

Bearhawk #164 “Three Sigma” Checkout Report

Date: 6-19 April 2008

Objective: Troubleshoot and repair alternator and tachometer

Background: The tachometer was not working during the initial engine run. There was no indication of alternator function.

Results: Both problems resulted from mis-understandings of the systems.

The alternator problem started with an extra wire coming out of the Mark Landoll alternator (modified for external regulation) that did not exist on any of Bob Nuckolls’ wiring diagrams. This extra wire was labeled “stator” and is used with the regulator sold by Mark Landoll, but apparently is not used with the “Ford” regulator (Standard VR-166) installed. As the regulator has a terminal marked “S” (probably for “sense”), through some confusion the stator wire was connected to the “S” terminal.

A phone call to Mark Landoll did not result in an explanation of the purpose of the “stator” wire (it may have something to do with the initial excitation of the alternator), but did result in the suggestion to try leaving it disconnected. The “S” terminal of the regulator was connected to the “A” terminal (+12v) as shown in the Nuckolls’ diagrams. A test engine run verified that the alternator was functioning properly with this wiring configuration.

The tachometer issue took longer to troubleshoot because the problem was identified just as the tech support personnel for Lightspeed Engineering and for JP Instruments were departing for Sun’N Fun. Much troubleshooting traced the problem to the ignition boxes not outputting the expected pulses for the tachometer signal. Lightspeed Engineering confirmed that this was expected, because with the recent upgrade of the Plasma III systems to the “A” version (actually now version A1), the design of the tachometer output was changed from a +10v pulse to an “open collector” design. Of course, I was not notified of this and none of the documentation on the web site reflected this change (I notified Lightspeed Engineering and they indicated that they would update the web site). The result of this change was that the “dongle” between the ignition box and the tachometer was no longer needed, as the functionality provided by the dongle had been incorporated inside the ignition box. With the new design, the tachometer wire from the ignition box could be connected directly to the tachometer input wires.

This wiring change was made. A test engine run verified that the tachometer was functioning properly, but only when the right ignition system (the system the tachometer was connected to) was on.

Further study of the Lightspeed Engineering web site uncovered the statement that with the new tachometer trigger design, the tachometer outputs from both ignition boxes in a dual Lightspeed ignition system could be connected in parallel to the tachometer input.

After confirmation with Lightspeed Engineering, the wiring was modified to this configuration. A test engine run verified that the tachometer was functioning properly with either or both ignition systems on.

Conclusions: The alternator system and tachometer systems are functional.

Recommendations: Continue with ground engine runs.