

Power Quality Monitors and Stray Voltage Investigations

Using a power disturbance analyzer on stray voltage investigations

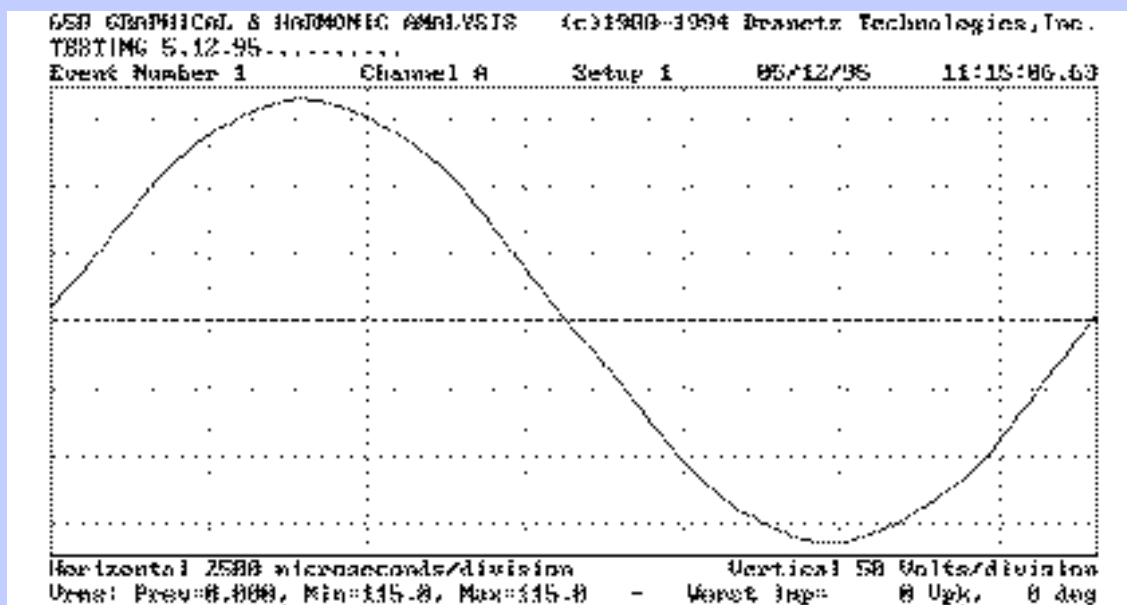
- ❖ **1. Input Impedance Test**
- ❖ **2. DC Blocking Test**
- ❖ **3. Floating Zero**
- ❖ **4. Steady-state Voltage Resolution**
- ❖ **5. Impulse Voltage Measurements**
- ❖ **6. Impulse Voltage Resolution**
- ❖ **7. Wave Form Display Resolution**

Should power disturbance monitors be used on stray voltage investigations?

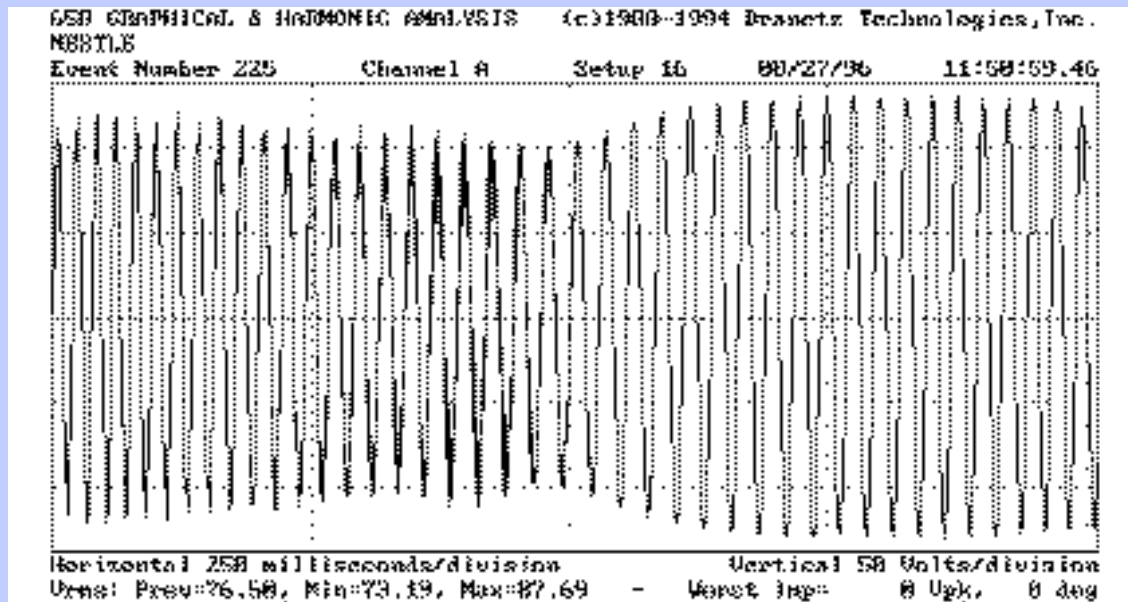
- ▶ **Routine electrical events that happen on the 120, 208, 240, 277 or 480 volt system do not directly impact cow contact voltages.**
- ▶ **Using remote measurements to interpolate the resulting cow contact voltage.**
- ▶ **Power disturbance analyzers designed for 120 volt systems and above do not have the proper range or resolution.**

When using a disturbance monitor, you can expect to see the following:

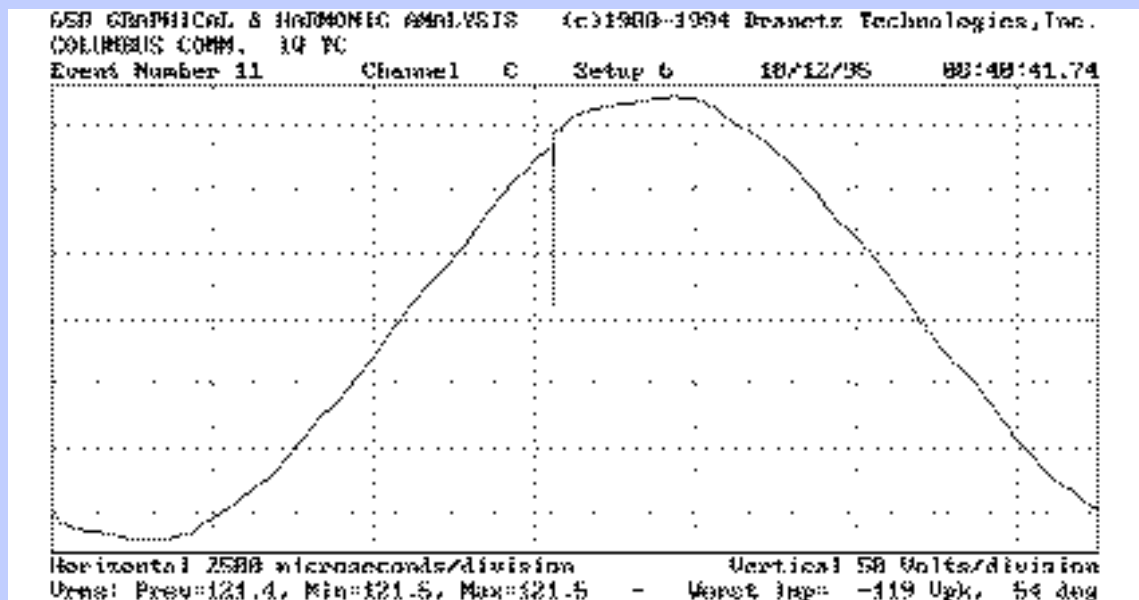
- ▶ **A normal 120 to 480 volt wave form, typical for either voltage or current.**



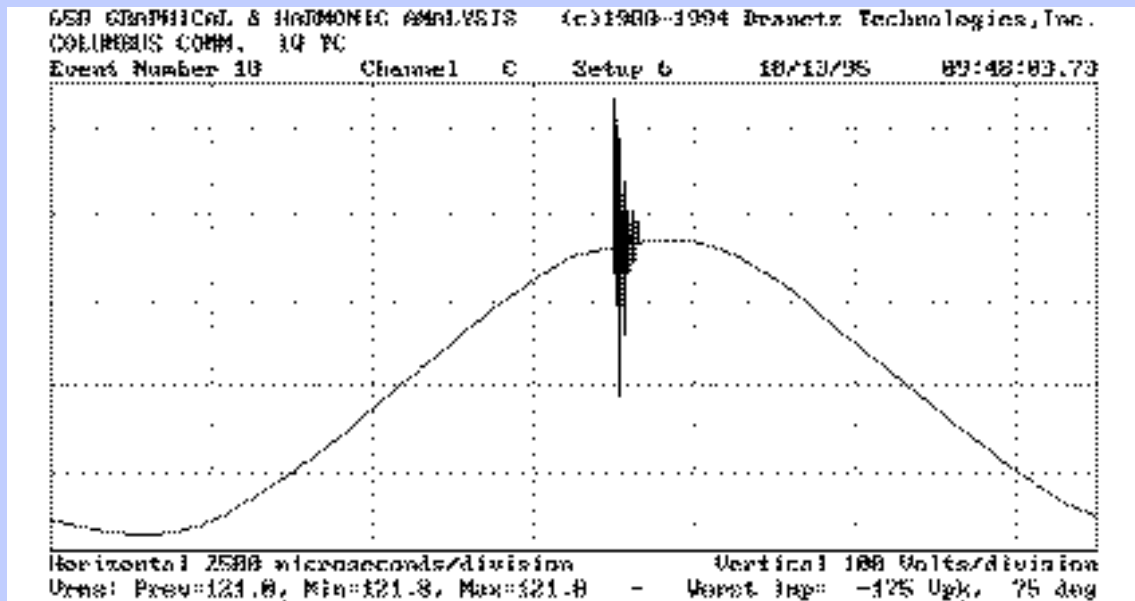
Sags and swells



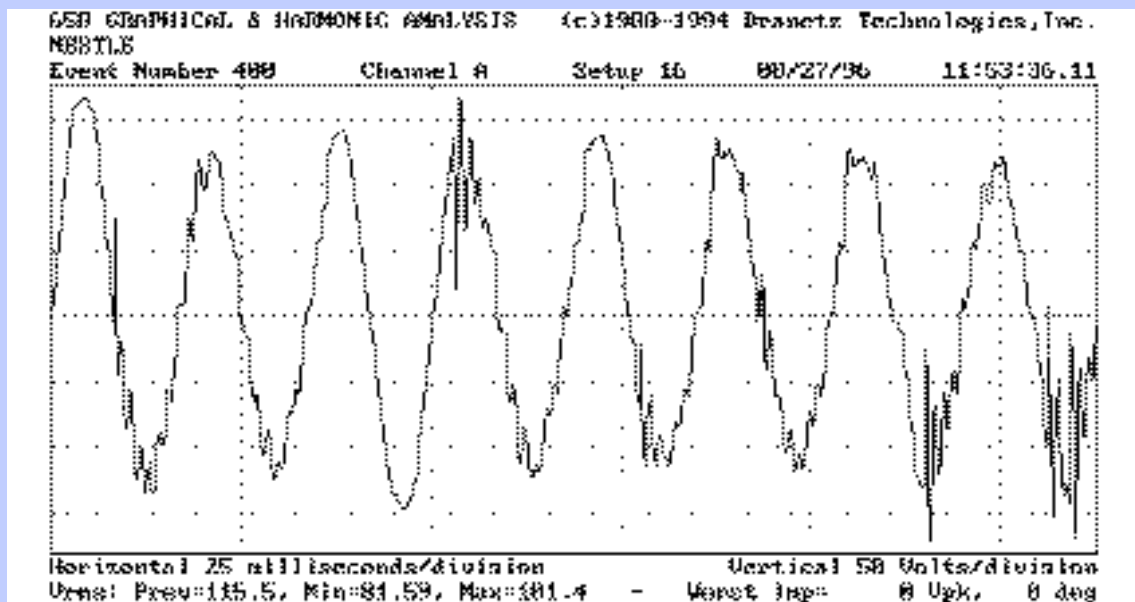
Voltage “spikes” or “high frequency noise”



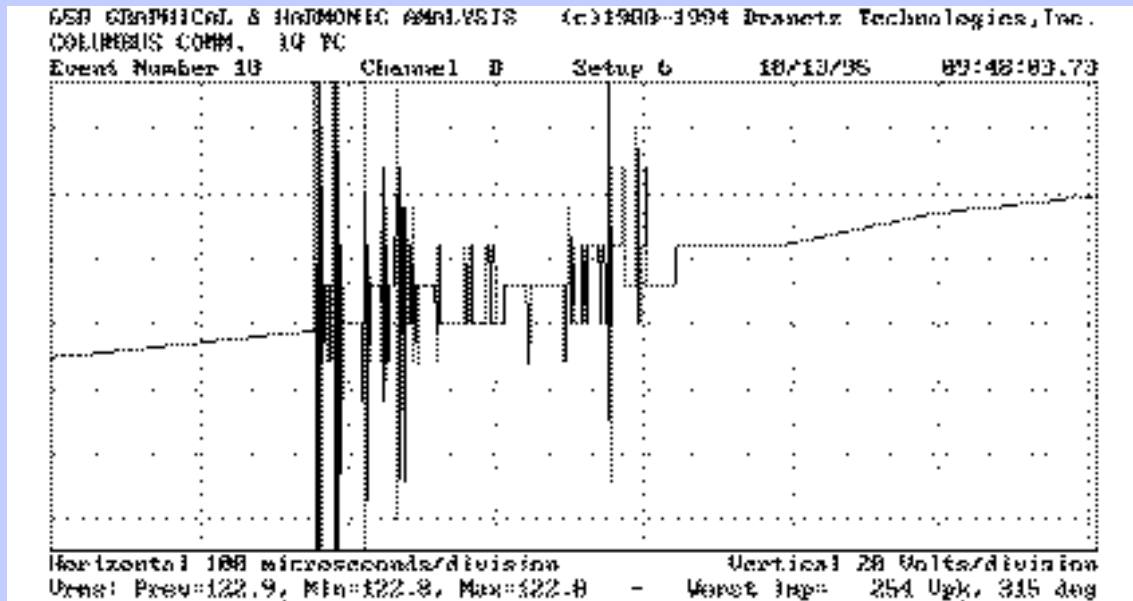
Noise



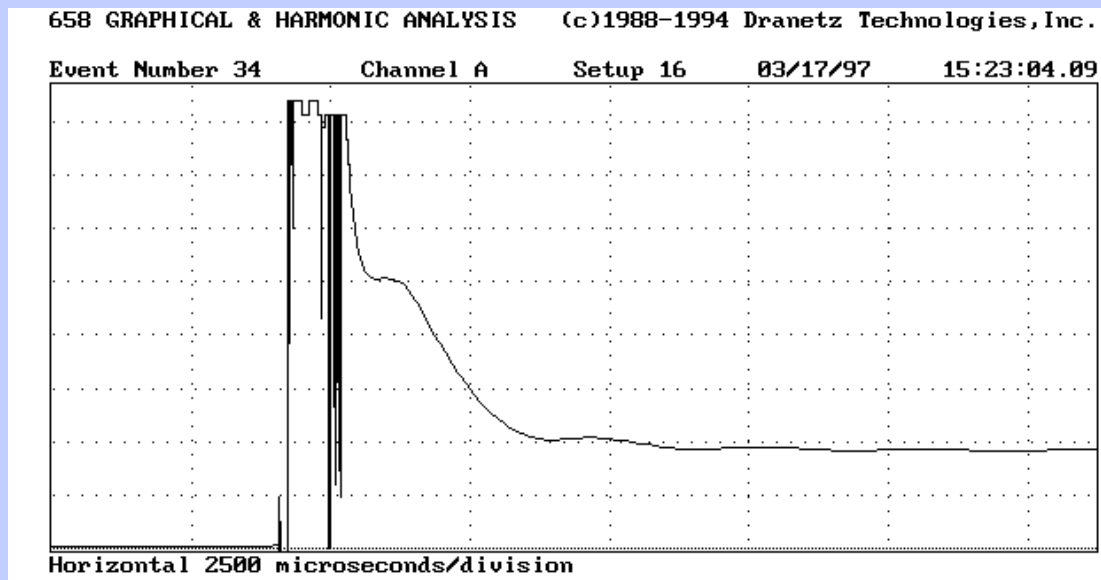
Or “noise” can be continuous



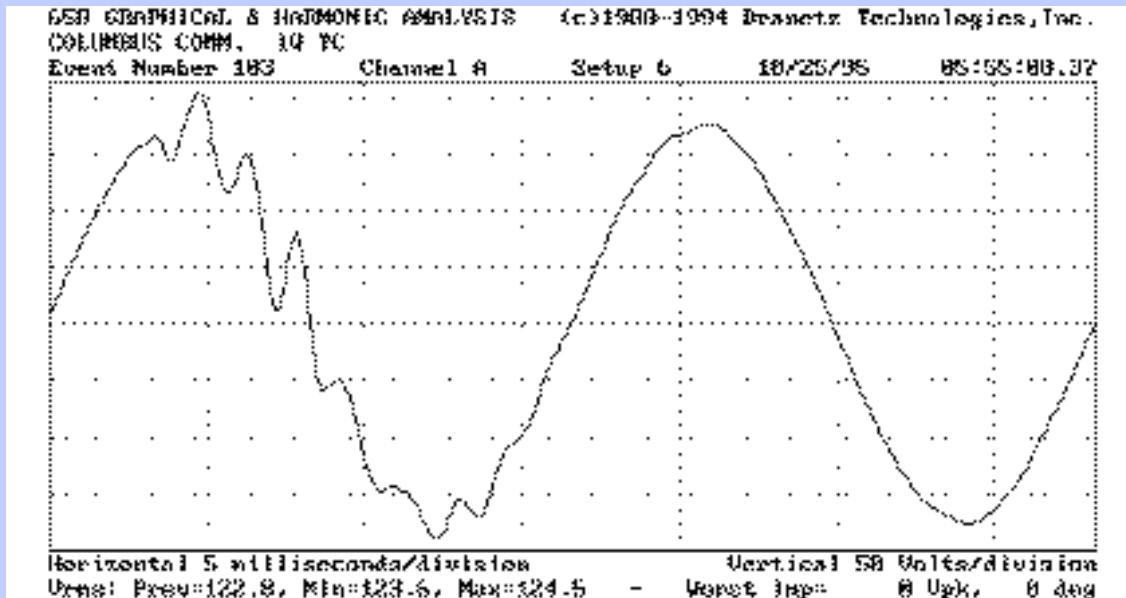
A blowup of the “high frequency noise”



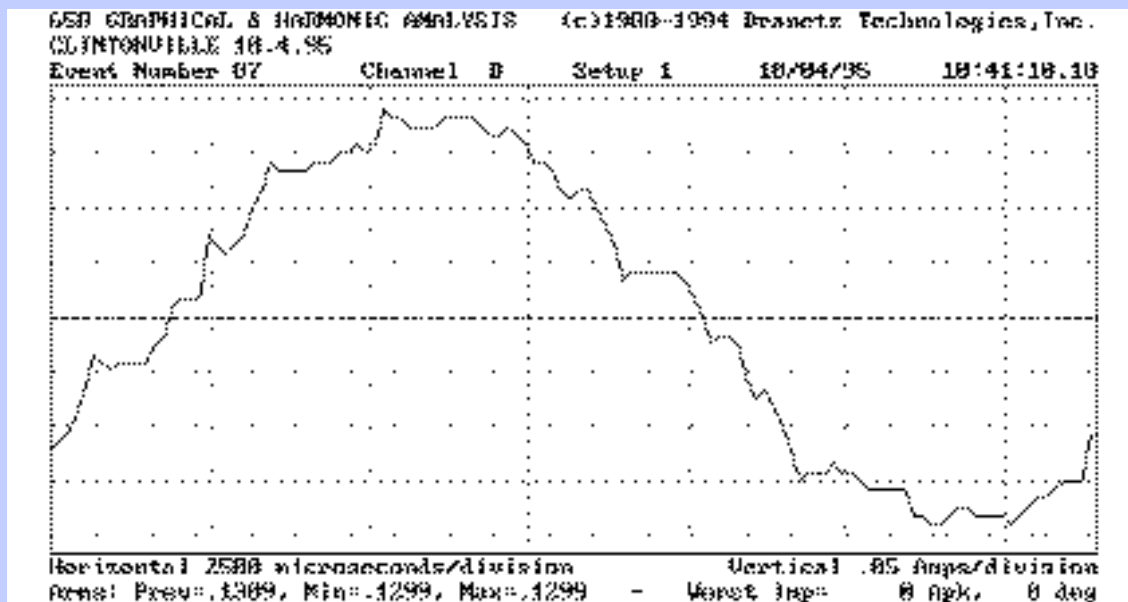
Spikes



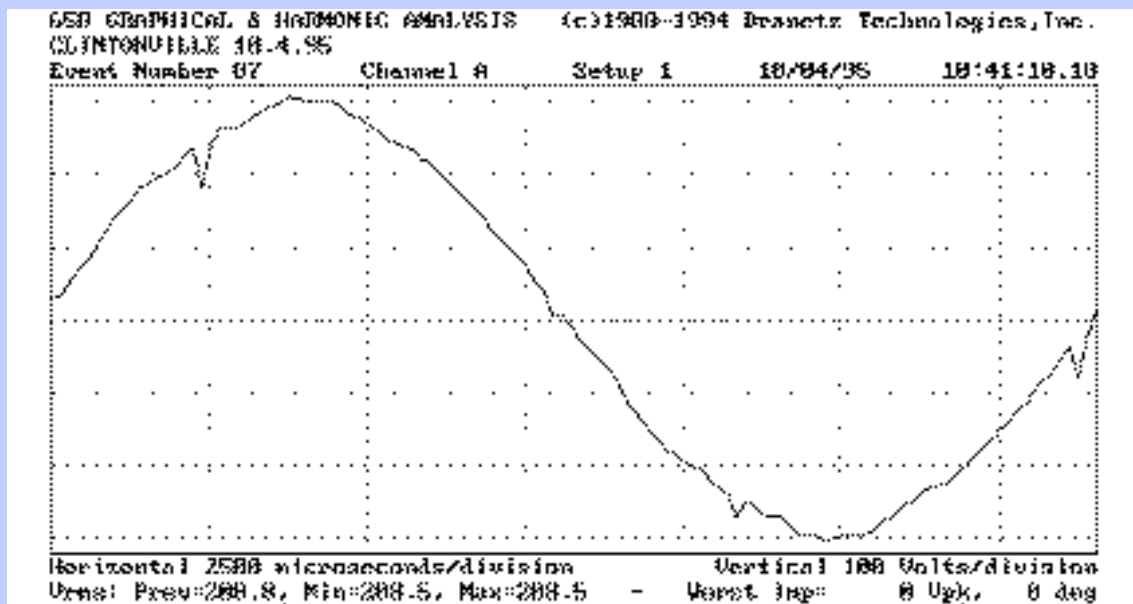
Variable speed motor “Drop-Out”



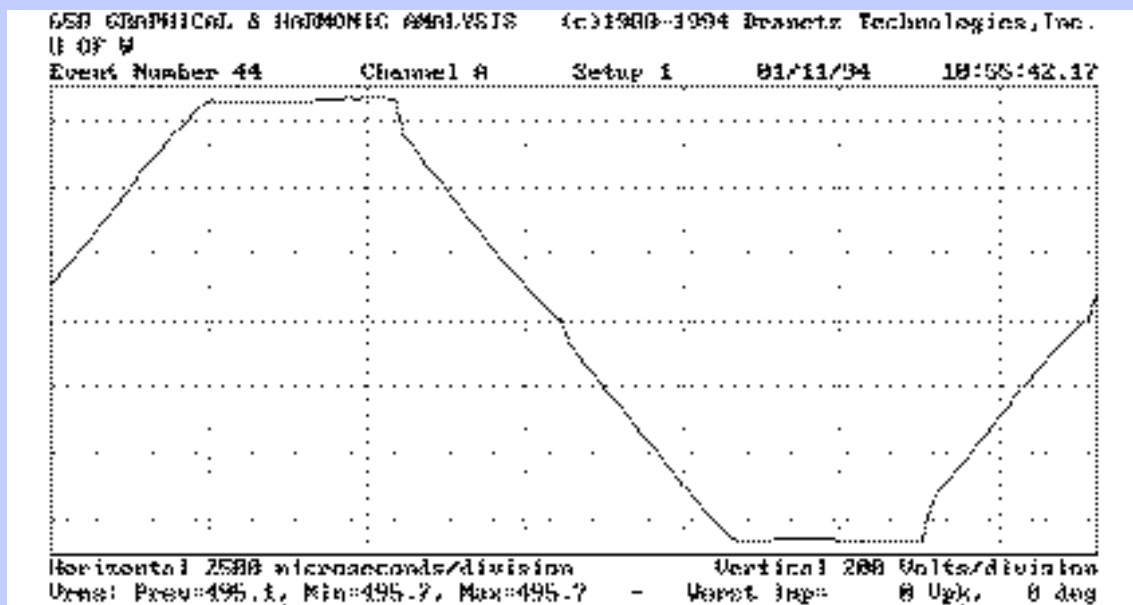
Severely distorted voltage or current wave form?.. Or an operator error?



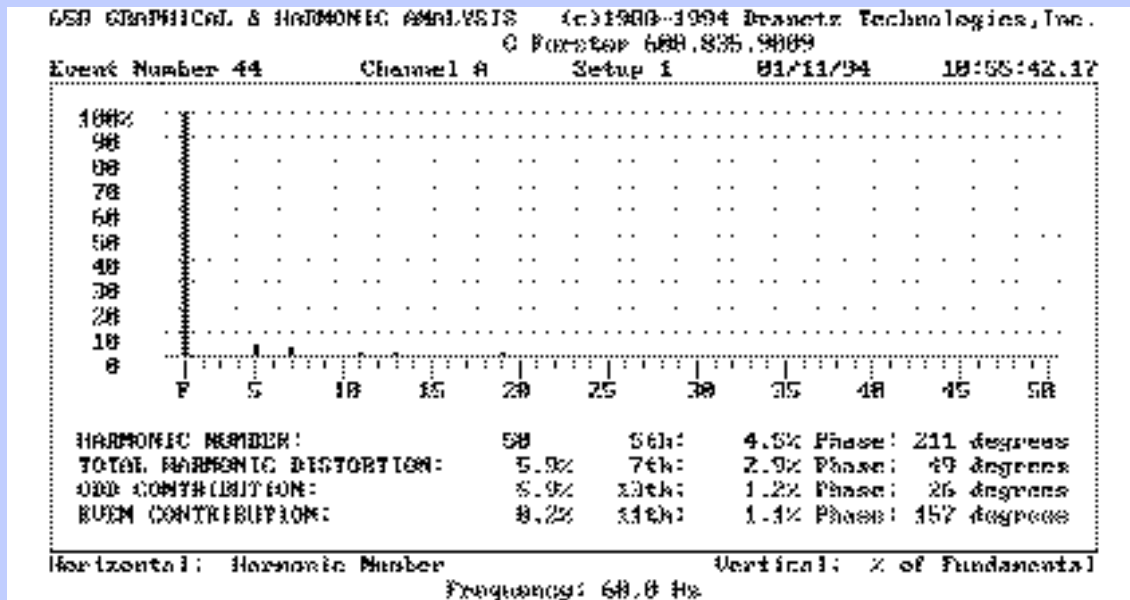
Line notching



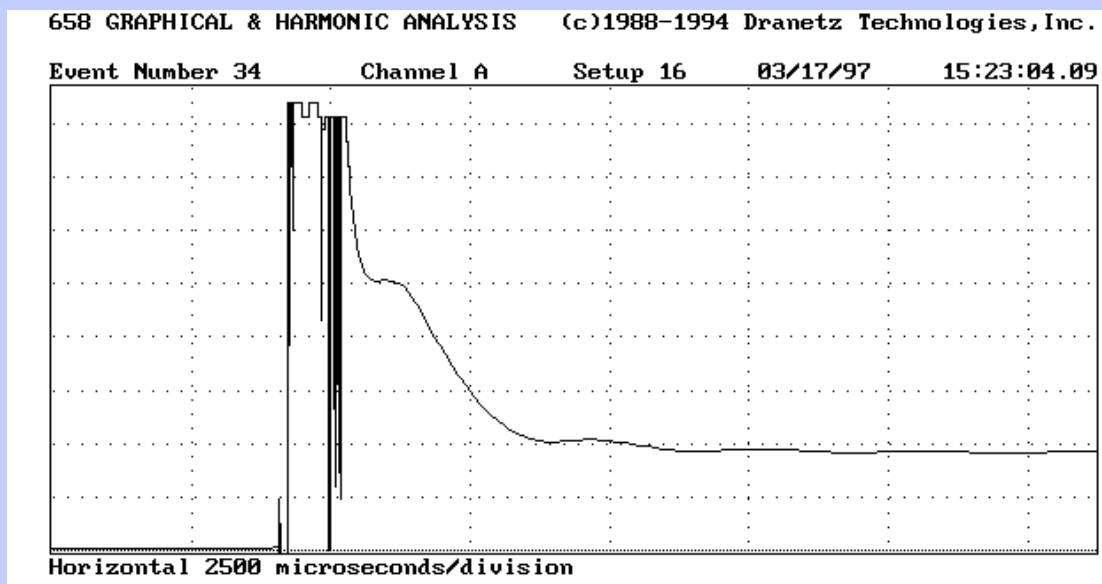
Harmonics



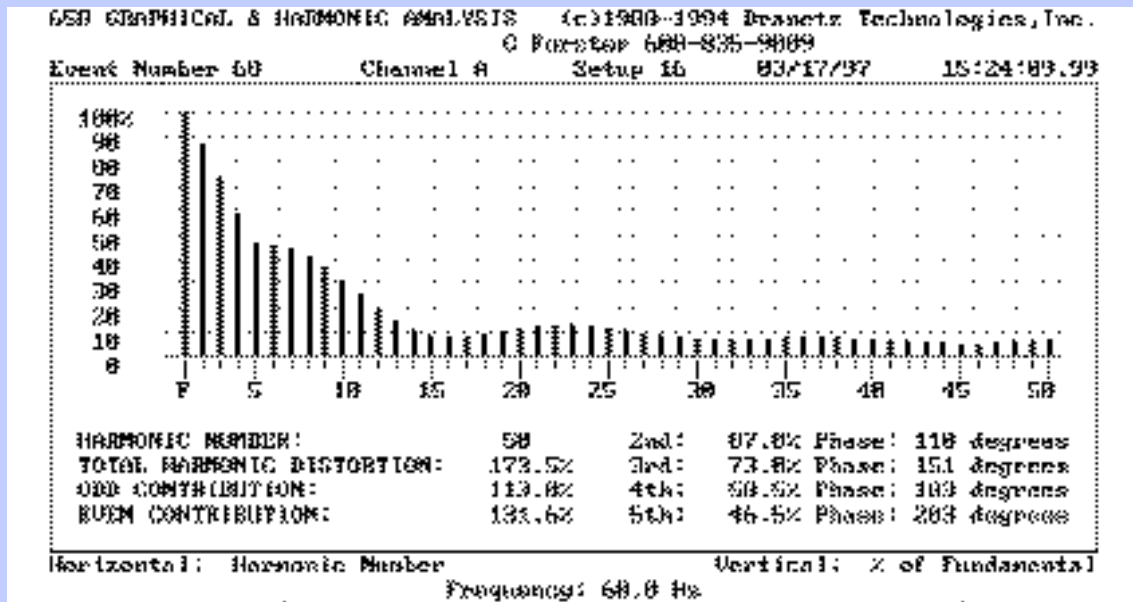
The wave form above is the “time domain” representation of the wave form. We can use a “frequency domain” representation of the wave form as shown below:



When time and frequency domains collide



When a total harmonic distortion (THD) analysis is performed on a recorded impulse, strange outputs occur.



Conclusion

- Use the disturbance monitor to monitor incoming power quality if you are curious, but use proper tools designed for cow contact measurements if you need to identify or resolve a stray voltage problem.