



**NEW SOURCE TECHNOLOGY<sub>LLC</sub>**  
*Where performance equals value*

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## Capacitor Charging Worksheet

### PFN SYSTEMS

Output Voltage Requirement (V) : \_\_\_\_\_ Vmax \_\_\_\_\_ Vmin  
PFN Capacitor ( C ) \_\_\_\_\_ uF Maximum Rep Rate ( f ) : \_\_\_\_\_ Hz  
Maximum Output Power [ $P = \frac{1}{2} CV^2f$ ]: \_\_\_\_\_ Joules/sec average  
Voltage Accuracy Required: \_\_\_\_\_ %

### RESERVOIR CHARGING SYSTEMS

Max Output Voltage (V<sub>f</sub>) \_\_\_\_\_ Output Voltage Droop During Pulse \_\_\_\_\_ V<sub>i</sub>  
Capacitance of Reservoir Bank ( C ): \_\_\_\_\_ uF  
Maximum Pulse Width: \_\_\_\_\_ sec Minimum Pulse Width: \_\_\_\_\_ sec  
Maximum Rep Rate ( f ) : \_\_\_\_\_ Hzs  
Maximum Output Power [ $P = 1.2C(V_f^2 - V_i^2)f$ ]: \_\_\_\_\_ Joules/sec average  
Voltage Accuracy Required: \_\_\_\_\_ %

### INPUT POWER

Input AC Voltage Range: \_\_\_\_\_ VAC to \_\_\_\_\_ VAC  
Power Factor Required? \_\_\_\_\_ Yes \_\_\_\_\_ No  
Universal Input Required? \_\_\_\_\_ Yes \_\_\_\_\_ No

### AGENCY APPROVAL REQUIREMENTS

None \_\_\_\_\_ UL \_\_\_\_\_ TUV \_\_\_\_\_ CSA \_\_\_\_\_ CE \_\_\_\_\_ OTHER \_\_\_\_\_

### PACKAGE OPTIONS

Shoebox \_\_\_\_\_ Chassis \_\_\_\_\_  
Custom Package (Dimensions): \_\_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_

### ENVIRONMENTAL

Ambient Temp Range \_\_\_\_\_ Deg C min \_\_\_\_\_ Deg C max

### OTHER OUTPUTS REQUIRED:

Simmer: \_\_\_\_\_ mA  
Aux Output 1: \_\_\_\_\_ V @ \_\_\_\_\_ A,  
Aux Output 2: \_\_\_\_\_ V @ \_\_\_\_\_ A

**PFN SYSTEMS** (A high voltage capacitor is discharged into a pulse forming network which includes a flashlamp. The current into the flashlamp is sinusoidal as a result of the resonance of the capacitor and the PFN inductor.)

**Output Voltage Requirement** – Customers typically run their pulsed lasers at a fixed voltage, although some may want to vary the output over a range of voltages.

**PFN Capacitor** – Need to know this value since the voltage, capacitance and rep rate are needed to calculate the power required, and sometimes the customers have calculated wrong.

**Maximum Rep Rate** Typically, customers run 10Hz to 100hz, but sometimes, they run up to 1,000Hz and we need to know this as it is harder to maintain accuracy of the output voltage at high rep rates.

**Maximum Output Power** [ $P = \frac{1}{2} CV^2f$ ]: Once we have C,V and f, we can calculate output power.

**Voltage Accuracy Required** – Customers tell us how accurate the output voltage has to be.

**RESERVOIR CHARGING SYSTEMS** (Instead of a PFN capacitor, energy is stored in a large bank of electrolytic capacitors and discharged into the flashlamp through a high power transistor. The current into the flashlamp in this case is more like a square-wave. Customers have more flexibility with this system as they can vary the width of the pulse.

**Max Output Voltage** Once again, we need to know the maximum required voltage

**Output Voltage Droop During Pulse** During the pulse, the voltage in the bank of capacitors will drop, but typically not more than 20% of the maximum value. We need to know the value of the droop and the amount of capacitance in the bank.

**Capacitance of Reservoir Bank** – Customer should know this.

**Maximum Pulse Width/Minimum Pulse Width** – These are important parameters for us. The flexibility of Reservoir Charging systems is that they permit the user to vary the pulse width. This is typically not possible in PFN systems.

**Maximum Rep Rate (f)** – This is information we need to make sure all are in agreement over the power required.

**Maximum Output Power** [ $P = 1.2C(V_f^2 - V_i^2)f$ ]: Once you have the Maximum voltage, the droop, the value of the capacitor bank and the rep rate, one can calculate the power required from the power supply

**Voltage Accuracy Required:** - How accurate does the voltage on the capacitor bank have to be?