

N52367 Preliminary accident investigation.

2014 KITFOX V VIXEN S/N V9404-0008

ENGINE- SUBARU EA-81

The aircraft was taking off on runway 12 at KEUL on August 26, 2022. Shortly after takeoff the pilot had problems and tried to return to a parallel taxiway.

Pilot reported substantial loss of engine power and landed (crashed) short of a taxi way.

There was no evidence or sign of any control issues with the aircraft during the post crash inspection and none reported by the pilot.

Mechanical power train: (& Spark)

All the prop blades were sheared at the hub. I was able to determine that the engine rotated normally and had good compression. All spark plugs, wiring harness and ignition coil were intact and appeared to have no issues.

Engine Control cables:

Mixture and throttle cables were free and hit the stops at full power and idle cutoff.

Fuel flow:

Fuel tanks were empty due to aircraft upside down and recovery. After putting approximately 2 gallons in each wing, I was able to determine fuel flow to header tank behind copilot seat was good. Fuel filters were clean and all vents were clear. Fuel flow from header tank to carb was normal. Fuel shut-off valve functioned normally.

Aircraft 12 volt main power:

Ship battery appeared to have shorted to ground during accident or recovery. Battery voltage was at 4.2 volts. After installing good power source, I was able to verify fuel boost pump was functional and the ECU (Electronic Control Unit) would power up.

Ken Greenwell, with Boise FSDO was on site to assist. He observed that the ECU would lose power when he wiggled wire harness near right side of firewall inside of aircraft. Subsequently, he discovered a loose (bad) connector that was sending 12 volts to the ECU.

PRELIMINARY CONCLUSION:

There are several documented aircraft accidents involving this engine and ECU where it goes into "Limp Mode". This reduces engine power to about 25% in order to protect the power train in automobile applications. I recommend further investigation of this ECU to determine if the "Limp Mode" was or even could be disabled. This issue needs light on it to verify that aircraft owners, pilots and mechanics are able to determine what the ECU is programmed to do.

My guess is that the engine went into "Limp Mode" possibly due to the bad connector interrupting power to the unit.

If you Google "Subaru EA-81 aircraft engine (limp mode)", you will find a history of incidents involving this issue.

LIMP MODE- "A very strong sign that your car is in limp mode is if you feel that your car has lost almost all of its power."

12/09/2022

Bob Hinkle A&P [REDACTED] IA [REDACTED]

From: [Greenwell, Kenneth \(FAA\)](#)
To: [Salazar Fabian](#)
Subject: N52367
Date: Thursday, December 1, 2022 2:06:43 PM
Attachments: [image001.png](#)
[N52367 1.pdf](#)

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Good Afternoon Fabian,

I conducted government oversight of mechanic evaluating N52367 for the cause of power loss and subsequent accident. A poorly crimped wire was discovered with the wire not secured in the crimp of a terminal. The wire was traced to the Ignition Switch 5 amp circuit breaker power wire. The wire was reconnected and verified that the ignition module was functional. The wire was removed and the ignition control module lost power. The ignition control module is a SDS CPI model 1000, the coil pack was a UF240T distributed by SDS EFI (<http://www.sdsefi.com/> 403-671-4015). The fuel system was evaluated and determined to be functional. The crimp was a standard automotive ring type terminal. An evaluation of the terminal determined the wire may not have been properly secured since manufacture of the aircraft.

v/r

Kenneth J. Greenwell
Aviation Safety Inspector
Federal Aviation Administration

Boise, ID 83705



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