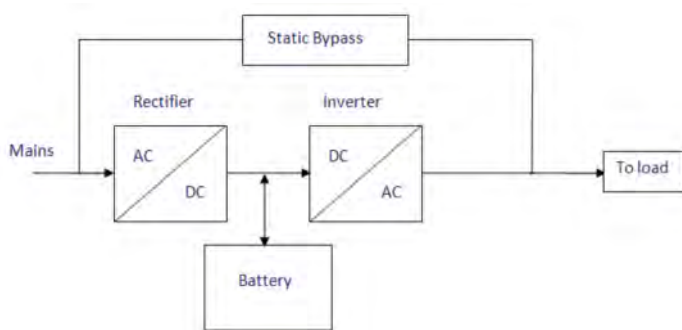


## Uninterruptible Power Supply

The main purpose of a basic back-up power system, or a truly "uninterruptible" power supply (UPS) system, is to keep the power on during utility power outages. These systems thus enable all types of electrical equipment to keep working, even when the incoming utility electrical power cannot supply the proper current and/or voltage needed. There are three basic types of back-up power systems: off-line (or "standby"), line-interactive and in-line (double-conversion). In-line (double-conversion) is the true uninterruptible power supply (UPS) system and is considered to be the best type because it provides the highest protection against all types of utility power anomalies (e.g., full outages, transients, surges, droops, brown-outs).

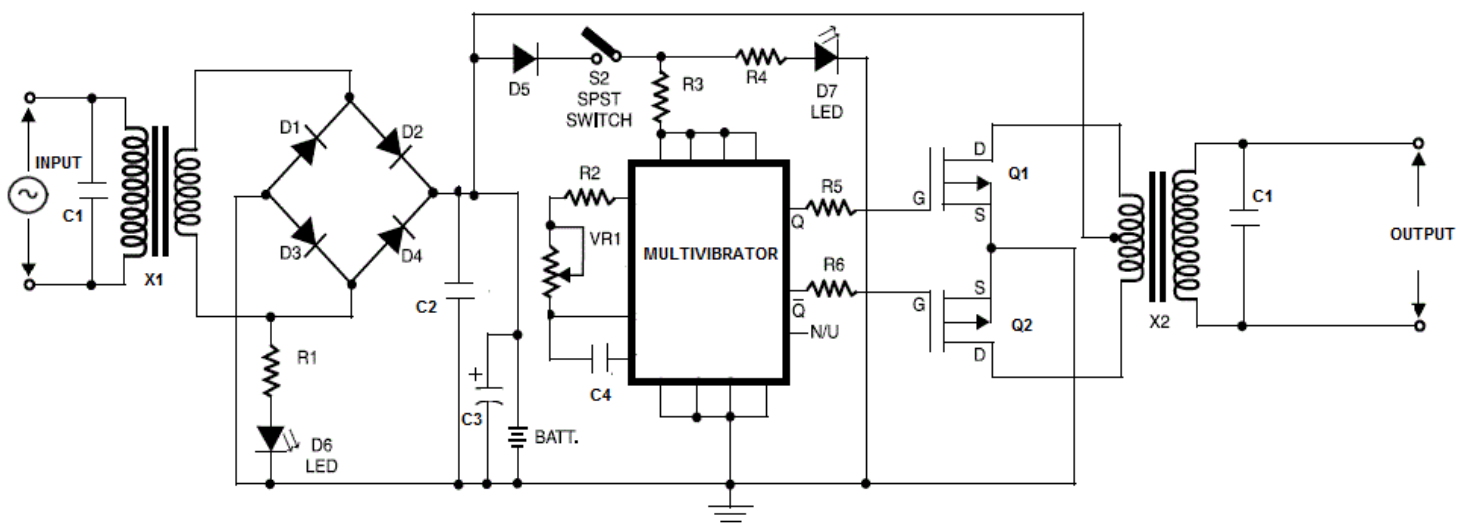


The minimum components needed to design an Online UPS are the rectifier, the battery bank, and the inverter. The

rectifier converts the distribution line's AC (Alternating Current) power to DC (Direct Current), the form of current suitable to store energy in a battery bank. At all times, this DC is also fed to an inverter, which reconverts the DC power to an AC waveform connected to any equipment utilizing AC that a user considers as mission-critical. If the AC supply fails for any reason, the inverter will continue to draw power from the batteries. See Figure 1.

X2 capacitor suppresses the incoming electromagnetic interference from the mains line. Next, the AC to DC power is converted by a rectifier. From there, the DC link capacitor regulates voltage and current waveforms and all the energy is stored as "DC power". Next, the inverter is powered primarily from DC-Link power. If DC-Link power begins to drop, then the inverter receives power from other stored energy systems, such as ultracapacitors or batteries.

To create the sinusoidal voltage and current waveforms, the inverter devices are switched on and off rapidly. As a result, voltage and current spikes are developed and these must be carefully removed using "Snubber Capacitors". Lastly, the X2 capacitor in the output filter guarantees that unwanted (spurious) energy, either from the previous blocks of the UPS circuit or unwanted energy coming back in from the load, does not corrupt the inverted power.



C1- X2 Capacitor

C2- DC Link Capacitor

Figure 1  
C3- Electrolytic Capacitor

C4- Snubber Capacitor

## Uninterruptible Power Supply

### Deki Capacitors Range for Uninterruptible Power Supply Application

| Series Name  | Deki Series Code | Capacitance Range   | Rated Voltage      |
|--|------------------|---------------------|--------------------|
| Interference Suppression Capacitor Class X2  | 07, 20           | 0.01 to 10 $\mu$ F  | 275 VAC, 310 VAC   |
| High Capacitance Stability Interference Suppression Capacitor Class X2 High Humidity Resistant Grade | 151              | 0.01 to 10 $\mu$ F  | 275 VAC, 310 VAC   |
| Metallized Polypropylene DC Link Capacitor   | 91               | 1 to 120 $\mu$ F    | 450 VDC - 1100 VDC |
| Metallized Polypropylene IGBT Snubber Capacitor  | 121, 150         | 0.047 to 10 $\mu$ F | 700 VDC - 3000 VDC |