ANNUAL INSPECTION CHECKLIST

BEECHCRAFT MODEL E35 BONANZA

Table of Contents

Introduction

This inspection booklet is to perform several duties:

- Allow A&P mechanics to more easily inspect the aircraft's subsystems and components for airworthiness,
- Provide a handy 100 hour maintenance lubrication checklist as you go, and
- Provide a spot to check the aircraft's paperwork, mainly
  - On-board paperwork,
  - Airworthiness directive compliance, and
  - Service Bulletin compliance (optional)

This booklet is designed to be an easy-to-use checklist. Merely go down through the list of things to check, or items to perform, and check off the appropriate space(s) on the right.

Comments in the space should classify the inspected assembly as:

"G"ood, or Satisfactory (√).	√
"F"air, but could stand some work.	F
"P"oor - needs repairs (but it is still "airworthy).	P
"U"nairworthy - grounded until repaired.	U
(Does not apply).	. . .

Other indented lined area are provided for writing in information such as:

- Date / tach of last service _____
- Current pressure setting or wear length: _____
- Component serial number _____

This Annual Inspection guide was made by Ron Davis to assist in inspecting his 1954 E35 Bonanza (N3218C) equipped with the following features:

- E225-8 engine, with the Bendix PS-5C pressure carburetor and fuel primer,
- Electric prop w/ Airborne Electronics electronic prop governor,
- Sunrise spin-on oil filter adapter,
- Beryl D'Shannon air/oil separator,
- various radios and gadgets in the dashboard.

While this checklist is specifically tailored for a specific Bonanza, it should be useable for others with a minimum of plagiarism and modification. Others are free to use this form, but be forewarned that it may not be complete for other engines, fuel injection, hydraulic props, placards, radios, autopilots, and other features on other models.

The information in this booklet was collated from many different sources, such as Beech's Shop Manual, Beech's original "Model 35 Maintenance Manual", Norm Colvin's "Colvin's Clinic" book, American Bonanza Society magazine issues, Lawson Barber's Annual Inspection checklist, and probably other sources now forgotten. Wherever there was a conflict, I tried to use the most recent (most correct?) or "most logical" information.

This document has been created using Microsoft Word 97. There is an option of "hidden text" in use for features and options not used in N3218C. To turn them on, go to Tools > Options > View Tab, Nonprinting characters, and check the box for 'Hidden Text'. Now, the hidden text should be viewable.

Replacement Parts Needed

The following replacement parts will probably be needed to do the annual inspection:

Qty	Mf'r	Part Number	Description	Price	..As of..
var.	...	SAE 20	Lube oil		
var.	...	...	Spray lubricant like LPS-3 (*Not WD-40!*)		
var.	..	AN-G-15	Grease		
var.	...	AN-VV-0-366	(I think) Brake Fluid		
var.	...	0.000 stainless	Safety wire		
var.	...	...	Nuts, screws, washers, cotter pins		
Induction Air Filter					
1	Beech	BA-7112	Brackett air filter, foam	15.00	06/96
10 qts	Shell	Aeroshell W100	motor oil	20.00	06/96
2	Beech	AN900-10	oil drain plug copper crush gasket (not needed on N3218C)		
1	Champion	CH48109	oil filter	10.75	06/96
1	AOA	...	oil analysis sampling kit	11.95	01/98
Brake pads (Cleveland kit 199-50 for 6.50 x 8 and 7.00 x 8 wheels)					
8	Cleveland	66-044	lining	7.50	03/98
16	…	…	brake rivets	.15	03/98
or					
8	Rapco	RA66-44	lining	6.00	03/98
16	…	…	brake rivets	.15	03/98
Spark Plugs					
12	Champion	REM-40E	spark plugs, massive electrode	198.00	06/96
or 12	Champion	REM38P	spark plugs, fine-wire platinum	475.80	07/98
or 12	Auburn	SR-88	spark plugs, massive-electrode	167.40	07/98
or 12	Auburn	SR-83P	spark plugs, fine-wire iridium	462.00	07/98
or 12	Auburn	SR-93	spark plugs, fine-wire iridium	462.00	07/98
12	{?}	{?}	copper gaskets, 18mm	0.20	07/98
1	Champion	4 oz. bottle	Spark plug anti-seize compound	4.75	07/98
1	{?}	{?}	instrument vacuum filter, pleated paper type		
or 1	{?}	{?}	instrument vacuum filter, foam garter type		
1	Beech	365533	Bendix carburetor fuel screen gasket		
1	{?}	{?}	auxiliary fuel boost pump o-ring		
1/2 pint	Mobil	636	landing gear gearbox oil		
You may also need...					
1	{?}	{?}	Thompson TF-1900 fuel pump drive pin		
2	{?}	352065	Thompson TF-1900 fuel pump gasket		
or 2	{?}	AN4045-1	Thompson TF-1900 fuel pump gasket (not sure which is the right part #)		
-or-					
1	{?}	1991	"Aviation Consumer" fuel pump rebuild kit	157.00	10/97
2	Beech	31-408	(unknown brand motor) propeller pitch motor brushes		
2	Beech	535324	Bendix magneto mounting gasket		

1	Beech	530341 (3/8")	Ecllipse starter motor mounting gasket		
4	Beech	839317	Eclipse starter motor brushes		
1	Beech	352066 (1/2")	Delco-Remy generator mounting gasket		
2	Beech	1866148	Delco-Remy generator brushes		
2	Beech	35107-A	"Lamb" or "Aero Electric" landing gear motor brushes		
2	Beech	R-457-0627-475	"Lamb" or "Aero Electric" flaps motor brushes		
1	Airtex	00-60-62	"Dorne & Margolin" ELT battery	15.00	06/96
1	Jeppesen	DTRM3202	Trimble 1000DC GPS data card (1-time update)	153.00	08/97
2	Duracell	D-cell	Flashlight batteries	2.50	

... plus whatever parts you find that needs replacing during the inspection.

Component Serial Numbers

Component serial numbers will be requested during the inspection to ensure that they have not been mysteriously replaced without a log entry since the last inspection. They need not be checked against the records right now, but if a question arises later, this record will attest to the fact that a particular component was installed at the date of the inspection.

ANNUAL INSPECTION CHECKLIST

Inspection Date : _____

Inspector : _____

Registration No. : N3218C

Aircraft Make : Bonanza
Aircraft Model : E35
Aircraft Year : 1954
Aircraft serial number : D-3882

Engine : Continental E-225-8
Engine serial number : 35922-D-2-8-R

_____ Tach Time + 6431.2_____ = _____ TTAF

_____ Tach Time + 3021.5_____ = _____ TTEngine

_____ Tach Time - 597.0_____ = _____ SMOH

Directions for the inspection:

[ ] Perform the Inspection
[ ] Perform other regulatory inspections (i.e. Pitot/Static check, Transponder/Altimeter check, etc.)
[ ] Perform periodic service (oil, filters, 50-hr, 100-hr, etc.)

[ ] Automatically repair / replace equipment which is in an "unairworthy" condition.
[ ] Advise owner of equipment in "unairworthy" condition first before doing any work.

[ ] Automatically repair / replace equipment which is in a "poor but airworthy" condition.
[ ] Advise owner of equipment in "poor but airworthy" condition first before doing any work.

[ ] Automatically perform all uncomplied Airworthiness Directives.
[ ] Advise owner of uncomplied Airworthiness Directives before doing any work.

[ ] Automatically perform all uncomplied Service Bulletins.
[ ] Advise owner of uncomplied Service Bulletins before doing any work.

This is really meant to be just an inspection (and maybe a periodic service), not a carte-blanche repair order.
Once the inspection is complete, you can review this with the owner, showing him what "must" be repaired, and also the optional items that you think "should" be repaired. The owner will make the decisions from there.

Other Instructions:

Logbook Entries

Several Service / overhaul decisions are made depending on the time-in-service, so to make things easier, go through the logbooks now and find the Date / tach time for the most recent service or overhaul of the following components:

NOTE: Most 100-hr. service items are automatically assumed to be performed during this inspection, and are not listed below.

	Date Last Serviced	Tach Time Last Serviced	Service Interval	Date / Tach of Next Service
1. Propeller service			250 hrs	
2. Propeller overhaul			1000 hrs	
3. Propeller pitch motor brushes			200 hrs	
4. Induction air filter			100 hrs	
5. Major engine overhaul			1500 hrs	
6. Engine oil change			50 hrs	
7. Spark plug inspection			25 hrs	
8. Thompson TF-1900 fuel pump drive pin			250 hrs	
9. Fuel lines replaced			5 yrs / overhaul	
10. Oil lines replaced			5 yrs / overhaul	
11. Starter motor brushes			200 hrs (?)	
12. Generator brushes			200 hrs (?)	
13. Air / oil separator			400 hrs	
14. Instrument vacuum filter			250 hrs	
15. Altimeter check:			24 months	
16. Transponder check:			24 months	
17. Pitot / static air check:			24 months	
18. Landing gear motor brushes			200 hrs (?)	
19. Flap motor brushes			200 hrs (?)	
20. ELT battery:			24 months	

NOTE: Components are listed in order of nose-to-tail

Physical Examination / Placard Check / Basic Lubrication

Note: Do not wash the plane before inspection.
The dirt and oil patterns may make it easier to discern hidden problems.

Exterior Check

Propeller

1. Spinner
   Check spinner for dents, cracks and security. _____

   Remove spinner
   Note: The mounting screws should be replaced "periodically" (say, 5 years), as they tend to become difficult to remove with age.

2. Spinner bulkhead
   Check for cracks and security _____

3. Propeller hub
   Look for grease leakage at the blade hub juncture caused by overgreasing.
   Also check for cracks, security and cleanliness. _____

4. Blades
   Beech 215-series (electric prop) aluminum blades:
   a) Check blades for damage, especially on the leading edge and on the back face. Look closely at any previous repair of rock damage, especially if file marks appear. Remove *any* nicks or file marks that are found. They should be polished out with crocus cloth. Even a file mark will cause a stress concentration that can start a crack. _____
   b) Look for cracks across the face of the blade.
   Such cracks indicate blade stress and imminent failure _____
   c) Blades should have a small amount of movement (about 1/8" - 1/4"), fore and aft, at the tip. This play is necessary to ensure free movement and to avoid overloading of the blade bearings. _____
   d) Check the play or looseness of the pitch control mechanism. _____
   e) Lube propeller blade bearings
   Date / tach of last service _____
   Hand pack grease every 250 hrs. _____
   (See Service Hints for packing the propeller pitch change bearing)

5. Propeller attach bolts
   Look for loose prop attach bolts, or signs of oil coming from the prop hub that would indicate a crack.

6. Check exposed area of crankshaft between prop and engine for signs of oil leaks that result from a crack in the crankcase. _____

7. Crankshaft seals
   Check front crankshaft seals for signs of leakage. _____

Fuselage - Left
Fuselage - Left - Nose

1. Nose cowling (nose bug)
   Check around the spinner cutout in the nose bowl for cracks.
   Stop-drill those of minor nature. More severe cracks should be repaired by patching or welding. _____

2. Air induction grill _____

   Remove air induction grill

3. Air induction filter
   a) Date / tach of last service _____
   b) Condition
      Look at the air induction filter. It will tell you if the plane was flown out of dirt strips or not. If it was, then pay particular condition to the propeller blade (rock nicks) and landing gear (proper strut extension and mud in the wheel wells). _____
   c) Service filter _____
      c3. Brackett foam filter (Brackett part# BA-7112)
      Replace the filter every 100 hrs.

Fuselage - Left - Forward of Wing

1. Exterior skin
   This should include a thorough inspection of the exterior skins from the firewall forward, less the cowling and cowl flaps.
   Inspect for damage, cracks, and worn rivets. The most prevalent spot for worn rivets is in the nacelle skin tie to the firewall just above the cowl flap areas on both sides. In early stages, they show up as black stains around the affected rivets. They should be replaced when stains or looseness are found. _____

2. Oil filler door
   a) Condition _____
   b) Placard check _____

OIL
USE SAE 50 ABOVE 40° F
USE SAE 30 BELOW 40° F

   c) Placard check _____

OIL CAPACITY
MAX: 10 U.S. QTS.
MIN: 8 U.S. QTS

3. Cowling door (left):
   a) Exterior condition _____
   b) Proper operation _____
   c) Interior condition _____
   d) Fasteners _____
      The top and side cowls should be checked for fit and wear, and fasteners for condition. Worn fasteners should be replaced.
      A thin coat of silicone sealer can be applied to the nacelle surfaces that the cowls ride on. This will eliminate the metal-to-metal contact and do away with black streaks (of oxidized aluminum).

4. Engine cheek cowl panel (left):
   Side cowls worn to the point where Airloc studs will not stay in the cowl panel should be replaced.
   a) Condition _____
   b) Proper operation _____

c) Interior condition _____

5. Nosewheel strut hinge bolt cover (left) _____

6. Cowl flap (left)
(See Engine Compartment section)

7. Phono jack under window - placard check _____

GROUND HERE

8. Pilot's storm window:
a) Condition _____

9. Front-seat window (left): _____
a) Condition _____

10. Rear-seat window (left): _____
a) Condition _____

Wing - Left

Wing - Left - Leading Edge

1. Cabin air vent intake screen _____

2. Wing root - leading edge - placard check _____

NO STEP

3. Fuel filler door
a) General condition _____
b) Placard check _____

FUEL 20 US GAL (17 USABLE)

c) Placard check _____

USE GRADE 80 AVIATION FUEL ONLY

d) Placard check _____

CAUTION DO NOT INSERT FUEL NOZZLE MORE THAN 3" INTO TANK

4. Fuel cap
Check for proper sealing.
Also check for signs of leaks _____

5. Fuel cell
Look inside the cell to see if the cell has wrinkled or collapsed. _____

6. Landing light lens condition _____

7. Stall warning detector _____
   (Test will be done later)

Wing - Left - Wingtip

1. Wingtip assembly _____

2. Navigation light (red) _____

3. Navigation light indicator lens _____

Wing - Left - Trailing Edge

1. Aileron (left):
   a) General condition _____
   b) Attachment (hinges) _____
   c) Alignment
      Check the gap between the aileron and the trailing edge.
      The gap should be the same. If the gap is wider at either end, chances are it was installed wrong, and one of the aileron hinges is not in its bolt mounting hole. _____
   d) Freedom of movement _____
   e) Full travel
      Deflect the aileron against its down-travel stop.
      up: $20^o \pm 1^o$ down: $20^o \pm 1^o$
      It should hit the stop in the wing before it hits the stop in the control column. _____
   f) Counterweights
      With the aileron against its stop,
      Strike the trailing edge with your fist, and listen for any rattling noise that would indicate loose counterweights. _____
   g) Trim tab _____
   h) Push up and down on the aileron.
      Listen for a thumping noise in the nose gear well. If you do, it is probably caused by a worn nose steering idler arm. Check for frayed aileron cables at the pulleys below the floorboards and just aft of the firewall. I would suspect the chain tension inside the control arm is the most likely spot.

2. Flaps - placard check
   a) On flap leading edge – flaps extended 10° _____

10°

   b) On flap leading edge – flaps extended 20° _____

20°

   c) Trailing Edge of Flap _____

NO STEP

3. Flap (left):
   a) Inspect flap skins for condition.
      Especially so where the flap actuator attaches to the flap - any deformation indicates a broken bulkhead inside the flap. _____
   b) Attachment _____
   c) Bearings
   e) Actuators _____
   f) Alignment with other flap
      Check for flap looseness at the trailing edge.
      If there is movement, go to the right-hand flap.

If there is no free movement on the right flap, squawk the flap adjustment.
The right flap is a slave to the left flap; you don't want the right flap to stop (up or down) before the left.

g) Limit switches - check for alignment and accuracy.

Wing - Left - Topside

1. Wing: general condition
   Check for a bump in the area above the landing gear, indicating that the gear is/was improperly rigged, and is striking the top of the wheel bay from below.

2. Wing bolt: forward bathtub drain
   If wing has been re-attached, wing bolt must be re-torqued (once) after 100 hrs.

3. Wing bolt: rear bathtub drain
   If wing has been re-attached, wing bolt must be re-torqued (once) after 100 hrs.

Wing - Left - Underside

1. Wing: general condition

2. Jack attach point - placard check

   JACK ATTACH POINT

3. Fuel sump
   a) Check for leaks or stains
   b) Placard check

   FUEL CELL SUMP
   DRAIN DAILY

   Remove inspection cover 1 (by landing light)
   Remove inspection cover 2 (oval inspection cover)
   Remove inspection cover 3 (circular inspection cover)

4. Fuel cell forward vent (overfill vent)

6. Possible fuel cell leakage
   a) Look for fuel stains at the lower fuel cell area (trailing edge)
   b) Look for fuel stains along the bottom front spar, around the front lower spar bathtub drain.
   c) Look for fuel stains along the bottom wing root fairing.
   Fuel cell leaking? Check the gaskets & connections first. Also check to see if it has jillions of pinhole leaks.

7. Anti-siphon valves for operation

8. Fuel cell rear vent
   a) Note the position of the fuel vent.
   It should stick out 1-3/4 inch, angle forward 10°, and chamfered forward about 45°.
   b) Look for fuel stains around the vent.
   If present, check the siphon break vent hole in the bottom wing just outboard of the fuel tank end.
   Talk to the owner about fuel siphoning through the vents.

10. Pitot tube

11. Tiedown ring _____

Fuselage - Left

Fuselage - Left - Aft of Wing

1. Aux. fuel:
   a) Filler door _____
   b) Placard check _____

FUEL 10 US GAL

   c) Placard check _____

USE GRADE 80 AVIATION FUEL ONLY

   d) Fuel cap
   Check for proper sealing.
   Also check for signs of leaks. _____
   e) Rubber collar _____
   f) Fuel vent _____
   g) Fuel drain (belly) _____

2. Phono jack - placard check _____

GROUND HERE

3. Behind 2nd window
   a) Placard check (1) _____

L P E O V I E N L T

   b) Placard check (2) _____

L P E O V I E N L T

4. Static air vent (left) _____
   a) Condition _____
   b) Placard check _____

STATIC AIR KEEP CLEAN

Fuselage - Tail

Remove tail fuselage side access door
Remove tailcone - be careful of the tail light wiring.

1. Check fuselage skins in the stabilizer area and the ruddervator skins for condition and distortion.
   a) Left side: _____
   b) Right side: _____
   c) Note left rudervator serial number at tip _____
   c) Note right rudervator serial number at tip _____

2. Ruddervator fuselage side access door
   a) Tailcone bulkhead
      This is the vantage point to view the tailcone bulkhead.
      Examine it closely!
      This is the stabilizer attach bulkhead which will show buckling or warping if there has been any overstress on the tail (the infamous v-tail problem).
      Take special pains to look for cracks, too. _____
   b) Lubricate ruddervator differential control every 100 hrs. _____

3. Check the rudder spar and bell crank welds for cracks and rust. _____

4. Check control cables for condition and correct routing.
   Standard check procedures calls for inspection of control cables both visually for condition and by slipping a cloth along the cable which will detect broken cable strands that eventually could lead to further deterioration. _____

5. Elevator cable tension
   min: 22 lbs max: 32 lbs @ 70°
   Cable tension is: _____

6. Elevator trim tab cable tension
   min: 17 lbs max: 22 lbs @ 70°
   Cable tension is: _____

7. Elevator push-pull rods
   a) Rotate the push-pull rods.
      They should have "some" rotation. _____
   b) Check elevator push-pull rods for service bulletin / AD compliance.
      Beech Service Bulletin Number 989 or 2188 or AD 97-06-11 _____

8. Ruddervator (left):
   Remove the upper inspection cover
   a) Condition
      Inspect the v-tail stabilizers for skin distortion at both spar root ends. _____
   b) Lower stabilizer spar bolt _____
   c) Check the actuator arms on the ruddervator root end for security of attachment and for cracks. _____
   d) Check actuator castings for security to the control surface. _____
   e) Check the ruddervator skin around the castings for cracks. There must not be *any*. If there are, then ground the plane. _____
   f) Check the inboard ruddervator hinge bearing for wear and end play.
      Wear / play limits are ± 0.000" (?) _____
   g) Check the outboard hinge bearing for wear, and visually check the counterweight for security. _____
   h) Note the condition of paint on the elevator skins.
      If paint is thick and heavy, question the owner about elevator balance. Elevators are very difficult to balance, and the weight of a heavy coat of paint may make it impossible to balance

properly.
Proper travel is:
up: 22-1/2° ± 1° down: 17-1/2° ± 1° _____
Overall travel is:
up: 35° ± 2° down: 30° ± 2° _____

9. Ruddervator trim tab (left)
   a) Note the condition of the trim tab. _____
   b) Check the trim tab hinge for security and proper hinge rig.
   The trim tab airfoil should appear as "upside down". _____
   c) Check the trim tab actuator linkage for accumulated wear. _____
   d) Check for proper hinge installation and clevis bolt tension at the trim tab horn, paying particular attention to the exposed tab cable for rust.
   The bolt should be snug, but not so tight as to bind the cable clevis. _____
   e) Check for frayed or damaged trim tab cable _____

10. Left ruddervator tip - placard check _____

NO HANDLE

11. Navigation light (white) _____

12. Tail tiedown ring _____

13. Ruddervator (right):
   Remove the upper inspection cover
   a) Condition
   Inspect the v-tail stabilizers for skin distortion at both spar root ends. _____
   b) Lower stabilizer spar bolt _____
   c) Check the actuator arms on the ruddervator root end for security of attachment and for cracks. _____
   d) Check actuator castings for security to the control surface. _____
   e) Check the ruddervator skin around the castings for cracks. There must not be *any*. If there are, then ground the plane. _____
   f) Check the inboard ruddervator hinge bearing for wear and end play.
   Wear / play limits are ± 0.000" (?) _____
   g) Check the outboard hinge bearing for wear, and visually check the counterweight for security. _____
   h) Note the condition of paint on the elevator skins.
   If paint is thick and heavy, question the owner about elevator balance. Elevators are very difficult to balance, and the weight of a heavy coat of paint may make it impossible to balance properly.
   Proper travel is:
   up: 22-1/2° ± 1° down: 17-1/2° ± 1° _____
   Overall travel is:
   up: 35° ± 2° down: 30° ± 2° _____

14. Ruddervator trim tab (right)
   a) Note the condition of the trim tab. _____
   b) Check the trim tab hinge for security and proper hinge rig.
   The trim tab airfoil should appear as "upside down". _____
   c) Check the trim tab actuator linkage for accumulated wear. _____
   d) Check for proper hinge installation and clevis bolt tension at the trim tab horn, paying particular attention to the exposed tab cable for rust.
   The bolt should be snug, but not so tight as to bind the cable clevis. _____
   e) Check for frayed or damaged trim tab cable _____

15. Right ruddervator tip - placard check _____

NO HANDLE

Leave tail fuselage side access door removed until service has been done
Leave ruddervator belly access panel removed until service has been done
Leave tail cone removed until service has been done

Fuselage - Belly

1. Fuel selector sump
   a) Access door: condition _____
      Examine the fuel selector sump access door.
      If this does not have a wing nut on the door, then suggest that one be added to simplify preflights. The necessary parts are:
      WL 98293-1-060 Wing Nut Dzus Fastener
      99785-2 Pin (TRW Electric Components)
   b) Placard check _____

FUEL STRAINER DRAIN DAILY

   c) Placard check _____

WARNING FUEL STRAINER MUST BE INSTALLED FIRST WITH FLANGED END UP TOWARD SELECTOR VALVE, FOLLOWED BY SPRING.

   d) Fuel selector sump screen
      Access to the fuel selector sump screen, which is located in the bottom of the fuel selector pump unit, is through the access door in the fuselage beneath the fuel unit.
      Service the sump screen every 100 hrs.
      (Make sure the fuel selector is in the "off" position...)
      Check for corrosion and unusual amounts of collected sediment, dirt, lint, etc. _____

2. Landing gear limit switches: access door condition _____

Remove access door 1 (landing gear actuator)
Remove access door 2 (below rear seat)
Remove access door 3 (at tailcone near the identification plate)

3. Jack attach point - placard check _____

JACK ATTACH POINT

4. Aux fuel sump drain - placard check _____

FUEL CELL SUMP DRAIN DAILY

5. Antennas:
   a) Transponder ("blade" antenna) _____
   b) DME ("blade" antenna - no longer used: Jun 1997) _____

c) Localizer ("sled" antenna) _____
d) VOR ("Vee" antenna) _____

6. Baggage compartment belly air exhaust vent _____

7. Strobe light _____

8. Identification placard
a) Placard check _____

MANUFACTURED BY
BEECH AIRCRAFT CORPORATION
WICHITA KANSAS

SERIAL *D-3882* MODEL *E35*
DATE MFD *07-54*
ENGINE *E225-8*

LICENSED UNDER U.S. AIRPLANE
PATENTS OF ALL MEMBERS
MANUFACTURERS AIRCRAFT ASSOCIATION

MAA PLATE NO 220640

Fuselage - Right

Fuselage - Right - Aft of Wing

1. Static air vent (right)
a) Condition _____
b) Placard check _____

STATIC AIR
KEEP CLEAN

2. Baggage door:
a) Condition _____
b) Seals and fit _____
c) Lock _____

3. Entry assist step: condition _____

Fuselage - Top

1. Windshield: condition _____

2. Antennas:
a) ADF Sense ("ice detector" AM/FM radio) antenna _____
b) Forward dorsal (com-1 ?) antenna _____
c) GPS ("square pad") antenna _____
d) ELT ("whip") antenna _____
e) Rear dorsal ("dog-leg") antenna _____

3. Cabin air exhaust vent _____

4. Air conditioner intake scoop:

a) Condition _____
b) Proper operation _____

5. Rotating beacon _____

Wing - Right

Right Wing - Leading Edge

1. Cabin air vent intake screen _____

2. Wing root - leading edge - placard check _____

> NO STEP

3. Fuel filler door
   a) General condition _____
   b) Placard check _____

> FUEL
> 20 US GAL
> (17 USABLE)

   c) Placard check _____

> USE GRADE
> 80 AVIATION
> FUEL ONLY

   d) Placard check _____

> CAUTION
> DO NOT INSERT
> FUEL NOZZLE MORE
> THAN 3" INTO TANK

4. Fuel cap
   Thermos-style cap:
   a) Check for proper sealing. _____
   b) Also check for signs of leaks _____

5. Fuel cell
   Look inside the cell to see if the cell has wrinkled or collapsed. _____

6. Landing light lens condition _____

Right Wing - Wingtip

1. Wingtip assembly _____

2. Navigation light (green) _____

3. Navigation light indicator lens _____

Right Wing - Trailing Edge

1. Aileron (right):
   a) General condition _____
   b) Attachment (hinges) _____
   c) Alignment
      Check the gap between the aileron and the trailing edge.
      The gap should be the same. If the gap is wider at either end, chances are it was installed wrong, and one of the aileron hinges is not in its bolt mounting hole. _____
   d) Freedom of movement _____
   e) Full travel
      Deflect the aileron against its down-travel stop.
      up: 20º ± 1º down: 20º ± 1º
      It should hit the stop in the wing before it hits the stop in the control column. _____
   f) Counterweights
      With the aileron against its stop,
      Strike the trailing edge with your fist, and listen for any rattling noise that would indicate loose counterweights. _____
   g) Trim tab _____
   h) Push up and down on the aileron.
      Listen for a thumping noise in the nose gear well. If you do, it is probably caused by a worn nose steering idler arm. Check for frayed aileron cables at the pulleys below the floorboards and just aft of the firewall. I would suspect the chain tension inside the control arm is the most likely spot.
      _____

2. Flap (right):
   a) Inspect flap skins for condition.
      Especially so where the flap actuator attaches to the flap - any deformation indicates a broken bulkhead inside the flap. _____
   b) Attachment _____
   c) Bearings
   d) Actuators _____
   e) Alignment with other flap
      Check for flap looseness at the trailing edge. There should be "some" at the right-hand flap.
      The right flap is a slave to the left flap; you don't want the right flap to stop (up or down) before the left. _____
   f) Trailing edge - outboard of wing walk surface - placard check _____

NO STEP

Right Wing - Topside

1. Wing: general condition
   Check for a bump in the area above the landing gear, indicating that the gear is/was improperly rigged, and is striking the top of the wheel bay from below. _____

2. Wing bolt: forward bathtub drain _____
   If wing has been re-attached, wing bolt must be re-torqued (once) after 100 hrs. _____

3. Wing bolt: rear bathtub drain _____
   If wing has been re-attached, wing bolt must be re-torqued (once) after 100 hrs. _____

4. Wing walk _____

Right Wing - Underside

1. Wing: general condition _____

2. Jack attach point - placard check _____

JACK ATTACH POINT

3. Fuel sump
   a) check for leaks or stains _____
   b) Placard check _____

FUEL CELL SUMP DRAIN DAILY

   Remove inspection cover 1 (by landing light)
   Remove inspection cover 2 (oval inspection cover)
   Remove inspection cover 3 (circular inspection cover)

4. Fuel cell forward vent (overfill vent) _____

5. Possible fuel cell leakage
   a) Look for fuel stains at the lower fuel cell area (trailing edge) _____
   b) Look for fuel stains along the bottom front spar, around the front lower spar bathtub drain. _____
   c) Look for fuel stains along the bottom wing root fairing. _____
   Fuel cell leaking? Check the gaskets & connections first. Also check to see if it has jillions of pinhole leaks.

6. Anti-siphon valves for operation _____

7. Fuel cell rear vent
   a) Note the position of the fuel vent.
   It should stick out 1-3/4 inch, angle forward 10°, and chamfered forward about 45°. _____
   b). Look for fuel stains around the vent.
   If present, check the siphon break vent hole in the bottom wing just outboard of the fuel tank end.
   Talk to the owner about fuel siphoning through the vents. _____

8. Tiedown ring _____

Fuselage - Right

Fuselage - Right - Forward of wing

1. Exterior skin
   This should include a thorough inspection of the exterior skins from the firewall forward, less the cowling and cowl flaps.
   Inspect for damage, cracks, and worn rivets. The most prevalent spot for worn rivets is in the nacelle skin tie to the firewall just above the cowl flap areas on both sides. In early stages, they show up as black stains around the affected rivets. They should be replaced when stains or looseness are found. _____

2. Grounding jack - placard check _____

GROUND HERE

3. Cowling door (right):
   a) Exterior condition _____
   b) Proper operation _____
   c) Interior condition _____
   d) Fasteners _____
      The top and side cowls should be checked for fit and wear, and fasteners for condition. Worn fasteners should be replaced.
      A thin coat of silicone sealer can be applied to the nacelle surfaces that the cowls ride on. This will eliminate the metal-to-metal contact and do away with black streaks (of oxidized aluminum)

4. Engine cheek cowl panel (right):
   Side cowls worn to the point where Airloc studs will not stay in the cowl panel should be replaced.
   a) Condition _____
   b) Proper operation _____
   c) Interior condition _____

5. Nosewheel strut hinge bolt cover (right) _____

6. Cowl flap (right)
   (See Engine Compartment section)

7. Cabin door:
   a) Condition _____
   b) Seals and fit (closed) _____
   c) Door handle / lock
      c1. Condition _____
      c2. Lubricate door handle / lock every 100 hrs. _____
   d) Door latching mechanism (upper)
      d1. Condition _____
      d2. Lubricate upper door latching mechanism every 100 hrs. _____
   e) Door latching mechanism (lower)
      e1. Condition _____
      e2. Lubricate lower door latching mechanism every 100 hrs. _____
   f) Door hinges _____
      f1. Condition
         To check the door for looseness or poor fit, open the door up to its full open position and lift up on the door to see if there is any play.
         For instructions on replacing worn hinges, see the Service Hints section.
      f2. Lubricate door hinges every 100 hrs. _____
   g) Hold-open arm _____

8. Close and latch the cabin door.

Check pressure to actuate the inside door handle, as the top latch breaks over the cam lock. _____

9. Front-seat window (left): _____
   a) Condition _____

10. Rear-seat window (left): _____
    a) Condition _____

Landing Gear

Landing Gear - Nose Gear

1. General attachment _____

2. Wheel bay:
   a) Condition _____
   b) Oil sump drain plug _____
   c) Fuel overflow drain tube
   This tube should have a loop in it at the top of the bay to prevent fuel siphoning. _____

3. Left nosewheel gear door:
   a) Condition _____
   b) Weatherstripping _____
   c) Linkage and attachment _____
   d) Lubricate nosewheel gear door hinges every 100 hrs. _____
   e) Lubricate nosewheel gear door hinge points every 100 hrs. _____

4. Right nosewheel gear door:
   a) Condition _____
   Check for nicks or scrapes 3/4 of the way down the door, indicating possible interference with the nosewheel scraper attach bolt.
   b) Weatherstripping _____
   c) Linkage and attachment _____

5. Door closing mechanism
   a) Linkage and attachment _____
   b) Lubricate nosewheel gear door closing mechanism every 100 hrs. _____

6. Gear retract mechanism
   a) Condition _____
   b) Linkage and attachment _____
   c) Lubricate nosewheel gear retract mechanism every 100 hrs. _____

7. Nosewheel gear retract rod
   a) Condition _____
   b) Linkage and attachment _____
   c) Placard check (2 placards) _____

HEAT TREATED ASSEMBLY

8. Nosewheel steering mechanism:
   a) Linkage and attachment _____
   b) Canvas boot _____
   c) Lubricate steering mechanism every 100 hrs. _____
   d) Lubricate steering mechanism linkage every 100 hrs. _____

9. Nosewheel gear assist step retract cable
   a) Cable condition
   Look at the cable in the nosewheel well for broken strands. The cable tends to fray and break at the small pulley just behind the nose gear attach point. _____
   b) Fittings & rubber hose / shield _____
   c) Check for the presence of the aluminum shear link on the fitting (should the assist step jam, the shear link is supposed to break so the landing gear may retract) _____
   d) Cable down-tension
   min: 45 lbs max: 65 lbs

Cable tension is: _____

e) Check the clearance between the assist step cable housing and the fuel pressure indicator line inside the nosewheel well. There should be at least 1" of clearance between the two to keep the cable from chafing the fuel line. _____

f) Lubricate the assist step pulley wheel _____

10. Nosewheel strut:

Models 35 - G35 (open-casting strut):

a) Condition
Check strut for corrosion in the lower area. _____

b) Check for waterproof patches over the lightening holes.
The patches will keep water from soaking the oiled felt pad at the bottom of the strut and corroding the magnesium strut. _____
Install waterproof patches if there aren't any.
Some will go so far as to have an aluminum plate fabricated to cover the holes - an excellent idea.

c) Check for leakage _____

d) Proper extension
Proper extension is (600 (150?) lbs pressure, strut compressed; 80 lbs pressure, strut extended):
min extension: 5" max extension: 5-1/2"
Strut extension length is: _____
Nosewheel strut going flat? Check for a bad schrader valve core.

e) Nosewheel strut - placardm ceck
f1) Placardm ceck _____

> Beechcraft
> OIL AIR STRUT
> Beech Aircraft Corporation
> Wichita, Kansas USA
> -
> INSTRUCTIONS
> Tom ceck fluid and fill
> Remove valve cap. Depress valve core and allow strut to fully compress. Then raise and block strut 1/4 inch from compressed position.
> Remove valve body assembly and fill with hydraulic oil conforming to instruction manual specifications. Slowly extend strut from blocked position and replace valve body assembly. Depress valve core and completely compress strut to release excess air and oil.
> With airplane empty except for full fuel and oil keep strut inflated to 3-1/2 inches of piston showing.
> WARNING
> Release air in strut before disassembling
> -
> Built under one or more of the following Beech patents patents pending.

11. Nosewheel strut - service

a) Strut felt pads
There is a felt pad at the bottom of the strut.
They keep water out of the (open-casting version) strut.
Lubricate the felt pads with oil every 100 hrs.
If it doesn't get done often enough, the bronze bearing will get dry and seize. Make sure it is well soaked, so water will not sit there and begin corrosion. _____

b) Zerk fittings

Grease all zerk fittings every 100 hrs. _____

12. Shimmy dampener:
    a) Condition _____
    b) Reservoir
    Check the fluid reservoir
    Insert a wire in the aft end of the piston (you might have to spread the cotter key to do this).
    Full: 2-3/16" Empty: 3-3/16"
    Reservoir level is: _____
    To service the shimmy dampener, see the Service Hints section.

13. Nosewheel Scraper
    a) Scraper - condition: _____
    b) Attachment _____
    If the nosewheel was recently serviced, and the nosewheel scraper removed and reinstalled, then the right side attach bolt for the nosewheel may have been replaced with one that is too long, and the difference made up by adding a few washers. This extra-long bolt can now catch on the nosewheel door during retraction, causing complete nose gear failure.
    Make sure the bolts are the proper size. The Beech manual calls out:

Left side:	pg 2-86, item 50-41:	part# AN4-21A {?}
Left side:	pg. 2-84, item 49-7:	part# AN4-4A {?}
Right side:	pg. 2-84, item 49-12:	part# AN74-3

    c) Ground wire - condition _____
    The ground wire need not drag along the ground. It is to discharge static electricity on touchdown. With the wheels and struts properly inflated, the ground wire should be between 1/4" and 1/2" from the ground.

14. Nosewheel taxi light
    a) Housing - condition _____
    b) Wiring - condition _____

15. Wheel
    a) Condition _____

16. Tire:
    a) Condition _____
    b) Proper inflation
    5.00 x 5: 28 lbs
    Inflation is: _____

Landing Gear

Landing Gear - Main - Left

1. General attachment _____

2. Outer door:
   a) Condition _____
   b) Weatherstripping _____
   c) Hinges _____
   d) Linkage and attachment
      Check the bolts that attach the gear doors to the gear attach rods are both facing aft as they are supposed to. Otherwise there will be interference at the main strut, leaving a paint chip on the strut. _____
   e) Lubricate outboard door hinges every 100 hrs. _____

3. Inner door:
   Will be checked during Gear Retraction Test

4. Inner Door closing mechanism
   Will be checked during Gear Retraction Test

5. Wheel bay:
   a) Note wing serial number at wing root _____
   b) Condition _____
   c) Canvas boot over flap mechanism _____
   d) Retract rod linkage condition
      Look behind the canvas boot to see it _____

6. Gear retract mechanism:
   a) Retract rod play (twist 1/8 turn) _____
   b) Lubricate retract rod every 100 hrs. _____

7. Main Gear Uplock System
   The uplock bracket and block are located at the top inboard position of each main gear. Unsnap and peel back the canvas cover and inspect the uplock bracket for the following:
   a) Check for cracks _____
   b) Check that the uplock bracket is not bent where the uplock cable attaches to it. _____
   c) Make sure that the bolt that attaches the uplock cable to the uplock bracket points *forward* (screw head aft).
      The bolt position is covered in Beech Service Instruction 0680-211. _____
   d) Make sure that the uplock spring (part # 35-815115, or part # 100942C0020-31) located between the uplock bracket and the outer wing rib of the wheel compartment is in good condition. *Absolutely no corrosion*. The uplock spring is *VERY IMPORTANT.*
      This spring is the sole means of pulling the uplock bracket and uplock block clear of the uplock roller, thus allowing main gear extension. If there is any question as to the uplock spring condition, replace it.
      Also, check for elongation of the hole where the uplock spring attaches to the wing rib. _____
   e) Closely inspect the uplock cable for broken strands and corrosion where it is swaged into the outboard terminal. This is usually where the uplock cable breaks. _____
   f) Check cable tension
      min: 52-1/2 lbs max: 52-1/2 lbs
      Cable tension is: _____
   g) A short piece of rubber hose should be attached to the outboard end of the uplock cable outer housing. This hose prevents interference of the uplock roller lubrication fitting with the uplock cable.
      This subject is covered in Beech Service Instruction 0448-211. _____

i) Inspect that the uplock roller turns freely.
The roller bearing should roll with a twist of the fingers.
Bearing-to-block clearance is about 0.010" - 0.020" (about 1/64", or the thickness of a razor blade)
If not, check the vee brace to the wing skin first - it should be 1/16".
Get this right first, then adjust the uplock spacing. _____

j) Lubricate the uplock roller every 100 hours.
This complies with AD 72-22-01. _____

k) Check the uplock block for signs of contact with the roller.
The uplock roller and uplock block should not ever touch.
The owner can check this by smearing grease on the outside of the roller, and retract the gear a couple of times. You can tell after a few retractions if the two are contacting. _____

l) Check the uplock block hinge bolt and holes for wear. _____

m) Check the canvas boot over uplock block mechanism for holes _____

n) It is important to keep the canvas covers
(part # 35-815156-4 left hand, # 35-815156-5 right hand)
in good condition because they prevent the uplock cables from fouling with the top wing skin ribs.
If the canvas cover or uplock springs need to be replaced, the easiest way to install them is to remove the uplock bracket from the gear. When replacing an uplock spring, do not pry open the ends of the spring. It is a tough fit, but install the spring as it is supplied from Beech. _____

8. Strut:

a) Condition
Look for paint chipping on the lower saddle piece surrounding the main strut (the saddle piece is part of the "outrigger" struts).
If there is chipped paint, then check to see if the bolt attaching the outboard door to the link rod is installed backwards.
This bolt should point *rearward* (screw head forward). _____

b) Check for leakage _____

c) Proper extension (200 (300?) lbs pressure, strut compressed; 40 lbs pressure, strut extended)
min: 3" max: 4-1/2"
Strut extension length is: _____

d) Proper operation
Put your back under the wing spar near the tip, and using yourself as a human jack, lift the wingtip up and down several times, and observe the operation of the landing gear strut.
If the strut sticks or extends jerkily or groans while extending and compressing, then the strut may be low on fluid. Refer to the Service Hints section to refill the struts. _____

e) Placard check _____

Beechcraft
OIL AIR STRUT
Beech Aircraft Corporation
Wichita, Kansas USA

- -

INSTRUCTIONS
To check fluid and fill
Remove valve cap. Depress valve core and allow strut to fully compress. Then raise and block strut 1/4 inch from compressed position.
Remove valve body assembly and fill with hydraulic oil conforming to instruction manual specifications. Slowly extend strut from blocked position and replace valve body assembly. Depress valve core and completely compress strut to release excess air and oil.
With airplane empty except for full fuel and oil keep strut inflated to 3 inches of piston showing.
WARNING
Release air in strut before disassembling

9. Strut: service
   a) Lubricate main gear hinge points every 100 hrs. _____
   b) Lubricate main gear torque knee every 100 hrs. _____
   c) Lubricate main gear retract links every 100 hrs. _____
   d) Zerk fittings
      Grease all zerk fittings every 100 hrs. _____

10. Strut brace
    a) Condition _____
    b) Placard check (2 placards) _____

HEAT TREATED ASSEMBLY

10. Wheel
    a) Condition _____

11. Tire:
    a) Condition _____
    b) Proper inflation__
       6.50 x 8: 30 lbs
       Inflation is: _____

12. Brakes (Cleveland brakes kit 199-50):
    a) Castings for leaks _____
    b) Brake disk
       Minimum thickness is: 0.330
       Thickness is: _____
    c) Brake pads
       Minimum thickness is: 0.100
       Thickness is: _____
    d) Brake hose condition _____

Landing Gear

Landing Gear - Main - Right

1. General attachment _____

2. Outer door:
   a) Condition _____
   b) Weatherstripping _____
   c) Hinges _____
   e) Linkage and attachment
   Check the bolts that attach the gear doors to the gear attach rods are both facing aft as they are supposed to. Otherwise there will be interference at the main strut, leaving a paint chip on the strut. _____
   e) Lubricate outboard door hinges every 100 hrs. _____

3. Inner door:
   Will be checked during Gear Retraction Test

4. Inner Door closing mechanism
   Will be checked during Gear Retraction Test

5. Wheel bay:
   a) Note wing serial number at wing root _____
   b) Condition _____
   c) Canvas boot over flap mechanism _____
   d) Retract rod linkage condition
   Look behind the canvas boot to see it _____
   e) Squat switch _____
   f) Lube the limit switch with a spray lubricant _____

6. Gear retract mechanism:
   a) Retract rod play (twist 1/8 turn) _____
   b) Lubricate retract rod every 100 hrs. _____

7. Main Gear Uplock System
   The uplock bracket and block are located at the top inboard position of each main gear. Unsnap and peel back the canvas cover and inspect the uplock bracket for the following:
   a) Check for cracks _____
   b) Check that the uplock bracket is not bent where the uplock cable attaches to it. _____
   c) Make sure that the bolt that attaches the uplock cable to the uplock bracket points *forward* (screw head aft).
   The bolt position is covered in Beech Service Instruction 0680-211. _____
   d) Make sure that the uplock spring (part # 35-815115, or part # 100942C0020-31) located between the uplock bracket and the outer wing rib of the wheel compartment is in good condition. *Absolutely no corrosion*. The uplock spring is *VERY IMPORTANT.*
   This spring is the sole means of pulling the uplock bracket and uplock block clear of the uplock roller, thus allowing main gear extension. If there is any question as to the uplock spring condition, replace it.
   Also, check for elongation of the hole where the uplock spring attaches to the wing rib. _____
   e) Closely inspect the uplock cable for broken strands and corrosion where it is swaged into the outboard terminal. This is usually where the uplock cable breaks. _____
   f) Check cable tension
   min: 52-1/2 lbs max: 52-1/2 lbs
   Cable tension is: _____
   g) A short piece of rubber hose should be attached to the outboard end of the uplock cable outer housing. This hose prevents interference of the uplock roller lubrication fitting with the uplock

cable.
This subject is covered in Beech Service Instruction 0448-211. _____

i) Inspect that the uplock roller turns freely.
The roller bearing should roll with a twist of the fingers.
Bearing-to-block clearance is about 0.010" - 0.020" (about 1/64", or the thickness of a razor blade)
If not, check the vee brace to the wing skin first - it should be 1/16".
Get this right first, then adjust the uplock spacing. _____

j) Lubricate the uplock roller every 100 hours.
This complies with AD 72-22-01. _____

k) Check the uplock block for signs of contact with the roller.
The uplock roller and uplock block should not ever touch.
The owner can check this by smearing grease on the outside of the roller, and retract the gear a couple of times. You can tell after a few retractions if the two are contacting. _____

l) Check the uplock block hinge bolt and holes for wear. _____

m) Check the canvas boot over uplock block mechanism for holes _____

n) It is important to keep the canvas covers
(part # 35-815156-4 left hand, # 35-815156-5 right hand)
in good condition because they prevent the uplock cables from fouling with the top wing skin ribs.
If the canvas cover or uplock springs need to be replaced, the easiest way to install them is to remove the uplock bracket from the gear. When replacing an uplock spring, do not pry open the ends of the spring. It is a tough fit, but install the spring as it is supplied from Beech. _____

8. Strut:

a) Condition
Look for paint chipping on the lower saddle piece surrounding the main strut (the saddle piece is part of the "outrigger" struts).
If there is chipped paint, then check to see if the bolt attaching the outboard door to the link rod is installed backwards.
This bolt should point *rearward* (screw head forward). _____

b) Check for leakage _____

c) Proper extension (200 (300?) lbs pressure, strut compressed; 40 lbs pressure, strut extended)
min: 3" max: 4-1/2"
Strut extension length is: _____

d) Proper operation
Put your back under the wing spar near the tip, and using yourself as a human jack, lift the wingtip up and down several times, and observe the operation of the landing gear strut.
If the strut sticks or extends jerkily or groans while extending and compressing, then the strut may be low on fluid. Refer to the Service Hints section to refill the struts. _____

e) Placard check _____

Beechcraft
OIL AIR STRUT
Beech Aircraft Corporation
Wichita, Kansas USA

- -

INSTRUCTIONS
To check fluid and fill
Remove valve cap. Depress valve core and allow strut to fully compress. Then raise and block strut 1/4 inch from compressed position.
Remove valve body assembly and fill with hydraulic oil conforming to instruction manual specifications. Slowly extend strut from blocked position and replace valve body assembly. Depress valve core and completely compress strut to release excess air and oil.
With airplane empty except for full fuel and oil keep strut inflated to 3 inches of piston showing.
WARNING
Release air in strut before disassembling

9. Strut: service
   a) Lubricate main gear hinge points every 100 hrs. _____
   b) Lubricate main gear torque knee every 100 hrs. _____
   c) Lubricate main gear retract links every 100 hrs. _____
   d) Zerk fittings
      Grease all zerk fittings every 100 hrs. _____

10. Strut brace
    a) Condition _____
    b) Placard check (2 placards) _____

HEAT TREATED ASSEMBLY

11. Wheel
    a) Condition _____

12. Tire:
    a) Condition _____
    b) Proper inflation__
       6.50 x 8: 30 lbs
       Inflation is: _____

13. Brakes (Cleveland brakes kit 199-49):
    a) Castings for leaks _____
    b) Brake disk
       min: 0.330" max: ???"
       Thickness is: _____
    c) Brake pads
       min: 0.100" max: ???"
       Thickness is: _____
    d) Brake hose condition _____

Engine compartment

Engine Compartment - Left side

1. Engine Data Plate - placard check

Continental Motors Corporation	
Model:	*E225-8*
Serial Number:	*35922-D-2-8-R*

2. Nose bug interior
   Check the inside of the nose bug for cracks, especially in back of the prop spinner.
   Suggest stiffening the area with fiberglass if needed. _____

3. Visually inspect all structure within the engine compartment for cracks, missing or loose fasteners, and distortion. Check for loose or missing rivets attaching the rear engine mounts to the nosewheel well structure. Check structure between front engine mounts for cracks. Check wheel well skin for cracks. _____

4. Cowl seals (left): condition _____

5. Prop pitch control unit
   Beech electric prop:
   a) Check for oil leaks around spinner _____
   b) Ring gear
      b1. Check for broken or missing teeth at the high and low end. _____
      b2. Check for broken or missing spring stops at the high and low end. _____
   c) Ring gear bearings
      c1. Date / tach of last propeller service _____
      c2. Hand pack grease every 250 hrs. _____
   d) Limit switches _____
   e) Lube the limit switches with a spray lubricant _____
   f) Prop pitch motor
      e1. Note model & serial number _____ _____
      e2. Condition _____
      e3 Motor brushes
      Brush 1 length: _____
      Brush 2 length: _____
   g) Wiring _____

6. Air induction ducting
   Check the flex duct aft of the filter for condition. Especially check the rubber parts. They should be replaced about every 5 - 7 years... _____

7. Aux air door
   a) Check hinges.
      Check operation - sometimes the hinge or hinge pin will fail, and the door will fall into the duct, choking the carb. _____
   b) Check spring tension.
      The door should open about 3/4" when a 10 oz. weight is placed on it. _____
   c) Check intake hoses and clamps for condition and security.
      Fuel stains at attachment of intake pipes to cylinders can indicate leaking intake pipe seals. _____

8. Carburetor

a) Note model & serial number _____ _____
b) Check throttle control for full travel _____
c) Check mixture control for full travel _____

9. Fuel primer (E225-8 engine)
   a) Solenoid - condition _____
   b) Fuel primer lines - condition _____
   c) Fuel distribution manifold - condition _____
   d) Fuel distribution lines to cylinders - condition _____

10. Forward engine mount: condition _____

11. Cylinders
    Cylinders should be checked for cracks, leaks, and general condition.
    Check cylinder base nuts for security and flanges for evidence of oil leaks. Leaks can also be found between the wheel barrels and aluminum heads, heads themselves, pushrod housing seals, and rocker box cover gaskets.
    a) #6: condition _____
    b) #4: condition _____
    c) #2: condition _____

12. CHT sensors:
    a) #6: condition _____
    b) #4: condition _____
    c) #2: condition _____

13. EGT sensors:
    a) #6: condition _____
    b) #4: condition _____
    c) #2: condition _____

14. Spark plug wiring: upper
    a) #6: condition _____
    b) #4: condition _____
    c) #2: condition _____

15. Spark plug wiring: lower
    a) #6: condition _____
    b) #4: condition _____
    c) #2: condition _____

16. Fuel manifold valve on top center of crankcase _____

17. Fuel manifold valve vent hole _____

18. Crankcase through-bolts
    Check for oil leaks _____

19. Engine baffles
    Check the engine baffles for cracks and especially the brace that attaches to the rear cylinder _____

20. Exhaust manifold
    a) Check the exhaust gaskets for signs of excessive residue, indicating leaks. _____
    b) Check the mounting flange nuts for security. _____
    c) Check for cracks, holes or signs of exhaust leakage. _____

d) Check the ball joint for undue stiffness. The spring-loaded bolts may be too tight. _____

21. Exhaust muffler and cabin heater muff:
    a) Check muffler shell for signs of excessive exhaust residue, indicating leaks. _____
       If present, suggest that the heater body be checked for cracks.
    b) Check heater muff and shrouds for corrosion or cracks. _____
    c) Check condition of front and rear flex ducts attached to the cabin heater muff. _____
    d) Inspect the cabin heat valve externally for condition. _____
    e) Check control valve for condition and security _____

22. Tailpipe
    a) Physically move tailpipe and check that there is some movement. _____
    b) Check for rubber grommets on the tailpipe support bracket. _____
    c) Check the tailpipe support bracket for condition and wear. _____
    d) Check the support brackets that rivet to the firewall for security. _____
    e) Check exhaust tailpipe for clearance with keel. _____
    f) Look up the tailpipe and check for condition and for presence of the flame cone. Owner complaints of low heat output can often be because these flame cones are missing. _____

    Note: Flame cones are recommended, but they are not required (ABS July 1973, p. 347).
    Note: If the tailpipe is the "short" version (one which ends flush with the belly), Beech can furnish exhaust pipes which are over 4" longer than the original (part# 35-950133), and these will cut down on noise and eliminate considerable mess on the belly.

23. Rear engine mount
    a) Condition _____
    b) Be sure ground straps are installed between the rear engine mount legs and mount holes. _____

24. Aft Keel
    Check the keel for condition. _____

Engine Compartment - Left - just forward of the engine accessory section

1. Oil return line _____

2. Check cylinder hold-down lugs for security. _____

3. Cylinder base for oil leaks _____

4. Oil pan gasket for oil leaks _____

5. Check cylinder barrels for oil leaks that would result from a cracked cylinder wall _____

6. Inspect lower cylinder at juncture of head and barrel _____

7. Check around spark plug base in the cylinder for cracks _____

8. Check push rod seals for leaking. _____

9. Look for excess oil on forward keel that would denote an oil leak in the forward lower engine. _____

Engine Compartment - Right side

1. Nose bug interior
   Check the inside of the nose bug for cracks, especially in back of the prop spinner.
   Suggest stiffening the area with fiberglass if needed. _____

2. Cowl seals (right): condition _____

3. Forward engine mount: condition _____

4. Cylinders
   Cylinders should be checked for cracks, leaks, and general condition.
   Check cylinder base nuts for security and flanges for evidence of oil leaks. Leaks can also be found between the wheel barrels and aluminum heads, heads themselves, pushrod housing seals, and rocker box cover gaskets.
   a) #5: condition _____
   b) #3: condition _____
   c) #1: condition _____

5. CHT sensors:
   a) #5: condition _____
   b) #3: condition _____
   c) #1: condition _____

6. EGT sensors:
   a) #5: condition _____
   b) #3: condition _____
   c) #1: condition _____

7. Spark plug wiring: upper
   a) #5: condition _____
   b) #3: condition _____
   c) #1: condition _____

8. Spark plug wiring: lower
   a) #5: condition _____
   b) #3: condition _____
   c) #1: condition _____

9. Engine baffles _____

10. Exhaust manifold:
    a) Check the exhaust gaskets for condition. _____
    b) Check the mounting flange nuts for security. _____
    c) Check for cracks, holes or signs of exhaust leakage. _____
    d) Check the ball joint for undue stiffness. The spring-loaded bolts may be too tight. _____

11. Exhaust muffler:
    a) Check muffler shell for signs of excessive exhaust residue. _____

12. Tailpipe
    a) Physically move tailpipe and check that there is some movement. _____
    b) Check for rubber grommets on the tailpipe support bracket. _____
    c) Check the tailpipe support bracket for condition and wear. _____
    d) Check the support brackets that rivet to the firewall for security. _____
    e) Check exhaust tailpipe for clearance with keel. _____

f) Look up the tailpipe and check for condition and for presence of the flame cone. Owner complaints of low heat output can often be because these flame cones are missing. _____

Note: Flame cones are recommended, but they are not required (ABS July 1973, p. 347).
Note: If the tailpipe is the "short" version (one which ends flush with the belly), Beech can furnish exhaust pipes which are over 4" longer than the original (part# 35-950133), and these will cut down on noise and eliminate considerable mess on the belly.

13. Rear engine mount
    a) Condition _____
    b) Be sure ground straps are installed between the rear engine mount legs and mount holes. _____

14. Aft keel
    Look for excessive oil on top of the aft keel.
    If there is, its coming from somewhere. Probably an engine accessory. Find it. _____

Engine Compartment - Engine accessory area

1. Ignition harness
    a) Check for security and condition.
    Wires should be routed clear of the exhaust system and not lie on the cylinders. _____
    b) Loosen and retighten all connector nuts on the harness to allow fresh ground connections for shields, especially if ignition noise has been a complaint. _____

2. Magnetos
    Note the position of both magnetos that might indicate improper internal timing _____

3. Magneto (left):
    a) Note model & serial number _____ _____
    b) Condition
    Check accessory mounting bolts for security.
    Make sure it isn't mounted upside down!
    There are drain vents which should point down, not up. _____
    c) Check for oil leaks
    Look for drops of oil on the bottom of the magneto which would indicate a magneto oil seal leak
    d) Cooling tube _____

4. Magneto (right):
    a) Note model & serial number _____ _____
    b) Condition
    Check accessory mounting bolts for security.
    Make sure it isn't mounted upside down!
    There are drain vents which should point down, not up. _____
    c) Check for oil leaks
    Look for drops of oil on the bottom of the magneto which would indicate a magneto oil seal leak
    d) Cooling tube _____

5. Starter:
    a) Note model & serial number _____ _____
    b) Condition
    Physically check the starter security to the crankcase. _____
    c) Check for oil leaks.
    A drop of oil on the bottom aft end of the case would indicate a starter seal leak. _____

6. Generator:
    a) Note model & serial number _____ _____

b) Condition _____
c) Check for oil leaks
Check for oil leaks and security. An oil leak may mean a defective or worn seal.
Wipe or wash off any oil seepage at pinion gear shaft in starter adapter. Should the leather washer ever need replacing on this shaft, replace only with a washer designed for the starter. _____
d) Cooling tube _____
e) Rear bearing
The generator's rear bearing, although prelubricated and sealed, is still vulnerable to water entering the bearing and eventually rust the bearing.
An aluminum cover plate may be fabricated to reduce water invasion.
See ABS Mag. Jan 1992, pg. 2917.
Hey, even some duct tape is better than nothing... _____

7. Tachometer drive adapter
Tighten (or at least check tightness) of the tachometer drive cable. _____

8. Fuel lines
a) Look for fuel stains (red=80 octane, blue=100LL, green=100 octane) that would reveal a ruptured rubber diaphragm.
A sniff or two will also reveal if there is fuel leaking in the engine compartment. _____

9. Instrument air pump:
a) "Wet" Instrument pump
a1 Note model & serial number _____ _____
a2. Condition _____
a3. Date / tach of last service _____
a4. Service instrument air pump every 100 hrs. _____

10. Oil screen / filter
a) Condition _____
b) Check the adapter base for oil leaks. _____
c) Check the oil filter itself for oil leaks. _____

11. Oil filler cap _____

12. Oil cooler tank
a) Check condition and cleanliness of tank. _____
b) Check for oil leaks. _____
c) Check oil tank drain plug. _____

13. Brake fluid reservoir
a) Check condition of reservoir. _____
b) Placard check . _____

BRAKE FLUID
TO REFILL AND
BLEED BRAKES SEE
INSTRUCTION MANUAL

14. Cabin air shutoff control _____

15. Flex ducting: carb heat _____

16. Flex ducting: cool air to cabin _____

17. Cabin heat controls _____

18. Flex ducting: warm air to cabin _____

19. Kidney plate _____

20. Engine breather pipe
    Note engine breather pipe for condition and proper installation. _____

21. Starter solenoid
    Check for the presence of boots over the connections to prevent arcing and corrosion. Check for water corrosion, too. _____

22. Vacuum pump regulator
    Check the screen underneath to make sure it isn't clogged or torn. _____

23. Air / oil separator:
    a) Condition _____
    b) Oil separator drain hose
       Examine the drain hose exhaust pipe. The drain tube should end flush with the closed cowl flap, or about 3/4" inside. If it sticks out too far, it can create a suction, pulling the oil out of the separator. The first 45 minutes fills up the air/oil separator, then starts pulling oil out at the rate of about 1 quart per hour. _____

24. Firewall
    Check the firewall for open holes, or holes (improperly) filled with putty. _____

25. Battery box:
    a) Door - condition _____
    b) Interior – condition
       Check for scratches to the bare metal and/or holes in the acid-resistant paint.
       If there are holes, battery acid can drip on the circuit breakers and wiring underneath. _____
    c) Wiring – condition
       Check for signs of arcing near the terminals. _____
    d) Vent lines _____

26. Battery: Condition _____

27. Fuel lines (general)
    a) Condition
       Look at lines for condition and clearance, or signs of chafing.
       Check for abrasion and kinks in small-diameter tubing near the firewall and carburetor in the nosewheel well skin areas. _____
       "I insist on replacing the 3/8" diameter fuel line between the engine-driven fuel pump and carburetor with a high pressure Aeroquip hose. I have seen several cracked." Harold Clark
    b) Date / tach of last replacement _____
    c) Replace fuel lines every 5 years, or at engine overhaul _____

28. Oil lines (general)
    a) Condition
       Look at lines for condition and clearance, or signs of chafing.
       Check for abrasion and kinks in small-diameter tubing near the firewall and carburetor in the nosewheel well skin areas. _____
    b) Date / tach of last replacement _____
    c) Replace oil lines every 5 years, or at engine overhaul _____

29. Ducting (general)
Look at lines for condition and clearance, or signs of chafing. _____

30. Metal lines (general)
Look at lines for condition and clearance, or signs of chafing. _____

31. Wiring (general)
Look at wiring for condition and clearance, or signs of chafing. _____

32. Hose clamps (general)
Check all hose clamps for security and tightness. _____

33. Cowl flaps
    a) Check cowl flaps for condition and fit. _____
    b) Check cowl flaps (in closed position) for clearance with exhaust tailpipe _____
    c) Check cowl flap hinges for condition. Hinges should be riveted tight to the flap, and hinge bolts should be snug so as to eliminate "working". You may wish to use exhaust manifold bolt springs to reduce wear in the cowl flap hinges. Hinge bolts will wear, and bolt holes may become oversized. If new bolts don't remove play, enlarge bolt holes to 1/4" and install 1/4" aircraft quality bolts. _____
    d) Close the cowl flaps and note cowl flap control linkage rig.
    The rod to the cowl flap should "split" the cross shaft hole with the cowl flaps closed. _____
    e) Check the cowl flap door actuator rods for looseness, wear and security. _____

Engine Compartment - Behind kidney plate

Remove kidney plate

1. Wiring (general)
Look at wiring for condition and clearance, or signs of chafing.
Especially check the wiring that goes over the control yoke column for chafing or contact with the column. _____

2. Engine instrument cluster lines
    a) Check the oil pressure gauge line for chafing, cracks and leaks _____
    b) Check the oil temperature line for chafing, cracks and leaks _____
    c) Check the fuel pressure line for chafing, cracks and leaks _____
    d) A sniff or two should detect any fuel leaks _____
Note: If you are installing or removing the instrument cluster, be very careful.
It is *very* easy to damage the instruments or sensor lines.

3. Defroster and heating ducts
Look at ducting for condition and clearance, or signs of chafing. _____

4. Instrument vacuum hose
    a) Check the hoses for condition and clearance, or signs of chafing _____

5. Instrument vacuum filter
    a) Condition _____
    b) Date / tach of last replacement _____
    c) Replace instrument filter every 250 hrs.
    On models that use a "dry" instrument air pump, note the induction air filter.
    If it is the Styrofoam garter type, suggest it be replaced with the pleated paper type.
    If replaced, write Tach reading on filter. _____

6. Radio equipment
   a) Check mounting hardware for security and possible chafing of other lines _____
   b) Check wiring harnesses for condition, security and chafing _____

7. Control yoke: freedom of movement and rollers _____
   a) Lubricate differential control arms every 100 hrs. _____
   b) Lubricate differential control column every 100 hrs. _____

Cabin

Cabin - Dashboard Area

1. Control wheel:
   a) Move the control in and out.
   Check for free movement and side play.
   If the movement feels "rough" or "gritty", then there probably is grime built up on the control yoke shaft, or on the three sets of nylon idler wheels behind the dash. (If so, see "g" below) _____
   b) Turn the control wheel left and right, looking for too-tight a chain inside the control arm.
   If it is, you will feel each chain link as it passes over each sprocket tooth. _____
   c) Turn the yoke again.
   If the ailerons feel "sticky", try spraying brake degreaser onto the aileron hinges and rod ball ends while exercising the control surface to get rid of the old gunk and grit. Clean out the residual grease and dirt dislodged by the degreaser with paper towels. Relubricate the hinges and ball ends with CAE 20 wt oil. _____
   d) Turn the yoke again.
   Listen for scraping or sawing sounds which would indicate fairlead problems. _____
   e) Turn the yoke again.
   Check to ensure that the ailerons are not cross-controlled (you never know). _____
   f) Level the control wheel.
   Note if the aileron inboard trailing edge is aligned with the outboard flap trailing edge. _____
   g) Remove the yoke and the aluminum collar around the yoke shaft to gain access to the yoke column and nylon idler wheels. Clean off the grime using a good cleaner, and relubricate the idler wheels. _____
   h) Lubricate the control column linkage every 100 hrs. _____
   i) Lubricate the control column head every 100 hrs. _____
   j) Lubricate the control column aileron link every 100 hrs. _____
   k) Lubricate the aileron control linkage every 100 hrs. _____

2. Elevator trim:
   a) Check trim tabs for proper operation and travel _____
   b) Ensure trim tabs are neutral when indicator is neutral _____
   c) Lubricate trim tab wheel every 100 hrs. _____
   d) Lubricate trim tab linkage every 100 hrs. _____

3. Aileron trim:
   a) Move the trim up and down, and listen for scraping or sawing sounds which would indicate fairlead problems. _____
   b) Ensure ailerons are neutral when indicator is neutral _____
   c) Check aileron trim for proper operation and travel _____

4. Rudder pedals:
   a) Move the pedals back and forth, and listen for scraping or sawing sounds which would indicate fairlead problems. _____
   b) Check for proper ruddervator operation. Make sure that they are not cross-controlled (you never know). _____
   c) Check for proper nosewheel steering operation, too. _____

5. Windshield _____

6. Windshield defroster vents _____

7. Dashboard / glare shield _____

8. Sun visors:
   a) Left visor: condition and proper operation _____

b) Right visor: condition and proper operation _____

9. Overhead cabin air exhaust vent
Condition and proper operation _____

10. Check all instruments for condition and proper marking:
a) Outside air temperature gauge _____
b) Magnetic compass
b1. Fluid level _____
b2. Placard check _____

Compass Correction Card
For: 0 - 30 - 60 - 90 - 120 - 150 - 180 - 210 - 240 - 270 - 300 - 330
Steer:

c) Instrument panel - placard check _____

BONANZA ***N3218C***

d) 3-light marker beacon _____
e) Audio selector switches
e1. Transmit select _____
e2. Radio-1 _____
e3. Radio-2 _____
e4. Marker beacon _____
f) Radio-1 VOR indicator _____
g) Airspeed indicator _____

	White arc	Green arc	Yellow arc	Redline
E35:	48 - 91 kts	57 - 152	152 - 176 176	

h) Artificial horizon _____
i) Altimeter
i1. Condition _____
i2. Altimeter check: expiration date is: _____
j) Rate-of-climb _____
k) Manifold pressure _____

	Min	Green	Yellow	Redline
E35:	15.0" Hg.	15.0 - 26.5	26.5 - 29.6	29.6

l) Tachometer _____

	Min	Green	Yellow	Redline
E35	1750 rpm	1750 - 2300	2300 - 2650	2650

m) Radio-2 VOR indicator _____
n) Instrument suction _____

	Min	Green	Redline
E35:	3.75 " Hg	3.75 - 4.25	4.60

o) Radio stack
o1. GPS _____
o2. Radio-1 _____
o3. Radio-2 _____
p) Turn and bank _____
q) Gyro compass _____
r) Instrument cluster
r1. Fuel gauge _____
Also check for proper markings per AD 72-11-02. _____
r2. Oil temperature gauge _____

	Min	Yellow	Green	Redline
E35:	30° F	100°	100° - 225°	225°

r3. Oil pressure gauge _____

	Min	Green	Redline
E35:	30 psi	30 - 60	80

r4. Fuel pressure gauge

	Min	Green	Redline
E35:	9 psi	11 - 15	15

r5. Cylinder head temperature gauge

	Min	Green	Redline
E35	300°	300° - 525°	525°

r6. Ammeter

s) Engine Analyzer

t) 8-day clock

11. Piano key switches

Ensure that the switches are properly labeled

a) (blank)
b) RADIO MASTER (ON / OFF)
c) STROBE LIGHT (ON / OFF)
d) FUEL GAGE (AUX / LEFT / RIGHT)
e) (blank - lock for flaps switch)
f) FLAPS (UP / OFF / DOWN)
g) (blank)

- - center console - -

h) (blank - lock for landing gear switch)
i) LANDING GEAR (UP / DOWN)
j) LEFT LANDING LIGHT (ON / OFF)
k) RIGHT LANDING LIGHT (ON / OFF)
l) NAVIGATION LIGHTS (ON / OFF)
m) ROTATING BEACON (ON / OFF)
n) (blank)

12. Map compartment door
    a) Transponder
        a1. Condition
        a2. Transponder check: expiration date is:
    b) Intercom
    c) Taxi light (ON / OFF)
    d) (blank – spare switch space)
    e) (blank – spare switch space)
    e) Radio Master circuit breaker
    f) Placard check

INTERCOM	ON	(ON) ON
ALL ON	TAXI	AUX
INTERCOM MUSIC		ELT RADIO
CREW/PAX OFF	OFF	MASTER
ON		
SQUELCH POWER VOLUME		
OFF		

    f) Placard check

			(Firewall)		
2	MODE C ENC		- - -		- - -
2	TRANSPONDER	2	TAXI LT		- - -
10	NAV / COM 2	3	STROBE LT	2	JPI analyzer
10	NAV / COM 1	5	AM / FM		- - -
1	G P S	2	INTERCOM		JPI port
4	MARKER BCN	2	AUDIO PANEL		GPS port

H-Set jack	Mic jack (Dashboard)

13. Cowl flaps handle
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

14. Carburetor heat handle
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

15. Engine starter button _____

16. Mixture control knob
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Tighten the Phillips head screws in the knob _____
    d) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

17. Center Console
    a) Flaps indicator lights _____
    b) Landing gear indicator lights _____
    c) Propeller pitch control knob _____
    d) Instrument lights dimmer knob _____
    e) Propeller pitch control switch _____
    f) Throttle
        f1. Inspect cable for condition and security.
        f2. Check for freedom of movement and correct travel. _____
        f3. Check condition of wires (2) attached to microswitch on throttle cable aft of carburetor (landing gear warning horn circuit). _____
        f4. Lubricate the cable every 5 years or so.
        Directions for lubricating the cable are found in the Service Hints section. _____
    g) Ignition key / magnetos switch _____
    h) Fuel primer button _____

18. Cigar lighter _____

19. Pitot heat knob _____

20. Air conditioner handle
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

21. Cabin heat handle
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

22. Circuit breaker door
    a) Placard check _____

Push to reset circuit breakers

BAT	GEN	GEAR	LDG PITCH	PROP BANK	TURN	FLAP LAMP	INST LDG LIGHT	LEFT LDG LIGHT	RIGHT PROP CTRL	AUTO LIGHTS	NAV	ROT BEACON	VENT SHUTOF

23. Circuit breaker vent cutoff knob
    a) Inspect cable for condition and security. _____
    b) Check for freedom of movement and correct travel. _____
    c) Placard check _____

Pull to close in case of smoke or fire

    d) Lubricate the cable every 5 years or so _____
    Directions for lubricating the cable are found in the Service Hints section.

24. Check to ensure all switches are properly labeled _____

25. Pitot / static system air check:
    a) Expiration date is: _____
    b) Perform pitot / static check as necessary _____

26. Under the dash
    a) Radio circuit breakers
        a1. Mode C encoder _____
        a2. Transponder _____
        a3. Radio #2 (KX-155) _____
        a4. Radio #1 (KX-155 w/ glideslope) _____
        a5. GPS _____
        a6. 3-light marker beacon _____
        a7.Taxi light _____
        a8. Strobe light _____
        a9. AM/FM/Tape deck _____
        a10. Intercom _____
        a11. Audio panel _____
        a12. JPI engine analyzer (toggle) _____
    b) Emergency headset jacks _____
    c) Data port connectors
        c1. GPS _____
        c2. JPI engine analyzer _____
    d) AM / FM / tape deck _____

Cabin - Front Seat Area

1. Storm window:
    a) Check handle and lock _____
    b) Open window to check ease of opening _____
    c) Check weatherstripping while window is open _____
    d) Placard check _____

CAUTION
Do not open above 145 Mph (126 Knots)

2. Fuselage sidewall under storm window
   a) Placard check _____

   > Utility Category Airplane
   >
   > Operate in accordance with FAA approved airplane flight manual
   >
   > INTENTIONAL SPINS PROHIBITED
   >
   > No acrobatic maneuvers approved except those listed in the airplane flight manual

   b) Placard check _____

   > Turning takeoffs and takeoff immediately following fast taxi turn prohibited.
   > Avoid prolonged slips (20 seconds or more) with fuel tanks less than half full.

   c) Placard check _____

   > Do not take off if fuel quantity gauges indicate in yellow band or with less than 13 gallons in each wing tank

   d) Placard check _____

   > Emergency Landing Gear
   > Instructions To Extend
   >
   > Engage handle in rear of front seat and turn counterclockwise as far as possible (50 turns)

3. Cabin ankle vent (left): proper operation _____

4. Aux static air valve
   a) Proper operation _____
   b) Placard check _____

   > Open for Emergency Static Air Port

5. Cabin ankle vent (right): proper operation _____

6. Fuel selector / Auxiliary fuel pump
   a) Fuel Selector:
   It should operate smoothly, and each tank position should have a smooth but definite detent.
   The fuel selector will become hard to turn with age or lack of use.
   Hopefully, a few rotations will free it up. Try pulling *up* to loosen the conical valve if necessary.
   Do not try to "fix" the fuel selector valve if it is working reasonably easy - it is extremely difficult to service.
   b) Aux. fuel pump
   Move the selector to a nonempty fuel tank position and pump. Verify that pumping produces a pressure reading.
   Check for excessive play and looseness _____
   c) Aux. fuel pump - placard check _____
   ...with 10 Gal Aux. Tank:

   > OFF

L.H. Tank 17.5 Gals (Use First)		R.H. Tank 17.5 Gals
	Aux. Tank. 10 Gals Level Flight Only	

d) Aux. fuel pump - wobble pump handle - placard check _____

EMERGENCY FUEL PUMP

e) Aux. fuel pump - wobble pump handle - placard check _____

WARNING POSITION SELECTOR IN DETENTS ONLY NO FUEL FLOW TO ENGINE BETWEEN DETENTS

f) Aux. fuel pump - Lubricate wobble pump every 100 hrs. _____

g) Fuel selector - Lubricate fuel selector valve every 100 hrs. _____

7. Fire extinguisher
   a) Condition _____
   b) Expiration date is: _____

8. Overhead console
   a) Condition _____
   b) Cabin light (forward seats = red) _____

9. Front seat (left):
   a) Recline adjustment _____
   b) Seat belt for proper operation _____

10. Front seat (right):
    a) Recline adjustment _____
    b) Seat belt for proper operation _____

11. Cabin door
    a) Placard check _____

Rotate handle to full locked position

    b) Placard check _____

WARNING Verify door is latched before takeoff

    c) Placard check _____

Open storm window to relieve pressure when closing door Close and latch door before leaving airplane Do not allow door to swing in wind Do not use top of door as handhold

Cabin - Floor Area

Remove front seats
Remove front floorboard

1. Rudder bellcrank and linkage _____

2. Rudder pedals (left)
   a) Check to insure both pedals are in the same adjustment hole _____
   b) Check the rudder pedal / brake pivot holes for elongation.
      The bolt holes in the rudder pedal arms may be worn and/or slotted quite badly on high-time airplanes (> 3,000 hrs).
      Determine if the pivot holes are "slotted" by moving the brake pedal by hand and observing looseness. _____
      If looseness is observed, refer to the Service Hints section.
   c) Lubricate rudder pedals every 100 hrs. _____

3. Left side master brake cylinders
   a) Check condition _____
   b) Check for boots over the tops of the brake cylinders.
      If there are none, suggest they be installed to keep dirt and dust out. _____
   c) Check the top surface for hydraulic fluid leakage. _____

4. Landing gear position indicator _____

5. Rudder pedals (right)
   a) Check to insure both pedals are in the same adjustment hole _____
   b) Check the rudder pedal / brake pivot holes for elongation.
      The bolt holes in the rudder pedal arms may be worn and/or slotted quite badly on high-time airplanes (> 3,000 hrs).
      Determine if the pivot holes are "slotted" by moving the brake pedal by hand and observing looseness. _____
      If looseness is observed, refer to the Service Hints section.
   c) Lubricate rudder pedals every 100 hrs. _____

6. Right side master brake cylinders
   a) Check condition _____
   b) Check for boots over the tops of the brake cylinders.
      If there are none, suggest they be installed to keep dirt and dust out. _____
   c) Check the top surface for hydraulic fluid leakage. _____

7. Cables and pulleys
   Make sure there are canvas or plastic material covers around the landing gear pushrods. _____

8. Aileron cable tension
   min: 38 lbs max: 43 lbs @ 70°
   Cable tension is: _____

9. Flap motor:
   a) Note model & serial number _____ _____
   b) Condition _____

10. Flap motor gearbox
    a) Condition _____
    b) Lubricate the gearbox every 250 hrs.
       As long as the flap motor gearbox doesn't leak grease, leave it alone. _____

11. Flap motor drive cables
    a) Condition _____
    b) Lubricate the flex cables every 250 hrs.
    This part is often overlooked. Don't take it apart, just add a little lube to the shaft. _____

12. Landing gear actuator gear box:
    a) Condition _____
    The landing gear actuator gearbox cannot be properly overhauled in the field. If it needs service, it must be sent to Beech.
    b) Check oil level
    The oil should come up to the bottom of the gear teeth.
    If it needs oil (which is unlikely), you *must* use Mobil 636. Any other oil is an expensive mistake!
    c) Gearbox actuator
    It says: Lubricate the landing gear actuator gear box every 250 hrs.
    But, as long as the gearbox is running good and doesn't leak lubricants, leave it alone. _____

13. Landing gear retraction motor:
    a) Note model & serial number _____ _____
    b) Condition _____

14. Landing gear limit switches
    a) Condition _____
    b) Lube the limit switches with a spray lubricant _____

Cabin - Rear Seat Area

1. Emergency gear extension handle
    a) Check the emergency gear extension handle casting for proper angle of attachment. _____
    b) Handle cover - placard check _____

Landing Gear Emergency Hand Crank

    c) Look for oil stains on the carpet below the emergency hand crank.
    If oil is present, squawk the oil level in the landing gear gearbox - it is too full. _____

2. Overhead console
    a) Cabin light (rear light = white) _____

3. Rear window (left):
    a) Check handle and lock _____
    b) Open window to check ease of opening _____
    c) Pull emergency pin and check opening again for proper operation _____
    d) Check weatherstripping while window is open _____
    e) Placard check _____

Do not open in flight

    f) Placard check _____

EMERGENCY EXIT Lift latch - Pull pin - Push window out

4. Rear seat (left):
    a) Seat belt for proper operation _____

5. Rear seat (right):

a) Seat belt for proper operation _____

6. Rear window (right):
   a) Check handle and lock _____
   b) Open window to check ease of opening _____
   c) Pull emergency pin and check opening again for proper operation _____
   d) Check weatherstripping while window is open _____
   e) Placard check _____

   > Do not open in flight

   f) Placard check _____

   > EMERGENCY EXIT
   > Lift latch - Pull pin - Push window out

Cabin - Inside Baggage Compartment and Tail Section

1. Air conditioner unit:
   If the customer complains of a musty odor in the cabin it is probably due to mold or mildew in the water tank of the air conditioner unit.
   a) Drain water tank
      At least twice a year the air conditioner should be drained to remove dirt and other foreign particles from the water tank (wick box), drain line, and overflow lines. Open the drain valve and allow all water to drain. _____
   b) Remove water tank
      Disconnect the drain and overflow lines, and unsnap the four fasteners holding the water tank. _____
   c) Inspect and/or replace wick plates.
      Remove the baffle from the wick assembly. Inspect the wicks for the presence of mineral deposits. If tap water has been used in the air conditioner continuously, the drains and wicks may be clogged with salts and mineral deposits. The wicks should be flushed with, or soaked in distilled water.
      If the wicks need replacement, refer to the Service Hints section _____
   d) Reinstall water tank
      Reinstall the wick assembly into the water tank (wick box). Reconnect the drain and overflow lines and reinstall the water tank. Close the drain valve. _____
   e) Refill water tank
      Refill the air conditioner (through the top clamshell scoop) with 1 tsp. of chlorine bleach (to kill bacteria) and then 3-4 quarts distilled water (not just bottled water or tap water). Fill slowly. About two quarts must be absorbed by the wicks. _____

2. Baggage door
   a) Placard check _____
      ... with 10 Gal Aux. tank:

      > Baggage Compartment
      > Load in accordance with loading chart in airplane flight manual
      >
      > Maximum capacity - 258 pounds

3. Static air line
   a) Access cover _____
   b) Static air line condition _____
   c) Static line water drain
      The drain is located on the left sidewall of the baggage compartment.

Drain this during the annual inspection by first opening the static line at the aux static source (at the pilot's left knee). Then, drain the water from the plastic trap. Otherwise, the sealed air in the line will not let the water drain out. _____

Remove aft bulkhead panel
Be careful of the air conditioner water drain hoses which are attached to the drain valve

4. Cables and pulleys _____

5. Cleanliness _____

6. Air conditioner water drain hoses
   a) Overall condition _____
   b) Drain valve - proper operation _____
   c) Drain spout on belly - condition _____

7. Passenger assist step retract mechanism
   a) Overall condition _____
   b) Check cable for frayed ends _____
   c) Check bungee cord for looseness, which may mean it is time for replacement. You may wish to consider using door closing springs instead of bungees, as they will not sag with age as badly. _____
   d) Put a few drops of oil in the cable's conduit. Do not lube the assist step itself. It will simply get the extension bar (and your clothes) greasy. _____

8. Emergency Locator Transmitter (ELT)
   a) Security _____
   b) Antenna cable _____
   c) ELT battery expiration date is: _____
   d) Replace battery if necessary _____
   e) ELT test
      Tests may be done within the first five minutes after the hour (3-4 beeps only). _____

9. Rotating beacon housing _____

10. Strobe light housing _____

11. Tailcone - condition _____

Systems Tests

Gear Retraction Test

Gear Retract Test - Pre-retraction Check

Start with the plane on the ground

Master switch on - check: _____
Battery switch on - check: _____
Turn key to "Batt" - check: _____

1. Floor gear position indicator: "DOWN" _____
2. Gear position indicator light: green _____
3. Gear box for security _____
4. Check that the assist step is properly extended _____

Master switch off - check: _____
Battery switch off - check: _____

Put the plane up on jacks (gear is extended)

Go to the cockpit, and pull the landing gear circuit breaker.

5. Engage the emergency hand crank, and turn it counter-clockwise.
   It should turn 1/8 to 1/4 turn before the sector gear inside the landing gear box hits the internal stop.
   If there is no travel, squawk that the landing gear motor dynamic brake is not working, or landing gear limits are improperly set. _____

Retract the landing gear with the emergency hand crank for 20 turns <u>only</u>.
This will open the main gear inner doors, but will not start moving the gear yet or load the system.

DO NOT USE THE EMERGENCY CRANK TO RAISE THE GEAR!
YOU MAY DAMAGE THE GEARBOX TEETH.

Gear Retract Test - Gear Partially Retracted - Nosewheel

1. Nosewheel strut
   a) Turn the strut & nosewheel.
   Note resistance to turn.
   If the strut turns hard,
   a1. Check bolt torque on the shimmy dampener clevis bolt and on the shimmy dampener attach bolt. _____
   a2. If bolt tension is good, check for a bent shimmy dampener piston shaft.
   To check for a bent shaft, remove the bolt from the clevis end of the shimmy dampener piston rod and move the piston rod fore and aft. If the rod binds, its bent. _____
   If the strut turns too easy,
   a3. The shimmy dampener's piston is probably sheared, allowing it to "float" on the rod.
   Overhaul the shimmy dampener. _____
   b) Turn the strut & nosewheel (again).
   You should see no flexing or looseness in the torque knee hinge joints. There must be virtually no play in the center joint where the upper and lower torque knees come together. The center joint is most critical. Even a small amount of looseness here causes considerable looseness in the nose wheel steering, and it rapidly accelerates wear at this joint.
   One of the nose gear torque knees is steel, while the other is aluminum. A steel bushing passes through the centerjoint, and a single AN4-12 bolt holds this critical joint together. This design can lead to problems with normal wear. It is imperative that the thru bolt be kept properly torqued. If it is allowed to become loose, the torque knees will wobble. The aluminum knee takes most of the wear. It's machined hole quickly becomes elongated and oversized to the point where play in the joint cannot be eliminated. Another problem is that at the hinge point, the face of the aluminum and steel knees meet; separated by a steel washer. Over time, the face of the aluminum part wears, reducing it's thickness. The wear will reach a point where the stackup of the torque knees and washers is shorter than the steel bushing. When this happens, the bolt will tighten against the bushing, rather than the torque knee stackup. The result is that all play cannot be eliminated. The wear in the hole of the aluminum knee previously described will occur if this condition is not corrected. _____
   c) Check the nose gear for strut piston wear by pushing aft on the nose strut.
   If the axle will move fore and aft more than 3/8", then squawk for barrel bearing wear. _____
   d) Push aft on the partially retracted strut (again).
   Watch the strut hinge bolts. If they move or rotate with the strut, they are loose. _____
   e) Push aft on the nose strut (again).
   Check for wear in the lift leg attach bushing at the strut. _____
   f) Push aft on the nose strut (again).
   Check for wear in the retract rod hinge bolts in the keel. _____
   g) Push aft on the nose strut (again).
   Check the right-hand door gear lift hinge bolt.
   If the hinge bolt moves up and down, bolt tension is loose or its bushing is worn. _
   h) Push aft on the nose strut (again).
   If the main gear jumps, it would indicate wear in the landing gear actuator gearbox's sector teeth or the worm gear drive has excessive end play. _____
   The landing gear actuator gearbox cannot be properly overhauled in the field. It must be sent to Beech.
   i) Rock the nose gear fore and aft.
   Look for excessive play in the retract rod. _____

2. Nosewheel
   a) Spin the wheel to see if the tire is out-of-round.
   If it is, it can cause nosewheel shimmy problems. You may want to replace the tire. _____

b) Spin the wheel (again) and see how the wheel comes to a stop.
Check for a heavy spot on the tire (out of balance).
If it is out of balance, rebalance the tire.
If the owner complains of taxiing vibration, this is usually the culprit. _____

c) Bearings
Spin the wheel (again) to check them for proper tension and smooth running.
Spin them again and listen to the bearings - if it needs grease or if the bearings are rough, you can hear them. _____

3. Check rod end bearing at the idler arm location.
If play is noted, investigate further because the rod end may be stretched or broken. _____

4. Inspect the nose gear actuator rod boot at the firewall for condition. _____

5. Check the nose gear door actuating rods for bends and wear. _____

6. Check the nose gear door hinges for bends and wear. _____

7. Check the tab on the lift leg that actuates the nose gear doors.
Check the cross pin for wear.
Check the tab base for possible cracks. _____

8. Check the cowl flap door actuator rods for wear and security.
Reach up in the wheel well and actuate the nose gear door actuator that turns on the cowl flap cross shaft in the keel.
This shaft should move freely and its spring should snap the shaft back in a positive manner.
If the nose gear jams up in the nose gear doors during gear retraction, it is the cross shaft just mentioned that is bent or binding, or its spring is broken. _____

Gear Retract Test - Gear Partially Retracted - Left Main Wheel Well

1. Gear bay
   Look the wheel well area over for:
   a) Fuel stains _____
   b) Chafing fuel lines _____
   c) Brake lines _____
   d) Electrical wires _____

2. Main gear outer door:
   (Checked previously)

3. Main gear inner door:
   a) Condition _____
   b) Weatherstripping _____
   c) Hinges, linkage and attachment _____
   d) Lubricate inboard door hinges every 100 hrs. _____
   e) Dust cover / patch
      The patches keep dirt and mud out of the inner door lightening holes, which reduces the probability of corrosion. _____
      If they are not there, use heavy-duty fabric duct tape (not the cheapie plastic) for dust cover patch material.
   f) Placard check _____

IMPORTANT INSTALL DOOR LINK ROD BOLT WITH HEAD AFT

4. Main gear wheel & tire:
   a) Spin the wheel to see if the tire is out-of-round.
      If it is, consider replacing the tire _____
   b) Spin the wheel (again) and see how the wheel comes to a stop.
      Check for a heavy spot on the tire (out of balance).
      If it is out of balance, rebalance the tire. _____
   c) Bearings
      Spin the wheel (again) to check them for proper tension and smooth running.
      Spin them again and listen to the bearings - if it needs grease or if the bearings are rough, you can hear them. _____

5. Check brake disc for condition and warpage _____

6. Check for condition of brake hose at strut to caliper.
   Brake hose should, when extended, have only a slight bend in them. _____

7. Check for fluid leak at strut piston. _____

8. Check for lower barrel bushing and torque knee bushing wear. _____

9. Lift strut and observe main gear strut hinge bolt security.
   If the bolt turns with the strut, bolt tension is loose.
   If the bolt moves up and down, the bushing is worn. _____

10. Lift the strut and observe the brake hose at the front strut hinge bolt position.

If the hose flexes at the hose ferrule end, it will cause the hose to fail; suggest the fitting position be changed. _____

11. Check the main gear door linkage self-align bearings.
The linkage should rotate. _____

12. Check the main gear door actuator rod.
    a) With the landing gear partially retracted, the strut can be lifted in a rocking motion. This action compresses the down tension spring and moves the slip joint inside the rod. The slip joint in the rod should move freely as the landing gear is lifted.
    If it squeaks, chatters, or binds, it should be lubricated. _____
    b) The same lifting of the strut will reveal loose main gear hinge bolts. _____
    c) Try to rotate the rod. It should have some rotation.
    {If it doesn't, it means something bad, but I don't know what.} _____

Gear Retract Test - Gear Partially Retracted - Right Main Wheel Well

1. Gear bay
   Look the wheel well area over for:
   a) Fuel stains _____
   b) Chafing fuel lines _____
   c) Brake lines _____
   d) Electrical wires _____

2. Main gear outer door:
   (Checked previously)

3. Main gear inner door:
   a) Condition _____
   b) Weatherstripping _____
   c) Hinges, linkage and attachment _____
   d) Lubricate inboard door hinges every 100 hrs. _____
   e) Dust cover / patch
      The patches keep dirt and mud out of the inner door lightening holes, which reduces the probability of corrosion. _____
      If they are not there, use heavy-duty fabric duct tape (not the cheapie plastic) for dust cover patch material.
   f) Placard check _____

IMPORTANT INSTALL DOOR LINK ROD BOLT WITH HEAD AFT

4. Main gear wheel & tire:
   a) Spin the wheel to see if the tire is out-of-round.
      If it is, consider replacing the tire _____
   b) Spin the wheel (again) and see how the wheel comes to a stop.
      Check for a heavy spot on the tire (out of balance).
      If it is out of balance, rebalance the tire. _____
   c) Bearings
      Spin the wheel (again) to check them for proper tension and smooth running.
      Spin them again and listen to the bearings - if it needs grease or if the bearings are rough, you can hear them. _____

5. Check brake disc for condition and warpage _____

6. Check for condition of brake hose at strut to caliper.
   Brake hose should, when extended, have only a slight bend in them. _____

7. Check for fluid leak at strut piston. _____

8. Check for lower barrel bushing and torque knee bushing wear. _____

9. Lift strut and observe main gear strut hinge bolt security.
   If the bolt turns with the strut, bolt tension is loose.
   If the bolt moves up and down, the bushing is worn. _____

10. Lift the strut and observe the brake hose at the front strut hinge bolt position.
    If the hose flexes at the hose ferrule end, it will cause the hose to fail; suggest the fitting position be changed. _____

11. Check the main gear door linkage self-align bearings.
    The linkage should rotate _____

12. Check the main gear door actuator rod.
    a) With the landing gear partially retracted, the strut can be lifted in a rocking motion. This action compresses the down tension spring and moves the slip joint inside the rod. The slip joint in the rod should move freely as the landing gear is lifted.
    If it squeaks, chatters, or binds, it should be lubricated. _____
    b) The same lifting of the strut will reveal loose main gear hinge bolts. _____
    c) Try to rotate the rod. It should have some rotation.
    {If it doesn't, it means something bad, but I don't know what.} _____

13. Check the gear safety switch (squat switch) for proper operation _____

Read ahead a bit so you'll know what to look at, and then
Go to the cockpit.

Landing Gear circuit breaker: push in - check: _____
Stow the emergency hand crank - check: _____
Master switch, ON - check: _____
Ignition switch, "Batt" - check _____
and when the landing gear area is clear _____
Landing Gear switch, "retract" (up) - check: _____,

DO NOT USE THE EMERGENCY CRANK TO RAISE THE GEAR!
YOU MAY DAMAGE THE GEARBOX TEETH.

Gear Retract Test - Gear Fully Retracted

1. Watch the gear (and the assist step) retract.
   Pay particular attention to retract speed and listen for any unusual noises from:
   a) The landing gear, _____
   b) The landing gear gear-box, and _____
   c) The assist step mechanism,. _____
   A change in the pitch of the gear retract motor, as if it were "laboring" to retract the gear, may indicate high resistance to the motor.
   Clanking or grinding sounds may indicate poorly lubricated slip joints, or clearance problems on various undercarriage parts.
   A clank when the gear stops may indicate a mis-rigged gear system.
   Scraping or sawing sounds might indicate assist step retract cable fairlead problems.

2. Gear retract time
   Full retract time should be 09 - 12 seconds (11-1/2 seconds by the book)
   Partial retract time should be 08 - 10 seconds _____
   If the retract time is slow, squawk for high resistance in the landing gear motor electrical circuit.

3. Check all doors for proper closing. _____
   If the right-hand inboard door hangs open, squawk the landing gear motor for low power.
   Check to make sure that the brake lines to not get pinched in the gear doors.

4. Check the assist step.
   Check that the step is fully retracted. _____
   There is a kit available (35-4003) which installs an additional shock cord to obtain a more positive retraction. Other possible mods replace the bungee cord with an ordinary screen door closing spring.
   Note: Increasing spring tension increases the load on the landing gear motor, so don't overdo it.

5. Gear position floor indicator: "UP" _____

6. Gear position indicator light: red _____

7. Check for gear-up warning horn operation _____

8. Nosewheel gear cable up-tension
   min: 18 lbs max: 25 lbs
   Cable tension is: _____

9. Nosewheel gear retract rod

   Now, extend the gear electrically.

   Read ahead a bit so you'll know what to look at, and then
   Go to the cockpit.

   Master switch, ON - check: _____
   Ignition switch, "Batt" - check: _____
   Landing Gear switch, "down" - check: _____

Gear Retract Test - Gear Fully Extended

1. Floor gear position indicator: "DOWN" _____

2. Gear position indicator light: green _____

3. Check landing gear extension time again.
   If the extension time is slow, squawk for high resistance in the landing gear motor electrical circuit.
   (Extension time should be 09 - 12 seconds) _____

4. Turn key to "Off", master switch off, battery switch off _____

End of Gear Retraction Test

Landing Gear Service

1. Nosewheel
   a) Hand pack grease wheel bearings every 100 hrs. _____

2. Left Main wheel
   a) Hand pack grease wheel bearings every 100 hrs. _____
   b) Water will accumulate in the brake lines and sink down to the lowest point, which is the aluminum brake calipers, where it will promote corrosion.
   Drain out a small amount of brake fluid from the brake casting at the wheel to remove any water that may be there to reduce the corrosion problem. _____

3. Right Main wheel
   a) Hand pack grease wheel bearings every 100 hrs. _____
   b) Water will accumulate in the brake lines and sink down to the lowest point, which is the aluminum brake calipers, where it will promote corrosion.
   Drain out a small amount of brake fluid from the brake casting at the wheel to remove any water that may be there to reduce the corrosion problem. _____

Lower plane onto the ground
Remove the jacks

If the landing gear needs to be re-rigged, refer to the Service Hints section

Examination / Service Requiring Disassembly

Aircraft Service - Engine

1. Engine oil service
   a) Date / tach of last service _____
   b) Replace oil every 25 - 50 hrs. _____
   Be sure to drain the oil cooler tank and the engine sump tank.
   Let it drain as you perform the other engine service steps.
   Save an oil sample for Oil Analysis.

2. Oil cooler tank
   a) While the oil is drained, check the oil cooler tank interior for corrosion. _____
   b) Interior baffles
   Make sure that there are no holes in the interior baffles which would make the oil temperature hotter. _____

3. Oil screen / oil filter
   oil filter:
   a) Remove oil filter. _____
   b) Install and safety new oil filter.
   Champion Filter # CH48109
   Torque to 16 - 18 lb.ft. _____
   c) Scribe tach hours on end of filter. _____
   d) Open the old oil filter and examine the pleats for particles / contaminants.
   It is common to find "some" carbon particles, but any metal particles should be analyzed to determine their source, and, by the amount present, if it is normal or excessive wear.
   Almost no steel particles, and few others, should be present. _____

4. Spark plugs - compression test
   Date / tach of last service _____
   Compression test cylinders every annual inspection. _____
   Remove the upper spark plugs (keep track of which plug came out of which cylinder - you will need to examine them in order later).
   Complete a cylinder compression check.
   a) Cylinder #1 compression: _____
   b) Cylinder #2 compression: _____
   c) Cylinder #3 compression: _____
   d) Cylinder #4 compression: _____
   e) Cylinder #5 compression: _____
   f) Cylinder #6 compression: _____
   If a cylinder compression test reads poorly, refer to ABS Mag. Jul 1991, pg. 2819 for a description of how to do a second test before declaring the cylinder "bad".
   (There is also a correction to the article in ABS Mag. Aug. 1991 pg. 2833).

5. Spark plugs - examination and reinstallation
   Remove the remaining lower spark plugs (keep track of which plug came out of which cylinder - you will need to examine them in order).
   Check the color and condition of all spark plugs. They give first-hand indication of how each cylinder is performing.
   a) Cylinder #1 (top plug) condition: _____
   Cylinder #1 (bottom plug) condition: _____
   b) Cylinder #2 (top plug) condition: _____
   Cylinder #2 (bottom plug) condition: _____
   c) Cylinder #3 (top plug) condition: _____

Cylinder #3 (bottom plug) condition: _____
d) Cylinder #4 (top plug) condition: _____
Cylinder #4 (bottom plug) condition: _____
e) Cylinder #5 (top plug) condition: _____
Cylinder #5 (bottom plug) condition: _____
f) Cylinder #6 (top plug) condition: _____
Cylinder #6 (bottom plug) condition: _____

Clean, gap and test all 12 spark plugs or replace them.
Spark plug gap (massive electrode) is .014 - .018
Torque to 300 - 360 in. lbs. (25 - 30 ft. lbs.)
To reduce deterioration of the anode / cathode elements, reinstall the plugs as follows:

1 top to 6 bottom,
1 bottom to 6 top,
2 top to 5 bottom,
2 bottom to 5 top,
3 top to 4 bottom,
3 bottom to 4 top,
4 top to 3 bottom,
4 bottom to 3 top,
5 top to 2 bottom,
5 bottom to 2 top,
6 top to 1 bottom,
6 bottom to 1 top. _____

Note: Many early-model Bonanzas have trouble with carbon or lead "buildup" or missing during or after long, low-power descents. This is normally caused by oil fouling the lower spark plugs. Installation of iridium or platinum spark plugs in the bottom of each cylinder may cure, or at least improve, the situation.
New spark plugs should be used when available.

6. Carburetor
b) Fuel screen
Bendix PS-5C pressure carburetor:
Clean the carburetor fuel screen.
The carburetor screen is located behind a one-inch diameter hex head brass plug at the right rear corner of the carburetor. It is a small fine screen and should be cleaned. Very little foreign material should be found in this screen (as the debris should be filtered out at the fuel selector screen).
When reinstalling, note that there should be a thin, paper-like gasket (Bendix part# 365533) under the brass plug. It is common to find this missing. Elimination of this gasket can cause fuel leaks and undue stress on the carburetor body. Be sure to safety this plug to the smaller adjacent plug.
c) Fuel unit linkage
Lubricate the linkage every 100 hrs. _____
d) Fuel unit shaft
Lubricate the shaft every 100 hrs. _____

7. Fuel primer system
The fuel primer lines and nozzles may become clogged with fuel solids as the engine heat tends to evaporate the fuel. Lack of use will cause the solids to build up and eventually clog the nozzles and/or the fuel primer lines.
Remove the primer lines at the cylinders and place a Dixie cup under each of the nozzles.
a) Have someone in the cockpit depress the fuel primer button. Listen to make sure you hear a clicking sound from the solenoid, indicating it isn't sticking. _____
b) Pump the wobble pump and press the primer button for 5 – 10 seconds.
Check the Dixie cups to ensure that there is about the same amount of fuel in each one. Little or no fuel probably means a clogged nozzle. (From Lew Gage 1998.02.19) _____

8. Main fuel screen
   Inspect and clean (?) _____

9. Forward engine mounts
   Rotate 1/2 turn to reduce elongation _____

10. Rear engine mounts
    Rotate 1/2 turn to reduce elongation _____

11. Tachometer drive cable
    Hand pack grease every 100 hrs. _____

12. Fuel pump
    Thompson TF-1900 fuel pump
    The TF1900 fuel pump has a drive pin (part# {?}) which will wear out after some time. If it does, the pump will fail.
    b) Date / tach reading of last replacement: _____
    c) Replace drive pin every 250 hrs. _____
    See: TRW Service Bulletin "ESD 182D"
    Also see:Beechcraft Executive Airplane Service Communique No. 55

13. Pressure check fuel system _____

14. Starter:
    a) Date / tach of last inspection _____
    b) Check starter motor brushes
    min: 3/8" max: ???"
    Brush 1 length: _____
    Brush 2 length: _____
    As long as the motor is running good, leave it alone.
    Note: Do not clean with carbon tetrachloride since its use will result in excessive wear of the brushes and corrosion of other parts. Do not apply abrasive of any kind to the commutator under any circumstances. _____
    c) Internal lubrication hole
    Internally, there is a lubrication hole which may become plugged by carbon deposits. If it does, it will cause the starter to seize from lack of oil, forcing replacement. _____

15. Generator
    a) Date / tach of last inspection _____
    b) Brushes & commutator - Condition
    min: 1/2" max: ???"
    Brush 1 length: _____
    Brush 2 length: _____
    As long as the generator is running good, leave it alone.
    Note: Do not clean with carbon tetrachloride since its use will result in excessive wear of the brushes and corrosion of other parts. Do not apply abrasive of any kind to the commutator under any circumstances.

16. Magneto (left):
    a) Remove breaker point cover.
    Inspect for the presence of oil, security, and general condition of all parts. _____
    b) Check point gap.
    Point gap should be 0.001" {?} _____

c) Remove the timing inspection plug from the top of both magnetos. Check to make sure that points are just breaking with timing marks in inspection hole aligned and you are turning the propeller in direction of rotation.
If correctly set, time magnetos to engine.
Timing is 26° before TDC. _____
d) Reinstall inspection plugs and point covers. _____

17. Magneto (right):
a) Remove breaker point cover.
Inspect for the presence of oil, security, and general condition of all parts. _____
b) Check point gap.
Point gap should be 0.001" {?} _____
c) Remove the timing inspection plug from the top of both magnetos. Check to make sure that points are just breaking with timing marks in inspection hole aligned and you are turning the propeller in direction of rotation.
If correctly set, time magnetos to engine.
Timing is 25-1/2° {or is it 26-1/2°} before TDC. _____
d) Reinstall inspection plugs and point covers. _____

18. Brake fluid reservoir
a) Check brake fluid
min: bottom of dipstick max: ???"
If the reservoir is full, and the parking brake works, then most likely the system is void of leaks.
If the parking brake doesn't work, either:
there is air in the system, or
the master brake cylinders' seals (fwd of the rudder pedals) leak fluid, or
the parking brake valve leaks. _____
b) Check for water in the brake fluid.
The old brake fluid reservoir is vented in a way that can promote water ingestion. _____

19. Battery
Generally, and owner can tell you the condition of his battery. Since he services it regularly and if he doesn't complain about low battery capacity or the need to use external power for starting, it is probably good.
a) It should be checked for water level and specific gravity. _____
b) The battery and box should be thoroughly cleaned, and any bare metal in the battery area should be painted with acid-resistant paint. Household baking soda can be used for cleaning the battery box as it neutralizes the acid. Care should be exercised so as not to allow baking soda to enter the battery cells. _____

20. Engine breather tube
The engine breather tube should be cleaned every 200 - 400 hours.
Use a discarded flex cable housing to initially remove sludge/scale from the breather tube I.D.
Follow up with a solvent-soaked rag tied to a wire - pull through several times - like cleaning a gun barrel. Air pressure and solvent alone will *not* remove sludge/scale from the breather tube wall. _____

21. Air/oil separator
The air/oil separator should be cleaned every 200 - 400 hours.
Oil separator orifices are known to clog and restrict normal oil return, which causes oil to exit overboard through the breather. _____

22. Cowl flap hinges
Lubricate cowl flap hinges every 100 hrs. _____

23. Replace and safety oil drain plugs _____

24. Refill oil
    8 - 10 qts. 40 wt in summer, 30 wt in winter, or
    Phillips 20W – 50 -or- Aeroshell W100 (50 wt) year round. _____

Propeller Service

1. Check if propeller 250-hr service is due.
   Assure that the propeller, and in particular, the pitch control bearing, has had a complete lubrication and service every 250 hours. This is sometimes overlooked and can be very expensive.
   Date / tach reading of last service: _____
   Perform service, if necessary : _____

2. Check if propeller pitch motor 500-hr service is due.
   a) Date / tach reading of last service: _____
      Perform service, if necessary : _____
   b) Check propeller pitch motor brushes for condition.
      min: ???" max: ???"
      Brush 1 length: _____
      Brush 2 length: _____
      As long as the motor is running good, leave it alone.

3. Check if propeller 1,000-hr overhaul is due.
   Date / tach reading of last overhaul: _____
   Perform service, if necessary : _____

4. Paint tips and face of blades, if necessary. _____

Other Electrical Motor Service

1. Landing gear retraction motor:
   a) Motor brushes
      a1) Date / tach of last service _____
      a2) Check the landing gear motor brushes.
      The landing gear motor works harder than the other parts, so the motor brushes should be looked at every 100 - 250 hrs.
      Be careful! The upper brush is easy to inspect, the lower one is more difficult.
      Lazy mechanics will skip inspecting the lower brush...
      min: ???" max: ???
      Brush 1 length: _____
      Brush 2 length: _____
      As long as the motor is running good, leave it alone.

2. Flap motor:
   c) Motor brushes
      min: ???" max: ???
      Brush 1 length: _____
      Brush 2 length: _____
      As long as the motor is running good, leave it alone.

Electrical System Test

1. Overhead cabin light: front seat _____

2. Overhead cabin light: rear seat _____

3. Instrument lights & dimmer switch
   a) Dashboard _____
   b) Compass _____
   c) Flap position indicator light (checked during flaps test)
   d) Gear position indicator light (checked during flaps test)
   e) Trim tab indicator _____
   f) Fuel selector / wobble pump _____
   g) Floor gear position indicator _____

4. Stall warning test
   a) Press lamp to test lamp _____
   b) Raise stall detector on wing to test detector _____

5. Landing light - left _____
   14v 250w - GE # 4522
   14v 100w - GE # 4537
   14v 50w - GE # H-7635
   Note: If the customer complains of the landing light burning out rapidly, then apply a strip of 5/8" wide 3M Exterior Foam Weatherstrip adhesive-backed tape all the way around the circumference of the bulb before installation. This takes up the looseness of the light in the assembly, reducing the vibration the bulb is subjected to. _____

6. Landing light - right _____
   14v 250w - GE # 4522
   14v 100w - GE # 4537
   14v 50w - GE # H-7635
   Note: If the customer complains of the landing light burning out rapidly, then apply a strip of 5/8" wide 3M Exterior Foam Weatherstrip adhesive-backed tape all the way around the circumference of the bulb before installation. This takes up the looseness of the light in the assembly, reducing the vibration the bulb is subjected to. _____

7. Navigation lights:
   a) Left: red _____
   b) Right: green _____
   c) Tail: white _____

8. Anti-collision light - rotating beacon _____

9. Anti-collision light - belly strobe _____

10. Taxi light _____
    14v 250w - GE # 4522
    14v 100w - GE # 4537 (?)
    14v 100w - GE # 4509 (?)

11. Gyro instruments: check for excessive noise
    a) Artificial Horizon _____
    b) Gyro Compass _____
    c) Turn and bank _____

12. Radio: 3-light marker beacon _____

13. Radio: audio panel switches (overhead speaker / headphones) _____

14. Radios
    a) GPS (Terra TGPS 400D) _____
    b) Radio 1 (KX-155) _____
    c) Radio 2 (KX-155) _____
    d) Transponder (TRT-250D) _____
    e) Intercom _____
    f) Sony AM/FM/Tape _____

15. Fuel quantity gauge(s)
    a) Left _____
    b) Right _____
    c) Aux. _____

16. Fuel primer pump
    Watch the fuel pressure gauge to confirm {?} _____

17. Pitot heat
    Note: The pitot head will get hot enough to burn your hand. Be careful. _____

18. Cigarette lighter _____

Flaps Test

As the flaps are extended / retracted, listen to the flap drive motor for strange sounds

1. Flap instrument indicator light: green (up) _____

2. Extend the flaps halfway.
   Inspect the left flap.
   Lift on the flap trailing edge and at the same time inspect the flap actuator for up-and-down movement that would indicate flap actuator wear. _____

3. At the same time, look for oil leakage along the actuator piston.
   If there is, then that would indicate the need for lubricant. _____

4. Extend the flaps fully, observing the flap rollers.
   The flange on both rollers should be on the inside, like a railroad car wheel. _____

5. Flap instrument indicator light: red (down) _____

6. With the flaps extended, go to the left side and lubricate the flap limit switches with a spray lubricant

7. Retract the flaps.
   Flap retraction time should be 00 - 00 {?} seconds. _____

8. Flap up/down limits:
   E35: up: 0° ± 1° down: 30° ± 1°
   Limit check _____

Electric Prop Control Test

1. Manual Switch: Hi rpm
   Prop should move to hi rpm _____

2. Manual switch: Low rpm
   Prop should move to low rpm _____

3. Return prop to Hi rpm
   Prop return time should be 00 - 00 seconds. _____

   (Automatic prop unit must be tested with engine running)

Paperwork Check

1. Check for certificates:
   a) Airworthiness certificate _____
   r) Registration _____
   r) Radio Operating License (optional) _____
   o) Operating Handbook (Owner's Manual) _____
   w) Weight and Balance figures _____

2. Check for presence of all proper form 337s _____

3. Check for compliance of all AD notices _____

4. Check for compliance of all Service Bulletins (optional) _____

General Clean-up

Note: When re-installing bulkheads, inspection covers, etc., coat the screws with a bit of grease to make them easy to remove during the next annual.

1. Re-install spinner _____
2. Re-install all plates & inspection covers _____
3. Re-install kidney plate _____
4. Replace floorboards, seats and carpets _____
5. Re-install Emergency gear extension handle cover _____
6. Re-install rear bulkhead _____
7. Leave elevator trim tab at "neutral" _____
8. Leave aileron trim at "neutral" _____
9. Wash engine
   Cover up magnetos, generator and air pumps first _
10. Clean the wheel bays _____
11. Wash and wax the plane _____
12. Polish the windows _____
    Be careful not to scratch the plexiglass
13. Armor-All the tires _____
14 Vacuum the interior _____
    Note: Small electric motors, such as the ones in portable vacuum cleaners or drills, may accidentally irreparably magnetize the magnetic compass. Try to avoid using electric motors in the cockpit (use a long vacuum hose), or else remove the magnetic compass before doing so. (ABS Oct. 96, p.4497)
15. Clean the seats _____
16. Armor-All –or- leather treat the interior _____
17. Replace customer's property _____

Engine Run-up Test

1. Check oil level _____

2. Check parking brakes for proper operation _____

3. Engage starter - start engine
   Check the starter for normal operation during start-up _____
   Slippage: Most generally caused by engine oil entering the starter (models E-80 and 36E14) and getting into the clutch pack.
   Can also be caused by a worn clutch pack.
   In either case, it is a shop job to repair or replace the clutch pack and adjust the clutch setting.
   Sluggishness: Worn brushes and/or poor wiring connections cause this condition. Worn brushes should be replaced. Starter wiring should be checked for good connections or in the starter relay.
   Another not-too-usual cause is a poor connection between the starter ground terminal and structural ground. In some cases the engine ground straps are broken or missing. It may be necessary to add a large ground wire from the starter ground terminal to a good structural ground.
   Unusual noises: Can occur in both the starter and engine and should be examined to determine the exact cause.
   Correct if necessary.

4. Fuel pressure
   During engine operation, the pressure should be adjusted to give 11 - 14 psi at the carburetor. The adjustment for this is on the engine-driven fuel pump. It is also possible that the gauge may be indicating incorrectly. _____

5. Oil pressure & temperature
   When the engine is started cold, the pressure gauge needle should start moving within about 10 seconds.
   If not, shut down *immediately* and determine the reason. _____
   Pre-1956 AC instrument gauges:
   It will help normal operations to disconnect the oil pressure gauge line at the engine and instrument. Replace the heavy engine oil in this line with "Three-In-One" oil or light engine oil and reconnect. This will give more direct readings.

6. Oil Temperature gauge:
   Prior to start, note that the oil temperature gauge reads about the ambient temperature. It will only be possible to see that the gauge needle moves during the ground run. _____

7. Cylinder Head Temperature gauge:
   It is difficult during a normal ground operation to check accuracy other than to note that the needle on the gauge is somewhere near the normal ground run operation position.
   The owner must be the source of an accuracy check unless a flight test is made. _____

8. All instruments for operation _____

9. Generator output
   The generator will normally cut in between 800 - 1300 rpm to start charging.
   Landing lights can be used to check generator capacity.
   Each 100w bulb draws 7 amps. Each 250w bulb draws 18 amps. _____
   The ammeter should also be checked at this time. _____

10. Mag check
First, check the ignition switch at idle to be sure that the engine will stop with the ignition switch turned off.
At 1800 rpm, make a normal magneto check.
The drop on each magneto should not exceed 75 rpm. It should also be a smooth drop. _____
If it is rough on either magneto, run on that magneto for about 5 - 10 minutes at 1200 rpm. Shut down the engine and quickly open the cowling. Using caution, check each cylinder with your hand to determine which cylinder (if any) is cold. If a cold cylinder is found, the problem lies in the spark plug, lead, or distributor cap of the magneto selected during the run.
If there is no cold cylinder, the problem is most likely within the magneto being checked, or the timing to the engine. Broken impulse springs can sometimes cause this condition.

11. Prop governor check
Beech 215 electric prop:
a) Run the engine at 1800 rpm.
b) Switch propeller manual control to Manual Low and hold until engine rpm stabilizes.
c) Reset switch to Manual High rpm position and hold until engine stabilizes at 1800 rpm, or a little more in the case of an installation including an Automatic Prop Control _____

12. Auto Prop control check
If an APC unit is installed,
a) Select Manual Low rpm position once again and allow the engine rpm to stabilize.
b) Return the propeller control to the Automatic position, and the rpm should increase to about 1800 rpm. _____

13. Carburetor Heat check
Apply heat while running the engine at 1800 rpm with a warm engine.
A decrease of about 50 rpm should be noted along with a drop in manifold pressure. _____

14. Engine controls for freedom of operation _____

15. Idle rpm and mixture checks
A warm engine should idle at 550 - 600 rpm.
This can be adjusted on the "E" series engines by removing the left cheek cowl and noting the throttle arm on the side of the carburetor. Above the throttle shaft is a pin with float sides. In the closed throttle position, a screw on the aft side of the throttle arm assembly contacts a flat pin. Screwing the screw clockwise will increase idle rpm, and counter-clockwise to reduce it. _____
The idle mixture can be checked by idling the engine and pulling out the mixture control at a rate so as to go from Full Rich to idle-Cutoff in 8 - 10 seconds. (This test may not work at altitudes above, say, 5,000 ft.)
Note the rpm. It should rise 10 - 25 rpm prior to dropping off. If it drops with no rise, it is set too lean. If it rises more than 50 rpm, it is set too rich. This can be adjusted by using the slot head screw on the forward side of the throttle shaft assembly (left side). Clockwise will lean and counter-clockwise will richen the mixture. Small adjustments are used, and it must be kept in mind that this adjustment also has an affect at higher power settings. It should be adjusted by a competent A&P mechanic as it may become necessary to reset the enrichment valve after a mixture adjustment.

16. Check fuel selector in all positions _____

17. Alternate air _____

18. Power check _____

19. Heat and ventilation systems _____

20. Check gyros for operation _____

21. Fuel quantity - sufficient for 30-minute test hop _____

22. Shutdown engine _____

23. Check engine compartment for fuel or oil leaks _____

24. Check oil level _____

25. Secure cowls _____

Notify inspector ready-to-fly

Flight Test

Remember that at this point, a considerable amount of "tampering" has occurred on every system of the aircraft. The possibility that something was not properly reassembled is, unhappily, rather high.

Pay very close attention to even the "little things" - your life may depend on it.

Cancel or abort the test flight *the instant* a problem is found.
Too many accidents occur when several small problems gang up on the pilot.

1. Stall warning light _____

2. Landing gear warning horn _____

3. Air drafts
   Check for cold air drafts
   a) Firewall _____
   b) Windshield – dashboard vents _____
   c) Knee vents _____
   d) Storm window _____
   e) Overhead air exhaust vent _____
   f) Cabin door _____
   g) Rear windows _____
   h) Cold rear seat _____
   i) Overhead air conditioner vent _____

4. Heating system (CABIN HEAT knob)
   Check all systems for operation and ample flow.
   b) Windshield – dashboard vents _____
   c) Firewall toe vent - left side _____
   c) Firewall toe vent - right side _____
   c) Rear seat floor vent _____

5. Ventilating system (AIR CONDITIONER knob)
   Check all systems for operation and ample flow.
   b) Windshield – dashboard vents _____
   a) Knee vent - left side _____
   a) Knee vent - right side _____
   b) Front seat overhead exhaust _____
   i) Overhead air conditioner vent _____

6. Vibrations
   Check for unusual vibrations. _____
   In troubleshooting vibrations, refer to the Service Hints section

7. Cabin noisy? _____
   In troubleshooting cabin noise, refer to the Service Hints section

Post-Flight Discussion With Owner

Discuss the results of the flight with the owner.

Other things to discuss with the owner:

1. Fire Extinguisher:
   Remind owner if the extinguisher's examination is due. _____

2. On-board battery-powered equipment: _____
   Check for a flashlight, hand held radio, hand-held GPS, and any other battery-operated equipment.
   Suggest that the batteries be replaced, or that fresh spare batteries are available in the cockpit.

3. GPS Database _____
   If there is a GPS with a Jeppesen datacard, and the database is "expired", remind the owner that it needs to be updated.

4. Survival Equipment: _____
   If there is survival equipment on board, remind the owner to check for goods which may have expired, and replace them.
   If there is no survival equipment, then suggest that he carry some.

5. Radio Operator's License: _____
   If there is no Radio Operator's license on board (and it is optional), remind owner that one is required if he is going to Canada or Mexico.
   If there is one on board, check for its expiration date.

6. Periodic maintenance: _____
   If you noticed during the inspection that periodic maintenance is not being performed, you may wish to suggest that the owner start such a program.

Other Remarks

Other Remarks

Service Hints

Packing the Propeller Pitch Change Bearing with Grease

CBA Newsletter, May 1997, pg.4

1. Remove the spinner and one side of the backing plate to gain access to the pitch change motor.
2. Run the motor from stop to stop and measure the clearance between the pitch rod stops and the hub (between the hub and the nuts on the rods that move fore and aft as the pitch change gear moves CW and CCW).
   The prop should be centered between the stops.
   While you have the prop off, you can add or remove shims from behind the rear cone on the crankshaft to center the prop hub between the pitch stops. I just took one apart that had lost all of the shims. It would not produce more than 2350 rpm on the ground.
   The coarse stop would bottom before the limit switch would stop the motor, and the prop nut was bottomed out on the carnkshaft threads before the hub was pulled against the rear cone. Iw was not surprising to find that the backing plate had cracked, welded, and had cracked again from the vibration. The pitch change bearing was rough and dry from the overload and lack of attention.
3. Remove the pitch change motor, the six nuts holding the pitch change assembly to the front of the engine, and the cotter pin and headed pin from inside the front prop nut.
   I set up a ladder up to hold the prop tip while I hung on the torque bar to untorque the prop nut.
4. Set the prop up on a couple of saw bucks and twist the blades to fine pitch.
5. Turn the pitch change gear until you have access to the two nuts that attach the pitch change bearing to the pitch rods.
6. Remove the cotter pins and nuts and the pitch change assembly will come loose in your hand.
   Take note of where the bearing is located in the assembly as the ring is turned to the limits of travel if the motor were installed. The bearing can be re-installed more than one way, and you need to get it back in with the same travel as when it was removed.
7. Now, turn the ring gear all the way around until the bearing falls out in your hand.
8. Remove the spring clips and seals from both sides of the bearing.
9. Clean, pack, and reassemble the bearing.
   If the bearing is still rough, Dallas Aircraft Propeller can rebuilt it for about $300.00 (1997).
   Turn the bearing to spin out the extra grease and to seat the seals.
10. Reassemble the prop, add or subtract shims from behind the rear cone as necessary, and reinstall the prop.

Cabin Door

ABS Magazine, Oct 94, pg. 3649:

Removal

1. Access to the bottom hinge pin is gained by removing the kick panel which will probably mean removing the seat bottom and floorboards. Access to the top hinge pin on my E35 is gained by removing the battery and partial removal of the battery box.
   Moving the battery box forward allowed me to "see" the top hinge pin. There are relays and connectors attached to the glove box, so I recommend leaving it in place. {Also, it may be impossible to completely remove the box if you have accessories like an air/oil separator.} Just push it forward a couple of inches to get to the top hinge pin.
2. I got the retaining angle clips on the pins out easily enough, but could not budge the pins, and there is no way, really, to get a drift on them; plus one runs the risk of peening the pin end and making it impossible to remove through the pin holes.
   It seemed the best way was to cut the pins, so I used a Sawzall and reached in through the hinge with the door open and cut the {tops and bottoms of the} pins. With the pins cut (four cuts needed), it was easy to remove the door and to disengage the hold-open rod and lift the door clear of the plane. I put down several layers of blankets to protect the wing - just in case.
3. The cut pins in the fuselage actually fell out as I found out that, contrary to popular lore, the pins tend to freeze in the brass bushing in the door and therefore turn in the fuselage bracket which is quite thin, enlarging those holes. I had to drive the pins out of the brass oilite bushing in the door as they were corroded fast.

The repair

4. The holes in the oilite bushings (1/2" long, 1/16" thick flange) and the door were originally 1/16", as was the pin (part# AN393-63). Both parts are available locally. The next larger, easiest-to-find drill pin size is a 7/32".
5. I was able to fit the drill in the fuselage from the bottom and top of the holes and turn it by gripping the bit with channel locks and rotating the bit in the hole (drilling) until it went through. One could also break the bit to shorten it and fit it in the opening from the outside and turn it with pliers and/or channel locks. There isn't much room to work, but the hole opened up to 7/32" quite quickly, as the receiver metal is quite thin!
6. Using the same 3/16" drill, I then reamed out the 3/16" bushings in the door to 7/32".
7. I was able to get new bushings for about $3 each, with the 3/16" hole, not quite as long, but adequate. I bought them in advance so I used them, but actually, the old ones could be salvaged (although I did cut the flange part off when cutting the pins).
8. Now I had a good, clean 7/32" holes, but needed pins. I went to a large wholesale hardware store and got a three-foot long 7/32" drill rod for $3. I cut off pins of two inches or so long. I used a ball peen hammer to peen the end over to make a rivet-like head after first drilling a small hole in the end to make flattening the end easier. I messed up the first couple by getting too anxious and bending them by hammering too hard. Again, practice is needed!
9. I double-checked the fit in the fuselage and the door before reinstallation and had to ream the door bushings a tad more by just running the drill back and forth.

Reinstallation.

10. It would be easier to do with a helper, but I did it by installing the rod in the door and by then, after rough fitting the door in the fuselage, I put some blocking under the door on the wing to hold it in place. The pins went in easily by using a long hemostat to reach in and insert the top pin.
11. Remember to install the bottom pin from the top; the top pin from the bottom. The pins did not go all the way in at first, so I used a long 3/8" extension to tap in the top pin with a 1/2" socket installed backwards to make a recess so the rod would not slip off the pin.
12. Installing the rod angle clip, screw and nut was probably the most frustrating part of the job until I figured out how to hold it all in place. I used masking tape to tape the angle clip to the end of the extension, with the screw and nut installed.
13. I then removed the screw and taped it to the end of a Phillips screwdriver. I was able to easily line up the angle clip with the nut taped on the end of the extension and get a couple turns of the screw into the nut before the tape came loose. (Be sure to remove the tape after getting the screw started).
14. I then taped an open-end wrench to the side of the extension and it fit over the nut easily and held firmly while I tightened up the screw. One could, I suppose, drill a hole in the end of the new pin and secure it with a washer and cotter key and avoid reinstalling the angle clips.

The test

15. I disengaged the hold-open rod and pushed the door. It closed and sounded like a door on a bank vault. No play and no adjustment needed. I cannot believe how easily it operates now. No more lifting up on the door to close it; no more wind noise. We forget how well Beech fit the door when they originally built it and how ever so slowly the hinges wear.

Shimmy Dampener

There are several directions on how to service / overhaul the shimmy dampener. This one was originally taken from the Beechcraft Model 35 Maintenance Manual. {There are other notes from ABS magazine issues. I will insert them as I find them...}

1. Remove shimmy dampener
2. Remove the cotter key, washer, and spring from the piston rod.
3. Remove the internal snap ring, scraper ring, and the end seal from the aft end of the barrel. (opposite of clevis end).
4. Remove the small piston inside the piston rod. (See Note)
   Extreme care should be taken when moving the 'O' ring seal of the floating pistons past the drilled holes in the piston rod. To remove the floating piston, insert a small rod that has a 6/32 thread cut on one end and screw the rod into the floating piston.
5. Push the piston rod to the clevis end.
6. Fill the barrel with hydraulic fluid, AN-VV-0-366.
7. Slowly actuate the piston rod, allowing the fluid to flow into the clevis end chamber, then return the piston to the clevis end of the barrel.
8. Refill the displaced fluid and replace the end seal, scraper ring, and internal snap ring.
9. Fill the piston rod with fluid.
10. Reinstall the floating piston, spring, washer, and cotter key.

Refilling the Landing Gear Struts With Fluid

(From the Classic Bonanza Association newsletter, Oct 1997, p. 5)

Sticky, noisy struts are probably low on fluid. Here are the directions for refilling a low main landing gear strut.

1. First, put the aircraft up on jacks and let the struts fully extend.
2. Next, remove the valve cap and depress the valve core to release the pressure.
   Hold a rag over the valve to catch the fluid that will escape and quit when the foam starts to come out. The fluid is under pressure and the gas has become dissolved in the hydraulic oil like fizz in a soft drink.
   You can release all of the pressure at once and all of the fluid will bubble out with it. If you want to change the fluid this will drain it for you, but you'll have a mess to clean up. Hydraulic fluid will ruin the tires so be sure to wash them if necessary. I prefer to release the pressure gradually over about 8 hours and keep most of the fluid inside.
3. Remove the valve core and attach a length of tygon tubing over the valve stem.
4. Compress the strut by slowly lifting the wheel with a floor jack until the strut hits its upper limit. Be careful. more fluid may bubble out periodically.
   If you have a problem with the strut leaking, this is the perfect time to replace the strut's upper o-ring, which is a common cause of leaky struts:
   a) Remove the snap ring above the cap and pull out the cap with the valve attached, but with the valve core removed. *Never* remove the snap ring with the valve core in place (boom!).
   b) Replace the o-ring. King Bearing will be happy to sell you a new o-ring for 57 cents.
   c) Replace the snap ring with the sharp side up and inspect the snap ring with a mirror to be sure it is fully seated. Failure to follow this advice may result in the strut literally blowing a hole through the upper wihg skin.

   Just do it! You might be surprised how many strut leaks are caused by the top o-ring.
5. Refill the strut by putting some MIL-H-5606 hydraulic oil in the tubing and slowly working the strut up and down until the fluid goes in and the air comes out. You won't get all of the air out, but continue until the big bubbles are gone.
6. Once all the fluid is in, make sure the strut is compressed, then remove the tubing and replace the valve core.
7. Repressurize the strut with compressed air. The pressure in the strut is about 500 psi or more, so you will need to use a booster pump which converts 150 psi compressed air from a shop compressor into up to 2,000 psi of compressed air. It is available in Trade-A-Plane for about $200.00, or from a hangar neighbor who already has one for free. Be sure to drain the moisture out of the compressor tank and lines before you use it.
   Some prefer to use a nitrogen gas bottle to ensure there is no corrosive oxygen or moisture in the strut.

Lubricating Control Knobs

Cowl Flaps, Carb Heat, Air Conditioner, Cabin Heat Cabin Vent Shutoff

Directions for lubricating the control cable are as follows:

1. Remove the pan assembly from the air conditioner unit and disconnect the control wire from the linkage.
2. Pull the control handle out far enough to retract the wire to within one inch of the end of the wire housing. Be careful not to lose the "lock ball" at the handle end.
3. Slip a piece of rubber tubing snugly over the control wire housing on one end, and over the nozzle of a small pump oiler at the other end.
4. Using the oil pump, pump about 2 teaspoons of 20 wt motor oil into the control wire housing. Pump slowly and use caution not to blast the rubber tube off either end to prevent spilling oil on the upholstery.
5. Remove the rubber tubing, and as long as you're there, lubricate the control wire linkage.
6. Reconnect the wire and exercise the system several times to work the oil into the housing.

Rudder Pedal Bolt Holes

Use the following procedure to enlarge the pivot hole and install steel bushings:

1. Remove the brake pedals from the rudder pedal arms and brake master cylinder rods.
2. Turn the nosewheel full travel to displace the rudder pedal arm rearward, and using a long (6") 1/4" drill bit, drill through the worn pivot hole (from right to left) using pressure to try and maintain the original hole center.
3. Drill the left hand hole using the already-drilled right hand hole as a steadying/aligning jig.
4. Using another long drill bit of about 9/32" diameter, enlarge the holes using care to get a "straight shot" through the first hole toward the second; it may be necessary to use a drill slightly larger than 9/32" to clean up the worn slotted hole so a full round hole results. A round hole is necessary so the bushings to be installed will not be deformed out-of-round when pressed into the drilled/reamed holes.
5. Measure the I.D. of the drilled holes and fabricate a set of steel bushings as the O.D. is .002" *over* the drilled hole size and the I.D. of the bushing is 3/16", with the length to suit the hole to be bushed.
6. Install the bushings using a good quality small "C" clamp as a press.
7. Ream the installed bushings with a 3/16" spiral flute hole reamer, if necessary, for a proper fit of the No. 10 pivot bolts.
8. Inspect the brake master cylinders for fluid leakage around the actuating rod and reseal the cylinders with o-rings (in place) if necessary.
9. Reinstall the brake pedals using *new* pivot bolts. Make sure the nuts are snug enough to prevent rotation of the bolts in the brake pedal holes, but not tight enough to strain the brake pedal hole lugs.
10. Lubricate all the rudder pedal arm and brake pivot points.

Rudder pedal arm shaft holes which are slotted nearly through would require more extensive repair work, but most are repairable in place if the repairman has the necessary tools and time to accomplish the job.
The rudder pedal arm lower pivot holes are also subject to wear. Due to their large diameter and the fact that they usually receive lubrication each annual, they wear very little compared to the small diameter, relatively highly loaded brake pedal pivot holes.

Brake Cylinders

To service the brake master cylinders in-place, refer to the ABS Magazine Mar 1997 issue.

Air Conditioner Wick Plates

If necessary, refer to the following procedure for wick replacement (from the Beech Bonanza Shop Manual, pg 3-30):

1. Fill the wick box with water and soak the wick assembly for a few hours to loosen the salts and minerals around the wicks.
2. Construct a jig similar to the one shown in the Beech Shop Manual pg. 3-30, figure 3-14. This jig will simplify installation of the wicks, as considerable pressure is required to insert all of the wicks in the rack.
3. Remove the wicks from the rack and thoroughly clean the rack and baffle.
4. Make new inter-wick seals from 1/8" sheet cellular sponge rubber, 3/8" wide and cut to fit the wicks as shown. Dip the seals in thinned EC-870 cement (3M Co.) and allow them to dry before installation.
5. Place the jig in a vise. Lay two pieces of heavy twine, approximately 30 inches long, on the jig as shown. The twine is used to temporarily hold the wick assembly together until it is placed in the wick box.
6. Place the rack on the jig with the cut-out for the overflow tube at the top right hand side of the jig, and clamp the rack to the back of the jig with four C-clamps. Tie a string to the top of the rack to hold it open.
7. Place sixteen 35-554022-2 wicks in the rack with the inter-wick sealers between the wicks.
8. Place the aluminum bar across the top of the wicks and pull it up tight. then, install three 35-554022-4 wicks, then the remaining twelve 35-554022-2 wicks.
9. Release the string holding the top of the racks, and tie the heavy twine tightly around the complete assembly. Loosen the jig's wing nuts and slide the aluminum bar out from the side of the wicks.
10. Check the cellular rubber seals in the wick box for deterioration. If new seals are required for the wick box, cut two strips of 1/8" cellular sponge rubber to 3/8" x 9-3/4 inches, and two strips to 3/8" x 9-3/16 inches. If new wick box seals are not required, cut only one long rubber strip and one short rubber strip. Cement one longer strip over the inter-wick seals on the front side, and the other inside the box, where the old one was peeled off. Cement one short strip over the inter-wick seals in the rear, and the other on the box. Make certain the two short strips clear the left rear corner of the box by 3/8". Use any good rubber-to-metal cement such as 3M's EC-870.
11. Place the wicks in the wick box, making certain that the overflow standpipe has sufficient clearance. The three 35-554022-4 wicks and the cut-out in the rack must align with the overflow standpipe.
12. Cut and remove the heavy twine, and replace the baffle in the box. Position the wick box and secure the fasteners. Connect the overflow and drain lines to the rear of the wick box.

Note:

There is a note in one of the ABS magazines (Oct. 1996, pg 4505-4506) mentioning that there are replacements for the Beech wick plates.

The Beech evaporative air conditioner wick plates are actually a very common part for humidifiers used in residential hot air heating systems. They come cut to the original "T" shape and size - no trimming necessary. I procured mine from a local heating supply company (Division Plumbing and Heating Supply, 50 Division St., Danbury, CT. 203-748-1524).

In assembling the plates in the housing, I used self-ahdesive foam weatherstrip to make both the half inch square pads in the upper corners of the "T" cap and the long seal strip across the shank of the "T". The uncompressed thickness of the weatherstrip will depend on its density. When properly compressed, it will be about 1/8" thick. I found the best way to keep the stack of plates together while wrestling it into the housing was to tie it with string, which I cut and pulled out when the job was complete.

Members may obtain the air conditioner wick plates through the Grainger catalog. They cost $1.00 apiece and come 5 to a box. I ordered one from Beech to make sure the plates were the same and they are the exact same plates. Beech charges $7.50 for one plate. It takes 27 plates, therefore you can see that it is a real bargain from Grainger's.

Note: the little rubber spacers that are used to separate the plates are quite expensive. What I did was to use self-sticking weatherstrip on the inside of the box to hold the plates in place.

Once you begin putting water in the evaporator box with these new plates, you must continue to keep water in the evaporator box or after flying a few hours, the plates become very dry and flake apart, and you will see little white fuzz balls coming through the vent.

Note: you must have the baffle in place on top of the plates.

Qty	Part #	Desc	Mfr.	Price
12	35-554022-2	WICK	Beech	7.50
3	35-554022-4	WICK	Beech	7.50
...	880	General Universal Fiberglass Humdifier Plates	General Filters, Inc. Novi, MI 48050 810-476-5100	1.20
...	A5-490-1	Universal Fiberglass Humidifier Plates	Skuttle Mfg. Co. Marietta, OH 45750 614-373-9169	1.20
27	(unknown)	Autoflo Humidfier Plate	Grainger's (1996) (pg. 2440)	1.00
6	2E539 (pkg of 5)	Autoflo humidifier plates PK 5 Universal type	Grainger's (1997) (pg. 3602)	12.13

Replacing Nosewheel torque knee bushings

{From an email in the Bonanza Lover's mail group - 1997.12.07}

The torque knees are easy to remove. Do this only with the weight of the aircraft on the nose gear, not when on jacks. Do not jack or move the aircraft after the knees are removed. To do so invites the nose strut to explosively exit its housing. You are safe if weight is on the gear.

There are several possible repairs. The first is to simply replace the aluminum knee ($450), the through bushing ($18), and the washers ($20). The steel knee is less likely to be worn out, but if it is that's another $450 or so.

The alternative is repair of the worn knees. A machine shop can bore out the hole in either knee, and press in a thin sleeve to bring the holes back to as new diameter and roundness. New Beech washers, and the bushing complete the repair. If you go this way, take the Beech bushing with you to the machine shop. They will use it to fit the sleeves, and they will probably need to put the bushing in a lathe to make it a few thousandths shorter so the bushing is not longer than the stackup of the knees and washers. Another method is to have the machine shop bore the holes in the knees just enough to make them round again. The shop can then machine a new oversize bushing to fit the repaired holes since the Beech supplied bushing will no longer fit. Assemble with new Beech washers and bolt.

If you elect repair, be sure to tell the shop that you want a minimum of material removed in the machining. Anticipate machine shop charges to run $50-150 for either method.

I am not advocating any particular repair, merely highlighting what is possible. Consult with your A&P or Engineer to determine what repair method is acceptable under the aircraft regulations for your country.

As this joint is critical, it would be sensible to check for cracks in the torque knees with dye penetrant or other reliable method before assembly. Pre-lubricate all parts with MIl-G-23827 grease, and assemble. I was unable to find a torque specification for the thru bolt in my service manual. The standard shear nut torque for an AN-4 bolt of 30-40 in-lbs is what I used. This seemed to eliminate all play, while allowing free movement in the hinge. If anybody has a Beech torque specification for this, I'd like to know what it is. Repairing this joint made a remarkable difference in the tightness of my nose wheel steering. It was well worth the effort and expense.

BTW, the parts prices I listed are approximate, based on my recollection.

{Bob Newman }
{E33 Bonanza N917CE }

Landing Gear Rigging Instructions - Method A

There is a set of directions for rigging the landing gear in the "Beechcraft Bonanza Model 35 Maintenance Manual", pg. 50 - 58.

The landing gear retract mechanism, and landing gear door actuating mechanism should be rigged and adjusted according to the following procedure:

1. Adjust the rear actuating rod for the nose gear to the length of 30-7/8 inch. Adjust the front actuating rod for the nose gear to a length of approximately 18 inches. If the nose gear actuating rods have not been removed from the airplane it will be difficult to measure the rod lengths, however approximate settings may be made by adjusting the rod ends until approximately 1/16 inch of threads are visible at each rod end. The rear rod may be adjusted by turning, since one rod end has left hand threads and one right hand threads.
2. Adjust the main gear rod ends until the center of the bolt hole through the rod end is approximately 1-3/16 inches from the face of the large spring retaining washer.
3. Connect the actuating rods to the nose and main gear.
4. Connect the actuating rods to the main landing gear inboard doors. Be sure the bolts attaching the actuating rods to the inboard doors are installed from rear to front. If the nut is on the rear side of the fitting it will not clear he rear edge of the cutout in the root rib. The nose gear doors, and main landing gear should be disconnected.
5. Slowly retract the landing gear. This may be done by intermittently making the circuit with the landing gear circuit breaker. As the landing gear is retracted a close check should be kept on all three gears to see that they have sufficient clearance from surrounding objects. The main landing gear wheels should be closely watched to see that they do tot rub the inboard landing gear doors. The doors should be adjusted to have a minimum of 3/8 inch clearance from the wheels as the gear is retracted. A close watch should be kept on all three landing gears to see that they do not retract too far and cause damage to the skin or actuating mechanism.
6. After the gears are completely retracted with the sector gear in the actuator assembly resting against the stop, they should be lowered 1/8 to 1/4 turn of the emergency handcrank and the 'Up' limit switch adjusted to break the circuit. See Figure 40.
7. The nose gear should be inspected for proper contact with the 'Up' stop. The actuating rods should be adjusted to pull the nose shock strut up snugly against the stop. Over tightening should be avoided. When adjusting the nose gear, a maximum of 1/4 inch of threads showing at each rod end is permissible. If it is necessary to shorten the actuating rods, the major amount of the adjustment should be made at the front rods. Finer adjustments should be made by turning the aft rod.
8. Adjust the actuating rod end at the main landing gear until from 1/64 inch to 1/32 inch clearance is obtained between the upper wing skin and the union of the side brace and leg assembly. When the desired clearance has been obtained, adjust the 'Up' stop to rest snugly against the shock strut. See Figure 35.
9. Lower the landing gear slowly, intermittently making the circuit with the circuit breaker until the landing gear is completely extended. A close inspection of each gear should be kept as the landing gear is lowered to see that sufficient clearance is maintained.
10. After the gears are completely lowered with the sector gear in the actuator assembly resting against the stop, they should be retracted from 1/8 to 1/4 turn of the emergency handcrank and the 'Down' limit switch adjusted to break the circuit. See Figure 40.
11. Retract and lower the landing gear to check the limit switch adjustment. The limit switches should be adjusted to break the circuit when the sector gear in the actuator assembly likes 1/8 to 1/4 turn of the landing gear handcrank from contacting the stop.
12. Check the spring tension at the nose gear slip joint to see that a minimum force of 30 pounds id required to cause any deflection at the union of the drag leg and V-brace assembly when such force is applied at the pivot point of this union and perpendicular to the centerline of these assemblies when the landing gear is in the fully extended position. See Fig. 36. If necessary a maximum of two washers, Beech part number 100951-DD-064-020-102 may be used at the slip joint to obtain proper spring loading. To install the washers, remove the bolt attaching the slip joint to the rod and remove the joint. Do not tighten the bolt enough to hinder free movement of the slip joint when it is reinstalled. See Fig. 37.
13. Check the spring tension at the main gear to see that a minimum force of 45 pounds is required to cause any deflection at the union of the side brace and leg assembly when such a force is applied at the pivot point of this union and perpendicular to the centerline of these assemblies when the landing gear is in the fully extended

position. See Figure 36. If necessary a maximum of four washers, Beech part number 100951-5-063-024-018, may be used at the slip joint to obtain the required spring loading. See Figure 37. The washers may be added by removing the bolt attaching the slip joint to the rod. Do not tighten the bolt enough to hinder free movement of the slip joint when it is reinstalled.

Landing Gear Rigging Instructions - Method B

(From American Bonanza Society Magazine) As an alternate, use the following:

If the landing gear needs to be re-rigged, perform the following:

1. Disconnect the main outboard gear doors at the main gear.
   Remove the left hand nose gear retract rod and tape the door.
2. Retract the gear.
   Check the emergency gear extension crank and make sure that the crank handle stops 1/8 to 1/4 turn from its internal stop (retracted).
3. Extend the gear.
   Check the emergency gear extension crank and make sure that the crank handle stops 1/8 to 1/4 turn from its internal stop (extended).
4. Retract the gear.
   Check the nose gear-up tension (18 - 25 lbs)
   Check the main gear clearance between the inboard gear door (1/4") and v-brace clearance from the top wing skin (1/16" to 1/8").
   If either clearance needs adjustment, back off the uplock striker and turn in the v-brace stop bolt before adjusting.
5. Partially extend the gear to 3/4 down.
   Check for excessive movement of the inboard gear doors (1" is too much)
   Using your hand, *gently* push the gears toward the retracted position to determine that the slip joints move freely.
   Gently move the nose gear back and forth to detect wear in retract linkages.
6. Retract the gear.
   Check the uplock striker clearance (1/64"). Adjust if necessary.
   Then, check the uplock cable tension (52-1/2 lbs, +10/-0 lbs)
   Check that the v-brace stop bolt is touching the main gear.
   Check the inboard door tension (about 10 lbs)
7. Extend the gear.
   Check downlock tensions (45 - 65 lbs)
   Hook up all doors.
   Retract the gear and check the doors again.

Note: "The most common mistake I find when working on a particular airplane for the first time is that someone has adjusted the downlock tension by changing the position of the retract rod and rod-end bearing.
NEVER DO THIS!
The rod-end bearing (at the retract braces) determines the gear-up position and the nose gear up-tension.
Downlock tension is changed by the addition or removal of the proper washers under the downlock springs. If the number of washers has to be changed on the main gear, *carefully* count the number of turns (I count by half-turns) it takes to remove the outboard rod-end bearing from the retract rod. Make sure it is returned to its original position after changing washers.
As a check that the rod-end bearing is in the right position, retract the gear and check that the uplock clearance has not changed"
(ABS Mar 1982, pg 1161)

Note: When disconnecting / reconnecting the main gear outer doors,
The rear bolt which connects the link rod to the door (*not* the bolt which connects the link rod to the gear leg) must point *rearward* with the bolt head *forward*.
The elastic stop nut used is thick enough that if it is installed with the bolt pointing forward, the nut will strike the gear leg and cause bending of the bracket on the gear door to which the link connects.

Troubleshooting Vibrations

Possible culprits are:

Vibration can be transmitted from the engine to the aircraft structure from points of contact between engine components and the cowl, firewall, or engine mount.

The following is a list of areas to be checked to ensure the engine is isolated from the aircraft structure or to minimize the effect from components which must bridge between engine and structure. The list also includes engine conditions for smooth operation which affect airframe vibration.

a) Baffle-to-cowl clearance
   Check inside of cowl for chafing; trim metal baffle as required. Repaint affected area and reinspect next flight.
b) Exhaust-to-cowl
   Check exhaust stack for clearance where it extends through the cowl. Check stack and cowl for signs of interference. Enlarge cutout in cowl as required.
c) Cowl-to-firewall interference
   On models utilizing shock mounted cowls, positive clearance should be ensured between the cowl and the firewall. Typical clearances where the cowl overlaps the fuselage run on the order of .06" to .13".
d) Induction hose clamps
   Check induction hose clamps for clearance with the engine mount structure. Look for marks on engine mount. Rotate clamps as required.
e) Breather and overboard dump lines
   Check all overboard dump lines from the engine for clearance with the firewall, cowl, and/or cowl flap openings. Check cowl flap in both the open and closed positions. Reposition and reclamp to clear.
f) Engine isolators (Lord mounts)
   a. Check engine isolator bolt lengths. Bolts which are too long will shank out and will not apply the correct pressure to the isolator. Bolts must be removed to be properly checked. Replace with the next size shorter bolt if barrel nut has shanked out.
   b. Check isolators for aging and deterioration. Replace if rubber is separated from metal pad, there is cracking of the rubber, and/or pronounced set of the rubber pad.
g) Propeller track
   a. Check propeller track; set up reference point at tip of propeller, rotate blades past this point. Blades should not be more than 1/16" out of track.
   b. Check propeller for loose or binding blades, loose or missing attach bolts.
   c. Check propeller spinner for loose, damaged, or deformed parts and visual wobble.
   d. Balance suspected prop if roughness continues.
h) Engine controls
   a. Engine controls should be routed to provide a gentle curve between engine and firewall. They should not be stretched tight. Pull control through firewall and reclamp.
   b. Check engine controls behind engine for contact with engine. Reroute and reclamp controls as required to clear.
i) Starter cable
   Check starter cable for clearance with cowl ant that a loop is provided for flexing.
j) Engine condition
   a. Check spark plugs for fouling, improper gap, and for proper type.
   b. Check condition of ignition wiring.
   c. Check condition of points.
   d. Check magneto timing.
   e. Check engine compression.
   f. Check fuel injection engines; check fuel injector nozzles for restriction and correct size. Check fuel pump and mixture unit settings; check distributor valve for calibration and proper flow.
   g. On turbocharged engines, check nozzle shrouds for leakage, and/or rubber couplings for proper seal.
   h. On turbocharged engines, check turbocharger for foreign object damage, binding, and worn bearings.
k) Antenna vibration
   Check antenna if vibration tends to be related to airspeed rather than power setting.
l) Wheel balance and brake disk trueness

Wheel balance and brake disc trueness can be sources of vibration during the ground run on some aircraft. These should be checked as a part of the vibration diagnostic process if conditions indicate that they may be a problem.

Troubleshooting Cabin Noise

Also see the noise checklist ABS Jan 82 pg. 1135

a) Sometimes at engine overhaul, an change in engine noise can be noted; this could be caused by unbalanced parts being used that would cause an engine to run rough, or it should be caused by the engine mount rubber {Lord mounts}.
The engine mount rubber in Bonanzas up to the G35, have a tendency to sag; this can allow the engine sump to touch the keel which will cause vibration and noise in the airframe. In most cases, new rubber mounts are not needed, they only need to be rotated.
On the later models, H35 and after, sagging is not a problem.
On the S35 and after, two types of rubber mounts were used - the Lord and Robin Tech. If a three blade prop is used, it is best to use the Lord mount which for this combination will give the smoothest operation.

b) Propellers can give rough operation. A prop can be in balance, but if the blades are not set at the same angle, they will run rough.

c) Noise can be caused by exhaust systems. The Service Clinic has revealed that more muffler cones inside mufflers are missing than are there. The muffler cone serves a dual purpose; it cuts down on exhaust noise, and it directs hot exhaust gas to the heater shell for top heater efficiency. My main concern in checking during Clinic inspections is to be sure the broken cone doesn't block the exhaust, which would cause engine back pressure.

d) Tailpipe extensions also tend to quiet the cabin.

e) Mufflers. My personal opinion on external mufflers is that the objections outweigh any good. While they may make things quieter outside the airplane, they do little to quiet the inside. Mufflers interfere with cowl flap travel, and they add more weight to the tailpipe support bracket and most likely increase engine back pressure, robbing the engine of horsepower.

e) Skin canning is another likely source of noise. The square access plate in the fuselage belly, directly below the landing gear gearbox will sometimes flutter or can cause noise. Sometimes a stiffener angle is needed to stop the flutter, and sometimes car undercoating material added to the inside surface will do the trick. If wing flaps are rigged too tight to the wing, it will sometimes cause the lower wing skin, just forward of the flap, to vibrate. In such cases, the sound may be like a twin engine airplane with the props out of sync. This noise travels down the wing spars into the cabin. The fix - hand form the skin to give it a slight contour or add angle stiffeners.

f) Sometimes skin in the cabin belly will buzz or vibrate. This is hard to locate. The easiest way to find the offending skin is to remove the cabin floorboards, then go fly the airplane. While in flight, place a hand on the belly skin between each stringer. When you feel the skin moving, you have found the trouble. A stiffener added to the skin will cure the problem.

g) I have seen skin canning on the lower side fuselage, just aft of the firewall. This particular skin "can" was obvious to the eye. Most skin canning occurs in flat skins. There is an area in the side engine cowl, just aft of the nose bug, what will "can" usually while on the ground. You will see a stiffener here on some airplanes fresh from the factory.

h) Of course the overhead air scoop in some models is noisy, that is why it was moved back to the tail. You can cut a used Brackett air filter to fit the escutcheon below the scoop, wedge the filter in the box, and this will muffle wind noise.

i) A leaking door or window seal will cause cabin noise. Most cabin door seal problems are caused by worn cabin door hinge pins that allow the door to shift in the fuselage opening. The windlace around the door opening in the fuselage must lay against the door in the closed position.

j) There have been a few cases where the lower firewall has canned causing noise; a stiffener can cure this problem.

k) If sound deadener can be added to the firewall it would help. 3M makes a product called Scotch-foam Y370. This is self-adhesive, is very light weight, and has good sound deadening qualities.

l) If everything else is good, sound level in the cabin can be improved by installing thicker windshields, sloped windshields, and side windows. Like everything else, they are a compromise, in that the thicker glass adds weight.

AD #	Completed Description	Next Due	Completed (tach)	Completed (date)

Airworthiness Directive Compliance

A.D. #	Description	Next	Last	Lst.Date
47-47-8			1040.8	04-25-58
49-4-1			1040.8	04-25-58
49-26-1			1040.8	04-25-58
49-31-1			1040.8	04-25-58
50-5-2			1040.8	04-25-58
50-42-1			1040.8	04-25-58
51-14-1			1040.8	04-25-58
52-22-1			1040.8	04-25-58
53-1-2			1040.8	04-25-58
53-11-1			1040.8	04-25-58
53-20-2			1040.8	04-25-58
55-8-1			1040.8	04-25-58
55-22-1			1040.8	04-25-58
55-26-2			1040.8	04-25-58
56-6-1	E-225-8 Engine: Parts replacement		.	
56-25-1			1040.8	04-25-58
57-1-1			1040.8	04-25-58
57-18-1			3222.5	02-20-63
60-6-4	Replace washer and nut under generator drive gear		2132.2 2541.8	06-02-60 06-06-61
60-12-1	E-225-8 engine: piston pin assemblies	.	.	
62-8-3	Inspect ram's horn control wheel (?)	.	.	
63-15-1	E-225-8 engine: replacement of exhaust valves	.	.	
70-15-18		.	.	
72-11-02	Alters useable fuel quantity	.	.	

AD #	Completed Description	Next Due	Completed (tach)	Completed (date)
72-22-1	Uplock roller bearings	0.0	6010.6	09-15-73
		6110.6	6174.3	03-10-76
		6274.3	6273.3	11-01-80
		6373.3	6281.8	06-23-82
		6381.8	6303.4	10-12-87
		6403.4	6306.1	11-09-88
		6406.1	6373.9	12-01-89
		6473.9	6548.4	01-12-91
		6648.4	6650.5	03-01-92
		6750.5	6763.1	03-19-93
		6863.1	6860.8	05-05-94
		6960.8	6923.6	05-24-95
		7023.6	7028.5	06-14-97
		7128.5		
73-7-4			6117.8	01-10-75
	"(not due at this time)"			
75-05-02	Beryl Air/Oil separators: clean and check		6174.3	10-10-76
			7028.0	06-12-97
76-07-12	Magneto ... Bendix clip	0.0	6373.9	12-01-89
	(Magneto switch check)	6473.9	6548.4	01-12-91
		6648.4	6650.5	03-01-92
		6750.5	6763.1	03-19-93
		6863.1	6860.8	05-05-94
		6960.8	6923.6	05-24-95
		7023.6		
78-20-03R3	Magneto Impulse Couplers		6548.4	01-12-91
		6648.4	6650.5	03-01-92
		6750.5		
79-06-09	Capacitor DA		6860.8	05-05-94
84-09-01	Rear window curtain rods & pull pins		6888.0	03-08-95
86-21-07	Beech speed restrictions due to ruddervator fittings		6303.4	10-12-87
	--- AD no longer applies			11-09-88
88-05-02	Elevator fittings	0.0	6373.9	12-01-89
		6473.9	6548.4	01-12-91
		6648.4	6650.5	03-01-92
		6750.5	6763.1	03-19-93
		6863.1	6860.8	05-05-94
		6960.8	6923.6	05-24-95
		7023.6	7028.5	06-14-97
		7128.5		
94-01-03	Bendix coils		6860.8	05-05-94
97-06-11	Elevator pushrods		0.0	00-00-00

AD #	Completed Description	Next Due	Completed (tach)	Completed (date)
97-06-01?	(May be a superceded version of 88-05-02)			

-=-

Beech Service Bulletin Compliance

(O)ptional, or
(M)andatory.

AD #	Date		Description	Completed (tach)	Completed (date)
989	??-81	?	To eliminate elevator rod end corrosion. Note: this is superseded by SB# 2668 Sep-96.		
2001 r3	06-90	O	General - Beechcraft Service Publications What is available and how to obtain it		
2010 r1	05-88	M	Fuselage - Part I, Seat track modification Part II, Inspection and/or installation of a washer to the pilot's and Copilot's seat frame assemblies		
2016	09-85	O	Electrical power - Installation of a printed circuit board assembly on the alternator auxiliary terminal		
2031 r2	09-90	M	Equipment / Furnishings - Notice of availability of shoulder harness kits		
2032	06-84	O	Instruments - Remarking tachometers		
2045 r3	05-89	M	Fuel - Modification of fuel filler and replacement of fuel filler caps		
2054	02-85	O	Placards and Markings - Removal of Placard		
2100	06-85	O	Electrical power - Installation of a diode on the standby generator switch wiring		
2109	03-86	M	Fuel - Inspection and replacement of the foam insert in the fuel reservoir assembly		
2133	03-86	O	Pneumatic - Installation of a standby instrument air pressure system		
2175 r1	06-87	M	Equipment / Furnishings - Replacement of recline actuator handle on Co-pilots and cabin 3rd and 4th seats		
2176	05-93	O	Flight Controls - Modification of flap and landing gear selector switch knobs		
2188	05-87	M	Flight Controls - Structural inspection and installation of a stabilizer reinforcement kit		
2190	09-90	M	Doors - Cabin door latching warning placard and cabin door adjustment instructions		
2210	09-87	O	Flight Controls - Elevator trim tab limits modification		

AD #	Date		Description	Completed (tach)	Completed (date)
2219	12-87	O	Landing Gear - Replacement of nose landing gear door stiffener		
2242 r1	08-88	M	Flight Controls - Inspection and/or replacement of Magnesium elevator control fittings		
2305	11-89	M	Fuel - Inspection of fuel strainer and installation of a fuel strainer warning placard		
2360	11-90	M	Fuselage - Wing forward spar carry-thru structure inspection and/or reinforcement		
2363	02-91	O	Doors - Announcement of a kit to replace the inside cabin door handle		
????	??-??	O	Landing Gear - Announcement of a kit to increase the Emergency Maximum Landing Gear Extended speed to 175 mph. Note: This kit is no longer available (03-11-96)		
2366	02-91	O	Landing Gear - Landing gear retraction warning system improvement kits		
2380	04-91	M	Environmental / Air Conditioning Inspection / Modification of the Optional fresh air blower installation		
2394	12-90	M	Equipment / Furnishings - Pilot and Copilot shoulder harness guide retaining washer inspection and/or replacement		
2403	??-??	?	Coupling connectors (-?- Not a Beech Service Bulletin -?-)	6763.1	03-19-93
2405	11-92	O	Placards and Markings - Inspection to verify Installation and condition of all interior and exterior Placards and markings		
2420	02-92	M	Engine Fuel and Control - Inspection of the fuel metering unit for leaks and installation of a fuel drain line		
2457 r1	02-94	M	Doors - Cabin door third latch pin overcenter mechanism installation		
2460 r1	11-93	M	Flight Controls - Inspection of Flap drive cable / flap drive motor coupling connection		
2463	08-92	O	Windows - Installation of Improved sealing on emergency exit windows		
2518 r1	03-94	M	Fuel - Replacement of the fuel strainer spring and housing plate		
2526	12-93	M	Fuel - Dukes, Inc. Electric fuel boost pump inspection and overhaul / replacement		

AD #	Date		Description	Completed (tach)	Completed (date)
2538	12-94	M	Wings – inspection of upper and lower spar caps		
2668	??-??	M	Flight Controls - Another S.B. on elevator push rods.		
0736-211	??-??	?	Landing gear uplock brackets on 1964 and later models		
2605	12-94	M	Flight controls – elevator rtim tab horn attachment inspection.		
2527	09-95	M	Flight controls – control gust lock modification/replacement		
2693	06-96	M	Doors – inspection of the interior door handles		
2668	09-96	M	Flight controls – ruddervator differential tail control rod assembly inspection/modification		
2668rev1	12-96	M	Flight controls – ruddervator differential tail control rod assembly inspection/modification		
2670	05-98	M	Placards and markings – Installation of fuel selector placard.		

-=-

AD #	Date	Description	Completed (tach)	Completed (date)

Annual Inspection Form revision date

1995.06.01	First revision.
1997.10.28	
1997.11.10	
1998.01.14	Engine compartment area - added inspection for hose clamps.
1998.03.11	Added brake part numbers to list of things you may need.
1998.03.26	This version sent to folks on the beech-owner's Internet web page.
1998.03.31	Added checks on the battery box for possible damage (holes).
1998.04.01	Corrected Exterior placards
1998.04.02	Corrected location of "Install link rod bolt with head facing aft" placard. Added check for strut-to-gear door bolts to both be facing aft.
1998.08.01	Changed Non-N3218C items to "hidden" text.
1998.09.21	Changed brake info to reflect Cleveland 199-50 brake kit.
1998.12.03	Modified checklist during & after first actual owner-assisted annual using this form.
1999.01.01	Changed landing gear strut air pressure information.

-=-