

## **Problems associated with series charging & discharging of nickel-cadmium aircraft batteries.**

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Constant current charging and discharging of two or more nickel-cadmium aircraft batteries in series is not recommended by the major battery manufacturers. Although series charging and discharging is not specifically addressed in battery maintenance manuals, all specified procedures assume that battery servicing is being performed on a single battery.

A fully charged 20-cell nickel-cadmium aircraft battery can reach 32 volts at the end of top charge with current still flowing. Charging two 20-cell batteries in series can result in a total voltage of 64 volts or more on the workbench. Under some conditions, this could result in a potentially unsafe condition. With respect to safety in general, the popular Christie RF80-K is CE approved, unlike competitive models. CE approval assures the charger/analyzer has been designed and constructed to ensure that it is safe when connected to the AC supply system by providing a level of protection against electric shock. The RF80-Ks CE approval includes compliance with the European Low Voltage Directive (LVD) and standards for Electromagnetic Compatibility (EMC).

If multiple batteries are being charged or discharged, it is impractical for a single technician to monitor, and accurately record all the required individual cell voltage data. For example, during discharge, it would be quite difficult for a technician to identify the first cell to reach 1.00 volts when manually scanning 40 cells using a voltmeter.

When performing a capacity check, batteries should always be tested separately in order to accurately determine discharge capacity. If two batteries are discharged in series, it may be necessary to reduce the discharge current to stay below competitor's charger/analyzer's maximum discharge power ratings. This can reduce the discharge current by up to 50%, causing distortion in the battery capacity measurement. The battery manufacturer's component maintenance manuals specify that batteries be discharged at the full "C" (1-hour) rate, so discharging at lower rates cannot be supported by approved battery maintenance data.

Competitors may claim that series charging can improve battery shop productivity by charging two batteries in the same time it would take to charge one battery. On the surface, this may sound attractive, but in reality, series charging can result in safety issues, documentation problems and is not supported by the battery manufacturer's maintenance data. In the event rapid charging is necessary to support an AOG situation or rapid turn-around, the RF80-Ks unique ReFLEX charging mode can safely perform a main charge in only one hour when performed by an experienced technician.

For questions or additional information, please contact us at 949-829-8264 or visit our web site at [www.marvelaero.com](http://www.marvelaero.com).

