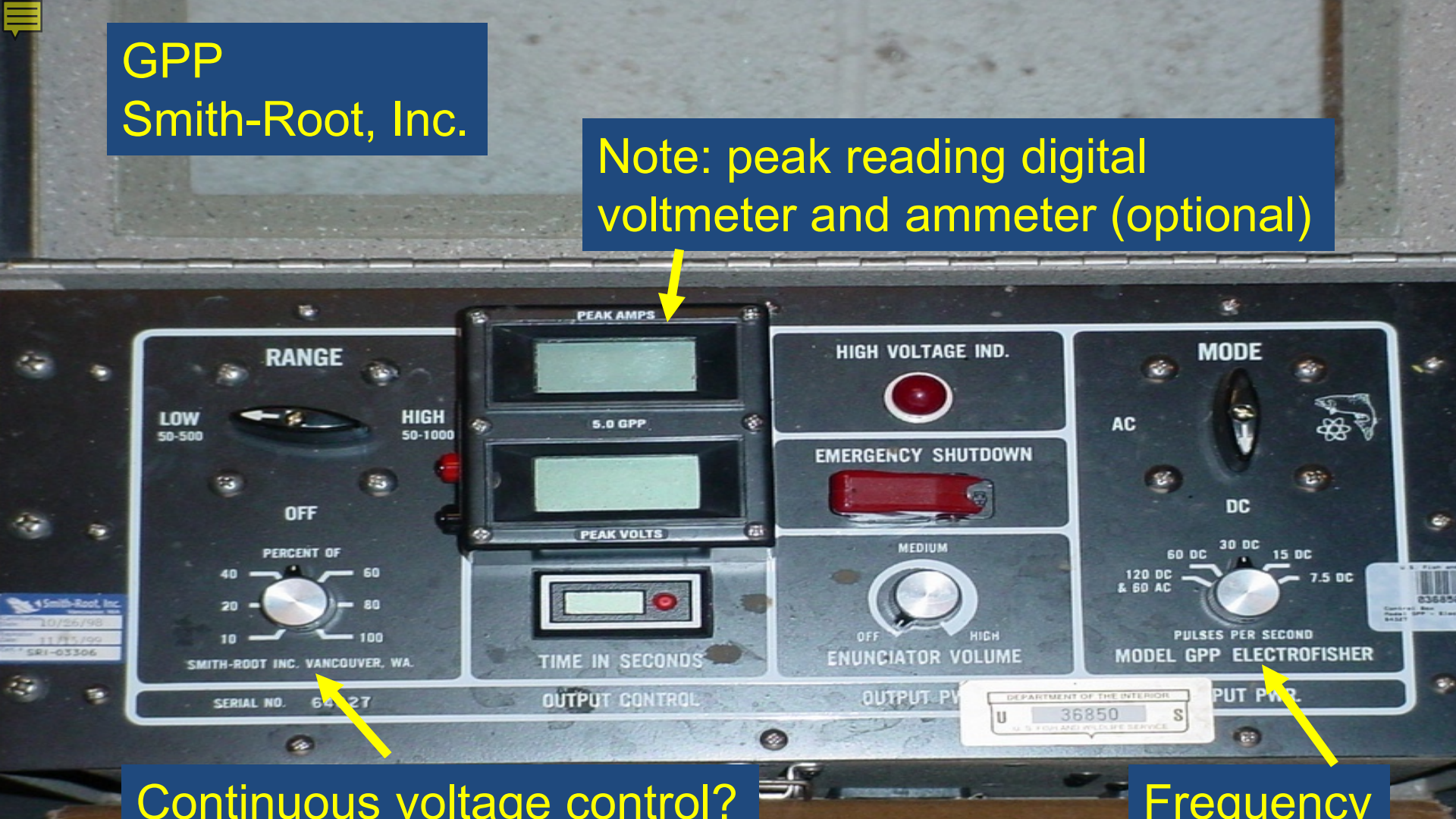
Generator Powered Pulsator (GPP)

Outputs and Metering

Acknowledgement to Jan Dean for several contributions

GPP
Smith-Root, Inc.

Note: peak reading digital voltmeter and ammeter (optional)

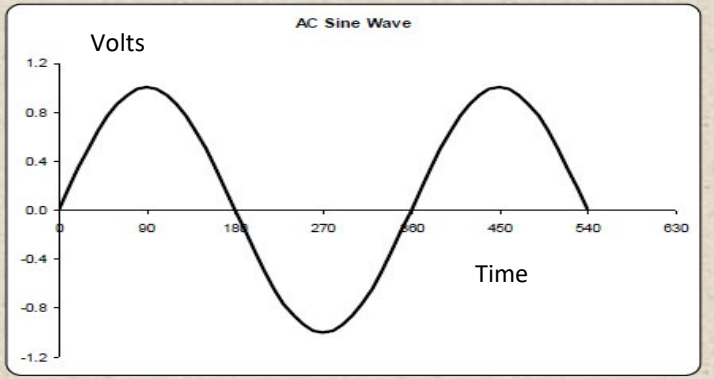


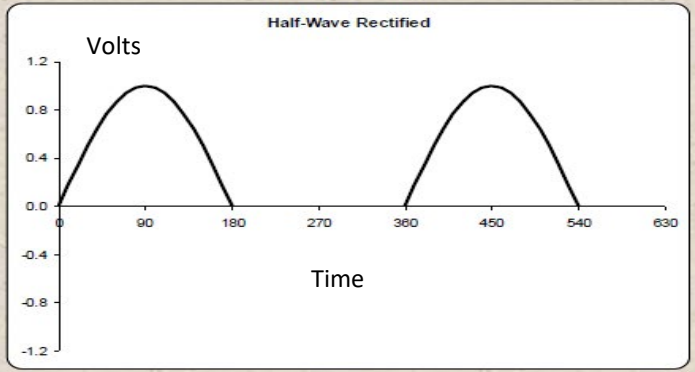
Continuous voltage control?

Frequency

How PDC is Generated

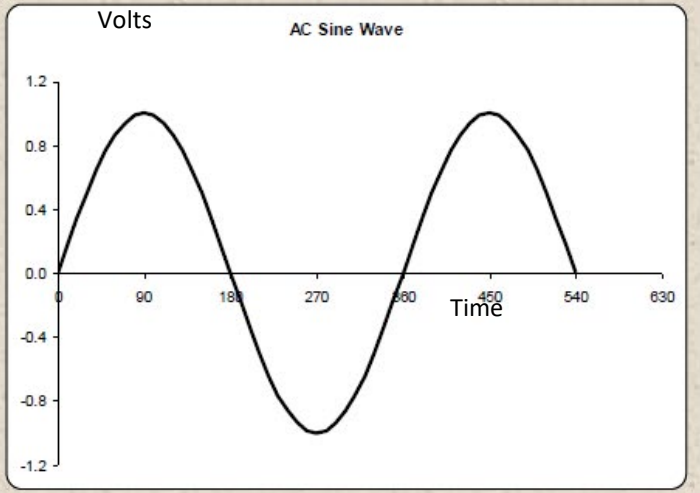
Alternating Current + Diode = Half-Wave Rectified DC

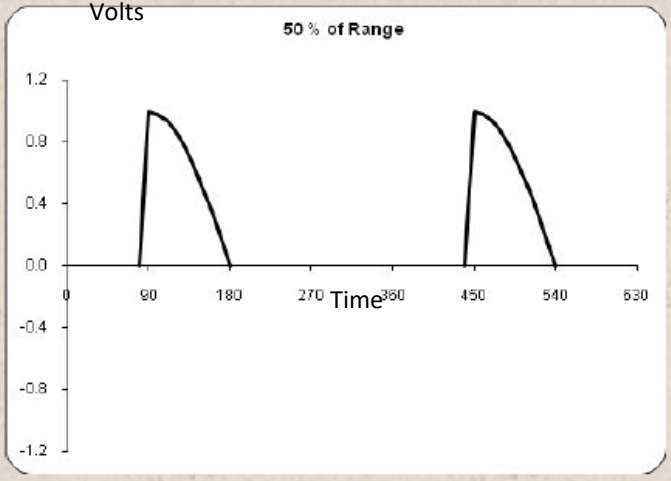




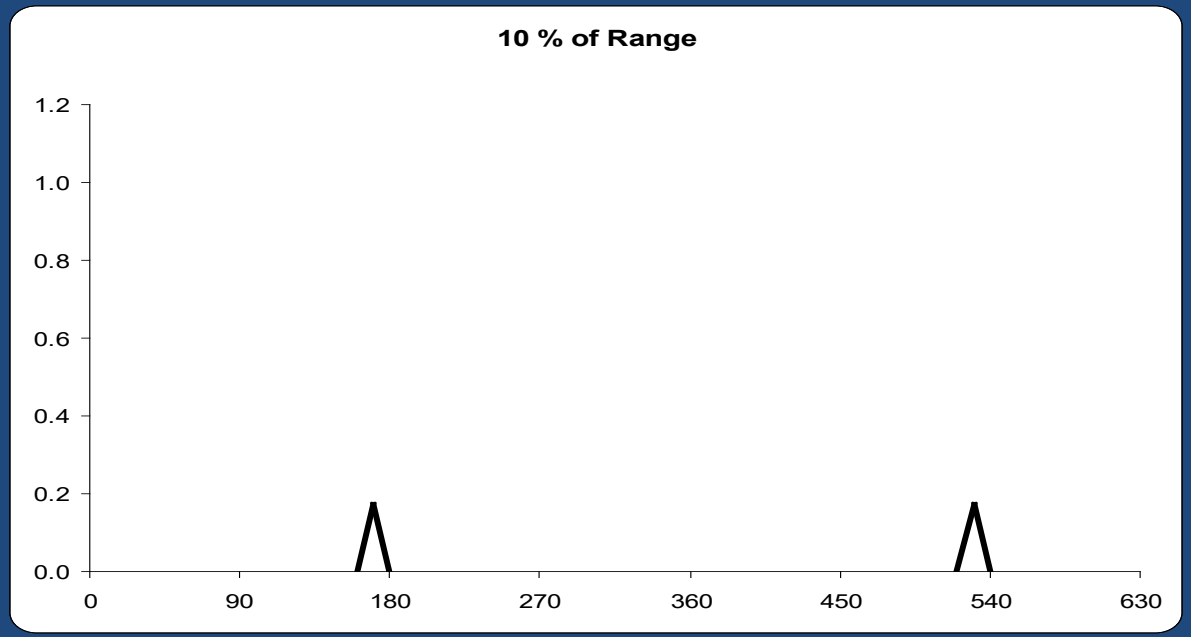
How PDC is Generated and Controlled

Alternating Current + SCR = Controlled-Rectified DC

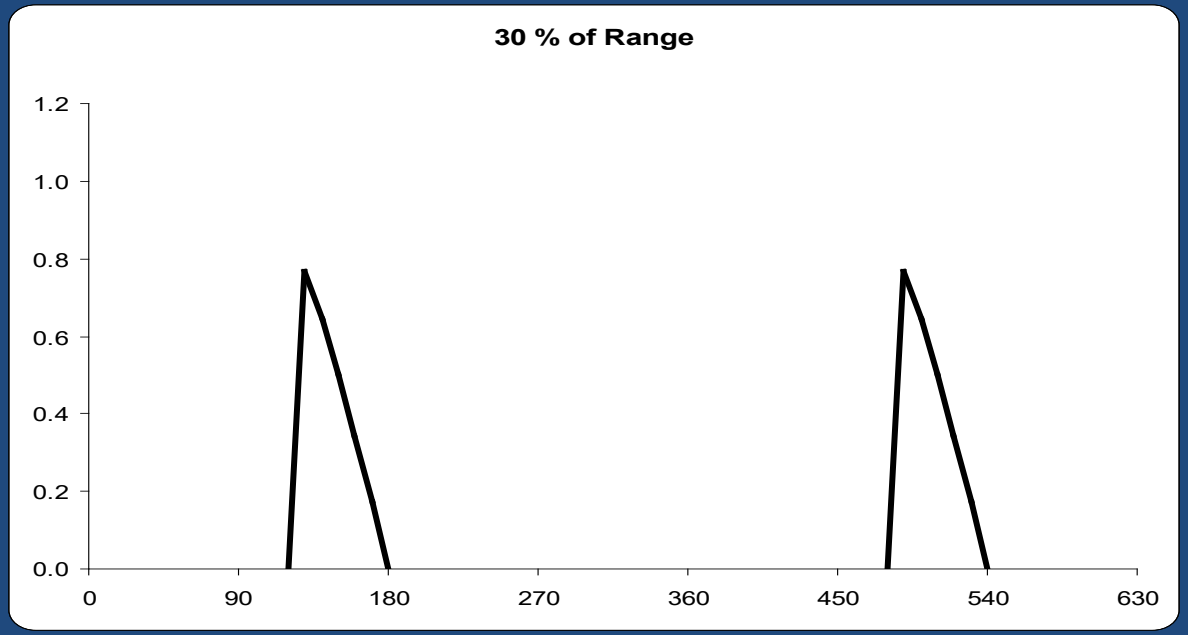




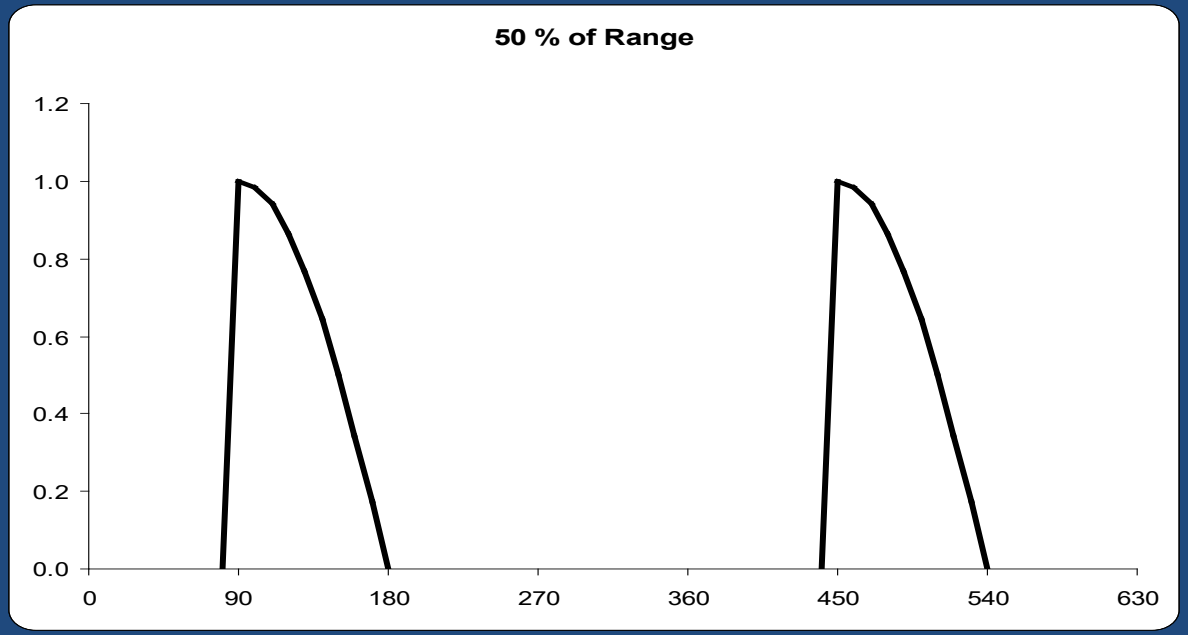
Smith-Root GPP Percent of Range Adjustment 10%



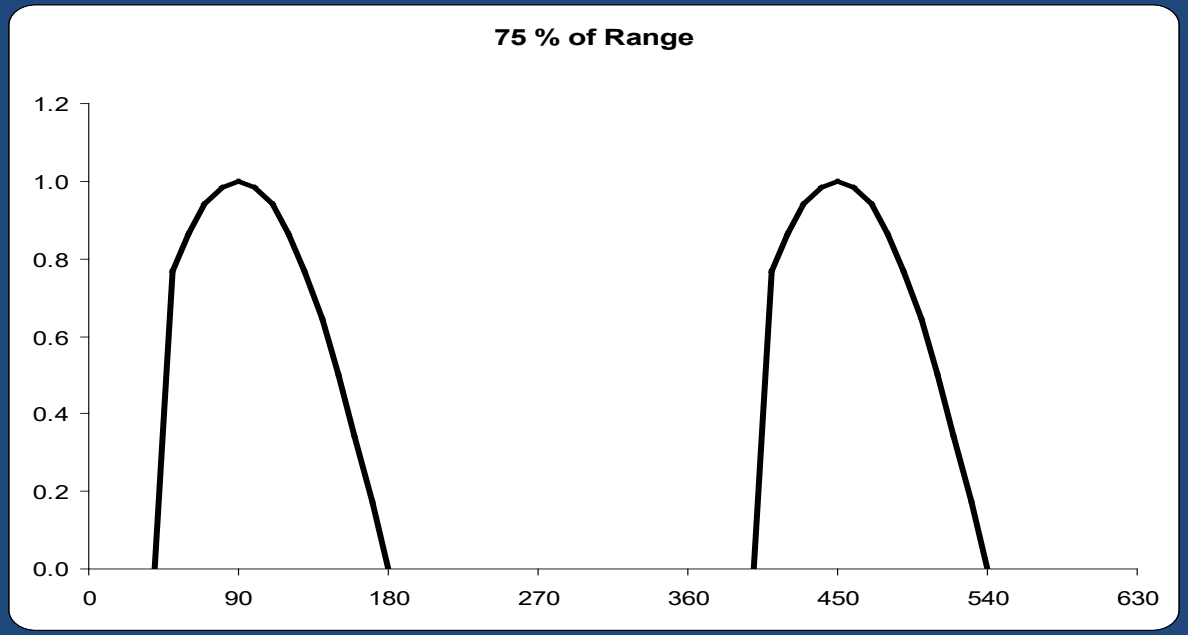
Smith-Root GPP Percent of Range Adjustment 30%



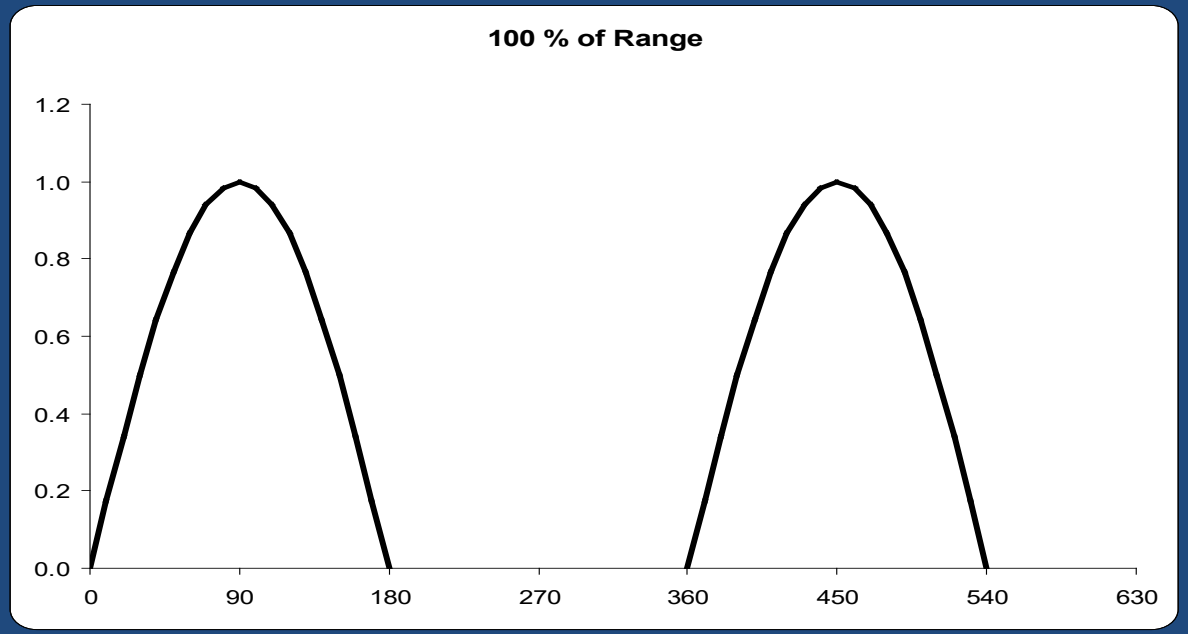
Smith-Root GPP Percent of Range Adjustment 50%



Smith-Root GPP Percent of Range Adjustment 75%

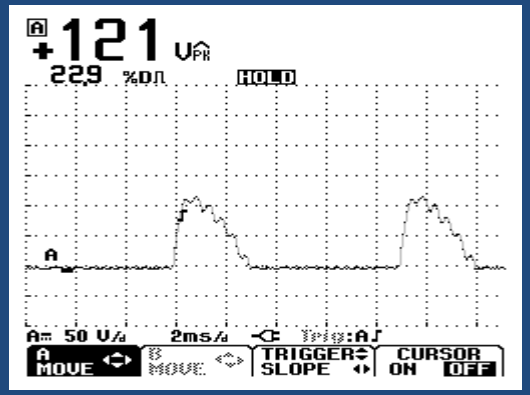


Smith-Root GPP Percent of Range Adjustment 100%

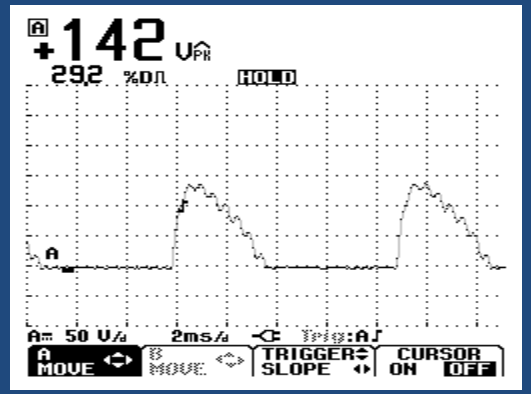


Percent of Range (POR) Control

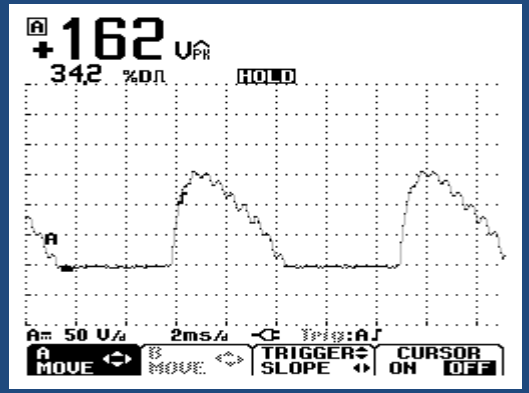
10 POR



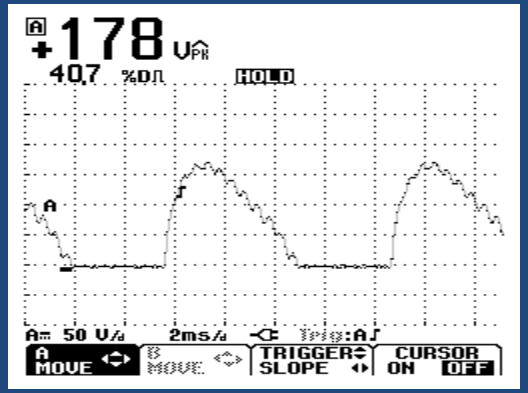
20 POR



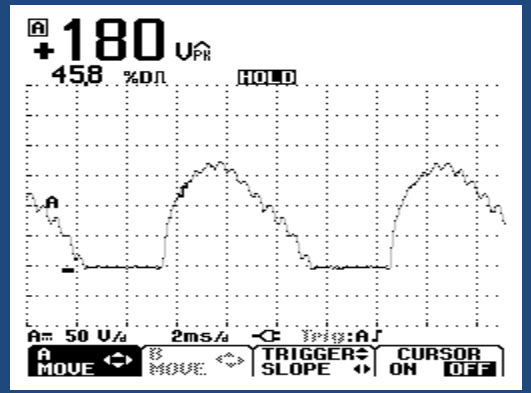
40 POR



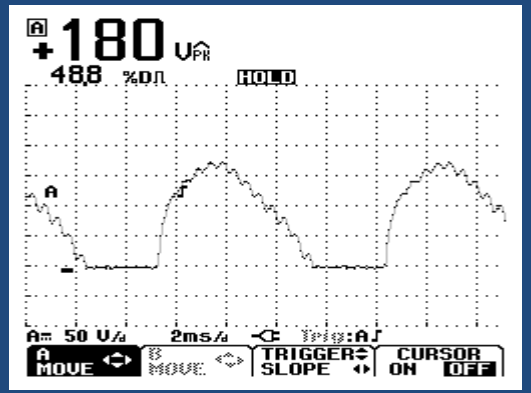
60 POR



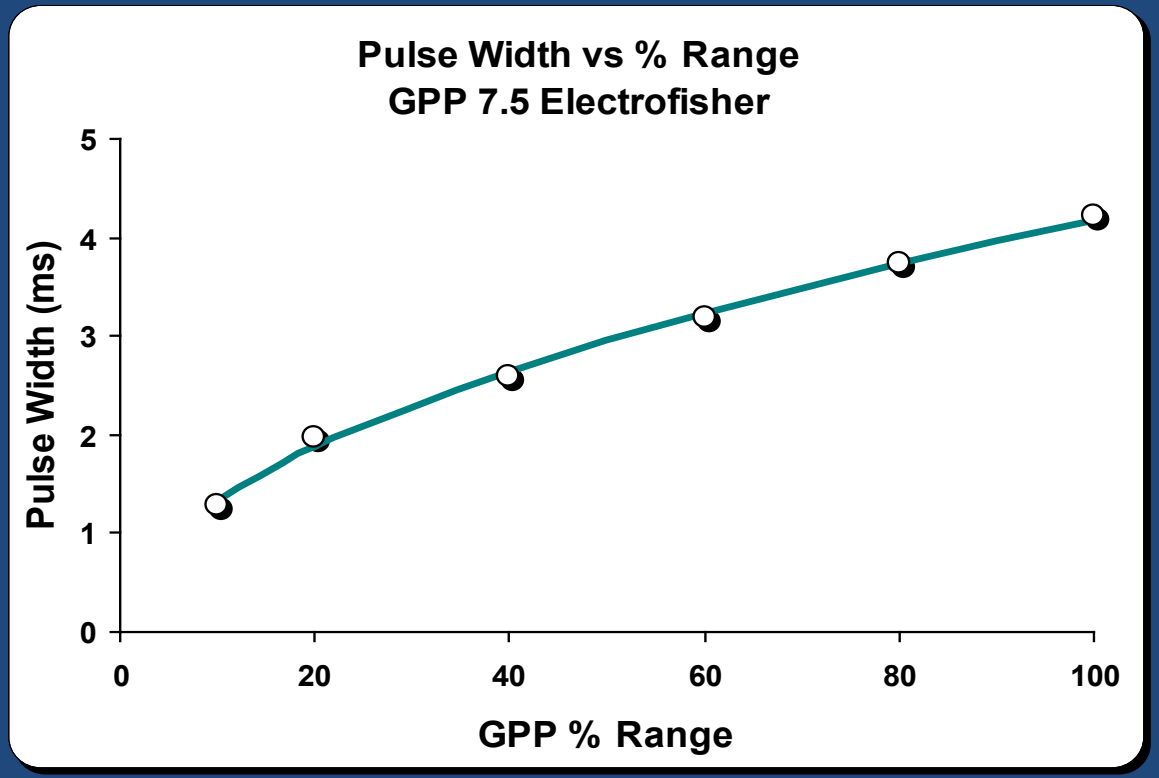
80 POR



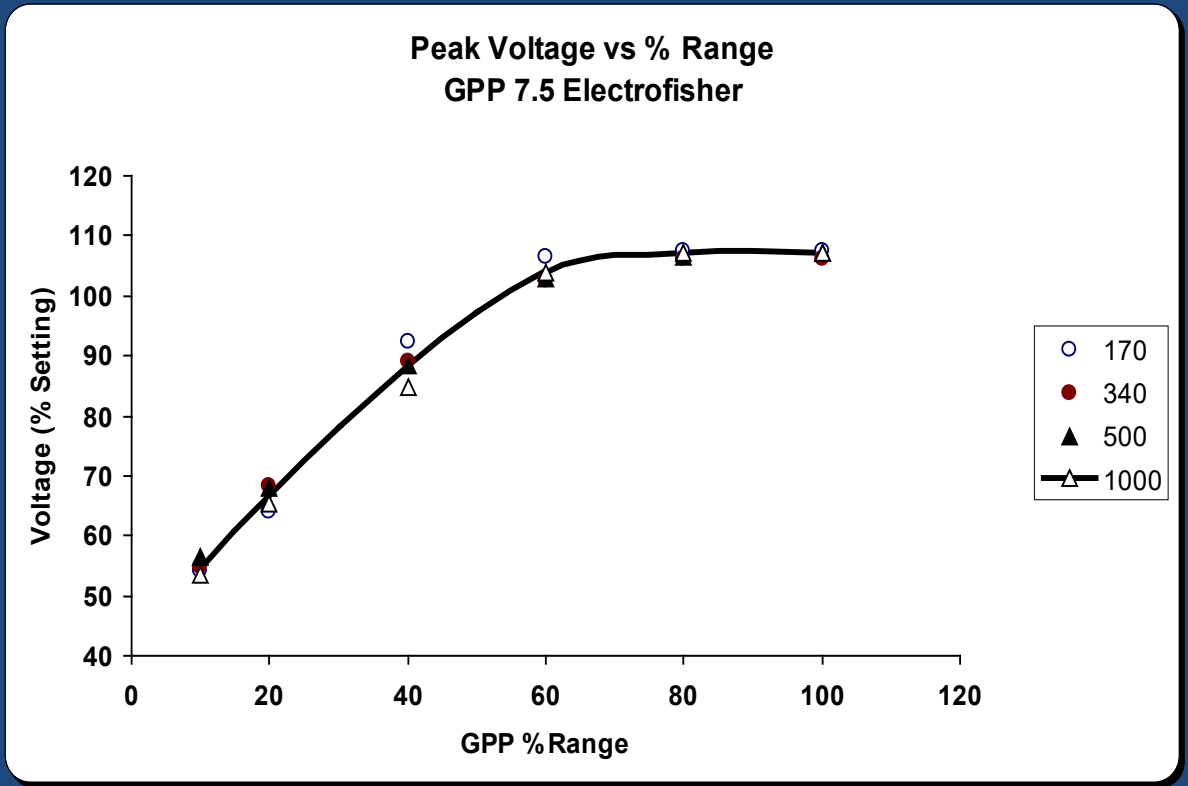
100 POR



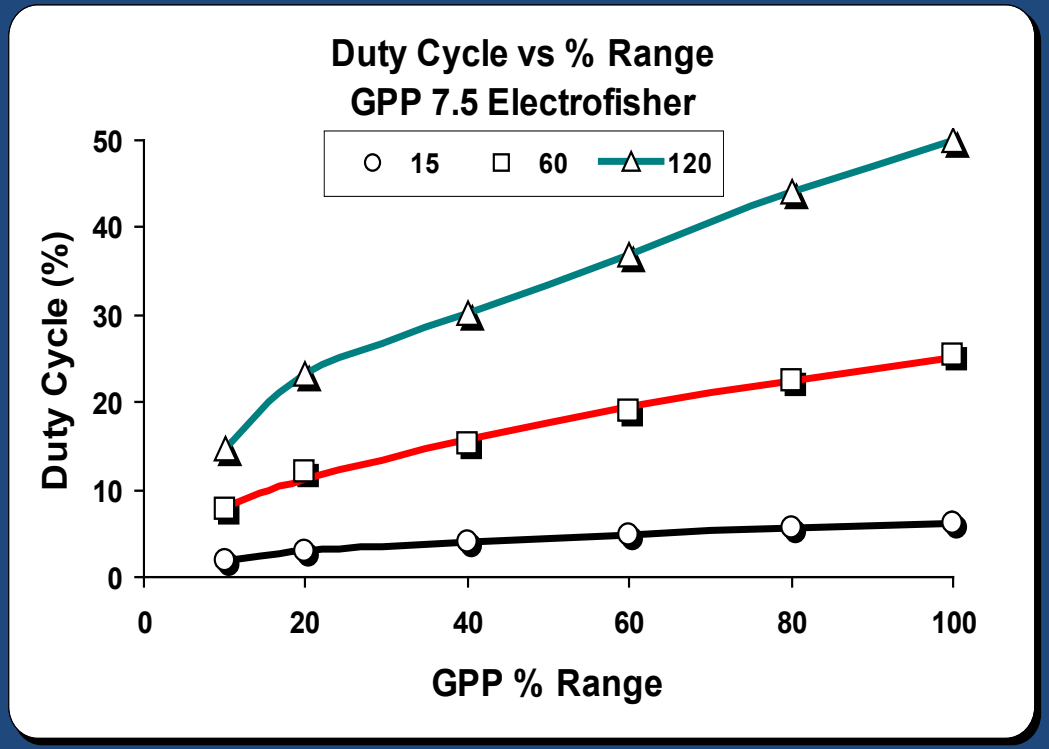
S-R GPP Pulse Width vs. Range Setting



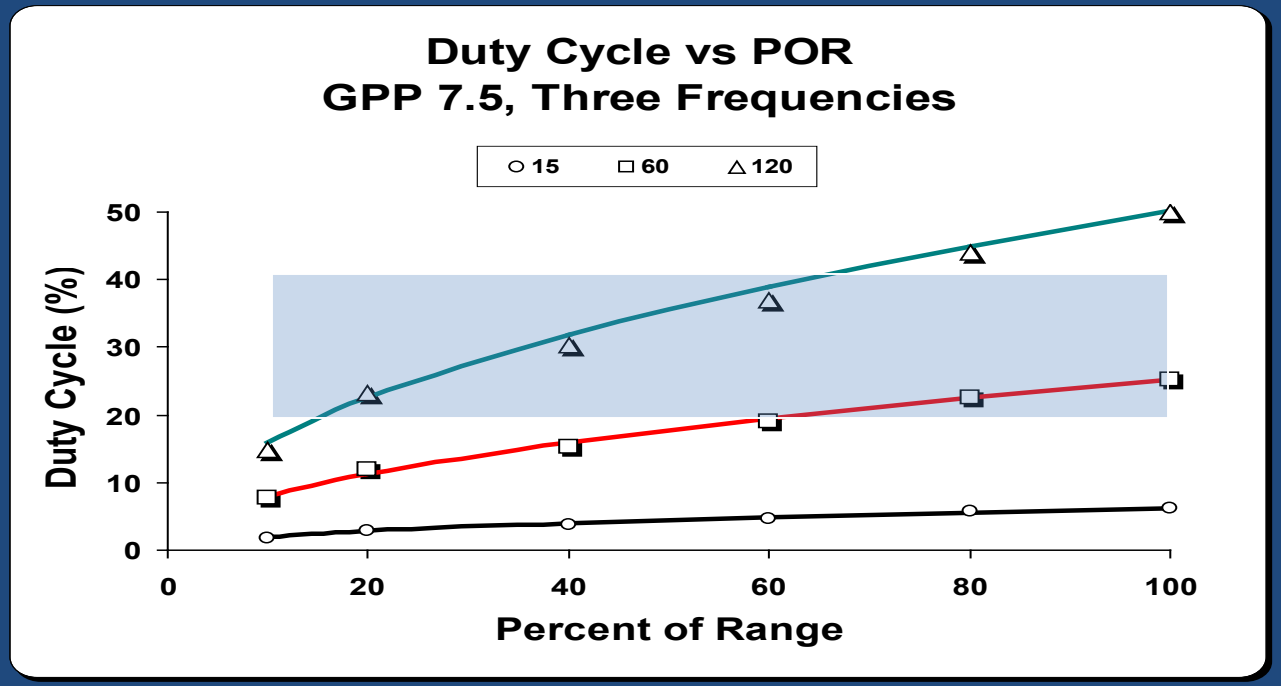
S-R GPP Voltage vs. Range Setting



S-R GPP Duty Cycle vs. Range Setting



Which Frequency should you use?
Consider optimum Duty Cycle (20 – 40%)



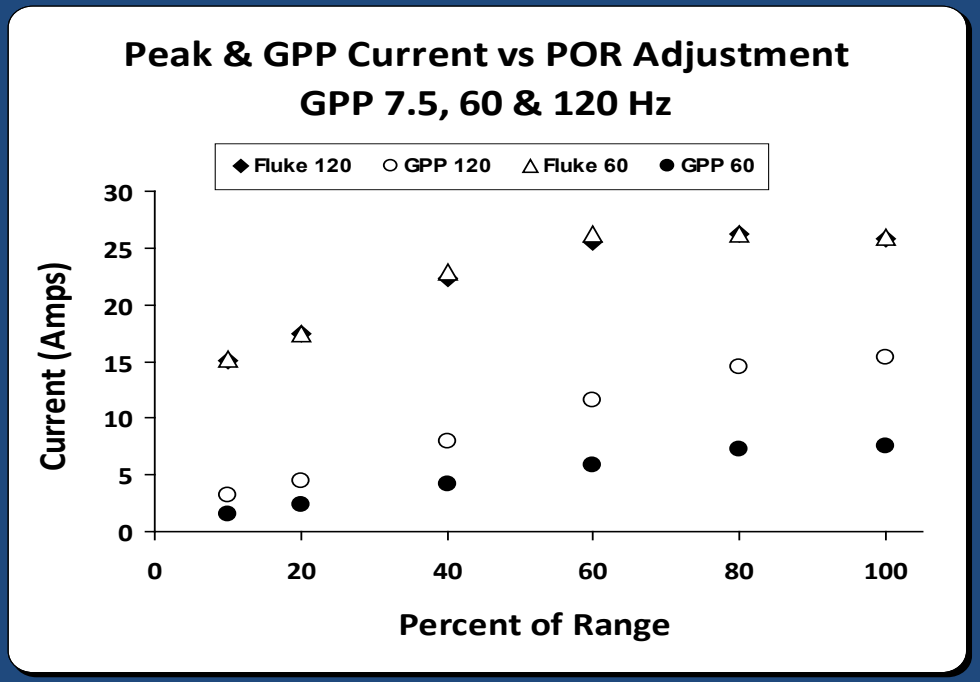
Settings with a target duty cycle of 20 – 40%:

120 pps = 20 – 60 POR

60 pps = 60 – 100 POR

☆A Consideration About Metering☆

Does the GPP ammeter measure Peak or Average current?



Using the 60 pps, 60% of range settings, the peak voltage was ~25 amps and the GPP ammeter reading was ~5 amps. Duty cycle at 60 pps, 60 POR is about 20%. Thus, the average current is about 20% of the peak. In this case, 20% of 25 amps is 5 amps.

Fluke 60 or 120 = scopemeter measured peak current under 60 pps or 120 pps
GPP 60 or 120 = GPP ammeter displayed current under 60 pps or 120 pps

Summary

- GPPs have interrelated controls, i.e., the POR controls peak voltage (and peak current and peak power) in an asymptotic fashion, it increases over 10-60 POR then begins to level off within 60-100 POR
- This interrelatedness between voltage and duty cycle (two important fish-catching factors) leads to greater variation and hinders standardization
- The operator does not have fine control over voltage and duty cycle, hindering the use of standardization tables
- POR increases pulse width in a linear fashion
- Changing frequency affects duty cycle (possibly why some agencies only use 120 pps with GPPs)
- GPPs lack peak metering for current and have no voltage metering (to monitor peak voltage or current output, either must use external metering or install Smith-Root, Inc. metering)

Summary (continued)

- <u>Settings</u> for general warmwater fish sampling:
  - set Frequency to 120 pps
  - set Percent of Range (POR) knob in a range of 40 – 60
  - in very low (say ≤ 50 µS/cm) or in very high (say ≥ 800 µS/cm) conductivity, try Alternating Current (AC)

Optional Meter for GPPs

GPP Meter Display

All the important attributes are displayed: peak volts, peak amps, and peak power plus frequency and duty cycle. However, you still have very little direct control of output.