

D'Shannon Products, Ltd.
1309 County Road 134
Buffalo, MN 55313

Supplemental Type Certificate SA2200SW

Installation Instructions

Teledyne Continental IO-520-B, -BA, -BB and IO-550-B Engines

Series II Beechcraft 35 and 33 Airplanes

Eligible Models: H35, J35, K35, M35, N35, P35, 35-33, 35-A33, 35-B33, 35-C33, E33,
F33 and G33.

December 30, 1992

Introduction

Supplemental Type Certificate SA2200SW allows installation of the Teledyne Continental Motors IO-520-B, -BA, -BB or IO-550-B engines in most Beech Bonanza and Debonair aircraft which were not factory equipped. It also includes the IO-550-B engine as a direct replacement for the IO-520-B, -BA and -BB engines that were Beechcraft issue on model 33, 35 and 36 airframes.

The Series II aircraft dealt with in these instructions or "Second Generation" models require some, but not all modifications set forth under this STC. There are options that should be considered before beginning the modification process.

First, is the aircraft's engine compartment to be left as is, or upgraded to Series III (example - V35B) standards? The considerations here affect overall cost and performance. Under most circumstances, upgrading to Series III standards is more expensive due to more extensive modification. On the other hand, should you decide to upgrade to Series III standards you will be required to install canted engine mounts which are designed to counter the additional torque and "P factor" caused by the higher horsepower. Secondly, when installing the IO-550-B engine on the canted mounts you are not subject to the 285 horsepower manifold pressure restriction that you are when installing the engine on the earlier straight engine mounts which were standard equipment in most Series II aircraft.

For the latest drawing or engineering change order revisions, refer to D'Shannon Products Drawing List DL2200SW and Series II Installation Drawing Requirement List DRL2200-2. As continued upgrades and updates to these drawings are possible, attention should be given to insure that the latest changes to the modification can be incorporated.

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General Description

This modification provides a power increase to improve performance of early Beech 35 and 33 series airplanes. The general approach has been to install a Continental IO-520-B, -BA, -BB or IO-550-B engine with various eligible two or three blade McCauley or Hartzell propellers as used on later model Bonanza airplanes. The necessary structural modification to bring the engine mount area up to later model structural integrity must be accomplished if the aircraft is to be upgraded to Series III standards. The tunnel section needs to be upgraded to meet Series II standards as well, but only if the tunnel arch (tunnel former) is made of .032" material. If the tunnel arch is made of .040" material and a cap strip is installed on the inboard flange, no tunnel section modifications are required for this series aircraft when doing a "straight" or Series II installation. In general these modifications are done through the installation of Beech parts. Some of the increase in strength will be accomplished by reinforcing existing structure using fabricated parts.

For balance reasons the battery may be moved from the firewall to a position aft of the baggage area.

Modification Procedures

Structural Rework Review

Canted mounts (Series III upgrade):

- Note: Model G33 is factory equipped with Series III tunnel section/engine mount upgrades.

1. Remove existing engine mounts and supports. Remove nose section and existing pan forward of station 12.125. Modify bulkhead at sta. 12.125 per 54-10-00 and 68B001. The use of a new nose section is optional. The Beech part number for this nose section is 002-410029-1. However, the existing section may be modified as required. Install 35-910027-9 and -11 forward engine mounts per 71-14-00 and these instructions.
2. Remove existing aft engine mounts and doublers. Modify nosegear tunnel per 71-20-00. Install 35-410446-19 and -20 doublers and 35-910027-3 and -5 mounts per 71-14-00.
3. Install baffles per 71-60-00 and page 14 of these instructions. Modify per 71-60-02, and 71-60-03 when installing an IO-550-B or a late model IO-520 equipped with cylinder hold down studs between cylinders.

Straight Mounts (Series II upgrade):

- You must upgrade tunnel section only if the tunnel arch (tunnel former) is made of .032" material and no cap strip on the inboard flange is installed. On models with .040" tunnel arches with the cap strip, no structural modification to the tunnel section or rear engine mount area is required.

1. Remove existing aft engine mounts and doublers. Modify nosegear tunnel per 71-20-00. Install 35-410446-19 and -20 doublers and reinstall original rear mounts per 71-15-00.
2. Install 35-910067-51, -85, 35-410446-620, 35-910067-1, and -43 baffles per 71-60-00. Modify per 71-60-02, and 71-60-03 when installing an IO-550-B or a late model IO-520 equipped with cylinder hold down studs between cylinders. Rear baffle must also be modified per 71-60-00 page 3 of 3 to account for straight engine mounts.

Engine Installation

1. Install IO-520/550 and applicable propeller/Spinner Assy. per Dwg. 71-12-00 and appropriate propeller manufacturers' installation manual.
2. Install fuel boost pump per Dwg. 28-10-00 (Model H35 only). Many of these aircraft have been retrofitted with electric boost pumps under several STC's. As many of these systems used eligible fuel pumps and components, this modification may not be necessary.

3. Install engine mixture control and services per 73-10-00 (H35, 35-33, and 35-A33 through serial number CD-350).
4. Replace or re-mark manifold pressure and fuel pressure gauge per drawing 77-11-00, 77-12-00 or 77-13-00 depending on which engine is being installed and whether the aircraft is being updated to Series II or Series III standards.
5. Re-mark or replace engine instrument markings per 77-14-00.
6. Change cockpit placards to reflect new engine parameters.
See Dwg. 11-15-00.
7. Change fuel tank markings to specify 100 octane fuel. See Dwg. 11-16-00.
8. When installing the IO-550-B engine, install new fuel pump drain line per Dwg. 77-18-00.

Electrical System

1. Remove existing voltage regulator and reverse current relay. Install new regulator and circuit breaker per Dwg. 24-20-00 and 24-10-00. Rewire alternator circuit per Dwg. 25-05-00.
2. Battery Box Option: Relocate battery box per Dwg. 24-30-00 only if it is necessary from a weight and balance standpoint.
3. If installing an IO-550-B engine, install a two speed boost pump switch per Dwg. 24-40-00.

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New Parts List

The following parts are necessary in the course of this modification;

Beechcraft

- For tunnel structure modification:

- 1 002-410000-17 Doubler
- 1 002-410000-18 Doubler

- For Series III conversions only:

- 1 35-410446-179 Tee
- 1 002-410010-3 Nose Cowl (Optional)
(002-410029-1)

- For all Series II and III installations

- 1 35-380035-1 Filter Assy.
(P10-5304)
- 1 35-919025-1 Air Box
(002-910011)
- 1 35-919025-21 Bracket
(002-410000-87)
- 1 35-919025-23 Lever
(002-910011-21)
- 1 1009421023-17 Spring
- 1 35-944051-1 Bracket, prop. gov. control
(35-944051-13)
- 1 BE-106-2 Duct, air induction
(36-380098-1)
- 1 35-924254-1 Valve

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1	114693-2-01300	Tube
1	35-410020-14	Door (H35 only)
1	35-410020-15	Door (H35 only)

- See Dwg. 73-10-00 for mixture control and alternate air new control (where required).
- For baffle installation new parts list, see Dwg. 71-60-00
- See Dwg. 24-20-00 for voltage regulator and associated parts list.

Canted Installation (Series III)

	1	35-910027-11	Mount
	1	35-910027-9	Mount
	1	35-910027-3	Mount
	1	35-910027-5	Mount
	4	J10520-1	Vibration Isolators (Lord)
or	4	7351231-3	Vibration Isolators (Barry Controls)
	1	35-950005-1 (35-9016)	Stack Assy., L.H. Exhaust
	1	35-950005-3 (35-9016-35)	Stack Assy., R.H. Exhaust
		35-910007-606	Muffler/Tailpipe Assy., L.H.
		35-910007-607	Muffler/Tailpipe Assy., R.H.

- See Dwg. 77-11-00 for manifold pressure/fuel flow information when installing an IO-520, or 71-13-00 when installing IO-550-B (Series III)

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Straight Installation (Series II)

1	35-910018-3	Mount
1	35-910018-4	Mount
1	35-910019-1	Mount
1	35-910019-3	Mount
4	J7518-2	Vibration Isolators (Lord)

* Note: Aircraft should be equipped with these engine mounts prior to installation. It is recommended that the vibration isolators be changed when engine is installed.

Ball Joint Exhaust System;

1	35-950004-53	Stack, L.H. Exhaust
1	35-950004-53	Stack, R.H. Exhaust
1	35-910005-606	Pipe Assy., Exhaust L.H. heater and tailpipe
1	35-910005-607	Pipe Assy., Exhaust R.H. muffler and tailpipe

or

Clamp Join Exhaust System;

1	35-950004-5	Stack, L.H. Exhaust
1	35-950004-13	Stack, R.H. Exhaust
1	35-910004-606	Pipe Assy., Exhaust L.H. heater and tailpipe
1	35-910004-607	Pipe Assy., Exhaust R.H. muffler and tailpipe

* Note: All eligible 35 model aircraft should be previously equipped with one of these two eligible four stud exhaust systems. Ideally the ball joint system should be obtained when doing this installation on 33 models due to added durability of this later system; however, the clamp type system is eligible for installation on straight Series II installations. When reusing an exhaust system, inspect it for blown flame cones, leaks in the heater muff and the general structural integrity of the system prior to reinstallation. Model G33 is equipped with a factory installed canted exhaust system.

- See Dwg. 77-11-00 for manifold pressure/fuel flow information when installing an IO-520 or 77-12-00 when installing the IO-550-B (Series II).

Engine Compartment Structural Modification Procedure

* Note: Model G33 is factory equipped with all Series III structural modifications.

1. Disconnect battery.
2. Deflate nose strut.
3. Provide support under aft fuselage.
4. Remove propeller, spinner and upper cowl.
5. Disconnect all electrical, fuel, vacuum, instrument and breather lines.

6. Remove exhaust system from engine (drop without removing from airplane).
7. Remove engine complete with baffles. Plug all lines.
8. Remove loose exhaust system from airplane.
9. If Tunnel arch thickness criterion is complied with, go on to Electrical System Notes when performing a Series II installation. Remove rear engine mounts if tunnel arch thickness criterion is not met or when upgrading to Series III specs. Install rear engine mount tunnel reinforcements per Dwg. 71-20-00 and Beech rear engine mount doublers (002-41000-17, -18). Note that attaching rivets also attach top section of 71-20-01-05 and -06 to tunnel structure. Beech doublers are self locating because of forward top corner configuration. Also install doublers on inboard side of tunnel skin if required by fastener pattern holes. Permanently bolt original rear engine mounts in place if doing Series II installation. Then go on to Electrical System Notes. If performing Series III installation continue modification at step 10.
10. Drill off nose bowl.
11. Remove pan/bulkhead angle from bulkhead 12.125.
12. Drill off station 12.125 bulkhead.
13. If doing Series III upgrade, use four center bolt holes to locate new rear mounts (35-910027-5 and -3).

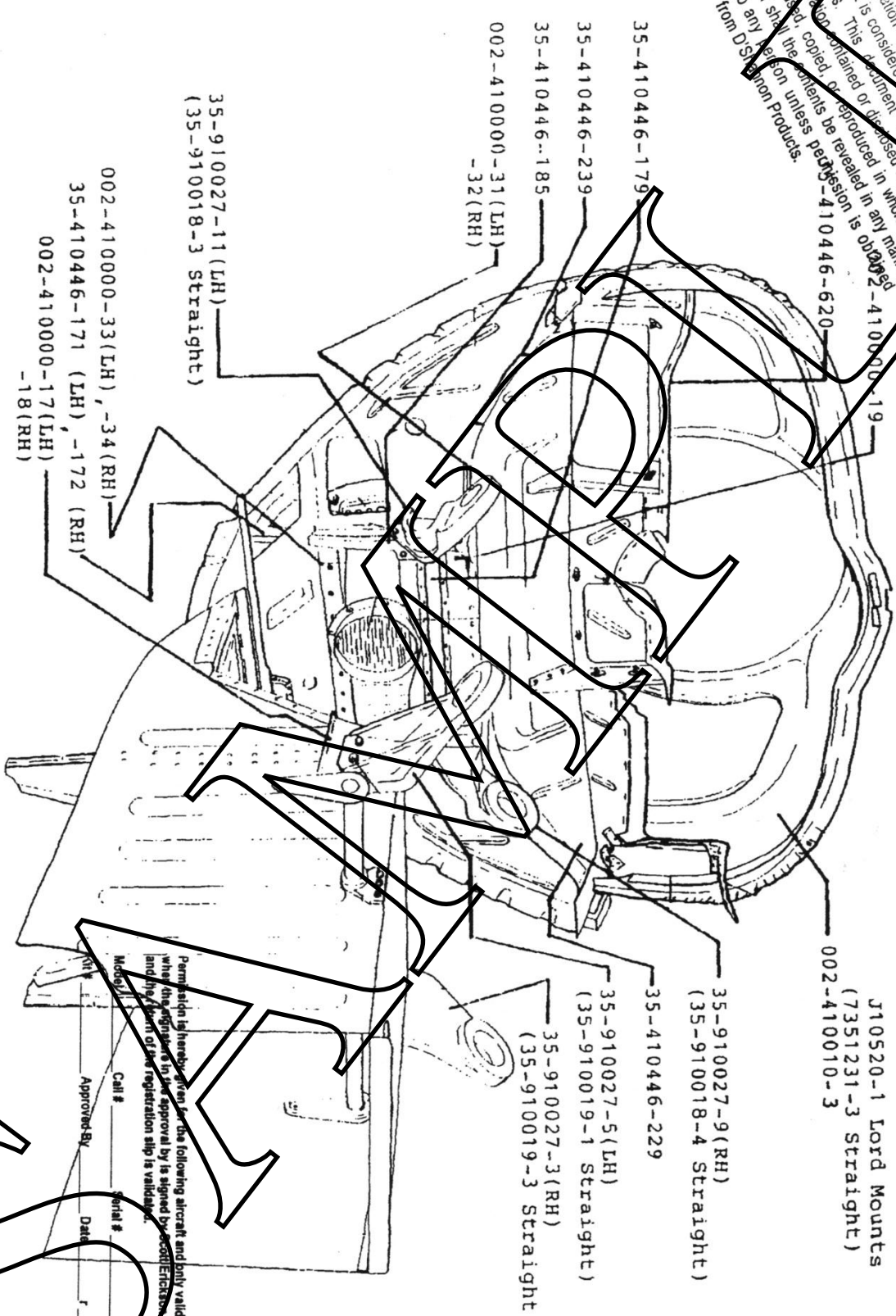
14. Permanently bolt rear mounts in place.
15. Locate front vertical engine mount support channels (35-410446-171 and -172).
16. Use an IO-520/550 oil sump Continental part no. 242273 with the engine legs attached to determine the location of the forward structure relative to rear mounts. Bolt oil sump to previously installed rear mounts and then bolt front mounts to oil sump (mount part numbers dependent on whether it is a Series II or III upgrade). Clamp forward mounts to vertical support channels (35-410446-171 and -172) and temporarily clamp all related structure in place (35-410446-239 wishbone angle, 002-41000-31 and -32 top gussets, 35-410446-179 horizontal channel). The 35-410446-179 horizontal channel must be replaced with new as the vertical bolt holes in the canted engine mounts will not align with the existing holes in this channel. Install new horizontal channel and permanently bolt front engine mounts (35-910027-9 and -11 Series III) in place.
17. Fit and rivet airbox assy. (35-919025-1) in place at station 12.125 bulkhead.
18. Modify noseowl intake area per 54-10-00 and 68B001, unless new late model noseowl is used.
19. Reinstall noseowl.

The engine compartment will now be structurally complete and ready for the installation of an IO-520-B, -BA, -BB or IO 550-B engine per D'Shannon Products DL2200SW.

Electrical System Notes

1. The existing generator switch will be used for the alternator circuit.
2. The voltage regulator and related relays will in general be installed in the location of the old regulator although the location may be changed if necessary.
3. All switches and breakers must be identified.

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 020052-410000-19



Nose Section

Permission is hereby given for the following aircraft and only valid when the signature of the approval is signed by a certificated and the form of the registration slip is valid.

Model # _____
 Call # _____
 Approved By _____
 Serial # _____
 Date _____

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