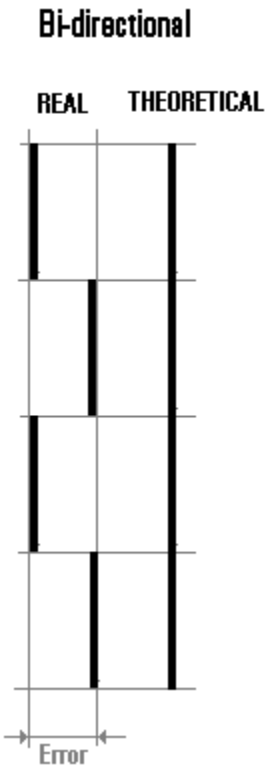
Vertical Line Straightness (VLS).

Symptons:

Vertical lines jagged. VLS is a measure of the hoitzontal distance between the segments of a vertical line plotted in two consecutive swaths. If the plotter is working correctly, this distance should be less than 2 mils.
A VLS error is commposed of two parts: Theta Z and Bidirectional errors.

Bidirectional Error.

The error shown below is called a bi-directional error. If you print the same plot using a unidirectional print mode, the error should not appear.

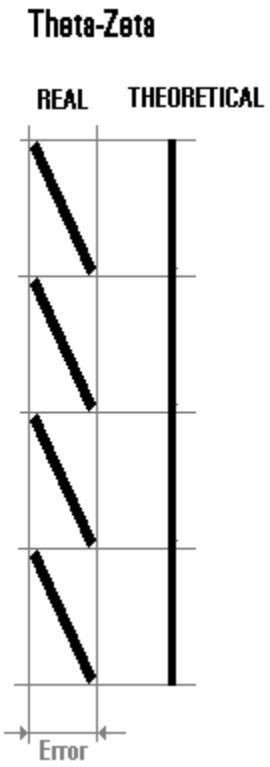


This error can occur for various reasons, including:

- Incorrect distance between nozzles and media. (Adjustment: Pen Height Test)
- Encoder-strip slots are damaged or dirty.
- Dirt on the pulley is causing the belt to slip.
- Friction between carriage bushings and slider rod.

Theta Z Error.

The errors shown below is called Theta Z error. They appear when the rows of nozzles on a cartridge are not perpendicular to the carriage axis (Y-axis).



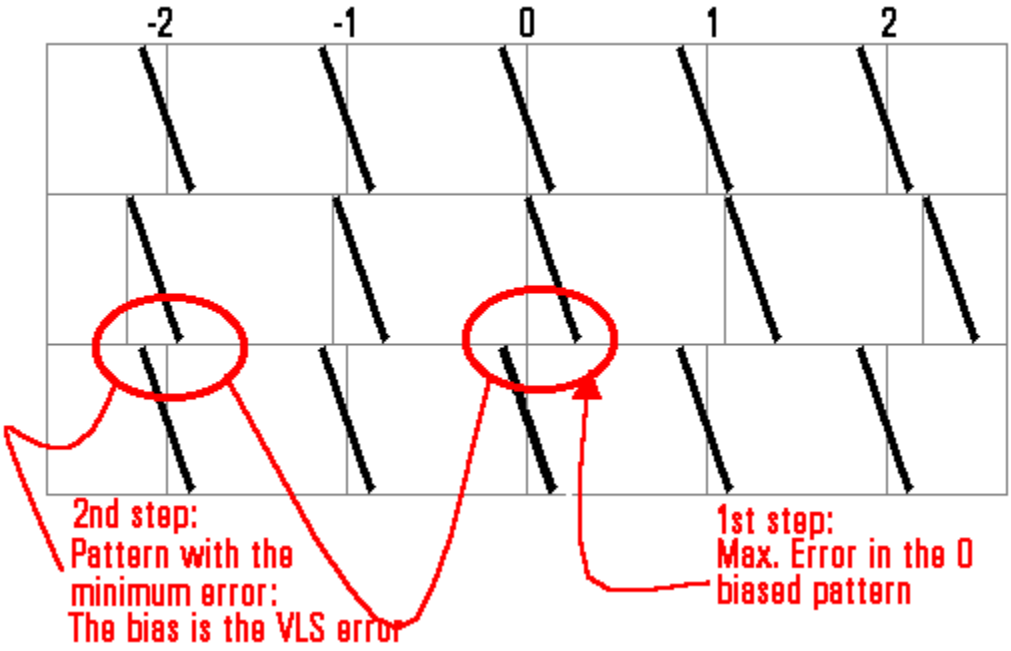
This error can occur for various reasons, including:

- Badly seated cartridge.
- Faulty cartridge.
- Faulty carriage.

How to measure the VLS error?.

1- In the 0 biased pattern, choose the worst intersection: Between the 1st and 2nd swath or between the 2nd and 3rd swath (When printing in the unidireccional mode, the error is the same in both intersections.)

2- Choose the bias for which the error is least visible: this bias corresponds to the VLS error.



Note:
Remember that 1 pixel at 300 dpi = 3.33 mils, so you see only if the plotter is out of specs, not if it's in specs.

Customer Expectations.

Although the VLS specification satisfies the expectations of most customers, some may complain even when the plotter is working within this specificacion. If the VLS error is already less than 2 mils, do not try to improve it.

Corrective Actions.

1- Perform the cartridge alignment.
2- Replace the black cartridge.
3- Replace the Carriage assy.