

January 30, 2007

**TO ALL EXEC 162F OWNERS with  
ACIS EQUIPPED ENGINES**

**ADVISORY BULLETIN A-41**

Subject: ACIS - Altitude Compensation Induction System

History: The ACIS (Altitude Compensation Induction System) was developed for use at high altitudes where engine power was limited due to air density. Aircraft at these higher altitudes with the ACIS system installed have operated very successfully.

Operators of aircraft based at lower altitudes with ACIS installed have seen fuel consumption increase, excessive combustion blow-by, lack of power and in several cases internal engine damage.

RotorWay personnel, along with the help of the supercharger manufacturer, have evaluated these failures. Using the FADEC system's ability to record the last four hours of flight, we have found that the inlet air temperatures were extremely high on the damaged engines. These high inlet air temperatures are directly associated with high outside air temperatures and high power demands from the engine (high manifold pressure).

An ACIS engine differs internally from the normally aspirated engine in the design of the piston, the piston ring end gap and the compression ratio of the engine. The failures that have occurred are with the piston and piston rings. It is very likely that the pistons are getting too hot from the combustion of hot intake air and fuel. The fuel mixtures of the failed engines appear to be okay except in cases where the boost available to the intake system was too high from non-operable stepper motor control, and in these cases the fuel mixture was leaner.

Detonation is also a factor in the failures that have occurred. Poor quality fuel, fuel of a low octane rating (below 92) or fuel that has obtained a high octane rating by use of alcohol can all result in detonation.

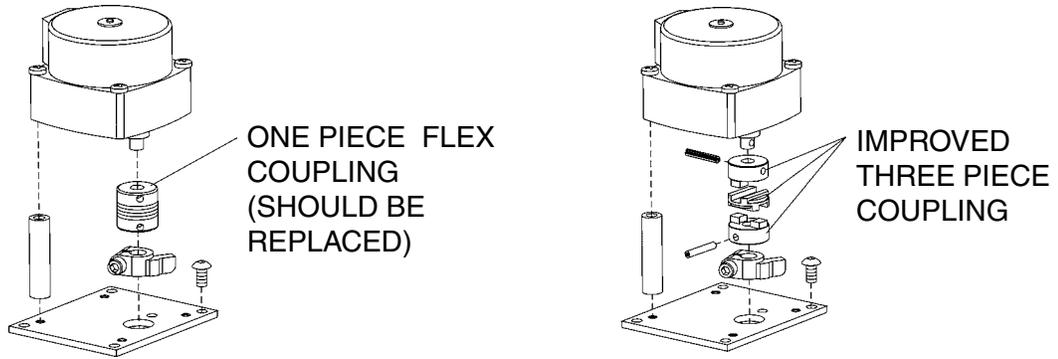
There have also been a couple of instances where the coolant bleed valve on the engine opened in flight from the supercharger belt failing and impacting the valve. In each case the valve was safety wired as recommended in Bulletin A-35 (September 21, 2000).

Action:

1. When outside air temperatures exceed 100° F, the inlet manifold pressure should not exceed 32" Hg. The inlet air temperature (boosted air temperature) monitored from the FADEC digital display should not exceed 160° F.

(continued)

- 2. The flexible coupling for the stepper motor control, used on earlier systems, should be replaced with the improved coupling. See illustration below. Use the Stepper Motor Coupling Kit, part number E38-5200.



- 3. If the engine has a bleed valve on the passenger side waterjacket elbow, the valve should be replaced with a bushing and plug. Use the Bleed Valve Replacement Kit, part number A24-3070.

