

Experiments to Measure Electrical Noise on 120/240 volt Power Systems

This information is intended as a
supplement to the presentation on
Minnesota electrical noise
measurements

June 21, 2001

cforster@forstereng.com

1

The following waveforms and
charts show the recorded output at
Phasor Labs.

This presentation is not intended to make any
conclusions with respect to the concern over
electrical noise, but provide information to
technical personnel that may not have had the
opportunity to investigate this concern.

June 21, 2001

cforster@forstereng.com

2

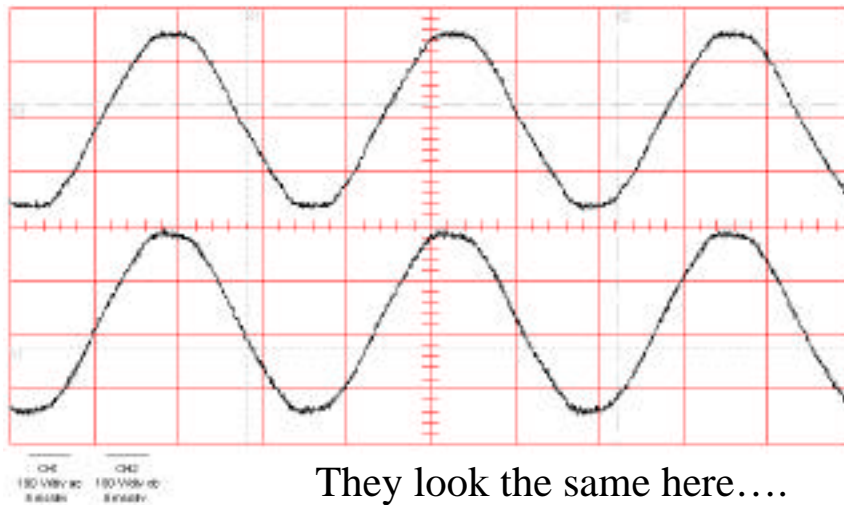
The intent of the first set of tests is to compare the characteristics of noise voltage on the shop 120 vac system to the output from the Graham filter.

June 21, 2001

cforster@forstereng.com

3

First let's see if the voltage from L1-N is the same as from L2-N ?



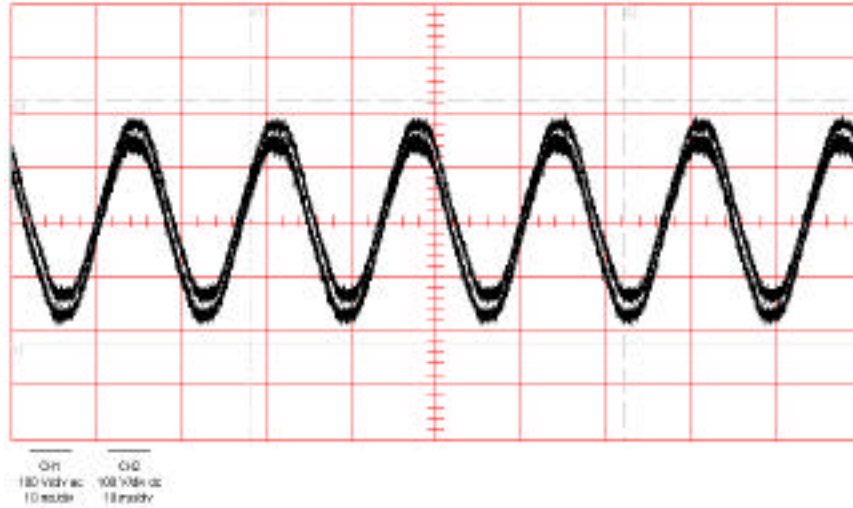
June 21, 2001

cforster@forstereng.com

4

Phasor Labs

If we increase the scope bandwidth and superimpose the two waveforms, they still look the same.

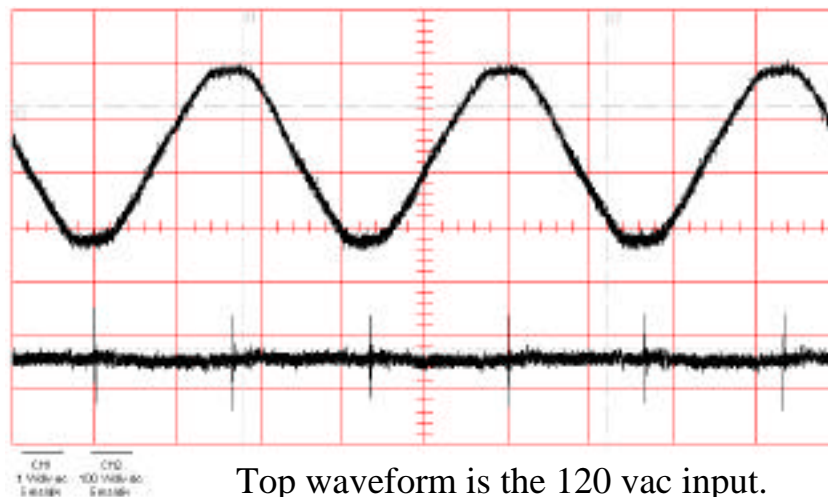


June 21, 2001

cforster@forstereng.com

5

Compare the input to the output on the Graham filter:



Top waveform is the 120 vac input.
Bottom waveform is the filter output.

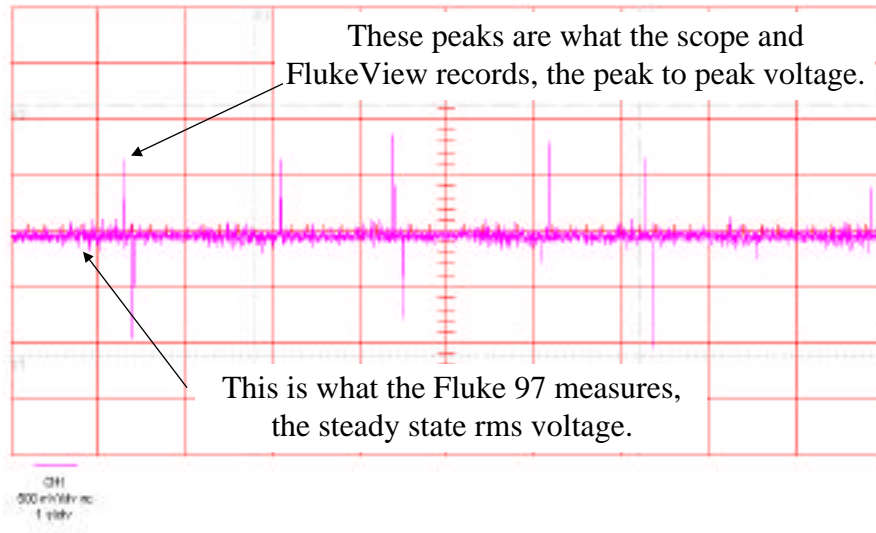
June 21, 2001

cforster@forstereng.com

6

Phasor Labs

Lets look at the output at a sweep speed of 1 sec/div:

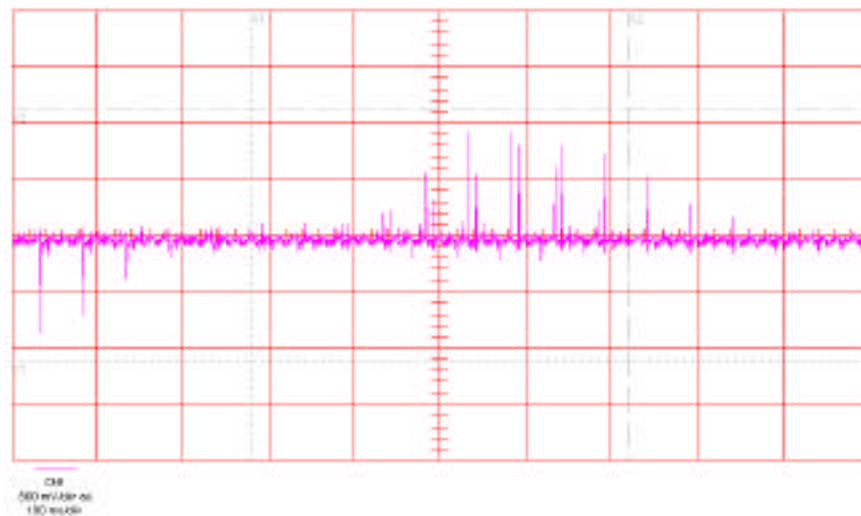


June 21, 2001

cforster@forstereng.com

7

At 0.1 second or 100 ms/div:



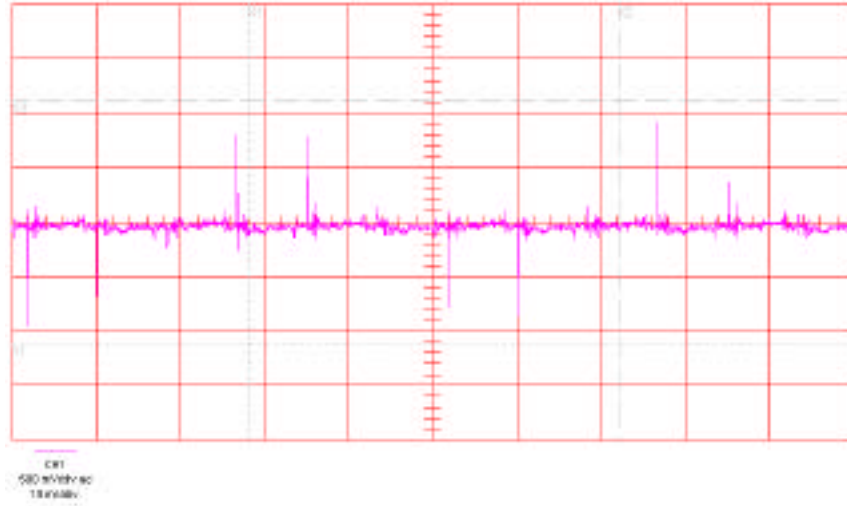
June 21, 2001

cforster@forstereng.com

8

Phasor Labs

At 0.01 second or 10 ms/div:

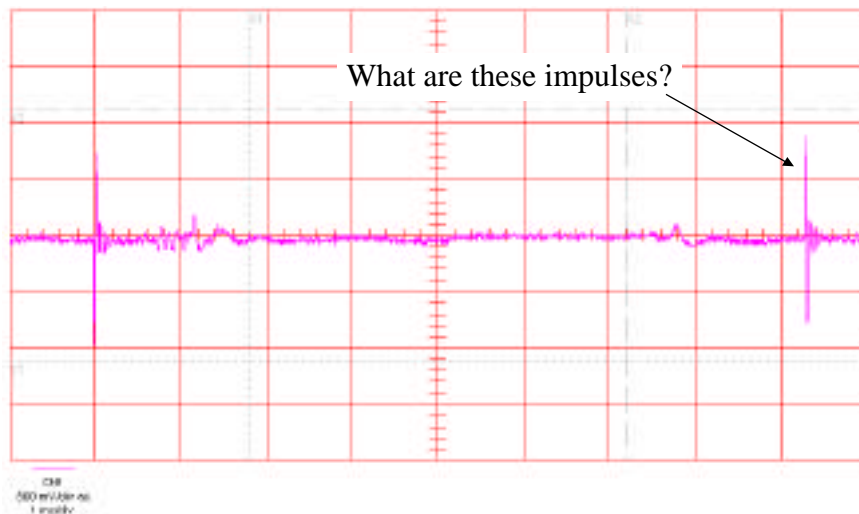


June 21, 2001

cforster@forstereng.com

9

At 0.001 second or 1 ms/div:



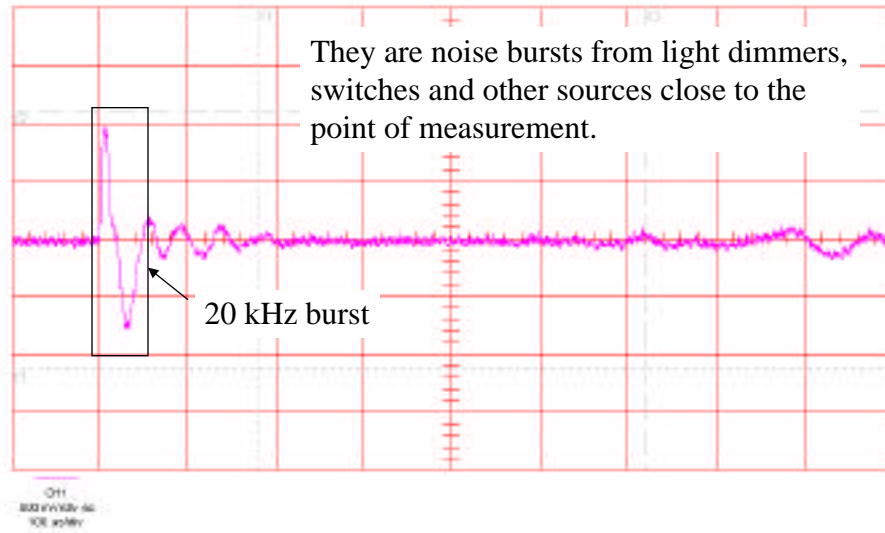
June 21, 2001

cforster@forstereng.com

10

Phasor Labs

At 0.0001 second or 0.1 ms or 100 usec/div:

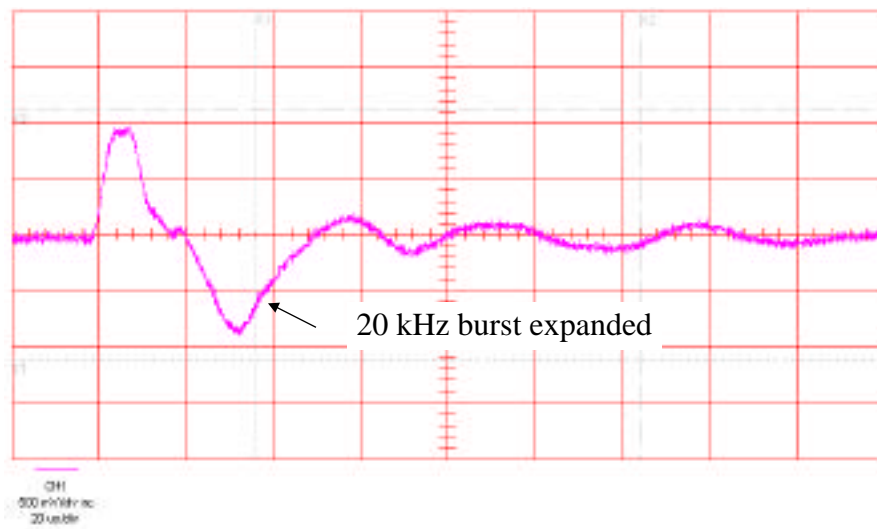


June 21, 2001

cforster@forstereng.com

11

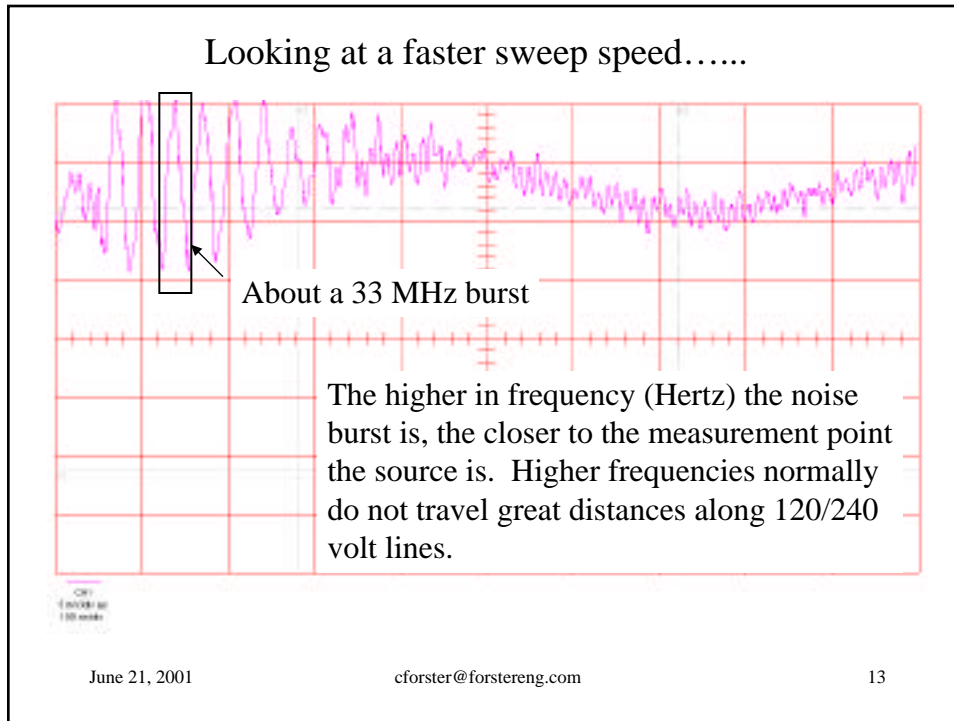
At 0.00002 second or 0.02 ms or 20 usec/div:



June 21, 2001

cforster@forstereng.com

12



Recording electrical noise
using a data logging digital
voltmeter

June 21, 2001 cforster@forstereng.com 14

Phasor Labs

The output of the Graham filter was recorded using a simple Radio Shack digital voltmeter and computer logging program.

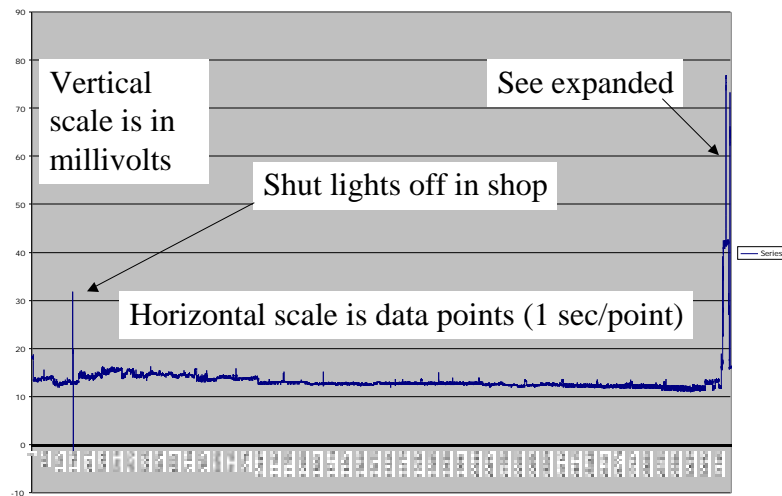
The meter was not true rms, but did have a frequency response to 70 kHz before any noticeable decrease in accuracy.

June 21, 2001

cforster@forstereng.com

15

This is the recording of the filter output from evening to the next morning at Phasor Labs

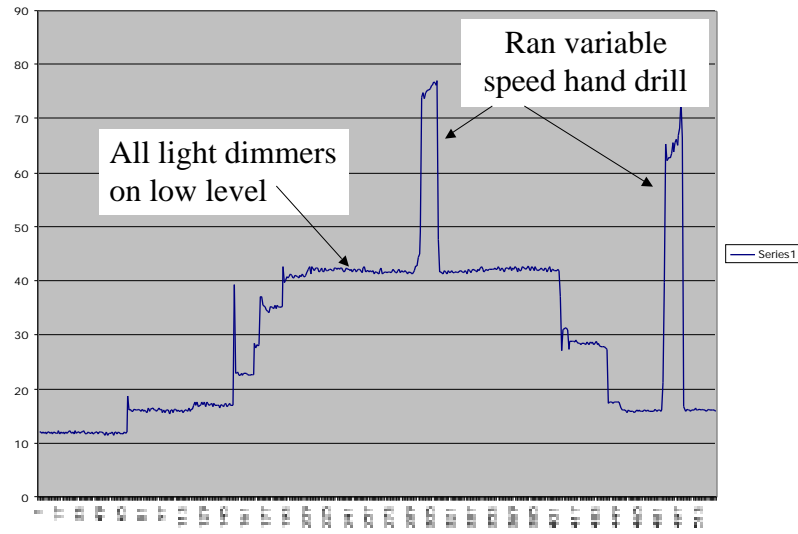


June 21, 2001

cforster@forstereng.com

16

The next morning I intentionally increased the output of the filter by operating appliances in the shop:



June 21, 2001

cforster@forstereng.com

17

End of presentation

Beginning for questions

June 21, 2001

cforster@forstereng.com

18