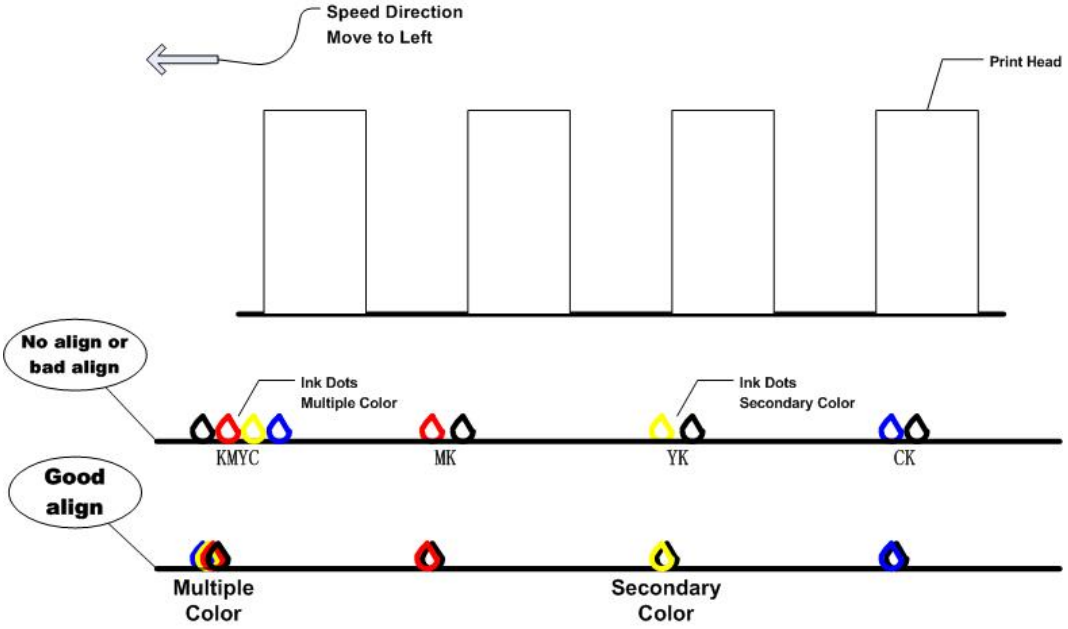


Fig.1.6-1 Illustration for Right Align

For Flora machine, we take K1 as the base to align the other print heads.

1. Highlight Right Align from test drop down list, and send print by click align color icon. You will get prints as below.

Fig.1.6-2 Send Y Right Align

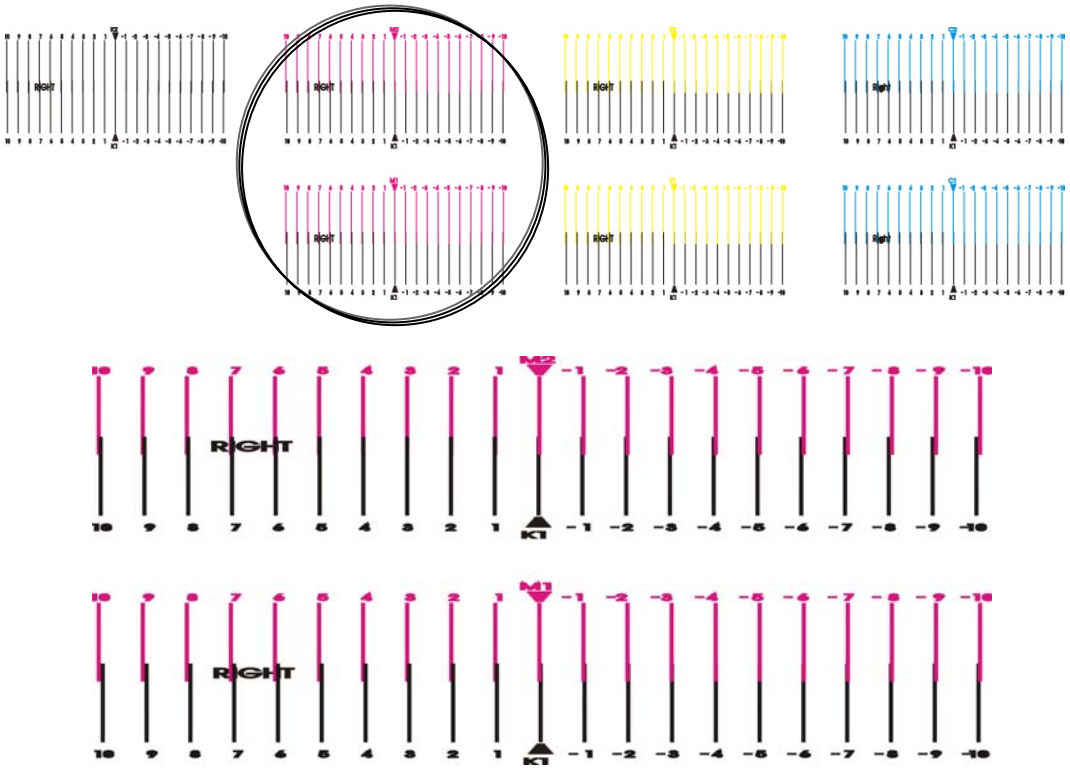


Fig.1.6-3 Right Align Drawing

2. All the print heads will take K1 as basic. The “0 position” of K1 print heads must be aligned with “0 position” of all the other print heads. Because of the space problem, I take M print head as example. K1 meets M1 at “- 4 position” (in green circle), M2 at “4 position”.

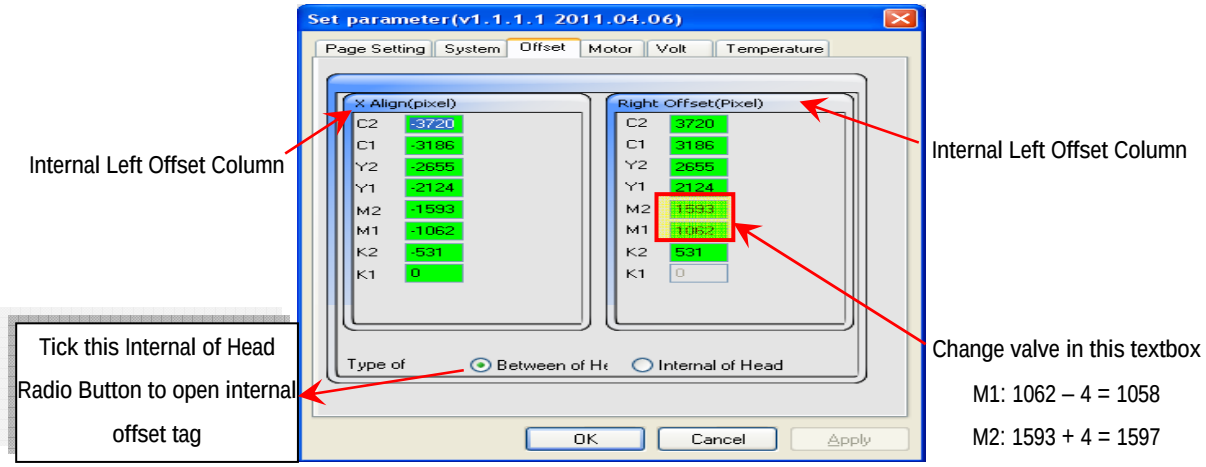


Fig.1.6-4 Offset Tag

- **Path for setting Right alignment:**

  Print Option Tag → Advanced (Test Print Tools Bar → Parameter Setting Icon) → Offset Tab → Right align Check Box

Print Heads	Previous Value	Test Results	Modified Value
M1	1062	-4	1058
M2	1593	4	1597

3. Align the other print heads as the same procedure.

1.8 X Alignment

X alignment is very necessary for Bi-direction print mode. If this alignment is not good, the output image will be rough and fuzzy because of dislocation output coming from double directions.

X alignment is similar with Right alignment. But every print head will take itself as reference print head! The way to set the value is the same with right alignment!

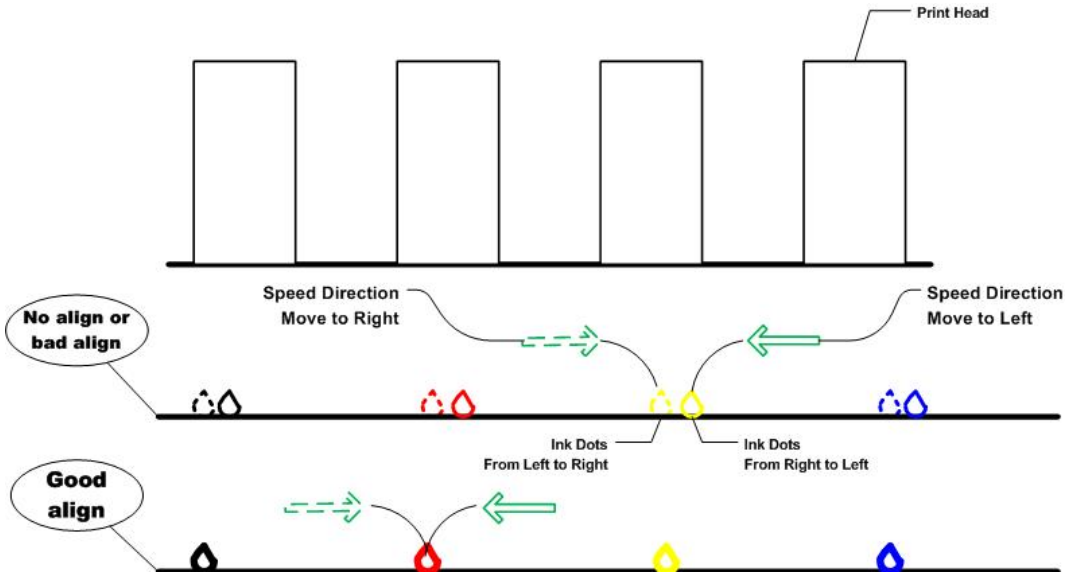


Fig.1.7-1 Illustration for X Align

1. Highlight X Align from test drop down list, and send print by click align color icon;

Fig.1.7-2 Send X Align

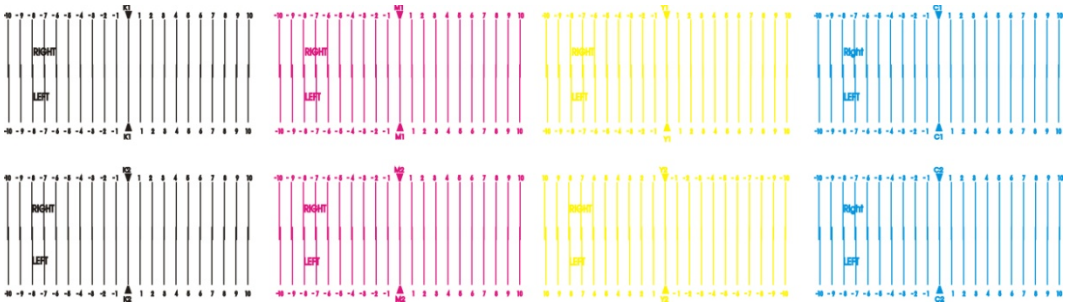


Fig.1.7-3 X Align Drawing

- **Path for setting X alignment:**

  Print Option Tag → Advanced (Test Print Tools Bar → Parameter Setting Icon) → Offset Tab → X align Check Box

1.9 Step Alignment

Step alignment is an important alignment for Y-axis.

If the step is too big, the output will have blank line; otherwise, the output will have overlap line.

1. Highlight X Align from test drop down list, and send print by click align color icon;

Fig.1.8-1 Send Step Align

2. The first pass will print dotted line, and the printer will feed media forward, after that it will print straight line. You may get three possible cases as below:

Fig. 1 – Insufficient Media Feeding Step

- Figure 1 shows the motor step value when the test was sent is higher than exact value so we need to increase, by trial and error method you can get the correct value.

Fig. 2 – Excessive Media Feeding Step

- Figure 2 shows the motor step value when the test was sent is lower than exact value so we need to decrease, by trial and error method you can get the correct value.

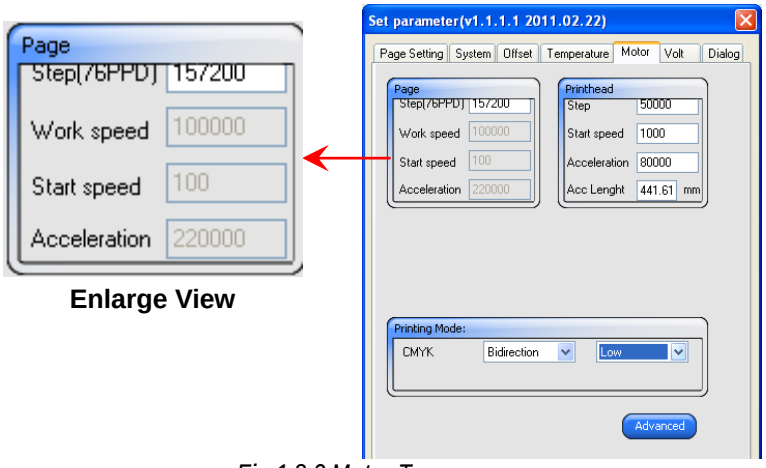
Fig. 3 – Correct Media Feeding Step

- Figure 3 shows the motor step has exact value so no need for any changes. To determine the exact motor step value setting, you need to bring the broken and solid lines closer until you can see one single line only.

3. Below is the table where you can find the Step Parameter setting.

- **Path for setting X alignment:**

  Print Option Tag → Advanced (Test Print Tools Bar → Parameter Setting Icon) → Motor Tag → Page windows



Enlarge View

Fig.1.8-2 Motor Tag

Notice:

If any factor (temperature, voltage and highness of the carriage) which will affect viscosity or firing speed has changed, you must check Internal left & right alignment, right alignment and X alignment!