Power Supplies - High Voltage DC

Our laboratory assembled high voltage DC supplies are available as current sources with a defined short circuit current or as a voltage source with a defined voltage at the rated operating current.

The advantages of the current source are realized in the charging of capacitors used for high-energy storage single event discharges intended for rail guns and other electro kinetic and EMP devices. Even at the time the charging cycle starts the current is controlled and remains relatively constant through the charging cycle. The source can also be short circuited where the current is still in a controlled mode. The charge voltage (vt)= f(t) x I all divided by C. This is a linear relationship and does not require the power wasting series resistance used for voltage sources. The disadvantage is that there is a tendency for the voltage to soar above the design ratings. Operation requires preventative measures such as monitoring the charge voltage or an electronic trigger that shuts the sources off when the desired charging voltage is reached.

The advantage of the voltage source approach is the property of maintaining a constant voltage value within the design limits required as current (load) is being drawn. This is an advantage for electric- field charging when used for accelerators, ion beams, isotope enrichment, particle beams, potential generators etc. The disadvantage is that current is not controlled and overloads can damage the circuitry. Charging capacitors now require a power robbing series resistance to control the current. Charging is exponential. Our HVOLTV high power series utilize a bit of both worlds being voltage and current sources by user selection.

Capacitor chargers can also be used as power supplies.

SPECIAL NOTE ON CHARGING CAPACITORS

DANGER -- charged capacitors can kill you by electrocution, and cause very serious injury from burns and explosions. Do not attempt to use this equipment unless completely educated in high voltage circuitry. These products are intended for experienced laboratory personnel.

Programmable capacitor chargers allow you to dial in the charging voltage and view the event via a front panel analog meter. Capacitors charge from a current source and waste little energy such as that when using a ballast resistor. Ballasted energy is all reactive and never is consumed as real power.

A selector switch is included allowing charge cycle to cease once the preprogrammed value is reached. It can be selected to automatically recycle the charging function keeping the capacitor up to voltage until the charger is turned off or the event occurs.

The charging time can be estimated by calculating the energy in joules of the capacitor being charged and dividing by joules (watt-sec) of the charger. This is only approximate as it assumes linear power being applied throughout the charge cycle.

A charge current control allows adjustment of charging time and is very useful when using smaller capacitance values.

You can more accurately approximate the charging time of your capacitors by using the simple formula t=cv/i, where t = sec, c = capacity in farads, v = voltage, and i = charging current in amps.

Excellent to use for capacitor integrity testing or just as a charger for laboratory functions and experiments.

Optional designs are available in preferred voltage and current value.