FAA APPROVED AIRPLANE FLIGHT MANUAL

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H.H. Slaughter FAA

GRUMMAN SUPER WIDGEON G-44

Serial 1267

Equipped with Continental IO-470 E engines

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LIMITATION SECTION

Maximum gross weight 5500 pounds, land operations
Maximum gross weight 5200 pounds, water operations

C. G. range straight line variation 3800 to 4700 pounds (14.8-22.5)"
4700 to 5400 pounds (17.0-21.9)"

Positive maneuvering load factor flaps up 4.08 G's 38* flaps down 2.0 G's

Forward compartment limited to 200 pounds load @ - 50"

Rear cargo compartment limited to 400 pounds @ + 90"

Airspeed indicated mph and markings:

VR	62	water rotation
VSO	55	stall dirty----------bot of white arc
VMC	78	minimum control S.E.----------red radial line
VX	81	best angle of climb
1.3 Vso	85	fence speed
Vyse	95	best rate of climb single engine----blue line
Vs	65	Clean Stall speed----------bottom of green
VY	100	best rate of climb
Vfe	104	maximum flap---------- ---top white arc
Va	112	maneuvering speed (1.7) Vso
Vle	165	maximum landing gear speed
Vno	175	maximum structural cruise-------bot yellow arc
Vne	210	never exceed----------red line

HYDRAULIC SYSTEM

The reservoir holds ¾ gal. of 5606 fluid is located above and behind the left engine nacelle and supplies the electrical hydraulic pump from a line connected mid-way up inside the tank so that in the event of a system leak approximately half of the fluid will remain for emergency hand pump use, which is taken from the bottom of the reservoir.

The electric hydraulic pump supplies 950 pounds of pressure to actuate the landing gear and flaps. It is located under the pilot's seat. The pressure relief valve located above the pilot's head is set at 1050 pounds and will bypass fluid back to the reservoir if this pressure is exceeded. The accumulator is connected into the electric pump line and internal pressure is set at 1/3 system pressure absorbing hydraulic shock and provides residual pressure / fluid for emergencies. The hand pump handle is located next to the pilot's left knee and approximately 24 strokes are needed to lower or raise the landing gear. Resistance to the handle will indicate full gear extension or retraction. Emergency flap extension is done by holding the flap handle down and pumping the hand pump and they retract by returning the fluid to the reservoir.

FUEL SYSTEM

Fuel is carried in two fully usable integral main wing tanks 54 gallons each. The fuel shutoff valves are located behind the Co-pilot's head one for each tank and a cross flow valve. Only two valves are to be on at a time, otherwise both engines will fail as air is drawn into the system from the empty tank. This is a pressure cross-flow system, i.e. the electric boost pump on the tank being used may need to be on to push the fuel across to the other engine.

The two electric fuel pumps located below each tank should be used when the pressure drops and during takeoff and landing at extreme altitude or temperatures. The primer is a solenoid valve located under the engine and supplies raw fuel to the cylinders directly into the intake manifold to aid in starting, use it sparingly or flooding will occur. The mixture controls are located behind the pilot's head, up to lean and idle cutoff, down for rich.

IGNITION SYSTEM

The ignition switch is located in the middle of the forward overhead panel. It consists of two standard magneto switches and one center master magneto switch. The pilot may "bump" the master ignition on and off to slow the water taxi speed down in confined areas. Impulse couplings are installed on each magneto to aid in starting the engines by retarding and enhancing the spark at very low RPM.

PROPELLER SYSTEM

The Hartzell propellers are full feathering constant speed HC-C2YF-C2UF/FC8468-3 two blade 82-inch diameter props that will automatically feather in 3-10 seconds if there is a loss of oil pressure. Low pitch locks will keep the props from feathering during normal engine shut down, engaging around 600 rpm. Unfeathering can be done in flight by using the starter to start the engine in high pitch (just forward of feather) position on the prop control and then slowly increase rpm as the engine warms up being careful to not over speed.

ELECTRICAL SYSTEM

Two 51 amp, 12 volt alternators provide enough energy to charge two 25 amp. Hr. batteries and run all normal loads during single engine flight. . The batteries are located in the right wing just behind the engine nacelle. Circuit breakers are located overhead and on the lower panel and should be reset only once by the pilot. The fuse for the hydraulic pump is located under the pilot's seat. The interior lights and bilge pump bypass the master switch so they can be used at all times and the fuse is located at the battery in the right wing.

INDUCTION AIR SYSTEM

Alternate air is automatic when normal intake air is blocked. A spring door opens and air is directed from the rear of the engine compartment.

VACUUM SYSTEM

There is one engine-driven vacuum pump powering one common manifold capable of handling the entire system.

BRAKE SYSTEM

The hydraulic brakes for each main wheel are operated individually by toe brakes attached to the pilot's rudder pedals. The parking brake is set by lifting the knob between the pilot's pedals while pressing down on the toe brakes. Brake fluid is the DOT 5 Silicon brake fluid. Both brake reservoirs are located beneath the pilot's rudder pedals.

AILERON and ELEVATOR

Standard control column with throw over wheel.

RUDDER

Pilot has standard rudder and brake pedals, co-pilot has removable rudder bar

ELEVATOR TRIM

A hand crank over pilot's head operates the left elevator trim tab. Rotate the crank clockwise for nose up. The right trim tab is connected directly to the flap actuator by cable and aids in nose up trim when the flaps are deployed.

ELEVATOR BALANCE TAB

The balance tube must be firmly attached to the right tab's upper surface, it is a no go item. It serves two functions, flutter balance and as a stop to keep the tab from traveling upward since it is designed for downward movement only when the flaps are deployed, counteracting the nose down pitch you get with flaps.

RUDDER TRIM TAB

The hand crank is located on the right overhead panel. Rotate clockwise for nose right. Position indicator is located above the handle

STEP VENTS

There are square vents in the side of the hull just behind the step area that channel air to the keel area behind the main step to relieve the "suction" caused by the step at step taxi speeds and above while on the water. This aids in shortening the takeoff run.

WING FLAPS

On the right overhead panel there is a three-position hydraulic control lever for the flaps. Down - down, up - up, and the middle stops them at any position. The indicator is to the right of the flap handle. Do not use more than 30 degrees of flaps during normal landings. Nose-up trim may be exceeded with 40 degrees of flaps. The aircraft will pitch up severely if the flaps are retracted quickly to the full up position when going around. Use 10 degrees flaps for normal takeoff, 15 degrees for short field or short water takeoff and glassy water landings, 30 degrees flaps for normal landings. 5 degrees of flaps will aid in single engine performance. To retract the flaps, hold the lever up and the hydraulic fluid will return to the reservoir.

LANDING GEAR

A two-position control lever is located on the left overhead panel, up - up, down - down. Thumb latches are provided as safety locks and hold the gear selector in place while hand pumping. Gear indicator lights are located on the instrument panel immediately in front of the pilot, red -up, green - down, and amber-low pressure warning. The hydraulic system pressure gauge is on the right overhead panel. This is a closed system, i.e.: the hydraulic pressure locks the gear in place when up or down, the mechanical locks on the gear are the secondary locks. Do not lower the gear if you are in less than 4 feet of water, as it is not meant to lift the airplane. Always visually inspect the up mechanical locks are in place before landing on the water.

TAILWHEEL LOCK

Located on the left overhead panel is the tail wheel castor lock lever. It locks the tail wheel from turning and is used on takeoff, landing, ramping, and taxiing and will permit up to 5 degrees of turning when locked.

OPERATIONS

LAND TAKEOFF

The land takeoff ground run is approximately 900 feet at sea level with a gross weight of 5500 pounds, standard day, no wind. Apply brakes before retracting the landing gear to prevent excessive wear against the wheel pocket bumper pad.

WATER TAKEOFF

The duration of the takeoff run is 11 seconds at 5200 pounds on a standard - no wind day. Approximately 2000 feet is needed to clear a 50 foot obstacle

SINGLE ENGINE FLIGHT

In the event of an engine failure the power of the operating engine should be managed so that overheating will not occur. Maintain a speed just above VYse for best performance, 5 degrees flaps, up to 5 degrees of bank into the good engine, avoid rain, turbulence and ragged flying.

BEACHING

When approaching a beach with the intent of taxiing out, approach slowly at an oblique angle with the tail wheel unlocked, so that you can easily return to the water if you start to get stuck in soft sand. It may help to let some pressure out of the main tires before leaving the airport to give the tire a larger “footprint” in the sand.

SPRAY REDUCTION

The durability of the propellers is greatly reduced if they are subjected to severe spray. At idle taxi speed the bow wave lies flat and passes well below the propellers, as speed increases the bow wave moves rearward and the spray will strike the props causing severe erosion. The pilot should get onto the step as quickly as possible where the bow wave will be below and behind the props. Hold the elevator back until past the “hump”. Then the pilot should gently ease the backpressure lowering the nose with a slow - constant motion until on the step.

WEIGHT AND BALANCE

The FAA requires that a loading chart or device be prepared and made a part of the weight and balance report for each individual airplane. When the airplane is altered in the field the loading chart must be altered accordingly, so that the operator can determine the CG and gross weight. The CG limits are absolute. For weight up to 4700 pounds (14.85-22.5) inches aft LEW (datum line),and 4700-5500 pounds (17-21.9) inches aft the datum line. The pilot must use the latest weight and balance changes found in the schedule log in the weight and balance section of this manual. Weight and balance can be calculated easily on the flight loading page and double checked on the C G Envelope chart.

OPERATING INFORMATION

The single engine rate of climb chart in this manual is based on a maximum gross weight of 5500 pounds and the following:

Standard day
Critical engine inoperative
Inoperative engine propeller feathered
Operative engine at maximum continuous power
Mixture full rich
Carburetor air intake cold
Wings level
No deicers installed

PROCEDURE FOR SINGLE ENGINE FLIGHT

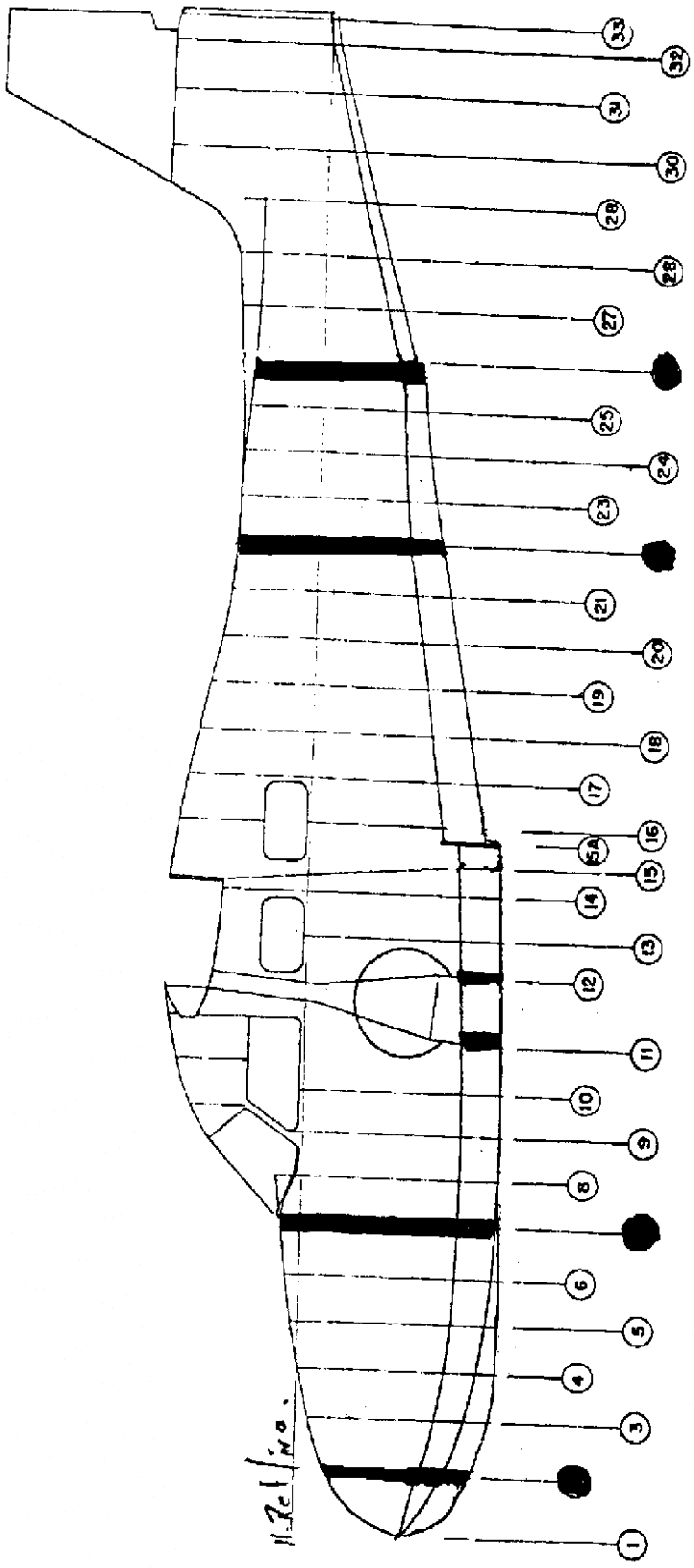
Mixture rich
Propellers forward
Throttles forward
Flaps up
Gear up
Identify
Verify

Feather propeller of inoperative engine. Continuation of Single engine checklist: (inoperative engine: mixture idle cut off, ignition off, fuel selector off, alternator off, 5 degrees bank into good engine, 5 degrees flaps)

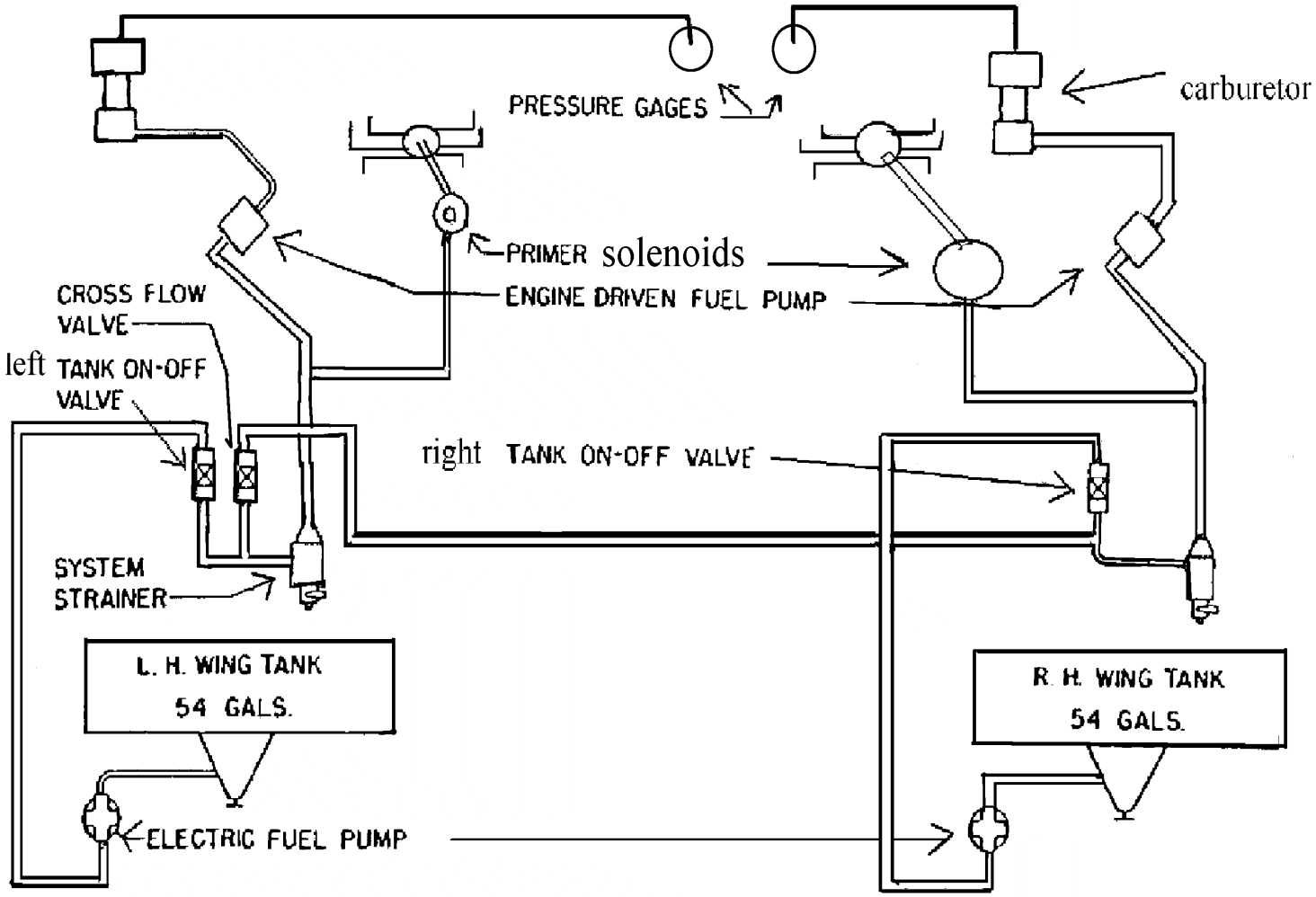
ENGINE DETAILS
Model IO-470E

Type certificate number	3E1
Number of cylinders	6
Cylinder bore	5.0
Piston stroke	4.0
Total displacement	471
Compression ratio	8.6:1
Rated maximum continuous BHP	260
Rated maximum continuous rpm	2625
Oil sump capacity	12 qts.
Minimum oil temperature for take off	75*F
Maximum allowable oil temperature	225*F
Maximum cylinder temperature	460*F
Firing order	163254
Ignition timing both mags.	20 degrees btc
Minimum fuel octane rating	100 LL
Minimum oil pressure at idle	10 pounds
Normal oil pressure cruise	30-60 pounds

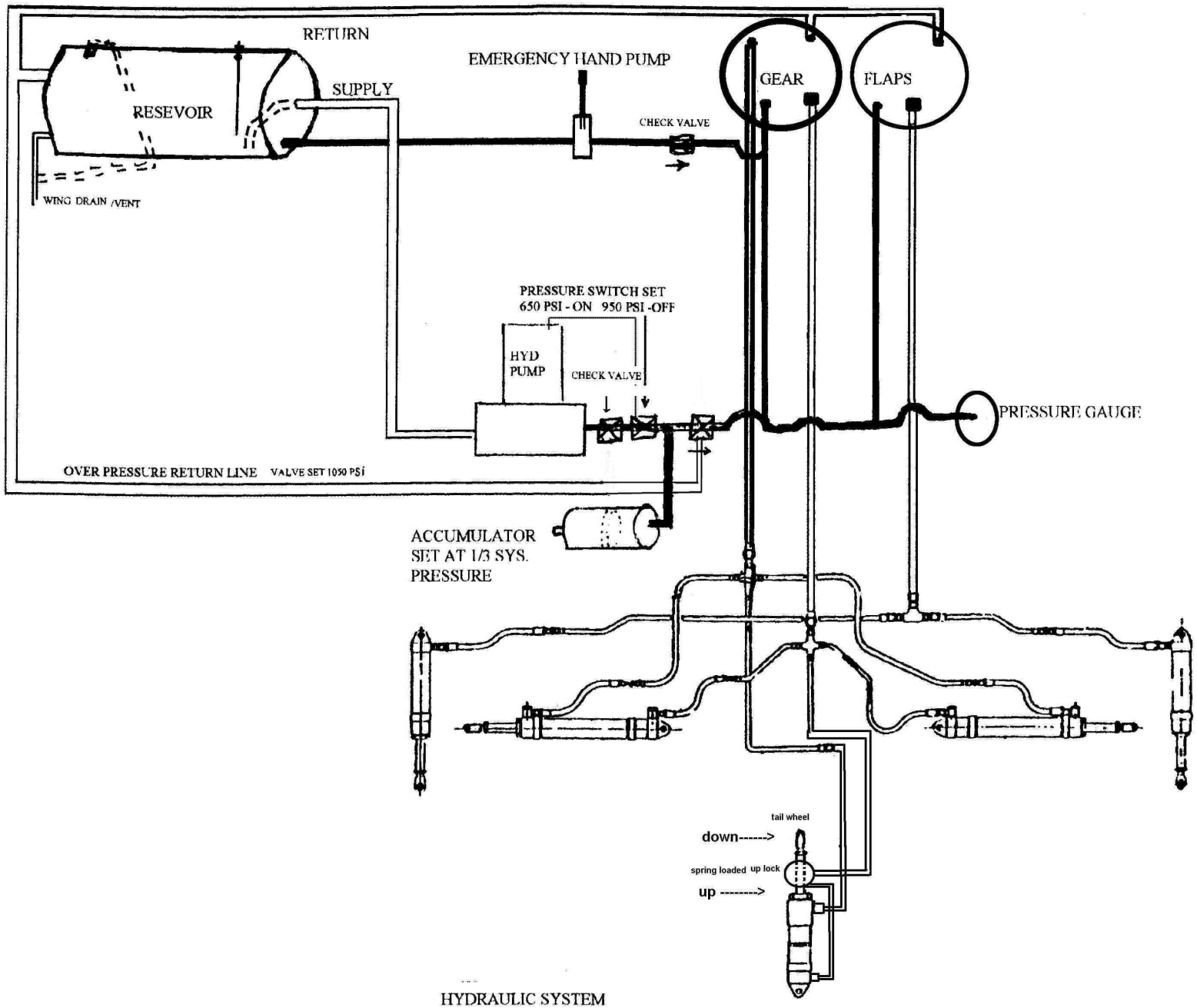
Mixture do not lean above 75 % POWER
At or above 65% lean best power 100 degrees rich of peak
Below 65% can be leaned to peak EGT



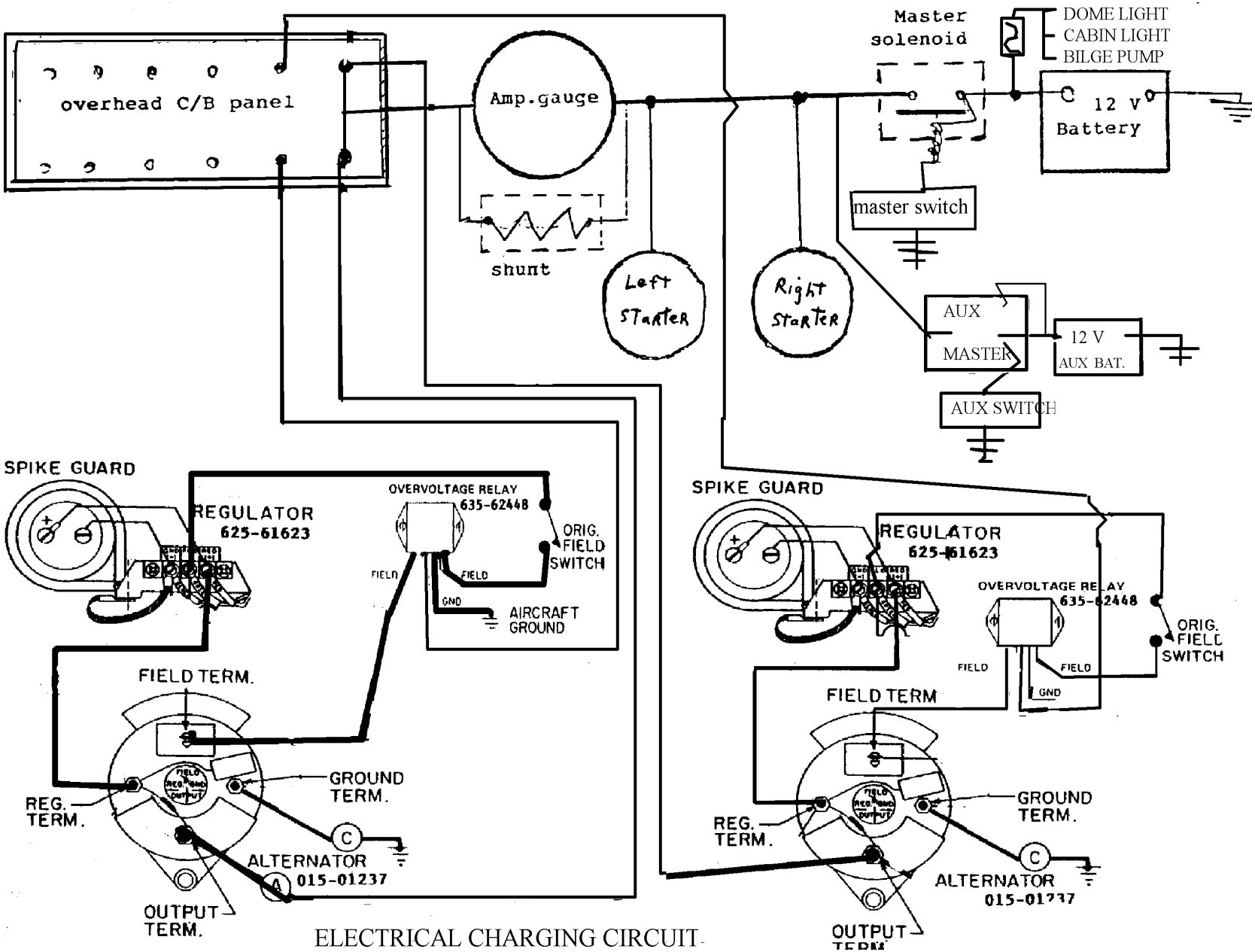
Bulkheads/water tight compartments



FUEL SYSTEM DIAGRAM

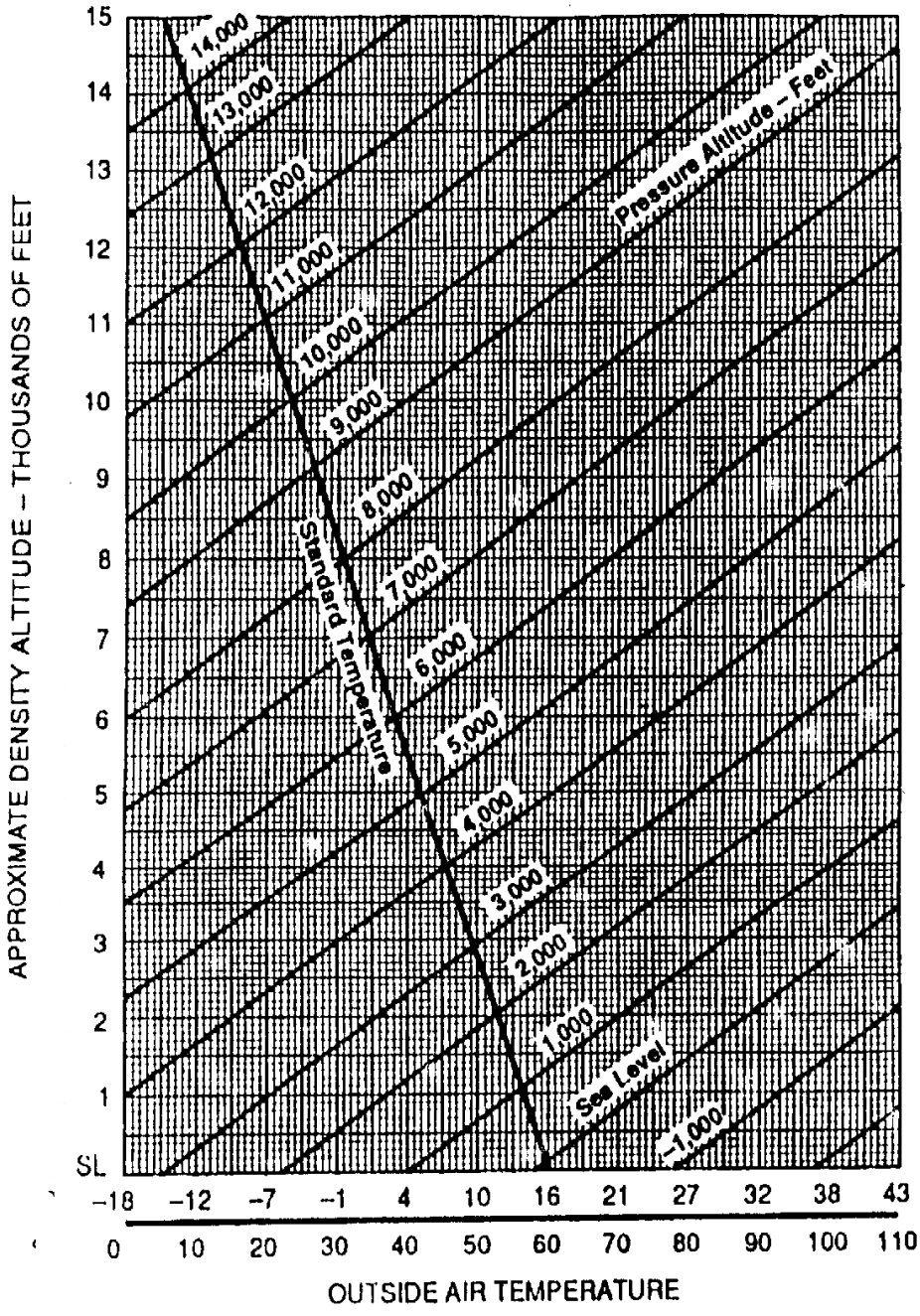


HYDRAULIC SYSTEM



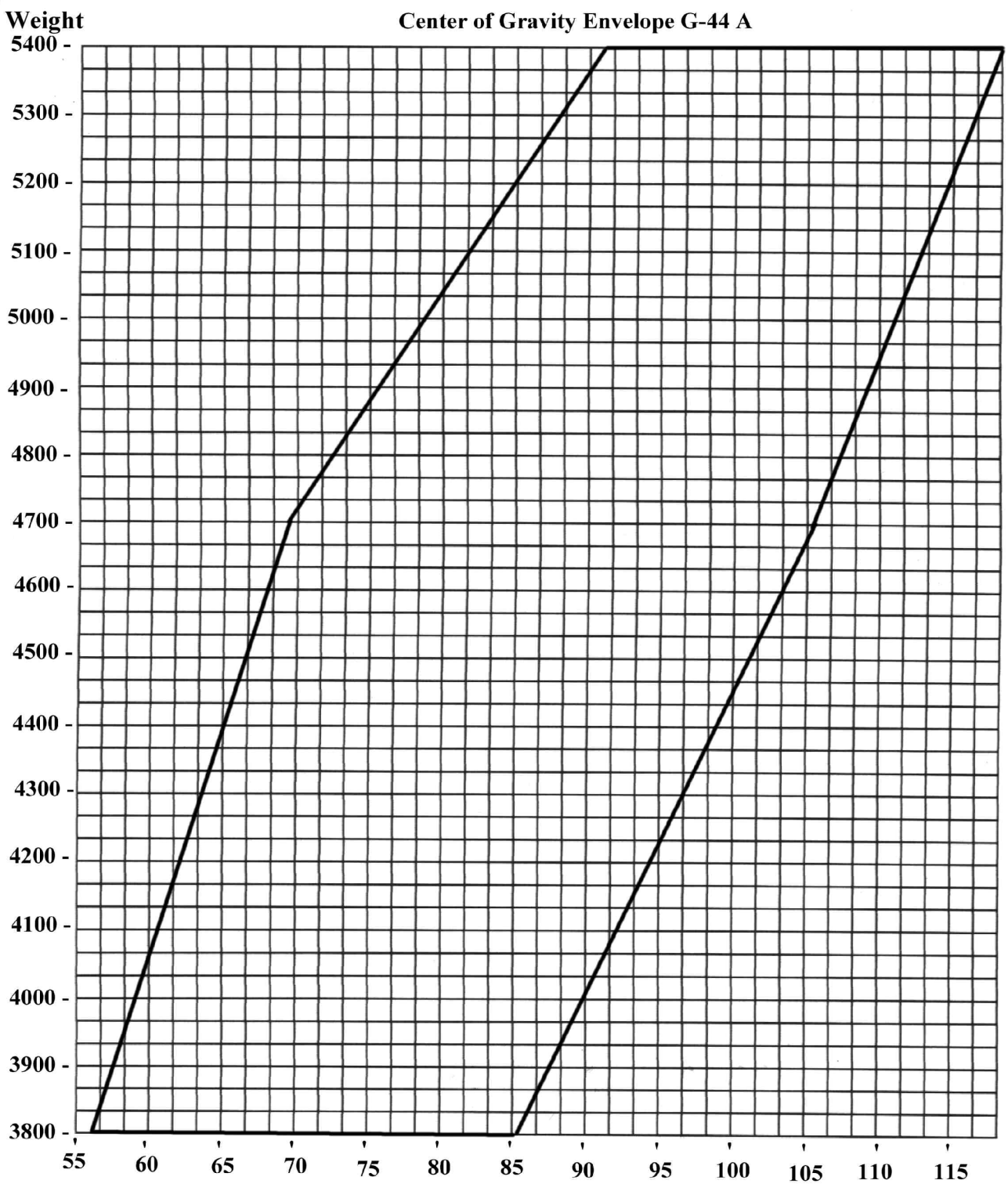
ELECTRICAL CHARGING CIRCUIT

DENSITY ALTITUDE CHART



Altimeter Setting (" Hg)	Pressure Altitude Conversion Factor
28.0	1,824
28.1	1,727
28.2	1,630
28.3	1,533
28.4	1,436
28.5	1,340
28.6	1,244
28.7	1,148
28.8	1,053
28.9	957
29.0	863
29.1	768
29.2	673
29.3	579
29.4	485
29.5	392
29.6	298
29.7	205
29.8	112
29.9	20
29.92	0
30.0	-73
30.1	-165
30.2	-257
30.3	-348
30.4	-440
30.5	-531
30.6	-622
30.7	-712
30.8	-803
30.9	-893
31.0	-983

FIGURE 24.—Density Altitude Chart.



C G limits 4700# =14.8 -22.5 5400# = 17-21.9
straight line variation

PREFLIGHT

WIDGEON **1**

1. **Nose compartment:** hatch closed, items stored
2. **Cockpit:** fire extinguisher checked, flight controls set, mags. off

EXTERIOR

1. **Drain Plugs Installed**, 11 hull, 2 in each wing float
2. **Horizontal Stabilizer Struts**, counter balance, right trim tab balance tube attached
3. **Rudder:** beacon, cables, hinges
5. **Right wing**, flaps, aileron, pitot tube, edge, wing float, prop.
6. **right oil level**, right fuel tank sump, right wheel
7. **windshield**, left side same as the right
8. **Topside**: check fuel quantity, hydraulic reservoir level

G—Gas on, cross-feed off.
U—Undercarriage, Hyd. Pressure, Locks
M—Mixture – Rich
P—Props Forward
F—Flaps 10-15 degrees take off / 15-38 landing
T—Trim – set
S—Stick – full aft, Aileron right

START

WIDGEON 2

1. **Door** locked, **Seatbelts** fastened, **Passengers** briefed
2. **Brakes** test and hold (land), check movement area (water)
3. **Fuel** on, **x-feed** off, **Mixture** rich, **props** forward, & **Throttles** cracked
4. **Master** on, all 3 **mag**. switches on, CLEAR
5. **Left Engine**: starter engaged
6. **Oil Pressure** checked, warm up 800 rpm
7. **Right engine** same as the left
8. **Switches ON**--Alternator, Electric masters, Radio, Lights
9. **Unlock** tailwheel
10. Check instrument movement while taxiing

RUN UP

WIDGEON **3**

1. Engine instruments in the green
2. Flight controls free and correct movement
3. **GUMPFTS**
4. Each engine 1800 rpm: feather check prop. vac pressure, amps., mag. check 150 drop max., cycle prop.
6. Hydraulic pressure, instruments, set radios
7. Takeoff briefing

VX 81

TAKEOFF

VY 100

1. Lineup, lock tailwheel (land), (water) Elevator back, Aileron right, Rudder as needed
2. When airspeed alive then stick forward pick up the tail, lift-off @ 81, climb @100 mph & Flaps up
3. boost pumps off @500 feet

AFTER T.O.

1. **Gear** up
2. **Throttles** 24”, props 2400

CRUISE

Power 23 x 2300,
Mixture set- 70 degrees rich of peak EGT

DESCENT

WIDGEON 4

1. Power 15” minimum
2. Emergency descent, 15”, gear and flaps down.

LANDING

1. **GUMPFTS** on downwind, (flaps after white line speed) normal 10 downwind, 20 base, 30 final / 15 glassy
2. **Approach Speed** Blueline (95), until “made”, power 12” normal , 16” glassy water
3. **Fence speed** 85, glassy water 75 mph - 16“ mph
4. Transition 5-10’ establish and maintain landing attitude

AFTER LANDING

1. (water) Power off, ease stick back, close windows, Flaps up after slowing down
2. Tailwheel unlocked
3. (water) ramping, gear down while in deep water, tailwheel locked

SHUT DOWN

1. Switches - off
2. mixture--idle cutoff
3. mags. & master-off
4. tie-down, control locks, door closed

WIDGEON

EMERGENCY CHECKLIST

ENGINE FAILURE

1. Maintain control, speed at least Vmc (78 mph Red Radial Line)
2. Mixture rich,
   - Props & Throttles **forward**
   - Flaps & Gear **up**
   - Identify, (Dead Foot-Dead Engine)
   - Verify (reduce throttle on suspect engine) & feather Dead Engine

Single Engine Checklist -

- Fuel, Mags. & Alternator-**off** ,
- dead engine secured--Then
- flaps 5 degrees
- reduce power to maintain Blueline (95) (save the good engine)

EMERGENCY CHECKLIST

LOSS OF HYDRAULIC PRESSURE

1. use the hand pump for the gear and to lower the flaps, check pressure
2. check c/b, check for leaks
3. gear may be forced down by opening the gear uplock viewing window behind the pilot, unlock the gear latch and use a paddle or long handle to push down and lock the gear.

LOSS OF ALTERNATOR

1. Check circuit breaker.
2. Down-load electric demand if needed

1 alt. Out = flight guard, two out = land as soon as practicable. Any c/b that "pops" can be reset only once

CROSSFEED

1. Select tank, crossfeed - on, other tank off
2. Only two fuel levers are to be down at the same time
3. Boost pump on the selected tank on to push fuel to the other engine.