# Troubleshooting VideoJet® printers using a Fluke ScopeMeter® 190C Series

Application Note

**VideoJet printers are used in production-line applications that require the products to be marked with information such as date and serial number. Millions of products are marked this way daily (see figure 5 on next page). The information is non-contact printed on the products at a very high print speed as they flow through the production line. A typical example is milk cartons where the "sell by date" needs to be printed on each carton.**

## Principle of the VideoJet Printer

Ink is pressurized from the ink cylinder (see figure 1) to the print head where the nozzle crystal vibrates and breaks the ink stream into small droplets. The droplets then pass through a charge tunnel and under a deflection plate. Uncharged drops continue into the return block and are recycled to the ink module. The deflection plate attracts the negatively charged ink drops, deflecting them from their original path.

## Measuring the charge tunnel voltage of a VideoJet Printer

To locate the position of an ink droplet, the voltage applied at the charge tunnel needs to be measured. This voltage creates an amount of charge that changes the direction of the ink droplet, and there is a direct relation between the applied voltage and the final vertical position of the ink droplet.

By observing the charge tunnel voltage, the printing mechanism can be tested, even without ink.

As the value of the charge-tunnel voltage is normally several hundreds volts, both the oscilloscope and the probes used must be capable of withstanding these voltages to ensure that the user is safe.

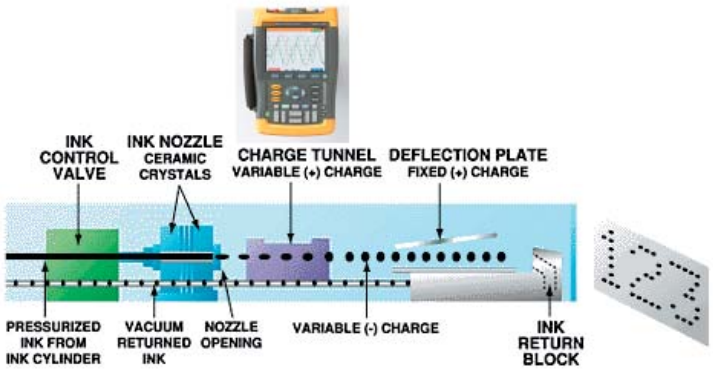


*Figure 1 – Print head diagram*

## Analyzing the signal

By measuring the charge-tunnel voltage, it is possible to determine the position of the ink droplet when it hits the product to be marked. This gives a trace as shown in figure 2. This waveform contains all

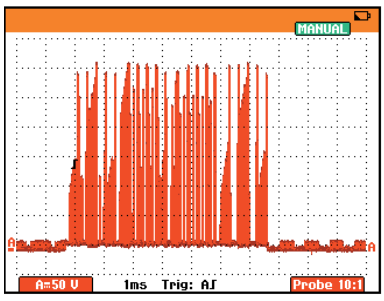


*Figure 2 – Signal corresponding to: TEST ABCD: (Fluke 199C)*

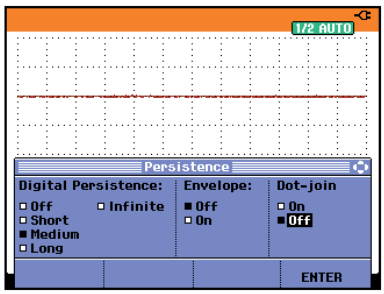


***Figure 3*** *– Waveform option menu of ScopeMeter (Fluke 199C)*

information, but requires considerable analysis to understand its real meaning. The problem lies in the connection lines between the samples, by switching these off, a clear "picture" is revealed
To do this, make the following selections in the waveform option menu of the Fluke 190C ScopeMeter (see figure 3), to make use of two unique features.

- Persistence – set to 'medium' so the samples stay longer on the screen
- Dot-join – set to 'off' so that the connection lines between the samples are disabled.

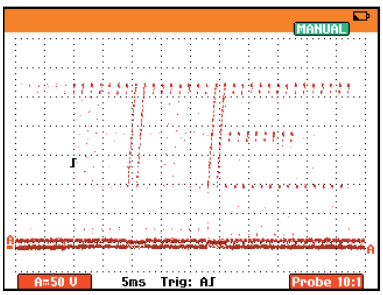


***Figure 4*** *– First part of the characters "TEST" at the ScopeMeter screen (Fluke 199C)*

This results in a display as shown in figure 4. The 'TE' ink droplet pattern is now clearly visible, making the testing and verification of these high-speed printers a very simple task.

## Conclusion

The 600 V Cat III measurement capability of the ScopeMeter 190 Series makes it ideal for direct measurements in this type of application.

And the use of 'Dot-join OFF' and 'Variable Persistence' reveals only the signal levels of interest, to make analysis of complex signals easy. These features can be found on the Fluke 196C and Fluke 199C

***Figure 5*** *– VideoJET Excel printer in a production line*

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