

Introduction

The directions described below (X, Y) refer to the nomenclature used in the PrintManager Print Queue Diagnostics Window Offsets Tab, and may differ from the naming conventions used in SG1024 Product Manual documentation. Here, X refers to the up/down web direction, with a positive change moving the image up-web relative to the other blades/printheads, and negative moving it down-web. Y refers to the cross-web direction, with a positive change moving the image towards the front of the printer, and a negative change moving it towards the rear of the printer. Absolute Value Method (AVM) is the process of counting the exact number of teeth of the Printhead Twist/Crossweb Adjustment Gears have been turned from a zero state, and recorded for future printhead replacement/setting.

Preparation/Tools Needed

- A. Printer with sufficient ink and sample material (photo paper and actual substrates)
- B. Vacuum settings established and stable, ink supply and jetting temperature confirmed and stable
- C. Optimum waveform for ink, fly height for printheads (1-1.5mm for SG1024)
- D. 5/64" Allen Wrench for Printbar Adjustments
- E. Small Flathead Screwdriver for Printhead Adjustment Gears
- F. Microscope/Camera/Eye Loop

Adjustment Units

- A. All Printbars: 100 microns (0.1mm) per revolution in Cross-web (Y) and Twist (θ)
- B. SG1024 Printhead Alignment Gears
 - a. Maximum travel of alignment gear = ~5 revolutions
 - b. Gears have 16 teeth, so 80 teeth maximum travel for AVM scale
 - c. Pitch = 0.2mm (0.0125mm/tooth) = 0.008in (0.0005in/tooth)

Pixel Size by DPI (SG1024 Highlighted in Green)

DPI	300	360	400	600	720	1200
Pixel Size [inch]	0.0033	0.0028	0.0025	0.0017	0.00139	0.00083
Pixel Size [mm]	0.0847	0.0706	0.0635	0.0423	0.03528	0.02117
Pixel Size [micron]	84.7	70.6	63.5	42.3	35.3	21.2

Alignment Prep

1. Start with all Printbar Ball Adjust Mounts/Screws at nominal/centered position.
2. Set the Printhead Twist Alignment Gears to 0.0100 inches in from zero (~25 teeth). This will allow you to do the rough printbar alignment, but will be reset.
3. Start with all voltages at nominal multipliers, confirm good jetting with Nozzle Check.
4. Check temperatures, vacuum settings, and fly height for ink and substrate.
5. Select a color (often C or K) as starting point to become the master alignment baseline.
6. Disable colors and/or printheads as needed to isolate single colors when applicable.

Alignment Order of Operations

1. Rough printbar alignment of all colors to web path, within 2-4 pixels of square. See Clear Substrate Method.
2. Rough X- and Y- alignment with alignment image (ALL colors).
3. Printhead Twist alignment, see AVM (single color).
4. Stitch/Y-Offsets (single color).
5. Downweb/X-Offsets (single color).
6. Voltages for color balance (single color).
7. Second pass of X-Offsets if drastic (5+%) voltage modifiers are needed.
8. Repeat Steps 3-6 on each color until all are complete.
9. Plane Offsets for color to color alignment (ALL colors, or 2 at a time).
10. Production Images/final pass of all offsets.

Printbar Twist Alignment Details

1. Print Alignment Image, identify outliers from end to end

- a. Test Image: "*ColorAlignment10W*"
- b. Look at the left and right edges of each head, look for repeatable "jagged" edges at the stitches of each head, which would indicate severe printbar twist
- c. Use 5/64" Allen Wrench to advance or retreat the Front Right Alignment Ball Mount as needed until all printheads appear parallel.

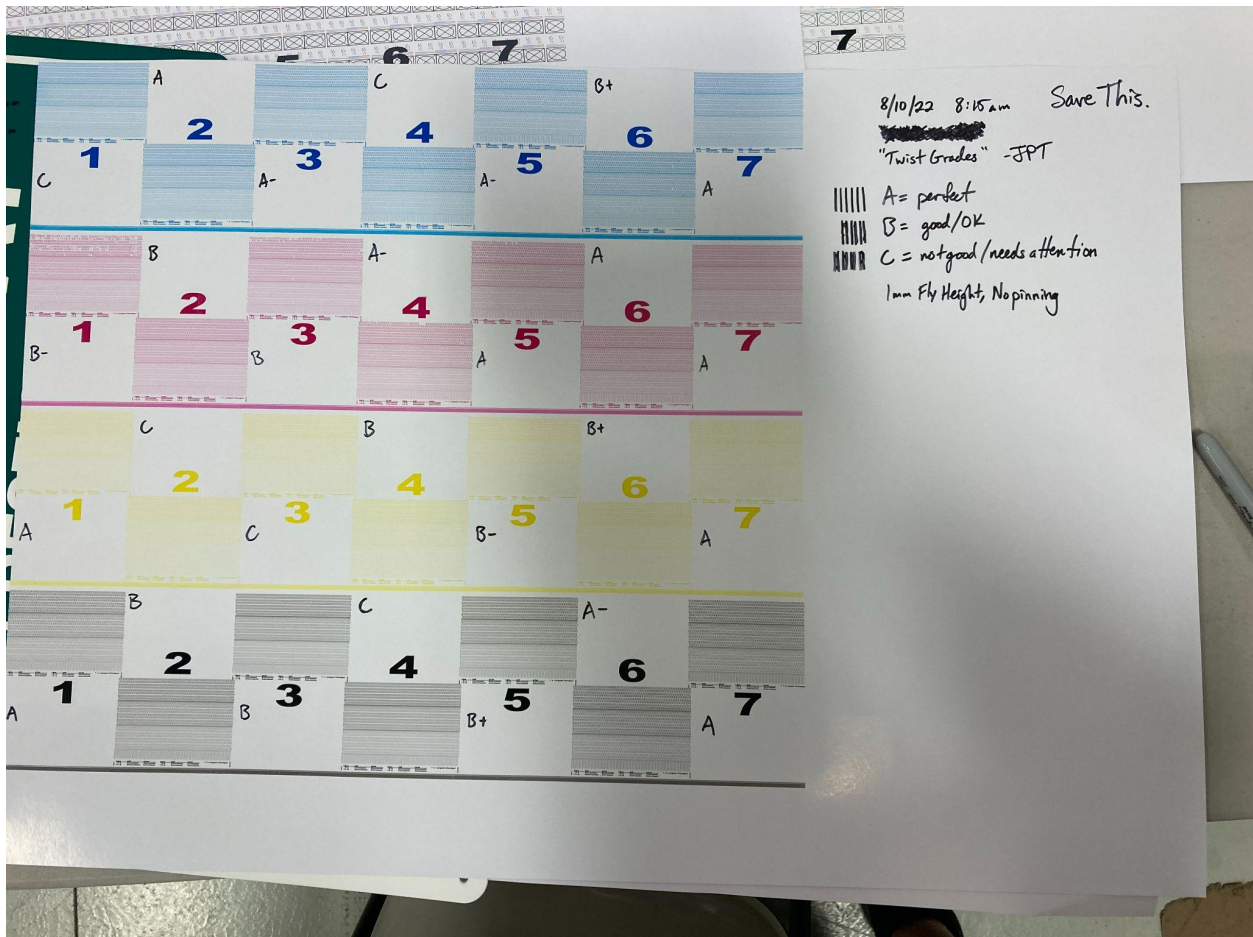
2. Clear Substrate Method

- a. If possible, print on both sides of a clear substrate. Adjust until the lines are lined up on top of each other.

Individual Printhead Alignment Details

1. Twist: Around Z-axis, Physical Adjustment

- Test Image: "NozzleCheck10W"
- Look for evenly spaced lines at the trailing edge/bottom of the print. The tops of the lines should all be roughly even length, but there may be some minor alternating lengths due to wet-out differences. Example below.



2. Cross-web: Along Y-axis, Physical Adjustment

- a. Test Image: “*NozzleCheck10W*” and/or “*GreyLevelCheck10W*” and/or “*ColorAlignment10W*”
- b. On Nozzle Check, look for even spacing of lines at stitch junctions. It may help to add a print offset so the stitches do not appear at the edges of the nozzle check patterns for each head.
- c. On Grey Level Check, look for white gaps or darker lines at stitch junctions. It may help to add a print offset so the stitches do not appear at the edges of the nozzle check patterns for each head.

3. Voltage: Software Adjustment

- a. Test Image: “*GreyLevelCheck10W*” and/or “*NozzleCheck10W*”
- b. Match the darkness of colors using Print Queue Diagnostics Voltage Tab. The values are in percentages of nominal. Typical range of these values for SG1024 printheads is **95 to 110**. **If you notice wide variations needed, something else might be wrong like twist, HDC voltage, printhead, printhead cable, etc.**
- c. This must be done before Down-web/X direction because voltage changes affect jetting speed and therefore may slightly change down-web placement.

4. Down-web: Along X-axis, Software Adjustment

- a. Test Image: Alignment Pattern “*ColorAlignment10W*”
- b. Line up the tops/bottoms of the patterns so the printheads begin printing at the same time across the width of the web.

Appendix/Miscellaneous:

Historically, final values for the Absolute Value Method are about 25 teeth (+/- 5)