

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 I Beechcraft 35 Airplanes

Eligible Models: A35, B35, C35, D35, E35, F35, G35

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 I aircraft dealt with in these instructions or "First Generation" models require virtually all modifications set forth under this STC. There are options that should be considered before beginning the modification process.

First, is the aircraft to be upgraded to Series II (example - P35) or 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 I Installation Drawing Requirement List DRL2200-1. 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 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 integrity must be accomplished. In general this has been 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):

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. Modify air duct per 71-30-00. Install 35-410446-227 pan, and 35-410446-171 and -172 channels. 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):

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 71-50-00. 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. Modify air duct per 71-30-00. Install 35-410446-227 web, and 35-410446-171 and -172 channels. Install 35-910018-3 and -4 forward engine mounts per 71-15-00.f
2. Remove existing aft engine mounts and doublers. Modify nosegear tunnel per 71-20-00. Install 35-410446-19 and -20 doublers and 35-910019-1 and -3 mounts per 71-15-00.
3. 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. Remove existing oil tank.
2. Install IO-520/550 and applicable propeller/Spinner Assy. per Dwg. 71-12-00 and appropriate propeller manufacturers' installation manual.
3. Install fuel boost pump per Dwg. 28-10-00. 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.
4. Modify engine controls and services per 61-10-00, 73-11-00.
5. 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.
6. Re-mark or replace engine instrument markings per 77-14-00.
7. Change cockpit placards to reflect new engine parameters.
See Dwg. 11-15-00.
8. Change fuel tank markings to specify 100 octane fuel. See Dwg. 11-16-00.
9. 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.

New Parts List

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

Beechcraft

1	35-410446-171	Support
	(002-410013-1)	
1	35-410446-172	Support
	(002-410013-2)	
1	002-410000-17	Doubler
1	002-410000-18	Doubler
1	002-410000-33	Angle
1	002-410000-34	Angle
1	35-410446-179	Tee
2	35-410446-185	Angle
1	002-410000-19	Angle
1	002-410000-20	Angle

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1	35-410446-229 (002-410014-3)	Panel
1	35-380035-1 (P10-5304)	Filter assy.
1	35-410446-239	Reinforcement
1	35-919025-1 (002-910011)	Air Box
1	002-41000-31	Gusset
1	002-41000-32	Gusset
1	35-919025-21 (002-410000-87)	Bracket
1	35-919025-23 (002-910011-21)	Lever
1	100942L023-17	Spring
1	35-944051-1 (35-944051-13)	Bracket, prop. gov. control
1	BE-106-2 (36-380098-1)	Duct, air induction
1	35-924254-1	Valve
1	114693-2-01300	Tube
1	35-410020-14	Door
1	35-410020-15	Door
1	002-410010-3 (002-410029-1)	Nose Cowl
1	35-410446-79 (002-410000-21)	Grill

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- 1 35-410446-227 Web
- 1 35-410446-620 Baffle Assy, Nose LH (may be used on nose bowl if purchased used)

- See Dwg. 73-10-00 for mixture control and alternate air new parts list.
- 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 Stack Assy., L.H. Exhaust
(35-9016)
- 1 35-950005-3 Stack Assy., R.H. Exhaust
(35-9016-35)
- 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-250, 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)

Ball Joint Exhaust System;

1	35-950004-53	Stack, L.H. Exhaust
1	35-950004-63	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

- 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

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. Drill off 35-410446-45 nose bowl.
8. Remove engine complete with oil tank and baffles. Plug all lines.
9. Remove loose exhaust system from airplane.
10. Remove pan/bulkhead angle from bulkhead 12.125.
11. Drill off station 12.125 bulkhead.
12. Remove forward vertical engine mount support channels (35-415346-13) including attached horizontal channel (35-415346-6)
13. Remove old rear engine mounts.

14. Install rear engine mount tunnel reinforcements per Dwg. 71-20-00.
15. Install 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. Doublers are self location because of forward top corner configuration. Also install doublers on inboard side of tunnel skin if required by fastener pattern holes.
16. Use four center bolt holes to locate new rear mounts (35-910027-5 and -3 Series III) or (35-910019-1 and -3 Series II) on models which have bolted existing mounts. On models with riveted rear mount attachments locate new mounts centered on web of tunnel arch and $\frac{3}{16}$ inch above lower flange of 002-41000-17 and -18 doublers. Permanently bolt rear mounts in place.
17. Locate undrilled front vertical engine mount support channels (35-410446-171 and -172).
18. 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 isolators and then bolt front mounts and isolators 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).

19. Drill vertical supports (35-410446-171 and -172) and bolt in place. Use AN3 bolts with AN365 nuts to replace rivets in blind areas at lower edges as required.
20. Drill vertical supports and bolt in attach clips (35-410446-185) for forward engine mounts.
21. Rivet top gussets (002-410000-31 and -32) to vertical supports.
22. Remove clamps from wishbone angle (35-410446-239), trim bulkhead to match and rivet angle to bulkhead.
23. Install pan (35-410446-229) and rivet to wishbone angle. Permanently bolt front engine mounts in place (35-910027-11 and -9 Series III) or 35-910018-3 and -4 Series II).
24. Fit and rivet airbox assy. (35-919025-1) in place at station 12.125 bulkhead.
25. Modify nosebow intake area per 54-10-00 and 68B001, unless new late model nosebow is used.
26. Reinstall nosebow.

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.

