

u. STOWAGE.—Stowage is provided under the rear right seat for the propeller hub and the engine cover.

The hoisting sling is secured to the floor just aft of the rear left seat.

The engine tool kit, airplane tool kit, propeller grease gun extension and propeller hub wrench are stowed aft of the rear bulkhead.

Manuals, instruction books, charts, etc., are located in a pocket provided in the back of the pilot's seat.

SECTION IV POWER PLANT

1. DESCRIPTION.

a. The airplane is powered by a Pratt & Whitney, Wasp Junior, R-985-AN-6 or R-985-AN-12 engine. The engine is a 9 cylinder, radial air cooled, direct drive type. A Hamilton Standard constant speed propeller, Model 2D30-235, is used. The propeller is a two-bladed 6167A-15 type with an overall diameter of 8'3". The constant speed governor is a Model 1A2.

2. ENGINE RATING.

(Based on Grade 87 Fuel)

Take-Off: 450 brake hp at 2300 rpm with 35.5" Hg manifold pressure.

Normal: 400 brake hp at 2200 rpm with 34.5" Hg manifold pressure at sea level.

400. brake hp at 2200 rpm with 32.0" Hg manifold pressure at 5500 feet altitude.

3. ENGINE OPERATION.

Instructions should be followed in the order outlined below.

a. STARTING PROCEDURE.

- (1) Turn over engine five or six times by hand.
- (2) Check fuel supply.
- (3) Set fuel selector to "MAIN TANK."
- (4) Pump fuel pressure up 3 to 5 pounds with wobble pump.
- (5) PRIME.—Push mixture control to "IDLE CUT-OFF" (In) and pump throttle slowly, as it then acts as a primer pump. Use 3 to 5 full strokes of throttle during normal to cold weather, maintaining a slight fuel pressure at the carburetor with the wobble pump.
- (6) Propeller control in positive high pitch (full out).
- (7) Return mixture control to "AUTO RICH" position.
- (8) Set carburetor air control to "FULL COLD" (In) position until engine starts. Heat should be used only in unusually cold or damp weather for elimination of ice in the carburetor.
- (9) Push throttle "OPEN" (In) approximately 1/10 inch.
- (10) Push master switch to "ON" position.

(11) PRESS BOTH STARTER BUTTONS SIMULTANEOUSLY.

(12) After engine starts, immediately increase throttle to amount required to prevent back firing and to maintain continued operation.

b. WARMING UP.—Refer to Pilot's Check Chart, (figure 7) in conjunction with remaining instructions.

(1) When engine is operating smoothly, reduce throttle and continue operation for warm up period at 900 rpm, gradually increasing to 1200 rpm.

(2) Oil pressure should register immediately on start, and should come up to normal (70 to 90 lbs./sq. in.) in less than 30 seconds. Stop engine immediately if it does not. Shift propeller control to high rpm position (Full In) after oil pressures are normal.

(3) Oil temperature should be brought up to 38°C-43°C (100°F-110°F) before take-off.

(4) Pull propeller control out slowly to high pitch position and back to take-off position at least once before take-off. To accomplish this the engine speed should be increased to about 1600 rpm, then pull the propeller control out slowly to the "FULL OUT" position. After rpm is reduced to a minimum, push the control back into the instrument panel and allow rpm to return to 1600 rpm before reducing throttle.

(5) Do not exceed 204°C (400°F) head cylinder temperature.

(6) Fuel pressure should be 5 ± 1 lbs./sq. in.

c. TAKE-OFF.

(1) The desirable cylinder head temperature just before take-off is 120°C (250°F).

(2) Push propeller control "FULL IN" to instrument panel to obtain 2300 rpm during take-off. (This control is very sensitive in flight and should never be moved rapidly.)

(3) Set stabilizer control to an indicated ¼ to ½ nose down setting, unless the proper setting has already been determined.

(4) Place tail wheel in steerable position.

(5) Do not exceed 35.5" Hg manifold pressure

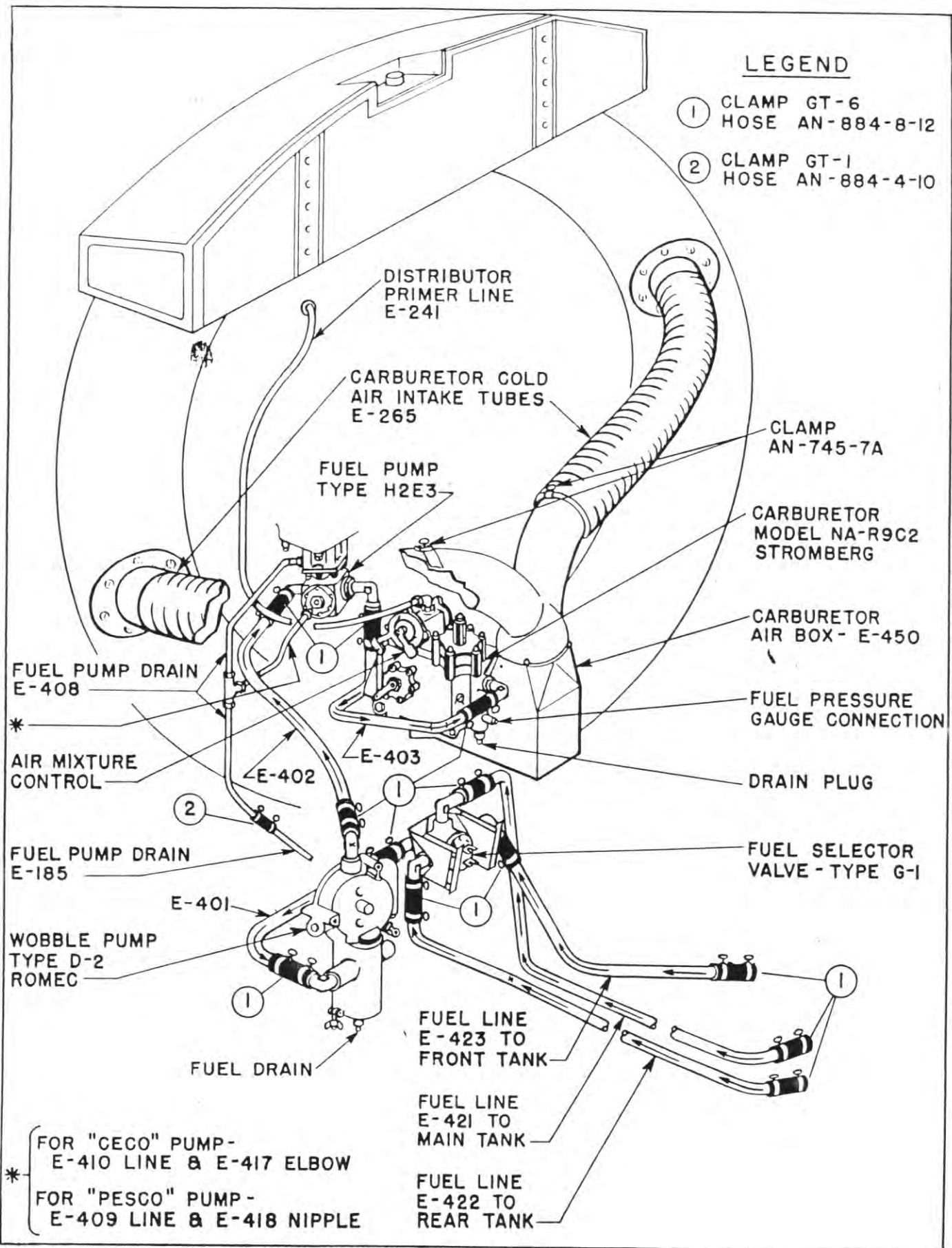


Figure 4—Fuel System Diagram

when using Grade 87 fuel.

(6) Do not use carburetor heat for take-off.

(7) Carburetor intake air should be at least 30°C (85°F) under ice forming conditions.

d. CLIMB.

(1) Reduce rpm to 2000 after leaving ground by gradually pulling propeller control outward approximately 1/2 inch.

(2) Reduce throttle to 29" Hg or 30" Hg manifold pressure for climb.

(3) It is desirable to maintain a carburetor air temperature at 32°C (90°F) during climb. An abnormal drop in manifold pressure during climb usually indicates ice formation. If this occurs, apply carburetor heat immediately.

(4) The best indicated climbing speed is approximately 82 knots (95 mph) below 1500 feet altitude; 95 knots (110 mph) about 5500 feet altitude.

e. CRUISING.

(1) Set fuel selector to "FRONT TANK." For cruising operations the fuel in the tanks should be consumed in the following order:

1. Front tank
2. Rear tank
3. Main tank

(2) Maximum recommended engine cruising limits are 27" Hg manifold pressure at 2000 rpm. Engine should be cruised at 1900 to 2000 rpm for maximum efficiency and smoothness.

(3) After the airplane has leveled off and while attaining its approximate cruising speed, the engine should be given an opportunity to cool down after the climb, preferably even below final cruising temperatures, before placing the mixture control in "AUTO LEAN" position. The desirable cylinder head temperature for cruising is 204°C (400°F). Under no circumstances should they be allowed to exceed 232°C (450°F) when operating in "AUTO LEAN" mixtures.

f. LANDING.

(1) Set fuel selector to "MAIN TANK."

(2) Set mixture control to "AUTOMATIC" or "FULL RICH" position.

(3) Set tail wheel control at "STEERABLE"

(4) Use FULL FLAPS in all weather conditions, except with winds over 26 knots (30 mph). The flaps are spring loaded and smooth the effects of gusts as well as improve the approach and landing characteristics of the airplane. Never extend flaps when speed is greater than 94 knots (108 mph).

(5) The best indicated gliding speed is 78 knots to 82 knots (90 to 95 mph). Above 5000 feet, glide at 87 knots (100 mph) with flaps extended.

(6) Set stabilizer to "NOSE HIGH" position.

(7) Propeller control need not be set to a higher rpm than 2000.

(8) Level off close to ground.

(9) Land in a full stall-power off and flaps extended.

g. STOPPING.

(1) If cylinders are hot due to hard taxiing, permit the engine to idle until cylinder temperatures cool to below 204°C. (400°F).

(2) Shift propeller to positive high pitch position (control full out).

(3) Close throttle.

(4) Slowly advance throttle to 700 or 800 rpm.

(5) Place mixture control in "IDLE CUT-OFF" position.

4. FUEL SYSTEM.

(See figure 4.)

When filling fuel tanks, fill main tank first, rear tank second, and front tank last. The fuel system consists of three tanks located under the cabin. The front tank has a capacity of 30 gallons, the main tank 74 gallons and the rear tank 18 gallons, totaling 122 gallons. For take-off and landing, set fuel selector to "MAIN TANK." For cruising, fuel selector should be set to "FRONT TANK." The fuel in the tanks should be consumed in the following order:

1. Front tank
2. Rear tank
3. Main tank

At cruising speed the 122 gallons is sufficient for approximately 4 hours. Each tank has a drain cock in the sump to drain the system. Grade 87, AN-F-25, fuel should be used. If Grade 87 fuel is not available, use the next higher grade.

Minimum Fuel Pressure (400 rpm or less) 2 lb/sq in.
Minimum Fuel Pressure

(All speeds above 1200 rpm) 4 lb/sq in.

Desired Fuel Pressure 5 lb/sq in.

Maximum Fuel Pressure 6 lb/sq in.

5. OIL SYSTEM.

(See figure 5.)

The oil tank capacity is 8 gallons, not including a foaming space of approximately 2 gallons. The tank is located just forward of the firewall, resting on top of the engine mount structure. The oil system, including most of the oil from the engine, may be drained by removing the drain plug located in the oil line at its lowest point below the oil tank. To drain the engine crank case, the crank case sump drain plug must be removed.

Average Oil Temperature 60°C to 75°C

(140°F to 167°F)

Maximum Oil Temperature 85°C (185°F)

Minimum Oil Temperature 37°C (100°F)

Average Oil Pressure 70 to 90 lb/sq in.

Minimum Oil Pressure (at idling speeds) 10 lb/sq in.

Minimum Oil Pressure (at cruising speeds) 50 lb/sq in.