Glasair Super IIRG

PILOT'S OPERATING HANDBOOK

For N61CY

Log of Revisions

Page Number	Revision	Date
All	New	Feb. 2007

No revisions at time of printing

THINGS TO DO

Proof read everything

Update language for injected engines

Update photo for rollout configuration

Record rollout Wt. & Bal.

Section 5 (W&B) belongs after 4.2, IMHO so I moved it there.

Formula given in 4.3.2 is wrong, but don't have the expertise to change it.

Complete pre-flight check list

Add A.O.A pre-flight checks, autopilot check, nav checks

Expand emergency list

Table of Contents

1 GENERAL INFORMATION

1.1 INTRODUCTION

The Glasair Super IIRG is a high performance, two-place, low-wing, aircraft that features retractable tricycle landing gear and an airframe made entirely from female molded Fiberglass composite components.

The Glasair was designed to provide the highest utility possible in a homebuilt aircraft. The aerodynamically clean airframe is responsible for the Glasair's exceptional operating efficiency. The excellent high speed performance is complemented by good slow flight characteristics and an honest, predictable stall. The Glasair Super IIRG's comfortable side-by-side seating, ample baggage capacity, and good range make it an excellent cross-country traveler. Thanks to light, responsive controls, sport aerobatics in the Glasair are pure delight. The integration of all these capabilities in a single aircraft makes the Glasair Super IIRG the ultimate in performance and versatility.

This Pilot's operating handbook is designed as an appropriate information manual and to provide information relevant to achieve maximum utilization of the aircraft. It is not designed to be a substitute for adequate and competent flying instruction and should not be used for operational purposes unless kept up to date.

Assurance that the aircraft is airworthy is the responsibility of the owner. The pilot in command is responsible for ensuring the aircraft is safe for flight and for operating within the limits detailed in this handbook and as displayed on placards and instrument markings in the Aircraft and in accordance with a current airworthiness certificate issued by Federal Aviation Administration.

This version of the Pilot Operating Handbook is pre-first flight. As such a number of facts have not yet been established. These facts are based on the factory prototype and are noted with a yellow highlighted background. This data will be updated as they are proven during the flight test program.

1.2 PILOT ABILITY

The Glasair Super IIRG is a high performance airplane. To fly the airplane safely, the pilot needs the necessary skills and confidence to operate and control the airplane automatically. Activities requiring attention outside the airplane, such as avoiding traffic and flight path planning, will occupy much of the pilot's thought and time. Although you may have dreamed of being at the controls of a high performance plane such as the Glasair Super IIRG, please be honest with yourself about your experience and ability. Unless you have adequate experience, it is strongly advised that you initially fly Glasair with extended wing tips installed. The longer wing will permit slower approaches that feel more comfortable during the "training phase." Remove the wing tip extensions only when you feel comfortable and confident enough to do so.

NOTE

With wing tip extensions installed, minimum control speed is as critical as stall speed in setting Vs, as defined in the FARs and this owner's manual. This is why the declared minimum airspeed, Vs, is not lowered for Glasairs with wing tip extensions installed, even though the actual stall speed is lower than in the standard configuration. With tip extensions installed, therefore, the pilot must be careful to let the airspeed rise above the declared Vs before rotating for takeoff.

1.2.1 FAA REGULATIONS

The owner and operator should be familiar with the Federal Aviation Regulations (FARs) applicable to the operation and maintenance of an airplane and with FAR Part 91, General Operating and Flight Rules. Further, the airplane must be operated and maintained in accordance with FAA Airworthiness Directives which may be issued against it regarding power plants, propellers, and any other parts not manufactured by Glasair Aviation (formerly Stoddard-Hamilton Aircraft).

WARNING

Revisions or Service Bulletins issued by Glasair Aviation that are mandatory in nature must be complied with. Review a current Service Bulletin list to determine which Service Bulletins apply to the Glasair Super IIRG.

The Federal Aviation Regulations place the responsibility for maintenance of this airplane on the owner and operator. All limits, procedures, safety practices, time limits, servicing, and maintenance requirements contained in this manual are considered mandatory for continued safe airworthiness and to maintain the airplane in a condition equal to that of its original construction.

1.2.2 IMPORTANT NOTICE

This manual is not designed, nor can it serve as a substitute for adequate and competent flight instruction. It is not intended to be a guide of basic flight instruction or a training manual.

This manual should be read thoroughly and carefully by the owner and/or operator in order to become familiar with the operation of the aircraft. It is intended to serve only as a guide under most circumstances, but cannot take the place of good sound judgment during flight operations. Multiple emergencies, adverse weather, terrain, etc., may require deviation from the recommended procedures.
Furthermore, this Owner's Manual does not provide a discussion of all possible dangerous situations an owner or operator may encounter.

Flying in itself is not inherently dangerous, but to an even greater extent than any other mode of travel, it is terribly unforgiving of any carelessness, incapacity, or neglect. The builder/pilot is entirely responsible for manufacture, inspection, maintenance, test flight, and normal operation of the aircraft. Thorough, careful procedures, therefore, must be carried out in all these phases.

How well the plane is built, maintained, and operated will determine how safely it performs. Maximum performance and safe operation can only be achieved by a skilled pilot and a good mechanic. Thorough, careful construction, continued maintenance, and diligent practice during the early phases of flight familiarization are mandatory.

The information in this manual refers to the Glasair Super IIRG aircraft (Model SH-2R) built according to the appropriate Instruction Manuals. Any modifications to the aircraft that deviate from the Instruction Manuals may alter the applicability of this manual. The designation for the aircraft when filing a flight plan is (GLAS).

1.3 USE OF THE POH (PILOT OPERATING MANUAL)

The Glasair Super IIRG Pilot operating manual is designed to maintain documents necessary for the safe and efficient operation of the aircraft. It has been prepared in loose leaf form for easy revision and in a convenient size for storage in the airplane. The manual is divided into ten major sections, which are listed in the Contents.

1.3.1 REVISING THE MANUAL

Immediately following the title page is the "Log of Revisions," which lists all revisions to the Owner's Manual by the page number, revision letter, and date issued. After receiving a revision, remove all the obsolete pages and insert the revised pages. Discard the obsolete pages. Insert the latest "Log of Revisions" page on top of the previous one, behind the title page.

1.3.2 WARNINGS, CAUTIONS and NOTES

The following definitions apply to WARNINGS, CAUTIONS, and NOTES thought this manual.

WARNING

Procedures, practices, etc., which may result in personal injury or loss of life if not carefully followed.

CAUTION

Procedures, practices, etc., which if not strictly observed may result in damage or destruction of equipment.

NOTE

An operating procedure, or condition, etc., which it is considered essential to emphasize.

1.4 AIRPLANE THREE VIEW DRAWING

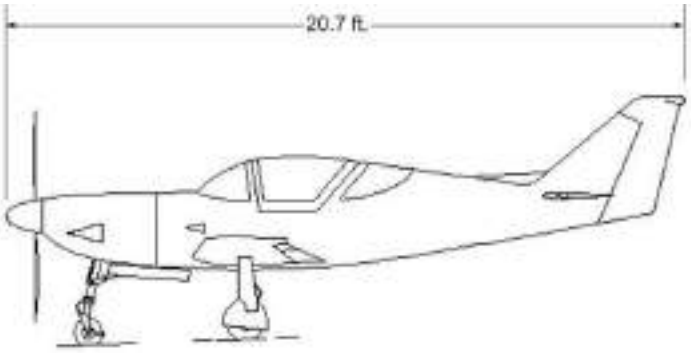


Figure 1, side view

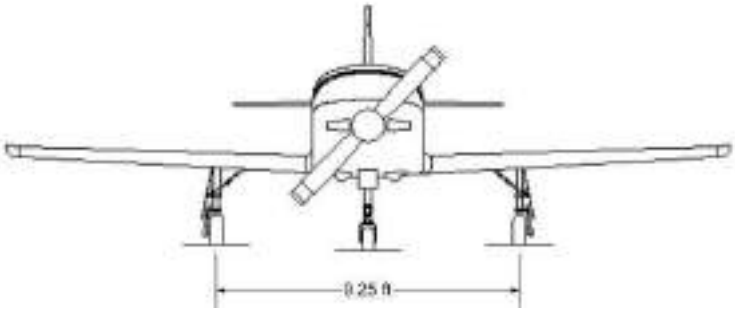


Figure 2, front view

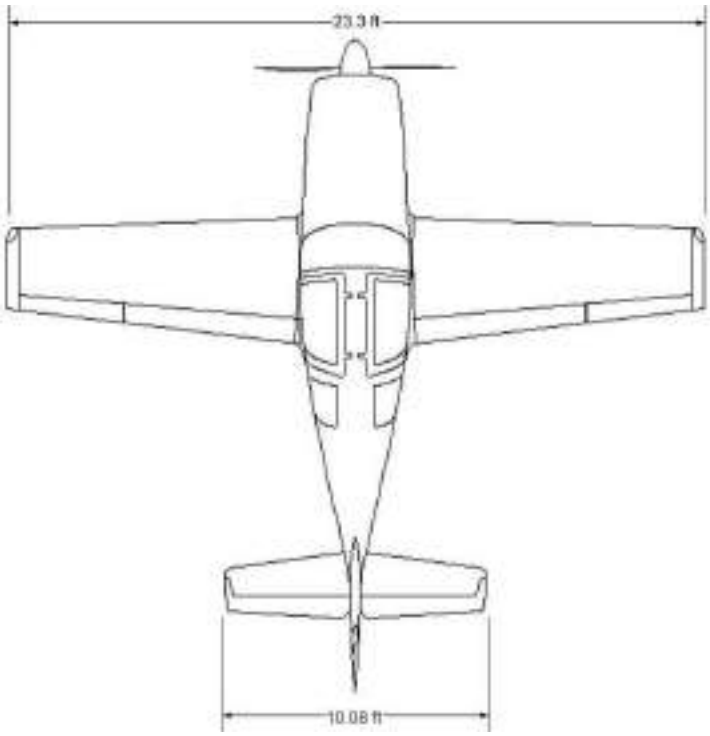


Figure 3, top view

Aircraft shown with standard wing tips, wing span increases to 27.3 feet with extended tip installed.

1.5 SPECIFICATIONS

Wing span ..... 23.3 ft
With wing tip extensions ..... 27.3 ft
Wing area ..... 81.3 ft^2
With wing tip extensions ..... 91.5 ft^2
Wing aspect ratio 6.20
With wing tip extensions 7.64
Length overall ..... 20.7 ft
Height overall without propeller ..... 6.8 ft
Wheel base ..... 5.19 ft
Wheel span (track) ..... 9.25 ft
Cabin width ..... 42.0 in
Baggage space ..... 12 ft^3

Gross weight:
Max with standard tips ..... 2200 lb
Aerobatic configuration ..... 1900 lb
Max with wing tip extensions ..... 2300 lb
Empty weight (approximate) 1400lb
Useful load (approximate) 800lb
With wing tip extensions (approximate) 900lb
Baggage capacity (max) ..... 100 lb
Wing loading extended tip (2300lb) ..... 25.14 lb/ft^2
Wing loading standard tip (2200lb) ..... 27.06 lb/ft^2

Fuel capacity:
Main wing tank ..... 40 gal (240lb)
Header tank ..... 8 gal (48 lb)
Wing tip extensions ..... 10 gal (60 lb)
Oil capacity ..... 8qt (15 lb)
Seats 2

Tire size:
Main gear ..... 5.00 X 5,10 ply rating
Nose gear ..... 11 X 4.00-5, 8 ply rating

1.6 SYMBOLS, ABBREVIATIONS and TERMINOLOGY

1.6.1 GENERAL AIRSPEED

KCAS ..... Calibrated airspeed is indicated airspeed corrected for position and instrument error, expressed in knots. Calibrated airspeed is equal to true airspeed in standard atmosphere at sea level.

GS..... Ground speed is the speed of an airplane relative to the ground, that is, corrected for winds aloft.

KIAS ..... Indicated airspeed is the speed of an airplane as shown on the airspeed indicator when corrected for instrument error. IAS values published in this handbook assume zero instrument error.

KTAS ..... True airspeed is the airspeed of an airplane relative to undisturbed air which is the CAS corrected for altitude, temperature, and compressibility.

1.6.2 SPEED TERMINOLOGY

Va..... Maneuvering speed is the maximum speed at which application of full available aerodynamic control will not over stress the airplane.

Vfe..... Maximum flap extended speed is the highest speed permissible with the flaps in a prescribed extended position.

Vio..... Maximum landing gear operating speed is the maximum speed at which the landing gear can be safety extended or retracted.

Vne..... Never exceed speed is the speed limit that may not be exceeded at any time. (Redline).

Vno..... Maximum structural cruising speed is the speed that should not be exceeded except in smooth air and then only with caution.

Vs ..... Stalling speed or the minimum steady flight speed at which the airplane is controllable.

Vso ..... Stalling speed or the minimum steady flight speed at which the airplane is controllable, when in the landing configuration.

Vx..... Best angle of climb speed is the airspeed, which delivers the greatest gain of altitude in the shortest possible horizontal distance.

Vy..... Best rate of climb speed is the airspeed, which delivers the greatest gain in altitude in the shortest possible time.

1.6.3 METEOROLOGICAL TERMINOLOGY

ISA ..... International Standard Atmosphere is a nominal atmosphere where air is a dry perfect gas with a temperature of 15°C (59°F) at sea level. The pressure at sea level is 29.92 in. Hg. The temperature gradient from sea level to 36,089 ft is -1.98°C per 1,000 ft.

OAT..... Outside Air Temperature is the free static air temperature. It is obtained from meteorological sources or in-flight instruments adjusted for instrument error and compressibility effects.

Pressure Altitude..... Pressure Altitude is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inHg assuming zero position and instrument error (instrument error is assumed to be zero in this POH).

1.6.4 POWER TERMINOLOGY

BHP	Brake Horsepower is the power developed by the engine.
RPM	Revolutions Per Minute is engine speed.
MP	Manifold Pressure is a pressure measured in the engine's induction system and is expressed in inches of mercury (inHg).

1.6.5 AIRCRAFT PERFORMANCE TERMINOLOGY

Climb Gradient	Climb Gradient is the ratio of the change in height during a climb, to the horizontal distance covered in the same time interval.
Demonstrated Crosswind ...	Demonstrated crosswind velocity is the velocity of the crosswind component for which adequate control of the aircraft during take off and landing has been demonstrated during flight tests. The value shown is not considered to be limiting.
Usable Fuel	Usable Fuel is the fuel that can be safely used in flight.
Unusable Fuel	Unusable Fuel is the fuel that cannot be safely used in flight.
GPH	Gallons Per Hour is the amount of fuel (in US gallons) consumed per hour.
G's	Acceleration due to gravity.

1.6.6 WEIGHT and BALANCE TERMINOLOGY

Reference Datum	Reference Datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes.
Station	Station is a location along fuselage given in terms of distance from the reference datum.
Arm	Arm is the horizontal distance from the reference datum to the centre of gravity of an item.
Moment	Moment is the product of weight of an item multiplied by its arm.
Center of Gravity (CG)	Center of Gravity is the point at which an aircraft, or item, would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight.
CG Arm	Center of Gravity Arm is the arm obtained by adding the aircraft individual moments and dividing the sum by the total weight.
CG Limits	Center of Gravity Limits are the extreme centre of gravity locations within which the aircraft MUST be operated at a given weight.
Empty Weight	Empty Weight is the weight of aircraft including unusable fuel and full engine oil.
Useful Load	Useful Load is the difference between the take off weight and empty weight.
Payload	Payload is the weight of occupants, cargo, and baggage.
Gross Weight	Gross Weight is the loaded weight of the aircraft.
Maximum Take-Off Weight	Maximum Take-off Weight is the maximum weight approved for start of the take off run.
Maximum Landing Weight	Maximum Landing Weight is the maximum weight approved for the landing touch-down.
Tare	Tare is the weight of chocks, blocks, stands, etc. used when weighing an aircraft, and is included in the scale readings. Tare is deducted from the scale readings to obtain the actual (net) aircraft weight.

1.7 PERFORMANCE DATA (Estimated)

Performance based on the following aircraft configuration.

- Wing tip extensions fitted.
- Lycoming IO-360-B1E (180hp)
- Hartzell HC-C2YR-1BF propeller
- Gross weight 2350 lb.

Normal Cruise Speed (65% power @8000ft.) ..... 165 KIAS
Range at 65% power (approx. 10gph) ..... 880 nm in still air
Rate of Climb at Sea Level ..... 1600 ft/min.
Service Ceiling ..... 14000 ft.
Stall Speed, Takeoff flap ..... 65 KIAS
Stall Speed, Full flaps ..... 58 KIAS
Approach Speed, Full flaps ..... 80 KIAS
Best Rate of Climb Speed ..... 104 KIAS
Best Gradient Speed ..... 87 KIAS
Recommended Speed after Engine failure ..... 110 KIAS
Roll Rate ..... 90 deg/second

1.7.1 LIMITATIONS

AIRSPEED LIMITATIONS

Vne	226 KIAS	Do not exceed this speed in any operation.
VA	126 KIAS	Do not make full or abrupt control movements above this speed.
Vno	174 KIAS	Do not exceed this speed except in smooth air and only then with caution.
Vfe	122 KIAS	Do not extend flaps or operate with flaps extended above this speed.

NOTE

The airspeeds listed in this section are based on the use of the normal static source. If the alternate static source is used, the airspeeds should be corrected using the information obtained during flight test.

NOTE

Definitions of these airspeeds are given in 1.6.1

1.7.2 AIRSPEED INDICATOR MARKINGS

White Arc ..... 59 to 122 KIAS
Green Arc ..... 70 to 174 KIAS
Yellow arc ..... 174 to 226 KIAS
Red Line ..... 226 KIAS

1.7.3 POWER PLANT LIMITATIONS

Engine Manufacture ..... Textron Lycoming
Engine Model number IO-360-B1E
FAA type Certificate 1E10
Rated Horsepower 180
Rated Speed, RPM 2700
Bore, inches 5.125
Stroke, inches 4.375
Displacement, cubic inches 361

Compression Ratio.....8.5:1
Firing Order.....1-3-2-4
Spark Occurs, degree BTDC.....25°
Valve rocker clearance (hyd. tappets collapsed).....028-.080
Propeller Drive ratio.....1:1
Propeller drive rotation (viewed from the rear).....Clockwise
Minimum fuel grade.....91/96 or 100/130 or 100/100LL
Oil Capacity, quarts.....8
Minimum safe oil quantity, quarts.....2
Maximum oil consumption at rated power, qt/hr.....0.80
Maximum oil consumption at 75% power, qt/hr.....0.45
Maximum oil consumption at 65% power, qt/hr.....0.39

Recommend grade oil

Average ambient air temperature	MIL-L-6082B Grade	MIL-L-22851 Ashless Dispersant
All Temperatures	-	SAE 15W50 or 20W50
>80 °F	SAE 60	SAE 60
>60 °F	SAE 50	SAE 40 or 50
30 to 90 °F	SAE 40	SAE 40
0 to 70 °F	SAE 30	SAE 40,30 or 20W40
< 10 °F	SAE 20	SAE 30 or 20W30

Instrument	Red Line Minimum Limit	Green Arc Normal Operating	Recommended	Yellow Arc Caution Range	Red Line Maximum Limit
Tachometer	-	600-2700 RPM	-	see propeller	2700 RPM
Manifold Pressure	-	15-23 in Hg		-	-
Oil Temperature	-	75 – 245 °F	180 °F	< 75 °F	245 °F
Cylinder Head Temp.	-	180 – 435 °F	400 °F	435 - 500 °F	500 °F
Oil Pressure	25 psi Idle	50 – 100 psi	60 – 90 psi	25 – 50 psi	100 psi
Fuel Pressure	2 psi	-	-	-	35 psi

1.7.4 VACUUM PRESSURE LIMITS

Operating range.....4.3 to 5.9 inHg

1.7.5 GROSS WEIGHT LIMITS

Standard wing.....2200 lb
With wing tip extensions.....2350 lb
Maximum baggage weight.....100 lb
Maximum aerobatic weight (standard tips).....1900 lb

1.7.6 Flight load factors

At maximum gross weight (2150 lb for the standard wing; 2350 lb for the extended tip wing), the G limit load factors are:

+3.5 G's
-1.0 G's

At aerobatic weight 1900 lb. with standard tips, the G limits are:

+6.0 G's (9 G's, ultimate)
-4.0 G's (-6.0 G's, ultimate)

1.7.7 CENTER OF GRAVITY LIMITS

Forward limit ..... station 89.71
Aft limit ..... station 97.72
The reference datum is 58.0 inches forward of the cowling attach flange joggle. Stations are measured in inches from the datum. Landing gear is assumed to be down.

1.7.8 AEROBATIC LIMITATIONS

During the flight test period, the test pilot should log all aerobatic maneuvers successfully completed. When application is made for the unlimited duration airworthiness certificate (or later date), the builder can request that the operating limitations be amended to permit the logged maneuvers. In addition, the FAA inspector may request an actual flight demonstration of the maneuvers.

The Glasair is not a competition class aerobatic aircraft. It was designed as a sport aerobatic type airplane. Glasair aircraft are capable of the following maneuvers:

- Aileron rolls
- Point rolls
- Slow rolls
- Barrel rolls
- Vertical rolls
- Loops
- Hammerhead stalls
- Cuban eights
- Immelmanns
- Continuous rolls

NOTE

These listed aerobatic maneuvers are maneuvers that can be performed in the Glasair; pilot ability and skill will determine whether they can be accomplished safely. Do not expect that 10 hours of dual aerobatic instruction in a Cessna 152 Aerobat or Citabria will completely prepare you for flying the Glasair aerobatically. We recommend that you try to get some higher performance training in an aircraft such as a Pitts or an Eagle and become proficient in it before attempting any serious aerobatics in the Glasair. The best method would be to have an experienced aerobatic instructor fly with you in your Glasair and train you in some of the basic maneuvers and techniques. Treat any aerobatic maneuvers with respect, and approach all practice with a calm, disciplined attitude. Wear a parachute at all times and never attempt any maneuvers below 3000 feet AGL.

NOTE

Adhere to FAR Part 91.71 when engaging in aerobatic maneuvers. Refer to FAR Part 91.15 on the use of parachutes, and FAR Part 91.70 on aircraft speed limits.

WARNING

Snap rolls, tail slides, torque rolls, lomcevaks, or any other high empennage or fuselage loading maneuvers are prohibited in the Glasair.

WARNING

The Glasair is a high performance aircraft. Aerobatics in the Glasair are to be approached with caution and only after prior dual instruction from an experienced aerobatic instructor. The "aircraft has such a low drag coefficient that in the event of falling out of a maneuver, red line velocity can be reached or exceeded in very little time.

WARNING

Do not exceed the structural design limits of the aircraft.
The limits are +6 Gs and -4 Gs at an aerobatic weight of 1900 lb. Structural failure can occur if these limits are exceeded.

WARNING

Aerobatics are prohibited with the wing tip extensions installed. This prohibition is based on the reduced roll rate with tip extensions rather than a strength limitation.

NOTE

Sustained inverted flight requires inverted oil and fuel systems. The 8 gallon header tank on the firewall is easily converted into an inverted fuel system by means of a flop tube fuel line installation. A Christen Industries inverted oil system is recommended.. For aerobatics, it is also recommend that an aerobatic counterweighted propeller be fitted on which the blades go to coarse pitch to prevent engine or propeller damage in the event of engine oil pressure loss.

WARNING

Any negative, slipping, or cross-controlling maneuvers require an inverted fuel system to prevent unporting the fuel system. If an injector or pressure carburetor equipped engine is unported during flight, the engine will stall and quit under power.

1.7.9 INTENTIONAL SPINS PROHIBITED

Due to many variables that affect spin recovery, and the lack of control over these variables, the Glasair Super IIRG is prohibited from intentional spins. Some of the variables are: pilot technique, the manner in which the spin is entered, slight differences in wing and horizontal stabilizer incidence angles, center of gravity location, number of turns into the spin, spin direction, aileron position, power carried, and control rigging and adjustment.

1.7.10 FLIGHT IN ICING CONDITIONS

Flight in known icing conditions is prohibited in the Glasair Super IIRG. The Glasair must not be exposed to icing encounters of any intensity. If the airplane is inadvertently flown into icing conditions, the pilot must

make an immediate diversion by flying out of the area of visible moisture or going to an altitude where icing is not encountered.

1.7.11 FLIGHT IN THE VICINITY OF THUNDERSTORMS

The Glasair Super IIRG, because of its composite structure which is transparent to an electrical charge, does not comply with FAR Part 23 Standards for lightning protection. For this reason, the Glasair Super IIRG is prohibited from flight in conditions that would expose the airplane to the possibility of a lightning strike.

1.7.12 PRECAUTIONS CONCERNING SLIPS

In order to help prevent fuel starvation as the result of slips or other uncoordinated flight, a pair of fuel tank check valves are installed in the main wing tank. They help ensure that the main tank fuel sump will remain covered with fuel as fuel transfers from one side of the wing to the other.

Slips longer than 30 seconds in duration are prohibited while drawing fuel from the main fuel tank. If less than ten (10) gallons of fuel remains in the main tank, slips are prohibited entirely when drawing fuel from the main tank.

WARNING

If the aircraft is parked on sloping ground with one wing low and with a partially empty main fuel tank, fuel slowly transfers into the low wing creating a wing-heavy condition that can cause control difficulty after takeoff. Making tight turns while taxiing can have the same effect. A heavy left wing is especially critical since the resulting left-turning tendency exacerbates the effects of engine torque. If you suspect an unbalanced fuel condition, taxi to level ground and allow sufficient time for the main tank fuel level to equalize before attempting takeoff.

NOTE

Because of the total drag with both gear and flaps extended, slips should rarely be needed in the Glasair Super IIRG.

1.7.13 REQUIRED EQUIPMENT

Builders of Experimental Category aircraft must comply with Part 91.205 of the Federal Aviation Regulations, which specifies the minimum instrumentation and equipment that must be installed and operational for various flight conditions. Equipment is specified for both VFR and IFR flight and for both day and night conditions.

VFR Day

(1) Airspeed indicator.
(2) Altimeter.
(3) Magnetic direction indicator.
(4) Tachometer.
(5) Oil pressure gauge.
(6) Oil temperature gauge.
(7) Manifold pressure gauge.
(8) Fuel gauge indicating the quantity of fuel in each tank.
(9) Landing gear position indicator.
(10) Anti-collision light system
(11) Seatbelt with shoulder harness.
(12) An emergency locator transmitter, if required by §91.207.

VFR night

(1) Instruments and equipment specified VFR day.
(2) Approved position lights.
(3) An adequate source of electrical energy for all installed electrical and radio equipment.
(4) Circuit breaker accessible to the pilot in flight.

IFR day

(1) Instruments and equipment specified VFR day.
(2) Two-way radio communications system and navigational equipment appropriate to the ground facilities to be used.
(3) Gyroscopic rate-of-turn indicator.
(4) Slip-skid indicator.
(5) Sensitive altimeter adjustable for barometric pressure.
(6) A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation.
(7) Generator or alternator of adequate capacity.
(8) Gyroscopic pitch and bank indicator (artificial horizon).
(9) Gyroscopic direction indicator (directional gyro or equivalent).

IFR Night

(1) Instruments and equipment specified VFR night.
(2) Instruments and equipment specified IFR day.

1.7.14 PLACARDS

Placards and Markings Required by FARs

Placards and markings required for certification of an experimental amateur built aircraft are:

1. The word "EXPERIMENTAL", in 2" high block letters, displayed near each entrance to the cabin.
2. A permanently installed, fireproof identification plate that is permanently stamped or engraved with the information required by FAR 45.13. The data plate must be located on the exterior of the aircraft, either just aft of the entry door or on the fuselage near the tail surfaces and must be legible to a person standing on the ground. Data shall include:
    a. Builder’s name
    b. Model designation
    c. Builder’s serial number
    d. Registration Number

3. A Passenger Warning Placard, permanently installed in the cockpit in full view of all the occupants with the words: "PASSENGER WARNING- THIS AIRCRAFT IS AMATEUR BUILT AND DOES NOT COMPLY WITH FEDERAL SAFETY REGULATIONS FOR STANDARD AIRCRAFT."
4. A placard on the inside of the fuselage near the latch handle for each gull wing canopy is installed with this warning:
   "WARNING- DO NOT OPEN CANOPY IN FLIGHT." The canopy will be torn off if opened in flight.
5. Airplane Exterior Placards
   a. Place a "NO STEP" placard on the upper surface of each flap panel just outboard of the fuselage near the entrances to the cabin. Other "NO PUSH" placards are placed on control surfaces. Each static port is labeled "KEEP CLEAN".
   b. Apply a placard specifying the fuel type and quantity near each fuel filler cap. (A permanent engraving of these markings on the fuel caps is a good idea.) what is it?
6. Baggage Compartment Placards
   a. The following placard is used on N61CY in the baggage area;
      "NOT TO EXCEED 100 LB OF BAGGAGE"

NOTE
Use 100 pounds or a lesser value, whichever is permissible, while remaining within CG limits.
"Keep all articles securely stowed to avoid the possibility of interference with the control system."

7. Fuel Valve Placard

Install a placard in the aircraft to show that the small pointer on the fuel selector valve handle, not the handle itself, indicates the chosen fuel tank. This will help eliminate the possibility of a fuel starvation incident that could occur if a pilot who is not familiar with the airplane uses the handle as the pointer. What is it? Take a photo

WARNING
Make sure that the fuel selector valve engages the detent for the desired tank. If the valve is positioned between detents, fuel will feed from the header tank. When the header tank is empty, the engine will pull air from the tank and quit from fuel starvation. Also, make sure that the fuel selector valve cannot inadvertently be bumped out of position during flight.

1.7.15 MINIMUM CONTROLLABLE AIRSPEED

If the aircraft is fitted with wing tip extensions, Vmc, minimum controllable airspeed, may occur at a higher airspeed than the actual stall speed. Until flight test data is obtained the following placard is fitted on the instrument panel:

"DO NOT ROTATE BELOW 65KIAS ON TAKEOFF."

All placards should be highly visible and easy to read. Advise passengers of pertinent placards.

2 Emergency Procedures

2.1 INTRODUCTION

The emergency procedures described in this section are applicable to most aircraft including the Glasair Super IIRG. These procedures are suggested as the best course of action for coping with the particular condition described, but are not a substitute for sound judgment and common sense. Since emergencies rarely happen, their occurrence is usually unexpected, and the best corrective action may not always be obvious. Pilots should familiarize themselves with the procedures given in this section and be prepared to take appropriate action should an emergency arise. The recommended procedures given herein for coping with emergency situations are the best techniques presently available, based on flight test results and operational experience. Multiple emergencies, weather, unusual conditions, etc., may require deviation from these procedures. Each pilot must make the final decision as to the correct procedure under the circumstances and is responsible for the final decision.

2.2 FIRE

2.2.1 ENGINE FIRE

It is recommended that at least a 2 lb Halon type fire extinguisher be installed. The extinguisher should be located within easy reach of both pilot and passenger.

2.2.2 IN-FLIGHT FIRE

(1) Immediately shut off the fuel supply to the engine.
(2) Turn off all electrical accessories.
(3) Close all vents and the cabin heat box to prevent smoke from entering the cabin.
(4) Execute an emergency landing as soon as possible.
(5) If smoke and fumes are bad enough to overcome the pilot, open the canopies so that a safe landing can be accomplished.

WARNING

Open the gull wing canopies in flight only as a last resort. Never attempt this procedure under normal circumstances as the gull wing canopies will depart the aircraft.

2.2.3 GROUND FIRE

If an engine fire occurs while starting the engine on the ground.

(1) Pull the mixture to the full lean, idle cutoff position.
(2) Open the throttle.
(3) Continue cranking the engine with the starter.

If the engine has already started and is running, let it continue running in an attempt to pull the fire back into the engine. If the fire continues to burn for longer than a few seconds, shut the engine down and extinguish the fire by the best available external means. Use a Halon type extinguisher, if possible.

2.2.4 ELECTRICAL FIRE

In the event of an electrical fire on the ground.

(1) Turn all electrical systems off, including the master switch.
(2) Shut down the engine.
(3) Clear the aircraft and use a Halon type fire extinguisher.

If an electrical fire occurs in the air.

(1) Turn the alternator switch, master switch, and all electrical equipment off.

(2) Reduce speed (95KIAS)
(3) Open air vents to provide fresh air for breathing.
(4) Don smoke hood.
(5) Extinguish the fire, if possible.

Land as soon as possible and remedy the problem before further flight.
If smoke and fumes are bad enough to overcome the pilot, open the canopies so that a safe landing can be accomplished. Be aware that the canopy door will likely depart the aircraft.

2.3 ENGINE FAILURE

2.3.1 GENERAL

The Lycoming aircraft engine is very reliable and the probability of a catastrophic engine failure without some type of advance warning is quite low. Early indications of an engine failure are lowering oil pressure, increasing oil temperature, high cylinder head temperatures, excessive mechanical noise, lowering fuel pressure, and so on. Pilot induced failures, on the other hand, are far more common:, mixture set too lean, fuel starvation, etc. Keep these in mind if an engine problem or failure should arise.

2.3.2 ENGINE FAILURE on TAKEOFF

If the engine fails after the aircraft has left the ground on takeoff, lower the nose to maintain flying speed. If there is not sufficient prepared landing area remaining in front of the aircraft, prepare to land straight ahead. Small turns may be made to avoid obstacles. Only if enough altitude and airspeed are available, can a 180° turn be made to return to the airfield. You are much more likely to survive an emergency straight ahead forced landing of the plane than a stall and spin resulting from a steep, slow turn back to the field.
Due to the high wing loading and the extra drag with gear extended, the engine-out sink rate will be high. Consequently, time to locate a suitable landing site will be limited. Always maintain adequate flying speed.

If the landing gear has been retracted, keep it retracted, unless you are assured of returning to the runway or another hard surface landing area. A belly landing on the runway is acceptable if it guarantees making it to the runway. Soft surface forced landings should always be made with the gear up to minimize airframe damage and to reduce the possibility of flipping over the nose.

Only if there is time and you have maintained control of the aircraft should you attempt to restart the engine. Check for adequate fuel pressure and switch on the electric fuel pump. Make sure the mixture control is in the full rich position. Check the fuel quantity and move the fuel selector valve to the fullest tank. Make sure the magneto switch is in the "BOTH" position.

2.3.3 ENGINE FAILURE IN FLIGHT

In the event of an engine failure during flight, maintain best glide speed (110 KIAS) and prepare for a forced landing. Quickly check that fuel pressure is adequate, that the mixture is full rich, that the fuel valve is on, that there is adequate fuel in the tanks, and that the mags are both on. Switch to the header tank if it is full of fuel. If time permits, and one of the above conditions is the problem, attempt a restart.

Engine roughness may be caused by a bad magneto, induction problems, improper leaning, plug fouling, fuel starvation, water in the fuel, etc. If you encounter engine roughness or power loss in flight, check all engine gauges to verify that the pressures and temperatures fall within the allowable ranges. Also, check the mixture setting, fuel tank selection, magnetos, etc. If none of these items alleviates the problem, make a precautionary landing at the next airport and troubleshoot the problem.

2.3.4 ENGINE FAILED APPROACH AND LANDING

If loss of power occurs at altitude, immediately (while there is still enough oil pressure to operate the prop) pull the propeller control to the full aft (coarse pitch) position to reduce drag. Trim the aircraft for best gliding speed (110 KIAS), and look for a suitable landing field. If measures taken to restore power are not effective,

and if time permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. If possible, notify the FSS of your location, difficulty, and intentions.

When you have located a suitable field, establish a spiral pattern around the field. Try to be at 1000 feet above the field at the downwind position, to make a normal approach. If you are forced to land away from an airport, it is advisable to fly an imaginary pattern with downwind, base, and final legs. This will help you make correct altitude and approach speed judgments for an unknown landing site.

Remember that the power-off glide will be steeper than the engine idle glide that you are used to. Always leave yourself enough altitude and airspeed to clear obstacles.

WARNING

Keep the gear and flaps retracted until you are assured of making the field. Conversely, the gear and flaps work very effectively if you are too high on approach. Engine out landings on a hard surface runway should be made with the gear down. On a soft surface keep the gear retracted to minimize airframe damage and reduce the chance of injury. Retracting the flaps at the last minute before touchdown will minimize flap damage.

Keep the airspeed relatively high (90-100 KIAS, depending on flap setting) throughout the approach to keep the sink rate low and to provide enough excess lift so that the descent can be arrested in the flare. Bleed off the airspeed in the flare, however, so that the actual touchdown is made at the lowest possible airspeed.

When committed to landing:

(1) Throttle closed or off.
(2) Mixture full lean.
(3) Fuel selector off.
(4) Flaps as required.
(5) Alternator/Battery and Master switches off.
(6) Ignition switches off.
(7) Seat belt and shoulder harness tight.

Touch down at the minimum controllable airspeed, being careful not to stall and drop the airplane in. Especially if forced to land in trees, allow the airplane to fly into the trees rather than stalling it and dropping to the ground through the trees.

In very rough terrain, try to fly the airplane so that the fuselage area (passenger compartment) misses the larger objects, such as the biggest tree trunks and rocks. Sacrifice other parts of the airframe (wings, landing gear) to absorb the impact energy.

2.4 EMERGENCY LANDING GEAR EXTENSION

2.4.1 Standard Emergency Extension System

In the event of an electrical failure that prevents the normal extension of the landing gear, it will be necessary to extend the landing gear by alternate means. Electrical problems that could result in failure of the gear actuation system are a low battery or some kind of defect in the RG electrical system such as a burned-out solenoid.

To actuate the emergency gear extension system:

(1) Move the gear switch to the down position.

(2) Pull the 40 Amp hydraulic pump circuit breaker, and the 5 Amp gear control breaker. Leave the 5 Amp gear light control breaker in.
(3) Turn the emergency extension release valve handle 90° to the emergency gear extension position. (Opens the release valve.)
(4) Pull the hand pump handle to the extended position.
(5) Pump slowly until 800 psi (maximum) is indicated on the pressure gauge and the gear indicator lights show that all three gear are fully extended (three green lights). Could take up to 20 pumps.
(6) Leave the emergency extension pressure release valve in the open position.

NOTE

Failure of all three green lights to come on may indicate that a gear control microswitch is faulty or that the gear is blocked from extending completely. In either case, pull the control breaker to disconnect the power to the hydraulic pump solenoids (after verifying that the gear indicator lights are functioning properly).

NOTE

If hydraulic pressure is lost, roll out straight ahead after landing, and shut the engine down. After coming to a stop and before attempting to taxi, clamp the main gear side braces in the extended position to prevent their collapse.

2.5 SPINS AND SPIRAL DIVES

2.5.1 SPINS

WARNING

Intentional spins are prohibited in the Glasair Super IIRG.

Since the wing must be stalled for a spin to occur, inadvertent spins can be prevented by avoiding inadvertent stalls. The pilot must be thoroughly familiar with the Glasair's stall and pre-stall behavior to avoid inadvertent stalls. Remember that a stall can occur at any airspeed and attitude; a pilot who is thoroughly familiar with the Glasair's stall behavior under all conditions will be unlikely to enter an inadvertent spin.
The stall strips must be installed on the inboard wing leading edges to help ensure that there is no tendency for a wing to drop during the stall and to provide a good margin of pre-stall buffet for stall warning.

If a spin is entered inadvertently, immediately apply standard spin recovery control inputs.

Standard spin recovery procedures for spin entry are:
(1) Power off.
(2) Retract flaps, if applied, and neutralize the ailerons.
(3) Immediately apply full rudder opposite to the direction of rotation, and neutralize the stick. If a spin has fully developed, apply rudder opposite to the direction of rotation, while holding full aft stick.
--as rotation stops-
(4) Neutralize the rudder.
(5) If the spin was fully developed, release or neutralize the stick to break the stall.
(6) Pull out of dive.

WARNING

If a spin is entered inadvertently, do not push full forward stick. This action will substantially delay recovery, accelerate the spin, and could prevent recovery. We recommend full aft stick until rotation stops. This holds the elevator in the up

position which provides more airflow over the rudder to help stop rotation. As rotation stops, release back pressure to recover from the stall. Also, keep the ailerons neutral. Aileron opposite to the spin direction will flatten the spin, making recovery more difficult.

If a wing drops during a stall, immediately apply "top" rudder to catch the wing drop and then apply forward stick to break the stall before the situation can progress to a fully developed spins.

2.5.2 SPIRAL DIVES

A spiral dive is a situation that develops when the nose of the aircraft begins dropping out of a turn. (A spin, on the other hand, develops from excessive yaw during a stall.) In a spiral dive, speed builds rapidly as the nose drops and, if the pilot attempts to raise the nose by applying back pressure, the turn will tighten and G forces will begin to build. If allowed to continue, the aircraft will either strike the ground at high speed or will suffer in-flight structural failure from excessive G loads.

The proper recovery from a spiral dive is to first reduce power by bringing the throttle control back to prevent exceeding Vne. Simultaneously with the power reduction, level the wings and then apply gentle back pressure to stop the dive.

A spiral dive is a common result (usually fatal) of flying into instrument conditions without proper training or proper instrumentation. For this reason, pilots who are not rated and current in IFR flight must avoid flight in conditions of reduced visibility.

3 Normal Operating Procedures

3.1 INTRODUCTION

This section described normal operating procedures for both ground and flight operations. All pilots should be thoroughly familiar with this section along with the sections on Emergency Procedures, Limitations, Weight and Balance and Systems Description before attempting any ground or flight operations.

3.2 PREFLIGHT CHECKLIST

Before each flight, check the exterior and interior of the aircraft for anything that looks suspicious or unusual. Use the following walk-around checklist as a guide.

A. COCKPIT—Reach inside cockpit and check:
   1. Parking brake ON or Chocks set.
   2. Throttle closed (knob out).
   3. Mixture full lean (knob out).
   4. Magneto switches off.
   5. Gear switch in DOWN position
   6. Battery switch ON. Select flap full down after checking clearances.
   7. Check hydraulic pressure. If under 200psi, run hydraulic pump until 800psi.
   8. Battery OFF.
   9. Remove control lock. Seat belt around control stick.

B. LEFT WING, ENGINE & FUEL—Remove all control locks, jack pads, tie-downs, pitot cover, etc.
   1. Check LH wing skins for stress cracks fractures.
   2. Check wing attach screws in fuselage.
   3. Left flap hinges for condition and security.
   4. Flap actuator fitting bolts.
   5. Left aileron hinge pins, actuator fitting bolts and counterweight fasteners.
   6. Left aileron full travel.
   7. Fuel vent for obstructions.
   8. Check left wing tip extension fuel sump: drain into clear cup; check for water and debris.
   9. Fuel level and fuel cap for security. (two places with extended tips fitted).
   10. Remove pitot tube cover
   11. Pitot tube for obstruction and alignment.
   12. Left main gear:
   13. Tire condition and pressure.
   14. Oleo strut for leaks
   15. Condition of brake disc and pads.
   16. Security of doors and hardware.
   17. Hydraulic system for leaks and chafed lines.
   18. Electrical wiring and connections.
   19. Check main fuel sump under belly: drain into clear cup; check for water and debris.

C. FORWARD FUSELAAGE
   1. Fuel sump header tank (front fuselage belly, LHS).
   2. Check engine cowling fasteners and hinge pins for security.
   3. Exhaust pipe for security.
   4. Fuel sump gascolator (front fuse belly, RHS, fwd of firewall).
   5. Nose gear:
   6. Tire condition and pressure.
   7. Oleo strut for leaks.

8. Condition and tightness of shimmy damper.
9. Security of door and gear hardware.
10. Hydraulic system for leaks and chafed lines.
11. Electrical wiring and connections.
12. Propeller for nicks and cracks. Check spinner and propeller for looseness.
13. Engine cooling inlets for obstructions. (No bird nests!!)
14. Engine air intake for obstructions.
15. Engine oil level check. Fill if less than 6 quarts.
16. Check RH wing skins for stress cracks and fractures.
17. Wing attach screws in fuselage.
18. Right flap hinges for condition and security.
19. Flap actuator fitting bolts.
20. Right aileron hinge pins, safety wire, actuator fitting bolts and counterweight fasteners.
21. Right aileron full travel.
22. Fuel cap security. (two places with extended tips fitted).
23. Right main gear:
24. Tire condition and pressure.
25. Oleo strut for leaks.
26. Condition of brake disc and pads.
27. Security of doors and gear hardware.
28. Hydraulic system for leaks and chafed lines.
29. Electrical wiring and connections.

D. FUSELAGE AND EMPENNAGE
1. Check condition of fuselage and empennage skins for stress cracks and fractures.
2. Header tank fuel cap for security.
3. Give stabilizer an integrity shake.
4. Elevator and rudder for full travel, binding and chafing.
5. Empennage counterweights for security and chafing.
6. Check elevator hinge fittings and bolts for condition and security.
7. Check elevator actuator fitting attach hardware.
8. Rudder hinge pins and safety wire.
9. Check rudder actuator linkage fitting bolts. Pivot rudder to right to check.

E. RETURN TO COCKPIT
1. Battery switch ON, retract flaps.
2. Check Nav and strobe lights; Gear warning lights lamp test.
3. Note fuel in tanks; plan refueling load; calculate Weight and Balance (Sect. 4.3).
4. Reselect MAIN fuel tank.
5. Battery switch OFF.

3.3 WEIGHT AND BALANCE

3.3.1 General Data

WARNING

To operate the Glasair safely, it must be flown within the specified CG limits. These limits are mandatory and must be strictly observed. Flight in either a nose-heavy or a tail-heavy airplane is unsafe, and can result in loss of control.

MAXIMUM GROSS WEIGHT
Standard tip.....2200 lb

With wing tip extensions ..... 2300 lb
Aerobatic ..... 1900 lb

MEAN AERODYNAMIC CHORD (MAC) ..... 44.5"
With Wing Tip Extensions ..... 43.0"

WING LEADING EDGE AT MAC ..... Station 83.70
With Wing Tip Extensions ..... Station 84.11

STATIONS OF FLIGHT CG LIMITS
Standard Wing Tips (23.3 ft wing span):
Forward ..... Station 89.71 (13.5% MAC)
Aft ..... Station 97.72 (31.5% MAC)
With Tip Extensions (27.3 ft wing span):
Forward ..... Station 89.91 (13.5% MAC)
Aft ..... Station 97.65 (31.5% MAC)

NOTE
For aircraft with the standard wing tips (23.3 ft wing span) use the following formula to calculate aircraft CG with respect to MAC:

$$\text{Aircraft CG (\%MAC)} = \frac{\text{CG Station} - 83.70}{44.5} \times 100$$

For aircraft with wing tip extensions (27.3 ft wing span) use this formula to calculate aircraft CG with respect to MAC:

$$\text{Aircraft CG (\%MAC)} = \frac{\text{CG Station} - 84.11}{43.0} \times 100$$

VARIOUS MOMENT ARMS: (Glasair Super IIRG Prototype)
Oil (1.9 lb./qt.) ..... Station 44.00
Main Tank (6.0 lb/gal) ..... Station 89.85
Header Tank (6.0 lb/gal) ..... Station 68.00
Wing Tips (6.0 lb/gal) ..... Station 98.69
Firewall ..... Station 60.00
Baggage ..... Station 136.00
Passengers ..... Station 115.50
Instrument Panel ..... Station 89.00
Nose Wheel Axle ..... Station 43.50
Main Gear Axles ..... Station 104.90
Wing Tip Extensions ..... Station 100.62
Cowling Attach Flange Joggle ..... Station 58.00

The REFERENCE DATUM is located 58.0" forward of the cowling attach flange joggle (aft edge of the engine cowling). See FIGURE 4-3. Stations are measured in inches from the datum.

3.3.2 Empty Weight CG Calculations

The empty weight CG of each individual aircraft must be determined before any additional CG calculations can be made.

First, with the wings level (wing tips at same height) and with waterline -100 level longitudinally, use a plumb bob to mark the location of the cowling attach flange joggle (the aft edge of the cowling) onto the floor.

NOTE

To level the airplane, use blocks under the wheels for coarse adjustments. Fine adjustments can be made just by raising a wing, the nose, or the tail; usually there is enough friction in the landing gear oleo struts that the adjustment will hold without slipping. Alternatively, you could block the nose or main gear oleos up or clamp them down to adjust the airplane for level. Refer to Subsection D, Marking the Fuselage Reference Lines, in the Fuselage Assembly section of the Instruction Manuals for procedures to mark waterline 100.

Measure 58.0" forward from the cowling attach flange joggle, and mark a line at this point perpendicular to the longitudinal centerline of the airplane. This line represents the intersection of a plane in space with the floor. This plane is defined as the reference datum (station 0.00) from which all moment arms are measured.

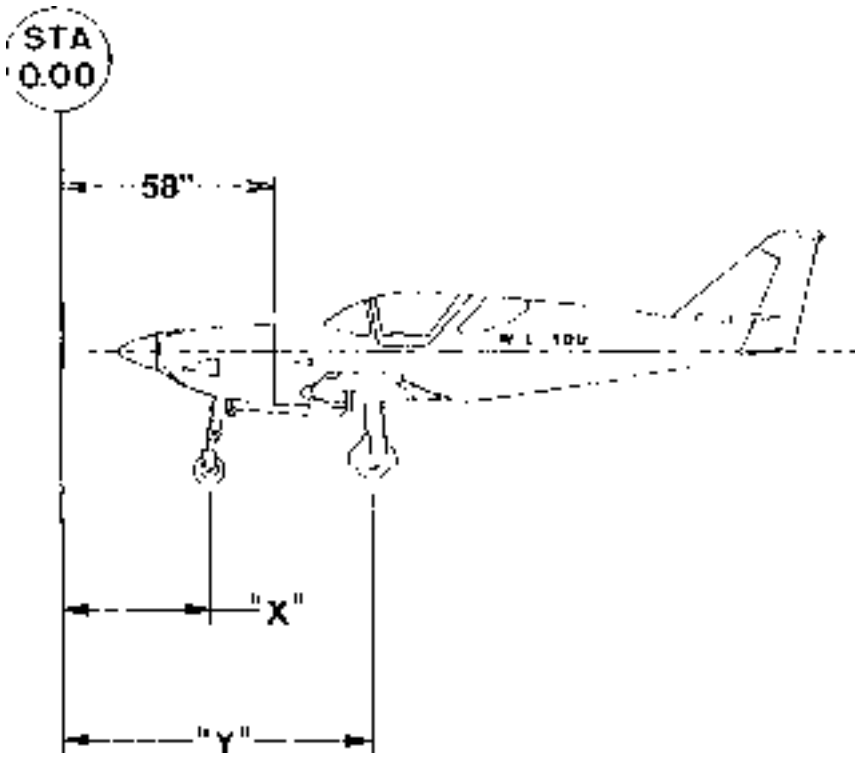


Figure 4-3

Measure the distances marked "X" and "Y" in FIGURE (4-3) from the datum line to the centers of the nose and main gear axles. These distances represent the stations of the landing gear. For N61CY the distance "X" is 43.50" and distance "Y" is 104.9".

Now weigh the airplane, without fuel, but with oil and other operating fluids, using three scales, one under each of the wheels. The scales should be capable of handling about 600 pounds each. While weighing the airplane, block up either the nose or main wheels so that waterline 100 and the wings are level. Be sure to subtract the weight of any blocks or wheel chocks used on the scales..

To determine the empty weight CG, use the data just collected. Station is defined as the distance in inches from the reference datum. Moment is the weight times the station.

Center of Gravity (CG) is defined as the sum of the moments divided by the sum of the weights:

$$EmptyWeightCG = \frac{(NoseGearWeight)(X)+(RightMainWeight)(Y)+(LeftMainWeight)(Y)}{TotalAirplaneWeight}$$

NOTE:
"X" and "Y" in the above formula are the stations of the nose and main gear axles, respectively. Refer to FIGURE (4-3).

Following is N61CY empty weight CG calculation as of 7 July 2007.

Location	Weight	Station
Nose Gear	356 lb.	43.50
Left main gear	518 lb.	104.90
Right main gear	507 lb.	104.90

Empty Weight is 1381lb.

$$CG = \frac{(356)(43.5)+(518)(104.9)+(507)(104.9)}{356+518+507}$$

$$CG = \frac{15486+54338.2+53184.3}{1381} = Station89.07$$

WARNING

Any modifications to the aircraft that add, subtract, or shift weight change the location of the empty weight CG. If any such modifications are made, recalculate the empty weight CG to permit accurate flight CG calculations.

Flight CG Calculations
Calculate the flight CG for the extreme or worst case loading conditions expected, such as full fuel or minimum fuel situations, and heavy pilot, passenger, and baggage conditions. Consider the flight CG before every flight and recalculate the CG if conditions are different from any previous flight.

To calculate the flight CG, tabulate the weights, stations, and moments, as shown in the following typical example using data from N61CY scale readings. Add the weights and moments, and divide the total moment by the total weight to obtain the center of gravity position.

CONDITION FORDWARD LIMIT: light pilot; only fuel in Aux header tank; no baggage.

ITEM	WEIGHT(lb)	STATION(in.)	MOMENT(in.lb)
N61CY empty	1381	89.07	123009
1 crew	100	115.5	11550
Main tank	0	89.85	0
Tip tank	0	98.7	0
Header tank	48	68.0	3264
Baggage		136.0	0
Total	1529	90.14	137823

Station 90.14 is within the allowable CG range.

CONDITION AFT LIMIT: Heavy crew; full fuel; full baggage.

ITEM	WEIGHT(lb)	STATION(in.)	MOMENT(in.lb)
N61CY empty	1381	89.07	123009
1 crew	519	115.5	59945
Main tank	240	89.85	21564
Tip tank	60	98.7	5922
Header tank	0	68.0	0
Baggage	100	136.0	13600
Total	2300	97.41	224040

Station 97.26 is within the allowable CG range. Note that as fuel is use the CG will move forward, but stay within limits at the end of the flight, with 8 gallons in main tank.

WARNING

In most situations, the CG moves aft as fuel is burned from either the header tank or the main tank. Calculate the flight CG using the quantity of fuel expected to be remaining at the end of the flight. The flight should be planned so as to have eight gallons of reserve fuel (approx. 45 minutes) remaining at the end of the flight.

3.3.3 Fuel Filling (Thermal expansion)

When filling the main fuel tank allow for 2 gallons of thermal expansion. Standard usable capacity is 40 gallons. Total volume is 42 gallons. If topped off, the expanding fuel in the wing tanks will be forced overboard through the wing vent system.

WARNING

When fueling the airplane, always ground it with a grounding strap attached to a metal component (such as the exhaust stack). Before opening the fuel filler cap, touch it with the fuel nozzle and with your hand to discharge any static electricity that may exist. Always have a fire extinguisher nearby.

WARNING

Fuel spills (caused by overfilling, fuel expansion, or the wings not being level) are always a possibility when fueling the aircraft. Be aware of the potential for spills, especially when the airplane is parked on uneven ground. If a fuel spill occurs, move the airplane well away from the spill (upwind if possible), and have someone stand by with a fire extinguisher before attempting to start the engine.

3.4 PRE-START AND ENGINE START CHECKLIST

3.4.1 General

After the preflight check, the airplane can be boarded and the engine started. Before starting the engine:

1. Parking brake on.
2. Set the fuel selector to the main fuel tank or the tank having most fuel.
3. Turn master switches on.
4. Turn electric fuel pump on.
5. Check to see whether the propeller is clear of all objects, people, etc. (shout, "Clear prop!")

3.4.2 Normal Start

1. Crack throttle 1/8".
2. Set mixture full rich.
3. Engage the starter by rotating the magneto switch clockwise.
4. When the engine fires, move the magneto switch to "both", and advance throttle to desired setting. If the engine does not fire within 5 to 10 seconds, disengage starter switch, and try again after a few seconds.

3.4.3 Cold Start

TBD.

3.4.4 Flooded Start

1. Open the throttle fully.
2. Set mixture full lean.
3. Electric fuel pump off.
4. Engage starter. When engine fires, advance the mixture control and move the throttle to the desired setting.

After the engine starts, check to see whether the oil pressure comes up into the green arc range (normal operating pressure: 60-90 psi; minimum idling pressure: 25 psi) after about 30 seconds of operation. If proper pressure does not develop, shut the engine down and determine the cause before proceeding. Let the engine warm up at about 1000-1200 rpm before take-off.

3.4.5 RUN-UP and PRE-TAKEOFF CHECK (CIGARS)

CONTROLS:

- Check full travel of stick in all directions while watching ailerons and elevator.
- Check full travel of rudder.
- Make sure all control surfaces move in the proper direction.

INSTRUMENTS:

- Set altimeter and directional gyro.
- Check all instruments for normal operating ranges.
- Check all switches and circuit breakers.
- Check autopilot off.

GAS:

- Enough fuel and reserve for planned flight?
- Fuel valve switched to desired tank. (normally MAIN).
- Check fuel pressure with electric fuel boost pump on.
- At high density altitude, lean mixture appropriately for best power during takeoff.

WARNING

Make sure that the fuel selector valve engages the detent for the desired tank. If the valve is positioned between detents, fuel will feed from the header tank. When the header tank is empty, the engine will pull air from the tank and quit from fuel starvation. Make sure that the valve cannot inadvertently be bumped out of position during flight.

ATTITUDE:

- Trim set at neutral position (for takeoff).

RUN-UP:
Face into wind; set brakes.
Advance throttle to 1800 rpm

a. Check magnetos; rpm drop should not exceed 175 rpm and 50 rpm between magnetos.
b. Cycle constant speed prop .
c. Check all engine instruments.
d. Check ammeter.
e. Check suction gauge.

Reduce throttle to 1000 rpm.

SEAT BELTS:
Check seat belts are snug and properly latched.
Check canopies closed and latched.

NOTE
Do not overheat the engine by excessive ground run up and taxi on hot days.

3.4.6 TAXIING

The tricycle landing gear configuration makes taxiing the Glasair Super IIRG a simple matter. Visibility over the nose is excellent. Steering at slow taxi speeds is by differential braking. Above about 26 knots indicated airspeed, the rudder begins to become effective for directional control. It is best to keep the speed well under control while taxiing and to taxi defensively when in the vicinity of other ground traffic.

In most conditions, taxi with the stick in the full aft (elevator up) position. This reduces the weight on the nose wheel and makes steering easier. Only in the instance of a very strong tail wind (i.e. a strong enough wind to move the aircraft itself) should the airplane be taxied with the stick forward. In very strong crosswinds, hold aileron into the wind while taxiing.

In warm weather, the Glasair Super IIRG may be taxied with the gull wing canopies open. In wet weather, cracking open either canopy slightly will keep the inside of the windshield from fogging prior to takeoff.

Keep the canopies latched in very windy conditions or if taxiing through the prop wash of another airplane.

3.4.7 TAKEOFF

General
Before takeoff, all preflight, pre-start, engine start, and run-up checklists must be finished. Keep in mind that the Glasair Super IIRG is a very responsive aircraft. Rapid, jerky control inputs are not necessary or recommended.

WARNING

If the aircraft is parked on sloping ground with one wing low and with a partially empty main fuel tank, fuel slowly transfers into the low wing creating a wing-heavy condition that can cause control difficulty after takeoff. Making tight taxi turns can have the same effect. A heavy left wing is especially critical since the resulting left-turning tendency in flight exacerbates the effects of engine torque. If you suspect an unbalanced fuel condition, taxi to level ground and allow sufficient time for the main tank fuel level to equalize before attempting takeoff.

When applying power for takeoff, advance the throttle smoothly and slowly. Follow the throttle with right rudder, as necessary, to overcome the torque effects of the engine and propeller and to keep the airplane tracking straight down the runway.

Check the full throttle operation of the engine during the early part of the takeoff roll. Abort the takeoff if there is any sign of engine roughness or if the engine doesn't seem to be developing full power. Correct any problems with the engine before attempting another takeoff.

3.4.8 Normal Takeoff

Make sure the canopies are securely latched and check that the electric fuel boost pump is on. Move the electrically-powered flaps using the flap position toggle switch until the 15° down position is displayed on the LH flap surface. After making sure no other airplanes are landing, line the airplane up with the runway centerline. Advance the throttle smoothly and slowly until full power is achieved. Rotate gently at 65 KIAS.

WARNING

For the Glasair Super IIRG with wing tip extensions installed, minimum controllable airspeed is as critical as stall speed in setting VS, as defined in the FARs and the Glasair Owner's Manual. If wing tip extensions are installed on the aircraft, therefore, the pilot must be careful to let the airspeed reach VS before rotating for take off. Each builder must determine VS for his particular Glasair.

As the airplane accelerates after lift-off, ease the flaps up, making sure that they are completely retracted before reaching the flap placard (122 KIAS for slotted flaps). Let the airplane accelerate to 104 knots which is the best rate of climb airspeed. The landing gear may be retracted at any time after lift-off, but it is better to wait until the airplane is beyond the point of being able to land straight ahead on the runway in the event of an engine failure immediately after lift-off. Check for “3 Greens” and hydraulic pump off.

NOTE

Leave the electric fuel boost pump on at all times while in the pattern. When leaving the pattern, attain adequate altitude before switching the pump off.

3.4.9 Short Field Takeoff

The short field takeoff is the same as the normal takeoff except that, after lining up on the runway, hold the brakes while advancing the power. Release the brakes after full power is reached. Use 15° flap. Rotate at 65 KIAS. Once airborne, retract gear, and establish a climb speed of 87 KIAS which is the best angle of climb speed. Check for “3 Greens” and hydraulic pump off. When all obstacles are cleared, ease the flaps up while accelerating to the best rate of climb airspeed (104 KIAS).

3.4.10 High Altitude Takeoff

At high altitude (above 4000 ft MSL), lean the engine during run-up for best takeoff power. Follow the leaning procedures described in the Lycoming Engine Operator's Manual for your powerplant.

NOTE : It is intended to add takeoff distance guidance after flight test data is available.

3.4.11 CLIMB

After lift-off, if no obstacles are present, let the airspeed rise to 104 KIAS for best rate of climb, and to avoid overheating the engine. Pay close attention to engine temperatures during climb; temperatures can exceed the normal ranges if the airspeed is too low on hot days. 114 KIAS are recommended for climb out on hot days.

The most important consideration during the climb is visibility. Lower the nose or perform "S" turns periodically to check for traffic.

When clear of terrain and an adequate climb rate is established, reduce power to avoid excessive fuel burn and high engine temperatures.

3.4.12 STALLS

General

Stall recovery for the Glasair Super IIRG is typical of most conventional aircraft--lower the nose with forward stick, and add power. The stall characteristics are predictable for both power off and moderate power on stalls. Just before the stall, slight buffeting is felt giving an early indication of the stall.

The Glasair Super IIRG should not be intentionally stalled with any heavy baggage in the baggage compartment unless it is securely fastened down. When practicing stalls, be sure to check the air space for any conflicting traffic.

NOTE

Stall strips are mandatory on the Glasair Super IIRG to induce the wing roots to stall first. Without these stall strips properly installed, the stall may be unpredictable or erratic. Refer to the Final Assembly section of the Glasair Super IIRG Instruction Manuals for a description of stall strip installation. The stall strips make a nice gentle stall possible with an adequate margin of stall warning.

WARNING

Intentional spins are prohibited in the Glasair Super IIRG. We strongly recommend that stalls be practiced at least 4000 ft AGL. Be familiar with standard spin recovery procedures in the event of an inadvertent spin entry while practicing stalls.

Remember that an airplane can stall at any airspeed and attitude (high speed stalls) but the recovery is always the same: stick forward and add power. The rudder is effective in keeping the wings level throughout the stall.

Just prior to the stall, a moderate burble or airframe shake, induced by the stall strips at the wing root, will be felt. If the stick is held back, the shake will become more pronounced, followed by the nose dropping. To recover, move the stick forward and apply power. Keep the wings level, if necessary, with the rudder.

WARNING

Do not use the ailerons to keep the wings level in a stall as this will more easily cause a spin entry or aggravate spin recovery.

3.4.13 Power Off Stalls

When practicing power off stalls, hold the nose up in a slight climb attitude, gradually bringing the stick back as the speed bleeds off, until the plane begins to stall. Practice power off stalls at each flap setting to get the feel of the stall in each mode from fully retracted to fully extended flaps.

NOTE

If flaps are extended with the gear retracted, the gear warning horn will sound unless an override breaker has been installed in the gear warning circuit and the breaker is opened for practicing stalls.

With flaps applied, the plane feels more stabilized, the stall speed is lowered by a few knots, the actual point of the stall is a little more sudden, and the nose drops slightly lower. Because of the extra drag with the flaps lowered, the stall is more pronounced and there is less time lag between the wing root buffet and the nose dropping. The stall with full flaps is still quite gentle and a quick recovery with minimal altitude loss is possible. Release back pressure on the stick, apply full power, stabilize the plane back into a climb and gently ease the flaps off.

3.4.14 Power On Stalls

Do not practice these types of stalls lower than 6000 ft AGL. Power on stalls are more pronounced or sudden because of the high angle of attack, but recovery is the same as with power off stalls: stick forward and add power. With power applied, the torque effects of the engine and propeller induce rolling and yawing forces during the stall. For this reason, a wing drop is more likely to occur in a power on stall.

WARNING

Power on stalls can more easily lead to a spin entry. Give yourself plenty of recovery room for safety in the event of an inadvertent spin. As the power is increased above 1800 rpm, a spin becomes more and more likely during power on stalls.

3.4.15 Accelerated Stalls

An airplane can stall at any airspeed and any attitude since exceeding the acceptable angle of attack is what causes a stall. As with most aircraft, the Glasair will stall at a progressively higher airspeed as the angle of bank in a turn is increased.

A common means of inadvertently entering an accelerated stall is to pull the stick back too suddenly after recovery is made from an initial stall. This is typically done to avoid altitude loss.

In most cases, incipient stall recovery is made by simply relaxing the back pressure or neutralizing the stick. To minimize altitude loss during an inadvertent approach-to-landing stall or a departure stall, immediate application of full power is necessary.

3.4.16 CRUISE

When the desired altitude is reached, throttle back to the desired cruise rpm. It takes a little while for the airplane to adjust to the cruise attitude after transitioning from climb. Use the elevator trim to trim away stick pressure as the airplane increases in speed. An airplane in trim is a much easier airplane to handle. N61CY is fitted with a 2-axis autopilot to facilitate longer distance flights.

NOTE

Adjust the ground adjustable aileron and rudder trim tabs between test flights for the desired optimum cruise conditions. Refer to the Rudder Assembly Section and the Aileron Assembly Sections of the Glasair Super IIRG Instruction Manuals for details on how to adjust the tabs.

3.4.17 Cruise Performance

The following figures are to be used as guides for determining the desired cruise rpm and speeds. The values given here are for a Glasair Super IIRG equipped with a Lycoming 180 hp engine and Hartzell constant speed propeller at 8000 ft MSL. Cruise performance will vary from plane to plane depending on many factors (such

as propeller, engine horsepower, etc.). The fuel consumption values represent the average between best power and best economy mixture settings, as specified in the Lycoming Operator's Manual.

RPM	Power	Gal/hour	Speed
2200	55%	7.9	152 KIAS
2400	65%	9.2	165 KIAS
2700	75%	10.7	176 KIAS

NOTE: If an EGT gauge is used, lean the engine to 50° F rich of peak EGT (hottest cylinder) to obtain the optimum fuel consumption rate, or follow the recommendations in your Lycoming Operator's Manual.

3.4.18 En Route Fuel

Determine by careful experimentation what your aircraft burns in fuel per hour at various power settings such as 55% and 75% power. Plan your flights so that you always have a 45 minute reserve on board in case of any unexpected delays. Always keep track of how much fuel remains in both the main and header tanks. Make sure that, for takeoff and landing, the fuel tank selector valve is set to a fuel tank that has ample fuel.

WARNING

Make sure that the fuel selector valve engages the detent for the desired tank. If the valve is positioned between detents, fuel will feed from the header tank. When the header tank is empty, the engine will pull air from the tank and quit from fuel starvation. Make sure that the valve cannot inadvertently be bumped out of position during flight.

3.4.19 DESCENT

Never pull power off and dive down in cold air. The rapid cooling at idle and high velocity can be very hard on an engine. When descending keep a little power on and don't descend too fast. Another thing to keep in mind when descending is that the airplane is very clean aerodynamically. If you are in at 174 KIAS cruise, it doesn't take much of a descent angle to reach red line, so be cautious. Also remember that, with a very clean airframe, you are limited to fairly shallow descents, so plan your descent in advance to reach your destination airport at pattern altitude.

Be sure your seat belts are fastened snugly when descending. Coming down from smooth air into turbulent air at a high rate of speed can be especially tough on you and the airframe. Maximum structural cruising speed (Vno) of the Glasair is 174 KIAS.

Gradually push the mixture control rich during long descents.

APPROACH
Pre-Landing Check List
A suggested pre-landing check list has the acronym GUMP:
GAS:
Fuel boost pump on.
Check fuel quantity.
Select proper tank. Verify that handle engages detent.
Throttle reduced as necessary.
Parking brake off.
UNDERCARRIAGE:

Extend landing gear (below 122 KIAS).
Check for hydraulic pressure and three green lights.
MIXTURE:
Push to full rich position.
PROP:
Move prop control to high rpm, flat pitch (forward) position.
NOTE
We recommend completing the pre-landing check list before entering the pattern so that the pilot's attention can be directed outside the airplane to clear for traffic while in the pattern. Some pilots prefer to use full flaps early in the approach (before turning onto the downwind leg) to provide maximum visibility over the nose and also to reduce their work load while in the pattern.

3.4.20 Approach

The Glasair is a fast, clean aircraft that will take longer to slow down than you may be used to. If you enter the pattern at 174 knots, you may have to circle an extra lap before you land. To avoid overtaking other aircraft, plan ahead to slow down before entering the pattern.

Enter the pattern on the 45° at about 120 KIAS. Slow the airplane to about 105 KIAS when abreast of the threshold on downwind and select takeoff flap setting (15°).

Continue slowing the airplane: select landing flap (40°) at about 80 KIAS on base leg. Throughout downwind, base, and final, continue to trim the airplane, as necessary. Turn onto final approach at approximately 75 KIAS if landing weight less than 2000lb., otherwise maintain 80KIAS. Control altitude with power and airspeed with pitch.

You should be at about 75 KIAS over the threshold under normal conditions. Even at these airspeeds you will need to carry a little power through the approach to keep the sink rate under control. Carry a little more airspeed if you are heavily loaded or in gusty or strong wind conditions.

NOTE

When on final, you should be pattern high with your speed down and a somewhat high angle of descent. This allows visibility over the nose all the way down through final. Do not approach the field low and slow with a shallow descent angle. If you're low and slow, go around and try again. If you can't see the runway numbers all the way down to flare, your approach is not correct.

REFER to Figure 4-12 on next page.

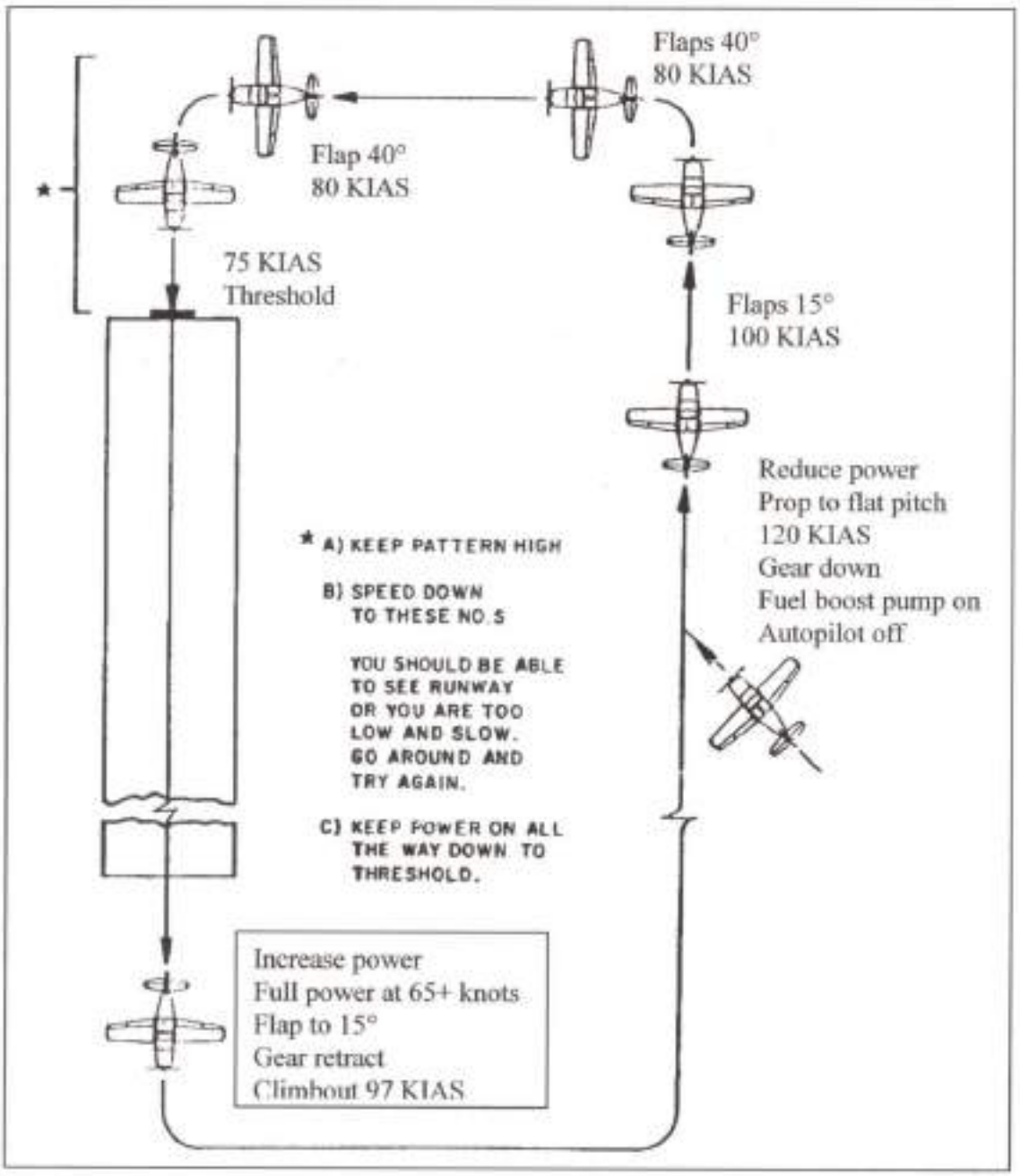

Flaps 40°
80 KIAS
Flap 40°
80 KIAS
75 KIAS
Threshold
Flaps 15°
100 KIAS
Reduce power
Prop to flat pitch
120 KIAS
Gear down
Fuel boost pump on
Autopilot off
* A) KEEP PATTERN HIGH
B) SPEED DOWN
TO THESE NO.S
YOU SHOULD BE ABLE
TO SEE RUNWAY
OR YOU ARE TOO
LOW AND SLOW.
GO AROUND AND
TRY AGAIN.
C) KEEP POWER ON ALL
THE WAY DOWN TO
THRESHOLD.
Increase power
Full power at 65+ knots
Flap to 15°
Gear retract
Climbout 97 KIAS

Figure 5

3.4.21 LANDING

The landing in the Glasair Super IIRG is similar to the landing in any nose wheel airplane. Due to the high sink rate with gear and flaps extended and the propeller in flat pitch, the flare may have to be started somewhat higher above the ground and back pressure applied to the stick more rapidly in order to break the glide.
Keep the power off sink rate in mind when flying landing approaches. At a standard pattern altitude of 800 ft AGL, a fairly tight pattern must be maintained to execute a power-off glide to the runway. Especially avoid letting your airspeed get too low during a power-off approach; the sink rate increases at lower approach speeds and you have less excess lift available to arrest the descent in the flare.

Always touchdown on the main wheels first with enough airspeed to allow the nose gear to come down gently. If the airplane is too slow with a high angle of attack at touchdown, the reduced airflow over the elevator may not provide adequate elevator authority to prevent the nose wheel from slamming down after touchdown. Carry a little power prior to touchdown and then cut power just before touchdown. Do not attempt full stall landings in the RG model.

CAUTION

If you don't like the way you're set up for landing, don't be ashamed or too proud to go around and try it again. It is much better to go around than to damage the plane or yourself.

On a balked landing (go-around), add full power (applying right rudder, as necessary), stabilize the plane in a climb, and select flaps up. The plane has enough power to go around with full flaps, but with limited performance. Retract gear when positive rate of climb established. Climb speed is 97 KIAS for best gradient. We cannot stress enough that, if you do not have a lot of flying experience in aircraft with wing loading and performance similar to the Glasair Super IIRG, we recommend the initial use of the wing tip extensions. They can be thought of as transforming your Glasair into an intermediate trainer.

3.4.22 Slipping the Aircraft

The Glasair Super IIRG will slip with full flaps. With the normal high descent rate with the gear and flaps extended, however, slips should not be necessary. The amount of slip is limited by the amount of rudder power available. On a full flap, slipping approach, there is a very rapid sink rate which must be checked by adding power. Speed should be kept comfortably above the stall (80 KIAS) throughout the approach.

WARNING

If less than ten (10) gallons of fuel remain in the main tank, slips are prohibited when drawing fuel from the main tank.

CAUTION

Attempt such maneuvers as full flap, full slip approaches only after becoming thoroughly familiar and proficient with the normal flying and handling characteristics of the Glasair Super IIRG.

3.4.23 Crosswinds

Normal crosswind landing procedures for conventional aircraft apply to the Glasair Super IIRG. Especially strong crosswinds require a crab into the wind and straightening out just before touchdown while holding the upwind wing low.
The maximum crosswind that can be handled by the Glasair Super IIRG is highly dependent on pilot proficiency and technique.

3.4.24 ENGINE SHUT DOWN

1. Set parking brake
2. Set the propeller control at minimum blade angle. (Knob fully fwd.)
3. Idle until there is a decided decrease in cylinder head temperature.
4. Turn radios off.
5. Turn all accessory switches off.
6. Set mixture to idle cutoff (full lean: Knob out) and wait for the engine to stop.
7. Turn off magneto and master switches.

4 Systems Description

4.1 POWERPLANT

The powerplant used on N61CY Glasair Super IIRG is the Lycoming IO-360-B1BCE injected engine rated at 180hp. Engine mount utilizes the Dynafocal style. Injected engines require higher fuel pressures than carbureted versions, so an electric fuel boost pump is fitted. It is located beneath the pilot's seat pan. An aft mounted engine fuel servo receives filtered air from a NACA duct integral with the lower cowl (LHS).
The Operator's Manual for the engine is part number 60297-12. The recommended time to overhaul is 2000 hours.

4.2 PROPELLER

A 2-blade, aluminum, constant-speed Hartzell propeller is fitted on N61CY. Model number is HC-C2YR-1BF with F7068-2 blades fitted to a compact hub. The engine-propeller combination is subject to harmonic resonance issues. The engine restrictions are placarded on the instrument panel and are listed below. .

MP above	25 in.Hg	2300- 2350 rpm
MP below	15 in.Hg	above 2600 rpm

Avoid stabilized engine operation in the restricted rpm range.
Blade pitch angles vary between 12.2 deg. (fine) and 38.8 deg. (coarse).

4.3 FUEL SYSTEM

The aircraft has two fuel tanks; a main tank extending tip to tip in the leading edge D-section of the wing and a header tank located behind the instrument panel. Useable capacities are approximately 40USG and 8USG respectively. When extended wing tips are fitted, a further 5USG/side is added to the main tank bringing the estimated total useable fuel to 58USG.
Aviation grade gasoline 100LL is used.

The aircraft is fitted with (2) fuel vent float valves, one at the end of each main wing. Each valve combines a check valve and a pressure relief feature as well as providing a tank vent path to atmosphere. The header tank has a separate vent arrangement.

A fuel sump with a drain is mounted at the bottom of each tank and a cartridge type fuel filter is positioned at the low point of the fuel line forward of the firewall. There are 5 sumps total.
Fuel gauging is by capacitance probes in main and header tanks. Fuel in the wing tip extensions is not gauged.

4.4 OIL SYSTEM

The engine oil system uses a mechanical, engine-driven oil pump with a wet sump on the bottom of the engine. The oil cooler radiator is on the firewall with cooling air provided from the back of the engine cylinder cooling plenum (RHS).
Oil capacity is 8 quarts.

CAUTION: Operate new or overhauled engines on mineral oil for a minimum of 50 hours or until oil consumption has stabilized. After this time, change to an approved additive oil if so desired.

4.5 LANDING GEAR AND BRAKES

A tricycle retractable gear is used on the Glasair Super IIRG. All landing gear struts are or the pressurized air-oil type (oleo strut). For N61CY, the gear is retracted and extended by an electrically driven hydraulic pump and three hydraulic actuators. In case of electric pump failure, a hand operated hydraulic pump is available to provide gear down pressure. The handle for this pump is normally stowed in the baggage area and can be

accessed by either occupant through the center of the seatback structure. Mechanical springs (main) and a gas spring (nose) are provided to assist the "gear down and locked" operation.
Cleveland 5.00 X 5 wheels are used on the mains and nose.
The nose gear is free-castering, and steering is accomplished by differential braking. A friction type shimmy damper is incorporated on the nose gear.
Cleveland brakes and master cylinders are used, with toe pressure on top of the rudder pedals causing braking action. N61CY is equipped with dual brake pedals and is fitted with a cable operated parking brake.
A schematic of the complete hydraulic system used on N61CY is given in Section 12.

4.6 COCKPIT

Glasair Super IIRG provides side-by-side seating for two occupants within the 42inch wide cabin.
N61CY is equipped for IFR night conditions per the requirements listed in Section 2.8 of this handbook. An ELT is located behind the baggage area (LHS). The Mode C transponder uses an external antenna mounted below the RH wing. Other antennas are mounted internally inside the fiberglass structure.
An Angle Of Attack (AOA) indicator is fitted which continuously shows margin above stall. The device also provides data for a "gear not down" warning.

Typical operating ranges for selected instruments are listed below

Instrument	Normal	Redline
Airspeed-White arc (flaps)	59 - 122KIAS	122KIAS
-Green arc	70 - 174KIAS	
-Yellow arc	174 -226KIAS	226KIAS
Tachometer	TBD	2700rpm
CHT	180°F - 435° F	500° F
Fuel pressure	TBD	
Oil pressure	60 - 90psi	100psi max 25psi min idle
Oil temperature	160° F - 220° F	245° F
Hydraulic pressure		
- Down	?psi	
-Up	?psi	

4.6.1 Cabin environment

4.6.1.1 Heat

Cabin heat is accomplished by a heat exchanger mounted on the exhaust system crossover tube from cylinder#2 and using a heater valve mounted on the firewall. A push-pull cable controls the cabin heat valve and can also divert warm air to windshield defrosting use.

4.6.1.2 Fresh air

Two fresh air cabin vents are provided for the cockpit. They are fed from NACA inlet ducts on each side of the fuselage and flow is controlled using "eyeball" vent valves.

The aircraft utilizes gull wing canopies as doors with fore and aft bullet type latches. The latch system uses two-way handles which can be operated from both inside and outside the cockpit. This provides access from the outside in the event of an emergency. Canopies can be left open for ventilation during taxi, but must be closed and locked for flight.

WARNING
Do not open the canopies in flight. They will be torn off the aircraft.

Baggage is stored directly behind the seat back and should be securely anchored down for flight. Baggage compartment load must not exceed 100lb. In addition, the hat shelf load should not exceed 10lb.

WARNING

Do not place small items loosely in the baggage compartment. Stow all small articles in bags, packs or suitcases. Small articles could bind up control linkages with serious consequences.

4.7 CONTROL SYSTEM

Glasair Super IIRG flight controls are of conventional 3-axis design using dual stick controls for pitch and roll, and dual rudder pedals for yaw. All flight control interconnections are push-pull tube linkages except for rudder. Cables are used between rudder pedals and the rudder bellcrank with a push-pull tube between bellcrank and the rudder. Controls are light and responsive in all modes of flight. Elevator trim is actuated by a trim wheel in the center console. The wheel is connected to a cable drum around which the elevator trim actuating cable is wound. This trim cable, with tension springs installed in-line at each end, is routed between the cable drum and the ends of the elevator actuator arm located at the tailplane bulkhead in the rear fuselage. Trim for the roll and yaw axis is by external, ground adjustable tabs at the trailing edges of the LH aileron and rudder, respectively.

An Autopilot is also available using a 2-axis S-TEC model 30 autopilot operating in pitch and roll. Servos for the autopilot are located behind the baggage compartment (pitch) and in the RH wing outboard of the inspection hatch (roll).

Electrically powered slotted flaps are externally attached to 3 wing brackets on each side. The flap motor is located beneath the passenger seat pan.

4.8 ELECTRICAL

Glasair Super IIRG electrical system is conventional for a modern, light aircraft except for one feature. As the structure is fiberglass, a separate negative bus bar is used with a return circuit needed for every electrical device. Electric power is generated by an engine driven alternator and from the 17AH battery unit located on the firewall (RHS). The alternator powers the main bus which, in turn, feeds instrument and essential busses. There is a separate battery bus for ground use. The essential bus may also draw power from the battery. Navigation and strobe lights are installed in the wing tips and rudder and a landing light is mounted in the lower engine cowl.

Electrical system and a listing of the wire labeling and ratings are included in Section 7.

4.9 WING TIP EXTENSIONS

Extended wing tips reduce roll rate somewhat and are not approved for aerobatics. They also reduce stall speed to values that may be less than the minimum control speed when operating at high power settings. Takeoff rotation speeds must not be less than the min. control speed.

WARNING

Do not use rotation speeds less than 65KIAS.

4.10 Equipment listing

4.10.1 Airframe

Item	Manufacture	Model	Serial Number
Airframe Kit	Stoddard Hamilton *	SH-2R	2399

4.10.2 Propeller

Item	Manufacture	Model	Serial Number
Hub	Hartzell	HC-C2YR-1BF	CH32310A
Blade	Hartzell	F7068-2	H86373 and 75
Governor	Woodward	B210776A	11497330

4.10.3 Engine

Item	Manufacture	Model	Serial Number
Engine	Textron-Lycoming	IO-360-B1E	L-1212-51A
Oil Cooler	Stewart-Warner	10599R	2735
Starter	BC Specialty	BCS206-149	647045
RH Magneto	Bendix	S4LN-1209	050595-1
LH Magneto	Bendix	S4LN-1227	050595-2
Fuel Injection	Bendix	RSA-5AD1	84676

4.10.4 Engine Instruments

Item	Manufacture	Model	Serial Number
Tachometer	Electronics International	R-1-4	57762
Manifold Pressure	Electronics International	M-1	57340
Oil Pressure/Temp	Electronics International	OPT-1	57826
Oil Pressure Sender	Electronics International	PT-100GA	57827
Volt/Amp	Electronics International	VA-1A-50	58106
Clock	Electronics International	SC-5	58322
Fuel Level	Electronics International	FL-2CA	94634
Fuel Flow/Pressure	Electronics International	FP-5L	53682
Fuel Flow Transducer	Electronics International	FT-60 (852)	53683
EGT/CHT	Electronics International	UBG-16	53681

4.10.5 Radio/Nav equipment

Item	Manufacture	Model	Serial Number
Nav/Comm	UPS **	CNX80	
Transponder	UPS	SL70	
MFD	UPS	MX20	
Audio Panel	UPS	SL15	
Altitude Encoder	Trans-Cal	SSD120-RS232C	
ELT	Ameri-King	AK-450	464200

4.10.6 Flight Instuments

Item	Manufacture	Model	Serial Number

ASI	Aero Mach Labs.	P/n 1525-04	29H8
Altimeter	United Instrument,Inc.	P/n 5934D-3	400020
VSI	United Instrument, Inc.	7030	277323
VOR/GS Indicator	Mid-Continent Instr. Co.	MD200-306	K23872
Directional Gyro	Sigma-Tek	4000C	T64998M
Attitude Gyro	Sigma-Tek	5000B-36	T78469N
Hydraulic Pressure	Electric Auto-Lite Co.	10058-A	42-43641
Vacuum Gauge	Varga Enterprises	5001	13157
AOA Computer	Proprietary Software Sys.	Pro II 1101V6	621
Accelerometer	Burton Div. of Aviation Cp.	2119-500	24651

4.10.7 Autopilot

Item	Manufacturer	Model	Serial Number
Turn Coordinator	S-TEC	01260-11-0-14	0502-4822D
Pitch Computer	S-TEC	01291-7-14	0502-4663A
Pitch Servo	S-TEC	0107-2-PH	10040A
Pitch Servo Xducer	S-TEC	0111	0452-32928AA
Roll Servo	S-TEC	0105-4-R4	12353A
GPSS Convertor	S-TEC	03977PO01278-3	0501-7858E/A
GPSS Switch	S-TEC	0975	0452-0687

4.10.8 Electrical equipment

Item	Manufacture	Model	Serial Number
Battery	Panasonic	LC-RD1217P	
Alternator	BC Specialty		
Alternator Regulator	BC Specialty	LR-3A	0554491
Strobe Power	X-PAX	904	
Hydraulic Solenoids (2)	Cole-Hersee, Boston		

4.10.9 Other equipment

Item	Manufacturer	Model	Serial Number
Fuel Boost Pump	Wheldon	A8163-A	98035
Boost Pump Filter	Peterson	Series 600	
Flap Motor	Motion	73463	
Vacuum Pump	Airborne	21CC	02AL000372

* now Glasair Aviation
** now Garmin

4.11 Electrical Diagrams

4.12 Hydraulic Diagram

4.13 Servicing

4.13.1 Oil System

CAUTION

Oil consumption tends to be higher during break-in periods on new engines. Prolonged flights should be avoided and oil level monitored closely during this period. New or newly overhauled engines should be operated on straight mineral oil for a minimum of 50 hours or until oil consumption has stabilized. After this period, a change to an approved additive oil may be made.

Consult the Lycoming Engine Operators Manual or Lycoming Service Instruction 1014 J for the recommended grades of oil to be used.

The engine oil filler cap and dipstick are accessible through the access door on the right side of the upper engine cowling. Maximum oil sump capacity of Lycoming engines recommended for the Glasair Super II-S RG is 8 quarts.

If the engine is not equipped with an external full flow oil filter, the oil should be changed and the oil suction and oil pressure screens cleaned and checked for metal particles every 50 hours.

If the engine is equipped with an external full flow oil filter and also an air filter, the oil change intervals may be increased to every 100 hours as long as the oil filter element is replaced every 50 hours. See Lycoming Service Instruction 1319 B. If the airplane does not have an air filter, change the oil every 50 hours.

To assure complete drainage of the engine oil, the engine should be at operating temperature.

We recommend keeping a record in the flight log of all oil added between changes. This practice monitors changes in oil consumption patterns that can serve as a warning of impending problems. An oil analysis performed at every oil change is another valuable tool for monitoring the engine's condition.

4.13.2 Battery

The battery is a recombinant gas type, and does not require maintenance beyond normal charging. Replacement during every other conditional inspection will maintain needed capacity.

CAUTION

Excessive overcharging can cause heating and boiling.

4.13.3 Tires

Tire Specifications:

Main Gear	5.00 – 5 10 Ply Rating.
Nose Gear	11 X 4.00 – 5 8 Ply Rating.

Maintain an inflation pressure of 35 to 50 psi in the main wheel tires. Inflate the nose wheel tire to 50 psi.

Inspect the tires for breaks and cuts when inflating.

4.13.4 Landing Gear Oleo Struts

4.13.4.1 PRESSURIZING THE STRUTS

To pressurize the struts, the airplane must be jacked up to allow complete extension of the struts. Otherwise, if the struts are compressed, the fluid level will be above the level of the air valve.

Pressurize the main gear struts to 90 psi and the nose gear strut to 110 psi, using either nitrogen or dry compressed air.

WARNING: Never fill the shock struts with oxygen.

4.13.4.2 FILLING THE OLEO STRUTS

To fill the oleo struts, the airplane must be jacked up to allow complete strut extension.

With the strut fully extended, remove the air valve cap and use a suitable tool to depress the valve core. Allow the strut to fully deflate.

CAUTION

Cover the air valve with a rag while deflating the strut to protect the mechanic's face and eyes from hydraulic fluid that might spray out.

Fill the oleo strut to within 1/2" of the level of the valve boss. Use type 15 hydraulic fluid (Mil-H-5606).

NOTE

Because the hydraulic fluid must flow down through small holes in the metering piston, add the fluid slowly, giving it plenty of time to assume its new level. Air can also become trapped under the metering piston, leading to faulty fluid level indications. Shake the struts (very gently: the airplane is on jacks) or tap them to promote the elimination of any trapped air.

NOTE

It is desirable to have the fluid level slightly below the level of the valve assembly so that the person pressurizing the strut will not be sprayed with hydraulic fluid.

Reinstall the valve body assembly in the valve boss on the trunnion cylinder assembly, using Teflon thread sealant or Teflon tape on the threads.

Pressurize the struts, as described in the previous section. Let the airplane down off the jacks.

NOTE

For a description of oleo strut service procedures, refer to the Glasair Oleo Strut Service Instructions (Part Number 632-0195014) available from Stoddard-Hamilton Aircraft.

4.13.5 RG Hydraulic Pump

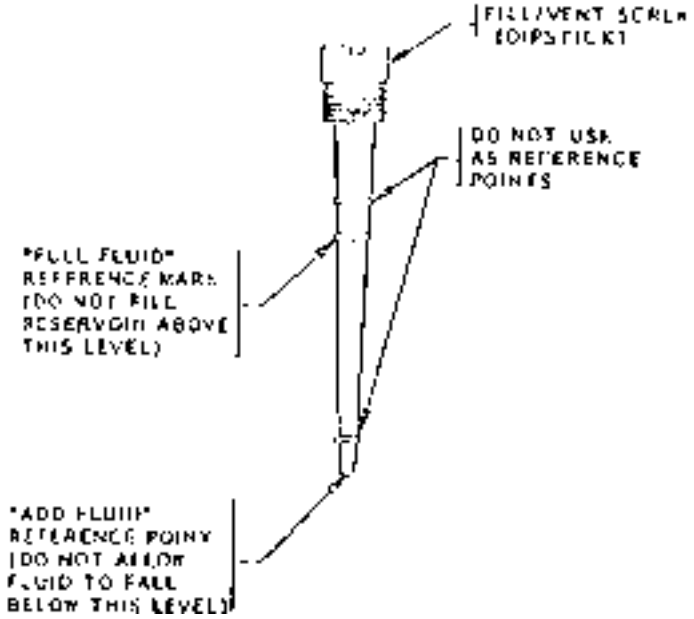


Figure 6

Check the fluid level in the retractable gear hydraulic pump at least every 100 hours of flight time, or if indications (such as incomplete or sluggish retraction) suggest that the fluid level may have fallen. Use MIL-5606 hydraulic fluid in the hydraulic pump.
Do not thread the fill/vent screw into the hydraulic pump reservoir when checking the fluid level. Use the proper reference marks on the dipstick, as shown in FIGURE 6.

CAUTION
If the reservoir is filled above the "FULL" mark shown, damage to the pump seals could result. The uppermost mark on the dipstick is a reference for the fluid level when the dipstick is threaded into the pump and should not be used.

CAUTION
After checking the fluid level in the pump reservoir, thread the fill/vent screw (dipstick) all the way into the pump and then back it out one full turn to vent the reservoir. If the fill/vent screw is not backed out after bottoming, damage to the pump seals could result.

Some pilots may wish to tighten the fill/vent screw all the way to prevent spilling hydraulic fluid when performing negative G aerobatic maneuvers. If this is done, fill the pump reservoir only half full to provide an ample air cushion above the hydraulic fluid to help prevent damage to the pump. During all other flight operations, the pump must be vented.

4.13.6 Nose Gear Shimmy Damper

Inspect the nose gear shimmy damper friction material periodically for wear and damage.

To remove the friction collars for inspection of the friction material, remove the friction collar clamp bolts. Swing the forward clamp half out of the way, leaving it attached to the upper scissor.
Check that the friction material is well adhered to the strut, and replace any damaged material.

Reassemble the friction collars, leaving the clamp bolts loose.

4.13.6.1 Adjustment

- Connect the Stoddard-Hamilton RG tow bar (or equivalent 29-1/2" long lever) to the lower scissors pin,

and hook a fisherman's scale (spring balance) to the "T" handle end of the tow bar.

- Measure the internal friction of the nose gear strut by lowering the tail of the aircraft and rotating (steering) the nose gear with the fisherman's scale on the end of the tow bar.
- Now adjust the tightness of the clamp bolts equally until the force required to steer the nose gear is 6 to 12 lb greater than the internal friction measurement.

NOTE

Make a check of the shimmy damper tightness as a part of every preflight inspection.

4.13.7 Brakes

The brake hydraulic fluid reservoir is mounted on an engine mount tube to simplify access for service and maintenance. Check the brake fluid level periodically and top it up if necessary.

There is no need to adjust the brakes since the brake pistons move to compensate for brake pad wear. Inspect the brake pads at every preflight, however, and replace them if worn excessively.

WARNING

The minimum brake lining thickness is 1/10". If the brake pads are excessively worn, the piston 0-rings can protrude beyond the caliper housing, resulting in loss of hydraulic fluid and complete brake failure.

The Cleveland brakes supplied with Glasair kits use floating calipers, which are free to move from side to side, rather than being solidly attached to the torque plates. This provides for equal lining wear on both pieces of lining material. Periodically (at least at every annual inspection), check that the brake caliper assembly is free to float from side to side. Grasp the caliper and wiggle it back and forth (parallel to the wheel axle) to check for a little play. If no play is present, lubricate the caliper anchor pins and torque plate bushings with a dry lubricant such as silicone or graphite. If the anchor pins or torque plate bushings are dirty or corroded, disassemble the calipers, clean the anchor pins and bushings or remove corrosion with fine sandpaper, lubricate the anchor pins, and reassemble.

NOTE

Do NOT use any petroleum base lubricants (oil, grease, or WD40) on the caliper anchor pins. Petroleum base lubricants are sticky and attract dust and dirt which can impede the floating action of the calipers.

4.13.8 BRAKE LINING REPLACEMENT

There is no need to jack the aircraft or disconnect the brake hydraulic lines to replace the brake linings.
You will need a brake lining installation tool and a new set of brake linings and rivets to fit your calipers.
Brake linings are available from the Glasair Options Catalog.

STEP 1
Remove the safety wire and the two bolts that secure the back plate to the caliper housing.

NOTE

Do not confuse the caliper housing bolts with the anchor pin nuts. The caliper housing bolts are the farthest from the axle.

Remove the caliper back plate, with its piece of lining material attached. Slide the caliper housing away from the wheel in a direction parallel to the wheel axle until the anchor pins clear the torque plate bushings. Remove the pressure plate (the small metal plate with the other piece of brake lining material attached) by sliding it off the anchor pins of the brake caliper housing assembly.

Take the time now to push the caliper piston back into the caliper housing. The piston is the round piece that protrudes slightly from the caliper housing and is located under the pressure plate that was just removed. As the brake lining wears, the piston protrudes farther from the caliper housing. To accommodate the thickness of the new linings and permit assembly of the caliper to the brake disc, the piston must be pressed back into the housing. Hold the caliper housing in both hands and press the piston back in using both thumbs equally. Push the piston straight in to avoid unseating the piston 0-rings. If the 0rings are unseated, loss of brake fluid or entry of air into the system may result.

NOTE

Do not press on the brake pedal while the caliper is disassembled. This will push the piston completely out of the caliper, causing a mess and resulting in further work to refill and bleed the brake system. We recommend placing a small clamp or band around the caliper to prevent the piston from accidentally popping out.

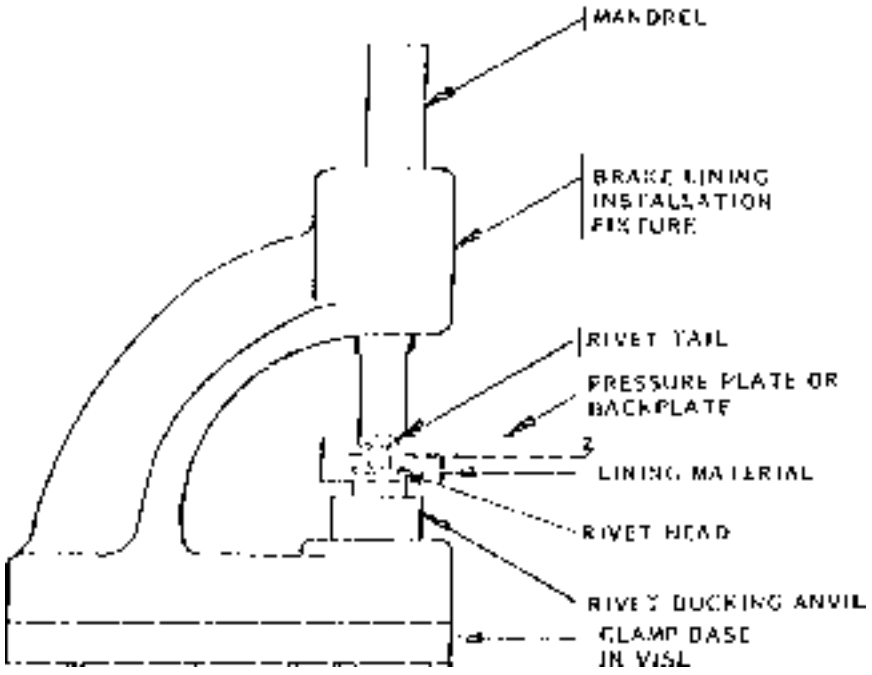
Slide the caliper anchor pins back into the torque plate bushings temporarily to support the caliper housing while the new lining material is being installed.

STEP 2

Examine the pieces of lining material that are attached to the back plate and the pressure plate, noting the relationship of the pieces and the direction that the rivets are installed. Note that the head of the rivet fits into the counterbored side of the brake lining material and the tail of the rivet (the end that is formed during brake lining installation) fits into the counterbored side of the pressure plate or back plate.

STEP 3

Place the back plate or pressure plate on a vise with the lining material down and with the rivets positioned over the gap between the vise jaws. Use a hammer and the punch supplied with the lining installation tool to drive each rivet out. Hammering with the punch un-crimp the tail end of the rivet and pushes it out of the assembly.



Brake rivet press Figure 7

Position the new lining material against the back plate or the pressure plate, making sure that the counterbores on both pieces are facing outward so that the rivets can be installed correctly. In other words, place the flat side of the lining material against the flat side of the pressure plate or back plate.
Insert a rivet into each of the holes in the lining material with the head of the rivet fitting into the counterbore in the lining. Clamp the rivet installation fixture in a vise, and place the plate and lining into the installation fixture with the head of the rivet down against the bucking anvil of the tool. Insert the rivet setting mandrel into the fixture with the mandrel contacting the rivet tail. Refer to FIGURE 5.

Support the plate and the lining in the installation fixture with one hand while hitting the mandrel with a hammer. Check the security of the lining frequently while proceeding. Stop when the lining is firmly attached to the plate (there is no movement when wiggled by hand) but before the lining begins to crack from over-driving. The brake plates are now ready for reassembly to the caliper housing.

STEP 5
Slide the caliper housing off the torque plate where it was placed temporarily after disassembly. Make sure the piston is pushed all the way into the caliper housing, as mentioned previously.

Inspect the bores of the torque plate bushings for dirt or corrosion. Clean or use fine sandpaper to remove corrosion, if necessary. Do the same for the caliper housing anchor pins.

Lubricate the caliper housing anchor pins with silicone lubricant or with aerosol graphite spray. As mentioned previously, do NOT use a petroleum base lubricant.

Slide the pressure plate with its new lining material over the caliper housing anchor pins, with the pressure plate against the piston. Slide the caliper housing anchor pins into the torque plate bushings until the lining on the pressure plate contacts the brake disc.
Position the back plate with its new lining material against the other side of the disc and thread the two caliper housing bolts with their washers into the back plate from the opposite side of the caliper housing. Tighten the bolts to 90 inch-pounds. Safety wire the bolts using standard procedures.

STEP 6
Check the brakes for firm pedal pressure and bleed the system if either brake feels spongy.

STEP 7
To provide the maximum service life, the brake lining material must be properly broken-in by gently heat curing the resins, as described below. Excessive heat applied before curing will carburize the lining material, lowering the braking coefficient and reducing the service life of the linings.

To break-in the new brake lining material, perform a minimum of six stops from a speed of between 25 and 35 knots, using light pedal effort and letting the brakes cool partially (about one minute) between stops. This procedure generates enough heat to cure the resins in the lining, yet will not carburize the material by heating excessively. Once the linings are properly cured, they will provide many hours of maintenance free service.

4.14 Propeller

For constant speed propellers, instructions for propeller operation, servicing, and maintenance are contained in the propeller owners manual furnished with the propeller.

WARNING

When servicing the propeller, always make sure that the magneto switch is off, the throttle is closed, the mixture is in the idle cutoff position, and the engine has cooled completely. Stand in the clear when moving a propeller. There is: always

some danger of a cylinder firing when the propeller is moved. The best procedure is to turn the propeller backwards, or counter-clockwise as viewed from the cockpit. This way the impulse coupling cam in the magneto can't catch and fire a cylinder.

Daily Inspection
Inspect the blades for nicks, gouges, and cracks. Inspect the spinner and the visible hub parts for damage or cracks. Repair prior to the next flight. See the Propeller Owners Manual for blade repair procedures.

Inspect for grease or oil leakage. Leaks would show up on the inside of the spinner or at the base of the blades next to the hub.
100 Hour Inspection Remove the spinner.

Inspect the blades for nicks and gouges. Repair nicks and gouges using the procedures described in the propeller Owners Manual. Always consider propeller balance when removing material from a blade.

Inspect hub parts for cracks or wear. Check all visible parts for wear and safety. Check the inside of the spinner and at the base of the blades next to the hub for evidence of oil and grease leaks. Grease the propeller hub through the zerk fittings.

CAUTION
Consult the propeller Owner's Manual for proper lubrication procedures. On some propellers, one of the zerk fittings must be removed to avoid pressurizing the hub.

Induction Air Filter
The Brackett air filter element used in the induction system is treated with a wetted agent to capture dust and repel water. The element has also been treated with a fire retardant. Replace the element every 200 hours of use or every 12 months or when it is difficult to see light through it due to foreign material. Clean with compressed air. Since the filter's effectiveness depends on its chemical treatment, do NOT wash and reuse it.

When operating under severely dusty conditions check the element daily and replace it when needed.

4.15 Airframe Care

The fiberglass composite structure of the Glasair Super IIRG should give many years of trouble free service. This structure is virtually corrosion free and, because all exterior surfaces are shielded from ultraviolet radiation by a special primer under the finish paint, exposure to sunlight is not a problem. Do not expose any unprotected fiberglass surfaces to direct sunlight for a prolonged time.

Extended exposure to the ultraviolet radiation in sunlight will cause the finish paint to oxidize, requiring buffing to restore the original gloss. If the airplane is to be tied down outside for an extended time, we recommend covering the wings, fuselage, and tail surfaces with protective slip covers to prevent finish paint oxidization.
Some minor surface cracking has occurred on the Stoddard-Hamilton prototypes. This cracking is usually just a cosmetic concern and not a structural problem. If surface cracks appear in the finish in a high stress or vibration area, however, it may indicate damage to the underlying structure. Check the fiberglass structure below the finish by sanding down to the fiberglass laminate. Do not sand into the laminate. If the fiberglass structure is damaged, it will have a white colored ridge or notch, indicating torn or compressed fibers. If no damage has occurred to the structure, the glass will be smooth and translucent. If damage has occurred, contact Stoddard-Hamilton for repair consultation.

To help keep the exterior finish in like new condition, it must be kept clean and waxed. Follow the paint manufacturer's recommendations for care. We recommend washing the airframe by hand. Flush away loose dirt with clean water and then wash with a mild soap and water solution, using a soft cleaning cloth. Rinse thoroughly with clean water to prevent build-up of a residue of cleaning solution.

CAUTION

If high pressure washing equipment is used, keep the stream of water away from wheel bearings, propeller hub bearings, pitot-static ports, electrical and avionics equipment, etc. Avoid directing the stream toward the wings and tail surfaces from the rear where the water can more easily enter the structure.

Wax the airframe with a high quality paste type wax. We recommend avoiding the use of waxes containing silicone. Silicone is very difficult to remove from a surface, even with solvents such as acetone, and its presence may inhibit a good bond in the event that airframe repair or finish touch-up is necessary.

4.15.1 Windshield and Canopies

Keep the windshield and canopy Plexiglas clean, and wax it with a Plexiglas polish such as Mirrorglaze. To prevent scratches, wash the windows carefully with plenty of mild soap and water solution, using the palm of the hand to feel and dislodge dirt and mud. A soft cloth, chamois, or sponge may be used but only to carry water to the surface. Rinse thoroughly and then dry with a clean moist chamois. Rubbing the surface of the plastic with a dry cloth builds up an electrostatic charge which attracts dust particles in the air.

Remove oil and grease with a cloth moistened with isopropyl alcohol. Never use gasoline, benzene, alcohol, acetone, carbon tetrachloride, lacquer thinner, or glass cleaner. These materials will soften the plastic and may cause it to craze.

After a thorough cleaning, wax the surface with a good grade of commercial wax (Mirrorglaze or similar). The wax will fill in minor scratches and help prevent further scratching. Apply a thin, even coat of wax and bring it to a high polish by rubbing lightly with a clean, dry, soft flannel cloth.

4.15.2 Engine Cleaning

Use standard, parts-cleaning solvent to clean the engine. Spray or brush the fluid over the engine, rinse thoroughly with water, and allow to dry. Engine degreasers may be used cautiously and should always be properly neutralized after use.

CAUTION

Pay particular attention to electrical equipment during engine cleaning. Do not allow cleaning fluids to enter the magnetos, the starter, the alternator, or the like. Cover all openings in such equipment before cleaning.

4.16 Ground Handling

4.16.1 TOWING

One person can move the airplane on a smooth, level surface using the optional tow bar. Attach the tow bar to the ends of the lower nose gear scissor pin where the scissor attaches to the nose gear fork.

CAUTION

1. **Do not exert force on the propeller or control surfaces.**
2. **Do not force the nose gear beyond the pivot stops by attempting too tight a turn.**

3. **Do not push the airplane backwards unless the nose wheel is being steered by the tow bar; unless steered, the nose wheel will try to caster which may result in damage to the pivot stops or the nose gear fork.**
4. **Do not attempt to move the airplane if the main gear is obstructed by mud or snow-- damage to the gear mounting hardware may result.**

4.16.2 TIE-DOWN

It is best to secure the airplane with the nose into the wind. In addition to the wing tie-down points, a tail tie-down should be used.

1. Thread the tie-down eyes (5/16-18) into their receptacles in the wings and at the tail.
1. There are 5 tie-down locations. One is in the rear base of the fuselage; the wing has 2/side, one outboard of the MLG and one at the wingtip.
2. Secure the airplane at three points, using nylon line or chain.
3. Chock the main wheels, fore and aft.
4. At the least, use a lap belt to tie the control stick back to protect the ailerons and elevator from gusts. External gust locks, especially on the rudder are also recommended.
5. If high winds are expected, prop the tail with a support and tie the nose wheel down.
6. Use a canopy cover to keep moisture from entering the cockpit.
7. Make sure that the drain holes in the tail cone and the drain/vent holes in the control surfaces are clear to prevent the collection of water in any part of the airframe.

4.16.3 JACKING THE AIRPLANE

The Glasair Super IIRG must be jacked up and supported on jack stands for landing gear retraction tests, for periodic landing gear maintenance, and for annual inspections. A jacking system, consisting of jack stands and removable jack pads for the underside of the wing, is available from Stoddard-Hamilton for the Glasair Super IIRG. Follow these suggested procedures when jacking the airplane:

1. Place the jack pads in position on the lower surface of the wing.
2. Secure the pads by threading a tie-down eye or similar bolt (5/16-18), through the wing into the tie down plate. Indexing pins in the jack pads orient the jack pads properly.
3. To further ensure against the jack pads shifting, use duct tape or the equivalent to tape the pads to the wing.

CAUTION

Proper alignment of the indexing pin is important to prevent damaging the lower wing skins.

Support the tail of the airplane with a sturdy padded sawhorse and place approximately 50 to 60 pounds of padded weight on top of the horizontal stabilizer. Keep the weights close to the vertical fin. The weights are needed to keep the airplane from tipping onto its nose when on the jacks.

Jack the airplane up just enough for the wheels to clear the floor by about 1". Use a short step stool for access into the cockpit when the airplane is on jacks.
Safety Notes for Jacking the Airplane

1. No persons should be under the airplane while in the process of jacking. Only after you have finished jacking and checked the airplane for security on the stands should you crawl under the aircraft.
2. Always make sure that all people and objects are clear of the landing gear prior to a retraction test. If one of the gear struts became obstructed or wedged on something, it could pull the plane down off the stands.
3. The Glasair may be left on the jack stands for extended periods of time, but, as a general safety precaution, always leave the gear down when you are away from the plane.

5 Conditional Checklist

		Date Started: _____ Date Completed:_____			
		Hobbs Start: _____ Hobbs End:_____			
		Last/prior annual inspection completed on _____ at _____hrs.			
		This annual inspection procedure details a complete and thorough inspection of the entire airframe, engine and all systems. It is a recommended guide only. If the regular 50 and 100 hour inspections are complied with then many of the inspection items and tasks in this document are redundant and need not apply. These items are noted with an "if required" comment.			
Parts & Supplies Required For Condition Inspection:					
		ALL applicable AD notes (see section IX-A)			
		Hartzell Propeller Owners Manual.			
		Lycoming Service Bulletins & Letters (see section IX-A)			
		Oil, Oil Filter (CH-48110)			
		Oil Analysis Kit			
		Filter Wrench, Drain Hose, Trash Bag			
		Fuel Lube Lubricant (for above washer).			
		Bracket Air Filter Element p/n: BA-23 (or entire filter assy BA-110)			
		Aeroshell 6 Grease (Prop Hub Lube) (if required)			
		Grease Gun (Prop Hub) (if required)			
		Wheel Bearing Grease (Blue type?)			
		LPS-2 Lubricant or Tri-Flow non-drying penetrating lube.			
		Hydraulic Fluid type ?			
		Degreaser Solvent/Cleaner (cowling/engine compartment)			
		Injector Servo Fuel Inlet Fitting O-ring (may not be needed - check before reinstalling)			
		.032 Inconel Safety Wire (prop bolts).			
		Brake Pads (Cleveland #66-106), Rivets, Rivet Tool (if required)			
		Torque Wrench			
		Air Compressor, Hose & Filtered Nozzle			
		Tire Pressure Gage			
		Differential Compression Tester			
		Magneto Timing Box			
		Angle Finder (Elevator, Aileron & Flap travel)			
		Rudder Travel Jig			
		Misc Screws: AN509-10R10 (MS24694-S52) Belly Pan; Wing Tip:S56, S57, S58			
		Parts & Supplies Required For Condition Inspection continued next page >>			

Parts & Supplies Required For Condition Inspection continue:	**Chk**	**Date**	**Initials**
Part Cups/cans/small boxes			
4 Small jars or cans with tops for soaking fuel injectors.			
Hopps #9			
Remarks:			
Section O - Preliminary Condition Checks & Preparation			
A. Engine Run-up:			
Start the engine and warm it up thoroughly. Check the following: **Note OAT:_____**			
1. Set parking brake and run engine at 2000 RPM for the following checks:			
2. Left magneto drop (switch to L position):_____rpm.			
3. Right magneto drop (switch to R position):_____rpm.			
4. Propeller control and governor action (do not exceed 500 RPM drop).			
5. Suction Gage Vacuum: @Idle:_____ 1000 rpm:_____ 1400:_____2000:_____			
6. Oil Temp:_____ Oil Pressure: Idle (800 rpm):_____ 2000 rpm:_____			
7. Static RPM - Idle:_____			
8. Alternator output - Idle: Voltage: _____ Amps: _____			
9. Parking brake - operation and will hold at 2000 rpm.			
10. Magneto ground: Shut off engine with magneto switches. Warning: **let engine come to a complete stop** - do not turn switches on or a backfire will occur and damage the exhaust! Be sure to **restart engine and shut down with mixture cut-off** to insure no combustible fuel remains in the cylinders which would create a serious prop hazard.			
Remarks:			

		Engine Run-up continued (In Flight Checks):	**Chk**	**Date**	**Initials**
		11. Prepare for take-off. Perform the following in-flight checks:			
		12. Take Off Roll - Full throttle RPM: _____ Manifold Pressure:_____			
		13. Check engine operation on all fuel selector valve positions (__Header, __Main)			
		14. Alternator full load output - (2000 rpm min): Volts: _____ Amps:_____ **			
		** Full load output: check with all equipment turned on: Nav lights, Strobe Lights, Landing Lights, Interior Lights, Fuel Pump, Pitot Heat, All Avionics & COM Xmit. Cycle gear (in-flight only!) and operate flap motor to draw maximum current.			
		15. Check cabin heat and defrost functioning properly.			
		16. Note OAT:_____ Cruise Oil Temp:_____ Max Climb Oil Temp:_____			
		17. Note Cylinder head temperature: Cylinder #1 _____, Cylinder #2 _____, Cylinder #3 _____, Cylinder #4 _____			
		18. Note Exhaust temperature: Cylinder #1 _____, Cylinder #2 _____, Cylinder #3 _____, Cylinder #4 _____			
		19. Oil Pressure (Hot, 2400 RPM):_____			
		20. Return to airport & land.			
		21. Mixture cutoff RPM rise at idle:_____			
		22. Check functioning of ELT - 1st 5 min of the hour: Trigger for 3 cycles max. Listen on 121.5			
		Remarks:			
	B. External Lights				
		External Lights - Check security and operation - Prior to removing cowling.			
		1. Nav Lights - Left (red):_____ Tail (white):_____ Right (green):_____			
		2. Strobe Lights - Left: _____ Right:_____			
		3. Landing Light:_____			
		Remarks:			

Section I - Powerplant and Propeller	Chk	Date	Initials
A. Engine Compression Check, while engine still Hot (if required):			
0. Remove the engine cowl and check for leaks and stains.			
1. Check engine for any Oil Leaks or Fuel Leaks			
2. Perform compression check per Lycoming Service Instruction 1191-A			
#1: #2: #3: #4:			
Record results in Engine Log Book.			
Last (prior) Compression Check @_____ hrs.			
Remarks:			
B. Engine Oil & Filter Change, while engine still Hot (if required):			
1. Drain oil & replace spin-on filter. Take oil sample for analysis.			
2. Safety wire filter.			
3. Refill with new oil.			
Last (prior) Oil & Filter Change @_____hrs.			
Remarks:			
C. Plug Rotation Cleaning & Gapping (if required):			
1. Clean, Gap & Rotate spark plugs (Gap .016-.022)- note measured plug gap as removed.			
[ ]1T<-->4B 1T Gap: 4B Gap:			
[ ]2B<-->3T 2B Gap: 3T Gap:			
[ ]1B<-->4T 1B Gap: 4T Gap:			
[ ]2T<-->3B 2T Gap: 3B Gap:			
2. Check ignition harnness for breaks; check cigarettes and contact springs.			
3. Clean cigarettes and contact springs with alcohol - (do not touch springs with fingers)			
4. Re-install spark plugs (420 in-lbs/35 ft-lbs)			
5. Re-install ignition leads. Torque lead nuts 80-90 in-lbs max (dry).			
Last (prior) Plug Rotation & Cleaning @_____hrs.			
Remarks:			

			Chk	Date	Initials
	D. Magnetos: 100 hr Inspection (if required):				
		1. Inspect security of mounting bolts & Ignition harness cap.			
		2. Check security of P-leads (15 IN-LBS MAX) and check wires for breaks or frays.			
		3. Check security of Mag ground wires and check wires for breaks or frays.			
		4. Check and adjust magneto timing per Lycoming: 25 deg BTDC (if not recently done).			
		Note timing - LEFT Before:_____ After:_____ Right Before_____ After:_____			
		5. Torque magneto clamp down nuts to 17 ft-lbs (204 in-lbs) max or the flange may become permanently damaged.			
		Last (prior) Mag 100 hr inspection @_____ hrs.			
		Remarks:			
	E. Engine Controls:				
		Check the following controls for security, full range of travel, interference, rubbing or chafing of the control linkage/arms through the full range of travel.			
		Lubricate if necessary.			
		1. Throttle.			
		2. Mixture.			
		3. Prop pitch control.			
		4. Inspect each mounting clamp and cable housing end keeper for wear or looseness.			
		Remarks:			
	F. Fuel System:				
		1. Drain the fuel tank sumps and check for contaminants. Remove and clean the fuel sump strainers (finger screens) if excessive contamination is apparent.			
		2. Inspect & replace fuel filter element & Stat-O-Seal washer. Lube Stat-o-Seal & bolt with thin film of fuel lube to prevent rubber seal damage. Safety wire filter bowl bolt.			
		3. Remove and clean injector servo body fuel inlet screen. Replace o-ring if necessary.			
		4. Check fuel flow through fuel line with electric fuel pump ON.			
		5. Remove fuel injectors - use 6 point socket. Identify cylinder and keep separate. - Do not mix injectors or components.			
		6. Clean Fuel Injector Nozzles w/ Hopps #9 to remove all gum and varnish. DO NOT SOAK MORE THAN 1 HOUR!			
		Fuel System continued next page >>			

		Fuel System continued	**Chk**	**Date**	**Initials**
		7. Re-install Fuel Injector Nozzles - do not use thread sealant. Re-torque injectors to 60 in-lbs using 6 point long reach socket.			
		8. Torque injector line B-nuts to 25-50 in-lb max. Do Not Over Tighten. Per SB 1414A			
		Last (prior) Fuel Injector Check & Cleaning done at @_____ hrs; date:_____			
		Remarks:			
	G. General Engine Compartment and Engine Accessories:				
		1. Inspect alternator: mounting, wiring, terminals for security and condition.			
		2. Check field connector plug and grip of connectors on spade terminals. Pinch down female connector for firm/tight sliding grip on male spade terminals if required.			
		3. Inspect alternator belt and adjust tension, if needed.			
		4. Inspect starter: mounting bolts, wiring & terminals for security & condition.			
		5. Remove cabin heat muff scat hoses and check exhaust for cracks. (Soot on the inner surface of the heat muff indicates a crack). Remove the heat muff from the exhaust pipe for further inspection if any trace of exhaust soot is found indicating a crack exists.			
		6. Carefully inspect all welded exhaust joints paying close attention to the welded "Y" joints.			
		7. Check exhaust springs, gaskets and shrouds for security and cracks.			
		8. Check cylinder baffles for cracks and proper seal.			
		9. Check engine mount and braces for security, rust, chafing, cracks & condition of rubber bushings and bonding straps.			
		10. Check engine mount to firewall securing bolts. Torque to 200 in-lbs min. Note that these become loose over time due to heating of the fiberglass firewall mounting surface allowing it to shrink and/or compress.			
		11. Check engine for loose nuts, bolts and screws. **Check Acc. Case Ground Lug Bolt**			
		12. Check oil cooler and lines for security, chafing, signs of leaks and obstructions.			
		13. Check all breather and overboard lines for security and obstruction.			
		14. Inspect injector body, fuel pump and fuel filter fuel lines for security and leaks.			
		15. Check fuel distributor/fuel injector fuel lines for cracks, nicks, sharp bends or leaks.			
		16. Inspect cabin hoses for security and leaks.			
		17. Inspect manifold pressure hose from cylinder fitting to firewall fitting for security, chafing and leaks.			
		General Engine Compartment and Engine Accessories continued next page >>			

		General Engine Compartment and Engine Accessories continued	**Chk**	**Date**	**Initials**
		18. Inspect the induction air filter and clean with compressed air. Replace if it is difficult to see light through it due to foreign material or if it has been in service for 12 months or 200 hours since last replacement (per Brackett Instructions). BA-110 assy; BA-23 Element.			
		19. Clean engine and cowling, using a suitable solvent or degreaser to remove all traces of oil, soot, dirt and fuel stains.			
		20. Check cowling for chafing, cracks or heat damage.			
		21. Check taxi & landing lights for security. Check wire terminal connections snug.			
		22. Top up brake fluid reservoir; leave an air space for fluid expansion.			
		23. Check engine for any loose hardware and tools that may have been left in the engine compartment during maintenance.			
		24. Check & tighten Main Bus power feed terminals & Alternator fuse bolts/nuts on copper bus bar on aft firewall - co-pilot side.			
		Remarks:			
	H. Propeller and Spinner (grease only if > 100 hrs since last grease):				
		1. Remove propeller spinner and check spinner, front plate and back plate for security and cracks.			
		2. Inspect propeller track.			
		3. Check blades for nicks. Repair nicks per Hartzell Propeller Owners Manual.			
		4. Remove mounting bolt safety wire. Check torque of mounting bolts (60-70 ft-lbs). Re-safety bolts with .032 inconel safety wire.			
		5. Grease propeller hub. Aeroshell 6 per Hartzell Prop Manual No. 115N Rev 5 pg 605-606. Remove the rubber lubricaps from all four fittings (pull off - do not remove safety wire). Remove the engine-side (rear) fitting from each blade socket. Remove any hardened grease with safety wire. Pump 1 fl. oz grease (maximum) into each cylinder-side (front) fitting, or until grease emerges from the opposite hole where the fitting was removed - whichever occurs first. Note: one (1) ounce grease is approximately 6 pumps on hand held grease gun. DO NOT USE AIR AN ASSISTED GREASE GUN.			
		6. Reinstall spinner. Do not over tighten spinner screws.			
		7. Make an entry in propeller log book of this inspection and any maintenance performed.			
		Remarks:			

		I. Ground Run-up Check (After Engine Maintenance Completed):	**Chk**	**Date**	**Initials**
		Start the engine and warm it up thoroughly. Check the following: **Note OAT:_____**			
		1. Set parking brake and run engine at 2000 RPM for the following checks:			
		Check engine operation on all fuel selector valve positions (__Header, __ Main)			
		3. Left magneto drop (switch to L position):_____rpm.			
		4. Right magneto drop (switch to R position):_____rpm.			
		5. Propeller control and governor action (do not exceed 500 RPM drop).			
		6. Suction Gage Vacuum: @Idle:_____ 1000 rpm:_____1400:_____2000:_____			
		7. Oil Temp:_____ Oil Pressure: Idle (800 rpm):_____ 2000 rpm:_____			
		8. Static RPM - Idle:_____			
		9. Alternator output - Idle: Voltage: _____ Full load amps:(optional)** _____			
		10. Parking brake - operation and will hold at 2000 rpm.			
		11. Magneto ground: Shut off engine with key switch. Warning: **let engine come to a complete stop** - do not turn key on or a backfire will occur and damage the exhaust! Be sure to **restart engine and shut down with mixture cut-off** to insure no combustible fuel remains in the cylinders which would create a serious prop hazard.			
		12. Mixture cutoff RPM rise at idle:_____			
		13. After engine shut-down, carefully check for any oil or fuel leaks.			
		Remarks:			
		J. Cowling Installation and Check:			
		1. Replace Taxi and/or Landing Lights if necessary.			
		2. Adjust taxi and landing light positions if required.			
		3. Pre-Cowling Check:			
		b. Check: Landing Light Connectors			
		c. Check: Side Hinge Pins Secure			
		d. Check: Induction SCEET Tube Secure - No Rips.			
		e. Check: Lower Cowling Screws			
		f. Check: Nose Door Hinge Pin Secured w/screw.			
		g. Check: Nose Door Gas Spring Secure w/clip			
		h. Check: Nose door retraction cable secure, washers installed correctly, bolt tight.			
		Cowling Installation and Check continued next page >>			

		Cowling Installation and Check	**Chk**	**Date**	**Initials**
		I. Check: Nose door retraction cable plastic tubing sleeve. Replace if split or cut.			
		4. Reinstall upper cowling. Check all screws secure.			
		5. Verify operation of Taxi & Landing Lights			
		Remarks:			
Section II Cabin & Fuselage					
	A. Interior Lighting (prior to removing interior component & console):				
		1. Baggage Compartment/Interior Flood Light			
		2. Map/Reading Lights			
		3. Panel Flood Lights			
		4. Instrument Lights & Dimmer			
		5. Internal Instrument Lights & Dimmer			
		Note: all lights will be checked again after interior reassembled. (see sect. VII-C)			
		Remarks:			
	B. General Cockpit & Interior Inspection				
		1. Check instruments for security, legibility and markings.			
		2. Check the fuel tank gauges and senders, if applicable, for proper markings, indication, and freedom of movement.			
		3. Check the compass for discoloration, compass card displayed.			
		4. Check the circuit breakers and switches for security and condition.			
		5. Check all Plexiglas for cracks.			
		6. Check canopy hinges and latches for security. Lubricate as required.			
		Remarks:			

			Chk	Date	Initials
	C. Canopy handle, Latch & Lock Mechanisms				
		1. Remove inside canopy latch handle covers			
		2. Check actuator bars secure, cir-clips & not flopping over pin.			
		3. Check for excessive free-play & rattling of actuator bars.			
		4. Lubricate mechanism pivot points and pins with graphite lube.			
		5. Check mill-fiber handle stop pad is secure - not fractured off canopy frame.			
		Remarks:			
Section II Cabin & Fuselage Cont.					
	D. Interior Panels & Covers Removal				
		1. Remove: wing attach bracket black covers, overhead console, center console, baggage bulkheads, rear control tunnel top, carpets, heal rests, seat pans, belly pan, and gear doors (as necessary).			
		2. Check all seat pan screws - discard & replace screws with chewed heads (they will wear holes in leather seat cushions)			
		3. Check the seat pans for cracks or stress marks.			
		4. Check the seat belts and shoulder harnesses for security and condition.			
		5. Check the wing attach bolts and fittings for security, integrity and safety.			
		Remarks:			
	E. Fwd cabin - Instrument Panel & Forward, Header Tank, Firewall.				
		1. Replace the 6 gear position indicator lamps annually to reduce the possibility of a lamp burning out during flight.			
		2. Replace the instrument air filter semi-annually or 500 hrs. or whichever comes first.			
		3. Check the pitot tube line and static line plumbing and fittings behind the panel.			
		4. Check all instrument wiring and plumbing for security and chafing behind the panel.			
		5. Check radio equipment, wiring & antenna connectors for security & proper connection.			
		6. Check all cabin ground bus terminal screws tight.			
		7. Check the fuel tank, fuel lines, vent lines and fuel standpipes and fittings behind the panel for security, leaks or contaminants also check all lines and fittings in the seat pan area and where they pass thru the lower center panel and console.			
		8. Inspect engine mount points on the aft side of firewall for cracks or stress marks in the fiberglass.			
		9. Check all Cabin Ground Bus Bar terminal connections are tight.			
		10. Inspect parking brake cable, cable keeper, security and operation.			
		11. Check the brake master cylinders and brake line fittings for leaks.			
		Fwd cabin - Instrument Panel & Forward, Header Tank, Firewall continued next page >>			

		Fwd cabin - Instrument Panel & Forward, Header Tank, Firewall.	**Chk**	**Date**	**Initials**
		12. Check all brake pedal and cylinder pivot points free with no excessive wear or freeplay.			
		13. Verify all brake pedal and cylinder pivot bolts/nuts properly cotter-pinned and secure.			
		14. Lubricate brake cylinder pivot points with a light lubricant.			
		Remarks:			
Section II Cabin & Fuselage Cont.					
	F. Control System Inspection				
		Inspect the following control system components: pushrods, rod end bearings, cable and linkages for corrosion, safety, security and chafing. Clean and lubricate all rod-end bearing surfaces, pulleys and gears as necessary. Check the following systems:			
		1. Aileron system (seat pan area, see section IV-D for wing bell-crank inspection):			
		a. Check rod end bearings & jam nuts tight.			
		b. Check control stick pivot not binding and not loose.			
		c. Check control stick wires not being pinched or binding.			
		2. Elevator system (seat pan area, see section II-I for rear control tunnel & aft fuse area):			
		a. Check rod end bearings & jam nuts tight on both control tubes. Check tubes are free and clear with no interference or rubbing on wires, cables etc. through full range of travel.			
		3. Trim system:			
		a. Check trim cables for any wear, rubbing or binding.			
		b. Check trim cable pullys for free rotation. Check for excessive wear or cable cuts.			
		c. Inspect trim spring tension:			
		d. Inspect each trim cable ferrel for wear and carefully inspect each nico-press sleeve for signs of slippage - at both the spring end and the control arm end.			
		e. Lubricate trim box shafts & gears with graphite lubricant.			
		4. Rudder system:			
		a. Inspect rudder cables for any wear, rubbing or binding throughout full range of travel.			
		Cabin & Fuselage continued next page >>			

		Control System Inspection	**Chk**	**Date**	**Initials**
		b. Check rudder cable pulleys for free rotation. Check for excessive wear or cable cuts.			
		c. Check rudder return springs and attach bracket. Inspect spring attach holes for wear.			
		d. Lubricate hinge pin and between hinge knuckles with an appropriate grease lubricant while holding rudder up to open the lower hinge knuckle gaps on bottom side for grease.			
		e. Verify that the rudder hinge is properly safetied and bracket is secure.			
		5. Flap system: Note: Lube flap actuator linkages and pivot points.			
		a. Inspect flap motor attach and pivot points for security.			
		b. Inspect flap actuator linkage for security with all pivot bolts/nuts cotter pinned.			
		c. Check linkage free from binding, interference and rubbing on wires, hoses etc. through the full range of travel.			
		d. Check the flap/gear warning cam and microswitch for security.			
		e. Lubricate the flap linkage with a light lubricant.			
		Remarks:			
Section II - Cabin and Fuselage cont.					
	G. Seat Pan Area - Fuel Lines, Hydraulic Lines & Wiring				
		1. Check the operation of the fuel selector valve. Remove, disassemble and lubricate if necessary. Check the handle position markings on the console overlay.			
		2. Check all fuel lines for leaks, security and chafing in the seat pan area.			
		3. Check all hydraulic lines and fittings for security, leaks and chafing.			
		4. Check all wiring bundles for security and chafing.			
		5. Check wiring terminal blocks for security & check each screw terminal is tight/secure.			
		Remarks:			

			Chk	Date	Initials
	H .Battery inspection:				
		1. Inspect and clean the battery terminals if necessary. Check all terminal connections on battery master contactor.			
		2. Inspect and clean the battery box (if installed).			
		3. For an enclosed battery box, inspect the drain tube and vent lines for damage and obstructions if applicable.			
		Note: Replace the battery every 3 years to guarantee maximum performance and reserve capacity. 3 years max or at first sign of poor cranking power.			
		Remarks:			
	I. Rear Control Tunnel Area				
		1. Check all hydraulic lines secure, wire bundles secure & not chafing.			
		2. Check fuel vent lines & fittings secure, not rubbing or loose.			
		3. Check all cables & control tubes free of interference.			
		Remarks:			
	J. Aft Fuselage Area:				
		1. Check static tube security and connection to static ports & tee.			
		2. Check hydraulic pump secure.			
		3. Check ELT Battery replacement date (on back of battery):_____			
		4. Verify ELT switch set to ARMED.			
		5. Check Transponder Antenna secure.			
		6. Remove transponder antenna connector, check for corrosion, clean & re-connect.			
		7. Check aft elevator control tube secure, jam nuts tight			
		8. Check rudder bell-crank, cable clevis's & rudder pushrod secure.			
		9. Check Trim cables & pulleys free, not worn & nico press crimps secure. Be sure to check all cables & sleeves including at the elevator control horn with light & mirror.			
		10. Lubricate rudder cable clevis's & all rod ends as necessary.			
		Remarks:			

Section III - External Fuselage & Under Belly Pan	Chk	Date	Initials
A. Control Surfaces & Rigging			
1. Check the stabilizer for security and cracks.			
2. Check elevators for security:			
a. Check hinges & hinge bolts tight.			
b. Check elevator hinge pivot bolts secure.			
c. Check elevator pivot points for excessive bushing wear and excessive side play.			
d. Check elevator control horn secure between elevators: No up/down movement between the left and right elevators when moved independently by the trailing edges.			
3. Check the elevator counterweights for cracks or any signs of rubbing.			
4. Lubricate the elevator hinge bushings with a graphite lubricant.			
Remarks:			
B. Under wing/belly-pan wiring, plumbing and hardware check:			
1. Check all hydraulic lines & brake lines that run under the wing for security, leaks, chafing, corrosion and general condition.			
2. Check all hydraulic manifold fittings for signs of leaks. Check aft edge of wing for signs of hydraulic fluid indicating a hydraulic leak somewhere.			
3. Check all antenna cables for security, proper routing and general condition.			
4. Check battery cables security, proper mounting clamps, any chafing, condition, etc.			
5. Check static system tubing for security, proper mounting, abrasion and condition.			
Remarks:			

Section IV - Wings & Control Surfaces:			Chk	Date	Initials
	A.	Remove all inspection covers and remove the wing tips.			
	B.	Check the wing tips for cracks and stress marks.			
	C.	Check all wiring and plumbing for chafing and security. Fuel vent lines secure.			
	D.	Check all control rods, rod ends and bell cranks for corrosion, safety, security and chafing:			
		1. Aileron bell cranks secure with full freedom of movement at full elevator up/down.			
		2. Aileron control rod ends & jam nuts tight.			
		3. Aileron counter weights secure.			
		4. Remove aileron counterweights and inspect inside tubing for corrosion (SB#_____) if aircraft has been flown in rain or tied down outside. Check for corrosion every 2 yrs min.			
	E.	Check the flaps, ailerons and rudder for full freedom of movement (and proper travel *):			
		1. Ailerons: 19 deg down, 21 deg up (+/- 1 deg.) Left:_____ Right:_____			
		2. Flaps: 0 to 40 degrees down (slotted flaps) Full down travel:_____			
		3. Elevator: 18 degrees down, 30 degrees up. Measured:_____			
		4. Rudder: 24 degrees left, 25 degrees right (+/- 1 deg.) Measured:_____			
		*Note: Check travel if any control system has been removed or adjusted since last check.			
	F.	Check all vent and drain holes in control surfaces are free and unobstructed.			
		Ailerons			
		Flaps			
		Elevators			
		Rudder			
	G.	Inspect & lubricate hinges: (Do NOT use graphite on piano hinges!!)			
		1. Aileron hinges: Check for security and wear. Lubricate with non-drying penetrating lube.			
		2. Flap hinges: Check for security and wear. Lubricate with non-drying penetrating lube.			
		3. Rudder hinge: Lubricate hinge pin and between hinge knuckles with grease or non-drying lubricant while holding rudder up to open hinge knuckle gaps on bottom. **See above**			
		4. Verify that the rudder hinge is properly safetied.			
	H.	Check the wing skins, the leading edge and the wheel wells for cracks, stress marks and delamination.			
	I.	Check the fuel tank, the fuel lines, vent lines and wing tank end rib ground studs at each wing tip for security, leaks or contaminants.			
	J.	Check the fuel filler caps for proper labeling:			
	K.	Check all drain and vent holes for obstructions.			
		Wings & Control Surfaces Continued next page >>>			

		Wings & Control Surfaces:	**Chk**	**Date**	**Initials**
	L.	Check inside the wings for loose hardware tools or any other FOD.			
	M.	Check pitot tube mounting, wiring and hose connection. Check mounting screws tight.			
	N.	Reinstall the inspection covers and wing tips.			
		Remarks:			
Section V - Landing Gear & Hydraulic System					
	0	Check gear oleo height: Mains 3-1/2" minimum, Nose gear topped out.			
	A.	Jack up the airplane.			
	B.	Check the landing gear struts for general condition. Wipe clean the oleo struts and actuating cylinders.			
	C.	Clean the landing gear wheel wells of any accumulation of mud or other debris.			
	D.	Check the landing gear support structure for evidence of damage.			
	E.	Check the oleo struts and the actuating cylinders for signs of leakage or damage. Check the fluid level (remove entire valve body from strut) if any signs of leaks or bi-annually and recharge the struts if necessary. Nose gear:_____ PSI; Main Gear _____ PSI.			
	F.	Check the condition of the hydraulic lines. Look for leaks in fittings and for chafing of the flexible lines.			
	G.	Check the landing gear microswitches for security of mounting and proper operation.			
		Check that the main gear in-transit switch arms are straight - not accidentally bent from a cleaning rag catching on it.			
	H.	Clean and lubricate main gear side-brace microswitch actuator pins with light grease to protect from water/freezing problems. Flush out any dried or caked graphite, grease or water. Be sure they slide freely. Light wheel bearing grease can be used to lube the pins to keep water from entering and freezing the pins in a locked position in winter ops.			
	I.	Check all wiring for security and chafing.			
	J.	Check the main tires for cracks, wear and proper inflation.			
	K.	Remove main wheels. Repack wheel bearings & inspect wheels for cracks and corrosion.			
	L.	Inspect the brake discs for excessive scoring, the brake lines for leaks or chafing and the brake pads for wear. Replace the brake pads if necessary. Check the operation of the brakes and bleed them, if necessary.			
	M.	Check the nose gear shimmy damper for security. Inspect the damper clamps . Tighten shimmy damper clamp bolts to increase damping friction if required.			
		Landing Gear & Hydraulic System Continued next page >>>			

		Landing Gear & Hydraulic System	**Chk**	**Date**	**Initials**
	N.	Remove the nose gear emergency extension gas spring and check for proper pressure by compressing if against a bathroom scale.			
	O.	If the force needed to compress the gas spring is less than 80 lb, replace the spring. (The spring is normally replaced every two or three years.)			
	P.	Check inflation & condition of main tire. Replace if necessary.			
	Q.	Remove Nose Wheel. Clean and re-pack wheel bearings.			
	R.	Check the gear doors for damage and security of mounting.			
	S.	Inspect the hydraulic pump for security of mounting. Inspect the hydraulic lines for general condition and leaks. Check & top up level of the hydraulic fluid in the pump.			
Section V - Landing Gear Cont.					
	T.	Check/re-torque trunion bearing mounting bolts.			
	U.	Check security & torque of side brace arm mounting bolts on gear leg strut stud and check security of all snap rings on side brace arm and bell cranks.			
	V.	Check the struts for excessive play in the scissors pivot points. Re-shim pivot points tight as required.			
	W.	Check and lubricate all scissor pivot pin joints using a non-drying penetrating lubricant (Per S-H Service Letter #3) Tri-Flow Lube - or- disassemble & lubricate with grease.			
	**	Check scizzor bushings by twisting entire assembly by the axel/wheel. Install bushings in lower scizzor boss per S-H SB #141 if excessive play is found.			
	X.	Lubricate main gear bell crank over-center spring tab holes to reduce wear.			
	Y.	Lubricate main gear bell crank pivot pins and snap ring washers with a non-drying penetrating lubricant.			
	Z.	Lubricate flap actuator arm/rod clevis pins with a non-drying penetrating lubricant.			
		Remarks:			

Section VI - Landing Gear Operation Test			Chk	Date	Initials
	A.	With the gear switch in the down position, switch on the master switch. The 3 green "Down & Locked" lights should illuminate.			
	B.	Make sure there is nothing obstructing the gear. Move the gear switch to the "UP" position. The pump motor should start immediately and each of the three red lights should illuminate as the corresponding strut leaves it's locked position, indicating that the gear is in transit. Each green light should switch off as the corresponding strut leaves the locked position.			
	C.	With the gear in the retracted position, all indicator lights should be off. Check all the gear doors for complete closure. Left [ ] Right[ ] Nose[ ] Adjust if necessary.			
	D.	With the gear retracted, move the flaps out of the full UP position. The gear warning horn should sound at approximately 18 degrees of flap deployment. Adjust the gear warning microswitch mounting in the co-pilot seat pan if necessary.			
	E.	With the gear retracted, move the gear switch to the "DOWN" position. The hydraulic pump should switch on immediately and the three red "IN-Transit" lights should illuminate as each gear strut leaves the up position.			
	F.	Each green "Down & Locked" light should illuminate as the corresponding gear leg reaches its fully extended and locked position.			
	G.	The pump motor should switch off immediately after the last green "Down & Locked" light illuminates and the hydraulic pressure reaches 800 psi. Readjust the side brace microswitches (modify or replace actuating pins (rivets) if lights do not illuminate. Sect F.			
		Service or replace the down pressure switch if the pump does not shut off at aprox 850 psi or it does not come back on at aprox 600 psi. If the hydraulic pump continues to run with the pressure indicating above 850 psi, the pressure switch needs to be adjusted to shut the pump off at a lower pressure.			
		If the pump continues to run at an indicated pressure below 800-850 psi, then the hydraulic pump must be serviced to increase the internal bypass pressure. The internal bypass pressure should be set to 1000 psi minimum. Return the pump to the factory for proper service if needed.			
		Remarks:			
	H. Emergency Gear Extension Test (On Jack Stands):				
		1. With the gear in the UP position: Pull the Gear Pump 40 amp breaker OFF			
		2. Pull the Gear Control 5 amp breaker OFF			
		3. Turn the Emergency Hydraulic Pressure relief valve 90 degrees to bleed off UP press.			
		4. Pump the Emergency Hydraulic Hand Pump to pump the gear down.			
		5. The 3 green Down & Locked lights should illuminate when the gear is fully locked down.			
		Remarks:			

Section VI - Landing Gear Operation Test Cont.			**Chk**	**Date**	**Initials**
	I. Check the side brace and nose gear drag brace microswitch settings:				
		With the airplane still on jacks, and after performing the Emergency Gear Extension Test (gear is down with near zero pressure in the down side of the system)			
		1. Pull the Gear Hydraulic Pump and Gear Control circuit breakers out (off)			
		2. With the master switch ON, the Green Down & Locked lights should be ON.			
		3. For each main gear: Gently push up on each main gear side brace and note when the Green light corresponding to the gear sidebrace arm goes out.			
		The light should go out just as the sidebrace arm is moved up (less than 1/8") and it should go back on just before the sidebrace arm is lowered to its locked position.			
		Check Left main:			
		Check Right Main:			
		Check Nose Gear Drag brace microswitch in the same manner:			
		Remarks:			
Section VII - Post Maintenance Systems Check:					
	A. Replace interior components. Check inside fuselage and seat pan areas for any tools, rags or loose hardware prior to covering up.				
		1. Center Console, Seat Pans			
		3. Overhead Console			
		4. Control Tunnel Top			
		5. Aft Baggage Bulkhead - Lower Verify ELT set to ARMED prior to installing bulkhead.			
		6. Upper Baggage Bulkhead - Upper & Hat Shelf			
		7. Carpets & Seat Cushions			
	B.	External Lights - Check security and operation:			
		1. Nav Lights - Left (red):_____ Tail (white):_____ Right (green):_____			
		2. Strobe Lights - Left: _____ Right:_____			
		3. Landing Light:_____			
	C.	Interior Lighting:			
		1. Baggage Compartment/Interior Flood Light			
		2. Map/Reading Lights			
		3. Panel Flood Lights			
		4. Instrument Post Lights & Dimmer			
		5. Internal Instrument Lights & Dimmer			
		Remarks:			

Section IX - Paperwork			Chk	Date	Initials
		Perform this check after all other inspections and service has been accomplished and the aircraft is considered airworthy for a test flight.			
	A.	Take Off Roll - Full throttle RPM: _____ Manifold Pressure:_____			
	B.	Landing Gear - In-transit microswitch settings: All doors remain closed at cruise speed:			
	C.	Check cabin heat and defrost functioning properly.			
		Remarks:			
	D.	In-Flight Gear Warning Test			
		1. Slow the aircraft to under 140 mph.			
		2. Lower the flaps to more than 18 degrees with the landing gear retracted. The A.O.A warning should sound, the "GEAR" unsafe announcement.			
		3. Lower the landing gear. The "GEAR" unsafe announcement should silence.			
		4. Raise the landing gear, the "GEAR" unsafe "GEAR" unsafe announcement should be heard.			
		5. Retract the flaps. The horn should silence.			
		Remarks - Note any abnormal characteristics or anomalies:			
	A.	Verify compliance with **ALL** known and applicable ADs for the engine or other components.			
		Known recurring/repetitive SBs & ADs at time of this writing:			
		SB 518 - Thermostatic Bypass Valve (Oil)			
		SB 466 - Oil Filter base Adapter Cracks			
		SB 388B- Exhaust Valve & Guide Condition Check (Wobble Check)			
	B.	Check that all Stoddard Hamilton Service Bulletins are complied with.			
	C.				
		Replace main 14v 25 amp-hr battery 36 months max.			
		Pitot Static System & Transponder Check - 24 calendar months.			
		Air Filter - Replace Annually			
		Fuel Filter - Replace Annually			
		Vacuum filter change due at 575 hrs (every 500 hrs, last replaced at 75 hrs)			
		Remarks:			
		Paperwork Continued next page >>>			

		Section IX - Paperwork Cont.	**Chk**	**Date**	**Initials**
	D.	Make sure the following documents are present, current and properly displayed if applicable.			
		Airworthiness Certificate			
		Registration Certificate			
		Weight and Balance			
		Placards			
		Radio Station License (Not required for flights within continental US)			
	E.	Logbook: make the appropriate log book entries, noting any discrepancies and other pertinent information. Sign off the annual condition inspection as required by the operating limitations imposed with the Experimental Airworthiness Certificate.			
		Airframe Logbook Entry:			
		Engine Logbook Entry:			
		Propeller Logbook Entry:			
		Remarks:			
Section X - Completion Sign-Off:				-	-
		Note the date when all of the above inspections have been completed:_____			
		Remarks:			
	****	Additional Remarks & Notes to Include In Next Inspection:			
		END OF ANNUAL CONDITION INSPECTION CHECKLIST			