

Handling, Service and Maintenance

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INTRODUCTION TO SERVICING

This section is designed to help the owner and pilot of the Lancair to service and maintain it in a safe and efficient manner. The information herein is intended as a guide to maintaining the aircraft and assumes any/all work accomplished is of such quality that structural or aerodynamic integrity is not compromised. Inspections, and servicing information herein should be used as a guide.

AIRPLANE INSPECTION PERIODS

Annual-Inspection

An annual inspection is required on all aircraft. This inspection must include an inspection of the landing gear, all structure for cracks, evidence of delamination, corrosion of parts, security of fittings and fasteners, a compression test of the engine's cylinders, and an inspection of the propeller. This "Annual Inspection" must be signed off in the aircraft log book as well as any repairs necessary due to items found during the inspection.

Recommended Inspections

It is recommended that two additional levels of inspections. These are at 50 hour and 100 hour intervals. Your aircraft will undoubtedly be given several "100 hour" inspections at earlier intervals, a practice which is also recommended. In addition there are continuing care items, items which have a recommended overhaul or replacement schedule, and special inspections required due, such as gear or flap extensions at high speeds.

The 50 hour inspection is intended to cover rather routine items of wear such as tires, oil changes, cable end fittings, brake linings, hose and wire fretting and rubbing areas, etc.

The 100 hour inspection takes a more in-depth look at the aircraft for structural cracks, delaminating, etc. much as an annual inspection. It is recommended that the aircraft be thoroughly washed, the engine cleaned, compression checked and a complete review of the aircraft and engine log book be made to insure

This inspection must be recorded in the aircraft and engine logbooks and signed by the inspector.

MAIN WHEEL JACKING

The aircraft have one wheel raised by jacking. Care must be used to prevent damage to the landing gear doors. A scissors or "bohle" type hydraulic jack is recommended. An allowance must be made for the compression pads to extend the wheel to its limit. At this point the wheel may be removed for servicing of the wheel and/or brake.

CAUTION

Anytime an aircraft is on jacks of any sort personnel should not be allowed in or on the aircraft.

NOSE WHEEL JACKING

The nose wheel may be raised easily by securing some weight about the fuselage forward of the empennage. A 4inch wide strap is recommended or the uses of the tail tie down point. Approximately 150 pounds are required. Again care must be observed and the caution note above applies.

OIL SYSTEM SERVICING

The oil used should conform to the engine manufacturer's recommendation. Since engine oil consumption is higher during break-in of a new or overhauled engine, very long flights should be avoided until it is certain that the sump quantity is sufficient for the flight duration. The oil level is checked thru the small door on the upper right topside of the engine cowling. A minimum of 6 quarts should be indicated before every flight.

Oil Changes

During the initial break-in the engine should be operated with a straight mineral oil. The break-in is normally 25 to 50 hours during which time the oil consumption should stabilize. Following this break in period, the oil and filter should be changed and an oil Ashless Dispersant Oil installed. If consumption has not stabilized at the 25 to 50 hour point, continue the use of mineral oil.

The engine oil should be changed at a minimum of each 50-hour of flight time. More often is recommended. The engine oil should be drained while the engine is thoroughly warm and with the aircraft in a level position.

The filter should be cleaned at each oil change and the element examined for its contents. Sand type material is indicative of inadequate air filtration and may warrant corrective action ranging from more frequent changes to the installation of an improved filter system. Metallic particles may vary from aluminum to steel or stainless steel.

Following the initial break-in period during which some metallic particles are normal almost any amount thereafter becomes cause for concern. If subsequent changes show additional metallic particles, the source should be determined.

The type can be somewhat determined by separating by category, i.e. magnetic or not, steel or aluminum, silicon (sand), etc.

Another method of determining the source is the use of spectral analysis of an oil sample. These services are readily available by mail, and can provide you with a running history of the contaminants from each of your oil changes.

BATTERY

The Battery is Jelly-lead type. This type of Battery is Gas-sealed and don't need 50 or 100 Hour inspection, and serviced.

The Battery- Box is open .

TIRES

The Lancair tires should be properly inflated at all times. The nose wheel tire should contain 28 to 30 psig and the main gear tires from 40 - 45 psig. Maintaining the proper inflation will minimize tread wear and aid in ground control of the aircraft. When inflating, visually check both sides of the tire for bulges, cracking of the sidewall, cuts. The tread should be $>1/16$ ".

WARNING

Tire size is important on your Lancair. Use only the specified tire. **Other sizes will not fit into the wheel well and may damage the mechanism and the aircraft structure.**

LANDING GEAR SHOCK ABSORBERS

HB-YFR is fitted with nitrogen/oil shock absorbers on the main gear. Before each flight, check for leak and equal travel on both sides. For maintenance, use special bulletin in the aircraft technical book.

Nose wheel struts 320 styles contain air (nitrogen) and oil and is a sealed system. It contains a shimmy dampening system that must be checked often. This check is made as follows:

- 1) Have someone hold the nose wheel off the ground by pressing down on the fuselage just forward of the empennage.
- 2) Spin the nose wheel. It should not spin over one or two turns at the most. If excessive rotation occurs the axle nut must be retightened and the test conducted again until satisfactory. Verify that the Timken bearings are properly snug; there must be no free play between bearings and race.

Check that the side bushings are properly snug against bearings and that they are not worn.

BRAKES

The brakes are independent systems on each of the main gear wheels. The fluid reservoir for each is located behind the rudder pedals on the pilot's side. The toe brakes should depress approximately 1/2 inch before any pressure is generated at the brake when properly serviced.

Lines should be checked for leaks and chaffing due to rubbing on the tire or the airframe while the gear is retracted. The brake pucks should be a minimum of 0.150 inches thick. The brake pucks should be replaced when less than this value.

INDUCTION AIR FILTER

Operation of the aircraft in dusty areas requires that a filter be installed and changed periodically to preclude premature engine degradation. Removal of the filter requires removal of the cowl and should be accomplished at least on an annual basis. If operating in dusty areas, more often is desirable. Depending on the type of filter used, it may be cleaned, or may require replacement.

PROPELLER

Your propeller should be serviced according to the Mühbauer-Manufacturer's instructions. It is a highly stressed component and any failure has the potential of being catastrophic. Treat it with care. Nicks and dents (stress risers) in the leading edge due to rocks, hail or whatever needs to be "dressed out" until smooth. Care should be used to maintain a similar contour to the blade after dressing and the area should then be polished resulting in a smooth, scratch free surface.

Propeller TBO: 1600 hours or 60 month, whichever comes first.

WARNING

Use care when handling the propeller. Insure that the mags are OFF, the throttle CLOSED, and the mixture in the CUT-OFF position. Then remain as clear as possible during the dressing operation. Be prepared for a cylinder to fire when moving the propeller to a new position.

ELECTRICAL POWER

Alternator

The alternator is an alternating current device, which is then converted by diodes to direct current for charging the battery. It has no brushes or other rubbing parts and may have the voltage regulator mounted on the unit or integral. The Alternator is an Automotive-Alternator. The B&C voltage regulator is located at the COPI's firewall side and it's Voltage output should be the same i.e.14.2 to 14.8 volts.

Excessively high voltage regulation will cause overcharging of the battery and shorten its life; low settings will result in a low battery and probably poor starting especially in colder weather.

CARE AND CLEANING

Your Lancair requires no special care and cleaning. Prior to washing, cover the wheels, Pitot and static ports, and plug cabin air intake ports. Care should be used to avoid removal of grease and oil from lubricated areas.

The windshield should be cleaned with generous amounts of water and a soft cloth. Prepared cleaners should be used with caution unless expressly made for acrylic material. Oil and grease can be removed with small amounts of kerosene if necessary followed by soap and water.

Never use gasoline, benzine, alcohol, acetone, carbon tetrachloride, anti-ice fluids, lacquer thinners or glass cleaners. They will either soften the material or cause it to craze. Rubbing of the surface with a dry cloth should be avoided as it causes static electricity build-up, which subsequently attracts dirt and dust particles.

Upholstery materials and carpets can be cleaned in the normal manner. Rubber seals can be lubricated with Oakite 6, Armorall or equivalent materials. A vacuum is the primary means of cleaning the interior of loose dust and dirt. Blot up any liquid spills as soon as possible with cleansing tissues or clean rags. Hold the material securely against the spill for a few seconds allowing it to absorb the liquid. Repeat until all liquid is removed. Scrape off any gum materials.

Test a spot remover on a test piece of material or an out of sight location if there is any question as to the compatibility of the cleaner and the upholstery or carpet materials. If acceptable, clean areas of spots as necessary.

Detergent foams can be used to clean carpets if used per the manufacturer's instructions.

Interior plastic parts should be cleaned with a water damp cloth. Oil and grease can be removed with cloth dampened slightly with kerosene. Volatile solvents such as those mentioned for the windshield are to be avoided.

Exterior Painted Surfaces

CAUTION

Polyurethane finishes is a high corrosion resistant paint. This paint is Benzine and Hydraulic resistant. But you should be washed only with a mild soap and *not with a raw sponge or scotchbrite sponge*.

Use only soft clean cloths and minimize rubbing to avoid damage to the paint film surface. Rinse thoroughly with Clearwater. Stubborn oil or grease deposits may be removed with automotive tar removers if required. (Mild detergents can be used on Urethane finishes.)

Wax or polish paint only after it has completely cured. Use power polishers with extreme care as they can build up excessive heat levels locally at the polishing surface and damage the paint surface.

ENGINE

Clean the engine with a neutral solvent. While the engine is warm but not hot, spray with the solvent and allow setting a few minutes. Follow with a spray wash and allow drying. Avoid excessively high pressures, which can force entry of water and/or solvents under seals resulting in contamination of the sealed system or entry thru the firewall into the cabin. Use caution and protect any electrical relays or switches you may have installed in the engine compartment as well. Use only solvents, which do not attack rubber or plastics.

RECOMMENDED SERVICING**INTERVAL****ITEM****Preflight**

Check & Service oil

Service fuel tanks

50 Hrs

Change oil and clean filter

Clean or change engine air filter

Lube landing gear mechanism

Check control surface hinges

Annual -Check**100Hrs**

At each 100 Hrs

Or minimum each after 12 month

ANNUAL TYPE CONDITION INSPECTION

Model: 320 Serial Number: 503

Registration Number HB-YFR

ENGINE "GROUP A"	50	100	500
1 Check documentation AD's, SB's, SDR's	x	x	x
2 Fuel pressure (auxiliary pump) Light OFF	x	x	x
3 Start-up oil pressure (60 – 90 psi regarding temp.)	x	x	x
4 Run engine @ 1200 RPM until oil temp > 140 F	x	x	x
5 Idle oil pressure min. 25 psi (depending temp.)	x	x	x
6 Magneto CHECK DROP L/H, R/H @ 2000 RPM	x	x	x
7 Propeller: set 1700 RPM then 2700	x	x	x
8 Alternator: CHECK for proper current supply	x	x	x
9 Full power manifold Pressure 27.5Hg @ 2700 RPM	x	x	x
10 CKECK for gen. Running conditions and vibrations	x	x	x
11 Check idle speed and mixture rise @ RPM	x	x	x
12 Magneto ground CHECK	x	x	x
13 Compression CHECK: CYL. / COMPRESSION 1 / 80, 2 / 80, 3 / 80m 4 / 80		x	x

ENGINE "GROUP B"		50	100	500
1	Drain engine oil	x	x	x
2	Remove oil filter and or screen. and check for contaminates	x	x	x
3	Drain engine breather can if installed Check whistle or shi for obstructions	x	x	x
4	Install new oil filter or replace screen gasket Service engine with recommended quality of oil	x	x	x
5	Clean & gap spark plugs Rotate plugs top to bottom	x	x	x
6	Check ignition harness for chaffing & general condition	x	x	x
17	Check Ignition, engine timing, Hall-sensor condition in accordance with LSE-Maintenance Manual. (EVERY 50h)		x	x
8	Check exhaust system for cracks. Security, and condition of gaskets		x	x
9	Check intake pipes for condition and Leaks		x	x
10	Check condition of air box. Clean or replace air filter element as necessary	x	x	x
11	Check condition of alternate air system and flapper valves	x	x	x
12	Check engine baffles & cowling for gen. condition		x	x
13	Inspect fuel hoses for general condition		x	x
14	Inspect oil cooler / hoses for general condition	x	x	x
15	Replace or clean fuel filter and screens as necessary	x	x	x

16	Check engine vibration isolators for poor condition and deterioration		x	x
17	Check engine mount for cracks and security to firewall		x	x
18	Check engine for oil leaks	x	x	x
19	Check prop gov for Leaks and security and condition of cable end		x	x
20	Check starter for security and condition		x	x
21	Check alternator and mount for security condition of wiring and belt for condition and tension		x	x
22	Check vacuum pump for security and condition		x	x
23	Check tach cable or wiring for security and condition		x	x
24	Wash engine. CAUTION DO NOT CONTAMINATE VACUUM PUMP or INDUCTION SYSTEM WITH FLUID		x	x
25	Lubricate engine controls and check for connections and travel		x	x

PROPELLER "GROUP C"		50	100	500
1	Inspect propeller for cracks, nicks, binds and oil or grease leaks		x	x
2	Remove minor nicks and dress blades as necessary		x	x
3	Check propeller mounting bolts for torque and safety wiring		x	x
4	Check blades for looseness in hub		x	x
5	Inspect spinner, screws and bulkhead for cracks and condition		x	x
6	Lubricate propeller per manufacturer's recommendation		x	x

CABIN "GROUP D"		50	100	500
1	Check seat belts for general condition and defects		x	x
2	Check battery		x	x
3	Check battery vent for security and obstructions		x	x
4	Clean battery cable terminals if required and reinstall battery		x	x
5	Check hydraulic power pack and lines for Leaks, security and fluid level		x	x
6	Check elevator idler arm and bob weight for security, and lubricate rod ends		x	x
7	Inspect. flap motor compartment. rods and motor for proper operation. running current and lubricate		x	x
8	Check aileron. elevator push tubes and trim systems and lubricate rod ends		x	x
9	Check for loose equip't that might foul the controls		x	x
10	Inspect rudder cables, and attachments etc.			
11	Inspect brake master cylinders for leakage, free and full extension and proper operation Check fluid level at the master cylinders		x	x
12	Check condition of Instrument panel, wires, hoses, and vacuum filters		x	x
13	Check compass for fluid level and correction card		x	x
14	Check Instruments for proper markings, general conditions and security		x	x
15	Clean inside of cabin and insure that drain holes are clear		x	x
16	Inspect fuel lines and tank for security and Leaks		x	x
17	Inspect pitot static lines		x	x

FUEL SYSTEM "GROUP E"		50	100	500
1	Check fuel transfer pumps for operation		x	x
2	Check fuel tank filters and sump drains for contaminants	x	x	x
3	Check all fuel vents for security and obstructions	x	x	x
4	Check fuel lines for security, chaffing and leakage	x	x	x
5	Check fuel tanks and caps for leakage, security and placards		x	x
6	Check fuel boost pump for operation, Leaks and security		x	x
7	Check fuel shut-off valve for operation and Leakage		x	x
LANDING GEAR "GROUP F"		50	100	500
1	Place aircraft on jacks		x	x
2	Clean excess grease off gear legs, struts, and wheels		x	x
3	Check brake discs and linings for wear or cracks		x	x
4	Check wheels for general condition and cracks		x	x
5	Check tires for wear, condition, and proper inflation		x	x
6	Check wheel bearings for corrosion wear, re-pack with grease		x	x
7	Check main gear trailing beams and bolts for wear		x	x
8	Check main gear weldment for fore and aft end play		x	x
9	Check compression assemblies and bolts for wear (disassembly required)		x	x
10	Check nose gear drag link at the knee for wear or hole elongation (disassembly required)		x	x
11	Check nose gear gas spring for 100# minimum to compress		x	x
12	Retract the gear checking for wear and freedom of movement of all bearings of gear and drag strut assembly. Lubricate all moving points. Check pressure within limits		x	x
13	Check gear doors for fit and security. Lubricate pivot points and rods		x	x

	50	100	500
14	Free fall the gear using the dump valve. Check for freedom of movement and over centering of links. Check gear using power pack and check pressure down within limits	x	x
15	Check nose oleo shimmy damper for proper resistance to movement	x	x
16	Check nose gear oleo for condition and leakage. Inflate nose gear oleo to specified psi unloaded, or strut extension loaded	x	x
17	Check nose gear operation when wheel is at slight turning radius and tire or tang do not hang up when gear is retracted	x	x
18	Check operation of gear position lights and switches	x	x
19	Check all gear actuators and sequence valves for proper operation and leakage	x	x
20	Check gear switch is down and dump valve closed.	x	x

EMPENAGE "GROUP G"		50	100	500
1	Remove exterior inspection covers. Inspect for security and wear and lubricate torque tubes, cables and bell cranks. Reinstall inspection covers		x	x
2	Inspect rudder hinges and rudder attachment pin and safetied		x	x
3	Inspect trim tabs, elevator hinges, and lubricate		x	x

FLIGHT CONTROLS DISPLACEMENT

ELEVATOR	Down	14°
	UP	27°
RUDDER	Right	30°
	Left	25°
AILERONS	High	22°
	Low	17°
FLAPS	-10° - 40°	

Wing bolts torque: 600 in*lb

NOTES

Teinture jaune: 1016