FN-333

Riviera

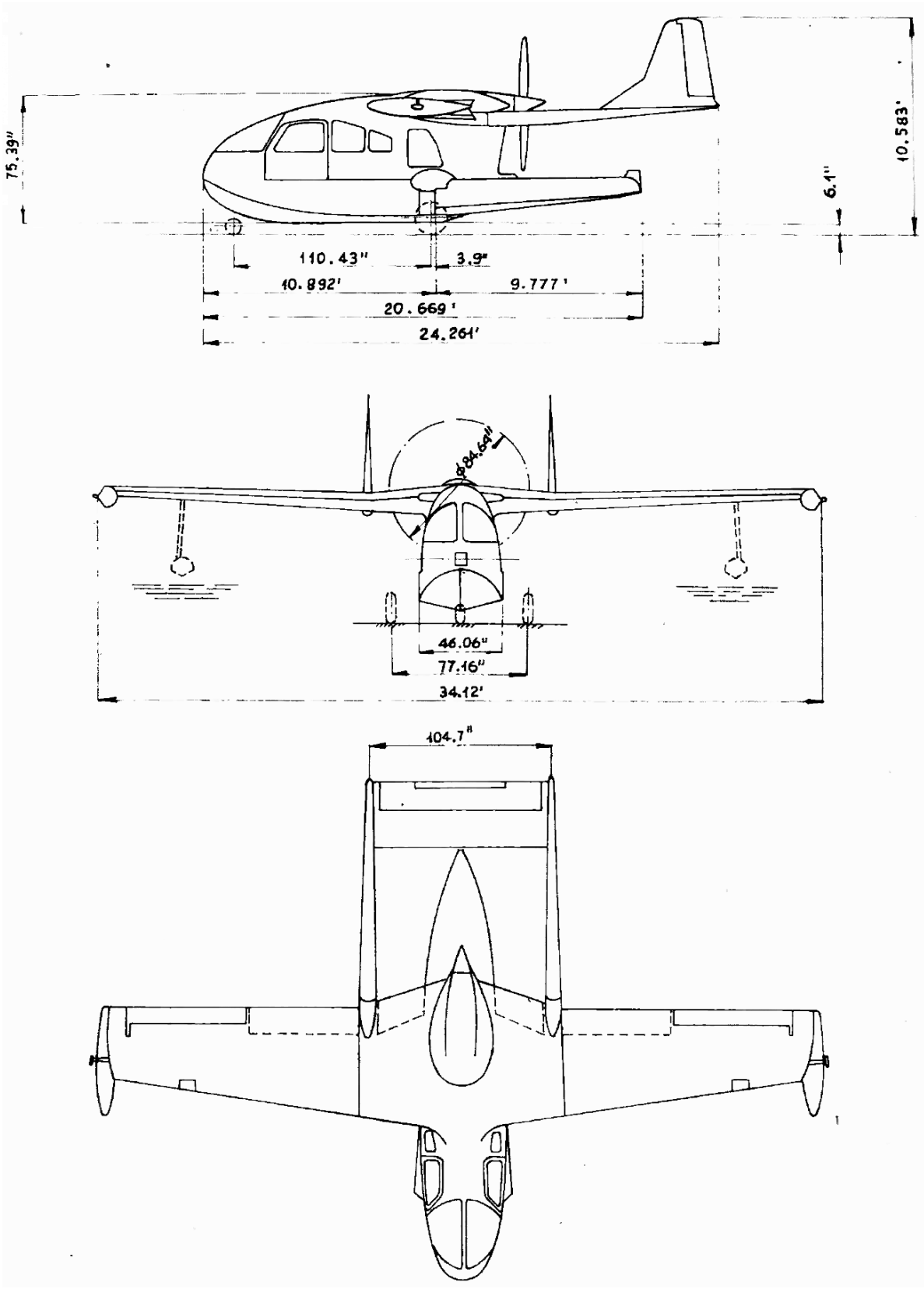
OWNER'S MANUAL

Mario Noriega Designs

Not for Real World operations

For Simulation Use Only

TABLE OF CONTENTS


75.39"
10.583'
6.1"
110.43"
3.9"
10.892'
9.777'
20.669'
24.261'
94.64"
46.06"
77.16"
34.12'
104.7"

SECTION I -

DESCRIPTION

ENGINE.

The FN-333 is powered by a Continental IO-470P horizontally opposed, six-cylinder engine, rated at 250 horsepower at 2600 RPM.

The engine utilizes a wet sump oil system, dual magnetos, continuous fuel injection and a jet augmenter exhaust system.

THROTTLE.

The Throttle (65, Figure I-1) has a knob and knurled friction adjusting sleeve by which proper friction drag may be applied to the throttle control.

To operate the control, grasp the knob between the thumb and two fingers and push in the knob to advance the throttle, or pull out to retard.

Turn the knurled sleeve clockwise to increase the friction drag and counterclockwise to decrease the friction drag.

> NOTE – Because of the constant speed propeller mechanism installed on the airplane, advancing the throttle will not increase the engine RPM.
>
> It will increase the manifold pressure. With each power increase, the constant speed propeller automatically takes a larger pitch, enabling the engine to run at constant speed at all times. Engine RPM can be changed by adjusting the propeller control. Refer to paragraph "Propeller controls" on page 1-6 for this procedure.

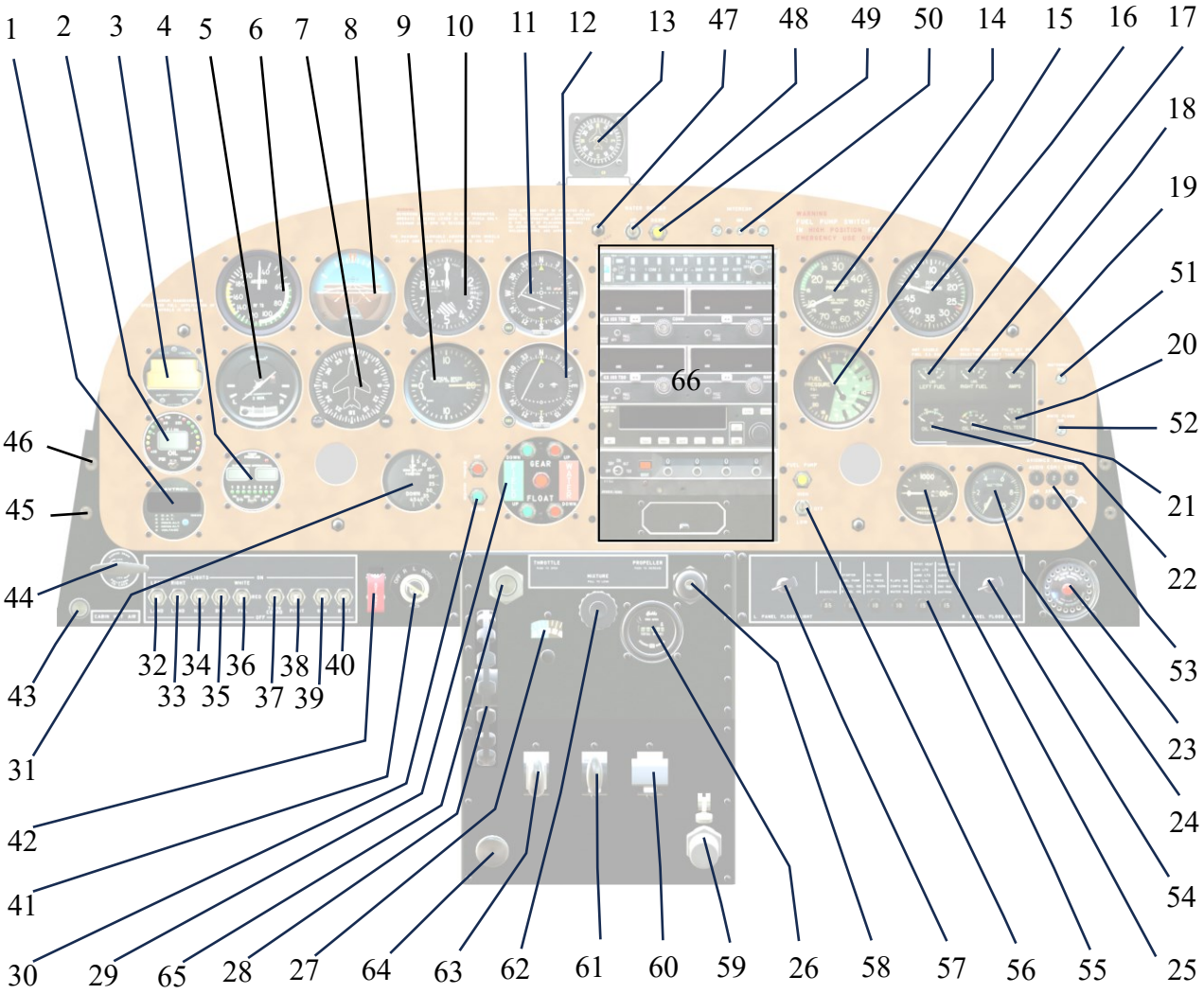


Figure I-1: Main Panel (Refurbished)

Description

1. DAVTRON M655 (*)
2. ENGINE OIL TEMP & PRESS (*)
3. CLOCK/CHRONOMETER (*)
4. ENGINE ANALYZER (*)
5. TURN COORDINATOR
6. AIRSPEED INDICATOR
7. GYROCOMPASS
8. ATTITUDE INDICATOR
9. VERTICAL SPEED INDICATOR
10. ALTIMETER
11. VOR 1
12. VOR 2 (*)
13. MAGNETIC COMPASS
14. MANIFOLD PRESSURE INDICATOR
15. FUEL PRESSURE INDICATOR
16. RPM INDICATOR
17. LEFT TANK LEVEL
18. RIGHT TANK LEVEL
19. AMMETER
20. CHT INDICATOR
21. OIL PRESSURE INDICATOR
22. OIL TEMPERATURE INDICATOR
23. STALL WARNING LIGHT & HORN
24. SUCTION GAUGE
25. HYDRAULIC PRESSURE
26. HOBBS METER (*)
27. ELEVATOR TRIM POSITION IND.
28. ELEVATOR TRIM CONTROL
29. GEAR FLOAT INDICATOR
30. NOSE GEAR POSITION LIGHTS
31. FLAPS POSITION INDICATOR
32. LEFT LANDING LIGHT SWITCH
33. RIGHT LANDING LIGHT SWITCH
34. NAVIGATION LIGHTS SWITCH
35. BEACON LIGHTS SWITCH
36. PANEL LIGHTS SWITCH
37. TURN COORDINATOR SWITCH
38. PITOT HEAT SWITCH
39. GENERATOR SWITCH
40. BATTERY SWITCH
41. IGNITION SWITCH
42. STARTER SWITCH
43. CABIN HEAT CONTROL
44. PARKING BRAKE
45. HEADSET JACK
46. MICROPHONE JACK
47. GNS-430 AS NAV 1 FUNCTION (*)
48. WATER RUDDER CONTROL
49. WATER RUDDER POSITION LIGHT
50. INTERCOM
51. INSTR. BACKLIGHT DIMMER (*)
52. WHITE FLOODLIGHT DIMMER (*)
53. AVIONICS BREAKERS (*)
54. RH RED FLOODLIGHT DIMMER
55. MAIN ELECTRICAL BREAKERS
56. AUX. FUEL PUMP SW. & IND. LIGHT
57. LH RED FLOODLIGHT DIMMER
58. PROPELLER CONTROL
59. HYDR. UNLOADING CONTROL
60. FLAPS CONTROL
61. FLOATERS CONTROL
62. MIXTURE CONTROL
63. LANDING GEAR LEVER
64. EMERGENCY GEAR CONTROL
65. THROTTLE CONTROL
66. RADIO STACK (*)

* Item installed post refurbishment (see SECTION VIII -)

MIXTURE CONTROL.

The mixture control (62, Figure I-1) incorporates a friction lock button to secure it at the desired position. Push the control in to enrich the mixture and pull out to lean. To stop the engine, pull the knob to the IDLE-CUT-OFF position. Turn the knob in or out for close adjustments.

Detailed information on leaning the mixture in flight is contained in SECTION III.

IGNITION SWITCH.

The key-operated ignition switch (41, Figure I-1) controls the dual magneto ignition system. The four switch positions are "OFF", "L", "R" and "BOTH", Always operate the engine on both magnetos. Combustion will be smoother and more complete when the cylinder charge is fired at two points.

The "R" and "L" positions are for checking purposes only. When engine is not operating, the switch always must be in the "OFF" position.

STARTER SWITCH.

The starter switch (42, Figure I-1) is of the toggle type and operates when raised, automatically engaging the starter through a relay. Never operate the starter switch when the engine is running, because the starter driving mechanism may be damaged.

ENGINE COOLING.

The air, for cooling the engine, enters through two air scoops located on the leading edge of' the wing and is directed to engine cylinders. After passing through the cylinders from top to bottom, the air is collected and blown to the outside by an augmenter tube. In the interior of this tube are installed the engine exhaust pipes. Due to the induction created by the high-velocity exhaust gases, the required amount of cooling air circulation is produced in both in-flight and ground operations of airplane.

Part of engine cooling air discharges through three vent ports existing on both the engine inspection doors located under the wing center section. Eight auxiliary vent ports also existing in both inspection doors are normally closed by four removable cover plates. No cowl flaps exist in this engine cooling air system because an increase in power causes a corresponding increase in the flow of cooling air throughout the engine compartment.

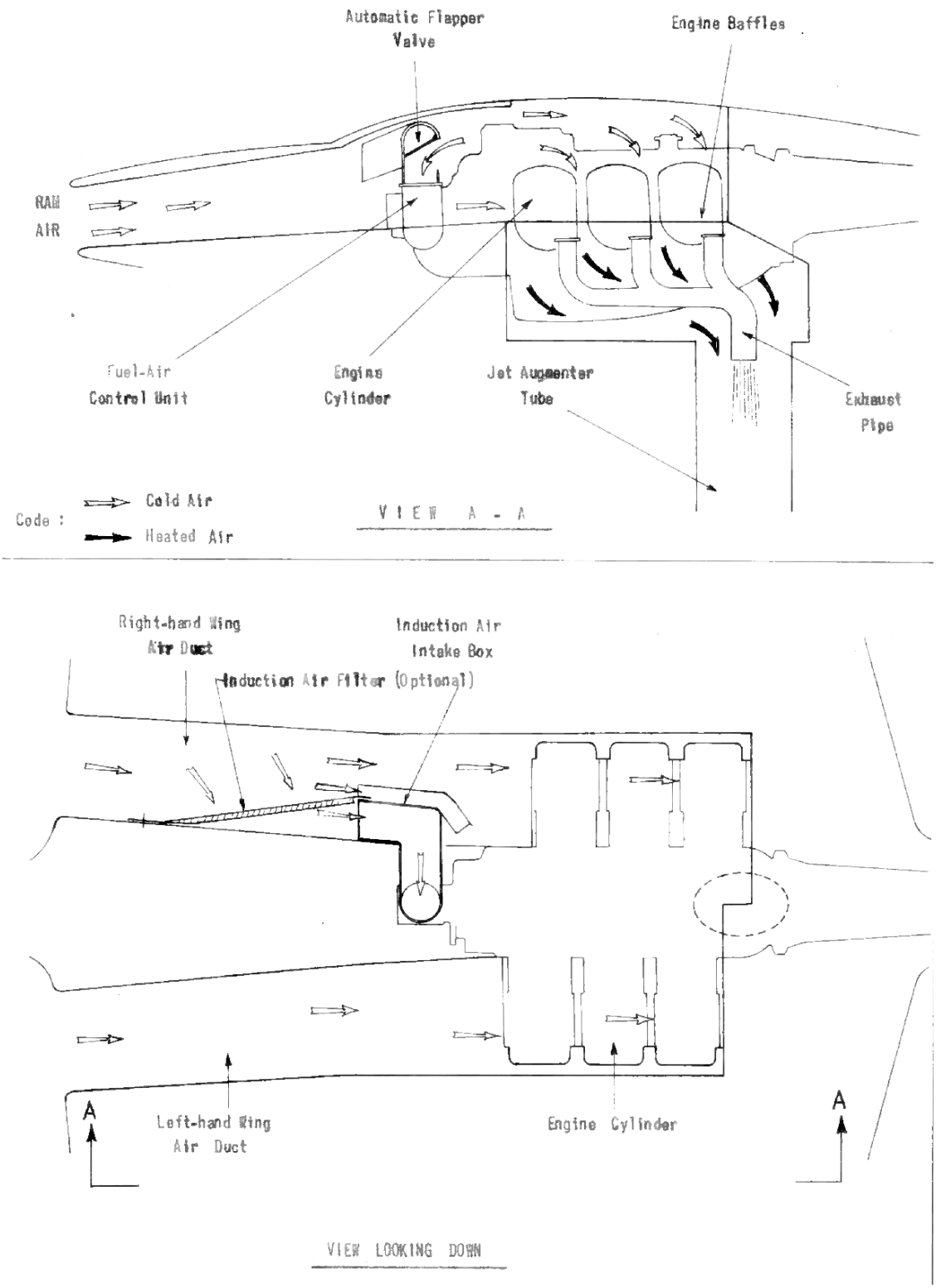


Figure I-2: Engine Air induction System

However, to prevent excessive cylinder head temperatures when operating in very hot weather conditions, a further increase of the flow of cooling air through the engine may be obtained by increasing as necessary the number of vent ports existing in the engine inspection doors (by removing the cover plates which normally close the auxiliary vent ports). The engine operation, generally, is satisfactory in both cold and warm weather

operations. However, to prevent undue overheating, it is recommended that engine operation on ground be maintained at a necessary minimum (particularly during ground and water taxiing).

ENGINE AIR INDUCTION SYSTEM.

In the engine air induction system (Figure I-2), part of the air admitted at right-hand wing air scoop duct for the engine cooling, passes through an air intake box and into the fuel-air control unit and intake manifold. If an obstruction of the air intake box opening caused by icing condition or other foreign matter should occur, an automatic flapper valve (located in the air intake box) opens, admitting the air existing in the engine compartment into the air intake box and the fuel-air control units.

ENGINE INDUCTION AIR FILTER (OPTIONAL).

An optional induction air filter may be installed in the right wing air scoop duct when operating in dusty conditions. Refer to paragraph XIII, Section VI for the air filter servicing instructions.

MANIFOLD PRESSURE GAGE.

A manifold pressure gage (14, Figure I-1) indicates the pressure of the fuel-air mixture entering the engine cylinder. It is calibrated in inches of Hg. By observing the manifold gage and adjusting the throttle and propeller controls, the power output of the engine can be adjusted to any recommended power setting shown in the operating procedures of Section II, or the performance charts of Section VII.

CYLINDER HEAD TEMPERATURE GAGE.

The cylinder head temperature gage (20, Figure I-1) is calibrated in degrees Fahrenheit. By watching the gage and regulating the power settings, the cylinder head temperature may be kept within limits.

The indicator is operated by a thermocouple or a resistance bulb mounted on cylinder No.3 which normally will operate at the highest temperature.

PROPELLER.

The Hartzell two-blade propeller is of the constant speed type. It is hydraulically controlled by a Hamilton Standard governor and incorporates a negative pitch feature to operate the propeller in the reverse thrust range. The engine oil system supplies the oil to the governor.

An optional Hartzell three-blade propeller of the constant speed type and incorporating a negative pitch feature may be installed when required by the purchaser.

The propeller blades are made of hard aluminum alloy.

PROPELLER CONTROLS.

A propeller control knob (58, Figure I-1) changes the setting of the propeller governor to control the engine speed. The control may be quickly moved through its full range by depressing the locking button, while close adjustments may be made turning the knob. With the control knob fully in, the propeller is in the HIGH RPM position, pulling the control knob out, the propeller is in the low RPM position. By rotating the knob clockwise or counterclockwise, close adjustments of RPM may be obtained. For all ground operations and for take-off, the control should be fully in (High RPM). After take-off, reduce throttle first, then reduce RPM. Since a small control movement will produce a considerable RPM change, the climb and cruise RPM should be set by turning the knob in or out.

NOTE - When increased power is required, increase the RPM first, then open the throttle. To decrease power, close the throttle first, then decrease the RPM. High manifold pressure, and low RPM combination may produce excessive cylinder pressures. Such harmful condition may be avoided using the above described procedure. To prevent propeller surging, the propeller and throttle controls must be operated smoothly without jerky and rapid motions.

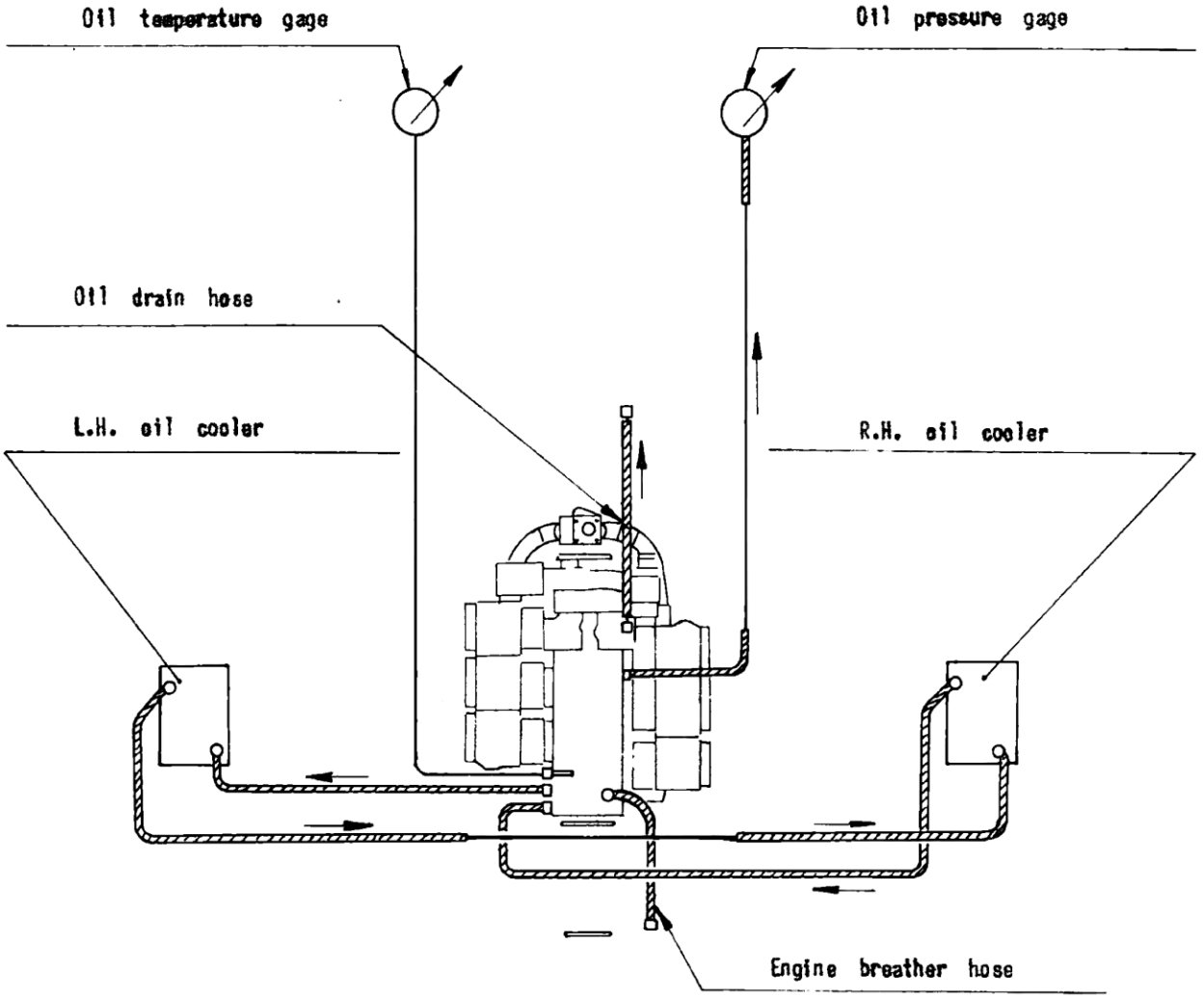


Figure I-3: Oil System

The negative pitch (reversing) control lever (See Figure I-7) is located on the cabin ceiling. This lever is normally locked in the up position. To set propeller in the negative pitch position, unlock the lever and pull it down. The reverse pitch should only be used for water taxiing at low speed and in "Docking" or "Beaching" the airplane, assuring excellent maneuverability in very small areas. The use of reverse pitch for braking the landing roll on field or in water is permitted only in case of emergency; the use in flight is prohibited.

OIL SYSTEM.

The Continental 10-470-P engine incorporates a sump that makes up the tank of the oil system. An engine driven oil pump draws the oil from the sump and forces it, at a given pressure, to the thermostatically controlled oil coolers, installed in wing center section. The thermostatic valve shuts off the passage of the oil to the coolers whenever the oil temperature drops below 158°F, thus bypassing the oil around the coolers. When the oil temperature reaches 158°F and higher, the thermostatic valve opens the oil passage and the oil is circulated through the oil coolers, which maintain the oil temperatures well within operating limits. When operating in ambient temperatures of 59°F and lower, the cooling air to left oil cooler should be shut out by installing a cap into the left oil cooler air inlet duct located under the left center wing, below the oil cooler. The cap is maintained against the oil cooler by three spring clips in the inlet duct. This is to prevent that the cooling caused by both coolers at low temperatures may thicken the oil in the coolers, causing difficulty in the oil circulation with consequent high oil temperatures. For the oil cooler cap stowage see page I-34.

OIL LEVEL.

The whole capacity of the oil system is 16 quarts. The oil system servicing is made by opening the engine cowling, through which the engine filler neck can be easily reached. The oil level can be checked by a dipstick, accessible through the opened engine cowling. The oil may be drained from the engine by opening a drain plug accessible through the left rear fuselage access door, located in the rear upper side of fuselage.

OIL SPECIFICATION AND GRADE.

Refer to paragraph XI, Section VI for the recommended oil Specification and grade, and servicing intervals.

OIL SYSTEM INSTRUMENTS.

An electrical oil temperature gage (22, Figure I-1) and a direct reading oil pressure gage (21, Figure I-1) are installed on the engine instrument panel. A green bar on instrument dials indicates the normal range.

Refer to Section V for markings and range limits of the instruments.

FUEL SYSTEM. (See Figure I-4).

Fuel is supplied to the engine from two inboard rubberized bladder type fuel tanks and two outboard metallic fuel tanks. One inboard tank is located in each side of the wing center section and one outboard tank in each outer panel. Each inboard tank has 18.5 gallons capacity and each outboard tank has 13 gallons capacity. The inboard and outboard tanks are interconnected and vented to atmosphere. Two lines from the inboard tanks connect to a three-way fuel selector valve, located on cabin ceiling, by which the left or the right wing fuel tanks can be selected.

The engine cannot be supplied simultaneously with fuel coming from both the left and the right wing fuel tanks.

The fuel coming from the selector valve flows, through a large capacity filler, to an auxiliary electric fuel pump which, when operating, sends the fuel under pressure to the engine driven fuel injection pump. From the engine driven fuel injection pump, the fuel under pressure is fed to the fuel-air control unit which controls the engine air intake and the metered fuel pressure for the proper mixture. When the electric fuel pump is not operating, the fuel flows directly to the engine driven fuel injection pump, thus by-passing the electric fuel pump. From the fuel injection control unit, the metered fuel is delivered to the fuel manifold valve, from which individual fuel lines carry the metered fuel to the fuel discharge nozzles, one for each cylinder.

FUEL SPECIFICATION AND GRADE.

For the recommended fuel specification and grade, tanks capacity, tanks and fuel system strainer servicing, refer to paragraph X, Section VI.

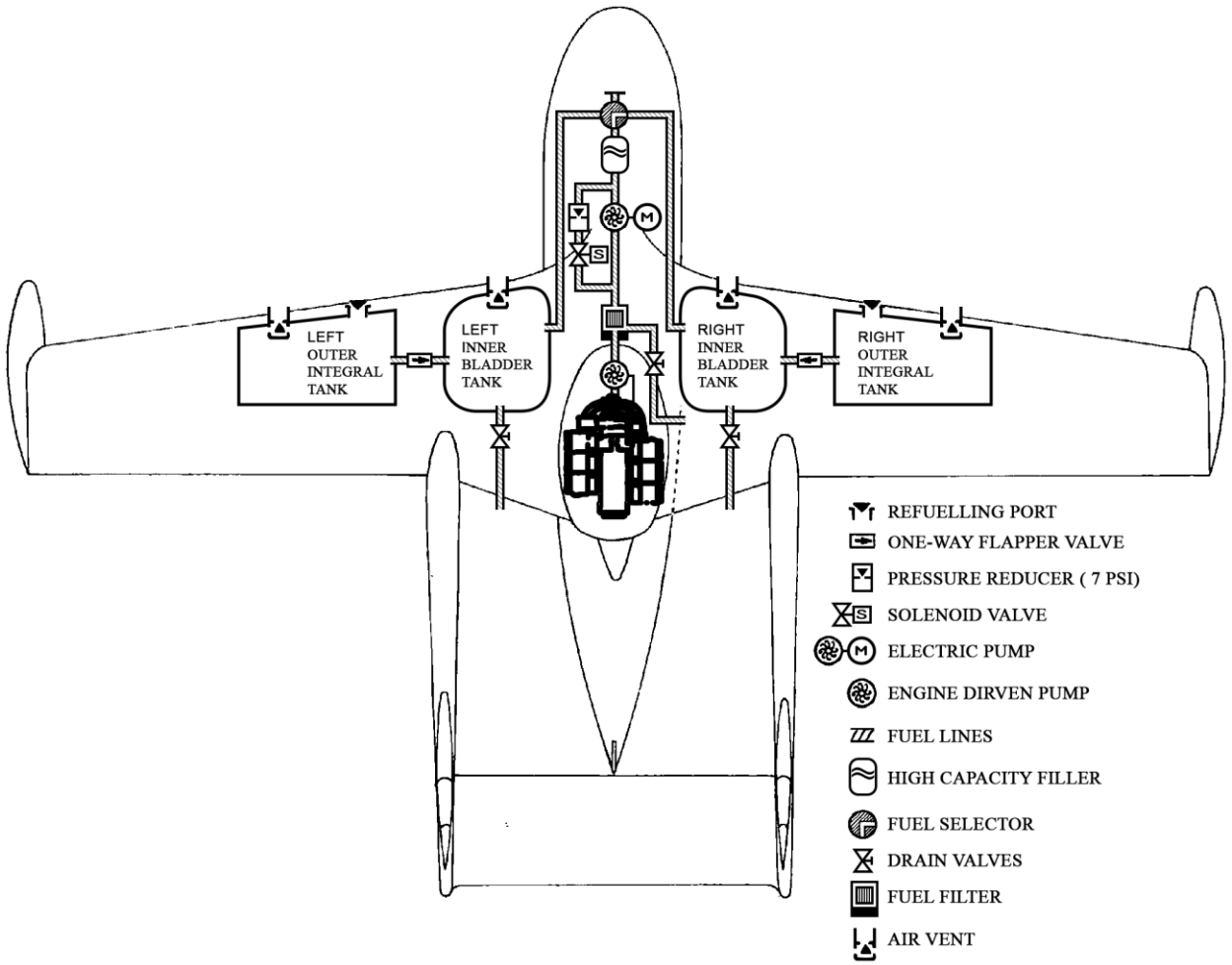


Figure I-4: Fuel System

AUXILIARY FUEL PUMP SWITCH.

The auxiliary electric fuel booster pump switch (56, Figure I-1) has three positions labelled OFF, LOW and HIGH. The LOW position serves only for the engine starting and as a safety measure at take-off and landing. When in this position, the switch energizes the auxiliary booster pump and opens a solenoid valve installed in a by-pass line, connected to the outlet port of the pump.

The by-pass line incorporates a valve adjusted to open at a fuel pressure of 6 to 8 psi. This arrangement allows the auxiliary booster pump to deliver 6 to 8 psi. during engine starting, since a portion of the pump delivery is diverted through the by-pass line into the inlet port of the pump. The HIGH position serves as a safety measure and is used in flight in case of failure of the engine driven fuel pump. In this case, however, the solenoid valve will remain closed, shutting-off the by-pass line, and the auxiliary booster pump delivers its full fuel pressure to the system.

> NOTE - Anytime the auxiliary booster pump switch is turned to LOW or HIGH position and the engine is not running, the mixture control must be in IDLE-CUT-OFF to prevent flooding of the engine intake manifold.

FUEL QUANTITY INDICATORS.

The fuel quantity indicators (17 and 18, Figure I-1) are electrically operated instruments. When the battery switch is ON, the indicators show the fuel quantity existing in the right and left wing fuel tanks.

FUEL PRESSURE GAUGE.

The fuel pressure gage (15, Figure I-1) is installed in the right hand side of the instrument panel. It is calibrated in psi and indicates the recommended fuel pressure for the various engine power settings. Its dial has green markings and is divided into two portions. The upper portion of the dial is calibrated to indicate the recommended metered fuel pressure for the various engine power percentage setting for the cruising flight. The lower portion of the dial is marked to indicate the recommended settings for take-off and climb power.

AUXILIARY FUEL BOOSTER PUMP INDICATOR LIGHT.

A light (56, Figure I-1) indicates to pilot when the auxiliary booster pump is in operation.

FUEL TANK DRAIN VALVES.

Each inboard wing tank is provided with a drain valve located on underside of each tank. The drain valve is easily accessible through an access door on underside of wing. To drain water or small quantity of fuel, open the valve. To empty the tank, remove the drain valve assembly.

FUEL FILTER DRAIN VALVE.

The fuel filter is provided with a drain valve, accessible by opening the access door located on the right side of the fuselage rear section.

The valve serves to eliminate the water and dirt collected by the filter.

ELECTRICAL SYSTEM.

Electrical energy is supplied by a 24-volt, direct-current system, powered by a 25-Amp engine-driven generator. Two "Exide" 12-Volt, 24 Amp-hour battery, connected in series, or an optional "Varley", 24-Volt battery, is installed in the airplane nose. The battery is adequately protected and vented. All the electrical circuits are of the single wire, ground return network, utilizing the aircraft structure as ground return.

BATTERY AND GENERATOR SWITCHES.

A battery switch, (40, Figure I-1), and a generator switch (39, Figure I-1), connect either the battery or the generator to the main bus bar of system, through relays.

CIRCUIT BREAKERS.

All of the electrical circuits in the airplane are protected by "push-to-reset" circuit breakers, which are located in a circuit breaker panel on the lower right side of the instrument panel. The name of each circuit is indicated below its own breaker. (53 and 55, Figure I-1).

If a circuit is inoperative, wait approximately three minutes for the cooling of the thermal unit, then depress the circuit breaker button to reset the breaker. If this does not restore the circuit, it should be checked for short circuits, defective parts, or loose connections.

If the breaker pops out a second time, do not attempt to reset, but open the switch which controls the circuit concerned and then correct the malfunction.

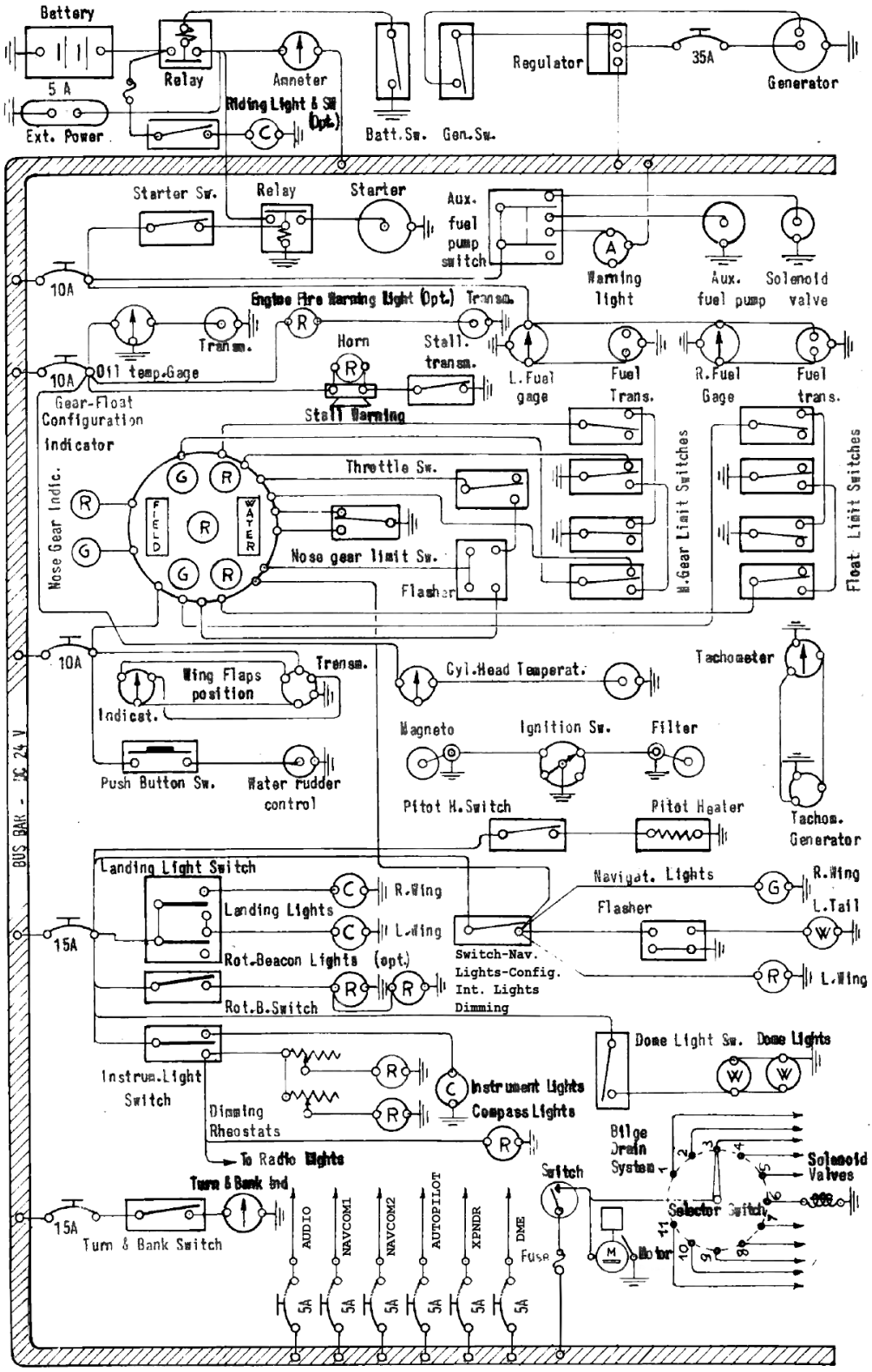


Figure I-5: Electrical System

AMMETER.

The electrical system is provided with an ammeter (19, Figure I-1), indicating the charge rate of the battery.

EXTERNAL POWER RECEPTACLE.

In the inner right side of cabin there is installed an external power receptacle.

An external power source may be connected during the electrical system ground testing and ground operation, in order to avoid the battery discharge.

FIRE DETECTOR WARNING LIGHT (OPTIONAL).

An optional red warning light, which illuminates in the event of engine fire, may be installed on the instrument panel. The light is operated by an optional bi-metallic element type fire detector, located in the engine area.

FLIGHT CONTROLS.

Conventional wheal and rudder pedal controls for pilot and copilot operate the primary flight control surfaces: (aileron, elevator, and rudders). The ailerons and rudders are provided with adjustable trim tabs which may be adjusted only on ground for trimming the airplane both laterally and directionally.

REMOVABLE COPILOT'S CONTROL WHEEL AND RUDDER PEDALS (OPTIONAL).

The optional copilot's control wheel and rudder pedals may be easily removed to add room to cabin for installation of bulky baggage or cargo. To remove the control wheel, locate the knurled sleeve near the right control tee sprocket. Unscrew clockwise the knurled sleeve until the control wheel tube is released from the universal joint of sprocket, then pull out the control wheel and tube assembly from instrument panel. Screw the sleeve to universal joint until the sleeve rests securely against the joint bolt. The copilot's rudder pedals may be easily removed by unscrewing a knurled knob located on upper part of each pedal arm.

ELEVATOR TRIM TAB.

To trim the airplane longitudinally, the elevator is provided with an adjustable trim tab control wheel (28, Figure I-1). Nose attitude of the airplane is indicated by a position indicator (27, Figure I-1) labelled "NOSE UP" and "NOSE DOWN",

FLAPS.

The wing flaps are hydraulically actuated and controlled by a selector valve lever (60, Figure I-1). In the full "UP" and "DOWN" positions, the wing flap selector valve lever enters in locking notches that hold it in that position. The flaps can be lowered and raised to any position between O° to 45° by moving the lever towards the "DOWN" or "UP" position until the flaps have reached the desired position, and then stopped at the selected position by releasing the wing flap lever, which automatically returns to the center or "NEUTRAL" position. A flap indicator (31, Figure I-1) installed on the left side of the instrument panel, shows the position of flap in degrees.

The angular travels of the flaps are:

For take-Off	0°	UP
	10°	DOWN
	20°	DOWN
For Landing	30°	DOWN
	40°	DOWN
	45°	DOWN

ANCHOR (MSFS).

The anchor (Figure I-6) is available when the airplane is floating on water, at reduced speeds. Its selection will deploy it overboard. A recovery cable is to be left within the cabin, on the copilot's seat. This can be pulled to hoist the anchor back into the cabin.

When the anchor is deployed, the aircraft is secure and pre-flight operations, such as engine run-ups, can be safely conducted.

The foldable anchor will be automatically stowed if:

- the aircraft reaches sufficient speed, or leaves the water (by means of taking off, rolling or beaching into the ground.)
- engine power exceeds a maximum threshold.

Figure I-6: Anchor
Left: Available. Right: Deployed

Figure I-7: Propeller Reverse Control Lever

LANDING GEAR SYSTEM.

The landing gear is of the fully retractable, tricycle type, incorporating a steerable nosewheel. The gears are hydraulically operated by hydraulic actuators incorporating hydraulic features, which automatically lock the actuators when fully extended.

To extend or retract the landing gear, the landing gear selector valve (63, Figure I-1) is moved to the DOWN or UP position. To prevent the inadvertent retraction of the landing gear on ground, a mechanical latch is provided, which must be operated before the landing gear control can be moved upwards. It is positioned just above the control lever. All three landing gears incorporate air-oil shock struts.

The main landing gear upper doors fully enclose the landing sear when retracted. They are opened by a mechanical linkage during the main landing gear extension, and close when the landing gear is fully extended. The lower doors of the main landing gear, however, will remain open when the gear is extended, and will close when the landing gear is in the retracted position.

The nose landing gear doors will remain open when the gear is extended, closing only when the gear is fully retracted.

MAIN LANDING GEAR POSITION LIGHTS.

The main landing gear position lights are incorporated in the gear-float configuration indicator (29, Figure I-1). The lights are of the push-to-test type and incorporate a shutter for dimming.

Clockwise rotation of the lens holder closes the shutter, permitting only a diffused ring of light to be directed through the lenses. When the lens holder is rotated counterclockwise, the light will illuminate fully. The right hand red light comes ON only when the landing gear is retracted in the UP position.

The left hand green light comes ON only when the landing gear reaches the DOWN or extended position.

MAIN LANDING GEAR AND WING FLOATS WARNING LIGHTS.

A red warning light, (29, Figure I-1), located in the center portion of the configuration indicator and connected to a flasher unit, is electrically controlled by the throttle.

The warning light illuminates intermittently when the throttle is retarded to 12 inches of manifold pressure and the amphibian is not in the correct landing configuration. (Both for landing on land or water). See "Gear-float configuration indicator".

NOSE GEAR POSITION LIGHTS.

The nose gear position lights (30, Figure I-1) are installed on the left and adjacent to the gear-float configuration indicator. The lights are of the push-to-test type and incorporate a shutter for dimming.

The red upper light illuminates only when the nose gear is not in the full DOWN position or is in the retracted position.

The green lower light comes on only when the nose landing gear reaches the full DOWN or extended position.

STEERING SYSTEM.

When the landing gear is in the extended position, its steering mechanism is linked to the rudder pedals, so that the nose wheel can be steered by means of the rudder pedals up to 20°, either right or left of the center position. When the nose gear is to be retracted, just as it starts moving toward retraction, the steering system becomes disconnected from rudder pedals and the nose wheel is returned to its center position by two springs, so that the gear can retract in the nose wheel well freely.

WING FLOATS SYSTEM.

The retractable wing floats are controlled by a selector valve (61, Figure I-1) located on the control pedestal. They are hydraulically operated by two hydraulic actuators and are locked in the retracted or UP position by means of one each hydraulic cylinder. In the extended, or DOWN position, hydraulic devices lock the oil pressure in the actuator chambers, to prevent accidental retraction of the floats in the event of hydraulic failure.

NOTE - A field landing must be normally performed with the landing gear DOWN and the wing floats UP, but in an emergency, a landing can be performed with the floats lowered without any difficulty or danger.

WING FLOAT POSITION LIGHTS.

The gear-float configuration indicator also incorporates, in its lower position, a green and a red wing float indicator light, of the push-to-test type, containing shutters for dimming purposes. The green light is on at all times when the wing floats are UP. The red light comes on only when the wing floats are in DOWN position.

GEAR-FLOAT CONFIGURATION INDICATOR.

The gear-float configuration indicator (see Figure I-8 and 29, Figure I-1) is provided to indicate to pilot whether the amphibian is ready for landing or take-off on ground or on water. It incorporates the main landing gear and wing float position lights and two caps with the words "FIELD" and "WATER". The cap light intensity is maximum during the day, when the navigation lights switch (34, Figure I-1) is OFF. The cap lights are dimmed when the navigation lights switch is moved to ON for night flights. The left cap, with the word "FIELD", is green and will only come on when the main and nose landing gears are DOWN and the wing floats are UP. Since the green position lights of main gear, nose gear and wing floats will also be on at the same time, all indicator lights will be green. In this case the amphibian can land or takeoff as a landplane. The right cap, with the word "WATER", is red, and comes on only when all landing gears are UP and the wing floats are DOWN. Since the red position lights of main gear, nose gear and wing floats will also be al at the same time, all indicator lights will be red. In this case the amphibian can take-off or land on water as a seaplane.

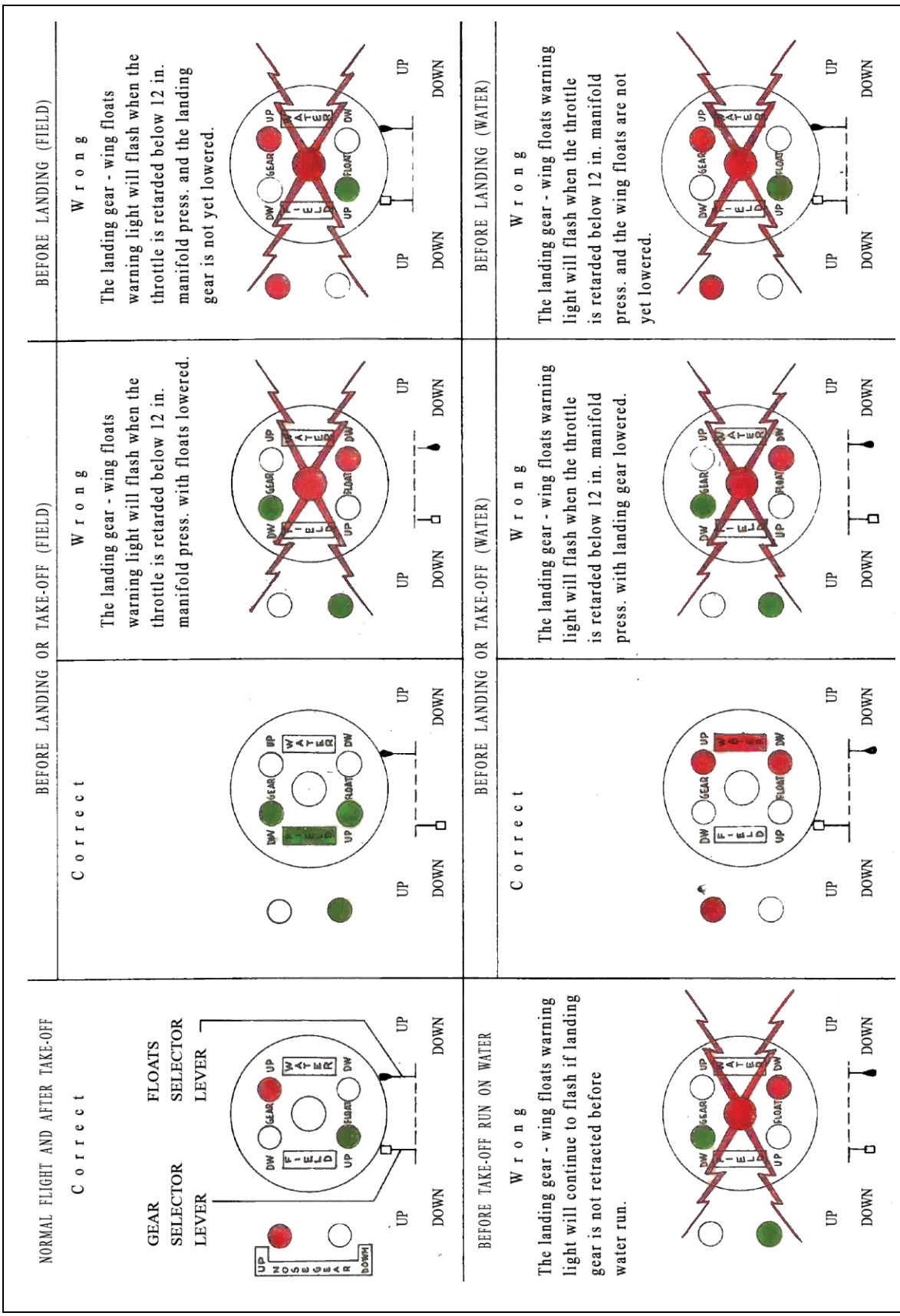


Figure I-8: Gear-Float Configuration Indicator

In the normal flight attitude, the two FIELD and WATER cap lights are OFT, while the green wing float light and the red landing gear lights are ON. If the pilot wants to land on ground, he should extend the landing gear only; then the red landing gear lights will go OFF while the green lights will come ON.

Both the landing gear and wing float position lights will be green, and the word FIELD, appearing on the green lighted cap, confirms the correctness of pilot's operation. (All lights should be green). If the pilot decides to land on water, he should lower the wing floats only; then the green wing floats light will go OFF while the red light will go ON, and the word WATER will appear in the red lighted cap. (All lights should be red).

Should the pilot incorrectly accomplish the prescribed operations to land on ground or on water, or the landing gear or wing floats fail to reach their correct position due to hydraulic system failure or other, the red gear-wing float warning light (located in the center of the configuration indicator) will flash whenever the manifold pressure is reduced below 12 inches Hg. Watching the position lights, the pilot can accomplish the required operation in order to have the airplane in the correct landing configuration. Then the gear-wing float warning light will go off and the "FIELD" or "WATER" indication will appear.

Should the gear-wing float warning light flash after having performed the correct operation, a failure of the landing gear or wing floats system is indicated, therefore, the pilot can decide upon emergency measures to be taken.

WATER RUDDER.

The water rudder is hydraulically actuated and electrically controlled by a toggle switch located in the upper center of the instrument panel (48, Figure I-1).

Activating the switch, a solenoid selector valve will be energized, allowing the fluid under pressure to be directed to a hydraulic actuator which lowers the rudder.

When the water rudder is lowered, it is controlled through its angular travel by the rudder pedals.

Deactivating the control switch, the water rudder is rotated into its hull housing by the actuator and is disconnected from its actuating sector-pulley which is cable-connected to the air rudder control cables.

Therefore, movement of rudder pedals cannot be transmitted to the water rudder when in retracted position.

BRAKE SYSTEM.

The hydraulic brakes on the main wheel are conventionally operated by applying toe pressure to the pilot's or the copilot's (optional) rudder pedals. The brake cylinders are actuated by depressing the pedals; this results in a braking action on the main landing gear wheels. The brakes may also be set by means of parking brake knob.

PARKING BRAKE.

The parking brake is operated by a parking brake knob (44, Figure I-1), located on the lower left side of the instrument panel.

To set the parking brake, first apply full toe pressure on the rudder pedals, then pull the knob and turn clockwise 1/4 turn.

To release the parking brake, turn the knob counterclockwise ¼ turn, allowing it to return to the stowed position.

HYDRAULIC SYSTEM. (See Figure I-9).

The hydraulic system consists of the power unit, the distributor unit, and of various systems utilizing the hydraulic pressure. The power unit produces and maintains a reserve of pressure for the various hydraulically operated components of the airplane.

It consists of a reservoir containing one gallon of hydraulic fluid, an engine driven hydraulic pump that builds up the hydraulic pressure, an accumulator that stores the pressure in the system, and a pressure regulator that by-passes the hydraulic fluid to the tank when the pressure in the system has reached about 1500 psi, thus maintaining the system pressure to a preset value.

The distributer unit consists of a pressure manifold, to which four selector valves are connected, and a relief valve which relieves excessive pressure built-up in the system and permits to reduce the system pressure to zero psi, by depressing a relief valve lever (59, Figure I-1I-3) on the center pedestal.

Three of the four selector valves are installed on the control pedestal and control the landing gear, wing floats and flaps.

The fourth selector valve is electrically controlled by a switch on pilot's control wheel and operates the water rudder extension cylinder. A hydraulic pressure gage (25, Figure I-1: Main Panel (Refurbished)) indicates the pressure of the system in psi.

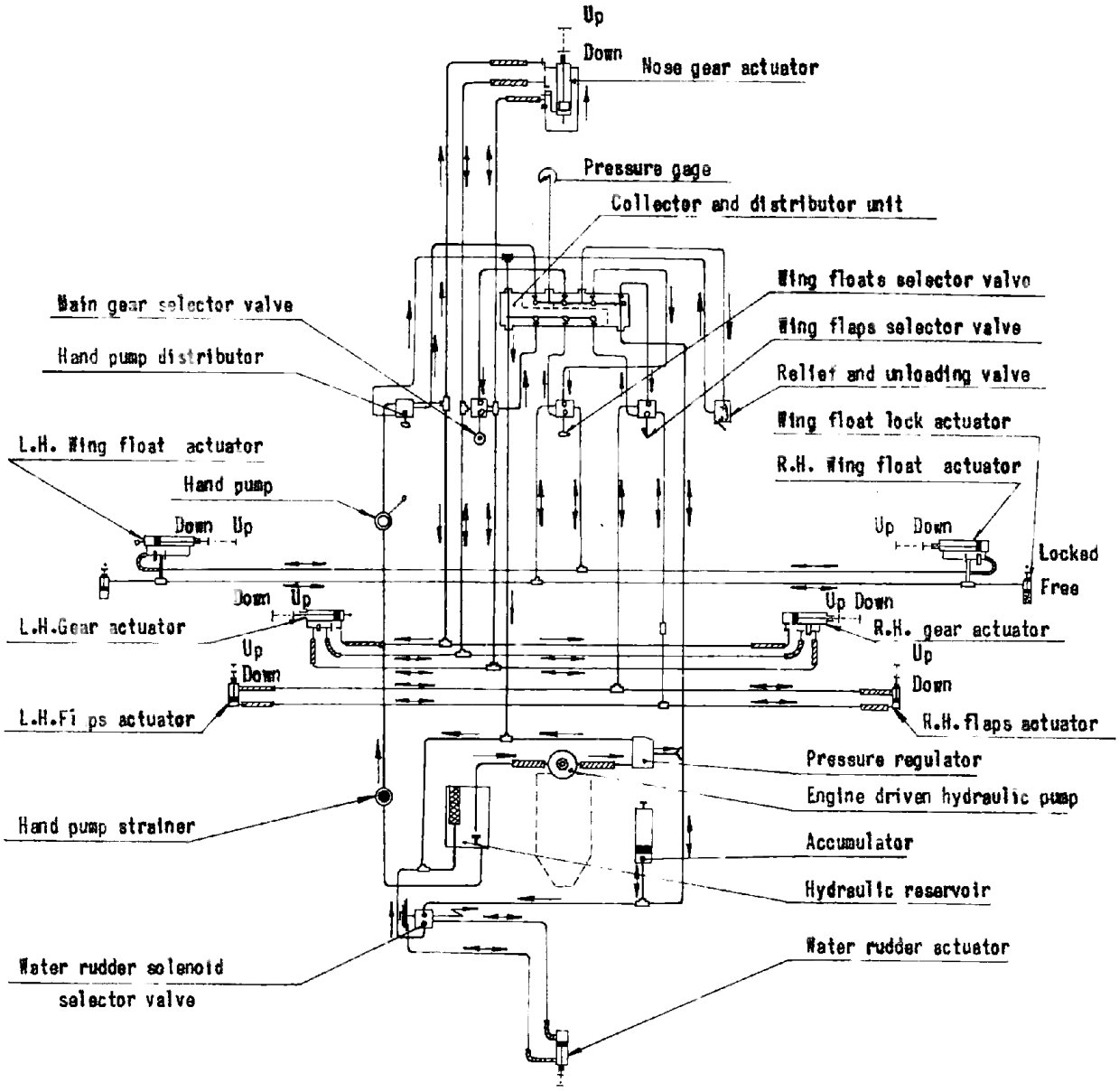


Figure I-9: Hydraulic System

AUXILIARY HYDRAULIC SYSTEM.

The auxiliary hydraulic system consists of a hand pump installed on the left side of the pilot's seat. It is operated by a handle which is normally stowed under the pilot's seat when not used.

The hand pump is supplied by the reserve existing in the hydraulic reservoir and is connected to the main system through a two-position selector valve, installed on the control pedestal. The selector valve knob is normally safety wired in its FORWARD position. Leaving the selector valve knob in its FORWARD position and operating the hand pump, the main hydraulic system can be pressurized to operate the hydraulic components of the airplane, in the event of engine driven hydraulic pump failure.

NOTE – In this simulation, the hand pump can ONLY be used to lower the landing gear, after operating the LANDING GEAR HYDRAULIC SYSTEM EMERGENCY.

LANDING GEAR HYDRAULIC SYSTEM EMERGENCY.

In case of complete main and auxiliary hydraulic system failure, the landing gear can be extended by pulling the hand pump selector valve knob (64, Figure I-1) in the "EMERGENCY" or REAR position (breaking the safety wire), and the landing gear selector valve in DOWN position, and then operating the hand pump until the landing gear extends. With the hand pump selector valve in EMERGENCY, the landing gear actuating cylinders will be directly connected to the hand pump, thus excluding the main hydraulic system.

FLIGHT INSTRUMENT SYSTEMS.

The flight instruments, installed on the left side of instrument panel directly in front of the pilot, consist of an airspeed indicator (6, Figure I-1), an altimeter (10, Figure I-1), a rate-of-climb indicator (9, Figure I-1), a turn-and-bank indicator (5, Figure I-1), a clock (3, Figure I-1), a magnetic compass (13, Figure I-1), and the directional gyro (7, Figure I-1), gyro horizon (8, Figure I-1), V.O.R. 1 indicator (11, Figure I-1) and V.O.R. 2 indicator (12, Figure I-1). A free air temperature indicator is installed on the cabin ceiling.

PITOT-STATIC SYSTEM.

On the left wing panel is installed a Pitot tube, providing pitot and static pressure to operate the airspeed indicator, and static pressure to operate the rate-of-climb indicator and the altimeter. The Pitot openings must be kept clean and free from dirt or other foreign matter to insure proper instrument operation. To prevent dust or dirt from entering in the Pitot tube openings, a cover must be placed over the Pitot tube when the airplane is idle on the ground.

PITOT TUBE HEATER SWITCH.

A Pitot Tube heater switch (38, Figure I-1) energizes the Pitot heater elements, and is placed in ON position to prevent ice from obstructing the Pitot openings during cold flight conditions.

VACUUM SYSTEM. (OPTIONAL).

The optional directional gyro and gyro horizon are vacuum operated instruments. An engine driven vacuum pump connected to the instruments is the suction source. A suction gage (24, Figure I-1), located on the lower right side of the instrument panel, indicates the suction in inches of mercury. The suction gage should indicate between 3.9and 4.2 inches of mercury.

STALL WARNING SYSTEM.

The stall warning system consists of a horn electrically operated and of a red light (23, Figure I-1) installed on the right side of the instrument panel. They are controlled by a transmitter unit installed in the leading edge of the right wing panel. The transmitter responds to any change in the airflow over the wing leading edge as a stall is approached. Since the same change of airflow occurs with every stall, the unit operates regardless of attitude, speed, weight and other factors that may affect the stall speed.

Whenever an incipient stall condition exists, the horn will sound and the red light illuminates, thus giving to pilot a positive warning.

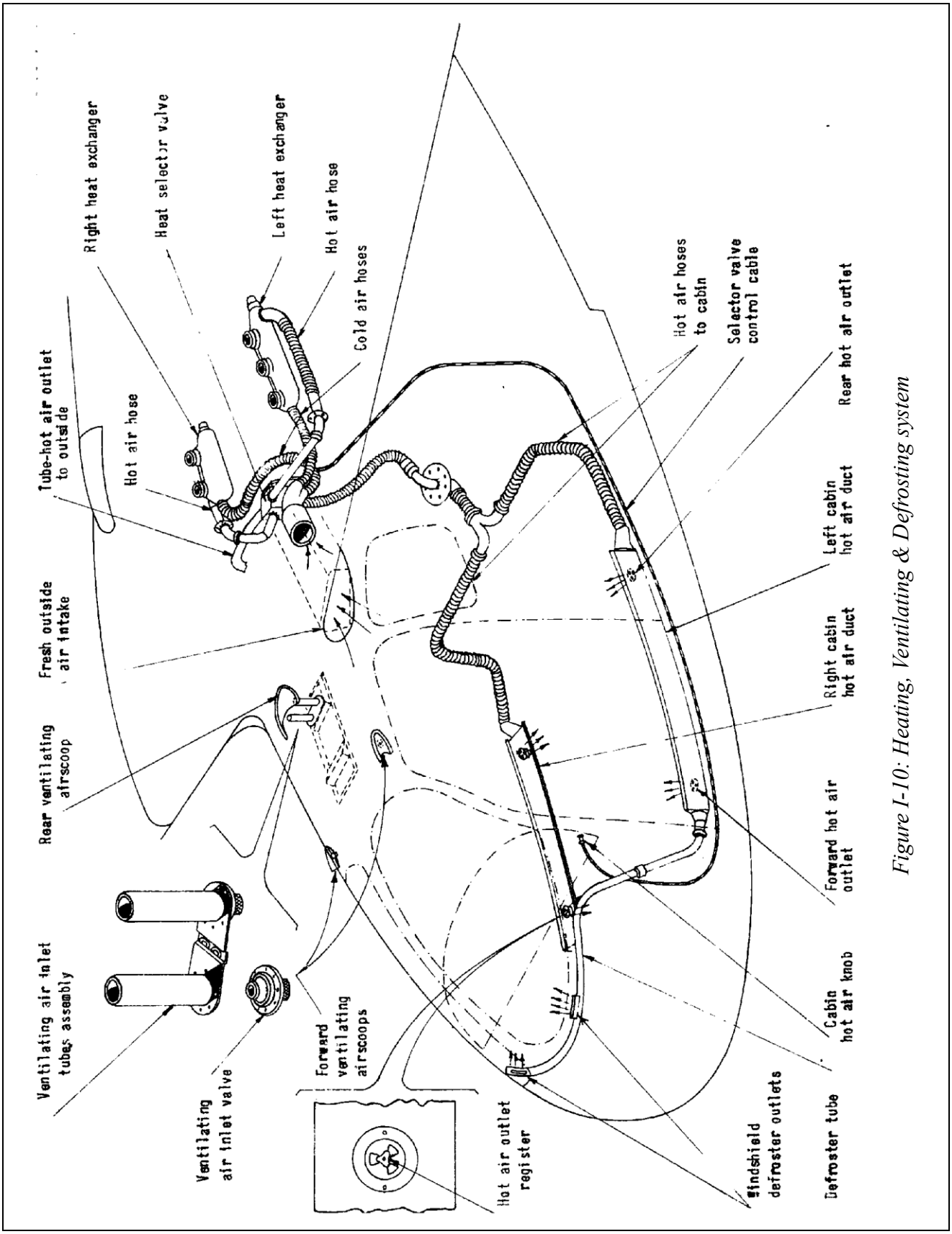


Figure I-10: Heating, Ventilating & Defrosting system

HEATING, VENTILATING AND DEFPROSTING SYSTEM.

(See Figure I-10)

Fresh air is picked up from the engine air induction left duct and heated by the heat exchangers, consisting of the right and left engine exhaust stacks and shrouds surrounding the exhaust stacks. Hot air hoses, from the heat exchangers, join at a flapper selector valve which shuts off the flow of hot air to cabin when not required and exhausts it to outside of the aircraft by a line. A single duct, from the selector valve, supplies the hot air to two box shaped metallic ducts, one each located in the lower sides of cabin, A hose, from the left cabin duct and routed along the left cabin side, connects to two windshield defroster outlets for windshield defrosting purposes. Hot air outlets at front and rear seat occupants are provided in both right and left cabin ducts. All air outlets incorporate manually adjustable hot air registers by which the front and rear seat occupants can adjust the flow of hot air. A cabin heat knob controlling the heat selector valve is installed on the lower left side of instrument panel. When this knob is pushed all the way in, the het air flow to cabin is shut off. Pulling out this knob, hot air is admitted to cabin. The knob may set in any intermediate position to regulate the quantity of air. Overhead cabin ventilation is provided by manually-adjustable ventilators installed on cabin ceiling at front and rear seat occupants. Ram air for the front seat occupants is received from two scoops, mounted on cabin skin, and delivered to two ventilators (inlet valves). Ram air, for the rear seat occupants, is received from a scoop mounted on cabin skin and delivered, through two short ducts, to two air ventilators (inlet valves) installed on the dome and instrument light console. The volume of air is regulated by turning counterclockwise or clockwise the knurled ring located around the ventilator opening; counterclockwise to Open and clockwise to close. Each ventilator can be positioned to direct air as desired.

LIGHTING EQUIPMENT.

NAVIGATION LIGHTS.

A steady navigation light is installed in each wing tip. A flashing navigation light is also installed on the tail of the left boom.

The lights are controlled by the navigation light switch (34, Figure I-1) located on the lower left side of the instrument panel.

LANDING LIGHTS.

A landing light, installed in the leading edge of each outer panel, is provided to give proper lighting to the runway during take-off and landing. During taxiing, only the left light should be used, to prevent an unnecessary drain on the battery during periods of low engine speed, when the generator is not charging. The landing light switches (32 and 33, Figure I-1) allow for individual control of both left and right landing lights.

ROTATING BEACONS. (OPTIONAL).

A rotating anti-collision beacon may be installed on top of the forward section of the engine cowling. Another anti-collision rotating beacon may be installed on the lower rear part of the left tail boom. The beacons rotate through 360° when the switch (35, Figure I-1) is ON.

NOTE - The rotating beacons should not be used when flying through clouds or haze, to prevent distracting glare. This equipment is installed in this simulation.

RIDING (ANCHOR) LIGHT. (OPTIONAL).

An optional riding (anchor) light may be installed on top of forward section of engine cowling, ahead of the rotating beacon. The light serves to show the position of the airplane when it is moored or drifting on the water during the night.

NOTE – Not installed in this simulation

INSTRUMENTS, RADIO CONTROL PANEL AND CABIN LIGHTS.

Both the control panel for the optional radio communication system and the magnetic compass are illuminated by integral lights.

The lights are actuated by placing the instrument panel light switch (36, Figure I-1) in the "RED" position. Instrument panel lighting is provided by two overhead red lights (right and left), and an overhead white light (central), installed in the overhead console on the cabin ceiling. The two red lights are actuated by the switch (36, Figure I-1) and individually controlled by separate rheostat knobs (54 and 57, Figure I-1), located on the instrument panel, which control the light intensity. With these separate rheostats, the pilot may reduce the intensity of the engine instruments lighting, leaving only the flight instrument lights brightened, thus reducing glare to a minimum. The white instrument panel light is controlled by the same switch (36, Figure I-1). A dimmer knob for the white instrument light is located in the right side of the instrument panel (52, Figure I-1). Next is the dimmer for the integral lights (51, Figure I-1). On the cabin ceiling console there are installed two white lights for the cabin lighting and the light switch. A loudspeaker is also installed in the cabin ceiling console.

RADIO SYSTEM.

Provisions on the instrument panel of the FN-333 permit the installation of optional radio sets of various types and models. See (53, Figure I-1) for radio equipment circuit breakers.

NOTE – Installed on this aircraft:

Radio	Function	Notes
KMA 24 TSO	Audio Panel	
KX 155 TSO Or GNS-430	NAV1 COMM 1 + GPS	See (47, Figure I-1) The equipment will remain installed until the user choses to remove it.
KX 155 TSO	NAV2 COMM2	
KAP 140	Autopilot	
KT 76 A	Transponder	
KDI 572	DME Indicator	Only when GNS-430 is not installed

MISCELLANEOUS EQUIPMENT.

PILOT'S AND COPILOT'S SEATS.

The pilot's and copilot's seats are individually mounted on tracks and are adjustable fore and aft. To adjust the seats, move the handle under the lower front of the seat to the left and slide the seat to the desired position, then release the handle and slide the seat to the nearest locking position. The seat back can be folded forward to gain access to the rear seat.

RECLINABLE COPILOT"'S SEAT. (OPTIONAL).

A reclinable copilot's seat may be installed in the airplane. The copilot's seat is reclinable horizontally to form an emergency stretcher. To recline the seat, first pull out the seat head rest from the seat back, and remove the two rubber plugs from the two holes existing in the front frame of rear seat. Unscrew the two knurled knobs on both sides of seat and fold the seat back rearward until itis in a horizontal position; then pull the seat back lightly forward so that the two pins existing on the upper side of the seat back may be inserted into the two holes of rear seat frame.

REAR SEAT.

The rear seat accommodates two passengers. The back of the seat can be folded fully forward against the seat, then moving the handle under the lower front of the seat to the left, the seat assembly can be rotated up rearward to gain access to the baggage area.

CABIN DOORS.

The two large cabin doors have an outside door handle, and a door lock, operated from the inside.

EMERGENCY LEFT CABIN DOOR QUICK RELEASE.

(Optional Equipment).

An emergency left cabin door may be installed on the airplane. A mechanism incorporated in the left cabin door permits the quick release of the door for the emergency exit of cabin occupants when the airplane is on the ground. The mechanism is operated by a handle installed near the lower front side of the door. To operate the mechanism, see the placard installed near the control handle.

BAGGAGE AREA.

The baggage area extends from the cabin flooring, just under the rear seat, to the rear of the fuselage. Access is gained by folding and raising the rear seat. The baggage volume is approximately 15 cu. ft. Baggage or cargo up to 300 lb. may be stowed in the baggage area.

ANCHOR SYSTEM (OPTIONAL).

An anchor system for anchorage of the airplane in water may be installed in your airplane. (See Figure I-11).

The system consists of an anchor equipped with a 65 feet nylon rope and of a device for the recovery and casting of the anchor.

The anchor is stowed within the central front seat supporting base, and is accessible by opening a door on front of base.

To cast the anchor, proceed as follows:

a) Open the left cabin door. Remove the anchor from its housing. Unwind the rope from the anchor; rotate the locking ring to unlock the anchor arms and rotate them to the open position, then lock the arms in this position by means of the locking ring.

b) Hook the anchor rope spring-clip to ring of the anchor connecting rope (Figure I-11). Remove the recovery rope reel from its container and unwind the rope.

c) Release the connecting rope from its hook and cast the anchor.

The anchor may be recovered as follows:

a) Wind the recovery rope on reel until the elastic terminal of connecting rope is raised at cabin door. Grasp the ring of elastic terminal and pull until the ring can be hooked to the connecting rope retaining hook.

b) Weigh the anchor from water by means of its rope. Rotate the anchor arms to the closed position and lock with the locking ring.

Wind rope on the anchor. Release the anchor rope spring-clip from the connecting rope ring and stow the anchor in its housing.

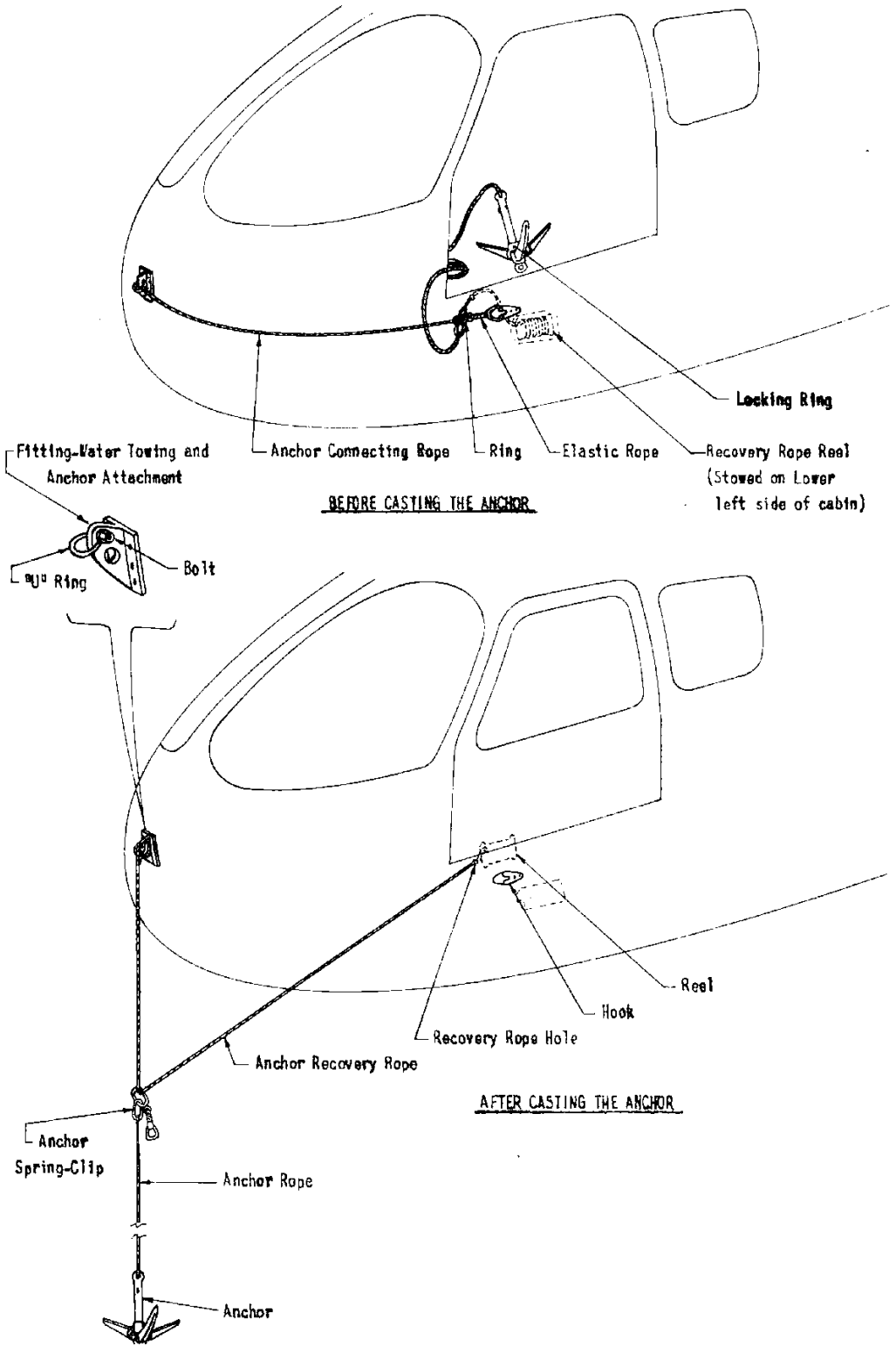


Figure I-11: Anchor System.

CARGO TIE-DOWN LUGS.

Six cargo tie-down lugs are permanently installed on the lower inner sides of cabin.

NOSE WHEEL STEERING BAR.

A nose wheel steering bar is stowed on forward bulkhead of the accessory compartment of rear fuselage and is accessible by opening the accessory compartment access door.

AIRPLANE'S OUTFIT PARTS BAG.

A cloth bag stowed under the copilot's seat contains the outfit parts of the airplane, consisting of the controls look, jack pads, wheel chocks, Pitot cover, spark plug and hull drain plug wrenches, left oil cooler duct cap, tail strut, water towing sling, and nylon mooring rope. The tail strut may be installed under the hull tail skid as a safety measure to prevent the airplane from dropping back on tail during the ground maintenance.

BILGE DRAIN SYSTEM (OPTIONAL).

A bilge drain system may be installed to drain water that may have collected in the hull compartments for any reasons. (See Figure I-12).

It consists of a special electric self-priming pump, located on left side of cabin, just above the cabin floor. The suction port of the pump is connected, by means of a suction manifold, to eleven plastic drain lines from the eleven water-proof compartments of hull.

A solenoid valve is provided in each compartment of hull to shut off its suction line when the solenoid is net energized. The pump is controlled by an eleven-position selector switch (which controls the eleven solenoid valves) and a momentary-on toggle switch installed on lower left part of instrument panel. The system is protected by a 10A fuse. When the switch is on (UP position) the electric pump and the solenoid valve selected by the selector switch are energized at the same time. The water eventually existing in the hull compartment selected, is drawn up by the pump and discharged outside the airplane by a line extending to the left side of hull, between stations 5 and 6 AV. When the toggle switch is released, it automatically returns to the DOWN position, deenergizing the pump and the solenoid valve. The location and numbering of hull compartments is shown in a placard installed on the left side of cabin.

For a correct and safe operation of the system, fellow these instructions:

1) - To avoid damage to the pump, it should net run dry more than one minute.

2) - The solenoid valves should net be energized more than eight consecutive minutes.

3) - The congealment of water in the pump and system should be avoided.

To find the compartment containing water, set successively the selector switch in each of its numbered eleven positions (corresponding the hull compartments) and move the toggle switch to UP position for five seconds, watching for drainage of water from the discharge line. If drainage of water is not noted, this indicate that the compartment being checked is empty. In this case, go on with next compartment, and so on. When drainage of water is noted, maintain the toggle switch on for a maximum of eight minutes, then check successively the other compartments and come back, if necessary, to compartment which was not completely emptied. This procedure is necessary in order to permit the cooling of the solenoid valve, before proceeding with another operating cycle of eight minutes.

When a noticeable quantity of water is found in a compartment, it is obvious that the hull must be checked to detect and correct the defect.

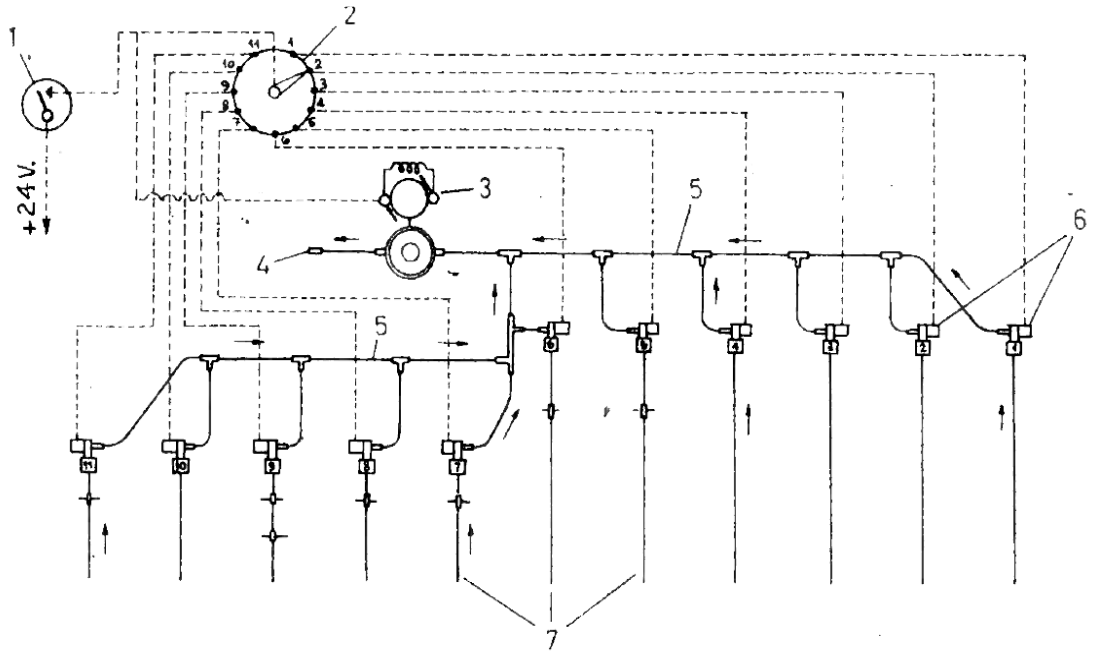
MOORING KIT. (OPTIONAL).

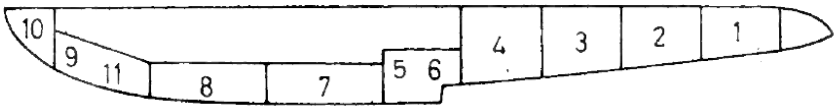
A mooring kit containing all parts necessary for mooring the airplane on the ground may be furnished as optional equipment.

It may be stowed in the airplane outfit bag.

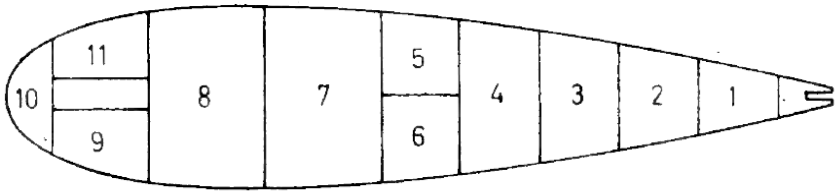
WATER MOORING NYLON ROPE.

A single nylon rope stowed in the airplane outfit bag serves for a prompt mooring when the airplane approaches the mooring buoy. The rope should be hooked to the central airplane nose fitting and to the mooring buoy. For a permanent water mooring, use the mooring sling.





HULL COMPARTMENTS



1. Pump Control Switch
2. Solenoid Valves Selector Switch
3. Electric Self Priming Pump
4. Water Drain Line to Outside
5. Suction Manifold
6. Hull Compartment Solenoid Valves
7. Hull Compartment Suction Lines

Figure I-12: Bilge Drain system.

WATER TOWING AND MOORING SLING.

A water towing and mooring sling stowed in the airplane outfit bag serves for water towing and also for the permanent water mooring of the airplane. For water towing, the sling should be hooked to the central fitting and to the two lateral fittings on nose of the airplane. For water mooring, it should be also connected to these nose fittings and to the mooring buoy. When a two-point mooring is required, the mooring sling should be connected to the airplane nose fitting and ta a mooring buoy, while the single nylon rope should be connected to the airplane stern fitting and to the other buoy.

DROGUE, BOAT HOOK AND OAR. (OPTIONAL).

The drogue (sea anchor), boat hook, and oar, may be furnished when required by the customer. This equipment is normally stowed in the baggage area.

FIRE EXTINGUISHER CYLINDER. (OPTIONAL).

A fire extinguisher cylinder may be installed on left side of central front seats supporting base (pilot's side) when required by the customer.

COCKPIT COVER.

The cockpit cover should be installed to protect the cockpit window and windshield when the airplane is permanently parked outside. It may be stowed in the baggage area.

SECTION II -

NORMAL PROCEDURES

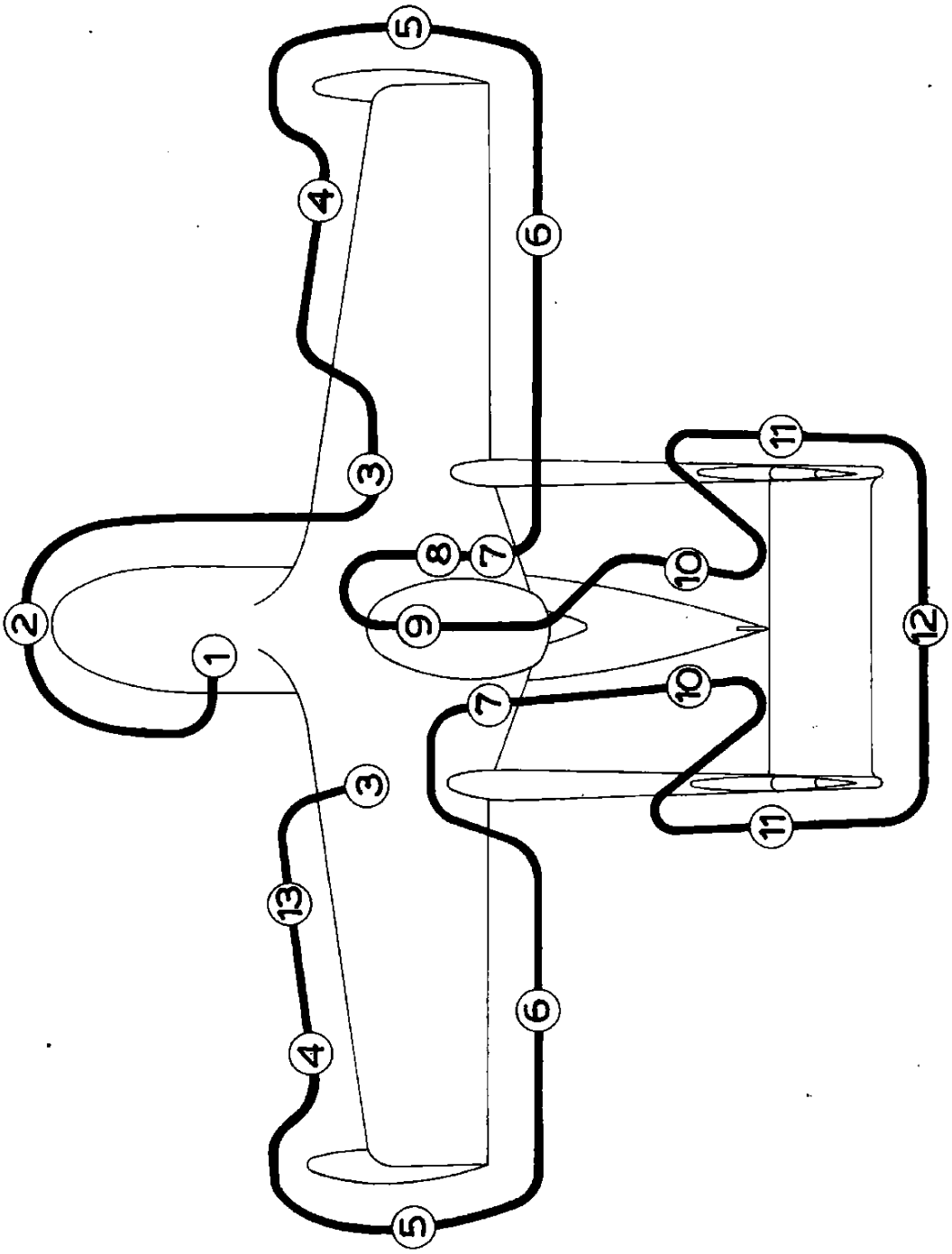


Figure II-1: Walk-Around Procedure

LEGEND FOR FIGURE II-1

1. a) Check landing gear control lever for "DOWN" position.
   b) Remove control lock.
   c) Momentarily turn "ON" battery switch and check fuel quantity indicators.

2. a) Check nose landing gear strut and tire for inflation.
   b) Check gear structure, doors and wheel well for general condition and security.
   c) Check for evidence of hydraulic fluid leakage.
   d) Check tire for cuts and noticeable damage.

3. a) Remove filler cap and check fuel level. Reinstall and secure filler cap.
   b) Drain approximately two ounces of fuel from tanks and check for signs of water. Check fuel vent for obstruction.

4. a) Check wing outer panel for general condition of skin and rivets.
   b) Check stall transmitter for free movement. (Right outer wing only).
   c) Check landing light for damage and cleanliness.

5. a) Check wing float for general condition and security of latching in the "UP" position.
   b) Check wing tip light and bracket for general condition and security.

6. a) Check general condition of ailerons and flaps.
   b) Check aileron and flap hinges, hinge belts and actuator rod bolts for damage and security.

7. a) Check the main landing gear for condition of structures, tires, doors, and wheel well.
   b) Check gear strut and tire inflation.
   c) Check for evidence of hydraulic leakage.

8. Open the rear fuselage compartment access doors and perform the following:
   a) Check proper level of hydraulic fluid tank.
   b) Drain the fuel strainer on first flight of the day or after each refueling operation.

9. a) Open engine cowling and check proper level of engine oil. Close and secure the engine cowling.
   b) Check rotating beacon for damage and security. (If installed).
   c) Check propeller and spinner for nicks, cracks, security and oil leakage.

10. a) Check general condition of hull.
    b) Check hull inspection doors for security.
    c) Check water rudder for damage and correct retraction.

11. a) Check tail boom for general condition and security.

12. a) Check empennage surfaces for general condition. .
    b) Check general condition of elevator, rudders and trim tab hinges, hinge bolts and actuator rod bolts.
    c) Check elevator counter-weights for security.
    d) Check tail light and rotating beacon (if installed) for damage and security.

    Repeat steps 11, 10 (a) and 10 (b), 7, 6, 5, and 4.

13. a) Check Pitot tube openings for obstruction. (Pitot tube cover removed).

    Repeat step 3.

NORMAL PROCEDURES

This section lists, in "Pilot's Check List" form, the normal procedures necessary to operate the airplane efficiently and safely.

This section includes only the normal "day-to-day flying" procedures.

It is supplemented by SECTION III, covering the operating procedure description, and by the SECTION IV, which contains the emergency procedures.

BEFORE ENTERING THE AIRPLANE.

1) Perform an exterior inspection (See Figure II-1).

BEFORE STARTING THE ENGINE.

1) Adjust and lock seats in a comfortable position, then fasten the safety belts.
2) Lock cabin doors.
3) Remove controls lock, if used, and stow appropriately.
4) Hydraulic emergency control knob in "Forward" position. (Safety wire intact).
5) Check landing gear selector valve lever in "DOWN" position,
6) Check wing floats selector valve lever in "UP" position.
7) Set parking brake.
8) Set altimeter and clock.
9) Battery switch ..... "ON". Connect an external power source if available.

NOTE - When using an external power source, de not turn battery "ON" until external power is disconnected.

10) Generator switch ..... "ON".
11) Check circuit breakers panel for faulty circuits.
12) Landing gear lights ..... "PUSH TO TEST.
13) Wing float lights..... "PUSH TO TEST".
14) Fuel selector ..... Left tank.
15) All radio switches ..... "OFF".
16) Check flight controls for free and correct movement.
17) For night flying, test operate all lights and check that a flashlight is available.

STARTING THE ENGINE.

1) Ignition switch ..... "ON",
2) Mixture control ....."FULL RICH" position. (Forward).
3) Propeller control lever....."HIGH RPM" position. (Forward).
4) Throttle.....cracked approx. 1/2 Inch.
5) Auxiliary fuel pump switch ..... "LOW" position.

NOTE - To avoid flooding, be sure you are ready to start the engine before turning on the auxiliary fuel pump.

6) "Clear" the propeller.
7) Starter switch .....ON - (when fuel pressure reaches 2 to 2.5 psi).
8) Auxiliary fuel pump switch ..... "OFF" when the engine runs smoothly.

NOTE - If engine fails to start, it is probably loaded since the fuel injectors tend to load easily. Repeat starting procedure with throttle open approximately 1/2 inch, mixture lever in "IDLE-CUT-OFF" and auxiliary pump "OFF". As engine fires, move mixture lever to FULL RICH" position and decrease throttle to "IDLE" position.

NOTE - During very hot weather, if there is an indication of vapor in the fuel system (fluctuating fuel pressure) with the engine running, turn the auxiliary fuel pump on until the system is purged.

NOTE - Check for an oil pressure within 30 seconds in normal weather. If no oil pressure indication appears, shut off engine and investigate.

9) Disconnect external power source, if used, then turn ON battery.
10) Check flap operation.

WARM-UP AND GROUND TEST.

1) Adjust engine speed to 1000-1200 RPM and warm-up until 30°C (86°F) oil temperature, 150°C (302°F) cylinder head temperature and not more than 60 psi oil pressure, are obtained.
2) Radio sets ..... "ON" and test.
3) Parking brake ..... Release.
4) While taxiing out to the runway, test operate the brakes, noting all "spongy" action or excessive brake pedal travel.
5) Stop the airplane at the run-up location with nose wheel straight, then set parking brake.
6) Throttle..... 1700 RPM.
7) Check engine instruments for operation and indications within green arcs.
8) Check generator operation by noting ammeter reading.
9) Check magnetos. (100 RPM max. allowable drop).
10) Retard propeller control lever until engine speed drops to 1000 RPM, then advance to full "FORWARD" position. Repeat this operation for two or three times.
11) Check the flight instruments.

BEFORE TAKE-OFF.

1) Set trim tab to zero degree if only the pilot is on board, and to ten (10) degrees "NOSE UP" if two to four passengers (pilot included) are on board.
2) Auxiliary fuel pump switch ..... "LOW" position.
3) Recheck free and correct movement of the flight controls.
4) Recheck cabin doors ..... Closed and locked.
5) Recheck and set flight instruments and radio as necessary.
6) Recheck engine instruments.
7) Flaps..... 0° to 20°.
8) Propeller control lever..... HIGH RPM position (FULL FORWARD).

NOTE - Leaning during take-off run is normally unnecessary; however, should maximum take-off performance be desired, adjust fuel pressure to match field elevation.

NORMAL TAKE-OFF.

1) Brakes ..... Release.
2) Apply full throttle smoothly.

Do not exceed 2600 RPM. To avoid dragging the brakes, keep heels on floor.

3) Apply light back pressure on the control wheel to raise the nose wheel as the airplane approaches 66 MPH.
4) Retract the landing gear after airplane is airborne and apply brakes momentarily to stop wheel rotation. Check landing gear indicators.
5) Retract flaps after reaching a safe altitude and 75 KIAS.
6) Turn auxiliary pump "OFF" checking final fuel pressure.

NOTE - During very hot weather, if there is an indication of vapor in the fuel system (fluctuating fuel pressure), turn the auxiliary fuel pump to "LOW" position until cruising altitude has been obtained and the system is purged.

TAKE-OFF IN STRONG CROSSWIND.

1) Flaps..... 0° (Retracted).
2) Apply full throttle and use sufficient aileron into the wind. To maintain wing level.
3) Hold nosewheel on ground 4-8 KIAS above normal takeoff speed.
4) Take off abruptly to prevent airplane from settling back to runway while drifting.
5) When clear of runway, make a coordinated turn into the wind to correct for drift.

BEFORE WATER TAXIING.

1) Enter water with wing floats lowered.
2) Water rudder..... UP

WATER TAXIING.

1) As amphibian floats, lower the water rudder.
2) Retract the landing gear.
3) Slowly taxi up to take-off line, with engine at low RPM.

CAUTION - Do not use the water rudder at speeds above 45 KIAS.

NOTE - If take-off point is very far away and there are no speed restrictions, it is advisable to place the amphibian on the float step (as described in the TAKE-OFF ON WATER) and perform a taxi run with a speed of 30 to 40 KIAS

BEFORE WATER TAKE-OFF.

1) Check Landing Gear "UP".
2) Check wing floats "DOWN".
3) Set Trim Tab to 0° if only the pilot is on board, and to 10° NOSE-UP if 2 to 4 passengers are on board.
4) Auxiliary fuel pump switch ..... "LOW".
5) Recheck flight control for free and correct movement.
6) Recheck and set the flight instruments and radio.
7) Recheck engine instruments.
8) Flaps..... 15°.
9) Propeller control lever..... HIGH RPM position (Full forward).

WATER TAKE-OFF.

1) Throttle.....slowly to full throttle.
2) Place airplane on float step as follows:
   a. Keep control wheel lightly forward until 35 to 45 KIAS airspeed is reached or when the bow wave moves aft of the rear seat position.
   b. As the airplane moves on to the float step position, apply back pressure on the control wheel.
3) After airplane is "on the step", retract the water rudder and continue the run with a moderate wheel back pressure.

CAUTION - Do not use the water rudder at speeds above 45 KIAS.

4) When the amphibian has reached at least 65 KIAS, increase back pressure on control wheel and allow the amphibian to fly off smoothly.
5) Retract wing flaps after reaching 75 KIAS.
6) Retract wing floats after reaching a safe altitude and an airspeed of 75 KIAS.
7) Auxiliary fuel pump switch .....OFF.

NORMAL CLIMB.

1) During normal operation, climb with an airspeed of 93 KIAS.
2) Power ..... 24 inches and 2450 RPM.
3) For economical fuel consumption in cruising climb adjust mixture so that pressure reading (in fuel pressure gage) is at high side of cruise power dial range for power being used.

MAXIMUM PERFORMANCE CLIMB.

1) For maximum rate-of-climb, the airspeed should be 85 KIAS (Sea level).
   Decrease airspeed approximately 3 KIAS for every 3500 feet altitude, starting at sea level.
2) Power ..... Full throttle and 2600 RPM.
3) The mixture should be adjusted to the low side of the take-off and climb dial range (of the fuel pressure gage) for maximum climb performances.
4) Best angle of climb - 80 KIAS.

CRUISING.

1) Adjust RPM and manifold pressure to match selected cruising power for desired range, speed and altitude. (See "Performance Charts", page VII-6 to VII-8).
2) Maximum power - 24 inches and 2450 RPM.
3) After speed is stabilized, trim the airplane.
4) Adjust mixture to the low side of the fuel gage dial range for normal operation at desired power.
5) Check cylinder head temperatures for abnormal changes, after leaning.

LET-DOWN.

1) Mixture control ....."RICH",
2) Reduce power to obtain desired letdown rate at cruising speed.
3) If a steep let-down is desired, extend landing gear and flaps if necessary. Let-down at 80 to 85 KIAS.

BEFORE LANDING (LAND).

1) Mixture control ..... "FULL RICH" (full Forward).
2) Fuel selector .....fullest tank.
3) Landing gear .....DOWN (Below 105 KIAS).
   Check configuration indicator for green "FIELD" indication, green position lights illuminated and nose gear indicator for green position light illuminated.
4) Auxiliary fuel pump switch ..... "LOW".
5) Airspeed .....75 to 85 KIAS (Flaps retracted).
6) Propeller..... High RPM (Full Forward).
7) Flaps..... 15° to 45°.
8) Airspeed..... 70 to 80 KIAS (Flaps extended).
9) Adjust trim tab.

NORMAL LANDING.

1) Touch down on main wheels first.
2) Landing Roll - Lower nose wheel gently.
3) Avoid excessive braking action unless obstacles are ahead.

SHORT FIELD LANDING.

1) Perform a power-off approach at 102 KIAS airspeed with 40° flaps.
2) Land on main wheels first.
3) Lower nose wheel immediately after touch-down.
4) Apply heavy braking as required.

LANDING IN STRONG GROSSWIND.

1) If field length permits, land with flaps retracted.
2) Use wing low, crab, or a combination method of drift correction.
3) Land in a nearly level attitude.
4) Lower nosewheel immediately after touch-down, and hold control wheel forward.
5) Maintain a straight path by using a combination of ailerons and rudders.

GO-AROUND.

1) Apply full throttle, 2600 RPM, if necessary.
2) Adjust elevator trim tab for trimming airplane.
3) Retract landing gear, or wing floats, first, then retract flaps as soon as all obstacles are cleared and a safe altitude and airspeed are obtained.

AFTER LANDING (LAND).

1) Auxiliary fuel pump switch ..... "OFF".
2) Park with nose in the wind, if possible.

POST FLIGHT CHECK.

1) Retract flaps.
2) Radio and accessory electrical switches .....“OFF”.
3) Stop the engine by putting mixture control in ....."IDLE-CUT-OFF".
4) After engine has stepped, turn ignition switch..... "OFF".
5) Remaining electrical switches.....“OFF”.
6) Parking brake .....“SET”.
7) Install the controls lock, if necessary.
8) Tie down airplane if necessary.

BEFORE LANDING (WATER).

1) Mixture control ..... "FULL RICH" (Full forward).
2) Fuel tank selector .....fullest tank.
3) Reduce airspeed below 105 KIAS, and lower the wing floats.
   Check configuration indicator for red "WATER" indication, red position lights illuminated (Main gear "UP" and wing floats "DOWN!"), and red nose gear indicator light illuminated (UP).
4) Auxiliary fuel pump switch ..... "LOW" position.
5) Airspeed ..... 85 to 95 KIAS (Flap retracted).
6) Propeller control lever..... "HIGH RPM" position. (Full forward).
7) Flaps..... 15° to 30°.
8) Airspeed ..... 80 to 90 KIAS (Flaps extended).
9) Adjust the trim tab.

NORMAL LANDING (WATER).

1) Land with water rudder retracted.
2) After water touch-down, keep a moderate back pressure on control wheel until the airplane has almost stopped after leaving the "step".
3) Release wheel back pressure after airplane has stopped.

CAUTION - Do not use the water rudder at speeds above 35 KIAS.

4) To beach the airplane, lower the landing gear and check the configuration indicator position lights and the nose gear position indicator light.

NOTE - The reversible propeller may be used in "DOCKING" or "BEACHING" the airplane assuring excellent maneuverability in very small areas.

5) Retract water rudder when airplane bears safely on the wheels. Continue taxiing.

POST FLIGHT CHECK.

1) Radio and accessory electrical switches .....“OFF”.
2) Mixture contro ....."IDLE-CUT-OFF",
3) Ignition switch .....“OFF”.
4) Remaining electrical switches.....“OFF”.
5) Parking brake .....“SET”.
6) Install control lock if necessary.
7) Tie down if necessary.

SECTION III -

OPERATING DETAILS

This section contains detailed information on those items listed in the Pilot's Check List of Section II requiring further information.

PREFLIGHT CHECK.

The exterior inspection in Section II is recommended for the first flight of the day. Inspections for further flights in the day are normally limited to a check of the tail control surface hinges, fuel and oil quantity and security of fuel and oil filer caps. If airplane has been subjected to extended storage, recent major maintenance, or operation from marginal airports, a more extensive inspection is recommended.

Following the periodic inspection of airplane, a check of all inspection plates of airplane for security will be performed.

The fight and trim tab controls should be inspected for free and correct movement after a major maintenance.

When the airplane has been subjected to ground handling in a crowded hangar, it should be checked for dents or scratches on wings, fuselage, and tail surfaces, as well as navigation and landing lights and radio antennas. Outside storage for long period may result in water and obstructions in airspeed system lines, condensations in fuel tanks, and dust and dirt on the intake air filter and engine cooling fins.

If airplane has been operated from: muddy fields or in snow and slush, check the nosewheel and main landing gear wheel wells for obstructions and cleanliness.

After airplane washing or polishing, check the Pitot tube openings for obstructions.

When airplane has been operated from rough fields, it should be checked frequently for landing gear mechanism damage, for tires and struts inflation and brake conditions.

The Pitot tube heater operation may be checked noting the discharge on the ammeter when the Pitot heater switch is turned "ON". The effectiveness of heater elements may be verified by feeling the Pitot tube.

STARTING ENGINE.

Before starting engine warn the ground personnel to clear the airplane properly calling out "CLEAR" in loud tones.

Since the engine is equipped with a continuous flow fuel injection system, if will flood more easily than conventional carburetor engines. For this reason the auxiliary fuel pump shall not be operated until immediately before starting the engine.

If the mixture lever is moved accidentally to "FULL-RICH" position and the auxiliary fuel pump is in the "LOW" position, with the engine not turning over, fuel will flow continuously through the injection nozzles to the intake ports of the cylinder heads in proportion to the amount of throttle opening and length of time.

It is possible to collect as much as two pints of fuel in the intake manifold. In this event it is advisable to wait several minutes while the fuel drains through the automatic drain valves located in the intake manifold.

Engine mis-starts characterized by weak intermittent explosions followed by puffs of black smoke from exhaust tube, indicate over-priming or flooding. This a typical difficulty in hot weather or with hot engine starts. A corrective action is given in Section II.

If the engine is under-primed, which is more likely in cold weather with a cold engine, repeat the starting procedure and switch fuel pump to “High" until engine fires. In case of engine starting difficulty, it is necessary to allow the starter motor to cool in frequent intervals to prevent damage or wear to the starter.

TAXIING.

The nose wheel steering mechanism provides positive control up to 20° left or right. In addition to the nosewheel steering, which is preferred when practical, steering may be accomplished with the aid of the rudder and differential braking on the main wheels.

At sometime early in the taxi run, test the brakes to detect any unusual trouble, such as uneven braking.

If the brake operation is not satisfactory, the airplane should be returned to the tie-down location and the malfunction corrected.

The operation of turn-and-bank indicator and directional gyro should also be checked during taxiing.

Do not exceed 1600 RPM engine speed while oil is cold.

Taxiing should be accomplished using the minimum power setting necessary to keep the airplane moving.

Taxiing in loose gravel, or cinders, should be done at low engine speed to avoid abrasion and damage to the propeller tips.

BEFORE TAKE-OFF.

The use of the "Pilot's Check List" in the airplane is recommended to prevent the possibility of overlooking an important check item, because the pilot may be usually distracted by other important duties at this time.

Most of the "warm-up" will have been conducted during taxi run.

Additional engine warm-up should be restricted to the checks outlined in Section II.

Full throttle checks on ground are not recommended unless the pilot suspects that the engine is not turning up properly.

If, during the ignition system check procedure, an engine drop in excess of 100 RPM is produced, continue the warm-up for one or two minutes, then recheck the system . A drop exceeding 100 RPM at 1700 RPM engine speed, with the engine properly warmed, is unacceptable.

If an instrument flight is anticipated, a careful check of vacuum pump operation should be made. The generator operation check is also important and must be performed by watching the ammeter with an engine speed of 1200 RPM.

A last minute recheck should include the circuit breaker panel to see that all circuit breakers are "ON", the mixture and propeller pitch control levers for "FORWARD" position, all flight controls for free and correct movement and the fuel selector valve for correct position.

TAKE-OFF.

The use of full throttle is not recommended in the static run-up, therefore, the full throttle engine operation should be checked early in the take-off run. Any sign of rough engine operation, or sluggish engine acceleration is good reason for discontinuing the take-off.

In this case, a full throttle static run-up check should be made before another take-off is attempted.

In order to obtain maximum take-off power, adjust the mixture control to the low side of dial range corresponding to field elevation. This technique should always be used operating from field elevations greater than 5000 feet above sea level, since the performance increase, obtained by leaning, will become greater as the field elevation increases.

Normal take-off is performed with flaps 20°, full throttle and 2600 RPM. During take-off run maintain a light wheel back pressure.

As airspeed approaches 55 KIAS the nose wheel is lifted and, after a short run on main wheels, the airplane leaves the ground at 63-65 KIAS.

TAKE-OFF - AMPHIBIAN ON WATER.

After reaching the take-off line, accomplish the checks prescribed in the "Before Take-Off" paragraph. Then perform the procedure for placing the amphibian on the float step, described in Section II.

When the amphibian is on the float step, retract the water rudder by operating its control switch and continue the water run, exercising a moderate wheel back pressure.

Wait until 65 KIAS airspeed is reached, then increase the wheel back pressure.

The amphibian will leave the water without porpoising.

NOTE -

1) If porpoising occurs while on the step, apply additional back pressure to correct the excessively nose low attitude.

2) If any uncontrollable porpoising occurs, close the throttle and use full back pressure on the control wheel.

The porpoising generally takes place in the speed range affecting the operation of the amphibian on the float step, and is emphasized by the waves striking the hull nose, therefore, the amphibian nose must be kept well raised to prevent the above mentioned difficulty.

When the amphibian runs quickly on the float step, the minimum drag attitude is within a few degrees; therefore, a slight hull nose-up attitude should be maintained and increased as the speed builds-up.

The nose-up attitude ranges from 4° to 7° maximum. To obtain good take-off performances, it is generally preferable to have too much back pressure, rather than not enough pressure on the control wheel.

CAUTION - During the water taxiing, do not use the water rudder at speeds above 35 KIAS, to prevent any damage to water rudder parts.

During take-off, any attempt to pull the airplane off the water before reaching the proper airspeed will only result in either porpoising or extending ne take-off run. Water friction is high and it takes time for the airplane to accelerate to take-off speed, even when it is running lightly on the step.

Therefore, it is advisable to reduce the control wheel back pressure and wait until the proper airspeed has been reached, before applying the final back pressure.

AFTER TAKE-OFF.

As airplane reaches 75 KIAS, first retract the landing gear and then the flaps for the take-off from land. For take-off from water, first retract the wing floats and then the flaps at the same airspeed.

Adjust power for climbing and mixture for the selected power setting.

The normal "After Take-Off" power rating is 24 inches manifold pressure and 2450 RPM.

CLIMB.

The recommended rate-of-climb airspeed is 90 KIAS, with 24 inches of manifold pressure and 2450 RPM. The mixture should be leaned in this type of climb to give fuel pressure on the high side of the cruising power dial range, which is approximately the best power mixture. At this setting, the maximum performance for the power selected will be obtained without the high fuel consumption required for cooling at higher powers and lower climb speed.

The best rate-of-climb speed is 85 KIAS, full throttle, and 2600 RPM with full load.

CRUISE.

Cruising charts for normal cruising power and altitude are presented in Section VII. These charts are based upon 63 gallons of fuel for cruising, normal lean mixture, 3270 lbs gross weight, zero wind and without fuel reserve. Allowances for warm-up, take-off and climb sidewinds, change in mixture leaning technique and fuel reserve should be estimated. The endurance and range shown in the charts should be modified accordingly.

Charts show that longer ranges are obtainable at lower cruising speeds. Therefore, in the case of a destination being slightly out of range in one flight at normal cruising speed, it may save time and money to make the trip non-stop at some lower speed.

Normal cruising is done between 60% and 70% power. A. maximum cruising power of about 75% is allowable with 24 inches of manifold pressure and 2450 RPM.

To obtain the performances shown in the chart, the mixture should be leaned to give fuel pressures on the lower side of the cruise power dial range for desired power.

The airspeed obtained by this procedure is slightly lower than those obtained with the best power mixture, but the fuel consumption is considerably lower, resulting in a longer range.

An optimum compromise between speed and range will be obtained by this leaning technique.

When the maximum speed is required, as in short flight where range and fuel consumption are less important, mixtures should be leaned to give a fuel pressure in the high side of the cruise power range of the fuel gage dial.

This fuel pressure setting will give approximately best power mixtures with an airspeed increase and a fuel flow approximately one gallon per hour greater than those listed in Section VII.

If maximum range is desired, the mixture should be leaned approximately one psi below the lower edge of the power range utilized (See fuel pressure gage). At normal cruise power (below 75%), operation at maximum range mixture is not detrimental to engine life, provided that engine runs smoothly and cylinder head temperature is maintained within the recommended operating range.

FLYING IN TURBULENT AIR.

The airspeed structural limitations will take gust velocities up to 30 ft/sec.

For gust velocity of 45 ft/sec, the maximum allowable airspeed is about 130 KIAS. Greater airspeed may result in structural damage.

The minimum airspeed to prevent stall conditions are: 100 KIAS for gust velocity of 30 ft/sec and 120 KIAS for gust velocity of 45 ft/sec. These values are for airplane gross weight.

For lower gross weights, the airspeed limitations will be 130 KIAS max. and 102 KIAS min. for gust velocity of 30 ft/sec. For a gust velocity of 45 ft/sec. the minimum and maximum airspeeds are both 113 KIAS.

It will be seen from the foregoing that the airplane is a very strong one, capable of easily supporting 30 ft/sec. gusts, which are encountered only in severe turbulence. Further, with some caution on the part of the pilot as to airspeed, gust loads of 45 ft/sec. can be supported. The latter extreme gust loads are usually found in exceptionally strong thunderstorms.

During flight in turbulent air, it is advisable to maintain proper engine cooling while flying at reduced airspeeds. Therefore, it is recommended that the landing gear be lowered in order to operate the engine at a higher power setting.

MANEUVERING FLIGHT - NORMAL CATEGORY.

The FN-333 exceeds the requirements of the Civil Air Regulations, Part. III, set forth by the United States Government for airworthiness.

Spins and aerobatic maneuvers are not permitted in normal category airplanes in compliance with these regulations.

UNINTENTIONAL SPINS.

Should an unintentional spin occur, the following recovery should be observed:

1) Rudder against spin direction.
2) Ailerons against spin direction.
3) Control wheel forward smoothly.

STALLS.

The stall characteristics of the airplane are conventional in all configurations. The stall is preceded by mild aerodynamic buffet, which increases in severity as the stall is approached.

Both visual and aural warnings are provided by the stall warning indicator light and warning horn, between 5 and 10 KIAS above the stall, in all configurations. The buffeting will continue until the airplane stalls.

This will be followed by a clean drop of the nose, and recovery is obtained with little less of altitude if the nose is not lowered excessively and full available power is applied.

The power on stall occurs at a very steep angle of attack, therefore, during recovery, it is suggested that the control wheel be pushed almost fully in.

The various stalling speeds and configurations are shown on page III-11, Figure III-1.

LET-DOWN.

To accomplish a correct let-down with the FN-333, it is advisable to retard the throttle and set the propeller control lever in the "HIGH RPM" position.

The trim tab should be adjusted to trim the airplane for an airspeed between 90 and 130 KIAS, depending upon desired airspeed and weather conditions.

During let-down, the cylinder head temperature should be checked to prevent excessive engine cooling, which may result in spark plug fouling.

Whenever a steeper let-down is desired, it is advisable to extend the landing gear and flaps, making the let-down at 75 to 85 MPH airspeed.

BEFORE LANDING.

Upon entering the traffic pattern, the airspeed must be reduced below 105 KIAS, and the landing gear extended. The configuration indicator should be checked to see that the landing gear is "DOWN".

A further indication that the landing gear is "DOWN" will be given by the flashing red light, located in the center of the configuration indicator, which will not flash when the throttle lever is retarded below 12 inch. manifold pressure.

LANDING.

After touching down with the main wheels, immediately, but gently, lower the nose wheel to the ground while you still have elevator control. Do not hold nose wheel off until you lose elevator control. This will only result in dropping the nose wheel with a harder impact.

LANDING ON WATER.

The procedure for landing on water is the same as for landing on ground, with the only difference that the landing gear should be retracted and the wing floats lowered. The water rudder should be retracted and the flaps set at 30°.

The final approach and the water touch-down are conventional and do not require further description. The control wheel back pressure should be held until the airplane has stopped, to eliminate the possibility of porpoising.

The water rudder may be lowered when the amphibian has left the float step.

AFTER LANDING.

Heavy braking during the landing roll is to be avoided because of the possibility of skidding the main wheels, with resulting loss of braking effectiveness and tire damage,

To aid in decelerating the airplane it is best to leave the flaps fully extended during the landing roll. The flaps should be retracted after leaving the active runway.

MOORING.

A tie-down fitting, located on the underside of each wing, and a tie-down fitting located on the upper side of the nose are provided for mooring the amphibian on ground.

Another tie-down fitting, located on the hull stern, is used together with the nose fitting to moor the amphibian on water.

NIGHT FLYING.

Before starting the engine for a night flight, the interior lighting should be adjusted to permit good instrument visibility by turning "ON" the proper switches and rheostats.

The navigation lights and landing lights should be checked also. Before taxiing, the interior lighting intensity should be reduced to a point where all controls and switches are visible.

Night take-offs are conventional, although the landing gear retraction is usually delayed to ensure that the airplane is well clear of the runway.

During cruise, the interior lighting will usually be decreased in order to have better visibility outside of the airplane.

COLD WEATHER PROCEDURE.

ENGINE STARTING.

The higher engine cranking power required in cold weather starts, coupled with decreased battery capacity associated with cold temperatures, will impose a heavy load on both the engine and the battery. Therefore, whenever possible, external power should be employed. The use of external engine preheat will maintain the engine oil in a sufficient viscous state, so facilitating the engine starting.

Preheat will also thaw the congealed oil existing in the oil coolers.

BETORE TAKE-OFF.

The engine should be accelerated smoothly and the oil pressure should remain normal and steady. The propeller should be operated through several complete cycles to warm the governor and propeller hub.

TAKE-OFF.

Take-off procedures are normal in all respects.

CLIMB AND CRUISE.

At half-hour intervals the propeller pitch control should be exercised to flush the cold oil from governor and propeller.

Since cold weather adversely affects battery capacity, use the electrical equipment as necessary to permit the generator charging the battery throughout the flight.

LET-DOWN AND LANDING.

During let-down, the cylinder head temperature should be checked and sufficient engine power used in order to maintain the cylinder head temperature above operating minimum.

STALL SPEED CHART KNOTS-IAS 3270 POUNDS GROSS WEIGHT	
CONFIGURATION	LEVEL FLIGHT
Gear, Flap and wing floats UP	65
Gear Down, wing floats UP, Flaps 45°	59
Gear UP, wing floats Down, Flaps 45°	58

Figure III-1: Stall Speed Chart

SECTION IV -

EMERGENCY PROCEDURES

ENGINE FIRE

In the event of engine fire perform the following:

1) Fuel selector valve ..... "OFF".
2) Throttle..... fully in.
3) Ignition switch ..... "OFF".
4) DO NOT restart the engine.
5) Prepare for landing on ground or water.

HYDRAULIC SYSTEM FAILURE.

In the event of a main hydraulic system failure during flight, the hydraulically operated devices can be operated by the hydraulic hand pump as follows:

1) Set all hydraulic selector valves in neutral position and operate the hand pump through a few cycles while watching the hydraulic gage.
2) If the pressure raises gradually after each pumping cycle, the engine driven hydraulic pump is at a fault.
   In this case, to extend or retract the landing gear, the wing floats or the flaps, move the proper selector valve in the desired position and continue the hand pump operation until the affected unit is extended or retracted. (The hand pump replaces the engine driven pump and completely pressurizes the main hydraulic system).
3) If the gage indicates zero psi and the pressure does not build up after a few cycles of hand pump operation, a failure in the main hydraulic circuit is indicated (breakage of a main hydraulic line causing severe leakage). In this event, immediately discontinue the pumping action (to prevent all of the hydraulic tank reserve oil from seeping through the leakage point) and accomplish the "Landing gear emergency extension" procedure.

LANDING GEAR EMERGENCY EXTENSION.

If a complete main hydraulic system failure occurs (both hydraulic pump and hydraulic circuit), use the following procedure for the landing gear emergency extension:

1) Pull the red hydraulic pump selector valve knob in the '"Emergency" or full rear position, breaking the safety wire.
2) Set the landing gear selector valve handle in "down" position.
3) Operate the hydraulic hand pump until the green main gear indicator light and "FIELD" word come on, and the green nose gear indicator light comes on.

FUEL SYSTEM FAILURE.

In the event of the engine-driven fuel pump failure, turn the auxiliary fuel pump switch to HIGH position. If fuel pressure does not increase to normal value, turn the fuel selector valve to other fuel tank. If fuel pressure remains below normal, land as soon as practical.

FORCED LANDING.

1) Mixture lever..... "IDLE" CUT-OFF.
2) Fuel selector valve ..... "OFF".
3) All switches..... "OFF", except battery switch.
4) Approach at 103 KIAS.
5) If field is smooth and hard, extend the landing gear within gliding distance of the field.
6) Extend flaps as necessary within gliding distance of the field.

> NOTE - The glide path is rather steep with flaps and landing gear DOWN.

7) Battery switch ..... "OFF".
8) Make a normal landing, keeping the nose wheel off ground as long as possible.
9) If terrain is rough or soft, make a wheels-up landing as follows:
   a) Approach at 103 KIAS with landing gear and flaps retracted.
   b) Extend flap to 20° within gliding distance of the field.
   c) Battery switch ..... "OFF".
   d) Open cabin door prior to flare-out.
   e) Land in a slightly tail low attitude.
   f) Attempt to held tail low throughout the slide.

LANDING WITH FLAT MAIN LANDING GEAR TIRE.

If tire failure occurred during take-off and the defective main gear tire is identified, proceed as follows:

1) If a landing on water upon arrival to destination is anticipated, retract the landing gear and proceed to destination.
2) Upon arrival at destination, lower the wing floats and land on water.
3) If landing on water is not possible, prepare for landing as follows:
   a) Leave the landing gear selector valve handle in "DOWN" position (Landing gear lowered).
   b) Turn fuel selector valve handle to tanks on the same side as the defective tire, to reduce fuel load.
   c) If a crosswind landing is required, select a runway with crosswind from the side opposite of the defective tire.
   d) Check configuration indicator and nose gear indicator for a landing gear "DOWN" indication.
   e) Flaps fully extended to 45°.
   f) In approach, align airplane with edge of runway that is opposite from defective tire, to allow room for mild turn in landing roll.
   g) Land with a wing slightly low on side of inflated tire, and lower nose wheel to ground immediately, for positive steering.
   h) Use full aileron in landing roll to lighten the load on the defective tire.
   i) Apply brake only to the inflated tire, to minimize landing roll and maintain directional control.
   j) Stop the airplane to avoid further tire and wheel damage, unless runway must be cleared because of other traffic.

LANDING WITH FLAT NOSE GEAR TIRE.

1) If failure occurred during take-off, retract the landing gear and land on water before or upon arrival at destination, if this is possible. If landing on water is not possible, proceed as follows:
2) Leave the landing gear selector valve handle in the "DOWN" position (landing gear lowered).

> NOTE - Do not attempt to retract the landing gear with a tire blow out. If retraction is attempted, the defective tire may be distorted enough to bind the wheel strut within the well and prevent later gear extension.

3) Move disposable load to the rear of cabin if this is possible.
4) Flap from 0° to 20°, as required.
5) Land in a nose-up attitude, with or without power.
6) Maintain back pressure on control wheel, to hold nosewheel off the ground in landing roll.
7) Retard throttle in landing roll.
8) As roll speed diminishes, hold control wheel fully aft until the airplane is stepped.
9) Additional taxiing should be minimized in order to avoid further tire damage.

SECTION V -

OPERATING LIMITATIONS

MANEUVERS - NORMAL CATEGORY.

All intentional aerobatic maneuvers and spins are not permitted.

The following gross weight and flight lead factors should not be exceeded:

Maximum take-off gross weight ..... 3270 lbs
Flight load factor (positive) 3.8
Flight load factor (negative) 1.52

AIRSPEED LIMITATIONS.

Maximum structural cruising speed 141KIAS
(level flight or climb)
Maximum maneuvering speed ..... 128 KIAS
Maximum speed, gear extended ..... 108 KIAS
Maximum speed:
Flaps fully extended (45°) ..... 108 KIAS
Flaps 1/2 extended ..... 108 KIAS

AIRSPEED INDICATOR MARKINGS.

Never exceed (glide or dive, smooth air)	178 KIAS	(Red line)
Caution range	140 to 178 KIAS	(Yellow line)
Normal operating range	63 to 140 KIAS	(Green arc)
Flap operating range	58 to 108 KIAS	(White arc)

ENGINE OPERATING RANGE

Maximum power and speed ..... 250 HP at 2600 RPM

ENGINE INSTRUMENT MARKINGS.

OIL TEMPERATURE INDICATOR.

Idling temperature	75°F to 120°F	(Yellow bar)
Normal operating range	120°F to 225°F	(Green line)
Maximum temperature	225°F	(Red line)
Minimum temperature	75°F	(Red line)

OIL PRESSURE GAGE.

Idling pressure	10 to 30 psi.	(Yellow bar)
Normal operating range	30 to 60 psi.	(Green bar)
Maximum pressure	60 psi.	(Red line)
Minimum pressure	10 psi.	(Red line)

FUEL PRESSURE GAGE.

Normal operating range	2 to 17 psi.	(Green arc)
Minimum and maximum pressures	1.5 and 17.5 psi.	(Red line)

MANIFOLD PRESSURE GAGE.

Normal operating pressure	15 to 24 in.Hg	Green arc)

CYLINDER HEAD TEMPERATURE INDICATOR,

Normal operating temperature	250°F to 460°F	(Green bar)
Minimum temperature	250°F	(Red line)
Maximum temperature	460°F	(Red line)

TACHOMETER.

Normal operating range	2100 to 2450 RPM	(Green arc)
Maximum (engine rated speed)	2600 RPM	(Red line)

HYDRAULIC PRESSURE GAGE.

Normal operating range	1100 to 1500 psi.	(Green bar)
Minimum pressure	1100 psi.	(Red line)
Maximum pressure.....	1500 psi.	(Red line)

CENTER OF GRAVITY RANGE.....19% to 31% M.A.C.

110" to 117" (distance from the nose reference datum)

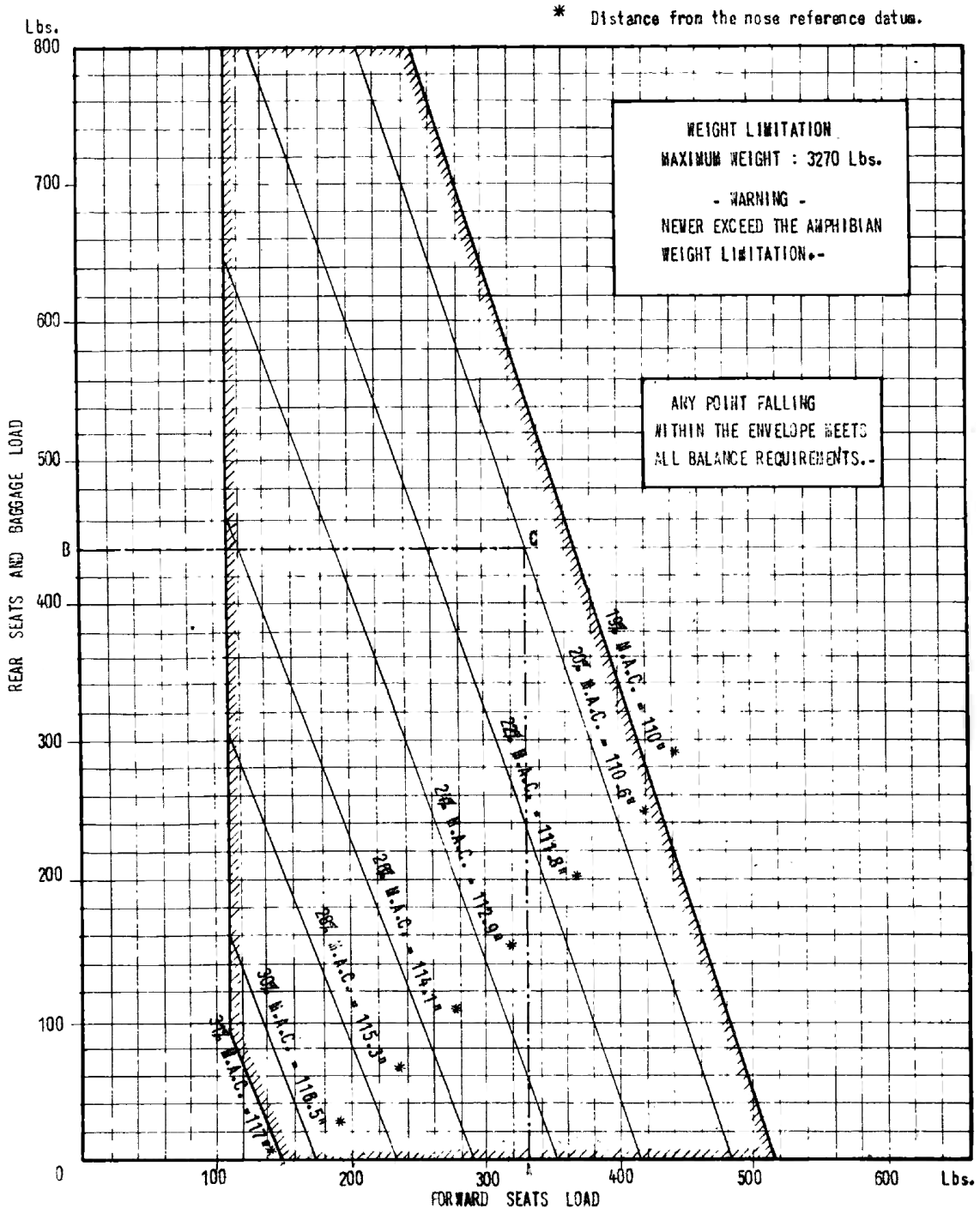
WEIGHT AND BALANCE LIMITATIONS.

The airplane is designed for certain limit loads and balance conditions which must not be exceeded in any load conditions.

The allowable C.G. limits for the airplane for any particular load condition are shown on the "Center Gravity Envelope" diagram (See page V-4). Using this diagram and following the example, you can quickly determine whether or not the C.G. is within the prescribed limits.

A "Weight and Balance Data Report" is furnished with each airplane. All the information on empty weight C.G. and allowable limits for your particular airplane as equipped when it left the factory, is shown. For a more precise and detailed determination of C.G. for any particular load and equipment condition, use the "Weight and Balance Data Report".

CENTER GRAVITY ENVELOPE



Example for a forward useful load of 330 lbs. (A - Pilot + one passenger) and a rear useful load of 440 lbs. (B - Two passengers + baggage) : Plotting A and B on the diagran yelds point C on 20% M.A.C. which falls well within the center gravity envelope.

NOTE : The C.G. change due to fuel and oil is negligeable.

SECTION VI -

GENERAL MAINTENANCE

I. LEVELING.

Leveling of the FN-333 for purposes of weighing or rigging is accomplished as follows:

1) Open the two cabin doors.
2) To level airplane longitudinally, locate the two leveling screws in the lower channel of the left hand door sill. Put a straight edge on two gage blocks placed on the heads of the two screws and place a level on the straight edge. Raise or lower the airplane at proper jacking points until an accurate level reading is obtained.
3) To level the airplane laterally, put a gage block on the head of a leveling screw of the left hand door sill and another gage block on the head of opposite leveling screw of the right hand door sill; place a straight edge on the two gage blocks and a level on the straight edge-Raise or lower the airplane laterally until an accurate level reading is obtained.

II. MOORING THE AIRPLANE.

1) To moor the airplane on ground, fasten ropes or cables of at least 700 pounds tensile strength to the wing tie-down fitting, located on the underside of each wing, and secure the opposite ends to tie-down rings suitably anchored to the ground. Fasten a rope or cable of 700 pounds to anchor fitting, located on the upper side of the airplane nose, and secure opposite end to tie-down ring anchored to the ground. Install the controls lock at control wheel and rudder pedals. Set the parking brake or install wheel chocks.
2) To moor the airplane on water, fasten a rope or cable of 700 pounds to airplane nose anchor fitting and secure the opposite end to the mooring buoy. Another rope or cable may be fastened to the stern anchor fitting and to a second mooring buoy, if it is necessary to prevent movement of airplane around the single mooring buoy.; A mooring equipment may also be used. (See page I-33).

III. STORAGE.

The outside storage of the airplane is permitted due to its all-metal construction. However, whenever possible, inside storage is preferred, to increase the airplane life.

During extended storage, pull the propeller through several revolutions at least each 5 day interval, to insure lubrication of the cylinder walls, engine bearings and other internal parts.

During storage, set propeller blades horizontally to prevent rain water from entering the hub mechanism.

The fuel tanks should be kept full to prevent moisture condensations. This will also increase the fuel tank life.

The tires and struts should be maintained correctly inflated.

When the airplane is stored for a great length of time, it will deteriorate more rapidly than when it is flown regularly, therefore, it should be carefully checked before releasing to service, after extended storage.

IV. JACKING.

A special airplane lift trailer is used to raise the entire airplane for the landing gear functional checks, etc. and for ground handling. Three jack pads may also be installed under the hull for the same purpose.

If a minor maintenance, such as a tire change, is required, the individual wheels may be raised as follows:

1) To raise the nose wheel, place weights (sandbags, etc.) on the hull stern until the stern rests securely on the ground.
   The main wheels should be chocked when raising the nose wheel.
2) To raise either main wheel, a jacking point is provided on the gear leg. Check the opposite main wheel and the nose wheel, before jacking.

V. EXTERIOR AND INTERIOR CARE.

1) Painted surfaces contaminated with accidentally spilled fluids containing dyes, such as hydraulic oil or fuel, should be immediately flushed with cold water to remove all fluid. Battery electrolyte must be flushed off immediately and the area neutralized with an alkali such as baking soda solution. Thoroughly rinse with clean water.
   Exterior surfaces of the hull should be inspected frequently for scratches, nicks and local condition of paint, which may result in corrosion and subsequent water-tightness failure. The condition of the riveting below the light water line and the inspection door seals should be thoroughly checked to prevent water seepage into the hull.
   The seals at water rudder control cable passages must be kept greased at all times, to prevent moisture seepage.
2) The windshield and windows are made of plexiglass and should be kept clean and clear at all times. The following maintenance procedure is suggested:
   a) Flush with clean water and dislodge excess dirt, mud, etc. with hands.
   b) Wash with mild soap and water solution. Use a soft cloth or sponge (do not rub).
   c) Remove oil, grease or sealing compounds with a cloth soaked in Kerosene.

      NOTE - Do not use gasoline, alcohol, benzene, carbon tetrachloride, lacquer thinner or window cleaning sprays.

   d) After cleaning, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth.
   e) A severe scratch or mark can be removed by using jeweler's rouge to rub out the scratch. Smooth on both sides and apply wax.
3) The inside of cabin should be kept clean. The dust can be removed with a whisk broom or a vacuum cleaner.
   Spots or stains on the upholstery should be removed as soon as possible with a good grade of commercial cleaning fluid.
   Do not use too much fluid to prevent seat and cushion pads damage.
4) LANDING GEAR.
   Keep the polished surfaces of the landing gear cleaned and moistened with a cloth soaked in hydraulic fluid MIL-H-5606.
   Use a lint-free clean cloth to avoid scratches.

VI. TIRE INFLATION.

The nose and main wheel tires should be kept inflated to 35 psi.

Reverse the tires on the main wheels, if necessary, to produce even wear.

To maintain the original balance, the wheels, tires and tubes relationship must be kept upon reinstallation.

In the installation of a new component, it may be necessary to rebalance the wheel with the tire installed.

VII. LANDING GEAR SHOCK STRUTS SERVICING.

The inflation of the nose and main landing gear shock struts should be checked with the normal static weight of the airplane on the nose wheel.

To perform this check, rock the airplane several times to remove any shock strut internal friction.

Check to see that the nose gear shock strut extends fully with and without airplane weight on the nosewheel.

The main gear shock struts residual stroke is about one to 5/8 inch.

VIII. BRAKE SERVICING.

The brake system is filed with UNIVIS PJ43, or MIL-H-5606 hydraulic brake fluid.

To add fluid to the brake system, remove the air bleed plug, located on the right or left brake cylinder, and release the parking brake handle.

Using a hand pump, add the hydraulic fluid, under pressure, through the filler fitting on the wheel brake.

Operate the brake during this operation.

Continue operation until fluid flows from the air bleed plug free of all air bubbles. Repeat this procedure for filling and bleeding the other brake system.

IX. HYDRAULIC SYSTEM SERVICING.

The hydraulic system uses the UNIVIS PJ43 (MIL-H-5606) hydraulic fluid.

The hydraulic system reservoir oil level is checked by a dipstick incorporated in the hydraulic reservoir filler cap.

The access to the hydraulic reservoir is gained by opening the left rear fuselage compartment access door.

X. FUEL SYSTEM SERVICING.

Only aviation 91/96 octane grade fuel should be used in the FN-333.

Fuel tanks total capacity..... 63 gallons.

The fuel system strainer and the left and right inboard fuel tanks should be drained before first flight of each day and after each refueling.

XI. OIL SYSTEM SERVICING.

The following grades are required for the specified operating temperatures:

Temperature above 40°F ..... SAE 50-Grade 1100

(Spec. MIL-L-6082)

Temperature below 40°F ..... SAE 30-Grade 1065

(Spec. MIL-L-6082)

Engine oil sump Capacity ..... 12 quarts

The sump oil must be changed every 25 hours. The oil screen should be removed and cleaned every 25 hours, or oftener under severe operating conditions.

XII. BATTERY SERVICING.

a) "Varley" Battery.

The battery voltage should never drop below 24.5 Volt. Keep the exposed metallic parts of the battery coated with a silicone insulating compound. If the amphibian is used frequently, the battery electrolyte level should be checked every 100 hours and distilled water added until the level is about 1/8" above the perforated baffle plate. If battery is not in regular service, add distilled water every month or 50 hours flight time.

Every three months, or not later than every 500 flight hours, the battery should be removed for a thorough inspection and maintenance.

b) "Exide" battery.

The full charge specific gravity is 1.265-1.275. If the hydrometer reading of one or two cells is below 1.240, give battery a freshening charge. A freshening charge should also be given once a month to idle batteries. Distilled water must be added regularly to each cell.

The maximum filling height is "at bottom of the filling tube"; add before the level exposes the protector above the separator.

It is advisable to remove the battery not later than every three months or not later than every 500 flight hours for a thorough inspection and maintenance.

XIII. ENGINE INDUCTION AIR FILTER SERVICING.

Proper cleaning and servicing of the air filter is important to increase life and maintain top efficiency of the engine.

The air filter should be serviced every 25 hours (during regular oil change) or more often when operating in dusty conditions.

Under extremely dusty conditions, daily maintenance of the air filter is recommended.

The air filter may be easily removed or installed through the right wing air scoop by removing or installing two wingnut which attach the air filter to wing air scoop duct.

To clean the air filter, wash thoroughly, soiled face down, in dry cleaning solvent, specification P-S-661, and allow to dry.

Dip the dry filter in mixture of three parts of oil, specification MIL-L-6082 grade 1100, and one part of corrosion preventative compound, specification MIL-G=6529, and allow to drain for three hours. Wipe off excess oil.

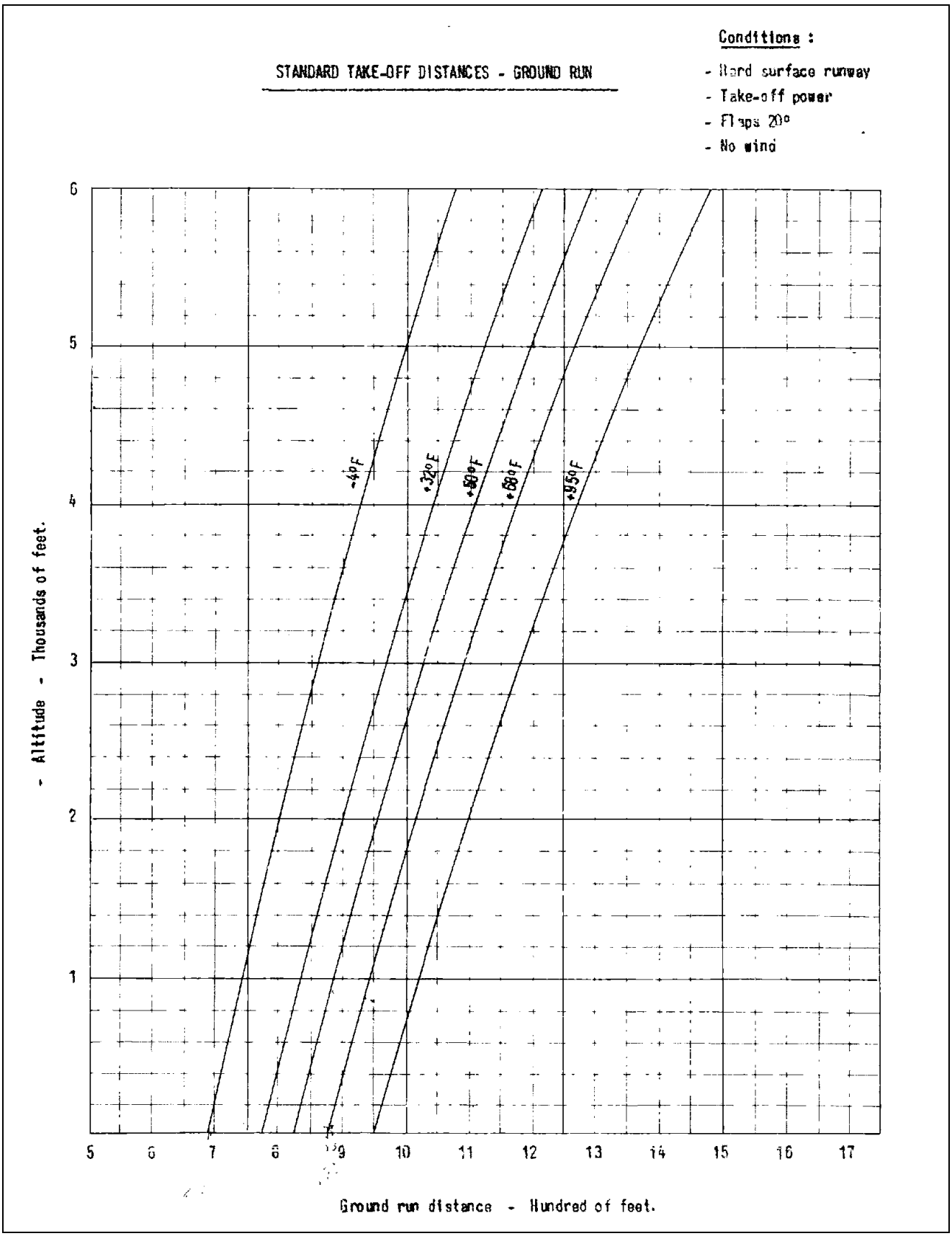
SECTION VII -

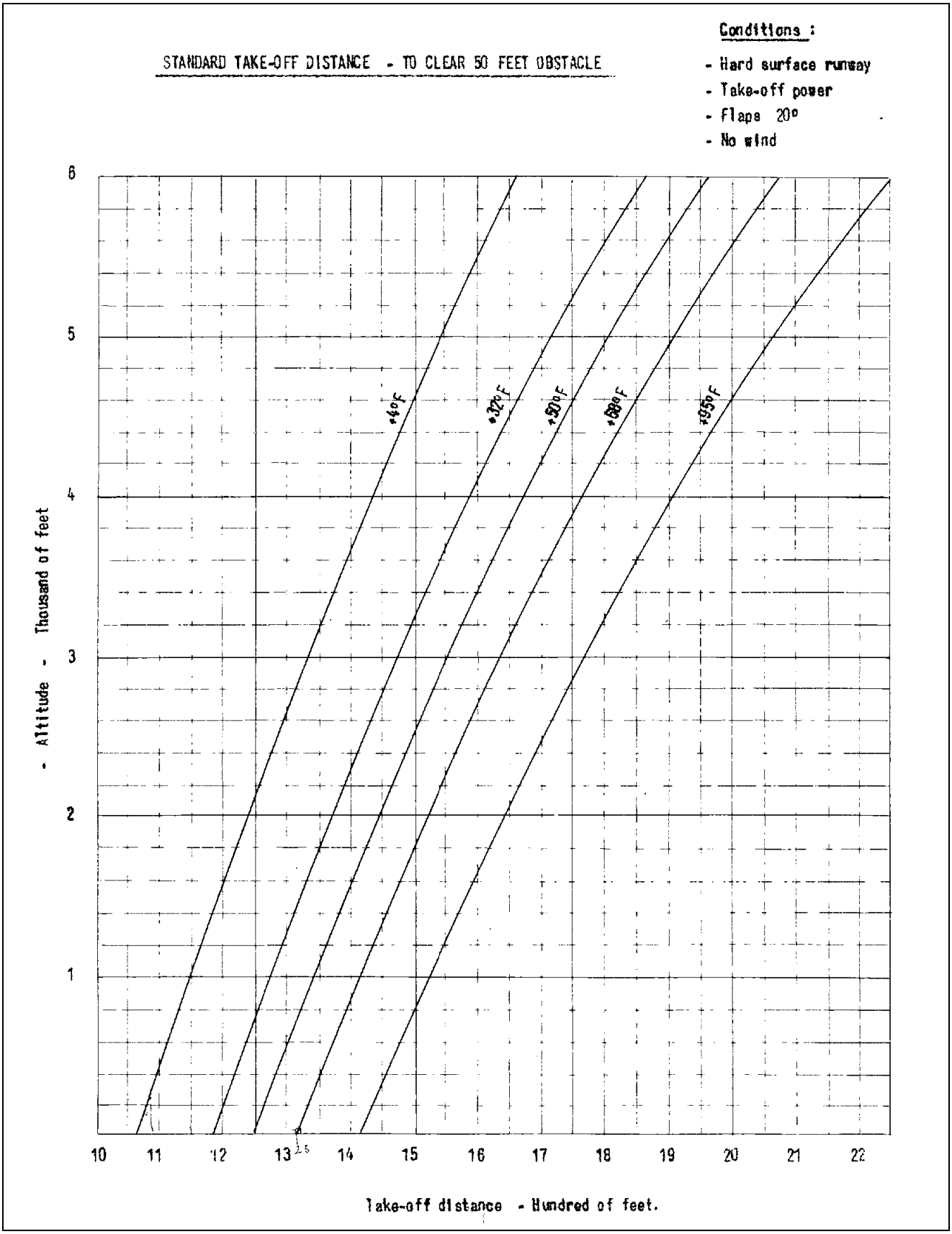
OPERATIONAL DATA

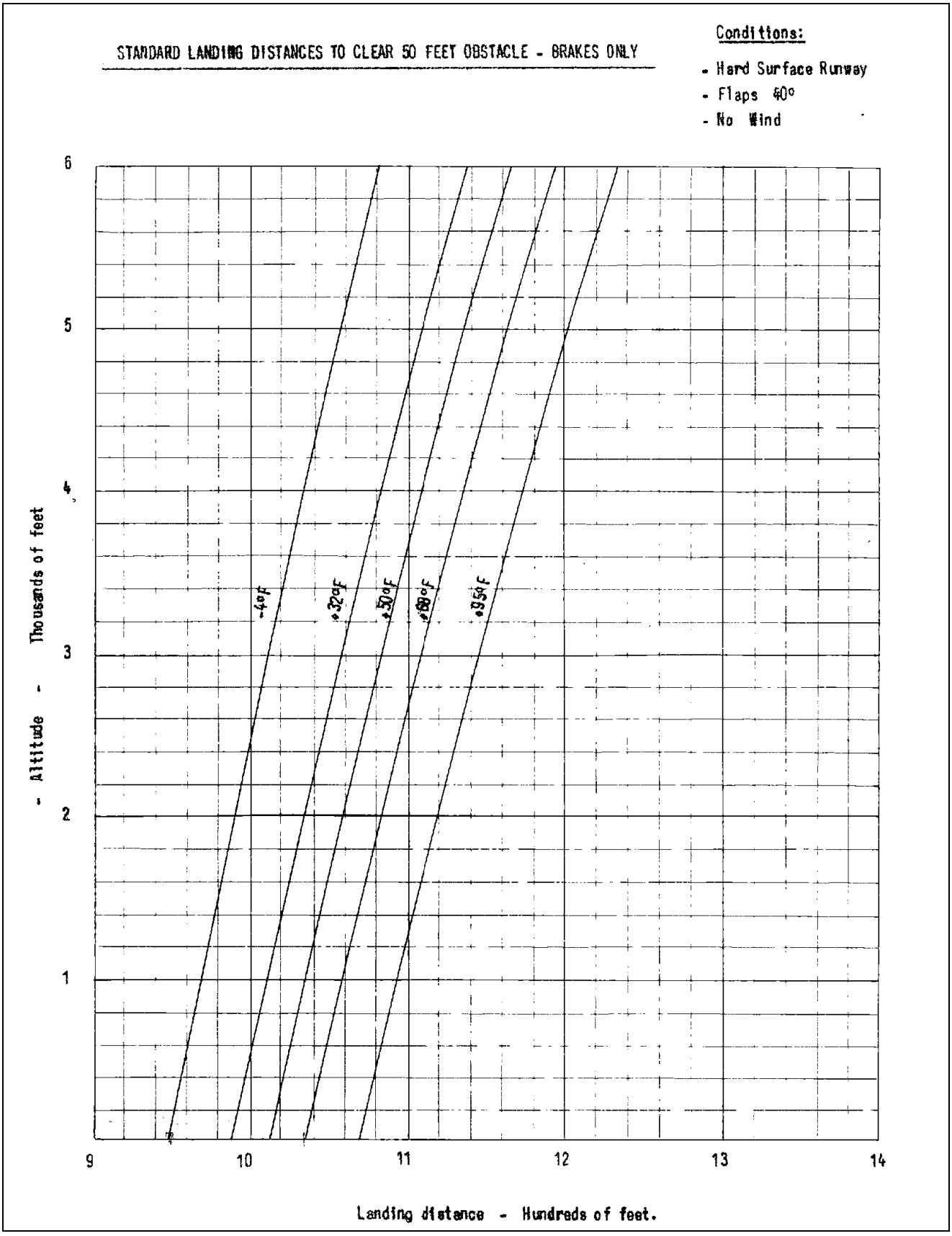
The operational data diagrams and charts, shown on the following pages, are compiled from actual tests with the airplane and engine in good condition using average piloting technique and normal lean mixture.

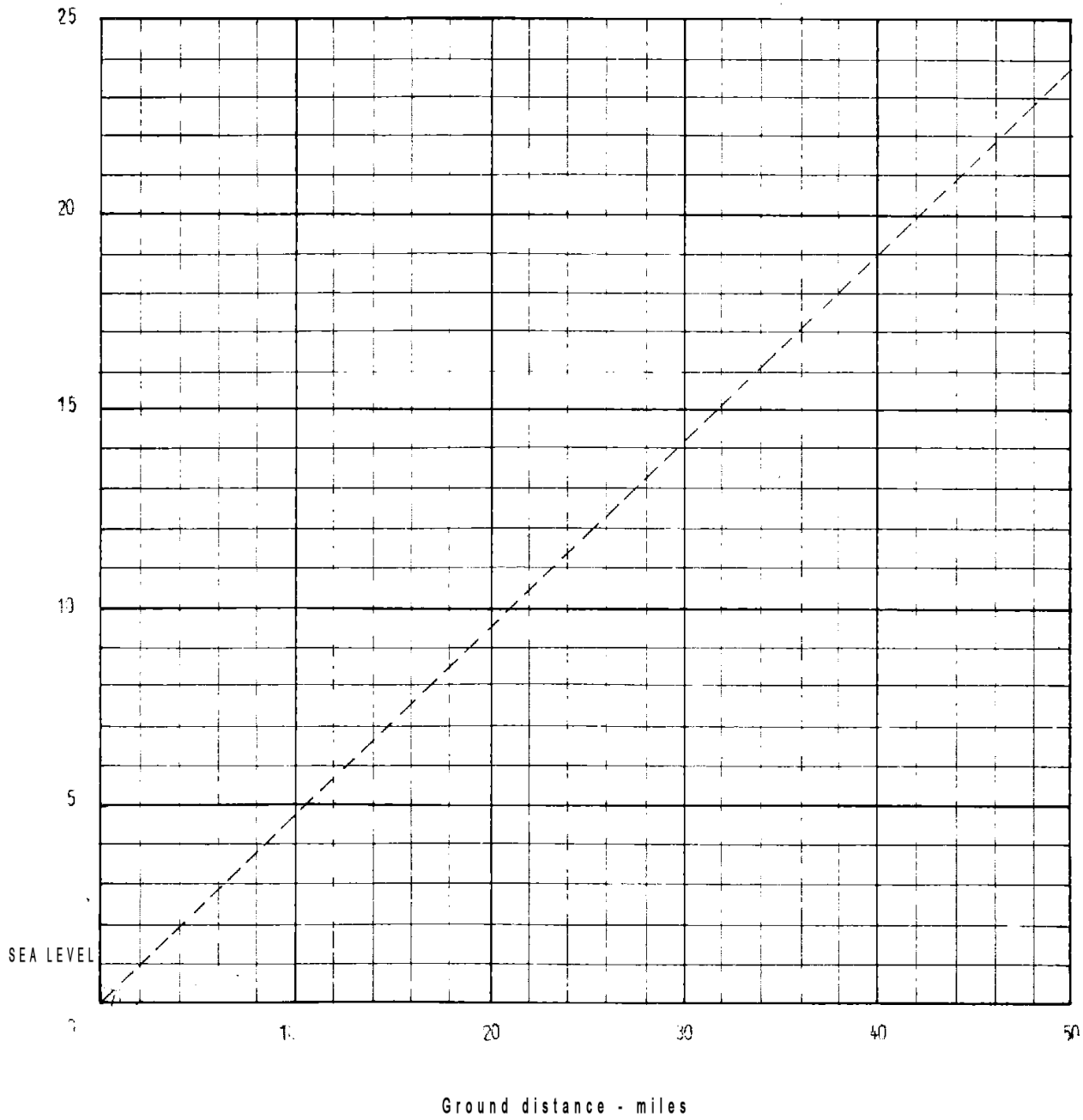
In as much as the number of variables involved precludes great accuracy, an ample fuel reserve should be provided. The charts make no allowance for wind, navigation error, pilot technique, warm-up, take-off, climb, etc.

All of these factors must be considered when estimating fuel reserve. Use the cruise performance charts to solve flight planning problems.


STANDARD TAKE-OFF DISTANCES - GROUND RUN
Conditions :
- Hard surface runway
- Take-off power
- Flaps 20°
- No wind
- Altitude - Thousands of feet.
0
1
2
3
4
5
-4°F
+32°F
+50°F
+68°F
+95°F
5
6
7
8
9
10
11
12
13
14
15
16
17
Ground run distance - Hundred of feet.


STANDARD TAKE-OFF DISTANCE - TO CLEAR 50 FEET OBSTACLE
Conditions :
- Hard surface runway
- Take-off power
- Flaps 20°
- No wind
+40°F
+32°F
+50°F
+68°F
+95°F
- Altitude - Thousand of feet
6
5
4
3
2
1
10
11
12
13
14
15
16
17
18
19
20
21
22
Take-off distance - Hundred of feet.


STANDARD LANDING DISTANCES TO CLEAR 50 FEET OBSTACLE - BRAKES ONLY
Conditions:
- Hard Surface Runway
- Flaps 40°
- No Wind
6
5
4
3
2
1
- Altitude - Thousands of feet
40°F
32°F
50°F
68°F
95°F
9
10
11
12
13
14
Landing distance - Hundreds of feet.


MAXIMUM GLIDE
Conditions :
- Wing floats UP
- Landing Gear UP
- Speed 89 KIAS
- No wind
25
20
15
10
5
SEA LEVEL
20
30
40
50
Ground distance - miles

CRUISE PERFORMANCE WITH NORMAL LEAN MIXTURE AT 2,500 ft.							
RPM	MP	% BHP	FUEL PRESS.	TAS (Knots)	GAL / HOUR	ENDURANCE HOURS WITH 63 Gl.s OF FUEL	RANGE STA. MILES
2450	24	77	8.6	141	14.3	4.4	710
	23	73	8.0	137	13.6	4.6	734
	22	70	7.4	134	12.8	4.9	760
	21	66	6.9	131	12.1	5.2	786
2300	24	70	7.5	134	12.96	4.9	756
	23	67	7.0	132	12.3	5.1	780
	22	63	6.5	129	11.6	5.4	804
	21	60	6.0	125	10.9	5.7	830
2200	23	52	6.3	128	11.3	5.5	815
	22	58	5.8	124	10.7	5.9	838
	21	54	5.4	120	10.1	6.2	863
	20	51	5.0	115	9.5	6.6	880
2100	22	52	5.1	117	9.7	6.5	876
	21	49	4.8	113	9.2	6.9	893
	20	46	4.6	108	8.7	7.2	905
	19	42	4.3	103	8.2	7.7	914
	18	39	4.2	97	7.7	8.2	914

CRUISE PERFORMANCE WITH NORMAL LEAN MIXTURE AT 5,000 ft.							
RPM	MP	% BHP	FUEL PRESS.	TAS (Knots)	GAL / HOUR	ENDURANCE HOURS WITH 63 Gl.s OF FUEL	RANGE STA. MILES
2450	24	78	8.6	144	14.5	4.3	724
	23	75	8.2	141	13.8	4.6	744
	22	71	7.6	138	13.1	4.8	768
	21	67	7.0	134	12.3	5.1	796
2300	24	71	7.6	139	13.1	4.8	766
	23	68	7.2	135	12.5	5.0	788
	22	64	6.5	132	11.8	5.3	813
	21	61	6.2	129	11.2	5.6	893
2200	23	63	6.5	132	11.7	5.4	820
	22	60	6.1	128	11.0	5.7	845
	21	56	5.6	124	10.4	6.1	871
	20	53	5.2	120	9.8	6.4	893
2100	22	54	5.4	122	10.1	6.2	878
	21	51	5.0	118	9.5	6.6	898
	20	47	4.7	113	9.0	7.0	917
	19	44	4.4	108	8.5	7.4	924
	18	41	4.2	101	8.0	7.9	924
	17	37	4.1	94	7.5	8.4	894

NOTE – Cruise Performance is based on standard conditions, zero wind, normal lean mixture, 63 gallons of fuel (no reserve) and 3270 pounds weight.

CRUISE PERFORMANCE WITH NORMAL LEAN MIXTURE AT 7,500 ft.							
RPM	MP	% BHP	FUEL PRESS.	TAS (Knots)	GAL / HOUR	ENDURANCE HOURS WITH 63 Gl.s OF FUEL	RANGE STA. MILES
2450	22	72	7.8	142	13.3	4.7	775
	21	68	7.2	139	12.6	5.0	801
	20	64	6.6	134	11.8	5.3	830
	19	60	6.1	131	11.1	5.7	856
2300	22	65	6.8	136	12.1	5.2	820
	21	62	6.3	132	11.4	5.5	846
	20	58	5.8	128	10.7	5.9	872
	19	55	5.4	125	10.2	6.2	890
2200	22	62	6.3	132	11.4	5.5	846
	21	58	5.8	128	10.7	5.9	874
	20	54	5.4	124	10.0	6.2	895
	19	51	5.0	120	9.5	6.6	911
2100	22	56	5.6	127	10.4	6.0	882
	21	53	5.2	122	9.8	6.4	902
	20	49	4.8	117	9.2	6.8	922
	19	46	4.6	112	8.8	7.2	930
	18	42	4.3	106	8.2	7.6	930
	17	39	4.1	97	7.7	8.1	910

CRUISE PERFORMANCE WITH NORMAL LEAN MIXTURE AT 10,000 ft.							
RPM	MP	% BHP	FUEL PRESS.	TAS (Knots)	GAL / HOUR	ENDURANCE HOURS WITH 63 Gl.s OF FUEL	RANGE STA. MILES
2450	20	65	5.8	139	12.0	5.2	836
	19	61	6.3	134	11.0	5.5	863
	18	58	5.8	131	10.6	5.9	890
	17	53	5.2	126	9.9	6.3	916
2300	20	59	6.0	132	10.9	5.8	879
	19	56	5.5	128	10.3	6.1	902
	18	52	5.1	123	9.7	6.5	924
	17	48	4.7	117	9.1	8.0	940
2200	20	56	5.5	128	10.3	6.1	903
	19	52	5.1	123	9.7	6.5	922
	18	49	4.8	118	9.2	6.9	938
	17	45	4.4	111	8.6	7.3	943
2100	20	51	5.0	122	9.6	6.6	923
	19	47	4.7	116	9.0	7.0	940
	18	44	5.0	110	8.5	7.4	942
	17	41	4.2	101	8.0	7.9	918

NOTE – Cruise Performance is based on standard conditions, zero wind, normal lean mixture, 63 gallons of fuel (no reserve) and 3270 pounds weight.

CRUISE PERFORMANCE WITH NORMAL LEAN MIXTURE AT 15,000 ft.							
RPM	MP	% BHP	FUEL PRESS.	TAS (Knots)	GAL / HOUR	ENDURANCE HOURS WITH 63 Gl.s OF FUEL	RANGE STA. MILES
2450	16	52	5.1	126	9.7	6.5	951
	15	48	4.7	119	9.0	7.0	957
	14	43.4	4.3	107	8.4	7.5	928
2300	17	51	5.0	124	9.4	6.7	957
	16	47	4.7	117	8.9	7.1	957
	15	43	4.3	106	8.3	7.5	923
2200	17	48	4.7	119	9.0	7.0	956
	16	44	4.4	109	8.5	7.4	938
2100	17	43.6	4.4	107	8.4	7.5	933

NOTE – Cruise Performance is based on standard conditions, zero wind, normal lean mixture, 63 gallons of fuel (no reserve) and 3270 pounds weight.

SECTION VIII -

RETROFIT AVIONICS

This section describes avionics retrofitted to the aircraft that are not part of the manufacturer-provided installation.

NOTE - Individual manuals are provided by the individual vendors, and are therefore not included or attached in this manual.

GARMIN GNS-430

Refer to Garmin documentation for the detailed operation of this avionic equipment.

The GNS-430 unit is connected to the NAVCOMM1 circuit breaker (53, Figure I-1)

NOTE – The unit can be toggled by clicking on the domed nut above the radio stack (47, Figure I-1). The selection will persist across simulator sessions.

DAVTRON M-803

Refer to Davtron documentation for detailed operation instructions.

Clock – Chronometer unit, with OAT & Voltage display options.

NOTE – This unit is as provided by Microsoft flight Simulator. Some functions may not be available.

DAVTRON M-655

Refer to Davtron documentation for detailed operation instructions.

A multi-Display unit. The selection button, when pressed momentarily toggles – in sequence – the following options:

- F: OAT, °F
- C: OAT, °C
- p: Pressure Altitude

- d: Density altitude
- e: electrical voltage

When held for 3 seconds, the selection button will activate an altitude alert function, and illuminate an amber LED indicator The target will be the current flight altitude, with a tolerance of ±200 ft by default. To deactivate the alert, press the button for 3 seconds again.

To change the tolerance, press the button for more than 5 seconds until the value starts to increase by 100 ft. Once the maximum of 999 ft is reached, the value resets at 100 ft.

NOTE – Since the KAP-140 autopilot is fitted with an altitude alert system, the audio output of this device is disconnected.

KAP-140 AUTOPILOT

Refer to KAP-140 documentation for detailed operating instructions.

Audio alert options for the autopilot unit are active:

- "BEEP BEEP BEEP BEEP": Altitude alert, AP OFF
- "ALTITUDE": when reaching within ±1000 ft of target altitude, AP ON.
- "LEAVING ALTITUDE": when leaving out of ±200 ft of target altitude, AP ON
- "AUTOPILOT": AP switched from ON to OFF.
- "TRIM IN MOTION, TRIM IN MOTION …": elevator trim has been moving in a single direction for more than 5 seconds, AP ON. The alert will persist until the condition ceases.
- "CHECK PITCH TRIM, CHECK PITCH TRIM …": elevator trim has been deflected past the expected range for normal flight, AP ON. The alert will persist until the condition ceases.

NOTE – This unit is as provided by Microsoft flight Simulator. Some functions may not be available.

KX-155 TSO NAVCOMM

A NAV-COMM unit with standby frequency swap. Refer to KX-155 TSO documentation for detailed operation.

NOTE – This unit is fitted to the NAVCOMM 1 & NAVCOMM 2 positions, unless the GNS-430 is fitted. When the GNS-430 is fitted, this unit only fills the NAVCOMM 2 position.

NOTE – This unit is as provided by Microsoft flight Simulator. Some functions may not be available.

DME KDI-572

Refer to KDI-572 documentation for detailed operating instructions.

The KDI-572 is a unit capable of displaying NAV1 or NAV2 DME data.

It displays, in order, Miles, Knots & minutes from the tuned DME station.

The mode knob has the following positions:

- OFF: the unit is unpowered.
- N1: DME 1 is used as source. An "1" is displayed above the "NM" unit to indicate that DME 1 is coupled to the unit's display.
- HLD: holds at the current values, and stops updating. Either "1H" or "H2" is displayed above the "NM" unit to indicate that the unit is holding either the DME 1 or DE 2 values.
- N2: DME 2 is used as source. A "2" is displayed above the "NM" unit to indicate that DME 2 is coupled to the unit's display.

Dashes will be displayed if the DME sources are not tuned to a valid station, or if power is interrupted or lost momentarily while in HLD mode.

NOTE – If the GNS-430 is installed, this unit is removed. The DME circuit breaker will be secured with a tie strap.

E.I. OIL TEMPERATURE & PRESSURE INDICATOR

Electronics International Oil Temperature & Pressure Indictor. Refer to the E.I Manuals for complete operating instructions.

The LED indictors provide Oil Temperature & Pressure, and are color-coded and matched to the expected performance of the IO-470P engine fitted to the FN-333.

The switch permits the selection of Oil Pressure or temperature to be displayed in the digital readout.

E.I. ENGINE ANALYSER.

Electronics International Engine Analyser. A programmable unit, currently set-up to display engine CHT & EGT for individual cylinders.

The green LED indicators illuminate to indicate the current cylinder selected for display in the digital readouts.

The red LEDs indicate that temperature for either CHT or EGT has exceeded the programmed limits.

The 3-position switch permits the selection of:

SCN: in this mode, the unit scans through each cylinder every second.

STEP: spring-loaded position, returns to centre. With every operation of the switch into the SCAN position, the readouts move to the next cylinder, then return to cylinder 1 at the end.

> NOTE – Since the IO-470 is equipped with 6 cylinders, the unit is configured to skip positions 7 & 8 and restart at 1.

PK: the buttons select the peak value for either CHT or EGT. When in SCAN mode, hold the buttons pressed until desired. Upon release, the scanning will continue. When in manual mode, a single press will move the selection to the hottest cylinder.

> NOTE – the programming functions for this instrument are not simulated.

SECTION IX -

ALPHABETICAL INDEX