THURSTON AIRCRAFT CORPORATION

OWNERS MANUAL

MODEL TSC-1A1 TEAL AMPHIBIAN

INCORPORATING MAINTENANCE INSTRUCTIONS

2200 POUND GROSS WEIGHT

Report 7150-M3

Revised:

30 September 1971

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MODEL TSC-1A1 TEAL AMPHIBIAN

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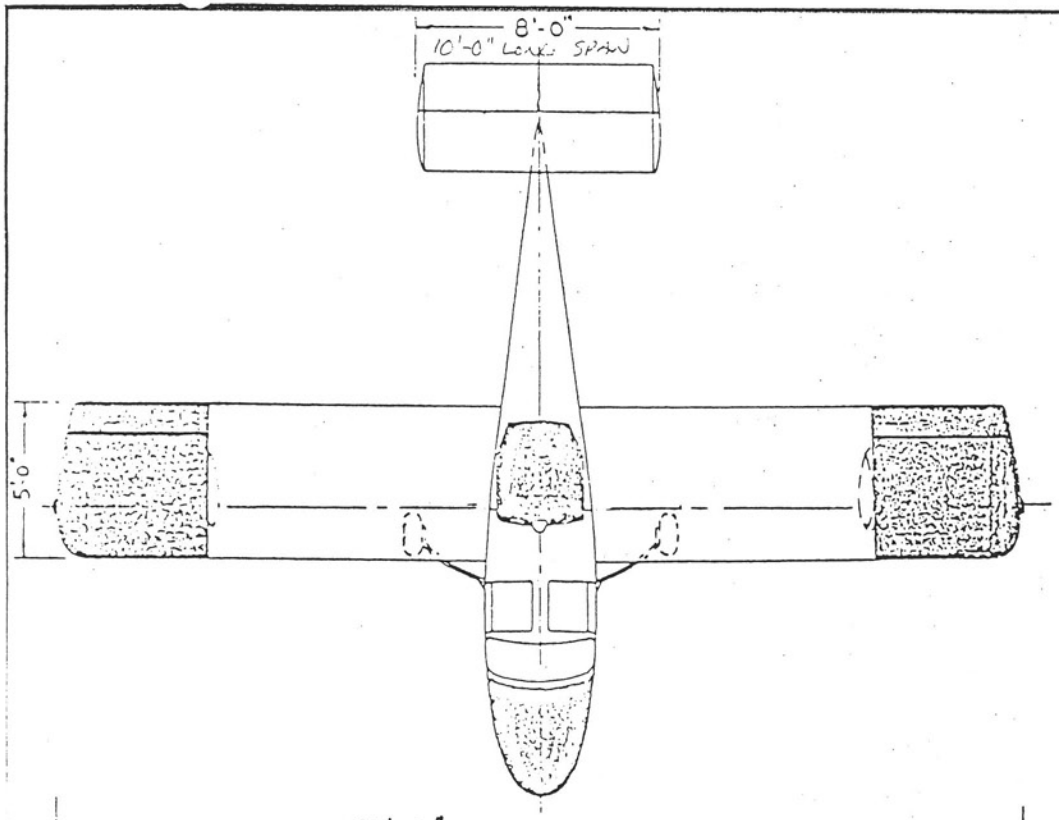
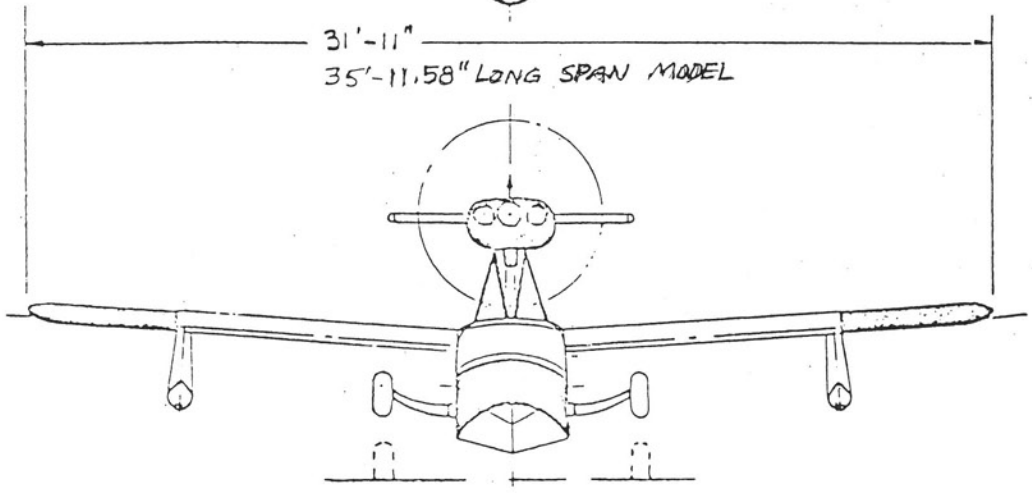
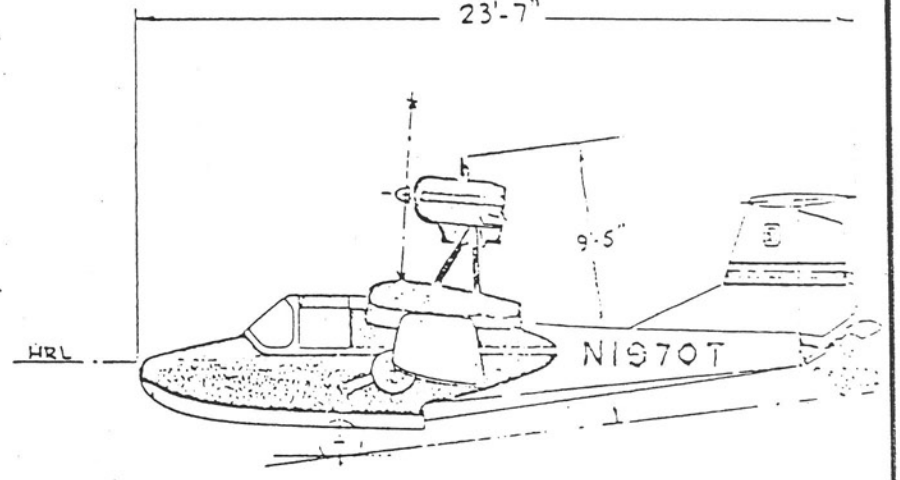






GENERAL ARRANGEMENT

MODEL TSC-1A1 "TEAL" AMPHIBIAN -

DRAWN BY	TRACED BY	CHECKED BY	APPROVED BY			TOLERANCES
			STRUCT	ENG'G	CUST	FRACTIONS ± 1/32
D. THURSTON						DECIMALS ± .01
20 AUG 70						ANGLES ± 1/2°
						UNLESS SPECIFIED

THURSTON AIRCRAFT CORPORATION
SANFORD AIRPORT SANFORD, MAINE

SCALE:

REV

DESIGN DATA

WING AREA 151 SQ FT

ENGINE - LYCOMING O-320-A3B
150 HP AT 2700 RPM

GROSS WEIGHT - 2200 LB. LAND/2100 LB. WATER

USEFUL LOAD - 840 POUNDS LAND
740 POUNDS WATER

CRITICAL BOLTS AND TORQUE VALUES

Wing (Beam) Bolts	70 foot-pounds
NAS 464-12-A26 (160,000 heat treat steel) (4) AN 364-1216 nuts (4) AN960-1216L washers (8)	
Wing (Drag) Bolts	10 foot-pounds
AN5-7A (2) AN365-524 nuts (2) AN960-516 washers (4)	
Engine Mount Bolts	10 foot-pounds
AN5-12A (Magnafluxed) (4) AN365-524 nuts (4) AN960-516 washers (8)	
Vertical Fin Bolts	60 inch-pounds
AN4-5A (4) AN4-7A (4) AN960-D416 (8)	
Horizontal Stabilizer Bolts	40 inch-pounds
AN24-11A (4) AN24-8A (6) AN364-428 nuts (10) AN960-D416 washers (10)	
Landing Gear Torque Shaft Bolts	60 inch-pounds
AN5-32A (4) AN5-33A (2) AN365-524 nuts (6) AN960-516 washers (12)	
AN6-34A (2) AN6-35A (2) AN365-624 nuts (4) AN960-616 washers (8)	60 inch-pounds

Landing Gear Strut Bolts AN6-17A (2) AN6-20A (2) AN365-624 nuts (4) AN960-616 washers (8)	30 foot-pounds
Wheel Bolts & Axle Attachment Bolts AN5-21A (4) AN365-524 nuts (4) AN960-516 washers (8)	20 foot-pounds
AN6-22A (4) AN365-624 nuts (4) AN960-616 washers (8)	30 foot-pounds
Tail Wheel Bolt AN8-23A (1) AN365-820 nut (1) AN960-816 washer (1)	45 foot-pounds

CONTROL TRAVEL LIMITS

Ailerons	Up - 30° $^{+3}_{-0}$
	Down - 20° $^{+3}_{-0}$
Elevator	Up - 15° $^{+2}_{-0}$
	Down - 20° $^{+2}_{-0}$
Rudder	Left and Right - 28° ± 2

Trim Tab Travel Limits

Elevator tab (Elevator at 0°)	Up - $7\frac{1}{2}$° $^{+2\frac{1}{2}}_{-0}$
	Down - 21° $^{+2}_{-0}$
Rudder tab	Left and Right - 30° ± 2

LUBRICANTS

1. Dow Corning MOLYKOTE 557 Lubricant (Spray)

   Flight Control Hinges
   Engine Controls
   Door Hinges
   Seat Tracks
   Tail Wheel Retraction Strut

LUBRICANTS (Continued)

2. Dubois Chemicals MPG-2 Multi-purpose grease
Wheels and bearings

CONTROL CABLE TENSIONS (All) (25 ±5 lbs.)

Main Wheel Tire Pressure	20 PSI
Tail Wheel Tire Pressure	35 PSI.

SECTION I - DESCRIPTION AND OPERATING DETAILS

THE AIRPLANE

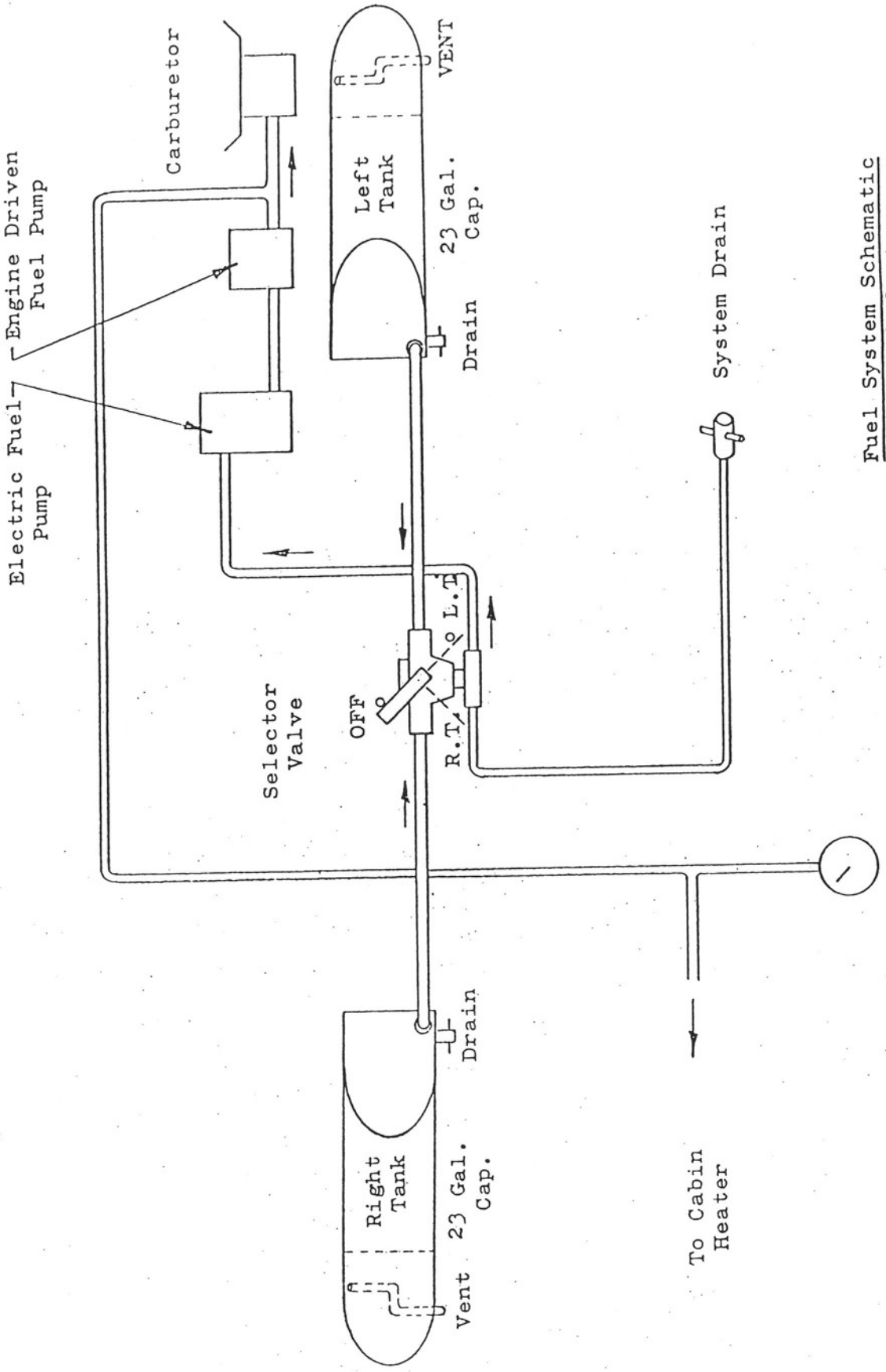
The Thurston Aircraft Corporation Model TSC-1A1 TEAL Amphibian is a single engine, two-place, monoplane amphibian with conventional retractable landing gear, no flaps, and a T configured tail. The hull is a conventional seaplane type with a step and a retractable water rudder attached to the tail wheel. Seating is side by side incorporating flight controls using a stick and toe brake rudder pedals on the left side with an option for controls with or without brakes on the right. Engine controls are overhead mounted in the center. Trim controls for elevator and rudder are mounted on the floor ahead of the seats; it is possible to fly the TEAL directly using these trim control handles.

FUEL SYSTEM

The standard fuel system is supplied from two 23 gallon tanks located in the leading edges of the left and right wing panels just outboard of the hull sides. Each tank has a usable capacity of 20 gallons, giving a total standard fuel capacity of 40 gallons. Tank selection is provided by the three-way valve located on the cabin aft wall. Tank sump drains are provided at the inboard aft corner of each wing tank, just forward of the main beam. Each tank is separately vented overboard under the wing. The fuel system drain valve is located on the left side of the hull; to completely drain the engine pylon, simply open this system drain valve. To drain each fuel tank line after draining the pylon line, first select and drain one tank using the fuel selector valve located on the cabin aft wall, and then select and drain the other tank line. The tank sumps are, of course, drained directly at each tank.

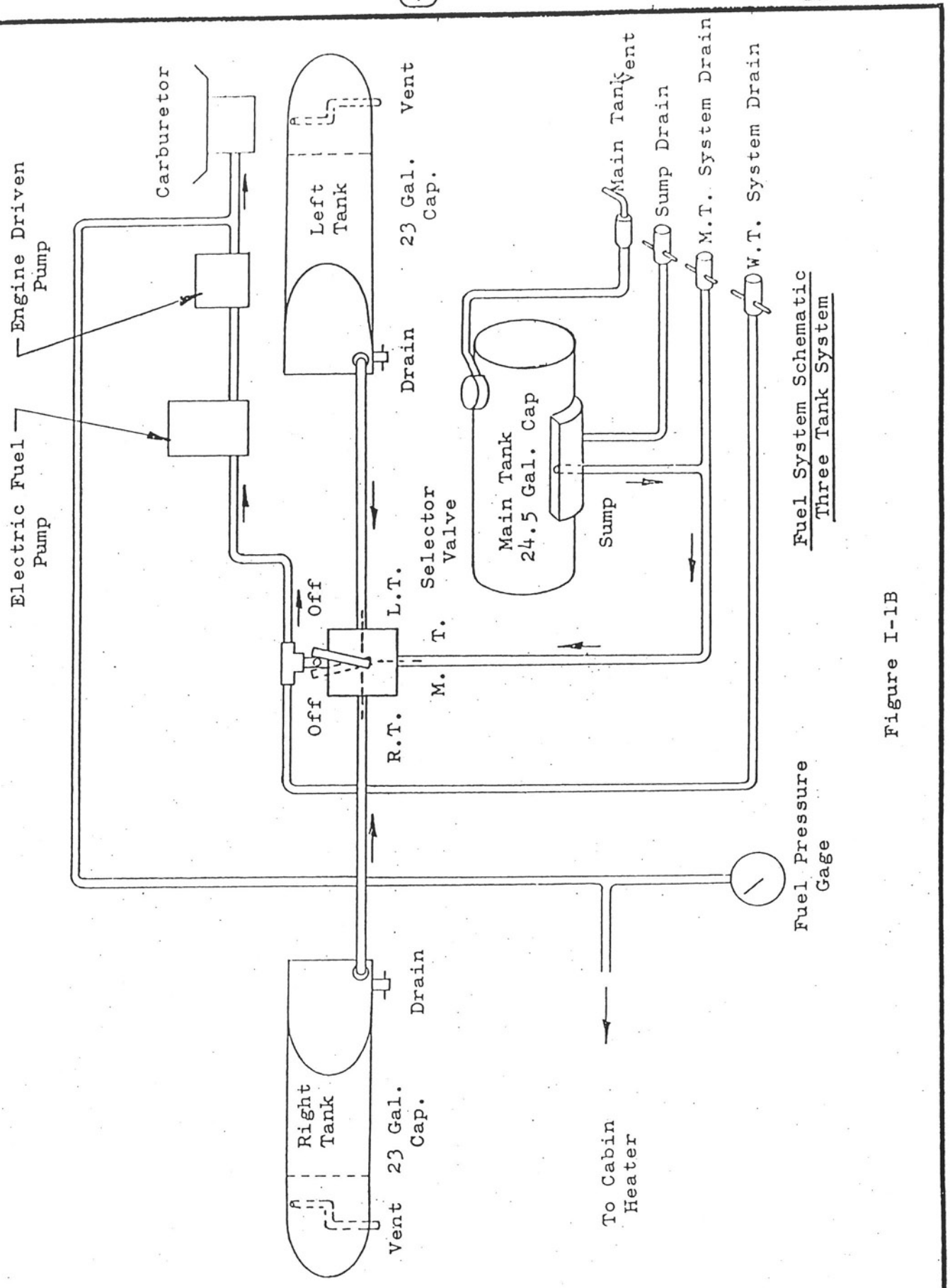
For the three tank system, including the 24.5 gallon hull tank as well as the two wing tanks, the pylon and wing tank fuel lines are drained as above, while the hull tank sump and lower fuel lines are drained through two quick-drain valves located on the left side of the hull forward of the wing tank drain outlet. The hull tank vents overboard on the left side aft of the system quick drain valves. Tank selection is via the four-way selector valve located on the cabin aft wall. Total usable capacity with the three tank system is 64 gallons; 20 gallons from each wing tank plus 24 gallons from the hull tank.

Each fuel tank is provided with a stainless steel mesh screen finger strainer and a sump. Fuel flows from each tank through this strainer to the tank selector valve, which also incorporates a shut-off position. From this selector valve, the fuel flows up through the right side forward engine mount leg to the electric boost pump located in the engine nacelle. Figure I-1 provides schematic views of the two and three tank systems.



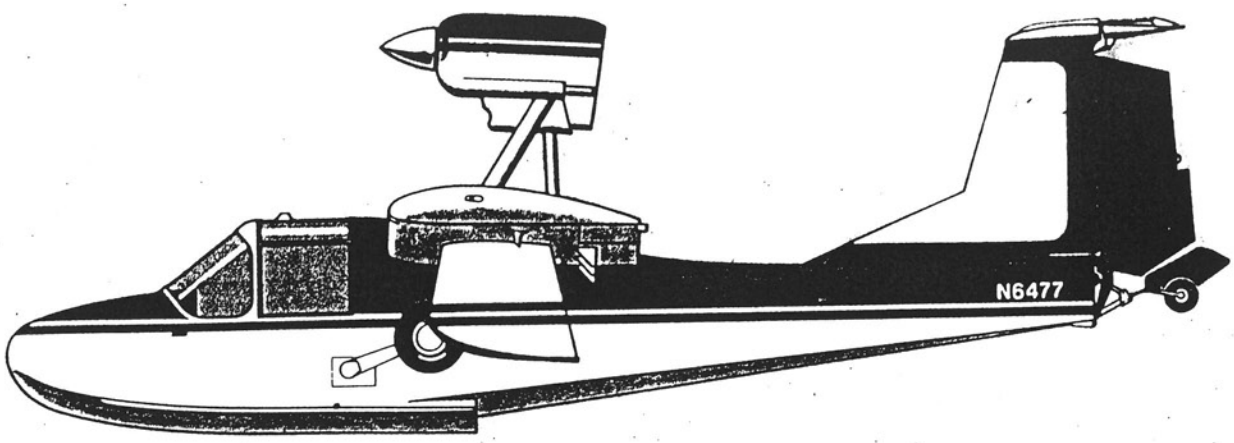
Fuel System Schematic
Two Tank System

Figure I-1A



Fuel System Schematic
Three Tank System

Figure I-1B



ENGINE

The engine is a Lycoming O-320-A3B four cylinder, horizontally opposed, direct drive air cooled, non-supercharged engine rated at 150 horsepower at sea level standard day conditions at full throttle and 2700 RPM.

The required fuel is 80/87 octane aviation gasoline.

The oil capacity is 8 U.S. Quarts with the grade of oil specified in the Lycoming Engine Operator's Manual supplied with the airplane. Operating limitations for the engine are included in the Engine Operator's Manual and Section 4 of this Manual.

The throttle, propeller pitch, mixture and carburetor heat controls are located on the overhead panel between the seats. All the controls are directly connected to the engine by push-pull cables. Throttle and propeller pitch control friction is adjustable at the control by tightening the pivot bolts. Mixture and carburetor heat controls lock in position by rotating the knobs clockwise.

The mixture control knob is red for identification and is at "full rich" in the forward position, leaning the mixture

progressively as the control is moved rearward. The fuel is completely shut off at the full aft "idle cut-off" position of the mixture control.

The carburetor heat control is full cold in the forward position and full hot in the rearward position.

The starter magneto switch has five positions and is operated by an ignition key. The positions are OFF, RIGHT, LEFT, BOTH and START. All positions are detented except for START, which must be held engaged manually and is spring loaded to return to BOTH. In the START position, the starter is engaged and cranks the engine with only the LEFT magneto engaged. The LEFT magneto incorporates an Impulse Coupling which mechanically provides an intensified retarded spark during starting rotational speeds. The Impulse Coupling automatically disengages as engine RPM increases to operating speeds.

PROPELLER

The propeller is a Hartzell Model HC-C2YL-1B/7663-4 two bladed constant speed propeller with a diameter of 72 inches. The propeller is governed by a Hartzell F-2-6-A governor. The propeller pitch control located on the overhead console, provides low pitch and maximum RPM at the forward position and high pitch and low RPM in the aft position.

ELECTRICAL SYSTEM

The electrical system is powered by a 12 volt engine driven Prestolite alternator rated at 40 amperes (60 amperes optional). Whenever the alternator switch is "ON", the alternator provides electrical power at all engine speeds; resulting in improved performance for radio and electrical equipment plus longer battery life.

In addition to the alternator, the electrical system includes a 37 ampere hour battery which is located in the forward end of the cockpit at floor level. All electrical circuits except the engine ignition system are controlled by the Master Switch, located on the left side of the instrument panel.

AMMETER

The ammeter indicates the flow of current, in amperes, from the alternator to the battery or from the battery to the aircraft electrical system. When the engine is operating and the master switch is "ON", the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning, or the electrical load exceeds the output of the alternator, the ammeter indicates the discharge rate of the battery. A shunt with a resistance value of 0.00258 ohms consisting of a 2 foot 4 inch coil of 10 gauge wire is in parallel with the ammeter and

must always be installed when operating the system.

CIRCUIT BREAKERS AND SWITCHES

All electrical circuits are protected by either circuit breaker type switches or circuit breakers. The circuit breaker switches are located on the left side of the instrument panel. Proceeding to the right from the Master Switch, they consist of the Alternator, Fuel Pump, Pitot Heat, Navigation Lights, Strobe (anti-collision), Cabin Heat and Landing Light Switches. The circuit breakers are on the right side of the instrument panel and from left to right consist of the Starter, Stall Warning, Fuel Quantity Indicator, Radio, Turn and Bank Indicator and Gyros. The wiring diagram for the airplane, exclusive of the heater wiring details, are given in Figure I-2.

WING TIP FLOATS

The wing tip floats provide stability on the water for all operations. During winter operation or any other time water operations are curtailed for extensive periods, the floats may be removed and stored. With the floats removed, an additional 3 mph in airspeed should be realized. In addition, when operating in snow regions, the hazard of having the floats collide with snow banks is removed. Removal involves three attaching bolts per float which are replaced after detaching the float. The wing tie down bracket should be attached to the forward inboard attaching bolts.

LANDING GEAR

The landing gear is retracted and lowered mechanically by a pilot operated release button and lever located between the seats. This mechanism is assisted by a patented air cylinder system that helps to raise and lower the gear. To raise the main gear, the down lock must first be released and then the actuating lever pulled up until the system goes over center and locks in the up position. The tail wheel is then retracted, using the shorter lever located alongside the main gear lever. Note the amber position light on the instrument panel, indicating the entire gear is locked up.

To lower the gear for land operation, the tail wheel is first lowered. Then the main gear release button is depressed and the lever lowered to the floor. The down lock must be engaged and locked in place, at which time the green light on the panel indicates the gear is safely locked down for landing on land.

When operating on water, the tail wheel and water rudder may be independently lowered to provide precise directional control and permit maneuvering in tight areas at low speed.

Before lowering the main gear for ramp approach and beaching, the cylinder pivot aft of the gear mechanism enclosure must be released, raised and locked in the up position. The gear may then be readily raised and lowered in water. It is necessary to change the retraction pivot center for water operation due to the buoyancy of the tires. The pivot must be lowered and locked when the gear is raised prior to water take off if a land landing is to be made. Make sure the red light is off on the panel, indicating the pivot is locked down for proper operation. If possible, a much simpler procedure is to simply run the hull up onto the beach at low speed, using the water rudder for precise control. The TEAL may be pushed off the beach and swung around by the wing tips before the engine is started for departure.

AIRFRAME

There are eight $3\frac{1}{2}$ inch diameter access holes under each wing to permit servicing the flight controls, floats, pitot tube and stall warning wing probe. One access hole is provided on each side of the vertical stabilizer for servicing the elevator bellcrank. These holes are all covered with 4 inch diameter disks and held in place by three tabs. The covers are removed and installed by pulling down one edge of the cover and then sliding the ends of the tabs past the edges of the inner ring.

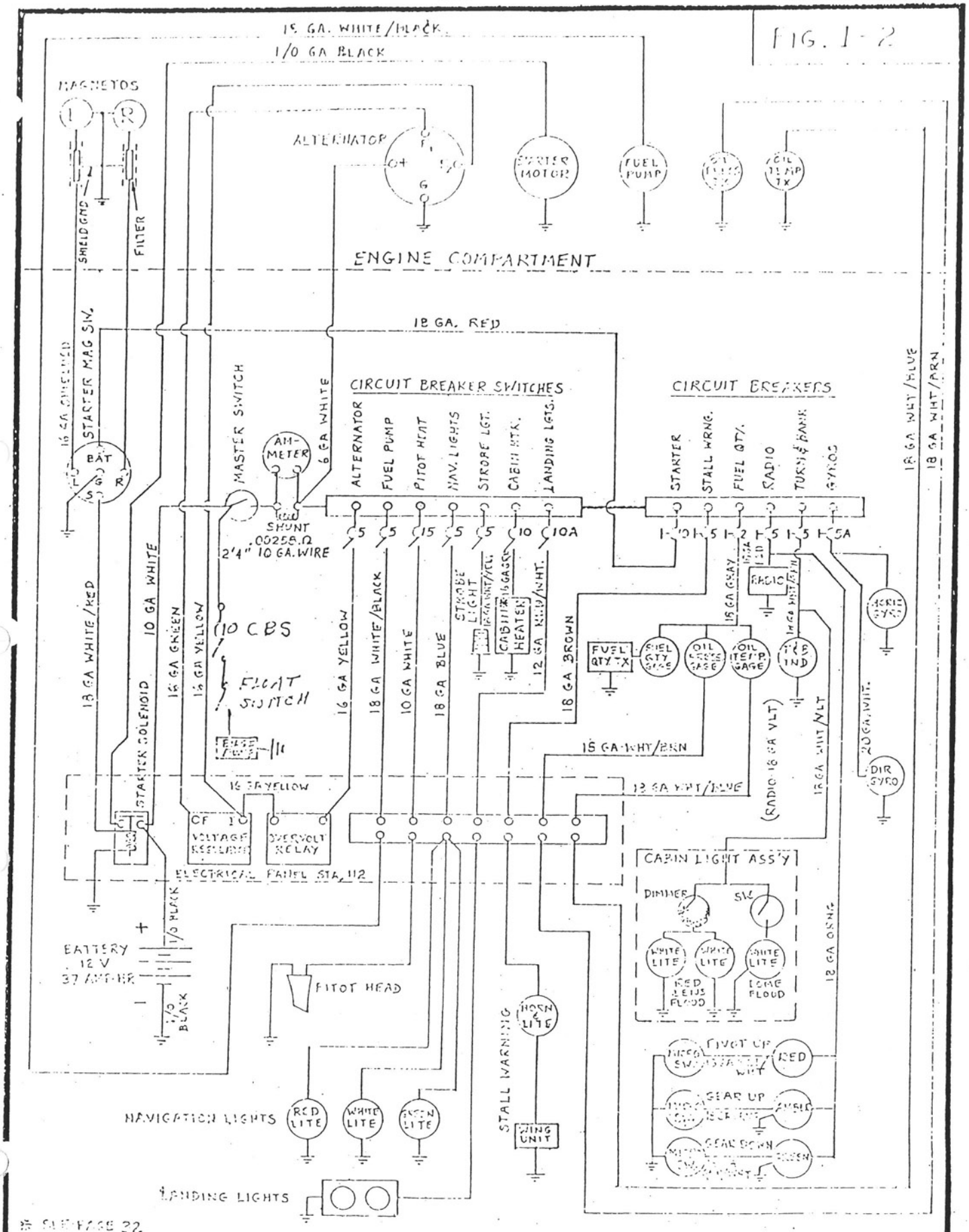
PARKING BRAKE

Set parking brakes by depressing and holding brake pedals, pulling out parking brake knob with approximately five to ten pound force, and then releasing brake pedals. Parking brake knob may then be pushed in. To release the brakes, depress both brake pedals with parking brake knob pushed in to panel. To prevent excessively high brake pressure buildups due to ambient temperature increase, do not leave parking brake set when aircraft is to be left for a long period.

CONTROL STICK

The copilot control stick is removable for convenience when flying cross country or carrying sightseeing passengers. It may be readily removed by unbuttoning the boot and removing the joining pin. The upper stick with pin attached may be stored in the side pocket; the boot should be rebuttoned to keep objects from falling through the floor opening.

FIG. 1-2



SEE PAGE 22

SECTION II - NORMAL OPERATING PROCEDURES BEFORE ENTERING THE AIRCRAFT

OPERATING LIMITS. Refer to Section IV for a discussion and tabulation of TEAL operational limitations

WEIGHT AND BALANCE. A weight and balance calculation as described in Section V should be computed to establish that the weight and balance of the airplane remains within limits throughout the entire flight.

EXTERIOR PREFLIGHT INSPECTION. The aircraft logs should be checked to acquaint the pilot with any discrepancy and modification entries. An exterior inspection should then be performed following the procedure outlined below:

1. Open pilot's window and insure landing gear handle is down and locked, ignition and master switches OFF.

2. Pull all four hull drain plugs and the single drain plug in each float to check for any trapped water or condensation. This should be done after: (1) every flight involving water operation; (2) remaining exposed to any precipitation; and (3) after prolonged periods which would permit condensation to accumulate inside the structure. Since drainage provisions normally present in a landplane cannot be incorporated in a watertight seaplane, this draining procedure is an important step in insuring that weight and balance limitations are not exceeded. Water in the after hull compartment could lead to aft center of gravity instability in flight, and possibly frozen controls at low ambient temperatures.

NOTE: Be sure that all six drain plugs are replaced, and coated with MIL-L-3545 grease.

3. Remove all tie downs and use chocks as necessary.

4. Inspect left main gear strut upper and lower attachments, brake, brake line and wheel. Check tire for condition and inflation to 20 PSI.

5. Inspect nose including bumper, skin and windshield.

6. Inspect right cockpit area and window security.

7. Inspect right main gear assembly same as item 4.

8. Check right wing leading edge, upper and lower surfaces, wing tip and wing attachment security.

9. Check right aileron for freedom of movement, security

of hinges and tab position.

10. Check wing float for damage and attachment security.

11. Check right side of hull for integrity along entire length.

12. Visually check oil level and secure cap and cowling. Check for oil or fuel leaks.

13. Check propeller for nicks, rust and leaks.

14. Check tail wheel retraction strut to insure it is clean, straight, smooth and lubricated.

15. Check tail wheel tire for condition and inflation to 35 PSI.

16. Check water rudder. Side motion with tail wheel steering engaged to be less than one inch right side. This checks play in the tail wheel locking mechanism which affects ground steering.

17. Check tail attachment areas for cracks, buckled skin and general security.

18. Check rudder and elevator for freedom of movement and security of hinges and trim tabs.

19. Check left side of hull for integrity along entire length.

20. Check engine cowling for security.

21. Visually check fuel supply and secure caps.

22. Drain fuel system and tank drains and check for contaminants. Check tank vents for possible plugging by insects.

23. Check left wing same as items 8, 9 and 10.

24. Check pitot head for unobstructed openings, damage and security.

25. Check landing light lens for security.

26. Check stall warning vane for damage and freedom of movement.

27. Check radio antenna and outside air temperature guage for security and condition.

28. Check the baggage compartment area for loose articles and conformity to the WEIGHT AND BALANCE loading. A tie down strap is provided in the baggage coinpartment and should

always be used for holding down loose articles, including the anchor, paddle, and mooring line.

COCKPIT PROCEDURE AND ENGINE START

1. Close both overhead hatches and insure locking pins are fully engaged.

2. Adjust seats and insure seat locking pins are fully inserted.

3. Set parking brakes by depressing and holding brake pedals, pulling out parking brake knob with approximately five to ten pound force, and then releasing brake pedals. Parking brake knob may then be pushed in.

4. Insure all electrical equipment switches are OFF.

5. Turn Fuel Valve onto desired tank.

6. Move the Mixture Control to the FULL RICH position.

7. Check Carburetor Heat Control at COLD position.

8. Check Propeller Pitch Control at forward, in low pitch (high RPM) position.

9. Turn Master Switch ON.

10. Turn Fuel Boost Pump ON and check fuel pressure rise to 4-5 PSI.

11. Pump throttle one to three times depending on outside temperature (one pump at 70°F; three pumps at 10°F) and then set at about $\frac{1}{2}$ inch open. In extremely cold weather, continual pumping may be required during initial start to enable engine to fire. For a hot engine, omit pumping engine.

12. Turn ignition key to START and release back to BOTH the instant engine fires. Do not crank continually for more than 10 seconds and if engine does not start after second attempt, a Trouble Shooting check should be made as outlined in Section 6 of the Lycoming Operators Manual.

13. Set engine to run at 1000 RPM and check oil pressure gage. If minimum oil pressure is not indicated within thirty seconds, stop engine and determine trouble. Under extremely cold conditions, excessively high oil pressures may be reached during initial minutes of operation, therfore it is recommended that the engine be run at the minimum idle speed possible until the pressure reduces to the acceptable range.

14. To release the brakes, depress both brake pedals with parking brake knob pushed in to panel.

NOTE: To prevent excessively high brake pressure buildups due to ambient temperature increase, do not leave parking brake set when aircraft is to be left for a long period.

GROUND RUNNING, WARMUP AND ENGINE CHECK

The engine is aircooled and requires aircraft forward speed to maintain proper cooling. Particular care is necessary, therefore, when running aircooled engines on the ground. To prevent overheating, it is recommended that the following precautions be observed:

1. Head the aircraft into the wind.

2. Leave mixture in FULL RICH.

3. Operate only with propeller in low pitch (high RPM) setting.

4. Warm up at approximately 1000-1200 RPM. Avoid prolonged idling and ground operation and do not exceed 2200 RPM on the ground.

5. Engine is warm enough for take-off when the throttle can be opened without engine faltering.

6. When engine is warmed up following above procedure, check oil pressure and oil temperature (should be 60 to 90 PSI at 1200 RPM or above and at least 100°F to not more than 180°F).

7. Leaving mixture FULL RICH, set engine RPM to 2000 and perform magneto check by switching from BOTH to one magneto for approximately 3 to 5 seconds to observe the RPM drop; then switching back to BOTH. After RPM has risen and stabilized, check the other magneto in the same manner and return to BOTH. Reduce RPM as soon as magneto check is finished. The allowable drop on each magneto is 175 maximum and engine operation must be smooth. The drop of both magnetos must be within 50 RPM.

NOTE: Refer to Section 3, Paragraphs 6e and 6f of the Lycoming Operators Manual for additional information.

8. With the propeller in low pitch, check constant speed propeller operation by setting the RPM at 1700 with the throttle, and then moving the propeller control smoothly back to the high pitch (low RPM) position. The RPM should smoothly and rapidly drop to about 1000 to 1100 RPM. Return the propeller control to the forward position and observe that the RPM returns smoothly, although slightly more slowly, back to 1700 RPM. Cycle the propeller twice to insure proper oil circulation in the propeller pitch control mechanism. Observe the propeller dome visually for oil leaks.

CAUTION: The maximum RPM at which the propeller pitch control should be moved aft of the forward position is 1700 RPM. Higher RPMs will cause excessive pressure to build up in the cylinders and could lead to engine damage.

9. Check the carburetor heat control by setting the RPM at 1500 and moving the heat control full aft (HOT) and noting an RPM drop of about 100. Return the control to the forward (COLD) position.

10. Check all flight controls for full deflection and freedom of movement.

LAND TAKE OFF AND CLIMB

Perform items called out on TAKE OFF CHECK OFF LIST on instrument panel. Mixture controls must be FULL RICH, carburetor heat FULL COLD, and propeller pitch in INCREASE RPM (forward) position. Power should be added smoothly to full throttle after the brakes are released, with directional control maintained by the rudder pedals. Engine instruments should be rapidly checked and the RPM should be 2700. At approximately 40 to 50 mph, the tail should be eased off the ground to a height of about 1 foot and maintained until airforne. The airplane should be flown off the ground at about 65 mph.

A climb should be established with full throttle (about 28.5 inches manifold pressure at sea level, decreasing 1 inch for each 1000 feet of altitude) and 2700 RPM. Maintain a climb airspeed of 70 mph in smooth air, increasing to near 80 mph if any turbulence exists. An airspeed of 70 mph will produce the maximum rate of climb; 80 mph will result in a slight reduction in rate of climb but provide a greatly increased margin of controllability required in turbulent air. At sea level with an air temperature of 59°F and a gross weight of 2200 lbs., a rate of climb of 600 feet per minute should be obtained in stable air. The rate of climb will decrease approximately 70 feet per minute for every 1000 feet of altitude. Above 5,000 feet, the engine should be leaned as described on the following page.

CRUISE

Normal cruising is recommended at 65% to 75% maximum power and with the landing gear down, as this is the minimum drag position. The power settings for 65% can be closely approximated by a setting of 23 inches manifold pressure and 2300 RPM. The settings for 75% are approximated by 24 inches and 2400 RPM. To avoid exceeding engine limitations, the manifold pressure setting should never be allowed to exceed the RPM value in hundreds, ie, the above cruise settings are at the maximum manifold pressure that should be used with each corresponding RPM. If a higher power than 24 and 2400 is required, then a corresponding higher RPM should be used. These maximum manifold pressure settings produce the most efficient engine operation, particularly from a fuel consumption standpoint, thus producing maximum range and endurance. Operating at low manifold pressures and high RPM will decrease efficiency and engine life, the latter resulting from unnecessary use of high RPM.

When a cruising condition is established, the engine should be leaned to improve fuel consumption and range. The effect becomes increasingly greater with increasing altitude. However, leaning can only be performed at power settings of 2400 RPM and below and never above 2400 RPM since this will lead to detonation and possible engine damage. After the engine power has been established, the mixture control is very slowly moved towards the rear until a slight roughness is detected. Then slowly move the control forward to just where smooth operation and power is regained. The position of the mixture control for lean operation will be progressively further aft with increased cruising altitudes.

If while cruising in a leaned condition any changes in power, including the application of carburetor heat, or any changes in altitude are to be made, the mixture must first be returned to FULL RICH. Descending in a leaned condition will cause the engine to overlean and stop. Adding power to increase altitude in a leaned condition may cause detonation.

The continuous use of carburetor heat during cruising flight decreases engine efficiency. Unless carburetor icing is severe, do not cruise with carburetor heat on. Apply FULL HOT carburetor heat (only with MIXTURE FULL RICH) until ice is cleared, which should occur in a few seconds, and return to COLD. Partial heat should not be used except in those airplanes where a carburetor air temperature gauge is installed. Carburetor icing can occur with outside air temperatures of from 20° to 90°F, since air temperature can drop up to 50° and more in the carburetor throat. It is recommended that areas of visible moisture be avoided whenever possible. Do not use carburetor heat with over 75% power.

Icing in the carburetor must be detected early for the carburetor heat to be effective, for once the engine stops, there will be insufficient heat available to clear the ice in the carburetor. With a constant speed propeller, the RPM does not provide an indication of power loss since the RPM is maintained at a constant setting. The only indication available in this installation (unless the optional carburetor ice detector is installed) is the manifold pressure (MAP). Ice collecting in the throat will restrict the induction air flow exactly as if the throttle were being pulled back. An otherwise unexplainable loss in MAP of 1 inch or more must be concluded to be caused by ice, and full carburetor heat must be applied immediatley (with MIXTURE FULL RICH). An additional loss of MAP will now occur due to the heat but as the ice melts, a rise in MAP should occur equal to the amount originally lost due to the ice. The carburetor heat can then be returned to COLD unless the icing conditions are considered severe.

Refer to the Lycoming Operators Manual for additional information on the use of carburetor heat.

DESCENT

Descend with the mixture control in FULL RICH. Additionally, if the descent is prolonged (over one minute) and the MAP is reduced, the carburetor heat should be placed at FULL HOT. Opening the throttle for a few seconds each minute of the descent will keep the engine warm and prevent carburetor icing.

LANDING APPROACH

Once the landing traffic pattern has been entered, the LANDING CHECKOFF LIST on the instrument panel must be performed. The mixture must be FULL RICH; when power is rechecked for the approach, the propeller should be placed into low pitch (high RPM) to enable full power application if a go around becomes necessary. The carburetor heat should be in the FULL COLD position unless icing conditions are suspected, in which case FULL HOT should be used. If a go around is executed, the heat control should be placed at FULL COLD immediately after power is applied. Full throttle operation with the heat on is likely to cause detonation.

Care should be exercised in going over the CHECKOFF LIST to insure that the landing gear is positioned properly depending on whether land or water landing is to be made. Check to be sure the gear actuation handle is locked in place and that the proper gear position indicator light is illuminated. An optional reflector on the left wing float will provide a view of the tail wheel position.

LANDING ON LAND

An approach speed of 70 mph can be used in smooth air when a short landing rollout is desired. In turbulent air, or if a normal rollout is acceptable, an approach speed of 80 mph is more desirable. A normal approach patter can be flown with a power setting of about 12 inches MAP. The power can be reduced while executing the flare and the airplane altitude established at three points just off the ground. The airplane makes an excellent three wheel landing under all permissable wind conditions. The three point landing is recommended since it provides maximum directional control immediately after touchdown. While your heels may be on the floorboards at landing contact, they should be moved up immediately to permit rapid use of the brakes if required. Upon establishing a three point touchdown, the stick should be held full aft to hold the tail down. You will find that under all permissable wind conditions adequate directional control exists without the use of brakes.

WATER TAKE OFF

Perform items required on WATER TAKE OFF checklist, similar to the land take off. The engine magneto check can be performed at 2000 RPM prior to the airplane getting onto the step - if it is performed expeditiously. As an alternative, check the magnetos at 1800 RPM, which is adequate, or perform this check with the gear lowered in the water.

Prior to take off, be sure the landing gear is up and the pivot has been locked in the down position. To prepare for take off, determine the wind direction and position yourself at a point far enough downwind in the sea lane to provide adequate room for the take off run plus a possible emergency landing area in case of engine failure or aborted take off. The take off should be made as directly into the wind as possible, although a 90° crosswind component can be handled as high as 20 mph. To start the take off, the control stick must be held full aft while power is slowly applied to keep the bow high to minimize water coming over the bow and up onto the windshield. When the bow rises over the bow wave, full throttle is applied while holding the stick aft. As the airplane comes up onto the step, the stick should be eased forward to neutral, permitting the airplane to assume a natural planing attitude. The TEAL planes almost at once, so do not hold back stick over 4-5 seconds. During planing the TEAL is exceptionally stable, with more than adequate control available to maintain the desired attitude. The airplane should be accelerated to 65 mph on the water; then lifted off and climbed as previously described in this section. When water operations are to be terminated, the landing gear should be lowered to improve inflight cruise performance once the water area has been departed.

LANDING ON WATER

When preparing to land on water, two major differences from land landings must be realized:

(a) be sure the landing gear is raised - use the checklist and note the landing gear position light.

(b) establish wind direction from water surface conditions. Wind direction is easier to determine as velocity increases, since surface chop and wind streaks become more pronounced.

Most bodies of water permit landing directly into the wind. When the wind velocity is under 10 mph, inland water bodies tend to become calm and appear glassy. While a landing can be made safely in any direction under such conditions, it is extremely difficult to judge height above the water surface. Carefully read the following paragraph concerning water landings, placing particular emphasis on the technique when landing under GLASSY WATER conditions.

The approach is normally made with power, the touchdown attitude being the same as the planing attitude; i.e., with the bow somewhat lower than for the three point attitude used with land landings. The procedure producing best touchdown results following flare is to establish a slight sink rate (not to exceed 200 fpm) holding the proper attitude, using power as required, until touchdown occurs. The airspeed following the flare maneuver should be between 60 and 65 mph and will automatically determine the correct attitude. It is important during this phase to hold the airplane attitude as steady as possible to achieve a constant sink rate. The technique just described is a necessity when operating under GLASSY WATER conditions where the height above the water is impossible to detect accurately. Under such conditions a steady let down of 100-200 fpm should be held right onto the water surface. Upon touching the water, the throttle should be immediately closed and the attitude of the airplane held fixed in the planing condition until the airplane starts to come off the step. At this point, a slight nose up motion occurs which can be minimized by easing the stick full forward. When forward motion stops, the landing is complete.

OPERATIONS ON THE WATER

Taxiing the airplane in unobstructed water areas under low wind and sea state conditions is extremely pleasant and easy. The engine controls must be in the same position as for all ground operations; i.e., mixture FULL RICH, propeller control FULL FORWARD in low pitch and carburetor heat FULL COLD. When the wind conditions are no greater than about 10 mph, the airplane can be steered to any heading with only the aerodynamic rudder, leaving the landing gear and water rudder in the up position. This configuration has the dual advantage of permitting fast taxi on the step and the use of lower power settings with cooler engine operation. Taxiing on the step is achieved by starting a normal take off until the planing condition is reached and then retarding the power enough to hold the desired speed. The power required generally is about 2000 RPM.

While taxiing on the step, turns can be made by using the aerodynamic rudder to control the turn and using the ailerons to control the bank angle. A bank with the turn should be used to reduce the outward side force. However, the limitation here is keeping the inboard float out of the water; although with the TEAL tip float design occasional float skipping on the water need not be a matter for concern.

If wind conditions increase to a point such the airplane tends to weathercock beyond the controllability of the air rudder, it will be necessary to lower the tail wheel to provide water rudder steering. To lower the main gear in the water, the landing gear pivot must first be raised (raise only when on the water) to provide the required air cylinder assistance to overcome

the bouyancy of the tires. After the pivot is raised, the gear is lowered in the normal manner with the forward airplane speed as low as possible. While the gear is down in the water, the pivot must be left in the raised position. Directional control with the gear down is excellent and the airplane can be controlled in winds of over 20 mph. Care should be exercised to avoid use of prolonged high engine powers while taxiing with the gear down to prevent engine overheating. Power in general should be limited to about 1200 RPM. Increased steering power can be obtained by increasing engine RPM and forward speed, but should be limited to the minimum necessary.

To raise the landing gear in the water, raise the gear in the normal manner and then return the pivot to the lowered position. Leaving the pivot in the raised position may lead to landing gear actuating system damage if the gear is subsequently lowered in flight (as the result of rapid extension of the gear against the stops). If you find the pivot raised when you wish to lower the gear in flight, simply lower and lock the pivot down - then lower the landing gear. Always use the TAKE OFF/LANDING checklist.

BEACHING AND RAMPING

Beaching can be accomplished with the landing gear up or down depending on the beaching surface. On soft surfaces such as sand it is best to beach gear up similarly to a boat. If external assistance is not available during launching, beaching on a heading nearly parallel with the beach will enable the airplane to be swung so it heads somewhat outward from the beach prior to launching. Then the airplane can be taxied off the beach under its own power. Access to and from the cockpit can be gained by means of the beached wing by stepping on the retracted main gear, or over the bow. This beaching procedure is recommended with an onshore wind or current condition.

On hard surfaces such as a prepared ramp or rocky beach, beaching should be done gear down. Again the angling approach should be used to facilitate the launching operation. Where the airplane is to be brought up a ramp, the approach should be directly up the ramp centerline on a heading perpendicular to the beach. The approach should be made as slowly as possible so the wheels contact the ramp at minimum speed. After contact is made, power should be added until forward motion is established. Steering should be through the rudder, with speed kept to a minimum since wet brakes will be very ineffective. The brakes should be checked carefully coming up the ramp with slow speeds maintained after topping the ramp until brake effectiveness is regained. The TEAL disc brakes wipe quite rapidly and will become effective almost immediately.

Descending a ramp should be executed with caution due to the increased tendency to nose over when in the nose low attitude. Engine power should be set at idle with speed kept to a minimum by use of the brakes, with no abrupt braking.

When the airplane is parked or beached gear down on rough or soft ground, it should not be pushed backwards since this may cause the water rudder to bury and be damaged. Parking or beaching the airplane with the gear down in rough or soft ground should always be planned such that the departure route will be in a forward direction; i.e,, taxi out of the water onto the beach and head back towards the water before parking.

When beaching on the hull bottom with the tail in the water, care must be exercised to prevent the tail from submerging too deeply, since the openings for control cables and linkages in the tail area above the water line are not water tight. Rapid flooding of the after hull could occur in this situation. For this reason, beaches and ramps with steep inclines should be approached at an angle to prevent the tail from being forced too deeply into the water.

AIRPORT AND INLAND WATER AREA SURVEY

A listing by states of the number of airports, public seaplane bases and inland water areas in square miles are given in the table on page 20.1.

AIRPLANE SHUT DOWN

If another take off is not planned, all unnecessary electrical equipment should be turned off including the fuel boost pump while taxiing to the parking area. To shut down the engine, be sure it is relatively cool by idling for at least one minute, then run at about 800 RPM and pull the mixture control to idle cut off. When the RPM drops to about 200, close the throttle to minimize vibration as the engine stops. Then turn off the alternator, master and ignition switches and any other equipment in use.

FOLLOWING WATER OPERATIONS

If the airplane has been operated in water, it is best to drain the fuselage and tip floats prior to leaving the airplane rather than waiting until the next flight. This is particularly true if: (1) operations were in salt water and (2) if freezing temperatures are expected. In the first case, this procedure will minimize the threat of corrosion and in the second will eliminate water from freezing (preventing draining) and also causing possible locked (frozen) control cables in the hull.

Following salt water operation, the TEAL should be thoroughly washed off with fresh water with drain ports open using a hose with adequate flow volume and pressure. Permit thorough draining and then install hull and tip float drain plugs following wash down. While every part of the TEAL has been corrosion treated and primed prior to assembly, salt water should never be permitted to dry overnight on any airplane.

Inland Water Area in Square Miles[2]

State	Public[1] Airports	Public Seaplane[3] Bases	0-100	100-250	250-500	500-1,000	1,000-5,000	Over 5,000
Alaska	323	91						15,335
Texas	190	3					4,449	
Florida	102	5					4,308	
Minn.	105	21					4,059	
N.C.	37	-					3,645	
La.	43	12					3,417	
Utah	50	-					2,577	
Maine	43	42					2,203	
Cal.	222	7					2,120	
New York	55	25					1,647	
Wash.	85	9					1,483	
Wisc.	74	12					1,449	
N. D.	58	-					1,208	
Montana	100	-					1,402	
Michigan	112	5					1,197	
Okla.	81	-					1,032	
Va.	34	1				977		
Idaho	98	1				849		
S. C.	39	-				783		
Nevada	38	-				752		
Oregon	65	2				733		
Md.	14	-				703		
S. D.	55	-				669		
Neb.	78	-				615		
Ark.	49	-				605		
Ga.	66	-				602		
[illegible]	64	4				548		
Ala.	55	-				541		
Ky.	35	-				532		
Wyoming	37	-				503		
Miss.	42	-			493			
Tenn.	49	1			482			
Illinois	65	1			470			
Mass.	31	7			390			
Colorado	52	-			363			
Arizona	66	-			334			
Vermont	9	-			333			
[illegible]a.	59	4			326			
N. J.	19	7			315			
N. H.	13	-			290			
Iowa	62	1			258			
Ohio	45	2			250			
Kansas	102	-		216				
N. M.	41	-		156				
R. I.	6	-		156				
Conn.	14	6		110				
Indiana	42	-		106				
W. Va.	15	-		102				
Delaware	3	-	79					
Hawaii	16	-	9					
D. C.	3	-	8					

1. From FAA Report published Jan. 1, 1964.
2. Permanent inland water areas such as lakes, reservoirs and ponds 40 acres or more in area; streams, sloughs, estuaries and canals 1/8 of a statute mile or more in width; and sheltered bays and sounds. (From 1964 World Almanac and U.S. Census.)
3. From 1965 AOPA Airport Directory

SECTION III EMERGENCY PROCEDURES

ENGINE FAILURE

If engine failure occurs, the primary rule of flight governs the immediate action to be taken - and that is to maintain flying speed. Immediately set up a safe gliding attitude; then, if altitude permits, attempt to remedy the cause of the engine failure through the procedure outlined below.

In rapid succession:

(a) Check that fuel tank valve is ON one tank
(b) Mixture FULL RICH
(c) Fuel boost pump ON
(d) Throttle 1/4 open

The engine should never be started at full throttle, since a momentary and serious overspeeding of the engine would result.

If engine failure has been caused by fuel starvation, the foregoing steps should be sufficient to re-establish engine operation.

If the engine failure has been caused by carburetor ice, immediate application of carburetor heat may clear enough ice to restart, although this is considered doubtful. (Review of Section II of this Manual as well as the Lycoming Operators Manual covering use of carburetor heat prior to initial flight will provide background for application of emergency carburetor heat.)

ENGINE FAILURE DURING TAKE OFF

In the event of engine failure during take off, LAND STRAIGHT AHEAD. As many as possible of the following operations should be performed in the order given:

(a) landing gear UP unless sufficient runway is available STRAIGHT AHEAD for a landing in the normal DOWN position.
(b) battery and generator and ignition switches OFF
(c) fuel selector OFF, if time permits, otherwise OMIT
(d) cockpit side windows open.

ENGINE ROUGHNESS

If engine is popping and losing power during take off and sufficient runway for a straight ahead landing does not exist, continue the take off at reduced power and come back around for an immediate landing. The trouble may be fouled plugs or wet ignition, permitting TEAL operation on reduced power sufficient to return to a runway.

ENGINE FAILURE DURING FLIGHT

The best speed for maximum glide distance is estimated to be 75 mph and this speed should be established immediately and in conjunction with a turn to the intended landing area. The engine restart procedure should be immediately commenced, particularly if the cause is suspected to be carburetor ice. If the engine will definitely not restart, place the propeller pitch control to full aft (high pitch) position to reduce the drag. The landing gear should be down when gliding for distance, retract just prior to contact with a rough surface.

LANDING WITH NO POWER

Once the landing area has been determined to be definitely within gliding distance and the final approach has been established, the airspeed should be increased to 80 mph to provide sufficient control in turbulence and permit a comfortable flare. The landing gear should be UP except for a landing on a prepared runway.

PROPELLER FAILURE

Failure of the governor to operate properly may result in a runaway propeller. A runaway propeller goes to full low pitch and could result in an engine overspeed. When such a failure occurs, the only method of reducing engine speed is to throttle back and decrease the airspeed to bring the RPM within limits. Land as soon as practicable and correct the malfunction.

FIRES

ENGINE FIRE

Excessive priming may cause backfiring and possible induction fire. In such a case continue cranking or running the engine to draw the fire through the engine. If this fails to stop the fire, place the mixture control in idle cut off, shut off the master switch, exit the airplane and use a fire extinguisher on the fire.

FIRE DURING TAKE OFF

If a fire occurs during take off, a landing should be made as quickly as possible.

FIRE DURING FLIGHT

The best means of preventing engine fire is thorough rigid ground inspection and maintenance of those items which might fail and cause a fire. If a fire does occur during flight perform the following items:

(a) throttle CLOSED
(b) mixture IDLE CUT OFF
(c) propeller HIGH PITCH (low RPM)
(d) fuel tank valve CLOSED
(e) master switch OFF
(f) ignition OFF
(g) open side windows
(h) set up for EMERGENCY LANDING

ALTERNATOR FAILURE

An alternator failure would be indicated by a discharge reading on the ammeter. If this occurs, turn off all nonessential electrical equipment including the alternator and land immediately.

SECTION IV OPERATING LIMITATIONS

AIRPLANE

The airplane shall be operated within the following limitations as established by the Type Certificate:

GROSS WEIGHT (Refer to page 26)		2200 LB.
CG LIMITS-see weight manual -	@1900 lbs.	18.0 to 30.4%MAC
	@2200 lbs.	20.0 to 27.2%MAC
NORMAL ACCELERATION (G's)		+3.8G to -1.9G

AIRSPEEDS

MAXIMUM - LANDING GEAR UP OR DOWN	123 mph IAS
RAISING OR LOWERING GEAR	100 mph IAS
SIDE WINDOW OPEN SPEED	110 mph IAS
MANEUVERING SPEED* - 2200 lbs.	97 mph IAS

*The maximum speed at which you can use abrupt control travel without exceeding the design load factor.

MANEUVERS

All maneuvers are prohibited except for normal flying and stalls. For normal flying, the bank angle in turns and rolls should not exceed 60°. Stalls should be approached in a wings level attitude at a rate of no more than 1 mph per second; any amount of power may be used from idle to full. Recovery should be started immediately upon stalling by pushing the stick forward to regain flying speed and by adding power.

ENGINE

OIL TEMPERATURE	(ON GROUND - MAG CHECK)	100 to 180° F
	(DESIRED - IN FLIGHT)	160 to 180° F
	(MAXIMUM)	210°F BELOW 10°F Ambient Air
		245°F ABOVE 60°F Ambient Air
OIL PRESSURE	(START AND WARMUP)	100 psi
	(IDLE)	25 psi
	(NORMAL OPERATING)	60-90 psi
SPEED	(MAXIMUM)	2700 RPM
	(ON THE GROUND MAXIMUM)	2200 RPM
	(OVERSPEED - NO INSPECTION REQUIRED)	3200 RPM

SECTION V WEIGHT AND BALANCE

To compute the weight and balance for your particular airplane, use the Sample Problem, Loading Graph and Center of Gravity Moment Envelope as given on the following page. This procedure establishes TEAL operation within the prescribed weight and center of gravity limits. Refer to the weight manual for detail item weights, airplane empty weight, and airplane weight vs. cg envelope.

SECTION VI AIRPLANE CARE AND MAINTENANCE

With the proper care and maintenance, your TEAL will retain its new-plane performance and provide years of dependable service. The airframe is ruggedly built, with all structural aluminum parts alodined and painted with zinc chromate to prevent corrosion. This treatment permits operation of your airplane in salt water, provided the prescribed wash down procedures are followed. Magnesium is not used in the airplane due to its strong reactive properties when exposed to salt water. This section of the Manual provides the information needed to properly care for your airplane. For further information, contact your dealer or the factory.

GROUND HANDLING

On hard surfaces, the airplane may be easily moved in any direction by pushing on any structurally reinforced area. The water rudder should not be pushed as a means of turning the tail wheel since this will overstress the rudder and tail wheel mechanism. On soft or rough surfaces, the airplane should only be pushed in a forward direction, otherwise the water rudder and tail wheel support structure may be damaged by becoming buried.

MOORING ON LAND

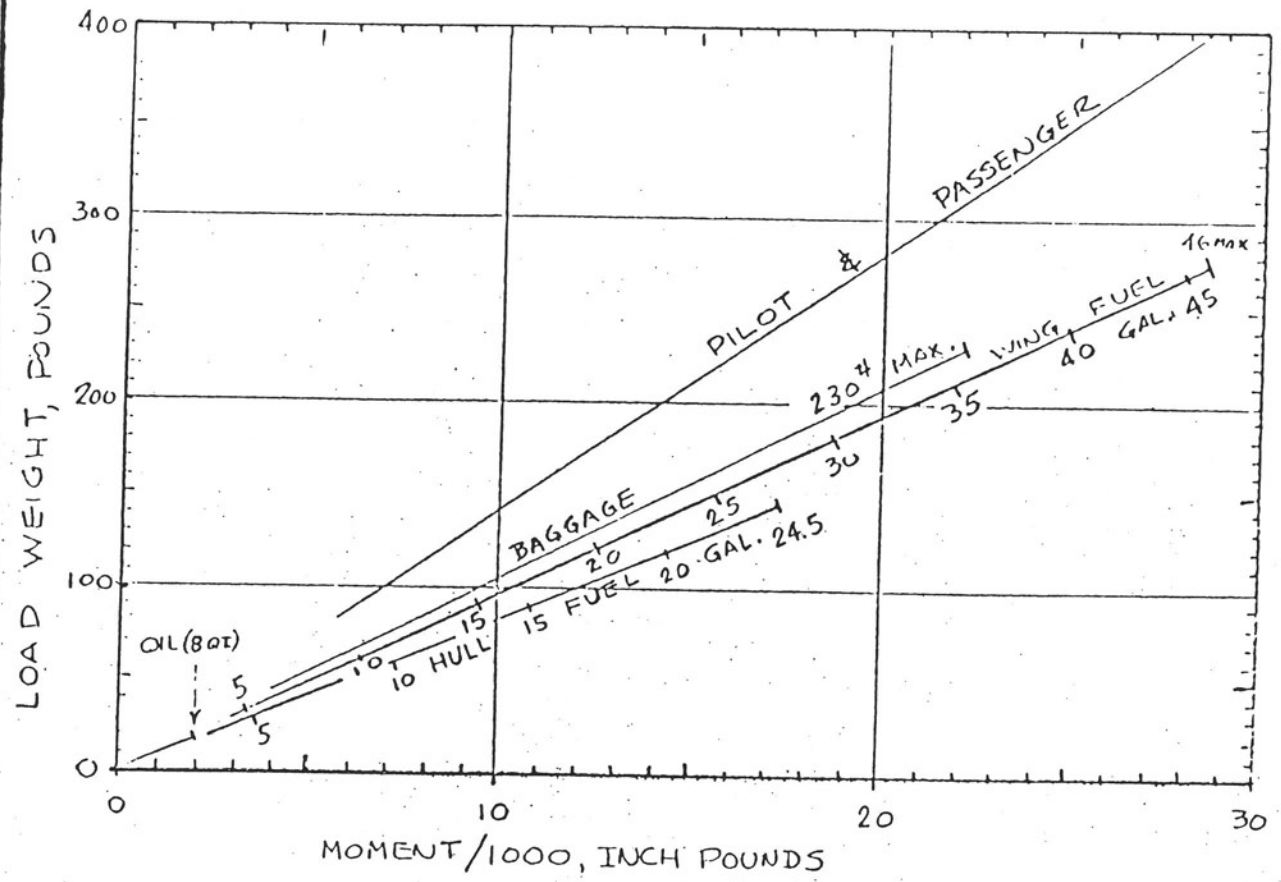
Proper tie down is the best precaution against damage to your parked airplane from gusty or strong winds. To tie down your airplane securely, proceed as follows:

(a) Spot the airplane in the parking area and check both wheels. Tail wheel should be centered in forward motion direction.
(b) Fasten one pilot's lap belt around the stick and pull the belt tight so stick is full back, with ailerons centered. If high winds are expected both seat belts could be used.
(c) Tie sufficiently strong ropes or chains to the wing float bumper support and the tail tie down fitting under the keel. Secure each rope to the ramp tie downs.
(d) Additional tie downs can be attached to bow mooring cleats

(cont'd on page 27)

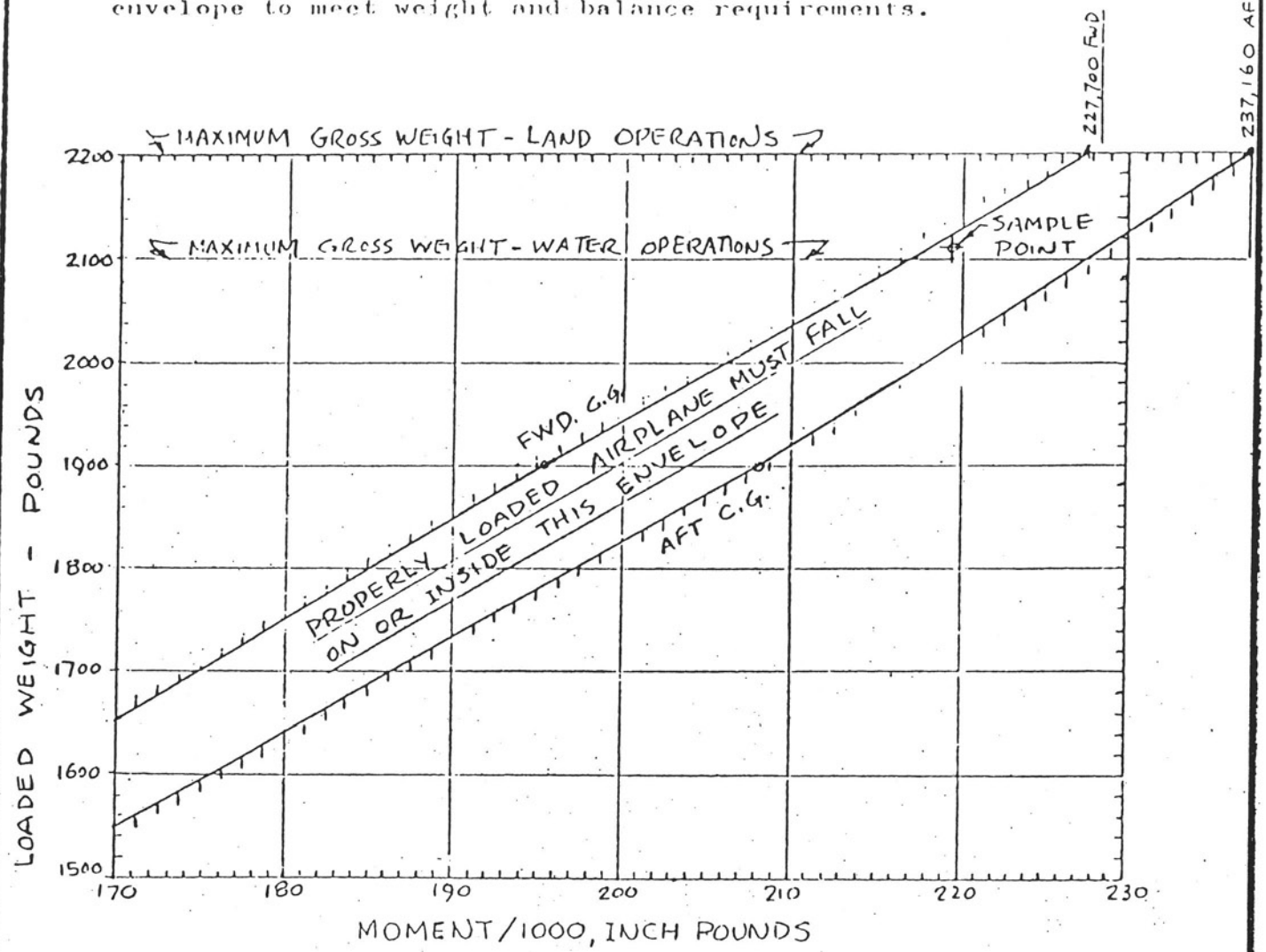
For calculation of proper loading, the following method may be used:

1. Find the point on each line of the next chart for your loading and record in the table below.



	Actual Problem			Sample Problem		
	Weight	Arm	Moment	Weight	Arm	Moment
Lic. Empty wt./equip.		---		1454	---	162,867
Oil (8qts = 15 lbs)		126		15	126	1,890
Wing fuel(46 gal=276 lbs.)		103		180	103	18,540
Hull fuel(24.5gal=147 lbs.		118		3	118	354
Pilot and passenger		71		340	71	24,140
Baggage		96		120	96	11,520
Totals		--		2112	--	219,311

2. Locate this final point (sample 2112#, 219,311 in-lbs) on the weight-moment chart below. This point and all points representing conditions throughout the entire flight must fall inside the envelope to meet weight and balance requirements.



WEIGHT LIMIT: 2200 LBS. OFF LAND
2100 LBS. OFF WATER

NOTE: The owner and pilot are responsible for meeting this requirement.

(e) Lock cockpit hatches and windows.
(f) Install canopy and engine covers.

A rudder lock has not been provided since the tail wheel steering springs provide sufficient support to hold the rudder under all but the most severe wind conditions. For these cases an external rudder lock can be made and installed at the owner's option.

MOORING ON THE WATER

Mooring on the water can be accomplished by tying a Y configured line to the cleats on each side of the bow. The two arms of the Y should be long enough to extend ahead of the nose.

As a general practice, mooring is not considered advisable for several reasons: Hull damage incurred on a landing may go undetected until the airplane took on a serious amount of water; Curious observers in boats may cause damage from bumping; and high speed boat traffic could collide with the airplane if the mooring site is not clearly visible for a sufficient distance.

WINDSHIELD AND WINDOWS

The plastic windshield and windows require careful treatment to prevent marring and scratching. The surfaces should be flushed with clean water to dislodge excess dirt and then, if required, washed with mild soap and water. Use a soft cloth or sponge but do not rub. An aircraft plastic windshield cleaner may be used if applied sparingly with clean soft cloths and dirt is not ground into the plastic.

PAINTED SURFACES

The painted exterior surface of your TEAL has a durable long-lasting finish which normally requires no polishing or buffing. The finish should be kept clean by washing with clean water and a mild soap. Waxing is not necessary; however, a good automotive wax can be used on the painted surfaces and propeller.

PROPELLER CARE

The propeller should be inspected after every flight for nicks and damage, especially along the leading edges near the tips. Nicks in these areas must be dressed out to relieve stress concentrations since cracks in the blades could result if the damage remained unattended. The blades should also be wiped off occasionally to remove grass and insect stains which may not only attack the finish but also reduce propeller thrust if allowed to build up. Never use an alkaline cleaner on the blades; carbon tetrachloride or a Stoddard solvent may be used. The blades may then be wiped down with an oily cloth. Propeller diameter may be reduced to 70 inches if tip damage occurs, but this work must be

performed by an authorized Propeller Repair Station qualified to rebalance the propeller.

INTERIOR CARE

The interior should be kept clean with a vacuum cleaner. Cleaning of plastic surfaces can be done by wiping with a damp cloth or using a mild soap for soiled areas.

LUBRICATION AND SERVICING PROCEDURES

The specific items that require servicing at the designated periods are listed following. Adherence to this schedule is a major factor in insuring trouble free operation of your airplane.

DAILY

DRAIN PLUGS

If the airplane has been operated in water or has been exposed to rain or snow, the four hull drains and the drain in each float should be removed and all entrapped water allowed to flow out. It is recommended that this be done immediately following water operation to minimize the possibility of corrosion; freezing inside the hull with the added hazard of freezing control cables; and forgetting to drain prior to the next flight. BE SURE ALL PLUGS ARE REPLACED AFTER DRAINING AND PRIOR TO FLIGHT.

WASHING THE AIRPLANE

Following every flight involving salt water operations, the airplane must be washed thoroughly with fresh water. This washing should precede the draining of the hull and floats.

FUEL TANK FILLER

Service after each flight with 80/87 minimum octane aviation grade fuel. The capacity of the tank is 24.5 gallons, 24 of which are usable.

FUEL SYSTEM AND FUEL TANK DRAINS

After fuel servicing and before each flight, drain the fuel system and fuel tank drains to check for contaminants, particularly water.

OIL SERVICING

Check oil level before each flight. The oil capacity is 8 U. S. quarts and it is recommended that the level be maintained above 6 quarts but not overfilled.

The airplane is delivered with straight mineral oil (non detergent) which must be used for the first 25 hours and then replaced with a detergent oil. The oil grades to be used are given in the Lycoming Operations Manual on page 3-11. If detergent oil is not used at the end of 25 hours, then detergent oil should not be introduced at a later time because it will dislodge accumulations on internal engine surfaces and create operating problems. If such a situation arises, consult with the engine manufacturer or your local airplane dealer.

TIRES

Check prior to each flight for condition and inflation. Main tires are inflated to 20 psi and the tail wheel to 35 psi. Do not overinflate as this will increase airplane structural loads.

EACH 25 HOURS

LANDING GEAR

Fill the two oil cups in the main landing gear.

The tail wheel retraction strut should be clean and sprayed with silicon spray.

Both of the preceding services should be performed more frequently if required due to frequent retraction of the landing gear.

BATTERY

Check fluid level and service as required. Check at least every 30 days if operating in hot weather. Use distilled water refill.

EACH 50 HOURS

ENGINE

The checks to be performed are given in outline form here but are listed in detail in the Lycoming Operations Manual:

(a) Check spark plugs, leads and harness
(b) Check oil suction and pressure screens for metal particles.
(c) Drain and renew lubricating oil, using a detergent oil grade recommended by Lycoming. Change oil every four months even though 50 hours have not been accumulated.
(d) Check oil lines for leaks
(e) Check exhaust system
(f) Check cooling system cowling and baffles
(g) Check cylinders and associated parts
(h) Check fuel system in engine compartment

(i) Check induction system including filter and clean or replace as required.
(j) Check engine controls for freedom of operation or looseness.
(k) Check tension of alternator drive belt and condition.

EACH 100 HOURS

ENGINE

Check Lycoming Operator's Manual for details.

(a) Check fuel boost pump strainer and replace as needed.
(b) Check magneto breaker points for pitting.
(c) Test, clean and regap spark plugs to .016. Replace as necessary with Champion EM42E or equivalent.
(d) Check engine accessories for security.
(e) Check cylinders for condition.
(f) Check mounting bolts for security.
(g) Check pylon attachment fittings for security.
(h) Lubricate engine control linkages.

BRAKES

(a) Check fluid level in brake master cylinders and fill as required with MIL-H-5606 hydraulic fluid.
(b) Check condition of lines and all connections for leaks.
(c) Check brake discs for condition and shoes for wear. Replace as required.

WHEELS

(a) Lubricate main and tail wheel bearings with DUBOIS CHEMICALS (Div. of N. R. Grace & Co.) #MPG-2 multi-purpose grease.

FLIGHT CONTROLS

(a) Lubricate all control hinge bolts and pins using MIL-L-7870 general purpose low temperature lubricant.
(b) Check tension of all cables at 25 $\pm$5 pounds.

MISCELLANEOUS

(a) Lubricate entrance hatch hinges and latch mechanism.
(b) Lubricate seat adjustment mechanism with MIL-L-3545 grease.

EACH 400 HOURS

ENGINE

Check Lycoming Operator's Manual for details.

March 19, 1975

TO: TEAL Owners

FROM: David B. Thurston DBT

SUBJECT: Landing Gear Operational Check

When installing new air cylinders (part 1-5509-1) and at each 100 hour inspection:

1. Raise hull forebody off the ground sufficiently to permit the tires to clear and turn freely.

2. At the correct cylinder pressure of 250/300 psi, the landing gear struts (with wheels and brakes installed) should hang aft at about 45° from vertical. If the gear is then pulled down it should go back up to near the 45° position, and if raised it should return to about the same location.

3. Remember that in flight the drag action of the airstream will help to raise the gear from the full down position, and similiarly help to keep it from striking against the down lock too severely when it is being lowered from the retracted position. As a result, some outside physical assistance may be required during routine ground check tests.

SECTION VII - OPTIONAL EQUIPMENT

JANITROL CABIN HEATER AND DEFROSTER

The cabin heater is a Janitrol Model B-1500 Aircraft Gasoline Heater rated at 15,000 BTU/hr operating on 12 volts dc and 12 psi fuel pressure. The heater is located in the bow compartment and provides either heated or unheated air to the heater and defroster outlets under all ground and flight conditions and while taxiing on the water.

Gasoline to the heater is supplied through a tee connection in the fuel pressure gauge fuel line behind the instrument panel. The fuel line then passes into the bow compartment through a four inch diameter hole in the cabin forward bulkhead. Fuel is fed to a Bendix 476818-12V-N Electric Fuel Boost Pump which filters the fuel and boosts the pressure by 7.5 psi (from approximately 5 to 6 psi at the gauge) to approximately 12-13 psi. The fuel then passes through the Janitrol 14D11 Electric Pressure Regulator and Shutoff Valve (12.0 psi) where it is limited to 12 psi prior to entering the heater. The fuel boost pump, pressure regulator and shutoff valve, and the fuel connection at the heater are all steel shrouded and connected to an overboard drain on the left side of the airplane. Any leakage of fuel through this drain line must be investigated.

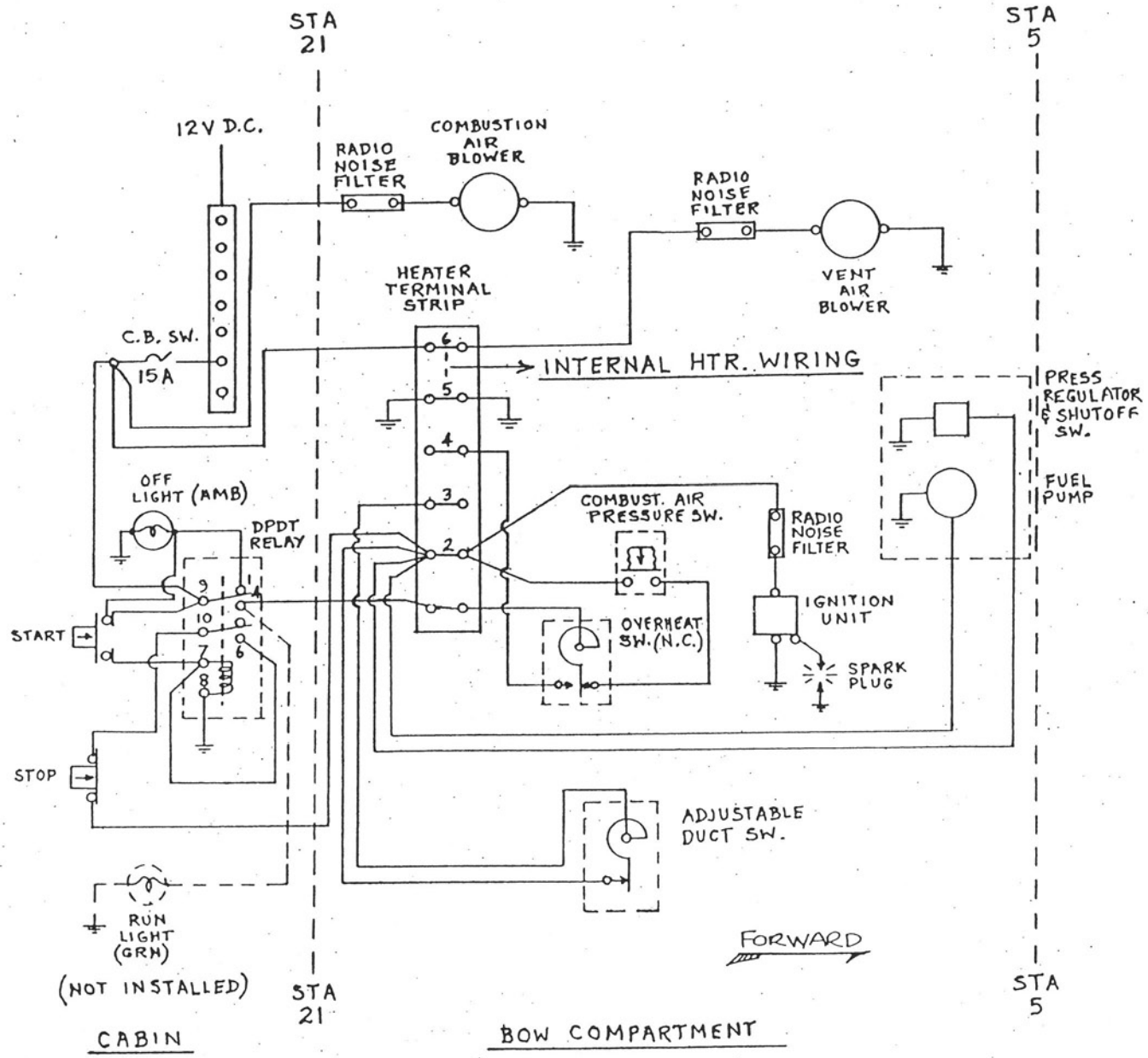
Electrical Power to the heater is through a circuit breaker switch on the instrument panel which turns on the ventilation air blower, the combustion air blower and the amber heater-off light. Igniting the heater is accomplished by momentarily pushing the start button which turns on the fuel pump, opens the shut off valve, ignites the spark plug and turns off the heater-off light. Pushing the stop button reverses this sequence. The blower must be permitted to run for two minutes after heater shut off to clear out any possible fuel in the heater and to cool down the heater.

Combustion air enters through an aft facing fairing on the left side of the bow compartment. It is forced into the heater by the electric combustion air blower. The combustion products are expelled out the right side of the bow compartment through an aft facing stainless steel fairing. The exhaust pipe connecting the heater to the exhaust fairing is a stainless steel tube which is shrouded by a $2\frac{1}{2}$ inch diameter stainless steel tube. Ground operation with the wind blowing from the right side and the right window open should be avoided to prevent exhaust gases from entering the cabin. Heater should be off during water take offs and landings.

Ventilation air is circulated from the cabin to the heater compartment through the four inch bulkhead hole. Air is forced into the heater by the ventilation air blower and the heated air is then directed back into the cabin through the vent air box. A door mounted on the vent air box directs air to the cabin or defroster in any proportion selected by the pilot, using the

defroster control knob on the instrument panel. A thermostatic duct switch is mounted in the vent air box and is adjusted by the temperature control knob on the instrument panel. Any temperature setting between full hot and full cold can be made.

Access to the bow heater compartment is through the large rectangular hatch normally sealed by a fiberglass cover, sealant and eighteen screws. The hole is large enough to provide convenient servicing of all heater components.



CABIN HEATER WIRING DIAGRAM

VIII MODEL TSC-1A1 TEAL AMPHIBIAN DISASSEMBLY AND ASSEMBLY PROCEDURES

DISASSEMBLY

1. Electrical
   a. Disconnect battery, and tape cables in safe position.

2. Engine (30 Day Storage)
   a. Remove anti-collision light and tape connector in cowling.
   b. Remove top plugs (4) and install dessicant plugs.
   c. Attach dessicant plugs or bags to carburetor inlet and each exhaust pipe and seal exhaust pipes with plastic sheet.
   d. Cover entire engine cowling with plastic sheet and tape together at bottom to seal engine.

3. Wings (Instructions apply to both wings except where marked LWO for left wing only).
   a. Remove four (two top and two bottom) wing bolt access plates.
   b. Remove two aileron cable disconnect access plates on lower side of wing.
   c. Disconnect aileron (1) actuating and (2) idler cable turnbuckles.
   d. Remove baggage compartment floor and back panels and loosen back end of side panels.
   e. LWO: Disconnect pitot and static lines near station 112 at left lower corner; and pitot heater, stall warning and landing light wires at terminal board.
   f. Disconnect navigation light wires in hull at station 112 Left: at terminal strip; Right: Quick disc. (back of upholstery).
   g. LWO: Cover pitot head, landing light and stall warning indicator with protective padding.
   h. Install aileron lock battens.
   i. Support wing panel and remove in order, (1) rear bolt, (2) upper bolt and (3) lower bolt.
   j. Remove wing and pull flexible lines and wires through hole in fuselage.
   k. Tape together the aileron cable ends on the wings and fuselage.
   l. Reinstall access panels on wings.

4. Horizontal Tail
   a. Remove elevator trim tab cable fairing on top of horizontal tail.

DISASSEMBLY (CON'T)

4. b. Disconnect elevator trim tab cable from (1) trim tab (2) attaching clip; then remove hold down clamp.
   c. Disconnect elevator push rod at elevator.
   d. Remove horizontal stabilizer (1) forward bolts and (2) rear bolts; remove stabilizer and elevator as a unit.
   e. Tape down elevator trim tab cable and elevator actuating rod.
   f. Install elevator trim tab cable fairing on stabilizer.

5. Hull and Landing Gear

   NOTE: Items (a) through (h) are performed to permit loading in truck trailer.

   a. Place airplane in horizontal attitude on cradles or jacks (raise tail first).
   b. Raise landing gear.
   c. Remove main wheels and axles.
   d. Remove brake discs and install separator between brake shoes.
   e. Install axles and discs in wheels.
   f. Detach brake line from upper strut clamp.
   g. Place brake assembly on inside of strut and bolt in place (tape shim material to brake assembly to prevent loss).
   h. Provide sign in cockpit warning against brake pedal actuation.

   NOTE: Brakes should not require bleeding if brake shoes are held in place with no fluid loss. If fluid loss at the shoes occurs, system bleeding may be required.

   i. Drain fuel completely through tank and system quick drains.

MODEL TSC-1A1 TEAL AMPHIBIAN DISASSEMBLY AND ASSEMBLY PROCEDURES

ASSEMBLY

1. Hull and Landing Gear

NOTE: Items (a) through (i) to be performed only if wheels have been removed and brake assemblies repositioned.

a. Place airplane in horizontal attitude on cradles or jacks (raise tail first).
b. Remove bolts holding brake assembly on struts.
c. Place brake assembly on outside of strut and bolt in place with wheel axle.

NOTE: (1) Insure that wheel alignment shim material stays in place.
(2) Insure brake shoe spacer stays in place to prevent brake shoe from falling out resulting in fluid loss and need to bleed the brakes.
(3) Torque wheel bolts to 20 foot-pounds.

d. Place brake disc on brake assembly and between brake shoes (remove brake shoe spacer).
e. Install wheels.
f. Attach brake line to upper strut clamp.
g. Lower and lock down landing gear.
h. Check brakes (bleed only if required).
i. Lower plane to ground.

NOTE: Do not connect battery until entire assembly of aircraft wiring is completed.

2. Horizontal Tail

a. Remove elevator trim tab cable fairing from stabilizer.
b. Remove tape from elevator trim tab cable and elevator actuating rod.
c. Hold horizontal stabilizer and elevator as a unit above vertical fin and route elevator trim tab cable through the holes in the stabilizer skins.
d. Place horizontal stabilizer in position and bolt in place (four front and six rear bolts).

NOTE: If there is difficulty in seating stabilizer, place one rear bolt on each rear attachment and pull down stabilizer leading edge to align front attachment holes.

e. Attach elevator actuating rod.
f. Hold elevator at neutral and lock in place with #30 size drill rod inserted in alignment hole at left side of vertica fin near the top.
g. Route elevator trim tab cable through attaching clip and lock in place.

ASSEMBLY (CON'T)

2. h. Install hold down clamp loosely.
   i. Attach cable end to trim tab and adjust length at cable end to obtain proper travel: UP $7\frac{1}{2}° \begin{smallmatrix}+2\frac{1}{2}° \\ -0\end{smallmatrix}$; DOWN $21° \begin{smallmatrix}+2° \\ -0\end{smallmatrix}$

   NOTE: If proper travel cannot be attained, reposition cable relative to attaching clip to provide sufficient travel to permit proper adjustment.

   j. Tighten hold down clamp.
   k. Install elevator trim tab cable fairing.

3. Wings (Instructions apply to both wings except where marked LWO for left wing only)

   a. Remove access panels on wings.
   b. Untape aileron control and idler cables at fuselage.
   c. LWO: Support wing near attachment points and feed through the hole in fuselage, in order, (1) two flexible lines (2) two large wires and (3) two small wires.
   d. Pull the bundle of lines and wires from inside cabin and feed aileron control and idler cables through wing holes as wing is brought to fuselage attaching points.

   NOTE: Right wing has one navigation light wire to be routed same as in c and d above.

   e. Support wing panel in place and (1) temporarily place tapered bolt in upper fitting (2) install lower bolt with washer under head (3) install upper bolt with washer under head and (4) install rear bolt with washer under head. (All bolts heads are forward).
   f. Install all nuts with washers and torque as follows: large wing beam bolts - 70 foot-pounds; small wing drag bolts - 10 foot-pounds.
   g. Lock the following items in their neutral positions:
      1) Control stick with centering board or template.
      2) Aileron bellcranks with #40 drill rod through access hole in wing lower surface.
      3) Ailerons
   h. Connect aileron control and idler cables turnbuckles.
   i. Tension aileron control and idler cables separately to 25 $\pm$5 pounds.
   j. Remove all locking devices and check travel of ailerons to following values: UP $30° \begin{smallmatrix}+3° \\ -0\end{smallmatrix}$; DOWN $20° \begin{smallmatrix}+3° \\ -0\end{smallmatrix}$

   NOTE: Adjustment, if required, should be made by lengthening or shortening aileron pushrods.

   k. LWO: Connect four wires (navigation light, stall warning, pitot heat heat and landing lights) to terminal strip at station 112 with matching colors.

ASSEMBLY (CON'T)

NOTE: Right wing navigation light wire is connected at quick disconnect.

3. l. LWO: Connect pitot and static flexible lines using drain connectors near station 112.
   m. Install all access panels on wings.
   n. Remove protective covering on landing light lens, pitot head and stall warning indicator.

4. Engine (30 Day Storage)

   a. Remove plastic sheet covering from cowling.
   b. Remove dessicant plugs and bags from carburetor inlet and each exhaust pipe.
   c. Remove dessicant plugs from spark plug holes and install spark plugs: torque to 300 - 360 inch-pounds.
   d. Install anti-collision light.

5. Electrical

   a. After all electrical connections are completed, insure all switches are off: Then connect battery and check out systems.

THURSTON AIRCRAFT CORPORATION

IX. RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 1

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE	MODEL	SERIAL NO.	REGISTRATION NO.

ITEM	PROCEDURE	STATUS
	A. PROPELLER GROUP	
1.	Inspect hub parts for cracks.	
2.	Check propeller mounting bolts for security & safety.	
3.	Check pitch actuating arms and bolts.	
4.	Check for grease and oil leaks.	
5.	Inspect blades for nicks and cracks.	
	B. ENGINE GROUP	
1.	Check spark plugs for .016 gap, replace or clean plugs as required, re-torque plugs per engine specifications.	
	Check spark plug leads and harness for fraying, chafing and security.	
3.	Check oil suction and pressure screens for metal particles.	
4.	Drain and re-new lubricating oil, using a detergent oil grade recommended by Lycoming.	
5.	Check oil lines for leaks.	
6.	Check intake and exhaust manifold for leaks.	
7.	Check magneto breaker points for pitting.	
8.	Check magneto for correct timing.	
9.	Check induction system including air filter and clean or replace as required.	
10.	Check fuel boost pump strainer and replace as needed.	
11.	Drain carburetor, clean carburetor fuel strainer and check fuel system for leaks.	

THURSTON AIRCRAFT CORPORATION

RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 2

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE	MODEL	SERIAL NO.	REGISTRATION NO.

ITEM	PROCEDURE	STATUS
	B. ENGINE GROUP (Continued)	
12.	Check throttle, carburetor heat, carburetor mixture, and propeller governor controls for travel and operating conditions.	
13.	Check all engine accessories for security.	
14.	Check alternator drive belt for tension and conditions.	
15.	Check cooling system cowlings and baffles for damage and security.	
16.	Check cylinders and associated parts.	
17.	Check engine mount for cracks and loose mounting.	
18.	Check fuel pumps for operation (engine driven and electric).	
19.	Clean screens on fuel pumps.	
20.	Check condition on flexible fuel and oil lines.	
21.	Check condition of all metal fuel and oil lines.	
22.	Check engine mounting bolts for security.	
23.	Check pylon attachment fittings for security.	
24.	Lubricate engine control linkages.	
	C. CABIN GROUP	
1.	Check control column, pulleys, cables and pushrods for security, chafing and ease of operation.	
2.	Check rudder pedals and brake cylinders for operation and leaks.	
3.	Check trim operation (rudder and elevator).	
4.	Check instruments, lines and attachments.	
5.	Check vacuum-operated instruments, and electric turn and bank for operation.	
6.	Check cabin doors and windows for scratches and cracks. Check doors and windows for operation.	

THURSTON AIRCRAFT CORPORATION

RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 3

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE	MODEL	SERIAL NO.	REGISTRATION NO.

ITEM	PROCEDURE	STATUS
	C. CABIN GROUP (Continued)	
7.	Check upholstery for tears.	
8.	Check seats, seat belts, securing brackets and bolts.	
9.	Check landing, strobe, navigation, cabin and instrument lights.	
10.	Check parking brake.	
11.	Remove baggage compartment and floor boards, check fuel and brake lines; aileron, elevator and rudder, trim and tail wheel retraction cables, and electrical wiring.	
12.	Check aileron, rudder elevator pulleys bellcrank and turnbuckle safeties.	
13.	Check all flight control stops.	
14.	Check bulkheads for damage in forebody section.	
15.	Re-install floor boards and baggage compartment.	
16.	Check for compass correction card in aircraft.	
	D. HULL OR FUSELAGE AND EMPENNAGE GROUP	
1.	Check stabilizer, elevator, fin and rudder and trim tabs for damage and operation.	
2.	Check control hinges, hinge pins and clips.	
3.	Check elevator horn and bellcrank.	
4.	Check tail wheel and water rudder for damage and operation.	
5.	Check antenna mounts for security and wiring conditions.	
6.	Remove all inspection covers in hull and empennage and check all contents inside these areas such as control cables, pulley bellcranks etc. for security or damage.	
7.	Check condition of bulkheads in aft section of hull.	

THURSTON AIRCRAFT CORPORATION

RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 4

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE	MODEL	SERIAL NO.	REGISTRATION NO.

ITEM	PROCEDURE	STATU
	D. HULL OR FUSELAGE AND EMPENNAGE GROUP (Continued)	
8.	Check fuel tank marked for capacity and octane.	
9.	Remove heater cover on front hull section and check general condition inside heater compartment. Check for fuel leaks and fumes. Check heater controls.	
10.	Check battery and cables; check battery water level.	
11.	Check all drain plugs for security and weep holes for clearance.	
12.	Check fuel and battery vents for clearance.	
13.	Check fuel drains for operation and security.	
14.	Check aircraft over for state of preservation.	
	E. LANDING GEAR GROUP	
1.	Put aircraft on jacks.	
2.	Remove wheels, clean and re-pack bearings.	
3.	Check brake drums and blocks.	
4.	Check wheels for cracks, broken bolts.	
5.	Check tires for wear.	
6.	Check gear attachment bolts.	
7.	Check brakes and hydraulic lines.	
8.	Retract gear and check for kinking of brake lines, operation of gear and gear lights, check landing gear pivot and light. Check UP and DOWN locks in relation to their lights.	
9.	Check tire pressure.	
10.	Check all grease fittings.	
11.	Check tail wheel retraction and clearance of water rudder to rudder.	

THURSTON AIRCRAFT CORPORATION

RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 5

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE MODEL SERIAL NO. REGISTRATION NO.

ITEM	PROCEDURE	STATUS
	F. WING GROUP	
1.	Check surfaces and tips for damage.	
2.	Check ailerons, remove all wing inspection covers, check all aileron attachments, cables, push rods and bellcranks and idlers for damage and operation.	
3.	Check wing attachment bolts.	
4.	Check wing floats and attachment.	
5.	Check for general condition inside thru inspection holes and outside for loose or popped rivets or other damage.	
	G. ENGINE RUN-UP	
1.	Check fuel selector valve, and fuel pump operation.	
2.	Check oil pressure and temperature.	
3.	Check fuel quantity and pressure.	
4.	Check alternator output.	
5.	Check manifold pressure.	
6.	Check parking brake.	
7.	Check carburetor heat.	
8.	Check gyros for noise and roughness.	
9.	Check cabin heater operation.	
10.	Check magneto switch operation.	
11.	Check magneto R.P.M. variation.	
12.	Check throttle operation.	
13.	Check propeller governor action.	
14.	Check radio operation.	

THURSTON AIRCRAFT CORPORATION

RECOMMENDED ANNUAL OR 100 HOUR INSPECTION SHEET 6

(✓) Indicates Satisfactory (X) Indicates Unsatisfactory

MAKE	MODEL	SERIAL NO.	REGISTRATION NO.

ITEM	PROCEDURE	STATUS
	H. GENERAL	
1.	Aircraft conforms to FAA Specifications.	
2.	All FAA Airworthiness Directives complied with.	
3.	All Mfgrs. service bulletins complied with.	
4.	All aircraft papers in order.	

I. LIST ALL DEVIATIONS BELOW AND SIGN FOR REPAIR AFTER CORRECTION ON INSPECTION RECORD OF AIRCRAFT REPAIR, ATTACH REPAIR RECORD.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Signature of Mechanic | Certificate No. | Date | Total Time on Aircraft

END
7150-M3
May 1971