

Vans AF String Nov 2, 2017

The screenshot shows a web browser window with the URL <http://www.vansairforce.com/community/showthread.php?t=154137&highlight=earthx>. The forum header includes navigation links like 'VAF Forums > Main > Safety', a search bar, and a login section with fields for 'User Name', 'Password', and a 'Remember Me?' checkbox. Below the header is a blue navigation bar with links: 'Register', 'FAQ', 'Members List', 'Calendar', 'Search', 'Today's Posts', and 'Mark Forums Read'. The main content area shows a thread titled 'Over voltage required for EarthX battery' with a 'Post Reply' button. The thread is on page 1 of 16, with a 'Thread Tools' section and a 'Search this Thread' button. The thread was started on 10-10-2017 at 01:25 PM. The user 'EarthX Lithium' is the poster, with a join date of Feb 2014, location of Windsor, CO, and 185 posts. The thread is marked as #1.

Dear Van's Forum readers:

Safety is of top importance to **EarthX** as we know it is to you too. If you are using an **EarthX** battery and have an alternator/generator that puts out more than 20 amps, please read.

After careful consideration, as we know this is the experimental community and not the certified aircraft community, we have changed the verbiage throughout our documentations about the importance of having over voltage protection from "strongly recommended" to "require" if you have a 20amp+ alternator/generator charging system on your aircraft.

We also want to stress the importance of also using the fault light indicator by either installing an LED light on your control panel or connecting it to your EFIS. This fault light is a mode of communication to you that something is outside the normal parameters of either your charging system or the voltage of your battery but most importantly, it will also indicate if there is an internal issue within the battery. (We have marked these lights 50% off for the next month to encourage the use of this important safety feature on the website).

The reason for the change in verbiage is for the following real situation that happened to an RV-8 owner/pilot who had a 60 amp alternator charging system. With his permission, we want to share with you what happened so it does not happen again. There will be an article in Kitplanes magazine that will touch on this situation in their November issue, and there will also be an article in EAA Sport Aviation magazine possibly the December issue, plus if you have been to an **EarthX** presentation at Sun N Fun or EAA Oshkosh, we also discuss this situation as we want to avoid it ever happening.

I will summarize the situation greatly in saying there was a very seasoned, experience pilot and co-pilot, who had recently changed many things in this RV-8 aircraft including wiring and took his plane up for a test run. He had an **EarthX** aircraft battery in his plane.

Note: He did not have over voltage protection on his plane. He did not connect the LED fault light to his panel or to his EFIS system, and the battery was located with cabin access.

During his flight, his regulator failed and his voltages climbed up and remained at +29V and 40+ amps for many minutes. (After approximately 6 minutes, his alternator failed too). A couple of times the voltage spiked above 60V per the data from the EFIS. The over voltage protection for the **EarthX** batteries is a maximum of 60V, even though the FAA requires protection only up to 19.8V. When the voltages spiked, it was enough to cause a cell rupture as the pilot smelt a funny electrical smell and with continued high voltages and

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amps, the battery did go into thermal runaway. As the pilot had just had the new wiring done, he thought it was related to this and immediately started to look for a place to land. In the stress of the situation, the pilot thought he turned his alternator off. He did not. The location of the battery was not sealed outside the firewall so heavy smoke was able to enter the cabin. There was no visible flames and no wiring was melted but there was a lot of smoke inside the cabin. He was able to open the canopy to get fresh air and did land the plane. The pilot's and the plane were unharmed.

Had his plane had over voltage protection, once his regulator failed, within a milliesconds the overvoltage protection would have been engaged, there would have not been any high voltages or high amps going into the battery (lead acid or lithium), the alternator would not have failed and certainly no smoke or thermal runaway of the battery. This is a very simple, inexpensive safety feature that is very wise to have no matter what battery you use. In a certified aircraft, it is a mandatory safety feature. The pilot was very honest and truthful with us in saying that in a situation like this, you can make mistakes. He really thought he turned the master off. To err is human. Therefore, we have changed the verbiage from "strongly recommend" to "require" as we want to eliminate this situation from happening again.