



Legacy FG

**PILOT'S OPERATING
HANDBOOK**
and
AIRPLANE FLIGHT MANUAL
for the



LEGACY FG

Mfgr's Serial No. _____

Registration No. _____

Owners will need to develop a Pilot's Operating Handbook as part of the aircraft airworthiness process, and are encouraged to modify this document to help in that process.

NOTE

Be sure to allow adequate cooling periods between starting attempts and avoid long continuous periods of cranking as damage to the starter will result.

NOTE

In some cases with the Lycoming, the flooded engine procedure may work well for starting a hot engine.

WARNING

Should a backfire occur during any start, continue cranking to draw any fire back into the engine. If backfiring continues or an engine compartment fire starts, shut down and EXIT the aircraft. Use fire extinguisher to extinguish any fire.

GROUND WARM-UP

Textron Lycoming and Superior aircraft engines are air-cooled and are dependent on the forward speed of the aircraft for cooling. To prevent overheating, it is important that the following rules be observed:

1. Head the aircraft into the wind.
2. Operate the engine on the ground with the propeller in "Full Increase" RPM position.
3. Avoid prolonged idling at low RPM. Fouled spark plugs can result from this practice.
4. Warm up 900 - 1000 RPM.
5. Oil Door - Closed.

PRE-TAXI CHECKS - (Checklist)

1. Prior to power applicationCLEAR area around and aft
2. BrakesCHECK

PRE TAKE-OFF RUN-UP - (Checklist)

1. Canopy LOCKED
2. Area CLEAR
3. Brakes SET
4. CHT /Oil Temp GREEN
5. Throttle 1800 RPM
6. Propeller (controllable) CYCLE TWICE
7. Mags CHECK:
Max 175 rpm drop, 50 rpm difference
8. Throttle IDLE, then 1000 rpm
9. Suction CHECK (4.8 - 5.2 in. Hg.)

BEFORE TAKE-OFF - (Checklist)

1. Canopy LOCKED* (recheck)
2. Seat Belts/Harness SECURE
3. Instruments * CHECK
4. Fuel Quantity CHECK
5. Oil Press/Temp CHECK, GREEN
6. Breakers IN
7. Master Switch ON
8. Avionics Master ON
9. Radios ON & SET
10. Auto Pilot OFF
11. Transponder TO Standby
12. Propeller FULL IN (Max RPM)
13. Mixture FULL RICH
14. Boost Pump AS DESRED
15. Trims SET (Aileron neutral, Rudder for
takeoff, Elevator Take-off)
16. Flaps Set SET (-10°)
17. Controls Free CHECK
18. Door Seal ON

* NOTE

**Allow enough time for the gyro instruments to fully erect.
A minimum of five (5) minutes is recommended, eight (8)
minutes if IMC conditions exist.**

RUNWAY CHECKS - (Checklist)

1. Strobes ON
2. Transponder ALT
3. Approach and T.O. Area CLEAR
4. Boost AS REQUIRED
5. Clearance from Tower RECEIVED AND
ACKNOWLEDGED
6. Takeoff Runway CLEAR
7. Time Off NOTE

TAKE-OFF & CLIMB - (Checklist)

1. Take-off Power 2700 RPM
2. Oil Temperature 100°F MINIMUM
3. Cylinder Head Temperatures 150°F MINIMUM
4. After Power Application CHECK Engine Instruments
5. Check Flight Instruments OPERATING
6. Rotate 65 - 75 KTS
7. Initial Climb 102 KTS
8. Alt >800 feet AGL FLAPS UP
9. Reduce RPM 2500 RPM
10. Mixture LEAN FOR CLIMB*
11. Cylinder Head Temps 500°F MAXIMUM
12. Oil Temperature 240°F MAXIMUM

NOTE

These numbers are typical. Check for your specific engine and aircraft.

13. Climb Speed (V_x) 105 KIAS until all obstacles are cleared
(V_y) 120 KIAS Best Rate of Climb
135 KIAS and greater Normal Climb

CRUISE - (Checklist)

1. Throttle AS DESIRED SET
2. Propeller 2400 RPM SET
3. Mixture LEAN AS REQ'D*

GENERAL LEANING RULES

**NOTE*

The following are excerpts from the Lycoming Engine Operating Handbook and should be generally applicable for all engines.

- A. Never exceed the maximum cylinder head temperature limits.
- B. For maximum service life, CHTs should be maintained below 435°F (224°C) during high performance cruise operations and below 400°F (205°C) for economy cruise powers.
- C. Maintain “Full Rich” for Take-off, and climb. For take-off from high altitude airports, if engine roughness is noted, lean only enough to obtain smooth operation. Be alert for temperature rise. This is most likely to occur at altitudes over 5000 feet. Consult engine manufacturer’s recommendations for cruise leaning procedures.
- D. Always return to full rich before increasing power settings.
- E. Operate the engine at maximum power mixture for performance cruise powers and at best economy mixture for economy cruise power .
- F. During let-down flight operations it may be necessary to manually enrichen uncompensated carbureted or fuel injected engines to obtain smooth operation.
- G. On turbocharged engines never exceed 1650°F turbine inlet temperature (TIT) with standard turbochargers.
- H. Changes to cruise altitudes and/or power settings require the mixture to be reset.

NOTE

The following guidelines reflect recommended procedures with the specified equipment. It is prudent to know each method in case of equipment failure.

LEANING, EXHAUST GAS TEMPERATURE

Lycoming:

Lean to 50° F Rich of peak EGT.

LEANING FLOWMETER

Lean to the applicable fuel-flow tables or lean to an indication marked for correct fuel flow for each power setting.

LEANING, MANUAL MIXTURE CONTROL

Fuel Injected Engines

1. Slowly move mixture control from “Full Rich” towards lean position
2. Continue leaning until slight loss of power is noted (this may or may not be accompanied by roughness)
3. Enrich until engine runs smoothly and power is regained

USE OF CARBURETOR HEAT / ALTERNATE AIR

NOTE

This section on carburetor icing obviously does not apply to fuel injected engines normally installed on the Lancair Legacy FG. Follow normal procedures for carburetor icing.

ADDITIONAL CHECKLISTS

The use of written checklists is the safest means of insuring that all items in a sequence are covered and acted on correctly. Their use is a sign of maturity and professionalism. Those provided herein for the Lancairs are for your convenience. Modifications may be required for your particular aircraft.

DESCENT - (Checklist)

1. Fuel Selector..... AS DESIRED
2. Fuel Pump OFF (under 10,000' MSL)
3. Altimeter..... SET (FOR BARO OR FIELD)

- ELEVATION)
4. Mixture ENRICHEN THRU DESCENT
OR FULL RICH
5. Power AS REQ'D (use caution, avoid rapid
adn excessive cooling)

PRE-LANDING - (Checklist)

1. Seat Belts/Shoulder Harness FASTENED
2. Fuel Selector AS DESIRED
3. Mixture RICH
4. Flaps FULL (120 KTS)
5. Propeller HIGH RPM
6. Brakes CHECK and PUMP
7. Establish NORMAL APPROACH

BALKED LANDING - (Checklist)

1. Throttle FULL
2. Airspeed 95 KTS, ESTABLISH CLIMB
3. Flaps RETRACT TO 20°
4. Gear RETRACT

AFTER LANDING - (Checklist)

(After turning off runway)

1. Flaps UP
2. Strobes OFF
3. Transponder STANDBY
4. Lights AS REQUIRED
5. Trim RESET FOR TAKE-OFF
6. Canopy Seal OFF
7. Time NOTE

SHUTDOWN - (Checklist)

(At parking site)

1. Avionics Master OFF
2. Throttle IDLE
3. Mixture IDLE CUT-OFF
4. Mags (After engine stops) OFF
5. Lights OFF

FLIGHT CONTROLS

The Lancair Legacy FG is conventional in its control configuration. The ailerons and elevators use push-pull tubes with bearing mounts and rod end bearings providing smooth controls. The rudder control is via stainless steel cables. The flaps are fully electric. A single flap motor drives a linear actuator and operates the flaps thru a torque tube.

TRIM CONTROLS

The Lancair Legacy FG comes standard with pitch and roll trim controls. The rudder trim control is optional. All three systems use an electric servo that deflects a trim tab. Prior to the first flight verify that the servos move in the proper direction. The control surface always moves in the opposite direction of the tab. For example, if the elevator trim tab moves down it causes the elevator to move up resulting in pitch up. A loose trim can be disastrous therefore it is very important that it is properly secured. As you build time in your aircraft you will become familiar with the trim tab positions for the different configurations. It is essential that all trims are set in the correct positions prior to takeoff. Both the rudder and elevator trims have position indicators, however for roll you can determine approximate position by looking at it.

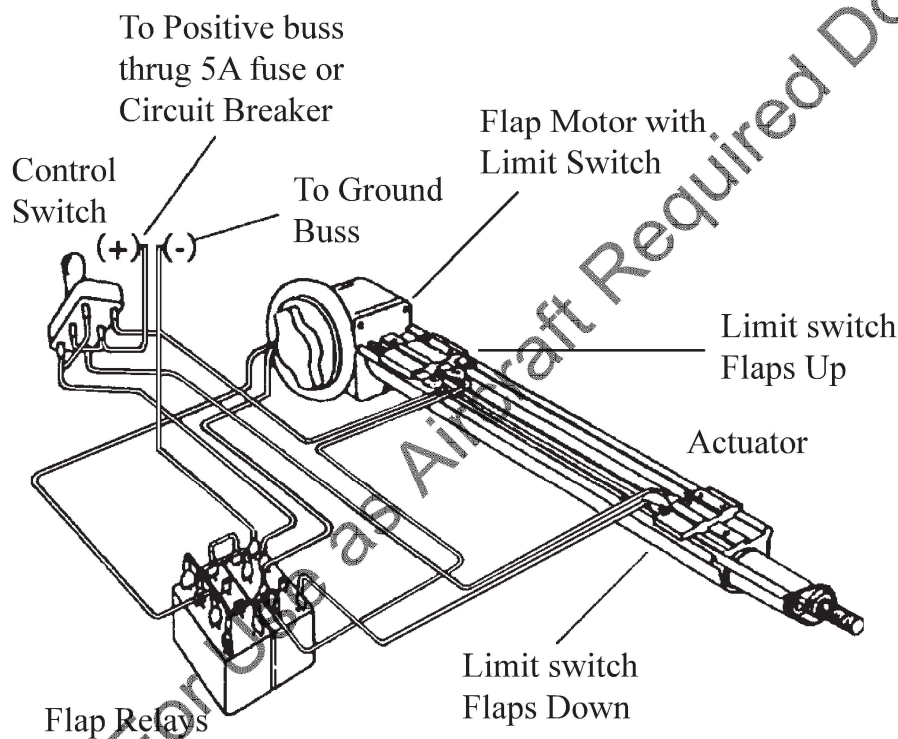
GROUND CONTROL

The Lancair is controlled on the ground using differential braking of the toe brakes located on the upper portion of the rudder pedals. A little caution for the first few times in the aircraft is all that is required to get the feel of this simple and light weight approach. Over-the-nose visibility is such that this approach is easily mastered. Initial use of the brakes during taxiing should be cautious but positive to “set” the pads and disks. Brakes should be used sparingly during the takeoff roll obviously, and rudder control can be expected to begin after about 35 kts indicated airspeed.

The standard Lancair Legacy FG is fitted with 5.00 x 5 wheels on the main gear. These tires are essentially scaled down “500x5” tires. The nose gear are five inch wheels with Lamb tires.

FLAPS

The flaps are electrically operated by a single electric two-way motor. The motor drives a jack screw which in turn extends and retracts the flaps. The figure below shows the flaps system in schematic form. The standard technique for establishing “approach” flaps is to time the application of the down flap power. Full up and full down are determined by the setting of microswitches which deactivate the motor. Power for the flap motor comes from the primary electrical buss. A flap electrical schematic is shown on the next page.



Since the Lancair is a composite design, all circuits require the use of a return wire leading to “ground”. The use of a ground buss is recommended with it being located near the firewall requiring only one relatively large ground wire to the battery and one “hot” wire to the starter. The power to the starter is controlled by a relay.

Flap Electrical System

The wing flaps are electrically operated and off of the main electrical buss. The linear actuator (essentially a two-way electric motor driving a jack screw) is located behind the pilot’s seat. Attached to the actuator shaft is the limit switch assembly with the full up and down limit switches. These determine the extreme flap positions. Partial flaps are obtained by simply timing the actuation of the switch. For example the “count” of 5 will generally result in approach flaps. If desired a mark can be placed on the extended flap visible to the pilot to aid in reaching a consistent position quicker. The simplicity of the system is apparent in the schematic shown.

Flap Motor Wiring Schematic

