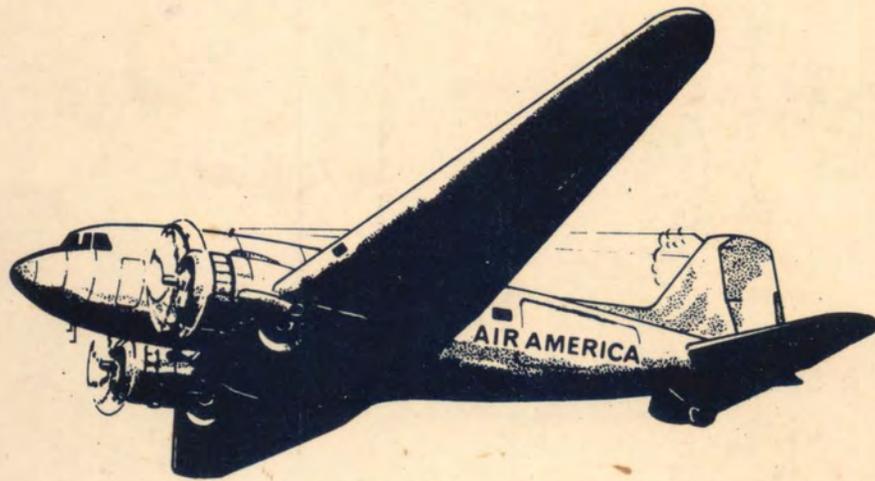


**AIR AMERICA**

**C-47**



**FLIGHT MANUAL**

EFFECTIVE: September 1968

## PREFACE

Manuals are charged to the employee to whom assigned and are part of his authorized equipment and are not transferable. The manual originally issued to any employee shall be retained by him regardless of change of station and shall be surrendered only upon transition to a different aircraft in the case of Flight Manuals, and upon termination of employment for all manuals.

Manuals issued to particular offices become the responsibility of the senior supervisor of that office, who is charged with the safekeeping, revision and for the transfer to his relief in the event of transfer or separation from the Company.

This manual is company property and is subject to recall at any time. This manual is restricted to the use of company personnel.

## MANUAL ASSIGNMENT

Copies of this manual will be assigned, or replacement made, only upon the written request of section head or higher supervisory level.

## REVISIONS

Each revision is accompanied by a Revision Transmittal Slip (RTS). If transmittals are not received in consecutive order, missing ones should be ordered immediately.

Revised pages are to be inserted according to instructions on the Revision Transmittal Slip as soon as possible after receipt. Please complete reverse side of the RTS and return as indicated.

Manual holders may submit revisions to this manual to the Manager of Flying for coordination and routing within the Company for approval.

A definite procedure for handling manual revisions has been established to expedite the request. The Manual Revision Request Form FOPS-755-R1 will be used for this purpose. Instructions for completion are printed on the reverse side of the form.

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## REVISION SUMMARY RECORD

Maintaining an accurate record of revisions is the responsibility of individual manual holders.

Whenever revisions are not received in sequence, order needed revisions from Flight Operations Publications Department.

Rev. No.	Date Inserted	Chapter & Page	Inserted By	Rev. No.	Date Inserted	Chapter & Page	Inserted By
1	9 AUG 69		R				
2	9 AUG 69	II 11	R				
3	9 AUG 69		R				
4	25 AUG 69	I 33	R				
5	OK						
6	OK						
7	OK						
8	15 JAN 70	II 7-10	R				
		III 5-6	R				
		V 3-4	R				
		7-8	R				
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#### NOTE

A minimum battery voltage of approx. 18 volts is required to close the battery relay. The battery relay must be closed before the generators can recharge the battery.

- \*16. No smoking/Seat belt signs - ON - P.
- 17. Lights - SET - P, CP.
- \*18. Ignition switches - check individual switches OFF, set master ON - P.
- 19. Fire detection system - CHECKED - P.
- 20. Static selector - NORMAL - CP.
- \*21. Fuel quantity - CHECKED - CP.



The selector must be turned clockwise to prevent jamming.

- \*22. Fuel tank selectors - SET (main or fullest tank) - P, CP.
- 23. Oil coolers - COLD - P.
- 24. Carburetor Air - RAM/COLD - CP check doors visually (if applicable.)
- 25. Mixtures - IDLE CUT-OFF - CP.
- 26. Throttles - SET - P.
- 27. Props - FORWARD - P.
- \*28. Manifold pressure - CHECKED - P check gage reading and state inches of Hg.
- \*29. Fire guard - CLEAR 2 - CP check fire guard posted and prop clear for start.

#### STARTING ENGINES.

The pilot will start the right engine and the copilot will start the left engine. It is recommended that the right engine be started first.

#### NOTE

For ground operation at density altitudes above 6,000 feet. refer to HIGH ALTITUDE PROCEDURES in Section IX.

- \* 1. Propellers clear, fire guard posted. P, CP.
- \* 2. Fuel booster pump switch - ON:
- \* 3. Starter switch - ENGAGE. P, CP.

#### NOTE

If inertia-direct cranking starters are installed, the energize switch should be engaged a minimum of 15 seconds before the mesh switch is engaged.



To clear the engine and insure proper lubrication, pull the propellers through 15 blades with continuous starter operation. Fifteen blades are required for any start made after a 2 hr. shutdown period. Eight blades will insure elimination or detection of hydraulic lock of engine starts made within 2 hours of last shutdown. If inertia starters are installed and the engine has been shut down 2 hours or more, the propeller will be turned through with the starter by engaging the energize and mesh switches simultaneously.

- \* 4. Ignition switch - BOTH. P, CP.
- \* 5. Prime - AS REQUIRED. P, CP.



If the engine does not start, continuous use of the engine starter should be limited to 60 sec. Allow 5 to 10 minute cooling periods between attempted starts, based on existing temperature and wind conditions.

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6. Oil Pressure - WITHIN LIMITS. P, CP.



If oil pressure is not indicated within 30 seconds, stop the engine and determine the reason.

7. Mixture Control - AUTO-RICH. P, CP.  
After engine RPM stabilizes at 1000 RPM with steady prime, move mixture control from IDLE CUT-OFF to AUTO-RICH. When a drop in RPM is noted, stop priming.

- \*8. Throttle - ADJUSTED. P, CP.

Operate the engine at 1100 to 1200 rpm until oil temperature and oil pressure are within limits.



Prolonged idling below 800 rpm may damage the spark plug elbow insulation, as the cylinder head temperature will rise quickly and may exceed limits.

- \*9. Fuel booster pump switch - OFF. P, CP

Turn the booster pump OFF after the engine is running smoothly.

- \*10. Fuel pressure - WITHIN LIMITS. P, CP

- \*11. Vacuum pressure - CHECK. P

- \*12. Deicer pressure - CHECK. P

- \*13. Hydraulic system pressure - CHECK. P

Check the right engine hydraulic pump by lowering the flaps. Observe a decrease in hydraulic pressure as the flaps are lowered. When the flaps reach the full down position, the hydraulic system pressure should increase to within limits.

- \*14. Gear safety pins - REMOVED. P.  
Pilot will signal for ground crew to remove the safety pins.

- \*15. External power-DISCONNECTED. P.  
The pilot will signal the ground crew to disconnect the power unit and will observe the unit is clear of the aircraft before proceeding.

- \*16. Battery Switch - ON. P.

Do not turn battery switch ON until ground power is disconnected.

- \*17. Start the left engine repeating steps 1 thru 10. - CP..

- \*18. Starting Engines Check-COMPLETED. CP.

#### BEFORE TAXIING.

- \* 1. External Power - REMOVED. P.
- \* 2. Battery Switch - ON. P.
- 3. Generators - ON. CP.
- \* 4. Booster Pumps - OFF. CP.
- \* 5. Hydraulic System Pressure - CHECKED. P.
- \* 6. Inverters - CHECKED/SET check spare and leave Main On. CP.
- \* 7. Radios - CHECKED/SET. CP.
- 8. Fuel Tank Selectors - CHECK. P, CP.  
Check by operating the engines on OFF position momentarily and for three min. each on all other positions. Check crossfeed if installed, then OFF.

#### NOTE

This check will be initiated at this point and completed prior to initiating the ENGINE RUNUP check.

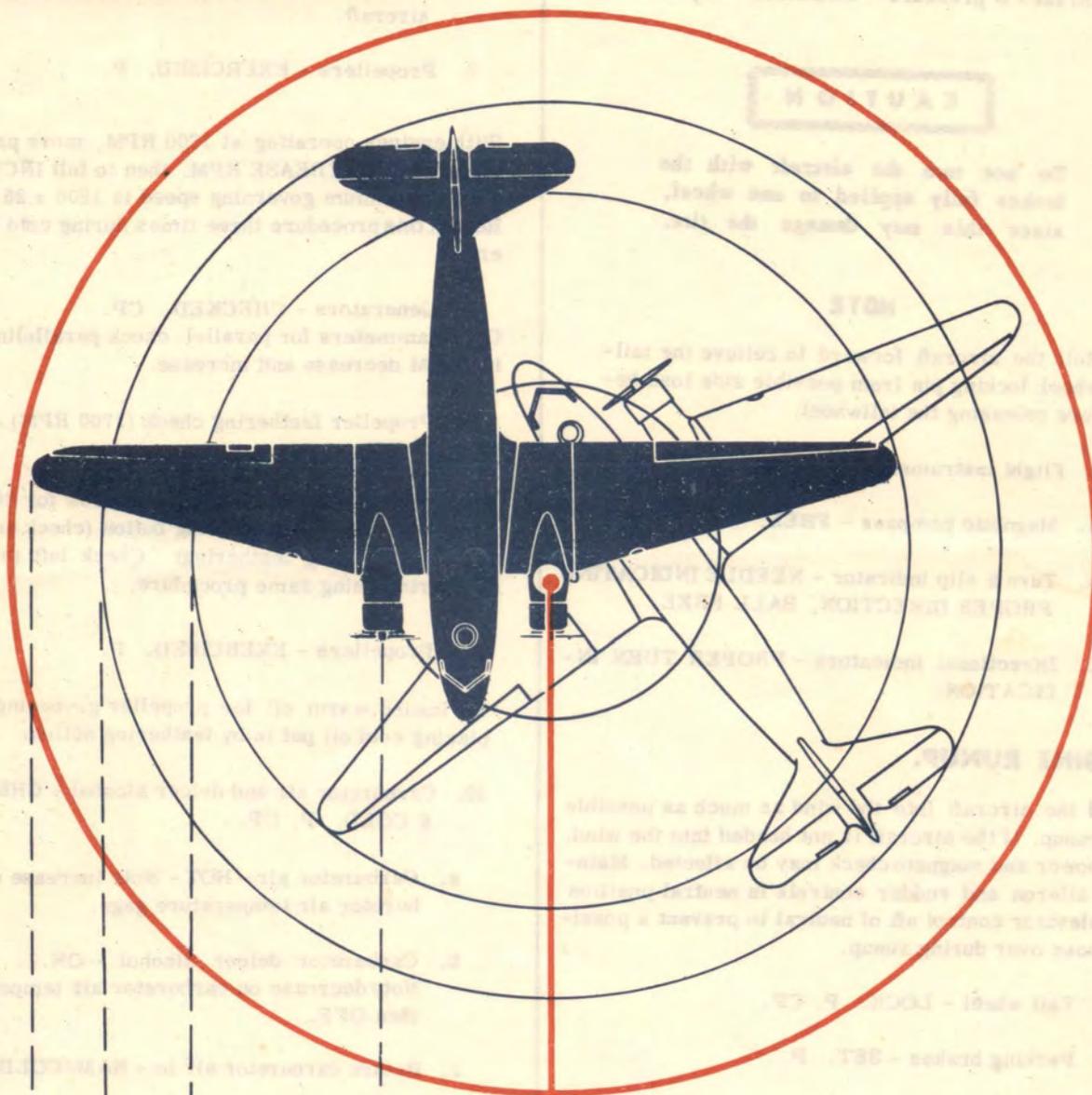
- \* 9. Engine Instruments - CHECKED. P, CP.
- 10. Flight Instruments - CHECK/UNCAGED. P, CP.
- 11. Ignition Grounding - CHECKED. P.
- \*12. Gear Pins - STOWED. P.
- \*13. Chocks - REMOVED. P, CP.
- \*14. Doors & Hatches - SECURED. P, CP.

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## TURNING RADIUS DIAGRAM



- OUTER MAIN GEAR . . . . . 18 FT 6 IN.
- INNER WING TIP . . . . . 39 FT 8 IN.
- HORIZONTAL STABILIZER . . . . . 49 FT 4 IN.
- OUTER WING TIP . . . . . 57 FT 6 IN.

**VERTICAL CLEARANCES**

- PROPELLERS . . . . . 12 FT 4 IN.
- WING TIP . . . . . 9 FT 4 IN.
- FUSELAGE . . . . . 16 FT. 11 1/2 IN.

Figure 2-1

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#### TAXIING.

- \* 1. Brakes & pressure - CHECKED - P, CP.

#### CAUTION

Do not turn the aircraft with the brakes fully applied to one wheel, since this may damage the tire.

#### NOTE

Roll the aircraft forward to relieve the tail-wheel locking pin from possible side load before releasing the tailwheel.

- \* 2. Flight instruments - CHECKED - P, CP.
  - a. Magnetic compass - FREE.
  - b. Turn & slip indicator - NEEDLE INDICATING PROPER DIRECTION, BALL FREE.
  - c. Directional indicators - PROPER TURN INDICATION.

#### ENGINE RUNUP.

Head the aircraft into the wind as much as possible for runup. If the aircraft is not headed into the wind, the power and magneto check may be affected. Maintain aileron and rudder controls in neutral position and elevator control aft of neutral to prevent a possible nose over during runup.

- \* 1. Tail wheel - LOCK. P, CP.
- \* 2. Parking brakes - SET. P.
- \* 3. Manifold valve - BLEED. P.
- 4. Auto-pilot - BLEED. P.
- \* 5. Engine Instruments - WITHIN LIMITS. P, CP.

#### CAUTION

Cooling of the cylinder heads, barrels and ignition harness is insufficient for prolonged periods of ground operation above 1400 RPM. Do not allow cylinder head temperature to exceed 232°C. See Section V.

- 6. Fuel tank selectors - MAIN or FULLEST TANK, crossfeed - OFF. P, CP.

Main tank selection is preferred on Company aircraft.

- 7. Propellers - EXERCISED. P.

With engines operating at 1700 RPM, move propeller controls to DECREASE RPM, then to full INCREASE RPM (minimum governing speed is 1200 ± 25 RPM). Repeat this procedure three times during cold weather.

- 8. Generators - CHECKED. CP.  
Check ammeters for parallel; check paralleling during RPM decrease and increase.

- 9. Propeller feathering check (1700 RPM) - CKD. P, CP.

Push right feathering button and allow for 200 RPM drop. then pull out feathering button (check ammeter for change during feathering). Check left propeller feathering using same procedure.

Propellers - EXERCISED. P.

To insure warm oil for propeller governing by replacing cold oil put in by feathering action.

- 10. Carburetor air and deicer alcohol - CHECKED & COLD. P, CP.

- a. Carburetor air - HOT - Note increase on carburetor air temperature gage.
- b. Carburetor deicer alcohol - ON.  
Note decrease on carburetor air temperature; then OFF.
- c. Return carburetor air to - RAM/COLD.

- \*11. Power and ignition check - CHECKED. P, CP.

This check will be performed on one engine at a time to prevent nose-up and brake-slipping accidents. Retard one throttle to 1200 rpm, and advance the opposite throttle to a manifold pressure equal to field barometric pressure. On aircraft equipped with paddle blade propellers, the tachometer should read 2425 ± 50 rpm at CAT of 30°C (each increase or decrease of 10°C CAT will result in a corresponding increase or decrease of 15 rpm). On aircraft equipped with narrow blade propellers, the tachometer should read 2350 ± 50 rpm. Turn the ignition switch from BOTH to RIGHT then back to BOTH, and from BOTH to LEFT, then back to BOTH pausing at each position to allow rpm to stabilize. Observe rpm drop (100 rpm

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maximum, 50 - 75 rpm normal). Retard throttle to 1200 rpm, and repeat check on the other engine. If rpm drop exceeds 100 rpm on either magneto of either engine, the difference in drop between magnetos on either engine exceeds 40 rpm, or excessive engine vibration exists, corrective maintenance will be performed prior to release of the aircraft for flight.

#### NOTE

At a CAT of 30°C, the RPM limits are 2425 ± 50 RPM. Each increase or decrease of 10°C CAT will result in a corresponding increase or decrease of 15 RPM.

Temp Vs RPM Table

CAT (°C)	Min. RPM	Max
60°	2420	2520
50°	2405	2505
40°	2390	2490
30°	2375	2475
20°	2360	2460
10°	2345	2445
0°	2330	2430
-10°	2315	2415
-20°	2300	2400
-30°	2285	2385
-40°	2270	2370

#### NOTE

When heading into the wind, add approximately two rpm for each one mph wind velocity; when training into the wind subtract approximately two rpm for each one mph wind velocity. Cross winds will cause buffeting and rpm surging.

#### CREW BRIEFING-TYPICAL.

Crew briefing - COMPLETE. The Captain will brief the First Officer, AFS and AFD on the following:

1. Type take-off
2. Power application and abort procedures.
3. Oral and visual signals for gear retraction and power reductions.
4. Emergency procedures.
5. Departure instructions.
6. Advise reaching V<sub>2</sub> speed.

#### BEFORE TAKE-OFF.

- \* 1. Flaps - UP - CP.
- \* 2. Engine & Flight Instruments - CKD. - P, CP.
- \* 3. Mixtures - AUTO-RICH - CP.
- \* 4. Props - FORWARD - P.
- \* 5. Trim - SET - P.
- \* 6. Radios - SET - P, CP.
- \* 7. Crew briefing - COMPLETED - P.
- \* 8. Fuel booster pumps - ON - CP.
- \* 9. Anti-collision light - ON - CP.
- \* 10. Flight controls - FREE & FULL TRAVEL - P.
- \* 11. Tail wheel - LOCKED - P.

#### WARNING

Extreme directional control difficulties and possible loss of aircraft control may be experienced during take-off if the tail-wheel is unlocked

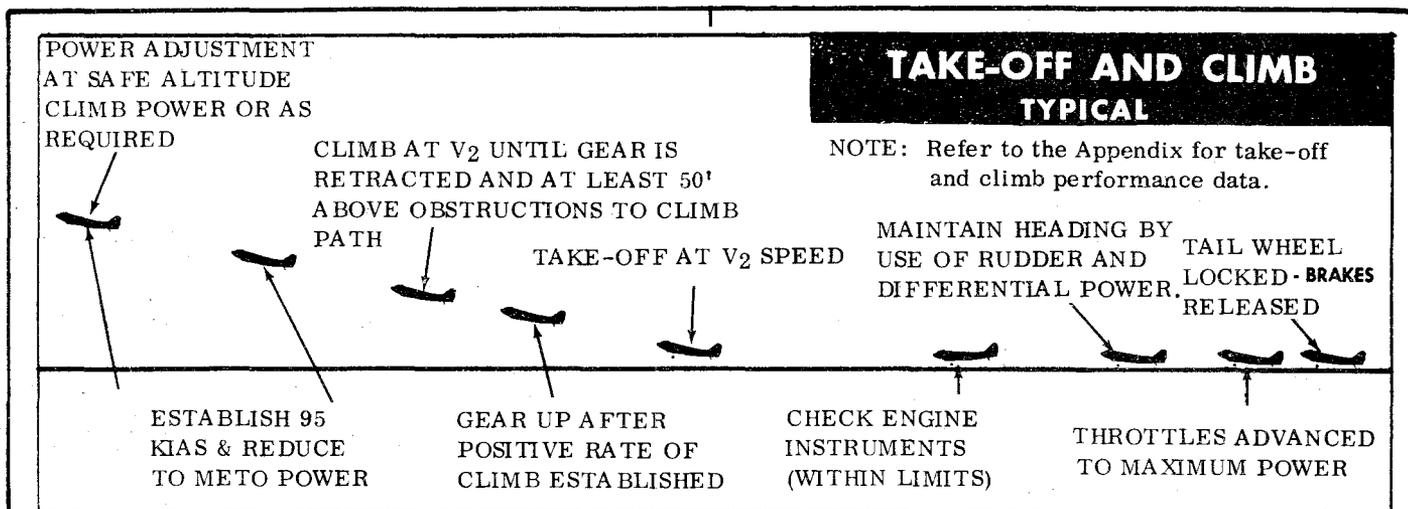
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#### TAKE-OFF

Release the brakes and advance throttles to maximum power. As the brakes are released a slight change in heading may occur; correct by use of differential power and rudder application. It is not recommended to use brakes to maintain directional control unless it is absolutely necessary. Allow the aircraft to accelerate without operating the elevator control, and the tail will rise to level flight attitude between 43 and 52 knots. Continue accelerating and initiate elevator back pressure to fly off at  $V_2$ . During take-offs at light gross weights, it will not be practicable to hold the aircraft on the ground until  $V_2$ ; however, lift off must not occur prior to  $V_{mc}$ . After the gear is retracted and the initial climb is established, command METO power.

The First Officer will follow up on the throttles during takeoff, and make minor adjustments of the throttles to maintain MAP within limits. He will also adjust the friction lock as briefed by the Captain, and when commanded to do so, make all power adjustments. He will advise the Captain when reaching  $V_2$  speed.

#### AFTER TAKE-OFF

1. Landing Gear - RETRACT - CP.
  - a. Gear Latch Lever - LATCH RAISED
  - b. Gear Lever - UP
2. METO Power - MAP 42.5, - RPM 2550 - CP.
3. Temperatures & Pressures - CHECKED - P, CP.

4. Landing Gear Lever - NEUTRAL, after gear is fully retracted.

#### NOTE

The landing gear latch lever will automatically return to SPRING LOCK position.

5. Climb Power - SET - CP.

#### NOTE

Climb power (850 BHP) is recommended during climb to prevent high CHT; however, lower powers may be used when necessary. Refer to appendix for climb performance.

If CHT cannot be maintained within limits during climb, increase airspeed or adjust power as necessary.

6. Engines, wings and fuel syphoning - CHECKED - P, CP.

#### NOTE

When remaining in a closed traffic pattern, the landing crew briefing should be accomplished prior to takeoff and only the first 5 items of the After Takeoff Climb check should be performed. In this event the Cruise & Descent check need not be performed.

7. No smoking/seat belt signs - AS REQUIRED - P.
8. Fuel Booster Pumps - OFF  
Check fuel pressures and turn booster pumps OFF one at a time after reaching a safe altitude.

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#### MINIMUM RUN TAKEOFF

For minimum run takeoffs, position wing flaps to 1/4. hold brakes and apply power to 35" MAP. Holding back pressure on the control column, release brakes and apply maximum power. Release back pressure on the control column keeping the aircraft in a tail low attitude and the aircraft will become airborne at 52 to 61 knots. When aircraft is safely airborne and clear of obstacles, establish normal climb.

#### WARNING

Lift-off can be made at speeds less than Vmc. It must be remembered that in the event of engine failure power will have to be reduced on the operative engine to maintain directional control.

#### CROSS-WIND TAKEOFF.

In addition to the procedures and techniques used in a normal takeoff, lead with the upwind throttle sufficiently to correct for weather cocking tendencies. The application of aileron into the wind is effective in maintaining directional control.

#### CAUTION

Do not allow the aircraft to skip along the ground. Make a clean break with the runway. otherwise, severe side loads may collapse or damage the landing gear.

#### NOTE

It is recommended that brake application, to maintain directional control, be used only when absolutely necessary.

#### CRUISE.

Level off upon reaching cruising altitude and maintain the climb power setting until the desired cruising airspeed is attained. Refer to the Appendix and set power to obtain the cruise conditions desired. For Supercharger Operation, Refer to Section VII.

1. Cruise power - SET - CP.  
Normal cruise power is 600 BHP. Set according to Chart in Part Two of Appendix.
2. Engine instruments - WITHIN LIMITS. - CP.
3. Mixture controls - AS REQUIRED - CP.

Cruise Check - COMPLETED - CP.

#### FLIGHT CHARACTERISTICS.

Refer to Section VI for detailed information on aircraft flight characteristics.

#### DESCENT.

The rate of descent is determined by altitude, distance from the field, terrain, and weight of the aircraft. The rate of descent should be held constant. During descent from enroute flight the First Officer or pilot not flying the airplane will call out:

- a. Approaching 10,000 feet.
- b. Approaching 5,000 feet.
- c. 1,000 ft above initial approach altitude, or 1,000 feet above field elevation (VFR approaches.)

#### CAUTION

If flying conditions in descent require a large reduction in power, reduce rpm as well as manifold pressure. For descents or other low power maneuvers, or perhaps a simulated engine failure, it is important to cushion the high inertia loads on the master rod bearings which occur at conditions of high rpm and low manifold pressure. As a rule of thumb, it is well to remember that each 100 rpm requires at least 1 inch Hg manifold pressure; for example, 23 inches Hg at 2300 rpm. Operation at high rpm and low manifold pressure should be kept to a minimum.

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1. Approach & landing data - CHECKED - P, CP. Check landing gross weights, approach minimums, field elevation, runway length & condition, and wind conditions.

#### NOTE

On final approach after reaching 500 feet above field elevation the First Officer or pilot not flying will call out:

- a. Altitude (repeated when altitude deviates from programmed altitude)
  - b. Airspeed (repeated when airspeed deviates from programmed airspeed)
  - c. Rate of descent (repeated when it deviates from programmed rate)
  - d. 100 feet above minimums
  - e. Minimums
  - f. Runway in sight.
2. Altimeters - SET - P, CP set altimeter setting when passing through transition altitude if used.
  3. Fuel tank selectors - SET - P, CP. place on FULLEST tank but Company policy prefers MAIN tanks.
  4. Autopilot/Emergency shutoff valve - OFF - P.
  5. Hydraulic fluid level - CHECKED - P.
  6. Mixtures - AS REQUIRED - CP.
  7. Magnetos - CHECKED - P.

#### NOTE

Company policy requires that a magneto check be performed during the descent. This will be accomplished at cruise power with the mixtures AUTO-RICH. During this check if it is determined that a magneto is malfunctioning, a landing will not be made at an airfield where company maintenance is not usually performed, unless in the Captains opinion a greater emergency would exist by complying with this policy.

#### BEFORE LANDING.

1. No smoking/seat belt signs - ON - CP.
  2. Carburetor air - COLD - CP.
  3. Fuel booster pumps - ON - CP.
  4. Mixtures - AUTO-RICH - CP.
  5. Landing gear - DOWN/POSITIVE LOCK - CP.
- When the landing gear has reached the extended position and gear hydraulic pressure has built up to equal system pressure, move the landing gear lever rapidly to NEUTRAL, check the green indicator light ON, and the red warning light OFF. Position the landing gear latch lever to POSITIVE LOCK and visually check that the gear is down.
6. Propellers - RPM 2350 - CP.
  7. Brakes/System pressures - CHECKED - CP.
  8. Landing Gear Lights - GREEN - CP.
  9. Flaps - AS REQUIRED - CP.

#### NOTE

As soon as main gear is on the ground First Officer should advance props to full FORWARD.

#### LANDING.

Normal Landing. (See figure 2-3.)

Touch down main wheels first in a slight tail low attitude. When the main wheels contact runway, check power off, relax pressure, flaps up. As the aircraft decelerates, lower the tail wheel gently on the runway. Maintain directional control utilizing rudder, differential power, and brakes, as necessary. Maintain back pressure on column until landing roll is completed. When landing at gross weights above 26,000 pounds, touch down at less than 300 fpm rate of descent in a tail-high attitude.

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#### NOTE

The parking brakes are locked and released by use of the pilot's rudder brake pedals only.

#### INSTRUMENTS.

The dual manifold pressure gage is a direct-reading instrument. The free air temperature indicator is electrically operated. The vacuum-operated instruments include the attitude indicator, the directional indicator, and the turn-and-slip indicator. For proper operation of the vacuum instruments, engine rpm should be at least 1000.

#### VACUUM SYSTEM.

The vacuum system consists of two engine-driven vacuum pumps, two vacuum relief valves, two check valves, a vacuum manifold, two air filters, a vacuum restrictor for the turn-and-slip indicator, and the connecting lines. A direct-pressure-operated vacuum gage mounted on the main instrument panel (10, figures 1-11 and 13, figure 1-12) indicates the vacuum pressure in inches Hg. (See the paragraph on the Autopilot, Section IV.)

#### PITOT-STATIC SYSTEM.

The pitot-static system instruments and equipment consist of two airspeed indicators, two altimeters, and a vertical velocity indicator, all installed on the main instrument panel (figures 1-11 and 1-12); and two pitot-static tubes mounted on masts on the underside of the fuselage nose section (21, figure 1-1), a static selector, and the connecting lines. The static selector control switch mounted on the main instrument panel (21, figure 1-11, and 25, figure 1-12), provides for selection of an alternate static source (16, figure 1-1) in the event of malfunctioning of the normal static source. On some aircraft, the alternate static source is located in the left aft fuel tank bay. The selector switch is safetywired to the normal static source. The pitot-static tubes are protected from ice by integral heating elements.

#### ELECTRICALLY OPERATED INSTRUMENTS. (Some Aircraft).

The attitude indicator and the directional indicator are driven by AC power from the No. 1 AC bus located in the Main Electrical Junction Box. The turn and slip indicator is driven by DC power and has a separate switch directly to the battery.

#### FREE AIR TEMPERATURE INDICATOR.

One 28-volt d-c free air temperature indicator is mounted on the main instrument panel (12, figure 1-11, and 17, figure 1-12). The indicator is connected to the thermometer resistance bulb on the underside of the nose section so that changes in the temperature of the outside air will be registered on the indicator face by means of changes in the electrical current between the bulb and the indicator. The indicator is calibrated in degrees centigrade.

#### EMERGENCY EQUIPMENT.

#### FIRE EXTINGUISHING SYSTEM.

Most aircraft are equipped with a single-shot FREON (CF<sub>3</sub>Br) engine fire extinguishing system. The system incorporates two spherical containers containing 6.5 pounds of FREON, one located in each engine nacelle (24, Fig 1-1), the necessary piping for routing the agent to the spray ring mounted on each engine, and the controls for operation of the system. Each container is pressurized with nitrogen to 600 psi standard day and incorporates a pressure gage for checking pressure within the container. A fire detection circuit is also provided for each engine.

#### NOTE

The fire extinguishing system is connected directly to the batteries and will operate regardless of battery switch position. They are also protected by circuit breakers located on the main junction box.

Two portable hand fire extinguishers, one mounted on the bulkhead above the pilot's seat, and one mounted on the rear section of the main cabin door or, on C-117 series aircraft, immediately forward of the passenger entrance door, are provided for combating fires in the fuselage.

## ENGINE FIRE EXTINGUISHER CONTROLS

LOCATED: COCKPIT FLOOR BETWEEN PILOTS' SEATS



1. LEFT ENGINE FIREWALL SHUTOFF VALVE HANDLE
2. LEFT ENGINE FIRE EXTINGUISHER DISCHARGE SWITCH
3. RIGHT ENGINE FIRE EXTINGUISHER DISCHARGE SWITCH
4. RIGHT ENGINE FIREWALL SHUTOFF VALVE HANDLE

Figure 1-28

### WARNING

Prolonged exposure (5 minutes or more) to high concentrations of bromochloromethane (CB) or its decomposition products should be avoided. CB is an anesthetic agent of moderate intensity. It is safer to use than previous fire extinguishing agents (carbon tetrachloride or methylbromide). However, especially in confined spaces, adequate respiratory and eye protection from excessive exposure (pronounced irritation of eyes and nose), including the use of oxygen when available, should be sought as soon as the primary fire emergency will permit.

### Engine Fire Extinguisher Switches.

Two guarded ON-OFF fire extinguisher switches (2 and 3, figure 1-28), one for the left engine and one for the right engine, are located under the hinged door on the flight compartment floor between the pilot's and co-pilot's seats. When either switch is placed in the ON position, a 28-volt d-c circuit is energized to discharge the CB agent to the respective spray ring around the engine.

### CB Container Pressure Gages.

A pressure gage mounted on each CF<sub>3</sub>Br container indicates the charge in psi within the container. When the container is fully charged the indicator should read 600 psi standard day.

### FIREWALL SHUTOFF VALVE SWITCHES

Some company aircraft have been modified to incorporate electrical firewall shutoff valve switches which shuts off all fuel and hydraulic fluid to the engine. These switches are mounted forward of each fuel selector valve. Each switch is a 3-position switch labeled OPEN-NEUTRAL-CLOSED. The switches are protected by circuit breakers located on the main junction box case. On B-879 they are located on the main junction box circuit breaker panel.

### FIREWALL SHUTOFF VALVE POSITION LIGHTS

A red press-to-test light, located on the instrument panel directly above each Fire-wall Shutoff Switch, is illuminated when the Shutoff Valve is closed.

### Firewall Shutoff Valve Handles.

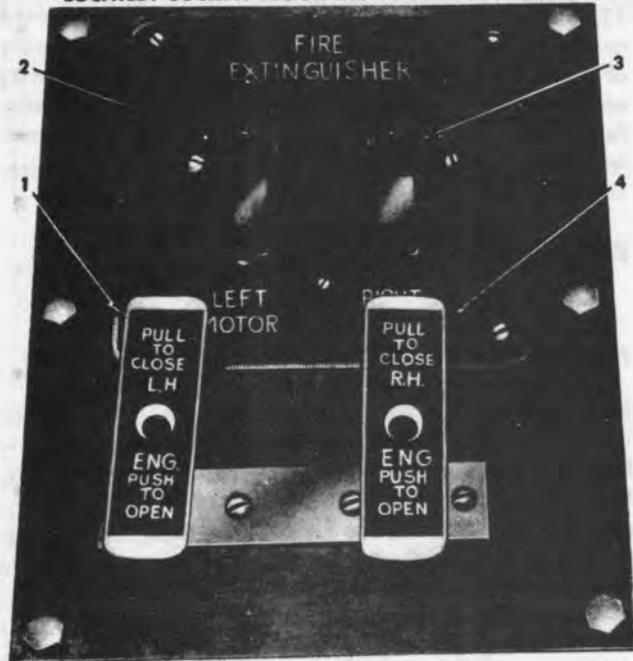
The firewall shutoff valve handles for shutting off the flow of fuel, engine oil, and hydraulic fluid are located under the engine fire extinguisher access door between the pilot's and co-pilot's seats (1 and 4, figure 1-28). The shutoff valves are connected by cables to the handles. In case of fire in either engine, the corresponding handle is pulled, shutting off the flow of fuel, engine oil, and hydraulic fluid to that engine.

### NOTE

When a firewall shutoff valve handle or switch is activated, oil for propeller feathering is still available.

**ENGINE FIRE  
EXTINGUISHER CONTROLS**

LOCATED: COCKPIT FLOOR BETWEEN PILOTS' SEATS



1. LEFT ENGINE FIREWALL SHUTOFF VALVE HANDLE
2. LEFT ENGINE FIRE EXTINGUISHER DISCHARGE SWITCH
3. RIGHT ENGINE FIRE EXTINGUISHER DISCHARGE SWITCH
4. RIGHT ENGINE FIREWALL SHUTOFF VALVE HANDLE

Figure 1-28

**WARNING**

Prolonged exposure (5 minutes or more) to high concentrations of bromochloromethane (CB) or its decomposition products should be avoided. CB is an anesthetic agent of moderate intensity. It is safer to use than previous fire extinguishing agents (carbon tetrachloride or methylbromide). However, especially in confined spaces, adequate respiratory and eye protection from excessive exposure (pronounced irritation of eyes and nose), including the use of oxygen when available, should be sought as soon as the primary fire emergency will permit.

**Engine Fire Extinguisher Switches.**

Two guarded ON-OFF fire extinguisher switches (2 and 3, figure 1-28), one for the left engine and one for the right engine, are located under the hinged door on the flight compartment floor between the pilot's and co-pilot's seats. When either switch is placed in the ON position, a 28-volt d-c circuit is energized to discharge the CB agent to the respective spray ring around the engine.

**CB Container Pressure Gages.**

A pressure gage mounted on each CF<sub>3</sub>Br container indicates the charge in psi within the container. When the container is fully charged the indicator should read 600 psi standard day.

**FIREWALL SHUTOFF VALVE SWITCHES**

Some company aircraft have been modified to incorporate electrical firewall shutoff valve switches which shuts off all fuel and hydraulic fluid to the engine. These switches are mounted forward of each fuel selector valve. Each switch is a 3-position switch labeled OPEN-NEUTRAL-CLOSED. The switches are protected by circuit breakers located on the main junction box case. On B-879 they are located on the main junction box circuit breaker panel.

**FIREWALL SHUTOFF VALVE POSITION LIGHTS**

A red press-to-test light, located on the instrument panel directly above each Fire-wall Shutoff Switch, is illuminated when the Shutoff Valve is closed.

**Firewall Shutoff Valve Handles.**

The firewall shutoff valve handles for shutting off the flow of fuel, engine oil, and hydraulic fluid are located under the engine fire extinguisher access door between the pilot's and co-pilot's seats (1 and 4, figure 1-28). The shutoff valves are connected by cables to the handles. In case of fire in either engine, the corresponding handle is pulled, shutting off the flow of fuel, engine oil, and hydraulic fluid to that engine.

**NOTE**

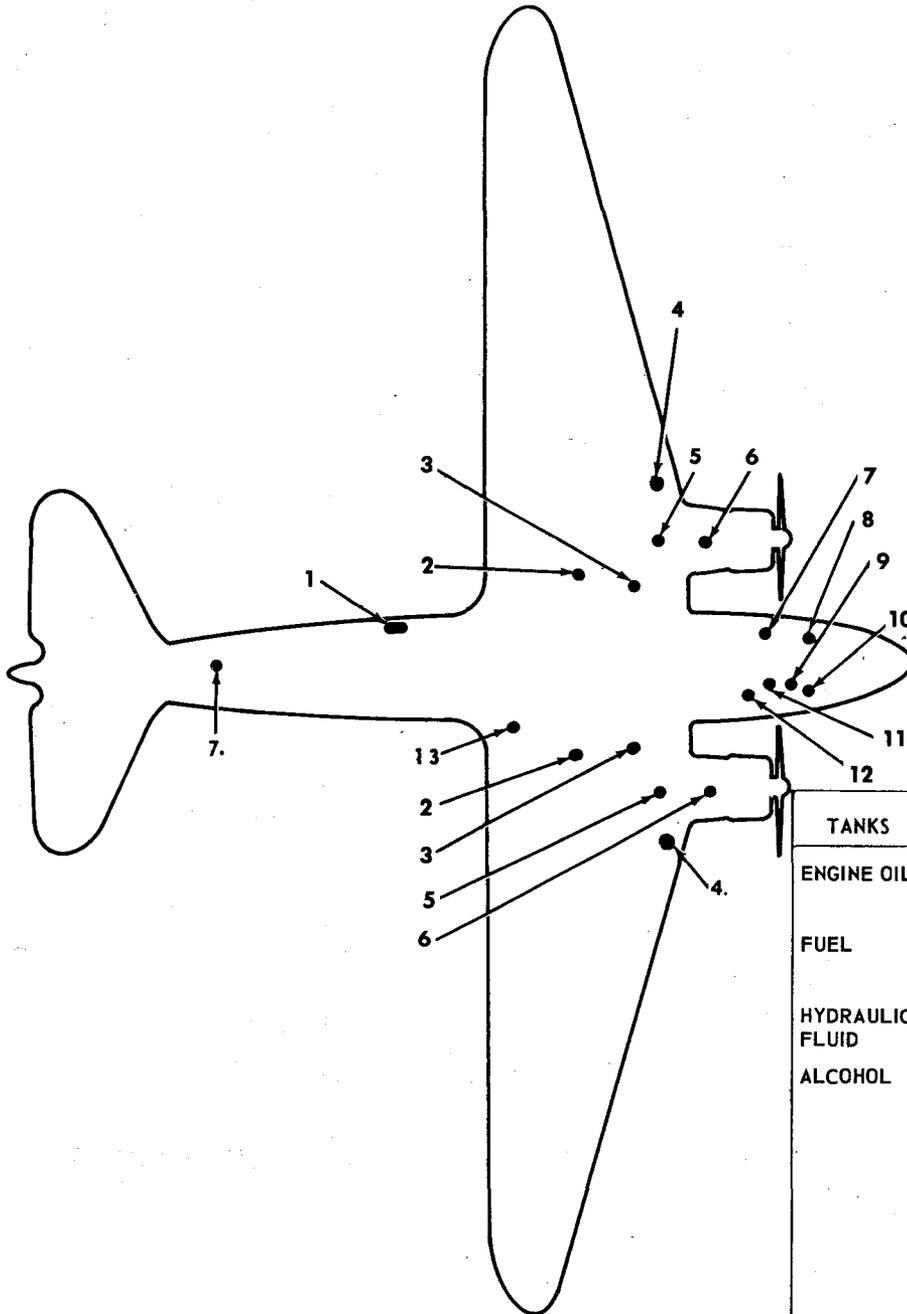
When a firewall shutoff valve handle or switch is activated, oil for propeller feathering is still available.

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## SERVICING DIAGRAM



1. OXYGEN FILLER VALVE (SOME AIRCRAFT)
2. AUXILIARY FUEL TANK FILLER NECK
3. MAIN FUEL TANK FILLER NECK
- #4. OUTER WING TANK FILLER NECK
5. OIL TANK FILLER NECK
6. OIL TANK DIPSTICK ACCESS PANEL
7. WATER SUPPLY TANK FILLER
8. PROPELLER DEICING TANK FILLER NECK
9. HYDRAULIC RESERVOIR FILLER NECK
10. INFLIGHT WINDSHIELD AND CARBURETOR DEICING TANK FILLER NECK (SOME AIRCRAFT)
- † 11. WINDSHIELD DEICING TANK FILLER NECK
- † 12. CARBURETOR DEICING TANK FILLER NECK
- \* 13. WINDSHIELD AND CARBURETOR DEICING TANK FILLER NECK

TANKS	NO. TANKS	USAF SPECIFICATION	GRADE	NATO SYMBOL
ENGINE OIL	2	MIL-L-6082	1100	0-117
		MIL-L-22851 (ALT)	1100	---
FUEL	4 (8, HC-47)	MIL-G-5572	115/145	F-22
		MIL-G-5572 (ALT)	100/130	F-18
HYDRAULIC FLUID	1	MIL-H-5606		H-515
ALCOHOL	4	PROPELLER DE-ICING TT-I-735		S-737
		GRADE B OR MIL-F-5566 (ALT)		
		----- CARBURETOR AND WINDSHIELD DE-ICING MIL-A-6091 TYPE 1 OR TT-I-735 GRADE B OR MIL-F-5566 (ALT)		S-738
OXYGEN	---	MIL-O-27210		
APP OIL	---	MIL-L-8383		
WATER	2			

\* C-47 and C-117 series aircraft

† R4D series aircraft

#SC-47 series aircraft

Figure 1-30

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EMERGENCY EQUIPMENT CHART

BAILED CARGO C-47

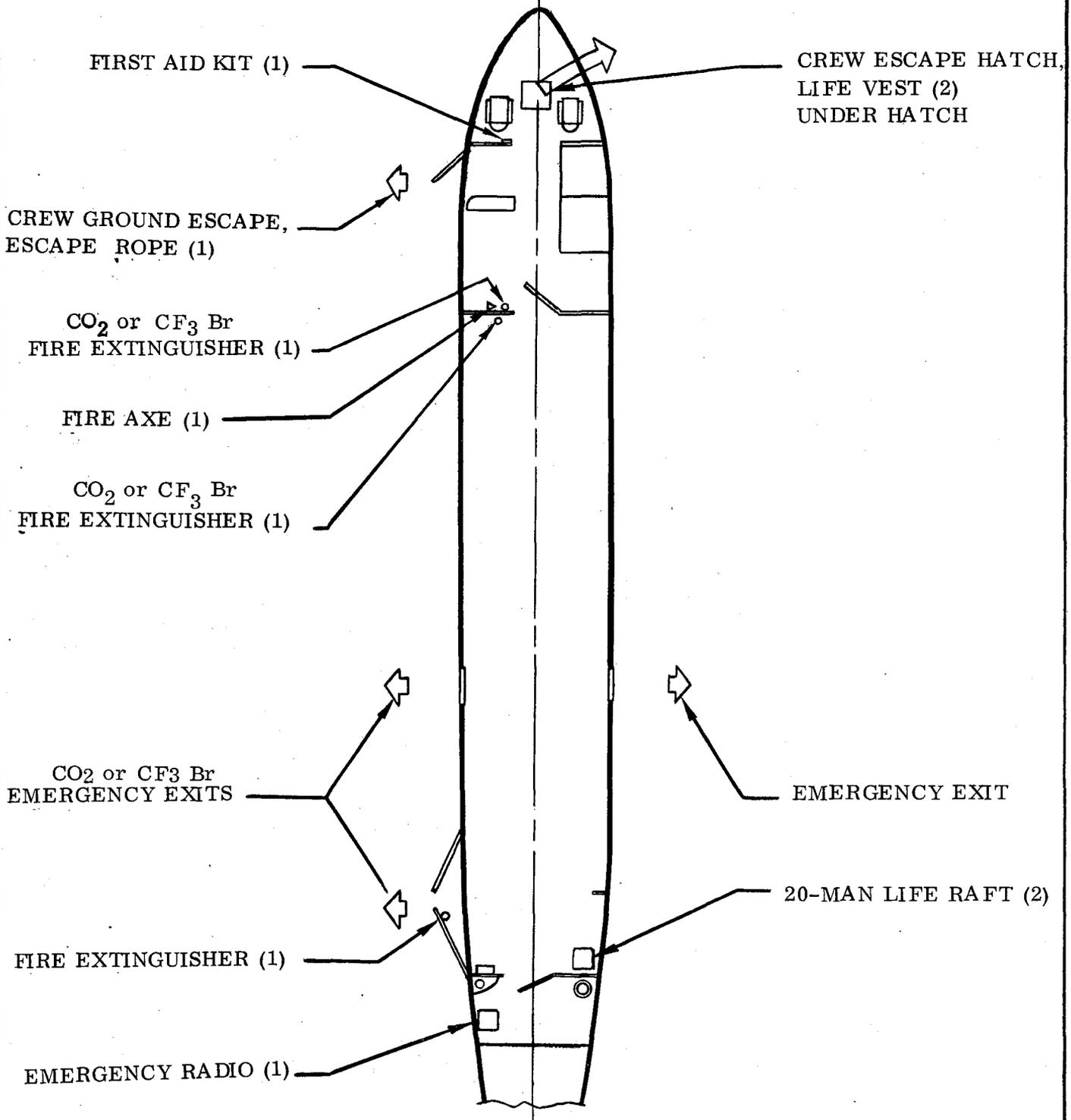


Figure 1 - 31

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**HYDRAULIC POWER SUPPLY SYSTEM.**

**NOTE**

Hydraulic system on most company aircraft has been modified to provide higher pressure. Pressure operating range is between 800 and 1000 PSI with a pressure relief valve setting of 1100 ( $\pm$  50) PSI. On these aircraft the accumulator air precharge is 300 ( $\pm$  20) PSI with a minimum allowable air precharge of 250 PSI.

A pressure accumulator hydraulic power supply system (figure 1-23) operates the landing gear, wing flaps, brakes, cowl flaps, nonram carburetor air filter mechanism, and the windshield wipers, skis, and blower clutches.

Hydraulic fluid is supplied by gravity from the hydraulic fluid reservoir to the engine-driven hydraulic pumps (one on each engine), which supply fluid pressure for the hydraulic system and the autopilot system. However, the fluid flow from the engine-driven pumps may be selected by means of the hydraulic pump selector valve, located on the hydraulic control panel in the flight compartment. The hydraulic pressure accumulator is attached to a bracket adjacent to the hydraulic fluid reservoir and aft of the bulkhead behind the co-pilot's seat. The lower chamber of the pressure accumulator is charged with air through the air valve fitting to an initial pressure of 250 psi. A system pressure relief valve, installed in the hydraulic system fluid pressure line, functions to protect the hydraulic system from excessive fluid pressure when the system pressure increases to 1000 ( $\pm$  50) psi. A hydraulic hand pump is incorporated in the system for use when the engine-driven pumps fail to supply sufficient pressure or for ground operation of the hydraulic system when the engines are not running. A pressure regulator is installed in the main system pressure line to regulate system pressure between 600 and 875 psi. When system pressure is below 600 psi, the accumulator is charged until system pressure reaches this value. If system pressure exceeds 875 psi, fluid is ported to return until the pressure drops below 875 psi. The fluid capacity of the hydraulic reservoir is 10 quarts. Seven quarts are available to the engine-driven hydraulic pumps, while the remaining 3 quarts in the reservoir sump are available only to the hydraulic hand pump for emergency operation. The 3 quarts of fluid reserved for the hydraulic hand pump are not visible in the sight gage. For fluid specification and reservoir location, see figure 1-30.

**HYDRAULIC PUMP SELECTOR VALVE LEVER.**

The hydraulic pump selector valve lever located on the hydraulic control panel (4, figure 1-24), controls the flow of fluid for operation of the hydraulic system. Selection of the hydraulic engine pump is governed by the position of the selector valve lever. For normal operation, the lever is placed in the LEFT ENG. HYDR. SYS. - RIGHT ENG. GYRO PILOT (aft) position and the left engine pump supplies pressure for the hydraulic system and the right engine pump supplies pressure for the autopilot system. When the control lever is in the LEFT ENG. GYRO PILOT - RIGHT ENG. HYDR. SYS. (forward) position, the systems for which the pumps supply pressure are reversed. The control lever operates in a notched quadrant and it is necessary to lift the lever slightly before moving it from one position to another. There is no difference in the functioning of the hydraulic system when the fluid delivery of the engine-driven pumps is changed. Of company operated aircraft it is only installed on AF-883.

**HYDRAULIC HAND PUMP.**

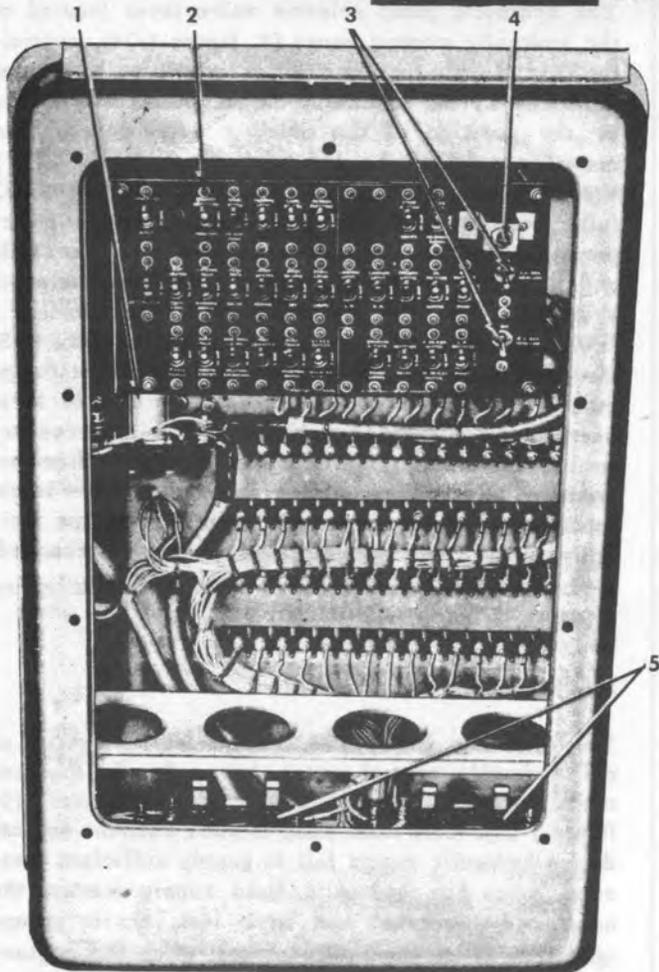
The hydraulic hand pump, located at the bottom of the hydraulic control panel, has a handle that extends between the pilot's and co-pilot's seats (9, figure 1-24). This hand pump is used when the engine-driven hydraulic pumps fail to supply sufficient pressure, when the hydraulic fluid supply (except the hand pump reserve) has been lost, or for ground operation of the hydraulic system when the engines are not running. The hand pump may be used to supply pressure to any unit operated by the hydraulic system, except the autopilot.

**STAR VALVE.**

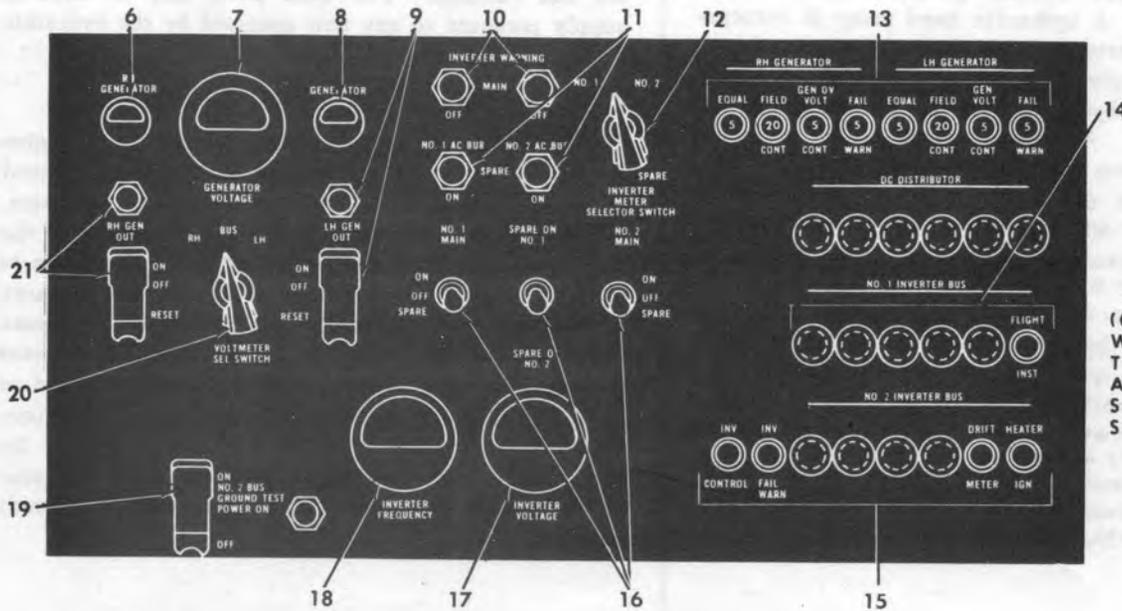
The hand pump to pressure accumulator shutoff valve handle, (star valve), located on the hydraulic control panel (6, figure 1-24) has two placarded positions, ON and OFF. When the star valve is turned to the ON (open) position, the hydraulic hand pump can be used to increase hydraulic pressure in the pressure accumulator for operation of the hydraulic units when the aircraft is on the ground and the engines are not running. When the star valve is turned to the OFF (closed) position, the hydraulic units (except the autopilot) may be actuated directly by operation of the hydraulic hand pump. The star valve should be safetywired to the OFF (closed) position.

**MAIN ELECTRICAL JUNCTION BOX**

GOVERNMENT FURNISHED AIRCRAFT



1. BATTERY CONNECTOR RELAY
2. CIRCUIT BREAKER PANEL
3. GENERATOR MAIN LINE SWITCHES
4. JUNCTION BOX LAMP SWITCH
5. VOLTAGE REGULATOR MOUNTS
6. RH GENERATOR LOADMETER
7. VOLTMETER
8. LH GENERATOR LOADMETER
9. LH GENERATOR SWITCH AND LIGHT
10. MAIN INVERTER WARNING LIGHTS
11. SPARE INVERTER WARNING LIGHTS
12. INVERTER METER SELECTOR SWITCH
13. GENERATOR CIRCUIT BREAKERS
14. NO. 1 INVERTER BUS CIRCUIT BREAKERS
15. NO. 2 INVERTER BUS CIRCUIT BREAKERS
16. INVERTER SWITCHES
17. INVERTER VOLTAGE METER
18. INVERTER FREQUENCY METER
19. GROUND TEST POWER SWITCH
20. VOLTMETER SELECTOR SWITCH
21. RH GENERATOR SWITCH AND LIGHT



**JUNCTION  
 BOX  
 CONTROL  
 PANEL**

(ON AIRCRAFT  
 WITH GENERATOR-INVERTER  
 AND BUS PRIORITY  
 SYSTEMS IN-  
 STALLED)

Figure 1-21

#### Hydraulic Fluid Quantity Sight Gage.

A hydraulic fluid quantity sight gage is located at the top of the hydraulic control panel (2, figure 1-24) to indicate fluid quantity. A placard for servicing instructions is mounted adjacent to the sight gage.

#### Hydraulic System Pressure Gages.

Two hydraulic system pressure gages mounted in a bracket assembly below the right windshield at the co-pilot's station (16, 17, figure 1-7), are direct-reading, pressure operated gages calibrated from 0 to 2000 psi. One gage indicates the fluid pressure in the hydraulic system and the other indicates the fluid pressure in the landing gear DOWN line when the landing gear control lever is in the DOWN or NEUTRAL position.

On aircraft B-879 the hydraulic gages are small diameter gages on the co-pilot's instrument panel adjacent to the auto-pilot oil pressure gage. Also there are individual pump indicating pressure gages on the hydraulic control panel.

#### FIREWALL SHUTOFF VALVES.

See paragraph on the Firewall Shutoff Valve Handles, this section.

#### FLIGHT CONTROL SYSTEM.

The flight control system consists of independent elevator, aileron, and rudder systems. All flight controls are directly controlled and are operated by dual wheel and rudder pedals. The elevator, aileron, and rudder systems incorporate trim tabs.

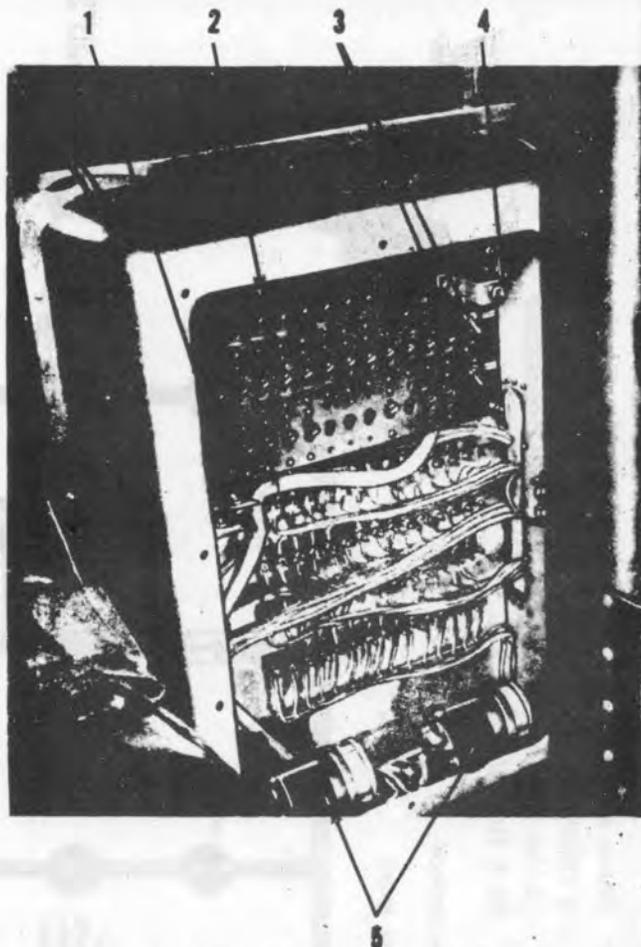
#### RUDDER PEDALS.

The rudder is mechanically controlled by a duplicate set of hinged rudder pedals incorporating toe brakes. The pedals can be adjusted forward or aft for proper length by means of the adjusting lever mounted on each rudder pedal.

#### Rudder Trim Crank.

Rudder trim is mechanically controlled by a rotatable crank mounted on the aft face of the control pedestal (11, figure 1-10). Movement of the trim tab is shown on the indicator immediately below the crank.

### MAIN ELECTRICAL JUNCTION BOX C-117 SERIES AIRCRAFT



1. BATTERY CONNECTOR RELAY
2. CIRCUIT BREAKER PANEL
3. GENERATOR MAIN LINE SWITCHES
4. JUNCTION BOX LAMP SWITCH
5. VOLTAGE REGULATORS

Figure 1-22

# HYDRAULIC SYSTEM

Note: Some aircraft carry spare hydraulic fluid in a relocated windshield alcohol tank adjacent to the hydraulic reservoir. It is connected by a line and petcock.

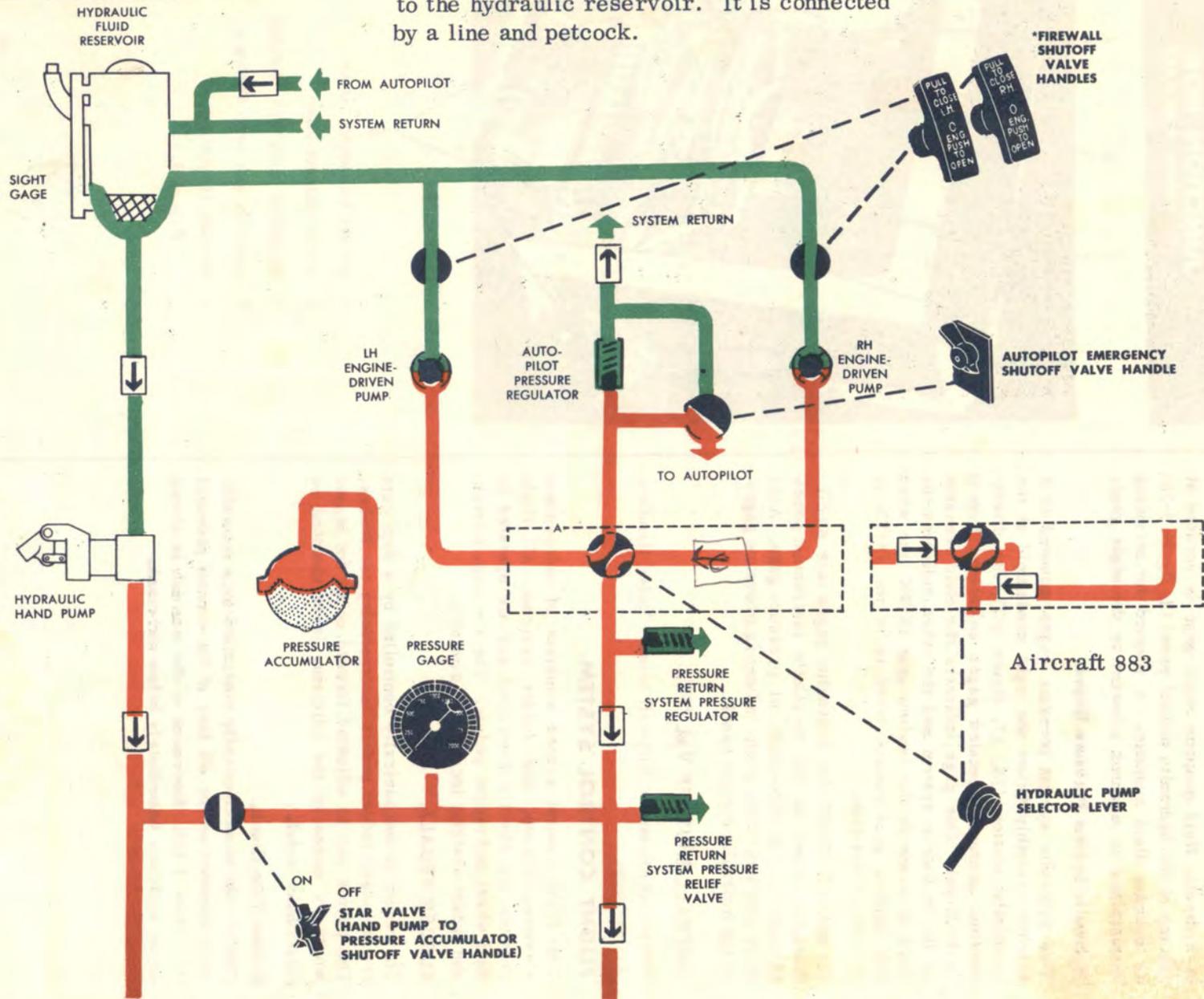


Figure 1-23 (Sheet 1 of 2)

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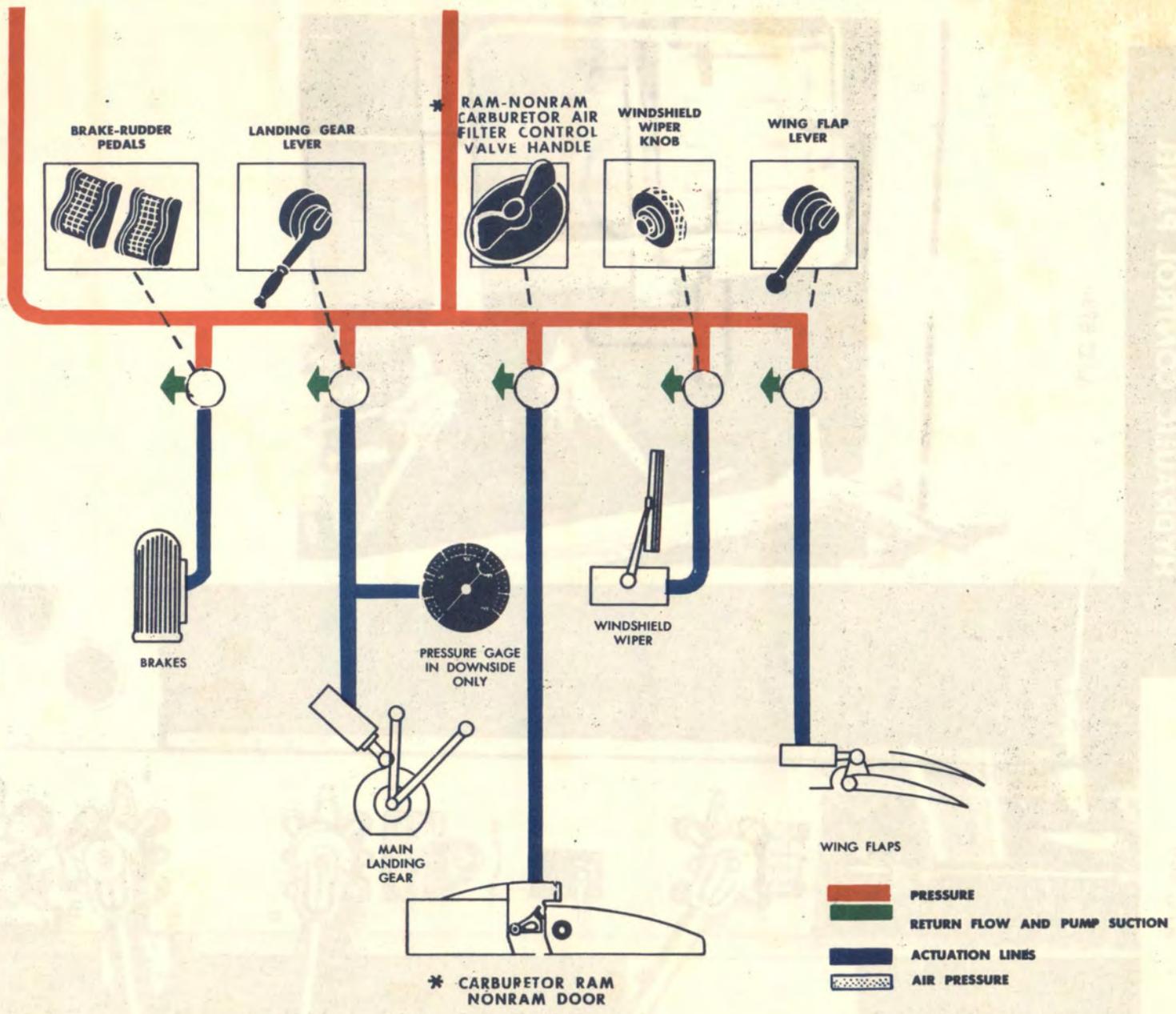


Figure 1-23 (Sheet 2 of 2)

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A/C 883

**HYDRAULIC CONTROL PANEL**

A/C 879

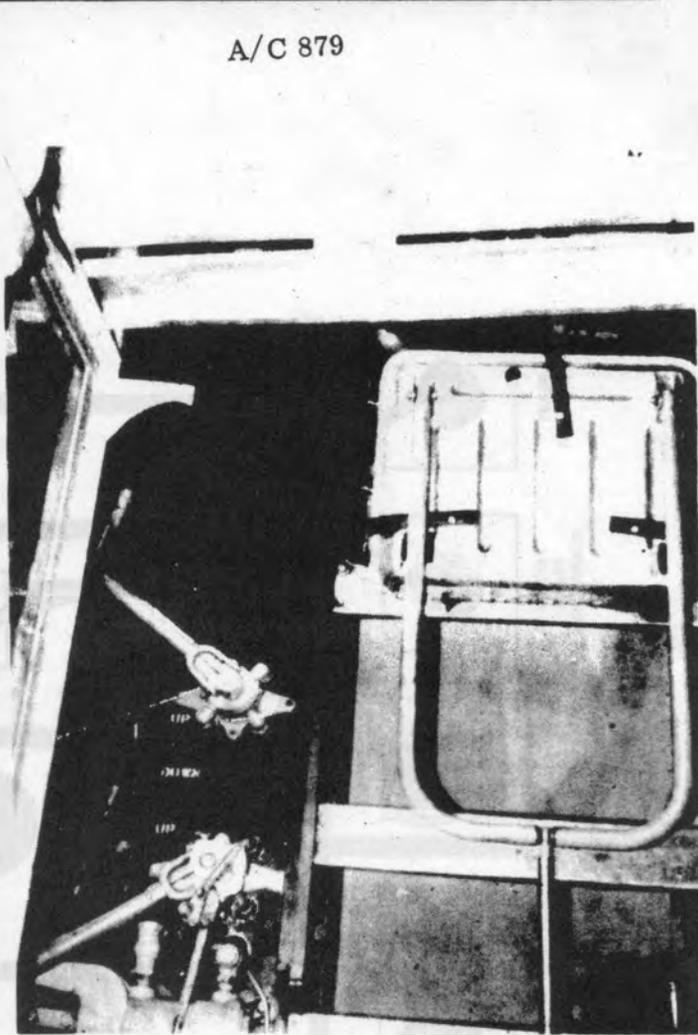
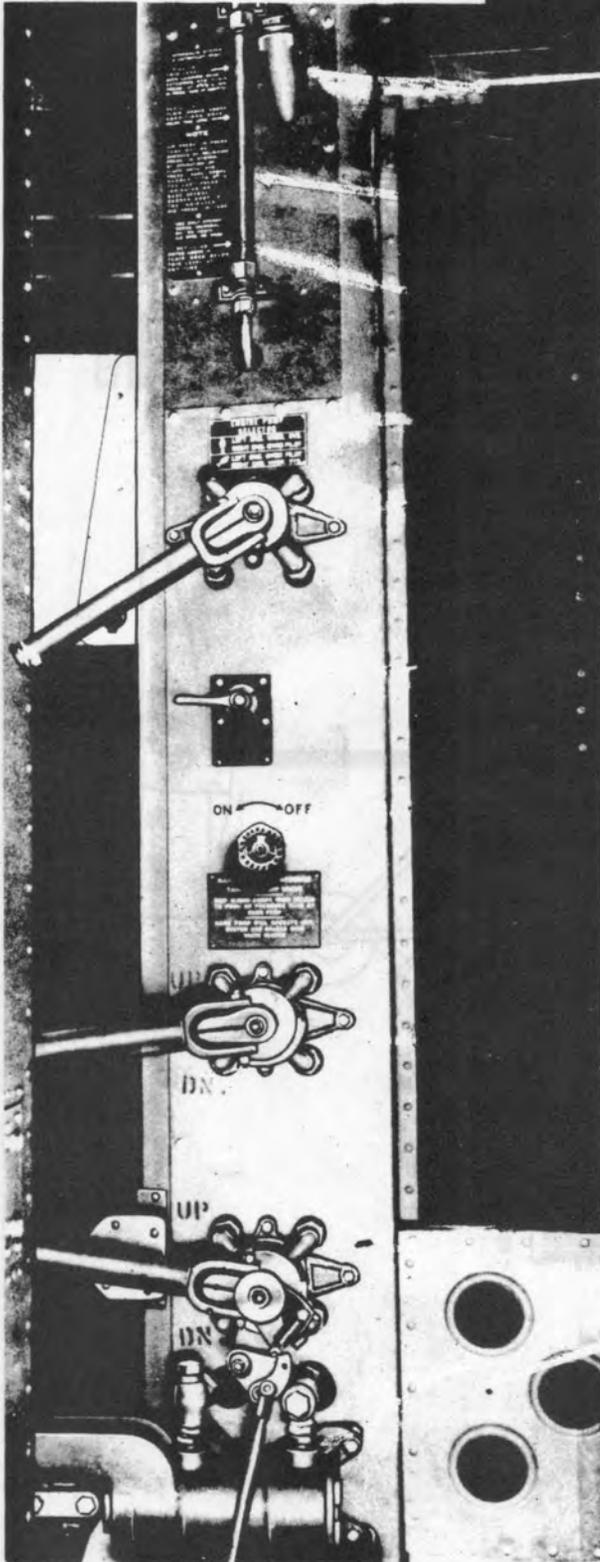


Figure 1-24

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#### Air Filter Control Handle. (Some Aircraft)

The ram-nonram carburetor air filter control handle, located on the bulkhead aft of the pilot's seat (figure 1-4), mechanically controls a hydraulic valve that directs the flow of hydraulic pressure for the operation of the ram door and the nonram door in each carburetor air scoop. On some aircraft, this control handle has OPEN (nonram), CLOSED (ram), and OFF positions. On other aircraft, the positions are: FILTERED (nonram), UNFILTERED (ram), and LOCKED. In the OPEN or FILTERED position, the ram door shuts off the ram air flow and the nonram door is opened to allow nonram filtered air to flow to the carburetor, provided the preheat control lever is in the COLD position. In the CLOSED or UNFILTERED position, the nonram door shuts off the nonram filtered air flow and the ram door is opened to permit ram air to flow to the carburetor, provided the preheat control lever is in the COLD position (figure 1-3). When the air filter control handle is placed in a desired position, sufficient time must be allowed for hydraulic actuation before the air filter control handle is returned to OFF or LOCKED to relieve the system pressure. The doors will remain in this position until the control handle is used to select another position.

#### Carburetor Air Temperature Indicators.

A 28-volt d-c dual carburetor air temperature indicator, graduated in degrees centigrade from  $-50^{\circ}$  to  $+150^{\circ}$ , is mounted on the main instrument panel (15, figure 1-11, 23, figure 1-12).

#### Carburetor Air Control Selector Switches (Some Aircraft).

Two rotary, 5-position carburetor air control selector switches, one for each carburetor, are located on the left side of the cockpit immediately aft of the main instrument panel. Each switch has the following positions: HOT AIR, OFF, FULL COLD, FILTER, and FULL COLD. The HOT AIR position of the switch energizes a 28-volt d-c motor which, through a cam and cable system, closes the aft (nonram) door and the induction valve (forward) door to shut off the ram air supply admitting preheated air to the carburetor (figure 1-3). The FULL COLD positions of the switch energizes the motor to close the aft (non-ram) door and the induction valve door to shut off the preheated air supply, admitting ram airflow to the carburetor. The FILTER position of the switch energizes the motor to position the induction valve door to shut off the flow of ram and preheated air, and open the aft (non-ram)

door to supply filtered non-ram air to the carburetor. The OFF position opens the circuit to deenergize the motor. The electrical circuit for the motor incorporates micro and limit switches which automatically shut off the motor when the doors are properly positioned for the selected airflow.

#### COWL FLAPS.

All company operated aircraft have fixed cowl flaps.

#### IGNITION SYSTEM.

The ignition system consists of two magnetos, installed in the rear accessory section of each engine, which distribute the current to the spark plugs through ignition switches, wiring, and a high tension ignition harness.

#### Ignition Switches.

The ignition switch unit is located above the vee of the windshield (6, figure 1-6) and incorporates a master ON-OFF switch and an ignition switch for each engine. Each engine ignition switch has four positions: OFF, L, R, and BOTH. The master ON-OFF switch grounds out all four magnetos (both magnetos of each engine) when in the OFF position. The ON position leaves the control of the magnetos to each engine ignition switch. When the engine ignition switch is positioned to L, the left magneto provides ignition for the rear spark plugs and the right magneto is grounded. When the engine ignition switch is positioned to R, the right magneto provides ignition for the front spark plugs and the left magneto is grounded. When the engine ignition switch is positioned to OFF, both magnetos for that engine are grounded and both front and rear spark plugs will not fire. When the ignition switch is in the BOTH position, both magnetos for that engine are able to generate current for the ignition system and all spark plugs can fire.

#### PRIMING SYSTEM.

The priming system functions as an aid in starting the engines by injecting fuel from a primer line into the upper eight cylinders.

#### Primer Switch (C-47 and C-117 Series Aircraft).

A 3-position, 28-volt d-c engine primer switch, mounted on the electrical control panel (15, figure 1-13), is a momentary-type switch spring loaded to the OFF position. The RIGHT (down) position of the switch energizes the right engine primer solenoid valve to direct fuel under pressure to the right engine for priming. The LEFT (up) position energizes the

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left engine primer solenoid valve to direct fuel under pressure to the left engine for priming. The OFF position opens the engine primer circuit. Priming fuel pressure is provided by the booster pumps (if installed) when the booster pump is ON or by manually operating the hand wobble pump (if installed).

#### **HAND PRIMER HANDLE.**

On some aircraft, a hand primer is installed on the co-pilot's side of the cockpit. The handle of the primer is turned to the left to UNLOCK, then pushed in and pulled out to pump the fuel to the engine. The handle of the primer is pushed in, then turned to the right to LOCK. The valve handle for selecting the LEFT or RIGHT engine is adjacent to the hand primer.

#### **Oil Dilution and Primer Switches (Some Aircraft).**

Two 3-position, 28-volt d-c oil dilution and primer switches, one for each engine, are mounted on the electrical control panel (20, figure 1-14). These switches are the momentary-type, spring loaded to the OFF position. When either switch is placed in the ENGINE PRIMER (down) position, the respective engine primer solenoid valve is energized to direct fuel under pressure to the engine for priming. When either switch is held in the OIL DILUTION (up) position, a 28-volt d-c circuit energizes the oil dilution solenoid, and fuel is introduced into the engine oil inlet line for dilution of the engine oil to aid in cold weather starting. Priming fuel pressure is provided by the booster pumps (if installed) when the booster pump is ON or by manually operating the hand wobble pump (if installed).

#### **STARTING SYSTEM.**

A direct cranking or, on some aircraft, a combination inertia-direct-cranking starter with a solenoid meshing device, is mounted on each engine. The starters are operated by switches located in the cockpit.

##### **Starter Switches (Direct Cranking).**

Two 2-position starter switches, one for each engine, are mounted on the electrical control panel. The RIGHT switch engages the 28-volt d-c starter for the right engine; the LEFT switch engages the starter for the left engine.

Some aircraft are equipped with one 3-position spring-loaded switch. The down position engages the starter for the RIGHT engine; the up position engages the starter for the left engine. The switch is spring loaded to the off (center) position.

##### **Starter Switches (Inertia-Direct Cranking).**

Two 3-position starter switches, one for ENERGIZE and one for MESH, are mounted on the electrical control panel (16, figure 1-13, and 17, 18, figure 1-14). The STARTER ENERGIZE switch is used to energize the 28-volt starter motor and build up sufficient inertia before the STARTER MESH switch is used to energize the solenoid meshing device to engage the starter. Placing the STARTER ENERGIZE switch in the RIGHT (down) position, energizes the starter for the right engine, and placing it in the LEFT (upper) position, energizes the starter for the left engine. Placing the STARTER MESH switch in the RIGHT (down) position meshes the right starter. Placing the STARTER MESH switch in the LEFT (up) position meshes the left starter. Both switches are spring loaded to the OFF (center) position.

#### **ENGINE INSTRUMENTS.**

All engine instruments are dual indicating. A direct-reading manifold pressure gage on the main instrument panel indicates the pressure in inches Hg in each engine intake manifold. A 28-volt d-c carburetor air temperature indicator and a self-generated cylinder head temperature indicator (which indicates temperature for the right engine from No. 1 cylinder and for the left engine from No. 13 cylinder), all calibrated in degrees centigrade, are mounted on the main instrument panel (13, 15, figure 1-11, and 23, 27, figure 1-12). A self-generated tachometer is installed on the main instrument panel.

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#### MINIMUM RUN TAKEOFF

For minimum run takeoffs hold brakes and apply power to 35" MAP. Holding back pressure on the control column, release brakes and apply maximum power. Release back pressure on the control column and at approximately 39 knots lower  $\frac{1}{4}$  flaps. Keep the aircraft in a tail low attitude and the aircraft will become airborne at 52 to 61 knots. When the aircraft is safely airborne, raise the landing gear and establish a normal climb.

#### WARNING

Lift-off can be made at speeds less than Vmc. It must be remembered that in the event of engine failure power will have to be reduced on the operative engine to maintain directional control.

#### CROSS-WIND TAKEOFF.

In addition to the procedures and techniques used in a normal takeoff, lead with the upwind throttle sufficiently to correct for weather cocking tendencies. The application of aileron into the wind is effective in maintaining directional control.

#### CAUTION

Do not allow the aircraft to skip along the ground. Make a clean break with the runway. otherwise, severe side loads may collapse or damage the landing gear.

#### NOTE

It is recommended that brake application, to maintain directional control, be used only when absolutely necessary.

#### CRUISE.

Level off upon reaching cruising altitude and maintain the climb power setting until the desired cruising airspeed is attained. Refer to the Appendix and set power to obtain the cruise conditions desired. For Supercharger Operation, Refer to Section VII.

1. Cruise power - SET - CP.  
Normal cruise power is 600 BHP.
2. Engine instruments - WITHIN LIMITS. - CP.
3. Mixture controls - AS REQUIRED - CP.

Cruise Check - COMPLETED - CP.

#### FLIGHT CHARACTERISTICS.

Refer to Section VI for detailed information on aircraft flight characteristics.

#### DESCENT.

The rate of descent is determined by altitude, distance from the field, terrain, and weight of the aircraft. The rate of descent should be held constant. During descent from enroute flight the First Officer or pilot not flying the airplane will call out:

- a. Approaching 10,000 feet.
- b. Approaching 5,000 feet.
- c. 1,000 ft above initial approach altitude, or 1,000 feet above field elevation (VFR approaches.)

#### CAUTION

If flying conditions in descent require a large reduction in power, reduce rpm as well as manifold pressure. For descents or other low power maneuvers, or perhaps a simulated engine failure, it is important to cushion the high inertia loads on the master rod bearings which occur at conditions of high rpm and low manifold pressure. As a rule of thumb, it is well to remember that each 100 rpm requires at least 1 inch Hg manifold pressure; for example, 23 inches Hg at 2300 rpm. Operation at high rpm and low manifold pressure should be kept to a minimum.

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1. Approach & landing data - CHECKED - P, CP. Check landing gross weights, approach minimums, field elevation, runway length & condition. and wind conditions.

#### NOTE

On final approach after reaching 500 feet above field elevation the First Officer or pilot not flying will call out:

- a. Altitude (repeated when altitude deviates from programmed altitude)
  - b. Airspeed (repeated when airspeed deviates from programmed airspeed)
  - c. Rate of descent (repeated when it deviates from programmed rate)
  - d. 100 feet above minimums
  - e. Minimums
  - f. Runway in sight.
2. Altimeters - SET - P, CP set altimeter setting when passing through transition altitude if used.
  3. Fuel tank selectors - SET - P, CP, place on FULLEST tank but Company policy prefers MAIN tanks.
  4. Autopilot/Emergency shutoff valve - OFF - P.
  5. Hydraulic fluid level - CHECKED - P.
  6. Mixtures - AS REQUIRED - CP.
  7. Magnetos - CHECKED - P.

#### NOTE

Company policy requires that a magneto check be performed during the descent. This will be accomplished at cruise power with the mixtures AUTO-RICH. During this check if it is determined that a magneto is malfunctioning, a landing will not be made at an airfield where company maintenance is not usually performed, unless in the Captains opinion a greater emergency would exist by complying with this policy.

#### BEFORE LANDING.

1. No smoking/seat belt signs - ON - CP.
  2. Carburetor air - COLD - CP.
  3. Fuel booster pumps - ON - CP.
  4. Mixtures - AUTO-RICH - CP.
  5. Landing gear - DOWN/POSITIVE LOCK - CP.
- When the landing gear has reached the extended position and gear hydraulic pressure has built up to equal system pressure, move the landing gear lever rapidly to NEUTRAL, check the green indicator light ON, and the red warning light OFF. Position the landing gear latch lever to POSITIVE LOCK and visually check that the gear is down.
6. Propellers - RPM 2350 - CP.
  7. Brakes/System pressures - CHECKED - CP.
  8. Landing Gear Lights - GREEN - CP.
  9. Flaps - AS REQUIRED - CP.

#### NOTE

As soon as main gear is on the ground First Officer should advance props to full FORWARD.

#### LANDING.

Normal Landing. (See figure 2-3.)

Touch down main wheels first in a slight tail low attitude. When the main wheels contact runway, check power off, relax pressure, flaps up. As the aircraft decelerates, lower the tail wheel gently on the runway. Maintain directional control utilizing rudder, differential power, and brakes, as necessary. Maintain back pressure on column until landing roll is completed. When landing at gross weights above 26,000 pounds, touch down at less than 300 fpm rate of descent in a tail-high attitude.

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## INTRODUCTION

**SCOPE.** This manual contains the necessary instructions for safe and efficient operation of the C-47 and C-117. These instructions provide you with a general knowledge of the airplane, its characteristics, and specific and emergency procedures. Your flying experience is recognized, and therefore, basic principles are avoided.

**SOUND JUDGEMENT.** Instructions in this manual are for a crew experienced in the operation of this airplane. This manual provides the best possible operating instructions under most circumstances, but it is a poor substitute for sound judgement. Multiple emergencies, adverse weather, terrain, etc., may require modification of the procedures.

**PERMISSIBLE OPERATIONS.** The Flight Manual takes a "Positive Approach" and normally states only what you can do. Unusual operations or configurations (such as asymmetrical loading) are prohibited unless specifically covered herein. Clearance must be obtained from office of DFD before any questionable operation is attempted which is not specifically permitted in this manual.

**STANDARDIZATION AND ARRANGEMENT.** Standardization assures that the scope and arrangement of all flight manuals are identical. The manual is divided into ten fairly independent sections to simplify reading it straight through or using it as a reference manual. The first three sections must be read thoroughly and fully understood before attempting to fly the airplane. The remaining sections provide important information for safe and efficient mission accomplishment.

**SAFETY SUPPLEMENTS.** Information involving safety will be promptly forwarded to you.

**OPERATIONAL SUPPLEMENTS.** Information involving operations will be promptly forwarded to you by Operational Supplements.

**CHECKLISTS.** The Flight Manual contains only amplified checklists. Abbreviated checklists have been issued as separate scroll or placard checklists. Line items in the Flight Manual and checklists are identical with respect to arrangement and item number. whenever a Safety or Operational Supplement affects the abbreviated checklist, write in the applicable change on the affected checklist page. As soon as possible, a new checklist, incorporating the change will be issued.

**FLIGHT MANUAL.** This Flight Manual is the USAF T. O. 1C-47-1, with modifications as pertain to operation of Company C-47 type aircraft. Reproduction for nonmilitary use of the information or illustrations in this Flight Manual is not permitted without approval of DFD. The integrity of T. O. 1C-47-1 as to cross reference and indexing has been maintained whenever possible. Section II has been rewritten in its entirety to meet Company Standards and requirements but T. O. 1C-47-1 has been followed as closely as possible.

**HOW TO GET PERSONAL COPIES.** Each flight crew member is entitled to a personal copy of the Flight Manual, Safety Supplements, Operational Supplements and Checklists. The required quantities should be ordered before you need them to assure their prompt receipt. Make sure a system is established at your base to deliver these publications to the flight crews immediately upon receipt.

**WARNINGS, CAUTIONS, AND NOTES.** The following definitions apply to "Warnings," "Cautions," and "Notes" found throughout the manual.

### WARNING

Operating procedures, techniques, etc., which will result in personal injury or loss of life if not carefully followed.

### CAUTION

Operating procedures, techniques, etc., which will result in damage to equipment if not carefully followed.

### NOTE

An operating procedure, technique, etc., which is considered essential to emphasize.

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**YOUR RESPONSIBILITY - TO LET US KNOW.**

Every effort is made to keep the Flight Manual current. Review conferences with operating personnel and a constant review of accident and flight test reports assure inclusion of the latest data in the manual. However, we cannot correct an error unless we know of its existence. In this regard, it is essential that you do your part. Comments, corrections, and questions regarding this Manual or any phase of the Flight Manual program are welcomed. These should be forwarded to DFD

**AIRCRAFT SERIES DESIGNATION.** The C-47, C-47A, C-47D and HC-47 aircraft will be referred to in this manual as C-47 Series Aircraft, and the C-117A, C-117B and C-117C Aircraft will be referred to as C-117 Series Aircraft. The R4D-1, C-47H, C-47J, and TC-47K aircraft will be designated as R4D Series Aircraft. Information Common to all series will not carry a designation, except differences which are common to specific aircraft.

**NOTE**

Aircraft with The R-1830-92 engine installed were designated C-47, C-47A, HC-47, R4D-1, or C-47H. Aircraft with the R-1830-90C engine installed were designated C-47B, C117A, or C-47J. Aircraft with the R-1830-90D engine installed were designated C-47D, C-117B or TC-47K. The HC-47 is a C-47 modified for long range missions. Coverage of the VC-47 (personnel transport) aircraft in this manual, as a result of varied modifications, will consist of installations that are common to the C-47 Series Aircraft.