Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

Piper PA24-260 Comanche
Engine Alternate Air Systems

AWB 73-009 **Issue** : 1
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1. Effectivity

All Piper PA24-260 Series Comanche aeroplanes.

2. Purpose

To clarify the requirements for PA24-260 aircraft with engines equipped with Bendix RSA fuel servos, which may be equipped with either a manually operated alternate air system or an automatic spring-loaded engine alternate air system.

3. Background

The FAA issued AD 91-02-06 (Amended by AD 91-21-09 in 1991) which mandated Piper SB No. 861 to remove the spring-loaded automatic alternate air door used with Bendix RSA fuel injected engines (Lycoming IO-540 Series) installed in some PA24-260's, and install the manually operated alternate heated air system as used on the carburetted version (Lycoming O-540 Series) of the PA24-260.

FAA AD applicability

CASA Civil Aviation Safety Regulations (CASR1998) Part 39 requires that from 01 October 2009, Registered Operators are required to comply with both State of Design ADs and Australian ADs applicable to the aircraft models on the Australian Civil Aircraft Register. However, because CASA did not mandate FAA AD 91-02-06, which was amended by FAA AD 91-21-09 and which became effective 29 November 1991, the FAA AD is not applicable to any Australian Registered PA24-260 aeroplane, including those added to the Register prior to or after 01 October 2009.

While it can be imagined that the automatic spring-loaded alternate air doors could be rendered ineffective by encounters with severe icing, that operation into icing conditions is prohibited in Australia unless the aircraft is suitably equipped. The NTSB report No A-89-14 indicates that the fuel injected engine with the alternate air induction system having a spring-loaded door appears to provide adequate protection against inadvertent excursions of short duration into icing conditions.

The Australian fleet of Piper Comanche PA24-260 aeroplanes has doubled since FAA AD 91-21-09 was issued and many PA24-260 aircraft may have the manually operated heated alternate air door modification incorporated when imported into Australia.

This means that the Australian fleet of PA24-260 aircraft may have either a carburettor equipped Lycoming O-540 series engine with a manually operated alternate air door, or a fuel injected Lycoming IO-540 Series engine with either a manually operated alternate air door, or a spring-loaded, automatically opening alternate air door. There is a potential for confusion between the flight manual operating instructions and cockpit placards for the various engine fuel delivery systems and alternate air system configurations.

Unfortunately, in addition to this, the instructions for the detection of carburettor ice in the PA24-260 and correct application of carburettor pre-heated air are either not available or not clear in the original PA24-260 Flight Manual.

4. Recommendations

Due to the potential for confusion between the various engine fuel delivery systems and alternate air system configurations, CASA recommends that:

1. Operators should assess the merits of Piper SB No.861 to remove the spring-loaded automatic alternate air door used on the fuel injected PA24-260 and install the manually operated alternate heated air system used on the carburetted version of the PA24-260.
2. A visual inspection of the engine installation be carried out at the next periodic inspection, to determine the type of engine fuel delivery system and alternate induction air arrangement installed, and take the following actions.

   2(a) In regard to:

   i. Carburettor equipped engines – ensure the manually operated carburettor induction pre-heat system is installed and operates correctly. Maintain required placards in a serviceable condition and ensure the applicable supplement for detecting carburettor icing and the correct operation of the manual induction air pre-heat system are in the aircraft Flight Manual.

   ii. Fuel injected Bendix RSA air-servo equipped engines with the manually operated alternate air door system installed – ensure the system operates correctly. Maintain required placards in a serviceable condition and ensure the applicable supplement for the correct operation of the manual system is in the aircraft Flight Manual

   iii. Fuel injected Bendix RSA air-servo equipped engines with the spring-loaded automatic door in the induction system - remove any placards referring to manual operation of the alternate air door and ensure the applicable supplement for

correct operation with the automatic system is in the aircraft Flight Manual. Ensure the spring-loaded air door operates as intended at each periodic inspection. Maintain the alternate air door, including door seals, springs and check for security of the seal and excessive hinge wear in accordance with approved data. Defect reports indicate insecure seals and excessive hinge wear results in the seal and/or door being ingested into the engine and causing engine failure.

Note: A fuel injected engine induction system which incorporates a spring loaded door with a manual control to partly open or trigger the door opening should be considered as configuration ii.

5. Reporting

All defects relating to the PA24-260 engine alternate air systems are to be reported to CASA via the SDR system. sdr@casa.gov.au

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address:

AirworthinessBulletin@casa.gov.au

or in writing, to:

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