

Series vs. Parallel Configurations

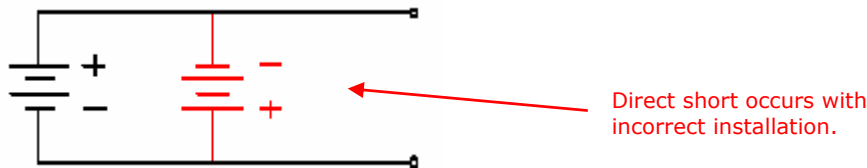
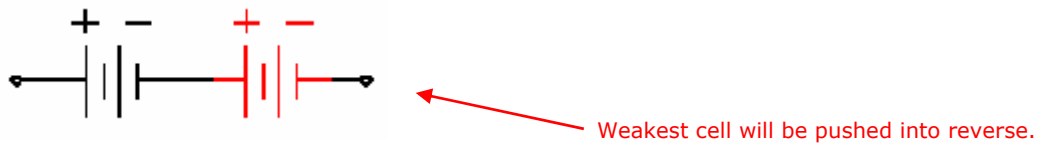
Guidelines:

Regulating drain rates below the device functional end point:

Ideally the drain rate should be less than 50 uA when the operating voltage falls below ~0.8 volts per cell and approach 0 uA as the voltage continues to decline. This will minimize the likelihood that leakage will occur. A key variable which can have a significant impact on leakage potential is the length of time before fresh batteries are installed in the device.

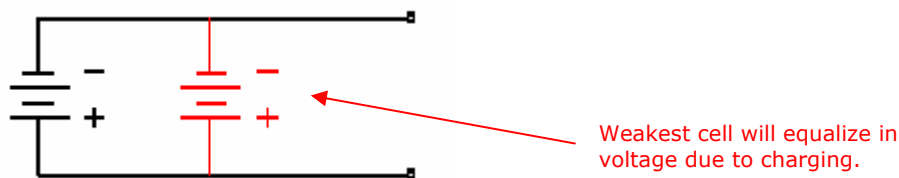
A cell can be driven in reverse in only a series configuration:

This would occur when there is a gross difference in voltage between cells as shown below:



Weaker cells in a parallel configuration will result in either a **direct short** if cells are installed incorrectly...

...OR with correct installation in parallel configurations, the stronger cell will charge the weaker one in order to bring both legs up to equal voltage. The capacity will not increase, however the voltage potential of the cells will increase.



Series Configuration:

In a series configuration, the weakest cell controls the performance of the device. As the device operates, the weakest cell will deplete at a faster rate and be driven into reverse, if the end point voltages are low enough. The net voltage will then cause the device to perform poorly. In the event that the device is turned off and left unattended, the weakest cell could potentially leak over time.

Parallel Configuration:

In a parallel configuration, the strongest cell controls the device and reversal will not occur. Rather, the weakest cell will drain the stronger one in order to "equalize" the voltages of both legs of the circuit. The device will continue to operate until the functional end point is met.