



## Battery series and parallel Wiring:

Batteries can be wired in series or parallel. What will change is voltage and current of the system. We will only go into 6 volt and 12 volt batteries since these are the most common for car audio. Also be aware of more industrial vehicles such as golf cars, semi-trucks and other large vehicles. They commonly operate on a 24 volt system that is usually comprised of multiple 12 volt batteries wired in series or series-parallel combinations. It is not acceptable to "tap" into one of the two 12 volt batteries wired in series for an audio system. This puts all of the load on that battery and will cause battery failure.

### **Parallel battery wiring:**

When you parallel two 12 volt batteries together, the current rating is the sum of the two batteries added together. The voltage is still the original 12 volts. You must make sure that both batteries are the same rated voltage and similar current capabilities. If they are not, you may damage one of the batteries from over charging or larger current draw.

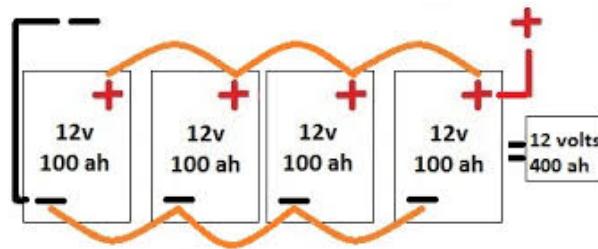
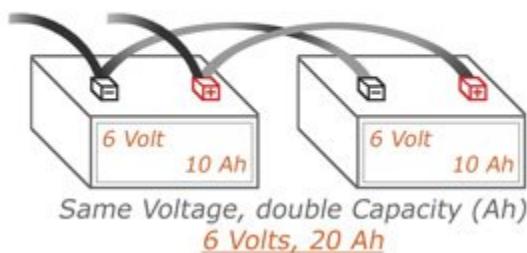
### **Example:**

Two 12 volt, 600 CCA (cold cranking amp) batteries in parallel will give you 12 volts and 1200 CCA. This means that the voltage is the same but you have 2x the current reserve so you can operate your electronics for 2x as long before the batteries need to be charged. Just remember, since you have 2x the capacity, it will take 2x longer to fully recharge both. That is why this is popular for car audio and boating especially when using electric trolling motors.

Two 6 volt, 10Ah (amp hour) batteries wired in parallel would give you 6 volt and 20 Ah.

Four 12 volt, 100 Ah batteries in parallel would give you 12 volts and 400 Ah.

## Batteries Joined in Parallel



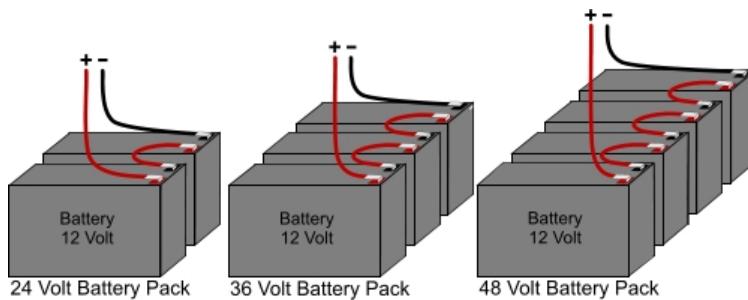
## Series battery wiring:

When you series two 12 volt car batteries, you will add the voltage of each for the total voltage output (24 volts). The current will stay the same. Since power ( $P$ ) is calculated by voltage ( $V$ ) x current ( $I$ ) ( $V \times I = P$ ), you will note that since you are effectively doubling the voltage to 24 volts and the current is the same, the power is also double. That is why with an unregulated power supply, you will lose power as voltage drops (see the power supply tech paper for more information). You can obtain a 12 volt system with 6 volt batteries by wiring them in series.

### Example:

Two 6 volt, 200 CCA batteries wired in series would give you 12 volt and 200 CCA.

Three 12 volt, 600 CCA batteries in series would give you 36 volts and 600 CCA.

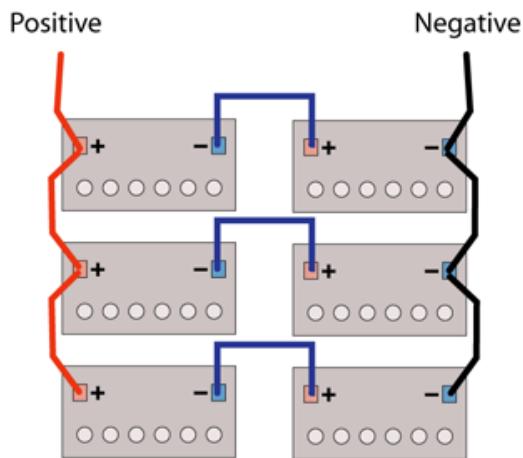


Sometimes you need more voltage and capacity. This is where you need series-parallel battery wiring. This is a common practice for Semi-trucks and construction equipment. It is also used in some all electric vehicles like golf cars and ultra-efficient electric vehicles like the Tesla.

### Example:



If you wire six 12 volt 300 Ah batteries in series parallel you would have 24 volts with 1200 Ah capacity.



Series/Parallel Wiring Combination