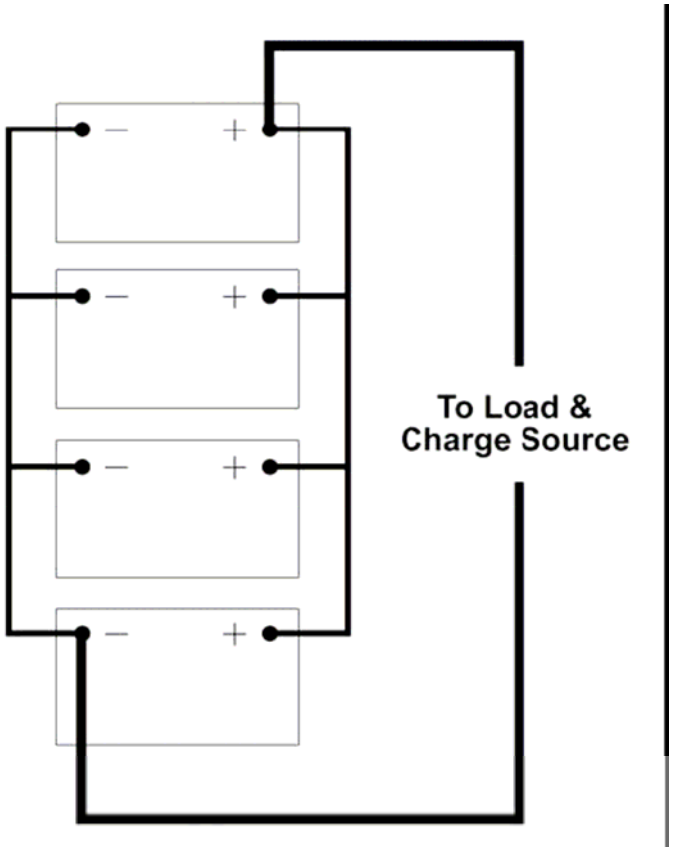
Parallel Charging

Connection of batteries in parallel is acceptable provided certain precautions are taken. Failure to take these precautions can result in dramatic battery failure, shortened life and poor performance.
It is important that each parallel string carries the same load. Any variations can lead to problems and premature failure. When loads are not equally shared then neither are the charging requirements. A battery carrying a higher load and therefore receiving higher charge current will increase in temperature. A small increase in the string temperature increases the problem as this string is more “willing” and will provide even more of the load and accept even more of the charging current. Obviously this string is being put through a deeper cycle and is operating at a higher temperature thus reducing life. A secondary effect is that the warmer string will have a lower terminal voltage resulting in the other strings discharging through the warmer one when at rest. This increased “activity” has a general negative effect on the life of the whole bank.
A snowball effect takes place and a significant reduction in life results.
The unequal sharing of load is the main danger of parallel strings and the more strings that are added the more likely the problem. Lion recommends that parallel strings are limited to a maximum of four.
To help overcome the problems detailed above it is important that the connection to the load and the interconnecting cables are arranged such that there is the same amount of resistance attached to each string. By connecting the positive load cable to one end of the bank and the negative to the other (see diagram) this problem is largely overcome. If in doubt all strings can be connected to a central buss with care being taken to ensure that all connection cables from the strings to the buss are of approximately the same length.



Because heat is potential problem care should be taken to ensure that any heat applied to the batteries through an external source is applied evenly to all strings. If one string is sitting adjacent to a heat source uneven load carrying will result.
It is also important that old batteries are not coupled in parallel or series with new. Older batteries have different capacity (capacity is lost as the battery ages), different self discharge and different internal resistance. All of these factors lead to an uneven sharing of the load and should therefore be avoided if possible. As a rule of thumb, an age difference of up to one year is generally acceptable except in heavy duty cycling applications.